

Timco Engineering, Inc.

TCB Application Form 731

Rev 22 June 2004

For Timco Use Only	
Job Number	
Scope	
Date Filed	
Conf. #	
Grant Note	

Shaded areas are REQUIRED

Item 1. Applicant's complete, legal business name:

ASUSTek Computer Inc.

Applicant's FCC Registration Number (FRN): 0005-8219-88

Item 2. Applicant's mailing address: *fill in fields, as appropriate*

Line 1:4/F, 150, Li-Te Rd.,

Line 2:Peitou,

P.O. Box:

City:Taipei

State:

Country (if foreign address):

Taiwan

Zip/Postal Code:

112

Item 3. Applicant Contact Person:

First Name:Lawrence

Last Name:Yu

Title:Manager

Telephone:886-2-28943447

E-mail:lawrence_yu@asus.com.tw

Fax No.:886-2-28950113

Item 4.	FCC ID	Grantee Code:	Equipment Product Code (14 characters maximum):
	consisting of:	MSQ	WL500GD <i>include "dashes" (-) where appropriate</i>

Item 5. Application Contact: All questions regarding the application will be directed to this contact. The Original Grant and Invoice will be sent to this contact.

Firm Name:

Training Research Co., Ltd.

Telephone:

886-2-26935155

Ext:

32

Fax: No.:

886-2-26934440

First Name:Jack

Middle Initial:

Last Name:Tsay

Address Line 1:1F, No. 255, Nan-yang Street,

P.O. Box:

Address Line 2:Shijr City, Taipei Hsien

City:

State:

Country (if foreign address):Taiwan

Zip/Postal Code:221

E-mail:

Telephone:

Fax:

Item 6. Test Firm Used to Take Measurements:

Firm Name:

Training Research Co., Ltd.

Telephone:

886-2-26935155

Ext.:

32

Fax No.:

886-2-26934440

First Name:Jack

Middle Initial:

Last Name:Tsay

Address Line 1:1F, No. 255, Nan-yang Street,

P.O. Box:

Address Line 2:Shijr City, Taipei Hsien

City:

State:

Country (if foreign address):Taiwan

Zip/Postal Code:221

E-mail:

FCC Registered Test Site Number. *Required for Part 15 and 18 applications.*

93906

Item 7.

* Does this application include a request for **SHORT-TERM** confidentiality for any portion(s) of the data contained in this application pursuant to FCC DA 04-1705 dated 6/15/2004?

* Does this application include a request for confidentiality for any portion(s) of the data contained in this application pursuant to 47 CFR 0.459 of the Commission Rules?

SHORT-TERM request:

☒ Yes ☐ No

PERMANENT request:

☒ Yes ☐ No

Item 8. *Is this application for modular approval? ☐ Yes ☒ No

If yes, please submit a cover letter addressing the modular approval requirements of DA 00-1407.

Item 9. *Is this application for software defined radio authorization? ☐ Yes ☒ No

Item 10. Equipment Class: *3-digits required*

DTS

Description of Product as it is marketed:

Wireless Router

Item 11. *Application is for:☒ Original Equipment☐ Change in identification of presently authorized equipment:

Original FCC ID

Grant Date (MM/DD/YYYY)

☐ Class II permissive change or modification of presently authorized equipment☐ Class III permissive change to software defined radio*Note: this may only be filed for applications pertaining to Software Defined Radio***Item 12. Is the equipment in this application:**

* (a) a composite device subject to an additional equipment authorization?

☐ Yes☒ No

* (b) part of a system that operates with, or is marketed with, another device that requires an equipment authorization?

☐ Yes☒ No*If either of the above questions is answered "Yes" complete section 12 (c).***(c) The related application:**☐ has been granted under the FCC ID listed to the right☐ is in the process of being filed under the FCC ID listed to the right☐ is pending with the FCC under the FCC ID listed to the right**FCC ID****Item 13. * Equipment will be operated under FCC Rule Part(s):**

15(c)

Item 14. EQUIPMENT SPECIFICATIONS:*Where applicable*

Frequency range in MHz		Rated RF power output IN WATTS	Frequency tolerance		Emission Designator (See 47 CFR 2.201 and 2.202)	Microprocessor model number
Low Freq	High Freq		%, Hz, ppm			
2412	2462	0.1135				

Read each certification carefully before answering and signing this application

WILLFUL FALSE STATEMENTS MADE ON THIS FORM ARE PUNISHABLE BY FINE AND/OR IMPRISONMENT (U.S. CODE, TITLE 18, SECTION 1001), AND/OR REVOCATION OF ANY STATION LICENSE OR CONSTRUCTION PERMIT (U.S. CODE, TITLE 47, SECTION 312 (a) (1)), AND/OR FORFEITURE (U.S. TITLE 47, SECTION 503).

(Continued on Next Page)

Item 15. APPLICANT/AGENT CERTIFICATION:

I certify that I am authorized to sign this application. All of the statements herein and the exhibits attached hereto are true and correct to the best of my knowledge and belief. In accepting a Grant of Equipment Authorization issued by the TCB, under the authority of the FCC, as a result of the representations made in this application, the applicant is responsible for (1) labeling the equipment with the exact FCC ID specified in this application, (2) compliance statement labeling pursuant to the applicable rules, and (3) compliance of the equipment with the applicable technical rules. If the applicant is not the actual manufacturer of the equipment, appropriate arrangements have been made with the manufacturer to ensure that production units of this equipment will continue to comply with the FCC's technical requirements.

Authorizing an agent to sign this application is done solely at the applicant's discretion; however, the applicant remains responsible for all statements in this application.

If an agent has signed this application on behalf of the applicant, a written letter of authorization which includes information to enable the agent to respond to the above Section 5301 (Anti-Drug Abuse) Certification statement has been provided by the applicant. It is understood that the letter of authorization must be submitted to the FCC upon request, and that the FCC reserves the right to contact the applicant directly at any time.

***Signature of Authorized Applicant:**Lawrence Yu

Title of Authorized Signature:Manager

NOTE: An asterisk '*' preceding a field indicates it must be completed.

List of Exhibit

<i>EXHIBIT A</i>	<i>Cover Letter</i>
<i>EXHIBIT B</i>	<i>Sample Label</i>
<i>EXHIBIT C</i>	<i>Test Report</i>
<i>EXHIBIT D</i>	<i>Test Setup Photos</i>
<i>EXHIBIT E</i>	<i>User Manual</i>
<i>EXHIBIT F</i>	<i>Schematics</i>
<i>EXHIBIT G</i>	<i>Part List</i>
<i>EXHIBIT H</i>	<i>Block Diagram</i>
<i>EXHIBIT I</i>	<i>Operational Description</i>
<i>EXHIBIT J</i>	<i>Photographs of EUT</i>
<i>EXHIBIT K</i>	<i>RF Exposure Calculations</i>

EXHIBIT A

Cover Letter

Request for Confidentiality

Federal Communications Commission
Authorization and Evaluation Division

**Subject: Confidentiality Request regarding application for certification of
FCC ID : MSQWL500GD**

Dear Madam or Sir:

Pursuant to Sections 0.457 and 0.459 of the Commission's Rules, we hereby request confidential treatment of information accompanying this application as outlined below:

- Schematics
- Part List
- Block diagram
- Operational description

The above materials contain trade secrets and proprietary information not customarily released to the public. The public disclosure of these materials may be harmful to the applicant and provide unjustified benefits to its competitors.

The applicant understands that pursuant to Section 0.457 of the Rules, disclosure of this application and all accompanying documentation will not be made before the date of the Grant for this application.

Pursuant to DA 04-1705 June 15, 2004 of the Commission's public notice, we also request temporary confidential treatment of information accompanying this application as outlined below:

- External Photos
- Internal Photos
- Test Setup Photos
- User's Manual

Sincerely,

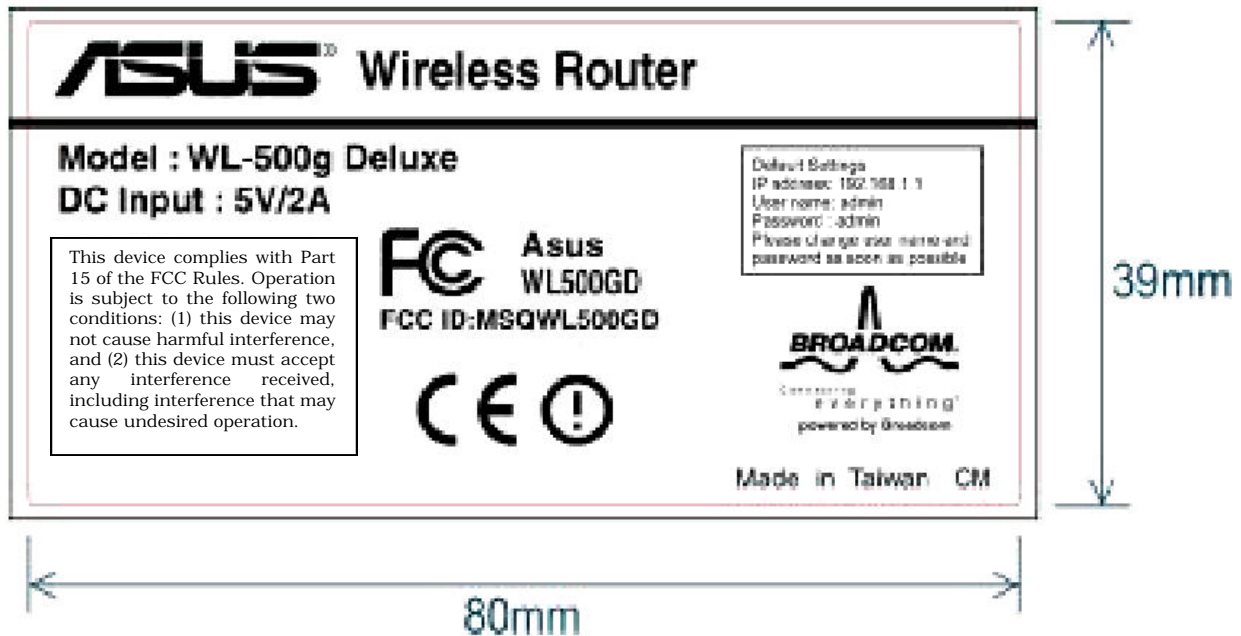
A handwritten signature in blue ink, appearing to read "Lawrence Yu".

Lawrence Yu / Manager
ASUSTek Computer Inc.

EXHIBIT B

Sample Label

LABEL Format:



LABEL Position:



EXHIBIT C

Test Report

MEASUREMENT REPORT

of

Wireless Router

Applicant : ASUSTek Computer Inc.
EUT : Wireless Router
Model No. : WL-500G Deluxe
FCC ID : MSQWL500GD
Report No. : A5415022

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 : Wireless Router
Model Name : WL-500G Deluxe
FCC ID : MSQWL500GD
Report No. : A5415022
Test Date : October 11, 2004

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.*

★ NVLAP LAB CODE: 200174-0

Federal Communications Commission **Declaration of Conformity** **(DoC)**

for the following equipment:

Product name : Wireless Router
Model name : WL-500G Deluxe
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 : A5415022

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

Manufacturer	USA local representative
Company name: ASUSTeK Computer Inc.	To be determined
Computer address: 4/F, 150, Li-Te Rd., Peitou, Taipei, Taiwan	
ZIP / Postal code 112	
Contact person: Lawrence Yu	
Title: Manager	
Internet e-mail address: lawrence_yu@asus.com.tw	
Tel / Fax: 886-2-28943447 / 886-2-28950113	

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. 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

Granted FCC ID	:	MSQWL500GD
Product Name	:	Wireless Router
Model Name	:	WL-500G Deluxe
Frequency Range	:	2.412 GHz ~ 2.462GHz
Support Channel	:	11 Channels
Modulation Skill	:	DBPSK, DQPSK, CCK, OFDM
Power Type	:	Powered by the Switching adapter, Mfg.: DVE Model: DSA-0101F-05 A I/P: 100-240VAC, 50/60Hz, 0.3A, 30VA O/P: +5VDC, 2.0A
Power Cable	:	185cm length, non-shielded, incorporates a ferrite core
Data Cable	:	USB cable x1, 271cm length, shielded, no ferrite core USB cable x1, 188cm length, shielded, with ferrite core RJ45 cable x1, 2m length, non-shielded, no ferrite core RJ45 cable x2, 3m length, non-shielded, no ferrite core RJ45 cable x2, 30m length, non-shielded, no ferrite core

1.3 Test method

- 1 The USB-1 port of EUT connected with a video camera, another USB-2 by USB cable un-terminus.
- 2 The LAN-1 connected with a LAN card, the LAN-2 connected with a Giga-LAN card, which installed in PC located remotely, other LAN ports by RJ45 cables un-terminus.
- 3 Connected the LAN-3 jack of EUT with the LAN interface of PC. Using PC and software provided by the manufacturer to control EUT, the test is performed under the specific conditions.
- 4 Set different data rate and channel (CH1/CH6/CH11) being tested and repeat the procedures above.
 - (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

4.1 Description of Support Equipment

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

PC : HP
Model No. : d330 uT; d338 uT, D6928A
Serial No. : SGH41508PJ; SGH41508NP, SG91801432
FCC ID : N/A, DoC (Declaration of Confirmation) Approved
BSMI : R33001, R33001, 3872H013
Power type : 100 ~ 127VAC / 4A, 200 ~ 240VAC/2A, 50 ~ 60Hz, 5A, Switching
Power cord : Non-shielded, 2.33 m length, Plastic hood, No ferrite core

Monitor : HP 15' Color Monitor
Model No. : D2827A, D2832A
Serial No. : KR91161719, KR91161716, KR91159981
FCC ID : C5F7NFCMC1518X, DoC Approved
BSMI : 3872B039, 4872A167
Power type : 110 ~ 240 VAC / 50 ~ 60 Hz, Switching
Power cord : Shielded, 1.83m long, No ferrite core
Data cable : Shielded, 1.46m long, with two ferrite cores

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-UR89, M-S69, M-S34
Serial No. : LZS21750238, 334684-002 323614-001, LZB90714106
FCC ID : DoC Approved
BSMI : 3892D767, R41126, 4862A011
Power type : By PC
Power cord : Shielded, 1.80m (1.90m) length, No ferrite core

PS/2 Keyboard : HP
Model No. : 5187-0343, KB0133, 5181
Serial No. : BE21700404, 265987-AB1 Tch 323686-AB1, BE21700405
FCC ID : DoC Approved
BSMI : 3892C981, R31310, 3892C981
Power type : By PC
Data cable : Shielded, 1.85m length, with ferrite core

Modem : ACEEX
Model No. : XDM-56V14
FCC ID : IFAXDM-56V14
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 gamepad : Rockfire
Model No. : QF-337uv
Serial No. : 10600545, KR91379759
FCC ID : None (CE approval)
BSMI : 3862A574
Power type : By computer
Data Cable : Shielded, 1.81m length, Plastic, with ferrite core

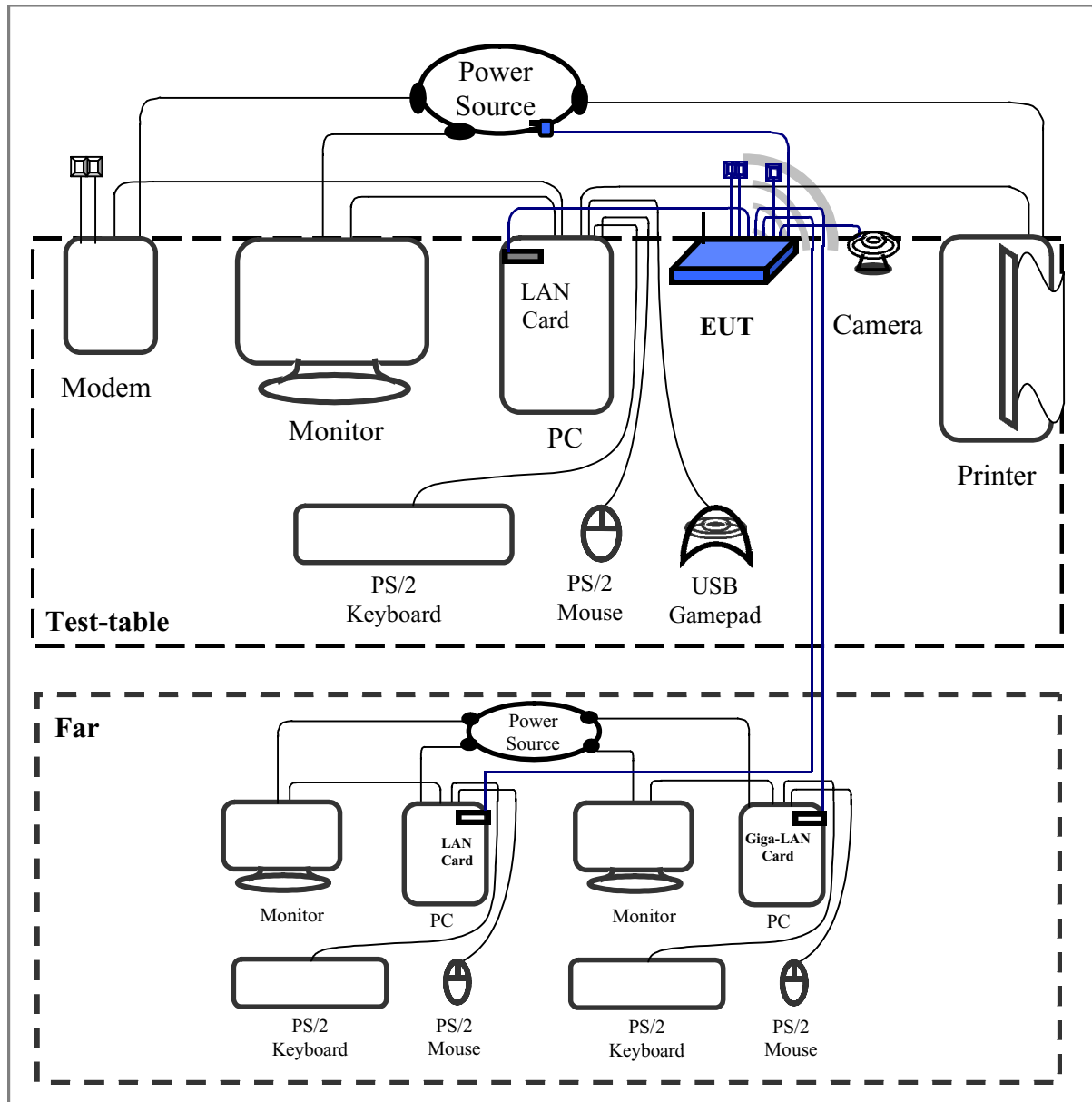
Video Camera : **Logitech**
Model No. : V-UJ16
Serial No. : LZA30600780
Product No. : 861095-0010
BSMI : 4912A026
FCC ID : N/A, DoC Approved
Power type : 5V, 300mA

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

Giga-
LAN Card : **Intel**
Model No. : PRO/1000MT
FCC ID : N/A, DoC Approved
Power type : Powered by PC

1.5 Configuration of System Under Test

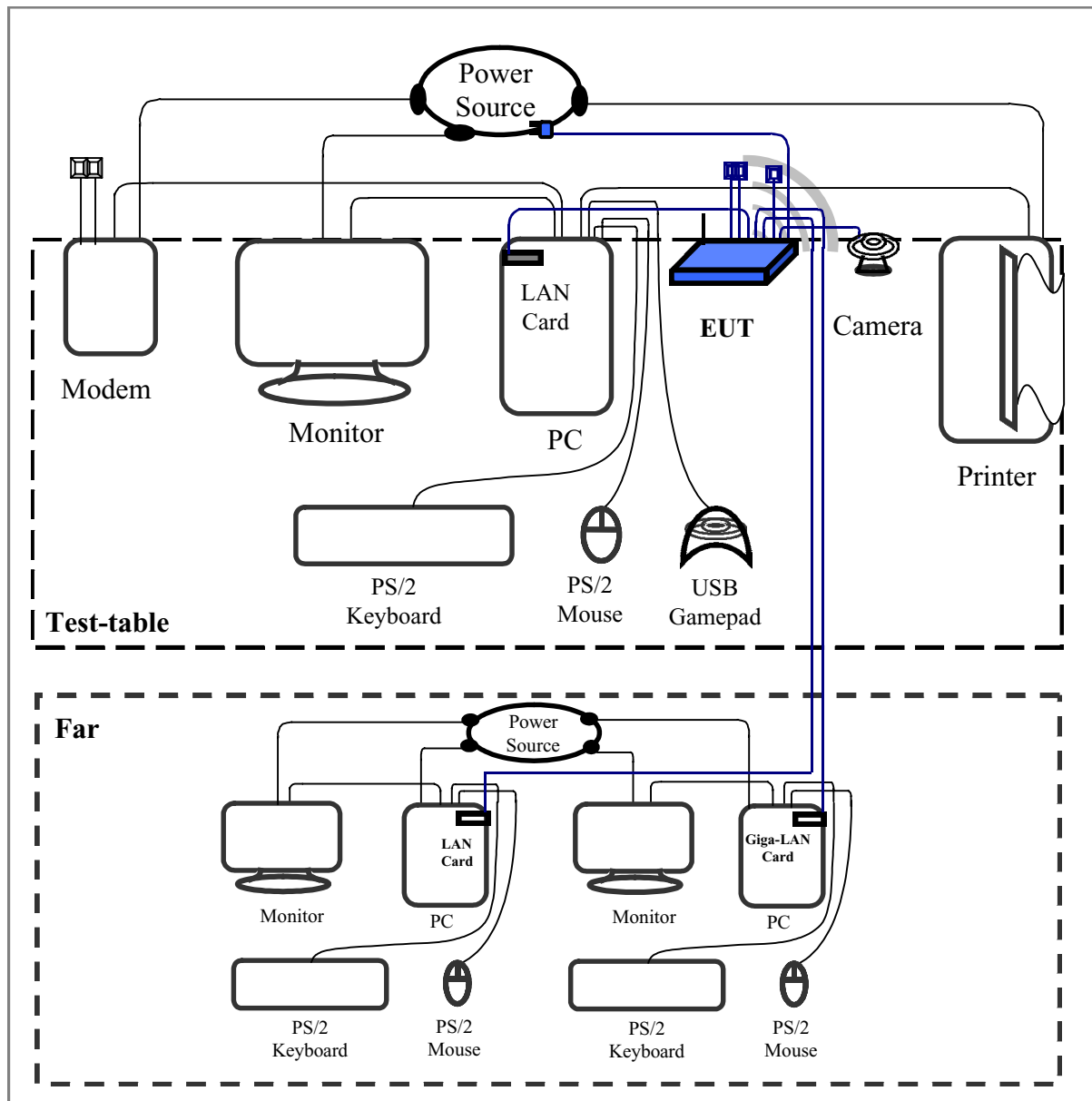
1.5.1 Conducted and Radiated for Unintentional



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 Sect.15.107 (Conducted limits) and Section15.109 (Radiated emission limits) is same as Section15.207 and 15.247(C).

III. Section 15.203: Antenna requirement

The EUT can be equipped with detachable antenna. The detachable external antenna is affixed to the EUT using a unique connector, which allows for replacement of a broken antenna, but does not use a standard antenna jack or electrical connector.

The custom antenna specification of list as below:

Manufacturer	:	Wha Yu Industrial Co., Ltd.
Part No	:	C660-510003-A
Connector	:	SMA Plug Reverse
Antenna Type	:	Dipole Antenna
Antenna Gain	:	1.80dBi

VI. Section 15.207: Power Line Conducted Emissions for AC Powered Units

4.1 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 4.3

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).

4.2 List of Test Instruments

				Calibration Date
Instrument Name	Model	Brand	Serial No.	Next time
EMI Receiver	8546A	HP	3520A00242	08/05/05
RF Filter Section	85460A	HP	3448A00217	08/05/05
LISN (EUT)	LISN-01	TRC	99-05	10/07/05
LISN (Support E.)	LISN-01	TRC	9912-03, 04	10/21/04
Pre-amplifier	15542 ZFL-500	Mini – Circuits	0 0117	05/20/05
6dB Attenuator	MCL BW-S6W2	Mini – Circuits	9915 – Conducted	05/20/05
10dB Attenuator	A5542 VAT010	Mini – Circuits	0215 – Conducted	05/20/05
Coaxial Cable (2 meter)	A30A30-0058-50FS-2M	Jyebao	SMA-08	05/20/05
Coaxial Cable (1.1 meter)	A30A30-0058-50FS-1M	Jyebao	SMA-09	05/20/05
Coaxial Cable (20 meter)	RG-214/U	Jyebao	NP-01	05/20/05
Coaxial Cable (20 meter)	RG-214/U	Jyebao	NP-02	05/20/05
Auto Switch Box (< 30MHz)	ASB-01	TRC	9904-01	05/20/05

4.3 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	174.000	50.05	---	---	65.31	55.31	-5.26
	243.000	44.61	---	---	63.34	53.34	-8.73
	311.000	40.74	---	---	61.40	51.40	-10.66
	434.000	34.93	---	---	57.89	47.89	-12.96
	681.000	32.53	---	---	56.00	46.00	-13.47
	3004.000	35.61	---	---	56.00	46.00	-10.39
	8690.000	28.23	---	---	60.00	50.00	-21.77
	13430.000	30.90	---	---	60.00	50.00	-19.10
	16160.000	31.06	---	---	60.00	50.00	-18.94
	23120.000	33.81	---	---	60.00	50.00	-16.19
Line 2	185.000	49.60	---	---	65.00	55.00	-5.40
	231.000	44.66	---	---	63.69	53.69	-9.03
	248.000	43.56	---	---	63.20	53.20	-9.64
	311.000	38.57	---	---	61.40	51.40	-12.83
	391.000	31.42	---	---	59.11	49.11	-17.69
	3381.000	33.18	---	---	56.00	46.00	-12.82
	7770.000	27.81	---	---	60.00	50.00	-22.19
	13290.000	31.37	---	---	60.00	50.00	-18.63
	16230.000	30.02	---	---	60.00	50.00	-19.98
	23120.000	33.25	---	---	60.00	50.00	-16.75

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

Power Connected Emissions					Class B		
Conductor	Frequency (KHz)	Peak (dBμV)	QP (dBμV)	Average (dBμV)	QP-limit (dBμV)	AVG-limit (dBμV)	Margin (dB)
Line 1	170.475	54.43	48.43	20.67	65.23	55.23	-16.80
	195.980	52.22	49.73	34.12	64.49	54.49	-14.76
	233.000	48.24	---	---	63.63	53.63	-5.39
	262.000	45.77	---	---	62.80	52.80	-7.03
	338.000	41.65	---	---	60.63	50.63	-8.98
	3349.000	35.35	---	---	56.00	46.00	-10.65
Line 2	181.690	53.56	50.03	30.37	64.94	54.94	-14.91
	240.000	46.72	---	---	63.43	53.43	-6.71
	302.000	40.88	---	---	61.66	51.66	-10.78
	363.000	35.52	---	---	59.91	49.91	-14.39
	1994.000	31.25	---	---	56.00	46.00	-14.75
	3349.000	33.70	---	---	56.00	46.00	-12.30

Test mode: IEEE 802.11b, Channel 6

Power Connected Emissions					Class B		
Conductor	Frequency (KHz)	Peak (dBμV)	QP (dBμV)	Average (dBμV)	QP-limit (dBμV)	AVG-limit (dBμV)	Margin (dB)
Line 1	176.000	52.38	48.51	25.07	65.00	55.00	-16.49
	203.000	49.56	---	---	64.49	54.49	-4.93
	259.000	44.80	---	---	62.89	52.89	-8.09
	317.000	41.02	---	---	61.23	51.23	-10.21
	528.000	33.46	---	---	56.00	46.00	-12.54
	3126.000	36.28	---	---	56.00	46.00	-9.72
Line 2	170.170	52.50	45.56	21.06	65.37	55.37	-19.81
	197.000	50.34	---	---	64.66	54.66	-4.32
	231.000	46.31	---	---	63.69	53.69	-7.38
	262.000	43.63	---	---	62.80	52.80	-9.17
	334.000	38.15	---	---	60.74	50.74	-12.59
	3285.000	32.81	---	---	56.00	46.00	-13.19

Test mode: IEEE 802.11b, Channel 11

Power Connected Emissions					Class B		
Conductor	Frequency (KHz)	Peak (dBμV)	QP (dBμV)	Average (dBμV)	QP-limit (dBμV)	AVG-limit (dBμV)	Margin (dB)
Line 1	177.000	50.93	---	---	65.23	55.23	-4.30
	199.000	48.84	---	---	64.60	54.60	-5.76
	259.000	43.86	---	---	62.89	52.89	-9.03
	308.000	41.60	---	---	61.49	51.49	-9.89
	452.000	34.20	---	---	57.37	47.37	-13.17
	3030.000	34.79	---	---	56.00	46.00	-11.21
Line 2	187.000	49.93	---	---	64.94	54.94	-5.01
	243.000	44.19	---	---	63.34	53.34	-9.15
	267.000	41.91	---	---	62.66	52.66	-10.75
	323.000	36.98	---	---	61.06	51.06	-14.08
	1582.000	30.51	---	---	56.00	46.00	-15.49
	3285.000	33.46	---	---	56.00	46.00	-12.54

Test mode: IEEE 802.11g, Channel 1

Power Connected Emissions					Class B		
Conductor	Frequency (KHz)	Peak (dBμV)	QP (dBμV)	Average (dBμV)	QP-limit (dBμV)	AVG-limit (dBμV)	Margin (dB)
Line 1	193.000	48.01	---	---	64.77	54.77	-6.76
	250.000	44.23	---	---	63.14	53.14	-8.91
	331.000	40.74	---	---	60.83	50.83	-10.09
	434.000	35.56	---	---	57.89	47.89	-12.33
	523.000	34.70	---	---	56.00	46.00	-11.30
	3126.000	35.83	---	---	56.00	46.00	-10.17
Line 2	185.000	48.68	---	---	65.00	55.00	-6.32
	250.000	43.06	---	---	63.14	53.14	-10.08
	331.000	37.05	---	---	60.83	50.83	-13.78
	391.000	32.20	---	---	59.11	49.11	-16.91
	3253.000	32.13	---	---	56.00	46.00	-13.87
	23120.000	33.88	---	---	56.00	46.00	-12.12

Test mode: IEEE 802.11g, Channel 6

Power Connected Emissions					Class B		
Conductor	Frequency (KHz)	Peak (dBμV)	QP (dBμV)	Average (dBμV)	QP-limit (dBμV)	AVG-limit (dBμV)	Margin (dB)
Line 1	179.000	50.02	---	---	65.17	55.17	-5.15
	238.000	44.87	---	---	63.49	53.49	-8.62
	267.000	42.48	---	---	62.66	52.66	-10.18
	320.000	39.30	---	---	61.14	51.14	-11.84
	494.000	34.65	---	---	56.17	46.17	-11.52
	3030.000	35.40	---	---	56.00	46.00	-10.60
Line 2	193.000	47.68	---	---	64.77	54.77	-7.09
	231.000	45.10	---	---	63.69	53.69	-8.59
	255.000	42.80	---	---	63.00	53.00	-10.20
	320.000	36.61	---	---	61.14	51.14	-14.53
	1582.000	30.95	---	---	56.00	46.00	-15.05
	3253.000	34.01	---	---	56.00	46.00	-11.99

Test mode: IEEE 802.11g, Channel 11

Power Connected Emissions					FCC Class B		
Conductor	Frequency (KHz)	Peak (dBμV)	QP (dBμV)	Average (dBμV)	QP-limit (dBμV)	AVG-limit (dBμV)	Margin (dB)
Line 1	183.000	50.05	---	---	65.06	55.06	-5.01
	231.000	45.81	---	---	63.69	53.69	-7.88
	257.000	43.49	---	---	62.94	52.94	-9.45
	314.000	40.60	---	---	61.31	51.31	-10.71
	456.000	34.27	---	---	57.26	47.26	-12.99
	3062.000	36.16	---	---	56.00	46.00	-9.84
Line 2	177.000	50.16	---	---	65.23	55.23	-5.07
	248.000	43.51	---	---	63.20	53.20	-9.69
	317.000	35.54	---	---	61.23	51.23	-15.69
	370.000	33.07	---	---	59.71	49.71	-16.64
	1566.000	30.83	---	---	56.00	46.00	-15.17
	3285.000	33.72	---	---	56.00	46.00	-12.28

V. Section 15.247 (a): Technical description of the EUT

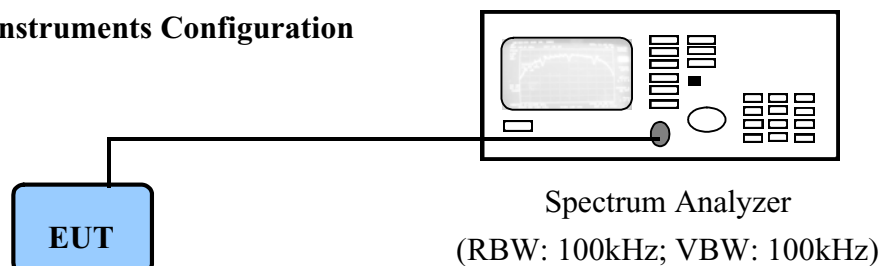
Direct Sequence System is a spread spectrum system in which the carrier has been modulated by a high speed spreading code and an information data stream. The high speed code sequence dominates the “modulating function” and is the direct cause of the wide spreading of the transmitted signal. In the operational description demonstrates the operation principles of the Baseband processor employed by the EUT, shows that which is a complete DSSS baseband processor and meets the definition of the direct sequence spread spectrum system.

VI. Section 15.247(a)(2): Bandwidth for Direct Sequence System.

6.1 Test Condition & Setup

The transmitter bandwidth measurements were performed by the contact manner. The EUT was set to transmit continuously, also various channels were investigated to find the maximum occupied bandwidth. The output of the EUT was connected to the spectrum analyzer. The bandwidth of the fundamental frequency is observed by the spectrum analyzer with 100kHz RBW and 100kHz VBW.

6.2 Test Instruments Configuration



P.S.: PC to control the EUT at maximal power output and channel Number and set antenna kit

6.3 List of Test Instruments

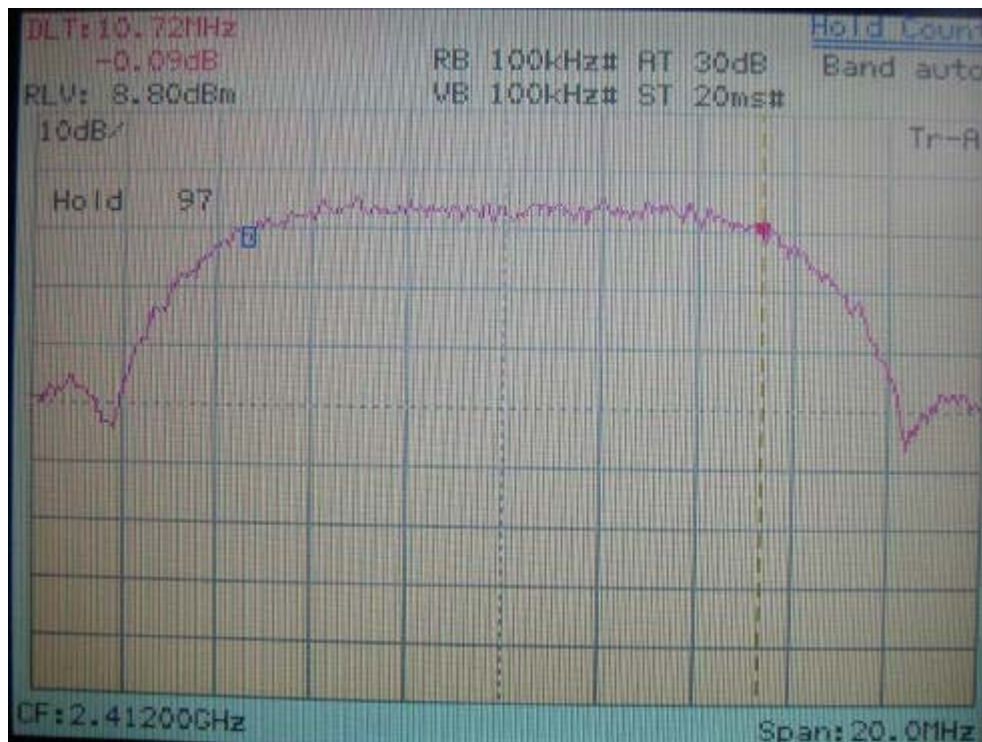
Instrument Name	Model No.	Brand	Serial No.	Next time
Spectrum Analyzer	MS2665C	ANRITSU	6200175476	12/30/04

6.4 Test Result of Bandwidth

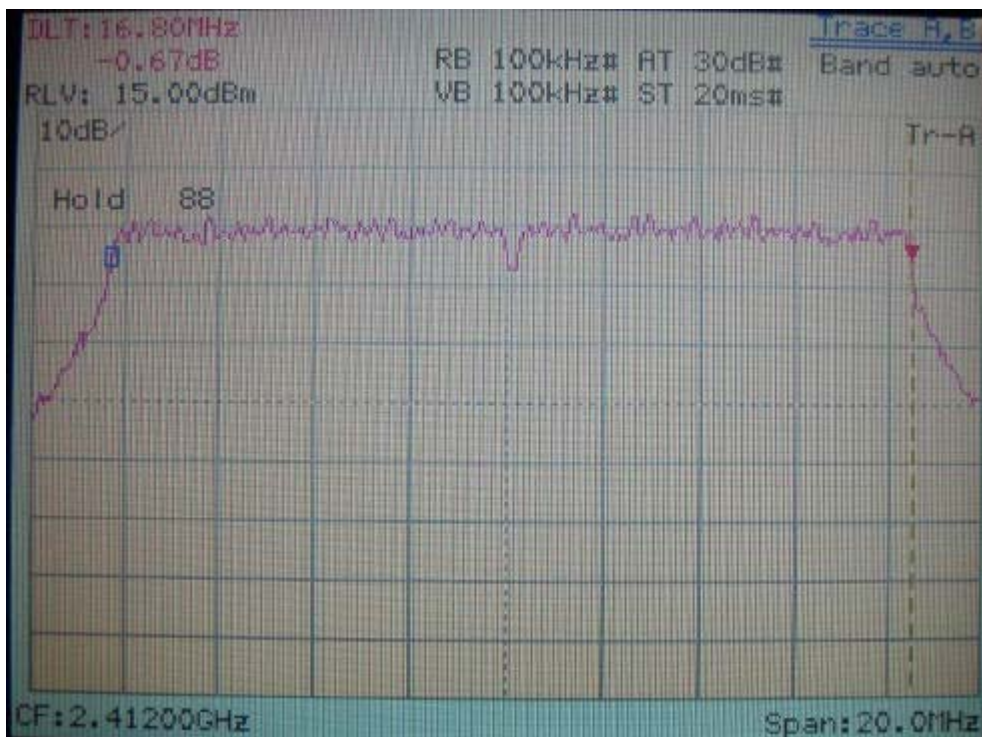
Channel	802.11b	802.11g
01	10.72 MHz	16.80 MHz
06	10.72 MHz	16.88 MHz
11	10.80 MHz	16.80 MHz

- Note:
1. The data in the above table are summarizing the following attachment spectrum analyzer hard copy. According to the guidance, we'd made the measurement with the spectrum analyzer's resolution bandwidth (RBW)=100kHz and set the $span \gg RBW$. The results show the measured 6dB bandwidth comply with the minimum 500kHz requirement.
 2. The attachments show these on the following pages.

6dB Bandwidth of Channel 1 (The minimum 6dB BW at least 500kHz)

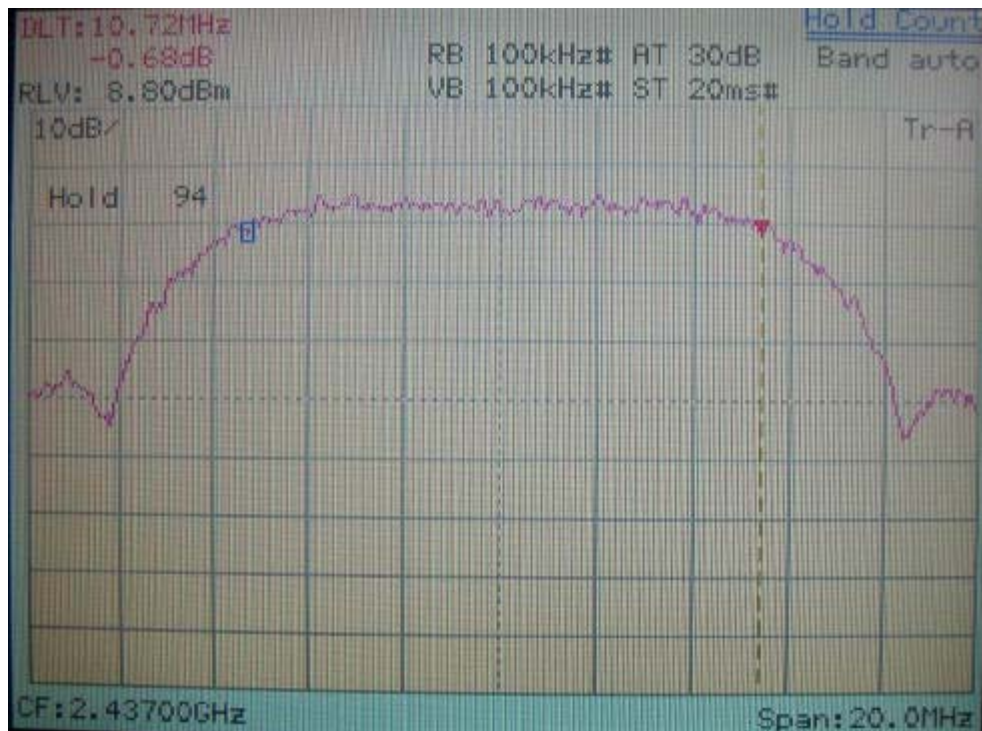


IEEE 802.11b

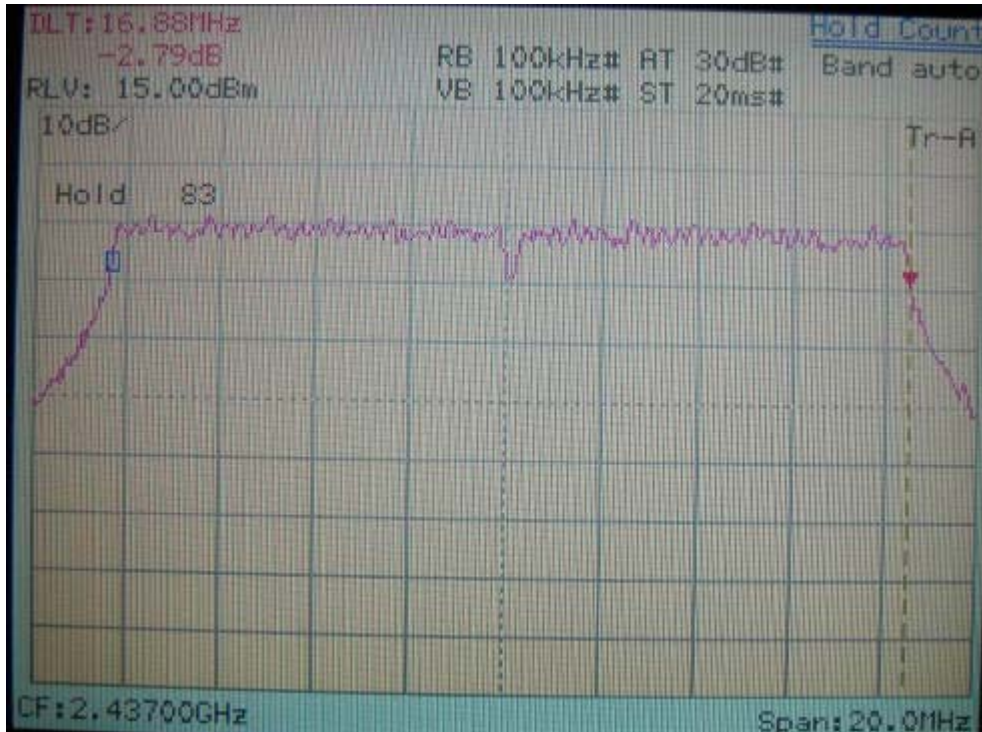


IEEE 802.11g

6dB Bandwidth of Channel 6 (The minimum 6dB BW at least 500kHz)

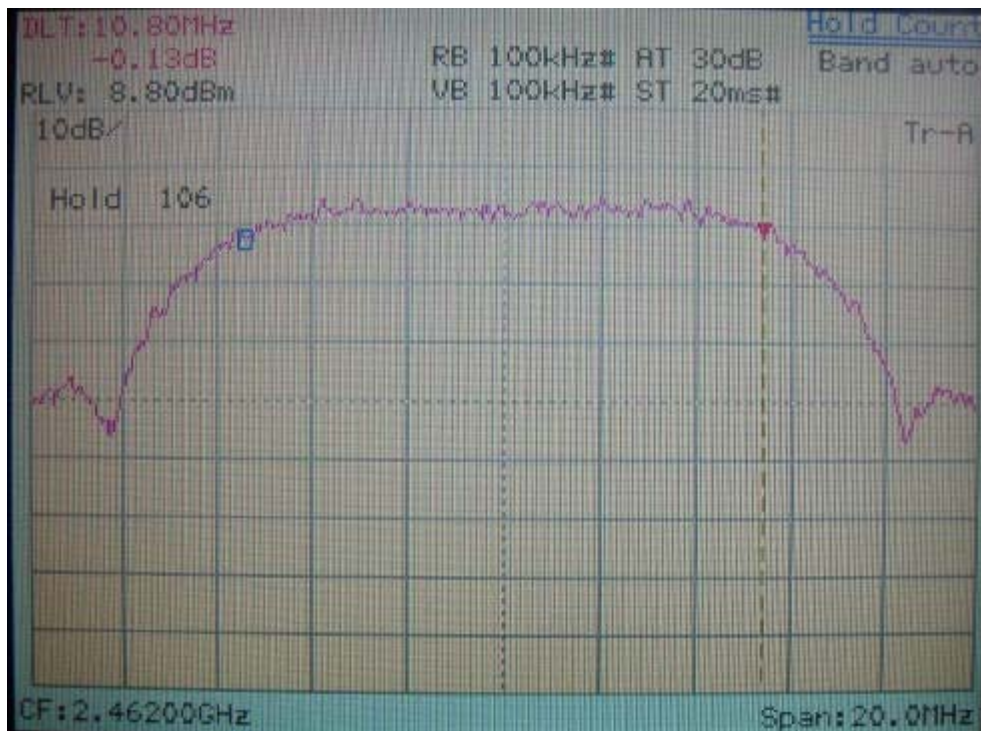


IEEE 802.11b

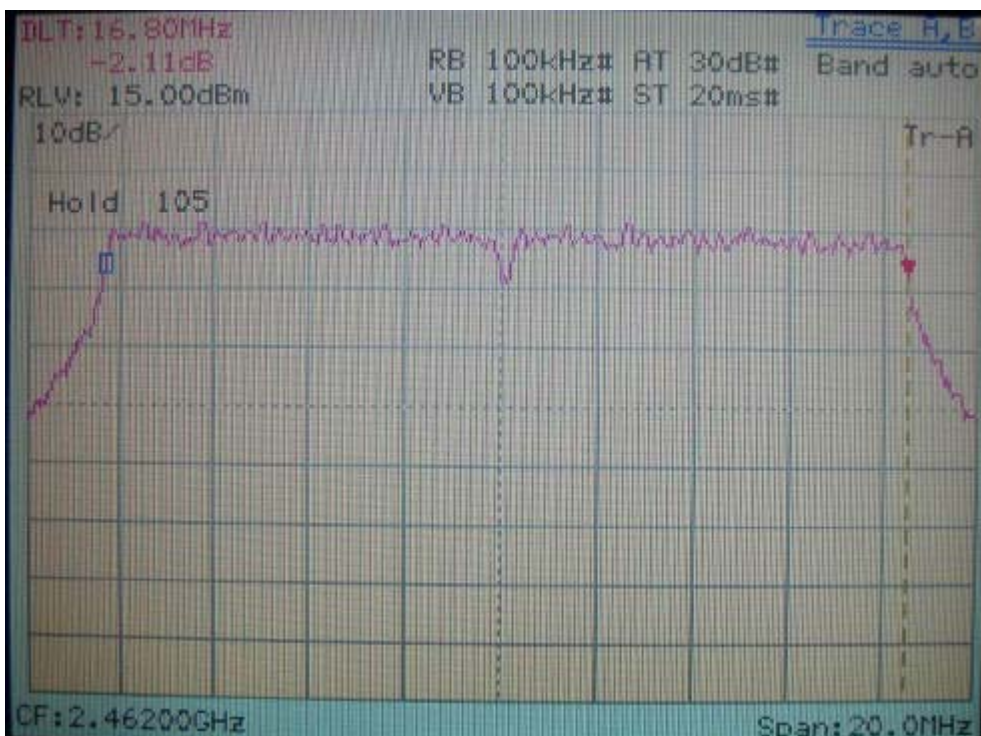


IEEE 802.11g

6dB Bandwidth of Channel 11 (The minimum 6dB BW at least 500kHz)



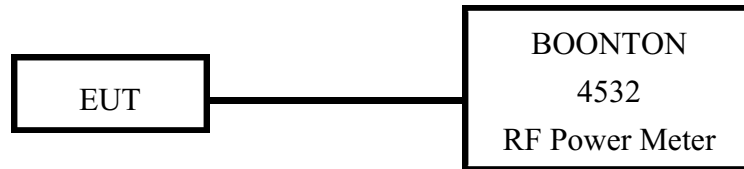
IEEE 802.11b



IEEE 802.11g

VII. Section 15.247(b): Power Output

7.1 Test Condition & Setup



1. The output of the transmitter is connected to the BOONTON RF Power Meter.
2. The calibration is performed before every test. The values of the output power of the EUT will shown in the dBm directly are the transmitter output peak power. Recording as follows.

7.2 List of Test Instruments

Instrument Name	Model	Brand	Serial No.	Next time
RF Power Meter	4532	BOONTON	117501	04/16/05
Peak Power Sensor	57340	BOONTON	2696	04/16/05

7.3 Test Result

Formula:

$$\text{RF Output of EUT} + |\text{Cable Loss}| = \text{Output Peak Power}$$

IEEE 802.11b

Channel	RF Output	Cable Loss	Output Peak Power	
	dBm	dBm	dBm	mW
CH 01	13.35	0.60	13.95	24.83
CH 06	12.54	0.60	13.14	20.61
CH 11	11.95	0.60	12.55	17.99

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Channel	RF Output	Cable Loss	Output Peak Power	
	dBm	dBm	dBm	mW
CH 01	19.95	0.60	20.55	113.50
CH 06	19.52	0.60	20.12	102.80
CH 11	19.02	0.60	19.62	91.62

VIII. Section 15.247 (C): Spurious Emissions (Radiated)

8.1 Test Condition & Setup

We'd performed the test by the *radiated emission* skill: The EUT was placed in an anechoic chamber, and set the EUT transmitting continuously and scanned at 3-meter distance to determine its emission characteristics. The physical arrangement of the EUT 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, directivity, and frequency. The exact system configuration, which produced the highest emissions was noted so it could be reproduced later during the final tests. For the measurement above 1GHz, according to the guidance we'd set the spectrum analyzer's 6dB bandwidth RBW to 1MHz.

This was done to ensure that the final measurements would demonstrate the worst-case interference potential of the EUT.

Final radiation measurements were made on a three-meter, anechoic chamber. The EUT system was placed on a nonconductive turntable, which is 0.8 meters height, top surface 1.0 x 1.5 meter.

The spectrum was examined from 30 MHz to 1000 MHz using an Hewlett Packard 85460A EMI Receiver, SCHWARZECK whole range Small Biconical Antenna (Model No.: UBAA9114 & BBVU9135) is used to measure frequency from 30 MHz to 1GHz. The final test is used the HP 85460A spectrum and 8564E spectrum was examined from 1GHz to 25GHz using an Hewlett Packard Spectrum Analyzer, EMCO/HP Horn Antenna (Model 3115 / 84125-80008) for 1G - 25GHz.

At each frequency, the EUT was rotated 360 degrees, and the antenna was raised and lowered from one to four meters to find the maximum emission levels. Measurements were taken using both horizontal and vertical antenna polarization.

Appropriate preamplifiers were used for improving sensitivity and precautions were taken to avoid overloading or desensitizing the spectrum analyzer. There are two spectrum analyzers use on this testing, HP 85460A for frequency 30MHz to 1000MHz, and 8564E for frequency 1GHz to 25GHz. No post-detector video filters were used in the test. The spectrum analyzer's 6dB bandwidth was set to 120KHz (spectrum was examined from 30 MHz to 1000 MHz), the spectrum analyzer's 6 dB bandwidth was set to 1 MHz (spectrum was examined from 1GHz to 25GHz) and the analyzer was operated in the maximum hold mode. There is a test condition applies in this test item, the test procedure description as the following:

Three channels were tested, one in the top (CH01), one in the middle (CH06) and the other in bottom (CH11). The setting up procedure is recorded on <1.3>

With the transmitter operating from a AC source and using the internal of EUT, radiates spurious emissions falling within the restricted bands of 15.209 were measured at operating frequencies corresponding to upper, middle and bottom channels in the 2400 ~ 2483.5 MHz band.

The actual field intensity in decibels referenced to 1 microvolt per meter (dB μ V/m) is determined by algebraically adding the measured reading in dB μ V, the antenna factor (dB), and cable loss (dB) at the appropriate frequency. Since the EUT was set to transmit continuously, no *duty cycle* is present.

For frequency between 30MHz to 1000MHz

$$F_{Ia} \text{ (dB}\mu\text{V/m)} = F_{Ir} \text{ (dB}\mu\text{V)} + \text{Correction Factors}$$

F_{Ia} : Actual Field Intensity

F_{Ir} : Reading of the Field Intensity

$$\text{Correction Factors} = \text{Antenna Factor} + (\text{Cable Loss} - \text{Amplifier Gain}) + \text{Switching Box Loss}$$

For frequency between 1GHz to 25GHz

$$F_{Ia} \text{ (dB}\mu\text{V/m)} = F_{Ir} \text{ (dB}\mu\text{V)} + \text{Correction Factor}$$

F_{Ia} : Actual Field Intensity

F_{Ir} : Reading of the Field Intensity

$$\text{Correction Factors} = \text{Antenna Factor} + (\text{Cable Loss} - \text{Amplifier Gain}) + \text{Switching Box Loss}$$

8.2 List of Test Instruments

Instrument Name	Model	Brand	Serial No.	Calibration Date
				Next time
EMI Receiver	8546A	HP	3520A00242	08/05/05
RF Filter Section	85460A	HP	3448A00217	08/05/05
Small Biconical Antenna	UBAA9114 & BBVU9135	SCHWARZECK	127	10/11/05
Pre-amplifier	PA1F	TRC	1FAC	05/20/05
Auto Switch Box (>30MHz)	ASB-01	TRC	9904-01	05/20/05
Coaxial Cable (Double shielded, 15 meter)	A30A30-0058-50FS-15M	JYEBAO	SMA-01	05/20/05
Coaxial Cable (1.1 meter)	A30A30-0058-50FS-1M	JYEBAO	SMA-02	05/20/05
Spectrum Analyzer	8564E	HP	3720A00840	08/13/05
Microwave Preamplifier	84125C	HP	US36433002	08/13/05
Horn Antenna	3115	EMCO	9104-3668	12/18/04
Standard Guide Horn Antenna	84125-80008	HP	18-26.5GHz	12/18/04
Standard Guide Horn Antenna	84125-80001	HP	26.5-40GHz	12/18/04
Horn Antenna	1196E (3115)	HP (EMCO)	9704-5178	12/12/04
Pre-amplifier	PA2F	TRC	2F1GZ	03/20/05
Coaxial Cable (3 miter)	A30A30-0058-50FST118	JYEBAO	MSA-05	03/20/05
Coaxial Cable (1 meter)	A30A30-0058-50FST118	JYEBAO	MSA-04	03/20/05

8.3 Test Result of Spurious Radiated Emissions

The highest peak values of radiated emissions from the EUT at various antenna heights, antenna polarizations, EUT orientation, etc. are recorded on the following.

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

Test mode: Standby mode for 30MHz to 1GHz [Horizontal]

Radiated Emission				Correction Factors	Corrected Amplitude	Class B (3 m)	
Frequency (MHz)	Amplitude (dBμV)	Ant. H. (m)	Table (°)			Limit (dBμV/m)	Margin (dB)
253.10	40.29	1.00	196	-4.08	36.21	46.00	-9.79
385.26	37.30	1.00	23	-1.51	35.79	46.00	-10.21
444.67	35.17	1.00	32	0.80	35.97	46.00	-10.03
502.87	36.83	1.00	70	3.02	39.85	46.00	-6.15
750.23	24.58	1.00	229	10.42	35.00	46.00	-11.00
802.36	24.58	1.00	241	11.68	36.26	46.00	-9.74

Test mode: Standby mode for 30MHz to 1GHz [Vertical]

Radiated Emission				Correction Factors	Corrected Amplitude	Class B (3 m)	
Frequency (MHz)	Amplitude (dBμV)	Ant. H. (m)	Table (°)			Limit (dBμV/m)	Margin (dB)
71.22	33.68	1.00	52	1.20	34.88	40.00	-5.12
102.75	36.66	1.00	297	-1.38	35.28	43.50	-8.22
158.52	34.38	1.00	279	-3.42	30.96	43.50	-12.54
502.87	35.04	1.00	285	3.02	38.06	46.00	-7.94
601.09	29.06	1.00	299	6.71	35.77	46.00	-10.23
750.23	26.07	1.00	200	10.42	36.49	46.00	-9.51

Note:

1. Margin = Amplitude – limit, if margin is minus means under limit.
2. Corrected Amplitude = Reading Amplitude + Correction Factors
3. Correction factor = Antenna factor + (Cable Loss – Amplitude gain) + Switching Box Loss

Test mode: Standby mode for 1GHz to 25GHz [Horizontal]

Frequency	Ant. H.	Table	Amplitude		Correction Factor	Corrected Amplitude		Limit		Margin
			Peak / Ave.			Peak / Ave.		Peak / Ave.		
MHz	m	degree	dBμV		dB/m	dBμV/m		dBμV/m		dB
5915.83	1.00	184	26.74	---	17.80	44.54	---	73.96	53.96	-9.42
8975.83	1.00	160	24.74	---	23.53	48.27	---	73.96	53.96	-5.69
13027.50	1.00	157	29.07	---	20.62	49.69	---	73.96	53.96	-4.27
20535.83	1.00	103	47.32	---	2.36	49.68	---	73.96	53.96	-4.28
23177.92	1.00	130	46.66	---	3.60	50.26	---	73.96	53.96	-3.70

Test mode: Standby mode for 1GHz to 25GHz [Vertical]

Frequency	Ant. H.	Table	Amplitude		Correction Factor	Corrected Amplitude		Limit		Margin
			Peak / Ave.			Peak / Ave.		Peak / Ave.		
MHz	m	degree	dBμV		dB/m	dBμV/m		dBμV/m		dB
8033.75	1.00	322	22.24	---	22.48	44.72	---	73.96	53.96	-9.24
9450.42	1.00	170	23.24	---	23.16	46.40	---	73.96	53.96	-7.56
12914.17	1.00	243	27.57	---	20.49	48.06	---	73.96	53.96	-5.90
18715.42	1.00	253	48.32	---	1.50	49.82	---	73.96	53.96	-4.14
20805.00	1.00	229	47.66	---	2.48	50.14	---	73.96	53.96	-3.82
24066.87	1.00	41	47.49	---	3.40	50.89	---	73.96	53.96	-3.07

Note:

1. Margin = Corrected - Limit.
2. The EUT utilizes a *permanently attached antenna*. In addition the spurious RF radiated emissions levels do comply with the *20dBc limit* both at its bandedges and other spurious emissions.
3. As stated in Section 15.35(b), for any frequencies above 1000MHz, radiated limits shown are based upon the use of measurement instrumentation employing an average detector function. As the results of our test, the peak amplitudes are already below the FCC limit. Thus the average amplitudes of the rest are omitted.

Test mode: IEEE 802.11b CH01 for 30MHz to 1GHz [Horizontal]

Radiated Emission				Correction Factors	Corrected Amplitude	Class B (3 m)	
Frequency (MHz)	Amplitude (dBμV)	Ant. H. (m)	Table (°)			Limit (dBμV/m)	Margin (dB)
253.10	40.96	1.00	184	-4.08	36.88	46.00	-9.12
369.50	36.71	1.00	230	-2.06	34.65	46.00	-11.35
453.16	35.58	1.00	179	1.13	36.71	46.00	-9.29
504.09	38.89	1.00	9	3.07	41.96	46.00	-4.04
557.44	29.48	1.00	26	5.26	34.74	46.00	-11.26
804.79	28.41	1.00	247	11.76	40.17	46.00	-5.83

Test mode: IEEE 802.11b CH01 for 30MHz to 1GHz [Vertical]

Radiated Emission				Correction Factors	Corrected Amplitude	Class B (3 m)	
Frequency (MHz)	Amplitude (dBμV)	Ant. H. (m)	Table (°)			Limit (dBμV/m)	Margin (dB)
71.22	32.18	1.00	68	1.20	33.38	40.00	-6.62
90.62	34.16	1.00	229	-0.47	33.69	43.50	-9.81
101.54	37.66	1.00	280	-1.31	36.35	43.50	-7.15
203.39	35.94	1.00	116	-3.84	32.10	43.50	-11.40
504.09	35.30	1.00	277	3.07	38.37	46.00	-7.63
601.09	29.39	1.00	195	6.71	36.10	46.00	-9.90

Test mode: IEEE 802.11b CH01 for 1GHz to 25GHz [Horizontal]

<i>Frequency</i>	<i>Ant. H.</i>	<i>Table</i>	<i>Amplitude</i>		<i>Correction Factor</i>	<i>Corrected Amplitude</i>		<i>Limit</i>		<i>Margin</i>
			<i>Peak / Ave.</i>			<i>Peak / Ave.</i>		<i>Peak / Ave.</i>		
<i>MHz</i>	<i>m</i>	<i>degree</i>	<i>dBμV</i>		<i>dB/m</i>	<i>dBμV/m</i>		<i>dBμV/m</i>		<i>dB</i>
2239.58	1.00	121	36.50	---	8.76	45.26	---	73.96	53.96	-8.70
2777.08	1.00	304	35.00	---	10.01	45.01	---	73.96	53.96	-8.95
7233.75	1.00	141	36.28	---	10.07	46.35	---	73.96	53.96	-7.61
9650.42	1.00	291	35.44	---	11.47	46.91	---	73.96	53.96	-7.05
12061.04	1.00	36	38.10	---	9.81	47.91	---	73.96	53.96	-6.05
24120.00	1.00	259	44.82	---	3.40	48.22	---	73.96	53.96	-5.74

Test mode: IEEE 802.11b CH01 for 1GHz to 25GHz [Vertical]

<i>Frequency</i>	<i>Ant. H.</i>	<i>Table</i>	<i>Amplitude</i>		<i>Correction Factor</i>	<i>Corrected Amplitude</i>		<i>Limit</i>		<i>Margin</i>
			<i>Peak / Ave.</i>			<i>Peak / Ave.</i>		<i>Peak / Ave.</i>		
<i>MHz</i>	<i>m</i>	<i>degree</i>	<i>dBμV</i>		<i>dB/m</i>	<i>dBμV/m</i>		<i>dBμV/m</i>		<i>dB</i>
2152.08	1.00	155	38.00	---	8.52	46.52	---	73.96	53.96	-7.44
2258.33	1.00	184	39.34	---	8.81	48.15	---	73.96	53.96	-5.81
3216.67	1.00	140	36.67	---	11.47	48.14	---	73.96	53.96	-5.82
7233.75	1.00	248	36.11	---	10.07	46.18	---	73.96	53.96	-7.78
9650.42	1.00	80	35.61	---	11.47	47.08	---	73.96	53.96	-6.88
12061.04	1.00	96	37.44	---	9.81	47.25	---	73.96	53.96	-6.71

Test mode: IEEE 802.11b CH06 for 30MHz to 1GHz [Horizontal]

Radiated Emission				Correction Factors	Corrected Amplitude	Class B (3 m)	
Frequency (MHz)	Amplitude (dBμV)	Ant. H. (m)	Table (°)			Limit (dBμV/m)	Margin (dB)
254.31	41.68	1.00	176	-4.10	37.58	46.00	-8.42
461.65	38.28	1.00	311	1.45	39.73	46.00	-6.27
504.09	37.64	1.00	130	3.07	40.71	46.00	-5.29
571.99	28.70	1.00	154	5.74	34.44	46.00	-11.56
750.23	25.57	1.00	235	10.42	35.99	46.00	-10.01
804.79	27.50	1.00	258	11.76	39.26	46.00	-6.74

Test mode: IEEE 802.11b CH06 for 30MHz to 1GHz [Vertical]

Radiated Emission				Correction Factors	Corrected Amplitude	Class B (3 m)	
Frequency (MHz)	Amplitude (dBμV)	Ant. H. (m)	Table (°)			Limit (dBμV/m)	Margin (dB)
67.59	31.90	1.00	18	1.55	33.45	40.00	-6.55
101.54	37.71	1.00	309	-1.31	36.40	43.50	-7.10
502.87	34.41	1.00	280	3.02	37.43	46.00	-8.57
571.99	30.47	1.00	32	5.74	36.21	46.00	-9.79
601.09	29.86	1.00	189	6.71	36.57	46.00	-9.43
804.79	24.61	1.00	311	11.76	36.37	46.00	-9.63

Test mode: IEEE 802.11b CH06 for 1GHz to 25GHz [Horizontal]

Frequency	Ant. H.	Table	Amplitude		Correction Factor	Corrected Amplitude		Limit		Margin
			Peak / Ave.			Peak / Ave.		Peak / Ave.		
MHz	m	degree	dBμV		dB/m	dBμV/m		dBμV/m		dB
1625.00	1.00	340	36.33	---	13.94	50.27	---	73.96	53.96	-3.69
2297.92	1.00	302	37.17	---	8.92	46.09	---	73.96	53.96	-7.87
7312.29	1.00	61	36.11	---	10.30	46.41	---	73.96	53.96	-7.55
9747.08	1.00	91	35.44	---	11.89	47.33	---	73.96	53.96	-6.63
12187.92	1.00	19	39.94	---	9.74	49.68	---	73.96	53.96	-4.28
21934.79	1.00	12	46.16	---	3.09	49.25	---	73.96	53.96	-4.71
24371.46	1.00	174	45.83	---	3.26	49.09	---	73.96	53.96	-4.87

Test mode: IEEE 802.11b CH06 for 1GHz to 25GHz [Vertical]

Frequency	Ant. H.	Table	Amplitude		Correction Factor	Corrected Amplitude		Limit		Margin
			Peak / Ave.			Peak / Ave.		Peak / Ave.		
MHz	m	degree	dBμV		dB/m	dBμV/m		dBμV/m		dB
2258.33	1.00	62	37.67	---	8.81	46.48	---	73.96	53.96	-7.48
3250.00	1.00	179	37.00	---	11.63	48.63	---	73.96	53.96	-5.33
4871.46	1.00	51	40.60	---	3.95	44.55	---	73.96	53.96	-9.41
7312.29	1.00	214	36.61	---	10.30	46.91	---	73.96	53.96	-7.05
9747.08	1.00	186	35.60	---	11.89	47.49	---	73.96	53.96	-6.47
12187.92	1.00	91	40.27	---	9.74	50.01	---	73.96	53.96	-3.95

Test mode: IEEE 802.11b CH11 for 30MHz to 1GHz [Horizontal]

Radiated Emission				Correction Factors	Corrected Amplitude	Class B (3 m)	
Frequency (MHz)	Amplitude (dBμV)	Ant. H. (m)	Table (°)			Limit (dBμV/m)	Margin (dB)
253.10	40.34	1.00	189	-4.08	36.26	46.00	-9.74
385.26	38.41	1.00	229	-1.51	36.90	46.00	-9.10
418.00	38.51	1.00	9	-0.28	38.23	46.00	-7.77
444.67	39.84	1.00	229	0.80	40.64	46.00	-5.36
502.87	37.71	1.00	18	3.02	40.73	46.00	-5.27
804.79	27.56	1.00	252	11.76	39.32	46.00	-6.68

Test mode: IEEE 802.11b CH11 for 30MHz to 1GHz [Vertical]

Radiated Emission				Correction Factors	Corrected Amplitude	Class B (3 m)	
Frequency (MHz)	Amplitude (dBμV)	Ant. H. (m)	Table (°)			Limit (dBμV/m)	Margin (dB)
67.59	31.63	1.00	136	1.55	33.18	40.00	-6.82
101.54	38.04	1.00	278	-1.31	36.73	43.50	-6.77
152.46	37.60	1.00	321	-3.22	34.38	43.50	-9.12
459.22	34.85	1.00	160	1.36	36.21	46.00	-9.79
502.87	33.62	1.00	275	3.02	36.64	46.00	-9.36
601.09	29.64	1.00	301	6.71	36.35	46.00	-9.65
804.79	24.30	1.00	345	11.76	36.06	46.00	-9.94

Test mode: IEEE 802.11b CH11 for 1GHz to 25GHz [Horizontal]

<i>Frequency</i>	<i>Ant. H.</i>	<i>Table</i>	<i>Amplitude</i>		<i>Correction Factor</i>	<i>Corrected Amplitude</i>		<i>Limit</i>		<i>Margin</i>
			<i>Peak / Ave.</i>			<i>Peak / Ave.</i>		<i>Peak / Ave.</i>		
<i>MHz</i>	<i>m</i>	<i>degree</i>	<i>dBμV</i>		<i>dB/m</i>	<i>dBμV/m</i>		<i>dBμV/m</i>		<i>dB</i>
2297.92	1.00	189	37.84	---	8.92	46.76	---	73.96	53.96	-7.20
2814.58	1.00	7	35.50	---	10.08	45.58	---	73.96	53.96	-8.38
7384.79	1.00	279	34.94	---	10.42	45.36	---	73.96	53.96	-8.60
9849.79	1.00	72	35.94	---	11.93	47.87	---	73.96	53.96	-6.09
12308.75	1.00	347	37.61	---	9.56	47.17	---	73.96	53.96	-6.79
24619.37	1.00	150	45.99	---	3.01	49.00	---	73.96	53.96	-4.96

Test mode: IEEE 802.11b CH11 for 1GHz to 25GHz [Vertical]

<i>Frequency</i>	<i>Ant. H.</i>	<i>Table</i>	<i>Amplitude</i>		<i>Correction Factor</i>	<i>Corrected Amplitude</i>		<i>Limit</i>		<i>Margin</i>
			<i>Peak / Ave.</i>			<i>Peak / Ave.</i>		<i>Peak / Ave.</i>		
<i>MHz</i>	<i>m</i>	<i>degree</i>	<i>dBμV</i>		<i>dB/m</i>	<i>dBμV/m</i>		<i>dBμV/m</i>		<i>dB</i>
2297.92	1.00	138	38.50	---	8.92	47.42	---	73.96	53.96	-6.54
2379.17	1.00	225	38.83	---	9.15	47.98	---	73.96	53.96	-5.98
4925.83	1.00	169	39.27	---	4.13	43.40	---	73.96	53.96	-10.56
7384.79	1.00	242	35.78	---	10.42	46.20	---	73.96	53.96	-7.76
9849.79	1.00	1	36.61	---	11.93	48.54	---	73.96	53.96	-5.42
12308.75	1.00	209	37.27	---	9.56	46.83	---	73.96	53.96	-7.13

Test mode: IEEE 802.11g CH01 for 30MHz to 1GHz [Horizontal]

Radiated Emission				Correction Factors	Corrected Amplitude	Class B (3 m)	
Frequency (MHz)	Amplitude (dBμV)	Ant. H. (m)	Table (°)			Limit (dBμV/m)	Margin (dB)
253.10	40.27	1.00	339	-4.08	36.19	46.00	-9.81
375.56	38.20	1.00	253	-1.85	36.35	46.00	-9.65
444.67	38.44	1.00	339	0.80	39.24	46.00	-6.76
502.87	38.20	1.00	156	3.02	41.22	46.00	-4.78
571.99	30.92	1.00	75	5.74	36.66	46.00	-9.34
804.79	27.91	1.00	247	11.76	39.67	46.00	-6.33

Test mode: IEEE 802.11g CH01 for 30MHz to 1GHz [Vertical]

Radiated Emission				Correction Factors	Corrected Amplitude	Class B (3 m)	
Frequency (MHz)	Amplitude (dBμV)	Ant. H. (m)	Table (°)			Limit (dBμV/m)	Margin (dB)
101.54	38.06	1.00	304	-1.31	36.75	43.50	-6.75
202.17	36.39	1.00	105	-3.83	32.56	43.50	-10.94
376.77	35.74	1.00	187	-1.80	33.94	46.00	-12.06
460.44	32.67	1.00	205	1.40	34.07	46.00	-11.93
504.09	34.30	1.00	266	3.07	37.37	46.00	-8.63
601.09	29.50	1.00	177	6.71	36.21	46.00	-9.79

Test mode: IEEE 802.11g CH01 for 1GHz to 25GHz [Horizontal]

<i>Frequency</i>	<i>Ant. H.</i>	<i>Table</i>	<i>Amplitude</i>		<i>Correction Factor</i>	<i>Corrected Amplitude</i>		<i>Limit</i>		<i>Margin</i>
			<i>Peak / Ave.</i>			<i>Peak / Ave.</i>		<i>Peak / Ave.</i>		
<i>MHz</i>	<i>m</i>	<i>degree</i>	<i>dBμV</i>		<i>dB/m</i>	<i>dBμV/m</i>		<i>dBμV/m</i>		<i>dB</i>
2237.50	1.00	328	37.84	---	8.75	46.59	---	73.96	53.96	-7.37
3216.67	1.00	231	35.50	---	11.47	46.97	---	73.96	53.96	-6.99
4823.12	1.00	306	39.94	---	3.76	43.70	---	73.96	53.96	-10.26
7235.56	1.00	149	42.93	26.61	10.08	53.01	36.69	73.96	53.96	-17.27
9650.42	1.00	148	35.77	---	11.47	47.24	---	73.96	53.96	-6.72
12061.04	1.00	331	37.60	---	9.81	47.41	---	73.96	53.96	-6.55

Test mode: IEEE 802.11g CH01 for 1GHz to 25GHz [Vertical]

<i>Frequency</i>	<i>Ant. H.</i>	<i>Table</i>	<i>Amplitude</i>		<i>Correction Factor</i>	<i>Corrected Amplitude</i>		<i>Limit</i>		<i>Margin</i>
			<i>Peak / Ave.</i>			<i>Peak / Ave.</i>		<i>Peak / Ave.</i>		
<i>MHz</i>	<i>m</i>	<i>degree</i>	<i>dBμV</i>		<i>dB/m</i>	<i>dBμV/m</i>		<i>dBμV/m</i>		<i>dB</i>
2239.58	1.00	158	39.67	---	8.76	48.43	---	73.96	53.96	-5.53
2820.83	1.00	176	38.17	---	10.09	48.26	---	73.96	53.96	-5.70
3216.67	1.00	222	37.83	---	11.47	49.30	---	73.96	53.96	-4.66
4823.95	1.00	348	47.27	32.11	3.76	51.03	35.87	73.96	53.96	-18.09
7233.65	1.00	148	42.28	26.61	10.07	52.35	36.68	73.96	53.96	-17.28
9650.42	1.00	180	37.11	---	11.47	48.58	---	73.96	53.96	-5.38
12061.04	1.00	77	37.10	---	9.81	46.91	---	73.96	53.96	-7.05

Test mode: IEEE 802.11g CH06 for 30MHz to 1GHz [Horizontal]

Radiated Emission				Correction Factors	Corrected Amplitude	Class B (3 m)	
Frequency (MHz)	Amplitude (dBμV)	Ant. H. (m)	Table (°)			Limit (dBμV/m)	Margin (dB)
253.10	41.19	1.00	176	-4.08	37.11	46.00	-8.89
387.69	40.44	1.00	213	-1.43	39.01	46.00	-6.99
462.86	37.07	1.00	204	1.50	38.57	46.00	-7.43
502.87	38.36	1.00	130	3.02	41.38	46.00	-4.62
601.09	26.15	1.00	218	6.71	32.86	46.00	-13.14
804.79	26.90	1.00	258	11.76	38.66	46.00	-7.34

Test mode: IEEE 802.11g CH06 for 30MHz to 1GHz [Vertical]

Radiated Emission				Correction Factors	Corrected Amplitude	Class B (3 m)	
Frequency (MHz)	Amplitude (dBμV)	Ant. H. (m)	Table (°)			Limit (dBμV/m)	Margin (dB)
101.54	38.04	1.00	310	-1.31	36.73	43.50	-6.77
202.17	35.48	1.00	117	-3.83	31.65	43.50	-11.85
379.20	36.30	1.00	196	-1.72	34.58	46.00	-11.42
504.09	33.64	1.00	255	3.07	36.71	46.00	-9.29
601.09	29.18	1.00	183	6.71	35.89	46.00	-10.11
804.79	25.16	1.00	328	11.76	36.92	46.00	-9.08

Test mode: IEEE 802.11g CH06 for 1GHz to 25GHz [Horizontal]

<i>Frequency</i>	<i>Ant. H.</i>	<i>Table</i>	<i>Amplitude</i>		<i>Correction Factor</i>	<i>Corrected Amplitude</i>		<i>Limit</i>		<i>Margin</i>
			<i>Peak / Ave.</i>			<i>Peak / Ave.</i>		<i>Peak / Ave.</i>		
<i>MHz</i>	<i>m</i>	<i>degree</i>	<i>dBμV</i>		<i>dB/m</i>	<i>dBμV/m</i>		<i>dBμV/m</i>		<i>dB</i>
2239.58	1.00	353	37.50	---	8.76	46.26	---	73.96	53.96	-7.70
2889.58	1.00	214	35.67	---	10.22	45.89	---	73.96	53.96	-8.07
4877.50	1.00	315	41.27	---	3.97	45.24	---	73.96	53.96	-8.72
7312.29	1.00	128	37.77	---	10.30	48.07	---	73.96	53.96	-5.89
9747.08	1.00	203	35.77	---	11.89	47.66	---	73.96	53.96	-6.30
12187.92	1.00	332	38.44	---	9.74	48.18	---	73.96	53.96	-5.78

Test mode: IEEE 802.11g CH06 for 1GHz to 25GHz [Vertical]

<i>Frequency</i>	<i>Ant. H.</i>	<i>Table</i>	<i>Amplitude</i>		<i>Correction Factor</i>	<i>Corrected Amplitude</i>		<i>Limit</i>		<i>Margin</i>
			<i>Peak / Ave.</i>			<i>Peak / Ave.</i>		<i>Peak / Ave.</i>		
<i>MHz</i>	<i>m</i>	<i>degree</i>	<i>dBμV</i>		<i>dB/m</i>	<i>dBμV/m</i>		<i>dBμV/m</i>		<i>dB</i>
2239.58	1.00	238	39.67	---	8.76	48.43	---	73.96	53.96	-5.53
2318.75	1.00	71	41.17	---	8.98	50.15	---	73.96	53.96	-3.81
3250.00	1.00	201	37.50	---	11.63	49.13	---	73.96	53.96	-4.83
4877.50	1.00	156	44.94	---	3.97	48.91	---	73.96	53.96	-5.05
7312.29	1.00	196	39.27	---	10.30	49.57	---	73.96	53.96	-4.39
9747.08	1.00	150	37.94	---	11.89	49.83	---	73.96	53.96	-4.13
12187.92	1.00	143	38.27	---	9.74	48.01	---	73.96	53.96	-5.95

Test mode: IEEE 802.11g CH11 for 30MHz to 1GHz [Horizontal]

Radiated Emission				Correction Factors	Corrected Amplitude	Class B (3 m)	
Frequency (MHz)	Amplitude (dBμV)	Ant. H. (m)	Table (°)			Limit (dBμV/m)	Margin (dB)
253.10	40.68	1.00	342	-4.08	36.60	46.00	-9.40
379.20	36.33	1.00	307	-1.72	34.61	46.00	-11.39
444.67	38.56	1.00	211	0.80	39.36	46.00	-6.64
504.09	37.25	1.00	258	3.07	40.32	46.00	-5.68
715.06	25.56	1.00	212	9.83	35.39	46.00	-10.61
804.79	27.56	1.00	253	11.76	39.32	46.00	-6.68

Test mode: IEEE 802.11g CH11 for 30MHz to 1GHz [Vertical]

Radiated Emission				Correction Factors	Corrected Amplitude	Class B (3 m)	
Frequency (MHz)	Amplitude (dBμV)	Ant. H. (m)	Table (°)			Limit (dBμV/m)	Margin (dB)
101.54	38.66	1.00	304	-1.31	37.35	43.50	-6.15
434.97	40.44	1.00	225	0.41	40.85	46.00	-5.15
460.44	34.38	1.00	164	1.40	35.78	46.00	-10.22
502.87	34.41	1.00	263	3.02	37.43	46.00	-8.57
601.09	29.25	1.00	270	6.71	35.96	46.00	-10.04
804.79	25.37	1.00	334	11.76	37.13	46.00	-8.87

Test mode: IEEE 802.11g CH11 for 1GHz to 25GHz [Horizontal]

<i>Frequency</i>	<i>Ant. H.</i>	<i>Table</i>	<i>Amplitude</i>		<i>Correction Factor</i>	<i>Corrected Amplitude</i>		<i>Limit</i>		<i>Margin</i>
			<i>Peak / Ave.</i>			<i>Peak / Ave.</i>		<i>Peak / Ave.</i>		
<i>MHz</i>	<i>m</i>	<i>degree</i>	<i>dBμV</i>		<i>dB/m</i>	<i>dBμV/m</i>		<i>dBμV/m</i>		<i>dB</i>
1641.67	1.00	333	36.83	---	13.68	50.51	---	73.96	53.96	-3.45
3283.33	1.00	242	36.33	---	11.79	48.12	---	73.96	53.96	-5.84
4925.83	1.00	221	40.11	---	4.13	44.24	---	73.96	53.96	-9.72
7384.79	1.00	235	39.61	---	10.42	50.03	---	73.96	53.96	-3.93
9849.79	1.00	191	36.11	---	11.93	48.04	---	73.96	53.96	-5.92
12308.75	1.00	27	37.11	---	9.56	46.67	---	73.96	53.96	-7.29
24619.37	1.00	78	45.99	---	3.01	49.00	---	73.96	53.96	-4.96

Test mode: IEEE 802.11g CH11 for 1GHz to 25GHz [Vertical]

<i>Frequency</i>	<i>Ant. H.</i>	<i>Table</i>	<i>Amplitude</i>		<i>Correction Factor</i>	<i>Corrected Amplitude</i>		<i>Limit</i>		<i>Margin</i>
			<i>Peak / Ave.</i>			<i>Peak / Ave.</i>		<i>Peak / Ave.</i>		
<i>MHz</i>	<i>m</i>	<i>degree</i>	<i>dBμV</i>		<i>dB/m</i>	<i>dBμV/m</i>		<i>dBμV/m</i>		<i>dB</i>
2870.83	1.00	41	37.66	---	10.19	47.85	---	73.96	53.96	-6.11
3283.33	1.00	16	38.33	---	11.79	50.12	---	73.96	53.96	-3.84
4925.83	1.00	280	42.61	---	4.13	46.74	---	73.96	53.96	-7.22
7384.79	1.00	66	35.28	---	10.42	45.70	---	73.96	53.96	-8.26
9849.79	1.00	38	36.11	---	11.93	48.04	---	73.96	53.96	-5.92
12308.75	1.00	359	37.61	---	9.56	47.17	---	73.96	53.96	-6.79
24619.37	1.00	166	46.99	---	3.01	50.00	---	73.96	53.96	-3.96

8.5 Test Result of the Bandedge

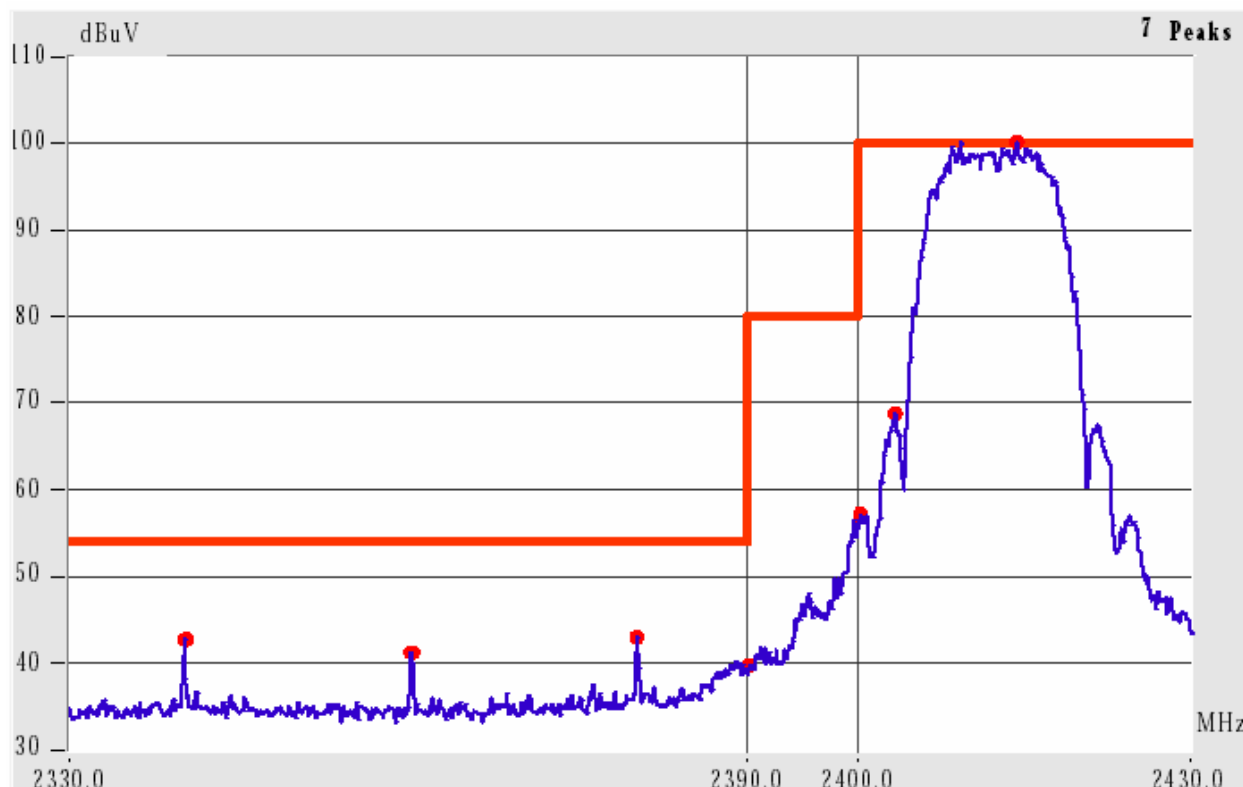
If any 100 kHz bandwidth outside these frequency bands, the radio frequency power that is produced by the modulation products of the spreading sequence, the information sequence and the carrier frequency shall be either *at least 20 dB below that in any 100 kHz bandwidth within the band that contains the highest level of the desired power or shall not exceed the general levels specified in § 15.209(a),*

We perform this section by the *radiated manner*, the RBW is set to 100kHz and VBW>RBW. We'd made the observation *up to 10th harmonics and the criterion is all the harmonic/spurious emissions must be 20dB below the highest emission level measured.* If the emissions fall in the restricted bands stated in the Part15.205(a) must also *comply with the radiated emission limits specified in Part15.209(a).* (Peak mode: RBW=VBW=1MHz, Average mode: RBW=1MHz; VBW=10Hz)

The following pages show our observations referring to the channel 1 and 11 respectively.

Test Condition & Setup: same as < 8.1 >

Channel 1 of IEEE 802.11b

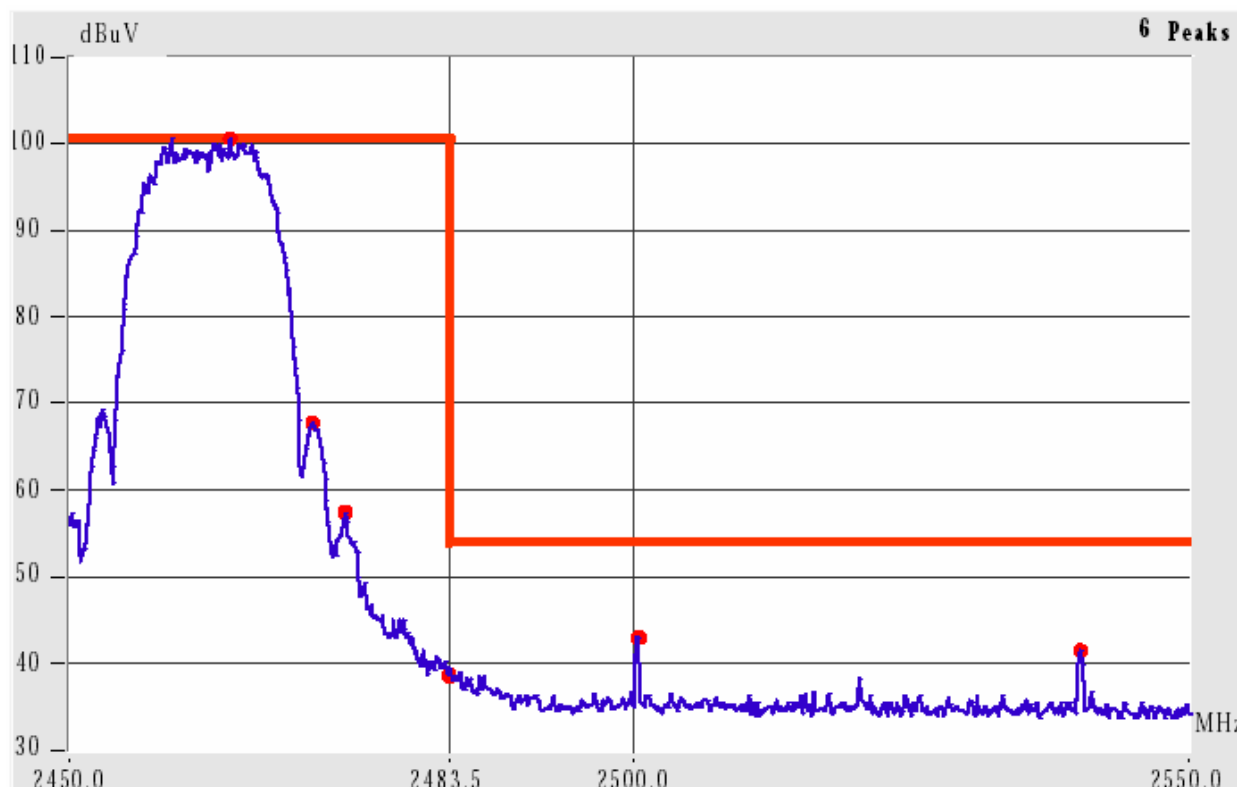


This is the hard copy of our bandedge measurement generated by our bandedge testing program. The plot shown above is the bandedge of channel 1.

1. The lobe left by the fundamental side is already 20dB below the highest emission level.
2. The emissions recorded in the restricted band is do comply with the Part 15.209(a) – as below.

Radiated Emission					Corrected Amplitude		Class B (3m)		
Frequency (MHz)	Ant. P.	Ant. H. (m)	Table (°)	Factors (dB)	(dBμV/m)		Limit (dBμV/m)		Margin (dB)
					Peak	Average	Peak	Ave.	
2379.89	Hor	1.00	212	9.15	45.65	---	74.00	53.96	-8.31
2390.02	Hor	1.00	199	9.18	46.02	---	74.00	53.96	-7.94
2380.21	Ver	1.00	187	9.15	47.49	---	74.00	53.96	-6.47
2390.02	Ver	1.00	209	9.18	48.18	---	74.00	53.96	-5.78

Channel 11 of IEEE 802.11b

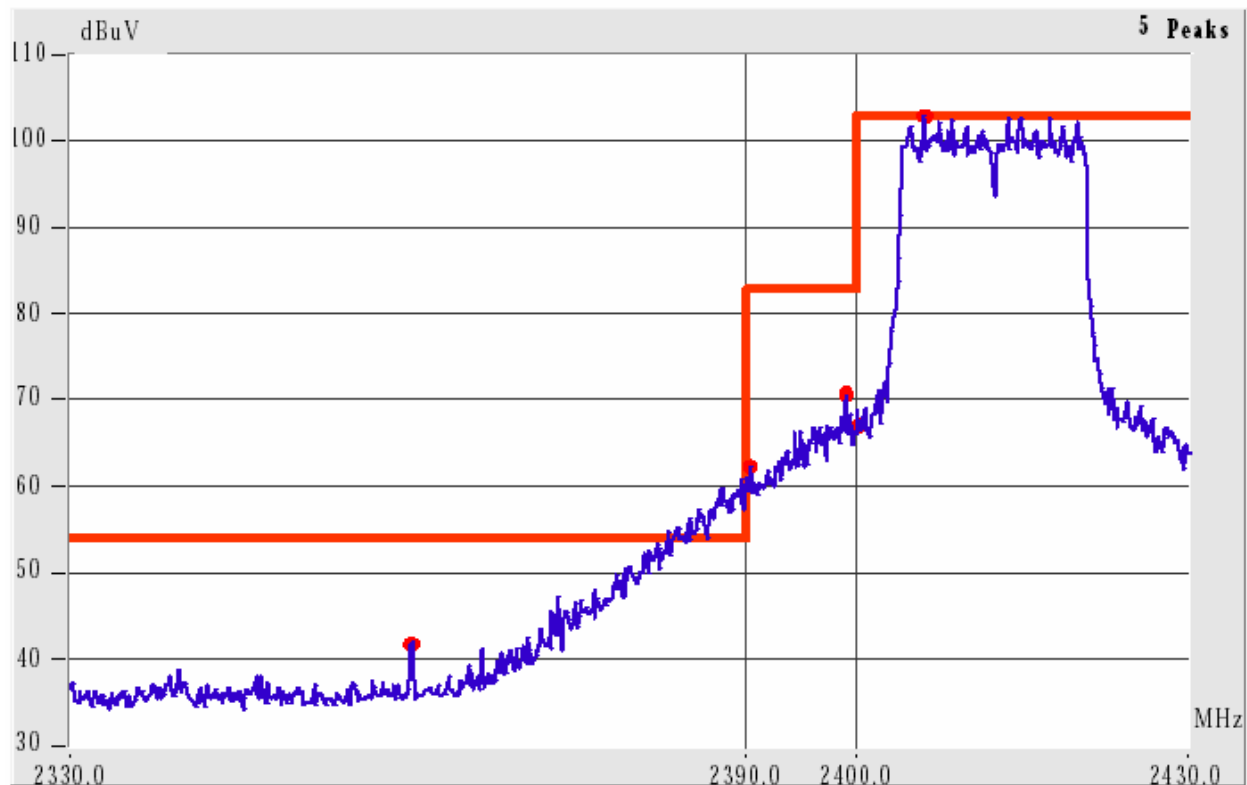


This is the hard copy of our bandedge measurement generated by our bandedge testing program. The plot shown above is the bandedge of channel 11.

3. The lobe right by the fundamental side is already 20dB below the highest emission level.
4. The emissions recorded in the restricted band is do comply with the Part 15.209(a) – as below

Radiated Emission					Corrected Amplitude		Class B (3m)		
Frequency (MHz)	Ant. P.	Ant. H. (m)	Table (°)	Factors (dB)	(dBμV/m)		Limit (dBμV/m)		Margin (dB)
					Peak	Average	Peak	Ave.	
2487.64	Hor	1.00	170	9.46	45.12	---	74.00	53.96	-8.84
2514.94	Hor	1.00	251	9.52	45.35	---	74.00	53.96	-8.61
2483.50	Ver	1.00	246	9.44	48.11	---	74.00	53.96	-5.85
2494.12	Ver	1.00	234	9.47	47.14	---	74.00	53.96	-6.82
2500.01	Ver	1.00	210	9.49	48.49	---	74.00	53.96	-5.47
2539.91	Ver	1.00	67	9.57	47.90	---	74.00	53.96	-6.06

Channel 1 of IEEE 802.11g

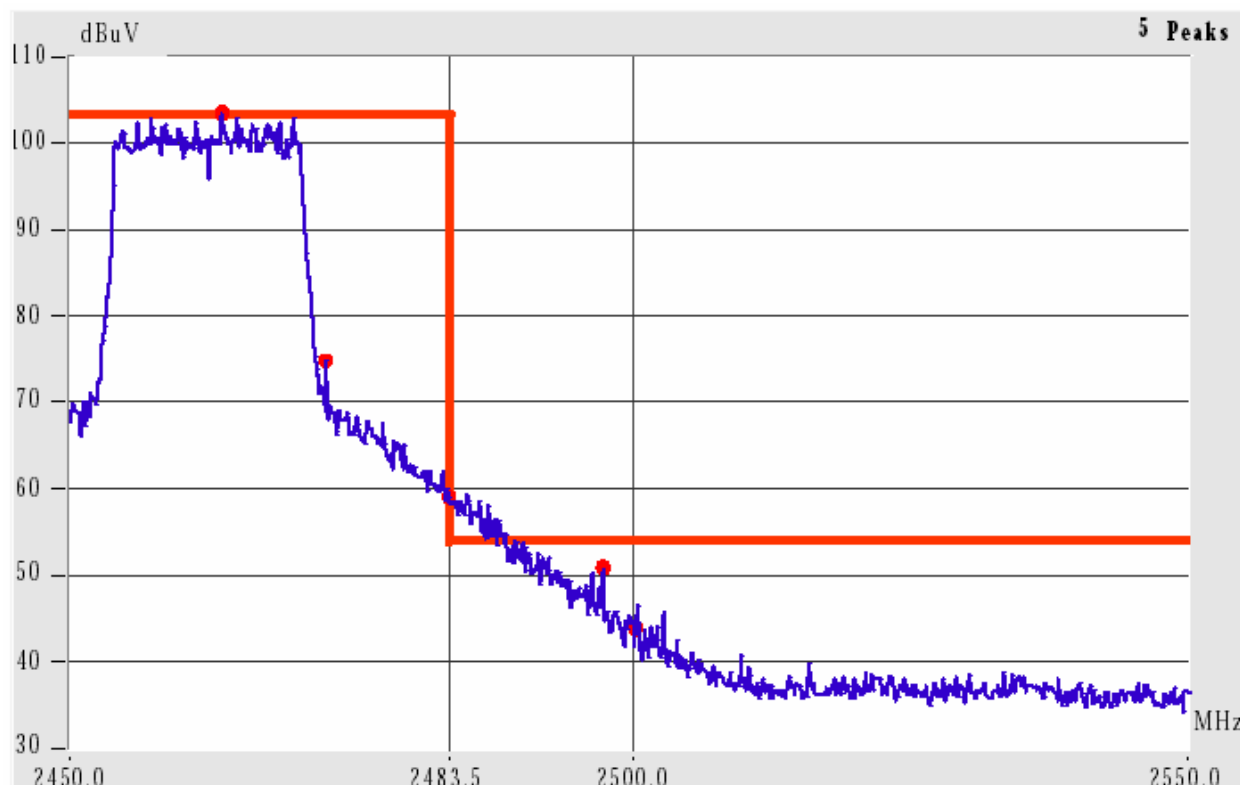


This is the hard copy of our bandedge measurement generated by our bandedge testing program. The plot shown above is the bandedge of channel 1.

5. The lobe left by the fundamental side is already 20dB below the highest emission level.
6. The emissions recorded in the restricted band is do comply with the Part 15.209(a) – as below.

Radiated Emission					Corrected Amplitude		Class B (3m)		
Frequency (MHz)	Ant. P.	Ant. H. (m)	Table (°)	Factors (dB)	(dBμV/m)		Limit (dBμV/m)		Margin (dB)
					Peak	Average	Peak	Ave.	
2387.60	Hor	1.00	177	9.18	65.84	37.18	74.00	53.96	-8.12
2390.14	Hor	1.00	304	9.18	66.52	37.35	74.00	53.96	-7.44
2388.21	Ver	1.00	125	9.18	72.84	38.51	74.00	53.96	-1.12
2390.43	Ver	1.00	130	9.18	71.68	39.35	74.00	53.96	-2.28

Channel 11 of IEEE 802.11g



This is the hard copy of our bandedge measurement generated by our bandedge testing program. The plot shown above is the bandedge of channel 11.

7. The lobe right by the fundamental side is already 20dB below the highest emission level.
8. The emissions recorded in the restricted band is do comply with the Part 15.209(a) – as below

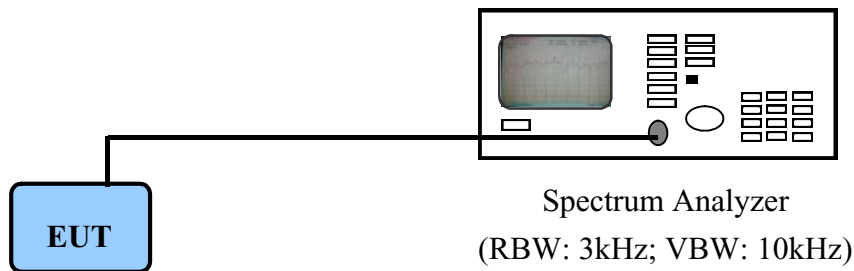
Radiated Emission					Corrected Amplitude		Class B (3m)		
Frequency (MHz)	Ant. P.	Ant. H. (m)	Table (°)	Factors (dB)	(dBμV/m)		Limit (dBμV/m)		Margin (dB)
					Peak	Average	Peak	Ave.	
2483.22	Hor	1.00	164	9.44	60.94	36.44	74.00	53.96	-13.02
2484.15	Hor	1.00	133	9.45	63.28	35.78	74.00	53.96	-10.68
2503.70	Hor	1.00	72	9.50	52.83	32.33	74.00	53.96	-21.13
2483.19	Ver	1.00	71	9.44	71.28	38.77	74.00	53.96	-2.68
2487.59	Ver	1.00	271	9.46	71.95	39.63	74.00	53.96	-2.01
2499.52	Ver	1.00	256	9.49	56.99	34.49	74.00	53.96	-16.97
2504.17	Ver	1.00	144	9.50	59.66	33.83	74.00	53.96	-14.30

IX. Section 15.247(d): Power Spectral Density

9.1 Test Condition & Setup

The tests below are running with the EUT transmitter set at high power in TDD mode. The EUT is needed to force selection of output power level and channel number. While testing, the EUT was set to transmit continuously and to be tested by the contact manner with the spectrum analyzer.

9.2 Test Instruments Configuration



P.S.: PC to control the EUT at maximal power output and channel Number and set antenna kit

9.3 List of Test Instruments

Instrument Name	Model No.	Brand	Serial No.	Next time
Spectrum Analyzer	MS2665C	ANRITSU	6200175476	12/30/04

9.4 Test Result of Power spectral density

The following table shows a summary of the test results of the Power Spectral Density.

IEEE 802.11b

<i>Channel</i>	<i>Ppr (dBm)</i>	<i>Cable Loss (dB)</i>	<i>Ppq (dBm)</i>	<i>Limit (dB)</i>	<i>Margin (dB)</i>
CH 01	-20.18	0.60	-19.58	8.00	-27.58
CH 06	-20.36	0.60	-19.76	8.00	-27.76
CH 11	-22.10	0.60	-21.50	8.00	-29.50

IEEE 802.11g

<i>Channel</i>	<i>Ppr (dBm)</i>	<i>Cable Loss (dB)</i>	<i>Ppq (dBm)</i>	<i>Limit (dB)</i>	<i>Margin (dB)</i>
CH 01	-16.22	0.60	-15.62	8.00	-23.62
CH 06	-16.02	0.60	-15.42	8.00	-23.42
CH 11	-17.01	0.60	-16.41	8.00	-24.41

Note:

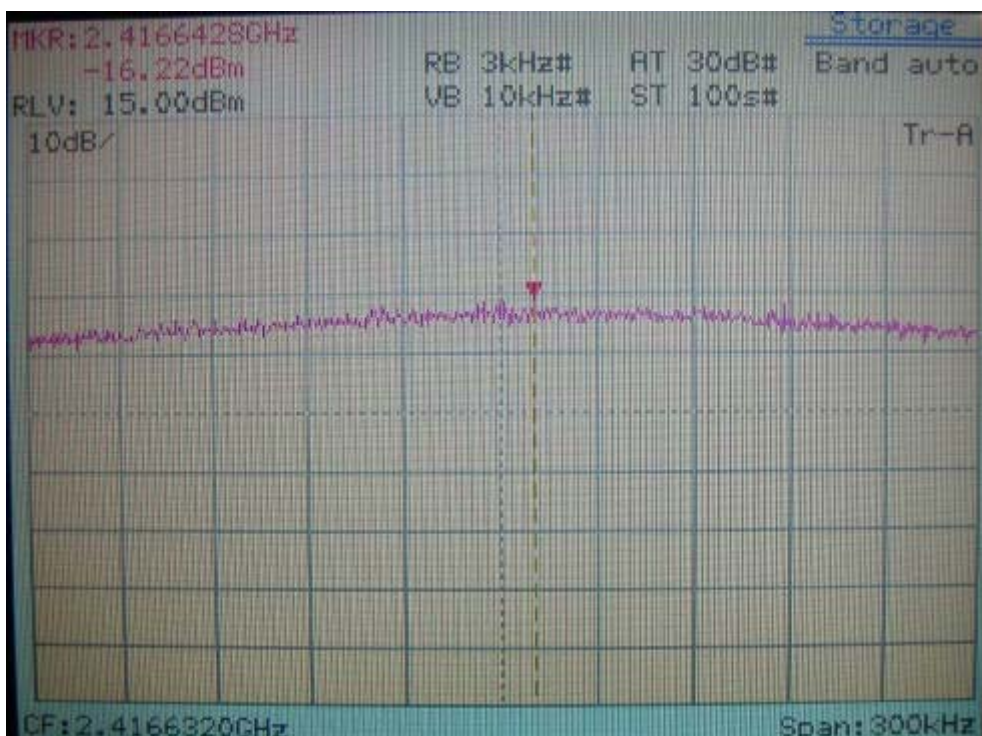
1. The following pages show the results of spectrum reading.
2. Ppr: spectrum read power density (using peak search mode),
Ppq: actual peak power density in the spread spectrum band.
3. $Ppq = Ppr + |Cable Loss|$

Power Spectral Density Channel 01

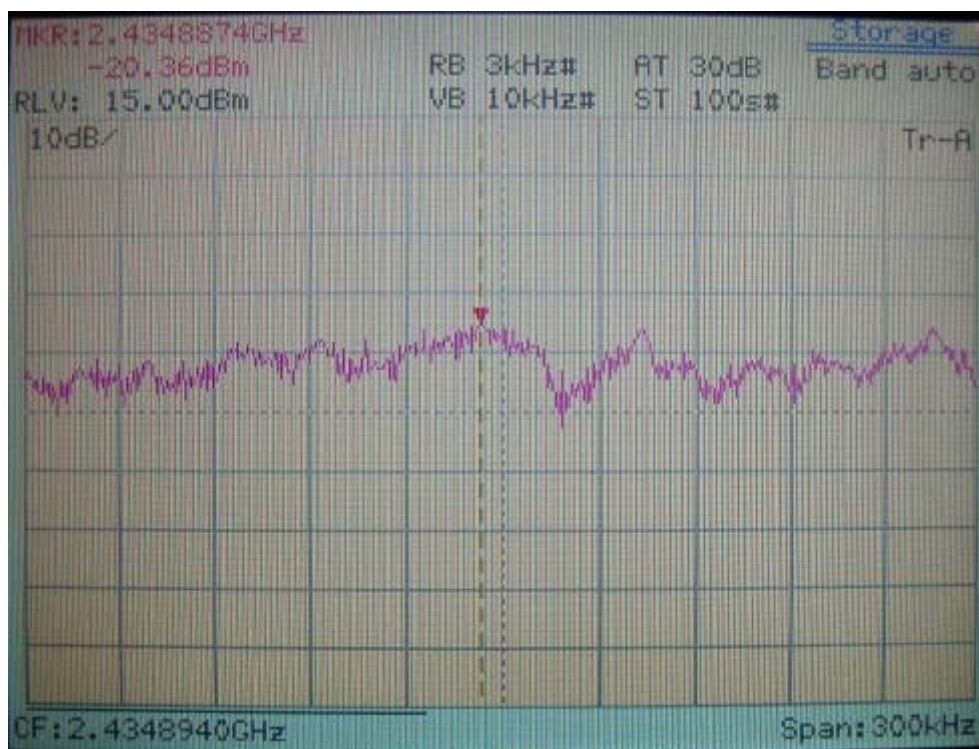
IEEE 802.11b



IEEE 802.11g



Power Spectral Density Channel 06



IEEE 802.11b



IEEE 802.11g

Power Spectral Density Channel 11

IEEE 802.11b



IEEE 802.11g

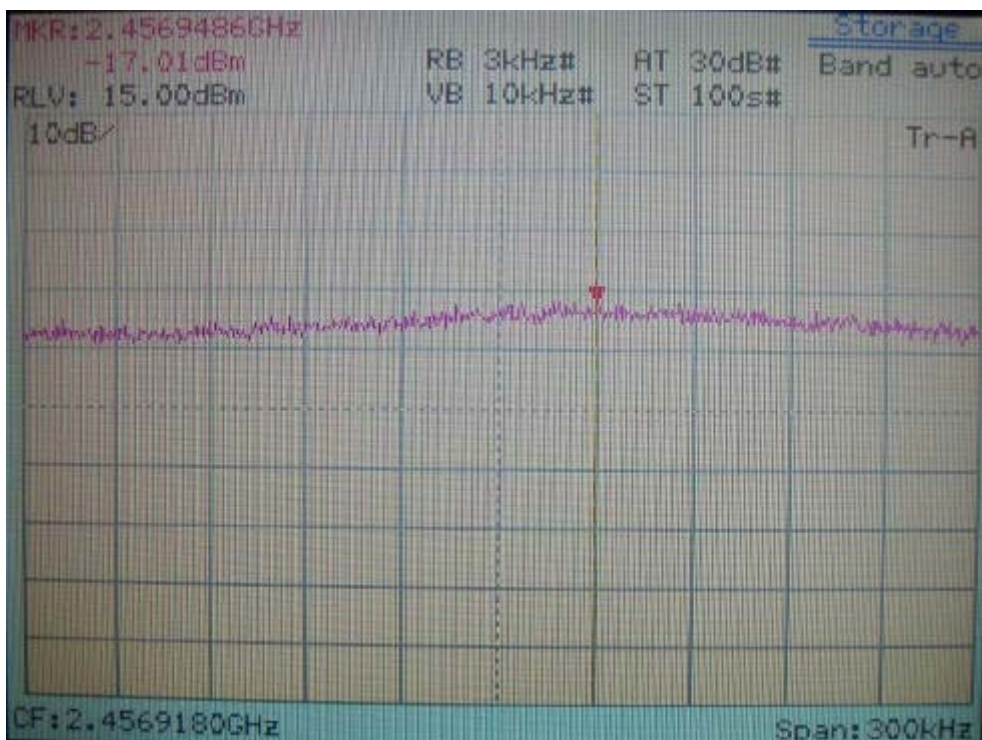
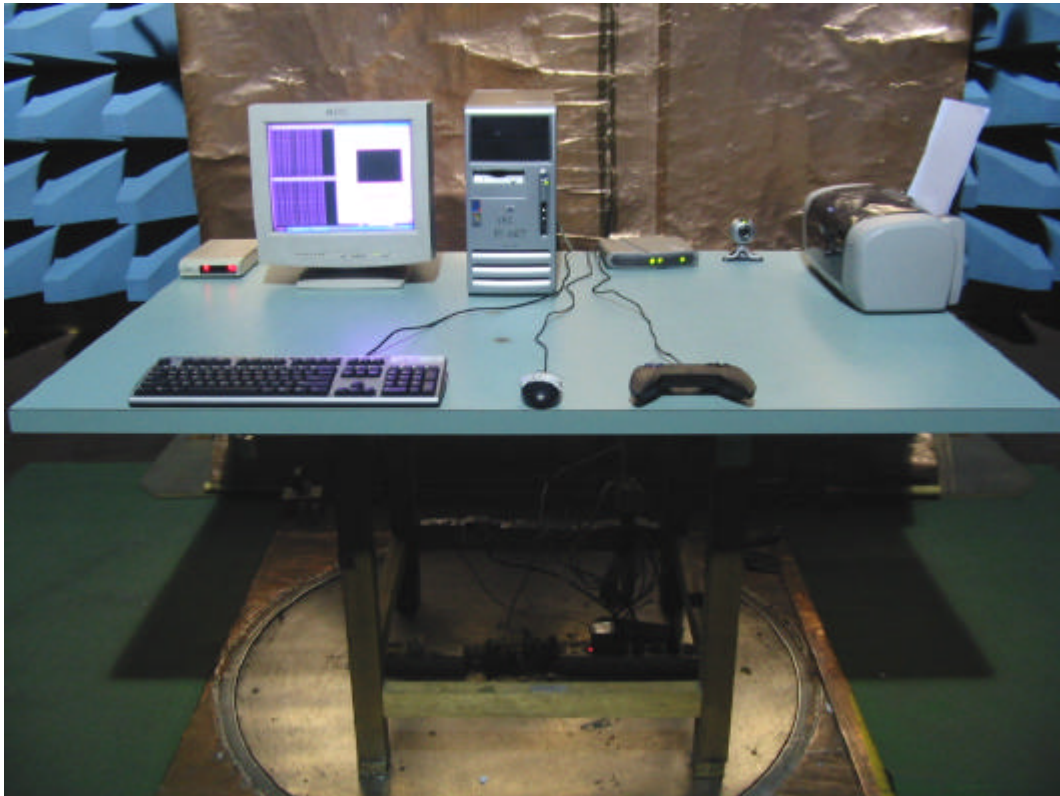


EXHIBIT D

Test Set-up Photos

Conducted Test Setup Placement:



Front View of the Test Configuration



Side View of the Test Configuration

Radiated Test Setup Placement:



Front View of the Test Configuration



Rear View of the Test Configuration

EXHIBIT E

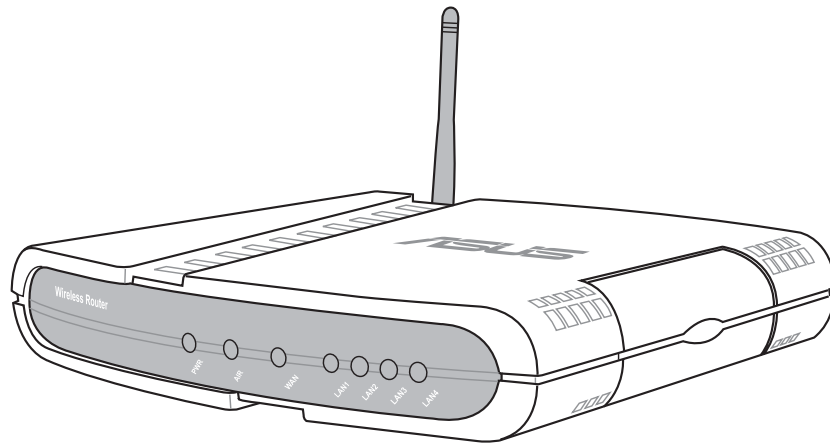
User Manual

WL500g / WL500g Deluxe Wireless Router

(For 802.11g/b Wireless Clients)

WL500b Wireless Router

(For 802.11b Wireless Clients)



User's Manual

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Manual Revision:	E1697
Release Date:	July 2004

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Notices

Federal Communications Commission Statement

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

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to Part 15 of the Federal Communications Commission (FCC) rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

WARNING! The use of a shielded-type power cord is required in order to meet FCC emission limits and to prevent interference to the nearby radio and television reception. It is essential that only the supplied power cord be used. Use only shielded cables to connect I/O devices to this equipment. You are cautioned that changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment.

Reprinted from the Code of Federal Regulations #47, part 15.193, 1993. Washington DC: Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office.

Canadian Department of Communications

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

**This Class B digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe B est conforme à la norme
NMB-003 du Canada.**

FCC Radio Frequency Exposure Caution Statement

In order to maintain compliance with the FCC RF exposure guidelines, this equipment should be installed and operated with minimum distance 20 cm between the radiator and your body. Use only with supplied antenna. Unauthorized antenna, modification, or attachments could damage the transmitter and may violate FCC regulations. Any changes of modifications not expressly approved by the grantee of this device could void the users authority to operate the equipment.

Installation and use of this Wireless LAN device must be in strict accordance with the instructions included in the user documentation provided with the product. Any changes or modifications (including the antennas) made to this device that are not expressly approved by the manufacturer may void the user's authority to operate the equipment. The manufacturer is not responsible for any radio or television interference caused by unauthorized modification of this device, or the substitution or attachment of connecting cables and equipment other than manufacturer specified. It is the responsibility of the user to correct any interference caused by such unauthorized modification, substitution or attachment. Manufacturer and its authorized resellers or distributors will assume no liability for any damage or violation of government regulations arising from failing to comply with these guidelines.

This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter.

Declaration of Conformity for R&TTE directive 1999/5/EC

Essential requirements – Article 3

Protection requirements for health and safety – Article 3.1a

Testing for electric safety according to EN 60950 has been conducted. These are considered relevant and sufficient.

Protection requirements for electromagnetic compatibility – Article 3.1b

Testing for electromagnetic compatibility according to EN 301 489-1 and EN 301 489-17 has been conducted. These are considered relevant and sufficient.

Effective use of the radio spectrum – Article 3.2

Testing for radio test suites according to EN 300 328-2 has been conducted. These are considered relevant and sufficient.

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1. Introduction

Overview

Thank you for purchasing the ASUS Wireless Router. The ASUS Wireless Router, WL500g/WL500g Deluxe, complies with IEEE 802.11g and 802.11b standards. The ASUS 802.11b Wireless Router, WL500b, complies with IEEE 802.11b standards. The 802.11g is an extension to 802.11b (used in majority of wireless LANs today) that broadens 802.11b's data rates to 54 Mbps within the 2.4 GHz band using OFDM (orthogonal frequency division multiplexing) technology. The 802.11g allows backward compatibility with 802.11b devices but only at 11 Mbps or lower, depending on the range and presence of obstructions. Wireless LANs are complementary extensions to existing wired LANs, offering complete mobility while maintaining continuous network connectivity to both corporate and home Intranets. They add a new level of convenience for LAN users. PC users stay connected to the network anywhere throughout a building without being bound by LAN wires. This is accomplished through the use of Access Point functionality of ASUS Wireless Routers. ASUS Wireless Router with built-in Internet gateway capability, allows your family to share a broadband Modem and one ISP account simultaneously from different rooms without wires! ASUS Wireless products can keep you connected anywhere, any time.

System Requirements

To begin using the ASUS 802.11g/802.11b Wireless Router, you must have the following minimum requirements:

- ADSL/Cable Modem and Broadband Internet Account.
- An Ethernet (10Base-T or 10/100Base-TX) adapter for wired client
- At least one 802.11g (54Mbps) or one 802.11b (11Mbps) wireless adapter for wireless mobile clients
- TCP/IP and an Internet browser installed

The Product Package

The WL500g/WL500g Deluxe Wireless Router comes with:

- One ASUS 802.11g Wireless Router
- One ASUS Wireless Router Quick Start Guide
- One power adapter (5 Volts DC)
- One support CD (utilities and user's manual)
- One RJ-45 Ethernet cable (straight-through)

The WL500b Wireless Router comes with:

- One ASUS 802.11b Wireless Router
- One ASUS Wireless Router Quick Start Guide
- One power adapter (5 Volts DC)
- One support CD (utilities and user's manual)
- One RJ-45 Ethernet cable (straight-through)

Features

The WL500g/WL500g Deluxe and WL500b Wireless Router features include:

- **Wireless Connectivity And Protect Compatibility.** WL500g/WL500g Deluxe Wireless Router enables fastest 54Mbps IEEE 802.11g wireless transmission but keeps compatibility with existing IEEE 802.11b devices. WL500g Deluxe increases performance compared with standard 802.11g when Afterburner mode is enabled. The WL-500b Wireless Router utilizes the IEEE 802.11b standard.
- **Secure wireless connectivity.** The integrated Wireless Access Point with WPA authentication and encryption functionality allows the wireless router to link a broadband Internet connection to your local network of 802.11g or/and 802.11b wireless mobile clients securely. The ASUS Wireless Router is firmware upgradable to support WPA.
- **Multiple local network ports.** Four 10/100Base-T Ethernet ports, offering either a connection to a hub or switch on the local wired network or a direct connection to multiple Ethernet-enabled computers. Build-in DHCP server allows the Wireless Router to provide IP addresses to clients on your local network automatically.

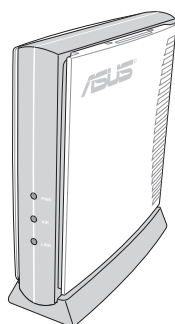
- **Broadband port.** The Broadband port connects the Wireless Router to your cable/DSL modem. Static IP, dynamically IP and PPPoE (PPP over Ethernet) connection to Internet are supported.
- **Shared Internet access.** All computers on the local network can access the Internet through the Wireless Router, using only a single external IP address.
- **Firewall protection.** The wireless router use of NAT (Network Address Translation) provides firewall protection for your local network.
- **Children Protection.** The wireless router allows you to block the Internet access within a predefined time interval and to block the WWW access with specific keywords in URL within a predefined time interval.
- **USB devices support.** Connecting a USB storage device to the wireless router enables you to set up an FTP server and share the USB storage device with Internet or WLAN users. With a USB web camera, the wireless router allows you to monitor locations such as your home or office from any location through a wireless LAN or over the Internet.
- **Printer sharing.** With an additional Printer, the ASUS Wireless Router allows you to share the printer to your local area network. Standard parallel printers are supported.
- **Easy setup and management.** Use your web browser from any computer on the local network to configure the ASUS Wireless Router.

Chapter 1 - Introduction

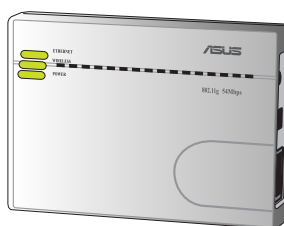
The ASUS Wireless Family

The ASUS Wireless family contains a several wireless network solutions for 802.11g & 802.11b wireless local area networks in the home or office.

Access Point or Client

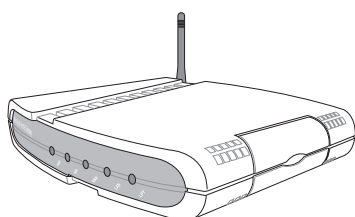


The **ASUS WLAN 802.11g Access Point (WL-300g)** creates a wireless network using the IEEE 802.11g and 802.11b wireless standards.

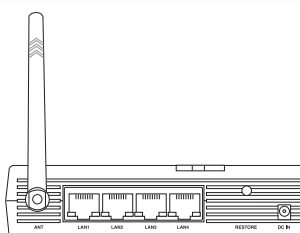


The **ASUS 3 in 1 Pocket Access Point (WL-330g)** creates a wireless network using the IEEE 802.11g/b wireless standards.

Access Point & Router

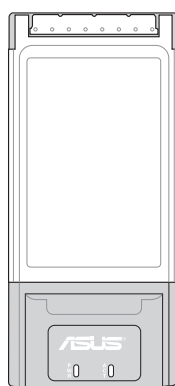


The **ASUS WLAN Gateway (WL-500g)** creates a wireless network using the IEEE 802.11g/b wireless standards and allows sharing a single Internet connection.

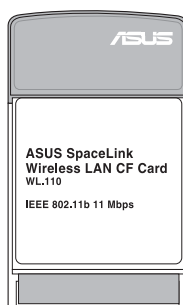


The **ASUS WLAN 802.11g Pocket Router (WL-530g)** creates a wireless network using the IEEE 802.11g and 802.11b wireless standards and allows sharing a single Internet connection.

PCMCIA Client



The **ASUS WLAN PC Card (WL-107g)** is a wireless LAN adapter that fits into a PCMCIA Type II slot in a Notebook PC and creates a wireless network using the IEEE 802.11g/b wireless standards.



The **ASUS 802.11b Wireless CF Card (WL-110)** is a IEEE 802.11b wireless LAN adapter that fits into a Compact Flash Type II slot in a Portable Digital Assistant (PDA).

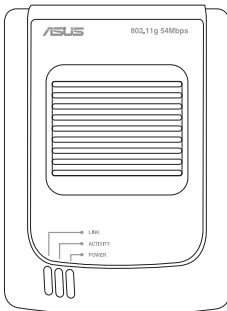
(The illustrations are not to scale.)

PCI Client

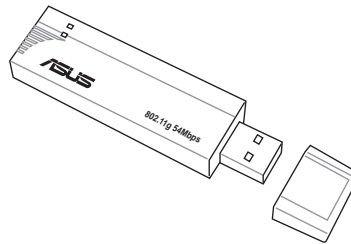


The **ASUS WLAN PCI Card (WL-138g)** is a wireless LAN adapter that fits into a standard PCI slot in a desktop PC and creates a wireless network using the IEEE 802.11g/b wireless standards.

USB Access Point or Client USB Client

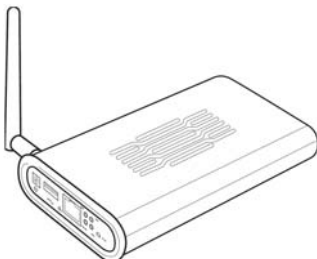


The **ASUS USB Wireless LAN Adapter (WL-160g)** creates a wireless network using the IEEE 802.11g/b wireless standards and connects to any computer using USB2.0 connectivity.



The **ASUS USB Wireless LAN Adapter (WL-167g)** is thumb-sized and creates a wireless network using the IEEE 802.11g/b wireless standards and connects to any computer using USB2.0 connectivity.

Access Point & File Server



The **ASUS WLAN 802.11g Access Point (WL-HDD)** creates a wireless network using the IEEE 802.11g and 802.11b wireless standards. Also serves as a file server (wireless network attached storage).

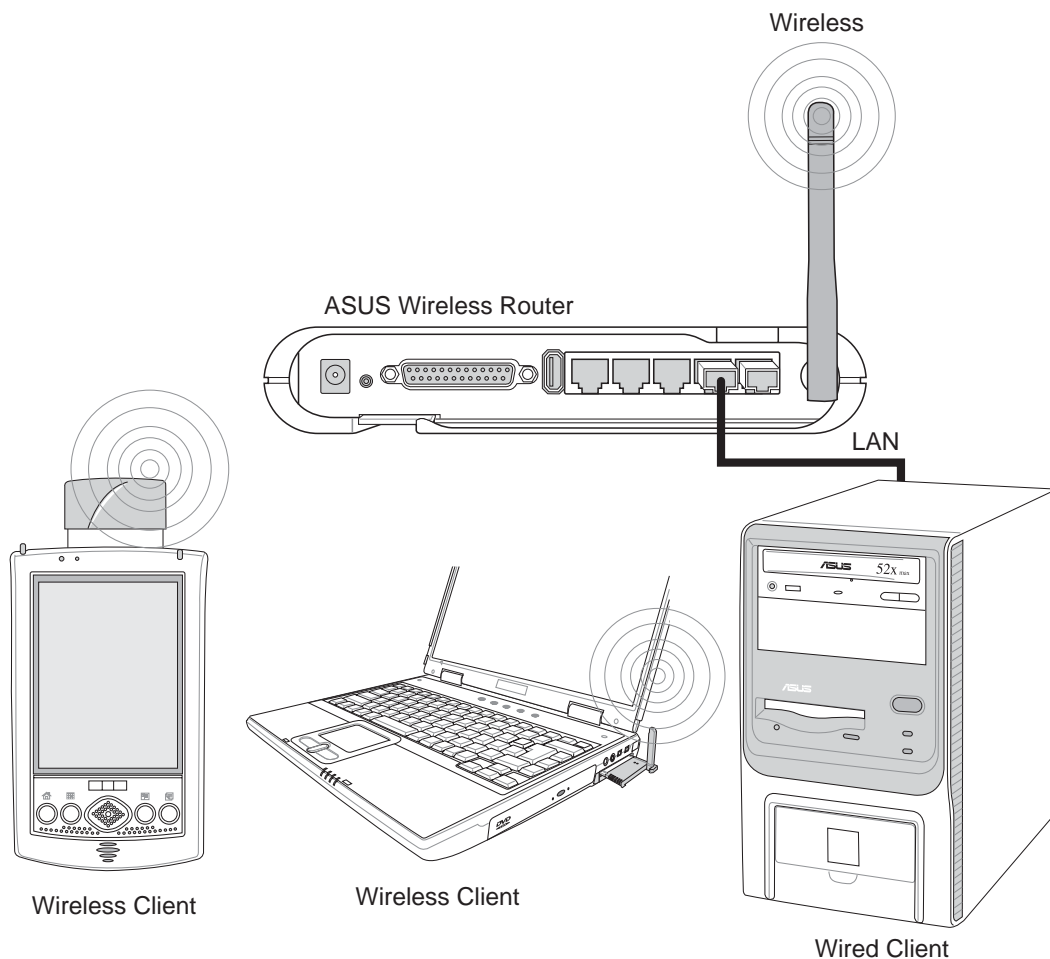
(The illustrations are not to scale.)

Network Topology

The settings that you need to perform will vary depending on the role that your ASUS Wireless Router will play.

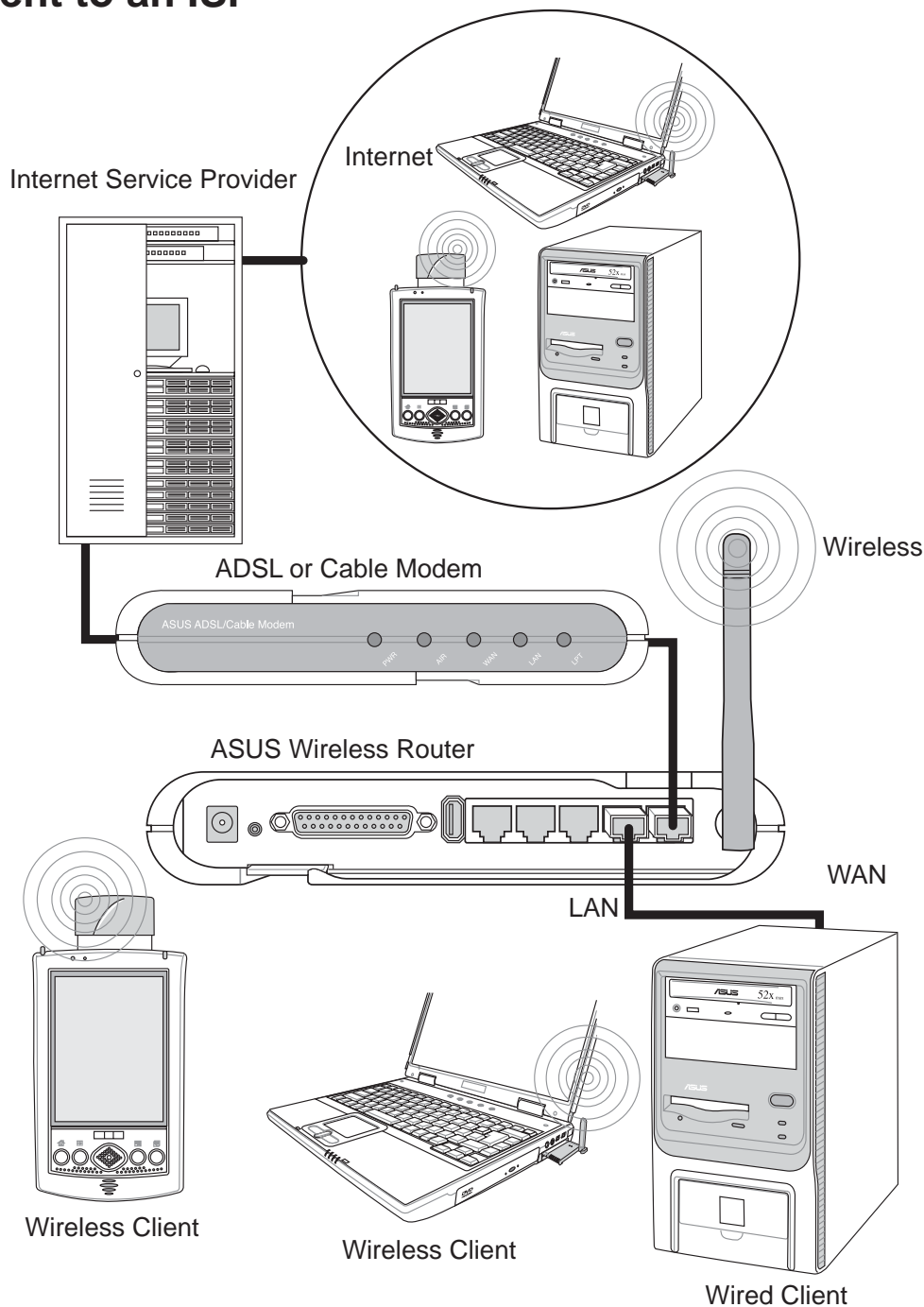
Network Backbone

No software setting is necessary in the ASUS Wireless Router.



In this topology, the wireless router connects your wired and wireless devices together to form a local area network (LAN), as shown. To connect a computer (or other device) to the ASUS Wireless Router, you need a network cable (UTP-Cat5) with one end connected to one of the LAN ports on the back of the ASUS Wireless Router and the other in the 10/100 LAN port on that device. For wireless connections, wireless mobile clients must comply with the IEEE 802.11b standard.

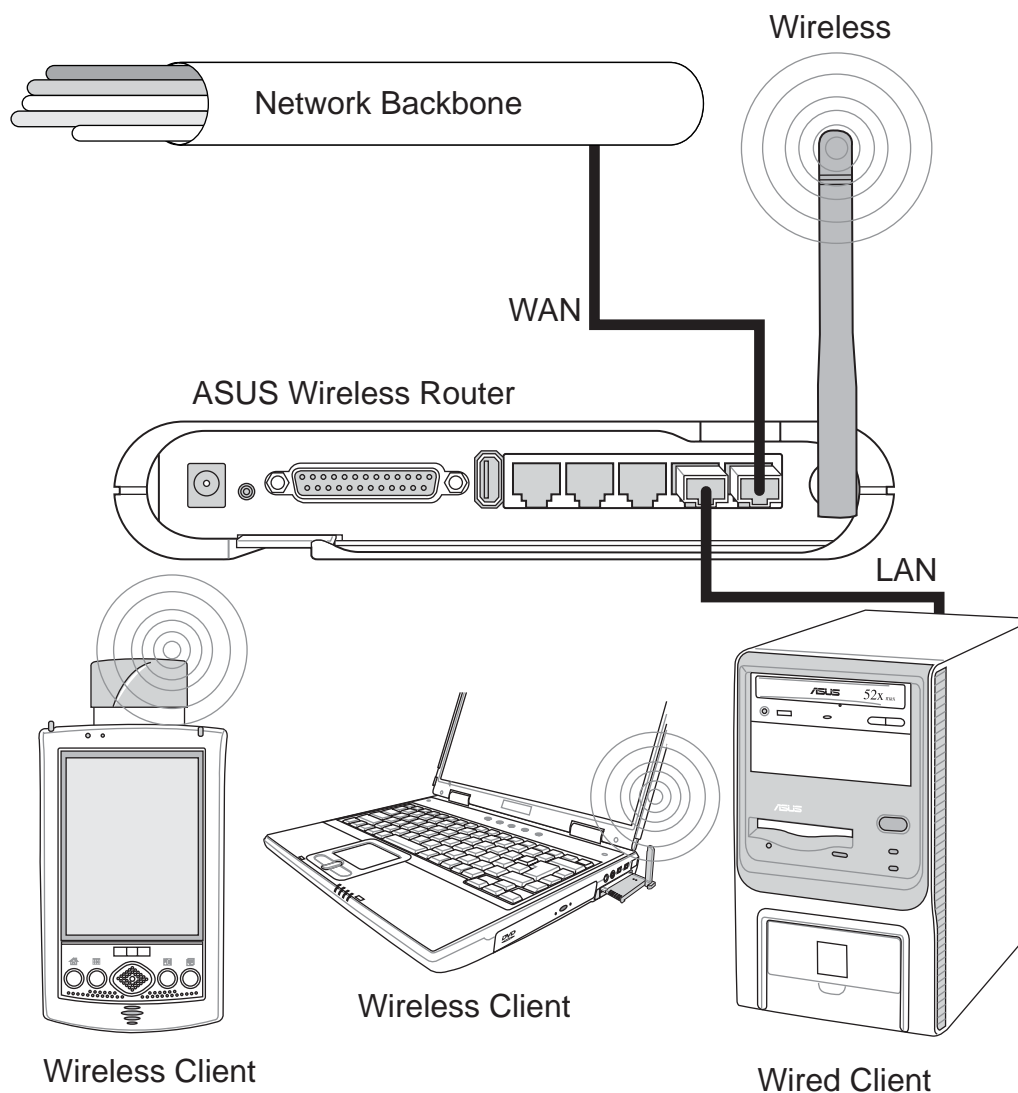
Agent to an ISP



In this topology, the wireless router is not only a backbone of your LAN but also an agent to your Internet Service Provider (ISP). You may use an ADSL or Cable modem to communicate with your ISP. Connect the LAN port on the modem with the WAN port at the back of the ASUS Wireless Router using a network cable as shown above.

Note: You also need to make sure that other connections on the ADSL or Cable modem are correct.

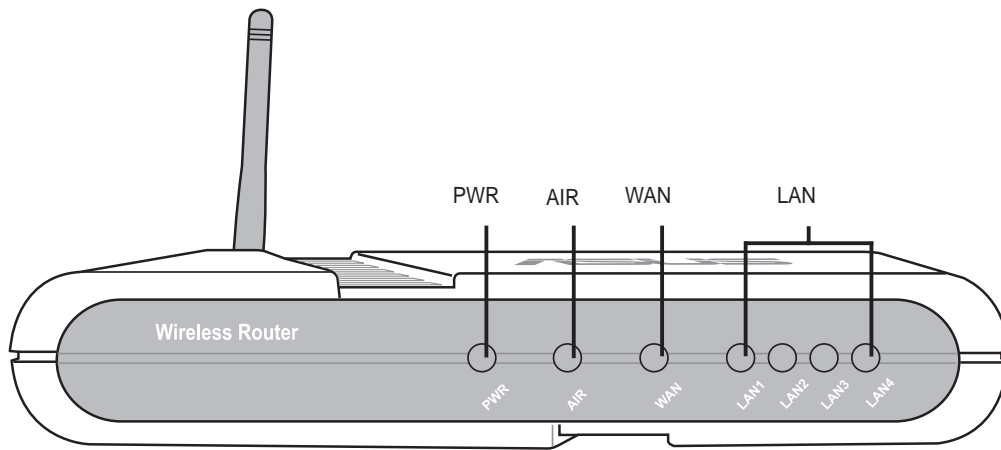
Agent to Another Network



In this topology, the wireless router is an agent between your LAN and another network. Use a network cable with one end connected to the WAN port on the wireless router and the other to the other network as shown above.

LED Indicators

The LEDs on the front of the ASUS Wireless Router display the status of the ASUS Wireless Router.



PWR (Power)

Off	No power
On	System ready
Flashing	Firmware upgrade failed

AIR (Wireless Network)

Off	No power
On	Wireless system ready
Flashing	Transmitting or receiving data (wireless)

WAN (Wide Area Network)

Off	No power
On	Has physical connection to an Ethernet network
Flashing	Transmitting or receiving data (through Ethernet wire)

LAN 1-4 (Local Area Network)

Off	No power
On	Has physical connection to an Ethernet network
Flashing	Transmitting or receiving data (through Ethernet wire)

2. Installation Procedure

Follow these steps to install the ASUS Wireless Router.

1. Determine the best location for the ASUS Wireless Router. Keep in mind the following considerations:
 - The length of the Ethernet cable that connects the ASUS Wireless Router to the network must not exceed 100 meters.
 - Try to place the ASUS Wireless Router on a flat, sturdy surface as far from the ground as possible, such as on top of a desk or bookcase, keeping clear of obstructions and away from direct sunlight.
 - Try to centrally locate the ASUS Wireless Router so that it will provide coverage to all of the wireless mobile devices in the area. Orientating the antenna vertically should provide the best reception.
 - Use only the power supply that came with this unit. Other power supplies may fit but the voltage and power may not be compatible.
2. Wall mounting or vertical standing is also possible.

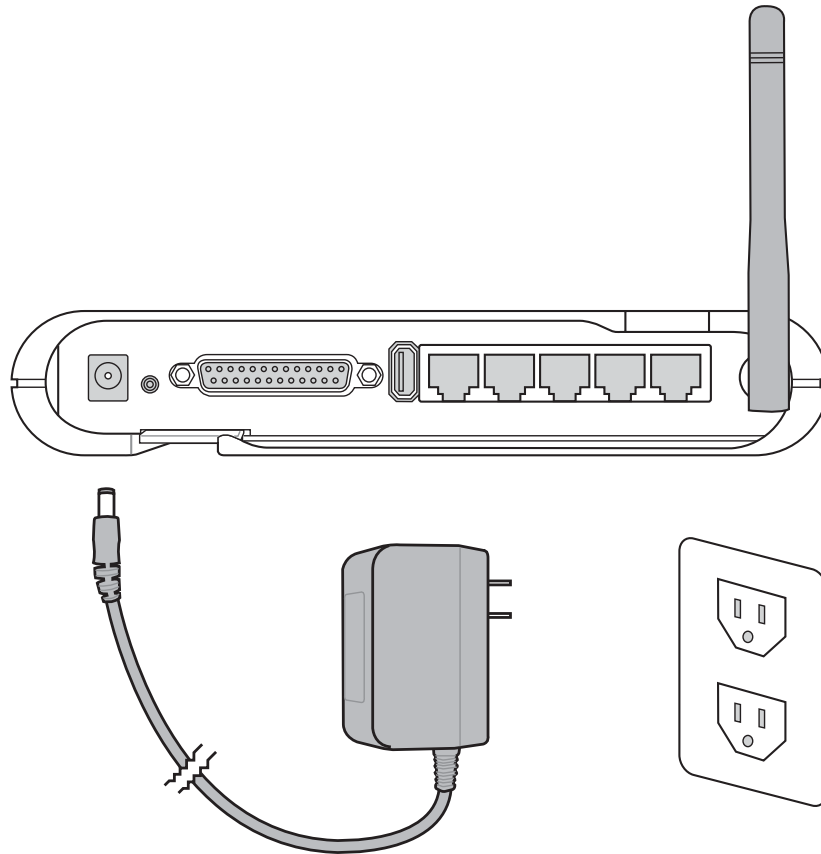
It is the responsibility of the installer and users of the ASUS Wireless Router to guarantee that the antenna is operated at least 20 centimeters from any person. This is necessary to insure that the product is operated in accordance with the RF Guidelines for Human Exposure which have been adopted by the Federal Communications Commission.

4. **LAN Connection:** Attach one end of an RJ-45 Ethernet cable to the ASUS Wireless Router's LAN port (any one of the four) and attach the other end to the RJ-45 Ethernet cable to your desktop computer.
5. **Power Connection:** The ASUS Wireless Router requires power from an external power supply. The ASUS Wireless Router ships with a UL listed, Class 2 power supply (5V). Attach one end of the DC power adapter to the back of the ASUS Wireless Router and the other end to a power outlet.

The Power LED on the front of the ASUS Wireless Router will light up when the unit is powered ON. In addition, the green LAN or WAN LEDs will turn ON to indicate that the ASUS Wireless Router has a physical Ethernet network connection.

Chapter 2 - Installation

Warning: Use the ASUS Wireless Router only with the power adapter supplied in the product package. Using another power supply may damage the ASUS Wireless Router.



2. Installation

6. **Printer Connection:** Connect a printer to the Wireless Router printer port (WL500g/WL500b only) or USB port to use the router as a printing server for your local network.
7. **USB Connection:** Connect a supported USB web camera or USB storage device to the Wireless Router USB port.

Note: Before using an embedded USB application or device, refer to the USB storage and USB camera support list on the ASUSTeK Web site at the following Internet address: <http://www.asus.com>.

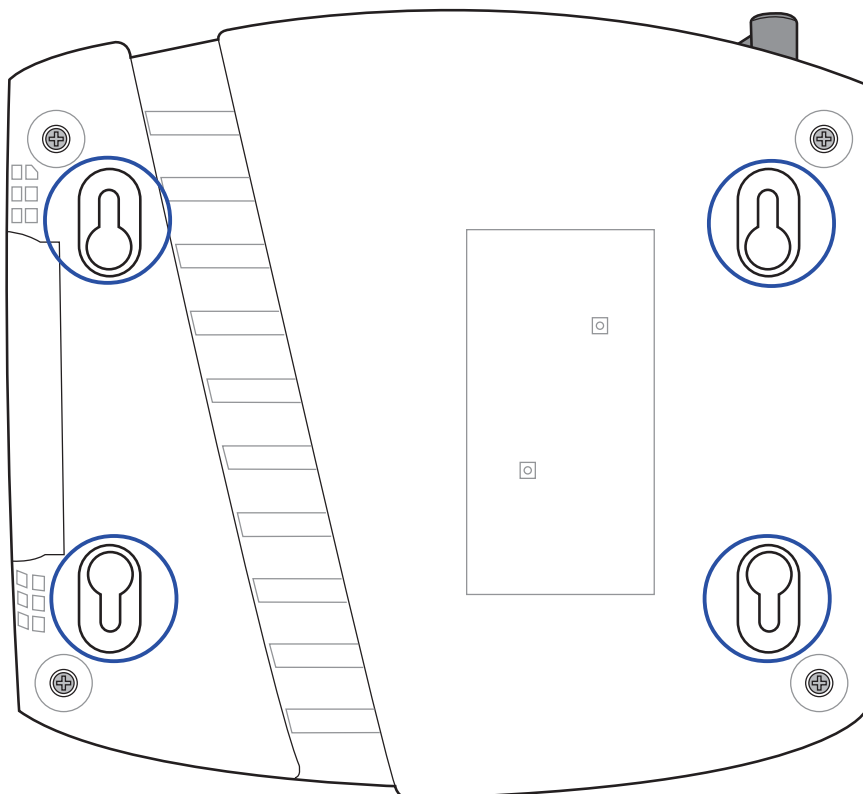
Wall Mounting Option

Out of the box, the ASUS Wireless Router is designed to sit on a raised flat surface like a file cabinet or book shelf. The unit may also be converted for mounting to a wall or ceiling.

Follow these steps to mount the ASUS Wireless Router to a wall:

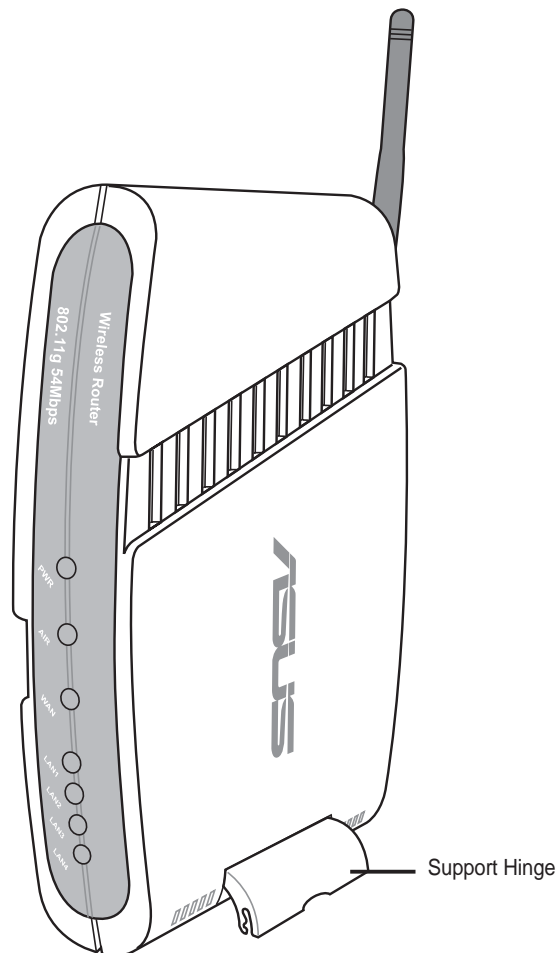
1. Look on the underside for the four mounting hooks.
2. Mark two upper holes in a flat surface using the provided hole template.
3. Tighten two screws until only 1/4" is showing.
4. Latch the upper two hooks of the ASUS Wireless Router onto the screws.

Note: Readjust the screws if you cannot latch the ASUS Wireless Router onto the screws or if it is too loose.



Vertical Standing Option

The ASUS Wireless Router can also stand on its side to save space. Two hinges can be opened on the right side to support vertical standing. Orientate the antenna so that it points upwards.



Connecting to the ASUS Wireless Router

Wired Connection

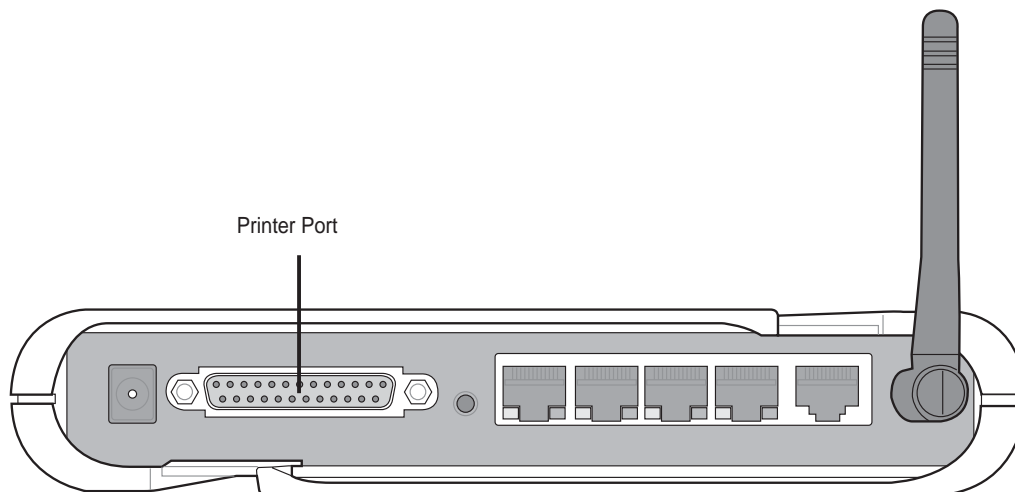
One RJ-45 cable is supplied with the ASUS Wireless Router. Auto crossover function is designed into the ASUS Wireless Router so you can use either a straight-through or a crossover Ethernet cable. Plug one end of the cable into the WAN port on the rear of the ASUS Wireless Router and the other end into the Ethernet port of your ADSL or Cable modem.

Wireless-Connection

Refer to your wireless adapter user's manual on associating with the ASUS Wireless Router. The default SSID of the ASUS Wireless Router is "default" (lower case), encryption is disabled and open system authentication is used.

Printer Connection (WL500g/WL500b only)

A DB25 parallel cable should be supplied with your printer. Plug the male connector of this parallel cable into the printer port on the rear of the ASUS Wireless Router and the centronics end into your printer.



3. Software Configuration

Configuring the ASUS Wireless Router

The ASUS Wireless Router can be configured to meet various usage scenarios. Some of the factory default settings may suit your usage; however, others may need changing. Prior to using the ASUS Wireless Router, you must check the basic settings to guarantee it will work in your environment. Configuring the ASUS Wireless Router is done through a web browser. You need a Notebook PC or desktop PC connected to the ASUS Wireless Router (either directly or through a hub) and running a web browser as a configuration terminal. The connection can be wired or wireless. For the wireless connection, you need an IEEE 802.11g/b compatible device, e.g. ASUS WLAN Card, installed in your Notebook PC. You should also disable WEP and set the SSID to “default” for your wireless LAN device. If you want to configure the ASUS Wireless Router or want to access the Internet through the ASUS Wireless Router, TCP/IP settings must be correct. Normally, the TCP/IP setting should be on the IP subnet of the ASUS Wireless Router.

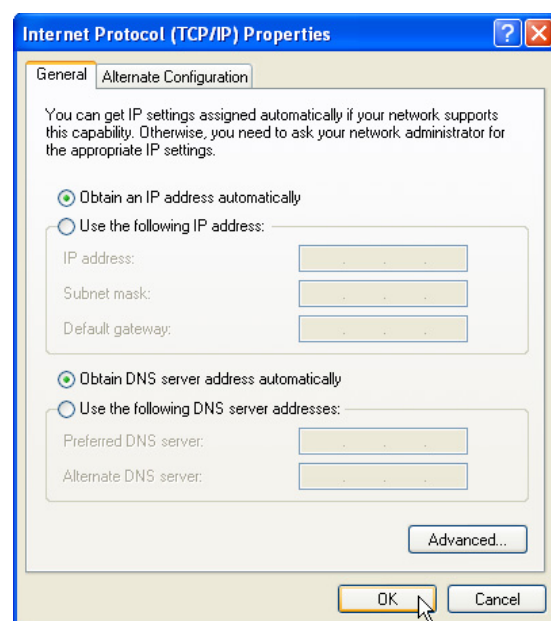
Note: Before rebooting your computer, the ASUS Wireless Router should be switched ON and in ready state.

Setting IP address for Wired or Wireless Connection

Get IP Automatically

The ASUS Wireless Router incorporates a DHCP server so the easiest method is to set your PC to get its IP address automatically and reboot your computer. So the correct IP address, gateway, DNS (Domain Name System Server) can be obtained from the ASUS Wireless Router.

Note: Before rebooting your PC, the ASUS Wireless Router should be switched ON and in ready state.



Chapter 3 - Software Configuration

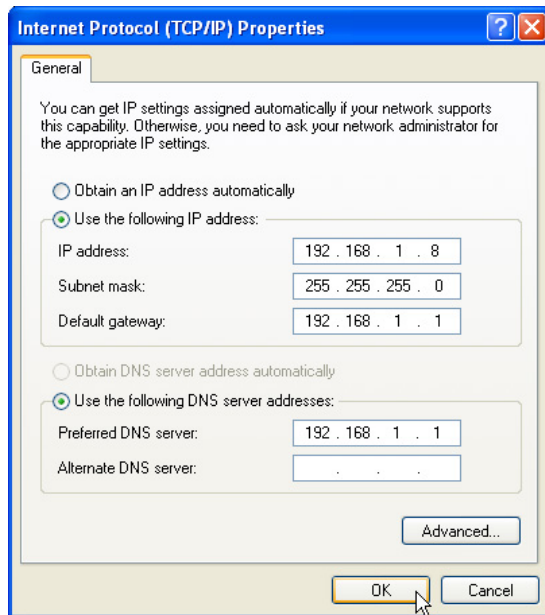
Setting IP Manually

If you want to set your IP address manually, the following default settings of the ASUS Wireless Router should be known:

- IP address 192.168.1.1
- Subnet Mask 255.255.255.0.

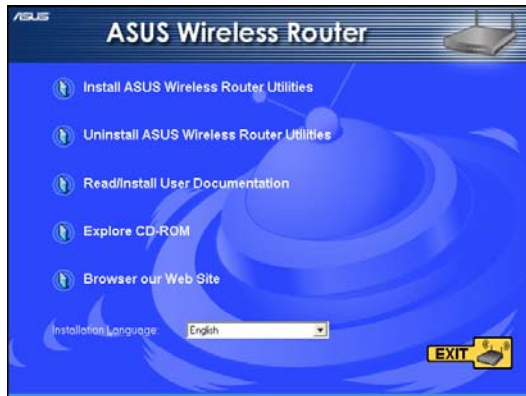
If you set your computer's IP manually, it needs to be on the same segment. For example:

- IP address 192.168.1.xxx (xxx can be any number between 2 and 254 that is not used by another device)
- Subnet Mask 255.255.255.0 (same as the ASUS Wireless Router)
- Gateway 192.168.1.1 (this is the ASUS Wireless Router)
- DNS 192.168.1.1 (ASUS Wireless Router IP address or your own).

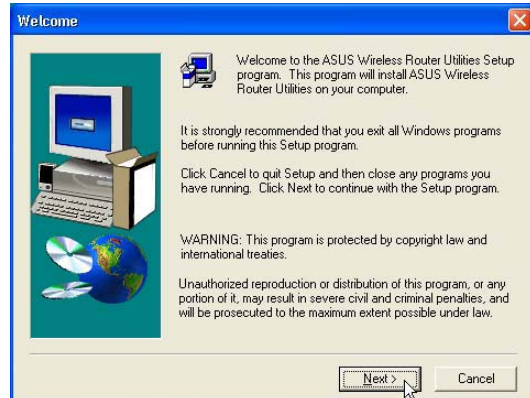


Installing the ASUS Wireless Router Utilities

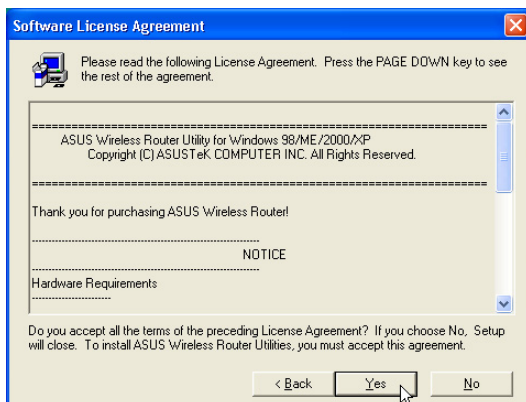
Follow these steps to install the ASUS Wireless Router Utilities in Microsoft Windows. Insert the support CD provided with the ASUS Wireless Router and the menu will appear. (Double-click **setup.exe** if your autorun has been disabled.)



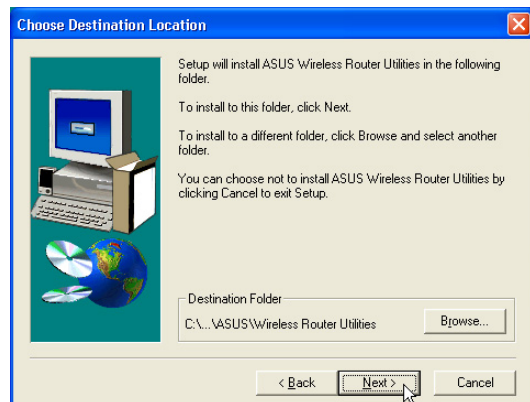
- (1) Select a language and click **Install ASUS Wireless Router Utilities**.



- (2) Click **Next** after reading the welcome screen.



- (3) Click **Yes** after reading the license agreement.



- (4) Click **Next** to accept the default destination folder or enter another.



- (5) Click **Next** to accept the default program folder or enter another.



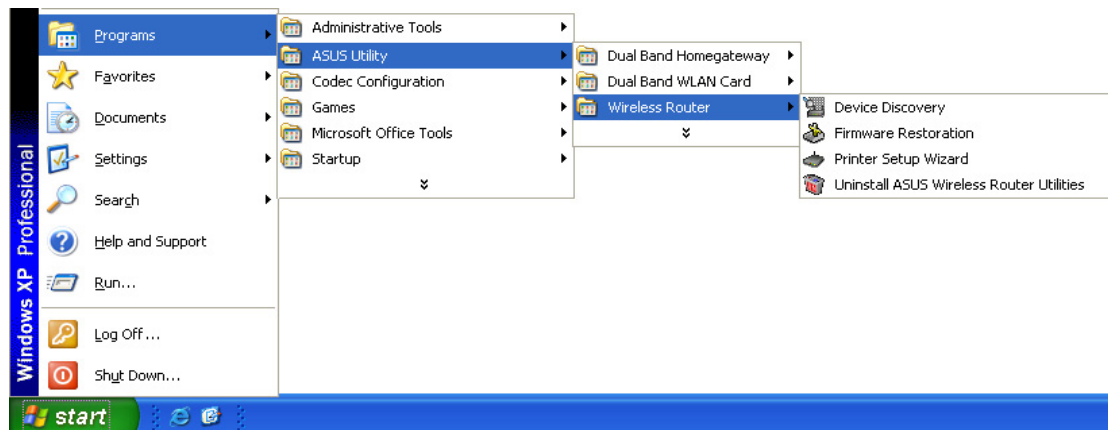
- (6) Click **Finish** when setup is complete.

Chapter 3 - Software Configuration

Using the Wireless Router for the First Time

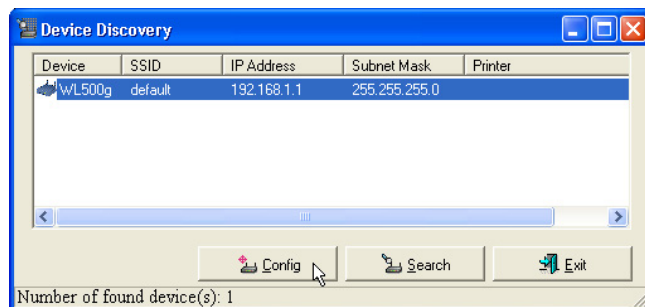
1. ASUS Wireless Router Utilities

Run **Device Discovery** from “ASUS Utility” in Windows Start Programs.



2. Connect to the ASUS WLAN Web Manager

Run the ASUS WLAN **Device Discovery** from the **Start** menu and click **Config** when the device is found.



Add **192.168.1.1** in the Exceptions box if you are using a proxy server (Microsoft® Internet Explorer).

Microsoft® Internet Explorer



If your computer's IP is not on the same subnet as the ASUS Wireless Router (192.168.1.X), you will be asked to change it. The IP address can be any number from 2 to 254 that is not used by another device. Gateway is not required.

Note: Using a proxy server (Microsoft® Internet Explorer) for your LAN requires that you set an exception for the ASUS Wireless Router or else connection will fail.

Chapter 3 - Software Configuration

Enter Address or Name Manually

You can also open your PC's web browser and enter the name or the default IP address of the ASUS Wireless Router:

WL500g

<http://my.router> or <http://my.WL500g> or <http://192.168.1.1>

WL500g Deluxe

<http://my.router> or <http://my.WL500gx> or <http://192.168.1.1>

User Name & Password

Once connected, a window will ask for the User name and Password in order to log in. The factory default values are “**admin**” and “**admin**”.

Note: If you cannot find any the ASUS Wireless Routers due to a problem in the IP settings, push and hold the “Restore” button over five seconds to restore factory default settings.



Home Page

After logging in, you will see the ASUS Wireless Router home page.



WL500g




WL500g Deluxe

Chapter 3 - Software Configuration

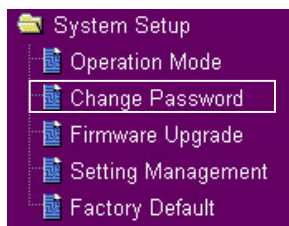


WL500b

IMPORTANT: After entering information on any page, click the “Apply” button . If you click any other link, you will be directed to another page and lose your new settings.

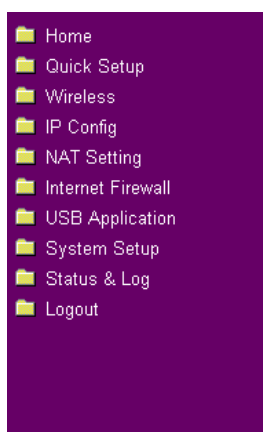
3. Utilities

3. Set your own password



System Setup - Change Password	
New Password:	<input type="text"/>
Retype New Password	<input type="text"/>
<div>Save Clear</div>	

4. Use Quick Setup



Wireless Home Gateway

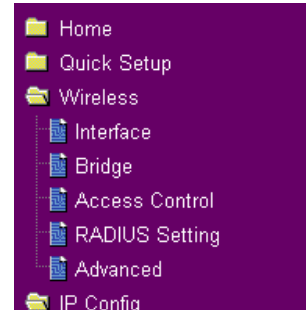
- **Quick Setup** allows users to complete basic setting by just answering several questions.
- **802.11g and WPA** supports up to 54Mbps transmission rate, backward compatibility with 802.11b and interoperable security enhancement.
- **USB Application** Plug a USB storage to become a FTP server or plug a USB web camera to monitor your home environment.
- **IP Sharing** all computers share the same IP to Internet.
- **Internet Firewall** protect LAN or Wireless environment through flexible filter rule setting.
- **Status & Log** log status of system in details.

This site is best viewed with IE 5.0 or above.

Click NEXT to start Quick Setup Next

Home Gateway Mode

There are three operation modes in the ASUS Wireless Router. The default operation mode of the ASUS Wireless Router is Home Gateway Mode. Please refer to “System Setup” – “Operation Mode” in detail. To start quick setup, click **Next** to enter the “Quick Setup” page. Follow the instructions to setup the ASUS Wireless Router.



Quick Setup in Home Gateway Mode

Select your time zone or the closest region. Click **Next** to continue.

Select the connection type. Click **Next** to continue.

Select “No” to enter the information manually. “Yes” will disable the field. Click **Next** to continue.

Home Gateway Mode (Cont.)

The screenshot shows the 'Quick Setup' section of the ASUS Wireless Router configuration interface. The 'Configure Wireless Interface' tab is selected. Below the tab, there is a text box for 'SSID' containing 'JoeyElsa'. A dropdown menu for 'Security Level' is open, showing three options: 'High(WPA-PSK)', 'Middle(WEP-128bits)', and 'Low(WEP-40bits)'. The 'Passphrase' field is empty. Below these are four 'WEP Key 1 (10 or 26 hex digits)' fields, all empty. At the bottom, there is a 'Default Key' dropdown menu. At the very bottom of the 'Quick Setup' section are 'Prev' and 'Finish' buttons. Below the 'Quick Setup' section is the 'Save & Restart' section, which contains a message: 'You have finished the basic setting of Home Gateway. You can just press **Save&Restart** button to apply your setting or perform other advanced settings.' and a 'Save&Restart' button.

Quick Setup

Configure Wireless Interface

First step to set your wireless interface is to give it a name, called SSID. In addition, if you would like to protect transmitted data, please select the Security Level and assign a password for authentication and data transmission if it is required.

SSID: JoeyElsa

Security Level: High(WPA-PSK) (selected)

Passphrase:

WEP Key 1 (10 or 26 hex digits):

WEP Key 1 (10 or 26 hex digits):

WEP Key 1 (10 or 26 hex digits):

WEP Key 1 (10 or 26 hex digits):

Default Key:

Prev Finish

Save & Restart

You have finished the basic setting of Home Gateway. You can just press **Save&Restart** button to apply your setting or perform other advanced settings.

Save&Restart

To set up your wireless interface, you must first give it an SSID (Service Set Identifier). The SSID is a unique identifier attached to packets sent over WLANs. This identifier emulates a password when a wireless device attempts communication on the WLAN. Because an SSID distinguishes WLANs from each other, access points and wireless devices trying to connect to a WLAN must use the same SSID.

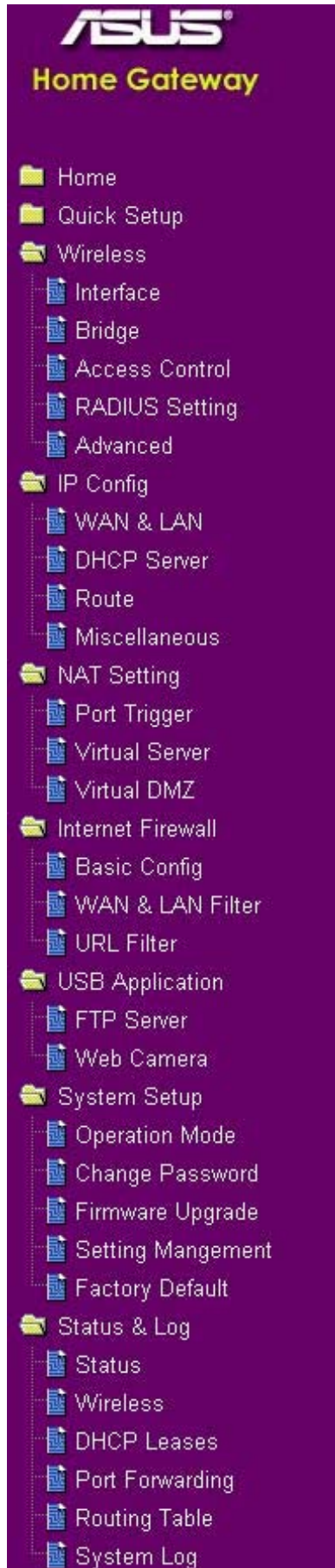
Also, if you want to protect

transmitted data, select a middle or high Security Level.

Middle: allows only those users with the same WEP key to connect to this access point and to transmit data using 128-bit WEP encryption.

High: allows only those users with the same WPA pre-shared key to connect to this access point and to transmit data using TKIP encryption.

Click **Finish** to continue. You are prompted to save the settings. Click **Save&Restart** to save the settings to the ASUS Wireless Router and enable the new settings.

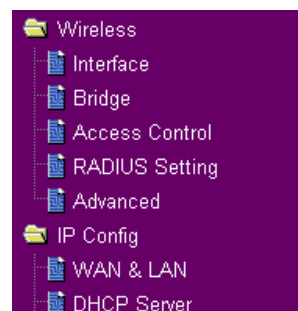


To adjust other settings, click an item on the menu to reveal a submenu and follow the instructions to setup the ASUS Wireless Router. Tips are given when you move your cursor over each item. The following have submenu items:

- Wireless
- IP Config
- NAT Setting
- Internet Firewall
- USB Application
- System Setup
- Status & Log

Wireless

Click an item on the menu to reveal a submenu. Follow the instructions to set up the ASUS Wireless Router. Tips are displayed when you move your cursor over an item.



Interface

WL500b

Wireless - Interface	
SSID:	WL500b
Channel:	3
Authentication Method:	Open System or Shared Key
Encryption:	None
Passphrase:	
WEP Key 1 (10 or 26 hex digits):	
WEP Key 2 (10 or 26 hex digits):	
WEP Key 3 (10 or 26 hex digits):	
WEP Key 4 (10 or 26 hex digits):	
Default Key:	Key1
Hide SSID:	<input type="radio"/> Yes <input checked="" type="radio"/> No
WPA Re-key Timer:	0

WL500g/WL500g Deluxe

Wireless - Interface	
SSID:	Joey&Elsa
Channel:	Auto
Wireless Mode:	Auto <input type="checkbox"/> 54g Protection
Authentication Method:	Open System or Shared Key
WPA Encryption:	TKIP
WPA Pre-Shared Key:	
WEP Encryption:	None
Passphrase:	
WEP Key 1 (10 or 26 hex digits):	
WEP Key 2 (10 or 26 hex digits):	
WEP Key 3 (10 or 26 hex digits):	
WEP Key 4 (10 or 26 hex digits):	
Key Index:	
Network Key Rotation Interval:	0
<input type="button" value="Restore"/> <input type="button" value="Finish"/> <input type="button" value="Apply"/>	

SSID

The SSID is an identification string of up to 32 ASCII characters that differentiate one ASUS Wireless Router AP or Access Point from other manufacturers. The SSID is also referred to as the “ESSID” or “Extended Service Set ID.” You can use the default SSID and radio channel unless more than one ASUS Wireless Router or Access Point is deployed in the same area. In that case, you should use a different SSID and radio channel for each ASUS Wireless Router or Access Point. All ASUS Wireless Routers and ASUS 802.11g/802.11b WLAN client adapters must have the same SSID to allow a wireless mobile client to roam between the ASUS Wireless Routers. By default, the SSID is set to “default”.

Wireless (Cont.)

Channel

The 802.11g and 802.11b specifications supports up to 14 overlapping channels for radio communication. To minimize interference, configure each ASUS 802.11g AP to be non-overlapping; select Auto from the Channel drop-down list to enable the system to select a clear channel during boot up as your operating channel.

Ensure that ASUS Wireless Routers sharing the same channel (or channels which are close in number) are as far away from each other as possible, based on the results of your site survey of the facility. There is a site survey utility on the ASUS Wireless Router setup CD.

Wireless Mode (WL500g/WL500g Deluxe Only)

This field indicates the 802.11g interface mode. Selecting “Auto” allows 802.11g and 802.11b clients to connect to the ASUS Wireless Router. Selecting “54g Only” maximizes performance, but prevents 802.11b clients from connecting to the ASUS Wireless Router. If “54g Protection” is checked, G-Mode protection of 11g traffic is enabled automatically in the presence of 11b traffic.

Wireless (Cont.)

Authentication Method	Encryption	Passphrase	WEP Key 1~4
Open or shared key	None WEP-64 bits WEP-128 bits	Not required 1~64 characters 1~64 characters	Not required 10 hex 26 hex
Shared key	WEP-64 bits WEP-128 bits	1~64 characters 1~64 characters	10 hex 26 hex
WPA-PSK ^	TKIP only * AES only *	8~63 characters 8~63 characters	Not required Not required
WPA ^	TKIP only * AES only *	Not required Not required	Not required Not required
Radius with 802.1x ^	Auto WEP-64 bits WEP-128 bits	Not required 1~64 characters 1~64 characters	Not required 10 hex 26 hex

* WL500g/WL500g Deluxe supports AES and TKIP encryption for WPA.

^ WL500b does not support WPA and Radius with 802.1x and WL500b only supports TKIP encryption for WPA-PSK.

WEP Encryption

Traditional WEP encryption is applied when “Open or Shared Key”, “Shared Key” or “Radius with 802.1x” authentication methods are selected.

WL500g/WL500g Deluxe: When “WPA” or “WPA-PSK” authentication methods are selected, you still can set WEP encryption for those clients that do not support WPA/WPA-PSK. Please note that Key Index for WEP key is limited to 2 or 3 when both WPA and WEP encryption are supported at the same time.

64/128-bit versus 40/104-bit

The following section explains low-level (64-bit) and high-level (128-bit) WEP Encryption schemes:

Wireless (Cont.)

64-bit WEP Encryption

64-bit WEP and 40-bit WEP are the same encryption method and can interoperate in a wireless network. This level of WEP encryption uses a 40-bit (10 Hex character) encryption scheme as a secret key, which is set by the user, and a 24-bit “Initialization Vector” scheme, which is not under user control.

Together these two schemes make a 64-bit (40 + 24) encryption scheme. Some vendors refer to this level of WEP as 40-bit and others refer to this as 64-bit. ASUS WLAN products use the term 64-bit when referring to this *lower* level of encryption.

128-bit WEP Encryption

104-bit WEP and 128-bit WEP are the same encryption method and can interoperate on a wireless network. This level of WEP encryption uses a 104-bit (26 Hex character) encryption scheme as a secret key which is set by the user, and a 24-bit “Initialization Vector”, which is not under user control.

Together these two schemes make a 128-bit (104 + 24) encryption scheme. Some vendors refer to this level of WEP as 104-bit and others refer to this as 128-bit. ASUS WLAN products use the term 128-bit when referring to this *higher* level of encryption.

Passphrase

Selecting “WEP-64bits” or “WEP-128bits” in the Encryption field generates four WEP keys automatically. A combination of up to 64 letters, numbers, or symbols is required. Alternatively, leave this field blank and type in four WEP keys manually.

☞ WEP-64bit key: 10 hexadecimal digits (0~9, a~f, and A~F)

☞ WEP-128bit key: 26 hexadecimal digits (0~9, a~f, and A~F)

Note: The ASUS WLAN family of products uses the same algorithm to generate WEP keys, eliminating the need for users to remember passwords and to maintain compatibility between products. However, using this method to generate WEP keys is not as secure as manual assignment.

Wireless (Cont.)

WEP Key

You can set a maximum of four WEP keys. A WEP key is either 10 or 26 hexadecimal digits (0~9, a~f, and A~F) based on whether you select 64bits or 128bits in the WEP pull-down menu. The ASUS Wireless Router and ALL of its wireless clients MUST have at least the same default key.

Key Index

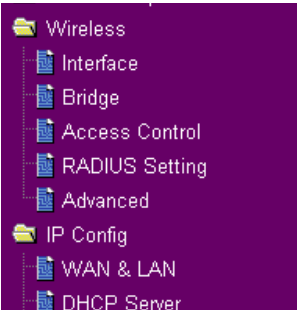
The Default Key field lets you specify which of the four encryption keys you use to transmit data on your wireless LAN. As long as the ASUS Wireless Router or wireless mobile client with which you are communicating has the same key in the same position, you can use any of the keys as the default key. If the ASUS Wireless Router and ALL of its wireless clients use the same four WEP keys, select “key rotation” to maximize security. Otherwise, choose one key in common as the default key.

Network Rotation Key Interval

This field specifies the time interval (in seconds) after which a WPA group key is changed. Enter ‘0’ (zero) to indicate that a periodic key-change is not required.

Wireless

Click an item on the menu to reveal a submenu. Follow the instructions to set up the ASUS Wireless Router. Tips are displayed when you move your cursor over an item.



Bridge/Access Control List

AP Mode:	Hybrid
Channel:	AP Only WDS Only Hybrid

AP Only

Wireless - Bridge

Wireless bridge (also known as Wireless Distribution System or WDS) function allows you to connect to one or many APs through wireless.



AP Mode: AP Only

Channel: 6

Connect to APs in Remote Bridge List? ☐ Yes ☒ No

Allow anonymous? ☐ Yes ☒ No


Remote Bridge List [Add] [Del]

MAC Address

WDS Only (WL500g/WL500g Deluxe)

Wireless - Bridge

Wireless bridge (also known as Wireless Distribution System or WDS) function allows you to connect to one or many APs through wireless.



AP Mode: WDS Only

Channel: 6

Connect to APs in Remote Bridge List? ☐ Yes ☒ No

Allow anonymous? ☐ Yes ☒ No


Remote Bridge List [Add] [Del]

MAC Address

Hybrid

Wireless - Bridge

Wireless bridge (also known as Wireless Distribution System or WDS) function allows you to connect to one or many APs through wireless.



AP Mode: Hybrid

Channel: 6

Connect to APs in Remote Bridge List? ☒ Yes ☐ No

Allow anonymous? ☐ Yes ☒ No

Remote Bridge List [Add] [Del]

MAC Address

[Restore] [Finish] [Apply]

Wireless bridge (also known as Wireless Distribution System or WDS) allows you to connect to one or many Access Points.

Wireless (Cont.)

AP Mode

AP (Access Point) Mode configures the ASUS Wireless Router for a specific application. By default, the ASUS Wireless Router is configured as an Access Point which enables wireless mobile clients to connect wirelessly to a wired Ethernet network. The following options are available from the drop-down list:

AP Only: the ASUS Wireless Router acts only as an Access Point.

WDS Only (WL500g/WL500g Deluxe): the ASUS Wireless Router can only communicate with other Access Points.

Hybrid: Hybrid allows you to use the ASUS Wireless Router both as an access point and as a wireless bridge.

Channel

Both Access Points in Wireless Bridge mode must be set to the same channel.

Connect to APs in Remote Bridge List (Yes/No)

Select **Yes** to connect to access points in the remote bridge list.

Allow anonymous? (Yes/No) (WL500g/WL500g Deluxe)

Select **Yes** to allow users without accounts to connect.

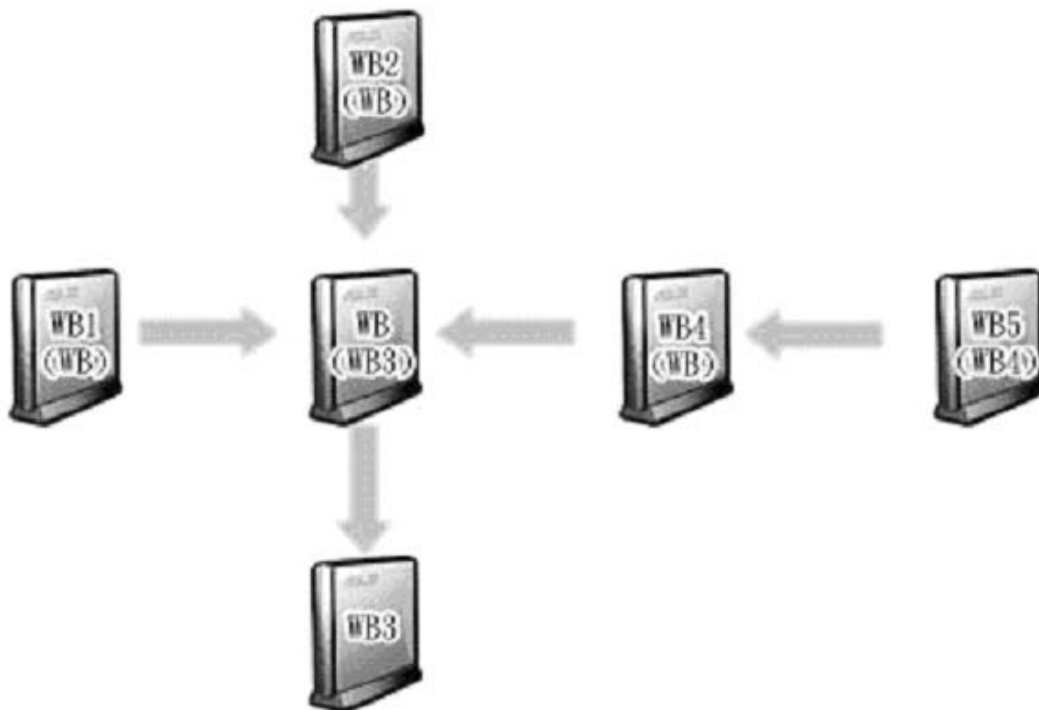
Note: If “Connect to APs in Remote Bridge List” and “Allow Anonymous” are both set to “No”, it means that this AP will not connect with other APs and therefore the AP mode setting will return to “AP Only”.

Wireless (Cont.)

MAC Address

Enter the MAC address of the target ASUS Wireless Router in order to designate which ASUS Wireless Router will be the partner for this ASUS Wireless Router.

You can setup your wireless environment as shown in this figure:



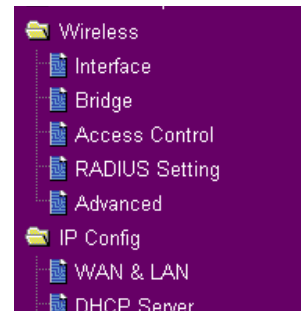
Note: The content in braces “()” is the MAC address in the Remote Bridge List of the AP. For example, WB1 have the MAC address of WB in its Remote Bridge List.

In this case, there are six ASUS Wireless Routers and they are linked as wireless bridges. Take one of them, named WB, as an example. WB is not in “AP Only” mode and “Connect to APs in Remote Bridge List” is set as “Yes”, so it can connect to WB3. Meanwhile, “allow anonymous” is set as “Yes” or “Allow anonymous” is set as “No” but it has the MAC addresses of WB1, WB2, and WB4 in the “Remote Bridge List”, so it can be connected by WB1, WB2, and WB4.

Chapter 3 - Software Configuration

Wireless

Click an item on the menu to reveal a submenu. Follow the instructions to set up the ASUS Wireless Router. Tips are displayed when you move your cursor over an item.



Access Control

A screenshot of the 'Wireless - Access Control' configuration page. The page has a yellow header with the title 'Wireless - Access Control'. Below the header, there is a paragraph of text explaining the function of Access Control. Underneath, there is a section for 'MAC Access Mode' with a dropdown menu currently set to 'Disable'. Below this is a section titled 'Access Control List' which contains a table with a header 'MAC Address' and several empty rows for input. At the bottom of the page, there are three buttons: 'Restore', 'Finish', and 'Apply'.

Pull down menu items:

Disable (no info required)

Accept (need to input information)

Reject (need to input information)

To add security, the ASUS Wireless Router has the ability to only associate with or not associate with wireless mobile clients that have their MAC address entered into this page.

The default setting of “Disable” will allow any wireless mobile client to connect. “Accept” will only allow those entered into this page to connect. “Reject” will prevent those entered into this page from connecting.

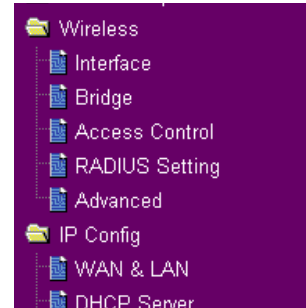
Adding a MAC Address

To add a MAC address, enter the 12 hexadecimal characters into the white box next to “MAC Address:” and click the **Add** button. The MAC address will be placed in the control list below. Only a total of 31 MAC addresses can be entered into this page so determine which will be the lesser; those you wish to accept or those you wish to reject and click the appropriate “MAC Access Mode”.

Note: Click the “Finish” button to save your new settings and re-start the ASUS Wireless Router or click “Save” and restart later.

Wireless

Click an item on the menu to reveal a submenu. Follow the instructions to set up the ASUS Wireless Router. Tips are displayed when you move your cursor over an item.



Radius Setting (WL500g/WL500g Deluxe)

Wireless - RADIUS Setting

This section allows you to set up additional parameters for authorizing wireless clients through RADIUS server. It is required while you select "Authentication Method" in "Wireless - Interface" as "WPA" or "Radius with 802.1x".

Server IP Address:	<input type="text"/>
Server Port:	<input type="text" value="1812"/>
Connection Secret:	<input type="text"/>

This section enables you to set up additional parameters for connection with a RADIUS Server. Values are required for this page when the Authentication Method field in the Wireless - Interface screen are set as "WPA" or "Radius with 802.1x". Refer to *Authentication Method* on page 32.

Server IP Address – specifies the IP address of the RADIUS server to use for 802.1X wireless authentication and dynamic WEP key derivation.

Server Port – specifies the UDP port number used by the RADIUS server.

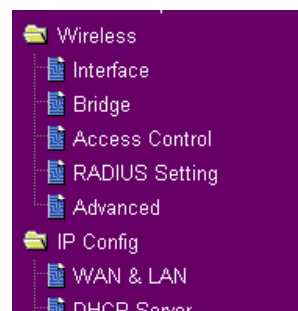
Login Secret – specifies the password used to initialize a RADIUS connection.

Note: A RADIUS server is used for remote user authentication and accounting. It is primarily used by Internet Service Providers, but can also be used on any network that needs a centralized authentication function for its workstations.

Chapter 3 - Software Configuration

Wireless

Click an item on the menu to reveal a submenu. Follow the instructions to set up the ASUS Wireless Router. Tips are displayed when you move your cursor over an item.



Advanced

Wireless - Advanced	
This section allows you to set up additional parameters for wireless. But default values are recommended.	
Hide SSID:	<input type="radio"/> Yes <input checked="" type="radio"/> No
Set AP Isolated?	<input type="radio"/> Yes <input checked="" type="radio"/> No
Data Rate(Mbps):	Auto
Basic Rate Set:	Default
Fragmentation Threshold:	2346
RTS Threshold:	2347
DTIM Interval:	1
Beacon Interval:	100
Enable Frame Bursting?	Disabled
Enable Radio?	<input checked="" type="radio"/> Yes <input type="radio"/> No
Date to Enable Radio:	<input checked="" type="checkbox"/> Sun <input checked="" type="checkbox"/> Mon <input checked="" type="checkbox"/> Tue <input checked="" type="checkbox"/> Wed <input checked="" type="checkbox"/> Thu <input checked="" type="checkbox"/> Fri <input checked="" type="checkbox"/> Sat
Time of Day to Enable Radio:	00 : 00 - 23 : 59
Radio Power:	19

This section allows you to set up additional parameters for the wireless router function. We recommend that you use the default values for all items in this window.

Wireless - Advanced	
This section allows you to set up additional parameters for wireless. But default values are recommended.	
Enable AfterBurner?	Disabled
Hide SSID:	Enabled
Set AP Isolated?	<input type="radio"/> Yes <input checked="" type="radio"/> No

AfterBurner (WL500g Deluxe only)

Enable AfterBurner: (WL500g Deluxe) - Set to Enable to increase performance for clients (such as WL100gx) that support this function.

Note: Your network speed will slow down if you have mixed 802.11g and Afterburner clients.

Hide SSID - By default, “No” is selected so that wireless mobile users can see your ASUS Wireless Router’s SSID and join. If “Yes” is selected, your ASUS Wireless Router will not show in site surveys by wireless mobile clients and they will have to manually enter your ASUS Wireless Router’s SSID. If you want to restrict access to “your” ASUS Wireless Router, this is a simple way to do it but for security reasons, don’t forget to change the SSID to something other than “default”.

Set AP Isolated (WL500g/WL500g Deluxe) - Selecting Yes to prevent wireless client from communicating with each other.

Data Rate (Mbps) (WL500g/WL500g Deluxe) - This field allows you to specify the transmission rate. Leave on “Auto” to maximize performance versus distance.

Wireless (Cont.)

Basic Rate Set (WL500g/WL500g Deluxe) - This field indicates the basic rates that wireless clients must support. Use “1 & 2 Mbps” only when backward compatibility is needed for some older wireless LAN cards with a maximum bit rate of 2Mbps.

Fragmentation Threshold (256-2346) – Fragmentation is used to divide 802.11 frames into smaller pieces (fragments) that are sent separately to the destination. Enable fragmentation by setting a specific packet size threshold. If there is an excessive number of collisions on the WLAN, experiment with different fragmentation values to increase the reliability of frame transmissions. The default value (2346) is recommended for normal use.

RTS Threshold (0-2347) – The RTS/CTS (Request to Send/Clear to Send) function is used to minimize collisions among wireless stations. When RTS/CTS is enabled, the router refrains from sending a data frame until another RTS/CTS handshake is completed. Enable RTS/CTS by setting a specific packet size threshold. The default value (2347) is recommended.

DTIM Interval (1-255) (WL500g/WL500g Deluxe) – DTIM (Delivery Traffic Indication Message) is a wireless message used to inform clients in Power Saving Mode when the system should wake up to receive broadcast and multicast messages. Type the time interval in which the system will broadcast a DTIM for clients in Power Saving Mode. The default value (3) is recommended.

Beacon Interval (1-65535) – This field indicates the time interval in milliseconds that a system broadcast packet, or beacon, is sent to synchronize the wireless network. The default value (100 milliseconds) is recommended.

Enable Frame Bursting? (WL500g/WL500g Deluxe) – This field allows you to enable frame-bursting mode to improve performance with wireless clients that also support frame-bursting.

Enable Radio? (WL500g/WL500g Deluxe) - Selecting “Yes” enables the wireless function during user-defined dates and times. Wireless users will not be able to connect on non-selected dates and times.

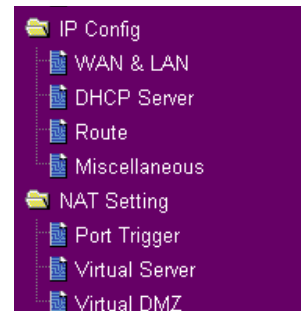
Date to Enable Radio (WL500g/WL500g Deluxe) - This field defines the dates that the wireless function will be enabled.

Time to Enable Radio (WL500g/WL500g Deluxe) - This field defines the time range that the wireless function will be enabled on each of the selected dates.

IP Config

WAN & LAN

Click an item on the menu to reveal a submenu. Follow the instructions to set up the ASUS Wireless Router. Tips are displayed when you move your cursor over an item.



WL500g

IP Config - WAN & LAN

WL500g supports several connection types to WAN. These types are selected from the drop-down menu beside WAN Connection Type. The setting fields will differ depending on what kind of connection type you select.

WAN Connection Type:	Automatic IP
WAN IP Setting	Automatic IP Static IP PPPoE PPTP
IP Address:	
Subnet Mask:	
Default Gateway:	

WL500g Deluxe

IP Config - WAN & LAN

WL500g Deluxe supports several connection types to WAN. These types are selected from the drop-down menu beside WAN Connection Type. The setting fields will differ depending on what kind of connection type you select.

WAN Connection Type:	Automatic IP	Automatic IP
WAN Connection Speed:	Automatic IP Static IP PPPoE PPTP BigPond	Auto negotiation Auto negotiation 10Mbps half-duplex 10Mbps full-duplex 100Mbps half-duplex 100Mbps full-duplex
WAN IP Setting		
IP Address:		
Subnet Mask:		
Default Gateway:		

WAN Connection Type

The ASUS Wireless Router supports four connection types to WAN, including Static IP, PPPoE, PPTP and Automatic IP. WL500g Deluxe includes “Big Pond” (Telstra) in “WAN Connection Type” and “WAN Connection Speed”. The WAN setting fields in this page will differ depending on what kind of connection type you select.

WAN Connection Speed (WL500g Deluxe)

You can use the pull-down menu to change the WAN connection speed if you do not want to use “Auto negotiation”.

WAN IP Setting

These three items are editable only when **WAN Connection Type** is set as **Static IP** or **PPTP**.

IP Address - This is IP address of the Wireless Router as seen on the remote network. If you leave it blank, the router will get IP address from DHCP Server automatically.

Subnet Mask - This is Subnet Mask of the Wireless Router as seen on the remote network.

Default Gateway - This is the IP address of default gateway that allows for contact between the Wireless Router and the remote network or host.

IP Config (Cont.)

WL500g

WAN DNS Setting	
Get DNS Server automatically?	<input checked="" type="radio"/> Yes <input type="radio"/> No
DNS Server1:	<input type="text"/>
DNS Server2:	<input type="text"/>

WL500g Deluxe

WAN DNS Setting	
Get DNS Server automatically?	<input checked="" type="radio"/> Yes <input type="radio"/> No
DNS Server1:	<input type="text"/>
DNS Server2:	<input type="text"/>

WAN DNS Settings

You can set the DNS setting using any **WAN Connection Type** (Static IP, PPPoE, or Automatic IP). WL500g Deluxe includes “Big Pond” and “WAN Connection Speed” (not shown here).

Get DNS Server automatically? - Normally this is automatic and you would answer “No” to the question about manually assigning DNS. If you are given instructions from your ISP to enter DNS addresses, select “Yes” to manually assigning DNS.

DNS Server 1/DNS Server 2 - If you are given instructions from your ISP to enter DNS addresses, select “Yes” to manually assigning DNS and enter the IP addresses here.

WL500g

PPPoE or PPTP Account	
User Name:	<input type="text" value="T0088225"/>
Password:	<input type="password" value="*****"/>
Idle Disconnect Time in seconds(option):	<input type="text" value="1800"/>
PPPoE MTU:	<input type="text" value="1492"/>
PPPoE MRU:	<input type="text" value="1492"/>
Enable PPPoE Relay?	<input checked="" type="radio"/> Yes <input type="radio"/> No

WL500g Deluxe

PPPoE or PPTP Account	
User Name:	<input type="text"/>
Password:	<input type="password"/>
Idle Disconnect Time in seconds(option):	<input type="text" value="1800"/> <input type="checkbox"/> Tx Only
MTU:	<input type="text" value="1492"/>
MRU:	<input type="text" value="1492"/>
Service Name(option):	<input type="text"/>
Access Concentrator Name(option):	<input type="text"/>
Enable PPPoE Relay?	<input type="radio"/> Yes <input checked="" type="radio"/> No

PPPoE or PPTP Account

These three items are editable only when **WAN Connection Type** is set as **PPPoE or PPTP**.

User Name - The name of your Internet account provided by your ISP. Some ISPs work with the entire account name along with the hosting domain (such as yourname@yourdomain.com) and others require that you enter only the account name (yourname).

Password - Enter the password for your Internet account.

Idle Disconnect Time in seconds (option) - Enter the number of seconds of inactivity to disconnect you from your ISP.

Chapter 3 - Software Configuration

PPPoE MTU - This field is shows the Maximum Transmission Unit (MTU) of PPPoE packets.

PPPoE MRU - This field is shows the Maximum Receive Unit (MTU) of PPPoE packets.

Enable PPPoE Relay - Enable PPPoE relay allows stations in LAN to setup individual PPPoE connections that are passthrough NAT. It is also known as PPPoE multi-session.

WL500g

Special Requirement from ISP	
Host Name:	<input type="text"/>
MAC Address:	<input type="text"/>
LAN IP Setting	
IP Address:	<input type="text" value="192.168.123.1"/>
Subnet Mask:	<input type="text" value="255.255.255.0"/>
Host Name:	<input type="text"/>
<input type="button" value="Restore"/> <input type="button" value="Finish"/> <input type="button" value="Apply"/>	
Restore:	Clear the above settings and restore the settings in effect.

WL500g Deluxe

Special Requirement from ISP	
Host Name:	<input type="text"/>
MAC Address:	<input type="text"/>
Heart Beat Server:	<input type="text"/>
LAN IP Setting	
IP Address:	<input type="text" value="192.168.1.250"/>
Subnet Mask:	<input type="text" value="255.255.255.0"/>
<input type="button" value="Restore"/> <input type="button" value="Finish"/> <input type="button" value="Apply"/>	
Restore:	Clear the above settings and restore the settings in effect.
Finish:	Confirm all settings and restart WL500g Deluxe now.
Apply:	Confirm above settings and continue.

Special Requirement from ISP

The following two items may be specified by some ISPs. Check with your ISP and fill them in if required.

Host Name – Fill this in if required by your ISP.

MAC Address – Fill this in if required by your ISP.

Heart-Beat Server (WL500g Deluxe) - Fill in the server name or server IP address when you are connecting with BigPond.

LAN IP Setting

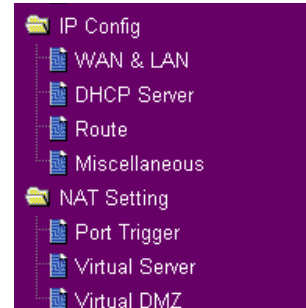
IP Address - This is IP address of the Wireless Router as seen in your local network. The default value is 192.168.1.1.

Subnet Mask - This is Subnet Mask of the Wireless Router as seen in your local network. The default value is 255.255.255.0.

Host Name - This is Host Name of the Wireless Router as seen in your local network.

IP Config (Cont.)

Click an item on the menu to reveal a submenu. Follow the instructions to set up the ASUS Wireless Router. Tips are displayed when you move your cursor over an item.



DHCP Server

A screenshot of the 'IP Config - DHCP Server' configuration page. It has a yellow header. Below the header is a text block explaining that the router supports up to 253 IP addresses. Then, there are several form fields: 'Enable the DHCP Server?' with radio buttons for 'Yes' (selected) and 'No'; 'Domain Name:' with a text input field; 'IP Pool Starting Address:' with a text input field containing '192.168.1.2'; 'IP Pool Ending Address:' with a text input field containing '192.168.1.254'; 'Lease Time:' with a text input field containing '86400'; and 'Default Gateway:' with an empty text input field.

DHCP (Dynamic Host Configuration Protocol) is a protocol defined for dynamically assigning IP addresses to computers in a network. Enabling the DHCP server allows the Wireless Router to assign IP address to PC or NB that is set to obtain an IP address automatically. The ASUS Wireless

Router supports up to 254 IP addresses for your local network.

Enable the DHCP Server? – This field allows you to enable or disable DHCP server in the Wireless Router. The default value is “Yes”

Domain Name - This field indicates the Domain Name to provide to clients that request IP Address from DHCP Server.

IP Pool Starting Address - This field specifies the first address in the pool to be assigned by the DHCP server in your local network.

IP Pool Ending Address - This field specifies the last address in the pool to be assigned by the DHCP server in your local network.

Lease Time - This field specifies the amount of connection time a network user be allowed with their current dynamic IP address.

IP Config (Cont.)

DHCP Server (Cont.)

DNS and WINS Server Setting

DNS Server 1:

DNS Server 2:

WINS Server:

Assign IP Address Manually

Enable Manual Assignment? ☒ Yes ☐ No

Manually Assigned IP List

MAC Address	IP Address
<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>

Restore:	Clear the above settings and restore the settings in effect.
Finish:	Confirm all settings and restart WL500g Deluxe now.
Apply:	Confirm above settings and continue.

DNS and WINS Server Setting

DNS Server 1/DNS Server 2 - This field indicates the IP address of DNS to provide to clients that request IP Address from DHCP Server. You can leave it blank, then the Wireless Router will process the DNS request.

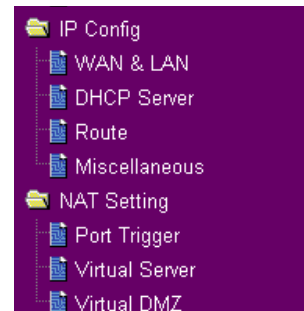
WINS Server - The Windows Internet Naming Service manages interaction of each PC with the Internet. If you use a WINS server, enter IP Address of server here.

Assign IP Address Manually (WL500g Deluxe)

Enable Manual Assignment - Selecting “Yes” allows you to assign a static IP address to the PC that has the IP address and MAC address mapping set in the “Manually Assigned IP List”.

IP Config (Cont.)

Click an item on the menu to reveal a submenu. Follow the instructions to set up the ASUS Wireless Router. Tips are displayed when you move your cursor over an item.



Static Route

IP Config - Route

This function allows you to add routing rules into WL500g. It is useful if you connect several routers behind WL500g to share the same connection to Internet.

Apply to routing table? ☒ Yes ☐ No

Static Route List Add Del Help

Network/Host IP	Netmask	Gateway	Metric	Interface
				LAN

Restore Finish Apply

A route is a possible path from a given host to another host or destination. If you append one or more routers behind the ASUS Wireless Router to share the same connection to Internet, you need to insert predefined rules of route, called static route, into the ASUS Wireless Router. Then the ASUS Wireless Router could know which

router the packets from Internet with different destination IP address can deliver to.

Apply to routing table? – Selecting “Yes” applies all those rules in Static Route List into routing table.

Static Route List

Network/Host IP –It stands for the destination IP address of network or host. So it could be an IP address, such as 192.168.1.1 or a range of IP address, such as 192.168.0.0 or 192.0.0.0. If a packet with destination IP address that match to this field or within the range of this field, it will route to the device set in Gateway field.

Netmask – It stands for the netmask of an added network route.

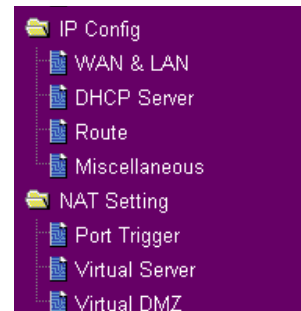
Gateway - This field stands for the IP address of gateway where packets are routed. The specified gateway must be reachable first. It means you have to set up a static route to the gateway beforehand.

Metric - Metric is a value of distance for the network and used to decide the priority of route rules.

Interface - This field decide which network interface this routing rule is applied to.

IP Config (Cont.)

Click an item on the menu to reveal a submenu. Follow the instructions to set up the ASUS Wireless Router. Tips are displayed when you move your cursor over an item.



Miscellaneous

A screenshot of the 'IP Config - Miscellaneous' settings page. The page has a yellow header bar with the title 'IP Config - Miscellaneous'. Below the header, there are several configuration fields: 'Enable UPnP?' with radio buttons for 'Yes' (selected) and 'No'; 'Remote Log Server:' with a text input field; 'Time Zone:' with a dropdown menu showing '(GMT+08:00) Taipei'; 'NTP Server' with a text input field containing 'time.nist.gov' and a blue link 'NTP Link'; a blue header bar for 'DDNS Setting'; a paragraph of text explaining Dynamic-DNS (DDNS); 'Enable the DDNS Client?' with radio buttons for 'Yes' (selected) and 'No'; 'Server:' with a dropdown menu showing 'WWW.DYNDNS.ORG' and a blue link 'Free Trial'; 'User Name or E-mail Address:' with a text input field; 'Password or DDNS Key:' with a text input field; 'Host Name:' with a text input field; 'Enable wildcard?' with radio buttons for 'Yes' (selected) and 'No'; and 'Update Manually:' with an 'Update' button.

Enable UPnP – Selecting “Yes” to enable UPnP, it will allow your Wireless Router to be found automatically by systems, such as Windows XP. And it allows these systems to automatically configure the Wireless Router for various Internet applications, such as gaming and video conferencing.

Remote Log Server – This feature allows you to assign a remote server to record log messages of the

Wireless Router. If you leave it blank, system will record up to 1024 messages on the Wireless Router only.

Time Zone – This field indicates time zone where you are locating in.

NTP Server – NTP Server is a time server on the Internet that allows the Wireless Router to synchronize its system time to. You can keep the default IP address or set to the IP address of an NTP server that you prefer.

DDNS Setting

Dynamic - DNS (DDNS) allows user to export host name to Internet through DDNS service provider. Each time the ASUS Wireless Router connect to Internet and get an IP address from ISP, this function will update your IP address to DDNS service provider automatically, so that any user on Internet can access the ASUS Wireless or servers behind it through a predefined name registered in DDNS service provider.

Enable the DDNS Client? – Selecting “Yes” to enable DDNS update, then each time your IP address to WAN is changed, the information will be updated to DDNS service provider automatically.

IP Config (Cont.)

Server – Currently, clients connect to DynDNS or TZO are embedded in the Wireless Router. You can click Free Trial link behind this field to start with a free trial account.

User Name or E-Mail Address – This field is used as an identity to log in Dynamic-DNS service.

Password or DDNS Key – This field is used as a password to log in Dynamic-DNS service.

Host Name – This field represents the Host Name you register to Dynamic-DNS service and expect to export to the world.

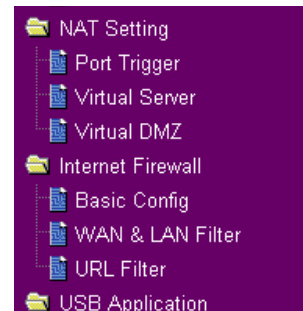
Enable wildcard? – This field determines if domain name with wildcard is also redirected to your IP address.

Update Manually – This button allows you to update DDNS database manually. It is available only when automatic DDNS update failed. You can get current status of DDNS update from System Log.

Note: Currently, clients connected to DynDNS or TZO are embedded in ASUS Wireless Router. You can click Free Trial link behind each DDNS service provider to start with a free trial account.

NAT Setting

Click this item on the menu to reveal a sub menu. Follow the instructions to setup the ASUS wireless router. Tips are given when you move your cursor over each item.



Port Trigger

A screenshot of the 'NAT Setting - Port Trigger' configuration page. It includes a title bar, a descriptive paragraph about the function, an 'Enable Port Trigger?' section with 'Yes' and 'No' radio buttons, and a 'Trigger Port List' table. The table has columns for Trigger Port, Protocol, Incoming Port, and Description. A 'Well-Known Applications' dropdown is set to 'User Defined'. There are 'Add' and 'Del' buttons next to the table.

This function allows you to open certain TCP or UDP ports to communicate with the computers connected to the WL500g. This is done by defining trigger ports and incoming ports. When the trigger port is detected, the inbound packets to the specified incoming port numbers are redirected to your computer.

Enable Port Trigger? - Selecting “Yes” applies all the rules in the Port Trigger List to the Wireless Router.

Port Trigger List

Trigger Port - This field allows you to enter the port or port range of outgoing packets that will trigger port redirect.

Protocol - This field allows you to select the protocol of outgoing packets.

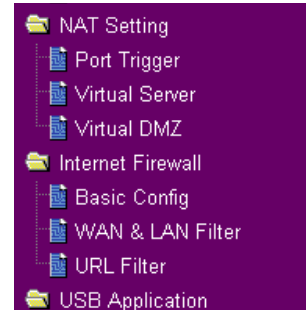
Incoming Port - This field allows you to enter the port or port range of incoming packets that will be redirected to your computer.

Protocol - This field allows you to select the protocol of incoming packets.

Description - This field keeps information on what the rule is used for.

NAT Setting (Cont.)

Click this item on the menu to reveal a sub menu. Follow the instructions to setup the ASUS wireless router. Tips are given when you move your cursor over each item.



Virtual Server

NAT Setting - Virtual Server

To make services, like WWW, FTP, provided by a server in your local network accessible for outside users, you should specify a local IP address to the server. Then, add the IP address and network protocol type, port number, and name of the service in the following list. Based on the list, the gateway will forward service request from outside users to the corresponding local server.

Enable Virtual Server? ☒ Yes ☐ No

Virtual Server List Add Del

Well-Known Applications:		User Defined	
Local IP	Port Range	Protocol	Description
		TCP	

Restore Finish Apply

To make services, like WWW, FTP, provided by a server in your local network accessible for outside users, you should specify a local IP address to the server. Then, add the IP address and network protocol type, port number, and name of the service in the following list. Based on the list, the gateway will forward service request from outside users to the corresponding local server.

Enable Virtual Server?— Selecting “Yes” applies all those rules in

Virtual Server List into the Wireless Router.

Virtual Server List

Local IP – This field stands for the destination IP address that you like to redirect the matched packet to.

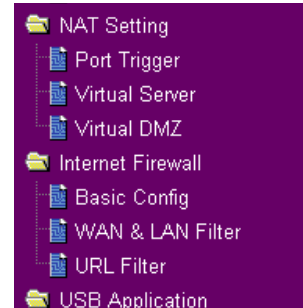
Port Range– This field stands for a port number or a range of ports. Once the destination port of incoming packets matches the port or within the port range, the incoming packets will be redirect to IP address specified in **Local IP**.

Protocol– This field stands for protocol of incoming packets.

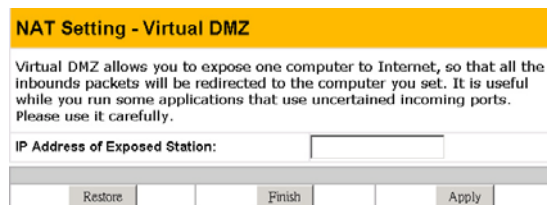
Description –This field allows you to record what this rule is used for.

NAT Setting (Cont.)

Click an item on the menu to reveal a submenu. Follow the instructions to set up the ASUS Wireless Router. Tips are displayed when you move your cursor over an item.



Virtual DMZ



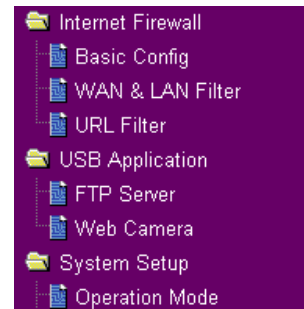
Virtual DMZ allows you to expose one computer to Internet, so that all inbound packets will be redirected to the computer you set. It is useful while you run some applications that use uncertain incoming ports.

Please use it carefully.

IP Address of Exposed Station – This field stands for the IP address of the computer that you want to expose to Internet.

Internet Firewall

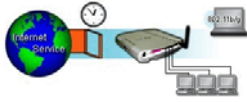
Click an item on the menu to reveal a submenu. Follow the instructions to set up the ASUS Wireless Router. Tips are displayed when you move your cursor over an item.



LAN & WAN Filter

Internet Firewall - WAN & LAN Filter

LAN vs. WAN filter allows you to block specified packets between LAN and WAN. At first, you can define the date and time that filter will be enabled. Then, you can choose the default action for filter in both directions and insert the rules for any exceptions.



LAN to WAN Filter

Enable LAN to WAN Filter?	<input type="radio"/> Yes <input checked="" type="radio"/> No
Date to Enable LAN to WAN Filter:	<input checked="" type="checkbox"/> Sun <input checked="" type="checkbox"/> Mon <input checked="" type="checkbox"/> Tue <input checked="" type="checkbox"/> Wed <input checked="" type="checkbox"/> Thu <input checked="" type="checkbox"/> Fri <input checked="" type="checkbox"/> Sat
Time of Day to Enable LAN to WAN Filter:	00 : 00 - 23 : 59
Packets(LAN to WAN) not specified will be:	ACCEPT
Filtered ICMP(LAN to WAN) packet types:	

WAN to LAN Filter Table

Add Del Help

Source IP	Port Range	Destination IP	Port Range	Protocol
				TCP

Restore Finish Apply

WAN to LAN Filter

LAN & WAN filter allows you to block specified packets between LAN and WAN. At first, you can define the date and time that filter will be enabled. Then, you can choose the default action for filter in both directions and insert the rules for any exceptions.

Date to Enable WAN to LAN Filter – This field defines the dates that WAN to LAN filter will be enabled.

Time of Day to Enable WAN to LAN Filter – This field defines the time interval that WAN to LAN filter will be enabled.

Packets (LAN to WAN) not specified will be – This field defines those LAN to WAN packets which are not specified in WAN to LAN Filter Table will be accepted or dropped.

Filtered ICMP (LAN to WAN) packet types – This field defines a list of LAN to WAN ICMP packets type that will be filtered. For example, if you would like to filter Echo (type 8) and Echo Reply (type 0) ICMP packets, you need to enter a string with numbers separated by blank, such as, "0 5".

Internet Firewall (Cont.)

WAN to LAN Filter Table

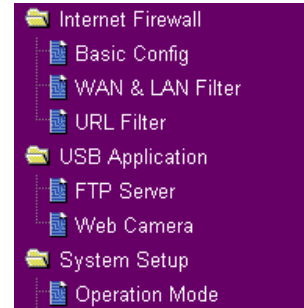
Source/Destination IP Address - For source or destination IP address, you can input a specific IP address, such as "192.168.122.1", or IP addresses within one subnet, such as "192.168.123.*", or "192.168.*.*", or all IP addresses as "*".

Source/Destination Port or Port Range - For source or destination port range, you can input a specific port, such as "95", or ports within a range, such as "103:315", ">100", or "<65535".

Protocol – This field indicates the protocol type of packets this rule like to filter.

Internet Firewall (Cont.)

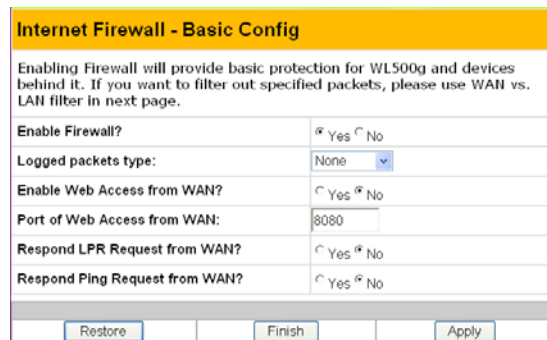
Click an item on the menu to reveal a submenu. Follow the instructions to set up the ASUS Wireless Router. Tips are displayed when you move your cursor over an item.



Basic Config

Enable Firewall? – Selecting “Yes” enables firewall to apply general SPI rules.

Logged Packet Type – This field indicates what kind of packets between WAN and LAN will be logged.



Enable Web Access from WAN – This field allows you to specify the port used to access Web server of the ASUS Wireless Router from Internet. The default value is 8080. If you know the WAN IP address of the Wireless Router, open your web browser and enter the IP address. For example:

http://140.113.201.1:8080

If you enable the DDNS with an account, please open your web browser and enter the host name registered in DDNS service provider. For example:

http://wl500g.homelinux.org:8080

Note: The default web browser port 80, is reserved for the Web server within your local network.

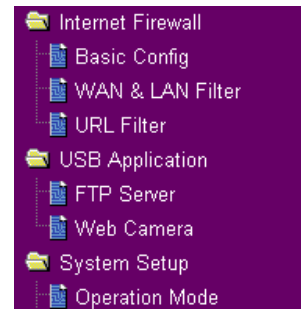
Port of Web Access from WAN - This field allows you to specify the port used to access the Web server of the ASUS Wireless Router from the Internet. The default value is 8080.

Responds LPR Request from WAN - This field allows you to decide if you like to respond to LPR requests from Internet.

Responds Ping Request from WAN - This field allows you to decide if you like to respond to ping requests from Internet.

Internet Firewall (Cont.)

Click an item on the menu to reveal a submenu. Follow the instructions to set up the ASUS Wireless Router. Tips are displayed when you move your cursor over an item.



URL Filter

A screenshot of the 'Firewall - URL Filter' configuration page. The page has a yellow header with the title 'Firewall - URL Filter'. Below the header, there is a description: 'URL Filter allows you to block specific URL access from your local network.' The main configuration area includes: 'Enable URL Filter?' with radio buttons for 'Yes' and 'No'; 'Date to Enable URL Filter:' with checkboxes for days of the week (Sun, Mon, Tue, Wed, Thu, Fri, Sat); and 'Time of Day to Enable URL Filter:' with a time range selector (00:00 to 23:59). Below these fields is a 'URL Keyword List' section with an 'Add' button and a 'Del' button. The list itself is empty. At the bottom of the page are three buttons: 'Restore', 'Finish', and 'Apply'.

URL Filter allows you to block specific URL access from your local network.

Enable URL Filter? – Selecting “Yes” enables URL Filter and applies rules in URL Keyword List into the Wireless Router.

Date to Enable URL Filter– This field defines the dates that URL filter will be enabled.

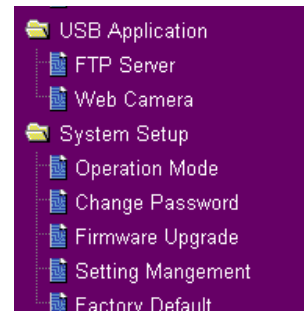
Time of Day to Enable URL Filter – This field defines the time interval that URL filter will be enabled.

URL Keyword List

URL Keyword – If the URL filter is enabled and URL access contains the keyword specified in the URL Keyword List, the DNS mapping of this URL would be blocked.

USB Application

Click an item on the menu to reveal a submenu. Follow the instructions to set up the ASUS Wireless Router. Tips are displayed when you move your cursor over an item.



FTP Server

USB Application - FTP Server	
Force to Eject USB Disk:	<input type="button" value="Eject"/>
Enable FTP Server?	<input checked="" type="radio"/> Yes <input type="radio"/> No
Allow Anonymous User to Login?	<input checked="" type="radio"/> Yes <input type="radio"/> No Login
Allow Super User to Login?	<input type="radio"/> Yes <input checked="" type="radio"/> No Login
FTP Port:	<input type="text" value="21"/>
Maximum Users Allowed to Log in:	<input type="text" value="12"/>
Login Timeout in Seconds:	<input type="text" value="120"/>
Stay Timeout in Seconds:	<input type="text" value="240"/>
Initial Script:	<input type="text"/>

FTP Server Mode – The ASUS Wireless Router features an embedded FTP server for USB storage. Before using the FTP server, ensure that your USB device fulfils the following requirements.

- The FTP server only works with supported USB devices. Supported devices are listed on the ASUSTeK Web site at <http://www.asus.com>.
- The ASUS router supports read/write functions for FAT or FAT32 file systems and read-only functions for NTFS (NT file system) with compressed or uncompressed files. **Encrypted files are not supported.** If your USB storage device is formatted as a FAT or FAT32 file system, configure the FTP server to work from the first partition (partition 0).
- Devices with multi-partitions will be detected; however, only super users and anonymous users can access devices configured with multi-partitions. Other users can only access the directory /ftp_pub or /ftp_pvt/username/ in partition 0.

Note: WL500g/b only supports USB Storage recognized as a “Mass Storage Device”. It does not support other types of USB to IDE devices. Most compatible USB storage devices are plug and play; you do not have to power off the router when connecting these devices. However, USB external storage cases for IDE devices require you to restart the router after you connect them.

The following describes the available fields in the FTP Server screen.

Force to Eject USB Disk – When this item is enabled, pressing the “Eject” button will allow the router to write the cached data back to the USB disk before you remove the USB disk. Remove the USB Disk only after you press the button and get the refreshed Web page. Otherwise, you will lose the cached data.

USB Application (Cont.)

Enable FTP Server? – Select Yes to enable the ftp server daemon when you have connected USB storage to the router.

Allow Anonymous User to Login? – Select Yes to enable an anonymous user account with all access rights. The User name is *anonymous* or *ftp*. No password is required.)

Login as Anonymous: click **Login** to log in to this FTP Server with an Anonymous User account to access a Net Disk.

Allow Anonymous User to Login?	<input checked="" type="radio"/> Yes <input type="radio"/> No Login
--------------------------------	---

Allow Super User to Login? – Select Yes to enable a super user account with all access rights. The user name and password are the same as the network administrator.

Login as Super User: click **Login** to log in to this FTP Server with Super User account to access a Net Disk.

Allow Super User to Login?	<input type="radio"/> Yes <input checked="" type="radio"/> No Login
----------------------------	---

FTP Port – Type the port number to be used for the FTP server. The default is 21.

Maximum Users Allowed to Log in – Type the maximum number of users allowed to simultaneously log in to the server.

Login Timeout in Seconds – This field enables you to terminate user connections after users have been connected for the specified period of time.

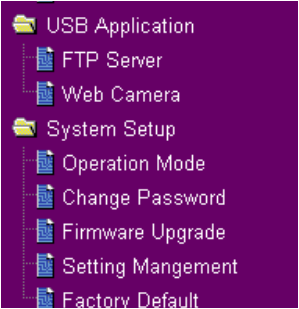
Stay Timeout in Seconds – This field enables you to terminate user connections after users log in but stay idle for the specified period of time.

Initial Script - After inserting a USB disk, the wireless router will look for the initial script as entered here in the root directory of the USB disk and execute it. Leaving this blank will disable this function.

USB Application (Cont.)

User Account List

The User Account List enables you to create a user profile, set the user password, the maximum number of times the user can log in, and user access rights



User Account List

User Name	Password	Max. Login	Rights
			Read/Write/Erase
			Read/Write
			Read Only
			View Only
			Private

User Name – Type the user name for the FTP account.

Password – type the password of the FTP account. Leave the field blank or type an asterisk (*) for anonymous access.

Note: The FTP Server only supports “No encrypted password” protection. Clients connecting with MD4 or MD5 will not be allowed.

Max. Login – This field indicates the maximum logins allowed with this FTP account. Leave the field blank or type zero (0) to allow unlimited login.

Rights – This field indicates the rights assigned to this FTP account:

Read/Write/Erase: Users attached to this account can access the USB storage device, and read, write, and erase files on the drive.

Read/Write: Users attached to this account can access the USB storage device, and read, and write to the drive; however, users cannot erase files on the drive.

Read Only: Users attached to this account can access the USB storage device, and read files on the drive; however, users cannot write to the drive or erase files.

View Only: Users attached to this account can access the USB storage device, and view files only.

Private: Users attached to this account can access a private directory in the USB storage (partition1:/ftp_pvt/User Name), and is allowed all access privileges (Read/Write/Erase/View). Please see User Account and Privileges for details.

USB Application (Cont.)

User Account and Privileges

If you have a USB disk with 3 partitions*, partition 1 is FAT32, partition 2 is FAT, and partition 3 is NTFS, the FTP directories will be constructed as follows:

\ : Files and directories in partition 1. "Super user" or "anonymous" are allowed to access.
\partition1 : Files and directories in partition 2. "Super user" or "anonymous" are allowed to access.
\partition2 : Files and directories in partition 3. "Super user" or "anonymous" are allowed to read only.
\ftp_pub : User rights set as Read/Write/Erase, Read/Write/Read Only, or View Only, are allowed to share this directory.
\ftp_pvt : User rights set as Private, are only allowed to access the directory with the user name.

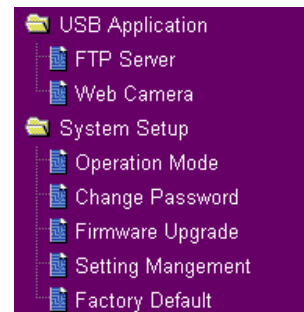
The account's root directory and its access rights on the FTP server are defined as follows:

<u>Account</u>	<u>Condition</u>	<u>Root Directory</u>	<u>Rights</u>
Anonymous	"Allow Anonymous User to Login" is enabled	\	Read/Write/Erase
Super User	"Allow Super User to Login" is enabled	\	Read/Write/Erase
[user]	Rights is set as "Read/Write/Erase"	\ftp_pub	Read/Write/Erase
[user]	Rights is set as "Read/Write"	\ftp_pub	Read/Write
[user]	Rights is set as "Read Only"	\ftp_pub	Read Only
[user]	Rights is set as "View Only"	\ftp_pub	View Only
[user]	Rights is set as "Private"	\ftp_pvt[user]	Read/Write/Erase

*** WL500g/b can manage up to 6 partitions, but if NTFS is used on partition 1, the system will not be able to create related system directories, such as ftp_pub or ftp_pvt for the FTP server. In this case, only "anonymous" or "super user" is allowed to read data in partition 1, however they will not be able to see any other partitions.**

USB Application (Cont.)

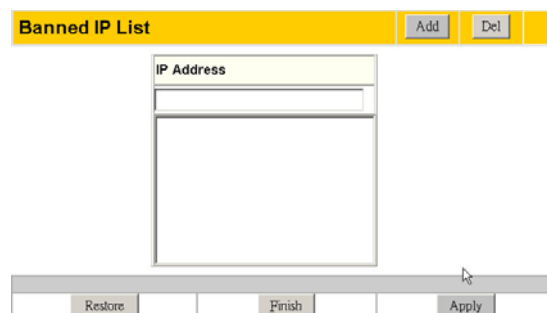
Click an item on the menu to reveal a submenu. Follow the instructions to set up the ASUS Wireless Router. Tips are displayed when you move your cursor over an item.



Banned IP List

This screen enables you to enter IP addresses that you do not want users connected to the router to access.

IP Address – This field indicates the IP address you want to ban. Enter a specific IP address, such as *192.168.1.5*, or IP addresses within one subnet, such as *192.168.*.**, or *192.168.1.**.



Client Setting

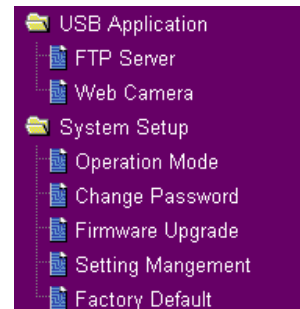
Users can connect to the FTP server using a Web based browser such as IE or Netscape. To connect to the server, type the FTP URL in the browser address bar: [ftp://username@\[IP address or host name of the router\]/](ftp://username@[IP address or host name of the router]/)

Using other FTP-protocol programs, you can connect to the FTP Server using either PASV or PORT.

Note: The FTP Server only supports “No encrypted password” protection. Clients connecting with MD4 or MD5 will not be allowed access.

USB Application (Cont.)

Click an item on the menu to reveal a submenu. Follow the instructions to set up the ASUS Wireless Router. Tips are displayed when you move your cursor over an item.



Note: Before using the Web Camera, refer to USB Web Camera support listed on the ASUSTeK Web site at the following address: <http://www.asus.com>.

Web Camera

The ASUS Wireless Router implements several applications for a USB Web Camera, enabling you to capture images and send them over the Internet.

Enable Web Camera – Selecting LAN Only enables Web Camera for LAN users. Selecting LAN and WAN enables Web Camera for both LAN users and WAN users through firewall.

Web Camera Mode – Select the appropriate camera mode from the drop down list. ActiveX Only enables users to execute ActiveX clients on an Windows IE platform to get the best image quality. ActiveX and Refresh enable users to get a basic image on both IE and other browsers. Refresh Only will force users both IE and other browser to have still images refreshed in a specified interval.

Web Camera Driver – When you plug a supported Web Camera into the wireless router, the appropriate driver is selected automatically. Refer to the USB Web Camera support list on the following ASUSTeK Web site for supported Web Cameras and chipset vendors: <http://www.asus.com>.

Image Size – Select the image size from the drop down list. 320 x 240 provides a larger image. 160 x 120 provides faster transmission. Click **Preview** to see how your web camera appears.

Sense Level – This field indicates the sensitivity at which image movement is detected.

USB Application - Web Camera	
Enable Web Camera?	LAN and WAN
Web Camera Mode:	ActiveX and Refresh
Web Camera Driver:	OV511 2.10
Image Size:	320 X 240 Preview
Sense Level:	Medium
Refresh Time in seconds:	1
Caption String:	Web Camera Live Demoll
HTTP Port:	7776 <input type="checkbox"/> Password Checking
ActiveX Port:	7777

USB Application (Cont.)

Refresh Time in Seconds – This field indicates the time interval in seconds in which the system reloads images. The range of values is 1~65535.

Caption String – This field indicates the text string that is displayed on your Webcam page.

HTTP Port – This field indicates the port that http server listens on to communicate. For example, by default, you can connect to your web camera by using <http://192.168.1.1:7776> without password checking. (The password checking field is unchecked.)

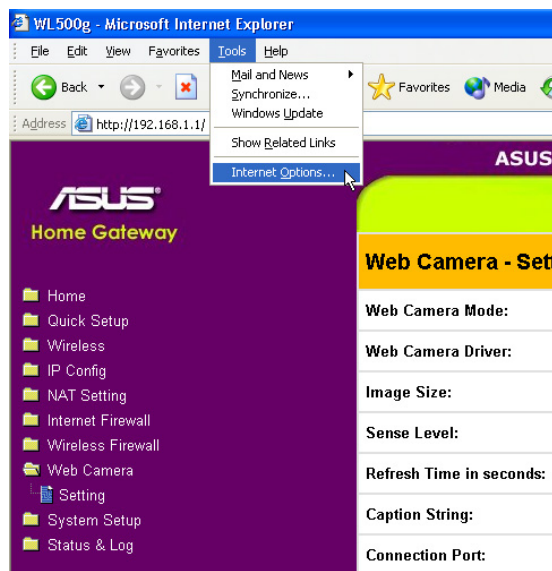
ActiveX Port – This field indicates the port that server listens on to communicate with Active X clients.

USB Application (Cont.)

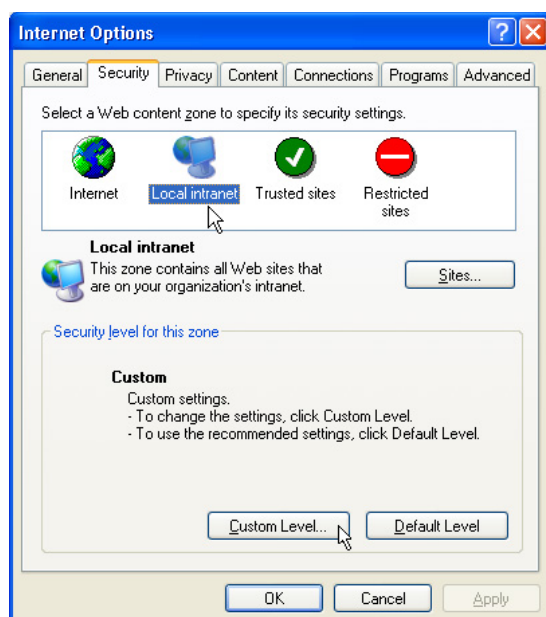
Web Camera - Client Setting

For clients that use Netscape or other browser that don't support ActiveX, you don't need additional setting to view an image in browser. For client that use IE 5.0 or above, you need to set IE to get a better support on ActiveX as following:

1. Open Internet Explorer 5.0 or above.
2. Select **Internet Options** | **Security** | **Local Intranet** | **ActiveX Controls**.
3. Check that your settings are as follows:

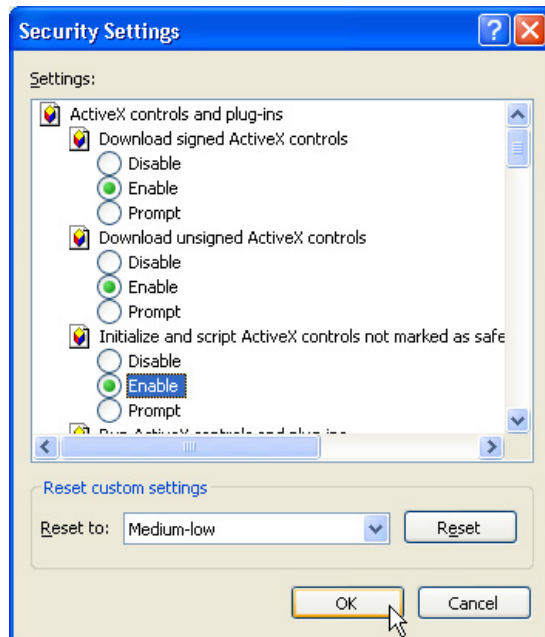


Go to **Internet Options** from the "Tools" menu.

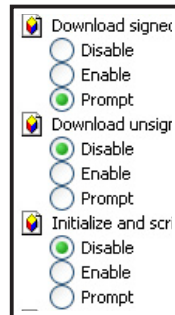


Click **Local Intranet** settings and click **Custom Level**.

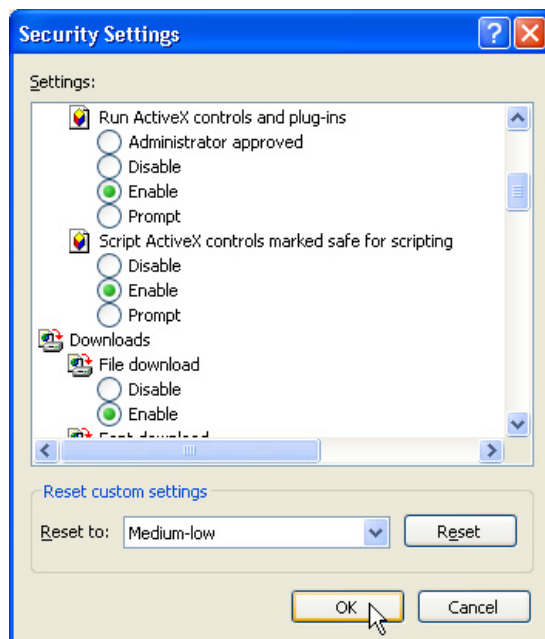
USB Application (Cont.)



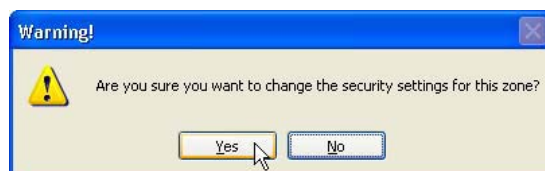
Enabled the three ActiveX controls and plug-ins.



By default, these items are disabled and will prevent the ASUS Wireless Router's web camera function from working.



By default, these three items should already be enabled. Enable them if they have been changed.



Click **Yes** to change the security settings.

USB Application (Cont.)

Web Camera vs. DDNS

Cooperating with DDNS, you can monitor your home environment through Internet, even through dynamic WAN IP address is applied.

Security Mode Setting

This function allows you to monitor your environment through Web Camera. If there is any motion detected, WL500g will try to alert you by means of email.

Enable Security Mode? – Selecting “Yes” enables the Security Function on the date and time you set below.

Date to Enable Security Mode – This field defines the dates that Security Mode will be enabled.

Time to Enable Security Mode – This field defines the time interval that Security Mode will be enabled.

Send to – This field indicates the email address you like to send to.

Email Server – This field indicates the email server where you like to deliver your email to. If you leave this field blank, the Wireless Router will find a Mail Exchanger from your email address in **Send to** field.

Subject – This field allows you to edit subject of email.

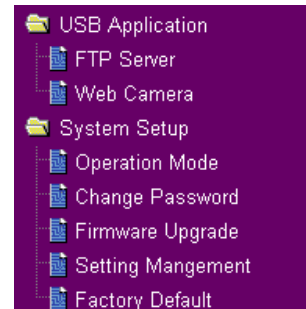
Attach Image File? – This field allows you to attach detected image file into email.

Security Mode Setting	
This function allows you to monitor your environment through Web Camera. If there is any motion detected, WL500g will try to alert you by means of e-mail.	
Enable Security Mode?	<input type="radio"/> Yes <input checked="" type="radio"/> No
Date to Enable Security Mode:	<input checked="" type="checkbox"/> Sun <input checked="" type="checkbox"/> Mon <input checked="" type="checkbox"/> Tue <input checked="" type="checkbox"/> Wed <input checked="" type="checkbox"/> Thu <input checked="" type="checkbox"/> Fri <input checked="" type="checkbox"/> Sat
Time to Enable Security Mode:	00 : 00 - 23 : 59
Send to:	
Email Server:	
Subject:	Motion detection alert!!!
Attach Image File?	<input checked="" type="radio"/> Yes <input type="radio"/> No

USB Application (Cont.)

Remote Monitor Setting

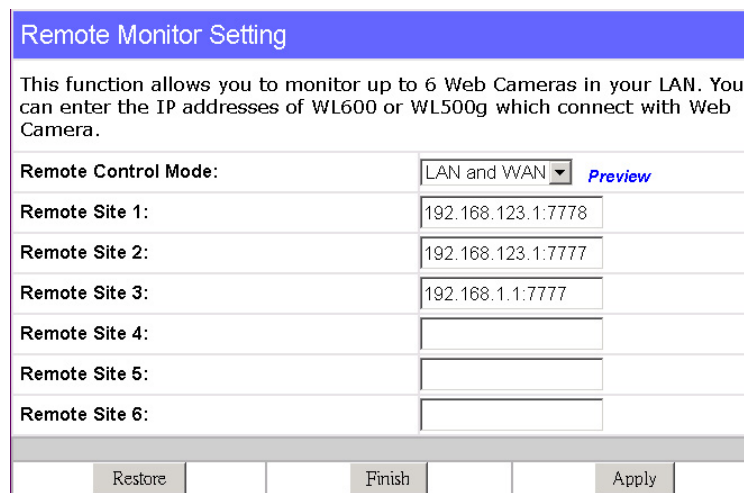
This function allows you to monitor up to 6 Web Cameras in your LAN. You can enter the IP addresses of WL500g, WL500b or WL600, which connect with Web Camera.



Remote Control Mode – Selecting LAN Only you can only monitor within LAN environment. To allow WAN users viewing Web Camera in your LAN, please set up Virtual Server rules in the router acting as the gateway for each router in your LAN plugging with Web Camera.

Note: When enabling “LAN and WAN” remote control in the Wireless Router, packets from the Internet with destination ports 8081 to 8086 will be forwarded to the WL500g/b set in Remote Control fields. To make sure packets from the WL500g/b can be routed back to the Internet, you should set a static route entry in the WL500g/b with the same gateway IP address as the IP address of the Wireless Router.

Remote Site 1-6 – This field stands for the IP address and port number of Remote Site. It should be filled with “[IP Address]:[Connection Port]”.



Remote Monitor Setting	
This function allows you to monitor up to 6 Web Cameras in your LAN. You can enter the IP addresses of WL600 or WL500g which connect with Web Camera.	
Remote Control Mode:	LAN and WAN Preview
Remote Site 1:	192.168.123.1:7778
Remote Site 2:	192.168.123.1:7777
Remote Site 3:	192.168.1.1:7777
Remote Site 4:	
Remote Site 5:	
Remote Site 6:	
<div>Restore Finish Apply</div>	

Preview

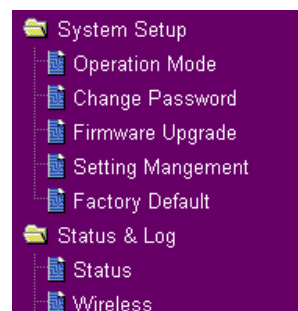
Click **Preview** behind **Remote Control Mode** to see the view of all the web camera sites you set in Remote Site.

Note: WL500g/b supports USB hub functionality. But, you are not recommended to run more than one USB applications on WL500g/b at the same time. It may run out of memory sometimes.

Chapter 3 - Software Configuration

System Setup

Click this item on the menu to reveal a sub menu. Follow the instructions to setup the Wireless Router. Tips are given when you move your cursor over each item.



Operation Mode

The ASUS Wireless Router supports three operation modes to meet different requirements. Please select the mode that matches your networking requirements.

System Setup - Operation Mode	
WL500g support three operation modes to meet different requirements from different group of people. Please select the mode that match your situation.	
<input checked="" type="radio"/> Home Gateway	<p>In this mode, we suppose you use WL500g to connect to Internet through ADSL or Cable Modem. And, there are many people in your environment share the same IP to ISP.</p> <p>Explaining with technical terms, gateway mode is , NAT is enabled, WAN connection is allowed by using PPPoE, or DHCP client, or static IP. In addition, some features which are useful for home user, such as UPnP and DDNS, are supported.</p>
<input type="radio"/> Router	<p>In Router mode, we suppose you use WL500g to connect to LAN in your company. So, you can set up routing protocol to meet your requirement in office.</p> <p>Explaining with technical terms, router mode is, NAT is disabled, static and dynamic routing protocol are allowed to set, and WAN connection is allowed only by using static IP.</p>
<input type="radio"/> Access Point	<p>In Access Point mode, all 5 Ethernet ports and wireless devices are set to locate in the same local area network. Those WAN related functions are not supported here.</p> <p>Explaining with technical terms, access point mode is, NAT is disabled, one wan port and four lan ports of WL500g are bridged together.</p>
<input type="button" value="Apply"/>	

Home Gateway

In Home Gateway mode, the WAN port is assumed to attach to the Internet via a Cable or DSL modem. This allows several wireless clients and PC attached to LAN ports to share the Internet connection to ISP.

Technically, gateway mode is, NAT is enabled, WAN connection is allowed by using PPPoE, or DHCP client, or static IP. In addition, some features, which are useful for home user, such as UPnP and DDNS, are supported.

Router (WL500g/WL500g Deluxe)

In Router mode, we suppose you use the Ethernet port to connect to LAN in your company. So, you can set up routing protocol to meet your requirement in office.

Technically, router mode is, NAT is disabled, static and dynamic routing protocol are allowed to set, and WAN connection is allowed only by using static IP.

Access Point

In Access Point mode, the ASUS Wireless Router acts as a bridge between the PC attached to all Ethernet ports (LAN) and the clients on the wireless LAN (WLAN). Both the LAN and WLAN will be on the same IP subnet, sharing the same address range. The internal NAT is disabled in this mode

Technically, access point mode is, NAT is disabled, one wan port and four LAN ports are bridged together.

By default, the ASUS Wireless Router operates in Access Point mode.

System Setup (Cont.)

Router Mode (WL500g/WL500g Deluxe)

After selecting “Router” mode and clicking “Apply”, you will enter the “Quick Setup” page of the Router mode. Follow the instructions to setup the ASUS Wireless Router.

Note: The Wireless, IP Config, Internet Firewall, Wireless Firewall and Web Camera settings in Router Mode are the same as the settings in Home Gateway Mode. To learn more about these settings, please refer to the Home Gateway Mode in this user’s manual.

Quick Setup in Router Mode

Select Time Zone

Please choose the time zone where you are locating in.

Time Zone: (GMT-11:00) Midway Island, Samoa

Next

After selecting “Router” mode and clicking “Apply”, you will enter the “Quick Setup” page of the Router mode. Follow the instructions to setup the ASUS Wireless Router as a Router.

WAN IP Setting

Fill TCP/IP setting for WL300g to connect to Internet through WAN port.

Get IP automatically? ☒ Yes ☐ No

IP Address:

Subnet Mask:

Default Gateway:

Get DNS Server automatically? ☒ Yes ☐ No

DNS Server 1:

DNS Server 2:

Prev Next

Quick Setup

Configure Wireless Interface

First step to set your wireless interface is to give it a name, called SSID. In addition, if you would like to protect transmitted data, please select the Security Level and assign a password for authentication and data transmission if it is required.

SSID: default

Security Level: Low

Phassphrase:

WEP Key 1 (10 or 26 hex digits):

WEP Key 2 (10 or 26 hex digits):

WEP Key 3 (10 or 26 hex digits):

WEP Key 4 (10 or 26 hex digits):

Default Key:

Finish

If you would like to perform other settings, click the item on the menu to reveal a sub menu. Follow the instructions to setup the ASUS Wireless Router. Tips are given when you move your cursor over each item.

System Setup (Cont.)

AP Mode

After selecting “Access Point” mode and clicking “Apply”, you will enter the “Quick Setup” page of the Access Point mode. Follow the instructions to setup the ASUS Wireless Router.

Note: The Wireless settings are the same as the settings in Home Gateway Mode. To learn more about these settings, please refer to the Home Gateway Mode in this user’s manual.

Quick Setup in Access Point Mode

Click **Next** to enter the Quick Setup page. Follow the instructions to setup the ASUS Wireless Router.

Configure Wireless Interface

Access Point

- **Quick Setup** allows users to complete basic setting by just answering several questions.
- **802.11g and WPA** supports up to 54Mbps transmission rate, backward compatibility with 802.11b and interoperable security enhancement.
- **Status & Log** log status of system in details.

This site is best viewed with IE 5.0 or above.

Click NEXT to start Quick Setup

NEXT

First step for setting your wireless interface is to give it a name, called SSID. In addition, if you would like to protect transmitted data, please select WEP protection and assign WEP keys for data transmission. Your wireless setting will be applied into all interfaces.

Quick Setup

Configure Wireless Interface

First step to set your wireless interface is to give it a name, called SSID. In addition, if you would like to protect transmitted data, please select the Security Level and assign a password for authentication and data transmission if it is required.

SSID: default

Security Level: Low

Phassphrase:

WEP Key 1 (10 or 26 hex digits):

WEP Key 2 (10 or 26 hex digits):

WEP Key 3 (10 or 26 hex digits):

WEP Key 4 (10 or 26 hex digits):

Default Key:

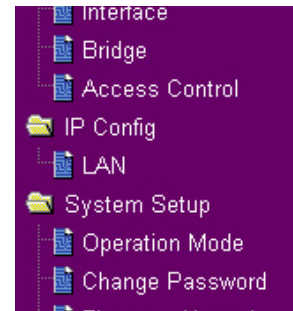
Finish

(See next few pages for item descriptions.)

If you would like to perform other settings, click an item on the menu to reveal a sub menu. Follow the instructions to setup the ASUS Wireless Router. Tips are given when you move your cursor over each item.

IP Config (Access Point Mode)

Click this item on the menu to reveal a sub menu. Follow the instructions to setup the ASUS Wireless Router. Tips are given when you move your cursor over each item.



LAN

Selection items:

- Yes (no info required)
- No (need to input information)

Click **Apply** or **Finish** if you make any changes.

Get IP Automatically

Select Yes (default) or No to get IP address automatically from a DHCP server.

Yes

This parameter determines if the ASUS Wireless Router will send out a DHCP request during bootup. If you have a DHCP server on the network, set this option so that the ASUS Wireless Router can receive an automatic IP address assignment.

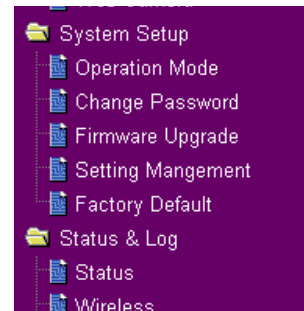
If you have a DHCP (Dynamic Host Configuration Protocol) server on the network, then the DHCP server will automatically assign the ASUS Wireless Router an IP address when the ASUS Wireless Router is powered up. To determine what IP address has been assigned to the ASUS Wireless Router, review the IP address on the “Status” page available on the “Main Menu”.

No

The ASUS Wireless Router also accepts a static IP address. You may manually configure the IP address and subnet mask on the “IP Config” page. Enter an IP address and a subnet mask in the field provided to assign the ASUS Wireless Router a static IP address. If you don’t know your Gateway setting, leave it empty (not 0.0.0.0).

System Setup (Cont.)

Click this item on the menu to reveal a sub menu. Follow the instructions to setup the ASUS Wireless Router. Tips are given when you move your cursor over each item.



Change Password

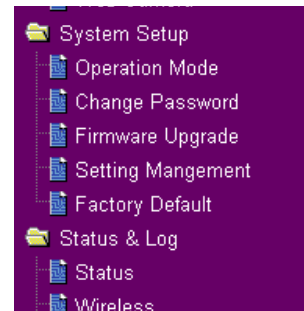
A screenshot of the 'System Setup - Change Password' web form. It has a yellow header bar with the title. Below the header, there are two text input fields: 'New Password:' and 'Retype New Password'. At the bottom right of the form, there are two buttons: 'Save' and 'Clear'.

This page will allow you to change the default password “admin” (lower case) to any password of you choice. You can enter any usable characters between 1-16 characters long (cannot be left blank). Click **Save** button to save your new password. If you forget the ASUS Wireless Router’s password, you can reset the ASUS Wireless Router to its factory settings (see troubleshooting).

Note: The password is case sensitive.

System Setup (Cont.)

Click this item on the menu to reveal a sub menu. Follow the instructions to setup the ASUS Wireless Router. Tips are given when you move your cursor over each item.



Firmware Upgrade

WL500g

System Setup - Firmware Upgrade	
Follow instructions listed below:	
<ol style="list-style-type: none">1. Check if any new version of firmware is available on ASUS website.2. Download a proper version to your local machine.3. Specify the path of and name of the downloaded file in the "New Firmware File".4. Click "Upload" to upload the file to WL300g. It spends about 10 seconds.5. After receiving a correct firmware file, WL300g will automatically start the upgrade process. It takes a few time to finish the process and then the system will reboot.	
Product ID:	<input type="text" value="WL300g"/>
Firmware Version:	<input type="text"/>
Bootloader Version:	<input type="text"/>
Hardware Version:	<input type="text"/>
New Firmware File:	<input type="text"/> <input type="button" value="Browse..."/>
<input type="button" value="Upload"/>	
Note: <ol style="list-style-type: none">1. For a configuration parameter existing both in the old and new firmware, its setting will be kept during the upgrade process.2. In case the upgrade process fails, WL300g will enter an emergent mode automatically. The LED signals at the front of WL300g will indicate such situation. Use the Firmware Restoration utility on the CD to do system recovery	

WL500g Deluxe

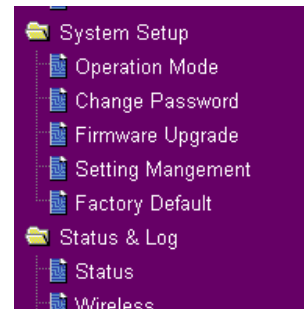
System Setup - Firmware Upgrade	
Follow instructions listed below:	
<ol style="list-style-type: none">1. Check if any new version of firmware is available on ASUS website.2. Download a proper version to your local machine.3. Specify the path of and name of the downloaded file in the "New Firmware File".4. Click "Upload" to upload the file to WL500g.Deluxe. It spends about 10 seconds.5. After receiving a correct firmware file, WL500g.Deluxe will automatically start the upgrade process. It takes a few time to finish the process and then the system will reboot.	
Product ID:	<input type="text" value="WL500gx"/>
Firmware Version:	<input type="text" value="1.8.1.4"/>
New Firmware File:	<input type="text"/> <input type="button" value="Browse..."/>
<input type="button" value="Upload"/>	
Note: <ol style="list-style-type: none">1. For a configuration parameter existing both in the old and new firmware, its setting will be kept during the upgrade process.2. In case the upgrade process fails, WL500g.Deluxe will enter an emergent mode automatically. The LED signals at the front of WL500g.Deluxe will indicate such situation. Use the Firmware Restoration utility on the CD to do system recovery.	

This page reports the Flash Code (Firmware) version installed in the ASUS Wireless Router. Periodically, a new Flash Code is available for the ASUS Wireless Routers on ASUS's Web site. You can update the ASUS Wireless Router's Flash Code using the Firmware Upgrade page under the Advanced Setup menu of the Web Manager. If you are experiencing a problem with your ASUS WLAN equipment, a Technical Support representative may ask you to give your device's Flash Code (Firmware) version.

Note: The firmware upgrade takes approximately 60 to 90 seconds. When the firmware upgrade is completed, you will be directed to the home page.

System Setup - Setting Management

Click this item on the menu to reveal a sub menu. Follow the instructions to setup the ASUS Wireless Router. Tips are given when you move your cursor over each item.



Setting Management

A screenshot of the 'System Setup - Setting Mangement' page. The page has a yellow header with the title. Below the header, there is a text block explaining the function: 'This function allows you to save current settings of WL500g.Deluxe to a file, or load settings from a file.' This is followed by two sections: 'Save As a File' and 'Load From a File'. The 'Save As a File' section contains instructions to click a 'HERE' link and select 'Save As...' from a right-click context menu. The 'Load From a File' section contains instructions to specify a file path in the 'New Setting File' field and click 'Upload'. At the bottom, there is a text input field for 'New Setting File:', a 'Browse...' button, and an 'Upload' button.

This function allows you to save current settings to a file, or load settings from a file.

Save As a File

Move your cursor over the **HERE** link on the web page. Then click the right button of mouse and select **Save As...** to save current setting into a file.

Note: When current settings are saved to file, it will be saved to flash as well.

Load From a File

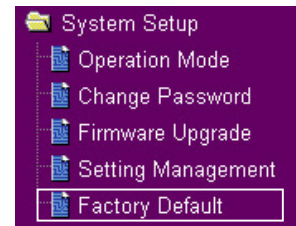
Specify the path of and name of the downloaded file in the **New Setting File** below. Then, click **Upload** to write the file to. It takes a few time to finish the process and then the system will reboot.

New Setting File

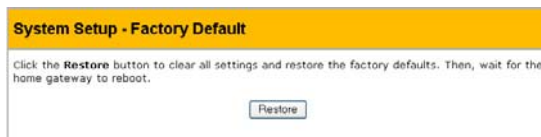
Click **Browse** to locate the file.

System Setup

Click this item on the menu to reveal a sub menu. Follow the instructions to setup the ASUS Wireless Router. Tips are given when you move your cursor over each item.



Factory Default



Restoring Factory Default Settings

Web Manager

You can reset all settings to their factory defaults through the web manager using the “Factory Default” page in “Advanced Setup”. Click the **Restore** button and wait about 30 seconds before trying to access the ASUS Wireless Router.

Hardware

You can reset all settings to their factory defaults manually by pushing the “Restore” button in a hole on the back of the ASUS Wireless Router while it is ON. Use a pen or straightened paper clip to hold the “Restore” button depressed over 5 seconds until the power LED on the front of the ASUS Wireless Router starts blinking.

Note: You will be notified when factory default settings are restored while using the web manager.

Status & Log

The Status & Log pages give you all the necessary information for monitoring the Wireless Router's condition.



Status & Log - Status

System Up Time: 0 Day : 4 Hour : 0 Min : 52 Sec

WAN Interface

WAN Type: Automatic IP

IP Address:

Subnet Mask:

Gateway:

DNS Servers:

Link Status: Disconnected

Action: Release Renew

Printer

Printer Model: Hewlett-Packard HP LaserJet 1200

Printer Status: Printing

User: 192.168.39.10

Action: Remove

LAN Interface

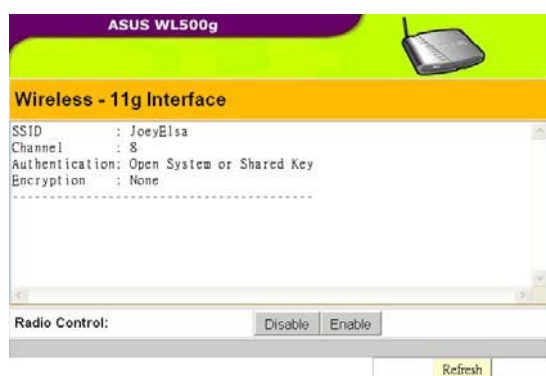
IP Address: 192.168.39.254

Subnet Mask: 255.255.255.0

Default Gateway:

Status

System information for WAN, LAN, and Printer are displayed on this page. The buttons for WAN interface allow you to release or renew the IP address if your WAN Connection Type is set as Automatic IP. The button for Printer Server is used to remove printing jobs manually.



ASUS WL500g

Wireless - 11g Interface

SSID : JoeyElsa

Channel : 8

Authentication: Open System or Shared Key

Encryption : None

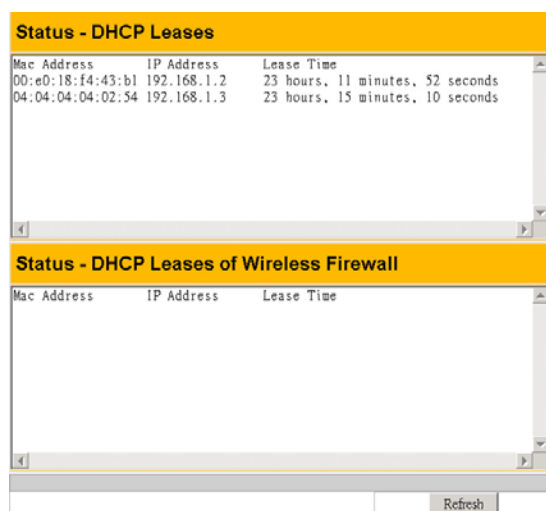
Radio Control: Disable Enable

Refresh

Wireless

Wireless clients, who connect to the Wireless Router, are displayed on this page. You can use buttons for radio control to manually disable or enable the wireless function.

WL500g



Status - DHCP Leases

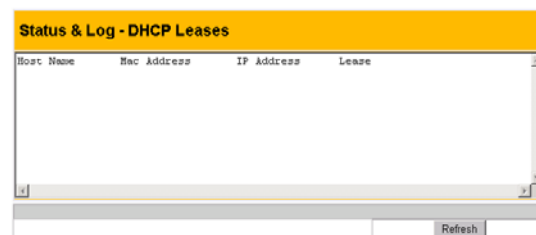
Mac Address	IP Address	Lease Time
00:e0:18:f4:43:b1	192.168.1.2	23 hours, 11 minutes, 52 seconds
04:04:04:04:02:54	192.168.1.3	23 hours, 15 minutes, 10 seconds

Status - DHCP Leases of Wireless Firewall

Mac Address	IP Address	Lease Time
-------------	------------	------------

Refresh

WL500g Deluxe



Status & Log - DHCP Leases

Host Name	Mac Address	IP Address	Lease
-----------	-------------	------------	-------

Refresh

DHCP Leases

Clients who request IP from DHCP server of your local area network or DHCP server in you're your wireless network behind Wireless Firewall are displayed in this page.

Status & Log (Cont.)

Status - Port Forwarding

Destination	Prot.	Port Range	Redirect to
192.168.123.19	tcp	20:21	192.168.1.1
192.168.123.19	tcp	23	192.168.1.2

Refresh

Port Forwarding

Information of port forwarding rules, which are added by Port Mapping, Virtual Server, Virtual DMZ or UPnP, are displayed in this page.

Router - Routing Table

Destination	Gateway	Genmask	Flags	Metric	Ref	Use
192.168.1.0	*	255.255.255.0	U	0	0	(C)
192.168.123.0	*	255.255.255.0	U	0	0	(C)
239.0.0.0	*	255.0.0.0	U	0	0	(C)
default	192.168.123.1	0.0.0.0	UG	0	0	(C)

Refresh

Routing Table

Static routing rules or dynamic routing rules updated by RIP are displayed in this page.

Status - System Log

Jan 1 08:00:15	dhcp client: lease is lost
Jan 1 08:00:16	dhcp client: bound IP address 192.168.123.19 from server
May 20 17:43:48	NTP client: time is synchronized to 131.107.1.10

Refresh

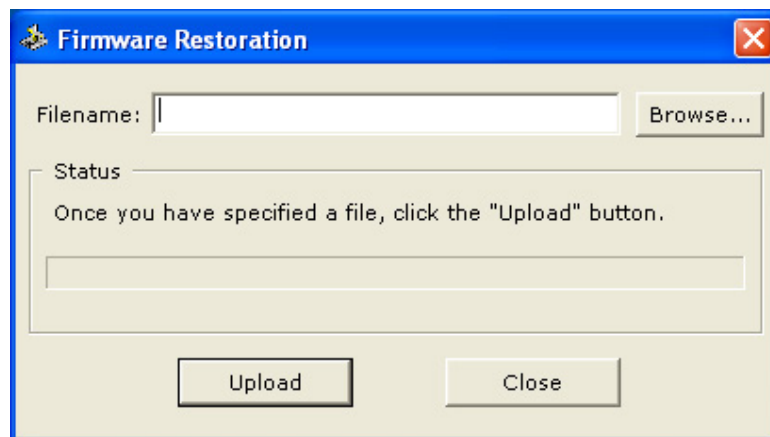
System Log

The last 1024 system log entries are recorded in this page.

Firmware Restoration

This utility will automatically search out failed ASUS Wireless Routers and upload a firmware that you specify. The process takes about 3 to 4 minutes and during this process the PWR, AIR, and WAN LEDs will remain lit while the LAN LED will flash slowly.

The Firmware Restoration utility is an emergency rescue tool to restore a ASUS Wireless Router which has failed during a previous firmware upload. A failed firmware upgrade will cause the ASUS Wireless Router to enter a failure mode, waiting for the user to use the Firmware Restoration utility to find and upload a new firmware. This is not a firmware upgrade utility and cannot be used on a working ASUS Wireless Router. Normal firmware upgrades must be done through the web manager.



Using a Hub

If you have problems upload a firmware while using a network hub, try connecting your computer directly to the LAN port. Either 10Base-T or 100Base-TX connections will work.

Setup Printer Wizard

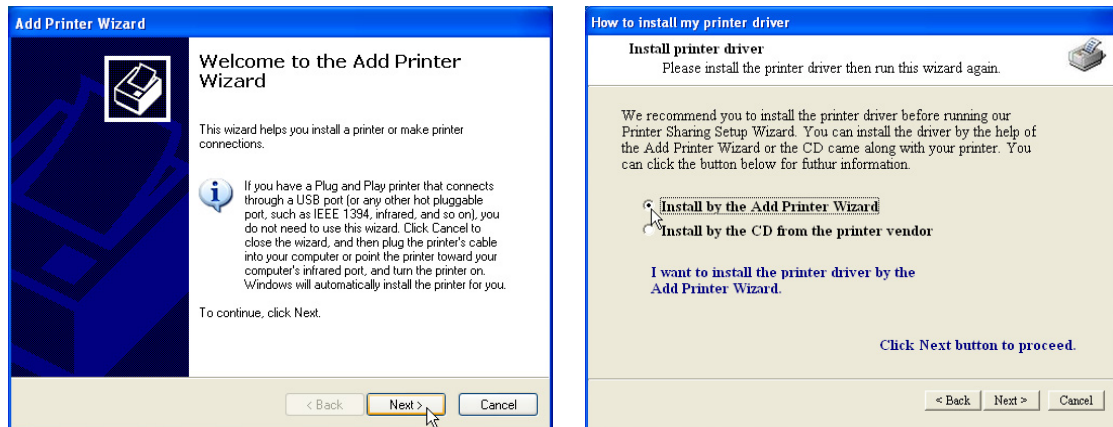
Follow the procedures below to set up your computers to utilize the printer server function of the ASUS Wireless Router.

Installing the Printer Driver

Adding a printer to your computer simplifies the ASUS Wireless Router Printer Setup Wizard.

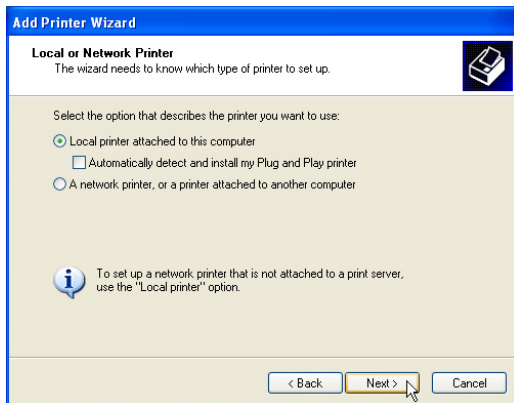
You are recommended to install a printer driver by the setup program that comes with your printer (see following Note), and then continue to the “Printer Setup Wizard” in the next section. If you run the “Printer Setup Wizard” without a printer driver installed, you are directed to the “Add Printer Wizard”.

Note: Some printer setup utilities require a printer to be physically connected to your PC during installation. Follow the driver installation instructions to connect your printer to the PC to install the driver and reconnect the Wireless Router after the printer driver has been installed.

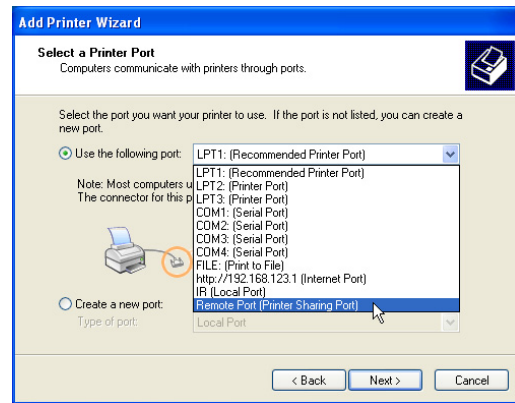


- (1) Run the “Add Printer Wizard” from **Start | Printers and Faxes | Add Printer**.
- (2) Choose “Install by the Add Printer Wizard”.

Chapter 3 - Software Configuration

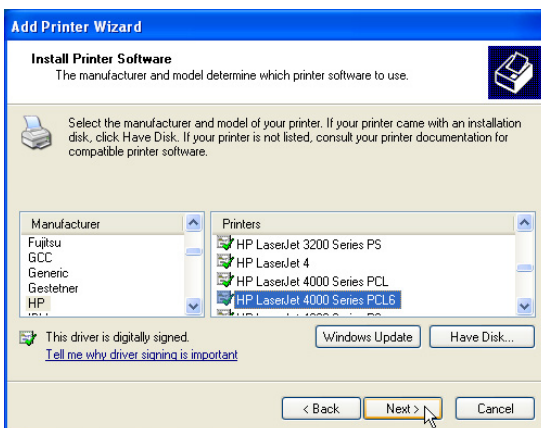


- (3) Choose “Local printer attached to this computer”.

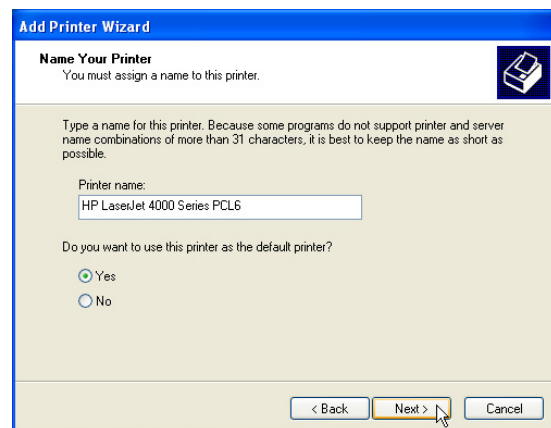


- (4) Choose “Remote Port (Printer Sharing Port)”. If this is not available, select LPT1*. You can select a USB port later in the “Printer Setup Wizard” if you are using a USB printer.

* WL500b/g also supports standard based network printing protocol, called, LPR, which is also supported by Windows XP, Windows 2000, MAC or Unix based system. If you are a Windows XP user, please refer to Setup for LPR client under Windows XP for setting as a LPR client.

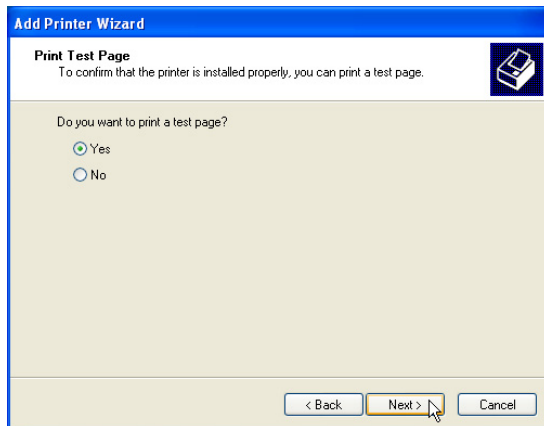


- (5) Find your manufacturer and model. Click **Have Disk** if you cannot find your printer in the list and use the driver provided with your printer.

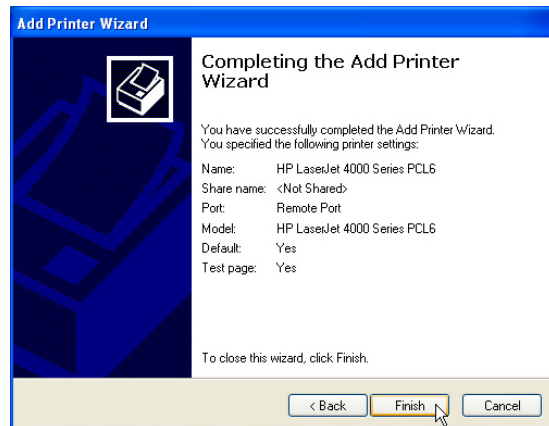


- (6) Click **Next** to set this as your default printer.

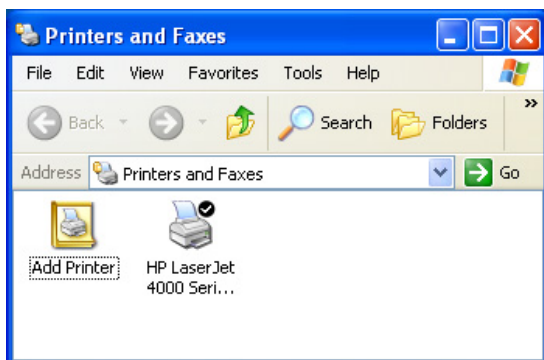
Chapter 3 - Software Configuration



(7) You can print a test page.



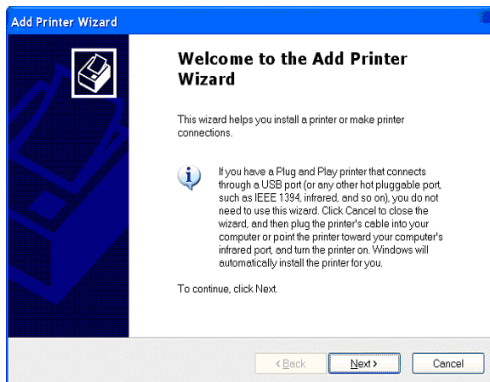
(8) Click **Finish** to close the wizard.



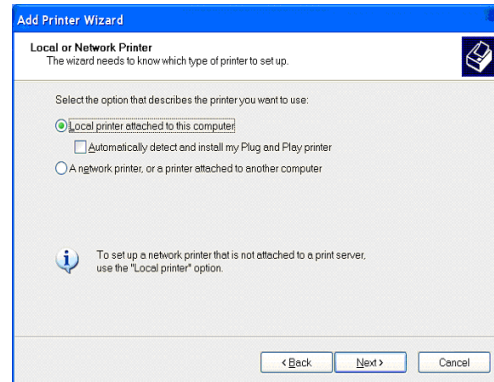
Your printer will show in the “Printers and Faxes” window and the check mark shows that it is set as your default printer.

Chapter 3 - Software Configuration

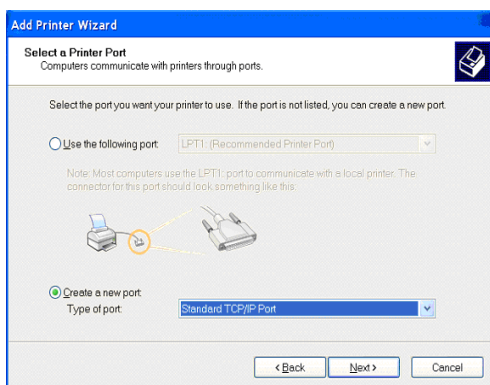
Setup for LPR client under Windows XP



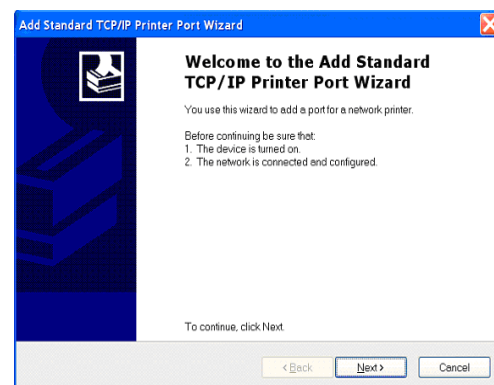
1. Run the “Add Printer Wizard” from Start | Printers and Faxes | Add Printer.



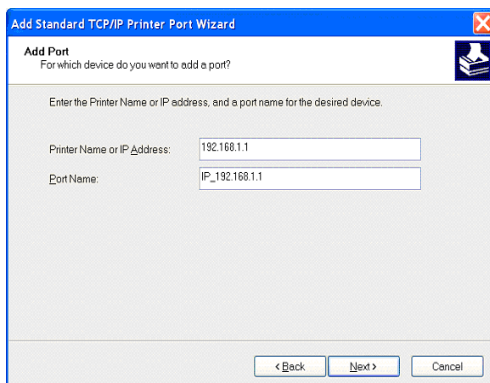
2. Choose “Local printer attached to this computer” then press **Next**.



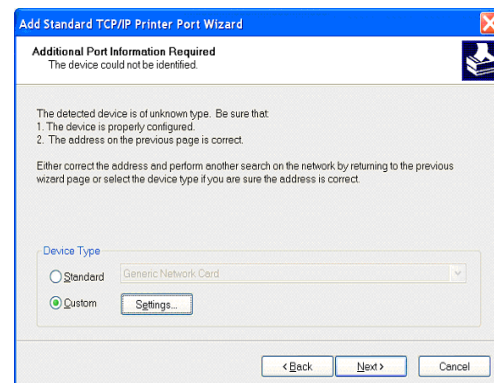
3. Click on “Create a new port” and select “Standard TCP/IP Port” in the pull down menu. Then press **Next**.



4. Click **Next** on the “Add Standard TCP/IP Printer Port Wizard”.

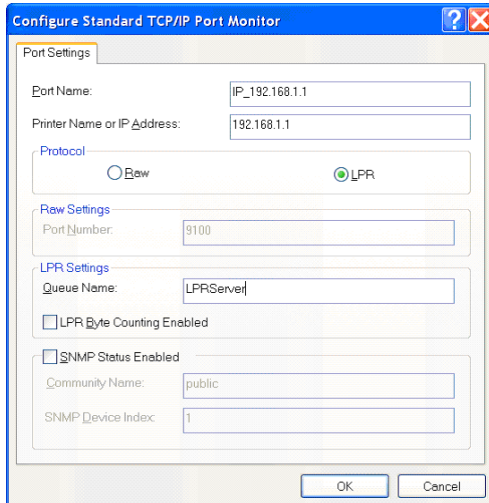


5. Input the IP address of the WL500g in the “Printer Name or IP Address” field and the press **Next**.

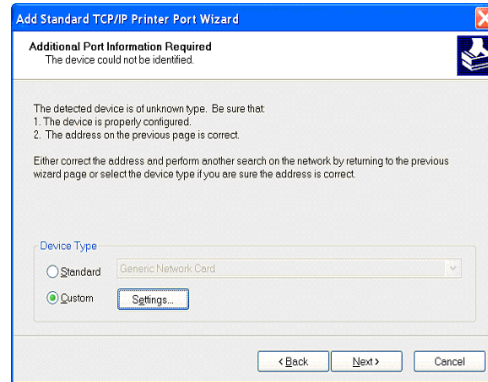


6. Select “Custom” and then click **Settings...**

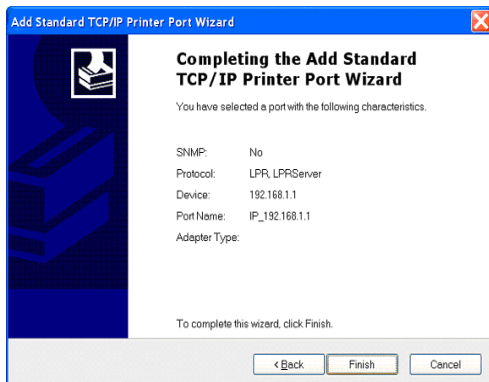
Chapter 3 - Software Configuration



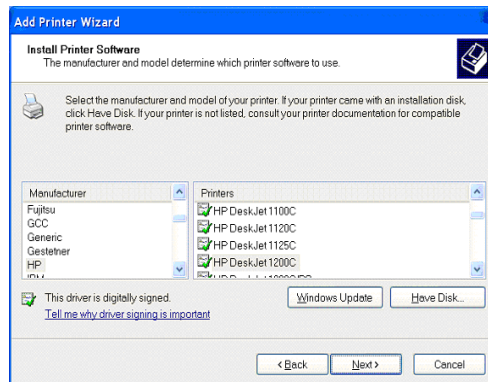
7. Select Protocol **LPR** and type **LPRServer** in “Queue Name field”.



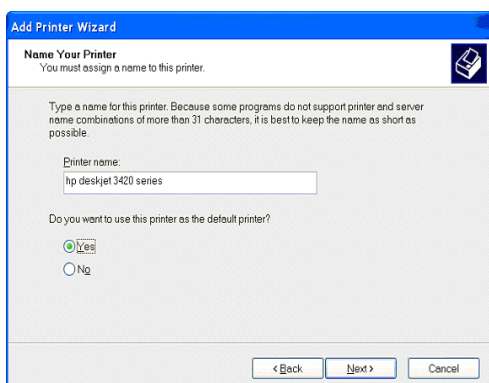
8. After completing settings, press **Next**.



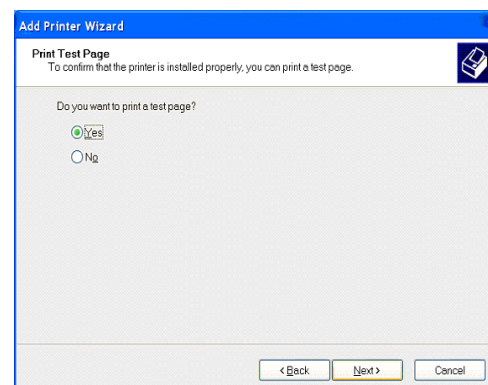
9. Press **Finish** to complete the “Add Standard TCP/IP Printer Port Wizard” and go back to “Add Printer Wizard”.



10. Find the manufacturer and model of your printer. Click **Have Disk** if you cannot find it in the list and use the driver provided with your printer.



11. Click **Next** to set this as your default printer.



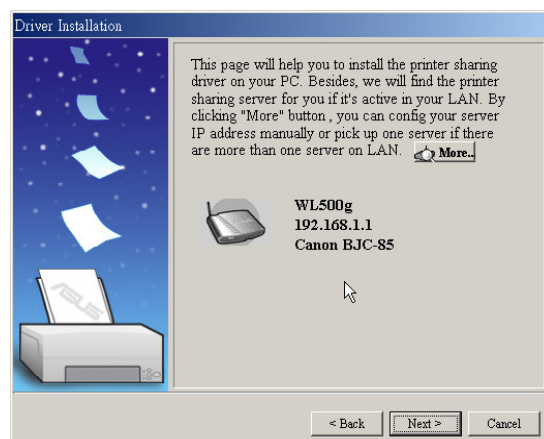
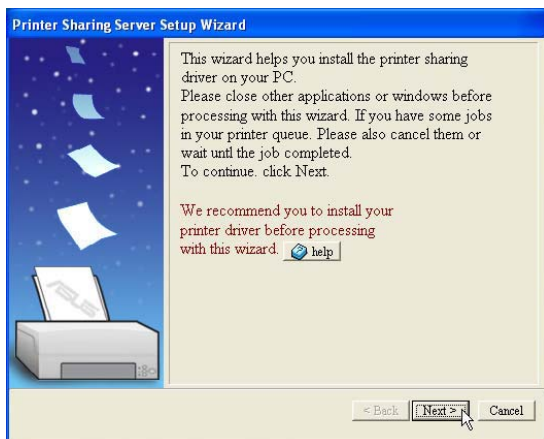
12. Select **Yes** and **Next** to print a test page, otherwise select **No**.

13. When the “Add Printer Wizard” is complete, click **Finish** to close the wizard.

Chapter 3 - Software Configuration

Printer Setup Wizard

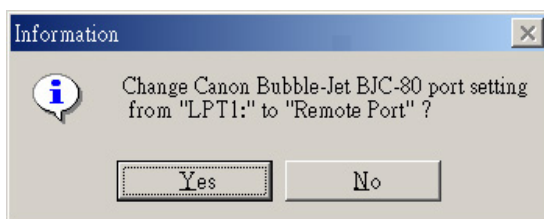
Make sure your printer is connected to the Wireless Router printer port or USB port and its power is turned on. Launch the “Printer Setup Wizard” through the Start menu. The wizard will explore all available ASUS Wireless Routers and model information of the printers attached to them in your local network.



- (1) Having a printer installed on the printer port (LPT1) or a USB port makes the setup process easier (refer to the following page).
- (2) If the printer is found, the name of the printer will be shown on this screen.

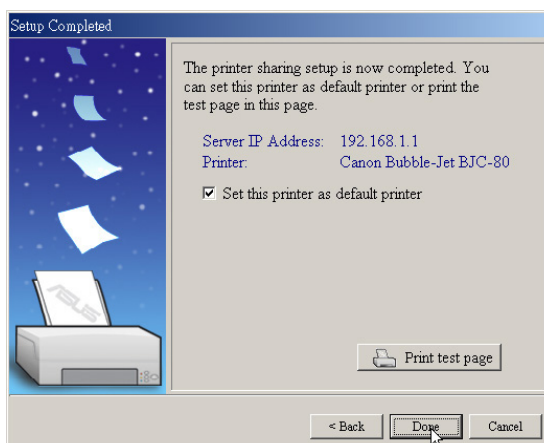
Note: If there is an error communicating with the printer, you will get this message. Make sure that the printer is ON, ready, and connected. Click **Back** and **Next**.

If you can see this message, this means no Server found during this search. Please click "More" to search again after checking all the settings.



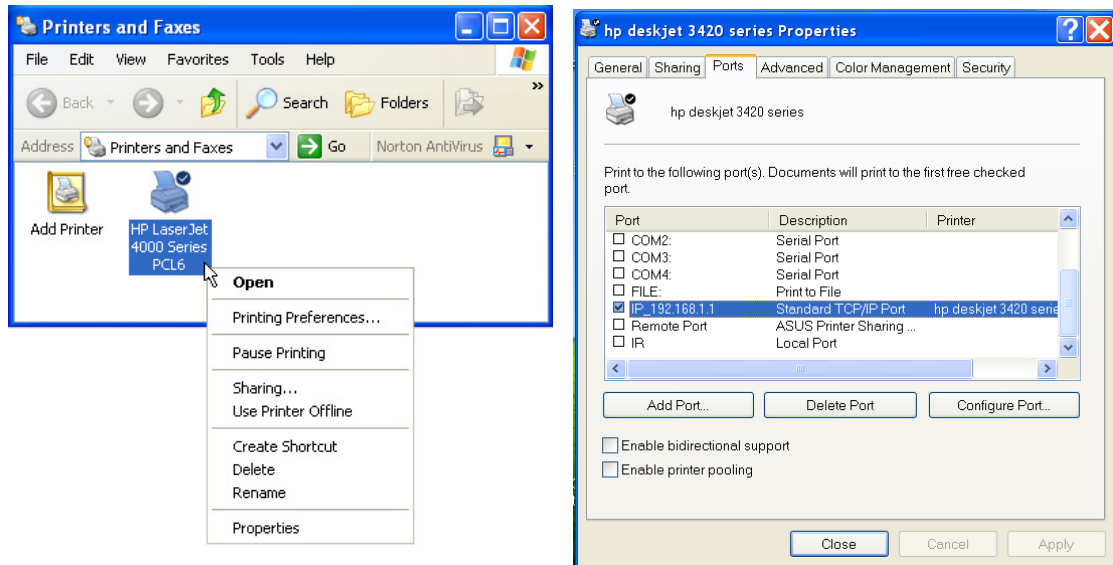
- (3) This setup wizard will change your default printer to use “Standard TCP/IP port” which is serviced by the ASUS Wireless Router.

Note: For Windows XP or Windows 2000, this setup wizard will guide you to select or add a “Standard TCP/IP port”. Refer to “Setup for LPR client under Windows XP” for details. For Windows 98 or Windows ME, this setup wizard will change your default printer to use “Remote Port” which is serviced by the ASUS Wireless Router.



- (4) Click **Done** when setup is complete.

Verifying Your Printer



After setting up the printer, a printer icon will appear in Windows' "Printers and Faxes". Right click the printer icon and choose **Properties** to configure the printer.

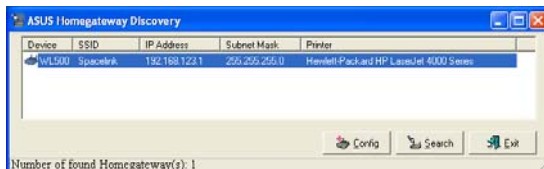
If your printer was previously setup, the ASUS Wireless setup wizard changes the printing port from the computer's local LPT1 (parallel) port or USB port to "Standard TCP/IP port"*. If necessary, you can change this back at anytime or use Windows "Add Printer" to setup another printer.

Note: If you use Windows 98 or ME which do not support "Standard TCP/IP port", you need to use "Remote Port" which is supported by ASUS.

Chapter 3 - Software Configuration

Verifying Your Printer (Cont')

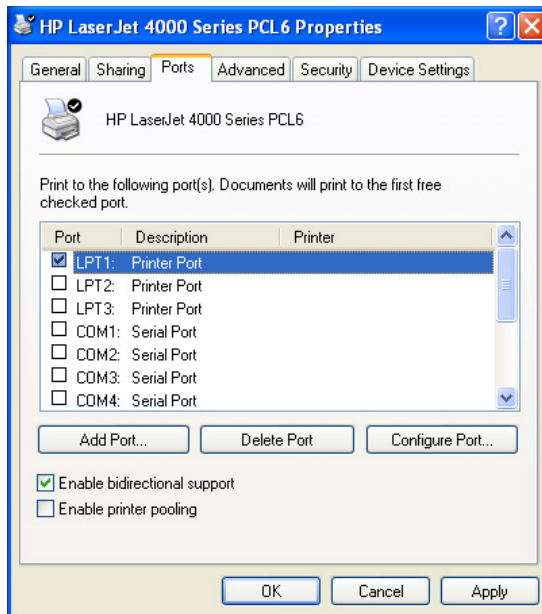
Note: If you use LPR client in Windows XP or Windows 2000, Standard TCP/IP port will be used. Please refer to Setup for LPR client under Windows XP in details.



Printer Server

Connected Printer Status:	on-line
User in service:	

When properly setup, the ASUS Wireless Router will show the printer name in the "Device Discovery" utility and show "on-line" under the "Printer Server" on the "Status" page of the web manager.



4. Wireless Performance

This section provides the user with ideas for how to improve the performance of a ASUS Wireless network.

Site Topography

For optimal performance, locate wireless mobile clients and the ASUS Wireless Routers away from transformers, heavy-duty motors, fluorescent lights, microwave ovens, refrigerators, and other industrial equipment. Signal loss can occur when metal, concrete, walls or floors block transmission. Locate the ASUS Wireless Routers in open areas or add the ASUS Wireless Routers as needed to improve coverage.

Microwave ovens operate in the same frequency band as the ASUS Wireless Router. Therefore, if you use a microwave within range of the ASUS Wireless Router you may notice network performance degradation. However, both your microwave and your the ASUS Wireless Router will continue to function.

Site Surveys

A site survey (utility provided with the WLAN PC card and CF card) analyzes the installation environment and provides users with recommendations for equipment and its placement. The optimum placement differs for each model.

Range

Every environment is unique with different obstacles, barriers, materials, etc. and, therefore, it is difficult to determine the exact range that will be achieved without testing. However, has developed some guidelines to estimate the range that users will see when the product is installed in their facility, but there are no hard and fast specifications.

Radio signals may reflect off of some obstacles or be absorbed by others depending on their construction. For example, with two 802.11b radios, you may achieve up to 1000' in open space outdoors where two devices have a line of sight, meaning they see each other with no obstacles. However, the same two units may only achieve up to 300' of range when used indoors.

The IEEE 802.11b specification supports four data rates: 11 Mbps, 5.5 Mbps, 2 Mbps, and 1 Mbps. Operation at 1 Mbps provides greater range than operation at 11 Mbps. The ASUS Wireless Router will automatically adjust the data rate to maintain a usable radio connection.

Therefore, a client that is close to the ASUS Wireless Router may operate at 11 Mbps while a client that is on the fringe of coverage may operate at 1 Mbps. As mentioned earlier, you can configure the data rates that the ASUS Wireless Router will use. Note that if you limit the range of data rates available to the ASUS Wireless Router, you may reduce the effective wireless range of the ASUS Wireless products.

Troubleshooting

The ASUS Wireless Router is designed to be very easy to install and operate. However, if you experience difficulties, use the information in this chapter to help diagnose and solve problems. If you cannot resolve a problem, contact Technical Support, as listed on the front of this manual.

Common Problems and Solutions

Problem

ASUS Wireless Router does not power up:

Solution

- Check for faulty the ASUS Wireless Router power supply by measuring the output voltage with an electrical test meter.
- Check failed AC supply (power outlet)

Problem

Cannot communicate with the ASUS Wireless Router through a wired network connection.

Solution

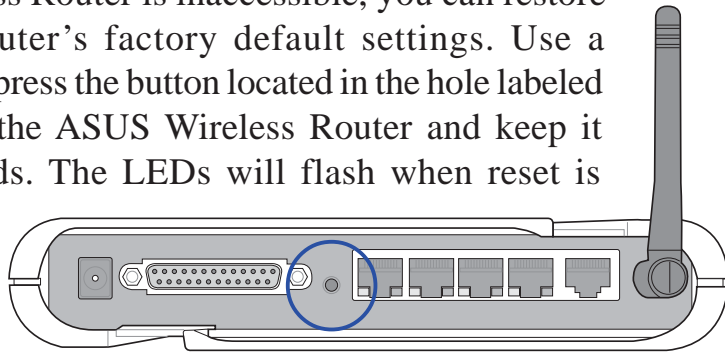
- Verify network configuration by ensuring that there are no duplicate IP addresses. Power down the device in question and ping the assigned IP address of the device. Ensure no other device responds to that address.
- Check that the cables used have proper pin outs and connectors or use another LAN cable.

Problem

The ASUS Wireless Router Web Manager still cannot find or connect to the ASUS Wireless Router after verifying the IP address and LAN cable, changes cannot be made, or password is lost.

Solution

In case the ASUS Wireless Router is inaccessible, you can restore the ASUS Wireless Router's factory default settings. Use a straightened paper clip to press the button located in the hole labeled "Reset" on the back of the ASUS Wireless Router and keep it depressed over 5 seconds. The LEDs will flash when reset is successful.



Reset to Defaults

The following are factory default values. These values will be present when you first receive your the ASUS Wireless Router, if you push the reset button on the back of the ASUS Wireless Router over 5 seconds, or if you click the "Restore" button on the "Factory Default" page under "Advanced Setup".

Name	Default Value
User Name	admin
Password	admin
Enable DHCP	Yes
IP Address	192.168.1.1
Subnet Mask	255.255.255.0
DNS Server 1	192.168.1.1
DNS Server 2	(blank)
SSID	default
Domain Name	(blank)

Appendix -Troubleshooting

Problem

My 802.11b PC Card will not associate with the ASUS Wireless Router.

Solution

Follow these steps:

1. Try to bring the devices closer together; the PC Card may be out of range of the ASUS Wireless Router.
2. Confirm that the ASUS Wireless Router and PC Card have the same SSID.
3. Confirm that the ASUS Wireless Router and PC Card have the same Encryption settings, if enabled.
4. Confirm that the ASUS Wireless Router's Air and Link LEDs are solid green.
5. Confirm that the authorization table includes or excludes the MAC address of the WLAN PC card if "Wireless Access Control" is enabled.

Problem

The throughput seems slow.

Solution

To achieve maximum throughput, verify that your antennas are well-placed, not behind metal, and do not have too many obstacles between them. If you move the client closer to the ASUS Wireless Router and throughput increases, you may want to consider adding a second the ASUS Wireless Router and implementing roaming.

- Check antenna, connectors and cabling.
- Verify network traffic does not exceed 37% of bandwidth.
- Check to see that the wired network does not exceed 10 broadcast messages per second.
- Verify wired network topology and configuration.

Problem

I cannot find the ASUS Wireless Routers using the ASUS Wireless Router Discovery.

Solution

To configure the ASUS Wireless Router through a wireless LAN card, your computer must be in the same subnet of the ASUS Wireless Router. You cannot find the ASUS Wireless Routers with subnet different from your computer within the same gateway. You must change your computer to the same subnet as the ASUS Wireless Router. The factory default subnet of the ASUS Wireless Router is "192.168.1.1".

In Windows NT/2000/XP, you must log in with Administrator privileges so that all functions of the ASUS Wireless Router Manager can function correctly. If you do not log in as a member of the Administrator group, you cannot change IP settings but can still run the Discovery utility if the original IP setting is correct.

Problem

How do I upgrade the firmware on the ASUS Wireless Router?

Solution

Periodically, a new Flash Code is available for ASUS Wireless Routers on the Web site at **<http://www.asus.com>**. Update the ASUS Wireless Router s Flash Code using the Firmware Upgrade option on the System Setup menu of the Web manager.

Glossary

Access Point - An access point is a device that allows wireless clients to connect to other wireless clients and it acts as a bridge between wireless clients and a wired Ethernet network.

Broadband - A type of data transmission in which a single medium (such as cable) carries several channels of data at once.

Channel - Wireless access points allows you to choose different radio channels in the wireless spectrum. A wireless LAN device operates within the 2.4 GHz spectrum and a channel is within a FCC specified range, similar to any radio channel.

Client - A client is the desktop or mobile PC that is connected to your network.

Device name - Also known as DHCP client ID or network name. Sometimes provided by an ISP when using DHCP to assign addresses.

DHCP (Dynamic Host Configuration Protocol) - This protocol allows a computer (or many computers on your network) to be automatically assigned a single IP address from a DHCP server.

DNS Server Address (Domain Name System) - DNS allows Internet host computers to have a domain name and one or more IP addresses. A DNS server keeps a database of host computers and their respective domain names and IP addresses, so that when a user enters a domain name into the Internet browser, the user is sent to the proper IP address. The DNS server address used by the computers on your home network is the location of the DNS server your ISP has assigned.

DSL Modem (Digital Subscriber Line) - A DSL modem uses your existing phone lines to transmit data at high speeds.

Encryption - This provides wireless data transmissions with a level of security.

ESSID (Extended Service Set Identifier) - You must have the same ESSID entered into the gateway and each of its wireless clients. The ESSID is a unique identifier for your wireless network.

Ethernet - Ethernet networks are connected by cables and hubs, and move data around. This is a standard for computer networks.

Frame-bursting - Refers to burst mode. *Burst mode* optionally allows a station to transmit a series of frames without relinquishing control of the transmission medium.

Firewall - A firewall determines which information passes in and out of a network. NAT can create a natural firewall by hiding a local network's IP addresses from the Internet. A Firewall prevents anyone outside of your network from accessing your computer and possibly damaging or viewing your files.

Gateway - A network point that manages all the data traffic of your network, as well as to the Internet and connects one network to another.

Handshaking - handshaking refers to the signals that are transmitted between communications networks that establish a valid connection between two stations.

IEEE - The Institute of Electrical and Electronics Engineers. The IEEE sets standards for networking, including Ethernet LANs. IEEE standards ensure interoperability between systems of the same type.

IP Address (Internet Protocol) - An IP address consists of a series of four numbers separated by periods, that identifies a unique Internet computer host, allowing messages intended for that computer to be delivered to the correct destination.

ISP (Internet Service Provider) - An ISP is a business that allows individuals or businesses to connect to the Internet. Users log on to the Internet using an account with an ISP or Internet Service Provider. ISPs can serve IP addresses dynamically, or assign static (fixed) IP addresses to individual computers.

ISP Gateway Address - The ISP Gateway Address is an IP address for the Internet router. This address is only required when using a cable or DSL modem.

LAN (Local Area Network) - A LAN is a group of computers and devices connected together in a relatively small area (such as a house or an office). Your home network is considered a LAN.

MAC Address (Media Access Control) - A MAC address is the hardware address of a device connected to a network.

Appendix - Glossary

NAT (Network Address Translation) - NAT masks a local network's group of IP addresses from the external network, allowing a local network of computers to share a single ISP account. This process allows all of the computers on your home network to use one IP address. This will enable access to the Internet from any computer on your home network without having to purchase more IP addresses from your ISP.

PC Card - This is an Ethernet card that connects to the PCMCIA slot on your Notebook PC. This enables the computer to communicate with wireless access points.

PPP (Point-to-Point Protocol) - PPP is a protocol for communication between computers using a serial interface, typically a personal computer connected by phone line to a server.

PPPoE (Point-to-Point Protocol over Ethernet) - Point-to-Point Protocol is a method of secure data transmission. PPP using Ethernet to connect to an ISP.

Subnet Mask - A subnet mask is a set of four numbers configured like an IP address. It is used to create IP address numbers used only within a particular network.

TCP/IP (Transmission Control Protocol/Internet Protocol) - This is the standard protocol for data transmission over the Internet. Protocols used to connect hosts on the Internet.

WAN (Wide Area Network) - A system of LANs, connected together. A network that connects computers located in separate areas, (i.e., different buildings, cities, countries). The Internet is a wide area network.

WECA (Wireless Ethernet Compatibility Alliance) - An industry group that certifies cross-vender interoperability and compatibility of IEEE 802.11b wireless networking products and to promote that standard for enterprise, small business, and home environments.

WLAN (Wireless Local Area Network) - This is a group of computers and other devices connected wirelessly in a small area. A wireless network is referred to as LAN or WLAN.

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- The busybox swiss army knife of embedded linux
- The zebra routing daemon implementation
- The udhcpd DHCP client/server implementation
- The pptp-linux PPTP client implementation
- The rp-pppoe PPPoE client implementation
- The pppd PPP daemon implementation
- The dproxy DNS proxy implementation
- The bridge-utils package

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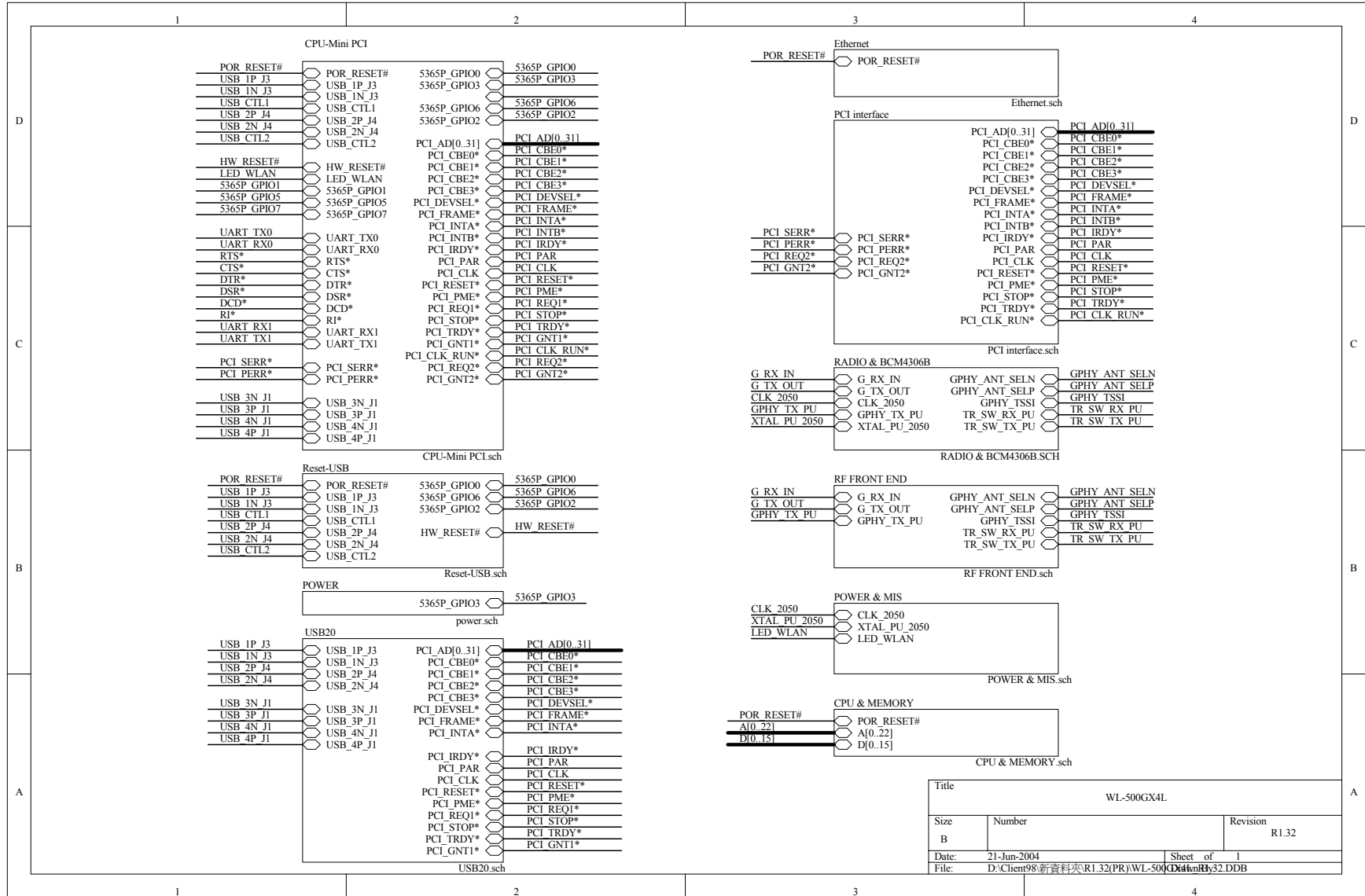
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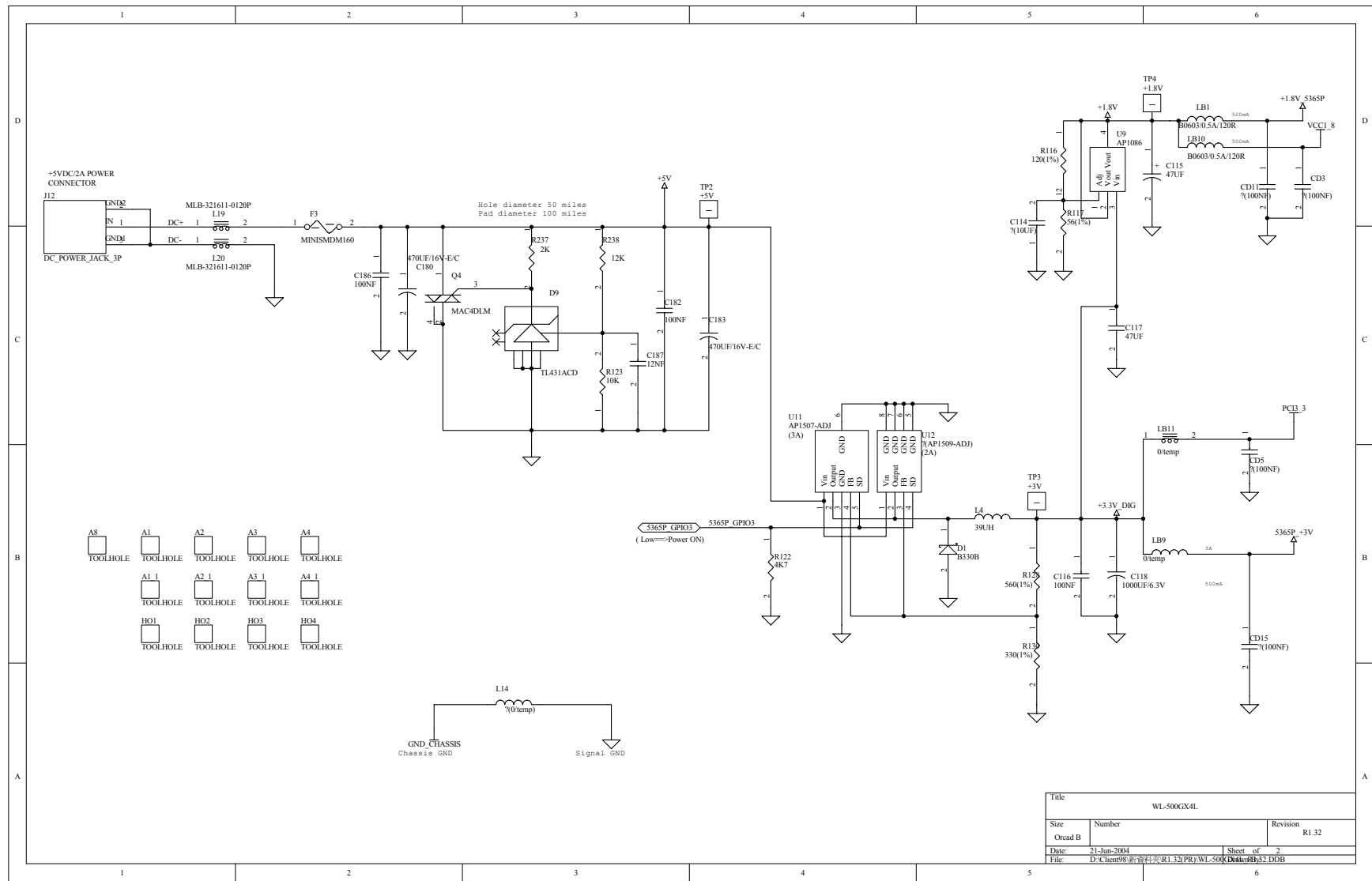
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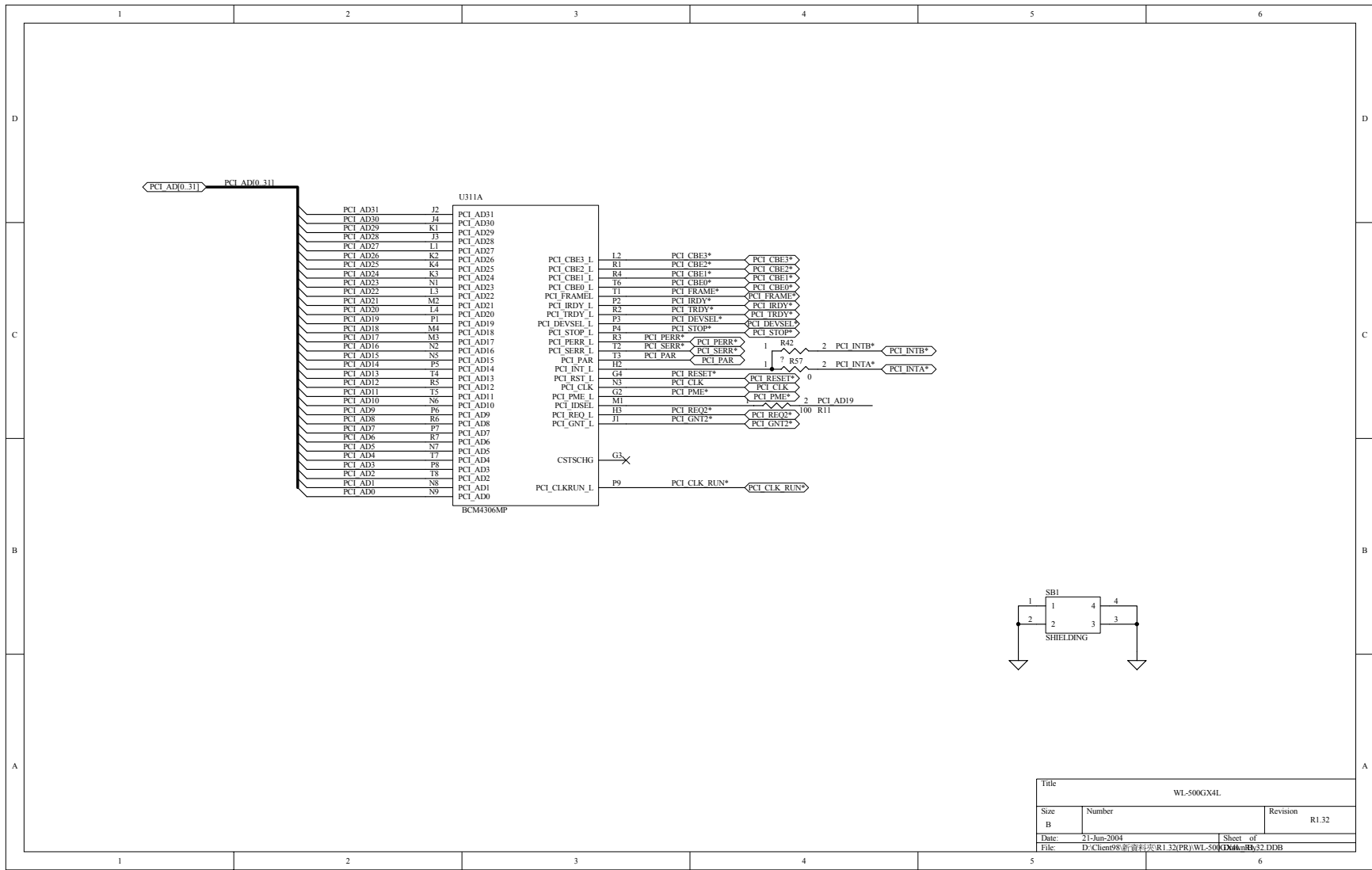
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EXHIBIT F

Schematics







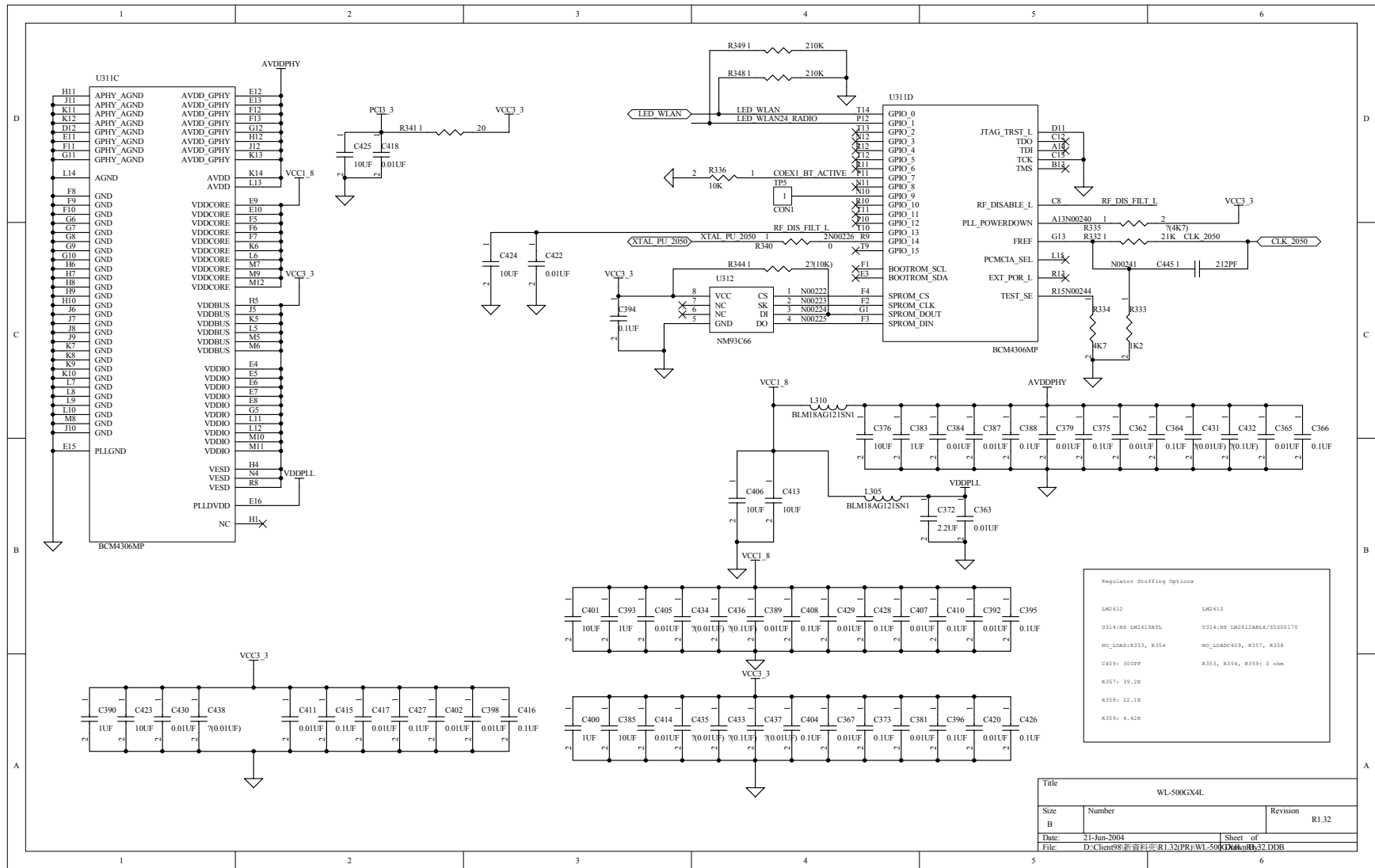


EXHIBIT G

Part List

華碩電腦

FROM:P4809

產品結構表

製表日期:04/10/14 11:04:13 有效日期:04/10/14 版本:

頁次:1

70-13U00A-A03	(WL-500G.D	R1.33	(EC:1A10613))	
(10)	07-015020003	(LED GREEN 3 R/A	KINGBRIGHT	)	*7 N
(20)	11-040710801	(CAP EL 1000UF/6.3V 8*12	OST RLP1086R3M08122C	)	*1 N
(30)	11-040847740	(CAP EL 470UF/16V 8x12 105d	TEAPO	)	*2 N
(30)S:	11-040004700	(CAP EL 470UF/16V 8x12 105d	OST	)	*2 N
(40)	12-061000080	(HEADER 2X4P		)	*2 N
(50)	12-090030042	(T.P SWITCH 4P,DIP,L:5.85		)	*1 N
(60)	12-130000040	(USB CON 1X4P DIP M S/T	FOXCONN/UB31123-K1	)	*2 N
(70)	12-142020050	(MODULAR JACK RJ45 1*5PORT	CHANSINCERE/415B-083150113	)	*1 N
(80)	12-145011032	(DC POWER JACK 3P SHIELD :2.0S	SINGATRON/2DC-S005D100	)	*1 N
(90)	12-149100028	(SMA R/A JACK R/P FOR PCB	DYNAHZ/21-81002-12040	)	*1 N
(90)S:	12-149100027	(MMCX JACK R/A RP-SMA	IO/D112-000A	)	*1 N
(100)	60-13U00A-A03	(WL-500G.D	R1.33 (EC:1A10613)	)	*1 N
(10)	08-534700000	(WL-500G.D R1.33	育富,8*5.8,4L(1)	)	*1 C
(20)	59-13U00A-A03T	(WL-500G.D	R1.33 (EC:1A10613)	)	*1 N
(10)	10-004414919	(RES 499 OHM 1/16W (0402)	1%	)	*2 N
(20)	02-040001800	(C.S VT6212L PQFP128	VIA PCI USB2.0 HOST CONTROLLER)	)	*1 N
(30)	02-561001200	(C.S BCM2050	802.11G RADIO TRANSCEIVER	)	*1 N
(40)	02-561001311	(C.S BCM4306 CO REV.1	802.11G BASEBAND/MAC IC	)	*1 N
(50)	02-561004000	(C.S BCM5364P PBGA-400	BROADCOM	)	*1 N
(60)	03-121039026	(8M*16-7.5 SAM TSOP SDRAM	K4S281632F-TC75	)	*2 N
(60)S:	03-12103A210	(8M*16-7 ETRON TSOP SDRAM	EM639165TS-7	)	*2 Y
(70)	05-020000602	(EEPROM AT93C46-10SI-2.7 SOIC-8	ATMEL (SHRINK-DIE)	)	*1 N
(80)	06-006001110	(Vref. TL431ACDR(1%)	S-8 TI	)	*1 N
(90)	06-006001810	(Vref.APL431BAC-TR 2.5V(1%)	ANPEC	SOT-23)	*1 N
(100)	06-007182010	(LIN REG.LP2985AIM5(X)-1.8	NS	SOT23)	*1 N
(100)S:	06-007196010	(LIN REG. NJM2872F18-TE1	MTP-5NJRC	)	*1 N
(110)	06-007225010	(LIN REG. AME8805DEGT	SOT-223AME 2.5V/600mA	)	*1 N
(120)	06-007339010AK	(LIN REG. AP1086K	T0263-3L # (=06-007339010)	)	*1 N
(120)S:	06-007184011	(LIN REG. AIC1084	T0-263 AIC	)	*1 N
(130)	06-010063020	(OP AMP. LMV321IDCKR	SC70-5TI	)	*1 N
(130)S:	06-010090010	(OP AMP. LMV321M7	SC70-5NS	)	*1 N
(140)	06-017010010	(Vcomp. MAX811SEUS-T	SOT143-4 MAXIM	)	*1 N
(150)	06-053020010	(POWER AMP. AP1091 QFN-16	RFIC	)	*1 N
(160)	06-055007010	(GAAS MMIC SPDT SW HWS-314	HEXAWAVE	SOT-363)	*2 N
(160)S:	06-055006010	(GAAS IC SPDT SW SW-485	SOT-363MACOM	)	*2 N
(160)S:	06-055001010	(GAAS IC PDT SW AS179-92	SC-70ALPHA	)	*2 N
(170)	07-001101010	(SCR DIODE MAC4DLMT4-1	DPACK369AON	)	*1 N
(180)	07-003000110	(TRASIS. PMBS3904,215	SOT23PHILIPS,NPN	)	*1 N
(190)	07-003001110	(TRASIS. PMBS3906,215	SOT-23PHILIPS,PNP	)	*1 N
(200)	07-004090020	(SCHOTTKY B330B	SMBDII 3A/30V	)	*1 N
(210)	07-008502500	(OSC 25 MHZ SMD	TQG/CX104B 50PPM	)	*1 N
(210)S:	07-008702500	(OSC 25MHZ SMD 7*5*1.0mm	FUJICOM/FC0-736B 50PPM	)	*1 N
(220)	07-010822002	(XTAL 20 MHZ SMD	TQG 18PF/10PPM CXA-631	)	*1 N
(220)S:	07-010702001	(XTAL 20.00 MHZ SMD	FUJICOM/FSX-6M/20M 20PF/10PPM)	)	*1 N
(220)S:	07-010232001	(XTAL 20 MHZ SMD 6*3.5mm	TXC/6V20000040 18PF/10PPM	)	*1 N
(230)	07-010802402	(XTAL 24MHZ 49US 20PF/20PPM	SMTTQG/SP024000-202141B	)	*1 N
(240)	07-014160000	(POLYSWITCH miniSMDM160	RAYCHEM 1.6A	##)	*1 N

(240)	S:07-014160010	(POLY SWITCH PSR-24669	RAYCHEM 1.6A	)	*1	N
(250)	09-011120005	(FERRITE BEAD (1206) 120 OHM/2AMAGLAYERSMLB-321611-0120P-N1##)		)	*2	N
(260)	09-012220001	(FERRITE BEAD (0805) 3A	2200HM/100MHZ TDK/MPZ2012S221A)	)	*1	N
(280)	09-013120000	(FERRITE BEAD (0603)200mA	120 OHM/100MHZ MURATA	)	*3	N
(280)	S:09-013120001	(FERRITE BEAD (0603)200mA	1200HM MURATA/BLM11A121S	)	*3	N
(280)	S:09-013120005	(FERRITE BEAD (0603)200mA	1200HM TDK/MMZ1608S121A	)	*3	N
(280)	S:09-013120002	(FERRITE BEAD (0603)200mA	120 OHM MLB-160808-0120B-N3 ##)	)	*3	N
(290)	09-013120400	(FERRITE BEAD(0603)1200HM/400mAMAG LAYERS	##)	)	*7	N
(300)	09-013600015	(FERRITE BEAD(0603)6000HM/200mATDK/MMZ1608S601AT		)	*1	N
(310)	09-01C120102	(FERRITE BEAD SMD(0402)	120 OHM TDK/MMZ1005S121AT000	)	*1	N
(310)	S:09-01C120000	(FERRITE BEAD SMD(0402)	120 OHM TECHSTAR/TB100505U121	)	*1	N
(320)	09-023101000	(INDUCTOR 0.01UH/300mA(0603)	5% ACX HI1608-1B10NJNT	)	*1	N
(330)	09-023271000	(INDUCTOR 27NH 300mA	5% ACX HI1608-1B27NJNT	)	*1	N
(340)	09-02C150000	(INDUCTOR 1.5NH (0402)	TAIYO	)	*2	N
(350)	09-02C200000	(INDUCTOR 2.0NH (0402)	MURATA/LQG15HN2N0S02	)	*2	N
(360)	09-051001311	(TRANSFORMER 10/100MB	DELTA/LF8505	)	*1	N
(370)	09-051024000	(TRANSFORMER 100-TX	DELTA LF8731	)	*1	N
(380)	09-051040004	(TRANSFORMER BALUN(0805)	TDK/HHM1520 2400-2500MHZ	)	*2	N
(390)	09-092090100	(C.M. CHOKE(0805)90 OHM/300MA	MURATA/DLW21HN900SQ2L	)	*2	N
(400)	10-001000000	(RES 0 OHM 1/4W (1206)	5%	)	*3	N
(410)	10-002300000	(RES 0 OHM 1/8W (0805)	JUMP	)	*3	N
(420)	10-003400000	(RES 0 OHM 1/10W (0603)	JUMP	)	*3	N
(430)	10-003401010	(RES 100 OHM 1/10W (0603)	5%	)	*1	N
(440)	10-003401030	(RES 10K OHM 1/10W (0603)	5%	)	*2	N
(450)	10-003401060	(RES 10M OHM 1/10W(0603)	5%	)	*1	N
(460)	10-003401230	(RES 12K OHM 1/10W (0603)	5%	)	*1	N
(470)	10-003402020	(RES 2K OHM 1/10W (0603)	5%	)	*1	N
(480)	10-003403310	(RES 330 OHM 1/10W (0603)	5%	)	*1	N
(500)	10-003407500	(RES 75 OHM 1/10W (0603)	5%	)	*14	N
(510)	10-003411210	(RES 120 OHM 1/10W (0603)	1%	)	*1	N
(520)	10-003413310	(RES 330 OHM 1/10W (0603)	1%	)	*1	N
(530)	10-003414909	(RES 49.9 OHM 1/10W(0603)	1%	)	*4	N
(540)	10-003415600	(RES 56 OHM 1/10W (0603)	1%	)	*1	N
(550)	10-003415610	(RES 560 OHM 1/10W (0603)	1%	)	*1	N
(560)	10-004400000	(RES 0 OHM 1/16W (0402)JUMP		)	*23	N
(570)	10-004401010	(RES 100 OHM 1/16W (0402)	5%	)	*3	N
(580)	10-004401020	(RES 1K OHM 1/16W (0402)	5%	)	*2	N
(590)	10-004401030	(RES 10K OHM 1/16W (0402)	5%	)	*24	N
(600)	10-004401040	(RES 100K OHM 1/16W (0402)	5%	)	*1	N
(610)	10-004401320	(RES 1.3K OHM 1/16W (0402)	5%	)	*1	N
(620)	10-004402000	(RES 20 OHM 1/16W (0402)	5%	)	*2	N
(630)	10-004402220	(RES 2.2K OHM 1/16W (0402)	5%	)	*7	N
(640)	10-004403300	(RES 33 OHM 1/16W (0402)	5%	)	*6	N
(650)	10-004403900	(RES 39 OHM 1/16W (0402)	5%	)	*2	N
(660)	10-004404720	(RES 4.7K OHM 1/16W(0402)	5%	)	*13	N
(670)	10-004411220	(RES 1.2K OHM 1/16W (0402)	1%	)	*1	N
(680)	10-004411337	(RES 13.7K OHM 1/16W (0402)	1%	)	*1	N
(690)	10-004411524	(RES 1.54K OHM 1/16W(0402)	1%	)	*1	N
(700)	10-004411530	(RES 15K OHM 1/16W(0402)	1%	)	*14	N
(710)	10-004412030	(RES 20K OHM 1/16W (0402)	1%	)	*2	N
(720)	10-004412211	(RES 221 OHM 1/16W(0402)	1%	)	*1	N
(730)	10-004412429	(RES 2.49K OHM 1/16W (0402) 1%		)	*1	N
(740)	10-004412827	(RES 2.87K OHM 1/16W (0402)	1%	)	*1	N
(750)	10-004414132	(RES 41.2K OHM 1/16W(0402)	1%	)	*1	N
(760)	10-004414312	(RES 432 OHM 1/16W(0402)	1%	)	*2	N

(770)	10-004418235	(RES 82.5K OHM 1/16W(0402)	1%	) *2 N
(780)	10-063301030	(CHIP RES. ARRAY 10K OHM (0603)4R8P YCN/AB TYPE		) *1 N
(790)	10-063303310	(CHIP RES. ARRAY 330 OHM (0603)4R8P YCN/AB TYPE		) *1 N
(800)	11-031247650	(CAP 47UF/6.3V(1206)X5R(476)	TDK/C3216X5R0J476MT000N	) *2 N
(810)	11-015000100	(CAP TAN 10U/16V (3528)	SMD	) *1 N
(820)	11-015247650	(CAP TAN 47U/6.3V (3528)	NEC ± 20%	) *1 N
(830)	11-01D122610	(CAP TAN 22U/16V (3528/D) 10%	AVX/TAJB226K016R	) *1 N
(830)S:	11-01D122612	(CAP TAN 22U/16V (3528/B) 10%	SPRAGUE/293D226X9016B2T	) *1 N
(840)	11-031110100	(CAP 100PF/3KV (1808) NPO (101)# pls use 11-031110110		) *4 N
(840)S:	11-031110110	(CAP 100P/3KV (1808) NPO (101)10% HEC		) *4 N
(850)	11-031110210	(CAP 1000P/3KV (1808) X7R (102)10%HEC		) *1 N
(860)	11-031222650	(CAP 22UF/6.3V (1206) X5R (226)20% TAIYO/JMK316BJ226ML-T		) *2 N
(860)S:	11-031222656	(CAP 22UF/6.3V (1206) X5R (226)20% TDK/C3216X5R0J226MT		) *2 N
(860)S:	11-031222657	(CAP 22UF/6.3V (1206) X5R (226)20%MURATA/GRM42-6X5R226M6.3		) *2 N
(860)S:	11-031222658	(CAP 22UF/6.3V (1206) X5R (226)20% AVX/CM316X5R226M06AT		) *2 N
(870)	11-032110652	(CAP 10UF/6.3V (0805)X5R 10%	MURATA/GRM21BR60J106K	) *12 N
(880)	11-032247550	(CAP 4.7U/6.3V(0805) X5R (475) 20%	TAIYO/JMK212BJ475MG	) *1 N
(890)	11-033110200	(CAP 1000PF/50V (0603)X7R (102) 10%		) *1 N
(900)	11-033110300	(CAP 0.01UF/50V (0603)X7R (103) 10%		) *1 N
(910)	11-033110500	(CAP 1UF/6.3V (0603) X5R (105) 10%	TDK/C1608JB0J105KT000N	) *7 N
(920)	11-033112340	(CAP 0.012UF/50V(0603)X7R (123) 10%		) *1 N
(930)	11-033122550	(CAP 2.2UF/6.3V(0603) X5R (225)10% AVX		) *1 N
(940)	11-033147300	(CAP 0.047UF/16V (0603)X7R(473) 10%		) *1 N
(950)	11-033322550	(CAP 2.2UF/6.3V(0603) Y5V (225)+80%-20% TAIYO/JMK107F225Z		) *5 N
(960)	11-033410400	(CAP 0.1UF/25V (0603) Y5V (104)+80%-20%		) *20 N
(970)	11-034012041	(CAP 12PF/50V (0402) NPO 5%	TAIYO/UMK105CH120JW-F	) *1 N
(980)	11-034012121	(CAP 120PF/50V (0402) NPO 5%	TAIYO/UMK105CH121JW	) *2 N
(990)	11-034015141	(CAP 150PF/50V (0402) NPO (151)5%	TAIYO/UMK105SL151JW-F	) *2 N
(1000)	11-034020040	(CAP 20PF/50V (0402) NPO 5%		) *2 N
(1010)	11-034022041	(CAP 22PF/50V (0402) NPO 5%	TAIYO	) *13 N
(1020)	11-034033041	(CAP 33PF/50V (0402) NPO 5%	TAIYO/UMK105CH330JW-F	) *4 N
(1030)	11-034036040	(CAP 36PF/50V (0402) NPO 5%	MURATA/GRP1555C1H36C	) *2 N
(1040)	11-034110241	(CAP 1000PF/50V (0402)X7R (102)10%	TAIYO/UMK105BJ102KV-F	) *4 N
(1050)	11-034110311	(CAP 0.01U/16V (0402) X7R(103) 10%	TAIYO	) *30 N
(1060)	11-034110461	(CAP 0.1UF/10V (0402) X5R (104)10%	TAIYO	) *61 N
(1070)	11-034127240	(CAP 2700PF/50V (0402) X7R 10%		) *1 N
(1080)	11-034310410	(CAP 0.1UF/16V (0402) Y5V (104)+80%-20%		) *5 N
(1090)	11-034601241	(CAP 1.2PF/50V (0402) NPO 0.25PF	TAIYO	) *1 N
(1100)	11-034602041	(CAP 2PF/50V (0402) NPO 0.25PF	TAIYO	) *1 N
(1110)	11-034606041	(CAP 6PF/50V (0402) NPO 0.5PF/TAIYO	UMK105CH060DW-F	) *1 N
(1120)	11-034606841	(CAP 6.8PF/50V(0402)NPO+-0.25PF	MURATA/GRP1555C1H6R8C	) *1 N
(1130)	11-034607041	(CAP 7PF/50V (0402) NPO 0.25PF	TAIYO/UMK105CH070DW-F	) *1 N
(1140)	11-034610041	(CAP 10PF/50V (0402) NPO 0.5PF	TAIYO	) *6 N
(1150)	10-004416129	(RES 6.19K OHM 1/16W(0402)	1%	) *1 N
(1160)	05-001608711	(FLASH MX29LV320ABTC-90	MXIC 32M-90 TSOP 48	) *1 N
(1160)S:	05-001606110	(FLASH AMD AM29LV320DB90EI	32M-90 TSOP 48P	) *1 N
(1160)S:	05-001614410	(FLASH SAMSUNG K8D3216UBC-YI07	32M-70 TSOP-48	) *1 N
(1170)	06-007336010	(LIN REG. AP1507 T0252-5L	ANACHIP	) *1 N
(1180)	13-10C10M020	(WL-120 BOTTOM SHIELDING BRKT		) *1 N
(1190)	10-004404710	(RES 470 OHM 1/16W (0402)	5%	) *2 N
(1200)	11-034706241	(CAP 6.2PF/50V(0402)NPO+-0.25PF	MURATA/GJ61555C1H6R2CB01	) *3 N
(1210)	09-02C300000	(INDUCTOR 3.0NH (0402)	MURATA/LQG15HN3N0S02	) *1 N
(1220)	10-004405626	(RES 5.6K OHM 1/16W (0402)	5%	) *1 N
(1240)	10-004414909	(RES 49.9 OHM 1/16W(0402)	1%	) *8 N
(1250)	09-013060600	(FERRITE BEAD(0603)60 OHM/300mAMAG.LAYERS/MLB-160808-0060A-N2)		) *1 N

(1260)	11-034701311	(CAP 1.3PF/16V (0402) NPO	0.1PF TAIYO	) *1 N
(30)	59-I3U00A-A03B	(WL-500G.D	R1.33 (EC:IA10613)	) *1 N
(10)	10-004401030	(RES 10K OHM 1/16W (0402)	5%	) *3 N
(20)	10-004402000	(RES 20 OHM 1/16W (0402)	5%	) *2 N
(30)	10-004402220	(RES 2.2K OHM 1/16W (0402)	5%	) *2 N
(40)	11-034110461	(CAP 0.1UF/10V (0402) X5R (104)	10% TAIYO	) *84 N
(60)	10-004414909	(RES 49.9 OHM 1/16W(0402)	1%	) *8 N
(70)	11-034310410	(CAP 0.1UF/16V (0402) Y5V (104)	+80%-20%	) *4 N
(110)	09-020394000	(INDUCTOR 39UH/2.5A DIP	MAG LAYERS/MRT-5052-390M-E	) *1 N
(120)	13-077003000	(HEAT SINK FOR WL-500GX	信緯/2025060SKB00/25*25*6.4	) *1 N

EXHIBIT H

Block Diagram

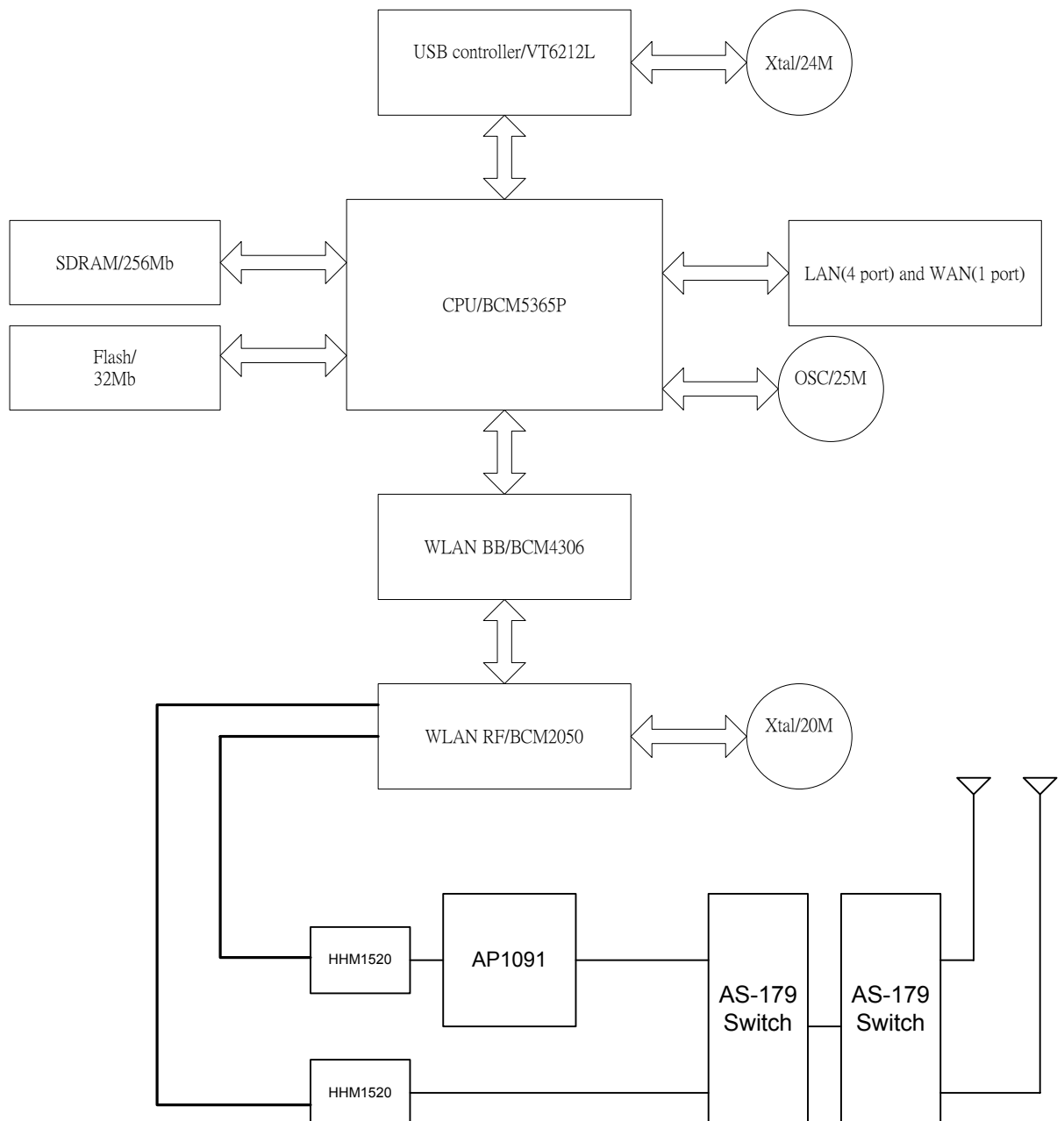


EXHIBIT I

Operational Description

WL-500gx Operational Description :

BROADCOM BCM5364P:

- 200 MHz MIPS32 CPU.
- Five 10BASE-T/100BASE-TX auto-MDIX transceivers.
- Six full-duplex capable Media Access Controllers (MACs).
- High-performance integrated packet buffer memory.
- PCI 2.3 Host interface – Connect high performance 802.11a/b/g wireless and IPSec acceleration or other PCI peripherals
- A non-blocking switch controller.

Flash ROM and SDRAM : Memory resources of CPU.

- Flash memory size is 32Mb. Firmware program is stored in flash ROM.
- SDRAM size is 256Mb. This ram is volatile memory resource for CPU operation.

VIA VT6212 : USB controller

- Compliant with Universal Series Bus (USB) Specification Revision 2.0.
- Compliant with Enhanced Host Controller Interface Specification Revision 1.0.
- Compliant with Universal Host Controller Interface Specification Revision 1.1.
- PCI multi-function device consists of two UHCI Host Controller cores for full/low speed signaling and one EHCI Host Controller core for high speed signaling.
- Root hub comprises 4 downstream facing ports with integrated physical layer transceivers shared by UHCI and EHCI Host Controllers.

BCM4306 : 802.11g MAC/Baseband.

- Supports data rate of 1Mbps, 2Mbps, 5.5 Mbps and 11Mbps for b mode and 6Mbps, 9Mbps, 12Mbps, 18Mbps, 24Mbps, 36Mbps, 48Mbps, 54Mbps for g mode,
- Supports Wire Equivalence Privacy (WEP), WEP2 and AES encryption, coupled with TKIP and IEEE 802.11x support.
- Complete DSSS and OFDM baseband processor.
- Supporting Differential Binary Phase Shift Keying (DBPSK), Differential Quadrature Phase Shift Keying (DQPSK) and Complementary Code Keying (CCK), 16QAM and 64QAM.

Data Rate (Mbps)	1	2	5.5	11
Modulation	DBPSK	DQPSK	CCK	CCK

Data Rate (Mbps)	6	9	12	18	24	36	48	54
Modulation	BPSK		QPSK		16QAM		64QAM	

- Transmitter operation : Digital data from MAC layer is modulated to produce analog I/Q baseband signal for transmission. When MAC asserts begin of transmission, bcm4306 generate preamble and header itself. After combining with data sent from MAC, all of the data, depends on different data rate, are modulated by the modulation scheme listed above. The modulated data pass through a digital LPF. At last, a on-chip D/A converter converts digital data to analog data and then outputs balanced differential analog signals TXI \pm , TXQ \pm
- Reception operation : Received analog I/Q baseband signal is demodulated into digital data and sent to MAC layer. Baseband spectrum occupies 0~11MHz, for any of the above modulation or data rate.
- A 20MHz oscillator provides operating clock.

EEPROM : Memory resources of CPU.

- EEPROM is nonvolatile memory. Firmware program is stored in flash ROM.

Bcm2050 : Direct conversion transceiver IC.

- Integrating all direct conversion transmit and receive functions.
- Integrating baseband transmission and reception AGC.
- Integrating a receiver DC offset calibration loop.
- Baseband I/Q signals are combined and converted to RF (Radio Frequency). Radio center frequency is within ISM band; the exact operating channel depends on channel specified. Bandwidth is about 22MHz. RF signal is sent to or from a balun. For transmission path, the signal is amplified by a power amplifier and then fed into T/R switch. For receive. RF signal is down converted to baseband IQ signals. Baseband I/Q signals are fed from or to the baseband processor, BCM4306.
- An on chip frequency synthesizer is used to generate the Local Oscillator frequency required by the up-down mixer. The 20MHz oscillator provides the reference frequency required by the frequency synthesizer.

MMPA742G : power amplifier for transmission.

EXHIBIT J

Photographs of EUT

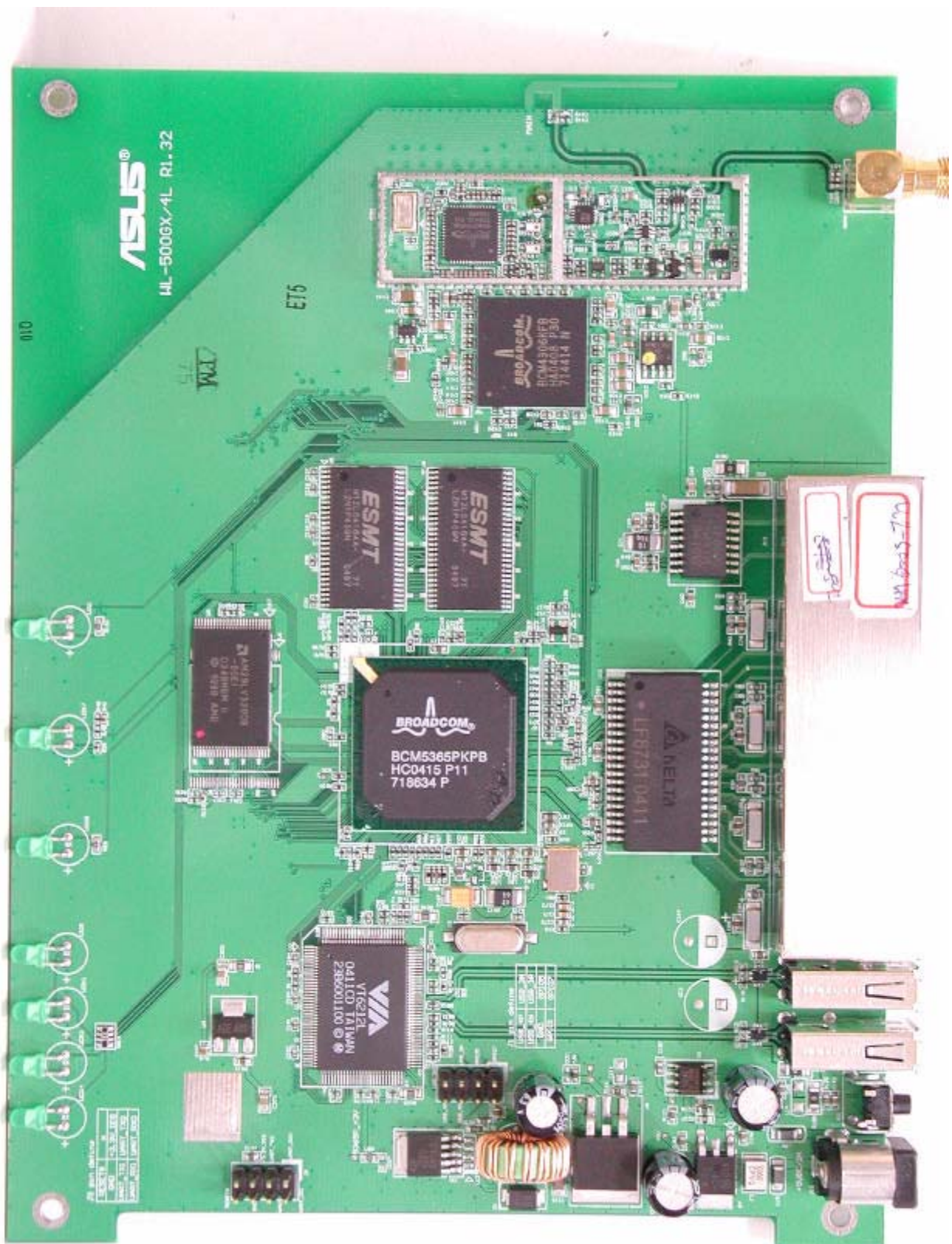


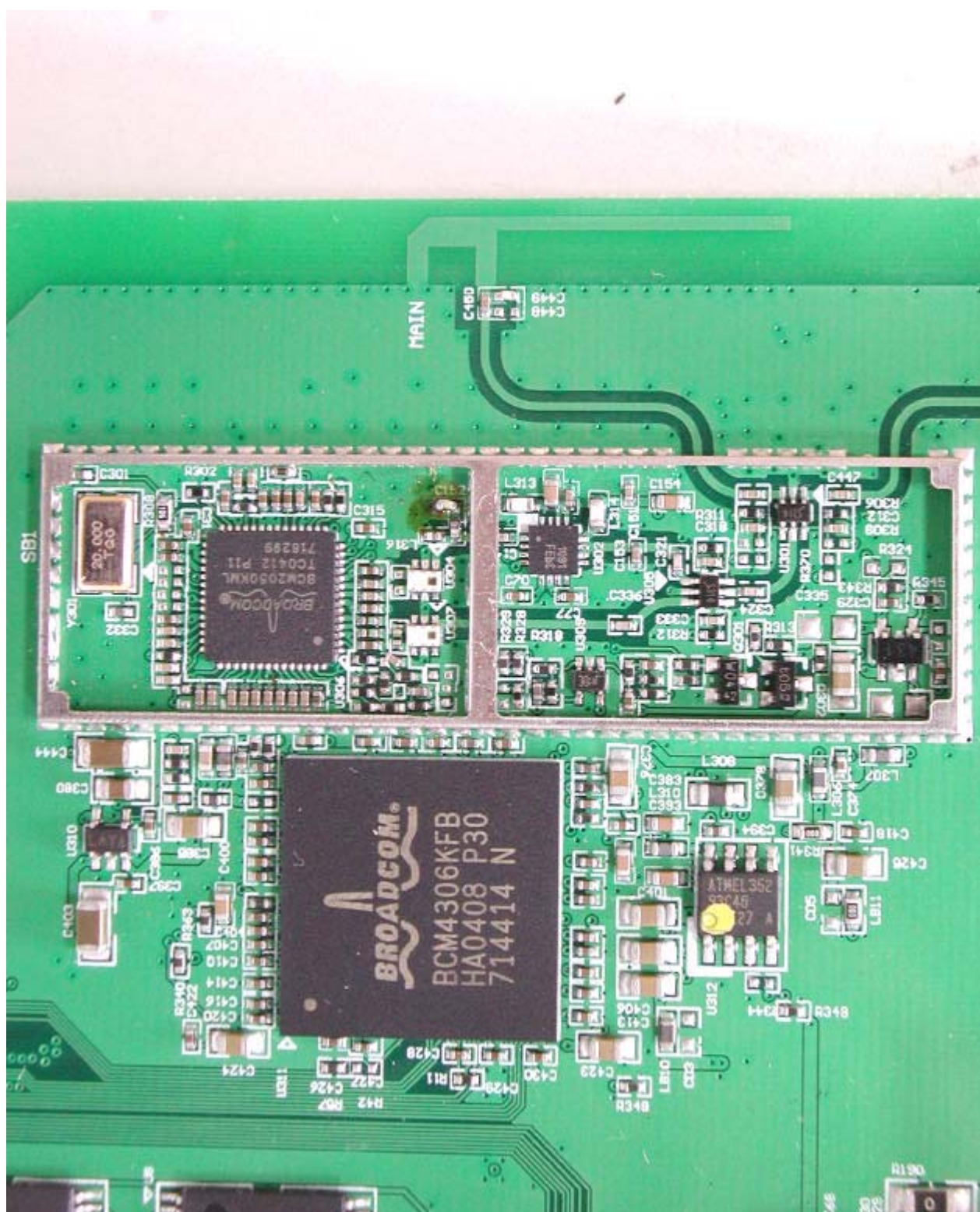












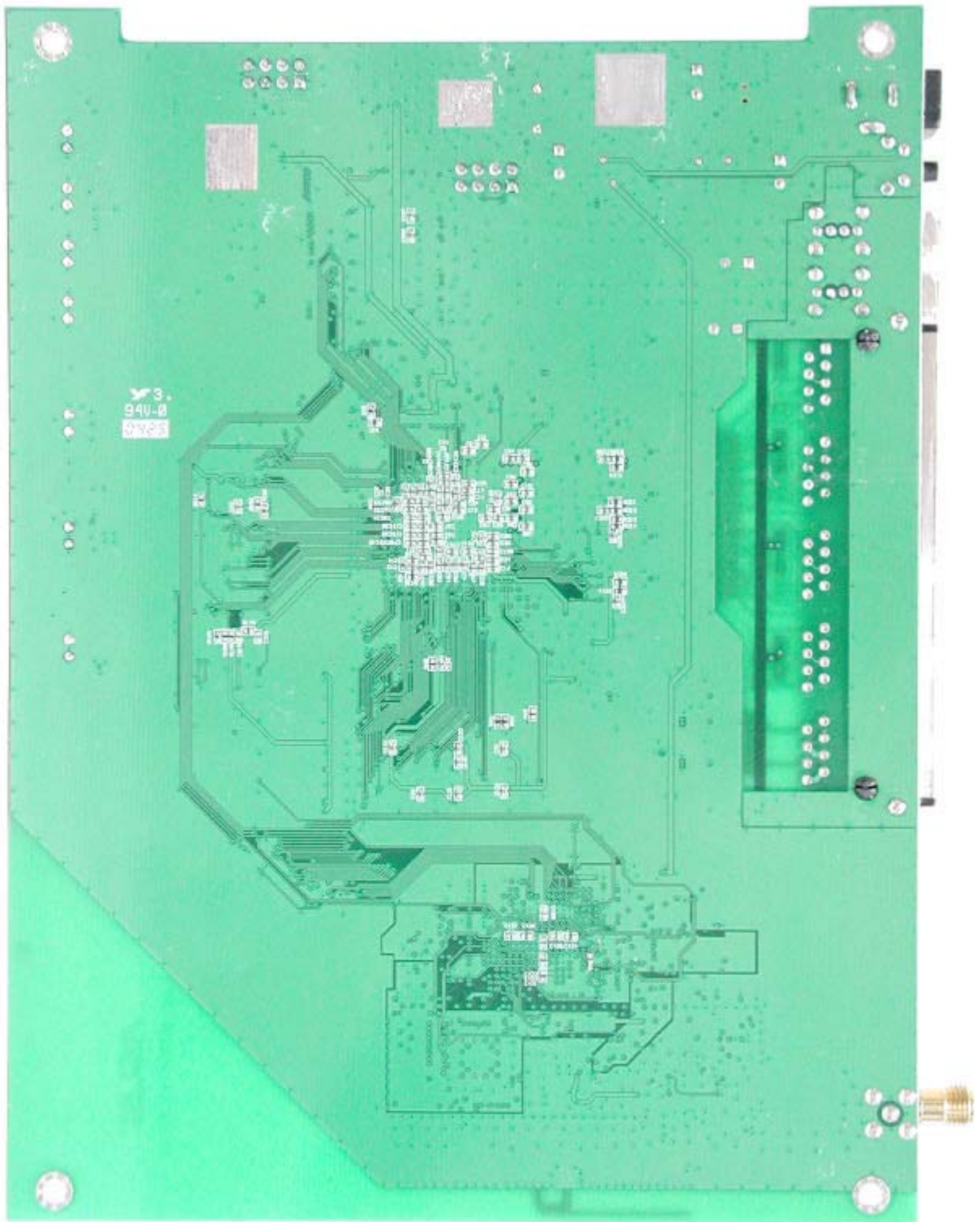


EXHIBIT K

RF Exposure Calculations

Measurement of Maximum Permissible Exposure

1. Foreword

In adopt with the Human Exposure IEEE C95.1, and according to the FCC 1.1310. The *Maximum Permissible Exposure (MPE)* is obligated to measure in order to prove the safety of radiation harmfulness to the human body.

The *Gain* of the antenna used is measured in an *Anechoic chamber*. The *maximum total power to the antenna* is to be recorded. By adopting the ***Friis Transmission Formula*** and the *power gain of the antenna*, we can find the distance right away from the product, where the limit of the MPE is.

2. Description of EUT

FCC ID	:	MSQWL500GD
Product name	:	Wireless Router
Model	:	WL-500G Deluxe
Classification	:	Mobile Device
		(i) Under normal use condition, the antenna is at least 20cm away from the user;
		(ii) Warning statement for keeping 20cm separation distance and the prohibition of operating next to the person has been printed in the user's manual
Frequency Range	:	2.412 GHz ~ 2.462GHz
Supported Channel	:	11 Channels
Modulation Skill	:	DBPSK, DQPSK, CCK, OFDM
Power Type	:	Powered by the Switching adapter, Mfg.: DVE Model: DSA-0101F-05 A I/P: 100-240VAC, 50/60Hz, 0.3A, 30VA O/P: +5VDC, 2.0A

3. Limits for Maximum Permissible Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time |E|², |H|² or S (minutes)
(A) Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	100	6
3.0-30	1842/f	4.89/f	900/f ²	6
30-300	61.4	0.163	1.0	6
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	100	30
1.34-30	824/f	2.19/f	180/f ²	30
30-300	27.5	0.073	0.2	30
300-1500	--	--	f/1500	30
1500-100,000	--	--	1.0	30

[The EUT is tested in transmit and receive modes and in the first, middle and the last channel separately. The following shows only our observation have the greatest emissions.]

According to OET BULLETIN 56 Fourth Edition/August 1999, Equation for Predicting RF Fields:

$$\text{Friis Transmission Formula: } S = \frac{PG}{4\pi R^2} = \frac{113.5011 \times 1.5136}{4\pi (20)^2} = 0.0342 \text{ mW/cm}^2$$

$$\text{Estimated safe separation: } R = \sqrt{\frac{PG}{4\pi}} = \sqrt{\frac{113.501 \times 1.5136}{4\pi}} = 3.697 \text{ cm}$$

Remarks: "The safe estimated separation that the user must maintain from the antenna is at least 3.697 cm."

Where: S = power density (in appropriate units, e.g. mW/cm²)

P = power input to the antenna (in appropriate units, e.g., mW)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

The Numeric gain G of antenna with a gain specified in dB is determined by:

$$G = \text{Log}^{-1} (\text{dB antenna gain} / 10)$$

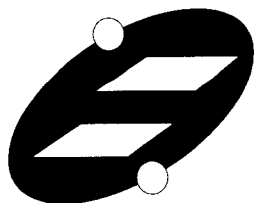
$$G = \text{Log}^{-1} (1.8 / 10) = 1.5136$$

Applicant: ASUSTeK Computer Inc. FCC ID: MSQWL500GD

Training Research Co., Ltd., TEL: 886-2-26935155, Fax: 886-2-26934440

Appendix

Antenna Specification



WHA YU INDUSTRIAL CO., LTD. (HEAD OFFICE)
TAI HWA ELECTRONIC CO., LTD.(CHINA)
SHANGHAI HUA YU ELECTRONIC CO., LTD.(CHINA)
AEON TECH CO., LTD. (CHINA)

SPECIFICATION FOR APPROVAL

CUSTOMER: 華碩科技股份有限公司

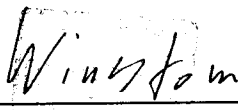
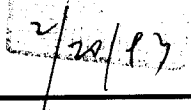
PART NAME: RF Antenna Assembly

PART NO.:

REVISION:

W. Y. P/NO.: C660-510003-A

REV.: X1

	MANUFACTURER SIGNATURE	CUSTOMER SIGNATURE
APPROVED BY :		
DATE :		

WHA YU GROUP

WHA YU INDUSTRIAL CO., LTD.(HEAD OFFICE)

譚裕實業股份有限公司

Address: #70 Shui Li Road, Hsin Chu City, Taiwan, R.O.C.

Tel: +886-3-5714225(REP.)

Fax: + 886-3-5713853 · + 886-3-5723600

TAI HWA ELECTRONIC CO., LTD. (CHINA)

台樺電業製品廠

Address: Pak Ho District, Hui Street Town, Dong Guan City, Guangdong, China

Tel: + 86-769-5599375 · + 86-769-5912375

Fax: + 86-769-5599376

HUA HONG INTERNATIONAL LTD.

華弘國際有限公司

Rm.1103A, President Commercial Centre, 608 Nathan Road, Mong Kok, Kowloon, Hong Kong

Tel: + 86-852-27712210

Fax: + 86-852-23843747

SHANGHAI HUA YU ELECTRONIC CO., LTD. (CHINA)

上海譚裕電子有限公司

Address: 3586, Wai Qing Song Road, Qing Pu County, Shanghai China

Tel: + 86-21-59741348 · + 86-21-59744101~4

Fax: + 86-21-59741347

SU ZHOU AEON TECH CO., LTD. (CHINA)

蘇州華廣電通有限公司

Address: Limin North Road, LiLi Town, LiLi Industrial Park, LinHu Economic Zone

Wujiang City, Jiangsu Province, China

Tel: + 86-512-63627980

Fax: + 86-512-63627981

INDEX

<i>Item</i>	<i>Content</i>	<i>Page</i>
1.	天線規格表	..... 1
2.	成品圖	..... 2
3.	測試報告	..... 3~5
4.	Cable 規格	..... 6~10
5.	天線桿套材質特性	..... 11~17
6.	天線固定座材質特性	..... 18
7.	膠水特性及黏著力	..... 19~23
8.	天線彎折力測試	..... 24

RF Antenna Cable Assembly

Specification

1. Electrical Properties :

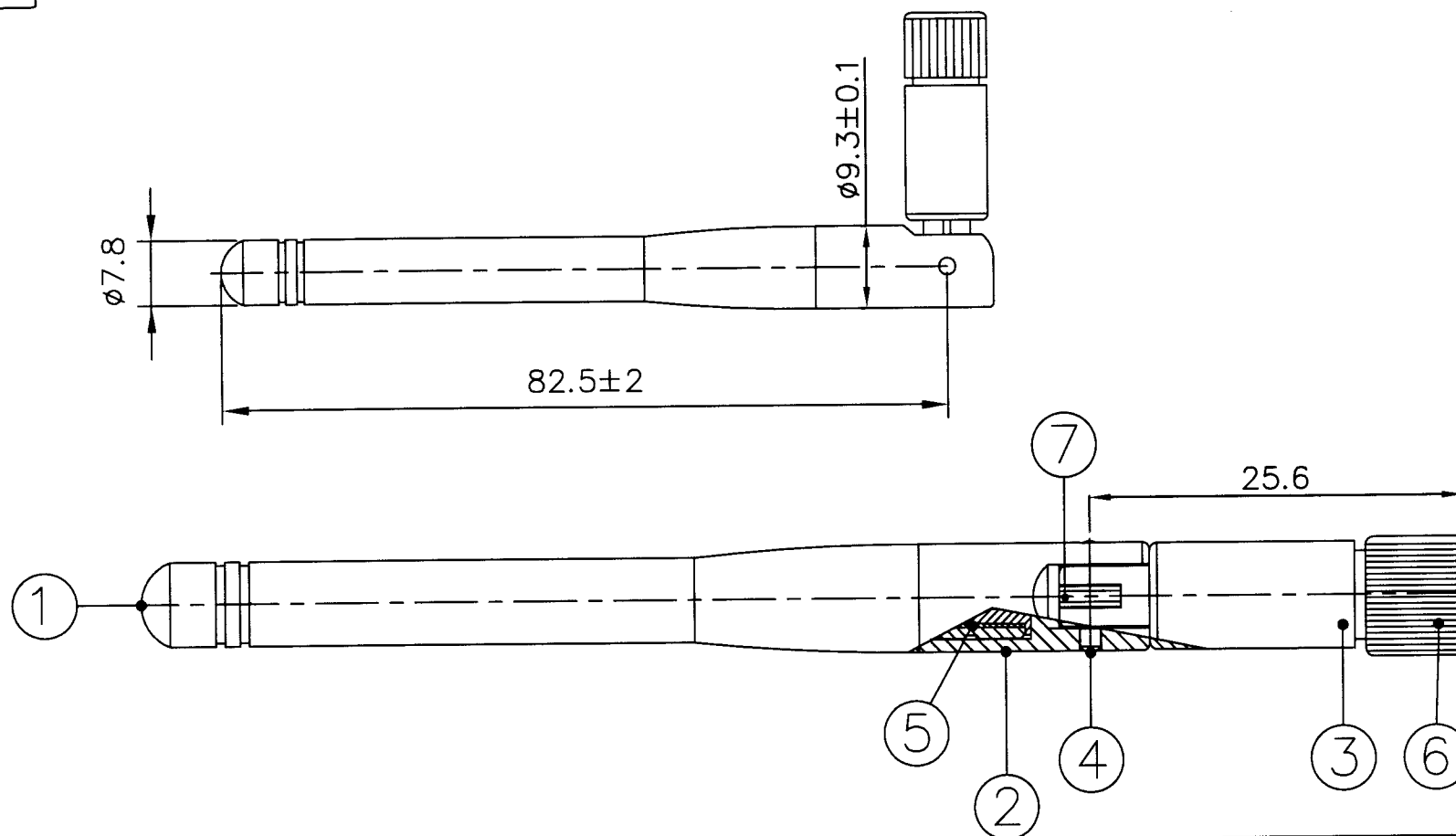
- 1.1 Frequency Rang..... 2.4GHz ~ 2.5GHz
- 1.2 Impedance 50Ω Nominal
- 1.3 VSWR 1.92 Max.
- 1.4 Return Loss..... -10dB Maximum
- 1.5 Electrical Wave..... $1/2 \lambda$ Diople
- 1.6 Gain..... 1.8 dBi
- 1.7 Admitted Power..... 1W

2. Physical Properties :

- 2.1 Cable..... RG-178 Cable
- 2.2 Antenna Cover..... TPE
- 2.3 Antenna Base..... PC
- 2.4 Operating Temp. -20°C ~ +65°C
- 2.5 Storage Temp. -30°C ~ +75°C
- 2.6 Color Black
- 2.7 Connector..... SMA Plug Reverse

CG-

REV	DATE	DESCRIPTION
X1	02/19-2004	New Issue



NO	DESCRIPTION	QTY	REMARK
7	Cable	RG-178, Translucent Brown; 50 Ω	1
6	Connector	SMA Straight Plug/Reverse	1
5	Ground Tube	Brass, Ni plated	1
4	Rivet	Brass, Black Surfaced	2
3	Antenna Base	PC; Color:Black	1
2	Antenna Base	PC; Color:Black	1
1	Antenna Cover	TPE; Color:Black	1

CUSTOMER'S SIGNATURE

XX	±3.0	APPROVED
X	±2.0	Winston 7/22
X	±1.0	CHECKED
XX	±0.5	
XXX	±0.1	DRAWING
		Jane

CUSTOMER: 華碩科技股份有限公司

PART NO :

PARTNAME: RF Antenna Cable Assembly

W.Y P/NO : C660-510003-A

REV UNIT FILE :

X1 mm SHEET: 1/1

Wha Yu
INDUSTRIAL CO.,LTD.

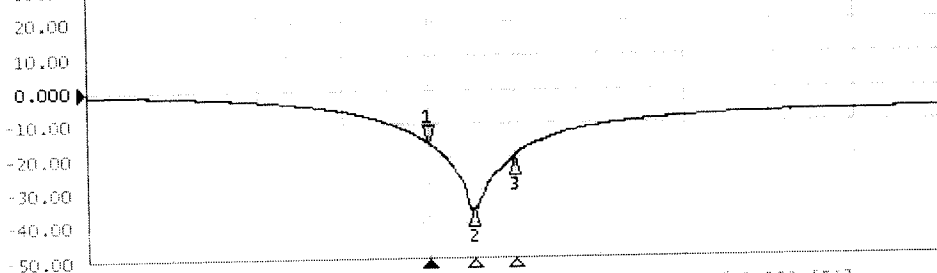
華裕實業股份有限公司

THIS DRAWING, AND ITS INHERANT DESIGN CONCEPTS,
ARE THE PROPERTY OF WHA YU AND AS SUCH MAY NOT
BE COPIED, REPRODUCED, OR GIVEN TO THIRD PARTIES
WITHOUT THE WRITTEN CONSENT OF WHA YU.

1 Active Ch/Trace 2 Response 3 Stimulus 4 Mkr/Analysis 5 Instr State

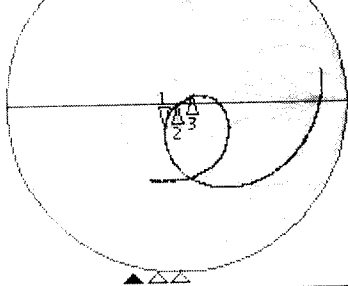
Tr1 S22 Log Mag 10.00dB/ Ref 0.000dB [F2]

>1	2.400000000 GHz	-16.090 dB
2	2.452538631 GHz	-35.359 dB
3	2.500000000 GHz	-20.158 dB

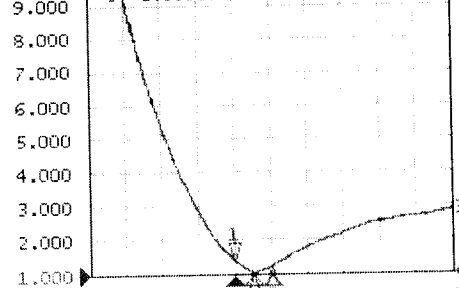


Tr2 S22 Smith (R+jX) Scale 1.000U [F2] Tr3 S22 SWR 1.000/ Ref 1.000 [F2]

>1	2.400000000 GHz	42.077 Ω	-12.227 Ω
2	2.452538631 GHz <th>50.931 Ω</th> <th>-1.4473 Ω</th>	50.931 Ω	-1.4473 Ω
3	2.500000000 GHz <th>59.722 Ω</th> <th>4.6662 Ω</th>	59.722 Ω	4.6662 Ω



>1	2.400000000 GHz	1.3721
2	2.452538631 GHz	1.0347
3	2.500000000 GHz	1.2178



1 Start 2 GHz

IFBW 70 kHz

Stop 3 GHz PExt Cor

Meas

Stop

ExtRef

Ready

Svc

2004-02-19 15:59

Display

Data -> Mem

Edit Title Label

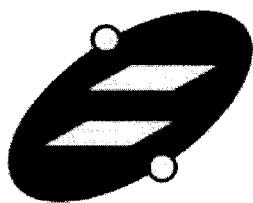
Title Label
OFF

Graticule Label
ON

Frequency
ON

Update
ON

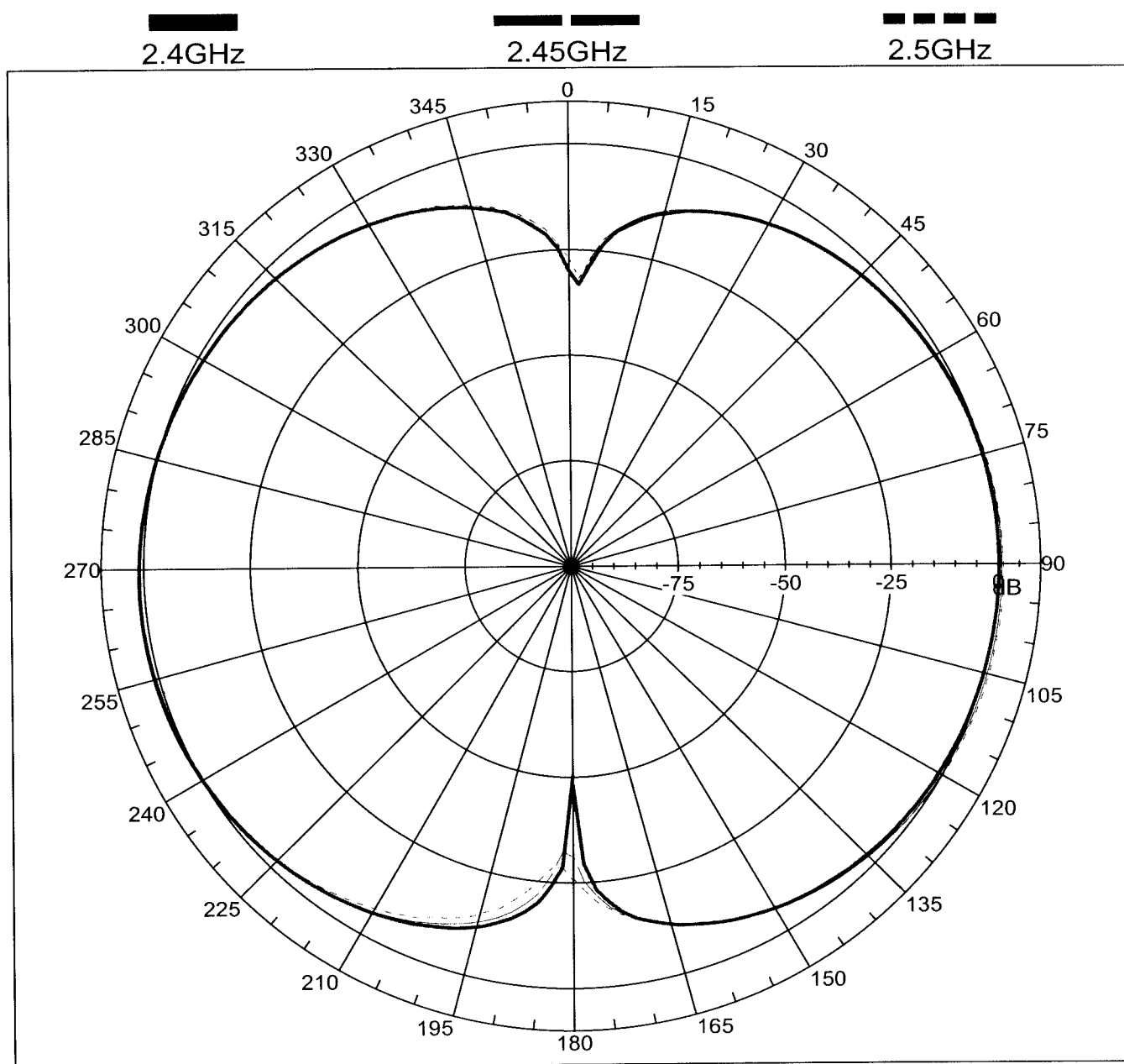
Return

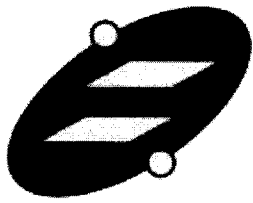


譚裕實業股份有限公司

WHA YU INDUSTRIAL CO., LTD

Far-field amplitude of 2.4GHz small dipole antenna-E-plane.nsi

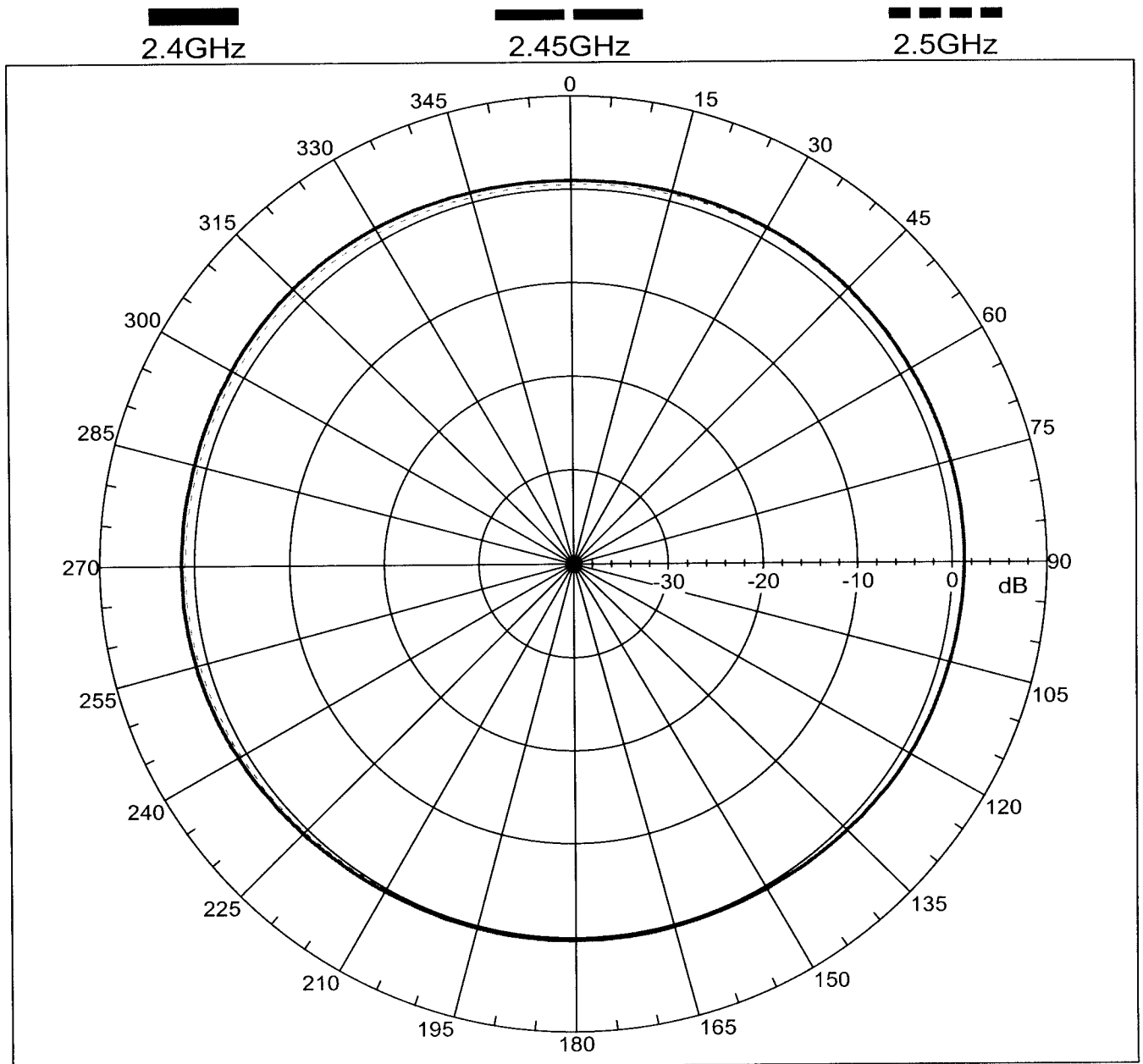




譚裕實業股份有限公司

WHA YU INDUSTRIAL CO., LTD

Far-field amplitude of 2.4GHz small dipole antenna-H-plane.nsi



Cable Specification

Cable : Mil-C-17 Coaxial Cable RG-178

1. Construction :

- 1 Conductor..... 30AWG 7/38 SCCS
- 2 Dielectric..... PTFE OD : 0.033"±0.002"
- 3 Shielded.....38AWG SPC OD : 0.051" Nominal
- 4 Jacket.....FEP OD : 0.071"±0.004"

2. Physical Properties :

- 1 Weight per 1000ft..... 6.3 lbs Maximum
- 2 Bend Radius.....0.35" Minimum
- 3 Operating Temperature Range -55°C ~ 200°C

3. Electrical Properties:

- 1 Impedance..... 50±2 ohms
- 2 Capacitance..... 32 pF/ft Maximum
- 3 Cut off Frequency..... 116 GHz
- 4 Attenuation.....45.0 dB/100ft @ 1GHz
64.4 dB/100ft @ 2GHz
79.7 dB/100ft @ 3GHz
92.7 dB/100ft @ 4GHz
104.3 dB/100ft @ 5GHz
115.0 dB/100ft @ 6GHz

Mil-C-17 Coaxial Cable

QPL Approved

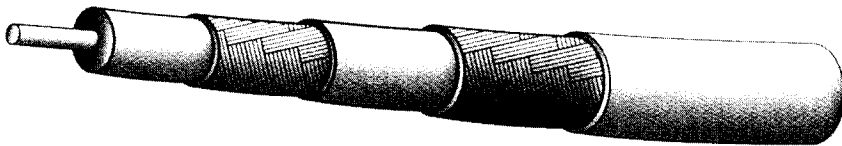
Single braid



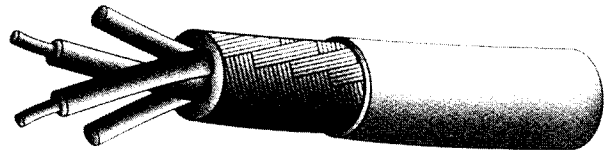
Double braid



Triax



Twinax



Harbour supplies a complete line of high temperature, high performance QPL approved MIL-C-17 coax cables for the military, commercial and industrial applications. The specific M17 constructions referenced are manufactured in accordance with the most recent revision of the MIL-C-17 specification. The MIL-C-17 specification defines complete physical and electrical characteristics for each M17 part number, including dimensional parameters, dielectric materials, shield construction, maximum attenuation, and VSWR levels.

▼ *VSWR Sweep Testing*

When selecting a 50 ohm coaxial cable, constructions with VSWR requirements are recommended. Manufacturing and sweep testing cables with concern for VSWR ensures a quality cable free of spikes over the referenced frequency range. (Note the test frequencies specified in the electrical characteristics section.)

Precision PTFE Dielectrics

All of the high temperature, high performance coax cables listed have PTFE dielectrics with high dielectric strength and low capacitance in proportion to the dielectric constant. All PTFE dielectrics are manufactured with tolerances tighter than the MIL-C-17 specification to ensure uniformity of electrical characteristics, especially impedance, attenuation and VSWR.

Tape wrapped PTFE Constructions

Harbour also manufactures PTFE tape wrapped cables to a previous revision of the MIL-C-17 specification. These constructions can withstand operating temperatures up to 250° C. versus 200° C. for FEP jacketed cables. Also, PTFE tape wrapped cables are generally more flexible than their FEP jacketed counterparts.

UL Approvals

All of Harbour's M17 part numbers manufactured to the MIL-C-17 specification may be ordered with UL and FT4 approvals.

Mil-C-17 Coaxial Cables

Physical Characteristics:

M17 Number	Center Conductor	PTFE Dielectric Diameter	Shield	Jacket	Overall Diameter	Minimum Recommended Bend Radius	Operating Temp. (°C)	Weight (lbs./MFT)	Comments
M17/60-RG142	.037" SCCS	.116"	SPC(2)	FEP	.195"	1.0"	-55 +200	43.0	
M17/93-RG178	.0120"(7/.004")SCCS	.033"	SPC	FEP	.071"	0.4"	-55 +200	6.3	
M17/93-00001	.0120"(7/.004")SCCS	.033"	SPC	PFA	.071"	0.4"	-55 +230	6.3	M17/93-RG178 w/extended temp. rat
M17/94-RG179	.0120"(7/.004")SCCS	.063"	SPC	FEP	.100"	0.4"	-55 +200	10.8	
M17/95-RG180	.0120"(7/.004")SCCS	.102"	SPC	FEP	.141"	0.7"	-55 +200	19.8	
M17/110-RG302	.0253"SCCS	.146"	SPC	FEP	.202"	1.0"	-55 +200	40.0	
M17/111-RG303	.037"SCCS	.116"	SPC	FEP	.170"	0.9"	-55 +200	31.0	
M17/112-RG304	.059"SCCS	.185"	SPC(2)	FEP	.280"	1.4"	-55 +200	94.0	
M17/113-RG316	.0201"(7/.0067")SCCS	.060"	SPC	FEP	.098"	0.5"	-55 +200	12.2	
M17/127-RG393	.094"(7/.0312")SC	.285"	SPC(2)	FEP	.390"	2.0"	-55 +200	165.0	
M17/128-RG400	.0384"(19/.008")SC	.116"	SPC(2)	FEP	.195"	1.0"	-55 +200	50.0	
M17/131-RG403	.0120"(7/.004")SCCS	.033"	SPC(2)	FEP(2)	.116"	0.6"	-55 +200	15.0	Triaxial M17/93-RG
M17/152-00001	.0201"(7/.0067")SCCS	.060"	SPC(2)	FEP	.114"	0.6"	-55 +200	18.5	Double shielded M17/113-RG316
M17/158-00001	.037"SCCS	.116"	SPC(2)	FEP	.195"	1.0"	-55 +200	56.0	Unswpt M17/60-RG
M17/169-00001	.0120"(7/.004")SCCS	.033"	SPC	FEP	.071"	0.4"	-55 +200	6.3	Unswpt M17/93-RG
M17/170-00001	.037"SCCS	.116"	SPC	FEP	.170"	0.9"	-55 +200	39.0	Unswpt M17/111-RG
M17/172-00001	.0201"(7/.0067")SCCS	.060"	SPC	FEP	.098"	0.5"	-55 +200	11.5	Unswpt M17/113-RG
M17/174-00001	.094"(7/.0312")SCCS	.285"	SPC(2)	FEP	.390"	2.0"	-55 +200	175.0	Unswpt M17/127-RG
M17/175-00001	.0384"(19/.008")SC	.116"	SPC(2)	FEP	.390"	1.0"	-55 +200	50.0	Unswpt M17/128-RG
M17/176-00002	.0235(19/.005")SPA(2)	.042"	SPA	PFA	.129"	0.6"	-55 +230	18.0	Controlled impedar twinax
PTFE Tape Wrap Jacketed RG Cables									
RG 187 A/U	.0120"(7/.004)SCCS	.063	SPC	PTFE	.100"	0.5"	-55 +250	10.0	Flexible, 250° C. rat
RG 188 A/U	.0201"(7/.0067)SCCS	.060	SPC	PTFE	.100"	0.5"	-55 +250	11.0	Flexible, 250° C. rat
RG 195 A/U	.0120"(7/.004)SCCS	.102	SPC	PTFE	.141"	0.7"	-55 +250	18.0	Flexible, 250° C. rat
RG 196 A/U	.0120"(7/.004)SCCS	.034	SPC	PTFE	.067"	0.4"	-55 +250	6.0	Flexible, 250° C. rat

Electrical Characteristics:

M17 Number	Impedance (ohms)	Capacitance (pF/ft)	Max. Operating Voltage (RMS)	Maximum attenuation (dB/100ft) @						Max Frequency (GHz)
				100 MHz	400 MHz	1 GHz	3 GHz	5 GHz	10 GHz	
M17/60-RG142	50 +/- 2	29.4	1900	5.5	11.7	19.0	35.0	48.0	-	17.4
M17/93-RG178	50 +/- 2	29.4	1000	16.0	33.0	52.0	94.0	-	-	3.0
M17/93-00001	50 +/- 2	29.4	1000	16.0	33.0	52.0	94.0	-	-	3.0
M17/94-RG179	75 +/- 3	19.4	1200	-	21.0	-	-	-	-	-
M17/95-RG180	95 +/- 5	16.4	1500	-	17.0	-	-	-	-	-
M17/110-RG302	75 +/- 3	19.4	2300	-	8.0	-	26.0	-	-	-
M17/111-RG303	50 +/- 2	29.4	1900	3.9	8.0	15.0	28.0	-	-	-
M17/112-RG304	50 +/- 3	29.4	3000	2.7	6.4	11.1	22.0	30.0	-	8.0
M17/113-RG316	50 +/- 2	29.4	1200	11.0	21.0	38.0	58.0	-	-	3.0
M17/127-RG393	50 +/- 2	29.4	2500	2.4	5.0	8.8	18.0	24.6	37.0	11.0
M17/128-RG400	50 +/- 2	29.4	1900	4.5	10.5	17.0	38.0	50.0	78.0	12.4
M17/131-RG403	50 +/- 2	29.4	1000	-	37.0	-	-	-	-	10.0
M17/152-00001	50 +/- 2	29.4	1200	11.5	24.0	40.0	75.0	110.0	170.0	12.4
M17/158-00001	50 +/- 2	29.4	1900	-	9.5	-	-	-	-	-
M17/169-00001	50 +/- 2	29.4	1000	-	29.0	-	-	-	-	-
M17/170-00001	50 +/- 2	29.4	1900	-	8.6	-	-	-	-	-
M17/172-00001	50 +/- 2	29.4	1200	-	21.0	-	-	-	-	-
M17/174-00001	50 +/- 2	29.4	2500	-	5.0	-	-	-	-	-
M17/175-00001	50 +/- 2	29.4	1900	-	10.5	-	-	-	-	-
M17/176-00001	77 +/- 7	19.0	1000	-	-	-	-	-	-	-
PTFE Tape Wrap Jacketed RG Cables										
RG 187 A/U	75 +/- 3	19.4	1200	-	21.0	-	-	-	-	3
RG 188 A/U	50 +/- 2	29.4	1200	11.0	21.0	38.0	58.0	-	-	3
RG 195 A/U	95 +/- 5	15.4	1500	-	17.0	-	-	-	-	3
RG 196 A/U	50 +/- 2	29.4	1000	-	29.0	-	-	-	-	-

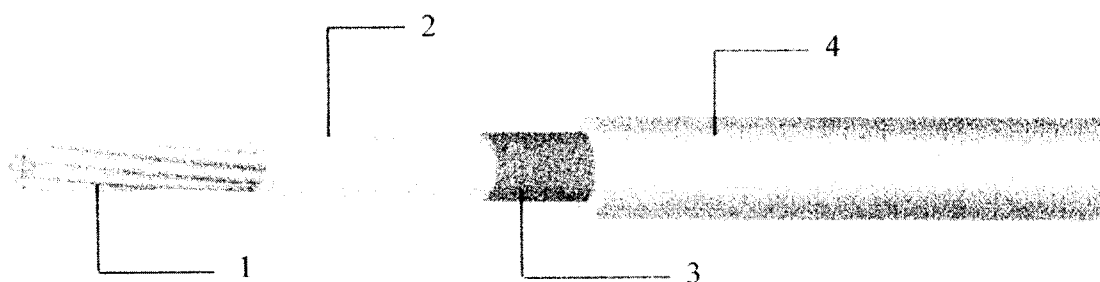
"Maximum frequencies" are those as referenced on individual shunt sheets of the MIL-C-17 specification. No values are given for unswept construction, as the specification recommends these cables should not be used above 400 MHz. (All figures referenced above are nominal unless otherwise specified.)

A3132PS001	FEP INSULATED HIGH-FREQUENCY COAXIAL CABLE	PAGE	1 / 2
PRODUCT STANDARD		ISSUED	21. Oct. 2003
		REVISED	

I - Scope

This specification presents a FEP insulated high-frequency coaxial cable AWG 32, 1.13 mm O.D. for internal wiring of electronic equipment, such as Computer / Notebook with wireless communication systems.

II - Construction



Item		Unit	Details
1. Inner Conductor	Material	—	Silver coated copper
	Composition	No./mm	AWG 32 or 7 × 0.08
	Dia. (approx.)	mm	0.24
2. Dielectric	Material	—	Extruded FEP
	Thickness	mm	0.22
	Nom. O.D.	mm	0.68 ± 0.02
	Color	—	Natural
3. Outer Conductor	Material	—	Silver coated copper
	Composition	—	Braided (16 / 4 / 0.05)
	Dia. (approx.)	mm	0.90 ± 0.03
4. Jacket	Material	—	Extruded FEP
	Thickness	mm	0.10
	Dia.	mm	1.13 + 0.05 / -0.08
	Color	—	Standard colors are Light Grey, Black, Dark Grey

Note :

MADE BY

APPROVALS

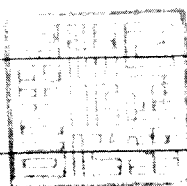
Shen Bin Chao

A3132PS001	FEP INSULATED HIGH-FREQUENCY COAXIAL CABLE	PAGE	2 / 2
PRODUCT STANDARD		ISSUED	21. Oct. 2003
		REVISED	

III – Characteristics

Item	Unit	Specified Value	Note
Temperature Rating	°C	200	
Voltage Lasting	V	250	
Dielectric strength	—	Dielectric core: No breakdown at AC 1.5 kV for 0.15 sec.	Spark test
		Jacket: No breakdown at AC 1.5 kV for 0.15 sec.	Spark test
		No breakdown at AC 500V for 1 min.	Outer conductor to inner conductor
Inner conductor resistance	Ω / km	525	at 20°C
Insulation resistance	$\text{M}\Omega / \text{km}$	Min. 1500	at 20°C
Characteristic Impedance	Ω	50 ± 2	TDR method
Capacitance	pF / m	98	at 1 kHz
Attenuation. (nom.)	dB / m	2.0	1.0 GHz
		2.9	2.0 GHz
		3.6	3.0 GHz
		4.2	4.0 GHz
		4.7	5.0 GHz
		5.2	6.0 GHz
Approx. Weight	g / m	3.15	

Note :


 MADE BY
APPROVALS

Shen Bin Chao

天線桿套材質特性表



Units Einheiten Unites	EM400	EM460	EL550	EL630	EL740	PL380
	1.12	1.16	1.20	1.23	1.27	1.18
°C	195	185	202	212	221	197
μ m/m.k	220	160	180	140	110	150
°C	\	\	110	115	120	\
°C	130	150	180	200	200	145
°C	\	50	85	115	150	\
%	0.30	0.30	0.20	0.20	0.15	0.40
%	0.75	0.70	0.55	0.60	0.90	7.0
*	HB	HB	HB	HB	HB	HB
Mpa	55	110	220	375	900	60
Mpa	4.0	7.1	13.2	20.2	26.9	3.5
Mpa	5.4	9.0	15.7	23	22.6	5.2
Mpa	8.4	11.4	16.6	22.0	26.3	8.5
Mpa	17	21	32	40	45	16
%	700	800	600	600	360	450
kJ/m ²	NB	NB	NB	NB	NB	NB
kJ/m ²	NB	NB	NB	NB	200	NB
kJ/m ²	NB	NB	NB	NB	9	NB
kJ/m ²	NB	NB	20	4	4	NB
	38	45	55	63	74	38
MV/m	\	\	\	\	\	\
Ω .cm	5×10^{14}	10^{14}	10^{14}	10^{14}	10^{12}	10^{12}
Ω	$>10^{13}$	$>10^{14}$	$>10^{14}$	$>10^{14}$	$>10^{10}$	$>10^{13}$
\	4.1	\	\	3.8	\	4.7
\	4.0	4.4	4.0	3.4	3.3	4.4
$\times 10^{14}$	10	\	\	3.8	\	310
$\times 10^{14}$	170	350	400	350	300	350
\	800	800	600	600	600	800
\	600	600	600	800	800	600

Arnitel

2.2 Product coding

The structure of the Arnitel productcodes is illustrated with the following example:

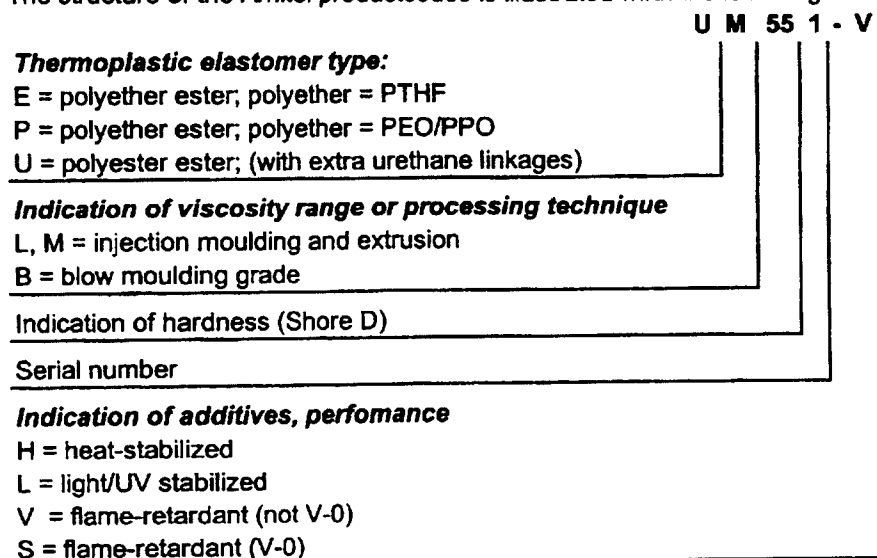


Figure 2.2: Arnitel product coding

2.3 Product portfolio

The Arnitel productrange is available with a hardness from 38 to 74 Shore D. The general Arnitel grades are shown in table 2.2. In order to enhance the flexibility of the portfolio a set of masterbatches (a.o. for heat, UV, etc) are on offer (refer to § 2.4).

Because of the development of these masterbatches heat stabilised Arnitel P is suggested for application areas where thermo-oxidative stability is an issue. For applications where colour and UV stability is required, the Arnitel E range is advised.

	Shore D					
	38	40	46	55	63	74
Arnitel E		EM400	EM460	EL550 EM550	EL630 EM630	EL740 EM740
Arnitel P	PL380		PL460	PL580 PM581		
Arnitel U				UM551 UM551-V UM552 UM552-V	UM622	

Table 2.2: Arnitel productrange for general purpose

Besides these multi-purpose grades, specialty grades can be offered for specific purposes and/or application areas. These grades are not intended for regular sales and are therefore restricted. Permission from marketing is needed before sampling is initiated.

	Arnitel E	Arnitel P	Arnitel U
Automotive			
• CVJ boots	EB460 EB463 EB464		
• Boyplugs		PL380-M0	
Extrusion			
• Roofing foil	EM402-L		

Table 2.3: Examples of specialty grades

Arnitel® EL630/EM630

2.8.31 General:

Arnitel is the brand name of a series polyester based thermoplastic elastomers. These polymers combine excellent processability with good elastomeric properties between -40 and 200°C. Arnitel EL630 and EM630 are excellent materials for injection moulding and extrusion applications respectively. The chemical structure of Arnitel EL630/EM630 is shown below.

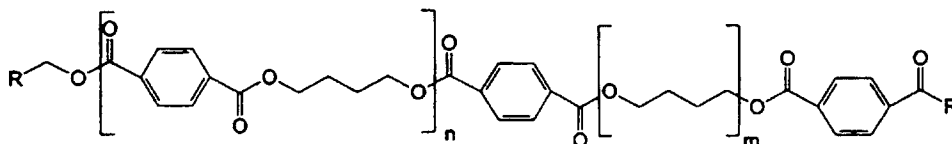


Figure 2.9: Chemical structure of Arnitel EL630/EM630.

Another way of writing the structure of Arnitels is shown below in Figure 2.



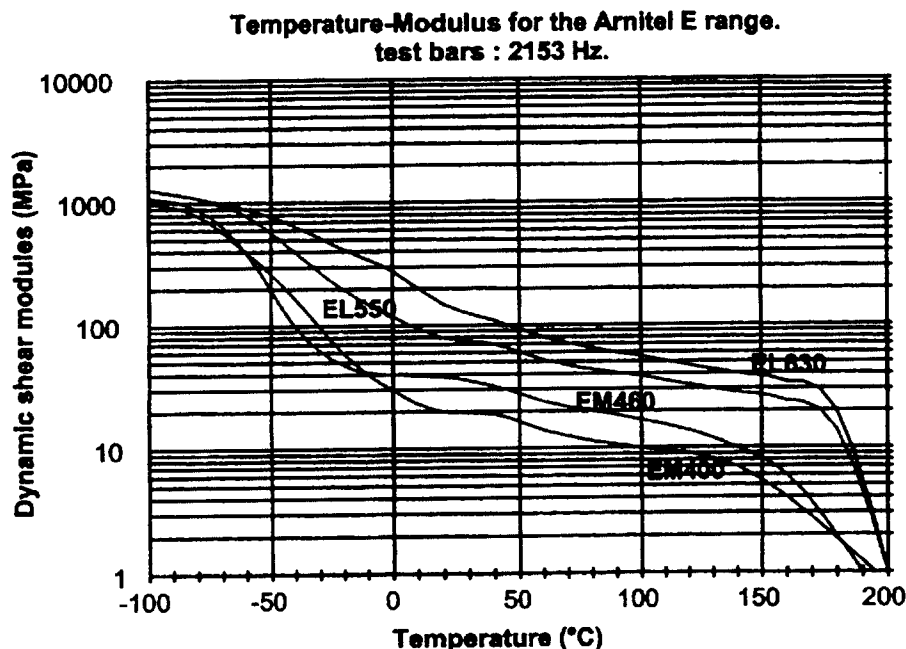
Figure 2.10: Simplified structure of Arnitel EL630/EM630.

Arnitel EL630/EM630 is TOSCA registered (including DSL-Canada) under CAS 37282-12-5

2.8.32 Thermal properties:

• Modulus-temperature behaviour:

The materials have a glass transition at circa -40°C and a typical melting point at 213°C. The modulus-temperature behaviour is shown in graph 2.76, for comparison, accompanied by other Arnitel E types.



Graph 2.76: Modulus-temperature behaviour of Arnitel EL630/EM630.

Arnitel® EL630/EM630

Although information on performance at higher temperatures may be extracted from the above shown graph, a Vicat or HDT are shown in table 2.29.

analysis	SI unit	typical data	test method
Vicat A	(°C)	200	ISO 306/A
Vicat B	(°C)	125	ISO 306/B
HDT-B	(°C)	115	ISO 75-1

Table 2.29: Vicat and HDT data on Arnitel® EL630 and EM630

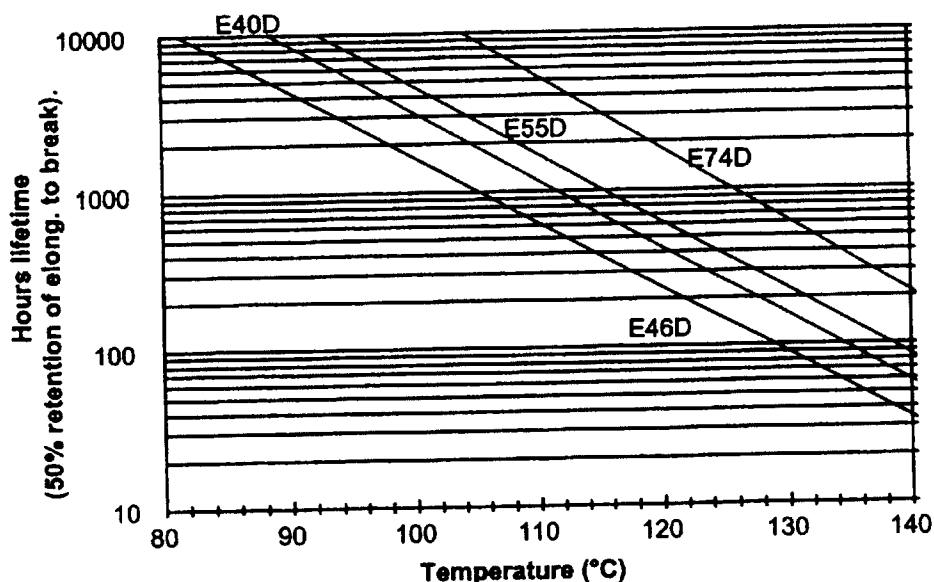
Arnitel EL630 and EM630 have a melting point of 213°C as found in the second heating curve of a DSC. The polymer will crystallize at 155°C using a 20°C/min cooling rate. The thermal expansion coefficient of Arnitel EL630/EM630 and is $140 \cdot 10^{-4} \mu\text{m/m.K}$.

• Heat aging:

Arnitel EL630/EM630 shows an optimum between heat resistance and colour stability. Heat aging for EL630/EM630 is under test at this moment, however the data will be between EL550 and EL740. Arrhenius curves of thermo-oxidative heat aging are shown in graph 2.77. Criterium chosen is retention of 50% original elongation at break.

Heat aging of Arnitel E40D, 46D, 55D and 74D.

Natural products, Arrhenius plot.



Graph 2.77: Heat stability for Arnitel E-range.

Heat ageing can be improve using a stabilisation masterbatch, however for heat stabilisation the P-range is preferred for it's excellence in performance. These data can be found in the Arnitel properties summary or an Arnitel P datasheet.

2.8.33 Processing and Handling:

Arnitel EL630/EM630 is a polyester with a density of 1.12 g/cm^3 according ISO 1183.

Due to the polyester nature of these materials it is of major importance to store the material dry prior to processing. Materials packaged in sealed packaging should have a moisture content lower then 500 ppm. The polymer will contain 0.12% moisture in 50% RH and 0.58% water after saturation in water. Both numbers are in equilibrium.

If samples have become wet during storage a drying step of 24 hours 120°C (or 6 hours 140°C) prior to use will prevent degradation of the material during processing combined with an eventual loss of properties. The air or nitrogen will have to have a dew point of at least -30°C.

Arnitel® EL630/EM630

• Processing:

Arnitel EL630/EM630 shows a single melting point at 195°C in DSC. Processing conditions are shown in the table below.

polymer	zone 1	zone 2	zone 3	additional	melt	mold
EL630	225	230	235	235	225-235	20-50
EM630	225	230	235	235	235	50

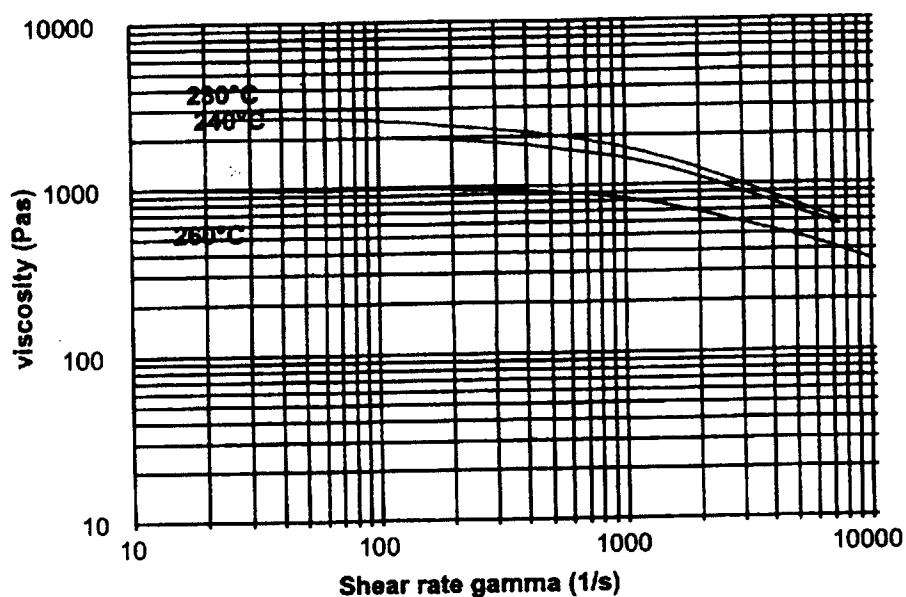
All temperatures are in °C.

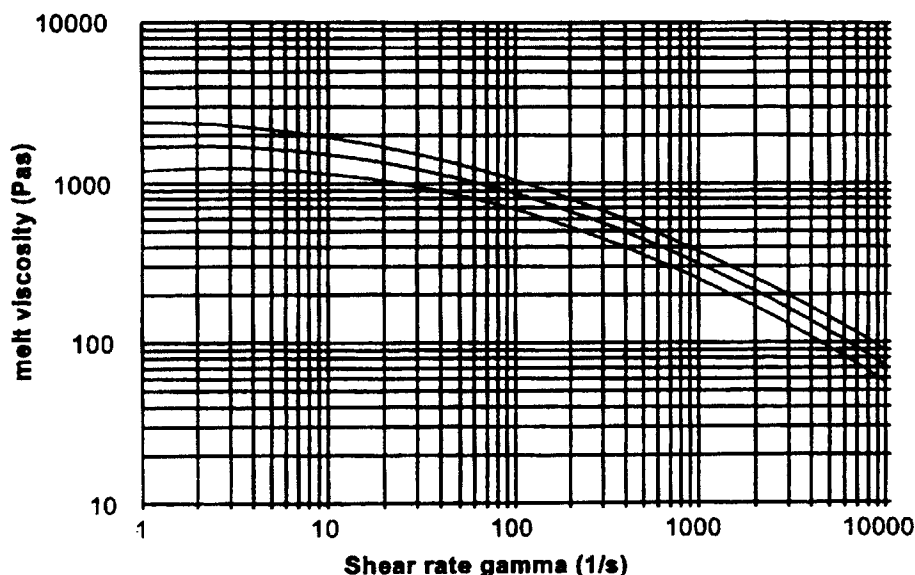
Table 2.30: Processing conditions for Arnitel EL630 and Arnitel EM630.

• Rheology:

The temperature depending melt viscosity of Arnitel EL630/EM630 and are shown below in graph 2.80 and 2.81 respectively.

Shear rate dependent of the melt viscosity of Arnitel EL630.
Effect of melt temperature.



Amitel[®] EL630/EM630Capillar melt viscosity of Amitel EM630.
240, 250 and 260°C.

Graph 2.80 and 2.81: Temperature dependancy of the melt viscosity for Amitel EL630 and EM630 .

The MFI values are shown in table 2.31.

		EL630	EM630	
MFI 230°C	g/10 min		7	ISO 1133
MFI 240°C	g/10 min	30		ISO 1133

Table 2.31: MFI for Amitel EL630/EM630.

- Use of regrind:

Amitel can readily be recycled. If the MFI of the regrind is up or down to four points higher, 20% can be recycled. A difference of 2 MFI points allows up to 50% of regrind. Obviously the regrind should be dried properly before use.

2.8.34 Mechanical properties:

If Amitel EL630 or Amitel EM630 are processed properly the materials will have mechanical properties as shown in table 2.32.

Mechanical property	SI Unit	typica data*		test method
		EL630	EM630	
Hardness	Shore D	63	63	ISO 868
Tensile modulus (1 mm/min)	MPa	330	330	ISO 527
Tensile strength (50 mm/min)	MPa	30	30	ISO 527
Strain at break	%	350	350	ISO 527
Tensile stress at 5% strain	Mpa	11.5	11.5	
Tensile stress at 10% strain	Mpa	15.9	15.9	
Tensile stress at 50% strain	Mpa	17.3	17.3	
Tear strength Graves	KN/m	145	145	DIN53515
Izod notched 23°C (73°F)	KJ/m ²	NB	NB	ISO 180/1A
Izod notched -30°C (-22°F)	KJ/m ²	4	4	ISO 180/1A
Charpy notched 23°C (73°F)	KJ/m ²	NB	NB	ISO 179/1eA
Charpy notched -30°C (-22°F)	KJ/m ²	12	12	ISO 179/1eA

Data for dry natural materials.

*1 NB: No Break

Table 2.32: mechanical properties of Amitel[®] EL630.

Amitel® EL630/EM630

- **Abrasion:**

Amitels show good abrasion resistance in both Taber and DIN 53516 abrasion tests. Data are shown in the Amitel general property overview (also included in the EPIC)

2.8.35 Flame retardancy:

Amitel EL630 and EM630 show in an ISO1210/A flammability test a burning rate leading to a classification FH-1. Flame retardancy can be improved using a halogenated or halogen free FR masterbatch.

2.8.36 Electrical properties:

Amitel EL630/EM630 can be used for cable jacketing applications. If the material is in permanent contact with copper a copper stabilisation package should be added. If the copper wires are coated with a tin layer, no stabilisation is necessary. The electrical properties are shown in table 33.

Electrical property	SI Unit	typical data*		test method
		EL630	EM630	
Dielectric strength	KV/mm	22	22	IEC 243-1
Relative permittivity (ϵ_r) at 1 kHz	-	4.4	4.4	IEC 250
Dissipation factor ($\tan \delta$) at 1kHz	-	0.019	0.019	IEC 250
Comparative tracking index	-	600	600	IEC 112
Volume resistivity	$10^{14} \Omega \cdot \text{cm}$	1	1	IEC 93
Surface resistivity	$10^{14} \Omega$	1	1	IEC 93

Table 2.33: Typical electrical properties of Amitel® EL630 and EM630.

2.8.37 Chemical resistance:

Amitel EL630 and EM630 are sensitive to strong bases and strong acids, especially at elevated temperatures. In some halogenated hydrocarbons (like tetrachloroethane), the materials (partially) dissolve. For a full review on chemical resistance of Amitel EL630 and EM630 request the chemical resistance brochure.

- **Hydrolysis**

Like all polyesters Amitel are sensitive to moisture, however Amitels are more stable to water than e.g. PET and PBT. graph 2.84 shows the hydrolytic stability of Amitel EL630 at 100°C and in steam (120°C). For improved hydrolysis stability, using a polycarbodiimid containing masterbatch like Stabaxol® in an option. To maintain all other properties use a masterbatch based on polyester. Data on the Stabaxol stabilised grade are shown in graph 2.85.

■Panlite L-1250Z

Category	Unit	Test Method	Condition	L-1250Z 100
Melt volume flow rate	cm ³ /10min	ISO 1133	300°C load 1.2kg	8
Density	kg/m ³	ISO 1183	—	1200
Water absorption rate	%	ISO 62	in water 23°C24h	0.2
Light transmission	%	ASTM D 1003	thickness 3mm	88
Refractive index	—	ASTM D 542	—	1.585
Tensile modulus	MPa	ISO 527-1 and ISO 527-2	1mm/min	2400
Tensile stress at yield	MPa		50mm/min	61
Tensile strain at yield	%		50mm/min	6
Nominal tensile strain at break	%		50mm/min	>50
Flexural modulus	MPa	ISO 178	2mm/min	2350
Flexural strength	MPa		2mm/min	93
Charpy impact strength	KJ/m ²	ISO 179	unnotched	NB
			notched	76
Heat deflection temperature	°C	ISO 75-1 and ISO 75-2	1.80MPa	129
			0.45MPa	142
Vicat softening temperature	°C	ISO 306	50°C/h 50N	149
Mold shrinkage	%	In-house method	parallel	0.5~0.7
			vertical	0.5~0.7
Coefficient of linear expansion	× 10 ⁻⁴ /°C	ISO 11359-2	parallel	0.7
			vertical	0.7
Specific inductive capacity	—	IEC 60250	100Hz	3.1
	—		1MHz	3
Dielectric loss tangent	× 10 ⁻⁴	IEC 60250	100Hz	10
	× 10 ⁻⁴		1MHz	90
Volume resistivity	Ω · m	IEC 60093	—	>1 × 10 ¹³
Surface resistivity	Ω	IEC 60093	—	>1 × 10 ¹⁵
Withstand voltage	MV/m	IEC 60243-1	short time test	30
Tracking resistance	—	IEC 60112	—	250
Flammability	—	UL 94	—	V-2(0.40mm) HB(1.5mm)
Temperature index	°C	UL 746B	electric 1.47mmt	125
			impact 1.47mmt	115
			non-impact 1.47mmt	125

※The values listed are specification values, not certified values.

Two-part adhesive		1590	High Super 5	EP-330 (HighSuper30)	EP-331	1500	Super
Feature		curing for 5 min type		curing for 30 min type	curing for 30min type Low- viscosity	Standard type	
Appearance	Base	Clear, blue	Translucent, blue	Translucent, pink	Clear, light yellow	Clear, light yellow	Translucent
	Hardener	Clear ight yellow	Translucent, light yellow	Translucent, milk white	Clear, light yellow	Clear, light brown	Light yellow
Viscosity (Pa · S/20°C)	Base	8	120	80	7	25	100
	Hardener	12	70	170	7	60	50
Specific gravity (g/cm ²)	Base	1.17	1.17	1.17	1.16	1.16	1.14
	Hardener	1.11	1.15	1.14	1.16	0.97	0.99
Mixing ratio(Base : Hardener)		1 : 1	1 : 1	1 : 1	1 : 1	1 : 1	1 : 1
Pot life		Within 5 min	Within 5 min	Within 30 min	Within 30 min	Within 1 hr	Within 1 hr
Tensile shear stength(N/mm ²)		19.0	18.0	17.5	17.6	15.7	15.1
T-Formed peeling adhesion (N/mm)		2.71	0.31	0.47		0.40	
Hardness(shore D)		77	77	82	71	82	
Coefficient of linear expansion (× 10 ⁻⁵)		8.6	10.7	6.7	4.1	7.1	
Tg(°C)			47	43		53.7	
Volume resistivity(Ω · cm)			4.9 × 10 ¹⁵	3.8 × 10 ¹¹	3.6 × 10 ¹¹	1.1 × 10 ¹⁶	
Coefficient of water absorption(%)			2.5	2.3		0.8	
Capacity standards		Base 1 kg Hardener 1 kg	6 g set 15 g set 25 g set 80 g set	320 ml set Base 3 kg Hardener 3 kg 6 g set, 15 g set, 80 g set	Base 1 kg Hardener 1 kg	Base 500 g, 1 kg, 3 kg, 15 kg Hardener 500 g, 1 kg, 3 kg, 15 kg	15 g set 40 g set 110 g set



施敏打硬 CEMEDINE 1500

〔一般性質〕

	主 劑	硬 化 劑
主 要 成 分	環氧 (Epoxy) 樹脂	聚醯胺 (Poly-Amido) 樹脂
顏 色 常 態	中間體淺黃色透明液體	色透明液體
不揮發率 (%)	99.6	99.4
黏度 (9/20°C)	350	600
比重 (20/20°C)	1.16	0.97
溶 劑	無	
硬化劑混合比例phr	60~110	
保持粘度時間	參照混合硬化劑後的粘度變化表	
膠 化 時 間	3 小時	
硬化所需時間	6 小時10分鐘	
可保存時間 (20°C)	2 年	

〔特性〕

由兩種液體混合而成的環氧 (Epoxy) 樹脂系黏着劑，能在常溫下硬化，應用範圍至為廣泛，可穩定黏着金屬、塑膠以及其他各種物質，而由於此黏着劑，通常以聚醯胺 (Poly-Amido) 樹脂為其硬化劑，具有下列各優點：

1. 能在常溫下硬化。
2. 縱使所使用的硬化劑份量不同，也不影響其特性。
3. 由於能產生比一般黏着劑富有彈曲性的黏着層，縱使黏着不同材質的物品，也能以黏着層緩和熱膨脹的差別所引起的兩物品彎曲，對機械學的衝擊也能顯示較良好的性能。
4. 由於能形成透明的黏着層，可以黏着透明的物質，如玻璃等等。

〔用 途〕

由於能強力黏着各種物質，諸如金屬，熱硬化塑膠，玻璃，機械裝配以及一般家庭器具等等，應用範圍至為廣泛。

縱然是聚烯乙稀 (Polythylene)，聚酯 (Polyester)，天然以及人造橡膠等，以一般的黏着根本無法黏着的物質，如果加以適當的表面處理，即可強力黏着。

〔實 例〕

汽車、火車、船隻、飛機……（將金屬把手黏着於玻璃窗／可以黏着鋁製品，三聚氰胺 (Melamine) 裝飾板等，於內部以增加強度／不同金屬間為防止電腐且加黏之／當作防腐塗料亦可）。

電器製品……（由於是一種優秀的黏着劑，使用於高級擴音器、音響線圈的黏着／電磁器或外殼的黏着／線圈框的黏着／鐵粉芯的黏着／馬達線圈的黏着等等）。

建築……（玻璃、壓克力門或將文字板黏於屏風黏住把手／照明設備以及其他塑膠裝飾品的加黏以及組立／不銹鋼製品、銅製建材、陶器或大理石等需要強力黏劑物品均加黏）。

高級裝飾品，玻璃以及塑膠製工藝品，精密機械……（照像機，調整距離儀／分光儀等等的加黏）。其他諸如鐘頭，運動器材，公路標誌等等的加黏。除上述各種加黏外，也可以使用作填充劑，鑄模用，敷層用以及複合用。

溫度 (°C)	時間 (小時)	黏度 (cP)
25	1	1000
50	1	600
100	1	100
120	1	10

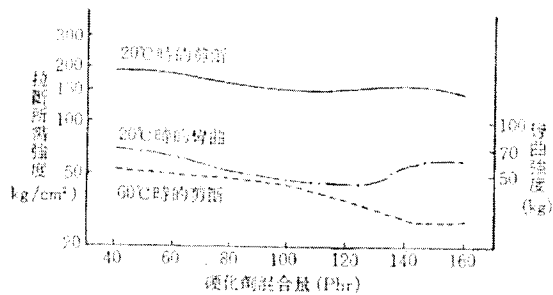


圖 II 2.1
硬化劑混合量和黏力強度
(在20°C七天的硬化)
試驗片：軟鋼板 (25×100×1.6mm)
(Over-lap)12.5mm

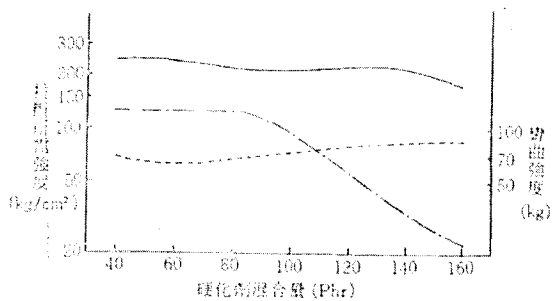


圖 II 2.2
硬化劑混合量和黏力強度
(在80°C一小時的硬化)
試驗片：以及其他同圖 II 2.1

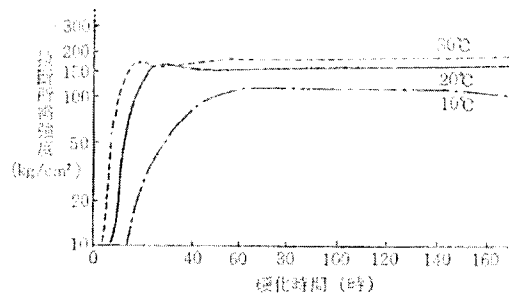


圖 II 2.3
常溫時的硬化特性 硬化劑混合率 100phr

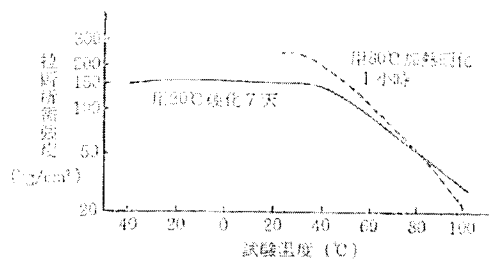


圖 II 2.5
耐熱特性 硬化劑混合率為 100phr

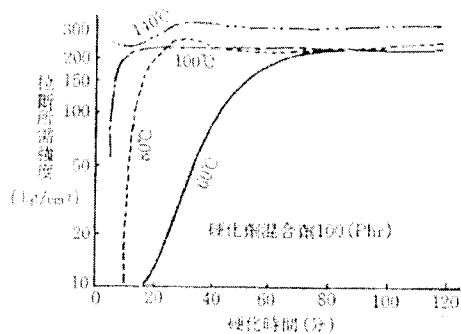


圖 II 2.4
加熱硬化特性 硬化劑混合率為 100phr

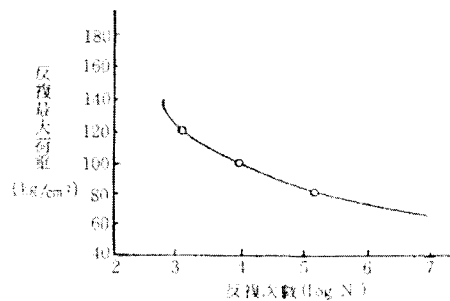


圖 II 2.6
老化特性

表 II 2.1 物理特性

抗張力 (kg/mm ²)	5.04	破損 {	68
抗剪力 (kg/mm ²)	7.40	破損 {	67
抗油壓性 (kg/mm ²)	214	破損 {	82
抗彎折力 (kg/mm ²)	11.6	表面測定電阻 (Ω)	5.6×10 ¹³
抗蠕變度 (kg/mm ²)	15.10(6.41)(1)	體積固有電阻 (Ω-Cm)	10.5×10 ¹³
最高硬化溫度 (°C)	47	誘電率 (10 ⁶ cycle)	2.94
		電壓破壞 (kv/mm)	19

表II 2.2 拉斷所需強度

被粘體	拉斷所需強度	被粘體	拉斷所需強度 (20°C)
樟樹材	83	多元酯漆	22
馬來西亞杉材	106 ※	苯乙稀樹脂	19
針葉樹材	99 < ※	壓克力樹脂	30
杉材	66	優質鹽基樹脂	36
鐵	158	三聚氰胺裝飾板 (表面)	55
鋁	61	三聚氰胺裝飾板 (背面)	45
黃銅	60	F	125
銅	80	R	
鍍電鍍	71	P	
鍍電鍍	50		

[註] 1. 粘着條件：20°C，硬化7天，硬化劑混合比 100phr(接合部over-lap)12.5mm。

2. ※記號者表示材料拉斷。

表II 2.3 促進劣化特性

試驗	未試驗前的粘力強度 (kg/cm ²)	比較調整試驗片的粘力強度(1) (1個月) (kg/cm ²)	經過各試驗1個月後的粘力強度 (kg/cm ²)	經過各試驗1,000小時後的粘力強度 (kg/cm ²)
利用測候儀所做的耐熱試驗	143	150	—	166
利用噴射鹽水的促進試驗	143	150	100	—
利用高溫高濕的促進試驗(2)	143	150	143	—
利用反覆冷熱的促進試驗(3)	143	150	183	—

[註] (1) 20±1°C, 65±5%RH 各保持1個月的試驗片；(2) 50°C100%RH；(3) -5°C8小時~50°C16小時。

表II 2.4 耐 候 性

拉斷所需強度 (kg/cm²)

暴露前的粘力強度					147	
比較調整試驗片的粘力強度 (6個月)			※	156	在戶外暴露6個月的粘力強度	147
"	(1年)	※		138	" 1年 "	152
"	(2年)	※		130	" 2年 "	138
"	(3年)	※		123	" 3年 "	137
"	(10年)	※		111	" 10年 "	130

[註] ※20±1°C, 65±5%RH 保持各期間的試驗片。

表II 2.5 耐水性 (20°C, 7天硬化)

拉斷所需強度 (kg/cm²)

試驗	時間	0	3個月	6個月	1年
常態試驗		120	106	123	120
耐水試驗			109	117	109

[註] 硬化劑混合比為 100phr
試驗片：不銹鋼 (100×25×1.5mm)
(接合部Over-lap)12.5mm。

表II 2.6 耐水性 (60°C, 2小時硬化)

拉斷所需強度 (kg/cm²)

試驗	時間	0	3個月	6個月	1年
常態試驗		157	150	169	163
耐水試驗			133	108	116

[註] 同表II 2.5。

表II 2.7 耐油性

拉斷強度(kg/cm²)

放置日數	1天	3天	5天	10天	20天	1個月
放置於20°C室温	—	—	—	80.0	—	79.0
0°C油中	—	—	77.5	87.5	—	80.0
20°C油中	—	—	82.5	77.6	—	89.5
70°C油中	77.6	75.3	80.0	74.3	—	71.0
循環油中 cycle	—	—	79.0	78.0	89.0	76.0

放置日數	40天	2個月	3個月	6個月	1年	10年
放置於20°C室温	—	—	73.0	65.9	76.3	75.4
0°C油中	—	88.5	71.5	80.5	80.2	—
20°C油中	—	70.5	79.5	78.7	79.7	—
70°C油中	—	75.5	—	75.4	68.3	—
循環油中 (cycle)	71.5	—	—	—	—	—

[註] 1. 硬化劑混合比為80phr，試驗片形本片(100×25×3mm)接合部(Over-lap)12.5mm 2. 油為變壓器油。
3. 試驗片全部破裂。

表II 2.8 耐溶劑、耐藥品性

種 類	項	浸漬7天後的黏力保持率(%)		浸漬1個月後的黏力保持率(%)	
		以20°C硬化7天 的試驗片	以80°C硬化1小 時的試驗片	以20°C硬化7天 的試驗片	以80°C硬化1小 時的試驗片
溶 劑	已 烷	107.0	80.6	94.1	78.8
	—	85.5	63.8	51.7	66.8
	—	88.8	69.5	93.4	70.8
	—	89.5	71.3	97.4	68.7
	—	90.2	64.7	101.3	69.1
三 氯 化 烯	—	91.5	72.7	65.0	69.5
	—	—	—	—	—
油 類	植物油	102.7	99.8	107.3	90.3
	礦 物 油	96.2	87.8	98.1	84.2
藥 品	蒸 餾 水	93.4	72.3	96.3	69.3
	10% 硝 酸 溶 液	93.4	72.8	79.8	69.8
	10% 鹽 酸 溶 液	74.7	67.8	70.8	57.2
	10% 苛性蘇打溶液	97.2	74.3	83.8	74.3
	10% 食鹽水溶液	89.6	71.8	91.0	69.8
	10% 醋 酸 溶 液	94.2	77.8	78.4	64.2

[註] 黏劑混合率=1:1，試驗片：軟質片(25×100×1.6mm)但是因為試驗時使用了SUS-27，接合部(Over-lap)為12.5mm。

容量規格=(主)、(硬) 110g、1kg、15kg (組)



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