

OEM Installation Guide

for WMP-A13

FCC Statement :

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.
- (2) 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 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.

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 of the 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.

FCC RF Radiation Exposure Statement:

1. This transmitter has been demonstrated co-located operation compliance requirement with [Outdoor AP/MODEL No: DWL-2700AP / FCC ID: KA22002090027-1]. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter except the configuration listed below.
 - WMP-A13/5dBi dual band antenna co-locate DWL-2700AP/4.5dBi dual band antenna
 - WMP-A13/14dBi panel directional antenna co-locate DWL-2700AP/16dBi panel directional antenna
 - WMP-A13/18dBi panel directional antenna co-locate DWL-2700AP/16dBi panel directional antenna
2. This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.

Caution for 5GHz

According to FCC 15.407(e), the device is intended to operate in the frequency band of 5.15GHz to 5.25GHz under all conditions of normal operation. Normal operation of this device is restricted to indoor used only to reduce harmful interference to co-channel MSS operations.

IMPORTANT NOTE: In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

End Product Labeling

This transmitter module is authorized only for use in devices where the antenna may be installed such that 20 cm may be maintained between the antenna and users (for example access points, routers, wireless ADSL modems, and similar equipment). The final end product must be labeled in visible area with the following:

“Contains TX FCC ID: RRK2004090192-1”

End Product Manual Information

The user manual for end users must include the following information in a prominent location “**IMPORTANT NOTE:** To comply with FCC RF exposure compliance requirements, the antenna used for this transmitter must be installed to provide a separation distance of at least 20cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.”

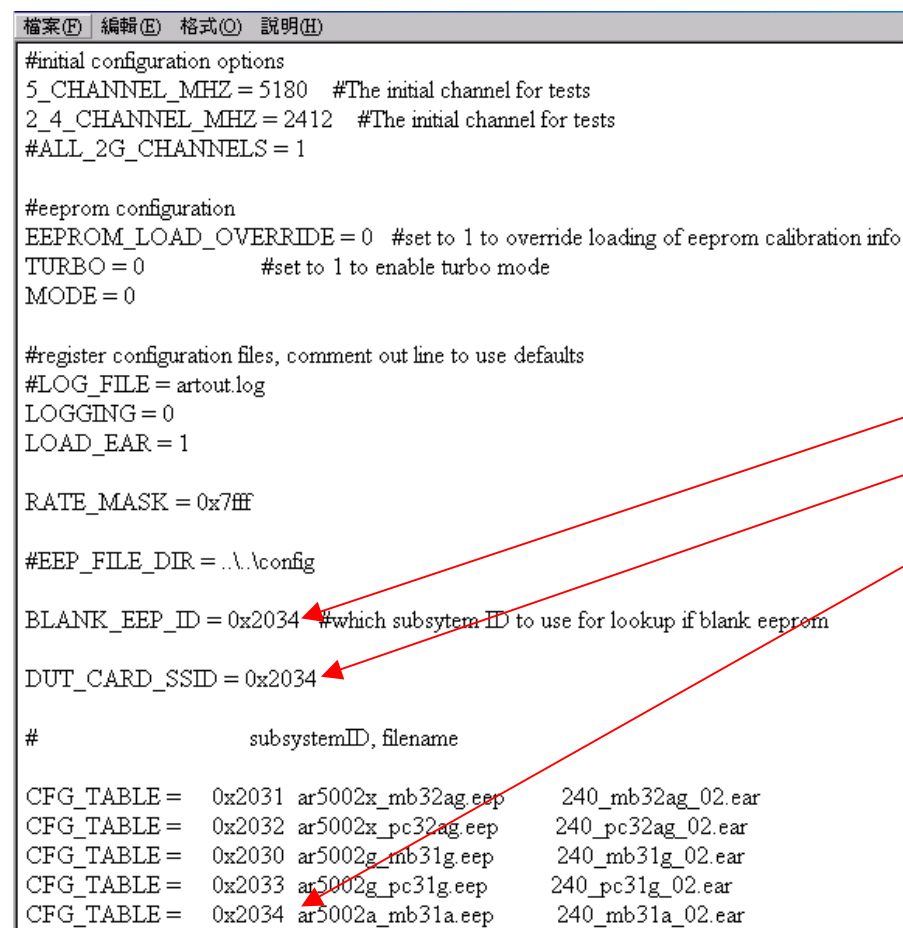
Test Utility Installation:

1. Unzip "ART48bld5.ZIP" to "C:\".
2. Run "inst_new_drv_2K.bat".
3. The utility must run on Win2000 and the Win2000 directory is "C:\WINNT\".

Configuration:

1. Open the artsetup.txt file, and modify some configuration to 0x2034 the following at windows path :

C:\ART48bld5\artsetup.txt



```
檔案(F) 編輯(E) 格式(O) 說明(H)
#initial configuration options
5_CHANNEL_MHZ = 5180 #The initial channel for tests
2_4_CHANNEL_MHZ = 2412 #The initial channel for tests
#ALL_2G_CHANNELS = 1

#eeprom configuration
EEPROM_LOAD_OVERRIDE = 0 #set to 1 to override loading of eeprom calibration info
TURBO = 0 #set to 1 to enable turbo mode
MODE = 0

#register configuration files, comment out line to use defaults
#LOG_FILE = artout.log
LOGGING = 0
LOAD_EAR = 1

RATE_MASK = 0x7fff

#EEP_FILE_DIR = ..\..\config

BLANK_EEP_ID = 0x2034 #which subsystem ID to use for lookup if blank eeprom
DUT_CARD_SSID = 0x2034

# subsystemID, filename
CFG_TABLE = 0x2031 ar5002x_mb32ag.eep 240_mb32ag_02.ear
CFG_TABLE = 0x2032 ar5002x_pc32ag.eep 240_pc32ag_02.ear
CFG_TABLE = 0x2030 ar5002g_mb31g.eep 240_mb31g_02.ear
CFG_TABLE = 0x2033 ar5002g_pc31g.eep 240_pc31g_02.ear
CFG_TABLE = 0x2034 ar5002a_mb31a.eep 240_mb31a_02.ear
```

Modify the value
to 0x2034

2. Open the DOS console window, and start the test utility with typing the following at the DOS command prompt:

C:\ART48bld5\art.exe

```

Reading in Calibration Setup from calsetup.txt
Attached to the Device for instance = 1
Loading values for devNum [0] from eep file ar5002a_mb31a.eep

Reading in Calibration Setup from calsetup.txt
Loading values for devNum [0] from eep file ar5002a_mb31a.eep

Operating in 11a at channel 5.180GHz
=====
                        UNKNOWN BOARD
=====
Devlib Revision 4.8 BUILD #5
Devices detected:
  PCI deviceID : 0x0013      Sub systemID : 0x2034
  MAC revisionID: 0x56      BB revisionID: 0x41
  RF productID : 0x3        RF revisionID: 0x6

Using defaults from //depot/bringup/ar5k/config/venice_derby2_0.cfg#22

Base Addr: 0xFF9F0000 Interrupt: 9
Wireless MAC ADDR: 0x0003_7FBE_F0E1

=====
: Test Harness Main Options:      :
: e - Ignore <E>EPROM Calibration :
: c - <C>ontinuous transmit mode  :
: r - Continuous RF <R>eceive mode :
: l - <L>ink test menu             :
: t - <T>hroughput test menu       :
: p - EE<P>ROM function            :
: s - <S>witch test card           :
: m - <M>anufacturing/Calibration Test :
: g - Disable lo<g>ging            :
: w - <W>rite Comment to Log File  :
: u - <U>tility Menu               :
: i - <N>oise Immunity Menu        :
: q - <Q>uit                       :
=====

```

3. Once ART.EXE is executed, a menu with test options will appear. To run a test, press the character key that is assigned to the test option.
For example, press “c” to run the continuous transmit test, or press “r” to run the continuous receive test.

```

=====
Using defaults from //depot/bringup/ar5k/config/venice_derby2_0.cfg#22

Base Addr: 0xFF9F0000 Interrupt: 9
Wireless MAC ADDR: 0x0003_7FBE_F0E1

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: i - <N>oise Immunity Menu
: q - <Q>uit
=====

```

4. Continuous Transmit Options.

The channel frequency, data rate and output power could be changed in continuous transmit options. For example, press “i” to increase the pcdac value to increase the output power. Press “b” to change the Turbo Mode or Normal Mode. Press ESC to return to the main Test Options menu when finished. The Continuous transmit power must press “s” change to TX100 Test mode and use “Tx100” Mode to Test.

```

: p - Increase Center Frequency by 10 MHz <P inc by 100 MHz>
: l - Decrease Center Frequency by 10 MHz <L dec by 100 MHz>
: o - Increase Data Rate
: k - Decrease Data Rate
: i - Increase pcdac <I inc by 10>
: j - Decrease pcdac <J dec by 10>
: f - Increase power output by 0.5dBm <F inc by 5dBm>
: c - Decrease power output by 0.5dBm <C dec by 5dBm>
: u - Increase ob by 1 <w - increase b-ob>
: h - Increase db by 1 <q - increase b-db>
: v - Toggle power override <ovr>
: x - Toggle external power
: n - Step xpd gain by 6dB
: s - Toggle output mode <tx100 ! tx99 ! single carrier>
: b - Toggle turbo mode
: a - Toggle antenna
: d - Toggle Data Pattern
: z - Toggle Scramble mode
: 9 - Toggle dynamic optimization
: ESC - exit
=====
Operating in 11a at channel 5.320GHz

Power control mode:
Target Power = 18.0, ext power detector = 1, xpdGain = 0,
ob = 7, db = 2, b_ob = 1, b_db = 2,
ANT_A, TX100, Rate = 6 Mbps, PN9_

```

```

:  p - Increase Center Frequency by 10 MHz <P inc by 100 MHz> :
:  l - Decrease Center Frequency by 10 MHz <L dec by 100 MHz> :
:  o - Increase Data Rate :
:  k - Decrease Data Rate :
:  i - Increase pcdac <I inc by 10> :
:  j - Decrease pcdac <J dec by 10> :
:  f - Increase power output by 0.5dBm <F inc by 5dBm> :
:  c - Decrease power output by 0.5dBm <C dec by 5dBm> :
:  u - Increase ob by 1 <w - increase b-ob> :
:  h - Increase db by 1 <q - increase b-db> :
:  v - Toggle power override <ovr> :
:  x - Toggle external power :
:  n - Step xpd gain by 6dB :
:  s - Toggle output mode <tx100 : tx99 : single carrier> :
:  b - Toggle turbo mode :
:  a - Toggle antenna :
:  d - Toggle Data Pattern :
:  z - Toggle Scramble mode :
:  9 - Toggle dynamic optimization :
: ESC - exit :
=====

```

Operating in 11a at channel 5.180GHz

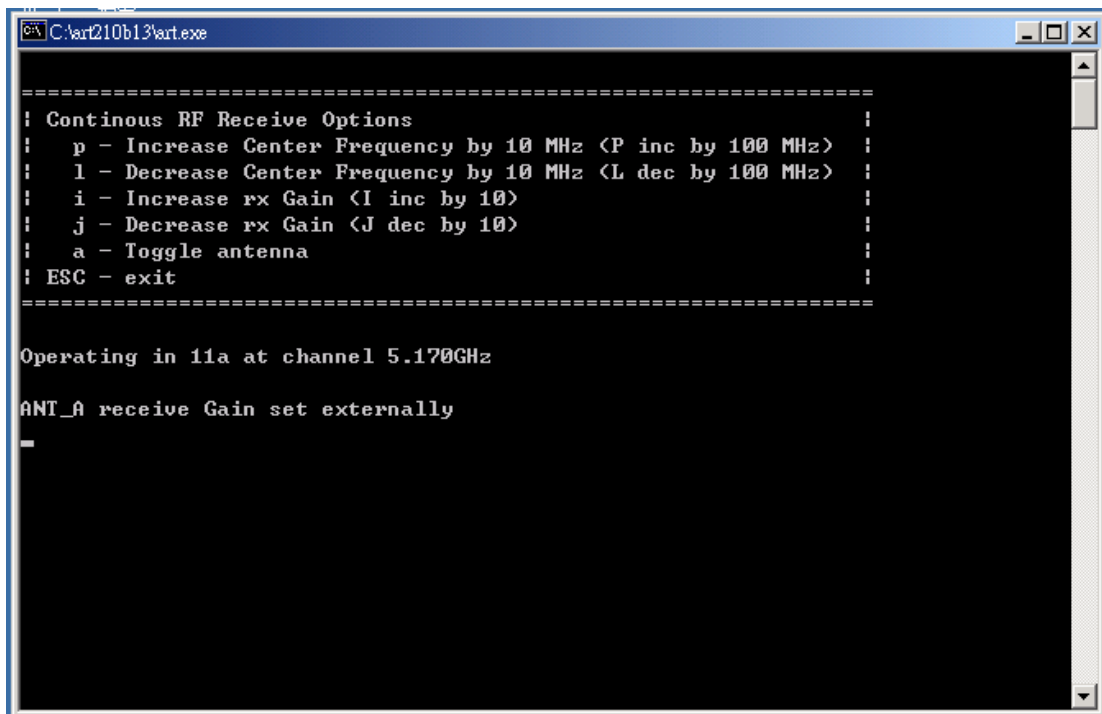
Power control mode:

Target Power = 18.0, ext power detector = 1, xpdGain = 0,
ob = 7, db = 7, b_ob = 2, b_db = 2,
ANT_A, [TX100], Rate = 6 Mbps, PN9

*Note that the initial frequency could be set in "artsetup.txt" directly.

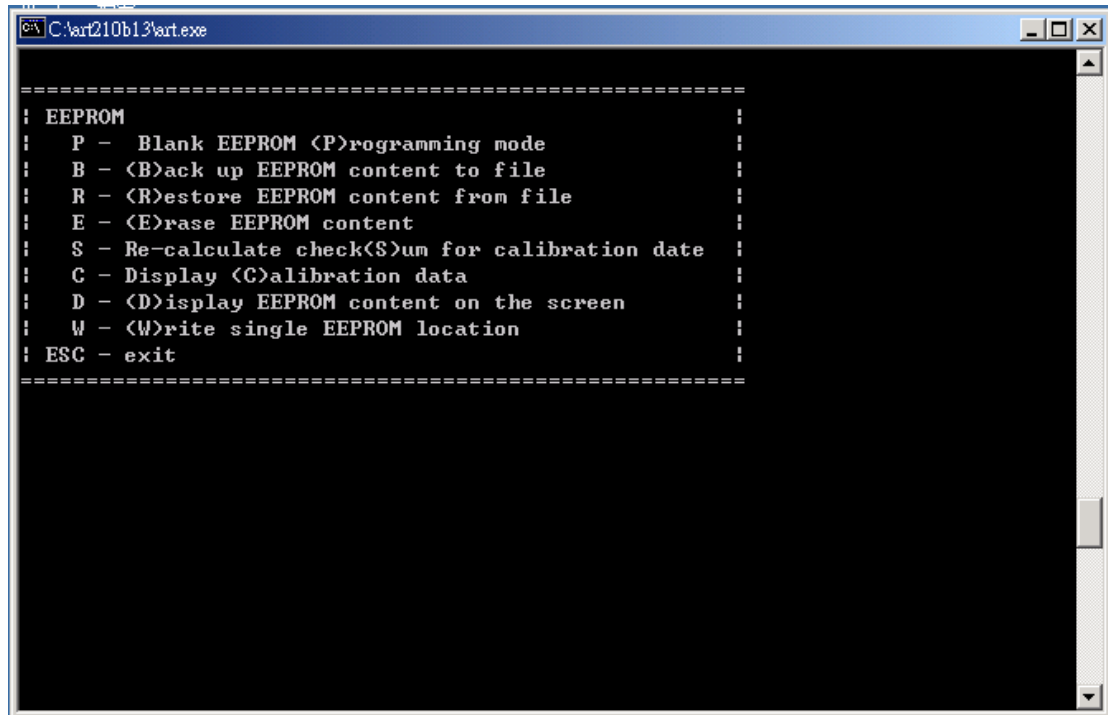
5. Continuous Receive Options

Continuous receive options will put the radio into receive mode to allow for radio measurements. Press ESC to return to the main Test Options menu when finished.



6. EEPROM Function

The function can Backup and restore EEPROM data. For example, press “c” to Display calibration data. Press ESC to return to the main Test Options menu when finished.



```
=====
: EEPROM                                     :
: P - Blank EEPROM <P>rogramming mode      :
: B - <B>ack up EEPROM content to file      :
: R - <R>estore EEPROM content from file    :
: E - <E>rase EEPROM content                :
: S - Re-calculate check<S>um for calibration date :
: C - Display <C>alibration data            :
: D - <D>isplay EEPROM content on the screen :
: W - <W>rite single EEPROM location        :
: ESC - exit                               :
=====
```

Calibration Information									
5170		5220		5280		5320		5450	
pcdac	pwr(dBm)	pcdac	pwr(dBm)	pcdac	pwr(dBm)	pcdac	pwr(dBm)	pcdac	pwr(dBm)
16	1.5	16	1.5	16	1.5	16	2.0	15	1.0
19	7.0	19	7.0	19	7.5	19	7.5	18	6.0
23	11.0	23	11.0	23	11.5	23	11.0	22	11.0
27	13.5	27	14.0	27	14.0	27	14.0	26	13.5
31	15.0	31	15.5	31	15.5	31	15.5	30	15.5
35	16.5	35	16.5	35	17.0	35	17.0	34	17.0
38	17.0	38	17.5	38	17.5	38	17.5	38	18.0
42	18.0	42	18.5	42	18.5	42	18.5	42	19.0
46	19.0	46	19.0	46	19.5	46	19.5	46	19.5
50	20.0	50	20.0	50	20.0	50	20.0	50	20.5
54	20.5	54	20.5	54	20.5	54	21.0	54	21.0
pcdac min 16		pcdac min 16		pcdac min 16		pcdac min 16		pcdac min 15	
pcdac max 54		pcdac max 54		pcdac max 54		pcdac max 54		pcdac max 54	
5590		5710		5850		5850		5850	
pcdac	pwr(dBm)	pcdac	pwr(dBm)	pcdac	pwr(dBm)	pcdac	pwr(dBm)	pcdac	pwr(dBm)
15	0.0	16	2.0	16	2.0	16	2.0	16	2.0
18	6.0	19	7.5	19	7.5	19	7.5	19	7.5
22	10.5	22	11.5	23	11.5	23	11.5	23	11.5
26	14.0	25	13.5	27	14.0	27	14.0	27	14.0
30	15.5	28	15.0	31	15.5	31	15.5	31	15.5
34	16.5	32	16.5	35	17.0	35	17.0	35	17.0
38	17.5	35	17.0	38	17.5	38	17.5	38	17.5
42	18.5	38	18.0	42	18.5	42	18.5	42	18.5
46	19.5	41	18.5	46	19.5	46	19.5	46	19.5
50	20.0	44	19.5	50	20.0	50	20.0	50	20.0
54	21.0	48	20.0	54	20.5	54	20.5	54	20.5

*Note that the calibration data could be see the Output power and Pcdac setting.

1.0 Scope

1.1 Document

This document is to specify the product requirements for **802.11a Mini-PCI Card**. This Mini-PCI Card is based on Atheros AR5002 chipset that complied with IEEE 802.11a WLAN standard from 5.15~5.850GHz wideband, and it can be used to provide up to 108Mbps high-speed data network to connect your wireless LAN

With seamless roaming, fully interoperability and advanced security with WEP standard, **802.11a Mini-PCI Card** offers absolute interoperability with different vendors' 802.11a products through the wireless LAN. This mini-PCI implementation is intended for products such as Access Point and PCI Adapter.

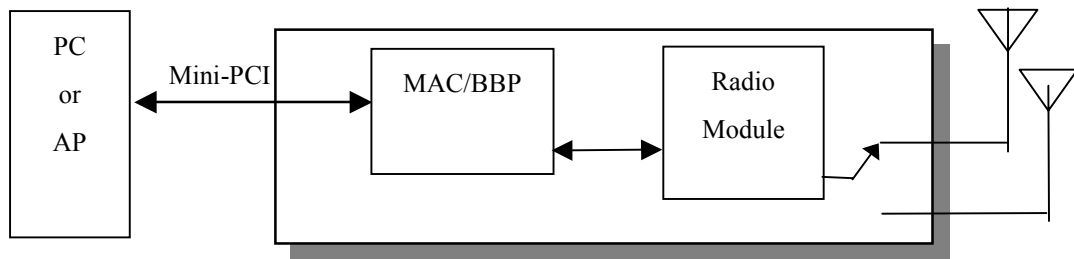
1.2 Product Features

- Compatible with IEEE 802.11a high rate standard to provide wireless 108Mbps data rate
- Operation at 5.15 ~ 5.850GHz frequency band to meet worldwide regulations
- Dynamic data rate scaling at 6, 9, 12, 18, 24, 36, 48, 54, 108 Mbps
- Maximum reliability, throughput and connectivity with automatic data rate switching
- Supports wireless data encryption with 64/128/152-bit WEP for security
- Supports infrastructure networks via Access Point and ad-hoc network via peer-to-peer communication
- Supports AES enhanced security
- Supports DFS/TPC for European operation
- Supports VLAN tagging
- Friendly user configuration and diagnostic utilities
- Drivers support Windows 98SE, ME, 2000, and XP
- Supports Mini-PCI Type IIIB standard
- Intended for PCI adapter and Access Point application

2.0 Requirements

The following sections identify the detailed requirements of the **802.11a Mini-PCI Card**.

2.1 Functional Block Diagram



2.2 General Requirements

This module is limited to be used with 3 antennas and FCC authorization will only be valid by the professional installation with the setting of output power/ antenna cable loss/ operating frequency listed below.

Antenna type/ spec.	Applicable frequency range	RF conducted output power (max.)	Antenna cable length/loss
Antenna 1- Dual-band Omni-directional antenna, Max Gain: 5dBi	5725~5850MHz	15.7dBm	n/a
Antenna 2- Panel directional Antenna, Max Gain: 14dBi	5250 ~5350MHz	14.14dBm	1m/ 1dBm
Antenna 3- Panel directional Antenna, Max Gain: 18dBi	5725~5850MHz	15.36dBm	1m/ 1dBm

#	Feature	Detailed Description
2.2.1.1	Standard	IEEE 802.11a
2.2.1.2	Radio and Modulation Type	BPSK, QPSK, 16QAM, 64QAM, OFDM
2.2.1.3	Operating Frequency	5.15 ~ 5.35GHz and 5.725 ~ 5.850GHz for US and Canada 5.15 ~ 5.25GHz for Japan 5.15 ~ 5.35GHz and 5.47 ~ 5.725GHz for Europe 5.725~5.85GHz for China
2.2.1.4	Channel Numbers	12 non-overlapping channels for US and Canada 4 non-overlapping channels for Japan 19 non-overlapping channels for Europe 4 non-overlapping channels for China
2.2.1.5	Data Rate	108,54, 48, 36, 24, 18, 12, 9 and 6Mbps
2.2.1.6	Media Access Protocol	CSMA/CA with ACK
2.2.1.7	Transmitter Output Power	Typical RF Output Power at each Data Rate +14 ~ 15dBm at 54Mbps +14 ~ 15dBm at 48Mbps +14 ~ 17dBm at 36Mbps +14 ~ 17dBm at 24, 18, 12, 9, and 6Mbps ALC loop to control transmit power within 0.9 dB tolerance in room temperature
2.2.1.8	Receiver Sensitivity	Typical Sensitivity at Which Frame (1000-byte PDUs) Error Rate = 10% -87dBm at 6Mbps -86dBm at 9Mbps -85dBm at 12Mbps -83dBm at 18Mbps -80dBm at 24Mbps -76dBm at 36Mbps -71dBm at 48Mbps -66dBm at 54Mbps

2.3 Engineering Requirements

#	Feature	Detailed Description
2.3.1	Transmit Power Level	The maximum allowable RF power level is subject to specified nation regulation
2.3.2	Operation Channel Frequencies	- Refer to sub clause 17.3.8.3, IEEE 802.11a for US and Canada - Channel 1: 5180MHz - Channel 2: 5200MHz - Channel 3: 5220MHz - Channel 4: 5240MHz - Channel 5: 5260MHz - Channel 6: 5280MHz - Channel 7: 5300MHz - Channel 8: 5320MHz - Channel 9: 5745MHz - Channel 10: 5765MHz - Channel 11: 5785MHz - Channel 12: 5805MHz - Channel 13: 5825MHz - Refer to ARIB STD-T71 for Japan - Channel 1: 5170MHz - Channel 2: 5190MHz - Channel 3: 5210MHz - Channel 4: 5230MHz - Refer to EN 301 893 draft for Europe - Channel 1: 5180MHz - Channel 2: 5200MHz - Channel 3: 5220MHz - Channel 4: 5240MHz - Channel 5: 5260MHz - Channel 6: 5280MHz - Channel 7: 5300MHz - Channel 8: 5320MHz - Channel 9: 5500MHz - Channel 10: 5520MHz - Channel 11: 5540MHz - Channel 12: 5560MHz - Channel 13: 5580MHz - Channel 14: 5600MHz - Channel 15: 5620MHz - Channel 16: 5640MHz - Channel 17: 5660MHz - Channel 18: 5680MHz - Channel 19: 5700MHz
2.3.3	Transmit Center Frequency Tolerance	- Refer to sub clause 17.3.9.4, IEEE 802.11a - The transmitted center frequency tolerance is +/- 20ppm maximum.
2.3.4	Transmit Modulation Accuracy	- Refer to sub clause 17.3.9.6, IEEE 802.11a - The relative constellation RMS error, averaged over sub carriers, OFDM frames, and packets, do not exceed a data-rate dependent value as follows. - Max. -5dB_r at 6Mbps - Max. -25dB_r at 54Mbps
2.3.5	Slot Time	- Refer to sub clause 17.3.8.6, IEEE802.11a - The slot time for the OFDM PHY is less than 9 μs, which is the sum of the RX-to-TX turnaround time,

#	Feature	Detailed Description
		MAC processing delay, and CCA detect time ($< 4 \mu\text{s}$).
2.3.6	Transmit Spectrum Mask	- Refer to sub clause 17.3.9.2, IEEE 802.11a 0dBr Bandwidth is less than 18MHz - Min. -20dBr at 11MHz offset - Min. -28dBr at 20MHz offset - Min. -40dBr at 40MHz offset
2.3.7	Out-of-band Emission	- Refer to FCC Part 15.407, 15.205, and 15.209 - Less than -27dBm EIRP in 1MHz bandwidth in unrestricted band
2.3.8	Receiver Sensitivity	- Refer to sub clause 17.3.10.1, IEEE 802.11a - Refer to #2.2.1.8
2.3.9	CCA Sensitivity	- Refer to sub clause 17.3.10.5, IEEE 802.11a - The start of a valid OFDM transmission at a receive level equal to or greater than the minimum 6Mbit/s sensitivity (-82dBm) causes CCA to indicate busy with a probability $>90\%$ within $4 \mu\text{s}$.

2.4 Software Requirements

The Configuration Software supports Microsoft Windows 98SE, ME, 2000, and XP. This configuration software includes the following functions:

- Information**
 Information allows you to monitor network status.
- Configuration**
 Configuration allows you to configure parameters for wireless networking.
- Encryption**
 Encryption provides WEP security control
- Diagnosis**
 Diagnosis allows you to display all channel status and search neighboring access points

2.4.1 Information

#	Feature	Detailed Description
2.4.1.1	General Information	General Information shows the name of Wireless Adapter, Adapter MAC Address, Regulatory Domain, Firmware Version, and Utility Version.
2.4.1.1	Current Link Information	Current Link Information shows the Current Setting ESSID, Channel Number, Associated BSSID, Network Type (infrastructure or Ad-hoc network), WEP Status (enable or disable), Link Status (Connect or Dis-connect), Transmit Speed (6, 9, 12, 18, 24, 36, 48, 54, 108), Signal Strength, and Link Quality.

2.4.2 Configuration

#	Feature	Detailed Description
2.4.2.1	ESS ID	- Input an SSID number if the roaming feature is enabled - Supports for ASCII printable characters.
2.4.2.2	Network Type	- Ad-hoc Mode and 802.11 Ad-hoc Mode for network configurations that do not have any access points - Infrastructure Mode for network configurations with access points
2.4.2.3	Power Save	Extend the battery life of clients by allowing the client to sleep for short periods of time while the Access Point buffers the messages.
2.4.2.4	RTS Threshold	Set the number of bytes used for fragmentation boundary for messages
2.4.2.5	Fragment Threshold	Set the number of bytes used for RTS/CTS boundary
2.4.2.6	Transmission Speed	This indicates the communication rates. Select appropriate transmission speed to match your wireless LAN settings
2.4.2.7	Roaming	Support Automatic or Manual Rescan to associate with access point.

2.4.3 Encryption

#	Feature	Detailed Description
2.4.3.1	Encryption	• RC4 encryption algorithm • Supports 64-bit, 128-bit, and 152-bit WEP encryption • Support open system (OSA) and shared key authentication (SKA)
2.4.3.2	WEP Management	• Four WEP keys can be selected • STA with WEP off will never associate any AP with WEP enabled • WEP Key Format: Option for Hex format

2.4.4 Diagnosis

#	Feature	Detailed Description
2.4.4.1	Channel Status	• To display the interference status of all channels.
2.4.4.2	Access Point Status	• To search the neighboring access points and display the information of all access points.

2.5 Mechanical Requirements

#	Feature	Detailed Description
2.5.1	Length	• 59.59mm
2.5.2	Width	• 44.6mm
2.5.3	Height	• 0.991mm

2.6 Compatibility Requirements

This device passes the following compatibility requirements.

#	Feature	Detailed Description
2.6.1	• Wi-Fi or Wi-Fi5	• Meet Wi-Fi certification of WECA (Wireless Ethernet Compatibility Alliance) as soon as WECA certification is available for IEEE 802.11a product
2.6.2	• WHQL	• Meet applicable WHQL certification requirements
2.6.3	• Physical Layer and Functionality	• Meet W-Link Engineering Test Plan and Test Report

2.7 Regulatory Requirements

#	Feature	Detailed Description
2.7.1	United States	- Safety: UL1950-3 for CSA mark - EMI: FCC Part 15.407(b) - MPE: FCC Part 15.407(f) - Power Limits: FCC Part 15.407(a)
2.7.2	Canada	- Safety: CSA - SAR: RSS-210 section 14 - Power Limits: RSS-210 6.2.2 (91)
2.7.3	Japan	- EMI: VCCI - Regulatory: TELEC
2.7.4	Europe	- EMC: EN 301 489-1 and -17, EN 60950 - DFS/TPC: 301 893 Draft

2.8 Requirements of Reliability, Maintainability and Quality

#	Feature	Detailed Description
2.8.1	MTBF	Mean Time Between Failure > 30,000 hours
2.8.2	Maintainability	There is no scheduled preventive maintenance required
2.8.3	Quality	The product quality is followed-up by W-Link factory quality control system

2.9 Environmental Requirements

#	Feature	Detailed Description
2.9.1	Operating Temperature Conditions	The product is capable of continuous reliable operation when operating in ambient temperature of 0 °C to +55 °C.
2.9.2	Non-Operating Temperature Conditions	Neither subassemblies is damaged nor the operational performance is degraded when restored to the operating temperature after exposing to storage temperature in the range of -20 °C to +75 °C.
2.9.3	Operating Humidity conditions	The product is capable of continuous reliable operation when subjected to relative humidity in the range of 10% and 90% non-condensing.
2.9.4	Non-Operating Humidity Conditions	The product is not damaged nor the performance is degraded after exposure to relative humidity ranging from 5% to 95% non-condensing