



# *WLAN - Computer Hardware Reference*

Preliminary Information

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# Specifications

## A P P E N D I X A

### WLAN

#### *WLAN*

The WLAN - Computer module provide an 802.11a/b/g/n WLAN interface with up to 54Mbps on the a/b/g band and up to 65 Mbps on the n band. The module has an on board chip antenna for 802.11a/b/g/n.

### Module Specifications

This appendix provides the WLAN - Computer module specifications.

#### *Environmental Specifications*

- Operating temperature      0°C to +70°C
- Storage temperature        -20°C to +85°C

#### *Network Interface*

- Antenna specifications: 802.11a/b/g antenna

## Attributes

Attribute	Band 1	Band 2
Frequency	2.45 GHz	5 ~ 6 GHz
Bandwidth	70MHz	500MHz
Impedance	50 Ohm	50 Ohm
VSWR	2.0 (max)	2.0 (max)
Polarization	Linear	Linear
Peak Gain	1dBi	1dBi
Dimension	10.3mm * 3.0mm * 1.6mm	
Part Number	AN1003	

## WLAN

### Standard

- IEEE 802.11a/b/g/e/i/h/j standards
- Single-stream IEEE 802.11n

### Frequency Band

- 2.400 - 2.500 GHz ( Low Band )
- 4.900 - 5.850 GHz ( High Band )

### Data Rates

- 802.11n :6.5, 13, 19.5, 26, 39,52 , 58.5, 65 Mbps
- 802.11a/g :6, 9, 12, 18, 24, 36, 48, 54 Mbps
- 802.11b :1, 2, 5.5, 11 Mbps

### Media Access Control

- Dynamic selection of fragment threshold, data rate and antenna depending on the channel statistics
- WPA, WPA2 and WMM support

### *Wireless Medium*

- 802.11b/g : Direct Sequence-Spread Spectrum ( DSSS ) and Orthogonal Frequency Divisional Multiplexing ( OFDM )
- 802.11a/n : OFDM

### *DFS Client*

- This module supports the DFS Client only between 5.25 and 5.35GHz bands. It does not support being DFS Master, or can it be connected to an Ad hoc network in these bands.

### *Modulation DSSS*

- Differential Binary Shift Keying ( DBPSK ) @ 1 Mbps
- Differential Quadrature Phase Shift Keying ( DQPSK ) @2 Mbps
- Complementary Code Keying ( CCK ) @ 5.5 Mbps and 11 Mbps
- BPSK @ 6 and 9 Mbps
- QPSK @ 12 and 18 Mbps
- 16-Quadrature Amplitude Modulation ( QAM ) @24 and 36 Mbps
- 64-QAM @ 48 and 54 Mbps

### *Frequency Bands*

- 2.412 to 2.472 GHz ( ETSI )
- 2.412 to 2.462 GHz ( FCC )
- 5.150 to 5.250 GHz ( ETSI ) ISM Band 1
- 5.250 to 5.350 GHz ( ETSI ) ISM Band 2 excluding TPC and DFS Client
- 5.470 to 5.725 GHz ( ETSI ) ISM Band 3 excluding TPC and DFS Client
- 5.150 to 5.250 GHz ( U-NII-1 )
- 5.250 to 5.350 GHz ( U-NII-2 )
- 5.470 to 5.725 GHz ( U-NII Worldwide )
- 5.725 to 5.825 GHz ( U-NII-3 )

*Available Transmit Power Settings ( Typical +/- ( 2 dBm )@25°C)*

( Maximum power settings will vary according to individual country regulations. )

- IEEE 802.11b ( ~16mW ETSI ) ( ~37mW FCC 15.247 )  
@ 1, 2, 5.5 and 11 Mbps
- IEEE 802.11g ( ~ 10mW ETSI ) ( ~72mW FCC 15.247 )  
@ 6, 12, 18, 24, 36 and 54Mbps
- IEEE 802.11n 2.4GHz Band ( ~12.5mW ETSI ) ( ~83mW FCC 15.247 )
- IEEE 802.11a & IEEE 802.11n  
( ~15mW ETSI )  
  
( 5.150 to 5.250 GHz ~17mW FCC 15.407 )  
( 5.250 to 5.350 GHz ~17mW FCC 15.407 )  
( 5.470 to 5.725 GHz ~22mW FCC 15.407 )  
( 5.725 to 5.850 GHz ~28mW FCC 15.247 )  
  
@ 6, 12, 18, 24, 36 and 54Mbps and  
  
@ 6.5, 13, 19.5, 26, 39,52 , 58.5, 65 Mbps

*Receive Sensitivity*

<b>Data Rate (bg Mode)</b>	<b>Typical Sensitivity (+ / - 1.5 dBm)</b>
1 Mbps	-94.0 dBm (< 8% PER)
2 Mbps	-89.0 dBm (< 8% PER)
11 Mbps	-86.0 dBm (< 8% PER)
6 Mbps	-89.0 dBm (< 10% PER)
54 Mbps	-74.0 dBm (< 10% PER)
645Mbps	-71.0 dBm (< 10% PER)

  

<b>Data Rate (a Mode)</b>	<b>Typical Sensitivity (+ / - 1.5 dBm)</b>
6 Mbps	-88.0 dBm (< 10% PER)
54 Mbps	-72.0 dBm (< 10% PER)

  

<b>Data Rate (bg Mode)</b>	<b>Typical Sensitivity (+ / - 1.5 dBm)</b>
65 Mbps	-69.0 dBm (< 10% PER)



# Certifications

## A P P E N D I X B

The WLAN - Computer product complies with the following standards.

### FCC Part 15 Class B

#### *Radio Frequency Interface (RFI) (FCC 15.105)*

The WLAN - Computer module has been tested and found to comply with the limits for Class B digital devices pursuant to Part 15 Subpart B, of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential environment. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, 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 and 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.

#### *Labeling Requirements (FCC 15.19)*

This device complies with Part 15 of 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.

If the FCC ID is not visible when installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed

module FCC ID. This exterior label can use wording such as the following: "Contains Transmitter Module FCC ID: MCQ-50M1699/ IC: 1846A-50M1699".

### *RF Exposure*

RF Exposure considerations require that a 20 cm separation distance between users and the installed antenna location shall be maintained at all times when the module is energized. OEM installers must consider suitable module and antenna installation locations in order to assure this in 20cm separation, and end users be also be advised to the requirement.

### *Indoor/Outdoor*

When the WLAN - Computer module is installed in devices that can be used outdoors, the channels in the band 5150 - 5250 MHz must be disabled to comply with US and Canadian regulatory requirements. OEM users are encouraged to inform end users of this restriction as well.

### *Modifications (FCC 15.21)*

Changes or modifications to this equipment not expressly approved by Digi may void the user's authority to operate this equipment.

### *Industry Canada*

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.

Le present appareil numerique n'emet pas de bruits radioelectriques depassant les limites applicables aux appareils numeriques de la class B prescrites dans le Reglement sur le brouillage radioelectrique edicte par le ministere des Communications du Canada.

The maximum antenna gain permitted in the band 5150-5250MHz to comply with the e.i.r.p limit is, according to RSS-210 section A9.2(2)

- 50mW conducted power
- 200mW max EIRP

The maximum antenna gain permitted in the bands 5250-5350 MHz and 5470-5725 MHz to comply with the e.i.r.p limit is, according to RSS-210 section A9.2(2)

- 250mW conducted power
- 1.0W max EIRP

This limit is met with the highest gain antenna listed, antenna factor AN1003.

The maximum antenna gain permitted in the band 5725-5825 MHz to comply with the e.i.r.p limit specified for non point-to-point operation is, according to RSS-210 section A9.2(3):

- 1W conducted power
- 4.0W max EIRP

This limit is met with the highest gain antenna listed, antenna factor AN1003.

OEM installers and users are cautioned to take note that high-power radars are allocated as primary users (meaning they have priority) of the bands 5250-5330 MHz and 5650-5850 MHz and these radars could cause interference and /or damage to devices operating in these frequency bands.