



# MWF220H RF Module User Manual

V1.1

# Content

- Preface .....3**
- RF Module Overview .....10**
  - Introduction.....10**
  - RF module form factor .....10**
  - Mini PCIe pin definition .....11**
  - System block diagram .....12**
- Installation.....13**
- Product specification .....14**
- Antenna specifications.....15**
- Note: .....16**

# Preface

This manual is for WLAN service providers or network administrators to set up a network environment using the IWF series Product line. It contains step-by-step procedures and graphic examples to guide MIS staff or individuals with slight network system knowledge to complete the installation.

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## Acknowledgements

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## Regulatory Compliance Statements

This section provides the FCC compliance statement for Class B devices and describes how to keep the system CE compliant.

## Declaration of Conformity

### Federal Communication Commission Interference Statement

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 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.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

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.

**IMPORTANT NOTE:**

**Radiation Exposure Statement:**

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Country Code selection feature to be disabled for products marketed to the US/CANADA

Operation of this device is restricted to indoor use only

**This device is intended only for OEM integrators under the following conditions:**

The antenna must be installed such that 20 cm is maintained between the antenna and users, and

The transmitter module may not be co-located with any other transmitter or antenna,

For all products market in US, OEM has to limit the operation channels in CH1 to CH11 for 2.4G band by supplied firmware programming tool. OEM shall not supply any tool or info to the end-user regarding to Regulatory Domain change.

As long as 3 conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed

**IMPORTANT NOTE**

In the event that these conditions can not 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 device where the antenna may be installed such that 20 cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following: "Contains FCC ID: YHI-MWF220H".

**Manual Information to the End User**

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module. The end user manual shall include all required regulatory information/warning as show in this manual.

**CE**

The product(s) described in this manual complies with all applicable European Union (CE) directives if it has a CE marking.

For computer systems to remain CE compliant, only CE-compliant parts may be used. Maintaining CE compliance also requires proper cable and cabling techniques.

**RoHS Compliance**



### NEXCOM RoHS Environmental Policy and Status Update

NEXCOM is a global citizen for building the digital infrastructure. We are committed to providing green products and services, which are compliant with European Union RoHS (Restriction on Use of Hazardous Substance in Electronic Equipment) directive 2011/65/EU, to be your trusted green partner and to protect our environment.

RoHS restricts the use of Lead (Pb) < 0.1% or 1,000ppm, Mercury (Hg) < 0.1% or 1,000ppm, Cadmium (Cd) < 0.01% or 100ppm, Hexavalent Chromium (Cr6+) < 0.1% or 1,000ppm, Polybrominated biphenyls (PBB) < 0.1% or 1,000ppm, and Polybrominated diphenyl Ethers (PBDE) < 0.1% or 1,000ppm.

In order to meet the RoHS compliant directives, NEXCOM has established an engineering and manufacturing task force to implement the introduction of green products. The task force will ensure that we follow the standard NEXCOM development procedure and that all the new RoHS components and new manufacturing processes maintain the highest industry quality levels for which NEXCOM are renowned. The model selection criteria will be based on market demand. Vendors and suppliers will ensure that all designed components will be RoHS compliant.

#### **How to recognize NEXCOM RoHS Products?**

For existing products where there are non-RoHS and RoHS versions, the suffix “(LF)” will be added to the compliant product name.

All new product models launched after January 2013 will be RoHS compliant. They will use the usual NEXCOM naming convention.

## **Safety Information**

Before installing and using the device, note the following precautions:

- Read all instructions carefully.
- Do not place the unit on an unstable surface, cart, or stand.
- Follow all warnings and cautions in this manual.
- When replacing parts, ensure that your service technician uses parts specified by the manufacturer.
- Avoid using the system near water, in direct sunlight, or near a heating device.

## **Installation Recommendations**

Ensure you have a stable, clean working environment. Dust and dirt can get into components and cause a malfunction.

Use containers to keep small components separated.

Adequate lighting and proper tools can prevent you from accidentally damaging the internal components.

Most of the procedures that follow require only a few simple tools, including the following:

- A Philips screwdriver
- A flat-tipped screwdriver
- A grounding strap
- An anti-static pad

Using your fingers can disconnect most of the connections. It is recommended that you do not use needle-nose pliers to disconnect connections as these can damage the soft metal or plastic parts of the connectors.

## Safety Precautions

1. Read these safety instructions carefully.
2. Keep this User Manual for later reference.
3. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a stable surface during installation. Dropping it or letting it fall may cause damage.
7. The openings on the enclosure are for air convection to protect the equipment from overheating. **DO NOT COVER THE OPENINGS.**
8. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
9. Place the power cord in a way so that people will not step on it. Do not place anything on top of the power cord. Use a power cord that has been approved for use with the product and that it matches the voltage and current marked on the product's electrical range label. The voltage and current rating of the cord must be greater than the voltage and current rating marked on the product.
10. All cautions and warnings on the equipment should be noted.
11. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
12. Never pour any liquid into an opening. This may cause fire or electrical shock.
13. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
14. If one of the following situations arises, get the equipment checked by service personnel:
  - a. The power cord or plug is damaged.
  - b. Liquid has penetrated into the equipment.
  - c. The equipment has been exposed to moisture.
  - d. The equipment does not work well, or you cannot get it to work according to the user's manual.
  - e. The equipment has been dropped and damaged.
  - f. The equipment has obvious signs of breakage.
15. Do not place heavy objects on the equipment.

16. CAUTION: DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE RECOMMENDED BY THE MANUFACTURER. DISCARD USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.

## Technical Support and Assistance

1. For the most updated information of NEXCOM products, visit NEXCOM's website at [www.nexcom.com](http://www.nexcom.com).
2. For technical issues that require contacting our technical support team or sales representative, please have the following information ready before calling:
  - Product name and serial number
  - Detailed information of the peripheral devices
  - Detailed information of the installed software (operating system, version, application software, etc.)
  - A complete description of the problem
  - The exact wordings of the error messages

## Warnings

Read and adhere to all warnings, cautions, and notices in this guide and the documentation supplied with the chassis, power supply, and accessory modules. If the instructions for the chassis and power supply are inconsistent with these instructions or the instructions for accessory modules, contact the supplier to find out how you can ensure that your computer meets safety and regulatory requirements.

1. Handling the unit: carry the unit with both hands and handle it with care.
2. Opening the enclosure: disconnect power before working on the unit to prevent electrical shocks.
3. Maintenance: to keep the unit clean, use only approved cleaning products or clean with a dry cloth.

## Cautions

Electrostatic discharge (ESD) can damage system components. Do the described procedures only at an ESD workstation.

If no such station is available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to a metal part of the computer chassis.

## Conventions Used in this Manual





**Warning:** Information about certain situations, which if not observed, can cause personal injury. This will prevent injury to yourself when performing a task.



**Caution:** Information to avoid damaging components or losing data.



**Note:** Provides additional information to complete a task easily.

# RF Module Overview

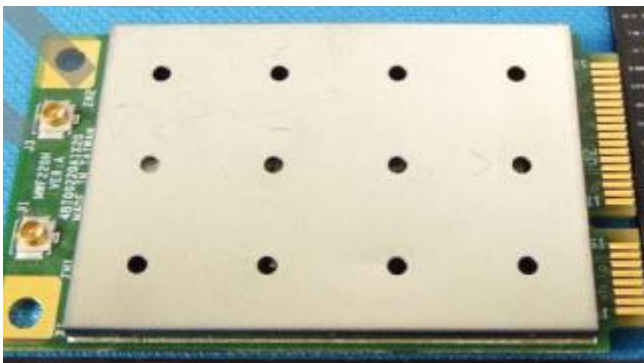
## Introduction

The MWF220H RF module is designed for the user to implement cost effective solution to industrial wireless high power network products. The standard mPCI-e form factor makes it easy to install and fix in the embedded board.

### Key Features:

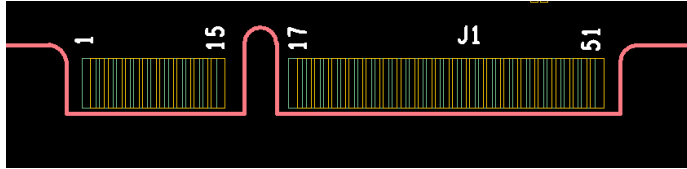
- Qualcomm Atheros RF chip
- Standard full size mPCIe interface
- High Power up to 24dBm.

## RF module form factor



# Mini PCIe pin definition

## Logical symbol of RF module

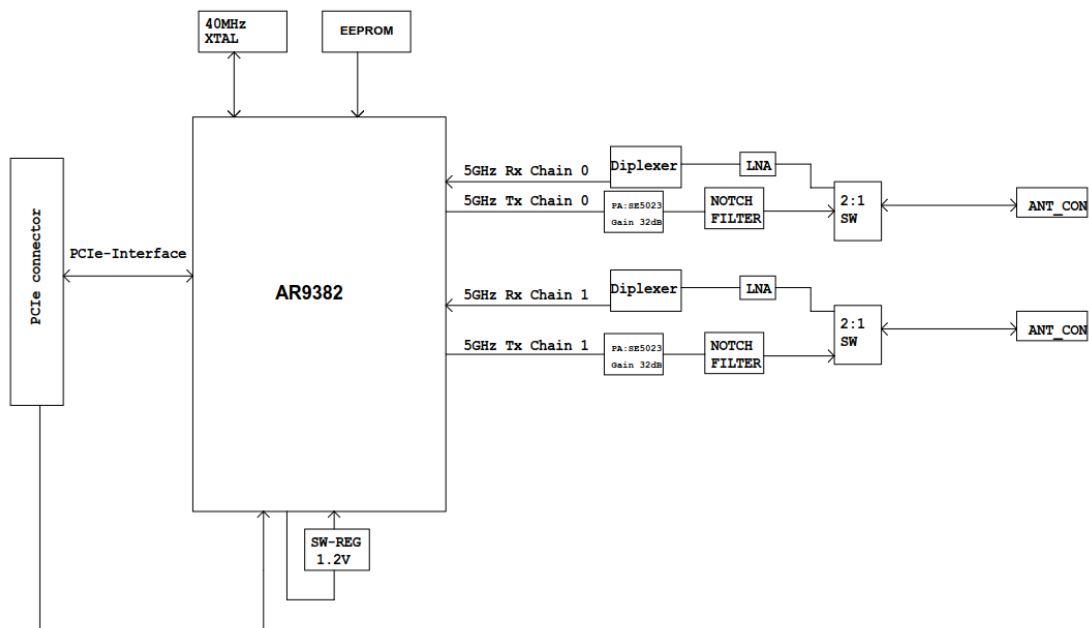


## Pin description

PIN	Definition	PIN	Definition
1	WAKE_L	2	3.3V
3	RESERVED	4	GND
5	RESERVED	6	NC
7	CLKREQ_L	8	NC
9	GND	10	NC
11	REFCLK-	12	NC
13	REFCLK+	14	NC
15	GND	16	NC
17	NC	18	GND
19	NC	20	W_DISABLE_L
21	GND	22	PERST_L
23	PERn0	24	3.3VAUX
25	PERp0	26	GND
27	GND	28	NC
29	GND	30	NC
31	PETn0	32	NC
33	PETp0	34	GND
35	GND	36	USB_D-
37	NC	38	USB_D+
39	3.3V	40	NC
41	3.3V	42	NC
43	GND	44	LED_WLAN_L
45	RESERVED	46	NC
47	RESERVED	48	NC
49	5V	50	GND

51	5V	52	3.3V
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## System block diagram



# Installation

The installation of RF module is very easy. Just follow the steps below and you can complete the installation:

Insert the radio module into mini PCIe slot in the PCBA.

Screw up to fasten the module tightly inside PCBA.

**Note: The mini PCIe pin definition is different from standard mini PCIe module in other Wi-Fi application. The embedded PCBA should follow the mini PCIe pin definition to design the pin assignment to connect this radio module.**



# Product specification

<b>Main Chip</b>	QCA9382 Dual-Band 2 x 2 MIMO 802.11 an WLAN Single chip
<b>Memory</b>	M24C32-FMC6TG, 32K, SOP-8, EEPROM
<b>Crystal</b>	XTAL,SMD,40MHz,4pin,21ppm,3.2X2.5MM
<b>PA</b>	SE5023L, 5 GHz, 26dBm Power Amplifier with Power Detector
<b>Power Supply</b>	DC 5V&3.3V (5V used to external PA)
<b>MIMO</b>	5GHz, 2T2R
<b>I/O interface</b>	mPCI-E
<b>Temperature spec</b>	-20~+80
<b>PCB Size</b>	30x50.8mm
<b>Output Power</b>	21dBm@MCS15
<b>Power consumption</b>	Max 9.6W

## RF output power : IEEE 802.11a/n

- a. IEEE802.11a
  1. 27dBm@6M
  2. 24dBm@54M
- b. IEEE802.11a/n HT20
  1. 27dBm@MCS0
  2. 24dBm@MCS7
- c. IEEE802.11a/n HT40
  1. 26dBm@MCS0
  2. 23dBm@MCS7

## Receive Sensitivity : IEEE 802.11a/n

- a. IEEE802.11a
  1. -95dBm@6M
  2. -80dBm@54M
- b. IEEE802.11a/n HT20
  1. -95dBm@MCS0
  2. -76dBm@MCS7
- c. IEEE802.11a/n HT40
  1. -92dBm@MCS0
  2. -75dBm@MCS7

# Antenna specifications

## Dual-Band Omni-Directional Antenna for 2400 – 2500 / 5150 - 5875 MHz

Version 1

### NEX04-22008A

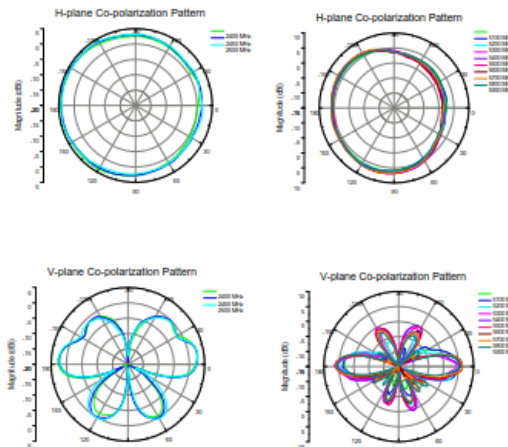
#### Electrical Specification

Frequency range	2400 - 2500 MHz	5150 - 5875 MHz
Peak Gain	4.5 dBi	7.0 dBi
Average Gain	2.5 dBi	5.0 dBi
VSWR	2.0 : 1 (Max.)	
Polarization	Linear, vertical	
HPBW/horizontal	360°	360°
HPBW/vertical	30°	20°
Power handling	2 W (cw)	
Impedance	50 Ohm	
Connector	Reverse N-Type	



#### Environmental & Mechanical Characteristics

Survival wind speed	216 km/hr
Temperature	-40°C to +80°C
Humidity	95% @55°C
Radome color	Gray
Radome material	ABS
Weight	70 g
Dimensions	φ 22 x 183 mm
Waterproof	IP-X7



## Note:

- i. **The module is limited to installation in mobile or fixed applications, according to Part 2.1091(b).**
- ii. **Separate approval is required for all other operating configurations, including portable configurations with respect to Part 2.1093 and different antenna configurations.**