802.11n Wireless LAN Dual band mPCI Module

Model: MtW_mPCI_DB_003

Revision 1.0

Legal Notice

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Revision History

Table 1: Revision History of this Document

Revision	Notes
1.0	Initial release of this Data sheet.

1. 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.

For product available in the USA/Canada market, only channel 1~11 can be operated. Selection of other channels is not possible.

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

This device is going to be operated in 5.15~5.25GHz frequency range, it is restricted in indoor environment only.

IMPORTANT NOTE:
FCC 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.

IMPORTANT NOTE:
This module is intended for OEM integrator. The OEM integrator is still responsible for the FCC compliance requirement of the end product, which integrates this module.

20cm minimum distance has to be able to be maintained between the antenna and the users for the host this module is integrated into. Under such configuration, the FCC radiation exposure limits set forth for an population/uncontrolled environment can be satisfied.

Any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.

USERS MANUAL OF THE END PRODUCT:
In the users manual of the end product, the end user has to be informed to keep at least 20cm separation with the antenna while this end product is installed and operated. The end user has to be informed that the FCC radio-frequency exposure guidelines for an uncontrolled environment can be satisfied. The end user has to also be informed that any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment. If the size of the end product is smaller than 8x10cm, then additional FCC part 15.19 statement is required to be available in the users manual: 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.

LABEL OF THE END PRODUCT:
The final end product must be labeled in a visible area with the following " Contains TX FCC ID: VT6-250DB ". If the size of the end product is larger than 8x10cm, then the following FCC part 15.19 statement has to also be available on the label: 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.

2. General Description

The MTW_MPCI_DB_003 is a highly integrated wireless LAN transceiver module that complies to the 802.11n (Draft 2.0) legacy mode. As such it operates in the 2.4GHz as well as in the 5GHz frequency range. Backwards compatibility to today's established modes 802.11a/b/g is guaranteed.

Separated into function blocks, the form factor and the electrical interface comply to the Mini-PCI interface standard (mPCI type IIIB).

The following function blocks are included:

- Power Management Unit (PMU); converts the power supply from the mPCI interface to the internally required supply voltages
- MAC / Baseband (BB); baseband controller for 802.11n and 802.11 a/b/g with mPCI interface
- PHY / Radio-IC (Radio); data conversion from baseband to RF with MiMo interface and channel selection
- RF-frontend (RF-FE); features 2 x 3 MiMo with low noise, high linearity RF-power amplifiers and switches

The MTW_MPCI_DB_003 module can be used in following application areas:

- Digital STB, IP STB, PVR, DVR, DMA
- HD TV
- Digital Media Server
- Residential Gateway, AP, Wireless A/V Extensions, Video Distribution Systems
- Game Consoles

3. Features

- Chipset Metalink WLANPlus MtW8151 / MtW8171
- 2x3 MIMO, 2 transceivers 3 receivers
- 20 MHz/40 MHz bandwidth support
- PHY rates up to 300 Mbps
- Sweet spot optimization of throughput: 60feet / 60Mbps
- Network Standards :
    - 802.11n draft 2.0
    - 802.11a/b/g
- Modulation modes:
    - OFDM with BPSK, QPSK, 16QAM and 64QAM
    - DBPSK, DQPSK, CCK
- FEC:
    - Convolution code, Advance coding (LDPC)
- QoS:
    - 802.11e compliant
    - EDCA w/admission control
    - DLS (Direct Link Set-up)
    - Fast link adaptation
- Security
    - 802.11i compliant
    - 64/128-bit key WEP, AES, TKIP, WPA, WPA2
- 802.11h – For Dynamic Frequency Selection (DFS) and Transmit Power Control (TPC)
- Antenna Interface connector 3 x U.FL
- Communication Interface Mini PCI 3B
- Dimensions: 44 x 59.75 x 4 mm
- Lead-free RoHS compliant
- Software
    - Linux device driver – Linux 2.4
    - Linux device driver – Linux 2.6
    - Firmware

4. Specifications

4.1 Maximum ratings

Characteristics	Symbol	Min	Typ	Max	Units
Supply voltage (I/O)	VDD 3.3V			3.6	V
Input voltage to digital pins	Vin	-0.3		VDD 3.3V+0.2	V
Operational temperature	Ta	0		+50	ºC
Storage temperature	Ts	-25		+85	ºC
Relative humidity	Rh			85	%

Table 2: Maximum ratings

4.2 DC Characteristics

The following table is defined in typical conditions: Ta=25ºC, unless otherwise specified.

Characteristics	Symbol	Min	Typ	Max	Units
Supply voltage	VDD 3.3V	3.135	3.3	3.465	V
Current consumption RX	ICCRX			710 (1)	mA
Current consumption TX	ICCTX			1030 (2)	mA

Table 3: DC characteristics

(1) Conditions: channel 100 (5500Mhz), 54Mbps, RX level=-50dbm, 3 antennas

(2) Conditions: channel 100 (5500Mhz), 54Mbps, TX power=18.5dbm, 2 antennas

4.3 Radio specifications

Characteristics	Min	Typ	Max	Units
Operating frequency range for 2.4GHz band	2.4		2.485	GHz
Operating frequency range for 5GHz band	5.15		5.85	GHz
IEEE 802.11a supported data rates	6		54	Mbps
IEEE 802.11b supported data rates	1		11	Mbps
IEEE 802.11g supported data rates	6		54	Mbps
IEEE 802.11n draft supported data rates	6.5		300	Mbps
RF Connector Impedance		50		ohm
5G band Output Power (Per Antenna @ -25dB EVM):				
802.11a		18		dbm
802.11n HT40		18		dbm
5G band Receive Sensitivity (PER < 10%):				
802.11a 64QAM 3/4		-72		dbm
802.11n HT40, 64QAM 2/3		-68		dbm
802.11n HT20, 64QAM 2/3		-71		dbm
802.11n HT40, BPSK ½		-83		dbm
802.11n HT20, BPSK ½		-85		dbm
2.4G band Output Power (Per Antenna @ -25dB EVM):				
802.11b		20		dbm
802.11g		20		dbm
802.11n HT40		20		dbm
2.4G band Receive Sensitivity (PER < 10%):				
802.11b 11M		-85		dbm
802.11g 64QAM 3/4		-72		dbm
802.11n HT40, 64QAM 2/3		-68		dbm

Characteristics	Min	Typ	Max	Units
802.11n HT20, 64QAM 2/3		-72		dbm
802.11n HT40, BPSK ½		-83		dbm
802.11n HT20, BPSK ½		-86		dbm

Table 4: Radio specifications

5. Mechanical Data

5.1 Mechanical outline and dimensions

The module is designed to fit mini PCI TYPE IIIB mechanics.

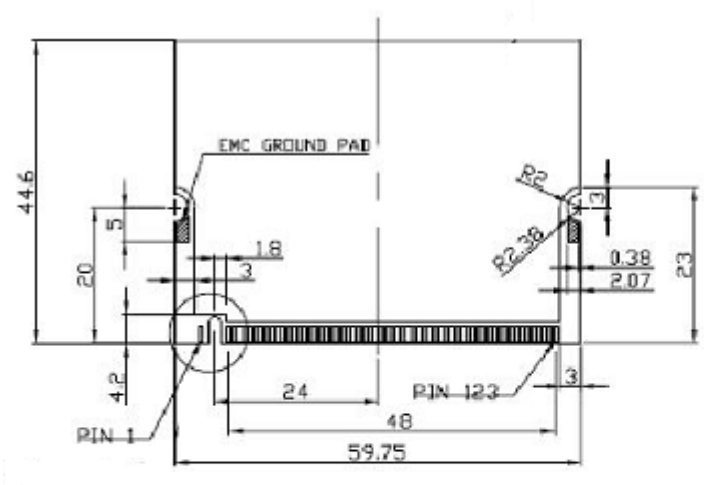

Figure 1: Mechanical outline

5.2 Mounting the module board

1. After confirming that the front and backside of module boards are correct, insert the module board at an angle of 20° to 30° into the innermost part of the connector.
2. Pushing down the module board downwards, when load is kept applied, the latches at both sides will be turned on. The total mating force should not exceed 51.5 N.
3. If the module board is held by the latches and does not get up, mounting will finish.

Be sure to confirm that latches at both sides are turned on correctly e.g. half fitting.

Board removal is done as follows:

1. Move both sides of Latch simultaneously in the outward direction from the module.
2. When the lock is released, the board will tilt approximately 25° in angle to the connector. The board must be pulled out straight and softly in the angle direction.

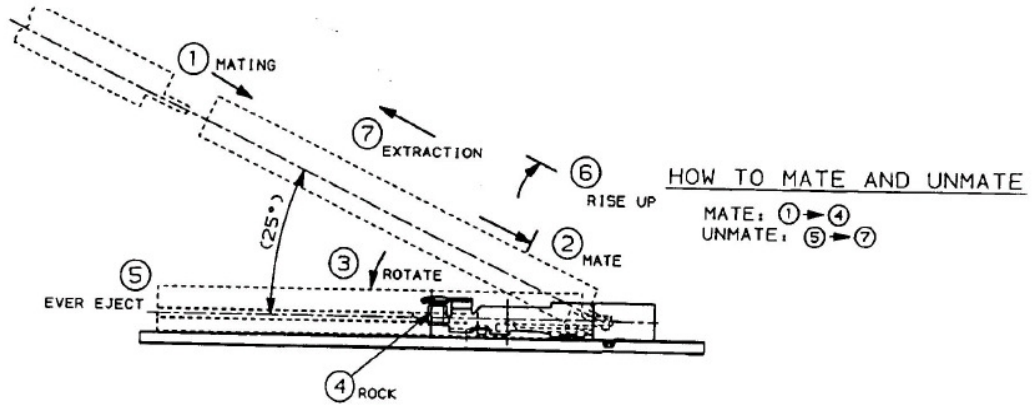

Figure 2: Module mountin