User Manual

WDF210M

802.11b/g/n WLAN Module

Revision History

0.1 2013-10-18 Created

1. General Descriptions

WDF210M is a Wi-Fi module compliant with IEEE802.11 b.g.n MAC/baseband/radio optimized for low-power applications. The core chipset is from Mediatek, part number MT7601U.

The MT7601U is a highly integrated Wi-Fi single chip which supports 150 Mbps PHY rate. It fully complies with IEEE 802.11n and IEEE 802.11 b/g standards, offering feature-rich wireless connectivity at high standards, and delivering reliable, cost-effective throughput from an extended distance.

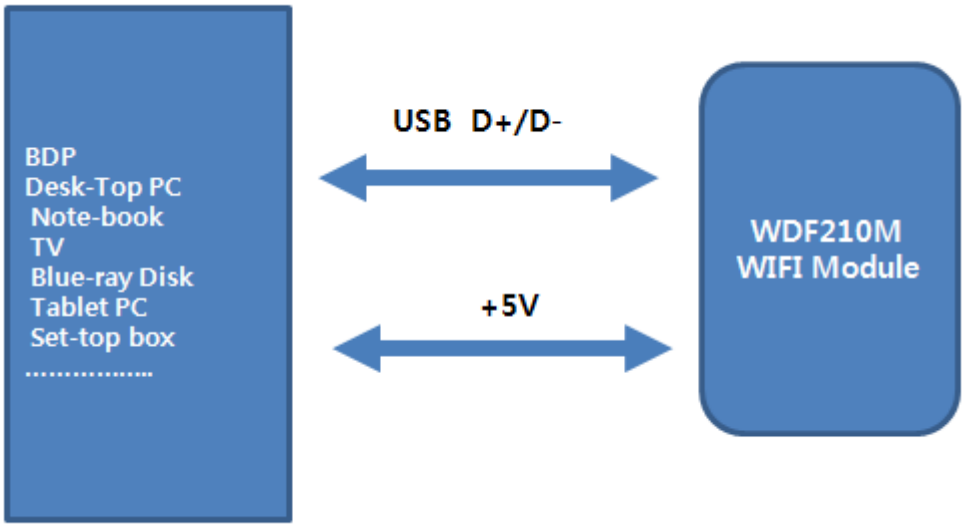
Optimized RF architecture and baseband algorithms provide superb performance and low power consumption. Intelligent MAC design deploys a high efficient DMA engine and hardware data processing accelerators which offloads the host processor.

The WDF210M is designed to support standard based features in the areas of security, quality of service and international regulations, giving end users the greatest performance any time and in any circumstance.

2. Features

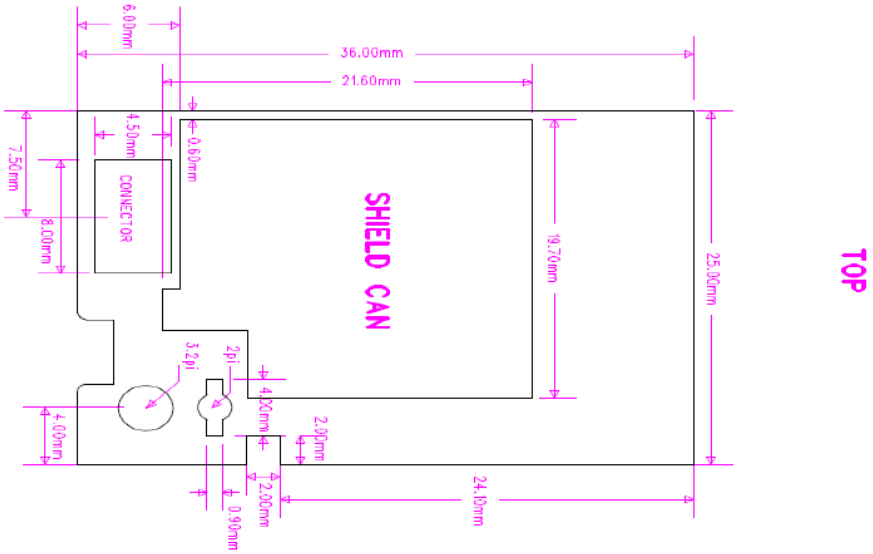
_ IEEE 802.11 b/g/n client
_ Embedded high-performance 32-bit RISC microprocessor
_ Highly integrated RF with 55nm CMOS technology
_ 1T1R mode with support of 150Mbps PHY rate
_ Integrate high efficiency switching regulator
_ Best-in-class power consumption performance
_ Compact 5mm x 5mm QFN40L package
_ 1/2/3/4-wire PTA Wi-Fi / Bluetooth coexistence support
_ 802.11 d/h/k compliant
_ Security support for WFA WPA/WPA2 personal, WPS2.0, WAPI
_ Supports 802.11w protected managed frames
_ QoS support of WFA WMM, WMM PS
_ Supports Wi-Fi Direct
_ Fully compliance with USB v2.0 High-speed mode
_ Per packet transmit power control
_ Antenna diversity

3. Applications



4 Dimension and Pin Assignments

4.1 Mechanical Dimension



4.2 Pin Assignments

Terminal	Name	Interface	I/O	Description
1	GND	Analog		Ground
2	USB D-	Digital	I/O	USB Interface negative
3	USB D+	Digital	I/O	USB Interface positive
4	VCC	Analog	I	+5V Power supply input
5	RESET	Digital	I	Reset From Host

5. Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
VCC	Power supply voltage	6.0	V
RFIN	Input RF level	0	dBm
Temp	Operating	-10 to 60	℃
TSTG	Storage Temperature	-40 to 85	℃

6. DC Characteristics

Symbol	Parameter	Min	Typ.	Max	Unit
VCC_IN	Input Power supply	4.5	5	5.5	V
VCC_3.3	3.3V Supply Voltage	2.97	3.3	3.63	V
VCC_1.5	1.5V Supply Voltage	1.425	1.5	1.575	V
VCC_1.2	1.2V Supply Voltage	1.14	1.2	1.26	V

7. Electrical Specification

Parameter		Min	Typ.	Max	Unit
Normal Condition					
11b	Tx mode, Cont.Tx@11M	-	147	-	mA
	Rx mode	-	86	-	mA
11g	Tx mode, Cont.Tx@54M	-	141	-	mA
	Rx mode	-	86	-	mA
11n	Tx mode, Cont.Tx@HT20 MCS7	-	141	-	mA
	Rx mode	-	86	-	mA

8.RF Specification

All measurements are made under nominal power supply and room temperature 25 ℃ unless specified.
RF specification of SPW-B4319S was defined according to 802.11b/g mandatory

8.1 Supportable Modulation Scheme & Data Rates

	Spacing	Rate	Data rates (Mbps)
802.11n OFDM	20MHz	MCS0	6.5
		MCS1	13
		MCS2	19.5
		MCS3	26
		MCS4	39
		MCS5	52
		MCS6	58.5
		MCS7	65
	40MHz	MCS0	15
		MCS1	30
		MCS2	45
		MCS3	60
		MCS4	90
		MCS5	120
		MCS6	135
		MCS7	150

	Modulation	Coding rate	Data rates (Mbps)
802.11g OFDM	BPSK	1/2	6
	BPSK	3/4	9
	QPSK	1/2	12
	QPSK	3/4	18
	16-QAM	1/2	24
	16-QAM	3/4	36
	64-QAM	1/2	48
	64-QAM	3/4	54
802.11b	DBPSK	NA	1
	DQPSK	NA	2
	CCK	NA	5.5
		NA	11

8.2 RF Specification

8.2.1. Receiver

Parameter	Conditions	Min	Typ.	Max	Unit
Minimum Receiver Sensitivity in 802.11b mode					
1Mbps	PER<8%, Packet size = 1024bytes	-	-	-80	dBm
2Mbps		-	-	-80	dBm
5.5Mbps		-	-	-76	dBm
11Mbps		-	-88	-76	dBm
Minimum Receiver Sensitivity in 802.11g mode					
6Mbps	PER<10%, Packet size = 1024bytes	-	-	-82	dBm
9Mbps		-	-	-81	dBm
12Mbps		-	-	-79	dBm
18Mbps		-	-	-77	dBm
24Mbps		-	-	-74	dBm
36Mbps		-	-	-70	dBm
48Mbps		-	-	-66	dBm
54Mbps		-	-75	-65	dBm
Minimum Receiver Sensitivity in 802.11n mode					
HT20, MCS7, 1stream, 1Tx, 1Rx	PER<10%	-	-74	-64	dBm
HT40, MCS7, 1stream, 1Tx, 1Rx			-71	-61	dBm

8.2.2. Transmitter

Parameter	Conditions	Min	Typ.	Max	Unit
Output Power in 802.11b mode					
1~11Mbps	As specified in IEEE802.11	-	15.5	-	dBm
Output Power in 802.11g mode					
6Mbps, 9Mbps, 12Mbps, 18Mbps	As specified in IEEE802.11	-	15.5	-	dBm
24Mbps, 36Mbps		-	15	-	dBm
48Mbps, 54Mbps		-	13	-	dBm
Output Power in 802.11n mode					
MCS0-3	As specified in IEEE802.11	-	14	-	dBm
MCS4-5		-	14	-	dBm
MCS6-7		-	13	-	dBm
Spectrum mask					
Margin to 802.11b mode	Maximum output power	0	-	-	dBr
Margin to 802.11g mode		0	-	-	dBr
Margin to 802.11n mode		0	-	-	dBr

9. Notice

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

(1) This device may not cause harmful interference, and
(2) This device must accept any interference received including interference that cause undesired operation.

This equipment has been tested and found to comply within 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 different circuit from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help.

The transmitter must not be co-located or operated in conjunction wit any other antenna or transmitter.
The available scientific evidence does not show that any health problems are associated with using low power wireless devices. There is no proof, however, that these low power wireless devices are absolutely safe. Low power wireless devices emit low levels of radio frequency energy (RF) in the microwave range while being used. Whereas high levels of RF can produce health effects (by heating tissue), exposure to low-level RF that does not produce heating effects causes no known adverse health effects. Many studies of low-level RF exposures have not found any biological effects. Some studies have suggested that some biological effects might occur, but such findings have not been confirmed by additional research.
To satisfy RF exposure requirements, this device and its antenna(s) must operate with a separation distance of at least 20 centimeters from all persons and must not be co-located or operated in conjunction with any other antenna or transmitter. End-users must be provided with specific operating instructions for satisfying RF exposure.

FCC WARNING:

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le present appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisee aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioelectrique subi, meme si le brouillage est susceptible d'en compromettre le fonctionnement.

* Information for OEM integrator

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 manual of the end product.
The user manual which is provided by OEM integrators for end users must include the following information in a prominent location.
"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 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. "
Label for end product must include "Contains FCC ID: A3LWDF210M, **IC: 649E-WDF210M"** or "A RF transmitter inside, FCC ID: A3LWDF210M, **IC: 649E-WDF210M** ".

* Information pour les OEM intégrateur

L'intégrateur OEM doit être conscient de ne pas fournir des informations à l'utilisateur final concernant la façon d'installer ou de retirer ce module RF dans le manuel utilisateur du produit final.
Le manuel de l'utilisateur qui est fourni par les intégrateurs OEM pour les utilisateurs finaux doivent inclure les renseignements suivants dans un endroit bien en vue.
«Pour se conformer aux exigences de conformité d'exposition RF de la FCC, l'antenne utilisée pour ce transmetteur doit être installé pour fournir une distance de séparation d'au moins 20 cm de toute personne et ne doit pas être co-localisés ou fonctionnant en conjonction avec une autre antenne ou transmetteur. "
Étiquette pour le produit final doit inclure "Contient FCC ID: A3LWDF210M, IC: 649E-WDF210M" ou "A l'intérieur du transmetteur RF, FCC ID: A3LWDF210M, IC: 649E-WDF210M".