

WM-8710BNSIP WIFI Module Manual

1 General Information

category	WIFI Module
Drawing Number	MW-8710BNSIP
Model	MW-8710BNSIP
Environmental requirements	RoHS, REACH
Number	17164200000522
Electrostatic level	Contact discharge $\pm$ 4KV, Air discharge $\pm$ 8KV
Certification number	FCC ID:2ARD9-501 IC :27775-501

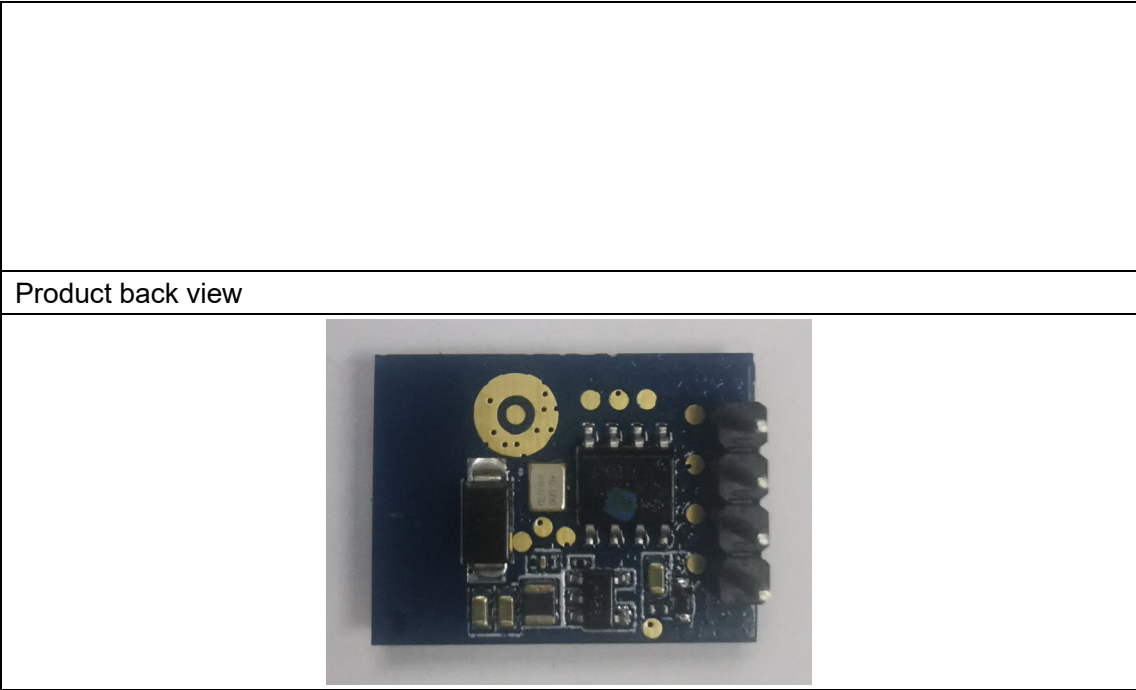
2 Technical information

The scheme is based on RTL8710BN (W302) and uses few peripheral components to realize the conversion from UART to WiFi signal.

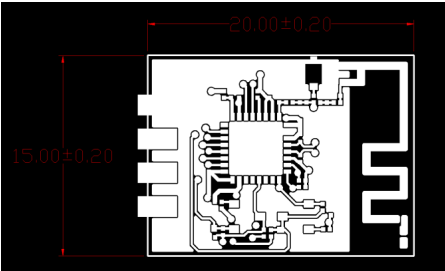
2.1 Appearance

Front view of module





2.2 Dimension



definition	Length	Width	Thickness
dimension (mm)	20	15	1.0
error (mm)	±0.2	±0.2	±0.2
PIN length	3.6mm±0.2mm		

2.3 PIN name

Pin No.	WiFi module pin description
1	VCC: Power supply pin
2	RXD: Signal receiving pin
3	TXD: Signal transmitting pin
4	GND: System ground PIN

2.4 Marking □ 13mm*11mm □



2.5 Parameters

No.	performance parameter	technical requirement	Note
1	MCU	RTL8710BN (W302)	
2	Operating frequency	2412 - 2462 MHz	
3	Supported WiFi standards	802.11b/g/n(1T1R)	
4	modulation mode	802.11b: DSSS (CCK, DQPSK, DBPSK) 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK) 802.11n HT20: OFDM (64QAM, 16QAM, QPSK, BPSK) 802.11n HT40: OFDM (64QAM, 16QAM, QPSK, BPSK)	
5	Supported rate	11b: 1, 2, 5.5 和 11Mbps 11g: 6, 9, 12, 18, 24, 36, 48, 54Mbps 11n: MCS0~7, up to 150Mbps	
6	Communication mode	UART	
7	Number of PCB layers	4-Layers Design	
8	PCB size	20mm (L) x15mm (W) x1.0mm (H)	
9	Crystal oscillator voltage input range	0.1V _{PP} to 1.5V _{PP}	
10	Operating ambient temperature (T _A)	-20℃~85℃	
11	Antenna type	PCB	
12	Operating temperature	-20℃~+85℃	
13	Storage temperature	-40℃~+85℃	
14	working voltage	5.0V+/-5%	

2.6 Description of key parameters

The key parameter of the module is the RF characteristic parameter of the module (the corresponding modulation characteristics of the module under different modulation modes), which represents the communication quality of the module in actual work .

Test method: Measure according to IEEE802.11b/g/n standard.

Electrical specifications

802.11b Mode

Parameters	Specifications
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Specification	IEEE802.11b				
Mode	DSSS / CCK				
Channel	CH1 to CH13				
Data rate	1, 2, 5.5, 11Mbps				
DC Characteristics	Min.	Typ.	Max.	单位	备注
1.DC current (Average) @5.0V input					
1) TX only @17dBm			229	mA	
2) TX throughput mode	-		120	mA	
3) RX throughput mode	-		100	mA	
TX Characteristics	Min.	Typ.	Max.	Unit	
2. Power Levels(Calibrated)					
1) 17dBm Target	15	17	18	dBm	
3. Spectrum Mask @ target power					
1) fc +/-11MHz to +/-22MHz	-	-	-30	dBr	
2) fc > +/-22MHz	-	-	-50	dBr	
4. Frequency Error	-25	0	+25	ppm	
RX Characteristics	Min.	Typ.	Max.	Unit	
5 Minimum Input Level Sensitivity					
1) 1Mbps (FER ≤ 8%)	-	-	-83	dBm	
2) 2Mbps (FER ≤ 8%)	-	-	-80	dBm	
3) 5.5Mbps (FER ≤ 8%)	-	-	-79	dBm	
4) 11Mbps (FER ≤ 8%)	-	-90	-76	dBm	
6 Maximum Input Level (FER ≤ 8%)	-20	-10	1	dBm	

802.11g 模式

Parameters	Specifications				
Specification	IEEE802.11g				
Mode	OFDM				
Channel	CH1 to CH13				
Data rate	6, 9, 12, 18, 24, 36, 48, 54Mbps				
DC Characteristics	Min.	Typ.	Max.	Unit	Remark
1. DC current (Average) @5.0V input					
1) TX only @17dBm	-		270	mA	
2) TX throughput mode	-		120	mA	
3) RX throughput mode	-		100	mA	
TX Characteristics	Min.	Typ.	Max.	Unit	
2. Power Levels					
1) 16dBm Target @6Mbps	14	16	18	dBm	
2) 14dBm Target @54Mbps	12	14	16	dBm	
3. Spectrum Mask @ target power					
1) at fc +/- 11MHz	-	-	-20	dBr	
2) at fc +/- 20MHz	-	-	-28	dBr	
3) at fc > +/-30MHz	-	-	-40	dBr	
4 Constellation Error(EVM)@ target power					

1) 6Mbps	-	-	-5	dB	
2) 9Mbps	-	-	-8	dB	
3) 12Mbps	-	-	-10	dB	
4) 18Mbps	-	-	-13	dB	
5) 24Mbps	-	-	-16	dB	
6) 36Mbps	-	-	-19	dB	
7) 48Mbps	-	-	-22	dB	
8) 54Mbps	-	-30	-25	dB	
5 Frequency Error	-25	0	+25	ppm	
RX Characteristics	Min.	Typ.	Max.	Unit	
6 Minimum Input Level Sensitivity					
1) 6Mbps (PER $\leq$ 10%)	-	-	-85	dBm	
2) 9Mbps (PER $\leq$ 10%)	-	-	-84	dBm	
3) 12Mbps (PER $\leq$ 10%)	-	-	-82	dBm	
4) 18Mbps (PER $\leq$ 10%)	-	-	-80	dBm	
5) 24Mbps (PER $\leq$ 10%)	-	-	-77	dBm	
6) 36Mbps (PER $\leq$ 10%)	-	-	-73	dBm	
7) 48Mbps (PER $\leq$ 10%)	-	-	-69	dBm	
8) 54Mbps (PER $\leq$ 10%)	-	-76	-68	dBm	
7 Maximum Input Level (PER $\leq$ 10%)	-20	-10	1	dBm	

802.11n HT20 模式

项目	规格				
Specification	IEEE802.11n HT20 @ 2.4GHz				
Mode	OFDM				
Channel	CH1 to CH13				
Data rate (MCS index)	MCS0/1/2/3/4/5/6/7				
DC Characteristics	Min.	Typ.	Max.	Unit	Remark
1. DC current (Average) @5.0V input					
1) TX only @ 17dBm Target(each port), (continue Tx MIMO MCS7)	-		229	mA	
2) TX throughput mode	-		120	mA	
3) RX throughput mode	-		100	mA	
TX Characteristics	Min.	Typ.	Max.	Unit	
2. Power Levels					
1) 16dBm Target@MCS0	14	16	18	dBm	
2) 13dBm Target@MCS7	11	13	15	dBm	
3. Spectrum Mask @target power					
1) at fc +/- 11MHz	-	-	-20	dBr	
2) at fc +/- 20MHz	-	-	-28	dBr	
3) at fc > +/-30MHz	-	-	-45	dBr	
4. Constellation Error(EVM)@ target power					
1) MCS0	-	-	-5	dB	
2) MCS1	-	-	-10	dB	

3) MCS2	-	-	-13	dB	
4) MCS3	-	-	-16	dB	
5) MCS4	-	-	-19	dB	
6) MCS5	-	-	-22	dB	
7) MCS6	-	-	-25	dB	
8) MCS7	-	-30	-28	dB	
5. Frequency Error	-25	0	+25	ppm	
RX Characteristics		Min.	Typ.	Max.	Unit
6. Minimum Input Level Sensitivity					
1) MCS0 (PER $\leq$ 10%)	-	-	-85	dBm	
2) MCS1 (PER $\leq$ 10%)	-	-	-82	dBm	
3) MCS2 (PER $\leq$ 10%)	-	-	-80	dBm	
4) MCS3 (PER $\leq$ 10%)	-	-	-77	dBm	
5) MCS4 (PER $\leq$ 10%)	-	-	-73	dBm	
6) MCS5 (PER $\leq$ 10%)	-	-	-69	dBm	
7) MCS6 (PER $\leq$ 10%)	-	-	-68	dBm	
8) MCS7 (PER $\leq$ 10%)	-	-73	-67	dBm	
7. Maximum Input Level (PER $\leq$ 10%)	-20	-10	1	dBm	

802.11n HT40 模式

Parameters		Specifications				
Specification		IEEE802.11n HT40 @ 2.4GHz				
Mode		OFDM				
Channel		CH3 to CH11				
Data rate (MCS index)		MCS0/1/2/3/4/5/6/7				
DC Characteristics		Min.	Typ.	Max.	Unit	Remark
1. DC current (Average) @5.0V input						
1) TX only @ 14dBm Target		-		220	mA	
2) TX throughput mode		-		120	mA	
3) RX throughput mode		-		100	mA	
TX Characteristics		Min.	Typ.	Max.	Unit	
2. Power Levels						
1) 14dBm Target@MCS0		12	14	16	dBm	
2) 12dBm Target@MCS7		10	12	14	dBm	
3. Spectrum Mask @target power						
1) at fc +/- 11MHz		-	-	-20	dBr	
2) at fc +/- 20MHz		-	-	-28	dBr	
3) at fc > +/-30MHz		-	-	-45	dBr	
4. Constellation Error(EVM)@ target power						
1) MCS0		-	-	-5	dB	
2) MCS1		-	-	-10	dB	
3) MCS2		-	-	-13	dB	
4) MCS3		-	-	-16	dB	

5) MCS4	-	-	-19	dB	
6) MCS5	-	-	-22	dB	
7) MCS6	-	-	-25	dB	
8) MCS7	-	-30	-28	dB	
5. Frequency Error	-25	0	+25	ppm	
RX Characteristics	Min.	Typ.	Max.	Unit	
6. Minimum Input Level Sensitivity					
1) MCS0 (PER $\leq$ 10%)	-	-	-85	dBm	
2) MCS1 (PER $\leq$ 10%)	-	-	-82	dBm	
3) MCS2 (PER $\leq$ 10%)	-	-	-80	dBm	
4) MCS3 (PER $\leq$ 10%)	-	-	-77	dBm	
5) MCS4 (PER $\leq$ 10%)	-	-	-73	dBm	
6) MCS5 (PER $\leq$ 10%)	-	-	-69	dBm	
7) MCS6 (PER $\leq$ 10%)	-	-	-68	dBm	
8) MCS7 (PER $\leq$ 10%)	-	-70	-62	dBm	
7. Maximum Input Level (PER $\leq$ 10%)	-20	-10	1	dBm	

FCC 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 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.

This equipment 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.

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

Please notice that if the FCC identification number is not visible when the module is 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. This exterior label can use wording such as the following: "Contains FCC ID: 2ARD9-501" any similar wording that expresses the same meaning may be used.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20cm between the radiator & your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

The device must be professionally installed

The intended use is generally not for the general public. It is generally for industry/commercial use.

The connector is within the transmitter enclosure and can only be accessed by disassembly of the transmitter that is not normally required. the user has no access to the connector.

Installation must be controlled. Installation requires special training

The module is limited to OEM installation ONLY.

The OEM integrator is responsible for ensuring that the end-user has no manual instruction to remove or install module.

The module is limited to installation in mobile application.

A separate approval is required for all other operating configurations, including portable configurations with respect to Part 2.1093 and difference antenna configurations.

There is requirement that the grantee provide guidance to the host manufacturer for compliance with Part 15B requirements.

The module complies with FCC Part 15.247 and apply for Single module approval.

Antenna type: PCB antenna

Antenna Gain: 2dBi

Canada Statement

This device complies with Industry Canada's licence-exempt RSSs. 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 présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

- (1) l'appareil ne doit pas produire de brouillage;
- (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le

brouillage est susceptible d'en compromettre le fonctionnement.

Please notice that if the ISED certification number is not visible when the module is 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. This exterior label can use wording such as the following: "Contains IC: 27775-501" any similar wording that expresses the same meaning may be used.

l'appareil hôte doit porter une étiquette donnant le numéro de certification du module d'Industrie Canada, précédé des mots « Contient un module d'émission », du mot « IC: 27775-501 » ou d'une formulation similaire exprimant le même sens, comme suit

The device meets the exemption from the routine evaluation limits in section 2.5 of RSS 102 and compliance with RSS-102 RF exposure, users can obtain Canadian information on RF exposure and compliance.

Le dispositif rencontre l'exemption des limites courantes d'évaluation dans la section 2.5 de RSS 102 et la conformité à l'exposition de RSS-102 RF, utilisateurs peut obtenir l'information canadienne sur l'exposition et la conformité de rf.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.

Cet émetteur ne doit pas être Co-placé ou ne fonctionnant en même temps qu'aucune autre antenne ou émetteur. Cet équipement devrait être installé et actionné avec une distance minimum de 20 centimètres entre le radiateur et votre corps.

Notice to OEM integrator

Must use the device only in host devices that meet the FCC/ISED RF exposure category of mobile, which means the device is installed and used at distances of at least 20cm from persons. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. The end user manual shall include FCC Part 15 /ISED RSS GEN compliance statements related to the transmitter as show in this manual(FCC/ICanada statement). Host manufacturer is responsible for compliance of the host system with module installed with all other applicable requirements for the system such as Part 15 B, ICES 003. Host manufacturer is strongly recommended to confirm compliance with FCC/ISED requirements for the transmitter when the module is installed in the host. The use condition limitations extend to professional users, then instructions must state that this information also extends to the host manufacturer's instruction manual. This module is stand-alone modular. If the end product will involve the Multiple simultaneously transmitting condition or different operational conditions for a stand-alone modular transmitter in a host, host manufacturer have to consult with module manufacturer for the installation method in end system. Any company of the host device which install this modular should perform the test of radiated & conducted emission and spurious

emission etc. according to FCC Part 15C: 15.247 and 15.209 & 15.207, 15B class B requirement, only if the test result comply with FCC part 15C: 15.247 and 15.209 & 15.207, 15B class B requirement. Then the host can be sold legally. This modular transmitter is only FCC authorized for the specific rule parts (47CFR Part 15.247) listed on the grant, and that the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. Host manufacturer is strongly recommended to confirm compliance with FCC/ISED requirements for the transmitter when the module is installed in the host. Must have on the host device a label showing contains FCC ID: 2ARD9-501, IC: 27775-501

l'hôte doit utiliser l'instrument uniquement dans des dispositifs qui répondent à la fcc / (catégorie d'exposition rf mobile, ce qui signifie le dispositif est installé et utilisé à une distance d'au moins 20 cm de personnes. le manuel de l'utilisateur final doit inclure la partie 15 / (fac rss gen déclarations de conformité relatives à l'émetteur que de montrer dans ce manuel. le fabricant est responsable de la conformité de l'hôte, le système d'accueil avec le module installé avec toutes les autres exigences applicables du système comme la partie 15 b, ices - 003. accueillir le fabricant est fortement recommandé de confirmer la conformité avec les exigences de la fcc / (émetteur lorsque le module est installé dans l'hôte. le dispositif d'accueil doivent avoir une étiquette indiquant contient FCC ID: 2ARD9-501, IC: 27775-501