



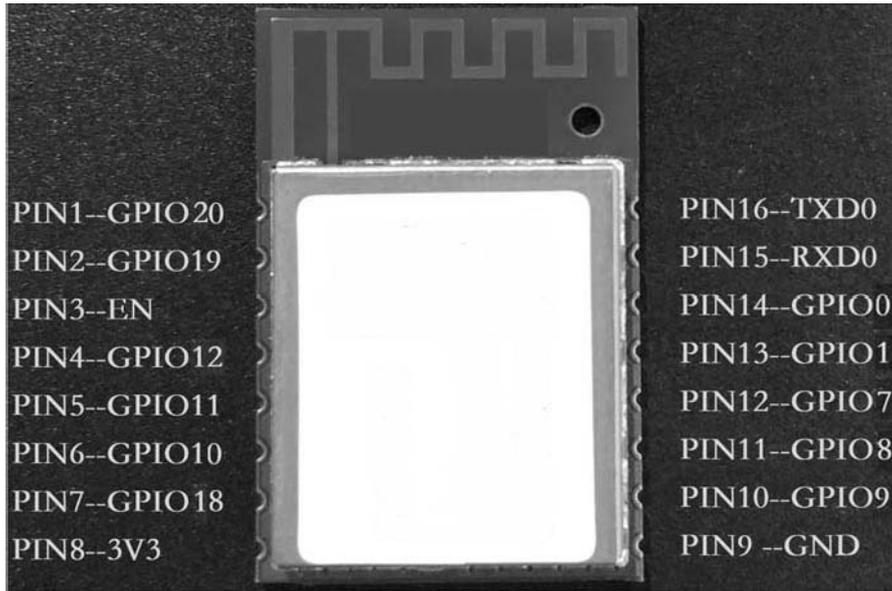
MWA6S WiFi Module Spec Manual

Version: 1.0

1. MWA6S Module Introduction

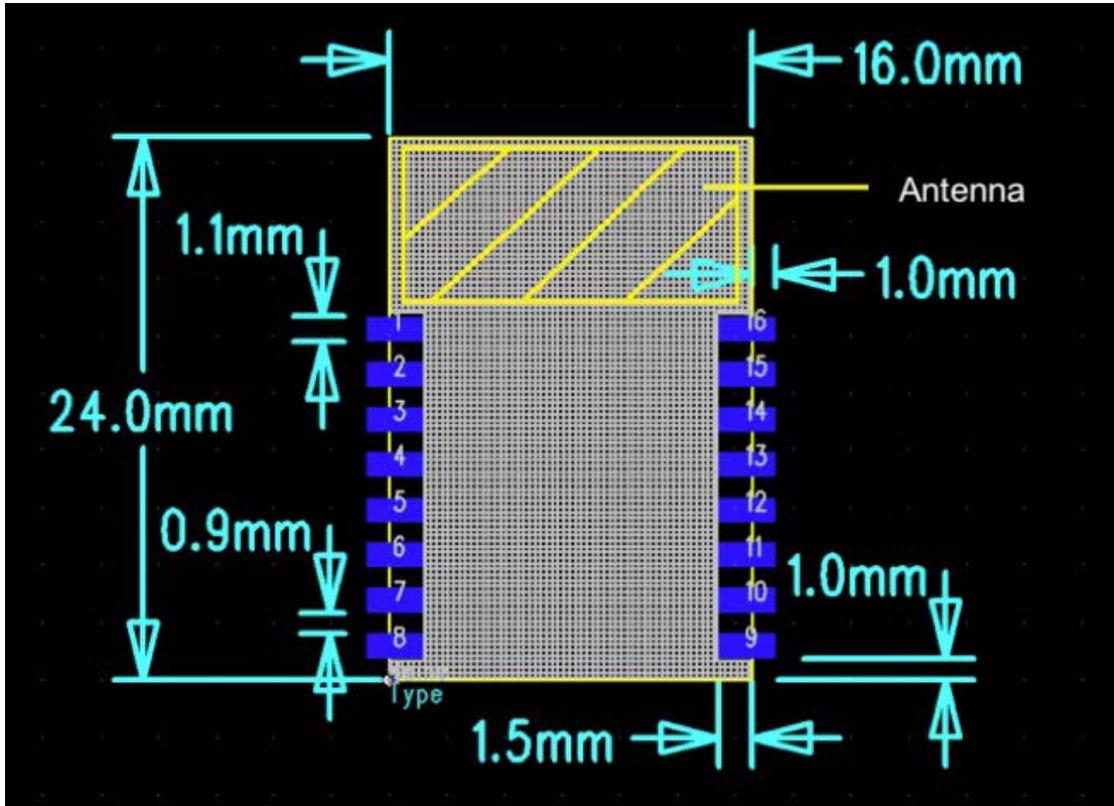
MWA6S is a 2.4G Wi-Fi module using MT7686DN chipset, which integrates a 1T1R 802.11 Wi-Fi radio, a 192MHz ARM® Cortex®-M4 CPU, some special ports and multiple slow IOs. A PCB printed antenna is used in MWA6S, which max gain is 1.5dBi.

2. GPIO Definition



GIPO	NAME	IO Type	FUN1	I2S&I2C	UART	PWM/Light		SPI
1	GPIO20	I/O	AUXADC3					
2	GPIO19	I/O	AUXADC2	I2C_SCL1		PWM5		
3	EN	PWR						
4	GPIO12	I/O			TXD2			
5	GPIO11	I/O			RXD2	PWM3	B	
6	GPIO10	I/O			U2CTS	PWM2	G	SFSCS0
7	GPIO18	I/O	AUXADC1	I2C_SDA1		(PWM5)	WW/CCT	
8	3V3	PWR						
9	GND	PWR						
10	GPIO9	I/O		TDM_MCLK	U0CTS			SFSHOLD
11	GPIO8	I/O		TDM_CK	U0RTS			SFSIN
12	GPIO7	I/O		TDM_WS				SFSCK
13	GPIO1	I/O		I2C_SDA1		PWM1	R	
14	GPIO0	I/O		I2C_SCL1		PWM0	CW	
15	GPIO5	I/O		TDM_RX	RXD0			SFSWP
16	GPIO6	I/O		TDM_TX	TXD0			SFSOUT

[Recommended backplane pad package]



4. Electrical parameters

Absolute electrical parameters

Para	Description	MIN	MAX	Unit
VCC	Power Supply	-0.3	3.63	V
VIO	IO Input	-0.3	5.5	V
Tstg	Storage Temp	0	85	°C

Normal working conditions

Para	Description	MIN	Typical Value	MAX	Unit
VCC	Power Supply	2.97	3.3	3.63	V
V _{IO}	IO Input	-0.3	—	3.63	V
V _{IL}	IO Low Level Input	-0.3	—	VCC*0.25	V
V _{IH}	IO High Level Input	VCC*0.75	—	VCC	V
V _{OL}	IO Low Level Input	0	—	VCC*0.15	V
V _{OH}	IO High Level Input	VCC*0.85	—	VCC	V
I _{IO}	IO Drive current	—	—	20	mA
T _c	Working Temp	-20	—	85	°C

Typical power consumption

Type	Mode	Transmit power	Typical Value
TX	CCK	19dBm	248mA
	OFDM	16.5dBm	220mA
RX	—	—	42mA

ESD Static Protection

ESD	GPIO	MIN	MAX	Unit
HBM (Mannequin)	Other PIN	-2000	2000	V
	RF PIN	-1000	1000	V
CDM (Charged device model)	Other PIN	-500	500	V
	RFPIN	-250	250	V

5. RF index

Basic Parameter

Operation Frequency:	802.11b/g/n(HT20):2412-2462MHz;n40(HT40): 2422-2452MHz
WiFi Standard	IEEE 802.11b/g/n20/n40
Transmission rate	11b : 1,2,5.5 and 11Mbps 11g : 6,9,12,18,24,36,48 and 54 Mbps 11n : HT20 MCS0~MCS7,HT40 MCS0~MCS7
Channel	802.11b/g/n(HT20):CH1~CH11; HT40: CH3~CH9
Antenna Type:	PCB printed antenna

TX Indicator

Parameter		MIN	Typical Value	MAX	Unit
11b 1Mbps	Transmission Power	—	20.08	—	dBm
	EVM	—	-28	—	dB
11g 6Mbps	Transmission Power	—	24.34	—	dBm
	EVM	—	-34	—	dB
11n HT20 MCS0	Transmission Power	—	24.10	—	dBm
	EVM	—	-33	—	dB
11n HT40 MCS0	Transmission Power	—	23.0	—	dBm
	EVM	—	-33	—	dB
Frequency deviation range		-10		10	ppm

Receiving sensitivity

Mode	MIN	Typical Value	MAX	Unit
11b 1Mbps	—	-96	—	dBm
11g 54Mbps	—	-76	—	dBm
11n HT20 MCS7	—	-73.5	—	dBm
11n HT40 MCS7	—	-70.5	—	dBm

Maximum receiving level

Mode	MIN	Typical Value	MAX	Unit
6Mbps OFDM	—	-10	—	dBm
54Mbps OFDM	—	-10	—	dBm
MCS0	—	-10	—	dBm
MCS7	—	-20	—	dBm

6. Recommended furnace temperature

Refer to IPC/JEDEC standard ;

Peak Temperature : $<250^{\circ}\text{C}$; Number of Times: ≤ 2 times ;

7. OEM/Integrators Installation Manual

List of applicable FCC rules

This module has been tested and found to comply with part 15.247 requirements for Modular Approval.

Summarize the specific operational use conditions

This module can be applied in household electrical appliances as well as TV and IP camera. The input voltage to the module should be nominally 2.97-3.63 VDC ,typical value 3.3VDC and the ambient temperature of the module should not exceed 85°C.

Limited module procedures

N/A

Trace antenna designs

N/A

RF exposure considerations

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. If the device built into a host as a portable usage, the additional RF exposure evaluation may be required as specified by § 2.1093.

Antennas

The module has one PCB antenna and the antenna gain is 1.5dBi.

Label and compliance information

When the module is installed in the host device, the FCC ID label must be visible through a window on the final device or it must be visible when an access panel, door or cover is easily re-moved. If not, a second label must be placed on the outside of the final device that contains the following text: "Contains Transmitter Module FCC ID:2AMUU-MWA02" or "Contains FCC ID:2AMUU-MWA02". The FCC ID can be used only when all FCC ID compliance requirements are met.

Information on test modes and additional testing requirements

- a) The modular transmitter has been fully tested by the module grantee on the required number of channels, modulation types, and modes, it should not be necessary for the host installer to re-test all the available transmitter modes or settings. It is recommended that the host product manufacturer, installing the modular transmitter, perform some investigative measurements to confirm that the resulting composite system does not exceed the spurious emissions limits or band edge limits (e.g., where a different antenna may be causing additional emissions).
- b) The testing should check for emissions that may occur due to the intermixing of emissions with the other transmitters, digital circuitry, or due to physical properties of the host product (enclosure). This investigation is especially important when integrating multiple modular transmitters where the certification is based on testing each of them in a stand-alone configuration. It is important to note that host product manufacturers should not assume that because the modular transmitter is certified that they do not have any responsibility for final product compliance.
- c) If the investigation indicates a compliance concern the host product manufacturer is obligated to mitigate the issue. Host products using a modular transmitter are subject to all the applicable individual technical rules as well as to the general conditions of operation in Sections 15.5, 15.15, and 15.29 to not cause interference. The operator of the host product will be obligated to stop operating the device until the interference have been corrected , WIFI testing using QRCT in FTM mode.

Additional testing, Part 15 Subpart B disclaimer

The final host / module combination need to be evaluated against the FCC Part 15B criteria for unintentional radiators in order to be properly authorized for operation as a Part15 digital device. The host integrator installing this module into their product must ensure that the final composite product complies with the FCC requirements by a technical assessment or evaluation to the FCC rules, including the transmitter operation and should refer to guidance in KDB 996369. For host products with certified modular transmitter, the frequency range of investigation of the composite system is specified by rule in Sections 15.33(a)(1) through (a)(3), or the range applicable to the digital device, as shown in Section 15.33(b)(1), whichever is the higher frequency range of investigation. When testing the host product, all the transmitters must be operating. The transmitters can be enabled by using publicly-available drivers and turned on, so the transmitters are active. In certain conditions it might be appropriate to use a technology-specific call box (test set) where accessory devices or drivers are not available. When testing for emissions from the unintentional radiator, the transmitter shall be placed in the receive mode or idle mode, if possible. If receive mode only is not possible then, the radio shall be passive (preferred) and/or active scanning. In these cases, this would need to enable activity on the communication BUS (i.e., PCIe, SDIO, USB) to ensure the unintentional radiator circuitry is enabled. Testing laboratories may need to add attenuation or filters depending on the signal strength of any active beacons (if applicable) from the enabled radio(s). See ANSI C63.4, ANSI C63.10 and ANSI C63.26 for further general testing details. The product under test is set into a link/association with a partnering WLAN device, as per the normal intended use of the product. To ease testing, the product under test is set to transmit at a high duty cycle, such as by sending a file or streaming some media content.

FCC statement

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.

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

ISED RSS Warning:

This device complies with Innovation, Science and Economic Development 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 présent appareil est conforme aux CNR d'ISED applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

- (1) l'appareil ne doit pas produire de brouillage, et
- (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

ISED RF exposure statement:

This equipment complies with ISED 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.

Le rayonnement de la classe b respecte ISED fixaient un environnement non contrôlés. Installation et mise en oeuvre de ce matériel devrait avec échangeur distance minimale entre 20 cm tonon corps. Lanceurs ou ne peuvent pas coexister cette antenne ou capteurs avec d'autres.

IC Label Instructions:

The outside of final products that contains this module device must display a label referring to the enclosed module. This exterior label can use wording such as: "Contains Transmitter Module IC: 24963-MWA02", or "Contains IC: 24963-MWA02".

Any similar wording that expresses the same meaning may be used.

Instructions d'étiquetage IC: L'extérieur des produits finis contenant ce module doit afficher une étiquette faisant référence au module inclus. Cette étiquette extérieure peut utiliser des libellés tels que: "contient le module émetteur IC: 24963-MWA02" ou "contient IC: 24963-MWA02", tout libellé similaire exprimant le même sens peut être utilisé.