



Manual for WLM720B Wi-Fi module

1. Introduction

WLM720B 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 REALTEK, part number RTL8192EU.

2. Hardware Architecture:

2.1 Main Chipset Information

Item	Vendor	Part Number
IEEE802.11 b.g.n mac/baseband/radio	REALTEK	RTL8192EU

2.2 Circuit Block Diagram

The major internal and external block diagram of WLM720B is illustrated in Figure 1-1.

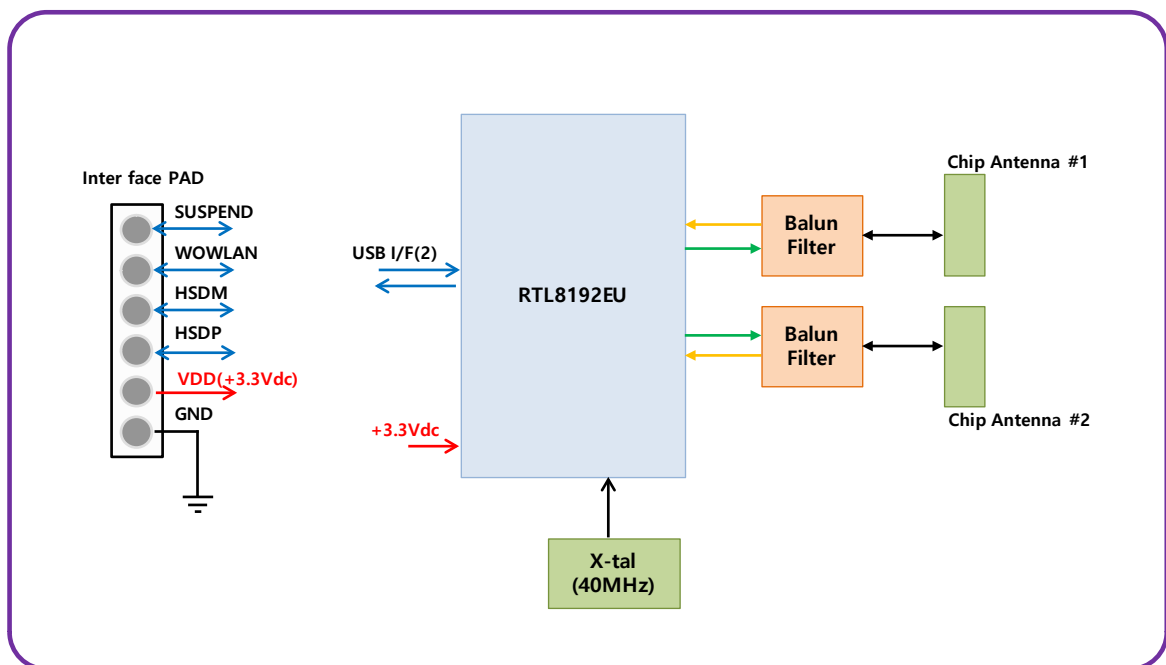


Figure 1-1 WLM720B block diagram and System Interface



3. Operational Description

WLM720B is the 802.11 b/g/n RF Module that acts as a communication controller for users of a wireless device to connect to WiFi TV. This uses IEEE 802.11n network with 13 channels at 2.4GHz

- Features

- 2x2 MIMO technology improves effective throughput and range over existing 802.11 b/g/n products
- Operates in 2.4 frequency bands
- Freq. Bands Frequency : 2.412-2.472 GHz, 2.484 GHz
- Data rates of up to 150 Mbps for 20 MHz channels and 300 Mbps for 40MHz channels
- 802.11e-compatible bursting
- Support for the IEEE 802.11e, and i standards
- BPSK, QPSK, 16 QAM, 64 QAM, DBPSK, DQPSK, and CCK modulation schemes.
- WEP, TKIP, and AES hardware encryption Schemes



- Time base of the RF frequency

For IF and RF frequency, a crystal(40MHz) is a clock reference.

- Synthesizer

Synthesizer inside Transceiver. Internal voltage controlled oscillator (VCO) provides the desired LO signal base on the phase-locked loop (PLL) with a relatively wide tuning range for this application.

- Transmission

Base-band Processing (BBP) IC has DSSS (BPSK/QPSK/CCK) and OFDM (BPSK/QPSK/16QAM/64QAM) modulation function, it provides transmission data rate are 1, 2, 5.5, 11 Mbps on DSSS and 6, 12, 18, 24, 36, 48, 54 Mbps on OFDM. Digital data signal will be converted to analog (TX IQ) signals through DAC in BBP IC, TX IQ pass through to low pass filter. TX I/Q signal use direct conversion (zero-IF) architecture converter to generate carrier frequency signal. Transceiver IC and internal PA magnify output power.

- Receiver

Reverse direction isolation of LNA inside Transceiver IC suppresses unwanted radiation. Then RF signal will be directly down to IF signal (RX IQ) and high frequency spurious emissions are suppressed by LPF. At last RX IQ signal will be demodulated digital data.

- Power Control Level

It uses open-loop power control function to limit RF output power level using a calibration file.

- Integrated Network Processor

Network processor manages Wi-Fi link operations. The network processor code is loaded automatically from a ROM. The network processor is optimized for energy efficient communications



- Product Details

- Standard 802.11b/g/n
- Data Transfer Rate: 1,2,5.5,6,11,12,18,22,24,30,36,48,54,60,90,120,180,240,270 and maximum of 300Mbps
- Modulation Method BPSK/ QPSK/ 16-QAM/ 64-QAM/ DBPSK/ DQPSK/ CCK
- Frequency Band 2.4GHz ISM Band
- Spread Spectrum:
 - IEEE 802.11b: CCK (Complementary Code Keying)
 - IEEE 802.11g/n: OFDM (Orthogonal Frequency Division Multiplexing)
- Security: 64 bit/128 bit WEP, TKIP, AES, WPA, WPA2
- Interface: USB 2.0
- Operating Temperature: 0 – 50° C ambient temperature
- Storage Temperature : -10 ~ 70°C ambient temperature
- Humidity 5 to 90 % maximum (non-condensing)
- Size 25 x 12 x 2mm (L x W x H)

-DC power input:

DC 3.3V (Minimum: 3.135V, Typical: 3.3V, Maximum: 3.465V)

4. Notice



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 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.

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.

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.

LABEL OF THE END PRODUCT:

The final end product must be labeled in a visible area with the following " Contains TX FCC ID: 2ADCFWLM720B ".

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.

Appropriate measurements (e.g. 15 B compliance) and if applicable additional equipment authorizations (e.g. Verification , Doc) of the host device to be addressed by the integrator/manufacture.

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

IMPORTANT NOTE:



IC Radiation Exposure Statement:

This equipment complies with IC RSS-102 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.

Déclaration d'exposition aux radiations: Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20 cm de distance entre la source de rayonnement et votre corps.

OEM integrator is still responsible for testing their end product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, etc.).

IMPORTANT NOTE: In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the IC authorization is no longer considered valid and the IC No. 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 IC 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 transmitter module IC: 12432A-WLM720B".

Contient le module d'émission IC: 12432A-WLM720B

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

CAN ICES-3 (B)/NMB-3(B)

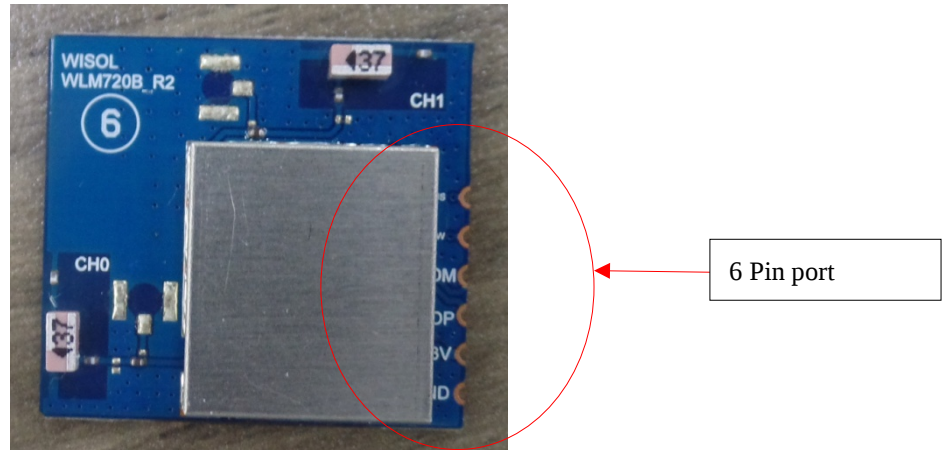
The Country Code Selection feature is disabled for products marketed in the US/Canada.

As required by §§ 2.1033(b)(3) and 2.1033(c)(3), users and installers shall be furnished with the required operating and installation instructions. These are reviewed for acceptance during equipment approval. The applicable instructions must be provided to installers, integrators and end users to ensure proper installation and operation of the devices for meeting compliance. a) The instructions required for standalone products and modular transmitters are generally different due to varying host configurations; therefore, these must be considered differently to ensure RF exposure compliance for both standalone and simultaneous transmission operations. User instructions must be sufficient for the typical consumers, who are generally unskilled, to install and operate the equipment to ensure RF exposure compliance. The acceptable host platform configurations and exposure conditions approved for a modular transmitter, including any restrictions, must be fully described in the equipment approval and required OEM integration instructions.

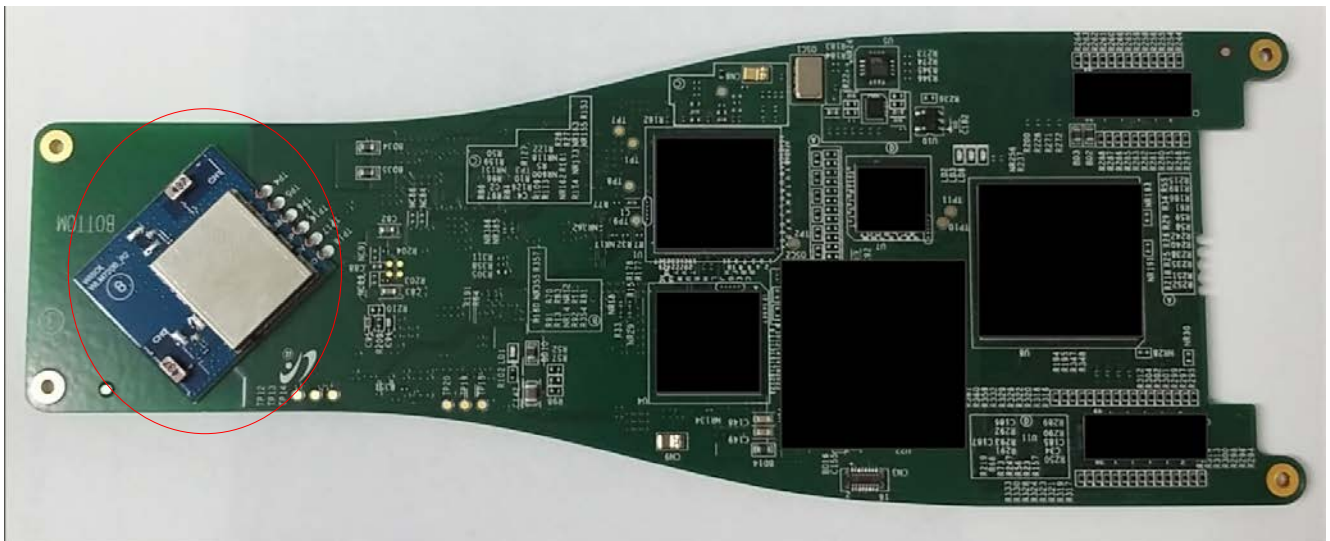
5. Installation

This radio module must be installed in a device and not allow the user to replace nor modify it.

Top view



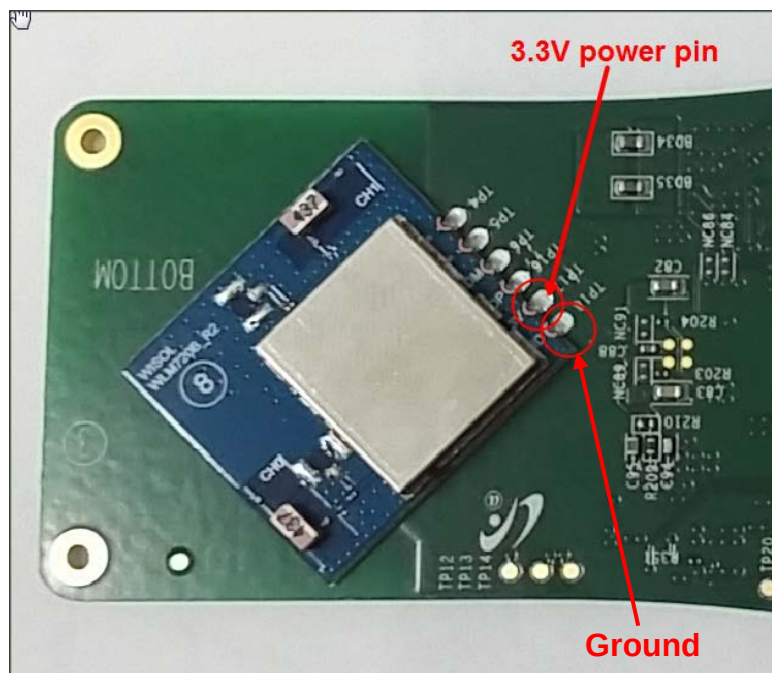
WLM720B wifi Module



WLM720B on main PCB



Antenna location at WLM720B (Location number: CH1, CH2)



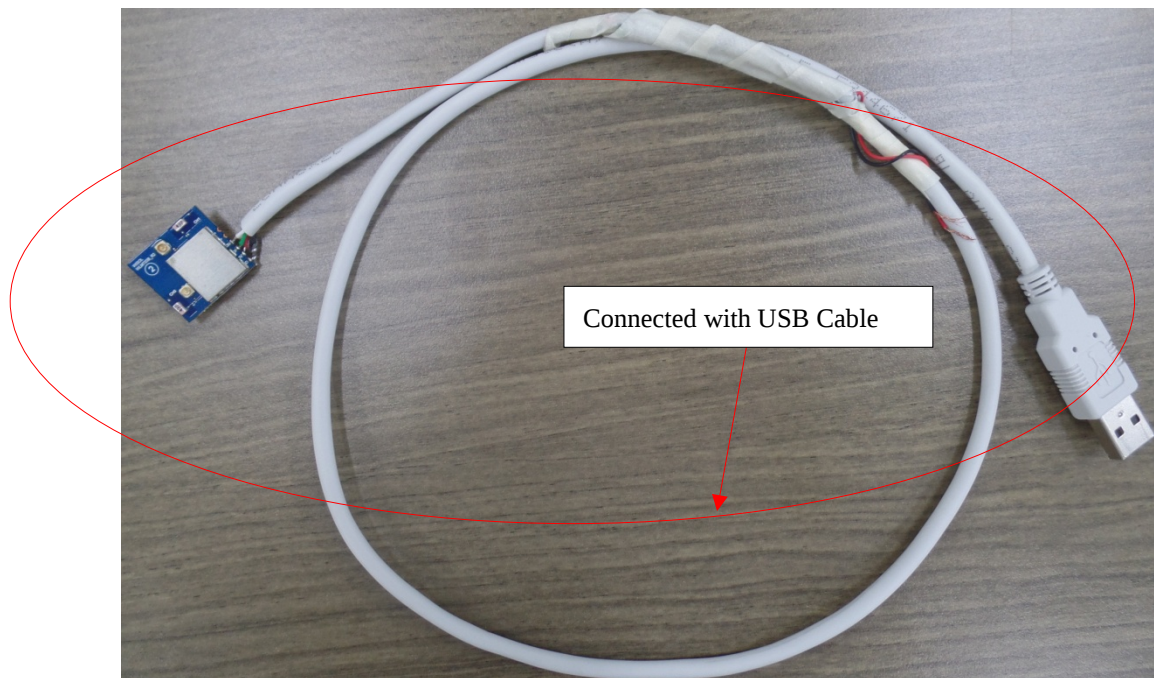
3.3V power for WLM720B is supplied from main PCB.



Do not place any metal material in this red area top and bottom of the main PCB.

-Notice of using Wiress Probe

- Please do not open the probe and use with any hardware changes
- The Probe guarantees stable operation within 2 meter from the Ultrasound Diagnostic system.
- The Probe may have disconnections and limitations to Ultrasound Diagnostic system , due to other electric devices's interference and the room condition.



WLM720B EVM (Evaluation Module)