Manual for WDF710Q WiFi module

1. Introduction

WDF710Q 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 Atheros, part number QCA6006.

2. Hardware Architecture:

2.1 Main Chipset Information

Item	Vendor	Part Number
IEEE802.11 b.g.n mac/baseband/radio	Atheros	QCA6006

2.2 Circuit Block Diagram

The major internal and external block diagram of WDF710Q is illustrated in Figure 1-1.

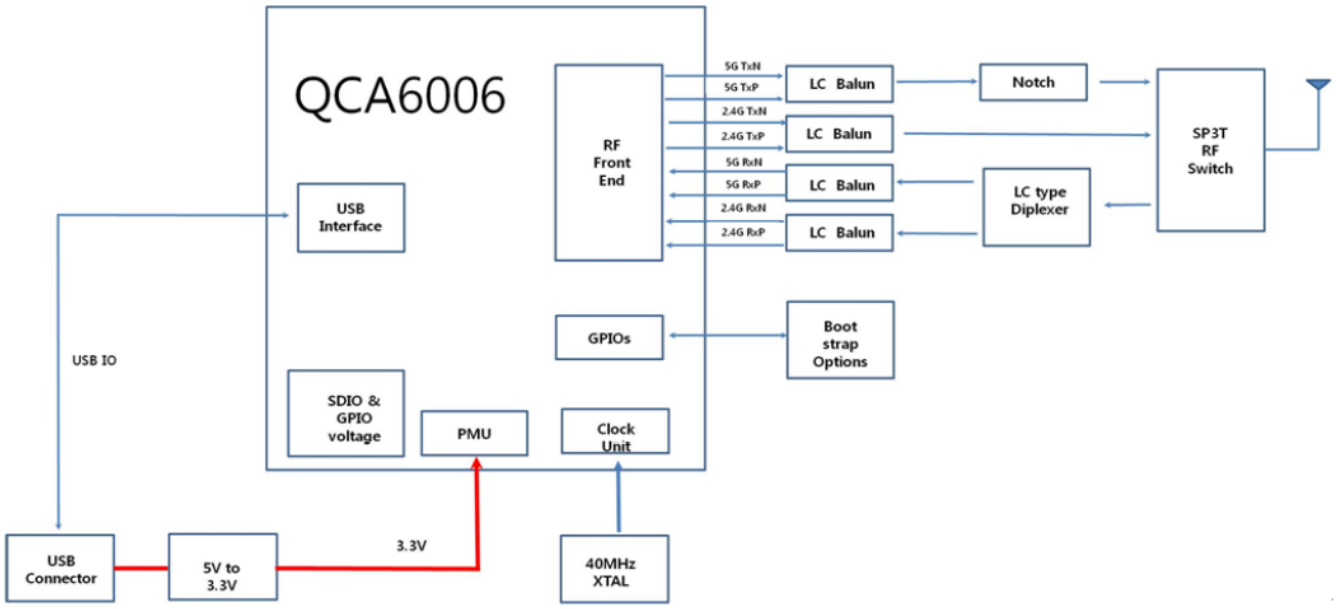

Figure 1-1 WDF710Q block diagram and System Interface

2.3 Module output power information

	Data rate	TX power	
		2.4G	5G
802.11 b	11Mbps	18dBm	
802.11 g	54Mbps	14dBm	10dBm
802.11 n	65Mbps (MCS7)	13dBm	8dBm

3. Operational Description

WDF710Q 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 and 27channels at 5GHz

- Features

>IEEE 802.11n, Single stream 1x1
>Dual-band 2.4GHz /5 GHz
>Integrated PA, LNA
>Green Tx power saving mode
>Low power listen mode
>Data rates up to 150Mbps
>Full security support : WPS,WPA,WPA2,WAPI,WEP,TKIP
>Host interface : USB2.0 High-speed

- 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

> Data Modulation OFDM (BPSK / QPSK / 16QAM / 64QAM)

> Frequency Range 2412-2484MHz

5180-5825MHz

- Module power output

Data rate	Freq (MHz)					
	2412	2437	2462	5180	5500	5825
11	18.6	18.8	18.8			
6	18.2	18.4	18.4	15.8	15.9	15.6
9	18.3	18.4	18.2	15.9	15.8	15.7
12	18.1	18.2	18.2	15.7	15.6	15.6
18	18.2	17.9	18.2	15.8	15.7	15.8
24	18.2	18.3	18.3	15.9	15.8	15.8
36	16.3	16.4	16.2	13.8	13.7	13.6
48	14	14.2	14.1	11.2	11.2	11.1
54	14	14.4	14.3	10.3	10.1	10.7
HT20MCS0	18	18.3	18.2	14.7	15	15.6
HT20MCS1	16.8	17	16.9	13.8	13.9	13.8
HT20MCS2	16.7	16.8	16.7	13.9	14	13.8
HT20MCS3	16.8	17	16.9	14	14.1	14.2
HT20MCS4	16.1	16.1	15.6	12.7	13.2	13
HT20MCS5	15.1	14.9	15.2	10.8	11.2	11.2
HT20MCS6	14.1	14	14	8.5	8.7	9.3
HT20MCS7	13.2	13.4	13.3	7.8	8.3	8.9

4. 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
According to FCC 15.407(e), the device is intended to operate in the frequency band of 5.15GHz to 5.25GHz under all conditions of normal operation. Normal operation of this device is restricted to indoor used only to reduce any potential for harmful interference to co-channel MSS operations.
. 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 co-located or operating in conjunction with any other antenna or transmitter.
If the end product integrating this module is going to be operated in 5.15~5.25GHz frequency range, the warning statement in the user manual of the end product should in clued the restriction of operating this device in indoor could void the user's authority to operate the equipment."

Label for end product must include "Contains FCC ID: WDF710Q" or "A RF transmitter inside, FCC ID: WDF710Q"

5. Installation

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

Top view