

# Manual for SPW-B43143S WiFi module

## 1. Introduction

SPW-B43143S 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 Broadcom, part number BCM43143.

## 2. Hardware Architecture:

### 2.1 Main Chipset Information

Item	Vendor	Part Number
IEEE802.11 b.g.n mac/baseband/radio	Broadcom	BCM43143

### 2.2 Circuit Block Diagram

The major internal and external block diagram of SPW-B43143S is illustrated in Figure 1-1.

## Functional Block Diagram

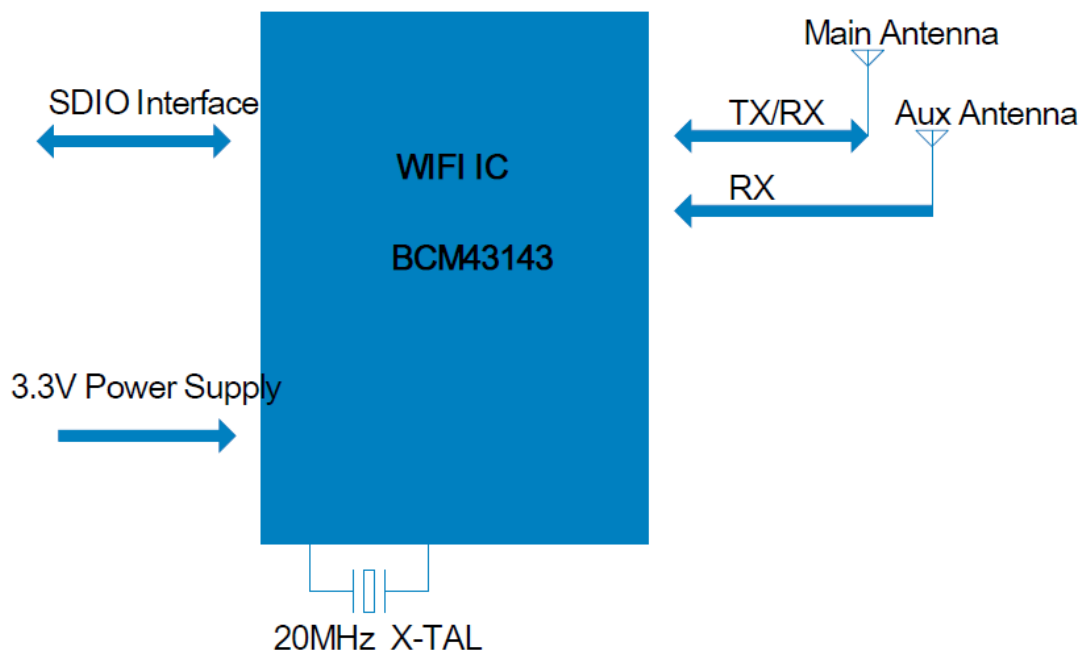


Figure 1-1 SPW-B43143S block diagram and System Interface

## 2.3 RF Specification

All measurements are made under nominal power supply and room temperature 25 °C unless specified.

RF specification of SPW-B43143S was defined according to 802.11b/g mandatory

### 2.3.1 Supportable Modulation Scheme & Data Rates

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

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

### 2.3.2 Module output power information

	Data rate	TX power
		2.4G
802.11 b	11Mbps	+17dBm
802.11 g	54Mbps	+14dBm
802.11 n	65Mbps (MCS7)	+13 dBm

### 2.3.3 Channel & Center Frequency

Channel No	Center Frequency [Mbps]	FCC, IC	ETSI Korea	
<b>1</b>	2412	O	O	
<b>2</b>	2417	O	O	
<b>3</b>	2422	O	O	
<b>4</b>	2427	O	O	
<b>5</b>	2432	O	O	
<b>6</b>	2437	O	O	
<b>7</b>	2442	O	O	
<b>8</b>	2447	O	O	
<b>9</b>	2452	O	O	
<b>10</b>	2457	O	O	
<b>11</b>	2462	O	O	
<b>12</b>	2467	-	O	
<b>13</b>	2472	-	O	

### 3. Operational Description

SPW-B43143S is the 802.11 b/g/n RF Module that acts as a communication controller for users of a wireless device to connect to Wi-Fi TV. This uses IEEE 802.11n network with 13 channels at 2.4GHz

#### - Features

- >IEEE 802.11 b/g/n client
- > Band 2.4GHz
- >Integrated PA, LNA
- >Green Tx power saving mode
- >Low power listen mode
- >1T1R mode with support of 150Mbps PHY rate
- >Security support for WFA WPA/WPA2 personal, WPS2.0, WAPI
- >Host interface : USB2.0 High-speed

#### - Time base of the RF frequency

For IF and RF frequency, a crystal(20MHz) 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 2412-2462MHz

#### 4. Notice

##### \_ 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 cause undesired operation.

##### \_ Warning

Any changes or modifications NOT explicitly APPROVED by Samsung Electronics Co., Ltd. could cause the SPW-B43143S module to cease to comply with FCC rules part 15, and thus void the user's authority to operate the equipment.

##### \_ RF-exposure statement

These modular transmitters, SPW- B43143S , comply with FCC radiation exposure limits set forth for an uncontrolled environment. The SPW-B43143S should be installed and operated with minimum distance 20cm between the antenna and the body of the user or nearby persons. 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 users manual of the end product which integrate this module.

This device is intended only for OEM integrators under the following conditions:

- 1) The antenna must be installed such that 20 cm is maintained between the antenna and users, and 2) The transmitter module may not be co-located with any other transmitter or antenna.

As long as the 2 conditions above are met, further transmitter testing will not be required. However, the 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 FCC authorization is no longer considered valid and the FCC ID and IC number 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).

##### \_ Antenna

These modular transmitters are for OEM integrations only. The end-user product will be installed in such a manner that only the authorized antennas are used.



## FCC Information to User

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 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.

## Caution

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

**FCC Compliance Information :** 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



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**IMPORTANT NOTE:****FCC RF Radiation Exposure Statement:**

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

“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.**