User Manual

SPW-B4319U

802.11b/g/n WLAN Module

Revision History

Revision	Date	Descriptions
0.1	2011-09-01	Created
0.2	2011-09-26	Update the module Picture and table for WLAN Spec.
0.3	2011-10-10	Update the Power Table

Table of Contents

1 General Description

1.1 Functional Description

SPW-B4319U is the low power USB 2.0 module for 802.11b/g/n wireless LAN (WLAN) aimed at embedded applications. SPW-B431U is the USB 2.0 module that adopts a single-chip wireless local area network (WLAN) medium-access controller (MAC) spread-spectrum baseband processor and 2.4 GHz RF radio.

SPW-B4319U supports IEEE 802.11b, 802.11g and 802.11n standards.

SPW-B4319 supports only 20MHz band width.

SPW-B4319 supports 1 Tx and 1 Rx Antenna (1x1, SISO).

SPW-B4319 supports 2412 ~ 2462 MHz.

SPW-B4319U provides crucial power management functionality and requires only a single 3.3V or 5.0 V supply voltage.

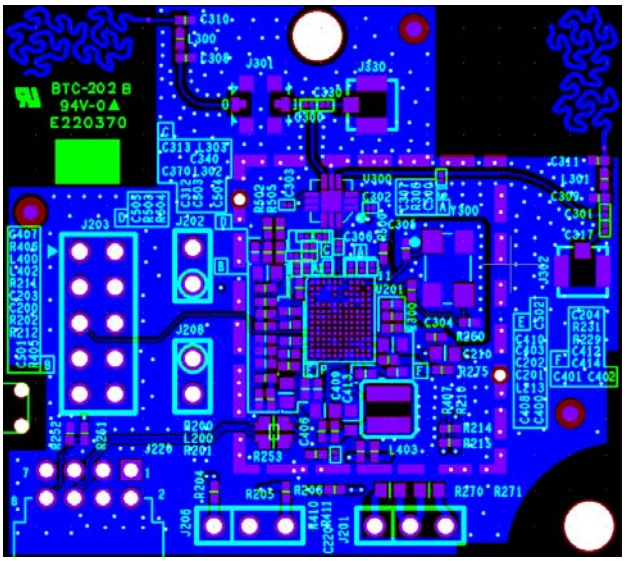


Figure 1-1 SPW-B4319U

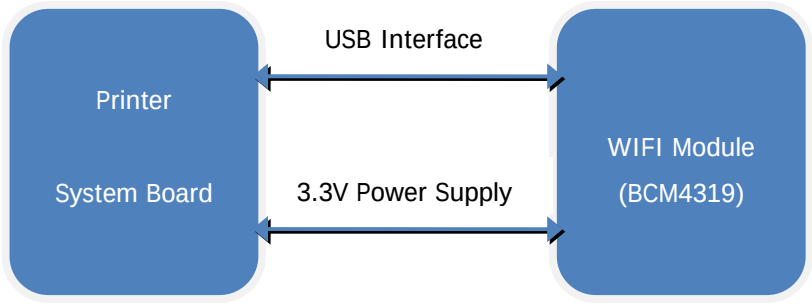
1.2 Features

- Wi-Fi compliant
- Security: WEP, WPA-PSK, WPA2-PSK, WMM, WMM-PS, TKIP, and AES hardware acceleration
- Host interface: USB 2.0
- Low power consumption

- Single 3.3V or 5.0 V external supply voltage required

1.3 Applications

- **This WLAN module is installed into the Samsung Wi-Fi printer through USB interface between this WLAN module and the system board of the Samsung printer set.**



1.4 Dimension and Pin Assignments

1.4.1 Mechanical Dimension

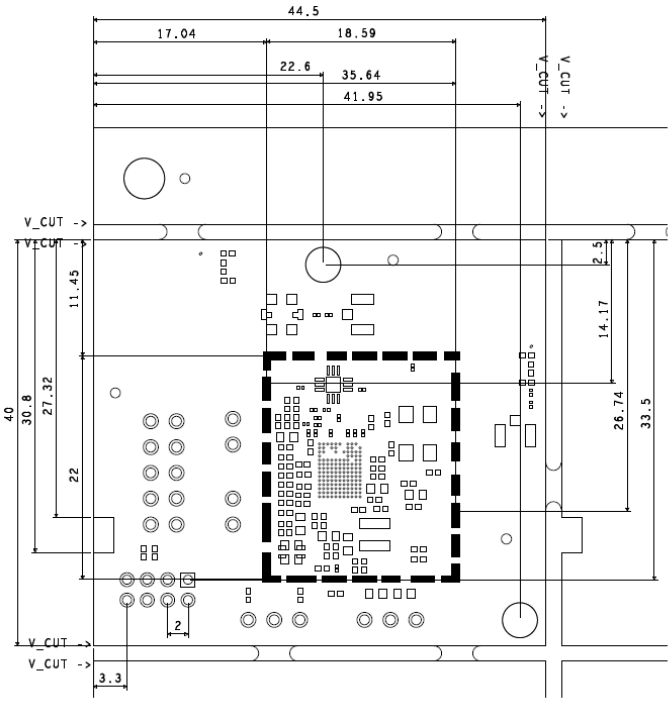


Figure 1-2 SPW-B4319U

1.4.2 HOST Interface

USB Interface : 8pin

Table 1-1 CON1 PIN Description

No.	Pin Name	Description
1,2	VDD_USB	VDD 3.3V or 5V from HOST
3,4	GND	Drain wire, to GND
5	USB_DM	USB Data+
6	USB_DP	USB Data-
7	WLAN_REG_ON	WLAN REG
8	GPIO_8	General Purpose I/O

2 Operating Conditions

2.1 Maximum Power Supply Rating

The supply Voltage of SPW-B4319U is 5V, do follow the Maximum Rating in 3.1.

2.2 Connection to HOST

SPW-B4319U will work properly only if connecting to USB2.0 Interface.

2.3 Ground Connection

SPW-B4319U does not need special ground, but uses the ground wire in HOST Interface.

2.4 Storage Condition

It needs proper condition for protecting the rust.

- Temperature : 0 ~ +50 °C
- Humidity : lower level recommended , 25% ~ 65%RH
- Max Storage Limit : Within 6 Month from Production

2.5 Absolute Maximum Ratings

Symbol	Parameter	Conditions	Min.	Nom.	Max.	Unit
DC supply	DC supply voltage from HOST	3.3V applied	**+3.1**	**+3.3**	**+3.5**	V
		5V applied	**+4.85**	**+5.0**	**+5.25**	V
DC for I/O	USB2.0 Compliant		-	-	-	-
ESD*	Electro-static discharge voltage IEC1000-4~2 POINT: CON1, CON12	AIR			5K	V
		Contact			1K	V
T_S	Storage temperature		**-20**	**-**	**+85**	°C
T_O	Operating temperature		**0**	**-**	**+60**	°C

* Final specification will be fixed later.

2.6 Current Consumption

Symbol	Parameter		Min.	Nom.	Max.	Unit
Current consumption *	Transmit current value	11b (Tx pwr: 13 dBm)		**300**	<350	mA
		11g/n (Tx pwr: 14 dBm)		**250**	<300	mA

* It can be different to test condition.

3 RF Specification

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

RF specification of SPW-B4319U was defined according to 802.11b/g mandatory

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	Not 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	

3.2 11b RF Specification

Data Rate / TRx	Item	Min	Nom	Max	Unit
11Mbps/Tx	Power	12	**13**	14	dBm
54Mbps/Tx	Power	11	**12**	13	dBm
65Mbps/Tx	Power	10	**11**	12	dBm
11Mbps/Tx	Freq. Tolerance	-25	**3**	25	ppm
54Mbps/Tx	Freq. Tolerance	-25	**3**	25	ppm
65Mbps/Tx	Freq. Tolerance	-25	**3**	25	ppm
11Mbps/Tx	EVM	0	**12**	16	%
54Mbps/Tx	EVM	-45	**-32**	-25	dB
65Mbps/Tx	EVM	-45	**-30**	-28	dB
11Mbps/Rx	Sensitivity	N/A	**-86**	-75	dBm
54Mbps/Rx	Sensitivity	N/A	**-74**	-65	dBm
65Mbps/Rx	Sensitivity	N/A	**-72**	-65	dBm

3.3 Channel & Center Frequency

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

FCC Compliance

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.

Caution

Any changes or modifications NOT explicitly APPROVED by Samsung Electronics Co., Ltd. could cause the SPW-B4319U 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-B4319U, comply with FCC radiation exposure limits set forth for an uncontrolled environment. The SPW-B4319U 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.

Label and manual requirements for the End Product

For an end product using the SPW-B4319U there must be a label containing, at least, the following information:

For FCCID	For IC number
This device contains FCC ID : A3LSPWB4319U	This device contains IC ID : 649E-SPWB4319U

The label must be affixed on an exterior surface of the end product such that it will be visible upon inspection in compliance with the modular approval guidelines.

Where the SPW-B4319U will be installed in final products larger than 8cm x 10cm following statements has to be placed ONTO the device.

The users manual for end users must include the following information in a prominent location "IMPORTANT NOTE: To comply with RF exposure compliance requirements, the antenna used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter."

IC NOTICE TO USER: This device complies with Industry Canada license-exempt RSS standard(s).Operation is subject to the following two conditions: (1) this device may notcauseinterference, and (2) this device must accept any interference, includinginterferencethat may cause undesired operation of the device.

RÉGLEMENTATION IC : Cet appareil est conforme avec Industrie Canada RSS standard exempts delicense (s). Son fonctionnement esiddiii(1)ild'ifé(2)ildiit soumis aux deux conditions suivantes: (1)cet appareil ne peut pas provoquer d'interférences et (2) cet appareil doitaccepter toute interférence, y compris les interférences qui peuvent causer unmauvais fonctionnement du dispositif.

EU Compliance

Regulatory compliance of the SPW-B4319U

The SPW-B4319U are made for OEM integrations only. The European regulations applying to the SPW-B4319U is the R&TTE Directive 1999/5/EC.

SPW-B4319U meets the following requirements of the R&TTE Directive.

R&TTE Directive article	Test category	Harmonized standard
Article 3.1(a)	Protection of health and safety	EN 60950-1, EN 50385
Article 3.1(b)	EMC	EN 301 489-1/-17
Article 3.2	Effective use of the spectrum	EN 300 328

The conformity assessment for the SPW-B4319U were completed in accordance with the R&TTE Directive Annex IV procedures, and the EC Declaration of Conformity is attached to this manual.

Cautions regarding regulatory compliance when integrating the SPW-B4319U

The person integrating the SPW-B4319U becomes the manufacturer of the final product and is therefore responsible for demonstrating compliance of the product with the essential requirements of the R&TTE Directive.

In all cases assessment of the final product must be made against the Essential requirements of the R&TTE Directive Article 3.1(a) and (b), safety and EMC respectively, and any relevant Article

3.3 requirements

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

1. This appliance and its antenna must not be co-located or operating in conjunction with any other antenna or transmitter.

2. A minimum separation distance of 20 cm must be maintained between the antenna and the person for this appliance to satisfy the RF exposure requirements of the Council recommendation 1999/519/EC of 12 July 1999.

As long as the 2 conditions above are met, no further evaluation under Article 3.2 of the

R&TTE Directive and do not require further involvement of an R&TTE Directive Notified Body for the final product. In all other cases, or if the manufacturer of the final product is in doubt then the equipment integrating the radio module must be assessed against Article 3.2 of the R&TTE Directive.

Please note that this product, SPW-B4319U, uses radio frequency bands not harmonized throughout the Community. This product is classified as Class 2 radio equipment for which some Member States apply restrictions on placing on the market and in use. Any parties putting Class 2 radio equipment on the market must notify the relevant national spectrum management authority of their intention, and the radio equipment must be given a Class Identifier (alert symbol).

Antenna

This product, SPW-B4319U, is for OEM integrations only. The end-user product will be installed in such a manner that only the authorized antennas are used.

Enclosure

This product, SPW-B4319U, is made for integrating in another final product. For this reason, there are some parts of the final product on which the SPW-B4319U depends for regulatory compliance regarding EMC and safety. The SPW-B4319U is mounted on the circuit board of the final product, and must be contained inside the case of the final product. Integrated the SPW-B4319U in the final product so that its surfaces are not in contact with the outside.

Documentation

In the documentation for the conformity assessment of the final product, state clearly that the SPW-B4319U is integrated in the system.

Conformity Assessment of the Products integrating the SPW-B4319U

The following is a supplementary explanation of conformity assessments for final products integrating the radio modules such as the SPW-B4319U, that have passed conformity assessments in accordance with the R&TTE Directive. The procedures for conformity assessment in accordance with the R&TTE Directive are the responsibility of the manufacturer of the final product. With final products integrating radio modules, the person who integrates the module in the system becomes the manufacturer of the final product, and it is their responsibility to certify that the requirements of the R&TTE Directive and met.

Exemption from conformity assessment

However, if radio modules that meet the requirements of the R&TTE Directive and that have passed the conformity assessment are integrated in a final product that follows the cautions concerning integrating radio modules, they are exempted from the conformity

assessment for R&TTE Directive Article 3.2 (efficient use of the radio spectrum).
For details, refer to the following Guidance and ETSI Technical Report from the R&TTE Compliance Association, and check whether your case applies.

Organization	R&TTE Compliance Association	Document No. TGN 01 Rev 3
Document title	Technical Guidance Note on Requirement for a Final Product that Integrates an R&TTE Directive Assessed Module	
URL	You can download the guidance from the download area of R&TTE Compliance association. http://www.rtteca.com	

Organization	ETSI (Technical report)	Document No. ETSI TR 102 070-2
Document title	Electromagnetic compatibility and Radio spectrum Matters (ERM); Guide to the application of harmonized standards to multi-radio and combined radio and non-radio equipment; Part 2: Effective use of radio frequency spectrum	
URL	You can download the guidance from the ETSI web site by entering TR102 070-2 in the search engine. Before downloading, you will be requested to register. http://www.rtteca.com	

□ Conformity assessment procedures for final products exempted from R&TTE Directive Article 3.2

In every case, the manufacturer of a final product must follow the procedures for conformity assessment of the final product with the requirements of R&TTE Directive Article 3.1(a) and (b), for safety and EMC. The conformity assessment for Article 3.2 is carried out in accordance with the following:

1) Attach the EN 300 328 test report of the assessed radio module and the EC Declaration of Conformity to the conformity assessment of the final product (The Declaration of Conformity is attached to the manual).

2) Specify on the conformity assessment of the end product that the assessed radio module was integrated in the system without any changes, in accordance with the installation directions of the manufacturer.

□ Notification of the final product

Please note that this product, SPW-B4319U, uses radio frequency bands not harmonized throughout the Community. The notification required by R&TTE Directive Article 6(4) is necessary. It is the responsibility of the manufacturer of the final product to notify the relevant national spectrum management authority of the intention to place the final product on the market.

□ CE marking

It is necessary to attach the CE mark to the final product to indicate that it conforms with all the directives that apply to the final product. It must be given a Class Identifier (alert symbol) in addition to the CE mark.

□ Exemption clause

Samsung Electronics Co., Ltd. does not guarantee the accuracy of the information above. In case of doubt or uncertainty, we recommend that you check with the authorities or official certification organizations of the relevant countries.

EC Declaration of Conformity

Samsung Electronics Co., Ltd.

of #416 Maetandong, Youngtonggu, Suwonsi, Gyeonggido, Korea of Samsung declares under our sole responsibility that the product

WLAN Module

model " SPW-B4319U "

to which this declaration relates is in conformity

with

R&TTE Directive 1999/5/EC

By application of the following standards

Article 3.1(a)	Health	EN 50385:2002
Article 3.1(a)	Safety	EN 60950-1:2001
Article 3.1(b)	EMC	EN 301 489-1 V1.7.1(2006-10), EN 301 489-17 V1.2.1(2002-08)
Article 3.2	Radio	EN 300 328 V1.7.1 (2006-10)

Notified Body UL Apex Co., Ltd.

4383-326, Asama-cho, Ise-shi, Mie 516-0021, JAPAN

EU Identification Number: 0983

Documentary evidence to demonstrate conformity

Description	Report or Certificate No.	Issue Date	Issued by
Health			Declaration of Conformity issued by Samsung Electronics Co., Ltd.
Safety			SK Tech Co., LTD.
EMC			SK Tech Co., LTD.
Radio			SK Tech Co., LTD.