Data Sheet

SPB209A
802.11 ac/Bluetooth 4.2 module

H&D Wireless

Current revision: 7.3

Revision History

Revision	Revision date	Description
PA5	2016-03-31	• Option D (U.fl connector) removed.
PA6	2016-04-25	• Updated Power Consumption and RF Performance tables • Removed commercial grade temperature • Updated marking on mechanical drawings
PA7	2016-05-12	• Updated landing pad drawing in section 6.4.1 • Updated pin naming in section 4.1
A	2016-09-16	First formal release • Section 1.2 Added operational mode STA and AP • Section 3.5 Added clarification of reduced power on channel 12 and 13 and use of "Power Table" for regulatory domain. • Updated marking with FCC ID • Updated antenna port pin 12 for SPB209A-RNM option and pin 15 for SPB209A-RLM option
B	2016-11-04	• Corrected some editorial failures in the notes area of section 3.5
C	2016-12-20	• Added an ISED (Canada) regulatory section
D	2017-03-24	• Pinout for SPB209A-B added
6.0	2018-02-22	• Reference to HW Design Guide added
7.0	2018-02-22	• Updated to new decimal revision system
7.1	2019-02-20	• Added CMIIT info
7.2	2019-02-22	• Update of the document after data sheet review. Order information, Soldering-and Sales information were updated among other.
7.3	2019-03-21	• Revised RFC1023 to RFC1042 in table 7.1.

Contents

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1 INTRODUCTION

1.1 Overview

SPB209A is a complete WLAN/BT module with EMC shield, ready for onboard integration in a hosted environment. SPB209A enables a cost efficient ultra-low power, high performance and feature rich client solution. It provides up to 433 Mbit/s data rate when operating in the OFDM mode and up to 11 Mbit/s data rate when operating in the DSSS/CCK mode.

SPB209A integrates RF, baseband/MAC, Bluetooth Package Engine, memory, RF filters, oscillator, antenna (option) and EMC shield into a highly integrated and optimized module solution with high quality and reliability to a complete standalone solution with no need for external components.

This highly integrated solution is optimized for customer applications running on a Linux host.
The host interface supports SDIO 3.0 and High Speed UART. Internal RAM comprises both code and data memory eliminating the need for external RAM, Flash or ROM memory interfaces. MAC address, trimming values etc. are stored in the on board memory.

1.2 Key Features

- Support for 802.11a/b/g/n/ac
- Data Rates: 20MHz CH 1-86Mbps; 40MHz CH 13-200Mbps; 80MHz CH 29-433Mbps
- Modulation: BPSK, CCK, QPSK, 16QAM, 64QAM 256 QAM for WLAN and GFSK/π/4DQPSK/8DPSK/LE for Bluetooth.
- Open WEP, WPA/WPA2 encryption
- No external components except for the antenna options
- Low power consumption due to efficient PA design and power off mode
- An on-board low power oscillator maintains real time in power save mode, allows the high frequency clock to be turned off
- Supporting STA and AP operation mode
- Supports BT-WLAN coexistence and ISM-LTE coexistence
- Extensive DMA hardware support for data flow to reduce CPU load.
- Advanced power management for optimum power consumption at varying load.
- External interfaces 4-bit SDIO 3.0 for WLAN and UART/PCM for BT interface
- On-board High Frequency High Precision Oscillator 37.4 MHz
- Small footprint 14 x 14 mm (196 mm2) 41-pin
- RoHS Compliant

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2 HARDWARE ARCHITECTURE

2.1 Block Diagram
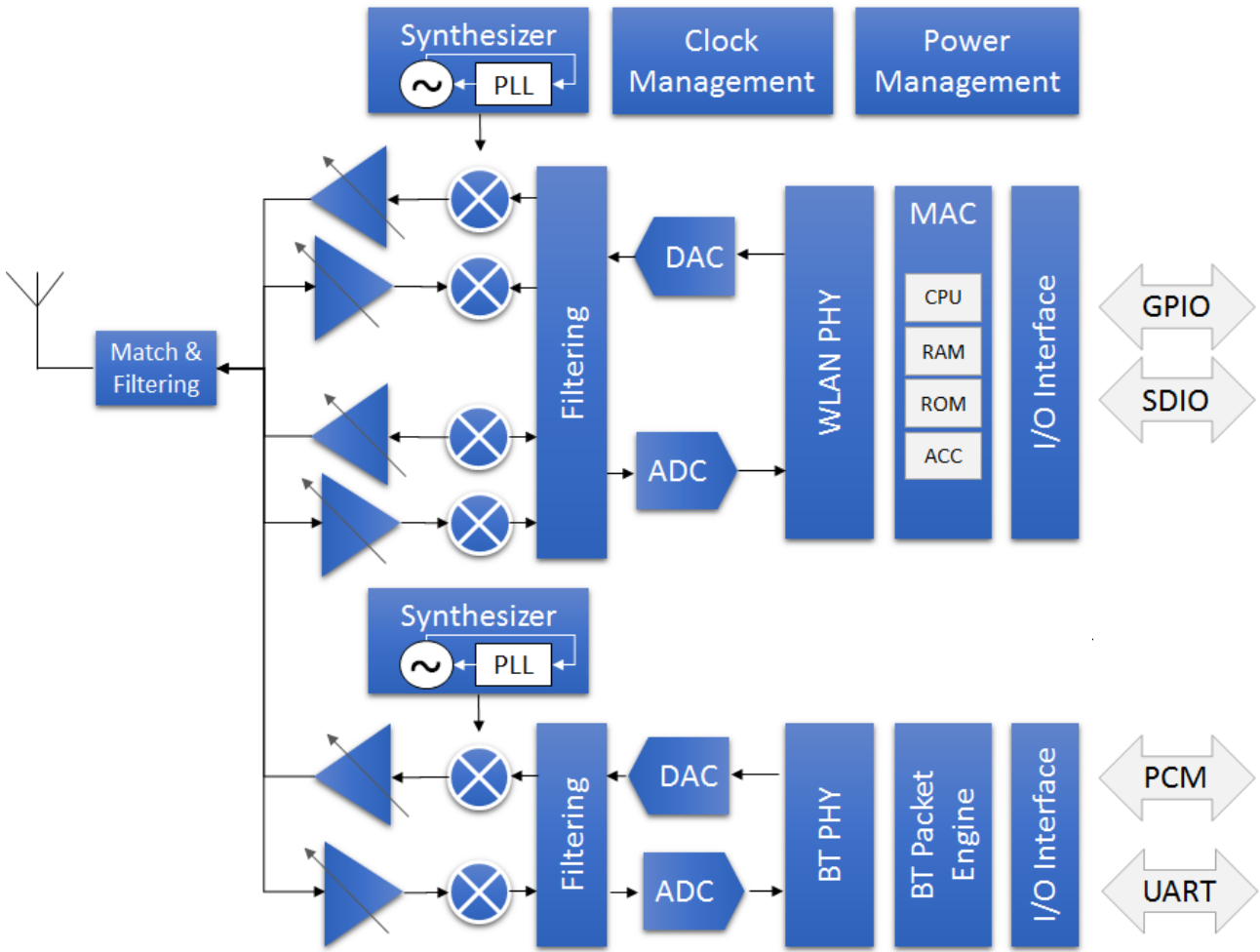
Figure 2-1: Block Diagram

2.2 Order Information

Part No.	Description
SPB209A-LBLMZ-2	SPB209A module with integrated chip antenna and integrated LTE filter 38 pin SMD module on Tape & Reel
SPB209A-LBLMZ-3	SPB209A module with integrated chip antenna and integrated LTE filter 38 pin SMD module on Tray
SPB209A-LBNMZ-2	SPB209A module with integrated chip antenna, but without LTE filter 38 pin SMD module on Tape &Reel
SPB209A-LBNMZ-3	SPB209A module with integrated chip antenna, but without LTE filter 38 pin SMD module on Tray
SPB209A-LRLMQ-2	SPB209A module without chip antenna, but with integrated LTE filter 41 pin SMD module on Tape &Reel.
SPB209A-LRLMQ-3	SPB209A module without chip antenna, but with integrated LTE filter 41 pin SMD module on Tray
SPB209A-LRNMQ-2	SPB209A module without chip antenna and without LTE filter 41 pin SMD module on Tape &Reel.
SPB209A-LRNMQ-3	SPB209A module without chip antenna and without LTE filter 41 pin SMD module on Tray
HDA209	Development board for SPB209A platform

Table 2-1 Order information for available SPB209A-versions

Part numbering information

EXAMPLE: SPB209A - L R N M Q - 2

Product Family
SPB209A

Firmware Programming
L=Linux

Antenna Option
B = Integrated Chip Antenna
R = RF Pad (option RN -> antenna port on pin 12 / option RL -> antenna port on pin 15)

Colocation Option
L = Integrated LTE Filter (antenna port on pin 15)
N = No Filter (antenna port on pin 12)

Operating Temperature
M= -40°C to 85°C

Package
Q= 41 pin SMD module, castellated via pads (Antenna Option R)
Z= 38 pin SMD module, castellated via pads (Antenna Option B)

Delivery Package
1= ESD bag
2= Tape & Reel
3= Tray

3   ELECTRICAL DATA

3.1   Absolute Maximum Ratings

Rating	Min	Max	Units
Supply voltage	-0.3	3.6	V
Supply voltage I/O	-0.3	4.0	V
Input RF level		+10	dBm
Storage temperature order option LxNM	-55	+125	°C
Storage temperature order option LxLM	-55	+85	°C
Lead temperature (No Pb), solder as per section 0		+250	°C

Table 3-1: Absolute maximum ratings. Exceeding any of the maximum ratings, even briefly lead to deterioration in performance or even destruction. Values indicates condition applied one at the time.

3.2   Electro Static Discharge (ESD)

SPB209A withstands ESD voltages up to 1000V HBM (Human Body Model) according to JESD22-A114 and up to 500 V CDM (Charged Device Model) according to JESD22-C101.

3.3   Recommended Operating Conditions

Rating	Min	Typ	Max	Units
Supply Voltage VDD	3.0	3.3	3.6	V
Supply Voltage VDD_IO	1.75	1.8 or 3.3V	3.6	V
Supply Voltage IO with VDD 0V		0	0.2	V
Operating temperature (Industrial grade)	-40	+25	+85	°C

Table 3-2: Recommended operating conditions

3.4   Power Consumption

Conditions: Tamb = 25 °C, VBAT=3.3V, Order Option R

Mode	Conditions	Min	Typ.	Max	Unit
2.4G/TX 802.11 b	DSSS 1Mbps, Pout=17 dBm		295		mA
2.4G/TX 802.11 g	OFDM 6Mbps, Pout=17 dBm		285		mA
2.4G/TX 802.11n HT40	OFDM MCS0, Pout=16 dBm		270		mA
5G/TX 802.11g	OFDM 6 Mbps, Pout=15 dBm		330		mA

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Mode	Conditions	Min	Typ.	Max	Unit
5G/TX 802.11n HT40	OFDM MCS0, Pout=14 dBm		310		mA
5G/TX 802.11ac VHT80	OFDM MCS0, Pout=9 dBm		335		mA
2.4G/RX 802.11 b	Normal mode – Max Sensitivity		51		mA
2.4G/RX 802.11 g	Normal mode – Max Sensitivity		54		mA
2.4G/RX MCS7 HT20	Normal mode – Max Sensitivity		66		mA
5G/RX 802.11g	OFDM 54 Mbps Normal mode – Max Sensitivity		67		mA
5G/RX MCS7 HT20	Normal mode – Max Sensitivity		78		mA
5G/RX MCS9 VHT40	Normal mode – Max Sensitivity		103		mA
5G/RX MCS9 VHT80	Normal mode – Max Sensitivity		121		mA
Continuous RX burst	SCO HV3 Peak RX		17		mA
Continuous Tx Class 2 (+4 dBm)	SCO HV3 Peak TX		22		mA
1.28 sec LE ADV			0.149		mA
1.28 sec sniff as master ACL Link			0.186		mA
Deep Sleep	Standby		200		µA
WLAN/Power Save	DTIM = 1, Beacon Interval 100ms		1.14		mA
WLAN/Power Save	DTIM = 3, Beacon Interval 300ms		0.47		mA

Table 3-3: Typical current consumption in different modes.

3.5 RF Performance

Conditions: VBAT= 3.3V, Tamb= 25°C Spectrum Mask and BER according to IEEE 802.11a/b/g/n/ac specification, Order Option LBNM*.

Parameter	Conditions	Min	Typ.	Max	Units
2.4G/Frequency range		2412		2472	MHz
2.4G/Supported Channels	ETSI	Ch1 (2412 MHz)		Ch13 (2472 MHz)	
	FCC	Ch1 (2412 MHz)		Ch11 (2462 MHz)	
5G/Frequency range		4900		5925	MHz
5G/Supported Channels		Ch36 (5180 MHz)		Ch165 (5825MHz)	
RF impedance			50		ohm
Transmitter performance 11a/b/g/n/ac and BT					
2.4G/Output power**	802.11b, 11Mbps		17		dBm

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Parameter	Conditions	Min	Typ.	Max	Units
2.4G/Output power**	802.11g, 54Mbps		17		dBm
2.4G/Output power**	802.11n/ac, MCS7, HT20		16		dBm
5G/Output power	802.11a, 54Mbps		15		dBm
5G/Output power	802.11n/ac, MCS7, HT20		14		dBm
5G/Output power	802.11ac, MCS8, VHT20		10		dBm
5G/Output power	802.11ac, MCS9, VHT40		9		dBm
5G/Output power	802.11ac, MCS9, VHT80		9		dBm
BT BR	GFSK		6		dBm
BT EDR	π/4DQPSK		3		dBm
BT EDR	8DPSK		3		dBm
BT LE			7		dBm
Receiver performance 11a/b/g/n/ac and BT					
2.4G/Receiver sensitivity	DPSK 1Mbit/s		-98		dBm
2.4G/Receiver sensitivity	OFDM/64-QAM 54Mbit/s, HT20		-74		dBm
2.4G/Receiver sensitivity	MCS-7, OFDM/64-QAM, HT20		-73		dBm
5G/Receiver sensitivity	OFDM/64-QAM 54Mbit/s, HT20		-70		dBm
5G/Receiver sensitivity	MCS-0, BPSK, HT20		-86		dBm
5G/Receiver sensitivity	MCS-9, OFDM/256-QAM, HT40		-60		dBm
5G/Receiver sensitivity	MCS-0, BPSK, HT80		-82		dBm
5G/Receiver sensitivity	MCS-9, OFDM/256-QAM, HT80		-57		dBm
BT BR	GFSK, BER≤0.1%		-92		dBm
BT EDR	π/4DQPSK, BER≤0.1%		-92		dBm
BT EDR	8DPSK, BER≤0.1%		-86		dBm
BT LE	BER≤0.1%		-89		dBm

Table 3-4: RF Performance

*: Order option LRNM will have ~2dB reduced BT Tx power
Order option LxLM (with LTE Filter) will have ~2 dB reduced TX Power and sensitivity for BT and WiFi 2.4GHz.
**: Channel 12 will have up to 2 dB and channel 13 will have 3-4 dB lower output power than the other 2.4GHz channels to comply with FCC band edge compliance. This only applies when FCC Regulatory Domain is selected. The SPB209A devices are already calibrated with Power Tables loaded by the driver at device start supporting both SPB209A unique setting and Regulatory Domain setting.

3.6 Digital Pin Characteristics

3.6.1 SDIO timing characteristics

The SPB209A support a SDIO device interface that conforms to the industry standard SDIO 3.0 Full-speed specification and allows a host controller using the SDIO bus protocol to access the SPB209A device. SDIO-interface can run the SDIO 1-bit and 4-bit mode with full clock range up to 208MHz.

Condition: VDDIO= 3.3 V, T_{amb}= -40 to +85°C
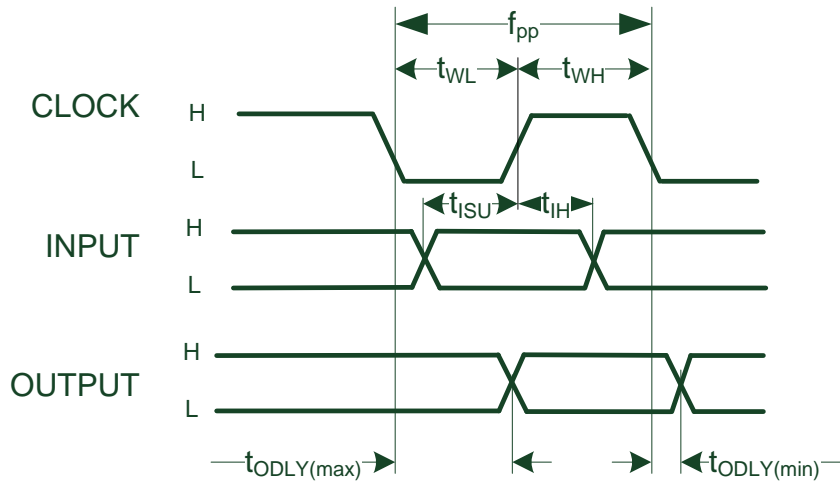
Figure 3-1: SDIO timing diagram

Parameter	Symbol	Min	Max	ns	Comments
Input set-up time	t_{ISU}	5		ns	
Input hold time	t_{IH}	5		ns	
Clock low time	t_{WL}		10	ns	
Clock high time	t_{WH}		10	ns	
Output delay time	t_{ODLY}		14	ns	
Clock Frequency	f_{pp}		25	MHz	

Table 3-5: SDIO timing parameter values (normal mode)

Parameter	Symbol	Min	Max	ns	Comments
Input set-up time	t_{ISU}	6		ns	
Input hold time	t_{IH}	2		ns	
Clock low time	t_{WL}		7	ns	
Clock high time	t_{WH}		7	ns	
Output delay time	t_{ODLY}	2.5	14	ns	
Output hold time		2.5		ns	
Clock Frequency	f_{pp}		50	MHz	

Table 3-6: SDIO timing parameter values (high speed mode 50MHz)

Parameter	Symbol	Min	Max	ns	Comments
Input set-up time	t_{ISU}	3		ns	
Input hold time	t_{IH}	0.8		ns	
Clock low time	t_{WL}		4	ns	
Clock high time	t_{WH}		4	ns	
Output delay time	t_{ODLY}	1.5	7.5	ns	
Output hold time	t_{OH}	1.5		ns	
Clock Frequency	f_{pp}		100	MHz	

Table 3-7: SDIO timing parameter values (high speed mode 100MHz, VDDIO= 1.8V)

Parameter	Symbol	Min	Max	ns	Comments
Input set-up time	t_{ISU}	1.4		ns	
Input hold time	t_{IH}	0.8		ns	
Clock low time	t_{WL}		1.5	ns	
Clock high time	t_{WH}		1.5	ns	
Clock Frequency	f_{pp}		208	MHz	

Table 3-8: SDIO timing parameter values (high speed mode 208MHz, VDDIO = 1.8V)

3.6.2 Digital input/output pad (I/O)

The digital I/O pads are of type none inverting three-state driver/receiver. It includes an input buffer and an output buffer with enable/disable control inputs. It also includes a hold-function. When an I/O is neither driven by the internal nor by an external circuitry, the hold function maintains the latest state of the I/O.

Parameter	Symbol	Min	Typ	Max	Units	Comments
Input low voltage	V_{IL}	-0.3		$0.3 - V_{IO}$	V	
Input high voltage	V_{IH}	$0.7 - V_{IO}$		$0.3 - V_{IO}$	V	
Input leakage current	I_{IL}	-5		5	µA	
Output low voltage	V_{OL}	0		4	V	$I_{out} < -11mA$
Output high voltage	V_{OH}	$V_{IO} - 0.4$			V_{IO}	$I_{out} > 3mA$
Input pin capacitance	C_{IP}		2.5		pF	
VDDIO	V_{IO}	1.75		3.46	V	

Table 3-9: I/O pin DC characteristics.

4 PIN CONFIGURATIONS

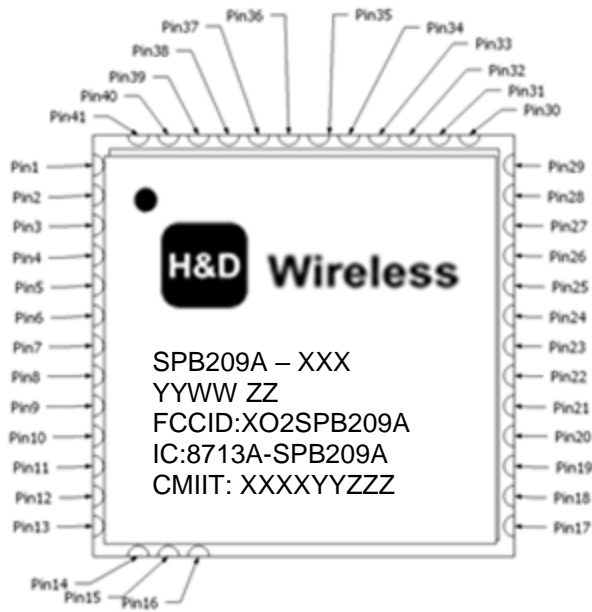## 4.1 Pin Configuration SPB209A Module

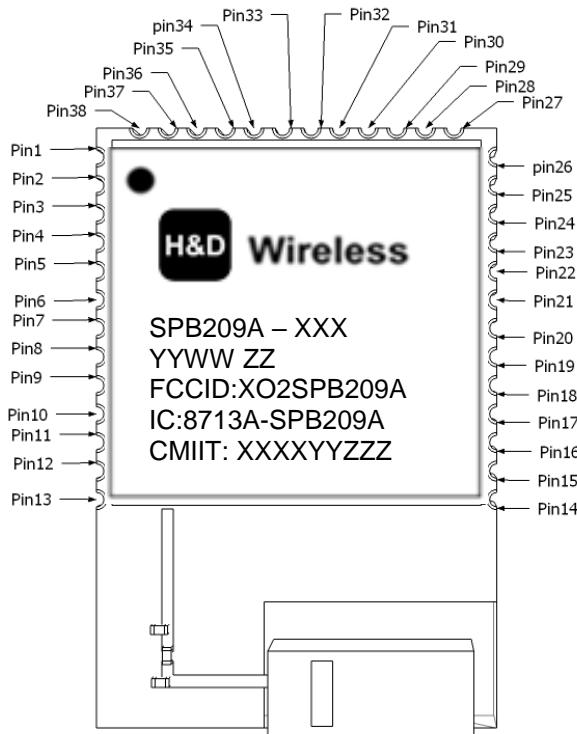Figure 4-1: SPB209A-LR package pin out, top view

Figure 4-2: SPB209A-LB package pin out, top view

4.2 Pin Assignments

Pin SPB209A-R	Pin SPB209A-B	Function	Type	Description
1	1	GND	S	Ground
2	2	GPIO17	O	General Purpose I/O (LTE Coexistence Signal TXD)
3	3	GPIO1	I/O	General Purpose I/O
4	4	GPIO16	I/O	General Purpose I/O (LTE Coexistence Signal RXD)
5	5	GPIO15	I/O	General Purpose I/O
6	6	GPIO14	I/O	General Purpose I/O
7	7	GPIO0	I/O	General Purpose I/O
8	8	NC	I/O	Do not connect
9	9	NC	IPU	Do not connect
10	10	NC	IPU	Do not connect
11	11	GND	S	Ground (NA for antenna option B)
12	12	RFOUT1	RF	Antenna Port **SPB209A-RNM option** (50 Ohm) for WLAN/BT (NA for antenna option B)
13	13	GND	S	Ground (NA for antenna option B)
14	-	GND	S	Ground (NA for antenna option B)
15	-	RFOUT2	RF	Antenna Port **SPB209A-RLM option** (50 Ohm) for WLAN/BT (NA for antenna option B)
16	-	GND	S	Ground (NA for antenna option B)
17	14	GND	S	Ground
18	15	GPIO2	I/O	General Purpose I/O (CON[0] configuration mode)
19	16	GPIO3	I/O	General Purpose I/O (CON[1] configuration mode and BT PCM MCLK)
20	17	GPIO13	I/O	General Purpose I/O
21	18	GPIO12	I/O	General Purpose I/O
22	19	NFC_ANT_P	RF	Do not connect
23	20	NFC_ANT_N	RF	Do not connect
24	21	GND	S	Ground
25	22	VDD33	S	Supply pin 3.3V, decouple with 100uF
26	23	GPIO8	I/O	General Purpose I/O (BT UART TXD (HCI))

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Pin SPB209A-R	Pin SPB209A-B	Function	Type	Description
27	24	GPIO11	I/O	General Purpose I/O (BT UART RTS)
28	25	GPIO10	I/O	General Purpose I/O (BT UART CTS)
29	26	GPIO9	I/O	General Purpose I/O (BT UART RXD (HCI))
30	27	PDn	I	Power Down of Module (0 = full power-down; 1 = normal mode)
31	28	SD_DAT1	I/O	SDIO Data 1
32	29	SD_DAT2	I/O	SDIO Data 3
33	30	SD_DAT3	I/O	SDIO Data 2
34	31	SD_CLK	IPU	SDIO Clock
35	32	SD_DAT0	I/O	SDIO Data 0
36	33	SD_CMD	I	SDIO Command
37	34	GPIO7	I/O	General Purpose I/O (BT PCM Sync)
38	35	GPIO5	I/O	General Purpose I/O (BT PCM Data Out)
39	36	GPIO4	I/O	General Purpose I/O (BT PCM Data In)
40	37	GPIO6	I/O	General Purpose I/O (BT PCM Clock)
41	38	VDDIO	S	IO Supply

Table 4-1: Pin Description for SPB209A Module

5 APPLICATION INFORMATION

5.1 Power Supply

SPB209A should be powered by a single supply voltage on VDD of 3.3V. It generates all required digital and analog supply voltages with the built in DC-DC converter. Ramp time applying VDD to SPB209A shall be less than 5ms (<5ms).

5.1.1 Main supply

The main power is connected to VDD. The ripple on VDD should be less than 10mV p-p.

5.2 Clock Signals

The SPB209A requires no external clock signals. It has an internal high frequency oscillator with a high precision 37.4 MHz crystal and a low power oscillator to generate the required clock signals.

5.3 Power-up and Standby

The Power Down pin (PDn) shall be set high during normal operation of either connectivity type. Can be connected to VDD directly.

Pulling PDn pin low, sets SPB209A in Standby mode. This turns OFF most parts of the circuit and minimizes the current consumption. All I/O interface pins are set to predefined states (high, low or high-z) when in Standby mode.

To end Standby mode set PDn high and reload firmware.

5.4 Power Save

Power save is an energy saving mode where SPB209A is only listening at regular intervals for the beacons transmitted from an access point and is set in sleep mode in between. During this sleep mode, firmware is kept in RAM but all not needed functions are turned off. Since the receive time is very short compared to the listening interval the average current consumption is reduced significantly.
The timing of the listening interval is based on the low power oscillator clock generated internally.

5.5 Interfaces

The SPB209A is equipped with a number of interfaces that can be set up in various ways by the value on GPIO2 and GPIO3 during boot, see section 5.5.1.

5.5.1 Host Interface SDIO and UART

The SDIO interface is SDIO 4-bit mode. For timing characteristics and trigger level see Figure 3-1 and Table 3-5, Table 3-6, Table 3-7 and Table 3-8.

The High Speed UART interface default supporting Baud Rates from 1200 up to 2764800 bps, 8 bits, no parity, 1 stop bit.

Both GPIO2 and GPIO3 have internal pull-up and only needs to be connected via a 100kOhm resistor to GND to be set low (0). For high level (1) the pin can be left unconnected. Table 5-1: Host Interface Selection shows the different options. The default is to leave GPIO2 and GPIO3 unconnected (11) and SDIO as host interface for all services.

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GPIO2	GPIO3	WLAN Host Interface	BT/BLE Host Interface	FW Download interface	FW Download mode
0	0	SDIO	UART	SDIO	Serial
0	1	SDIO	SDIO	SDIO	Parallel
1	0	SDIO	UART	SDIO+UART	Parallel
1	1	SDIO	SDIO	SDIO	Serial

Table 5-1: Host Interface Selection

5.5.2 PCM Interface

PCM interface is used for BT audio and can operate in master or slave mode. The interface supports the following:

- 8, 13, 14, 15 or 16-bit samples
- 4 slots per frame with up to 16-bits per slot
- Long or short frame sync

5.5.3 Host Wake up

Wake up command via the SDIO interface. This is the normal wake up and is implemented in the FW.

There are options to use defined GPIO:s for Host Wake-up or opposite for SPB209A Wake-Up involving both WLAN and BT. Below table outline the options.

GPIO No.	Function
GPIO1	WLAN to Host Wake-up
GPIO13	BT to Host Wake-up
GPIO14	Host to WLAN Wake-up
GPIO15	Host to BT Wake-up

5.5.4 RF Interface

The RF output pin impedance is 50 ohm and shall be connected to an antenna with VSWR much better than 2:1.

RF interfaces are not valid for antenna option B as the RF module have an integrated antenna

5.6 General Application Information

5.6.1 Design directions

The design using the SPB209A must be performed according to good RF design considerations. All the leads shall be as short as possible between the circuit pins and the external components. Highest priority has the RF-port to antenna strip line.

5.6.2 Soldering

The SPB209A uses a LGA type package. The recommended solder profile is pictured in Figure 5-1.

Before assembly it is recommended to bake SPB209A for 8 days at 40°C and RH<5% in Tape&Reel or for 16 hours at 125°C with no packaging.
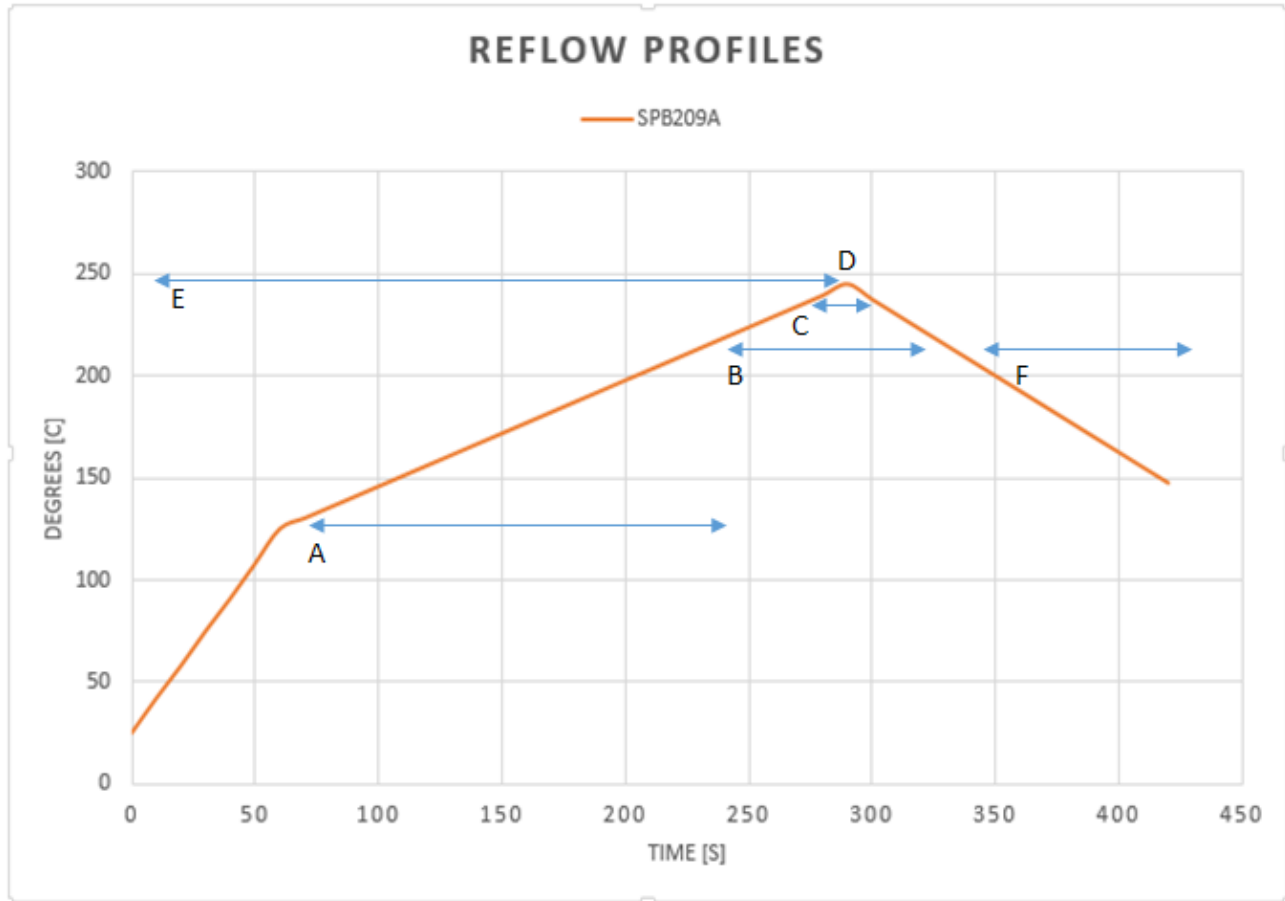

Figure 5-1: Reflow Temperature Profile

Item	Description	Temp	Time
A	Preheat ramp up rate	125-217°C	150-210s
B	Time at >217° C	>217°C	60-90s
C	Wetting time	>235°C	10-30s
D	Peak temperature	245°C	
E	Time from room to peak	25-245°C	240-360s
F	Ramp down temperature	<1°C/s	

Table 5-2: Solder Profile Specification

5.6.3 Environmental statement

The SPB209A is designed and manufactured to comply with the RoHS and Green directives.

6   PACKAGE SPECIFICATION

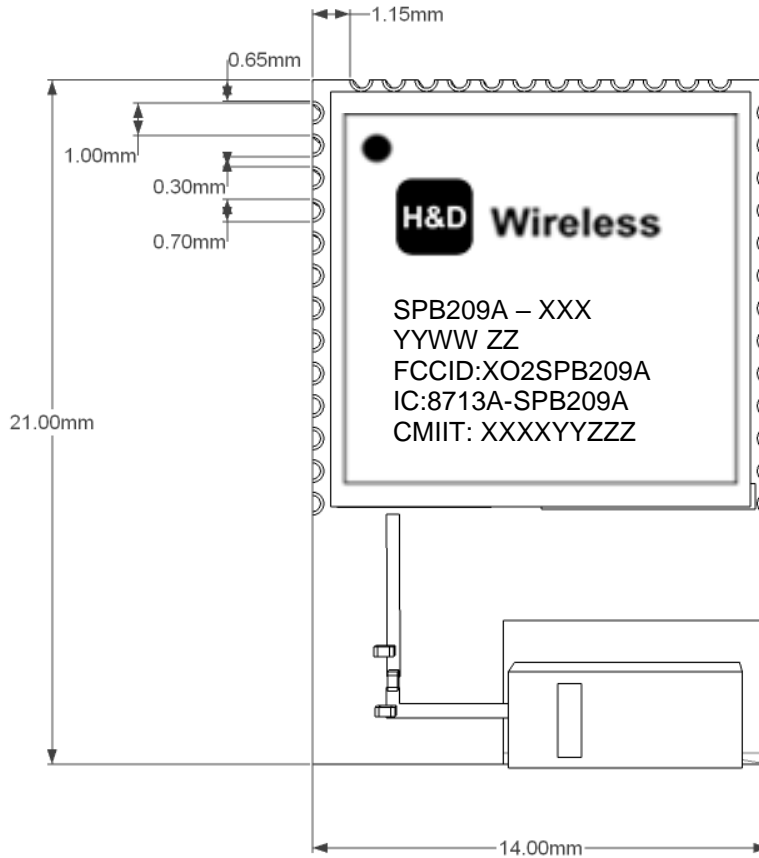## 6.1   Mechanical SPB209A PCB Module (Antenna Option B)
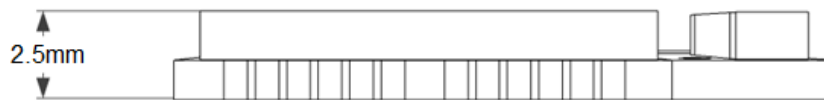

Figure 6-1: Top view (Antenna Option B)

Figure 6-2: Side view

6.2 Mechanical SPB209A PCB Module (Antenna Option R)
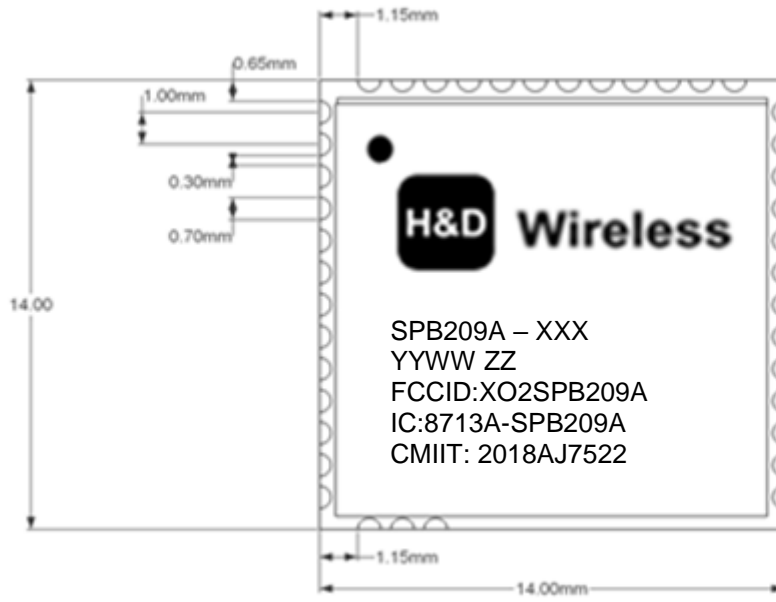

Figure 6-3: Top view (Antenna Option R)

Figure 6-4: Side View

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6.3 Marking SPB209A

The label on the EMC Shield is imprinted with the regulatory IDs and lot number.

6.4 Mounting Information

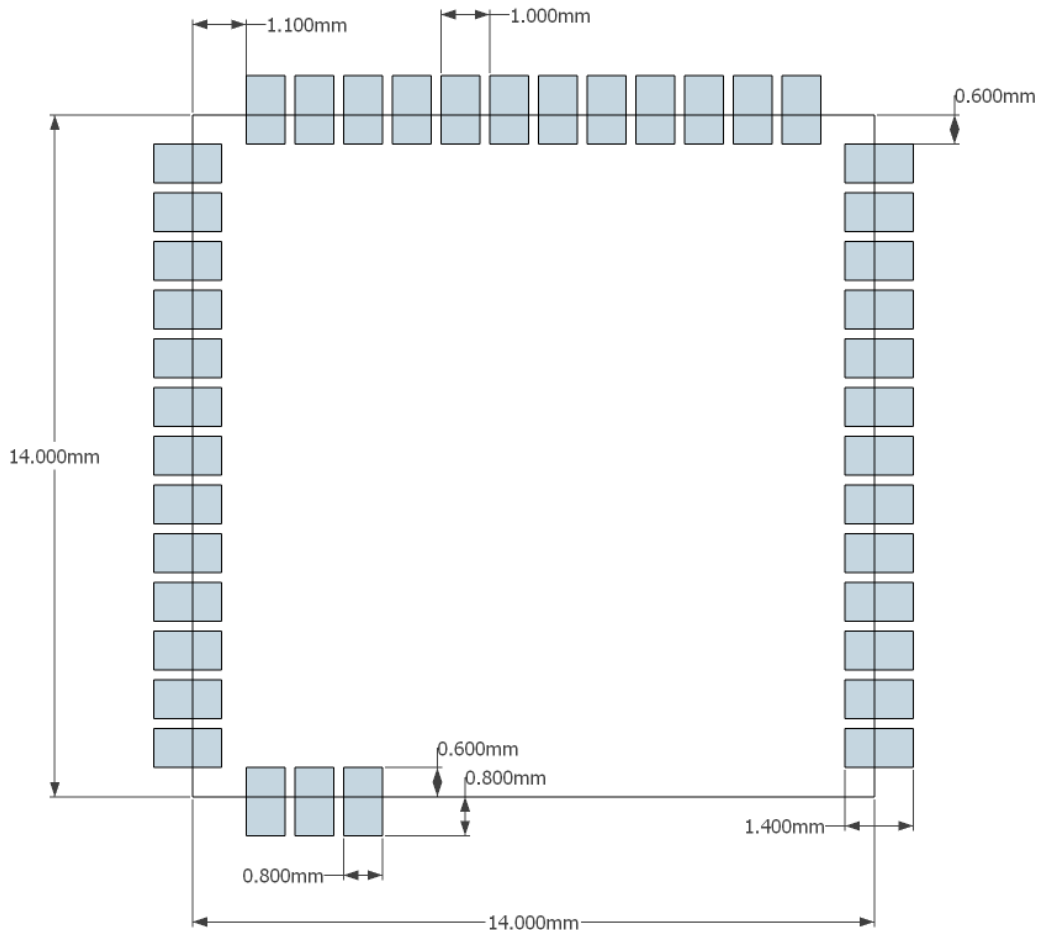### 6.4.1 Recommended Land Patterns for SPB209A Shielded Module

Figure 6-5:SPB209A-R Module Land Pattern

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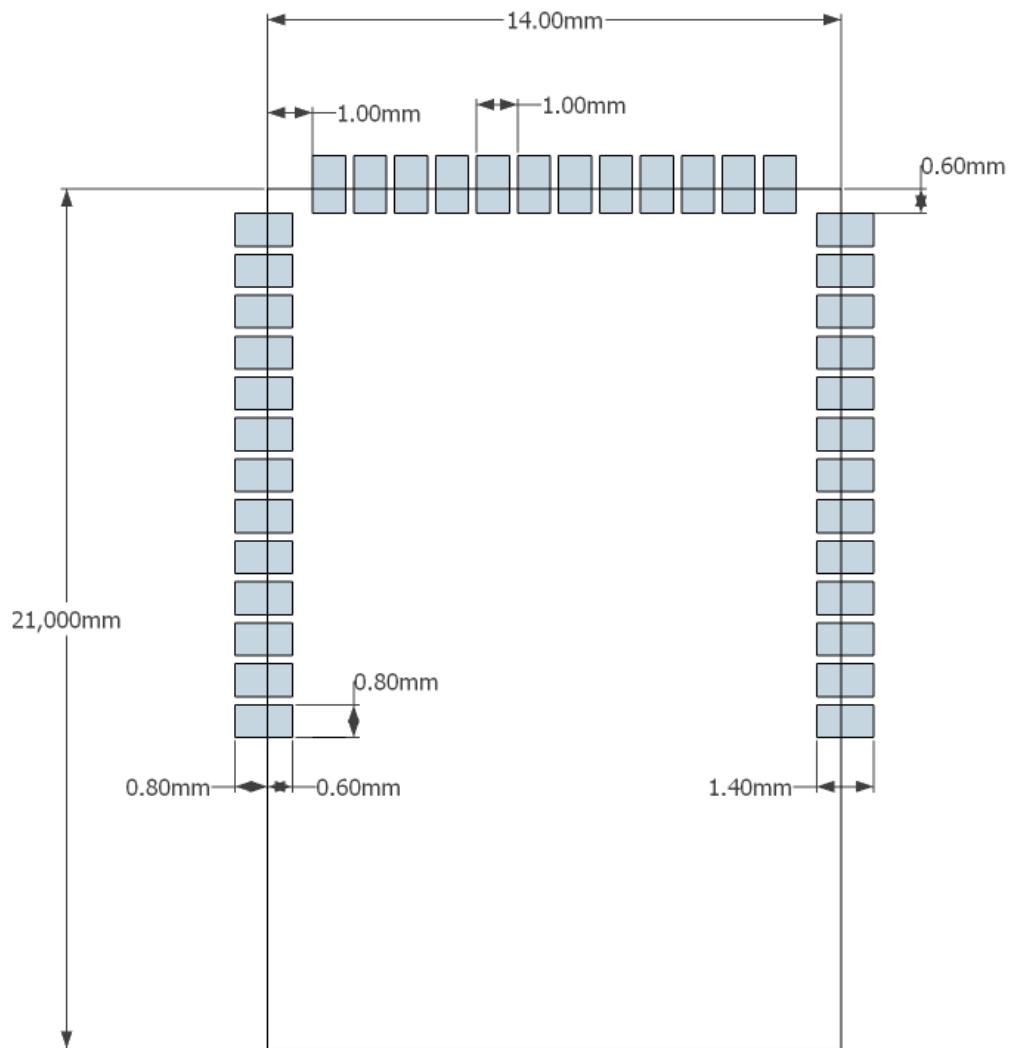
Figure 6-6: SPB209A-B Module land pattern

Place no via holes or exposed metal under the module, but it is recommended to fill as much as possible with ground.

For the module with integrated chip antenna keep an area free of all metal around the antenna, see Figure 6-1: Top view (Antenna Option B).

If possible, it is recommended to place the module at the edge of the PCB with the antenna portion outside the PCB edge for the best RF performance.

7 STANDARDS COMPLIANCE

7.1 IEEE/IETF

Standard	Revision	Description
802.11	802.11^{TM} –R2003	WLAN MAC& PHY
802.11ac	IEEE 802.11ac	Amendment to IEEE 802.11, wider channels and higher order modulation
802.11a	IEEE 802.11a-1999	OFDM waveform at 5.8 GHz
802.11b	802.11^{TM} –R2003	High Rate DSSS (5,5/11 Mbit/s)
802.11d	802.11^{TM} –R2003	Operation in different regulatory domains
802.11e	-2005	Quality of Service
802.11g	-2003	Extended rate PHY (ERP-PBCC, DSS-OFDM)
802.11i	-2004	Security enhancements
802.11n	-2009	WLAN MAC&PHY Amendment 5
802.11r	-2008	Amendment 2: Fast Basic Service Set (BSS) Transition
802.11h	1997 edition	Bridge tunneling
802.11w	-2009	Protected Management Frames (PMF)
RFC1042	Inherent	Frame encapsulation

Table 7-1: Applicable IEEE standards

7.2 WiFi

Specification	Description	Revision
Wi-Fi 802.11b with WPA system interoperability test plan for IEEE 802.11b devices	802.11b devices with WPA	2.1
WiFi 802.11g with WPA system inter operability test plan	802.11g devices with WPA	2.0
WMM (including WMM Power Save)		Ver 1.2
WPS (Wireless Protected Setup)		

Table 7-2: Applicable WiFi standards

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7.3 Regulatory

Country	Approval authority	Regulatory	Frequency band
USA	FCC	FCC ID: XO2SPB209A	2.412 GHz -2.472 GHz 5.180 GHz – 5.825 GHz
Canada	IC	IC: 8713A-SPB209A	2.412 GHz -2.472 GHz 5.180 GHz – 5.825 GHz
Europe		ETSI/EN	2.412 GHz -2.472 GHz 5.180 GHz – 5.700 GHz
China	SRRC	CMIIT ID: 2018AJ7522	2.412 GHz -2.472 GHz 5.180 GHz – 5.825 GHz

Table 7-3: Regulatory standards

7.3.1 FCC (United States of America)

This equipment complies with Part 15 of the FCC rules and regulations.
To fulfill FCC Certification requirements, an OEM manufacturer must comply with the following regulations:

1. The modular transmitter must be labeled with its own FCC ID number, and, if the FCC ID is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following:

Example of label required for OEM product containing SPB209A module

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Contains FCCID: X02SPB209A

The enclosed device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (i) this device may not cause harmful interference and (ii) this device must accept any interference received, including interference that may cause undesired operation.

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2. Only antennas approved may be used with the SPB209A module. The SPB209A module may be integrated with custom design antennas which OEM installer must authorize following the FCC 15.21 requirements.

The customer will need to sign a Software Configuration Control Agreement declaring the integration responsibility of the SPB209A WLAN/BT product when it comes to making sure compliance to regulatory domain.

IMPORTANT: The integrator must install and use specific antenna(s) and reference design as noted in the "Hardware Design Guide SPB209A Application Note" and must follow the specific software configuration guidelines specified. This "Hardware Design Guide SPB209A Application Note" is restricted and available only under fully executed NDA.

IMPORTANT: This equipment 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 15.19).

The internal / external antenna(s) used for this mobile transmitter must 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.

This device is approved as a mobile device with respect to RF exposure compliance, and may only be marketed to OEM installers. Use in portable exposure conditions (FCC 2.1093) requires separate equipment authorization.

IMPORTANT: Modifications not expressly approved by this company could void the user's authority to operate this equipment (FCC section 15.21).

IMPORTANT: The finished product is required to comply with all applicable FCC equipment authorizations regulations, requirements and equipment functions not associated with the transmitter module portion. Compliance for unintentional radiators (Part 15 Subpart B "Unintentional Radiators"), such as digital devices, computer peripherals, radio receivers, etc. must be demonstrated.

7.3.2 ISED (Canada)

The device complies with Industry Canada's licence-exempt RSSs. 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.

Cet appareil est conforme aux normes d'exemption de licence RSS d'Industry Canada. Son fonctionnement est soumis aux deux conditions suivantes:
  (1) cet appareil ne doit pas causer d'interférence, et
  (2) cet appareil doit accepter toute interférence, notamment les interférences qui peuvent affecter son fonctionnement.

The host product shall be properly labelled to identify the modules within the host product.

The ISED Canada certification label of a module shall be clearly visible at all times when installed in the host product; otherwise, the host product must be labelled to display the ISED Canada certification number for the module, preceded by the word "Contains" or similar wording expressing the same meaning, as follows:

Contains IC: 8713A-SPB209A

Le produit hôte devra être correctement étiqueté, de façon à permettre l'identification des modules qui s'y trouvent.

L'étiquette d'homologation d'un module ISED Canada devra être posée sur le produit hôte à un endroit bien en vue, en tout temps. En l'absence d'étiquette, le produit hôte doit porter une étiquette sur laquelle figure le numéro d'homologation du module ISED Canada, précédé du mot « contient », ou d'une formulation similaire allant dans le même sens et qui va comme suit:

Contient IC: 8713A-SPB209A

7.3.3 ETSI (Europe)

The SPB209A module has been certified for use in European union countries according to ETSI EN 300 328 (Electromagnetic compatibility and Radio spectrum matters for equipment operating in the 2,4 GHz ISM band using spread spectrum modulation techniques). This standard is harmonized within the European Union and covering essential requirements under article 3 of the Radio Equipment Directive (RED).

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If the SPB209A module is incorporated into a product, the manufacturer must ensure compliance of the final end-user product to the European harmonized EMC and low voltage/safety standards. A declaration of conformity must be issued for the product including compliance references to these standards. Underlying the declaration of conformity a technical construction file (TCF), including all relevant test reports and technical documentation, must be issued and kept on file as described in Annex II of the Radio Equipment Directive.

Furthermore, the manufacturer must maintain a copy of the SPB209A module documentation and ensure the final product does not exceed the specified power ratings, antenna specifications, and/or installation requirements as specified in the user manual. If any of these specifications are exceeded in the final product, a complete re-test must be made in order to comply with all relevant standards as basis for CE-marking. A submission to notified body must be used only if deviations from standards have been found or if non-harmonized standards have been used.

7.3.4 SRRC (State Radio Regulatory Commission of P. R. China)

This equipment is approved by SRRC (State Radio Regulatory Commission of P. R. China). The assigned CMIIT ID is: CMIIT ID 2018AJ7522
Integrating the SPB209 into a product, the manufacturer must ensure compliance of the final end-user product to the according national standards.

8 SALES

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Sweden

E-mail: sales@hd-wireless.se
Support page: support.hd-wireless.com
Support: support@hd-wireless.se

Local sales offices and distributors see **www.hd-wireless.com**

9   REFERENCE DESIGN USING SPB209A

This document describes how to use the SPB209A module in a customer application.
See support.hd-wireless.com for the complete list of reference designs and other support documents.

See the document "1453-SPB209A_Hardware_Design_Guide" for more information.

10 TRADEMARKS

- Wi-Fi is a trademark of Wi-Fi Alliance
- Bluetooth is a trademark of Bluetooth Special Interest Group.