December 2016   Version 2.2

Applications

- Industrial Automation
- Security & Building Automation
- Smart Home Appliances
- IoT and M2M Connectivity
- Wi-Fi/BLE Gateway
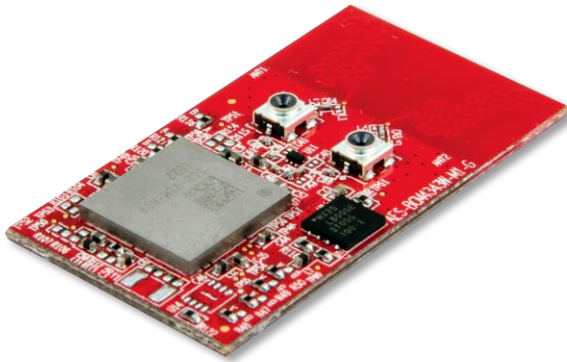
Description

The Avnet AES-BCM4343W-M1-G module is a high performance, Wi-Fi and Bluetooth/BLE combo module that includes a programmable ARM® Cortex™ M4 microprocessor for running user application code. The module is ideal for low-power Internet of Things (IoT) enabled sensor and actuator based devices that need wireless connectivity to cloud services. The compact 35 x 20mm LGA package makes the module a perfect fit for small, embedded applications.

This Avnet SoC Module is pre-certified, thus minimizing development time and certification costs. The module combines an advanced Cypress® 2.4GHz 802.11 b/g/n and Bluetooth® 4.1 SoC with 8Mb of serial Flash and a ST Microelectronics STM32F411 ARM® Cortex™ M4 MCU supporting 512KB Flash and 128KB SRAM. Several of the M4 MCU peripheral functions are made available on the module I/O, allowing for easy connection to user specified interfaces. Advanced security capabilities are available with an optional authentication chip.

Dual onboard fractal PCB antennas provide antenna diversity for optimized RF performance.

Features

- Based on integrated SIP device that includes:
  - Combo Wi-Fi & BT/BLE SoC (BCM4343W)
  - Host Application Processor (STM32F411)
- BCM4343W WLAN radio:
  - 2.4 GHz IEEE 802.11b/g/n(20), Channels 1-11 for USA and Canada
- BCM4343W Bluetooth radio:
  - Bluetooth® v4.1 (LE and Classic modes)
- STM32F411 ARM® Cortex™ M4 microcontroller features include:
  - 512KB Flash and 128KB SRAM
  - Multiple peripheral interfaces:
    - Digital I/O – 6
    - Analog inputs – 4
    - I2C Ports – 2
    - SPI Port – 1
    - UART Ports - 2
  - JTAG programing and debug port
- 8Mb SPI serial flash for storage of firmware upgrades and user accessible R/W file system
- Antenna Diversity implemented using onboard dual fractal PCB antennas
- Concurrent WLAN and Bluetooth operation (coexistence algorithm for shared antennas)
- Comprehensive software development tools:
  - Cypress WICED™ SDK
  - ZentriOS SDK
- Compact 35 x 20 mm 45-pin LGA package
- Operating temperature: -40° to +85° C
- FCC, IC and CE certifications: currently pending
- BT SIG QDID: coming soon

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Document Control

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	0.1	5/2/16	Initial release
	0.2	5/2/16	Updated Module Features
	0.3	5/2/16	Added SPI flash and Antenna details
	1.0	6/27/16	Tape & Reel Packaging and Antenna Options sections updated
	2.0	11/16/16	Specs for low-power modes added References to Broadcom removed Reference to BT/BLE 4.2 removed Option of using external antennas removed
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	2.2	12/23/16	256-QAM (TurboQAM) mode removed Data rate max reduced to 65 Mbps Regional contact info updated
Comments:			

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3 Functional Overview

This 2.4GHz wireless module provides a complete combo Wi-Fi/BT/BLE and MCU solution for cost-effective embedded-wireless IoT applications. Based on latest-generation Cypress BCM4343W Wireless SoC silicon, this high performance combo module provides a unique solution with Wi-Fi and Bluetooth radios, ARM Cortex-M4 host processor and expansion SPI Flash memory, plus versatile dual onboard and dual external antenna capabilities, all in a compact 35 mm x 20 mm, easy to mount (0.1" pitch LGA) form-factor module, qualified for operation across the full industrial temperature range

3.1 Microcontroller

The AES-BCM4343W-M1-G module includes an on-board microcontroller (MCU) that interfaces with the Cypress BCM4343W radio for communication and acts as the system controller for user applications. Based on the ST Microelectronics STM32F411, the MCU supports the following features:

- STM32F411 ARM 32-bit Cortex™-M4 (with FPU), @ 100 MHz

- On-chip memory: 512 kbytes Flash, 128 Kbytes SRAM

- Multiple serial communication interfaces: SPI, USART, PCM

- Sensor applications support: ADC, I2C, I2S, GPIO, Timers

- Cypress WICED SDK and ZentriOS SDK based cloud connected application examples are provided (AWS IoT, IBM Bluemix, ThingSpeak and others…)

- Debug support: JTAG interface

Application code for the module can be developed using Cypress's WICED Software Development Kit (SDK) or Zentri's ZentriOS SDK.

Additional details on the STM32F411 MCU features, specifications, and programming modes can be obtained from the STM32F411 datasheet.

3.2 SPI Flash Memory

An 8 Mbit SPI Flash memory (Macronix MX25L800EZUI12G) is included on the module for the storage of BCM4343W firmware, static webpages, built-in documentation, images, etc. The STM32F411 MCU's SPI1 peripheral interface, clocked at 50MHz, is used to communicate with this memory.

The SPI1 interface parameters are defined in the **BCM94343W_AVN** platform files of the Cypress WICED SDK development environment. When building an application in WICED SDK, adding the **download_apps** parameter to the make target command string, ensures that the BCM4343W firmware is written to- and loaded from this SPI flash

SPI1 Signal Name	MCU Pin Name	WICED SDK Pin Name
SPI_FLASH_CS	PA4	WICED_GPIO_5
SPI_FLASH_CLK	PA5	WICED_GPIO_6
SPI_FLASH_MISO	PA6	WICED_GPIO_7
SPI_FLASH_MOSI	PA7	WICED_GPIO_8

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3.3 WLAN

- Cypress BCM4343W combo single-chip MAC, Baseband and RF device (includes ARM Cortex-M3 processor)

- Frequency Band: Single-band, 2.4 GHz only

- WLAN Network Standards supported: 802.11b, 802.11g, 802.11n (single stream)

- Modulation Modes: CCK and OFDM with BPSK, QPSK, 16QAM, 64QAM

- Supported Data Rates:
  - IEEE 802.11b 1 – 11 Mbps
  - IEEE 802.11g 6 – 54 Mbps
  - IEEE 802.11n 7.2 – 65 Mbps (2.4 GHz only)

- Hardware Encryption
  - WEP, WPA / WPA2 Personal

- Advanced 1x1 802.11n Features:
  - Full/Half Guard Interval
  - Frame Aggregation
  - Space Time Block Coding (STBC)
  - Low Density Parity Check (LDPC) Encoding

- SDIO host interface for WLAN subsystem (between BCM4343W and STM32F411 MCU)

- Optional WLAN Debug Interfaces:
  - WLAN JTAG and WLAN Debug UART interfaces are pinned-out to support special cases (most application development will not require this)

3.4 Bluetooth

- Bluetooth 4.1 (supporting Bluetooth Low Energy) with backward compatibility

- Bluetooth Smart Ready (support for Dual-mode Bluetooth Classic and BLE operation)

- Advanced Algorithm for support of Bluetooth/BLE and Wi-Fi coexistence (for concurrent WLAN and Bluetooth operation)

- Dedicated high-speed UART for Bluetooth host interface

3.5 Antennas

- Onboard dual fractal PCB antennas (Cypress patented PCB trace antennas)

- Miniature switched RF connectors. These are for test purposes only!

- Transmit and Receive antenna diversity

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4 Block Diagram

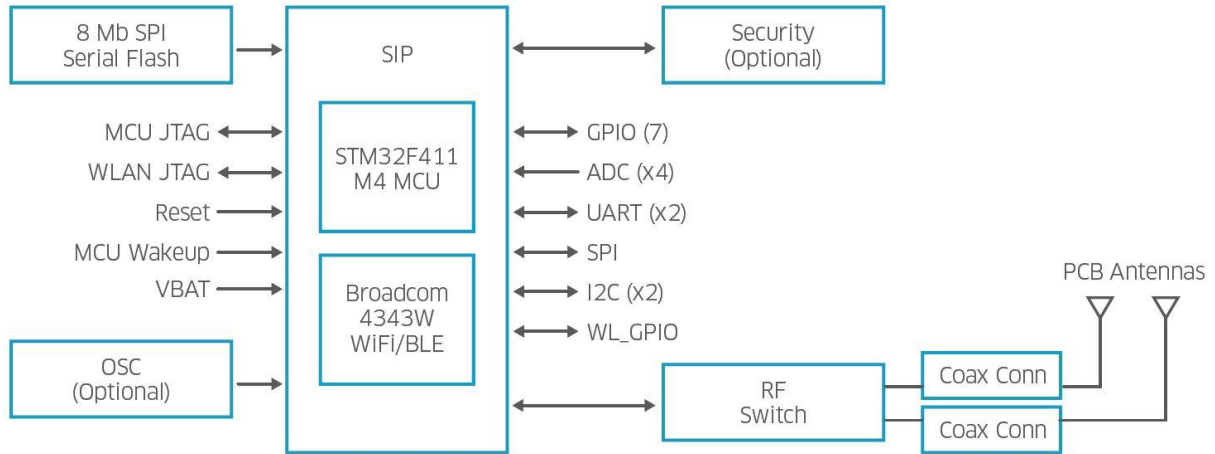Figure 1 shows a functional block diagram of the AES-BCM4343W-M1-G module.

Figure 1 – AES-BCM4343W-M1-G Module Block Diagram

5 Module Pin Descriptions

5.1 Pin Descriptions

Module			MCU	WICED SDK	
Pin No.	Signal Name	Type	Pin Name	Pin Name	Description*
1	GND	SIG	-	-	Ground
2	MICRO_I2C2_SCL	I/O	PB10	WICED_GPIO_20	I2C #2 SCL
3	MICRO_I2C2_SDA	I/O	PB11	WICED_GPIO_21	I2C #2 SDA
4	MICRO_SPI2_SCK	I/O	PB13	WICED_GPIO_23	SPI #2 SCK
5	MICRO_SPI2_SSN	I/O	PB12	WICED_GPIO_22	SPI #2 SSN
6	MICRO_SPI2_MISO	I/O	PB14	WICED_GPIO_24	SPI #2 MISO
7	MICRO_SPI2_MOSI	I/O	PB15	WICED_GPIO_25	SPI #2 MOSI
8	USART6_TX_I2S2_MCK	I/O	PC6	WICED_GPIO_13	USART #6 TX
9	USART6_RX_I2S2_CK	I/O	PC7	WICED_GPIO_14	USART #6 RX
10	MICRO_UART_TX	I/O	PA9	WICED_GPIO_9	USART #1 TX
11	MICRO_UART_RX	I/O	PA10	WICED_GPIO_10	USART #1 RX
12	MICRO_UART_CTS	I/O	PA11	WICED_GPIO_15	USART #1 CTS
13	MICRO_UART_RTS	I/O	PA12	WICED_GPIO_16	USART #1 RTS
14	WIFI_GPIO_1	I/O	PD13	-	WLAN Tx/Rx Activty (Driven by GPIO_1 of BCM4343W device)
15	GND	SIG	-	-	Ground
16	VDD_3V3_SIP	SIG	-	-	3.3V
17	GND	SIG	-	-	Ground
18	WL_JTAG_TDI	N/C	-	-	No Connect (requires hardware modification for connection)
19	WL_JTAG_TDO	N/C	-	-	No Connect (requires hardware modification for connection)
20	MICRO_JTAG_TMS	I/O	PA13	-	JTAG TMS
21	MICRO_JTAG_TCK	I/O	PA14	-	JTAG TCK
22	MICRO_JTAG_TDI	I/O	PA15	-	JTAG TDI
23	MICRO_JTAG_TDO	I/O	PB3	-	JTAG TDO
24	MICRO_JTAG_TRSTN	I/O	PB4	-	JTAG RESETN
25	GND	SIG	-	-	Ground
26	VBAT_SIP	SIG	-	-	Power supply for backup when VDD_3V3_SIP is not present
27	GND	SIG	-	-	Ground
28	MICRO_I2C1_SCL	I/O	PB6	WICED_GPIO_11	I2C #1 SCL
29	MICRO_I2C1_SDA	I/O	PB7	WICED_GPIO_12	I2C #1 SDA
30	MICRO_GPIO_3	I/O	PC1	WICED_GPIO_27	GPIO 3
31	MICRO_GPIO_2	I/O	PC0	WICED_GPIO_26	GPIO 2
32	MICRO_GPIO_4	I/O	PC2	WICED_GPIO_28	GPIO 4
33	MICRO_GPIO_5	I/O	PC3	WICED_GPIO_17	GPIO 5
34	MICRO_GPIO_6	I/O	PB9	WICED_GPIO_19	GPIO 6
35	MICRO_GPIO_1	I/O	PB8	WICED_GPIO_18	GPIO 1
36	MICRO_RST_N	I/O	NRST		RESET_N
37	MICRO_ADC_IN1	I/O	PA1	WICED_GPIO_2	ADC INPUT #1
38	MICRO_WKUP	I/O	PA0	WICED_GPIO_1	MCU WAKEUP
39	GND	SIG	-	-	Ground
40	MICRO_ADC_IN2	I/O	PA2	WICED_GPIO_3	ADC INPUT #2
41	MICRO_ADC_IN3	I/O	PA3	WICED_GPIO_4	ADC INPUT #3
42	MICRO_GPIO_0	I/O	PB0	WICED_GPIO_29	GPIO 0
43	MICRO_ADC_IN15	I/O	PC5	WICED_GPIO_30	ADC INPUT #15
44	GND	SIG	-	-	Ground
45	GND	SIG	-	-	Ground

- Denotes 5V tolerant I/O
- Standard 3.3V I/O
- Bidirection reset pin with embedded weak pullup

* Note the pin descriptions shown are arbitrary for most MCU connected signals

5.2 Pin Definitions

Of the 44 pads located along 3 edges of the module, 8 connect to GND and 2 are power connections Most of the remaining module pads are internally connected to the STM32F411 MCU. For this reason, the signal definition of these pins is somewhat arbitrary given that the pin modes can be configured via software.

The signal names provided in the Pin Description table shown in section 4.1 align with the names provided in the Cypress WICED SDK **platform.h** file. Users have the ability to modify these configurations and definitions as explained in the STM32F411 datasheet.

6 Electrical Specifications

For electrical characteristics of the module digital I/O's connected to the internal STM32F411 MCU, refer to the STM32F411 datasheet (Document ID 026289 Rev 4 or later).

6.1 Absolute Maximum Ratings

Parameter	Min	Max	Unit
VDD_3V3_SIP	0	4	Volts
VBAT_SIP	0	4	Volts
Voltage on Digital I/Os	-0.3	4	Volts
Voltage on Analog Inputs	-0.3	4	Volts
Supply Ripple	-2	2	%
Storage Temperature	-40	+85	ºC
Operating Temperature	-40	+85	ºC

6.2 Recommended Operating Conditions

Parameter	Min	Typ	Max	Unit
VDD_3V3_SIP	3.0	3.3	3.6	Volts
VBAT_SIP	2.0	3.3	3.6	Volts
Voltage on Digital I/Os	0	3.3	VDD_3V3_SIP	Volts
Voltage on Analog Inputs	0	3.3	VDD_3V3_SIP	Volts
Humidity Range*	0		95	%
Operating Temperature	-40	25	+85	ºC

* Non-condensing, relative humidity

6.3 Power Supply Requirements

Parameter	Min	Typ	Max	Unit
VDD_3V3_SIP	3.0	3.3	3.6	Volts
VDD_3V3_SIP*	-	-	-	mA
VBAT_SIP	2.0	3.3	3.6	Volts
VBAT_SIP*	-	-	-	mA

* See Power Consumption figures on next page

6.4 WLAN Power Consumption

Condition: 25deg.C, includes both Wi-Fi and Microcontroller

Parameter	Test Condition (+25 ºC, 3.3V)	Min	Typ	Max	Unit
11b Tx Mode	11 Mbps	-	400		mA
11g Tx Mode	54 Mbps	-	260		mA
11n Tx Mode	MCS7	-	200		mA
11b Rx Mode	11 Mbps	-	46		mA
11g Rx Mode	54 Mbps	-	46		mA
11n Rx Mode	MCS7	-	46		mA

6.5 Bluetooth Power Consumption

Condition: 25deg.C, includes Both Wi-Fi/BT and Microcontroller

Parameter	Test Condition (+25 ºC, 3.3V)	Min	Typ	Max	Unit
Tx Mode	3DH5	-	35		mA
Rx Mode	3DH5	-	16		mA

6.6 Bluetooth Low Energy Power Consumption

Condition: 25deg.C, includes Both Wi-Fi/BT and Microcontroller

Parameter	Test Condition (+25 ºC, 3.3V)	Min	Typ	Max	Unit
Tx Mode	Transmitter and baseband @ 100%	-	35		mA
Rx Mode	Receiver and baseband @ 100%	-	16		mA

6.7 Low Power Modes Power Consumption

Parameter	Device	Test Condition (+25 ºC, 3.3V)	Min	Typ	Max	Unit
Sleep Mode	STM32F411		-	122		uA
	BCM4343W	-	-	1.48		mA
Power Down Mode	STM32F411		-	6.6		mA
	BCM4343W	-	-	6.0		uA
Idle, Unassociated	STM32F411		-	8.6		mA
	BCM4343W	-	-	366		uA

7 RF Specifications

7.1 WLAN RF Characteristics

The AES-BCM4343W-M1-G module complies with the following WLAN features and standards.

Features	Description
WLAN Standards	IEEE 802 Part 11b/g/n (802.11b/g/n single stream n)
Antenna Port	Supports single antenna for Wi-Fi
Frequency Band	2.400 - 2.484 GHz

The RF performance of the AES-BCM4343W-M1-G module is given as follows (@ 3.3V):

Features	Description
Frequency band	2.4000 - 2.497 GHz (2.4 GHz ISM Band)
Number of selectable sub-channels	14 Channels
Modulation	OFDM, DSSS (Direct Sequence Spread Spectrum), DBPSK, DQPSK, CCK, 16QAM, 64QAM
Supported rates	1, 2, 5.5, 11, 6, 9, 12, 24, 36, 48, 54 Mbps & HT20 MCS 0~7
Maximum receive input level	-10dBm (with PER < 8% @ 11 Mbps) -20dBm (with PER < 10% @ 54 Mbps) -20dBm (with PER < 10% @ MCS7)
Output power	17dBm @ 802.11b 13dBM @ 802.11g 12dBM @ 802.11n
Carrier frequency accuracy	+/- 20 ppm (crystal: 26 MHz +/- 10 ppm @ 25 ºC)

7.1.1 Transmitter Specification

7.1.1.1 802.11b Transmitter Specification

Parameter	Test Condition	Min	Typ	Max	Unit
Transmit Output Power Level	1/2/5.5/11 Mbps	-	17	-	dBm
Transmit Center Freq. Tolerance	-	-20	0	20	ppm
Transmit Spectrum Mask	Fc-22MHz<F<FC-11MHz & Fc+11MHz<F<Fc+22MHz (1/2/5.5/11 Mbps; Channel 1~13)	-	-	-30*	dBr
	F<FC-22MHz & F>Fc+22MHz (1/2/5.5/11 Mbps; Channel 1~13)	-	-	-50*	dBr
Transmit Power-On	10% ~ 90%	-	0.3	2*	us
Transmit Power-Down	90% ~ 10%	-	1.5	2*	us
Transmit Modulation Accuracy	1/2/5.5/11 Mbps	-	-17	-10	dB

Note 1 - "*" Indicates IEEE802.11 specification

7.1.1.2 802.11g Transmitter Specification

Parameter	Test Condition	Min	Typ	Max	Unit
Transmit Output Power Level	6/9/12/18/24/36/48/54 Mbps	-	13	-	dBm
Transmit Center Freq. Tolerance	-	-20	0	20	ppm
Transmit Modulation Accuracy	6 Mbps	-	-	-5*	dB
	9 Mbps	-	-	-8*	dB
	12 Mbps	-	-	-10*	dB
	18 Mbps	-	-	-13*	dB
	24 Mbps	-	-	-16*	dB
	36 Mbps	-	-	-19*	dB
	48 Mbps	-	-	-22*	dB
	54 Mbps	-	-	-25*	dB
Transmit Spectrum Mask	@ 11 MHz	-	-	-20*	dBr
	@ 20 MHz	-	-	-28*	dBr
	@ 30 MHz	-	-	-40*	dBr

Note 1 - "*" Indicates IEEE802.11 specification

7.1.1.3   802.11n Transmitter Specification

Parameter	Test Condition	Min	Typ	Max	Unit
Transmit Output Power Level	HT20 MCS 0~7	-	12	-	dBm
Transmit Center Freq. Tolerance	-	-20	0	20	ppm
Transmit Modulation Accuracy	HT20, MCS0~7	-	-	-27*	dB
Transmit Spectrum Mask	@ 11 MHz	-	-	-20*	dBr
	@ 20 MHz	-	-	-28*	dBr
	@ 30 MHz	-	-	-40*	dBr

Note 1 - "*" Indicates IEEE802.11 specification

7.1.2   Receiver Specification

7.1.2.1   802.11b Receiver Specification

Parameter	Test Condition	Min	Typ	Max	Unit
Receiver Minimum Input Level Sensitivity (PER < 8%)	1 Mbps	-80*	-93	-	dBm
	2 Mbps	-80*	-91	-	dBm
	5.5 Mbps	-76*	-89	-	dBm
	11 Mbps	-76*	-86	-	dBm
Receiver Maximum Input Level Sensitivity (PER < 8%)	1/2/5.5/11 Mbps	-10*	-	-	dBm

Note 1 - "*" Indicates IEEE802.11 specification

7.1.2.2   802.11g Receiver Specification

Parameter	Test Condition	Min	Typ	Max	Unit
Receiver Min. Input Level Sensitivity (PER < 10%)	6 Mbps	-82*	-88	-	dBm
	9 Mbps	-81*	-87	-	dBm
	12 Mbps	-79*	-85	-	dBm
	18 Mbps	-77*	-83	-	dBm
	24 Mbps	-74*	-80.5	-	dBm
	36 Mbps	-70*	-78.5	-	dBm
	48 Mbps	-66*	-74	-	dBm
	54 Mbps	-65*	-72	-	dBm
Receiver Max. Input Level Sensitivity (PER < 10%)	6/9/12/18/24/36/48/54 Mbps	-20*	-	-	dBm

Note 1 - "*" Indicates IEEE802.11 specification

7.1.2.3   802.11n Receiver Specification

Parameter	Test Condition	Min	Typ	Max	Unit
Receiver Min. Input Level Sensitivity (PER < 10%)	HT20, MSC0	-82*	-87.5	-	dBm
	HT20, MSC1	-79*	-84	-	dBm
	HT20, MSC2	-77*	-82	-	dBm
	HT20, MSC3	-74*	-80.5	-	dBm
	HT20, MSC4	-70*	-77	-	dBm
	HT20, MSC5	-66*	-72	-	dBm
	HT20, MSC6	-65*	-71	-	dBm
	HT20, MSC7	-64*	-70	-	dBm
	MSC0 ~ MSC7	-20*	-	-	dBm
Receiver Max. Input Level Sensitivity (PER < 10%)	MSC0 ~ MSC7	-20*	-	-	dBm

7.2 Bluetooth RF Characteristics

7.2.1 Transmitter Specification

Parameter	Mode and Condition	Min	Typ	Max	Unit
Transmitter Section					
Frequency Range	-	2402.0	-	2480	MHz
Output Power	GFSK	-	10	-	dBm
	QPSK	-	6	-	dBm
	BPSK	-	6	-	dBm
Power Control Step		2	4	8	dB
Lo Performance					
Initial Carrier Freq. Tolerance	-	-	+/-25	+/-75	KHz
Lock Time	-	-	72	-	uS
Frequency Drift					
DH1 Packet	-	-	+/-8	+/-25	KHz
DH3 Packet	-	-	+/-8	+/-40	KHz
DH5 Packet	-	-	+/-8	+/-40	KHz
Drift Rate	-	-	5	20	KHz/50 us
Frequency Deviation					
00001111 Sequence in Payload (a)	-	140	155	175	KHz
10101010 Sequence in Payload (b)	-	115	140	-	KHz
Channel Spacing	-	-	1	-	MHz

(a) This pattern represents an average deviation in payload

(b) Pattern represents the maximum deviation in payload for 99.9% of all frequency deviations

7.2.2 Receiver Specification

Parameter	Mode and Condition	Min	Typ	Max	Unit
Receiver Section					
Frequency Range	-	2402	-	2480	MHz
Output Power	GFSK, 0.1% BER, 1 Mbps	-	-91	-	dBm
	$\pi/4$-DQPSK, 0.01% BER, 2 Mbps	-	-93	-	dBm
	8-DPSK, 0.01% BER, 3 Mbps	-	-87	-	dBm
Input IP3		-16	-	-	dBm
Maximum Input	-	-	-	-20	dBm

7.3 BLE RF Characteristics

Parameter	Mode and Condition	Min	Typ	Max	Unit
Frequency Range	-	2402	-	2480	MHz
Rx Sense (a)	GFSK, 0.1% BER, 1 Mbps	-	-94	-	dBm
TX Power	-	-	8	-	dBm
Mod Char: Delta f1 Average	-	225	225	275	KHz
Mod Char: Delta f2 max (b)	-	99.9	-	-	%
Mod Char: Ratio	-	0.8	0.95	-	%

Note (a) - The Bluetooth tester is set so that Dirty TX is on

Note (b) - At least 99.9% of all delta F2 max. frequency values recorded over 10 packets must be greater than 185 KHz

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8 Mechanical Specifications

8.1 Mechanical Size

Module dimensions are **35 mm x 20 mm x 2.59 mm** (max) as shown in the figures below.
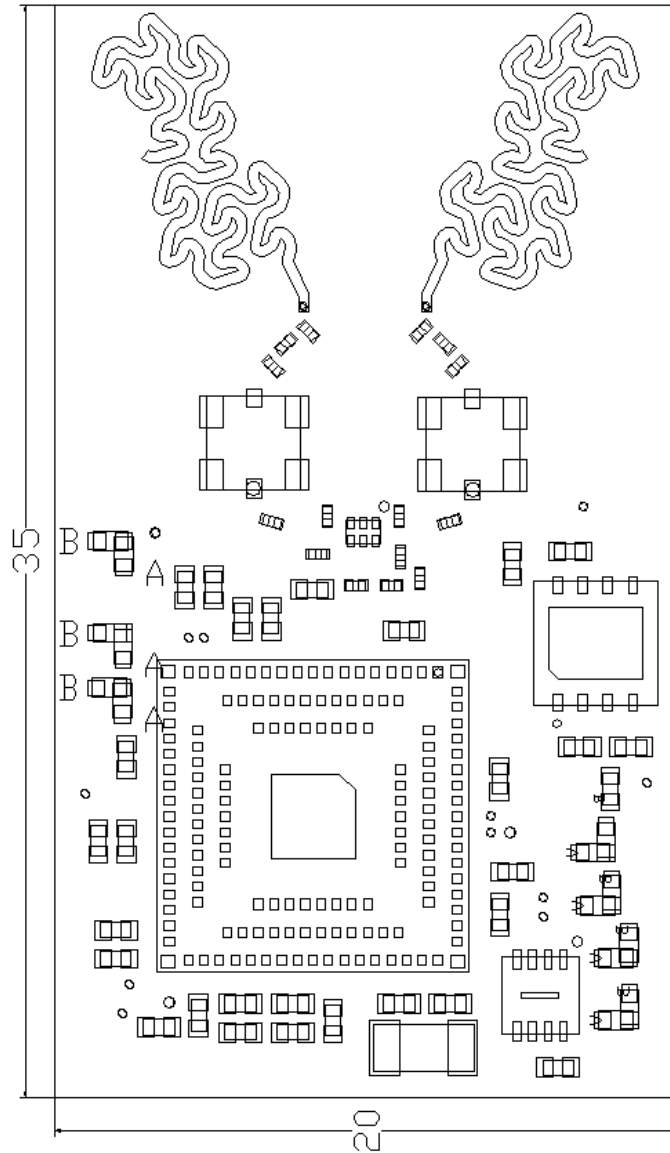

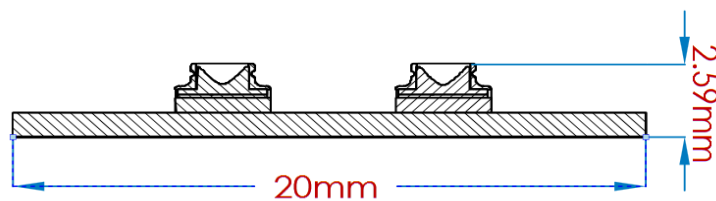**Figure 2 – AES-BCM4343W-M1-G Module Top View**

Figure 3 – AES-BCM4343W-M1-G Module Side View
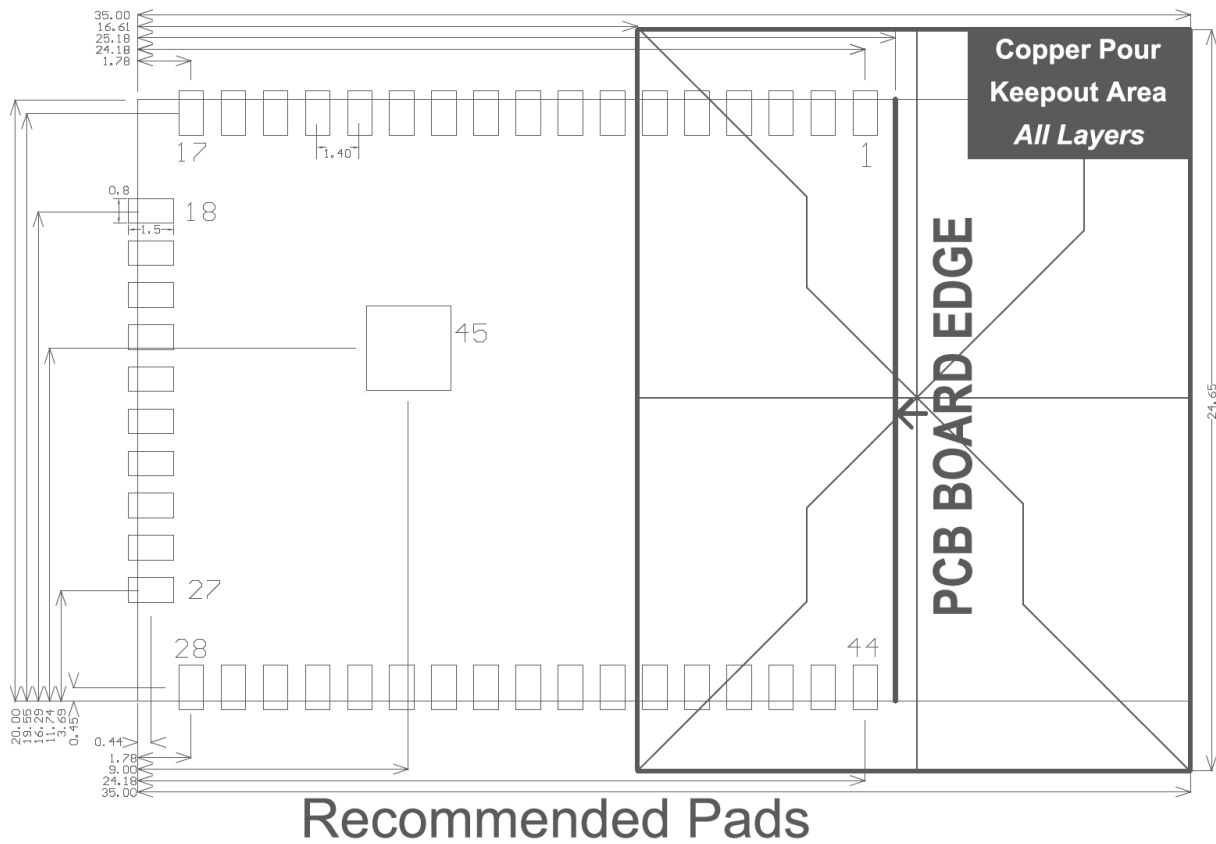
8.2 Module PCB Footprint

Figure 4 – AES-BCM4343W-M1-G Module PCB Footprint
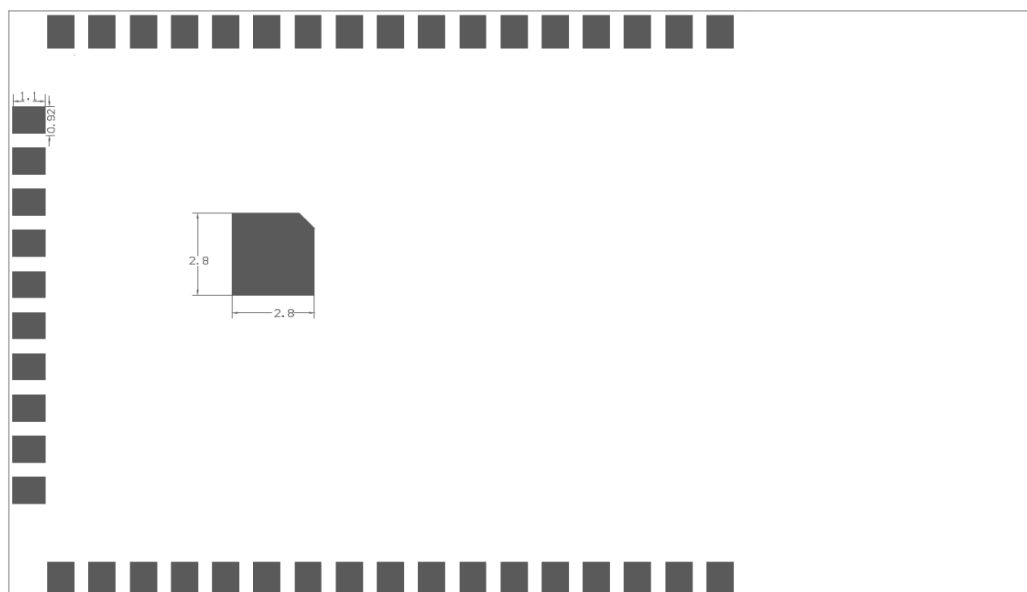
8.3 Module Pad Size

Figure 5 – AES-BCM4343W-M1-G Module Pad Size
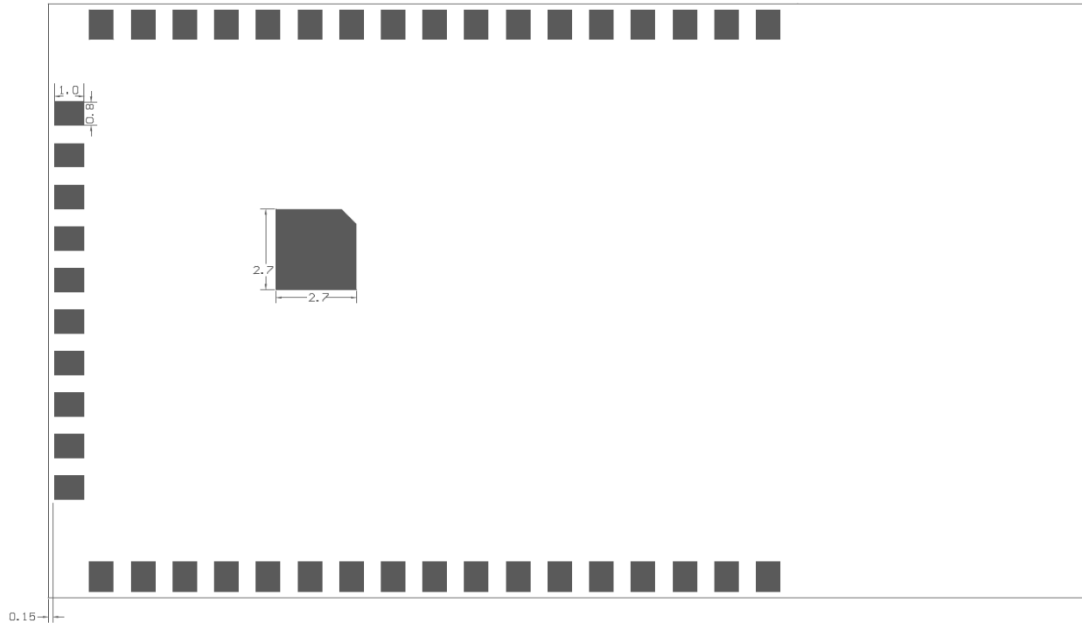
8.4 Recommended Solder Paste Mask

Figure 6 – Recommended Solder Paste Mask Size
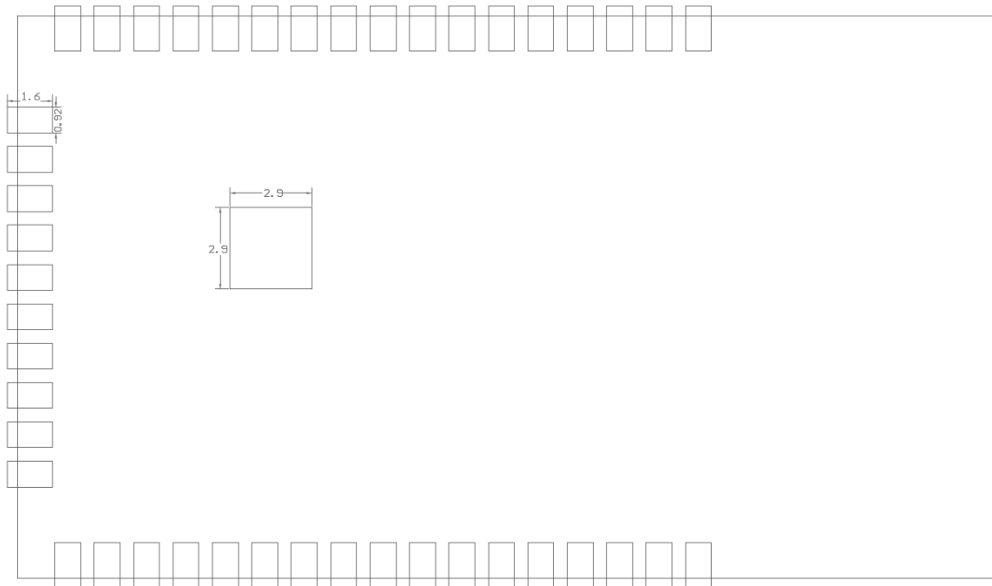
8.5 Recommended Solder Mask

Figure 7 – Recommended Solder Mask Size

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8.6 Tape and Reel Packaging

The AES-BCM4343W-M1-G module is available in tape and reel packaging at quantities of 600 units.

The reel dimensions are 13 inches x 56 mm.

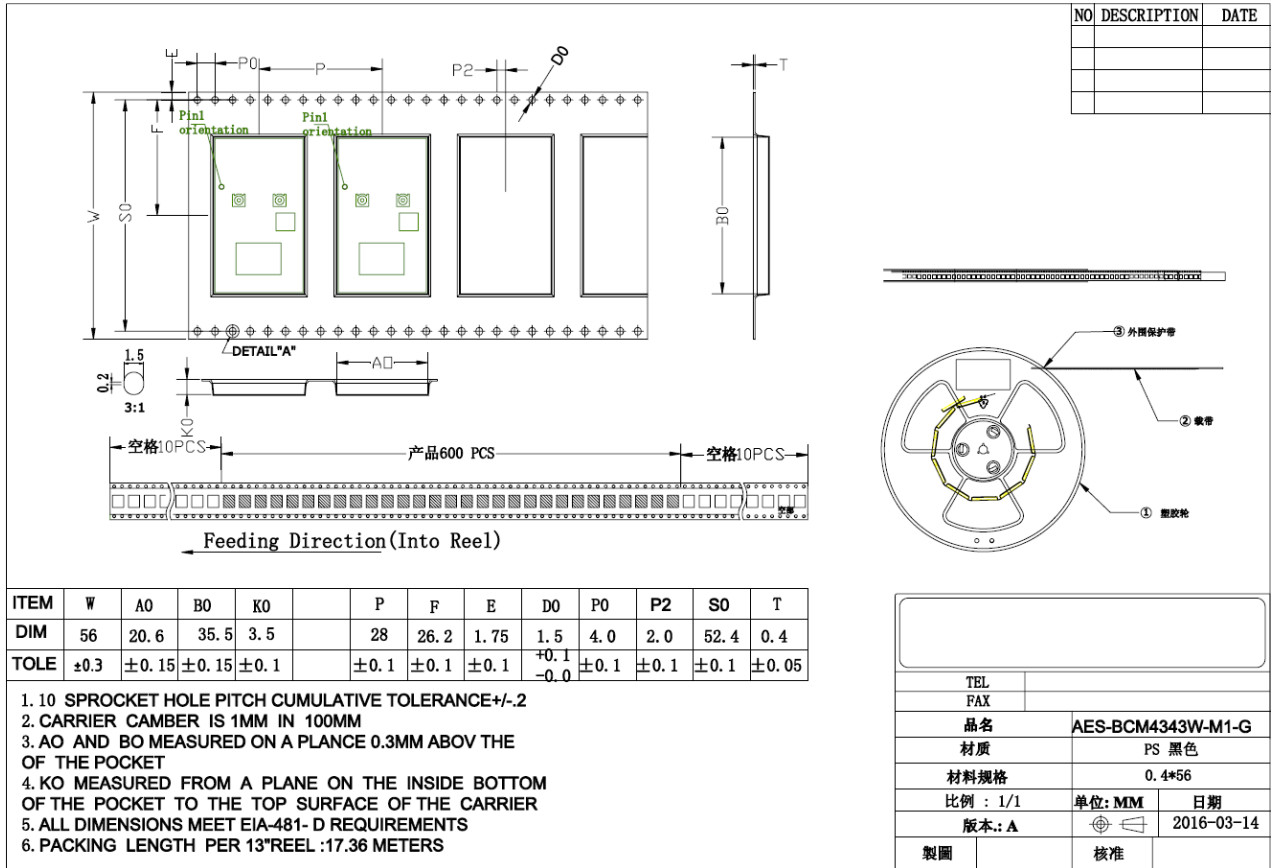The 56 mm tape conforms to the Electronic Components Association Standard EIA-481-D.

ITEM	W	A0	B0	K0	P	F	E	D0	P0	P2	S0	T
DIM	56	20.6	35.5	3.5	28	26.2	1.75	1.5	4.0	2.0	52.4	0.4
TOLE	±0.3	±0.15	±0.15	±0.1	±0.1	±0.1	±0.1	+0.1 −0.0	±0.1	±0.1	±0.1	±0.05

1. 10 SPROCKET HOLE PITCH CUMULATIVE TOLERANCE+/-.2
2. CARRIER CAMBER IS 1MM IN 100MM
3. AO AND BO MEASURED ON A PLANCE 0.3MM ABOV THE OF THE POCKET
4. KO MEASURED FROM A PLANE ON THE INSIDE BOTTOM OF THE POCKET TO THE TOP SURFACE OF THE CARRIER
5. ALL DIMENSIONS MEET EIA-481- D REQUIREMENTS
6. PACKING LENGTH PER 13"REEL :17.36 METERS

TEL	
FAX	
品名	AES-BCM4343W-M1-G
材质	PS 黑色
材料规格	0.4*56
比例：1/1	单位: MM
版本.: A	2016-03-14
制图	核准

Figure 8 – Tape Dimensions

9 Soldering and Cleaning Recommendations

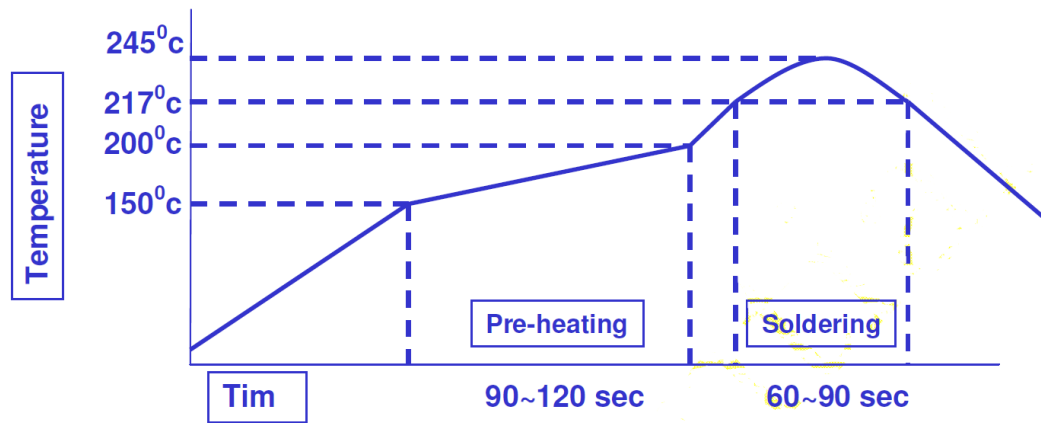## 9.1 Optimum Soldering Reflow Profile

Figure 9 – Recommended Soldering Profile for Lead-Free Solder

Solder joint quality between the module's LGA surface mount pads and their bonding with the host board should meet the appropriate IPC Specification.
(See *IPC-A-610-D Acceptability of Electronic Assemblies*, section 8.2.1 "*Bottom Only Terminations*")

It is recommended that only a single reflow soldering process be permitted for the host board

Any attempts at reworking the module will invalidate warrantee coverage and regulatory certifications

9.2 Cleaning

Cleaning of the populated module is not recommended! Residuals under the module cannot be easily removed by any cleaning process (Water / Solvents / Ultrasonic)

10 Antennas

Two onboard **Fractal PCB antennas** provide antenna diversity and good RF performance.
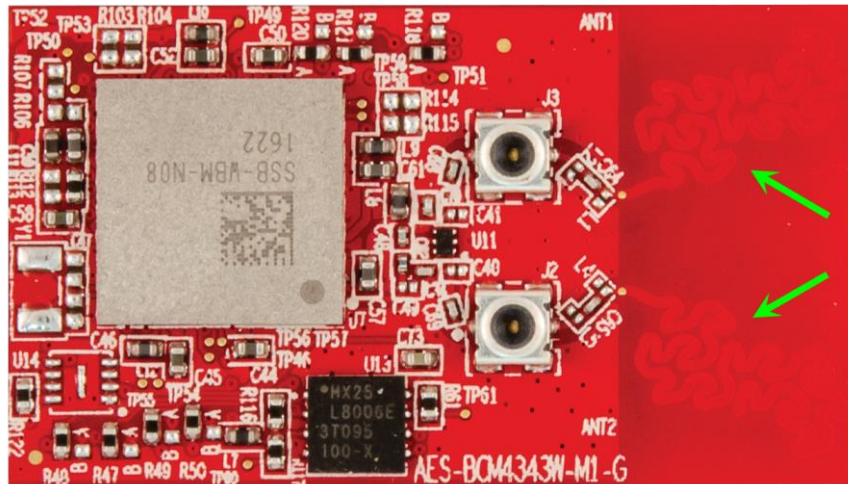(The Cypress patented PCB antenna trace pattern achieves a gain of 3dBi)

Figure 10 – Dual Fractal PCB Antennas

Two surface mount miniature RF (3mm x 3mm) switched coax connectors are included onboard.
These connectors are for **TEST PURPOSES ONLY** and shall not be used for external antennas!
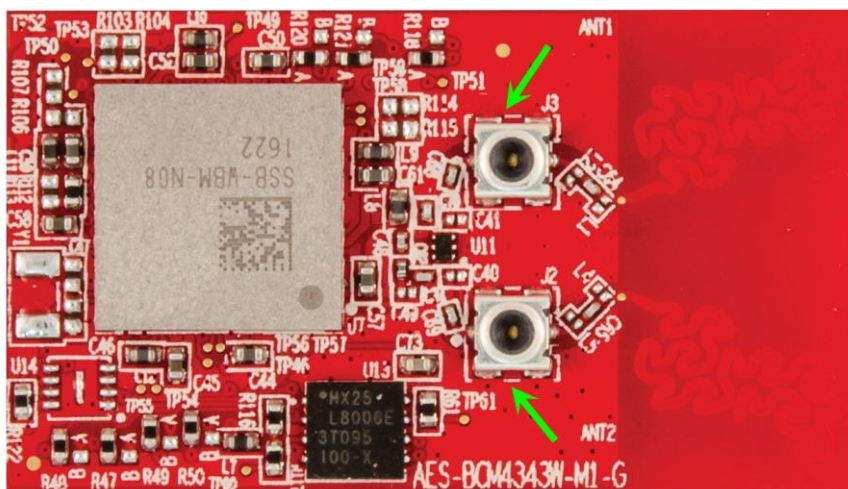

Figure 11 – Test Probe Connectors (Murata SWD series)

Note! Use of external antennas is **not** approved in the regulatory certifications for this module!

11 Certifications

11.1 RoHS

The AES-BCM4343W-M1-G module is lead-free and RoHS compliant.

11.2 Regulatory Compliance

Note: FCC, IC and CE certifications are currently pending (*Once the certification process has been concluded, this datasheet will be updated to remove this note*)

Regulatory Body	Status
FCC	2AF62-AVTEG001 (Pending)
IC	21571-AVTEG001 (Pending)
RoHS	Compliant
CE	EN 60950-1, EN 300 328, EN 301 489 (Pending)

Should regulatory certification be required in a specific country or region not already covered, please contact your local Avnet sales office or create a support request at http://cloudconnectkits.org/forum

11.3 Bluetooth Interoperability Compliance

BQB application in progress

11.4 Regulatory Agency Statements

The User Manual for the End Product should include the following statements:

FCC 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 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.

User manuals shall display the following Industry Canada notices in a conspicuous location:

Industry Canada Statements

This Device complies with Industry Canada License-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 onditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appa-reil doit accepter tout brouillage radioélectrique subi, meme si le brouillage est susceptible d'en com-promettre le fonctionnement.

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (EIRP) is not more than that necessary for successful communication.

Conformément à la réglementation d'Industrie Can-ada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou infé-rieur) approuvé pour l'émetteur par Industrie Can-ada. Dans le but de réduire les risques de brouil-lage radioélectrique à l'intention des autres utilisa-teurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

11.5 OEM Instructions

This module has been certified for installation into products only by OEM integrators under the following conditions:

The antennas used with this module must be installed to provide a separation distance of at least 20cm from all persons, and must not be co-located or transmit simultaneously with any other antenna or transmitter, except in accordance with FCC multi transmitter product procedures.

11.6 OEM Labeling Requirements

A clearly visible label is required, affixed to the outside of the user's (OEM) enclosure.
This label should display the following:

Contains FCC ID: 2AF62-AVTEG001
Contains IC: 21571-AVTEG001
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.

11.7 Limitations

This product is not intended for use in safety-critical applications (such as life support) where a failure of the Avnet product could be expected to cause severe personal injury or death.

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12 Shipping, Handling and Storage

12.1 Shipping

Bulk orders of the Avnet BCM4343W SoC module are delivered in reels of 600.
(See Section 7.6 for detail)

12.2 Handling

The AES-BCM4343W-M1-G module contains sensitive electronic circuitry that require proper ESD protection when handling. Failure to follow these ESD procedures may result in permanent damage to the module.

The module should not be subjected to excessive mechanical shock.

12.3 Moisture Sensitivity (MSL)

Modules that have been exposed to moisture and environmental conditions exceeding the prescribed packaging and storage conditions detailed in J-STD-020 (eg. not continuously in a sealed bag with a desiccant pack) MUST be baked before mounting! (Failure to meet the packaging and storage conditions described, will result in irreparable damage to modules during solder reflow soldering).

For devices that are packaged in a Moisture Barrier Bag with a desiccant pack and HIC (Humidity Indicator Card), the HIC card should be referenced and J-STD-033 consulted to determine if baking is required prior to reflow soldering.

In cases where baking is required, refer to J-STD-033 for details of the bake procedure.

"Broken reel" module quantities (under 600 units) typically require baking before reflow soldering

12.4 Storage

Per J-STD-033, the shelf life of devices in a Moisture Barrier Bag is 12 months at <40ºC and <90% room humidity (RH).

Do not store in salty air or an environment where there is a high concentration of corrosive gas, such as Cl_2, H_2S, NH_3, SO_2, or NOX.

Do not store in direct sunlight.

13 Ordering Information

Part Number	Description
AES-BCM4343W-M1-G	802.11 b/g/n WLAN, Bluetooth & BLE SoC Module

13.1 Module Accessories

Manuf.	Part Number	Description
Avnet	AES-EVB-BCM4343W-G	BCM4343W IoT Starter Kit

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14 Contact Information

For further details, contact your local Avnet representative or e-mail us at:

Region	Organization	Email
North America	Avnet EMA	eval.kits@avnet.com
Europe	Avnet EBV	ebvchips@ebv.com
	Avnet Silica	info@avnet.eu
Asia	Avnet Asia	XilinxAPAC@avnet.com

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FCC/IC Statements

(OEM) Integrator has to assure compliance of the entire end-product incl. the integrated RF Module. For 15 B (§15.107 and if applicable §15.109) compliance, the host manufacturer is required to show compliance with 15 while the module is installed and operating.

Furthermore the module should be transmitting and the evaluation should confirm that the module's intentional emissions (15C) are compliant (fundamental / out-of-band). Finally the integrator has to apply the appropriate equipment authorization (e.g. Verification) for the new host device per definition in §15.101.

Integrator is reminded to assure that these installation instructions will not be made available to the end-user of the final host device.

The final host device, into which this RF Module isintegrated" hasto be labelled with an auxilliary lable stating the FCC IDofthe RF Module,such as "Contains FCC ID: 2AF62-AVTEG001"

"This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions:
(1)this devicemay not cause harmful interference, and
(2)this devicemust accept any interference received, including interference thatmay cause undesired operation."

"Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment."

the Integrator will be responsible to satisfy SAR/ RF Exposure requirements, when the module integrated into the host device.

The final host device, into which this RF Module isintegrated" hasto be labelled with an auxilliary lable stating the IC ofthe RF Module,such as "Contains transmitter module IC:21571-AVTEG001"

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.

Host 15B and 15C compliance statement

A host product itself is required to comply with all other applicable FCC equipment authorization regulations, requirements, and equipment functions that are not associated with the transmitter module portion. For example, compliance must be demonstrated: to regulations for other transmitter components within a host product; to requirements for unintentional radiators (Part 15 Subpart B), such as digital devices, computer peripherals, radio receivers, etc.; and to additional authorization requirements for the non-transmitter functions on the transmitter module (i.e., Verification or Declaration of Conformity) as appropriate (e.g., Bluetooth and Wi-Fi transmitter modules may also contain digital logic functions).

The OEM integrator or the host manufacturer is responsible for the overall compliance of the host products

RF exposure statement

Human exposure to RF emissions from mobile devices (47 CFR §2.1091) may be evaluated based on the MPE limits adopted by the FCC for electric and magnetic field

strength and/or power density, as appropriate, since exposures are assumed to occur at distances of 20 cm or more from persons.

Module statement

The single-modular transmitter is a self-contained, physically delineated, component for which compliance can be demonstrated independent of the host operating conditions, and which complies with all eight requirements of § 15.212(a)(1) as summarized below.

1) The radio elements have the radio frequency circuitry shielded.

2) The module has buffered modulation/data inputs to ensure that the device will comply with Part 15 requirements with any type of input signal.

3) The module contains power supply regulation on the module.

4) The module contains a permanently attached antenna.

5) The module demonstrates compliance in a stand-alone configuration.

6) The module is labeled with its permanently affixed FCC ID label

7) The module complies with all specific rules applicable to the transmitter, including all the conditions provided in the integration instructions by the grantee.

8) The module complies with RF exposure requirements.