
Approval Sheet

Product Specification

Part Description: Bluetooth Module

Customer Part No:

Movon Part No: SBT-M2

Acknowledgement of reception

We have received the attached specification

Date

Company:

Dept:

Representative

Received by

Revision Record

Rev. No	Date	Item	Modifications	Approved
53.00	2019. 01. 22	SBT-M2	First Issued	

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

THE GRANTEE IS NOT RESPONSIBLE FOR ANY CHANGES OR MODIFICATIONS NOT EXPRESSLY APPROVED BY THE PARTY RESPONSIBLE FOR COMPLIANCE. SUCH MODIFICATIONS COULD VOID THE USER'S AUTHORITY TO OPERATE THE EQUIPMENT.

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 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.

IC Information to User

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

This Bluetooth module has been granted modular approval for mobile applications. OEM integrators for host products may use the module in their final products without additional FCC / IC (Industry Canada) certification if they meet the following conditions. Otherwise, additional FCC / IC approvals must be obtained.

The host product with the module installed must be evaluated for simultaneous transmission requirements.

The user's manual for the host product must clearly indicate the operating requirements and conditions that must be observed to ensure compliance with current FCC / IC RF exposure guidelines.

To comply with FCC / IC regulations limiting both maximum RF output power and human exposure to RF radiation, use this module only with the included onboard antenna.

A label must be affixed to the outside of the host product with the following statements:

Product Name : Bluetooth Module (Appliance Service Tool)

Contains FCC ID: WF5SBTM2

Contains IC: 9080A-SBTM2

The final host / module combination may also need to be evaluated against the FCC Part 15B criteria for unintentional radiators in order to be properly authorized for operation as a Part 15 digital device.

1 Electrical Characteristics

Parameter	Min	Typ.	Max	Unit
Supply Voltage	3.0	3.3	3.6	V
Storage Temperature	-20	25	70	°C

2 RoHS Compliance

This component can meet with ROHS compliance

Overview

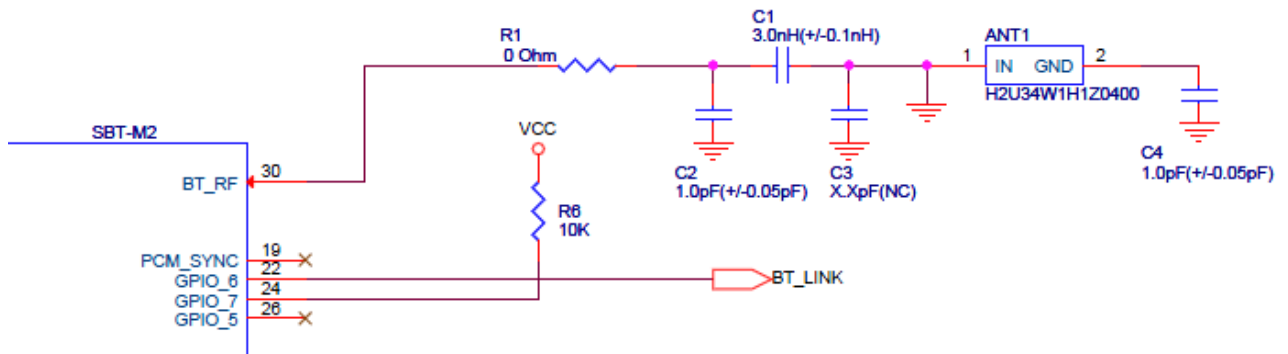
1. Substrate :

Printed Circuit Board

2. Pattern:

- 1) Recommended Antenna Circuit
- 2) Recommended Antenna Pattern
- 3) Recommended Antenna's Electrical properties
- 4) Recommended Module's PCB Footprint

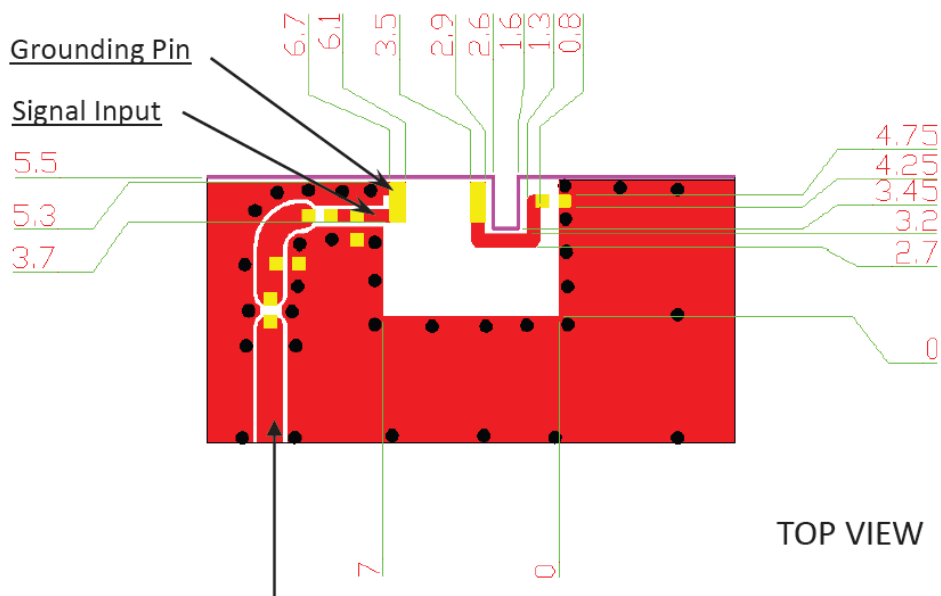
Recommended Antenna Circuit (Example)



Recommended Antenna Pattern

- Recommended Antenna : Unictron, H2U34W1H1Z0400

The solder land pattern (gold marking areas) is shown below. Recommendation on matching circuit will be provided according to customer's installation conditions.



Transmission line with 50 Ohm impedance characteristics

- Depending on the antenna and PCB pattern, the values of the elements may change.

Recommended Antenna's Eletrical properties

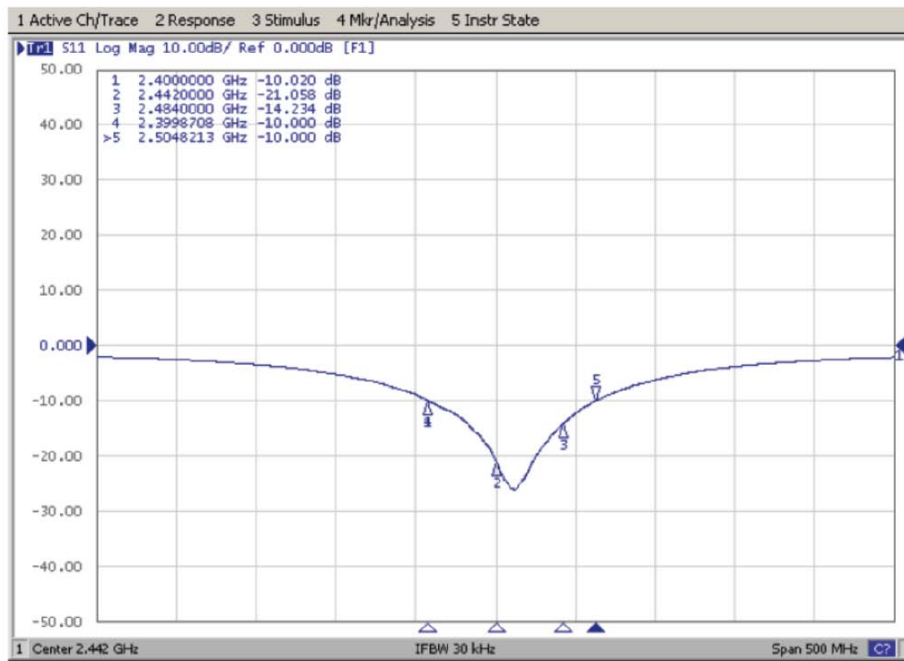
Characteristics		Specifications	Unit
Outline Dimensions		3.2x1.6x0.5	mm
Ground Plane		80x40	mm
Working Frequency		2400~2500	MHz
VSWR (@Center Frequency)*		2 Max.	
Characteristic Impedance		50	Ω
Polarization		Linear Polarization	
Peak Gain	(@2442MHz)	2.5 (typical)	dBi
Efficiency		84 (typical)	%

*Center frequency means the frequency with the lowest value in return loss of the chip antenna on the evaluation board.

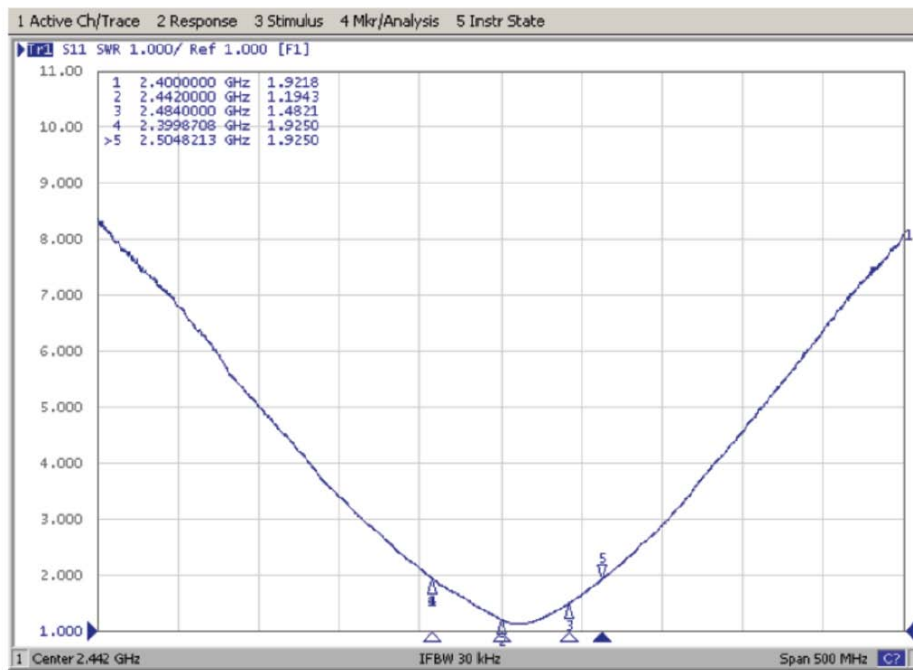
Efficiency Table

Frequency(MHz)	2400	2412	2417	2422	2427	2432	2437	2442	2447	2452	2457	2462	2467	2472	2484	2500
Efficiency(dB)	-1.4	-1.0	-0.9	-0.8	-0.8	-0.8	-0.7	-0.7	-0.8	-0.8	-0.8	-0.9	-0.9	-1.0	-1.2	-1.4
Efficiency(%)	72.8	78.7	80.4	82.3	83.0	83.9	84.4	84.5	84.1	84.0	83.2	82.0	80.5	78.6	75.4	72.5
Peak Gain(dBi)	1.5	1.8	1.9	2.1	2.3	2.3	2.4	2.5	2.5	2.5	2.4	2.4	2.2	2.1	1.9	1.8

Return loss (S_{11})

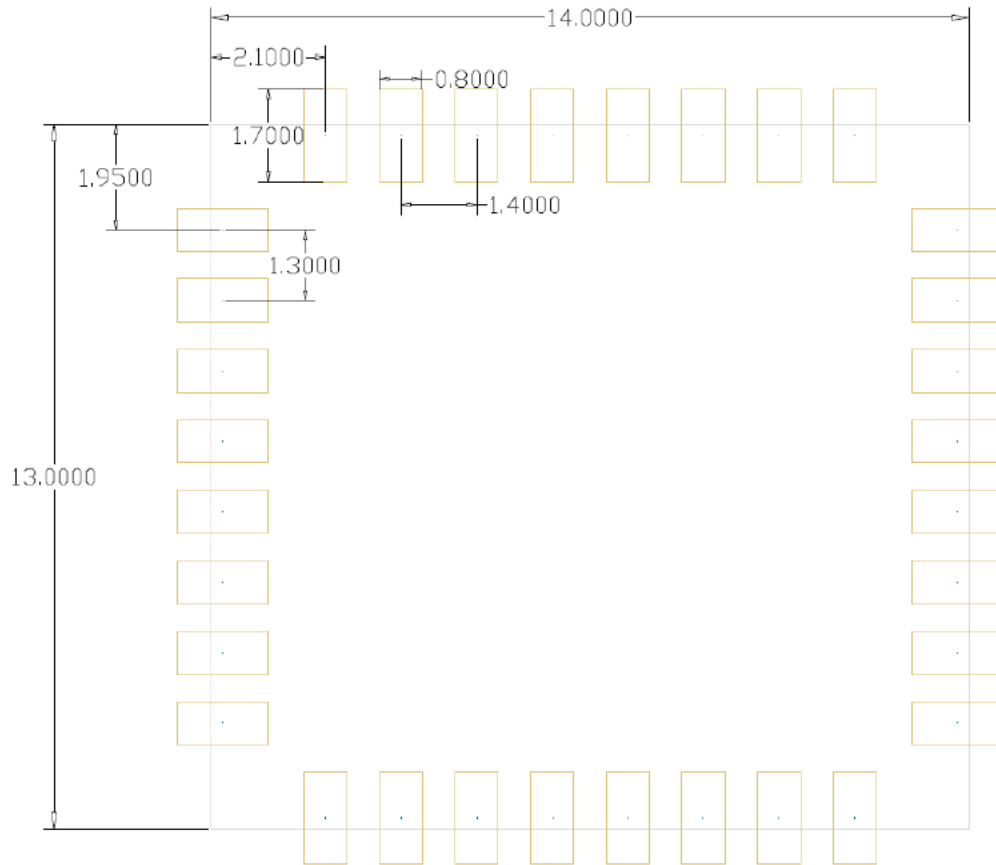


VSWR (S_{11})



- For more information, please refer to the antenna datasheet.

Recommended Module's PCB Footprint



Pin Map

PIN No.	Pin Name	Description	Pad Type
1	GND	Ground connection	
2	GND	Ground connection	
3	GND	Ground connection	
4	GPIO_3	General_purpose I/O	
5	VDD_IO	VBAT	
6	3P3V		
7	UART_RTS	UART request to send output	
8	GND	Ground connection	
9	GND	Ground connection	
10	UART_TX	UART transmit data	
11	UART_CTS	UART clear to send input	
12	UART_RX	UART receive data	
13	BT_HOST_WAKE	General_purpose I/O	
14	BT_CLK_REQ	General_purpose I/O	
15	GPIO_4 PUART_TX	General_purpose I/O, PUART_TX	
16	GND	Ground connection	
17	GND	Ground connection	
18	BT_DEV_WAKE	General_purpose I/O	
19	PCM_SYNC	General_purpose I/O	
20	I2C_SDA PCM_IN	General_purpose I/O	
21	PCM_CLK PUART_RX	General_purpose I/O, PUART_RX	
22	GPIO_6	General_purpose I/O	
23	I2C_SCL PCM_OUT	General_purpose I/O	
24	GPIO_7	General_purpose I/O	
25	RST_N	Active-low reset input	
26	GPIO_5	General_purpose I/O	
27	GND	Ground connection	
28	GND	Ground connection	
29	GND	Ground connection	
30	BT_RF	RF I/O antenna port	
31	GND	Ground connection	
32	GND	Ground connection	

Specifications of RF Characteristics

1. Standard RF Characteristics

Parameter	Conditions	Min	Typ	Max	Unit
Receiver RF Specifications					
General					
Frequency Range		2402	-	2480	MHz
RX sensitivity	GFSK, 0.1% BER, 1 Mbps	-	-93.5	-	dBm
	LE GFSK, 0.1% BER, 1 Mbps	-	-96.5	-	dBm
	π /4-DQPSK, 0.01% BER, 2 Mbps	-	-95.5	-	dBm
	8-DPSK, 0.01% BER, 3 Mbps	-	-89.5	-	dBm
Maximum input	GFSK, 1 Mbps	-	-	-20	dBm
Maximum input	π /4-DQPSK, 8-DPSK, 2/3 Mbps	-	-	-20	dBm
Transmitter RF Specifications					
General					
Frequency range	-	2402	-	2480	MHz
Class1: GFSK Tx power	-	-	12	-	dBm
Class1: EDR Tx power	-	-	9	-	dBm
Class 2: GFSK Tx power	-	-	2	-	dBm
Power control step	-	-	4	-	dBm
Modulation Accuracy					
π /4-DQPSK Frequency Stability	-	-10	-	10	kHz
π /4-DQPSK RMS DEVM	-	-	-	20	%
π /4-QPSK Peak DEVM	-	-	-	35	%
π /4-DQPSK 99% DEVM	-	-	-	30	%
8-DPSK frequency stability	-	-10	-	10	kHz
8-DPSK RMS DEVM	-	-	-	13	%
8-DPSK Peak DEVM	-	-	-	25	%
8-DPSK 99% DEVM	-	-	-	20	%
In-Band Spurious Emissions					
1.0 MHz < M - N < 1.5 MHz	-	-	-	-26	dBc
1.5 MHz < M - N < 2.5 MHz	-	-	-	-20	dBm
M - N > 2.5 MHz	-	-	-	-40	dBm
Out-of-Band Spurious Emissions					

30 MHz to 1 GHz	-	-	-	-36	dBm
1 GHz to 12.75 GHz	-	-	-	-30	dBm
1.8 GHz to 1.9 GHz	-	-	-	-47	dBm
5.15 GHz to 5.3 GHz	-	-	-	-47	dBm

Note: The above-mentioned values may vary depending on the circuit, in which this component is actually incorporated. You are, therefore, kindly requested to test the performance of this component t incorporating in your set.