Bluetooth® Low Energy Module
RN4871-TR100

Features

- Qualified for Bluetooth SIG v5.0 Core Specification
- Certified to KCC
- On-Board Bluetooth Low Energy (BLE) Stack
- ASCII Command Interface API over UART
- Scripting Engine for Hostless Operation
- Compact Form Factor - 9 mm x 11.5 mm
- Beacon Private Service for Beacon Services
- UART Transparent Service for Serial Data Applications
- Remote Configuration Over-the-Air

Operational

- Operating Voltage: 1.9V to 3.6V (3.3V typical)
- Temperature Range: -40°C to +85°C (Normal)
- Supports UART

RF/Analog Features

- ISM Band 2.402 to 2.480 GHz Operation
- Channels: 0-39
- RX Sensitivity: -90 dBm
- TX Power: 0 dBm
- RSSI Monitor

Applications

- Health/Medical Devices
- Sports Activity/Fitness Meters
- Beacon Applications
- Internet of Things (IoT) Sensor Tag
- Remote Control
- Wearable Smart Devices and Accessories
- Smart Energy/Smart Home
- Industrial Control

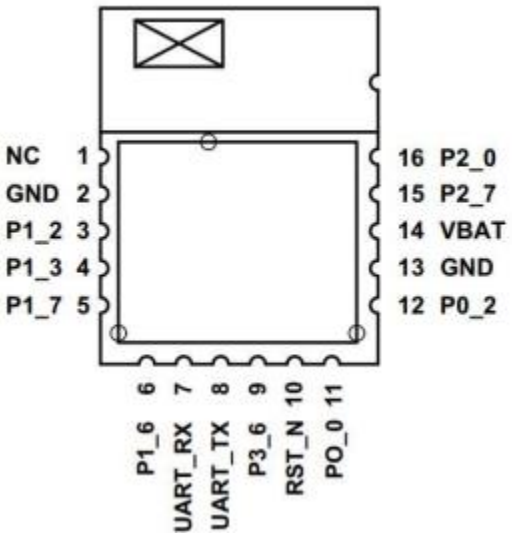
1.1 DEVICE OVERVIEW

The RN4871-TR100 BLE module integrates Bluetooth 5.0 baseband controller, on-board Bluetooth stack, serial communications, and RF power amplifier into one solution.

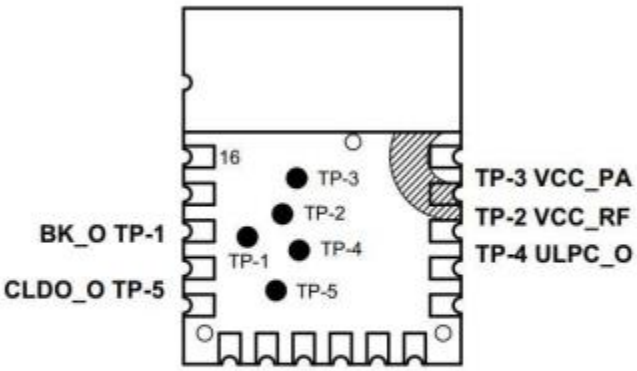
Part Number	Antenna On-Board	Shielding	Number of Pins	Dimensions	Operating Temperature Range
RN4871-TR100	Yes	Yes	16	9 mm x 11.5 mm	-40°C to +85°C

1.2 PIN DIAGRAM

Top View



Bottom View



1.3 PIN DESCRIPTION

PIN No.	Name	Type	Description
2	GND	Power	Ground reference
13	GND	Power	Ground reference
14	VBAT	Power	Positive supply input. Range: 1.9V~3.6V
10	RST_N	D, I/p	Module Reset; active-low; Internally pulled-high
16	P2_0	D, I/p	System configuration input; 1: Application mode 0: Test mode/Flash update/EEPROM configuration
12	P0_2	D, I/O	LED0: Provides indication whether the module is in ON/OFF mode
7	UART_RX	D, I/p	UART Data input
8	UART_TX	D, O/p	UART Data output
1	NC	-	-
3	P1_2	-	-
4	P1_3	-	-
5	P1_7	-	-
6	P1_6	-	-
9	P3_6	-	-
11	P0_0	-	-
15	P2_7	-	-

Legend: Pin Type Abbreviations:

A = Analog D = Digital I/O = Input/Output I/p = Input O/p = Output

2.1 GENERAL SPECIFICATIONS

Specification	Description
Standard Compliance	Bluetooth 5.0
Frequency Band	2.402 to 2.480 GHz
Modulation Method	GFSK
Maximum Data Rate (Transparent UART)	10 kbps (iOS®9)
Antenna	Ceramic
Interface	UART, AIO
Operating Range	1.9V to 3.6V
Sensitivity	-90 dBm
RF TX Power	0 dBm
Operating Temperature Range	-40°C to +85°C
Storage Temperature Range	-40°C to +125°C
Operating Relative Humidity Range	10% to 90%
Storage Relative Humidity Range	10% to 90%
Moisture Sensitivity Level	2

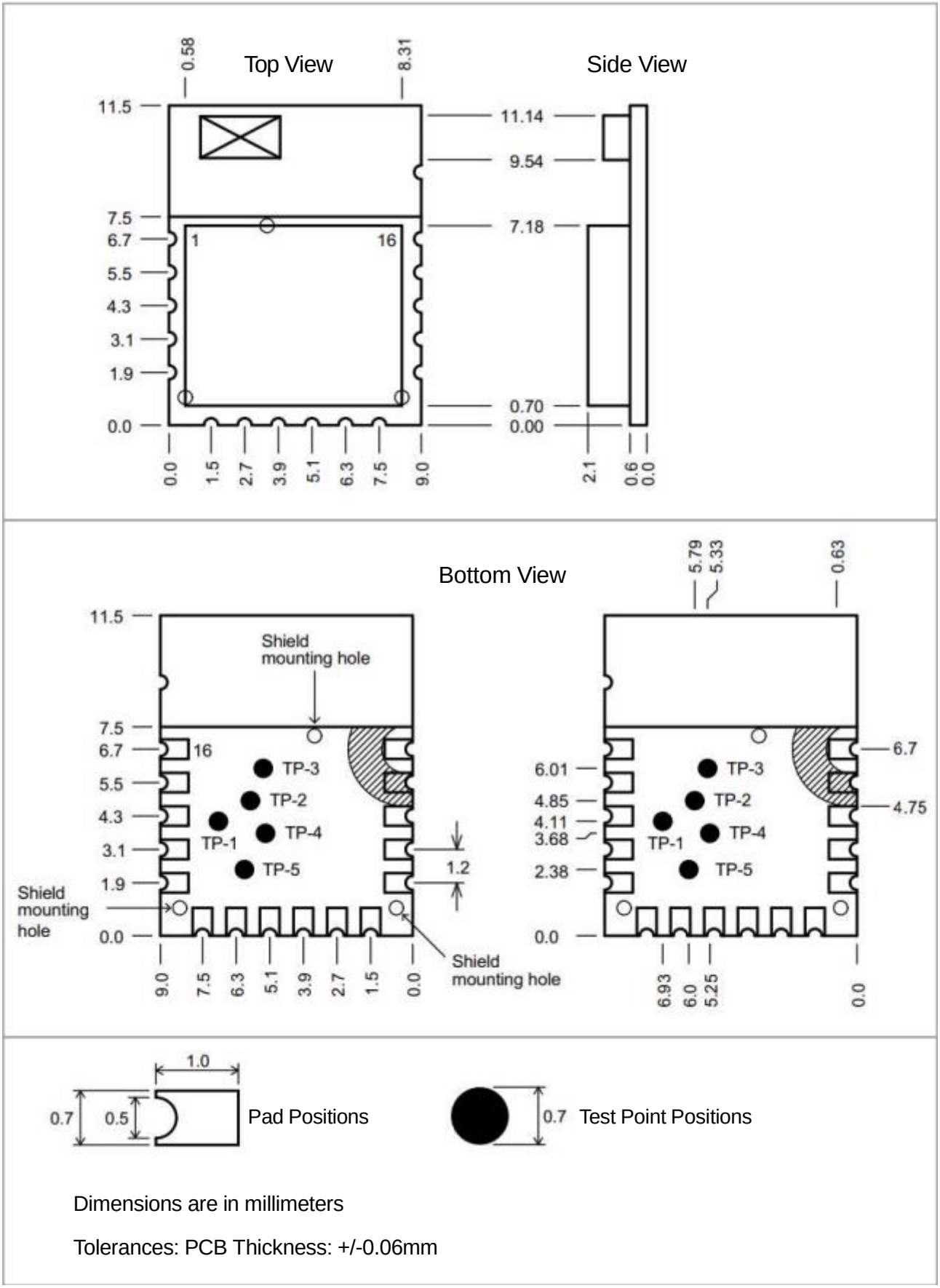
2.2 ELECTRICAL CHARACTERISTICS

Parameter	Min.	Typ.	Max.	Units
Supply Voltage (VDD)	1.9	-	3.6	V
I/O Voltage Levels				
VIL Input Logic Levels Low	Vss	-	0.3 VDD	V
VIH Input Logic Levels High	0.7 VDD	-	VDD	V
VOL Output Logic Levels Low	Vss	-	0.2 VDD	V
VOH Output Logic Levels High	0.8 VDD	-	VDD	V
RESET				
Reset Low Duration	63	-	-	ns
Input and Tri-State Current with				
Pull-Up Resistance	34	48	74	kΩ
Pull-Down Resistance	29	47	86	kΩ

2.3 CURRENT CONSUMPTION

2.4 CURRENT CONSUMPTION DURING APPLICATION MODE

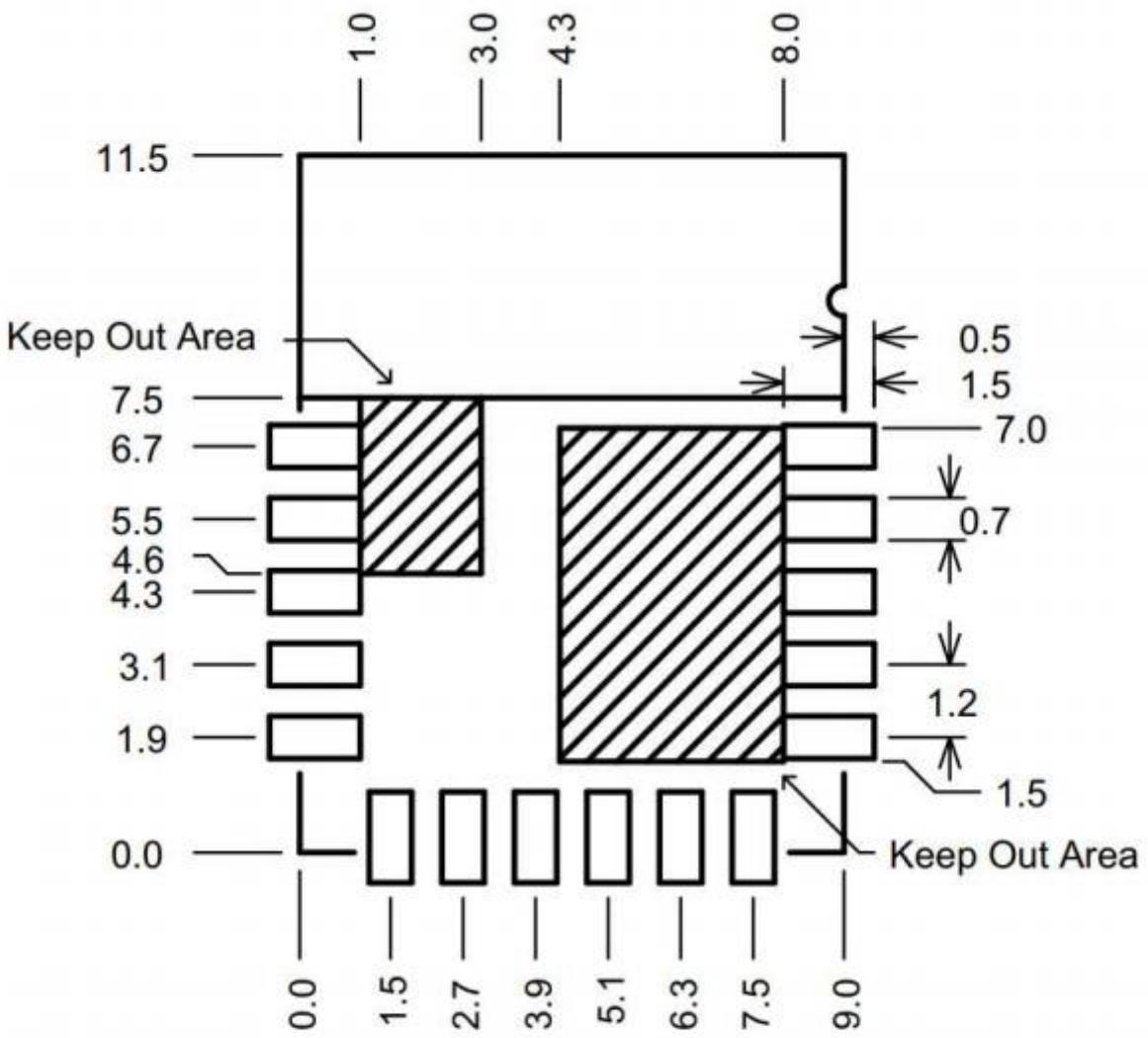
4.1 PHYSICAL DIMENSIONS



Dimensions are in millimeters

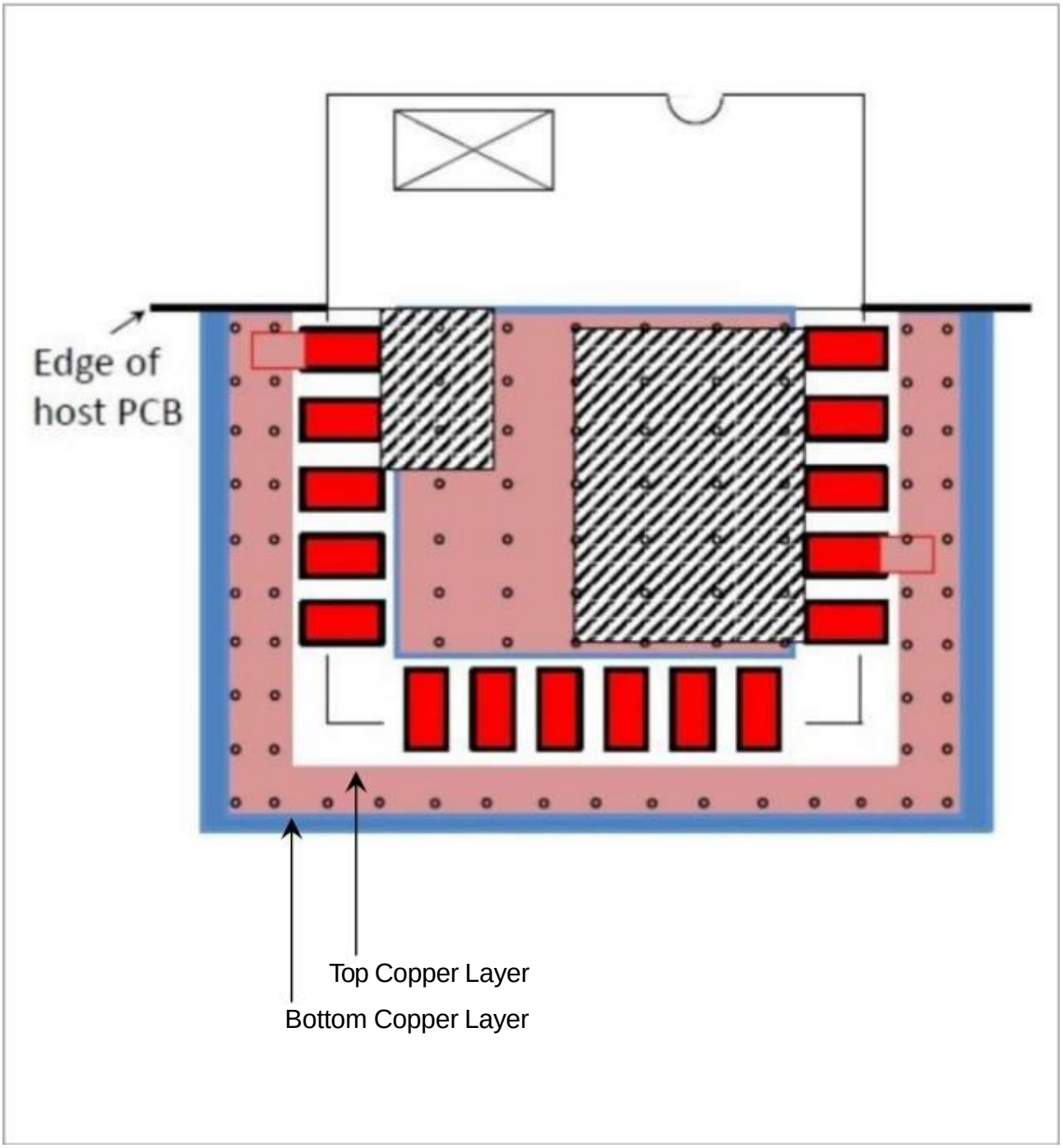
Tolerances: PCB Thickness: +/-0.06mm

4.2 RECOMMENDED PCB FOOTPRINT

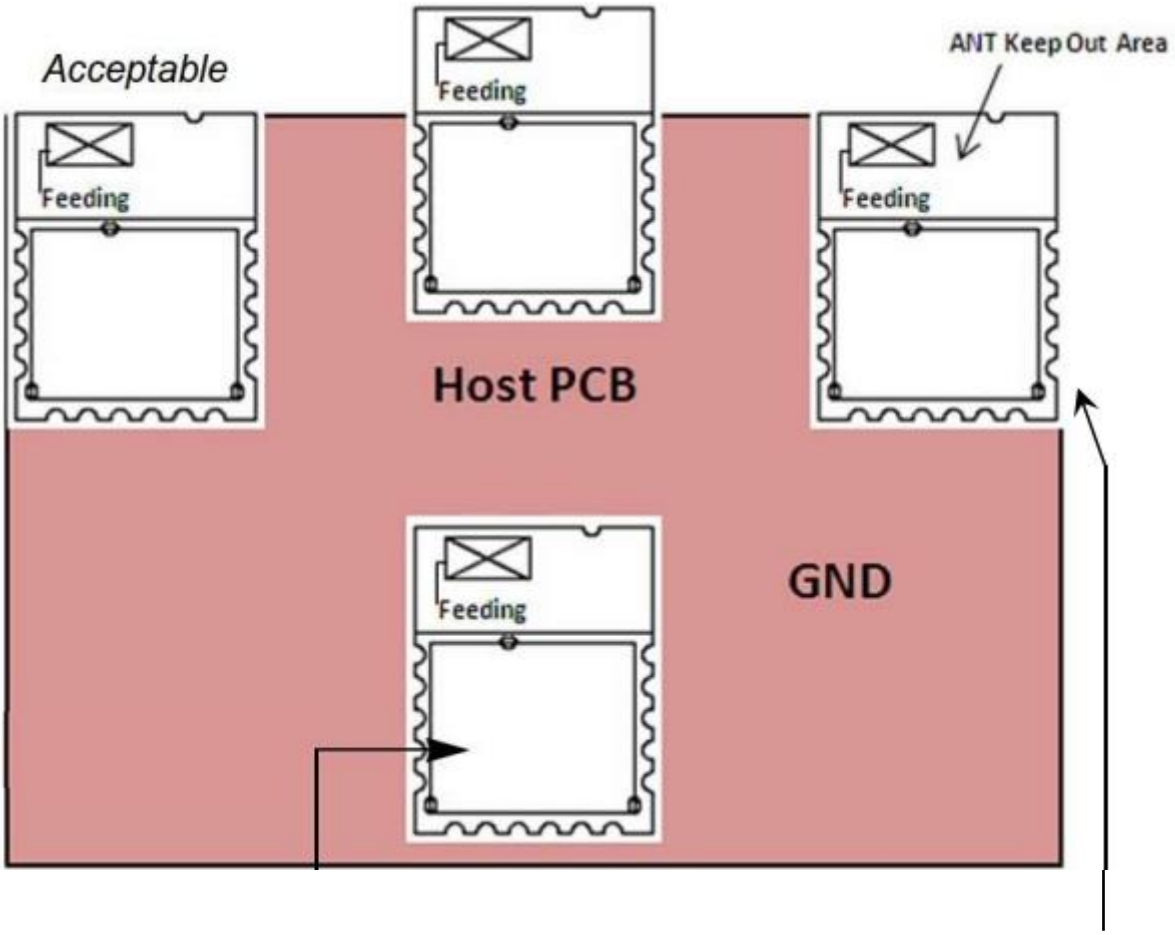


Dimensions are in millimeters

4.3 RECOMMENDED PCB MOUNTING SUGGESTION



4.4 RECOMMENDATIONS FOR THE PLACEMENT OF THE MODULE ON THE HOST PCB BOARD



Lowest performance *Acceptable*

4.5 Soldering Recommendations

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The RN4871-TR100 Bluetooth module is assembled using standard lead-free reflow profile IPC/JEDEC J-STD-020.

The module can be soldered to the host PCB using standard leaded and lead-free solder reflow profiles.

To avoid damaging the module, the following recommendations are given:

- Microchip Technology Application Note, *"AN233 Solder Reflow Recommendation"* (DS00233) provides solder reflow recommendations
- Do *not* exceed peak temperature (TP) of 250°C
- Refer to the solder paste data sheet for specific reflow profile recommendations
- Use no-clean flux solder paste
- Do *not* wash as moisture can be trapped under the shield
- Use only one flow. If the PCB requires multiple flows, apply the module on the final flow.

5.1 Federal Communications Commission (FCC) Statement

• The title page indicate “OEM/Integrators Installations Manual”
• The module is limited to OEM installation ONLY
• The OEM integrators is responsible for ensuring that the end-user has no manual instructions to remove or install module
• The module is limited to installation in mobile or fixed applications, according to Part 2.1091(b)
• The separate approval is required for all other operating configurations, including portable configurations with respect to Part 2.1093 and different antenna configurations • Antenna information:
As indicate in the FCC KDB 996369 D03 OEM Manual v01:
"A list of antennas included in the application for certification must be provided in the instructions. ... The antenna list shall also identify the antenna types (monopole, PIFA, dipole, etc. (note that for example an “omni-directional antenna” is not considered to be a specific “antenna type”))."
• Grantees are responsible for the continued compliance of their modules to the FCC rules. This includes advising host product manufacturers that they need to provide a physical or e-label stating “Contains FCC ID” with their finished product. See Guidelines for Labeling and User Information for RF Devices – KDB Publication 784748
15.21 You are cautioned that changes or modifications not expressly approved by the party responsible for compliance could void the user’s authority to operate the equipment.
This device complies with Part 15 of the FCC Rules.
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.

15.105(b) 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 or more 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 RF Radiation Exposure Statement:
This module complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

6.1 REGULATORY APPROVAL

The RN4871-TR100 Bluetooth module has received the regulatory approval for the following countries:

- Korea/KCC: R-R-tbo-RN4871-TR100

- United States/FCC ID
- Europe/CE