

2. 4G PCB Antenna Datasheet

Product Information

Model: ANT-2400-PCB

Applicable Standards: Bluetooth 4.0 / 4.2 / 5.0 / 5.2 / 5.3 | Wi-Fi 2.4G

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1. Product Overview

The ANT-2400-PCB is a PCB-mounted antenna specifically designed for the 2.4 GHz ISM band. It supports multiple wireless communication protocols, including Bluetooth Classic, Bluetooth Low Energy (BLE), and 2.4 GHz Wi-Fi.

Manufactured using FR-4 substrate material with an ENIG (Electroless Nickel Immersion Gold) surface finish, the antenna is designed for SMT assembly and can be soldered directly onto the RF feed point of the main PCB without requiring an external connector.

Featuring a compact size, low cost, easy installation, and stable RF performance, the antenna is widely used in IoT devices, wearable electronics, smart home products, wireless remote controls, and other embedded wireless applications.

2. Electrical Specifications

Test Conditions: Measurements were conducted in an anechoic chamber. A keep-out area of at least 5 mm beneath the antenna is required, with proper grounding applied.

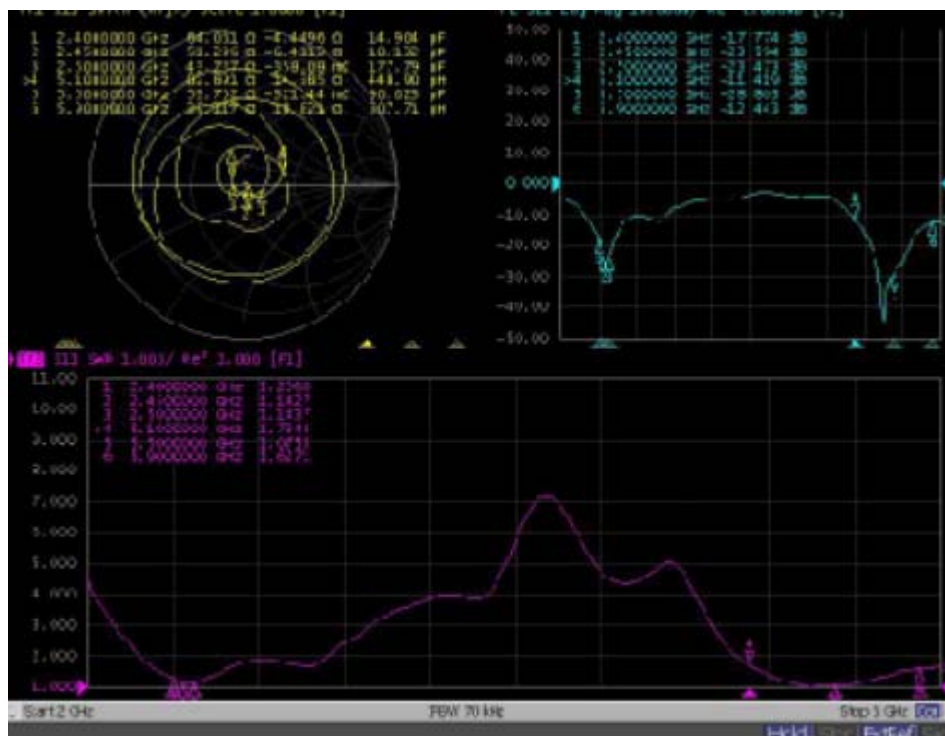
Item	Specification
Model	ANT-2400-PCB
Antenna Type	PCB Antenna
Frequency Range	2400 ~ 2500 MHz
Center Frequency	2450 MHz
Impedance	50 Ω
Polarization	Linear
VSWR	≤ 2.0
Radiation Pattern	Omnidirectional
Return Loss (S11)	≤ -10 dB
Max Input Power	≤ 2 W
Peak Gain	1.82 dBi
Radiation Efficiency	$\geq 70\%$

3. Mechanical Specifications

Item	Specification
Antenna Dimensions (L $\times$ W $\times$ H)	11.2 $\times$ 4.8 $\times$ 0.8 mm
Substrate Material	FR-4
PCB Thickness	1.0 mm
Surface Finish	ENIG
Mounting Method	Solder Pad Mounting
Connector	None (Direct PCB Soldering)
Keep-Out Area	≥ 5 mm beneath antenna
Weight	< 0.1 g

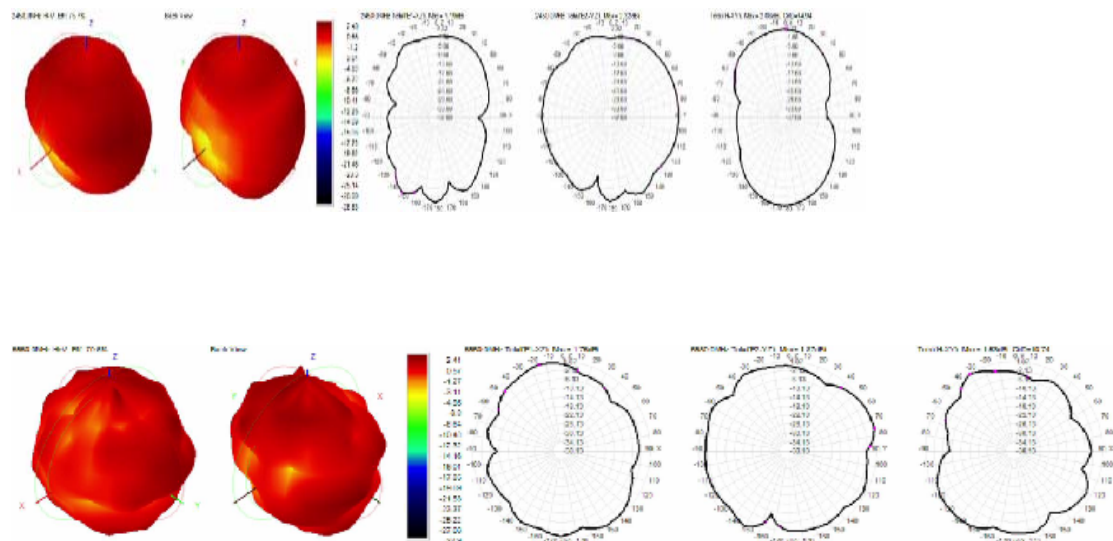


4. RF Performance Test Report (Single Antenna)



Frequency (MHz)	Gain (dBi)	Efficiency (%)
2400	1.60	72.44
2410	1.55	73.65
2420	1.50	73.82
2430	1.51	72.55

	Frequency (MHz)	Gain (dBi)	Efficiency (%)
2440		1.50	73.51
2450		1.82	73.42
2460		1.82	73.52
2470		1.54	73.62
2480		1.71	74.21
2490		1.81	72.55



5. Environmental Reliability

Item	Specification
Operating Temperature	-40° C ~ +85° C
Storage Temperature	-40° C ~ +105° C
Humidity Rating	95% RH (Non-condensing)
Vibration Test	10 - 500 Hz, 1.5 mm Amplitude
Environmental Compliance	RoHS / REACH

Item	Specification
ESD Protection	± 4 kV Contact Discharge
Salt Spray Test	48 Hours, No Corrosion
Thermal Shock	$-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$, 500 Cycles

6. Recommended Soldering Conditions

Item	Specification
Soldering Process	Reflow Soldering
Solder Alloy	Sn96.5 / Ag3.0 / Cu0.5 (Lead-Free)
Preheat Temperature	$150^{\circ}\text{C} \sim 180^{\circ}\text{C}$ (60 - 90 s)
Peak Temperature	$235^{\circ}\text{C} \sim 250^{\circ}\text{C}$ (10 - 20 s)
Cooling Rate	$\leq 4^{\circ}\text{C/s}$
Manual Soldering Temperature	$350^{\circ}\text{C} \pm 10^{\circ}\text{C}$ (Within 3 s)

7. Packaging & Storage

Item	Specification
Packaging Method	Tape & Reel / Tray
Reel Size	$\varnothing 330$ mm (13 inch)
Quantity per Reel	500 pcs / 1000 pcs (Optional)
Minimum Order Package	100 pcs (Sample Box)
Moisture Sensitivity Level	MSL 1
Storage Condition	Temperature $\leq 40^{\circ}\text{C}$, Humidity $\leq 60\%$ RH

8. Usage Notes

1. A dedicated keep-out area must be reserved beneath the antenna. Copper pours, signal traces, and metallic components are prohibited within this area.
2. Antenna performance is significantly affected by PCB ground size, enclosure materials, and battery placement. OTA validation is recommended after final product assembly.
3. Reflow soldering peak temperature shall not exceed 250°C . Manual soldering time should be limited to less than 3 seconds to avoid damage to the antenna radiator.

4. The specifications provided in this document are for reference only. Actual performance shall be subject to mass production test results. The manufacturer reserves the right to modify specifications without prior notice.

Mike