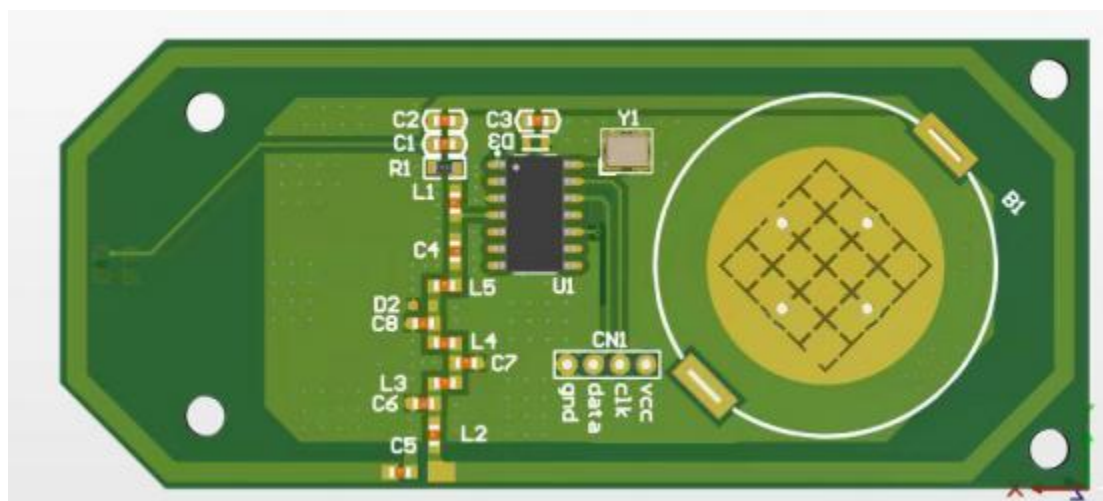


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433.92 MHz On-board Loop Antenna Datasheet

I. Product Overview

This datasheet defines a 433.92 MHz ISM band on-board PCB loop antenna, designed for low-power wireless devices such as IoT and industrial control applications. It complies with relevant FCC Part 15 RF regulations, features omnidirectional radiation, low cost, and easy integration, making it suitable for onboard direct-mount applications without external cables.



II. Electrical Performance Specifications

Parameter	Value	Test Conditions / Notes
Center Frequency	433.92 MHz	ISM license-free band
Nominal Impedance	50 Ω Nominal	Standard RF system impedance
Voltage Standing Wave Ratio (VSWR)	$\leq 2.0 : 1$	@ 433.92 MHz
Return Loss	≥ 10 dB	@ 433.92 MHz (corresponding to $VSWR \leq 2:1$)
Peak Gain	-10 dBi (typical)	Typical value under omnidirectional radiation conditions
Polarization	Vertical	Loop plane perpendicular to ground
Maximum Input Power	0.5 W	Continuous wave (CW) mode, long-term operation limit
Cable Loss	N/A	On-board direct mount design, no external cable
Connector Type	N/A	On-board integrated soldering, no standard RF connector

III. Radiation Performance

1. Pattern Characteristics

Radiation pattern: Omnidirectional

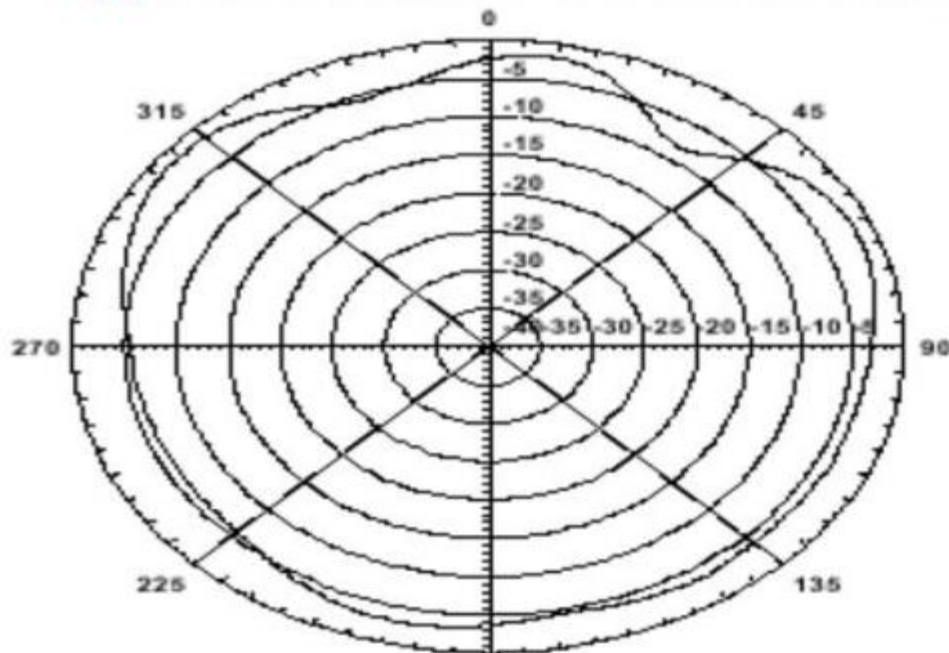
H-plane pattern: Typical pattern shown below, with good radiation uniformity in the horizontal plane and no significant dead zones, suitable for omnidirectional communication scenarios with no obstructions around the device.

2. Efficiency and Gain Notes

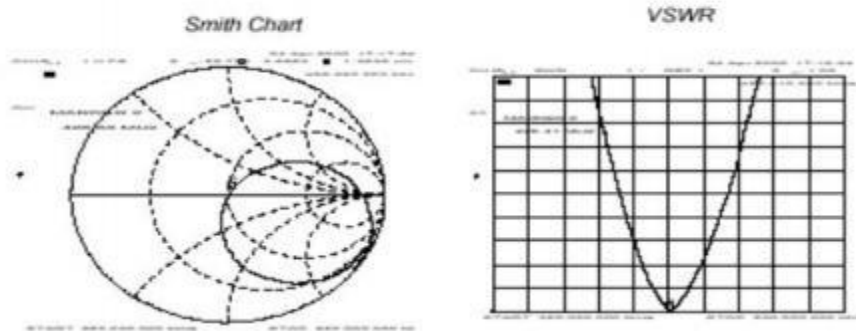
The antenna peak gain is -10 dBi (typical), which is inherent to on-board loop antennas. It is suitable for low-power, short-range 433 MHz communication scenarios and complies with the power limitation requirements of FCC Part 15 for unintentional radiators.

Actual radiation efficiency is affected by PCB ground plane size, mounting position, and surrounding metal/dielectric environment; optimization should be performed with the overall product layout.

Typical H-Plane Antenna Pattern



Input Characteristics



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IV. Input Impedance Characteristics

1. Smith Chart: The input impedance matching characteristics of the antenna at 433.92 MHz are shown below. Testing indicates that the antenna impedance at the target frequency is close to the 50 Ω system impedance, and the matching performance meets the design requirement of $VSWR \leq 2:1$.

2. VSWR Test Curve: The VSWR test curve of the antenna near 433.92 MHz is shown below. At the target frequency, the VSWR meets the design specification, return loss is ≥ 10 dB, RF signal reflection $\leq 10\%$, and matching performance is stable.



V. Mechanical and Environmental Specifications

Parameter	Value	Notes
Antenna Type	On-board loop antenna	Direct soldering type, no additional mounting bracket
Operating Temperature Range	-40 °C ~ +85 °C	Industrial grade environmental adaptability
Storage Temperature Range	-55 °C ~ +100 °C	Non-operating state
Mounting Method	On-board soldering	Directly soldered to designated PCB pads, no connector
Mechanical Structure	Loop structure	Loop plane perpendicular to ground; polarization is vertical. Actual operation depends on device orientation.

VI. Test Conditions

1. All electrical performance tests were performed on a standard 50 Ω test system using an Agilent 8753ES vector network analyzer for VSWR, return loss, and impedance characteristics.
2. Pattern and gain tests were performed in a standard anechoic chamber with no reflecting objects in the vicinity.
3. Actual product performance is affected by PCB ground plane size, surrounding component layout, and mounting environment; final verification should be performed with the complete product.

We statement that All measurements were performed radiated and therefore additional antenna gain documentation is not required.