# MINEW X Wiliot

MNDBPOE1 PoE Gateway + Bridge Combo

Datasheet
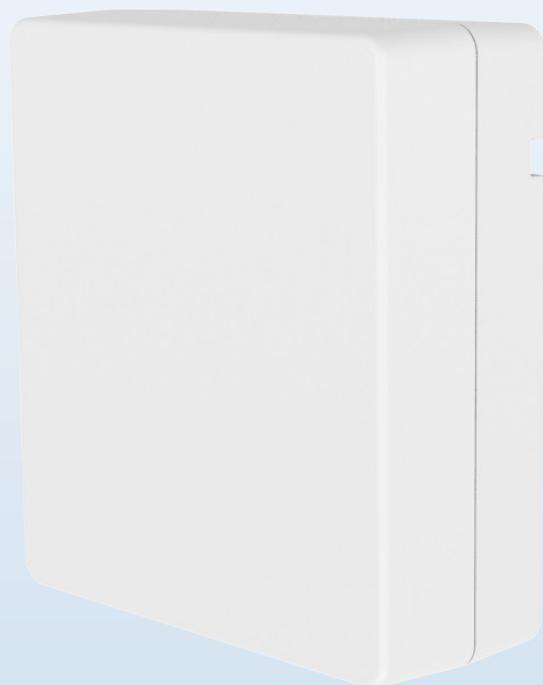
PRODUCT OVERVIEW

Wiliot bridges serve 3 operational tasks: energizing Wiliot IOT Pixels, receiving and filtering packets from Pixels, and echoing the filtered packets to gateways. The Minew Dual Band Reference Bridge runs Wiliot firmware and is optimized for Wiliot deployments. It features a Sub-1 GHz antenna for energizing Pixels and a 2.4 GHz antenna for echoing Wiliot Bluetooth packets.

The Minew POE is a device capable of the 4 Wiliot Network infrastructure modules: IoT Pixels Energizing, Data path, Network Management & Cloud Connectivity. It can achieve Cloud Connectivity via Wi-Fi or Ethernet. Lastly, it can be powered via a USB-C cable or PoE (Power over Ethernet).

Operational Modes

The goal (whether operating as a bridge or gateway) of the device at hand must be known before setting it up, since different steps are required accordingly.

Gateway

The device can work as a gateway through one of the following network interfaces:

Ethernet - Connect the device to Ethernet connection and register it through the Wiliot App.

Wi-Fi - Connect the device to a power source, wait 2 minutes until the blue led flickers rapidly. Register the device through the Wiliot App in which you'll have to provide Wi-Fi credentials.

Regardless of the network interface, once your gateway is fully initialized you'll see a blue LED constantly on, indicating network connectivity. You may also see a yellow LED blink if the device is echoing packets.

Bridge

For the device to work as a bridge, simply connect it to a power source. You may configure it through Wiliot Platform as long as there are nearby gateways.

Note that the LEDs do not reflect a bridge behavior for the first 8 minutes which is the time window for network interface initialization. Once 8 minutes have passed, the bridge's blue LED should be constantly off, indicating there is no cloud connectivity. You may see a yellow LED blinking indicating BLE transmissions.

Please Note: Regardless of the board behaving as a bridge or gateway, it can be configured to energize Wiliot IoT Pixels® via the Wiliot platform. In such case, it will have a red LED constantly on.

DETAILED SPECIFICATION

	Parameter	Description
Functionality	Common Uses	Asset Tracking, Inventory, Temperature Sensing, Proximity
	Supported Products	Dual Band Pixel, Single Band Pixel, Battery Assisted Pixel
	Key Functions	Energizing Pixels, Rebroadcast (Echo) Pixel Packets to gateway, Pacing Data
Hardware	Antennas	2.4GHz：5dBi,Linear polarization, 915MHz：2.5dBi,Linear polarization WiFi：3dBi,Linear polarization
	LED Indicators	Blue and Red (Power and Data)
	Firmware	Firmware provided by Wiliot
	Power	PoE IEEE 802.3af (PoE + Ethernet) 5 volt ,1.5A, USB C (USB C Power and WiFi) *
	Network connection	PoE/Wifi
	Memory Capacity	BLE（1MB flash+ 256kB RAM） Flash（64M-BIT）
	Interfaces	type-C RJ45 TC2050（1-VCC 2-SWDIO 3-GND 4-SWDCLK 5-GND 6-SWO 7-RXB 8-TXB 9-GND 10-P0.18/RESET）
	Operating temperature	-20~65℃
Package	Detailed Dimensions	11 x 10 x 4 cm
	Weight	6.9 oz
	Installation	IScrew sockets, cable tie slots, ¼-20 threaded insert
	Certifications	CE, FCC, RCM, ROHS, REACH, IC

* **Tips:** The package includes a 1-meter USB-A to Type-C charging cable. Adapter must be purchased separately. It is recommended to use a certified 5V2A adapter without fast charging and not specifically designed for Apple computers.

DETAILED SPECIFICATION

RADIO

| Parameter		Pixel Packet Echo	Pixel Energizing
	Function	Retransmit Wiliot Pixel packets, calibrate nearby Wiliot Pixels	Energize nearby pixels
Broadcast	Signal Protocol	Bluetooth® Low Energy (LE) 5.2 (2.4 GHz)	FSK\CSS (915MHz)
	Signal Strength	EIRP +20dBm@2.4GHz Max	EIRP +30dBm@915MHz Max
Payload	Broadcast Packet	Standard Bluetooth Low Energy Packet (PDU), payload: Wiliot Ephemeral ID (WEID)	--
	Security	AES-128, encryption and authentication	
	Pixel Calibration Beacons	3 BLE advertisements every 200ms (default)	
	Default Echo Pacing Interval	15 s (configurable)	

BRIDGE AND TAG ORIENTATION

The relative orientation of the bridge and tag antenna will affect energizing and broadcasting performance. The Dual Linear antenna in the Minew Dual Band Bridge makes it agnostic to in-plane (zy) tag orientation, and more capable of out-of-plane tag (xz and xy) energizing.


Bridge   Pixels
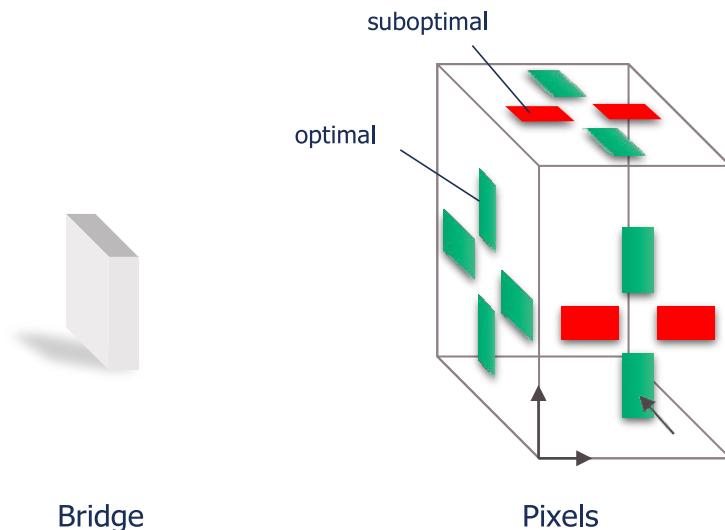
Optimal pixel orientation shown in green, and suboptimal in red, relative to the energizing bridge antenna. In the drawing, the antenna's dual linear polarizations are aligned with the y axis and z axis.

DETAILED DRAWINGS

100 mm

110 mm

40 mm
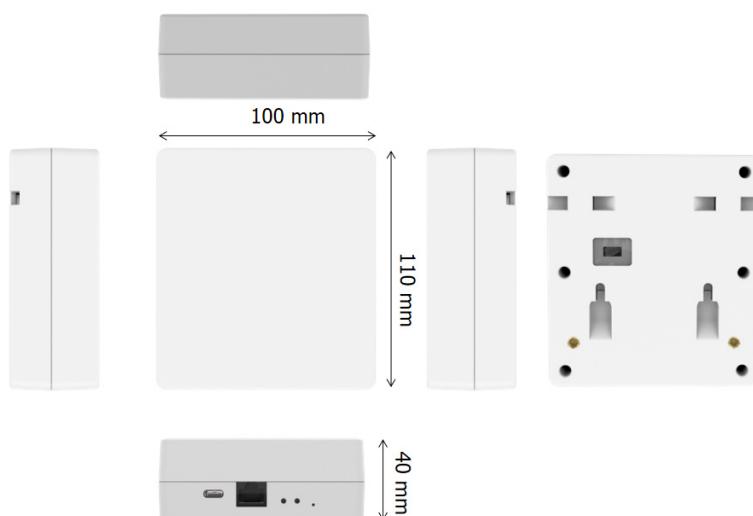
PROJECT INFORMATION

* **Antenna Coding:** ANT-LMIL8024007 (ANT-915), ANT-BMIL8024008 (ANT-J2/J3), ANT-WBNCNC24009 (ANT-WiFi)

* **Antenna Type:** Metal Antenna and onboard Antenna

* **Model of the DUT:** DG5

* **Test Data:** 2025.1.3
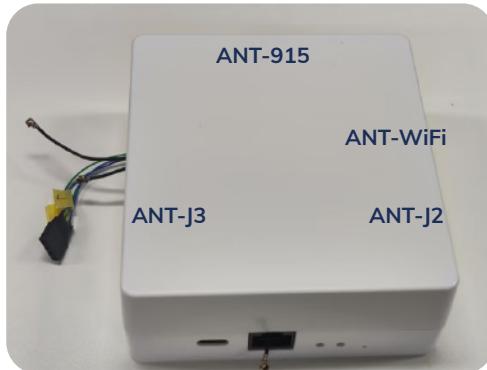
Product appearance
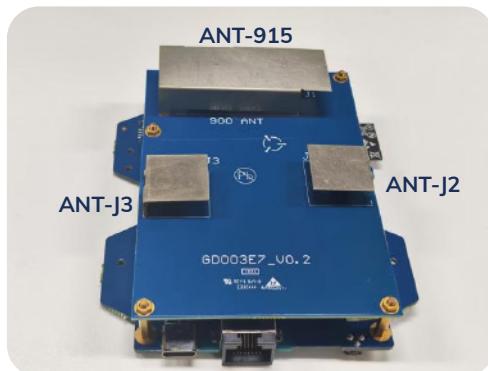
PCB board and antenna

TECHNICAL SPECIFICATION

ANT-J3

ELECTRICAL SPECIFICATIONS	
Frequency Range	2400-2480 MHz
Peak Gain	4.73 3.61(horizontal polarization) 3.67(vertical polarization)
Efficiency	71.85%
Return Loss	≤-15.02 dB（MAX）
VSWR	≤1.4（MAX）
Bandwidth (S11≤-10dB)	110 MHz
Input Impedance	50 Ω
Radiation direction	Directional ANT
Polarization Type	Linear
Lightning Protection	DC grounding
Power Capacity	1000mW（30dBm）
MECHANICAL SPECIFICATIONS	
Antenna Size	18.25mm x 17.90 mm
Core Radiator	Copper
Coaxial wire	L=80mm, Ø1.13mm
Connect Type	IPEX-1
Operating Temperature	-40 to +85℃
Storage Temperature	-40 to +85℃

ANT-J2

ELECTRICAL SPECIFICATIONS	
Frequency Range	2400-2480 MHz
Peak Gain	4.74 2.16(horizontal polarization) 3.66(vertical polarization)
Efficiency	76.51%
Return Loss	≤-12.0 dB（MAX）
VSWR	≤1.8（MAX）
Bandwidth (S11≤-10dB)	120 MHz
Input Impedance	50 Ω
Radiation direction	Directional ANT
Polarization Type	Linear
Lightning Protection	DC grounding
Power Capacity	1000mW（30dBm）

MECHANICAL SPECIFICATIONS	
Antenna Size	18.25mm x 17.90 mm
Core Radiator	Copper
Coaxial wire	L=80mm, ∅1.13mm
Connect Type	IPEX-1
Operating Temperature	-40 to +85°C
Storage Temperature	-40 to +85°C

ANT-915

ELECTRICAL SPECIFICATIONS	
Frequency Range	900-928 MHz
Peak Gain	2.96 2.85(horizontal polarization) 2.75(vertical polarization)
Efficiency	73.30%
Return Loss	≤-14.3 dB（MAX）
VSWR	≤1.4（MAX）
Bandwidth (S11≤-10dB)	150 MHz
Input Impedance	50 Ω
Radiation direction	Directional ANT
Polarization Type	Linear
Lightning Protection	DC grounding
Power Capacity	1000mW（30dBm）

MECHANICAL SPECIFICATIONS

Antenna Size	55mmx 21 mm
Core Radiator	Copper
Coaxial wire	L=80mm, Ø1.13mm
Connect Type	IPEX-1
Operating Temperature	-40 to +85°C
Storage Temperature	-40 to +85°C

ANT-WiFi

ELECTRICAL SPECIFICATIONS

Frequency Range	2400-2480 MHz
Peak Gain	2.98 1.33(horizontal polarization) 1.81(vertical polarization)
Efficiency	63.68%
Return Loss	≤-12.9 dB（MAX）
VSWR	≤1.88（MAX）
Bandwidth (S11≤-10dB)	150 MHz
Input Impedance	50 Ω
Radiation direction	Omni
Polarization Type	Linear
Lightning Protection	DC grounding
Power Capacity	1000mW（30dBm）

MECHANICAL SPECIFICATIONS

Antenna Size	5.56mm x 14.60 mm
Core Radiator	Copper
Substrate material	FR4
Substrate thickness	0.8 mm
Coaxial wire	For external antenna version
Connect Type	For external antenna version
Operating Temperature	-40 to +85°C
Storage Temperature	-40 to +85°C

THE SHAPE AND SIZE OF THE ANTENNA
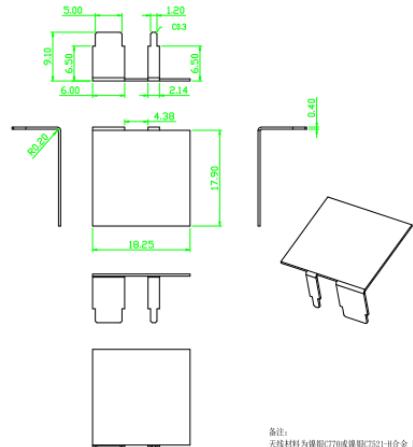
ANT-J3&ANT-J2
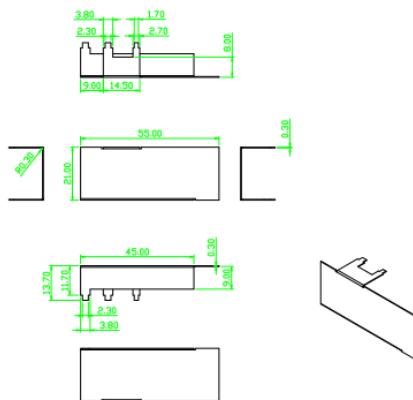
ANT-915
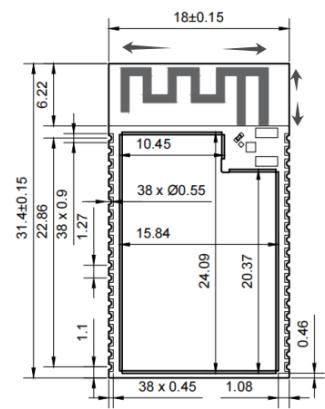
ANT-WiFi

THE RESULT OF THE TEST

VSWR & Return loss & Smith (ANT-J3)
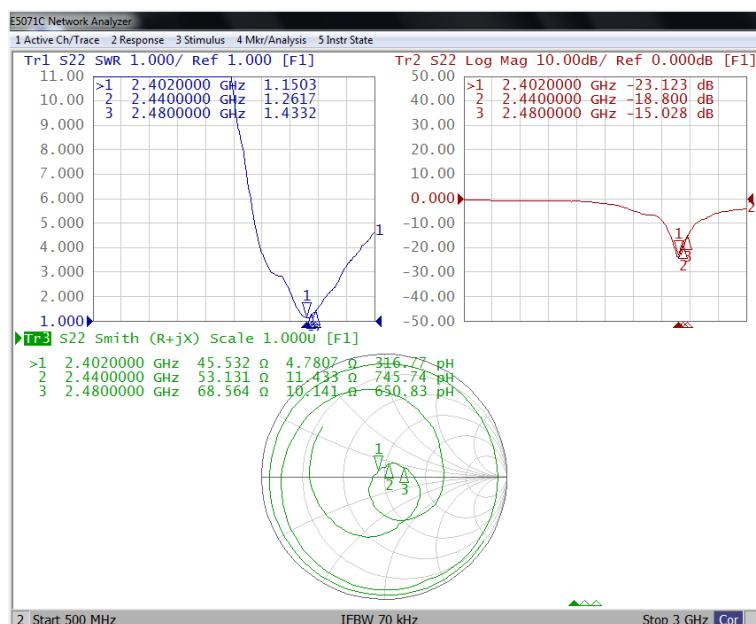
FREQUENCY (MHZ)	RETURN LOSS (DB)	VSWR
2402	-23.1	1.15
2440	-18.8	1.26
2480	-15.0	1.43
Bandwidth (S11≤-10dB)	120	

3D Radiation Pattern (ANT-J3)

2402MHZ

2440MHZ


2480MHZ
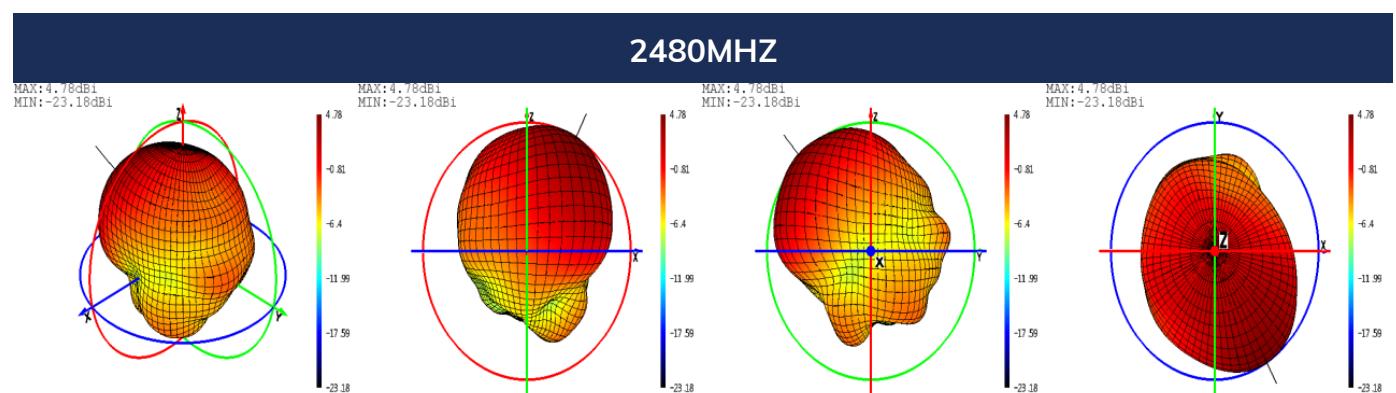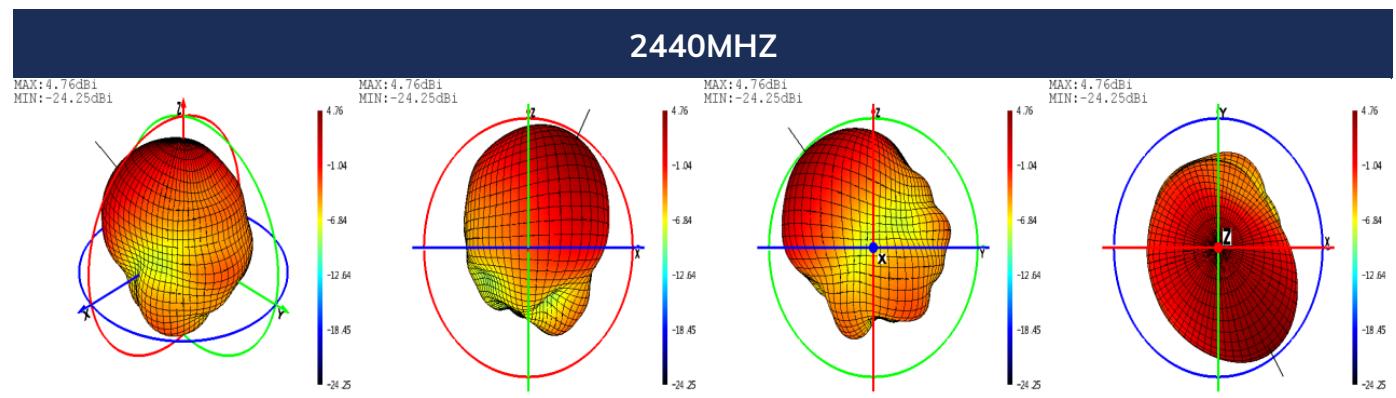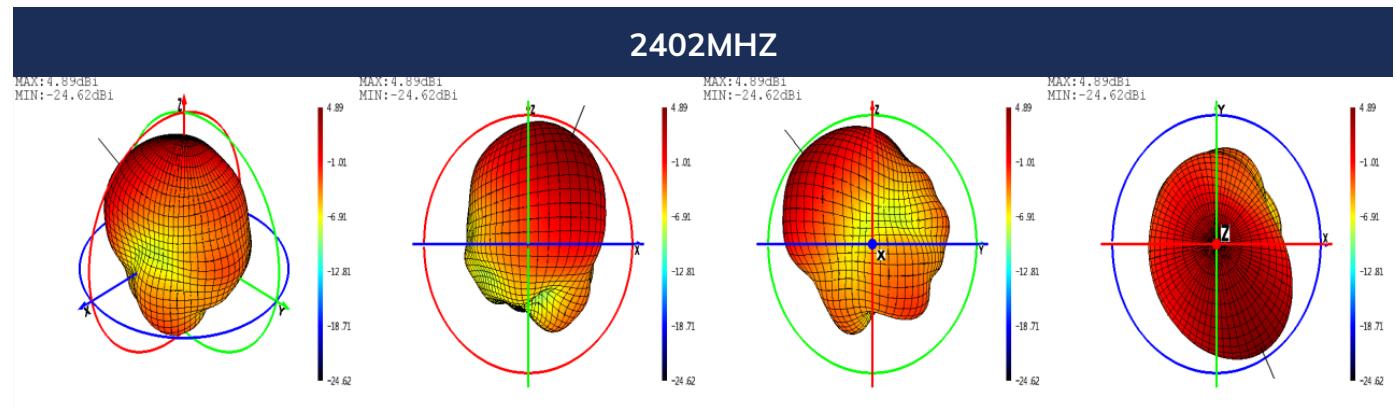
2D Radiation Pattern (ANT-J3)

VE1，XZ-FACE，PHI=0°;（E1，THETA=0~360°，PHI=0°）
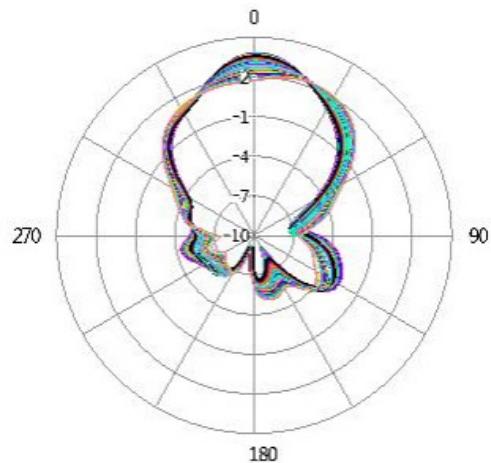
E2，YZ-FACE，PHI=90°;（E2，THETA=0~360°，PHI=90°）
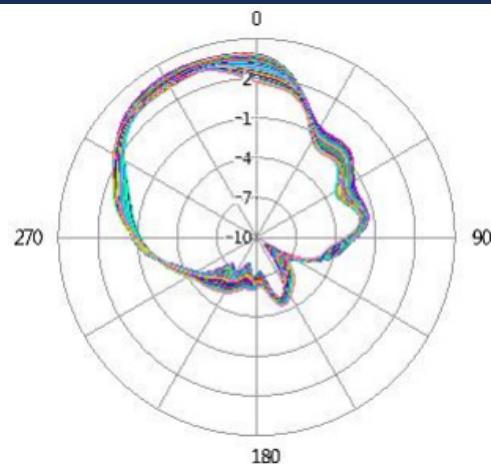
H，XY-FACE，THETA=90°;（H，PHI=0~360°，THETA=90°）
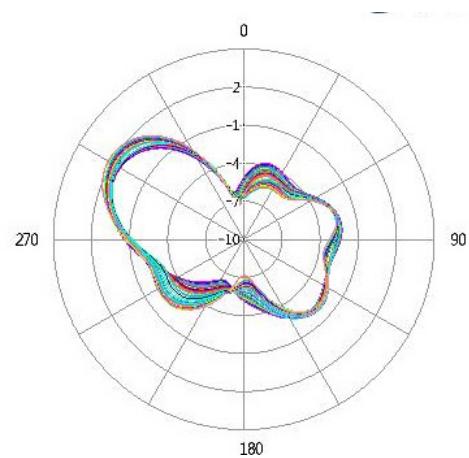
2D Radiation Pattern (ANT-J2)

E1，XZ-FACE，PHI=0°；（E1，THETA=0~360°，PHI=0°）
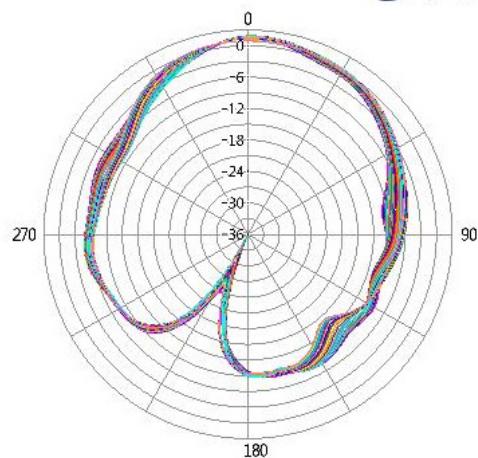
E2，YZ-FACE，PHI=90°；（E2，THETA=0~360°，PHI=90°）
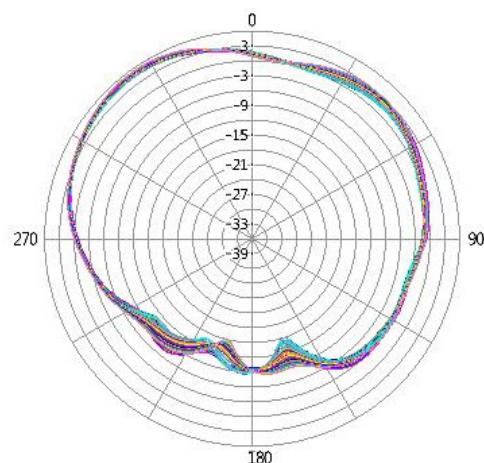
H，XY-FACE，THETA=90°；（H，PHI=0~360°，THETA=90°）
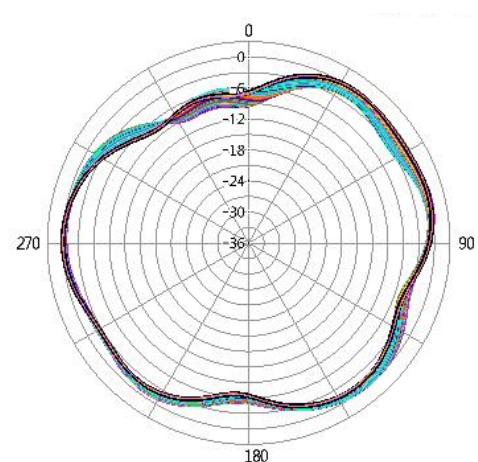
2D Radiation Pattern (ANT-915)

E1，XZ-FACE，PHI=0°;（E1，THETA=0~360°，PHI=0°）
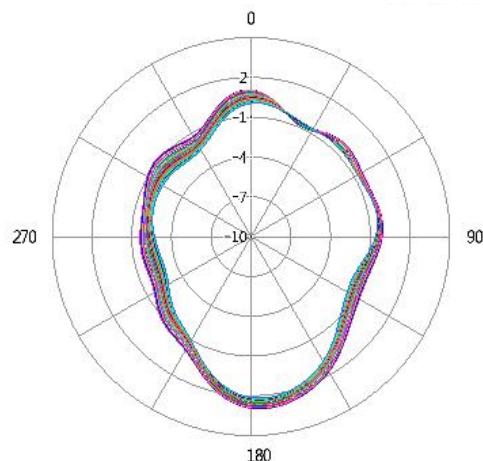
E2，YZ-FACE，PHI=90°;（E2，THETA=0~360°，PHI=90°）
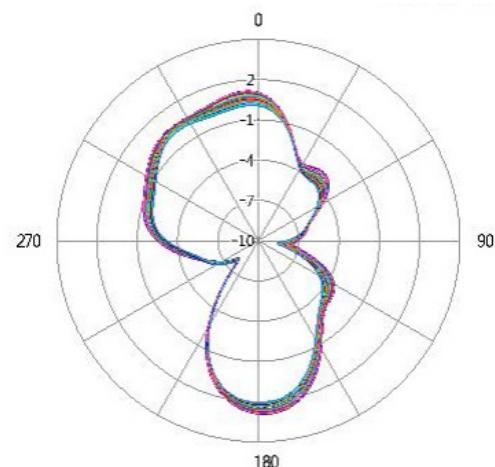
H，XY-FACE，THETA=90°;（H，PHI=0~360°，THETA=90°）
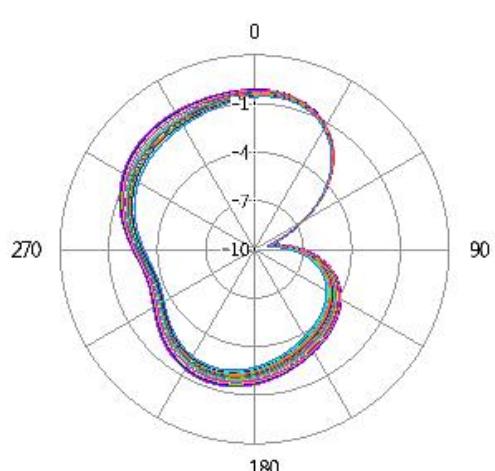
2D Radiation Pattern (ANT-WiFi)

E1，XZ-FACE，PHI=0°；（E1，THETA=0~360°，PHI=0°）
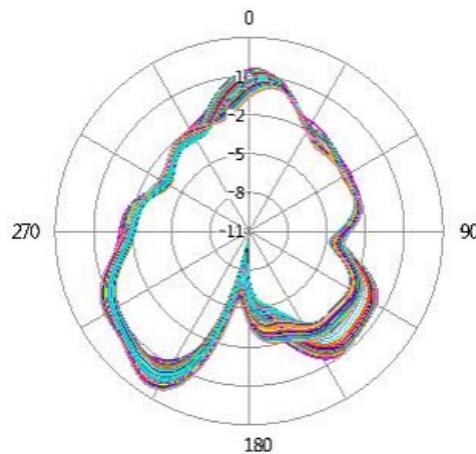
E2，YZ-FACE，PHI=90°；（E2，THETA=0~360°，PHI=90°）
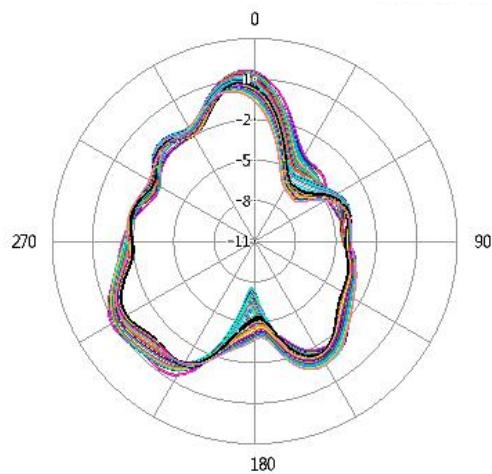
H，XY-FACE，THETA=90°；（H，PHI=0~360°，THETA=90°）
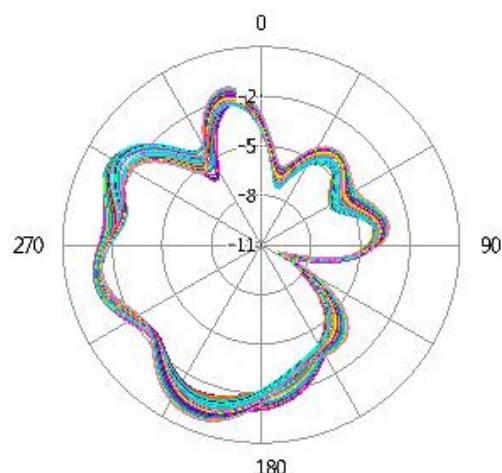
QUALITY ASSURANCE

The factory has already obtained the certification of ISO9001 Quality System. Each product has been strictly tested (tests include transmission power, sensitivity, power consumption, stability, aging, etc.).
Warranty Period: 12 months from the date of shipping (other accessories excluded).
It is recommended to use a 5V1A/5V2A adapter with Electrical safety certification.

DECLARATION

Statement of Rights:

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