



MA120.A.QP.001  
on ground-plane



## Hercules

**MA120.A.QP.001**

## Specification

<b>Part No.</b>	<b>MA120.A.QP.001</b>
<b>Product Name</b>	<b>Hercules</b> Hercules GENII Screw mount 2in1 450MHz and 868MHz (Separate cable and connectors)
<b>Feature</b>	Screw-Mount (Permanent Mount) For smart meters and mesh networks 450MHz and 868MHz Combo Antenna Peak Gain 3dBi for 450MHz Band 1dBi for 868MHz Band Cable and Connector 1M RG-316 SMA (M) Height 29mm * Diameter 49mm Waterproof IP67 & IP69K Rated RoHS Compliant

## 1. Introduction

The MA120 antenna is a high performance 450MHz and 868MHz combination thread mount antenna for external use with smart meters, gateways, mesh networks, vehicles and outdoor and indoor assets.

It is designed for heavy duty work with extra thick threads. The UV resistant polycarbonate housing is resistant to vandalism and direct attack.

At only 29mm high and a diameter of 49mm this unique antenna is the lowest profile and smallest worldwide.

The antenna has been tested in free space and on varying sizes of ground-planes, showing good frequency stability, allowing its use in many different mounting environments.

The IP67 and IP69K rated housing makes it waterproof against short immersion in water, and also against high pressure water jets used in industrial cleaning.

A closed cell foam on base prevents water leaking into mounting hole, while also providing a secure seal to a contoured surface.

The standard cable and connector is 1 meter RG316. High quality FEP (Teflon) jacket is used for the cable.

This makes the cable very flexible and able to operate in high temperature environments, corrosion resistant.

Note this antenna is designed for short range communication in the range of meters to hundreds of meters.

For cable lengths longer than 2 meters or where very long communication ranges are desired, apart from needing a higher transmit power from the transmitter, it is recommended to go with much larger high gain stand-alone whip or fiberglass Omni type antennas, to counteract losses in the cables.

## 2. Specification

### Electrical

	ISM450	ISM868	
<b>Frequency</b>	450	868	MHz
<b>Return Loss (min.)</b>	10	10	dB
<b>Peak Gain</b>	3.91	1.11	dBi
<b>Average Gain</b>	-3.27	-4.52	dBi
<b>Impedance</b>	50Ω		
<b>Polarization</b>	Linear		
<b>Radiation Properties</b>	Omni-Directional		
<b>Max Input Power</b>	5W		

### Mechanical

<b>Dimensions (mm)</b>	Height=29mm x Diameter=49mm
<b>Cable</b>	1M RG316 coax - Fully Customizable
<b>Casing</b>	PC Housing
<b>Base and Thread</b>	Nickel plated steel
<b>Weather proof gasket</b>	CR4305 foam with 3M9448HK double-side adhesive
<b>Connector</b>	SMA Male - Fully Customizable
<b>Thread Diameter</b>	18 mm
<b>Sealant</b>	Rubber Stopper

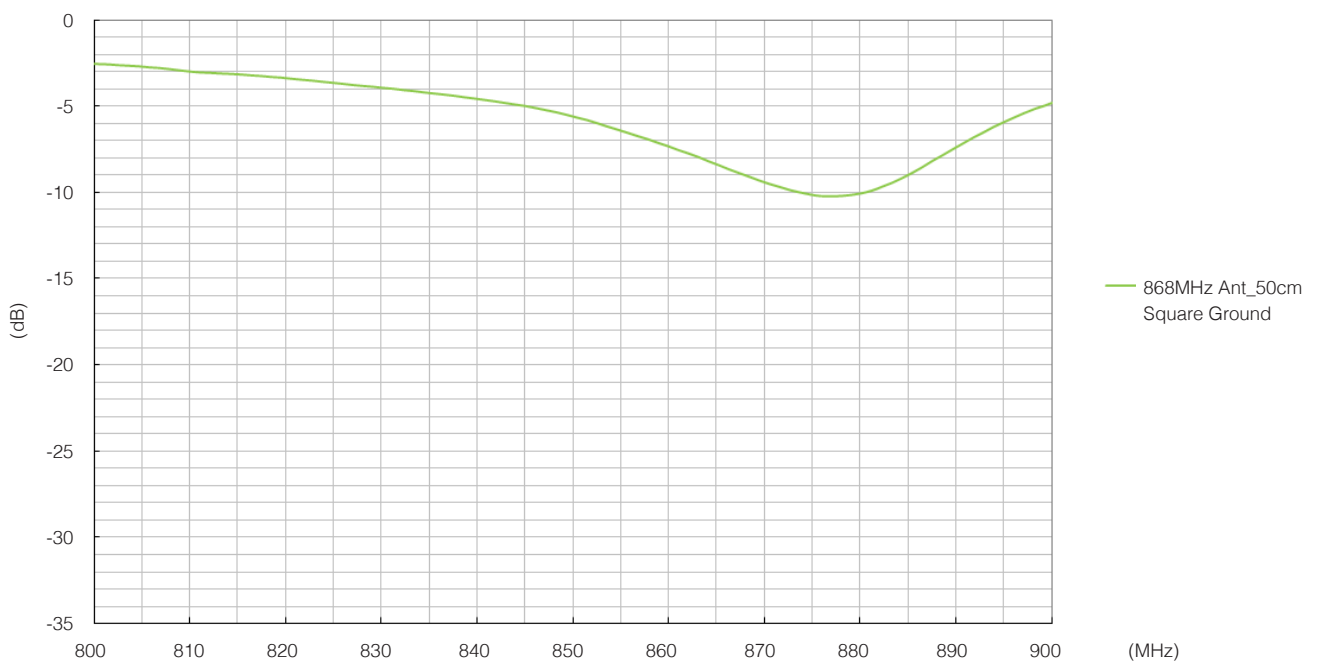
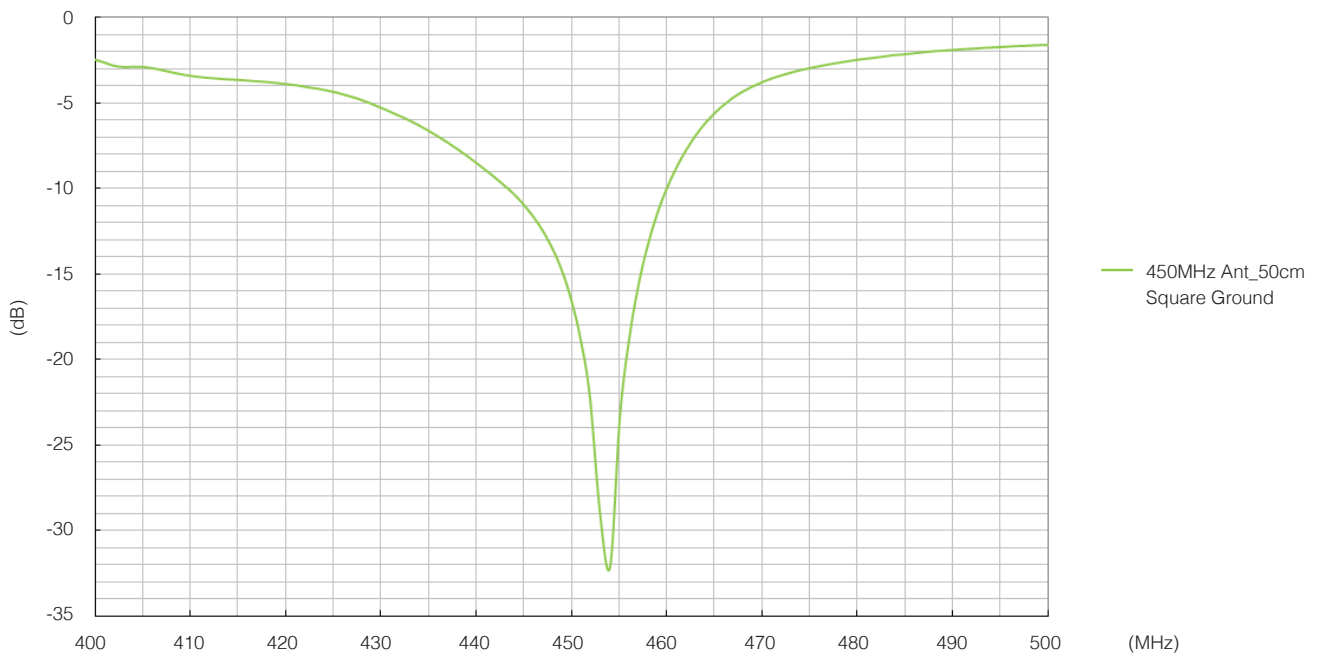
### Environmental Ratings

<b>Protection</b>	IP67 & IP69K
<b>Corrosion</b>	5% NaCl for 96hrs - Nickel plated steel base and thread
<b>Temperature Range</b>	40°C to +85°C
<b>Thermal Shock</b>	100 cycles -40°C to +85°C
<b>Humidity</b>	Non-condensing 65°C 95% RH
<b>Shock (Drop Test)</b>	1m drop on concrete 6 axes
<b>Cable Pull</b>	8Kgf

\* Results from mounting on 50cm\*50cm ground plane

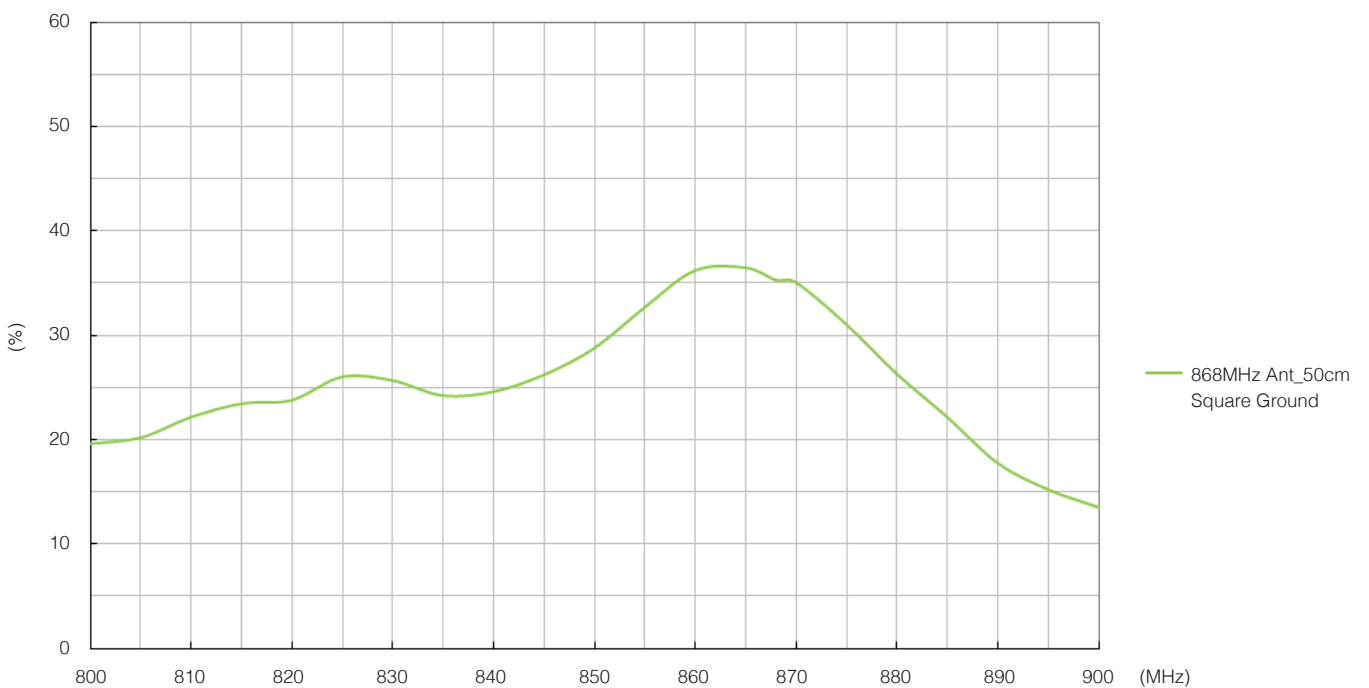
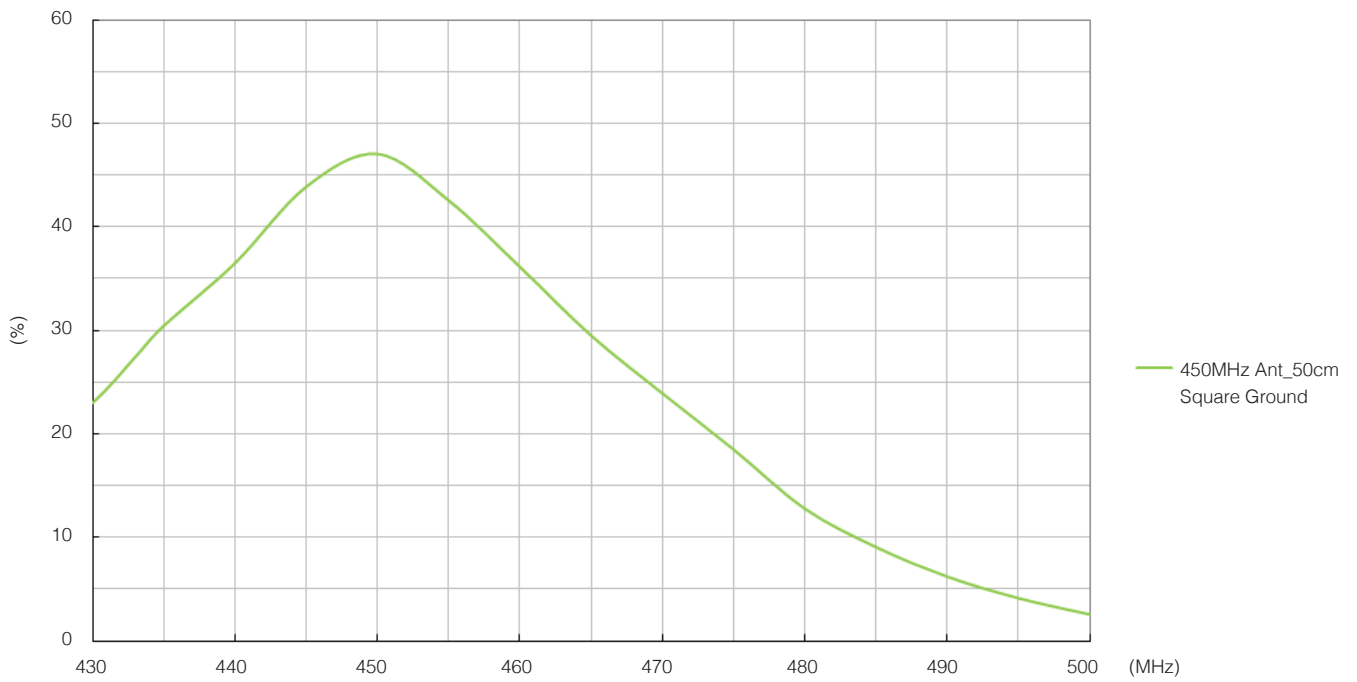
### 3. Antenna Characteristics

#### 3.1 Return Loss



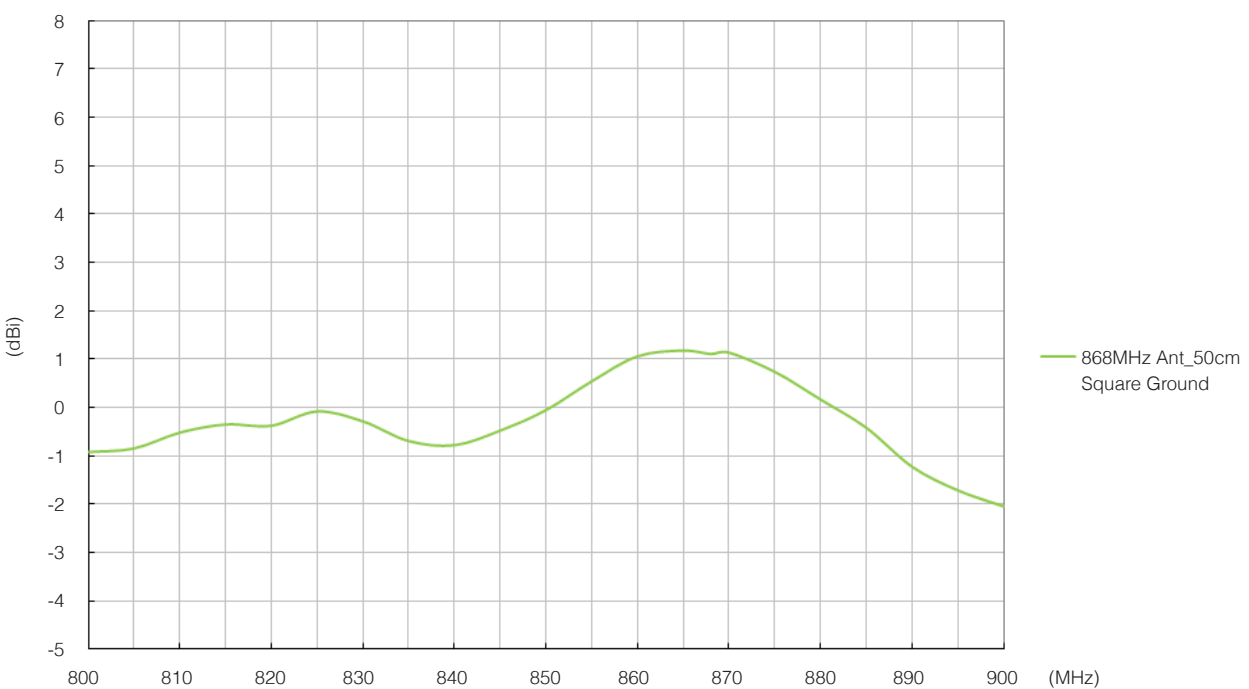
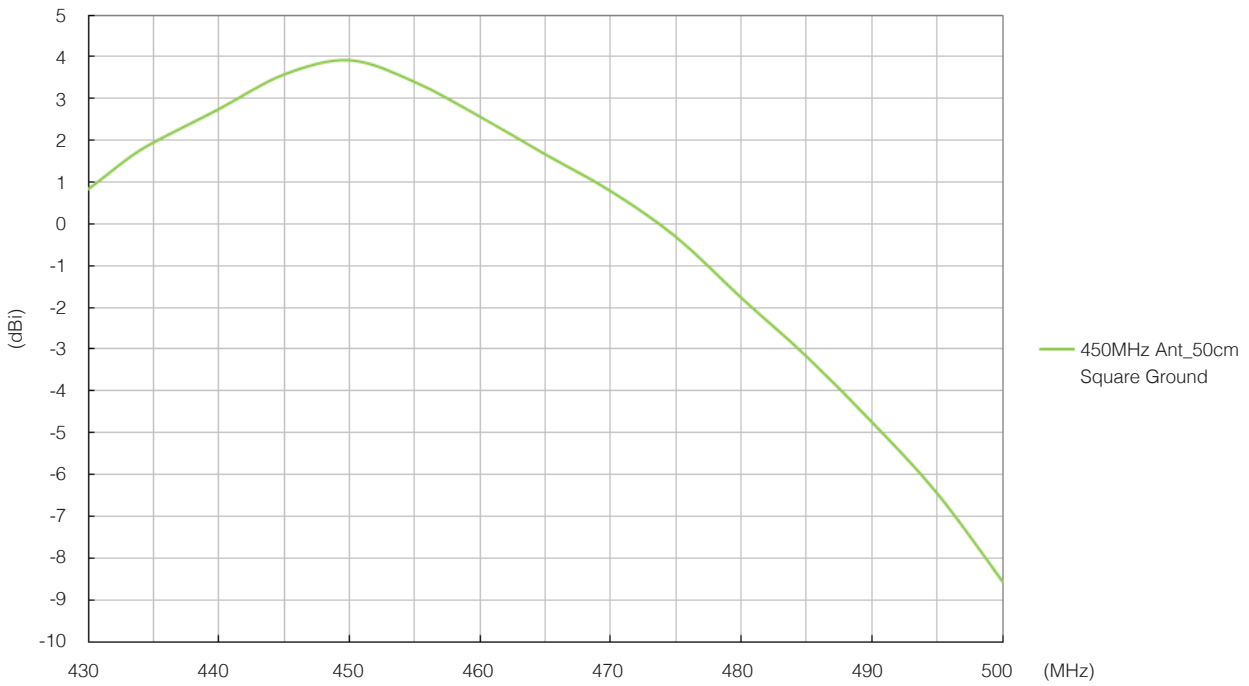
### 3. Antenna Characteristics

#### 3.2 Efficiency



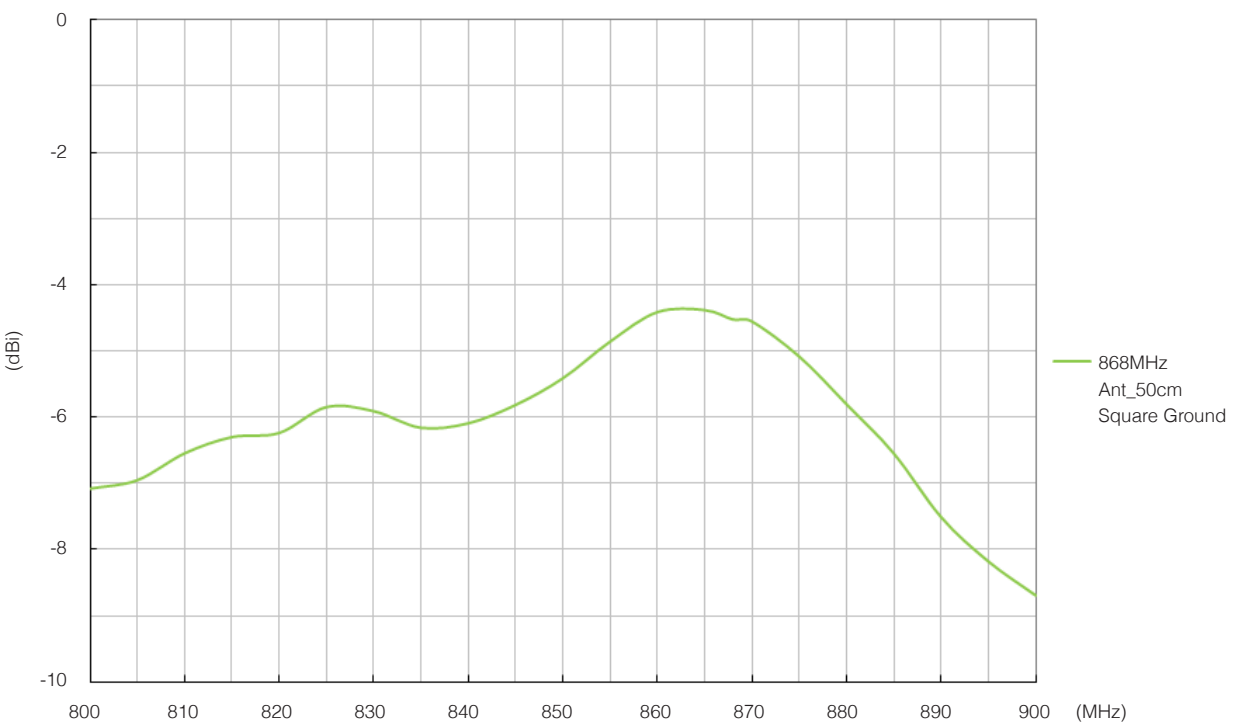
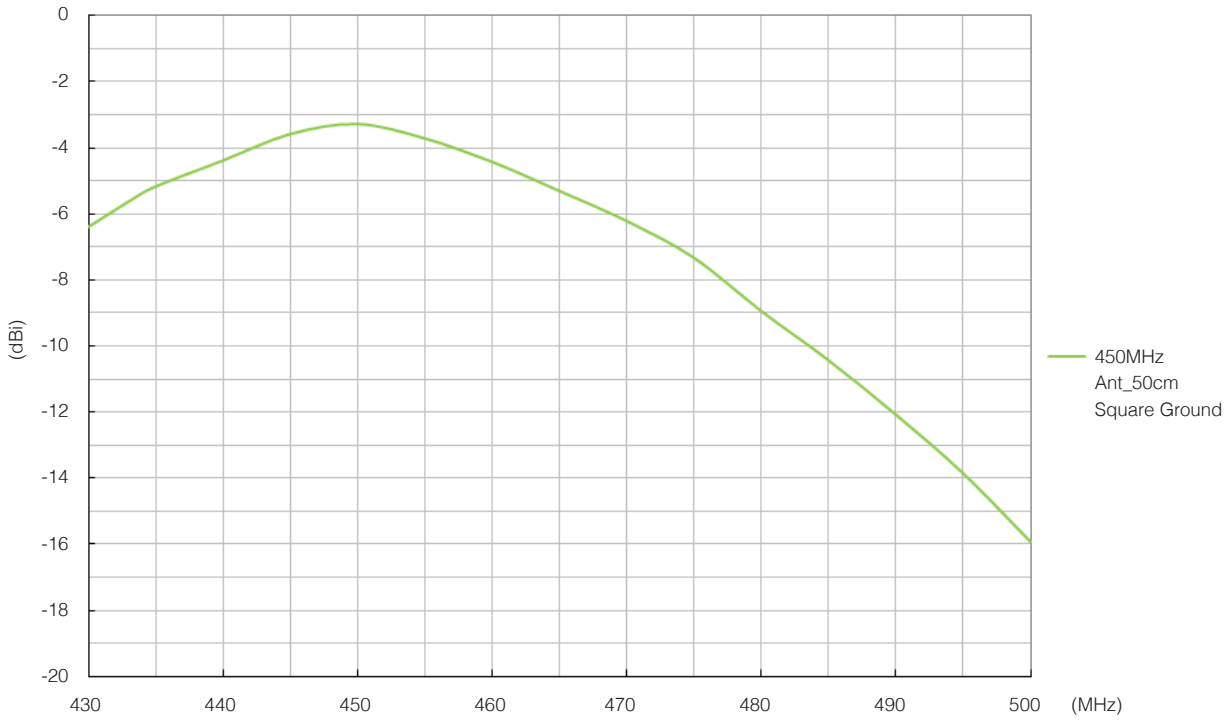
### 3. Antenna Characteristics

#### 3.3 Peak Gain



### 3. Antenna Characteristics

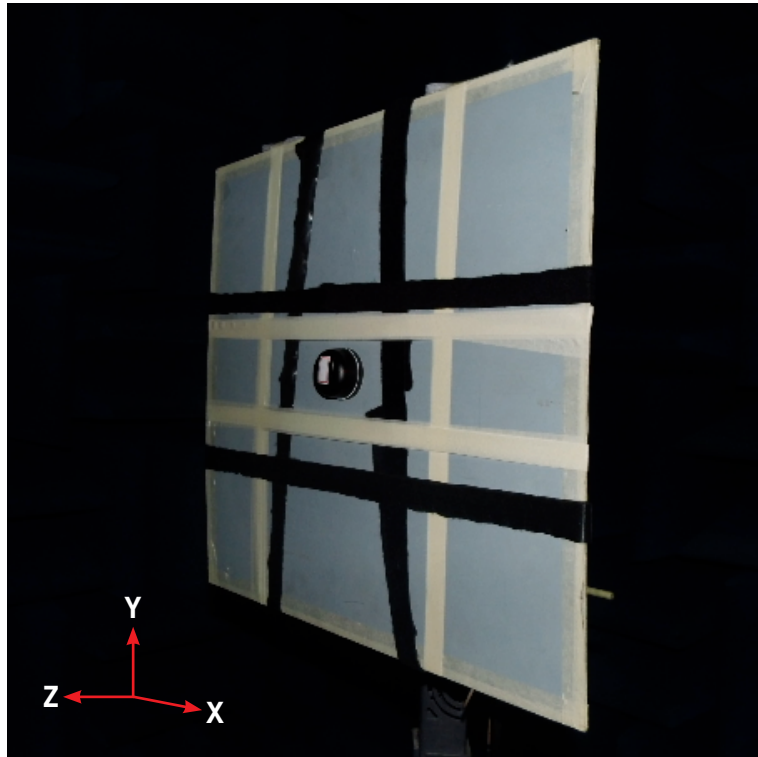
#### 3.4 Average Gain



## 4. Antenna Radiation Patterns

### 4.1 Antenna Setup

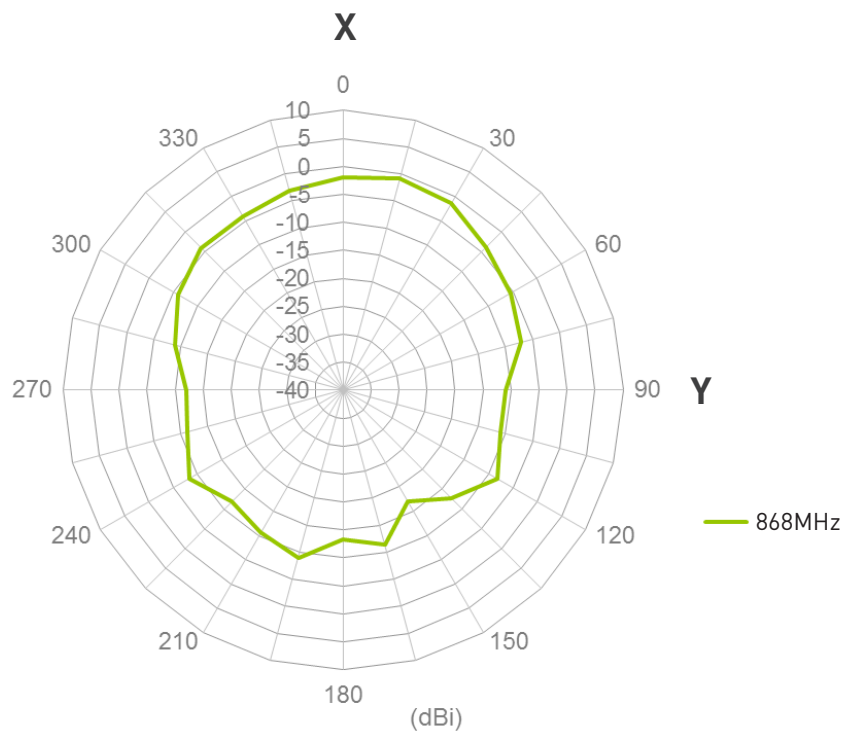
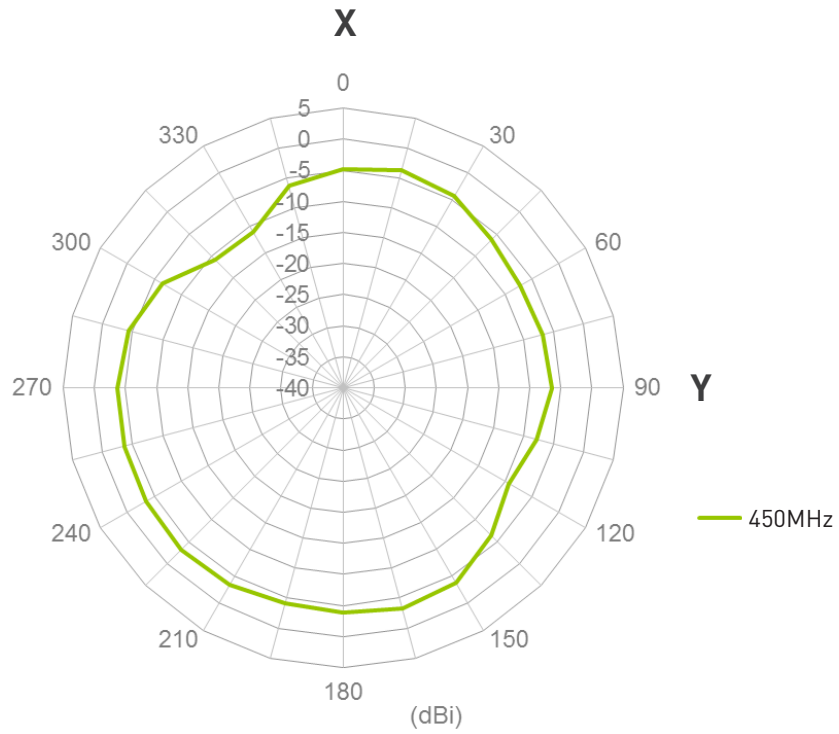
The antenna radiation pattern measured setup as shown below.





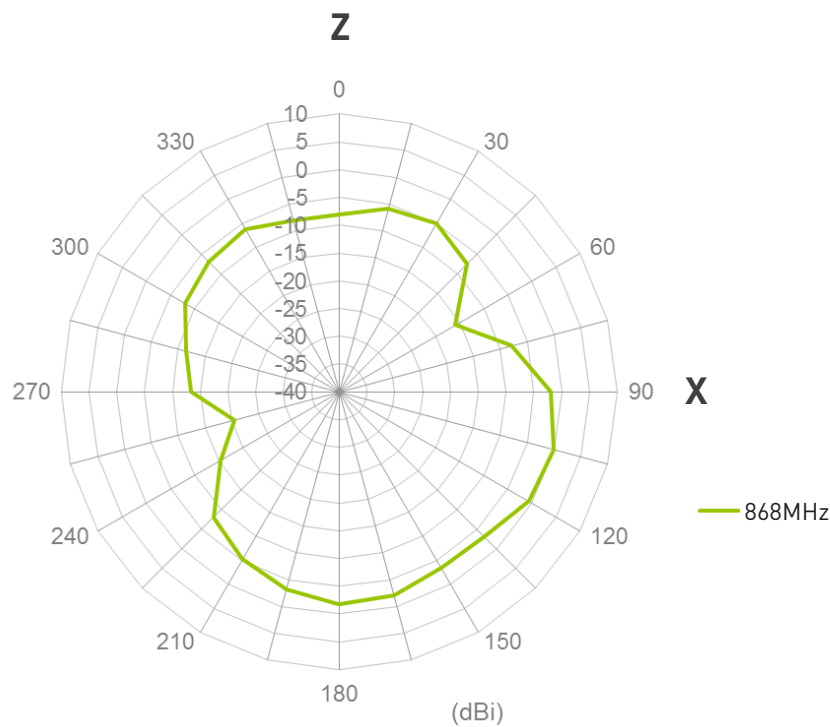
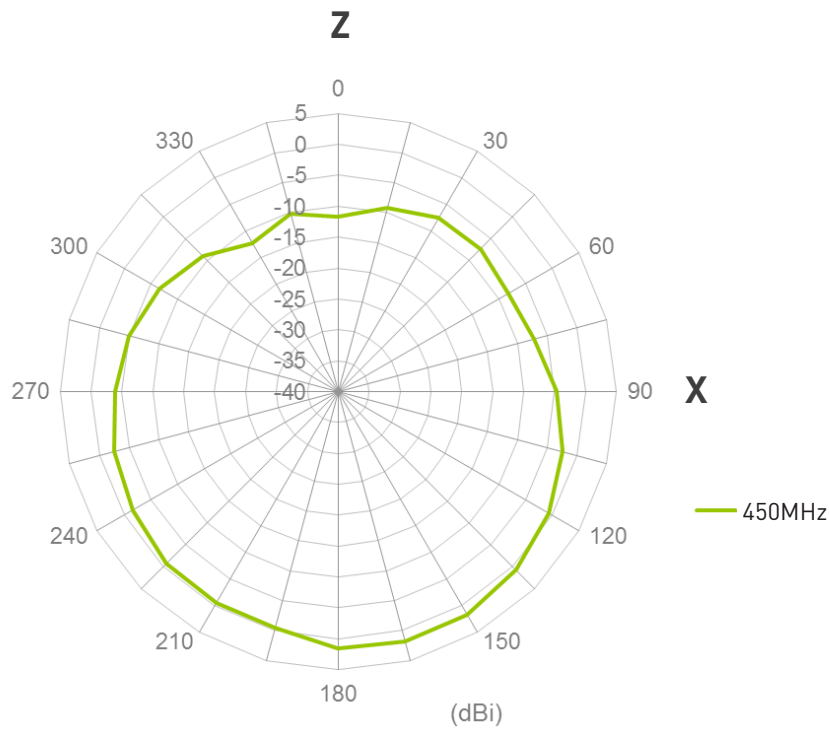
## 4.2 Antenna Radiation Patterns

### XY-Plane



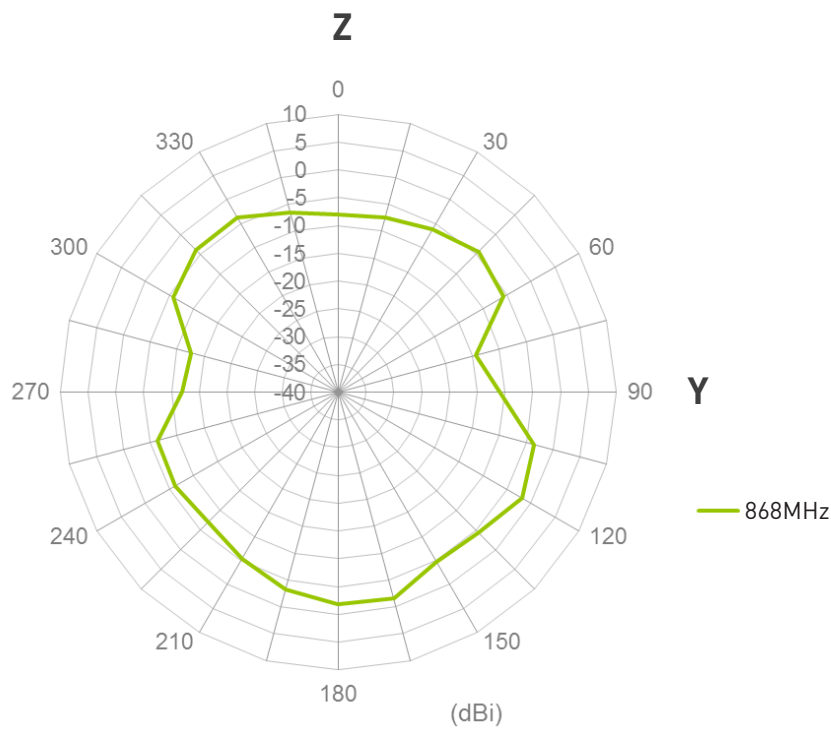
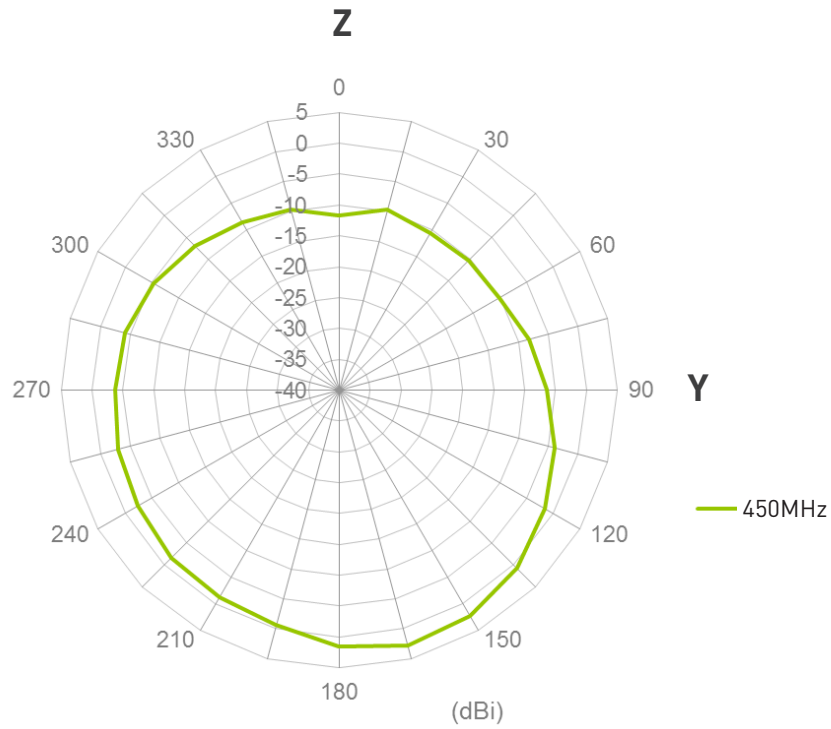
## 4.2 Antenna Radiation Patterns

### XZ-Plane

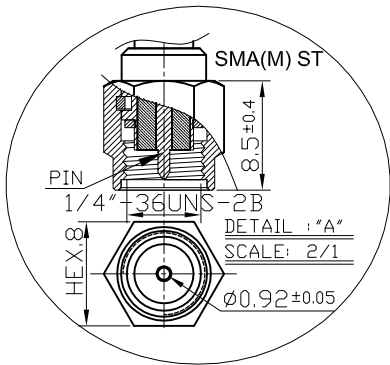


## 4.2 Antenna Radiation Patterns

### YZ-Plane

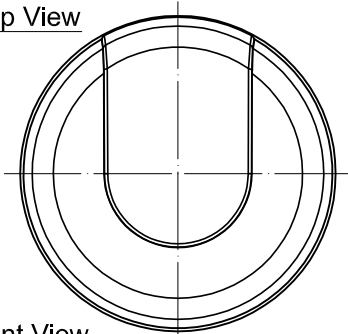


## 5. Drawing



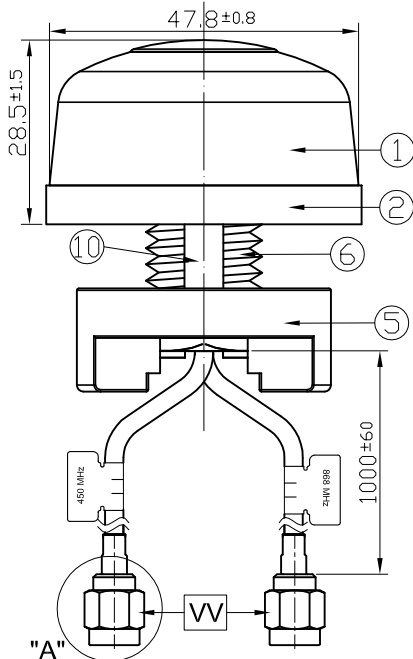
	Name	Material	Finish	QTY
1	Hercules Housing Not Squared Structure PC	PC	Black	1
2	Closed Cell Foam	CR 4305	Black	1
3	3M Double Adhesive	3M 9448 WC	White Liner	1
4	M18 Inner Nut	Steel Carbon	Ni Plated	1
5	Outer Nut Cover	ABS	Black	1
6	M18x2.5 Thread 14.6L	Zinc Alloy	Ni Plated	1
7	Heat Shrink Tube	PE	Black	2
8	450 MHz Label	Coated Paper	Yellow	1
9	868 MHz Label	Coated Paper	Brown	1
10	Rubber Stopper	Silicon Rubber	Black	1

Top View

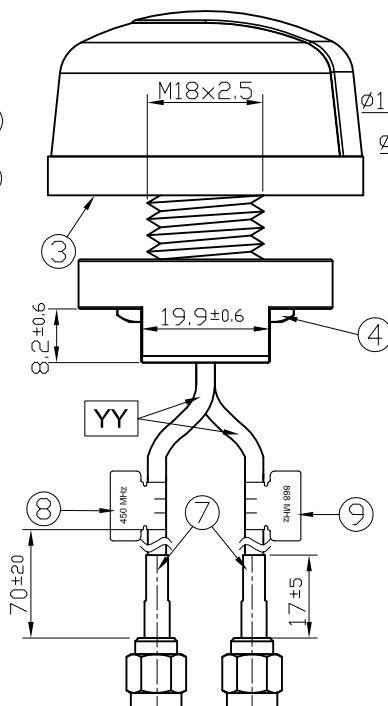


	Name	Spec	Finish	QTY
VV	Connector Type	SMA(M) ST	Gold	2
YY	Cable Type	RG316	Brown	2

Front View



Side View



Bottom Thread View



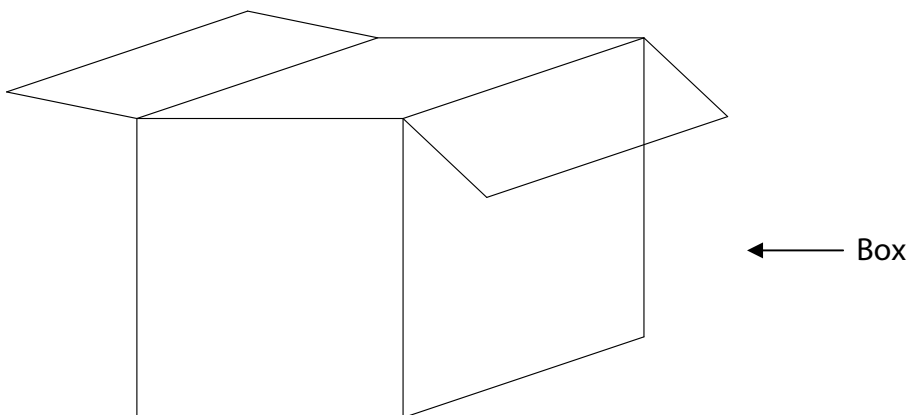
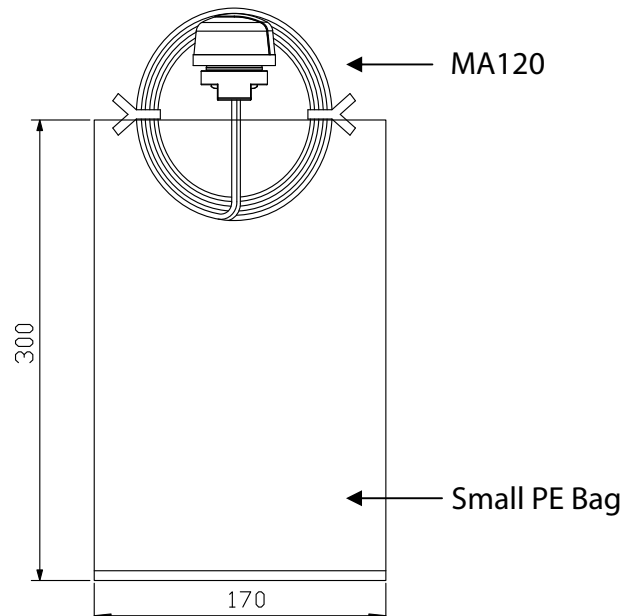
"A"  
Notes

1.New Part #: MA.120.A.Q108111.P108111

## 6. Packaging

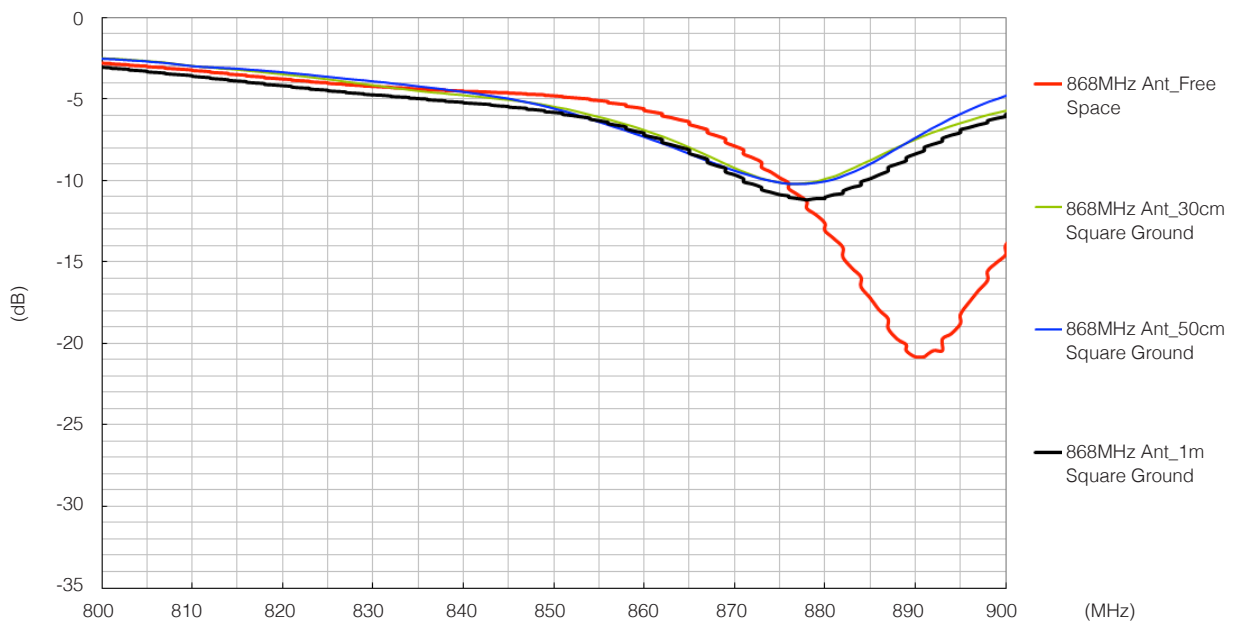
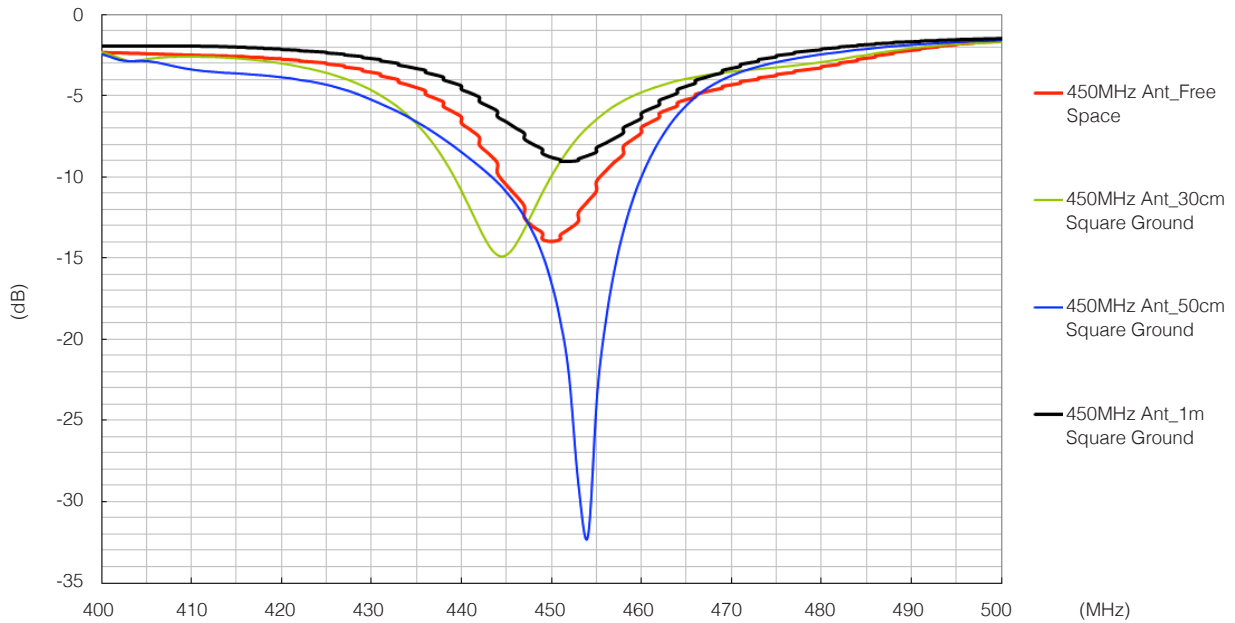
1 pcs antenna per small PE bag

40 small PE bags per box



## 7. Application Note

Taoglas provides this antenna return loss results with different ground conditions. Detail, please observe below.



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