

# **SPECIFICATION**

Part No. : **PC240.09.0300K** 

Product Name : Embedded T-Bar 433MHz

Adhesive/Screw Mounted Helical Dipole

with 0.3M RG316 MMCX(M)RA

Features : • Omni-Directional

• 96mm x 40mm x 3mm

 Integrated LC tank Balun to prevent influence of cable routing and cable length

• -1dBi Peak Gain @ 433MHz

• 48% high efficiency

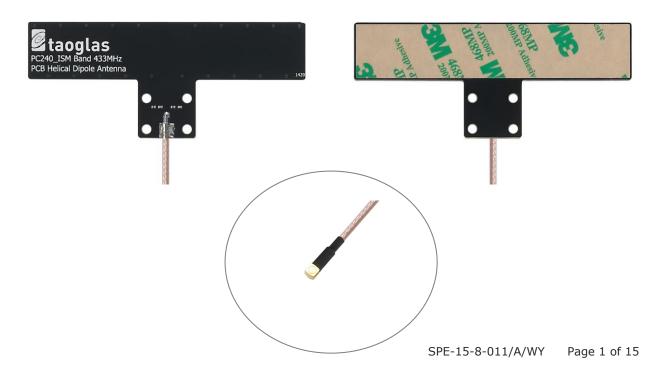
• 300mm RG316 Coaxial Cable

• MMCX(M) Right Angle Connector

• Low profile – only 3mm in thickness

**RoHS Compliant** 

#### Photo:





## 1. Introduction

The PC240.09.0300K is a 433MHz embedded omni-directional adhesive / screw mounted, linear polarised, dipole antenna with high efficiency at only 96mm in length.

The antenna was specifically designed for use in wireless alarm devices. It operates in license-free ISM band, making the PC240.09.0300K a suitable antenna in systems such as home security & alarm, home automation, metering, remote control, industrial control, and other 433MHz applications.

Most low frequency antennas detune inside enclosures when the cable is moved to new orientations. In order to mitigate the influence of cable routing direction while installing, the PC240.09.0300K uses a LC tank balun circuit. The LC tank balun circuit stabilizes the electrical characteristics when cable length changes. Please refer to Application Note (Section 7) for more details.

The PC240.09.0300K is designed as a helical dipole structure, which can significantly shorten the length while maintaining high efficiency. Users can easily attach the antenna on their device housing via the 3M adhesive, without worrying about their housing detuning the antenna as it has been tuned on a 2mm thick ABS board, which is typical enclosure thickness and material for electronic devices. It also has four thru holes that users can fix the antenna with screws.

With the balun circuit and helical dipole design, the PC240.09.0300K is truly a miniature 433 MHz PCB antenna, which can provide worry-free cable routing during installation.



# 2. Specification

ELECTRICAL						
Application Band		ISM				
Operation Frequency (MHz)		433				
Cable length (M)		0.3				
On 2mm thickness ABS  Base	Average Gain (dB)	-3.14				
	Efficiency (%)	48.82				
	Peak Gain	-0.97				
VSWR		< 2:1				
Return Loss (dB)		< -10				
Polarization		Linear				
Impedance		50 Ohms				

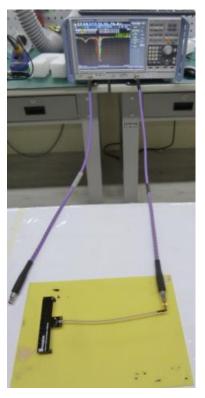
MECHANICAL					
Dimension (mm)	Height = 3 mm, Length = 96 mm, Width = 40 mm				
Cable length	300mm RG316 - Fully Customizable				
Connector	MMCX(M) RA – Fully Customizable				
Material	Composite				
Weight (g)	18				
ENVIRONMENTAL RATINGS					
Temperature Range	-40°C to +85°C				
Thermal Shock	100 cycles -40°C to +85°C				
Humidity	Non-condensing 65°C 95% RH				
Cable Pulling Force	18.2kgF				



# 3. Antenna Characteristics

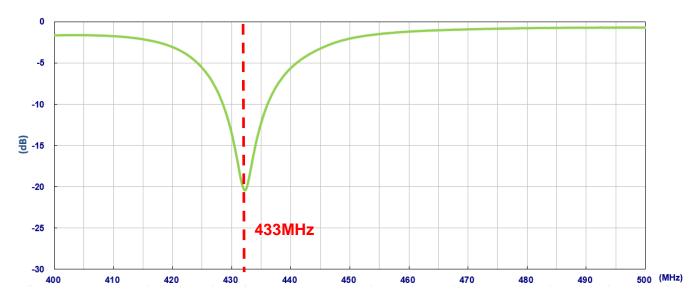
## 3.1 Testing Setup

PC240 antenna was tested with R&S ZNB-8 network analyzer.



On 2mm thick ABS base

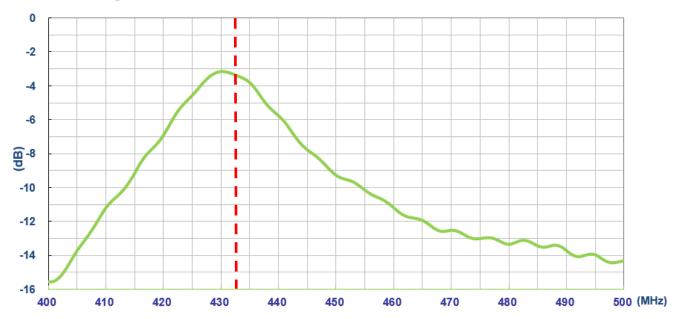
### 3.2 Return Loss



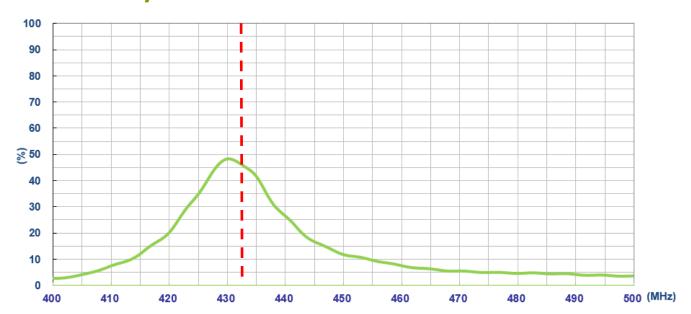
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# 3.3 Average Gain

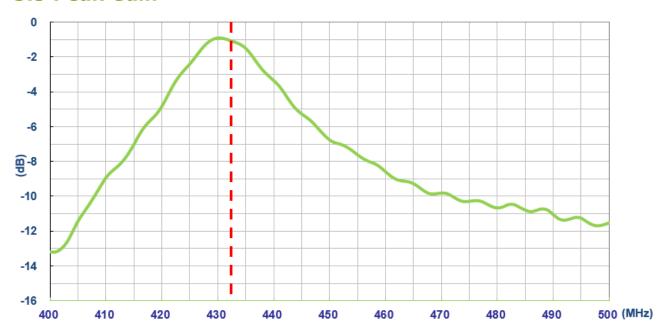


# 3.4 Efficiency





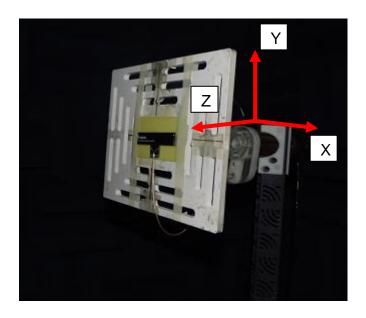
### 3.5 Peak Gain



# 4. Antenna Radiation Patterns

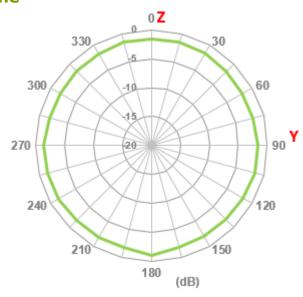
## 4.1 Antenna Setup

The antenna radiation pattern measurement setup is shown below.

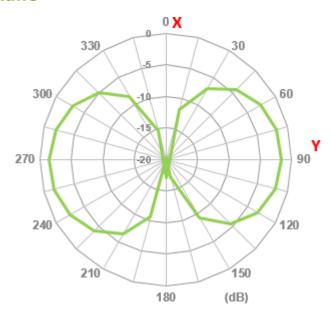




# 4.2 Antenna Radiation Patterns 2D Patterns YZ Plane

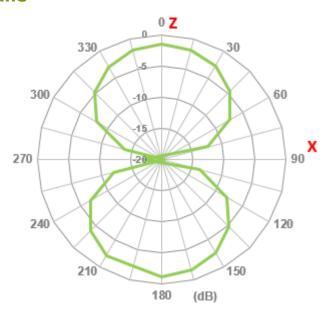


### **XY Plane**

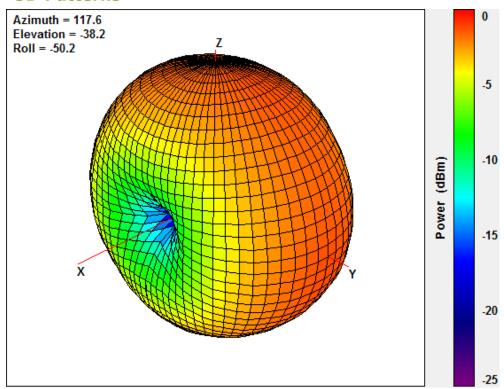




### **XZ Plane**

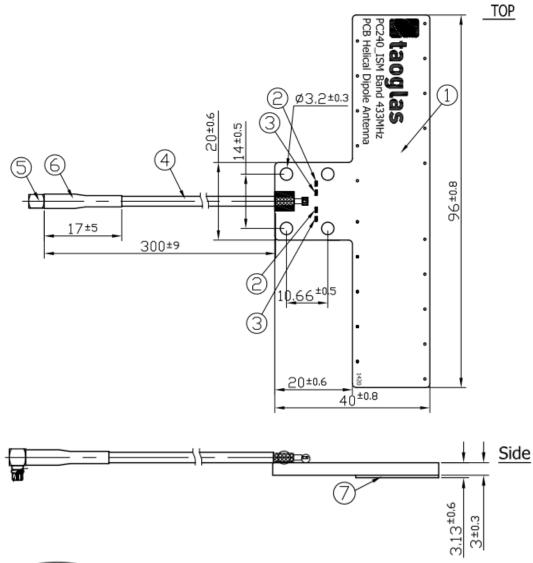


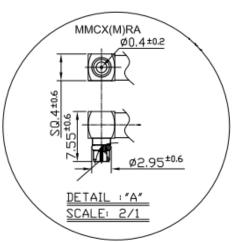
## **3D Patterns**





# 5. Drawing



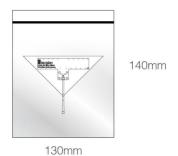


	Name	P/N	Material	Finish	QTY
1	PC240 PCB (96x40x3t)	100214G000011A	Composite	Black	1
2	Inductor	001514I000090A	Ceramic	N/A	2
3	Capacitor	001514 <b>I</b> 010090A	Ceramic	N/A	2
4	RG316 Coaxial Cable	301613A000013A	FEP	Brown	1
5	MMCX(M)RA	202711G000013A	Brass	Go <b>l</b> d	1
6	Heat Shrink Tube	001311F000013A	PE	Black	1
7	PC240 Adhesive 95x19x0.13t	001014I000013A	3M 468	N/A	1

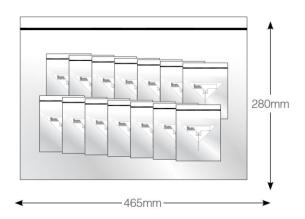


# 6. Packaging (unit: mm)

1 Piece PC240.09.0300K per small PE bag Dimensions - 140\*130mm Weight - 20g

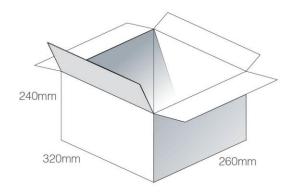


25 small PE bgs per large PE bag Dimensions - 465\*280mm Weight - 0.50Kg

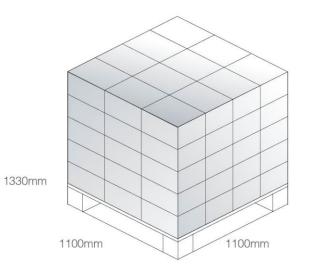




25 large PE bags per cartons 250 Pieces per carton Carton Dimensions - 260\*320\*240 Weight - 12.5 Kg



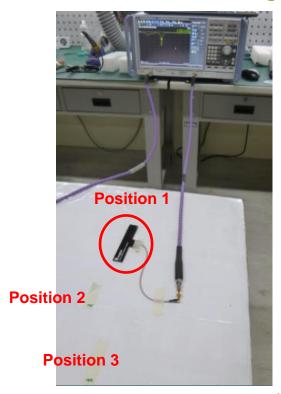
Pallet Dimensions 1100\*1100\*1330mm 60 Cartons per Pallet 12 Cartons per layer 5 Layers

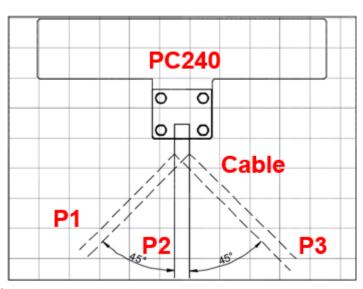




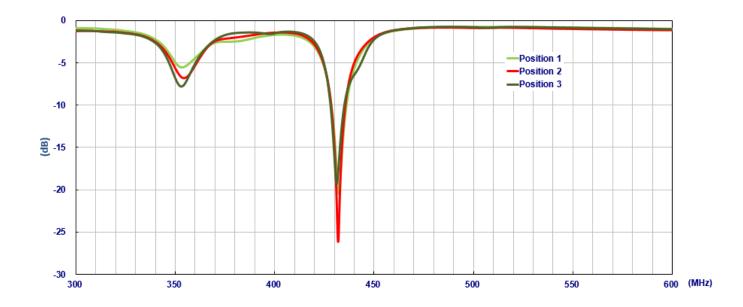
# 7. Application Note

## 7.1 PC240 antenna cable routing effects





Cable Routing

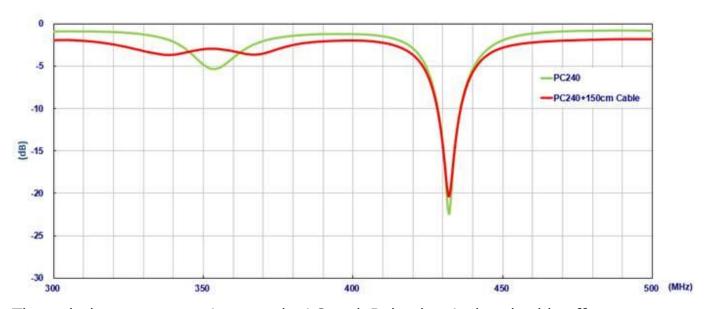




## 7.2 PC240 with long cable effects



PC240 with extra 150cm cable

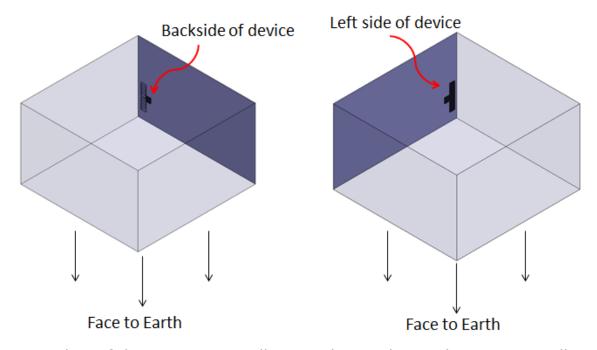


Through these two experiments, the LC tank Balun has isolated cable effects to antenna resonance.



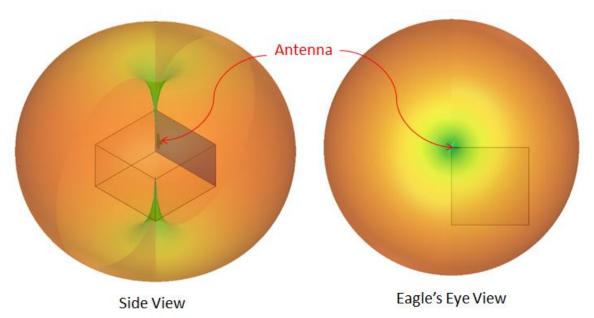
## 8. Installation Recommendations

PC240 antenna is a resonant arm meandered non-standard dipole novel antenna design. However, it still keeps the same radiation characteristics as standard dipole antennas. It has an omni-directional radiation pattern in the H-Plane(2D YZ Plane in the spec). The installation recommendation of this antenna is mounting the antenna internally on the side walls of the device, with one of the arms of the T pointing downwards



For either of the antenna installations shown above, the antenna will exhibit the radiation pattern as shown below.





Orange means much higher antenna gains, Green means the weakest antenna gains. So the correct application of this antenna is to let the antenna edges as below face the sky and Earth. Then the antenna can have omni-directional radiation patterns that are horizontal to the Earth.

