



Product image for illustration Purposes only

Introduction

LPRS's ceramic chip antenna is designed for use within the ISM 433/868/915MHz frequency bands, covering frequencies from 433.05~434.790 MHz or 863~870 MHz or 902 ~ 928 MHz bands.

Perfect for applications where the antenna must be mounted internally within a product enclosure, the LPRS-MCA-433-915 offers excellent RF performance and is fully compatible with surface mount production processes, enabling low assembly cost, improved quality and consistency.

Features

- Stable and reliable performance.
- Low profile, compact size.
- RoHS 3 compliant.
- SMD process compatible.
- Smart Home.

Applications

- Ideal for any ISM 433/868/915 RF applications.
- Short Range Devices (SRD).
 - Wireless Sensors.
- Internet of Things.

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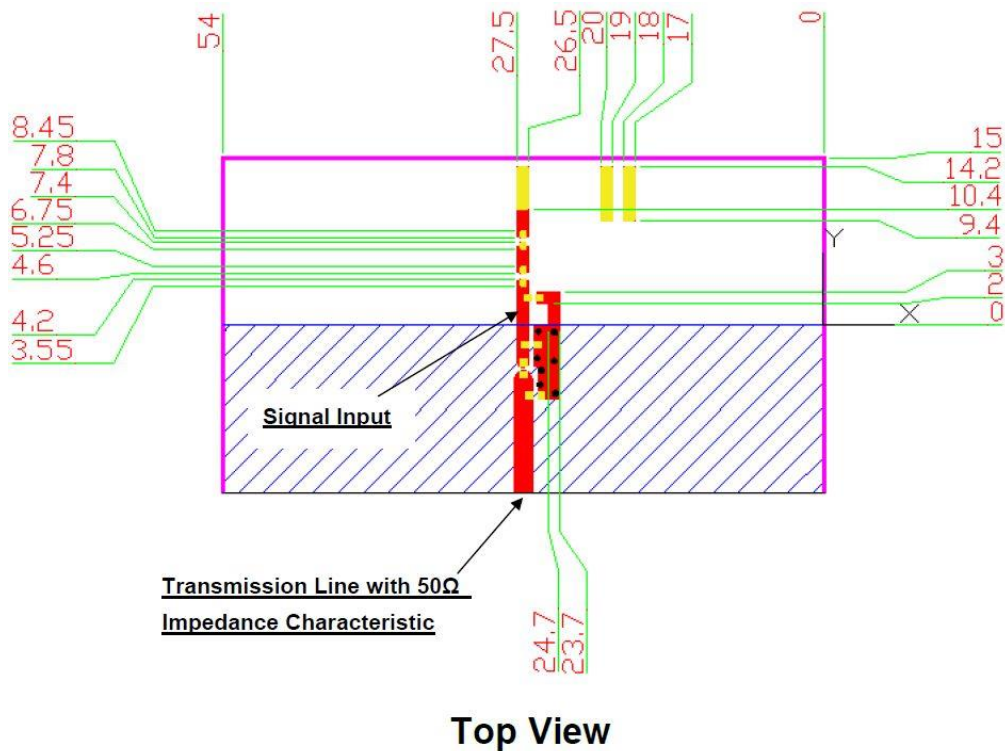
I. Layout Guide and Electrical Specifications


Figure 1 Layout Guide Top View (mm)

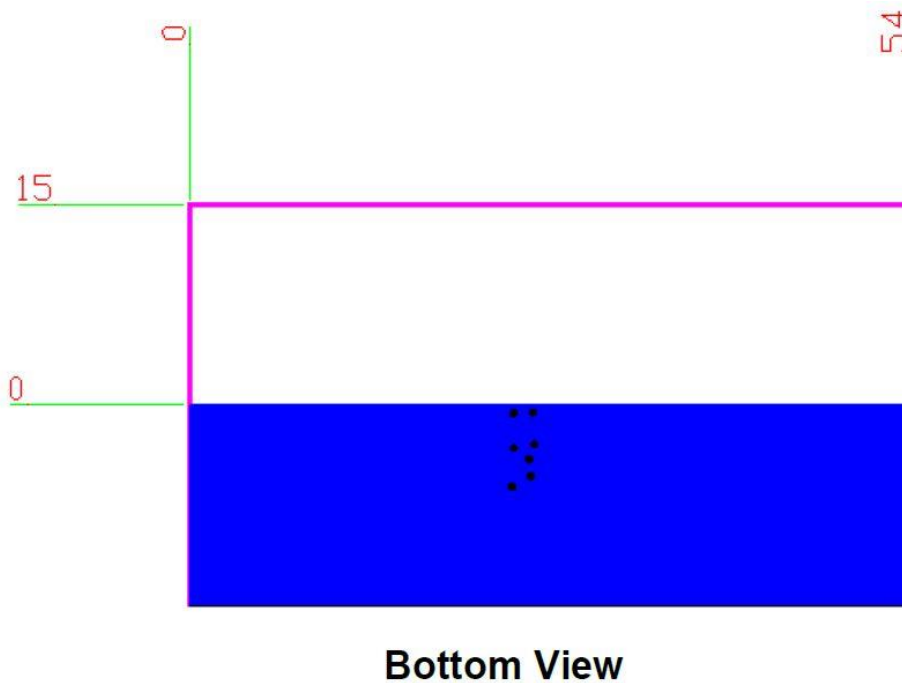


Figure 2 Layout guide Bottom View (mm)

I.1 Solder Land Pattern:

The solder land pattern (gold marking areas) is shown above in Figure 1. Recommendations on matching circuit will be provided according to customer's installation conditions.

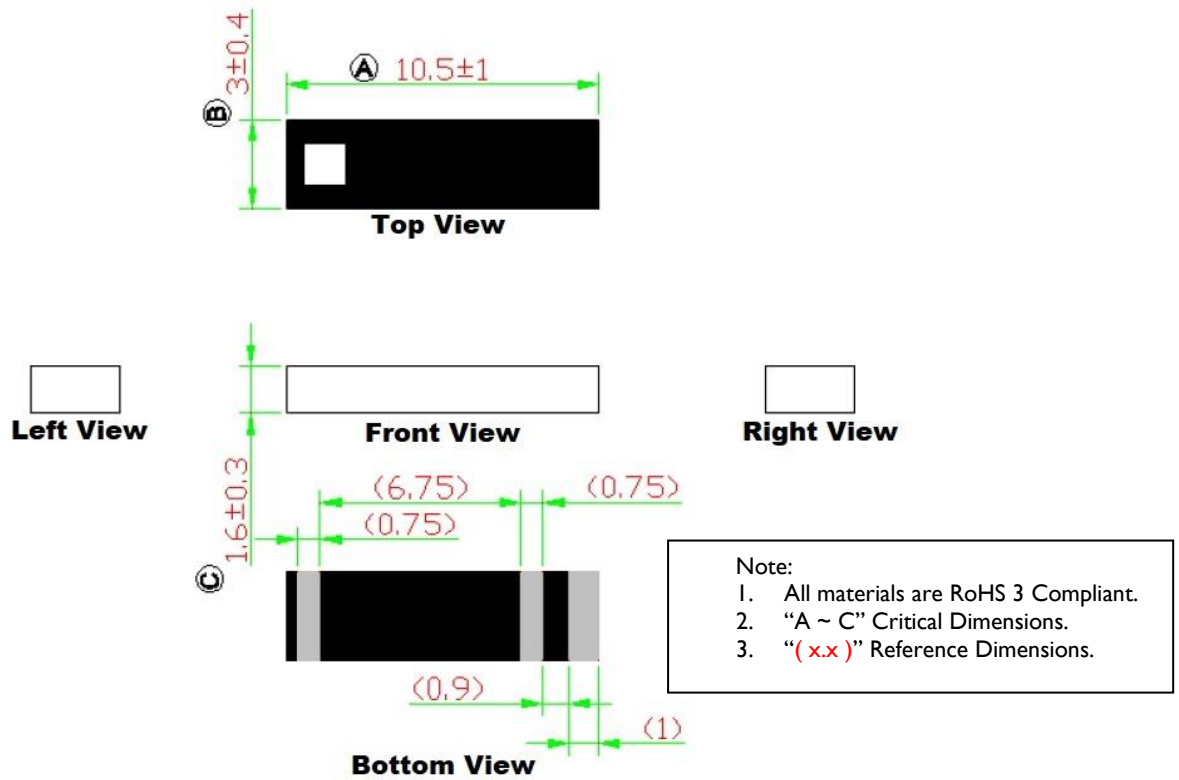
2. Antenna Outline Dimensions


Figure 3 Physical Dimensions (mm)

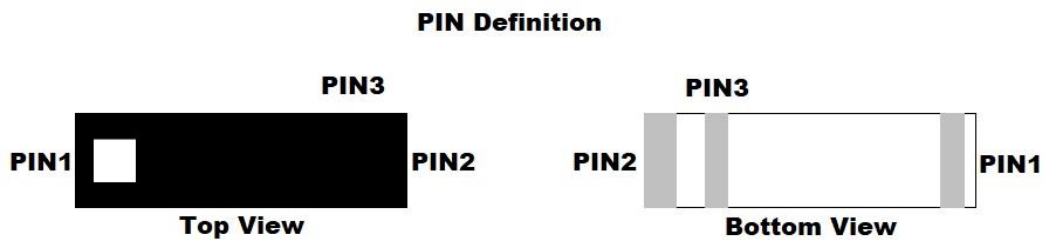
2.1. Pin Definitions.


Figure 4 Pin Assignments

Pin	1	2	N/C
Soldering Pad	Signal	N/C	N/C

3. Electrical Specifications (Evaluation Board Dimensions 86 x 54 mm²)

3.1 Electrical Table – 433MHz band***

Characteristics	Specifications	Unit
Outline Dimensions	10.5 x 3.0 x 1.6	mm
Ground Plane Dimensions	86 x 54	mm
Working Frequency	433.05 ~ 434.79	MHz
VSWR (@ centre frequency) *	2	
Impedance	50	Ω
Polarization	Linear Polarization	

3.2 Electrical Table – 868MHz band***

Characteristics	Specifications	Unit
Outline Dimensions	10.5 x 3.0 x 1.6	mm
Ground Plane Dimensions	86 x 54	mm
Working Frequency	863 ~ 870	MHz
VSWR (@ centre frequency) *	2	
Impedance	50	Ω
Polarization	Linear Polarization	
Peak Gain	-2.1 (Typical)**	dBi
Efficiency	(@868 MHz) 26 (Typical)**	%

3.3 Electrical Table – 915MHz band***

Characteristics	Specifications	Unit
Outline Dimensions	10.5 x 3.0 x 1.6	mm
Ground Plane Dimensions	86 x 54	mm
Working Frequency	903 ~ 928	MHz
VSWR (@ centre frequency) *	2	
Impedance	50	Ω
Polarization	Linear Polarization	
Peak Gain	(@915 MHz) -1.9 (Typical)**	dBi
Efficiency	26.3 (Typical)**	%

*Centre frequency means the frequency with the lowest value in return loss of the chip antenna on the evaluation board

**A typical value is for reference only, not guaranteed.

***Resonant frequency of LPRS-MCA-433-915 can be fine tuned for the working frequency 433MHz, 868MHz or 915MHz by using different matching components. Matching components will be defined according to the environmental conditions of cases or devices (see figure 13)

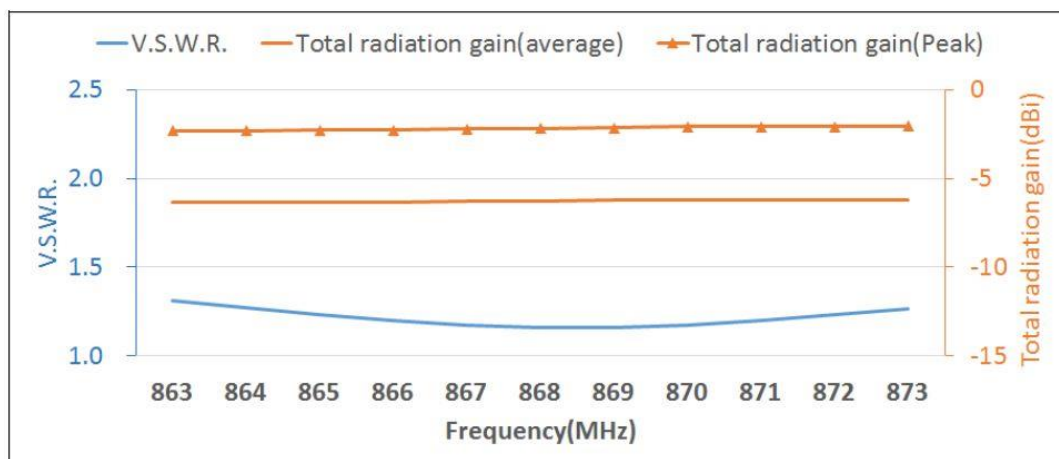


Figure 5 Frequency Vs VSWR and Total Radiation Gain (868 MHz band)

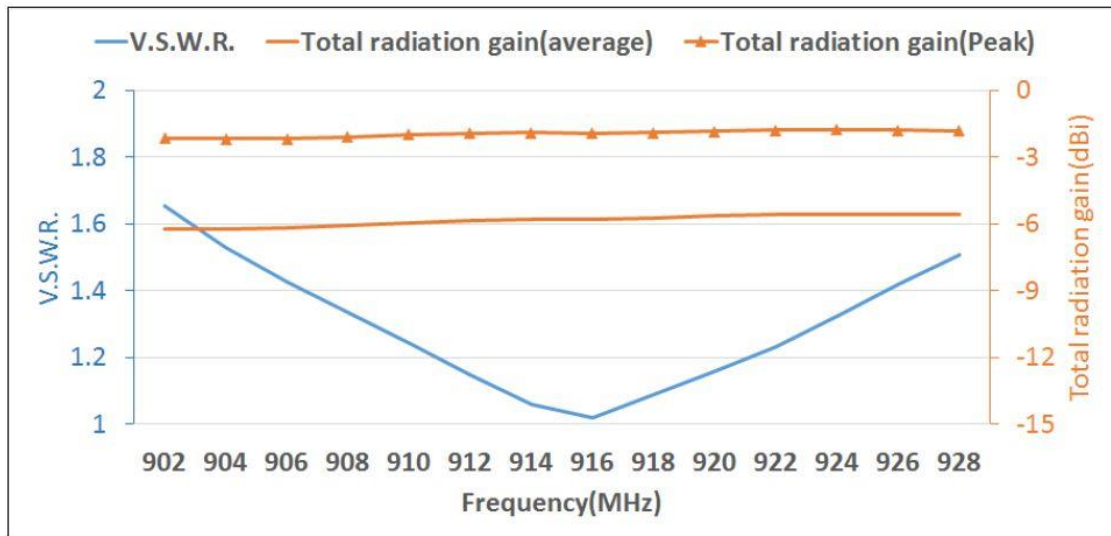


Figure 6 Frequency Vs VSWR and Total Radiation Gain (902-928 MHz band)

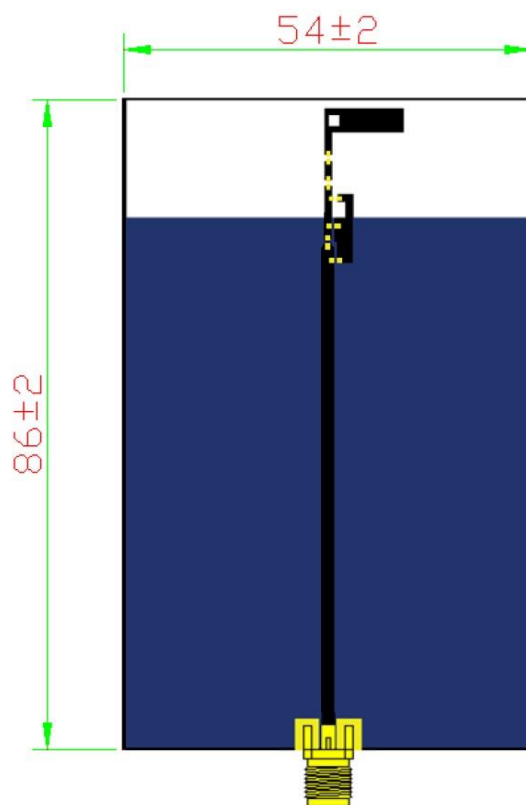


Figure 7 Evaluation Board

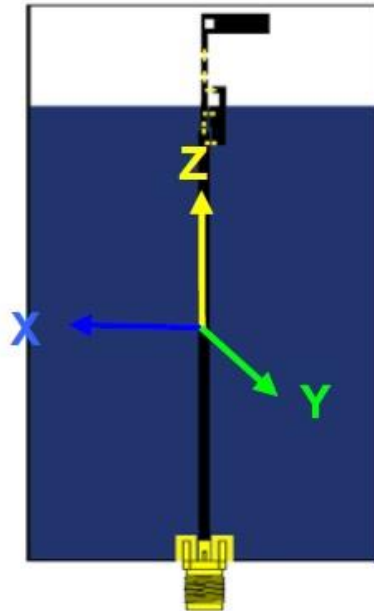
4. Radiation Pattern (based on the 86 x 54 mm² evaluation board)
4.1 3D gain pattern @ 868MHz in dBi


Figure 8 868MH Radiation Gain Pattern

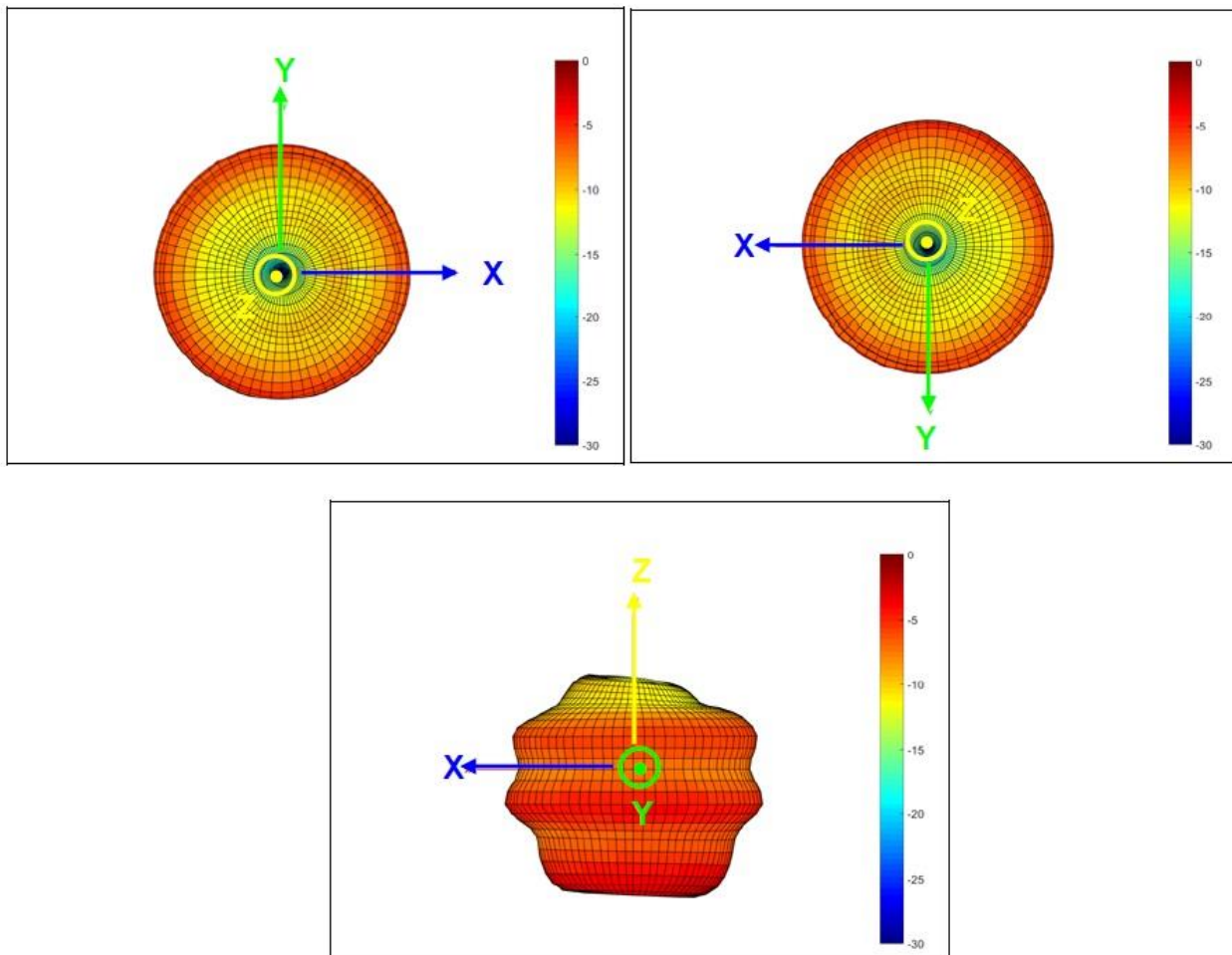


Figure 9 868MHz Radiation patterns for X, Y and Z

4.2 3D gain pattern @ 915MHz in dBi

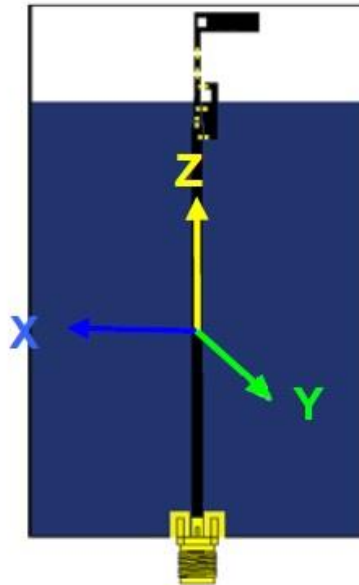


Figure 10 915MHz Radiation Gain Pattern

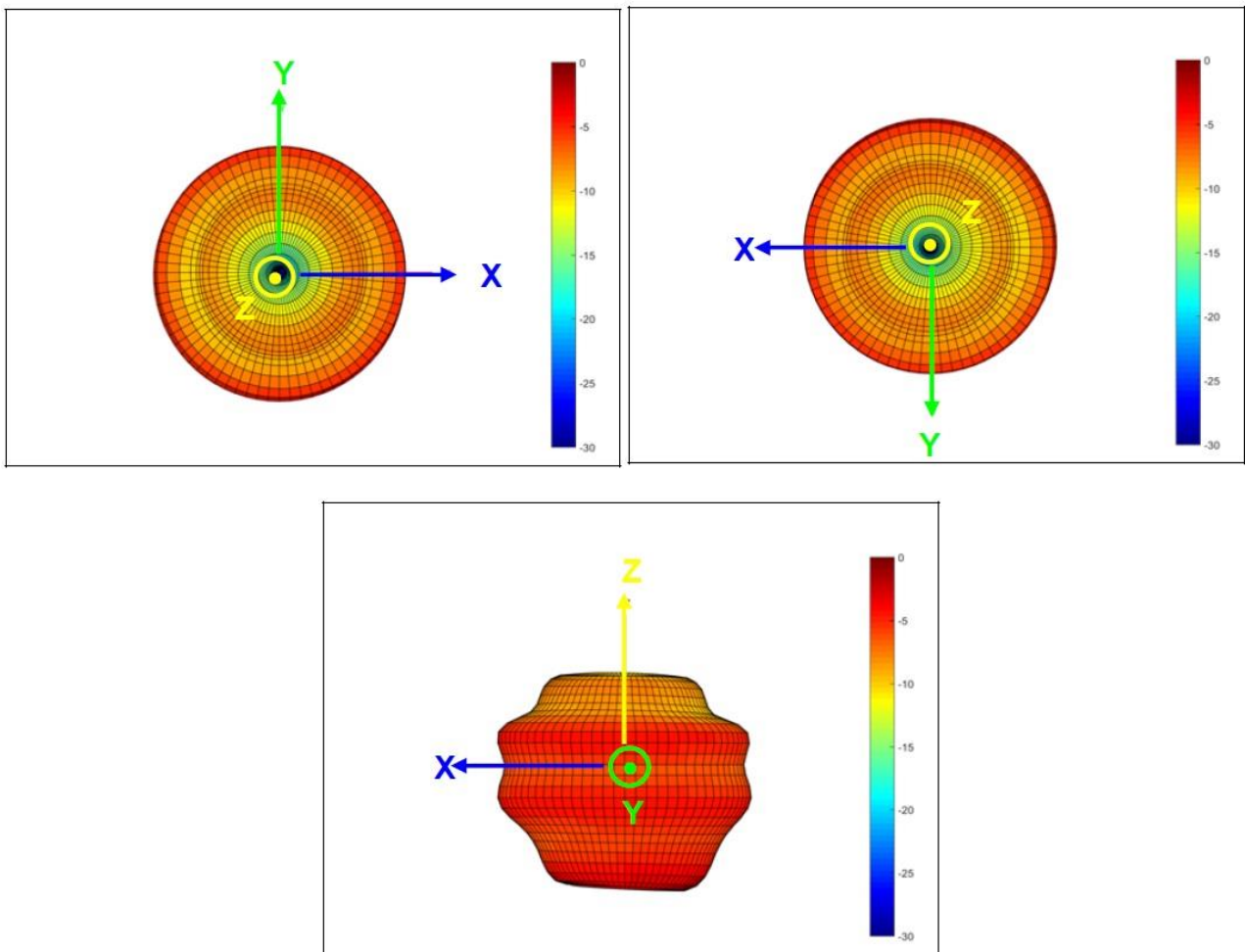


Figure 11 915MHz Radiation patterns for X, Y and Z

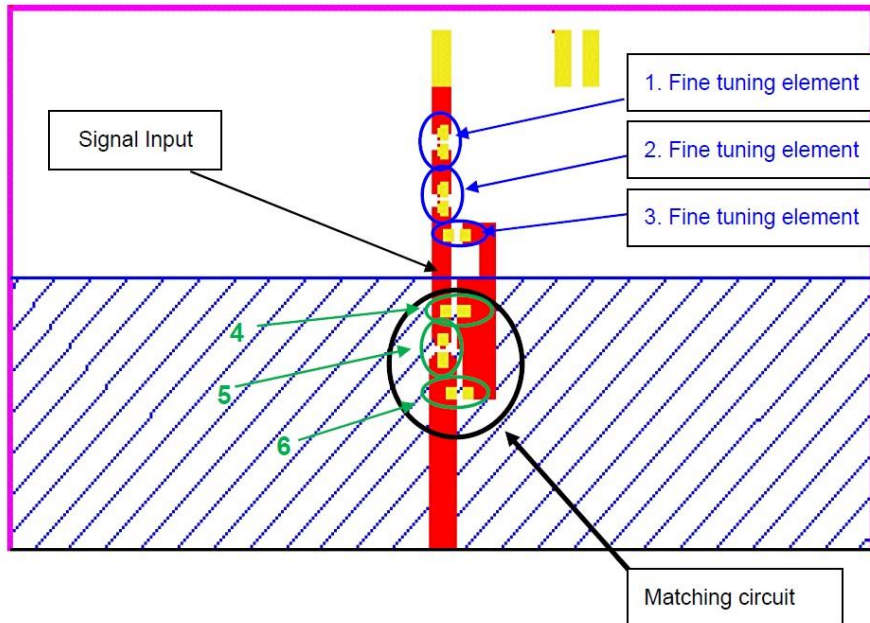
5. Frequency Tuning and Matching Circuit


Figure 12 Typical tuning Element

5.1 Matching Circuit

With the following recommended values of matching and tuning components, the centre frequencies will be about 433/868/915MHz using the standard 86 x 54 mm² evaluation board. However, these are typical reference values which may require changes when circuit boards are part vendors are different.

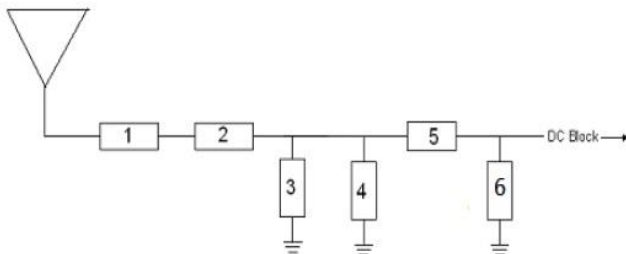


Figure 13 Matching circuit

System Matching Circuit Component(433MHz)			
Location	Description	Vender	Tolerance
1	150nH, (0402)	Murata	+5%
2	82nH, (0402)	Murata	+5%
3	N/A		
4	8.2nH, (0402)	Murata	+5%
5	39pF, (0402)	Murata	+5%
6	18pF, (0402)	Murata	+5%

System Matching Circuit Component(868MHz)			
Location	Description	Vender	Tolerance
1	33nH, (0402)	Murata	+5%
2	15nH, (0402)	Murata	+5%
3	N/A		
4	2.2pF, (0402)	Murata	±0.05pF
5	0Ω, (0402)		
6	N/A		

System Matching Circuit Component(915MHz)			
Location	Description	Vender	Tolerance
1	27nH, (0402)	Murata	+5%
2	18nH, (0402)	Murata	+5%
3	N/A		
4	2.2pF, (0402)	Murata	±0.05pF
5	0Ω, (0402)		
6	N/A		

6. Soldering Profile

Typical soldering profile for Lead-free process.

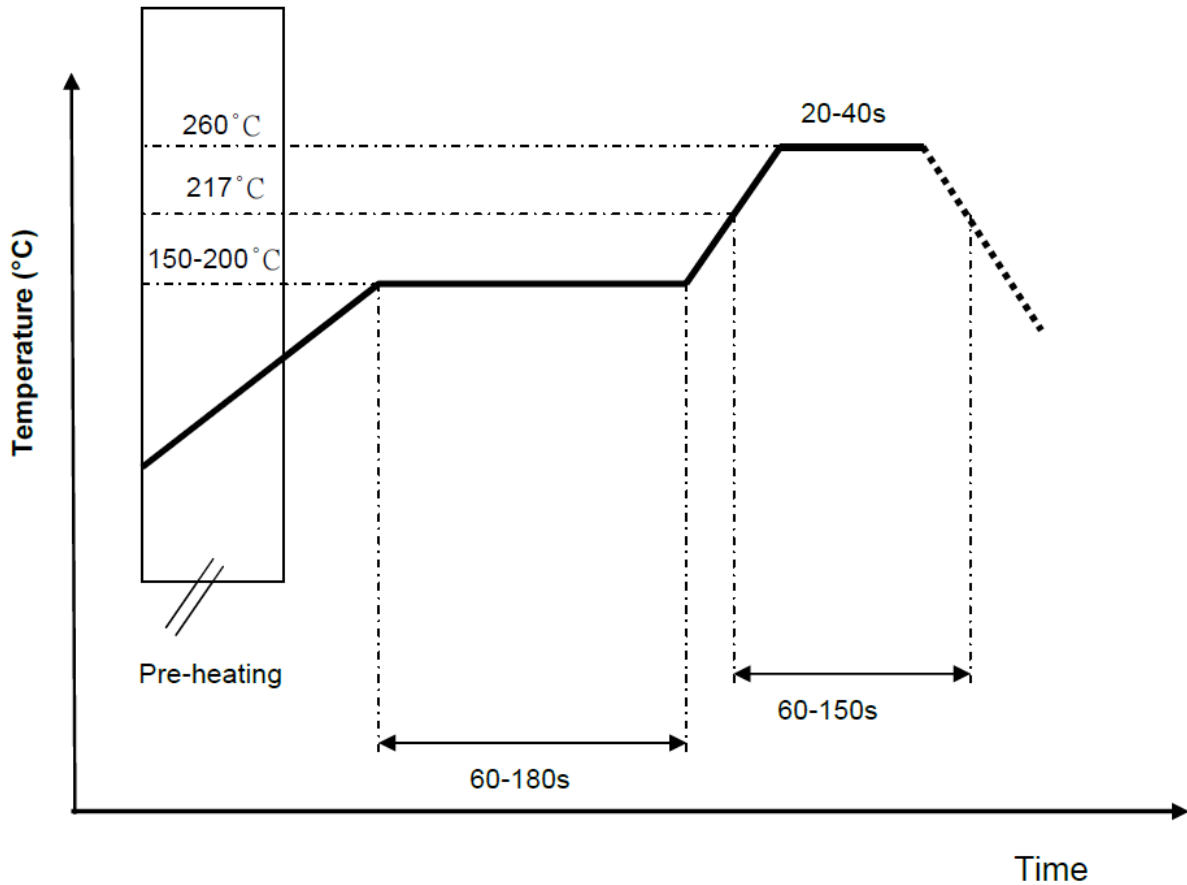


Figure 14 Typical Soldering Profile

7 Packing

- (1) Quantity/Reel: 3000 pcs/Reel
- (2) Plastic Tape: Black conductive polystyrene

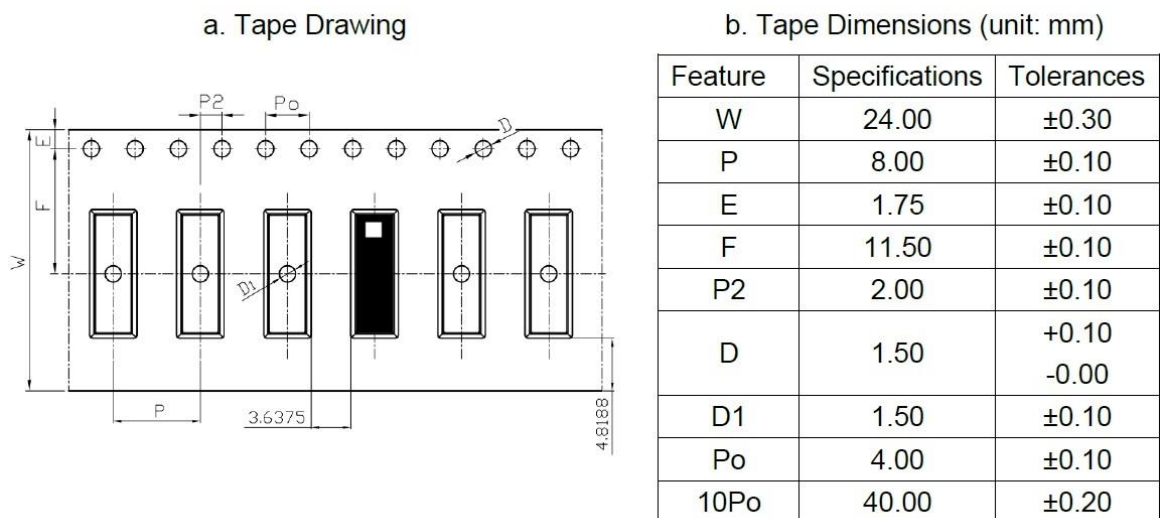


Figure 15 Tape and Reel drawing & Dimensions

8. Operating & Storage Conditions.

8.1 Operating

- (1) Maximum Input Power: 2 W
- (2) Operating Temperature: -40°C to 85°C
- (3) Relative Humidity: 10% to 70%

8.2 Storage (Sealed)

- (1) Storage Temperature: -5°C to 40°C
- (2) Relative Humidity: 20% to 70%
- (3) Shelf Life: 1 year

8.3 Storage (Unsealed)

Meets the criteria of J-STD-033 MSL2a

8.4 Storage (after mounted on Customers PCB with SMD process)

- (1) Storage Temperature: -40°C to 85°C
- (2) Relative Humidity: 10% to 70%

9. Product Order Code

Name	Description	Order Code
LPRS-MCA-433-915	Ceramic chip antenna @ 433/868/915MHz	LPRS-MCA-433-915

Please contact the sales office for availability of other variants of the standard product.

10. Notice

Installation guide

- (1) Installation Guide: "General Guidelines for the installation of LPRS chip antennas (AN001)".
- (2) All specifications are subject to change without notice.

11. Document History

Issue	Date	Revision
1.1	March 2020	Provisional datasheet

Changes to this Document

This data sheet has been updated to reflect changes throughout the range of LPRS modules. Specific changes are recorded in the documentation history above.

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