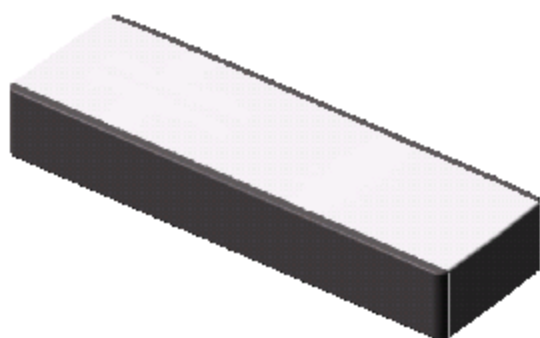




# THE DATASHEET OF W3070





*Application note*

## Ceramic Dual Band Monopole Antenna

### EGSM900 and PCN1800

*10 mm x 3.2 mm x 2 mm Ceramic Chip Antenna*

*Ground Cleared Under Antenna:*

*Version 1: 25 mm x 10 mm*

*Version 2: 40 mm x 10 mm*

*Pulse Part Number: W3070*

#### Status

|             |      |         |            |
|-------------|------|---------|------------|
| Author      | MiJu | Version | 4.0.0      |
| Checked by  |      | Date    | 02.07.2009 |
| Approved by |      | Date    |            |

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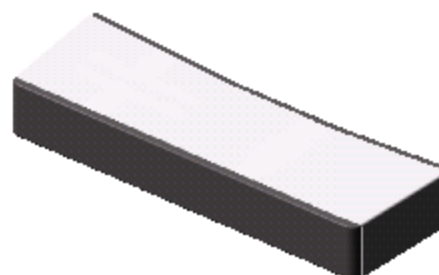


# Ceramic Chip Antenna

*Ground Cleared Under Antenna*

## Features

- Low profile
- Compact size W x L x H (10 x 3.2 x 2 mm)
- Low weight (240 mg)
- Lead free materials
- Fully SMD compatible
- Lead free soldering compatible
- Tape and reel packing
- RoHS Compliant Product



## Applications

- EGSM900 and PCN1800 radios

## Electrical specifications @ +25 °C

*Note: Electrical characteristics depend on test board (GP) size and antenna positioning on GP and Ground Clearance area size.*

### W3070 Ceramic Dual Band Monopole Antenna (Version 1: Ground Cleared Under Antenna 25 mm x 10mm)

*Typical performance (test board size 95 mm x 40 mm, PWB ground clearance area 25 mm x 10 mm)*

*18nH and 10nH series-inductors used for frequency tuning and 6.8nH shunt-inductor used for impedance matching.*

| Frequency Range [MHz] | 3D Max Gain [dBi]                   | 3D Efficiency [%] / [dB]                              | Return loss min. [dB]    | Impedance [Ω] | Operating Temperature [°C] |
|-----------------------|-------------------------------------|---|--------------------------|---------------|----------------------------|
| 880 - 960             | +1.5 (peak)<br>-0.4 (band edges)    | 70 / -1.55 (peak)<br>47 ; 40 / -3.3 ; -4 (band edges) | -4.7 ; -3.8 (band edges) | 50            | -40 to +85                 |
| 1710 – 1880           | +1 (peak)<br>-1 ; +0.5 (band edges) | 50 / -3 (peak)<br>30 ; 40 / -5.2 ; -4 (band edges)    | -4 ; -4.6 (band edges)   | 50            | -40 to +85                 |

### W3070 Ceramic Dual Band Monopole Antenna (Version 2: Ground Cleared Under Antenna 40 mm x 10mm)

*Typical performance (test board size 95 mm x 40 mm, PWB ground clearance area 40 mm x 10 mm)*

*18nH and 10nH series-inductors used for frequency tuning.*

| Frequency Range [MHz] | 3D Max Gain [dBi]                     | 3D Efficiency [%] / [dB]                             | Return loss min. [dB]    | Impedance [Ω] | Operating Temperature [°C] |
|-----------------------|---------------------------------------|--|--------------------------|---------------|----------------------------|
| 880 - 960             | +1.2 (peak)<br>-0.4 (band edges)      | 65 / -1.9 (peak)<br>47 / -3.3 (band edges)           | -5.1 ; -5.3 (band edges) | 50            | -40 to +85                 |
| 1710 – 1880           | +2.5 (peak)<br>+1.5 ; +2 (band edges) | 60 / -2.2 (peak)<br>50 ; 55 / -3 ; -2.6 (band edges) | -5.8 ; -5.7 (band edges) | 50            | -40 to +85                 |

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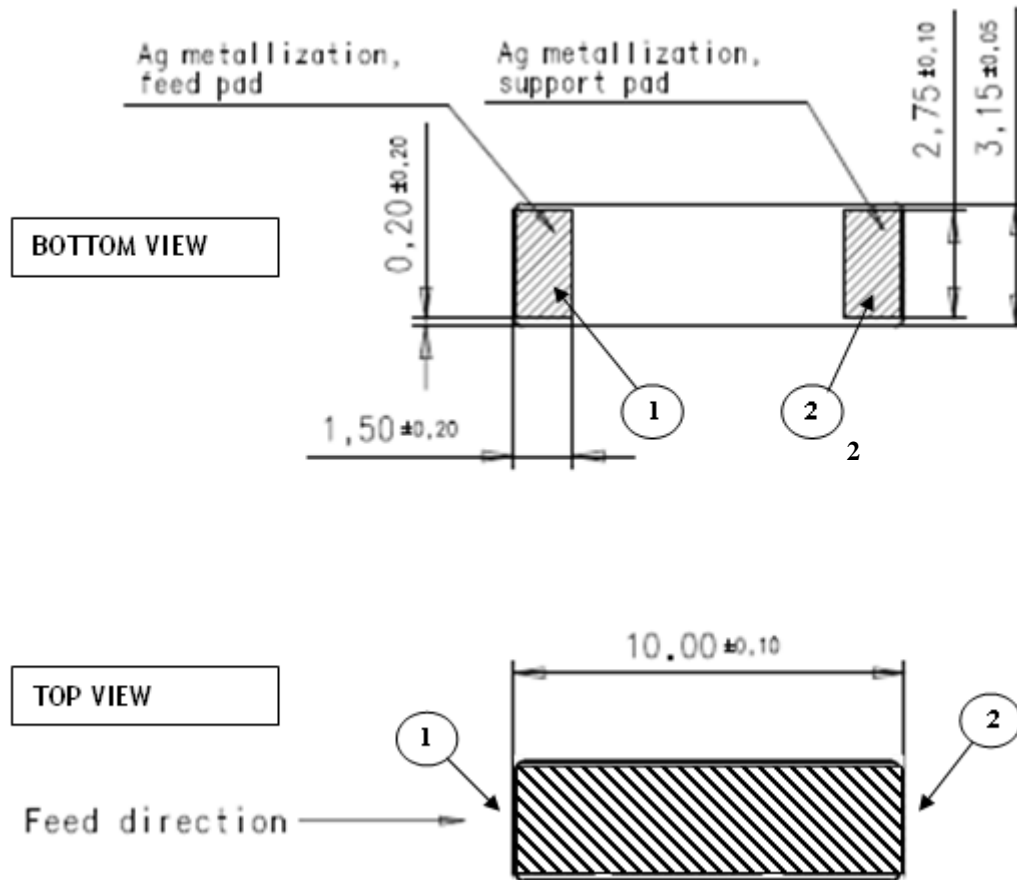
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# Ceramic Chip Antenna

## Terminal Configuration and Antenna Dimensions



| No. | Terminal Name | Terminal Dimensions |
|-----|---------------|---------------------|
| 1   | Feed          | 1.5 x 2.75 mm       |
| 2   | Support pad   | 1.5 x 2.75 mm       |

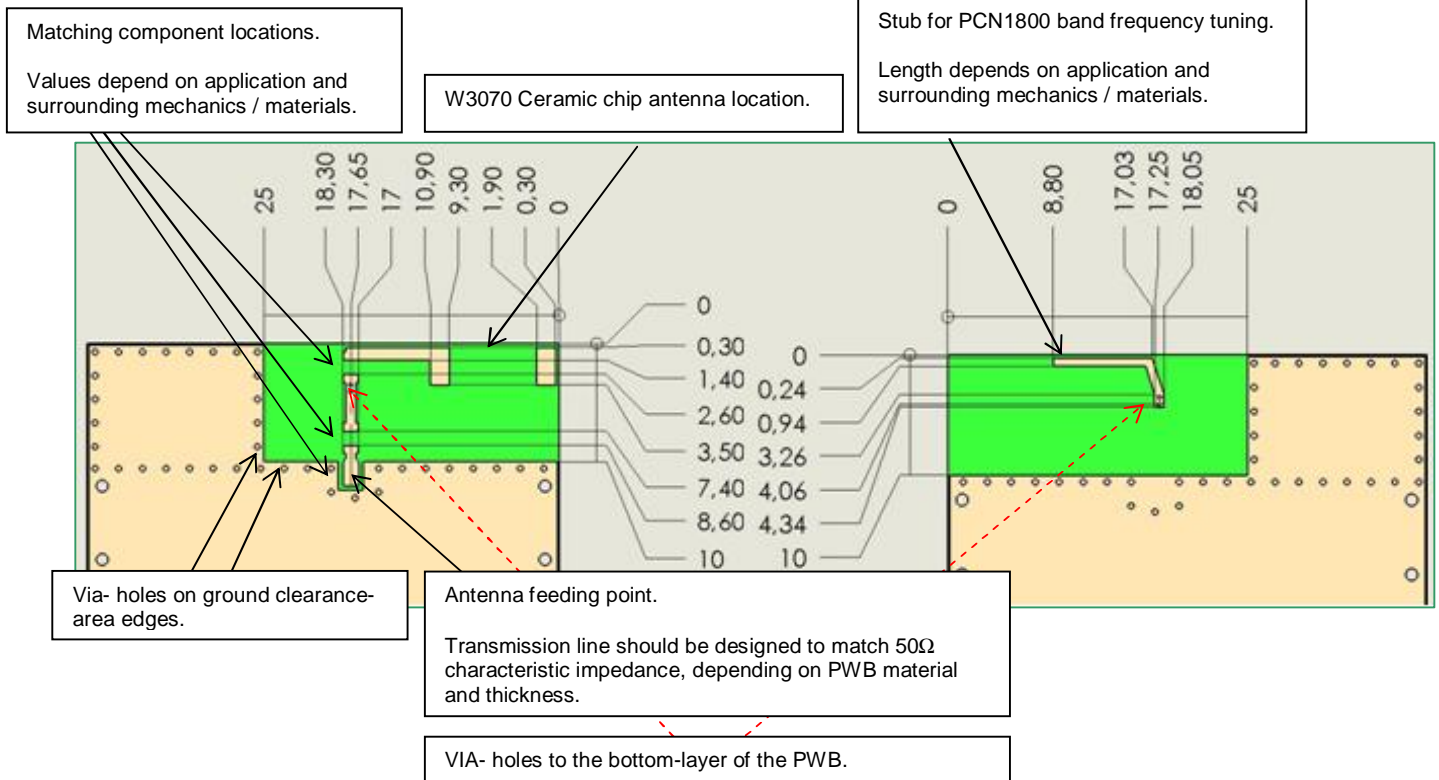
Antenna is symmetrical and orientation on footprint can be rotated 180 degrees without change in performance

# Ceramic Chip Antenna

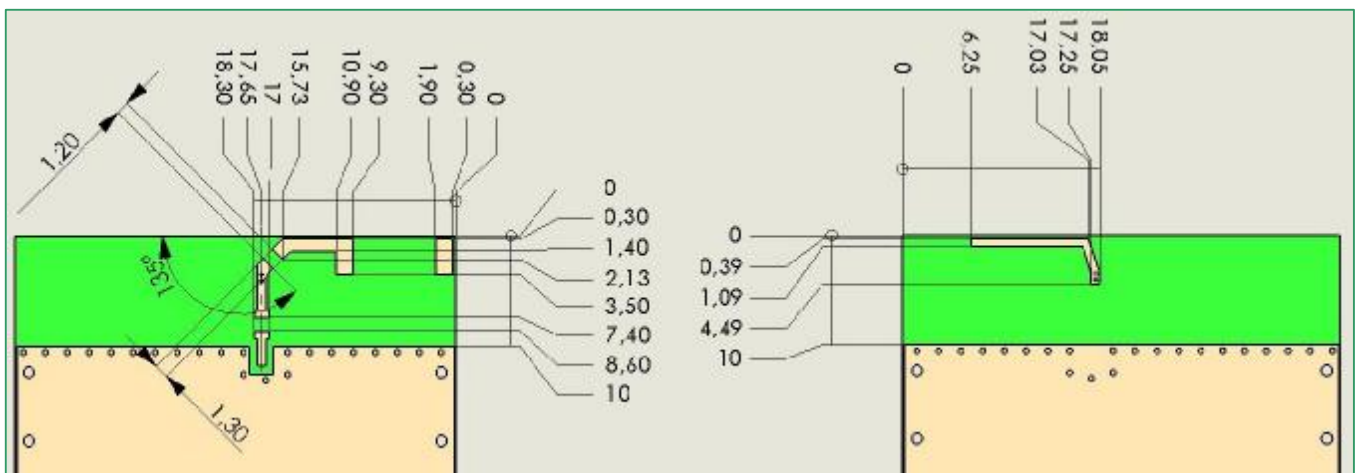
## Test Setup for Electrical Measurements

Recommended test board- layout for electrical characteristic measurement. Test board outline size 95 x 40mm.

Ground cleared under antenna, clearance area **25 mm x 10 mm**



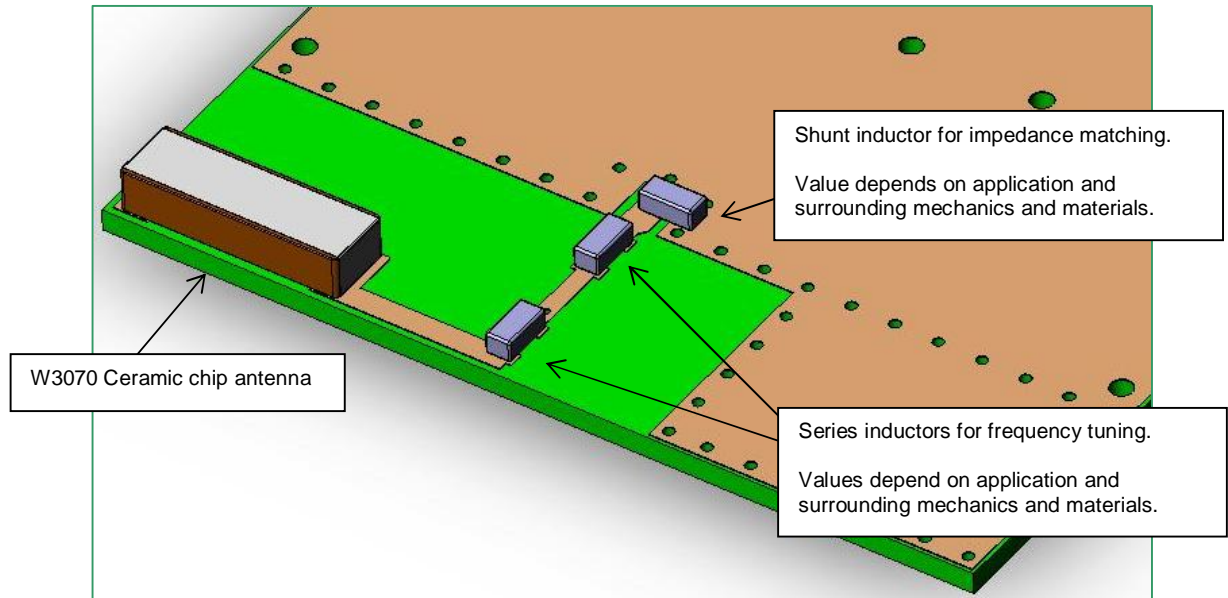
Ground cleared under antenna, clearance area **40 mm x 10 mm**



*Recommended test board- layout for electrical characteristic measurement. Test board outline size 95 x 40mm.*

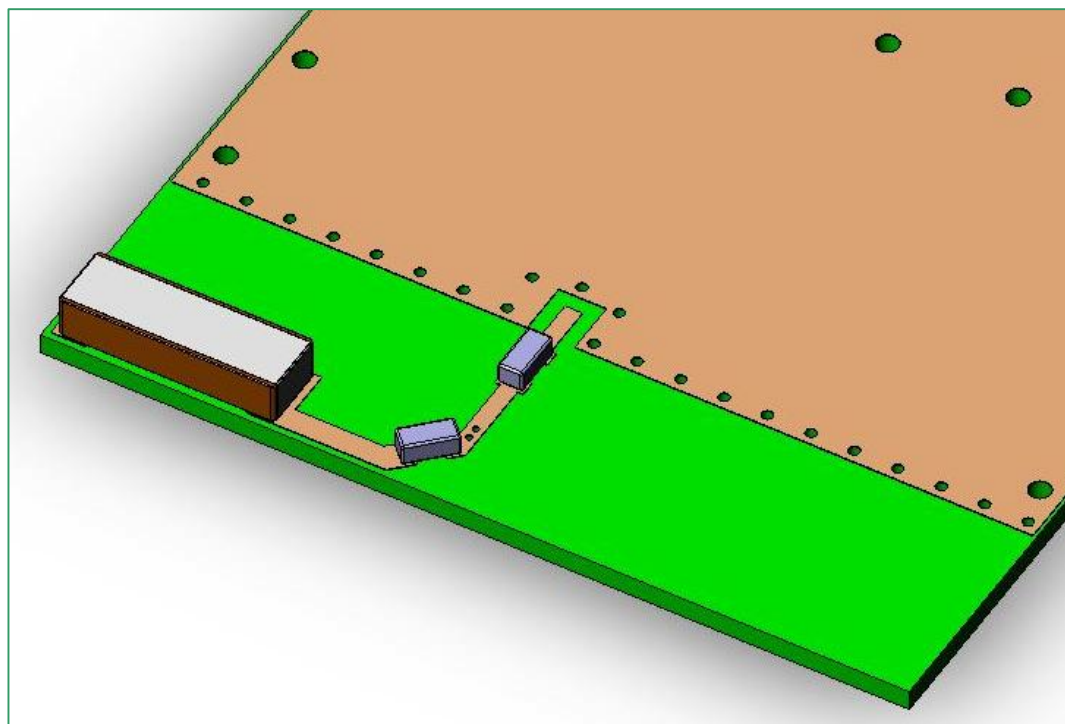
### 3D- view of Test Setup

Ground cleared under antenna, clearance area **25 mm x 10 mm**



### 3D- view of Test Setup

Ground cleared under antenna, clearance area **40 mm x 10 mm**



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# Ceramic Chip Antenna

Ground cleared under antenna. Clearance areas **25 mm x 10 mm** and **40mm x 10mm**.

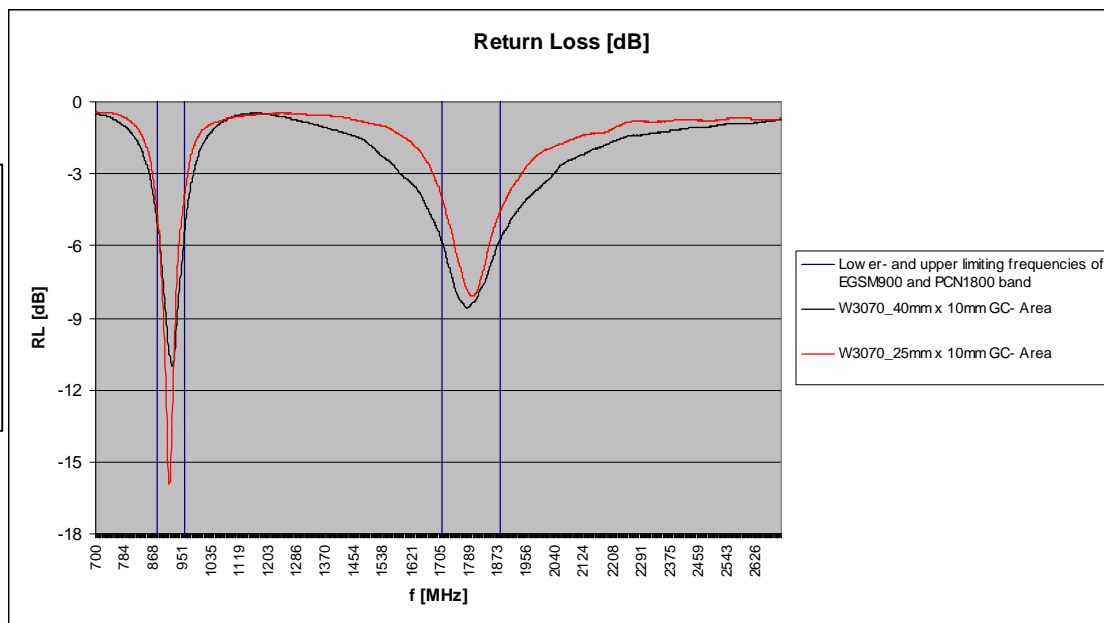
## Typical Electrical Characteristics (T=25 °C)

Measured on the 95 x 40mm test board with matching circuit.

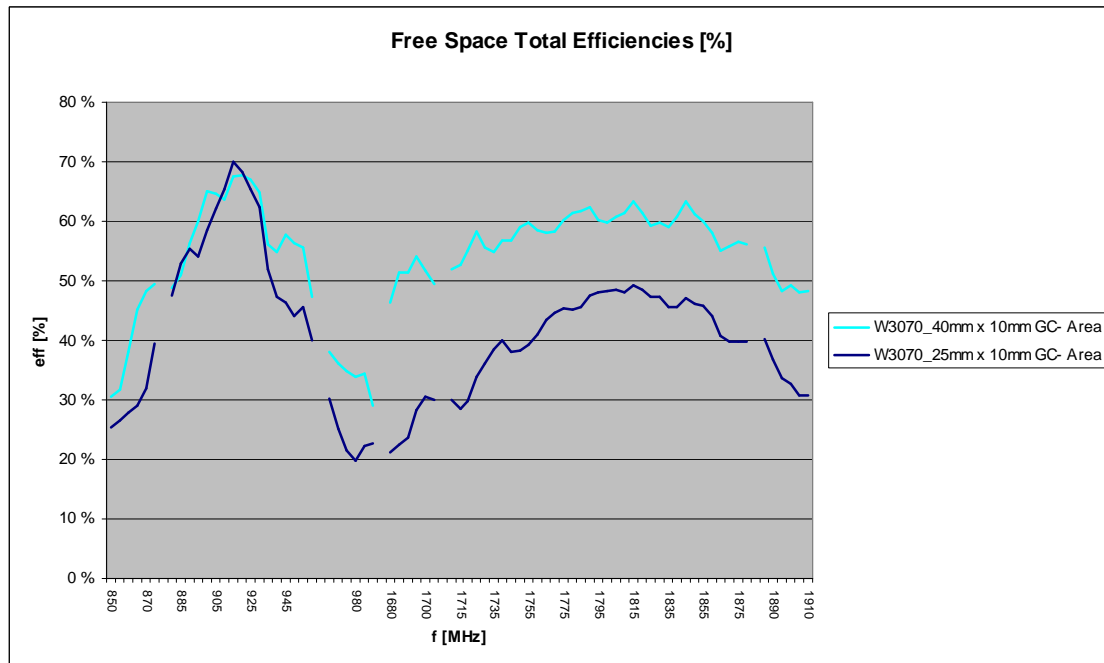
### Typical Return Loss S11

**Typical return loss-values at band edges:**

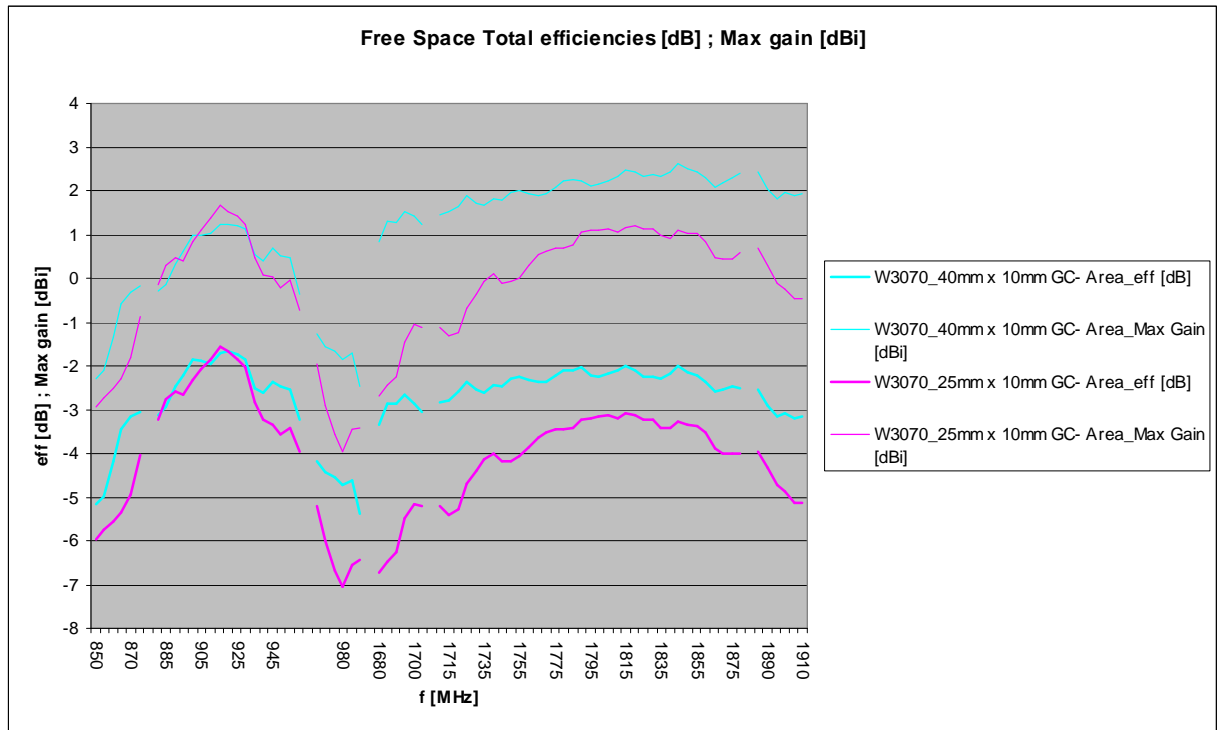
|                |                |
|----------------|----------------|
| <b>880MHz</b>  | <b>960MHz</b>  |
| -5.1dB         | -5.3dB         |
| -4.7dB         | -3.8dB         |
| <b>1710MHz</b> | <b>1880MHz</b> |
| -5.8dB         | -5.7dB         |
| -4dB           | -4.6dB         |



### Typical free Space Total Efficiencies [%]



Typical free Space Total Efficiencies [dB] and Maximum Gain [dBi]



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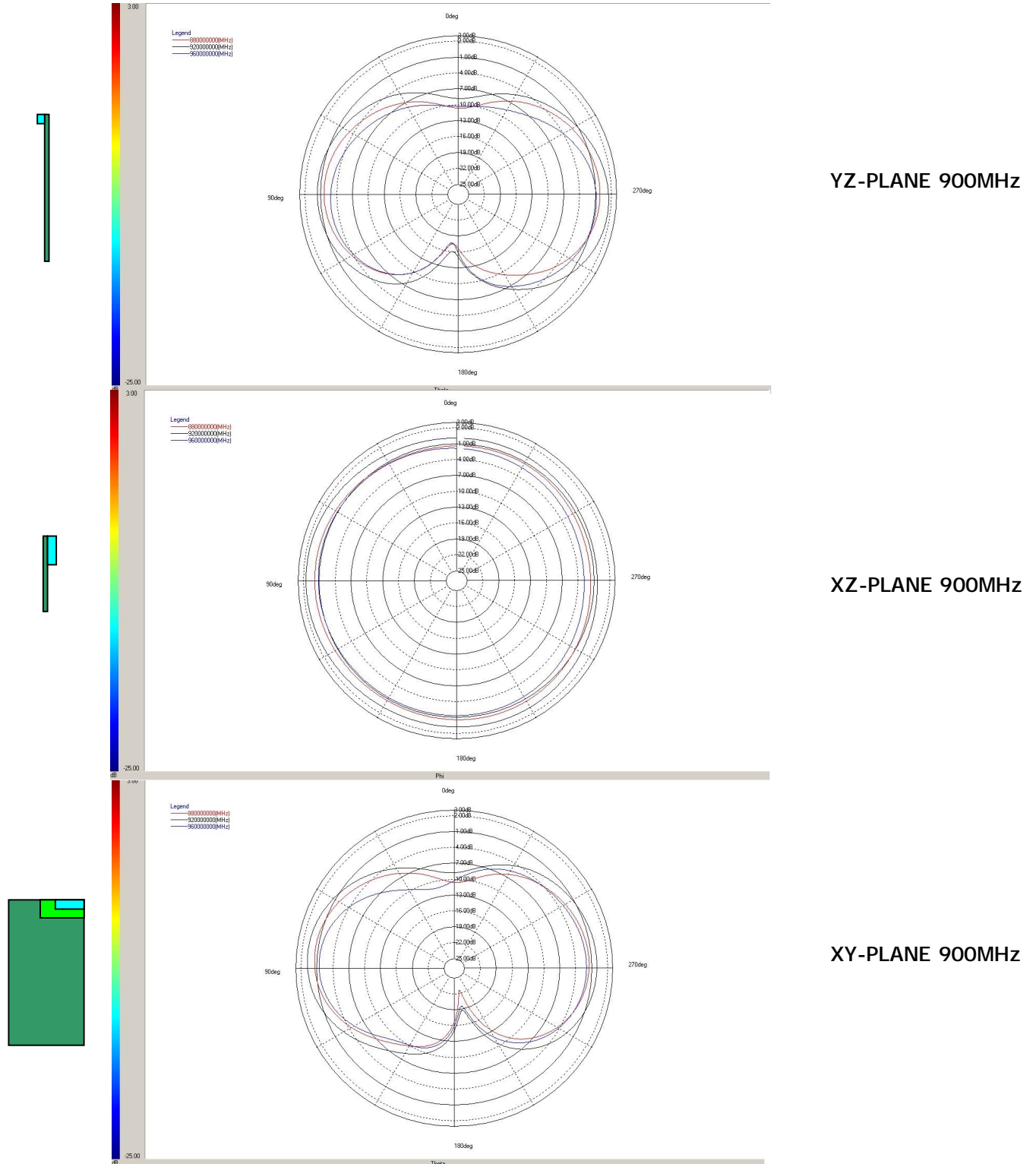
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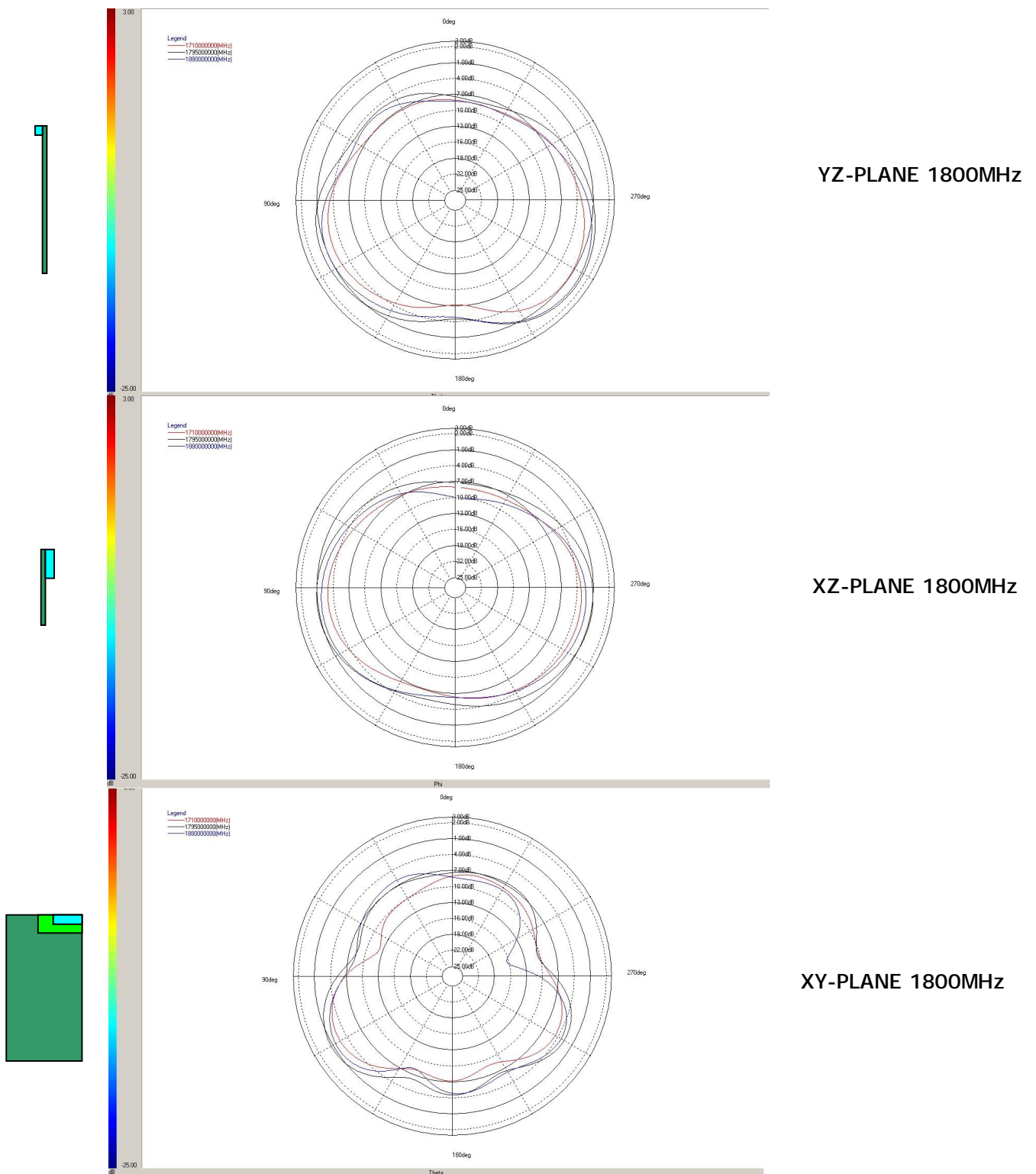
# Ceramic Chip Antenna

Ground cleared under antenna. Clearance area **25 mm x 10mm**.

## Typical Free Space Radiation Patterns for EGSM900 Band



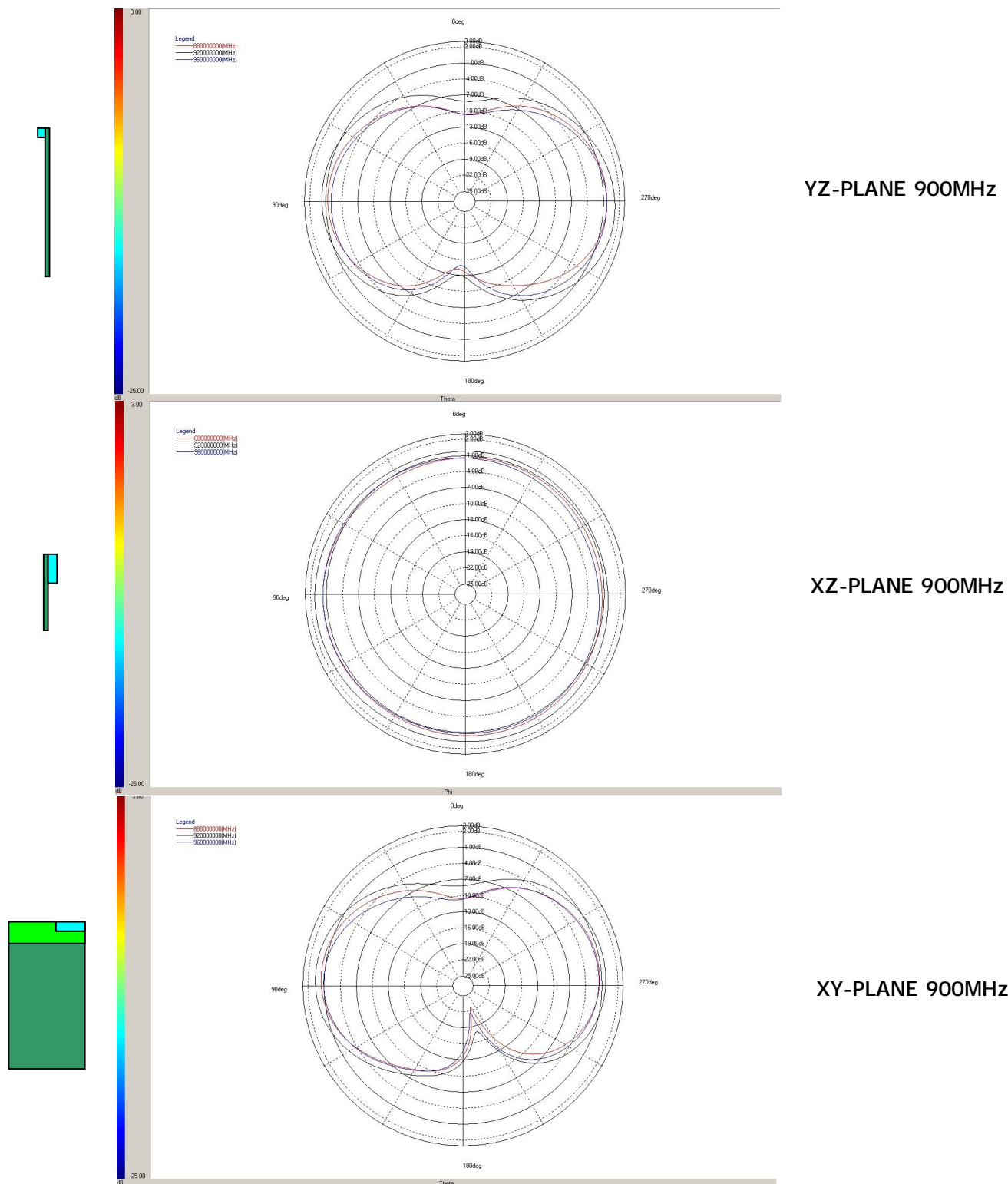
### Typical Free Space Radiation Patterns for PCN1800 Band



# Ceramic Chip Antenna

Ground cleared under antenna. Clearance area **40 mm x 10mm**.

## Typical Free Space Radiation Patterns for EGSM900 Band



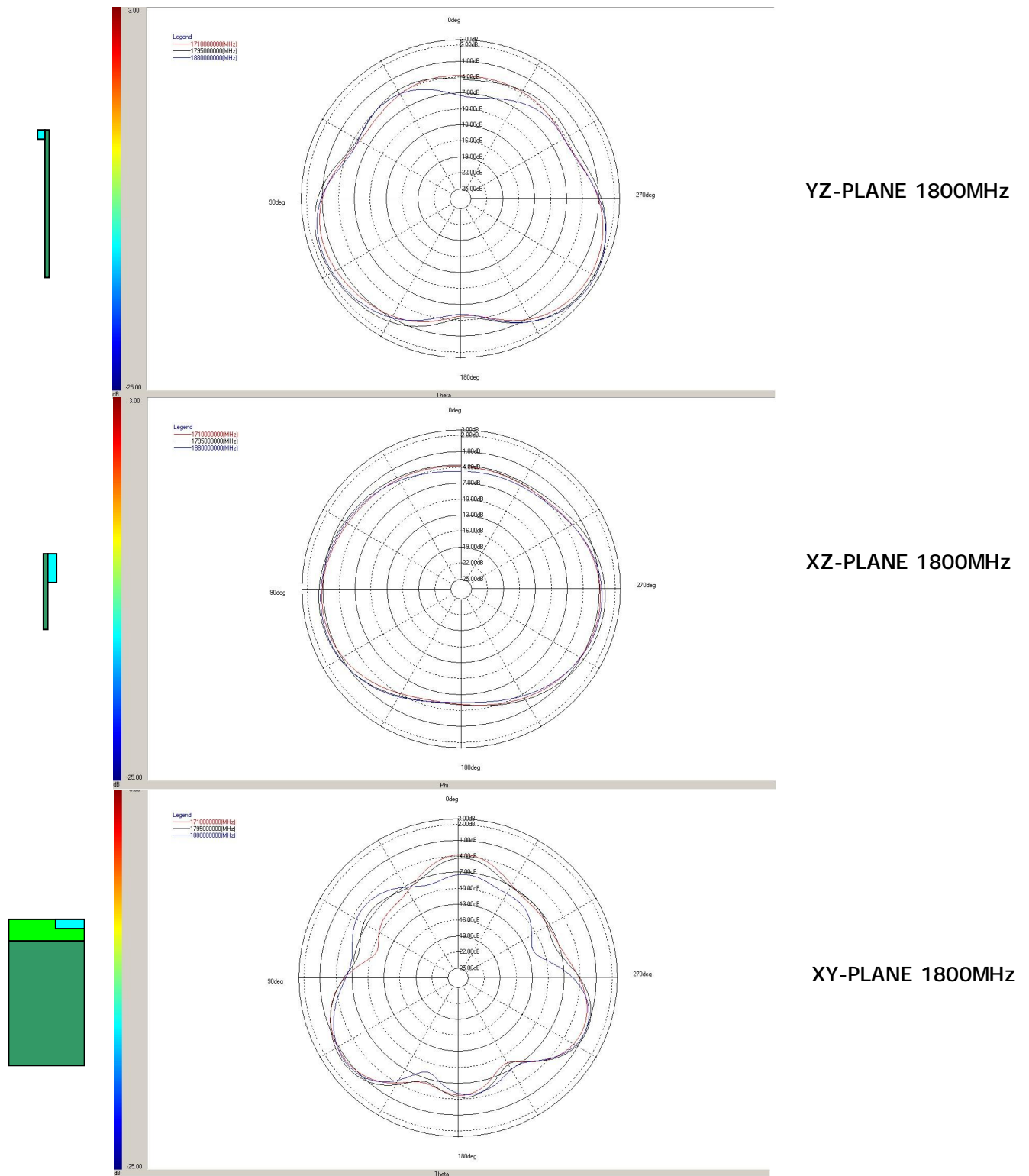
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### Typical Free Space Radiation Patterns for PCN1800 Band



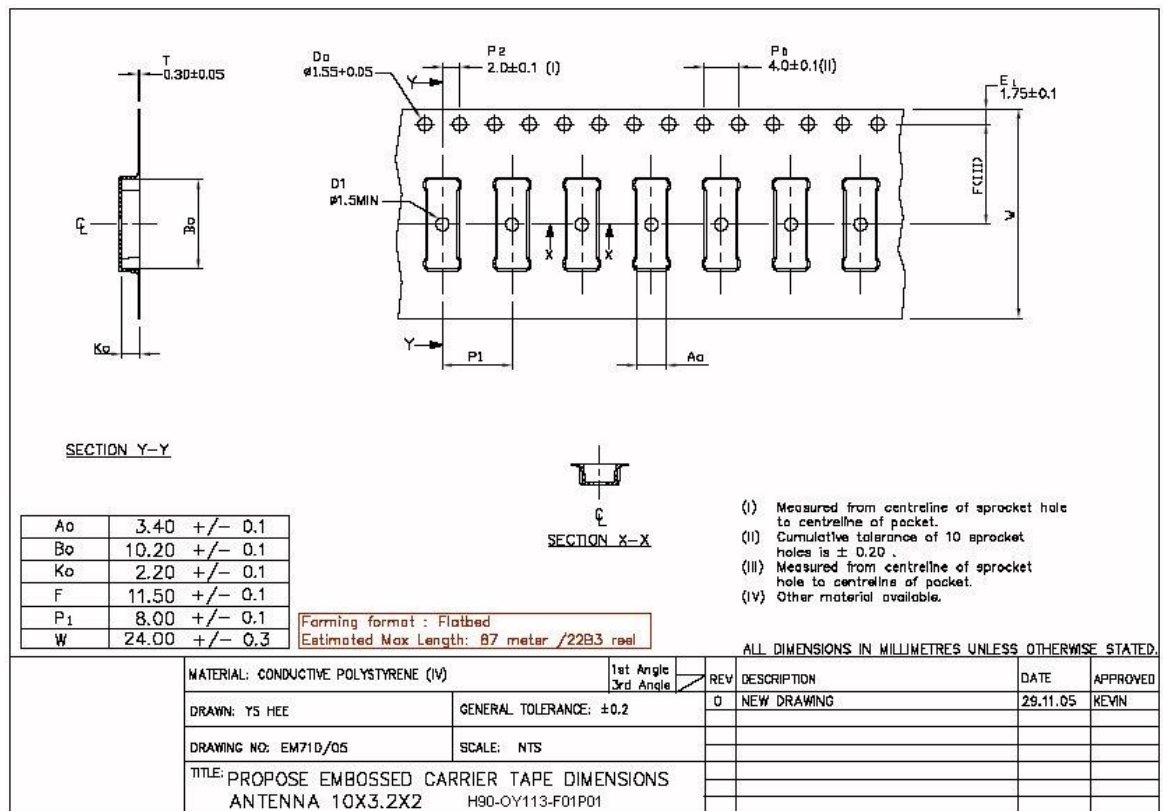
# Ceramic Chip Antenna

## Packing

### General

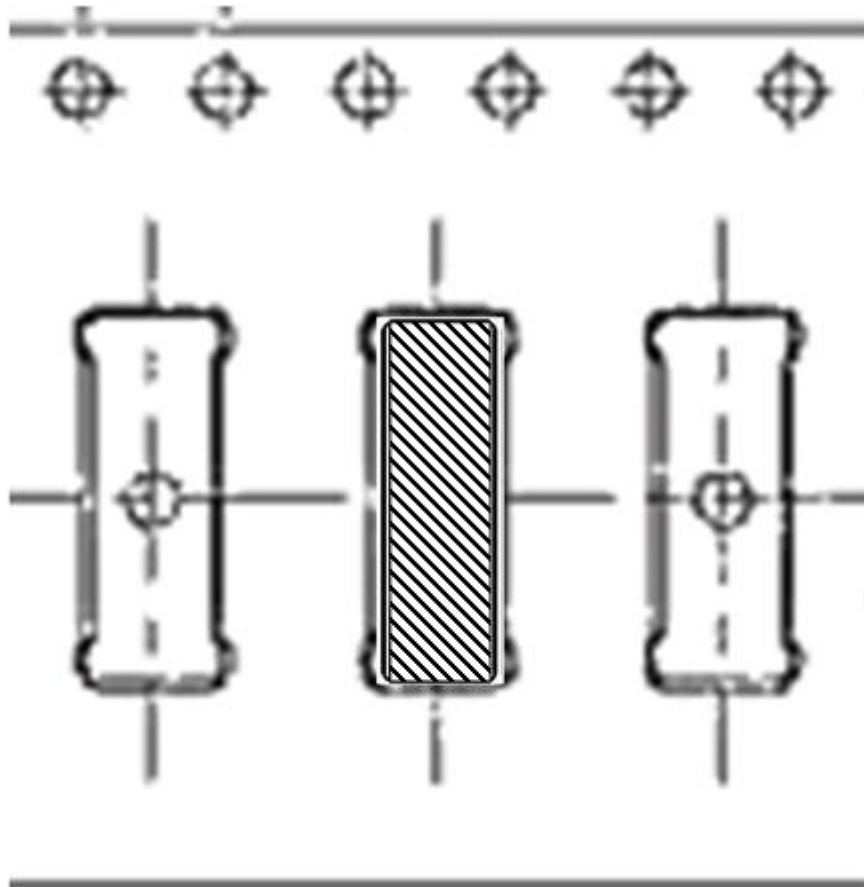
Tape and reel packing is used. Carrier tape, reel and box dimensions are presented in following pictures.

### Carrier tape



### **Block orientation**

Antenna soldering pads facing down to the bottom of the carrier tape.



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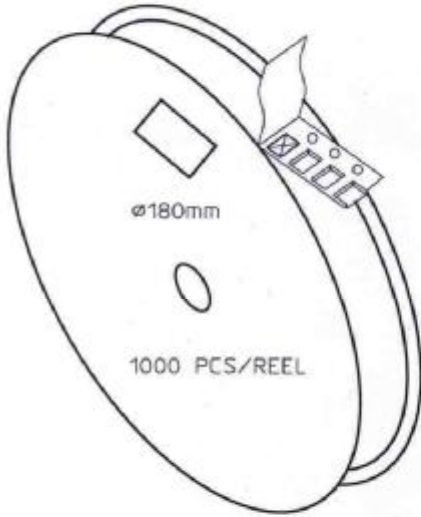
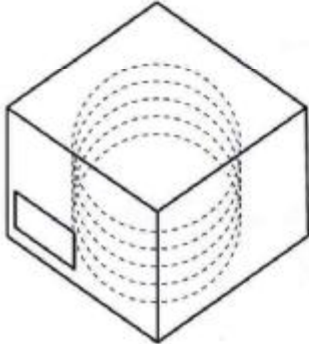
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### Packing form


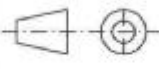
CARRIER TAPE H85-00168  
width=24,00 depth=2.20  
COVER TAPE H85-00159  
width=21.20

LENGTH OF TAPE:

- Leader section: min 350 mm before component section
- Trailer section: min 40 mm after component section.

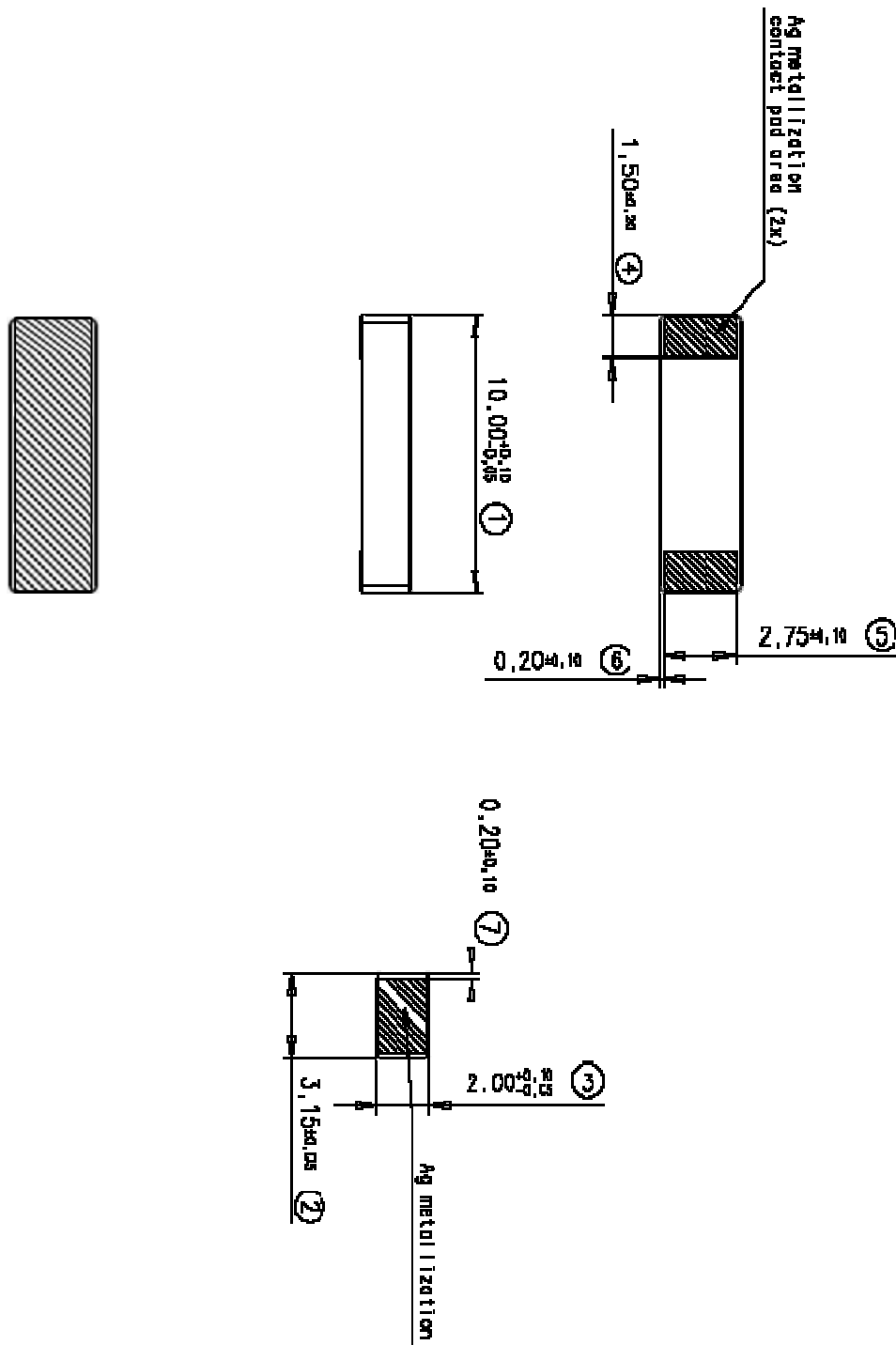
Empty part cavities at leader and trailer section of the tape must be sealed with top cover tape.

|                                |            |
|--------------------------------|------------|
| BOX H85-00128<br>(182x182x125) | 1 pcs      |
| - LABEL                        | 1 pcs/BOX  |
| REEL H85-00160<br>(D180, W28)  | 4 pcs      |
| - REEL LABEL                   | 1 pcs/REEL |

|   |   |         |                    |
|---|---|---------|--------------------|
| MATERIAL  |   |         |                    |
| HANDLINGS   |   |         |                    |
|  |  | RATIO   | DRWN 160107 PeHa H |
|   |   |         | DGNER              |
|   |   |         | CHKD               |
|   |   |         | APPRD              |
|   |   |         | APPRD BY           |
| PRODUCT   |   |         |                    |
| H90-OY113-F01P01  |   |         | C                  |
|   |   |         | B                  |
|   |   |         | A                  |
| DENOMINATION  |   | VERSION | MOD/DATE/NAME      |
| PACKING FORM  |   |         |                    |

# Ceramic Chip Antenna

## Mechanical Outline



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-  Excess Inventory Management