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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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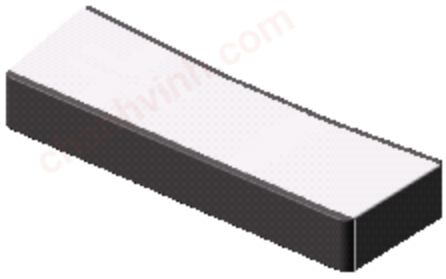
Ceramic Chip Antenna

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) -0.4 (band edges)	70 / -1.55 (peak) 47 ; 40 / -3.3 ; -4 (band edges)	-4.7 ; -3.8 (band edges)	50	-40 to +85
1710 – 1880	+1 (peak) -1 ; +0.5 (band edges)	50 / -3 (peak) 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) -0.4 (band edges)	65 / -1.9 (peak) 47 / -3.3 (band edges)	-5.1 ; -5.3 (band edges)	50	-40 to +85
1710 – 1880	+2.5 (peak) +1.5 ; +2 (band edges)	60 / -2.2 (peak) 50 ; 55 / -3 ; -2.6 (band edges)	-5.8 ; -5.7 (band edges)	50	-40 to +85

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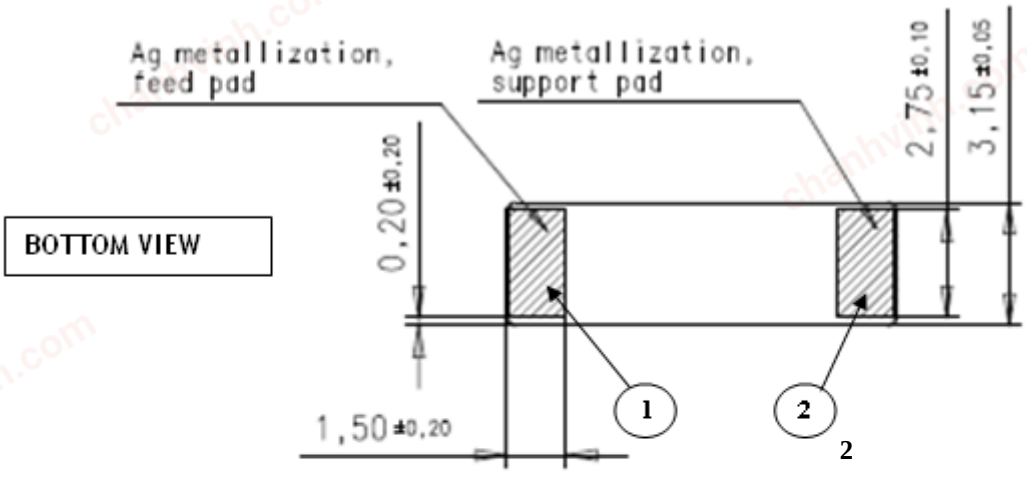
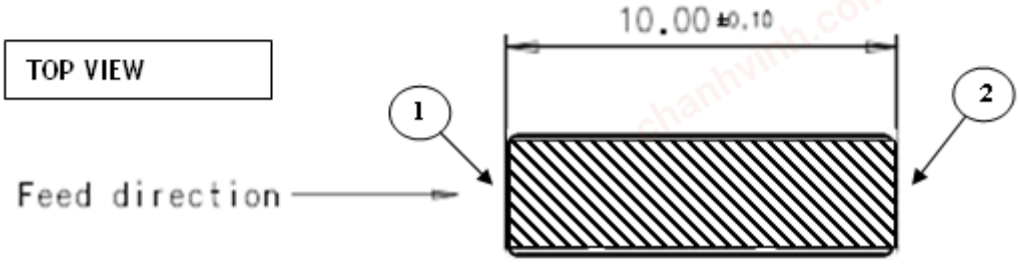
Ceramic Chip Antenna

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		

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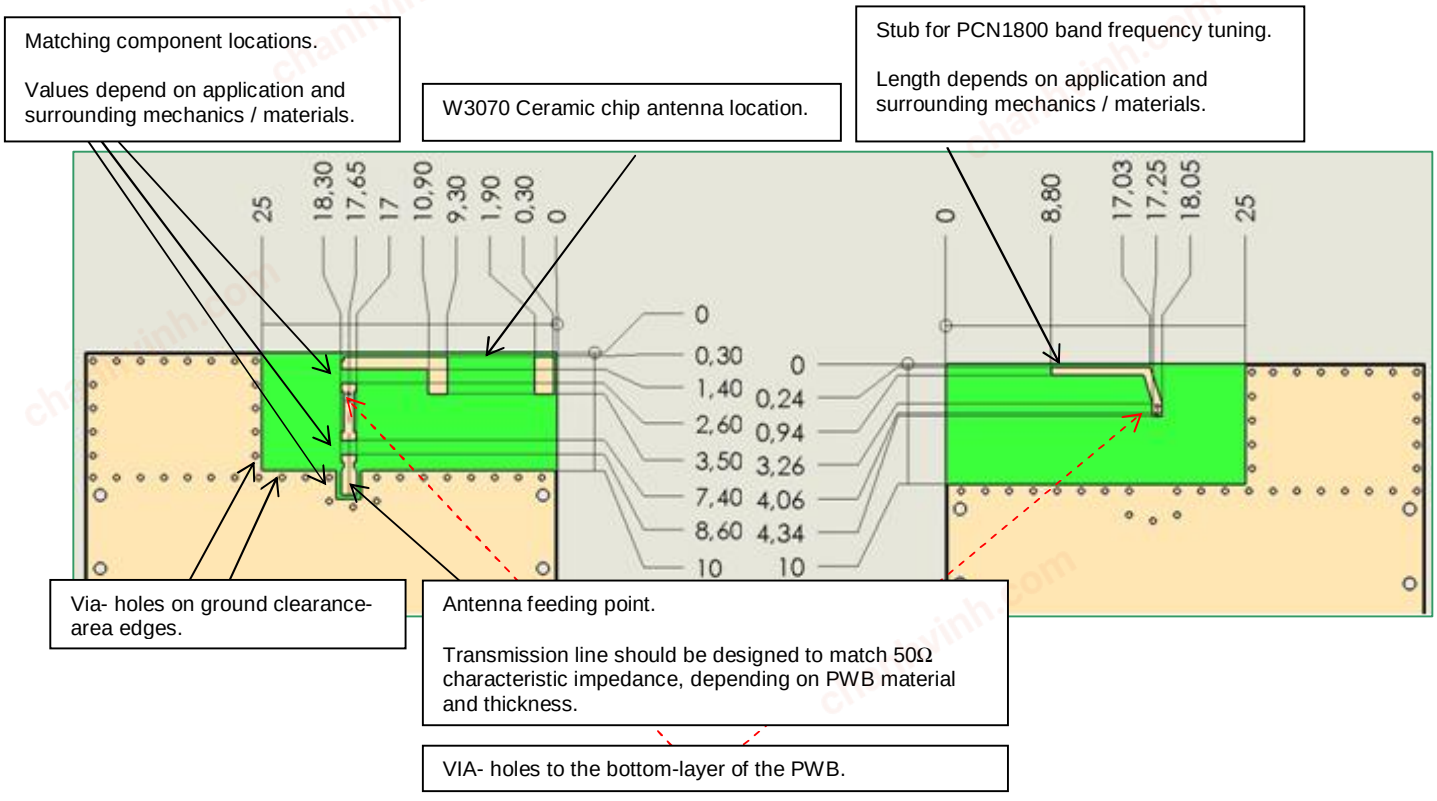
Ceramic Chip Antenna

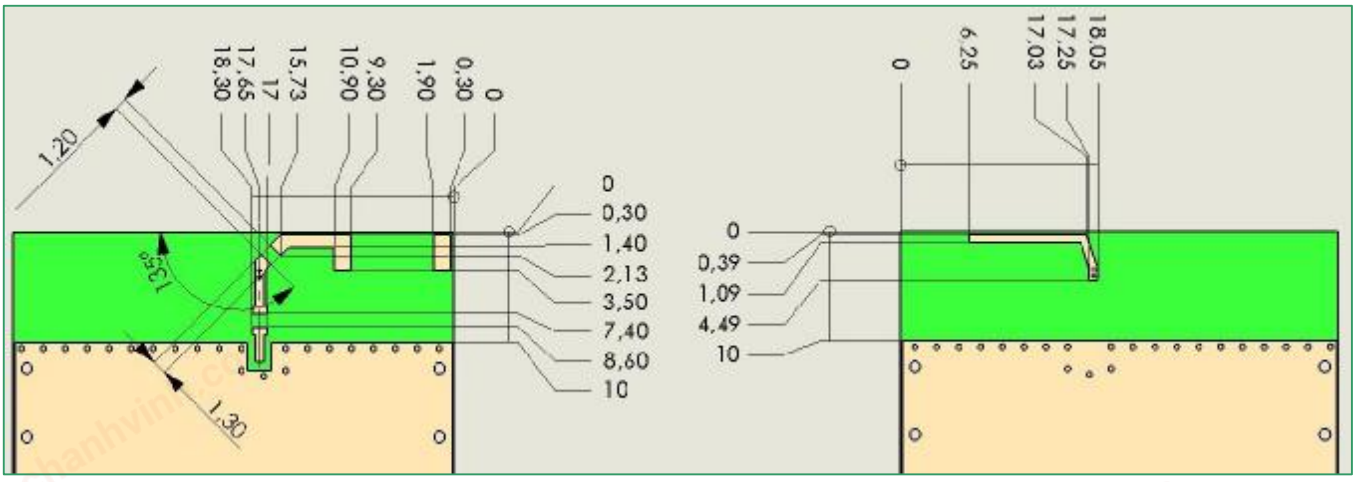
Test Setup for Electrical Measurements

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



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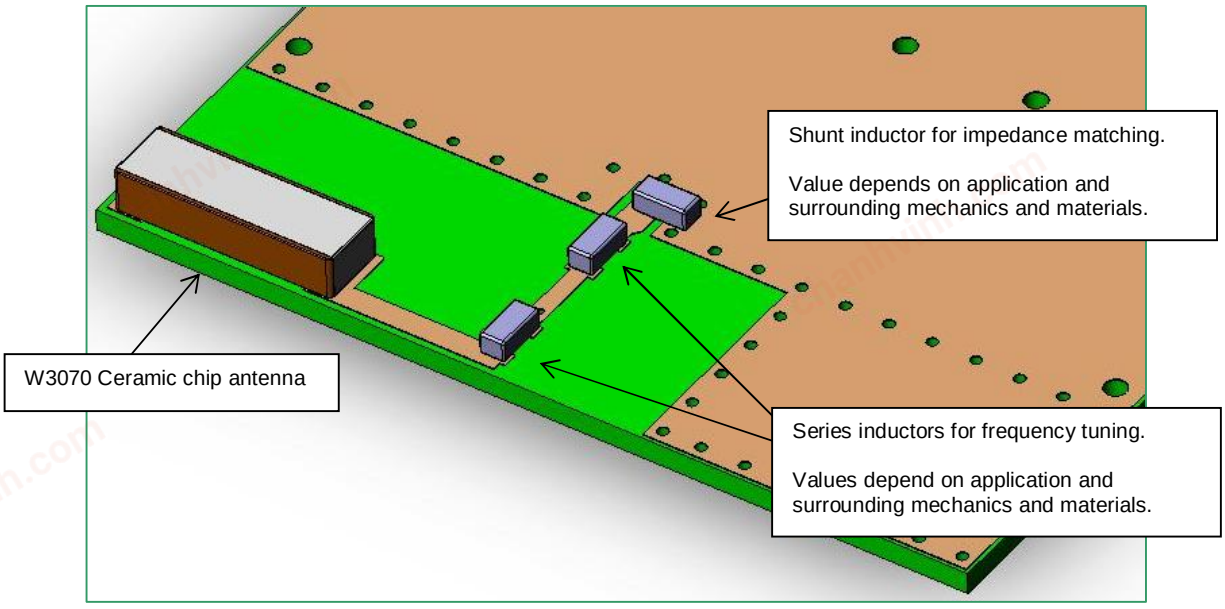
Recommended test board- layout for electrical characteristic measurement. Test board outline size 95 x 40mm.

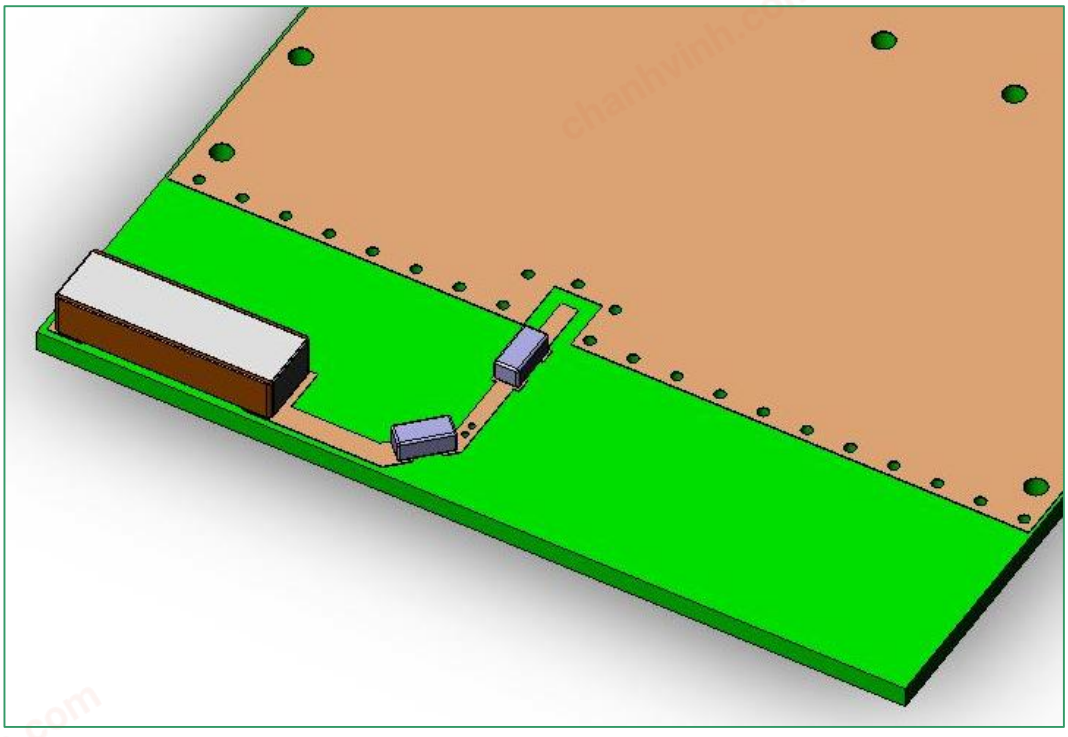
3D- view of Test Setup

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.**

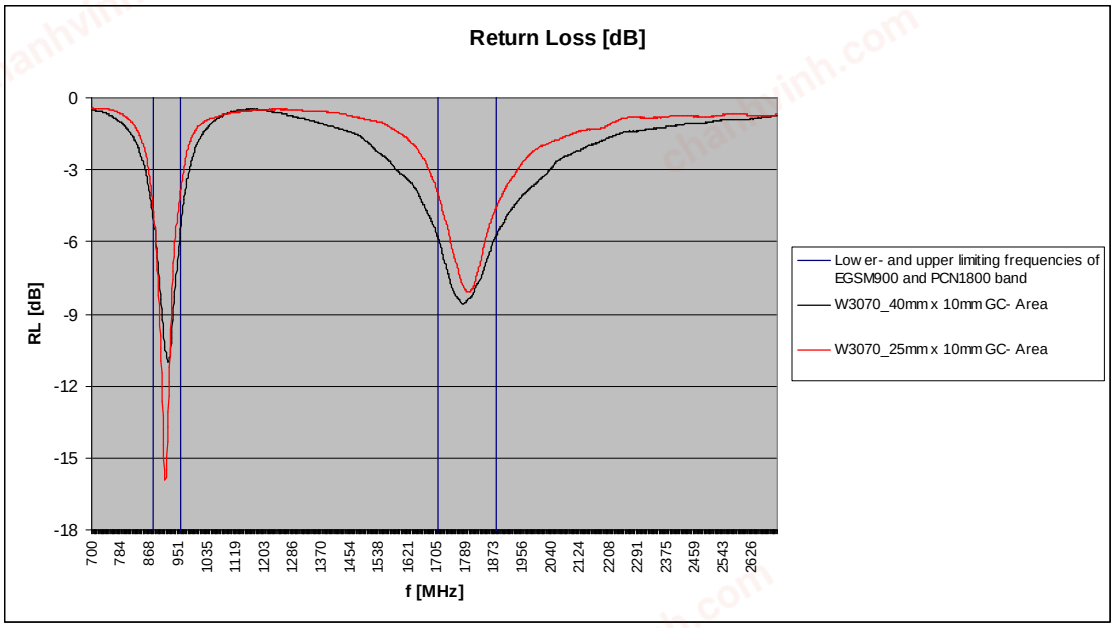
Typical Electrical Characteristics (T=25 °C)

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

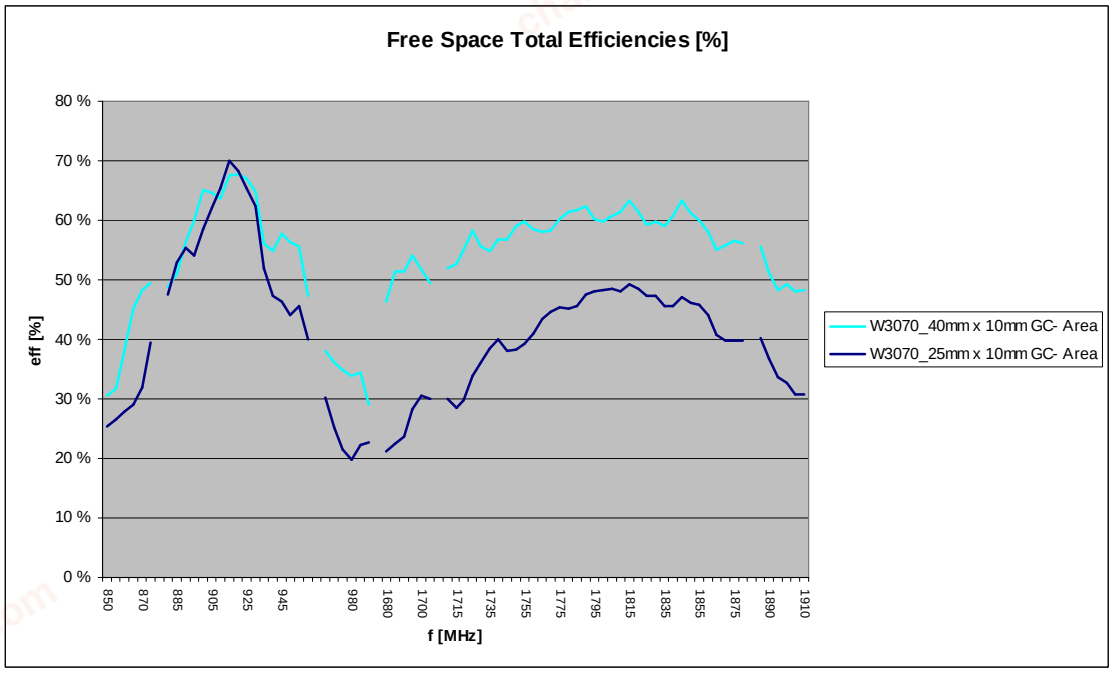
Typical return loss-values at band edges:

880MHz	**960MHz**
-5.1dB	-5.3dB
-4.7dB	-3.8dB
1710MHz	**1880MHz**
-5.8dB	-5.7dB
-4dB	-4.6dB

Typical Return Loss S11



Typical free Space Total Efficiencies [%]



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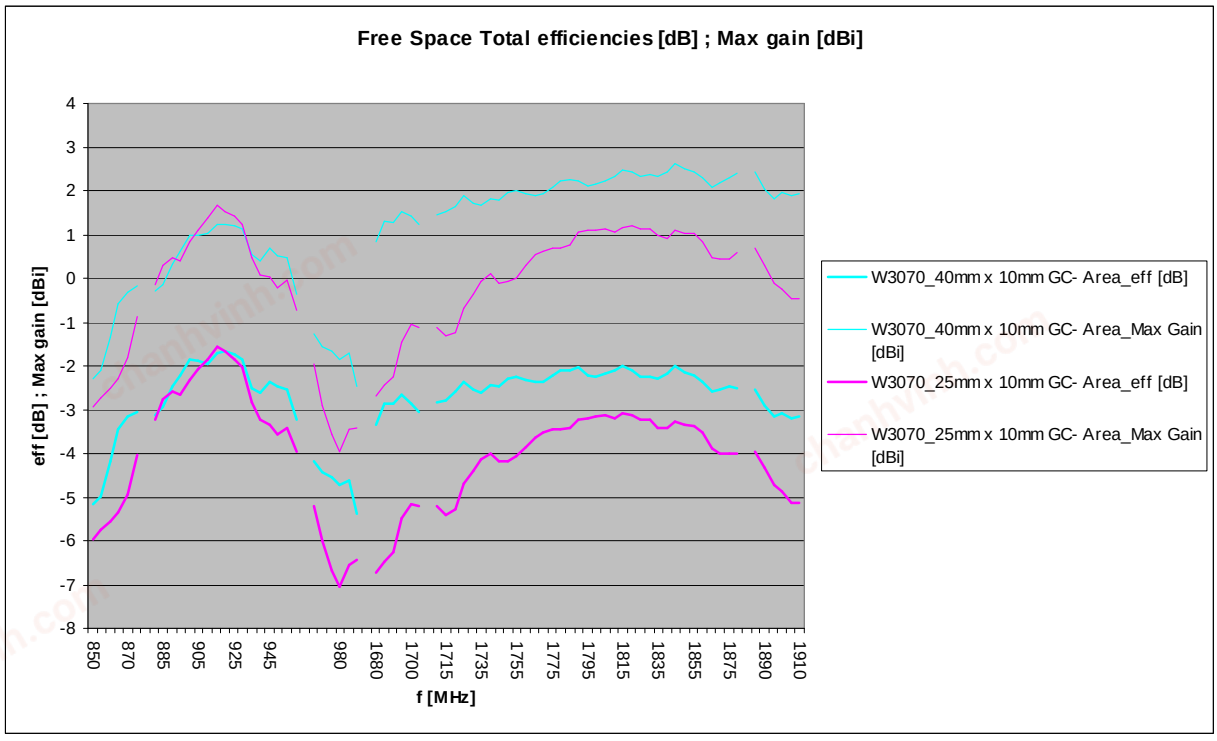
Typical free Space Total Efficiencies [dB] and Maximum Gain [dBi]



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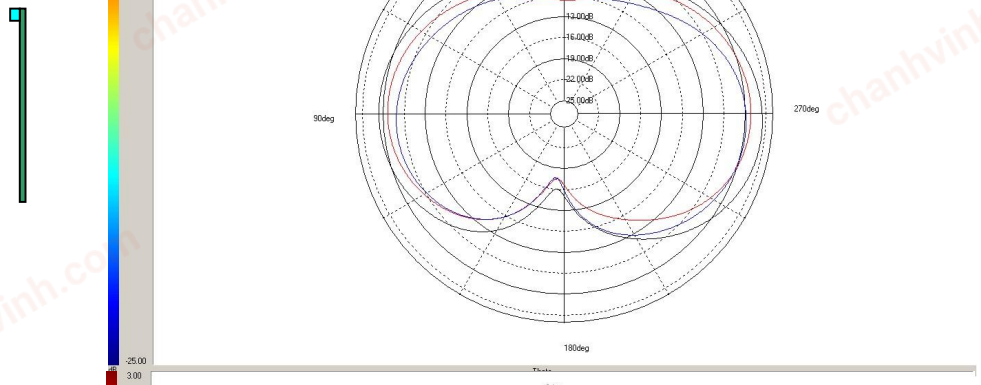
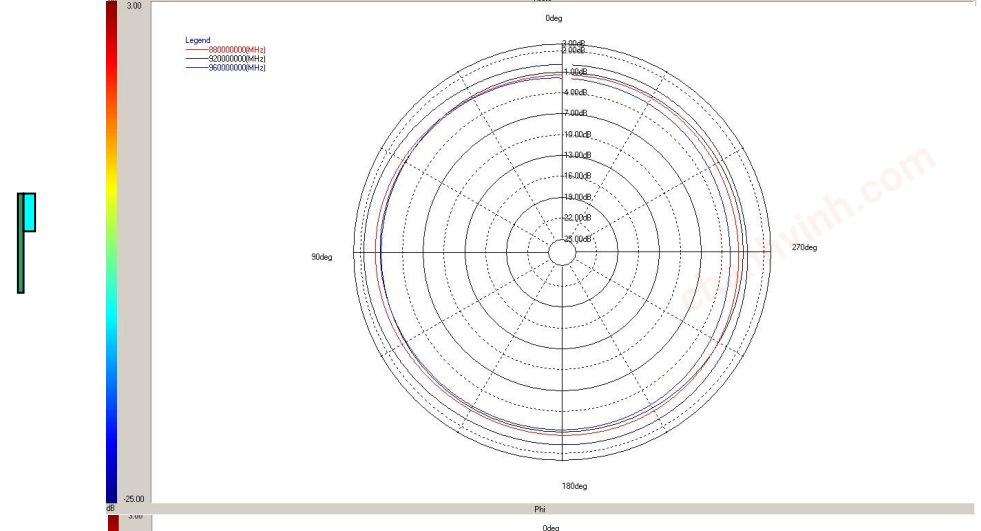
Ceramic Chip Antenna

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

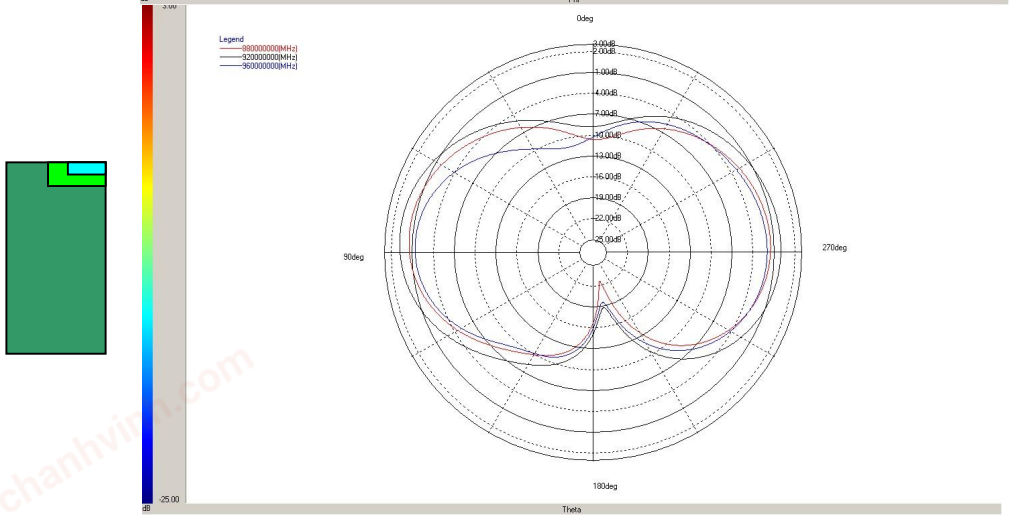
Typical Free Space Radiation Patterns for EGSM900 Band



YZ-PLANE 900MHz



XZ-PLANE 900MHz



XY-PLANE 900MHz

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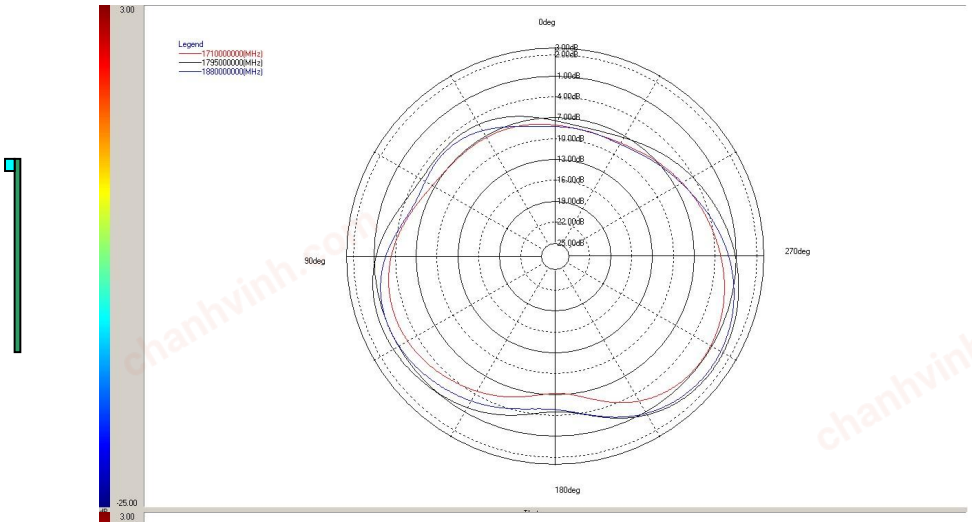
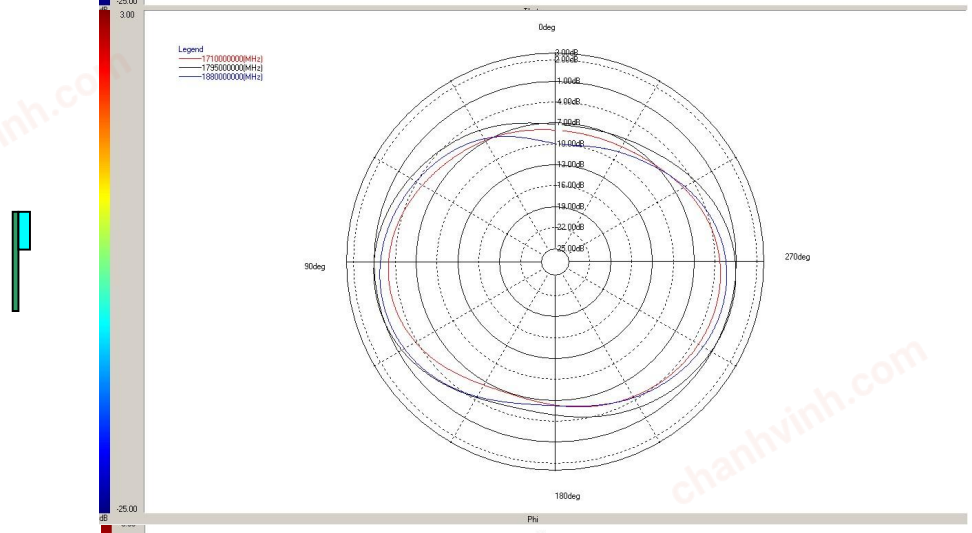
Typical Free Space Radiation Patterns for PCN1800 Band



YZ-PLANE 1800MHz



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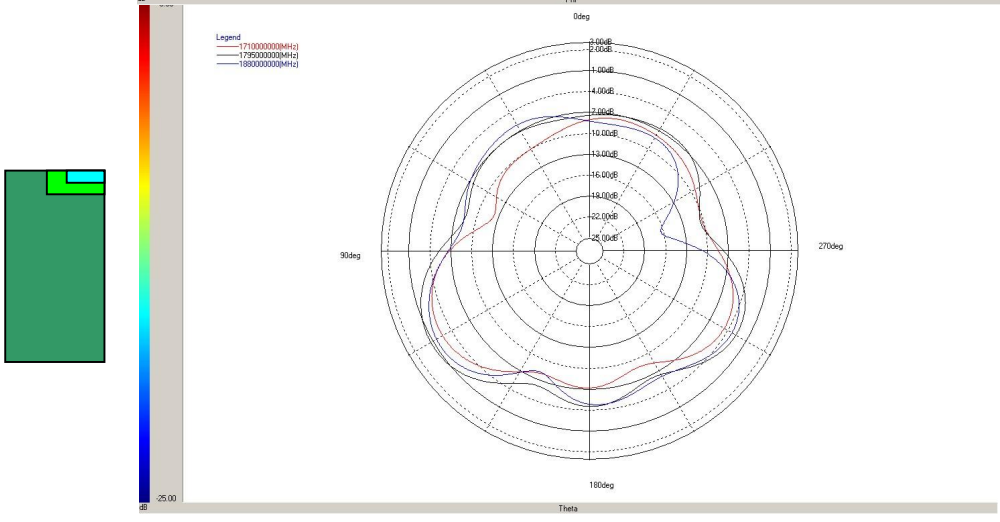

XY-PLANE 1800MHz

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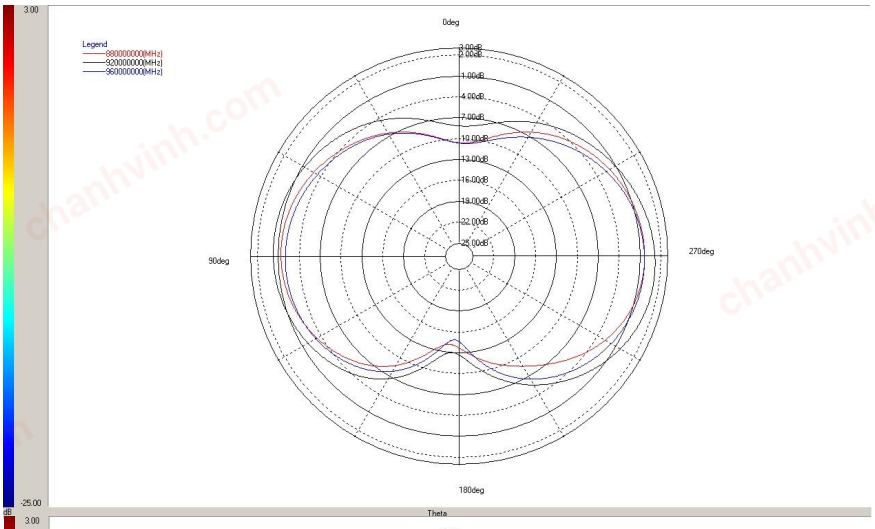
Ceramic Chip Antenna

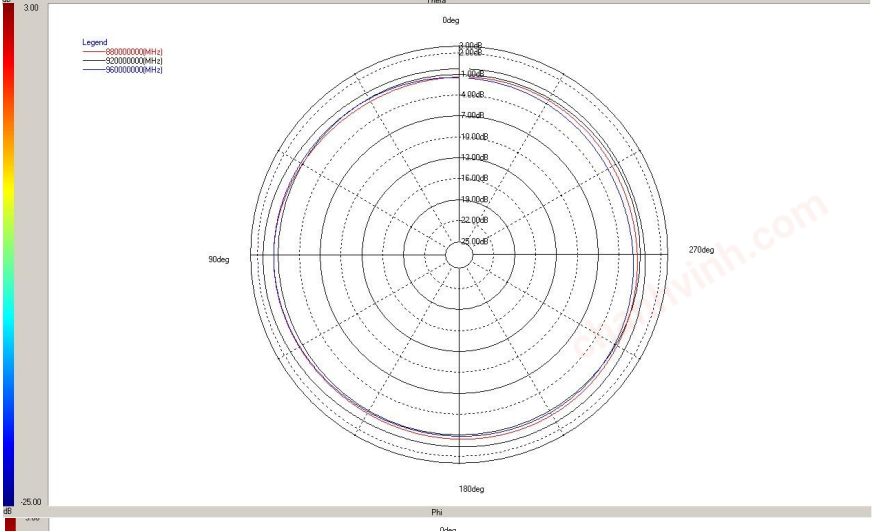
Ground cleared under antenna. Clearance area **40 mm x 10mm.**

Typical Free Space Radiation Patterns for EGSM900 Band

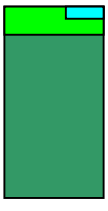


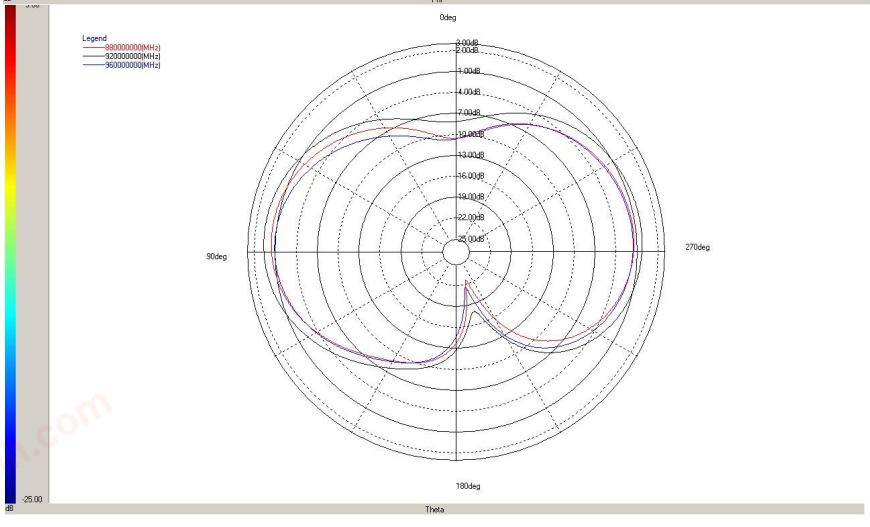
YZ-PLANE 900MHz





XZ-PLANE 900MHz





XY-PLANE 900MHz

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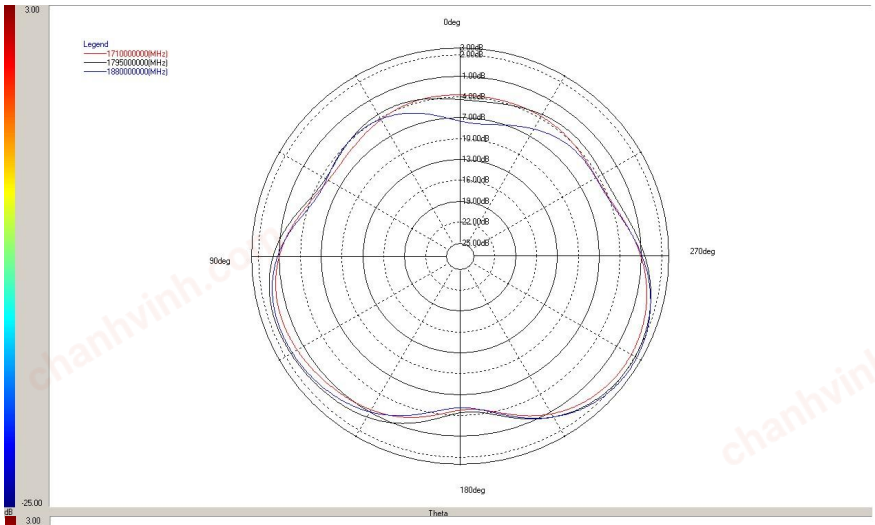
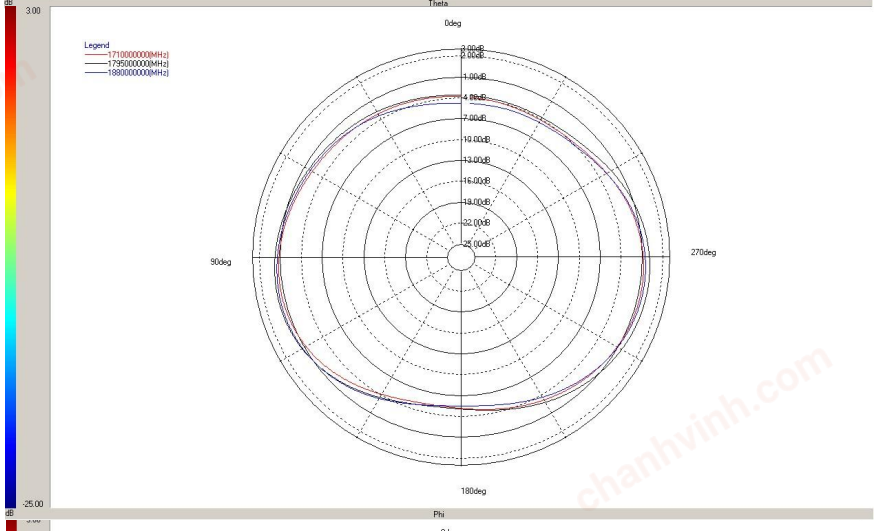
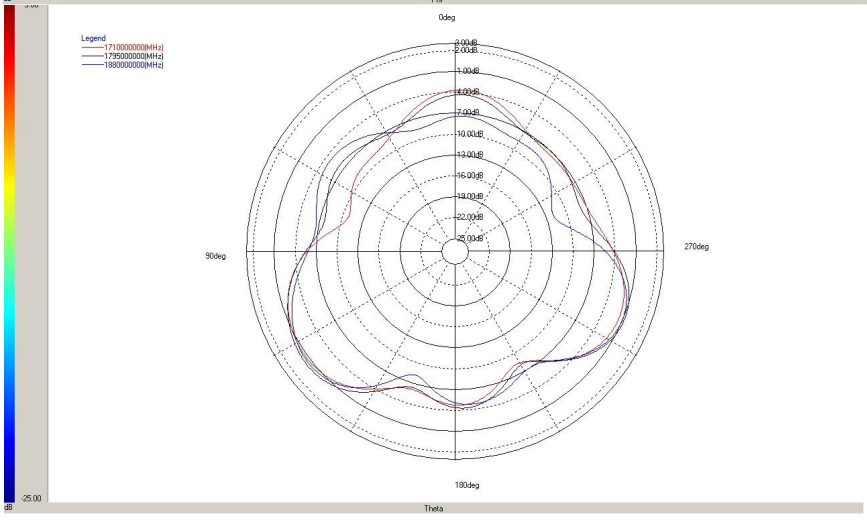
Typical Free Space Radiation Patterns for PCN1800 Band



YZ-PLANE 1800MHz



XZ-PLANE 1800MHz



XY-PLANE 1800MHz

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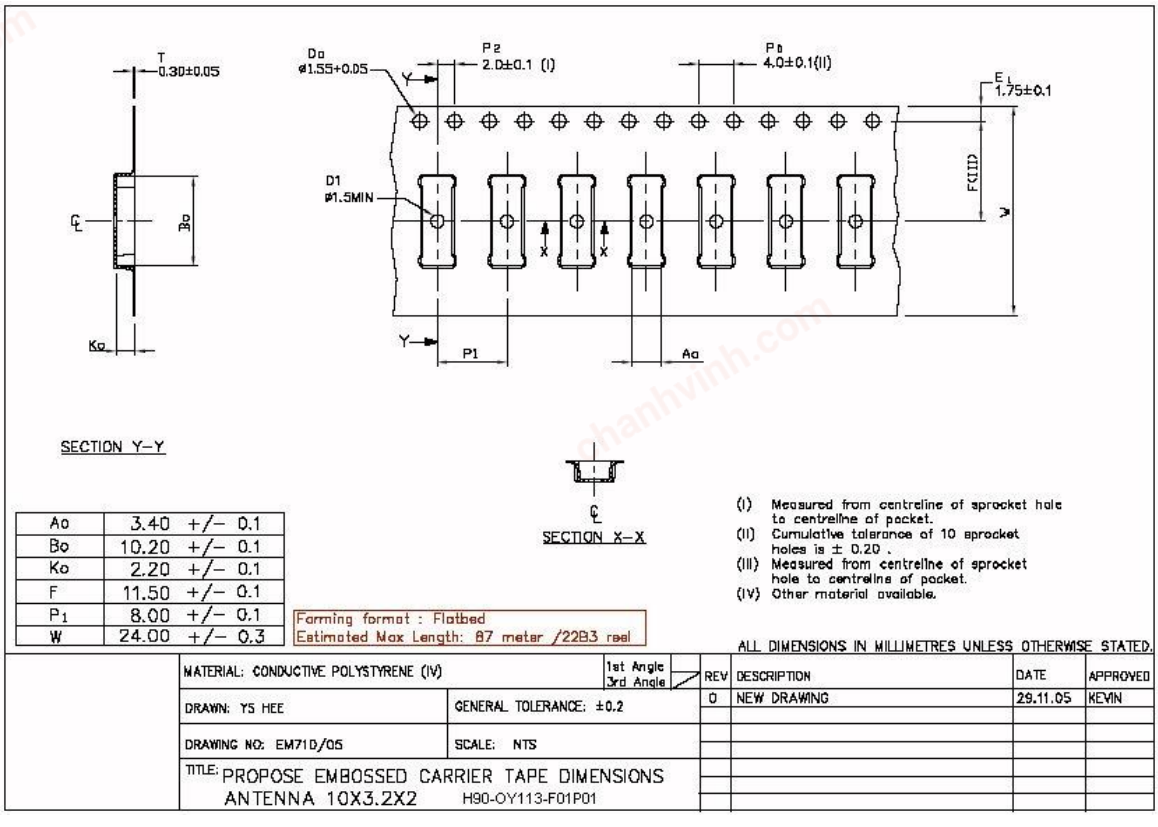
Ceramic Chip Antenna

Packing

General

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

Carrier tape



Ao	3.40	+/– 0.1
Bo	10.20	+/– 0.1
Ko	2.20	+/– 0.1
F	11.50	+/– 0.1
P_1	8.00	+/– 0.1
W	24.00	+/– 0.3

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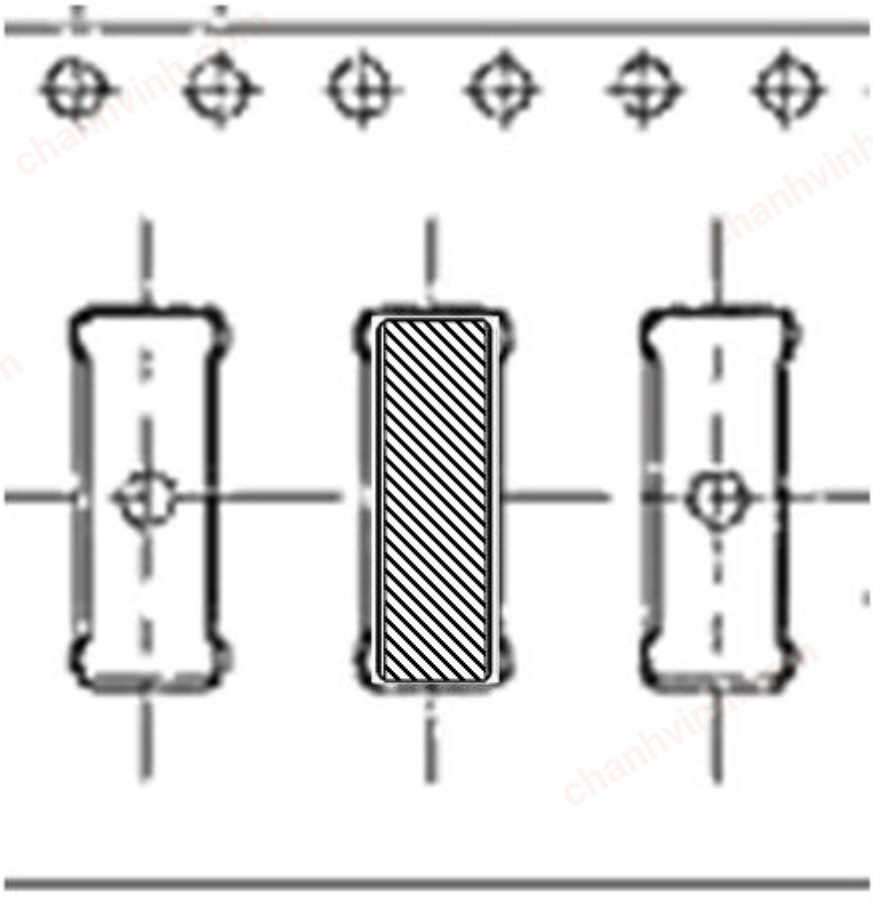
Block orientation

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



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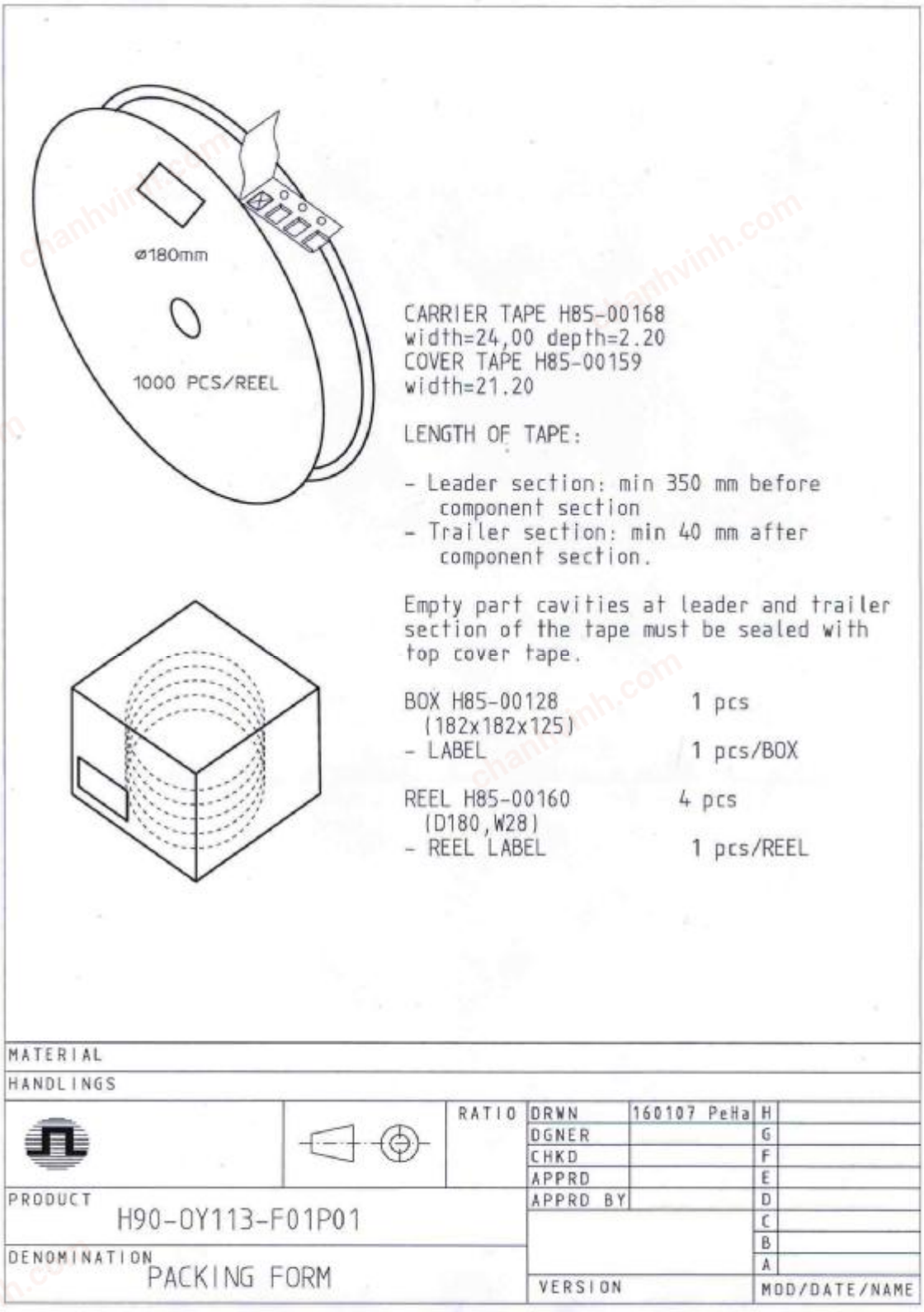
Packing form



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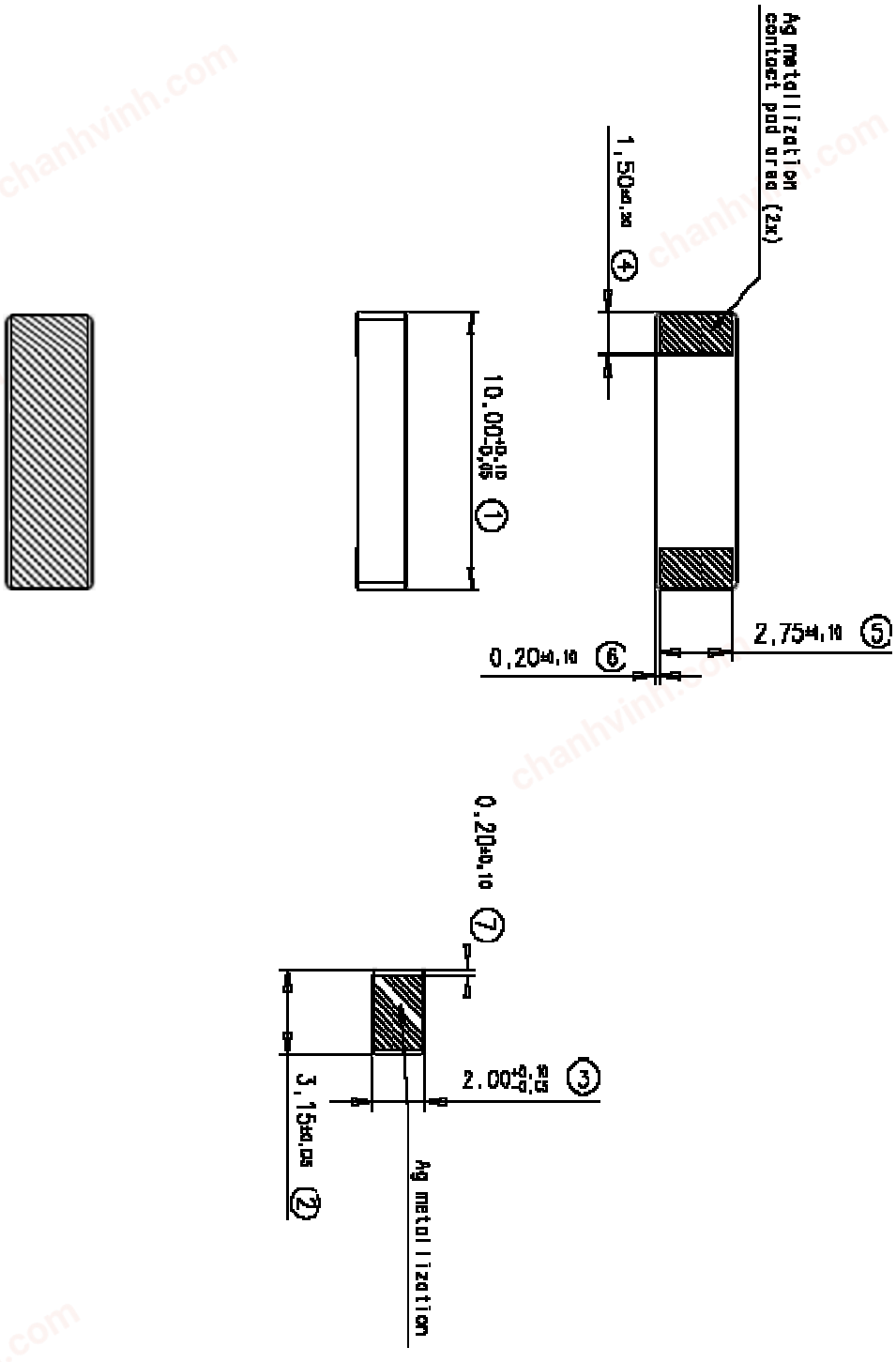
Ceramic Chip Antenna

Mechanical Outline



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