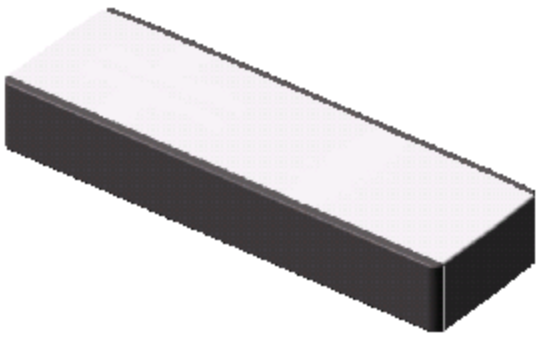


Application note

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	

Pulse Finland Oy
Takatie 6
90440 Kempele, Finland
Tel: +358 207 935 500
Fax: +358 207 935 501

Domicile: Kempele
Business ID: 1933992-8
firstnamelastname@pulseeng.com
www.pulseeng.com/antennas

© 2006. All Rights Reserved.

Table of Content

General Features and Applications 3

Terminal configuration and antenna dimensions..... 4

Test setup for electrical measurements 5

Electrical performance test results..... 7

Packing 13

Mechanical Outline 16

Contact information 17

Pulse Finland Oy
Takatie 6
90440 Kempele, Finland
Tel: +358 207 935 500
Fax: +358 207 935 501

Domicile: Kempele
Business ID: 1933992-8
firstnamelastname@pulseeng.com
www.pulseeng.com/antennas

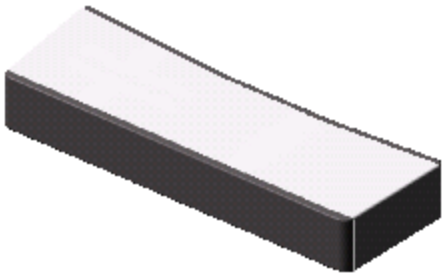
© 2006. All Rights Reserved.

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

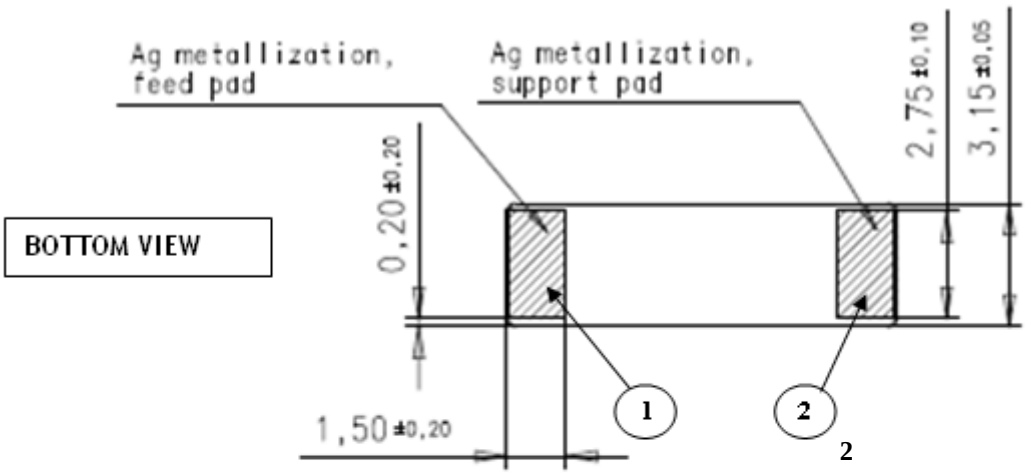
Pulse Finland Oy
Takatie 6
90440 Kempele, Finland
Tel: +358 207 935 500
Fax: +358 207 935 501

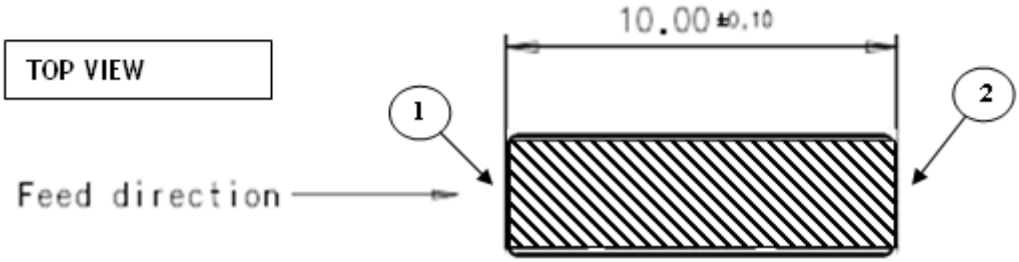
Domicile: Kempele
Business ID: 1933992-8
firstnamelastname@pulseeng.com
www.pulseeng.com/antennas

© 2006. All Rights Reserved.

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		

Pulse Finland Oy
Takatie 6
90440 Kempele, Finland
Tel: +358 207 935 500
Fax: +358 207 935 501

Domicile: Kempele
Business ID: 1933992-8
firstnamelastname@pulseeng.com
www.pulseeng.com/antennas

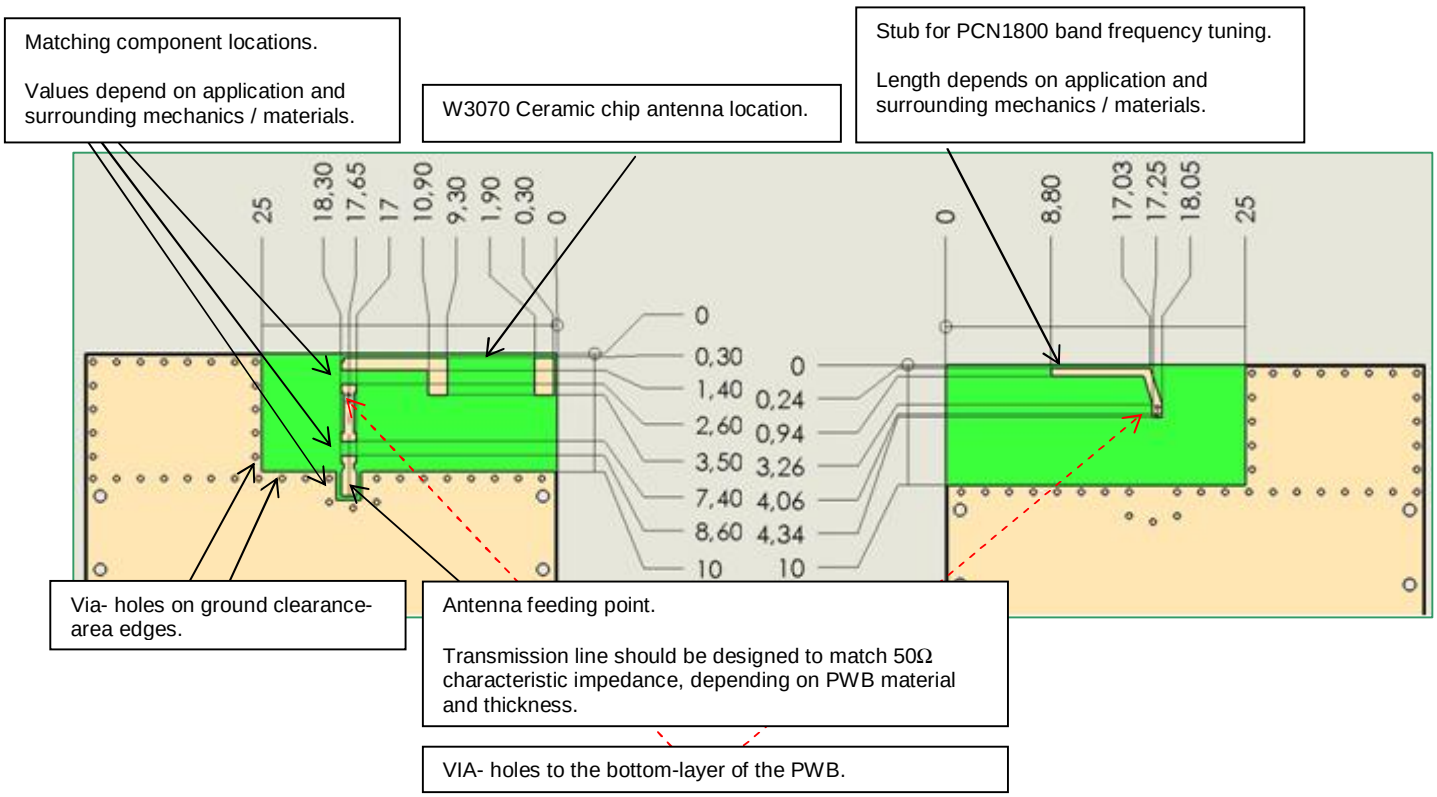
© 2006. All Rights Reserved.

Ceramic Chip Antenna

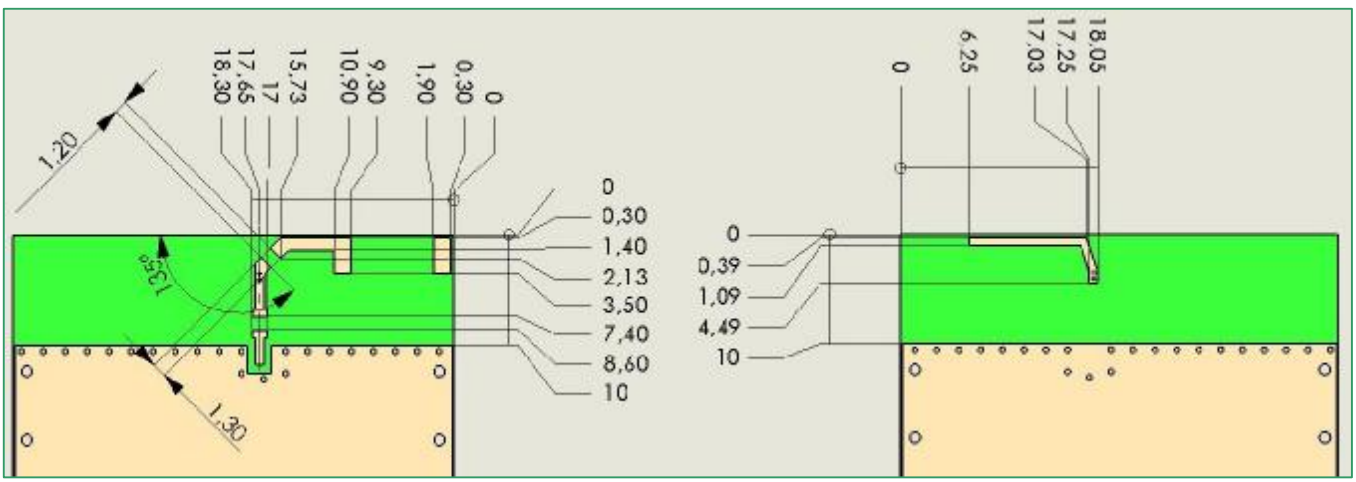
Test Setup for Electrical Measurements

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



Pulse Finland Oy
Takatie 6
90440 Kempele, Finland
Tel: +358 207 935 500
Fax: +358 207 935 501

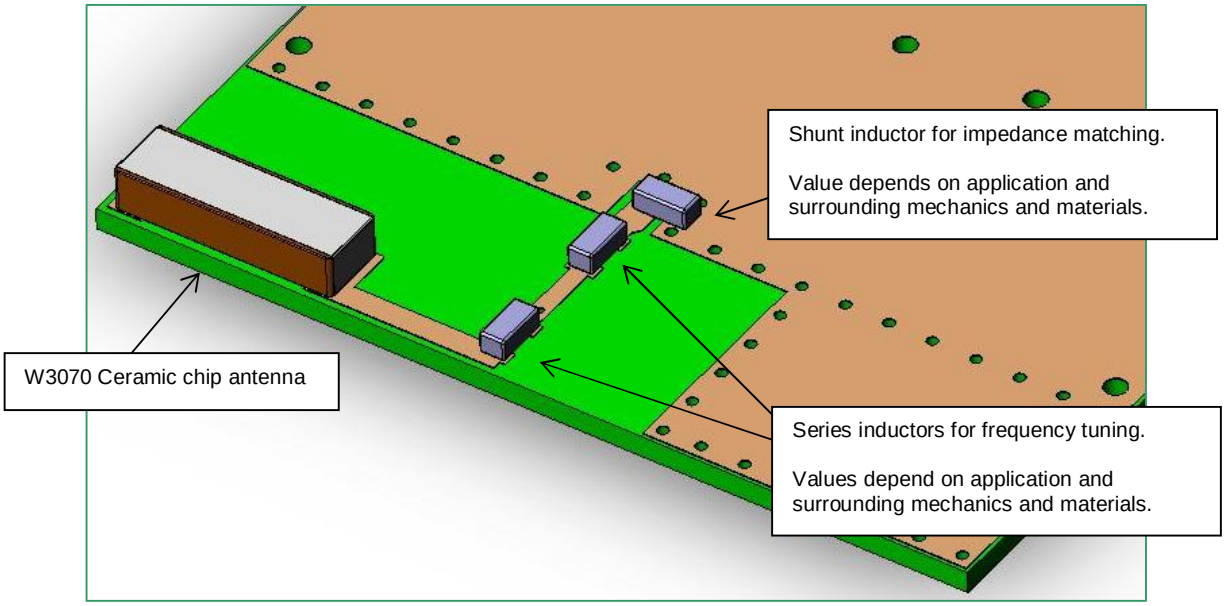
Domicile: Kempele
Business ID: 1933992-8
firstnamelastname@pulseeng.com
www.pulseeng.com/antennas

© 2006. All Rights Reserved.

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

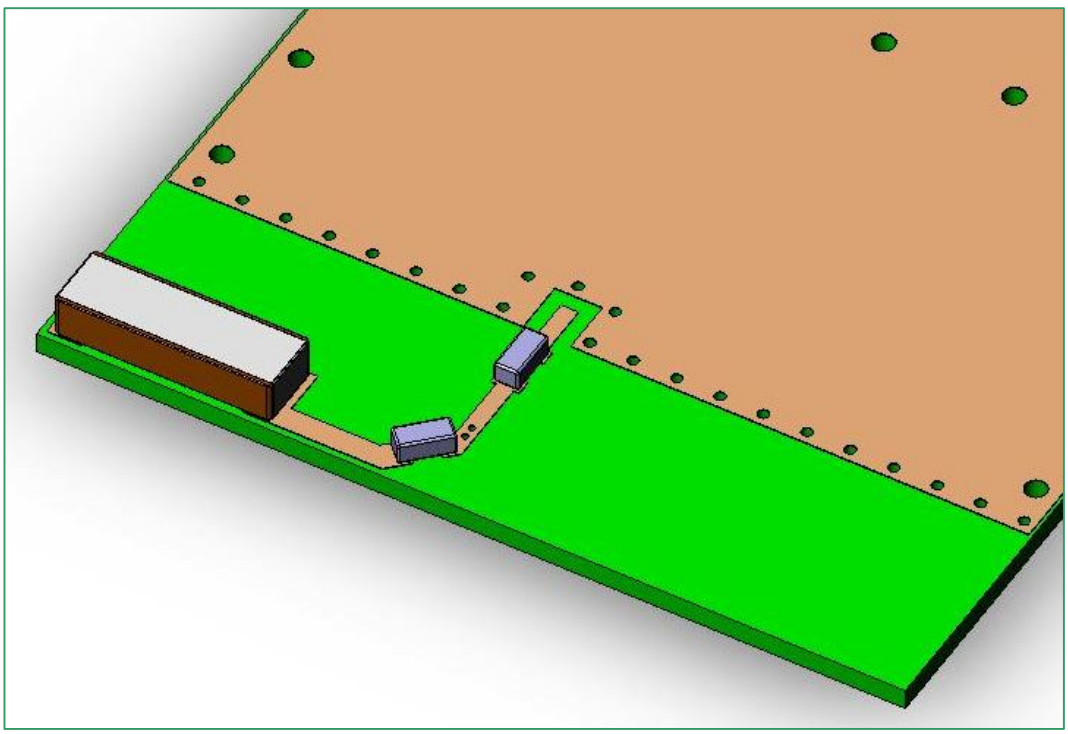
3D- view of Test Setup

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**



Pulse Finland Oy
Takatie 6
90440 Kempele, Finland
Tel: +358 207 935 500
Fax: +358 207 935 501

Domicile: Kempele
Business ID: 1933992-8
firstnamelastname@pulseeng.com
www.pulseeng.com/antennas

© 2006. All Rights Reserved.

Ceramic Chip Antenna

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

Typical Electrical Characteristics (T=25 °C)

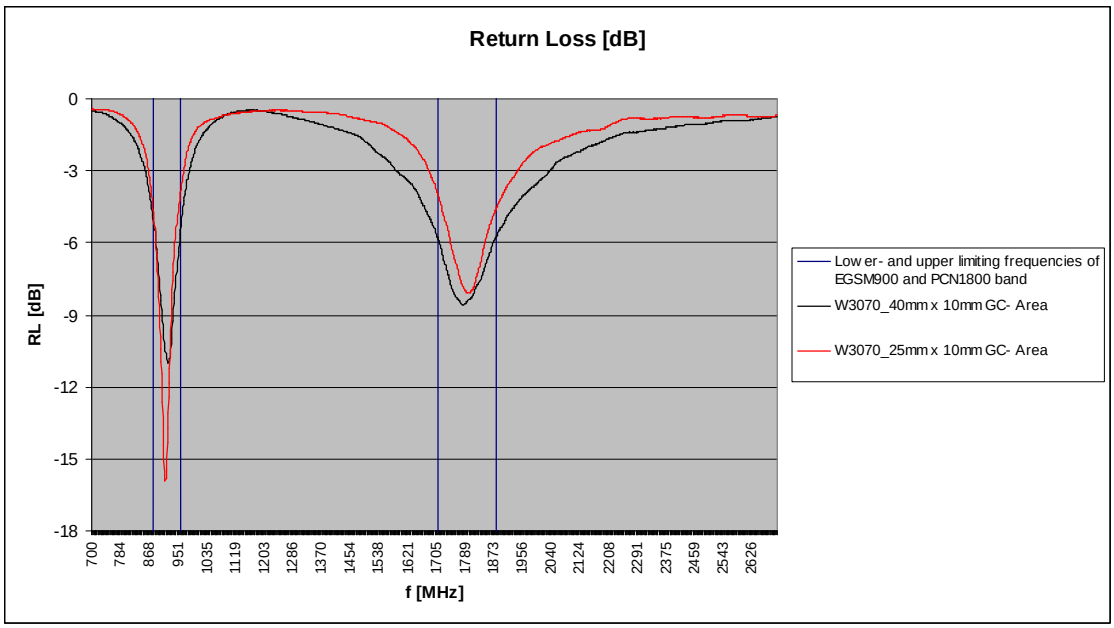
Measured on the 95 x 40mm test board with matching circuit.

Typical return loss-values at band edges:

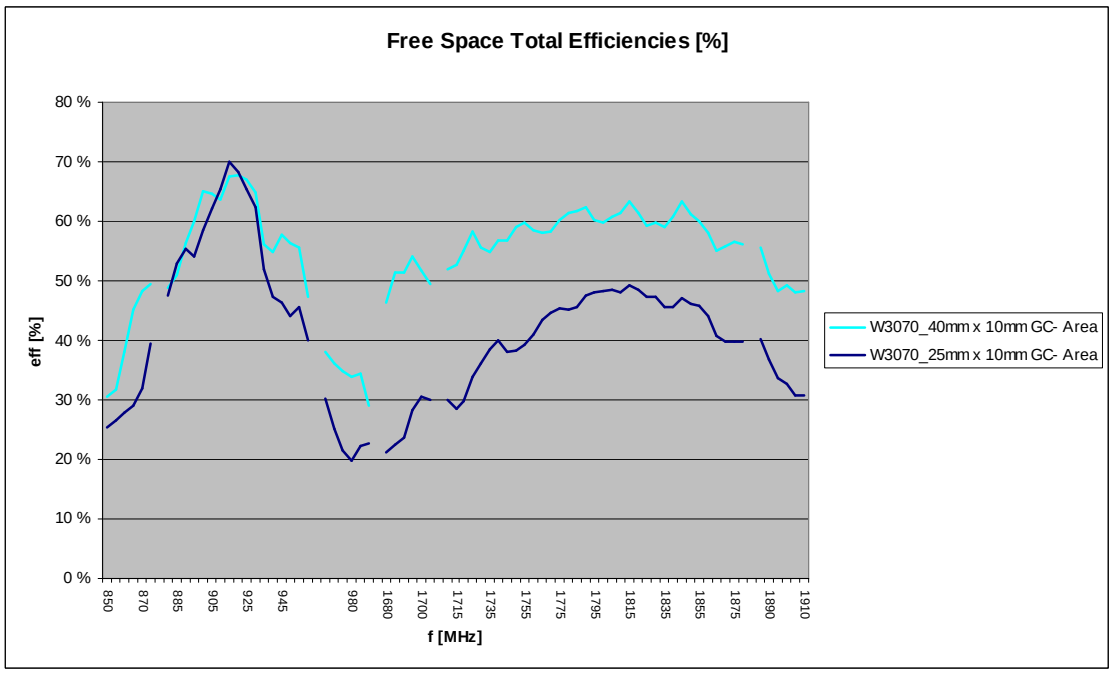
880MHz	960MHz
-5.1dB	-5.3dB
-4.7dB	-3.8dB

1710MHz	1880MHz
-5.8dB	-5.7dB
-4dB	-4.6dB

Typical Return Loss S11



Typical free Space Total Efficiencies [%]

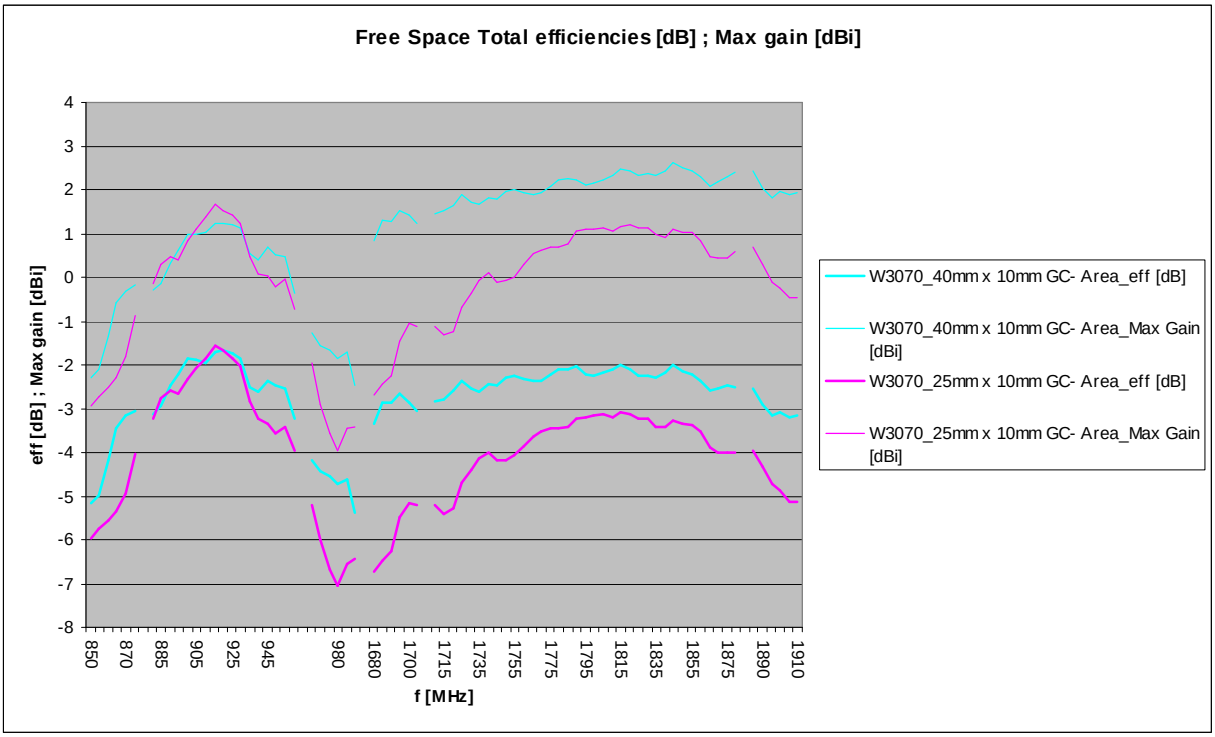


Pulse Finland Oy
Takatie 6
90440 Kempele, Finland
Tel: +358 207 935 500
Fax: +358 207 935 501

Domicile: Kempele
Business ID: 1933992-8
firstnamelastname@pulseeng.com
www.pulseeng.com/antennas

© 2006. All Rights Reserved.

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



Pulse Finland Oy
Takatie 6
90440 Kempele, Finland
Tel: +358 207 935 500
Fax: +358 207 935 501

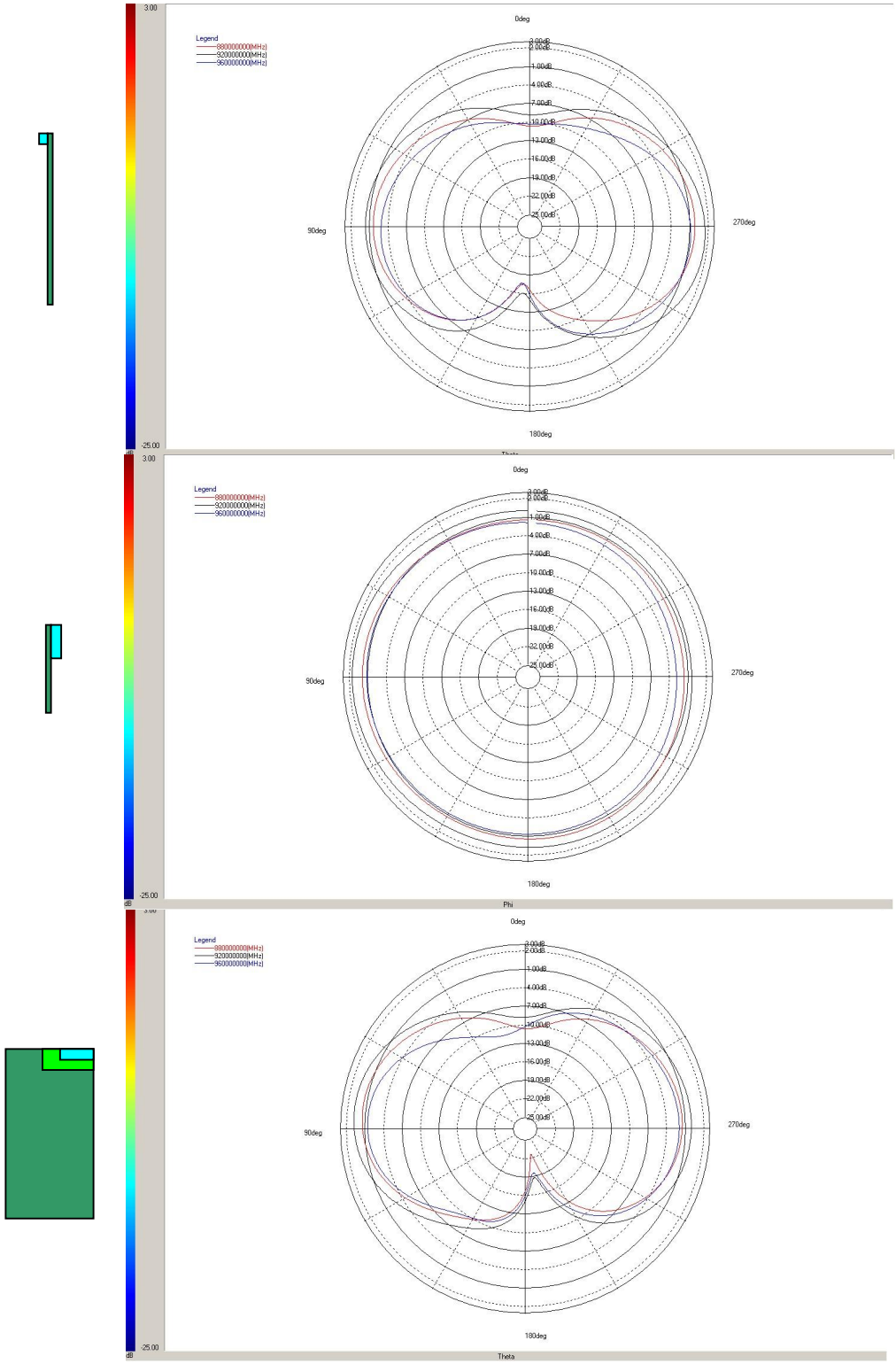
Domicile: Kempele
Business ID: 1933992-8
firstnamelastname@pulseeng.com
www.pulseeng.com/antennas

© 2006. All Rights Reserved.

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

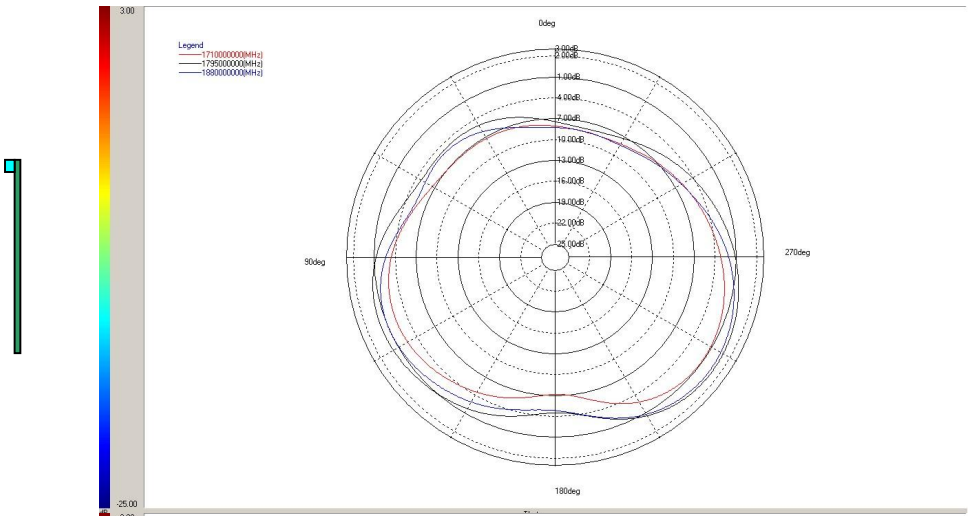
XY-PLANE 900MHz

Pulse Finland Oy
Takatie 6
90440 Kempele, Finland
Tel: +358 207 935 500
Fax: +358 207 935 501

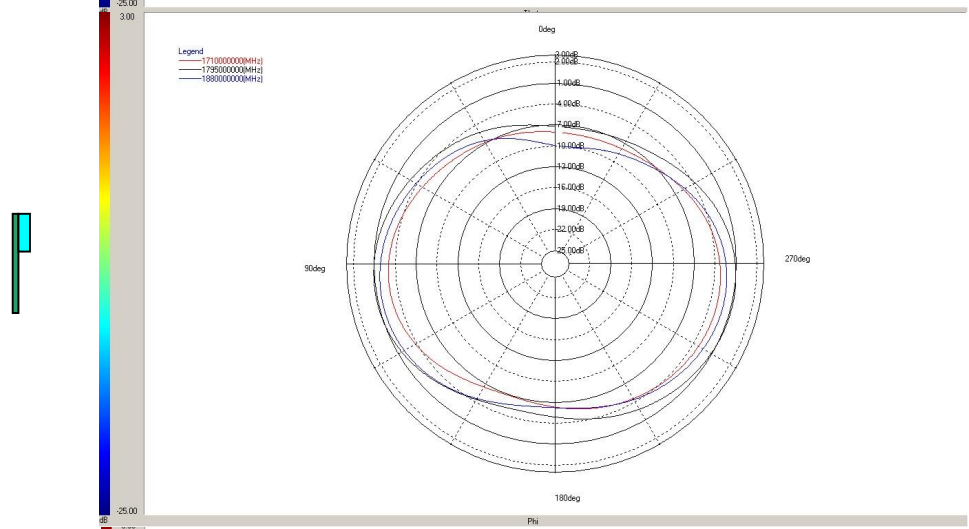
Domicile: Kempele
Business ID: 1933992-8
firstnamelastname@pulseeng.com
www.pulseeng.com/antennas

© 2006. All Rights Reserved.

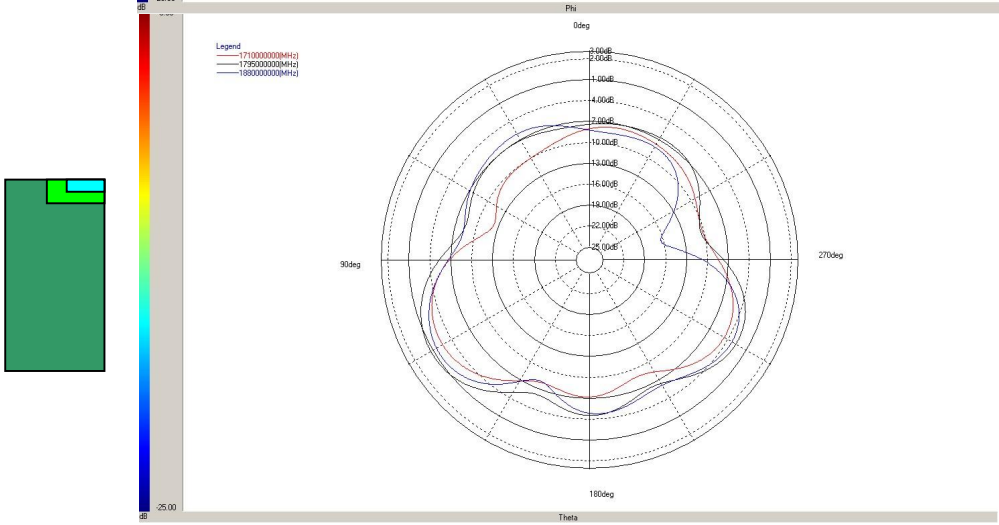
Typical Free Space Radiation Patterns for PCN1800 Band



YZ-PLANE 1800MHz



XZ-PLANE 1800MHz



XY-PLANE 1800MHz

Pulse Finland Oy
Takatie 6
90440 Kempele, Finland
Tel: +358 207 935 500
Fax: +358 207 935 501

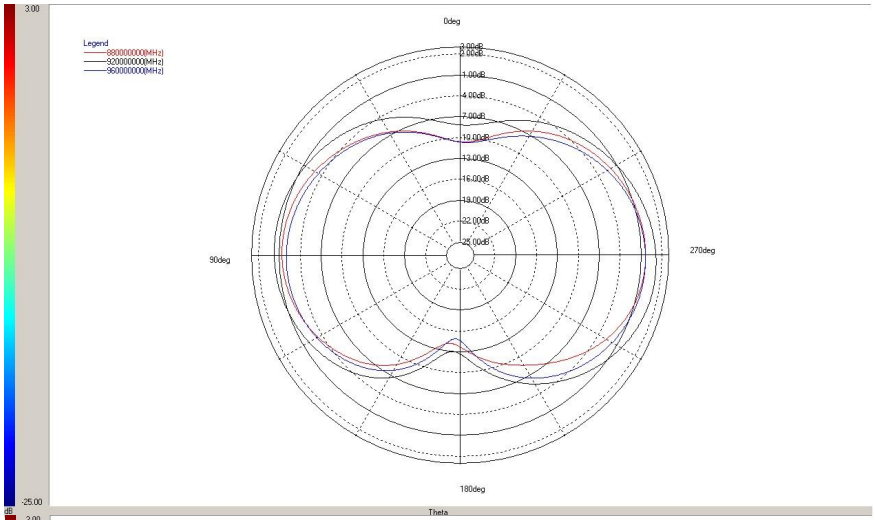
Domicile: Kempele
Business ID: 1933992-8
firstnamelastname@pulseeng.com
www.pulseeng.com/antennas

© 2006. All Rights Reserved.

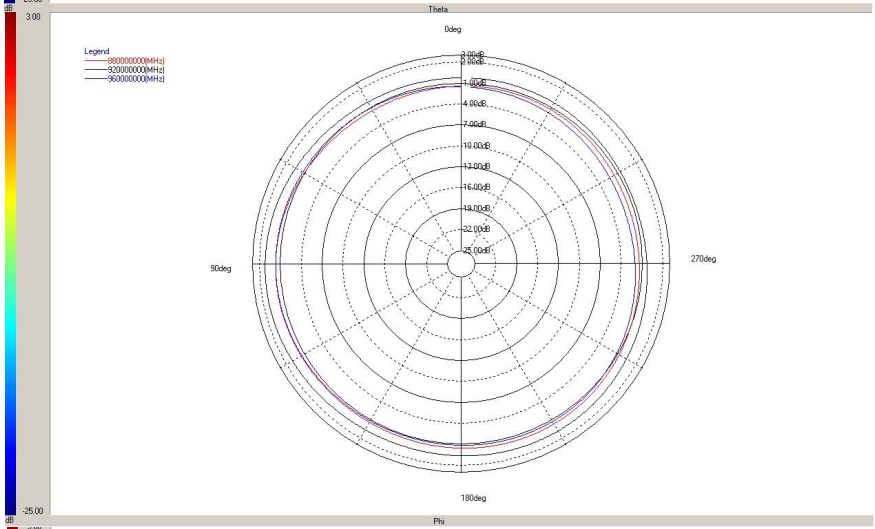
Ceramic Chip Antenna

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

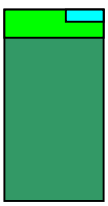
Typical Free Space Radiation Patterns for EGSM900 Band

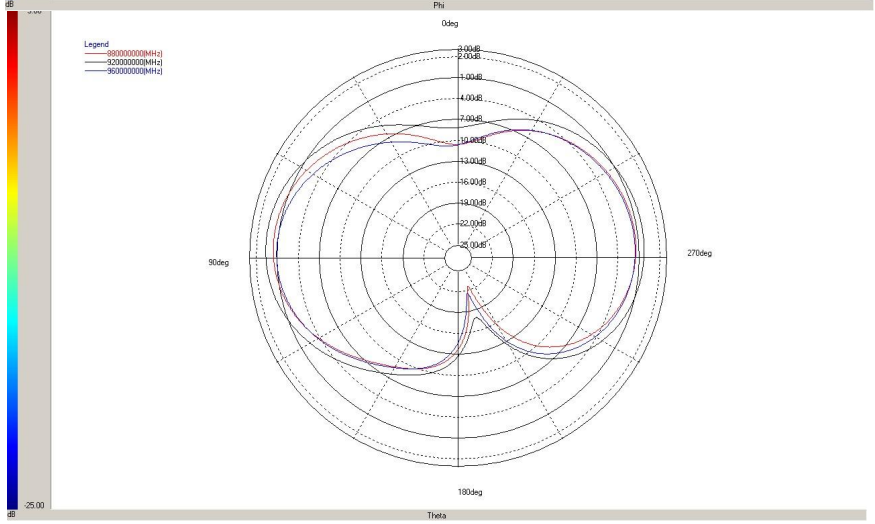


YZ-PLANE 900MHz



XZ-PLANE 900MHz





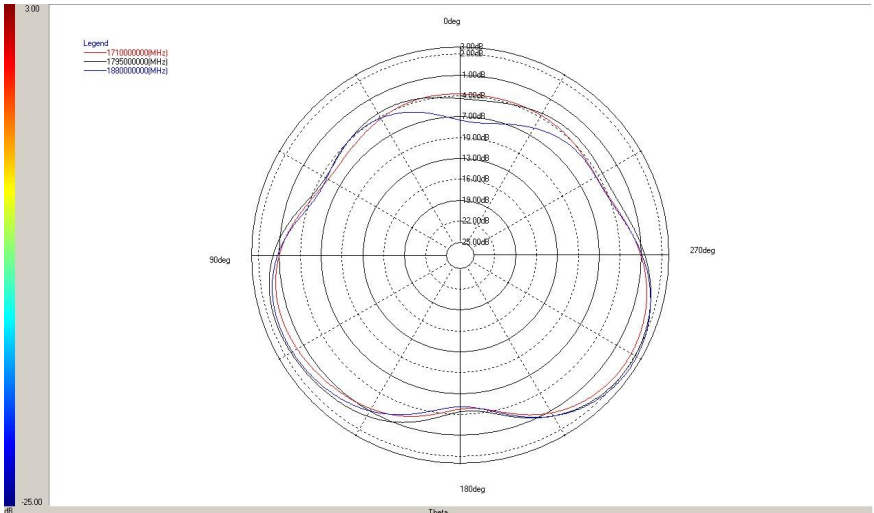
XY-PLANE 900MHz

Pulse Finland Oy
Takatie 6
90440 Kempele, Finland
Tel: +358 207 935 500
Fax: +358 207 935 501

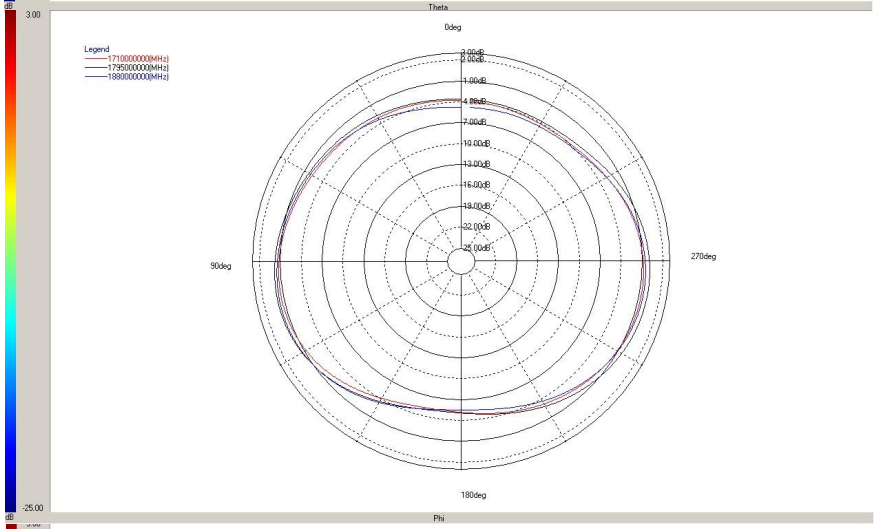
Domicile: Kempele
Business ID: 1933992-8
firstnamelastname@pulseeng.com
www.pulseeng.com/antennas

© 2006. All Rights Reserved.

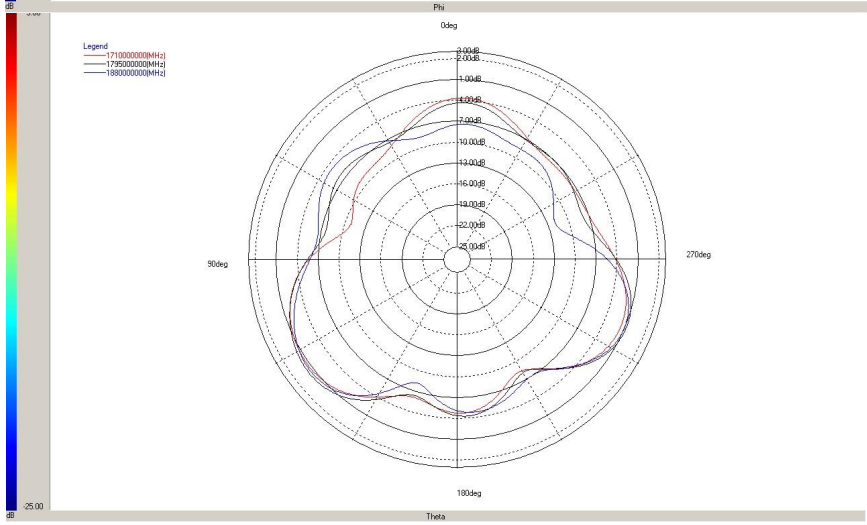
Typical Free Space Radiation Patterns for PCN1800 Band



YZ-PLANE 1800MHz



XZ-PLANE 1800MHz



XY-PLANE 1800MHz

Pulse Finland Oy
Takatie 6
90440 Kempele, Finland
Tel: +358 207 935 500
Fax: +358 207 935 501

Domicile: Kempele
Business ID: 1933992-8
firstnamelastname@pulseeng.com
www.pulseeng.com/antennas

© 2006. All Rights Reserved.

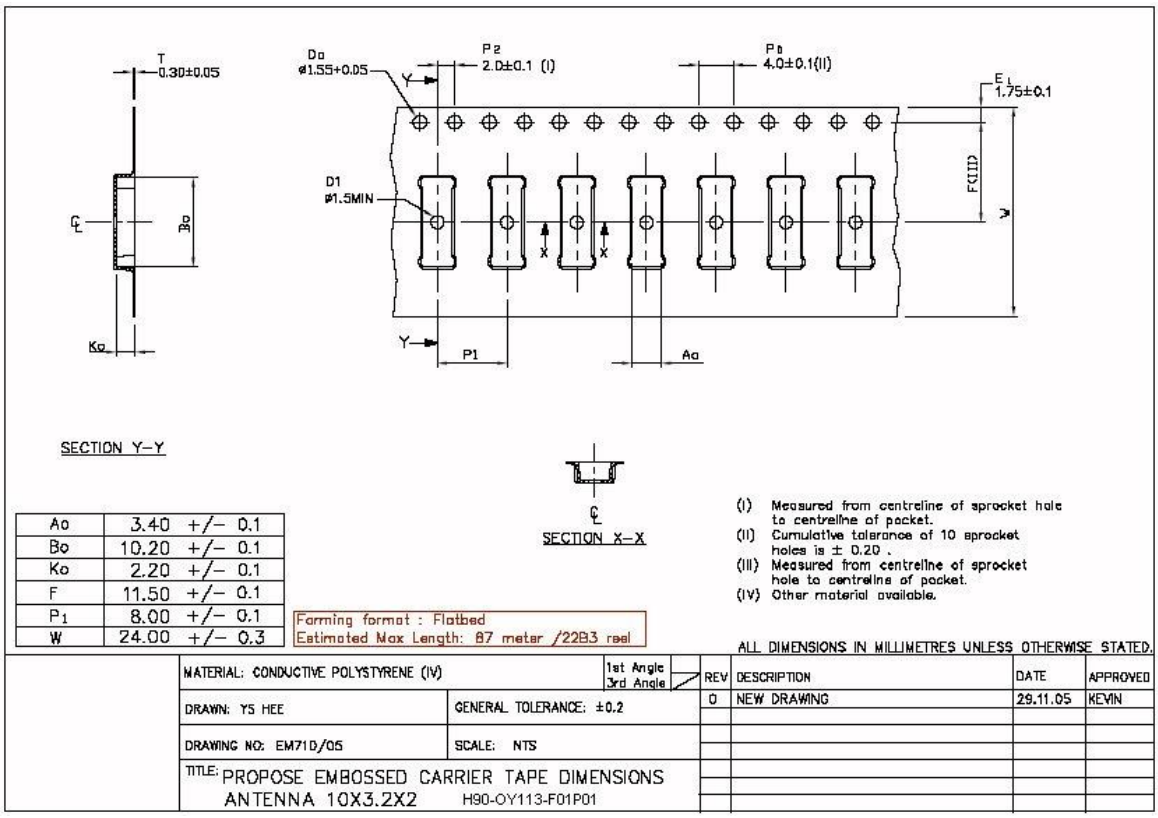
Ceramic Chip Antenna

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

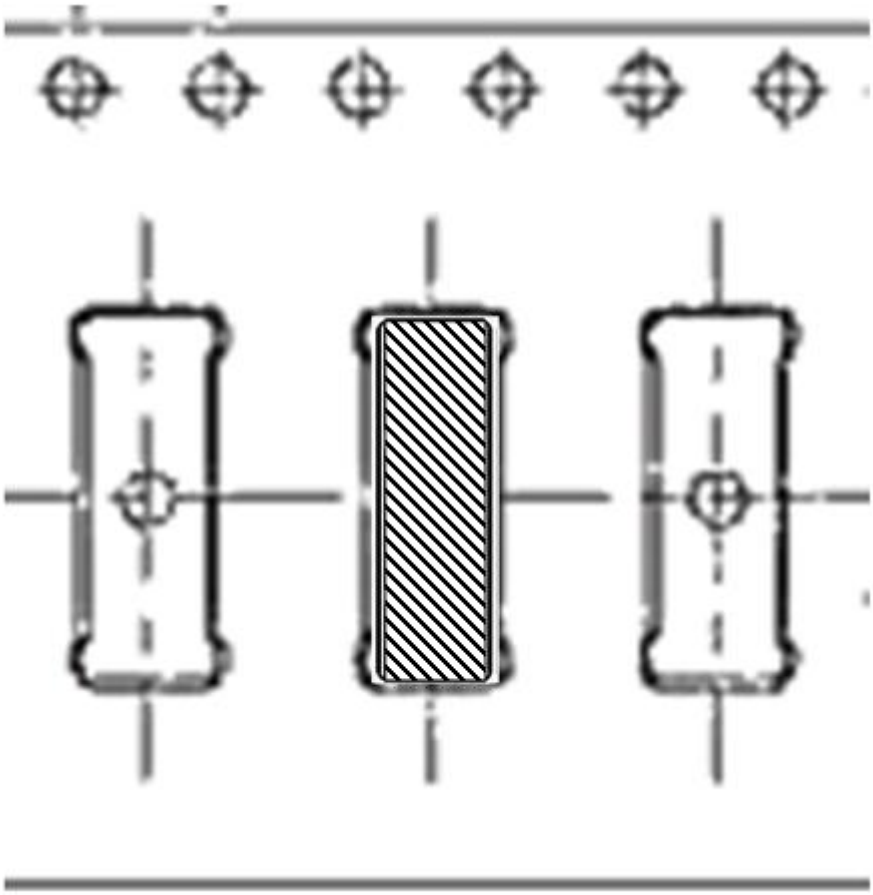
Pulse Finland Oy
Takatie 6
90440 Kempele, Finland
Tel: +358 207 935 500
Fax: +358 207 935 501

Domicile: Kempele
Business ID: 1933992-8
firstnamelastname@pulseeng.com
www.pulseeng.com/antennas

© 2006. All Rights Reserved.

Block orientation

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

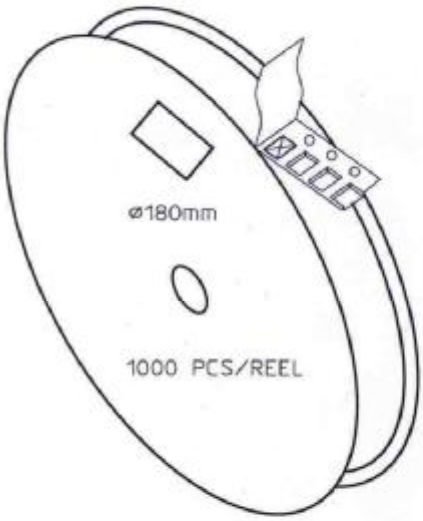


Pulse Finland Oy
Takatie 6
90440 Kempele, Finland
Tel: +358 207 935 500
Fax: +358 207 935 501

Domicile: Kempele
Business ID: 1933992-8
firstnamelastname@pulseeng.com
www.pulseeng.com/antennas

© 2006. All Rights Reserved.

Packing form

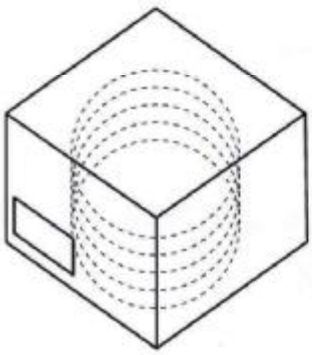


CARRIER TAPE H85-00168
width=24,00 depth=2.20
COVER TAPE H85-00159
width=21.20

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 (182x182x125)	1 pcs
- LABEL	1 pcs/BOX
REEL H85-00160 (D180,W28)	4 pcs
- REEL LABEL	1 pcs/REEL

MATERIAL					
HANDLINGS					
		RATIO	DRWN	160107 PeHa	H
			DGNER		G
			CHKD		F
			APPRD		E
PRODUCT H90-0Y113-F01P01			APPRD BY		D
					C
					B
DENOMINATION PACKING FORM					A
			VERSION		MOD/DATE/NAME

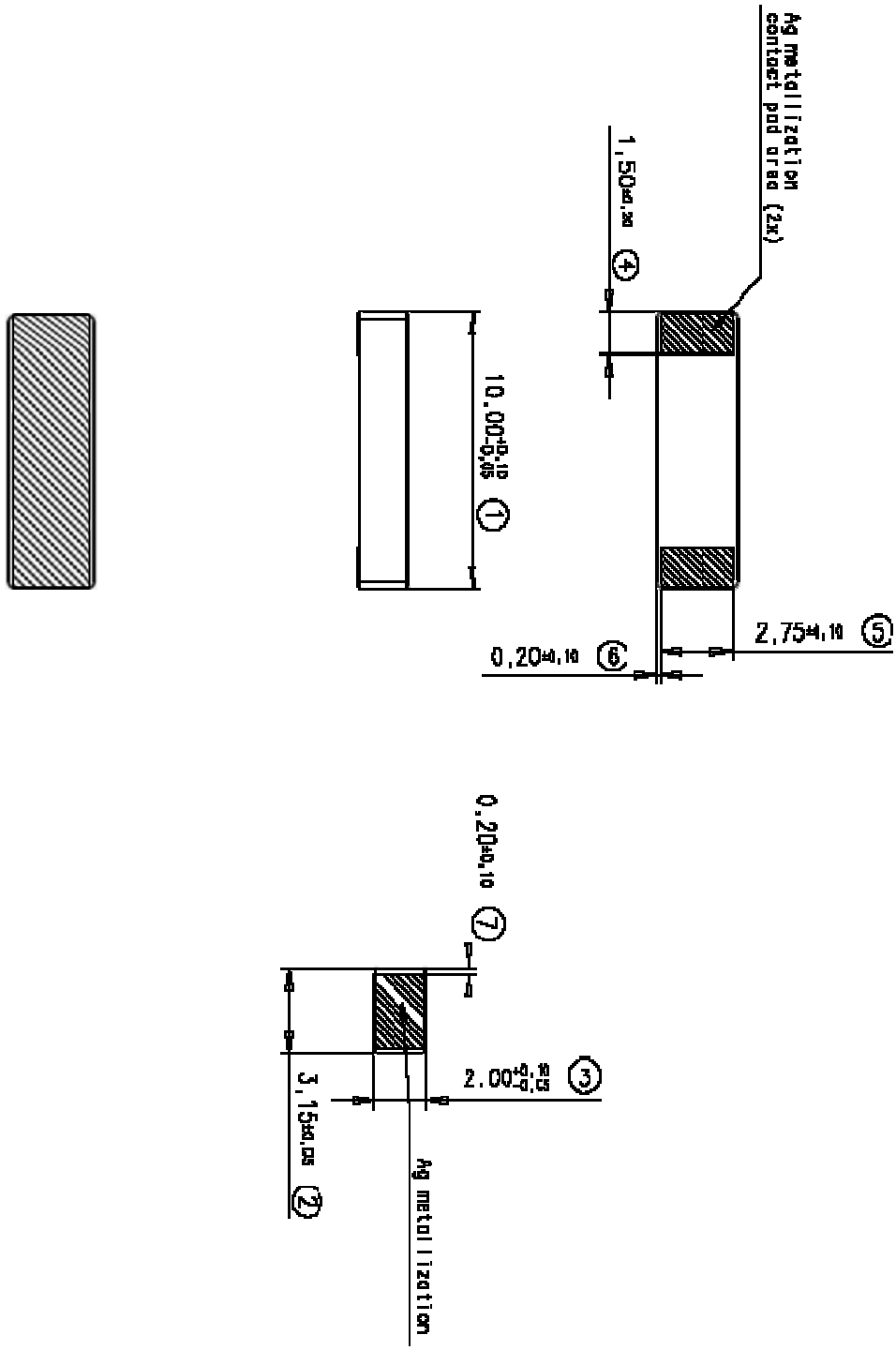
Pulse Finland Oy
Takatie 6
90440 Kempele, Finland
Tel: +358 207 935 500
Fax: +358 207 935 501

Domicile: Kempele
Business ID: 1933992-8
firstnamelastname@pulseeng.com
www.pulseeng.com/antennas

© 2006. All Rights Reserved.

Ceramic Chip Antenna

Mechanical Outline



Pulse Finland Oy
Takatie 6
90440 Kempele, Finland
Tel: +358 207 935 500
Fax: +358 207 935 501

Domicile: Kempele
Business ID: 1933992-8
firstnamelastname@pulseeng.com
www.pulseeng.com/antennas

© 2006. All Rights Reserved.

For More Information, please contact:

Pulse Finland Oy
Takatie 6
Fin-90440 Kempele
Finland
Tel. +358 207 935 500
Fax +358 207 935 501 (sales)

Domicile: Kempele
Business ID: 1933992-8
firstnamesurname@pulseeng.com
www.pulseeng.com/antennas

Pulse World Wide Headquarters
12220 World Trade Drive
San Diego, CA 92128
U.S.A

Tel. +1 858 674 8100
Fax +1 858 674 826
www.pulseeng.com

This is a "Preliminary" product application notes. Products mentioned on this application notes are in development and in the process of being qualified. These products are not fully released nor are they in production. Features, specifications and performance of products offered are subject to change without notice. Other brand and product names mentioned herein may be products and/or registered trademarks of their respective ones. For current info on this product, please contact the Pulse San Diego office.

© Copyright, 2006. Pulse Finland Oy. All rights reserved.