

### Application Note

## Ceramic Quad Band Monopole Antenna

GSM850 or EGSM900

PCN1800, PCS1900 and WCDMA I

10 mm x 3.2 mm x 4 mm Ceramic Chip Antenna

Ground Cleared Under Antenna:  
40 mm x 10 mm

Pulse Part Number: W3073

Version 1: GSM850, PCN1800, PCS1900 and WCDMA I  
Version 2: EGSM900, PCN1800, PCS1900 and WCDMA I

### Status

Author	MiJu	Version	1.0.0
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Approved by		Date	

#### Pulse Finland Oy

Takatie 6  
90440 Kempele, Finland  
Tel: +358 207 935 500

Domicile: Kempele  
Business ID: 1933992-8  
[firstname.lastname@pulseeng.com](mailto:firstname.lastname@pulseeng.com)

# Table of Content

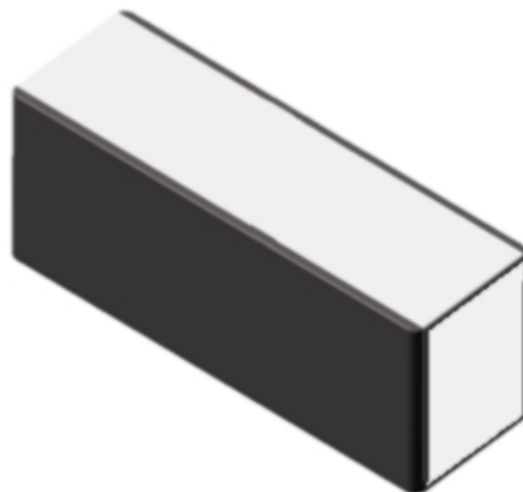
General Features and Applications .....	3
Terminal configuration and antenna dimensions.....	4
Test setup for electrical measurements .....	5
Electrical performance test results.....	8
Packing .....	15
Mechanical Outline .....	18
Contact information .....	19

# Ceramic Chip Antenna

Ground Cleared Under Antenna

## Features

- Low profile
- Compact size W x L x H (10 x 3.2 x 4 mm)
- Low weight (600 mg)
- Lead free materials
- Fully SMD compatible
- Lead free soldering compatible
- Tape and reel packing
- RoHS Compliant Product



## Applications

Version 1: GSM850, PCN1800, PCS1900 and WCDMA I- radios

Version 2: EGSM900, PCN1800, PCS1900 and WCDMA I- radios

## Electrical specifications @ +25 °C

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

### Version 1: W3073 Ceramic Quad Band Monopole Antenna (Ground Cleared Under Antenna 40 mm x 10mm)

Typical performance (test board size 105 mm x 40 mm, PWB ground clearance area 40 mm x 10 mm)

10nH and 12nH series-inductors used for frequency tuning and 12nH shunt-inductor used for impedance matching.

Frequency Range [MHz]	3D Max Gain [dBi]	3D Efficiency [%] / [dB]	Return loss at band edges [dB]	Impedance [Ω]	Operating Temperature [°C]
824 - 894	-2.6 ; -1.76 (band edges) 0.4 (peak)	28/-5.5 ; 33/-4.8 (band edges) 51/-2.9 (peak)	-4.7 ; -5.9	50	-40 to +85
1710 – 1880	0.7 ; 2.3 (band edges) 2.3 (peak)	40/-4.0 ; 59/-2.3 (band edges) 59/-2.3 (peak)	-3.5 ; -6.7	50	-40 to +85
1850 – 1990	2.2 ; 1.6 (band edges) 2.5 (peak)	59/-2.3 ; 54/-2.7 (band edges) 59/-2.3 (peak)	-6.5 ; -5.9	50	-40 to +85
1920 - 2170	2.2 ; 0.9 (band edges) 2.2 (peak)	58/-2.3 ; 46/-3.4 (band edges) 58/-2.3 (peak)	-6.6 ; -3.3	50	-40 to +85

### Version 2: W3073 Ceramic Quad Band Monopole Antenna (Ground Cleared Under Antenna 40 mm x 10mm)

Typical performance (test board size 105 mm x 40 mm, PWB ground clearance area 40 mm x 10 mm)

2pcs of 10nH series-inductors used for frequency tuning and 15nH shunt-inductor used for impedance matching.

Frequency Range [MHz]	3D Max Gain [dBi]	3D Efficiency [%] / [dB]	Return loss at band edges [dB]	Impedance [Ω]	Operating Temperature [°C]
880 - 960	-0.5 ; -1.8 (band edges) 1.0 (peak)	41/-3.8 ; 34/-4.7 (band edges) 60/-2.2 (peak)	-4.5 ; -3.8	50	-40 to +85
1710 – 1880	2.0 ; 2.8 (band edges) 2.9 (peak)	54/-2.7 ; 70/-1.6 (band edges) 70/-1.6 (peak)	-4.9 ; -9.1	50	-40 to +85
1850 – 1990	2.9 ; 2.5 (band edges) 2.9 (peak)	69/-1.6 ; 62/-2.1 (band edges) 71/-1.5 (peak)	-8.9 ; -8.0	50	-40 to +85
1920 - 2170	2.7 ; 2.3 (band edges) 2.8 (peak)	65/-1.9 ; 59/-2.3 (band edges) 67/-1.7 (peak)	-9.3 ; -4.4	50	-40 to +85

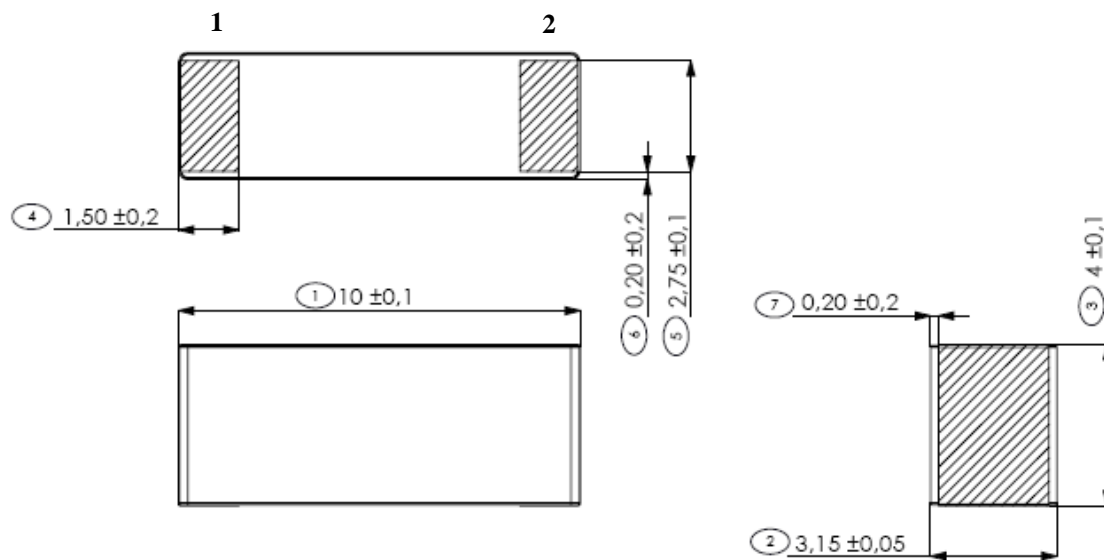
## Pulse Finland Oy

Takatie 6  
90440 Kempele, Finland  
Tel: +358 207 935 500

Domicile: Kempele  
Business ID: 1933992-8  
[firstname.lastname@pulseeng.com](mailto:firstname.lastname@pulseeng.com)

# Ceramic Chip Antenna

## Terminal Configuration and Antenna Dimensions



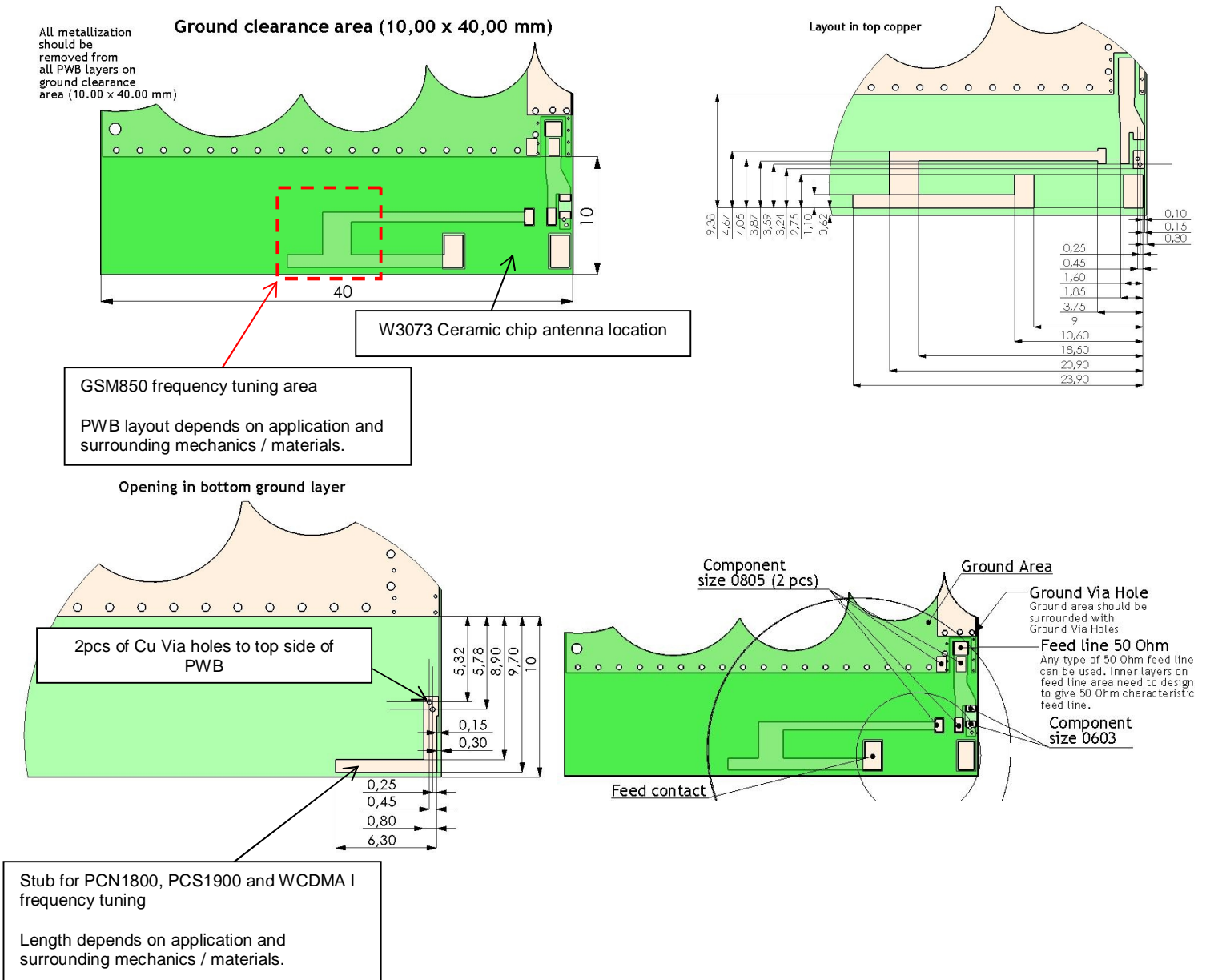
No.	Terminal Name	Terminal Dimensions
1	Feed	1.5 x 2.75 mm
2	Support pad	1.5 x 2.75 mm
Antenna is symmetrical and orientation on footprint can be rotated 180 degrees without change in performance		

# Ceramic Chip Antenna

## Test Setup for Electrical Measurements

Recommended test board- layout for electrical characteristic measurement. Test board outline size 105 x 40mm. Ground cleared under antenna 40mm x 10mm.

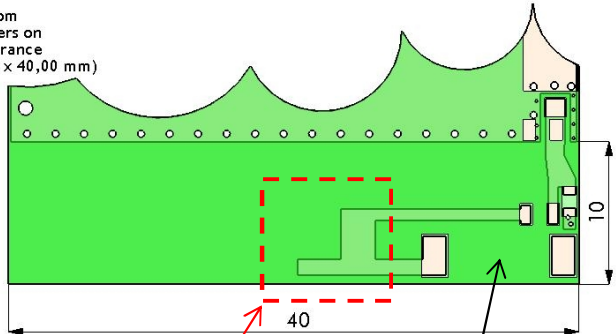
Version 1: GSM850, PCN1800, PCS1900 and WCDMA I



Version 2: EGSM900, PCN1800, PCS1900 and WCDMA I

All metallization should be removed from all PWB layers on ground clearance area (10,00 x 40,00 mm)

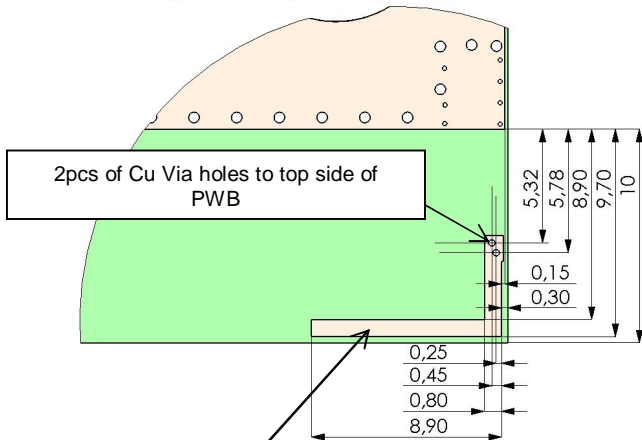
Ground clearance area (10,00 x 40,00 mm)



W3073 Ceramic chip antenna location

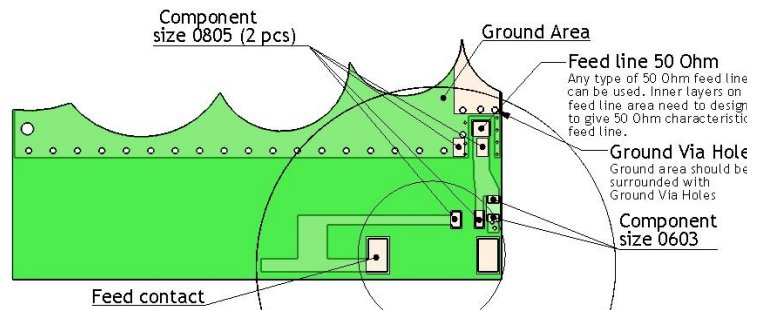
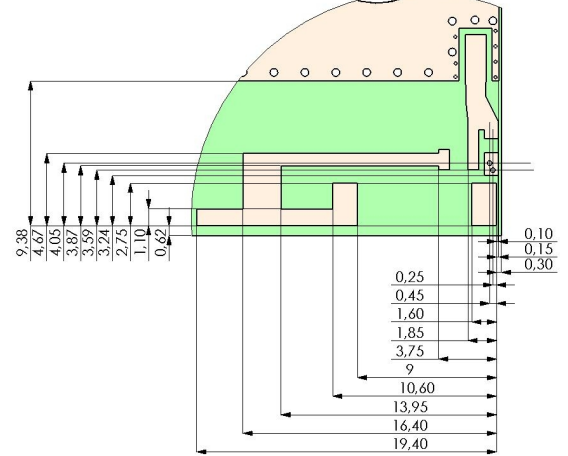
EGSM900 frequency tuning area  
PWB layout depends on application and surrounding mechanics / materials.

Opening in bottom ground layers



Stub for PCN1800, PCS1900 and WCDMA I frequency tuning  
Length depends on application and surrounding mechanics / materials.

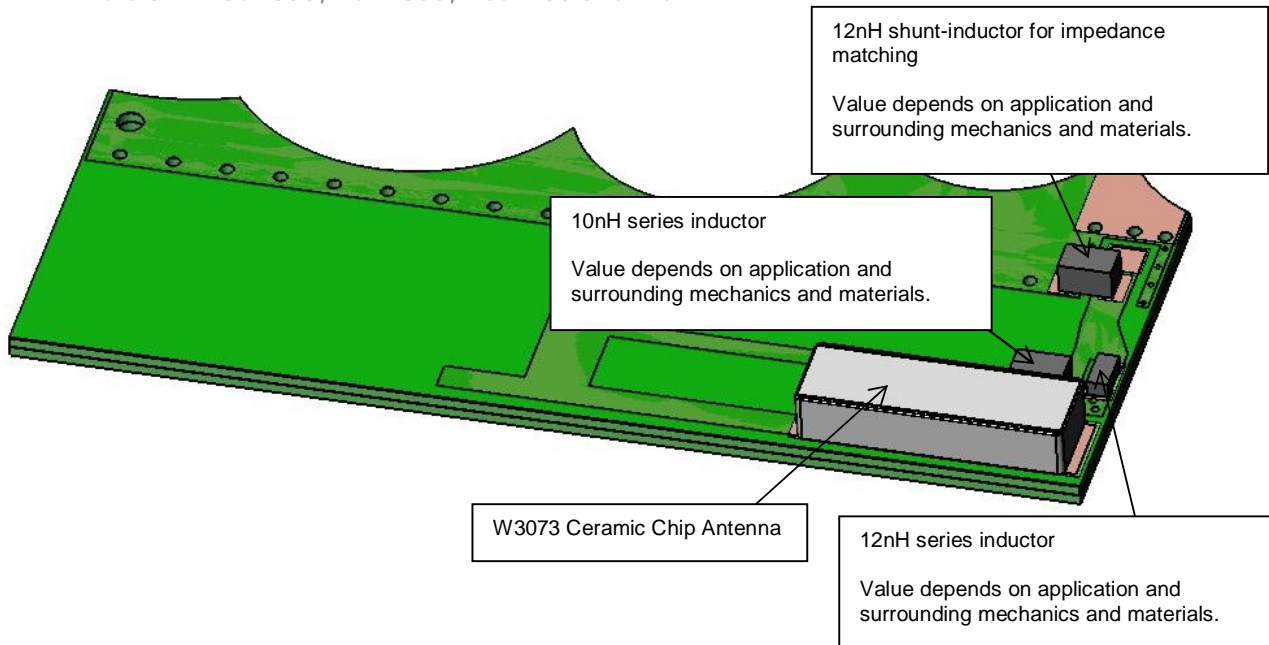
Pad dimensions in top copper



Recommended test board- layout for electrical characteristic measurement. Test board outline size 105 x 40mm. Ground cleared under antenna 40mm x 10mm.

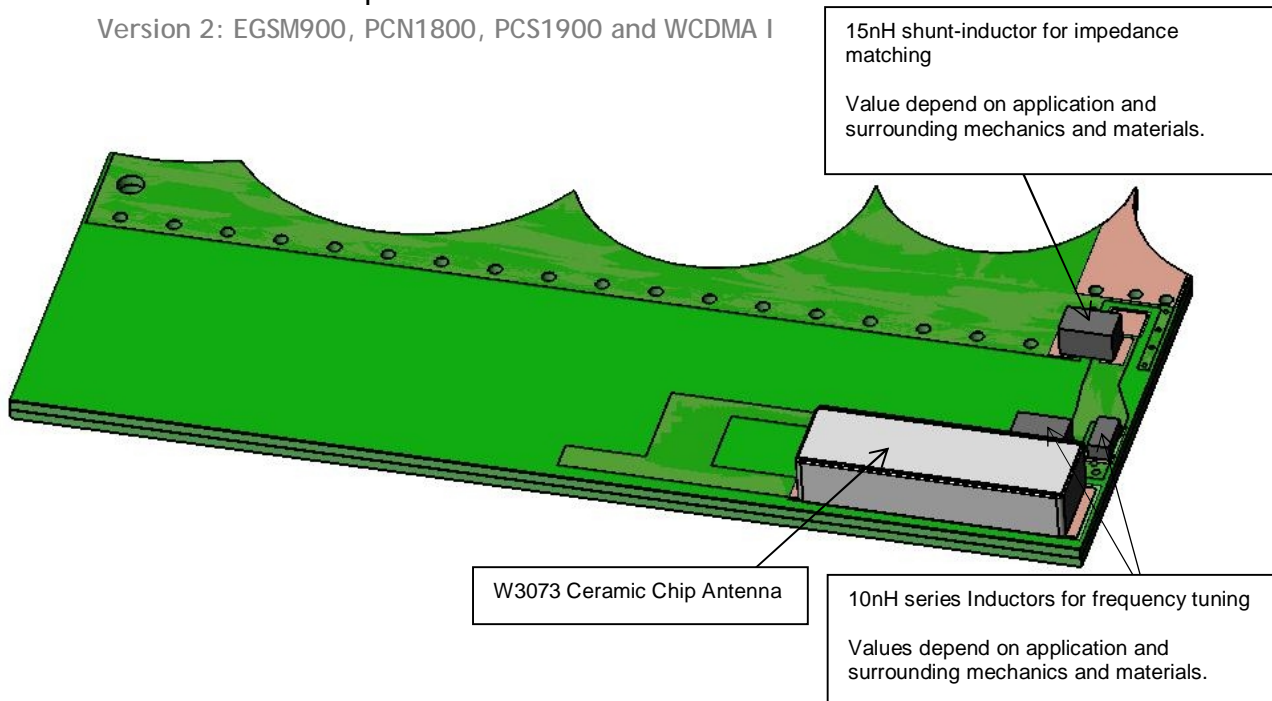
3D- view of Test Setup

Version 1: GSM850, PCN1800, PCS1900 and WCDMA I



3D- view of Test Setup

Version 2: EGSM900, PCN1800, PCS1900 and WCDMA I

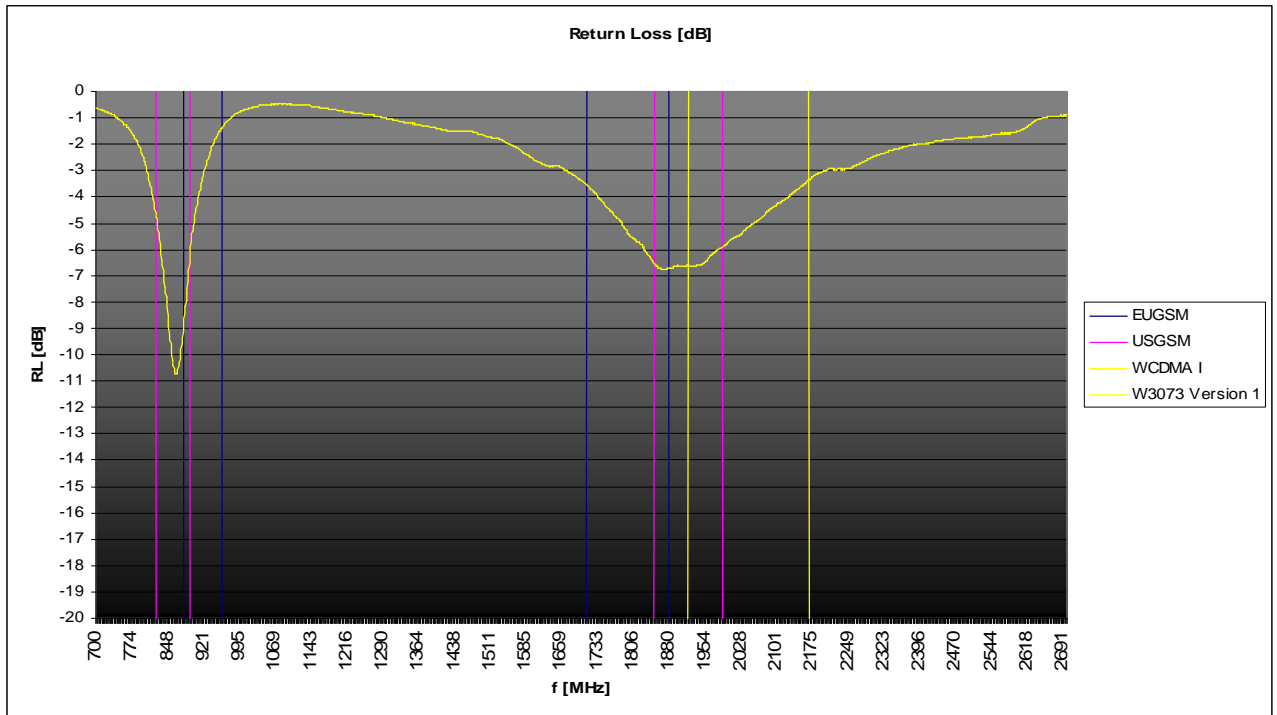


# Ceramic Chip Antenna

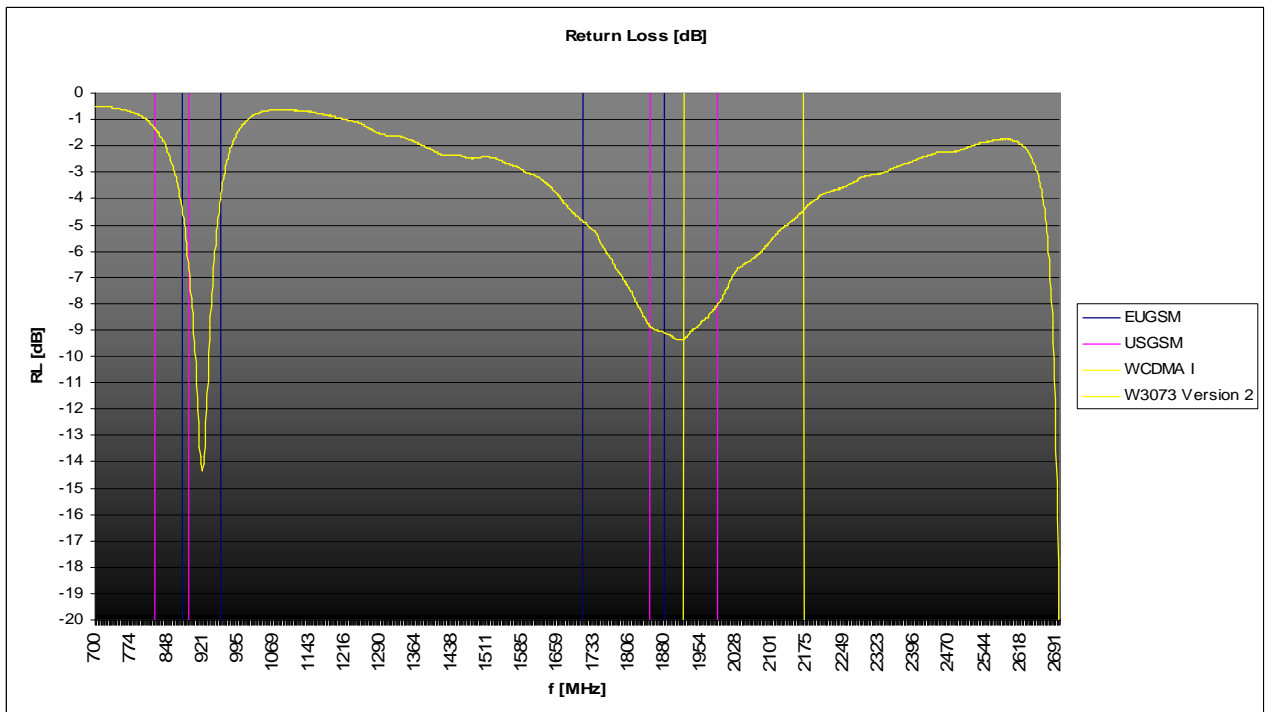
## Typical Electrical Characteristics (T=25 °C)

Measured with test board outline size 105 x 40mm. Ground cleared under antenna 40mm x 10mm.

Version 1: Typical Return Loss S11

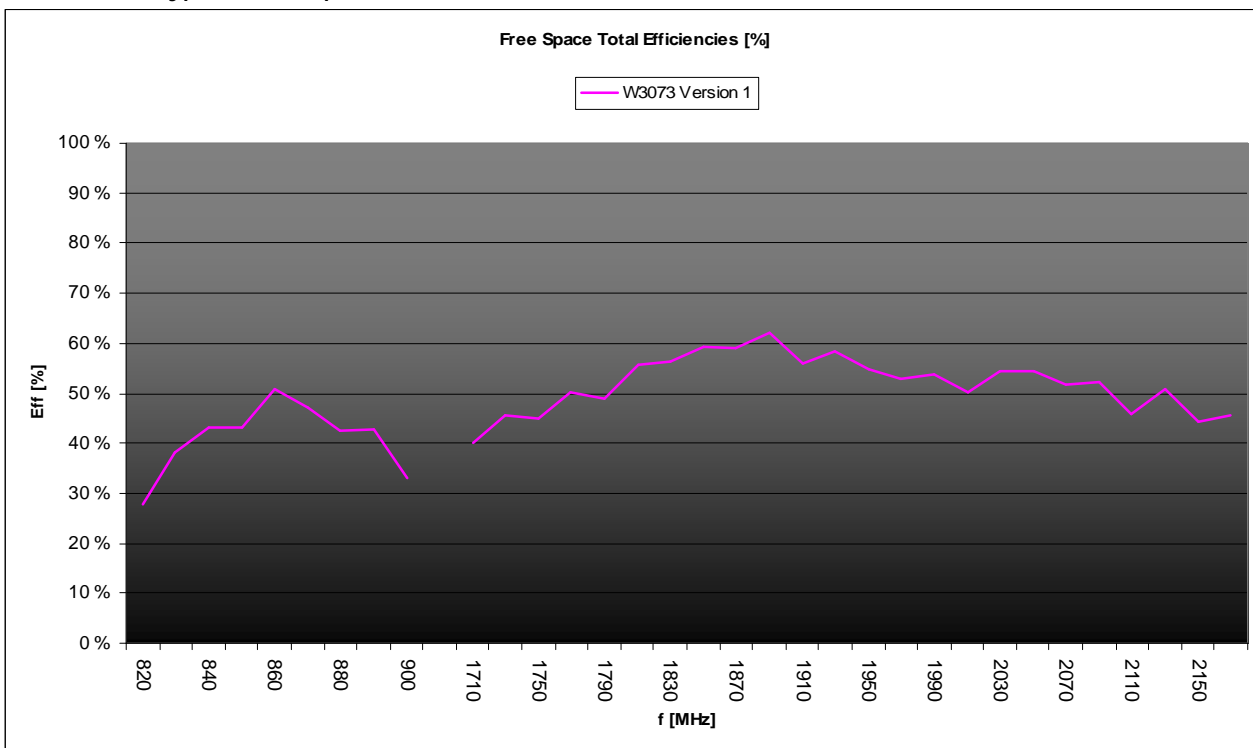


Version 2: Typical Return Loss S11

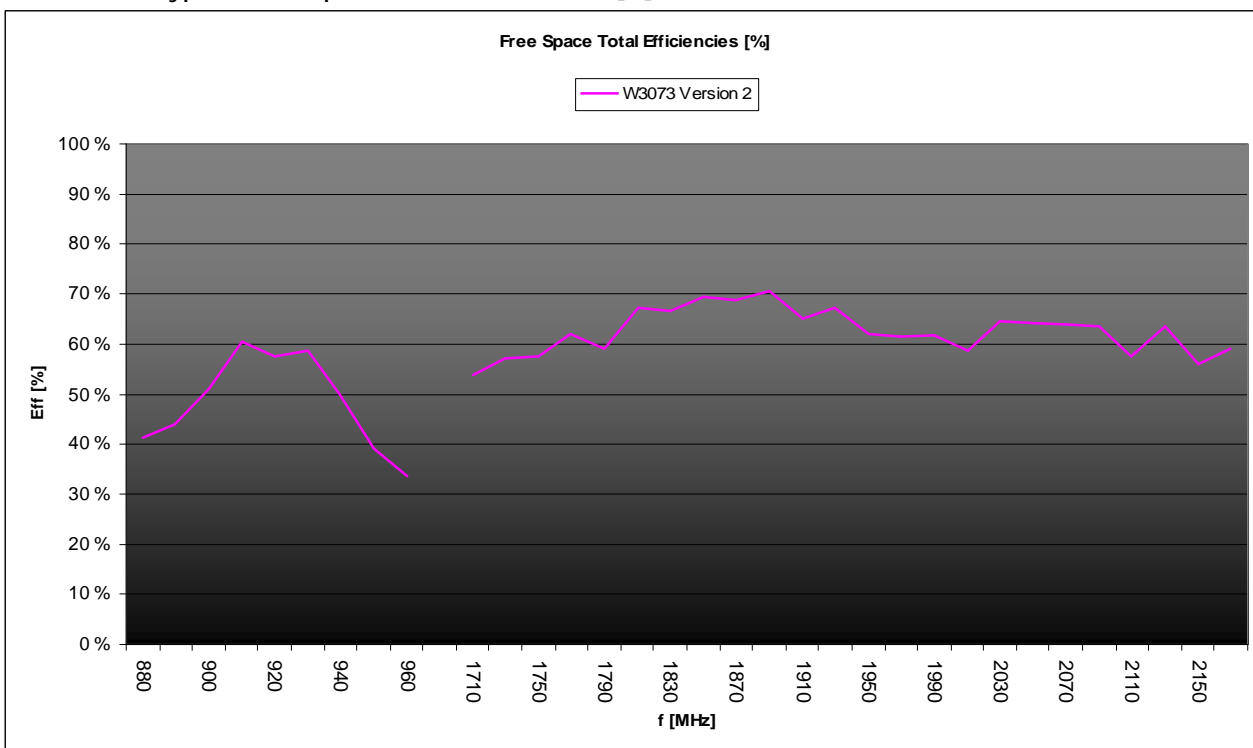




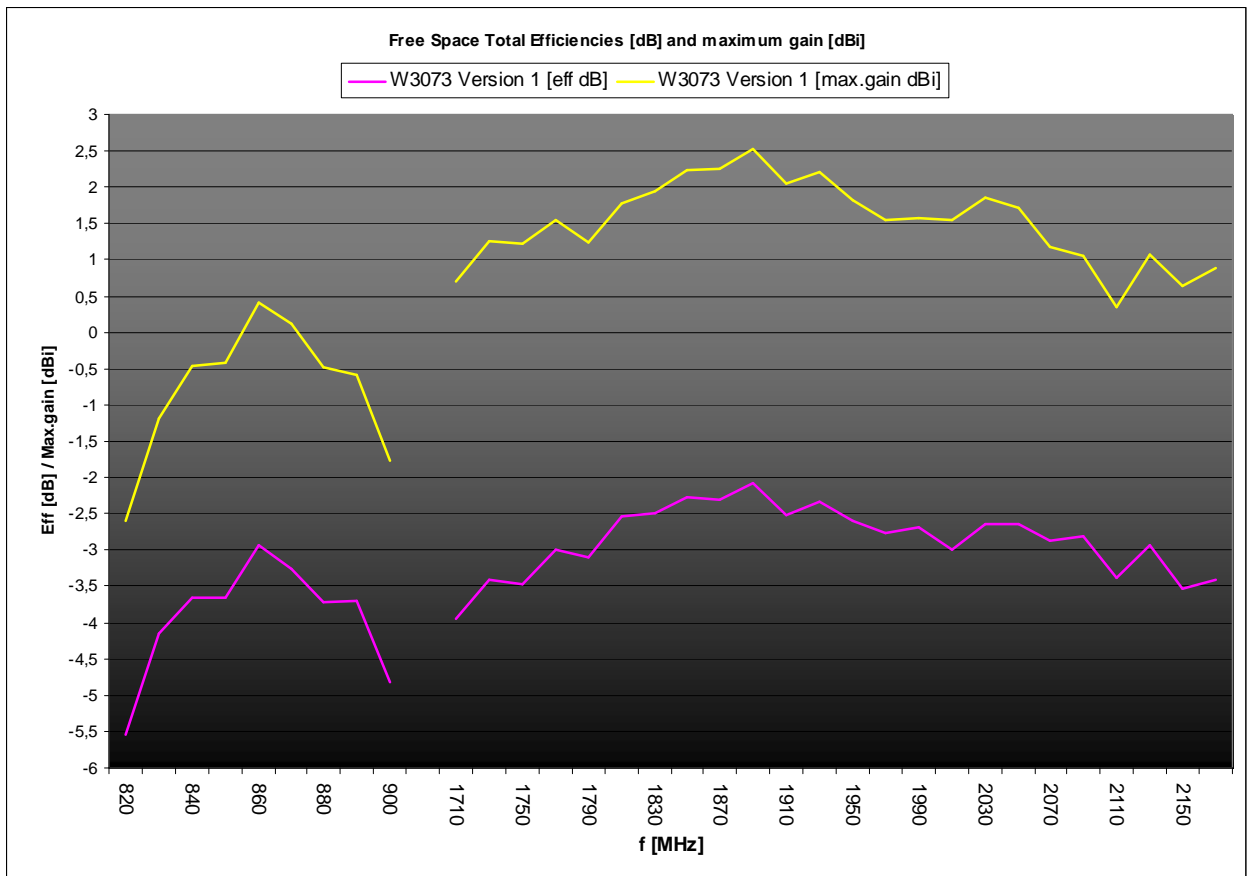
Version 1: Typical free Space Total Efficiencies [%]



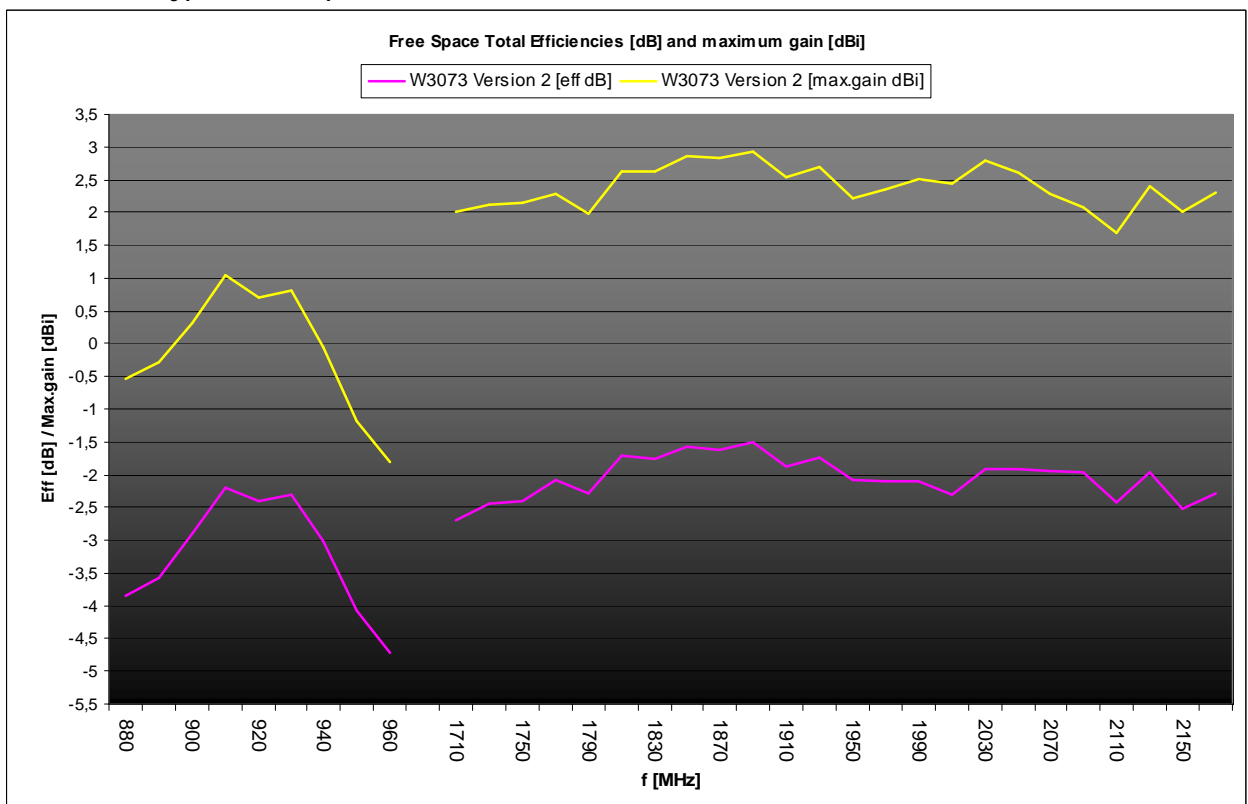
Version 2: Typical free Space Total Efficiencies [%]



Version 1: Typical free Space Total Efficiencies [dB] and Maximum Gain [dBi]



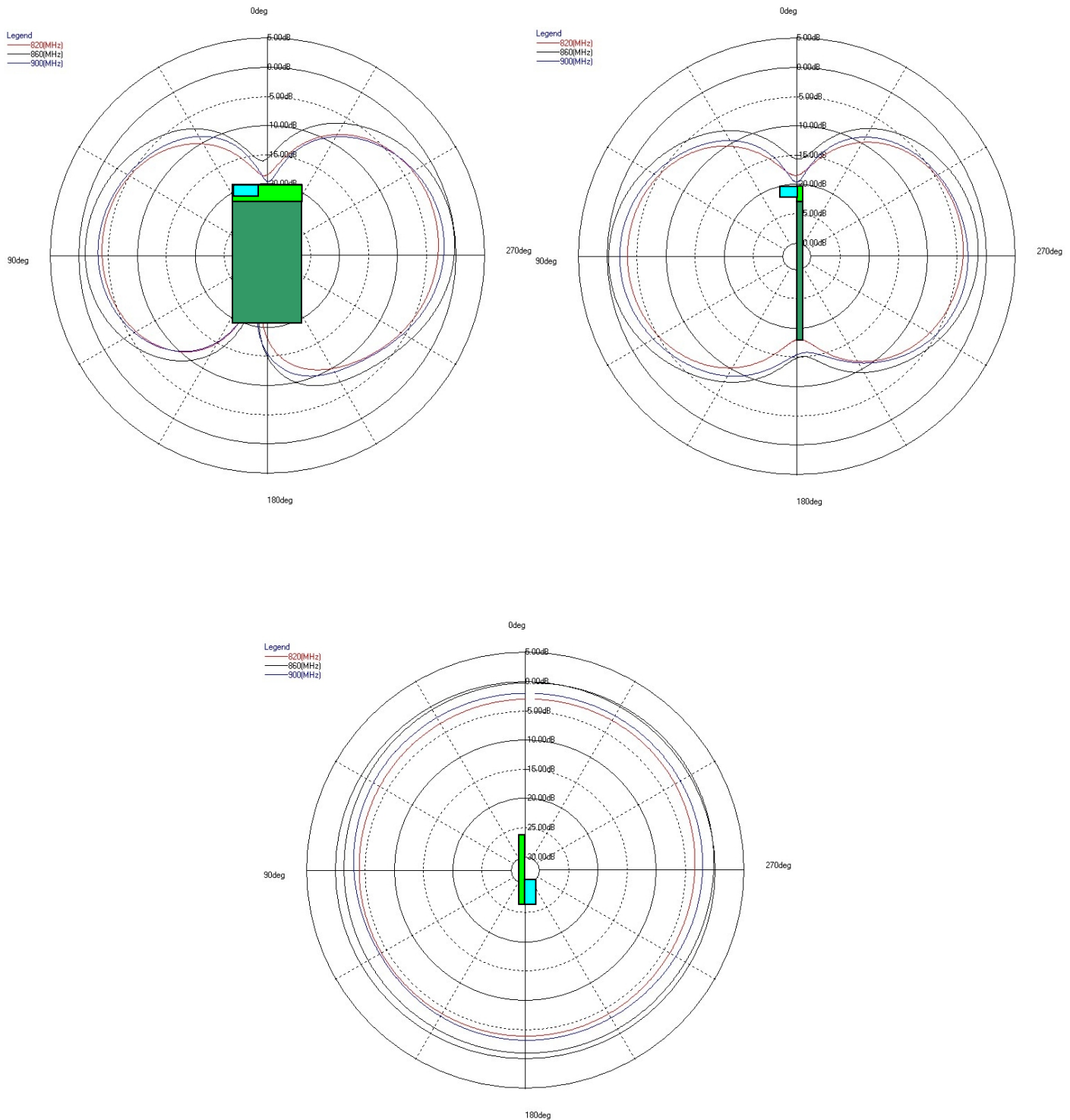
Version 2: Typical free Space Total Efficiencies [dB] and Maximum Gain [dBi]



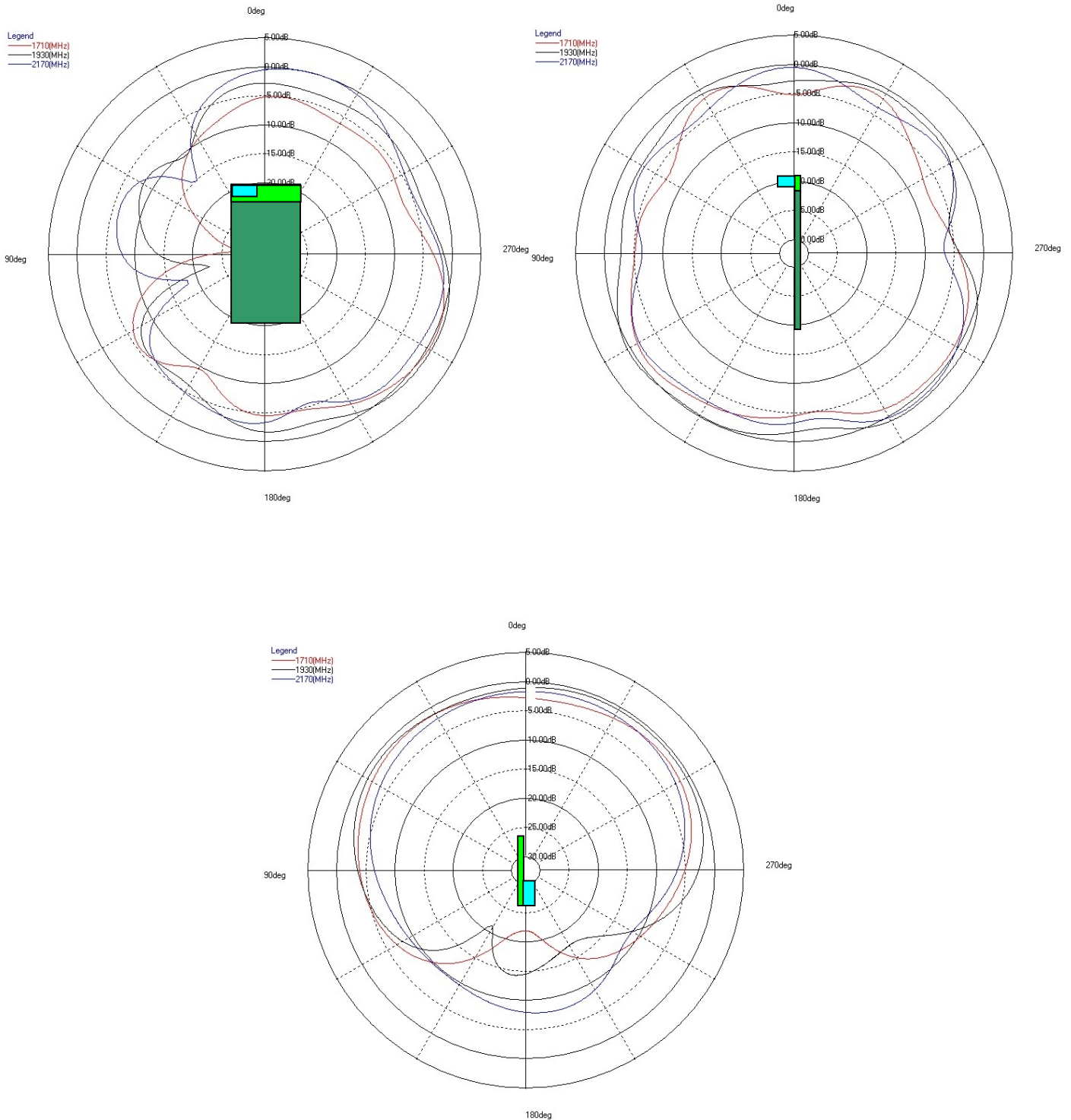
# Ceramic Chip Antenna

Measured with test board outline size 105 x 40mm. Ground cleared under antenna 40mm x 10mm.

## Version 1: Typical Free Space Radiation Patterns for GSM850 Band



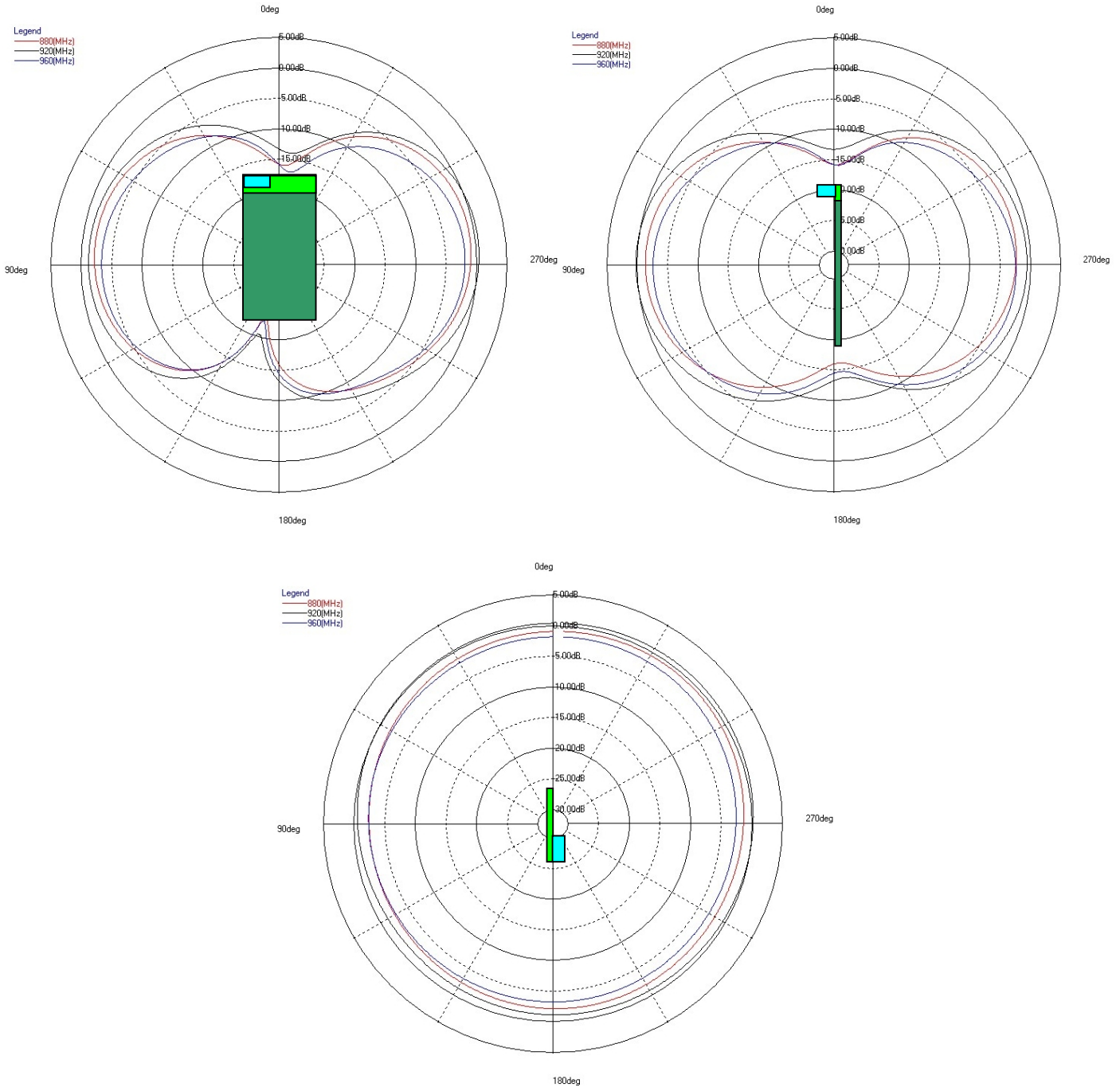
## Version 1: Typical Free Space Radiation Patterns for PCN1800, PCS1900 and WCDMA I Bands



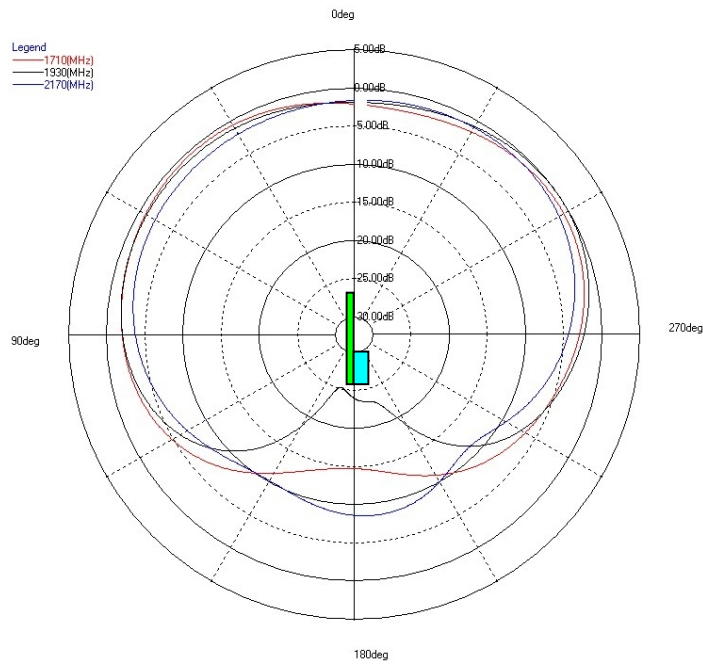
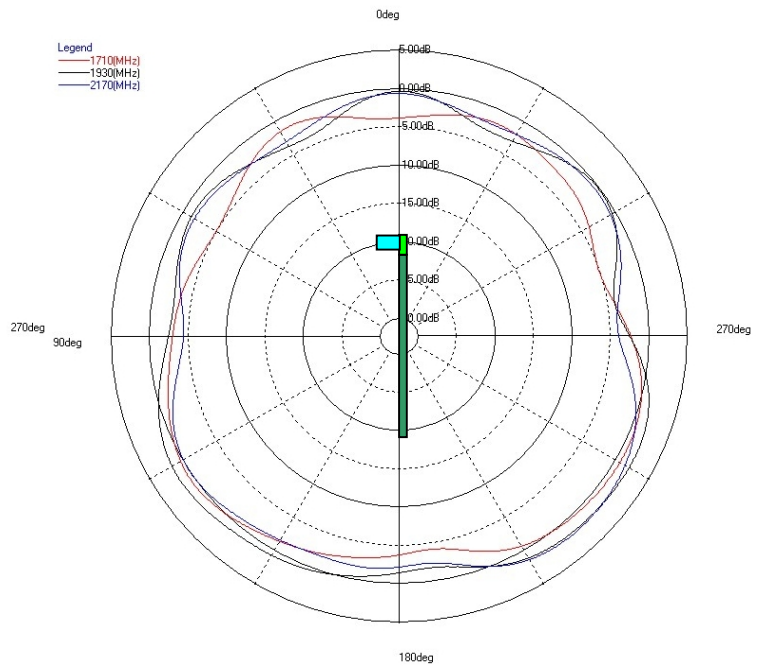
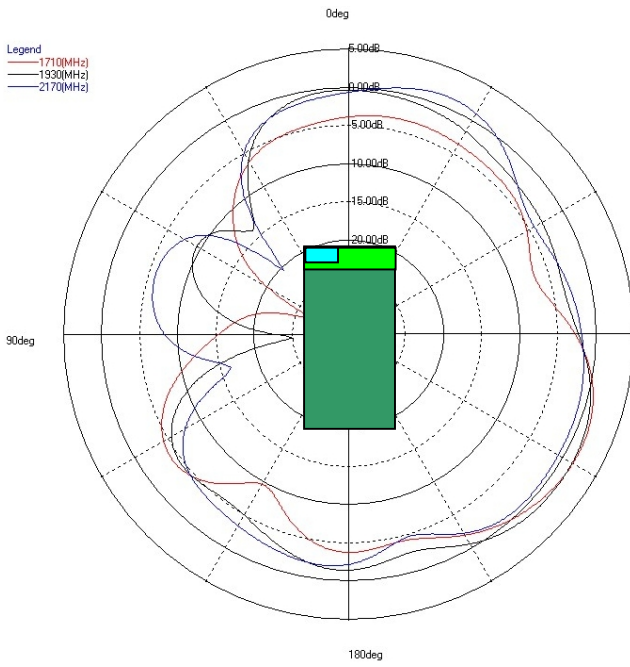
# Ceramic Chip Antenna

Measured with test board outline size 105 x 40mm. Ground cleared under antenna 40mm x 10mm.

## Version 2: Typical Free Space Radiation Patterns for EGSM900 Band



## Version 2: Typical Free Space Radiation Patterns for PCN1800, PCS1900 and WCDMA I Bands



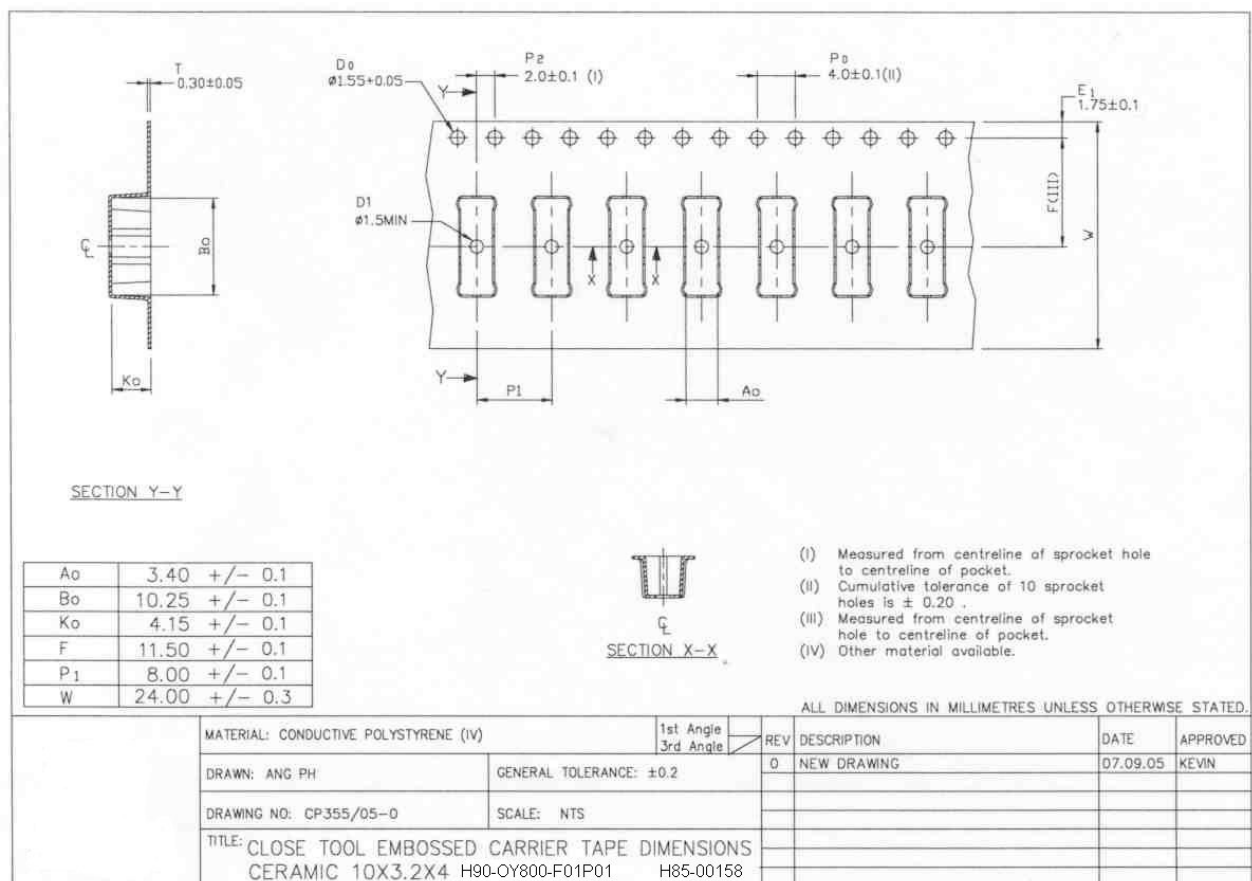
# Ceramic Chip Antenna

## Packing

### General

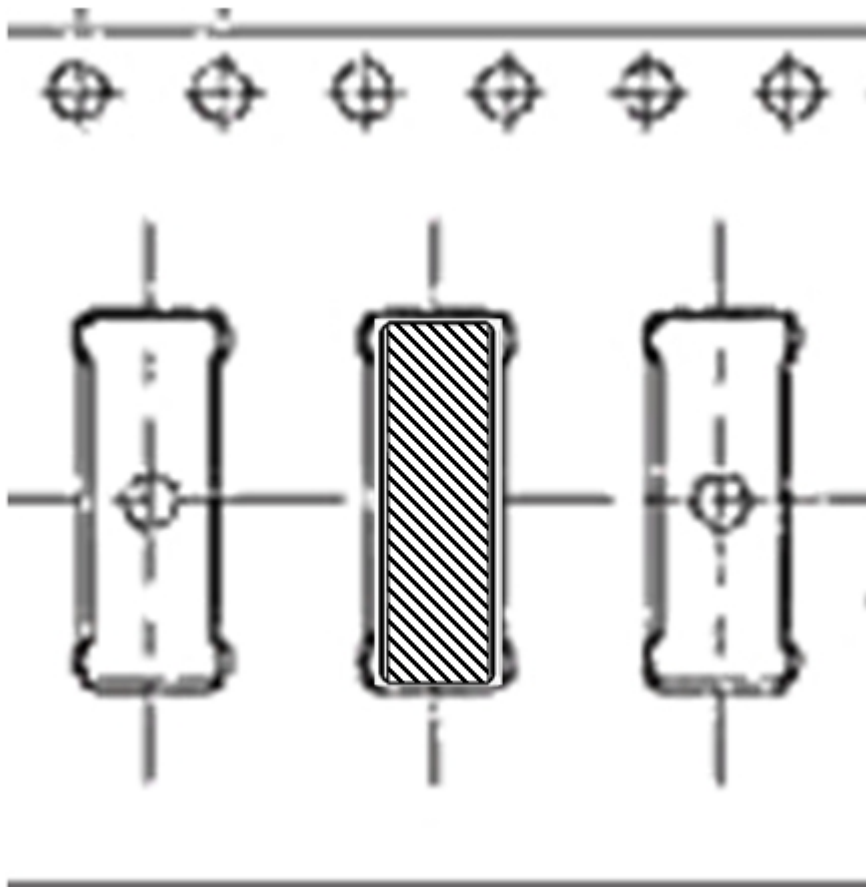
Tape and reel packing is used. Carrier tape, reel and box dimensions are presented in following pictures.

### Carrier Tape



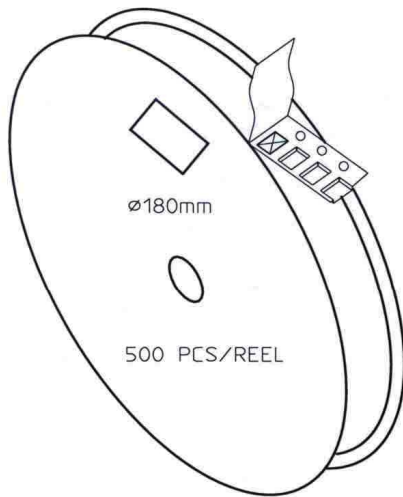
## Block Orientation

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





### Packing Form

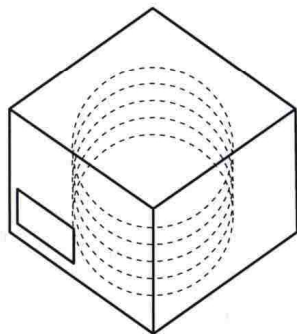


CARRIER TAPE H85-00158  
width=24,00 depth=4.15  
COVER TAPE H85-00159  
width=21.20


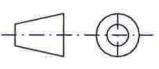
LENGTH OF TAPE:

- 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.



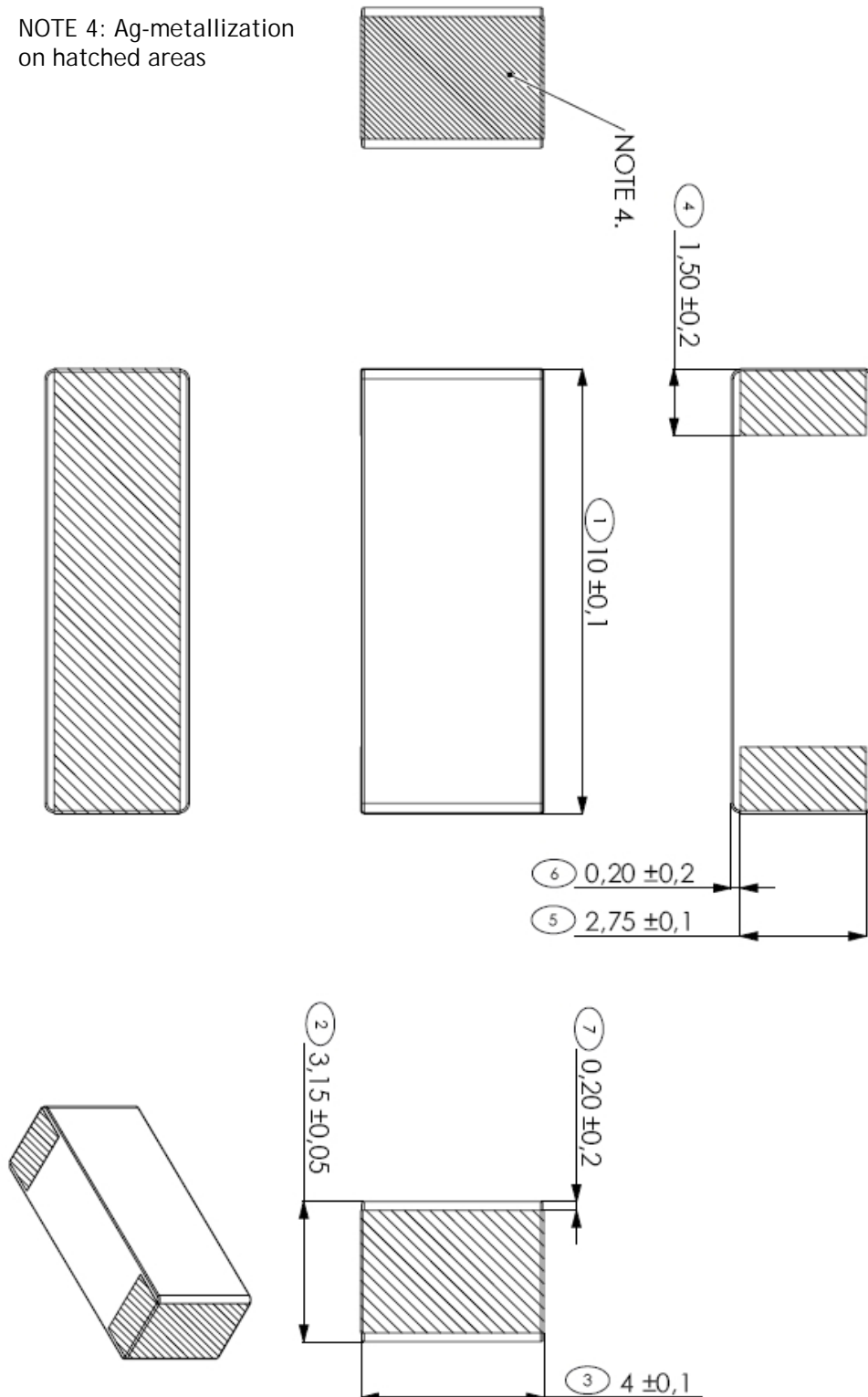
- BOX H85-00128 (182x182x125) 1 pcs
- LABEL 1 pcs/BOX
- REEL H85-00160 (D180, W28) 4 pcs
- REEL LABEL 1 pcs/REEL

MATERIAL						
HANDLINGS						
		RATIO	DRWN	160107	PeHa	H
			DGNER			G
PRODUCT H90-OY800-F01P01			CHKD			F
			APPRD			E
			APPRD BY			D
						C
DENOMINATION PACKING FORM						B
						A
			VERSION			MOD/DATE/NAME

# Ceramic Chip Antenna

## Mechanical Outline

NOTE 4: Ag-metallization on hatched areas



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

[firstname.lastname@pulseeng.com](mailto:firstname.lastname@pulseeng.com)

[www.pulseeng.com/antennas](http://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](http://www.pulseeng.com)

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