

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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Table of Content

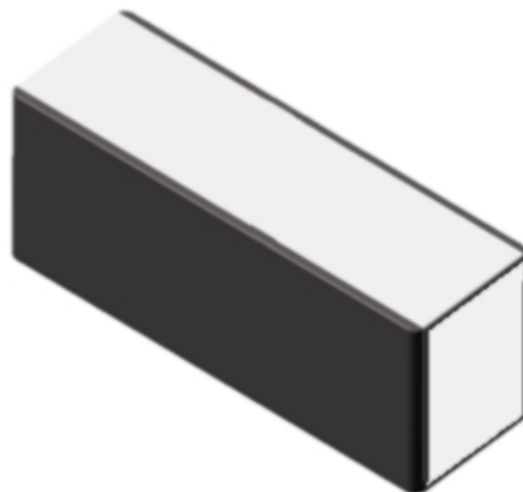
General Features and Applications	3
Terminal configuration and antenna dimensions.....	4
Test setup for electrical measurements	5
Electrical performance test results.....	8
Packing	15
Mechanical Outline	18
Contact information	19

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

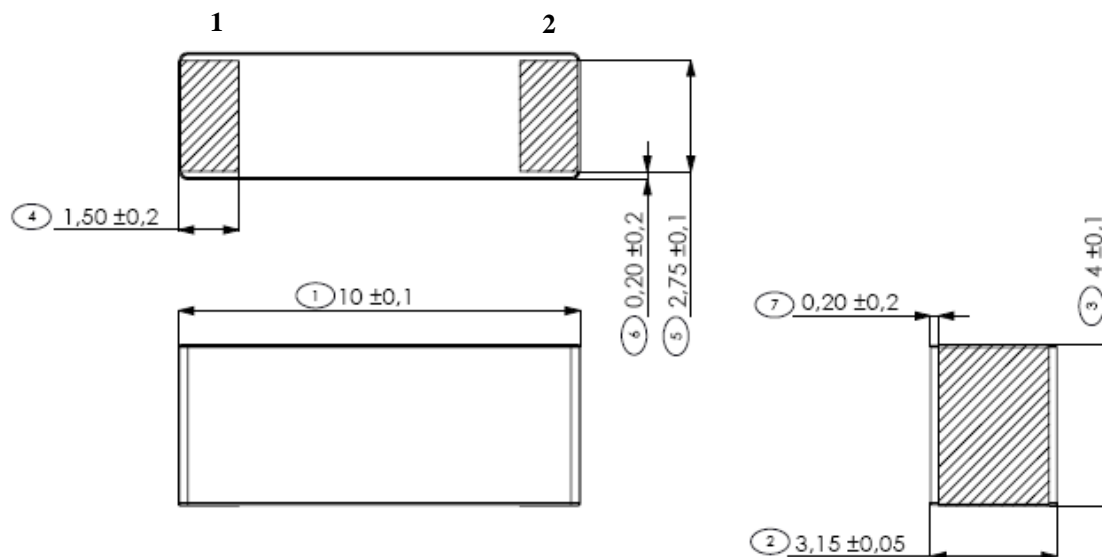
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Ceramic Chip Antenna

Terminal Configuration and Antenna Dimensions



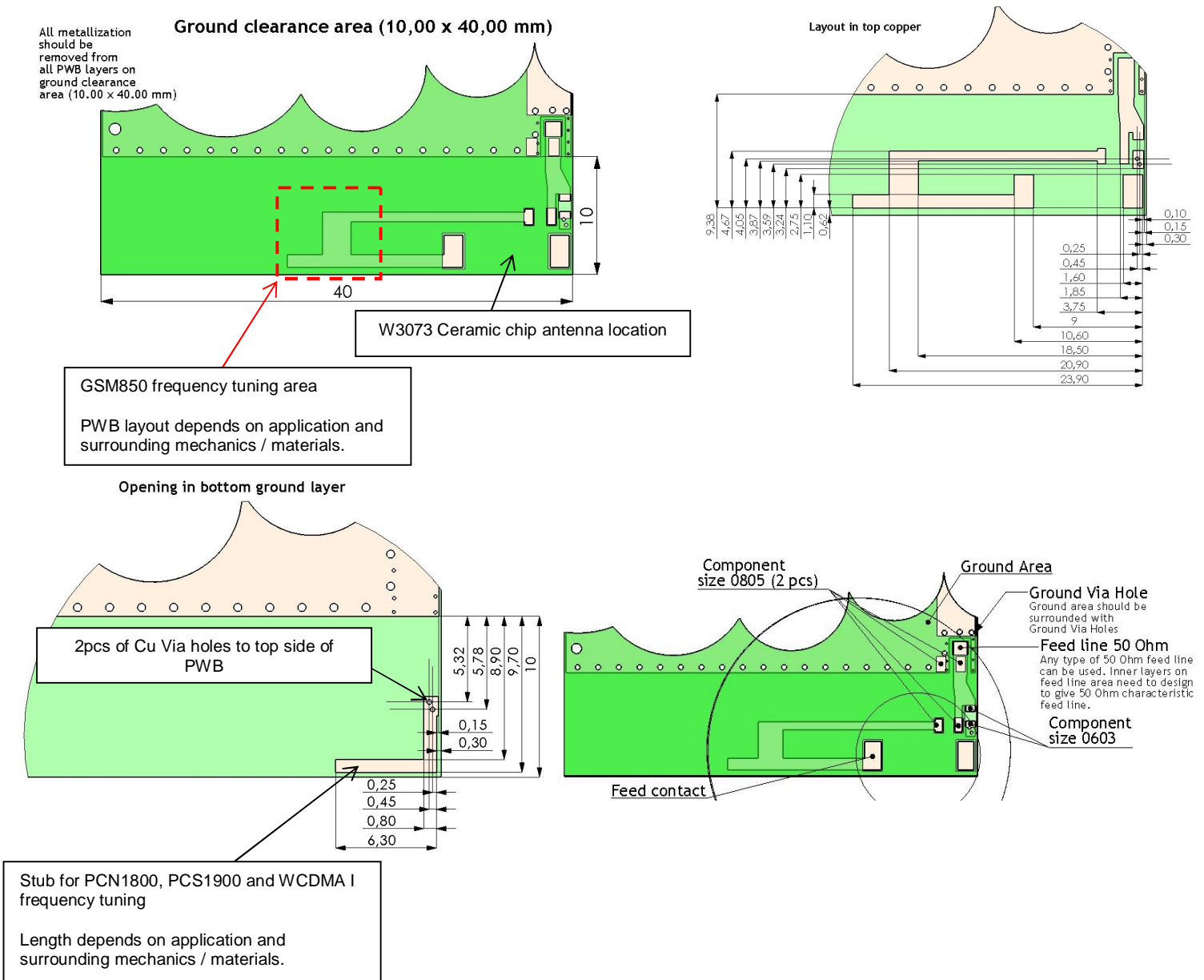
No.	Terminal Name	Terminal Dimensions
1	Feed	1.5 x 2.75 mm
2	Support pad	1.5 x 2.75 mm
Antenna is symmetrical and orientation on footprint can be rotated 180 degrees without change in performance		

Ceramic Chip Antenna

Test Setup for Electrical Measurements

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

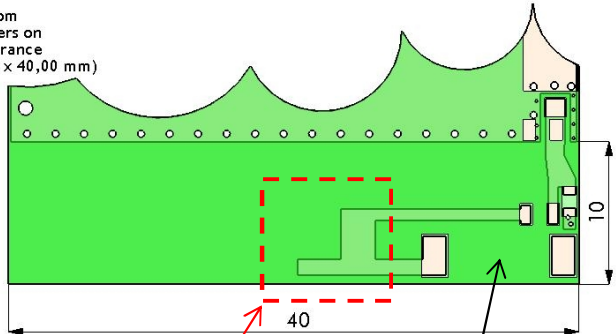
Version 1: GSM850, PCN1800, PCS1900 and WCDMA I



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)

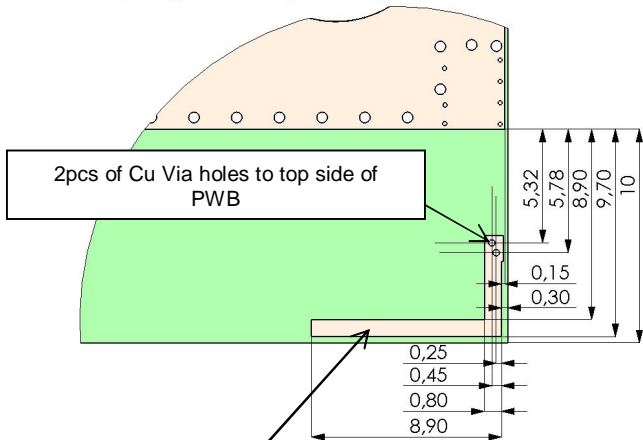
Ground clearance area (10,00 x 40,00 mm)



W3073 Ceramic chip antenna location

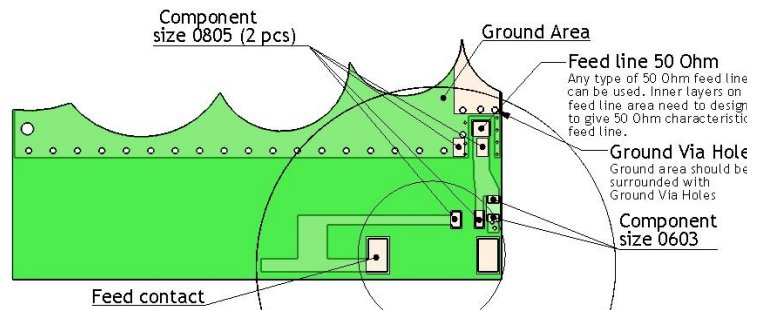
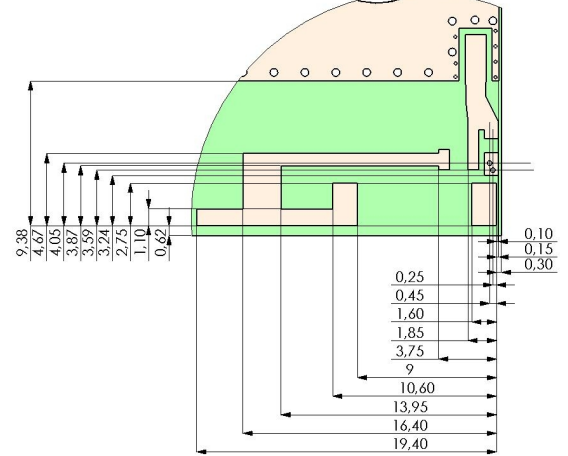
EGSM900 frequency tuning area
PWB layout depends on application and surrounding mechanics / materials.

Opening in bottom ground layers



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

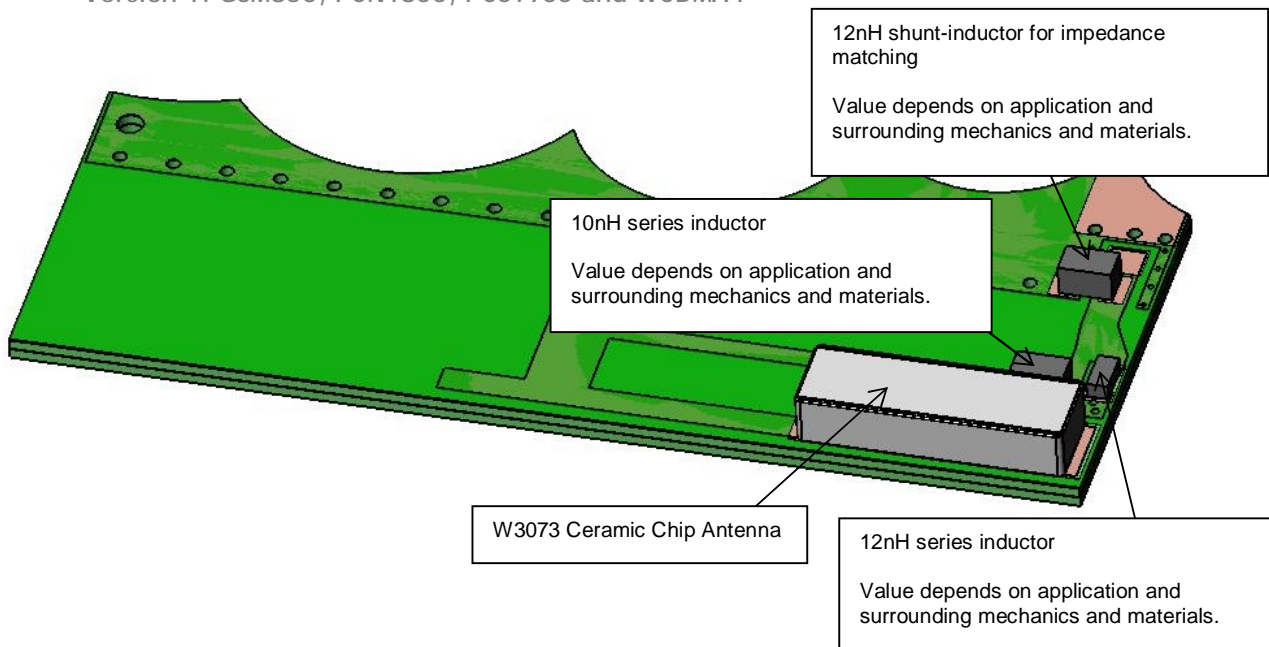
Pad dimensions in top copper



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

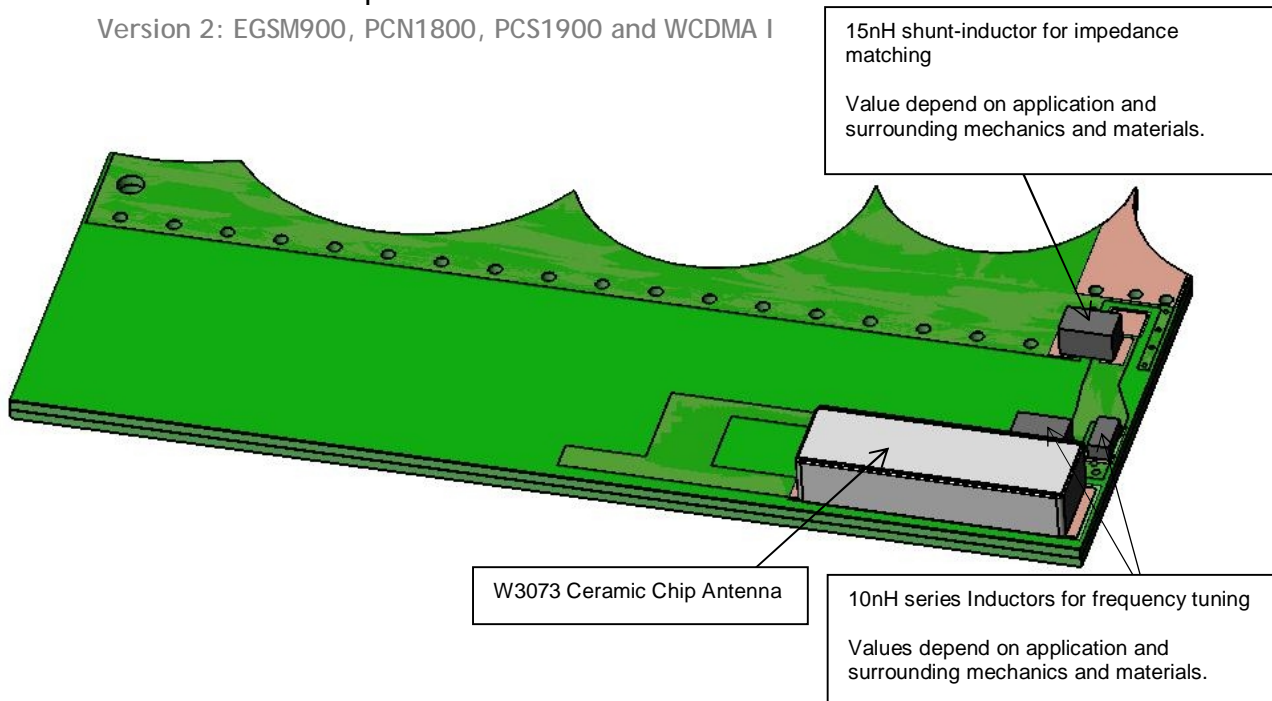
3D- view of Test Setup

Version 1: GSM850, PCN1800, PCS1900 and WCDMA I



3D- view of Test Setup

Version 2: EGSM900, PCN1800, PCS1900 and WCDMA I

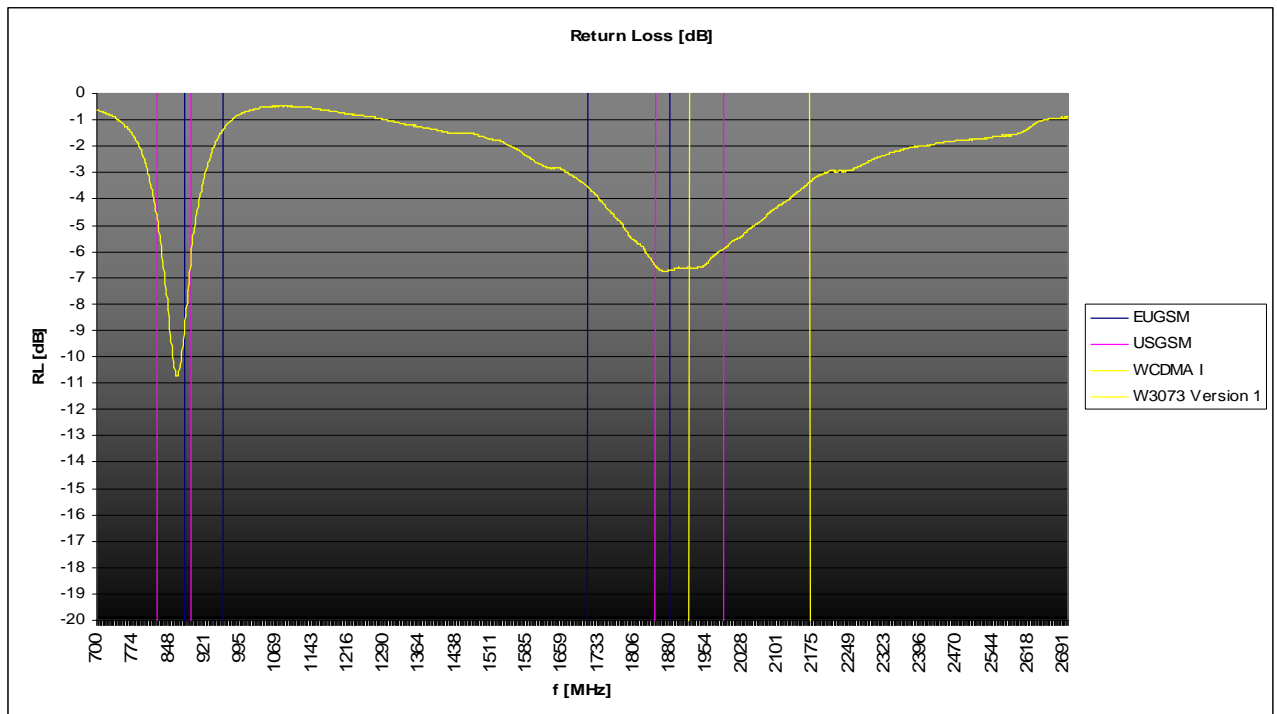


Ceramic Chip Antenna

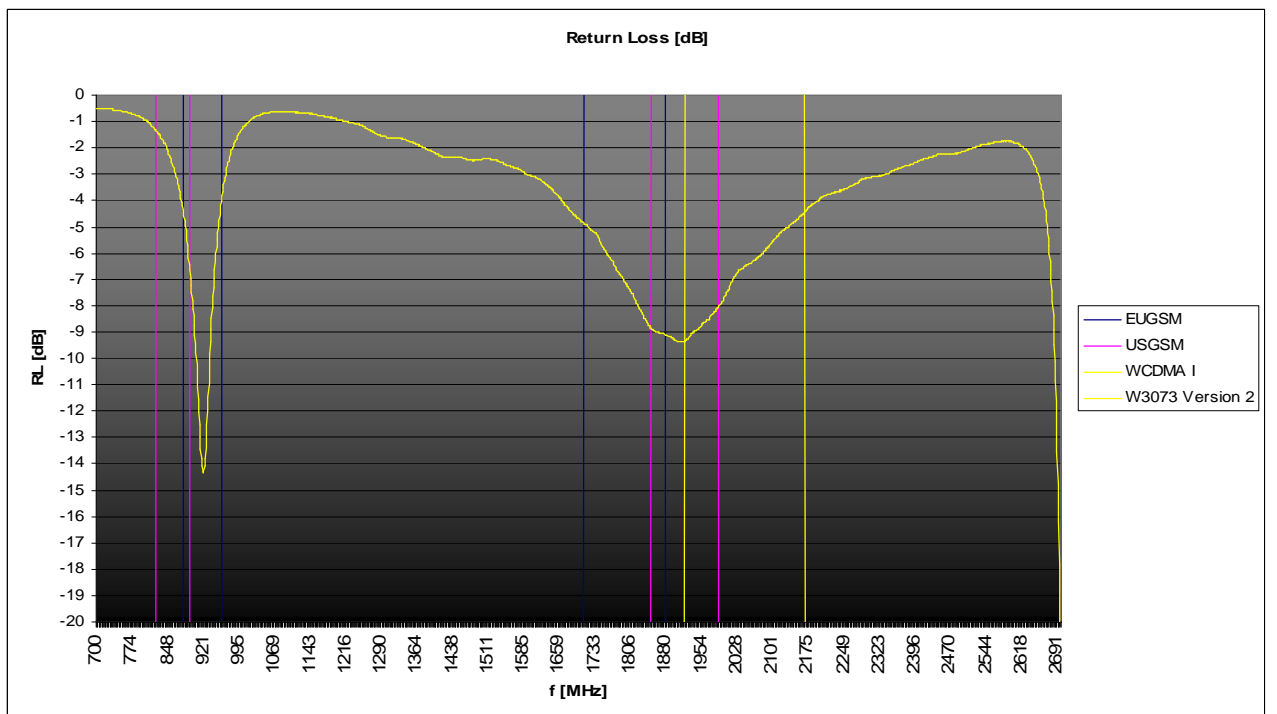
Typical Electrical Characteristics (T=25 °C)

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

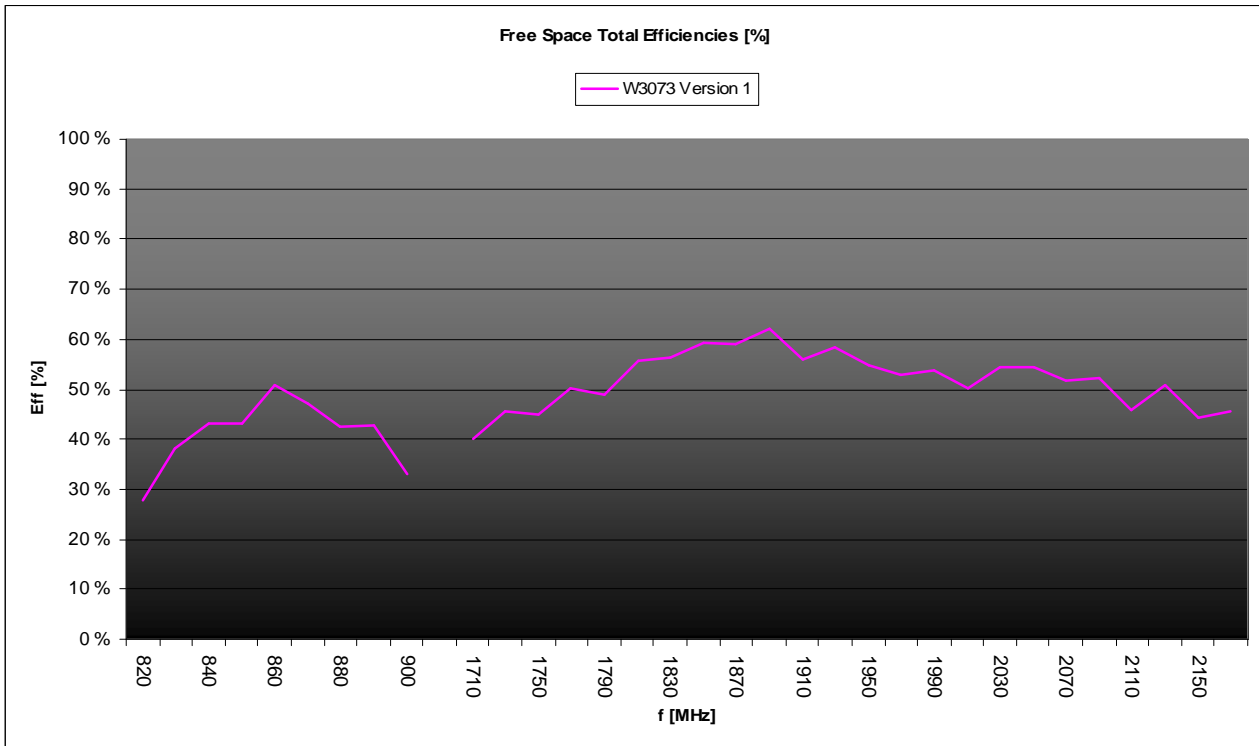
Version 1: Typical Return Loss S11



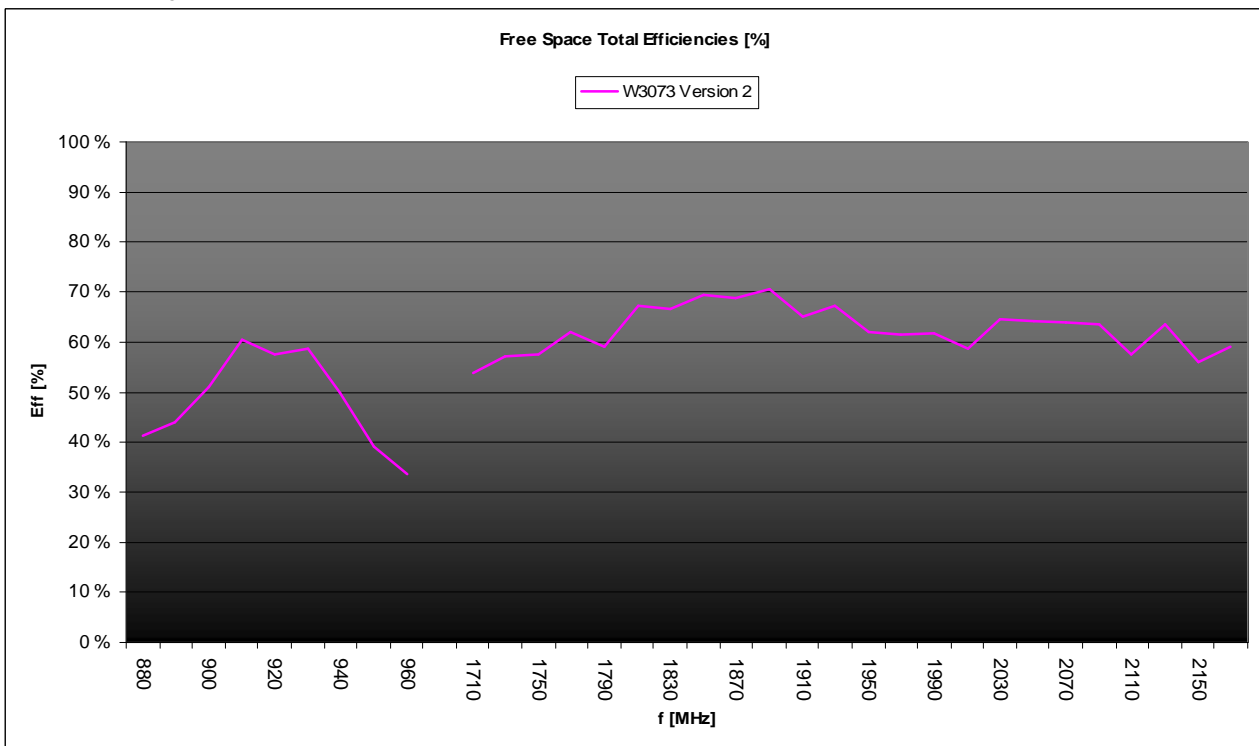
Version 2: Typical Return Loss S11



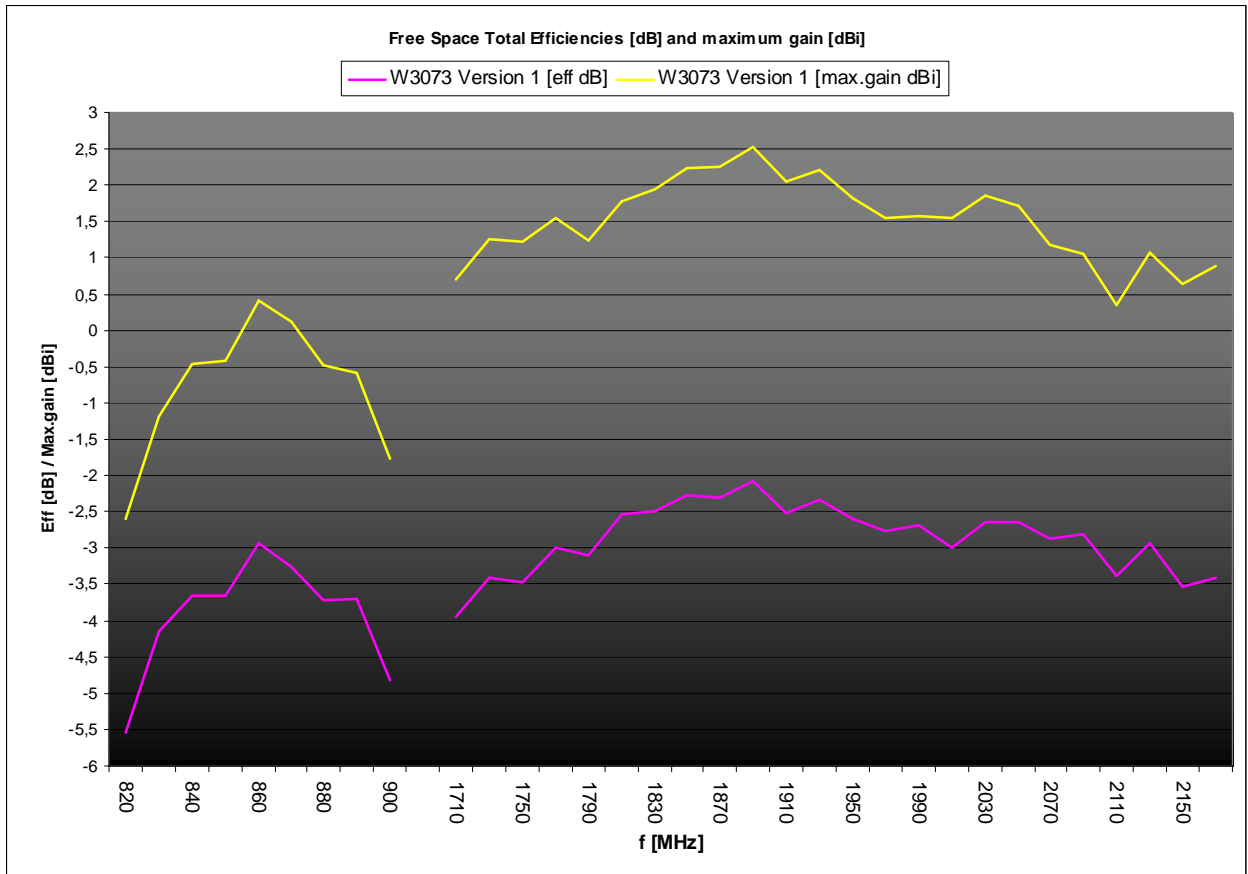
Version 1: Typical free Space Total Efficiencies [%]



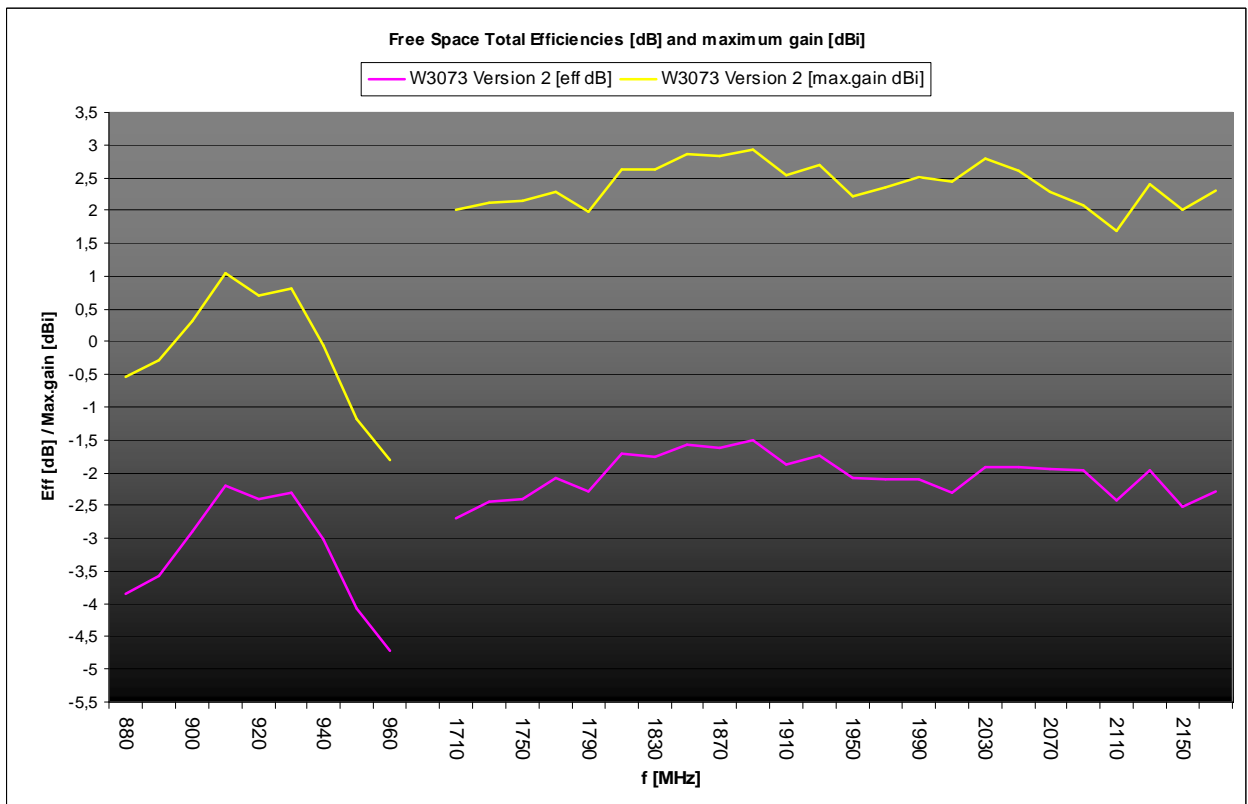
Version 2: Typical free Space Total Efficiencies [%]



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



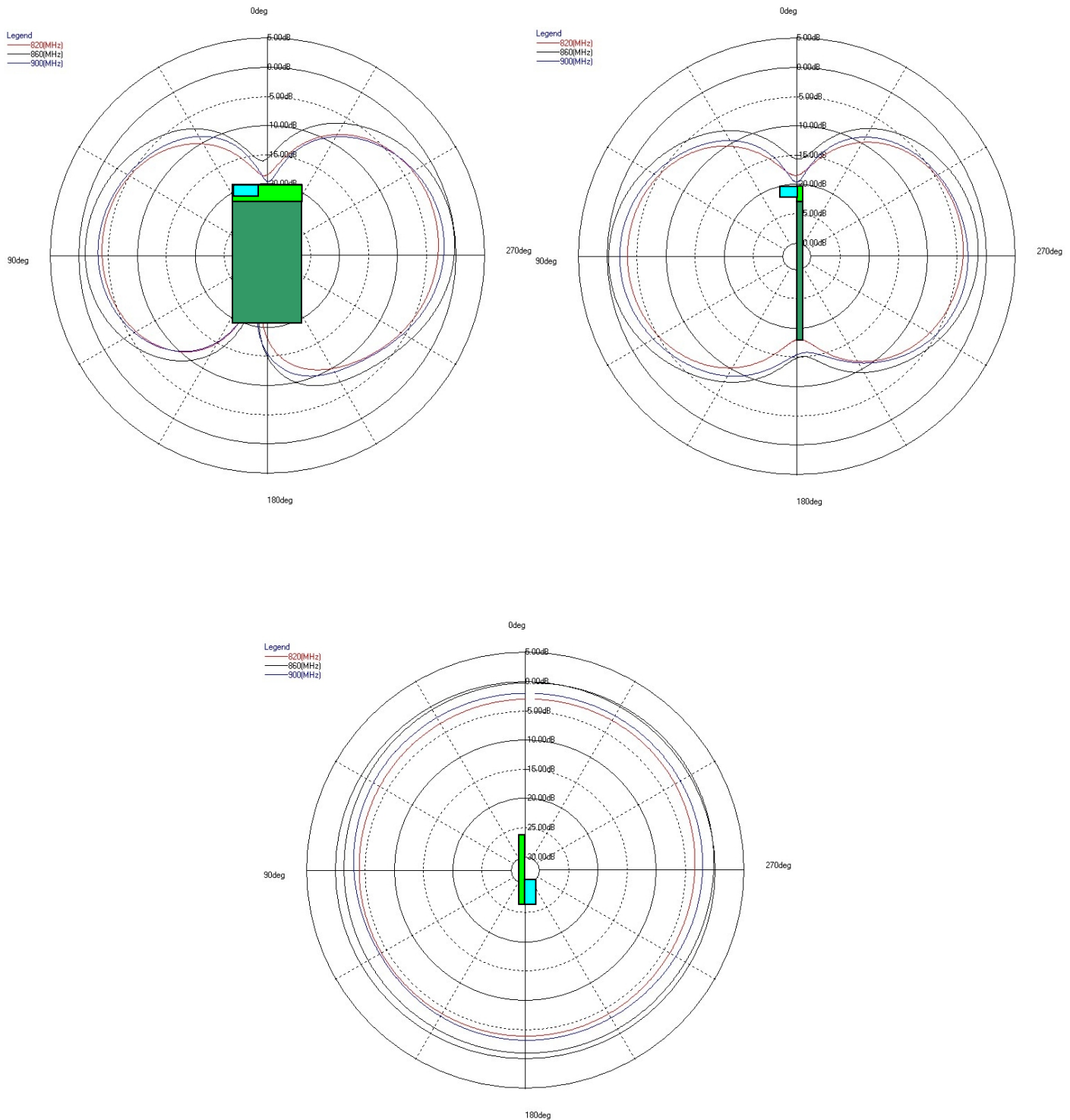
Version 2: Typical free Space Total Efficiencies [dB] and Maximum Gain [dBi]



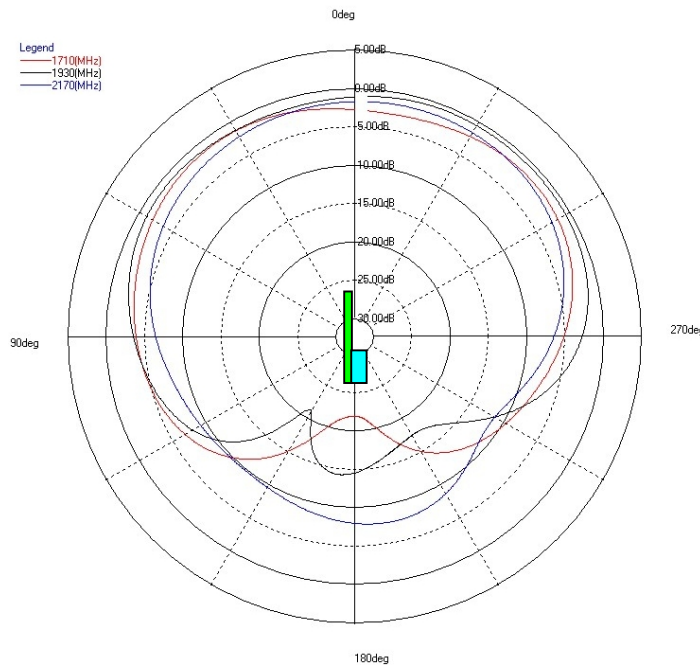
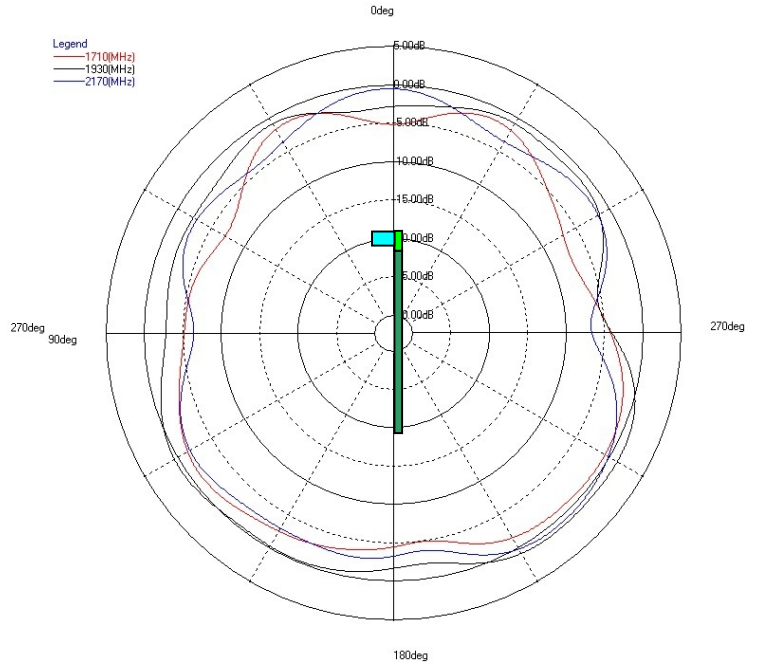
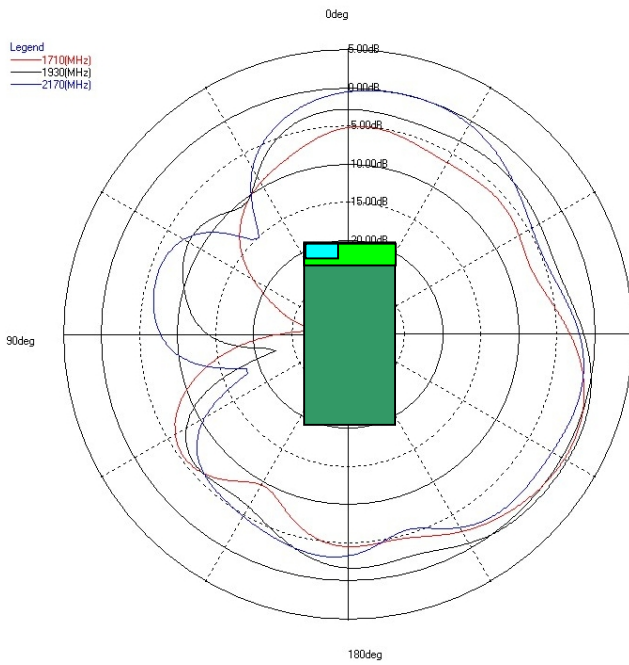
Ceramic Chip Antenna

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



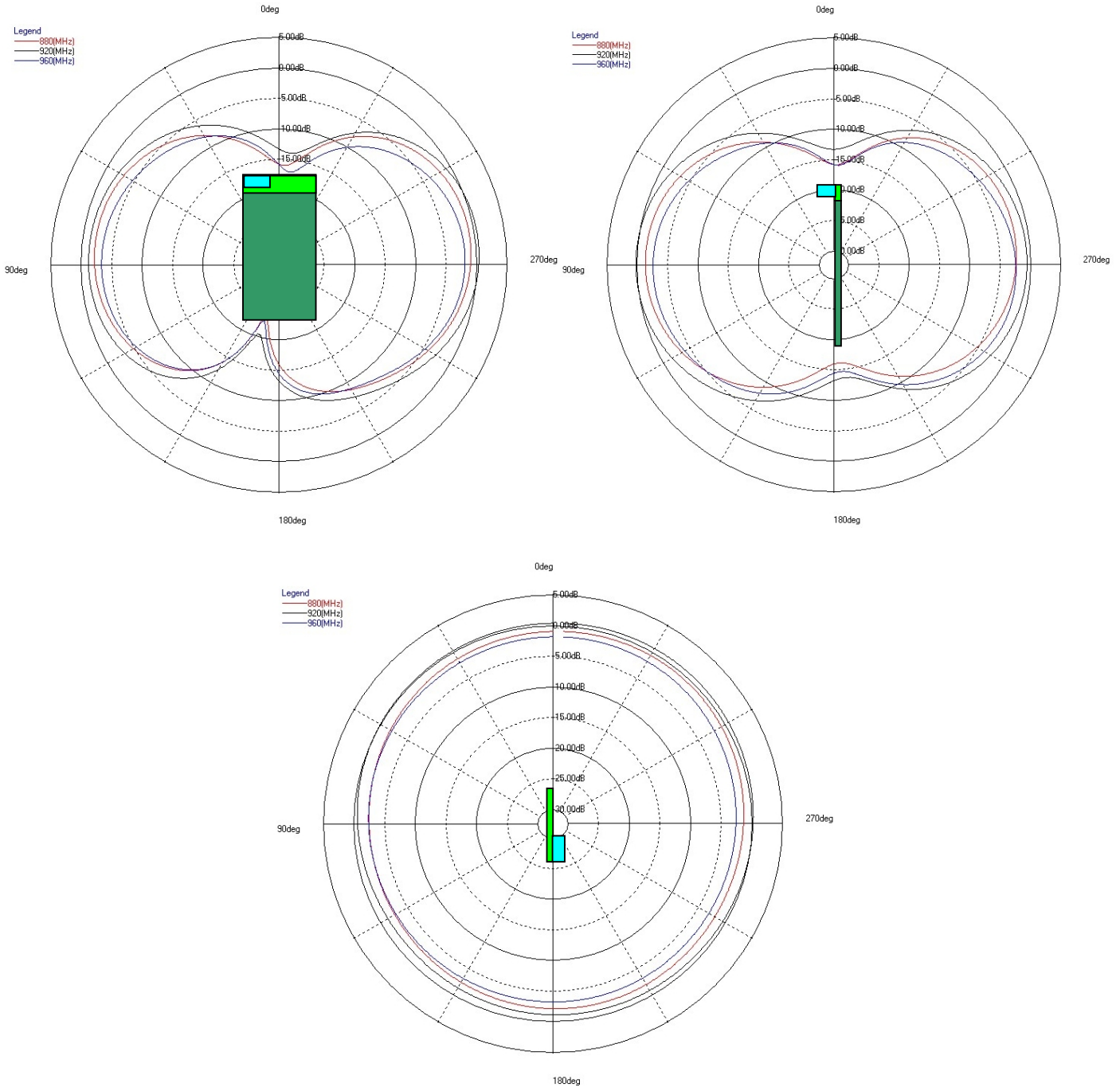
Version 1: Typical Free Space Radiation Patterns for PCN1800, PCS1900 and WCDMA I Bands



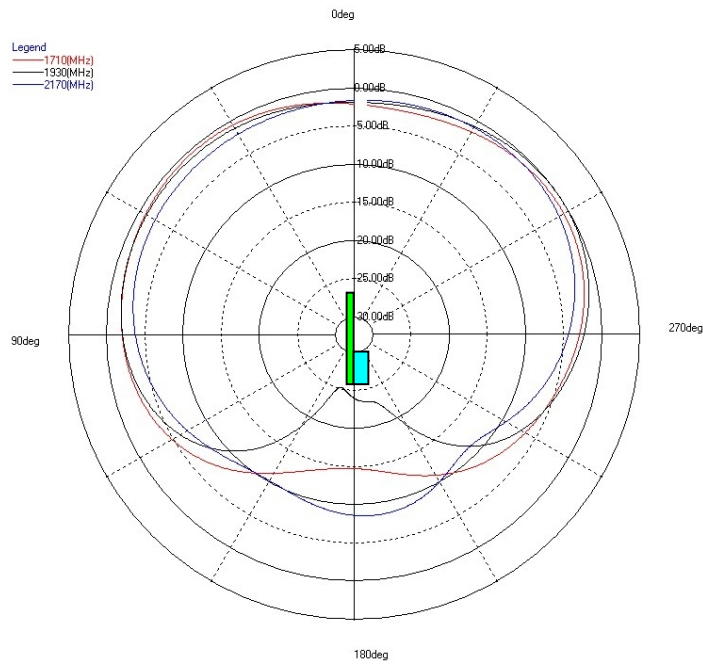
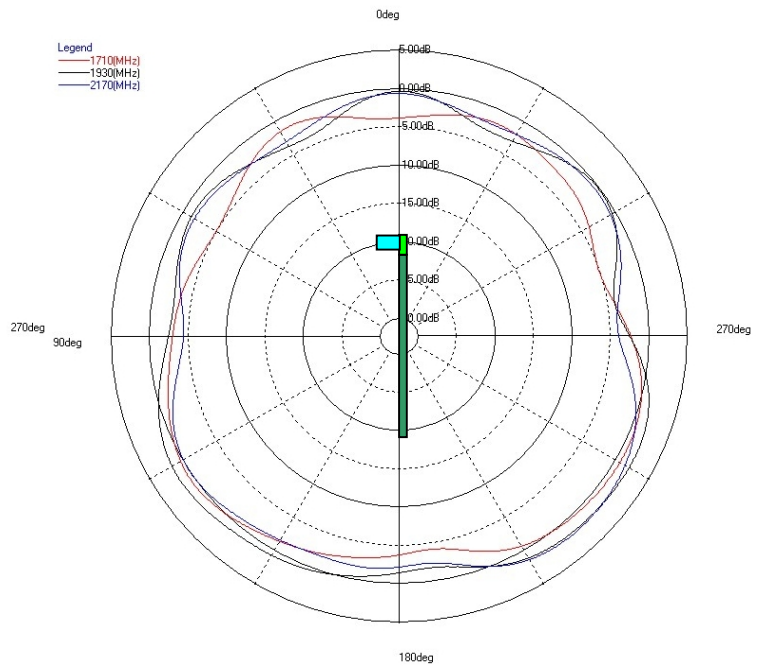
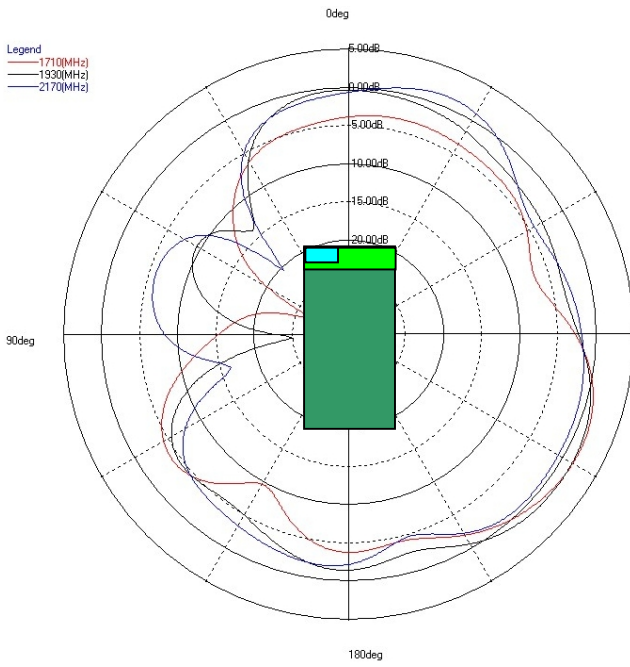
Ceramic Chip Antenna

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



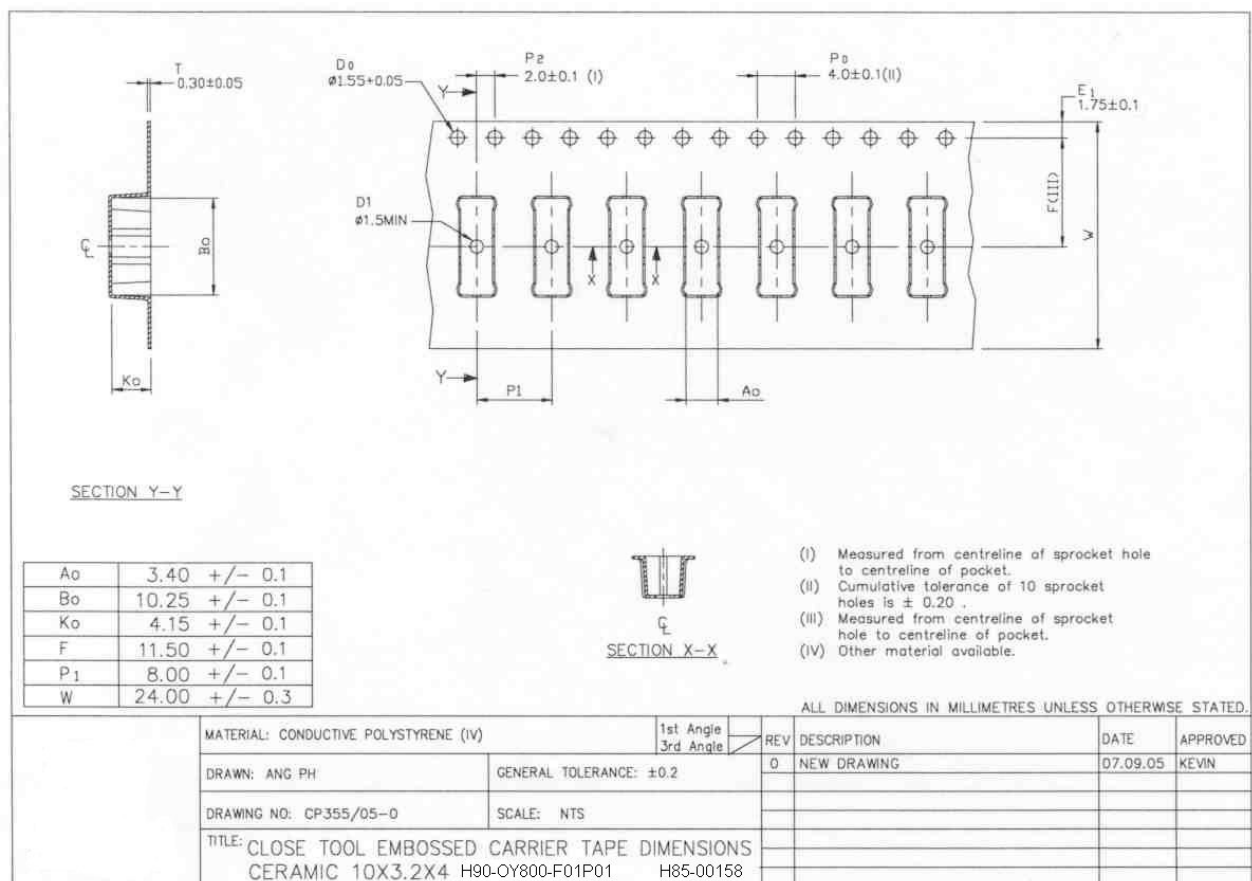
Ceramic Chip Antenna

Packing

General

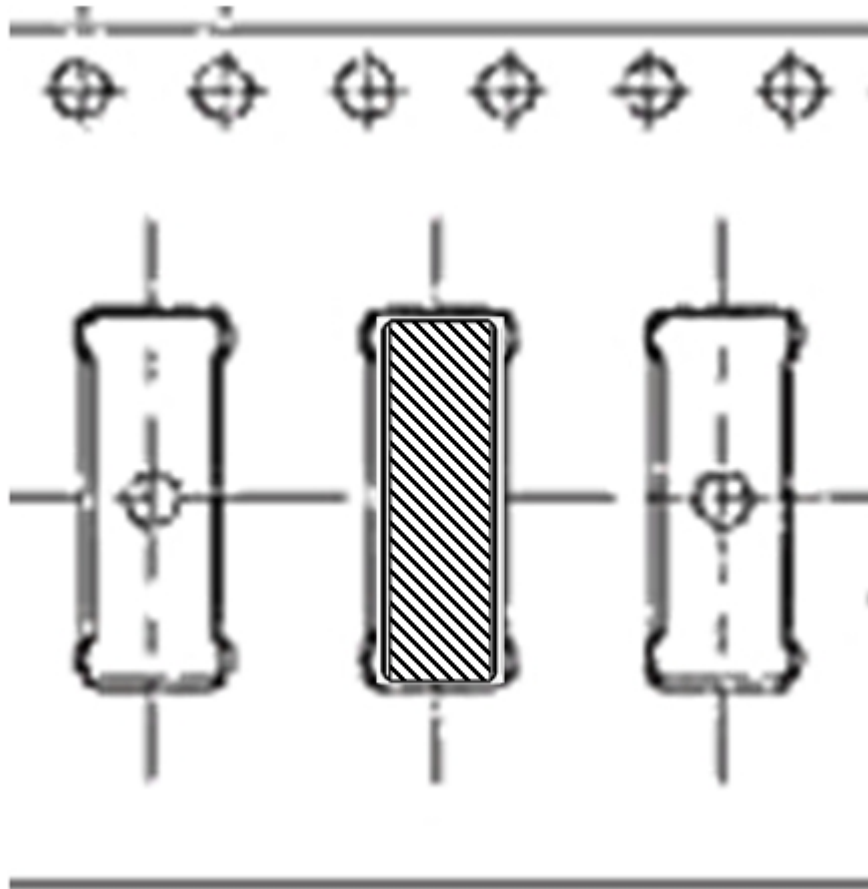
Tape and reel packing is used. Carrier tape, reel and box dimensions are presented in following pictures.

Carrier Tape

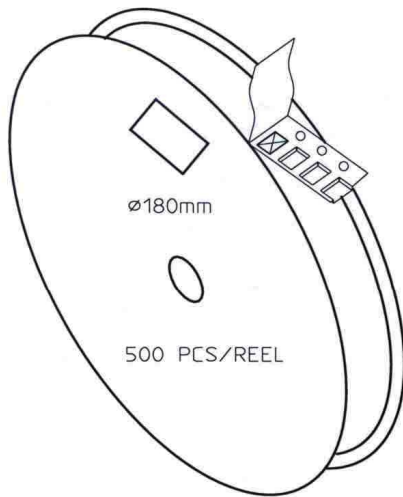


Block Orientation

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



Packing Form

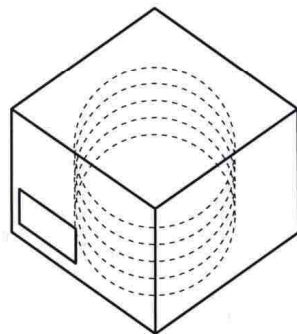


CARRIER TAPE H85-00158
width=24,00 depth=4.15
COVER TAPE H85-00159
width=21.20


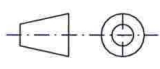
LENGTH OF TAPE:

- 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.



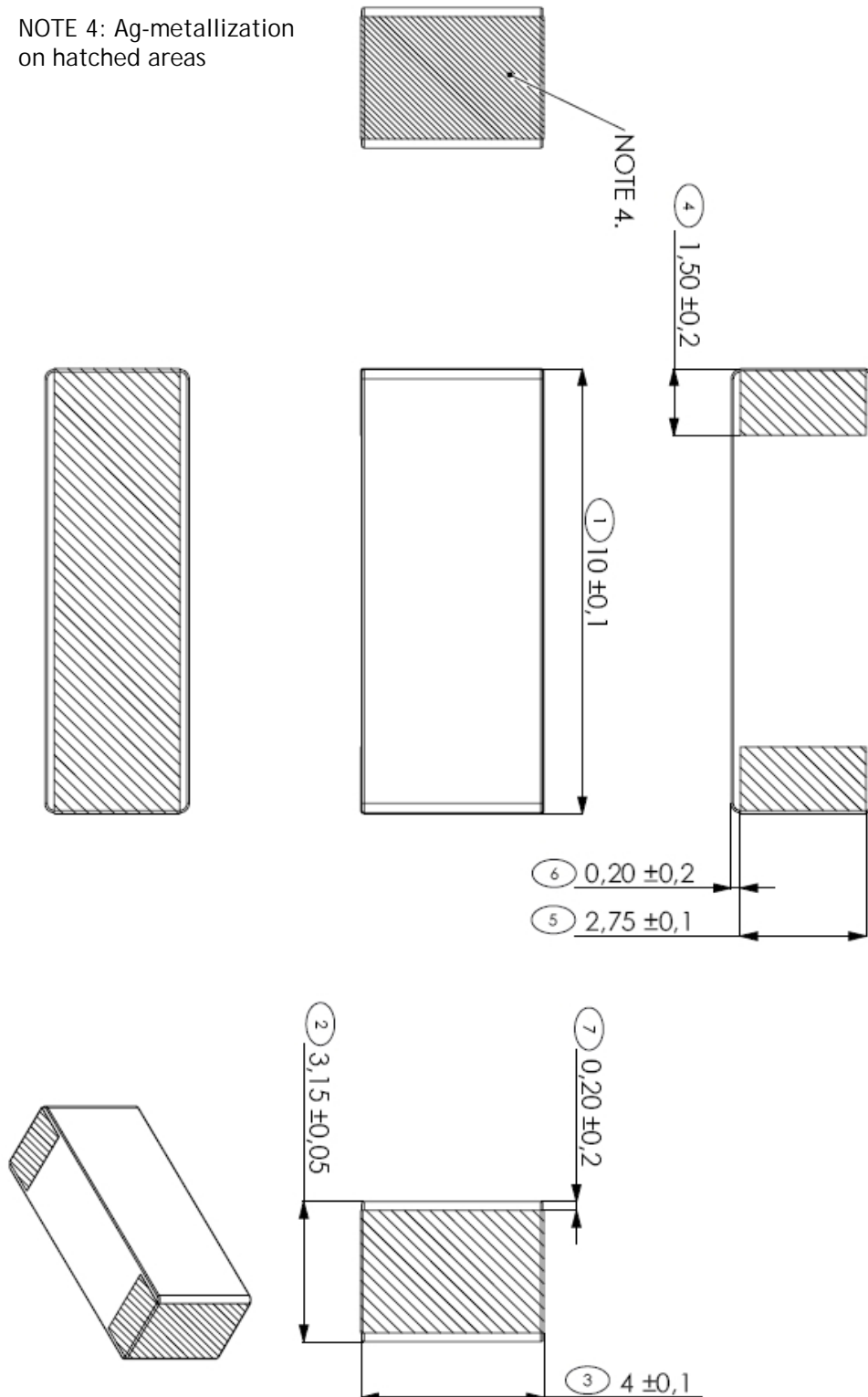
- BOX H85-00128 (182x182x125) 1 pcs
- LABEL 1 pcs/BOX
- REEL H85-00160 (D180, W28) 4 pcs
- REEL LABEL 1 pcs/REEL

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

Ceramic Chip Antenna

Mechanical Outline

NOTE 4: Ag-metallization on hatched areas



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