

Wireless External Antenna for 2.4 GHz Applications

Pulse Part Number: W1038



Features

- High gain performance
- For WLAN devices using WiFi (802.11b/g), Bluetooth® and ZigBee™
- Omni-directional radiation pattern provides broad 360° coverage
- One-quarter wavelength dipole configuration
- Connection and color options easily integrate with OEM designs

Color Options

- Black*
- Gray (Pantone cool gray 8C)
- Gray (Pantone 429C)
- Gray (Pantone cool gray 7C)

Connector Options

- Reverse SMA (Male)*
- SMA (Male)

** Default Configuration – Please contact Pulse Applications Engineering for assistance in ordering colors and connectors*

Weight.....25.1 grams
Carton.....20/bag; 500/carton

Dimensions: $\frac{\text{Inches}}{\text{mm}}$

Unless otherwise specified, all tolerances are $\pm \frac{.010}{0.25}$

Electrical Specifications @ 25 °C

Note: This part number is lead-free and RoHS compliant. No additional suffix or identifier is required.

Antenna Part No.	Frequency [GHz]	Gain [dBi]	Impedance [Nom]	VSWR	Polarization	Electrical Length	Radiation	Color
W1038	2.4 – 2.5	4.9	50 Ω	≤ 2.0	Vertical	1/4, dipole	Omni	Black

Pulse Antennas

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External Antennas Sales Contacts

USA 858 674 8100
UK 44 1483 401 700
France 33 3 84 35 04 04
Singapore 65 6287 8998

Shanghai 86 21 32181071
China 86 769 5538070
Taiwan 886 2 26980228



Wireless External Antenna for 2.4 GHz Applications

Pulse Part Number: W1038

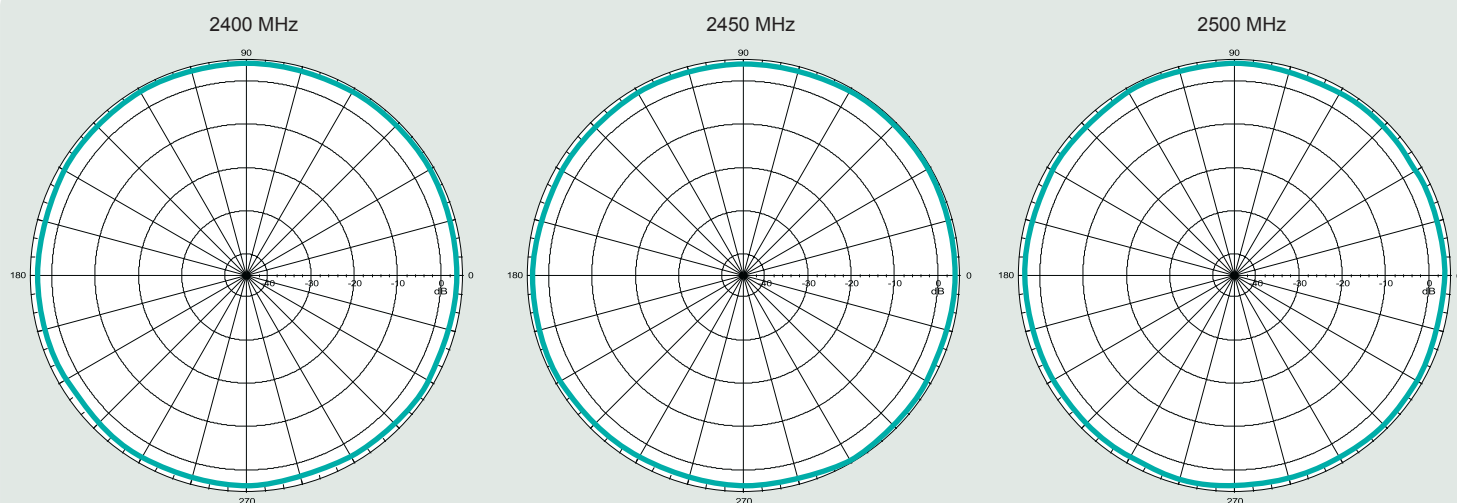
Application Notes

Omni-directional antennas provide a uniform, donut-shaped, 360° radiation pattern. The omni-directional pattern is suitable for point-to-multipoint broadcasting in all directions. This antenna is primarily used for WLAN

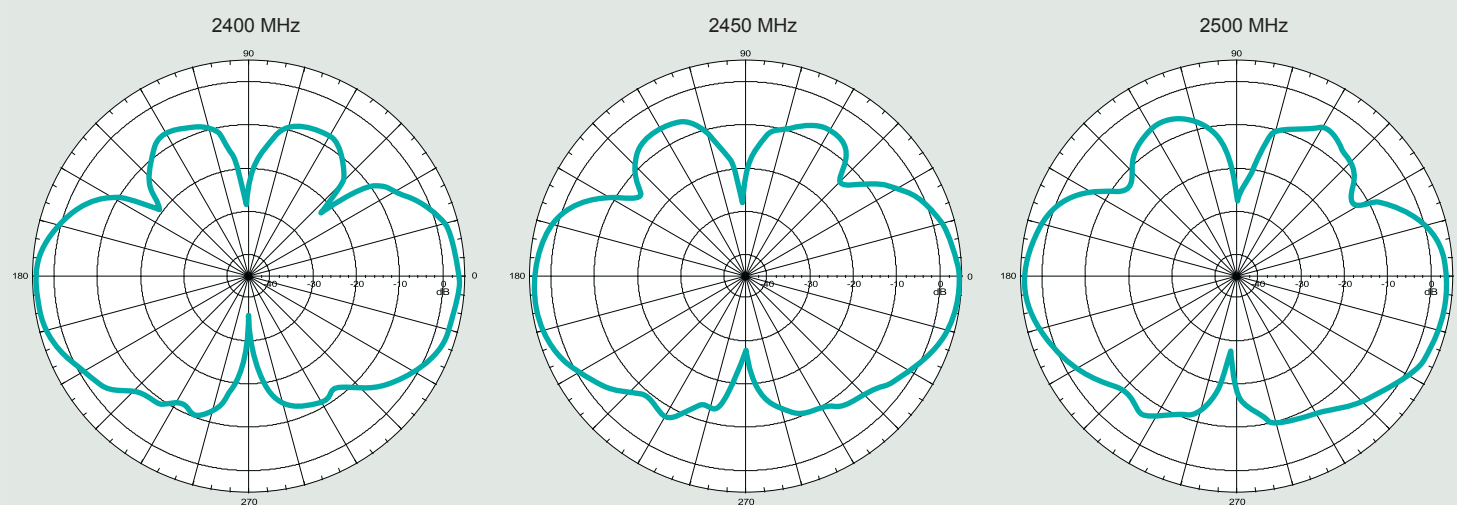
applications. However, it can also be used for a variety of other applications within the specified frequency range. When used as an access point, the antenna is ideally located at the center of the coverage area.

Gain Performance W1038

Horizontal Position



Vertical Position



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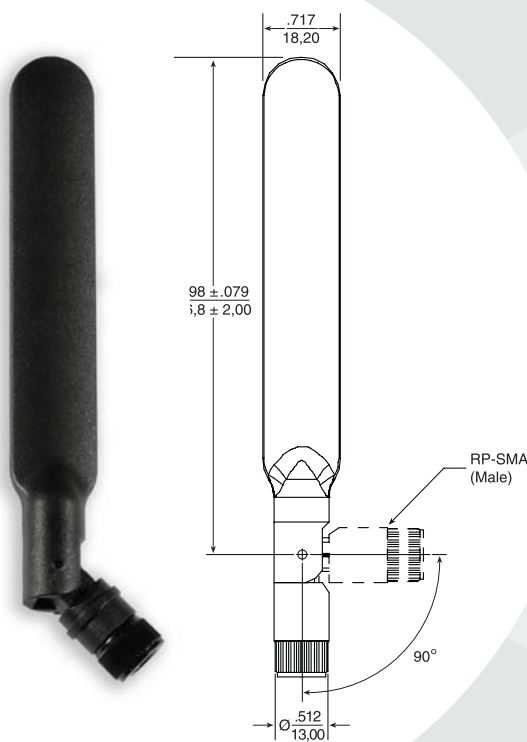
China 86 769 5538070

Taiwan 886 2 26980228



Wireless External Dual-Band Antenna for 2.4 GHz & 5.0 GHz Applications

Pulse Part Number: W1043



Features

- Dual-band, blade style antenna
- For WLAN devices using WiFi (802.11a/b/g), Bluetooth® and ZigBee™
- Omni-directional radiation pattern provides broad 360° coverage
- One-quarter wavelength dipole configuration
- Connection and color options easily integrate with OEM designs

Color Options

- Black*
- Gray (Pantone cool gray 8C)

Connector Options

- Reverse SMA (Male)*
- SMA (Male)

** Default Configuration – Please contact Pulse Applications Engineering for assistance in ordering colors and connectors*

Weight.....18.0 grams
Carton.....20/bag; 500/carton

Dimensions: $\frac{\text{Inches}}{\text{mm}}$

Unless otherwise specified, all tolerances are $\pm \frac{.010}{0.25}$

Electrical Specifications @ 25 °C

Note: This part number is lead-free and RoHS compliant. No additional suffix or identifier is required.

Antenna Part No.	Frequency [GHz]	Gain [dBi]	Impedance [Nom]	VSWR	Polarization	Electrical Length	Radiation	Color
W1043	2.4 & 5.0	2.0	50 Ω	≤ 2.0	Vertical	1/4, dipole	Omni	Black

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Wireless External Dual-Band Antenna for 2.4 GHz & 5.0 GHz Applications

Pulse Part Number: W1043

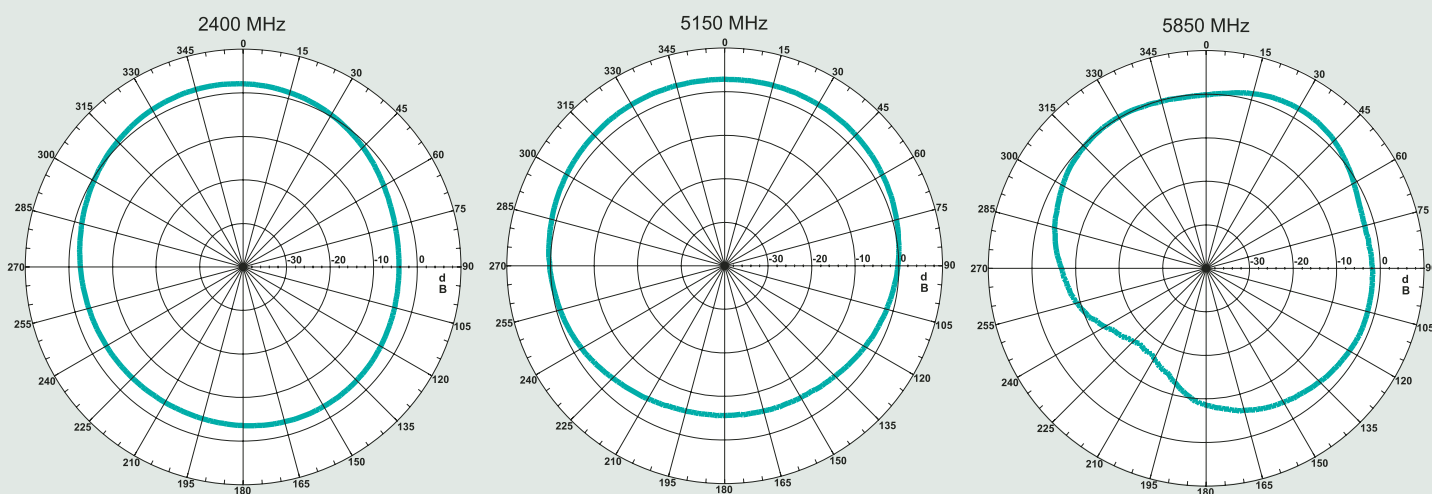
Application Notes

Omni-directional antennas provide a uniform, donut-shaped, 360° radiation pattern. The omni-directional pattern is suitable for point-to-multipoint broadcasting in all directions. This antenna is primarily used for WLAN

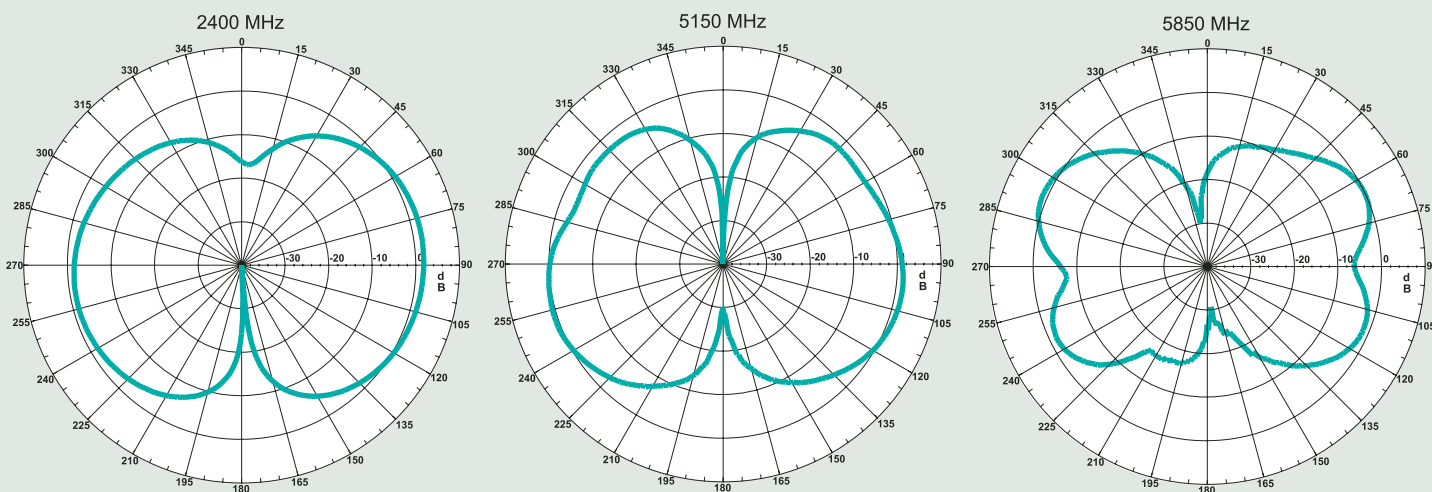
applications. However, it can also be used for a variety of other applications within the specified frequency range. When used as an access point, the antenna is ideally located at the center of the coverage area.

Gain Performance W1043

Horizontal Position



Vertical Position



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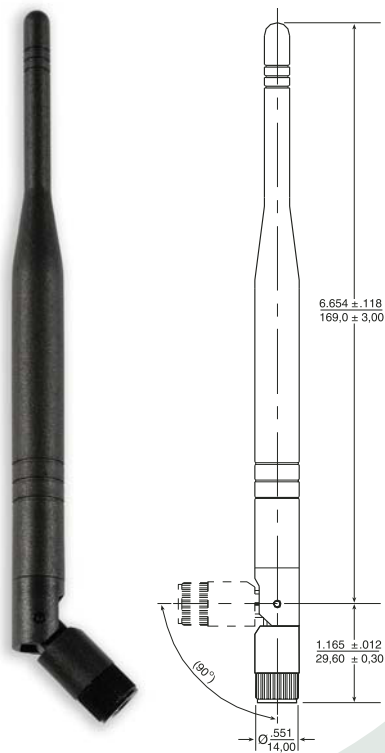
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Singapore 65 6287 8998

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China 86 769 5538070
Taiwan 886 2 26980228



Wireless External Antenna for 900 MHz Applications

Pulse Part Number: W1063



Features

- Ideal for lower frequency wireless applications in the ISM 900 MHz band
- Omni-directional radiation pattern provides broad 360° coverage
- One-eighth wavelength dipole configuration
- Connection and color options easily integrate with OEM designs

Color Options

- Black*
- Gray (Pantone cool gray 8C)
- Gray (Pantone 429C)
- Gray (Pantone cool gray 7C)

Connector Options

- Reverse SMA (Male)*
- SMA (Male)

** Default Configuration – Please contact Pulse Applications Engineering for assistance in ordering colors and connectors*

Weight.....25.6 grams
Carton.....20/bag; 500/carton

Dimensions: $\frac{\text{Inches}}{\text{mm}}$

Unless otherwise specified, all tolerances are $\pm \frac{.010}{0.25}$

Electrical Specifications @ 25 °C

Note: This part number is lead-free and RoHS compliant. No additional suffix or identifier is required.

Antenna Part No.	Frequency [MHz]	Gain [dBi]	Impedance [Nom]	VSWR	Polarization	Electrical Length	Radiation	Color
W1063	868 – 928	3.0	50 Ω	≤ 2.0	Vertical	1/4, dipole	Omni	Black

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Taiwan 886 2 26980228



Wireless External Antenna for 900 MHz Applications

Pulse Part Number: W1063

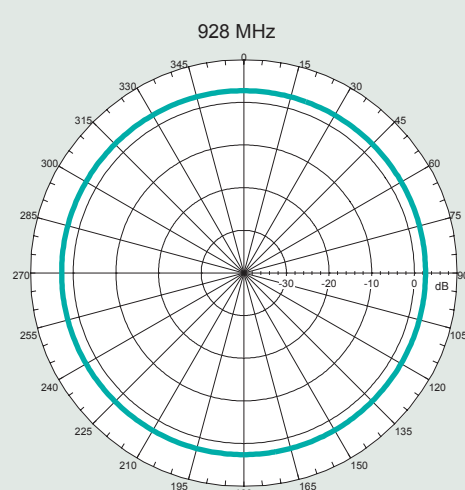
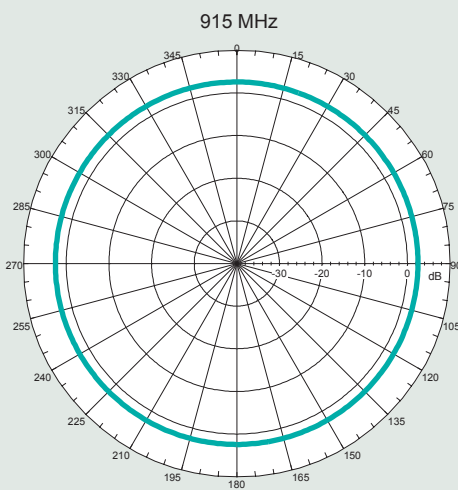
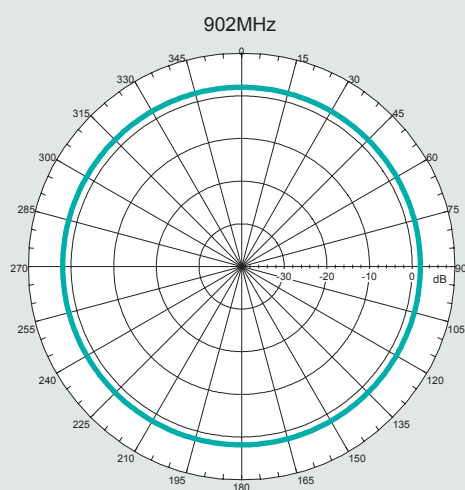
Application Notes

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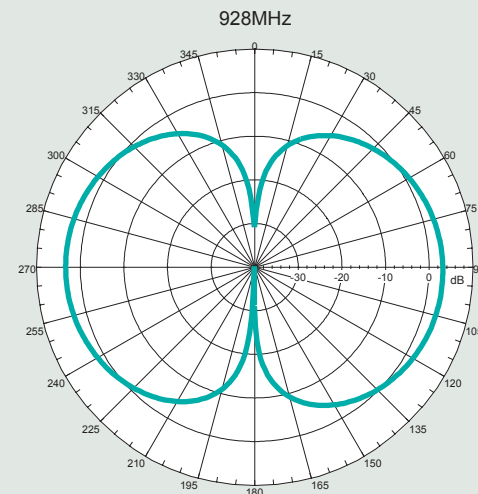
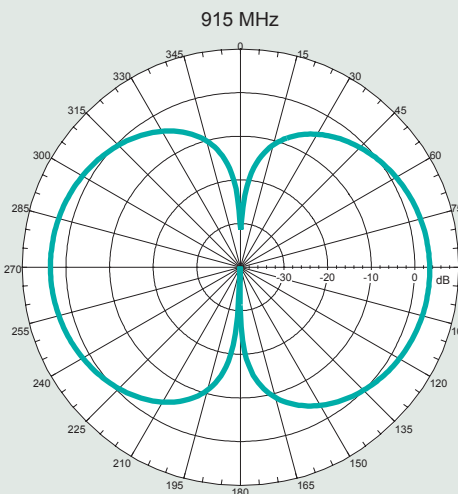
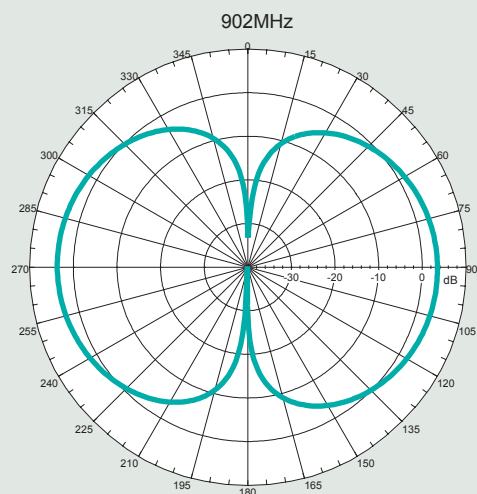
applications. However, it can also be used for a variety of other applications within the specified frequency range. When used as an access point, the antenna is ideally located at the center of the coverage area.

Gain Performance W1063

Horizontal Position



Vertical Position



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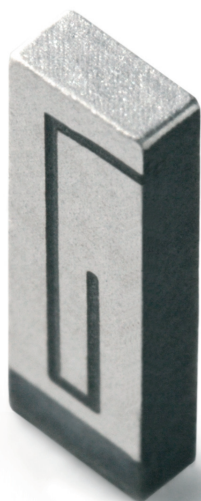
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Dualband WLAN Ceramic Chip Antenna

Ground cleared under antenna 11.60 x 6.00 mm. Pulse Part Number: W3006



Features

- Omnidirectional radiation
- Low profile
- Compact size WxLxH (10.0 x 3.2 x 1.5 mm)
- Low weight (240 mg)
- Fully SMD compatible
- Lead free soldering compatible
- Tape and reel packing
- RoHS Compliant Product
- Single feed point

Applications

- IEEE 802.11a/b/g
- 5 GHz WLAN
- 2.4 GHz WLAN
- 2.4 GHz ISM Band Systems
- ZigBee IEEE 802.15.4

Electrical specifications @ +25 °C

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

Dualband WLAN

Typical performance (testboard size 80 x 37 mm, PWB ground clearance area 11.60 x 6.00 mm)
1.5nH shunt inductor used for impedance matching.

Frequency Range [MHz]	Max Gain [dBi]	Efficiency [%] / [dB]	Return loss min. [dB]	Impedance [Ω]	Operating Temperature [°C]
2400–2483.5	3.2 (peak) 2.7 (band edges)	70 / -1.55 (peak) 65 / -1.85 (band edges)	-8	50	-40 to +85
5150–5850	4.2 (peak) 3.0 (band edges)	80 / -0.95 (peak) 70 / -1.55 (band edges)	-10	50	-40 to +85

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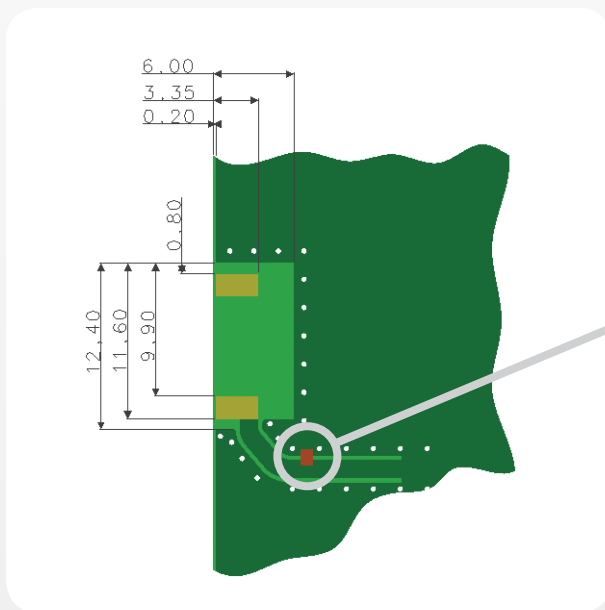
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Dualband WLAN Ceramic Chip Antenna

Ground cleared under antenna 11.60 x 6.00 mm. Pulse Part Number: W3006

**Recommended test board layout for electrical characteristic measurement,
test board outline size 80 x 37mm**



Shunt matching inductor,
1.5nH with presented setup.
Exact inductor value depends
on specific application.

Feed line should be designed to match 50 Ω characteristic impedance, depending on PWB material and thickness.

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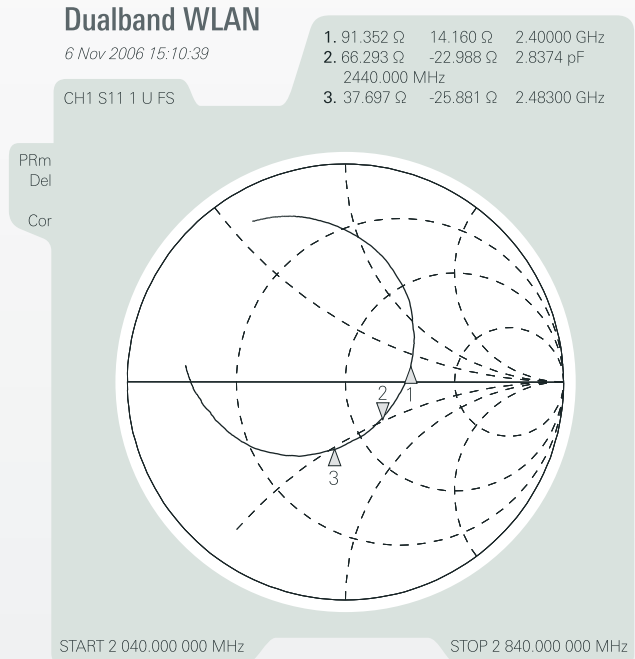
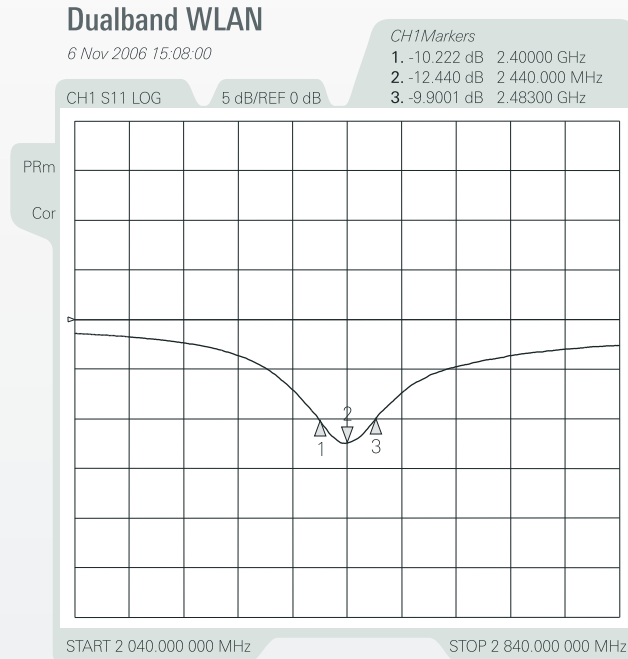
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Dualband WLAN Ceramic Chip Antenna

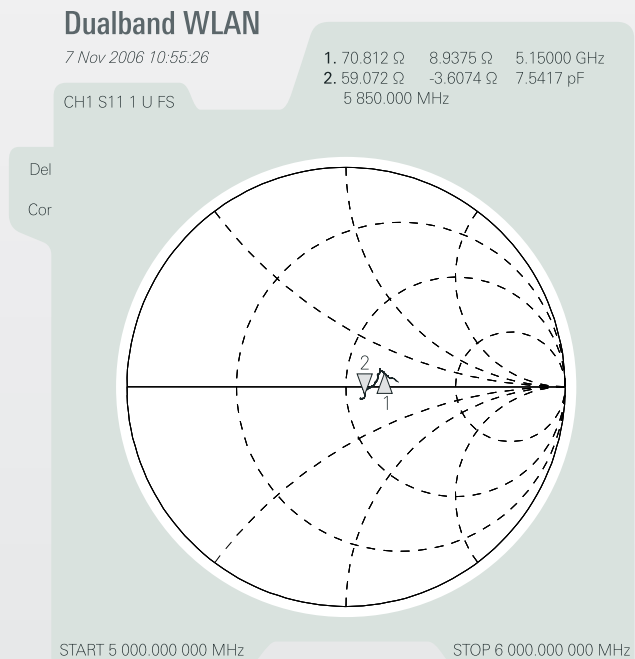
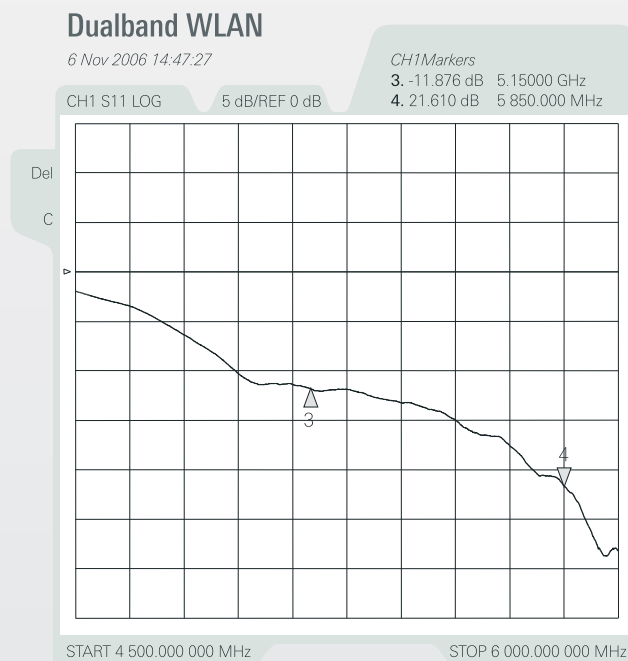
Ground cleared under antenna 11.60 x 6.00 mm. Pulse Part Number: W3006

Typical Electrical Characteristics (T=25 °C)

2,4 GHz Typical Return Loss S11/ impedance, measured on the test board



5GHz Typical Return Loss S11/ impedance, measured on the test board



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Dualband WLAN Ceramic Chip Antenna

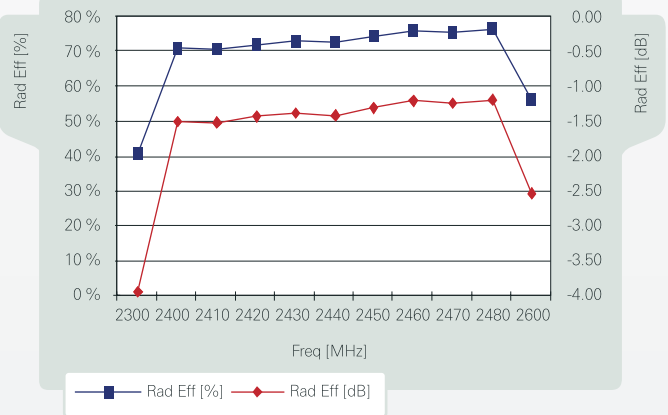
Ground cleared under antenna 11.60 x 6.00 mm. Pulse Part Number: W3006

2,4 GHz free space efficiency and maximum gain

DualBand WiFi 2.4G 10 x 3.2 x 1.5 mm

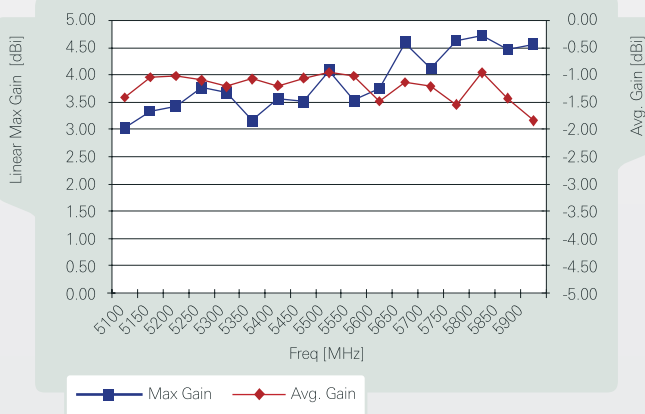


DualBand WiFi 2.4G 10 x 3.2 x 1.5 mm

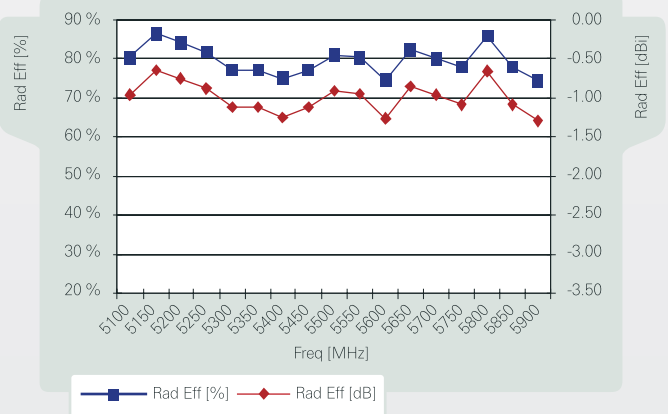


5 GHz free space efficiency and maximum gain

DualBand WiFi 5G 10 x 3.2 x 1.5 mm



DualBand WiFi 5G 10 x 3.2 x 1.5 mm



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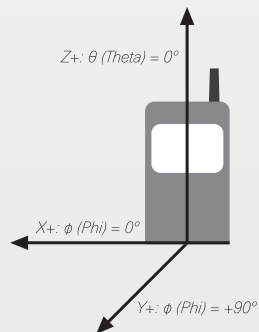
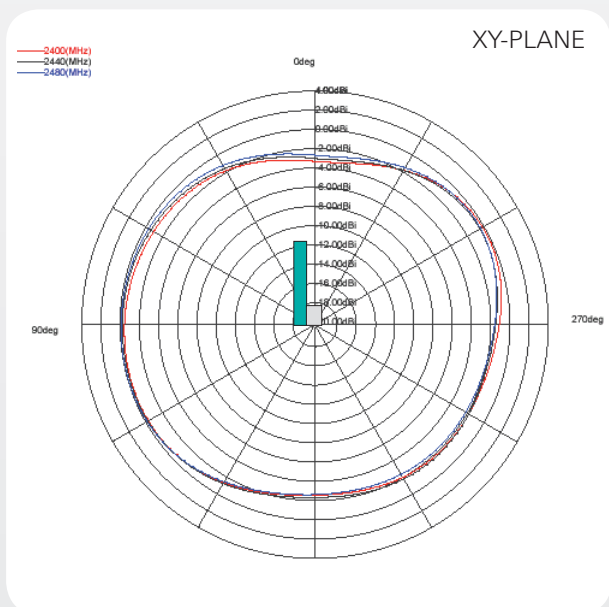
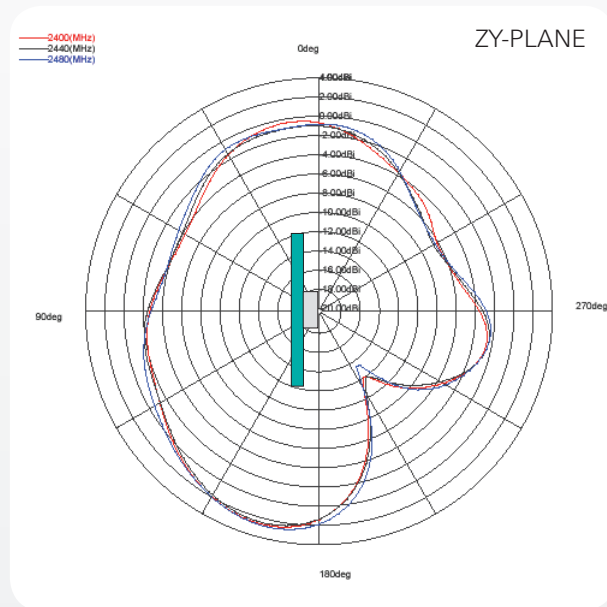
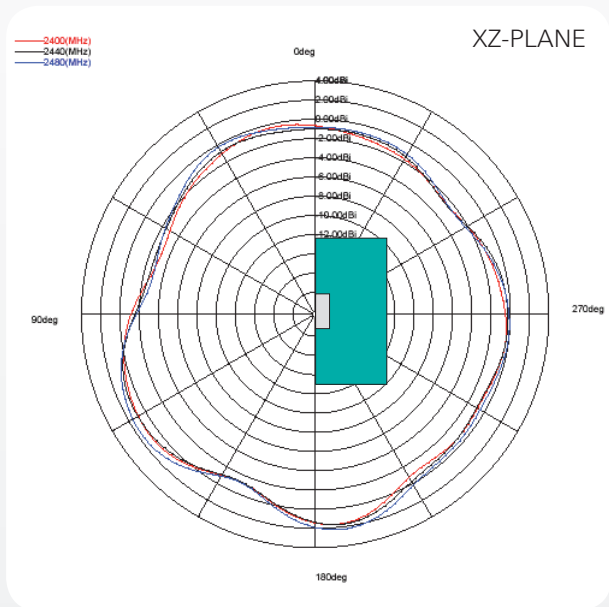


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Dualband WLAN Ceramic Chip Antenna

Ground cleared under antenna 11.60 x 6.00 mm. Pulse Part Number: W3006

2,4 GHz Typical Free space Radiation Patterns



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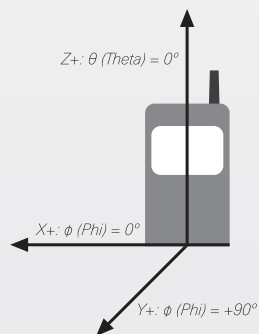
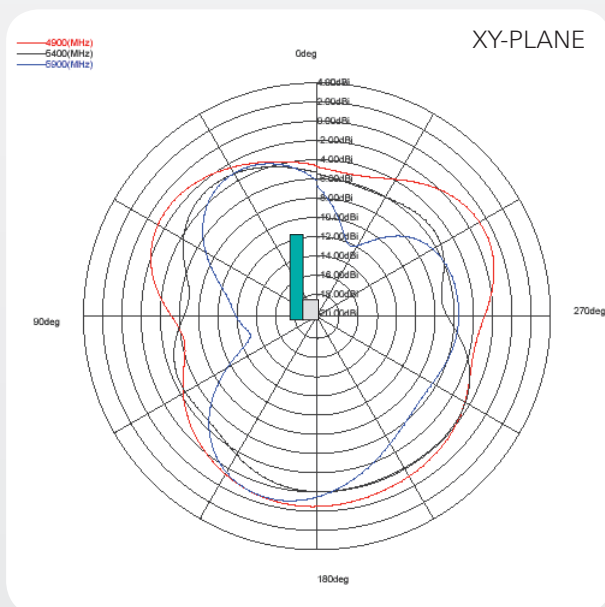
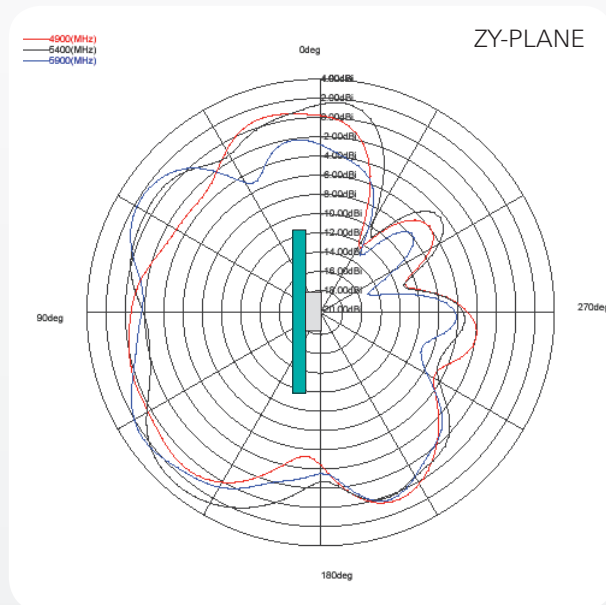
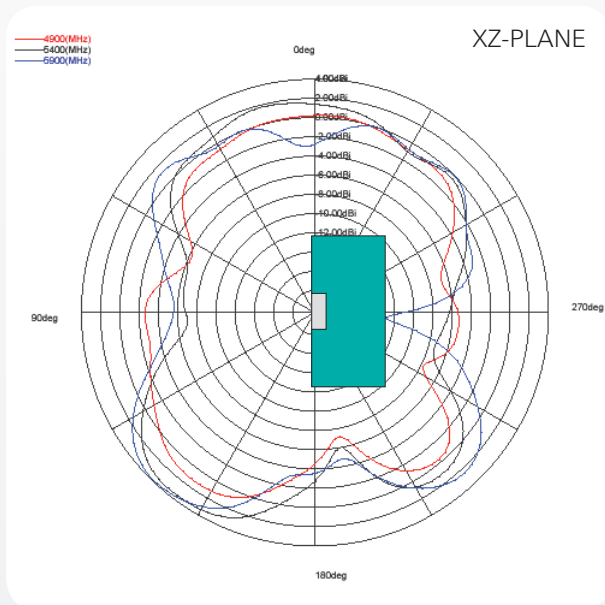
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Dualband WLAN Ceramic Chip Antenna

Ground cleared under antenna 11.60 x 6.00 mm. Pulse Part Number: W3006

5 GHz Typical Free space Radiation Patterns



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Bluetooth / WLAN / WiFi Ceramic Chip Antenna

Ground cleared under antenna, clearance area 4.00 x 4.25/6.25 mm. Pulse Part Number W3008, W3008C



Features

- Omni directional radiation
- Low profile
- Compact size W x L x H (3.2 x 1.6 x 1.1 mm)
- Low weight (33 mg)
- Fully SMD compatible
- Lead free soldering compatible
- Tape and reel packing
- RoHS Compliant Product

Applications

- Bluetooth, WLAN, WiFi
- IEEE 802.11b/g
- ZigBee IEEE 802.15.4
- 2.4 GHz WLAN
- 2.4 GHz ISM Band Systems

Electrical specifications @ +25 °C

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

Bluetooth, W3008

Typical performance (test board size 80x37 mm, PWB ground clearance area 4.00 x 4.25 mm)

Frequency Range [MHz]	Linear Max Gain [dBi]	Efficiency [%] / [dB]	Return loss min. [dB]	Impedance [Ω]	Operating Temperature [°C]
2400–2483.5	1.7 (Peak) 0.7 (Band edges)	70 / -1.6 (Peak) 55 / -2.6 (Band edges)	-8	50	-40 to +85

Bluetooth / WLAN / WiFi, W3008C

Typical performance (test board size 80x37 mm, PWB ground clearance area 4.00 x 6.25 mm)

Frequency Range [MHz]	Linear Max Gain [dBi]	Efficiency [%] / [dB]	Return loss min. [dB]	Impedance [Ω]	Operating Temperature [°C]
2400–2483.5	2.2 (Peak) 1.9 (Band edges)	75 / -1.3 (Peak) 70 / -1.6 (Band edges)	-11	50	-40 to +85

Pulse Finland Oy

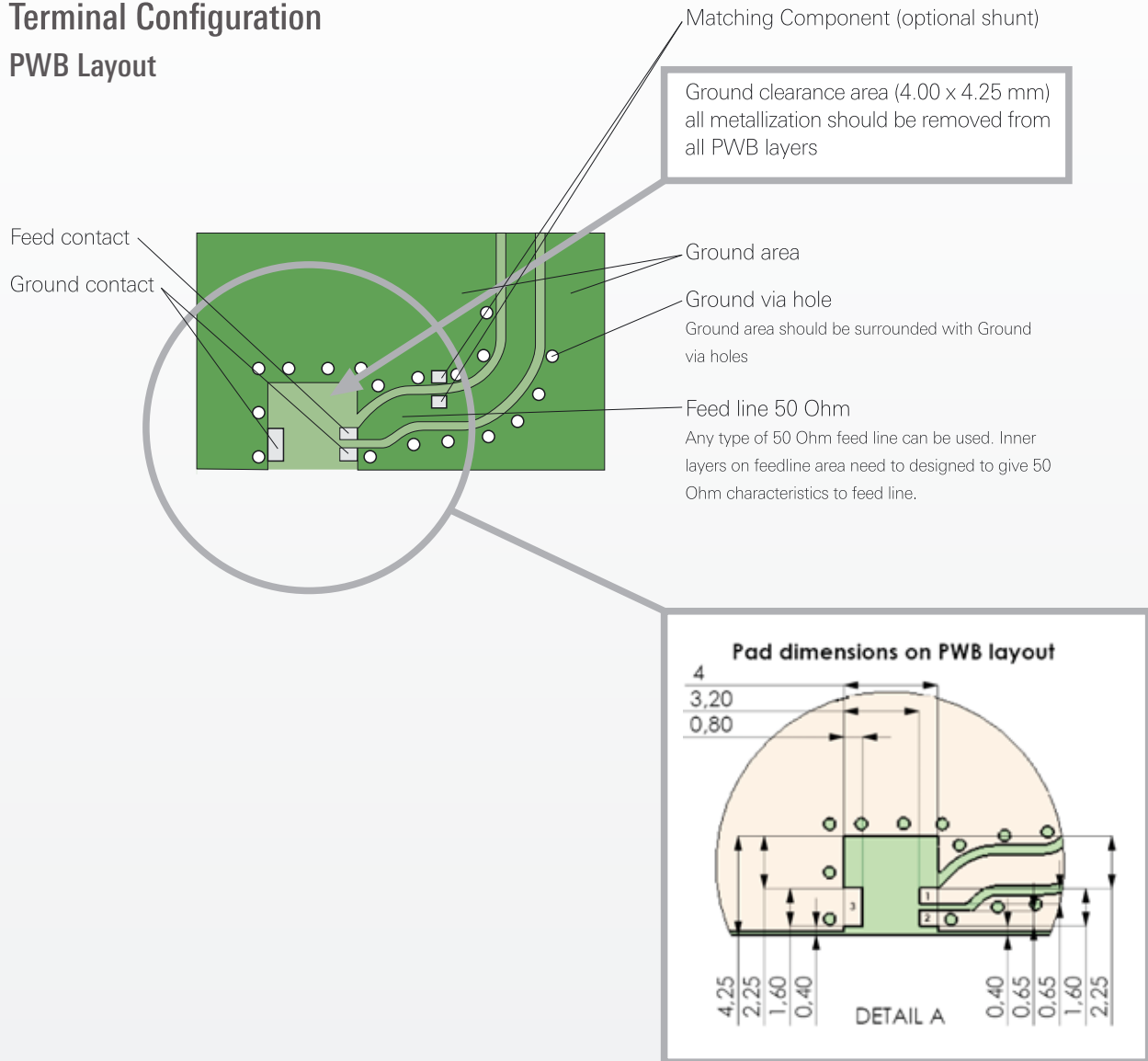
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Bluetooth / WLAN / WiFi Ceramic Chip Antenna

Terminal Configuration

PWB Layout



PWB features

No.	Terminal name	Terminal Dimensions
1	Feed	0.8 x 0.65 mm
2	GND	0.8 x 0.65 mm
3	GND	0.8 x 1.60 mm

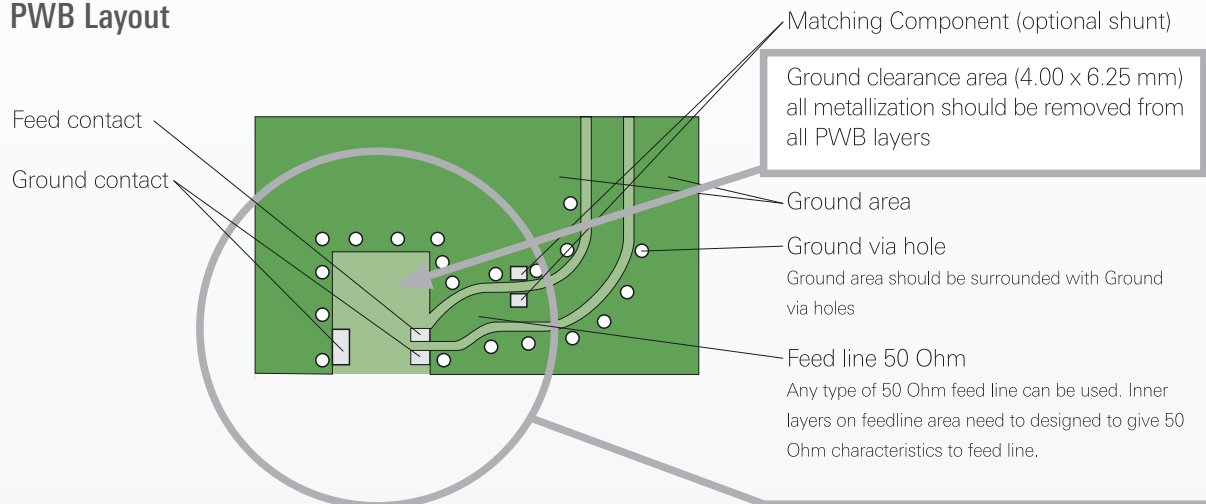
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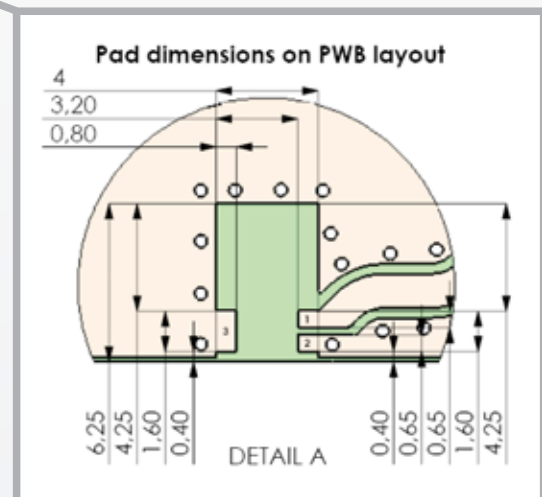
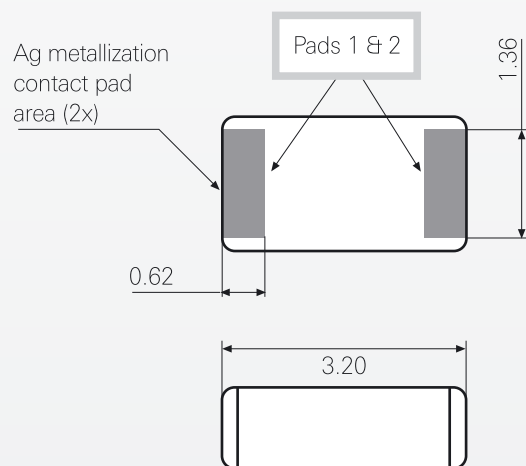
Bluetooth / WLAN / WiFi Ceramic Chip Antenna

Terminal Configuration

PWB Layout



Antenna



Antenna features

No.	Terminal name	Terminal Dimensions
1	Feed / GND	0.62 x 1.36 mm
2	Feed / GND	0.62 x 1.36 mm

Antenna is symmetrical.

Either of terminals 1 or 2 can be feed / GND

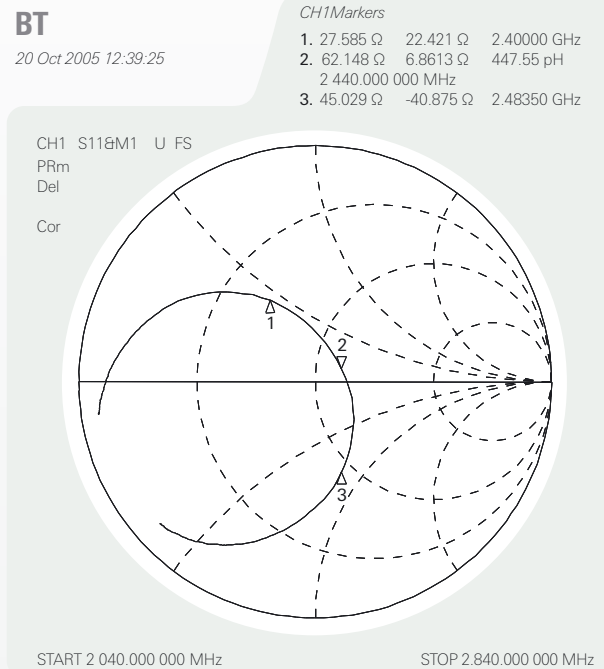
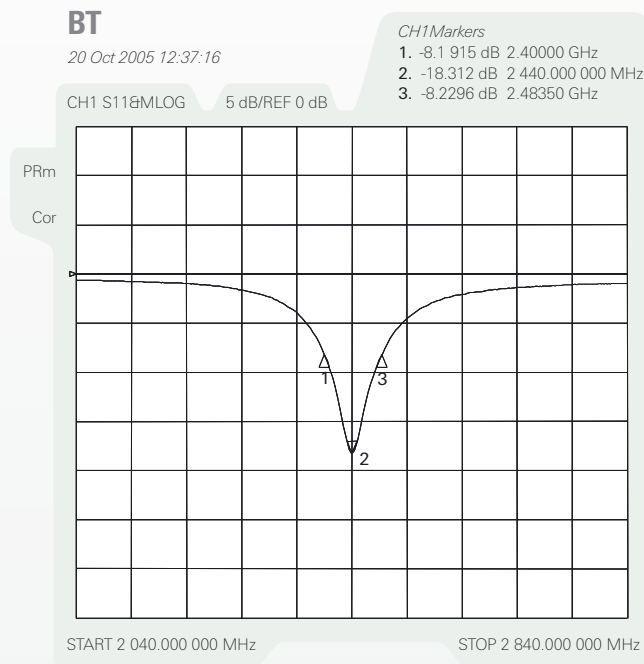
PWB features

No.	Terminal name	Terminal Dimensions
1	Feed	0.8 x 0.65 mm
2	GND	0.8 x 0.65 mm
3	GND	0.8 x 1.60 mm

Bluetooth / WLAN / WiFi Ceramic Chip Antenna

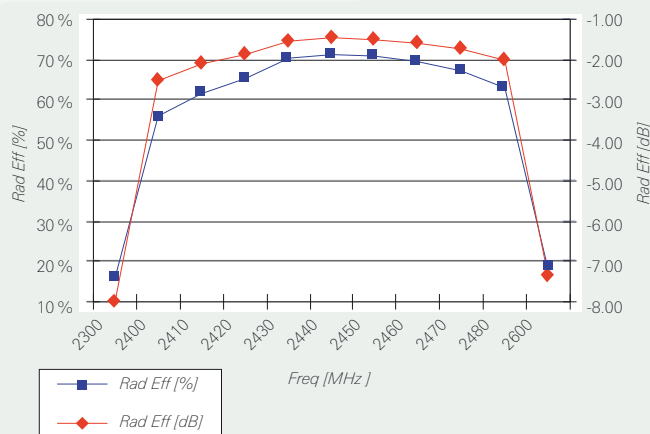
Typical Electrical Characteristics (T=25 °C), W3008

Typical Return Loss S11/ impedance, measured on the test board

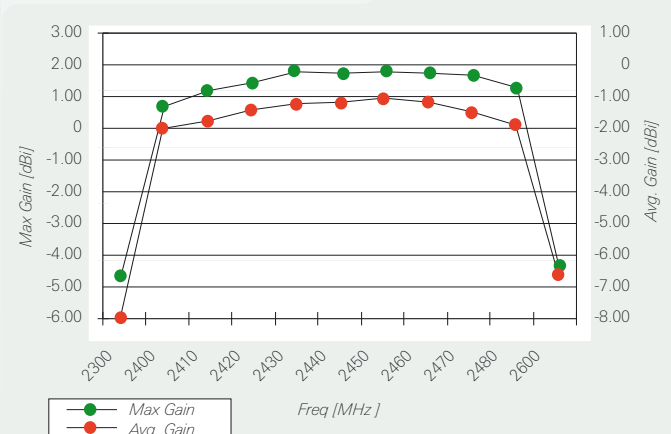


Free space efficiency and maximum gain / PWB ground clearance area 4.00 x 4.25 mm

BT GC 3.2 x 1.6 x 1.1 mm



BT GC 3.2 x 1.6 x 1.1 mm



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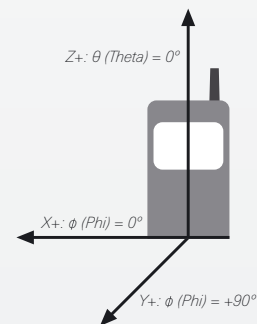
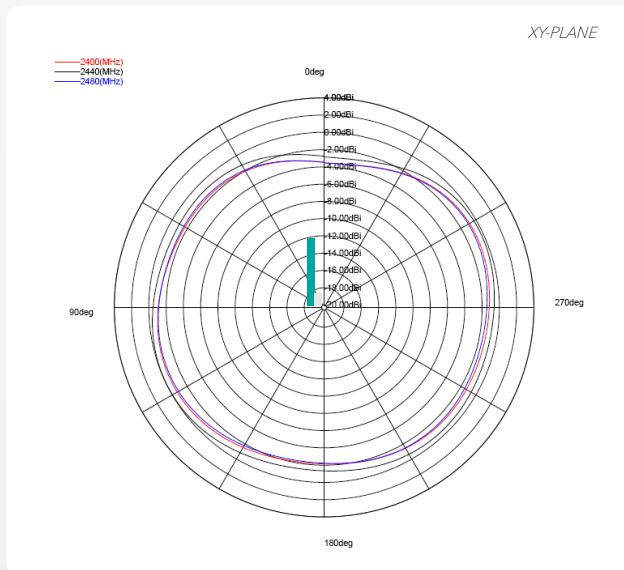
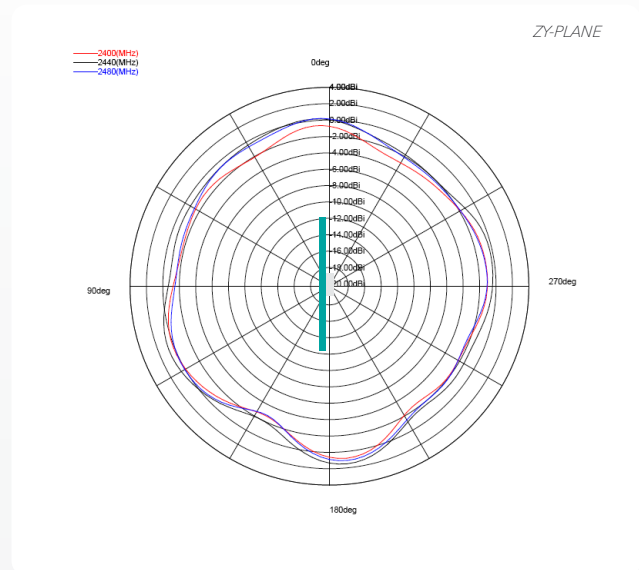
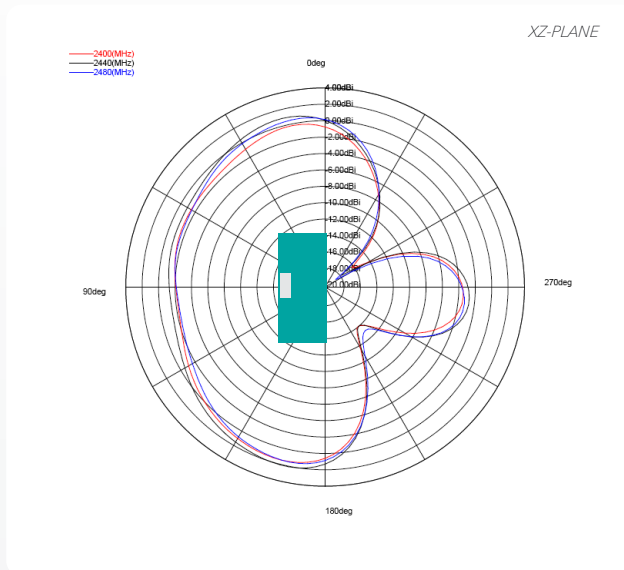
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Bluetooth / WLAN / WiFi Ceramic Chip Antenna

Typical Free Space Radiation Patterns, W3008



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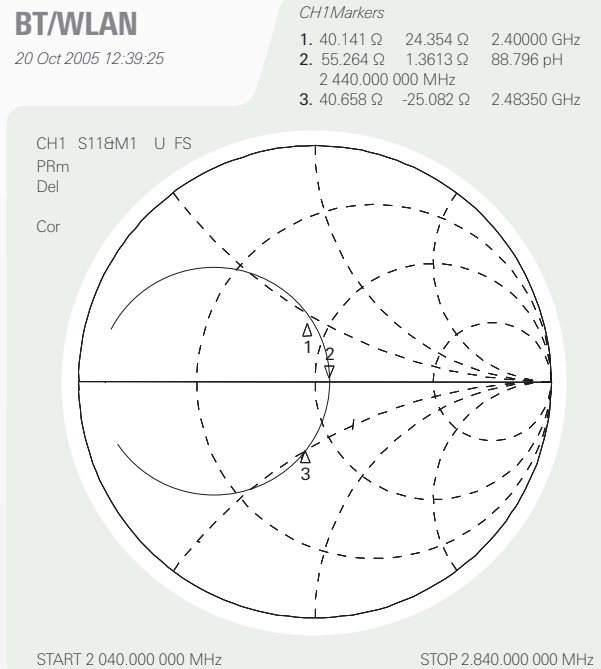
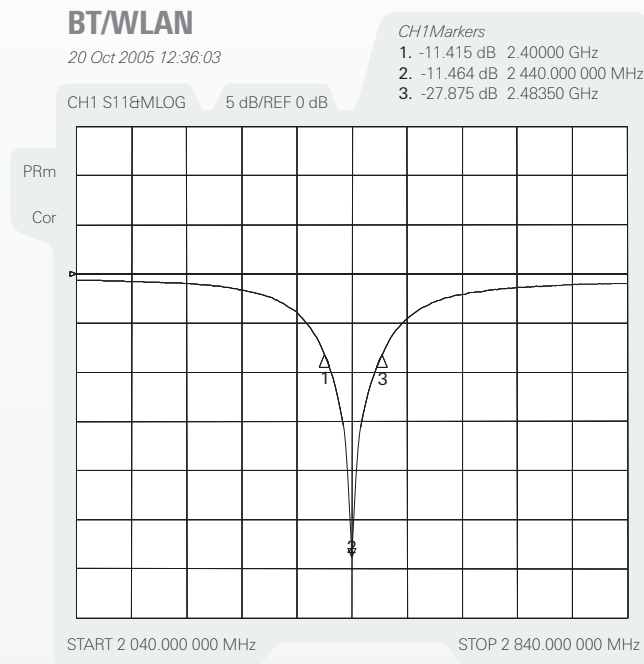
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Bluetooth / WLAN / WiFi Ceramic Chip Antenna

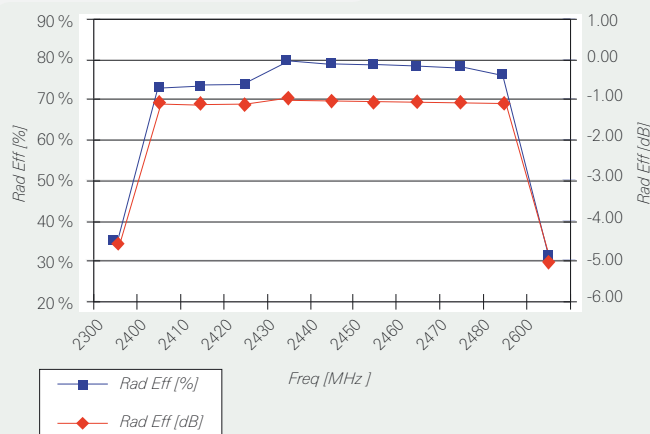
Typical Electrical Characteristics (T=25 °C), W3008C

Typical Return Loss S11/ impedance, measured on the test board

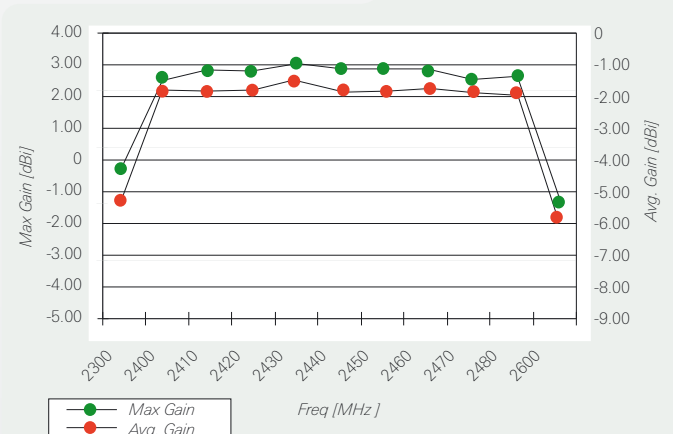


Free space efficiency and maximum gain / PWB ground clearance area 4.00 x 6.25 mm

BT GC 3.2 x 1.6 x 1.1 mm



BT GC 3.2 x 1.6 x 1.1 mm



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Fax: +358 207 935 501

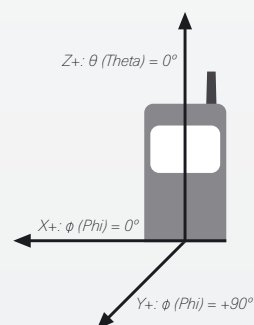
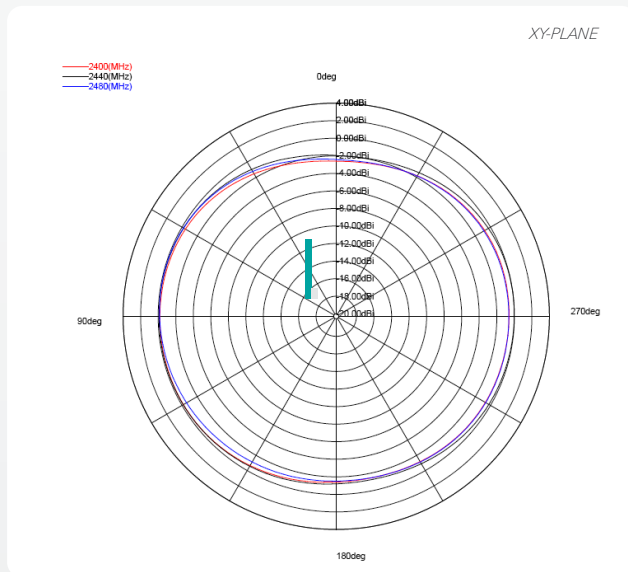
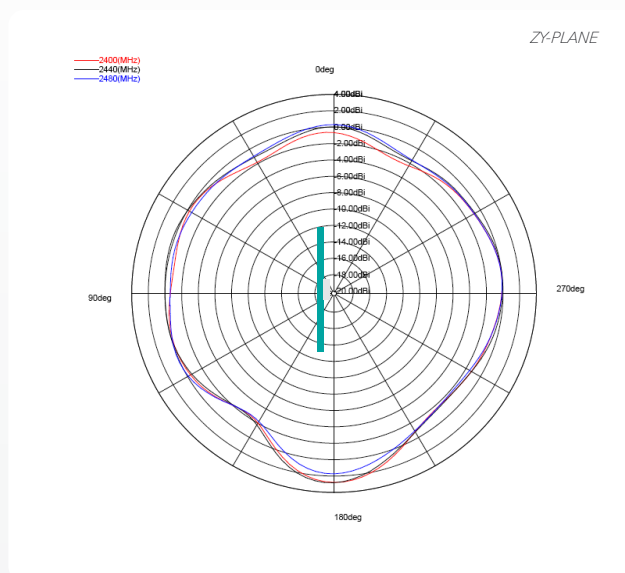
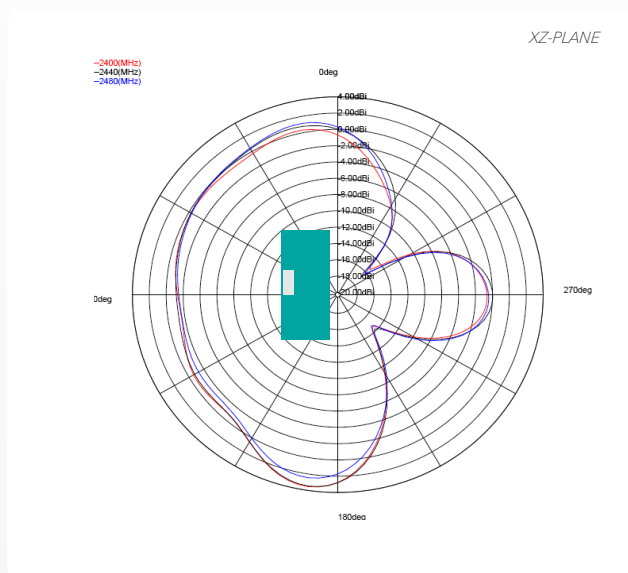
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Bluetooth / WLAN / WiFi Ceramic Chip Antenna

Typical Free Space Radiation Patterns , W3008C



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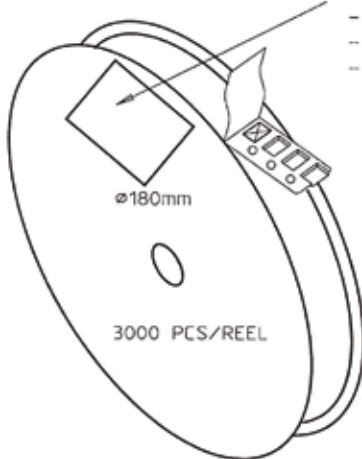
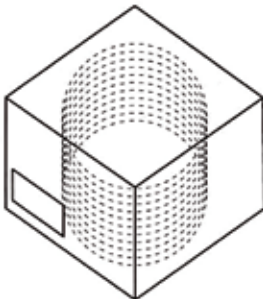
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Bluetooth / WLAN / WiFi Ceramic Chip Antenna

Packing Form

REEL LABEL INFORMATION:

- TRACEABILITY
- QUANTITY
- PRODUCT CODE

CARRIER TAPE H85-00125
width=8,00 depth=1,22
COVER TAPE H85-00126
width=5,60

LENGTH OF TAPE:

- Leader section: 50 empty cavities before component section
- Trailer section: 25 empty cavities after component section.

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

BOX H85-00128 (182x182x132)	1 pcs
- LABEL	1 pcs/BOX
REEL H85-00127 (D180, W12)	10 pcs
- REEL LABEL	1 pcs/REEL

MATERIAL					
HANDLINGS					
		RATIO	DRWN	010305 PeHa	H
			DGNER		G
			CHKD		F
			APPRD		E
			APPRD BY		D
PRODUCT H90-OY116-F01P01				C	
				B	
				A	
		DENOMINATION PACKING FORM		VERSION	MOD/DATE/NAME

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1.575GHz GPS Ceramic Chip Antenna

Ground cleared under antenna, clearance area 10.80 x 6.25mm

Pulse Part Number: W3010



Features

- Omni directional radiation
- Low profile
- Compact size W x L x H (10 x 3.2 x 2 mm)
- Low weight (310 mg)
- Lead free materials
- Fully SMD compatible
- Lead free soldering compatible
- Tape and reel packing
- RoHS Compliant Product

Applications

- GPS L1 band
- 1.575 GHz

Electrical specifications @ +25 °C

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

GPS

Typical performance (test board size 80x37 mm, PWB ground clearance area 10.80 x 6.25 mm)

Frequency Range [MHz]	RHCP Gain [dBic]	Linear Max Gain [dBi]	Efficiency [%] / [dB]	Return loss min. [dB]	Impedance [Ω]	Operating Temperature [°C]
1575.42 +/- 10	-0.2 (Peak) -0.7 (Band edges)	2.8 (Peak) 2.3 (Band edges)	75 / -1.25 (Peak) 70 / -1.55 (Band edges)	-18	50	-40 to +85

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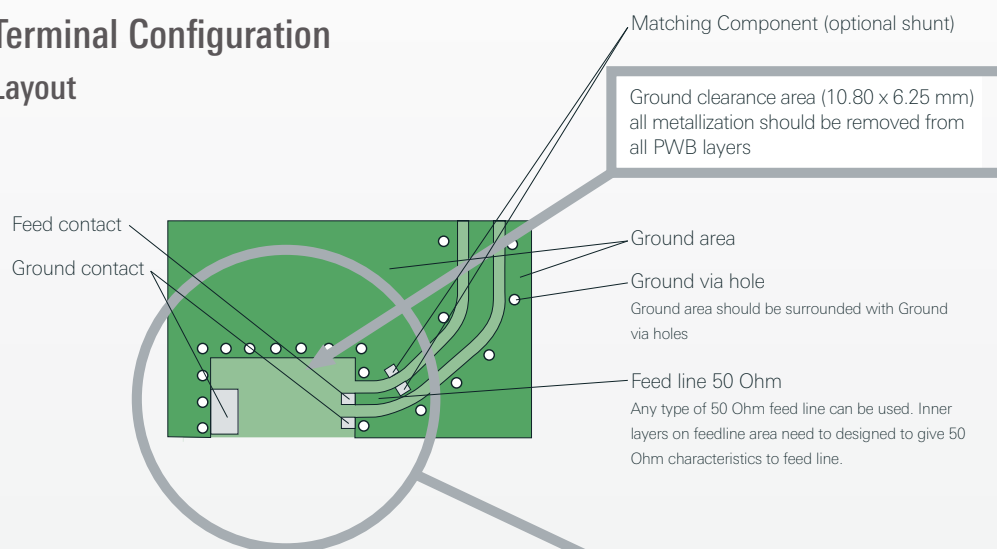


1.575GHz GPS Ceramic Chip Antenna

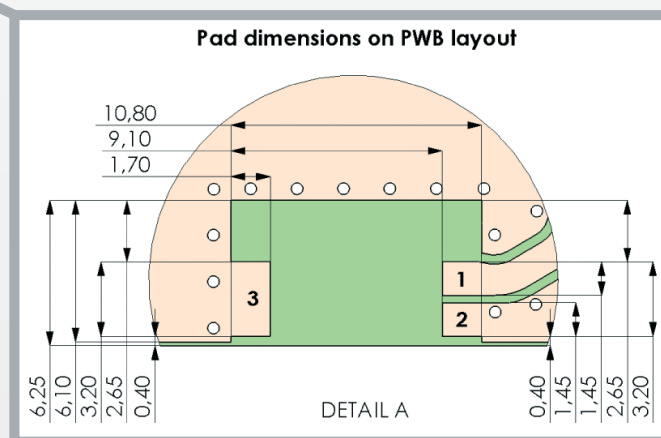
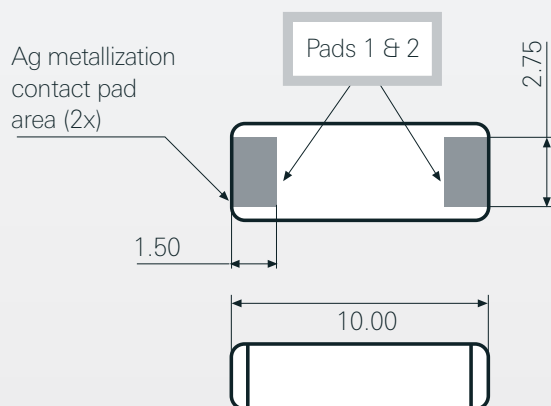
Ground cleared under antenna, clearance area 10.80 x 6.25mm

Terminal Configuration

Layout



Antenna



Antenna features

No.	Terminal name	Terminal Dimensions
1	Feed / GND	1.50 x 2.75 mm
2	Feed / GND	1.50 x 2.75 mm

Antenna is symmetrical.

Either of terminals 1 or 2 can be feed / GND

PWB features

No.	Terminal name	Terminal Dimensions
1	Feed	1.70 x 1.45 mm
2	GND	1.70 x 1.45 mm
3	GND	1.70 x 3.20 mm

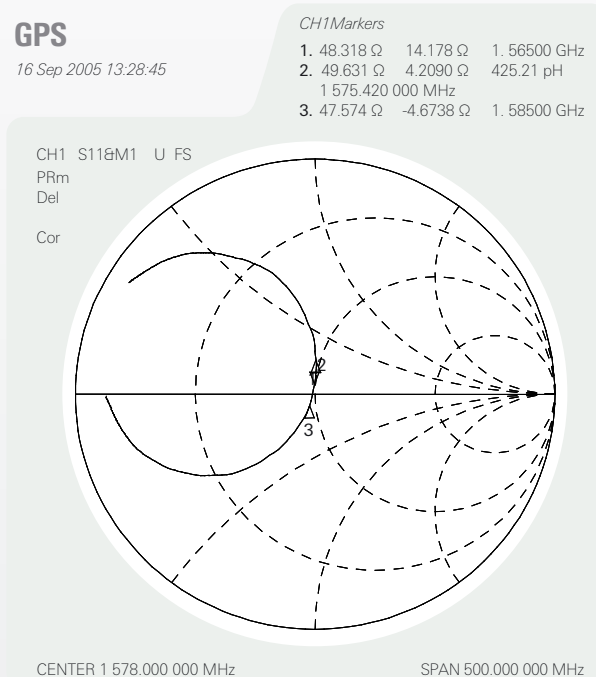
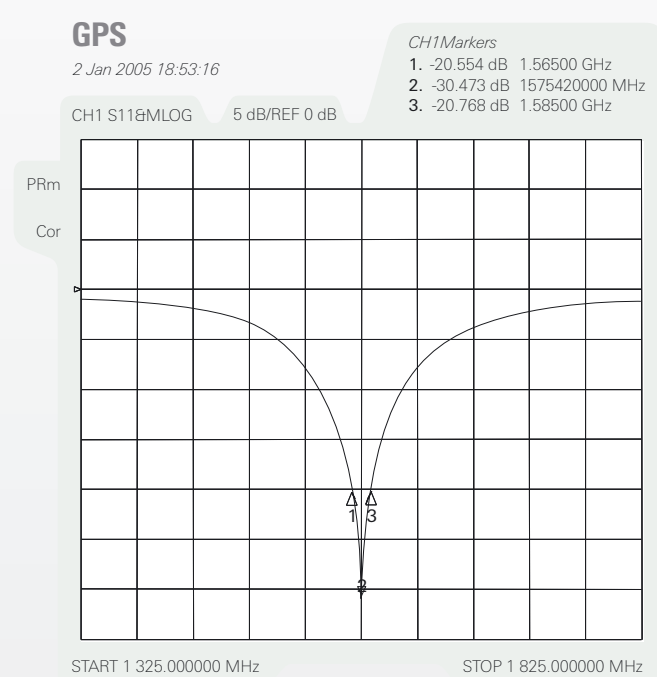
1.575GHz GPS Ceramic Chip Antenna

Ground cleared under antenna, clearance area 10.80 x 6.25mm

Typical Electrical Characteristics (T=25 °C)

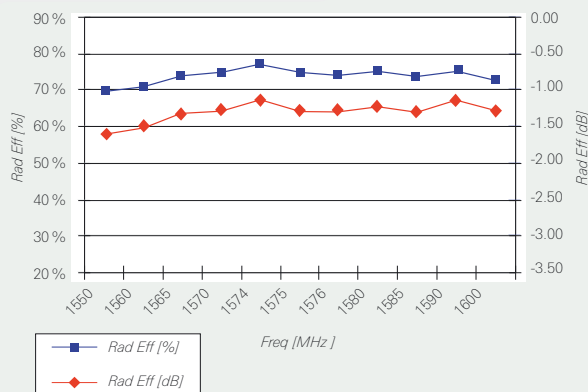
Measured with 3.3 pF shunt capacitor

Typical Return Loss S11/impedance

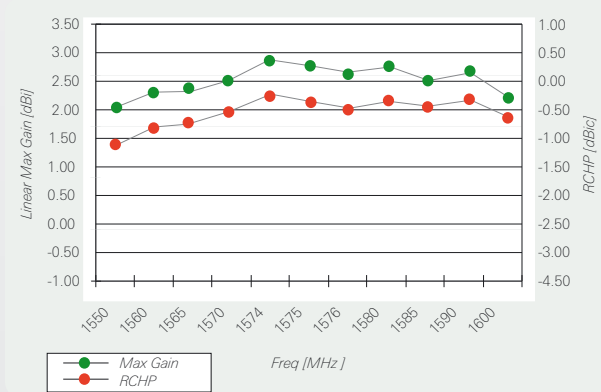


Free space efficiency and maxium gain

GPS CG 10 x 3.2 x 2 mm



GPS CG 10 x 3.2 x 2 x 2 mm



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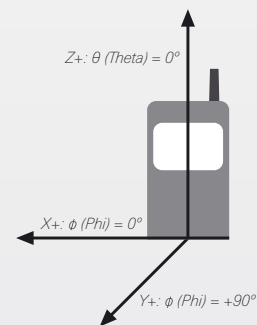
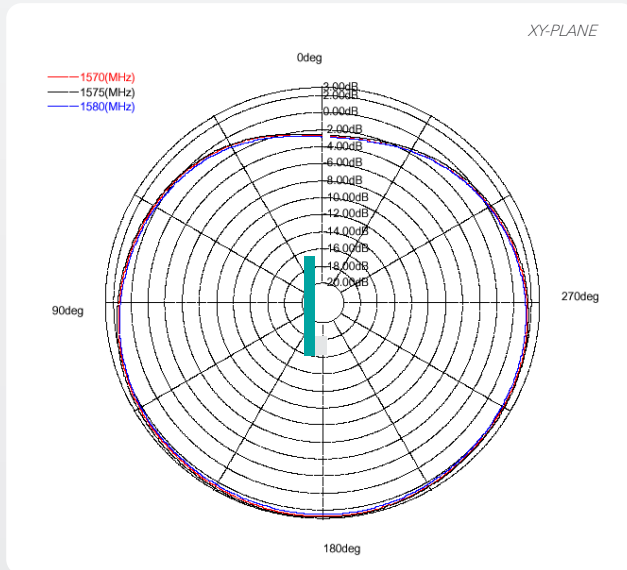
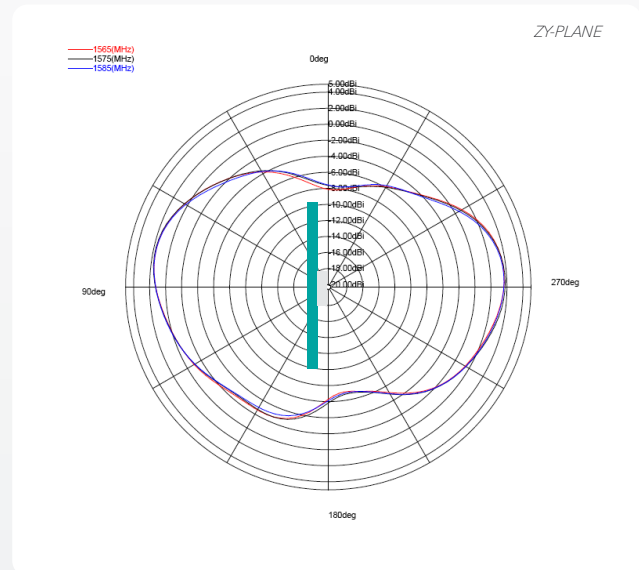
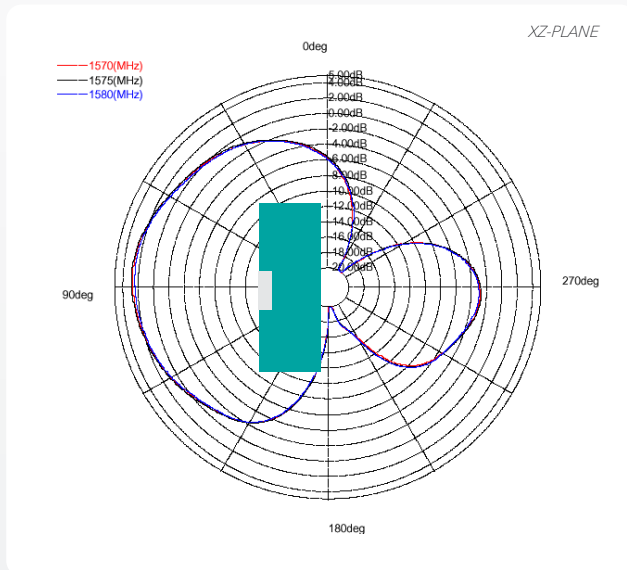


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1.575GHz GPS Ceramic Chip Antenna

Ground cleared under antenna, clearance area 10.80 x 6.25mm

Typical Free space Radiation Patterns



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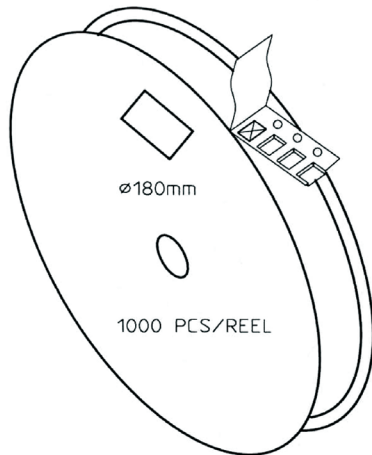


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1.575GHz GPS Ceramic Chip Antenna

Ground cleared under antenna, clearance area 10.80 x 6.25mm

Packing form

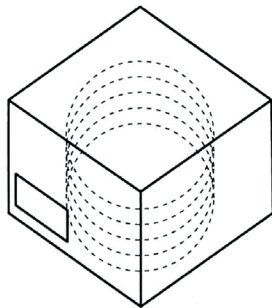


CARRIER TAPE H85-00188
width=24,00 depth=2.20
COVER TAPE H85-00159
width=21.20

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.

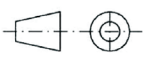


BOX H85-00128 1 pcs
(182x182x125)
- LABEL 1 pcs/BOX

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

MATERIAL

HANDLINGS

		RATIO	DRWN	160107 PeHa	H			
			DGNER		G			
			CHKD		F			
			APPRD		E			
PRODUCT	H90-OY113-F01P01		APPRD BY		D			
					C			
					B			
					A			
DENOMINATION			VERSION		MOD/DATE/NAME			
PACKING FORM								

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1.575 GHz GPS Ceramic Chip Antenna

Ground cleared under antenna, clearance area 4.00 x 4.25 mm / 6.25 mm. Pulse Part Number: W3011 / W3011A



Features

- Omni directional radiation
- Low profile
- Compact size W x L x H (3.2 x 1.6 x 1.1 mm)
- Low weight (33 mg)
- Lead free materials
- Fully SMD compatible
- Lead free soldering compatible
- Tape-and-reel packing
- RoHS Compliant Product

Applications

- GPS L1 band
- 1.575 GHz

Electrical specifications @ +25 °C

Note: Electrical characteristics depend on test board (GP) size and antenna positioning on GP and the size of the ground clearance area.

1.575 GHz GPS W3011

Typical performance (Test board size 80 x 37 mm, PWB ground clearance area 4.00 x 4.25 mm)

Frequency Range [MHz]	RHCP Gain [dBic]	Max Gain [dBi]	Efficiency [%] / [dB]	Return loss min. [dB]	Impedance [Ω]	Operating Temperature [°C]
1575.42 +/-10	0.85 (Peak) 0.5 (Band edges)	3.4 (Peak) 3.0 (Band edges)	85 / -0.7 (Peak) 80 / -1.0 (Band edges)	-12	50	-40 to +85

1.575 GHz GPS W3011A

Typical performance (Test board size 80 x 37 mm, PWB ground clearance area 4.00 x 6.25 mm)

Frequency Range [MHz]	RHCP Gain [dBic]	Max Gain [dBi]	Efficiency [%] / [dB]	Return loss min. [dB]	Impedance [Ω]	Operating Temperature [°C]
1575.42 +/-10	1.0 (Peak) 0.7 (Band edges)	3.7 (Peak) 3.4 (Band edges)	85 / -0.7 (Peak) 85 / -1.0 (Band edges)	-16	50	-40 to +85

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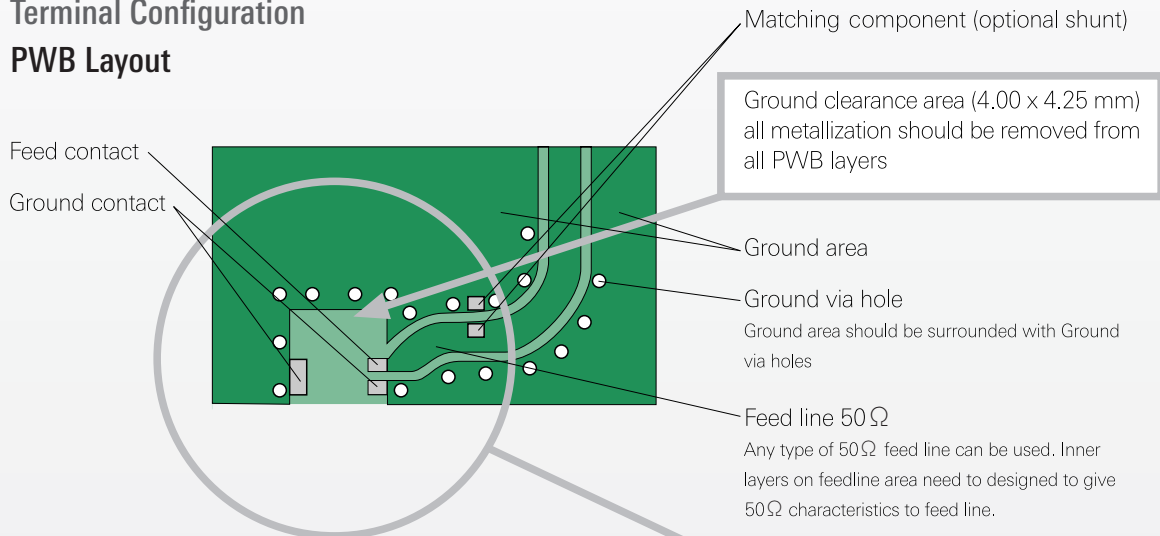


1.575 GHz GPS Ceramic Chip Antenna

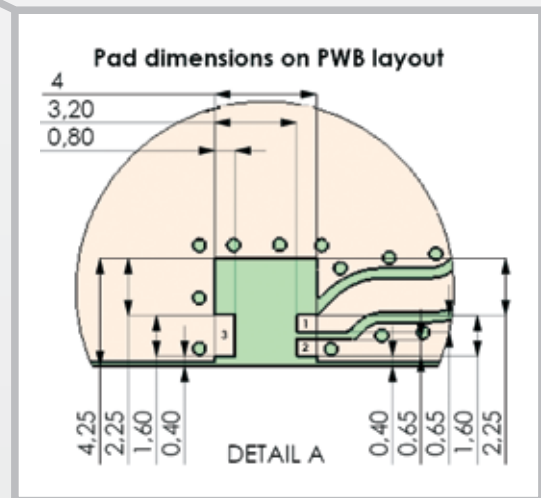
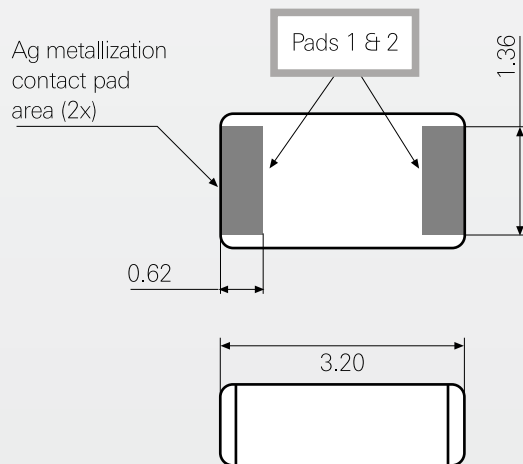
Ground cleared under antenna, clearance area **4.00 x 4.25 mm**. Pulse Part Number: W3011

Terminal Configuration

PWB Layout



Antenna



Antenna features

No.	Terminal name	Terminal Dimensions
1	Feed / GND	0.62 x 1.36 mm
2	Feed / GND	0.62 x 1.36 mm

Antenna is symmetrical.

Either of terminals 1 or 2 can be feed / GND

PWB features

No.	Terminal name	Terminal Dimensions
1	Feed	0.8 x 0.65 mm
2	GND	0.8 x 0.65 mm
3	GND	0.8 x 1.60 mm

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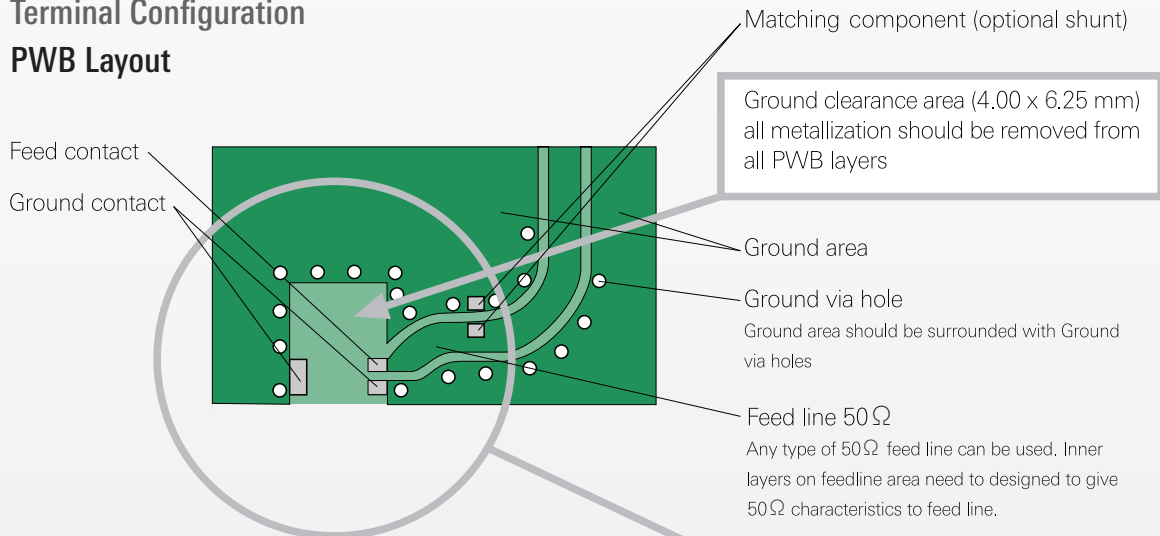
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1.575 GHz GPS Ceramic Chip Antenna

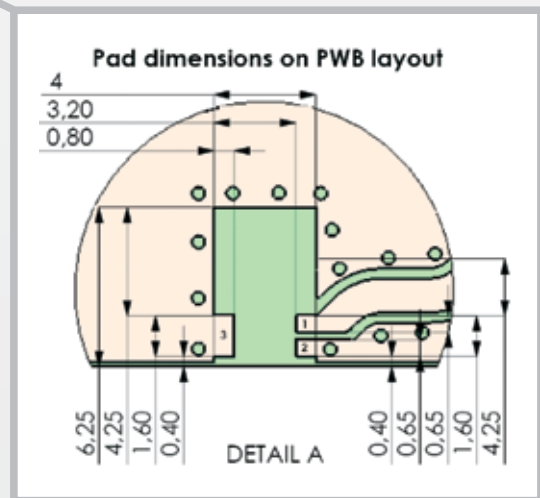
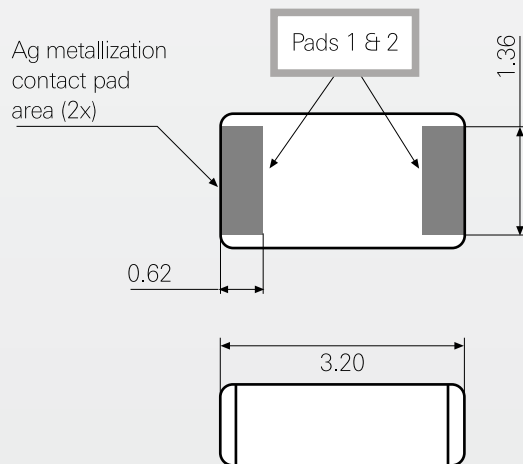
Ground cleared under antenna, clearance area **4.00 x 6.25 mm**. Pulse Part Number: W3011a

Terminal Configuration

PWB Layout



Antenna



Antenna features

No.	Terminal name	Terminal Dimensions
1	Feed / GND	0.62 x 1.36 mm
2	Feed / GND	0.62 x 1.36 mm

Antenna is symmetrical.

Either of terminals 1 or 2 can be feed / GND

PWB features

No.	Terminal name	Terminal Dimensions
1	Feed	0.8 x 0.65 mm
2	GND	0.8 x 0.65 mm
3	GND	0.8 x 1.60 mm

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1.575 GHz GPS Ceramic Chip Antenna

Ground cleared under antenna, clearance area 4.00 x 4.25 mm / 6.25 mm. Pulse Part Number: W3011 / W3011A

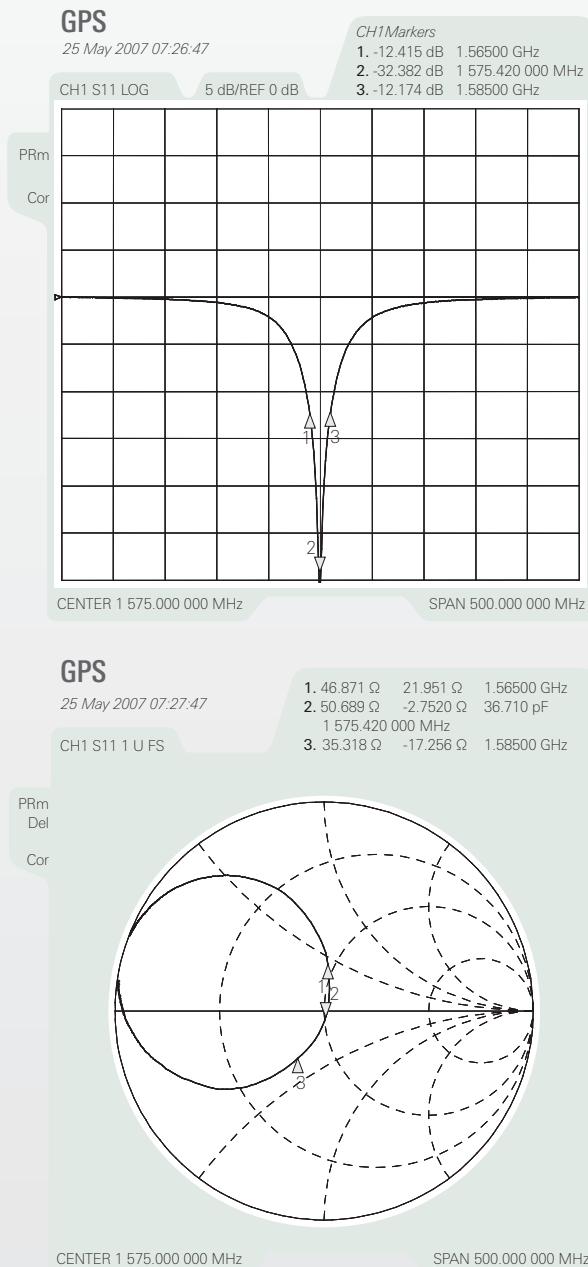
W3011 GPS Antenna Test Set Up and Measured Performance

Ground cleared under antenna, clearance area 4.00 x 4.25 mm.

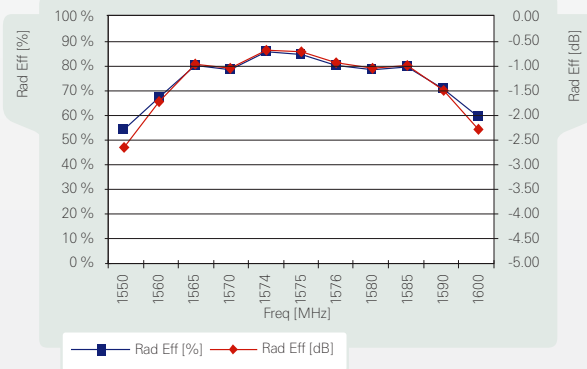
Typical Electrical Characteristics (T=25°C)

Measured on the 80 x 37mm test board without matching circuit and in antenna position 1 on PWB layout.

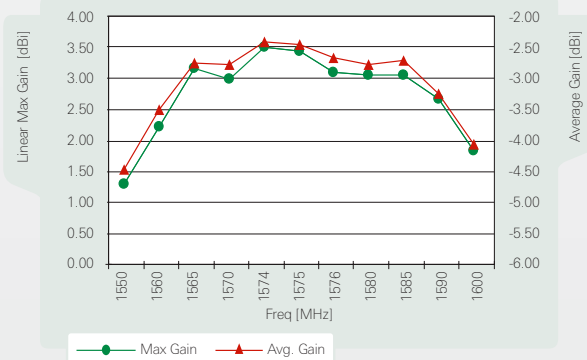
Typical Return Loss S11/ impedance, free space efficiency and gain.



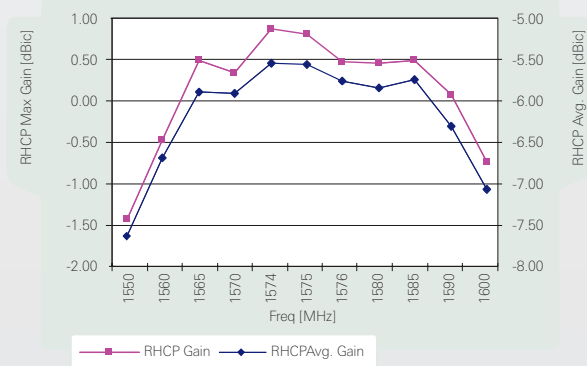
GPS mini 3.2 x 1.6 x 1.1 mm



GPS mini 3.2 x 1.6 x 1.1 mm



GPS mini 3.2 x 1.6 x 1.1 mm



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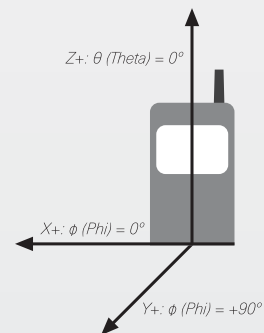
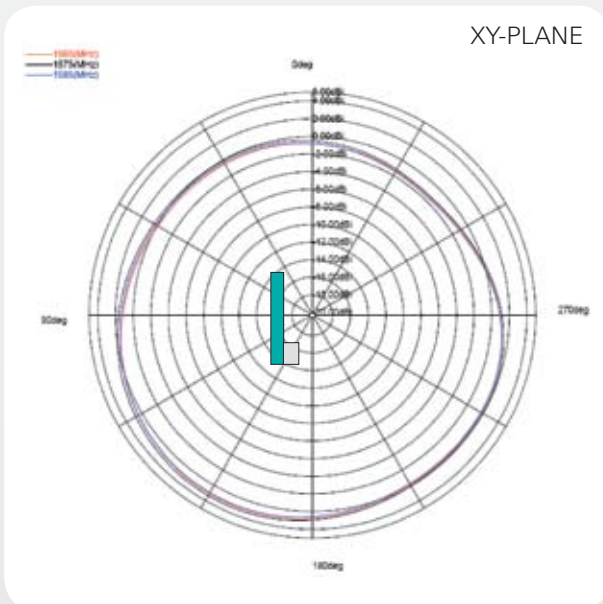
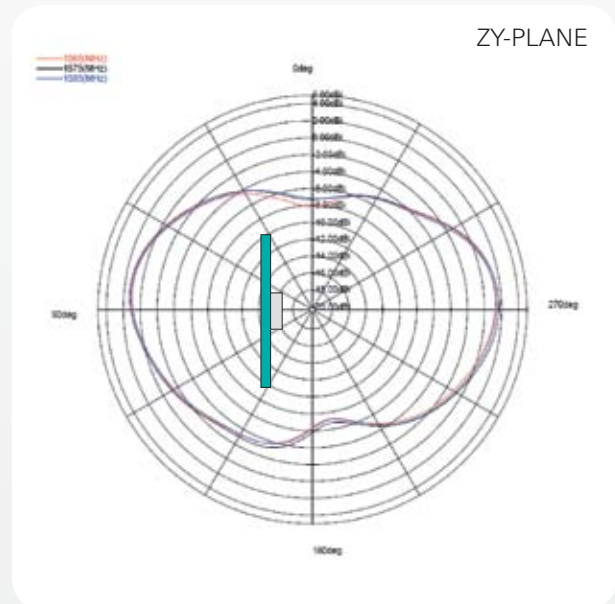
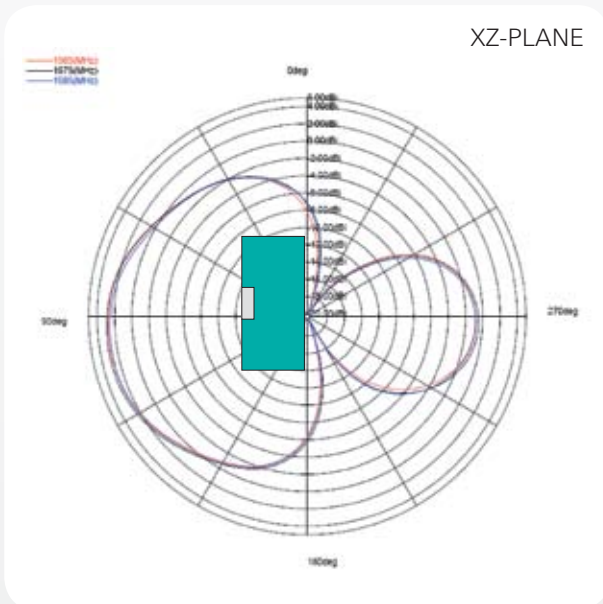
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1.575 GHz GPS Ceramic Chip Antenna

Ground cleared under antenna, clearance area 4.00 x 4.25 mm / 6.25 mm. Pulse Part Number: W3011 / W3011A

1.575 GHz Typical Radiation Patterns



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1.575 GHz GPS Ceramic Chip Antenna

Ground cleared under antenna, clearance area 4.00 x 4.25 mm / 6.25 mm. Pulse Part Number: W3011 / W3011A

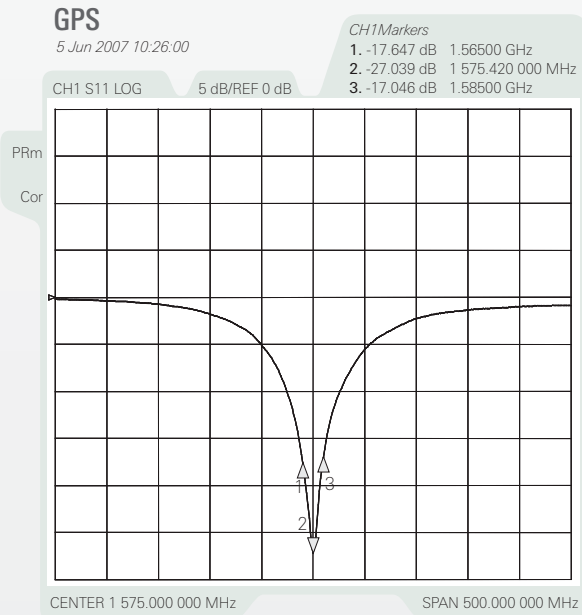
W3011a GPS 1.575GHz Test Set Up and Measured Performance

Ground cleared under antenna, clearance area 4.00 x 6.25 mm

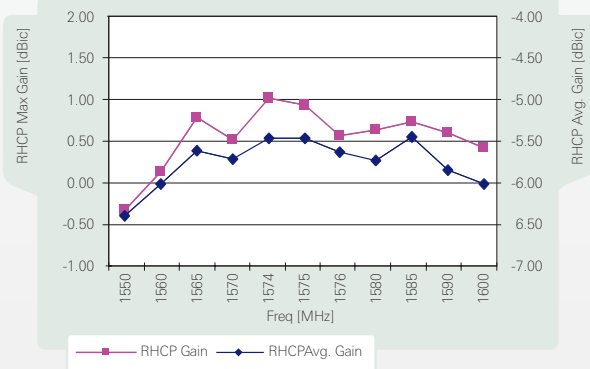
Typical Electrical Characteristics (T=25°C)

Measured on the 80 x 37mm test board with matching circuit (shunt 1.8 pF) and in antenna position 1 on PWB layout.

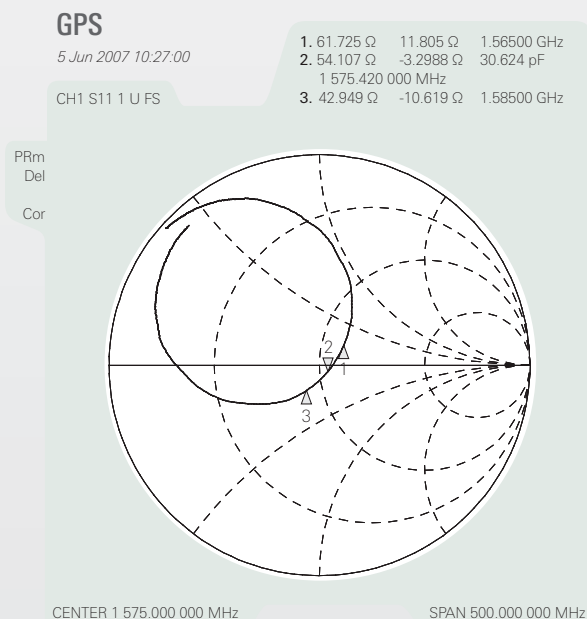
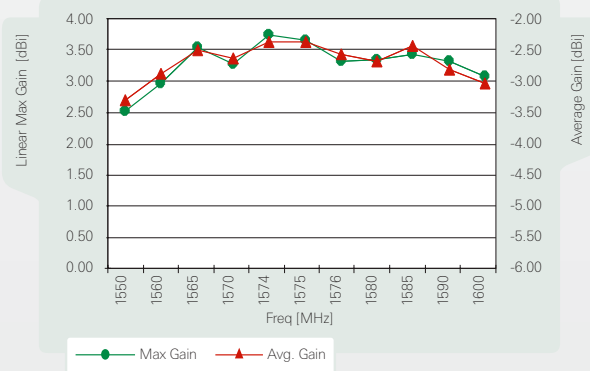
Typical Return Loss S11/ impedance, free space efficiency and gain



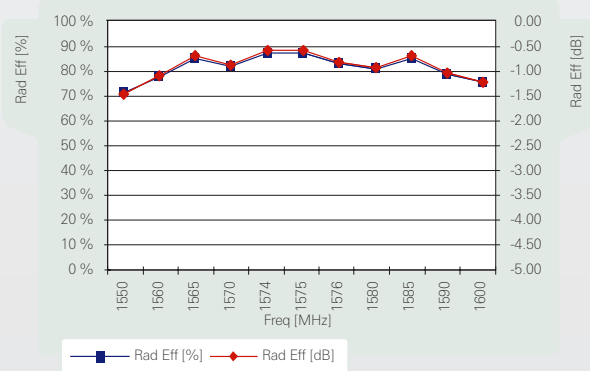
GPS mini 3.2 x 1.6 x 1.1 mm



GPS mini 3.2 x 1.6 x 1.1 mm



GPS mini 3.2 x 1.6 x 1.1 mm



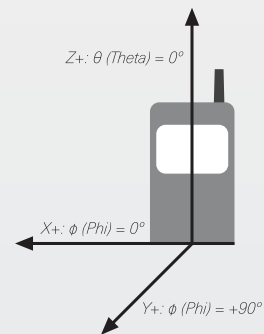
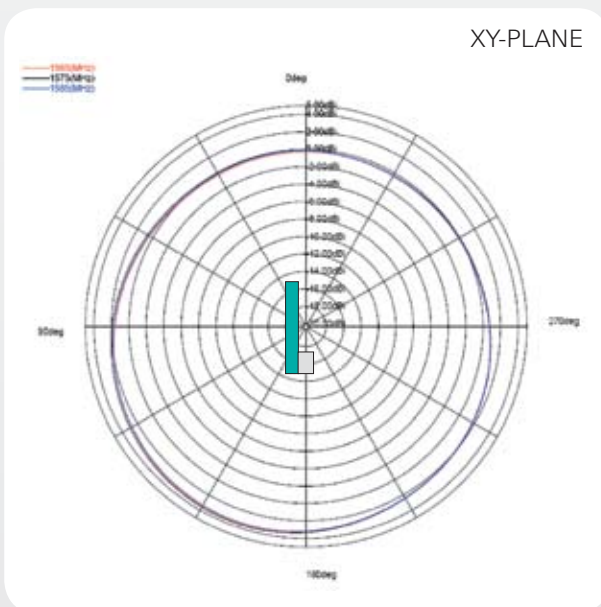
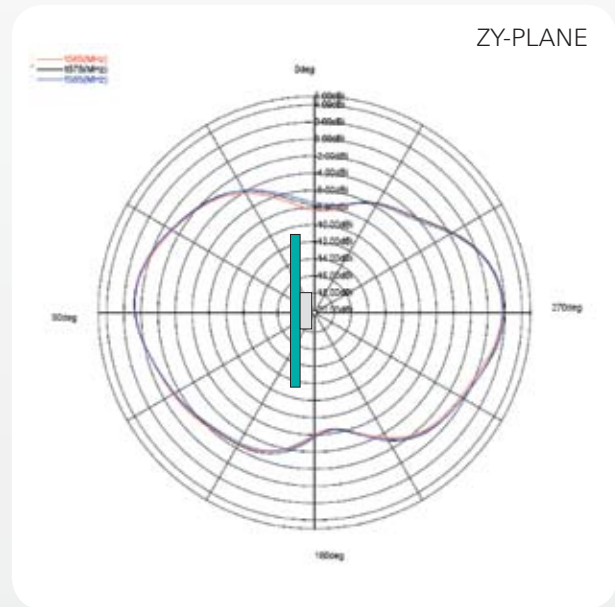
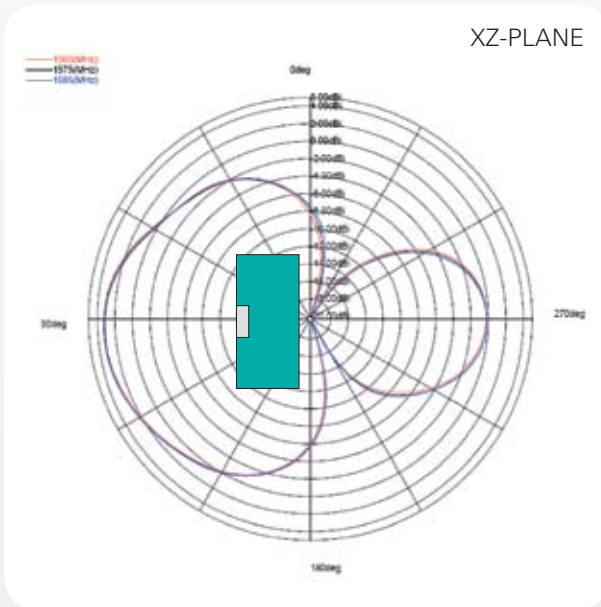
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1.575 GHz GPS Ceramic Chip Antenna

Ground cleared under antenna, clearance area 4.00 x 4.25 mm / 6.25 mm. Pulse Part Number: W3011 / W3011A

1.575 GHz Typical Radiation Patterns



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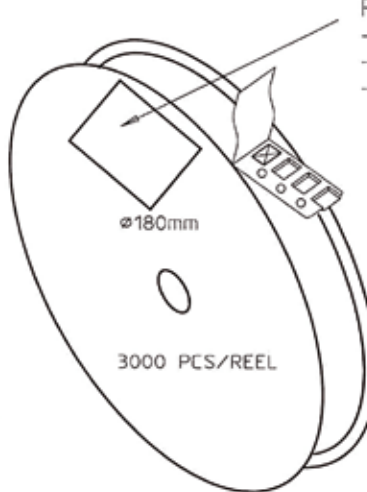
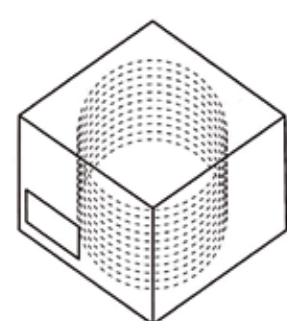
www.pulseeng.com/antennas



1.575 GHz GPS Ceramic Chip Antenna

Ground cleared under antenna, clearance area 4.00 x 4.25 mm / 6.25 mm. Pulse Part Number: W3011 / W3011A

Packing Form

REEL LABEL INFORMATION:

- TRACEABILITY
- QUANTITY
- PRODUCT CODE

CARRIER TAPE H85-00125
width=8,00 depth=1,22
COVER TAPE H85-00126
width=5,60

LENGTH OF TAPE:

- Leader section: 50 empty cavities before component section
- Trailer section: 25 empty cavities after component section.

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

BOX H85-00128 (182x182x132)	1 pcs
- LABEL	1 pcs/BOX
REEL H85-00127 (D180,W12)	10 pcs
- REEL LABEL	1 pcs/REEL

MATERIAL			
HANDLINGS			
	RATIO	DRWN	010305 PeHa H
		DGNER	G
		CHKD	F
		APPRD	E
		APPRD BY	D
PRODUCT H90-OY116-F01P01			C
			B
			A
		DENOMINATION PACKING FORM	
		VERSION	MOD/DATE/NAME

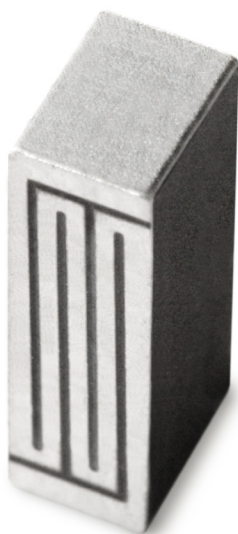
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ISM 900 MHz Ceramic Antenna

Ground cleared under antenna, clearance area 10.80 mm x 8.25 mm. Pulse Part Number: W3012



Features

- Omni directional radiation
- 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

- ISM 900 Band

Electrical specifications @ +25 °C

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

ISM 902 – 928 MHz

Typical performance (test board size 100 x 37 mm, PWB ground clearance area 10.80 mm x 8.25)

Frequency Range [MHz]	RHCP Gain [dBic]	Max Gain [dBi]	Efficiency [%] / [dB]	Return loss min. [dB]	Impedance [Ω]	Operating Temperature [°C]
902 – 928	0.85 (Peak) 0.5 (Band edges)	2 (peak) 0.5 (band edges)	70 / -1,55 (peak) 50 / -3 (band edges)	-6	50	-40 to +85

Pulse Finland Oy

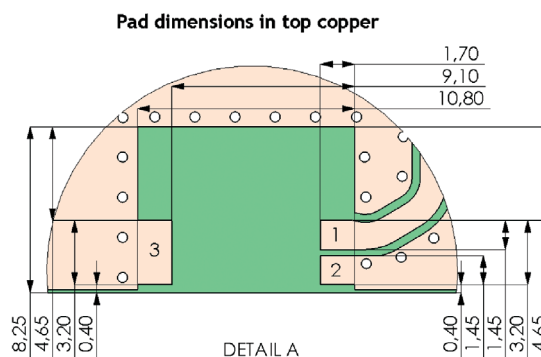
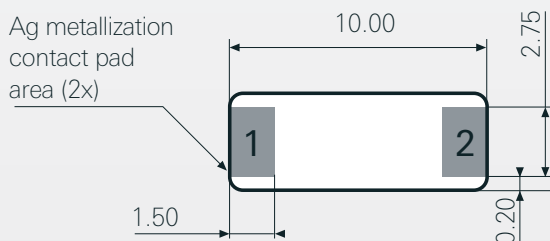
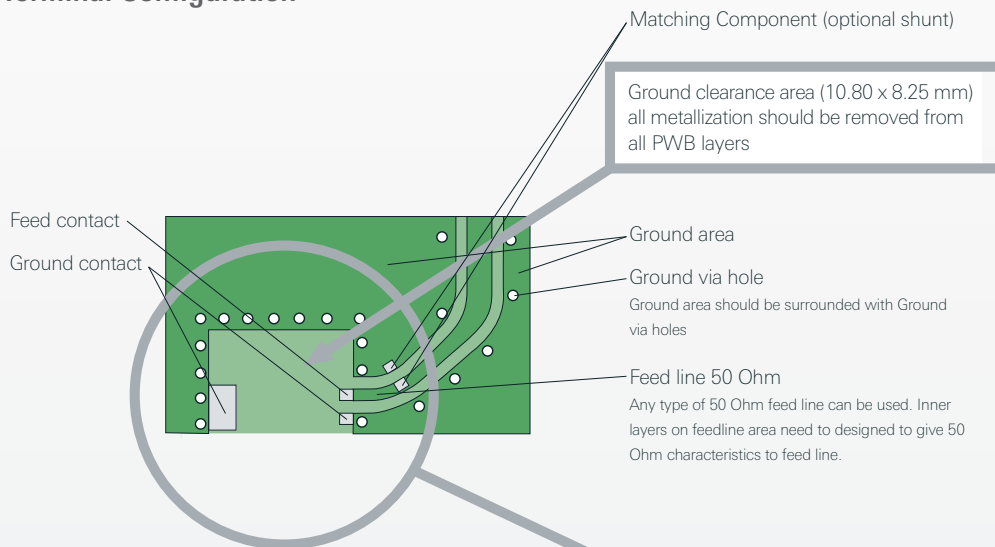
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ISM 900 MHz Ceramic Antenna

Ground cleared under antenna, clearance area 10.80 mm x 8.25 mm. Pulse Part Number: W3012

Terminal Configuration



Antenna features

No.	Terminal name	Terminal Dimensions
1	Feed / GND	1.5 x 2.75 mm
2	Feed / GND	1.5 x 2.75 mm

Antenna is symmetrical.

Either of terminals 1 or 2 can be feed / GND

PWB features

No.	Terminal name	Terminal Dimensions
1	Feed	1,7 x 1,45 mm
2	GND	1,7 x 1,45 mm
3	GND	1,7 x 3,20 mm

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ISM 900 MHz Ceramic Antenna

Ground cleared under antenna, clearance area 10.80 mm x 8.25 mm. Pulse Part Number: W3012

Typical Electrical Characteristics (T=25 °C)

Measured on the 100 x 37mm test board

Typical Return Loss S11/ impedance

ISM 900 MHz

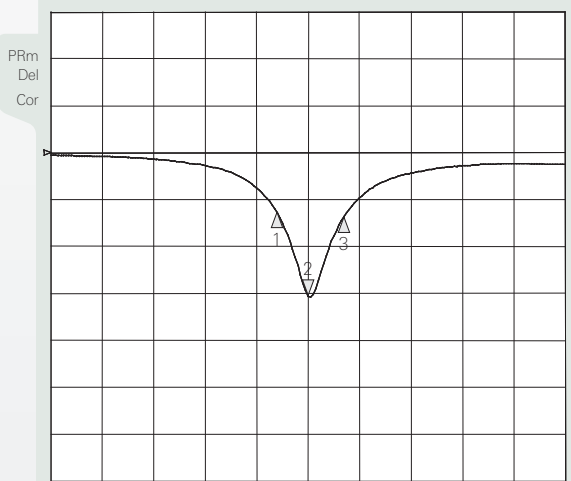
14 Jun 2007 09:55:59

CH1Markers

1. -6.4268 dB 902.000 MHz
2. -15.257 dB 914.000 MHz
3. -6.8206 dB 928.000 MHz

CH1 S11 LOG

5 dB/REF 0 dB



CENTER 914.000 000 MHz

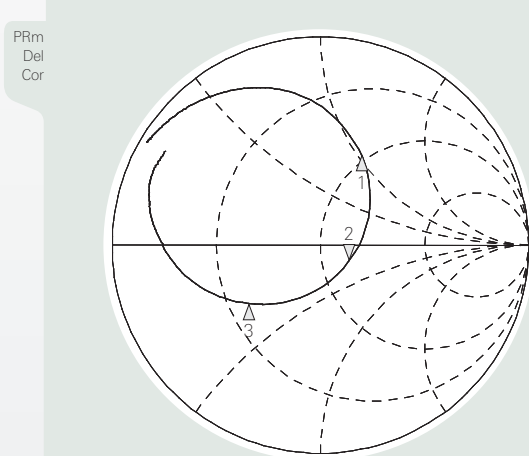
SPAN 200.000 000 MHz

ISM 900 MHz

14 Jun 2007 09:57:22

CH1 S11&M 1 U FS

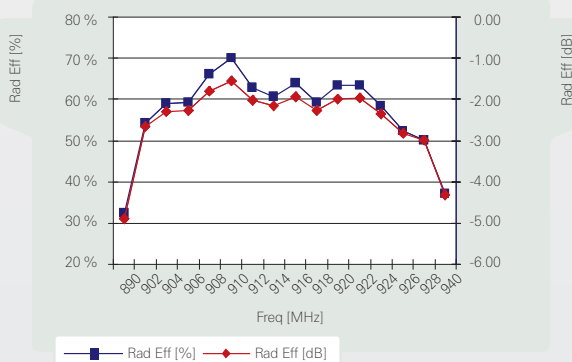
- | | | |
|-----------------|-----------|-------------|
| 1. 47.711 Ω | 51.703 Ω | 902.000 MHz |
| 2. 65.233 Ω | -10.121 Ω | 17.205 pF |
| 914.000 000 MHz | | |
| 3. 21.232 Ω | -14.895 Ω | 928.000 MHz |



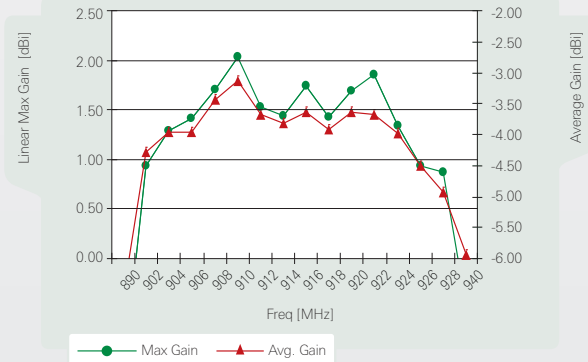
CENTER 914.000 000 MHz

SPAN 200.000 000 MHz

ISM 900 MHz



ISM 900 MHz



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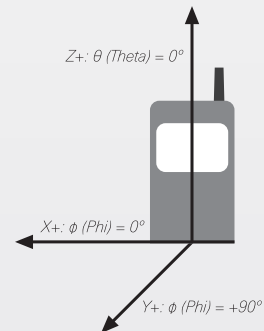
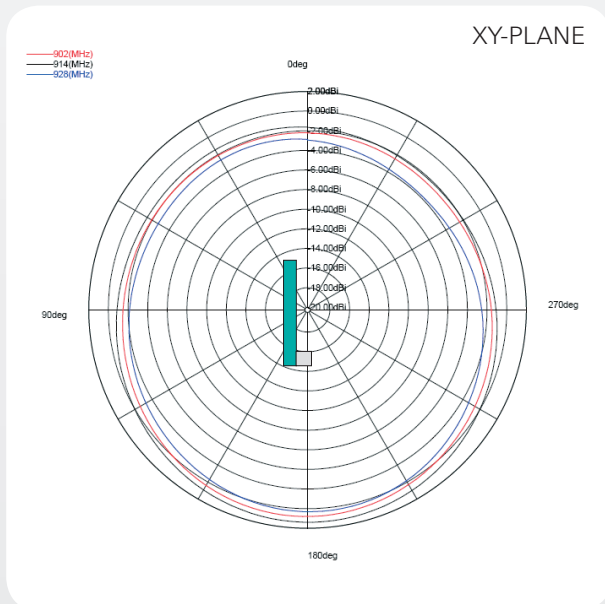
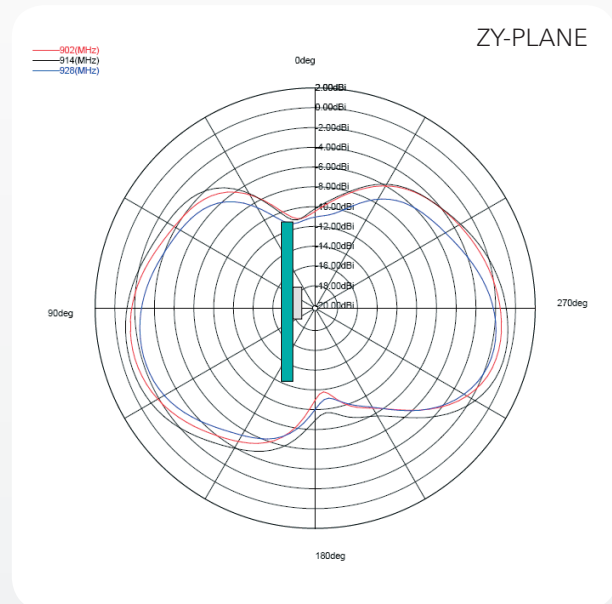
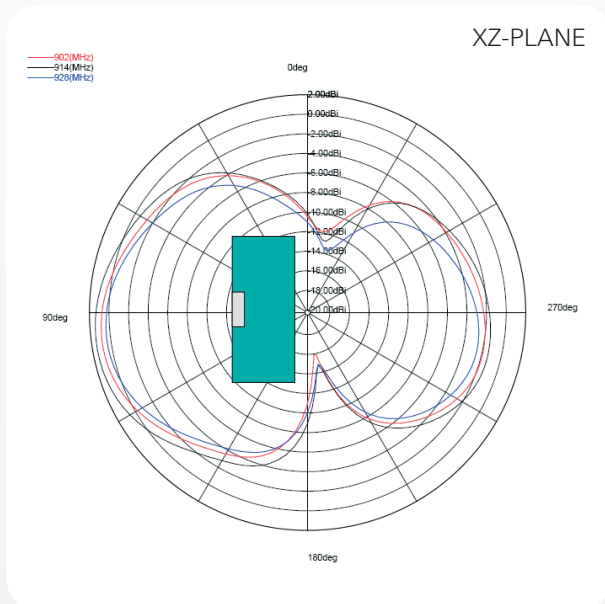


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ISM 900 MHz Ceramic Antenna

Ground cleared under antenna, clearance area 10.80 mm x 8.25 mm. Pulse Part Number: W3012

2,4 GHz Typical Free space Radiation Patterns



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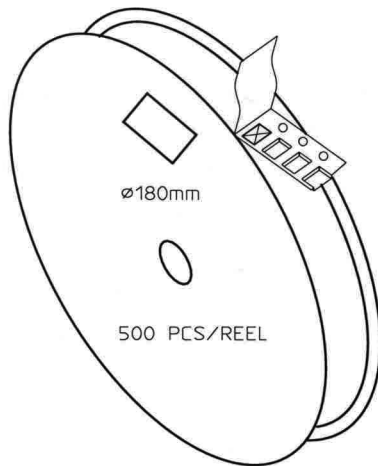


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ISM 900 MHz Ceramic Antenna

Ground cleared under antenna, clearance area 10.80 mm x 8.25 mm. Pulse Part Number: W3012

Packing form

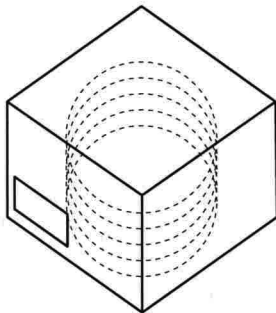


CARRIER TAPE H85-00158
width=24,00 depth=4.15
COVER TAPE H85-00159
width=21.20

LENGTH OF TAPE:

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

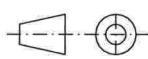
Empty part cavities at leader and trailer section of the tape must be sealed with top cover tape.



BOX H85-00128 1 pcs
(182x182x125)
- LABEL 1 pcs/BOX
REEL H85-00160 4 pcs
(D180, W28)
- 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		
PACKING FORM			VERSION	MOD/DATE/NAME		

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1.575 GHz Helical GPS SMD Antenna

Ground cleared under antenna, clearance area 7.50 x 5.50 mm

Pulse Part Number: W3110



Features

- Low profile (5.5 mm)
- Compact size WxLxH (5.0 x 2.5 x 5.5 mm)
- Low weight (170 mg)
- Lead free materials
- Fully SMD compatible
- Lead free soldering compatible
- Tape and reel packing
- RoHS Compliant Product

Applications

- 1.575 GHz L1 band GPS receivers

Engineering samples available

Electrical specifications @ +25 °C

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

1.575 GHz GPS

Typical performance (test board size 80 x 37 mm, PWB ground clearance area 7.50 x 5.50 mm)

Antenna measured on the test PWB with plastic covers and with matching circuit. Antenna location: top corner, left.

Frequency Range [MHz]	RHCP Gain [dBic]	Linear Max Gain [dBi]	Efficiency [%] / [dB]	Return loss min. [dB]	Impedance [Ω]	Operating Temperature [°C]
1575.42 +/- 10	-2.1 (Peak) -2.4 (Band edges)	1.3 (Peak) 0.7 (Band edges)	47 / -3.3 (Peak) 43 / -3.7 (Band edges)	-16	50	-40 to +85

Pulse Finland Oy

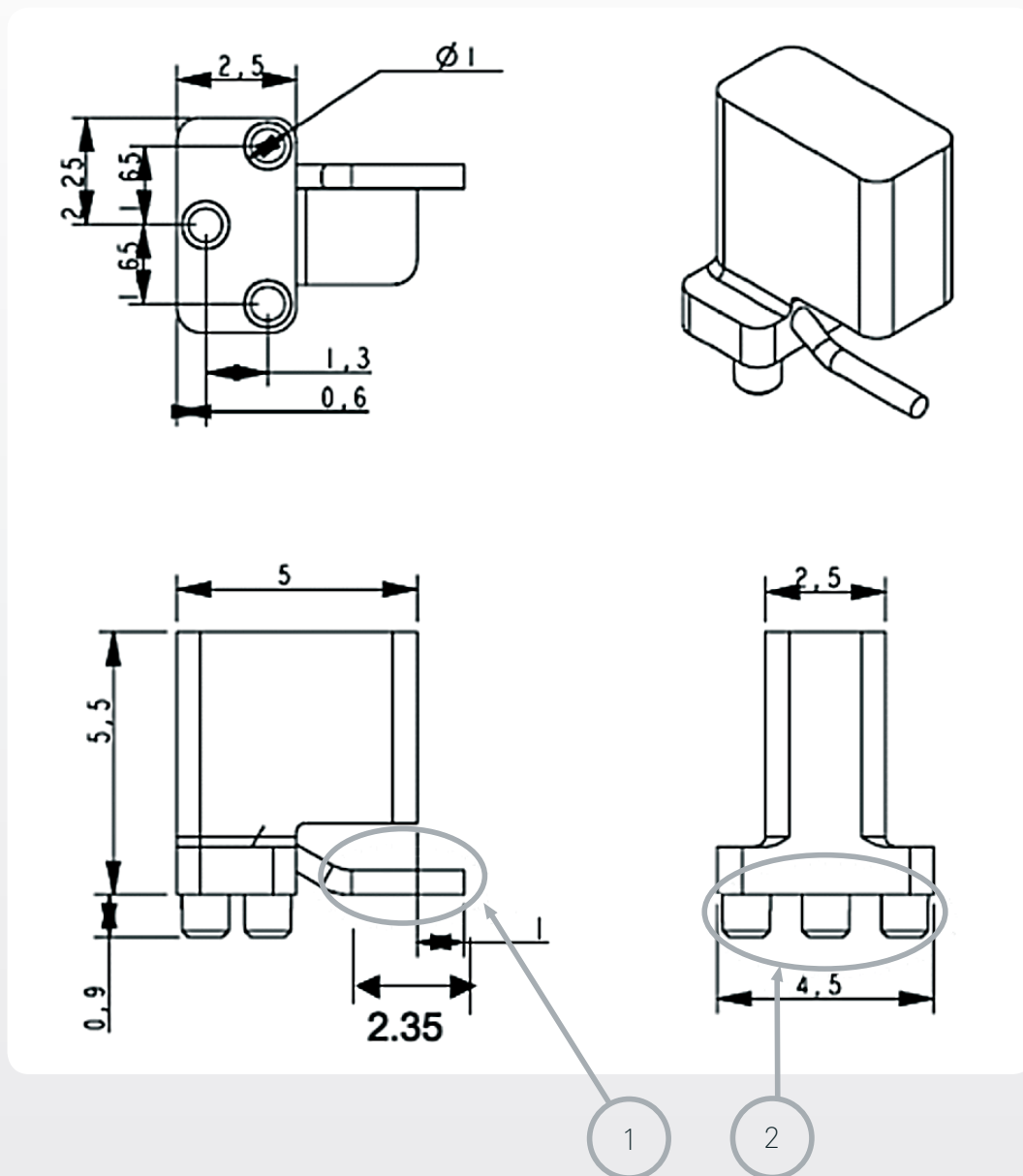
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1.575 GHz Helical GPS SMD Antenna

Ground cleared under antenna, clearance area 7.50 x 5.50 mm

Terminal Configuration



No.	Terminal Name	Terminal Dimensions
1	Feed	0.50 mm diameter Sn plated wire, planar soldering area length 2.35 mm
2	Mechanical support studs	1.00 mm diam, length 0.90 mm

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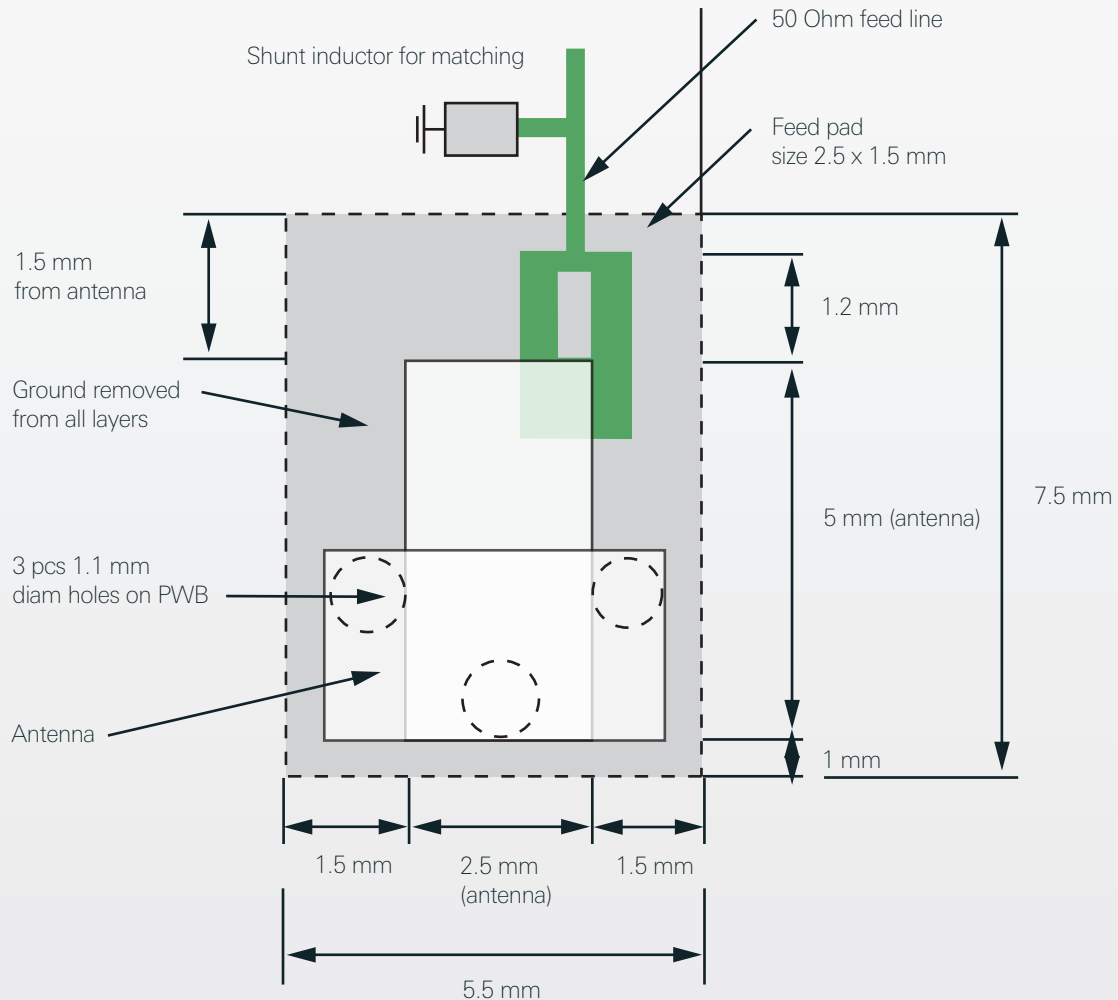
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1.575 GHz Helical GPS SMD Antenna

Ground cleared under antenna, clearance area 7.50 x 5.50 mm

Recommended test board layout for electrical characteristic measurement, test board outline size 100 x 40 mm

Feed line should be designed to match 50 Ω characteristic impedance, depending on PWB material and thickness.



Matching and tuning component values depend on application and surrounding mechanics / materials.

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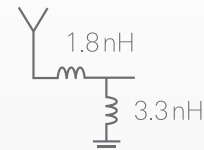


1.575 GHz Helical GPS SMD Antenna

Ground cleared under antenna, clearance area 7.50 x 5.50 mm

Typical Electrical Characteristics (T=25 °C)

Antenna measured on the test PWB with plastic cover. Shunt and series inductors used for matching.



Typical Return Loss S11/ impedance

GPS ANTENNA

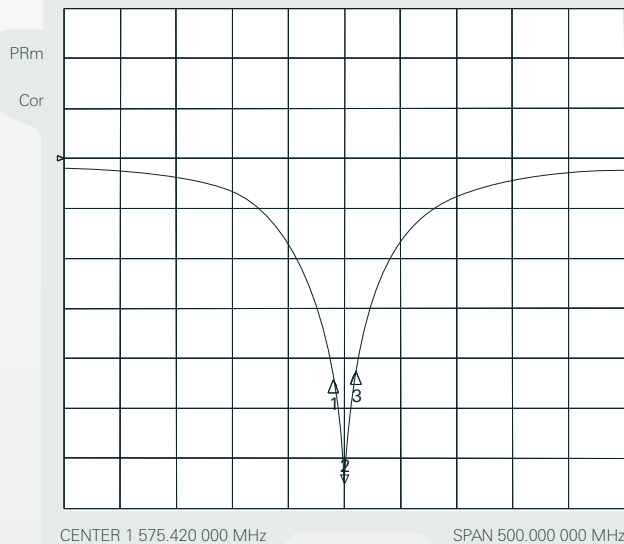
24 Aug 2006 08:44:11

CH1 S11 LOG

5 dB/REF 0 dB

CH1Markers

1. -17.512 dB 1.56500 GHz
2. -32.040 dB 1575.420000 MHz
3. -16.539 dB 1.58500 GHz



GPS ANTENNA

24 Aug 2006 08:45:11

CH1Markers

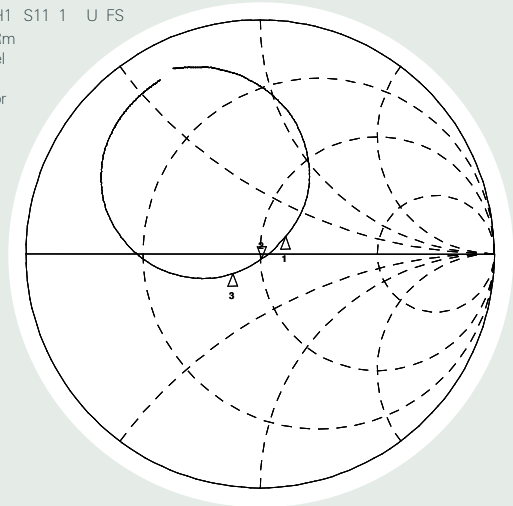
- | | | |
|------------------|-----------|-------------|
| 1. 61.484 Ω | 9.2539 Ω | 1.56500 GHz |
| 2. 50.723 Ω | -2.2129 Ω | 45.652 pF |
| 1575.420 000 MHz | | |
| 3. 39.158 Ω | -6.7695 Ω | 1.58500 GHz |

CH1 S11 1 U FS

PRm

Del

Cor



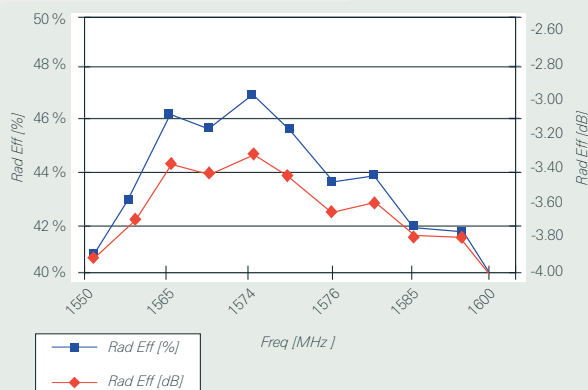
CENTER 1 575.420 000 MHz

SPAN 500.000 000 MHz

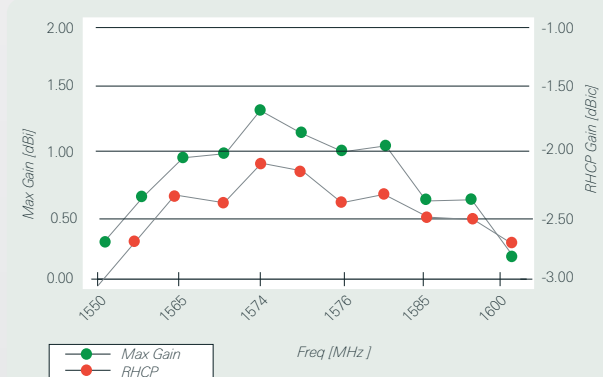
Free space efficiency and maximum gain

PWB ground clearance area 7.50 x 5.50 mm

GPS 5.5 mm Helical Antenna



GPS 5.5 mm Helical Antenna



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1.575 GHz Helical GPS SMD Antenna

Ground cleared under antenna, clearance area 7.50 x 5.50 mm

Typical Free Space Radiation Patterns

