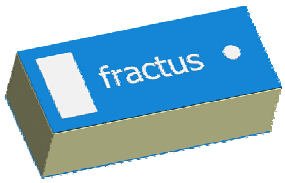
fractus

Optimised Antennas for Wireless Devices

Compact Reach Xtend™
Bluetooth®, 802.11b/g WLAN Chip Antenna

Application Notes: Wireless Headsets



Antenna Part Number:
FR05-S1-N-0-102

Bluetooth™

RoHS 2002/95/EC

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Fractus is an ISO 9001:2002 certified company
All our antennas are lead-free and RoHS compliant

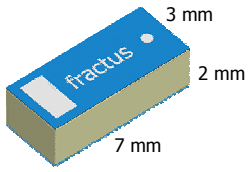
NOTES

The products described in this document are protected worldwide by at least one of the following Patents and Patent Applications owned by Fractus: WO0154225, WO0122528, PCT/EP01/10589, PCT/EP02/07837, US60/613394, US60/627653 and PCT/EP02/07836.

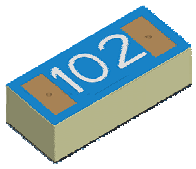
QUICK REFERENCE GUIDE

Technical Features	
Frequency range	2400-2500 MHz
Radiation Efficiency	> 70%
Peak Gain	> 1 dBi
VSWR	< 2:1
Polarization	Linear
Weight	0.1 g
Temperature	-40 to + 85ºC
Impedance	50Ω
Dimensions	7x3x2 mm

Note : Results measured in a reference evaluation board of 41x23 mm described in the following section



Front View



Back View

For further information related to the standard features of the Compact Reach Xtend Chip Antenna please refer to the *User Manual*.

PCB RECOMMENDED CONFIGURATIONS

Compact Reach Xtend has been designed to purposely minimise product integration efforts and optimise device performance. This document provides integration and mounting recommendations for the use of the Compact Reach Xtend Chip Antenna for wireless headset devices. Standard PCBs within this document were obtained through market research to provide you with the most accurate results.

Size reduction and cost are the key drivers for the wireless headset market. Based on the importance of PCB space for component allocation, the recommended configurations are designed to provide the best performance using a minimum clearance area (PCB area without ground plane) for the antenna.

These Application Notes provide you with both the performance of the headset PCB with standard plastic housing and the performance of the headset mounted on the user's ear. Following the instructions in this guide, you will

- ✓ reduce your product development and manufacturing costs
- ✓ increase your device performance

Please contact your sales representative at Richardson Electronics if you require additional information on antenna integration or optimisation on your industrial design.

RICHARDSON ELECTRONICS
Refer to the last page of this document for contact information of your local sales agent.

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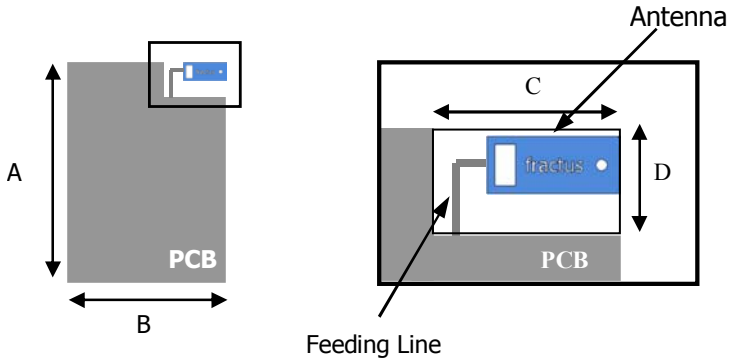
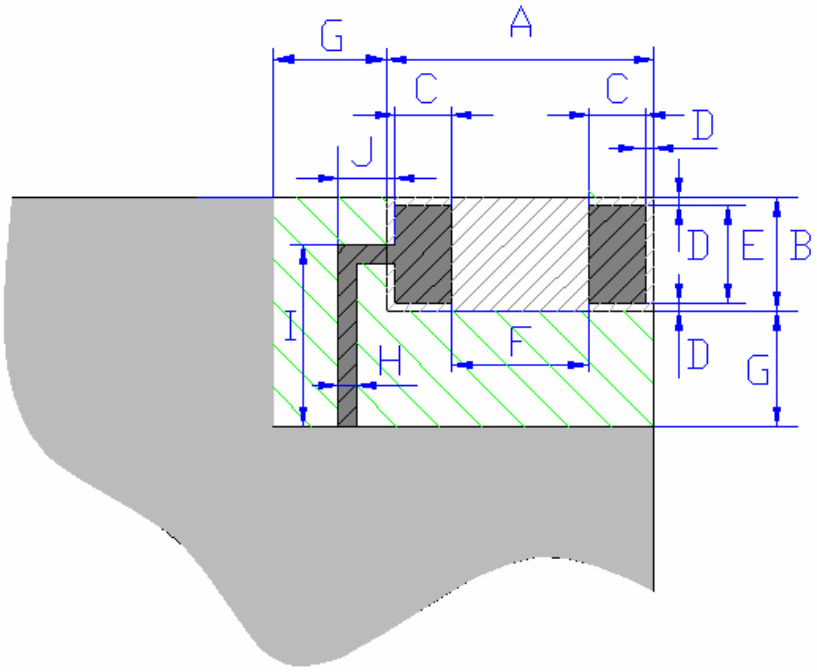
CONFIGURATION 1 (40X20 MM PCB)



A	40	**C**	10
B	20	**D**	6

All dimensions are in mm

Figure 1. *PCB Dimensions and Clearance Dimensions.*



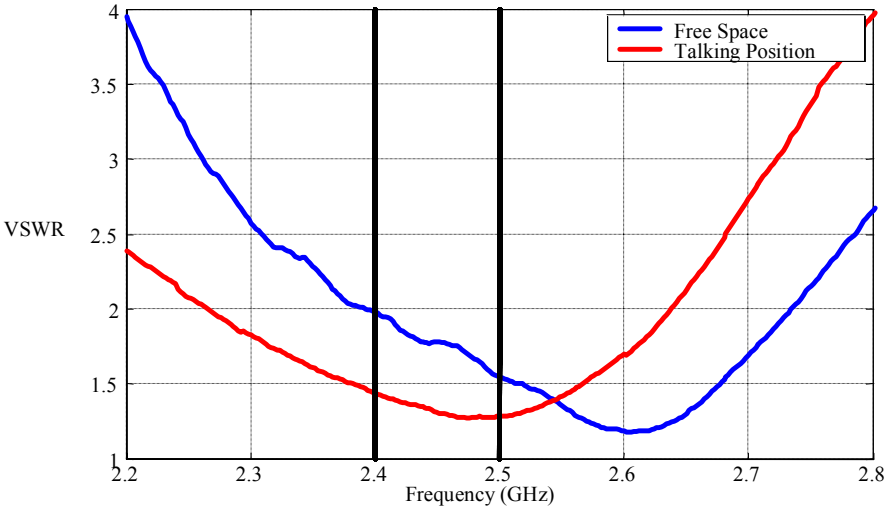
Letter	Meas.
A	7.00
B	3.00
C	1.50
D	0.20
E	2.60
F	3.60
G	3.00
H	0.50
I	4.75
J	1.50

All dimensions are in millimetres.

Zone occupied by the antenna
Soldering pads, feed point and feeding line
Antenna Clearance (PCB without ground
PCB ground-plane

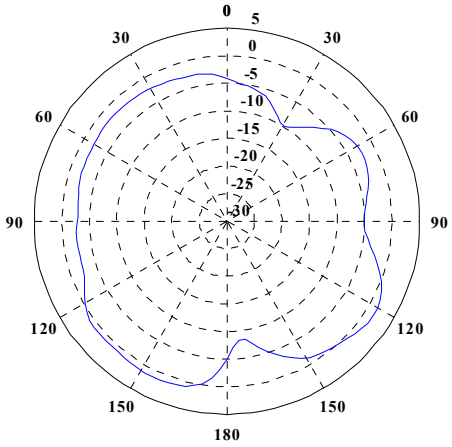
Figure 2. *Antenna Footprint*

VSWR, Radiation Patterns, Gain and Efficiency

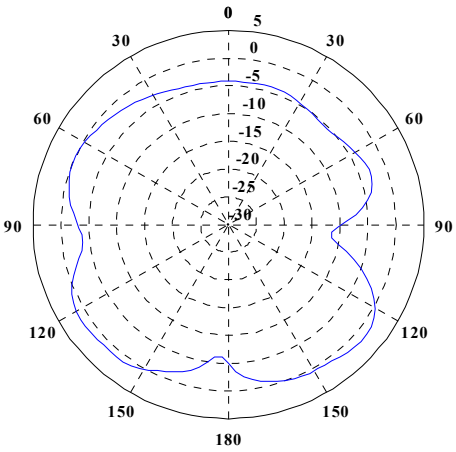


Measurement conditions:

- ABS Plastic housing (distance to the antenna: 0 mm).
- 2 element matching network.



Azimuth Cut



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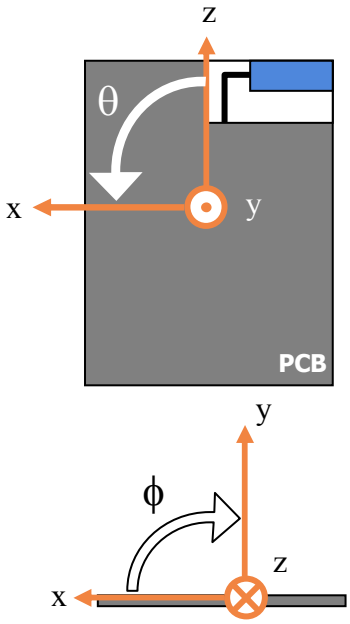
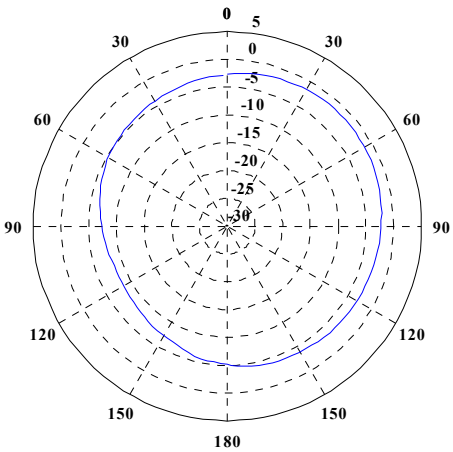


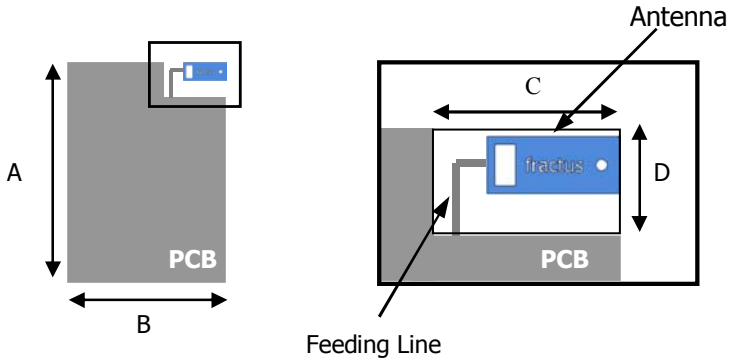


cut ϕ = 90º

Gain	Peak Gain	1.5 dBi
	Average Gain	-2.3 dBi
Efficiency	Peak Efficiency	75 %
	Average Efficiency	70 %

Note: Gain and efficiency values within the 2,5-2,6 GHz band (free space).

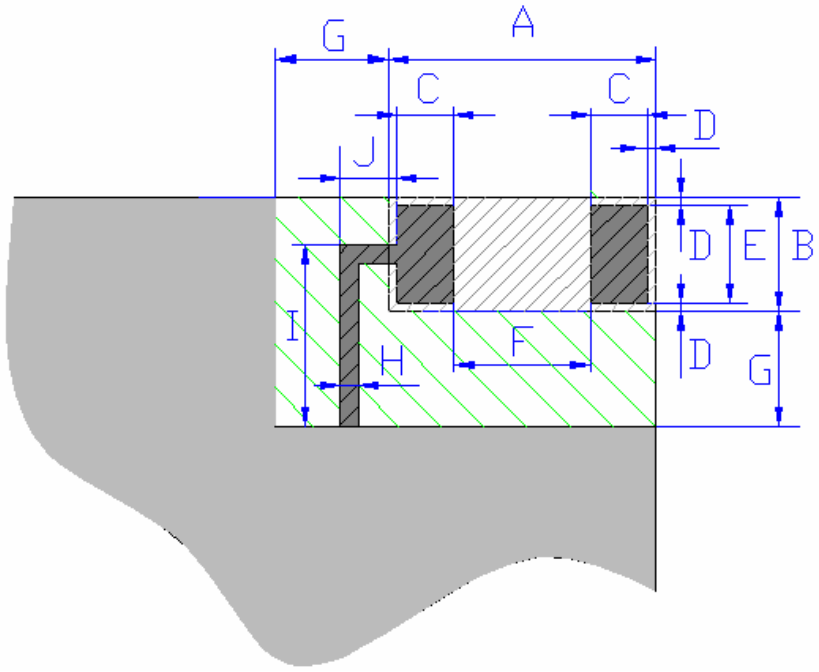
CONFIGURATION 2 (30X20MM PCB)



A	30	**C**	10
B	20	**D**	6

All dimensions are in mm

Figure 3. *PCB Dimensions and Clearance Dimensions.*



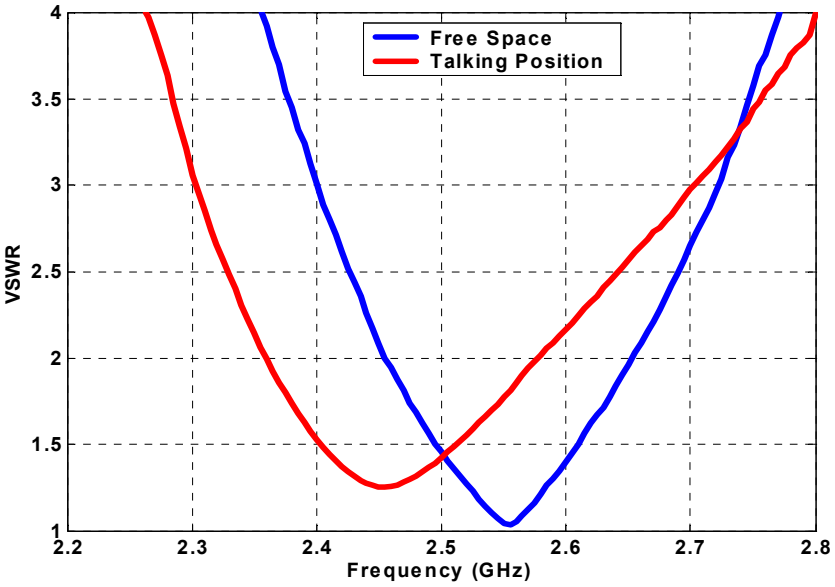
Letter	Meas.
A	7.00
B	3.00
C	1.50
D	0.20
E	2.60
F	3.60
G	3.00
H	0.50
I	4.75
J	1.50

All dimensions listed in millimetres.

Zone occupied by the antenna
Soldering pads, feed point and feeding line
Antenna Clearance (PCB without ground plane)
PCB ground-plane

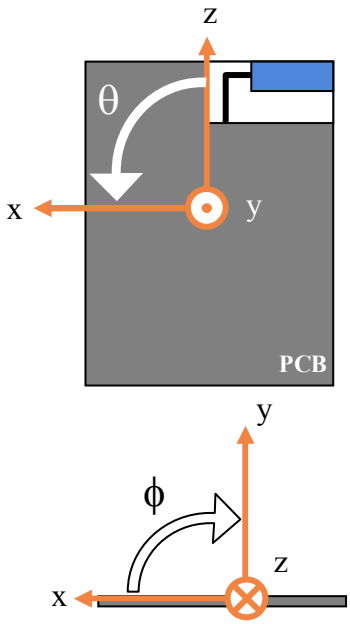
Figure 4. *Antenna Footprint*

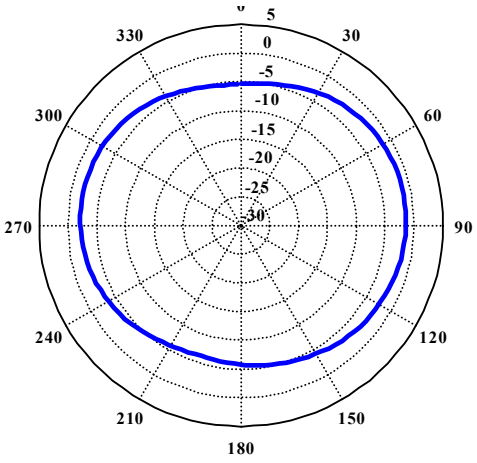
VSWR, Radiation Patterns, Gain and Efficiency



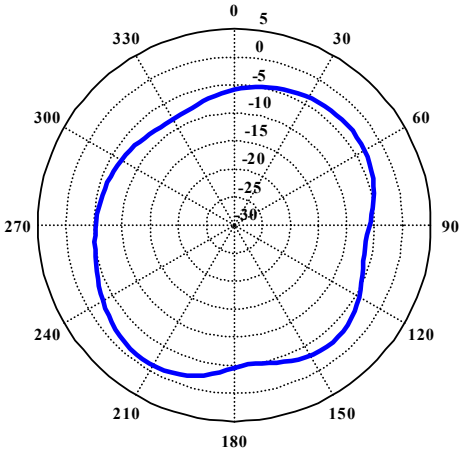
Measurement conditions:

- ABS Plastic housing (distance to the antenna: 0 mm).
- 2 element matching network.





Azimuth Cut



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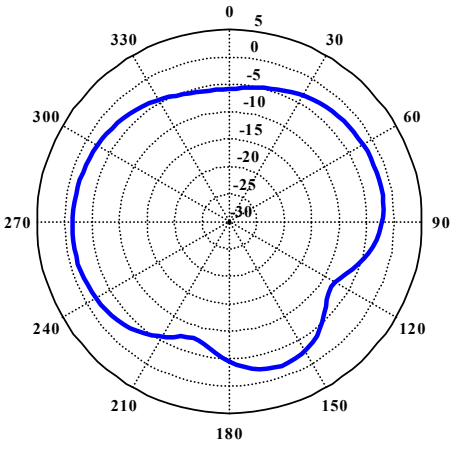
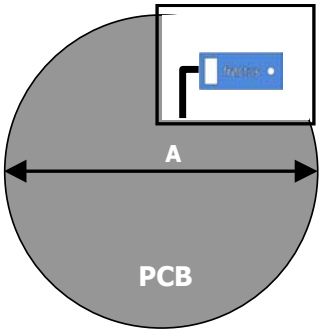


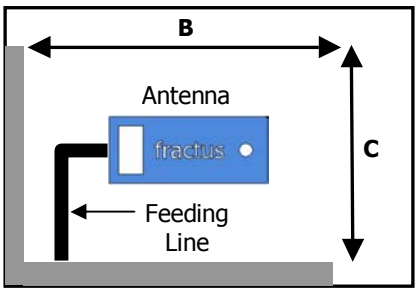
cut ϕ = 90º

Gain	Peak Gain	-0.3 dBi
	Average Gain	-3.9 dBi
Efficiency	Peak Efficiency	45 %
	Average Efficiency	41 %

Note: Gain and efficiency values within the 2,5-2,6 GHz band (free space).

CONFIGURATION 3 (CIRCLE PCB – 40 MM DIAMETER)

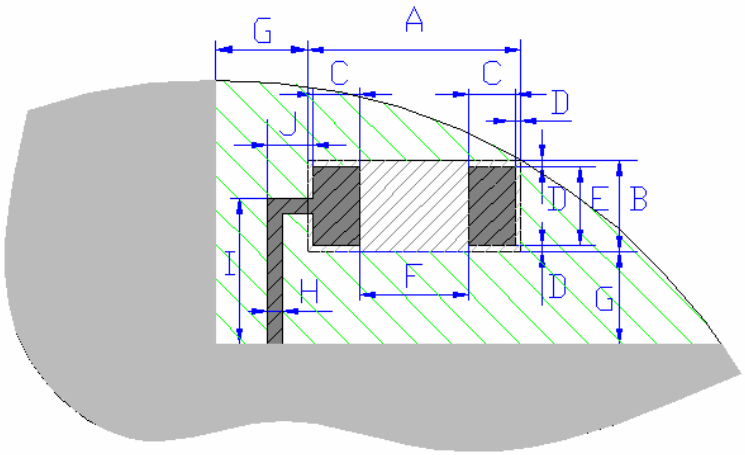




A	40	**C**	6
B	10		

All dimensions are in mm

Figure 5. *PCB Dimensions and Clearance Dimensions.*



Letter	Meas.
A	7.00
B	3.00
C	1.50
D	0.20
E	2.60
F	3.60
G	3.00
H	0.50
I	4.75
J	1.50

All dimensions listed in millimetres.

Zone occupied by the antenna

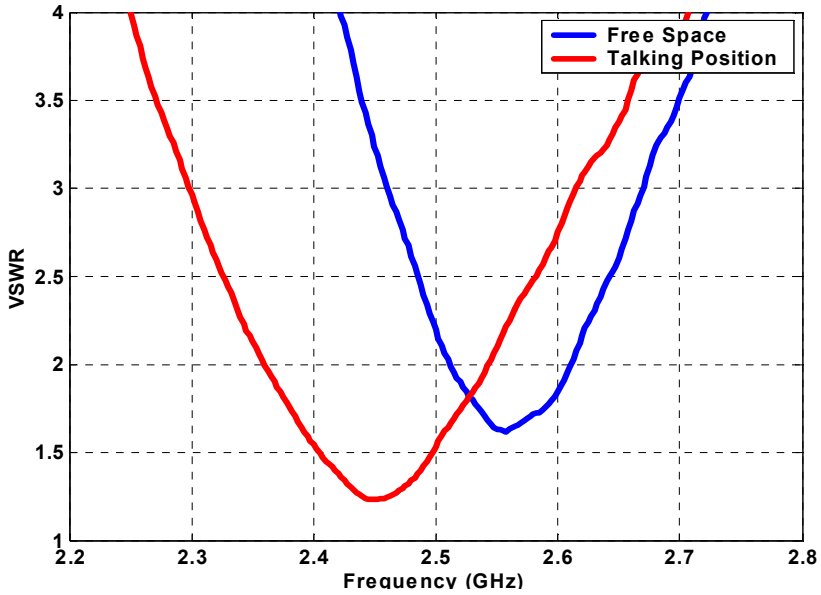
Soldering pads, feed point and feeding line

Antenna Clearance (PCB without ground plane)

PCB ground-plane

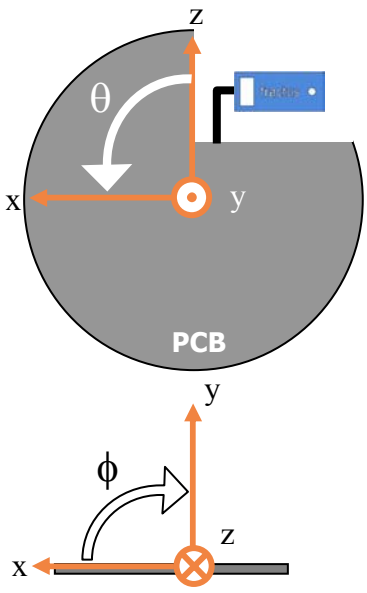
Figure 5. *Antenna Footprint*

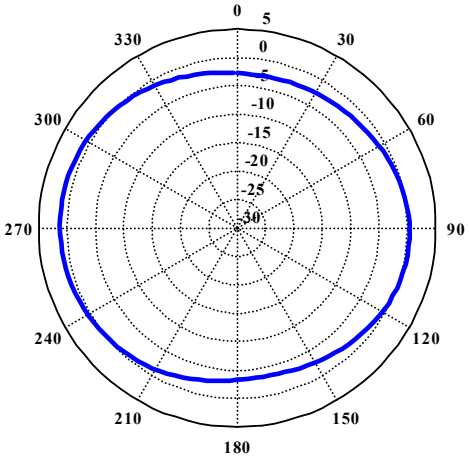
VSWR, Radiation Patterns, Gain and Efficiency



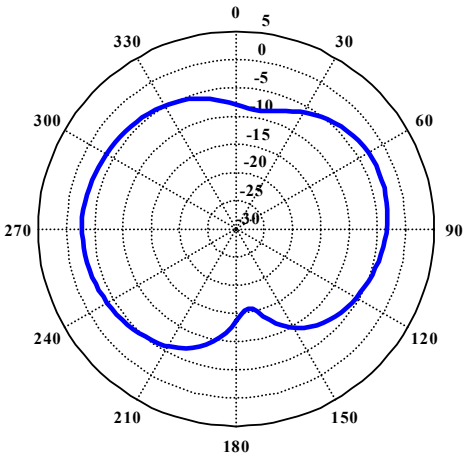
Measurement conditions:

- ABS Plastic housing (distance to the antenna: 0 mm).
- 2 element matching network.

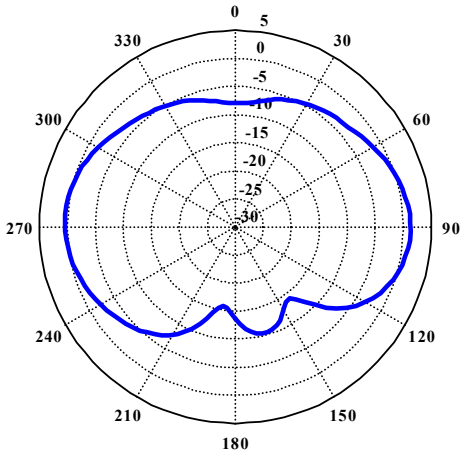




Azimuth Cut



cut ϕ = 0º

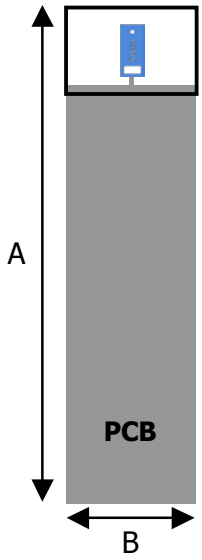


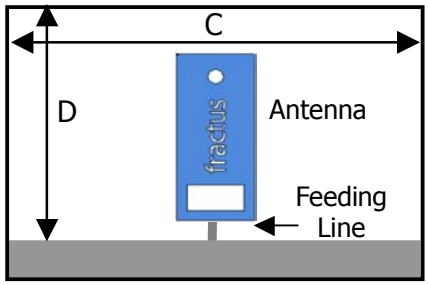
cut ϕ = 90º

Gain	Peak Gain	1.3 dBi
	Average Gain	-4.5 dBi
Efficiency	Peak Efficiency	52 %
	Average Efficiency	46 %

Note: Gain and efficiency values within the 2,5-2,6 GHz band (free space).

CONFIGURATION 4 (60X15MM PCB)

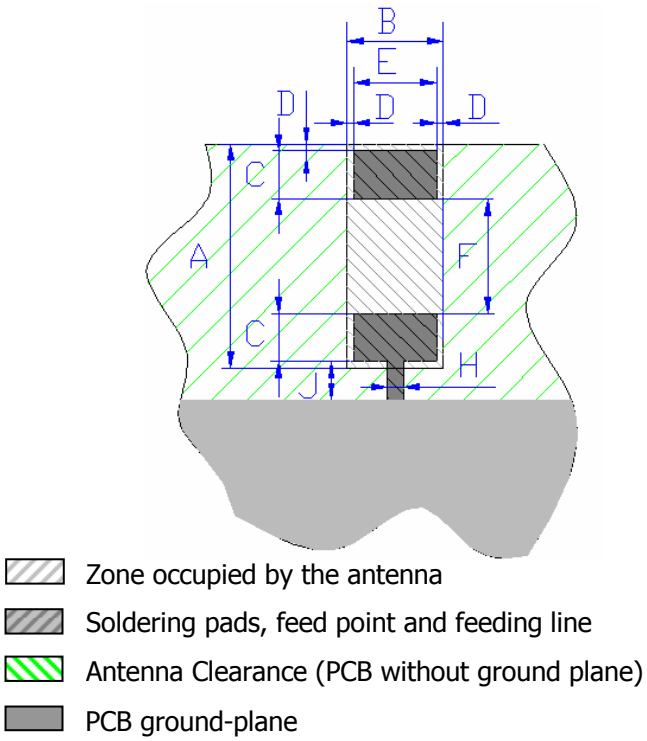




A	60	**C**	15
B	15	**D**	8

All dimensions are in mm

Figure 6. *PCB Dimensions and Clearance Dimensions.*

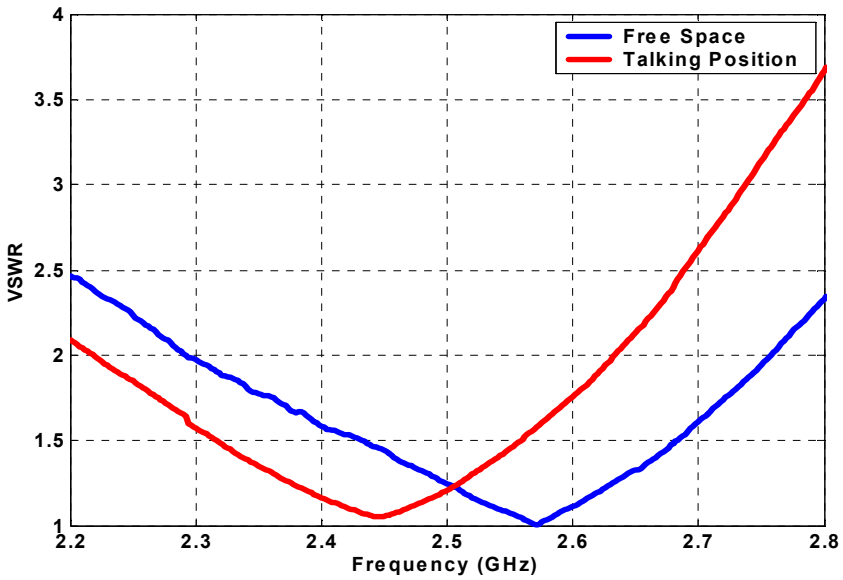


Letter	Meas.
A	7.00
B	3.00
C	1.50
D	0.20
E	2.60
F	3.60
G	N/A
H	0.50
I	N/A
J	1.20

All dimensions listed in millimetres.

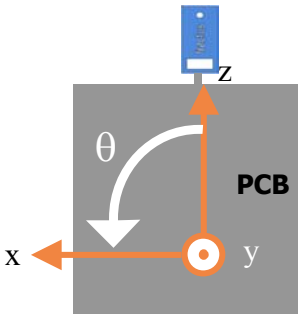
Figure 7. *Antenna Footprint*

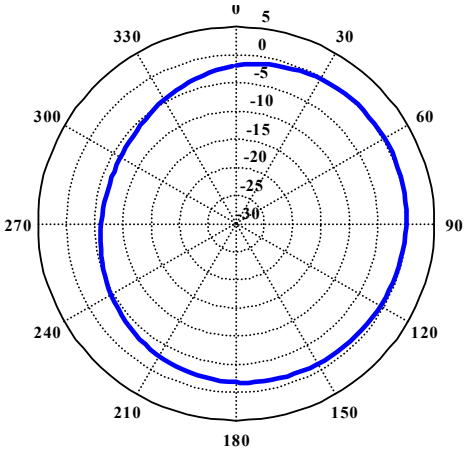
VSWR, Radiation Patterns, Gain and Efficiency



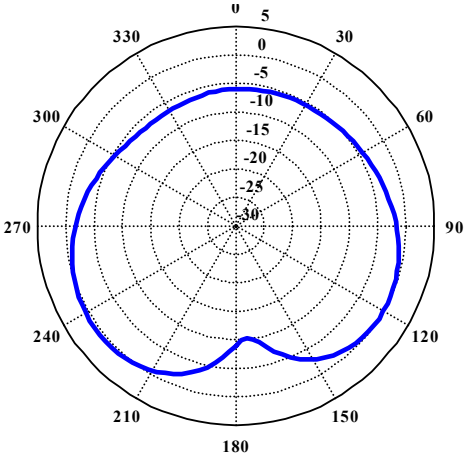
Measurement conditions:

- ABS Plastic housing (distance to the antenna: 0 mm).
- 2 element matching network.





Azimuth Cut



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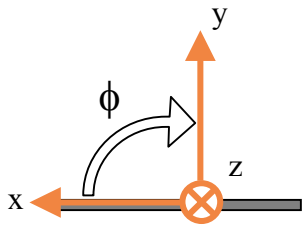

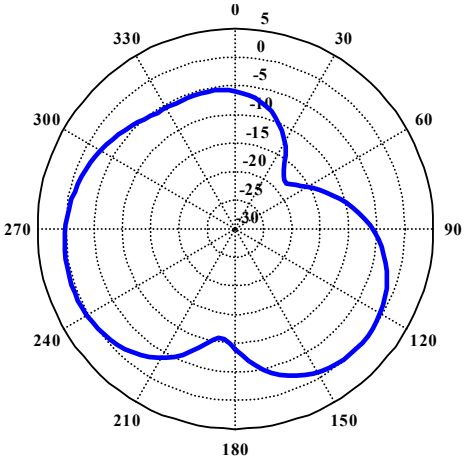

cut ϕ = 90º

Gain	Peak Gain	1.1 dBi
	Average Gain	-3.5 dBi
Efficiency	Peak Efficiency	60%
	Average Efficiency	56 %

Note: Gain and efficiency values within the 2,5-2,6 GHz band (free space).

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Please, contact your local Richardson Electronics' distributor to obtain pricing information and place an order.

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Fax: +86 (21) 6440-1293

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Fax: +86-755-82940656

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Fax: +81 (3) 5215-1588

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