

ECN/PCN No.: R0520

For Manufacturer

Product Description: GNSS L1/L2/L5/L6 Ceramic Stacked Patch Antenna	Abracon Part Number / Part Series: AANI-PP-0234	☐ Documentation only ☒ ECN ☐ EOL	☐ Series ☐ Part Number
Affected Revision: IR	New Revision: A	Application:	☐ Safety ☒ Non-Safety

Prior to Change:

GNSS L1/L2/L5/L6 Ceramic Stacked Patch Antenna

AANI-PP-0234

Request Samples

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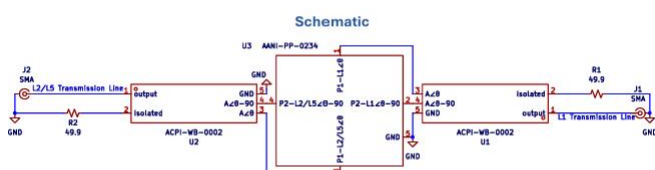
50 x 50 x 10 mm
 RoHS Compliant
 MSL Level = 1

Evaluation Board Outline & Hybrid Coupler

The evaluation board (Abracon AANI-PP-0234-EVB) is developed to simplify antenna testing and evaluation. It has a size of 70mm(L) x 70mm(W) and includes an SMA connector. The purpose is to give a reference design for an optimal antenna implementation. The evaluation board can also be used to test other implementations by cutting and soldering the PCB into any device.

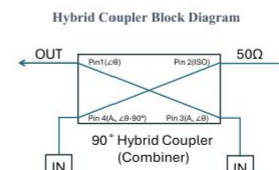
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Schematic



Component	Description	Manufacturer	Number	QTY
U3 (Ant.)	GNSS L1/L2/L5/L6 Ceramic Stacked Patch Antenna	Abracon	AANI-PP-0234	1
U1, U2	Hybrid Coupler (6.35 x 5.08 x 1.7 mm)	Abracon	ACPI-WB-0002	2
R1, R2	49.9 ohms (0603 / 1608 metric)	YAGEO	RC0603FR-0749R9L	2

Hybrid Coupler Block Diagram





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After Change:

GNSS L1/L2/L5/L6 Ceramic Stacked Patch Antenna



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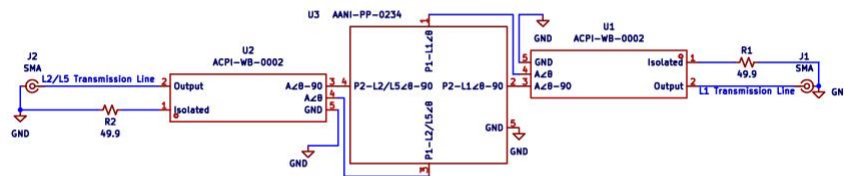
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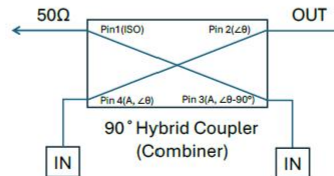
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Cause/Reason for Change: Updated reference design for hybrid couplers

Change Plan

Effective Date:

07/15/2026

Additional Remarks:

Change Declaration:

Issued Date:

07/15/2026

Issued By:

Allan

Issued Department:

Engineering

Approval:

Saravanan Subramanian
Engineering Director

Approval:

Reuben Quintanilla
Quality Director

Approval:

Ying Huang
Purchasing Director

For Abracon EOL only

Last Time Buy (if applicable):

Alternate Part Number / Part Series:

Additional Approval:	Additional Approval:	Additional Approval:
Customer Approval (If Applicable)		
Qualification Status: ☐ Approved ☐ Not accepted <i>Note: It is considered approved if there is no feedback from the customer 1 month after ECN/PCN is released.</i>		
Customer Part Number:		Customer Project:
Company Name:	Company Representative:	Representative Signature:
Customer Remarks:		

Brand	Affected PN	Discontinued/ EOL PN	Added PN	Series	ECO#	Datasheet Link	ECN Notification Link
Abracon	AANI-PP-0234			AANI-PP-0234	R0520	https://abracon.com/datasheets/AANI-PP-0234.pdf	https://abracon.com/downloads/ECN-PCN/ECN-PCN-Notification_ECOR0520_AANI-PP-0234.pdf

GNSS L1/L2/L5/L6 Ceramic Stacked Patch Antenna



AANI-PP-0234

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50 x 50 x 10 mm
RoHS Compliant
MSL Level = 1

Description

This advanced multi-frequency GNSS antenna delivers comprehensive support across GPS L1/L2/L5, Galileo, Beidou, QZSS, SBAS, and IRNSS constellations. Measuring 50 x 50 x 10 mm and weighing 68.2 grams, it features exceptional performance with peak gains of 5.0 dBic (L1), 5.2 dBic (L2), 1.7 dBic (L5), and 1.4 dBic (L6), paired with high efficiencies of 79% (L1), 89% (L2), and 55% (L5), and 34% (L6). Designed for centimeter-level RTK positioning, this RoHS-compliant antenna enables reliable navigation for UAVs, autonomous vehicles, precision agriculture, and land survey systems where robust multi-band reception in challenging environments is essential.



Features

- Multiband Multi-Constellations GNSS Support
 - GPS: L1/L2/L5
 - Galileo: E1/E5a/E6
 - Beidou: B1I/B1C/B2I/B2a/B2b
 - QZSS: L1/L2/L5/L6
 - SBAS: L1/L5
- Size: 50 x 50 x 10 mm
- Peak Gain: 5.0 dBic (L1), 5.2 dBic (L2), 1.7 dBic (L5), 1.4 dBic (L6)
- High Efficiency: 79% (L1), 89% (L2), 55% (L5), 34% (L6)
- Light Weight: 68.2 g
- [RoHS Compliant](#) | [MSL Level 1](#)

Applications

- UAVs and Drones
- Robotics and Autonomous Driving
- Asset Tracking and Telematics
- Real-Time Kinematic (RTK)
- Intelligent Transportation
- Precision Land Survey Positioning
- Precision Agriculture

Ordering Information

Part Number	Description
AANI-PP-0234	GNSS L1/L2/L5/L6 Ceramic Stacked Patch Antenna

Note: Other options not listed may be available upon request via [Abracon online support](#)



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GNSS L1/L2/L5/L6 Ceramic Stacked Patch Antenna



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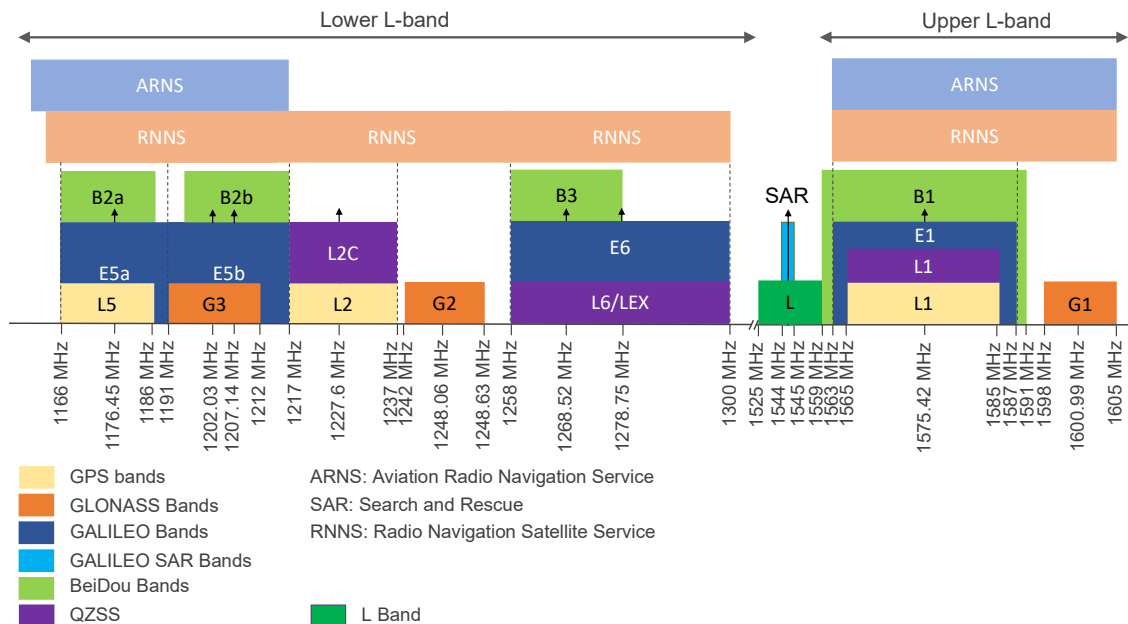
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GNSS Frequency Bands Covered

GPS	L1 1575.42MHz	L2 1227.6MHz	L5 1176.45MHz	
	■	■	■	
GLONASS	G1 1598.06-1609.31MHz	G2 1242.93-1251.68MHz	G3 1202.025MHz	
	■	■	■	
Galileo	E1 1575.42MHz	E5a 1176.45MHz	E5b 1201.5MHz	E6 1278.75MHz
	■	■	■	■
BeiDou	B1I 1561MHz	B1c 1575.42MHz	B2a/B2I 1176.45MHz	B2/B2b 1207.4MHz
	■	■	■	■
QZSS	L1 1575.42MHz	L2 1227.6MHz	L5 1176.45MHz	L6 1278.75MHz
	■	■	■	■
IRNSS/NAVIC			L5 1176.45MHz	
			■	
SBAS	L1/E1/B1 1575.42MHz		L5/B2a/E5a 1176.45MHz	
	■		■	



Frequency allocation: GNSS systems, upper L bands and lower L bands



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Electrical Specification

Parameters	Typ.						Units	Note
Frequency	1176.45 (L5)	1227.6 (L2)	1278.75 (L6)	1561 (B1I)	1575.42 (L1)	1602 (G1)	MHz	
VSWR	< 2.0						:1	
Peak Gain	1.7	5.2	1.4	4.6	5.0	4.9	dBic	
Average Gain	-3.6	-0.6	-4.7	-1.6	-1.1	-1.4	dBic	
Maximum Efficiency	55.0	89.0	51.3	71.6	78.9	75	%	
Average Efficiency	43.2	83.0	34.9	70.2	77.0	74	%	
Axial Ratio	1.9	1.6	2.5	1.9	1.8	1.4	dB	
Polarization	RHCP						-	
Nominal Impedance	50						Ω	

Note: All measurements were performed using the evaluation board in a free-space environment. Actual performance may vary depending on factors such as the ground plane, specific application, and surrounding environment.

Mechanical Specification

Parameter	Specification
Antenna Dimension	50 x 50 x 10 mm
Evaluation Board Dimension	70 x 70 mm
Mounting Type	Through Hole & Adhesive
Mounting Location	PCB Center Mounting
Material(s)	Ceramic
Weight	68.2 g
Additional Resources	Download STEP File, Package Drawing, 3D PDF

Environmental Specification

Parameter	Specification
Operating Temperature	-40°C to +85°C
Storage Temperature	-40°C to +85°C
RoHS Compliance	Yes



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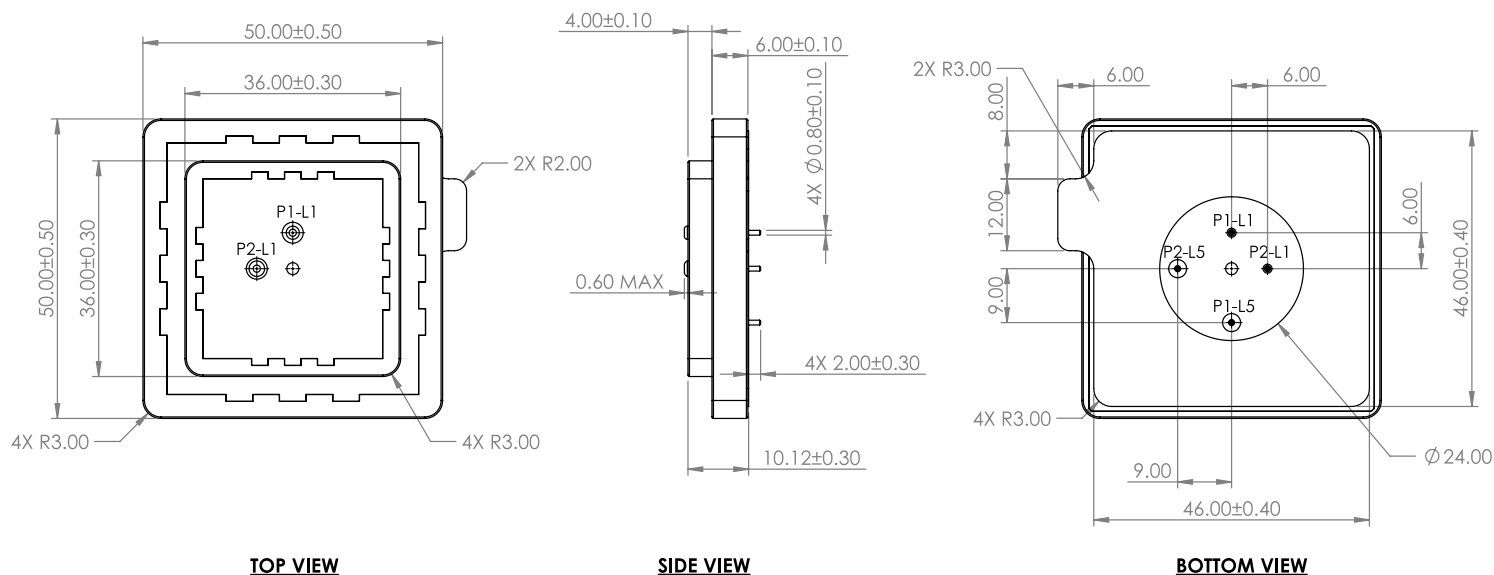


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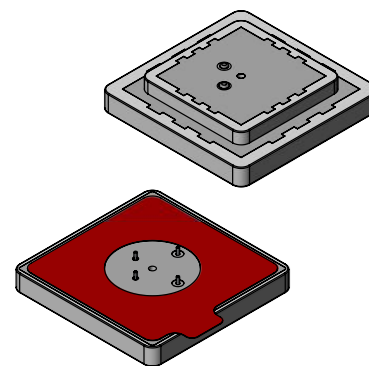


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Product Dimensions



Pin	Name
1	P1-L1
2	P2-L1
3	P1-L5/(L2)
4	P2-L5/(L2)



Unit: mm



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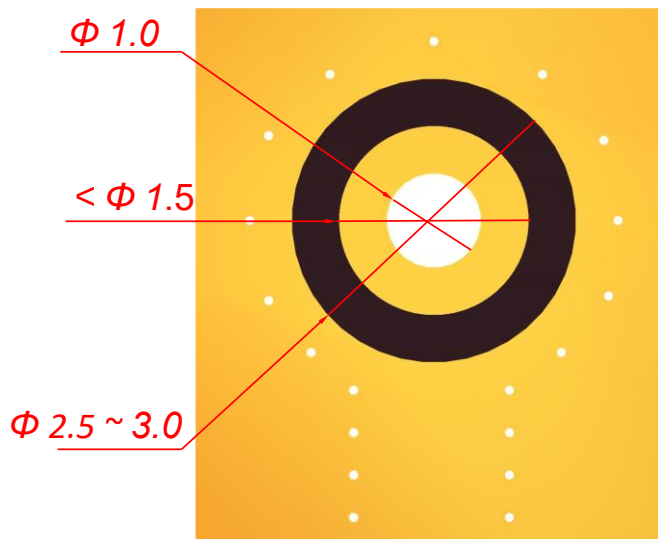
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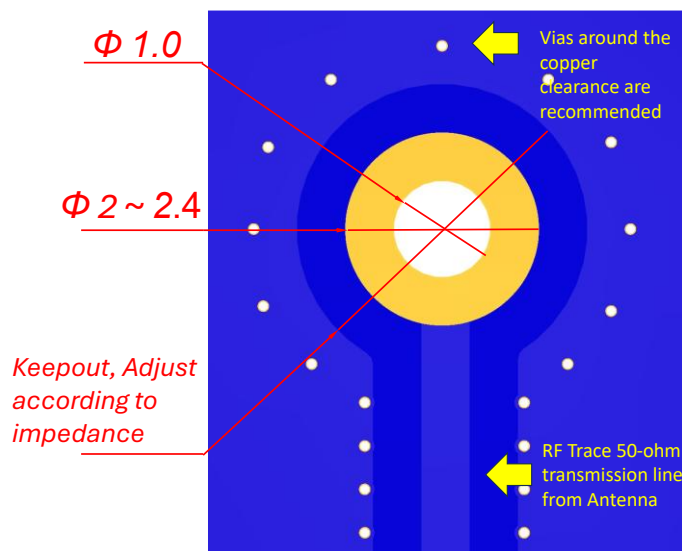
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Antenna Footprint & PCB Layout Guide

Top



Bottom



Unit: mm

Note: Antenna welding does not support reflow soldering, please use manual soldering, the recommended soldering time is $\leq 3s$, and the temperature is $390 \pm 20^\circ\text{C}$.

Transmission Line

The transmission line should be kept as short as possible and be designed to have a characteristic impedance of 50Ω. Abracon recommends using a Co-Planar Waveguide with Ground (CPWG), which dimensions can be derived by any trusted calculator, using the correct input for PCB materials and layer stack-up.

GNSS L1/L2/L5/L6 Ceramic Stacked Patch Antenna



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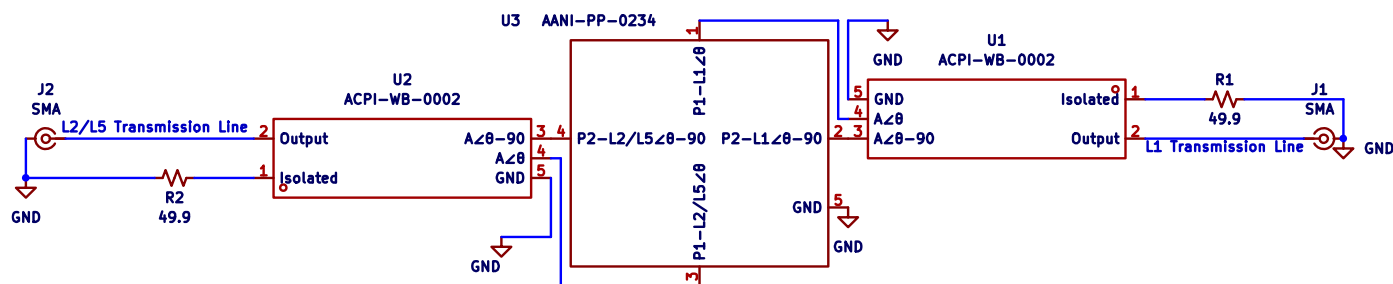
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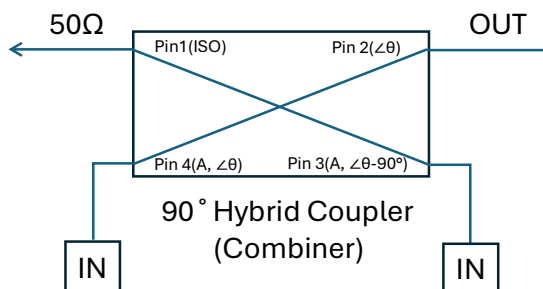
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Hybrid Coupler Block Diagram



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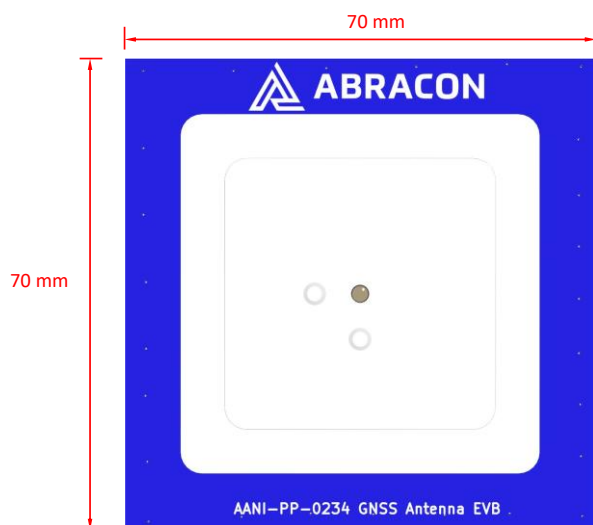


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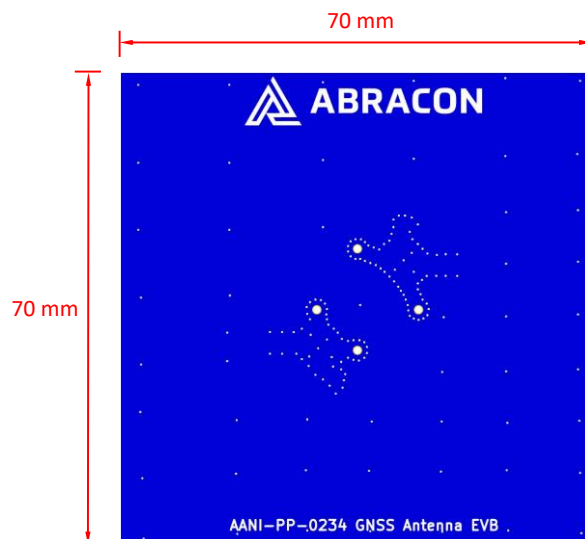


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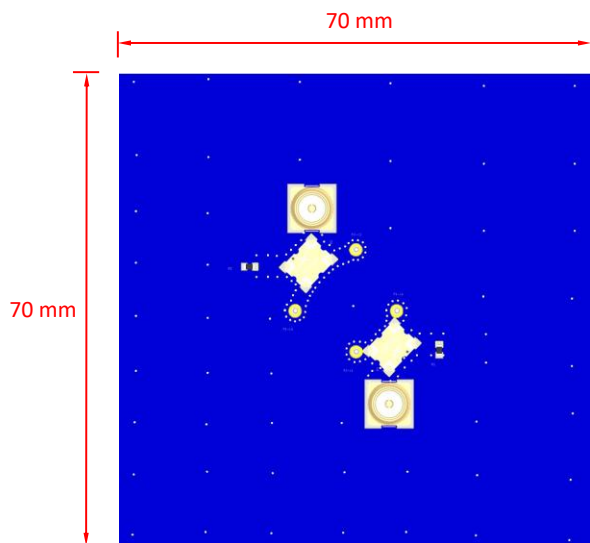
Integration Guide



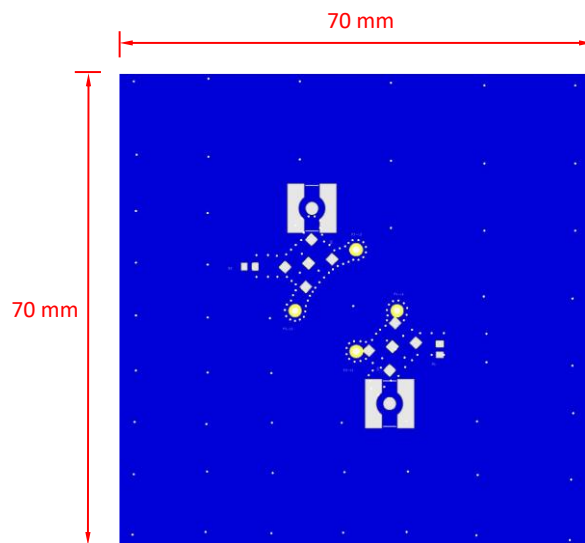
Top with Antenna



Top without Antenna



Bottom with Coupler



Bottom without Coupler

Unit: mm



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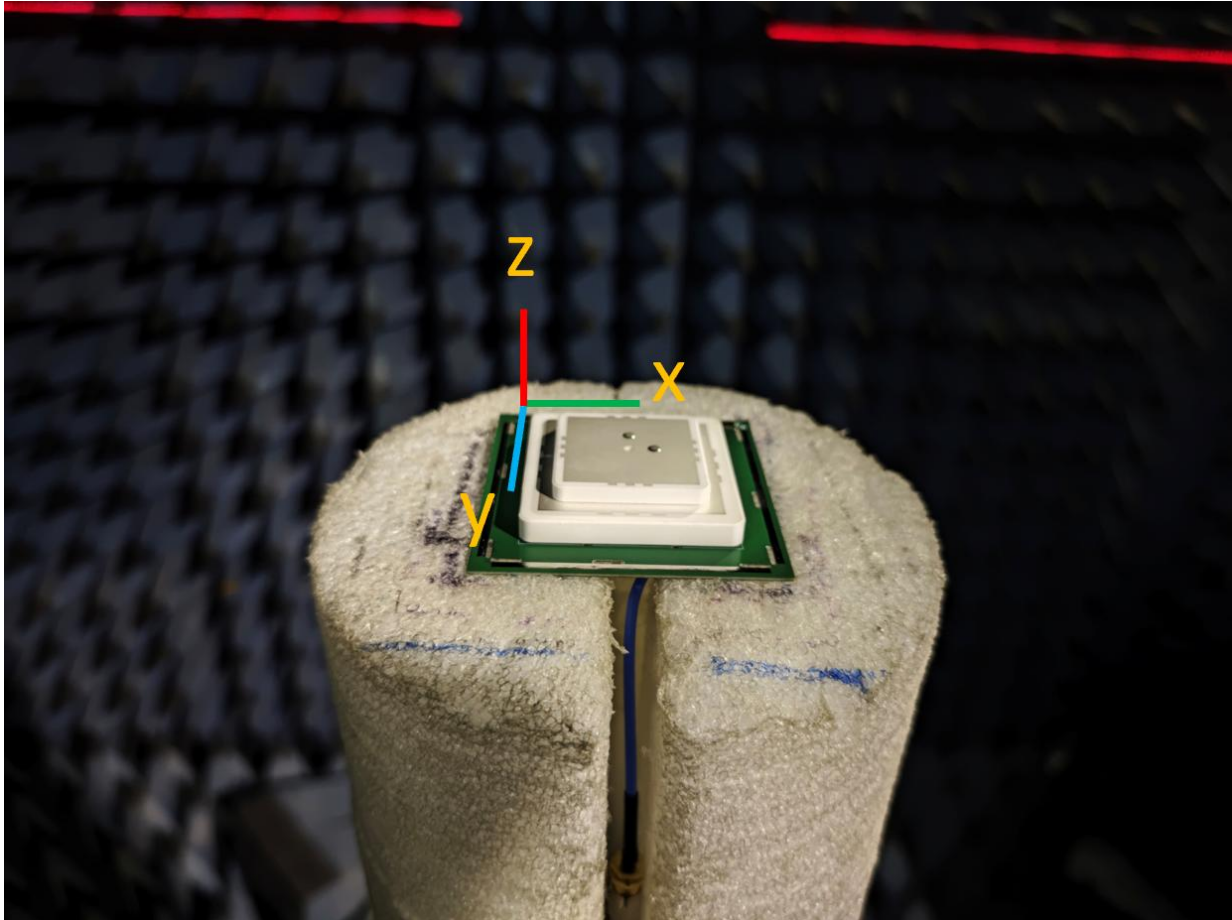


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Measurement Setup





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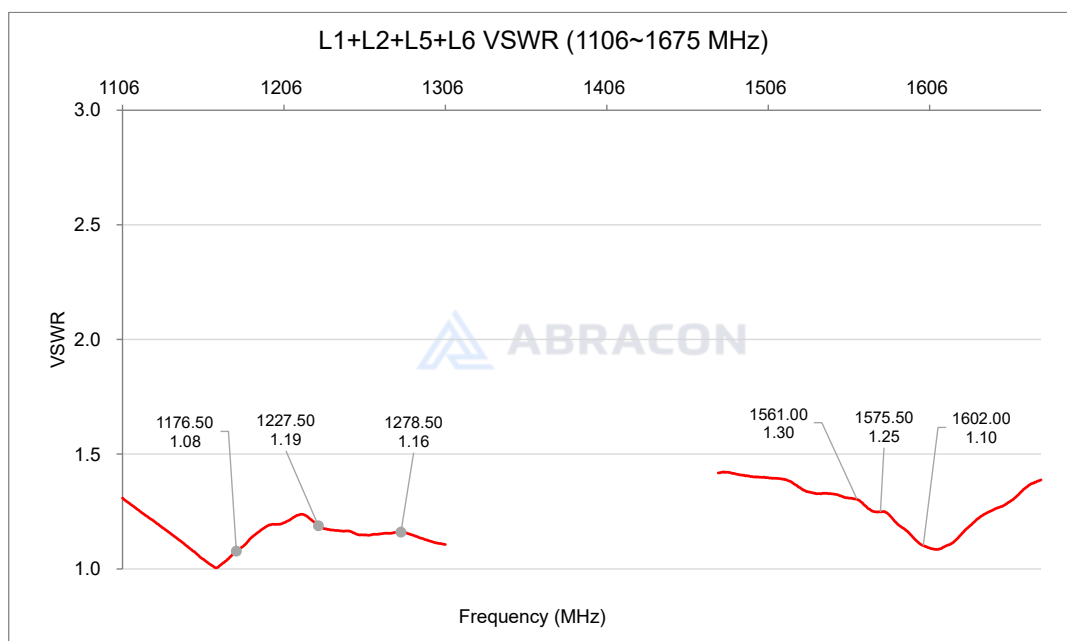
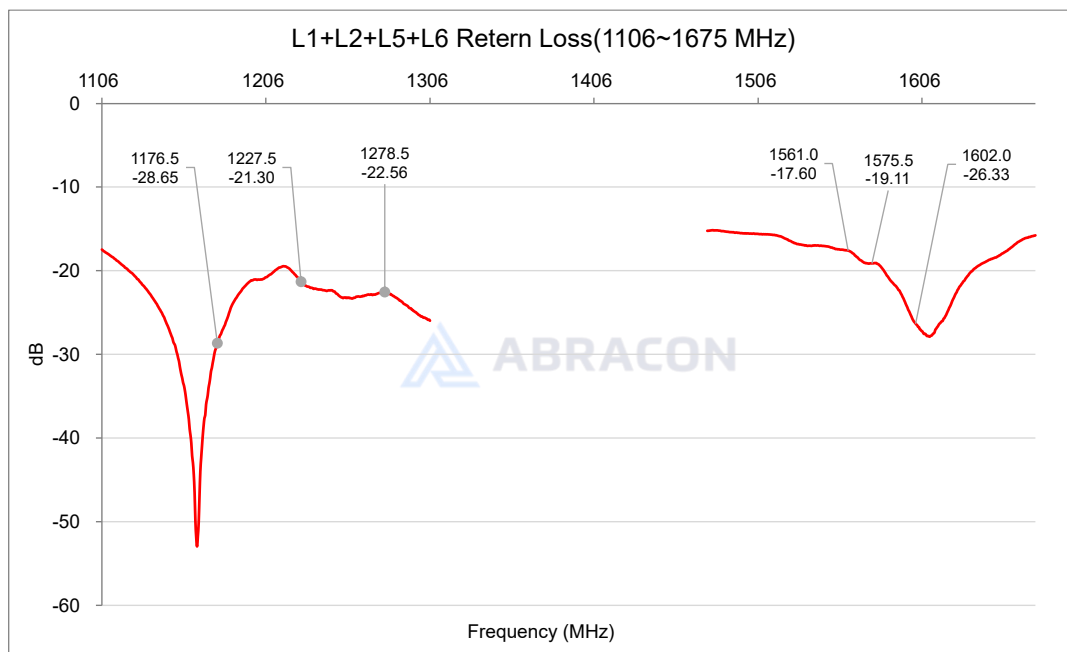


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50 x 50 x 10 mm
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Reflection Characteristics – Return Loss & VSWR





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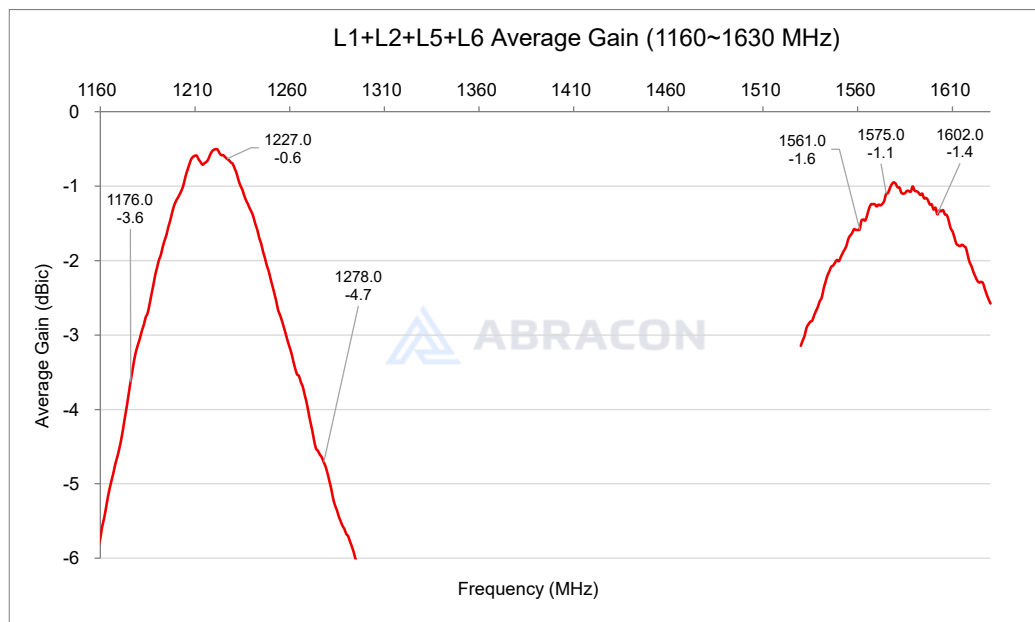
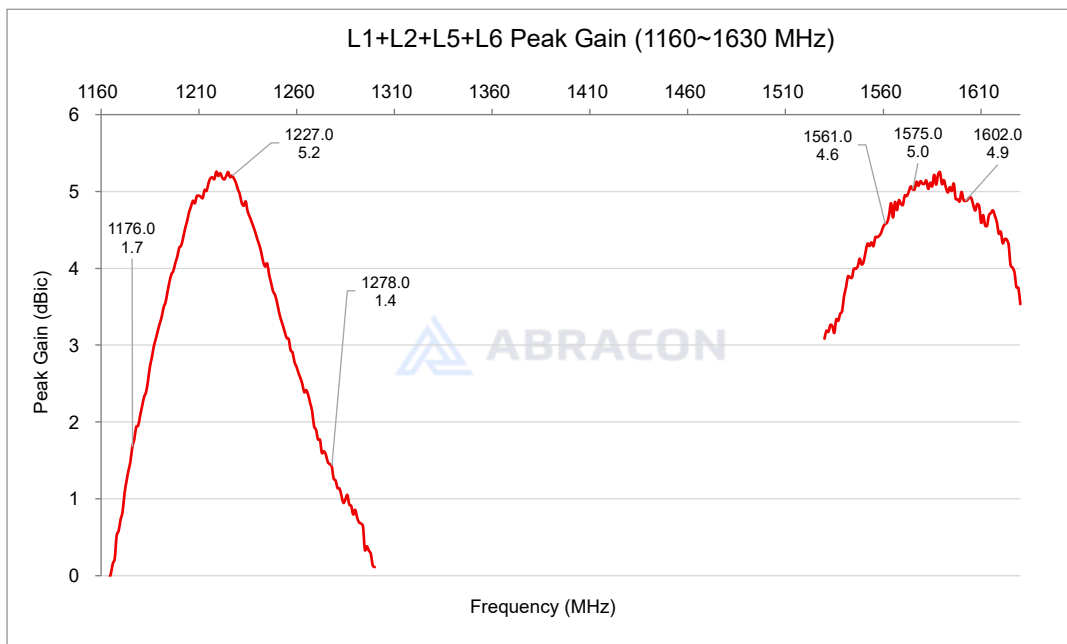


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Radiation Characteristics – Gain



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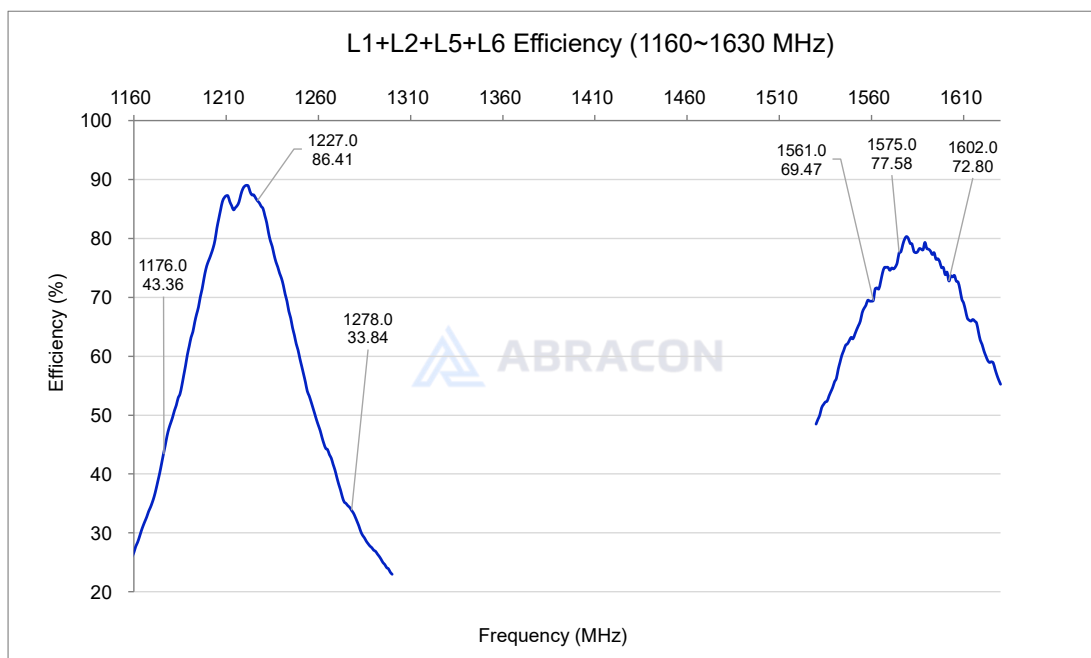


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Radiation Characteristics – Total Efficiency (%)



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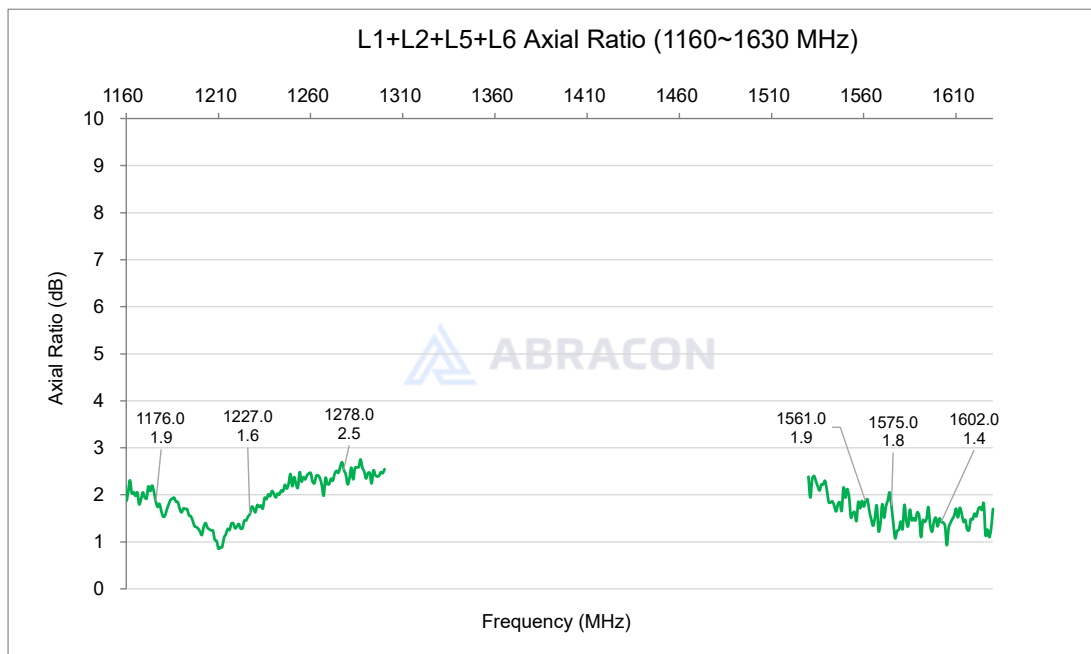


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Radiation Characteristics – Axial Ratio (dB)



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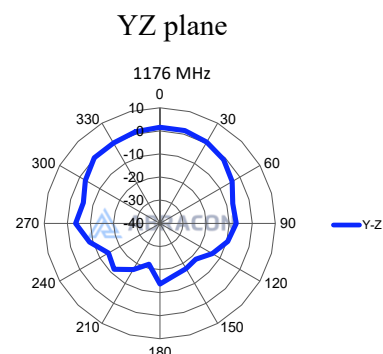
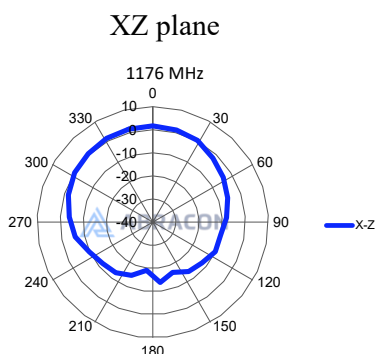
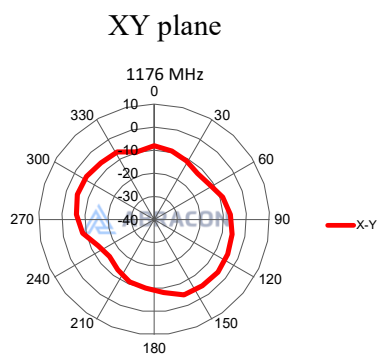
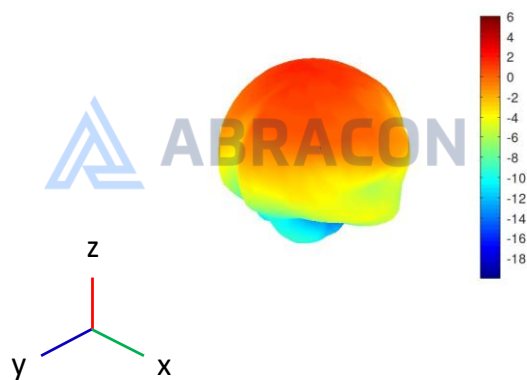
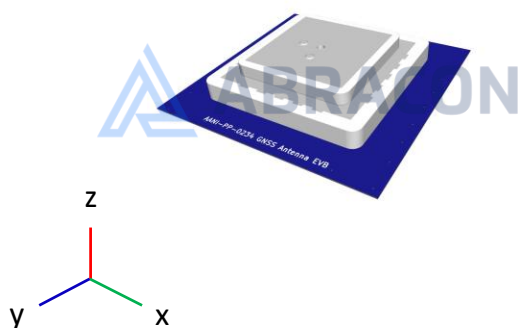
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MSL Level = 1

Radiation Characteristics – 3D & 2D Pattern

1176MHz (L5)



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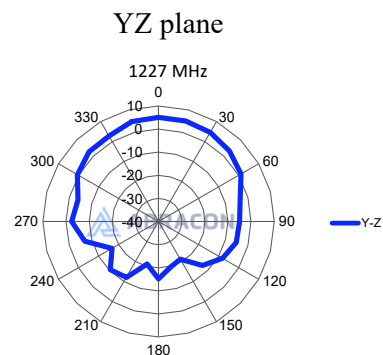
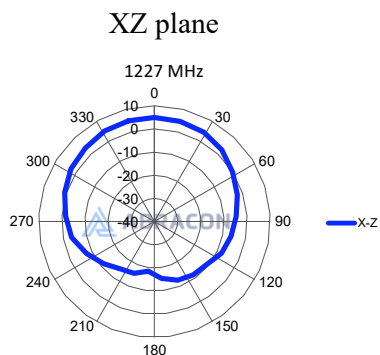
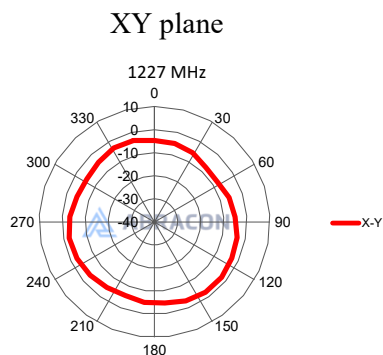
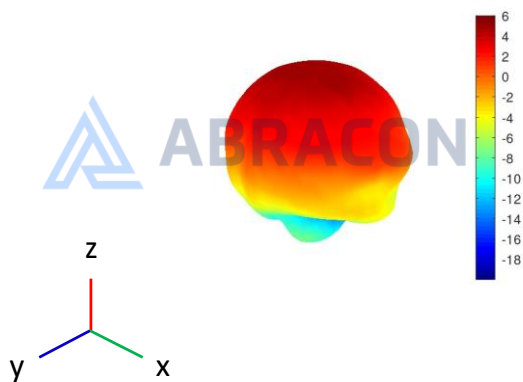
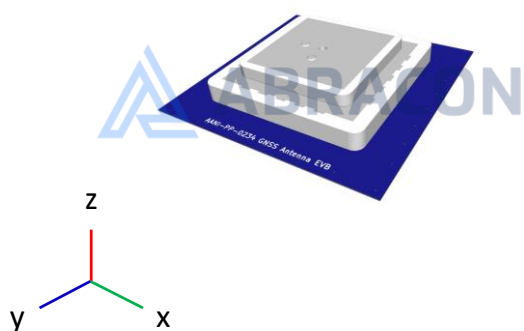


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RoHS Compliant
MSL Level = 1

1227MHz (L2)



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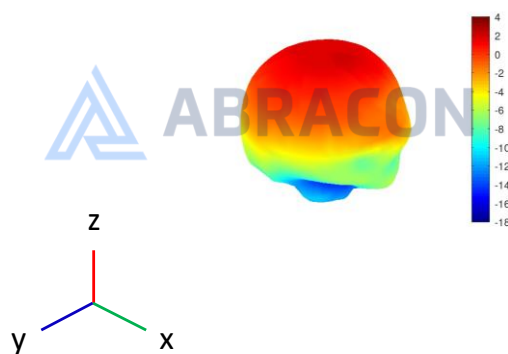
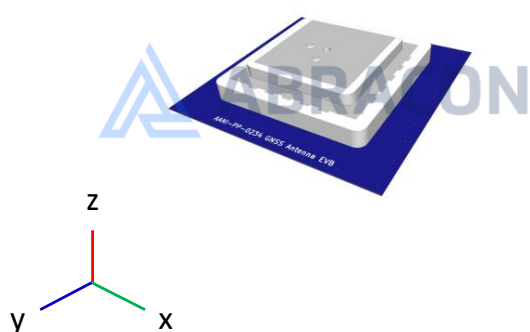


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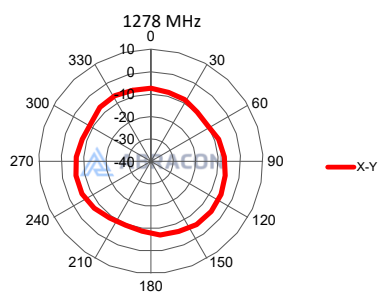


50 x 50 x 10 mm
RoHS Compliant
MSL Level = 1

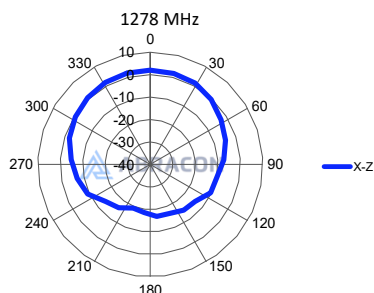
1278MHz (L6)



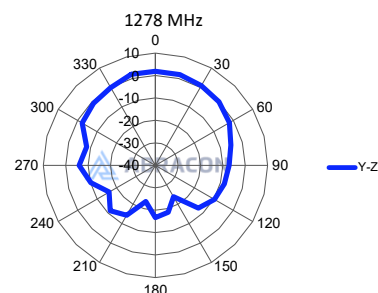
XY plane



XZ plane



YZ plane



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GNSS L1/L2/L5/L6 Ceramic Stacked Patch Antenna



AANI-PP-0234

Request Samples

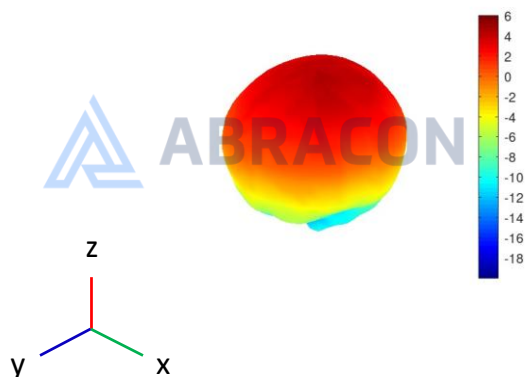
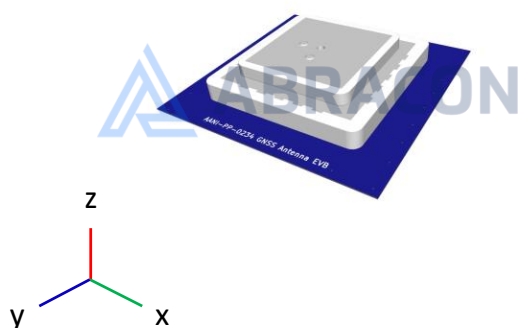


Check Inventory

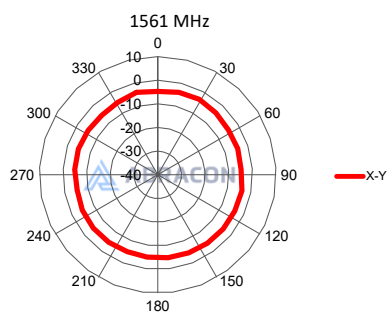


50 x 50 x 10 mm
RoHS Compliant
MSL Level = 1

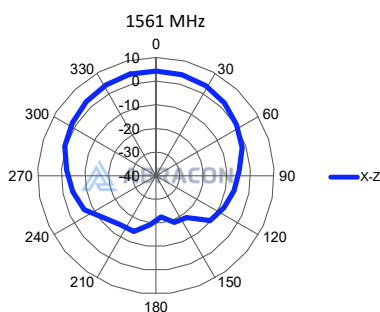
1561MHz (B1I)



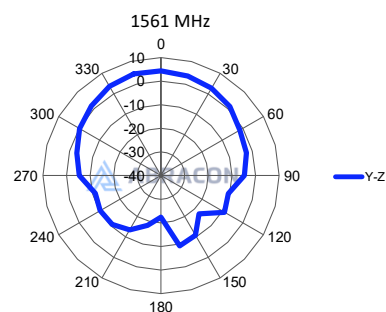
XY plane



XZ plane



YZ plane



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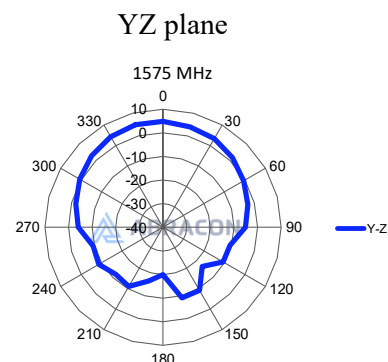
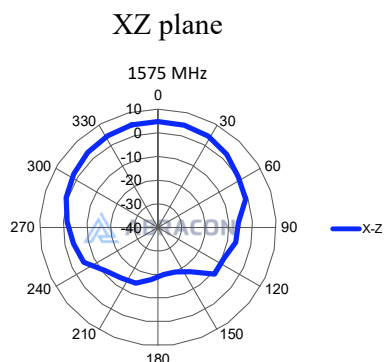
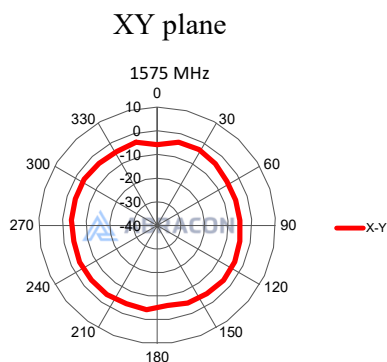
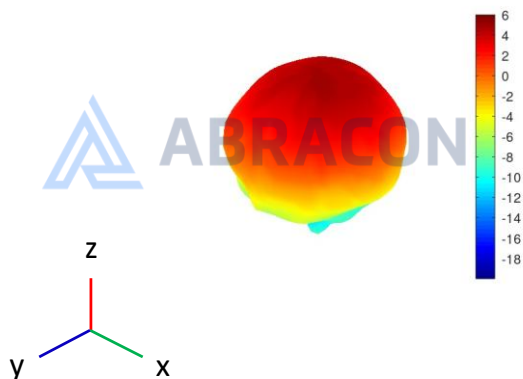
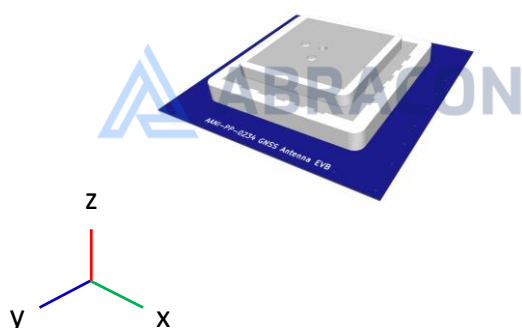


Check Inventory



50 x 50 x 10 mm
RoHS Compliant
MSL Level = 1

1575MHz (L1)



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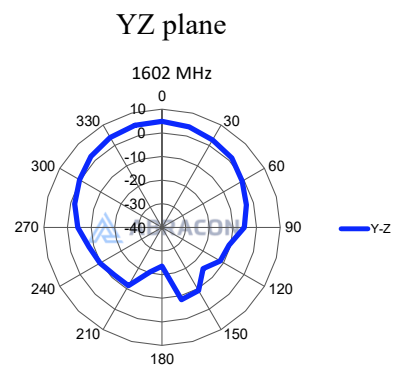
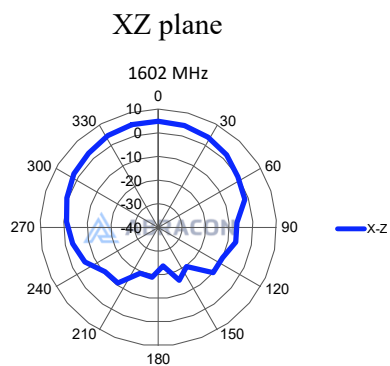
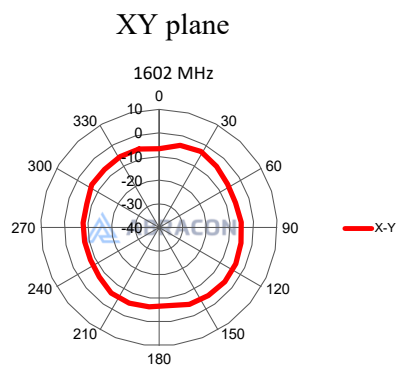
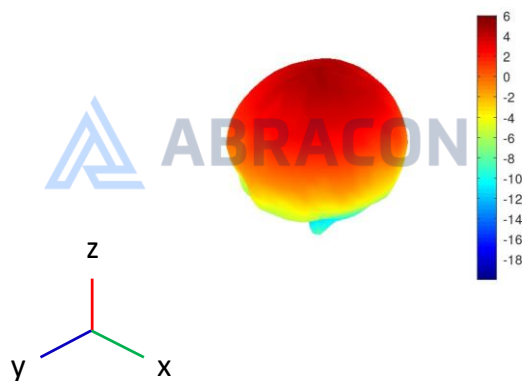
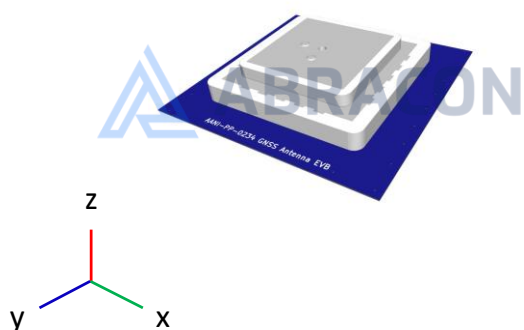


Check Inventory



50 x 50 x 10 mm
RoHS Compliant
MSL Level = 1

1602MHz (G1)



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50 x 50 x 10 mm
RoHS Compliant
MSL Level = 1

Packaging

96 pcs per carton

ATTENTION: Abracon LLC's products are Commercial-Off-The-Shelf ('COTS'), which are designed, intended, and validated for use in commercial, industrial, and automotive applications. The customer is responsible for testing and verifying the performance of an Abracon solution to meet their system-level requirements.



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