



TAOGLAS®



Datasheet

Part No:
AGGBLA.125.A

Description

Active On-Board SMD Multi-Band GNSS Antenna, covering L1/L5 bands

Features:

Single Stage LNA

Covers Bands

- GPS L1 & L5
- BeiDou B1
- Galileo E1 & E5a
- GLONASS G1
- IRNSS L5

Dimensions: 25 x 25 x 2.8mm

SMD Antenna

RoHS & Reach Compliant

| | | |
|-----------|---|-----------|
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1. Introduction



The patent pending AGGBLA.125.A embedded SMD antenna is a next generation, active multi-band GNSS antenna designed to cover working constellations in the GNSS L1/L5 spectrum. The AGGBLA.125.A comes with active circuitry, so it is a plug and play alternative to customer's design a complex active circuit themselves. The AGGBLA.125.A multi band GNSS antenna is a compact high precision solution for navigation or asset tracking devices where board space is at a premium and cost is a major factor.

The AGGBLA.125 has an omnidirectional radiation pattern that allows customers to use an omnidirectional antenna in devices where orientation of the product may be unknown, making it less sensitive to device orientation allowing it to be installed in areas where a patch antenna won't work. It also comes with a low noise figure to preserve signal quality helps minimize time to first fix. It also features excellent out-of-band rejection to prevent out-of-band signals from overdriving or damaging its LNAs.

Typical Applications Include:

- E-Mobility
- Precision Agriculture
- Autonomous Vehicles
- UAVs and Robotics

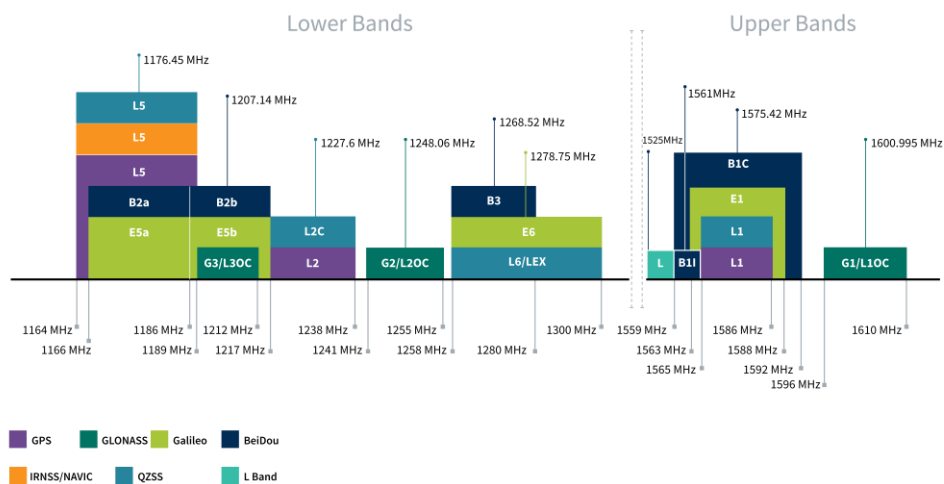
Based on the loop antenna electrical effect, this operates antenna best when placed in the center of the longest edge of the board, the AGGBLA.125.A is an SMD component, delivered on tape and reel. As with all on-board SMD antennas, care must be taken to ensure the device ground-plane layout and antenna matching has been done correctly.

This antenna can be mounted with no performance degradation in either orientation as long as the antenna is soldered correctly via Surface mounting. Please see the integration instructions section for further detail regarding the optimum way to integrate this antenna into your device.

At any of our global design and test facilities, Taoglas can offer professional Gerber review, transmission line design, general integration support and final matching services of the AGGBLA.125.A on your device board. Please contact your regional Taoglas customer support for further information.

2. Specification

| GNSS Frequency Bands | | | | | |
|----------------------|-------------------------|---------------------------|--------------------|--------------------|-------------------|
| GPS | L1 1575.42 MHz | L2 1227.6 MHz | L5 1176.45 MHz | | |
| | ■ | □ | ■ | | |
| GLONASS | G1 1602 MHz | G2 1248 MHz | G3 1207 MHz | | |
| | ■ | □ | □ | | |
| Galileo | E1 1575.24 MHz | E5a 1176.45 MHz | E5b 1201.5 MHz | E6 1278.75 MHz | |
| | ■ | ■ | □ | □ | |
| BeiDou | B1C 1575.42 MHz | B1I 1561 MHz | B2a 1176.45 MHz | B2b 1207.14 MHz | B3 1268.52 MHz |
| | ■ | ■ | ■ | □ | □ |
| L-Band | L-Band 1542 MHz | | | | |
| | □ | | | | |
| QZSS (Regional) | L1 1575.42 MHz | L2C 1227.6 MHz | L5 1176.45 MHz | L6 1278.75e6 | |
| | ■ | □ | ■ | □ | |
| IRNSS (Regional) | L5 1176.45 MHz | | | | |
| | ■ | | | | |
| SBAS | L1/E1/B1 1575.42 MHz | L5/B2a/E5a 1176.45 MHz | G1 1602 MHz | G2 1248 MHz | G3 1207 MHz |
| | ■ | ■ | ■ | □ | □ |



GNSS Bands and Constellations

| GNSS Electrical | | | | |
|---------------------------------------|---------|--------|---------|-------|
| Frequency (MHz) | 1176.45 | 1561 | 1575.42 | 1603 |
| Return Loss (dB) | -6.3 | -6.8 | -7.1 | -7.1 |
| Passive Antenna Efficiency (%) | 75.93 | 69.05 | 68.47 | 66.13 |
| Passive Antenna Gain at Zenith (dBic) | -0.38 | -0.95 | -0.95 | -0.94 |
| Group Delay Mean (ns) | 3.42 | 0.37 | 0.14 | 0.71 |
| Polarization | | Linear | | |
| Impedance | | 50 Ω | | |

| LNA and Filter Electrical Properties | | | | |
|--------------------------------------|---------|------|---------|------|
| Frequency (MHz) | 1176.45 | 1561 | 1575.42 | 1603 |
| Gain@5V (dBic) | 17.4 | 15.4 | 15.4 | 15.2 |
| Noise@5V (dBic) | 2.4 | 2.5 | 2.5 | 3.0 |
| Current Consumption @5V | 10mA | | | |

| Total Specification (Through Antenna, SAW Filter and LNA) | | | | |
|---|---------|------|---------|-------|
| Frequency (MHz) | 1176.45 | 1561 | 1575.42 | 1603 |
| Gain@5V (dBic) | 14.51 | 12.5 | 14.06 | 14.03 |
| Output Impedance | | 50 Ω | | |

| Mechanical | |
|------------|-------------|
| Dimensions | 25*25*2.8mm |
| Weight | 9g |
| Material | FR4 |

| Environmental | |
|----------------------------------|---------------|
| Temperature Range | -40°C to 85°C |
| Moisture Sensitivity Level (MSL) | 3 (168 Hours) |

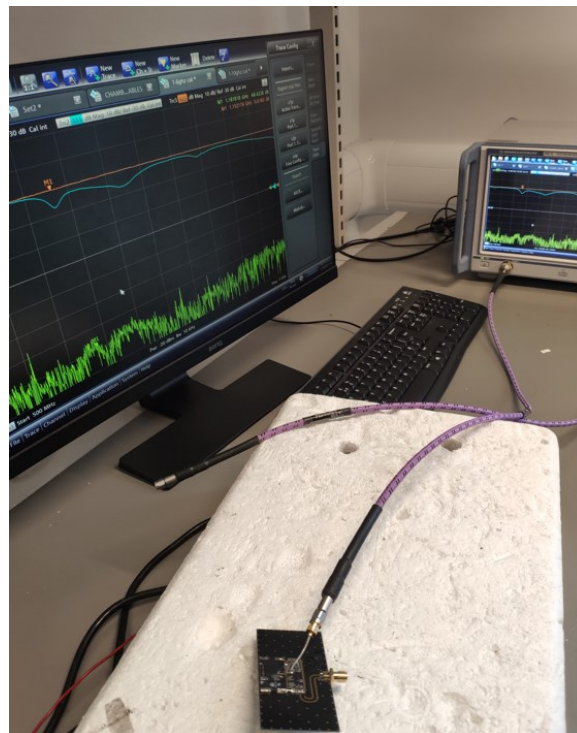
3. Antenna Characteristics

3.1 Test Setup

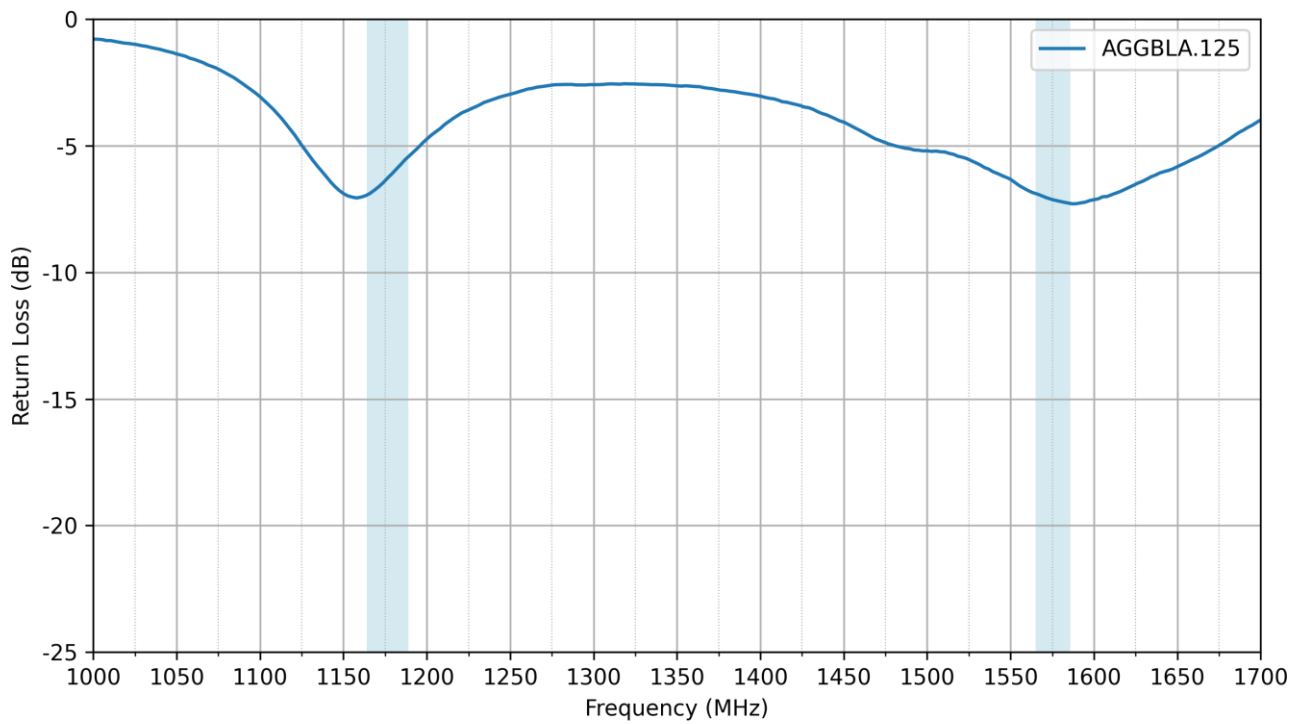
AUT



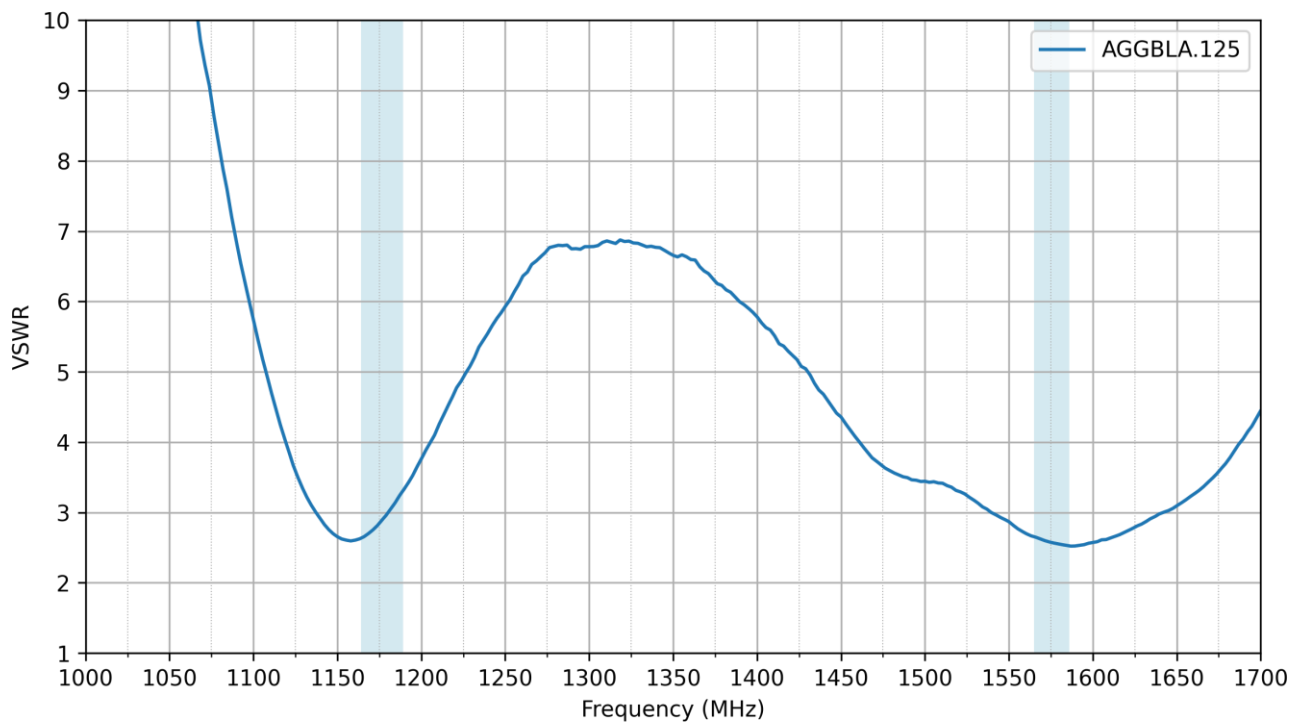
Vector Network Analyzer



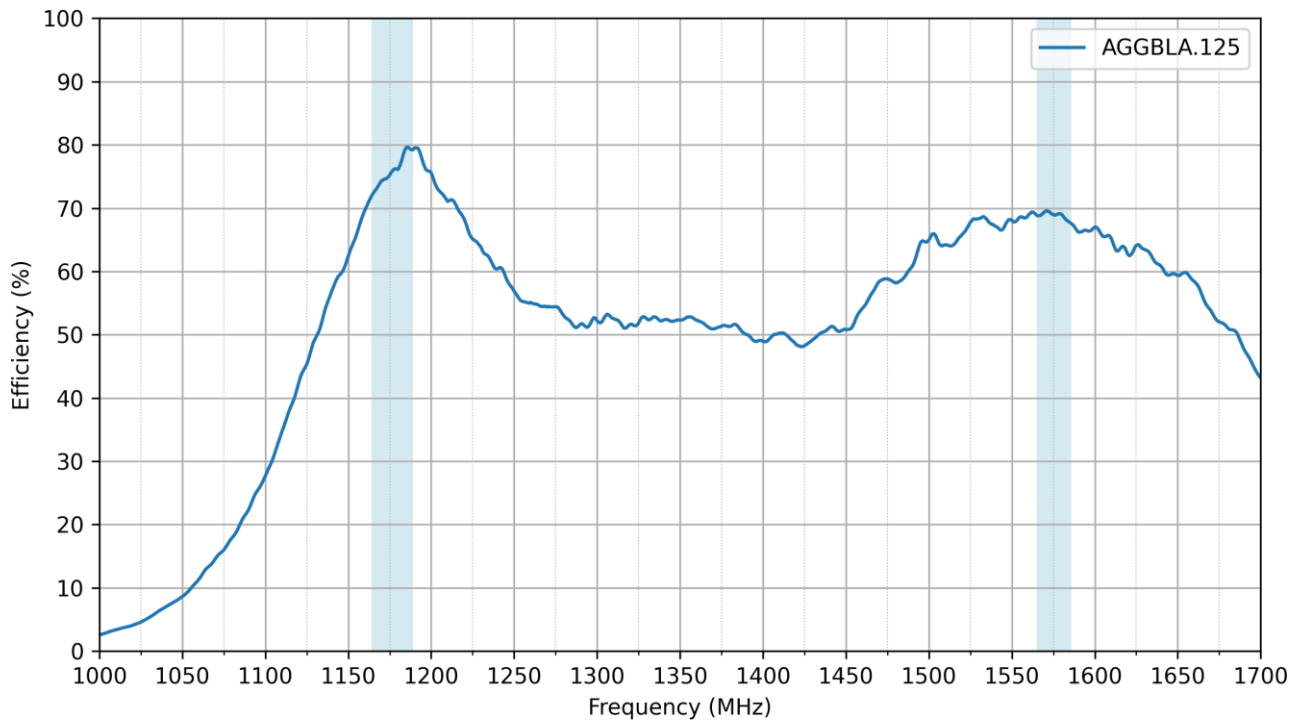
3.2 Return Loss



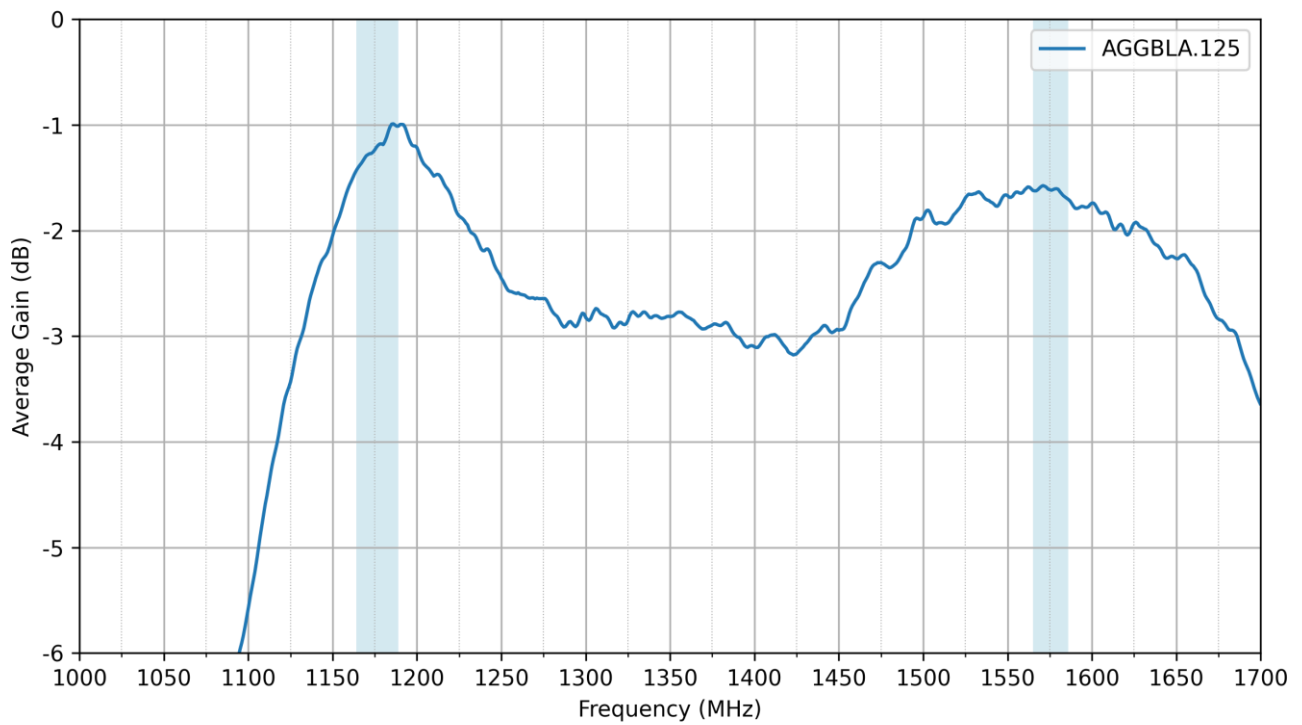
3.3 VSWR



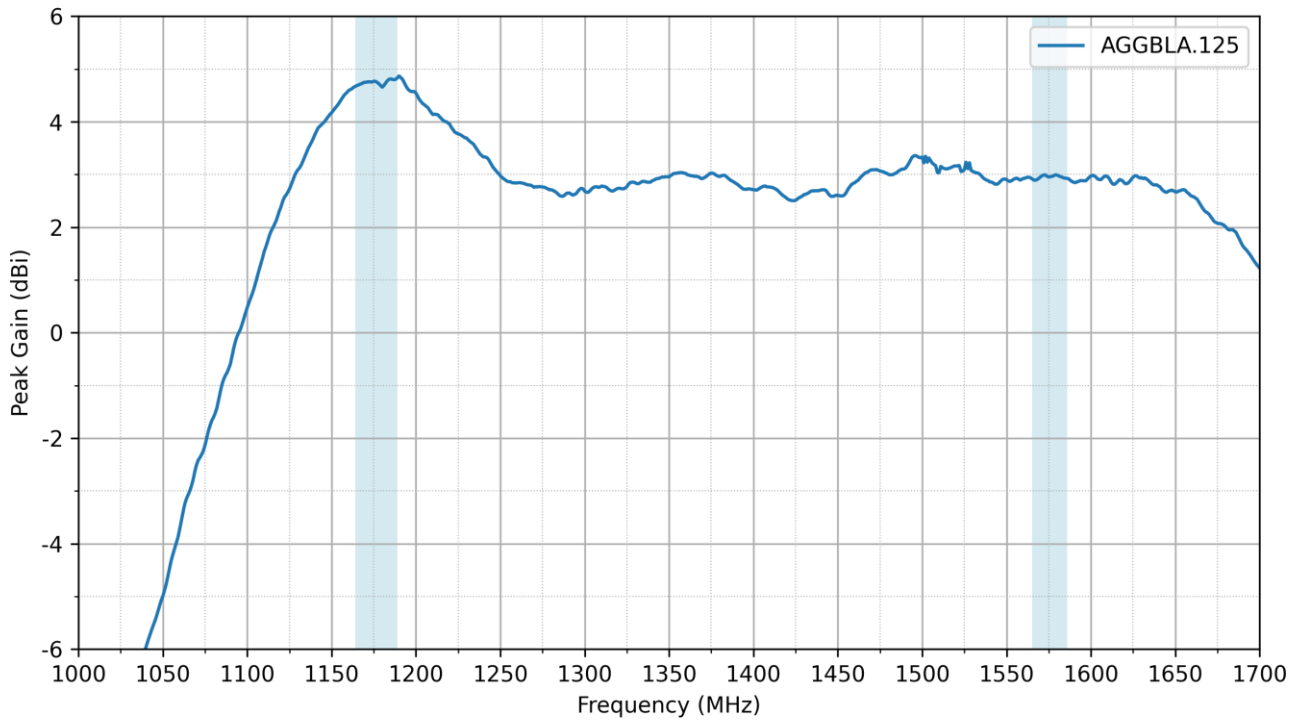
3.4 Efficiency



3.5 Average Gain

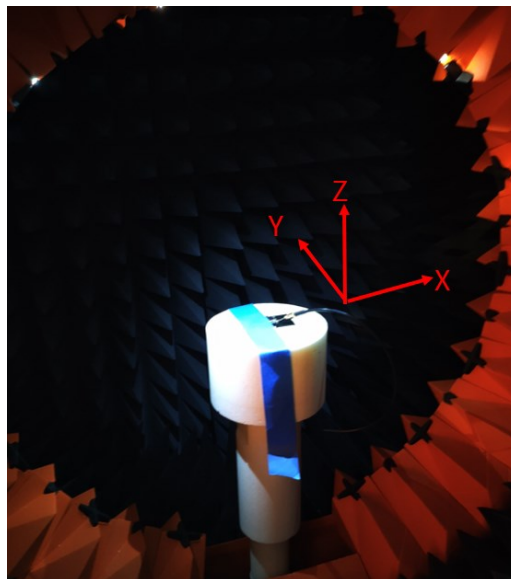
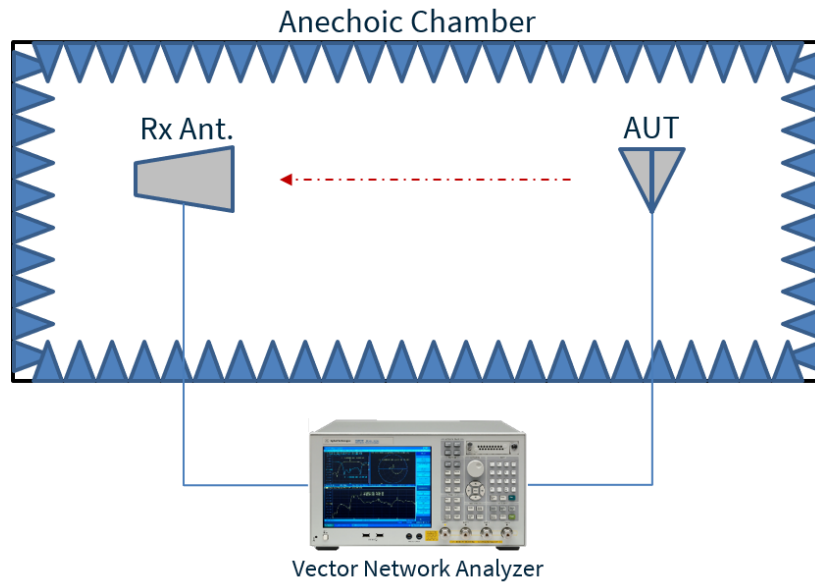


3.6 Peak Gain

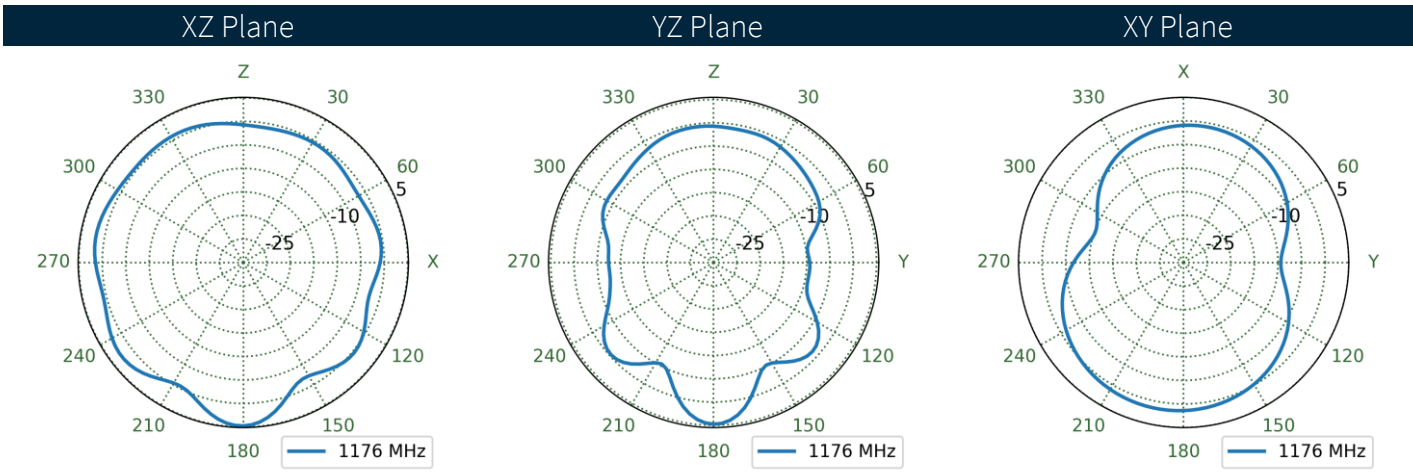
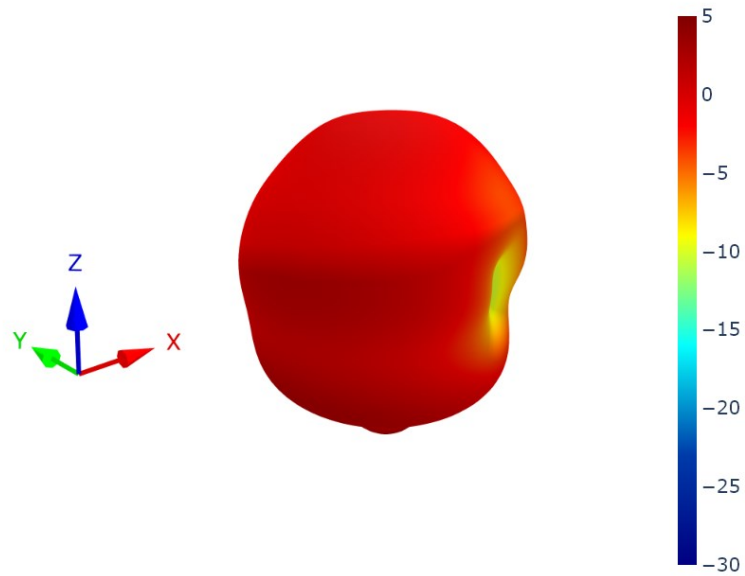


4. Radiation Patterns

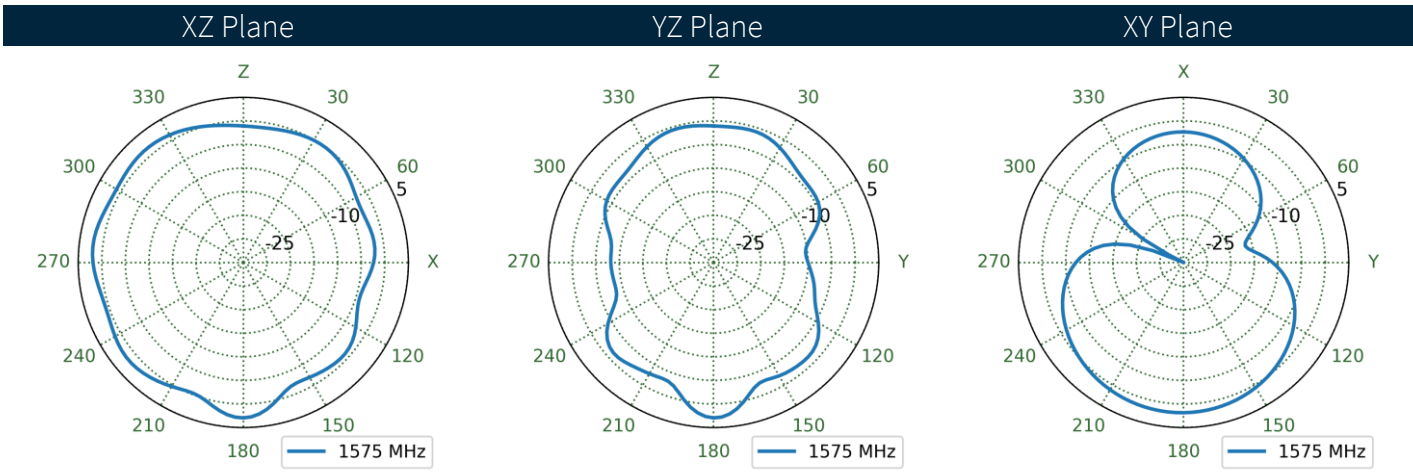
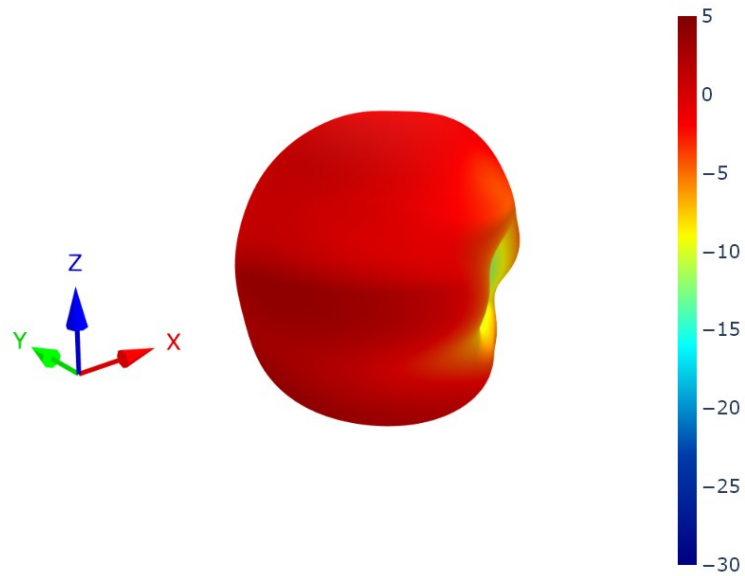
4.1 Test Setup



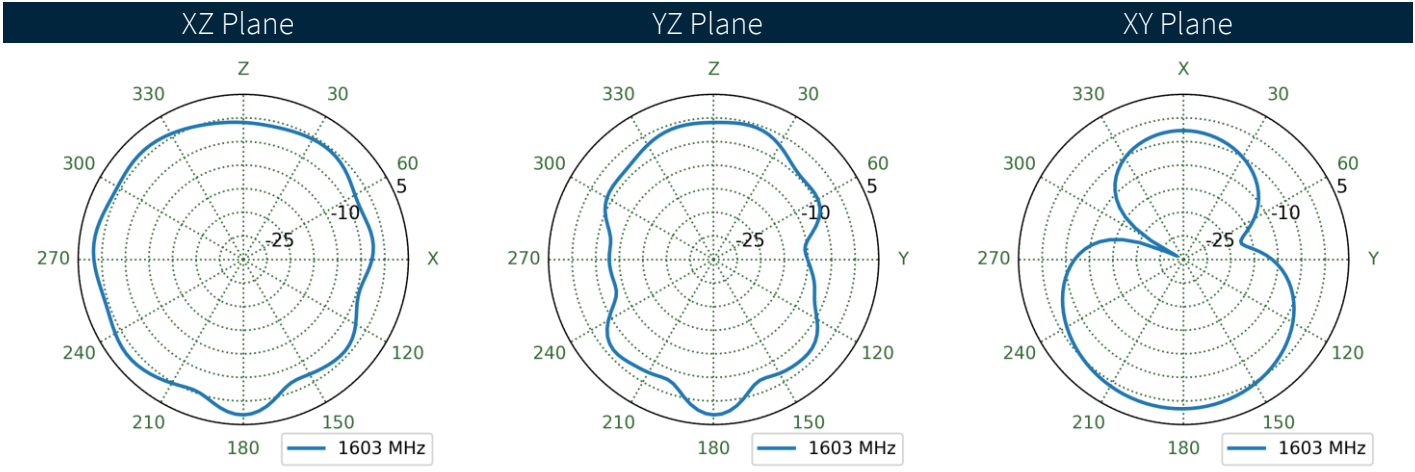
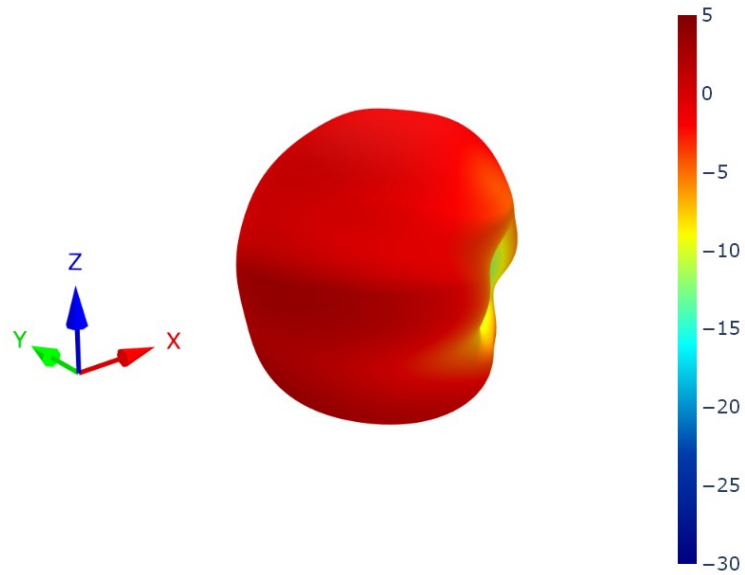
4.2 AGGBLA.125 Patterns at 1176 MHz



4.3 AGGBLA.125 Patterns at 1575 MHz

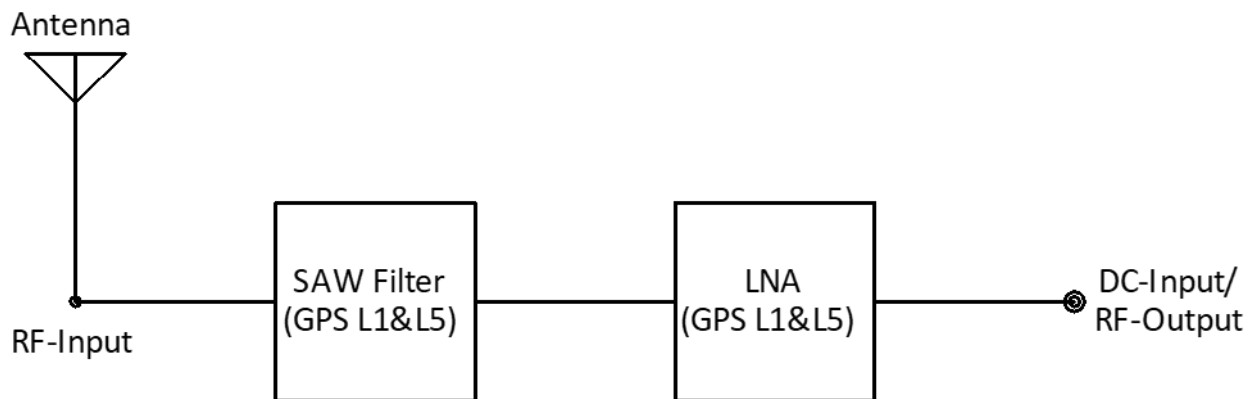


4.4 AGGBLA.125 Patterns at 1603 MHz

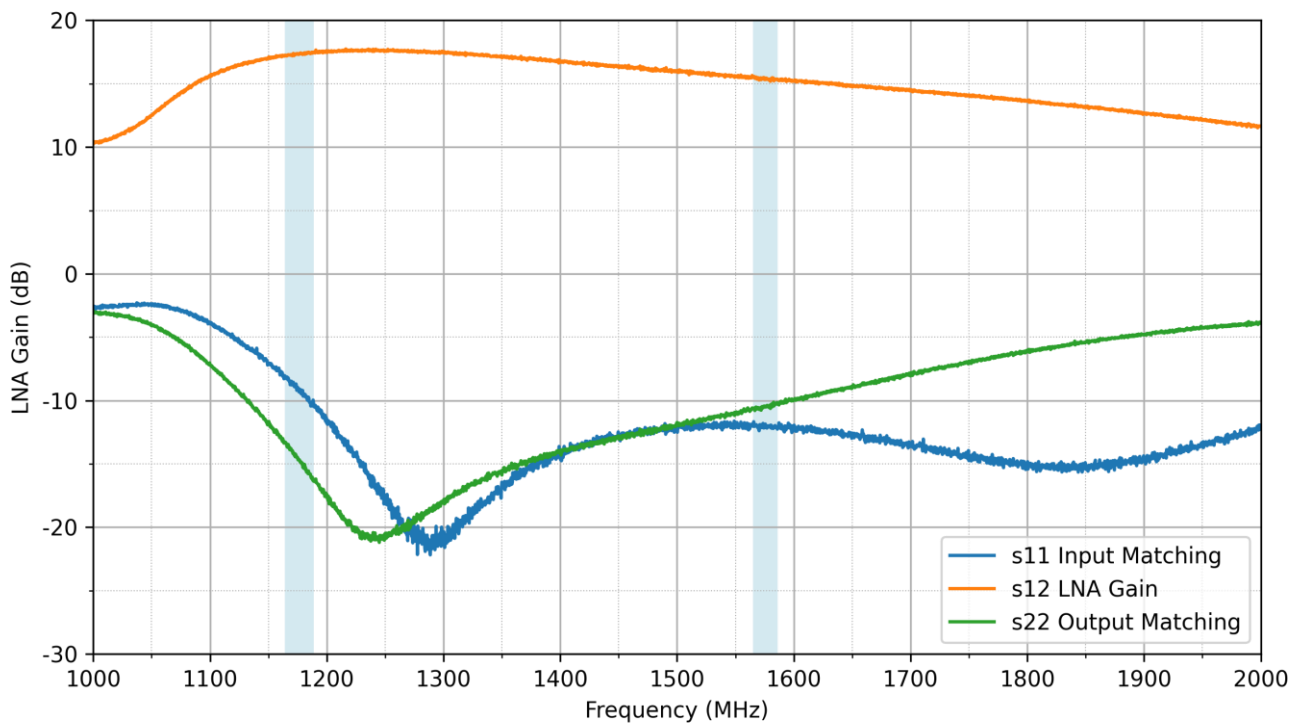


5. Active Circuitry Characteristics

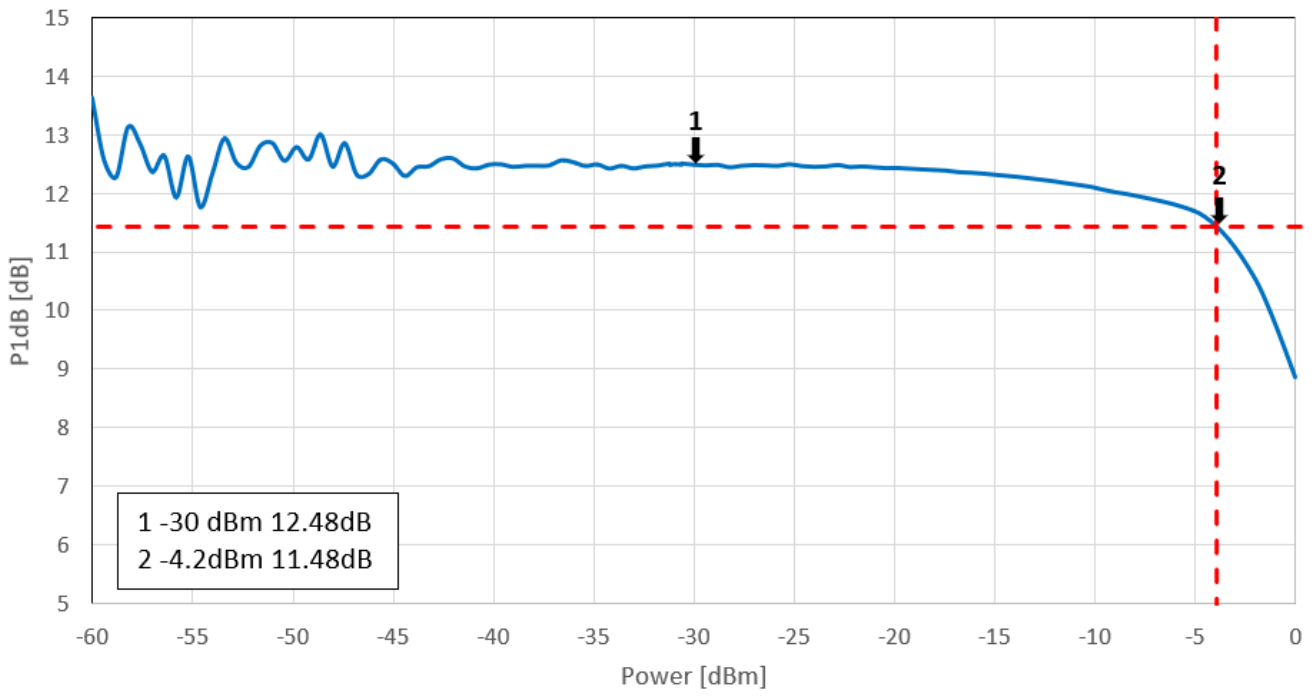
5.1 Block Diagram



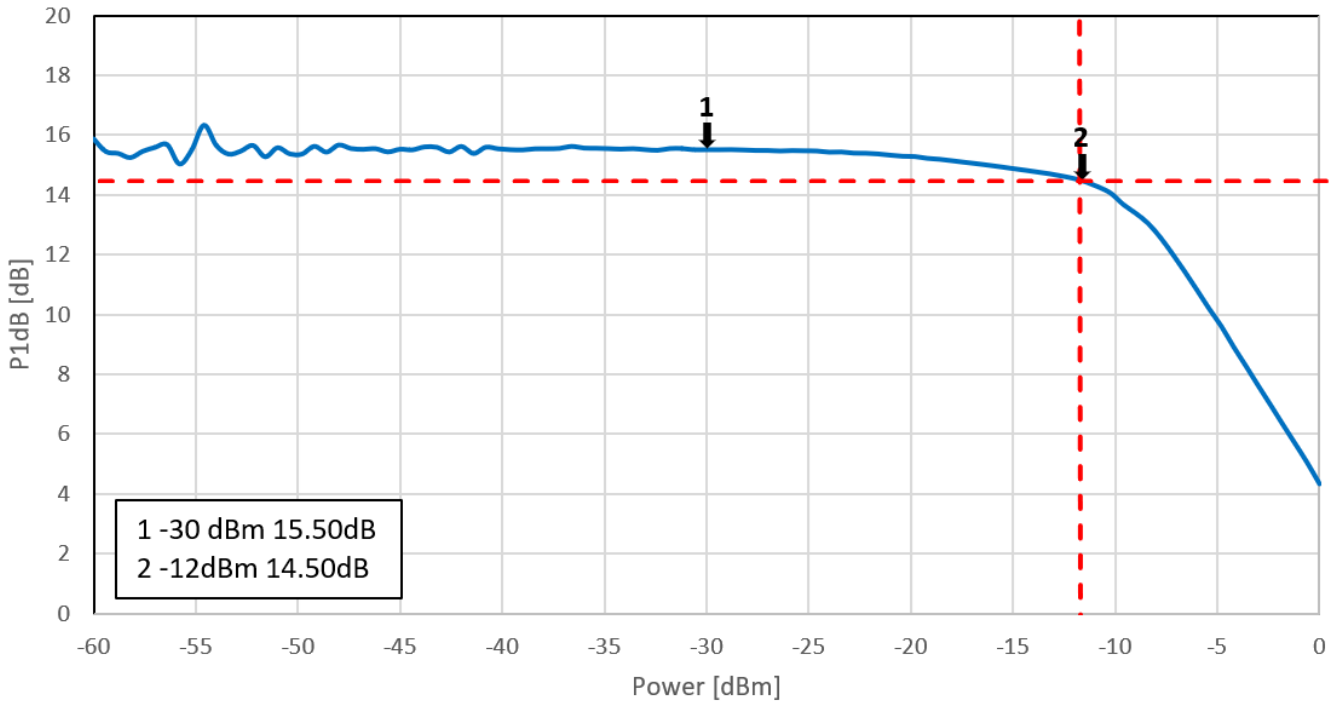
5.2 LNA Gain L1 & L5



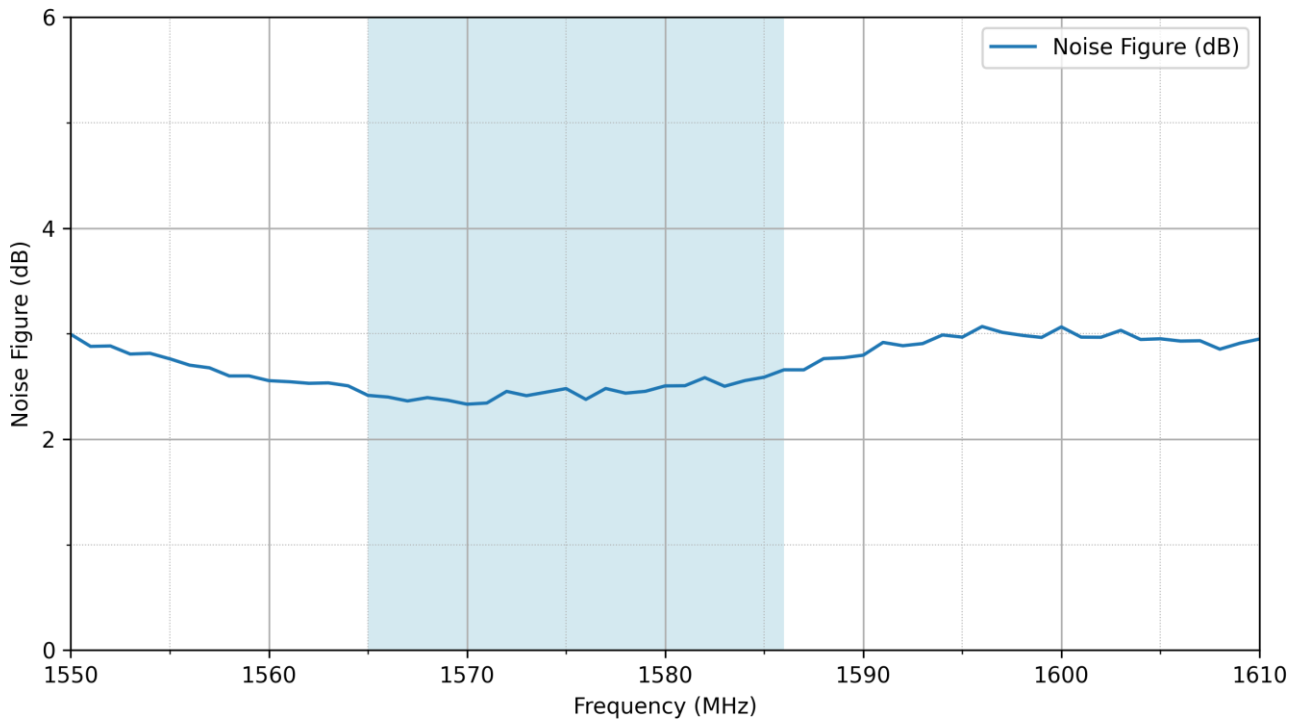
5.3 P1dB Compression Point (L1)



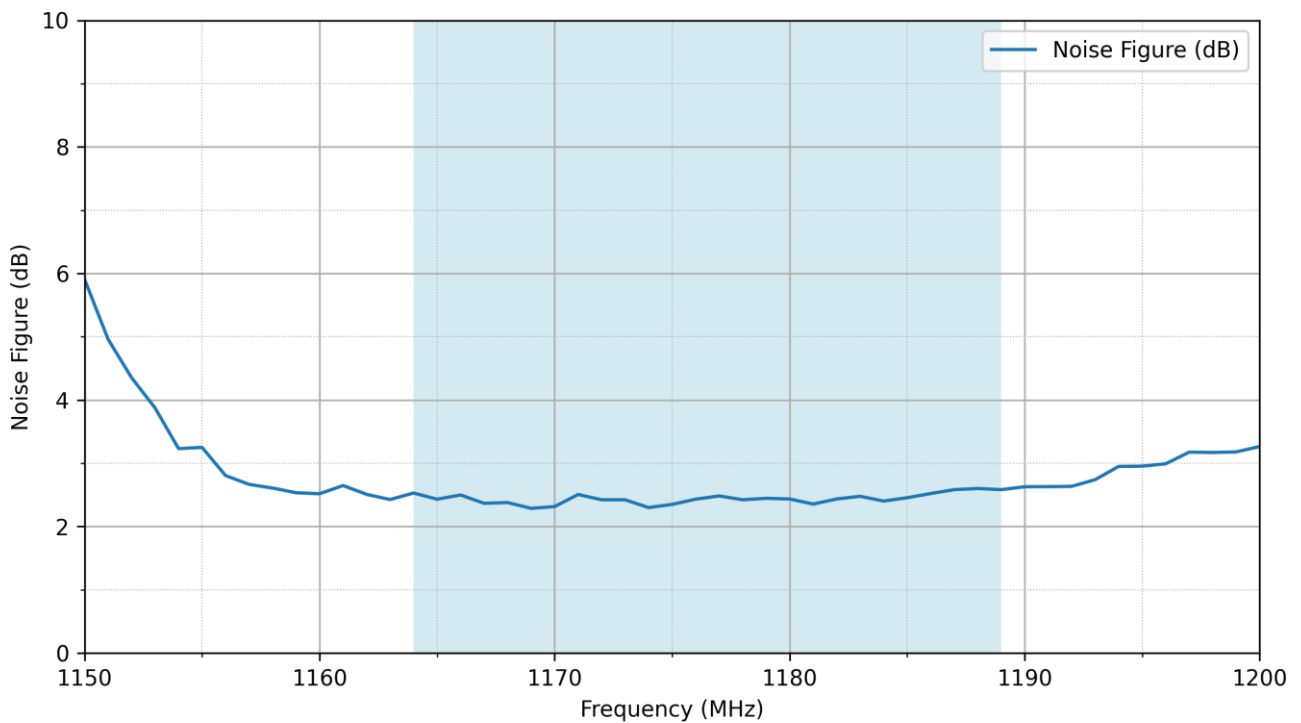
5.4 P1dB Compression Point (L5)



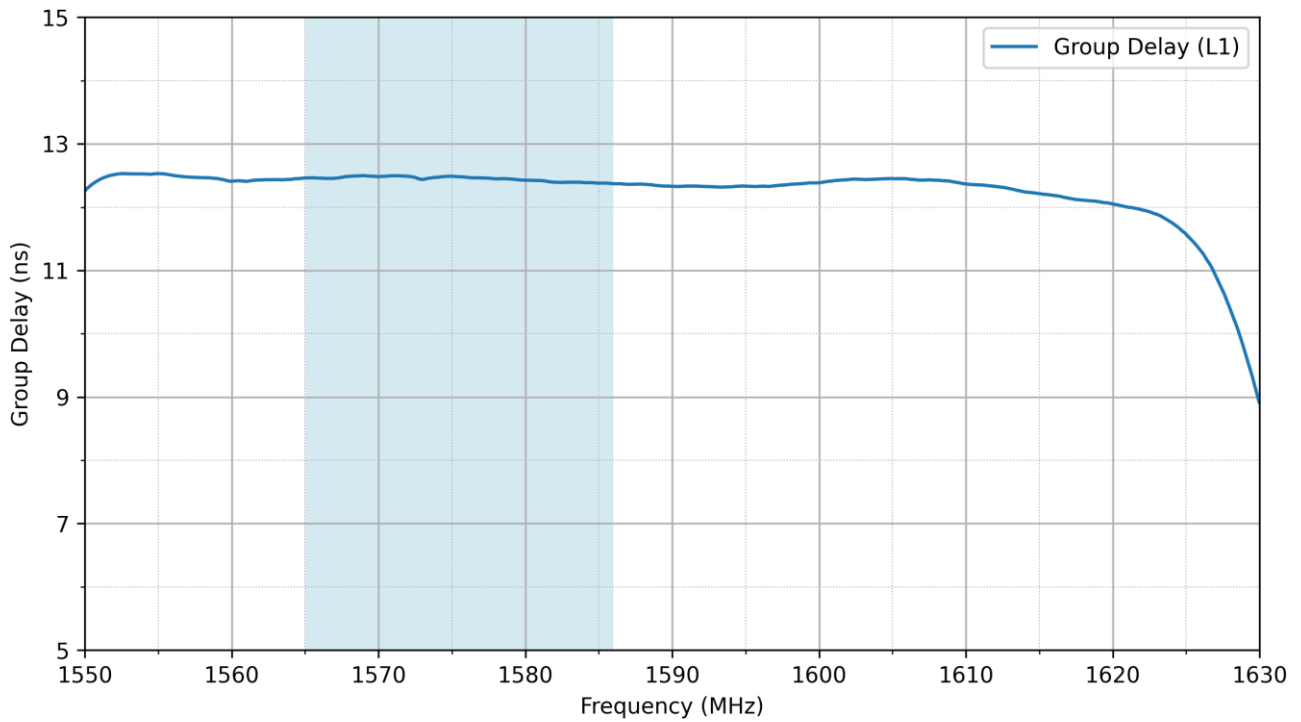
5.5 Noise Figure (L1)



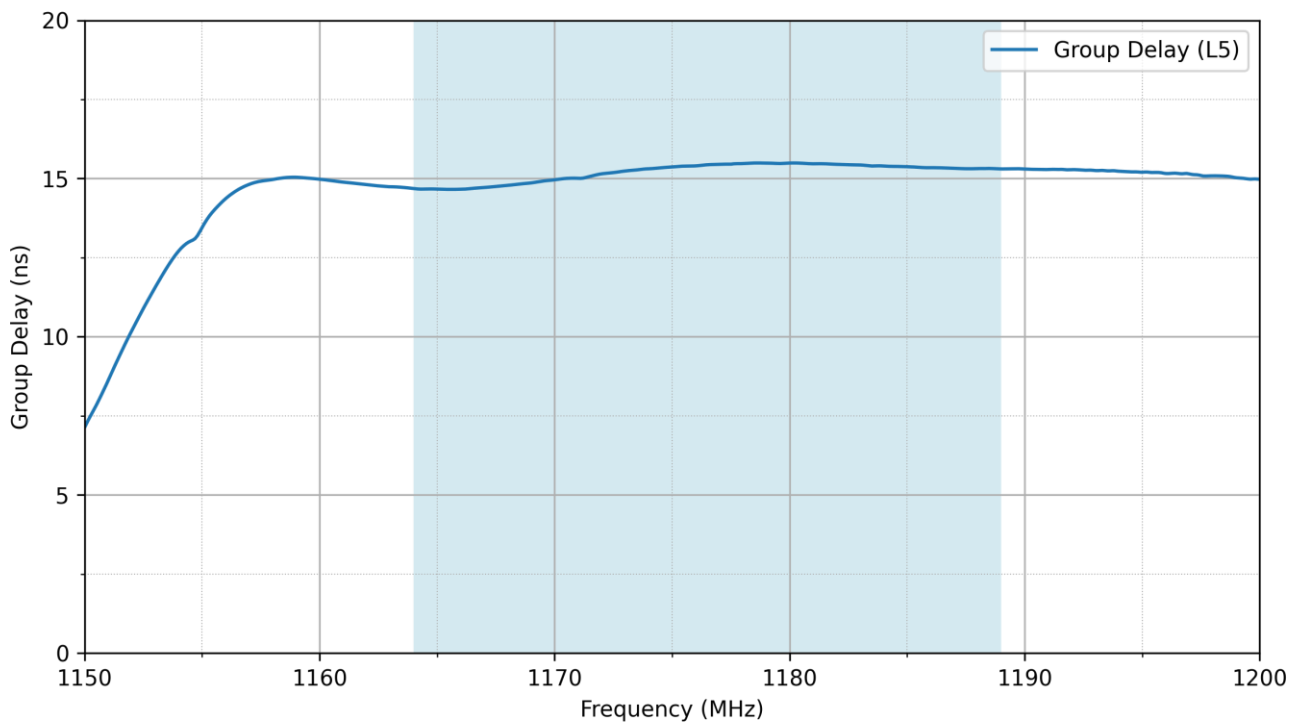
5.6 Noise Figure (L5)



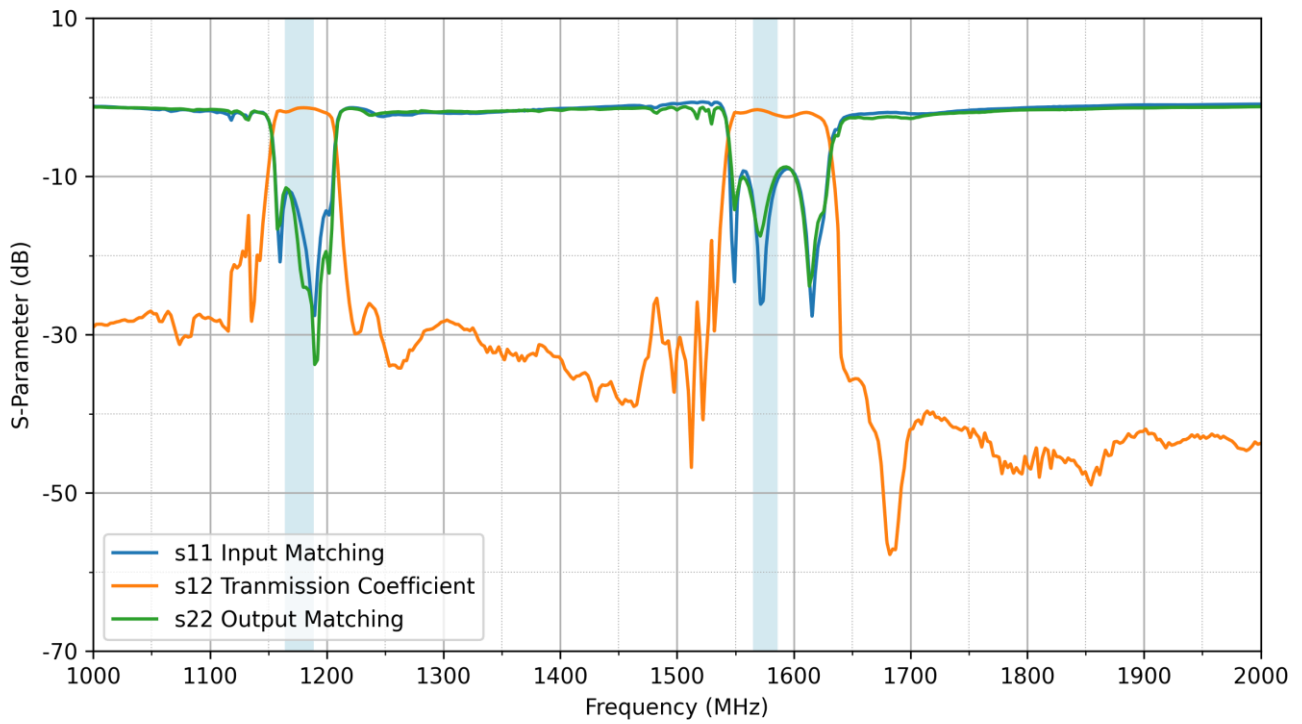
5.7 Group Delay (L1)



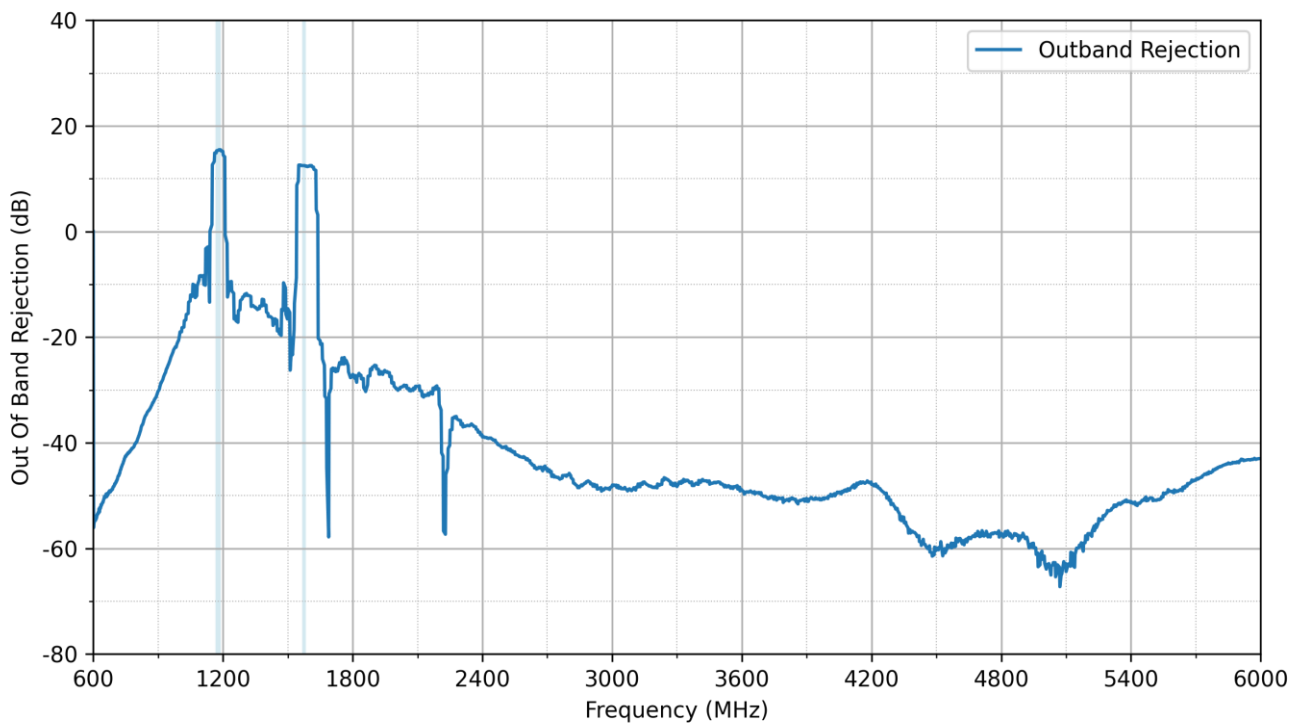
5.8 Group Delay (L5)



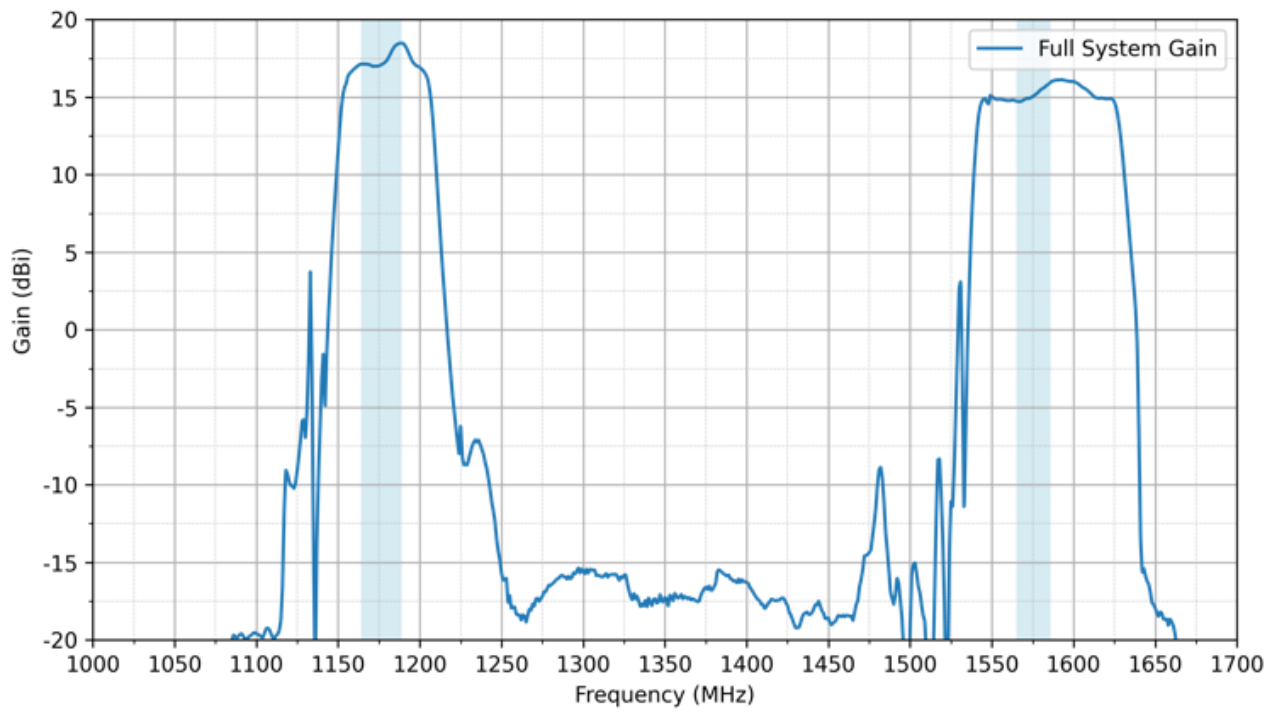
5.9 L1/L5 Dual Band Saw Filter Performance



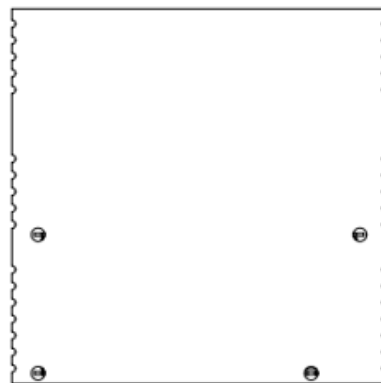
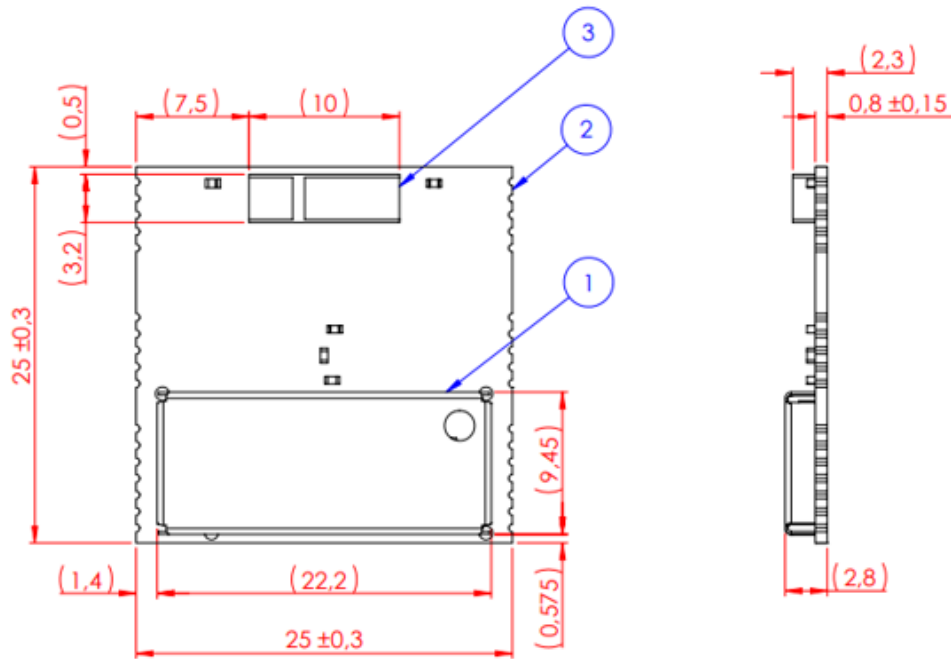
5.10 Out Of Band Rejection



5.11 Combined Gain

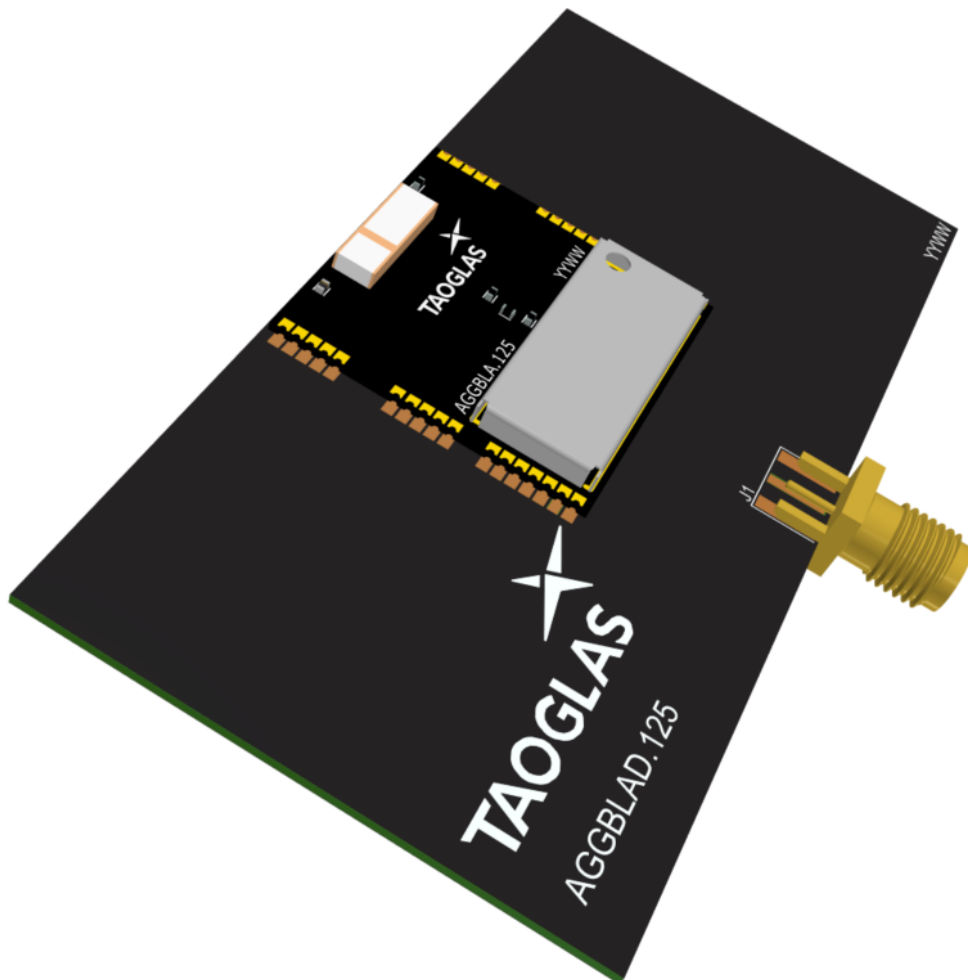
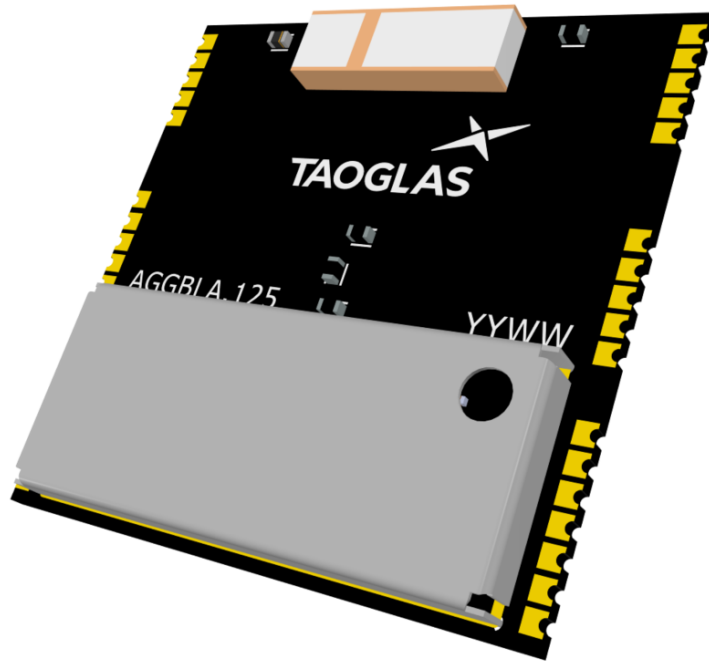


6. Mechanical Drawing



| ITEM NO. | DESCRIPTION | QTY |
|----------|--|-----|
| 1 | SHIELDING CASE SPTe TIN PLATED | 1 |
| 2 | GGBLA.125.A GNSS ANTENNA PCBA/SMDP | 1 |
| 3 | GPS/GLONASS/GALILEO/BEI-DOU CERAMIC SUBSTRATE LOOP ANTENNA (L/E 1, 2, 5) | 1 |

7. Antenna Integration Guide



7.1 Schematic Symbol and Pin Definitions

The circuit symbol for the antenna is shown below. The antenna has 34 pins with all pins as functional.

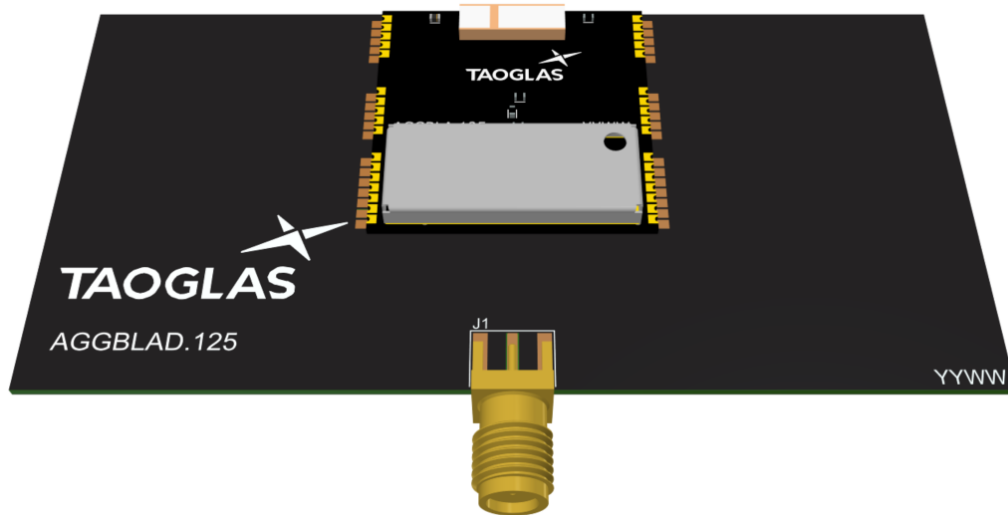
| Pin | Description |
|------|-------------|
| 1 | RF Feed |
| 2-34 | Ground |

TAOGLAS_AGGBLA.125 ANT1

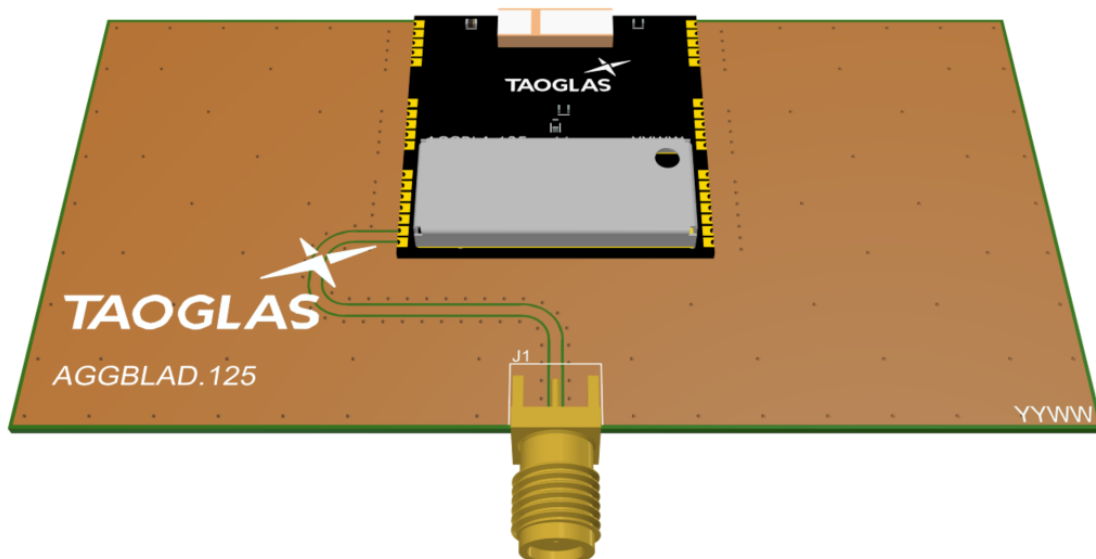
| | | | |
|----|---------|-----|----|
| 1 | RF FEED | GND | 34 |
| 2 | GND | GND | 33 |
| 3 | GND | GND | 32 |
| 4 | GND | GND | 31 |
| 5 | GND | GND | 30 |
| 6 | GND | GND | 29 |
| 7 | GND | GND | 28 |
| 8 | GND | GND | 27 |
| 9 | GND | GND | 26 |
| 10 | GND | GND | 25 |
| 11 | GND | GND | 24 |
| 12 | GND | GND | 23 |
| 13 | GND | GND | 22 |
| 14 | GND | GND | 21 |
| 15 | GND | GND | 20 |
| 16 | GND | GND | 19 |
| 17 | GND | GND | 18 |

7.2 Antenna Integration

For any given PCB size, the antenna should ideally be placed on the PCB's longest side, to take advantage of the ground plane. Optimized matching components can be placed as shown.



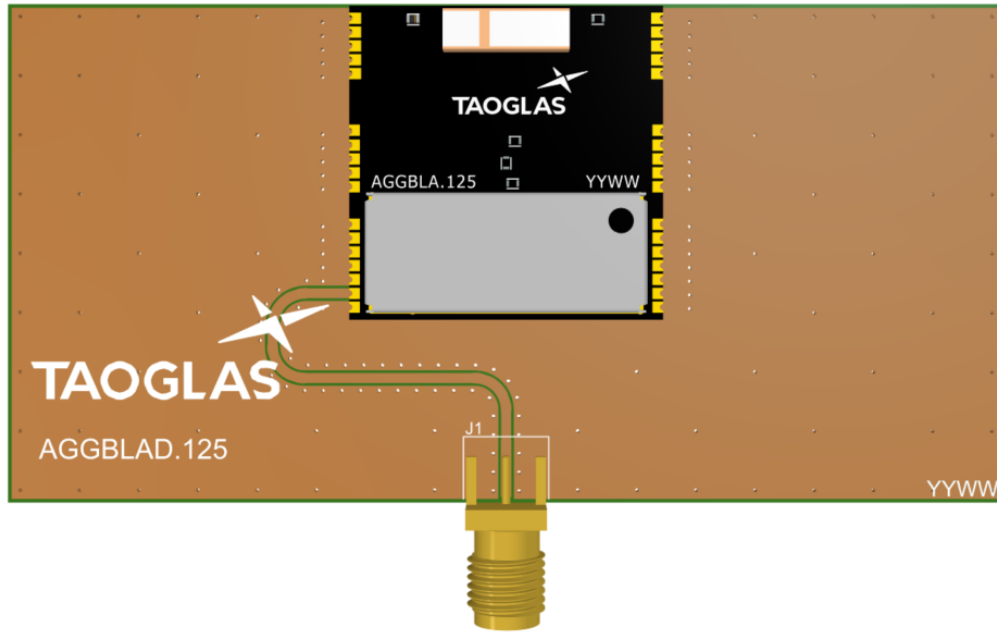
With Solder Mask



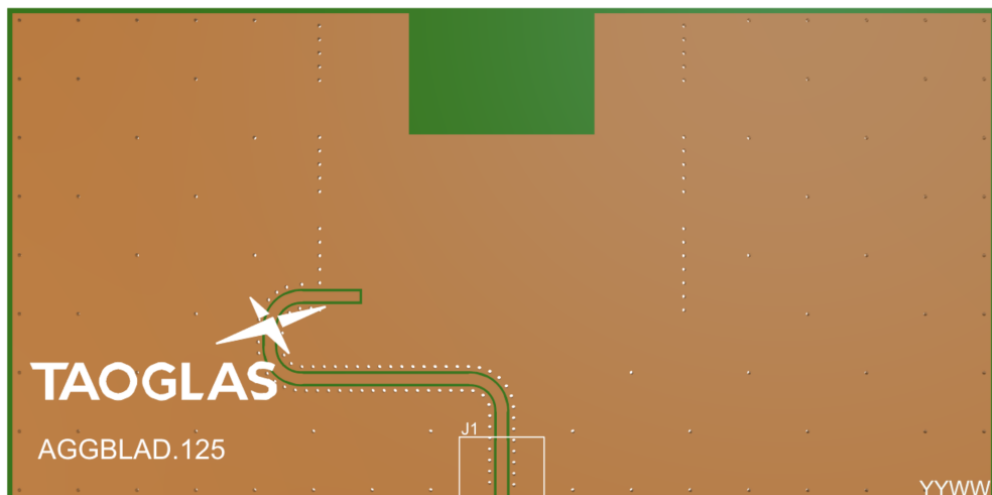
Without Solder Mask

7.3 PCB Layout

The footprint and clearance on the PCB must meet the layout drawing in section



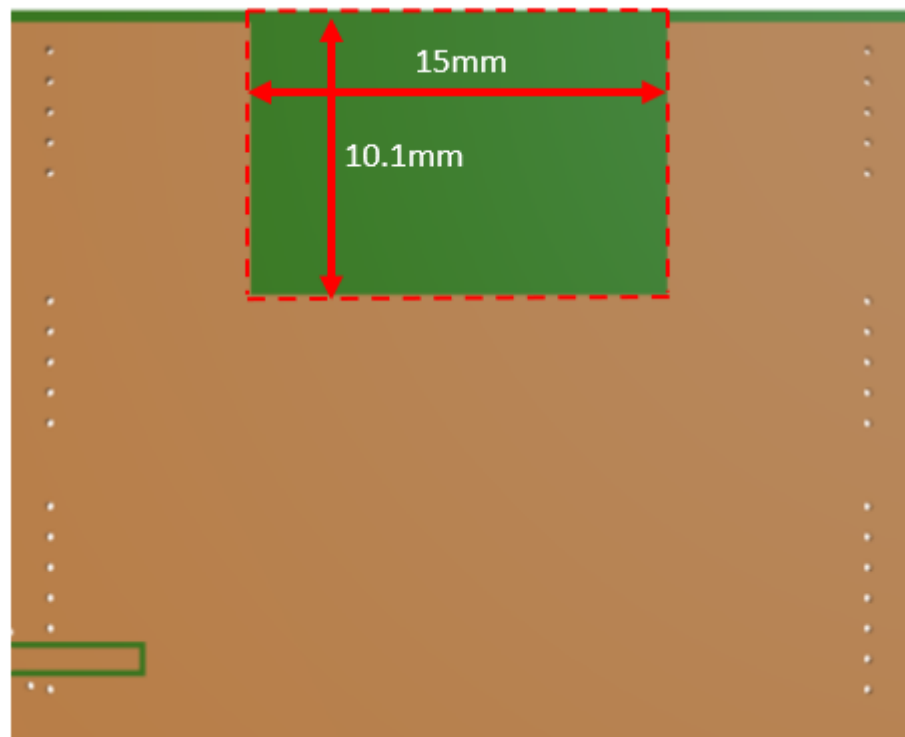
With Antenna



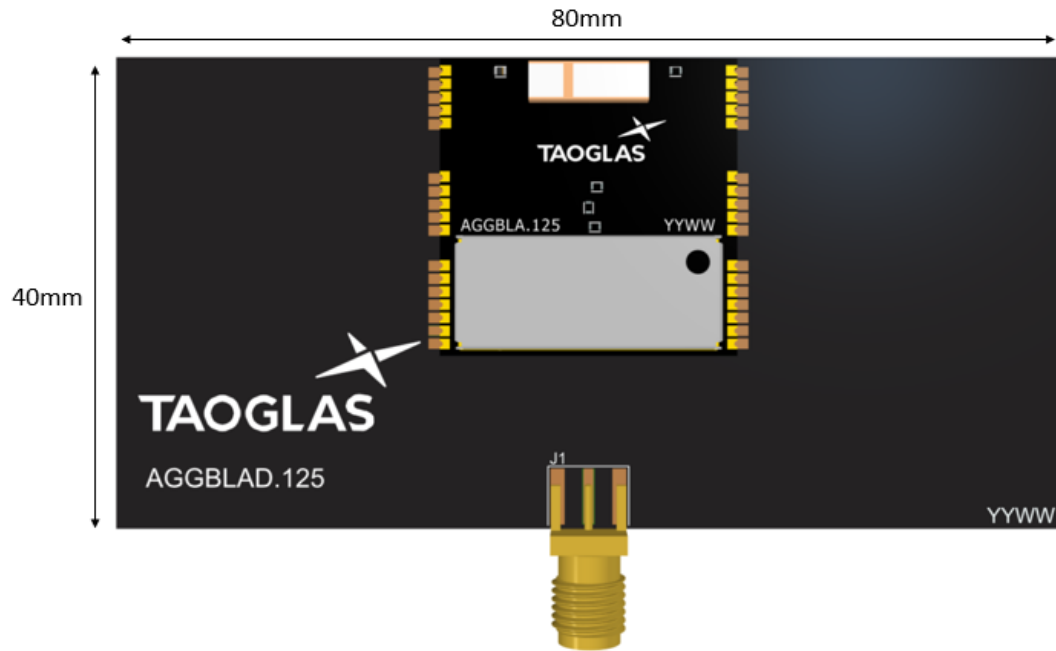
Without Antenna

7.4 PCB Clearance

Below shows the antenna footprint and clearance through ALL layers on the PCB. Only the antenna pads and connections to feed and GND are present within this clearance area (marked RED). The clearance area extends to 10.1mm in length and 15mm in width from the centre of the topside of the PCB. This clearance area includes the bottom side and ALL internal layers on the PCB.



7.5 PCB Clearance

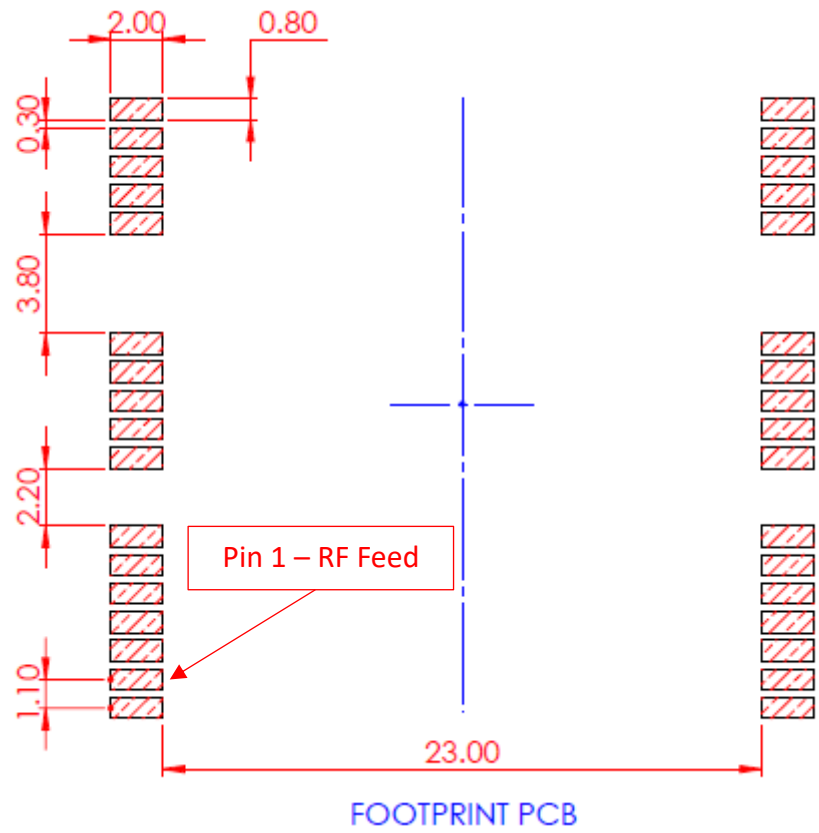


Topside



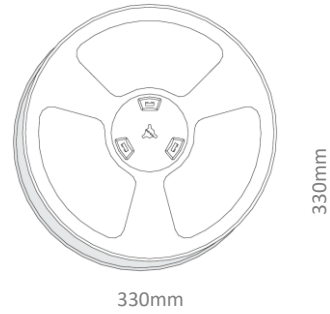
Bottom Side

7.6 Footprint

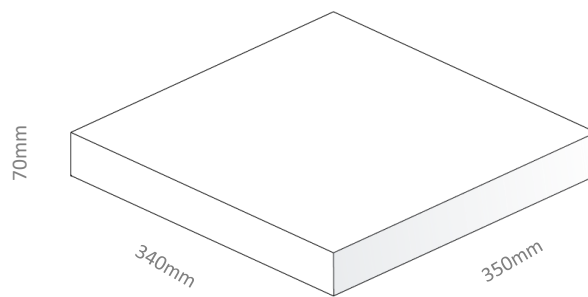


8. Packaging

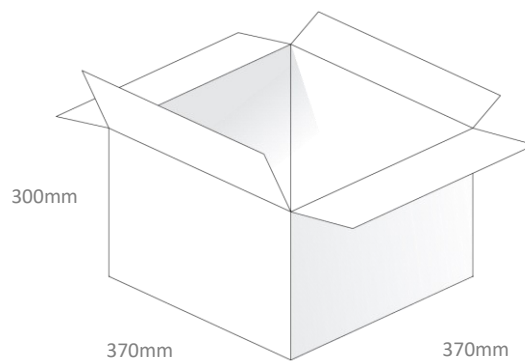
250 PCS AGGBLA.125 per reel



250 PCS / Box
 Dimensions: 350x340x70mm
 Weight: 1.3Kg



1000 PCS / Carton
 Dimensions: 370x370x300mm
 Weight: 6Kg



Changelog for the datasheet

SPE-23-8-240– AGGBLA.125

Revision: A (Current Version)

| | |
|---------|------------------------------|
| Date: | 2024-07-10 |
| Notes: | Update Packaging Information |
| Author: | Gary West |

Previous Revisions

Revision: A (Original First Release)

| | |
|---------|-----------------|
| Date: | 2023-08-24 |
| Notes: | Initial Release |
| Author: | Gary West |



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