TAOGLAS

Datasheet

# Bolt with Integrated Lightning Induced Surge Protection

**Part No:**
**A.93.A.101111**

**Description**

High-Gain, High-Rejection Active GPS Timing Antenna
With Integrated Lightning Induced Surge Protection

**Features:**

28 dB LNA Gain
Rejection > 80 dB Between 10 - 1400 MHz
> 60 dB Between 1820 - 3500 MHz
Ceramic Patch Antenna Element
Permanent Mount, IP67 Rated Enclosure
Wide Input voltage +1.9V to +12V
Lightning Induced Surge Protection IEC 61000-4-5 (Class 4)
Cable: 1m RG-174
Connector: SMA(M)
RoHS & Reach Compliant

# 1. Introduction

The Bolt Series A.93.A is a best in class high rejection timing antenna featuring high gain, excellent out-of-band rejection and integrated protection against lightning induced surges. It comes in a compact external permanent mount enclosure that is IP67 rated and UV resistant. The A.93.A has greater than 28 dB LNA gain and excellent out-of-band rejection, characteristics that make it ideal for GPS/GLONASS/BeiDou timing applications where the antenna will be placed near transmitters, such as cellular, Wi-Fi, Bluetooth, etc.

The integrated filters feature outstanding rejection across all non-GNSS frequencies to prevent overdriving or damaging the GNSS receiver from nearby transmitters. At the commonly used LTE frequencies between 700MHz-1000MHz, the A.93 provides greater than 80 dB of rejection and between 1820MHz-3500MHz, it has greater than 60 dB of rejection.

Even with the superb out of band rejection, the A.93 maintains a very low noise figure of less than 2.2 dB. This low noise figure minimizes overall signal quality degradation typically caused by losses in transmission lines. The A.93 includes integrated protection against lightning induced surges (IEC 61000-4-5, Class 4), thus removing the need for expensive external solutions.

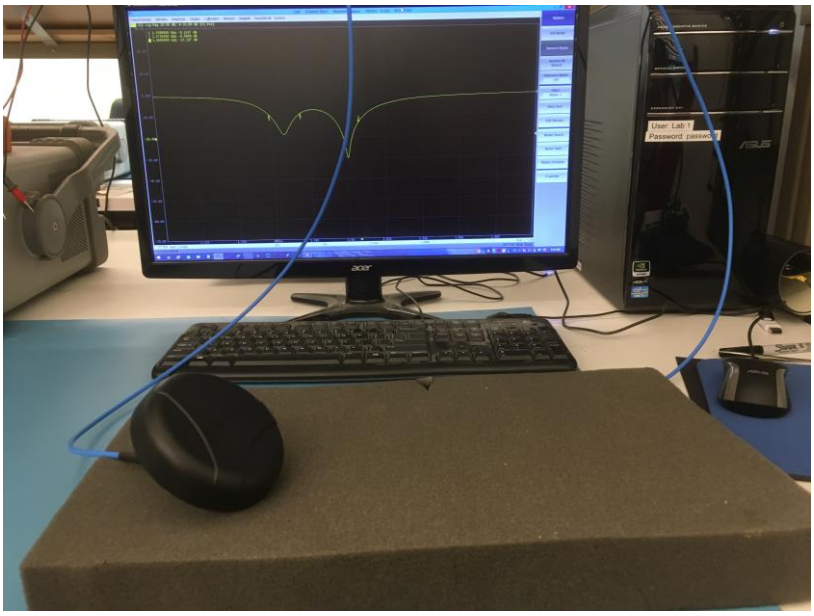
Different cable and connector assembly options are available, please contact your regional Taoglas Customer Support Team for more information or advice on integrating with your device.

# 2. Specification

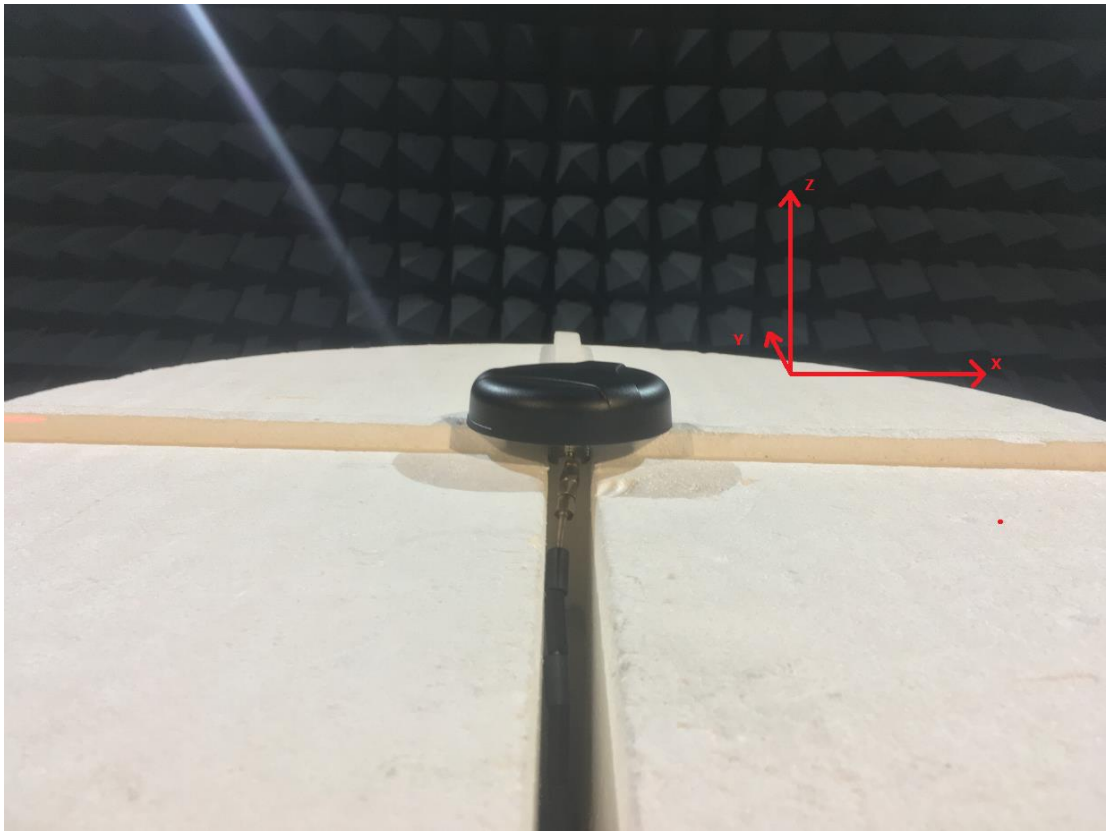
| Embedded Ceramic Patch Antenna Specifications * | | | |
|---|---|---|---|
| **Band** | **BeiDou** | **GPS/Galileo** | **GLONASS** |
| **Frequency** | **1561 MHz** | **1575.42 MHz** | **1602 MHz** |
| Efficiency (%) | 81.6 | 80.1 | 88.5 |
| Average Gain (dBi) | -0.88 | -0.96 | -0.53 |
| Peak Gain (dBi) | 4.49 | 4.84 | 5.09 |
| Impedance | 50Ω | | |
| Polarization | RHCP | | |
| **LNA Specification** | | | |
| Gain (dB) | 28 dB Typical | | |
| NF (dB) | <2.2 dB Typical | | |
| Input Voltage | +1.9 to +12 VDC | | |
| Power Consumption | < 9 mA | | |
| **Mechanical** | | | |
| Enclosure Material | UV Protected ASA | | |
| Enclosure Dimensions | Diameter: 94.3mm x 25.4mm | | |
| Connector | SMA(M) | | |
| Cable | 1 Meter RG-174 | | |
| Weight | 233 g | | |
| **Environmental** | | | |
| Operation Temperature | -40°C to 85°C | | |
| Storage Temperature | -40°C to 85°C | | |
| Humidity | Non-condensing 65°C 95% RH | | |
| Ingress Protection | IP67 | | |
| Lightning Induced Surge Protection | IEC 61000-4-5 (Class 4) 4kV | | |

*Note: Tested on evaluation board. Board losses removed.

# 3. Test Setup



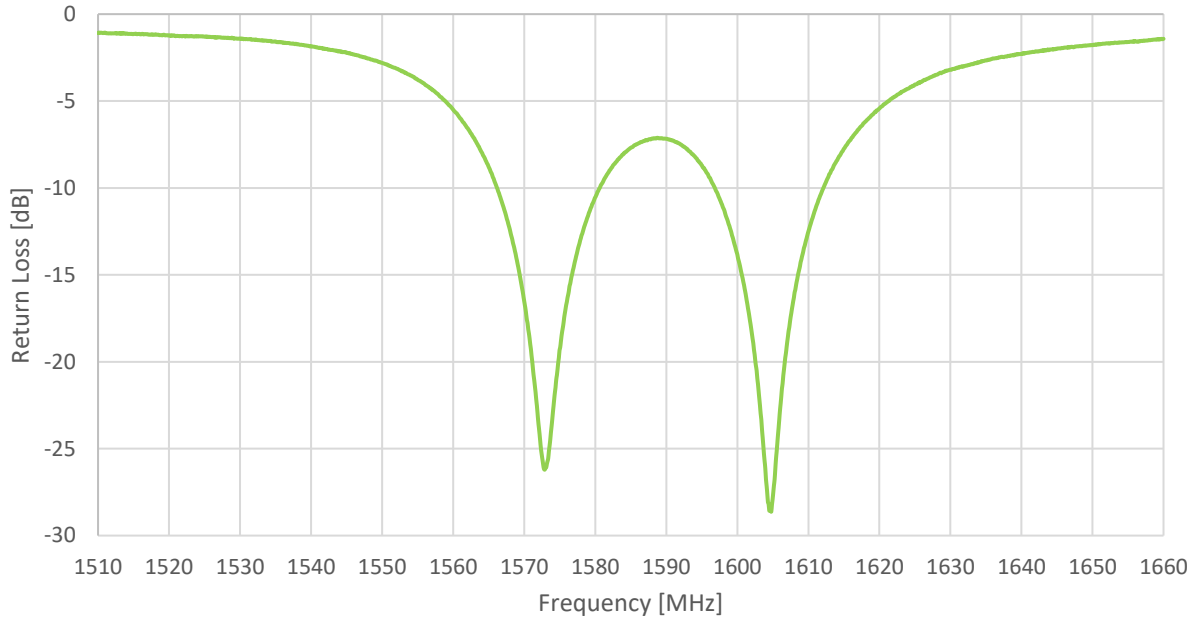
Return Loss measurement of the A.93 ceramic patch element



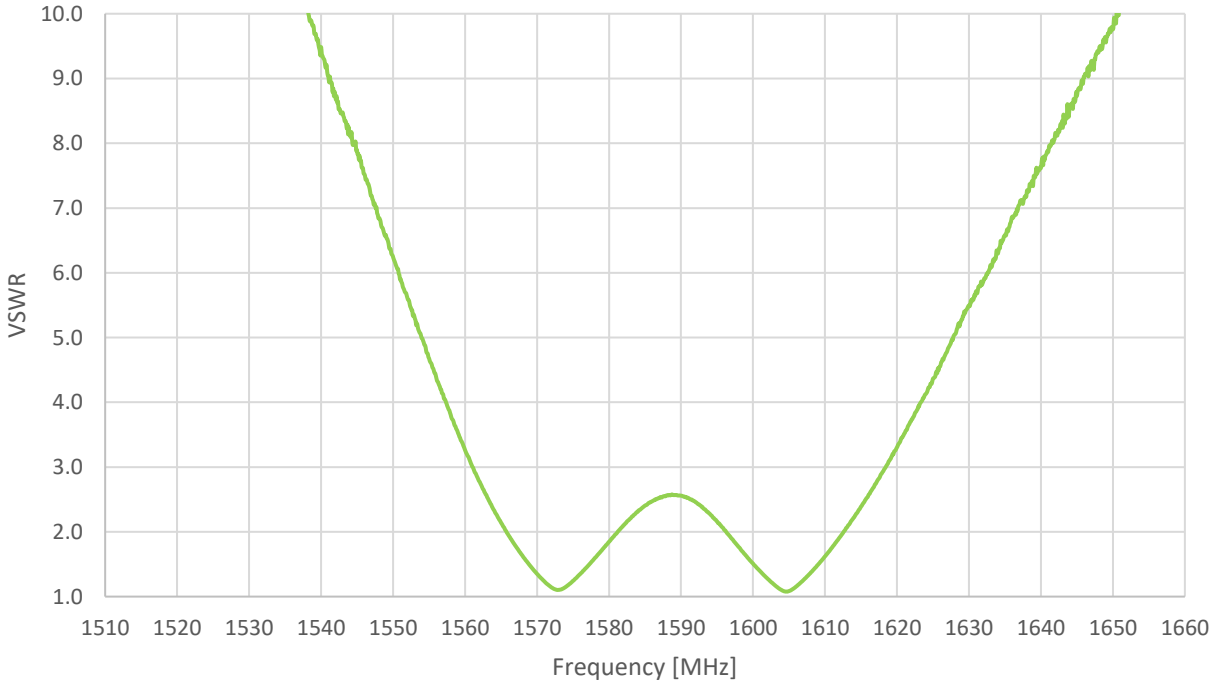

Anechoic Chamber test setup

# 4. Test Setup

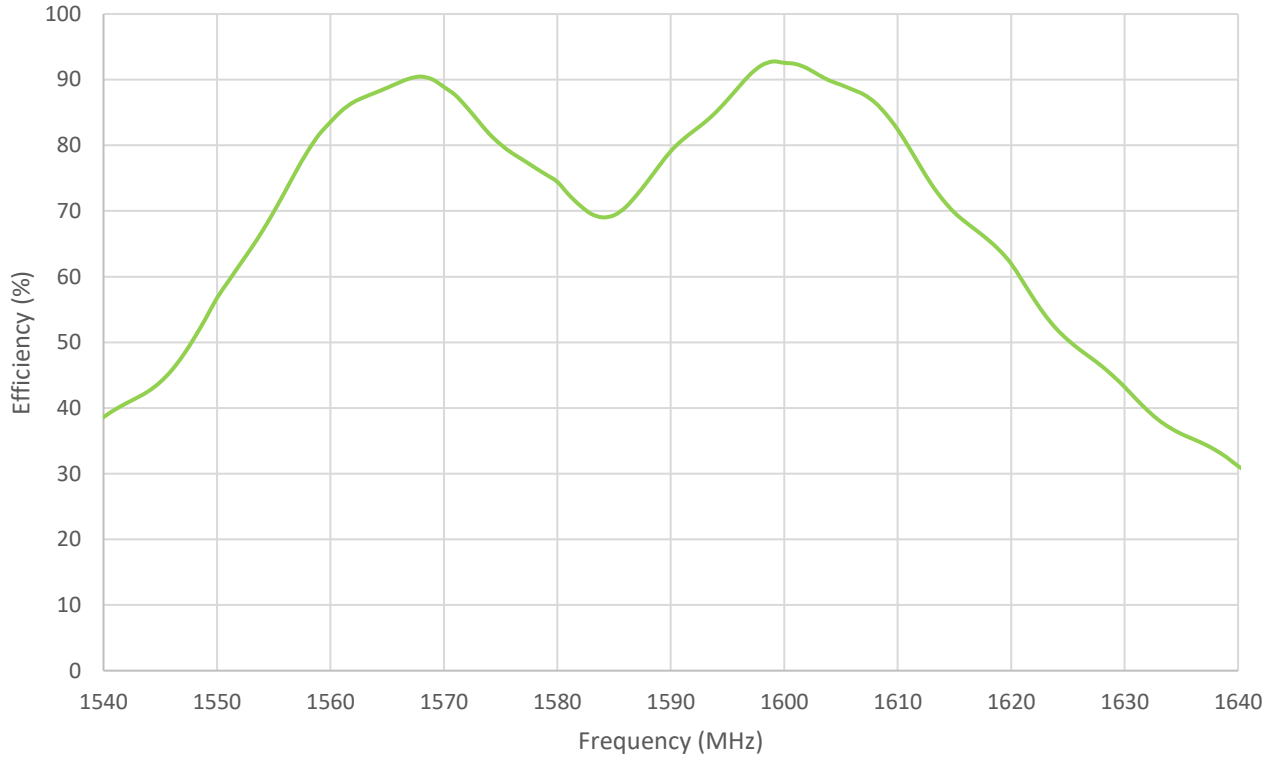
## 4.1 Return Loss



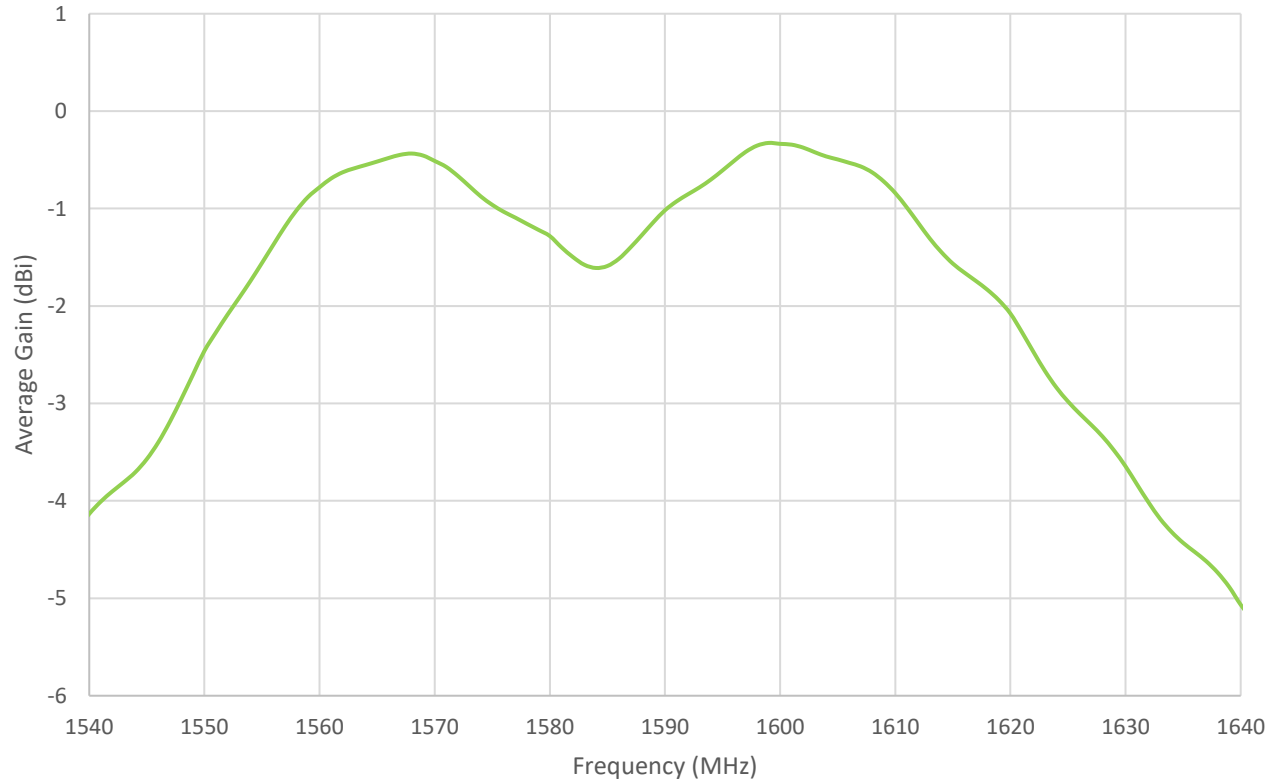

## 4.2 VSWR



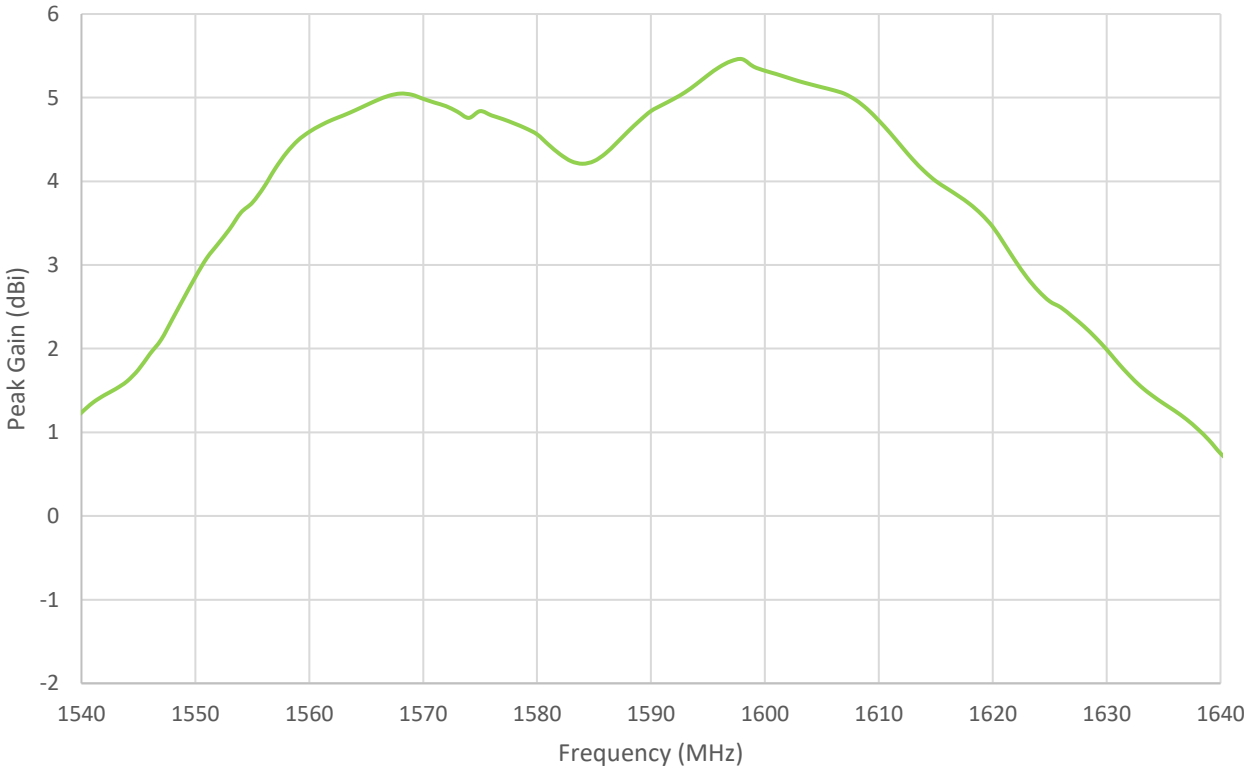
## 4.3 Efficiency



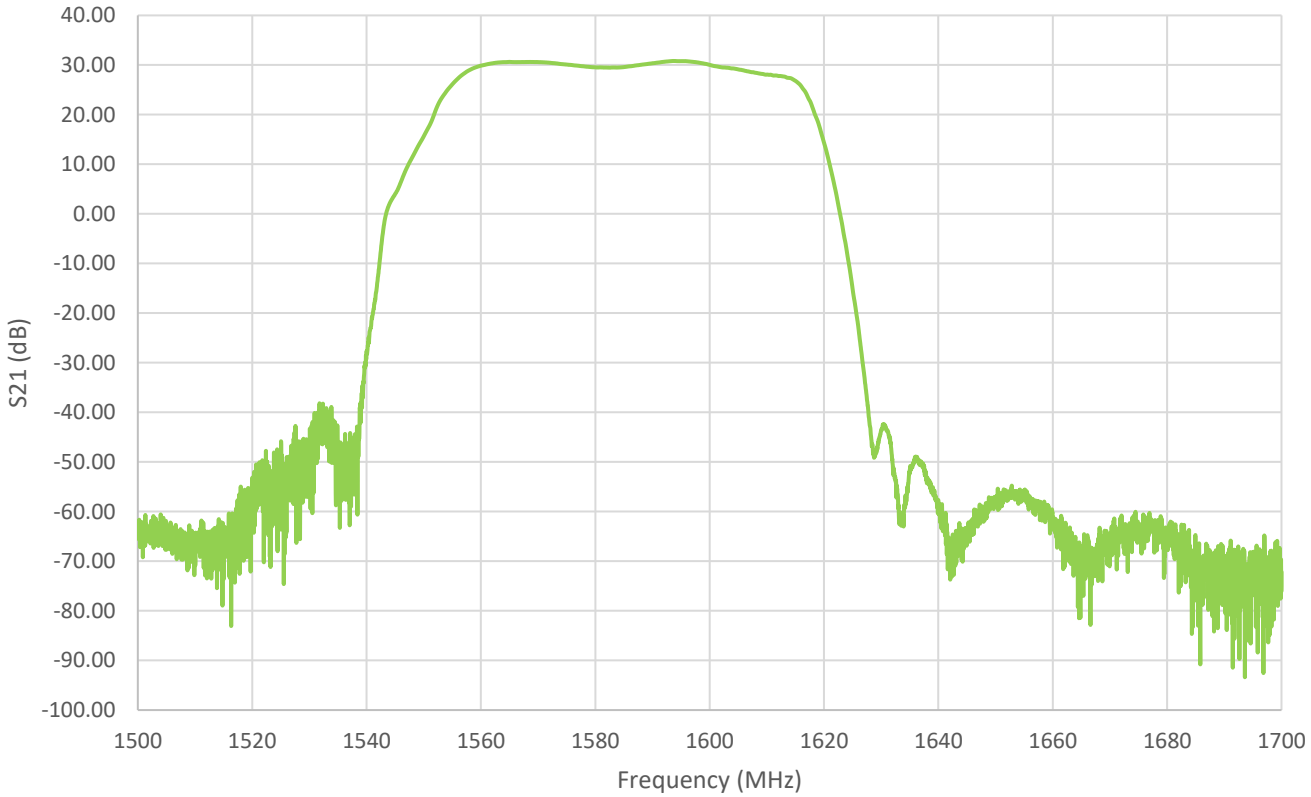

## 4.4 Average Gain



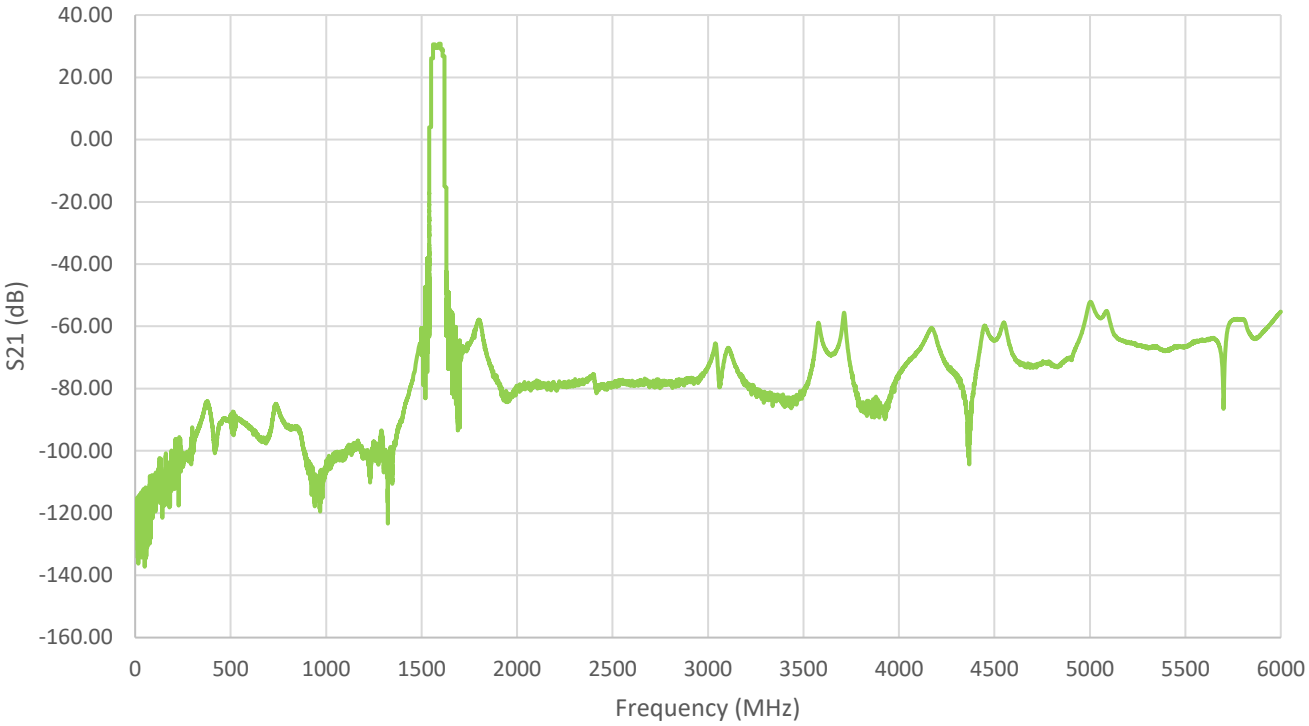
## 4.5 Peak Gain




## 4.6 In-Band LNA S21

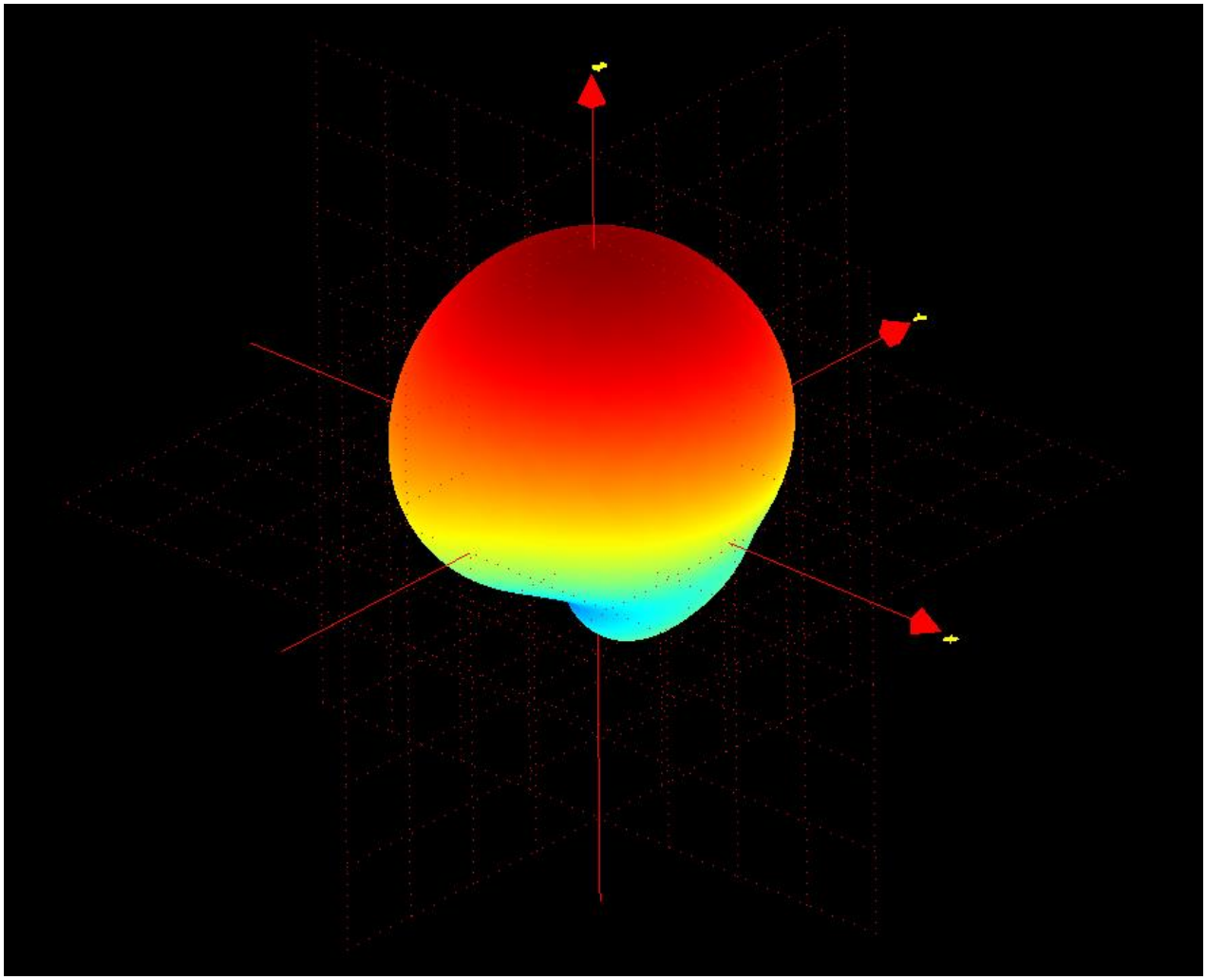


## 4.7 Wideband LNA S21

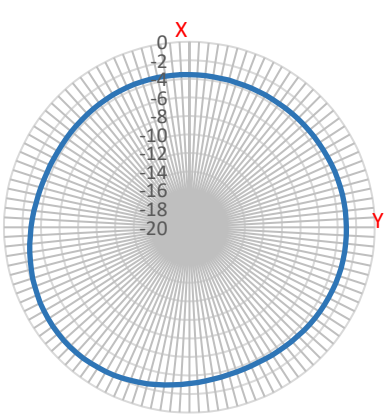


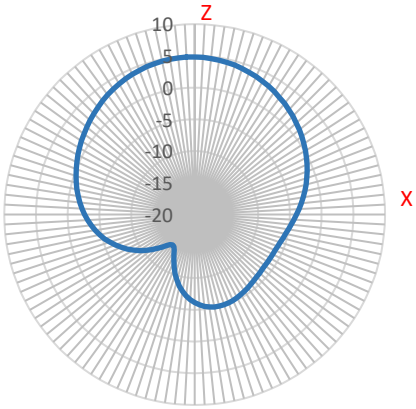
# 5. Radiation Patterns

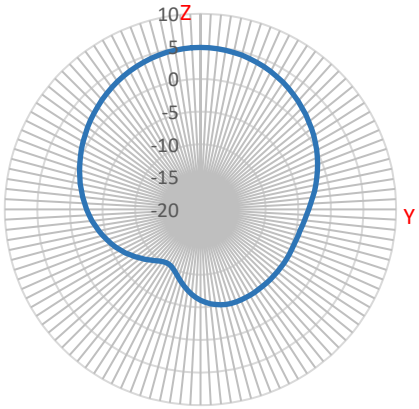
1575.42MHz



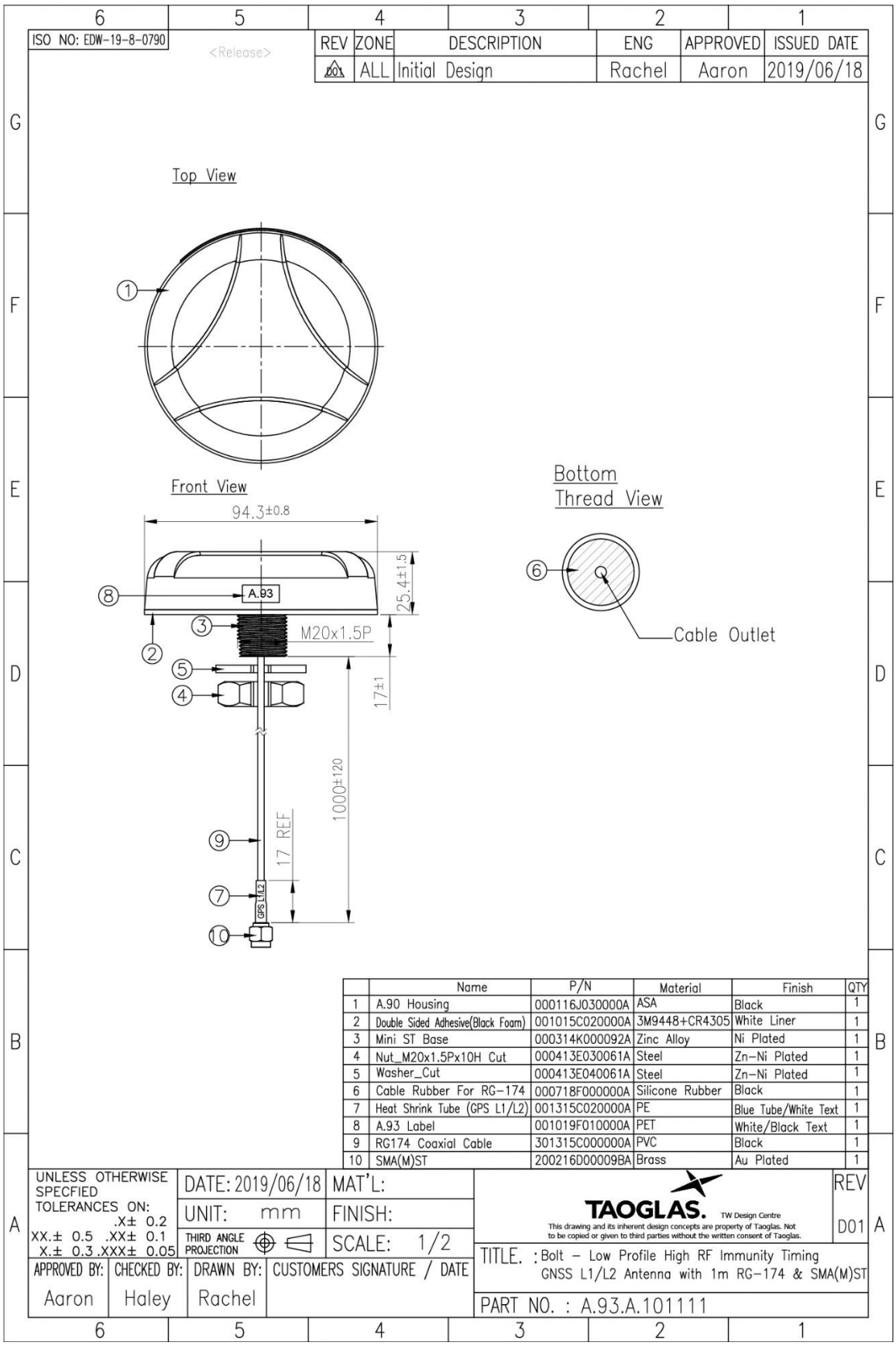
| XY Plane | XZ Plane | YZ Plane |
|---|---|---|



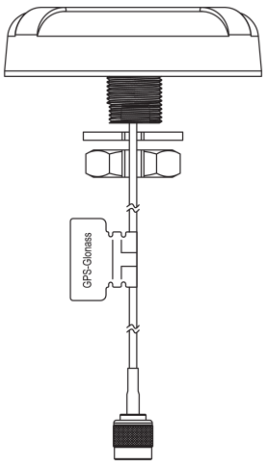
# 6. Mechanical Drawing




| | Name | P/N | Material | Finish | QTY |
|---|---|---|---|---|---|
| 1 | A.90 Housing | 000116J030000A | ASA | Black | 1 |
| 2 | Double Sided Adhesive(Black Foam) | 001015C020000A | 3M9448+CR4305 | White Liner | 1 |
| 3 | Mini ST Base | 000314K000092A | Zinc Alloy | Ni Plated | 1 |
| 4 | Nut_M20x1.5Px10H Cut | 000413E030061A | Steel | Zn-Ni Plated | 1 |
| 5 | Washer_Cut | 000413E040061A | Steel | Zn-Ni Plated | 1 |
| 6 | Cable Rubber For RG-174 | 000718F000000A | Silicone Rubber | Black | 1 |
| 7 | Heat Shrink Tube (GPS L1/L2) | 001315C020000A | PE | Blue Tube/White Text | 1 |
| 8 | A.93 Label | 001019F010000A | PET | White/Black Text | 1 |
| 9 | RG174 Coaxial Cable | 301315C000000A | PVC | Black | 1 |
| 10 | SMA(M)ST | 200216D00009BA | Brass | Au Plated | 1 |

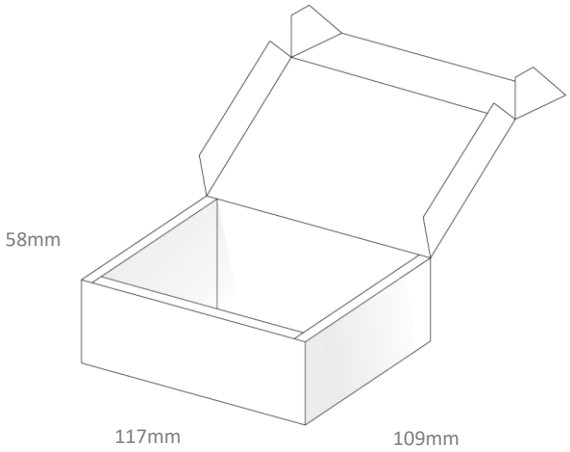
# 7. Packaging

1pc A.93.A.101111 per PE Bag
Dimensions: 232*183mm
Weight: 250g





1pc A.93.A.101111 per Carton
Inner Carton Dimensions: 117*109*58mm
Weight: 310g



## Changelog for the datasheet

**SPE-19-8-105 – A.93.A.101111**

| **Revision: B (Current Version)** | |
|---|---|
| Date: | 2023-05-09 |
| Changes: | Added VSWR Graph and updated datasheet format. |
| Changes Made by: | Gary West |

**Previous Revisions**

| **Revision: A (Original First Release)** | |
|---|---|
| Date: | 2018-03-27 |
| Notes: | Original Release |
| Author: | David Connolly / Jon Campbell |

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