



# 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

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## 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.

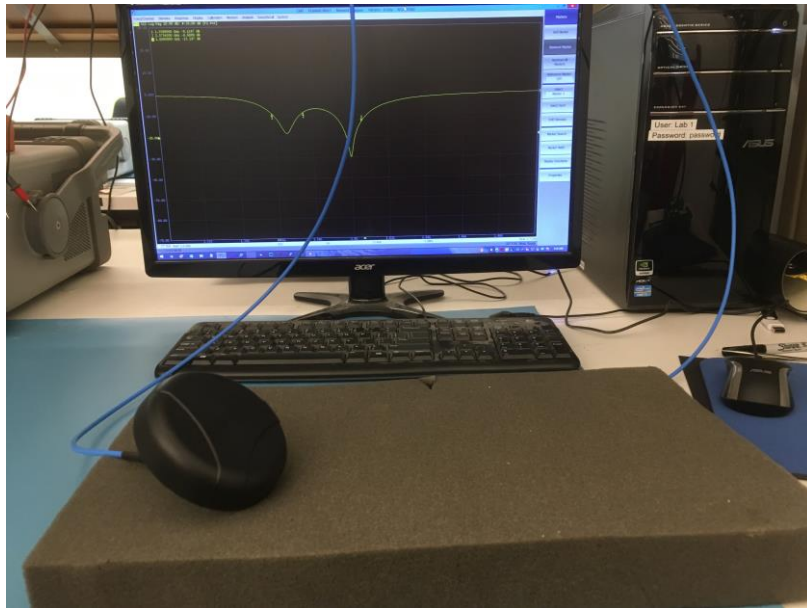
Different cable and connector assembly options are available, please contact your regional Taoglas Customer Support Team for more information or advice on integrating with your device.

## 2. Specification

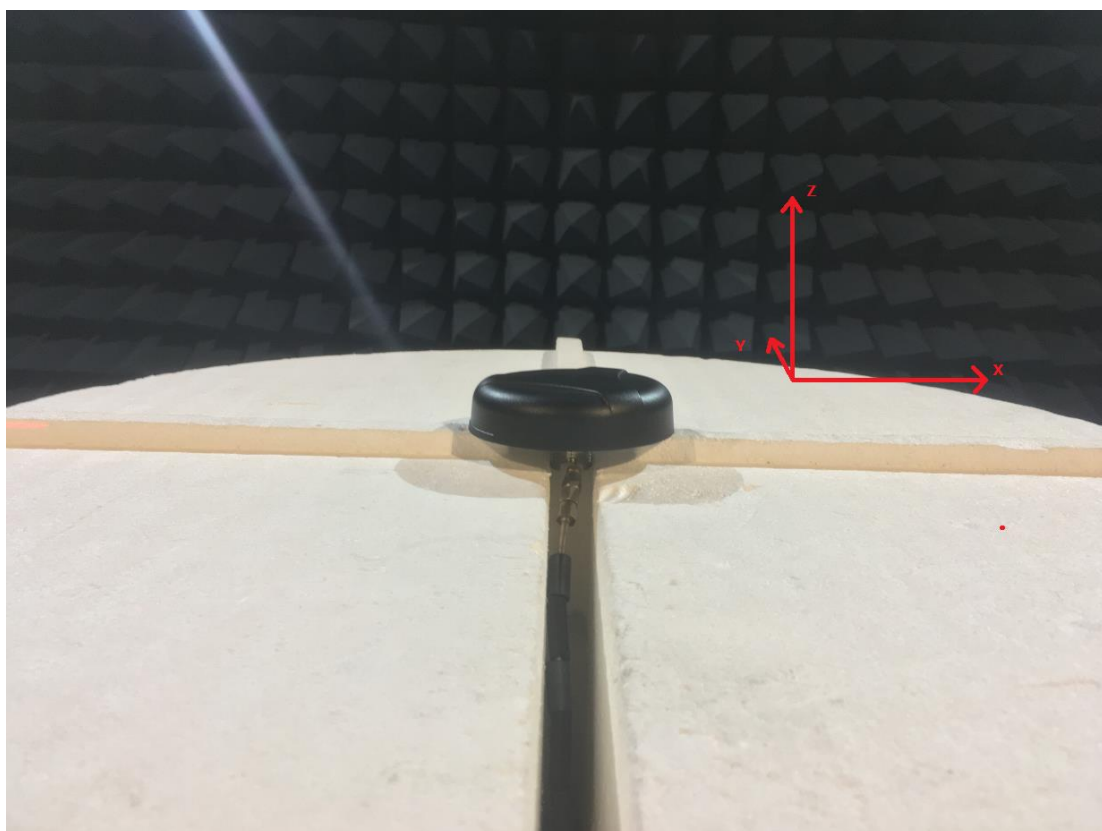
Embedded Ceramic Patch Antenna Specifications *			
Band	BeiDou	GPS/Galileo	GLONASS
Frequency	1561 MHz	1575.42 MHz	1602 MHz
Efficiency (%)	81.6	80.1	88.5
Average Gain (dBi)	-0.88	-0.96	-0.53
Peak Gain (dBi)	4.49	4.84	5.09
Impedance	50Ω		
Polarization	RHCP		
LNA Specification			
Gain (dB)	28 dB Typical		
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



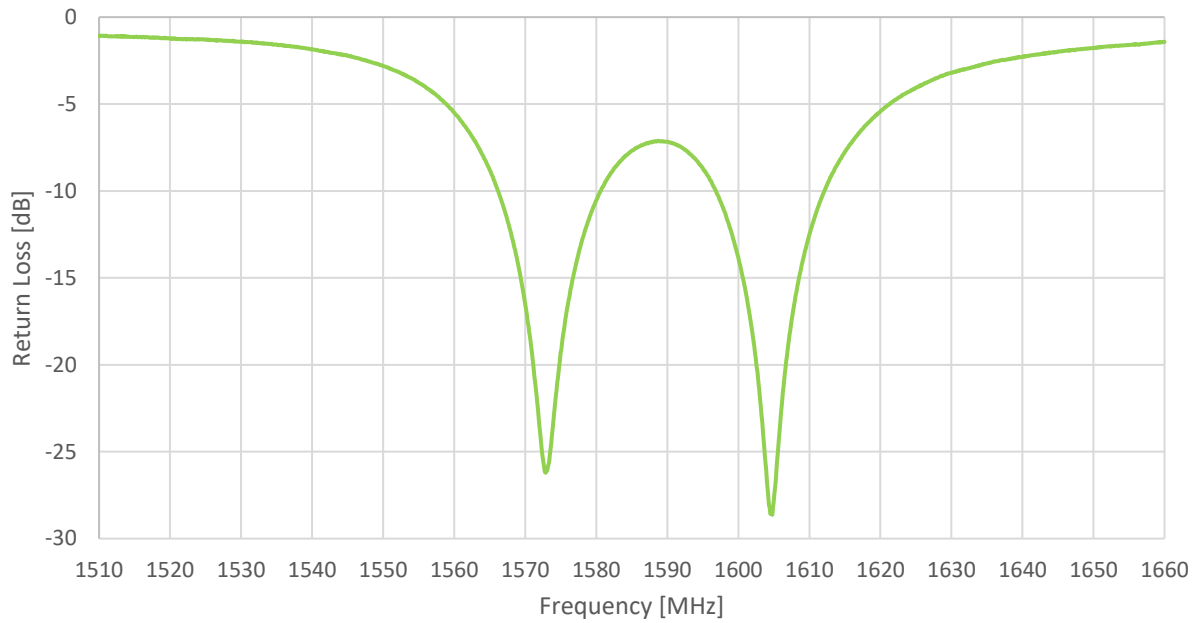
Return Loss measurement of the A.93 ceramic patch element



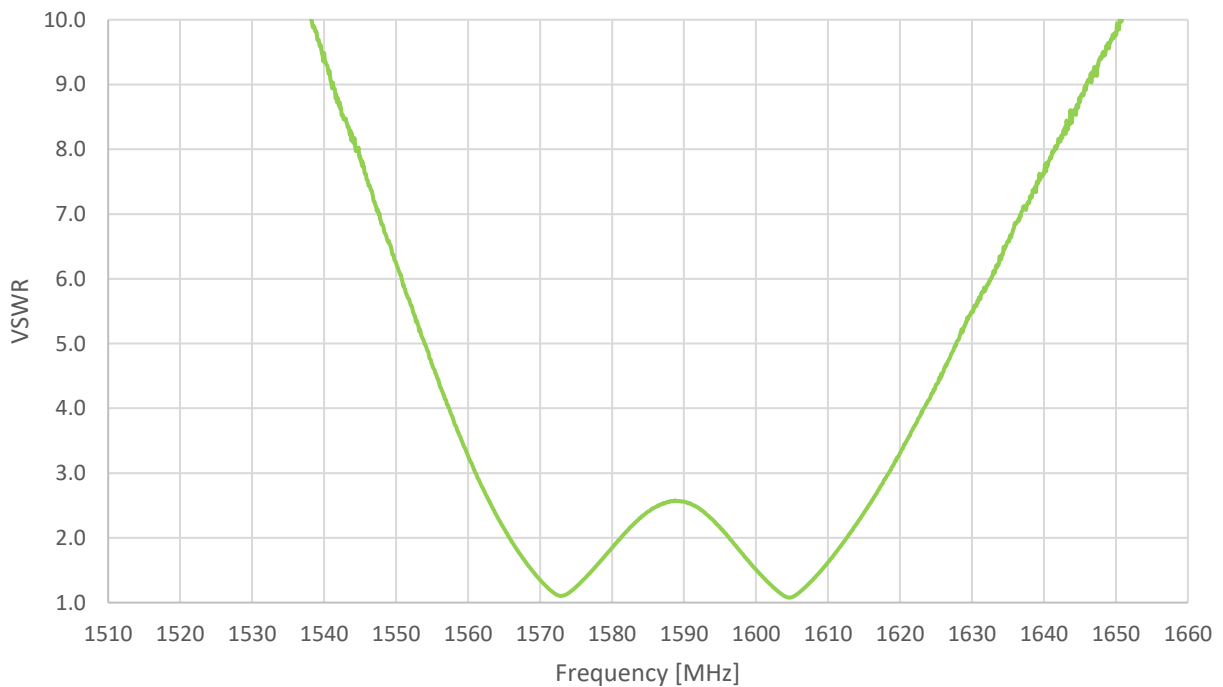
Anechoic Chamber test setup

## 4. Test Setup

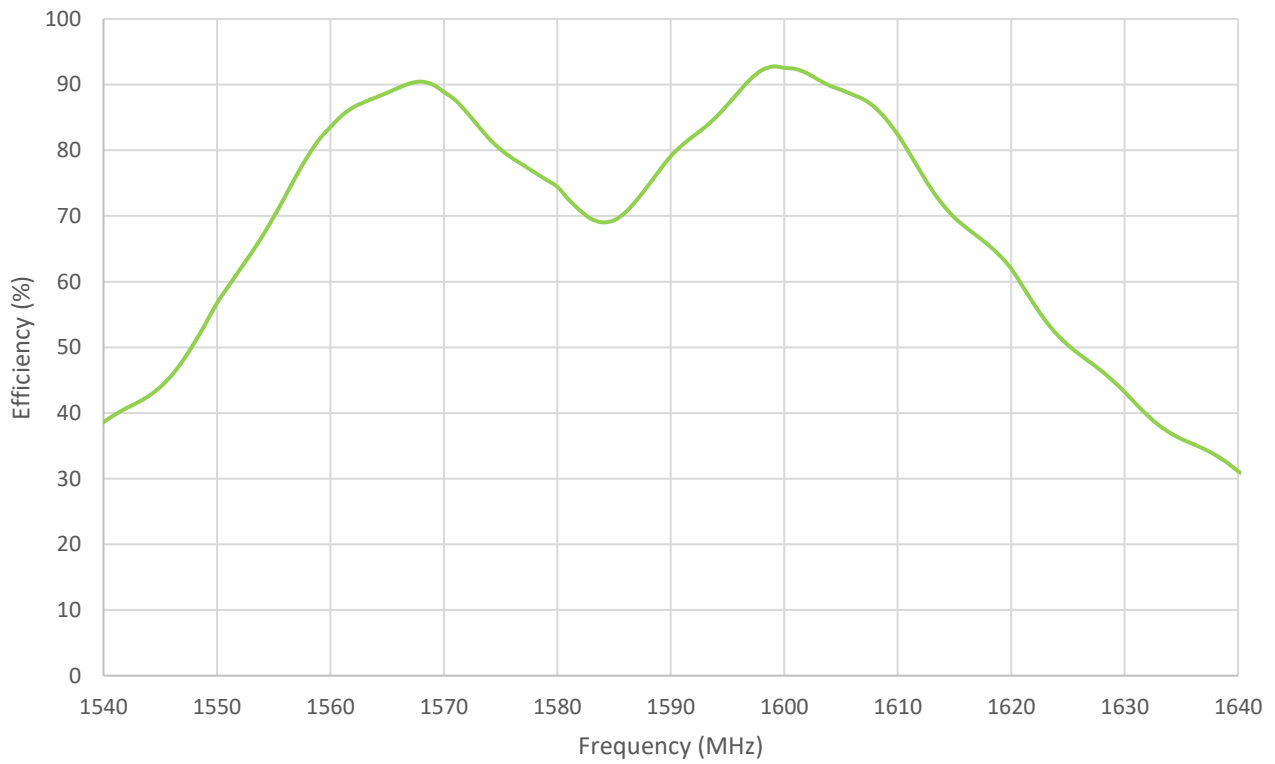
### 4.1 Return Loss



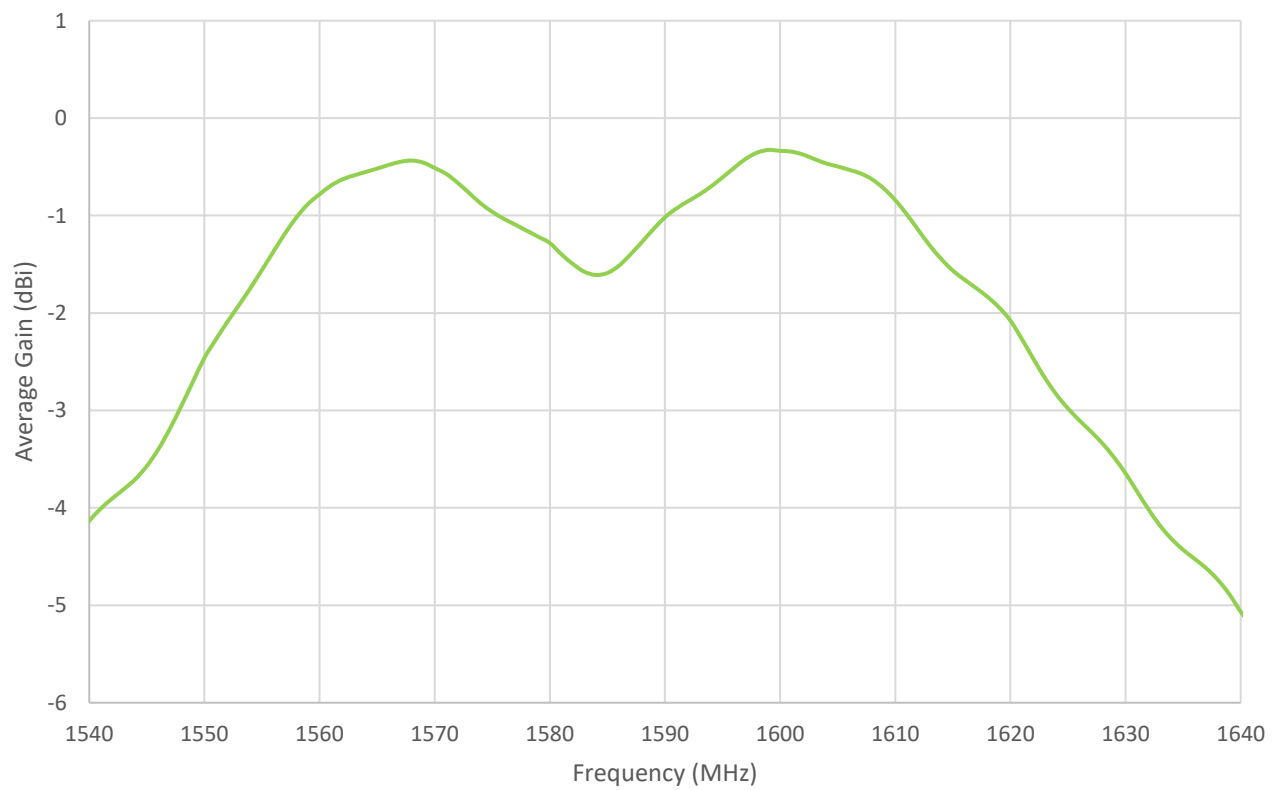
### 4.2 VSWR



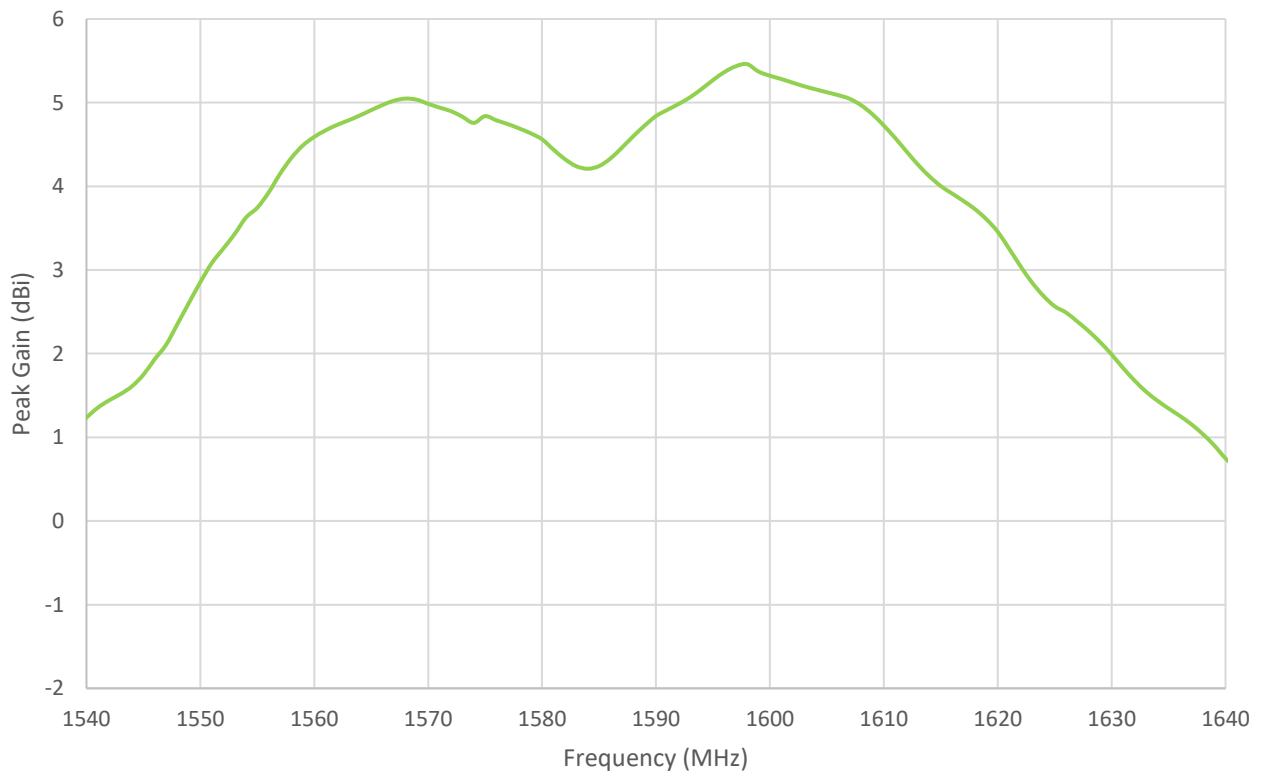
### 4.3 Efficiency



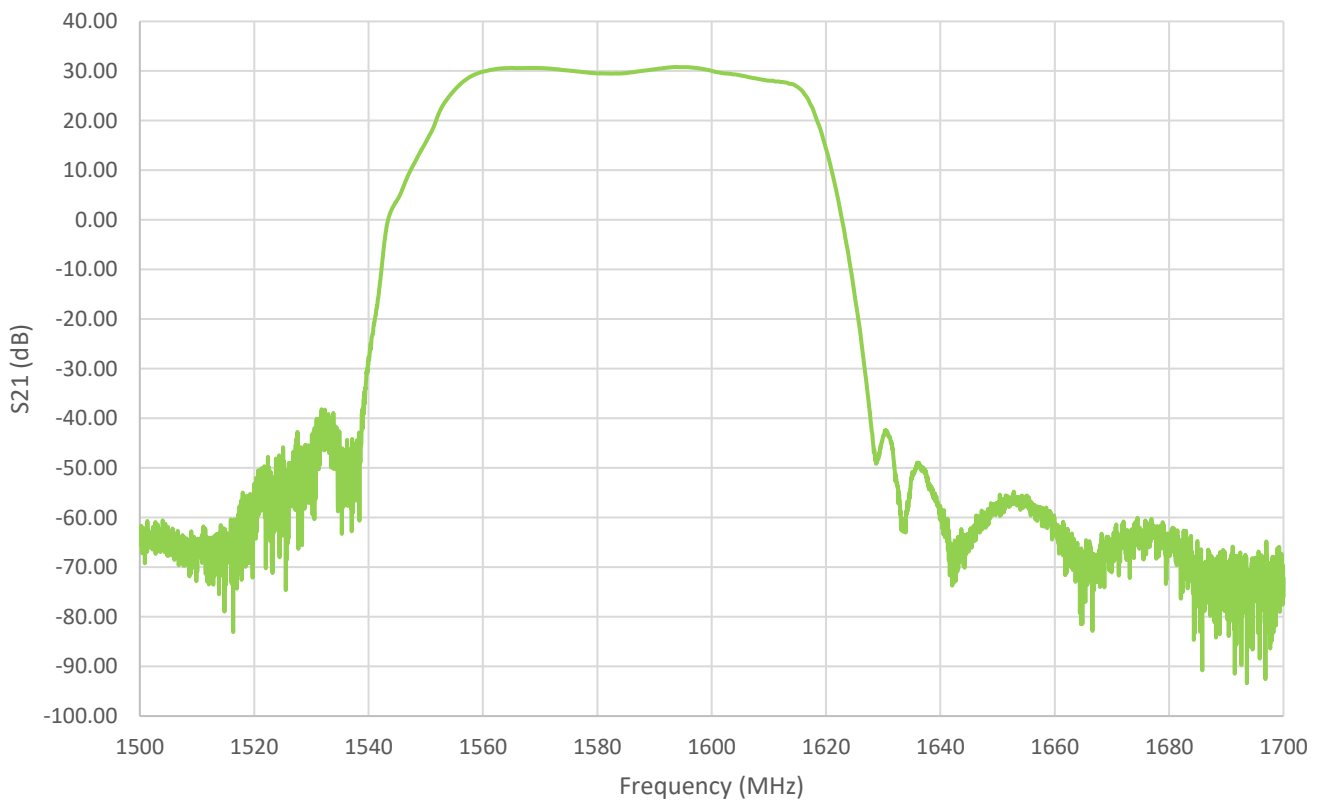
### 4.4 Average Gain



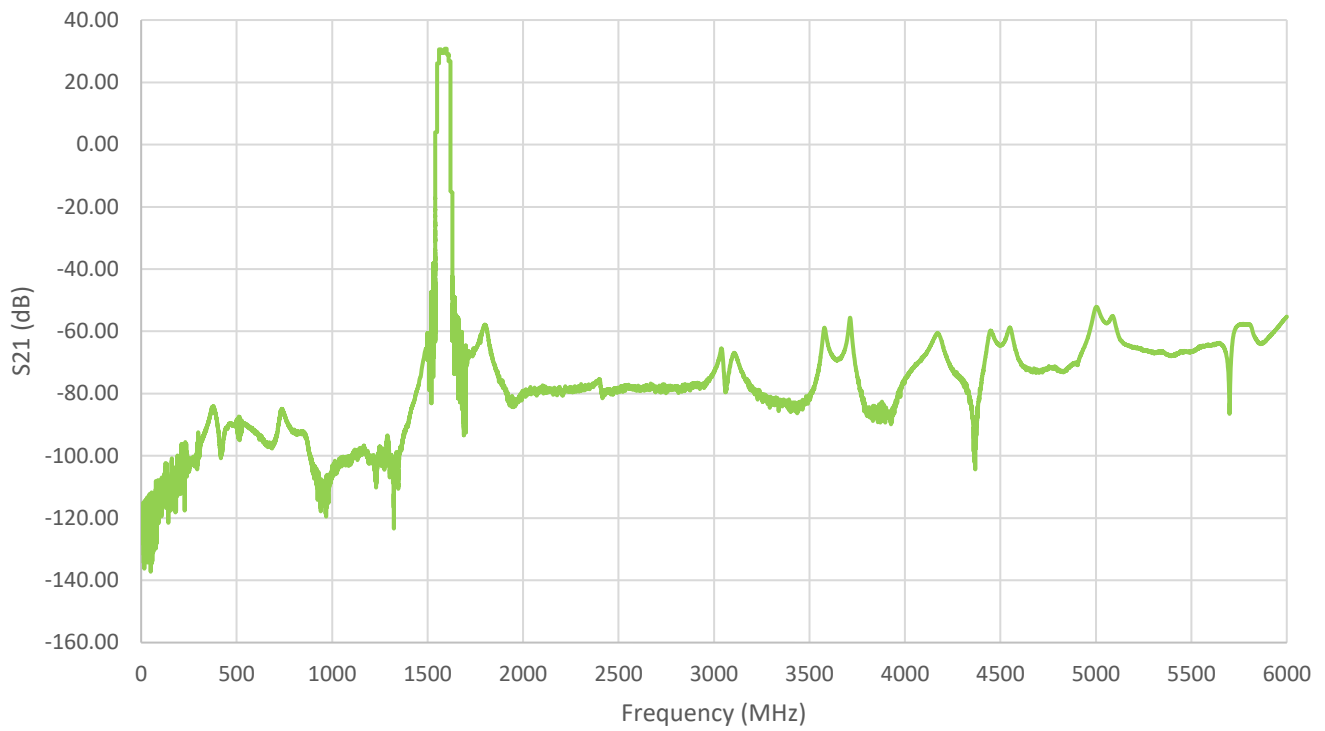
## 4.5 Peak Gain



## 4.6 In-Band LNA S21

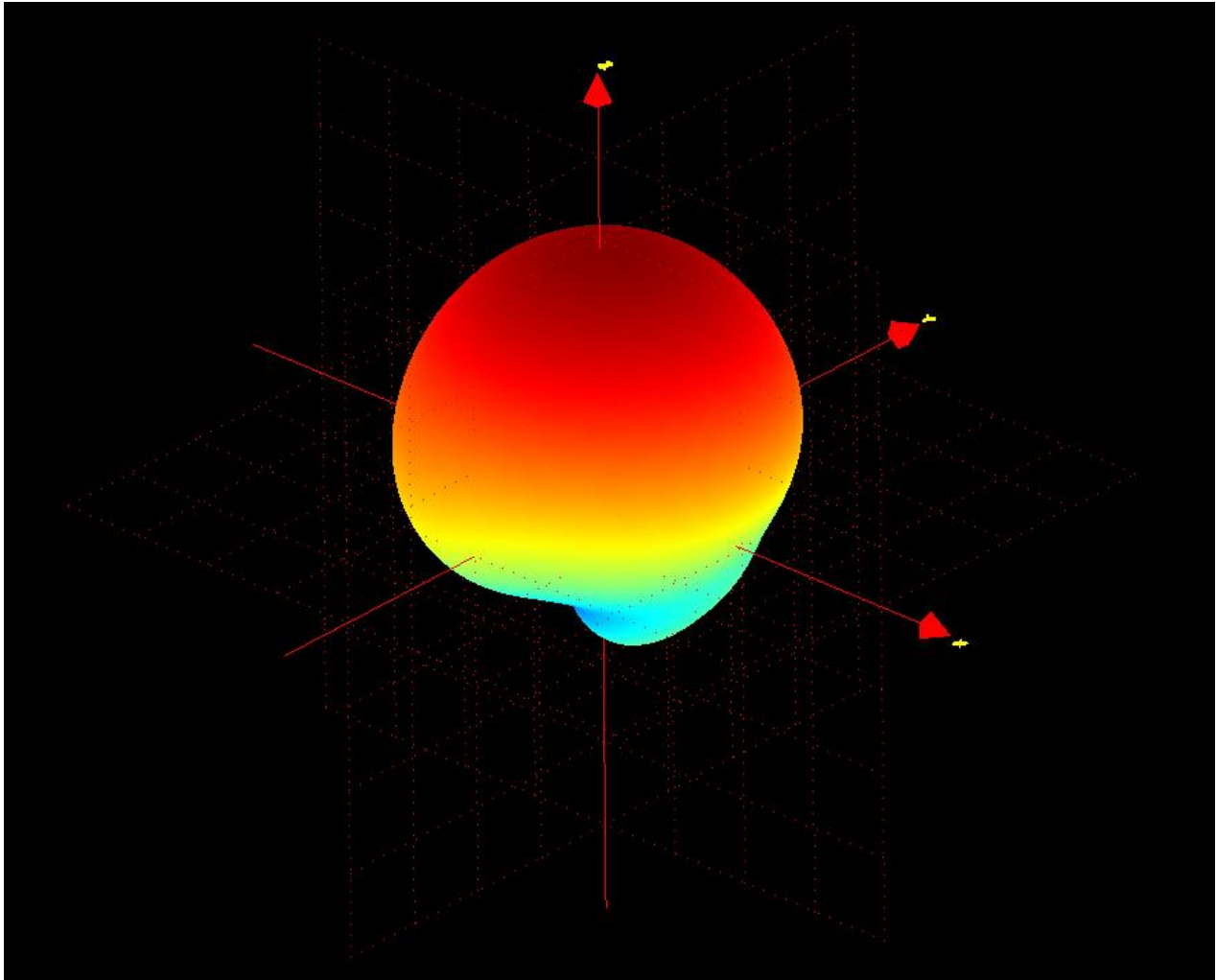


## 4.7 Wideband LNA S21

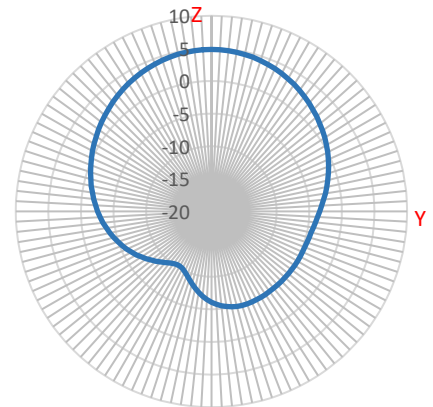
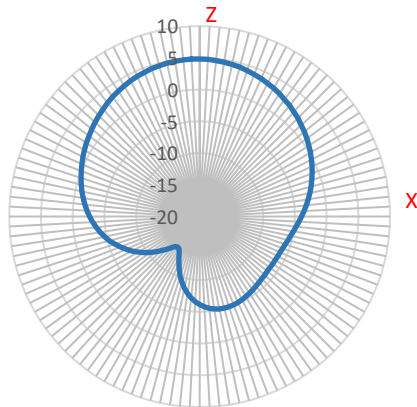
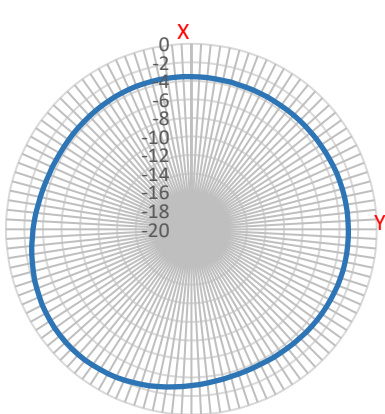


# 5. Radiation Patterns

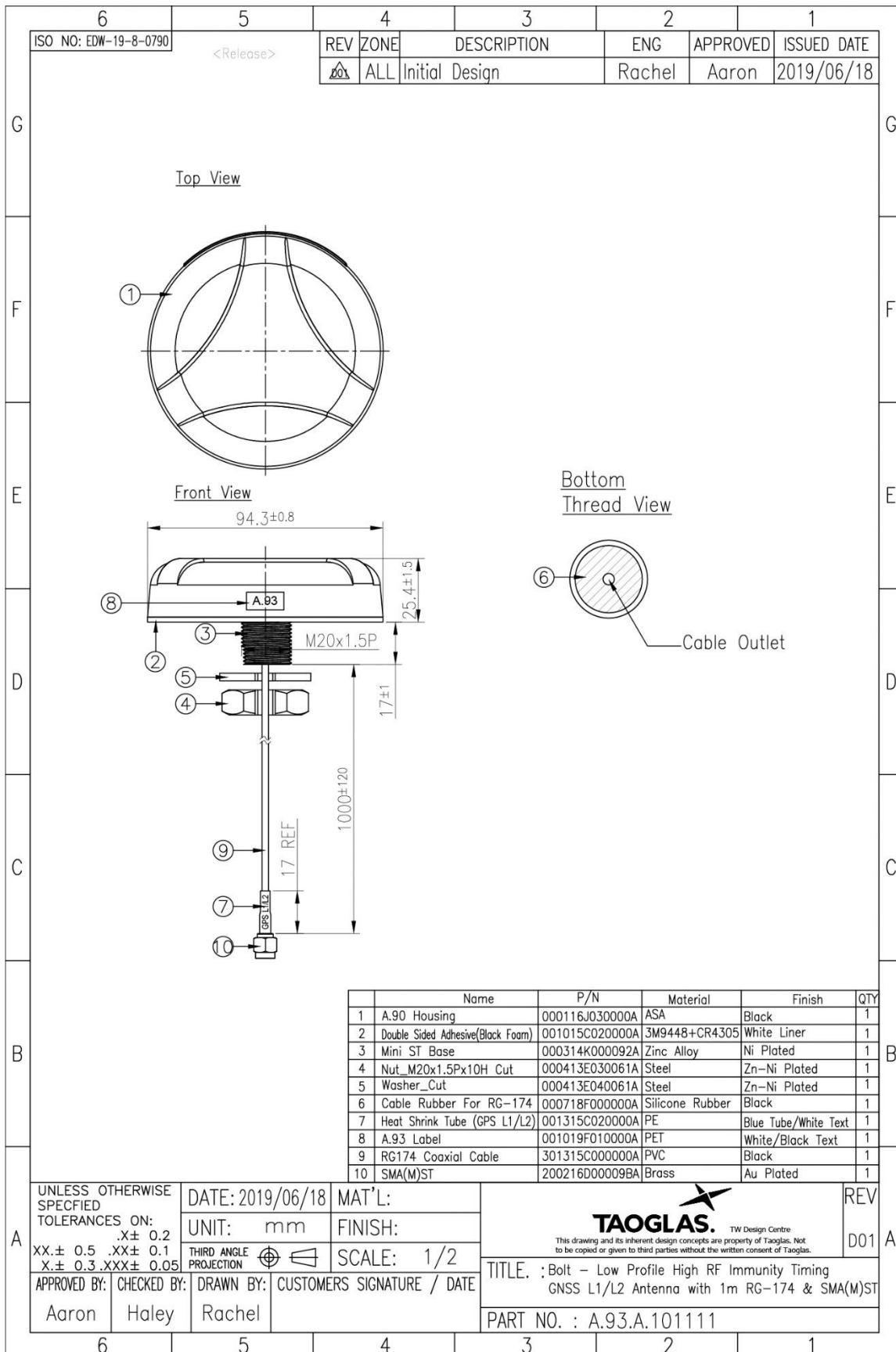
1575.42MHz



XY Plane      XZ Plane      YZ Plane

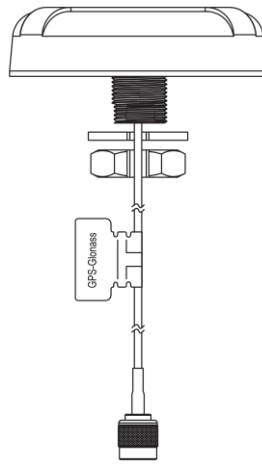


# 6. Mechanical Drawing

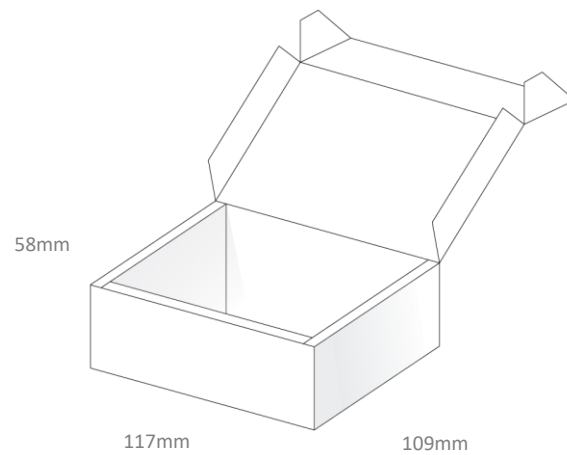


## 7. Packaging

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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