TAOGLAS

Datasheet

Bolt

Part No:
A.90.A.101111

Description:

Bolt – High Gain Low Profile GNSS L1 GPS/GLONASS Permanent Mount Antenna with High Out of Band Rejection

Features:

30dB GPS Gain, 25dB GLONASS Gain

Rejection: >80dB@850/900MHz,
>65dB@1800/1900MHz

Lightning Induced Surge Protection

IEC 61000-4-5 (Class 4) 4kV

Wideband Input Voltage

Permanent (Screw) Mount, Low Profile, Vandal Resistant Design

IP67 Rated, UV Resistant Enclosure

Cable: 1M RG-174

Connector: SMA (M) ST

Dimensions: Diameter: 94.3mm, Height: 25.4mm

RoHS & Reach Compliant

1. Introduction

The Bolt, A.90 is a high gain GNSS L1 (GPS/GLONASS) antenna that features very high out of band rejection and can handle large bursts of power from nearby transmitters. These characteristics make the A.90 ideal for applications where the antenna will be placed near high-power transmitters, such as cellular base stations or radar systems.

The A.90 utilizes a very high efficiency (>78%) patch antenna that has been tuned for best possible performance within the enclosure to maximize signal quality. A ceramic dielectric filter is placed between the antenna and the LNAs to absorb large out-of-band bursts of power from nearby transmitters while minimizing in-band insertion loss. The internal LNAs have very low noise figure to maintain excellent signal quality throughout the entire signal chain. The signal chain also features carefully selected and placed SAW filters that collectively allow for very sharp signal attenuation outside of the intended frequency bands without negatively impacting in-band signal quality.

The A.90 features excellent rejection across all non-GNSS frequencies to prevent overdriving or damaging your GPS receiver. At the 850/900MHz cellular bands, for example, the A.90 exhibits greater than 80dB of rejection. At the 1800/1900MHz cellular bands, it exhibits >65dB, making it best in class when out of band interference is a concern. Even with this excellent out of band attenuation, the A.90 maintains a low noise figure of 3.7dB and high gain of >25dB, making it an ideal solution for applications with longer cable runs where high cable loss is a concern. The A.90 also features protection against lightning induced surges that are common in tower equipment, according to IEC 61000-4-5 (Class 4) 4kV.

Cable lengths and connector types are customizable. Contact your regional Taoglas sales office for support.

2. Specifications

GNSS Frequency Bands Covered							
GPS/QZSS	L1 1575.42MHz	L2 1227.6MHz	L5 1176.45MHz	L6 1278.75MHz			
	■	□	□	□			
GLONASS	L5R 1176.45MHz	L3PT 1201.5MHz	L2PT 1246MHz	L1CR 1575.42MHz	L1PT 1602MHz		
	□	□	□	■	■		
Galileo	E5a 1176.45MHz	E5b 1201.5MHz	E4 1215MHz	E3 1256MHz	E6 1278.75MHz	E2 1561MHz	L1 1575.42MHz
	□	□	□	□	□	■	■
BeiDou	B1 1561MHz	B2 1207.14MHz	B3 1268.52MHz				
	■	□	□				
Compass	E5B(B2)/ E6(B3) 1268.56MHz	E2(B1) 1561MHz					
	□	■					
SBAS	Omnistar 1542.5MHz	WAAS/EGN OS 1575.42MHz					
	□	■					

GNSS Electrical		
Frequency (MHz)	**1575.42**	**1602**
Return Loss (dB)	<-10	<-10
Efficiency (%) (Without cable loss)	60.81	65.76
Peak Gain (dBi) (Without cable loss)	3.59	4.05
Average Gain (dB) (Without cable loss)	-2.16	-1.96
Axial Ratio (dB)		
Polarization	RHCP	
Impedance	50Ω	

LNA and Filter Electrical Properties		
Frequency (MHz)	**1575.42**	**1602**
Return Loss (dB)	<-10	<-10
Gain@3.3V (dB Typ.)	30.08	25.99
Noise@3.3V (dB Typ.)	3.76	3.70
Power consumption@3.3V (mA Typ.)	15	

Field Test Result				
Frequency	**GPS L1**	**Galileo E1**	**GLONASS G1**	**BeiDou B1I**
	1563-1587	**1559-1591**	**1598-1605**	**1559-1563**
Tracking Number without RTK (dB-Hz)	42.7	42.8	46.7	30.2
2*DRMS Positioning Accuracy (cm) without RTK	77	77	77	77
TTFF(s) without RTK	23.9	23.9	23.9	23.9
Tracking Number with **RTK** (dB-Hz)	42.7	42.8	46.7	30.2
2*DRMS Positioning Accuracy (cm) with **RTK**	1.5	1.5	1.5	1.5
TTFF(s) with **RTK**	23.9	23.9	23.9	23.9
Group Delay @ Zenith Variation Across Single Constellation(ns)	65	65	65	65
Phase Centre Offset PCO (cm)	0.73	1.29	1.2	0.5
Phase Centre Variation PCV (mm) including Active Circuitry	9.9	9.9	7.5	5.1
Axial Ratio	6	6	6	6

*All outdoor measurements performed on the roof top of the Taoglas R&D Labs facility in Dublin Ireland
** Recommended Minimum C/No for Standard Precision Acquisition/ Tracking (dB-Hz): 26-30/ 12-15
***Data Measured Free Space

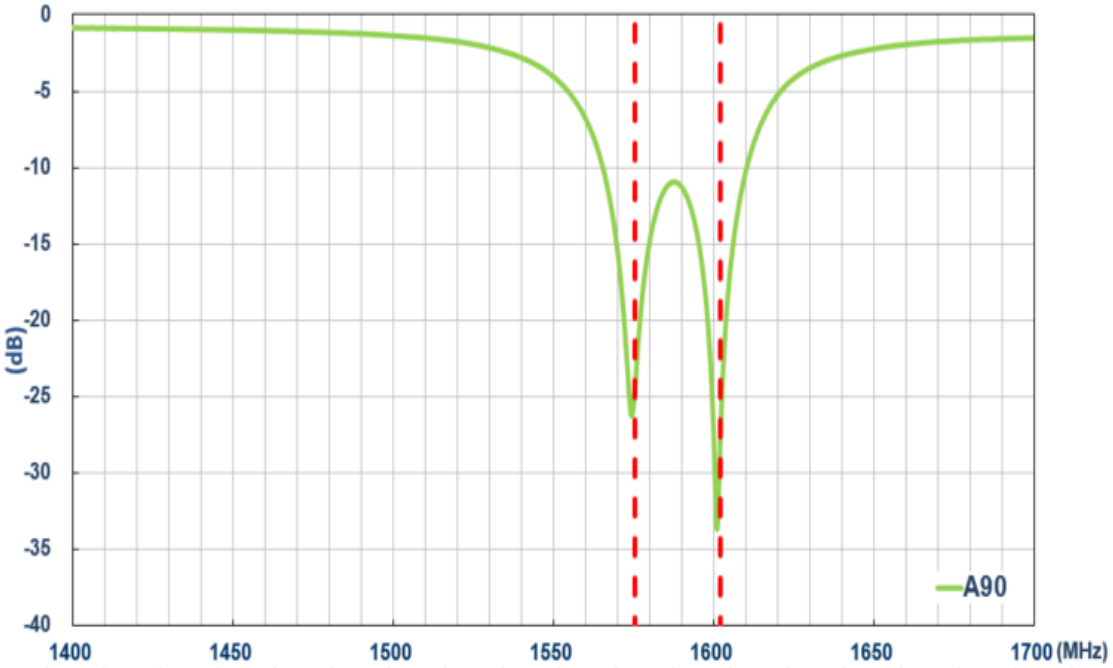
Mechanical	
Dimension(mm)	Diameter:94.3, Height:25.4
Housing	ASA
Cable	1M RG-174 SMA(M)
Connector	SMA(M)
Weight	175g
Environmental	
Protection	IP67
Temperature Range	-40°C to 85°C
Humidity	Non-condensing 65°C 95% RH

3. Antenna Characteristics

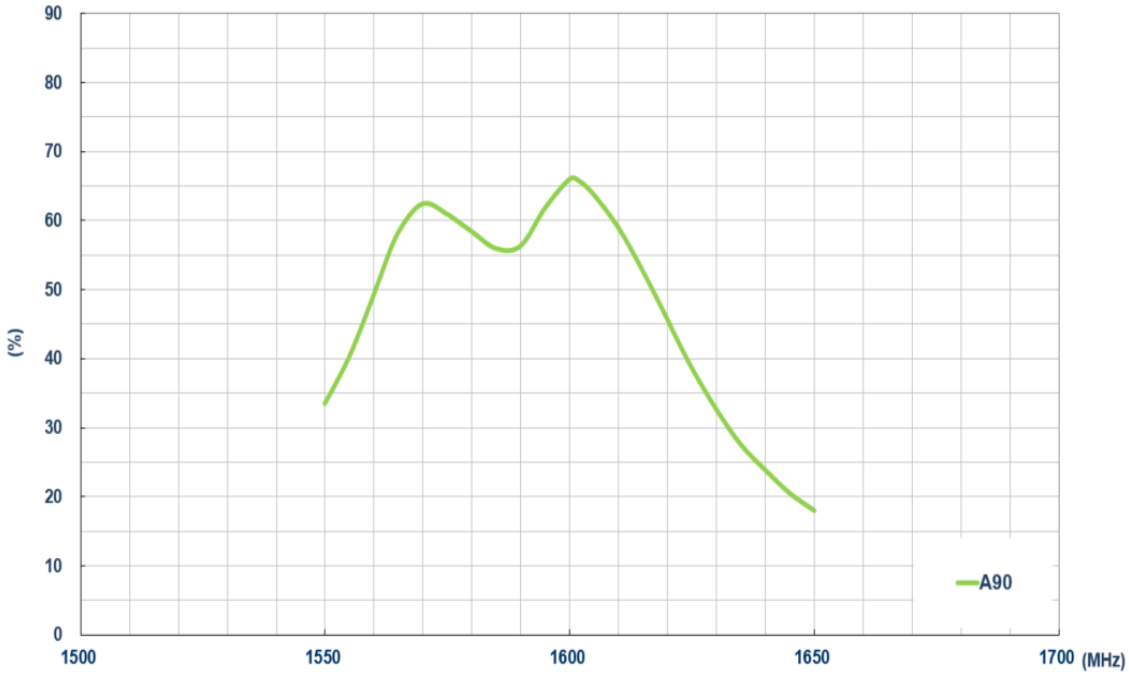
3.1 Test Setup

Free space

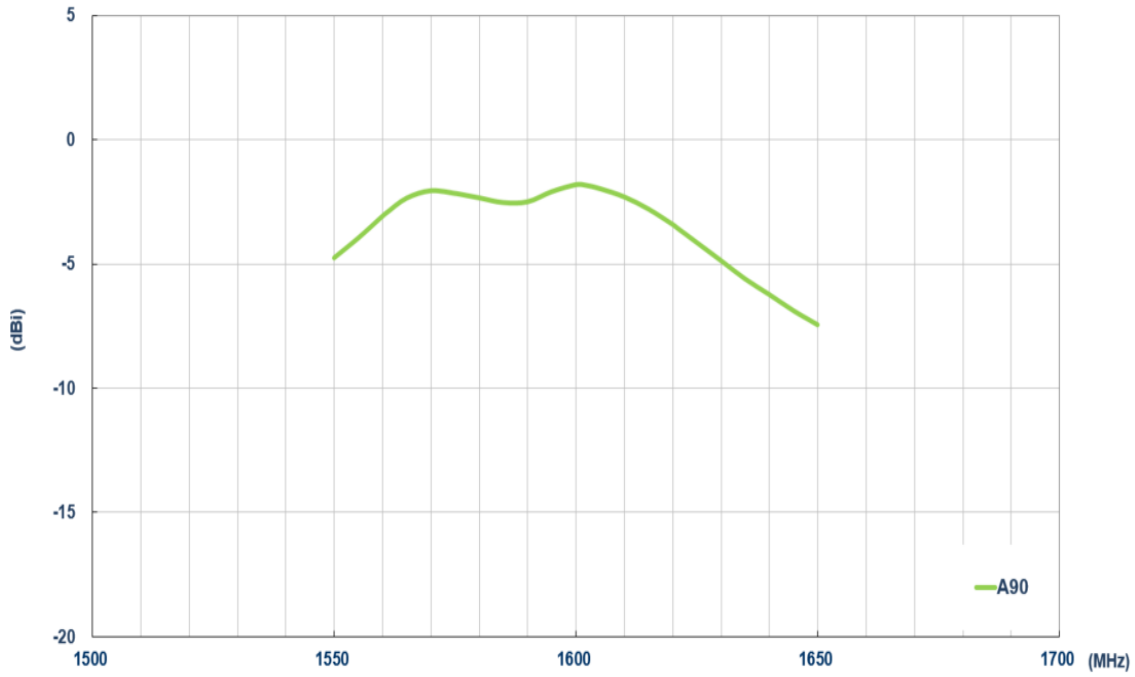
3.2 Return Loss



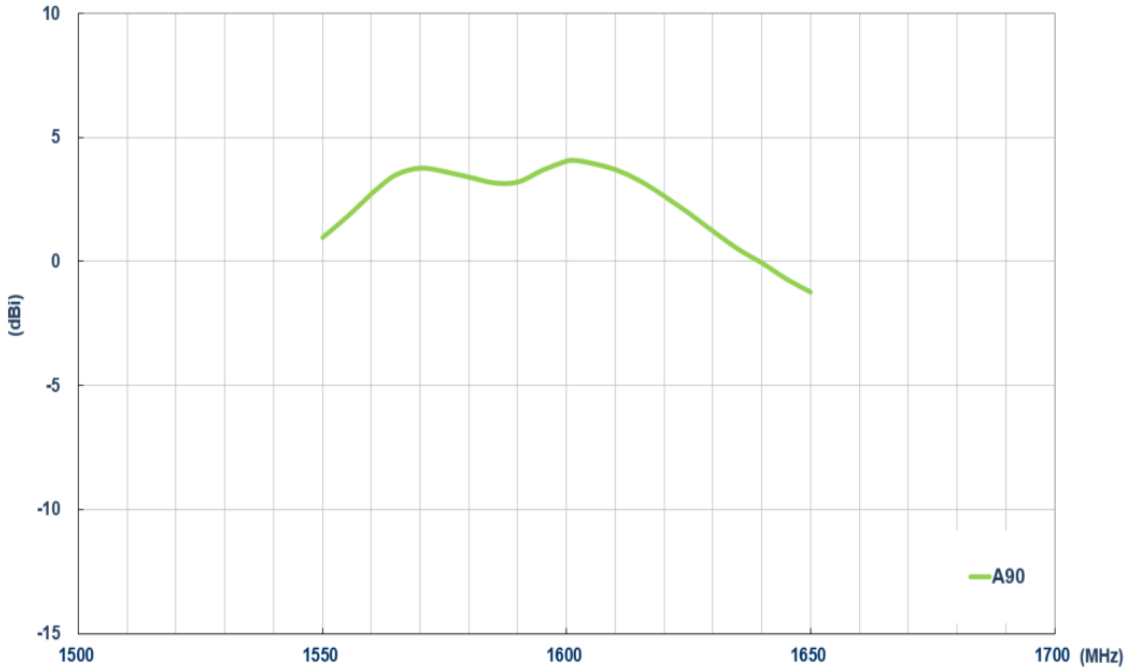
3.3 Efficiency



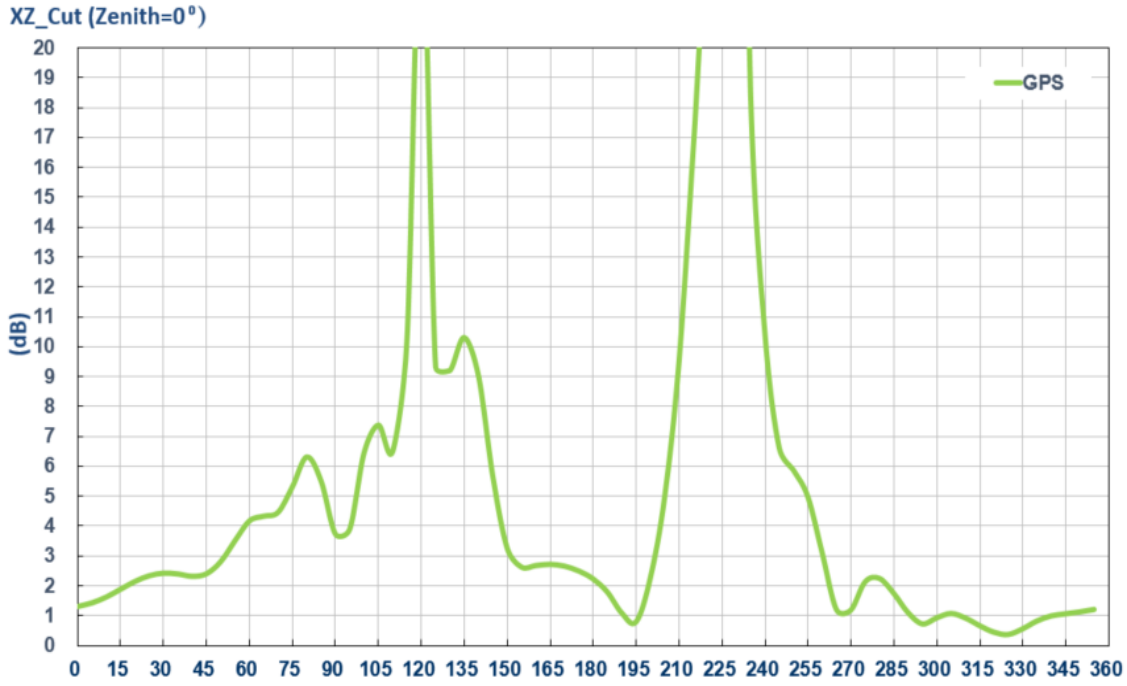
3.4 Average Gain



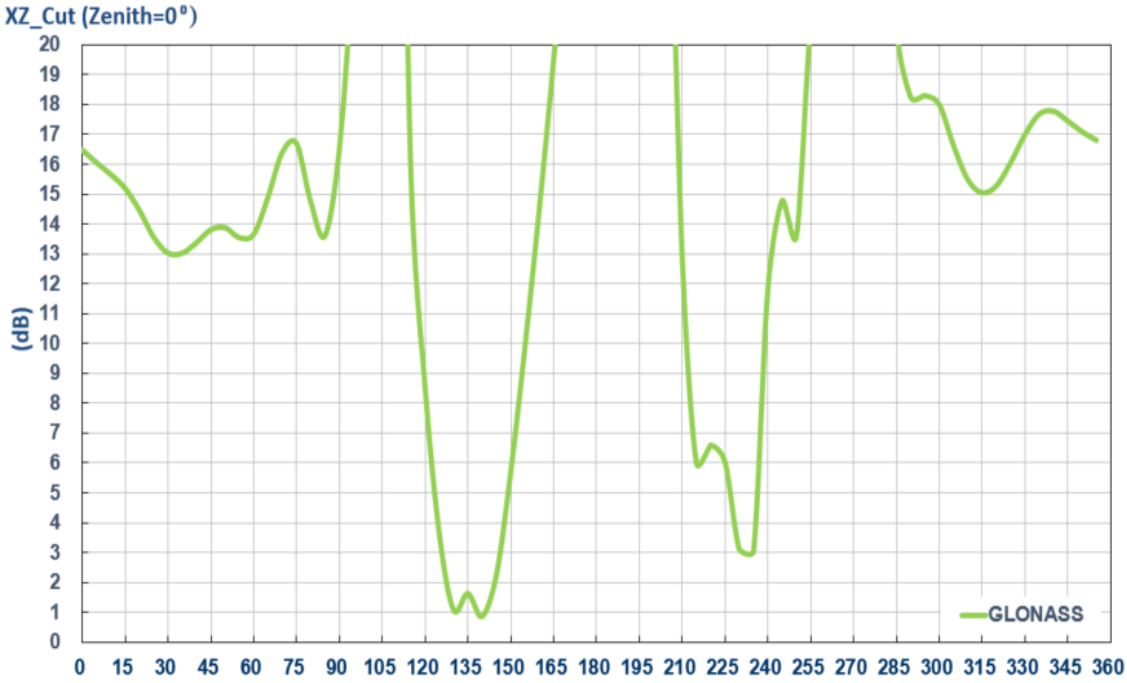
3.5 Peak Gain



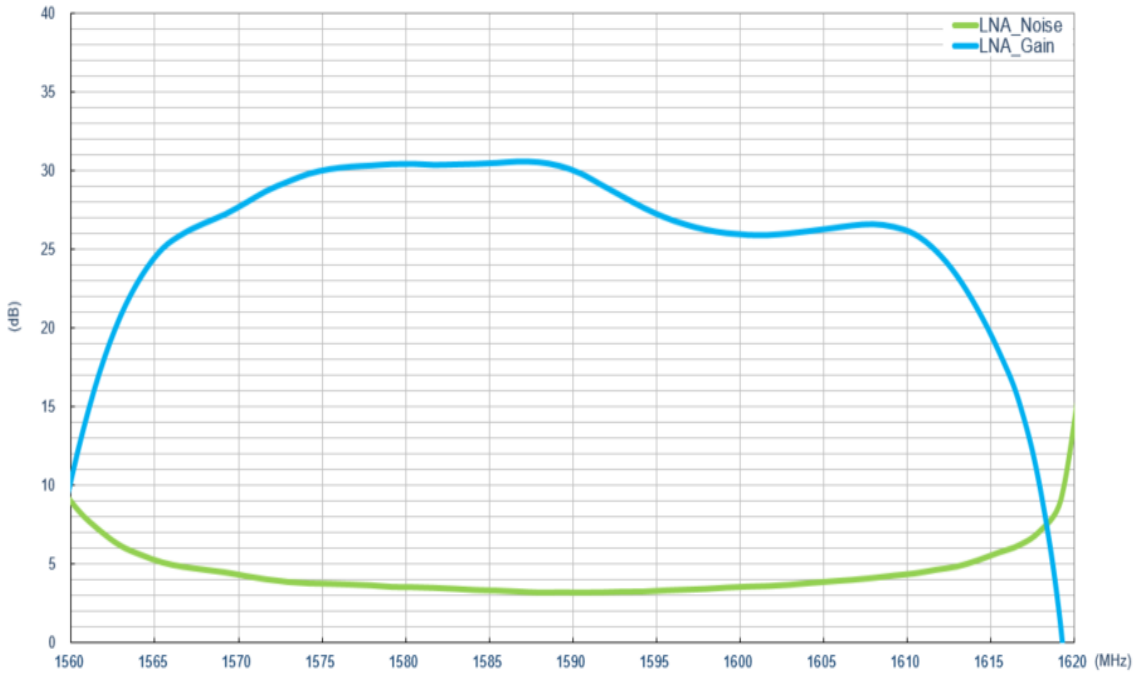
3.6 Axial Ratio @ 1575.42MHz, Phi=0



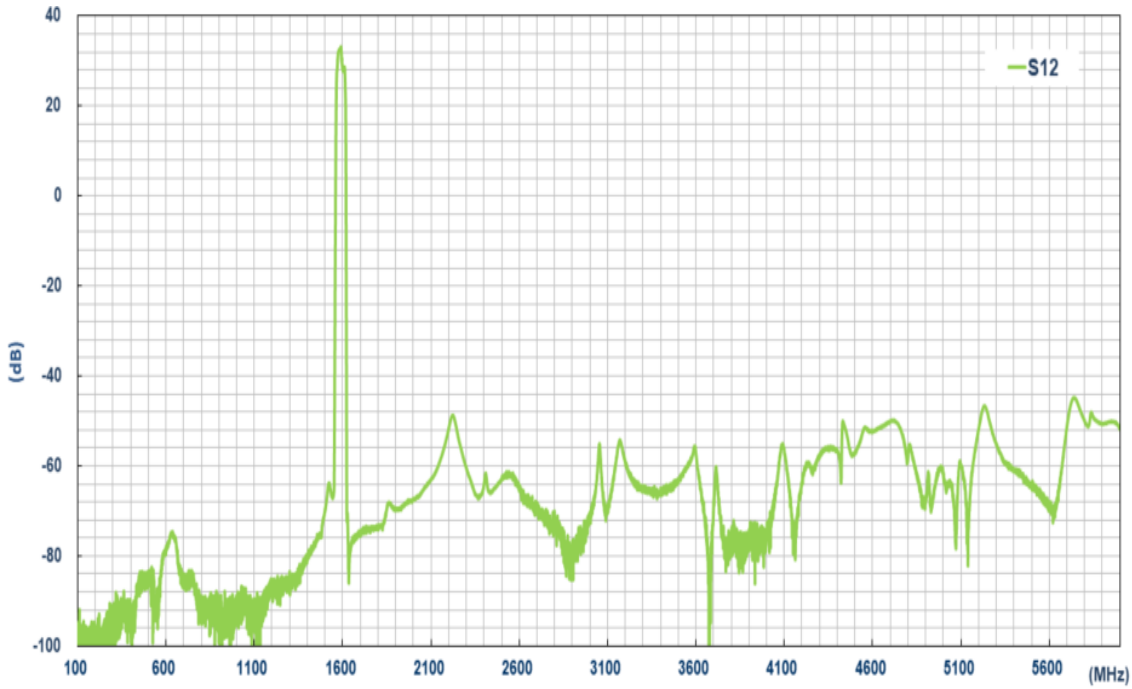
3.7 Axial Ratio @ 1602MHz, Phi=0



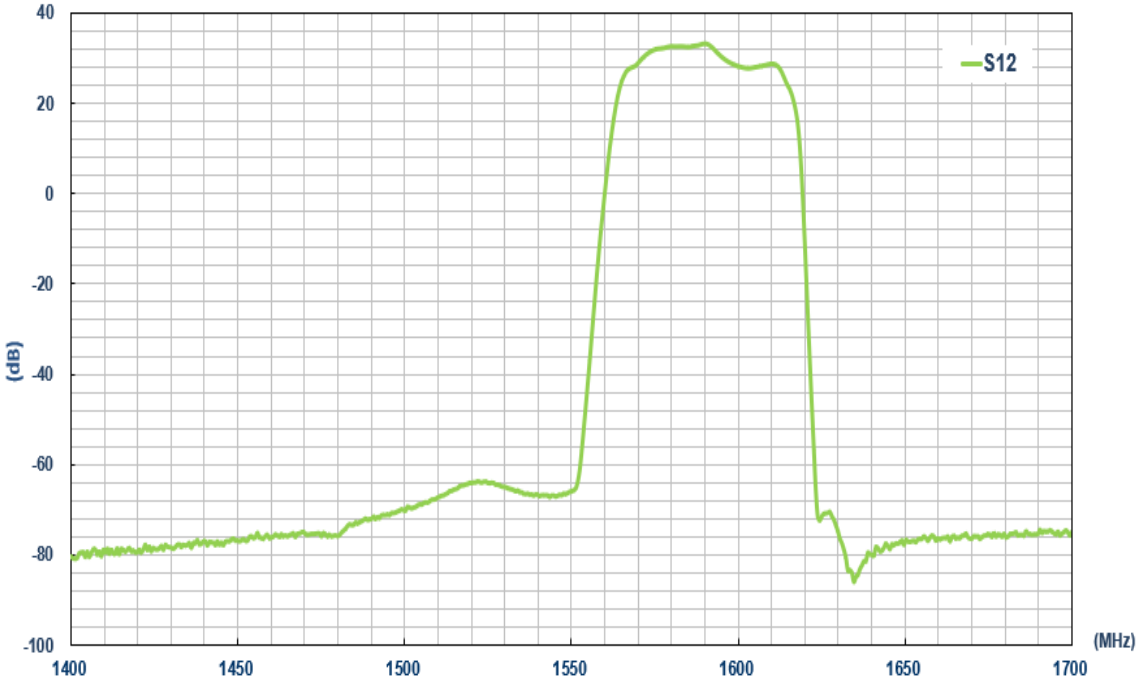
3.8 LNA Gain and Noise Figure @ 3.3V



3.9 Out of band Rejection 0.1GHz to 6GHz

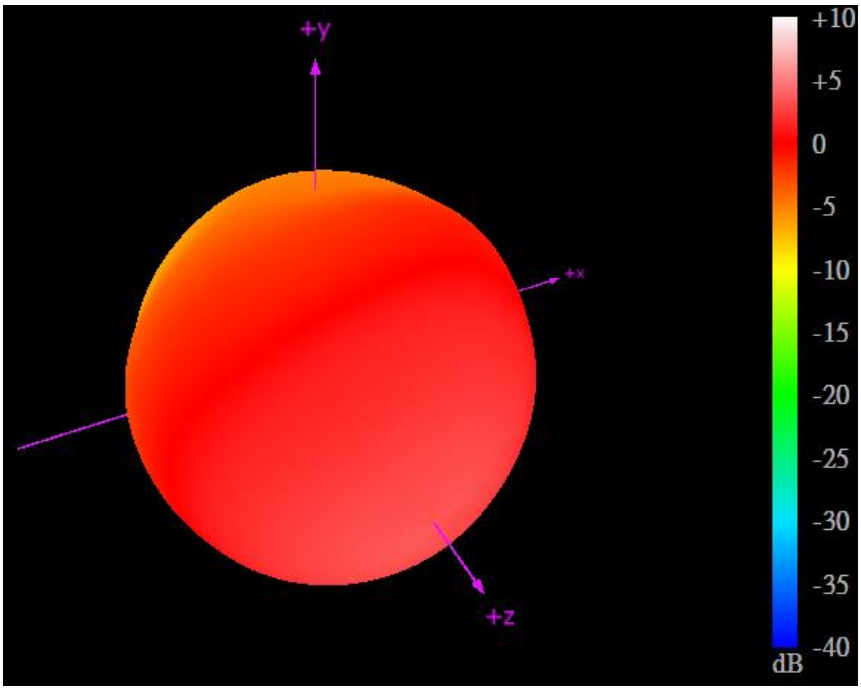


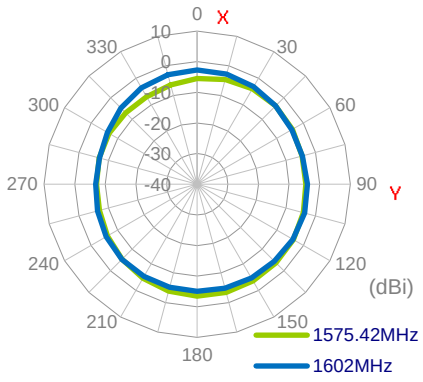
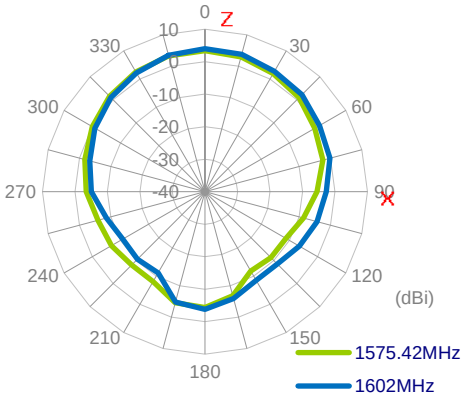
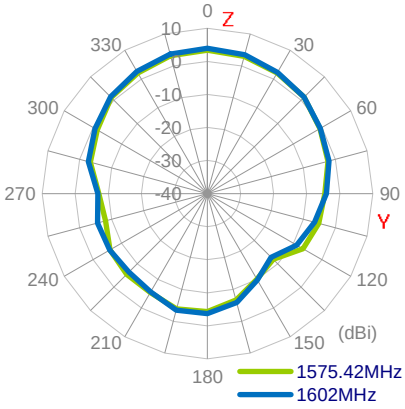
3.10 Out of Band Rejection 1.4GHz to 1.7GHz



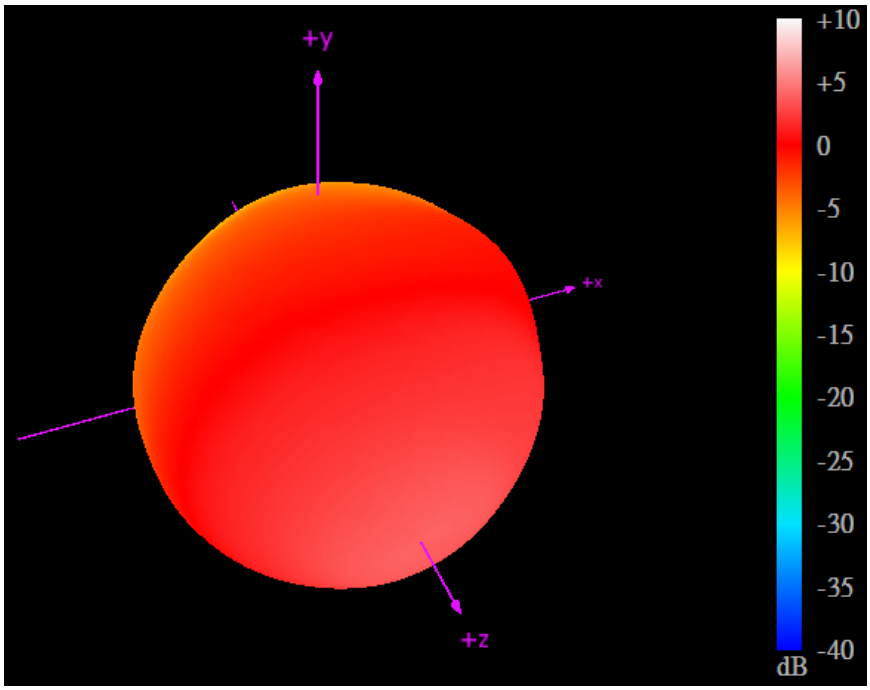
4. Radiation Patterns

4.1 1575.42MHz 3D and 2D Radiation Patterns

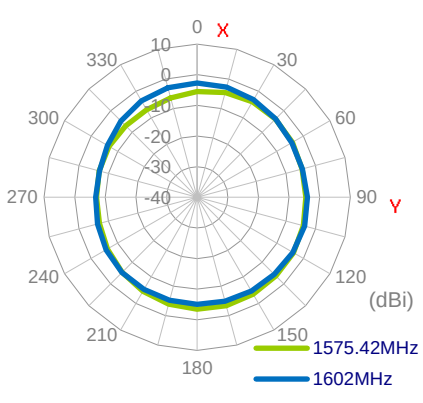


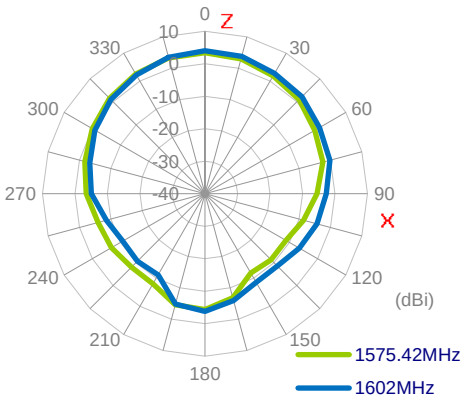
XY Plane	XZ Plane	YZ Plane
		

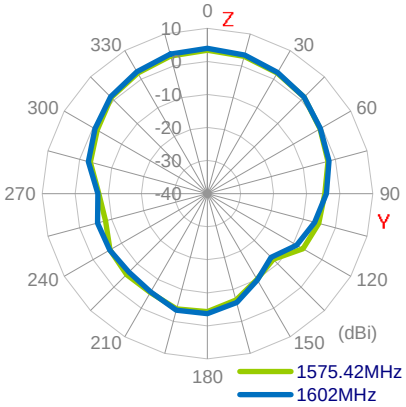
4.2 1602MHz 3D and 2D Radiation Patterns



XY Plane	XZ Plane	YZ Plane







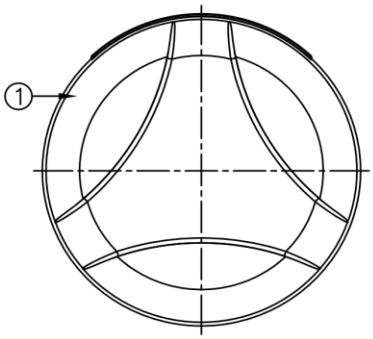
5. Mechanical Drawing (Units: mm)

ISO NO: EDW-18-8-xxxx

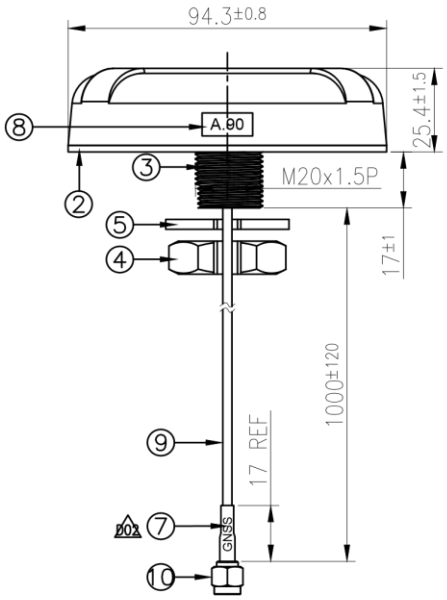
<Release>

REV	ZONE	DESCRIPTION	ENG	APPROVED	ISSUED DATE
D01	ALL	Initial Design	Bonnie	Paul	2018/03/05
D02	ALL	Change Label to Print Heat Shrink Tube. Modify Tolerances and BOM. (ECR-18-8-009)	Rachel	Haley	2018/10/15

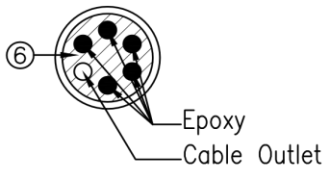
Top View



Front View D02



Bottom Thread View



		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_ST_6IN1	000713K000064A	Silicone Rubber	Black	1
D02	7	Heat Shrink Tube (GNSS)	001316C000000A	PE	Blue Tube/White Text	1
	8	A.90 Label	001017E000000A	PET	White/Black Text	1
D02	9	RG174 Cable Type	301315C000000A	PVC	Black	1
D02	10	SMA(M)ST	200216D00009BA	Brass	Au Plated	1

UNLESS OTHERWISE SPECFIED TOLERANCES ON:
.X± 0.2
XX.± 0.5 .XX± 0.1
X.± 0.3 .XXX± 0.05

DATE: 2018/03/05 | MAT'L:

UNIT: mm | FINISH:

THIRD ANGLE PROJECTION | SCALE: 1/2

taoglas antenna solutions TW Design Centre

REV D02

TITLE. : Bolt – Low Profile High RF Immunity Timing GNSS L1 Antenna with 1M RG-174 & SMA(M)ST

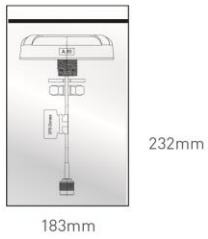
PART NO. : A.90.A.101111

APPROVED BY:	CHECKED BY:	DRAWN BY:	CUSTOMERS SIGNATURE / DATE
Paul	Jack	Bonnie	

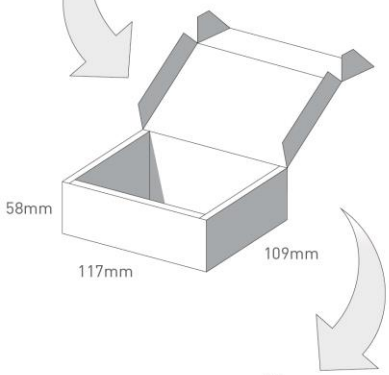
6. Packaging

6.1 A.90.A.101111 (Individual Packaging)

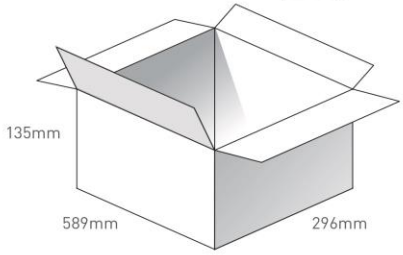
1 A.90.A.101111 per PE bag
Bag Dimensions - 232*183mm
Total Weight - 250g



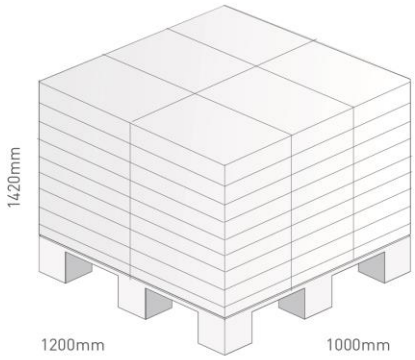
1pcs / PE bags per Inner Carton
Inner Carton Dimensions - 117*109*58mm
Weight - 310g



25 Inner Cartons per Outer Carton
Carton Dimensions - 589*296*135mm
Weight - 8Kg

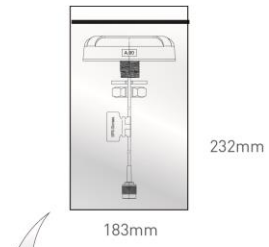


Pallet Dimensions 1200*1000*1420mm
54 Cartons per pallet
6 Cartons per layer
9 Layers

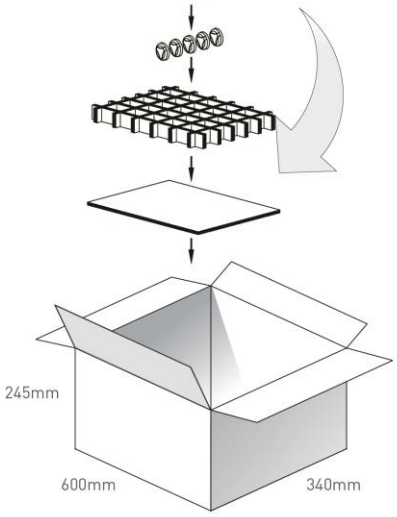


6.2 A.90.A.101111 (Bulk Packaging Packaging)

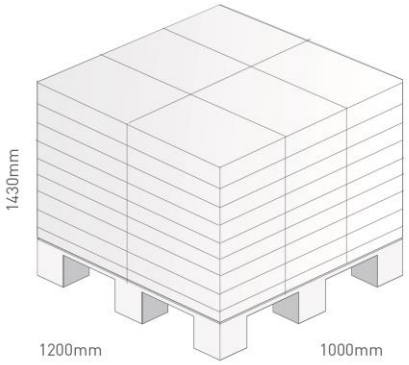
1 A.90.A.101111.bp per PE bag
Bag Dimensions - 232*183mm
Total Weight - 250g



50 pc per Carton in bulk packaging
Carton Dimensions - 600*340*245mm
Weight - 13Kg



Pallet Dimensions 1200*1000*1430mm
20 Cartons per pallet
4 Cartons per layer
5 Layers



Changelog for the datasheet

SPE-18-8-037 – A.90.A.101111

Revision: D (Current Version)	
Date:	2020-01-14
Changes:	Updated Template
Changes Made by:	Yu Kai Yeung

Previous Revisions

Revision: C	
Date:	2019-12-08
Changes:	Out of band rejection added
Changes Made by:	David Connolly

Revision: B	
Date:	2017-12-10
Changes:	Updated Drawing
Changes Made by:	Jack Conroy

Revision: A (Original First Release)	
Date:	2017-08-10
Notes:	Initial Datasheet release
Author:	Jack Conroy

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