SPECIFICATION

Part No.	:	**AA.162.301111**
Product Name	:	Ulysses Ultra-Low Profile Miniature Magnet Mounted GPS-GLONASS-Galileo Antenna
Feature	:	1575MHz – 1610MHz 1.8-5.5V 3m RG-174 SMA(M) IP67 Rated Dimensions: 40*38*10mm Custom cables and connectors available RoHS and REACH Compliant

1. Introduction

The Ulysses miniature super low profile (only 10mm in height) GNSS antenna is designed for applications which require high positioning accuracy by combining signals from GPS, Galileo and GLONASS systems. A high gain wide-band patch antenna on an integral ground delivers reliable performance. Fully IP67 waterproof rating allows use in outdoors environments. Front end SAW filter configuration eliminates potential LNA burn-out from nearby out of band radiated power bursts from other antennas that may be co-located nearby.

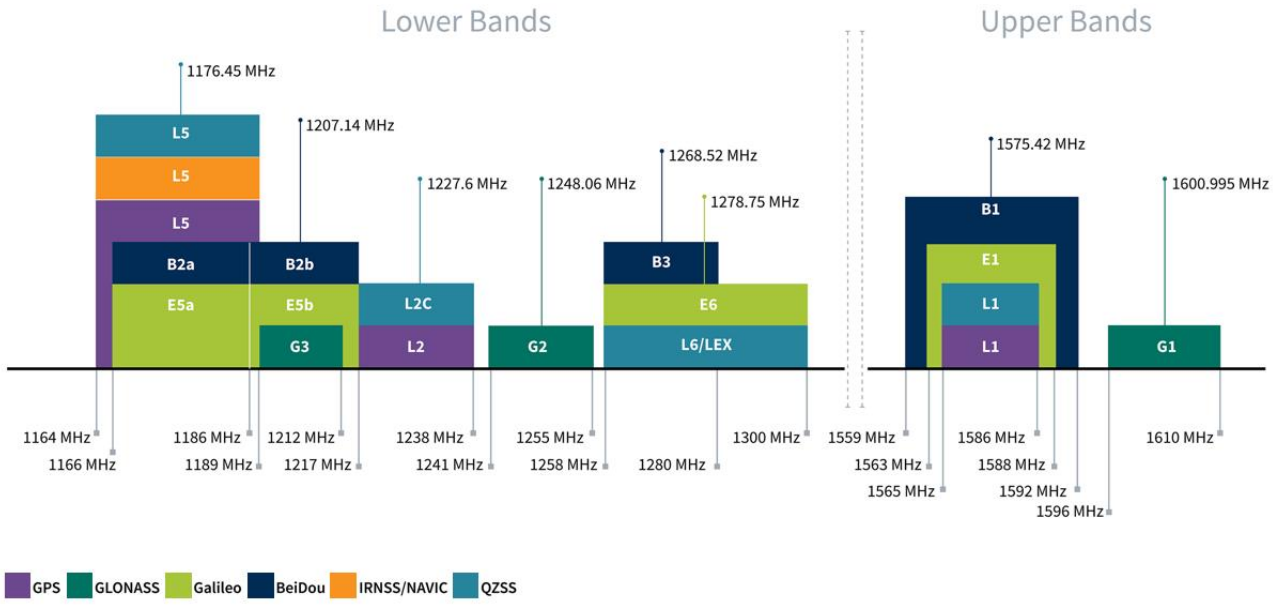
The antenna is manufactured to strict first tier Automotive quality controlled manufacturing process in TS16949 approved facility.

2. Specification

GNSS Frequency Bands Covered						
GPS	L1	L2	L5			
	■	□	□			
GLONASS	G1	G2	G3			
	■	□	□			
Galileo	E1	E5a	E5b	E6		
	■	□	□	□		
BeiDou	B1	B2a	B2b	B3		
	■	□	□	□		
QZSS (Regional)	L1	L2C	L5	L6		
	■	□	□	□		
IRNSS (Regional)	L5					
	□					
SBAS	L1/E1/B1	L5/B2a/E5a	G1	G2	G3	
	■	□	■	□	□	

■ GNSS Frequency Bands Covered. □ GNSS Frequency Bands Not Covered.

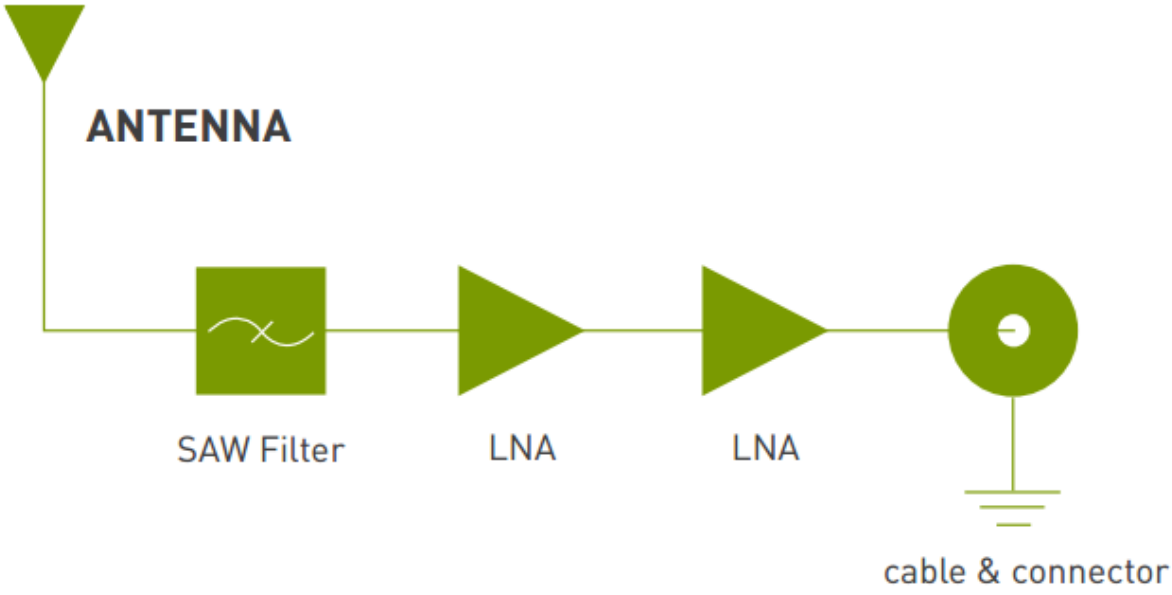
*SBAS systems: WASS(L1/L5), EGNOSS(E1/E5a), SDCM(G1/G2/G3), SNAS(B1,B2a), GAGAN(L1/L5), QZSS(L1/L5), KAZZ(L1/L5).



GNSS Bands and Constellations

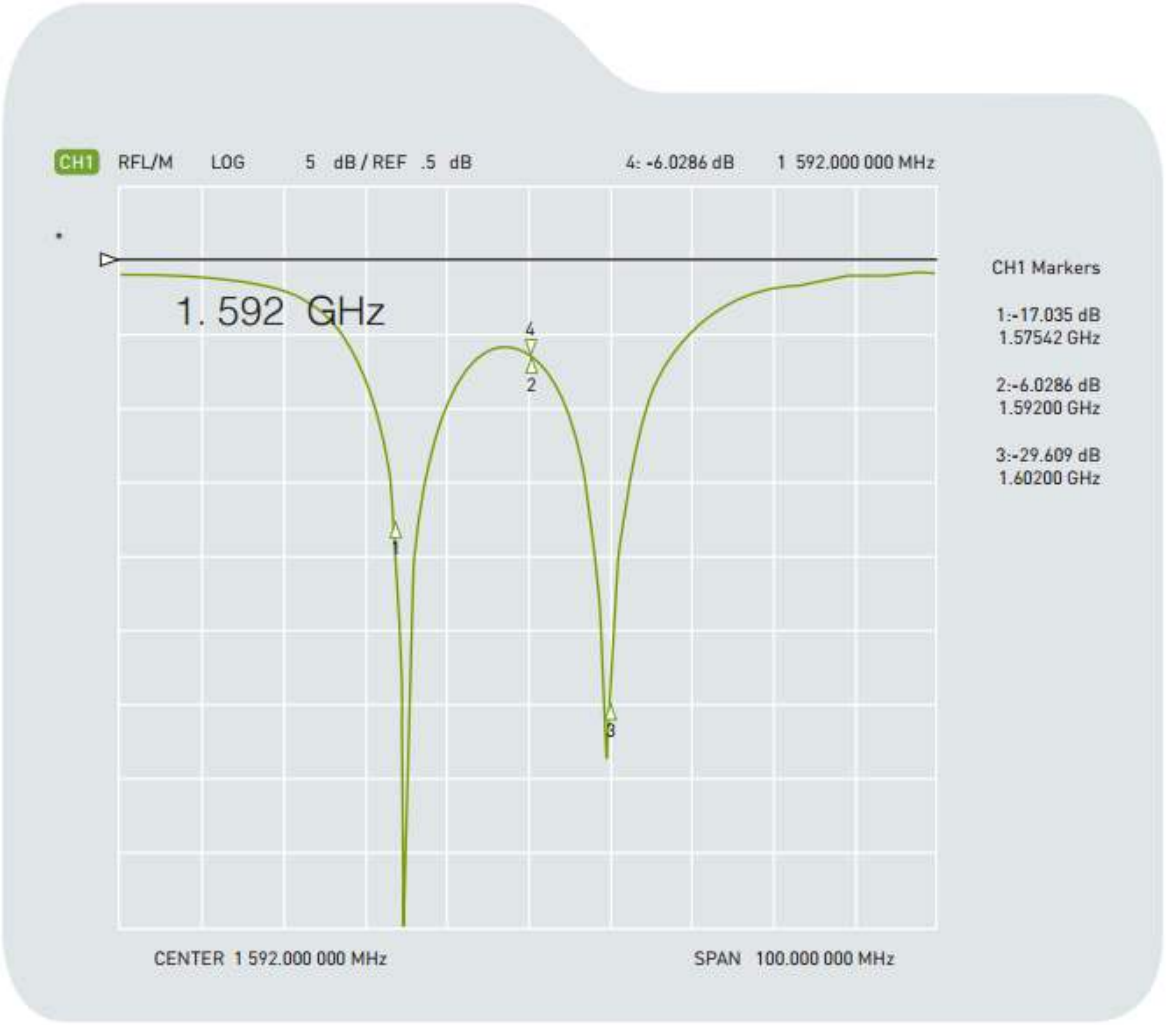
ELECTRICAL			
Centre Frequency	1575~1610MHz		
Antenna Gain	26±3dBic @ zenith @ 1575.42MHz 27±3dBic @ zenith @ 1602MHz		
VSWR	2.0 max.		
Impedance	50Ω		
Outer Band Attenuation	1592±140MHz 15dB Min		
Pout at 1dB Gain Compression Point	-6dBm Min. -2dBm Typ.		
DC input	1.8V (min.)	3.0V (typ.)	5.5V (max.)
LNA Gain	22dB	28dB	31dB
Noise Figure	2.6dB	2.6dB	2.9dB
Power Consumption	5mA	10mA	23mA
MECHANICAL			
Antenna Dimensions	37.8 x 40.4 x 10mm		
Housing Material	UV Resistant ABS		
Cable	3m RG174 (fully customizable)		
Connector	SMA(M) (fully customizable)		
ENVIRONMENTAL			
Operation Temperature	-40°C to 85°C		
Storage Temperature	-40°C to 85°C		
Relative Humidity	40% to 95%		

3. Antenna Block Diagram



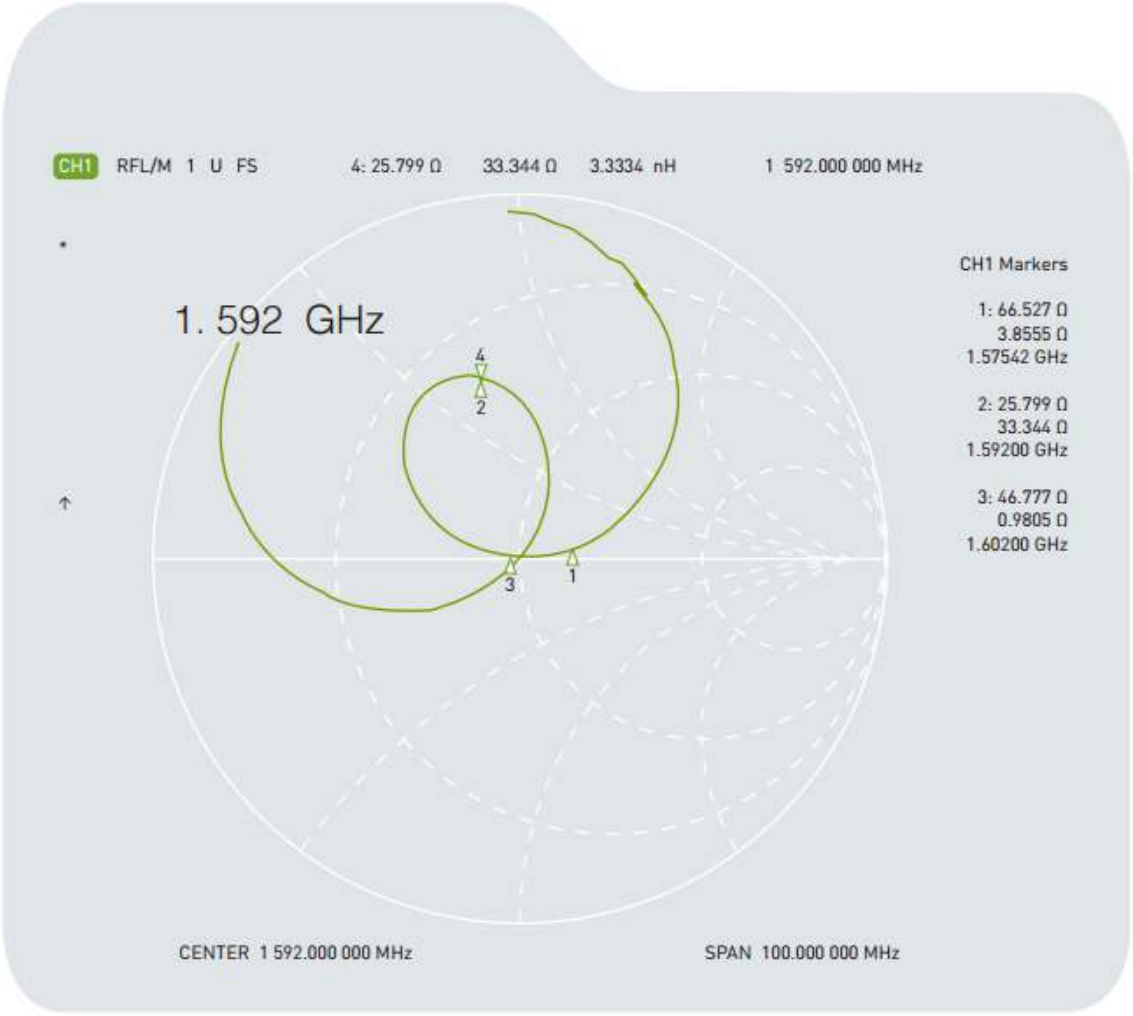
4. Antenna S11 Property

4.1. Return Loss



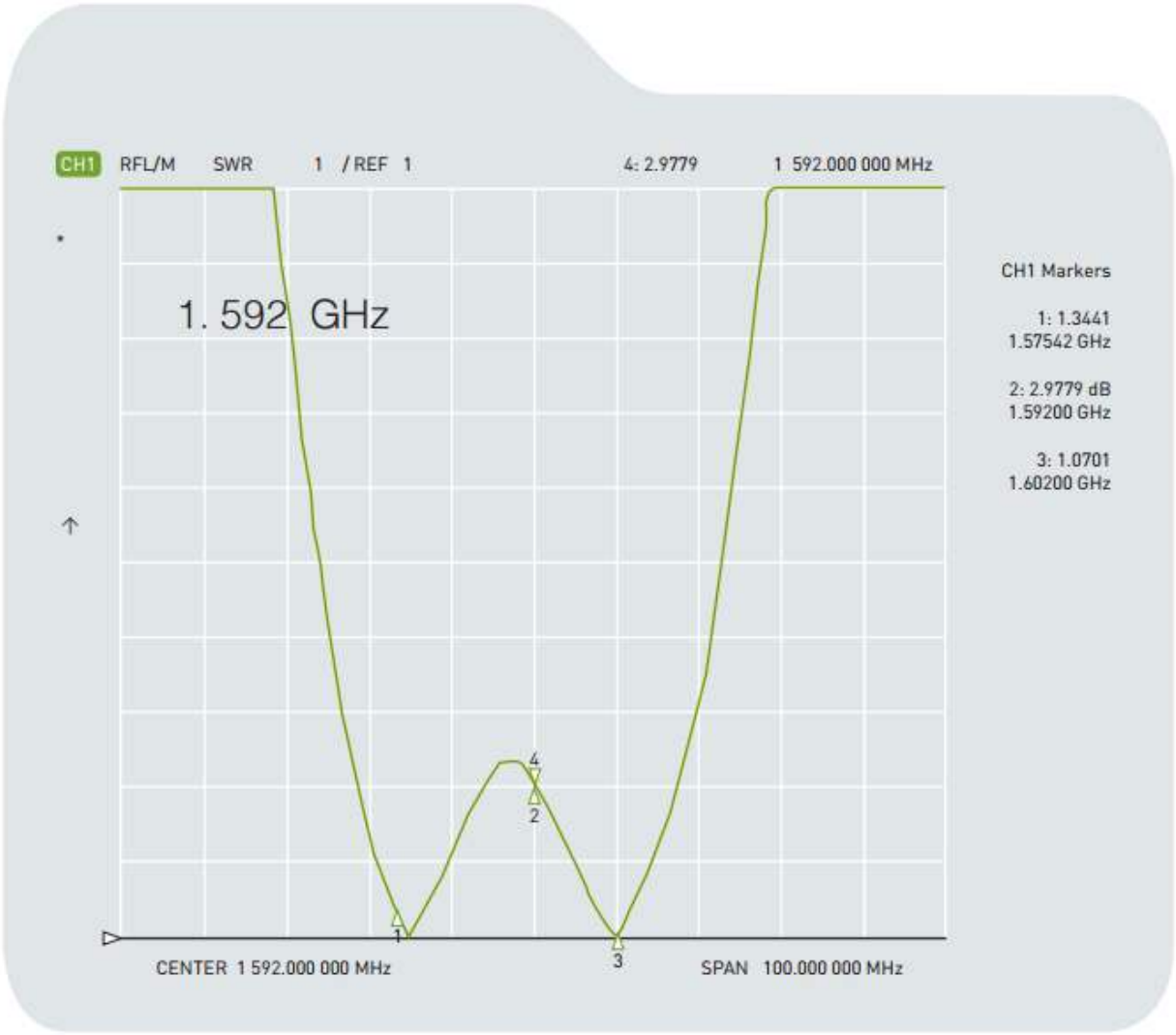
Return Loss
-17.03 dB @ 1575MHz
-29.60 dB @ 1602MHz

4.2. Impedance



Impedance :
66.52 +j3.85 Ohm@ 1575MHz
46.77 +j0.98 Ohm@ 1602MHz

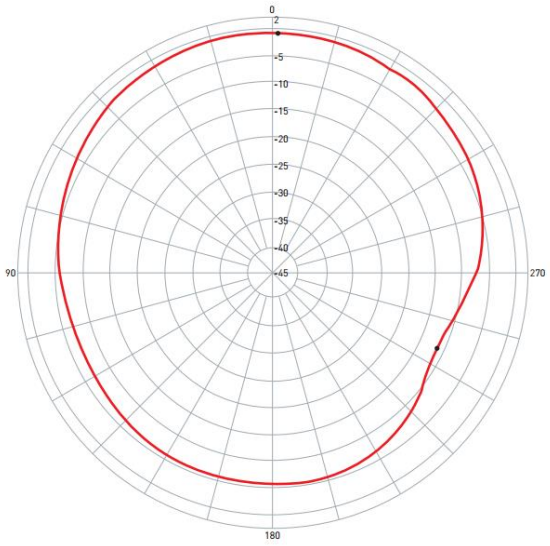
4.3. VSWR



VSWR
1.34 @ 1575MHz
1.07 @ 1602MHz

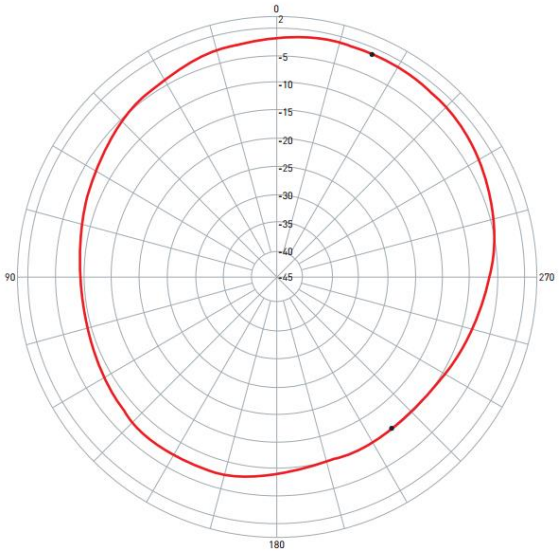
5. Radiation Patterns

1575.42MHz XZ Plane



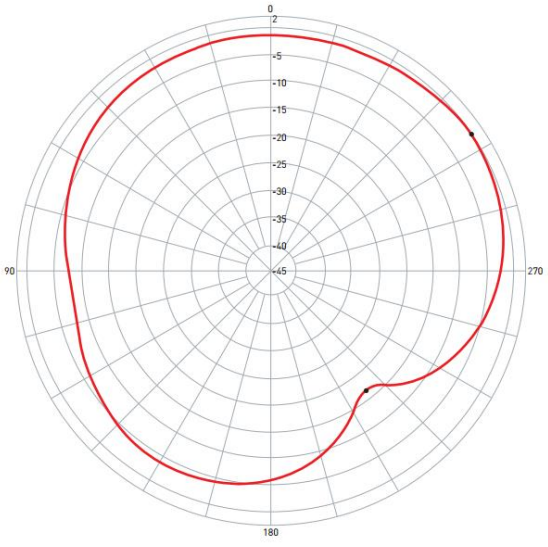
Pattern	Model No.	Test Mode	Freq (MHz)	Max Gain(dBi)	Min Gain(dBi)	Avg. Gain(dBi)	Source Polar.
1	AA.162.301111	XZ	1575.42	-0.69 / 359.00	-11.62 / 245.00	-4.12	V+H

1575.42MHz YZ Plane



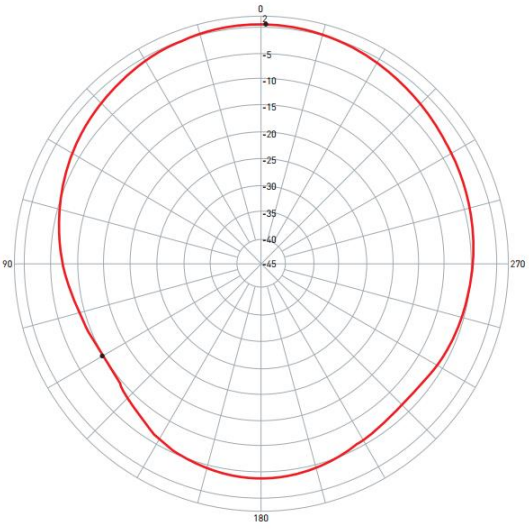
Pattern	Model No.	Test Mode	Freq (MHz)	Max Gain(dBi)	Min Gain(dBi)	Avg. Gain(dBi)	Source Polar.
1	AA.162.301111	YZ	1575.42	-1.15 / 337.00	-10.60 / 217.00	-5.28	V+H

1602MHz XZ Plane



Pattern	Model No.	Test Mode	Freq (MHz)	Max Gain(dBi)	Min Gain(dBi)	Avg. Gain(dBi)	Source Polar.
1	AA.162.301111	XZ	1602.00	-0.34 / 304.00	-16.71 / 218.00	-3.63	V+H

1602MHz YZ Plane

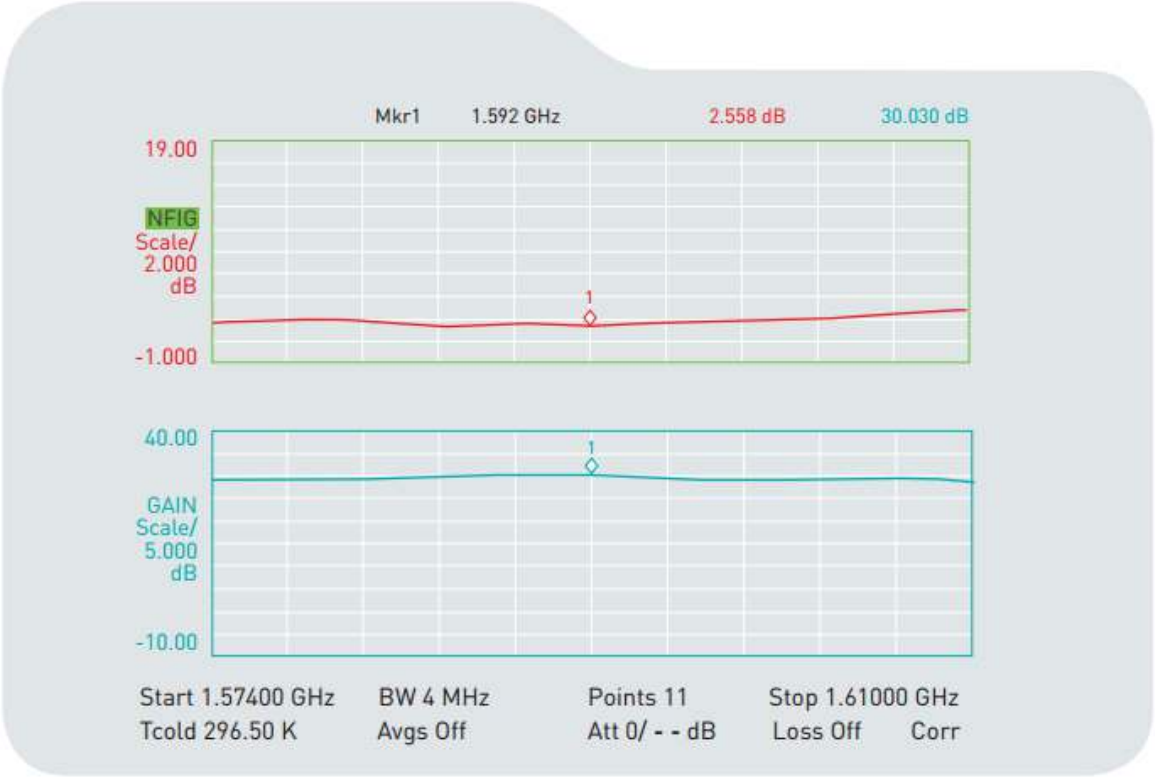


Pattern	Model No.	Test Mode	Freq (MHz)	Max Gain(dBi)	Min Gain(dBi)	Avg. Gain(dBi)	Source Polar.
1	AA.162.301111	YZ	1602.00	0.49 / 359.00	-10.13 / 120.00	-3.46	V+H

6. LNA Gain and Output Band Rejection @3.0V

Ch1 Tr1 S21	1	1.5740000 GHz	28.186	dB
Ch1 Tr1 S21	>2	1.6100000 GHz	27.949	dB
Ch1 Tr1 S21	3	1.5920000 GHz	29.044	dB
Ch1 Tr1 S21	4	1.5420000 GHz	9.0245	dB
Ch1 Tr1 S21	5	1.6420000 GHz	-10.035	dB
Ch1 Tr1 S21	6	1.4920000 GHz	4.4105	dB
Ch1 Tr1 S21	7	1.6920000 GHz	-14.431	dB
Ch1 Tr2 S21	1	1.5740000 GHz	1.0816	
Ch1 Tr2 S21	2	1.6100000 GHz	1.1855	
Ch1 Tr2 S21	3	1.5920000 GHz	1.2488	
Ch1 Tr2 S21	4	1.5420000 GHz	1.3486	

7. LNA Noise Figure @3.0V



8. Field Test Results

In this section Taoglas will present the field test result for AA.162 antenna. The test was performed when the antenna was mounted on a static rooftop test set up in an open sky environment for at least 6 hours.

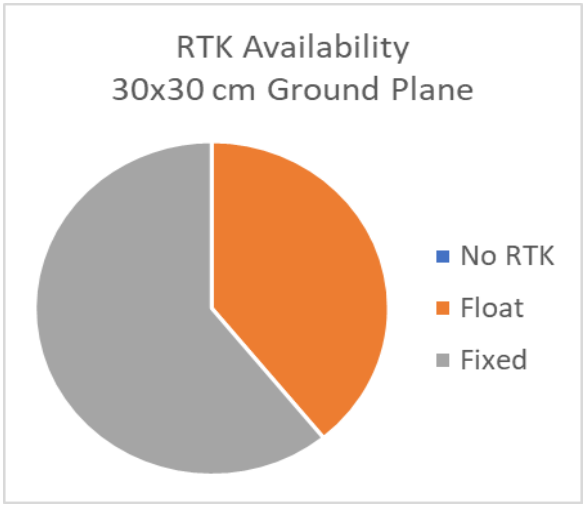
Taoglas will show the field test results using the following receiver:

1. U-blox ZED-F9P

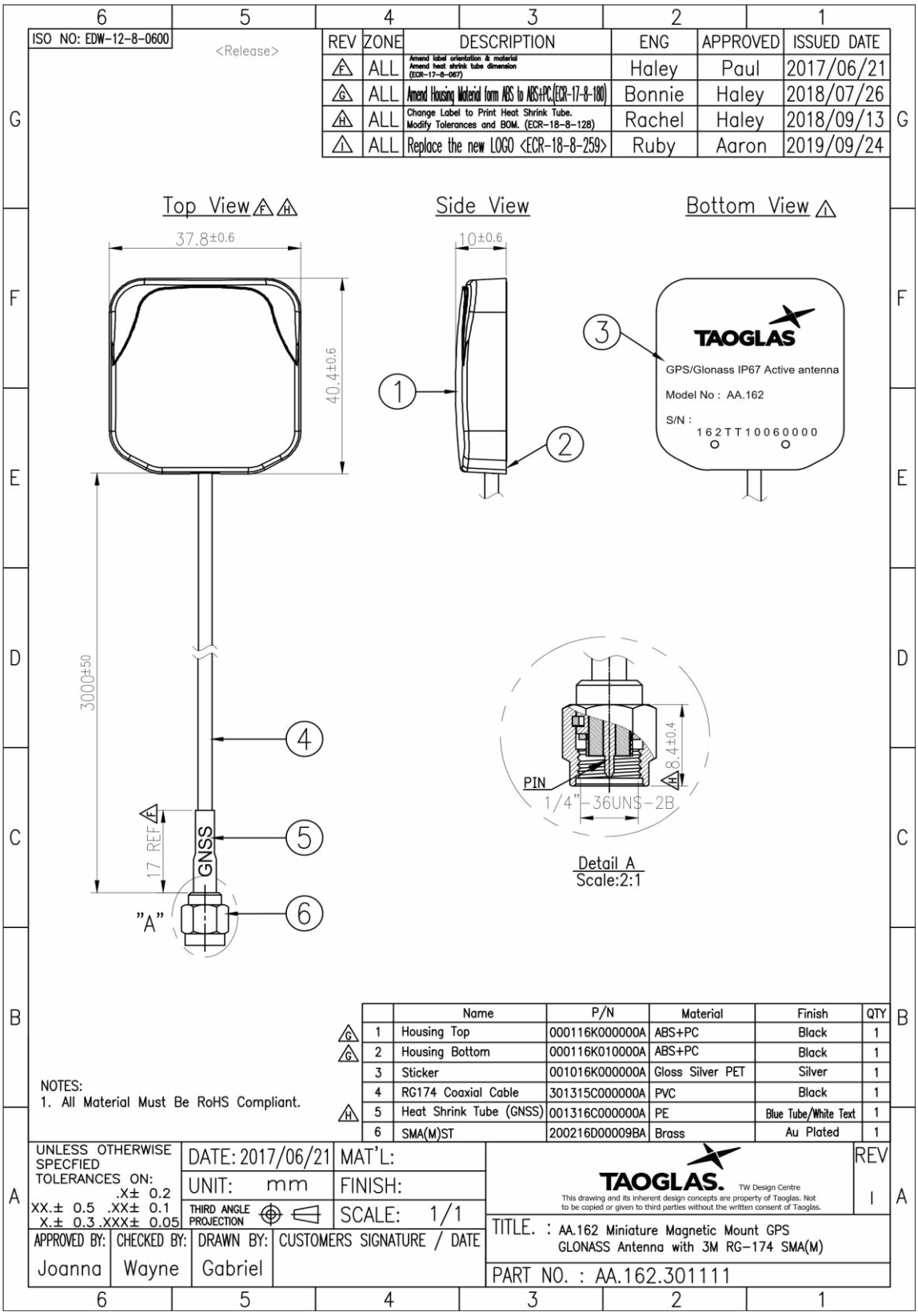
   Receiver features:

   - Multi-band GNSS: 184-channel GPS L1C/A L2C, GLONASS: L1OF L2OF, Galileo: E1B/C E5b, BeiDou: B1I B2I, QZSS: L1C/A L2C
   - Multi-band RTK with fast convergence times and reliable performance
   - Nav. update rate RTK up to 20 Hz
   - Position accuracy = RTK 0.01 m + 1 ppm CEP

Positioning Accuracy Table (2D Accuracy)					
Test Condition	**Correction Service**	**CEP (50%)**	**DRMS (68%)**	**2DRMS (95-98.2%)**	**TTFF (sec)**
30x30 cm Ground Plane	RTK DISABLED	48.57 cm	58.41 cm	116.82 cm	29
	RTK ENABLED	18.08 cm	23.17 cm	46.35 cm	29



9. Drawing


ISO NO: EDW-12-8-0600
<Release>
REV | ZONE | DESCRIPTION | ENG | APPROVED | ISSUED DATE
F | ALL | Amend label orientation & material Amend heat shrink tube dimension (ECR-17-8-067) | Haley | Paul | 2017/06/21
G | ALL | Amend Housing Material form ABS to ABS+PC.(ECR-17-8-180) | Bonnie | Haley | 2018/07/26
H | ALL | Change Label to Print Heat Shrink Tube. Modify Tolerances and BOM. (ECR-18-8-128) | Rachel | Haley | 2018/09/13
I | ALL | Replace the new LOGO <ECR-18-8-259> | Ruby | Aaron | 2019/09/24
Top View
Side View
Bottom View
37.8±0.6
40.4±0.6
10±0.6
3000±50
17 REF
GNSS
"A"
TAOGLAS
GPS/Glonass IP67 Active antenna
Model No : AA.162
S/N :
162TT10060000
PIN
1/4"-36UNS-2B
8.4±0.4
Detail A
Scale:2:1
NOTES:
1. All Material Must Be RoHS Compliant.
Name | P/N | Material | Finish | QTY
1 | Housing Top | 000116K000000A | ABS+PC | Black | 1
2 | Housing Bottom | 000116K010000A | ABS+PC | Black | 1
3 | Sticker | 001016K000000A | Gloss Silver PET | Silver | 1
4 | RG174 Coaxial Cable | 301315C000000A | PVC | Black | 1
5 | Heat Shrink Tube (GNSS) | 001316C000000A | PE | Blue Tube/White Text | 1
6 | 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: 2017/06/21
MAT'L:
UNIT: mm
FINISH:
THIRD ANGLE PROJECTION
SCALE: 1/1
APPROVED BY: Joanna
CHECKED BY: Wayne
DRAWN BY: Gabriel
CUSTOMERS SIGNATURE / DATE
TAOGLAS. TW Design Centre
This drawing and its inherent design concepts are property of Taoglas. Not to be copied or given to third parties without the written consent of Taoglas.
REV I
TITLE. : AA.162 Miniature Magnetic Mount GPS GLONASS Antenna with 3M RG-174 SMA(M)
PART NO. : AA.162.301111

10. Packaging