

**Description**: GNSS / 2x LTE / 0, 1x, 2x or 3x WiFi

**Adhesive Mount** 

Series: RAZORBACK

**PART NUMBER:** RAZ32011AM, RAZ32012AM, RAZ42111AM, RAZ42112AM, RAZ52211AM, RAZ52212AM, RAZ62311AM, RAZ62312AM



RAZ52211AM (Black)



RAZ52212AM (White)

## **Features:**

- 2x LTE 644-2700MHz (MiMo)
- 0, 1x, 2x or 3x WiFi 2.4/5GHz
- DSRC
- GNSS Active:
  - · Beidou, GPS, Glonass
  - RHCP polarization
  - · Amplifier Gain 30dBi
- Size: 88.5 x 195.1 x 92.6mm
   3.48 x 7.68 x 3.65 in
- Power withstanding 45W
- Available Models
   RAZ32011AM = 3 Cable, Black
   RAZ32012AM = 3 Cable, White
   RAZ42111AM = 4 Cable, Black
   RAZ42112AM = 4 Cable, White
   RAZ52211AM = 5 Cable, Black
   RAZ52212AM = 5 Cable, White
   RAZ62311AM = 6 Cable, Black
   RAZ62312AM = 6 Cable, White

# **Applications:**

- Vehicular use Telematics
- Fleet management
- Trucking
- · Navigation, GIS and survey
- Public safety
- · Search and Rescue
- Metering, Utility boxes

Issue: 1742

In the effort to improve our products, we reserve the right to make changes judged to be necessary. CONFIDENTIAL AND PROPRIETARY INFORMATION

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For more information:

Pulse Worldwide Headquarters 15255 Innovation Drive #100 San Diego, CA 92128 USA Tel:1-858-674-8100 Pulse/Larsen Antennas 18110 SE 34<sup>th</sup> St Bldg 2 Suite 250 Vancouver, WA 98683 USA Tel: 1-360-944-7551 Europe Headquarters Pulse GmbH & Do, KG Zeppelinstrasse 15 Herrenberg, Germany Tel: 49 7032 7806 0 Pulse (Suzhou) Wireless Products Co, Inc. 99 Huo Ju Road(#29 Bldg,4<sup>th</sup> Phase Suzhou New District Jiangsu Province, Suzhou 215009 PR China Tel: 86 512 6807 9998



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## **ELECTRICAL SPECIFICATIONS**

Antenna Type	Monopole, measured on Ø1.02m (40") ground plane
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Frequency (2x LTE) 644-960/1710-2700 MHz
Frequency (1x, 2x or 3x WiFi) 2400-2500/4900-5925 MHz

 Nominal Impedance
 50 Ω

 VSWR
 2:1

 Radiation Pattern
 Omni

 HPBW / Vertical Plane (LTE, 644-960)
 42°

 HPBW / Vertical Plane (LTE, 1710-2700)
 31°

 HPBW / Vertical Plane (WIFI, 2400-2500)
 25°

 HPBW / Vertical Plane (WIFI, 4900-5925)
 20°

Polarization Vertical

Average Peak Gain (LTE, 644-960) (LTE, 1710-2700) 4.6/4.9 dBi

Average Peak Gain (WIFI, 2400-2500) (WIFI, 4900-5925) 6/6.6 dBi

Isolation (LTE1 to LTE2) <-13
Isolation (WiFi1/2, WiF2/3 & WiFi1/3) <-13
Average Efficiency (LTE) 67 %
Average Efficiency (WiFi) 57 %

Power Withstanding 45 W

## GNSS Beidou-GPS-Glonass

Frequency 1561.098±2.046,1575.42±1.023,1602.5625±4 MHz

VSWR 2:1

Nominal Impedance 50  $\Omega$ 

Gain (Radiating element) 1 dBic +/- 1dB Gain (LNA gain) 30 dB +/- 2 dB

Polarization RHCP





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## **ELECTRICAL SPECIFICATIONS**

Out of Band Rejection 960MHz >65 dB, 1710MHz >60 dB, 2170MHz >65 dB. 2400MHz >65 dB

Noise Figure < 2.4dB

Operating Voltage  $3.3 - 5 \text{ Vdc} \pm 0.5 \text{ V}$ 

Current Consumption < 11 mA

## **MECHANICAL SPECIFICATIONS**

Length/Height/Width 195.1mm (7.68")/92.6 (3.65")/88.5mm (3.48")

Weight 856 g (1.9 lbs)

Antenna Color / Material Black or White / PC/ABS, UV protected

Cable / Connector 2x LTE, 5.2m (17') LMR-195/SMA-Male

1x, 2x or 3x WiFi, 5.2m (17') LMR-195/RP-SMA-Male

GNSS, 5.2m (17') RG-174/SMA-Male

Mounting Configuration Adhesive Mount

## **ENVIRONMENTAL SPECIFICATIONS**

Operating Temperature -40/+85° C

Ingress Protection IP67

RoHS Compliant Yes

## **OTHER SPECIFICATIONS**

Total cable assembly loss for 5.2m (17') LMR-195 @ 850MHz	2.1 dB
Total cable assembly loss for 5.2m (17') RG-174 @ 1575MHz	6.0 dB
Total cable assembly loss for 5.2m (17') LMR-195 @ 1930MHz	3.2 dB
Total cable assembly loss for 5.2m (17') LMR-195 @ 2500MHz	3.7 dB
Total cable assembly loss for 5.2m (17') LMR-195 @ 2450MHz	3.6 dB
Total cable assembly loss for 5.2m (17') LMR-195 @ 5350MHz	5.5 dB





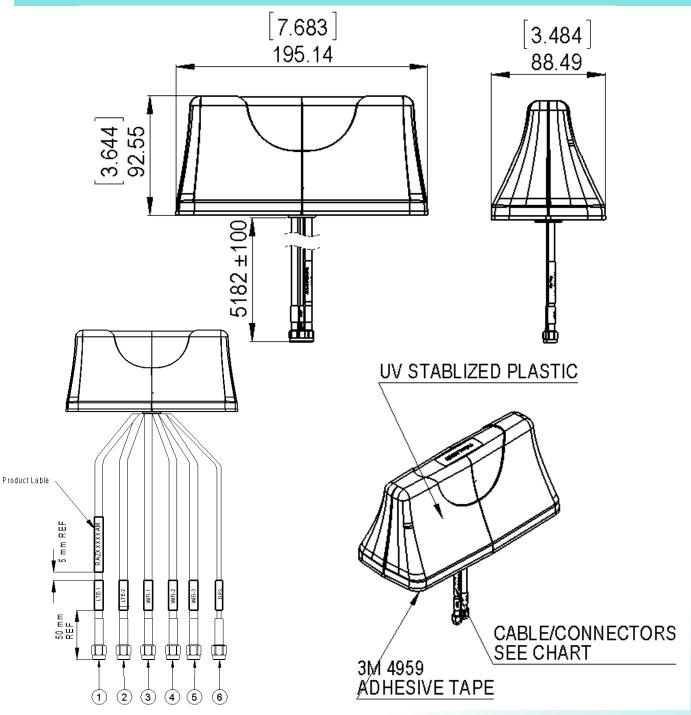
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# **MECHANICAL DRAWING**



All dimensions are in mm / inches

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## **MECHANICAL DRAWING**

# Vehicular Multiband Antenna with Adhesive Mount

(Part Number)



























1	Product ID: RAZORBACK			
2	Total Number of Cable leads			
3	Total Number of LTE Cable Leads			
4	Total Number of WiFi Cable Leads			
<b>(5)</b>	Total Number of GPS Cable Leads			
6	The Color of the Plastic Housing 1=Black; 2= White			
7	Mounting: Adhesive Mount			

	RAZXXXXXAM	CABLE	CABLE LENGTH	CONNECTOR
1	LTE-1 Cable Assy			CMANA
2	LTE-2 Cable Assy			SMA Male
3	WiFi-1 Cable Assy	LMR195	5181 mm /	RP-SMA Male
4	WiFi-2 Cable Assy		204" /	
5	WiFi-3 Cable Assy		17 FT	
6	GPS Cable Assy	RG-174		SMA Male

All dimensions are in mm / inches





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## **CHARTS**

#### VSWR vs Frequency RAZ62311AM Measured with 17' cables on Ø40" GP sured at Pulse, USA - July 07, 2017

2.5 VSWR 2

LTE 1 & 2 Measured with 5.2m (17') cable

### Return loss vs Frequency RAZ62311AM Measured with 17' cables on Ø40" GP

644-960

Frequency, MHz

**-**1710-2170

2300-2700

Measured at Pulse, USA - July 07, 2017 0 -5 -10 Return loss -15 -20 -25 -30 -35 -40 Frequency, MHz LTE 1 — LTE 2 -Isolation

LTE 1 & 2 Measured with 5.2m (17') cable

Issue: 1742



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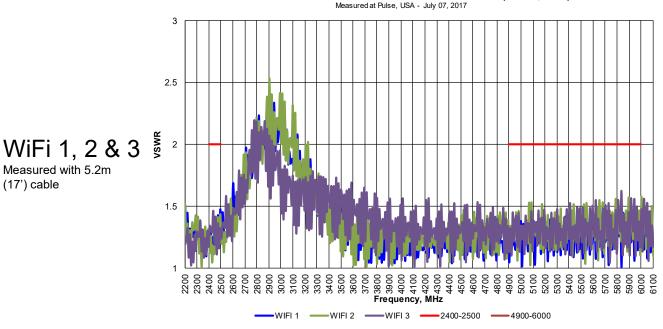
Measured with 5.2m

(17') cable

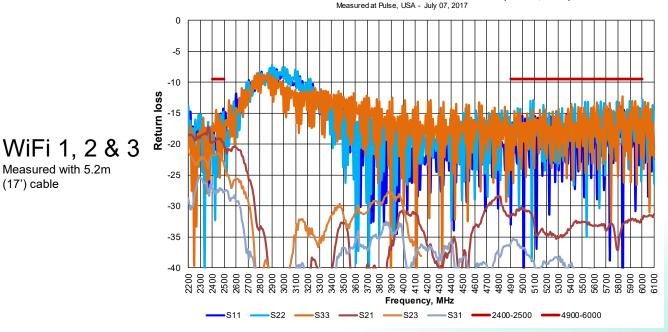
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## **CHARTS**

#### **VSWR vs Frequency** RAZ62311AM Measured with 17' cables on Ø40" GP (WiFi 1, 2 &3)



#### Return loss vs Frequency RAZ62311AM Measured with 17' cables on Ø40" GP (WiFi 1, 2 &3)



Issue: 1742

Measured with 5.2m

(17') cable



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## **CHARTS**

#### Peak Gain vs Frequency RAZ62311AM Measured with 4" cables on Ø40" GP (LTE 1)

Measured at Pulse, USA - Aug 04, 2017



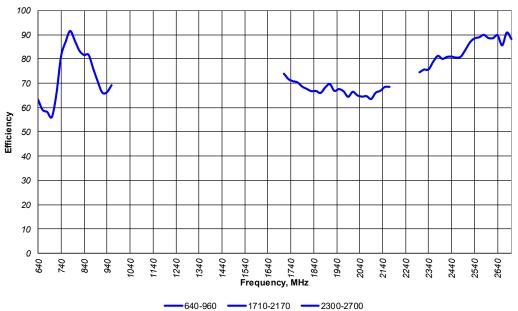
ITF 1 Measured with 102mm (4") cable

#### Efficiency vs Frequency RAZ62311AM Measured with 4" cables on Ø40" GP (LTE 1)

**-**640-960 **--**

Measured at Pulse, USA - aUG 04, 2017

**-**1710-2170 **--**2300-2700



LTE 1 Measured with 102mm (4") cable



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#### **CHARTS** XY plane @ Lower Band 800 330 30 $A \vee g (dBi) = -2.53$ Peak (dBi) = -0.58 $A \vee g - 3 (deg) = 154$ 1930 300 -15 Avg (dBi) = -0.25Peak (dBi) = 1.96 -20 Avg - 3 (deg) = 81Sain (dBi) 2500 -30 Avg (dBi) = -1.76 Peak (dBi) = 0.58 LTE 1 270 Avg - 3 (deg) = 97Measured with 102mm (4") cable 240 120 210 150 2500 800 -1930 Phi Angle (°) 180 ZX plane @ Lower Band 0 800 330 30 Avg (dBi) = -1.60Peak (dBi) = 2.53 $A \vee g - 3 (deg) = 41$ 300 Avg(dBi) = -3.36Peak (dBi) = 3.72 -20 Avg - 3 (deg) = 24-25 Gain (dBi) 2500 -30 LTE 1 $A \vee g (dBi) = -2.31$ Peak (dBi) = 4.49 270 -35 Avg - 3 (deg) = 29Measured with 102mm (4") cable 240 210 150

180

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Theta Angle (°)





2500

9

800



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**Adhesive Mount** 

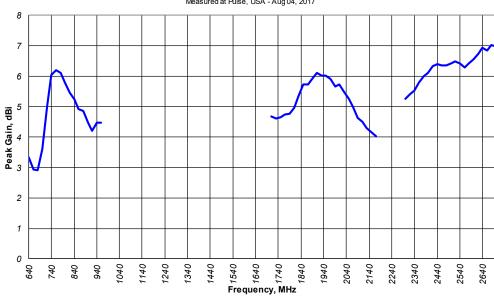
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## **CHARTS**

#### Peak Gain vs Frequency RAZ62311AM Measured with 4" cables on Ø40" GP (LTE 2)

Measured at Pulse, USA - Aug 04, 2017



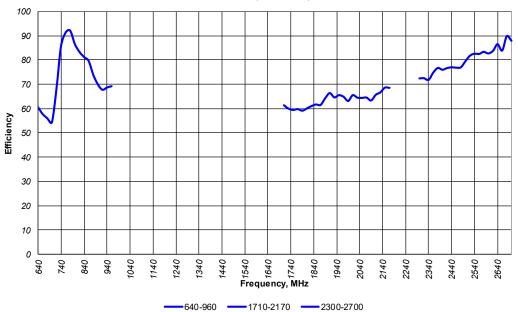
ITF 2 Measured with 102mm (4") cable

#### Efficiency vs Frequency RAZ62311AM Measured with 4" cables on Ø40" GP (LTE 2)

**-**640-960 **--**

Measured at Pulse, USA - aUG 04, 2017

**-**1710-2170 **--**2300-2700



LTE 2 Measured with 102mm (4") cable



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#### **CHARTS** XY plane @ Lower Band 0 800 330 30 $A \vee g (dBi) = -3.21$ Peak (dBi) = -1.25 $A \vee g - 3 (deg) = 145$ -10 1930 300 60 -15 Avg(dBi) = 0.00Peak (dBi) = 2.17 -20 Avg - 3 (deg) = 149Gain (dBi) 2500 Avg (dBi) = -2.64 Peak (dBi) = -0.06 LTE 2 -30 270 Avg - 3 (deg) = 162Measured with 102mm (4") cable 240 120 210 150 800 -1930 2500 Phi Angle (°) 180 ZX plane @ Lower Band 0 330 800 30 $A \vee g (dBi) = -1.75$ Peak (dBi) = 2.78 Avg - 3 (deg) = 42300 $A \lor g (dBi) = -3.00$ Peak (dBi) = 5.07 -20 Avg - 3 (deg) = 26-25 2500 -30 LTE 2 $A \lor g (dBi) = -1.70$ Peak (dBi) = 6.13 270 -35 Avg - 3 (deg) = 29Measured with 102mm (4") cable 240 120 210 150 800 -1930 2500 Theta Angle (°) 180

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ROHS



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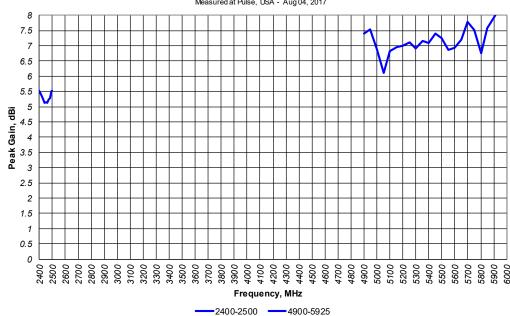
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## **CHARTS**

#### Peak Gain vs Frequency RAZ62311AM Measured with 4" cables on Ø40" GP (WiFi 1)

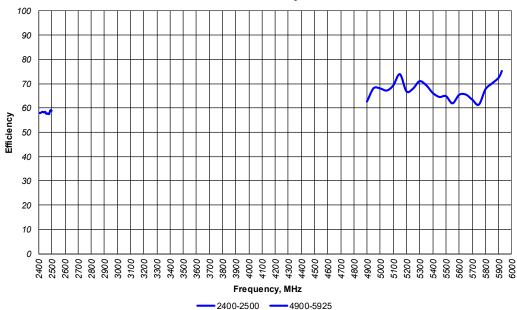
Measured at Pulse, USA - Aug 04, 2017



WiFi 1 Measured with 102mm (4") cable

#### Efficiency vs Frequency RAZ62311AM Measured with 4" cables on Ø40" GP (WiFi 1)

Measured at Pulse, USA - Aug 04, 2017



WiFi 1 Measured with 102mm (4") cable



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#### **CHARTS** XY plane @ Lower Band 2450 330 30 Avg (dBi) = -1.62 Peak (dBi) = 1.08 Avg - 3 (deg) = 122-10 5350 300 -15 $A \lor g (dBi) = -1.18$ Peak (dBi) = 1.62 -20 Avg - 3 (deg) = 154Power (dBm) -30 WiFi 1 270 90 Measured with 102mm (4") cable 240 210 150 2450 -5350 Phi Angle (°) 180 ZX plane @ Lower Band 330 2450 30 Avg (dBi) = Peak (dBi) = 2.78 $A \vee g - 3 (deg) = 24$ 5350 300 Avg (dBi) = 0.05Peak (dBi) = 7.15 -20 $A \vee g - 3 (deg) = 19$ Power (dBm) -30 WiFi 1 270 Measured with 102mm (4") cable 240 210 150

Issue: 1742



-5350

2450

180

Theta Angle (°)



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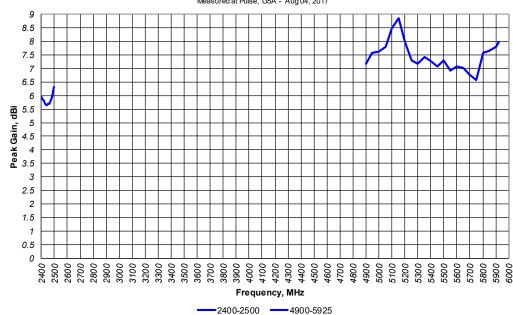
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## **CHARTS**

#### Peak Gain vs Frequency RAZ62311AM Measured with 4" cables on Ø40" GP (WiFi 2)

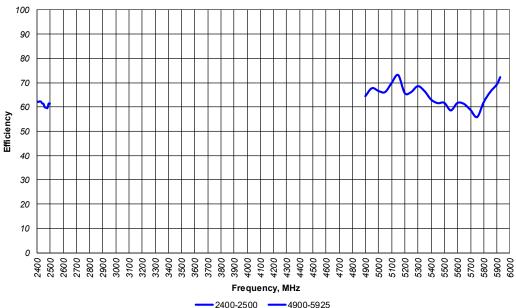
Measured at Pulse, USA - Aug 04, 2017



WiFi 2 Measured with 102mm (4") cable

#### Efficiency vs Frequency RAZ62311AM Measured with 4" cables on Ø40" GP (WiFi 2)

Measured at Pulse, USA - Aug 04, 2017



WiFi 2 Measured with 102mm (4") cable

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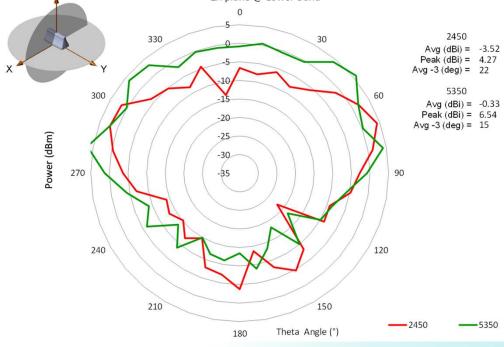
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#### **CHARTS** XY plane @ Lower Band 2450 330 30 Avg (dBi) = -1.34 Peak (dBi) = 2.28 $A \lor g - 3 (deg) = 48$ 5350 300 -15 $A \lor g (dBi) = -0.94$ Peak (dBi) = 2.59 -20 Avg - 3 (deg) = 53Power (dBm) -30 WiFi 2 270 90 Measured with 102mm (4") cable 240 210 150 2450 -5350 Phi Angle (°) 180 ZX plane @ Lower Band 330 2450 30 Avg (dBi) = Peak (dBi) = Avg - 3 (deg) = 22

WiFi 2
Measured with
102mm (4") cable







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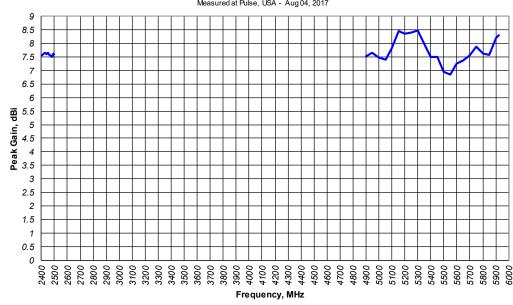
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## **CHARTS**

#### Peak Gain vs Frequency RAZ62311AM Measured with 4" cables on Ø40" GP (WiFi 3)

Measured at Pulse, USA - Aug 04, 2017

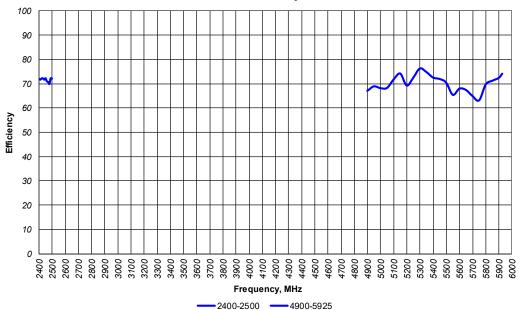


WiFi 3 Measured with 102mm (4") cable

#### Efficiency vs Frequency RAZ62311AM Measured with 4" cables on Ø40" GP (WiFi 3)

2400-2500 — 4900-5925

Measured at Pulse, USA - Aug 04, 2017



WiFi 3 Measured with 102mm (4") cable

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#### **CHARTS** XY plane @ Lower Band 0 2450 330 30 Avg (dBi) = -1.66 Peak (dBi) = 1.55 Avg - 3 (deg) = 1485350 300 $A \lor g (dBi) = -1.23$ Peak (dBi) = 2.33 -20 Avg - 3 (deg) = 103Power (dBm) WiFi 3 -30 270 90 Measured with 102mm (4") cable 240 210 150 -5350 2450 Phi Angle (°) 180 ZX plane @ Lower Band 330 2450 30 $A \vee g (dBi) =$ Peak (dBi) = 7.64 $A \vee g - 3 (deg) = 24$ 5350 300 Avg (dBi) = -2.05Peak (dBi) = 4.98 -20 $A \vee g - 3 (deg) = 52$ Power (dBm) -30 WiFi 3 270 90 Measured with 102mm (4") cable 240 210 150

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ROHS

-5350

2450

180

Theta Angle (°)



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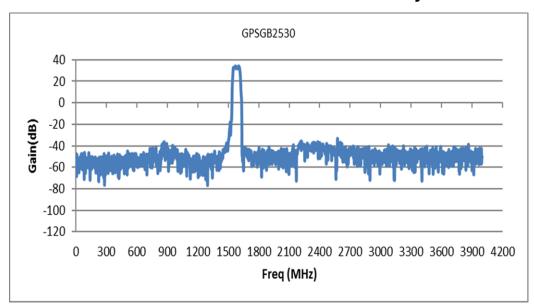
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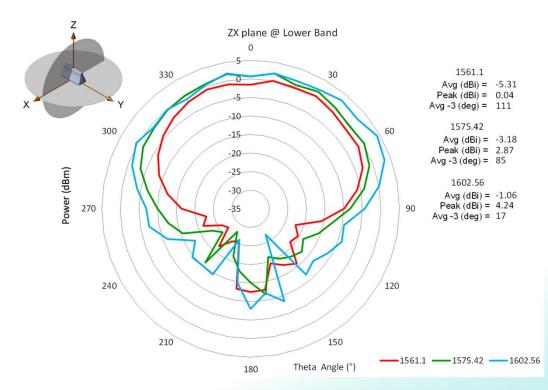
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## **CHARTS**

# GNSS LNA Gain and out-of-band rejection





**GNSS** 

Passive Measurement Measured with 152mm (6") cable

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ROHS



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# **PACKAGING**

1pcs antennas per foam bag

6pcs antennas per package box

Total 6pcs antenna per package box

Package box: 558mm\*386mm\*210mm

# **Mouser Electronics**

**Authorized Distributor** 

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

# Pulse:

RAZ62311AM RAZ32011AM RAZ42111AM RAZ52211AM