

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

This document contains confidential and proprietary information of Pulse Electronics, Inc. (Pulse) and is protected by copyright, trade secret and other state and federal laws. Its receipt or possession does not convey any rights to reproduce, disclose its contents, or to manufacture, use or sell anything it may describe. Reproduction, disclosure or use without specific written authorization of Pulse is strictly forbidden.

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 34th 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,4th Phase Suzhou New District Jiangsu Province, Suzhou 215009 PR China Tel: 86 512 6807 9998



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

45 W

Adhesive Mount

Series: RAZORBACK

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

ELECTRICAL SPECIFICATIONS

Antenna Type	Monopole, measured on Ø1.02m (40")	ground plane
<i>J</i> 1	1 /	J 1

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 %

GNSS Beidou-GPS-Glonass

Power Withstanding

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

VSWR 2:1

Nominal Impedance 50 Ω

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

Polarization RHCP







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

Adhesive Mount

Series: RAZORBACK

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

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





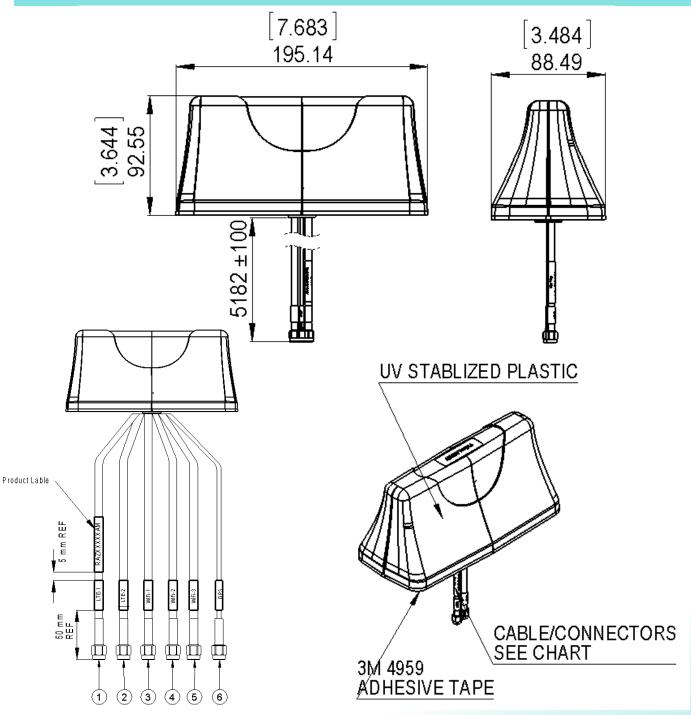
Description: GNSS / 2x LTE / 0, 1x, 2x or 3x WiFi

Adhesive Mount

Series: RAZORBACK

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

MECHANICAL DRAWING



All dimensions are in mm / inches

Issue: 1742

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





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

Adhesive Mount

Series: RAZORBACK

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

MECHANICAL DRAWING

Vehicular Multiband Antenna with Adhesive Mount

(Part Number)





























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

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

All dimensions are in mm / inches





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

Adhesive Mount

Series: RAZORBACK

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

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

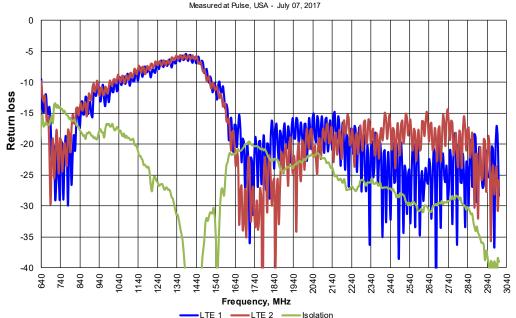
Return loss vs Frequency RAZ62311AM Measured with 17' cables on Ø40" GP

644-960

Frequency, MHz

-1710-2170

2300-2700



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

Issue: 1742

000



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

Adhesive Mount

Series: RAZORBACK

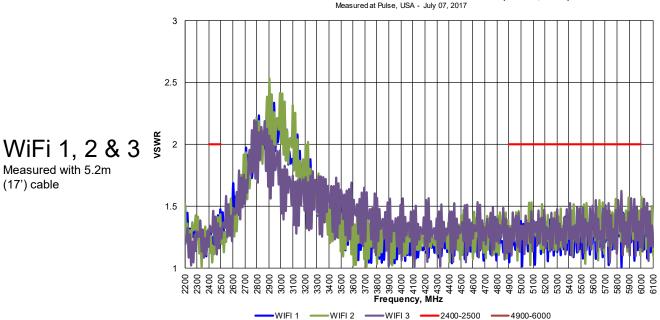
Measured with 5.2m

(17') cable

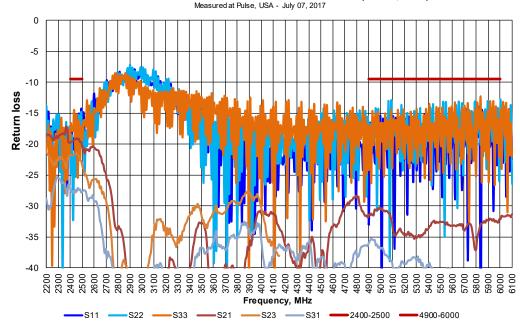
PART NUMBER: RAZ32011AM, RAZ32012AM, RAZ42111AM, RAZ42112AM, RAZ52211AM, RAZ52212AM, RAZ62311AM, RAZ62312AM

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

WiFi 1, 2 & 3

Measured with 5.2m

(17') cable



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

Adhesive Mount

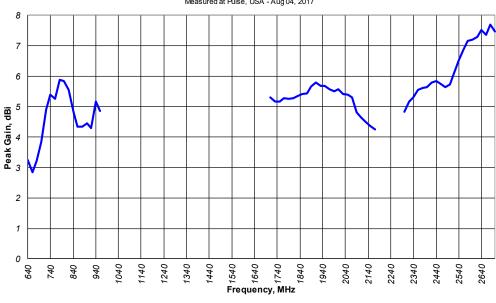
Series: RAZORBACK

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

CHARTS

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

Measured at Pulse, USA - Aug 04, 2017



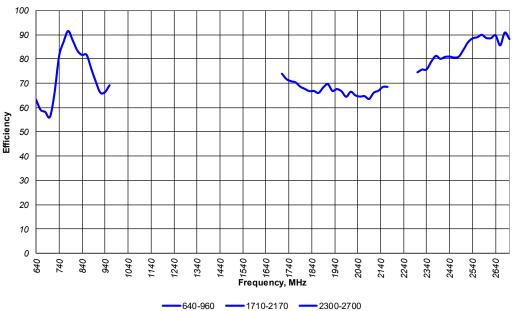
1 TF 1 Measured with 102mm (4") cable

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



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

Adhesive Mount

Series: RAZORBACK

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

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 1930 2500 800

Issue: 1742



9

180



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

Adhesive Mount

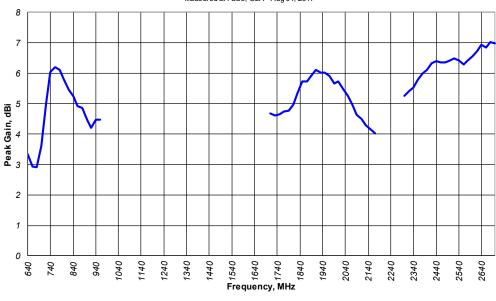
Series: RAZORBACK

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

CHARTS

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

Measured at Pulse, USA - Aug 04, 2017



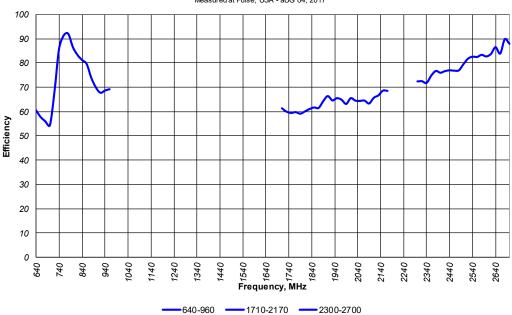
LTE 2
Measured with
102mm (4") cable

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

Issue: 1742

ROHS

10



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

Adhesive Mount

Series: RAZORBACK

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

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

Issue: 1742

ROHS



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

Adhesive Mount

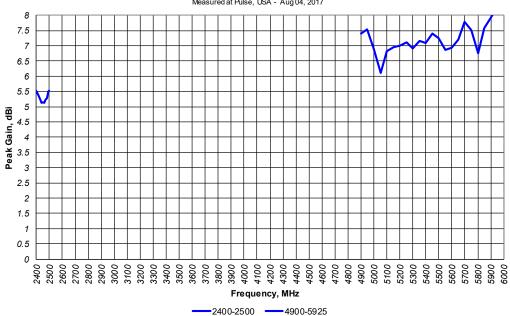
Series: RAZORBACK

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

CHARTS

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

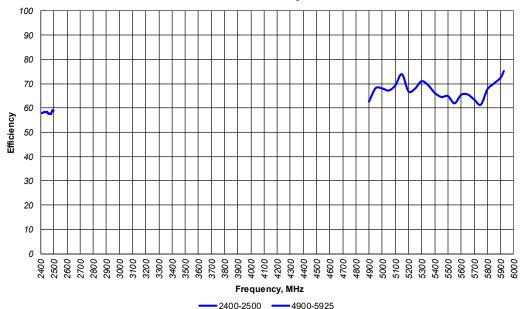
Measured at Pulse, USA - Aug 04, 2017



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



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

Adhesive Mount

Series: RAZORBACK

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

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



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

Adhesive Mount

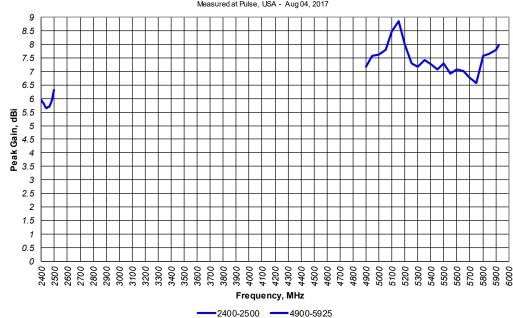
Series: RAZORBACK

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

CHARTS

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

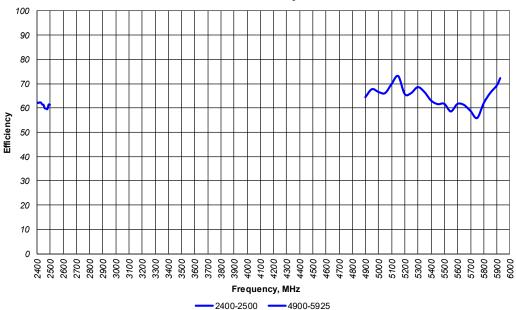
Measured at Pulse, USA - Aug 04, 2017



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



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

Adhesive Mount

Series: RAZORBACK

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

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) = 225350 300 Avg (dBi) = -0.33Peak (dBi) = 6.54-20 $A \lor g - 3 (deg) = 15$ Power (dBm) -30 WiFi 2 270 90 Measured with 102mm (4") cable 240 210 150

Issue: 1742



-5350

2450

180



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

Adhesive Mount

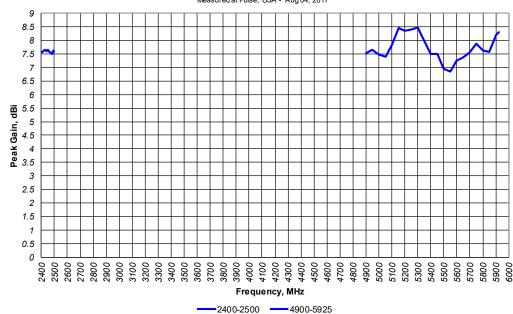
Series: RAZORBACK

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

CHARTS

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

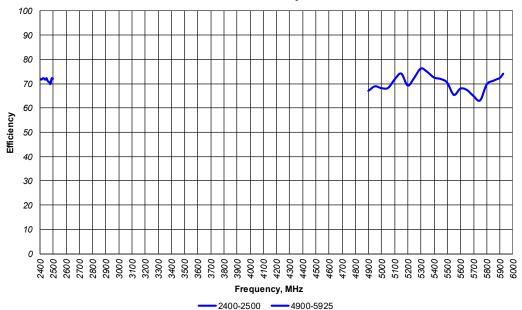
Measured at Pulse, USA - Aug 04, 2017



WiFi 3
Measured with
102mm (4") cable

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

Measured at Pulse, USA - Aug 04, 2017



WiFi 3
Measured with
102mm (4") cable

Issue: 1742

ROHS



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

Adhesive Mount

Series: RAZORBACK

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

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

Issue: 1742



-5350

2450

180



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

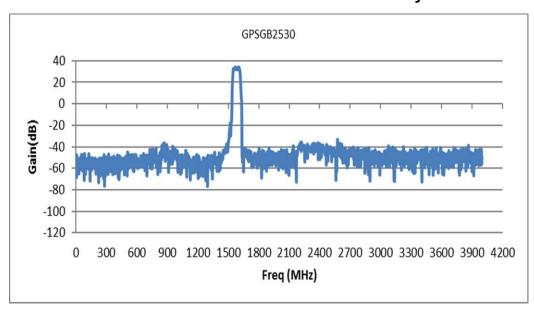
Adhesive Mount

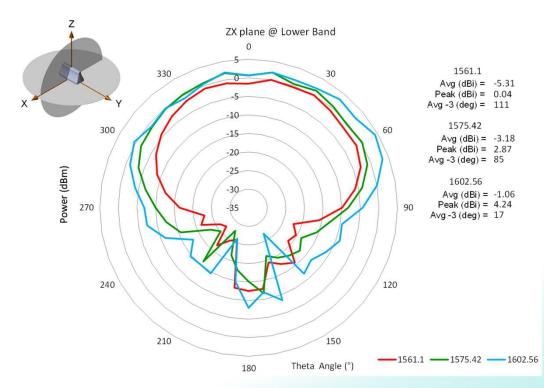
Series: RAZORBACK

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

CHARTS

GNSS LNA Gain and out-of-band rejection





GNSS

Passive Measurement Measured with 152mm (6") cable

Issue: 1742

ROHS

18



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

Adhesive Mount

Series: RAZORBACK

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

PACKAGING

1pcs antennas per foam bag

6pcs antennas per package box

Total 6pcs antenna per package box

Package box: 558mm*386mm*210mm