



Features:

- Supports MIMO Cellular LTE 698-960/1695-2170/2300-2700/2900-3600MHz
- Supports WiFi and DSRC 2400-2500MHz/4900-5925MHz
- Supports Beidou, GPS, Galileo, GLONASS
- Direct Mount and optional Magnetic Mount features
- See GPSMBMM for magnetic mount details

Applications:

- Telematics
- Location based services
- First Responders(Police, Ambulance, Fire)
- Government
- Energy(Utility Vehicles)
- Fleet Management
- Railroad

All dimensions are in mm / inches

Issue: 1823

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For more information:

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12220 World Trade Drive
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: MiMo LTE, WiFi, GNSS Vehicle
Mount Antenna

Series: Panther

PART NUMBER: GPSMB401, GPSMB402, GPSMB401R,
GPSMB402R

This document covers all product variants of the following product family

Model No.	Color	Remark
GPSMB401	Black	
GPSMB402	White	
GPSMB401R	Black	Compliant with EN 50155, EN 61373, EN45545-2, railroad application.
GPSMB402R	White	Compliant with EN 50155, EN 61373, EN45545-2, railroad application.

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Series: Panther

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GPSMB402R

ELECTRICAL SPECIFICATIONS

Frequency (LTE)	698-960/1695-2170/2300- 2700/2900-3600 MHz
Frequency (WiFi & DSRC)	2400-2500/4900-5925 MHz
Frequency (Beidou, GPS, Galileo, Glonass)	1561.098±2.046/ 1575.42±1.023/ 1602.5625±4MHz
Nominal Impedance	50 Ω
VSWR** (LTE)	<1.5
VSWR** (WiFi & DSRC)	<1.4
Gain* (LTE antenna, <2170MHz)	4 dBi ± 2.5 dB
Gain* (LTE antenna, >2170MHz)	5 dBi ± 2 dB
Gain* (WiFi antenna, <2500MHz)	4.5 dBi ± 1.5 dB
Gain* (WiFi antenna, >4900MHz)	5 dBi ± 2 dB
Isolation LTE to LTE**	15 dB or better
GNSS antenna RHCP gain	1 dBic ± 2 dB
LNA gain	30 dB ± 2 dB
Noise Figure	2.5 (cascade) dB
Current	9 mA ± 2 mA
Vdc	3-5Vdc
LNA and filter attenuation	
@ 824 MHz	70 dB
@960 MHz	65 dB
@1710 MHz	60 dB
@2170 MHz	65 dB

*Measured on 2ft GND plane and with 4 inch cables

**In free space with 17ft cables

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ELECTRICAL SPECIFICATIONS

Connector type(s)	SMA (LTE and GPS) /SMA-RP (WiFi)
Cable type(s)	RG-58 (LTE and WiFi) / RG-174 (GPS)
Length	17 Feet

Description: MiMo LTE, WiFi, GNSS Vehicle
Mount Antenna

Series: Panther

PART NUMBER: GPSMB401, GPSMB402, GPSMB401R,
GPSMB402R

MECHANICAL SPECIFICATIONS

Plastic radome for GPSMB401/GPSMB402	ABS/PC Material UV Stabilized, UL-94HB
for GPSMB401R/GPSMB402R	PC material, EN45545 R6 HL3 compliant
Color	Black, White
Ingress Protection	IP67
Weight	~1340 g
Fixing system	Roof mounting (Also Magnet mounting accessory available, GPSMBMM) Recommended fastening torque 1518ft-lb (20-25Nm).

ENVIRONMENTAL SPECIFICATIONS

Operating temperature	MIL-STD 810G -40/+85° C
Humidity	95%RH @ +25°C for 12h and 55°C for 12h
Vibration	MIL-STD 810G, section 514.6 , 5-500 Hz, 60min/axis
Thermal Shocks	MIL-STD 810G, section 503.5, -40 to +85°C, 3 cycles
Drop Test	Minimum of one drop per axis – 4, 1 meter drops

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Description: MiMo LTE, WiFi, GNSS Vehicle Mount Antenna

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Tests for railroad certification per EN50155, EN61373, EN45545-2

NO	T SN IN STAND	TEST DESCRIPTION	REFER STANDARD	TEST REPORT NO	RESULT(PASS/FAIL)
1	12.2.3	Cooling test	EN 50155	DD20170919002	PASS
2	12.2.4	Dry heat test			
3	12.2.5	Damp heat test, cyclic			
4	12.2.6	Supply overvoltages	EN 50155	W01714200900E	PASS
5	12.2.7	Surges, electrostatic discharge and transient burst susceptibility tests	EN 50155	E1710056-01E	PASS
6	12.2.8	Radio interference			
7	12.2.9	Insulation test	EN 50155	E17110014-01E	PASS
8	12.2.10	Salt mist test	EN 50155	DD20170919002	PASS
9	12.2.11	Vibration	EN 61373		
		Shock, and bump test	EN 61373		
10	12.2.12	Watertightness test	EN 50155		
11	12.2.14	Low temperature storage test	EN 50155	TC 18 02 000528	HL1&HL2
12	/	fire & smoke	EN 45545-2 R15&R16		
			EN 45545-2 R15&R16	TC.18.04.001633	HL1&HL2&HL3

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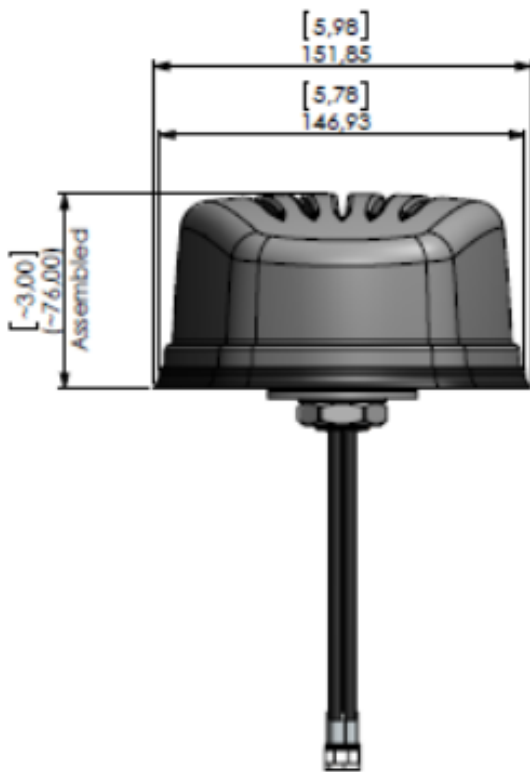
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MECHANICAL DRAWING



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TEST SETUP



For VSWR, test in free
space with 17ft cables



For radiation
performance, test on 2ft
GND plane with 4inch
cables

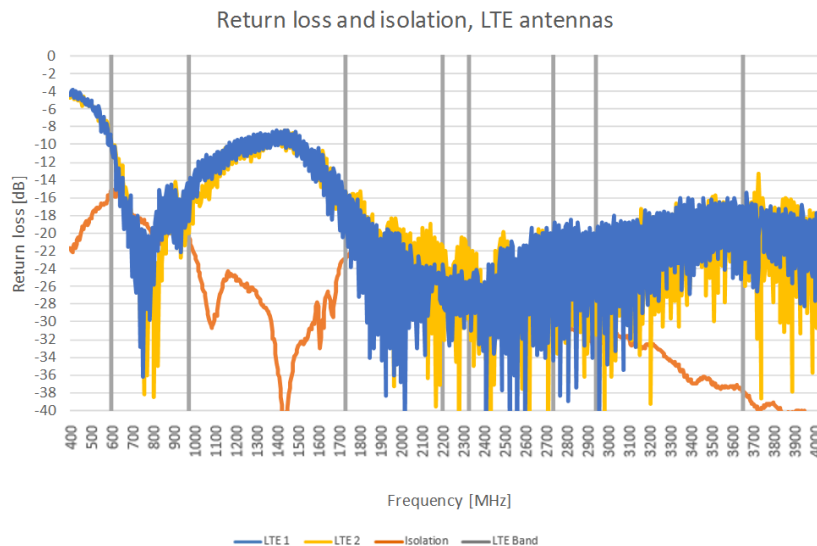
Description: MiMo LTE, WiFi, GNSS Vehicle Mount Antenna

Series: Panther

PART NUMBER: GPSMB401, GPSMB402, GPSMB401R, GPSMB402R

CHARTS

Return Loss and isolation in free space, LTE antennas**



Return Loss in free space, WiFi antenna**



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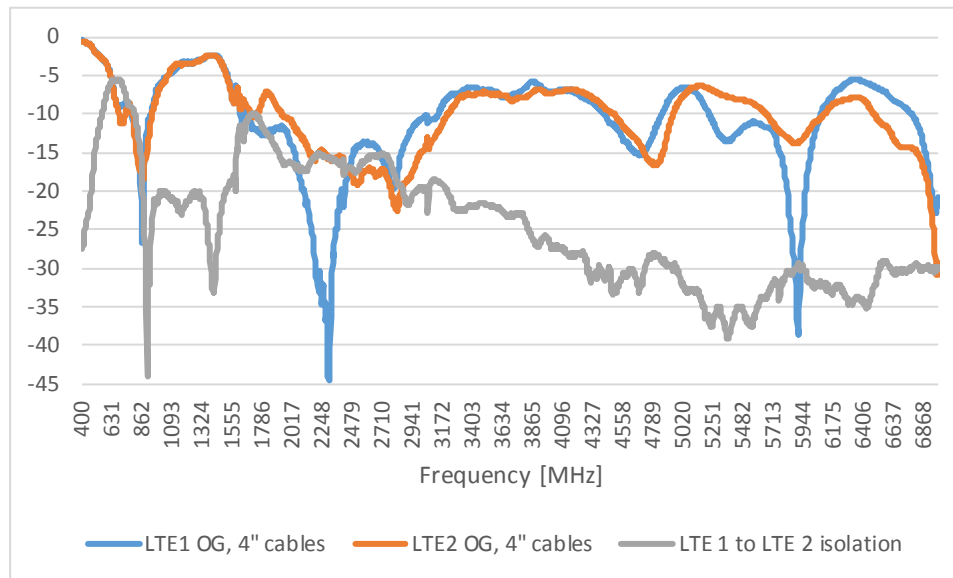
Description: MiMo LTE, WiFi, GNSS Vehicle Mount Antenna

Series: Panther

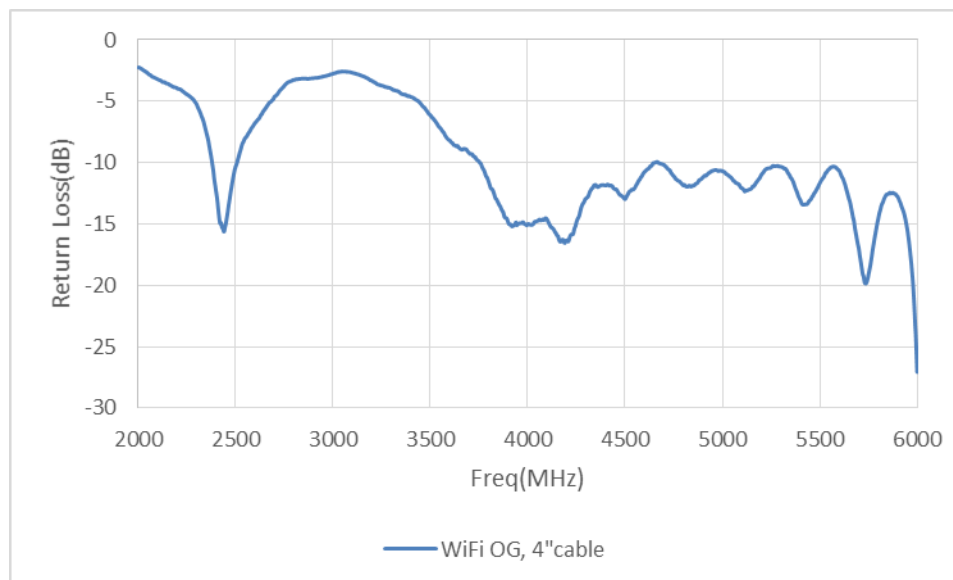
PART NUMBER: GPSMB401, GPSMB402, GPSMB401R, GPSMB402R

CHARTS

Return Loss and isolation, LTE antennas*



Return Loss, WiFi antenna*



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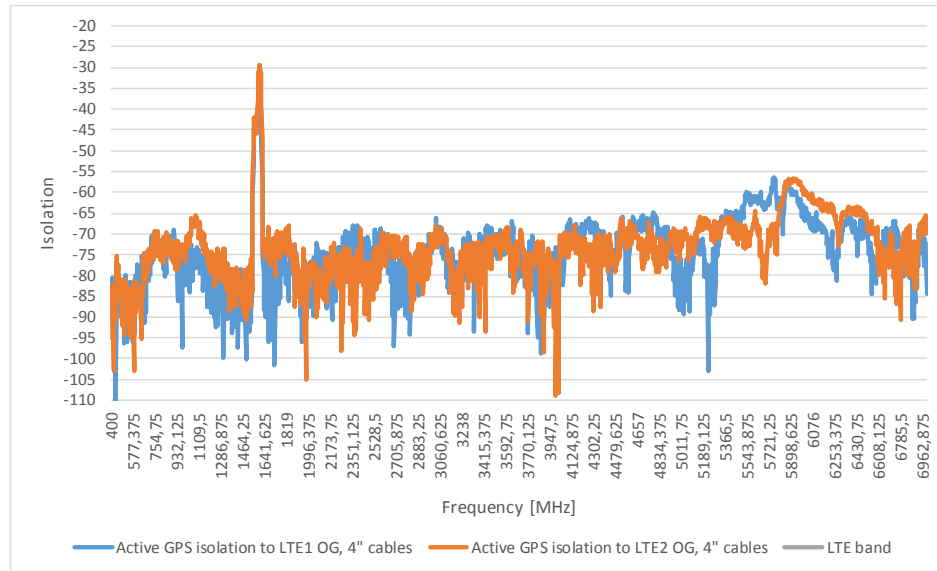
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Series: Panther

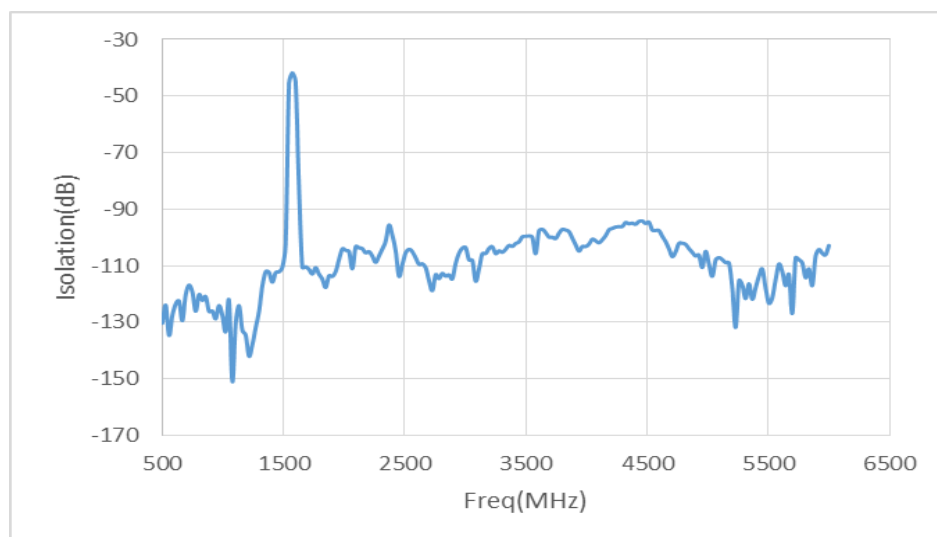
PART NUMBER: GPSMB401, GPSMB402, GPSMB401R, GPSMB402R

CHARTS

GPS isolation to LTE 1 and LTE 2 antenna*



GPS isolation to WiFi antenna*



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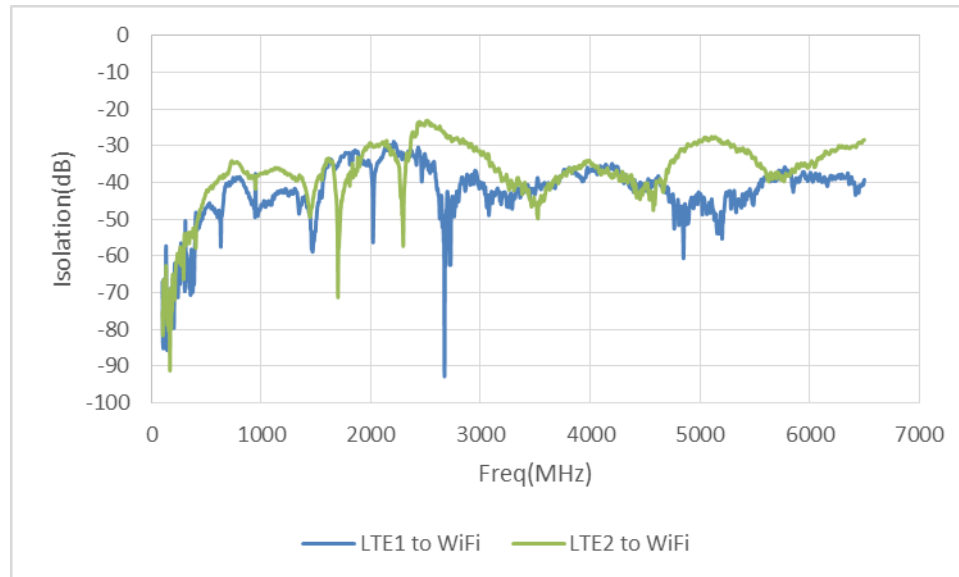
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Series: Panther

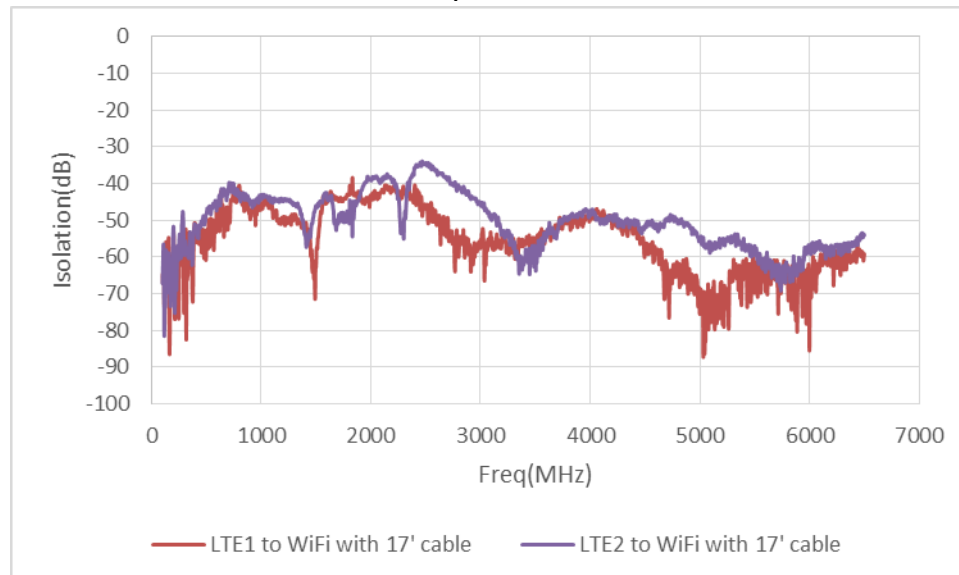
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CHARTS

Isolation characteristics, WiFi to LTE 1 and LTE 2*



Isolation characteristics, WiFi to LTE 1 and LTE 2**



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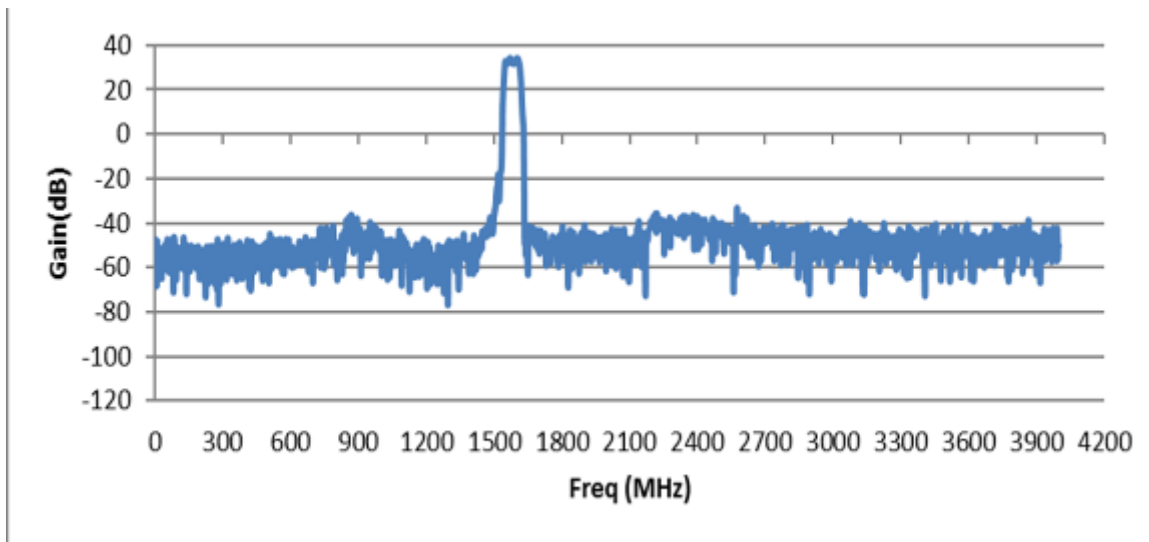
Description: MiMo LTE, WiFi, GNSS Vehicle
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CHARTS

GNSS LNA performance



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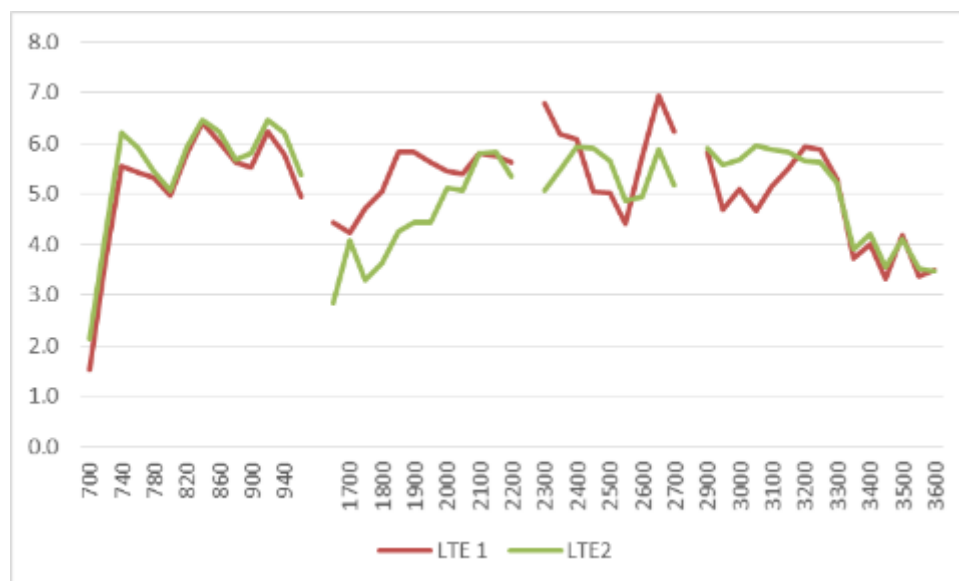
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CHARTS

LTE antenna total efficiency with 2ft metal plate and 4inch cables



Maximum 3D gain, LTE antenna with 2ft metal plate and 4inch cables



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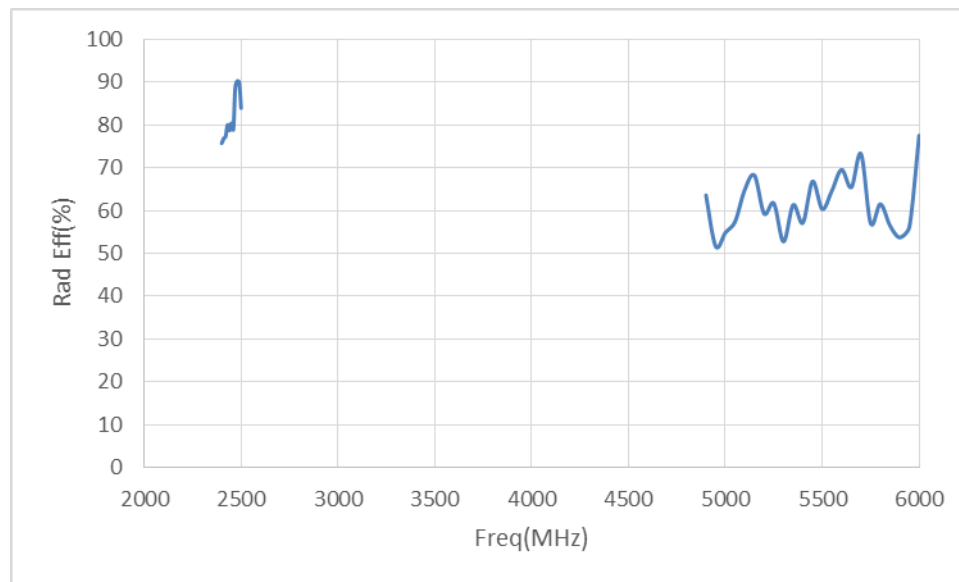
Description: MiMo LTE, WiFi, GNSS Vehicle Mount Antenna

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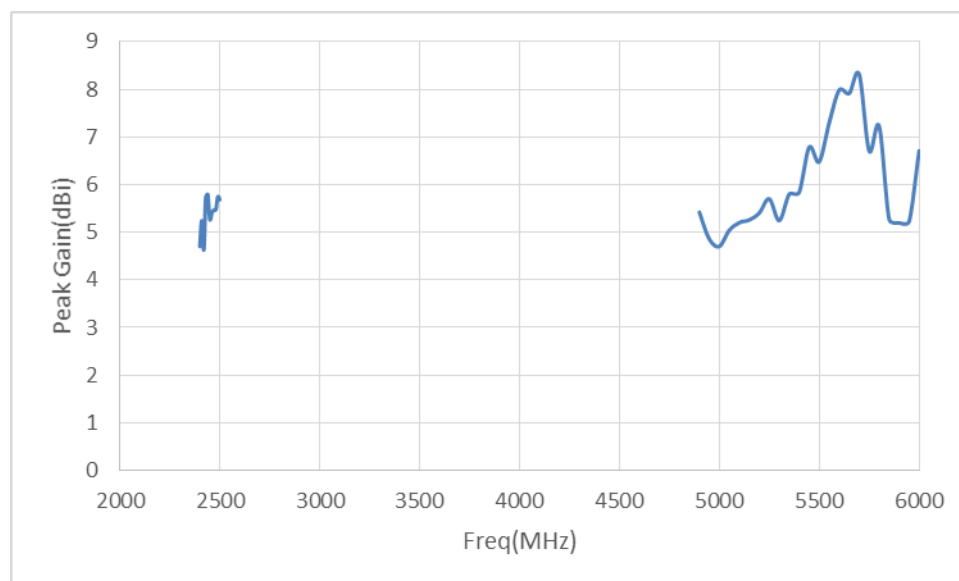
PART NUMBER: GPSMB401, GPSMB402, GPSMB401R, GPSMB402R

CHARTS

WiFi antenna total efficiency with 2ft metal plate and 4inch cables



Maximum 3D gain, WiFi antenna with 2ft metal plate and 4inch cables



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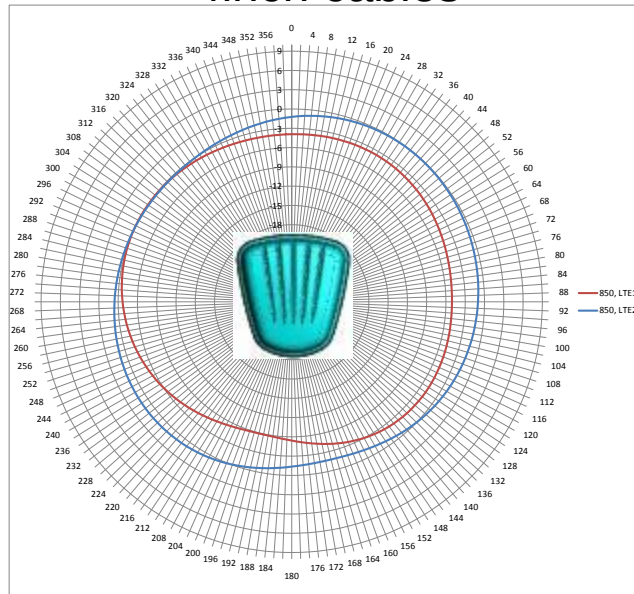
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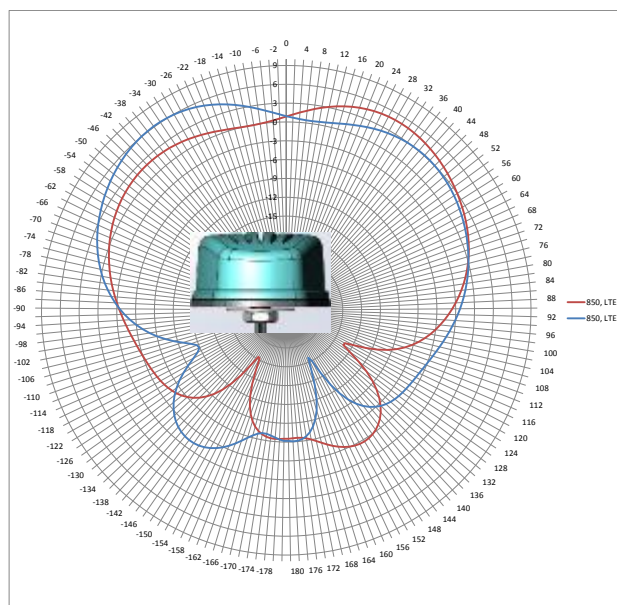
PART NUMBER: GPSMB401, GPSMB402, GPSMB401R, GPSMB402R

CHARTS

LTE antenna radiation pattern at 850MHz with 2ft metal plate and 4inch cables



Horizontal plot



Vertical plot front view

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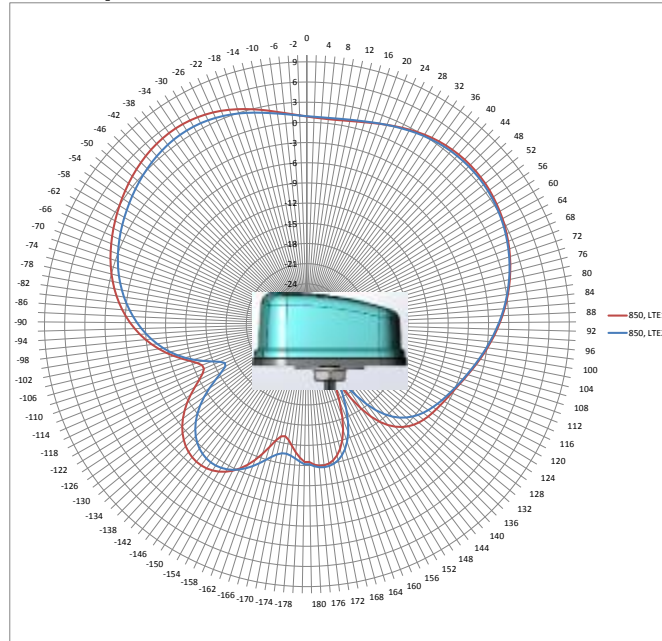
Description: MiMo LTE, WiFi, GNSS Vehicle
Mount Antenna

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CHARTS

LTE antenna radiation pattern at 850MHz with 2ft metal plate and



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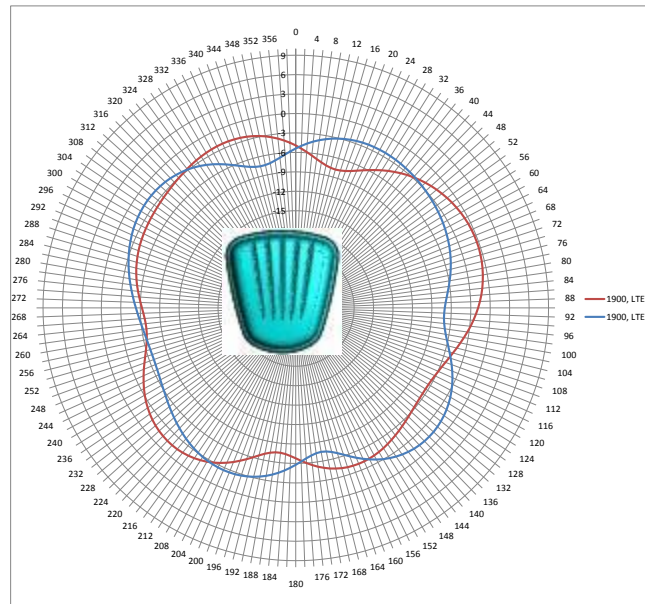
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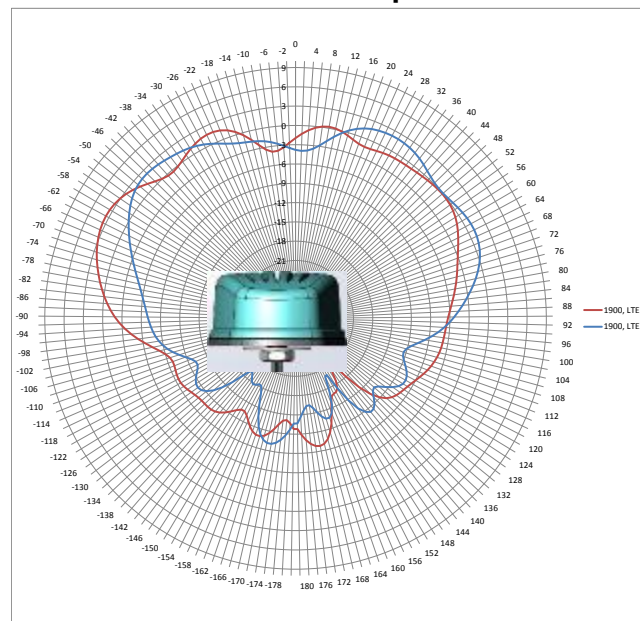
PART NUMBER: GPSMB401, GPSMB402, GPSMB401R, GPSMB402R

CHARTS

LTE antenna radiation pattern at 1900MHz with 2ft metal plate and 4inch cables



Horizontal plot



Vertical plot front view

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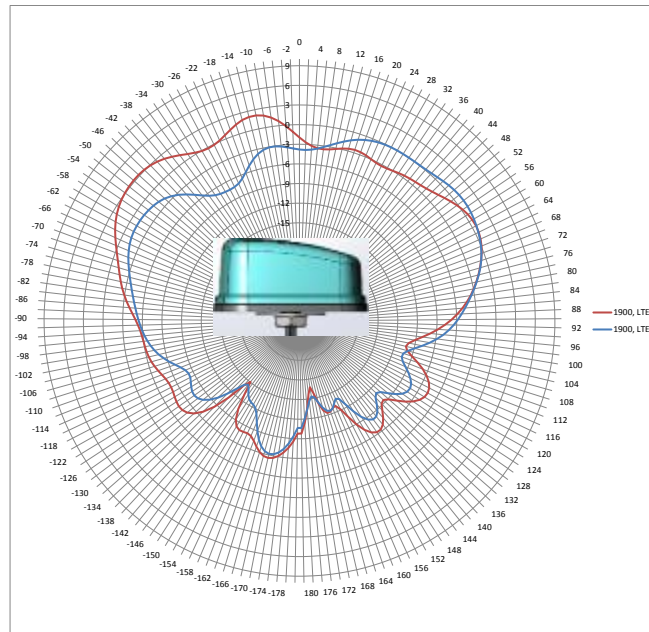
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CHARTS

LTE antenna radiation pattern at 1900MHz with 2ft metal plate and
4inch cables



Vertical plot side view

Issue: 1823

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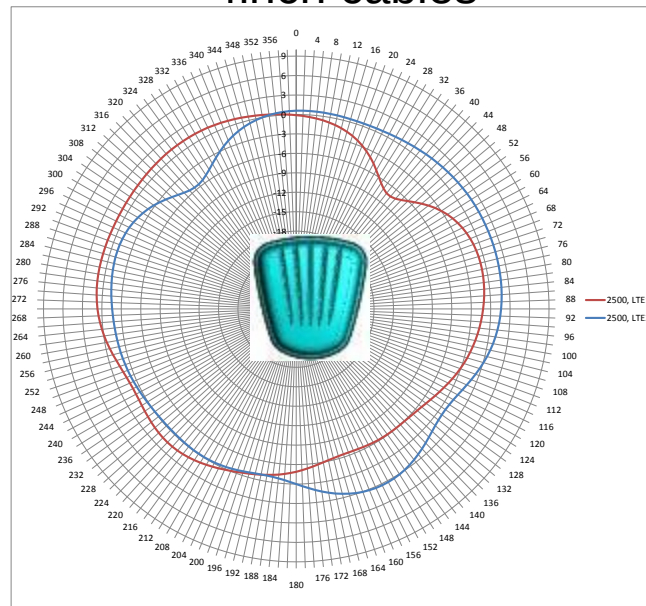
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Series: Panther

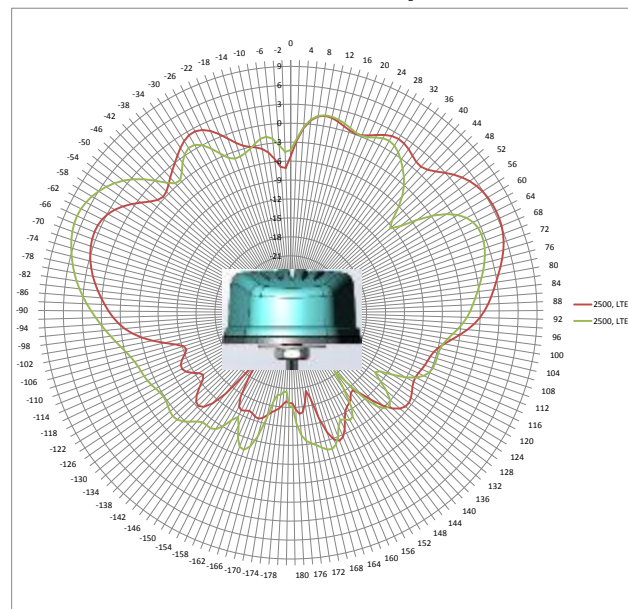
PART NUMBER: GPSMB401, GPSMB402, GPSMB401R, GPSMB402R

CHARTS

LTE antenna radiation pattern at 2500MHz with 2ft metal plate and 4inch cables



Horizontal plot



Vertical plot front view

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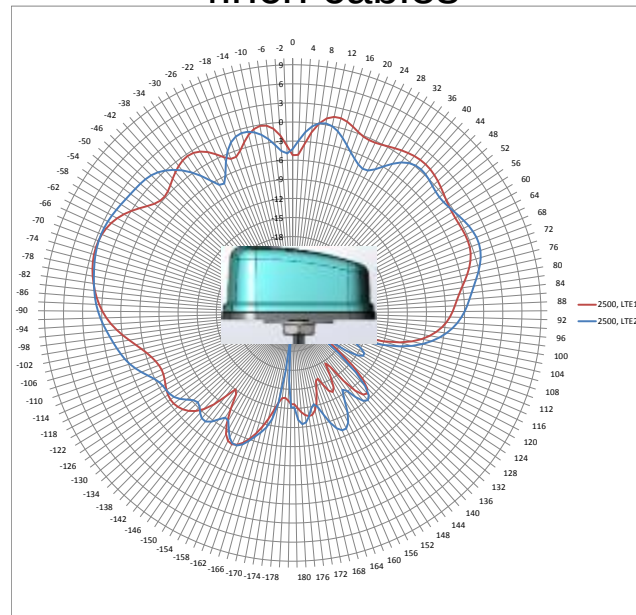
Description: MiMo LTE, WiFi, GNSS Vehicle Mount Antenna

Series: Panther

PART NUMBER: GPSMB401, GPSMB402, GPSMB401R, GPSMB402R

CHARTS

LTE antenna radiation pattern at 2500MHz with 2ft metal plate and 4inch cables



Vertical plot side view

Issue: 1823

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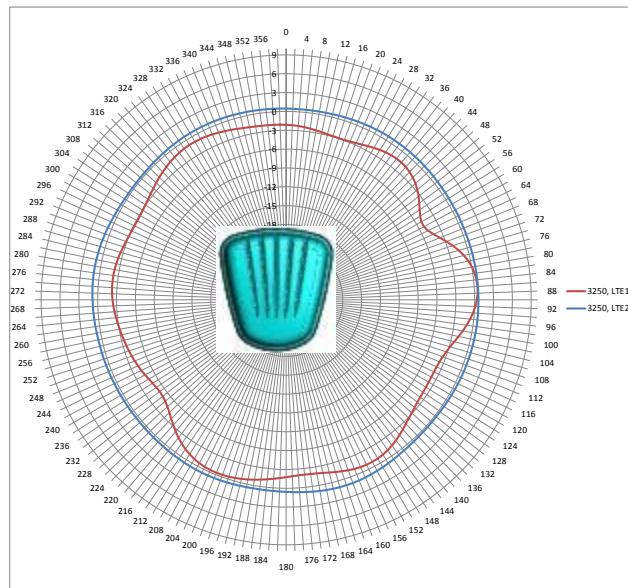
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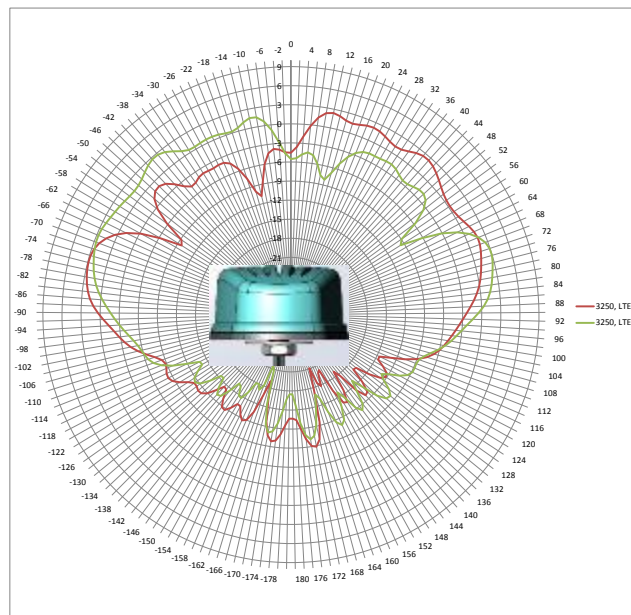
PART NUMBER: GPSMB401, GPSMB402, GPSMB401R, GPSMB402R

CHARTS

LTE antenna radiation pattern at 3250MHz with 2ft metal plate and 4inch cables



Horizontal plot



Vertical plot front view

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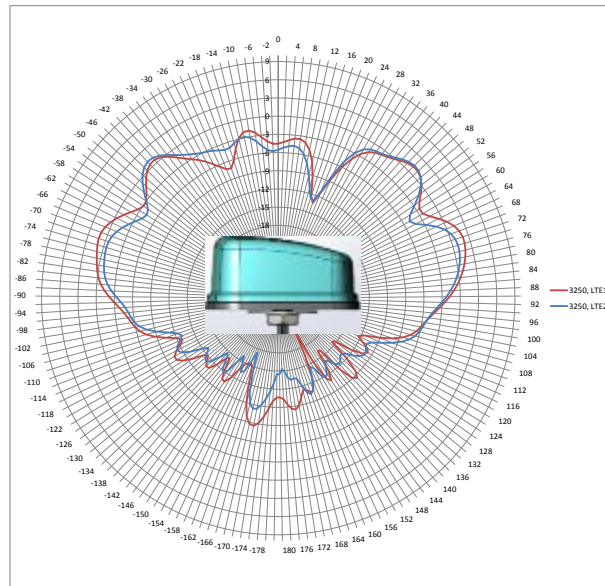
Description: MiMo LTE, WiFi, GNSS Vehicle
Mount Antenna

Series: Panther

PART NUMBER: GPSMB401, GPSMB402, GPSMB401R,
GPSMB402R

CHARTS

LTE antenna radiation pattern at 3250MHz with 2ft metal plate and
4inch cables



Vertical plot side view

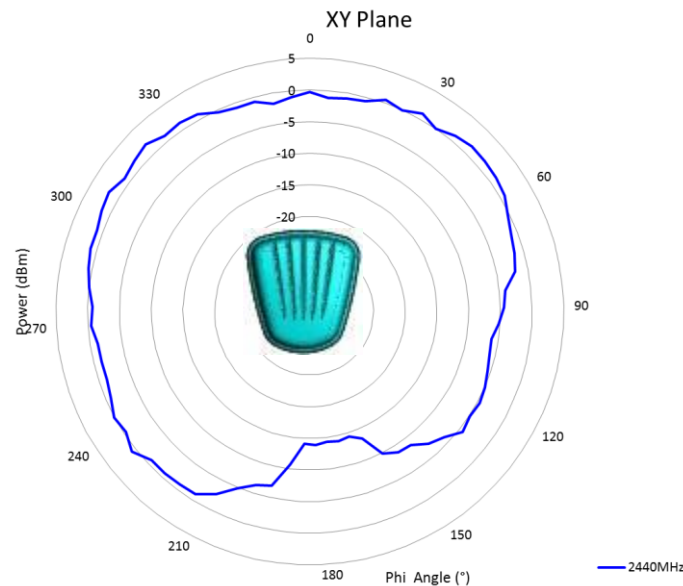
Description: MiMo LTE, WiFi, GNSS Vehicle Mount Antenna

Series: Panther

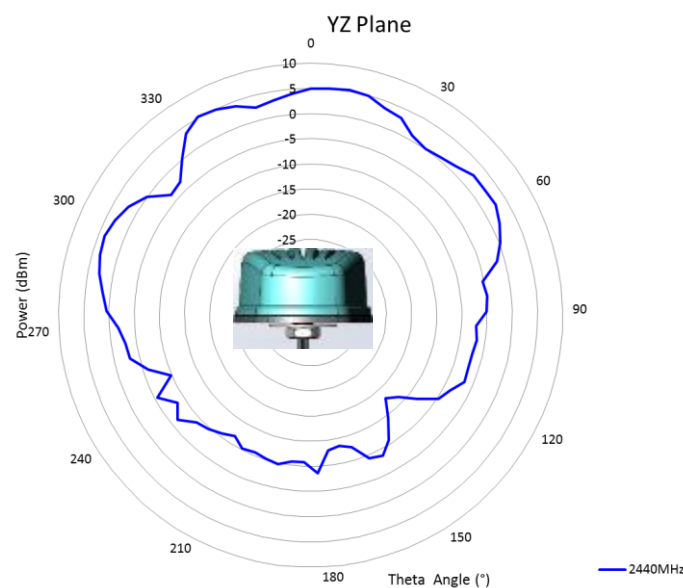
PART NUMBER: GPSMB401, GPSMB402, GPSMB401R, GPSMB402R

CHARTS

WiFi antenna radiation pattern at 2440MHz with 2ft metal plate and 4inch cables



Horizontal plot



Vertical plot front view

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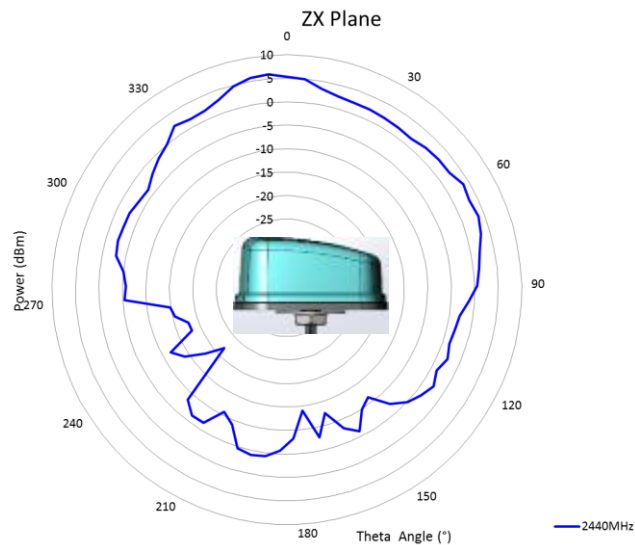
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Mount Antenna

Series: Panther

PART NUMBER: GPSMB401, GPSMB402, GPSMB401R,
GPSMB402R

CHARTS

WiFi antenna radiation pattern at 2440MHz with 2ft metal plate and
4inch cables



Vertical plot side view

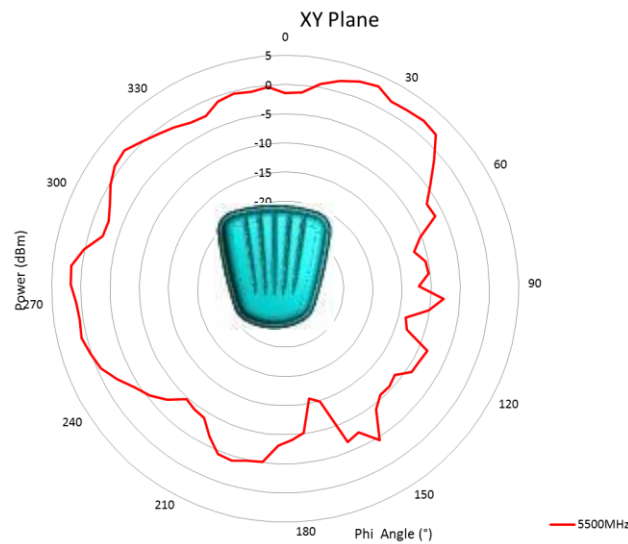
Description: MiMo LTE, WiFi, GNSS Vehicle Mount Antenna

Series: Panther

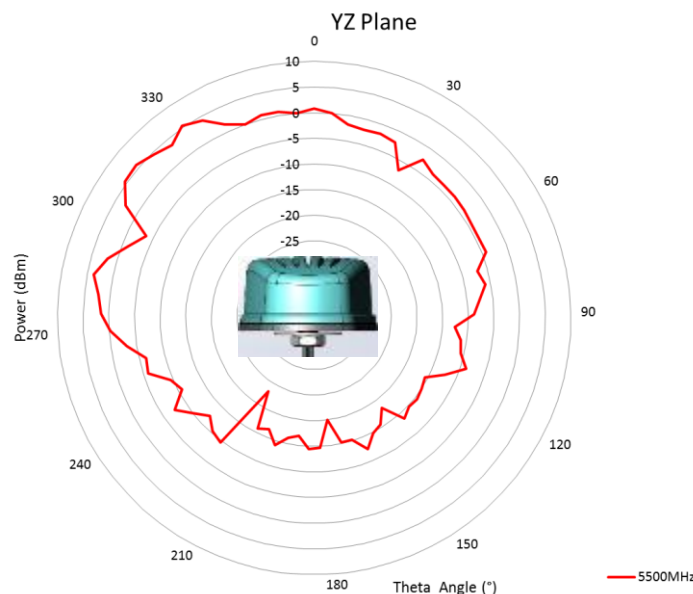
PART NUMBER: GPSMB401, GPSMB402, GPSMB401R, GPSMB402R

CHARTS

WiFi antenna radiation pattern at 5500MHz with 2ft metal plate and 4inch cables



Horizontal plot



Vertical plot front view

Issue: 1823

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

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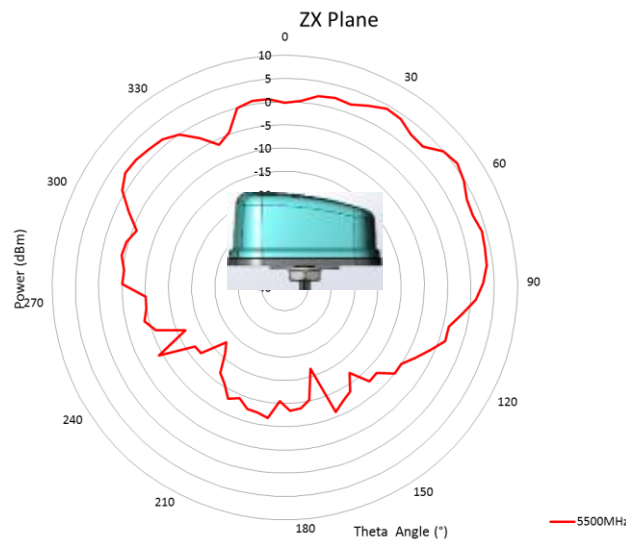
Description: MiMo LTE, WiFi, GNSS Vehicle
Mount Antenna

Series: Panther

PART NUMBER: GPSMB401, GPSMB402, GPSMB401R,
GPSMB402R

CHARTS

WiFi antenna radiation pattern at 5500MHz with 2ft metal plate and
4inch cables



Vertical plot side view

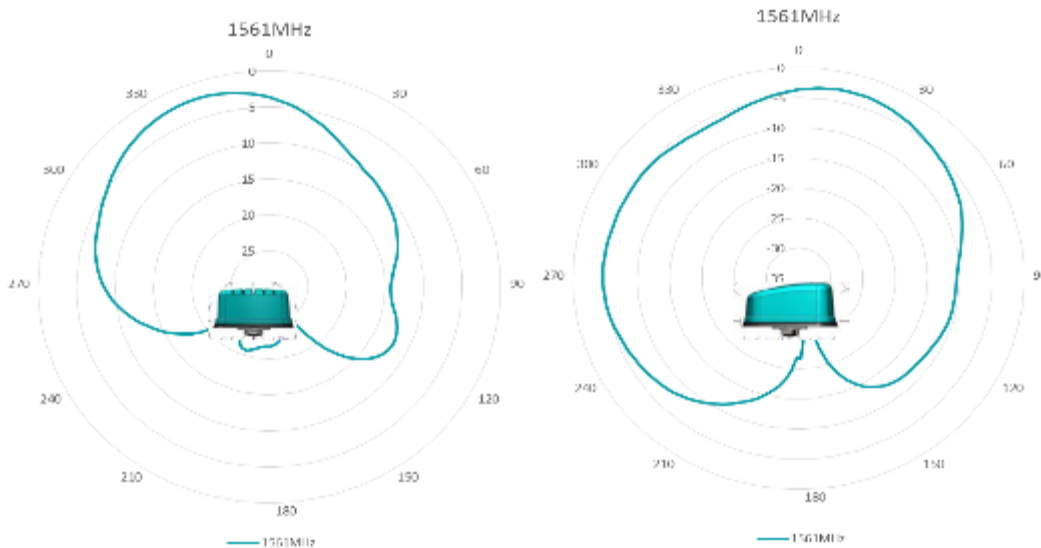
Description: MiMo LTE, WiFi, GNSS Vehicle Mount Antenna

Series: Panther

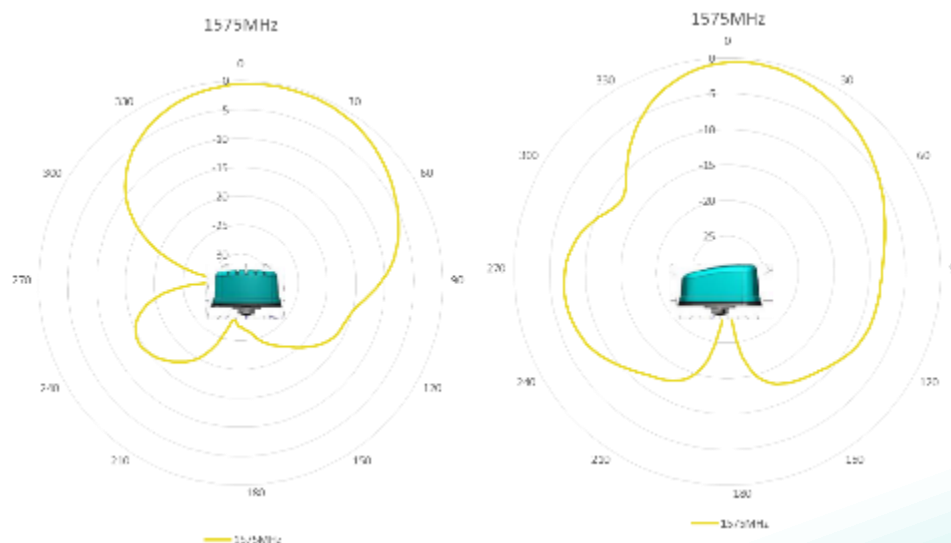
PART NUMBER: GPSMB401, GPSMB402, GPSMB401R, GPSMB402R

CHARTS

BD2 RHCP patterns, measured with 4inch cables in free space



GPS & Galileo RHCP patterns, measured with 4inch cables in free space



Issue: 1823

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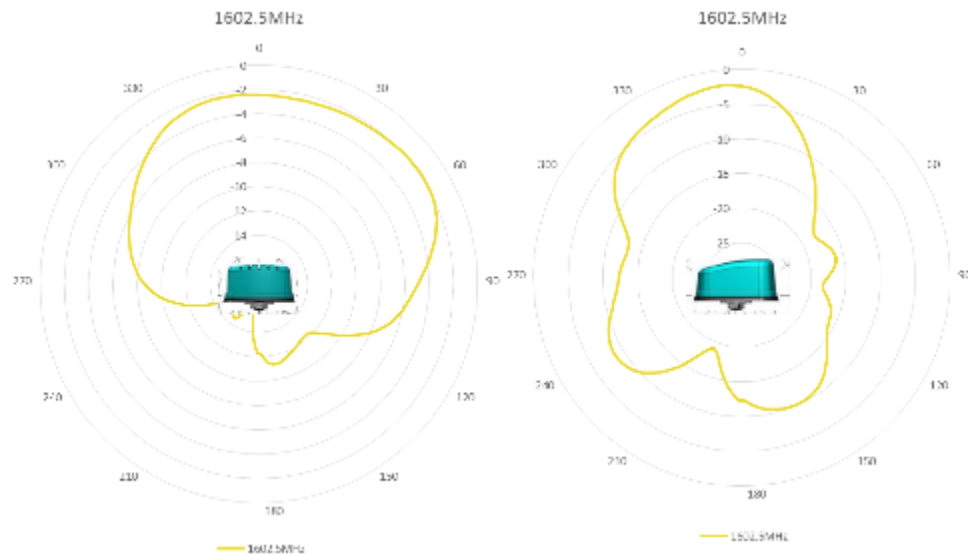
Description: MiMo LTE, WiFi, GNSS Vehicle Mount Antenna

Series: Panther

PART NUMBER: GPSMB401, GPSMB402, GPSMB401R, GPSMB402R

CHARTS

GLONASS RHCP patterns, measured with 4inch cables in free space



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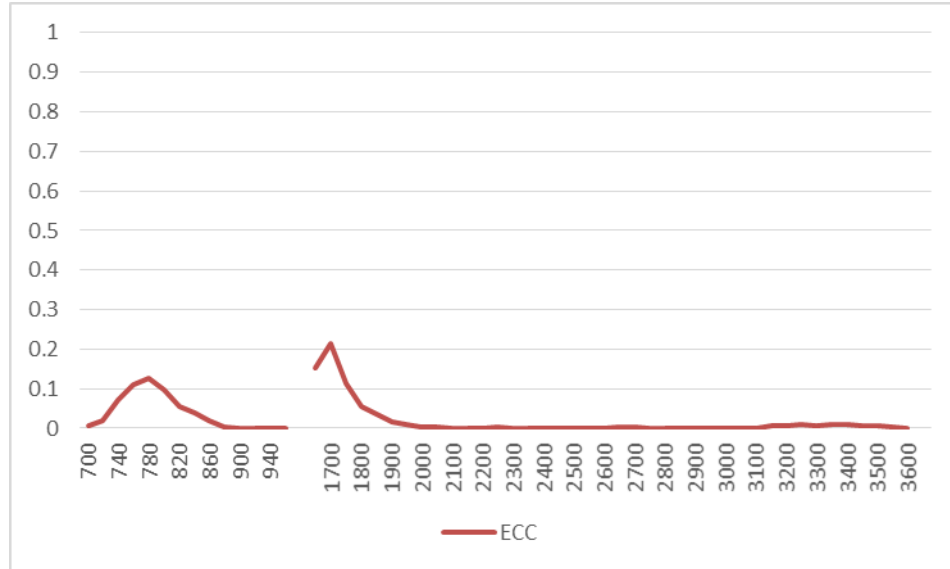
Description: MiMo LTE, WiFi, GNSS Vehicle
Mount Antenna

Series: Panther

PART NUMBER: GPSMB401, GPSMB402, GPSMB401R,
GPSMB402R

CHARTS

Envelope correlation coefficient – LTE 1 to LTE 2



Series: Panther

Description: MiMo LTE, WiFi, GNSS Vehicle
Mount Antenna

PART NUMBER: GPSMB401, GPSMB402, GPSMB401R,
GPSMB402R

PACKAGING

One antenna pack in one PE bag, 6 pcs antennas in one box