

**Description: MiMo LTE, GNSS Vehicle Mount  
Antenna**

**Series: Panther**

**PART NUMBER: GPSMB301, GPSMB302, GPSMB301R,  
GPSMB302R**



**Features:**

- Supports LTE 698-960/1695-2170/2300-2700/2900-3600MHz(MIMO)
- Supports Beidou, GPS, Galileo, GLONASS
- Direct Mount and optional Magnetic Mount features
- See GPSMBMM for magnetic mount details

**Applications:**

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

All dimensions are in mm / inches

Issue: 1823

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For more information:

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12220 World Trade Drive  
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Tel: 1-858-674-8100

Pulse/Larsen Antennas  
18110 SE 34<sup>th</sup> St Bldg 2 Suite 250  
Vancouver, WA 98683  
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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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**This document covers all product variants of the following product family**

Model No.	Color	Remark
GPSMB301	Black	
GPSMB302	White	
GPSMB301R	Black	Compliant with EN 50155, EN 61373, EN45545-2, railroad application.
GPSMB302R	White	Compliant with EN 50155, EN 61373, EN45545-2, railroad application.

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**ELECTRICAL SPECIFICATIONS**

Frequency (LTE)	698 – 960 / 1695 - 2170 / 2300 – 2700 / 2900 - 3600	MHz
Frequency (Beidou, GPS, Galileo, Glonass)	1561.098 ± 2.046/ 1575.42 ± 1.023/ 1602.5625 ± 4	MHz
Nominal Impedance	50	Ω
VSWR (LTE)	< 1.5	
Gain* (LTE antenna, < 2170 MHz)	6	dBi ± 1 dB
Gain* (LTE antenna, > 2170 MHz)	5.5	dBi ± 1 dB
Isolation LTE to LTE**	15 or better	dB
GNSS antenna RHCP gain	1	dBic ± 2dB
LNA gain	30	dB ± 2 dB
Noise Figure	2.5 (cascade)	dB
Current	8	mA ± 2 mA
V <sub>dc</sub>	3-5	V <sub>dc</sub>
LNA and filter attenuation		
	@ 824 MHz	70 dB
	@ 960 MHz	65 dB
	@ 1710 MHz	60 dB
	@ 2170 MHz	65 dB
Connector type	SMA	
Cable type(s)	RG-58 (LTE) / RG-174 (GPS)	
Length	17	Feet

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

\*\*In free space with 17ft cables

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**MECHANICAL SPECIFICATIONS**

Plastic radome for GPSMB301/GPSMB302	ABS/PC Material UV Stabilized, UL-94HB
for GPSMB301R/GPSMB302R	PC material, EN45545 R6 HL3 compliant
Color	Black, White
Ingress Protection	IP67
Weight	~940 g
Mounting	Direct or Magnetic options

**ENVIRONMENTAL SPECIFICATIONS**

Operating temperature	-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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**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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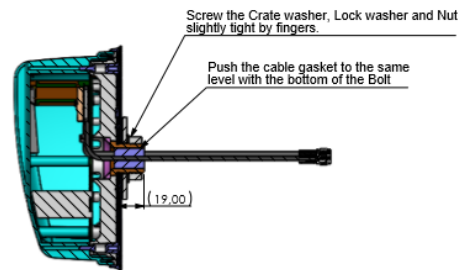
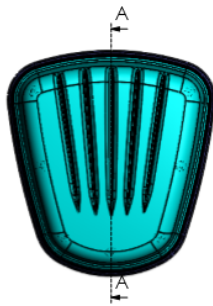
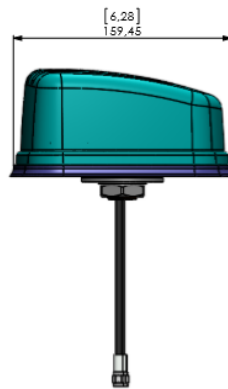
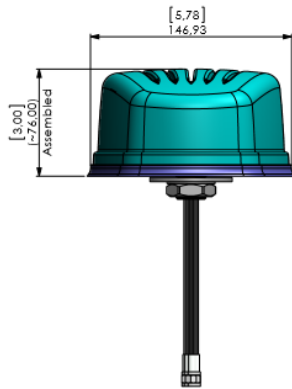


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### MECHANICAL DRAWING



Tolerances of linear dimensions (MEDIUM ISO 2768-m)	
Dimension	Tolerance
0.5 - 3	±0.1
3 - 6	±0.1
6 - 30	±0.2
30 - 120	±0.3
120 - 400	±0.5
400 - 1000	±0.8
1000 - 2000	±1.2
2000 - 4000	±2

For more details see ISO 2768-m  
Tolerances of linear dimensions (MEDIUM ISO 2768-m)

Tolerances of angular dimensions (MEDIUM ISO 2768-m)	
Dimension of chamfer side (millimeter)	Tolerance
up to 10	±1°
10 - 30	±0°30'
30 - 120	±0°20'
120 - 400	±0°15'
over 400	±0°12'

For more details see ISO 2768-m  
Tolerances of angular dimensions (MEDIUM ISO 2768-m)

Tolerances of radii and chamfers (MEDIUM ISO 2768-m)	
Radius, chamfer height	Tolerance
0.5 - 3	±0.2
3 - 6	±0.5
over 6	±1

For more details see ISO 2768-m  
Tolerances of radii and chamfers (MEDIUM ISO 2768-m)

No riveting craters allowed to use.

Functional Characteristics by:  
Process capability studies required, total 0 pcs.  
Process capability studies required and ongoing statistical process control required, total 0 pcs.

Please follow Pulse limits of hazardous substances (RoHS, halogens) in the document Pulse Hazardous Substances (HS) Limits and Vehicle Safety Substances Material Composition (VSM-24-0002).

Matr.	Application
P01	Cable Tie around GPS updated.
A	A-Release.

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Product: GPSMB301  
Item Name: Antenna Assembly

Sheet number	2/2		
General tolerance			
Customer number			
Date	12.03.2015		
Drawn	Jukka		
Check			
Appr.			
Scale	1:2 (A2)		
Document number	GPSMB301	Part Version	Document Version
		A	A
Issued	18.09.2015	Drawn	Jukka
Modified	02.07.2015	Drawn	Jukka
		Mod	

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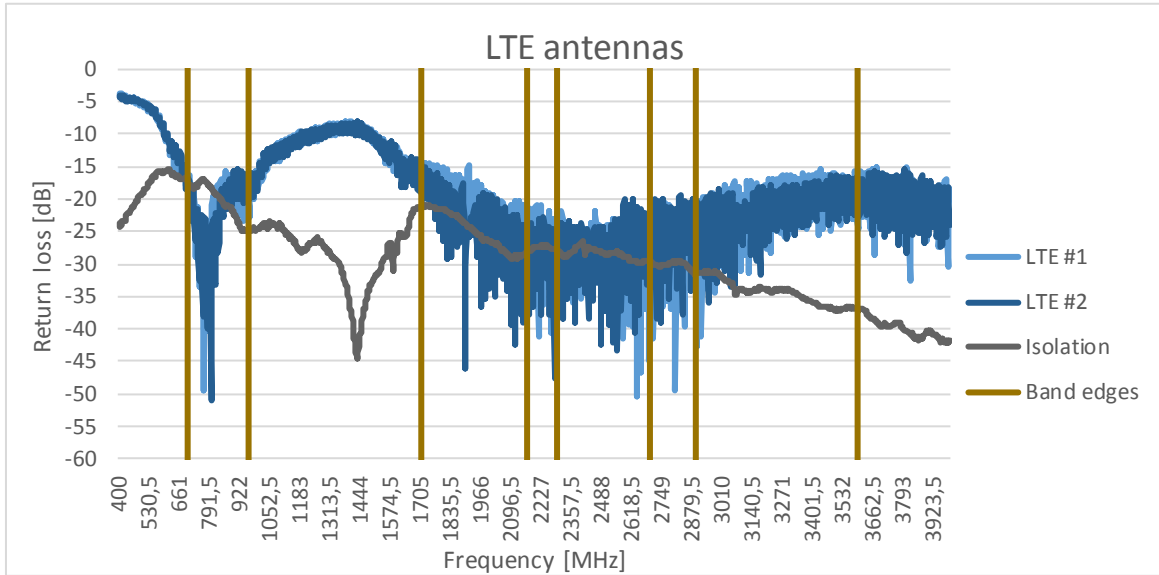
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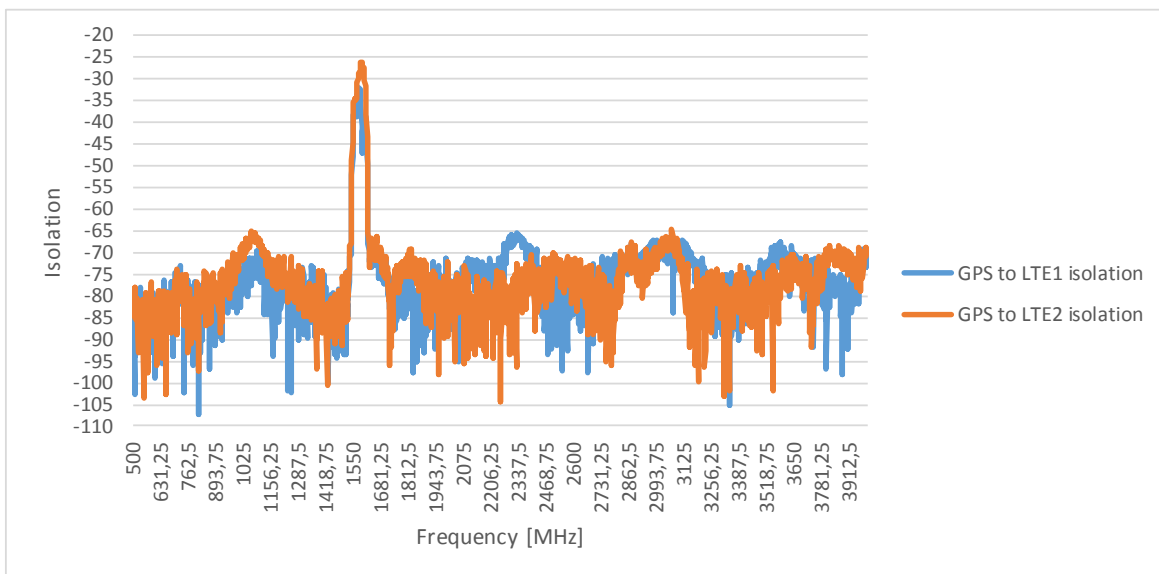
PART NUMBER: GPSMB301, GPSMB302, GPSMB301R, GPSMB302R

CHARTS

Return loss and isolation in free space, LTE antennas\*\*



GNSS isolation to LTE 1 and LTE 2 antenna\*



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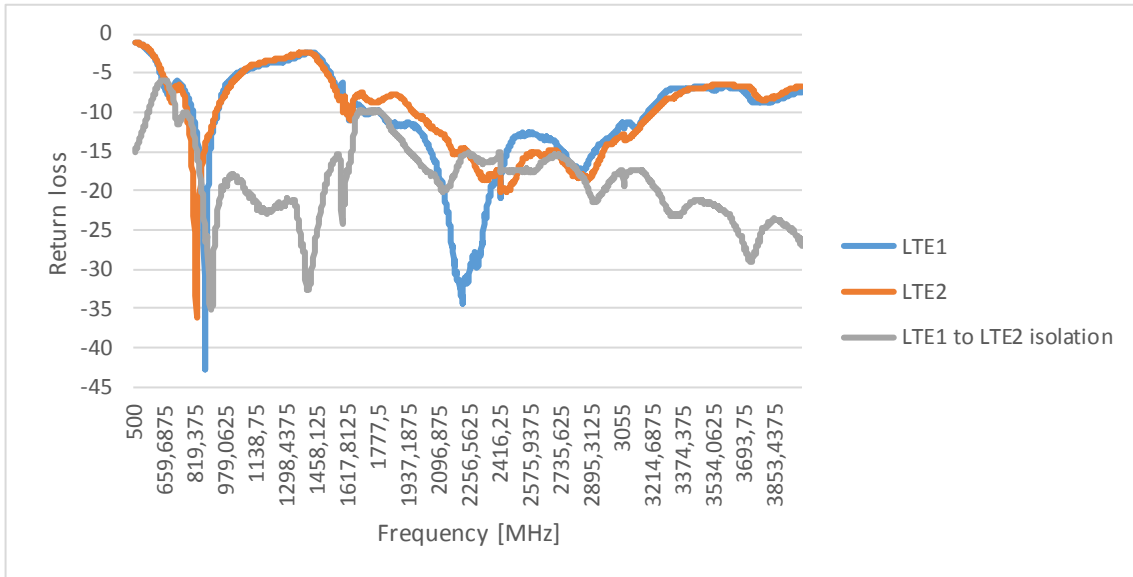
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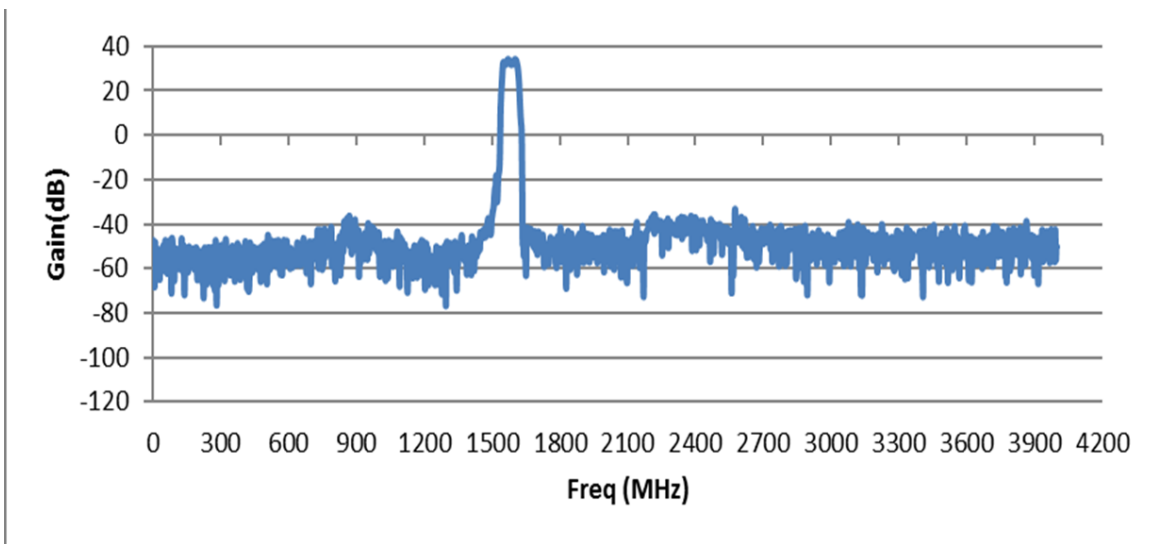
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**CHARTS**

Return loss and isolation, LTE antennas\*



GNSS LNA performance



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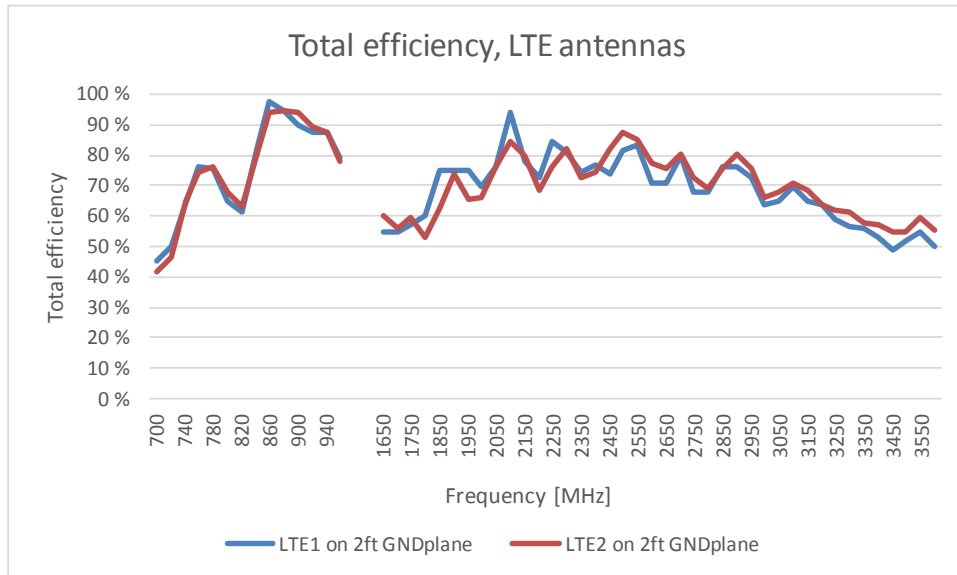
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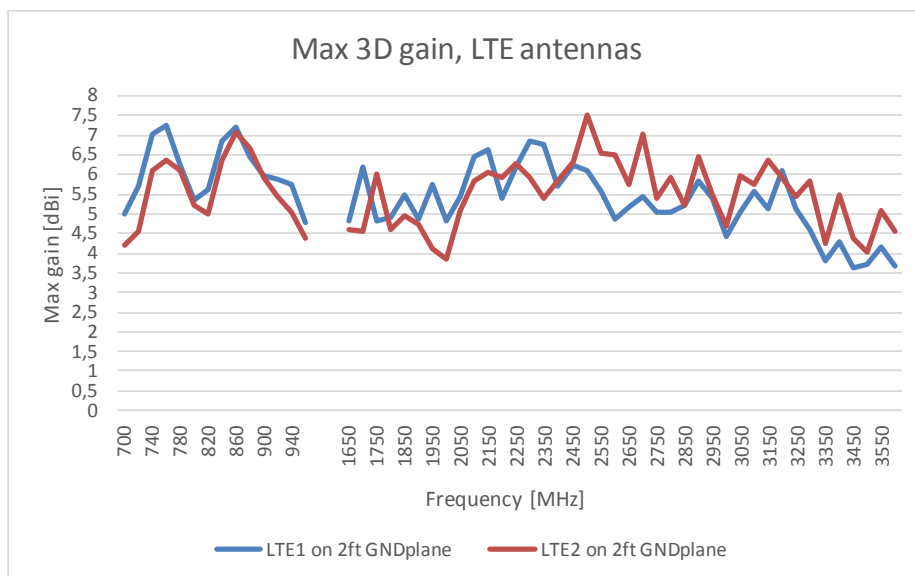
**PART NUMBER: GPSMB301, GPSMB302, GPSMB301R, GPSMB302R**

**CHARTS**

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



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



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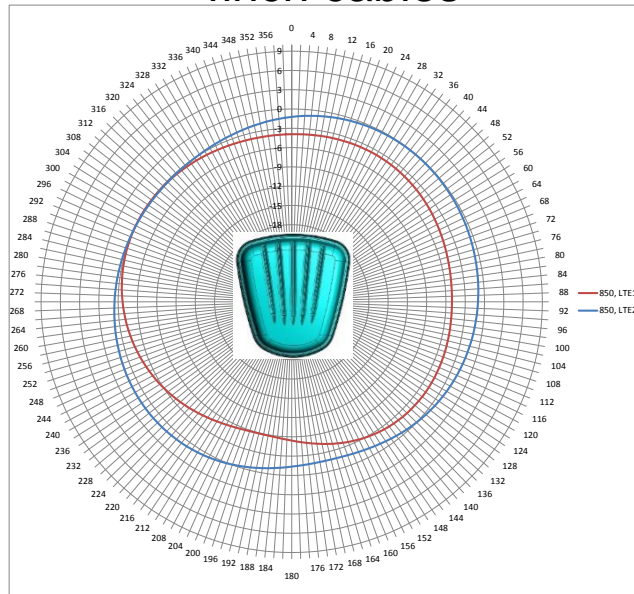
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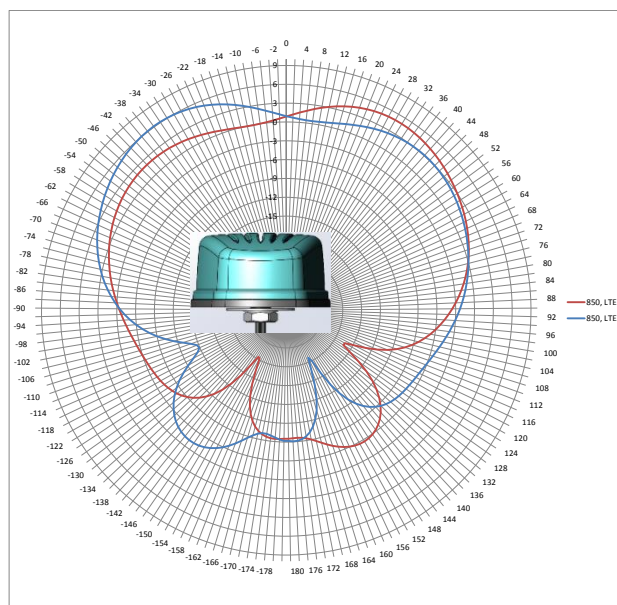
**PART NUMBER: GPSMB301, GPSMB302, GPSMB301R, GPSMB302R**

**CHARTS**

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



Horizontal plot



Vertical plot front view

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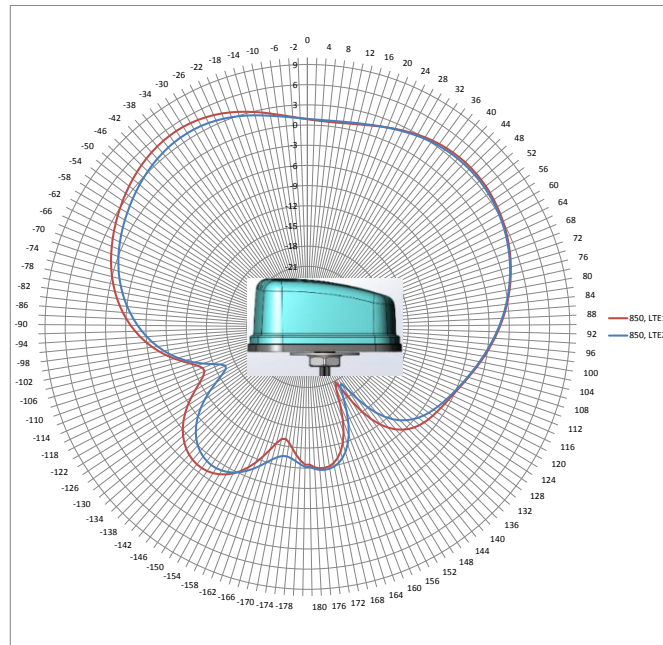
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**CHARTS**

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



Vertical plot side view

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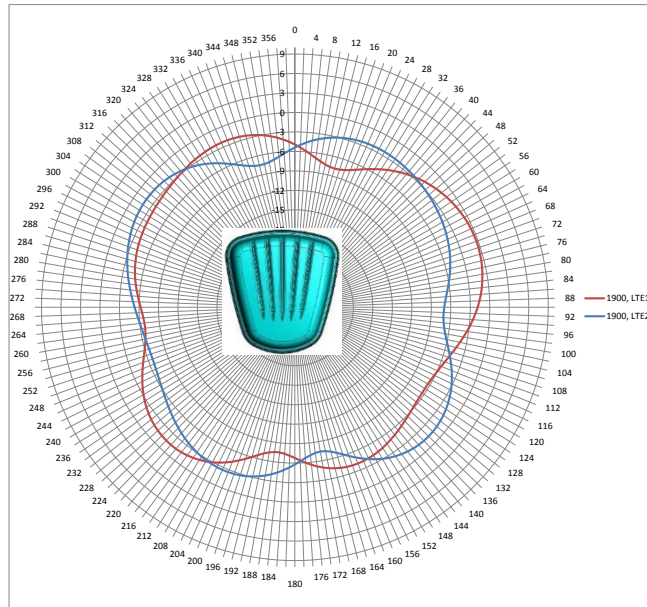
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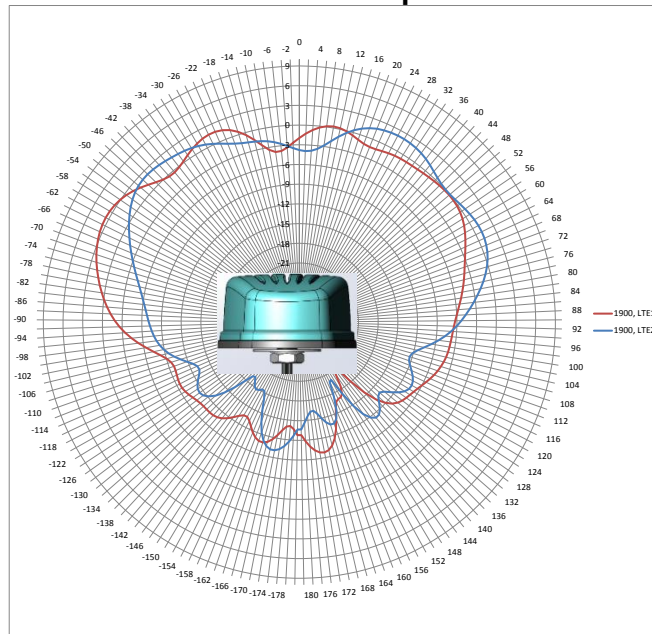
**PART NUMBER: GPSMB301, GPSMB302, GPSMB301R, GPSMB302R**

**CHARTS**

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



Horizontal plot



Vertical plot front view

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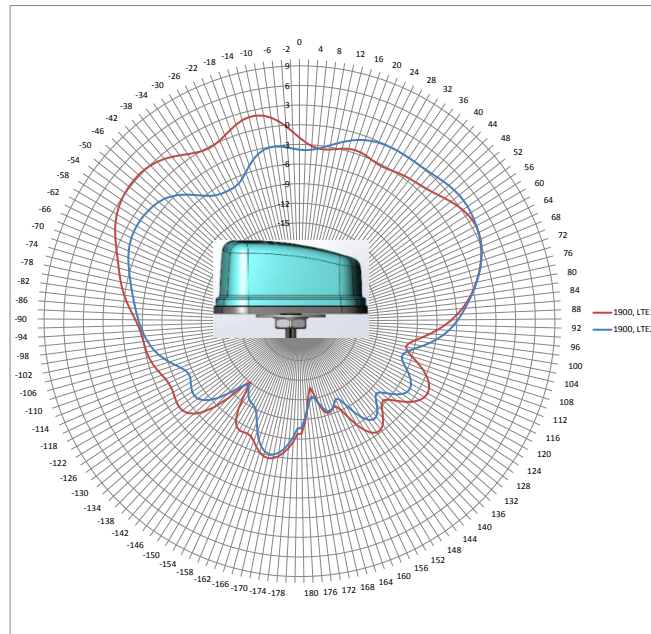
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**CHARTS**

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



Vertical plot side view



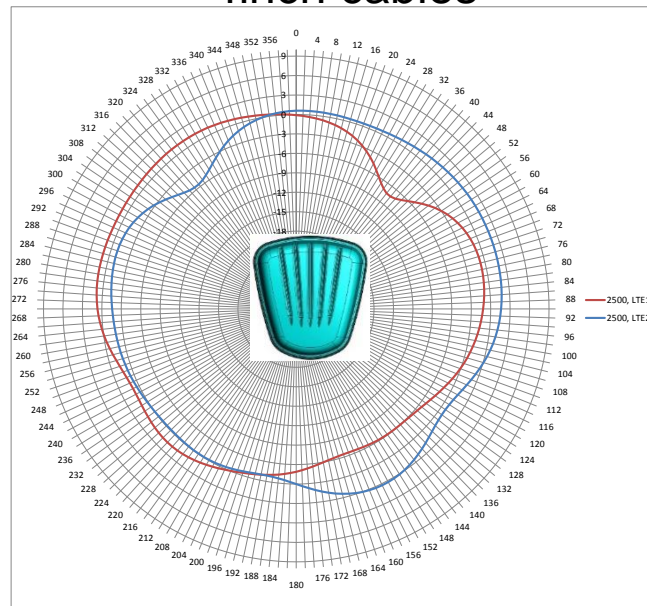
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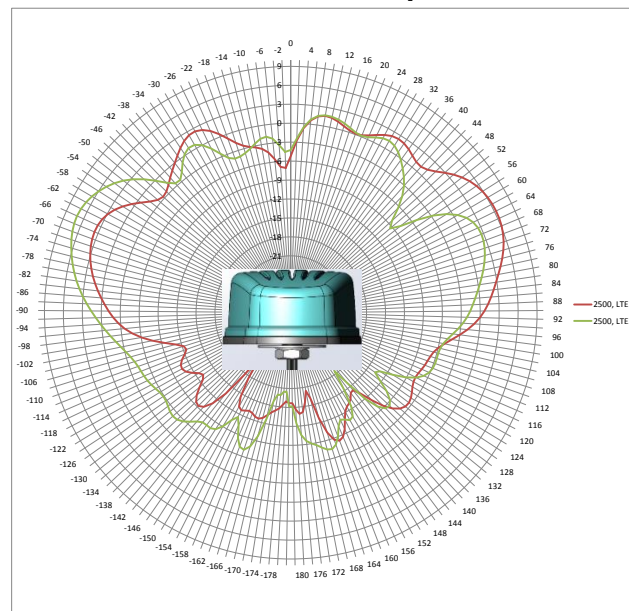
**PART NUMBER: GPSMB301, GPSMB302, GPSMB301R,  
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**CHARTS**

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



**Horizontal plot**



**Vertical plot front view**

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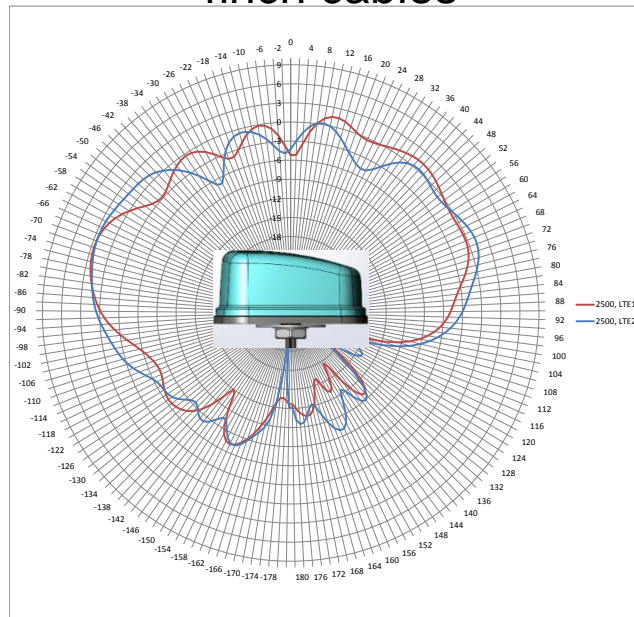
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**CHARTS**

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



Vertical plot side view

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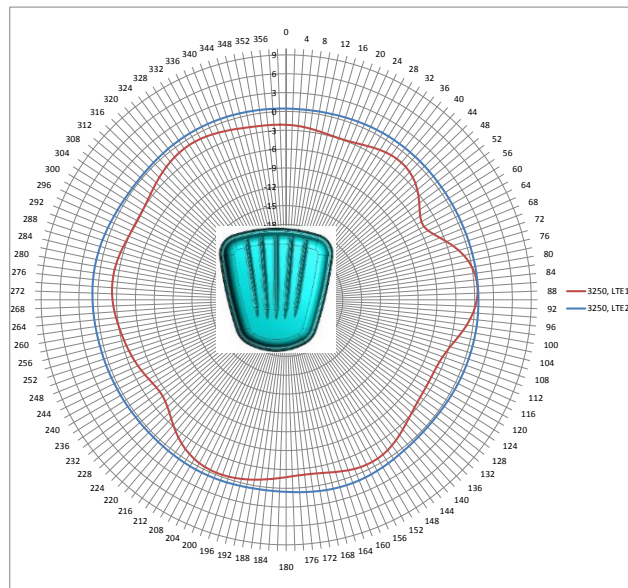
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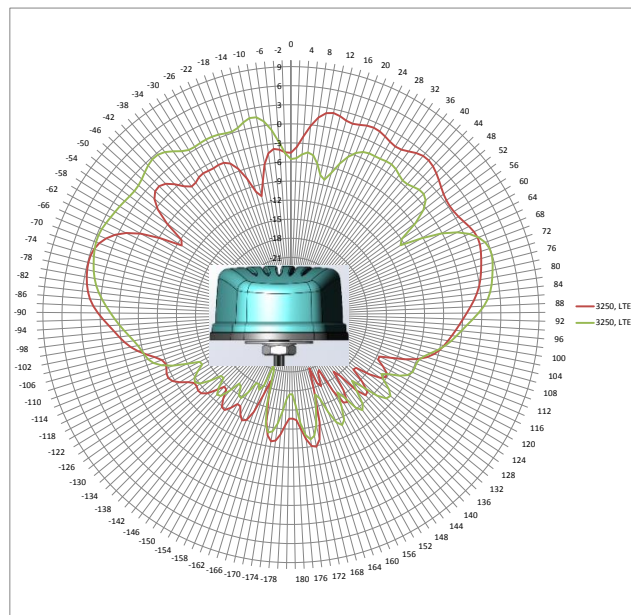
**PART NUMBER: GPSMB301, GPSMB302, GPSMB301R, GPSMB302R**

**CHARTS**

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



Horizontal plot



Vertical plot front view

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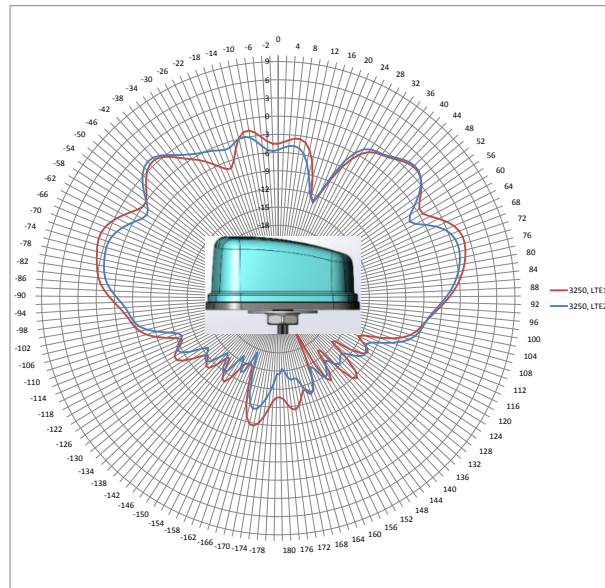
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**PART NUMBER: GPSMB301, GPSMB302, GPSMB301R,  
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**CHARTS**

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



**Vertical plot side view**

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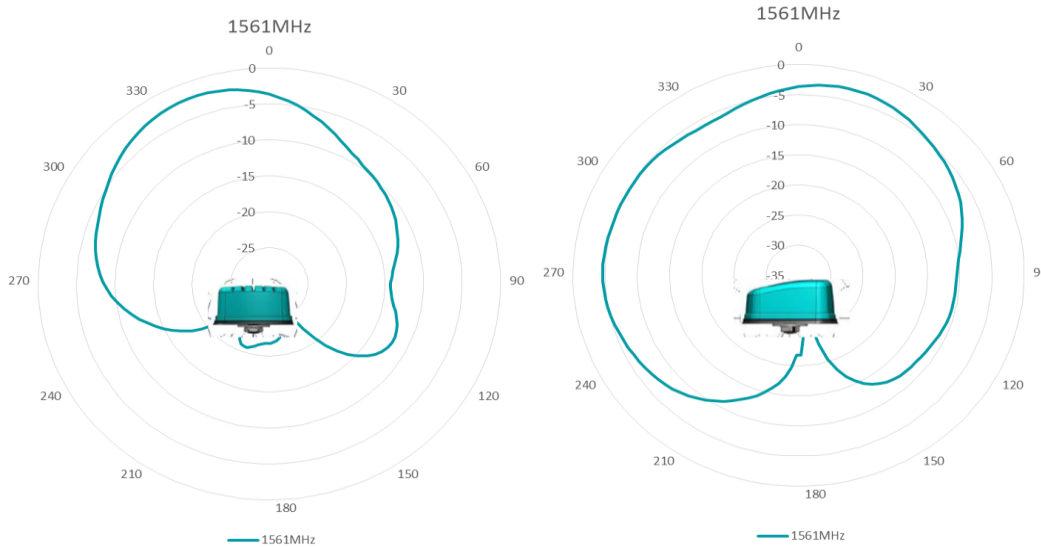
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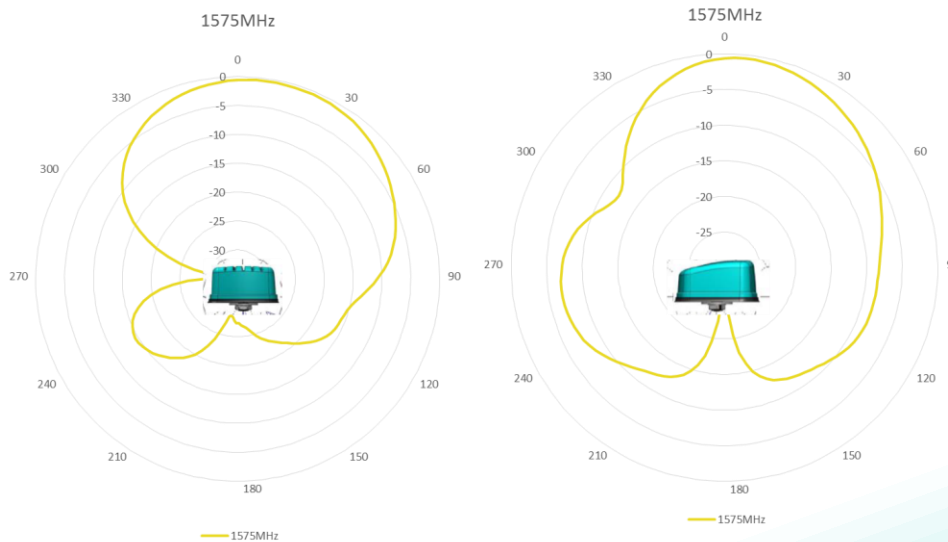
**PART NUMBER: GPSMB301, GPSMB302, GPSMB301R, GPSMB302R**

**CHARTS**

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



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



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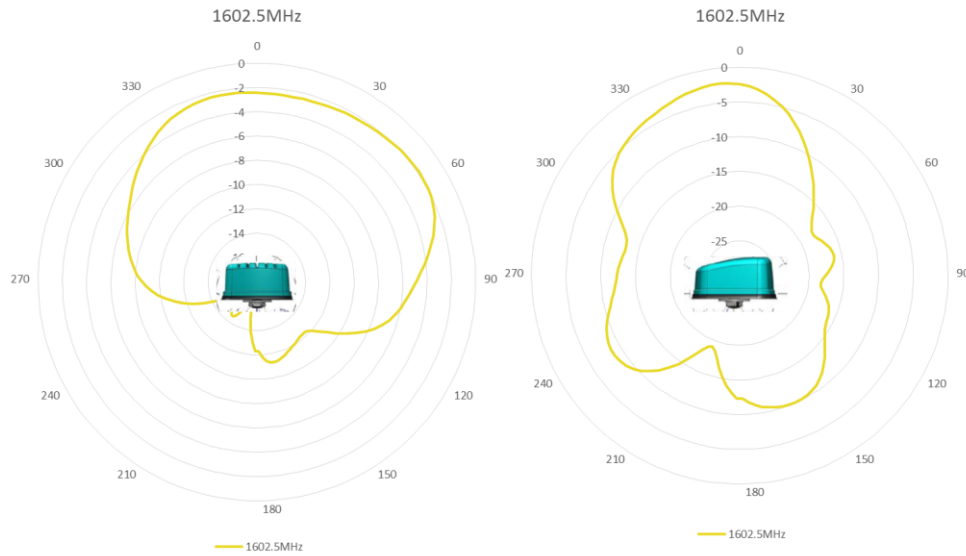
**Description: MiMo LTE, GNSS Vehicle Mount Antenna**

**Series: Panther**

**PART NUMBER: GPSMB301, GPSMB302, GPSMB301R, GPSMB302R**

**CHARTS**

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



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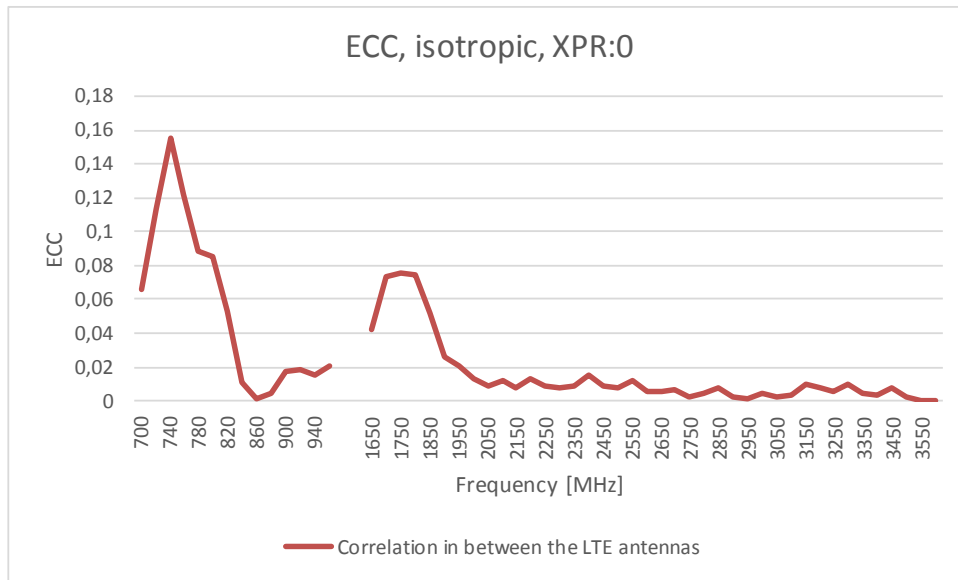
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**CHARTS**

**Envelope correlation coefficient - LTE 1 to LTE 2**



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**Description: MiMo LTE, GNSS Vehicle Mount  
Antenna**

**Series: Panther**

**PART NUMBER: GPSMB301, GPSMB302, GPSMB301R,  
GPSMB302R**

## PACKAGING

One antenna pack in one PE bag, 6 antennae in one box