

TECHNICAL DATA SHEET Description: 2X LTE, 2XWiFi Vehicular Antenna

# Series: Low Profile MB

## PART NUMBER: LPMB40X





#### All dimensions are in mm / inches

#### Issue: 1922

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 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



# Applications:

- Vehicle mount multiband antenna
- High Speed LTE data and WiFi
- Fleet management
- Utility Vans (Gas, Water, Electricity)

# Features:

- 2xMiMo 698-960/1710-2690MHz
- WiFi 2400-2500/4900-5900MHz
- Size 145x135x25mm
- Adhesive mount on plastic and glass fiber surfaces
- Mounting accessory for metallic surfaces



теснысаь рата sнеет Description: 2X LTE, 2XWiFi Vehicular Antenna

Series: Low Profile MB

### PART NUMBER: LPMB40X

### **ELECTRICAL SPECIFICATIONS**

LTE Antenna	
Frequency	698-960/1710-2690 MHz
Nominal Impedance	50 Ω
VSWR(*)	2.5 Max
Average Efficiency(698-960MHz)(**)	64 %
Average Efficiency(1710-2690MHz) (**)	57 %
Peak Gain(698-960MHz) (**)	2.0 dBi
Peak Gain(1710-2690MHz) (**)	4.4 dBi
WIFI Antenna	
Frequency	2400-2500/4900-5900 MHz
Nominal Impedance	50 Ω
VSWR (*)	2 Max
Average Efficiency(2400-2500MHz) (**)	63 %
Average Efficiency(4900-5900MHz) (**)	73 %
Peak Gain(2400-2500MHz) (**)	3.5 dBi
$1 \text{ Car Call (2+00-2500 \text{ Will (2) ( )})}$	
Peak Gain(4900-5900MHz) (**)	4.7 dBi

\* Measured on 500mm ground plane with LMR195 3m cable \*\* Measured on 500mm ground plane with LMR195 320mm cable

Issue: 1922

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



2



**Description**: 2X LTE, 2XWiFi Vehicular

Series: Low Profile MB

Antenna

### PART NUMBER: LPMB40X

### MECHANICAL SPECIFICATIONS

Antenna P/N	Antenna Color / Material	Weight	Cable	and Connector type	Cable length	Mounting System	
			LTE-1	LMR195* SMA Male			
		607-	LTE-2	LMR195* SMA Male	3Meters /		
LPMB401		WiFi-1	LMR195* RP-SMA Male	118.11Inchs			
				WiFi-2	LMR195* RP-SMA Male		Adhesive Tape 3mmThick 3M VHB
	— SABIC PC943, Black		LTE-1	LMR195* SMA Male		4959	
LPMB405 492g W	LTE-2	LMR195* SMA Male	2Meters /				
		492g	WiFi-1	LMR195* RP-SMA Male	78.74Inchs		
			WiFi-2	LMR195* RP-SMA Male			

\* Or Equivalent

#### **ENVIRONMENTAL SPECIFICATIONS**

Operating Temperature Ingress Protection RoHS Compliant -40 ~ +85° C IP67 Yes

Issue: 1922

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







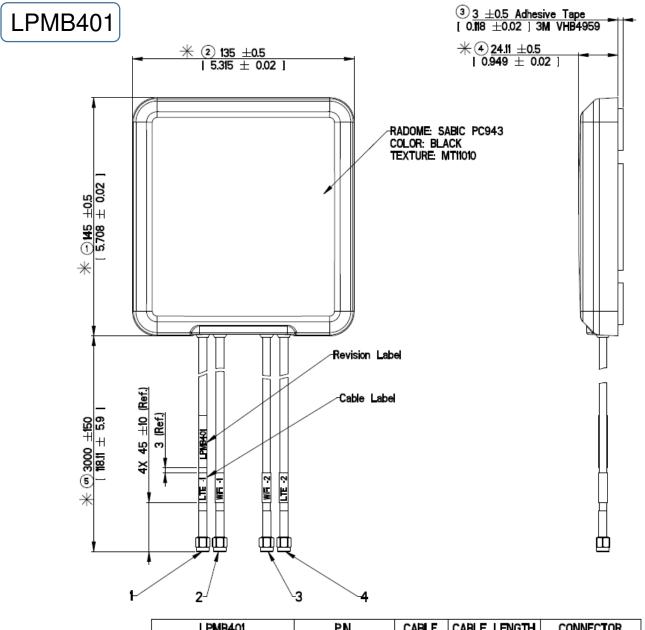
TECHNICAL DATA SHEET

Description: 2X LTE, 2XWiFi Vehicular

Antenna

#### PART NUMBER: LPMB40X

#### **MECHANICAL DRAWING**



LPMB401	PN	CABLE	CABLE LENGTH	CONNECTOR
1 LTE-1 Cable Assy	125-01188.001			SMA Male
2. WiFi-1 Cable Assy	125-01190.001	LMR-195+	3 Meters	RP-SMA Male
3. WiFi-2 Cable Assy	125-01191.001		9.84FT/118.11″	RP-SMA Male
4. LTE-2 Cable Assy	125-01189.001	]		SMA Male

OR EQUIVALENT

#### Issue: 1922

#### he right to make changes judged to be personal

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.



4

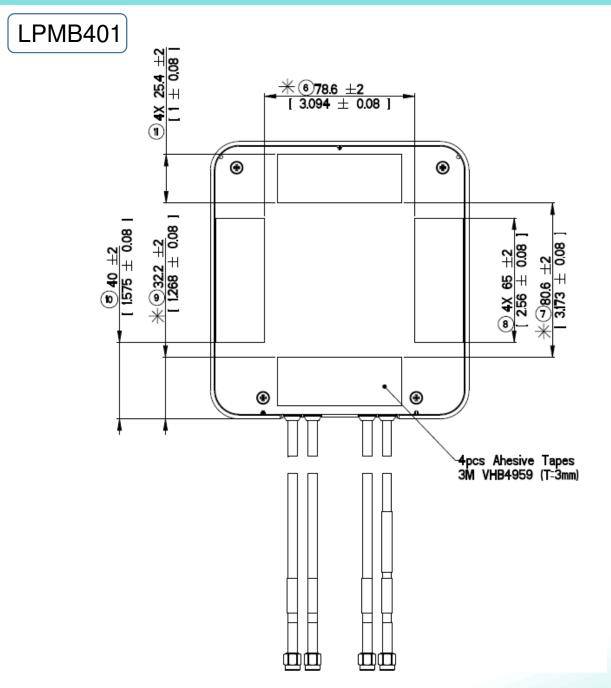


TECHNICAL DATA SHEET Description: 2X LTE, 2XWiFi Vehicular

Antenna

#### PART NUMBER: LPMB40X

## **MECHANICAL DRAWING**



Issue: 1922

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



5



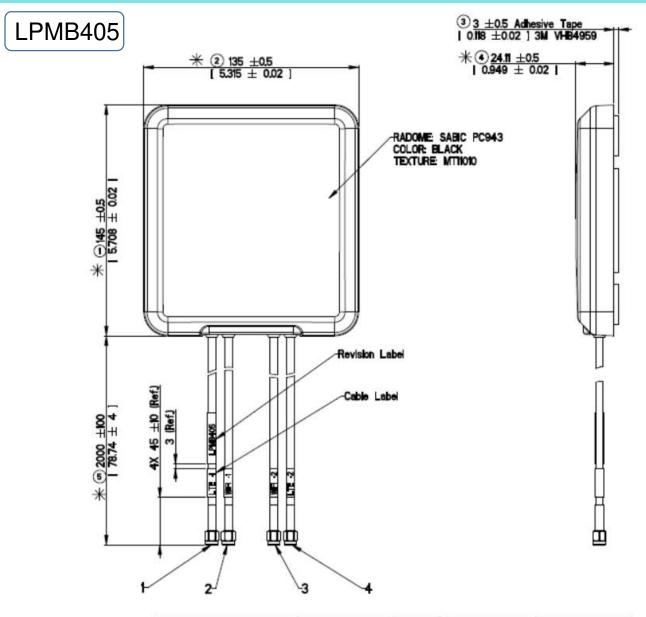
TECHNICAL DATA SHEET

Description: 2X LTE, 2XWiFi Vehicular

Antenna

#### PART NUMBER: LPMB40X

#### **MECHANICAL DRAWING**



LPMB405	P.N.	CABLE	CABLE LENGTH	CONNECTOR	
L LTE-1 Cable Assy	125-00436.001	- LMR-195*	2 Meters [78,747]	SMA Male	
2. WFi-1 Cable Assy	125-00438.001			RP-SMA Male	
3. WIFI-2 Cable Assy	125-00439.001			<b>RP-SMA Male</b>	
4. LTE-2 Cable Assy	125-00437.001			SMA Male	

· OR EQUIVALENT

#### Issue: 1922

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



6



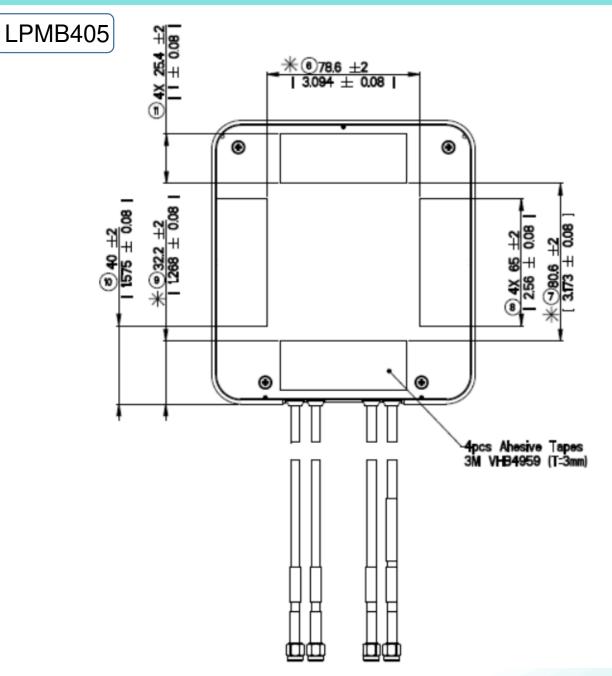
**Description**: 2X LTE, 2XWiFi Vehicular

Series: Low Profile MB

Antenna

### PART NUMBER: LPMB40X

#### **MECHANICAL DRAWING**



Issue: 1922

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



7



TECHNICAL DATA SHEET Description: 2X LTE, 2XWiFi Vehicular Antenna PART NUMBER: LPMB40X

### **TEST SETUP**

Below performance test in two situation

Situation 1 . Test in free space .

Situation 2. Test on 1 inch bracket with \$\$00mm (19.7inch) ground.

Situation 1



Free space

**Ground plane**  $\phi$  =500mm(19.7inch) Bracket height=1inch

Issue: 1922

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



8

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.

Situation 2



TECHNICAL DATA SHEET Description: 2X LTE, 2XWiFi Vehicular Antenna

Series: Low Profile MB

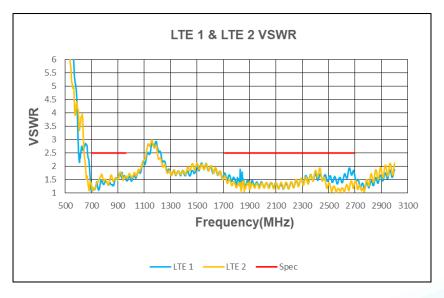
PART NUMBER: LPMB40X

### CHARTS

# Situation 1: Performance in free space



# LTE 1 & LTE 2 VSWR



#### Note : Measured with 3m cable

#### Issue: 1922

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



9

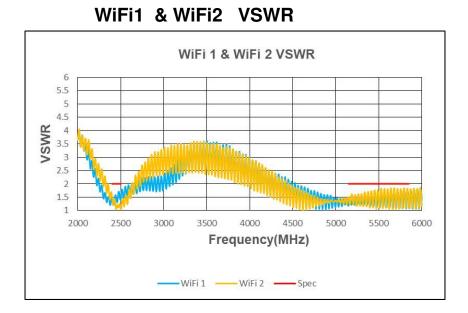


**Description**: 2X LTE, 2XWiFi Vehicular

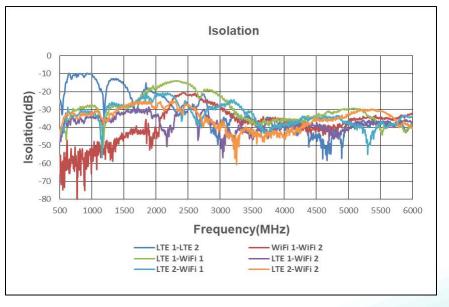
Antenna

#### PART NUMBER: LPMB40X

### CHARTS



Isolation



#### Note : Measured with 3m cable

#### Issue: 1922

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





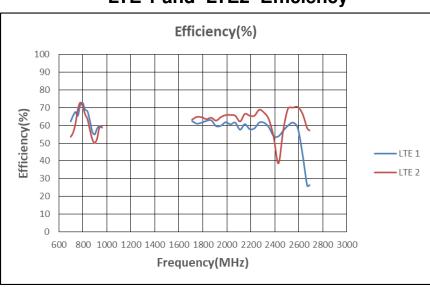
TECHNICAL DATA SHEET

Description: 2X LTE, 2XWiFi Vehicular

Antenna

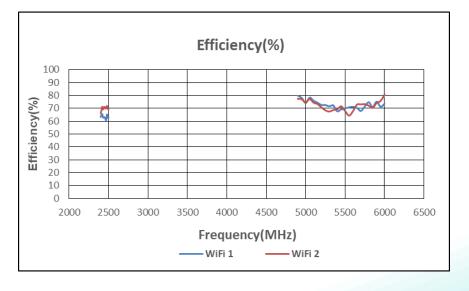
### PART NUMBER: LPMB40X

### CHARTS



#### LTE 1 and LTE2 Efficiency

WiFi 1 and WiFi 2 Efficiency



#### Note : Measured with 320mm cable

#### Issue: 1922

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



11



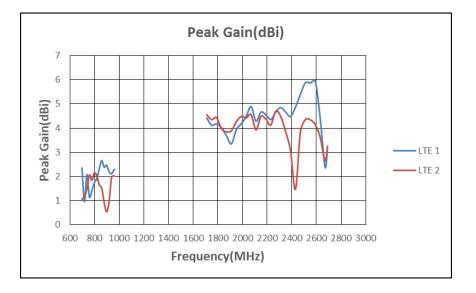
TECHNICAL DATA SHEET Description: 2X LTE, 2XWiFi Vehicular Antenna

Series: Low Profile MB

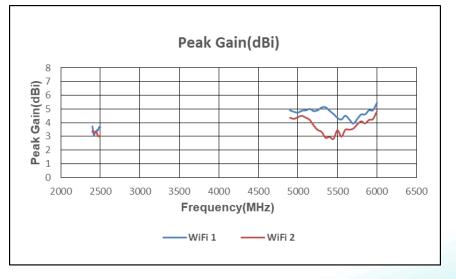
### PART NUMBER: LPMB40X

#### **CHARTS**

#### LTE 1 and LTE2 Peak Gain



#### WiFi 1 and WiFi 2 Peak Gain



#### Note : Measured with 320mm cable

#### Issue: 1922

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



12



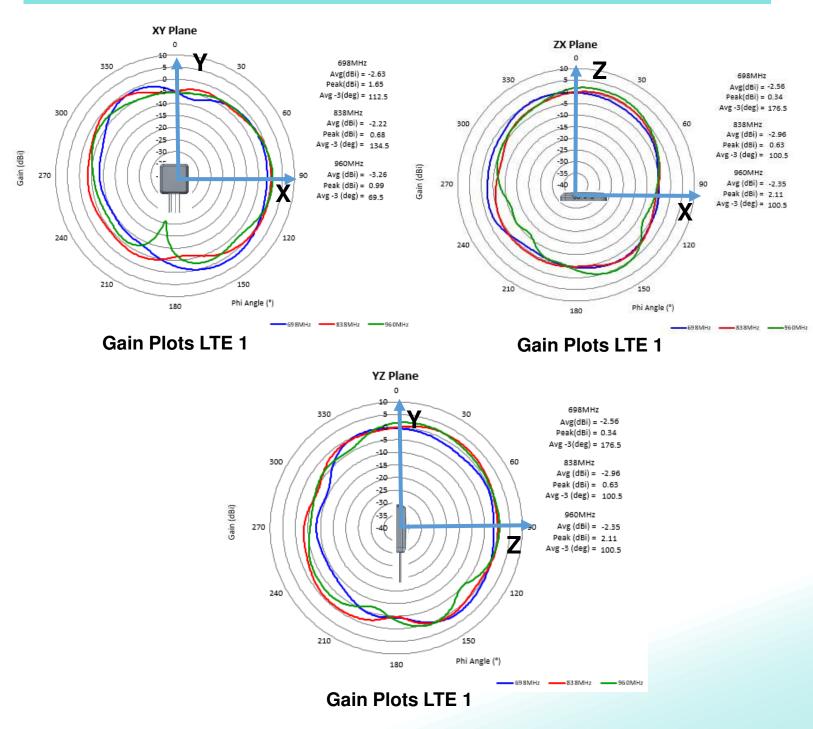
**Description**: 2X LTE, 2XWiFi Vehicular

## Series: Low Profile MB

Antenna

#### PART NUMBER: LPMB40X

#### **CHARTS**



#### lssue: 1922

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



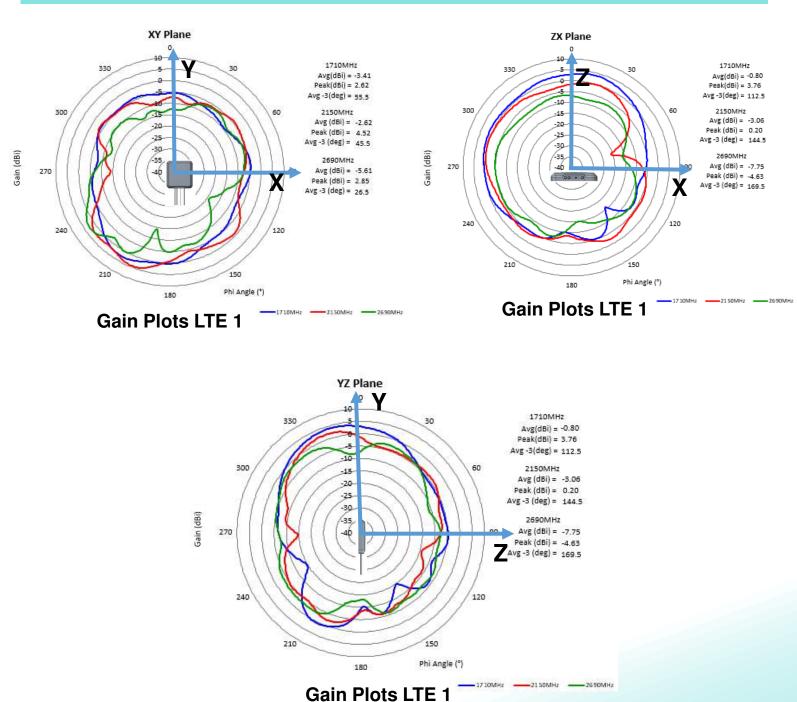


**Description**: 2X LTE, 2XWiFi Vehicular

#### Antenna

### PART NUMBER: LPMB40X

#### CHARTS



#### lssue: 1922

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





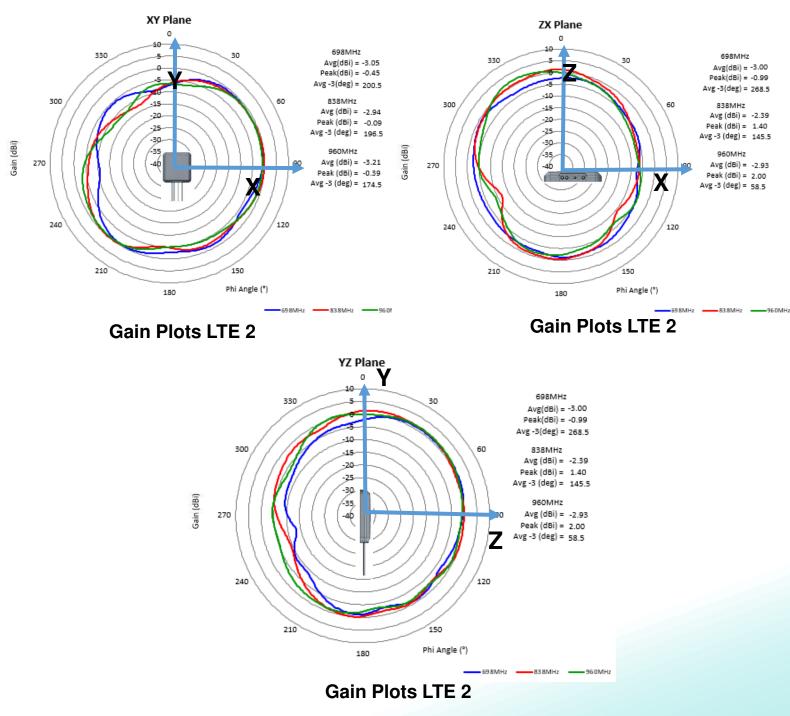
**Description**: 2X LTE, 2XWiFi Vehicular

## Series: Low Profile MB

## Antenna

# PART NUMBER: LPMB40X

### CHARTS



#### Issue: 1922

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



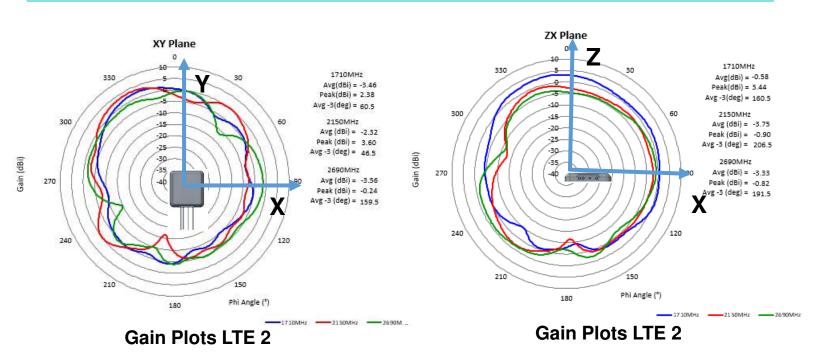


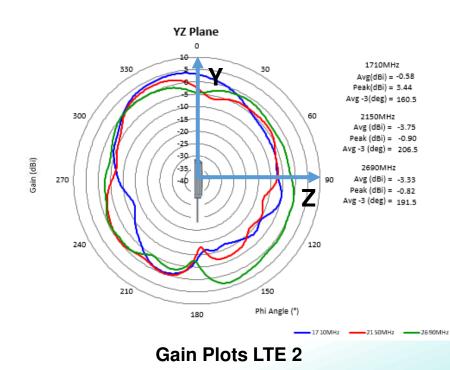
**Description**: 2X LTE, 2XWiFi Vehicular

Antenna

### PART NUMBER: LPMB40X

#### CHARTS





#### Issue: 1922

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



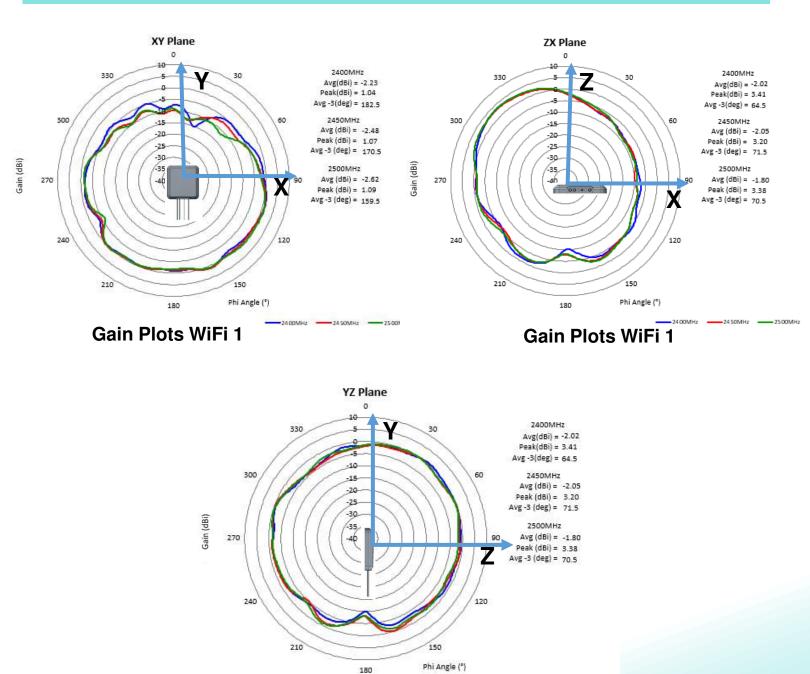


TECHNICAL DATA SHEET Description: 2X LTE, 2XWiFi Vehicular

Antenna

### PART NUMBER: LPMB40X

### CHARTS



Gain Plots WiFi 1

#### Issue: 1922

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.

-24 00 MHz -

-24 50MHz -

-25 00MHz



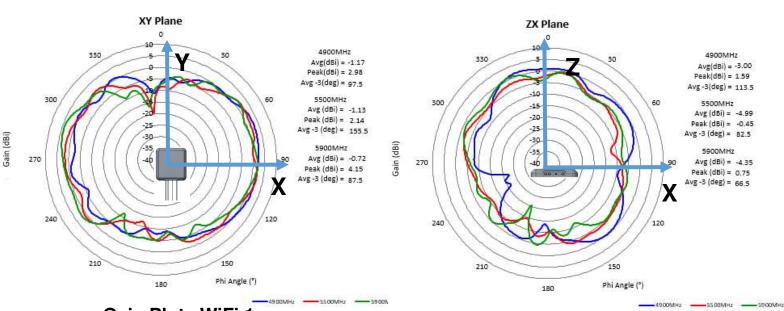
**Description**: 2X LTE, 2XWiFi Vehicular

# Series: Low Profile MB

# Antenna

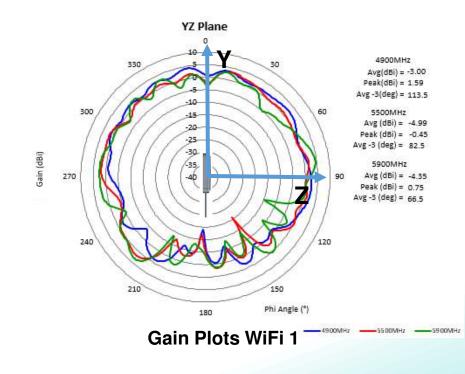
### PART NUMBER: LPMB40X

#### **CHARTS**



Gain Plots WiFi 1

Gain Plots WiFi 1



#### Issue: 1922

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



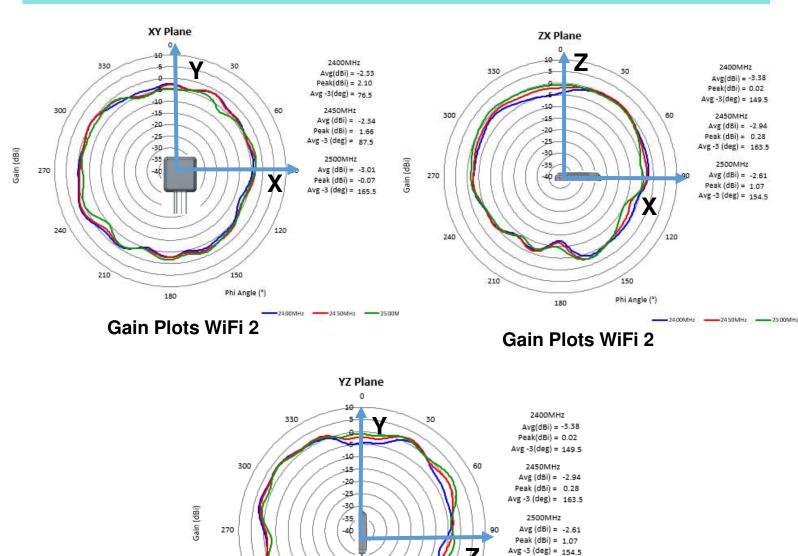


**Description**: 2X LTE, 2XWiFi Vehicular

# Antenna

### PART NUMBER: LPMB40X

#### CHARTS



#### Issue: 1922

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

240

210



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.

180

Gain Plots WiFi 2

120

2400MHz -

2450MHz \_\_\_\_\_2500MHz

150 Phi Angle (°)

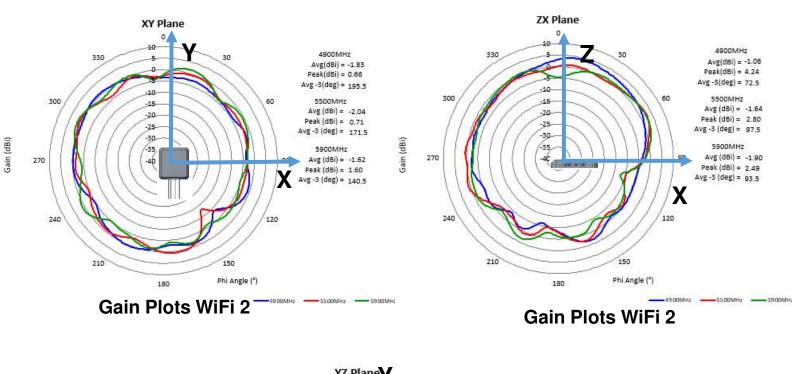


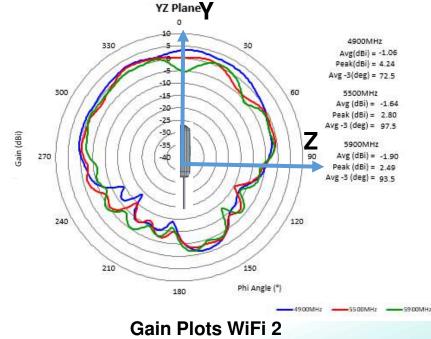
**Description**: 2X LTE, 2XWiFi Vehicular

#### Antenna

### PART NUMBER: LPMB40X

#### CHARTS





#### Issue: 1922

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



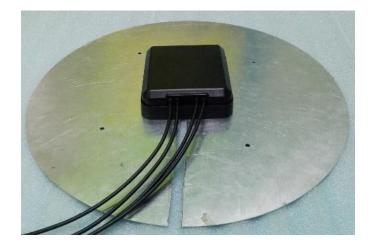


теснысаь рата sнеет Description: 2X LTE, 2XWiFi Vehicular Antenna

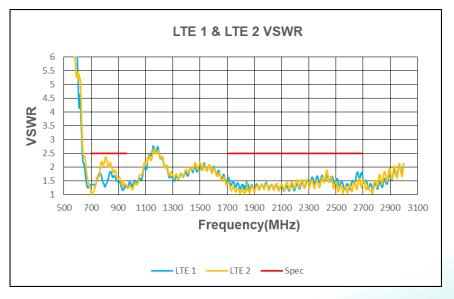
PART NUMBER: LPMB40X

#### **CHARTS**

# Situation 2: Performance on 1 inch bracket with φ500mm(19.7inch) ground



# LTE 1& LTE 2 VSWR



#### Note : Measured on 500mm ground plane with 3m cable

#### lssue: 1922

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

21



TECHNICAL DATA SHEET

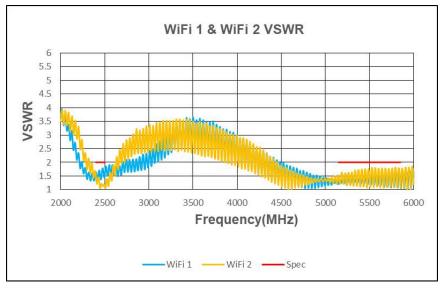
Description: 2X LTE, 2XWiFi Vehicular

Antenna

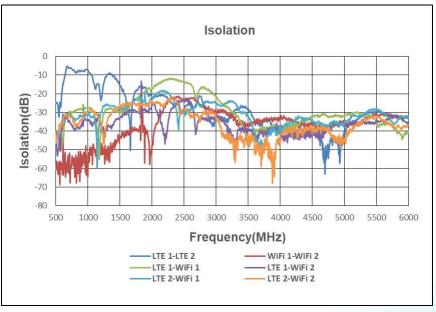
### PART NUMBER: LPMB40X

### CHARTS

#### WiFi 1& WiFi 2 VSWR



Isolation



#### Note : Measured on 500mm ground plane with 3m cable

#### Issue: 1922

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



22





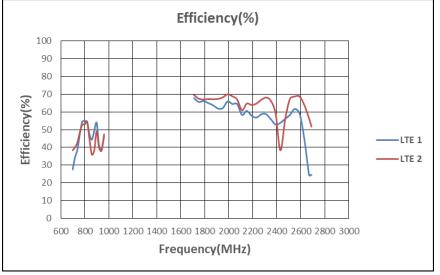
TECHNICAL DATA SHEET Description: 2X LTE, 2XWiFi Vehicular

Antenna

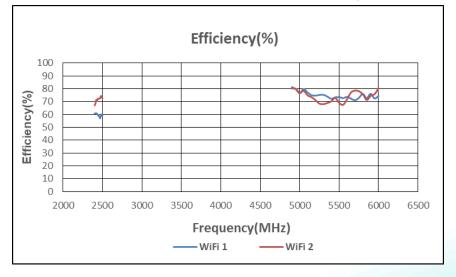
### PART NUMBER: LPMB40X

### CHARTS

# LTE 1 and LTE2 Efficiency



### WiFi 1 and WiFi 2 Efficiency



#### Note :Measured on 500mm ground plane with 322mm cable

#### Issue: 1922

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



23

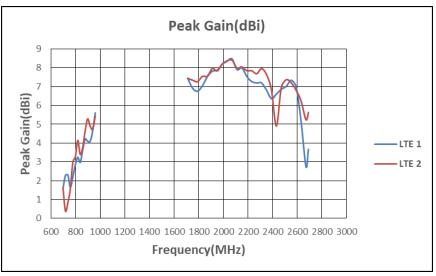


TECHNICAL DATA SHEET Description: 2X LTE, 2XWiFi Vehicular

Antenna

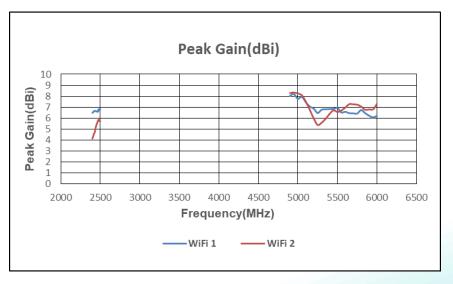
### PART NUMBER: LPMB40X

### CHARTS



#### LTE 1 and LTE2 Peak Gain

#### WiFi 1 and WiFi 2 Peak Gain



#### Note :Measured on 500mm ground plane with 322mm cable

Issue: 1922

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

24

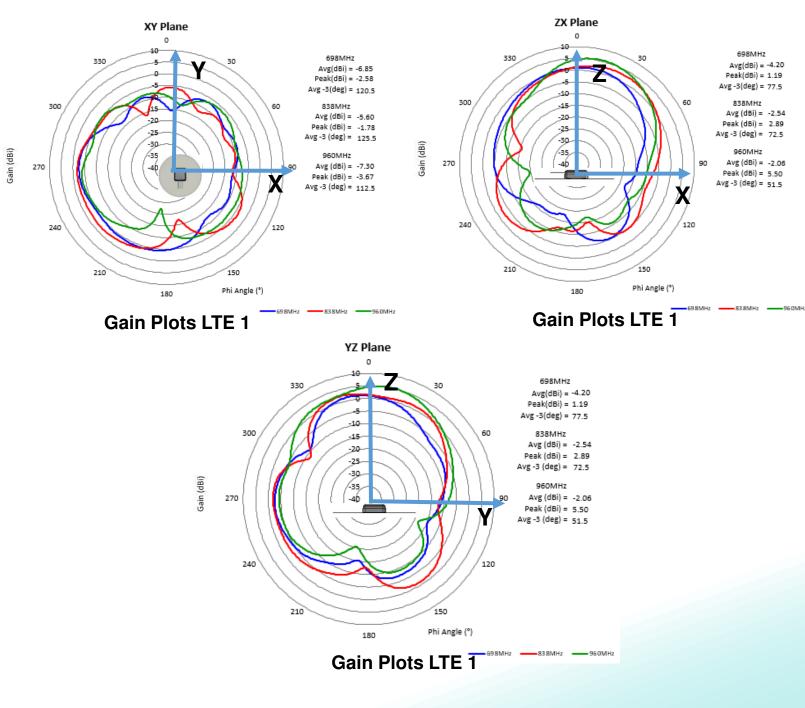


**Description**: 2X LTE, 2XWiFi Vehicular

#### Antenna

### PART NUMBER: LPMB40X

#### CHARTS



#### lssue: 1922

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



25

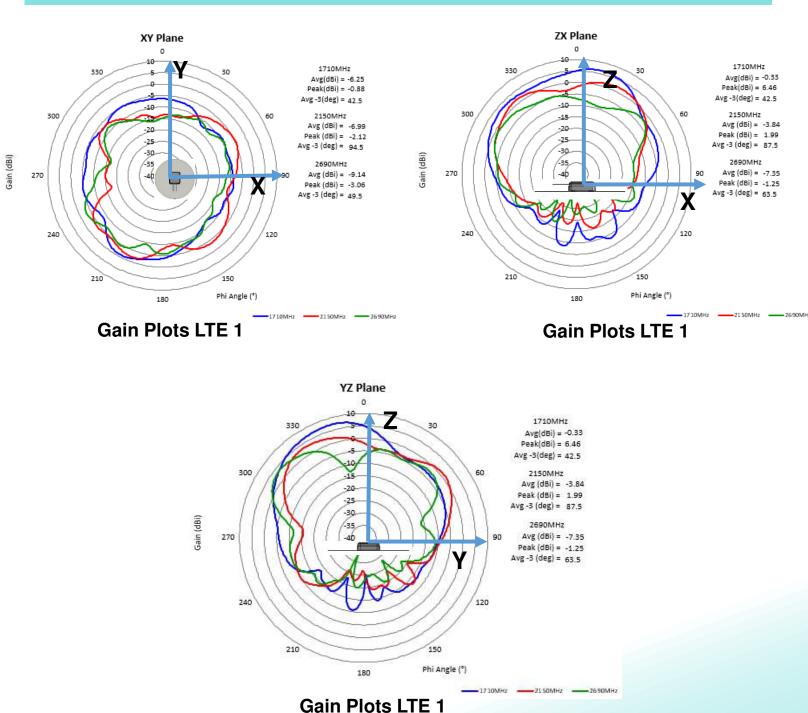


**Description**: 2X LTE, 2XWiFi Vehicular

#### Antenna

### PART NUMBER: LPMB40X

#### **CHARTS**



#### Issue: 1922

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



26

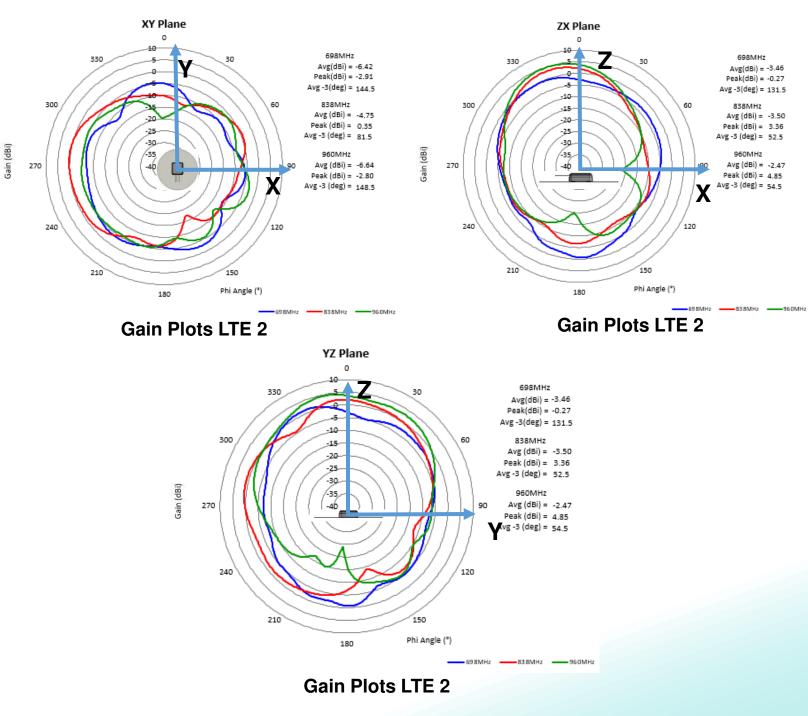


**Description**: 2X LTE, 2XWiFi Vehicular

Antenna

### PART NUMBER: LPMB40X

#### CHARTS



#### Issue: 1922

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



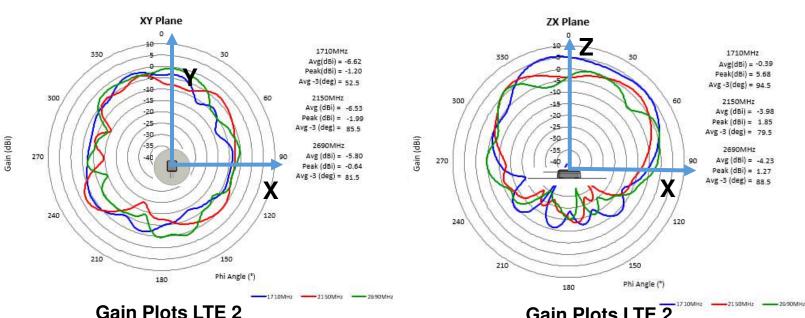


TECHNICAL DATA SHEET Description: 2X LTE, 2XWiFi Vehicular

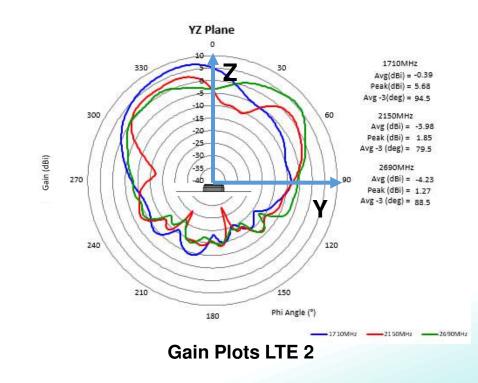
#### Antenna

### PART NUMBER: LPMB40X

#### **CHARTS**



Gain Plots LTE 2



#### Issue: 1922

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



28

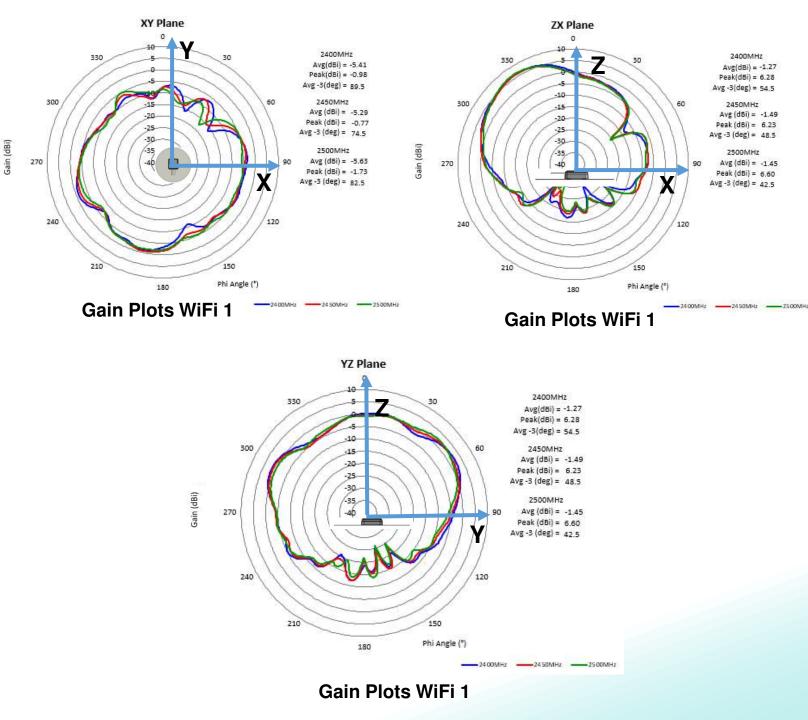


**Description**: 2X LTE, 2XWiFi Vehicular

Antenna

#### PART NUMBER: LPMB40X

#### **CHARTS**



#### Issue: 1922

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



29

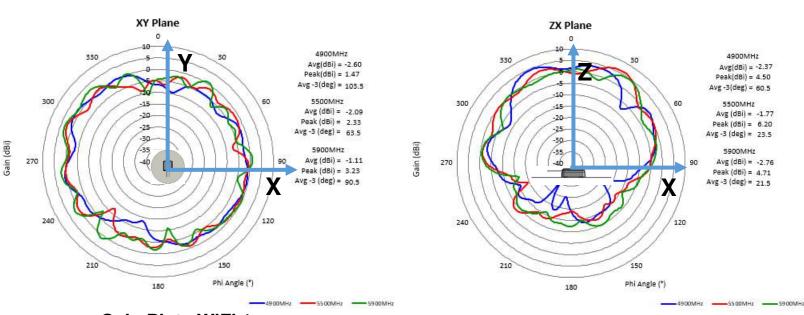


**TECHNICAL DATA SHEET Description**: 2X LTE, 2XWiFi Vehicular

Antenna

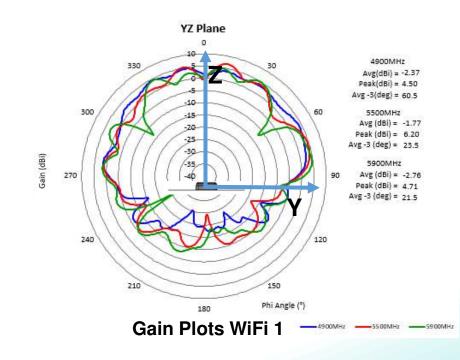
### PART NUMBER: LPMB40X

#### **CHARTS**



Gain Plots WiFi 1

Gain Plots WiFi 1



#### Issue: 1922

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



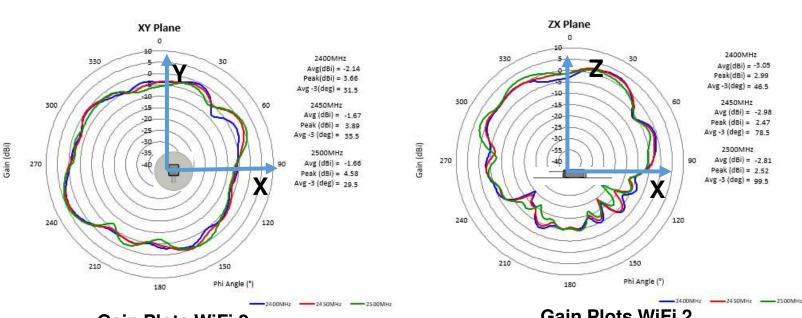


TECHNICAL DATA SHEET Description: 2X LTE, 2XWiFi Vehicular

#### Antenna

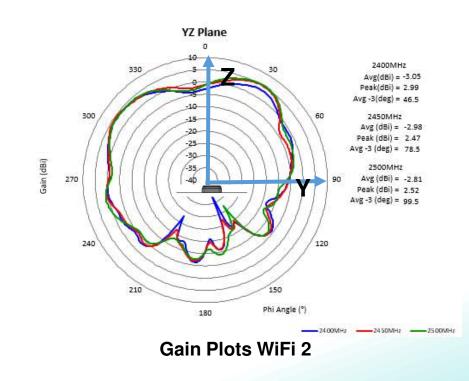
### PART NUMBER: LPMB40X

#### **CHARTS**



Gain Plots WiFi 2

Gain Plots WiFi 2



#### Issue: 1922

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



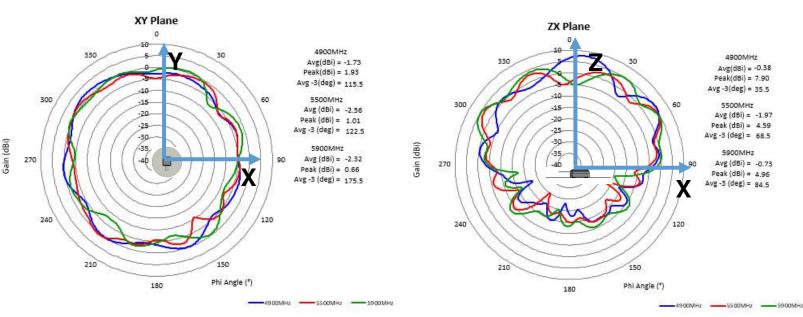


**Description**: 2X LTE, 2XWiFi Vehicular

#### Antenna

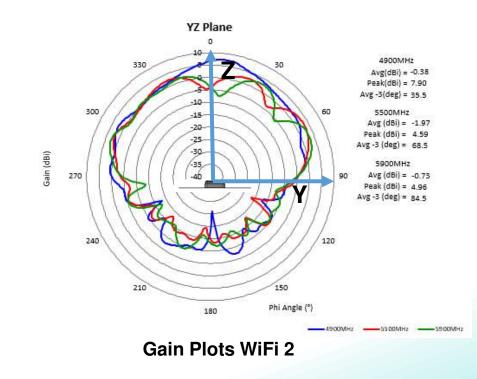
### PART NUMBER: LPMB40X

#### CHARTS



#### Gain Plots WiFi 2

Gain Plots WiFi 2



#### Issue: 1922

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



32



TECHNICAL DATA SHEET Description: 2X LTE, 2XWiFi Vehicular Antenna PART NUMBER: LPMB40X

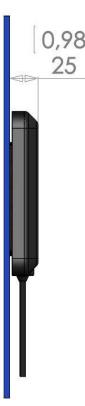
#### PACKAGING

- Each antenna packed in a plastic bag
- 18 bags(TBD) of antennas packed in a cardboard box.
- 1 label on each box with qty, part number, date code.

### ASSEMBLY

Option 1, Apply to the surface of the glass fiber or plastic material, the antenna could

be adhered on the surface directly.



lssue: 1922

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





TECHNICAL DATA SHEET Description: 2X LTE, 2XWiFi Vehicular Antenna

PART NUMBER: LPMB40X

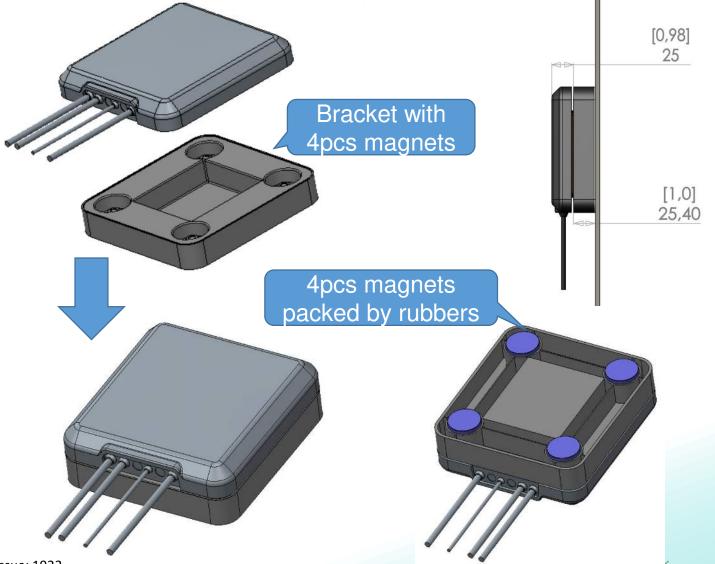
#### ASSEMBLY

Option 2, Apply to the surface of the Iron metals like normal steel/iron,

a bracket(GPSLPMM) is needed to elevate the antenna 1" for the optimum RF performance

Firstly, The antenna adhered on a magnetic bracket by the adhesive tape,

then the whole assemble could "stick" on the magnetic metals by magnets, and also could be removed from the metals easily.



#### Issue: 1922

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

HS 3



TECHNICAL DATA SHEET Description: 2X LTE, 2XWiFi Vehicular Antenna

PART NUMBER: LPMB40X

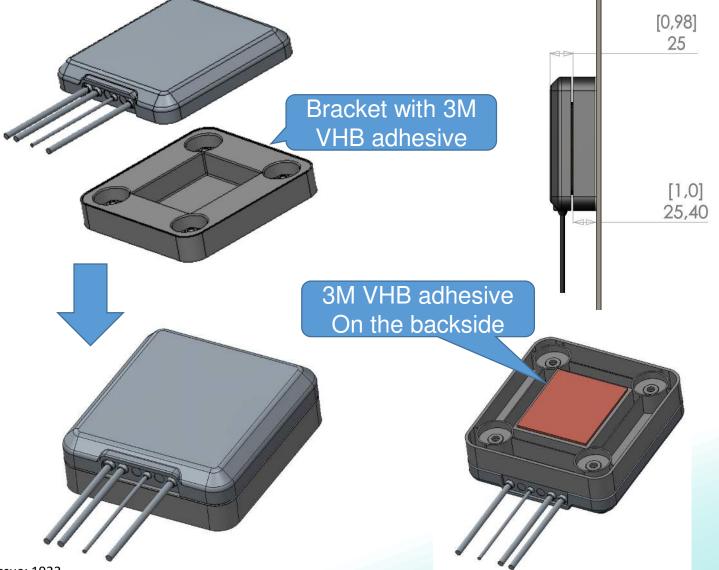
#### ASSEMBLY

Option 3, Apply to the surface of the non-iron metals like aluminum,

a bracket(GPSLPAM) is needed to elevate the antenna 1" for the optimum RF performance

Firstly, the antenna adhered on a bracket by the adhesive tape,

then the whole assemble could adhere on the aluminum by the 3MVHB adhesive tape on the bracket.



#### Issue: 1922

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

ROHS 35