



# CALPRO

## Conformal Compact Multi-Band Vehicle Antenna System

### INTRODUCTION

Multifunctional CALPRO sets a new standard for automotive antennas—a true breakthrough in size, function, and integration options. CALPRO combines up to 10 connected car antenna functions, with the benefit of being conformal and hidden beneath the roof of the vehicle. CALPRO is a broadband array covering a functions requiring frequencies ranging from 698MHz to 6.0GHz.



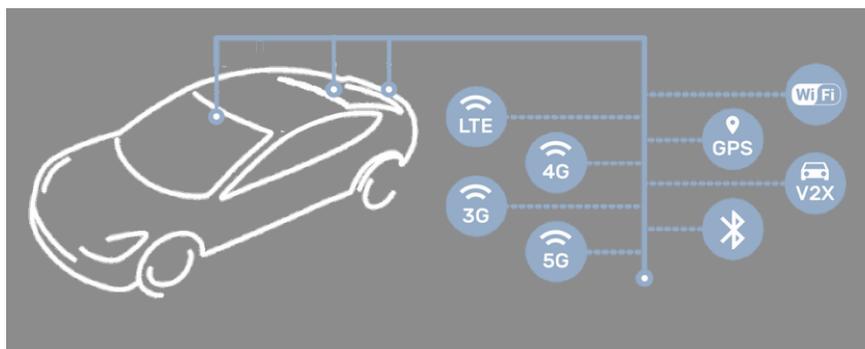
### MIMO

CALPRO can be configured to support either 2X2 or 4X4 MIMO without having to space out antenna elements, as is the case with conventional antennas. MIMO capability is in both the 4G LTE and 5G NR bands at 698-960, 1710-2170, 2300-2700, 3300-4200 and 4400-5000 MHz. Extremely low ECC leads to superior MIMO performance due to decorrelated antennas. Additionally, the antennas can be arrayed to increase gain which enables Directional MIMO.

CALPRO's directionality and strong beam isolation combine to deliver superior MIMO performance. This major contribution to the link budget delivers the increased probability of reception, extreme throughput, and low latency required to enable assured safety services and rich real time data.

### LOCATION OPTIONS

CALPRO can operate independent of a ground plane allowing it to work in Free Space, for instance, embedded in a plastic or glass surface. Horizon performance may be enhanced when installed flush in, or coupled to, a metal roof. Ideally, CALPRO is installed in one of three locations on a vehicle. The first is in the mirror module where it couples to the metal roof and car frame. The second is in the roof of the car, where a Sharkfin might currently be located. The third option is to put CALPRO inside a spoiler on the rear of the vehicle.





## SIZE OPTIONS

CALPRO is a volumetric antenna that can be produced in a variety of sizes and shapes. The system's gain is a function of the volume of the box among other factors. Units to date have ranged from a square 5"X5" model .75" deep, to a 6.25" X 6.25" that is 1" deep. A production unit has also been designed in rectangular form (8" X 4.5" and 0.75" deep)



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## SPECIFICATIONS:

### FREQUENCIES AND SUPPORTED MODES

4G LTE Cellular (MIMO 2x2 or 4X4): 698-960, 1710-2170, 2300-2700, 3400-3800 MHz

5G (sub-6) Cellular (MIMO 2x2 or 4X4): 698-5000 MHz

GNSS: 1164-1260, 1559-1610, 1151-1214 MHz, Tri-band (L1,L2 L5) Global Navigational Satellite System (GNSS) for GPS, Galileo, GLONASS, and BeiDou

WiFi/BT (2x2 MIMO): 2400-2484, 4850-5825 MHz

V2X: 5850-5925 MHz, C-V2X or 802.11p/DSRC

### MECHANICAL

Enclosure material/Color: Hi Temp Polycarbonate/Black

Body Dimensions (L x W x H): 5" x 5" x .75"

Weight: 0.14 Kg

Ingress Protection: To OEMs requirements

Mounting: Flange mounting

Flange Mounting Hole: 0.20"

### ENVIRONMENTAL

Operating temperature range -40°C to 105°C

Storage Temperature range -40°C to 125°C

Relative Humidity MIL-STD-810G method 507.4 @ 30° C

### PATENTS

CALPRO is covered by four issued and three pending U.S. and International patents.

### ANTENUM ABOUT

Antenum is an innovative, new antenna company located in Merrimack, NH. The Company offers groundbreaking conformal antenna systems for vehicles and has recently announced the introduction of BeamPRO, a totally passive, analog time-delay beamformer. Founded by veterans of the defense industry, Antenum is dedicated to bringing radically improved antenna systems to market in both the commercial and defense arenas.