

2016

# Antennas built for **IoT & M2M**



Global M2M Antenna Market Leaders

Device RF and OTA Performance Optimization

Full Test and Design Services

Global Support

 **taoglas**  
antenna solutions

# Dear Customers

## Welcome to the Taoglas Products and Services Catalogue 2016

**Read on to learn more about our extensive range of high performance antennas for a multitude of IoT and M2M applications.**

Welcome to our Product and Service Catalogue 2016. Once again we've extended our range of market leading products that help take your business to the next level of productivity. As our world becomes increasingly integrated, the opportunities to link every facet of your business together grows by the day. At Taoglas we are committed to helping you create a truly connected business.

The Internet of Things (IoT) was the phrase on everybody's lips in 2015 and exploded into mainstream media in areas such as Smart Home, Smart City and Wearable Technology. With this explosion brought many exciting new applications and challenges, driving Taoglas to expand and enhance its product range with pioneering designs and technology to continue its reputation as a market leader.

Our low profile, high performance, Storm antenna (page 84) brought cutting edge technology to a host of bandwidths, offering widespread opportunities in GPS Iridium, WiFi, LTE and GNSS. Our embedded NFC antenna range (page 147) was extended to include ferrite flux directors, increasing the interrogation distance when the antenna is adhered to metal.

Throughout 2015 we developed our range of products into new markets such as DSRC and LoRa. The hotly anticipated LoRa (Long Range) market operates at a frequency of 868 and 915MHz, and offers low path loss with great obstacle penetration, making it ideal for Smart City applications. DSRC (Dedicated Short Wave Communications) operates in the 5.9GHz frequency range and has wide spread applications in the automotive industry. We expect significant market penetration for both bands over the coming year.

We enhanced our online presence with the launch of our new website and the introduction of the CableWizard, our online cable assembly tool. Our fully optimised website provides an

even more user-friendly experience when accessing Taoglas from a variety of platforms from desktop to laptop, tablet to mobile. The CableWizard, our first-to-market assembly tool simplifies and enhances the process of ordering custom RF cables directly from Taoglas and ensures you get the right cable first time.

Our team has grown steadily over the past year and we were delighted to expand our reach to Germany in October with the opening of our first design and support location in Munich. Our Irish office was also renovated to cope with the ever increasing headcount there. Our German and Irish teams continue to grow and we feel that this expansion reinforces our commitment to the EMEA region.

In America, we have opened our IoTx Center, quadrupling the size of our operation there. The \$2 million upgrade allows us to provide a full-service design and testing center for 2G, 3G, 4G LTE, WiFi, BT and GNSS testing as well as providing antenna solutions and RF troubleshooting assistance.

Taoglas continues to support some of the world's largest wireless brands in optimizing their products to ensure reliable performance on a global scale. Our one stop solution will optimize your wireless device board design, and get you through regulatory radiated power, sensitivity and spurious emissions testing first time. Contact a member of our team today and discover how we can support you!

**Dermot O'Shea   Ronan Quinlan**

**Co-Founder/Joint Managing Director Co-Founder  
Joint Managing Director**

# Introduction

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## About Taoglas

### Company Profile

**Taoglas is an international company with a 100% positive approach and a world-class way of doing things. We listen. We learn. We respond.**

Since our foundation in 2004, we've combined forward-focused technological thinking with a determination to understand and respond to the real needs of our customers.

Our cross-cultural business-solutions approach means research, design and customer support services are based at our world-class technology centers in Ireland, the US and Taiwan.

Today Taoglas provides a comprehensive range of external, embedded and base station antenna solutions for M2M/IoT applications such as Telematics / Automotive, Smart-Grid, Metering / Telemetry, Home Automation, Remote Monitoring and Medical applications.

We are committed to continually researching new materials and improved antenna designs. Our surface-mount antenna range and flexible embedded products are unique in the industry.

Taoglas works with you to enable your company achieve the best possible performance from your wireless devices.

We can custom-design to suit your individual needs or provide highly-economical off-the-shelf solutions.

Our step-by-step design process ensures your devices achieve target specifications and comply with all required approvals so they're 'right first time'. If you're looking for a pioneering approach to problem-solving, talk to us at Taoglas. In the field of M2M/IoT, we outperform the rest.

***'Taoglas shows a real willingness to solve problems. I value this'***

#### Client Comment



## About Taoglas

### Our Services

# We work with the top innovators in M2M that are tasked to deliver smarter and/or better performing systems for wireless applications.

As well as a wide range of off the shelf antenna solutions (embedded and external) Taoglas has grown with the market and now offer a suite of related services;

- › **Custom Antenna Design**
- › **Device Layout Optimization**
- › **Noise Control**
- › **Certification (e.g. PTCRB) Pre-testing**
- › **Over the Air TRP/TIS Optimization to pass carrier / network requirements**
- › **First Tier Automotive approved antennas produced at TS16949 facility using PPAP and IMDS**
- › **Global Coverage with full test labs in USA, Taiwan, Ireland**

# What can Taoglas offer you?

## The Taoglas advantage

### 1. Materials

We are not committed to one material technology. We use a wide variety of materials and are constantly researching the latest developments. We ship antennas made from high grade Ceramics, FR4, Metal, Fiberglass, PTFE, Mylar and flexible PCB.

### 2. Surface Mount Technology

Taoglas are the worldwide leaders of high performance surface mounted antenna solutions for M2M with unique (patent pending) products for cellular, GPS, Wi-Fi and other ISM band antennas. These products are delivered on tape and reel and connect to our customers devices during the standard reflow process.

We are the first in the market to provide automotive approved SMD GPS patch antenna products and also unique multi-band cellular antennas that achieve high efficiency and performance off the shelf in a small footprint.

### 3. Antenna Design Techniques

We select the antenna design that is right for the individual project, application or market; PIFA antennas, Monopoles, Dipoles, Loop Antennas etc.

We are not limited by design methodology, we use software and practical tried and tested procedures to deliver the most effective and efficient antenna. This means we are also not limited by antenna frequency we have the ability to deliver all antennas for the project.

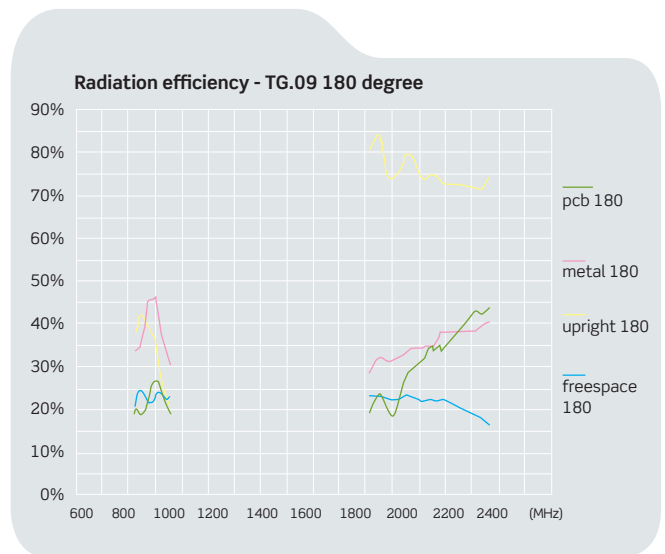
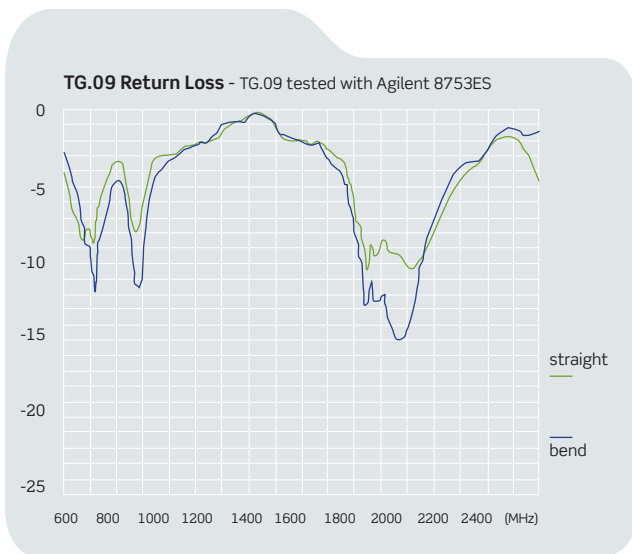
For the device itself you may need to have multiple antenna types GPS, multi-band cellular, diversity, Wi-Fi, Bluetooth, RFID etc. It is best to have one antenna company provide all the antennas because it cuts development time by half while also availing of bulk buying discounts.

We can design and deliver an antenna at any frequency and we have a huge amount of experience in being challenged to design with small spaces and high target specifications. This means we can provide full antenna network solutions

- base station antennas, external/remote/mobile and embedded antennas.

### 4. M2M Focused

Taoglas employees have built up years of practical international experience in different markets, and have worked on thousands of custom M2M devices.



### TRP (Total Radiated Power) with Sample Custom Device for TG.09

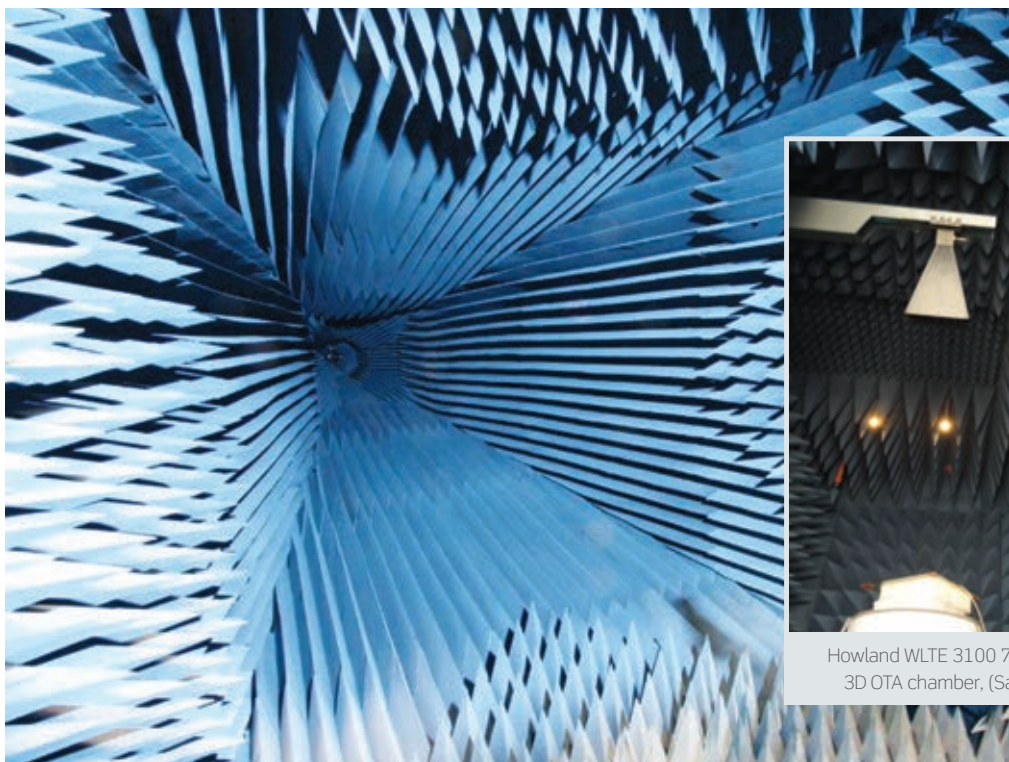
CDMA (Loop Back Service)				
Band (MHz)	Position	Channel	Frequency (MHz)	TRP (dBm)
CDMA800	L	1013	824.70	21.72
	M	384	826.52	22.21
	H	777	848.31	22.23
CDMA1900	L	25	1851.25	20.35
	M	600	1880.00	20.57
	H	1175	1908.75	20.51

### TIS (Total Isotropic Sensitivity) with Sample Custom Device for TG.09

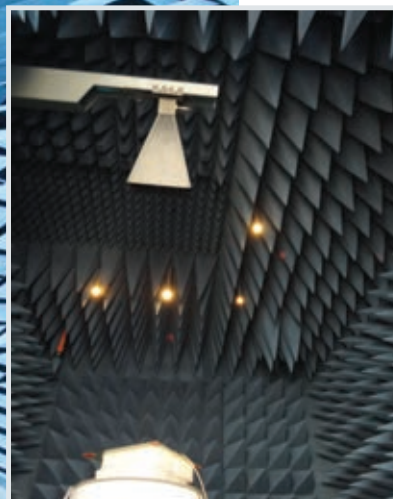
CDMA (Loop Back Service)				
Band (MHz)	Position	Channel	Frequency (MHz)	TIS (dBm)
CDMA800	L	1013	869.70	-100.73
	M	384	881.52	-101.94
	H	777	893.31	-101.66
CDMA1900	L	25	1931.25	-105.61
	M	600	1960.00	-106.36
	H	1175	1988.75	-106.71

## What can Taoglas offer you?

### The Taoglas advantage



Taoglas' 12 metre 400 MHz to 6000 MHz ETS Lindgren 3D Tapered Anechoic Chamber in Wexford, Ireland



Howland WLTE 3100 700MHz to 6GHz  
3D OTA chamber, (San Diego, USA)

Simply put, we know what designs work and what do not. We also stay close to M2M module developments and tradeshows so we can keep our product line as close as possible to ever changing market demands. We work with the leading certified test labs so we are fully aware of wireless device approvals and test methods.

#### 5. The Taoglas promise

Taoglas antennas are tested in the industry's most advanced CTIA approved test chambers, the very same ones that the world's automobile, mobile phone and notebook companies use to qualify the RF performance of their antennas.

Unlike other antenna companies we show the real test results and conditions they were tested in. Antenna performance will change if any parameter of the antenna or environment is changed.

For Omni-directional antennas the average gain over 360 degrees, also known as efficiency, is the only proper indicator of antenna performance.

A single peak gain figure used by most of our competitors are not indicative of real performance for Omni-directional antennas as they only give the gain at one particular angle or plane and mounting condition for one frequency point only.

You will often see antennas with peak gain of 2dBi listed, however this is largely meaningless as the average gain will be much lower, and it is average gain that influences the power and sensitivity of your product, not the peak gain.

In contrast Taoglas antenna specifications show average gain, efficiency and peak gain across the whole frequency band. Changing a cable type, length, will also change the gain of any antenna.

We are committed to being honest and open in our specifications.

It is advised to try different antennas in real life test conditions. It is recommended never to rely on an antenna specification as a guarantee of antenna performance. Taoglas will gladly test our antenna with your product and compare to a competitor's antenna in your product to get the real test results.

#### 6. Your TOTAL antenna and RF solution for wireless

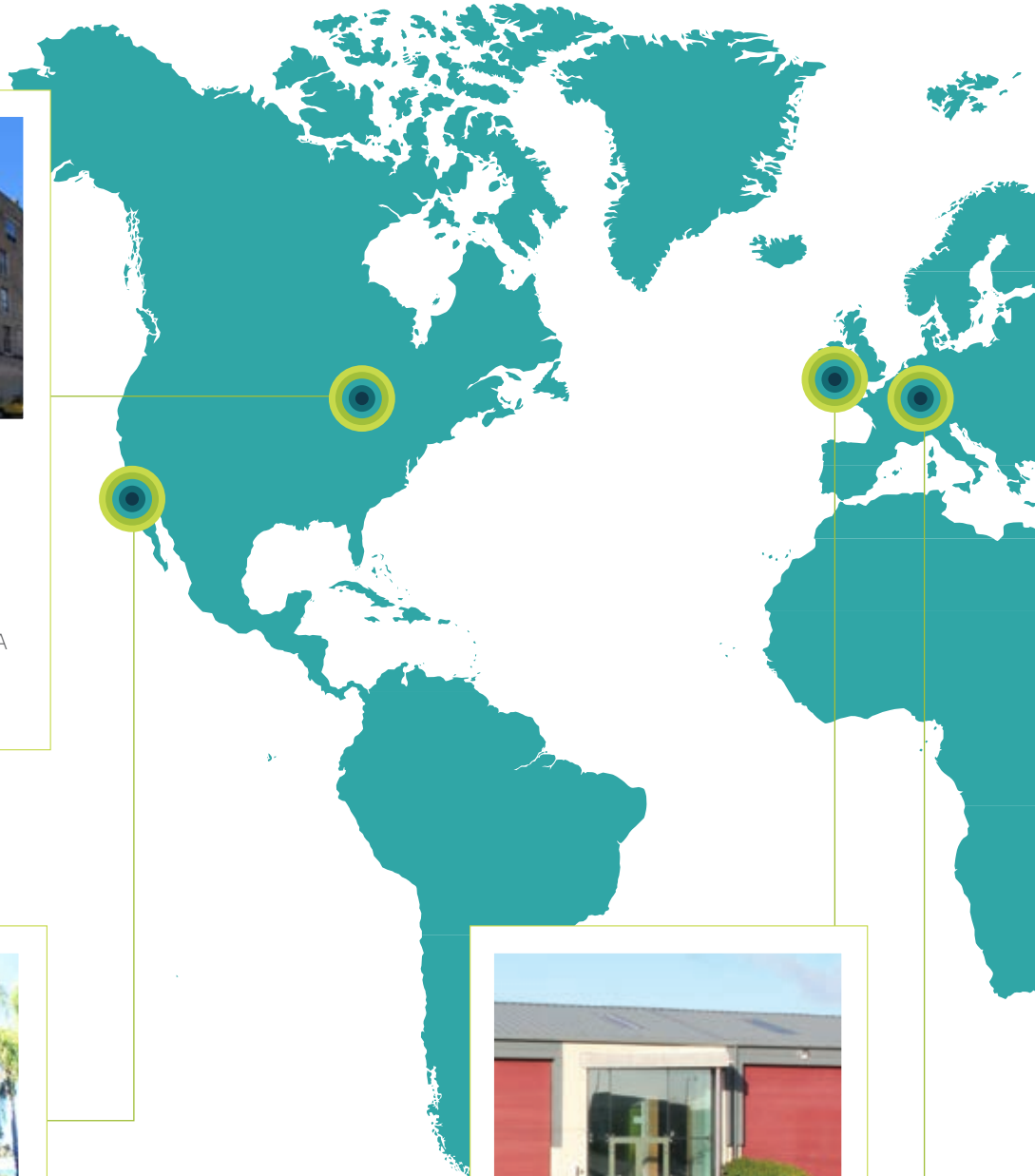
Please contact us today to discuss your wireless communication requirements or see how we can help you be more competitive in your market.

Avail of our test and design service packages at our fully qualified OTA test facilities in Wexford, Ireland and San Diego, USA.



## Contact Details

### Worldwide Presence



### MINNEAPOLIS

TAOGLAS USA INC  
RF INTEGRATION CENTRE

530 N 3rd St. Suite B10  
Minneapolis, MN 55401-1256, USA  
**+1 858 450 0888**  
[nasales@taoglas.com](mailto:nasales@taoglas.com)



### SAN DIEGO

TAOGLAS USA INC  
Full RF Test Laboratory  
Cable & Connector Division

8375 Camino Santa Fe, Suite A  
San Diego, CA 92121, USA  
**+1 858 450 0888**  
[nasales@taoglas.com](mailto:nasales@taoglas.com)



### IRELAND

TAOGLAS LIMITED (IRELAND HQ)  
WEXFORD, IRELAND  
Full RF Test Laboratory

Unit 5 Kilcannon Business Park  
Old Dublin Road, Enniscorthy  
Co. Wexford, Y21 XW56, Ireland  
**+353 53 9169500**  
[emeasales@taoglas.com](mailto:emeasales@taoglas.com)



## TAIWAN

TAOGLAS LIMITED (TAIWAN)  
TAOYUAN CITY, TAIWAN  
Full RF Test Laboratory  
In-House environmental test  
Laboratory New Test Chamber  
currently under implementation.

No.2-2, Ln. 66, ZhongShan 1st Rd.  
Bade City, Taoyuan County 33454  
Taiwan, ROC

**+886 3 3681223**  
**asiasales@taoglas.com**



## GERMANY

TAOGLAS GmbH - MUNICH,  
GERMANY  
Full RF Test Laboratory

Erika-Maa-Straße 19-25  
80636 München  
Germany

**+49 89 3803 7426**  
**emeasales@taoglas.com**

Our co-founders and Joint Managing Directors

Dermot O' Shea

Ronan Quinlan



# Applications

Examples of M2M applications for our products



## 1. Automotive/Transportation

- First tier OEM
  - In car entertainment
  - E-Call
- Aftermarket
  - Tracking
  - In vehicle diagnostics (OBD II)
  - In car entertainment

## 2. Remote Monitoring, Flow Meters, Level Detection, Scada and Telemetry

- Electronic Flow Meter (EFM) and Remote Monitoring
- Railroad Communications, Anti-Collision and Switching Control
- Heavy duty, rugged solutions for harsh environments

## 3. Smart Grid and Utilities

- Advanced Metering Infrastructure (AMI)
- Automatic Meter Reading (AMR)
- Water and Gas Monitoring & Flow Control
- Ruggedized sub-station deployments

## 4. Agriculture and Water

- Irrigation Management
- Precision Guidance
- Flow Control Information
- Data & Logistics Management
- Ruggedized and Multiple Frequency Mobile Antennas

## 5. Home Automation

- Control Screens
- Hubs and Control Points

## Embedded antenna systems for OBU/T-Box/OBDII/Infotainment

Taoglas offers its customers all-in-one solutions for their devices where multiple antenna technologies are to be used together. Optimized solutions and good isolation between different technologies are critical for strong device RF performance. Taoglas ceramic cellular and GNSS antennas are offered as reference solutions by many RF module manufacturers and RF design professionals. 2G/3G/4G, GNSS, Wi-Fi, BT, DSRC, all to be embedded and optimized by Taoglas.



## Shark Fin Antenna Systems

Increasing demand for superior performance, bigger data throughput, awareness for road safety and accurate location based services led Taoglas to develop unique multi-antenna systems inside relatively small form factor Shark Fin housing. Taoglas' Raptor solution is an exceptional off-the-shelf automotive product and serves as a great base for customization to satisfy high level requirements of car makers.



### Available with:

GPS-GLONASS-BeiDou antenna  
LTE/LTE MIMO antenna  
Wi-Fi/Wi-Fi MIMO antenna  
AM/FM  
DSRC



## In-vehicle antenna systems

Traditional telematics boxes connecting external antennas can decide between implementing Shark Fin or in-vehicle antennas. Taoglas offers a wide range of automotive grade individual antennas either with magnetic or adhesive mounting. One in particular that combines usual functions to one antenna is the Optimus 2in1. Offering good 2G/3G/4G performance and active GNSS antenna



## 6. Industrial and Commercial Application

- Traffic Control Systems
- Scoreboards, Advertising Billboards, Digital Signage
- Taxi Cab Communications, Internet and Advertising
- Wireless Kiosks and Electric Charging Stations

## 7. Healthcare and Medical

- Support & optimise wireless networks in hospitals & clinics for real-time data voice & video comm
- Wireless Medical Carts
- Tablet PCs & Laptops
- Medical Diagnostic Equipment

## 8. Defence

- Ruggedized Handsets
- Vehicle Telematics
- Special Applications

## 9. Public Safety: Wireless, Data Video Stream, Police, Fire and EMS

- Carrier Network Optimization
- Mass Transit Wireless Internet Access
- Utilities Data Transfer and Processing
- Rugged, low profile housings
- Glass or dash board mount
- GPS, Wi-Fi and Multi-Band Cellular
- Easy to install designs with minimal exposure to theft or vandalism.

# Applications

## Application areas for products

Here is a list of common applications where our antennas are used, and a recommendation of our most popular and high performance solutions for each application.

1. Automotive/Transportation				
	Category	Part No.	Description	pg
Exrternal	<b>GPS-GLONASS -COMPASS- (GNSS)</b>	<b>AA.105</b>	Titan Magnetic Mount High Gain (30dB) GPS Antenna	52
		<b>AA.108</b>	Titan Adhesive Mount High Gain (30dB) GPS Antenna	52
		<b>AA.161</b>	Dominator Magnetic Mount GPS-GLONASS Antenna	64
		<b>AA.162</b>	Ulysses Ultra-Low Profile Magnetic Mount GPS-GLONASS Antenna	64
	<b>Cellular/LTE</b>	<b>G21.B</b>	Hercules Gen.II Penta Band Cellular Screw Mount	30
		<b>G30.B</b>	Olympian Wide Band LTE Antenna	30
		<b>GSA.8821</b>	I-Bar Penta-Band GSM Antenna	25
		<b>WS.01.B</b>	Hercules Gen.II Dual Band WiFi Screw Mount	130
		<b>WA.500w</b>	Stingray Adhesive Mount WiFi/ ZigBee Antenna	131
	<b>ISM/LoRa</b>	<b>IS.05.B</b>	Hercules Gen.II ISM 915 MHz Screw Mount	101
	<b>Combination</b>	<b>MA204</b>	Stingray 2in1 Adhesive Mount GPS /GLONASS/Cellular Antenna	94
		<b>MA104</b>	Hercules Gen.II 2in1 GPS/Cellular Screw Mount	78
		<b>MA303</b>	2in1 Puck Magnetic Mount GPS/GLONASS/ Cellular Antenna	97
		<b>MA501</b>	Hercules Gen.II 2in1 GPS/WiFi Screw Mount	81
		<b>MA220</b>	Optimus 2in1 GPS/ GLONASS/ LTE Antenna	93
		<b>MA230</b>	Stream 3in1 GLONASS/ Cellular/ WiFi	95
		<b>MA240</b>	Genesis 3in1 GPS/GLONASS/LTE MIMO Antenna	96
		<b>MA600</b>	Spartan 3in1 GPS/GLONASS/Cellular/ WiFi Screw Mount	83
		<b>MA603</b>	Spartan 3in1 GPS/GLONASS/Cellular/ ISM 915MHz Screw Mount	85
		<b>MA760</b>	Pantheon 4in1 GPS/GLONASS/2*LTE MIMO/WiFi Screw Mount	90
Internal	<b>GPS-GLONAS-SCOMPASS (GNSS)</b>	<b>AGGP.25</b>	Active GPS-GLONASS Patch Antenna Module	63
		<b>SGP.25</b>	Passive GPS SMD Mount Patch Antenna	59
		<b>CGGP.25</b>	Passive GPS-GLONASS Patch Antenna	66
		<b>FXP611</b>	The Cloud GPS-GLONASS-COMPASS Flexible PCB Antenna	75
		<b>AP.25F</b>	Active GPS Patch Antenna Module	56
	<b>Cellular</b>	<b>PA.25A</b>	Anam Hexa-Band Cellular Ceramic PIFA	18
		<b>PA.710</b>	Warrior Ultra Wide-Band LTE/Cellular/CDMA SMD Antenna	19
		<b>FXP14</b>	Hepta-Band Cellular/ Assisted GPS Flexible PCB Antenna	21

## 2. Remote Monitoring, Flow Meters, Level Detection, Scada and Telemetry

Area	Category	Part No.	Description	pg
External	Cellular	GSA.8827	Phoenix I-Bar Adhesive Mount Wide-Band LTE/ Cellular/ CDMA Antenna	25
		GSA.8841	I-Bar Wide-band 4G LTE	26
	Combination	MA600	Spartan 3in1 GPS-GLONASS/ Cellular/ WiFi Screw Mount	83
		MA510	Hercules 2in1 MIMO Dual Band 2.4/5.8GHz	80
		MA120	Hercules 2in1 450MHz & 868MHz Screw Mount	79
		MA602	Spartan 3in1 GPS-GLONASS/Cellular/Iridium Screw Mount	145
	ISM/LoRa	FW.80	Meteor 169MHz Omni-Directional Flexible Whip	105
Iridium	STS.01	Spartan Iridium Transceiver Antenna System	144	
Internal	Cellular	PA.710	Warrior Ultra Wide-Band LTE/Cellular/CDMA SMD Antenna	19
		PA.25A	Anam Hexa-Band Cellular SMD Antenna	18
		FXP14	Hepta-Band Cellular/ Assisted GPS Flexible PCB Antenna	21
	GNSS	SGGP.18A	GPS/GLONASS SMD Mount Patch	67
	ISM/LoRa	PC81	The Stripe™ 868MHz PCB Antenna	105
		PC91	The Stripe™ 915MHz PCB Antenna	115
		HA.10.A	169 MHz Helical Monopole Antenna	116
		CA.69	169 MHz VHF Ceramic Chip Monopole Antenna	116

## 3. Smart Grid and Utilities

Area	Category	Part No.	Description	pg
External	Cellular	G30	Wide-Band 2G/3G/4G Antenna	41
		OMB.8912	Barracuda 2G/3G 5dBi Omni Directional Outdoor Antenna	32
		TLS.01	Shockwave 2G/3G/4G Terminal Antenna	39
		TG.09	2G/3G Cellular Connector Mount Monopole Antenna	35
	Combination	MA410	Storm 4in1 Permanent Mount GNSS & LTE 2xMIMO & L Band 1621MHz Antenna	84
	GNSS	AA.171	MagmaX GPS-GLONASS-BeiDou Antenna Dual pin patch	70
	ISM/LoRa	FW.80	Meteor 169MHz Omni-Directional Flexible Whip	105
Internal	Cellular	FXUB63	Ultra Wide Band Flex Antenna	22
		PCS.07	2G/3G Cellular SMD Antenna	20
	GNSS	GLA.01	GPS Ceramic Loop Antenna	63

## 4. Agriculture and Water Irrigation Management

Area	Category	Part No.	Description	pg
External	Cellular	G30	Wide-Band 2G/3G/4G Antenna	41
		MA104	Hercules 2in1 GPS & 2G/3G Permanent Mount Antenna	78
	Combination	MA410	Storm 4in1 Permanent Mount GNSS & LTE 2xMIMO & L Band 1621MHz Antenna	84
		MA230	3in1 GPS/GLONASS & 2G/3G/4G & WiFi Adhesive Mount Antenna	95
		OMB.915	Barracuda 915MHz 3dBi Omni Directional Outdoor Antenna	102
	ISM/ LoRa	PC240	33MHz Adhesive/Screw Mounted Helical Dipole	112
		FW.80	Meteor 169MHz Omni-Directional Flexible Whip	105
		Iridium	STS.01	Spartan Iridium Transceiver Antenna System
Internal	WiFi	FXP74	Black Diamond 2.4GHz Flex PCB Antenna	122

# Applications

## Application areas for products

### 5. Industrial and Commercial Application

Area	Category	Part No.	Description	pg
External	Cellular	TG.35	Apex II Ultra-Wideband 4G LTE Antenna	44
		GSA.8827	Phoenix I-Bar Adhesive Mount Wide-Band LTE/ Cellular/ CDMA Antenna	25
	Combination	MA600	Spartan 3in1 GPS-GLONASS/ Cellular/ WiFi Screw Mount	83
	ISM/LoRa	MA602	Spartan 3in1 GPS-GLONASS/Cellular/Iridium Screw Mount	145
		FW.86	Meteor FW.86 868MHz Flexible Whip Monopole	106
Iridium	STS.01	Spartan Iridium Transceiver Antenna System	144	
Internal	Cellular	PA.710	Warrior Ultra Wide-Band LTE/Cellular/CDMA SMD Antenna	19
		PCS.06.A	Havok Low Profile LTE/Cellular 2G/3G/4G SMD Dielectric Antenna	47
		FXUB70	2G/3G/4G Flexible MIMO Antenna	46
		FXP14	Hepta-Band Cellular/ Assisted GPS Flexible PCB Antenna	21

### 6. Healthcare and Medical

Area	Category	Part No.	Description	pg
External	UHF 450MHz	TLS.30	Shockwave 450-470MHz Terminal Antenna	108
Internal	Cellular	PA.25A	Anam Hexa-Band Cellular Ceramic PIFA	18
		TG.22	2G/3G Cellular Connector Mount Monopole Antenna	36
	WiFi	PC17	2.4GHz Ultra Miniature PCB Antenna	123
		PC14	Circular Dual Band 2.4-5.2GHz PCB Antenna	134
		FXP.831	2.4/4.9-6.0Ghz Flex PCB Antenna	135
GNSS/ Iridium	CGIP.25	GPS/Iridium Dual-Band Patch Antenna	141	

### 7. Home Automation

Area	Category	Part No.	Description	pg
External	Cellular	GSA.8841	I-Bar Wide-band 4G LTE	26
		GSA.8827	Phoenix I-Bar Adhesive Mount Wide-Band LTE/ Cellular/ CDMA Antenna	25
	WiFi	GW.05	Dual-Band WiFi 2.4-5GHz Terminal Mount Antenna	132
	Combination	MA208	Stream 2in1 GPS & 2G/3G/4G Adhesive Mount Antenna	94
		MA204	Stingray 2in1 GPS & 2G/3G Adhesive Mount Antenna, SMA(M)	92
Iridium	STS.01	Spartan Iridium Transceiver Antenna System	144	
Internal	Cellular	PA.710	Warrior Ultra Wide-Band LTE/Cellular/CDMA SMD Antenna	19
		PCS.06.A	Havok Low Profile LTE/Cellular 2G/3G/4G SMD Dielectric Antenna	47
		FXUB70	2G/3G/4G Flexible MIMO Antenna	46
		FXP14	Hepta-Band Cellular/ Assisted GPS Flexible PCB Antenna	21
	GNSS	AGGBLA.03	Embedded GPS/GLONASS/BeiDou Active Loop Antenna	75
	WiFi	FXP74	Black Diamond 2.4GHz Band/ Flexible PCB Antenna	122
		FXP.524	Venti 4x4 MIMO Dual-Band 5GHz Flex PCB Antenna	136
		FXP840	Freedom Dual Band 2.4GHz - 5GHz/ Micro Flexible PCB Antenna	135
		WLA.01	2.4GHz WLAN/WiFi/Bluetooth/ZigBee/ High Efficiency Loop Antenna	126
		SDWA.01	Dual Band 2.4/5.8GHz Wi-Fi Ceramic SMD Antenna	137
SWLP.12		2.4GHz Wi-Fi/WLAN/ISM/ZigBee SMD Patch Antenna	124	

## 8. Defence

Area	Category	Part No.	Description	pg
External	Cellular	<b>GSA.8827</b>	Phoenix I-Bar Adhesive Mount Wide-Band LTE/Cellular/CDMA Antenna	25
	Combination	<b>MA600</b>	Spartan 3in1 GPS-GLONASS/Cellular/WiFi Screw Mount	83
		<b>MA602</b>	Spartan 3in1 GPS-GLONASS/Cellular/Iridium Screw Mount	145
		<b>MA705</b>	Pantheon 3in1 Permanent Mount GPS/GLONASS & 2G/3G & WiFi	99
		<b>STS.01</b>	Spartan Iridium Transceiver Antenna System	144
Internal	Cellular	<b>PA.710</b>	Warrior Ultra Wide-Band LTE/Cellular/CDMA SMD Antenna	19
		<b>FXP14</b>	Hepta-Band Cellular/ Assisted GPS Flexible PCB Antenna	21

## 9. Public Safety: Wireless Data Video Stream, Police, Fire and EMS

Area	Category	Part No.	Description	pg
External	Combination	<b>MA600</b>	Spartan 3in1 GPS-GLONASS/ Cellular/ WiFi Screw Mount	83
		<b>MA673</b>	Spartan 3in1 3x Dual Band WiFi Screw Mount	98
		<b>MA602</b>	Spartan 3in1 GPS-GLONASS/ Cellular/ Iridium Screw Mount	145
		<b>MA510</b>	Hercules 2in1 MIMO Dual-Band 2.4/5.0GHz	80
		<b>MA760</b>	Pantheon 4in1 GPS-GLONASS/ 2xLTE MIMO/ WiFi	90
		<b>MA750</b>	Pantheon 5in1 GPS/ 2xLTE MIMO/ 2x WiFi MIMO Screw Mount	91
	Cellular	<b>TG.35</b>	Apex II Ultra-Wideband 4G LTE Antenna	44
		<b>GSA.8827</b>	Phoenix I-Bar Adhesive Mount Wide-Band LTE/Cellular/CDMA Antenna	25
	Iridium	<b>STS.01</b>	Spartan Iridium Transceiver Antenna System	144
	Internal	Cellular	<b>PA.710</b>	Warrior Ultra Wide-Band LTE/Cellular/CDMA SMD Antenna
<b>FXP14</b>			Hepta-Band Cellular/ Assisted GPS Flexible PCB Antenna	21
Combination		<b>CGIP.25</b>	GPS/Iridium Dual-Band Patch Antenna	141
WiFi		<b>FXP524</b>	Venti 4x4 MIMO Dual-Band 5GHz Flex PCB Antenna	136

## 10. Autonomous driving and UAVs

Area	Category	Part No.	Description	pg
External	WiFi	<b>GW.11</b>	2.4GHz Dipole Antenna	119
		<b>TCR.02</b>	5.8GHz External Rx & Tx Antenna	138
	Combination	<b>MA104</b>	Hercules 2in1 GPS & 2G/3G Screw Mount	78
	GNSS	<b>GRS.01</b>	Maverick GPS/GLONASS/BeiDou Smart Antenna Receiver system	138
	Accessories	<b>LPF.12.01</b>	Airvu 1.2GHz Low Pass Filter	139
		<b>BPF.24.01</b>	Airvu 2.4GHz Band Pass Filter	139
		<b>BPF.58.01</b>	Airvu 5.8GHz Band Pass Filter	139
Internal	Cellular	<b>PA.25A</b>	Anam Hexa-Band Cellular Ceramic PIFA	18
		<b>PCS.06.A</b>	Havok PCS.06 2G/3G/4G Low Profile SMD Antenna	20
	WiFi	<b>WDP.2458</b>	2.4/5.8GHz Ceramic Patch Antenna 25*25*4mm	137
	GNSS	<b>GP.1575</b>	GPS 1575MHz Patch Antenna 25*25*4mm	140



# On Board Cellular Antenna Solutions (SMD)

## Embedded Cellular 2G/3G/4G SMD Mount Range

Taoglas' unique ceramic multi-band cellular antennas use high grade ceramics which have been developed through years of expertise in delivering the right materials for high performance antennas.

The patent pending PA.700.A or "Viking" is an SMD solution and a favorite of global vehicle manufacturers. It is capable of operating at 700 to 960MHz and 1710 to 2200MHz and is 2G/3G/4G compatible.

The "Viking" has wide bandwidths over a small area and minimal transmission loss while being highly efficient and giving

impressive TRP/TIS results. The dense, robust ceramic antennas pass drop tests and 20G automotive vibration tests. Delivered on tape and reel and then soldered onto the board during the re-flow process, the "Viking" brings clear production benefits. The "Viking" antenna offers you automated assembly, reliability and uniform performance from every device.



**Model No**

PA.22A  
GSM Dielectric  
PIFA Antenna  
Tri-Band Cellular  
Ceramic PIFA

**Electrical Data**

**Working Freq.** 880~960MHz  
1710~1990MHz  
**VSWR** 2.5 Max\*.  
**Polarization** Linear  
**Impedance** 50Ω  
**Return Loss** <-10dB  
**Efficiency** >50%

**Mechanical Data**

**Dimensions** 29.8\*6\*5mm  
**Mounting** SMD  
**Ground Plane** 35\*115mm  
**Op. Temp.** -40°C~+105°C  
\*First Tier Automotive TS16949 approved



**Model No**

PA.25A  
Anam  
Hexa-Band Cellular  
Ceramic PIFA

**Electrical Data**

**Working Freq.** 824~960MHz  
1700~2170MHz  
**VSWR** 3.0 Max\*.  
**Polarization** Linear  
**Impedance** 50Ω  
**Return Loss** <-10dB  
**Efficiency** >50%

**Mechanical Data**

**Dimensions** 35\*5\*6mm  
**Mounting** SMD  
**Ground Plane** 40\*97mm  
**Op. Temp.** -40°C~+105°C  
\*First Tier Automotive TS16949 approved



**Model No**

PA.700.A  
Viking  
Wide-Band  
LTE/Cellular/CDMA  
Ceramic PIFA

**Electrical Data**

**Working Freq.** 689~960MHz  
1710MHz~2170MHz  
**VSWR** 3.0 Max  
**Polarization** Linear  
**Impedance** 50Ω  
**Return Loss** <-16dB  
**Efficiency** >56%

**Mechanical Data**

**Dimensions** 40\*6\*5mm  
**Mounting** SMD  
**Ground Plane** 140\*40mm  
**Op. Temp.** -40°C~+85°C  
\*First Tier Automotive TS16949 approved

\*VSWR depends on the environment

## Cellular SMD Mount Metal PIFA Range

Our custom metal stamp PIFA and monopole antenna range offers the highest efficiency for small form factor applications where ground is small or where there is no room for a ceramic solution. These antennas are 100% customized for each design so will suit high volume or critical applications



Example of a Metal Stamp Solution

## On Board Cellular Antenna Solutions (SMD)

### Embedded LTE Cellular SMD Mount Range

The patent pending PA.710.A or “Warrior” is a revolutionary high efficiency SMD LTE ceramic antenna, with 2G/3G/4G compatibility which operates at 698 to 960MHz and 1710 to 2690MHz. The “Warrior” is manufactured with high grade custom ceramic material and new design techniques to attain the highest stability in all bands when mounted on the device’s main PCB. These antennas are delivered on tape and reel.



#### Model No

PA.710.A  
**Warrior**  
 LTE Ultra Wide-Band  
 SMD Antenna  
 Ceramic PIFA

#### Electrical Data

**Working Freq.** 698~960MHz  
 1710MHz~2690MHz  
**VSWR:** 3.0 Max  
**Polarization** Linear  
**Impedance** 50Ω  
**Peak Gain** 2 dBi typ.  
**Efficiency** > 60%

#### Mechanical Data

**Dimensions** 40\*6\*5mm  
**Mounting** SMD  
**Ground Plane** 120\*45mm  
**Op. Temp.** -40°C~+85°C

\*First Tier Automotive TS16949 approved



#### Model No

PA.711.A  
**Warrior II**  
 LTE Ultra Wide-Band  
 SMD Antenna  
 Ceramic PIFA

#### Electrical Data

**Working Freq.** 698~960MHz  
 1710MHz~2690MHz  
**VSWR:** 3.0 Max  
**Polarization** Linear  
**Impedance** 50Ω  
**Peak Gain** 2 dBi typ.  
**Efficiency** > 52%

#### Mechanical Data

**Dimensions** 40\*6\*5mm  
**Mounting** SMD  
**Ground Plane** 120\*125\*6.8mm  
**Op. Temp.** -40°C~+85°C

\*First Tier Automotive TS16949 approved

\* Supplied as part of a MIMO Antenna Setup with PA710.

\*\* Refer to PAD.71X.A

# On Board Cellular Antenna Solutions (SMD)

## Embedded Cellular 2G/3G SMD Mount Range

**The PCS range are discreet and sturdy, with small form factors, lower profile of 3mm in height and resistance to detuning alongside the ease of tuning them in their device environment, instead of a complete retool.**

The PCS.06.A “Havok” and PCS.07.A “Nemesis” are both SMD LTE Cellular 2G/3G/4G embedded antennas. Small dimensions and low profile are the key features of the “Havok” and “Nemesis” antennas while maintaining the performance of larger equivalent models. The two models are also easily tuned in the device

environment. The minimal design of the “Havok” and “Nemesis” make them easy to mount directly on the edge of the PCB board. This range is more economical than ceramic antennas but they need a slightly larger ground plane to achieve greater efficiency.



### Model No

PCS.06.A  
**Havok**  
 Low Profile  
 LTE/Cellular  
 2G/3G/4G  
 SMD Dielectric  
 Antenna

### Electrical Data

**Working Freq.** 698~960MHz  
 1710MHz~2690MHz  
**VSWR:** 3.0 Max  
**Polarization** Linear  
**Impedance** 50Ω  
**Peak Gain** 3 dBi typ.  
**Efficiency** > 62%

### Mechanical Data

**Dimensions** 42\*10\*3mm  
**Mounting** SMD  
**Ground Plane** 123\*45mm  
**Op. Temp.** -40°C~+85°C



### Model No

PCS.07.A  
**Nemesis**  
 Low Profile  
 Cellular  
 2G/3G  
 SMD Dielectric  
 Antenna

### Electrical Data

**Working Freq.** 824~960MHz  
 1710MHz~2170MHz  
**VSWR:** 3.0 Max  
**Polarization** Linear  
**Impedance** 50Ω  
**Peak Gain** 2.9 dBi typ.  
**Efficiency** > 42%

### Mechanical Data

**Dimensions** 35\*7\*3mm  
**Mounting** SMD  
**Ground Plane** 100\*40mm  
**Op. Temp.** -40°C~+85°C

## Internal 2G/3G Flexible PCB Antennas FXP Series

Flexible printed circuit antennas are made from Flexible Polymer. Ultra low-profile, they can be directly adhered to even the curved housings of a product.

The FXP14 Hexa Band Cellular antenna is an extremely versatile product, covering all world-wide bands (850/900/1700/1800/1900/2100MHz). The FXP14 is adaptable to a huge variety of technologies. The FXP14 is an extremely versatile and powerful antenna used by some of the world's largest brands. The FXP07.07.B and FXP14 are general purpose, flexible stick-on PCB's. Connection to the main board is usually made by mechanical contact. The FXP07B has an added feature that it can be soldered to the edge of the main device ground-plane to optimize the efficiency.



### Model No

**FXP14**  
2G/3G Cellular  
1575MHz GPS  
Flexible Polymer  
Antenna  
Ground Plane  
Independent

### Electrical Data

**Working Freq.** 850/900/1700/  
1800/1900/2100 MHz  
1575.42MHz GPS  
**Peak Gain** 3dBi  
**Polarization** Linear  
**Impedance** 50Ω  
**Return Loss** < -17dB  
**Efficiency** > 50%

### Mechanical Data

**Dimensions** 70\*20\*0.1mm  
**Mounting** Adhesive  
**Op. Temp.** -40°C~+85°C  
**Cable\*** 100mm Ø 1.13  
**Connector\*** IPEX MHFIV (U.FL comp)  
**Material** Flex Polymer  
**Adhesive Tape** 3M 467



### Model No

**FXP07B**  
Embedded  
2G/3G  
Flex Monopole  
Antenna

### Electrical Data

**Working Freq.** 850/900/1800  
/1900/2100MHz  
**Radiation Pattern** Omni-directional  
**Polarization** Linear  
**Impedance** 50Ω  
**Return Loss** < 9dB avg.  
**Efficiency** > 30% w/ GND

### Mechanical Data

**Dimensions** 41\*24\*0.1mm  
**Mounting** Adhesive  
**Op. Temp.** -40°C~+85°C  
**Cable\*** 100mm Ø 1.13  
**Connector\*** IPEX MHFI (U.FL comp)  
**Material** Flex Polymer  
**Adhesive Tape** 3M 467

\* For assisted GPS only.

\* Cables and connectors are customizable.

# Embedded Cellular Flexible Series (with Cable & Connector)

## Flexible Polymer PCB Antennas

The FXP40 is made from poly-flexible material, has a tiny form factor (42.6mm\*12.1mm\*0.15mm) and has double-sided 3M tape for easy “peel and stick” mounting. The patent pending FXUB63 flexible ultra wideband antenna has been designed to

cover all working frequencies in the 698-3000MHz spectrum, covering all Cellular, 2.4GHz Wi-Fi, ISM and AGPS. The antenna features excellent efficiencies on all bands, ground independent, with cable and connector for easy installation.



### Model No

**FXUB63**  
LTE Wide Band  
Flex Antenna  
698~3000MHz

### Electrical Data

**Working Freq.** 698~3000MHz  
**Radiation Pattern** Omni-directional  
**Peak Gain** 5dBi  
**Polarization** Linear  
**Impedance** 50Ω  
**Return Loss** -12dB typ.  
**Efficiency** > 50%

### Mechanical Data

**Dimensions** 96\*21\*0.2mm  
**Mounting** Adhesive  
**Op. Temp.** -40°C~+85°C  
**Cable** 150mm Ø1.37  
**Connector** IPEX MHFI (U.FL comp)  
**Material** Flexible Polymer  
**Adhesive Type** 3M 467



### Model No

**FXP40**  
2G Quad-Band  
GSM850/GSM900/  
DCS/PCS  
Flexible PCB Antenna

### Electrical Data

**Working Freq.** 824~960/  
1710~1990MHz  
**Radiation Pattern** Omni-directional  
**Peak Gain** 1.37dBi  
**Polarization** Linear  
**Impedance** 50Ω  
**Return Loss** ≤ 5dB  
**Efficiency** > 24%

### Mechanical Data

**Dimensions** 46.2\*12.1\*0.15mm  
**Mounting** Adhesive  
**Op. Temp.** -40°C~+85°C  
**Cable\*** 85mm Ø 1.13  
**Connector\*** IPEX MHFI (U.FL comp)  
**Material** Flex Polymer  
**Adhesive Tape** 3M 467



### Model No

**FXP29**  
2100MHz 3G  
UMTS/HSPA+ Band  
Flexible PCB Antenna

### Electrical Data

**Working Freq.** 1920~2170MHz  
**Radiation Pattern** Omni-directional  
**Peak Gain** 1.5dBi  
**Polarization** Linear  
**Impedance** 50Ω  
**Return Loss** -10dB max  
**Efficiency** 45%

### Mechanical Data

**Dimensions** 12.7\*8.4\*0.24mm  
**Mounting** Adhesive  
**Op. Temp.** -40°C~+85°C  
**Cable\*** 70mm Ø1.13mm  
**Connector\*** IPEX MHFI (U.FL comp)  
**Material** Flex Polymer  
**Adhesive Tape** 3M 467

# Embedded Cellular Flexible Series (with Cable & Connector)

## LTE Flexible Polymer PCB/MIMO Antennas

The Maximus antenna has a unique hybrid design. Within one antenna structure the electromagnetic waves travel in two predominant propagation modes - one for lower frequencies, (e.g. LTE at 700 MHz) and the other for higher 4G and Wi-Fi frequencies up to 6GHz.

The FXUB70 flexible polymer antenna, at 182\*21\*0.2mm, is ultra thin and truly wideband with high efficiencies across the bands. The patent pending FXUB71 antenna is an industry

leading embedded LTE 2\*2 MIMO flexible polymer monopole type antenna for worldwide LTE applications, which also works equally well on 2G and 3G applications. Great care has been taken to ensure high isolation between the MIMO antenna elements to maximise MIMO throughput.



### Model No

**FXUB66**  
**Maximus**  
 Flexible Ultra  
 Wide Band Antenna  
 700~6000MHz

### Electrical Data

**Working Freq.** 700~6000MHz  
**Radiation Pattern** Omni-directional  
**Peak Gain** 5dBi  
**VWSR** < 3:1 typ.  
**Polarization** Linear  
**Impedance** 50Ω  
**Return Loss** -10dB typ.  
**Efficiency** > 60%  
**Max Input Power** 5W

### Mechanical Data

**Dimensions** 120.4\*50.4\*0.2mm  
**Mounting** Adhesive  
**Op. Temp.** -40°C~+85°C  
**Cable** 150mm Ø1.37mm  
**Connector** IPEX MHFI (U.FL comp)  
**Material** Flexible Polymer  
**Adhesive Type** 3M 467



### Model No

**FXUB70**  
 4G LTE Wide Band  
 Flex MIMO Antenna  
 698~3000MHz

### Electrical Data

**Working Freq.** 698~3000MHz  
**Radiation Pattern** Omni-directional  
**Peak Gain** 5dBi  
**VWSR** < 3:1 typ.  
**Polarization** Linear  
**Impedance** 50Ω  
**Return Loss** -10dB typ.  
**Efficiency** > 50%  
**Max Input Power** 5W

### Mechanical Data

**Dimensions** 182\*21\*0.2mm  
**Mounting** Adhesive  
**Op. Temp.** -40°C~+85°C  
**Cable** 150mm Ø1.37mm  
**Connector** IPEX MHFI (U.FL comp)  
**Material** Flexible Polymer  
**Adhesive Type** 3M 467



### Model No

**FXUB71**  
 4G LTE Wide Band  
 Flex MIMO  
 Antenna  
 698~3000MHz

### Electrical Data

**Working Freq.** 698~3000MHz  
**Radiation Pattern** Omni-directional  
**Peak Gain** 5dBi  
**VWSR** < 3:1 typ.  
**Polarization** Linear  
**Impedance** 50Ω  
**Return Loss** ≤-10dB typ.  
**Efficiency** >50%  
**Max Input Power** 2W

### Mechanical Data

**Dimensions** 240\*21\*0.15mm  
**Mounting** Adhesive  
**Op. Temp.** -40°C~+85°C  
**Cable** 150mm Ø1.37mm  
**Connector** IPEX MHFI (U.FL comp)  
**Material** Flexible Polymer  
**Adhesive Type** 3M 467

\* Cables and connectors are customizable.

# Internal 2G/3G Antenna

## PC Series - Rigid 2G/3G Cellular Antennas

The PC series are ground plane independent antennas which save on space, making them suitable for even smaller sized M2M devices in tracking, navigation, automotive and telemedical markets.

Taoglas also can design and tune custom antennas for your device. Where space is available the PC104 should be used to provide high efficiency and best performance.



### Model No

**PC104**  
Penta-Band Cellular  
FR4 PCB Antenna  
Adhesive Mount

### Electrical Data

**Working Freq.** 850/900/1800/  
1900/2100MHz  
**Radiation Pattern** Omni-directional  
**Peak Gain** 2dBi  
**Polarization** Linear  
**Impedance** 50Ω  
**Return Loss** ≤ 10dB  
**Efficiency** 62%+

### Mechanical Data

**Dimensions** 80\*20\*1mm  
**Cable\*** 164.9mm Ø 1.37  
**Connector\*** IPEX MHFI (U.FL comp)  
**Adhesive** 3M 467  
**Op. Temp.** -40°C~+85°C



### Model No

**PC27**  
**The Stripe™**  
Quad-Band Cellular  
FR4 PCB Antenna

### Electrical Data

**Working Freq.** 850/900/  
1800/1900MHz  
**Radiation Pattern** Omni-directional  
**Peak Gain** 0dBi  
**Polarization** Linear  
**Impedance** 50Ω  
**Return Loss** ≤ -10dB  
**Efficiency** 20% avg.

### Mechanical Data

**Dimensions** 34\*7\*0.8mm  
**Cable\*** 100mm Ø 1.13  
**Connector\*** MHF 11 (U.FL comp)  
**Op. Temp.** -40°C~+85°C



### Model No

**PC30**  
Penta-Band Cellular  
FR4 PCB Antenna

### Electrical Data

**Working Freq.** 850/900/1800  
/1900/2100MHz  
**Radiation Pattern** Omni-directional  
**Peak Gain** 0dBi  
**Polarization** Linear  
**Impedance** 50Ω  
**Return Loss** ≤ -10dB  
**Efficiency** 50% avg.

### Mechanical Data

**Dimensions** 75\*8\*0.8mm  
**Cable\*** 100mm Ø 1.13  
**Connector\*** IPEX MHFI (U.FL comp)  
**Op. Temp.** -40°C~+85°C

## External 2G/3G Adhesive Mount Antennas First Tier Automotive Approved

**Our adhesive mount external antennas offer ease of installation, high performance in compact form factors. They are supplied with high quality durable 3M tape to allow secure fixing onto any surface.**

The GSA.8827 “Phoenix” ultra-wideband I-Bar is a favorite of first-tier automotive manufacturers, after-market modification and telematics. Its slim-line design allows for covert and convenient installation in automotive vehicles and its Omni-directional gain across all bands ensures constant reception and transmission. The “Phoenix” is a rugged, adept antenna that can pick up all 2G/3G/4G cellular modules worldwide. The GSA.8821 I-Bar is a high gain, flexible, efficient GSM antenna solution. It is compliant with AT&T antenna standards and comes with fully customizable cables and connectors.



### Model No

**GSA.8827**  
**Phoenix I-Bar**  
2G/3G/4G  
Ultra Wideband and  
Adhesive Mount

### Electrical Data

**Working Freq.** 698-960/1575.42  
1710-2700MHz  
**Radiation Pattern** Omni-directional  
**Gain** 2dBi avg.  
**Polarization** Linear  
**Impedance** 50Ω  
**Return Loss** ≤-10dB avg.  
**Efficiency** > 41% avg.  
On non-metal

### Mechanical Data

**Dimensions** 105\*30\*7.7mm  
**Mounting** Adhesive  
**Cable\*** 1M RG174  
**Connector\*** SMA(M)  
**Housing** UV Resistant PC/ABS  
**IP Rating** IP65

\*First Tier Automotive TS16949 approved

### Model No

**GSA.8821**  
**I-Bar**  
2G/3G Cellular  
Adhesive Mount

### Electrical Data

**Working Freq.** 850/900/1800  
/1900/2100MHz  
**Radiation Pattern** Omni-directional  
**Gain** 2dBi avg.  
**Polarization** Linear  
**Impedance** 50Ω  
**Return Loss** ≤-7dB avg.  
**Efficiency** > 30% avg.  
On non-metal

### Mechanical Data

**Dimensions** 106.7\*14.7\*5.8mm  
**Mounting** Adhesive  
**Cable\*** 3M RG-174  
**Connector\*** SMA(M)  
**Housing** ABS POLYLAC PA-757  
**IP Rating** IP65

\*First Tier Automotive TS16949 approved

\* Cables and connectors are customizable.



# External 2G/3G Adhesive Mount Antennas

## First Tier Automotive Approved

The GSA.8822 “T-Bar” 2G/3G Omni-directional antenna is used in many 2G and 3G applications which require stable reception and transmission. Ease and speed of installation make it a perfect fit for the telematics industry, being an ideal tracking system or for cellular car kits.

The GSA.8830 comes in a slim-line, dipole design encased in waterproof heat-shrink material, allowing for covert and convenient installation in automotive vehicle.

Omni-directional gain across all bands means that reception and transmission is constant and reliable. The GSA.8830 is a great antenna for customers that appreciate the highest performance at a lower price.

The GSA.8841 LTE Wideband I-Bar Antenna is an external adhesive mount solution on glass and plastic for automotive and telematics applications.



### Model No

**GSA.8822**  
**T-Bar**  
 2G/3G  
 Penta-Band  
 Adhesive Mount

### Electrical Data

**Working Freq.** 850/900/1800/  
190/2100MHz  
**Radiation Pattern** Omni-directional  
**Gain** -2dBi avg  
**Polarization** Linear  
**Impedance** 50Ω  
**Return Loss** ≤-10dB avg.  
**Efficiency** > 28% avg.

### Mechanical Data

**Dimensions** 106\*13\*6.7mm  
**Mounting** 3M Adhesive  
**Cable\*** 3M RG174  
**Connector\*** SMA(M)  
**Housing** UV Resistant ABS  
**IP Rating** IP67

\*First Tier Automotive TS16949 approved



### Model No

**GSA.8830**  
**I-Bar**  
 Penta-Band  
 Heat-Shrink Wrapped  
 Adhesive Mount

### Electrical Data

**Working Freq.** 850/900/1800  
/1900/2100MHz  
**Radiation Pattern** Omni-directional  
**Gain** -3 dBi avg  
**Polarization** Linear  
**Impedance** 50Ω  
**Return Loss** ≤-10dB avg.  
**Efficiency** > 73% avg.

### Mechanical Data

**Dimensions** 90\*20.8\*4.6mm  
**Mounting** 3M Adhesive  
**Cable\*** 2M RG-174  
**Connector\*** SMA(M)  
**Housing** PE Heat Shrink  
**IP Rating** IP67 (Internal PCB)

\*First Tier Automotive TS16949 approved



### Model No

**GSA.8841**  
**I-Bar**  
 2G/3G/4G LTE  
 Heat-Shrink Wrapped  
 Adhesive Mount

### Electrical Data

**Working Freq.** 698-6000MHz  
**Radiation Pattern** Omni-directional  
**Gain** 2dBi avg.  
**Polarization** Linear  
**Impedance** 50Ω  
**Return Loss** ≤-5dB avg.  
**Efficiency** > 53% avg.

### Mechanical Data

**Dimensions** 176 \* 59 \*11.6 mm  
**Mounting** 3M Adhesive  
**Cable\*** 1M NFC-200  
**Connector\*** SMA(M)  
**Housing** UV Resistant ABS  
**IP Rating** IP65

\*First Tier Automotive TS16949 approved

## External Cellular Magnetic Mount Magnetic Mount Antennas

Compact, highly proficient and with a straightforward installation process, Taoglas magnetic mount external antennas are perfect for remote monitoring, vending machines and other terminal type applications.

At Taoglas our approach is to tune the antenna specifically for its housing, giving your device maximum sensitivity. We provide the cable and connector required to directly connect your device to our antennas, making the install that much easier. The MB.TG30 achieves world class standards for a magnet mount 4G solution with highest efficiencies.



### Model No

**GA.110**  
2G/3G/4G LTE  
Ultra Wide-Band  
Magnetic Mount

### Electrical Data

<b>Working Freq.</b>	698MHz ~ 960MHz, 1575.42MHz, 1710MHz to 2700MHz, 3500MHz
<b>Radiation Pattern</b>	Omni-directional
<b>Peak Gain</b>	3dBi
<b>Polarization</b>	Linear
<b>Impedance</b>	50Ω
<b>Return Loss</b>	<10dB
<b>Efficiency</b>	40%

### Mechanical Data

<b>Dimensions</b>	H: 298mm Ø 50mm
<b>Mounting</b>	Magnetic Mount
<b>Whip Material</b>	Coated Brass
<b>Connector</b>	1M RG-174 SMA(M)
<b>IP Rating</b>	IP65



### Model No

**GA.107**  
Penta-Band  
Whip Antenna  
Magnetic Mount

### Electrical Data

<b>Working Freq.</b>	850/900/1800 /1800/1900 /2100MHz
<b>Radiation Pattern</b>	Omni-directional
<b>Peak Gain</b>	2dBi Typ
<b>Polarization</b>	Linear
<b>Impedance</b>	50Ω
<b>Return Loss</b>	≤-12dB avg.
<b>Efficiency</b>	> 30% avg.

### Mechanical Data

<b>Dimensions</b>	H: 116mm Ø 29.5mm
<b>Mounting</b>	Magnetic Mount
<b>Cable*</b>	2M RG-174
<b>Connector*</b>	SMA(M)
<b>IP Rating</b>	IP65



### Model No

**Apex Magforce  
MB.TG30**  
Straight Fixed  
Dipole Terminal  
Magnetic Mount

### Electrical Data

<b>Working Freq.</b>	698 ~ 960MHz 1575 MHz 1710 ~ 2700MHz
<b>Radiation Pattern</b>	Omni-directional
<b>Peak Gain</b>	2dBi Typ
<b>Polarization</b>	Linear
<b>Impedance</b>	50Ω
<b>Return Loss</b>	≤-12dB avg.
<b>Efficiency</b>	> 50% avg.

### Mechanical Data

<b>Dimensions</b>	H: 196mm Ø 84mm
<b>Mounting</b>	Magnetic Mount
<b>Cable*</b>	3M CFD 200
<b>Connector*</b>	SMA(M)
<b>IP Rating</b>	IP67 (IP65 Base)

\* Cables and connectors are customizable.

# External Cellular Whip Antennas

## Whip Antennas

At Taoglas our approach is to tune an antenna specifically for its housing, giving your device maximum sensitivity. We provide the cable and connector required to directly connect your device to our antennas, making the install that much easier.

The FW.90 is a flexible cellular whip antenna with IP67 housing. It is ideal for outdoor environments which require high gain on upper and lower bands. It offers stable peak gain above 2dBi on all five common cellular bands (2G/3G/GSM/CDMA) used worldwide.

The FW.92 shares the same IP67 housing, wide response/high peak gain and is equally as effective on 2G/3G/GSM/CDMA bands. It comes with a RP-N type male connector and stable peak gain above 3dBi.



### Model No

**FW.90.SMA.M**  
**Meteor**  
 2G/3G/4G  
 Flexible Inner  
 Steel Core  
 Monopole Whip

### Electrical Data

**Working Freq.** 698~960MHz  
 1710~2690MHz  
**Radiation Pattern** Omni-directional  
**Peak Gain** 2dBi avg.  
**Polarization** Linear  
**Impedance** 50Ω  
**Return Loss** ≤-5dB avg.  
**Efficiency** > 50% avg.

### Mechanical Data

**Dimensions** H: 250mm  
 Ø 17mm  
**Mounting** Screw Mount  
**Op. Temp.** -40°C~+85°C  
**Connector\*** SMA(M)  
**IP Rating** IP67  
 (IP65 Connector)



### Model No

**FW.91.TNC.M**  
**Meteor**  
 2G/3G  
 Flexible Inner  
 Steel Core  
 Monopole Whip

### Electrical Data

**Working Freq.** 850/900/1800  
 /1900/2100MHz  
**Radiation Pattern** Omni-directional  
**Peak Gain** 2.5dBi avg.  
**Polarization** Linear  
**Impedance** 50Ω  
**Return Loss** ≤-10dB avg.  
**Efficiency** > 56% avg.

### Mechanical Data

**Dimensions** H: 255mm  
 Ø 16mm  
**Mounting** Screw Mount  
**Op. Temp.** -40°C~+85°C  
**Connector\*** TNC (M)  
**IP Rating** IP67  
 (IP65 Connector)



### Model No

**FW.92.RNT.M**  
**Meteor**  
 2G/3G  
 Flexible Inner  
 Steel Core  
 Monopole Whip

### Electrical Data

**Working Freq.** 850/900/1800  
 /1900/2100MHz  
**Radiation Pattern** Omni-directional  
**Peak Gain** 3dBi avg.  
**Polarization** Linear  
**Impedance** 50Ω  
**Return Loss** ≤-10dB avg.  
**Efficiency** > 55% avg.

### Mechanical Data

**Dimensions** H: 274mm  
 Ø 20mm  
**Mounting** Screw Mount  
**Op. Temp.** -40°C~+85°C  
**Connector\*** RP-N-type (M)  
**IP Rating** IP67  
 (IP65 Connector)

\* Note: These antennas should be used with a ground plane.

## External Cellular Wall Mount

### Cyclops Cellular Solution for Industrial Applications

With one eye on tenacity, the WM.90 “Cyclops” wall mount monopole is perfect for those in the automotive or industrial industries. Steel-cored and IP67 waterproof the “Cyclops” is resistant to collision, vandalism, wear and tear as well as adverse weather conditions.

The whip of the “Cyclops” is made up of an extensive inner steel core covered by TPU which is the key to its ability to survive accidents and deterioration. The built in bracket allows complete concealment of the cable for more secure integration and cleaner installation. The cable can also be routed out of the back wall of the bracket into the interior of the mounting wall for added security against vandalism. The cable and connector are both customizable and the whip itself can be modified for whatever frequency bands or gain requirements you need. We are constantly working on new connection versions of the whip.

#### Model No

**WM.90**  
**Cyclops**  
Wall Mount High Gain  
FW.90  
on Integrated L-Bracket

#### Electrical Data

Working Freq.	698~960MHz 1710~2690MHz
Radiation Pattern	Omni-directional
Gain	2.8~4.0dBi
Polarization	Linear
Impedance	50Ω
Return Loss	≤-10dB typ.
Efficiency	> 50% avg.

#### Mechanical Data

Dimensions	H: 250mm, Ø 16mm
Bracket	H: 118mm, L: 120mm, W:32mm
Mounting	Wall Mount L Bracket
Cable*	3M CFD-200
Connector*	SMA(M) ST
Op. Temp.	-40°C~+85°C
IP Rating	IP67



\* Cables and connectors are customizable.

# External Cellular Permanent Screw Mount Antennas

## Cellular Antenna External Range Cable and Connector

**The G30 Olympian is a high performance screw mount wide-band cellular antenna for external use on vehicles and outdoor assets worldwide.**

The G30 or “Olympian” can offer 4G LTE speeds globally on vehicles and outdoor assets. The “Olympian” offers consistent high bandwidth transmission that is vital for mobile broadband or video applications.

The G21.B or “Hercules” is the smallest high performance Penta-band Cellular (GSM/CDMA/PCS/DCS/UMTS/WCDMA/HSDPA) antenna on the market today.

The G24 or “Ultima” is a 2G/3G 800MHz to 2200MHz Cellular antenna solution for professional telematics purposes.



**Model No**

**G30**  
**Olympian**  
 Direct Mount  
 Ultra Wide-Band  
 LTE/Cellular/CDMA/Wi-Fi  
 Antenna for 2G/3G/4G

**Electrical Data**

**Working Freq.** 689~960MHz  
 1710~2700MHz  
 2.4GHz  
**VSWR** <3.0:1  
**Polarization** Linear  
**Impedance** 50Ω  
**Peak Gain** 2.1 dBi typ.  
**Efficiency** 43% avg.  
**Max Input Power** 5 W

**Mechanical Data**

**Dimensions** H:48mm, Ø 50mm  
**Mounting** Screw Mount  
**Thread** M12  
**Cable** 1M RG316  
**Connector** SMA(M)  
**Housing** UV Resistant ABS  
**Base and Thread** Nickel plated steel  
**IP Rating** IP67

\*First Tier Automotive TS16949 approved



**Model No**

**G21.B**  
**Hercules GEN II**  
 Penta-Band  
 Screw Mount

**Electrical Data**

**Working Freq.** 850/900/1800  
 /1900/2100MHz  
**Radiation Pattern** Omni-directional  
**Gain** 2dBi avg.  
**Polarization** Linear  
**Impedance** 50Ω  
**Return Loss** -13dB avg.  
**Efficiency** > 23% avg.

**Mechanical Data**

**Dimensions** H:28.5mm, Ø 49mm  
**Mounting** Screw Mount  
**Thread** M18  
**Cable\*** 3M RG-174  
**Connector\*** SMA(M)  
**Housing** UV Resistant PC  
**Op. Temp.** -40°C~+85°C  
**IP Rating** IP67 & IP69K

\*First Tier Automotive TS16949 approved



**Model No**

**G24**  
**Ultima**  
 Super Low Profile  
 Penta Band Cellular  
 Screw Mount (Permanent)  
 GSM/GPRS/CDMA/HSPA

**Electrical Data**

**Working Freq.** 850/900/1700/1800  
 /1900/2100MHz  
**Radiation Pattern** Omni-directional  
**Gain** 2dBi typ  
**Polarization** Linear  
**Impedance** 50Ω  
**Return Loss** <-10dB typ  
**Efficiency** > 30% with GND  
 > 39% without GND

**Mechanical Data**

**Dimensions** H:19.6mm, Ø 55mm  
**Mounting** Screw Mount  
**Thread** M24  
**Cable** 3M CFD200  
**Connector** SMA(M)  
**Housing** Durable UV PC  
**Base and Thread** ABS  
**IP Rating** IP67

\*First Tier Automotive TS16949 approved

## External GSM-Wall Mounted Antenna Hercules Gen II

The Gen II “Hercules” steel thread antenna is the product of in the field research and expertise, resulting in an ability to operate globally, deliver consistent data and go the distance in a fleet management or AVL capacity.

The wall mount G20 “Hercules Gen II” is a high performance, covert, wall-mounted, cellular antenna for 2G and 3G applications. This antenna can easily fix to a wall or metal surface. The wall mount G20 antenna has Omni-directional radiation patterns across all bands ensuring constant reception and transmission. The “Hercules” has been designed for heavy duty applications in outdoor environments, featuring a low profile, extra thick steel threads, strong washers and durable UV resistant ABS. Combined, these features make the Hercules tamper-proof, durable and an inconspicuous piece of kit.

### Model No

G20.WMC  
Hercules GEN II  
Penta-Band  
Covert Wall and Cabinet Mount

### Electrical Data

Working Freq.	850/900/1700/1800 /1900/2100MHz
Radiation Pattern	Omni-directional
Gain	2dBi avg.
Polarization	Linear
Impedance	50Ω
Return Loss	-5dB avg.
Efficiency	> 46% avg.

### Mechanical Data

Dimensions	H: 92.4mm, L: 129mm
Mounting	Bracket
Thread	M18
Cable*	3M NFC-200
Connector*	SMA(M)
Op. Temp.	-40°C~+85°C
IP Rating	IP67 & IP69K



\* Cables and connectors are customizable.

# Ceiling Mount Antennas

## Crusader

**When you need an all-in-one solution for providing wireless networking in a public or large office situation the “Crusader” gives you Omni-directional coverage for Cellular and Wi-Fi technologies.**

The CM.02 or “Crusader” is a wideband antenna covering 700MHz to 6GHz, with 2G/3G/4G and Wi-Fi 802.11 capability all and is Omni-directional, compared to competitors who cannot offer Omni-directional on all frequencies. Providing CPE and Hotspot

needs all “under one roof” combined with an attractive, subdued form makes it a clear choice for hotels, conference centre’s, exhibition halls, offices, retail outlets and many other locations.



### Model No

**CM.02**  
**Crusader**  
 Ceiling Mount 3dBi  
 LTE/GSM/CDMA/HSPA/UMTS/WCDMA/Wi-Fi/ WIMAX/ISM  
 High Peak Gain, High Efficiency Wide-Band Antenna

### Electrical Data

<b>Working Freq.</b>	0.7~1.0	1.0~2.0	2.0~3.0	3.0~4.0	4.0~5.0	5.0~6.0
<b>Radiation Pattern</b>	Omni					
<b>Peak Gain</b>	1.6dBi typ.	1.9dBi typ.	3.0dBi typ.	3.6dBi typ.	3.6dBi typ.	4.4dBi typ.
<b>Ave. Efficiency</b>	88%	87%	85%	81%	73%	65%
<b>Polarization</b>	Vertical					
<b>Impedance</b>	50Ω					

### Mechanical Data

<b>Dimensions</b>	H:97.5mm, Ø 167.5mm
<b>Mounting</b>	Thread Ø 17.25mm
<b>Op. Temp.</b>	-40°C~+85°C
<b>Cable*</b>	0.3M RG-58
<b>Connector*</b>	N Type Female

Standard length is 3M please contact us at [info@taoglas.com](mailto:info@taoglas.com).

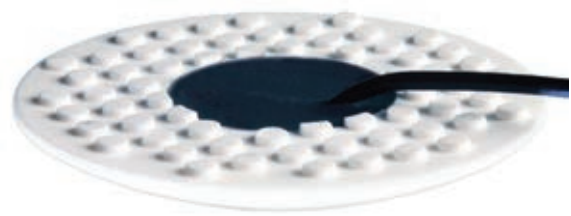
## External GSM-CDMA-Cellular Antenna Road Marker Antenna

Taoglas USA have designed a range of discreet, hardy antennas for use inside US standard raised non-reflective roadmarkers.

The RG.02.01 and RG.02.02 are purpose made for and installed inside "Bott's dots" that can be laid directly on the pavement and road in the USA. These antennas exhibit remarkable efficiencies in such small packages and such low profile enclosures as the "Bott's dots". They can be mounted directly on the road, pavement or any manhole cover, just like a standard roadmarker.



Road Marker  
Top View



Road Marker  
Underside View

### Model No

**RG.02.01**  
**Road Marker Kit**  
Quad-Band Cellular Antenna RG.01  
with CAB.826 Cable Assembly  
Low Profile

### Electrical Data

**Working Freq.** AMPS/GSM/PCS/DCS  
850/900/1800/1900

**Radiation Pattern** Omni-directional

**Gain** 2dBi

**Polarization** Linear

**Impedance** 50Ω

**Return Loss** ≤-16dB avg.

**Efficiency** > 23% avg.

### Mechanical Data

**Dimensions** H: 17.6mm, Ø 101.4mm

**Casing** UV Resistant PP

**Cable** RG.01: 1.5M WY-100  
CAB.826: 1.5M WY-100

**Connector** RG.01: SMB(M) Jack  
CAB.826: SMB(F) to SMA(M)ST

**Op. Temp.** -40°C~+85°C

**IP Rating** IP67

### Model No

**RG.02.02**  
**Road Marker Kit**  
Quad-Band Cellular Antenna RG.01  
with CAB.820 Cable Assembly  
Low Profile

### Electrical Data

**Working Freq.** AMPS/GSM/PCS/DCS  
850/900/1800/1900

**Radiation Pattern** Omni-directional

**Gain** 2dBi

**Polarization** Linear

**Impedance** 50Ω

**Return Loss** ≤-1dB avg.

**Efficiency** > 23% avg.

### Mechanical Data

**Dimensions** H: 17.6mm, Ø 101.4mm

**Casing** UV Resistant PP

**Cable** RG.01: 1.5M WY-100  
CAB.820: 1.5M WY-100

**Connector** RG.01: SMB(M) Jack  
CAB.820: SMB(F) to TNC(M)ST

**Op. Temp.** -40°C~+85°C

**IP Rating** IP67

\* Cables and connectors are customizable.



# External 2G/3G - Omni-directional Outdoor Antennas

## Barracuda Outdoor Antennas

The “Barracuda” excels in difficult outdoor environments or in boosting cellular coverage.

The OMB.8912.03F21 and OMB.8912.05F21 or “Barracuda” are two Omni-directional antenna covering frequencies of 850MHz to 2100MHz. With fiberglass housing and UV resistant coating, the “Barracuda” are well suited to outdoor environments, boosting

cellular coverage in remote areas. The “Barracuda” includes both pole and wall mountings making it a thoroughly adjustable product.



### Model No

**OMB.8912.03F21**  
**Barracuda**  
 3 dBi Penta-band  
 Cellular Indoor/Outdoor  
 Omni-directional

### Electrical Data

**Working Freq.** 850/900/1800  
 1900/2100 MHz  
**Radiation Pattern** Omni-directional  
**Peak Gain** 3 dBi  
**Polarization** Vertical  
**Impedance** 50Ω  
**VWSR** 2.0 Max  
**Efficiency** >79%

### Mechanical Data

**Length** 527 mm  
**Base Diameter** 70\*55mm (Max)  
**Mount Style** Pole Mount/Wall Mount  
**Mounting** Stainless Steel  
**Op. Temp.** -40°C~+60°C  
**Weight (G.W)** 350g  
**Radome Material** White Fiberglass  
**Connector** N Type Female



### Model No

**OMB.8912.05F21**  
**Barracuda**  
 5 dBi Penta-band  
 Cellular Indoor/Outdoor  
 Omni-directional

### Electrical Data

**Working Freq.** 850/900/1800  
 1900/2100 MHz  
**Radiation Pattern** Omni-directional  
**Peak Gain** 5 dBi  
**Polarization** Vertical  
**Impedance** 50Ω  
**VWSR** 2.0 Max  
**Efficiency** >83%

### Mechanical Data

**Length** 595 mm  
**Base Diameter** 70\*55mm (Max)  
**Mount Style** Pole Mount/Wall Mount  
**Mounting** Stainless Steel  
**Op. Temp.** -40°C~+60°C  
**Weight (G.W)** 350g  
**Radome Material** White Fiberglass  
**Connector** N Type Female

## 2G/3G/4G Terminal Mount Series

### Cellular Range Terminal (Connector) Mount Antennas

The TG.10 Triton dipole antenna can be used straight or hinged 90 degrees. The antenna has a wide-band response 2G/3G/4G and can also be used for other cellular and wireless applications such as GSM, LTE, UMTS and Wi-Fi.

The TG.09 Penta-band Cellular Hinged Rotatable SMA antenna, is a high efficiency monopole antenna. Compared to other much larger antennas on the market, it has superior wide-band high

efficiency characteristics. This antenna is used by many of the leading wireless device providers in the world marketplace.

The TG.19 quad-band GSM-DCS-PCS-CDMA-GPRS-EDGE 824MHz to 1990MHz monopole helical antenna is a quality robust antenna with high gain in a small form factor. Its tiny size allows it to be used inside as well as outside product housings.



#### Model No

**TG.10**  
**Triton**  
Cellular 2G/3G/4G  
Assisted GPS  
Hinged SMA(M)  
Dipole Terminal  
Antenna

#### Electrical Data

<b>Working Freq.</b>	698-960MHz 1575.42 1710-2690MHz
<b>Radiation Pattern</b>	Omni-directional
<b>Polarization</b>	Linear
<b>Impedance</b>	50Ω
<b>Return Loss</b>	<-3dB avg.
<b>Efficiency</b>	40%+ typ.
<b>Input Power</b>	10SW

#### Mechanical Data

<b>Dimensions</b>	H: 168mm Ø 18mm
<b>Housing</b>	UV Resistant, PC/ABS
<b>Op. Temp.</b>	-40°C~+85°C
<b>Connector</b>	Hinged SMA (M)



#### Model No

**TG.09**  
**Penta-Band Cellular**  
**Rotatable Hinge**  
**Monopole**  
**Terminal Antenna**

#### Electrical Data

<b>Working Freq.</b>	850/900/ 1800/1900/ 2100MHz
<b>Radiation Pattern</b>	Omni-directional
<b>Polarization</b>	Linear
<b>Impedance</b>	50Ω
<b>Return Loss</b>	<-7dB avg.
<b>Efficiency</b>	> 59% with Ground

#### Mechanical Data

<b>Dimensions</b>	H: 72mm Ø 10mm
<b>Mounting</b>	Hinged Rotatable 360°
<b>Connector*</b>	SMA(M)
<b>Op. Temp.</b>	-40°C~+85°C



Available  
in black  
and white

#### Model No

**TG.19**  
**Quad-Band Cellular**  
**Mini Helical**  
**Monopole**

#### Electrical Data

<b>Working Freq.</b>	850/900/1800 /1900MHz
<b>Gain</b>	0 dBi
<b>Polarization</b>	Linear
<b>Impedance</b>	50Ω
<b>Return Loss</b>	-9dB avg.
<b>Efficiency</b>	> 47% avg. (Ground plane dependent)

#### Mechanical Data

<b>Dimensions</b>	H: 28.5mm Ø 7.8mm L: 17mm (connector)
<b>Required Space</b>	28.5*17.0*7.8mm
<b>Material</b>	UV Resistant ABS
<b>Connector</b>	SMA(M)RA

\*Also available with Reverse Polarity Connectors

## 2G/3G Terminal Mount Series

### Cellular Range Terminal (Connector) Mount Antennas

**Used worldwide by leading wireless devices providers, our terminal antennas eliminate cable loss and inconsistent performance associate with cable antennas.**

The TG.22 series of antennas are monopole helical antennas for 2G/3G Cellular. Once mounted to an adequate ground plane it is a compact robust terminal antenna with high gain and stable efficiency in a small form factor. Connection is made

through a number of options – SMA(M) Straight, Right Angle and Reverse Polarity options available. The HT version applies highly resistant Dupont® Hytrel® TPEE material which is durable in high temperature application environments up to 150°C.



Available in black and white

#### Model No

**TG.22.0111 (Straight)**  
Penta-Band Cellular  
Helical Monopole

#### Electrical Data

<b>Working Freq.</b>	850/900/1800 /1900/2100MHz
<b>Radiation Pattern</b>	Omni-directional
<b>Polarization</b>	Linear
<b>Impedance</b>	50Ω
<b>Return Loss</b>	≤-5dB avg.
<b>Efficiency</b>	> 30% (Ground plane dependent)

#### Mechanical Data

<b>Dimensions</b>	H: 45mm Ø 7.8mm
<b>Mount</b>	Straight
<b>Op. Temp.</b>	-40°C~+85°C
<b>Connector</b>	SMA(M)*

\* Available with RP-SMA(M)



Available in black and white

#### Model No

**TG.22.0112 (R/A)**  
Penta-Band Cellular  
Helical Monopole

#### Electrical Data

<b>Working Freq.</b>	850/900/1800 /1900/2100MHz
<b>Radiation Pattern</b>	Omni-directional
<b>Polarization</b>	Linear
<b>Impedance</b>	50Ω
<b>Return Loss</b>	-8.8dB avg.
<b>Efficiency</b>	> 27% (Ground plane dependent)

#### Mechanical Data

<b>Dimensions</b>	H: 45mm, Ø 7.8mm L: 17mm (connector)
<b>Mount</b>	R/A
<b>Op. Temp.</b>	-40°C~+85°C
<b>Connector</b>	SMA(M) R/A*

\* Available with RP-SMA(M) R/A



Available in black and white

#### Model No

**TG.22.0112 HT**  
Penta-Band Cellular  
Helical Monopole

#### Electrical Data

<b>Working Freq.</b>	800MHz~2200MHz
<b>Gain</b>	0dBi
<b>Radiation Pattern</b>	Omni-directional
<b>Polarization</b>	Linear
<b>Impedance</b>	50Ω
<b>VSWR</b>	≤ 2.3
<b>Power Handling</b>	20W

#### Mechanical Data

<b>Dimensions</b>	H: 45mm, Ø 7.8mm L: 17mm (connector)
<b>Mount</b>	R/A
<b>Op. Temp.</b>	-40°C~+150°C
<b>Connector</b>	SMA(M) RA

## 2G/3G Terminal Mount Series

### Cellular Range Terminal (Connector) Mount Antennas

The TG.22.0221 and TG.22.0222 antenna have been tuned specifically for optimum efficiency when connected directly to the Sierra Wireless Airlink GL series programmable module. Connection is made via FME(F) Straight or Right Angle connectors

with a hardened TPEE casing, these antennas are a good compact 2G/3G antenna for remote monitoring devices or telematics applications.



#### Model No

**TG.22.0221**  
Penta-Band Cellular  
Monopole Helical

#### Electrical Data

**Working Freq.** 850/900/1800  
/1900/2100MHz  
**Radiation Pattern** Omni-directional  
**Polarization** Linear  
**Impedance** 50Ω  
**Return Loss** ≤-5dB avg.  
**Efficiency** > 37%  
(Ground plane dependent)

#### Mechanical Data

**Dimensions** H: 52.3mm  
Ø 7.8mm  
**Mount** Straight  
**Op. Temp.** -40°C~+85°C  
**Connector** FME(F)



#### Model No

**TG.22.0222**  
Penta-Band Cellular  
Monopole Helical

#### Electrical Data

**Working Freq.** 850/900/1800  
/1900/2100MHz  
**Radiation Pattern** Omni-directional  
**Polarization** Linear  
**Impedance** 50Ω  
**Return Loss** -8dB avg.  
**Efficiency** > 37%  
(Ground plane dependent)

#### Mechanical Data

**Dimensions** H: 45mm, Ø 7.8mm  
L: 24.7mm (connector)  
**Mount** R/A  
**Op. Temp.** -40°C~+85°C  
**Connector** FME(F)RA

# 2G/3G/4G Terminal Mount Series

## Shockwave - Terminal Robust Antenna - NMO Type

**Used worldwide by leading wireless devices providers, our terminal antennas eliminate cable loss and inconsistent performance associate with cable antennas.**

The TL.10 “Shockwave” series is a new generation of antenna produced with security in mind. A unique indent tab allows

for both securing the antenna with a wrench and also making replacement of the antenna by qualified personnel possible.



Also available in white



Underside of TL.10 with NMO Type connector

### Model No

**TL.10**  
**Shockwave**  
 Ultra Wide-Band Direct Mount  
 Covers all common  
 2G/3G/4G Cellular - ISM - Wi-Fi Bands

### Electrical Data

**Working Freq.** 698MHz to 960MHz, 1575.42MHz  
 1710MHz to 2700MHz,  
**Radiation Pattern** Omni-directional  
**Peak Gain** 2dBi\*  
**Polarization** Vertical  
**Impedance** 50Ω  
**Efficiency** up to 90%

\* on 30cm x 30cm ground plane

### Mechanical Data

**Dimensions** H: 84mm, Ø 41mm  
**Housing** PC + PBT  
**Base** Stainless Steel  
**Connector** NMO (M)  
**IP Rating** IP67 and IP69K  
**Op. Temp.** -40°C~+85°C



TL.10 with NMO Direct Mount



TL.10 with NMO Magnetic Mount

## 2G/3G/4G Terminal Mount Series

### Shockwave - Terminal Robust Antenna

The “Shockwave” range offers superior performance over wide-bands compared to more traditional whip antennas and is especially suitable for cellular applications.

The permanent mount, fully waterproof “Shockwave” range are robust external 2G/3G/4G and antennas. With efficiencies of up to 95%, a minimum peak gain of 2.5dBi and stable radiation patterns over low angles it's an obvious choice for cellular applications such as public safety, HD video streaming, utilities and Smart Cities, fleet management and agricultural. The range is IP67 and IP69K resistant against high pressure water jets, making it perfect for indoor or in harsh outdoor environments.



#### Model No

**TLS.01.1F21**  
**Shockwave**  
 2G/3G/4G Terminal Antenna  
 N Type(F) connector

#### Electrical Data

**Working Freq.** 698 to 960/1575.42/1710 to 2700MHz  
**Radiation Pattern** Omni-directional  
**Peak Gain** <2.2 dBi avg.  
**Polarization** Vertical  
**Impedance** 50Ω  
**Return Loss** <-10 Max  
**Max Input** 100W  
**Efficiency** up to 95%\*  
 \*on 30cmx30cm ground plane

#### Mechanical Data

**Dimensions** H: 79.45mm ø: 42mm  
**Housing** UV Resistant ABS  
**Weight** 169G  
**Connector\*** N type(F)  
**Op. Temp** -40°C to 85°C  
**IP Rating** IP67 and IP69K



#### Model No

**TLS.01.1F11**  
**Shockwave**  
 2G/3G/4G and GPS Antenna  
 Permanent Mount  
 N Type(M) connector

#### Electrical Data

**Working Freq.** 698 to 960/1575.42/1710 to 2700MHz  
**Radiation Pattern** Omni-directional  
**Peak Gain** <3 dBi avg  
**Polarization** Vertical  
**Impedance** 50Ω  
**Return Loss** <-10 Max  
**Max Input** 100W  
**Efficiency** up to 95%\*  
 \*on 30cmx30cm ground plane

#### Mechanical Data

**Dimensions** H: 79.45mm ø: 42mm  
**Housing** UV Resistant ABS  
**Weight** 130g  
**Connector\*** N type (M)  
**Op. Temp** -40°C to 85°C  
**IP Rating** IP67 and IP69K



#### Model No

**TLS.01.305111**  
**Shockwave**  
 2G/3G/4G Terminal Antenna  
 3M CFD-200 SMA(M)

#### Electrical Data

**Working Freq.** 698 to 960/1575.42/1710 to 2700MHz  
**Radiation Pattern** Omni-directional  
**Peak Gain** <3 dBi avg  
**Polarization** Vertical  
**Impedance** 50Ω  
**Return Loss** <-10 Max  
**Max Input** 100W  
**Efficiency** up to 77%\*  
 \* on 30x30cm ground plane

#### Mechanical Data

**Dimensions** H: 79.45mm ø: 42mm  
**Housing** UV Resistant ABS  
**Weight** 270g  
**Cable** 3m CFD-200  
**Connector\*** SMA (M)  
**Op. Temp** -40°C to 85°C  
**IP Rating** IP67 and IP69K

\*\* Also available with Fakra Code D connector

# External 4G LTE Solutions

## MIMO Antennas

The “Gemini”, a highly efficient indoor or outdoor antenna, is the best solution for 4G 2x2 Worldwide LTE MIMO applications. It operates at all common 4G LTE bands, including 2G and 3G so it can be used as a fallback for 2G or 3G applications.

The Gemini LTE 4G MIMO 2X2 is a robust, fully IP67 waterproof antenna designed for use with 2G/3G/4G MIMO cellular routers and access points worldwide. This unique antenna can be wall mounted or placed on a flat surface, using the stand holder, for easy mounting. This customizable antenna was designed for multiple applications including; HD real-time streaming, intelligent transport systems, IoT applications, digital signage, HD broadcast systems and wireless 4G LTE MIMO M2M devices with 3G functionality.



### Model No

LMA100  
Gemini  
4G 2x2 Worldwide LTE MIMO  
Wall Mount or Desktop Mount  
2\* Low Loss 1M CFD-200 Cables

### Electrical Data

Working Freq. 698 to 960MHz,1710-2170MHz,2490 to 2690MHz  
Radiation Pattern Omni-directional  
Peak Gain <3.5dBi avg.  
Polarization Vertical  
Impedance 50Ω  
Return loss >-15dBi avg  
Efficiency MIMO 1 up to 74%, MIMO 2 up to 69%

### Mechanical Data

Dimensions 164\*164\*36.5mm  
Mount Style Wall/Desktop Mount  
Casing PC+ABS  
Op. Temp -40°C to 85°C  
Weight 400g  
Cable\* 2\* 1M CFD-200  
Connector\* SMA(M)  
IP Rating IP67

## External 4G LTE Direct Mount Antennas

### Ultra Wide-Band, Fourth Generation, 4G Network Antenna Range

**Our range of ultra wide-band, robust, 4G antennas are designed with high efficiency in mind.**

The high performance G30 “Olympian” is an Omni-directional, screw mount antenna offering high gain and efficiency, ensuring a constant reception and transmission on all relevant bands. With its IP67 waterproof and vandal proof casing it is ideal for external use on vehicles and outdoor assets. This antenna is mounted on metal and plastic structures and is locked from the inside of the structure by a nut.



#### Model No

**G30**  
Olympian  
Direct Mount  
Ultra Wide-Band  
LTE/Cellular/CDMA  
Antenna for 2G/3G/4G

#### Electrical Data

**Working Freq.** 689~960MHz  
1710~2170MHz  
2500~2800MHz

**VSWR:** <3.0:1

**Polarization** Linear

**Impedance** 50Ω

**Peak Gain** 2.2 dBi typ.

**Efficiency** 45% avg.

**Max Input Power** 5 W

#### Mechanical Data

**Dimensions** H:48mm, Ø 50mm

**Mounting** Screw Mount

**Thread** M12

**Cable** 1m RG316

**Connector** SMA(M)

**Housing** UV Resistant ABS

**Base and Thread** Nickel plated Copper

**IP Rating** IP67

**Op. Temp.** -40°C~+85°C



#### Model No

**MA413**  
Storm  
Permanent Mount  
2G/3G/4G LTE Antenna

#### Electrical Data

**Working Freq.** 698 to 960MHz/1710  
to 2170MHz/ 2490  
to 2690MHz

**Radiation Pattern** Omni-directional

**Peak Gain** -4.5dBi avg

**Polarization** Linear

**Impedance** 50Ω

**VSWR** <3.5

**Efficiency** >40% avg.

#### Mechanical Data

**Dimensions** 216.24\*93.25\*30.95mm

**Mount Style** Screw Mount

**Casing** ABS and PC

**Op. Temp** -40°C to 85°C

**Base and Thread** Nickel Plated Aluminium

**Weight** 480g

**Cable\*** 3m CFD200

**Connector\*** SMA(M)

**IP Rating** IP67



# External 4G LTE MIMO Antennas

## Ultra Wide-Band, Fourth Generation, (4G) Network Antenna Range

**Our range of LTE MIMO 2\*2 Omni-directional, heavy-duty, fully IP67 waterproof, external M2M antennas were designed for use in telematics, transportation and remote monitoring applications.**

The MA.741 “Pantheon” LTE MIMO 2\*2 antenna operates at all common 2G, 3G and 4G LTE bands worldwide and includes two LTE MIMO antennas with the highest efficiency and peak gain possible. It is ideal when used with high speed data uplink and downlink systems as it provides maximum throughput and highest signal to noise ratio.

The MA241 “Genesis” delivers powerful MIMO antenna technology for worldwide 4G LTE bands and is designed for mounting directly on glass or plastic in the interior of vehicles. Low loss cables are used to keep efficiency high over long cable lengths and special care is taken to ensure high isolation between the two MIMO antennas. The “Storm” MA412 LTE MIMO antenna is the world lowest profile global telematics antenna solution and is used worldwide for telematics applications which require best in class LTE performance.



### Model No

**MA.741**  
**Pantheon 2 in 1**  
 LTE Cellular 2G/3G/4G  
 2\*2 MIMO  
 Screw-Mount

### Electrical Data

**Working Freq.** 698~960, 1710~2170  
 2300~2700,  
 2900~3500MHz  
**Polarization** Vertical  
**Impedance** 50Ω  
**Return Loss** -6dB avg.  
**Efficiency** > 40% avg.  
**Peak Gain** 2 dBi typ.

### Mechanical Data

**Dimensions** H: 85.7mm, Ø 145.6mm  
**Mounting** Screw Mount  
**Thread** Ø 30mm  
**Housing** Wonderloy PC-540  
 PC/ABS Alloy  
**IP Rating** IP67  
**Mimo 1** 3M CFD-200 SMA(M)  
**Mimo 2** 3M CFD-200 SMA(M)  
**Op. Temp.** -40°C~+85°C  
**Mimo 2** 3M CFD-200 SMA(M)  
**Op. Temp.** -40°C~+85°C



### Model No

**MA.241**  
**Genesis**  
 2in1 2G/3G/4G 2xMIMO  
 Adhesive Mount Antenna

### Electrical Data

**Working Freq.** 698 to 896/1710 to 2700MHz  
**Radiation Pattern** Omni-directional  
**Peak Gain** <2 dBi avg.  
**Polarization** Vertical  
**Impedance** 50Ω  
**VSWR** <3.5  
**Efficiency** LTE MIMO 1 - 42% (avg)  
 LTE MIMO 2 - 52% (avg)

### Mechanical Data

**Dimensions** 205.8 x 68 x 12.4mm  
**Mount Style** Adhesive Mount  
**Casing** PC and ABS Alloy  
**Op. Temp** -40°C to 85°C  
**Weight** 210g  
**Cable\*** 2m NFC-200  
**Connector\*** SMA(M)ST  
**IP Rating** IP67



### Model No

**MA.412**  
**Storm**  
 2in1 LTE MIMO  
 Aerodynamic, Super Low-profile  
 Screw mount

### Electrical Data

**Working Freq.** 698 to 960MHz/1710 to  
 2170MHz/ 2490 to 2690MHz  
**Radiation Pattern** Omni-directional  
**Peak Gain** -4.5dBi avg  
**Polarization** Linear  
**Impedance** 50Ω  
**VSWR** <3.5  
**Efficiency** >40% avg.

### Mechanical Data

**Dimensions** 216.24\*93.25\*30.95mm  
**Mount Style** Screw Mount  
**Casing** ABS and PC  
**Op. Temp** -40°C to 85°C  
**Base and Thread** Nickel Plated Aluminium  
**Weight** 480g  
**Cable\*** 3m CFD200  
**Connector\*** SMA(M)  
**IP Rating** IP67

# LTE Antenna Solutions

## Apex TG.30

The Apex Dipole LTE Antenna is primarily designed for use with 4G LTE modules and devices that require the highest possible efficiency and peak gain.

The TG.30 "Apex" is a ground plane independent, Omni-directional 4G LTE antenna. It can be used on any device with or without a ground plane connection through the connector. The "Apex" has been put through intensive testing

and is guaranteed to meet any type of approval or carrier certification requirements from an RF standpoint.

The built-in mechanism allows the antenna part itself to be orientated in different directions and can help avoid touching off other antennas close by. The patent pending "Apex" is available in both black and white, with hinged and right angle connectors also offered. Enhancing product reliability and customer satisfaction is a constant challenge for any business. Taoglas antenna diagnostics will make sure you know that an external antenna is attached properly.



○ also available in white

### Model No

**TG.30.8113**  
**Apex**  
 Hinged and Rotatable  
 Ultra Wide-Band  
 4G LTE Antenna  
 Dipole (Ground Independent)

### Electrical Data

**Working Freq.** 698~960/1575.42  
 1700~2700MHz  
**Radiation Pattern** Omni-directional  
**Peak Gain (dBi)** 3 dBi  
**Polarization** Linear  
**Impedance** 50Ω  
**Return Loss** <-10dB avg.  
**Efficiency** > 70% typ.  
**Input Power** 10 W

### Mechanical Data

**Dimensions (S)** H: 186mm, L: 49mm, W: 10mm  
**Dimensions (R/A)** H: 162.5mm, L: 49mm, W: 10mm  
 Ø 12.8mm (connector mount)  
**Housing** UV Resistant, PC/ABS  
**Connector** SMA Male Hinged 90°  
 Swivel 90°  
**Op. Temp.** -40°C~+85°C



○ also available in white

### Model No

**TG.30.8111**  
**Apex**  
 Straight  
 Ultra Wide-Band  
 4G LTE Antenna

### Electrical Data

**Working Freq.** 698/960/1575.42  
 1710/2700MHz  
**Radiation Pattern** Omni-directional  
**Peak Gain (dBi)** 3dBi  
**Polarization** Linear  
**Impedance** 50Ω  
**Return Loss** <-10dB avg.  
**Efficiency** > 70% typ.  
**Input Power** 10 W

### Mechanical Data

**Dimensions** H: 171.1mm, L: 49mm  
 W: 10mm  
 Ø 12.8mm (connector)  
**Housing** UV Resistant, PC/ABS  
**Connector** SMA Male  
**Op. Temp.** -40°C~+85°C



○ also available in white

### Model No

**TG.30.8112**  
**Apex**  
 Right Angle  
 Ultra Wide-Band  
 4G LTE Antenna

### Electrical Data

**Working Freq.** 698/960/1575.42  
 1710/2700MHz  
**Radiation Pattern** Omni-directional  
**Peak Gain (dBi)** 3dBi  
**Polarization** Linear  
**Impedance** 50Ω  
**Return Loss** <-10dB avg.  
**Efficiency** > 70% typ.  
**Input Power** 10 W

### Mechanical Data

**Dimensions** H: 148.6mm, L: 49mm  
 W: 10mm ; Ø 12.8mm  
 L: 39.5mm (connector)  
**Housing** UV Resistant, PC/ABS  
**Connector** SMA Male  
**Op. Temp.** -40°C~+85°C

# LTE Antenna Solutions

## Apex II TG.35

The hinged Apex II TG.35 Ultra-Wideband dipole antenna has been designed to cover all Cellular, ISM and Wi-Fi working frequencies in the 700-6000 MHz spectrum.

Evolved from the already highly successful Apex TG.30, this second generation has the highest wide-band efficiency in its range of any terminal antenna on the market today. The Apex II has been primarily designed for use with 4G LTE modules and

devices that require the highest possible efficiency and peak gain to deliver best in class throughput on all major cellular (2G/3G/4G) bands worldwide for access points, terminals and routers. High efficiency is vital for applications such as high speed video and real-time streaming, or high capacity MIMO networks on public transportation.



○ also available in white

### Model No

**TG.35.8113**  
**Apex II**  
 Hinged  
 Ultra Wide-Band  
 4G LTE Antenna

### Electrical Data

**Working Freq.** 698-960/1575/1602  
 1710-2700MHz  
 4800-6000MHz

**Radiation Pattern** Omni-directional

**Peak Gain (dBi)** 4dBi

**Polarization** Linear

**Impedance** 50Ω

**Return Loss** <-10dB avg.

**Efficiency** > 70% typ.

**Input Power** 5 W

### Mechanical Data

**Dimensions** H: 224mm, L: 58mm  
 W: 10mm  
 Ø 12.8mm (connector)

**Housing** UV Resistant, PC/ABS

**Connector** SMA (M) Hinged

**Op. Temp.** -40°C~+85°C



● also available in black

### Model No

**TG.35.8113W**  
**Apex II**  
 Hinged  
 Ultra Wide-Band  
 4G LTE Antenna

### Electrical Data

**Working Freq.** 698-960/1575/1602  
 1710-2700MHz  
 4800-600MHz

**Radiation Pattern** Omni-directional

**Peak Gain (dBi)** 4dBi

**Polarization** Linear

**Impedance** 50Ω

**Return Loss** <-10dB avg.

**Efficiency** > 70% typ.

**Input Power** 5 W

### Mechanical Data

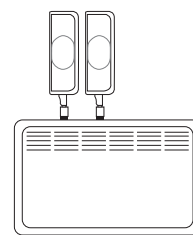
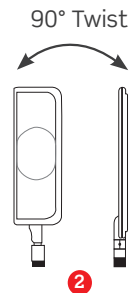
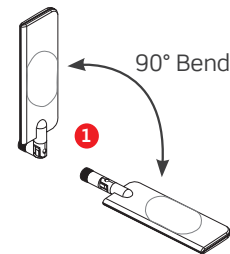
**Dimensions** H: 224mm, L: 58mm  
 W: 10mm  
 Ø 12.8mm (connector)

**Housing** UV Resistant, PC/ABS

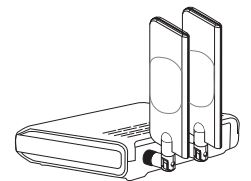
**Connector** SMA (M) Hinged

**Op. Temp.** -40°C~+85°C

Two ranges of motion for ease of installation in compact environments



Vertically Mounted on Router



2 x TG.35 will twist to fit side by side in compact space

# Internal 4G LTE Antennas

## Ultra Wide-Band, Fourth Generation, (4G) Network Antenna Range

The FXUB63 flexible ultra wideband antenna has been designed to cover all working frequencies in the 698-3000 MHz spectrum, covering all Cellular, 2.4GHz Wi-Fi, ISM and AGPS. The antenna is delivered with a flexible body with excellent efficiencies on all bands, ground independent, with cable and connector for easy installation. It enables designers to use only one antenna that covers all common LTE frequencies.

The FXUB66 future proofs device design for LTE and 4G globally. It is also the ideal antenna to fit in devices that are being retrofitted with wireless functionality, as it will cover non cellular applications such as 868, 915MHz or ZigBee applications. It's inherently wide bandwidth is more resistant to detuning than traditional small but narrow-band legacy antennas.



### Model No

**FXUB63**  
LTE Wide Band Flex  
Flexible  
Ultra Wide-Band  
698-3000MHz

### Electrical Data

**Working Freq.** 698-3000MHz  
**Radiation Pattern** Omni-directional  
**Peak Gain** 5 dBi typ.  
**VSWR:** <3.0:1  
**Polarization** Linear  
**Impedance** 50Ω  
**Return Loss** -10dB typ  
**Efficiency** > 45% avg.  
**Max Input Power** 5 W

### Mechanical Data

**Dimensions** 96\*21\*0.2 mm  
**Mounting** SMD  
**Op. Temp.** -40°C~+85°C  
**Cable** 1.37mm mini coax  
**Connector** IPEX MHFI  
(U.FL comp)  
**Material** Flexible Polymer  
**Adhesive Type** 3M 467MP



### Model No

**FXUB66**  
**Maximus**  
Flexible  
Ultra Wide-Band  
700~6000MHz

### Electrical Data

**Working Freq.** 700-6000MHz  
**Radiation Pattern** Omni-directional  
**Gain** 5 dBi  
**VSWR** < 3.5:1 typ  
**Polarization** Linear  
**Impedance** 50Ω  
**Return Loss** -10dB typ  
**Efficiency** > 55%  
**Max Input Power** 5 W

### Mechanical Data

**Dimensions** 120.4\*50.4\*0.2mm  
**Mounting** Adhesive  
**Op. Temp.** -40°C~+85°C  
**Cable** 1.37mm mini coax  
**Connector** IPEX MHFI  
(U.FL comp)  
**Material** Flexible Polymer  
**Adhesive Type** 3M 467MP

\*Cable and Connectors are Customizable

# Internal 4G LTE Flex Circuit MIMO Antennas

Ultra Wide-Band, Fourth Generation, (4G) Network Antenna Range

The patent pending FXUB70 and FXUB71 LTE wide-band flexible antennas have been designed to cover all working frequencies in the 698-3000 MHz spectrum, covering all Cellular, 2.4GHz Wi-Fi, ISM and AGPS. The antennas are delivered with a flexible body and excellent efficiencies on all bands, ground independent, with cable and connector for easy installation.



### Model No

**FXUB70**  
4G LTE Wide Band  
Flexible MIMO  
Ultra Wide-Band  
698-3000MHz

### Electrical Data

**Working Freq.** 698-3000MHz  
**Radiation Pattern** Omni-directional  
**Gain** 5 dBi  
**VSWR:** <3.0:1  
**Polarization** Linear  
**Impedance** 50Ω  
**Return Loss** -10dB typ.  
**Efficiency** 69% avg.  
**Max Input Power** 5 W

### Mechanical Data

**Dimensions** 182\*21\*0.2 mm  
**Mounting** SMD Adhesive  
**Op. Temp.** -40°C~+85°C  
**Cable** 1.37mm mini coax  
**Connector** IPEX MHFI  
(U.FL comp)  
**Material** Flexible Polymer  
**Adhesive Type** 3M 467MP



### Model No

**FXUB71**  
4G LTE MIMO  
Flexible  
Ultra Wide-Band  
698-3000MHz

### Electrical Data

**Working Freq.** 698-3000MHz  
**Radiation Pattern** Omni-directional  
**Gain** 5 dBi  
**VSWR** < 3:1 typ.  
**Polarization** Linear  
**Impedance** 50Ω  
**Return Loss** -10dB typ.  
**Efficiency** > 50%  
**Max Input Power** 2 W

### Mechanical Data

**Dimensions** 240\*21\*0.15 mm  
**Mounting** SMD Adhesive  
**Op. Temp.** -40°C~+85°C  
**Cable** 1.37mm mini coax  
**Connector** IPEX MHFHT  
(U.FL comp)  
**Material** Flexible Polymer  
**Adhesive Type** 3M 467MP

## LTE Antenna Solutions (Embedded)

### Ultra Wide-Band, Fourth Generation, (4G) Network Antenna Range

We have used years of cellular antenna design experience to predict the requirements of these new designs for emerging networks. These designs can be optimized and/or customized for any 4G device. On-board solutions of the flexible circuit antennas are also available.



#### Model No

**PA.700.A**  
**Viking**  
 Wide-Band  
 LTE/Cellular/CDMA  
 Ceramic PIFA

#### Electrical Data

**Working Freq.** 689-960MHz  
 1710-2170MHz  
**Radiation Pattern** Omni-directional  
**VSWR** 3.0 Max  
**Polarization** Linear  
**Impedance** 50Ω  
**Return Loss** <-16dB  
**Efficiency** ≥ 56%

#### Mechanical Data

**Dimensions** 40\*6\*5mm  
**Mounting** SMD  
**Ground Plane** 140\*40mm  
**Op. Temp.** -40°C~+85°C



#### Model No

**PCS.06.A**  
**Havok**  
 Low Profile  
 LTE/Cellular  
 2G/3G/4G  
 SMD Dielectric  
 Antenna

#### Electrical Data

**Working Freq.** 698-960MHz  
 1710-2690MHz  
**VSWR** 3.0 Max  
**Polarization** Linear  
**Impedance** 50Ω  
**Peak Gain** 3 dBi typ.  
**Efficiency** > 62 %

#### Mechanical Data

**Dimensions** 42\*10\*3mm  
**Mounting** SMD  
**Ground Plane** 123\*45mm  
**Op. Temp.** -40°C~+85°C

# LTE Antenna Solutions (Embedded)

## Ultra Wide-Band, Fourth Generation, (4G) Network Antenna Range

The PAD.71X.A “Gemini” LTE MIMO 2\*2 embedded antenna is the only compact MIMO antenna solution for the world LTE M2M and Internet of Things (IOT) market of today.

The “Gemini” has two antenna elements, the existing PA.710 LTE MIMO ceramic antenna successfully used in many LTE MIMO devices today, along with its new brother the PA.711 LTE MIMO ceramic antenna. By altering the radiation pattern of the PA.711 to that of the PA.710 (similar to reflecting), Taoglas has created

the world’s first high efficiency MIMO embedded wide-band cellular antenna conforming to an envelope correlation co-efficient of below 0.3. This minimal self interference is critical to achieve high data rates in today’s advanced LTE systems.



### Model No

**PA.710.A**  
**Warrior**  
 Ultra Wide-Band  
 LTE 2G/3G/4G  
 2G/3G/4G  
 Ceramic PIFA

### Electrical Data

**Working Freq.** 689~960MHz  
 1710MHz to 2690MHz  
**Radiation Pattern** Omni-directional  
**VSWR** 3.0 Max  
**Polarization** Linear  
**Impedance** 50Ω  
**Peak Gain** 2 dBi typ.  
**Efficiency** > 60%

### Mechanical Data

**Dimensions** 40\*6\*5mm  
**Mounting** SMD  
**Ground Plane** 120\*45mm  
**Op. Temp.** -40°C~+85°C



### Model No

**PA.711.A**  
**Warrior II**  
 Ultra Wide-Band  
 SMD Antenna  
 Ceramic PIFA

### Electrical Data

**Working Freq.** 698~960MHz  
 1710MHz to 2690MHz  
**VSWR:** 3.0 Max  
**Polarization** Linear  
**Impedance** 50Ω  
**Peak Gain** 2 dBi typ.  
**Efficiency** > 52%

### Mechanical Data

**Dimensions** 40\*6\*5mm  
**Mounting** SMD  
**Ground Plane** 120\*125\*6.8mm  
**Op. Temp.** -40°C~+85°C  
**Mounting** SMD  
**Ground Plane** 140\*40mm  
**Op. Temp.** -40°C~+85°C



### Model No

**PAD.71X.A**  
**Gemini**  
 Ultra Wide-Band  
 LTE/Cellular/CDMA  
 2G/3G/4G  
 Ceramic PIFA  
 MIMO 2\*2 ANTENNA

### Electrical Data

**Working Freq.** 689~960MHz  
 1710MHz to 2170MHz  
**Radiation Pattern** Omni-directional  
**VSWR** 3.0 Max  
**Polarization** Linear  
**Impedance** 50Ω  
**Return Loss** ≤-10 dB  
**Efficiency** > 40%

### Mechanical Data

**Dimensions** 120\*125mm  
**Op. Temp.** -40°C~+85°C  
**Connector** 2\*SMA (F)

\* Cables and Connectors are Customizable.

## Internal 3G/4G Digital Tunable Antennas

The DTAD.01 is an evaluation board for our patent pending Evolution DTA tunable antenna series – antennas which deliver higher efficiency on smaller ground-planes than traditional passive antennas, enabling a new miniaturized generation of high performance wireless devices.

The DTAD.01 board contains a surface-mount ceramic antenna DTA.01, a tunable capacitor PE64102 DuNE™ from Peregrine Semiconductor and a matching circuit. The board works with your device's microprocessor to dynamically improve the efficiency of a given antenna band in real time, covering multiple bands in a tiny form factor. Typical applications would be 3G on board diagnostic (OBDII), devices in automotive, medical telemetry devices, 4G dongles, access points and routers.

### Model No

<b>DTAD.01</b>
Digital Tunable Antenna
3G/4G cellular applications
Increase antenna efficiency from 7% to 28%

### Electrical Data

<b>Working Freq.</b>	698 to 960 and 1710 to 2170MHz
<b>Radiation Pattern</b>	Omni-directional
<b>Peak Gain</b>	>2.5 dBi
<b>Polarization</b>	Vertical
<b>Impedance</b>	50Ω
<b>Return Loss</b>	>-14 dBi
<b>Max Input</b>	26 dBm
<b>Efficiency</b>	40% avg.

### Mechanical Data

<b>Antenna Dimension</b>	40x6x5 mm
<b>Board Dimension</b>	60.50x45x1.57 mm
<b>Weight</b>	20g
<b>Connector</b>	SMA-Female





# Taoglas Antenna Diagnostics

## AntD<sup>®</sup> Chip Resistor Antennas

Taoglas antennas can enhance your product reliability and customer satisfaction by giving you the designer a way to ensure you know that an external antenna is attached properly.



### Model No

**TG.10R**  
**Triton**  
 Cellular 2G/3G/4G  
 Assisted GPS  
 Hinged SMA(M)  
 Terminal Antenna  
 With AntD<sup>®</sup>  
 Chip Resistor

### Electrical Data

**Working Freq.** 700~800/824~960/  
 1575.42/1710~1880  
 1850~1990/1710~2170  
 /2400~2500MHz

**Radiation Pattern** Omni-directional

**Polarization** Linear

**Impedance** 50Ω

**Peak Gain** >-3dBi

**Efficiency** >55%+ avg

**Input Power** 50 W

**Resistor** Shunt 10K Ohm (+/- 5%)  
 to Ground

### Mechanical Data

**Dimensions** H: 168mm  
 Ø 13mm

**Housing** PU

**Op. Temp.** -40°C~+85°C

**Connector** Hinged SMA Male



### Model No

**FXP14R**  
 Hexa-Band Cellular  
 1575MHz GPS  
 Flexible Polymer Antenna  
 Ground plane independent  
 With AntD<sup>®</sup>  
 Chip Resistor

### Electrical Data

**Working Freq.** 850/900/1700/  
 1800/1900/2100 MHz

**Radiation Pattern** Omni-directional

**Polarization** Linear

**Impedance** 50Ω

**Return Loss** <-7dBi

**Efficiency** >42%+ typ.

**Gain** >-3 dBi

**Resistor** Shunt 10K Ohm (+/- 5%)  
 to Ground

### Mechanical Data

**Dimensions** 70\*20\*0.1mm

**Mounting** Adhesive

**Op. Temp.** -40°C~+85°C

**Cable\*** 100mm Ø 1.13

**Connector\*** IPEX MHFII (U.FL comp)

**Material** Flex Polymer

**Adhesive Tape** 3M 467MP

# Taoglas Antenna Diagnostics

## AntD<sup>®</sup> Chip Resistor Antennas

With the addition of very minor circuitry to your design you can sense if the proper Taoglas antenna is attached or not as well as if damage to the antenna or coax cable has occurred.

Some radio modules even include this circuitry internally. The addition of the sensing resistor allows for DC sensing without interfering with the RF performance.

AntD antennas can be used on any radio product regardless if they have the sensing circuitry so you can buy and stock one part, even if not all your products have the diagnostic circuitry.



### Model No

**PC104R**  
Penta-Band Cellular  
FR4 PCB Antenna  
Adhesive Mount  
With AntD<sup>®</sup>  
Chip Resistor

### Electrical Data

**Working Freq.** 850/900/1800/  
1900/2100MHz  
**Radiation Pattern** Omni-directional  
**Peak Gain** 2dBi avg.  
**Polarization** Linear  
**Impedance** 50Ω  
**Return Loss** ≤-7dB  
**Efficiency** >42%  
**Resistor** Shunt 10K Ohm (+/- 5%)  
to Ground

### Mechanical Data

**Dimensions** 80\*20\*1mm  
**Cable\*** 164.9mm  
Ø 1.37 Coaxial Cable  
**Connector\*** IPEX  
**Material** FR4  
**Adhesive** 3M 467



### Model No

**GSA.8827R**  
**Phoenix I-Bar**  
2G/3G/4G  
Ultra Wide-Band  
Adhesive Mount  
With AntD<sup>®</sup>  
Chip Resistor

### Electrical Data

**Working Freq.** 698-960/1575.42  
1710-2700MHz  
**Radiation Pattern** Omni-directional  
**Gain** 2dBi avg.  
**Polarization** Linear  
**Impedance** 50Ω  
**Return Loss** ≤-5dB avg.  
**Efficiency** > 37%  
On non-metal  
**Resistor** Shunt 15K Ohm  
to Ground

### Mechanical Data

**Dimensions** 105\*30\*7.7mm  
**Mounting** Adhesive  
**Cable\*** 1M RG-174  
**Connector\*** SMA(M)  
**Housing** UV Resistant PC/ABS  
**IP Rating** IP65  
**Adhesive** 3M

# GPS External Antenna Solutions

## GPS External Antenna Range

Optimized in our unique test chambers, certified to the highest international standards, tuned and customized for M2M application – the Taoglas range of GPS and GLONASS antennas is peerless.

The AA.108 “Titan” is a first tier automotive approved IP67 antenna which has gone through stringent PPAP certification and is also a certified shipping part that is already in the global IMDS database system. The AA.108 is an adhesive mount antenna but we also offer the same performance in the AA.105 with a magnetic mount instead.

Compatible with a wide range of integrated LNA modules, the AA.109 is a 1 stage LNA magnetic mount antenna. Like its sister AA series models, its compact form makes for a hassle free install.



**Model No**

**AA.105**  
**Titan**  
 Magnetic Mount  
 High Gain (30dB)

**Electrical Data**

<b>Centre Freq.</b>	1575.42MHz
<b>Gain</b>	30dBic±2
<b>Noise Figure</b>	1.5dB Max
<b>VSWR</b>	1.92 Max.
<b>Axial ratio</b>	3.0dB Max
<b>Polarization</b>	RHCP
<b>Impedance</b>	50Ω
<b>Input Voltage</b>	2.7~5.5V
<b>Power Consum.</b>	@1.8V 2.3mA @2.7V 4.7mA @3.3V 6mA @5V 10.3mA

**Mounting Data**

<b>Dimensions</b>	25*25*4mm
<b>Mounting</b>	Magnetic Mount
<b>Op. Temp.</b>	-40°C~+85°C
<b>Cable*</b>	RG-174
<b>Connector*</b>	SMA(M)
<b>IP Rating</b>	IP67

\*First Tier Automotive TS16949 approved



**Model No**

**AA.108**  
**Titan**  
 Adhesive Mount  
 High Gain (30dB)  
 First Tier Automotive  
 Approved - TS16949

**Electrical Data**

<b>Centre Freq.</b>	1575.42MHz
<b>Gain</b>	30dBic±2
<b>Noise Figure</b>	1.5dB Max
<b>VSWR</b>	1.92 Max.
<b>Axial ratio</b>	3.0dB Max
<b>Polarization</b>	RHCP
<b>Impedance</b>	50Ω
<b>Input Voltage</b>	1.8~3.3V
<b>Power Consum.</b>	@1.8V 4.5mA @2.5V 6.6mA @2.7V 7mA

**Mounting Data**

<b>Dimensions</b>	25*25*4mm
<b>Mounting</b>	Adhesive
<b>Op. Temp.</b>	-40°C~+85°C
<b>Cable*</b>	RG-174
<b>Connector*</b>	SMA(M)
<b>IP Rating</b>	IP67

\*First Tier Automotive TS16949 approved



**Model No**

**AA.109**  
 1 Stage LNA (20dB)  
 Magnetic Mount

**Electrical Data**

<b>Centre Freq.</b>	1575.42MHz
<b>Gain</b>	20dBic±2
<b>Noise Figure</b>	1.3dB Max
<b>VSWR</b>	2.0 Max.
<b>Axial ratio</b>	1.0dB Max
<b>Polarization</b>	RHCP
<b>Impedance</b>	50Ω
<b>Input Voltage</b>	2.4~5.5V
<b>Power Consum.</b>	@3V 7mA Max @5V 16mA Max.

**Mounting Data**

<b>Dimensions</b>	H:15mm, Ø 45mm
<b>Mounting</b>	Magnetic Mount
<b>Op. Temp.</b>	-40°C~+85°C
<b>Cable*</b>	RG-174
<b>Connector*</b>	SMA(M)
<b>IP Rating</b>	IP67

\*First Tier Automotive TS16949 approved

\*Cable and Connectors are Customizable, Standard Length is 3M please contact us at info@taoglas.com

# GPS External Antenna Solutions

## Permanent Mount Antennas

The “Hercules” range has been designed for heavy duty applications in outdoor environments, featuring a low profile, extra thick steel threads, strong washers and durable UV resistant ABS. Our GNSS “Hercules” come in 2 Stage, 3 Stage and GPS/GLONASS combination.



### Model No

**A.01.C**  
**Hercules**  
 2 Stage 30dB  
 Screw Mount

### Electrical Data

**Centre Freq.** 1575.42MHz  
**Gain** 30dB typ. (@3V)  
**Noise Figure** 3.0dB Max (@3V)  
**VSWR** 2.0 Max.  
**Axial ratio** 3.0dB Max  
**Polarization** RHCP  
**Impedance** 50Ω  
**Input Voltage** 1.8~5.5V  
**Power Consum.** @1.8V 6mA Max  
 @3V 12mA Max  
 @5V 30mA Max.

### Mounting Data

**Dimensions** H:29mm, Ø 49mm  
**Mounting** Thread Ø 18mm  
**Op. Temp.** -40°C~+85°C  
**Cable\*** 3M RG-174  
**Connector\*** SMA(M)  
**IP Rating** IP67 & IP69K

\*First Tier Automotive TS16949 approved



### Model No

**A.03.C\*\***  
**Hercules**  
 3 Stage 40dB  
 Screw Mount

### Electrical Data

**Centre Freq.** 1575.42MHz  
**Gain** 40±2dB  
**Noise Figure** 1.5dB Max  
**VSWR** 2.0 Max.  
**Axial ratio** 3.0dB Max  
**Polarization** RHCP  
**Impedance** 50Ω  
**Input Voltage** 1.8~5.5V  
**Power Consum.** @1.8V 8mA Max  
 @3V 10mA Max  
 @5V 12mA Max.

### Mounting Data

**Dimensions** H:29mm, Ø 52mm  
**Mounting** Thread Ø 18mm  
**Op. Temp.** -40°C~+85°C  
**Cable\*** 10M RG-174  
**Connector\*** SMA(M)  
**IP Rating** IP67 & IP69K

\*First Tier Automotive TS16949 approved

\*\* A.03 is a Three Stage version of Hercules for longer cable lengths of >5M.

# GPS Active Embedded Antenna Modules

## Internal Active Patch Antennas

**Active GPS Patch Antenna Modules offer the best possible GPS performance for any device that needs to use internal antennas.**

Our active GPS patch antennas connect directly to your GPS module via a cable and connector or in some cases it can be soldered directly onto the edge of your board. Active antenna patches are already tuned for their own ground plane and LNA and have integrated front end SAW filters, meaning that

they are more resistant to the detuning effects of surrounding components and different device ground planes. They are also much more resistant to device noise rather than passive antennas, allowing most cases device integration.



### Model No

**AP.10E.07.0039B**  
 1 Stage 15dB  
 10mm Patch  
 Front End SAW Filter

### Electrical

**Frequency** 1575.42MHz  
**LNA Gain(3.0V)** 15dB Typ.  
**Antenna Gain** -10dBic  
**Axial Ratio** 4.0dB Max  
**Noise Figure (3.0V)** 2.5dB  
**Impedance** 50Ω  
**Polarization** RHCP  
**VSWR** 2.0 Max  
**Op. Temp** -40°C~+85°C  
**Rel. Humidity** 40%~95%  
**Input Voltage** Min: 1.8V  
 Typ: 3.0V  
 Max: 5.5V  
**Power Cons.** @1.8V 3mA Max  
 @3V 3mA Max  
 @5.5V 3mA Max

### Mounting Data

**Dimensions** 10\*10\*5.9mm  
**Cable\*** 39mm Ø 0.81mm  
**Connector\*** IPEX MHFI  
 (U.FL comp)



### Model No

**AP.10F.07.0039B**  
 2 Stage 25dB  
 10mm Patch  
 Front End SAW Filter

### Electrical

**Frequency** 1575.42MHz  
**LNA Gain(3.0V)** 25dB Typ.  
**Antenna Gain** -10dBic  
**Axial Ratio** 4.0dB Max  
**Noise Figure (3.0V)** 2.5dB  
**Impedance** 50Ω  
**Polarization** RHCP  
**VSWR** 2.0 Max  
**Op. Temp** -40°C~+85°C  
**Rel. Humidity** 40%~95%  
**Input Voltage** Min: 1.8V  
 Typ: 3.0V  
 Max: 5.5V  
**Power Cons.** @1.8V 5mA Max  
 @3V 10mA Max  
 @5.5V 23mA Max

### Mounting Data

**Dimensions** 10\*10\*4mm  
**Cable\*** 39mm Ø 0.81mm  
**Connector\*** IPEX MHFI  
 (U.FL comp)



### Model No

**AP.12F.07.0045A**  
 2 Stage 25dB  
 12mm Patch  
 Front End SAW Filter

### Electrical

**Frequency** 1575.42MHz  
**LNA Gain(3.0V)** 28dB Typ.  
**Antenna Gain** -5dBic  
**Axial Ratio** 4.0dB Max  
**Noise Figure (3.0V)** 2.0dB  
**Impedance** 50Ω  
**Polarization** RHCP  
**VSWR** 2.0 Max  
**Op. Temp** -40°C~+85°C  
**Rel. Humidity** 40%~95%  
**Input Voltage** Min: 1.8V  
 Typ: 3.0V  
 Max: 5.5V  
**Power Cons.** @1.8V 4mA Max  
 @3V 9mA Max  
 @5.5V 20mA Max

### Mounting Data

**Dimensions** 13.4\*13.4\*5.7mm  
**Cable\*** 45mm Ø 1.13mm  
**Connector\*** IPEX MHFI  
 (U.FL comp)

# GPS Active Embedded Antenna Modules

## Internal Active Patch Antennas

Taoglas Active GPS Patch Antenna Modules feature front end SAW filters; this offers better protection from nearby radiated power surges, and the SAW filter also reduces the radiated spurious emissions in devices.

Active antenna products simplify design and deliver the extra sensitivity required for accurate and reliable GPS performance. Active antennas deliver the shortest cold start time and best accuracy when compared to any other internal GPS antenna.



### Model No

**AP.17E.07.0064A**  
1 Stage 15dB  
17mm Patch  
Front End SAW Filter

### Electrical

Frequency	1575.42MHz
LNA Gain(3.0V)	15dB Typ.
Antenna Gain	-1.0dBic
Axial Ratio	3.0dB Max
Noise Figure (3.0V)	2.5dB
Impedance	50Ω
Polarization	RHCP
VSWR	2.0 Max
Op. Temp	-40°C~+85°C
Rel. Humidity	40%~95%
Input Voltage	Min: 1.8V Typ: 3.0V Max: 5.5V
Power Cons.	@1.8V 1.6mA Max @3V 3.5mA Max @5.5V 7.6mA Max

### Mounting Data

Dimensions	17*17*6.1mm
Cable*	64mm Ø 1.13mm
Connector*	IPEX MHFI (U.FL comp)



### Model No

**AP.17F.07.0064A**  
2 Stage 28dB  
17mm Patch  
Front End SAW Filter

### Electrical

Frequency	1575.42MHz
LNA Gain(3.0V)	28dB Typ.
Antenna Gain	-1.5dBic
Axial Ratio	3.0dB Max
Noise Figure (3.0V)	2.5dB
Impedance	50Ω
Polarization	RHCP
VSWR	2.0 Max
Op. Temp	-40°C~+85°C
Rel. Humidity	40%~95%
Input Voltage	Min: 1.8V Typ: 3.0V Max: 5.5V
Power Cons.	@1.8V 3.3mA Max @3V 7.5mA Max @5.5V 15.5mA Max

### Mounting Data

Dimensions	22.2*23.8*7.8mm
Cable*	64mm Ø 1.13mm
Connector*	IPEX MHFI (U.FL comp)

\* Cables and Connectors are Customizable.

# GPS Active Embedded Antenna Modules

## Embedded GPS Active Antenna Modules

Experienced customers often prefer a high gain LNA due to its ability to deliver superior GPS locking in difficult environments.

Our active antennas are available most commonly in 1 stage or 2 stage versions. The general rule of thumb is the larger the antenna, the better the performance.

The AP.35A is the most sensitive off the shelf GPS antenna in the M2M Telematics market. Combining high-zenith gain and low-axial ratio, it can pick up very weak signals at low elevation

satellites. A SAW filter reduces noise entering from the device system, important when considering the close proximity of cellular transmitters and circuitry in today's miniature devices. These results combined lead to quicker cold starts and more accurate position and location information.



### Model No

**AP.25E.07.0054A**  
1 Stage 15dB  
25mm Patch  
Front End SAW Filter

### Electrical

Frequency	1575.42MHz
LNA Gain(3.0V)	15dB Typ.
Antenna Gain	+1.5dBic
Axial Ratio	3dB Max
Noise Figure (3.0V)	2.5dB
Impedance	50Ω
Polarization	RHCP
VSWR	2.0 Max
Op. Temp	-40°C~+85°C
Rel. Humidity	40%~95%
Input Voltage	Min: 1.8V Typ: 3.0V Max: 5.5V
Power Cons.	@1.8V 3mA Max @3V 7.3mA Max @5.5V 3mA Max

### Mounting Data

Dimensions	35*35*4.5mm
Cable*	54mm Ø 1.13mm
Connector*	IPEX MHFI (U.FL comp)



### Model No

**AP.25F.07.0078A**  
2 Stage 28dB  
25mm Patch  
Front End SAW Filter

### Patch

Frequency	1575.42MHz
LNA Gain(3.0V)	28dB
Antenna Gain	+2.0dBic
Axial Ratio	3dB Max
Noise Figure (3V)	3.0dB
Impedance	50Ω
Polarization	RHCP
VSWR	Max 2.0
Op. Temp	-40°C~+85°C
Rel. Humidity	40%~95%
Input Voltage	Min 1.8V Typ. 3.0V Max. 5.5V
Power Cons.	@1.8V 10mA Max @3V 20mA Max @5.5V 40mA Max

### Mounting Data

Dimensions	25*25*8mm
Cable*	78mm Ø 1.13
Connector*	IPEX (U.FL) (U.FL comp)



### Model No

**AP.35A.07.0054A**  
1 Stage 15dB  
35mm Patch  
Back End SAW Filter

### Patch

Frequency	1575.42MHz
LNA Gain(3.0V)	15dB
Antenna Gain	+2.0dBic
Axial Ratio	3dB Max
Noise Figure (3V)	1.5dB
Impedance	50Ω
Polarization	RHCP
VSWR	Max 2.0
Op. Temp	-40°C~+85°C
Rel. Humidity	40%~95%
Input Voltage	Min 1.8V Typ. 3.0V Max. 5.5V
Power Cons.	@1.8V 3mA Max @3V 7.3mA Max @5.5V 3mA Max

### Mounting Data

Dimensions	35*35*5.5mm
Cable*	54mm Ø 1.13
Connector*	IPEX (U.FL) (U.FL comp)

# GPS Active Embedded Antenna Modules

## Embedded GPS Active Antenna Modules

AP.10G and AP.10H active GPS Patches are the smallest SMD GPS high performance embedded antenna currently available in the world.

Using extremely sensitive high dielectric constant powder formulation and tight process control, the 10\*10\*4mm T Type patch antenna is accurately tuned to have its frequency band right at 1575.42MHz for GPS systems. A patented SMD structure gives high reliability in integration. With an ultra low power consumption one stage LNA with Saw Filter, this small active patch has the performance of an ordinary active patch, but at only a quarter of the size.

This product is suited to small form factor mobile devices such as GPS smartphones, personal location, medical devices, telematics devices and automotive navigation and tracking. Custom gain, connector and cable versions are available.



### Model No

**AP.10G.01**  
1 Stage 14dB  
10mm Patch  
Front End SAW Filter

### Electrical

Frequency	1575.42MHz
LNA Gain (1.8V)	18dB
Antenna Gain	-10dBic typ.
Axial Ratio	4.0dB Max
Noise Figure	2.6dB
Impedance	50Ω
Polarization	RHCP
VSWR	2.0Max
Op. Temp	-40°C~+85°C
Rel. Humidity	40%~95%
Input Voltage	Min: 1.5V Typ: 3.0V Max: 3.3xV
Power Cons.	@1.8V 3.5mA Max @3V 7.3.5mA Max @5.5V 3.5mA Max

### Mounting Data

Dimensions	10*10*4mm 7.3mm vertical PCB
Mount	SMD Mount via Solder Pads

\*First Tier Automotive TS16949 approved

\* Cables and Connectors are Customizable.



### Model No

**AP.10H.01**  
2 Stage 25dB  
10mm Patch  
Front End SAW Filter

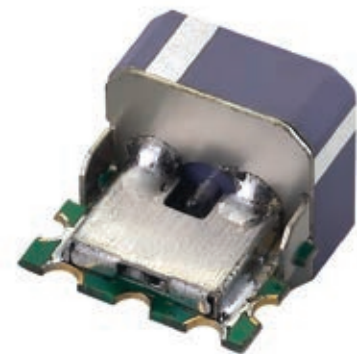
### Electrical

Frequency	1575.42MHz
LNA Gain (3.0)	25dB
Antenna Gain	-10dBic typ.
Axial Ratio	4.0dB Max
Noise Figure (3.0V)	2.5dB
Impedance	50Ω
Polarization	RHCP
VSWR	2.0Max
Op. Temp	-40°C~+85°C
Rel. Humidity	40%~95%
Input Voltage	Min: 1.8V Typ: 3.0V Max: 3.3V
Power Cons.	@1.8V 5mA Max @3V 10mA Max @3.3V 23mA Max

### Mounting Data

Dimensions	10*10*4mm 7.3mm vertical PCB
Mount	SMD Mount via Solder Pads

\*First Tier Automotive TS16949 approved

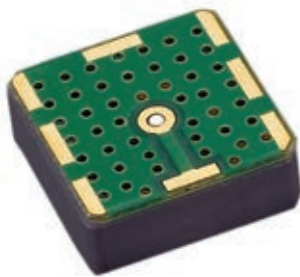




# GPS Embedded SMD Patch

## Passive SMD Ceramic Patch Antennas

Taoglas unique patented SMD (Surface Mount Device) GPS patches are designed to meet the requirements of high volume applications that need to avoid manual assembly processes.



### Model No

SGP12A  
12mm Patch

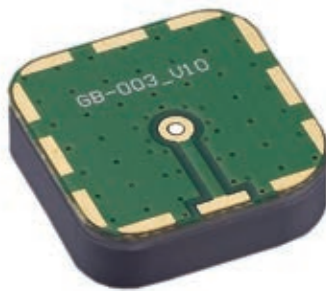
### Electrical Data

Centre Freq.	1575.42 MHz
Bandwidth	4MHz min
Return Loss	≤-10dB
VSWR	1.5 Max.
Gain at Zenith	-1.0dBic typ.
Axial Ratio	4dB Max
Polarization	RHCP
Impedance	50Ω

### Mechanical Data

Patch Dims.	12*12*4.5mm
Ground Plane	45*45mm
Mounting	SMD
Op. Temp.	-40°C~+85°C

\*First Tier Automotive TS16949 approved



### Model No

SGP15A  
15mm Patch

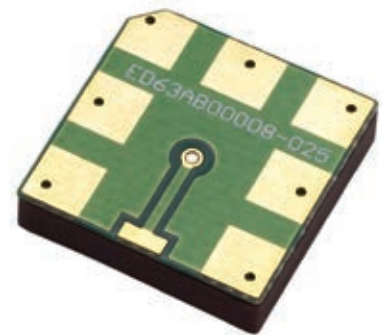
### Electrical Data

Centre Freq.	1575.42 MHz
Bandwidth	6MHz min
Return Loss	≤-10dB
VSWR	1.5 Max.
Gain at Zenith	1.0dBic typ.
Axial Ratio	3dB Max
Polarization	RHCP
Impedance	50Ω

### Mechanical Data

Patch Dims.	15*15*4.5mm
Ground Plane	45*45mm
Mounting	SMD
Op. Temp.	-40°C~+85°C

\*First Tier Automotive TS16949 approved



### Model No

SGP18C  
18mm Patch

### Electrical Data

Centre Freq.	1575.42 MHz
Bandwidth	5MHz min
Return Loss	≤-10dB
VSWR	1.5 Max.
Gain at Zenith	1.0dBic typ.
Axial Ratio	4dB Max
Polarization	RHCP
Impedance	50Ω

### Mechanical Data

Patch Dims.	18*18*4.5mm
Ground Plane	45*45mm
Mounting	SMD
Op. Temp.	-40°C~+85°C

\*First Tier Automotive TS16949 approved

## GPS Embedded SMD Patch

### Passive SMD Mount Ceramic Patch Antennas

Our SMD GPS antennas are not only exhaustively tested in our own state of the art facilities but also are put to task every day in real world applications. The high standards demanded by the automotive industry for environment resistances to temperature, shock and vibration, to name a few, are more than comfortably met by our SMD GPS antennas.

The antennas are delivered on tape and reel and mounted directly onto the PCB via large mounting pads underneath. Connection is made during the standard reflow process and there is a pad present for soldering to the feed line.



#### Model No

SGP.25C  
25mm Patch

#### Electrical Data

Centre Freq.	1575.42 MHz
Bandwidth	8MHz min
Return Loss	≤-10dB
VSWR	1.5 Max.
Gain at Zenith	2.0dBic typ.
Axial Ratio	3dB Max
Polarization	RHCP
Impedance	50Ω

#### Mechanical Data

Patch Dims.	25*25*4.5mm
Ground Plane	45*45mm
Mounting	SMD
Op. Temp.	-40°C~+85°C

\*First Tier Automotive TS16949 approved



U-blox Module

#### Note:

Centre frequencies can be shifted depending on ground plane size. The aim is to have the antenna receiving at 1575MHz when it is on the PCB.

Tuning services are available if the off the shelf parts do not retain centre frequency inside the GPS device, tuning services are subject to MOQ's and/or NRE.

**\*These antennas come on Tape and Reel**

# GPS Embedded PIN Patches

## Passive Ceramic Patch Antennas

GPS patch antenna technology has been proven across the industry to be the best antenna technology for receiving GPS signals in compact mobile devices.



### Model No

GP.1575.12.4.A.02  
12mm Patch

### Electrical Data

Centre Freq. 1575.42 MHz  
Bandwidth 8MHz min  
Return Loss  $\leq -10$ dB  
VSWR 1.5 Max.  
Peak Gain  $-0.5$ dBic typ.  
Polarization RHCP  
Impedance  $50\Omega$

### Mechanical Data

Ground Plane  $50 \times 50$ mm  
Patch Dims.  $12 \times 12 \times 4$ mm  
Op. Temp.  $-40^\circ\text{C} \sim +85^\circ\text{C}$

### Mounting

Pin  $1.65 \pm 0.2$ mm  
Adhesive 0.05mm thick  
Adhesive Type NITTO 5015

\*First Tier Automotive TS16949 approved



### Model No

GP.1575.15.4.B.02  
15mm Patch

### Electrical Data

Centre Freq. 1575.42 MHz  
Bandwidth 6MHz min  
Return Loss  $\leq -10$ dB  
VSWR 1.5 Max.  
Peak Gain 1dBic typ.  
Polarization RHCP  
Impedance  $50\Omega$

### Mechanical Data

Ground Plane  $66 \times 52.5$ mm  
Patch Dims.  $15 \times 15 \times 4$ mm  
Op. Temp.  $-40^\circ\text{C} \sim +85^\circ\text{C}$

### Mounting

Pin  $1.8 \pm 0.2$ mm  
Adhesive 0.05mm thick  
Adhesive Type Tesa 4972

\*First Tier Automotive TS16949 approved



### Model No

GP.1575.18.2.A.02  
18mm Patch

### Electrical Data

Centre Freq. 1575.42 MHz  
Bandwidth 5MHz min  
Return Loss  $\leq -10$ dB  
VSWR 1.5 Max.  
Peak Gain  $-0.5$ dBic typ.  
Polarization RHCP  
Impedance  $50\Omega$

### Mechanical Data

Ground Plane  $50 \times 50$ mm  
Patch Dims.  $18 \times 18 \times 2$ mm  
Op. Temp.  $-40^\circ\text{C} \sim +85^\circ\text{C}$

### Mounting

Pin  $2.25 \pm 0.3$ mm  
Adhesive 0.12mm thick  
Adhesive Type NITTO 5015

\*First Tier Automotive TS16949 approved

## GPS Embedded PIN Patches

### Passive Ceramic Patch Antennas

Taoglas embedded PIN Patch GPS antennas offer high gain, a narrow bandwidth and can be right hand circularly polarized (RHCP) thus matching the characteristics of the actual sign itself.

Our XtremeGain™ technology means that these tiny antennas pack the performance of larger models.



#### Model No

GP.1575.18.4.A.02  
18mm Patch

#### Electrical Data

Centre Freq.	1575.42 MHz
Bandwidth	8MHz min
Return Loss	≤-10dB
VSWR	1.5 Max.
Peak Gain	2.5dBic typ.
Polarization	RHCP
Impedance	50Ω

#### Mechanical Data

Ground Plane	50*50mm
Patch Dims.	18*18*4mm
Op. Temp.	-40°C ~+85°C

#### Mounting

Pin	2.4±0.2mm
Adhesive	0.12mm thick
Adhesive Type	NITTO 5015

\*First Tier Automotive TS16949 approved



#### Model No

GP.1575.25.2.A.02  
25mm Patch

#### Electrical Data

Centre Freq.	1575.42 MHz
Bandwidth	5MHz min
Return Loss	≤-10dB
VSWR	1.5 Max.
Peak Gain	2.0dBic typ.
Polarization	RHCP
Impedance	50Ω

#### Mechanical Data

Ground Plane	35*35mm
Patch Dims.	25*25*2mm
Op. Temp.	-40°C ~+85°C

#### Mounting

Pin	1.8±0.3mm
Adhesive	0.12mm thick
Adhesive Type	NITTO 5015

\*First Tier Automotive TS16949 approved



#### Model No

GP.1575.25.4.A.02  
25mm Patch

#### Electrical Data

Centre Freq.	1575.42 MHz
Bandwidth	10MHz min
Return Loss	≤-10dB
VSWR	1.2 Max.
Peak Gain	1.55dBic typ.
Polarization	RHCP
Impedance	50Ω

#### Mechanical Data

Ground Plane	50*50mm
Patch Dims.	25*25*4mm
Op. Temp.	-40°C ~+85°C

#### Mounting

Pin	2.4±0.2mm
Adhesive	0.12mm thick
Adhesive Type	NITTO 5015

\*First Tier Automotive TS16949 approved

# GPS-GLONASS Passive Antennas

## Embedded Ceramic Passive Patch Antennas

Using a double resonance design, our extensive CGGP patch antenna range has comprehensive wide-band operation over all GPS and GLONASS bands from 1575MHz to 1610MHz.

### Applications

Transportation, Defence, Marine, Agriculture and Navigation applications globally choose patch antenna technology for reliable and accurate GPS performance.



#### Model No

GP.1575.35.3.A.02  
35mm Patch

#### Electrical Data

Centre Freq	1575.42 MHz
Bandwidth	22MHz min
Return Loss	$\leq -10$ dB
VSWR	1.5 Max.
Peak Gain	2.0dBic typ.
Polarization	RHCP
Impedance	50 $\Omega$

#### Mechanical Data

Ground Plane	50*50mm
Patch Dims.	35*35*3.5mm
Op. Temp.	-40°C ~+85°C

#### Mounting

Pin	1.65 $\pm$ 0.2mm
Adhesive	0.12mm thick
Adhesive Type	NITTO 5015

#### Note:

Please see our SGP series for surface mounted solutions.

Centre frequencies can be shifted depending on ground plane size, shape and surrounding device.

The aim is to have the antenna receiving at 1575MHz when it is on the PCB.

Tuning services are available if the off the shelf parts do not retain centre frequency inside the GPS device, tuning services are subject to MOQ's and/or NRE.

\*First Tier Automotive TS16949 approved

# GPS Loop Antennas

## Internal Passive and SMD Loop Antenna Range

The Taoglas series of GPS loop antennas are miniature edge mounted antennas, designed for small space requirements.

Our GLA loop antenna series show at least three times the efficiency of traditional linear polarized 1575MHz antennas. Delivered on tape and reel they allow M2M customers to use an Omni-directional antenna in devices where the orientation of the product is unknown. We have also developed a Plug and Play active version which makes integration extremely easy.



### Model No

**ALA.01**  
1 Stage 16dB  
Front End SAW Filter

### Antenna

Frequency	1575.42MHz
Bandwidth	70MHz
Return Loss	≤-10dB
LNA Gain(3.0V)	16±4dBi@90°
Peak Gain	3.1dBi Typ.
Noise Figure	1.3dB Max
Impedance	50Ω
Polarization	Linear
VSWR	Max 2.0
Rel. Humidity	10%~95%
Input Voltage	Min 2.7V Typ. 3.0V Max. 3.3V
Current(3.0V)	Typ.13mA

### Mounting Data

Dimensions	45*10*2.3mm
Cable*	Ø1.13 95mm
Connector*	IPEX MHF (U.FL comp)
Op. Temp	-40°C~+85°C

\* Cables and Connectors are Customizable.



### Model No

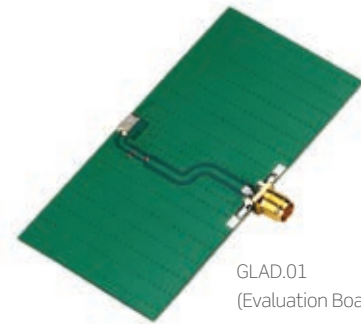
**GLA.01**  
Sub-Miniature  
Ceramic Loop

### Electrical Data

Centre Freq.	1575.42 MHz
Bandwidth	50MHz
Return Loss	≤-10dB
VSWR	2.0 Max
Peak Gain	2.5dBi typ.
Polarization	Linear
Impedance	50Ω

### Mechanical Data

Dimensions	5*3*0.5mm
Mounting	SMD
Ground Plane	80*40mm
Op. Temp.	-40°C~+85°C



GLAD.01  
(Evaluation Board for GLA.01)

# External GPS-GLONASS Antennas

## Magnetic Antennas

Optimized in our unique test chambers, certified to the highest international standards, tuned and customized for M2M application, the Taoglas range of GPS and GLONASS antennas is peerless.

The AA.161 “Dominator” is the acknowledged performance leader in the GPS-GLONASS arena, incorporating unique high gain wide band 35mm patch antenna technology.

The AA.162 “Ulysses” Ultra-Low Profile Miniature Magnetic Mount (only 10mm in height) GNSS antenna is designed for applications

which require high positioning accuracy by combining signals from GPS and GLONASS systems. A high gain wide-band patch antenna on an integral ground delivers reliable performance.

The Ulysses is fully IP67 waterproof and can survive wet outdoor environments.



### Model No

**AA.161**  
**Dominator**  
 Magnetic Mount  
 GPS-GLONASS  
 Antenna

### Patch

**Frequency** 1574~1610 MHz  
**LNA Gain(3.0V)** 28dBic  
**Antenna Gain** 26±3dBic@1575.42MHz  
 27±3dBic@1602MHz  
**Impedance** 50Ω  
**VSWR** 2.0 Max  
**Input Voltage** Min 1.8V  
 Typ 3.0V  
 Max 5.5V  
**Power Consum.** @1.8V 5mA Max  
 @3V 10mA Max  
 @5.5V 23mA Max

### Mounting Data

**Dimensions** 65.7\*49.7mm  
**Housing** ABS  
**Cable\*** 3M RG-174  
**Connector\*** SMA(M)  
**IP Rating** IP67  
**Op. Temp** -40°C~+85°C  
**Rel. Humidity** 40~95%

\*First Tier Automotive TS16949 approved

\* Cables and Connectors are Customizable.



### Model No

**AA.162**  
**Ulysses**  
 Ultra-Low Profile  
 Miniature Magnetic Mount  
 GPS-GLONASS

### Patch

**Frequency** 1574~1610MHz  
**LNA Gain(3.0V)** 28dBic  
**Antenna Gain** 26±3dBic@1575.42MHz  
 27±3dBic@1602MHz  
**Impedance** 50Ω  
**VSWR** 2.0 Max  
**Input Voltage** 1.8V (min.)  
 3.0V (typ.)  
 5.5V (Max.)  
**Power Consum.** @1.8V 5mA Max  
 @3V 10mA Max  
 @5.5V 23mA Max

### Mounting Data

**Dimensions** 37.8 x 40.4 x 10mm  
**Housing** ABS  
**Cable\*** 3M RG174  
**Connector\*** SMA(M)  
**IP Rating** IP67  
**Op. Temp** -40°C~+85°C  
**Rel. Humidity** 40~95%

\*First Tier Automotive TS16949 approved

## GPS-GLONASS External Solutions

### Adhesive Mount/Permanent Mount

Our range of adhesive and screw mount external antennas are ideal for robust, covert installations where durability is paramount. They are ideal for telematics and M2M applications for commercial vehicle installations for fleet management etc.

The “Stingray” AA.107 is designed for covert installation and reliable reception and transmission crossing through different mobile networks. The A.30 “Ultima” and A.40 “Hercules” are screw mount antennas - that are waterproof and robust. The advantage of the Taoglas solution is the antenna inside is tuned for its housing giving your device maximum sensitivity. The antenna was designed based on market feedback - thick threads, waterproof, no fin, low profile etc.



#### Model No

**AA.107**  
**Stingray**  
 Low Profile  
 Adhesive Mount  
 GPS-GLONASS

#### Electrical Data

Centre Freq.	
<b>GPS:</b>	1574.42MHz±3MHz
<b>GLONASS:</b>	1602MHz±0.5MHz
<b>LNA Gain at 3.3V</b>	28dB Typ.
<b>VSWR</b>	2.0:1
<b>Impedance</b>	50Ω
<b>Return Loss</b>	10dB Min.
<b>DC power Input</b>	3.3V
<b>Noise Figure</b>	2.2dB Typ.
<b>Power Consum.</b>	10mA Typ.

#### Mounting Data

<b>Dimensions</b>	55*51.7*10.8mm
<b>Mounting</b>	Adhesive Mount
<b>Op. Temp.</b>	-40°C~+85°C
<b>Cable*</b>	3M RG174
<b>Connector*</b>	SMA(M)

\*First Tier Automotive TS16949 approved



#### Model No

**A.30.A**  
**Ultima**  
 Low Profile  
 Screw Mount  
 GPS/GLONASS

#### Electrical Data

Centre Freq.	1574.42-1606MHz
<b>Gain</b>	27±2dB
<b>Noise Figure</b>	1.3dB
<b>VSWR</b>	2.0 Max.
<b>Axial Ratio</b>	3.0dB Max
<b>Polarization</b>	RHCP
<b>Impedance</b>	50Ω
<b>Input Voltage</b>	2.2~5.5V
<b>Power Consum.</b>	10mA Typ

#### Mounting Data

<b>Dimensions</b>	H:19.6mm, Ø 55mm
<b>Mounting</b>	Thread Ø 24 mm
<b>Cable</b>	3M SM RG174
<b>Connector</b>	SMA(M)
<b>Radome Material</b>	PC
<b>IP Rating</b>	IP67 & IP69K

\*First Tier Automotive TS16949 approved



#### Model No

**A.40.A**  
**Hercules**  
 GPS/GLONASS  
 Screw Mount

#### Electrical Data

Centre Freq.	1574-1606MHz
<b>Gain</b>	27±2dB
<b>Noise Figure</b>	1.3dB
<b>VSWR</b>	2.0 Max.
<b>Axial Ratio</b>	3.0dB Max
<b>Polarization</b>	RHCP
<b>Impedance</b>	50Ω
<b>Input Voltage</b>	2.5~5.5V
<b>Power Consum.</b>	10mA

#### Mounting Data

<b>Dimensions</b>	H:29mm, Ø 49mm
<b>Mounting</b>	Thread Ø 18mm
<b>Cable</b>	3M RG174
<b>Connector</b>	SMA(M)
<b>Radome Material</b>	PC
<b>IP Rating</b>	IP67 & IP69K

\*First Tier Automotive TS16949 approved



# GPS-GLONASS Passive Antennas

## Internal Ceramic Patch Antennas

Using a double resonance design, our extensive CGGP patch antenna range has comprehensive wide-band operation over all GPS and GLONASS bands from 1575MHz to 1610MHz.



### Model No

CGGP.18.4.C.02  
18mm Patch

### Electrical Data

Receiving Freq. 1575~1610MHz  
Bandwidth 2.4 Max.  
Return Loss  $\leq -7$ dB  
VSWR 2.4 Max.  
Peak Gain 3.0dBic typ.  
Impedance 50 $\Omega$

### Mechanical Data

Patch Dims. 18\*18\*4mm  
Ground Plane 70\*70mm  
Op. Temp. -40°C ~+85°C

### Mounting Data

Pin 1.8 $\pm$ 0.2mm  
Adhesive NITTO 5015

\*Also available CGGP.18.2.A.02 18\*18\*2mm patch  
\*First Tier Automotive TS16949 approved

### Model No

CGGP.25.4.A.02  
25mm Patch

### Electrical Data

Receiving Freq. 1575~1610MHz  
Bandwidth 15MHz min  
Return Loss  $\leq -10$ dB  
VSWR 1.5 Max.  
Peak Gain 5.0dBic typ.  
Impedance 50 $\Omega$

### Mechanical Data

Patch Dims. 25.1\*25.1\*4mm  
Ground Plane 70\*70mm  
Op. Temp. -40°C ~+105°C

### Mounting Data

Pin 1.8 $\pm$ 0.2mm  
Adhesive NITTO 5015

\*First Tier Automotive TS16949 approved

### Model No

CGGP.35.3.A.02  
35mm Patch

### Electrical Data

Receiving Freq. 1575~1610MHz  
Bandwidth 22MHz min  
Return Loss  $\leq -10$ dB  
VSWR 1.5 Max.  
Peak Gain 1.5dBic typ.  
Impedance 50 $\Omega$

### Mechanical Data

Patch Dims. 35\*35\*3.5mm  
Ground Plane 50\*50mm  
Op. Temp. -40°C ~+85°C

### Mounting Data

Pin 2.4 $\pm$ 0.2mm  
Adhesive NITTO 5015

\*First Tier Automotive TS16949 approved

Note: These antennas have been tuned for a centre position on a 70mm\*70mm ground plane. They are manufactured and tested in a TS16949 first tier automotive approved facility. For further optimization to customer specific device environments where positioning is off centre or on different ground plane sizes, custom tuned patch antennas can be supplied

## GPS-GLONASS Embedded SMD Patch Internal SMD Ceramic Patch Antennas

These new SMD GPS-GLONASS patch solutions are unique in that they meet the environmental requirements of the automotive industry (temperature, shock, vibration etc). This is because of the Taoglas design which keeps the feed-line of the SMD GPS patch antenna off the side of the ceramic and unexposed. It uses a separate PCB to connect to the GPS module feed-line.



SGGP.18A Back



SGGP.25A Back



### Model No

**SGGP.12A**  
12mm Patch  
Single Feed  
SMD Mount

### Electrical Data

<b>Frequency</b>	GPS: 1575.42 ± 1.023MHz GLONASS: 1602 ± 5MHz
<b>Bandwidth</b>	8MHz min
<b>Return Loss</b>	≤ -10dB
<b>VSWR</b>	2.5 Max.
<b>Gain at Zenith</b>	GPS: 2.67 GLONASS: 2.94
<b>Impedance</b>	50Ω

### Mechanical Data

<b>Patch Dims.</b>	12*12*4mm
<b>Ground Plane</b>	50*50mm
<b>Mounting</b>	SMD
<b>Op. Temp.</b>	-40°C~+85°C

\*First Tier Automotive TS16949 approved

### Model No

**SGGP.18A**  
18mm Patch

### Electrical Data

<b>Receiving Frequency</b>	1575-1610MHz
<b>Return Loss</b>	-10dB Max. E44
<b>Peak Gain</b>	3.5dBi Typ.
<b>Impedance</b>	50 Ω

### Mechanical Data

<b>Patch Dims.</b>	18*18*4mm
<b>Ground Plane</b>	70*70mm
<b>Mounting</b>	SMD
<b>Op. Temp.</b>	-40°C~+85°C

\*First Tier Automotive TS16949 approved

### Model No

**SGGP.25A**  
25mm Patch  
Single Feed  
SMD Mount

### Electrical Data

<b>Centre Freq.</b>	1575.42± 1.023MHz
<b>Bandwidth</b>	8MHz min
<b>Return Loss</b>	≤ -10dB
<b>VSWR</b>	1.5 Max.
<b>Gain at Zenith</b>	GPS: -0.14dBic typ. GLONASS: 1.75dBic typ.
<b>Impedance</b>	50Ω

### Mechanical Data

<b>Patch Dims.</b>	25*25*4.5mm
<b>Ground Plane</b>	50*50mm
<b>Mounting</b>	SMD
<b>Op. Temp.</b>	-40°C~+85°C

\*First Tier Automotive TS16949 approved

# GPS-GLONASS Active Embedded Series

## Active Patch Antenna Modules

The AGGP series is the best choice for embedded antenna with the latest generation GPS and GLONASS GNSS receivers.

The AGGP series features advanced wide-band ceramic patch antennas with optimized gain, radiation patterns and axial ratios at GPS and GLONASS centre frequencies. They also include two stage LNA's combined with front-end SAW filters to reduce out of band noise, such as that emanating from nearby cellular transceivers and improve probability of the wireless device

passing radiated spurious emissions certification. Designed and manufactured within stringent TS16949 guidelines and 100% tested for gain (S21), return loss (S11) to ensure total consistency of performance. Cable type, length and connectors can be customized and samples offered according to requirement, subject to minimum order quantities in production.



### Model No

**AGGP.25F**  
 2 Stage 28dB  
 25mm Patch  
 Front End SAW Filter

### Patch

**Frequency** 1574~1610MHz  
**LNA Gain(3.0V)** 28dB  
**Patch Gain @ Zenith** 1575.40MHz - 1.5dBic  
 1602MHz - 0dBic  
**Noise Figure (3V)** 2.6dB  
**Out Impedance** 50Ω  
**Op. Temp** -40°C~+85°C  
**Rel. Humidity** 40%~95%  
**Input Voltage** 1.8V~5.5V  
**Power Cons (3V)** @1.8V 5mA Max  
 @3V 10mA Max  
 @5.5V 23mA Max

### Mounting Data

**Dimensions** 25.1\*25.1\*7.4mm  
**Cable\*** 60mm Ø 1.13  
**Connector\*** IPEX MHFI (U.FL comp)



### Model No

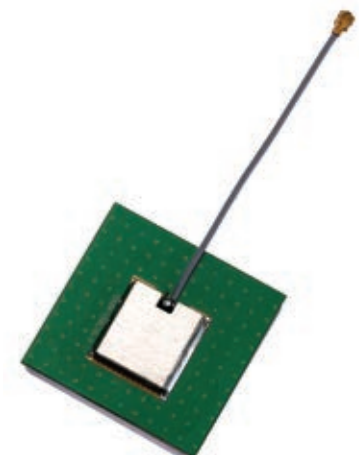
**AGGP.35F**  
 2 Stage 28dB  
 35mm Patch  
 Front End SAW Filter

### Patch

**Frequency** 1574~1610MHz  
**LNA Gain(3.0V)** 28dB  
**Patch Gain @ Zenith** 1575.40MHz - 1dBic  
 1602MHz - 0.5dBic  
**Noise Figure (3V)** 2.6dB  
**Out Impedance** 50Ω  
**Op. Temp** -40°C~+85°C  
**Rel. Humidity** 40%~95%  
**Input Voltage** 1.8V~5.5V  
**Power Cons (3V)** @1.8V 5mA Max  
 @3V 10mA Max  
 @5.5V 23mA Max

### Mounting Data

**Dimensions** 35\*35\*6.9mm  
**Cable\*** 60mm Ø 1.13  
**Connector\*** IPEX MHFI (U.FL comp)



\* Cables and Connectors are Customizable.

## External GPS-GLONASS-BeiDou Magnetic/Permanent Mount Antennas

Taoglas magnetic and permanent mount external antennas offer durable, robust and covert solutions with stable operation over all GPS/GLONASS/BeiDou frequency bands.

The “Magma” and “MagmaX” solutions offer a small form factor with best in class axial ratio across the relevant bands. This low axial ration also improves accuracy od GNSS system location, leading to speedier lock-in times and its low power consumption

can improve battery life. Primarily design for used in telematics and M2M applications, they can be found in commercial vehicle installations for fleet management. The addition of a front-end SAW reduces out-band interference from any nearby wireless transmitters, helping prevent LNA compression and burnout. The A.41 “Hercules” is a high gain antenna with IP67 waterproof and UV resistant housing. Applications for this antenna include heavy duty automotive, industrial and agricultural markets and is ideal for use in the urban canyons of cities in a factory or field environment .



### Model No

**AA.170**  
**Magma**  
GPS-GLONASS-BeiDou  
Magnetic Mount

### Electrical Data

**Frequency** BeiDou: 1561.098 ±2.046 MHz  
GPS: 1575.42 ±1.023 MHz  
GLONASS: 1602 ±8 MHz

**LNA Gain (3.0V)** 30dB  
**Noise Figure** 2.1dB  
**Impedance** 50Ω  
**VSWR** 2.0 Max  
**Polarization** RHCP  
**Input voltage** Min: 1.8V  
Typ: 3.0V  
Max: 5.5V  
**Power Cons** @1.8V 3.2mA Max  
@3V 7.2mA Max  
@5.5V 15.6mA Max

### Mechanical Data

**Dimensions** 53\*50\*17mm  
**Housing** ABS  
**Cable\*** 3M RG174  
**Connector\*** SMA (M)  
**IP Rating** IP65  
**Op. Temp** -40°C to + 85°C

\*First Tier Automotive TS16949 approved



### Model No

**AA.171**  
**MagmaX**  
GPS-GLONASS-BeiDou  
Magnetic Mount

### Electrical Data

**Frequency** BeiDou: 1561.098 ±2.046 MHz  
GPS: 1575.42 ±1.023 MHz  
GLONASS: 1602 ±8 MHz

**LNA Gain (3.0V)** 28dB  
**Noise Figure** 2.1dB  
**Impedance** 50Ω  
**VSWR** 2.0 Max  
**Polarization** RHCP  
**Input voltage** Min: 1.8V  
Typ: 3.0V  
Max: 5.5V  
**Power Cons** @1.8V 3.2mA Max  
@3V 7.3mA Max  
@5.5V 8.4mA Max

### Mechanical Data

**Dimensions** 53\*50\*17mm  
**Housing** ABS  
**Cable\*** 3M RG174  
**Connector\*** SMA(M)  
**IP Rating** IP65  
**Op. Temp** -40°C to + 85°C

\*First Tier Automotive TS16949 approved



### Model No

**A.41.A**  
**Hercules**  
GPS-GLONASS-BeiDou  
Permanent Mount

### Electrical Data

**Frequency** BeiDou: 1561.098 ±2.046 MHz  
GPS: 1575.42 ±1.023 MHz  
GLONASS: 1602 ±5 MHz

**LNA Gain (3.0V)** 28dB  
**Noise Figure** 2.8dB  
**Impedance** 50Ω  
**VSWR** 2.0 Max  
**Polarization** RHCP  
**Input voltage** Min: 1.8V  
Typ: 3.0V  
Max: 5.5V  
**Power Cons** @1.8V 5mA Max  
@3V 10mA Max  
@5.5V 15mA Max

### Mechanical Data

**Dimensions** H: 29mm ø: 49mm  
**Housing** PC Casing  
**Cable\*** 3M RG174  
**Connector\*** SMA(M)  
**IP Rating** IP67 & IP69K  
**Op. Temp** -40°C to + 85°C

\*First Tier Automotive TS16949 approved

# External GPS-GLONASS-BeiDou

## Terminal Antennas

For hinged monopole antennas with impressively high efficiency look no further than the TG.08 for GNSS and Cellular frequencies or the TS.07 for GNSS frequencies.

The Compact TS.07 provides coverage among GPS, GLONASS and BeiDou frequencies with impressively high efficiency. This monopole antenna works best when connected directly to the ground plane of the device main-board or metal enclosure. Typical applications include vehicle tracking devices, telematics devices, and other remote monitoring systems. The TG.08, is a small antenna with surprisingly large efficiency, surely the best candidate in the market for Cellular/GNSS

combination terminal antennas. The robust brass hinge enables TG.08 to be oriented in all directions, providing users to maximize performance with minimum effort. This 72mm long monopole antenna works efficiently from 700MHz to 2700MHz and its compact design means it fits and functions perfectly with routers, vehicle tracking devices, telematics devices, and remote monitoring systems.



### Model No

**TS.07**  
GPS-GLONASS -BeiDou  
Terminal Antenna  
Rotatable hinge design

### Electrical Data

<b>Frequency</b>	1561-1610 MHz
<b>Radiation Pattern</b>	Omni-directional
<b>Polarization</b>	Linear
<b>Impedance</b>	50Ω
<b>Input Power</b>	10W
<b>Peak Gain</b>	4.02 avg (on 30*30cm ground plane)
<b>Efficiency</b>	72.12% avg (on 30*30cm ground plane)
<b>Return Loss</b>	<-10 (on 30*30cm ground plane)

### Mounting Data

<b>Dimensions</b>	H: 72mm ø: 10mm
<b>Casing</b>	POM
<b>Connector</b>	SMA (M)
<b>Op. Temp</b>	-40°C to + 85°C



### Model No

**TG.08**  
Cellular/GPS/GLONASS/BeiDou  
Monopole Passive Antenna  
Rotatable hinge design

### Electrical Data

<b>Frequency</b>	698-960MHz, 1561MHz, 1575.42MHz, 1602MHz, 1710-2700MHz.
<b>Radiation Pattern</b>	Omni-directional
<b>Polarization</b>	Linear
<b>Impedance</b>	50Ω
<b>Input Power</b>	10W
<b>Peak Gain</b>	2.75dBi avg (on 30*30cm ground plane)
<b>Efficiency</b>	68% avg (on 30*30cm ground plane)
<b>Return Loss</b>	<-9 (on 30*30cm ground plane)

### Mounting Data

<b>Dimensions</b>	H: 72mm ø: 10mm
<b>Casing</b>	POM
<b>Connector</b>	SMA (M)
<b>Op. Temp</b>	-40°C to + 85°C

# Internal GPS-GLONASS-BeiDou Ceramic Through Hole Patch Antennas

Taoglas' ceramic GPS/GLONASS/BeiDou patch antenna's wide band of operation leads to excellent gain and radiation pattern stability on all three GNSS system bands.



#### Model No

**CGGBP.18.4.A.02**

GPS-GLONASS-BeiDou  
18mm Embedded  
Patch Antenna

#### Electrical Data

<b>Frequency</b>	BeiDou: 1561.098 ± 2.046MHz GPS: 1575.42 ± 1.023MHz GLONASS: 1602 ± 5MHz
<b>Centre Frequency</b>	1583MHz ± 3MHz
<b>VSWR</b>	2.8 max
<b>Zenith Gain</b>	BeiDou: +3.0dBi typ. GPS: +2.0dBi typ. GLONASS: +4.0dBi typ.
<b>Impedance</b>	50 Ω

#### Mechanical Data

<b>Dimensions</b>	18*18*4mm
<b>Material</b>	Ceramic
<b>Pin Diameter</b>	0.9mm
<b>Pin Length</b>	1.65mm

#### Mechanical Data

<b>Op. Temp.</b>	-40°C to 85°C
<b>Storage Temp.</b>	-40°C to 105°C
<b>Humidity</b>	Non-condensing 65°C 95% RH

\*First Tier Automotive TS16949 approved



#### Model No

**CGGBP.25.4.A.02**

GPS-GLONASS-BeiDou  
25mm Embedded  
Patch Antenna

#### Electrical Data

<b>Frequency</b>	BeiDou: 1561.098 ± 2.046MHz GPS: 1575.42 ± 1.023MHz GLONASS: 1602 ± 5MHz
<b>Centre Frequency</b>	1582MHz ± 3MHz
<b>VSWR</b>	2.5 : 1 max
<b>Zenith Gain</b>	BeiDou: +2.5dBi typ. GPS: +1.5dBi typ. GLONASS: +3.5dBi typ.
<b>Impedance</b>	50 Ω

#### Mechanical Data

<b>Dimensions</b>	25*25*4mm
<b>Material</b>	Ceramic
<b>Pin Diameter</b>	0.9mm
<b>Pin Length</b>	1.65mm

#### Mechanical Data

<b>Op. Temp.</b>	-40°C to 85°C
<b>Storage Temp.</b>	-40°C to 105°C
<b>Humidity</b>	Non-condensing 65°C 95% RH

\*First Tier Automotive TS16949 approved



#### Model No

**CGGBP.35.6.A.02**

GPS-GLONASS-BeiDou  
35mm Embedded  
Patch Antenna

#### Electrical Data

<b>Frequency</b>	BeiDou: 1561.098 ± 2.046MHz GPS: 1575.42 ± 1.023MHz GLONASS: 1602 ± 5MHz
<b>Centre Frequency</b>	1594MHz ± 6MHz
<b>VSWR</b>	2.5 : 1 max
<b>Zenith Gain</b>	BeiDou: +4.5dBi typ. GPS: +3.0dBi typ. GLONASS: +4.5dBi typ.
<b>Impedance</b>	50 Ω

#### Mechanical Data

<b>Dimensions</b>	35*35*6.5mm
<b>Material</b>	Ceramic
<b>Pin Diameter</b>	0.9mm
<b>Pin Length</b>	4.0mm

#### Mechanical Data

<b>Op. Temp.</b>	-40°C to 85°C
<b>Storage Temp.</b>	-40°C to 105°C
<b>Humidity</b>	Non-condensing 65°C 95% RH

\*First Tier Automotive TS16949 approved

# Internal GPS-GLONASS-BeiDou Ceramic Through Hole Patch Antennas

Compared to using a smaller antenna, this will translate into the GNSS system having much higher location accuracy, improved reliability of lock in urban areas, better signal reception, with more satellites acquired and a quicker time to first fix. The patch is mounted via pin and double-sided adhesive.



## Model No

CGGBP.35.3.A.02  
GPS-GLONASS-BeiDou  
35mm Patch  
Pin Mount

## Electrical Data

**Centre Frequency** 1589MHz  $\pm$  6MHz  
**Bandwidth** 34MHz  
**Return Loss** -10dB  
**VSWR** 1 Max  
**Peak Gain** BeiDou: +4.0dBi typ.  
GPS: +3.0dBi typ.  
GLONASS: +4.5dBi typ.  
**Impedance** 50 $\Omega$   
**Op.Temp** -40°C to + 85°C

## Mounting

**Dimensions** 35\*35\*3mm  
**Material** Ceramic  
**Pin Diameter** 0.9mm  
**Pin Length** 2.15mm

## Mechanical Data

**Op. Temp.** -40°C to 85°C  
**Storage Temp.** -40°C to 105°C  
**Humidity** Non-condensing 65°C 95% RH

\*First Tier Automotive TS16949 approved

## Internal GPS-GLONASS-BeiDou Active Patch Antennas

The AGGBP series offers a wide-band operation over GPS/Galileo/GLONASS/BeiDou systems from 1561 to 1606MHz.

These compact active ceramic patch antennas offer strong sensitivity across all bands and their small form factor includes a one-stage LNA and front-end SAW filter to reduce out of band noise, such as from nearby cellular transceivers. The antennas are manufactured and tested in a TS16949 first tier automotive approved facility.



### Model No

**AGGBP.25A**  
1 stage 18dB  
25mm Patch  
Front End SAW Filter

### Electrical Data

**Frequency** 1558 - 1609MHz  
**LNA Gain (3.0V)** 18dB  
BeiDou 1561MHz : -1 dBi typ.  
**Patch Gain @ Zenith** GPS/Galileo 1575.42MHz : -2.5 dBi typ.  
GLONASS 1602MHz : -1.5 dBi typ.  
**Noise Figure (3.0V)** 2.8dB  
**VSWR** 2.0 Max  
**Impedance** 50Ω  
**Op. Temp** -40°C to 85°C  
**Polarization** RHCP  
**Input Voltage** 1.8 -5.5V  
**Power Cons** @1.8V 5mA Max  
@3V 10mA Max  
@5.5V 23mA Max

### Mounting

**Dimensions** 25.1\*25.1\*7.9mm  
**Cable** 60mm Ø1.13  
**Connector** IPEX MHFI (U.FL)



### Model No

**AGGBP.25B**  
2 stage 28dB  
25mm Patch  
Front End SAW Filter

### Electrical Data

**Frequency** 1558 - 1610MHz  
**LNA Gain (3.0V)** 28dB  
BeiDou 1561MHz : -1 dBi typ.  
**Patch Gain @ Zenith** GPS/Galileo 1575.42MHz : -2.5 dBi typ.  
GLONASS 1602MHz : -1.5 dBi typ.  
**Noise Figure (3.0V)** 2.8dB  
**VSWR** 2.0 Max  
**Impedance** 50Ω  
**Op. Temp** -40°C to 85°C  
**Polarization** RHCP  
**Input Voltage** 1.8 -5.5V  
**Power Cons** @1.8V 5mA Max  
@3V 10mA Max  
@5.5V 23mA Max

### Mounting

**Dimensions** 25.1\*25.1\*7.9mm  
**Cable** 60mm Ø1.13  
**Connector** IPEX MHFI (U.FL)



# Internal GPS-GLONASS-BeiDou Loop Antenna

## Embedded Flex Polymer and Active Ceramic Loop Antennas

The FXP611 “Cloud” is a “peel and stick” flexible polymer antenna, designed for applications which require high positioning accuracy using GPS and GLONASS function on modern day GNSS systems alongside the new BeiDou standard that provides not only location and time information but also communication services.

The FXP611 “Cloud” is a multi-talented GNSS antenna. Covering the standard GPS standard, the “Cloud” also catches the Russian Global Navigation Satellite System (GLONASS) and the new Chinese BeiDou Navigation Satellite System. The “Cloud” outperforms most active patch antennas with an efficiency of 80% and a peak gain of 3dBi. It also has a unique ability to resist external detuning effects due to dual resonance.

The AGGBLA series is a range of internal GPS/GLONASS/BeiDou active loop type antennas, ideal for next generation GNSS devices to achieve sensitivity across all bands in a small form factor. They are a much lighter, low profile solution with a more Omni-directional radiation pattern compared to active patch antennas.



### Model No

**FXP611**  
**The Cloud**  
 Flexible Polymer  
 GPS-GLONASS-BeiDou  
 Cloud Shape Antenna

### Patch

Frequency	1559~1610MHz
Radiation Properties	Omni-directional
Polarization	Linear
Impedance	50Ω
Max VSWR	1.2:1
Peak Gain	3dBi
Efficiency	80%
Average Gain	-1 dB
Max Input Power	5 W

### Mounting Data

Dimensions	38*37*0.15mm
Mounting	Adhesive
Required Space	40*40*0.2mm
Material	Flexible Polymer
Adhesive Type	3M Tape
Cable	92mm Cable
Connector	IPEX MHFI (U.FL comp)



### Model No

**AGGBLA.02**  
 Active loop  
 Antenna element  
 Front-end SAW filter  
 Automotive TS16949  
 Production and Quality  
 Approved

### Patch

Frequency	1558 to 1610 MHz
LNA Gain (3.0V)	25dB
Antenna Gain	0 dBi typ. @zenith
Noise Figure (3.0V)	2.8dB
Impedance	50Ω
Polarization	Linear
VSWR	2.0 Max
Op. Temp	-40°C to 85°C
Input Voltage	Min: 1.8V Typ: 3.0V Max: 5.5V

Power Cons	@1.8V 3mA Max @3V 6mA Max @5.5V 12mA Max
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### Mounting Data

Dimensions	45*10*3.12mm
Cable	coaxial cable Ø1.13 length 95mm
Connector	IPEX MHFI (U.FL)



### Model No

**AGGBLA.03**  
 Active loop  
 antenna element  
 Front-end SAW filter  
 Two stage LNA, 25 dB gain

### Patch

Frequency	1558 to 1610 MHz.
LNA Gain (3.0V)	25 dB
Antenna Gain	BeiDou: -4.05 dBi typ. GPS/Galileo: -3.81 dBi typ. GLONASS: -3.57 dBi typ.
Noise Figure (3.0V)	2.8 dB
Impedance	50Ω
Polarization	Linear
VSWR	2.0 Max
Op. Temp	-40°C to 85°C
Input Voltage	Min: 1.8V Typ: 3.0V Max: 5.5V
Power Cons	@1.8V 3mA Max @3V 6mA Max @5.5V 12mA Max

### Mounting Data

Dimensions	25*10*3.12mm
Cable	coaxial cable Ø1.13 length 95mm
Connector	IPEX MHFI (U.FL)

## Internal GPS-GLONASS-BeiDou Ceramic SMD Loop Antenna

Taoglas have developed a unique ceramic miniature loop antenna series for GPS-GLONASS-BeiDou applications. At 3.2\*1.6\*0.5mm, the Unifier GGBLA.01.A loop antenna is a miniature edge mounted SMD antenna, designed for small space requirements.

Typical applications are small sized automotive navigation or position tracking systems and hand-held devices when GNSS function is needed. The radiation pattern is more Omni-directional than traditional patch antennas. The "Unifier" antenna series wide bandwidth allows high efficiency, stable reception on all three GPS-GLONASS-BeiDou bands from 1555MHz to 1602MHz. Efficiencies of 64% to 85% are achievable. Peak gain of 3.3dBi places this antenna gain performance within the range of a much larger 15mm to 18mm patch antennas.



Front



Back

### Model No

GGBLA.01.A  
Unifier  
GPS/GLONASS/BeiDou Ceramic SMD Antenna

#### GPS

##### Electrical Data

Frequency	1575.42MHz
VSWR	2.0 : 1 max
Polarization	Linear
Gain	Peak gain: 3.2 Typ.
Efficiency	>80%
Impedance	50Ω

##### Mechanical Data

Dimensions	3.2*1.6*0.5 mm
Material	Ceramic
Ground Plane	80*40mm

##### Environmental Data

Op. Temp.	-40°C to 85°C
Storage Temp.	-40°C to 85°C
Humidity	-20°C~+70°C

#### GLONASS

##### Electrical Data

Frequency	1598~1608MHz
VSWR	2.0 : 1 max
Polarization	Linear
Gain	Peak gain: 2.6 Typ.
Efficiency	>70%
Impedance	50 Ω

#### BeiDou

##### Electrical Data

Frequency	1561MHz
VSWR	2.0 : 1 max
Polarization	Linear
Gain	Peak gain: 2.8 Typ.
Efficiency	>70%
Impedance	50 Ω

# Embedded GPS-Cellular Combination Antenna Board

The MAT.03A Reference GPS and Cellular Embedded Antenna board combines the 2G/3G PA.25 Hexa-Band Cellular SMD Antenna and the ASGP.1575.25B.4.A.0 SMD 28dB active GPS patch antenna from Taoglas. It can be used as a reference board design or actual embedded antenna for telematics applications such as fleet management, asset tracking, road pricing, and security/surveillance.

The board comes with one SMA(F) connector for each antenna feed on the bottom side for easy connection via a cable assembly to a module or test equipment.



### Model No

**MAT.03A**  
 Embedded Active GPS  
 and Cellular Antenna  
 Assembly and Reference Board  
 Board Dimensions 110.3\*40.5\*6.75mm

### Electrical Data

**Frequency** 824 ~ 2170MHz  
**Peak Gain** < 2.54 dBi  
**Efficiency** >50%  
**Return Loss** <-5 dB  
**Impedance** 50Ω  
**Polarization** Linear

### Mechanical Data

**Dimensions** 36 \* 6 \* 5mm  
**Material** Ceramic  
**Connector** SMA(F)  
**Op. Temp.** -40°C to 85°C

### Electrical Data

**Polarization** RHCP  
**Axial Ratio** Max 3.0dB@zenith  
**Return Loss** <-5 dB  
**Input Voltage** 3.0V typ.  
**Gain** Typ. -1.5dBic @ Zenith

### Mechanical Data

**Dimensions** 25 \* 25 \* 4mm  
**Material** Ceramic  
**Connector** SMD via solder pads  
**Op. Temp.** -40°C to 85°C

## Screw Mount/Permanent Mount 2in1

### Ultima Gen II Lowest Profile

The “Ultima” MA.111 GPS/GLONASS/Cellular combination antenna is an extremely low profile combination high performance GPS/GLONASS and penta-band cellular antenna solution for professional telematics applications.

At only 30 mm height it is the lowest profile antenna in the market, with a diameter of 55 mm. It is designed to be mounted and couple to the metal structures it attaches to radiate. Durable UV ABS housing, thread and nut is resistant to vandalism and direct attack.

The IP67 waterproof robust plastic body makes it extremely light, economical for shipping and minimum weight impact on vehicles. This also makes it ideal for use in humid environments such as

water pits or marine applications as there are no external metal parts to corrode.

The closed cell foam with double-sided adhesive provides a permanent waterproof seal and can adjust to different curvatures, stopping water from leaking under the antenna into the mounting hole.

For applications that require mounting on non-metal structures we recommend the Hercules MA.104.

#### Model No

**MA.111**  
**Ultima 2in1**  
 GPS-GLONASS/Cellular  
 Screw Mount

#### Electrical Data

**GPS-GLONASS** 2 Stage 27dB  
**Centre Frequency** 1574~1606MHz  
**Total Gain @ Zenith** 27dB typical at 3.0V  
**Noise Figure** 1.3dB typical  
**VSWR** 2.0 Max

**Cellular** 824~896, 880~960  
 1710~1880  
 1850~1990  
 1710~2170 MHz

**Impedance** 50Ω  
**VSWR** 3.5 Max  
**Peak Gain** 2dBi  
**Efficiency** > 41%

#### Mechanical Data

**Dimensions** H: 30mm ± 2mm  
**Housing** UV Resistant ABS  
**Cable - Cellular** CFD200  
**Cable - GPS-GLONASS** RG174  
**Connector** SMA(M)  
**IP Rating** IP67



○ also available in white

# Screw Mount/Permanent Mount 2in1

## Hercules Ground Independent Solutions

The “Hercules” was designed mainly for commercial vehicle and outdoor equipment installations. It comes with extra thick threads and unique lowest loss, high external noise rejection cables exiting through the bottom for ease of install.

The “Hercules” is a waterproof, high performance antenna that has been designed for heavy duty applications in outdoor environments. It features extra thick threads and strong washers for sturdy installation. Its outer housing is manufactured from durable PC housing, protecting it from vandalism and direct attack.

It also features convenient side slots so that the antenna cables can run easily from the side. It is designed for covert mounting as it is only 3cm high when mounted, thus complying with the latest EU directives for height restrictions.



○ also available in white

### Model No

**MA104**  
**Hercules**  
 GPS/Cellular  
 Screw-Hercules

### Electrical Data

<b>GPS</b>	2 Stage 30dB LNA
<b>Centre Freq.</b>	1575.42±1.023MHz
<b>Gain</b>	-2dB Passive Gain @ Zenith
<b>Noise Figure</b>	3.0 typical
<b>Axial Ratio</b>	3.0dB Max
<b>Polarization</b>	RHCP

<b>Cellular</b>	Penta-band 850/900 /1800/1900/2100MHz
<b>Polarization</b>	Linear
<b>Impedance</b>	50Ω
<b>VSWR</b>	≤3.5
<b>Peak Gain</b>	1.6dBi@880-960MHz 0.1dBi@1710-1880MHz
<b>Efficiency</b>	> 20%

### Mechanical Data

<b>Dimensions</b>	H:29mm, Ø 49mm
<b>Mounting</b>	Thread Ø 18mm
<b>Cable*</b>	3M RG-174 - GPS 3M RG-174 - Cellular
<b>Connector*</b>	SMA(M) - GPS SMA(M) - Cellular
<b>IP Rating</b>	IP67 & IP69
<b>Op. Temp.</b>	-40°C to 85°C



### Model No

**MA106**  
**Hercules**  
 GPS-GLONASS/Cellular  
 Screw-Hercules

### Electrical Data

<b>GPS-GLONASS</b>	2 Stage 27dB LNA
<b>Centre Freq.</b>	1574~1610MHz
<b>Total Gain</b>	28dB typical at 3.0V @ Zenith
<b>Noise Figure</b>	2.6dB typical
<b>VSWR</b>	2.0 Max

<b>Cellular</b>	Penta-band 850/900 /1800/1900/2100MHz
<b>Polarization</b>	Linear
<b>Impedance</b>	50Ω
<b>VSWR</b>	≤3.5
<b>Peak Gain</b>	2.0dBi@880-960MHz 3.6dBi@1710-1880MHz
<b>Efficiency</b>	> 20%

### Mechanical Data

<b>Dimensions</b>	H:28.5mm, Ø 49.2mm
<b>Mounting</b>	Thread Ø 18mm
<b>Cable*</b>	CFD200 - Cellular RG174 - GPS-GLONASS
<b>Connector*</b>	SMA(M) - GPS-GLONASS SMA(M) - Cellular
<b>IP Rating</b>	IP67 & IP69K
<b>Op. Temp.</b>	-40°C to 85°C

\* Cables and connectors are customizable.

# Screw Mount/Permanent Mount 2in1

## Hercules Ground Independent

We have Hercules combination antennas that incorporate ISM Bands and also combine GPS/GLONASS with 868MHz and 915MHz for external use with smart meters, gateways, mesh networks, vehicles and outdoor and indoor assets. It is designed for heavy duty work with extra thick threads. The polycarbonate housing is resistant to vandalism and direct attack.

The MA120 combines ISM Bands 450MHz and 868MHz for external use. The standard configuration is with 1M and RG-316 cable. The cable is very flexible and able to operate in high temperature environments and is corrosion resistant. The MA130 and MA131 combine GPS-GLONASS with 868MHz and 915MHz respectively. These antennas are suited to remote monitoring applications. The integrated metal thread-mount allows for external use on vehicles and outdoor assets worldwide.



**Model No**

**MA120**  
**Hercules GENII**  
 450MHz & 868MHz  
 Screw-Hercules

**Electrical Data**

**ISM450**

**Frequency** 450~457MHz  
**Return Loss** 10dB  
**Peak Gain** 3.91dBi  
**Impedance** 50Ω  
**Polarization** Linear  
**Input Power** 5W (max)

**ISM868**

**Frequency** 865~870MHz  
**Return Loss** 10dB  
**Peak Gain** 1.11dBi  
**Impedance** 50Ω  
**Polarization** Linear  
**Input Power** 5W (max)

**Mechanical Data**

**Dimensions** H:29mm, Ø 49mm  
**Mounting** Thread Ø 18mm  
**Cable\*** 1M RG316  
**Connector\*** SMA(M)  
**IP Rating** IP67 \*IP69K  
**Op. Temp.** -40°C to 85°C



**Model No**

**MA130**  
**Hercules**  
 GPS/GLONASS/868MHz  
 Screw-Hercules

**Electrical Data**

**ISM868**

**Frequency** 865~870MHz  
**Return Loss** -10dB (max.)  
**Peak Gain** 3dBi  
**Efficiency** 42% avg.  
**Impedance** 50Ω  
**Polarization** Linear  
**Input Power** 5W (max)

**GPS-GLONASS**

**Frequency** 1574~1606MHz  
**VSWR** 2.0 (Max)  
**Total Gain** 27dB Typ.  
**Impedance** 50Ω  
**Polarization** Linear  
**Noise Figure** 1.3dB Typ.

**Mechanical Data**

**Dimensions** H:29mm, Ø 49mm  
**Mounting** Thread Ø 18mm  
**Cable\*** 1M RG316 / RG174  
**Connector\*** SMA(M)  
**IP Rating** IP67 & IP69K  
**Op. Temp.** -40°C to 85°C



**Model No**

**MA131**  
**Hercules**  
 GPS/GLONASS/915MHz  
 Screw-Hercules

**Electrical Data**

**ISM915**

**Frequency** 902~928MHz  
**Return Loss** -10dB (max.)  
**Peak Gain** 3.52dBi  
**Efficiency** 40% avg.  
**Impedance** 50Ω  
**Polarization** Linear  
**Input Power** 5W (max)

**GPS-GLONASS**

**Frequency** 1574~1606MHz  
**VSWR** 2.0 (Max)  
**Total Gain** 27dB Typ.  
**Impedance** 50Ω  
**Polarization** Linear  
**Noise Figure** 1.3dB Typ.

**Mechanical Data**

**Dimensions** H:29mm, Ø 49mm  
**Mounting** Thread Ø 18mm  
**Cable\*** 1M RG316 / RG174  
**Connector\*** SMA(M)  
**IP Rating** IP67 & IP69K  
**Op. Temp.** -40°C to 85°C

# Screw Mount/Permanent Mount 2in1

## Hercules & Ultima Wi-Fi 2\*2 MIMO

MIMO communication systems are needed for high data rate communication. Taoglas MIMO antennas offer a compact structure, high radiation efficiency, low envelope correlation and high isolation between signal ports.

The “Hercules” is a range of low profile, heavy-duty, fully IP67 waterproof antennas designed for external use in applications such as transportation and remote monitoring. These unique Omni-directional antennas provide high efficiency and high isolation (>20dB), between antenna elements in a heavy-duty low profile compact structure.

The MA530 “Ultima” is a MIMO antenna which screws down permanently onto a roof or metal panel and can be pole or wall mounted. One antenna element is vertically polarized and one is horizontally polarized to increase the isolation between antennas.



### Model No

**MA510**  
**Hercules**  
 Dual Band  
 2.5/5.8GHz MIMO  
 Screw-Hercules

### Electrical Data

#### 2.4 ~ 2.5GHz

**Frequency** 2400~2500MHz  
**Peak Gain** 3.9dBi typ.  
**Efficiency** 60% typ.  
**Polarization** Linear  
**Impedance** 50Ω  
**VSWR** ≤2.0  
**Max Input Power** 2W

#### 4.8~5.8GHz

**Frequency** 4800~5800MHz  
**Peak Gain** 3dBi typ.  
**Efficiency** 40% typ.  
**Polarization** Linear  
**Impedance** 50Ω  
**VSWR** ≤2.0  
**Max Input Power** 2W

### Mechanical Data

**Dimensions** H:29mm, Ø 49mm  
**Mounting** Thread Ø 18mm  
**Cable\*** 1M RG-316  
**Connector\*** RP-SMA(M)  
**IP Rating** IP67 & IP69K  
**Op. Temp.** -40°C to 85°C



### Model No

**MA515**  
**Hercules**  
 2.4GHz MIMO  
 Screw-Hercules

### Electrical Data

#### MIMO 1 & 2

**Frequency** 2400~2500MHz  
**Peak Gain** 3dBi typ.  
**Efficiency** 56% typ.  
**Polarization** Linear  
**Impedance** Linear  
**VSWR** ≤2.0  
**Max Input Power** 2W

### Mechanical Data

**Dimensions** H:29mm, Ø 49mm  
**Mounting** Thread Ø 18mm  
**Cable\*** 1M RG-316  
**Connector\*** RP-SMA(M)  
**IP Rating** IP67 & IP69K  
**Op. Temp.** -40°C to 85°C



### Model No

**MA530**  
**Ultima**  
 Dual Band  
 2.4/5GHz MIMO  
 Screw-Ultima

### Electrical Data

#### 2.4 ~ 2.5GHz MIMO

**1&2**  
**Frequency** 2.4~2.5 / 5.1~5.8GHz  
**Peak Gain** 3.5~5.5dBi typ.  
**Efficiency** 42% avg.  
**Polarization** Linear  
**Impedance** 50Ω  
**VSWR** ≤3.0  
**Max Input Power** 5W

#### 5.15 ~ 5.85GHz MIMO

**1&2**  
**Frequency** 5150~5850MHz  
**Peak Gain** 1.6~2.3dBi typ.  
**Efficiency** 26% typ.  
**Polarization** Linear  
**Impedance** 50Ω  
**VSWR** ≤3.0  
**Max Input Power** 5W

### Mechanical Data

**Dimensions** H:19.6mm, Ø 55.2mm  
**Mounting** Thread Ø 24mm  
**Cable\*** 1M RG-174  
**Connector\*** RP-SMA(M)  
**IP Rating** IP67 & IP69K  
**Op. Temp.** -40°C to 85°C

\* Cables and connectors are customizable.

# Screw Mount/Permanent Mount 2in1

## Hercules Ground Independent

The MA501 is a GPS and dual-band Wi-Fi Hercules antenna and the MA520 combines a Penta Band Cellular antenna with Dual-Band 2.4/5.8GHz antenna.



### Model No

**MA501**  
**Hercules**  
 GPS & Wi-Fi  
 Screw-Hercules

### Electrical Data

**GPS** 2 Stage 30dB LNA

**Centre Frequency** 1575.42±2MHz

**Gain** 30dBic typ. (@3V)

**Noise Figure** 3.0dB Max (@3V)

**Power Consump.** 12mA(@3V)

**Polarization** RHCP

**Wi-Fi** Dual Band 2.4~2.5GHz  
 4.9~6.0GHz

**Polarization** Linear

**Impedance** 50Ω

**VSWR** ≤1.8

**Peak Gain** 3dBic@2.4-2.5GHz  
 4dBic@4.9-6.0GHz

**Efficiency** > 40%

### Mechanical Data

**Dimensions** H:29mm, Ø 49mm

**Mounting** Thread Ø 18mm

**Cable\*** 3M RG-174 - GPS  
 CFD-200 - Wi-Fi

**Connector\*** SMA(M) - GPS  
 RP-SMA(M) - Wi-Fi

**IP Rating** IP67 & IP69K

**Op. Temp.** -40°C to 85°C



### Model No

**MA520**  
**Hercules**  
 Cellular & Wi-Fi  
 Screw-Hercules

### Electrical Data

**Cellular** Penta-band 850/900  
 /1800/1900/2100MHz

**Polarisation** Linear

**Impedance** 50Ω

**Return Loss** <-12dBi

**Peak Gain** 1.0dBi @ 824~960MHz  
 0dBi @ 1710~1880MHz

**Efficiency** >30%

**Dual Band** 2.4~2.5GHz  
 5.0~5.8GHz

**Polarisation** Linear

**Impedance** 50Ω

**Return Loss** <-8dBi

**Peak Gain** 2.1dBi@2.4~2.5GHz  
 -3.2dBi@5.0~5.8GHz

**Efficiency** >18%

### Mechanical Data

**Dimensions** H:29mm, Ø 49mm

**Mounting** Thread Ø 18mm

**Cable\*** 2M RG316 - Cellular  
 2M RG316 - Wi-Fi

**Connector\*** SMA(M) - Cellular  
 RP-SMA(M) - Wi-Fi

**IP Rating** IP67 & IP69K

**Op. Temp.** -40°C to 85°C



# Screw Mount/Permanent Mount 2in1

## Spartan GPS/GLONASS & Cellular 2G/3G

The Spartan MA650 antenna is a low profile, heavy-duty, fully IP67 waterproof external M2M antenna for use in telematics, transportation and remote monitoring applications.

With a standard length of 10 meters of very low loss cable, the MA650 is specially designed for e-Bus or train telematics applications where long cable lengths are needed. For industries such as commercial vehicle telematics, remote monitoring,

smart meter systems, construction equipment, at only 40mm high, the “Spartan” provides an unobtrusive, robust, rugged antenna that is durable even in extreme environments.



### Model No

MA.650  
Spartan - 2in1 with 10M cable length  
GPS-GLONASS / Cellular Combination Antenna  
Low Profile Screw Mount (Permanent Mount)

### GPS-GLONASS

#### Electrical Data

Frequency	1575~1602MHz
Efficiency	50% avg.
Peak Gain	4.0dBic typ.
VSWR	2:1 Max
Polarization	Linear
Impedance	50Ω

#### Mechanical Data

Dimensions	H: 50mm Ø: 150mm
Housing	Wonderloy PC-540 PC
Thread	ø30mm
Base & Thread	Nickel Plated Zinc
Cable	3M RG174
Connector	SMA(M)
Waterproof	IP67
Op. Temp.	-40°C~+85°C

### Cellular

#### Electrical Data

Frequency	850/900/1700 /1800/2100MHz
Efficiency	28%
Peak Gain	-0.75 dBi
VSWR	3 Max
Polarization	Linear
Impedance	50Ω
Radiation Pattern	Omni-directional

#### Mechanical Data

Cable	CFD 200
Connector	SMA(M)

# Screw Mount/Permanent Mount 3in1

## Spartan 3in1 GPS/GLONASS, Cellular & Wi-Fi

The “Spartan” MA600 antenna is a heavy-duty, fully IP67 water-proof external M2M antenna for use in telematics, transportation and remote monitoring applications.

The “Spartan” is unique in the market because it combines a 3in1 GPS-GLONASS /Cellular (2G and 3G) and Wi-Fi, heavy-duty antenna with high efficiency in a compact low profile format at only 35mm high. The antenna screws down permanently onto a roof or metal panel and can be pole or wall-mounted with a metal

bracket. The unique robust metal base serves as its own ground plane. The antenna has no need for an external ground plane. It comes with a waterproof 3M adhesive underlay to permanently prevent any water from leaking under the antenna into the mounting hole.



**Model No**

**MA600**  
Spartan - 3in1 Low Profile GPS-GLONASS/Cellular/Wi-Fi  
Screw Mount

**Cellular**

**Electrical Data**

<b>Frequency</b>	Penta-band 850/900 /1800/1900/2100MHz
<b>Peak Gain</b>	2dBi typ.
<b>Ave. Efficiency</b>	40%
<b>Polarization</b>	Linear
<b>Impedance</b>	50Ω

**Mechanical Data**

<b>Dimensions</b>	H:39.5mm (1.38") Ø 145.6mm (5.73")
<b>Mounting</b>	Thread Ø 30mm
<b>Housing</b>	Wonderloy PC-540 PC/ABS Alloy
<b>Op. Temp.</b>	-40°C~+85°C
<b>Cable*</b>	3M CFD-200
<b>Connector*</b>	SMA(M)
<b>IP Rating</b>	IP67

**GPS-GLONASS**

**Electrical Data**

<b>Frequency</b>	1575~1606MHz
<b>LNA</b>	2 Stage 30dB LNA
<b>Peak Gain</b>	4.0dBi typ.
<b>Ave. Efficiency</b>	50%
<b>Impedance</b>	50Ω
<b>VSWR</b>	≤2.0

**Mechanical Data**

<b>Cable*</b>	3M RG-174
<b>Connector*</b>	SMA(M)
<b>IP Rating</b>	IP67

**Wi-Fi**

**Electrical Data**

<b>Frequency</b>	2.4~2.5GHz 4.7~5.9GHz
<b>Peak Gain</b>	3.8dBi typ.
<b>Ave. Efficiency</b>	48%
<b>Polarization</b>	Linear
<b>Impedance</b>	50Ω
<b>VSWR</b>	≤1.6

**Mechanical Data**

<b>Cable*</b>	3M CFD-200
<b>Connector*</b>	SMA(M)
<b>IP Rating</b>	IP67

# Screw Mount/Permanent Mount 3in1

## Storm 3 in 1 GPS/GLONASS/BeiDou 2G/3G/4G 2\*2 MIMO

The MA411 “Storm” antenna is a low profile, heavy-duty, fully IP67 waterproof external M2M antenna used for worldwide telematics applications which require best in class LTE and GNSS performance.

The “Storm” delivers powerful worldwide 4G LTE MIMO antenna technology and includes 3G and 2G bands, plus BeiDou-GPS-GLONASS for next generation location accuracy. It is the world’s lowest profile global telematics antenna solution at only 31mm high.

This high efficiency, high gain antenna provides high isolation between the two MIMO antennas and is perfect for applications such as automotive and heavy equipment vehicle tracking and telematics, remote asset and pipeline monitoring, LTE HD video and emergency services.



### Model No

MA.411  
Storm 3in1  
GNSS/2G/3G/4G 2\*2 MIMO

#### GPS-GLONASS-BeiDou

#### Electrical Data

Centre Freq.	BeiDou:1561.098±2.046 MHz GPS:1575.42±1.023 MHz GLONASS:1602±5 MHz
Efficiency	>55% avg
VSWR	2 Max
Polarization	RHCP
Axial Ratio	BeiDou:<5.5 GPS:<3.2 GLONASS:<10.6
Return Loss	10 dB Min.
LNA Gain	Min 1.8V: 20dB Typ 3.0V: 28dB Max 5.5V: 31dB

#### Mechanical Data

Dimensions	216.24*93.25*30.95mm
Housing	ABS & PC
Weight	415g
Base & Thread	Nickle plated aluminium
Cable**	0.3m CFD-200
Connector**	Fackra(Jack) Code C
Waterproof	IP67
Op. Temp	-40°C to 85°C

\* Fully customizable

#### 2G/3G/4G MIMO 1 & 2

#### Electrical Data

Frequency	698 to 960MHz/1710 to 2170MHz/ 2490 to 2690MHz/3300 to 3600 MHz
Efficiency	>54% avg.
Peak Gain	6.4 dBi avg.
VSWR	<3.5
Polarization	Linear
Impedance	50Ω

#### Mechanical Data

Dimensions	216.24*93.25*30.95mm
Housing	ABS & PC
Weight	415g
Base & Thread	Nickle plated aluminium
Cable**	0.3m CFD-200
Connector**	Fackra(Jack) Code D
Waterproof	IP67
Op. Temp	-40°C to 85°C

\* On the 50\*50cm ground plane

# Screw Mount/Permanent Mount 3in1

## Spartan Highest Performance

The “Spartan” MA605 antenna is a low profile, heavy-duty, fully IP67 waterproof external M2M antenna for use in telematics, transportation and remote monitoring applications.

The “Spartan” MA605 antenna is unique in the market because it combines 3in1 GPS/GLONASS, Cellular (2G and 3G) and Wi-Fi antennas in a heavy-duty structure with high efficiency in a low profile compact format. The antenna screws down permanently

onto a roof or metal panel and can be pole or wall-mounted. The Spartan MA603 antenna is a low profile, heavy-duty, fully IP67 waterproof external M2M antenna for use in telematics, transportation and remote monitoring applications.



### Model No

**MA605**  
**Spartan - 3in1 Isolation Gasket**  
**GPS-GLONASS / Cellular / Wi-Fi**  
 2.4GHz ~ 5GHz  
 Low Profile Screw Mount  
 (Permanent Mount)

### Electrical Data

**GPS-GLONASS** 1575~1606MHz

**LNA** 2-stage 30dB

**Average Gain** 34dBic typ.

**Cellular** Penta-band 850/900/1800  
 1900/2100MHz

**Avg.Efficiency** 45%

**Peak Gain** 2dBi typ.

**Wi-Fi Dual Band** 2.4GHz/ 5GHz

**Avg. Efficiency** 50%

**Peak Gain** 3.8dBi typ.

### Mechanical Data

**Dimensions** H:35.1mm (1.38”), Ø 145.6mm (5.73”)

**Housing** Wonderloy PC-540, PC/ABS Alloy

**Base and thread** Nickel Plated Zinc

**Cable** 3M RG174 - GPS-GLONASS  
 2\* 3M CFD-200

**Connector** 2\* SMA(M), SMA(M) RP - Wi-Fi

**IP Rating** IP67



### Model No

**MA603**  
**Spartan - 3in1 Low Profile**  
**GPS-GLONASS / Cellular / 915MHz**  
 Screw Mount  
 (Permanent Mount)

### Electrical Data

**GPS-GLONASS** 1575~1606MHz

2 Stage 30dB LNA

**Peak Gain** 4.0dBic typ.

**Cellular** Penta-band 850/900/1800/1900/2100MHz

**Peak Gain** 3.4dBi typ.

**Avg.Efficiency** 40%

**Polarization** Vertical

**915MHz** 902~929MHz

**Avg. Efficiency** 50%

**Peak Gain** 2.3dBi typ.

### Mechanical Data

**Dimensions** H:35.1mm (1.38”), Ø 145.6mm (5.73”)

**Housing** Wonderloy PC-540, PC/ABS Alloy

**Base and thread** Zinc

**Cable** 3M RG-174  
 2\*CFD200

**Connector** 3\* SMA(M)

**IP Rating** IP67

\*Cable and Connectors are Customizable

# Screw Mount/Permanent Mount 2in1 LTE MIMO 2\*2

## Storm Series

The MA412 “Storm” delivers powerful worldwide 4G LTE MIMO antenna technology and at a height of just 31mm is world’s lowest profile global telematics antenna solution.

The “Storm” offers best in class LTE performance in a low profile, heavy duty, fully IP67 waterproof form factor. This external antenna is ideal for worldwide telematics applications, including; HD Video over LTE, digital signage, the IoT market, intelligent transport systems and HD video broadcast systems to name a few.

Low loss cables are used to keep efficiency high over long cable lengths and in contrast, smaller MIMO antennas with poorer quality, thinner cables will have a significantly reduced efficiency and isolation.



### Model No

**MA.412**  
**Storm 2in1**  
**698 to 960MHz/1710 to 2170MHz/ 2490 to 2690MHz Antenna**

MIMO1	
<b>Electrical Data</b>	
Frequency	698 to 960MHz/1710 to 2170MHz/ 2490 to 2690MHz
Peak Gain*	4.7 Avg.
Efficiency	>39% Avg.
Impedance	50Ω
VSWR	<3.5 AVG.
Polarization	Linear

Mechanical Data	
Dimensions	216.24*93.25*30.95mm
Weight	480g
Housing	ABS+PC
Cable**	3M CFD-200
Connector	SMA (M)
IP Rating	IP67
Op. Temp.	-40°C to 85°C

MIMO2	
<b>Electrical Data</b>	
Frequency	698 to 960MHz/1710 to 2170MHz/ 2490 to 2690MHz
Peak Gain*	5.1 dBi avg.
Efficiency	>40% avg.
Impedance	50Ω
VSWR	<3.5 Avg.
Polarization	Linear

Mechanical Data	
Dimensions	216.24*93.25*30.95mm
Weight	480g
Housing	ABS+PC
Cable**	3M CFD-200
Connector	SMA (M)
IP Rating	IP67
Op. Temp.	-40°C to 85°C

\* On the 50\*50cm ground plane

\*\*Also available with facra connectors

# Screw Mount/Permanent Mount 2in1 LTE MIMO 2\*2

## Pantheon Series

The MA741 “Pantheon” LTE MIMO 2\*2 antenna is an omnidirectional heavy-duty, fully IP67 waterproof external M2M antenna for use in telematics, transportation and remote monitoring applications.

The “Pantheon” includes two LTE MIMO antennas, with the highest efficiency and peak gain possible. This is necessary for today’s high speed data uplink and downlink systems in applications such as real time video, for maximum throughput and highest signal to noise ratio. The antenna elements operate

at all common 2G, 3G and 4G LTE bands worldwide 698-960MHz, 1710-2170MHz, 2300-2700MHz, 2900-3500MHz. The housing is an extremely robust IP67 direct mount antenna package with excellent isolation (20dB+).



### Model No

**MA741.B**

**Pantheon 2in1 Screw Mount Permanent Mount**

2 x LTE Cellular (2G/3G/4G) Antennas (MIMO)

#### MIMO 1

LTE Cellular  
2G/3G/4G

#### Electrical Data

<b>Frequency</b>	698-960, 1710-2170MHz 2300-2700, 2900-3500MHz
<b>Peak Gain</b>	2dBi typ.
<b>Ave. Efficiency</b>	45%
<b>Impedance</b>	50Ω
<b>Return Loss</b>	≤-6dBi

#### Mechanical Data

<b>Dimensions</b>	H:85.7mm Ø 145.6mm
<b>Mounting</b>	Thread Ø 30mm
<b>Housing</b>	Wonderloy PC-540 PC/ABS Alloy
<b>Op. Temp.</b>	-40°C~+85°C
<b>Cable*</b>	3M CFD-200
<b>Connector*</b>	SMA(M)
<b>IP Rating</b>	IP67

#### MIMO 2

LTE Cellular  
2G/3G/4G

#### Electrical Data

<b>Frequency</b>	698-960, 1710-2170MHz 2300-2700, 2900-3500MHz
<b>Peak Gain</b>	4dBi typ.
<b>Ave. Efficiency</b>	33%
<b>Impedance</b>	50Ω
<b>Return Loss</b>	≤-6dBi

#### Mechanical Data

<b>Dimensions</b>	H:85.7mm Ø 145.6mm
<b>Mounting</b>	Thread Ø 30mm
<b>Housing</b>	Wonderloy PC-540 PC/ABS Alloy
<b>Op. Temp.</b>	-40°C~+85°C
<b>Cable*</b>	3M CFD-200
<b>Connector*</b>	SMA(M)
<b>IP Rating</b>	IP67

# Screw Mount/Permanent Mount 3in1

## Pantheon Series

The MA700 “Pantheon” series antennas are for RF professionals who want the best possible performance without compromise.

This 3in1 MA700 model antenna is a heavy-duty, Omni-directional IP67 waterproof external M2M combination antenna for use in telematics, transportation and remote monitoring applications. The MA700 is unique in the market because it combines the highest efficiency and peak gain GPS-

GLONASS, LTE Cellular (2G/3G/4G) and Wi-Fi antennas together in a tough housing.

The antenna screws down permanently onto a roof or metal panel and can be pole or wall-mounted with a metal bracket.



### Model No

**MA700.B**

**Pantheon 3in1 Screw Mount Permanent Mount**

GPS-GLONASS / LTE Cellular (2G/3G/4G) / 2.4GHz/5GHz Combination Antenna

**LTE/Cellular**  
Wide-Band  
700-2170MHz

#### Electrical Data

<b>Frequency</b>	700/850/900 /1800/1900/2100MHz
<b>Gain</b>	2dBi avg.
<b>Ave. Efficiency</b>	58%
<b>Impedance</b>	50Ω
<b>Return Loss</b>	<-6.0dBi

#### Mechanical Data

<b>Dimensions</b>	H: 85.7mm Ø: 145.6mm
<b>Mounting</b>	Thread Ø 30mm
<b>Housing</b>	Wonderloy PC-540 PC/ABS Alloy
<b>Op. Temp.</b>	-30°C~+85°C
<b>Cable*</b>	3M Low-loss CFD-200
<b>Connector*</b>	SMA(M)
<b>IP Rating</b>	IP67

**GPS-GLONASS**  
2 Stage 30dB LNA

#### Electrical Data

<b>Frequency</b>	1575~1602MHz
<b>LNA</b>	2 Stage 30dB LNA
<b>Peak Gain</b>	4.0dBic typ.
<b>Ave. Efficiency</b>	50%
<b>Impedance</b>	50Ω
<b>VSWR</b>	≤2.0

#### Mechanical Data

<b>Dimensions</b>	H: 85.7mm Ø 145.6mm
<b>Mounting</b>	Thread Ø 30mm
<b>Housing</b>	Wonderloy PC-540 PC/ABS Alloy
<b>Op. Temp.</b>	-30°C~+85°C
<b>Cable*</b>	3M RG-174
<b>Connector*</b>	SMA(M)
<b>IP Rating</b>	IP67

**Wi-Fi**  
Dual Band

#### Electrical Data

<b>Frequency</b>	2.4~2.5GHz 4.7~5.9GHz
<b>Ave. Efficiency</b>	48%
<b>Polarization</b>	Linear
<b>Impedance</b>	50Ω
<b>Return Loss</b>	<-10.0dBi

#### Mechanical Data

<b>Dimensions</b>	H: 85.7mm Ø 145.6mm
<b>Mounting</b>	Thread Ø 30mm
<b>Housing</b>	Wonderloy PC-540 PC/ABS Alloy
<b>Op. Temp.</b>	-30°C~+85°C
<b>Cable*</b>	3M Low-loss CFD-200
<b>Connector*</b>	RP-SMA(M)
<b>IP Rating</b>	IP67

# Screw Mount/Permanent Mount 3in1

## Pantheon Series

The MA710 “Pantheon” antenna is an Omni-directional heavy-duty, fully IP67 waterproof external M2M antenna for use in telematics, transportation and remote monitoring applications.

The “Pantheon” includes two LTE MIMO antennas and one GPS/GLONASS antenna, in the highest efficiency and peak gain possible. This antenna particularly finds its application in mobile video, vehicle communications, location and fleet management, safety & security, remote industrial equipment monitoring. The antenna consists of two LTE MIMO elements 698-960MHz, 1710-2170MHz, 2300-2700MHz, 2900-3500MHz.



### Model No

MA710.B

Pantheon 3in1 Screw Mount Permanent Mount

2 x 2G/3G/4G LTE MIMO Cellular Antenna / 1 x GPS/GLONASS Antenna

#### MIMO 1

LTE Cellular  
2G/3G/4G

#### Electrical Data

Frequency	698~960 MHz 1710~2170 MHz 2300~2700 MHz 2900~3500 MHz
Peak Gain	2dBi typ.
Ave. Efficiency	45%
Impedance	50Ω
Return Loss	≤-6dBi

#### Mechanical Data

Dimensions	H:85.7mm Ø 145.6mm
Mounting	Thread Ø 30mm
Housing	Wonderloy PC-540 PC/ABS Alloy
Op. Temp.	-40°C~+85°C
Cable*	3M CFD-200
Connector*	SMA(M)
IP Rating	IP67

#### MIMO 2

LTE Cellular  
2G/3G/4G

#### Electrical Data

Frequency	698~960 MHz 1710~2170 MHz 2300~2700 MHz 2900~3500 MHz
Peak Gain	1dBi typ.
Ave. Efficiency	33%
Impedance	50Ω
Return Loss	≤-6dBi

#### Mechanical Data

Dimensions	H:85.7mm Ø 145.6mm
Mounting	Thread Ø 30mm
Housing	Wonderloy PC-540 PC/ABS Alloy
Op. Temp.	-40°C~+85°C
Cable*	3M CFD-200
Connector*	SMA(M)
IP Rating	IP67

#### GPS/GLONASS

#### Electrical Data

Frequency	1574~1606 MHz
Peak Gain	4dBi typ.
Ave. Efficiency	50%
Impedance	50Ω
VSWR	<-2.0

#### Mechanical Data

Dimensions	H:85.7mm Ø 145.6mm
Mounting	Thread Ø 30mm
Housing	Wonderloy PC-540 PC/ABS Alloy
Op. Temp.	-40°C~+85°C
Cable*	3M RG-174
Connector*	SMA(M)
IP Rating	IP67



# Screw Mount/Permanent Mount 4in1 Pantheon Series

The MA760 4in1 antenna is an Omni-directional heavy-duty, fully IP67 water proof external M2M antenna for use in telematics, transportation and remote monitoring applications. It is the first antenna on the market to combine 4in1 that includes two LTE MIMO elements, one 2.4GHz/5GHz antenna and GPS-GLONASS in the highest efficiency and peak gain possible. This unique antenna delivers powerful MIMO antenna technology for LTE

while also fully compatible with legacy 2G and 3G networks worldwide, plus GPS-GLONASS for next generation high bandwidth telematics systems. New fleet management and mobile and fixed video technology allows for real-time video uplink and downlink. High efficiency, high gain MIMO antennas are necessary to achieve the high signal to noise ratio and throughput required to solve these challenges.



## Model No

**MA760.B**  
**Pantheon 4in1 Screw Mount (Permanent Mount)**  
 2\* 2G/3G/4G MIMO LTE, GPS-GLONASS, Wi-Fi 2.4/5GHz

### 2G/3G/4G Mimo 1 & Mimo 2

#### Electrical Data

Frequency	698~960 MHz 1710~2170 MHz 2300~2700 MHz 2900~3500 MHz
Peak Gain	2dBi typ.
Ave. Efficiency	50%
Impedance	50Ω
Return Loss	≤-6dBi

#### Mechanical Data

Dimensions	H:85.7mm Ø 145.6mm
Mounting	Thread Ø 30mm
Housing	Wonderloy PC-540 PC/ABS Alloy
Op. Temp.	-40°C~+85°C
Cable*	3M CFD-200
Connector*	SMA(M)
IP Rating	IP67

### GPS-GLONASS

#### Electrical Data

Frequency	1574~1606 MHz
Peak Gain	4dBi avg.
Ave. Efficiency	50%
Impedance	50Ω
VSWR	<2.0

#### Mechanical Data

Dimensions	H:85.7mm Ø 145.6mm
Mounting	Thread Ø 30mm
Housing	Wonderloy PC-540 PC/ABS Alloy
Op. Temp.	-40°C~+85°C
Cable*	3M RG-174
Connector*	SMA(M)
IP Rating	IP67

### 2.4/5GHz

#### Electrical Data

Frequency	2400~2500MHz 5150~5850MHz
Peak Gain	3.0dBi avg.
Ave. Efficiency	48%
Impedance	50Ω
Return Loss	≤-10dBi

#### Mechanical Data

Dimensions	H:85.7mm Ø 145.6mm
Mounting	Thread Ø 30mm
Housing	Wonderloy PC-540 PC/ABS Alloy
Op. Temp.	-40°C~+85°C
Cable*	3M CFD-200
Connector*	SMA(M)
IP Rating	IP67

# Screw Mount/Permanent Mount 5in1 Pantheon Series

The MA750 “Pantheon” antenna is an Omni-directional heavy-duty, fully IP67 waterproof external M2M antenna for use in telematics, transportation and remote monitoring applications. This unique antenna delivers powerful MIMO antenna technology for cellular/LTE and Wi-Fi 802.11n and emerging 802.11ac, plus GPS-GLONASS for next generation multiple

wireless technology systems, such as telematics. Uses include new fleet management and real time video applications that demand high speed video uplink and downlink. High efficiency and high gain MIMO antennas are necessary to achieve the required signal to noise ratio and throughput required to solve these challenges.



**Model No**

**MA750.B**  
**Pantheon 5in1 Screw Mount (Permanent Mount)**  
 2\* 2G/3G/4G MIMO LTE, GPS-GLONASS, 2\* Wi-Fi 2.4/5GHz

**2G/3G/4G**  
**Mimo 1 & Mimo 2**

**Electrical Data**

<b>Frequency</b>	698~960 MHz 1710~2170 MHz 2300~2700 MHz 2900~3500 MHz
<b>Peak Gain</b>	2dBi typ.
<b>Ave. Efficiency</b>	50%
<b>Impedance</b>	50Ω
<b>Return Loss</b>	≤-6dBi
<b>VSWR</b>	<3.0

**Mechanical Data**

<b>Dimensions</b>	H:85.7mm Ø 145.6mm
<b>Mounting</b>	Thread Ø 30mm
<b>Housing</b>	Wonderloy PC-540 PC/ABS Alloy
<b>Op. Temp.</b>	-40°C~+85°C
<b>Cable*</b>	3M CFD-200
<b>Connector*</b>	SMA(M)
<b>IP Rating</b>	IP67

**GPS-GLONASS**

**Electrical Data**

<b>Frequency</b>	1574~1606 MHz
<b>Peak Gain</b>	4dBi avg.
<b>Ave. Efficiency</b>	50%
<b>Impedance</b>	50Ω
<b>VSWR</b>	<2.0

**Mechanical Data**

<b>Dimensions</b>	H:85.7mm Ø 145.6mm
<b>Mounting</b>	Thread Ø 30mm
<b>Housing</b>	Wonderloy PC-540 PC/ABS Alloy
<b>Op. Temp.</b>	-40°C~+85°C
<b>Cable*</b>	3M RG-174
<b>Connector*</b>	SMA(M)
<b>IP Rating</b>	IP67

**2.4/5GHz**

**Electrical Data**

<b>Frequency</b>	2400~2500MHz 5150~5850MHz
<b>Peak Gain</b>	3.0dBi avg.
<b>Ave. Efficiency</b>	40%
<b>Impedance</b>	50Ω
<b>Return Loss</b>	≤-10dBi
<b>VSWR</b>	<2.0

**Mechanical Data**

<b>Dimensions</b>	H:85.7mm Ø 145.6mm
<b>Mounting</b>	Thread Ø 30mm
<b>Housing</b>	Wonderloy PC-540 PC/ABS Alloy
<b>Op. Temp.</b>	-40°C~+85°C
<b>Cable*</b>	3M CFD-200
<b>Connector*</b>	RP-SMA(M)
<b>IP Rating</b>	IP67

# Adhesive Mount 2in1

## Stingray Series

Our adhesive mount external antennas offer ease of installation and high performance in compact form factors. They are supplied with high quality durable 3M tape to allow secure fixing onto any surface.

The MA204 “Stingray” GPS/GLONASS & 2G/3G Cellular antenna is a powerful combination of a tuned two stage GLONASS active ceramic patch and a leading edge Penta-band Cellular antenna,

making it ideal for applications that require durability, small size and covert installation, with reliable reception and transmission crossing through different mobile networks.



Underside View  
(this side faces the passenger)



Top View  
(this side faces the sky)

### Model No

**MA206**  
**Stingray**  
GPS & Wi-Fi  
Adhesive-Puck

### Electrical Data

**GPS** 2 Stage Active LNA  
**Centre Frequency** 1575.42±2MHz  
**Gain** 28dBic typ. (@3V)  
**Noise Figure** 2.0dB Max  
**Power Consump.** 19±2mA(@3~5V)  
**Polarization** RHCP

**Wi-Fi** 2.4~2.5GHz  
**Polarization** Linear  
**Impedance** 50Ω  
**VSWR** ≤1.92  
**Efficiency** > 20%

### Mechanical Data

**Dimensions** H: 10.8mm, Ø 51.7mm  
**Mounting** 3M 4612 Tape  
**Op. Temp.** -40°C~+85°C  
**Cable\*** 3M RG-174  
**Connector\*** SMA(M) - GPS  
RP-SMA(M) - Wi-Fi

### Model No

**MA204**  
**Stingray**  
GPS-GLONASS  
& Cellular 2G/3G  
Adhesive-Puck

### Electrical Data

**GPS-GLONASS** 2 Stage Active LNA  
**Centre Frequency** 1575-1602±2MHz  
**Gain** 28dBic typ. (@3V)  
**Noise Figure** 2.2dB Max (@3V)  
**Power Consump.** 10mA(@3.5V)

**Cellular** Penta-band 850/900  
1800/1900/1900/2100MHz  
**Polarization** Linear  
**Impedance** 50Ω  
**VSWR** ≤2.5

### Mechanical Data

**Dimensions** H: 10.8mm, Ø 55mm  
**Mounting** 3M 4612 Tape  
**Op. Temp.** -40°C~+85°C  
**Cable\*** 2\* 3M RG-174  
**Connector\*** SMA(M) - GPS  
SMA(M) - Cellular

# Adhesive Mount 2in1

## Optimus Series

The Optimus MA220 is a combination high performance GPS-GLONASS and 2G/3G/4G LTE (plus GSM /CDMA/PCS/DCS/UMTS/GPRS/EDGE/HSPA) antenna to simplify Automotive Telematics and Fleet Management systems worldwide.



Top View  
(this side faces the sky)



Underside View  
(this side faces the passenger)



Separate 3M Adhesive Pad

**Model No**

**MA220**  
**Optimus - 2in1 GPS-GLONASS / LTE Antenna**  
 External Adhesive Antenna for Glass and Plastic Mount

**LTE**

**Electrical Data**

Frequency	698~960 MHz 1710~2170 MHz 2300~2700 MHz
Efficiency	22% avg.
Peak Gain	0dBi
VSWR	1.92:1 max
Impedance	50Ω

**Mechanical Data**

Dimensions	62.8*68*12mm
Housing	ABS
Cable	3M RG174
Connector	SMA(M)
Waterproof	IP67

**GPS-GLONASS**

**Electrical Data**

Frequency	GPS:1575.42±3 MHz GLONASS:1602±0.5 MHz
Gain	3 ±1 dB typ.
VSWR	1.92:1 Max
Impedance	50Ω
Noise Figure	1.5dB typ.

**Mechanical Data**

Dimensions	62.8*68*12mm
Housing	ABS
Cable	3M RG174
Connector	SMA(M)
Waterproof	IP67

\* Cable and Connectors are Customizable.

# Adhesive Mount 2in1

## Stream Adhesive Series

The MA208 “Stream” GPS/LTE Cellular antenna is a low profile, heavy-duty, fully IP67 waterproof external M2M antenna for use by RF professionals in telematics, transportation and remote monitoring applications. The MA241 “Genesis” is a unique antenna delivering powerful MIMO antenna technology for worldwide 4G LTE bands at 700MHz/800MHz/1700MHz/1800MHz/2600MHz. It enables designers to use only one antenna that covers all common frequencies for LTE and 4G globally.

The “Stream” is unique in the market as it combines the highest possible efficiency and peak gain for GPS and all cellular bands in 2G/3G/4G in a low profile compact format for mounting via high quality first tier automotive approved 3M adhesive foam.

The Stream Two MA.209 patented design incorporates internally a custom Taoglas 35mm patch antenna on an extended integral ground plane to deliver more than 3.5dBic gain.



### Model No

**MA208**  
**Stream**  
 GPS/LTE-GSM-UMTS  
 Adhesive Mount

### Electrical Data

<b>GPS</b>	2 Stage Active LNA
<b>Centre Freq.</b>	1575.42±1.023MHz
<b>Gain</b>	30dBic typ.
<b>Cellular</b>	LTE 700MHz/824-960 MHz/1710-2170 MHz
<b>Polarization</b>	Linear
<b>Impedance</b>	50Ω
<b>VSWR</b>	≤3.6
<b>Peak Gain</b>	1.61dBi @ 700-960 MHz 0.03dBi @ 1710-2170 MHz
<b>Efficiency</b>	56% typ.

### Mechanical Data

<b>Dimensions</b>	200.5*66.5*9mm
<b>Adhesive</b>	3M 9448 B Tape
<b>Op. Temp.</b>	-40°C~+85°C
<b>Cable*</b>	3M RG-174/CFD-200
<b>Connector*</b>	2* SMA(M)
<b>IP Rating</b>	IP67



### Model No

**MA209**  
**Stream Two**  
 GPS-GLONASS/Cellular  
 Adhesive Mount

### Electrical Data

<b>GPS-GLONASS</b>	2 Stage Active LNA
<b>Centre Freq.</b>	1575MHz to 1610MHz
<b>Gain</b>	30dBic typ.
<b>Cellular</b>	LTE 700MHz/824-960 MHz/1710-2170 MHz
<b>Polarization</b>	Linear
<b>Impedance</b>	50Ω
<b>VSWR</b>	≤3.6
<b>Peak Gain</b>	2.16dBi @ 700~960MHz 0.42dBi @ 1710~2170MHz
<b>Efficiency</b>	56% typ.

### Mechanical Data

<b>Dimensions</b>	200.5*66.5*9mm
<b>Adhesive</b>	3M 9448 B Tape & F100 Foam
<b>Op. Temp.</b>	-40°C~+85°C
<b>Cable*</b>	3M RG-174/CFD-200
<b>Connector*</b>	2* SMA(M)
<b>IP Rating</b>	IP67



### Model No

**MA241**  
**Genesis**  
 LTE/2G/3G/4G MIMO 2\*2  
 Adhesive Mount

### Electrical Data

<b>Frequency</b>	698~960/1710~2170/ 2400~2700/3500MHz
<b>Polarization</b>	Linear
<b>Impedance</b>	50Ω
<b>VSWR</b>	≤3.6
<b>Peak Gain</b>	1.0dBi @ 700~960MHz 3.0dBi @ 1710~3500MHz
<b>Efficiency</b>	>50% typ.

### Mechanical Data

<b>Dimensions</b>	205.8*68.5*12.4mm
<b>Adhesive</b>	3M 9448 B Tape
<b>Op. Temp.</b>	-40°C~+85°C
<b>Cable*</b>	3M RG-174/CFD-200
<b>Connector*</b>	2* SMA(M)
<b>IP Rating</b>	IP67

\*Cable and Connectors are Customizable.

# Adhesive Mount 3in1 Stream Series

The 3in1 MA.230 “Stream” GPS/GLONASS, LTE Cellular 2G/3G/4G and Wi-Fi 2.4/5GHz antenna is a low profile, heavy-duty, fully IP67 waterproof external M2M antenna for use by RF professionals in telematics, transportation and remote monitoring applications.

The “Stream” 3in1 is unique in the market as it combines the highest possible efficiency and peak gain for GPS/GLONASS, Wi-Fi dual band 2.4/5GHz and all Cellular bands in 2G/3G/4G in a low profile compact format for mounting via high quality first tier automotive approved 3M adhesive foam.



## Model No

MA230

Stream 3in1 High Performance Adhesive Mount Combination Antenna

GNSS (GPS/GLONASS) / Cellular (LTE/HSPA/GSM/CDMA/UMTS) / Wi-Fi (2.4/5 GHz)

### 2G/3G/4G

#### Electrical Data

Frequency	698~960 MHz 1710~2170 MHz
Peak Gain	2.16dBi@700-960MHz 0.42dBi@1710-2170MHz
Ave. Efficiency	56%
Impedance	50Ω
VSWR	<3.3 dBi @700-900 <3.6 dBi @1710-1850 <2.2 dBi @1880-2170

#### Mechanical Data

Dimensions	200.5*66.5*9mm
Mounting	3M 1600TB
Op. Temp.	-40°C~+85°C
Cable*	3M CFD-200
Connector*	SMA(M)
IP Rating	IP67

### GPS/GLONASS

#### Electrical Data

Frequency	1574~1606 MHz
Peak Gain	1.92dBi @ 1575.42MHz 3.19dBi @ 1602MHz
Impedance	50Ω
VSWR	<1.21 @ 1575.42MHz <1.55 @ 1602MHz

#### Mechanical Data

Dimensions	200.5*66.5*9mm
Mounting	3M 1600TB
Op. Temp.	-40°C~+85°C
Cable*	3M RG-174
Connector*	SMA(M)
IP Rating	IP67

### 2.4/5.0GHz

#### Electrical Data

Frequency	2400~2500MHz 5150~5850MHz
Peak Gain	1.5dBi @ 2450MHz 2.0dBi @ 5000MHz
Ave. Efficiency	35%
Impedance	50Ω
VSWR	<2.3dBi @ 2450MHz <1.08dBi @ 5000MHz

#### Mechanical Data

Dimensions	200.5*66.5*9mm
Mounting	3M 1600TB
Op. Temp.	-40°C~+85°C
Cable*	3M CFD-200
Connector*	RP-SMA(M)
IP Rating	IP67

# Adhesive Mount 3in1

## Genesis

The “Genesis” MA240 4G antenna is an Omni-directional, fully IP67 waterproof external M2M antenna for use in telematics, transportation and remote monitoring applications worldwide. It is designed to be mounted directly on glass or plastic in the interior of vehicles.

This unique antenna delivers powerful MIMO antenna technology for worldwide 4G LTE bands at 700MHz/800MHz/1700MHz/1800MHz/2600MHz, plus GPS-GLONASS for next generation location accuracy.

Typical applications include HD video over LTE First Responder, Emergency Services, Automotive Vehicle Tracking and Telematics.



### Model No

**MA240**  
**Genesis 3in1 High Performance Adhesive Mount Combination Antenna**  
 2 x 2G/3G/4G LTE MIMO Cellular Antenna / 1 x GPS/GLONASS Antenna

**MIMO 1**  
**LTE Cellular**  
**2G/3G/4G**

#### Electrical Data

<b>Frequency</b>	698~960 MHz 1710~2170 MHz 2300~2700MHz, 2900-3500MHz
<b>Peak Gain</b>	1.5dBi typ.
<b>Ave. Efficiency</b>	50%
<b>Impedance</b>	50Ω

#### Mechanical Data

<b>Dimensions</b>	206*58*12.4mm
<b>Housing</b>	PC/ABS Alloy
<b>Op. Temp.</b>	-40°C~+85°C
<b>Mount</b>	Adhesive foam with 3M Tape
<b>Cable*</b>	2M NFC-200
<b>Connector*</b>	SMA(M)
<b>IP Rating</b>	IP67

**MIMO 2**  
**LTE Cellular**  
**2G/3G/4G**

#### Electrical Data

<b>Frequency</b>	698~960 MHz 1710~2170 MHz 2300~2700MHz, 2900-3500MHz
<b>Peak Gain</b>	2.0dBi typ.
<b>Ave. Efficiency</b>	50%
<b>Impedance</b>	50Ω

#### Mechanical Data

<b>Dimensions</b>	206*58*12.4mm
<b>Housing</b>	PC/ABS Alloy
<b>Op. Temp.</b>	-40°C~+85°C
<b>Mount</b>	Adhesive foam with 3M Tape
<b>Cable*</b>	2M NFC-200
<b>Connector*</b>	SMA(M)
<b>IP Rating</b>	IP67

**GPS/GLONASS**  
**2 Stage 30dB**

#### Electrical Data

<b>Frequency</b>	1574~1606MHz
<b>Total</b>	30dBi typ.
<b>Noise Figure</b>	1.7dB
<b>Ave. Efficiency</b>	50%
<b>Impedance</b>	50Ω
<b>VSWR</b>	<1.5

#### Mechanical Data

<b>Dimensions</b>	206*58*12.4mm
<b>Housing</b>	PC/ABS Alloy
<b>Op. Temp.</b>	-40°C~+85°C
<b>Mount</b>	Adhesive foam with 3M Tape
<b>Cable*</b>	2M RG-174
<b>Connector*</b>	SMA(M)
<b>IP Rating</b>	IP67

# Magnetic Mount 2in1

## GPS/Penta-Band Cellular

The MA301 (GPS/Cellular) and the MA.303 (GPS/GLONASS/Cellular) are combination small form factor high performance GPS and/or GLONASS and Penta-band Cellular (GSM/GPRS/CDMA/PCS/DCS/ WCDMA/UMTS) antennas to simplify AVL or fleet management antenna systems worldwide.

The MA301 and MA303 feature a Magnetic Mount as standard. An internal O-ring meets stringent IP65 waterproof standards. With the strongest GPS/GLONASS and Cellular antenna design team in the industry and rigorous testing Taoglas offers guaranteed performance with your system and your environment. The standard version comes with 3 metres RG-174 cable and SMA(M) connectors for both GPS/GLONASS and Cellular feeds. Cables and connectors are customizable upon request.



### Model No

**MA301**  
GPS/Cellular  
Magnetic-Puck

### Electrical Data

**GPS** 2 Stage Active LNA  
**Centre Frequency** 1575.42±2MHz  
**Gain** 28dB typ. (@3V)  
**Noise Figure** 1.5dB Max  
**Power Consump.** 6±2mA(@2.7~3.3V)  
**VSWR** <1.92

**Cellular** Penta-band 850/900 /1800/1900/2100MHz

**Polarization** Linear  
**Impedance** 50Ω  
**VSWR** ≤2.5  
**Efficiency** > 20%

### Mechanical Data

**Dimensions** H: 10.8mm, Ø 55.1mm  
**Mounting** Magnetic Mount  
**Op. Temp.** -40°C~+85°C  
**Cable\*** 3M RG-174  
**Connector\*** 2\* SMA(M)  
**IP Rating** IP65  
**Magnetic Pull Force** 1.58Kgf

### Model No

**MA303**  
GPS/GLONASS & Cellular  
Magnetic-Puck

### Electrical Data

**GPS** 2 Stage Active LNA  
**Frequency** 1575.42±2 / 1602MHz  
**Gain** 31dB typ. (@3V)  
**Noise Figure** 1.5dB Max  
**Power Consump.** 6±2mA(@2.7~3.3V)  
**VSWR** <1.92

**Cellular** Penta-band 850/900 /1800/1900/2100MHz

**Polarization** Linear  
**Impedance** 50Ω  
**VSWR** ≤2.5  
**Efficiency** 28% avg  
**Return Loss** <-5dBi

### Mechanical Data

**Dimensions** H: 16.8mm, Ø 56.2mm  
**Mounting** Magnetic Mount  
**Op. Temp.** -40°C~+85°C  
**Cable\*** 1M RG-174  
**Connector\*** 2\* SMA(M)  
**IP Rating** IP65  
**Magnetic Pull Force** 1.58Kgf

\*Cable and Connectors are Customizable



# Public Safety 3in1

## Spartan Public Safety Antennas

The MA671 “Spartan” Public Safety 3\*MIMO antenna is a low profile, heavy-duty, fully IP67 waterproof external M2M antenna for use in remote monitoring and public safety applications.

The Spartan 3\*MIMO antenna is unique in the market because it combines three 4.5~4.9GHz antenna elements in a heavy-duty structure with high efficiency in a low profile compact format.

The MA672 “Spartan” 5.0~5.8GHz 3\*MIMO antenna is a low profile, heavy-duty, fully IP67 waterproof, external M2M antenna for use in remote monitoring and telematics applications.

The MA673 “Spartan” 2.4/4.9~5.8GHz 3\*MIMO antenna is a low profile, heavy-duty, fully IP67 waterproof external M2M antenna for use in remote monitoring and telematics applications.



### Model No

**MA671**  
Spartan - 3in1  
3\* MIMO 4.5 ~ 4.9GHz  
Public Safety  
Low Profile Screw Mount  
(Permanent Mount)

### Electrical Data

**Frequency** 4.9 ~ 5.8GHz  
**Peak Gain** 3.0dBi  
**Efficiency** 43% avg.  
**VSWR** 2 Max  
**Polarization** 2\* Vertical 1 \*Horizontal  
**Impedance** 50Ω

### Mechanical Data

**Dimensions** H:35.1mm (1.38")  
Ø 145.6mm (5.73")  
**Housing** Wonderloy PC-540  
PC/ABS Alloy  
**Base and thread** Nickel Plated Zinc  
**Cable** 3\* 3M CFD-200  
**Connector** 3\* RP SMA(M)  
**IP Rating** IP67  
**Op. Temp.** -40°C~+85°C



### Model No

**MA672**  
Spartan - 3in1  
3\* MIMO 4.9 ~ 5.8GHz  
Wi-Fi  
Low Profile Screw Mount  
(Permanent Mount)

### Electrical Data

**Frequency** 4.9 ~ 5.8GHz  
**Peak Gain** 4.0dBi  
**Efficiency** 41% avg.  
**VSWR** 2 Max  
**Polarization** 2\* Vertical 1 \*Horizontal  
**Impedance** 50Ω

### Mechanical Data

**Dimensions** H:35.1mm (1.38")  
Ø 145.6mm (5.73")  
**Housing** Wonderloy PC-540  
PC/ABS Alloy  
**Base and thread** Nickel Plated Zinc  
**Cable** 3\* 3M CFD-200  
**Connector** 3\* RP SMA(M)  
**IP Rating** IP67  
**Op. Temp.** -40°C~+85°C



### Model No

**MA673**  
Spartan - 3in1  
3\* MIMO 2.4/4.9~5.8GHz  
Dual Wi-Fi  
Low Profile Screw Mount  
(Permanent Mount)

### Electrical Data

**Frequency** 2.4 / 4.9~5.8GHz  
**Peak Gain** 2.0dBi typ.  
**Efficiency** > 36%  
**VSWR** 2 Max  
**Polarization** Linear  
**Impedance** 50Ω

### Mechanical Data

**Dimensions** H:35.1mm (1.38")  
Ø 145.6mm (5.73")  
**Housing** Wonderloy PC-540  
PC/ABS Alloy  
**Base and thread** Nickel Plated Zinc  
**Cable** 3\* 3M CFD-200  
**Connector** 3\* RP SMA(M)  
**IP Rating:** IP67  
**Op. Temp.** -30°C~+85°C

# Public Safety 3in1

## Pantheon Public Safety Antennas

The MA705 “Pantheon” antenna is an Omni-directional heavy-duty, fully IP67 waterproof external M2M antenna for use in telematics, transportation and remote monitoring applications.

The “Pantheon” series is designed for RF professionals who accept no performance compromises whatsoever. The MA705 combines a 3in1 GPS-GLONASS, Cellular 700MHz to 2200MHz (2G/3G/4G) and 2.4GHz/5GHz antenna with the highest efficiency and peak gain possible. Unlike our competitors, who don’t measure cable loss, the specification is measured at 3 meters (10ft) to show real performance in the field. The antenna has an Electrically Isolated Gasket to prevent surge currents shorting equipment attached to the antenna.



### Model No

**MA705**  
**Pantheon 3in1**  
 Public Safety GPS-GLONASS / LTE Cellular / Wi-Fi 2.4GHz ~ 5GHz  
 Screw Mount (Permanent Mount)

#### LTE Cellular

##### Electrical Data

<b>Frequency</b>	700/850/900/1700 1800/2100MHz
<b>Ave. Efficiency</b>	55%
<b>Polarization</b>	Linear
<b>Impedance</b>	50Ω
<b>Radiation Pattern</b>	Omni-directional

##### Mechanical Data

<b>Dimensions</b>	H:85.7mm Ø 145.6mm
<b>Housing</b>	Wonderloy PC-540 PC/ABS Alloy
<b>Base and thread</b>	CAN10 Zinc Alloy
<b>Thread diameter</b>	M30 x 2 (30mm)
<b>Nut</b>	Nickel Plated Iron
<b>Foam</b>	3M 9448H
<b>Cable</b>	3M CFD-200
<b>Connector</b>	SMA(M)
<b>Waterproof</b>	IP67
<b>Op. Temp.</b>	-40°C~+85°C

#### GPS-GLONASS

##### Electrical Data

<b>Frequency</b>	1575~1606MHz
<b>LNA</b>	2 Stage 30dB LNA
<b>Peak Gain</b>	4.0dBic typ.
<b>Ave. Efficiency</b>	50%
<b>Impedance</b>	50Ω
<b>VSWR</b>	≤1.9

##### Mechanical Data

<b>Dimensions</b>	H:85.7mm Ø 145.6mm
<b>Housing</b>	Wonderloy PC-540 PC/ABS Alloy
<b>Base and thread</b>	CAN10 Zinc Alloy
<b>Thread diameter</b>	M30 x 2 (30mm)
<b>Nut</b>	Nickel Plated Iron
<b>Foam</b>	3M 9448H
<b>Cable</b>	3M RG-174
<b>Connector</b>	SMA(M)
<b>Waterproof</b>	IP67
<b>Op. Temp.</b>	-40°C~+85°C

#### Wi-Fi / Public Safety

##### Electrical Data

<b>Frequency</b>	2.4GHz~ 5GHz (4.9GHz ~ 6GHz)
<b>Peak Gain</b>	2.4GHz - 2dBi 4.9GHz - 4dBi 5GHz - 5dBi
<b>Ave. Efficiency</b>	38%
<b>Polarization</b>	Linear
<b>Impedance</b>	50Ω
<b>VSWR</b>	≤1.7

##### Mechanical Data

<b>Dimensions</b>	H:85.7mm Ø 145.6mm
<b>Housing</b>	Wonderloy PC-540 PC/ABS Alloy
<b>Base and thread</b>	CAN10 Zinc Alloy
<b>Thread diameter</b>	M30 x 2 (30mm)
<b>Nut</b>	Nickel Plated Iron
<b>Foam</b>	3M 9448H
<b>Cable</b>	3M CFD-200
<b>Connector</b>	SMA(M)
<b>Waterproof</b>	IP67
<b>Op. Temp.</b>	-40°C~+85°C

# External ISM - Adhesive Mount

## Adhesive Mount

The ISA.01 and ISA.06 are Omni-directional wide-band low profile 400MHz to 470MHz antennas for internal or external applications adhesive mounted on glass (ISA.01) or ABS (ISA.06)

The ISA.01 and ISA.06 are specifically tuned to perform on glass and ABS surfaces, with a semi-flexible build type and strong 3M automotive approved double-sided adhesive. Both find themselves being used in the automotive industry and in telematics. The ISA range offers superlative stable peak gain and efficiency across a very wide bandwidth.

The ISA.05 is designed primarily for 915MHz ISM band for applications such as RFID Readers, Short range mesh networks and environments like car engines where there are multiple metal objects. It offers high peak gain and efficiency, especially when attached to a ground plane.



**Model No**

**ISA.01**  
Wide-Band Low Profile  
Omni-directional  
Glass Mount

**Electrical Data**

Frequency	400~470MHz
Radiation Pattern	Omni-directional
Peak Gain	1.5dBi
Efficiency	35%
Return Loss	-11dB avg.
Polarization	Linear
Impedance	50Ω

**Mechanical Data**

Dimensions	239*42*10.5mm
Mounting	3M Adhesive
Cable	3M RG174
Connector	SMA(M)
Housing	TPR
Waterproof	Outside Housing - IP65 Internal PCB - IP67
Op. Temp.	-40°C~+85°C



**Model No**

**ISA.06**  
Wide-Band Low Profile  
Omni-directional  
Plastic Surfaces Mount

**Electrical Data**

Frequency	400~470MHz
Radiation Pattern	Omni-directional
Peak Gain	1.5dBi
Efficiency	37%
Return Loss	-11dB avg.
Polarization	Linear
Impedance	50Ω

**Mechanical Data**

Dimensions	239*42*10.5mm
Mounting	3M Adhesive
Cable	3M RG174
Connector	SMA(M)
Housing	TPR
Waterproof	Outside Housing - IP65 Internal PCB - IP67
Op. Temp.	-40°C~+85°C



**Model No**

**ISA.05**  
External ISM  
915MHz  
Omni Directional  
D/sided Adhesive Mount

**Electrical Data**

Frequency	902-928MHz
Radiation Pattern	hemispherical
Peak Gain	> 0 dB Avg.
Efficiency	> 52.5% avg.
Return Loss	-5.6dB avg
Polarization	Linear
Impedance	50Ω
Max Input Power	5 Watts

**Mechanical Data**

Dimensions	80*50.5*11mm
Gasket & Adhesive	3M 9448 + CR-4305
Cable	0.3m 1.37 RF Coaxial
Connector	IPEX MHFHT
Housing	Black, Heat Shrink with Glue
Waterproofing	IP 65
Op. Temp.	-40°C to +85°C

\*All measurements were conducted with 3M RG174 cable

## External ISM - Permanent Screw Mount

### Hercules Series

The “Hercules” series is based around being adaptable and reliable in any environment. The Hercules ISM line is especially suited to mesh networks, vehicles, indoor and outdoor assets.

The “Hercules” trademark design features are present on the IS.01, IS.04 and IS.05 with extra thick threads and durable UV resistant ABS housing.

The IS.01 antenna is for the 433MHz licensed band, the IS.04 for the 868MHz band and the IS.05 for the 915MHz band.



#### Model No

**IS.01.B**  
Hercules  
433MHz  
Screw Mount

#### Electrical Data

Frequency	400-460MHz
Radiation Pattern	Omni-directional
Peak Gain	1dBi
Efficiency	40% avg.
Return Loss	-16dB
Polarization	Linear
Impedance	50Ω
VSWR	≤ 2.0

#### Mechanical Data

Dimensions	H:29mm, Ø 49mm
Mounting	Thread 18mm
Op. Temp.	-40°C~+85°C
Cable	3M NFC-200
Connector	SMA(M)
IP Rating	IP67 & IP69K



#### Model No

**IS.04.B**  
Hercules  
868MHz  
Screw Mount

#### Electrical Data

Frequency	868-870MHz
Radiation Pattern	Omni-directional
Peak Gain	1.98dBi
Efficiency	35% avg.
Return Loss	-13dB
Polarization	Linear
Impedance	50Ω
VSWR	≤ 2.5

#### Mechanical Data

Dimensions	H:29mm, Ø 49mm
Mounting	Thread 18mm
Op. Temp.	-40°C~+85°C
Cable	3M RG-174
Connector	SMA(M)
IP Rating	P67 & IP69K



#### Model No

**IS.05/B**  
Hercules  
915MHz  
Screw Mount

#### Electrical Data

Frequency	902-928MHz
Radiation Pattern	Omni-directional
Peak Gain	2.2dBi typ.
Efficiency	35% avg.
Return Loss	-15dB
Polarization	Linear
Impedance	50Ω
VSWR	≤ 2.5

#### Mechanical Data

Dimensions	H:29mm, Ø 49mm
Mounting	Thread 18mm
Op. Temp.	-40°C~+85°C
Cable	3M RG-174
Connector	SMA(M)
IP Rating	IP67 & IP69K

# External ISM - Omni-directional Outdoor Barracuda Series

Taoglas range of Omni-directional base station antennas are the starting point for any mesh network solution - housed in fiberglass they are safer than traditional antennas.

The "Barracuda" series is a range of Omni-directional fiberglass outdoor antennas, suitable for metering, industrial monitoring and security applications. Its collinear dipole design means it radiates uniformly in the azimuth with a high gain, providing coverage over long distances.



### Model No

**OMB.868**  
**Barracuda**  
5dBi  
Omni-directional  
Dipole Antenna

### Electrical Data

**Frequency** 800~870MHz  
**Radiation Pattern** Omni-directional  
**Peak Gain** 5dBi  
**Efficiency** 75% avg.  
**Polarization** Vertical  
**Impedance** 50Ω  
**VSWR** ≤ 1.5  
**Max Input Power** 50W

### Mechanical Data

**Dimensions** H:1093.5, Ø 26mm  
**Mounting** Wall/Pole  
Mount Bracket  
**Op. Temp.** -40°C~+85°C  
**Application** Indoor/Outdoor  
**Connector\*** N Type Female  
**Wind Resistance** >150mph(>241km/h)



### Model No

**OMB.868**  
**Barracuda**  
8dBi  
Omni-directional  
Dipole Antenna

### Electrical Data

**Frequency** 860~870MHz  
**Radiation Pattern** Omni-directional  
**Peak Gain** 8dBi  
**Efficiency** 75% avg.  
**Polarization** Vertical  
**Impedance** 50Ω  
**VSWR** ≤ 1.5

### Mechanical Data

**Dimensions** 1474mm (Max)  
**Mounting** Wall/Pole  
Mount Bracket  
**Op. Temp.** -40°C~+85°C  
**Application** Indoor/Outdoor  
**Connector\*** N Type Female  
**Wind Resistance** >150mph(>241km/h)



### Model No

**OMB.915**  
**Barracuda**  
3dBi  
Omni-directional  
Dipole Antenna

### Electrical Data

**Frequency** 902~928MHz  
**Radiation Pattern** Omni-directional  
**Gain** 3.5dBi typ.  
**Efficiency** 63% avg.  
**Polarization** Vertical  
**Impedance** 50Ω  
**VSWR** ≤ 1.5  
**Max Input Power** 50W

### Mechanical Data

**Dimensions** H:1094, Ø 70\*55mm  
**Mounting** Wall/Pole  
Mount Bracket  
**Op. Temp.** -40°C~+85°C  
**Application** Indoor/Outdoor  
**Connector\*** N Type Female  
**Wind Resistance** >150mph(>241km/h)

## External ISM - Omni-directional Outdoor Barracuda Series

In practice no antenna is truly 100% Omni-directional. The best one can achieve is an antenna which has a doughnut shaped radiation pattern all around the antenna housing itself such as these "omnis". Omnis give the best value because they give maximum coverage range on the horizontal (azimuth) plane in

360 degrees thus minimizing the amount of nodes needed for a mesh network. They can be connected directly to the access point or telemetry unit or they can be fixed to a pole or wall and connected via any type of customer specified cable and connector.



### Model No

**OMB.242**  
**Barracuda**  
8dBi  
Omni-directional  
Dipole Antenna

### Electrical Data

<b>Frequency</b>	2400~2500MHz
<b>Radiation Pattern</b>	Omni-directional
<b>Gain</b>	8.0dBi typ.
<b>Efficiency</b>	65% avg.
<b>Polarization</b>	Vertical
<b>Impedance</b>	50Ω
<b>VSWR</b>	≤ 1.3
<b>Max Input Power</b>	50W

### Mechanical Data

<b>Dimensions</b>	H:523, Ø 26mm
<b>Mounting</b>	Wall/Pole Mount Bracket
<b>Op. Temp.</b>	-40°C~+85°C
<b>Application</b>	Indoor/Outdoor
<b>Connector*</b>	N Type Female
<b>Wind Resistance</b>	>150mph(>241km/h)



### Model No

**OMB.445**  
**Barracuda**  
7dBi  
Omni-directional  
Collinear Antenna

### Electrical Data

<b>Frequency</b>	4.4~5.0 GHz
<b>Radiation Pattern</b>	Omni-directional
<b>Gain</b>	7.0dBi typ.
<b>Efficiency</b>	75% avg.
<b>Polarization</b>	Vertical
<b>Impedance</b>	50Ω
<b>VSWR</b>	≤ 1.3
<b>Max Input Power</b>	100W

### Mechanical Data

<b>Dimensions</b>	H:270, Ø 26mm
<b>Mounting</b>	Wall/Pole Mount Bracket
<b>Op. Temp.</b>	-20°C~+60°C
<b>Application</b>	Indoor/Outdoor
<b>Connector*</b>	N Type Female
<b>Wind Resistance</b>	>150mph(>241km/h)

# External ISM - Road Marker

## Road Marker Antenna Kit

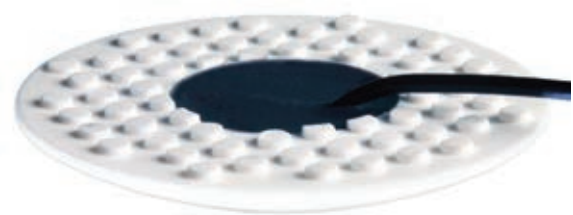
Our design team in the US has designed a special range of antennas which can be fitted inside US standard raised non-reflective roadmarkers. The antenna can be installed inside “Bott’s dots” that can in turn be mounted directly on the pavement and on the road in the USA.

These antennas have been potted with the epoxy that is traditionally used to secure the roadmarker itself to the ground. There are no air gaps whatsoever inside the new type approved roadmarker with antenna in order to maintain the

mechanical integrity. It is presumed that the standard black epoxy will also be used to install the roadmarker in its final resting place on the ground.



Road Marker  
top view



Road Marker  
underside view

### Model No

**RI.02.01**  
**915MHz Road Marker Kit**  
 Quad-Band Cellular Antenna RI.01  
 with CAB.826 Cable Assembly  
 Low Profile

### Electrical Data

Band	915MHz
Frequency	902~928MHz
Radiation Pattern	Omni-directional
Peak Gain	3.2dBi
Polarization	Linear
Impedance	50Ω
Return Loss	-18dB
Efficiency	26%

### Mechanical Data

Dimensions	H: 17.6mm, Ø 101.4mm
Casing	UV Resistant PP
Cable	RG.01: 1.5M WY-100 CAB.826: 1.5M WY-100
Connector	RG.01: SMB(M) Jack CAB.826: SMB(F) to SMA(M)ST
Op. Temp.	-40°C~+85°C
IP Rating	IP67

### Model No

**RI.02.02**  
**915MHz Road Marker Kit**  
 Quad-Band Cellular Antenna RI.01  
 with CAB.820 Cable Assembly  
 Low Profile

### Electrical Data

Band	915MHz
Frequency	902~928MHz
Radiation Pattern	Omni-directional
Peak Gain	3.2dBi
Polarization	Linear
Impedance	50Ω
Return Loss	-18dB
Efficiency	26%

### Mechanical Data

Dimensions	H: 17.6mm, Ø 101.4mm
Casing	UV Resistant PP
Cable	RG.01: 1.5M WY-100 CAB.820: 1.5M WY-100
Connector	RG.01: SMB(M) Jack CAB.820: SMB(F) to TNC(M)ST
Op. Temp.	-40°C~+85°C
IP Rating	IP67

## External ISM - Terminal Antennas

### Terminal Antenna Range

Taoglas ISM band terminal antennas are designed for easy connection to ISM terminals and equipment. Our antennas cover the 135MHz, 169MHz, 433MHz, 868MHz and 915MHz ISM bands worldwide.

The FW.80 "Meteor" is a 0dBi 169MHz ISM band 1/4 wavelength monopole flexible whip antenna with Omni-directional pattern, optimized in the azimuth for wide coverage range in typical 169 MHz applications such as Wireless M- Bus metering. It also finds

its usage in remote asset monitoring applications, alarms, paging systems and private mobile radio services. The Meteor has an IP67 housing. The antenna, like all low frequency monopole antennas, needs to be mounted to a metal plate to radiate.



#### Model No

**FW.80.SMA.M**  
**Meteor**  
 169MHz  
 Flexible Whip

#### Electrical Data

**Frequency** 169MHz  
**Radiation Pattern** Omni-directional  
**Peak Gain\*** 0dBi  
**Average Gain\*** -3.9dBi  
**Efficiency\*** 40%  
**Polarization** Linear  
**Impedance** 50Ω  
**Max Input Power** 50W

#### Mechanical Data

**Dimensions** H: 353mm, Ø 16mm  
**Base Diameter** Ø 16mm  
**Whip Diameter** Ø 4mm  
**Housing** ABS  
**Connector** SMA(M)

Tuned for 30cm x 30cm ground plane

\*For low frequency antennas these parameters can only be estimated using RF formula calculation, simulation or rough field test comparisons with large benchmark antennas.



#### Model No

**FW.81.SMA.M**  
**Meteor**  
 135MHz  
 Flexible Whip

#### Electrical Data

**Frequency** 135MHz  
**Radiation Pattern** Omni-directional  
**Peak Gain\*** 0dBi  
**Average Gain\*** -3.9dBi  
**Efficiency\*** 40%  
**Polarization** Linear  
**Impedance** 50Ω  
**Max Input Power** 50W

#### Mechanical Data

**Dimensions** H: 353mm, Ø 16mm  
**Base Diameter** Ø 16mm  
**Whip Diameter** Ø 4mm  
**Housing** ABS  
**Connector** SMA(M)



#### Model No

**FW.43.B.SMA.M**  
**Meteor**  
 433MHz  
 Flexible Whip

#### Electrical Data

**Frequency** 433MHz  
**Radiation Pattern** Omni-directional  
**Peak Gain\*** 1.10 dBi  
**Return Loss** <-10dB  
**Efficiency\*** 73.66% avg.  
**Polarization** Linear  
**Impedance** 50Ω  
**Input Power** 2 W

#### Mechanical Data

**Dimensions** 290 ± 9mm  
**Base Diameter** 16 ± 0.6 mm  
**Whip Diameter** 6.2 ± 0.6 mm  
**Casing** ABS  
**Connector** SMA Type (M)  
**Weight** 63.5g  
**Op. Temp** -40°C to +85°C



# External ISM - Terminal Mount Antennas

## Meteor Range

Our range of “Meteor” antennas are a robust outdoor solution designed for various ISM bands. They offer excellent efficiency and high peak gain on a 30\*30cm ground plane.

The FW.86 “Meteor” operates at the 868MHz ISM band. This rugged antenna is made of a flexible inner steel core covered by PE so it’s extremely resistant to abrasion and maintains performance even after shock. The antenna was specifically developed for monitoring systems, such as weather monitoring, motion/vibration sensors, and pollutants monitoring. At

915MHz, the FW.95 “Meteor” operates within the unlicensed ISM band which is seeing increasing popularity in the USA. At a length of just 226mm this robust antenna is ideal for monitoring systems, such as weather monitoring, motion/vibration sensors, and pollutants monitoring.



### Model No

**FW.86.RNT.M**  
Meteor  
868 MHz  
Flexible Whip  
Monopole antenna

### Electrical Data

**Frequency** 868MHz  
**Radiation Pattern** Omni-directional  
**Peak Gain** 4.78 dBi  
**Return Loss** <-15dB  
**Efficiency** 96.60%  
**Polarization** Linear  
**Impedance** 50Ω  
**Input Power** 2 W

### Mechanical Data

**Dimensions** H: 246 ± 6 mm  
**Base Diameter** 20 ± 0.5 mm  
**Whip Diameter** 6.2 ± 0.6 mm  
**Casing** ABS  
**Connector** RP-N Type(M)  
**Weight** 48.5g  
**Op. Temp.** -40°C to +85°C

\*30cm x 30cm ground plane



### Model No

**FW.86.B.SMA(M)**  
Meteor  
868 MHz  
Flexible Whip  
Monopole antenna

### Electrical Data

**Frequency** 850-890MHz  
**Radiation Pattern** Omni-directional  
**Peak Gain** 2.73 dBi avg.  
**Return Loss** <-10dB  
**Efficiency** >67.5% avg.  
**Polarization** Linear  
**Impedance** 50Ω  
**Input Power** 2 W

### Mechanical Data

**Dimensions** 240 ± 6mm  
**Base Diameter** 16 ± 0.6 mm  
**Whip Diameter** 6.2 ± 0.6 mm  
**Casing** ABS  
**Connector** SMA (M)  
**Weight** 39g  
**Op. Temp.** -40°C to +85°C



### Model No

**FW.95.B.SMA(M)**  
Meteor  
868 MHz  
Flexible Whip  
Monopole antenna

### Electrical Data

**Frequency** 902-928MHz  
**Radiation Pattern** Omni-directional  
**Peak Gain** 2.92 dBi avg.  
**Return Loss** <-10dB  
**Efficiency** >60%  
**Polarization** Linear  
**Impedance** 50Ω  
**Input Power** 2 W

### Mechanical Data

**Dimensions** 226 ± 6mm  
**Base Diameter** 16 ± 0.6 mm  
**Whip Diameter** 6.2 ± 0.6 mm  
**Casing** ABS  
**Connector** SMA (M)  
**Weight** 38g  
**Op. Temp.** -40°C to +85°C

## External ISM - Wall Mount Cyclops Series

The WM.80 “Cyclops” is a 169MHz ISM band monopole flexible whip antenna. The whip itself is made up of a flexible inner steel core covered by TPU and stands up to collisions while maintaining its original shape and performance.

The “Cyclops” finds its usage in remote asset monitoring, alarms, paging systems, Wireless M-Bus metering and private mobile radio services. This antenna delivers wider coverage areas and more reliable connections for professional customers in the automotive, industrial industries. The whip and the connection internally to the bracket is completely IP67 waterproof. The bracket allows complete concealment of the cable for a more secure integration and cleaner installation. The cable can be routed out of the back wall of the bracket into the interior of the mounting wall for added security against vandalism.

### Model No

**WM.80**  
**Cyclops**  
169MHz 0dBi Wall Mount  
Flexible Whip Monopole Antenna

### Electrical Data

Working Freq.	169MHz
Peak Gain	0dBi
Average Gain	-3.9dBi
Efficiency	40%
Impedance	50Ω
Polarization	Linear
Radiation Pattern	Omn-directional
Input Power	50W

### Mechanical Data

Whip Height	278mm
Base Diameter	Ø16mm
Whip Diameter	Ø4mm
Casing	ABS
Connector	SMA(M)
Op. Temp.	-40°C~+85°C
IP Rating	IP67



# External ISM 433MHz Permanent Mount Antennas

## Shockwave Series

The Shockwave range is a series of mechanically robust, waterproof, external antennas design for use on a ground plane and are ideal for applications in harsh outdoor environments.

The TLS.30 is IP67 and IP69K water resistant against high pressure water jets in commercial cleaning environments, this makes it an ideal antenna for use in 433MHz ISM band applications designed for heavy duty equipment and vehicle communications in harsh environments, remote control systems, security systems and mesh networks.

Due to a unique indent tab in the antenna's design, it can be solidly locked on the top of its mounting location and water is prevented from leaking through due to the waterproof o-rings around the bottom.



### Model No

**TLS.30.1F21**  
Shockwave 433MHz  
Permanent Mount  
External Antenna

### Electrical Data

**Frequency** 433 MHz  
**Radiation Pattern** Omni-directional  
**Peak Gain** -1.16 dBi  
**Average Gain** -2.59 dBi  
**Efficiency** 55.14%  
**Polarization** Vertical  
**Impedance** 50Ω  
**Max Input Power** 100 w

### Mechanical Data

**Dimensions** H = 79.45mm D= 42mm  
**Connector** N type (F)  
**Material** UV Resistant ABS  
**Base** Nickel plated zinc alloy  
**Weight** 169g  
**Waterproofing** IP67 and IP69K  
**Op. Temp** -40°C to +85°C



### Model No

**TLS.30.1F11**  
Shockwave 433MHz  
Permanent Mount  
External Antenna

### Electrical Data

**Frequency** 433 MHz  
**Radiation Pattern** Omni-directional  
**Peak Gain** -1.19 dBi  
**Average Gain** -2.87 dBi  
**Efficiency** 51.67%  
**Polarization** Vertical  
**Impedance** 50Ω  
**Max Input Power** 100 w

### Mechanical Data

**Dimensions** H = 79.45mm D= 42mm  
**Connector** N type (M)  
**Material** UV Resistant ABS  
**Base** Nickel plated zinc alloy  
**Weight** 130g  
**Waterproofing** IP67 and IP69K  
**Op. Temp** -40°C to +85°C



### Model No

**TLS.30.105111**  
Shockwave 433MHz  
Permanent Mount  
External Antenna  
1M CFD-200 SMA(M)  
connector

### Electrical Data

**Frequency** 433 MHz  
**Radiation Pattern** Omni-directional  
**Peak Gain** -0.54 dBi  
**Average Gain** -2.48 dBi  
**Efficiency** 56.46%  
**Polarization** Vertical  
**Impedance** 50Ω  
**Max Input Power** 100W

### Mechanical Data

**Dimensions** H = 79.45mm D= 42mm  
**Cable** 1M CFD-200  
**Connector** SMA (M)  
**Material** UV Resistant ABS  
**Base** Nickel plated zinc alloy  
**Weight** 130g  
**Waterproofing** IP67 and IP69K  
**Op. Temp** -40°C to +85°C

## External ISM - Terminal Antennas

### Terminal Antenna Range

The TI.10 series are high performance 433MHz Omni-directional antennas. The TI.10 helical SMA plug mount antenna is ideal for mobile small form factor applications.

At only 48mm in length, the Omni-directional 0dBi gain ensures constant reception and transmission. The antenna structure is designed for robust handling and the housing is made with TPE giving reliable performance in tough environments. The TI.10 HT series are robust miniature 433MHz Omni-directional antennas suitable for high temperature applications. The antenna housing is made of Dupont® Hytrel® TPEE material which is durable in high temperature application environments up to 150°C.



#### Model No

**TI.10.0112**  
433MHz  
Fixed R/A  
Monopole Helical

#### Electrical Data

**Frequency** 433-435MHz  
**Radiation Pattern** Omni-directional  
**Peak Gain** 0dBi typ.  
**Return Loss** -15dB  
**Polarization** Linear  
**Impedance** 50Ω  
**VSWR** ≤ 2.0

#### Mechanical Data

**Dimensions** H: 45mm  
Ø 7.8mm  
L: 17mm (connector)  
**Mounting** R/A Fixed  
**Op. Temp.** -40°C~+85°C  
**Connector** SMA(M)RA



#### Model No

**TI.10.0111**  
433MHz  
Straight  
Monopole Helical

#### Electrical Data

**Frequency** 433-435MHz  
**Radiation Pattern** Omni-directional  
**Peak Gain** 0dBi typ.  
**Return Loss** -17dB  
**Polarization** Linear  
**Impedance** 50Ω  
**VSWR** ≤ 2.2

#### Mechanical Data

**Dimensions** H: 48mm Ø 7.8mm  
L: 7.8mm (connector)  
**Housing** TPE  
**Mounting** Straight Fixed  
**Op. Temp.** -40°C~+85°C  
**Connector** SMA(M)

\* Also available, TI.10.0111.HT suitable up to 150°C



#### Model No

**TI.08.C.0112**  
868MHz  
Fixed R/A  
Monopole Helical

#### Electrical Data

**Frequency** 853-883MHz  
**Radiation Pattern** Omni-directional  
**Gain** 0dBi typ.  
**Polarization** Linear  
**Impedance** 50Ω  
**VSWR** ≤ 2.3

#### Mechanical Data

**Dimensions** H: 52.8mm  
Ø 9.6mm  
L: 17.1mm (connector)  
**Mounting** R/A Fixed  
**Op. Temp.** -40°C~+85°C  
**Connector** SMA(M)RA  
**Connector** SMA(M)RA

# External ISM - Terminal Antennas

## 868/915MHz Terminal Antenna Range

The TI.08.A.0111 is high performance 868MHz ISM band dipole Omni-directional antenna. The antenna features an SMA(M) connector as standard, the antenna has a high radiation efficiency of 35% in free space. The antenna is fabricated using TPU which allows for robust handling, while remaining lightweight

TI.18 is a high performance 868MHz ISM band dipole Omni-directional antenna. The SMA connector is used for general purposes and the hinged design enables the antenna to be positioned at its most suitable angle.



<b>Model No</b>	<b>TI.08.A.0111</b>
	868MHz
	Straight
	Dipole

<b>Model No</b>	<b>TI.18</b>
	868MHz
	Hinged 90°
	Dipole

<b>Model No</b>	<b>TI.09.A.0111</b>
	915MHz
	Straight
	Dipole

<b>Electrical Data</b>	
<b>Frequency</b>	868~870MHz
<b>Radiation Pattern</b>	Omni-directional
<b>Peak Gain</b>	0dBi typ.
<b>Efficiency</b>	35%
<b>Polarization</b>	Linear
<b>Impedance</b>	50Ω
<b>VSWR</b>	≤ 1.5
<b>Max Input Power</b>	10W

<b>Electrical Data</b>	
<b>Frequency</b>	868~870MHz
<b>Radiation Pattern</b>	Omni-directional
<b>Peak Gain</b>	3dBi typ.
<b>Efficiency</b>	92%
<b>Polarization</b>	Linear
<b>Impedance</b>	50Ω
<b>VSWR</b>	≤ 1.9
<b>Max Input Power</b>	10W

<b>Electrical Data</b>	
<b>Frequency</b>	902-928MHz
<b>Radiation Pattern</b>	Omni-directional
<b>Gain</b>	0dBi typ.
<b>Return Loss</b>	-22dB
<b>Polarization</b>	Linear
<b>Impedance</b>	50Ω
<b>VSWR</b>	≤ 1.1
<b>Max Input Power</b>	10W

<b>Mechanical Data</b>	
<b>Dimensions</b>	L: 168mm Ø 12mm
<b>Mounting</b>	Straight Fixed
<b>Op. Temp.</b>	-40°C~+85°C
<b>Connector</b>	SMA(M)

<b>Mechanical Data</b>	
<b>Dimensions</b>	H: 376mm Ø 13.1mm
<b>Mounting</b>	Hinged 90°
<b>Op. Temp.</b>	-40°C~+85°C
<b>Connector</b>	SMA(M)

<b>Mechanical Data</b>	
<b>Dimensions</b>	L: 168mm Ø 12mm
<b>Mounting</b>	Straight Fixed
<b>Op. Temp.</b>	-40°C~+85°C
<b>Connector</b>	SMA(M)

\* Tuned for ground plane

## External ISM - Terminal Antennas

### 915MHz High Gain Terminal Antenna Range

The TI.19 is a high performance 915MHz ISM band dipole Omni-directional antenna. The hinged design enables the antenna to be positioned at its most suitable angle. This antenna features an SMA(M) plug connector.



#### Model No

**TI.19**  
915MHz  
2dBi  
Hinged 90°  
Dipole

#### Electrical Data

**Frequency** 902~928MHz  
**Radiation Pattern** Omni-directional  
**Peak Gain** 2.5dBi  
**Efficiency** 81%  
**Polarization** Linear  
**Impedance** 50Ω  
**VSWR** ≤ 1.9  
**Max Input Power** 10W

#### Mechanical Data

**Dimensions** H: 379mm  
Ø 13mm  
L: 8.4mm (connector)  
**Mounting** Hinged 90°  
**Op. Temp.** -40°C~+85°C  
**Connector** SMA(M)

The TI.16 is a 5dBi 915MHz ISM band (902MHz to 928MHz) dipole omni-directional antenna. This robust whip is suitable for outdoor applications where wide coverage is required, especially in the azimuth plane, such as metering and remote monitoring.



#### Model No

**TI.16**  
915MHz  
5dBi  
Rigid Whip  
Monopole Helical

#### Electrical Data

**Frequency** 902~928MHz  
**Radiation Pattern** Omni-directional  
**Peak Gain** 5dBi  
**Efficiency** 60% (50x50 gp)  
**Polarization** Linear  
**Impedance** 50Ω  
**Max Input Power** 50W

#### Mechanical Data

**Dimensions** H: 620mm  
Ø 25mm  
L: 33.7mm (connector)  
**Whip Material** Rigid Coated Brass  
**Connector** N Male Straight

# Embedded ISM - Adhesive/Screw Mount Range

## Helical Dipole Antenna

The PC240 is a 433 MHz embedded Omni-directional adhesive/screw mounted, linear polarized, dipole antenna with high efficiency at only 96mm in length.

The PC240 operates in the license free ISM band and is specifically designed for use in wireless alarm devices, such as home security & alarm, home automation, metering, remote control, industrial control, and other 433MHz applications. The PC240's helical dipole structure means it can be designed

significantly shorter while still maintaining a high efficiency typically found in longer antennas. It can be easily attached to a device housing via 3M adhesive, without the worry of housing detuning it, due to its 2mm thick ABS board.



### Model No

**PC240**  
Embedded ISM  
Adhesive/Screw Mount  
Helical Dipole Range

### Electrical Data

**Frequency** 433MHz  
**Radiation Pattern** Omni-directional  
**Return Loss** <-10dB  
**VSWR** <2  
**Peak Gain** -0.97 dB  
**Efficiency\*** 48.82% avg.  
**Polarization** Linear  
**Impedance** 50Ω

### Mechanical Data

**Dimensions** H= 3 mm, L = 96 mm,  
**Cable** 1m CFD-200  
**Connector** SMA(M)  
**Material** UV Resistant ABS  
**Weight** 205g  
**Op. Temp** -40°C to +85°C

## Embedded ISM - Flexible Series

### Flexible Circuit Antennas

Flexible circuit antennas have been used in many modern mobile phone antenna designs. The material performs very well at higher ISM band frequencies. The products from this range are used where there is no space on the device PCB for an on-board antenna, or there is a lot of metal present on the main PCB e.g. inside a meter system. The antenna can be stuck directly to the device plastic housing or glass by pulling off the

3M label and using the automotive grade 3M glue that is on one side of the antenna. Despite the extremely thin material the antennas are very robust and pass the required device temperature and vibration/shock tests. Cable and connector are fully customizable and IPEX MHF (U.FL compatible) and MMCX are standard. Custom surface mount flexible solutions have also been developed.



#### Model No

**FXP280**  
868MHz

#### Electrical Data

<b>Working Freq.</b>	863~870MHz
<b>Radiation Pattern</b>	Omni-directional
<b>Peak Gain</b>	1.5dBi
<b>Polarization</b>	Linear
<b>Impedance</b>	50Ω
<b>Return Loss</b>	-20dB
<b>Efficiency</b>	≥ 40%
<b>VSWR</b>	≤ 2.0

#### Mechanical Data

<b>Dimensions</b>	75*45*0.1mm
<b>Op. Temp.</b>	-40°C~+85°C
<b>Cable*</b>	100mm, Ø 1.13
<b>Connector*</b>	IPEX MHFI (U.FL comp)
<b>Material</b>	Flex polymer
<b>Adhesive Tape</b>	3M 467

\*Cable and Connectors are Customizable.



#### Model No

**FXP290**  
915MHz

#### Electrical Data

<b>Working Freq.</b>	902~928MHz
<b>Radiation Pattern</b>	Omni-directional
<b>Peak Gain</b>	1.5dBi
<b>Polarization</b>	Linear
<b>Impedance</b>	50Ω
<b>Return Loss</b>	-20dB
<b>Efficiency</b>	≥ 40%
<b>VSWR</b>	≤ 2.0

#### Mechanical Data

<b>Dimensions</b>	75*45*0.1mm
<b>Op. Temp.</b>	-40°C~+85°C
<b>Cable*</b>	100mm, Ø 1.13
<b>Connector*</b>	IPEX MHFI (U.FL comp)
<b>Material</b>	Flex polymer
<b>Adhesive Tape</b>	3M 467



# Embedded ISM - Ceramic Patch Antenna

## ISM Ceramic Patch Range

The ISPC.868.A and ISPC.915.A are 5dBi embedded ceramic patch antennas, designed for their respective ISM bands where additional coverage range is needed. These antennas have excellent directional hemispherical radiation pattern on the zenith when placed on a 30\*30cm ground plane.

Coming as standard with a RG-178 cable and MMCX male right angle connector they are great solutions for the following typical applications; RFID readers, short range 868MHz or 915MHz mesh networks. The 5dBi ISPC.86A antenna is designed primarily for compact fixed wireless applications in the 865MHz to 870MHz frequency range where extra coverage range is required. The

antenna functions best when the backside is placed on a metal panel. When placed on a reference 30cm square ground-plane, the antenna has excellent directional hemispherical radiation pattern up to 5dBi on the zenith, and an efficiency of 65%.



### Model No

**ISPC.86.A**  
5dBi, 868MHz  
Ceramic Patch

### Electrical Data

**Working Freq.** 865~870MHz  
**Radiation Pattern** Broadside to Zenith  
**Peak Gain** 5dBi  
**Polarization** Linear  
**Impedance** 50Ω  
**Return Loss** -6.3dB  
**Max Input Power** 5W  
**Efficiency** 60% Typ. (30x30 gp)

### Mechanical Data

**Dimensions** 47.5\*47.5\*6.5mm  
**Op. Temp.** -40°C~+85°C  
**Cable** 92mm RG178  
**Connector** MMCX Male (R/A)  
**Material** Ceramic



### Model No

**ISPC.91.A**  
5dBi, 915MHz  
Ceramic Patch

### Electrical Data

**Working Freq.** 915MHz  
**Radiation Pattern** Broadside to Zenith  
**Peak Gain** 5dBi  
**Polarization** Linear  
**Impedance** 50Ω  
**Return Loss** -7dB  
**Max Input Power** 5W  
**Efficiency** 70% Typ. (30x30 gp)

### Mechanical Data

**Dimensions** 47.5\*47.5\*6.5mm  
**Op. Temp.** -40°C~+85°C  
**Cable** 92mm RG178  
**Connector** MMCX Male (R/A)  
**Material** Ceramic



ISPC.86.A  
Back



ISPC.91.A  
Back

# Embedded ISM - Rigid PCB Series

## FR4 PCB Antennas

The PC series are ground plane independent antennas which save on space, making them suitable for even smaller sized M2M devices in tracking, navigation, automotive and telemedical markets.

The PC31 dual band 868~915MHz PCB antenna, and the PC81 and PC91 for 868MHz and 915MHz respectively are FR4 PCB antennas designed especially for ISM applications. They have been designed to maximise gain and efficiency in an Omni-directional pattern.



**Model No**

PC81  
The Stripe™  
868MHz

**Electrical Data**

Working Freq.	868-870MHz
Radiation Pattern	Omni-directional
Peak Gain	2.5dBi
Polarization	Linear
Impedance	50Ω
Return Loss	<-10dB
VSWR	≤ 2.0
Efficiency	> 50%

**Mechanical Data**

Dimensions	34*7*0.8mm
Op. Temp.	-40°C~+85°C
Cable*	100mm, Ø 1.13
Connector*	IPEX MHFI (U.FL comp)
Adhesive	3M 9472 Tape
Foam	CR4305
Foam Dims	16*7*6.3mm



**Model No**

PC91  
The Stripe™  
915MHz

**Electrical Data**

Working Freq.	902-928MHz
Radiation Pattern	Omni-directional
Peak Gain	2.5dBi
Polarization	Linear
Impedance	50Ω
Return Loss	<-10dB
VSWR	≤ 2.0
Efficiency	> 52%

**Mechanical Data**

Dimensions	34*7*0.8mm
Op. Temp.	-40°C~+85°C
Cable*	100mm, Ø 1.13
Connector*	IPEX MHFI (U.FL comp)
Adhesive	3M 9472 Tape
Foam	CR4305
Foam Dims	13*7*6.3mm



**Model No**

PC31  
The Stripe™  
868/915MHz

**Electrical Data**

Working Freq.	868-928MHz
Radiation Pattern	Omni-directional
Peak Gain	2.3dBi / 1.6dBi
Polarization	Linear
Impedance	50Ω
Return Loss	<-25dB
VSWR	≤ 2.0
Efficiency	> 77%

**Mechanical Data**

Dimensions	90*55*0.8mm
Op. Temp.	-40°C~+85°C
Cable*	50mm, Ø 1.13
Connector*	IPEX MHFI (U.FL comp)

\*Cable and Connectors are Customizable.

# Embedded ISM - On Board Solutions

## 169MHz Ceramic Chip and Helical Antennas

The 169MHz ISM Band is increasingly being used for such applications as wireless M-Bus Metering, remote asset monitoring, alarms and paging systems.

The CA.69 ceramic chip antenna from Taoglas is specifically designed for VHF 169MHz band applications. It is a high efficiency miniature SMD edge mounted antenna with small footprint requirement. The CA.69 antenna electrical properties are symmetrical therefore the antenna can be soldered to the

board from either side. This antenna is delivered on tape and reel. The HA.10.A is a quarter wave-length monopole helical antenna. It is small and compact. The CA.69 and the HA.10.A are both available on EVBs.



CAD.A.69  
(Evaluation Board for CA.69)

### Model No

**CA.69**  
169MHz  
VHF Ceramic Chip

### Electrical Data

**Center Freq.** 169MHz  
**Bandwidth** 8MHz  
**Peak Gain** -7dBi (aprox. on EVB)  
**Polarization** Linear  
**Impedance** 50Ω  
**VSWR** 2 max.

### Mechanical Data

**Dimensions** 25.2\*5.1\*0.8mm  
**Op. Temp.** -40°C~+85°C  
**Connector\*** SMD  
**Material** Ceramic



HAD.A.10  
(Evaluation Board for HA.10)

### Model No

**HA.10**  
169MHz  
Helical Monopole

### Electrical Data

**Center Freq.** 169MHz  
**Peak Gain** -7dBi (aprox. on EVB)  
**Polarization** Linear  
**Impedance** 50Ω  
**VSWR** 2 max.  
**Return Loss** <-10dB

### Mechanical Data

**Dimensions** L: 25.5\*  
Ø 2.8mm  
**Op. Temp.** -40°C~+85°C  
**Material** Phosphor Bronze



HAD.B.10  
(Evaluation Board for HA.10)

# Embedded ISM - On Board SMD Solutions

## Ceramic SMD Loop & Chip Antennas

Taoglas have developed ceramic miniature loop antennas for ISM (Industrial Scientific Medical) wireless communications.

The ILA.01 for 915MHz and ILA.02 for 868MHz, have efficiencies of between 40-70%, these loop antennas show at least three times the efficiency of traditional chip antennas. The ILA series is delivered on tape and reel and will allow customers in Automated

Meter Reading (AMR), remote monitoring and healthcare markets achieve better RF reception and transmission when connecting with stand-alone devices.



ILAD.01  
(Evaluation Board for ILA.01)

### Model No

**ILA.01**  
915MHz  
Low Profile

### Electrical Data

**Working Freq.** 902~928MHz  
**Radiation Pattern** Omni-directional  
**Peak Gain** 1dBi  
**Polarization** Linear  
**Impedance** 50Ω  
**Return Loss** <-10dB  
**VSWR** ≤ 2.0  
**Efficiency** 60% Typ.

### Mechanical Data

**Dimensions** 10\*3.2\*0.5mm  
**Op. Temp.** -40°C~+85°C  
**Connector\*** SMA (F)  
**Material** Ceramic



ILAD.02  
(Evaluation Board for ILA.02)

### Model No

**ILA.02**  
868MHz  
Low Profile

### Electrical Data

**Working Freq.** 855~881MHz  
**Radiation Pattern** Omni-directional  
**Peak Gain** 2.4dBi  
**Polarization** Linear  
**Impedance** 50Ω  
**Return Loss** <-19dB  
**VSWR** ≤ 2.0  
**Efficiency** 60% Typ.

### Mechanical Data

**Dimensions** 10\*3.2\*0.5mm  
**Op. Temp.** -40°C~+85°C  
**Connector\*** SMA (F)  
**Material** Ceramic

## 2.4GHz Screw Mount

### Hercules Smallest Compact

Our “Hercules” series is focused on providing a solid foundation on which to build a network. The next generation (Gen II) Hercules is supremely reliable while remaining a high performance machine.

The “Hercules” series, on top of its reliability and performance is multipurpose as well. We offer the Hercules solution for a wide variety of applications.



#### Model No

**WS.02.B**  
**Hercules GEN II**  
**2.4GHz**  
Wi-Fi/ISM Bands/ZigBee/  
WLAN/ Bluetooth

#### Electrical Data

**Frequency** 2.4GHz  
**Return Loss** <-10dB  
**Radiation** Omni-directional  
**Gain** 2.4dBi avg.  
**Impedance** 50Ω  
**Polarization** Linear  
**Efficiency** >53%  
**Op. Temp.** -40°C~+85°C

#### Mounting Data

**Dimensions** H:28.5mm, Ø 47.8mm  
**Mounting** Screw Mount  
**Cable** 2M CFD 200  
**Connector** SMA(M)  
**IP Rating** IP67 & IP69K  
**Op. Temp.** -40°C~+85°C

## 2.4 External MIMO Antennas

### Trinity MIMO

With three individual high-gain elements, the WMA.01 “Trinity” has peerless performance yet tractable in the installation process with desktop, mag-mount, wall-mount and adhesive mounting all being options.

Unsurprisingly, the “Trinity” comfortably covers an enormous array of technologies, capable of dealing with Wi-Fi, ISM bands, ZigBee, WLAN and Bluetooth. The individual antennas can articulate horizontally and vertically for best signal reception depending on mounting conditions.

#### Model No

**WMA.01**  
**Trinity**  
2.4~2.5GHz  
3\*3 MIMO Antenna

#### Electrical Data

**Frequency** 2400~2500MHz

**Radiation Pattern** Omni-directional

**Peak Gain** 3dBi

**Return Loss**  $\leq$ -10dB

**Impedance** 50 $\Omega$

**Polarization** Linear Vertical

#### Mounting Data

**Dimensions** H: 142mm  
 $\varnothing$  7.2mm -  $\varnothing$  13mm  
105\*93\*31mm (Base Dimensions)

**Mounting** Desk/Wall/Magnet

**Cable** 3\* RG-174

**Connector** 3\* RP-SMA(M)

**Op. Temp.** -40°C~+85°C



## 2.4GHz External

### External 2.4GHz Antenna Solutions Terminal Mount

Taoglas external terminal mount antennas are easy to integrate into any existing device configuration you have and still maintaining the trademark robustness and performance.

○ also available in white



#### Model No

**GW.11**  
2.4GHz  
Hinged  
Dipole

#### Electrical Data

**Frequency** 2400~2500MHz  
**Gain** 2.3dBi  
**Out. Impedance** 50Ω  
**Polarization** Linear  
**Radiation** Omni-directional  
**VSWR** Max 1.92

#### Mounting Data

**Dimensions** H: 84mm  
Ø 7.8mm  
**Mounting** Hinged 90°  
**Connector\*** RP-SMA(M)  
**IP Rating** IP65  
**Op. Temp.** -40°C~+85°C



#### Model No

**GW.15**  
2.4GHz  
Hinged  
Dipole

#### Electrical Data

**Frequency** 2400~2500MHz  
**Gain** 2dBi  
**Out. Impedance** 50Ω  
**Polarization** Linear  
**Radiation** Omni-directional  
**VSWR** Max 1.8

#### Mounting Data

**Dimensions** H: 108mm  
Ø 7.8mm  
**Mounting** Hinged 90°  
**Connector\*** SMA(M)  
**IP Rating** IP65  
**Op. Temp.** -40°C~+85°C



#### Model No

**GW.17**  
2.4GHz 2dBi  
Click-in Terminal  
Dipole Antenna

#### Electrical Data

**Frequency** 2400~2500MHz  
**Gain** 2dBi  
**Out. Impedance** 50Ω  
**Polarization** Linear  
**Radiation** Omni-directional  
**Efficiency** 74%  
**Input Power** 2W Max.

#### Mounting Data

**Dimensions** H: 112.6mm  
Ø 9.3mm  
**Body Material** TPU  
**Cable** 250mm RG178  
**Connector** IPEX MHFI (U.FL comp)  
**IP Rating** IP65  
**Op. Temp.** -40°C~+85°C

\*\*Also available with RP-SMA Plug connectors

\*Custom antenna connector and gain versions available for a purchase order for a minimum order quantity MOQ and/or NRE

## 2.4 GHz External Solutions

### Terminal Mount

The FW.24, an Omni-directional whip antenna designed for outdoor use, offers excellent efficiency (75%) and peak gain (>4 dBi) on a 30\*30cm ground plane.

The FW.24 operates in the 2.4GHz band and offers extensive coverage in the azimuth. It was specifically designed for use in outdoor monitoring applications such as weather monitoring, motion/vibration sensors and pollutants monitoring. The FW.24 performs at its best while attached to a ground plane but can be used without one.



#### Model No

**FW.24**  
2.4 GHz  
Hinged  
Monopole

#### Electrical Data

**Frequency** 2400 MHz to 2500 MHz  
**Peak Gain\*** 4.48 dBi  
**Return Loss\*** < -10dBi  
**Impedance** 50Ω  
**Polarization** Linear  
**Radiation** Omni-directional  
**VSWR** ≤ 2

\* 30x30cm ground

#### Mounting Data

**Dimensions** 12\*12\*4mm  
**Base Diameter** 20 ± 0.5 mm  
**Whip Diameter** 6.2 ± 0.6 mm  
**Connector** N Type (M)  
**IP Rating** IP67 (housing only)  
**Op. Temp** -40°C to 85°C



## 2.4GHz External

### External 2.4GHz Antenna Solutions Mini Terminal Mount

Our external terminal mount antennas are designed for robust handling with housings made with TPE, which gives superior environmental resistance and a quality finish. The hinged versions, GW.11, GW.15, GW.58 and GW.71 can be rotated 90 degrees on the base hinge for ease of placement.

We have a complete commitment to 100% accurate testing for all our products - these terminal mount antennas are tested for VSWR/return loss and the results are reflected on their product specification.



#### Model No

**GW.26.0111**  
2.4GHz  
Straight Monopole

#### Electrical Data

**Frequency** 2400-2500MHz  
**Radiation Pattern** Omni-directional  
**Gain** 0dBi  
**Efficiency** >40%  
**Out. Impedance** 50Ω  
**Polarization** Linear  
**VSWR** Max 2.0

#### Mounting Data

**Dimensions** H: 28.5mm, Ø 7.9mm  
**Mounting** Fixed Straight  
**Connector\*** SMA(M)\*\*  
**Op. Temp.** -40°C~+85°C



#### Model No

**GW.26.0111.HT**  
2.4GHz  
Straight Monopole  
High Temperature

#### Electrical Data

**Frequency** 2400-2500MHz  
**Radiation Pattern** Omni-directional  
**Gain** 0dBi  
**Efficiency** >40%  
**Out. Impedance** 50Ω  
**Polarization** Linear  
**VSWR** Max 2.0

#### Mounting Data

**Dimensions** H: 30mm, Ø 7.8mm  
**Mounting** Fixed Straight  
**Connector\*** SMA(M)\*\*  
**Material** Dupont® Hytrel® TPEE  
**Op. Temp.** -40°C~+105°C



#### Model No

**GW.26.0112.HT**  
2.4GHz  
Fixed R/A Monopole  
High Temperature

#### Electrical Data

**Frequency** 2400~2500MHz  
**Radiation Pattern** Omni-directional  
**Gain** 0dBi  
**Efficiency** >40%  
**Out. Impedance** 50Ω  
**Polarization** Linear  
**VSWR** Max 2.0

#### Mounting Data

**Dimensions** H: 28.1mm, Ø 7.9mm  
**Mounting** Fixed 90°  
**Connector\*** SMA(M)\*\*  
**Material** Dupont® Hytrel® TPEE  
**Op. Temp.** -40°C~+105°C

\*Cable and Connectors are Customizable

\*\* Also available with RP-SMA(M)

## 2.4GHz Embedded (Cable & Connector)

### Embedded Wi-Fi/ZigBee/BT Flexible Antenna Solutions

Taoglas has developed high peak gain, high efficiency FXP technology flexible antennas for 2.4GHz, which boost coverage and data-speed performance of Wi-Fi 802.11, ZigBee, Bluetooth and ISM applications. We have a range of sizes available with fully customizable cable length and connector.



#### Model No

**FXP70**  
**Freedom**  
2.4GHz  
General Solution

#### Electrical Data

**Frequency** 2400~2500MHz  
**Peak Gain** 5dBi  
**VSWR** 1.5dB Max  
**Efficiency** 80%  
**Return Loss** -20dB  
**Impedance** 50Ω  
**Polarization** Linear  
**Op. Temp.** -40°C~+85°C

#### Mounting Data

**Dimensions** 27\*25\*0.1mm  
**Mounting** Adhesive  
**Cable\*** Ø1.13 53mm  
**Connector\*** IPEX MHFI (U.FL comp)  
**Adhesive** 3M 467 Tape



#### Model No

**FXP72**  
**Freedom**  
2.4GHz  
Ground Coupling  
Monopole

#### Electrical Data

**Frequency** 2400~2500MHz  
**Peak Gain** 4dBi  
**VSWR** 2.0dB Max  
**Efficiency** 70%  
**Return Loss** -14dB  
**Impedance** 50Ω  
**Polarization** Linear  
**Op. Temp.** -40°C~+85°C

#### Mounting Data

**Dimensions** 31\*31\*0.1mm  
**Mounting** 3M 467 Tape  
**Cable\*** Ø1.13 53mm  
**Connector\*** IPEX MHFI (U.FL comp)  
**Adhesive** 3M 467 Tape



#### Model No

**FXP74**  
**Black Diamond**  
2.4GHz

#### Electrical Data

**Frequency** 2400~2483.5MHz  
**Peak Gain** 4dBi  
**VSWR** < 2:1  
**Efficiency** 50%  
**Return Loss** <-10dB  
**Impedance** 50Ω  
**Polarization** Linear  
**Power Handled** 5W

#### Mounting Data

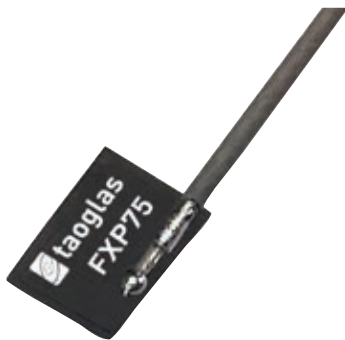
**Dimensions** 47\*7\*0.1mm  
**Mounting** Adhesive  
**Cable\*** Ø1.13 100mm  
**Connector\*** IPEX MHFI (U.FL comp)  
**Adhesive** 3M 467 Tape

## 2.4GHz Embedded (Cable & Connector)

### Embedded Wi-Fi/ZigBee/BT PCB and Flexible Antenna Solutions

These antennas have been designed in a number of form factors and materials to work on different plastics and thickness. Cables and connectors are customizable.

The FXP75 and PC17 have very small form factors, while still delivering excellent performance.



#### Model No

**FXP75**  
**Atom**  
2.4GHz Series

#### Electrical Data

**Frequency** 2400~2500 MHz  
**Peak Gain** 2.5dBi  
**VSWR** < 2:1  
**Efficiency** 45%  
**Return Loss** <-10dB  
**Impedance** 50Ω  
**Polarization** Linear  
**Max Input Power** 2W Max

#### Mounting Data

**Dimensions** 5.8mm\*3.7mm\*0.1  
**Material** Polymer  
**Connector** IPEX MHFI (U.FL comp)  
**Cable** 0.81 Coaxial Cable



#### Model No

**PC17**  
2.4GHz PCB Antenna

#### Electrical Data

**Frequency** 2400~2500 MHz  
**Peak Gain** 0.9dBi  
**VSWR** <1.5:1  
**Efficiency** 45%  
**Return Loss** <-12 dB  
**Impedance** 50Ω  
**Polarization** Linear  
**Max Input Power** 2W Max

#### Mounting Data

**Dimensions** 24mm\*11mm\*0.8  
**Material** Polymer  
**Connector** IPEX MHFI (U.FL comp)  
**Cable** 0.81 Coaxial Cable

## 2.4GHz go ZigBee Embedded Wi-Fi/ZigBee/BT Antenna Solutions

The SWLP.12 is a 2.4GHz patch antenna ideally suited for industrial application. The SWPL.12 has the highest gain in the XZ (azimuth) plane direction, most suitable for fixed wireless applications where transmission and reception are focused to

one hemisphere of the device, for example a wireless meter on a reinforced concrete wall. Unlike most chip and loop antenna, which need to be edge mounted, the SWLP.12 can be placed anywhere on the device ground plane.



Front

### Model No

**SWLP.10**  
2.4GHz  
SMD Ceramic Patch

### Electrical Data

**Frequency** 2400 MHz to 2500 MHz  
**Peak Gain** -1.0 dBi typ.  
**Impedance** 50Ω  
**Polarization** Linear  
**Average Gain** -6 dBi @2450 MHz  
**VSWR** ≤ 3

### Mounting Data

**Dimensions** 10\*10\*4mm  
**Weight** 3.1g



Front

### Model No

**SWLP.12**  
2.4GHz  
SMD Ceramic Patch

### Electrical Data

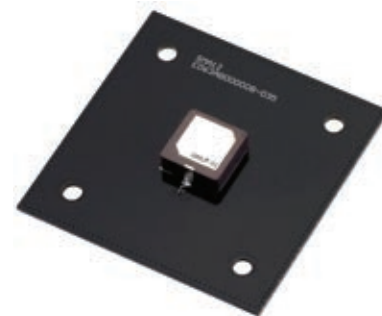
**Frequency** 2400~2500MHz  
**Peak Gain** 2dBi  
**Efficiency** 80%  
**Impedance** 50Ω  
**Polarisation** Linear  
**Return Loss** -9dB

### Mounting Data

**Dimensions** 12\*12\*4mm  
**Mounting** SMD Mount



Back



SWLPD.12  
(Evaluation Board  
for SWLP.12)

Original Patch Specification measured on EVB 50\*50mm, actual value depends on ground plane and housing.

Please check out our new high efficiency Embedded SMD and Cable Connection Dual band 2.4GHz/5GHz antennas if using 802.11n

## 2.4GHz Embedded Wi-Fi/ZigBee/BT Antenna Solutions

This WLP.25 patch antenna for ISM, Wi-Fi, Bluetooth and ZigBee is based on smart XtremeGain™ technology. It is mounted via pin and double-sided adhesive and is the clear solution for the 50\*50mm ground plane. The WPC.25A 2.4GHz ceramic patch antenna with cable works on Wi-Fi, ZigBee, Bluetooth and ISM band at 2.4GHz. This antenna comprises of a 2.4GHz 25\*25\*4mm

embedded patch with mini-coax cable and connector for connectivity and a PCB carrier to mount the antenna. The WPC.25A/B is circularly polarized which is more suitable to avoid interference and phase cancellation from reflections. The antenna has its own ground PCB carrier and is therefore ground independent.



### Model No

**WLP.25**  
2.4GHz  
Ceramic Patch

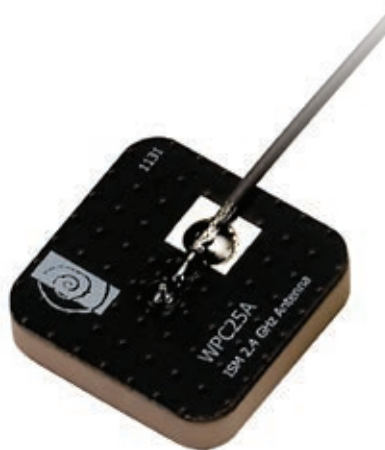
### Electrical Data

Frequency	2400MHz~2500MHz
Peak Gain	5.0dBic
Efficiency	>80%
Impedance	50Ω
Polarisation	RHCP
Return Loss	-30dB

### Mounting Data

Dimensions	25*25*4.5mm
Mounting	Pin
Adhesive	NITTO 5015

\*Tested on 50\*50mm ground plane



### Model No

**WPC.25A**  
2.4GHz  
Ceramic Patch with  
Cable & Connector

### Electrical Data

Frequency	2400MHz~2500MHz
Peak Gain	>0.5dBic
Efficiency	>50%
Impedance	50Ω
Polarisation	RHCP
Input Power	10W

### Mounting Data

Dimensions	25*25*5.5mm
Cable Type	1.37 mini coaxial cable
Cable Length	150mm
Connector	IPEX MHFI (U.FL comp)



### Model No

**WPC.25B.35**  
2.4GHz  
Ceramic Patch with  
MMCX(F) Connector

### Electrical Data

Frequency	2400MHz~2500MHz
Peak Gain	2dBic
Efficiency	>65%
Impedance	50Ω
Polarisation	Broadly Linear
Input Power	10W

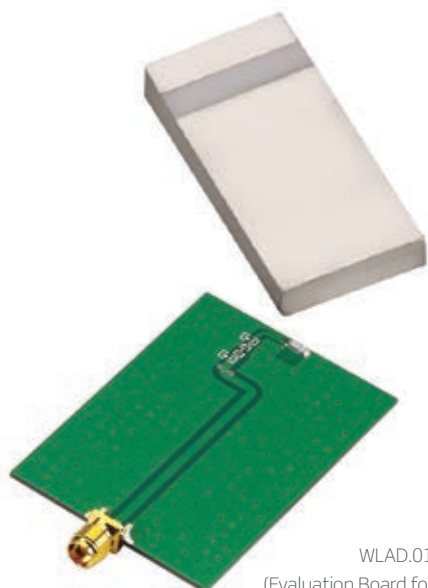
### Mounting Data

Dimensions	25*25*5.5mm
Connector	MMCX(F)

## 2.4GHz Embedded Ceramic PIFA

The WLA.01 2.4GHz loop antenna is a high efficiency miniature SMD edge mounted ceramic antenna devices with very small space requirements for Wi-Fi, WLAN, ZigBee, Bluetooth and 802.11 applications. The LA.02 is an embedded loop chip antenna offering best in class efficiency. Its tiny form factor means it is ideally suited to Bluetooth LE, Wi-Fi and 802.11 applications with very small space requirements.

The WLA.01 uses the main PCB as its ground plane, thereby increasing antenna efficiency. It is tuned for different PCB sizes by simply changing the value of the matching circuit. At 3.2mm\*1.6mm\*0.6mm, the WLA.01 is one of the smallest antennas available worldwide. This antenna is delivered on tape and reel. The LA.02 is a miniature SMD ceramic antenna which mounts directly on the edge of the main PCB device where it uses the PCB ground plane to increase efficiency. This tiny antenna is suited for applications such as telematic devices, Bluetooth LE wearables, Bluetooth headsets, hand-held devices, wireless PCMCIA cards and USB dongles. Some frequency offset may happen, as is normal with embedded antennas, so the antenna can be tuned for different PCB sizes and enclosures by simply changing the value of the matching circuit.



WLAD.01  
(Evaluation Board for  
WLA.01)

### Model No

**WLA.01**  
2.4GHz  
Ceramic PIFA  
Low Profile

### Electrical Data

**Frequency** 2450MHz  
**Peak Gain** 2.5dBi  
**Return Loss** -22dB  
**Efficiency** 84%  
**Impedance** 50Ω  
**Polarisation** Linear  
**Op. Temp.** -40°C~+85°C

### Mounting Data

**Dimensions** 3.2\*1.6\*0.6mm  
**Mounting** SMD Mount



### Model No

**LA.02**  
Embedded loop antenna  
Low profile

### Electrical Data

**Frequency** 2400-2500MHz  
**Peak Gain** 1 dBi typ.  
**VSWR** ≤ 2  
**Efficiency** 66% avg.  
**Impedance** 50Ω  
**Polarization** Linear  
**Bandwidth** > 100MHz

### Mounting Data

**Dimensions** 8\*2\*2mm  
**Material** Ceramic  
**Weight** 0.11g  
**Op. Temp** -40°C to 85°C

## 5.8GHz Embedded Passive Patch Antenna

The WLP.4958.12.04.A 6dBi high gain 4.9~5.8GHz patch pin fed antenna is ideally suited for high performance industrial and consumer applications in Wi-Fi, ISM, Public Safety, and ZigBee bands.

The WLP.4958.12.04.A is easily adjustable and can be placed anywhere on the device ground plane, unlike most chip or loop antennas which need to be edge mounted. The antenna can be

matched by a PI matching circuit or by creating a custom tuned part for a specific layout configuration on a board.



Back

### Model No

**WLP.4958.12.04.A.02**  
12mm\*12mm\*4mm 4.9~5.8GHz Patch  
Pin Fed  
Embedded High Gain Antenna

### Electrical Data

Frequency	4900~5825MHz
Return Loss	≤-10dB
Efficiency	60% avg.
Polarization	RHCP
VSWR	1.5 Max
Peak Gain	+6.0dBic typ.
Impedance	50Ω

### Mounting Data

Dimensions	12*12*4mm
Mounting	Pin and Adhesive Tape
Adhesive Type	Tesa 4972

## 5.8GHz SMD Antennas Embedded

The CA.50 5150-5900 MHz ceramic chip antenna is a custom solution for Wi-Fi/WHDMI/High Bandwidth 5GHz band applications. It is a miniature SMD edge mounted ceramic monopole antenna with small footprint requirement.

The CA.50 antenna uses the main PCB as its ground plane, thereby increasing antenna efficiency. It is tuned for different PCB sizes by simply changing the value of the matching circuit. CA.50 antenna electrical properties are symmetrical therefore the antenna can be soldered to the board from either side. With both Wi-Fi/WHDMI onboard the HLA.01 can give and take Wi-Fi/WHDMI applications where high data throughput is needed. The CA.50 and HLA.01 at 3.2mm\*1.6mm\*0.5mm, are the smallest antennas available worldwide. These antennas are delivered on tape and reel.



### Model No

**CA.50**  
5150-5900 MHz  
Ceramic Chip  
Monopole

### Electrical Data

**Frequency** 5500MHz  
**Bandwidth** 750MHz min.  
**Radiation Pattern** Omni-directional  
**Peak Gain** 3.4dBi (typical)  
**Efficiency** 79%  
**VSWR** 2 Max.  
**Impedance** 50Ω  
**Polarization** Linear  
**Max Input Power** 50W

### Mounting Data

**Dimensions** 3.2\*1.6\*0.5mm  
**Ground Plane** 40\*40mm



### Model No

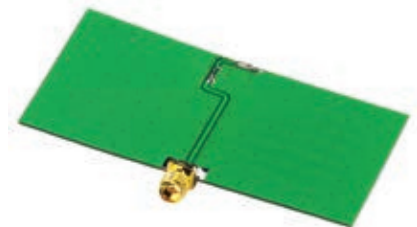
**HLA.01**  
5150-5900 MHz  
Ceramic Loop  
Antenna

### Electrical Data

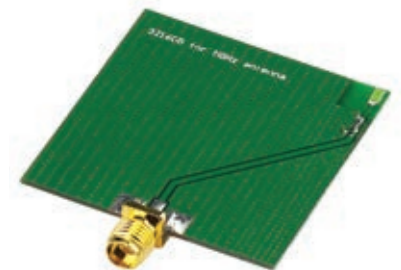
**Frequency** 5500MHz  
**Bandwidth** 524MHz  
**Radiation Pattern** Omni-directional  
**Peak Gain** 2.1dBi (typical)  
**Efficiency** 65%  
**VSWR** 2 Max.  
**Impedance** 50Ω  
**Polarization** Linear  
**Max Input Power** 50W

### Mounting Data

**Dimensions** 3.2\*1.6\*0.5mm  
**Ground Plane** 80\*40mm



HLAD.01  
(Evaluation Board  
for HLA.01)



CAD.50  
(Evaluation Board  
for CA.50)

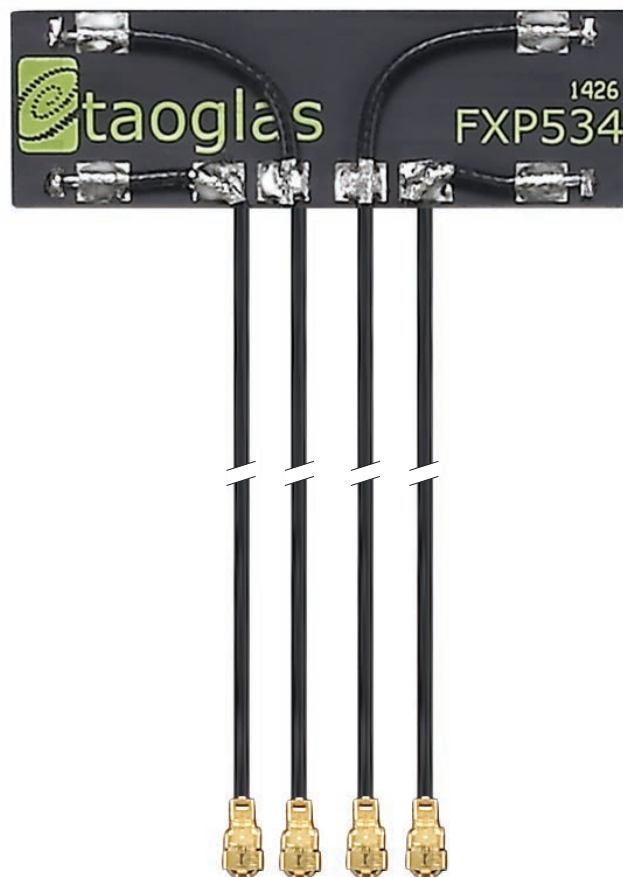


## 5.8GHz MIMO Antenna

### Embedded Flexible PCB with Multiple Ports

The FXP534 5.8GHz “Venti” 802.11ac 4\*4 MIMO antenna is an extremely compact, embedded 4-in-1 MIMO flexible polymer monopole type antenna. It is designed specifically for 802.11ac Wi-Fi applications, can be easily installed in your device, and takes up a minimum amount of space.

Typical applications include high speed real-time HD video streaming; high capacity Wi-Fi networks for mass transit and embedded kiosk Wi-Fi hotspots.



#### Model No

FXP534  
Venti  
Embedded 5.8GHz  
General Solution

#### Electrical Data

Frequency 5150~5850MHz  
Peak Gain  $\leq 5\text{dBi}$   
VSWR 1.5dB Max  
Efficiency 48%  
Return Loss  $-14\text{dB}$   
Impedance  $50\Omega$   
Polarization Linear  
Op. Temp.  $-40^{\circ}\text{C}\sim+85^{\circ}\text{C}$

#### Mounting Data

Dimensions  $48*15*0.15\text{mm}$   
Mounting Adhesive  
Cable\*  $\varnothing 1.13\ 53\text{mm}$   
Connector\* IPEX MHFI (U.FL comp)  
Adhesive 3M 467 Tape

## 2.4~5.8GHz Permanent Mount Hercules Smallest Compact

The Taoglas Hercules series is focused on providing a solid foundation on which to build a network. The next generation (Gen II) Hercules is supremely reliable while remaining a high performance machine.

WS.01 “Hercules” is a high efficiency, high gain thread mount dual band wireless antenna for external use on vehicles and outdoor assets worldwide. Omni-directional gain across both bands ensures constant reception and transmission, making the WS.01 an ideal solution for a ZigBee wireless mesh for remote applications such as remote metering. It is the smallest high performance antenna in the market.



### Model No

WS.01.B  
Hercules GEN II  
Dual Band Wi-Fi  
2.4GHz/5.8GHz  
Screw Mount

### Electrical Data

Frequency 2400~2500MHz  
5150~5900MHz  
Radiation Omni-directional  
Gain 4dBi  
Impedance 50Ω  
Polarization Linear  
Efficiency >60% @ 2.4~2.5GHz  
>40% @ 5.0~5.9GHz  
VSWR < 1.8:1  
Op. Temp. -40°C~+85°C

### Mounting Data

Dimensions H:29mm, Ø 49mm  
Mounting Screw Mount  
Cable 3M CFD 200  
Connector RP-SMA(M)  
IP Rating IP67 & IP69K

## 2.4~5.8GHz External Adhesive Antennas (Dual Band)

### Stingray

The WA.500w “Stingray” is dual band Wi-Fi 2.4GHz, 5.8GHz. Its housing has been carefully designed to stand up to tough environments.

The WA.500w “Stingray” is designed for applications that require Omni-directional gain across both bands to ensure wide coverage area and constant reception and transmission for Wi-Fi and ZigBee applications. Coupled with superior performance, and the

ability to offer custom gain solutions and full test reports with your system, the quality design of the Stingray makes it a step beyond any competitor solution on the market.



#### Model No

WA.500w  
Stingray Dual Band Wi-Fi  
2.4/4.9-6.0GHz  
Adhesive

#### Electrical Data

Frequency 2400-2500MHz  
4900-6000MHz  
Radiation Pattern Omni-directional  
Gain 4dBi  
Out. Impedance 50Ω  
Polarization Linear  
VSWR < 1.92:1  
Op. Temp. -40°C~+85°C

#### Mounting Data

Dimensions H: 10.8mm, Ø 55mm  
Mounting Adhesive  
Cable\* 3M RG-174  
Connector RP-SMA(M)\*  
Adhesive Type 3M Tape  
IP Rating IP65

## 2.4~5.8GHz External (Terminal Mount)

### External 2.4/5GHz Antenna Solutions Terminal Mount

Our external terminal mount antennas are designed for robust handling with housings made with TPE, which gives superior environmental resistances and a quality finish. The hinged versions, GW.59 and GW.71 can be rotated 90 degrees on the base hinge for ease of placement. At Taoglas we have a total commitment to 100% accurate testing for all our products -

These terminal mount antennas are tested for VSWR/Return loss and the results are reflected on their product specification. The GW.05 dual band Wi-Fi hinged rotatable antenna is a high efficiency monopole antenna. Compared to other much larger antennas on the market, it has superior wide-band high efficiency characteristics.



#### Model No

**GW.59**  
2.4GHz/5.8GHz  
Hinged  
Dipole

#### Electrical Data

**Frequency** 2400/5100MHz  
~5800MHz  
**Radiation Pattern** Omni-directional  
**Gain** 3dBi  
**Efficiency** 70% (2.4~2.5GHz)  
75% (5.15~5.8GHz)  
**Polarization** Linear  
**VSWR** < 2.0  
**Max Input Power** 2W

#### Mechanical Data

**Dimensions** H: 155.7mm, Ø12.5mm  
**Mounting** Hinged 90°  
**Connector** RP-SMA(M)  
**Op. Temp.** -40°C~+85°C



#### Model No

**GW.71**  
2.4GHz/5.8GHz  
Terminal-Hinged  
Dipole

#### Electrical Data

**Frequency** 2400-2500MHz  
5150-5900MHz  
**Radiation Pattern** Omni-directional  
**Gain** 5dBi  
**Efficiency** 80% (2.4~2.5GHz)  
80% (4.9~5.8GHz)  
**Polarization** Linear  
**VSWR** < 2.0  
**Max Input Power** 2W

#### Mounting Data

**Dimensions** H: 194mm, Ø13mm  
**Mounting** Hinged 90°  
**Connector** RP-SMA(M)  
**Op. Temp.** -40°C~+85°C



#### Model No

**GW.05**  
Dual-Band Wi-Fi  
2.4~2.5GHz /  
5.15~5.85GHz  
Terminal Mount  
Monopole Antenna

#### Electrical Data

**Frequency** 2400~5850MHz  
**Radiation Pattern** Omni-directional  
**Peak Gain** ≤5dBi  
**VSWR** 1.5dB Max  
**Efficiency** ≥50%  
**Return Loss** <-10dB  
**Impedance** 50Ω  
**Polarization** Linear  
**Max Input Power** 2W

#### Mounting Data

**Dimensions** 62.3 \* ø10mm  
**Connector** RP-SMA(M)  
**Op. Temp.** -40°C~+85°C

## 2.4~5.8GHz Dual Band PCB and Flexible Antennas

### Cable & Connector

Responding to the demands of the latest 802.11n applications such as real-time video streaming, which need the highest data speeds, we are pleased to offer a wide range of PCB antennas that are sure to fit any needs you may have.

The PC11 "Stripe™" is a dual band 2.4GHz/5.8GHz constructed with special FR4 PCB. The PC14 is a circular dual band antenna. It is designed for use internally in Wi-Fi or WLAN equipment worldwide. The FXP810 is a dual band 2.4GHz, 4.9 to 6.0GHz monopole antenna which comes with an IPEX MHFI connector as standard but both connector and cable are customizable on request.



#### Model No

**PC11**  
**Stripe™**  
 2.4GHz/5.8GHz  
 FR4 PCB  
 Dipole

#### Electrical Data

**Frequency** 2.4GHz/5.8GHz  
**Peak Gain** 2dBi  
**VSWR** 1.8dB Max  
**Efficiency** 86%  
**Return Loss** -21dB  
**Impedance** 50Ω  
**Polarization** Linear  
**Op. Temp.** -40°C~+85°C

#### Mounting Data

**Dimensions** 66\*16\*0.8mm  
**Material** FR4  
**Cable\*** Ø1.13 100mm  
**Connector\*** IPEX MHFI (U.FL comp)



#### Model No

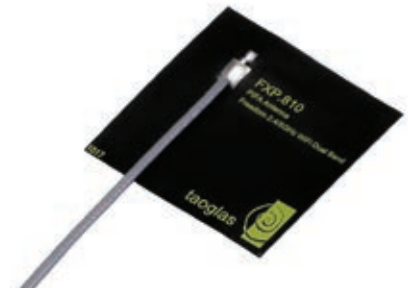
**PC14**  
 Circular Dual Band  
 2.4-5.2Ghz PCB  
 with cable and  
 connector

#### Electrical Data

**Frequency** 2.4-5.2Ghz  
**Return Loss** -12dB  
**VSWR** 1.5dB Max  
**Return Loss** ≤-27dB  
**Impedance** 50Ω  
**Radiation Pattern** Omni-directional  
**Polarization** Horizontal

#### Mounting Data

**Dimensions** Ø 42\*0.8mm  
**Connector\*** RP-SMA(M)  
**Cable\*** RG-174



#### Model No

**FXP810**  
 Dual Band 2.4GHz  
 4.9-6.0Ghz  
 Monopole

#### Electrical Data

<b>Frequency</b>	2.4~2.5GHz	4.9~6GHz
<b>Peak Gain</b>	2.4dBi	5dBi
<b>Efficiency</b>	66%	81%
<b>Return Loss</b>	≤-27dB	≤-5dB
<b>Impedance</b>	50Ω	
<b>Polarization</b>	Linear	

#### Mounting Data

**Dimensions** 31\*31\*0.1mm  
**Mounting** 3M 467 Tape  
**Cable\*** Ø1.37 100mm  
**Connector\*** IPEX MHFI (U.FL comp)

\*Cables and Connectors Customizable

## 2.4~5.8GHz Dual Band Flexible Antennas (Cable & Connector) PCB Antennas

The FXP830 has a peak gain of 2.6dBi at 2.4GHz and efficiency of about 50%, increasing to 5dBi and efficiencies of over 80% along bands 4.9GHz to 6GHz. The FXP831 has a peak gain of 3.0dBi at 2.4GHz and efficiency of over 50%, and 5.5dBi and 75% efficiency along bands 4.9GHz to 6GHz. The patent pending

FXP840 is a super small monopole ultra-low profile antenna for 2.4/5 GHz bands that includes Bluetooth and Wi-Fi dual-band applications. The FXP840 has a peak gain of 2.0dBi at 2.4GHz and efficiencies of 40%, and 2.5dBi gain with over 50% efficiency along bands 4.9GHz to 6GHz.



### Model No

**FXP830**  
Dual-Band 2.4GHz  
4.9-6.0GHz  
Dipole

### Electrical Data

**Frequency** 2400~2500MHz  
4900~6000MHz  
**Peak Gain** 2.6dBi (2.4-2.5GHz)  
5.0dBi(4.9-6.0GHz)  
**Efficiency** 50%(2.4-2.5GHz)  
84%(4.9-6.0GHz)  
**Return Loss** ≤-26dB  
**Impedance** 50Ω  
**Polarization** Linear  
**Op. Temp.** -40°C~+85°C

### Mounting Data

**Dimensions** 42\*7\*0.1mm  
**Mounting** Adhesive  
**Adhesive** 3M 467 Tape  
**Cable\*** Ø1.37 100mm  
**Connector\*** IPEX MHFI (U.FL comp)



### Model No

**FXP831**  
Dual-Band 2.4GHz  
4.9-6.0GHz  
Monopole

### Electrical Data

**Frequency** 2400~2500MHz  
4900~6000MHz  
**Peak Gain** 3.0dBi (2.4-2.5GHz)  
5.5dBi (4.9-5.8GHz)  
**Efficiency** 56% (2.4-2.5GHz)  
75% (4.9-5.8GHz)  
**Return Loss** ≤-26dB  
**Impedance** 50Ω  
**Polarization** Linear  
**Op. Temp.** -40°C~+85°C

### Mounting Data

**Dimensions** 45\*7\*0.1mm  
**Mounting** Adhesive  
**Adhesive** 3M 467 Tape  
**Cable\*** Ø1.37 100mm  
**Connector\*** IPEX MHFI (U.FL comp)



### Model No

**FXP840**  
**Freedom Series**  
Super Small Monopole  
2.4GHz-5.8GHz

### Electrical Data

**Frequency** 2410~2490MHz  
4900~5800MHz  
**Peak Gain** 2.0dBi (2.4-2.5GHz)  
2.5dBi (4.9-5.8GHz)  
**Efficiency** 40% (2.4-2.5GHz)  
53% (4.9-5.8GHz)  
**Return Loss** ≤-7dB @5.8GHz  
**Impedance** 50Ω  
**Polarization** Linear  
**Max Input Power** 2W

### Mounting Data

**Dimensions** 14\*5.4\*0.1mm  
**Mounting** Adhesive  
**Adhesive** 3M 467 Tape  
**Cable\*** Ø 0.81mm 55mm  
**Connector\*** IPEX MHFI (U.FL comp)

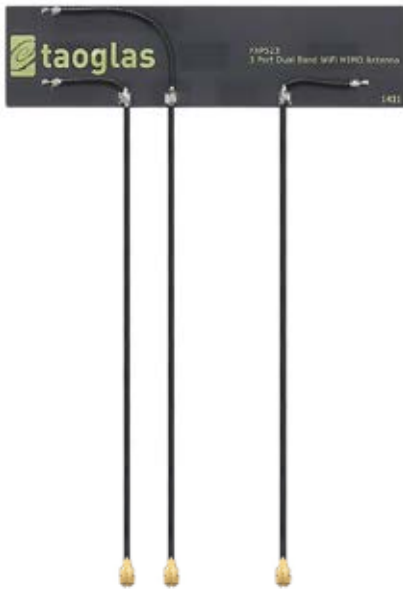
## 2.4~5.8GHz MIMO Antenna

### Embedded Flexible PCB with Multiple Ports

The “Venti” range are a series of embedded flexible PCB, MIMO antennas with many applications including smart home, smart grid, telematics, telemedicine, tracking and vending machine monitoring to name but a few.

The FXP523 “Venti” is a 3in1 MIMO, embedded flexible monopole type antenna and is used for 802.11 high speed Wi-Fi dual band applications. It offers a flexible material with a rectangular form-factor and cable connection for an easy installation and its high isolation between the three elements ensures optimal MIMO system throughput.

The unique FXP543 “Venti” circular antenna is the smallest 3in1 MIMO, internal flexible monopole type antenna for Wi-Fi 2.4/5.8GHz in the market. This exceptionally thin antenna (.15mm) offers an ideal solution for gateways, routers, smart city applications such as Wi-Fi hot spots, smart lighting control, video surveillance and traffic monitoring.



#### Model No

**FXP523**  
Venti 2.4/5.8GHz  
Flexible PCB 3 Port MIMO

#### Electrical Data

Frequency	2400-2500MHz/5150-5850MHz
Peak Gain	4.77 dBi avg.
Efficiency	> 63% avg.
Average Gain	- 1.99 avg.
Impedance	50Ω
Polarization	Linear
Input Power	2W Max

#### Mounting Data

Dimensions	80*20*0.1mm
Body Material	Polymer
Connector*	IPEX MHFI
Cable*	3* .1m 1.13mm Coaxial Cable
Cable Length	120mm



#### Model No

**FXP524.D.07.A.001**  
Venti  
WLAN MIMO 2.4/5.0GHz  
Antenna with 4 ports  
Unity Flex PCB MIMO Antenna

#### Electrical Data

Frequency	2400MHz	5850MHz
Peak Gain	≤5dBi *	≤6.3dBi *
VSWR	1.5dB Max	1.5dB Max
Efficiency	56%	≥64%
Return Loss	≤-13dB	≤-13dB
Impedance	50Ω	50Ω
Polarization	Linear	Linear
Op. Temp.	-40°C~+85°C	-40°C~+85°C

#### Mounting Data

Dimensions	80*20*0.1mm
Adhesive	3M 467 Tape
Cable*	4* Black 1.13mm Coaxial Cable
Connector*	IPEX MHFI



#### Model No

**FXP543**  
Venti Circular 2.4/5.8GHz  
Flexible PCB 3 x MIMO Antenna

#### Electrical Data

Frequency	2400-2500MHz/5150-5850MHz
Peak Gain	3.2dBi typ.
Efficiency	49.32%
Return Loss	≤ -10 typ.
Impedance	50Ω
Polarization	Linear
Radiation	Omni-directional
Input Power	5 W Max

#### Mounting Data

Dimensions	D: 37MM Thickness: .24 with release line
Weight	2.4g
Connector	IPEX MHFHT
Cable	3* .1m 1.37 coaxial cable

\* Peak gain can be customized to fit with your FCC requirements

## 2.4~5.8GHz Dual Band Embedded SMD Ceramic Antenna

The SDWA.01 dual-band SMD ceramic antenna and the WDP.2458 ceramic patch are embedded high efficiency, high peak gain solutions for professional Wi-Fi 802.11n and other ISM band applications which require high data speed rates and wide coverage areas. The CA.25 is an exceptionally small SMD ceramic loop antenna for 2400-2500MHz and 5150-5850MHz dual bands, including Bluetooth, Wi-Fi, ZigBee and ISM applications.

Typical applications include access points, tablets, high definition high throughput video streaming routers, high data MIMO bandwidth routers, automotive applications, home and industrial in-wall Wi-Fi automation, drones/quad-copters and UAV long range Wi-Fi remote control applications. The CA.25 ceramic loop antenna is ideal for maintaining fantastic Rf performance on extremely thin devices. Applications for this ultra thin antenna can include USB dongles, tablets, home and industrial in-wall Wi-Fi automation and hand-held devices. This antenna also has GPS/GLONASS/BeiDou functionality and can be re-tuned to work as an embedded GNSS antenna by following our specific matching circuit components on their main board



### Model No

#### CA.25

Dual-Band 2.4/5.8GHz  
Dual-Band Wi-Fi Loop Antenna

### Electrical Data

Frequency	2.4GHz	5.8GHz
Peak Gain	0.5 dBi avg.	3.3 dBi avg.
Efficiency	60% avg.	70% avg.
VSWR	≤ 3	≤ 3
Impedance	50Ω	
Polarization	Linear	
Op. Temp.	-40°C to 85°C	

### Mounting Data

Dimensions	3.05*1.6*0.55mm
Weight	9mg



SDWAD.01  
(Evaluation Board for SDWA.01)

### Model No

#### SDWA.01

Dual Band 2.4GHz  
4.9-5.8GHz  
Ceramic SMD Antenna

### Electrical Data

Frequency	2.4GHz	5.8GHz
Peak Gain	3.5dBi	4.2dBi
Efficiency	83%	75%+ avg
Return Loss	≤-10.5dB	≤-17dB
Impedance	50Ω	
Polarization	Linear	
Op. Temp.	-40°C~+85°C	

### Mounting Data

Dimensions	10*4*1.5mm
Mounting	SMD



WDPD.25  
(Evaluation Board for WDP.25)

### Model No

#### WDP.25

Dual Band 2.4/5GHz  
Embedded Ceramic  
Patch Antenna

### Electrical Data

Frequency	2.4GHz	5.8GHz
Peak Gain	6dBi	8dBi
Efficiency	60%+ avg.	60%+ avg
Return Loss	≤-19dB	≤-5dB
Impedance	50Ω	
Polarization	Linear	
Op. Temp.	-40°C~+105°C	

### Mounting Data

Dimensions	25*25*4mm
Mounting	Pin and Adhesive Tape



# External UAV Antennas

## Maverick GNSS Antenna & Omega 5.8GHz Antenna Set

Our bespoke antenna solutions for UAV/Drones are extremely robust and of superior quality, our antennas are designed and manufactured in world class manufacturing facilities to the most stringent standards.

The GRS.01 “Maverick” is a GPS/GLONASS/BeiDou Smart Antenna receiver system, featuring the u-blox M8 multi GNSS engine. The Maverick delivers high sensitivity and minimal acquisition times. A specially designed and tuned ceramic patch antenna is integrated directly with the receiver for best sensitivity. The Maverick allows continuous position coverage in most environments, by incorporating multiple satellite systems

in one unit. The TCP.02 “Omega” antenna set comprises of 2 x 5.8GHz clover leaf antennas, one Tx and one Rx. The design itself is rugged and robust to protect the inner antenna during rough landings. The Omega antennas use high quality SS402, semi-rigid cable which can be easily positioned and repositioned. The antenna has excellent efficiency of over 70%, this is essential for high definition video streams.



### Model No

**GRS.01.A**  
**Maverick**  
 GPS/GLONASS/BeiDou  
 Smart Antenna Receiver System

### Electrical Data

<b>Receiver Type</b>	72 channel u-blox M8 concurrent GNSS
<b>Frequency</b>	GPS/QZSS L1 C/A, GLONASS L10F, BeiDou B1, SBAS L1 C/A: WAAS, EGNOS, MSAS
<b>Sensitivity</b>	Tracking -158dBm    Aquisition -146dBm
<b>Position accuracy</b>	Autonomous 2.5m    SBAS 2.0m
<b>Time Pulse Signal</b>	RMS 30ns                      99% 60ns
<b>Frequency of TPS</b>	Configurable 0.25Hz to 10MHz
<b>Max Nav. update Rate</b>	Single GNSS: up to 18Hz    Concurrent GNSS: up to 10Hz
<b>Velocity accuracy</b>	0.05m/s
<b>Heading accuracy</b>	0.3 degrees
<b>Schmitt trigger</b>	Fall 0.2*VDDIO (VDDIO = 1.8V)
<b>Input SCL &amp; SDA</b>	Rise 0.8*VDDIO (VDDIO = 1.8V)
<b>Max Input Power</b>	15dBm
<b>Power cons</b>	DC 4V-6V (5V typ.) DC 30mA-50mA (40mA typ.)

### Mechanical Data

<b>Cable</b>	UART TTL serial bus (GPS/GLONASS /BeiDou) UART I2C serial bus (COMPASS)
<b>Connector</b>	1.25mm Wafer Horizontal SMD Single Row 04 & 05 contacts
<b>Stand</b>	164mm*39mm



### Model No

**TCP.02**  
**Omega**  
 5.8GHz Antenna Set  
 2 x External Drone Antennas (Tx and Rx)

### Electrical Data

<b>Frequency</b>	5600~6000MHz
<b>Peak Gain</b>	3dBi typ
<b>Efficiency</b>	70% typ
<b>VSWR</b>	1.5 typ
<b>Return Loss</b>	<-15dB
<b>Polarization</b>	LHCP
<b>Directionality</b>	Omni-directional
<b>Impedance</b>	50Ω
<b>Max Input Power</b>	10W

### Mechanical Data

<b>Cable</b>	Semi-rigid SS402
<b>Cable Length</b>	50mm
<b>Connector</b>	RP-SMA(M)
<b>Dimensions</b>	Ø35.6*30 (Only dome)
<b>Weight</b>	11g
<b>Op. Temp</b>	-40°C~+85°C

# External UAV Accessories

## AirVu Low Pass and Band Pass Filters

These filters can be placed on the end of the antenna port to eliminate or reduce radio interference problems, so common in Drones, they are perfect to use with the TCP.02 Omega Antenna system.

### The "Airvu" filters do this in 2 ways

1. they reduce out of band noise entering the receiver that cause effects such as reduction of control range
2. they reduce the antenna transmissions of out of band noise affecting other circuitry on your UAV (such as disrupting the GPS receiver leading to loss of fix, or a live video stream at 5.8GHz)

Note: There can still be noise issues that a filter cannot solve. Such as noise that can be radiated directly from the transmitter board and any wiring. Also no filter can protect from in-band noise within the assigned operating frequency of the receiver. Always try to place noisy components as far away from a receiver and antenna as possible.



#### Model No

**LPF.12.01**  
Airvu  
1.2GHz Low Pass Filter

#### Electrical Data

Frequency	300~1400MHz
Band Width	1100MHz
Insertion Loss	1.0dB typ 1.1dB max
Ripple	1.0dB max
Return Loss	10dB min
Stop-Band	1565~1625MHz 10dB min
Attenuation	1900~2200MHz 20dB min 2400~2700MHz 35dB min
Input/output Impedance	50Ω
Power	10W

#### Mechanical Data

Connector	SMA(M) & SMA(F)
Dimensions	Ø10*39mm
Weight	9.82g
Op. Temp	-40°C~+85°C



#### Model No

**BPF.24.01**  
Airvu  
2.4GHz Band Pass Filter

#### Electrical Data

Frequency	2400~2500MHz
Band Width	100MHz
Insertion Loss	1.3dB max.
Ripple	0.8dB max
Return Loss	9.6dB min
Stop-Band	2033~2098MHz 30dB min
Attenuation	2100MHz 25dB min 2786MHz 15dB min 4900~6000MHz 20dB min
Input/output Impedance	50Ω
Power	10W

#### Mechanical Data

Connector	RP-SMA(M) & RP-SMA(F)
Dimensions	Ø10*35mm
Weight	8.815g
Op. Temp	-40°C~+85°C



#### Model No

**BPF.58.01**  
Airvu  
5.8GHz Band Pass Filter

#### Electrical Data

Frequency	5480~5850MHz
Band Width	70MHz
Insertion Loss	2.1dB typ.
Ripple	1.5dB max.
Return Loss	10dB min
Stop-Band	5480~5850MHz 17dB min
Attenuation	7500~7700MHz 25dB min
Input/output Impedance	50Ω
Power	10W

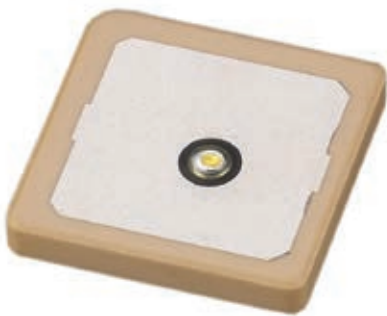
#### Mechanical Data

Connector	RP-SMA(M) & RP-SMA(F)
Dimensions	Ø10*35mm
Weight	8.865g
Op. Temp	-40°C~+85°C

# Embedded UAV Antennas

## Ceramic passive patch antennas

Ceramic patches with their Right Hand Circular Polarization have been proven in the market as providing stable high gain and efficiency, the larger the patch the better the results, we have a wide range of ceramic patches in a large number of frequencies, the most popular being 25\*25\*4mm. Below we highlight a few items in our range at differing frequencies that have been used in UAV/Drone applications.



### Model No

GP.1575.25.4.A.02  
25mm Patch

### Electrical Data

Centre Freq	1575.42 MHz
Bandwidth	10MHz min
Return Loss	≤-10dB
VSWR	1.2 Max.
Peak Gain	1.55dBic typ.
Polarization	RHCP
Impedance	50Ω

### Mechanical Data

Ground Plane	50*50mm
Patch Dims.	25*25*4mm
Op. Temp.	-40°C ~+85°C

### Mounting

Pin	2.4±0.2mm
Adhesive	0.12mm thick
Adhesive Type	NITTO 5015



### Model No

CGGBP.25.4.A.02  
GPS-GLONASS-BeiDou  
25mm Embedded  
Patch Antenna

### Electrical Data

Frequency	BeiDou: 1561.098 ± 2.046MHz GPS: 1575.42 ± 1.023MHz GLONASS: 1602 ± 5MHz
Centre Frequency	1582MHz ± 3MHz
VSWR	2.5 : 1 max
Zenith Gain	BeiDou: +2.5dBi typ. GPS: +1.5dBi typ. GLONASS: +3.5dBi typ.
Impedance	50 Ω

### Mechanical Data

Dimensions	25*25*4mm
Material	Ceramic
Pin Diameter	0.9mm
Pin Length	1.65mm
Op. Temp.	-40°C to 85°C



### Model No

WDP.25  
Dual Band 2.4/5GHz  
Embedded Ceramic  
Patch Antenna

### Electrical Data

Frequency	2400~2500MHz	5150~5850MHz
Peak Gain	6dBi	8dBi
Efficiency	60%+ avg.	60%+ avg
Return Loss	≤-19dB	≤-5dB
Impedance	50Ω	
Polarization	Linear	
Op. Temp.	-40°C~+105°C	

### Mounting Data

Dimensions	25*25*4mm
Mounting	Pin and Adhesive Tape

# Embedded Satellite - Iridium® Certified

## IP.25A Ceramic Pin Patch

The Taoglas Iridium® IP.25A ceramic patch antenna is a low profile (4mm) small footprint antenna (25\*25mm) designed for Iridium® devices. It has been specifically designed to provide excellent coverage in the 1616.0 to 1626.5 MHz range. The CGIP.25.4.A.02 is a low profile ceramic patch antenna with small footprint and a single feed, designed for combined Iridium/GPS applications.

The Taoglas Iridium® IP.25A ceramic patch antenna is a low profile (4mm) small footprint antenna (25\*25mm) designed for Iridium® devices. It has been specifically designed to provide excellent coverage in the 1616.0 to 1626.5 MHz range. The CGIP.25.4.A.02 is specifically designed to provide excellent performance within the 1575.42 to 1626.5 MHz range. This pin and double side adhesive mount antenna is Iridium certified but we recommend pre-test your whole device for Iridium certification to avoid issues with detuning or device/layout issues following installation of the antenna. Contact Taoglas to avail of our pre-testing services.



Iridium® Certified  
IP.25A  
Back



Model No	
IP.1621.25.4.A.02	4mm thick Iridium® Patch Antenna 1621MHz
Electrical Data	
Frequency	1616~1626.5MHz
Peak Gain	2dBic
VSWR	1.5 Max
Return Loss	≤-21dB
Axial Ratio	3dB Max
Impedance	50Ω
Polarization	RHCP
Op. Temp.	-40°C~+85°C
Mounting Data	
Dimensions	25*25*4mm
Mounting	Pin and Adhesive Tape
Ground Plane	50*50mm
Pin	1.65+/-0.2mm
Adhesive	NITTO 5015

GPS		Iridium	
Model No		Model No	
CGIP.25.4.A.02	Embedded Satellite - Iridium® Certified Ceramic Pin Patch	CGIP.25.4.A.02	Embedded Satellite - Iridium® Certified Ceramic Pin Patch
Electrical Data		Electrical Data	
Frequency	1575.42MHz	Frequency	1612MHz
Average Gain	> -2	Average Gain	> -2
VSWR	< 2	VSWR	< 1.5
Efficiency	75% typ.	Efficiency	75% typ.
Gain @ Zenith	5dBi typ.	Gain @ Zenith	5dBi typ.
Impedance	50Ω	Impedance	50Ω
Polarization	RHCP	Polarization	RHCP
Mechanical Data		Mechanical Data	
Dimensions	25*25*4mm	Dimensions	25*25*4mm
Weight	5g	Weight	5g
Ground Plane	70*70mm	Ground Plane	70*70mm
Pin	0.9 x 1.65	Pin	0.9 x 1.65
Adhesive	NITTO 5015	Adhesive	NITTO 5015
OP. Temp	-40°C to 85°C	OP. Temp	-40°C to 85°C

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# External Satellite Iridium® Certified

## Robust External Antennas

Taoglas has developed a range of external antennas for maritime, aeronautical, government/defense, public safety, utilities, oil/gas, mining, forestry, and transportation applications using the Iridium™ Satellite constellation. Iridium® has certified the IAA.01 and IMA.01 antennas for commercial use in connection with the Iridium Communications System.

The IAA.01 is a magnetic mount solution, which has been designed for land/mobile solutions. The magnetic mount allows for easy installation and removal between vehicles or assets. The IMA.01 is a bracket mount antenna which delivers exceptional

reception performance for permanent in-building or marine applications. This antenna is designed for free-air operation with no ground plane required.



### Model No

**IAA.01.121111**  
External Magnetic Mount  
IRIDIUM Antenna  
1616~1626.5MHz

### Electrical Data

**Frequency** 1616~1626.5MHz  
**Peak Gain** 3.7dBi  
**VSWR** 1.5 Max  
**Return Loss** ≤-21dB  
**Bandwidth** 15MHz  
**Impedance** 50Ω  
**Polarization** RHCP  
**Op. Temp.** -40°C~+85°C

### Mounting Data

**Dimensions** 40.5\*38\*12.3mm  
**Mounting** Magnetic  
**Cable** RG-174  
**Connector** SMA(M)  
**IP Rating** IP67



### Model No

**IMA.01**  
External Bracket Mount  
IRIDIUM Antenna  
1616~1626.5MHz

### Electrical Data

**Frequency** 1616~1626.5MHz  
**Peak Gain** 2dBi  
**VSWR** 1.5 Max  
**Return Loss** ≤-21dB  
**Bandwidth** 15MHz  
**Impedance** 50Ω  
**Polarization** RHCP  
**Op. Temp.** -40°C~+85°C

### Mounting Data

**Dimensions** Ø 108, H 90mm  
**Mounting** Magnetic  
**Cable** 1m CFD 200  
**Connector** SMA(M)  
**IP Rating** IP67

## External Satellite Iridium® Transceiver

### Iridium External Antennas

The Iridium® satellite network offers truly global M2M service with the lowest latency in the industry — extending the value of intelligent data far beyond the 10% of the Earth serviced by terrestrial networks.

The STS.01 “Spartan” Iridium® Transceiver consists of an advanced Taoglas Iridium® certified patch antenna and Iridium 9602 transceiver with RS-232 interface, all enclosed in a robust, IP67 waterproof through-hole mount enclosure.

Certified by Iridium, the STS.01 “Spartan” supports short burst data with a maximum mobile originated message size of 340 bytes and a maximum mobile terminated message size of 270 bytes. There is no SIM card required.



\*Available stripped or with M12 connector

#### Model No

**STS.01.A.0115FB**  
Spartan Iridium® Transceiver  
Antenna System

#### Electrical Data

Transceiver	Integrated Iridium 9602
Interface	3-Wire RS-232
Power Regulation	Integrated 8-32V Input Voltage Range
Op. Temp.	-40°C~+85°C

#### Mechanical Data

Dimensions	ø145*35 mm
Housing	ABS-Polycarbonate Alloy
Mounting	Thread Ø 30mm
Cable	115mm Multi Conductor Cable
Connector	M12
IP Rating	IP67 and IP69K

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\*Cables and Connectors Customizable

# Combination Iridium Antenna

## Spartan 3in1 GPS/GLONASS/Cellular/Iridium

The MA602 “Spartan” antenna is a heavy-duty, fully IP67 waterproof external M2M antenna for use in telematics, transportation and remote monitoring applications.

The “Spartan” is unique in the market because it combines a 3in1 GPS/GLONASS, Cellular (2G and 3G) and Iridium, heavy-duty antenna with high efficiency in a compact format. The antenna screws down permanently onto a roof or metal panel and can be pole or wall-mounted with a metal bracket.

For industries such as commercial vehicle telematics, remote monitoring, smart meter systems and construction equipment, the Spartan provides a robust, rugged antenna that is durable, even in extreme environments.



### Model No

**MA602**  
Spartan Screwmount 3in1  
Combination Antenna

#### CELLULAR

##### Electrical Data

Frequency	824~2170MHz
Avg. Gain	≥-5 dBi
Efficiency	64%
VSWR	≤5.2
Polarisation	Linear
Impedance	50 Ω Nominal

##### Mechanical Data

Dimensions	H:39.5 * ø145 mm
Housing	Wonderloy PC-540, PC/ABS Alloy
Mounting	Thread ø 30mm
Cable	1M CFD200
Connector	SMA(M)
Op. Temp.	-20°C~+65°C
IP Rating	IP67

#### GPS/GLONASS

##### Electrical Data

Ctr. Frequency	1575.42/1602MHz
Gain @ Zenith	3 dBic/2dBic Min.
Efficiency	73%
VSWR	1.92 Max
Polarisation	Linear
Impedance	50 Ω Nominal
Return Loss	10 dB Min
Gain @ 3.3V	29 ~ 30 dB
DC Power Input	3~5V

##### Mechanical Data

Cable	1M RG-174
Connector	SMA(M)

#### Iridium

##### Electrical Data

Frequency	1616~1626.5MHz
Gain @ Zenith	3.5dBic Min.
Efficiency	90%
VSWR	1.92 Max
Axial Ratio	4 dB Max.
Polarisation	PHCP
Impedance	50 Ω Nominal

##### Mechanical Data

Cable	1M CFD200
Connector	SMA(M)

## Combination 4in1 Permanent Mount

### Storm 4in1 GNSS/2\*LTE MIMO / L Band 1621 MHz

Part of the “Storm” series, the MA.410 offers a low profile, heavy duty, fully IP67 waterproof M2M solution to you antenna needs.

The MA.410 “Storm” offers best in class LTE, GNSS and Iridium antenna performance and is typically used for worldwide telematics applications such as Global Cellular, Location and Satellite Communications. The MA.410 is the lowest profile telematic antenna on the market, delivering 4G LTE MIMO antenna technology, GNSS accuracy and stability and a low axial ratio Satellite L Band 1621MHz antenna, providing connectivity for Satellite L Band systems, for global coverage, and back-up in case of cellular network failure.



#### Model No

Storm 4in1  
MA410  
4in1 GNSS/2\*LTE MIMO/L Band 1621MHz

	GPS/GLONASS/BeiDou	2G/3G/4G MIMO 1 & 2	Satellite L Band 1621MHz
<b>Electrical Data</b>		<b>Electrical Data</b>	
Frequency	BeiDou:1561.098±2.046MHz GPS:1575.42±1.023MHz GLONASS:1602±5MHz	Frequency	698 to 960MHz/1710 to 2170MHz/ 2490 to 2690MHz/3300 to 3600 MHz
Axial Ratio	BeiDou: < 5.5    GPS:< 3.2 GLONASS:< 10.6	Average Gain	-3.15 dBi avg. F63
VSWR	< 2	VSWR	< 3.5
Efficiency	> 45% typ.	Efficiency	> 51% avg.
Return Loss	≤ 10dB	Return Loss	8.8 dBi typ.
Impedance	50Ω	Impedance	50Ω
Polarization	RHCP	Polarization	Linear
<b>Mechanical Data</b>		<b>Mechanical Data</b>	
Dimensions	216.24*93.25*30.95mm	Dimensions	216.24*93.25*30.95mm
Casing	ABS +PC	Casing	ABS +PC
Base & Thread	Nickel Plated Aluminium	Base & Thread	Nickel Plated Aluminium
Weight	440g	Weight	440g
IP Rating	IP67	IP Rating	IP67
OP. Temp	-40°C to 85°C	OP. Temp	-40°C to 85°C
<b>Electrical Data</b>		<b>Electrical Data</b>	
VSWR	< 2	VSWR	< 2
Axial Ratio	< 1.7	Axial Ratio	< 1.7
Polarization	RHCP	Polarization	RHCP
Antenna Gain	2 dBi typ.	Antenna Gain	2 dBi typ.
Antenna Efficiency	> 40%	Antenna Efficiency	> 40%
Cable**	1m CFD-200	Cable**	1m CFD-200
Connector**	SMA(M)	Connector**	SMA(M)
<b>Mechanical Data</b>		<b>Mechanical Data</b>	
Dimensions	216.24*93.25*30.95mm	Dimensions	216.24*93.25*30.95mm
Casing	ABS +PC	Casing	ABS +PC
Base & Thread	Nickel Plated Aluminium	Base & Thread	Nickel Plated Aluminium
Weight	440g	Weight	440g
IP Rating	IP67	IP Rating	IP67
OP. Temp	-40°C to 85°C	OP. Temp	-40°C to 85°C



# Embedded Satellite - Globalstar Antenna

## Ceramic Pin Patch Antenna

**Globalstar is a low Earth orbit satellite constellation for satellite phone and low speed data communications. Globalstar can be used in remote areas beyond the reach of cellular and landline telephone services.**

The SP.1615.25.4.A.02 is a miniaturized 25mm square ceramic patch antenna is mounted via pin and double-sided adhesive and is the optimal embedded antenna solution for mobile Globalstar applications.



### Model No

SP.1615.25.4.A.02  
Globalstar 25mm 1615MHz  
3dBi Embedded  
Ceramic Patch Antenna

### Electrical Data

Frequency 1615.68MHz  
Peak Gain 4dBi  
VSWR 1.5 Max  
Bandwidth 26MHz min.  
Impedance 50Ω  
Polarization LHCP  
Op. Temp. -40°C~+105°C

### Mounting Data

Dimensions 25mm\*25mm\*4mm  
Mounting Double Coated Adhesive  
Connector SMA(F)

# Embedded SMD NFC Antennas

## Flex Polymer SMD Antennas

NFC

Taoglas have developed a new range of NFC (Near Field Communications) antenna solutions. This year 1.4BN cellphones will ship and up to 40% will have a NFC antenna. This means any device implementing one of our NFC solutions can communicate to a cellphone using NFC. For this they will require a NFC antenna. By implementing NFC you open your device up as mobile payment terminal.

The FXR.05.A and FXR.07.A are circular flexible NFC (Near Field Communications) antennas for use in mobile devices and other applications. This design is matched for optimal performance with typical NFC chipsets. The design provides a flexible NFC antenna that can be adhered to the plastic enclosure of the device for ease of installation.



### Model No

**FXR.05.A**  
Flexible Near - Field  
Communications  
Antenna

### Electrical Data

**Frequency** 13.56MHz  
**Polarization** Linear  
**Inductance** 15.9  $\mu$ H

### Mounting Data

**Dimensions**  $\phi$ 26.4\*0.24mm  
**Mounting** Peel and Stick Adhesive  
**Weight** 201.7mg  
**Op Temp.** -40°C~+85°C  
**Adhesive** 3M 467



### Model No

**FXR.07.A**  
Flexible Near - Field  
Communications

### Electrical Data

**Frequency** 13.56MHz  
**Polarization** Linear  
**Inductance** 6.4  $\mu$ H

### Mounting Data

**Dimensions**  $\phi$ 45.5\*0.24mm  
**Mounting** Peel and Stick Adhesive  
**Weight** 631.6g  
**Op Temp.** -40°C~+85°C  
**Adhesive** 3M 467



### Model No

**FXR.07.A.dg**  
Flexible Near - Field  
Communications  
Layered with ferrite flux director

### Electrical Data

**Frequency** 13.56MHz  
**Polarization** Linear  
**Inductance** 6.4  $\mu$ H

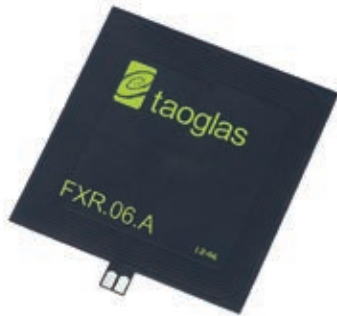
### Mounting Data

**Dimensions**  $\phi$ 45.5\*0.3mm  
**Mounting** Peel and Stick Adhesive  
**Weight** 2g  
**Op Temp.** -40°C~+85°C  
**Adhesive** 3M 467

# Embedded SMD NFC Antennas

## Polymer SMD Antennas

The FXR.06.A is a square form factor version, and FXR.08.A a rectangular form factor- for different size requirements - we have also versions of the FXR.06/07/08 with a ferrite flux director added, which improves the interrogation distance when adhering the antenna on metal.



**Model No**

**FXR.06.A**  
 Square Flexible  
 Near - Field Communications

**Electrical Data**

**Frequency** 13.56MHz  
**Polarization** Linear  
**Inductance** 5.2 µH

**Mounting Data**

**Dimensions** 47\*47\*0.24mm  
**Mounting** Peel and Stick Adhesive  
**Adhesive** 3M 467  
**Weight** 813.2mg  
**Op. Temp.** -40°C~+85°C

**Model No**

**FXR.06.A.dg**  
 Square Flexible  
 Near - Field Communications  
 Layered with ferrite flux director

**Electrical Data**

**Frequency** 13.56MHz  
**Polarization** Linear  
**Inductance** 5.2 µH

**Mounting Data**

**Dimensions** 47\*47\*0.3mm  
**Mounting** Peel and Stick Adhesive  
**Adhesive** 3M 467  
**Weight** 2g  
**Op. Temp.** -40°C~+85°C



**Model No**

**FXR.08.A**  
 Rectangular Flexible  
 Near - Field Communications  
 Antenna

**Electrical Data**

**Frequency** 13.56MHz  
**Polarization** Linear  
**Inductance** 4.5 µH

**Mounting Data**

**Dimensions** 53.3\*37.3\*0.24mm  
**Mounting** Peel and Stick Adhesive  
**Adhesive** 3M 467  
**Weight** 581.6mg  
**Op. Temp.** -40°C~+85°C

**Model No**

**FXR.08.A.dg**  
 Rectangular Flexible  
 Near - Field Communications  
 Layered with ferrite flux director

**Electrical Data**

**Frequency** 13.56MHz  
**Polarization** Linear  
**Inductance** 4.5 µH

**Mounting Data**

**Dimensions** 53.3\*37.3\*0.3mm  
**Mounting** Peel and Stick Adhesive  
**Adhesive** 3M 467  
**Weight** 2g  
**Op. Temp.** -40°C~+85°C



FXR.06.A.dg



FXR.08.A.dg

# Embedded NFC Antennas, with cable and connector

## Flex Polymer SMD Antennas

NFC

We also have options with twisted pair 28AWG cable that can be adhered to the plastic enclosure of the device for ease of installation and work with specific 13.56MHz RFID and NFC chips which need to connect via JST ACH connector. With NFC antennas being commonly attached to the battery of mobile devices, they can be customized with a ferrite flux director to provide isolation from the battery or other components within the device.



### Model No

**FXR.01.A**  
Flexible Near - Field  
Communications  
Reader Antenna

### Electrical Data

**Frequency** 13.56MHz  
**Polarization** Linear  
**Impedance** 50Ω

### Mounting Data

**Dimensions** 53.3\*36.8mm  
**Mounting** Peel and Stick Adhesive  
**Connector** 3M 467 Adhesive Tape  
**Cable** Mini-Coax. 1.13mm  
**Adhesive** 3M 467



### Model No

**FXR.07.52.0075X.A**  
NFC Antenna  
**FXR.07.52.0075X.A.dg**  
NFC Antenna with ferrite flux  
director

### Electrical Data

**Frequency** 13.56MHz  
**Inductance** 6.4 μH

### Mounting Data

**Dimensions** 45\*0.24mm  
45\*0.3mm  
**Connector** ACH (F)  
**Cable** 75mm Twisted Pair 28AWG  
**Adhesive** 3M467  
**Weight** 2g  
**Op Temp.** -40°C~+85°C



### Model No

**FXR.06.52.0075X.A**  
NFC Antenna  
**FXR.06.52.0075X.A.dg**  
NFC Antenna with ferrite flux  
director

### Electrical Data

**Frequency** 13.56MHz  
**Inductance** 5.2 μH

### Mounting Data

**Dimensions** 53.34\*36.83\*0.24mm  
53.34\*36.83\*0.3mm  
**Connector** ACH (F)  
**Cable** 75mm Twisted Pair 28AWG  
**Adhesive** 3M467  
**Weight** 2g  
**Op Temp.** -40°C~+85°C

# Embedded NFC Antennas, with cable and connector

## Flex Polymer Antennas

NFC antennas can be applied in areas not traditionally available to other types of antennas. A common example is the ability to apply NFC antennas to batteries or other conductive surfaces. To enable this usage, however, a ferrite flux director layer is required. This ferrite layer acts to steer the magnetic flux away from the metal or other conductor, where it would otherwise result in loss or complete failure to communicate. Taoglas NFC antennas can therefore be customized with flux director layers to enable this flexibility in usage. The coil inductance noted below can help estimate a capacitance value for creating resonance at 13.56MHz.

### Typical applications:

- Mobile devices
- Electronic wallets
- Health care ID scanners
- Payment readers
- Office ID
- Access control
- Internet Of Things

Customized antennas for specific applications, shape, and impedance match can also be provided for an NRE and subject to MOQ. Contact your regional Taoglas sales office for more information and support on our NFC antenna range.



### Model No

**FXR.08.53.0075X.A**  
 Near - Field Communications  
 Antenna  
**FXR.08.53.0075X.A.dg**  
 NFC Antenna with ferrite flux director

### Electrical Data

Frequency 13.56MHz  
 Inductance 4.5 μH

### Mounting Data

Dimensions 53.34\*37.3\*0.24mm  
 53.34\*37.3\*0.3mm  
 Connector ACH (F)  
 Cable 75mm Twisted Pair 28AWG  
 Adhesive 3M467  
 Weight 3g  
 Op. Temp. -40°C~+85°C

# Cable Assemblies

## Custom Assemblies

Taoglas have developed a new range of NFC (Near Field Communications) antenna solutions. This year 1.4BN cellphones will ship and up to 40% will have a NFC antenna. This means any device implementing one of our NFC solutions can communicate to a cellphone using NFC. For this they will require a NFC antenna. By implementing NFC you open your device up as mobile payment terminal.

### Here's what we need from you to prepare a drawing, part number and quotation

- 1 The type of Coaxial cable required (sometimes this is determined by the connectors eg. Murata GSC - uses 0.81mm coaxial cable)
- 2 The RF connectors needed - or if you require a stripped end, the open/strip/tin dimensions
- 3 The length of cable needed - please mention if this length is to include the connectors or not (our drawing will reflect the length excluding the connectors)
- 4 The orientation of the connectors to each other.
- 5 The quantity needed



Ø 0.81



Ø 1.13



Ø 1.37



RG-178



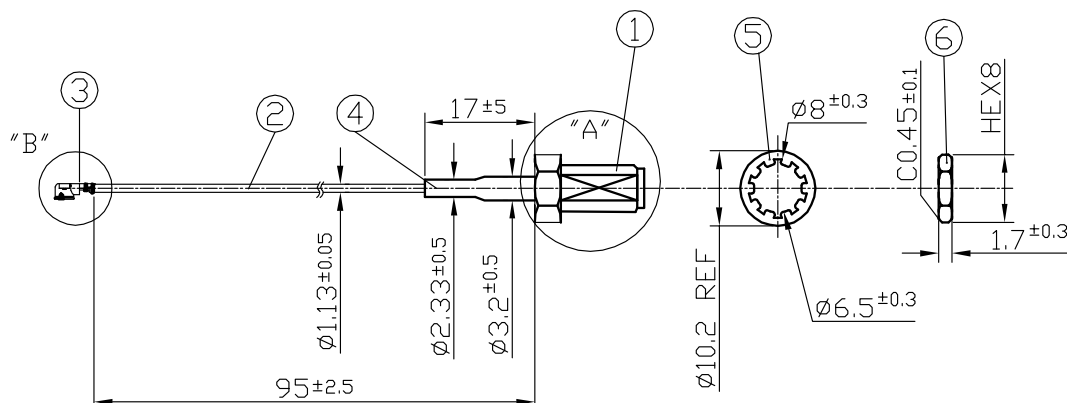
RG-174



CFD-200

Our process involves you every step of the way. Once you have contacted us with your requirement our engineers prepare a Mechanical Drawing of Assembly and then send it on to you for approval. When you are happy with our proposal we can supply tested and

approved custom samples within 2 weeks with our production lead-times being 3 to 4 weeks for most deliveries. Our products are put through rigorous QC testing procedures, ensuring that they are of the highest quality and within approved specifications.











# Cable Assemblies



## Standard Assemblies

Taoglas supply an extensive line of radio frequency (RF) coaxial cable assemblies, for use in wireless telecommunications applications including Wi-Fi, PCS, radio, computer networks, test instruments and antenna devices.








### Micro-Coaxial Cables

Description	Photo	Cable Length	Part Number
<b>∅0.81 SMA(F) to...</b>			
<b>Murata GSC</b>			
SMA(F) Bulkhead Straight to Murata GSC Orientation: Straight - R/A ∅0.81 Cable		95 mm 200 mm	CAB.922 CAB.940
<b>Murata HSC</b>			
SMA(F) Bulkhead Straight to Murata HSC Orientation: Straight - R/A ∅0.81 Cable		100 mm 200 mm	CAB.R01 CAB.R02
<b>IPEX MHFIII</b>			
SMA(F) Bulkhead Straight to IPEX MHFIII (W.FL comp) Orientation: Straight - R/A ∅0.81 Cable		96.4mm	CAB.A02
<b>IPEX MHF4</b>			
SMA(F) Bulkhead Straight to IPEX MHF4 (HSC comp) Orientation: Straight-R/A ∅0.81 Cable		100mm 200mm	CAB.S01 CAB.S02
<b>∅1.13 SMA(F) to...</b>			
<b>Hirose U.FL</b>			
SMA(F) Bulkhead Straight to Hirose U.FL Orientation: Straight-R/A ∅1.13 Cable		100mm 200mm	CAB.719 CAB.718
<b>IPEX MHFI</b>			
SMA(F) Bulkhead Straight to IPEX MHFI (U.FL comp) Orientation: Straight-R/A ∅1.13 Cable		95 mm 200 mm	CAB.011 CAB.618.C
<b>IPEX MHFI</b>			
RP-SMA(F) Bulkhead Straight to IPEX MHFI (U.FL comp) Orientation: Straight-R/A ∅1.13 Cable		95mm 200mm	CAB.628 CAB.622
<b>∅1.32 SMA(F) to...</b>			
<b>Hirose U.FL</b>			
SMA(F) Bulkhead Straight to Hirose U.FL Orientation: Straight-R/A ∅1.32 Cable		100mm 200mm	CAB.721 CAB.720

## Micro-Coaxial Cables

Description	Photo	Cable Length	Part Number
<p><b>ø1.37 N Type to IPEX MHFI</b></p> <p>N type Jack with O-Ring to IPEX MHFI (U.FL comp) Orientation: Straight - RA 1.37mm Coaxial Cable</p>		1300 mm	CAB.954
<p><b>RG-178 FME(F) to IPEX MHFI</b></p> <p>FME(F) Bulkhead Straight Jack to IPEX MHFI(U.FL comp) Orientation: Straight - R/A RG-178 Cable</p>		100mm	CAB.695

## Coaxial Cables







Description	Photo	Cable Length	Part Number
<p><b>RG-174 SMA(F)...</b></p> <p><b>SMA(M)</b></p> <p>SMA(M) Straight to SMA(F) Bulkhead Straight Orientation: Straight-Straight RG-174</p>		75 mm	CAB.0114
<p><b>Straight Jack Fakra</b></p> <p>SMA(F) Bulkhead Straight Jack to Fakra Code C Blue Straight Plug Orientation: Straight - Straight RG-174</p>		100mm	CAB.D05
<p>SMA(F) Bulkhead Straight Jack to Fakra Code D Violet Straight Plug Orientation: Straight - Straight RG-174</p>		100mm	CAB.J05
<p><b>MCX(M)</b></p> <p>SMA(F) Bulkhead Straight to MCX(M) Straight Orientation: Straight-Straight RG-174</p>		75mm	CAB.0130
<p><b>MMCX(M)</b></p> <p>SMA(F) Bulkhead Straight to MMCX(M) Right Angle Orientation: Straight-R/A RG-174</p>		100 mm	CAB.01402
<p><b>SMB(F)</b></p> <p>SMA(F) Bulkhead Straight with O-ring to SMB(F) Plug Straight Orientation: Straight-Straight RG-174</p>		100 mm	CAB.0101
<p><b>RG-174 SMA(F) to TS-9(M)</b></p> <p>SMA(F) Bulkhead Straight to TS-9(M) Plug Orientation: Straight - Straight RG-174</p>		100 mm	CAB.T01








# Cable Assemblies

## Standard Assemblies

### Coaxial Cables

Description	Photo	Cable Length	Part Number
<b>RG-316 N Type Jack to ...</b> <b>RG-316 SMA(M)ST</b>			
SMA(M)ST Plug to N type Jack with O-Ring Orientation: Straight-Straight RG-316		3.93in / 100mm 3.28ft / 1m 9.84ft / 3m	CAB.955 CAB.951 CAB.952
<b>RG-316 MCX(M)ST</b>			
MCX(M)ST Plug to N type Jack with O-Ring CAB.956 Orientation: Straight - Straight RG-316 Cable		3.93in / 100mm	
<b>RG-58 NMO Mount to ...</b> <b>SMA(M)</b>			
NMO Direct Mount Cable Assembly Accessory NMO Direct Mount - 3/4 inch Hole Brass Mount type to SMA(M) Straight Plug Orientation: R/A - Straight RG-58 cable		3ft / 915m 9.8ft / 3m 14ft / 4.26m 17ft / 5.18m	CAB.V08 CAB.V05 CAB.V09 CAB.V10
<b>FME(F)</b>			
NMO Direct Mount Cable Assembly Accessory NMO Direct Mount - 3/4 inch Hole Brass Mount type to FME(F) Straight Jack Orientation: R/A - Straight RG-58 cable		3ft / 915m 14ft / 4.26m 17ft / 5.18m	CAB.V11 CAB.V12 CAB.V13
<b>RG-58 NMO Mag Mount to ...</b> <b>SMA(M)</b>			
NMO Magnet Mount Cable Assembly Accessory NMO Magnet Mount - 3/4 inch Hole Brass Mount type to SMA(M) Straight Plug Orientation: R/A - Straight RG-58 cable		3ft / 915m 9.8ft / 3m 14ft / 4.26m 17ft / 5.18m	CAB.W08 CAB.W05 CAB.W09 CAB.W10
<b>FME (F)</b>			
NMO Magnet Mount Cable Assembly Accessory NMO Magnet Mount - 3/4 inch Hole Brass Mount type to FME(F) Straight Jack Orientation: R/A - Straight RG-58 cable		3ft / 915m 14ft / 4.26m 17ft / 5.18m	CAB.W11 CAB.W12 CAB.W13

## Low Loss Coaxial Cables

Description	Photo	Cable Length	Part Number
<b>CFD 200 N Type Jack to...</b> <b>SMA(M)</b> SMA(M)ST Plug to N type Jack with O-Ring Orientation: Straight-Straight CFD-200 Cable (Low Loss)		16.4ft / 5m 25ft / 7.6m	CAB.953 CAB.942
<b>N Type (M)</b> N Type(M) Straight to N Type(F) Straight Orientation: Straight - Straight CFD-200		1m	CAB.917
<b>CFD 200 N Type (M) to...</b> <b>N Type (M)</b> N Type(M) Straight to N Type(M) Straight Orientation: Straight - Straight CFD-200		1m	CAB.916
<b>CFD 200 SMA(F) Mag Mount to...</b> <b>SMA(M)</b> Taoglas Magnet Mount Cable Assembly SMA(F) Magnet Mount to SMA (M) Straight Plug Orientation: R/A - Straight CFD-200 cable		1ft / 305mm 3.28ft / 1m 9.8ft / 3m 16.4ft / 5m	CAB.X04 CAB.X05 CAB.X06 CAB.X07
<b>0.047" Semi-rigid cable SMA(F) Jack to...</b> <b>Strip/Tin</b> SMA (F) Straight to Strip/Tin Orientation: Straight - Straight		.047in semi-rigid cable	CAB.058

# Connectors


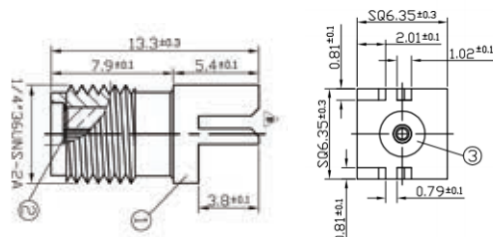

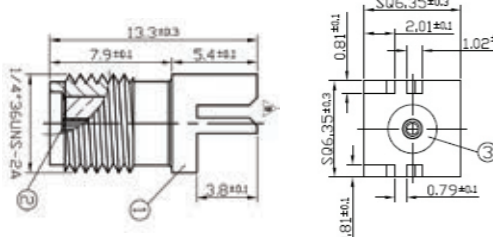

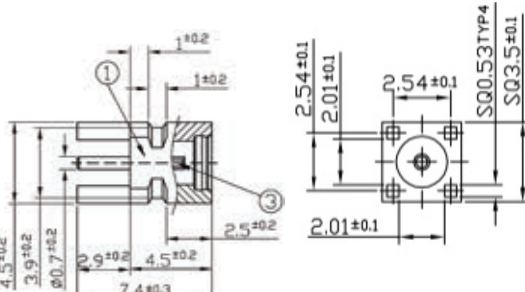
## Receptacles & On Board Connectors

Taoglas supply on-board connectors for PCB mount, Edge Mount and also available PCB and Crimp Mount types. These connectors complement our receptacle range for integration on PCB boards. We stock the below common configurations for SMA, MMCX and MCX - if there is a configuration you need not on the list please feel free to contact us at your local area Sales office.

### Receptacles

Part Number	Part Number	Part Number
<b>MHF Receptacle</b> RECE.20279.001E.01	<b>MHF4 Receptacle</b> RECE.20449.001E.01	<b>MHFIII Receptacle</b> RECE.20369.001E.01
<b>Description</b> IPEX MHF Receptacle Compatible with IPEX MHFI, MHFII, Hirose U.FL IPEX MHFHT Mating Height: 2.5mm max	<b>Description</b> IPEX MHF4 Receptacle Compatible with Murata HSC Mating Height: 1.2mm	<b>Description</b> IPEX MHFIII Receptacle Compatible with Hirose W.FL Mating Height: 1.6mm
		


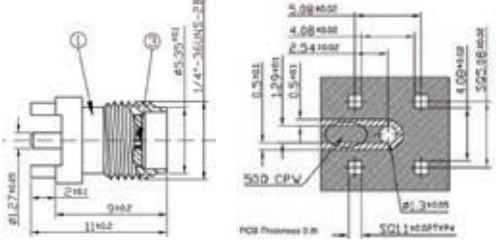

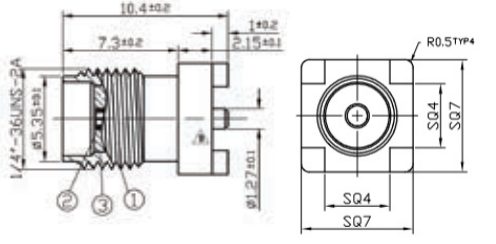

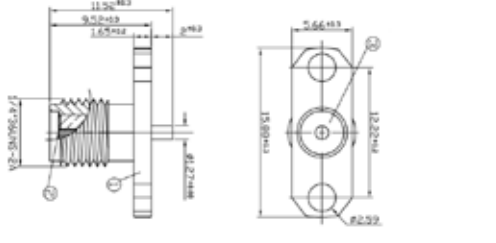

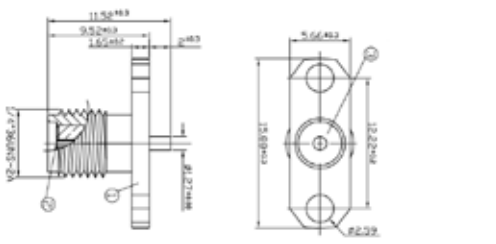

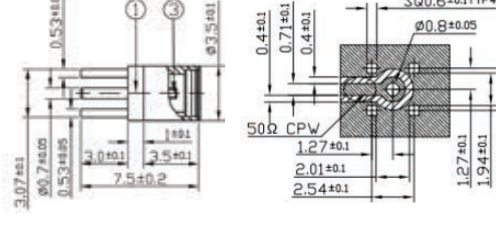
### Edge Mount Connectors

Description	Part Number	Photo	Drawing
SMA straight Edge Mount PCB JACK Finish: GOLD	EMPCB.SMAFSTJ.B.HT		
SMA straight Edge Mount PCB JACK NICKEL	EMPCB.SMAFSTJ.C.HT		
MMCX straight Edge Mount PCB JACK GOLD	EMPCB.MMCXFSTJ.A.HT		

## Connectors

## Vertical Mount On Board Connectors


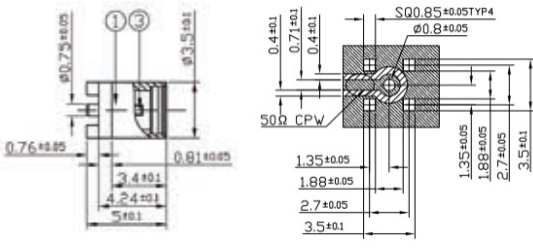

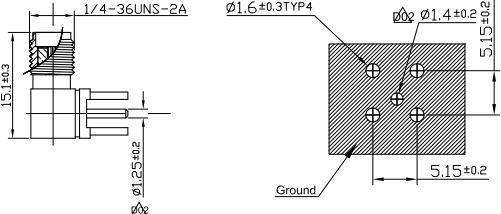

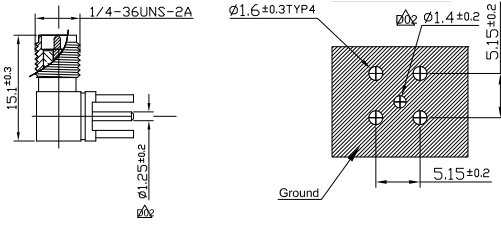
## PCB Mount

Description	Part Number	Photo	Drawings
SMA straight PCB Mount JACK Leg Length 2mm GOLD	PCB.SMAFSTJ.A.HT		
SMA straight SMD PCB Mount JACK Leg Length 1mm GOLD	PCB.SMAFSTJ.B.HT		
SMA straight 2 Hole PCB Mount receptacle JACK GOLD	PCB.SMAFST.2H.A.HT		
SMA straight 2 Hole PCB Mount receptacle JACK Nickel	PCB.SMAFST.2H.B.HT		
MMCX straight PCB Mount JACK Leg Length 3mm GOLD	PCB.MMCXFSTJ.HT		

# Connectors

## Vertical Mount On Board Connectors

### PCB Mount

Description	Part Number	Photo	Drawings
MMCX straight SMD PCB Mount JACK Leg Length 0.76mm GOLD	PCB.MMCXFSTJ.SMD.HT		
SMA RA PCB Mount JACK GOLD	PCB.SMAFRA.HT		
RP-SMA RA PCB Mount JACK GOLD	PCB.RPSMAFRA.HT		

# Services

## ISA Service Packages

### Code: ISA.10

**Title:** Initial System Review & Analysis

**Deliverables:** Report and interactive technical support

**Item:**

- High level system review
- Antenna performance requirements analysis
- Antenna selection options
- Antenna Integration Plan

**Time:** 2 days

### Code: ISA.12

**Title:** Transmission Line Design & Gerber Design Review

**Deliverables:** PCB Transmission line Design

**Item:**

- PCB transmission line design
- Gerber file review

**Time:** 2 days

### Code: ISA.20

**Title:** Detailed Performance and Certification Readiness Review

**Deliverables:** Report and interactive technical support

**Item:**

- Detailed analysis of design documents including schematic, PCB layout, BOM & mechanical models.
- Specific recommendations from the component level up to the system architecture level in order to minimize the risk of performance and certification problems for all radios in the system.
- Schematic recommendations
- PCB layout recommendations
- BOM recommendations
- Mechanical recommendations
- High level design verification test plan, what kind of testing will be needed to prove the design works
- High level certification test plan, what certification tests will be needed and what order to do them in

**Time:** 3 weeks

### Code: ISA.21

**Title:** Detailed RF Performance Optimization Review

**Deliverables:** Report and interactive technical support

**Item:**

- Detailed analysis of design documents including schematic, PCB layout, BOM & mechanical models.
- Specific recommendations from the component level up to the system architecture level in order to minimize the risk of performance and certification problems for all radios in the system.
- Schematic recommendations
- PCB layout recommendations
- BOM recommendations
- Mechanical recommendations

**Time:** 3 weeks

# Services

## ISA Service Packages

### Code: ISA.40

**Title:** Multi-Antenna Isolation Measurements

**Deliverables:** Antenna Isolation Report

**Item:**

- Antenna installed on a customer device prototype board, with extra antenna prototypes
- Multi-Antenna isolation performance matrix

**Time:** 3 Days

### Code: ISA.50

**Title:** Passive Mode Antenna Testing

**Deliverables:** Antenna Performance Report

**Items:**

- Antenna installed on a customer device prototype board, with extra antenna prototypes.
- Matching circuit diagram and documentation of values if relevant (or cable routing diagram, antenna position/mounting etc.).
- Final antenna position and integration method.
- PCB layout recommendations
- Return Loss, VSWR, Average Gain, Efficiency, Peak Gain and Radiation Patterns.
- Documented performance measurements.

**Time:** 3 Days

### Code: ISA.51

**Title:** Passive Mode Terminal and External Antenna Testing

**Deliverables:** Antenna Performance Report

**Items:**

- Antenna installed in a customer device
- Real-world antenna performance: antenna mounted in a vehicle
- Efficiency, Peak Gain, Radiation Patterns for four (4) frequencies
- Documented performance measurements

**Time:** 3 Days

\* Please check services on website as they are subject to change.

# Services

## CSA Service Packages

### Code: CSA.10

**Title:** Cellular Antenna Feasibility Study

**Deliverables:** Report and interactive technical support

**Item:**

- Test and/or simulate different antenna technologies, topologies and material
- Antennas will be tested in different locations / positions
- Selection of the best solution will be based on overall performance and project targets (price, certification, performance etc)

**Time:** 3 weeks

### Code: CSA.20

**Title:** Existing Cellular Antenna Product Implementation, organisation/matching

**Deliverables:** Report

**Item:**

- Antenna installed on a customer device prototype board, with extra antenna prototypes
- Matching Circuit Diagram and documentation of values if relevant (or cable routing diagram, antenna position/ mounting etc.)
- Final antenna position and integration method
- Return Loss, VSWR, Average Gain, Efficiency, Peak Gain, Radiation Patterns
- Documented performance measurements

**Time:** 1 Week

### Code: CSA.21

**Title:** Antenna Passive Implementation Optimization/Matching & ECC Measurements

**Deliverables:** Report

**Item:**

- Antenna installed on a customer device prototype board, with extra antenna prototypes
- Matching Circuit Diagram and documentation of values if relevant (or cable routing diagram, antenna position/mounting etc.)
- Final antenna position and integration method
- Return Loss, VSWR, Average Gain, Efficiency, Peak Gain, Radiation Patterns, ECC
- Documented performance measurements

**Time:** 1 Week

### Code: CSA.30

**Title:** Cellular Device Active Mode Testing - TRP (2 bands)

**Deliverables:** Report

**Item:**

- Test in Taoglas 3D anechoic chamber - Full CTIA/PTCRB TRP (850/1900MHz) USA channel analysis.
- EU channels optional.
- If fail consult with sales for custom solution

**Time:** 2 days



# Services

## CSA Service Packages

### Code: CSA.30L

**Title:** Cellular Device Active Mode Testing - TRP (4 bands)

**Deliverables:** Report

**Variables:** CSA.30L.1 - LTE Device Active Mode Testing - TRP (North America)  
CSA.30L.2 - LTE With Backup Device Active Mode Testing - (North America)  
CSA.30L.3 - LTE Device Active Mode Testing - TRP (Global)

**Item:**

- Test in Taoglas 3D anechoic chamber - Full CTIA/PTCRB TRP 2 Cellular & 2 LTE Bands (by Carrier) USA channel analysis.
- EU channels optional.
- If fail consult with sales for custom solution

**Time:** 1-3 Weeks

### Code: CSA.31

**Title:** Cellular Device Active Mode Testing - TIS (2 bands)

**Deliverables:** Report

**Item:**

- Test in Taoglas 3D anechoic chamber - Full CTIA/PTCRB TIS (850/1900MHz) USA channel analysis
- EU channels optional
- If fail consult with Noise Control Division

**Time:** 2 days

### Code: CSA.31L

**Title:** LTE Device Active Mode Device Testing - TIS (4 bands)

**Deliverables:** Report

**Variables:** CSA.31L.1 - LTE Device Active Mode Testing - TIS (North America)  
CSA.31L.2 - LTE With Backup Device Active Mode Testing - TIS (North America)  
CSA.31L.3 - LTE Device Active Mode Testing - TIS (Global)

**Item:**

- Test in Taoglas 3D anechoic chamber - Full CTIA/PTCRB TIS 2 Cellular & 2 LTE Bands (by Carrier) USA channel analysis
- EU channels optional
- If fail consult with Noise Control Division

**Time:** 1 week

### Code: CSA.32

**Title:** Cellular Device Radiated Spurious Emissions Testing for PTCRB (2 bands)

**Deliverables:** Report

**Item:**

- Test in 3D RSE anechoic chamber Full CTIA/PTCRB RSE-Traffic Mode Analysis (Global frequencies required)
- Test in 3D RSE anechoic chamber Full CTIA/PTCRB RSE-Idle Mode Analysis (Global frequencies required).
- If fail consult with Noise Control Division

**Time:** 1 week

\* Please check services on website as they are subject to change.

# Services

## CSA Service Packages

**Code: CSA.32L**

**Title:** LTE Device Radiated Spurious Emissions Testing for PTCRB (4 bands)

**Deliverables:** Report

**Item:**

- Test in 3D RSE anechoic chamber Full CTIA/PTCRB RSE-Traffic Mode Analysis (Global frequencies required)
- Test in 3D RSE anechoic chamber Full CTIA/PTCRB RSE-Idle Mode Analysis (Global frequencies required).
- If fail consult with Noise Control Division

**Time:** 2 weeks

**Code: CSA.33**

**Title:** Cellular Device Radiated Spurious Emissions Testing for Europe (2 bands)

**Deliverables:** Report

**Item:**

- Test in 3D RSE anechoic chamber Full RSE-Traffic Mode Analysis per EN301511 compliant to R&TTE.
- Test in 3D RSE anechoic chamber Full RSE-Idle Mode Analysis per EN301511 compliant to R&TTE.
- If fail consult with Noise Control Division

**Time:** 1 week

**Code: CSA.33L**

**Title:** LTE Radiated Spurious Emissions Testing for Europe (4 bands)

**Deliverables:** RSE Compliance Report

**Item:**

- Test in anechoic chamber Active-mode RSE test per EN 301 511
- Test in anechoic chamber Idle-mode RSE test per EN 301 511
- If fail consult with Noise Control Division

**Time:** 2-3 weeks

**Code: CSA.34**

**Title:** Cellular Device Radiated Spurious Emissions Pre-Testing for Europe (2 bands)

**Deliverables:** RSE Compliance Report

**Item:**

- Test in anechoic chamber Active-mode RSE test per EN 301 511
- If fail consult with Noise Control Division

**Time:** 1 week

# Services

## CSA Service Packages

### Code: CSA.36

**Title:** LTE Only Device Active Mode Testing- TRP (2 Bands)

**Deliverables:** Report

**Item:**

- Test in Taoglas 3D anechoic chamber - Single-carrier, Two-band TRP channel analysis

**Time:** 1 week

### Code: CSA.37

**Title:** LTE Only Device Active Mode Testing- TIS (2 bands)

**Deliverables:** Report

**Item:**

- Test in Taoglas 3D anechoic chamber - Single-carrier, Two-band TIS channel analysis

**Time:** 1 week

### Code: CSA.50

**Title:** Custom Cellular Antenna Design (North America)

**Deliverables:** Report and prototypes

**Variables:** CSA.50.1 - Custom Cellular Antenna Design (North America)-Embedded Flex/Metal/PCB  
CSA.50.2 - Custom Cellular Antenna Design (North America)-Existing Embedded Ceramic  
CSA.50.3 - Custom Cellular Antenna Design (North America)-New Form Factor Embedded Ceramic  
CSA.50.4 - Custom Cellular Antenna Design (North America)-Embedded MIMO LTE - M2M  
CSA.50.5 - Custom Cellular Antenna Design (North America)-Embedded MIMO LTE - Consumer Electronics  
CSA.50.6 - Custom Cellular Antenna Design (North America)-Existing External Antenna  
CSA.50.7 - Custom Cellular Antenna Design (North America)-New Form Factor External Antenna

**Item:**

- Test and/or simulate different antenna technologies, topologies and material
- Antennas will be tested in different locations / positions  
Selection of the best solution will be based on overall performance and project targets (price, certification, performance etc)
- Device transmit strength optimization in 3d anechoic RF test chamber
- Active device impedance mismatch-check and correction if required
- 5 custom antenna prototypes
- Mechanical Drawing
- Final antenna position and integration method  
Return Loss, VSWR, Average Gain, Efficiency, Peak Gain, Radiation Patterns, TRP measurements

**Time:** 6-8 weeks

\* Please check services on website as they are subject to change.

## Services

### CSA Service Packages

**Code:** CSA.51

**Title:** Custom Cellular Antenna Design Regional

**Deliverables:** Report and prototypes

**Variables:** CSA.51.1 - Custom Cellular Antenna Design Regional (excl. North America)-Embedded Flex/Metal/PCB  
 CSA.51.2 - Custom Cellular Antenna Design Regional (excl. North America)-Existing Embedded Ceramic  
 CSA.51.3 - Custom Cellular Antenna Design Regional (excl. North America)-New Form Factor Embedded Ceramic  
 CSA.51.4 - Custom Cellular Antenna Design Regional (excl. North America)-Embedded MIMO LTE  
 CSA.51.5 - Custom Cellular Antenna Design Regional (excl. North America)-Existing External Antenna  
 CSA.51.6 - Custom Cellular Antenna Design Regional (excl. North America)-New Form Factor External Antenna

**Time:** 6-8 weeks

**Code:** CSA.70

**Title:** Cellular RSE and TIS Mitigation Analysis

**Deliverables:** Report of Tests Done Modified Copy of Hardware if possible

**Item:**

- Detailed analysis of implemented hardware and all design files
- Reproduce problem with callbox and anechoic chamber
- Interference Frequency Analysis
- Interactive mitigation experiments to existing hardware
- Report of experiments, results and recommended changes

**Time:** 3-9 weeks

**Code:** CSA.71

**Title:** RF Interference Mitigation for Audio

**Deliverables:** Report

**Item:**

- Detailed analysis of implemented hardware and all design files
- Report with recommended changes for long term design fix
- Addition of RF shielding material on prototypes to attempt short term fix

**Time:** 1 week



# Services

## ISM Service Packages

**Code:** ISM.10

**Title:** Existing ISM Device Passive Mode Antenna Testing

**Deliverables:** Report

**Item:**

- Test existing antenna passive performance in 3D test chamber
- Return Loss, Average Gain, Efficiency, Peak Gain, Radiation Patterns
- Gerber review for impedance match

**Time:** 3 days

**Code:** ISM.20

**Title:** Custom ISM Antenna Design

**Deliverables:** Report and prototypes

**Variables:** ISM.20.1 - Custom ISM Antenna Design-Embedded Flex/Metal/PCB  
ISM.20.2 - Custom ISM Antenna Design-Existing Embedded Ceramic  
ISM.20.3 - Custom ISM Antenna Design-New Form Factor Embedded Ceramic  
ISM.20.4 - Custom ISM Antenna Design- Existing External Antenna  
ISM.20.5 - Custom ISM Antenna Design-New Form Factor External Antenna

**Item:**

- 5 custom antenna prototypes
- Mechanical Drawing
- Final antenna position and integration method
- Return Loss, VSWR, Average Gain, Efficiency, Peak Gain, Radiation Patterns

**Time:** 6-8 weeks

\* Please check services on website as they are subject to change.

# Services

## GSA Service Packages

**Code:** GSA.10

**Title:** Existing Satellite Device Passive Mode Antenna Testing

**Deliverables:** Report

**Item:**

- Test existing antenna passive performance in 3D test chamber
- Test existing antenna active gain and noise figure
- Return Loss, Axial Ratio, Average Gain, Efficiency, Peak Gain, Radiation Patterns

**Time:** 3 days

**Code:** GSA.20

**Title:** Existing GPS Antenna Product Customization

**Deliverables:** Report and prototypes

**Variables:** GSA.20.1 - Custom Satellite Antenna Design-Embedded Flex/Metal/PCB  
 GSA.20.2 - Custom Satellite Antenna Design-Existing Embedded Ceramic  
 GSA.20.3 - Custom Satellite Antenna Design-New Form Factor Embedded Ceramic  
 GSA.20.4 - Custom Satellite Antenna Design-Embedded MIMO LTE  
 GSA.20.5 - Custom Satellite Antenna Design-Existing External Antenna

**Item:**

- 5 custom antenna prototypes
- Mechanical Drawing
- Transmission line review
- Final antenna position and integration method
- Matching circuit when applicable
- Return Loss, VSWR, Average Gain, Efficiency, and Peak Gain
- Gerber Layout

**Time:** 4-6 weeks

**Code:** GSA.30

**Title:** GPS Device Active Mode Radiated Receive Sensitivity Testing

**Deliverables:** Report

**Item:**

- Measurement of conducted receive sensitivity
- Measurement of radiated receive sensitivity
- A high sensitivity spectrum analyzer sweep of the GPS band and surrounding frequencies from the antenna
- Comparison of radiated receive sensitivity to reference devices
- Recommendations to maximize performance

**Time:** 2 weeks

**Code:** GSA.60

**Title:** GNSS Antenna Circuit Design on Mainboard

**Deliverables:** Report, Schematics, Bill of Materials

**Item:**

- Active receive front-end circuitry design
- Low-Noise Amplifier and Band-pass Filters
- Integration onto customer main board
- Transmission line layout
- Circuit Test Report

**Time:** 2 weeks

# Services

## NSA Service Packages

### Code: NSA.10

**Title:** NFC Antenna Integration with an NFC IC

**Deliverables:** Antenna Integration and Performance Report

**Item:**

- Selection of the best NFC antenna to use on the device
- Matching circuit diagram (if needed)
- Cable routing diagram, antenna placement and mounting as well as any relevant information about antenna integration
- Selection of ferrite flux director material to improve interrogation distance when placing antenna on metal
- NFC Antenna installed on a customer device prototype board
- Documentation of interrogation distances tests.

**Time:** 3 Weeks

### Code: NSA.20

**Title:** Custom NFC Antenna Design

**Deliverables:** Custom NFC Antenna Design

**Item:**

- Active NFC performance testing in Taoglas lab
- Test against multiple targets
- Test report of device performance

**Variables:** NSA.20.1 Custom NFC Antenna Design - Embedded Flex  
NSA.20.2 Custom NFC Antenna Design - Embedded Bobbin Coil

**Time:** NSA 20.1 = 6-8 Weeks  
NSA 20.2 = 12 Weeks

### Code: NSA.30

**Title:** Active-Mode NFC Device Performance Testing

**Deliverables:** NFC Performance Report

**Item:**

- Active NFC performance testing in Taoglas lab
- Test against multiple targets
- Test report of device performance

**Time:** 2 Weeks

\* Please check services on website as they are subject to change.

## Services

### Service Packages

#### Noise Control Division (NCD)

Location: Taoglas USA Inc (San Diego)

#### Introduction

As winning antenna providers, Taoglas have been involved in the success of many different M2M devices over the past ten years. We have learned a lot about M2M applications and how to design RF systems and hardware that works. Everyday we actually share that knowledge with you and help you make your design a success, quickly. We want to extend our value, by not just offering an antenna solution, but a fast track to high volume device production so we can all benefit.

#### What does the Noise Control Division (NCD) do?

In addition to our comprehensive range of antenna products and services Taoglas also offers additional solutions in the RF, and more specifically, noise control area. This means eliminating (or suppressing) noise or more importantly "in band" noise that may cause a performance compromise, or certification challenges.

#### When would I need the Taoglas NCD?

When you have challenges getting your device to market from a wireless functionality standpoint. Maybe you have reception, TIS or RSE issues. Taoglas NCD is required when you know the antenna is good and the module is certified, but you can not find the reason why your device is not passing certification, or is not

doing what it is supposed to do. The problem is often in-band noise, meaning you have emissions at the cellular frequencies being re-radiated back into the cellular module. Obviously a great antenna makes the problem worse!

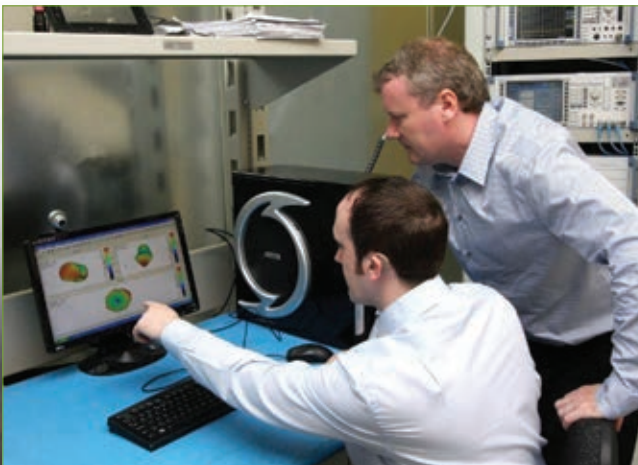
#### How can Taoglas NCD help?

Let's not make the antenna worse, let's make the device better! We have the equipment and experience to identify where the noise may be originating from and either eliminate the noise or prevent the noise from getting to the antenna. Identifying the source of the problem is the biggest challenge. Taoglas NCD has the equipment, expertise and experience to help you design your product better and quicker.

#### What next?

Please consult with Taoglas NCD to see how we can help design your product better and get to production quicker!

Tel: +1 858 450 0888 and ask for NCD  
or Dermot O'Shea  
Email: [ncd@taoglas.com](mailto:ncd@taoglas.com)





# External Screw Mounts

## Profiles and Available Combinations

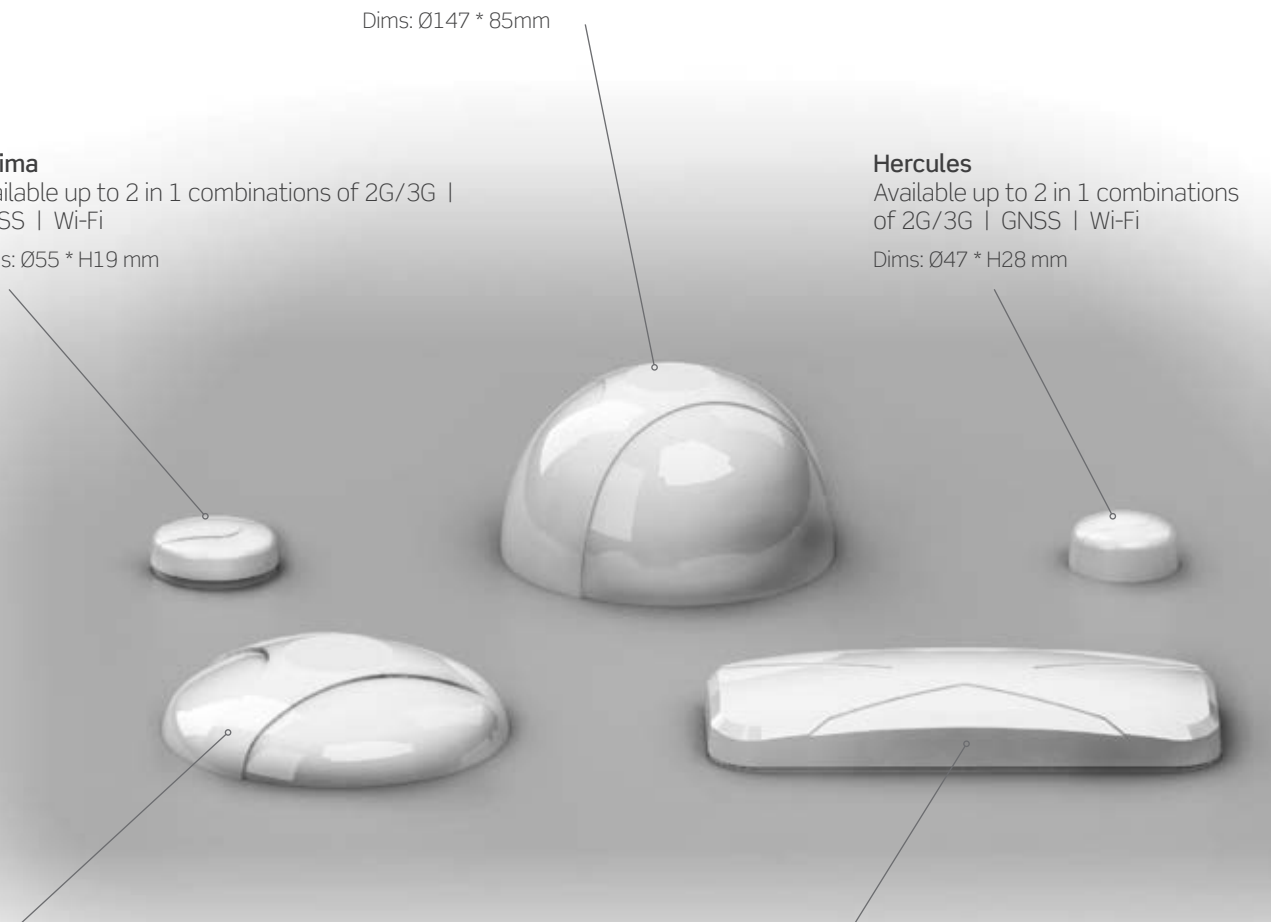
**Pantheon**  
Available up to 5 in 1 combinations of  
2G/3G/4G MIMO | GNSS | Wi-Fi MIMO | Iridium | ISM  
Dims: Ø147 \* 85mm

**Ultima**  
Available up to 2 in 1 combinations of 2G/3G |  
GNSS | Wi-Fi  
Dims: Ø55 \* H19 mm

**Hercules**  
Available up to 2 in 1 combinations  
of 2G/3G | GNSS | Wi-Fi  
Dims: Ø47 \* H28 mm

**Spartan**  
Available up to 3 in 1 combinations of 2G/3G |  
GNSS | Wi-Fi | Iridium | ISM  
Dims: Ø147.5 \* H35 mm

**Storm**  
Super Low-profile Vandal Resistant Housing  
Available up to 6 in 1 combinations of  
2G/3G | GNSS | Wi-Fi MIMO | Iridium | ISM  
Dims: L216 \* W93 \* H30 mm



**Ireland**

Unit 5 Kilcannon Business Park  
Old Dublin Road, Enniscorthy,  
Y21 XW56, Co. Wexford, Ireland  
+353 53 9169500  
emeasales@taoglas.com

**Taiwan**

No.2-2, Ln. 66, ZhongShan 1st Rd.  
Bade City, Taoyuan County 33454,  
Taiwan, ROC  
+886 3 3681223

**United States - CA**

8375 Camino Santa Fe, Suite A,  
San Diego, CA 92121, USA  
+1 858 450 0888  
nasales@taoglas.com

**United States - MN**

530 N 3rd St. Suite B10,  
Minneapolis, MN 55401-1256, USA  
+1 858 450 0888  
nasales@taoglas.com

**Germany**

Taoglas GmbH  
Erika-Maa-Straße 19-25,  
80636 München,  
Germany  
+49 89 3803 7426  
emeasales@taoglas.com

Taiwan  
ISO 9001:2008  
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ISO 9001:2008  
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