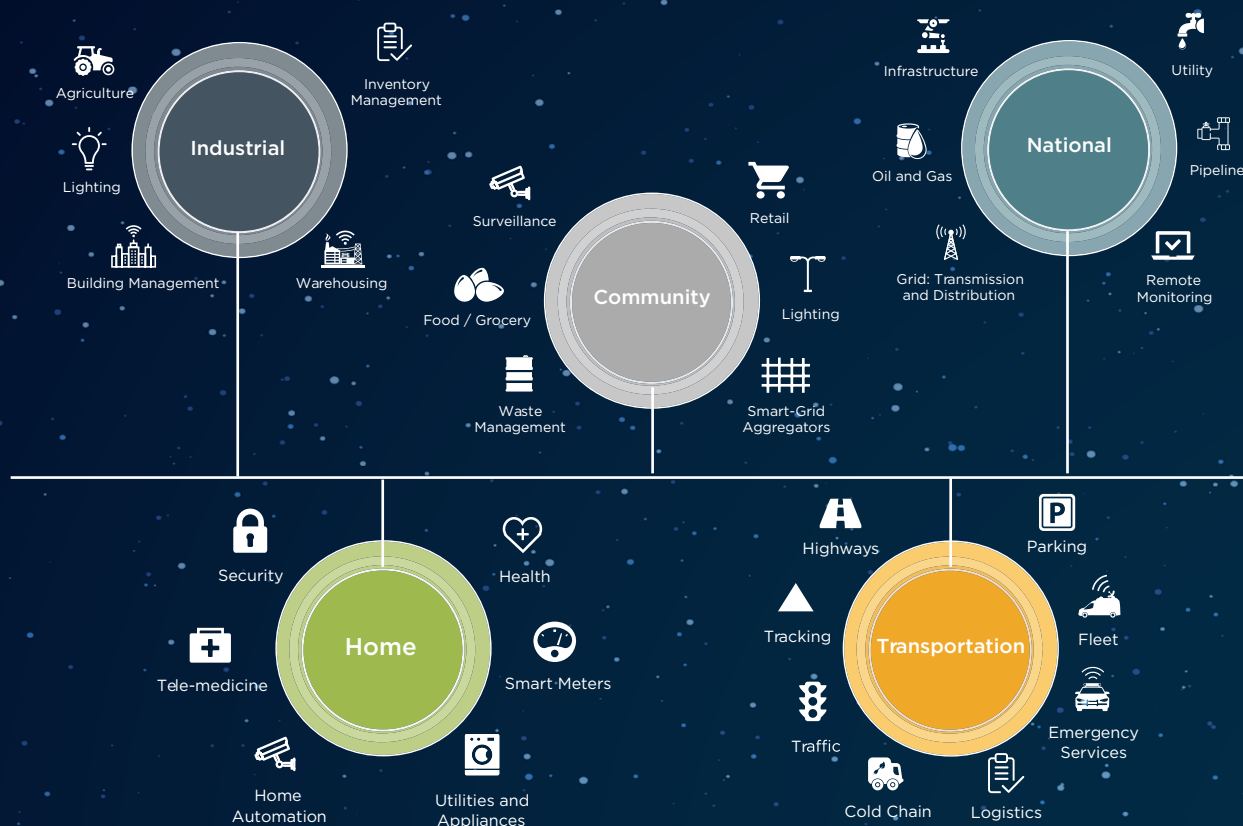




ANTENNAS & SOLUTIONS FOR IoT



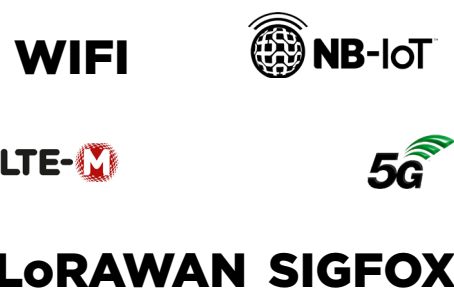
The IoT is about Connecting Everything - And We've Got the Tools to Connect It

In every industry and in every application, wireless connectivity is the business-critical upgrade driving the world's cutting edge products and services. In retail, smart metering, remote monitoring, transportation, public safety, and everything in between, getting data to the cloud and enabling sense and control on the ground is critical to satisfying customer demand and enabling smarter products that produce previously-impossible results. The right IoT antenna isn't just nice to have - it's critical to robust, cutting-edge next generation products that perform reliably in the field, no matter what.

Our 7+ decades of wireless design experience has produced a rich portfolio of IoT antennas that excel in their applications, whether they be internal, vehicle-mounted, infrastructure-based, and more. We're a leader in rugged, high-performance antennas that serve countless niche applications, so you will have the best fit for your specific applications. They're available in indoor or outdoor enclosures, with fully customizable cable and connector options, and supporting multi-frequency applications for some of today's most ambitious IoT designs.

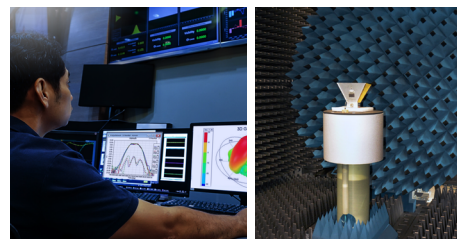
This brochure includes a selection of some of our most popular IoT products.

Today's smart applications are powered by several unique wireless protocols, each of which feature unique strengths and capabilities. Each brings something to the table: Bluetooth and Wi-Fi for gathering local data; LoRaWAN to route data to the cloud over low-power WAN; cellular 4G/5G/LTE-M for nationwide blanket coverage; FirstNet wireless network to support voice and data in public safety. Every problem has an ideal solution, and our wide range of IoT antennas can get critical data where it needs to go.



Antenna Services

Our decades of experience in antenna integration, optimizing antenna performance, and endless customization make us a leading authority on antennas. Antenna designs need expert consideration and testing to produce designs that perform and last. Rely on us for the antenna support to address the performance you need and products you can depend on.



Stick Dipoles & Monopoles

Range of swivel and fixed dipole and monopole solutions with gain levels up to 6dBi. Extensive options exist for various frequency bands, connector types, fixed vs swivel, and weatherproofing levels. Our most popular are the following:



Our Connectivity Family	Wireless Type	Frequency (MHz)	Connector Type	Description
DBA6927C1-FSMAM	Cellular	698-2700	SMA	LTE Swivel Dipole
DBA6927C1-FTNCM	Cellular	698-2700	TNC Male	LTE Swivel Dipole
DBA6927C1-FRNCM	Cellular	698-2700	RP-TNC Male	LTE Swivel Dipole
RD2458-5-SMA	Wi-Fi, BT/BLE, Zigbee	2400-2500 / 5100-5925	SMA Male	High Performance Swivel Dipole
RD2458-5-RSMA	Wi-Fi, BT/BLE, Zigbee	2400-2500 / 5100-5925	TNC Male	High Performance Swivel Dipole
RD2458-5-RTNC	Wi-Fi, BT/BLE, Zigbee	2400-2500 / 5100-5925	RP-TNC Male	High Performance Swivel Dipole
001-0001	Wi-Fi, BT/BLE, Zigbee	2400-2500	RP-SMA Male	Stubby Swivel Dipole
001-0009	Wi-Fi, BT/BLE, Zigbee	2400-2500 / 5150-5850	RP-SMA Male	Stubby Swivel Dipole
001-0010	Wi-Fi, BT/BLE, Zigbee	2400-2500	RP-SMA Male	Stubby Swivel Dipole (IP67)
001-0012	Wi-Fi, BT/BLE, Zigbee	2400-2500 / 4910-5850	RP-SMA Male	Stubby Swivel Dipole (IP67)
EXD312SM	ISM 315	312-318	SMA	Stubby Flexible Monopole
EXD420SF*	ISM 433	420-450	SMA Female	Stubby Flexible Monopole
EXD420SM*	ISM 433	420-450	SMA Male	Stubby Flexible Monopole
EXC821SM*	ISM868	821-902	SMA Male	Flexible Monopole
EXE821SM*	ISM868	821-902	SMA Male	Flexible Monopole
001-0002	ISM 915	902-928	RP-SMA Male	Swivel Dipole
001-0011	ISM 915	902-928	RP-SMA MALE	Swivel Dipole
EXC902SM*	ISM 915	902-960	SMA	Flexible Monopole

* Various connector options available

Gar Multi-port Antennas

Our Gar VFX69383x antenna is a multi-port, multi-band solution to support a complete communications hub. The Gar family offers up to 5 different port assignments including, MIMO and multiple ports of LTE, Wi-Fi, GNSS & GPS. It features an attractive IP67 low-profile aerodynamic housing that makes it a fantastic choice for many outdoor applications such as haulage, transportation or remote monitoring.



Our Connectivity Family	No. of Ports	Port Type	Frequency (MHz)	VSWR	Isolation (dB)	Peak Gain (dBi)	Cable Type (Length) *	Connector	Color
VFP69383x22JN-518x	5	2x LTE	698- 960/ 1690- 3800	< 2.0:1	-16/-21	1/6/7.2	LMR 100 (5.18 m/17.0 ft)	J or L- SMA male N- Mini UHF	B - Black W - White
		2x Wi-Fi	2400- 2500/ 4900- 6000		-21/-40	3.1/7.5		J- SMA male L- RPSMA male N- RPTNC male	
		GNSS	1559-1606		-42	30	RG174 (5.18 m/17.0 ft)	J or L- SMA male N- TNC male	
VFQ69383x21JN-518L	4	2x LTE	698- 960/ 1690- 3800	< 2.0:1	-19/-24	1.8/7.4	LMR 100 (5.18 m/17.0 ft)	SMA- male	B - Black W - White
		WiFi	2400- 2500/ 4900- 6000		-34/-49	3.1/7		RPSMA- male	
		GNSS	1559-1606		-27	30	RG174 (5.18 m/17.0 ft)	SMA- male	
VFT69383x11JN-518L	3	LTE	698- 960/ 1690- 3800	< 2.0:1	-36/-30	2.3/7.3	LMR 100 (5.18 m/17.0 ft)	SMA- male	B - Black W - White
		WiFi	2400- 2500/ 4900- 6000		-26/-44	3.9/5.4		RPSMA- male	
		GNSS	1559-1606		-29	30	RG174 (5.18 m/17.0 ft)	SMA- male	
VFT69383x2NJN-518Q	3	2x LTE	698- 960/ 1690- 3800	< 2.0:1	-18/-23	1.3/7.5	LMR 100 (5.18 m/17.0 ft)	SMA- male	B - Black W - White
		GNSS	1559-1606		-24	30	RG174 (5.18 m/17.0 ft)	SMA- male	
VFD69383x1NJN-518Q	2	LTE	698- 960/ 1690- 3800	< 2.0:1	-38/-26	1.9/5.3	LMR 100 (5.18 m/17.0 ft)	SMA- male	B - Black W - White
		GNSS	1559-1606		-24	30	RG174 (5.18 m/17.0 ft)	SMA- male	
VFD69383x2NNN-518R	2	2x LTE	698- 960/ 1690- 3800	< 2.0:1	-18/-24	1.8/7.2	LMR 100 (5.18 m/17.0 ft)	SMA- male	B - Black W - White

Disk Puck Multi-Port

Our disk puck antennas come in a mechanically robust, impact and UV resistant radome and are IP67-rated. These antennas can provide excellent coverage for both fleet and fixed applications.

VH/VL Series - Optimum performance.

VM Series - Wi-Fi Multi-port/MIMO solutions

LPS Series - LTE SISO Low profile puck style antennas



Our Connectivity Family	No. of Ports	Port Type	Frequency (MHz)	VSWR	Isolation (dB)	Peak Gain (dBi)	Cable Type (Length)*	Connector	Color
LPS69223NT-61xxxx	1	LTE	698-960/ 1710-2170	< 3.0:1	*	2.4/4.5	RG316 (0.61 m/2ft)	SMAM - SMA male RTNM - RTNC male	Black
LPS69273NT- 61xxxx	1	LTE			*	2.1/5.4			
LPS69863NT-61xxxx	1	LTE	698-960/ 1690-2700		*	4.0/6.6	LMR100 (0.61 m/2ft)		
VHP69273x22J-518A	5	2x LTE	698- 960/ 1710- 2700	< 2.0:1	-14	4.1/5.9	LMR 195M (5.18 m/17.0 ft)	SMA- male	B - Black W - White
		2x Wi-Fi	2300- 2700/ 4900- 5900		-18	6.2/6.5			
		GNSS	1559-1606		*	30	RG174 (5.18 m/17.0 ft)		
VLQ69273x22N-518A	4	2x LTE	698- 960/ 1710- 2700	< 2.0:1	-14/-19	3.2/4.5	LMR 195M (5.18 m/17.0 ft)	SMA- male	B - Black W - White
		2x Wi-Fi	2300- 2700/ 4900- 5900		-20/-26	5.5/6.3		RPSMA- male	
VLQ69273x21J-518A	4	2x LTE	698- 960/ 1710- 2700	< 2.0:1	-14/-20	3.3/4.6	LMR 195M (5.18 m/17.0 ft)	SMA- male	B - Black W - White
		WiFi	2300- 2700/ 4900- 5900		-23/-27	5.0/5.3		RPSMA- male	
		GNSS	1559-1606		*	30	RG174 (5.18 m/17.0 ft)	SMA- male	
VLT69273x2NJ-518A	3	2x LTE	698- 960/ 1710- 2700	< 2.0:1	-15/-20	2.6/4.7	LMR 195M (5.18 m/17.0 ft)	SMA- male	B - Black W - White
		GNSS	1559 - 1606		*	30	RG174 (5.18 m/17.0 ft)		
VLQ24593xN4N-518x	4	4x WiFi	2400- 2500/ 4900- 5925	<2.0:1	-20/-26	2.2/3.5	LMR 195M (5.18 m/17.0 ft)	B - RPSMA male G - SMA male	B - Black W - White
					-21/-26				
					-20/-26				
					-20/-26				
VMT24493RSM-366	3	3x WiFi	2400- 2500/ 4900- 5875	<2.0:1	*	4.5/5.4	LMR 195 (3.65m/12 ft)	RPSMA- male	Black
VMJ24493B-518RSMM	3	2x WiFi	2400- 2500/ 4900- 5875	<2.0:1	*	1.5/3.0	LMR240 (5.18 m/17.0 ft)	RPSMA- male	Black
		GNSS	1559 - 1606		*	26	RG174 (5.18 m/17.0 ft)		
VMD24493RSM-366	2	2x WiFi	2400- 2500/ 4900- 5900	<2.0:1	*	3.0	LMR240 (3.65m/12 ft)	RPSMA- male	Black

* Various connector options available

MIMO Phantom Antennas

The 2-Port MIMO Phantom antenna is a multi-protocol, wide-bandwidth antenna designed to support the latest and most demanding IoT applications. Supports 2x2 MIMO – choose from cellular, Bluetooth, ISM 868 and 900, Sigfox, LoRaWAN and 2.4 GHz – under an omnidirectional IP67 radome. Our MIMO Phantom antenna offers excellent omni-directional gain with minimum uptilt to optimize coverage, even when installed on small or no ground-plane devices.



Our Connectivity Family	Frequency (MHz)	VSWR	Peak Gain (dBi)	Cable Type (Length)	Connector	Color
MTRA61274Cx2	617-960 MHz & 1350-2700 MHz	<2.5:1	4.2	LMR 195M (610mm / 24 in)	SMA Male	B - Black W - White

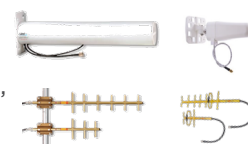
* Various connector options available

High Gain Directional and Omnis

We have a range of infrastructure antennas to establish your IoT network. The families below cover point to point, omnidirectional, directional or sectorial, ceiling and canister antennas.

Yagi Antennas

Our line of high-performance infrastructure Yagi antennas are great for building out the backbone of an IoT deployment. Optimized for long range and reliable connection, they're a robust and reliable antenna for the harshest of environments.



Our Connectivity Family	Frequency (MHz)	Description
PC2415N	2400-2500	Yagi, Enclosed, 13.9 dBi.
PC9013N	902-928	Yagi, 13 dBi, 13 element.
YA9-13	860-960	Yagi, 13 dB, 15 element.

High Gain Outdoor Omni Antennas

Our high gain line of omnidirectional baton antennas pushes infrastructure connectivity to wide-reaching outdoor areas, providing broad coverage for remote locations. Offered with gain as high at +13 dBi.



Our Connectivity Family	Frequency (MHz)	Description
OD24M-12	2400-2485	13dBi Omni, 7 deg. BW, 10 watt.
OD35M-10	3400-3600	10dBi Omni, 14 deg. BW, 10 Watt.
OD9-11	860-960	11dBi Omni, 7 deg. BW, 100 Watt.
OF86315	863-876 / 902-928	5.3 / 5.6 dBi Omni, 28/28 deg BW.
FG9023	902-928	5dBi Omni, 70 deg. BW, 200 Watt.
OC24527-FNF	2400-2500 / 5150-5875	4/7 dBi Omni, 28/15 deg BW, 10W.
OC69421-FNF	698-960 / 1710-4200	2/4 dBi Omni, 75 deg BW, 20W

Directional Panel Antennas

Expand your network coverage with high performance directional antennas. Ideal for applications such as university campus, stadiums, retail and warehousing.



Our Connectivity Family	Frequency (MHz)	Description
PDM245115	2400-2500 / 5150-5900	WLAN Panel, 4-Port MIMO, 15dBi
PSQ24495	2400-2490 / 4900-6000	WLAN Panel, 4-Port MIMO, +/-45 deg. X-POL,
MD24-12	2400-2485	12dBi Dir., 4"x4"x4".
PAV692780	698-960 / 1710-2700	7/8 dBi LTE Dir. Panel,

Multi-Port Canister and Ceiling Mount Antennas

Industry leading low profile ceiling mount and canister antennas can create reliable infrastructure networks for IOT coverage.



Our Connectivity Family	Frequency (MHz)	Description
CMD69423	698 - 4200	LTE 2x2 MIMO, Ceiling Mt.,
OP24516	2400-2500 / 5150-5875	6-Port WLAN, Canister,
S2451DBT	2400-2500 / 5150-5850	6-Port WLAN, Ceiling Mt. Omni.

Phantom Antenna Series

Our single and multi-band Phantom antennas are known industry-wide for their IP67 enclosure, rugged construction and excellent performance. They're the antenna of choice whether you need cellular, LTE M/NB-IoT, ISM868/915, UHF, or Wi-Fi. These antennas offer excellent performance with superior gain across the horizon vs some other antennas. Many Phantom antennas are available for small and no-ground-plane applications.



Our Connectivity Family	Frequency (MHz)	VSWR	Peak Gain (dBi)	Color
TRA(B)3803P	380-400	<2.0:1	0.0	B - Black No B - White
TRA(B)4103P	410-430	<2.0:1	3.0	
TRA(B)4303P	430-450	<2.0:1	3.0	
TRA(B)4503P	450-470	<2.0:1	3.0	
TRA(B)4703P	470-490	<2.0:1	3.0	
TRA(B)4903P	490-512	<2.0:1	3.0	
TRA(B)8213P	821-896	<2.0:1	3.0	
TRA(B)8903P	890-960	<2.0:1	3.0	
TRA(B)9023P	902-928	<2.0:1	0.0	
TRA(B)18503P	1850-1990	<2.0:1	3.0	
TRA(B)58003P	4900-6000	<2.0:1	3.0	
TRA(B)806/17103P	806-960 / 1575.42 / 1710-2500	<2.0:1	5.9/5.1/4.4	
TRA(B)24/49003P	2400-2500 / 4900-5850	<2.0:1	5.7	
TRA6927M3Px-001	698-960 / 1710-2700	<2.5:1	3.5/5.5	B - Black, W - White
TRA6927M3Px-003 (No Logo)	698-960 / 1710-2700	<2.5:1	3.5/5.5	
TRA6927M3PxN-001	698-960 / 1710-2700	<2.5 / <2.0	0 / 2.9	
TRA8063M3Px-001	806-896 / 1850-1990 / 2500-2700	<2.0:1	4.0/3.5/3.0	
HCF69273xN-60A	698-2700	<2.6 / <2.0	1.5 / 3.8	
FTRA6171M5PB-001 (5G)	617 - 7125	<2:1	4.5/5.0/6.0	Black (white optional)
FTRA6971M5PB-001 (5G)	698 - 7125	<2:1	4.3/5.7/6.2	Black (white optional)

Cable Assemblies and Accessories

Our coaxial cable assemblies are engineered for peak performance up to 6 GHz. They are manufactured in one of our state-of-the-art production facilities in either Penang, Malaysia or Schaumburg, Ill. They are tested 100% and certified to meet performance specifications. Equipment manufacturers require certified cable assemblies to minimize system losses to within known parameters and these cable assemblies address those requirements.



Our Connectivity Family	Frequency	Cable Type	Connector Options	Description
MicroCoax	DC to 6GHz	0.81mm Dia., 1.13mm Dia., and others.	u.FL/MHF1; w.FL/MHF4; SMA, RP-SMA, Bulkhead	-40 to +85 C; Waterproof models available.
CA178	700 MHz- 6 GHz	LMR100-Equiv., RG58/U, RG178, LMR400-Equiv.	N-Fem., N-Male(Bulkhead), SMA, RP-SMA, TNC, R/A-SMA, U.FL, MCX, and others.	-40 to +125 C; Waterproof models available.
CA195, CAN, CAS	450 MHz- 6 GHz	RG-58 "Ultralink", LMR195-Equiv., RG316, WBC240 (LMR240-Equiv.)	N-Male, N-Male (Bulkhead), SMA, RP-SMA, BNC, and others.	High Performance, Extensive combinations available.

TECHNICAL SUPPORT CENTER

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