



# EMBEDDED ANTENNA PRODUCT OVERVIEW



# SYNZEN

PRECISION TECHNOLOGY LTD

CELLULAR 2G/3G/4G/5G | LTE CAT-M | NB-IoT | WIFI | BLE | ISM/LoRa | GNSS | UWB





## ABOUT SYNZEN

Synzen specializes in designing active and passive antennas for the Automotive, Medical and IoT markets. Whether you are looking for a standard antenna, a custom design or additional support for an ongoing project we can help at any stage of your development. We also provide manufacturing services for prototypes and small volume builds.

We have many years of experience designing products across many different industries including fully qualified avionic applications, medical devices, wearables, internet of things (IoT), and wireless communications.

### STANDARD PRODUCT RANGE

Synzen has an ever-growing range of standard embedded active and passive antennas. Products that are designed to work together in multi system devices (co-existence) to ensure the class leading isolation and cross correlation for optimal performance and reliability.

### CUSTOM DESIGN

For applications where a standard part cannot meet your requirements, we can support you with a bespoke solution. Our free consultation service facilitates multiple discussions to take place to ensure you take the right path for your project development and includes a full initial technical assessment.

We have RF experts / Mechanical engineers and Antenna Designers for all your support needs throughout the complete development process and into mass production.

### FREE SAMPLES

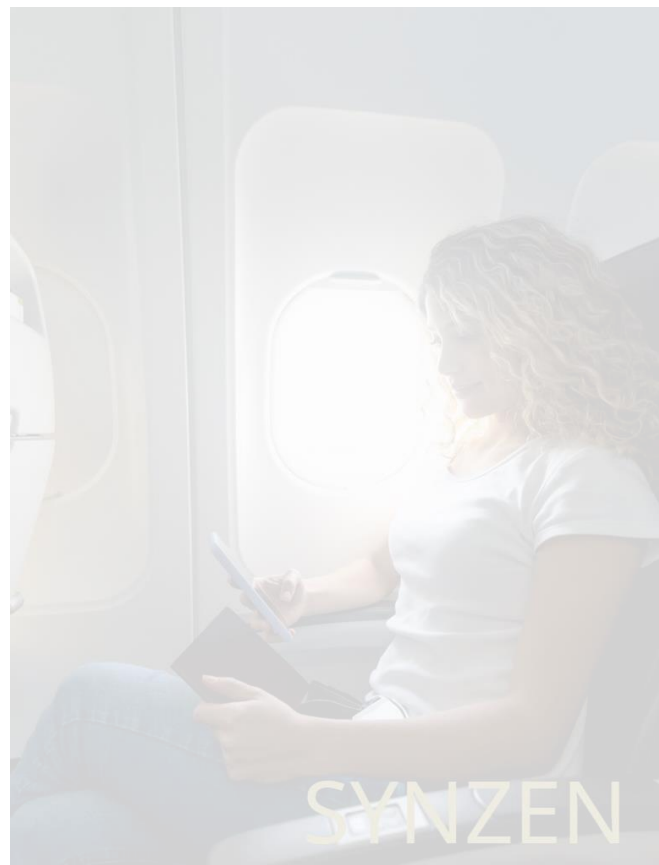
Free standard part samples available at [www.synzen.com.tw](http://www.synzen.com.tw)

### FREE PASSIVE CHAMBER TESTS

Upon engagement using a standard part and having discussed position and layout with you to ensure the design is optimal, we offer a free tuning and test service to fully characterize your device and provide a full test report which includes S11, Efficiency, Gain and full 3D radiated patterns.

### CONTINUED SUPPORT

As well as support for the initial development stages, we will continue to provide support as your design progress to MP including a full check of all design files prior to you building prototypes or final products. We can additionally assist with issues unrelated to the antenna such as noise mitigation and RF Schematic/layout checking services Meetings can be setup easily and quickly to ensure your project remains on schedule.





## TEST SERVICES

Synzen provides OTA and RF testing of designs to provide verification data as well as support for pre-certification tests.

- Wi-Fi pre-testing and validation
- Cellular OTA pre-certification testing for TRP, TIS and RSE
- Passive chamber tests (Free service when using Synzen products)

### PRE - CERTIFICATION TESTS

- Includes a reduced subset of globally approved certification tests targeting specific areas. Testing can be customized to target specific customer requirements.
- Conforms to the globally approved certification testing process
- Detects common problems and alerts the customer of the need to seek solutions to better prepare for regional / global certification.

**Data Throughput:** Testing to measure achieved data rates of the device under typical network and radio conditions.

**GNSS/A-GNSS Receiver Testing:** Testing to check the operation of the assisted global navigation satellite system (A-GNSS) within the device. GNSS simulation systems to check the device TTFF and accuracy of the given receiver.

**Carrier Aggregation (CA):** Pre-certification testing to measure the capability and performance of the device to combine multiple carriers scattered around the LTE spectrum to achieve wider effective bandwidths up to 100 MHz

**Over-the-Air (OTA) Antenna Performance:** Pre-certification testing to measure the radiated RF performance of the device's multiple antennas for all supported bands and technologies under typical network and radio conditions.





## ANTENNA OVERVIEW

	SMD	FPC/FR4 with Cable	Through Hole / Blade
<b>5G/4G/3G/2G/NB-IoT</b>	SZP-C-0L02 ( <b>OPALA</b> ) SZP-C-0L09 ( <b>PROCYON a</b> ) SZP-C-0L10 ( <b>PROCYON b</b> ) SZP-C-1C02 ( <b>TAU1</b> ) SZP-C-1C03 ( <b>TAU2</b> )	SZK-C-1L14 ( <b>ARCTURUS</b> ) SZK-C-0L05 ( <b>ANTARES</b> ) SZK-C-0L04 ( <b>LALANDE</b> ) SZK-C-0L06 ( <b>AVICI</b> ) SZK-C-1L08 ( <b>PERSEI</b> ) SZK-C-1L07 ( <b>PEGASI</b> )	
<b>2G</b>	SZP-C-0C01 ( <b>CETI</b> )		
<b>ISM/LoRa</b>	SZP-C-0M01 ( <b>VEGA</b> )	SZK-C-0M02 ( <b>CYGNI a</b> ) SZK-C-0M04 ( <b>CYGNI b</b> ) SZK-C-0M05 ( <b>SERPENTIS1</b> ) SZK-C-0M06 ( <b>SERPENTIS2</b> )	
<b>GNSS</b>	SZP-C-0G02 ( <b>LODESTAR</b> ) SZC-N-0G06 ( <b>ARIETIS a</b> ) SZC-N-0G07 ( <b>ARIETIS b</b> ) SZC-N-0G08 ( <b>ARIETIS c</b> ) SZC-N-0G09 ( <b>ARIETIS d</b> ) SZC-N-0G13 ( <b>POLARIS</b> )	SZK-C-0G04 ( <b>ZETA</b> )	SZC-N-0G10 ( <b>ARCADY b</b> )
<b>Wi-Fi/BLE</b>	SZP-C-0W01 ( <b>AULIN</b> ) SZP-C-0W02 ( <b>SIRIUS a</b> )	SZK-C-0W03 ( <b>AQUARIUS</b> ) SZK-C-0W07 ( <b>WOLF</b> ) SZK-C-0W08 ( <b>MIRA</b> ) SZK-C-1W09 ( <b>AGENA</b> ) SZK-C-1W10 ( <b>HYDRUS</b> )	
<b>UWB</b>	SZP-C-0U01 ( <b>RIGEL</b> )		

	SMD
<b>Active GNSS</b>	SZA-C-0G01 ( <b>CENTAURI</b> ) SZA-C-0G03 ( <b>PROXIMA</b> )

	Terminal Type
<b>5G/4G/3G/2G; Wi-Fi 6E</b>	SZW-N-1L15 ( <b>TELESTO</b> ) SZW-N-1L16 ( <b>ATLAS</b> ) SZW-N-1L17 ( <b>TITAN</b> )
<b>ISM/LoRa</b>	SZW-N-1M07 ( <b>PROTEUS</b> ) SZW-N-1M08 ( <b>TRITON</b> )
<b>Wi-Fi 6E/5/BLE</b>	SZW-N-1W13 ( <b>LARISSA</b> )



## 5G / 4G LTE / 3G / 2G / NB-IoT APPLICATIONS

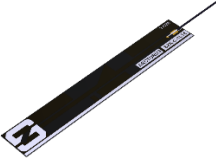


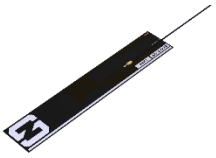
### SURFACE MOUNT DEVICE

Name	Part Number	Dimensions (mm)	Frequency (MHz)	Efficiency %	Peak Gain (dBi)
<b>PROCYON a</b> 	SZP-C-0L09	30.0 x 7.0 x 3.3	698-960 1710-2200 2300-2400 2500-2690	>50 >60 >60 >50	1.20 3.10 2.50 3.20
<b>PROCYON b</b> 	SZP-C-0L10	30.0 x 7.0 x 3.3	698-960 1710-2200 2300-2400 2500-2690	>50 >60 >60 >50	1.20 3.10 2.50 3.20
<b>OPALA</b> 	SZP-C-0L02	32.8 x 9.6 x 3.3	698-960 1710-2200 2300-2400 2500-2690	>50 >55 >50 >50	1.50 3.40 2.70 1.50
<b>TAU1</b> 	SZP-C-1C02	26.0 x 6.0 x 1.7	791-960 1710-2200 2300-2400 2500-2690	>55 >55 >60 >65	1.14 2.99 2.67 3.00
<b>TAU2</b> 	SZP-C-1C03	26.0 x 6.0 x 1.7	791-960 1710-2200 2300-2400 2500-2690	>55 >55 >60 >65	1.14 2.99 2.67 3.00
<b>CETI</b> 	SZP-C-0C01	25.0 x 10.0 x 3.3	824-960 1710-1990	>50 >55	0.60 2.40



## 5G / 4G LTE / 3G / 2G / NB-IoT APPLICATIONS

### FPC (FLEXIBLE PRINTED CIRCUIT) + CABLE

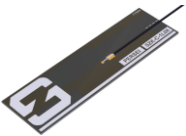

Name	Part Number	Dimensions (mm)	Frequency (MHz)	Efficiency %	Peak Gain (dBi)
<b>ARCTURUS</b> 	SZK-C-1L14	88.0 x 14.0 x 0.2  Cable = 180mm*  IPEX MHFI connector**	617-960	>50	2.80
			1427-1660	>30	1.20
			1710-2200	>60	2.90
			2300-2400	>70	3.20
			2500-2690	>50	3.10
			3400-3800	>45	4.20
			4200-5000	>40	3.10
<b>ANTARES</b> 	SZK-C-0L05	100.0 x 20.0 x 0.2  Cable = 180mm*  IPEX MHFI connector**	617-960	>50	2.60
			1427-1660	>65	3.20
			1710-2200	>65	3.10
			2300-2400	>70	3.70
			2500-2690	>70	4.50
			3400-3800	>70	4.40
			4200-5000	>30	5.50
<b>LALANDE</b> 	SZK-C-0L04	69.0 x 20.0 x 0.2  Cable = 150mm*  IPEX MHFI connector**	698-960	>60	2.30
			1710-2200	>70	2.60
			2300-2400	>65	2.90
			2500-2690	>65	3.50
<b>AVICI</b> 	SZK-C-0L06	110.0 x 20.0 x 0.2  Cable = 150mm*  IPEX MHFI connector**	698-960	>60	2.30
			1710-2200	>70	2.60
			2300-2400	>65	2.90
			2500-2690	>65	3.50

\*Custom cable lengths available upon request. \*\*Alternate connectors available upon request



## 5G / 4G LTE / 3G / 2G / NB-IoT APPLICATIONS

### FR4 + CABLE




Name	Part Number	Dimensions (mm)	Frequency (MHz)	Efficiency %	Peak Gain (dBi)
<b>PERSEI</b> 	SZK-C-1L08	110.0 x 20.0 x 0.6	698-960	>60	2.30
		Cable = 150mm*	1710-2200	>70	2.60
		IPEX MHFI connector**	2300-2400	>65	2.90
			2500-2690	>65	3.50
<b>PEGASI</b> 	SZK-C-1L07	69.0 x 20.0 x 0.6	617-960	>50	2.60
		Cable = 180mm*	1427-1660	>65	3.20
		IPEX MHFI connector**	1710-2200	>65	3.10
			2300-2400	>70	3.70
			2500-2690	>70	4.50
			3400-3800	>70	4.40
			4200-5000	>30	5.50

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## 5G / 4G LTE / 3G / 2G / NB-IoT / Wi-Fi 6E APPLICATIONS


### TERMINAL TYPE

Name	Part Number	Dimensions (mm)	Frequency (MHz)	Efficiency %	Peak Gain (dBi)
<b>TITAN</b> 	SZW-N-1L17	135.0 x 21.3 x $\varnothing=13$ SMA (M) Plug connector	617-960 1427-1660 1710-2690 3300-4200 4400-5000 5150-7150	>40 >50 >55 >55 >55 >55	1.00 2.00 2.00 2.00 2.00 2.00
<b>TELESTO</b> 	SZW-N-1L15	160.0 x 21.2 x $\varnothing=13$ SMA (M) Plug connector	617-960 1427-1660 1710-2690 3300-4200 4400-5000 5150-7150	>40 >55 >55 >55 >55 >55	1.00 2.00 2.00 2.00 2.00 2.00
<b>ATLAS</b> 	SZW-N-1L16	205.0 x 25.0 x $\varnothing=13$ SMA (M) Plug connector	617-960 1427-1660 1710-2690 3300-4200 4400-5000 5150-7150	>50 >60 >60 >60 >60 >60	1.00 2.50 2.50 2.50 2.50 2.50

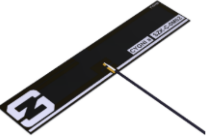
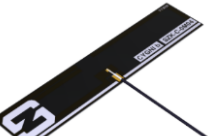

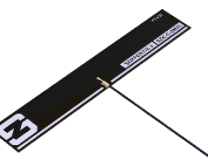


## ISM / LoRa APPLICATIONS

### SURFACE MOUNT DEVICE

Name	Part Number	Dimensions (mm)	Frequency (MHz)	Efficiency %	Peak Gain (dBi)
<b>VEGA</b> 	SZP-C-0M01	1.80 x 0.8 x 0.8	863 - 928	>65	1.20



### FPC (FLEXIBLE PRINTED CIRCUIT) + CABLE

Name	Part Number	Dimensions (mm)	Frequency (MHz)	Efficiency %	Peak Gain (dBi)
<b>CYGNU a</b> 	SZK-C-0M02	70.0 x 15.0 x 0.2 Cable = 100mm* IPEX MHFI connector**	902 - 928	>60	1.20
<b>CYGNU b</b> 	SZK-C-0M04	70.0 x 15.0 x 0.2 Cable = 100mm* IPEX MHFI connector**	863-870	>70	1.21
<b>SERPENTIS 1</b> 	SZK-C-0M05	88.0 x 15.0 x 0.2 Cable = 180mm* IPEX MHFI connector**	410-427 430-435 450-467	>30 >45 >30	-3.00 -2.90 -3.00
<b>SERPENTIS 2</b> 	SZK-C-0M06	88.0 x 15.0 x 0.2 Cable = 180mm* IPEX MHFI connector**	410-427 430-435	>30 >40	-3.50 -3.00

\*Custom cable lengths available upon request. \*\*Alternate connectors available upon request

## ISM / LoRa APPLICATIONS

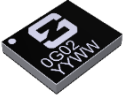
### TERMINAL TYPE

Name	Part Number	Dimensions (mm)	Frequency (MHz)	Efficiency %	Peak Gain (dBi)
<b>PROTEUS</b> 	SZW-N-1M07	202.0 x $\varnothing$ =13 SMA (M) Plug connector	863-870	>70	2.00
<b>TRITON</b> 	SZW-N-1M08	202.0 x $\varnothing$ =13 SMA (M) Plug connector	902 - 928	>70	2.00




## GNSS APPLICATIONS (PASSIVE ANTENNAS)

### SURFACE MOUNT DEVICE

Name	Part Number	Dimensions (mm)	Frequency (MHz)	Efficiency %	Peak Gain (dBi)
<b>LODESTAR</b> 	SZP-C-0G02	6.0 x 5.0 x 0.9	1559-1610	>60	0.5


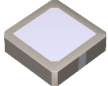
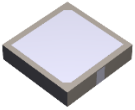
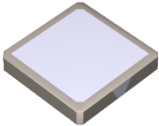
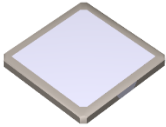
### FPC (FLEXIBLE PRINTED CIRCUIT) + CABLE

Name	Part Number	Dimensions (mm)	Frequency (MHz)	Efficiency %	Peak Gain (dBi)
<b>ZETA</b> 	SZK-C-0G04	40.0 x 10.0 x 0.2 Cable = 100mm* IPEX MHFI connector**	1559-1610	>70	2.00


\*Custom cable lengths available upon request. \*\*Alternate connectors available upon request

## GPS APPLICATIONS (CERAMIC PATCH)

### SURFACE MOUNT DEVICE

Name	Part Number	Dimensions (mm)	Frequency (MHz)	Efficiency %	Peak Gain (dBi)
<b>ARIETIS a</b> 	SZC-N-0G06	12.0 x 12.0 x 4.0	1575.42 ±1.023	>55	2.20
<b>ARIETIS b</b> 	SZC-N-0G07	15.0 x 15.0 x 4.0	1575.42 ±3 1605.0 ±3	>65	2.60
<b>ARIETIS c</b> 	SZC-N-0G08	18.0 x 18.0 x 4.0	1575.42 ±3 1568.0 ±3	>70	3.00
<b>ARIETIS d</b> 	SZC-N-0G09	25.0 x 25.0 x 4.0	1575.42 ±3 1602.0 ±3	>80	3.30
<b>POLARIS</b> 	SZC-N-0G13	25.0 x 25.0 x 2.0	1575.42 ±3 1602.0 ±3	>75	3.00



### THROUGH HOLE

Name	Part Number	Dimensions (mm)	Frequency (MHz)	Efficiency %	Peak Gain (dBi)
<b>ARCADYb</b> 	SZC-N-0G10	18.0 x 18.0 x 4.0	1575.42 ±1.023	>55	2.20





## GNSS APPLICATIONS (ACTIVE ANTENNAS)

### SURFACE MOUNT DEVICE


Name	Part Number	Dimensions (mm)	Frequency (MHz)	Efficiency %	LNA Gain (dB)
<b>CENTAURI</b>  	SZA-C-0G01	9.0 x 7.0 x 1.5	1559-1610	>60	18.5
		<b>Configuration</b>	<b>Power Avg (mA)</b>	<b>Supply (V)</b>	<b>Noise Figure</b>
		ANT→SAW→LNA	4.4	1.5 – 3.1	1.9
<b>PROXIMA</b>  	SZA-C-0G03	9.0 x 7.0 x 1.5	1559-1610	>60	18.2
		<b>Configuration</b>	<b>Power Avg (mA)</b>	<b>Supply (V)</b>	<b>Noise Figure</b>
		ANT→SAW→LNA	1.05	1.1 – 3.6	2.1

## WLAN / BLUETOOTH APPLICATIONS

### SURFACE MOUNT DEVICE





Name	Part Number	Dimensions (mm)	Frequency (MHz)	Efficiency %	Peak Gain (dBi)
<b>AULIN</b> 	SZP-C-0W01	5.0 x 4.0 x 0.9	2400-2500	>60	1.65
<b>SIRIUS a</b> 	SZP-C-0W02	1.6 x 0.8 x 0.8	2400-2500	>75	3.00

### TERMINAL TYPE

Name	Part Number	Dimensions (mm)	Frequency (MHz)	Efficiency %	Peak Gain (dBi)
<b>LARISSA</b> 	SZW-N-1W13	202.0 x $\varnothing$ =13 SMA-Reverse (M) Plug connector	2400-2483 5150-7125	>50 >60	4.00 5.00

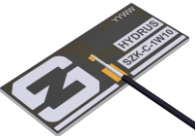
## WLAN / BLUETOOTH APPLICATIONS

### FPC (FLEXIBLE PRINTED CIRCUIT) + CABLE

Name	Part Number	Dimensions (mm)	Frequency (MHz)	Efficiency %	Peak Gain (dBi)
<b>AQUARIU</b> 	SZK-C-0W03	25.0 x 11.0 x 0.2 Cable = 100mm* IPEX MHFI connector**	2400-2500 4900-6000	>65 >65	1.85 5.50
<b>WOLF</b> 	SZK-C-0W07	25.0 x 11.0 x 0.2 Cable = 100mm* IPEX MHFI connector**	2400-2500 4900-5850 5925-7125	>65 >65 >60	1.85 5.50 3.40
<b>MIRA</b> 	SCK-C-0W08	30.0 x 6.0 x 0.2 Cable = 100mm* IPEX MHFI connector**	2400-2500 4900-5850 5925-7125	>70 >60 >70	3.40 4.20 4.85
<b>AGENA</b> 	SZK-C-1W09	75.0 x 20.0 x 0.2 Cables = 100mm* IPEX MHFI connector**	2400-2500 4900-5850 5925-7125	>60 >65 >70	1.50 3.50 4.20

\*Custom cable lengths available upon request. \*\*Alternate connectors available upon request

### FR4 + CABLE


Name	Part Number	Dimensions (mm)	Frequency (MHz)	Efficiency %	Peak Gain (dBi)
<b>HYDRUS</b> 	SZK-C-1W10	25.0 x 11.0 x 0.6 Cable = 100mm* IPEX MHFI connector**	2400-2500 4900-6000	>65 >65	1.85 5.50

\*Custom cable lengths available upon request. \*\*Alternate connectors available upon request

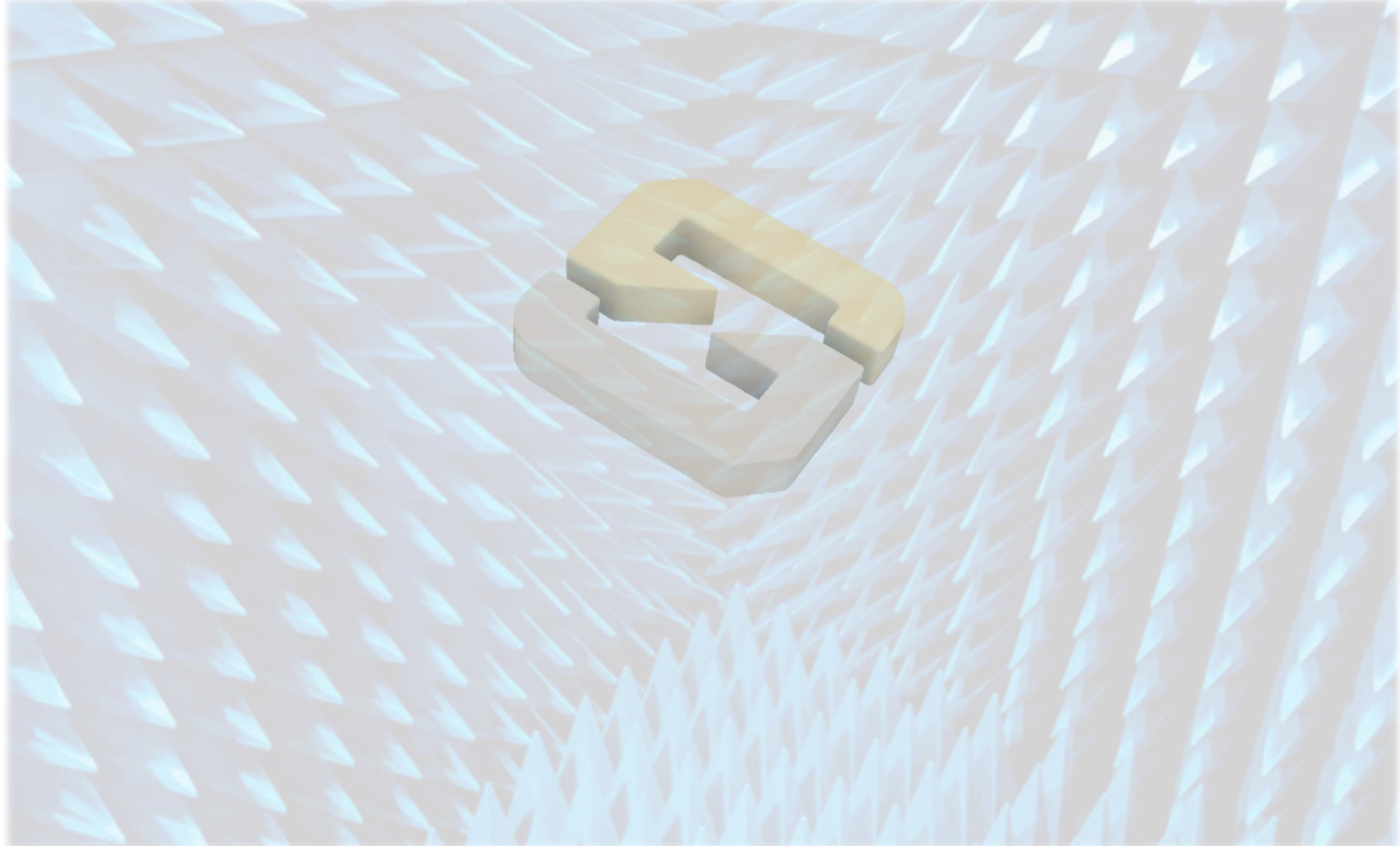


## UWB (ULTRA WIDE BAND) APPLICATIONS

### SURFACE MOUNT DEVICE

Name	Part Number	Dimensions (mm)	Frequency (MHz)	Efficiency %	Peak Gain (dBi)
<b>RIGEL</b> 	SZP-C-0U01	10.0 x 9.0 x 1.7	3200-4800 5900-7000	>80 >70	3.60 1.50





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