

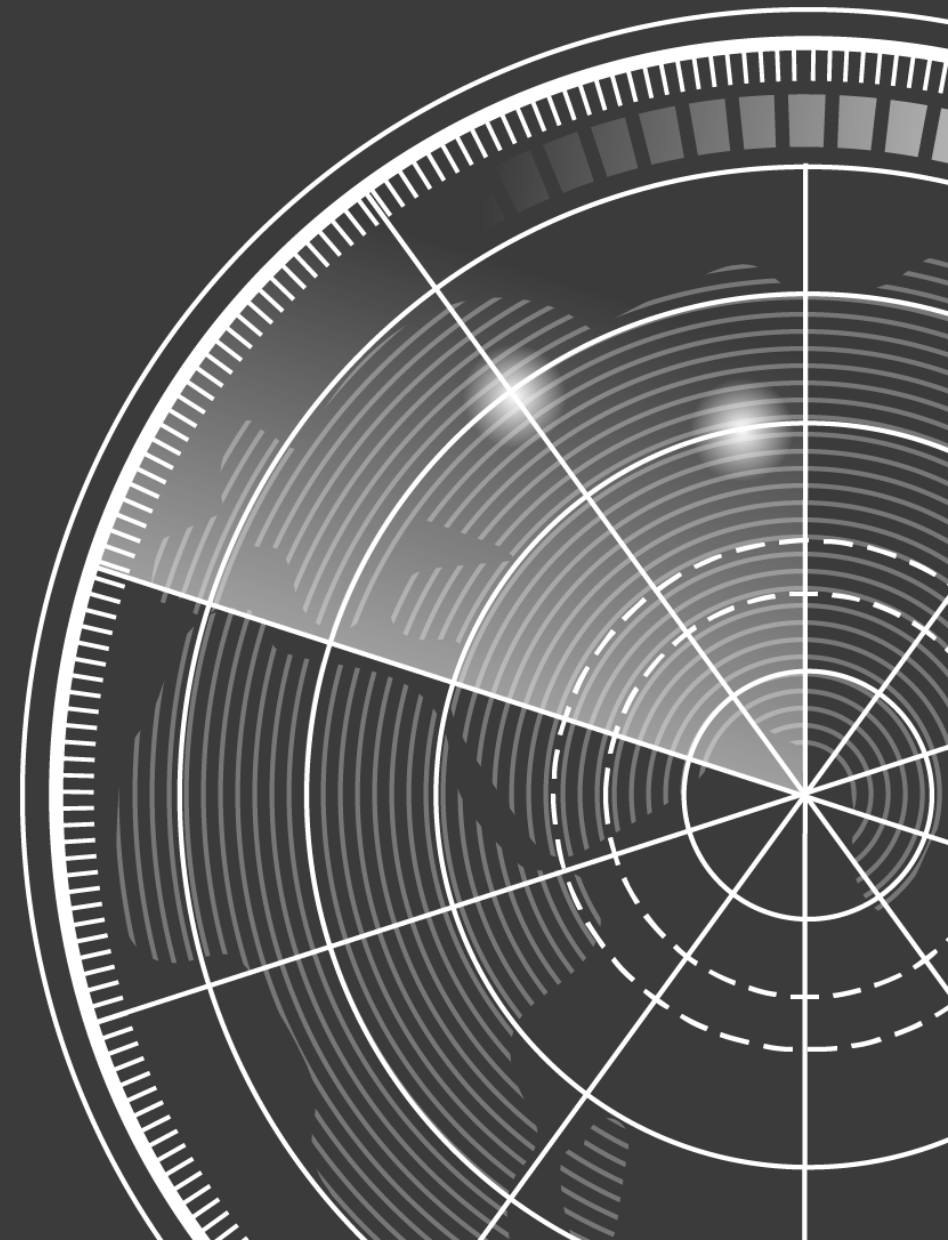
# ERAVANT

NEXT GENERATION MILLIMETERWAVE COMPONENTS

PRODUCTS FOR RADAR  
SYSTEM APPLICATIONS



ERAVANT is supported by TACTRON ELEKTRONIK GmbH & Co. KG



# CONTENTS

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## **INTRODUCTION**

COMMON RADAR BAND SPECTRUM

RADAR SYSTEM SUMMARY

RADAR HEAD TYPES

RADAR HEAD BLOCK DIAGRAMS

STANDARD COMPONENTS

INTERCONNECTION PRODUCTS

SUB-ASSEMBLIES

STANDARD RADAR SENSORS

TEST SETUPS

CONCLUSIONS

## **WEBSITE**

# INTRODUCTION

Eravant designs and manufactures total solutions for microwave and millimeterwave applications covering 10 MHz to 220 GHz.

- **This presentation introduces Eravant's standard product offering for Radar system applications.**
- **In fact, the most Eravant products are ready to be used for any Radar system application.**
- Our full product offering, including Limited Run Models, are listed on our website at [www.eravant.com](http://www.eravant.com).

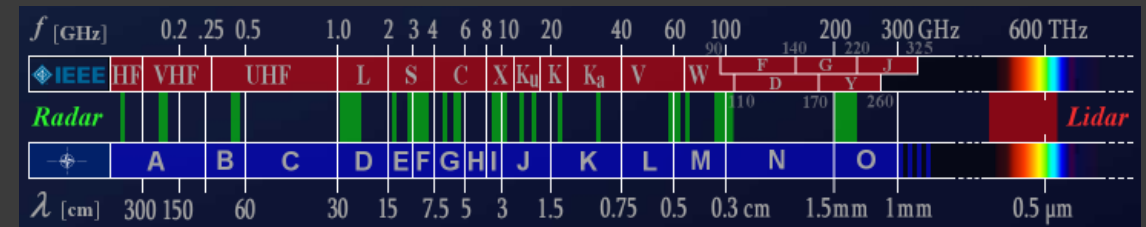
**Additional products and presentations are available upon request:**

- Custom models for components and subassemblies can be configured to customers' specifications.
- Presentations for specific applications like Instrumentations, 5G and IoT, Communications, and Space/Thermal Vac are also available.
- Presentations about Ka, Q, U, V, E, W, F and D-Bands are available.

# RADAR BAND SPECTRUM

## Upper Microwave and Millimeter Radar Frequency Bands

- **X Band:** 8.2 to 12.4 GHz, Short-range Tracking, Missile Guidance, Mapping, Marine Radar, Airborne Intercept
- **Ku Band:** 12 to 18 GHz, High Resolution Mapping and Satellite Altimetry
- **K Band:** 18 to 27 GHz, Traffic Control, Traffic Management and Security
- **Ka Band:** 27 to 40 GHz, Traffic Control, Very High-Resolution Mapping, Airport Surveillance, Missile Guidance
- **E Band:** 60 to 90 GHz, Automotive Radar (76 to 79 GHz)
- **W Band:** 75 to 110 GHz, Active Body Scan, Missile Guidance (94 GHz)
- **F Band:** 90 to 140 GHz, Body Scan (122 GHz)





# RADAR SYSTEM SUMMARY

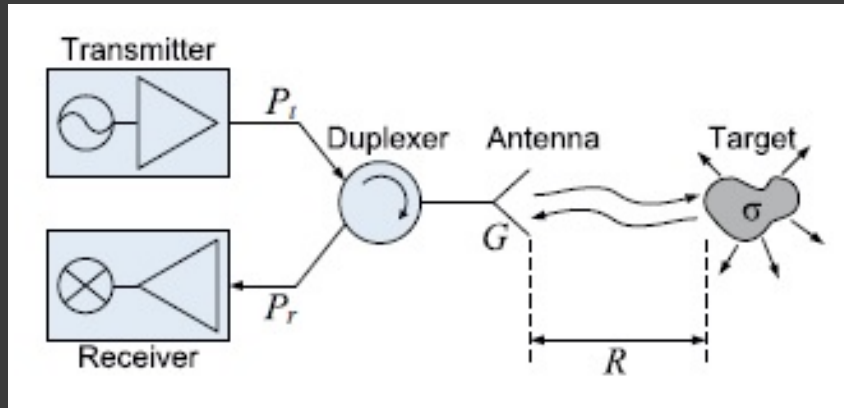
## Radar System by Function

- **Doppler Radar:** Moving Target Speed Measurement
  - ✓ Continuous Wave
- **Ranging Radar:** Still or Moving Target Distance Measurement
  - ✓ Frequency Modulated Continuous Wave (FMCW)
  - ✓ Pulse Radar
- **Directional Radar:** Moving Target Direction Measurement
  - ✓ Pulse Radar
  - ✓ I/Q Receiver
- **Angular Radar:** Target Azimuth and Vertical Position Tracking
  - ✓ Monopulse Radar

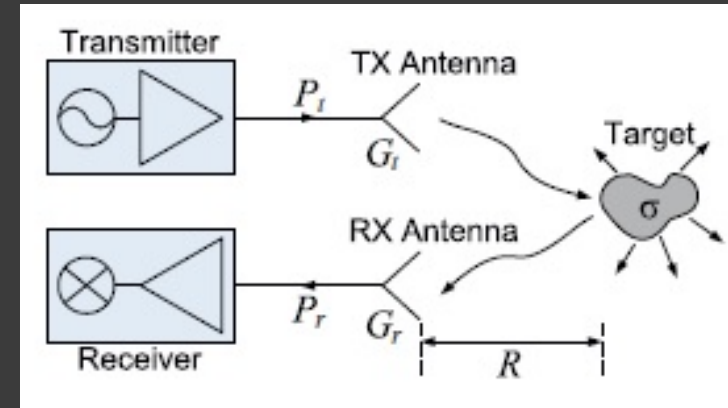
Many radar systems possess all functions: measuring the speed, the moving directions, the distance and position of the target by implementing various technologies.

# RADAR HEAD TYPES

- Common Antenna System (Monostatic)



- Dual Antenna System (Bistatic)



# RADAR HEAD TYPES

- **Common Antenna System (Monostatic)**

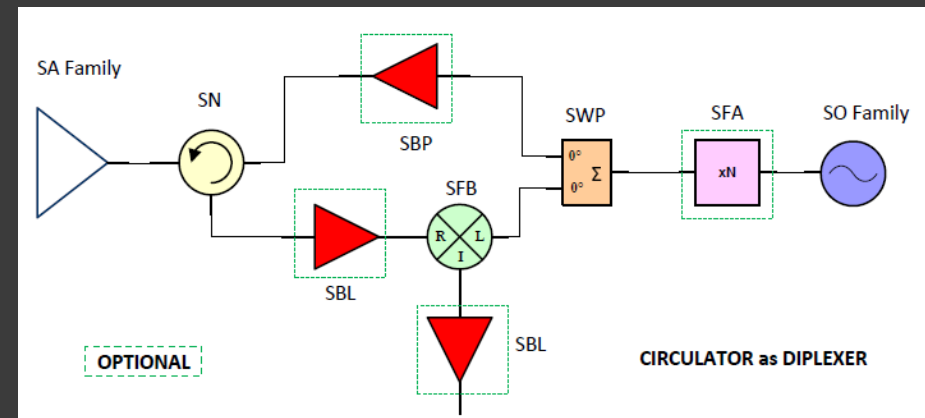
This configuration shares one antenna for the transmitter (TX) and receiver (RX) via a diplexer. The advantage of the configuration is its half aperture size compared to its counterpart, the Dual Antenna System (Bistatic). The configuration is widely used in handheld radar systems and missile guidance systems where space is limited. The drawback is its poor TX and RX isolation which invites system performance degradation or increasing damage probability of its receiver.

The diplexer is the key component in the system. Five types of diplexers are commonly used in this system:

- Circulators
- Hybrid or Directional Couplers
- Electrical Controlled Microwave Switches
- Orthomode Transducers (OMT)
- Turnstile Junctions

- **Doppler Radar (Monostatic)**

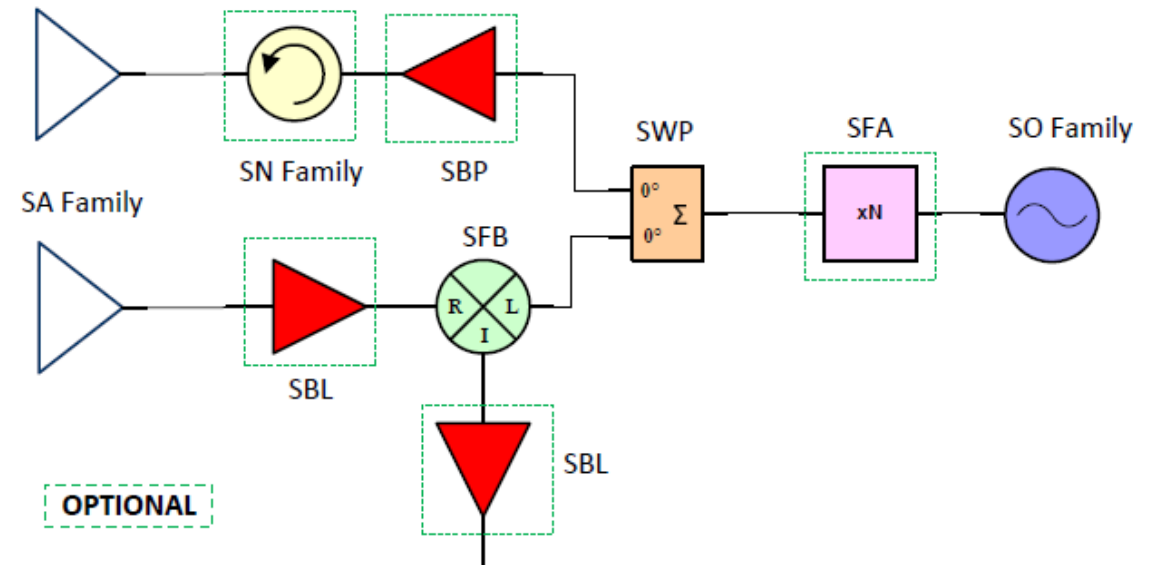
- The block diagram shown uses a circulator as a diplexer. Other diplexer types, such as switches, OMTs, couplers, Magic Tees etc. can be used.
- The antenna and the oscillator can be selected from SA and SO families to satisfy the system's requirements.
- The components in the dotted line frame are optional per system specifications.





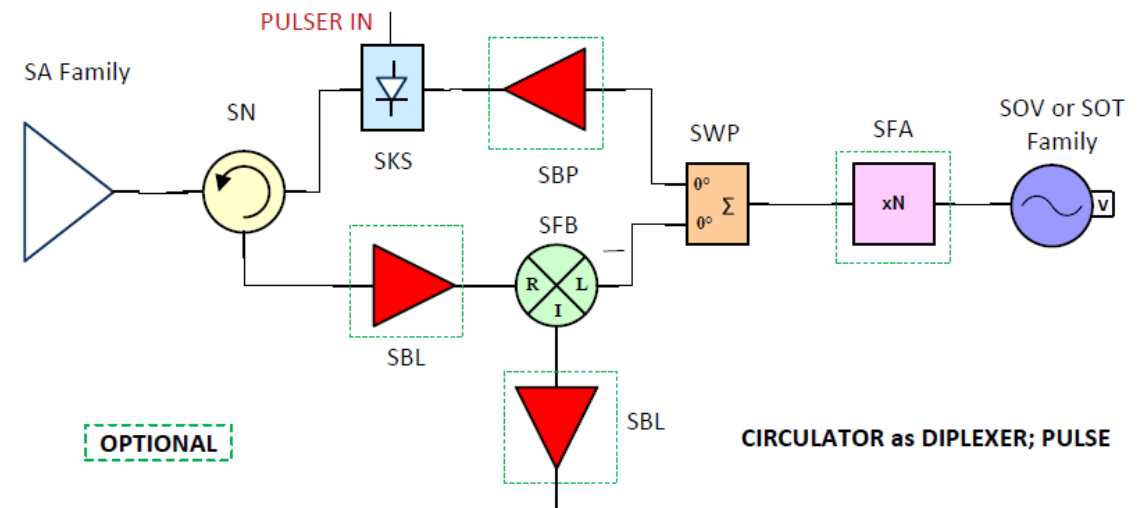
# RADAR HEAD BLOCK DIAGRAMS

- **Doppler Radar (Bistatic)**
  - The antenna and the oscillator can be selected from SA and SO families to satisfy the system's requirements.
  - The components in dotted line frame are optional per system specifications.



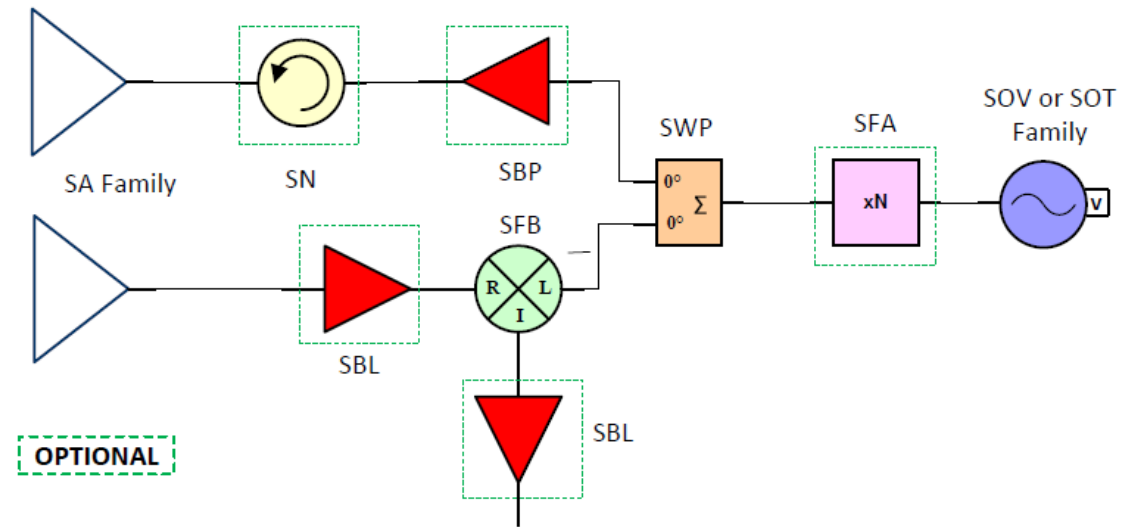
# RADAR HEAD BLOCK DIAGRAMS

- **Ranging Radar (Monostatic, FMCW Radar)**
  - The block diagram shown uses a circulator as a diplexer. Other diplexer types, such as switches, OMTs, couplers, Magic Tees etc. can be used.
  - The antenna and the oscillator can be selected from SA and SO families to satisfy the system's requirements.
  - The components in dotted line frame are optional per system specifications.



# RADAR HEAD BLOCK DIAGRAMS

- **Ranging Radar (Bistatic, FMCW Radar)**
  - The antenna and the oscillator can be selected from SA and SO families to satisfy the system's requirements.
  - The components in dotted line frame are optional per system specifications.

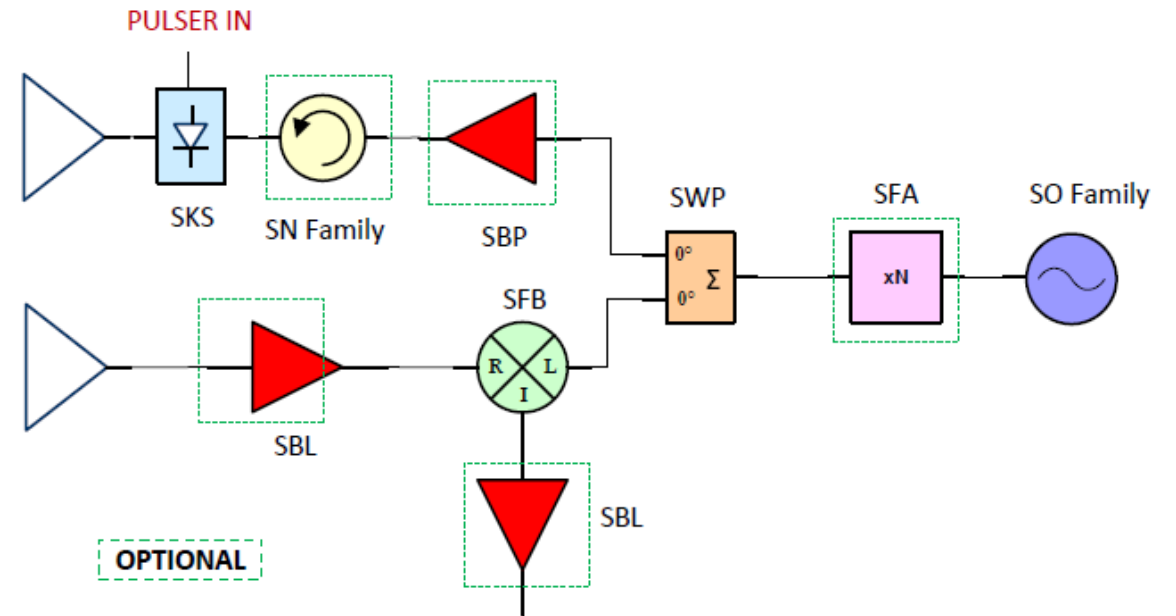






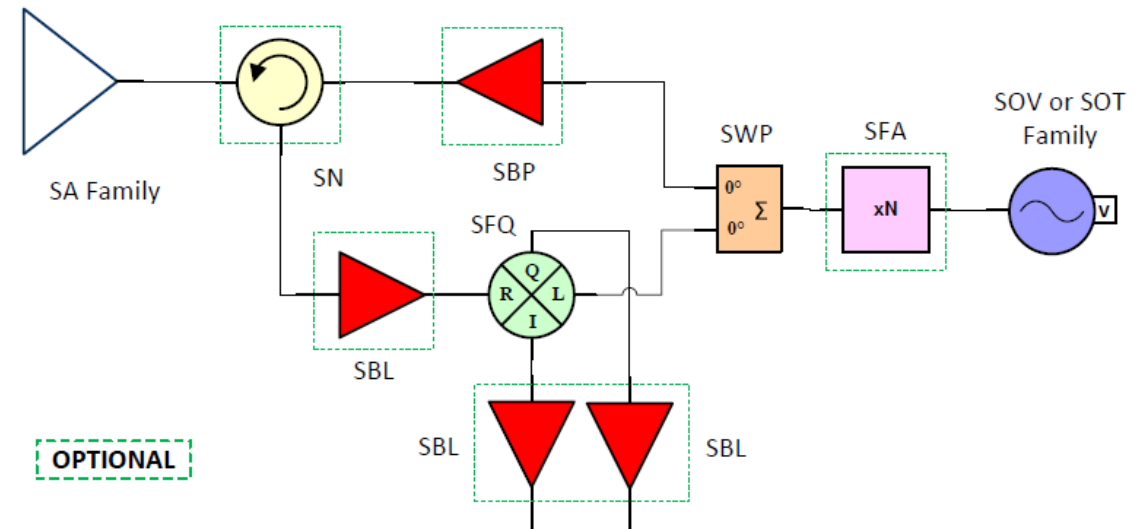
# RADAR HEAD BLOCK DIAGRAMS

- **Ranging and Directional Radar (Bistatic, Pulsed Radar)**
  - The antenna and the oscillator can be selected from SA and SO families to satisfy the system's requirements.
  - The components in dotted line frame are optional per system specifications.



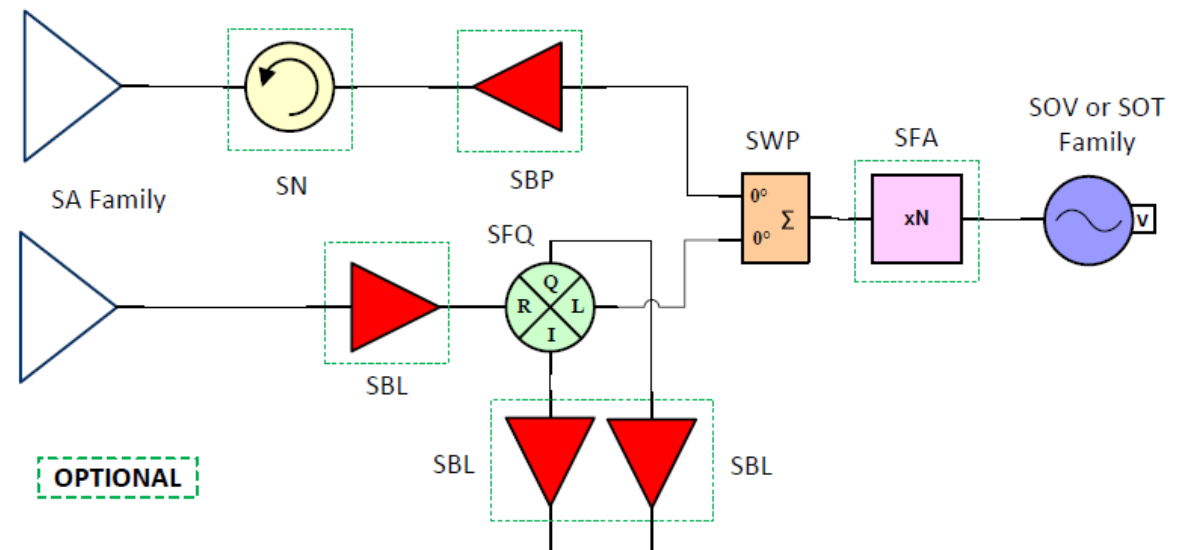
# RADAR HEAD BLOCK DIAGRAMS

- **Ranging and Directional Radar (Monostatic, FMCW Radar)**
  - The block diagram shown uses a circulator as a diplexer. Other diplexer types, such as switches, OMTs, couplers, Magic Tees etc. can be used.
  - The antenna and the oscillator can be selected from SA and SO families to satisfy the system's requirements.
  - The components in dotted line frame are optional per system specifications.



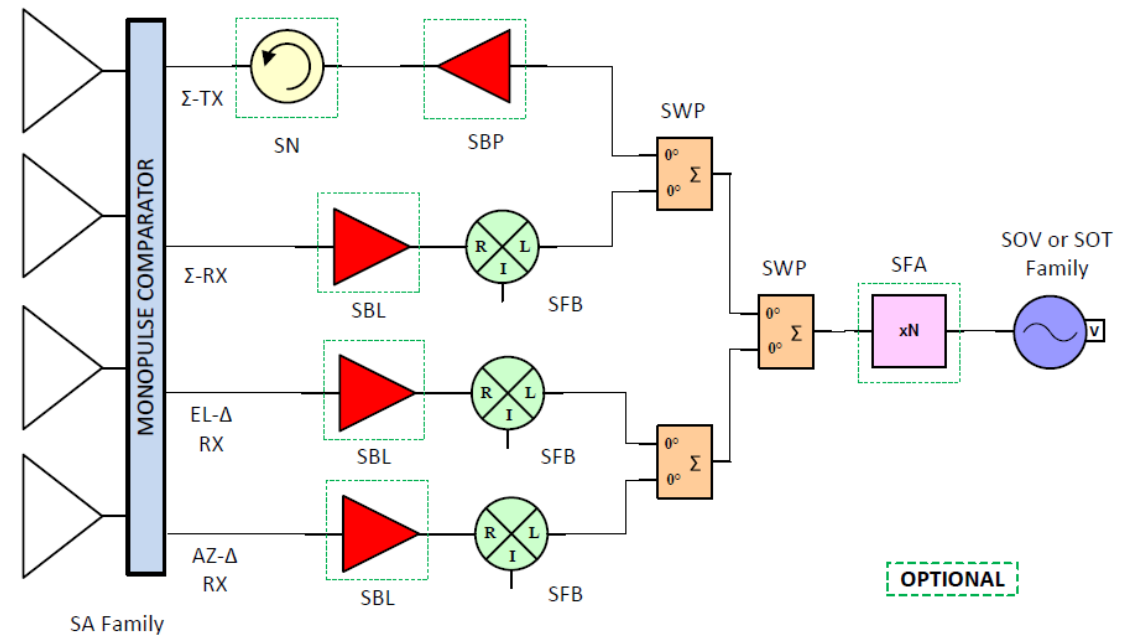
# RADAR HEAD BLOCK DIAGRAMS

- **Ranging and Directional Radar (Bistatic, FMCW Radar)**
  - The antenna and the oscillator can be selected from SA and SO families to satisfy the system's requirements.
  - The components in dotted line frame are optional per system specifications.



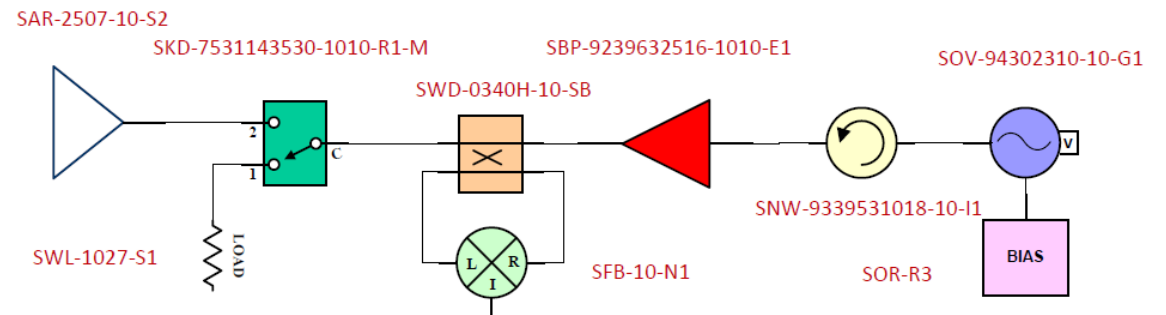
# RADAR HEAD BLOCK DIAGRAMS

- **Monopulse Radar (Monostatic, FMCW Radar)**
  - The antenna and the oscillator can be selected from SA and SO families to satisfy the system's requirements.
  - The components in dotted line frame are optional per system specifications.



# RADAR HEAD BLOCK DIAGRAMS

- **Reflectometer (Phase Detection Based Ranging Radar)**
  - The block diagram shown is a 94 GHz reflectometer based ranging radar sensor. The detection range can be 1 to 100 meters.
  - Other antennas and oscillators can be selected from the SA and SO families to satisfy the system's requirements.
  - Model SFB-10-N1 is used below. However, an I/Q mixer such as model **SFQ-75311415-1010SF-N1-M** can be used instead for further system performance enhancement.



# ERAVANT PRODUCT COVERAGE

- ERAVANT offers **total product solutions** to configure any Radar system applications in the Frequency Range of 8.2 to 170 GHz.
- ERAVANT products can be found on our website [here](#).
- ERAVANT offers a full product [catalog](#) to give an overview of our wide product offerings. Many of the products are readily available for any Radar system configuration and are prototype built for concept approval.
- ERAVANT has also organized a radar sensor focused [sensor catalog](#) to further collect its production ready, application specific products.
- Furthermore, the [ERAVANT products for 5G and IoT systems presentation](#) may further summarize its key technologies for these applications.
- The following presentation reveals many custom application focused products, which includes Components, Interconnection Parts, Sub-assemblies, Sensors, and Test Setups.



# STANDARD COMPONENTS

# STANDARD COMPONENTS FOR RADAR SYSTEMS

- Per the block diagram presented above, the following components are the key building blocks for any Radar systems. This presentation includes some examples for introduction/illustration purposes.
  - **SA:** Antennas
  - **SAT:** Orthomode Transducers
  - **SAS:** Polarizers
  - **SN:** Circulators and Isolators
  - **SB:** Amplifiers
  - **SF:** Mixers
  - **SFA:** Multipliers
  - **SO:** Oscillators
  - **SK:** Switches and Attenuators
  - **SWP & SCS:** Power Dividers
  - **SWM:** Magic Tees
  - **SWD & SCD:** Directional Couplers
  - **SCF & SWF:** Filters



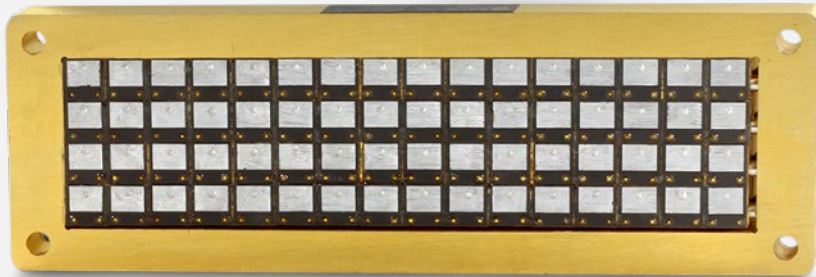
# BEAMFORMING PATCH ARRAY ANTENNA

**FAMILY: SAM**  
28 GHz

## SAM-2832830695-DM-L1-64C

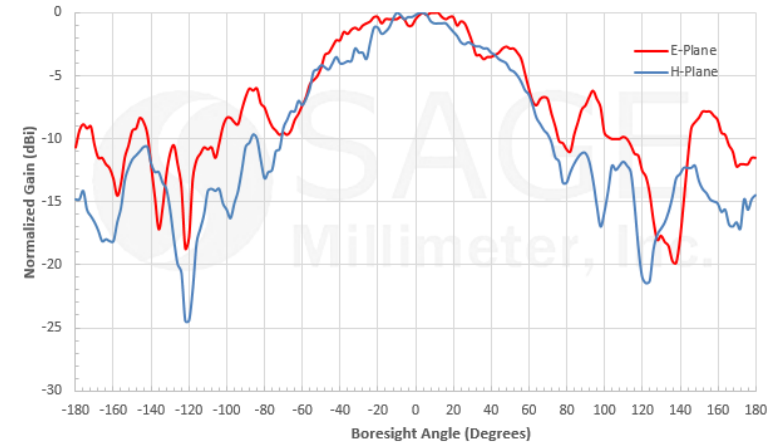
### Features:

- 28 GHz
- Beamforming Feasibility
- 4 x 16 Elements
- Various Array Configurations



Parameter	Minimum	Typical	Maximum
Frequency Range	68 GHz		70 GHz
Gain (Individual Patch)		4.0 dBi	
3 dB Beamwidth (Individual Patch)	50° (Vertical, E Plane) x 95° (Horizontal, H Plane)		
Sidelobe Level (Individual Patch)		-12 dB	
Array Gain (Fed in Phase)	12.0 dBi		
Array 3 dB Beamwidth (Fed in Phase)	60° (Vertical, E Plane) x 25° (Horizontal, H Plane)		
Array Sidelobe Level (Fed in Phase)	-12 dB		
Polarization	Linear		
Return Loss		8 dB	
Specification Temperature		+25 °C	
Operating Temperature	-40 °C		+85 °C

Typical Single Antenna Element Pattern @ 28 GHz



# MONOPULSE CASSEGRAIN ANTENNA

**FAMILY: SAY**  
35 GHz



## SAY-3433632750-28-U5-MP

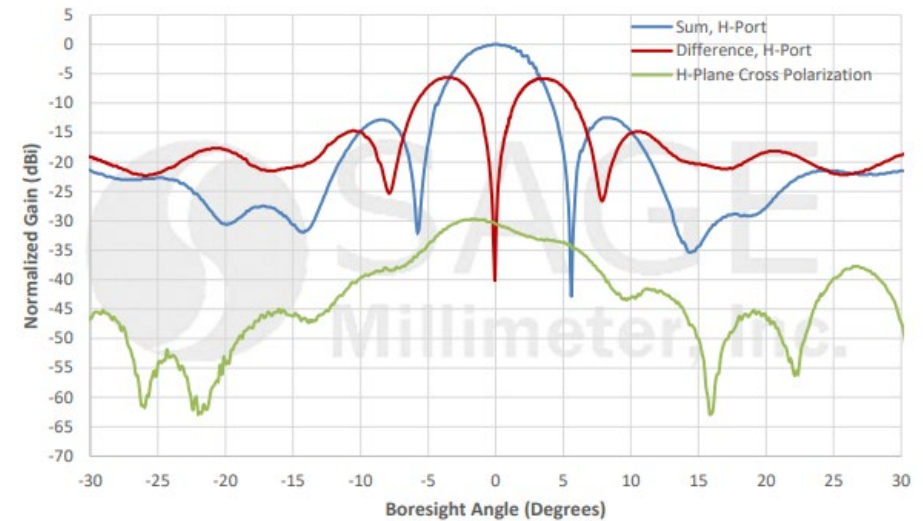
### Features:

- 34 to 36 GHz
- 27 dBi Gain
- Low Profile

Item	Specification
RF Connectors	WR-28 Waveguide with UG-599/U Compatible Flange
RF Connector Material	Aluminum
RF Connector Finish	Black Painted
Reflector Material	Aluminum
Reflector Finish	Chem Film
Weight	1.56 Oz
Reflector Diameter	4.02"
Outline	AY-RA28-04-MP-BX1

Parameter	Minimum	Typical	Maximum
Frequency	34 GHz		36 GHz
Gain, Sum Port		27 dBi	
Sum 3 dB Beamwidth		5.0°	
Gain, Difference V-Port		21 dBi	
Gain, Difference H-Port		21 dBi	
Null Depth		30 dB	
Polarization		Linear	
Sidelobes, E-Plane		10 dB	
Sidelobes, H-Plane		10 dB	
Return Loss		10 dB	
Specification Temperature		+25 °C	
Operating Temperature	-40 °C		+85 °C

Measured H-Plane @ 35 GHz



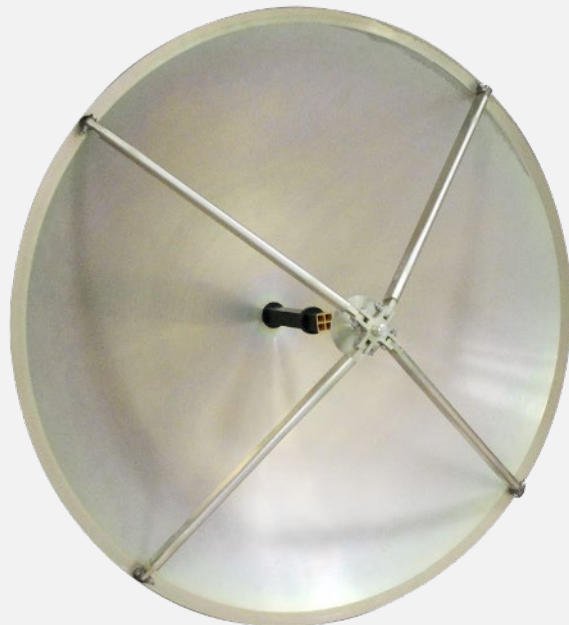
# MONOPULSE CASSEGRAIN ANTENNA

**FAMILY: SAY**  
35 GHz

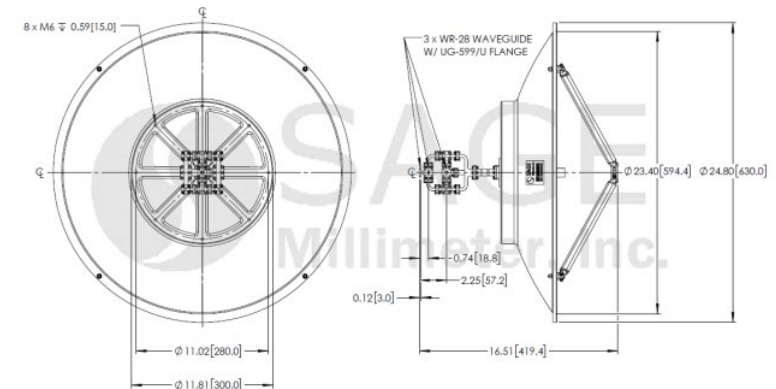
## SAY-3433632750-28-U5-MP

### Features:

- 34 to 36 GHz
- 43 dBi Gain
- Low Profile



Parameter	Minimum	Typical	Maximum
Frequency	34 GHz	35 GHz	36 GHz
Gain, Sum Port		38 dBi	
Sum 3 dB Beamwidth		2.0°	
Gain, Difference V-Port		34 dBi	
Gain, Difference H-Port		34 dBi	
Null Depth		30 dB	
Polarization	Linear		
Sidelobes, E-Plane		-16 dB	
Sidelobes, H-Plane		-16 dB	
Port VSWR		1.6:1	
Specification Temperature		+25 °C	
Operating Temperature	-40 °C		+85 °C



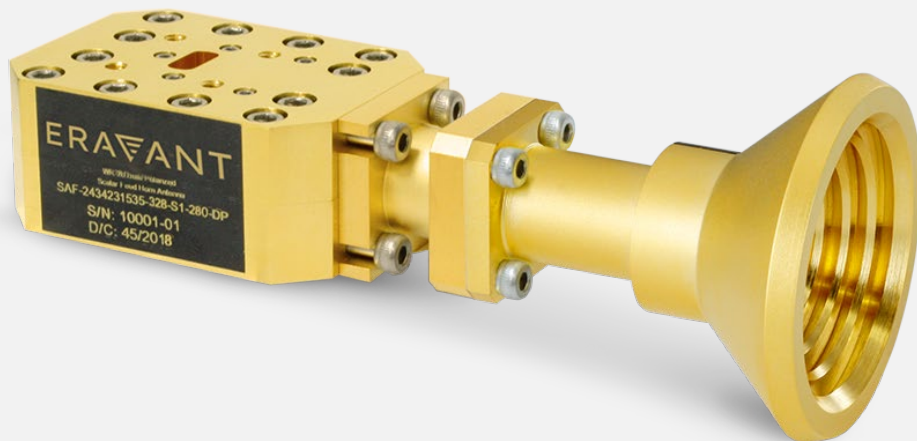
# DUAL POLARIZED SCALAR HORN ANTENNA

**FAMILY: SAO**  
24 TO 42 GHz

## SAF-2434231535-328-S1-280-DP

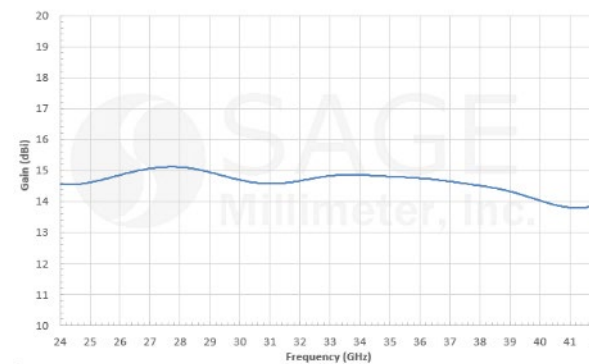
### Features:

- 24 to 42 GHz
- Gain 15 dBi
- 3 dB Beamwidth 35°
- Dual Polarized
- 7 Models to Cover up to 110 GHz

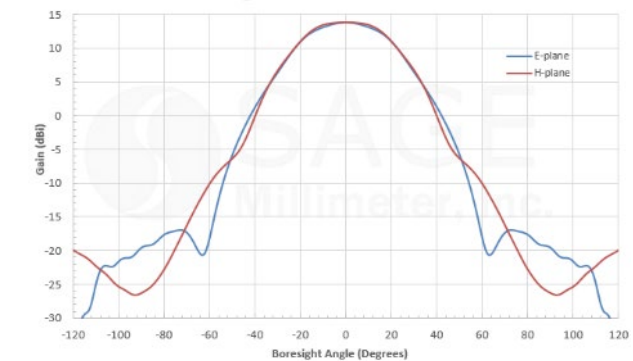


Parameter	Minimum	Typical	Maximum
Frequency	24 GHz		42 GHz
Gain		15 dBi	
3 dB Beamwidth, E-plane @ 33 GHz		35°	
3 dB Beamwidth, H-plane @ 33 GHz		35°	
Sidelobe Levels		-25 dB	
V and H Port Isolation		35 dB	
Cross Polarization Rejection		35 dB	
Port Return Loss		15 dB	
Specification Temperature		+25 °C	
Operating Temperature	-40 °C		+85 °C

Simulated Gain vs. Frequency



Simulated Antenna Patterns @ 42 GHz



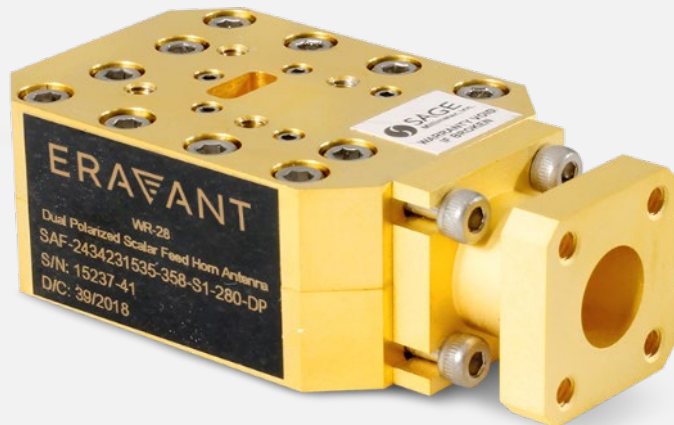
# ORTHOMODE TRANSDUCER

**FAMILY: SAT**  
18 TO 110 GHz

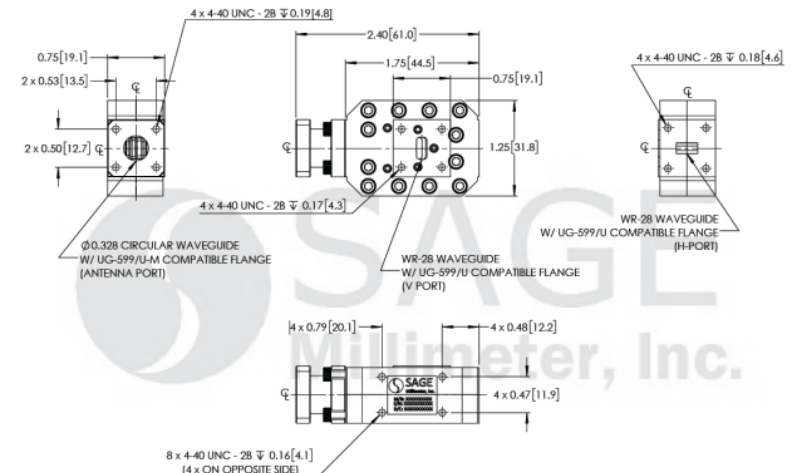
## SAT-333-32828-C1

### Features:

- Full Waveguide Band Operation
- High Port Isolation
- High Crosspol Rejection
- Frequency up to 110 GHz



Parameter	Minimum	Typical	Maximum
Frequency Range	24 GHz		42 GHz
Insertion Loss (H to A Port)		0.5 dB	
Insertion Loss (V to A Port)		0.5 dB	
Isolation (H to V Port)		40 dB	
Cross Polarization (H to A Port)		35 dB	
Cross Polarization (V to A Port)		35 dB	
Return Loss (H Port)		15 dB	
Return Loss (V Port)		15 dB	
Return Loss (A Port, Vertical)		15 dB	
Return Loss (A Port, Horizontal)		15 dB	
Specification Temperature		+25 °C	
Operating Temperature	-40 °C		+85 °C





# ORTHOMODE POLARIZER

**FAMILY: SAS**  
18 TO 110 GHz

## SAS-793-11012-F1

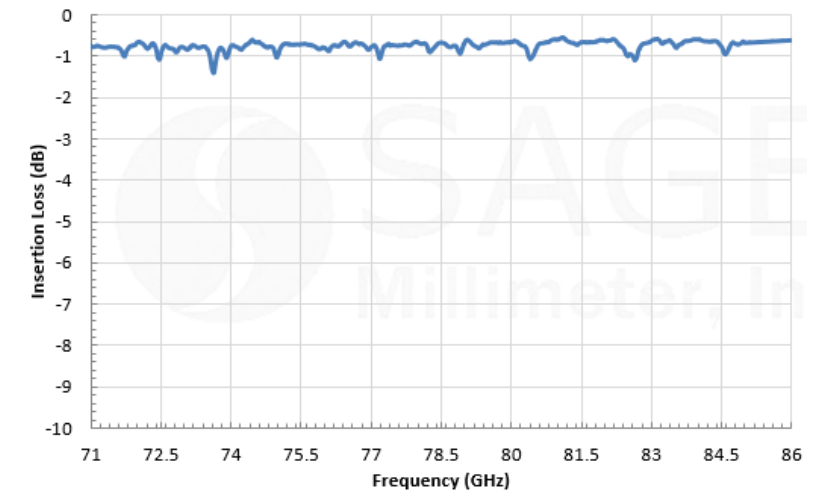
### Features:

- Circular Waveguide Interface
- Low Insertion Loss
- Good Axial Ratio
- LHCP or RHCP
- Frequency up to 110 GHz



Parameter	Minimum	Typical	Maximum
Frequency Range	71 GHz		86 GHz
Insertion Loss		0.5 dB	
Axial Ratio		1.1	1.2
Return Loss		20 dB	
Specification Temperature		+25 °C	
Operation Temperature	-40 °C		+85 °C

Typical Insertion Loss vs. Frequency (Back to Back)



# FULL WAVEGUIDE JUNCTION CIRCULATOR

**FAMILY: SNF**  
Ka BAND

## SNF-28-C5

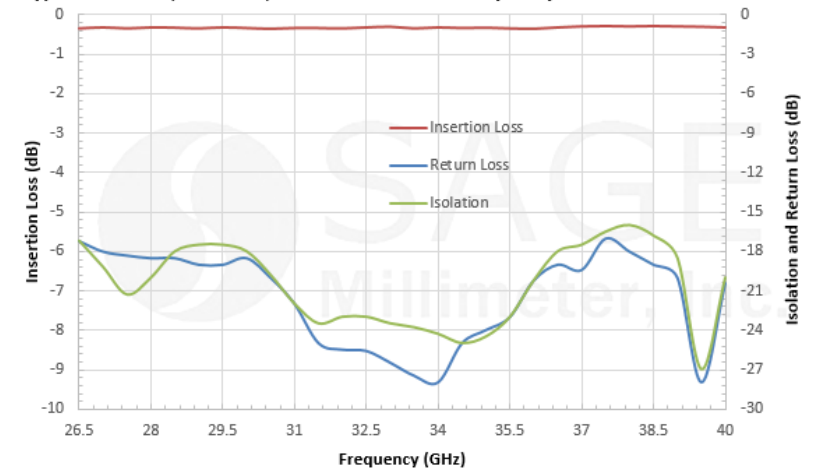
### Features:

- 26.5 to 40 GHz
- Full Waveguide Bandwidth Coverage
- 18 to 26.5 GHz and 22 to 33 GHz Models
- Total 6 Models to Support 5G Bands



Parameter	Minimum	Typical	Maximum
RF Frequency	26.5 GHz		40 GHz
Insertion Loss		0.4 dB	0.7 dB
Isolation*		15 dB	
Return Loss		15 dB	
Forward Power Handling			20 W (CW)
Specification Temperature		+25 °C	
Operating Temperature	-40 °C		+80 °C

Typical Isolation, Insertion, and Return Loss vs. Frequency



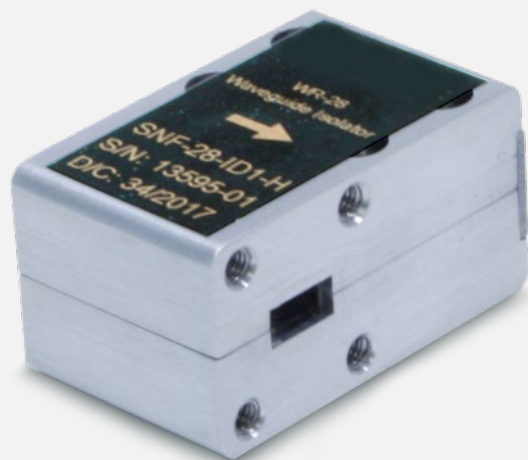
# FULL WAVEGUIDE JUNCTION CIRCULATOR

**FAMILY: SNF**  
Ka BAND

## SNF-28-15

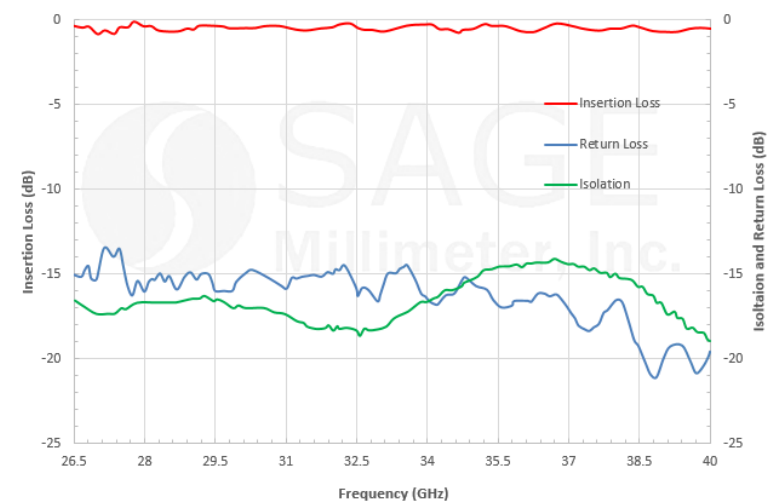
### Features:

- 26.5 to 40 GHz
- Full Waveguide Bandwidth Coverage
- 18 to 26.5 GHz and 22 to 33 GHz Models
- Total 6 Models to Support 5G Bands



Parameter	Minimum	Typical	Maximum
RF Frequency	26.5 GHz		40.0 GHz
Insertion Loss		0.50 dB	0.80 dB
Isolation		17 dB	
Return Loss		15 dB	
Forward Power Handling			25 W (CW)
Reverse Power Handling			10 W (CW)
Specification Temperature		+25 °C	
Operating Temperature	-40 °C		+85 °C

Typical Performance vs. Frequency





# WAVEGUIDE JUNCTION CIRCULATOR

**FAMILY: SNW**  
E BAND

## SNW-7137630818-12-C1

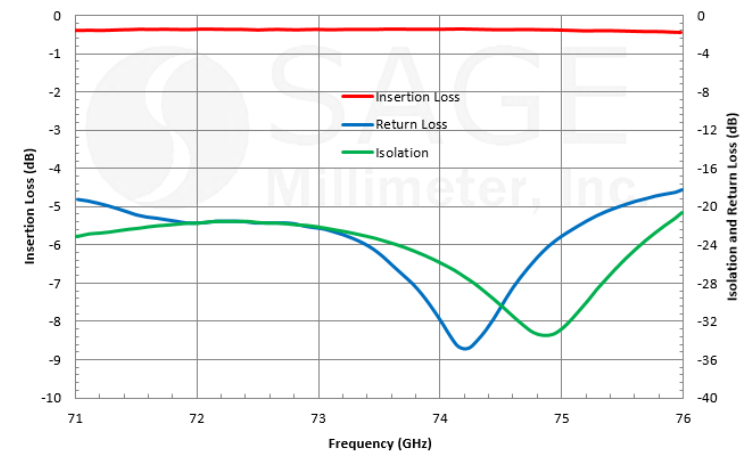
### Features:

- 71 to 76 GHz
- Broad Bandwidth Coverage
- 81 to 86 and 76 to 81 GHz Models
- 40+ Models to Support 5G Bands



Parameter	Minimum	Typical	Maximum
Frequency	71 GHz		76 GHz
Insertion Loss		0.8 dB	
Isolation		18 dB	
Return Loss		16 dB	
Power Handling			3 W (CW)
Specification Temperature		+25 °C	
Operating Temperature	-40 °C		+85 °C

Typical Insertion Loss, Isolation and Return Loss vs. Frequency



Note: The insertion loss, isolation and return loss between other ports, such as port 2 to port 3, port 3 to port 1 are similar to above given plots.

# WAVEGUIDE JUNCTION ISOLATOR

**FAMILY: SNW**  
E BAND

## SNW-7137630818-12-I1

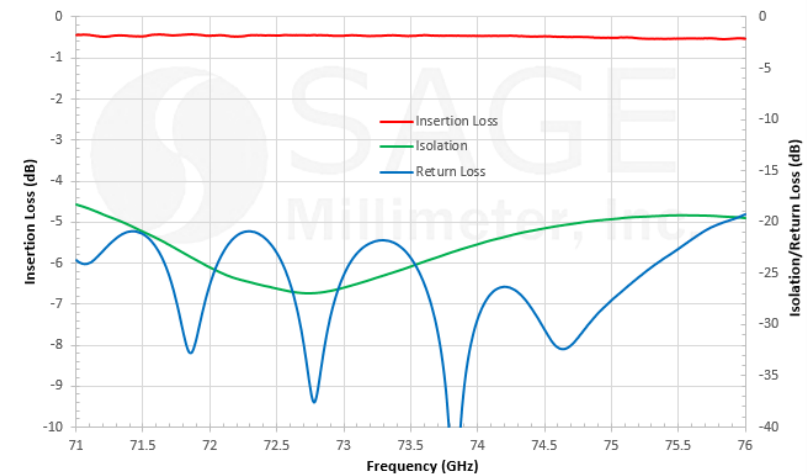
### Features:

- 71 to 76 GHz
- Broad Bandwidth Coverage
- 81 to 86 and 76 to 81 GHz Models
- 40+ Models to Support 5G Bands



Parameter	Minimum	Typical	Maximum
Frequency	71 GHz		76 GHz
Insertion Loss		0.8 dB	
Isolation		18 dB	
Return Loss		16 dB	
Forward Power Handling			3 W (CW)
Reverse Power Handling			1 W (CW)
Specification Temperature		+25 °C	
Operating Temperature	-40 °C		+85 °C

Typical Performance vs. Frequency



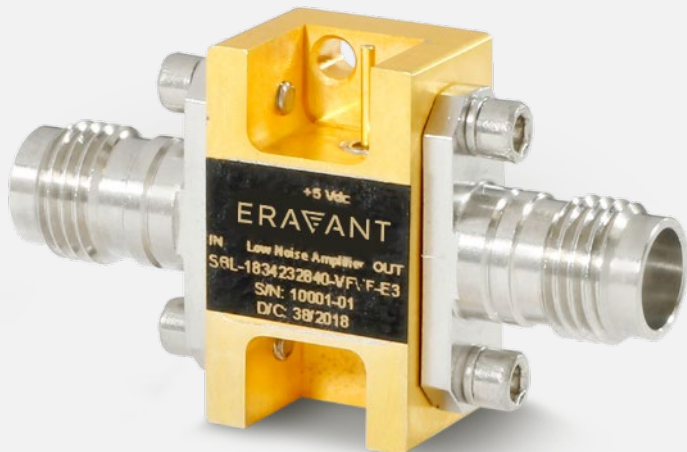
# BROADBAND AMPLIFIER

**FAMILY: SBB**  
18 TO 42 GHz

## SBB-1834232815-KFKF-E3

### Features:

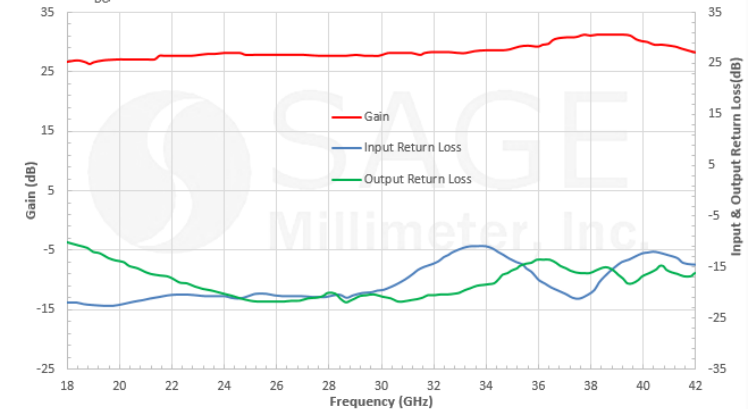
- 18 to 42 GHz
- 5G Band
- Gain 28 dBi
- SBB Family Has More than 50 Models



Parameter	Minimum	Typical	Maximum
Frequency	18 GHz		42 GHz
Gain	22 dB	28 dB	
$P_{1dB}$	+10 dBm	+15 dBm	
$P_{C,sat}$		+16 dBm	
Noise Figure		4.0 dB	6.0 dB
RF Input Power			-5 dBm
Damage RF Input Power			0 dBm
Input Return Loss		10 dB	
Output Return Loss		10 dB	
DC Voltage		+5 V <sub>DC</sub>	+5.5 V <sub>DC</sub>
DC Supply Current		240 mA	
Specification Temperature		+25 °C	
Operating Temperature	-40 °C		+85 °C

### Typical Performance vs. Frequency

Bias: +5 V<sub>DC</sub>/240 mA



# BROADBAND LOW NOISE AMPLIFIER

**FAMILY: SBL**  
75 TO 110 GHz

## SBL-7531143550-1010-E1

### Features:

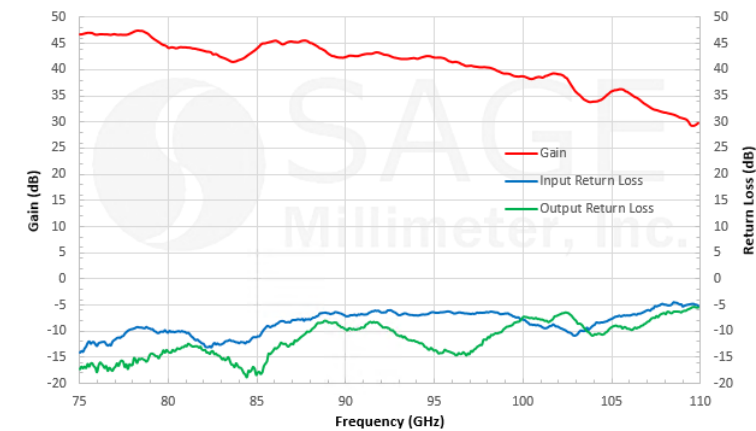
- 75 to 110 GHz
- 5 dB Noise Figure
- 35 dB Nominal Gain
- SBL Family Cover up to 170 GHz



Parameter	Minimum	Typical	Maximum
Frequency	75 GHz		110 GHz
Gain		35 dB	
Noise Figure		5 dB	
P <sub>1dB</sub>		-5 dBm	
P <sub>in</sub>			+15 dBm
Input Return Loss		6 dB	
Output Return Loss		8 dB	
DC Voltage	+6 V <sub>DC</sub>	+8 V <sub>DC</sub>	+15 V <sub>DC</sub>
DC Supply Current		100 mA	
Specification Temperature		+25 °C	
Operating Temperature	0 °C		+50 °C

### Typical Gain and Return Loss vs. Frequency

Bias: +8 V<sub>DC</sub>/69 mA



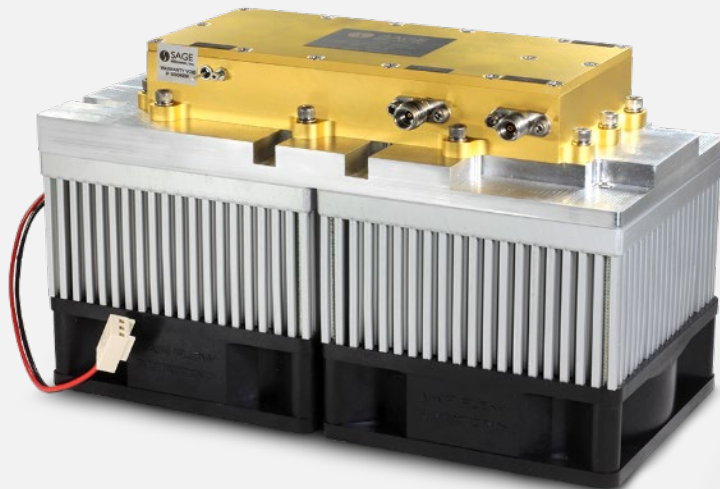
# HIGH POWER GaN AMPLIFIER

**FAMILY: SBP**  
32 TO 38 GHz

## SBP-3233831838-KFKF-E1-HR

### Features:

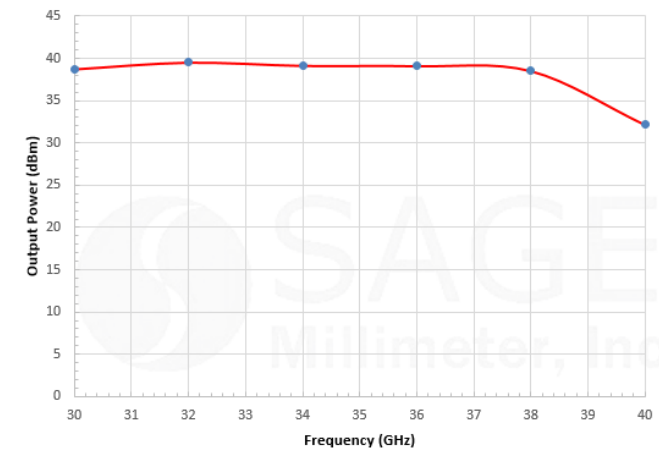
- 32 to 38 GHz
- +38 dBm Psat
- 18 dB Nominal Gain
- SBP Family Covers up to 110 GHz



Parameter	Minimum	Typical	Maximum
Frequency	32 GHz		38 GHz
Gain		18 dB	
$P_{sat}$		+38 dBm	
$P_{in}$			+30 dBm
Input Return Loss		15 dB	
Output Return Loss		10 dB	
DC Voltage		+30 V <sub>DC</sub>	+48 V <sub>DC</sub>
DC Supply Current		2 A	
Supply Voltage to Fan		+12 V <sub>DC</sub>	
Specification Temperature		+25°C	
Operating Temperature	0°C		+50°C

### Typical Output Power Psat Vs. Frequency

Bias = +48 V<sub>DC</sub> / 2 A



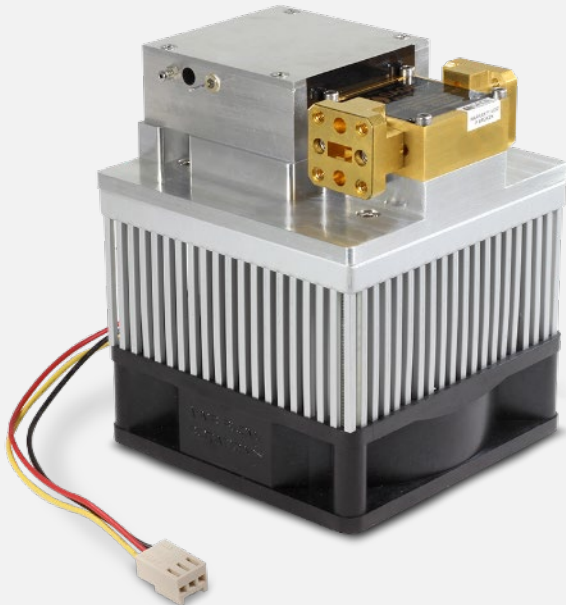
# HIGH POWER AMPLIFIER

**FAMILY: SBP**  
31 TO 38 GHz

## SBP-3133834034-KFKF-C1-2

### Features:

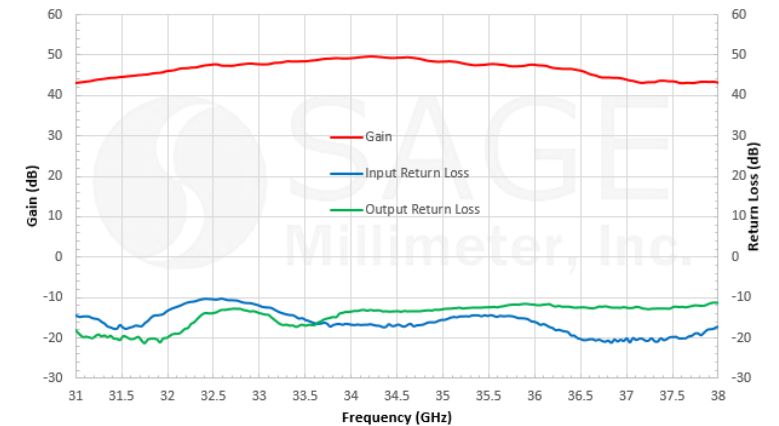
- 31 to 38 GHz
- +35 dBm Psat
- 40 dB Nominal Gain
- SBP Family Covers up to 110 GHz



Parameter	Minimum	Typical	Maximum
Frequency	31 GHz		38 GHz
Gain		40 dB	
$P_{1dB}$		+34 dBm	
$P_{sat}$		+35 dBm	
$P_{in}$			+20 dBm
Input Return Loss		10 dB	
Output Return Loss		10 dB	
DC Voltage		+8 V <sub>DC</sub>	
DC Supply Current (Under RF Drive)		4 A	
Supply Voltage to Fan		+12 V <sub>DC</sub>	
Specification Temperature		+25 °C	
Operating Temperature	0 °C		+50 °C

### Typical Gain and Return Loss vs. Frequency

$V_{IN}$ : +8 V<sub>DC</sub>/2.4 A



# HIGH POWER AMPLIFIER

**FAMILY: SBP**  
75 TO 110 GHz

## SBP-7531142515-1010-E1

### Features:

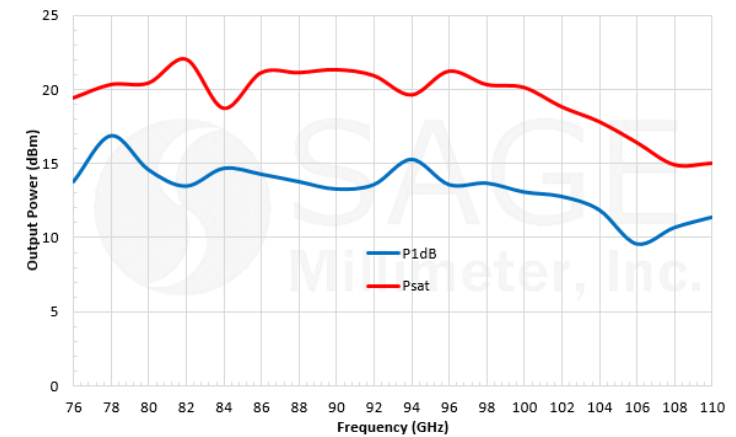
- 75 to 110 GHz
- +20 dBm Psat
- 25 dB Nominal Gain
- SBP Family Covers up to 110 GHz



Parameter	Minimum	Typical	Maximum
Frequency	75 GHz		110 GHz
Gain		25 dB	
P <sub>1dB</sub>		+15 dBm	
P <sub>sat</sub>		+20 dBm	
P <sub>in</sub>			0 dBm
Input Return Loss		10 dB	
Output Return Loss		10 dB	
DC Voltage	+13 V <sub>DC</sub>	+15 V <sub>DC</sub>	+16 V <sub>DC</sub>
DC Supply Current		190 mA	
Specification Temperature		+25 °C	
Operating Temperature	0 °C		+50 °C

### Typical Output Power vs. Frequency

Bias: +15 V<sub>DC</sub>/190 mA





# BALANCED MIXER

**FAMILY: SFB**  
11 TO 40 GHz

## SFB-11340312-KFKFSF-N1-M

### Features:

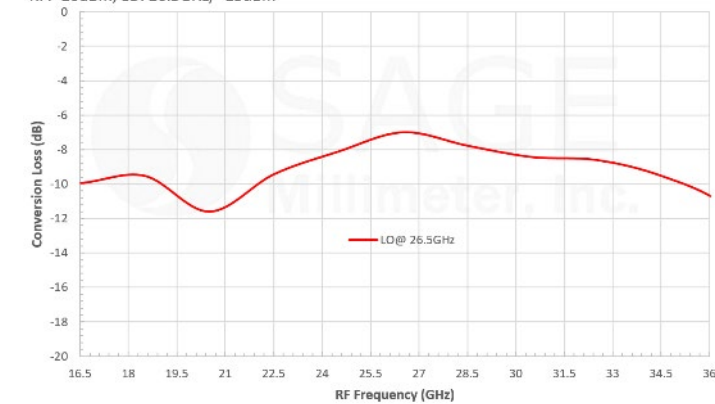
- 11 to 40 GHz
- 12 dB Conversion Loss
- Balanced Configuration
- SFB Family Has More than 30 Models



Parameter	Minimum	Typical	Maximum
RF Frequency	11 GHz		40 GHz
LO Frequency	11 GHz		40 GHz
IF Frequency	DC		10 GHz
LO Pumping Power	+13 dBm	+15 dBm	+18 dBm
Conversion Loss		12 dB	
Input P-1dB		+9 dBm	
RF to LO Isolation		30 dB	
LO to IF Isolation		25 dB	
RF to IF Isolation		25 dB	
Combined LO and RF Power			+21 dBm
Specification Temperature		+25 °C	
Operating Temperature	-40 °C		+85 °C

Typical Conversion Loss vs Frequency

RF: -20dBm; LO: 26.5GHz/+13dBm





# I/Q MIXER

**FAMILY: SFQ**  
30 TO 50 GHz

## SFQ-30350313-2F2FSF-N1-M

### Features:

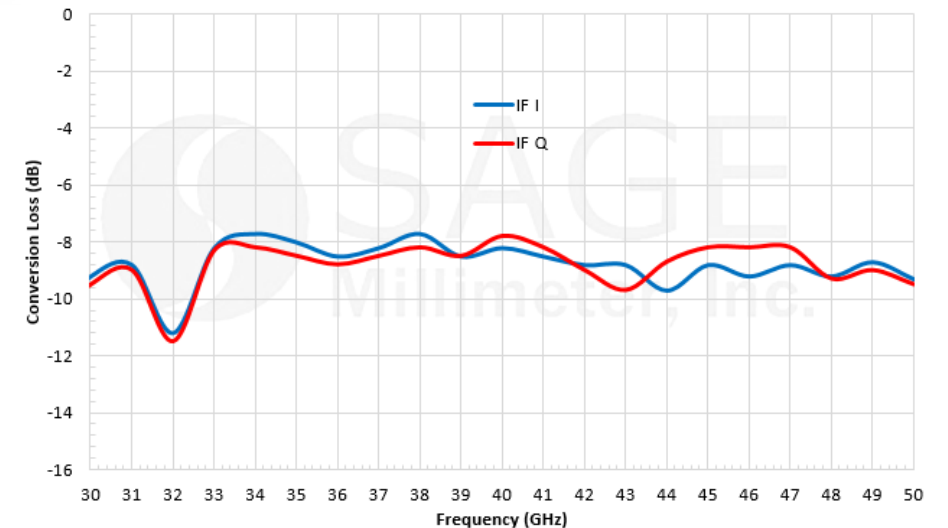
- 30 to 50 GHz
- 9 dB Conversion Loss
- Balanced Configuration
- SFQ Family Has More than 30 Models

Parameter	Minimum	Typical	Maximum
RF Frequency	30 GHz		50 GHz
LO Frequency	30 GHz		50 GHz
LO Pumping Power	+16 dBm	+17 dBm	+20 dBm
IF Frequency	DC		2.0 GHz
Conversion Loss		13 dB	15 dB
I/Q Phase Unbalance		±15°	
I/Q Amplitude Unbalance		±1.0 dB	
LO to RF Port Isolation	20 dB	30 dB	
LO to IF Port Isolation		15 dB	
RF to IF Port Isolation		20 dB	
IP1dB		+4 dBm	
IP3dB		+13 dBm	
Combined RF & LO Power			+20 dBm



Typical Conversion Loss vs. Frequency

LO Power: +17 dBm



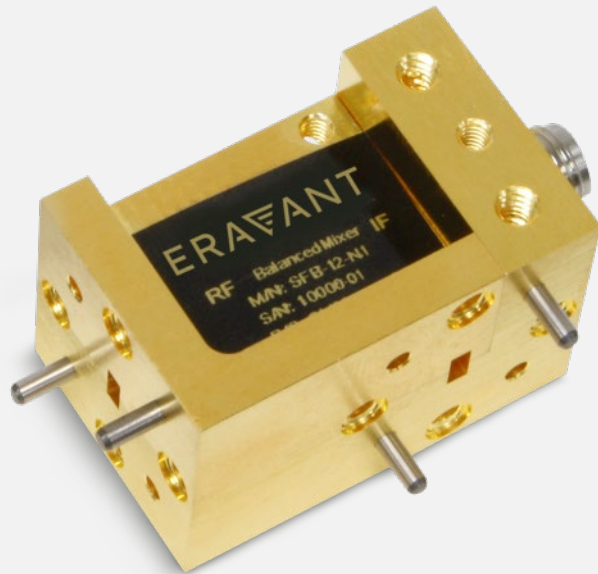
# BALANCED MIXER

**FAMILY: SFB**  
60 TO 90 GHz

## SFB-12-N1

### Features:

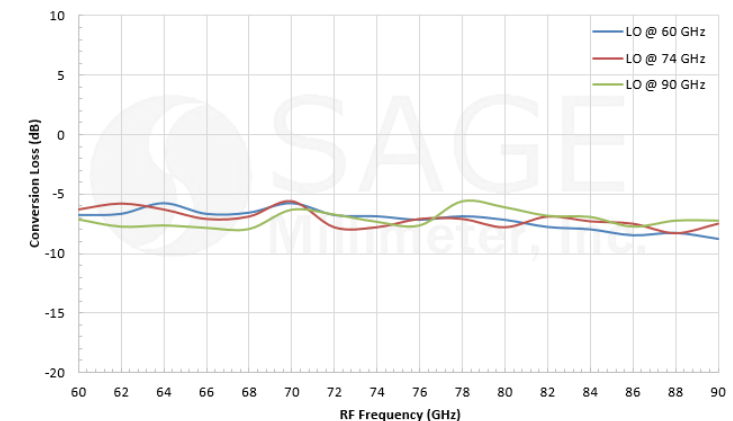
- 60 to 90 GHz
- 9 dB Conversion Loss
- Balanced Configuration
- SFB Family Has More than 30 Models



Parameter	Minimum	Typical	Maximum
RF Frequency	60 GHz		90 GHz
LO Frequency	60 GHz		90 GHz
IF Frequency	DC		30 GHz
LO Pumping Power	+10 dBm	+13 dBm	+15 dBm
Conversion Loss		9 dB	12 dB
Input P <sub>1dB</sub>		-3 dBm	
RF to LO Isolation		30 dB	
Combined RF and LO Power			+18 dBm
Specification Temperature		+25 °C	
Operating Temperature	-40 °C		+85 °C

Typical Conversion Loss vs. Frequency

RF: -20 dBm; LO: +13 dBm



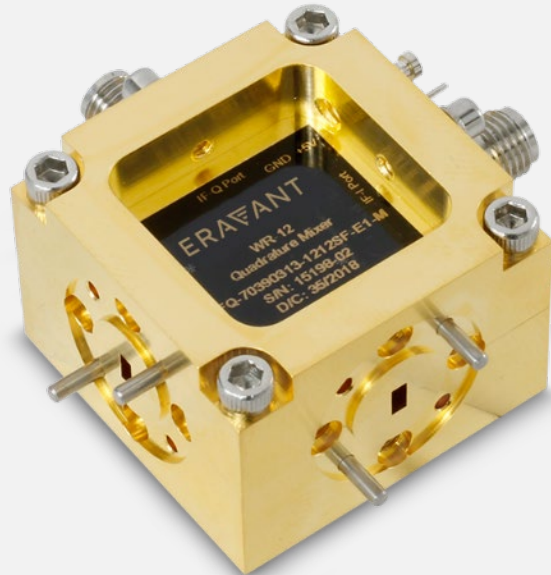
# I/Q MIXER

**FAMILY: SFQ**  
60 TO 90 GHz

## SFQ-60390315-1212SF-E1-M

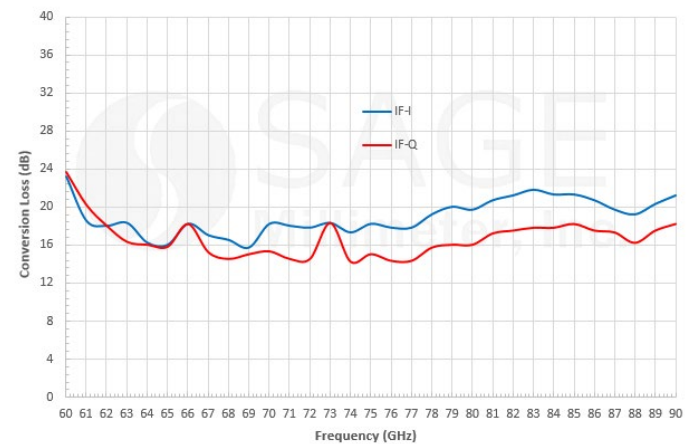
### Features:

- 60 to 90 GHz
- 15 dB Conversion Loss
- Balanced Configuration
- SFQ Family Has More than 30 Models



Parameter	Minimum	Typical	Maximum
RF Frequency Range	60 GHz		90 GHz
RF Input P-1		5 dBm	
LO Frequency Range	60 GHz		90 GHz
LO Pumping Power		+10 dBm	+12 dBm
IF Frequency Range	DC	2 GHz	
Conversion Loss		15 dB	20 dB
I/Q Phase Unbalance		$\pm 15^\circ$	
I/Q Amplitude Unbalance		$\pm 1.5$ dB	
LO to RF Port Isolations	20 dB	40 dB	
Operating Temperature	0 °C		+50 °C

Typical Conversion Loss vs. Frequency



# ACTIVE MULTIPLIER

**FAMILY: SFA**  
20 TO 50 GHz

## SFA-203503410-2FSF-S1

### Features:

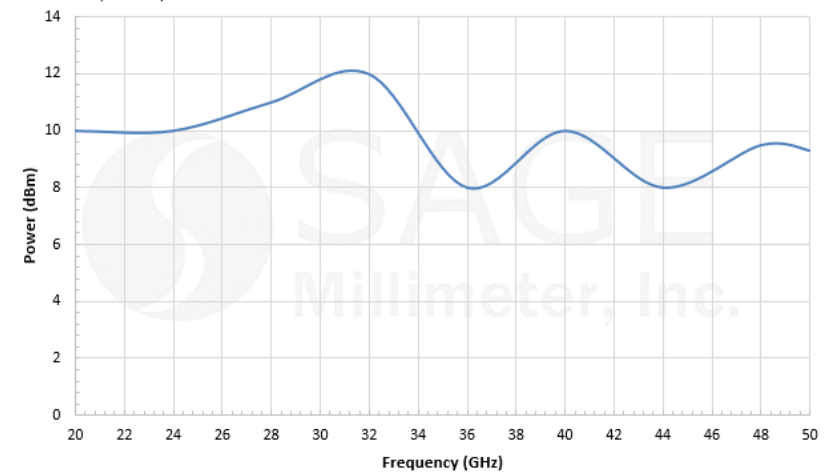
- 20 to 50 GHz
- X4 Multiplying Factor
- +10 dBm Output Power
- SFA Family Has More than 75 Models



Parameter	Minimum	Typical	Maximum
Input Frequency	5.0 GHz		12.5 GHz
Input Power	-5 dBm	+5 dBm	+15 dBm
Output Frequency	20.0 GHz		50.0 GHz
Output Power		+10 dBm	
Harmonic Suppression		-15 dBc	
Spurious		-60 dBc	
Port Return Loss		10 dB	
DC Voltage	+6 V <sub>DC</sub>	+8 V <sub>DC</sub>	+12 V <sub>DC</sub>
DC Supply Current		500 mA	
Specification Temperature		+25 °C	
Operating Temperature	0 °C		+50 °C

Typical Output Power vs. Frequency

Pin= +3 dBm, 12 Vdc/460 mA



# ACTIVE MULTIPLIER

**FAMILY: SFA**  
60 TO 90 GHz

## SFA-603903816-12SF-S1

### Features:

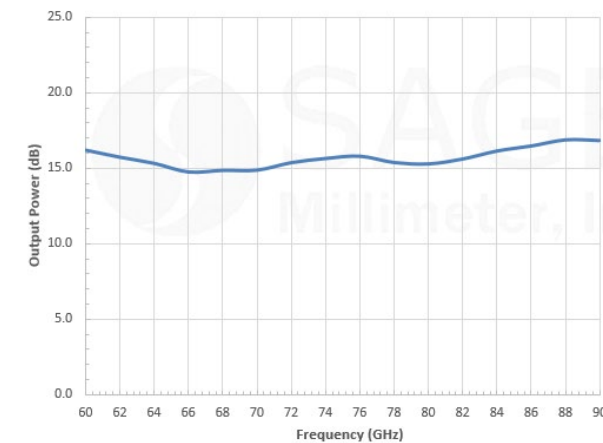
- 60 to 90 GHz
- X2, X4, X6 or X8 Multiplying Factor
- +16 dBm Output Power
- SFA Family Has More than 75 Models



Parameter	Minimum	Typical	Maximum
Input Frequency	10 GHz		15 GHz
Input Power		+3 dBm	+20 dBm
Output Frequency	60 GHz		90 GHz
Output Power		+16 dBm	
Harmonic Suppression		-20 dBc	
Spurious		-60 dBc	
Port Return Loss		10 dB	
DC Voltage	+6 V <sub>DC</sub>	+8 V <sub>DC</sub>	+16 V <sub>DC</sub>
DC Supply Current		650 mA	
Specification Temperature		+25 °C	
Operating Temperature	0 °C		+50 °C

Typical Output Power vs. Frequency

Bias: +8 V<sub>DC</sub>/650 mA, Input Power: +3 dBm



# DIELECTRIC RESONATOR OSCILLATOR

**FAMILY: SOD**  
37 GHz

## SOD-37301213-22-S1

### Features:

- 37 GHz
- Mechanical Tunable
- 1 to 40 GHz Coverage
- 50+ Models to Support 5G Bands



Parameter	Minimum	Typical	Maximum
Center Frequency		37 GHz	
Power Output		+13 dBm	
Mechanical Tuning Range		±50 MHz	
Frequency Stability			±4 ppm
Phase Noise @ 100 kHz Offset		-95 dBc/Hz	
Spurious			-75 dBc
Harmonics			-25 dBc
Bias Voltage	+6 V <sub>DC</sub>	+8 V <sub>DC</sub>	+12 V <sub>DC</sub>
Bias Current		500 mA	
Specification Temperature		+25 °C	
Operating Temperature	0 °C		+50 °C

# PHASE LOCKED OSCILLATOR

**FAMILY: SOP**  
28 GHz

## SOP-28310115-KF-I1

### Features:

- 28 GHz
- Low Phase Noise
- Internal/External Referenced
- 50+ Models to Support 5G Bands



Parameter	Minimum	Typical	Maximum
Frequency		28 GHz	
Output Power		+15 dBm	
Phase Noise (Internally Referenced) @ 10 kHz		-100 dBc/Hz	
Harmonics		-25 dBc	
Spurious		-75 dBc	
DC Voltage Supply		+12 Vdc/450 mA	
Phase Lock Indicator (Lock)		TTL High	
Frequency Stability (Internally Referenced)		±5 ppm	
Specification Temperature		+25 °C	
Operating Temperature	0 °C		+50 °C



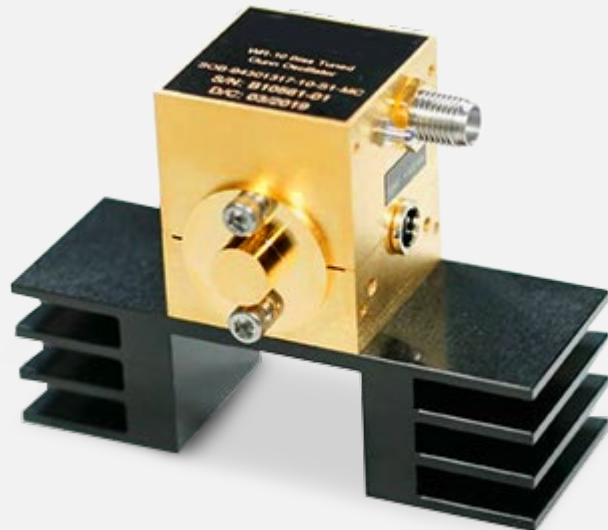
# BIAS TUNED GUNN OSCILLATOR

**FAMILY: SOB**  
94 GHz

## SOB-94301317-10-S1

### Features:

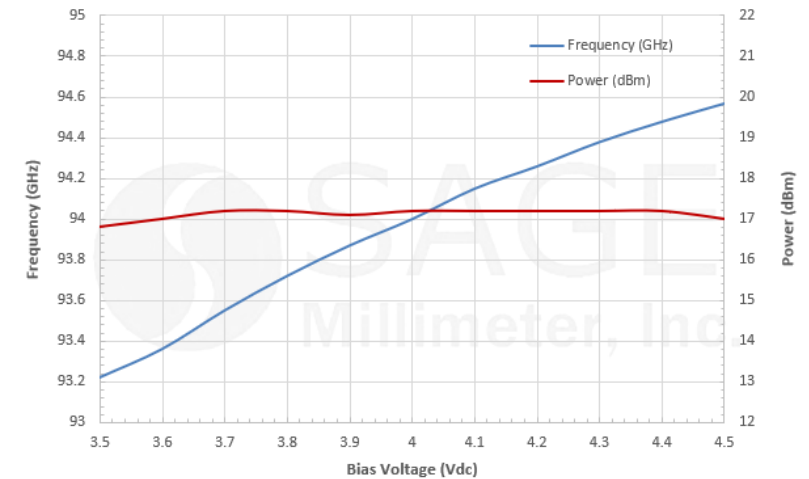
- 94 GHz
- Low AM/FM Noise and Harmonics
- Mechanical Tunable
- 10+ Models to Support 5G Bands



Parameter	Minimum	Typical	Maximum
Center Frequency	93.5 GHz	94 GHz	94.5 GHz
Power Output		+17 dBm	
Mechanical Tuning Range		±100 MHz	
Bias Tuning Range (+3.5 to +4.5 V <sub>DC</sub> )		±500 MHz	
Bias Voltage	+3.5 V <sub>DC</sub>	+4.0 V <sub>DC</sub>	+4.5 V <sub>DC</sub>
Bias Tuning Speed		100 μs	
Bias Current		750 mA	
Specification Temperature		+25 °C	
Operating Temperature	0 °C		+50 °C

Typical Frequency and Power Output vs. Bias Voltage

Bias: +3.5 to +4.5 Vdc/740 mA





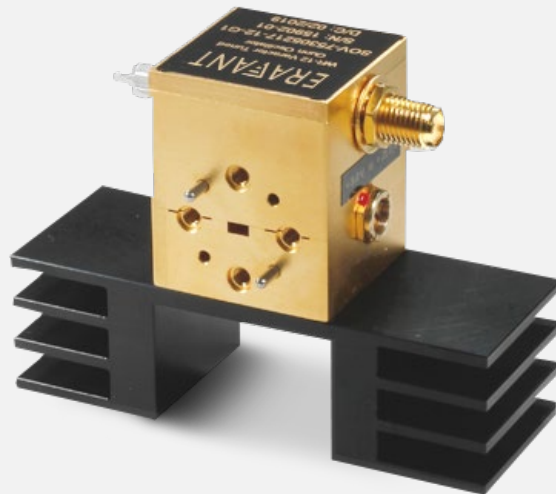
# VIRACTOR TUNED GUNN OSCILLATOR

**FAMILY: SOB**  
94 GHz

## SOV-94306310-10-G1

### Features:

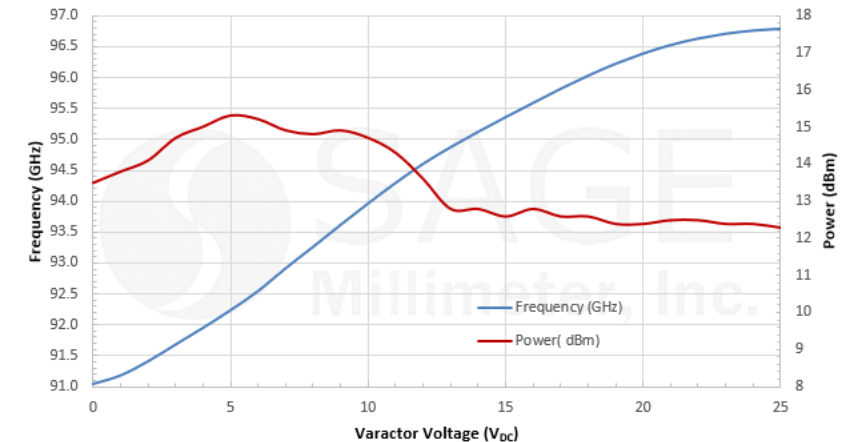
- 94 GHz
- Low AM/FM Noise and Harmonics
- Mechanical Tunable
- 25+ Models to Support 5G Bands



Parameter	Minimum	Typical	Maximum
Center Frequency	91.25 GHz	94.00 GHz	95.75 GHz
Power Output	+10 dBm	+13 dBm	
Mechanical Tuning Range		±100 MHz	
Varactor Tuning Range		±3.0 GHz	
Bias Voltage		+5.0 V <sub>DC</sub>	+5.5 V <sub>DC</sub>
Bias Current		780 mA	
Varactor Tuning Voltage Range	0 V <sub>DC</sub>		+30 V <sub>DC</sub>
Specification Temperature		+25°C	
Operating Temperature	+0°C		+50°C

### Frequency and Power Output vs. Bias Voltage

Bias: +5.0 V<sub>DC</sub>/760 mA



# VOLTAGE TUNED OSCILLATOR

**FAMILY: SOW**  
13 TO 17 GHz

## SOW-15303315-SM-S1-H

### Features:

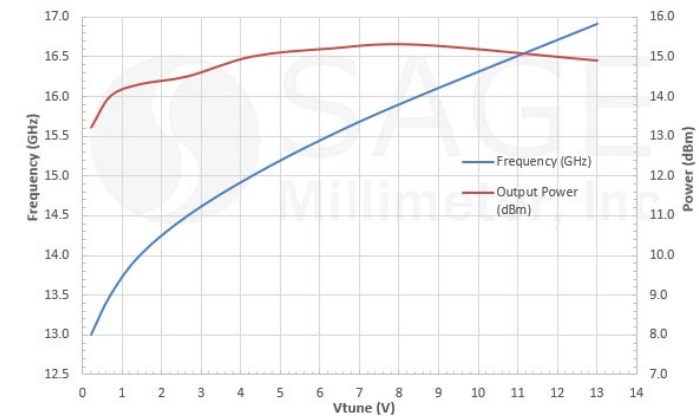
- 13 to 17 GHz
- Broad Tuning Bandwidth
- Good Power Flatness
- 4 Models to Support 5G Bands



Parameter	Minimum	Typical	Maximum
Frequency Range	13 GHz		16.5 GHz
Power Output		+15 dBm	
Frequency Tuning Range		±1.75 GHz	
Harmonics and Sub-harmonics		-18 dBc	
Phase Noise	-85 dBc/Hz @ 100 kHz Offset		
VCO Bias Voltage	+7.0 V <sub>DC</sub>	+8.0 V <sub>DC</sub>	+9.0 V <sub>DC</sub>
Bias Current		200 mA	
Heater Bias		+15 Vdc/100 mA	+15 Vdc/700 mA
Tuning Voltage Range	+0.2 V <sub>DC</sub>		+13 V <sub>DC</sub>
Temperature Stability w/ heater		0.3 MHz/°C	
Specification Temperature		+25 °C	
Operating Temperature	0 °C		+50 °C

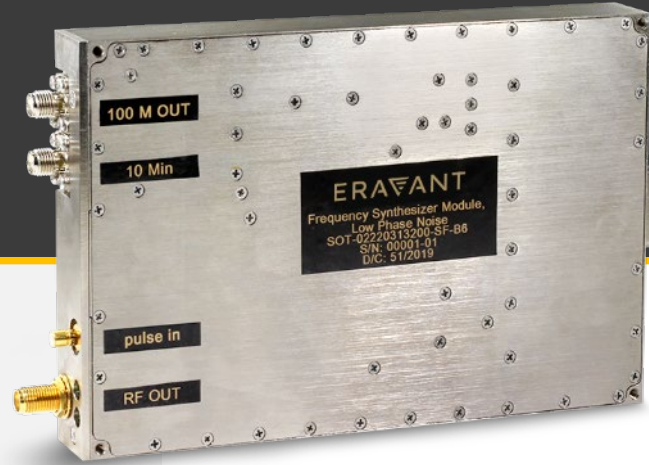
**Output Frequency and Power vs. Tuning Voltage**

Bias: +8V/200mA, Heater: +15V



# VOLTAGE TUNED OSCILLATOR

**FAMILY: SOT**  
200 MHz TO 20 GHz



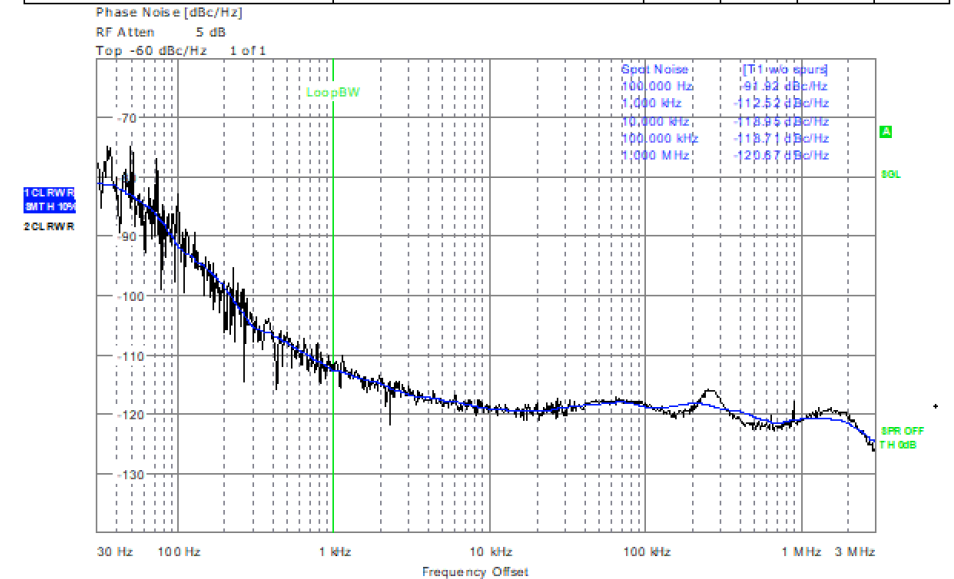
## SOT-02220313200-SF-B6

### Features:

- 200 MHz to 20 GHz
- Low Phase Noise
- Fast Switching Time
- 3 Models to Support 5G Bands

Parameter	Minimum	Typical	Maximum
Output Frequency Range	0.2 GHz		20.0 GHz
Step Size		0.1 Hz	
Output Power*	-20 to +13 dBm (Controllable by Command)		
Output Power Flatness	±2.5 dBm		
Frequency Stability	±0.2 ppm or Same as External Reference		
Frequency Accuracy	±0.2 ppm or Same as External Reference		
Output Spurious		-70 dBc	-65 dBc
Output Harmonics	≤-30 dBc/0.2-12 GHz and ≤-20 dBc/12-20 GHz @ +5 dBm P <sub>out</sub>		
External Reference	10 MHz/ +5 dBm ± 3 dBm		
Lock Indicator	TTL High		
Phase Noise (Internal)**	≤-101 dBc/Hz @ 1 kHz; ≤-110 dBc/Hz @ 10 kHz		
RF Frequency at 20 GHz	≤-110 dBc/Hz @ 100 kHz; ≤-115 dBc/Hz @ 1,000 kHz		
Frequency Switching Time	≤200 μs (Excludes the Series Port Communication Time)		
Control Interface	SPI		
Pulse Modulation Depth	≥60 dBc @ Output Power + 10 dBm		
Pulse Modulation Pulse Width	0.1 mS	5 mS	10 mS
Pulse Modulation Time	≤30 nS Rise/50 nS Fall		
Supply Voltage/Current	+12 V <sub>DC</sub> /1,600 mA		
Specification Temperature	+25 °C		
Operating Temperature	-40 °C		+70 °C

R&S FSUP 26 Signal Source Analyzer				LOCKED
Settings	Residual Noise [T1 w/o spurs]		Phase Detect or +20 dB	
Signal Frequency:	9.999982 GHz	Int PHN (30.0 .. 3.0 M)	-55.8 dBc	
Signal Level:	12.47 dBm	Residual PM	0.132 °	
Cross Corr Mode	Harmonic 1	Residual FM	3.208 kHz	
Internal Ref Tuned	Internal Phase Det	RMS Jitter	0.0367 ps	



# ELECTRICAL ATTENUATOR

**FAMILY: SKA**  
18 TO 40 GHz

## SKA-1834033537-KFKF-A1-M

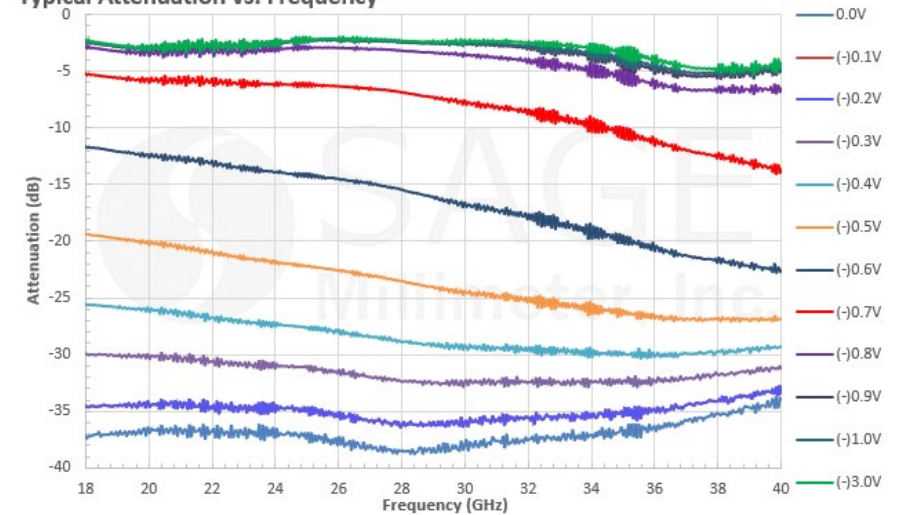
### Features:

- 18 to 40 GHz
- 35 dB Dynamic Range
- High Speed
- SKA Family Covers up to 110 GHz



Parameter	Minimum	Typical	Maximum
Frequency	18 GHz		40 GHz
Insertion Loss		3.5 dB	
Attenuation Range		37 dB	
Input P <sub>1dB</sub>		+10 dBm	
Damage RF Power Level			+30 dBm
Control Voltage		0 to -3 V <sub>DC</sub>	
Damage Control Voltage Level			-5 V <sub>DC</sub>
Input Return Loss		8 dB	
Output Return Loss		9 dB	
Specification Temperature		+25 °C	
Operating Temperature	0 °C		+50 °C

Typical Attenuation vs. Frequency



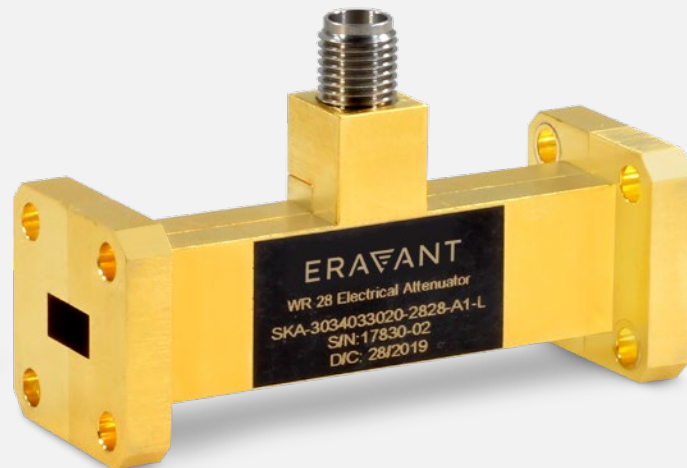
# ELECTRICAL ATTENUATOR

**FAMILY: SKA**  
26.5 TO 40 GHz

## SKA-2734032530-2828-A1

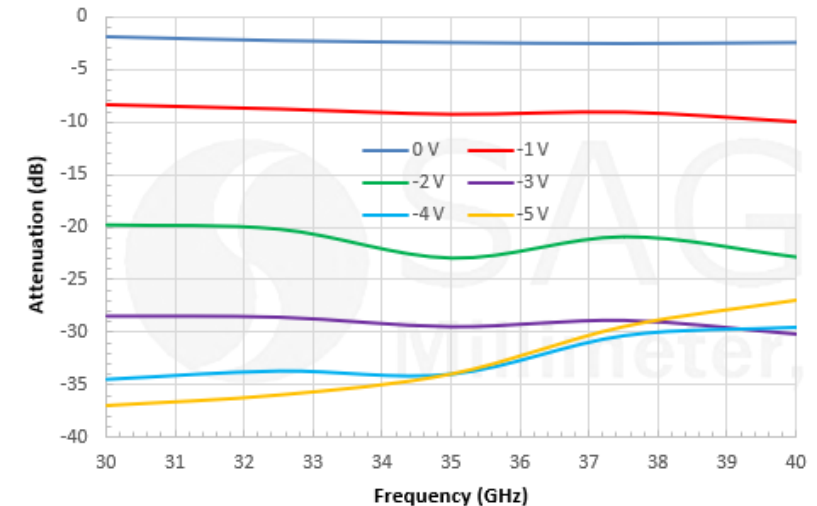
### Features:

- 26.5 to 40 GHz
- 30 dB Dynamic Range
- High Speed
- SKA Family Covers up to 110 GHz



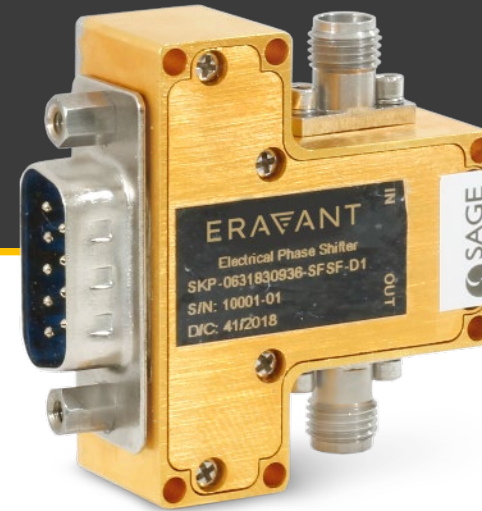
Parameter	Minimum	Typical	Maximum
Frequency	26.5 GHz		40 GHz
Insertion Loss		2.5 dB	3.0 dB
Attenuation		30 dB	
Power Handling		+20 dBm	+23 dBm
Control Voltage		0 to -5 V <sub>DC</sub>	
Control Current		10 mA	
Control Speed		100 ns	
Specification Temperature		+25 °C	
Operating Temperature	-40 °C		+85 °C

Typical Attenuation vs. Frequency



# SPST PIN SWITCH

**FAMILY: SKS**  
30 TO 40 GHz



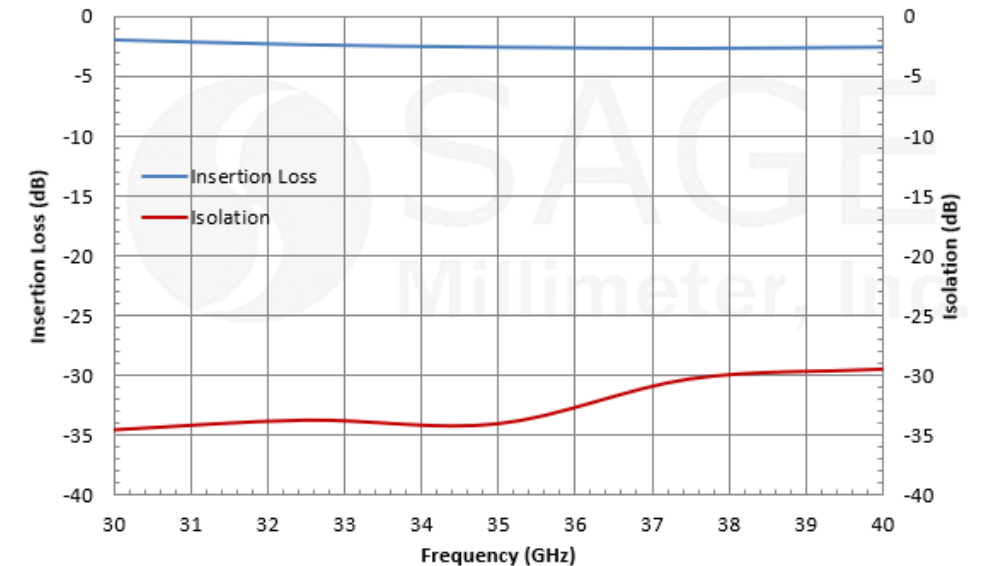
## SKS-3034032030-KFKF-A1-M

### Features:

- 30 to 40 GHz
- 30 dB Control Range
- 100 ns Switching Speed
- SKS Family Covers up to 110 GHz

Parameter	Minimum	Typical	Maximum
Frequency	30 GHz		40 GHz
Insertion Loss		2.0 dB	
Isolation		30 dB	
Return Loss		9 dB	
Power Handling			+23 dBm
Bias Voltage		$\pm 5 V_{DC}$	
Bias Current		25 mA	
Control Signal		TTL	
Switching Speed		100 ns	
Switch Type		Absorptive	
Specification Temperature		+25 °C	
Operating Temperature	-25 °C		+65 °C

Typical Insertion Loss and Isolation vs. Frequency





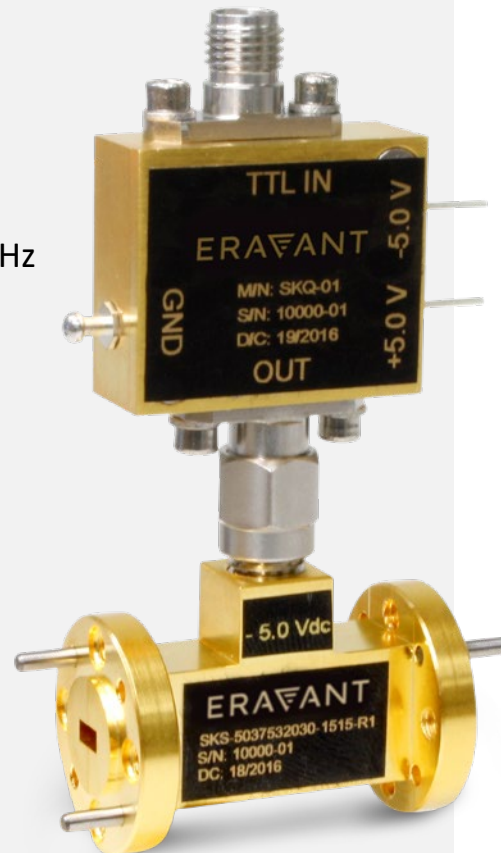
# SPST PIN SWITCH

**FAMILY: SKS**  
75 TO 110 GHz

## SKS-7531142520-1010-R1

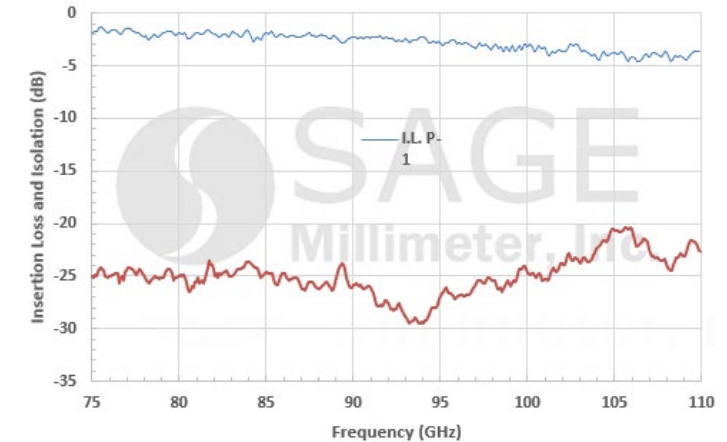
### Features:

- 75 to 110 GHz
- 25 dB Control Range
- 100 ns Switching Speed
- SKS Family Covers up to 110 GHz



Parameter	Minimum	Typical	Maximum
RF Frequency	75 GHz		110 GHz
Insertion Loss		2.5 dB	
Isolation		15 dB	
Power Handling		+20 dBm	+23 dBm
Bias Voltage		$\pm 5 V_{DC}$	
Bias Current		10 mA	
Control Signal		TTL	
Switching Speed		100 ns	
Specification Temperature		+25 °C	
Operating Temperature	-40 °C		+85 °C

Typical Insertion Loss and Isolation vs. Frequency



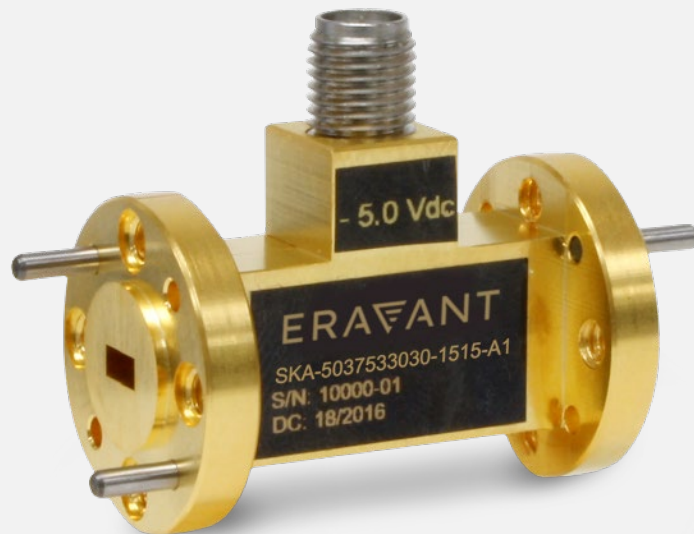
# ELECTRICAL ATTENUATOR

**FAMILY: SKA**  
50 TO 75 GHz

## SKA-5037533030-1515-A1

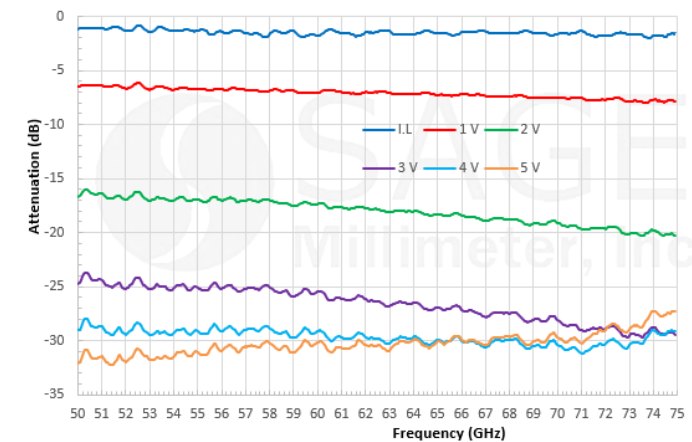
### Features:

- 50 to 75 GHz
- 33 dB Dynamic Range
- High Speed
- SKA Family Covers up to 110 GHz



Parameter	Minimum	Typical	Maximum
Frequency	50 GHz		75 GHz
Insertion Loss		2.5 dB	3.0 dB
Attenuation	2.5 dB	30 dB	
Power Handling		+20 dBm	+23 dBm
Control Voltage		0 to -5 V <sub>DC</sub> / 5 mA	0 to -6 V <sub>DC</sub> / 8 mA
Control Speed		100 ns	
Specification Temperature		+25 °C	
Operating Temperature	-40 °C		+85 °C

Typical Attenuation vs. Frequency at Various Control Voltage Value





# SP4T PIN SWITCH

**FAMILY: SK4**  
0.5 TO 43 GHz

## SK4-0524335060-KFKF-A3

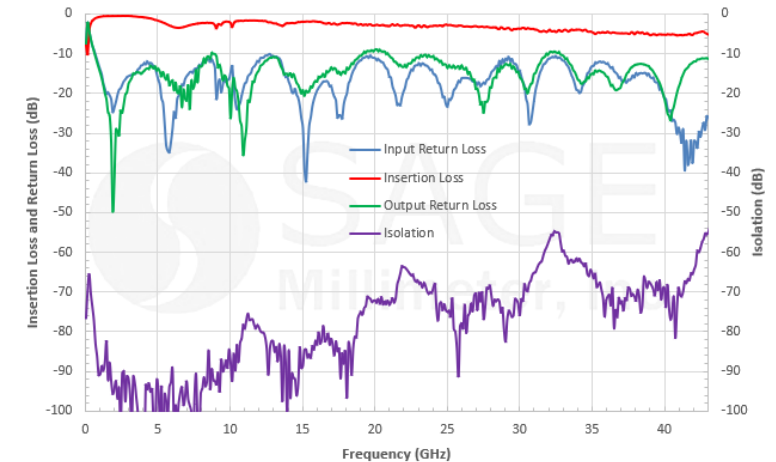
### Features:

- 0.5 to 43 GHz
- 60 dB Control Range
- 100 ns Switching Speed
- SK4 Family Covers up to 110 GHz



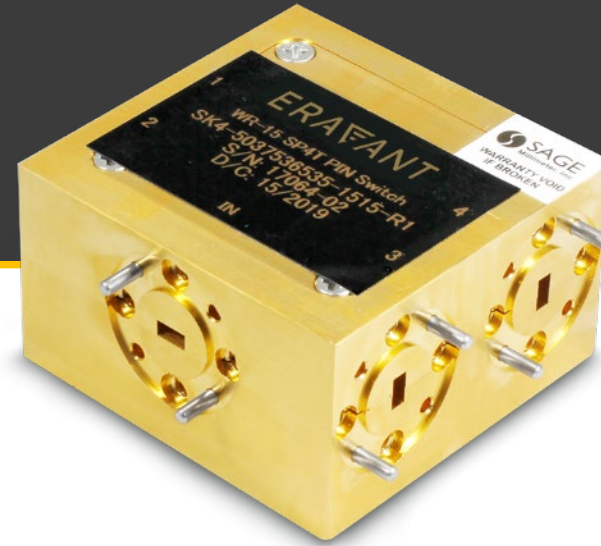
Parameter	Minimum	Typical	Maximum
Frequency	0.5 GHz		43 GHz
Insertion Loss		5.0 dB	
Return Loss		10 dB	
Isolation	45 dB	60 dB	
Operational RF Input Power			+20 dBm
Damage RF Input Power			+27 dBm
Bias Voltage		$\pm 5 V_{DC}$	
Bias Current		100/50 mA	
Control		TTL	
Switching Speed		100 ns	
Specification Temperature		+25 °C	
Operation Temperature	0 °C		+50 °C

Typical Performance vs. Frequency



# SP4T PIN SWITCH

**FAMILY: SK4**  
60 TO 90 GHz



## SK4-6039038030-1212-R1-M

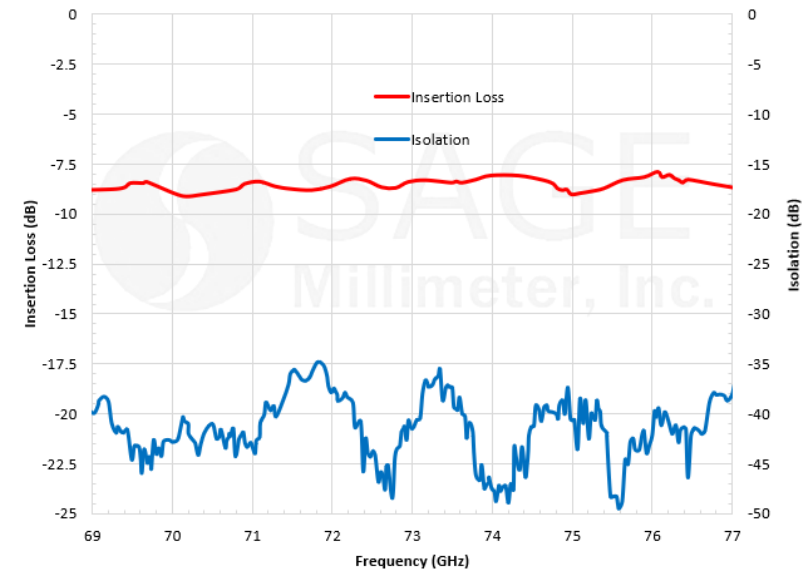
### Features:

- 60 to 90 GHz
- 30 dB Control Range
- 100 ns Switching Speed
- SK4 Family Covers up to 110 GHz

Parameter	Minimum	Typical	Maximum
Frequency	60 GHz		90 GHz
Insertion Loss		8 dB	
Return Loss		10 dB	
Isolation		30 dB	
Maximum Input RF Power		+20 dBm	+23 dBm
Bias Voltage		$\pm 5 V_{DC}$	
Bias Current		30 mA	
Control		TTL	
Switching Speed		100 nS	
Specification Temperature		+25 °C	
Operation Temperature	0 °C		+50 °C

### Typical Insertion Loss and Isolation vs. Frequency

Bias:  $\pm 5 V_{DC}/30 \text{ mA}$



# WAVEGIDE POWER DIVIDER 2 WAY, RIGHT ANGLE

**FAMILY: SWP**  
26.5 TO 40 GHz

## SWP-27340302-28-S1

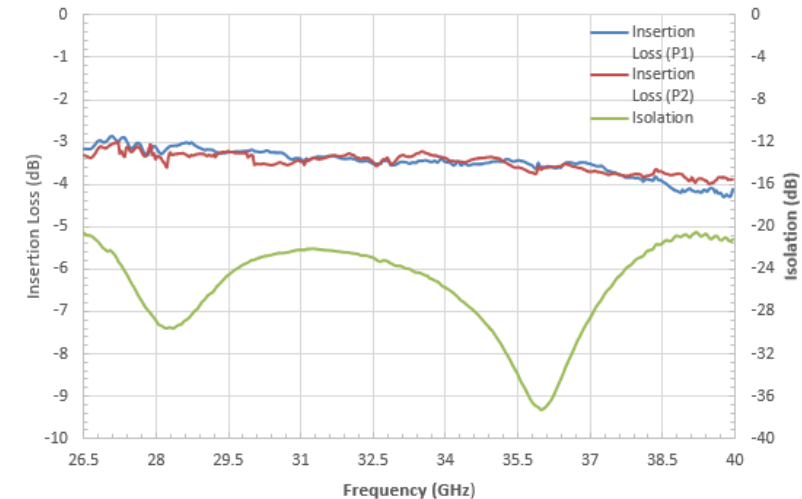
### Features:

- 26.5 to 40 GHz
- Right Angle and End Launch
- 2-Way, 4-Way, 8-Way and 16-Way
- 50+ Models to Support 5G Bands
- Frequency up to 110 GHz



Parameter	Minimum	Typical	Maximum
Frequency	27 GHz		40 GHz
Amplitude Unbalance		±0.2 dB	
Insertion Loss		0.4 dB	
Port Isolation		20 dB	
Port Return Loss		20 dB	
Specification Temperature		+25 °C	
Operating Temperature	-40 °C		+85 °C

Typical Insertion Loss & Isolation vs. Frequency



# WAVEGIDE POWER DIVIDER 2 WAY, RIGHT ANGLE

**FAMILY: SWP**  
50 TO 75 GHz

## SWP-50375302-15-S1

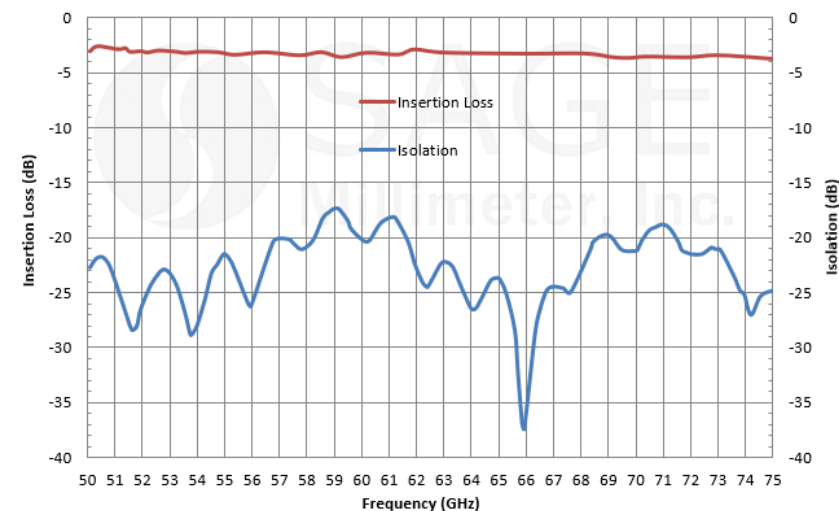
### Features:

- 50 to 75 GHz
- Right Angle and End Launch
- 2-Way, 4-Way, 8-Way and 16-Way
- 50+ Models to Support 5G Bands
- Frequency up to 110 GHz



Parameter	Minimum	Typical	Maximum
Frequency	50 GHz		75 GHz
Power Unbalance			$\pm 0.20$ dB
Insertion Loss		0.5 dB	0.8 dB
Isolation		20 dB	
Input/Output VSWR			1.5:1
Specification Temperature		+25°C	
Operating Temperature	-40°C		+85°C

Typical Insertion Loss and Isolation vs. Frequency



# WAVEGIDE POWER DIVIDER 2 WAY, INLINE

**FAMILY: SWP**  
50 TO 75 GHz

## SWP-50375302-15-E2

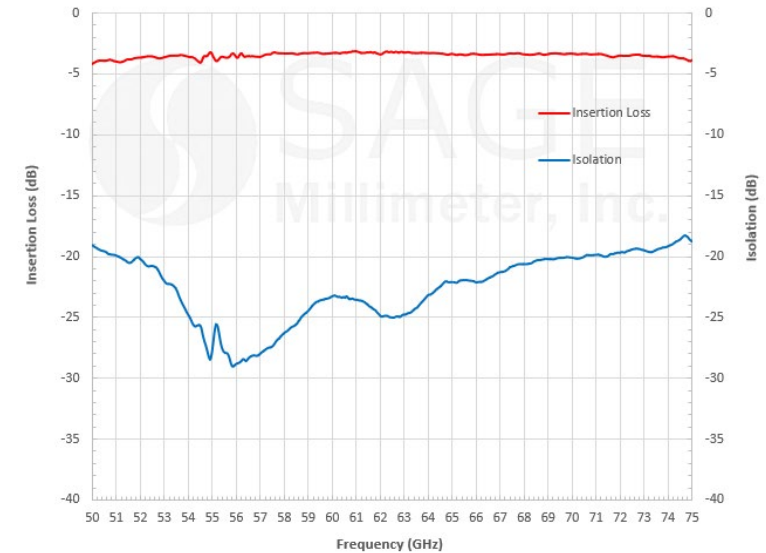
### Features:

- 50 to 75 GHz
- Right Angle and End Launch
- 2-Way, 4-Way, 8-Way and 16-Way
- 50+ Models to Support 5G Bands
- Frequency up to 110 GHz



Parameter	Minimum	Typical	Maximum
Frequency	50 GHz		75 GHz
Power Unbalance			±0.20 dB
Insertion Loss		0.5 dB	
Isolation		20 dB	
Return Loss		15 dB	
Specification Temperature		+25°C	
Operating Temperature	-40°C		+85°C

Typical Performance vs. Frequency



# WAVEGIDE POWER DIVIDER 4 WAY, INLINE

**FAMILY: SWP**  
30 TO 40 GHz

## SWP-30340304-28-E1

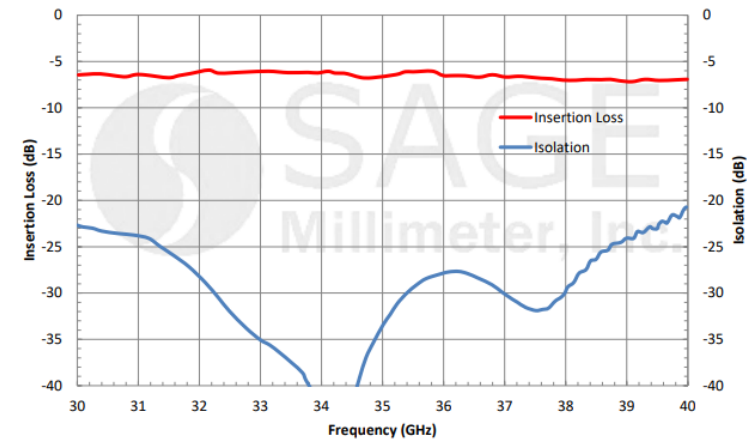
### Features:

- 30 to 40 GHz
- Right Angle and End Launch
- 2-Way, 4-Way, 8-Way and 16-Way
- 50+ Models to Support 5G Bands
- Frequency up to 110 GHz



Parameter	Minimum	Typical	Maximum
Frequency	30 GHz		40 GHz
Insertion Loss		0.5 dB	
Power Unbalance		±0.4 dB	
Port Isolation		20 dB	
Port Return Loss		15 dB	
Power Handling			100 W (CW)
Specification Temperature		+25 °C	
Operating Temperature	-40 °C		+85 °C

Typical Insertion Loss and Isolation vs. Frequency





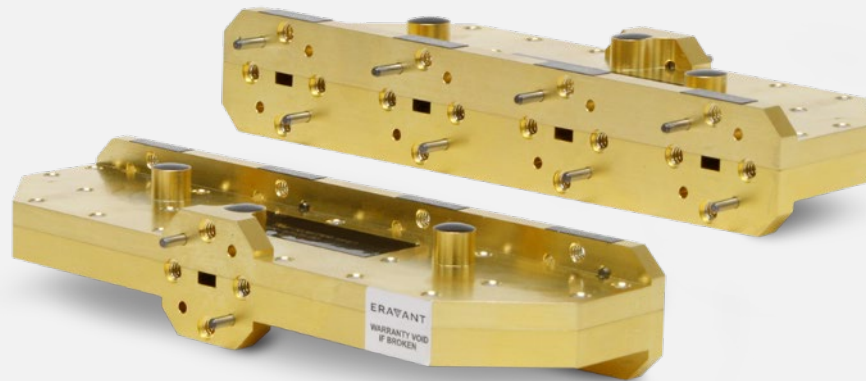
# WAVEGUIDE POWER DIVIDER 4 WAY, INLINE

**FAMILY: SWP**  
50 TO 75 GHz

## SWP-50375304-15-E1

### Features:

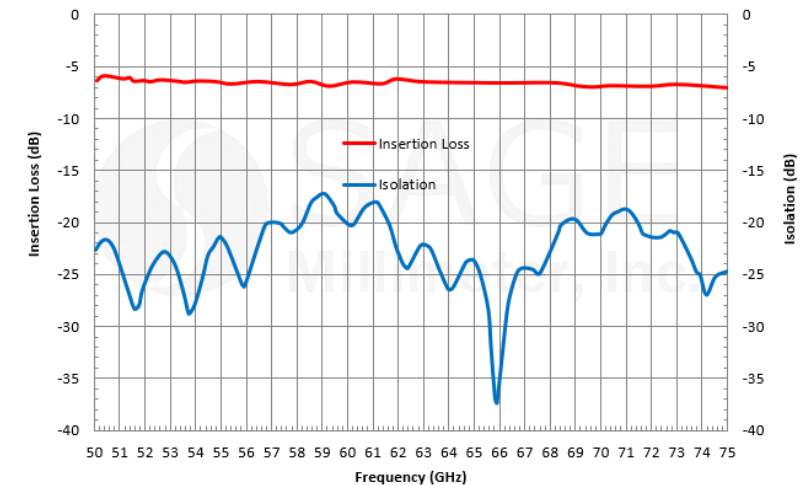
- 50 to 75 GHz
- Right Angle and End Launch
- 2-Way, 4-Way, 8-Way and 16-Way
- 50+ Models to Support 5G Bands
- Frequency up to 110 GHz



Parameter	Minimum	Typical	Maximum
Frequency	50 GHz		75 GHz
Power Unbalance			±0.20 dB
Insertion Loss		1.0 dB	1.2 dB
Isolation		20 dB	
Input/ Output Return Loss		20 dB	
Specification Temperature		+25 °C	
Operating Temperature	-40 °C		+85 °C

### Typical Insertion Loss and Isolation vs. Frequency

Isolation was tested between adjacent ports (i.e. 1-2, 3-4)



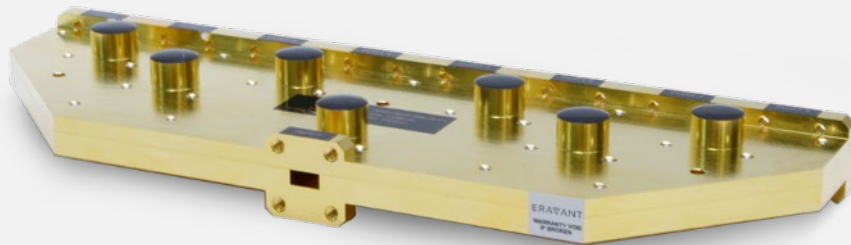
# WAVEGIDE POWER DIVIDER 8 WAY, INLINE

**FAMILY: SWP**  
28 TO 31 GHz

## SWP-29331308-28-E1

### Features:

- 28 to 31 GHz
- Right Angle and End Launch
- 2-Way, 4-Way, 8-Way and 16-Way
- 50+ Models to Support 5G Bands
- Frequency up to 110 GHz



Parameter	Minimum	Typical	Maximum
Frequency	28.5 GHz		30.5 GHz
Power Unbalance		±0.20 dB	
Insertion Loss		0.9 dB	
Isolation		25 dB	
Return Loss		15 dB	
Specification Temperature		+25 °C	
Operating Temperature	-40 °C		+85 °C



# COAX POWER DIVIDER

**FAMILY: SCS**  
1 TO 40 GHz

**More Than 50 Models: 2 Way, 4 Way, 8 Way and 16 Way**



**SCS-0134031215-KFKF-22**  
1 to 40 GHz, 2 Way

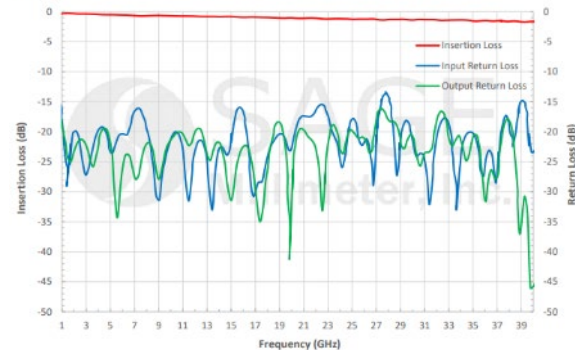


**SCS-0134035014-KFKF-41**  
1 to 40 GHz, 4 Way

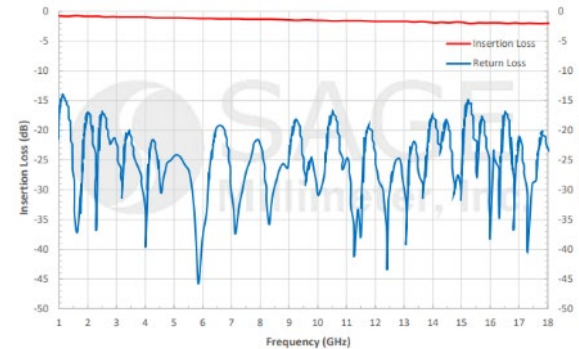


**SCS-1034032615-KFKF-82**  
10 to 40 GHz, 8 Way

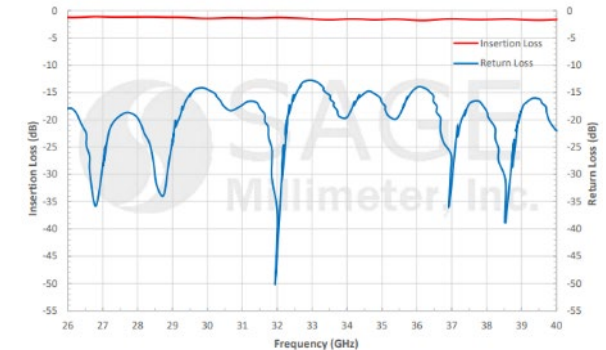
Typical Performance vs. Frequency



Typical Performance vs. Frequency



Typical Performance vs. Frequency



# COAX HYBRID COUPLER

**FAMILY: SCZ**  
1 TO 40 GHz

**More Than 15 Models: 2.92 mm, SMA**



**SCZ-0131831509-SFSF-43**  
1 to 18 GHz, 90 Degree

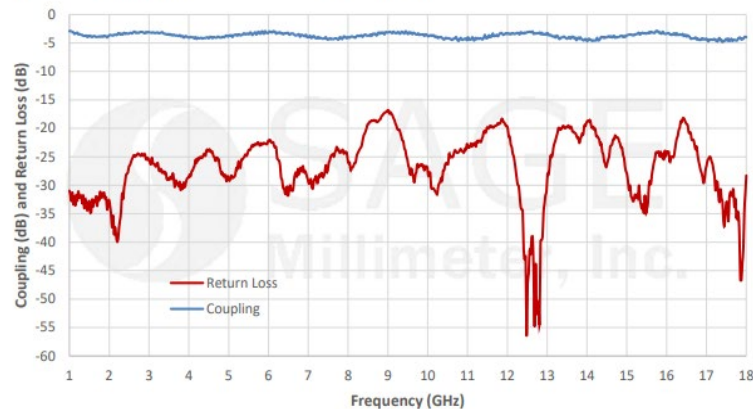


**SCZ-0432431409-SFSF-43**  
4 to 24 GHz, 90 Degree

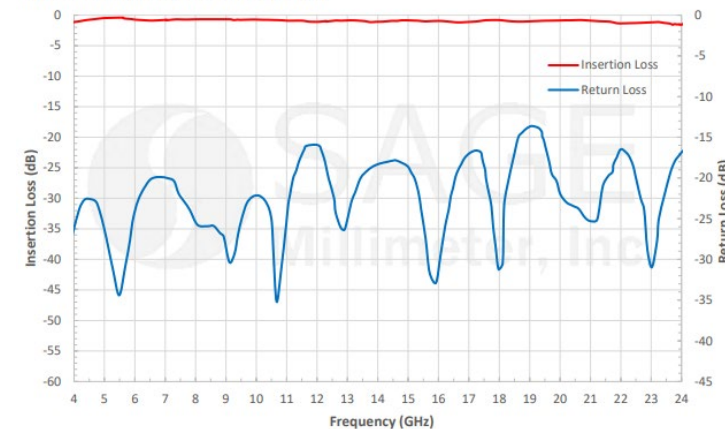


**SCZ-1834031209-KFKF-43**  
18 to 40 GHz, 90 Degree

**Typical Coupling and Return Loss vs Frequency**



**Typical Performance vs. Frequency**



# MAGIC TEE

**FAMILY: SWM**  
33 TO 50 GHz

## SWM-33350320-22-SB

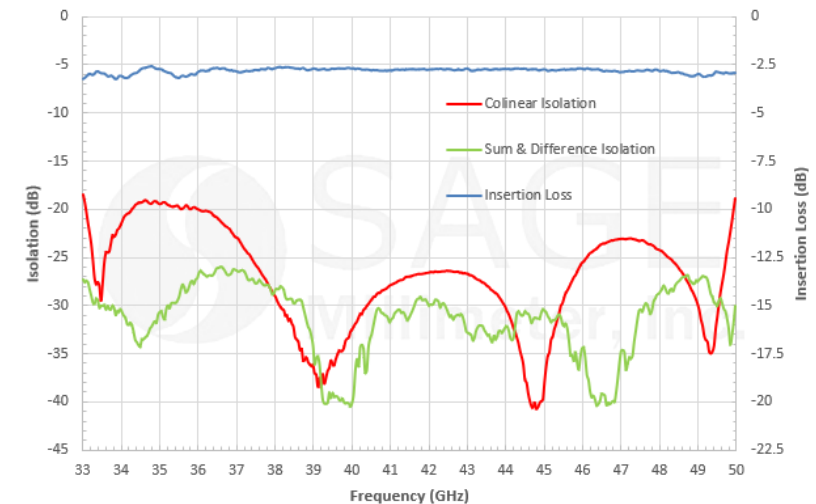
### Features:

- 33 to 50 GHz
- Full Waveguide Band
- High Performance
- 10+ Models to Support 5G Bands
- Frequency up to 110 GHz



Parameter		Minimum	Typical	Maximum
Frequency		33 GHz		50 GHz
Insertion Loss			0.3 dB	
Isolation	Sum and Difference Ports		30 dB	
	Collinear Ports	15 dB	20 dB	
Return Loss			14 dB	
Specification Temperature			+25°C	
Operating Temperature		-40°C		+85°C

Typical Isolation and Insertion Loss vs. Frequency



# MAGIC TEE

**FAMILY: SWM**  
75 TO 110 GHz

## SWM-75311420-10-SB

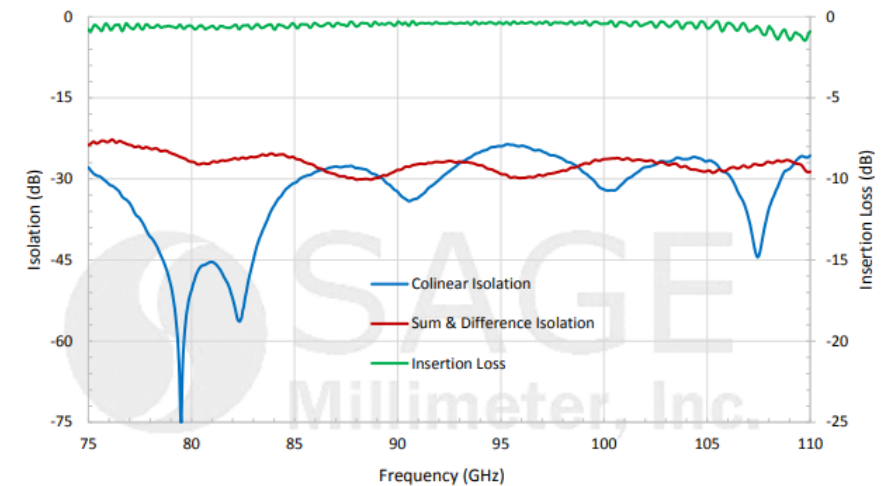
### Features:

- 75 to 110 GHz
- Full Waveguide Band
- High Performance
- 10+ Models to Support 5G Bands
- Frequency up to 110 GHz



Parameter	Minimum	Typical	Maximum
Frequency	75 GHz		110 GHz
Insertion Loss		0.3 dB	
Isolation	Sum and Difference Ports	30 dB	
	Collinear Ports	20 dB	
Return Loss		14 dB	
Specification Temperature		+25 °C	
Operating Temperature	-40 °C		+85 °C

Typical Isolation and Insertion Loss vs Frequency



# WAVEGUIDE DIRECTIONAL COUPLER

**FAMILY: SWD**  
24 TO 42 GHz

## SWD-1040H-28-SB

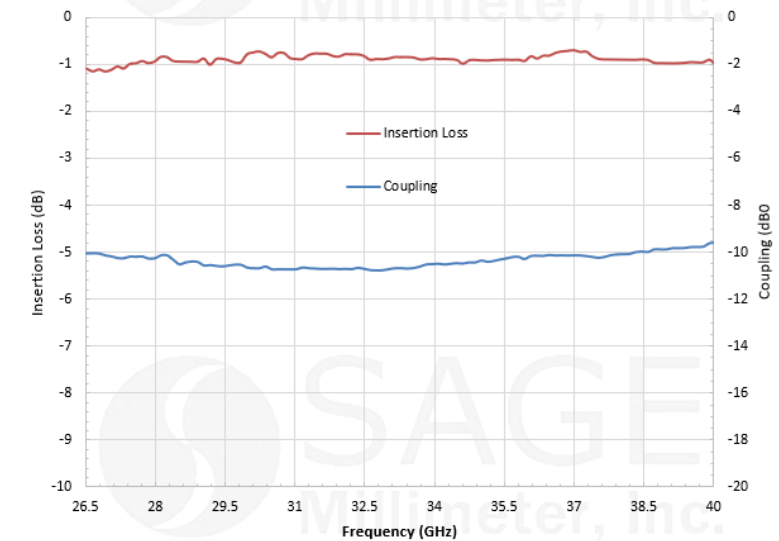
### Features:

- 24 to 42 GHz
- 3, 6, 10, 20, 30 and 40 dB
- 3 Port, Bi-Directional and Dual-Directional
- 100+ Models to Support 5G Bands
- Frequency up to 170 GHz



Parameter	Minimum	Typical	Maximum
Frequency	26.5 GHz		40 GHz
Insertion Loss*		0.5 dB	
Coupling*		10 dB	
Directivity*	35 dB		
Return Loss			26 dB
Specification Temperature		+25 °C	
Operating Temperature	-40 °C		+85 °C

Typical Coupling and Insertion Loss vs. Frequency



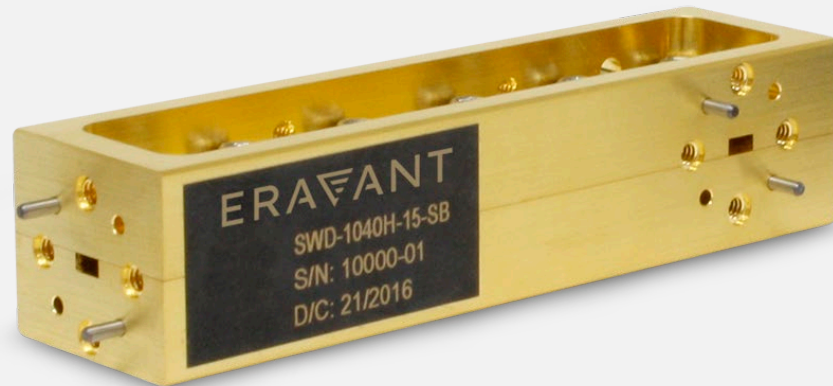
# WAVEGUIDE DIRECTIONAL COUPLER

**FAMILY: SWD**  
50 TO 75 GHz

## SWD-1040H-15-SB

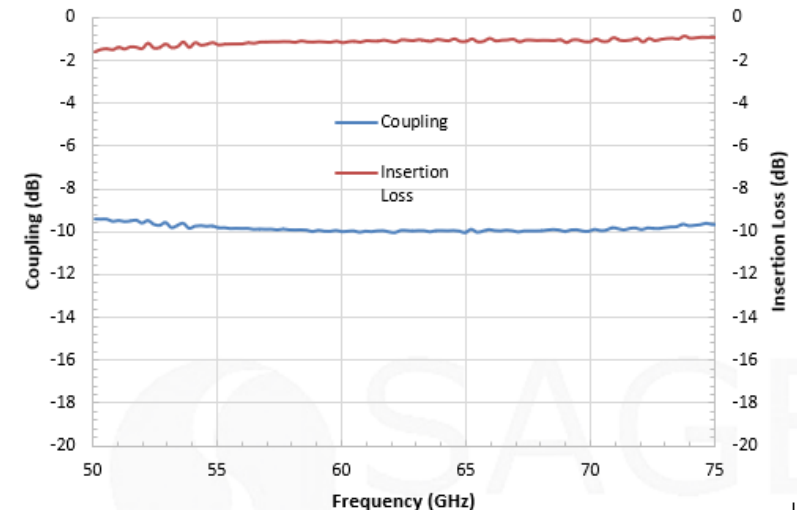
### Features:

- 50 to 75 GHz
- 3, 6, 10, 20, 30 and 40 dB
- 3 Port, Bi-Directional and Dual-Directional
- 100+ Models to Support 5G Bands
- Frequency up to 170 GHz



Parameter	Minimum	Typical	Maximum
Frequency	50 GHz		75 GHz
Insertion Loss*		0.7 dB	
Coupling*		10 dB	
Directivity*	30 dB	40 dB	
VSWR			1.1:1
Specification Temperature		+25°C	
Operating Temperature	-40°C		+85°C

Typical Coupling and Insertion Loss vs. Frequency





# WAVEGUIDE DIRECTIONAL COUPLER

**FAMILY: SCD**  
1 TO 67 GHz

**More Than 25 Models: 1.85 mm, 2.4 mm, 2.92 mm and SMA**

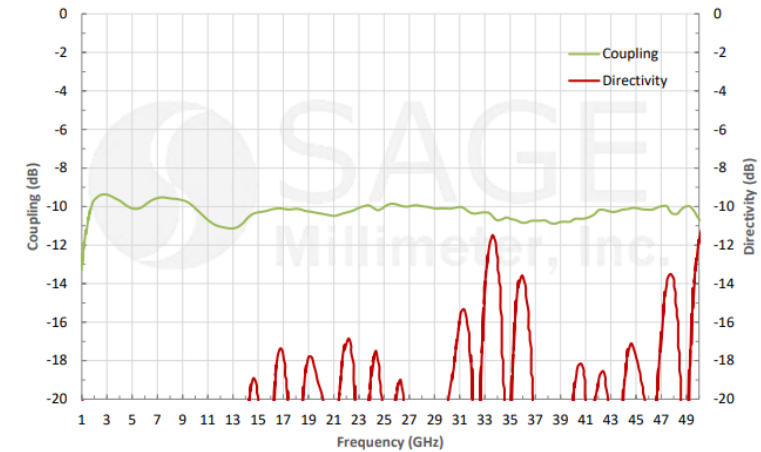


**SCD-0135031008-2F-SA**  
1 to 50 GHz, 10 dB

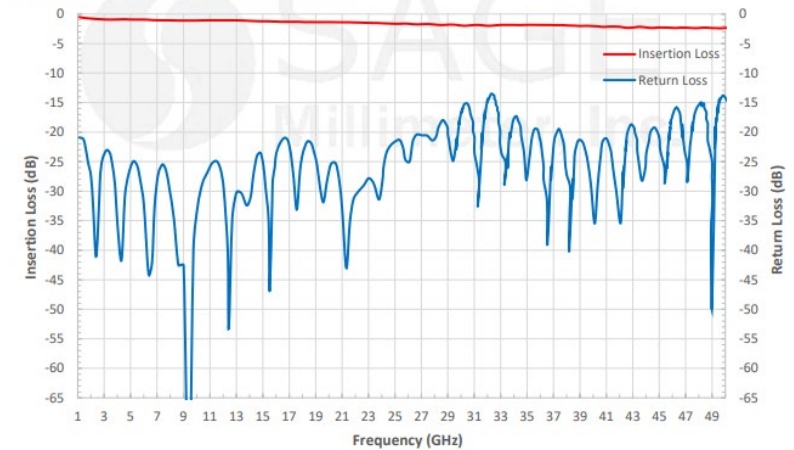


**SCD-0135032008-2F-SA**  
1 to 50 GHz, 20 dB

**Typical Coupling and Directivity vs. Frequency**



**Typical Performance vs. Frequency**



# WAVEGUIDE BANDPASS FILTER

**FAMILY: SWF**  
Ka BAND

## SWF-25301340-28-B2-D

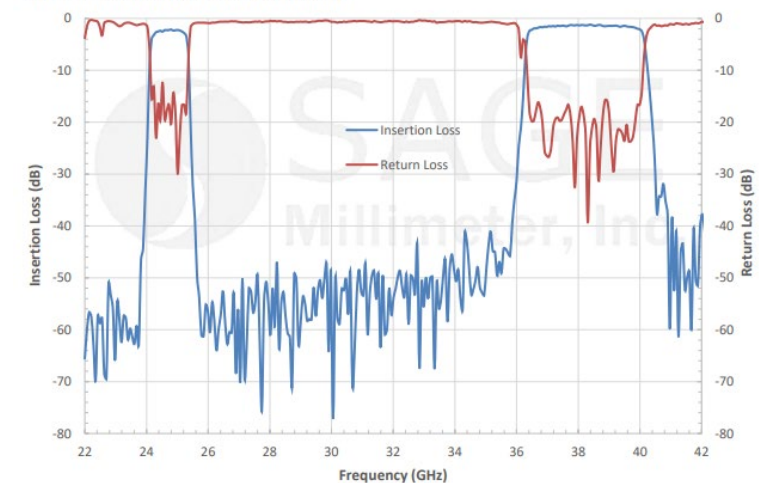
### Features:

- Dual Passband, 24 and 38 GHz
- High Rejection
- Waveguide Interface
- Other Frequency Available



Parameter	Minimum	Typical	Maximum
Passband Frequency	24.25 GHz		25.25 GHz
Passband Frequency 2	36.25 GHz		40.00 GHz
Passband Insertion Loss		3.0 dB	
Passband Ripple		±1.0 dB	
Rejection Frequency 1	DC		23.8 GHz
Rejection Frequency 2	27.0 GHz		35.5 GHz
Rejection Frequency 3	42.0 GHz		49.0 GHz
Rejection		40 dB	
Return Loss		14.0 dB	
Power Handling			10 Watts
Specification Temperature		+25°C	
Operating Temperature	-40°C		+85°C

Typical Performance vs. Frequency





# WAVEGUIDE LOWPASS FILTER

**FAMILY: SWF**  
Ka BAND

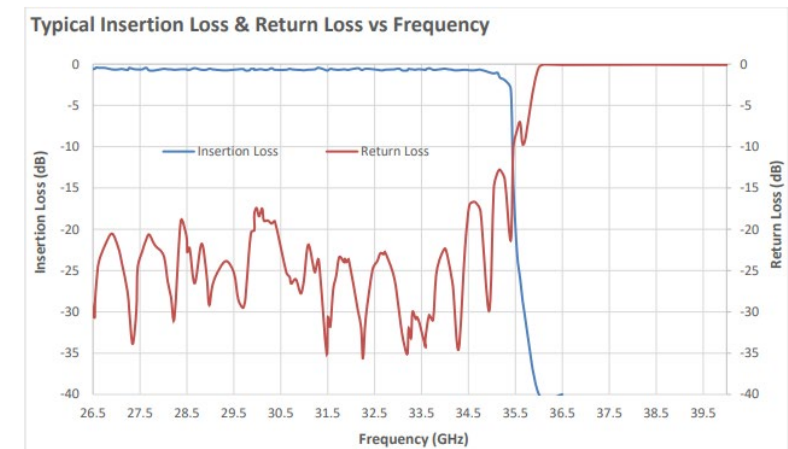
## SWF-34337340-28-L1

### Features:

- 22 to 34 GHz
- High Rejection
- Waveguide Interface
- Other Frequency Available



Parameter	Minimum	Typical	Maximum
Passband Frequency	22 GHz		34 GHz
Passband Insertion Loss		1 dB	
Rejection Frequency, Low Side	DC		20 GHz
Rejection Frequency, High Side	37 GHz		70 GHz
Rejection		40 dB	
Passband Return Loss			14 dB
Power Handling			100 W (CW)
Specification Temperature		+25 °C	
Operating Temperature	-40 °C		+85 °C



# WAVEGUIDE HIGHPASS FILTER

**FAMILY: SWF**  
Ka BAND

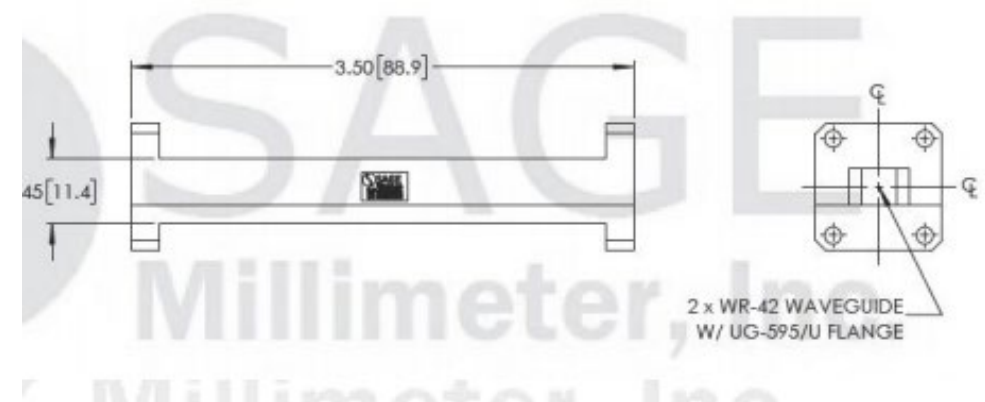
## SWF-24323340-42-H1

### Features:

- Passband: 24 GHz and Higher
- High Rejection
- Waveguide Interface
- Other Frequency Available



Parameter	Minimum	Typical	Maximum
Passband Frequency	24.1 GHz		
Passband Insertion Loss		0.5 dB	
Rejection Frequency	DC		23.1 GHz
Rejection		40 dB	
Specification Temperature		+25°C	
Operating Temperature	-40°C		+85°C



# COAX FILTER, BANDPASS

**FAMILY: SCF**  
2 TO 40 GHz

**More Than 25 Models**  
**Bandpass Filter**

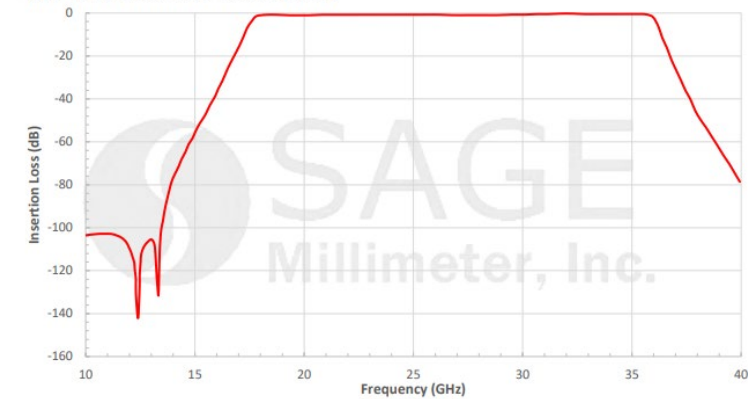


**SCF-27317335-VFVF-B1**  
Passband: 18 to 35 GHz

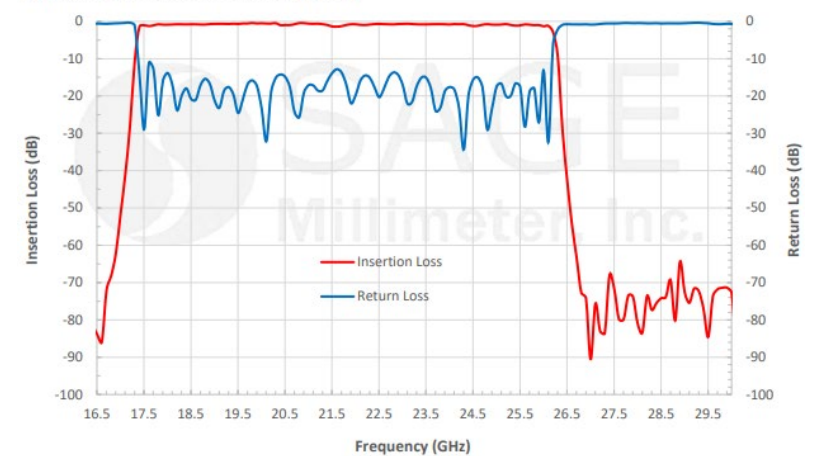


**SCF-22308340-SFSF-B3**  
Passband: 18 to 26.5 GHz

**Typical Insertion Loss vs. Frequency**



**Typical Performance vs. Frequency**



# COAX FILTER, BANDSTOP

FAMILY: SCF

## SCF-24324340-KFKF-N3

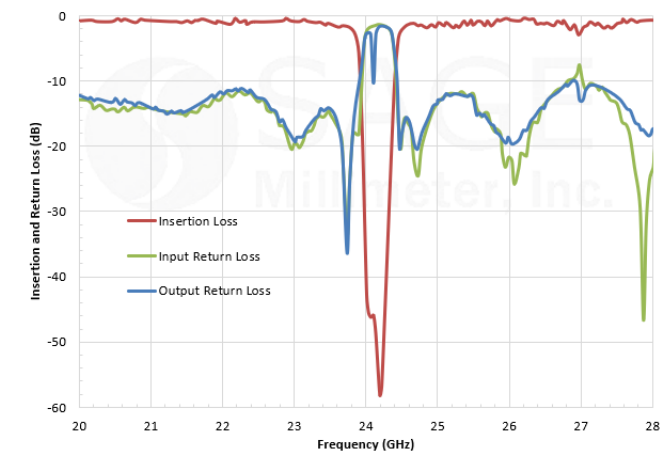
### Features:

- Notch at 24.125 GHz
- High Rejection
- Narrow Notch Bandwidth
- Other Frequency Available



Parameter	Minimum	Typical	Maximum
Passband Frequency, Low Side	DC		23.5 GHz
Passband Frequency, High Side	25 GHz		40 GHz
Passband Insertion Loss		3.0 dB	
Rejection Frequency	24.0 GHz		24.25 GHz
Rejection		40 dB	
Passband Return Loss		9 dB	
Impedance		50 $\Omega$	
Power Handling			1 W (CW)
Specification Temperature		+25 $^{\circ}$ C	
Operating Temperature	-20 $^{\circ}$ C		+60 $^{\circ}$ C

Typical Performance vs. Frequency



# COAX FILTER, LOWPASS

**FAMILY: SCF**  
15 TO 110 GHz

**10 Models**  
**Highpass Filter**

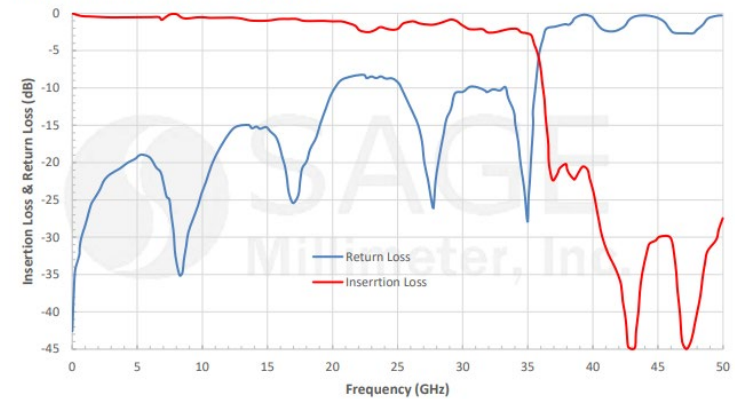


**SCF-33337325-KFKM-L3**  
Passband: DC to 30 GHz

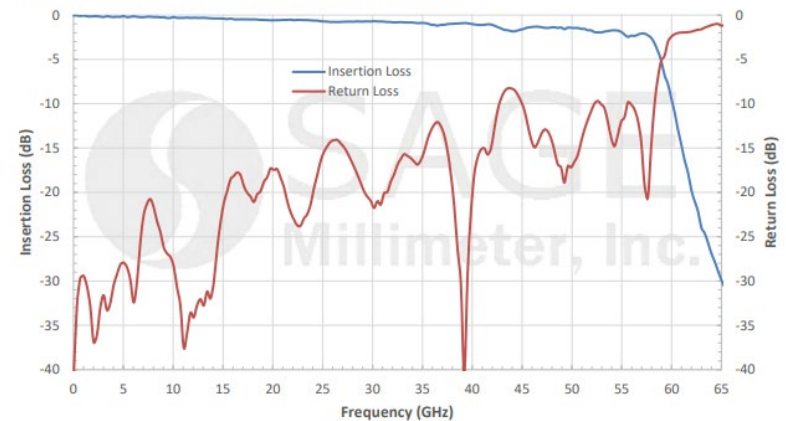


**SCF-55375330-KFKM-L1**  
Passband: DC to 55 GHz

Typical Performance vs. Frequency



Typical Insertion and Return Loss vs Frequency



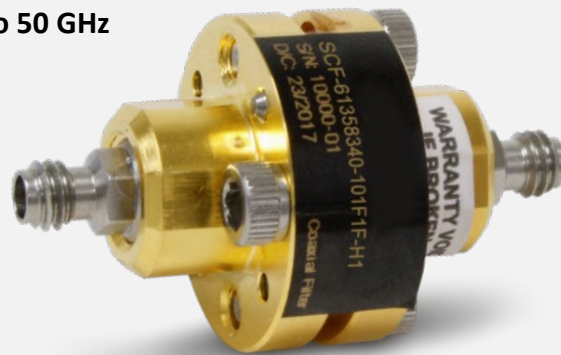
# COAX FILTER, HIGHPASS

**FAMILY: SCF**  
15 TO 110 GHz

**10 Models**  
**Highpass Filter**

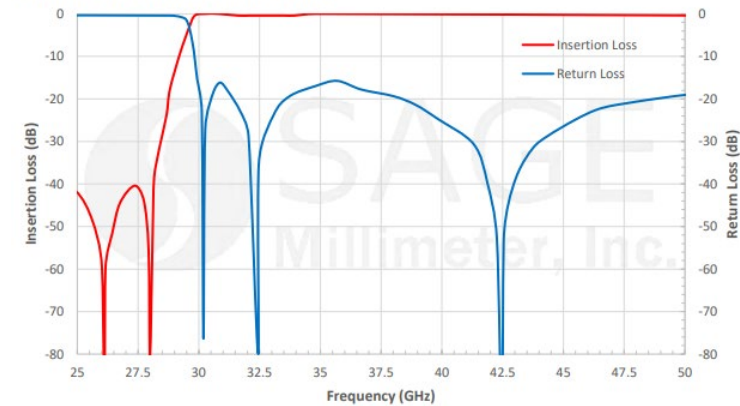


**SCF-30328330-2F2F-H3**  
Passband: 30 to 50 GHz

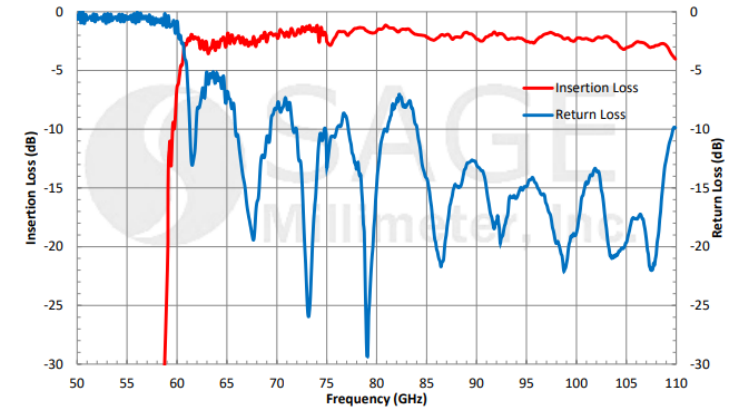


**SCF-61358340-101F1F-H1**  
Passband: 61 to 110 GHz

Typical Performance vs. Frequency



Typical Insertion and Return Loss vs. Frequency





# INTERCONNECTION COMPONENTS

# INTERCONNECTION COMPONENTS FOR RADAR SYSTEMS

- Per the block diagrams presented starting on page 9, the following interconnection parts are essential for any Radar system integrations. This presentation includes some examples for introduction/illustration purposes.
  - **SWC:** Waveguide to Coaxial Adapter
  - **SWT:** Waveguide Taper and Mode Transition
  - **SWG:** Waveguide, Ridged and Flexible
  - **SWB:** Waveguide, Bends and Twist
  - **SUF:** Waveguide Connector - Uni-Guide™
  - **SCT:** Coaxial Adapter
  - **SCA:** Coaxial Attenuator
  - **STQ:** Coaxial Matching Load
  - **SCB:** Coaxial DC Block
  - **SCV:** Coaxial Bias Tee
  - **SCW:** Coaxial Cable



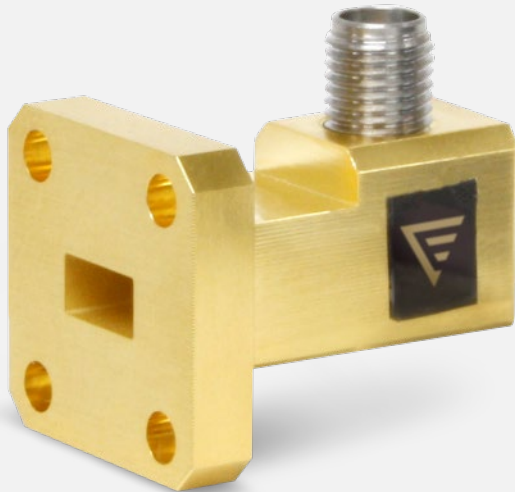
# WAVEGUIDE TO COAXIAL ADAPTER, RIGHT ANGLE

**FAMILY: SWC**  
26 TO 40 GHz

## SWC-28KF-R1 & SWC-28KM-R1

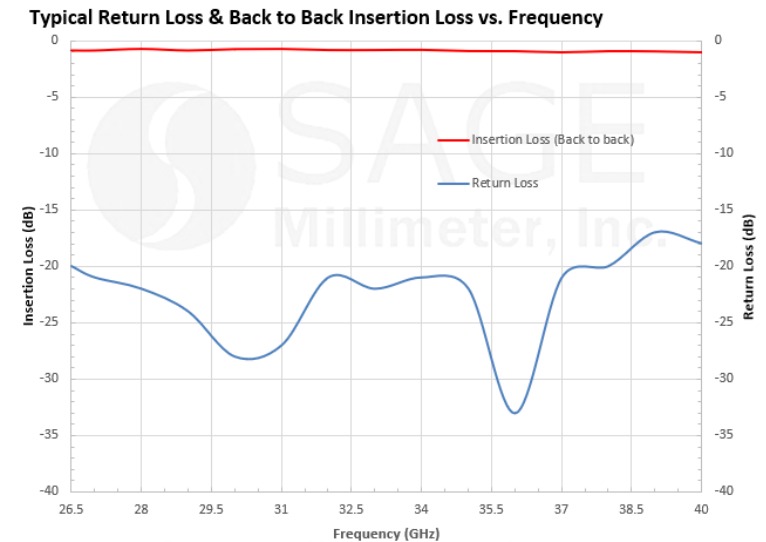
### Features:

- 26 to 40 GHz
- Right Angle
- Low Insertion Loss and VSWR
- 60+ Models to Support 5G Bands
- Frequency up to 130 GHz



Parameter	Minimum	Typical	Maximum
Frequency Range	26.5 GHz		40.0 GHz
Insertion Loss*		0.35 dB	0.50 dB
Return Loss	17 dB	20 dB	
Power Handling			30 W (CW)
Specification Temperature		+25 °C	
Operating Temperature	-40 °C		+85 °C

\*Insertion loss is tested back to back with a male and female adapter.  
The result is divided by 2.



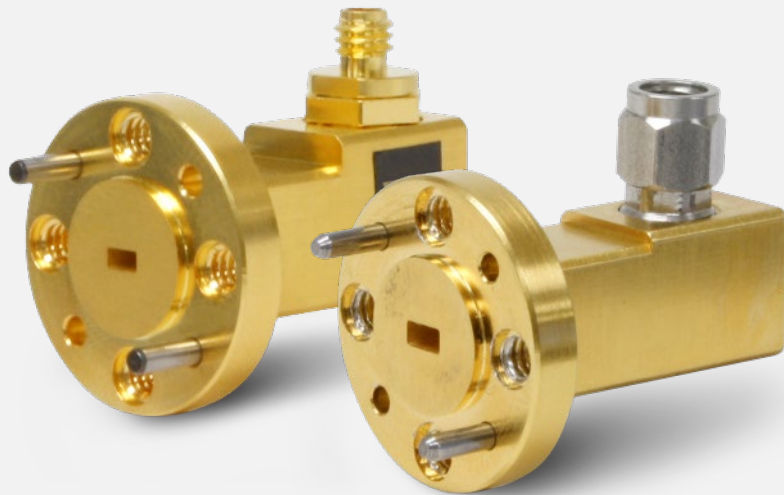
# WAVEGUIDE TO COAXIAL ADAPTER, RIGHT ANGLE

**FAMILY: SWC**  
75 TO 110 GHz

## SWC-101F-R1 & SWC-101M-R1

### Features:

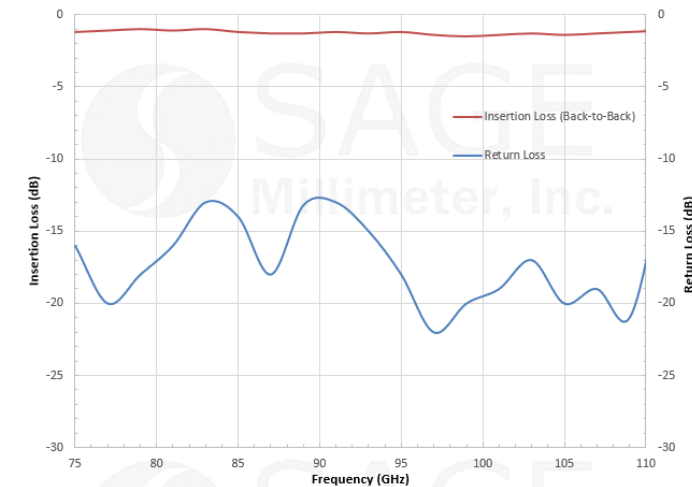
- 75 to 110 GHz
- Right Angle
- Low Insertion Loss and VSWR
- 50+ Models to Support 5G Bands
- Frequency up to 130 GHz



Parameter	Minimum	Typical	Maximum
Frequency Range	75 GHz		110 GHz
Insertion Loss*		1.2 dB	1.5 dB
Return Loss	12 dB	15 dB	
Power Handling			10 W (CW)
Specification Temperature		+25 °C	
Operating Temperature	-40 °C		+85 °C

\*Insertion loss is tested back to back with a male and female adapter, the result is divided by 2.

Typical Return Loss and Back-to-Back Insertion Loss vs. Frequency



# WAVEGUIDE TO COAXIAL ADAPTER, END LAUNCH

**FAMILY: SWC**  
26 TO 40 GHz

## SWC-28KF-E1 & SWC-28KM-E1

### Features:

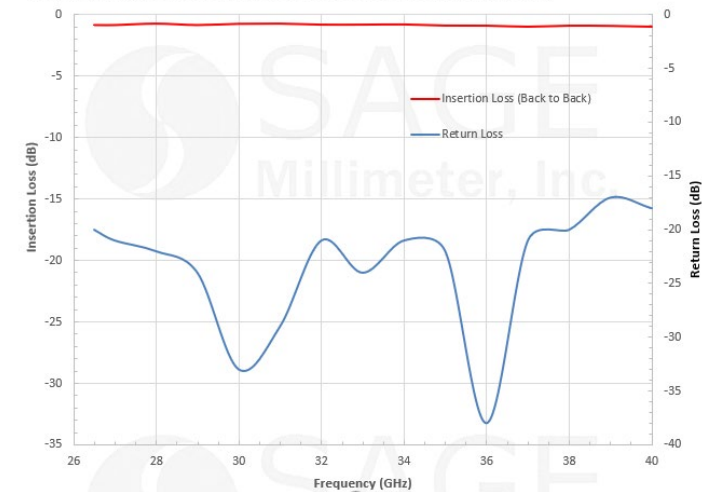
- 26 to 40 GHz
- End Launch
- Low Insertion Loss and VSWR
- 60+ Models to Support 5G Bands
- Frequency up to 130 GHz



Parameter	Minimum	Typical	Maximum
Frequency Range	26.5 GHz		40.0 GHz
Insertion Loss*		0.35 dB	0.50 dB
Return Loss	17 dB	20 dB	
Power Handling			30 W (CW)
Specification Temperature		+25 °C	
Operating Temperature	-40 °C		+85 °C

\*Insertion loss is tested back to back with a male and female adapter. The result is divided by 2.

Typical Return Loss & Back to Back Insertion Loss vs. Frequency



# WAVEGUIDE TO COAXIAL ADAPTER, END LAUNCH

**FAMILY: SWC**  
75 TO 110 GHz

## SWC-101F-E1 & SWC-101M-E1

### Features:

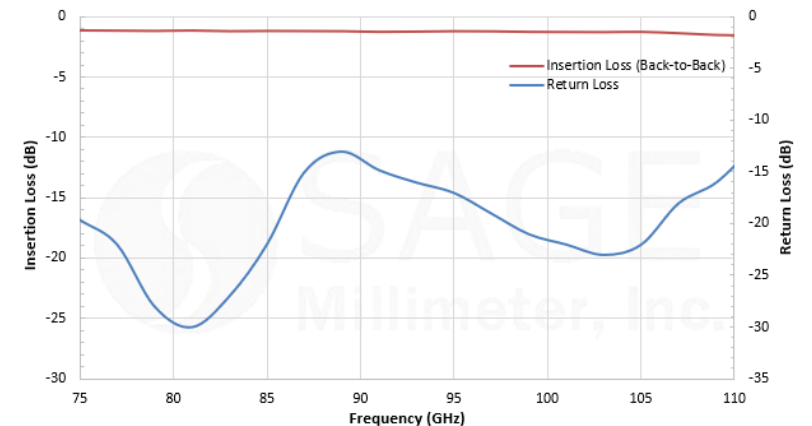
- 75 to 110 GHz
- End Launch
- Low Insertion Loss and VSWR
- 50+ Models to Support 5G Bands
- Frequency up to 130 GHz



Parameter	Minimum	Typical	Maximum
Frequency Range	75 GHz		110 GHz
Insertion Loss*		1.2 dB	1.5 dB
Return Loss	12 dB	15 dB	
Power Handling			10 W (CW)
Specification Temperature		+25°C	
Operating Temperature	-40°C		+85°C

\*Insertion loss is tested back to back with a male and female adapter, the result is divided by 2.

Typical Return Loss and Back-to-Back Insertion Loss vs. Frequency



# WAVEGUIDE TAPER TRANSITION

**FAMILY: SWT**  
WR-19 TO WR-10

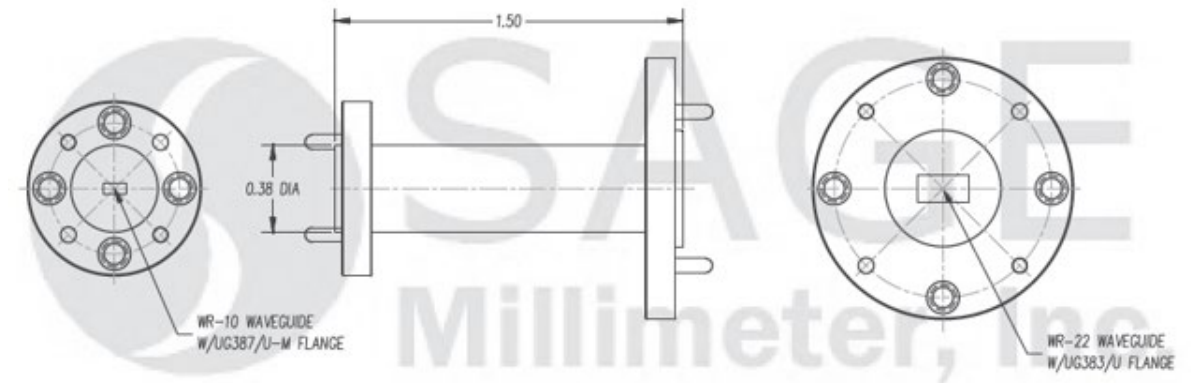
## SWT-1910-LB

### Features:

- WR-19 to WR-10 Taper Transition
- In Series and Out Series
- Low Insertion Loss and VSWR
- 50+ Models to Support 5G Bands
- Frequency up to 220 GHz



Item	Specification
Waveguide Size	WR-10 Waveguide with UG-387/U-M Flange
Waveguide Size	WR-19 Waveguide with UG-383/U-M Flange
Insertion Length	1.5"
Outline	WT-UW
Material	Brass
Finish	Gold Plated
Weight	1.5 Oz



# WAVEGUIDE MODE TRANSITION

**FAMILY: SWT**  
WR-28

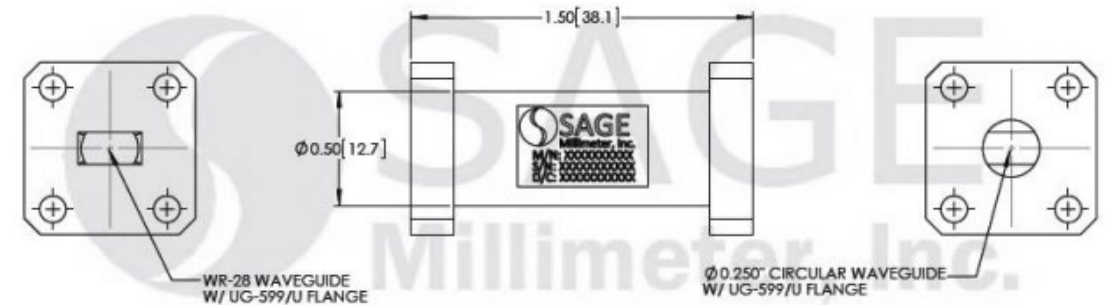
## SWT-28250-SB

### Features:

- WR-28 to 0.250" D Mode Transition
- In Series and Out Series
- Low Insertion Loss and VSWR
- 50+ Models to Support 5G Bands
- Frequency up to 220 GHz



Item	Specification
Waveguide Size	WR-28 Waveguide with UG-599/U Flange
Waveguide Size	0.250" Diameter Circular Waveguide with UG-599/U-M Flange
Material	Brass
Finish	Gold Plated
Weight	2.2 Oz
Insertion Length	1.5"
Outline	WT-AC-250-1.5





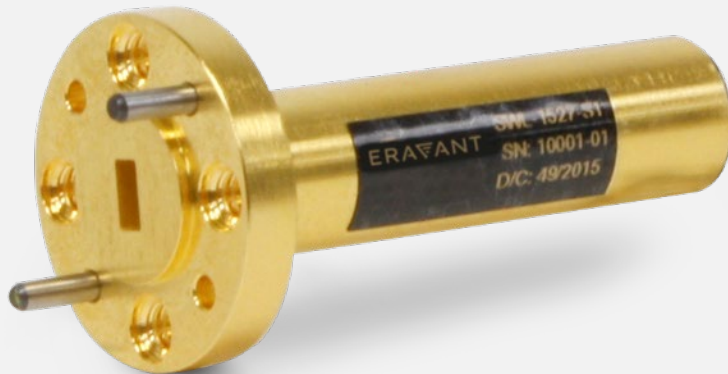
# WAVEGUIDE LOAD FIXED, LOW POWER

**FAMILY: SWL**  
50 TO 75 GHz

## SWL-1527-S1

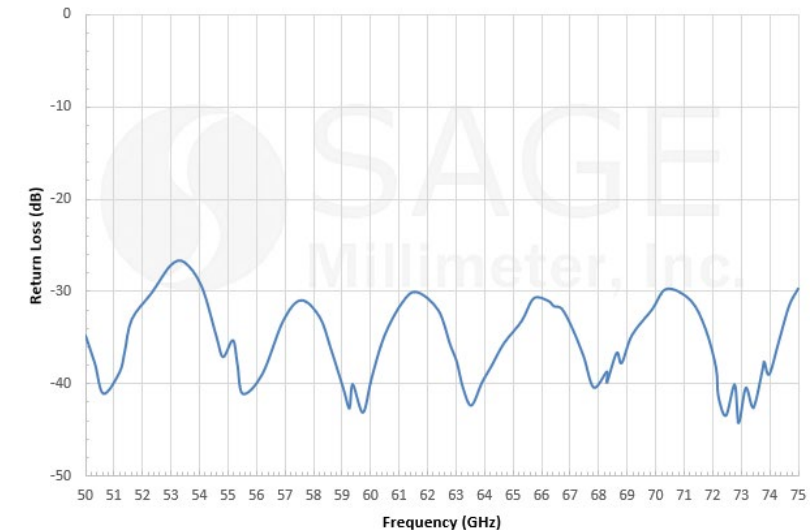
### Features:

- 50 to 75 GHz
- Full Waveguide Band
- Fixed and Tunable
- Low and High Power up to 1 kW
- 100+ Models to Support 5G Bands
- Frequency up to 170 GHz



Parameter	Minimum	Typical	Maximum
Frequency	50 GHz		75 GHz
VSWR		1.05:1	
Power Handling		0.5 W (CW)	2 W (CW)
Specification Temperature		+25°C	
Operating Temperature	-40°C		+85°C

Typical Return Loss vs. Frequency



# WAVEGUIDE LOAD FIXED, HIGH POWER

**FAMILY: SWL**  
50 TO 75 GHz

## SWL-1537-S1

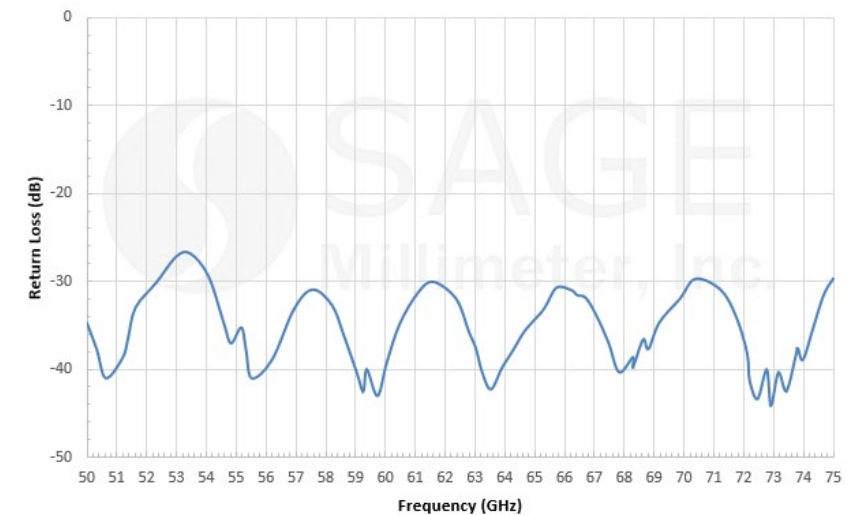
### Features:

- 50 to 75 GHz
- Full Waveguide Band
- Fixed and Tunable
- Low and High Power up to 1 kW
- 100+ Models to Support 5G Bands
- Frequency up to 170 GHz



Parameter	Minimum	Typical	Maximum
Frequency	50 GHz		75 GHz
VSWR		1.06:1	
Power Handling		5 W (CW)	6 W (CW)
Specification Temperature		+25°C	
Operating Temperature	-40°C		+85°C

Typical Return Loss vs. Frequency



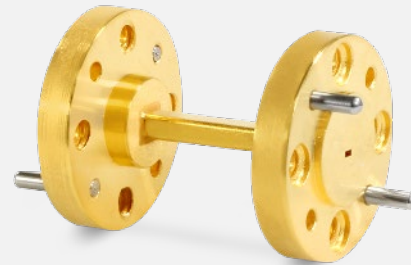


# WAVEGUIDE, RIDGED

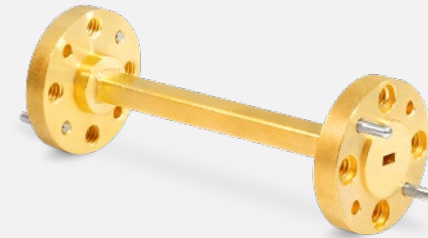
**FAMILY: SWG**  
WR-42 TO WR-03

## Features:

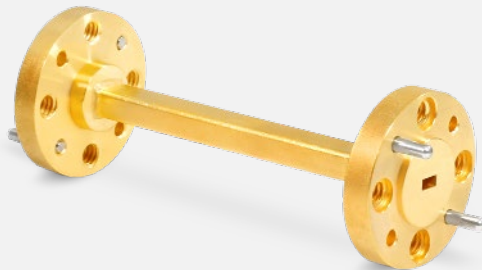
- WR-42 to WR-03
- Various Length
- 500+ Models to Support 5G Bands
- Frequency up to 325 GHz



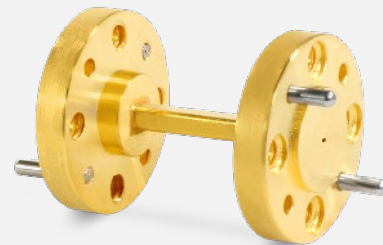
**SWG-05020-FB**  
WR-05 Straight Section, 2"



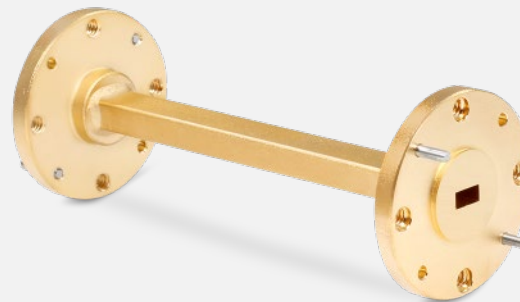
**SWG-06040-FB**  
WR-06 Straight Section, 4"



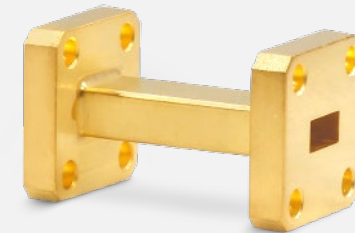
**SWG-10020-FB**  
WR-10 Straight Section, 2"



**SWG-03010-FB**  
WR-03 Straight Section, 1"



**SWG-22030-FB**  
WR-22 Straight Section, 3"



**SWG-28013-FB-1.25**  
WR-28 Straight Section, 1.25"

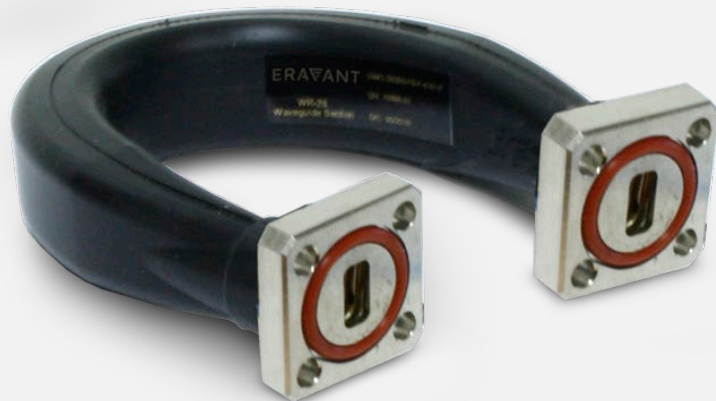
# WAVEGUIDE, FLEXIBLE

**FAMILY: SWG**  
Ka BAND

## SWG-28059-FB-FT-G

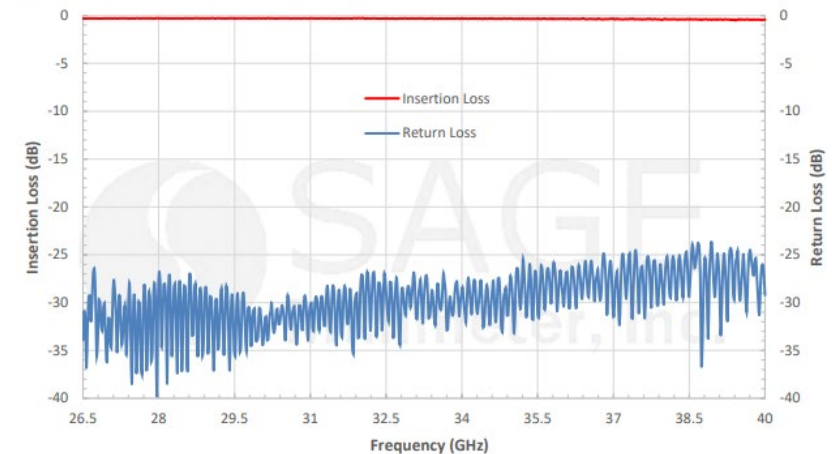
### Features:

- 24 to 42 GHz
- Full Waveguide Band
- Various Length
- WR-42 to WR-10
- 100+ Models to Support 5G Bands
- Frequency up to 110 GHz



Parameter	Minimum	Typical	Maximum
Frequency	26.5 GHz		40 GHz
Insertion Loss		0.3 dB	
Return Loss		21 dB	
Power Handling			75 W (CW)
Specification Temperature		+25 °C	
Operation Temperature	-40 °C		+85 °C

Typical Performance vs. Frequency



# WAVEGUIDE, FLEXIBLE

**FAMILY: SWG**  
Q BAND

## SWG-22354-FB-FT-A-G

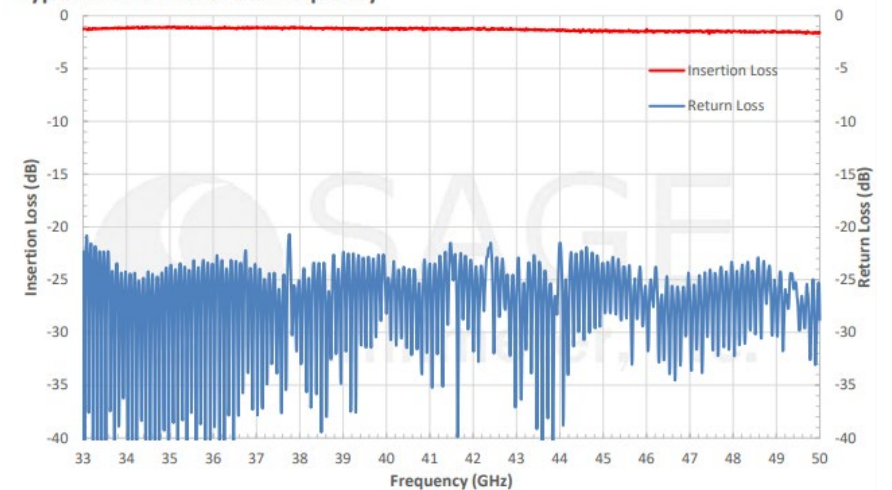
### Features:

- 33 to 50 GHz
- Full Waveguide Band
- Various Length
- WR-42 to WR-10
- 100+ Models to Support 5G Bands
- Frequency up to 110 GHz



Parameter	Minimum	Typical	Maximum
Frequency	33 GHz		50 GHz
Insertion Loss		2.3 dB	
Return Loss		14 dB	
Specification Temperature		+25 °C	
Operation Temperature	-40 °C		+85 °C

Typical Performance vs. Frequency



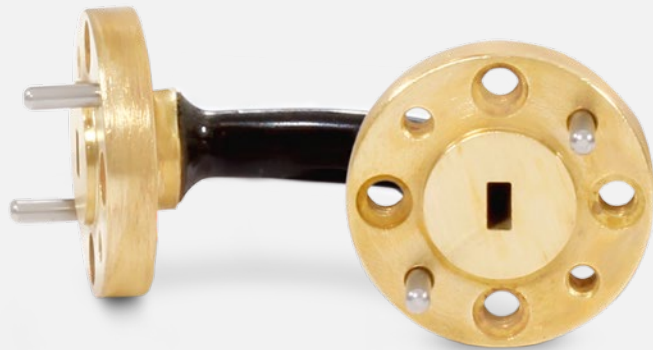
# WAVEGUIDE, FLEXIBLE

**FAMILY: SWG**  
W BAND

## SWG-10020-FB-F

### Features:

- 75 to 110 GHz
- Full Waveguide Band
- Various Length
- WR-42 to WR-10
- 100+ Models to Support 5G Bands
- Frequency up to 110 GHz



Parameter	Minimum	Typical	Maximum
Frequency	75 GHz		110 GHz
Insertion Loss		1.5 dB	
Return Loss	10 dB	15 dB	
Power Handling (CW/PK)		15 W / 1 kW	30 W / 2.5 kW
Specification Temperature		+25 °C	
Operation Temperature	-40 °C		+85 °C



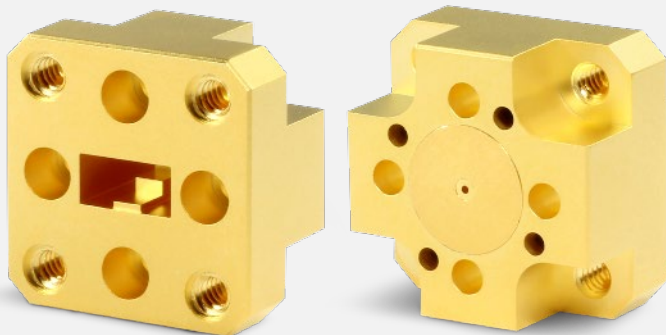
# WAVEGUIDE CONNECTOR UNI-GUIDE™

**FAMILY: SUF**  
Ka BAND

## SUF-2812-480-S1

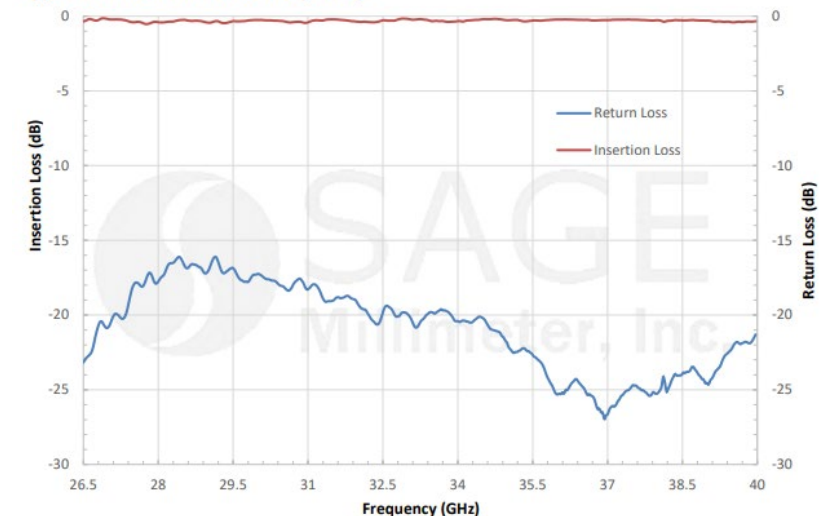
### Features:

- 26.5 to 40 GHz
- WR-28, WR-22 and WR-19 Bands
- 3 Models to Support 5G Bands
- Field Replaceable
- Interchangeable with Correspondent Coax Connector
- Hermetical Package Preservation



Parameter	Minimum	Typical	Maximum
Frequency Range	26.5 GHz		40.0 GHz
Insertion Loss		0.5 dB	
Return Loss		20 dB	
Power Handling			100 W (CW)
Specification Temperature		+25 °C	
Operating Temperature	-40 °C		+85 °C

Typical Performance vs. Frequency



# WAVEGUIDE CONNECTOR UNI-GUIDE™

**FAMILY: SUF**  
Q BAND

## SUF-2212-480-S1

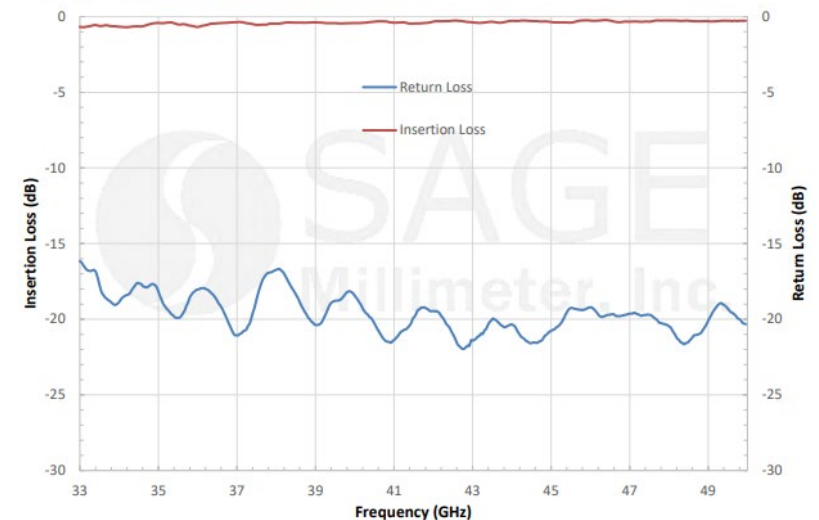
### Features:

- 33 to 50 GHz
- WR-28, WR-22 and WR-19 Bands
- 3 Models to Support 5G Bands
- Field Replaceable
- Interchangeable with Correspondent Coax Connector
- Hermetical Package Preservation



Parameter	Minimum	Typical	Maximum
Frequency Range	33 GHz		50 GHz
Insertion Loss		0.6 dB	
Return Loss		20 dB	
Power Handling			100 W (CW)
Specification Temperature		+25 °C	
Operating Temperature	-40 °C		+85 °C

Typical Performance vs. Frequency





# WAVEGUIDE CONNECTOR UNI-GUIDE™

**FAMILY: SUF**  
U BAND

## SUF-1912-480-S1

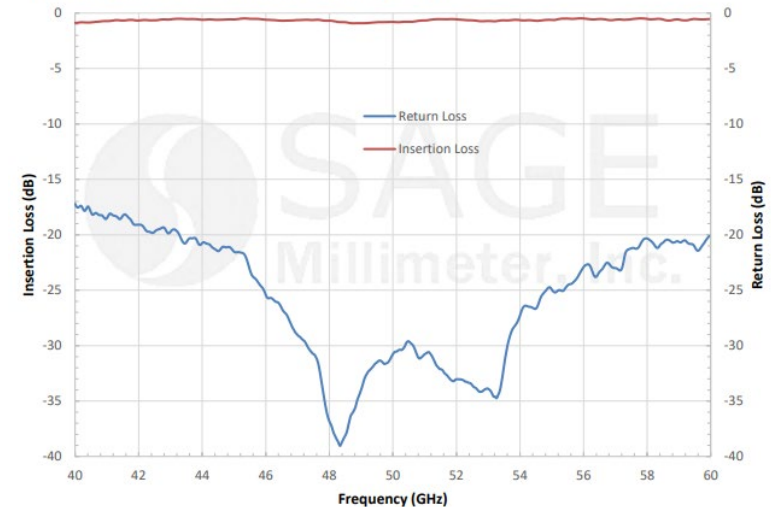
### Features:

- 40 to 60 GHz
- WR-28, WR-22 and WR-19 Bands
- 3 Models to Support 5G Bands
- Field Replaceable
- Interchangeable with Correspondent Coax Connector
- Hermetical Package Preservation



Parameter	Minimum	Typical	Maximum
Frequency Range	40 GHz		60 GHz
Insertion Loss		0.7 dB	
Return Loss		20 dB	
Power Handling			100 W (CW)
Specification Temperature		+25 °C	
Operating Temperature	-40 °C		+85 °C

Typical Measured Performance vs. Frequency





# COAX ADAPTER (IN SERIES)

**FAMILY: SCT**  
DC TO 110 GHz

**More Than 50 Models**

**1 mm, 1.35 mm, 1.85 mm, 2.4 mm, 2.92 mm, SMP, SMA**

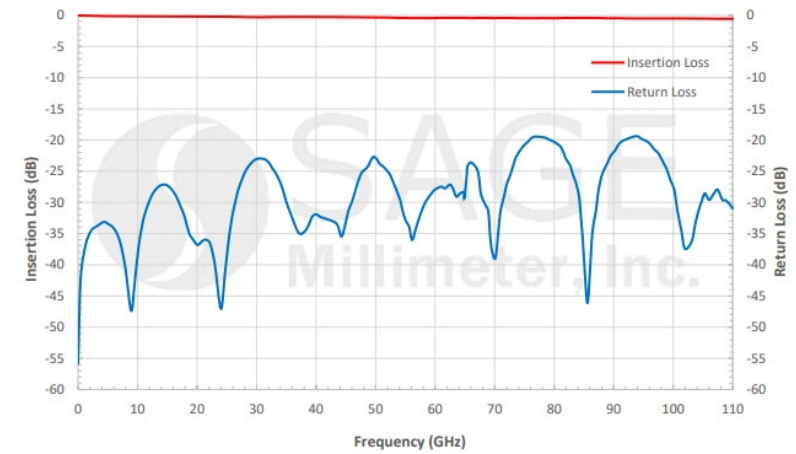


**SWC-101F-R1**  
DC to 110 GHz



**SCT-1M1M-UB**  
DC to 110 GHz

Typical Performance vs. Frequency



Typical Performance vs. Frequency



# COAX ADAPTER (BETWEEN SERIES)

**FAMILY: SCT**  
DC TO 110 GHz

**More Than 50 Models**

**1 mm, 1.35 mm, 1.85 mm, 2.4 mm, 2.92 mm, SMP, SMA**

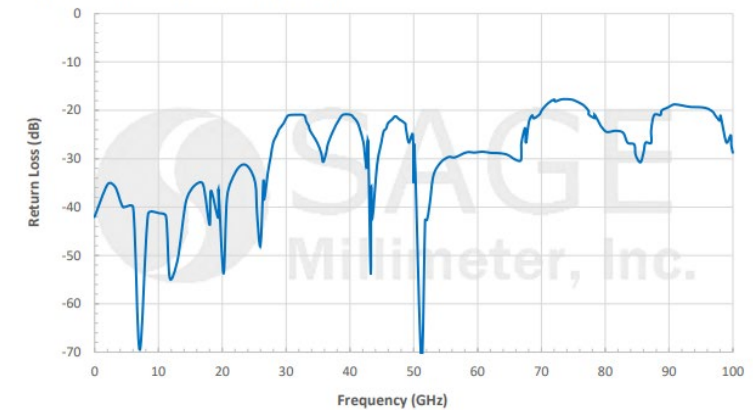


**SCT-AF1M-UB**  
DC to 100 GHz

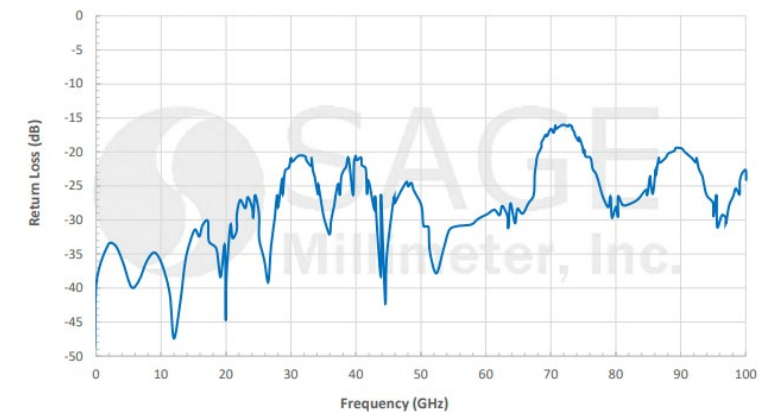


**SCT-AF1F-UB**  
DC to 100 GHz

Typical Return Loss vs. Frequency



Typical Return Loss vs. Frequency



# COAX ADAPTER (FIXED)

**FAMILY: SCA**  
DC TO 67 GHz  
3 dB THRU 30 dB

**More Than 50 Models**

**1.85 mm, 2.4 mm, 2.92 mm. 3.5 mm and SMA**

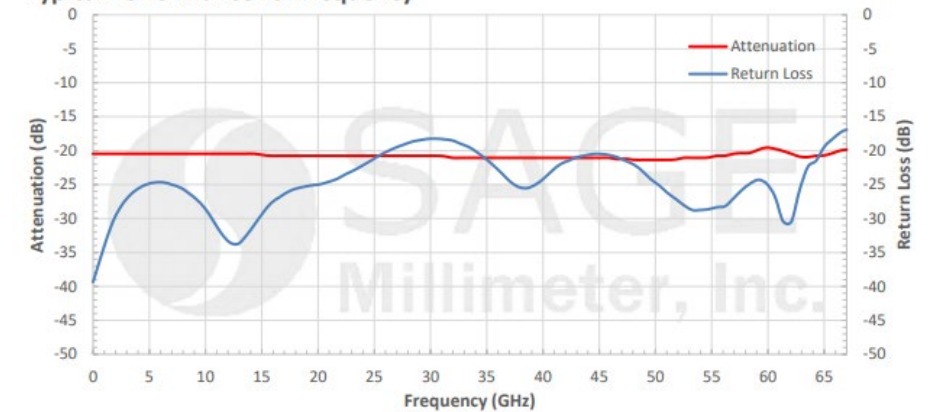


**SCA-20-VMVF-S9**  
DC to 67 GHz

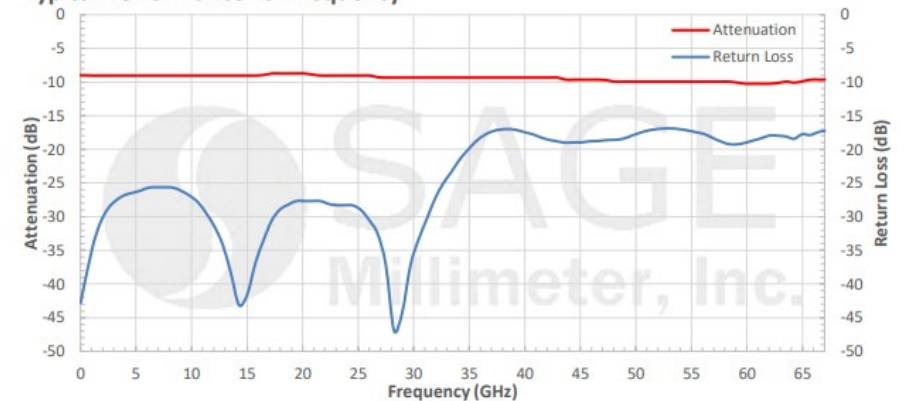


**SCA-10-VMVF-S9**  
DC to 67 GHz

Typical Performance vs. Frequency



Typical Performance vs. Frequency



# COAX MATCHING LOAD

**FAMILY: SCL**  
DC TO 67 GHz

**More Than 6 Models**

**1.85 mm, 2.4 mm, 2.92 mm**



**STQ-CM-KF27-U2**  
DC to 50 GHz

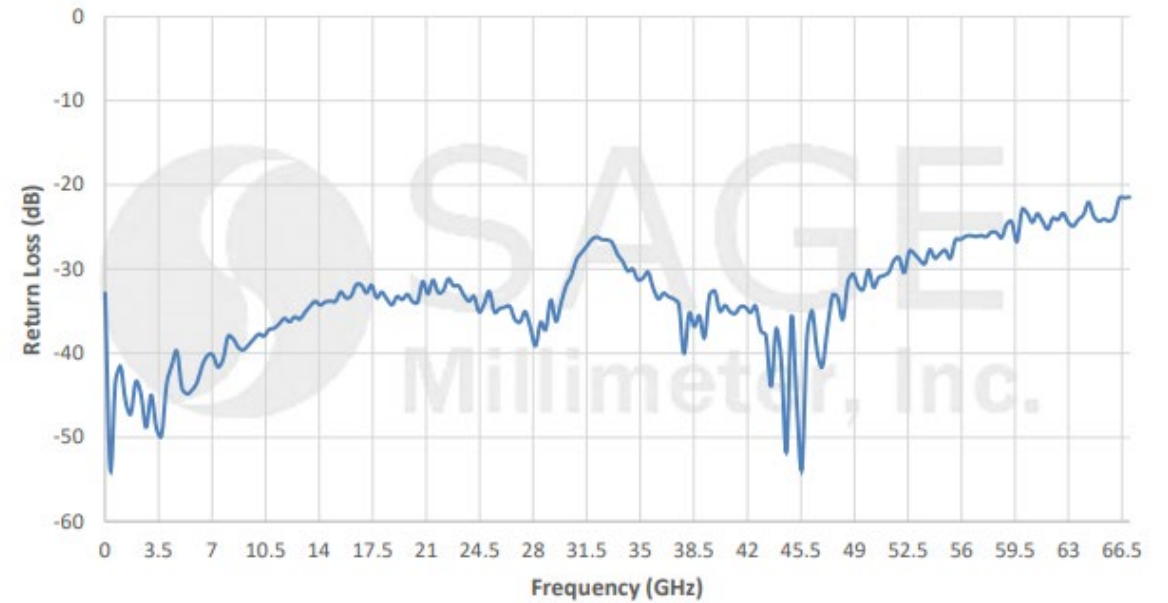


**STQ-CM-VM27-U2**  
DC to 67 GHz



**STQ-CM-2M27-U2**  
DC to 40 GHz

**Measured Return Loss vs Frequency**



# COAX DC BLOCK

**FAMILY: SCB**  
DC TO 67 GHz

5 Models

1.85 mm, 2.4 mm, 3.5 mm, 2.92 mm

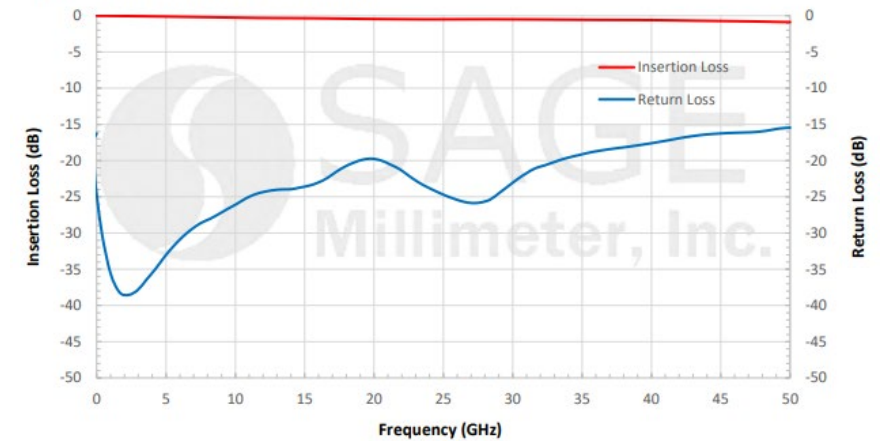


**SCB-050-2F2M-U2**  
DC to 50 GHz

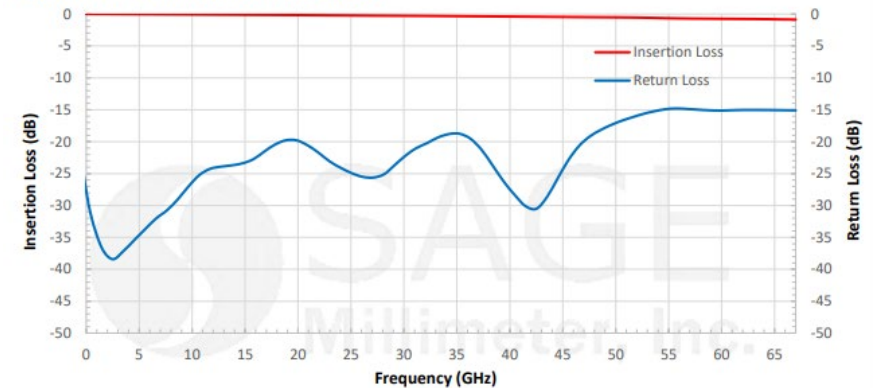


**SCB-016-VFVM-U2**  
DC to 67 GHz

Typical Performance vs. Frequency



Typical Performance vs. Frequency





# COAX BIAS TEE

**FAMILY: SCV**  
DC TO 85 GHz

**5 Models**

**1.85 mm, 2.4 mm, 3.5 mm, 2.92 mm**

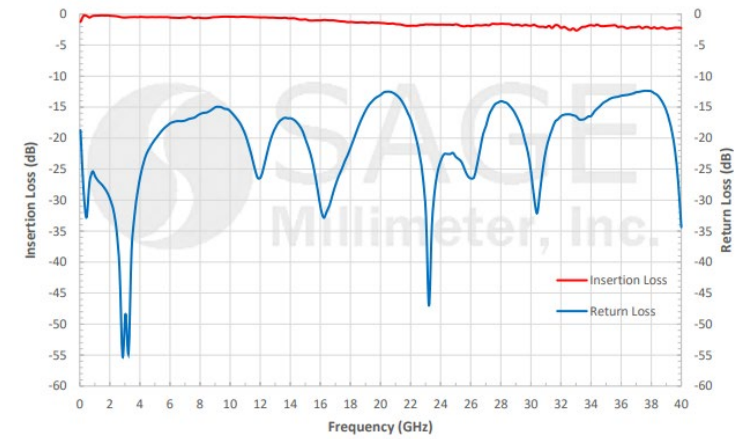


**SCV-000403302508-KFKF-U3**  
DC to 40 GHz

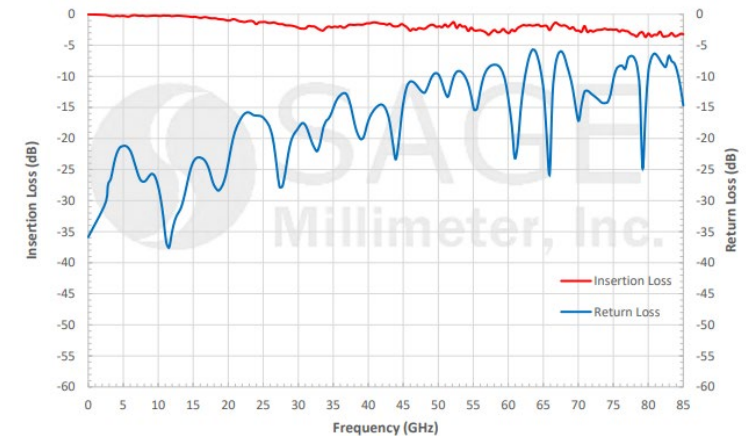


**SCV-000853402505-VFVF-U3**  
DC to 85 GHz

Typical Performance vs. Frequency



Typical Performance vs. Frequency



# COAX CABLES (FLEXIBLE)

**FAMILY: SCW**  
DC TO 110 GHz

**More Than 50 Models**

**1 mm, 1.85 mm, 2.4 mm, 2.92 mm**

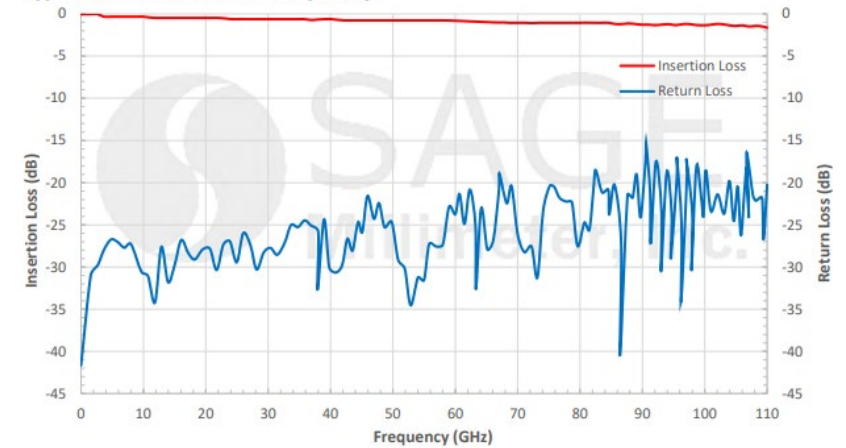


**SCW-1M1M003-F1**  
DC to 110 GHz, 3"

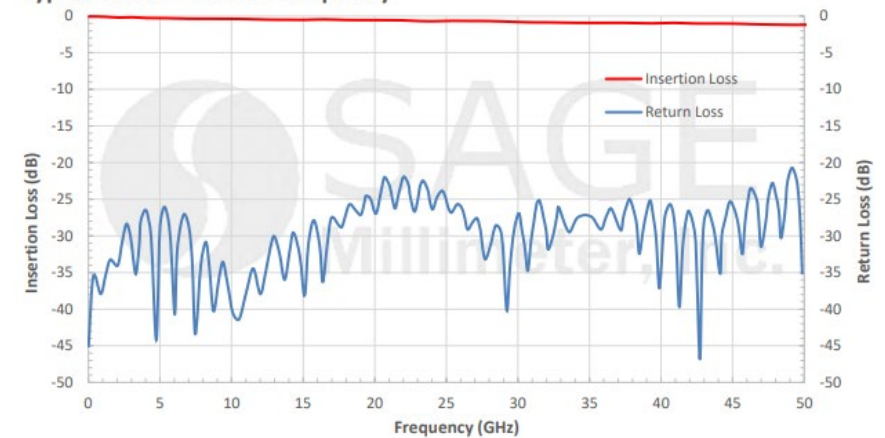


**SCW-2M2M006-F1**  
DC to 50 GHz, 6"

**Typical Performance vs. Frequency**



**Typical Performance vs. Frequency**





# COAX CABLES (SEMI RIDGED)

**FAMILY: SCW**  
DC TO 110 GHz

**More Than 50 Models**

**1 mm, 1.85 mm, 2.4 mm, 2.92 mm**

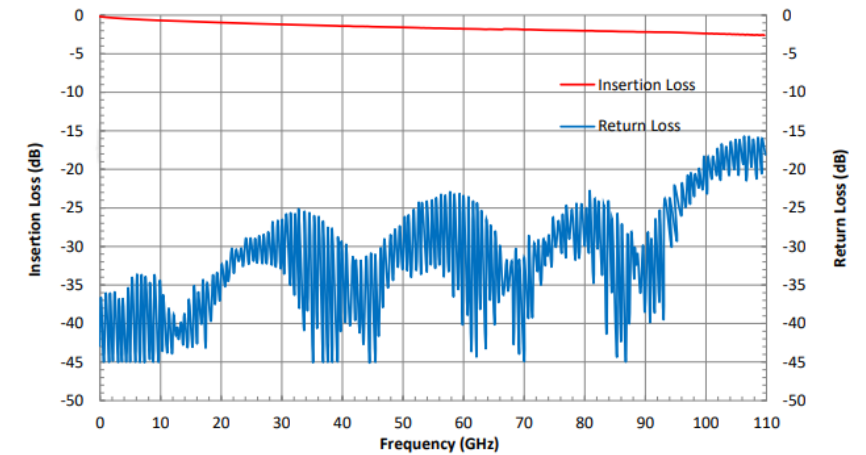


**SCW-1M1M006-S1**  
DC to 110 GHz, 6"

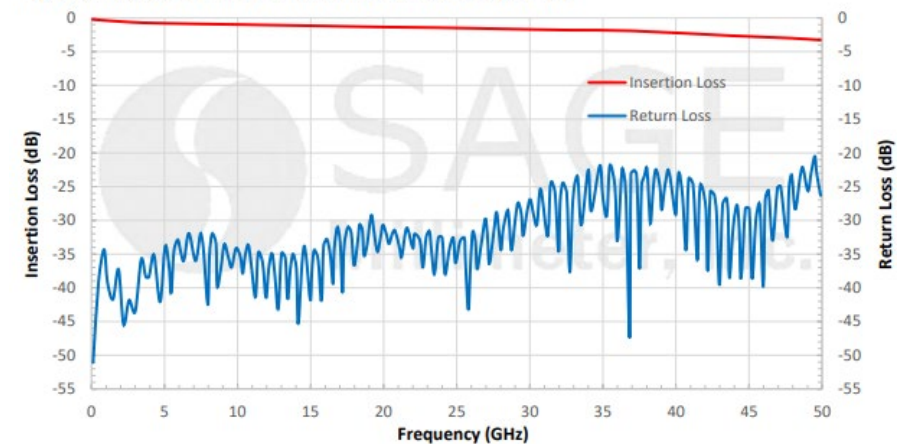


**SCW-2M2M012-S1**  
DC to 50 GHz, 12"

**Typical Performance vs. Frequency**



**Typical Insertion Loss & Return Loss vs. Frequency**



# WAVEGUIDE, BENDS & TWISTS

**FAMILY: SWB**  
WR-42 TO WR-03

## Features:

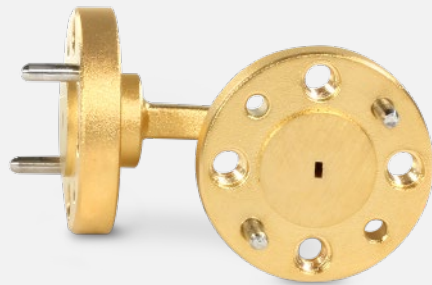
- WR-42 to WR-03
- Various Length
- 500+ Models to Support 5G Bands
- Frequency up to 325 GHz



**SWB-10090-HB**  
WR-10 H-Plane Bend, 90°



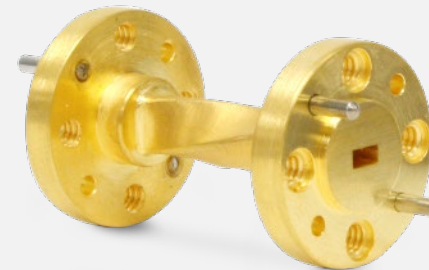
**SWB-28090-EB**  
WR-28 E-Plane Bend, 90°



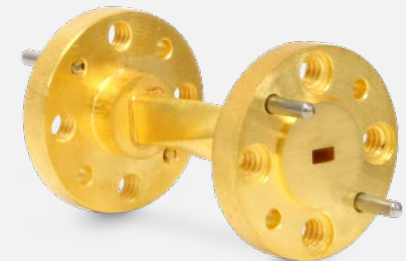
**SWB-06090-EB**  
WR-06 E-Plane Bend, 90°



**SWB-06090-TB**  
WR-06 Twist, 90°



**SWB-12090-TB**  
WR-12 Twist, 90°



**SWB-10090-TB**  
WR-10 Twist, 90°

# SUBASSEMBLIES

# SUBASSEMBLIES FOR RADAR SYSTEMS

- By using **ERAVANT** components and interconnection products, many Radar sub-assemblies can be constructed. This presentation includes some examples for introduction/illustration purpose.
  - **SSM:** Doppler Sensor Modules
  - **SSP:** Ranging Sensor Modules
  - **SSC:** Transceiver Modules
  - **SSK:** Custom Build Transceivers

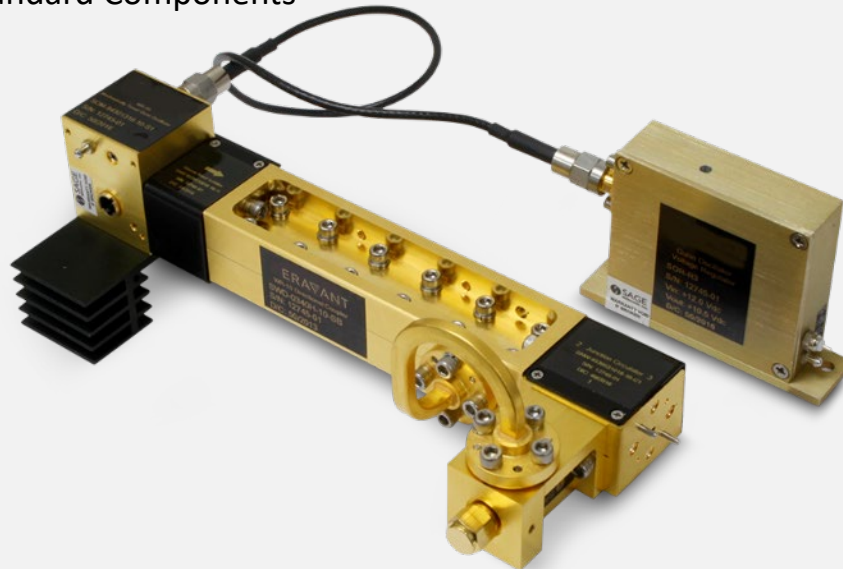
# DOPPLER SENSOR MODULE

**FAMILY: SSM**  
W BAND

## SSM-94313-S1

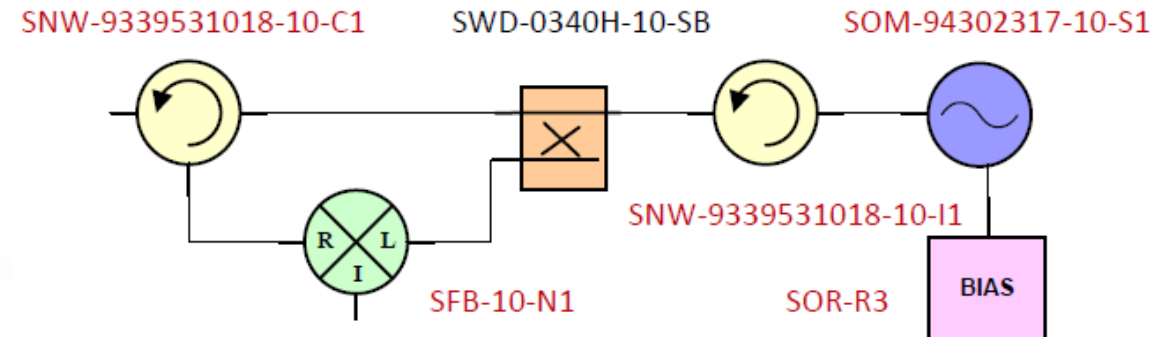
### Features:

- 94 GHz
- Low FM/AM Noise
- Bolt Together Solution
- Standard Components



Parameter	Minimum	Typical	Maximum
Tx Frequency Range	93.00 GHz	94.00 GHz	95.00 GHz
Tx Frequency Tuning Bandwidth*		±250 MHz	
Tx Output Power		+13 dBm	
Rx Frequency Range	93.00 GHz	94.00 GHz	95.00 GHz
Rx IF Frequency Range	DC		1 GHz
Rx Conversion Loss		10 dB	
Frequency Stability		-6.0 MHz/°C	
Power Stability		-0.04 dB/°C	
Oscillator Bias Voltage	+7.0 V <sub>DC</sub>	+8.0 V <sub>DC</sub>	+9.0 V <sub>DC</sub>
Oscillator Bias Current		650 mA	950 mA
Specification Temperature		+25 °C	
Operating Temperature	0 °C		+50 °C

\*The center frequency is factory preset per user's request



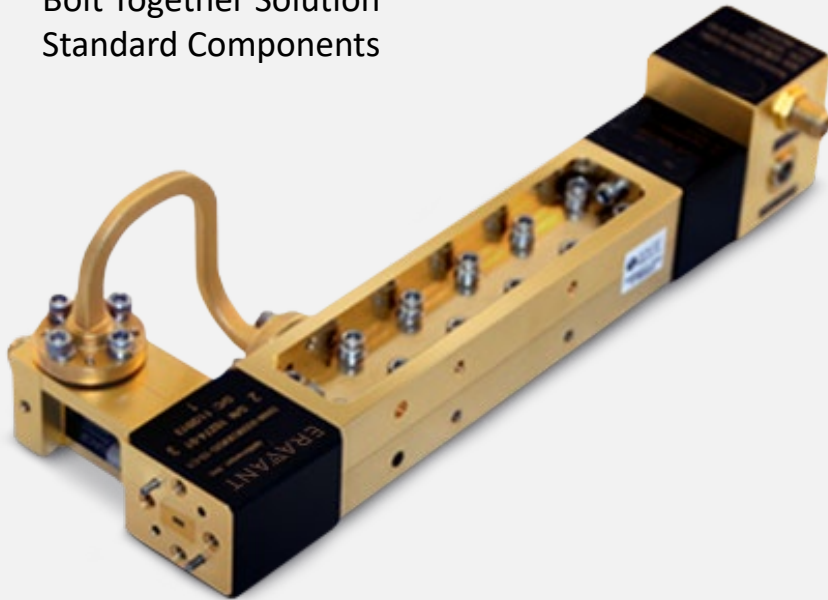
# RANGING SENSOR MODULE

**FAMILY: SSP**  
W BAND

## SSP-94310-S1

### Features:

- 94 GHz
- Low FM/AM Noise
- Bolt Together Solution
- Standard Components

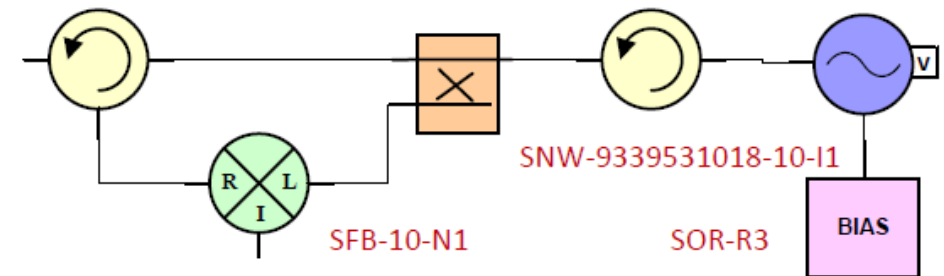


Parameter	Minimum	Typical	Maximum
Tx Frequency Range	93.75 GHz	94.00 GHz	94.25 GHz
Tx Output Power		+10 dBm	
FMCW Tuning Bandwidth		±250 MHz	
Rx Frequency Range	93.75 GHz	94.00 GHz	94.25 GHz
Rx IF Frequency Range	DC		1 GHz
Rx Conversion Loss		11 dB	
Varactor Voltage		0 to +20 Volts	
Varactor Tuning Speed		1 ms	
Frequency Stability		-6.0 MHz/°C	
Power Stability		-0.04 dB/°C	
Bias Voltage		+4.5 V <sub>DC</sub>	+5.0 V <sub>DC</sub>
Bias Current		650 mA	950 mA
Specification Temperature		+25°C	
Operating Temperature	0°C		+50°C

SNW-9339531018-10-C1

SWD-0340H-10-SB

SOV-94305216-10-G1



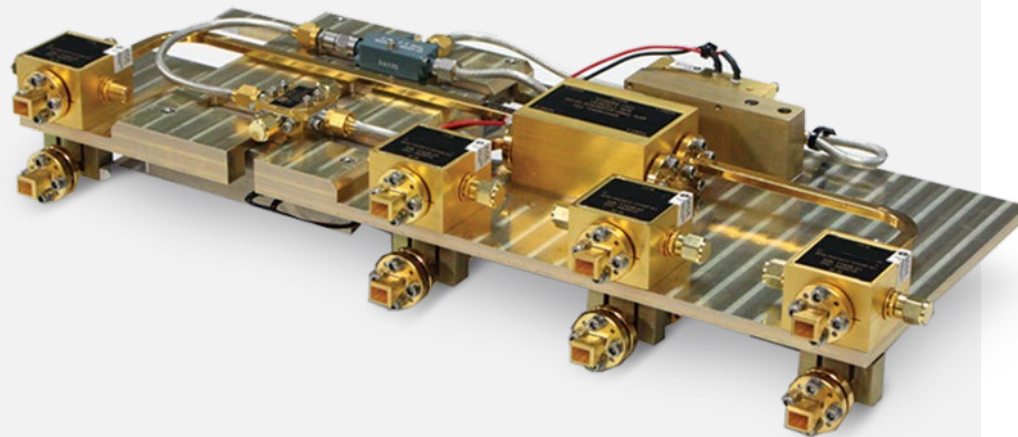
# TRANSCEIVER MODULE, FMCW

**FAMILY: SSC**  
E BAND

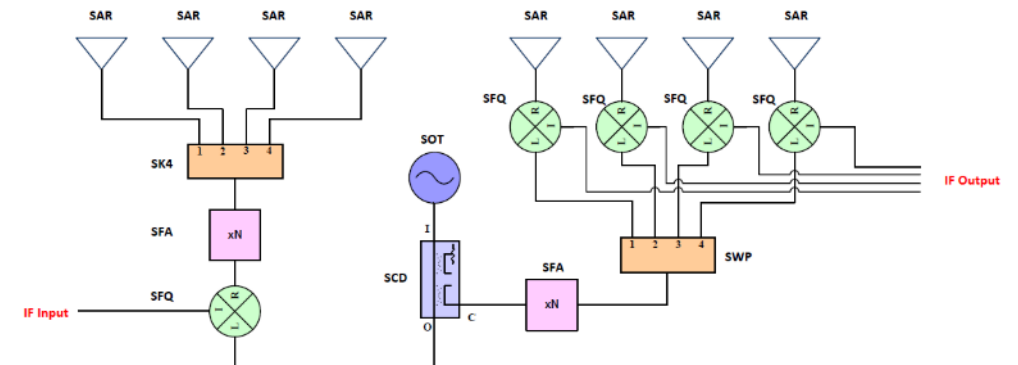
## SSC-7337331202-1212-B1

### Features:

- 70 to 75 GHz
- 4 TX and 4 RX Channels
- FMCW Short Range Sensor
- Custom Designed
- Standard Components



Parameter	Minimum	Typical	Maximum
Antenna 3 dB Beam-width		40°	
Antenna Gain		10 dB	
Antenna Polarization		Linear	
TX Frequency Range	70 GHz		75 GHz
TX Output P <sub>1dB</sub>		+2 dBm	
TX EIRP		+12 dBm	
TX IF Input	DC/0 dBm		100 MHz/0 dBm
TX On/Off Ratio		30 dB	
TX On/Off Control		TTL	
RX Frequency	70 GHz		75 GHz
IF Frequency Range, Each Channel	DC		100 MHz
DDS Synthesizer Phase Noise		-65 dBc/Hz @ 1 KHz Offset	
DDS Synthesizer Sweep Time		80 us	100 us
DDS Synthesizer Reference		Internal	
DDS Synthesizer Frequency Stability		±2.5 ppm	
Harmonics		-20 dBc	
DC Supply Voltage		+6 V <sub>DC</sub> /2.3 A	
Case Temperature	0 °C	+25 °C	+50 °C





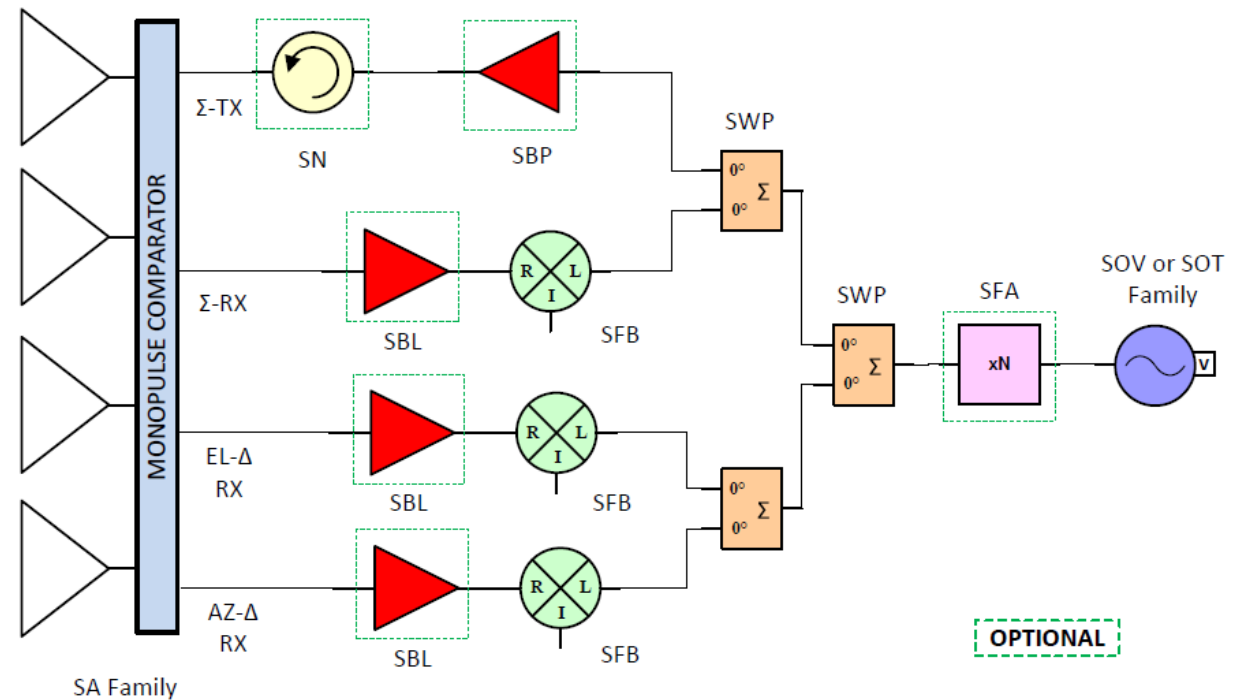
# CUSTOM BUILT TRANSCEIVER SUBASSEMBLIES

## Model:

- Doppler
- Ranging
- Directional
- Monopulse

## Features:

- Frequency Range: 18 to 170 GHz
- Custom Designed
- Standard Components
- Bolt Together Solutions



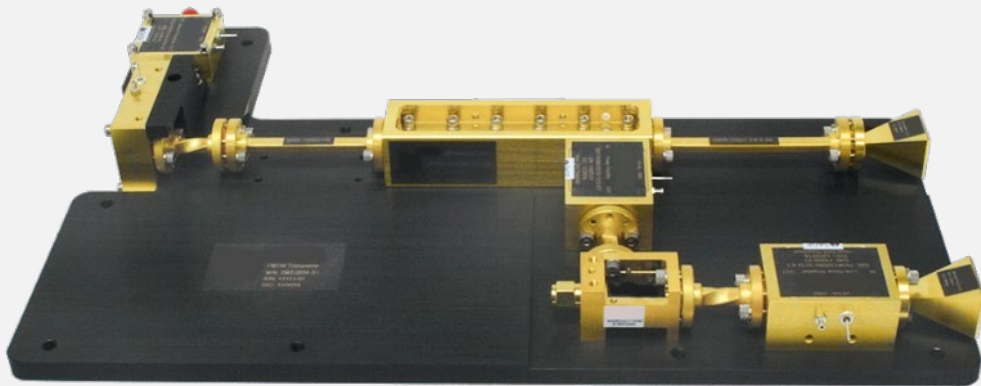
# CUSTOM BUILT TRANSCEIVER

**FAMILY: SSK**  
E BAND

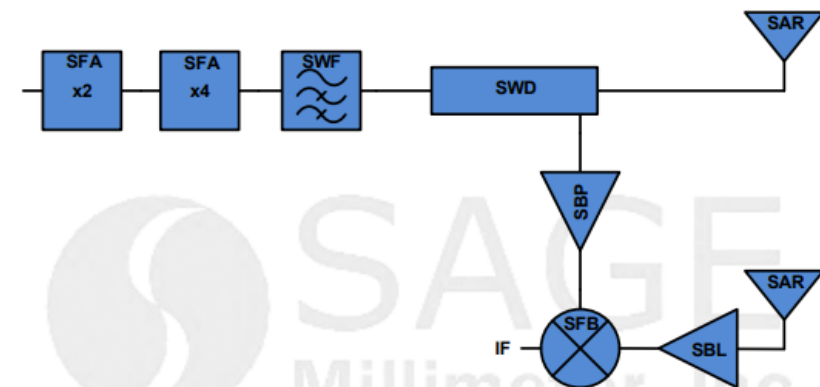
## SSK-SC763863-12-C1

### Features:

- 76 to 86 GHz
- Bi-Static
- FMCW Ranging Sensor
- Custom Designed
- Standard Components



Parameter	Minimum	Typical	Maximum
TX Frequency	76.0 GHz		86.4 GHz
TX Power		+10 dBm	
Input Frequency	9.5 GHz		10.8 GHz
Input Power		+0 dBm	+1 dBm
RX Frequency	76.0 GHz		86.4 GHz
RX Noise Figure		6.0 dB	
RX Conversion Gain		16 dB	
IF Frequency	DC		10 GHz
DC Supply Voltage		+8 V <sub>DC</sub> /1,000 mA	



# STANDARD SENSORS

# ERAVANT STANDARD SENSORS FOR RADAR SYSTEMS

- **ERAVANT** has designed, manufactured and delivered production ready sensors to the industry since 2012. ERAVANT has delivered more than 50,000 radar sensors for traffic control and management system, military radars, scientific/academia and many special applications.
- There are a total of more than 60 standard models.
- This presentation only includes some selected models for introduction/illustration purposes.
  - **SSS:** Doppler Sensor Heads - Without Antennas
  - **SSP:** Ranging Sensor Heads - Without Antennas
  - **SSM:** Doppler Sensor Modules
  - **SSD:** Ranging Sensor Modules

# DOPPLER SENSOR MODULE

**FAMILY: SSM**  
24.125 GHz

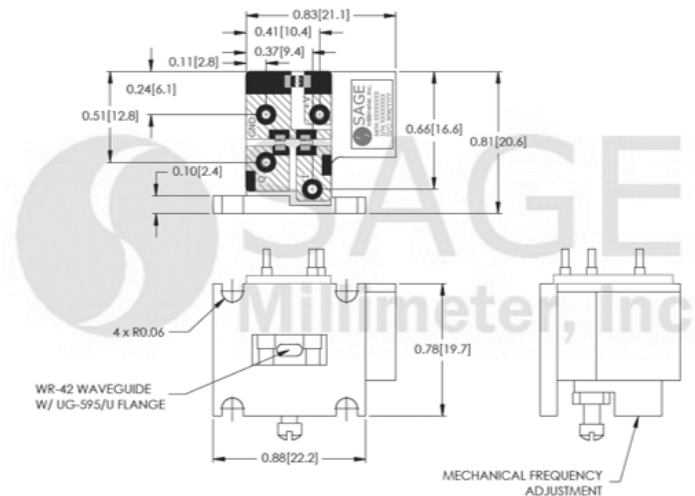
## SSM-24307-D1-1

### Features:

- 24.125 GHz Operation
- Low Flicker Noise
- Low Harmonic Emission
- FCC Part 15 Compliant
- Volume Production Ready



Parameter	Minimum	Typical	Maximum
RF Frequency Range	24.00 GHz	24.125 GHz	24.20 GHz
Transmitting Power		+7 dBm	
Receiver I/Q Phase $\Delta$	60°		120°
Receiver I/Q Amplitude $\Delta$		0 dB	3 dB
IF Frequency Range	DC		100 MHz
IF Offset Voltage		$\pm 0.5 V_{DC}$	
Frequency Stability		-0.8 MHz/°C	
Power Stability		-0.03 dB/°C	
DC Supply Voltage		+5 $V_{DC}$ /250 mA	
Specification Temperature		+25 °C	
Operating Temperature	-40 °C		+85 °C



# RANGING SENSOR MODULE

**FAMILY: SSP**  
24.125 GHz

## SSP-24303-D1

### Features:

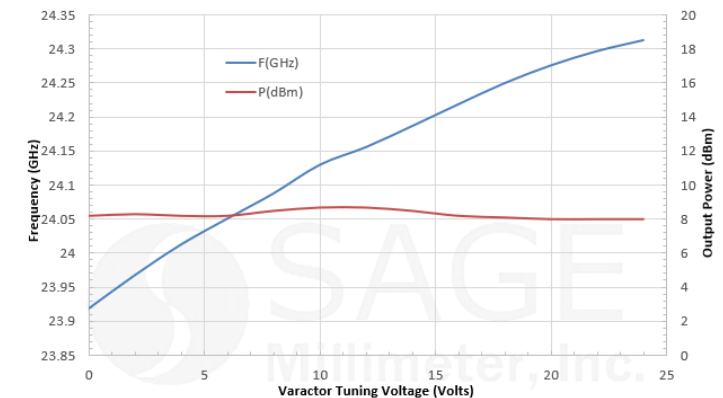
- 24.125 GHz FMCW Operation
- Low Flick Noise and High Sensitivity
- Low Harmonic Emission
- Directional Detection Capable
- Volume Production Ready



Parameter	Minimum	Typical	Maximum
TX Center Frequency		24.125 GHz	
TX Power		+3 dBm	
FMCW Tuning Bandwidth	±100 MHz	±150 MHz	
FMCW Tuning Voltage		0 to +20 Volts	
RX I/Q Phase $\Delta$		80 to 100°	60 to 120°
RX I/Q Amplitude $\Delta$		0 to 3 dB	
IF Frequency Range	DC		100 MHz
IF Offset Voltage		-0.5 to -1.0 V <sub>DC</sub>	
Frequency Stability		-1.5 MHz/°C	
Power Stability		-0.03 dB/°C	
DC Supply Voltage		+5 V <sub>DC</sub> /250 mA	+5.5 V <sub>DC</sub>
Specification Temperature		+25 °C	
Operating Temperature	-40 °C		+85 °C

### Typical Performance of Varactor Tuned Oscillator

Gunn Bias: +5 V<sub>DC</sub>/183 mA



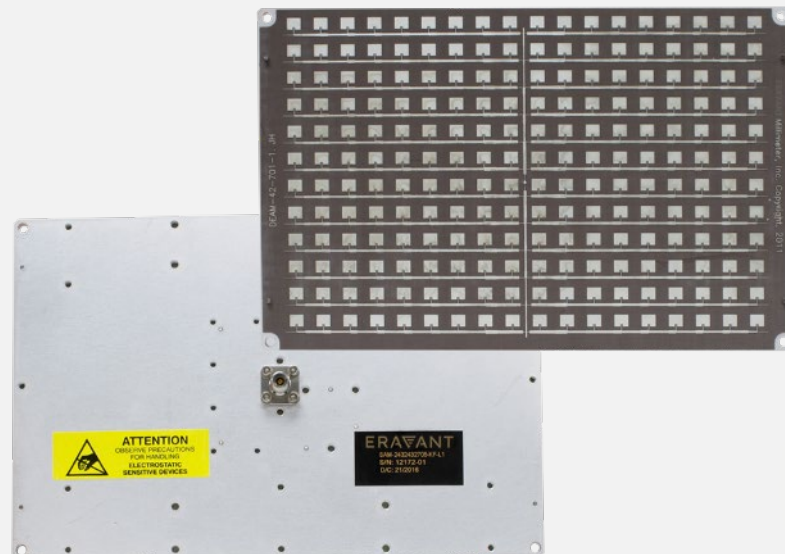
# DOPPLER SENSOR HEADS, MICROSTRIP ARRAY ANTENNA

**FAMILY: SSS**  
24.125 GHz

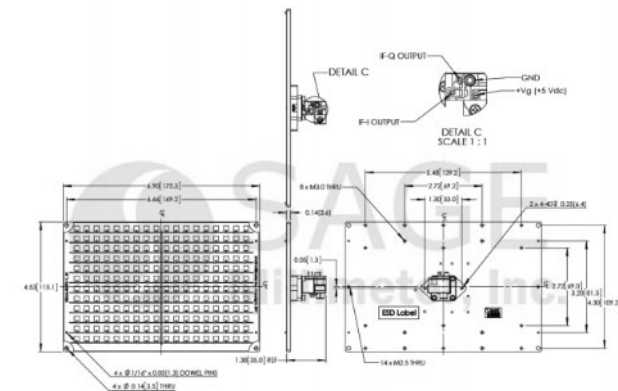
## SSS-24307-27M-DW

### Features:

- Doppler Sensor
- 24 GHz Operation
- Patch Array
- Volume Production Ready



Parameter	Minimum	Typical	Maximum
Antenna 3 dB Beamwidth		4.6° (H) x 6.8° (V)	
Antenna Side Lobes		-20 dBc	
Antenna Gain		27 dBi	
Antenna Polarization		Linear	
RF Frequency Range	24.050 GHz	24.125 GHz	24.200 GHz
Transmitting Power		+7 dBm	
Receiver I/Q Phase $\Delta$	60°		120°
Receiver I/Q Amplitude $\Delta$		0 dB	3 dB
IF Frequency Range	DC		100 MHz
IF Offset Voltage		-0.5 V <sub>DC</sub>	
Frequency Stability		-0.8 MHz/°C	
Power Stability		-0.03 dB/°C	
DC Supply Voltage		+5 V <sub>DC</sub> /250 mA	+5.5 V <sub>DC</sub>
Specification Temperature		+25 °C	
Operating Temperature	-40 °C		+85 °C





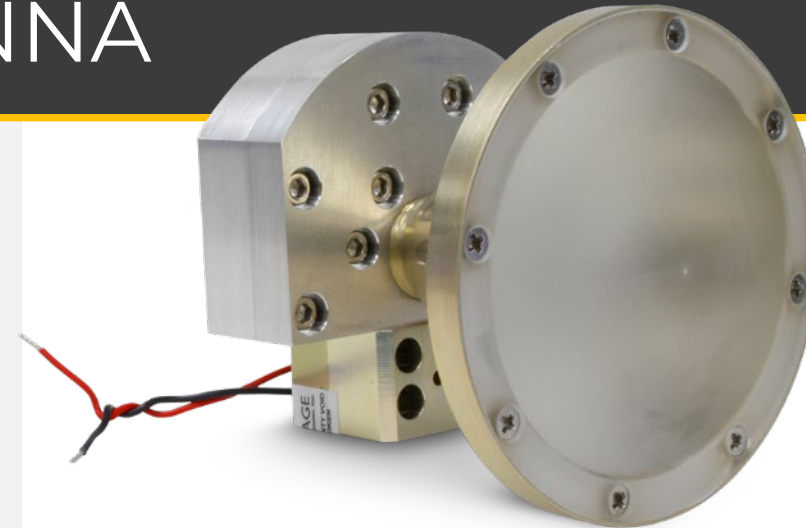
# DOPPLER SENSOR HEADS, LENS CORRECTED ANTENNA

**FAMILY: SSS**  
35 GHz

## SSS-35310-22L-D2

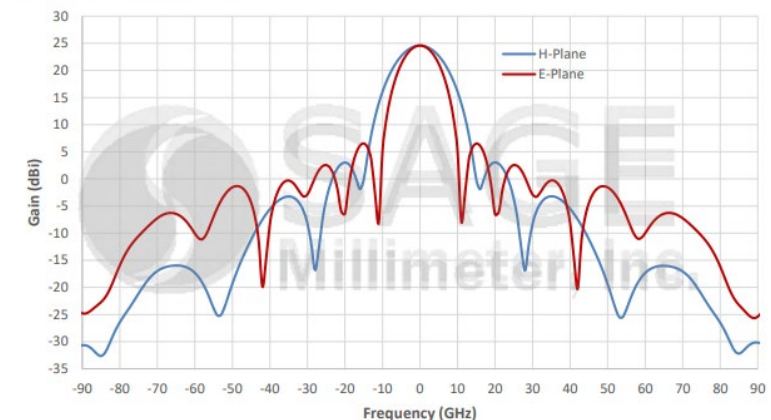
### Features:

- Doppler Directional Sensor
- 35 GHz Operation
- Lens Corrected Antenna
- Volume Production Ready



Parameter	Minimum	Typical	Maximum
Antenna 3 dB Beamwidth		12°	
Antenna Side Lobes		-20 dB	
Antenna Gain		22 dBi	
Antenna Polarization		Right-Handed Circular	
RF Frequency Range	33.9 GHz	35.0 GHz	36.1 GHz
Transmitting Power		+10 dBm	
Receiver Gain		19 dB	
Receiver Noise Figure		2.5 dB	
Receiver I/Q Phase $\Delta$	80°		100°
Receiver I/Q Amplitude $\Delta$	0 dB		3 dB
IF Gain		35 dB	
IF Frequency Range	5 Hz		2 MHz
IF Offset Voltage		$\pm 0.1 V_{DC}$	
System Gain		41 dB	
Frequency Stability		- 0.3 MHz/°C	
Power Stability		- 0.03 dB/°C	
DC Supply Voltage		+5.5 V <sub>DC</sub> /350 mA	
Specification Temperature		+25°C	
Case Temperature	-40°C		+85°C

Simulated Patterns @ 35 GHz

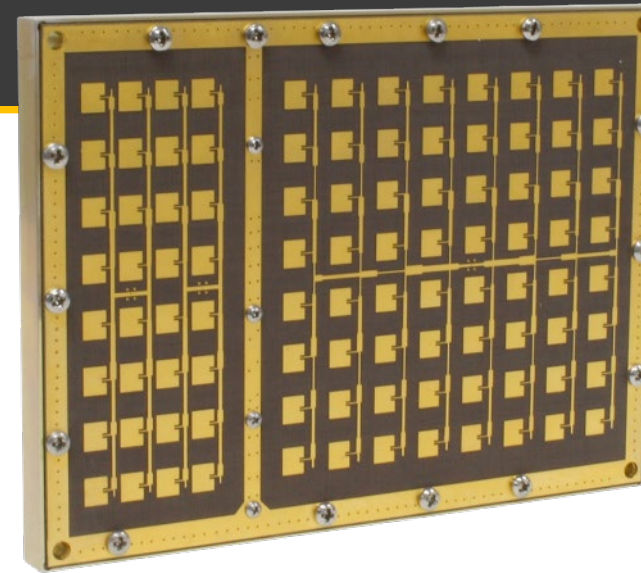


# RANGING SENSOR MODULE, DIRECTIONAL

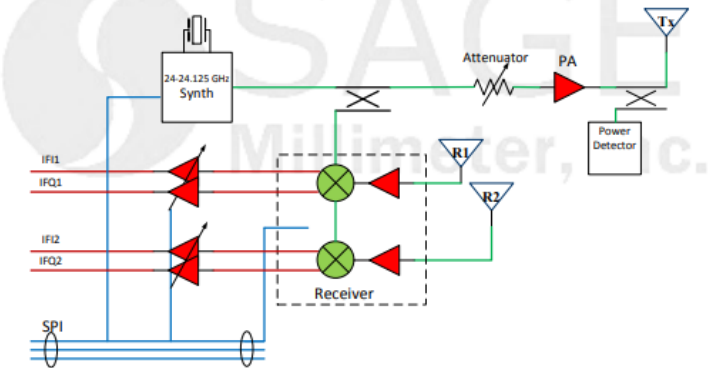
**FAMILY: SSS**  
24.125 GHz

## SSD-24307-2216M-A1

Parameter	Minimum	Typical	Maximum
<b>Antenna</b>			
Antenna Bandwidth		1,000 MHz @ VSWR <2:1	
Antenna Gain, Tx		22 dBi	
Antenna Gain, Rx		16 dBi	
Antenna Beamwidth, Tx		12°(H) x 12°(V)	
Antenna Beamwidth, Rx		12°(H) x 50°(V)	
Antenna Side Lobes, Tx		-20 dBc @ Elevation & Azimuth > ±20°	
Antenna Side Lobes, Rx		-20 dBc @ Elevation & Azimuth > ±20°	
<b>Transmitter</b>			
Transmit Frequency	24.000 GHz	24.125 GHz	24.250 GHz
Frequency Stability		-0.04 MHz/°C	
Output Power, EIRP	+12 dBm		+27 dBm
Phase Noise		-70 dBc/Hz @ 1 kHz PLL Locked -75 dBc/Hz @ 10 kHz PLL Locked -75 dBc/Hz @ 100 kHz PLL Locked	
FMCW Sweep Time	50 us		
<b>Receiver</b>			
Receiver Noise Figure			17 dB, SSB @ 100 kHz
IF Gain Range	21 dB		64 dB
IF, low f cutoff		50 Hz	
IF Bandwidth		1,000 kHz	
Receiver I/Q Channel		Channel One and Two	
Receiver I/Q Phase Δ		±10°	
Receiver I/Q Amplitude Δ		±2 dB	
IF Frequency Range	DC		1,000 kHz
IF Offset Voltage		-0.5 V <sub>DC</sub>	
Frequency Stability		±5 ppm	
Power Stability		- 0.03 dB/°C	
Operating Temperature	-25°C		+60°C
Supply Voltage	+5.0 V <sub>DC</sub>	+5.5 V <sub>DC</sub>	+6.0 V <sub>DC</sub>
Supply Current		280 mA	



**Block Diagram:**



# STANDARD TEST SET

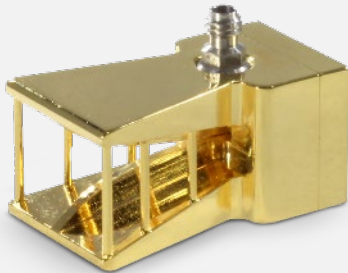
# ERAVANT STANDARD TEST SET FOR RADAR SYSTEMS

- ERAVANT offers several test equipment or test sets for Radar system evaluation and testing. They are organized into the following product families.
  - **SAV:** Broad Band Antennas
  - **SAC:** Dual Polarized Quad Ridge Circular Antennas
  - **SAF:** Dual Polarized Antennas
  - **SAH:** Dual Polarized Antennas
  - **SAN:** Rotary Joints
  - **SAJ:** Corner Reflectors
  - **SAX:** Antenna Mounting Fixtures
  - **STR:** Doppler Radar Target Simulators
  - **SSC:** Transceiver Module for Automotive Radar Simulator

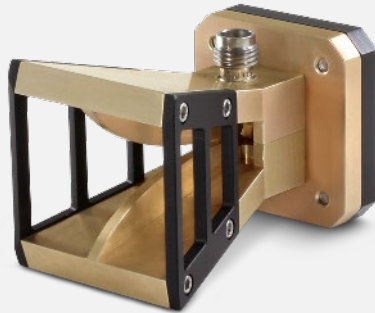
# DUAL RIDGED SQUARE ANTENNAS

**FAMILY: SAV**  
DC TO 110 GHz

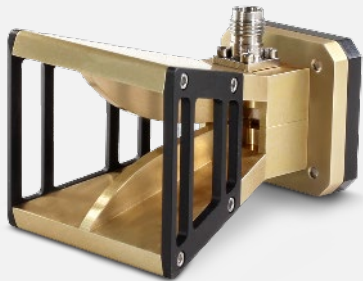
**5 Models**  
**Octave Bandwidth**



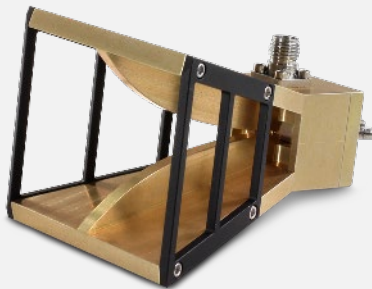
**SAV-1431141535-1F-U5**  
14 to 110 GHz



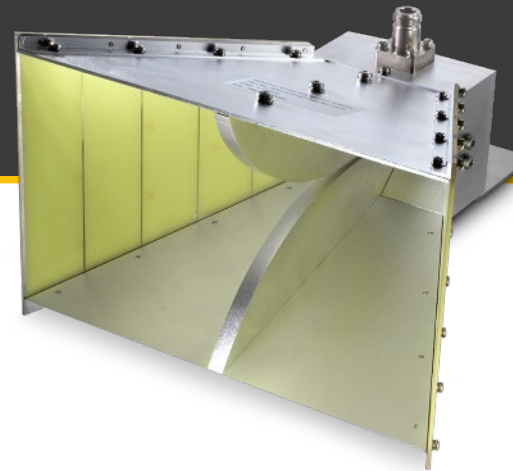
**SAV-0636731522-VF-U5**  
6 to 67 GHz



**SAV-4525031429-2F-U5**  
4.5 to 50 GHz

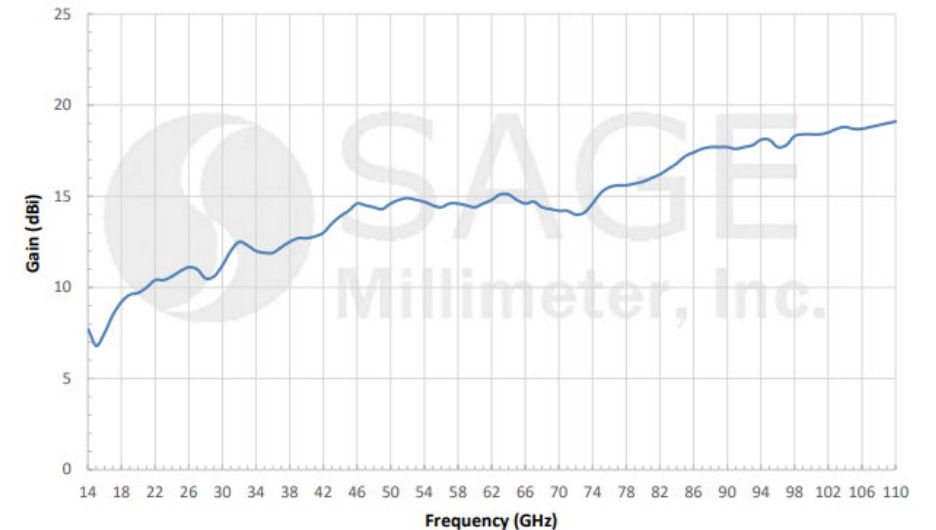


**SAV-0434031427-KF-U5**  
4 to 40 GHz



**SAV-0131831040-NF-U2**  
1 to 18 GHz

**Typical Gain vs. Frequency**



# DUAL RIDGED SQUARE ANTENNAS

**FAMILY: SAV**  
1 TO 50 GHz

**4 Models**

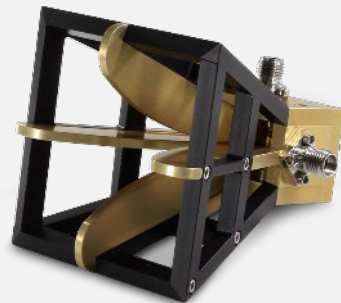
**Octave Bandwidth**



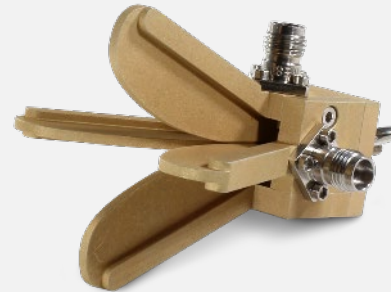
**SAV-0130430883-SF-U4-QR**  
1 to 4 GHz



**SAV-0632531431-SF-U3-QR**  
6 to 25 GHz

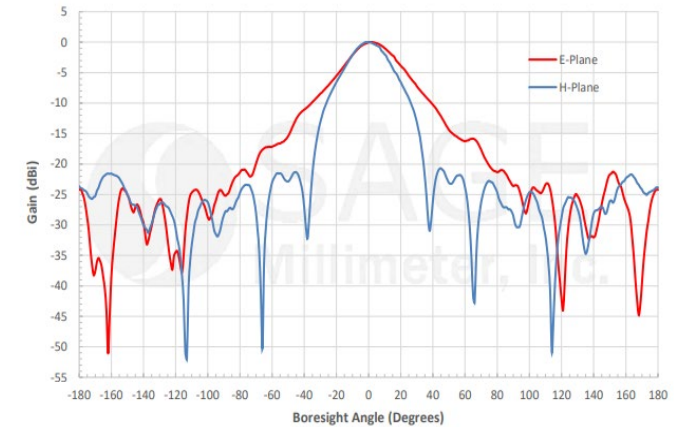


**SAV-0434031428-KF-U5-QR**  
4 to 40 GHz

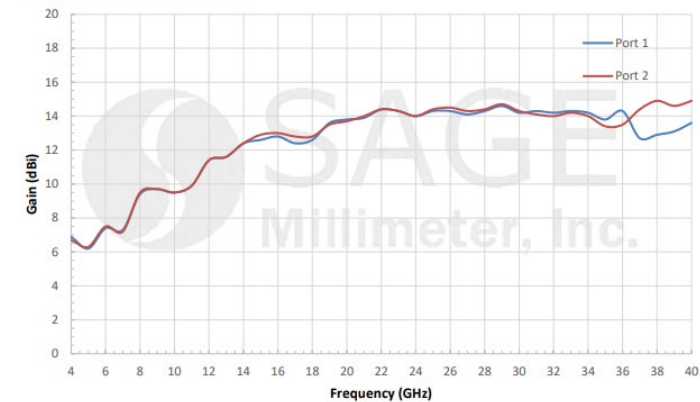


**SAV-0535031140-2F-U5-QR**  
5 to 50 GHz

Typical Antenna Pattern @ 22 GHz



Typical Gain vs. Frequency





# DUAL POLARIZED QUAD RIDGED CIRCULAR ANTENNAS

**FAMILY: SAC**  
2 TO 40 GHz

**6 Models**  
**Octave Bandwidth**



SAC-0231831225-SF-S4-DP  
2 to 18 GHz



SAC-0432431235-SF-S4-DP-QR  
4 to 24 GHz

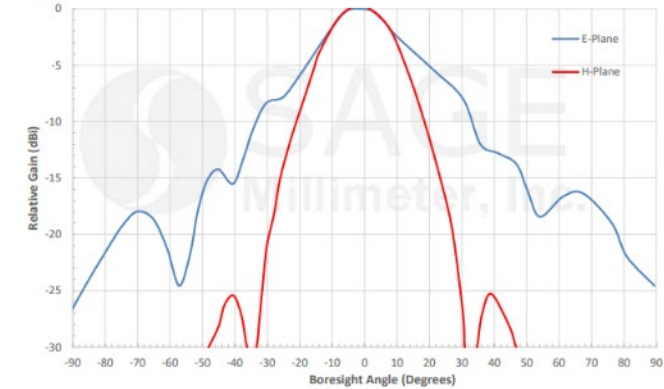


SAC-1834031621-KF-S5-DP  
18 to 40 GHz

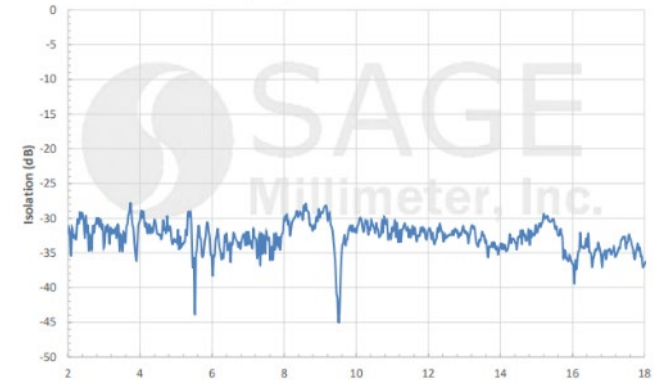


SAC-2734031517-KF-S5-DP  
27 TO 40 GHz

Typical Antenna Pattern @ 12 GHz



Measured Isolation vs. Frequency





# DUAL POLARIZED SCALAR HORN ANTENNAS

**FAMILY: SAF**  
24 TO 110 GHz

**7 Models**

**Full Waveguide Bandwidth**



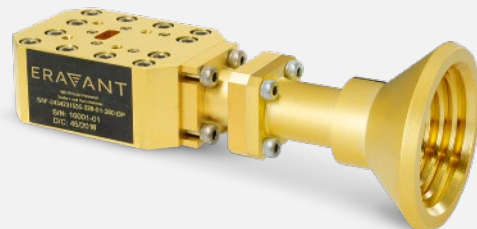
**SAF-7531141340-110-S1-100-DP**  
75 to 110 GHz



**SAF-6039031340-141-S1-122-DP**  
60 to 90 GHz

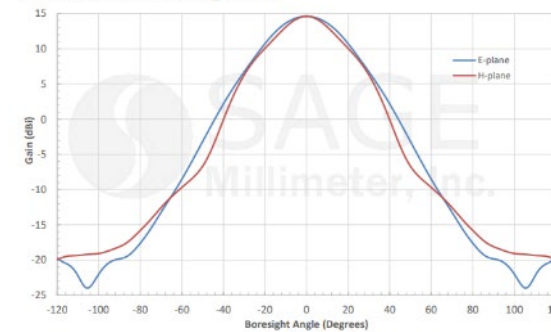


**SAF-4036031340-219-S1-188-DP**  
40 to 60 GHz

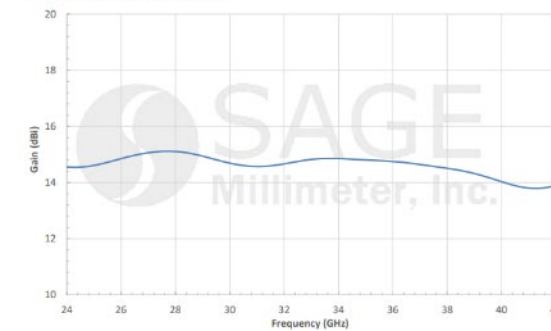


**SAF-2434231535-328-S1-280-DP**  
24 to 42 GHz

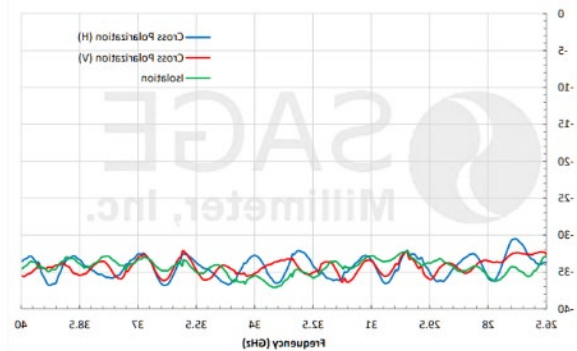
Simulated Antenna Patterns @ 30 GHz



Simulated Gain vs. Frequency



Measured Cross Polarization & Isolation vs. Frequency



# DUAL POLRIZED CHOKE HORN ANTENNAS

**FAMILY: SAH**  
24 TO 110 GHz

**6 Models**

**Full Waveguide Bandwidth**



**SAH-7531141060-110-S1-100-DP**

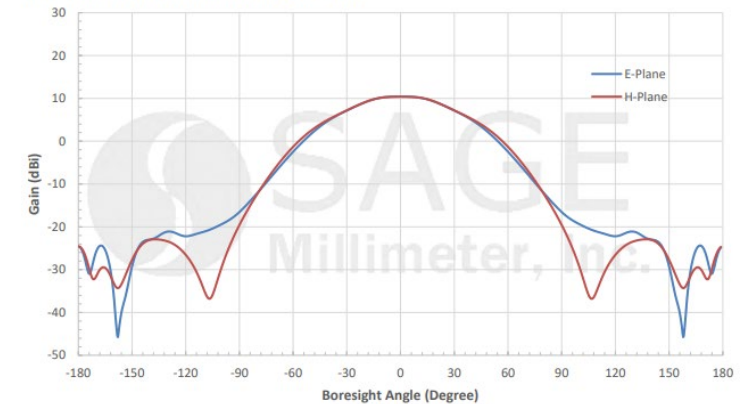
**75 to 110 GHz**



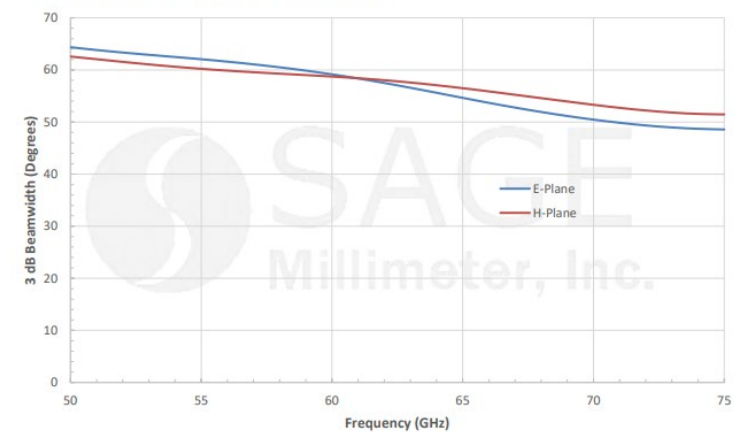
**SAH-5037531060-165-S1-148-DP**

**50 to 75 GHz**

Simulated Antenna Patterns @ 62 GHz



Simulated 3 dB Beamwidth vs. Frequency



# WAVEGUIDE ROTARY JOINT

**FAMILY: SAN**  
E BAND

## SAN-60390310-125I125I-S1

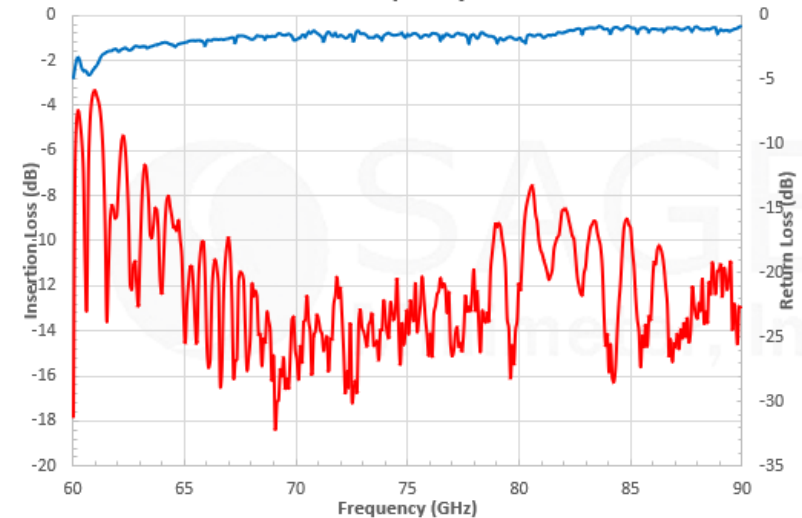
### Features:

- Doppler Directional Sensor
- 35 GHz Operation
- Lens Corrected Antenna
- Volume Production Ready



Parameter	Minimum	Typical	Maximum
Frequency Range	60 GHz		90 GHz
Insertion Loss		1.0 dB	
Return Loss		15 dB	
Rotating Speed		10 Turns/Second	
Waveform Supported	Circular Polarized		
Power Handling			10 W (CW)
Specification Temperature		+25 °C	
Operating Temperature	0 °C		+50 °C

Measured Performance vs. Frequency



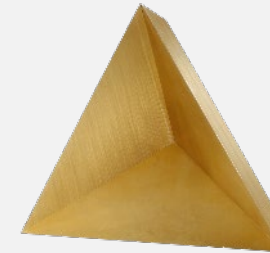
# CORNER REFLECTORS

**FAMILY: SAJ**  
0.70" TO 30" EDGE LENGTH

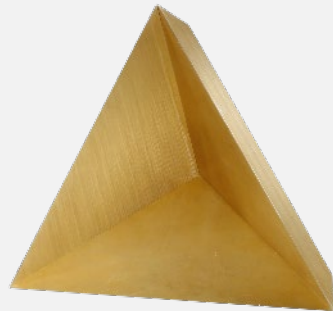
**More than 20 Models**  
**Various Sizes**



**SAJ-007-S1-0.71**  
0.71" Edge Length



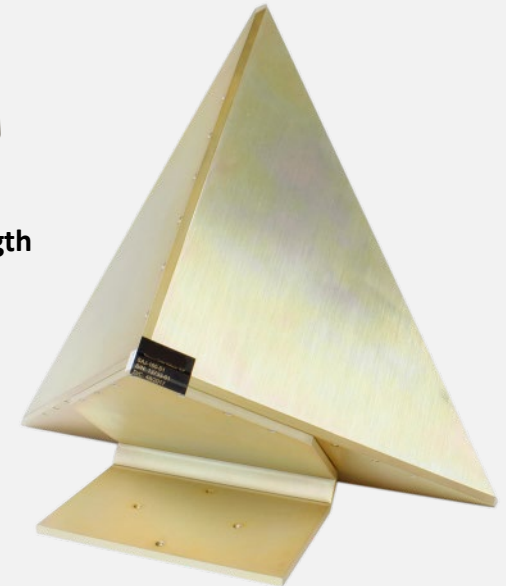
**SAJ-032-S1**  
3.20" Edge Length



**SAJ-060-S1**  
6.0" Edge Length



**SAJ-100-S1**  
10.0" Edge Length



**SAJ-160-S1**  
16.0" Edge Length

# ANTENNA MOUNTING FIXTURES

**FAMILY: SAX**  
0.70" to 30" Edge Length

**More than 10 Models**  
**Various Sizes**



**SAX-MT0750-C1**  
**0.75" Diameter Flange**  
**UG-385/U and UG-387/U**



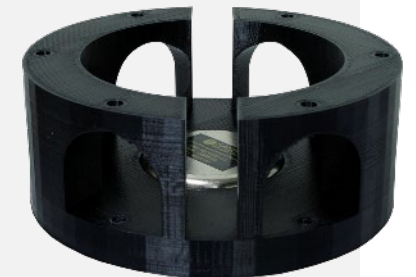
**SAX-MT0750-S1**  
**0.75" Square Flange**  
**UG-599/U**



**SAX-MT0880-S1**  
**0.88" Square Flange**  
**UG-595/U**



**SAX-MT1125-C1**  
**1.125" Diameter Flange,**  
**UG-383/U**



**SAX-ME5000-C1**  
**5" Diameter Mount for**  
**SAO-2734030810-KF-S1**  
**SAO-2734030810-28-S1**

# DOPPLER RADAR TARGET SIMULATOR

**FAMILY: STR**  
K BAND

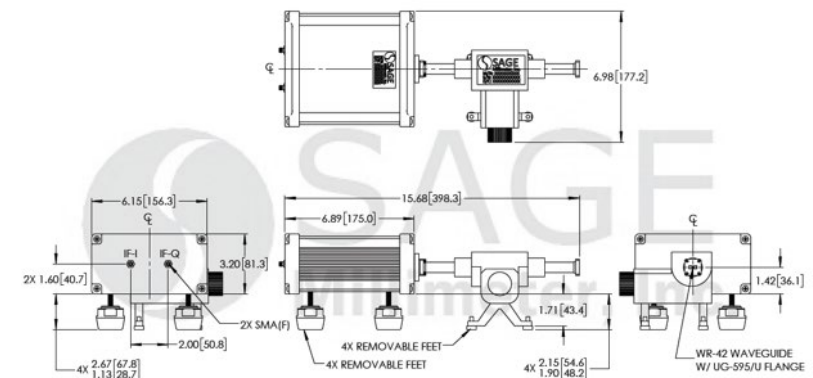
## STR-243-42-D1

### Features:

- Single Sideband Output
- Simulated Target Speed and Size Adjustable
- Simulated Target Moving Direction Switchable
- Instrumentation Grade



Parameter	Minimum	Typical	Maximum
Center Frequency		24.125 GHz	
RF Bandwidth		±100 MHz	
Carrier Rejection		25 dB	
Image Rejection		20 dB	
Routing Loss Range		25 to 125 dB	
I/Q Frequency Range	DC		100 MHz
I/Q Voltage			±10 V <sub>p-p</sub>
I/Q Current		±2.5 mA	±5 mA
I/Q Phase Error		±5°	
Specification Temperature		+25 °C	
Operating Temperature	0 °C		+50 °C





# DOPPLER RADAR TARGET SIMULATOR

**FAMILY: STR**  
Ka BAND

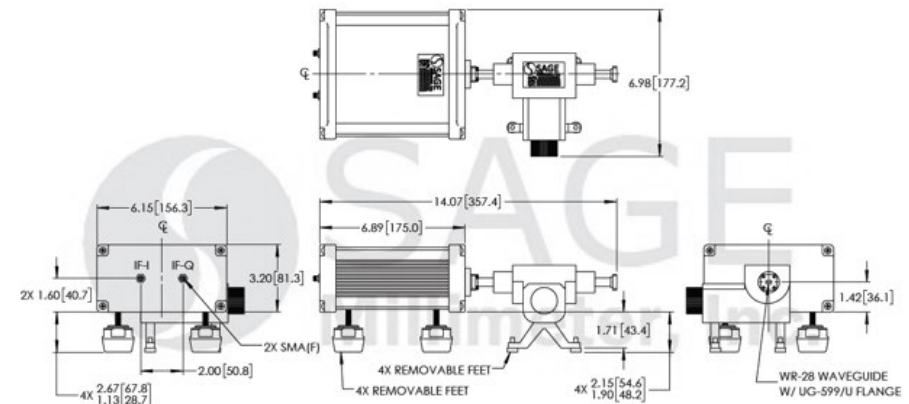
## STR-353-28-D1

### Features:

- Single Sideband Output
- Simulated Target Speed and Size Adjustable
- Simulated Target Moving Direction Switchable
- Instrumentation Grade



Parameter	Minimum	Typical	Maximum
Center Frequency		35 GHz	
RF Bandwidth		±150 MHz	
Carrier Rejection		25 dB	
Image Rejection		20 dB	
Routing Loss Range		25 to 125 dB	
I/Q Frequency Range	DC		150 MHz
I/Q Voltage			±10 V <sub>p-p</sub>
I/Q Current		±2.5 mA	±5 mA
I/Q Phase Error		±5°	
Specification Temperature		+25 °C	
Operating Temperature	+0 °C		+50 °C





# DOPPLER RADAR TARGET SIMULATOR

**FAMILY: STR**  
E BAND

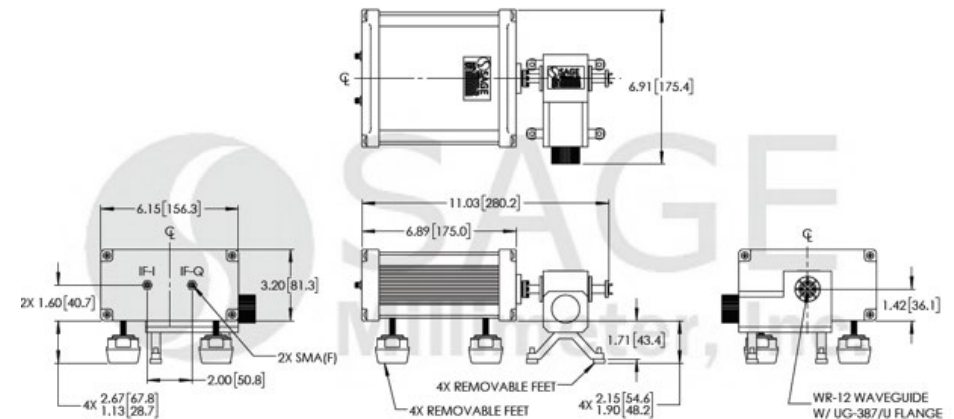
## STR-773-12-D1

### Features:

- Single Sideband Output
- Simulated Target Speed and Size Adjustable
- Simulated Target Moving Direction Switchable
- Instrumentation Grade



Parameter	Minimum	Typical	Maximum
Center Frequency		76.5 GHz	
RF Bandwidth		±250 MHz	
Carrier Rejection		30 dB	
Image Rejection		20 dB	
Routing Loss Range		25 to 125 dB	
I/Q Frequency Range	DC		250 MHz
I/Q Voltage		±10 V <sub>p-p</sub>	±12 V <sub>p-p</sub>
I/Q Current		±2.5 mA	±5 mA
I/Q Phase Error		±5°	
Specification Temperature		+25 °C	
Operating Temperature	0 °C		+50 °C



# TX/RX MODULE FOR AUTOMOTIVE RADAR SIMULATOR

**FAMILY: SSC**  
E BAND

## SSC-7737731200-1212-C1

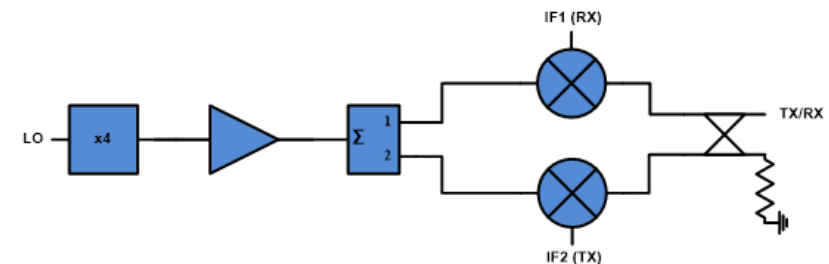
### Features:

- 76 to 78 GHz Operation
- Compact Size
- High Performance
- Fully Integrated Module



Parameter	Minimum	Typical	Maximum
TX RF Output Frequency	76 GHz		78 GHz
TX RF Output Power	-30 dBm		
TX IF Input Frequency	550 MHz		950 MHz
TX IF Input Power			0 dBm
RX RF Input Frequency	76 GHz		78 GHz
RX RF Input Power		-20 dBm	+3 dBm
RX IF Output Frequency	550 MHz		950 MHz
RX Conversion Loss		-12 dB	
LO Frequency	19.0 GHz		19.5 GHz
LO Input Power		+5 dBm	
TX Mixer DC Voltage Supply		+5V <sub>DC</sub>	+6 V <sub>DC</sub>
TX Mixer Current Supply		2.0 mA	2.5 mA
RX Mixer DC Voltage Supply		+5 V <sub>DC</sub>	+6 V <sub>DC</sub>
RX Mixer Current Supply		2.0 mA	2.5 mA
LO DC Voltage Supply		+6 V <sub>DC</sub>	
LO Current Supply		300 mA	

### Block Diagram:



# CONCLUSION

- ERAVANT has designed and fabricated total microwave and millimeterwave band COTS (Commercial of The Shelf) components and sub-assemblies to support full industrial applications. The product families are organized into 10 product families.
  - Antennas
  - Amplifiers
  - Coaxial Passive Components
  - Frequency Converters
  - Control Devices
  - Ferrite Devices
  - Oscillators
  - Subsystems
  - Test Equipment
  - Waveguide Passive Components
- While some of these products as shown in this presentation are designed for and manufactured for Radar System Applications, many products and custom solutions are available upon request. Contact [support@eravant.com](mailto:support@eravant.com) for more information.

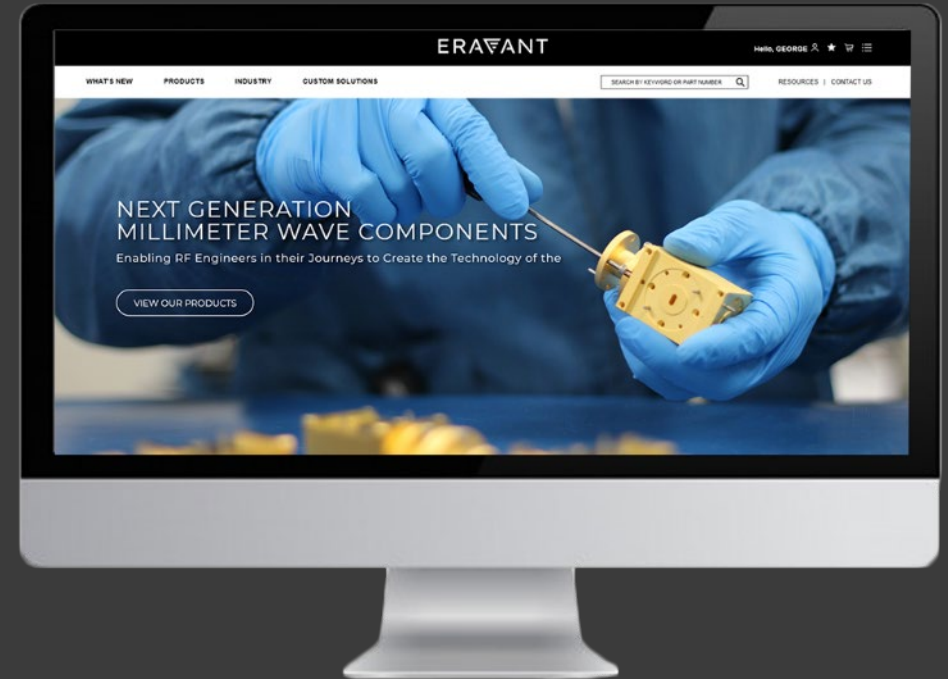
# ERA VANT

NEXT GENERATION MILLIMETERWAVE COMPONENTS

CHECK OUT OUR WEBSITE FOR MORE!

## Featuring

- 3,000+ Products with Full Datasheets
- Price and Delivery Available Online
- Product Categorization Filters
- Blogs, Calculators and Publications



**SWM-60390320-12-SB**  
Full E-Band Magic Tee

**Typical Isolation and Insertion Loss vs. Frequency**

**SWM-60390320-12-SB**  
Full E-Band Magic Tee

**Description:**  
Model SWM-60390320-12-SB is a full E-band magic tee that covers the entire band from 60 to 100 GHz. This magic tee is a four port hybrid coupler with power divider with two collinear arms, an E plane difference arm, and an H plane cross arm. The magic tee offers less than 1.0 dB insertion loss and high isolation between the two collinear arms and between the sum and difference arms. All waveguide ports have standard WR-12 waveguide flanges.

**Features:**

- Low Insertion Loss and High Isolation
- Compact Package

**Applications:**

- Test Labs
- Test Infrastructure
- Sub-assembly

**Electrical Specifications:**

Parameter	Minimum	Typical	Maximum
Frequency	50 GHz		50 GHz
Insertion Loss	0.5 dB	0.5 dB	0.5 dB
Isolation	Sum and Difference Ports	20 dB	20 dB
Collinear Ports		20 dB	20 dB
VSWR		1.5:1	

**Mechanical Specifications:**

Item	Specification
Sum and Difference Ports	WR-12 Waveguide with Up-38.70 Flange
Collinear Ports	WR-12 Waveguide with Up-38.70 Flange
Weight	1.2 Oz
Finishing	Gold Plated
Material	Aluminum
Outline	95M-81

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PASSIVE FREQUENCY MULTIPLIERS

GRID TABLE 28 RESULTS

MODEL	MINIMUM OUTPUT FREQUENCY	MAXIMUM OUTPUT FREQUENCY	OUTPUT POWER	MINIMUM INPUT FREQUENCY	MAXIMUM INPUT FREQUENCY	INPUT POWER	OUTPUT PORT	INPUT PORT	DOWNLOADS	VIEW
SFP-00212-S2	110 GHz	170 GHz	0 dBm	60 GHz	60 GHz	+10 dBm	WR-06 Waveguide	WR-12 Waveguide	Datasheet	View
SFP-00318-US	110 GHz	170 GHz	-3 dBm	35.57 GHz	55.87 GHz	+20 dBm	WR-06 Waveguide	WR-10 Waveguide	Datasheet	View
SFP-00210-S2	140 GHz	220 GHz	-3 dBm	70 GHz	110 GHz	+17 dBm	WR-05 Waveguide	WR-10 Waveguide	Datasheet	View
SFP-223403205-28SF-S1	22 GHz	40 GHz	+5 dBm	11 GHz	20 GHz	+18 dBm	WR-28 Waveguide	SMA (F)	Datasheet STEP File	View
SFP-243423303-28SF-S1	24 GHz	42 GHz	+3 dBm	8 GHz	14 GHz	+20 dBm	WR-28 Waveguide	SMA (F)	Datasheet STEP File	View
SFP-2635F-U9	26.5 GHz	40 GHz	+5 dBm	8.37 GHz	13.33 GHz	+20 dBm	WR-28 Waveguide	SMA (F)	Datasheet	View
SFP-273403205-28SF-S1	20.5 GHz	40 GHz	-5 dBm	8.37 GHz	13.33 GHz	+10 dBm	WR-28 Waveguide	SMA (F)	Datasheet STEP File	View
SFP-2235F-S1	33 GHz	60 GHz	+3 dBm	11 GHz	16.67 GHz	+20 dBm	WR-22 Waveguide	SMA (F)	Datasheet STEP File	View
SFP-222XV-S1	33 GHz	60 GHz	+7 dBm	16.5 GHz	26 GHz	+20 dBm	WR-22 Waveguide	2.02 mm (F)	Datasheet STEP File	View
SFP-302673303-19SF-NH	57 GHz	90 GHz	+3 dBm	12 GHz	19 GHz	+20 dBm	WR-19 Waveguide	SMA (F)	Datasheet STEP File	View
SFP-102XV-S1	40 GHz	80 GHz	+5 dBm	20 GHz	30 GHz	+20 dBm	WR-19 Waveguide	2.92 mm (F)	Datasheet STEP File	View

# ERAVANT

NEXT GENERATION MILLIMETERWAVE COMPONENTS

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