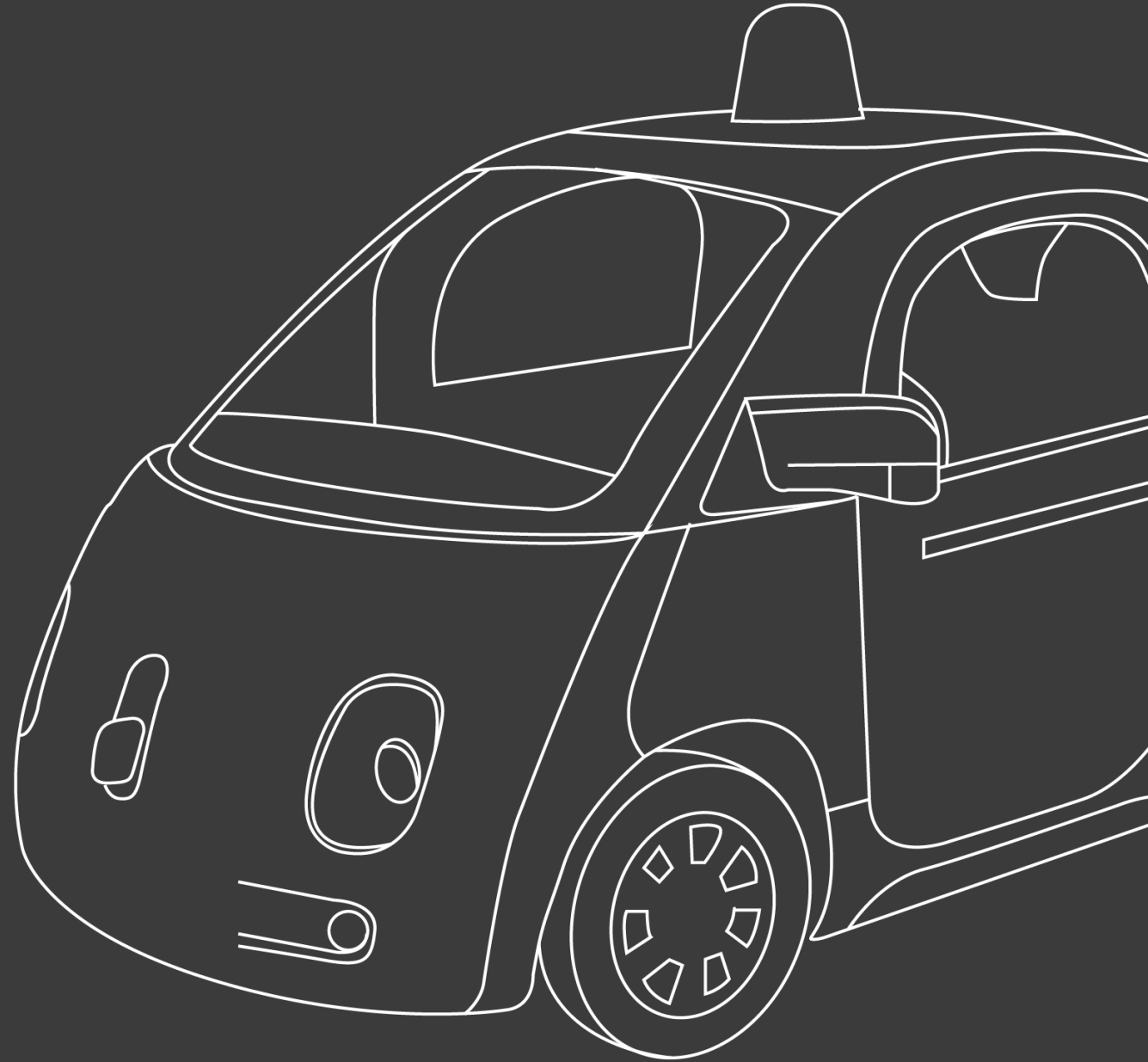


# ERA<sup>Δ</sup>ANT

NEXT GENERATION MILLIMETERWAVE COMPONENTS

COMPONENTS FOR  
MILLIMETERWAVE 5G  
& IOT SYSTEMS



# CONTENTS

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## **INTRODUCTION**

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# 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 in broadband for 5G and IoT System Applications.**
- Our full product offering, including Limited Run models, are listed on our website at [www.eravant.com](http://www.eravant.com).

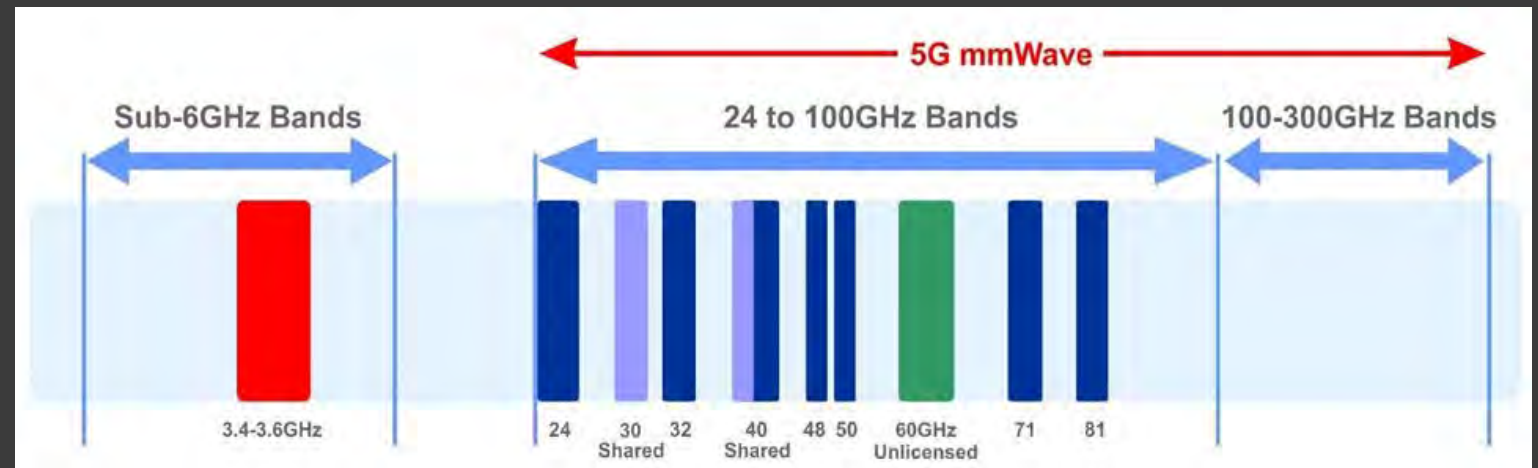
**Additional products and presentations are available upon customer request:**

- Custom models for components and subassemblies can be configured to customers' specifications.
- Presentations for specific applications like Instrumentation, Space, Communication, and Radar are also available.
- Presentations about Ka, Q, U, V, E, W, F and D-Bands are available.

# 5G FREQUENCY SPECTRUM

## Millimeter 5G Frequency Bands

- Ka Band: 24 to 34 GHz
- Q Band: 37 to 53 GHz
- V Band: 55 to 76 GHz
- E Band: 81 to 86 GHz





# ERAVANT PRODUCT OFFERINGS

- **Eravant** offers Total Product Solutions to configure any system application in the Frequency Range of DC to 220 GHz.
- Although the standard models are specified for full waveguide band operations, they can cover many Extended Millimeter Wave 5G Bands.
- While thousands of offered modules cover the Full Spectrum of the Millimeter Wave 5G Band, this presentation focuses on the products especially developed for Millimeter Wave 5G Spectrum. The examples are,
  - Beamforming, Omni-Directional, Dual Polarized Antennas
  - Broadband, Low Noise and Power Amplifiers
  - Frequency Converters and Multipliers
  - Control Devices
  - Ferrite Devices
  - Passive Components and Ferrite Devices



# ERAVANT ANTENNAS

The focus of this presentation section is to introduce the **Eravant** antenna product family by highlighting some representative models. There are several hundred standard models available to satisfy all 5G system applications. The antenna family includes the following types:

- Rectangular Horn Antenna
- Circular Horn Antenna
- Scalar Feed Horn Antenna
- Choke Flange Feed Horn Antenna
- Lens Correct Horn Antenna
- Gaussian Optics Antenna
- Microstrip Patch Array Antenna
- Omni Directional Antenna
- Probe Antenna
- Polarizer
- Orthomode Transducer
- Slotted Waveguide Array Antenna
- Cassegrain Antenna

# ANTENNAS

# BEAMFORMING ANTENNA

**SAM-2832830695-DM-L1-64C**

28 GHz

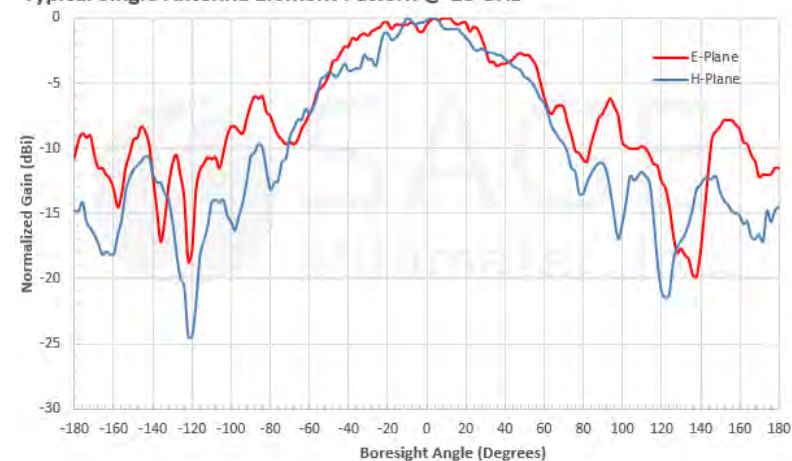
## Features:

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



Parameter	Minimum	Typical	Maximum
Frequency		28.0 GHz	
Bandwidth		±0.1 GHz	
Single Patch Gain		6.0 dBi	
3 dB Beamwidth	50° (Vertical, E Plane) x 95° (Horizontal, H Plane)		
Sidelobe Level		-12 dB	
Array Gain (Fed in Phase)	24.0 dBi		
Array 3 dB Beamwidth (Fed in Phase)	4° (Vertical, E Plane) x 17° (Horizontal, H Plane)		
Array Sidelobe Level (Fed in Phase)	-12 dB		
Polarization	Linear		
Return Loss		6 dB	
Specification Temperature		+25 °C	
Operating Temperature	-40 °C		+85 °C

Typical Single Antenna Element Pattern @ 28 GHz



# BEAMFORMING ANTENNA

**SAM-2832830695-DM-L1-32C-1**

28 GHz

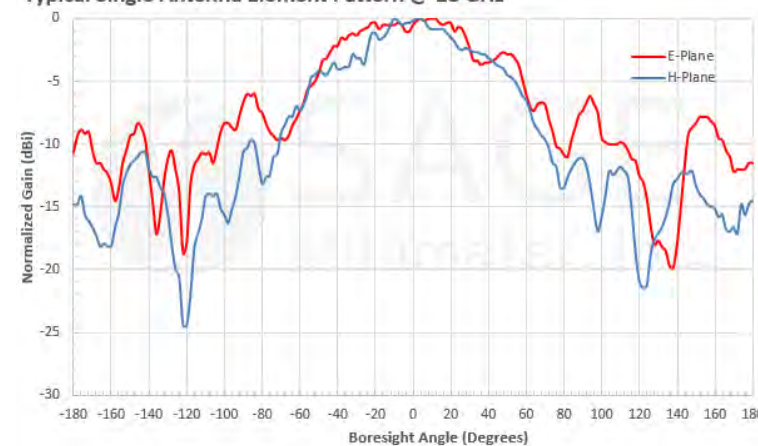
## Features:

- 28 GHz
- Beamforming Feasibility
- 1 x 32 Elements
- Various Array Configurations



Parameter	Minimum	Typical	Maximum
Frequency		28.0 GHz	
Bandwidth		±0.1 GHz	
Single Patch Gain		6.0 dBi	
3 dB Beamwidth	50° (Vertical, E Plane) x 95° (Horizontal, H Plane)		
Sidelobe Level		-12 dB	
Array Gain (Fed in Phase)	21.0 dBi		
Array 3 dB Beamwidth (Fed in Phase)	50° (Vertical, E Plane) x 3° (Horizontal, H Plane)		
Array Sidelobe Level (Fed in Phase)	-12 dB		
Polarization	Linear		
Return Loss		6 dB	
Specification Temperature		+25 °C	
Operating Temperature	-40 °C		+85 °C

Typical Single Antenna Element Pattern @ 28 GHz



# BEAMFORMING ANTENNA

**SAM-3934030695-2F-L1-4C**

39 GHz

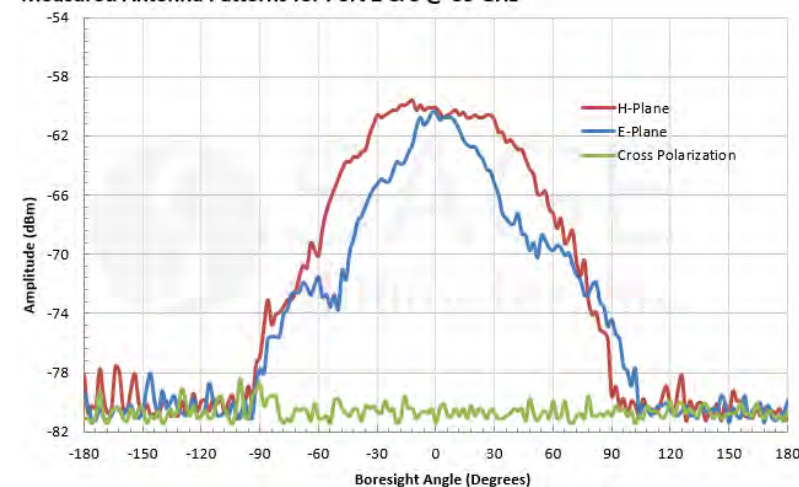
## Features:

- 39 GHz
- Beamforming Feasibility
- 1 x 4 Elements
- Various Array Configurations



Parameter	Minimum	Typical	Maximum
Frequency Range	38.5 GHz		39.5 GHz
Gain		6.0 dBi	
3 dB Beamwidth	50° (Vertical, E Plane) x 95° (Horizontal, H Plane)		
Sidelobe Level		-12 dB	
Array Gain	12.0 dBi		
Array 3 dB Beamwidth	15° (Vertical, E Plane) x 95° (Horizontal, H Plane)		
Array Sidelobe Level	-12 dB		
Polarization	Linear		
Return Loss		10 dB	
Specification Temperature		+25 °C	
Operating Temperature	-40 °C		+85 °C

Measured Antenna Patterns for Port 2 & 3 @ 39 GHz



# BEAMFORMING ANTENNA

**SAM-6837030395-15-L2-4W**

69 GHz

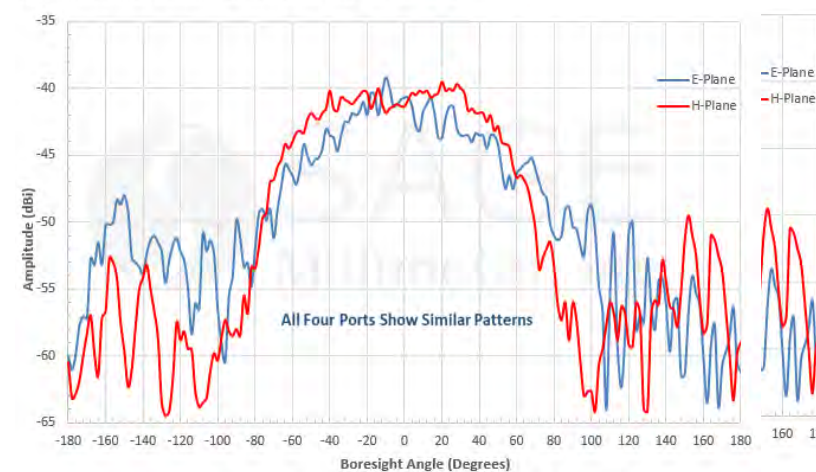
## Features:

- 69 GHz
- Beamforming Feasibility
- 2 x 2 Elements
- Various Array Configurations
- Many Models in V Band



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

Measured Individual Patch Pattern @ 69.17 GHz





# OMNI-DIRECTIONAL ANTENNA

**SAO-2734030345-28-S1**

Ka BAND

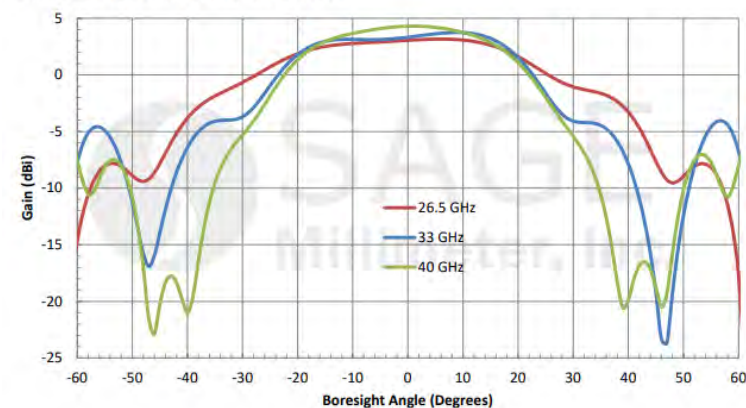
## Features:

- 26.5 to 40 GHz
- 360° Azimuth Coverage
- 45° Vertical 3 dB Bandwidth
- Vertically Polarized
- Full Ka Band Bandwidth Operation



Parameter	Minimum	Typical	Maximum
Frequency Range	26.5 GHz		40.0 GHz
Gain		3 dBi	
Azimuth Gain Variation		±1 dB	
Azimuth Beamwidth		360°	
3 dB Vertical Beamwidth		45°	
Return Loss		10 dB	
Power Handling		150 W (CW)	200 W (CW)
Specification Temperature		+25 °C	
Operating Temperature	-40 °C		+85 °C

Simulated E-Plane Antenna Patterns





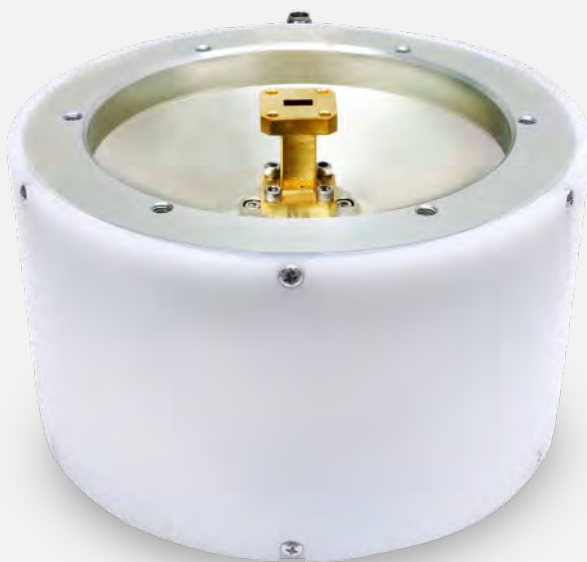
# OMNI-DIRECTIONAL ANTENNA

**SAO-2734030810-28-S1**

Ka BAND

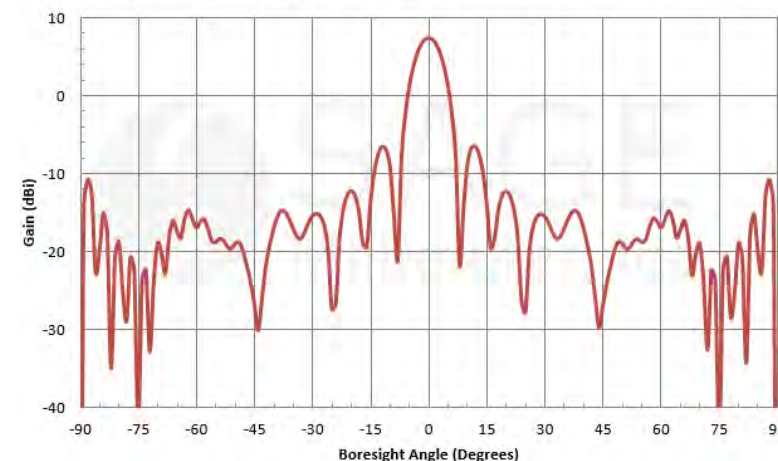
## Features:

- 26.5 to 40 GHz
- 360° Azimuth Coverage
- 10° Vertical 3 dB Bandwidth
- Vertically Polarized
- Full Ka Band Bandwidth Operation



Parameter	Minimum	Typical	Maximum
Frequency Range	24 GHz		40 GHz
Gain		7.5 dBi	
Azimuth Gain Variation		±1 dB	
Azimuth Beamwidth		360°	
3 dB Vertical Beamwidth		10°	
Return Loss		9 dB	
Power Handling		150 Watts	200 Watts
Specification Temperature		+25 °C	
Operating Temperature	-40 °C		+85 °C

Typical E-Plane Antenna Pattern @ 33.25 GHz



# OMNI-DIRECTIONAL ANTENNA

**SAO-5037530230-15-S1**

V BAND

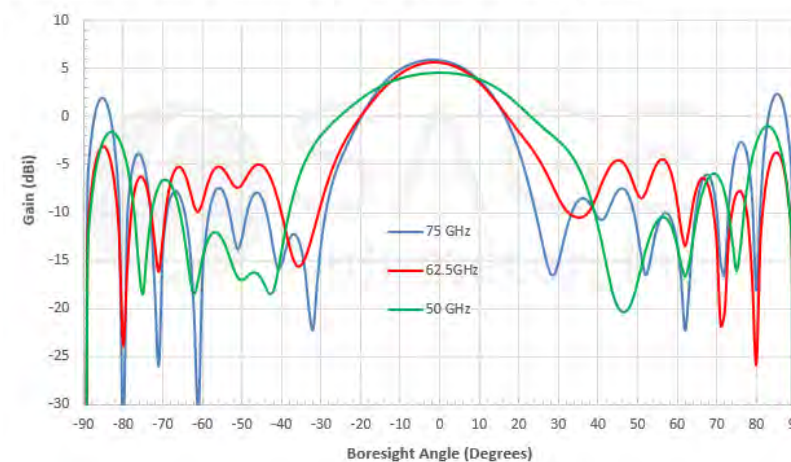
## Features:

- 50 to 75 GHz
- 360° Azimuth Coverage
- 30° Vertical 3 dB Bandwidth
- Vertically Polarized
- Full V Band Bandwidth Operation



Parameter	Minimum	Typical	Maximum
Frequency	50 GHz		75 GHz
Gain		2.0 dBi	
Azimuth Gain Variation		±2.0 dB	
Azimuth Beamwidth		360°	
3 dB Vertical Beamwidth		30°	
Return Loss		10 dB	
Power Handling		50 W (CW)	
Specification Temperature		+25 °C	
Operating Temperature	-40 °C		+85 °C

Simulated H-Plane Antenna Pattern @ 50GHz, 62.5GHz, 75 GHz



# OMNI-DIRECTIONAL ANTENNA

**SAO-4036030415-19-S1**

U BAND

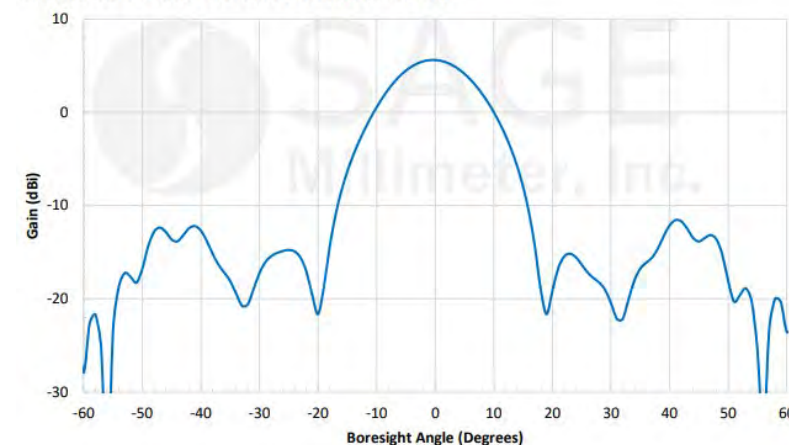
## Features:

- 40 to 60 GHz
- 360° Azimuth Coverage
- 30° Vertical 3 dB Bandwidth
- Vertically Polarized
- Full V Band Bandwidth Operation



Parameter	Minimum	Typical	Maximum
Frequency	40 GHz		60 GHz
Gain		4 dBi	
Azimuth Gain Variation		±2 dBi	
Azimuth Beamwidth		360°	
3 dB Vertical Beamwidth		15°	
Return Loss		10 dB	
Power Handling		150 W (CW)	
Specification Temperature		+25 °C	
Operating Temperature	-40 °C		+85 °C

Simulated E-Plane Antenna Pattern @ 50 GHz



# OMNI-DIRECTIONAL ANTENNA

**SAO-6039030230-12-S1**

E BAND

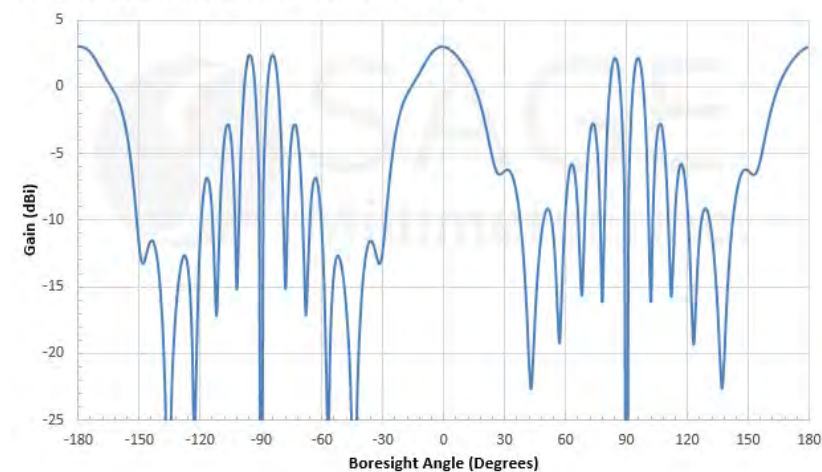
## Features:

- 60 to 90 GHz
- 360° Azimuth Coverage
- 30° Vertical 3 dB Bandwidth
- Vertically Polarized
- Full E Band Bandwidth Operation



Parameter	Minimum	Typical	Maximum
Frequency Range	60 GHz		90 GHz
Gain		2 dBi	
Gain Variation		$\pm 3$ dB	
Azimuth		360°	
3 dB Beamwidth, Vertical		30°	
Return Loss		9 dB	
Specification Temperature		+25°C	
Operating Temperature	-40°C		+85°C

Simulated E-Plane Antenna Pattern @ 75 GHz



# OMNI-DIRECTIONAL ANTENNA

**SAO-2734033045-KF-C1-BL**

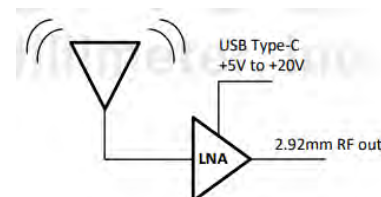
ACTIVE, Ka BAND

## Features:

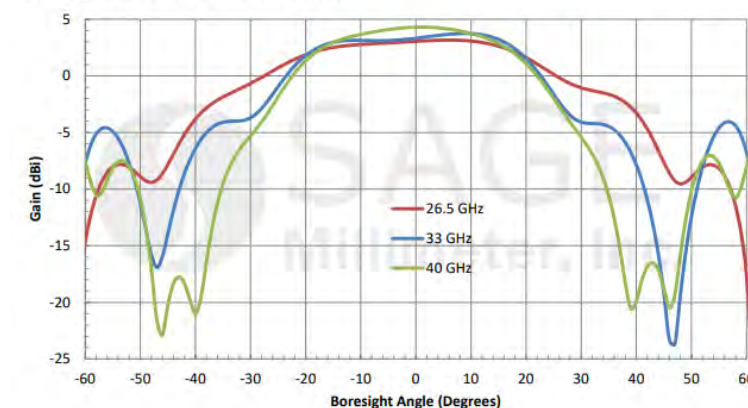
- 26.5 to 40 GHz
- 360° Azimuth Coverage
- 45° Vertical 3 dB Bandwidth
- Vertically Polarized
- Full Ka Band Bandwidth Operation



Parameter	Minimum	Typical	Maximum
Frequency Range	26.5 GHz		40.0 GHz
Gain at Center Frequency		30 dBi	
Noise Figure		5 dB	
Azimuth Gain Variation		±1 dB	
Azimuth Beamwidth		360°	
3 dB Vertical Beamwidth		45°	
P <sub>1dB</sub>		+11 dBm	
Return Loss		10 dB	
RF Input Power			-8 dBm
Damage RF Input Power			-3 dBm
Supply Voltage	+4.8 V <sub>DC</sub>	+5 V <sub>DC</sub>	+20 V <sub>DC</sub>
Supply Current		240 mA	
Specification Temperature		+25 °C	
Operating Temperature	-20 °C		+65 °C



Simulated E-Plane Antenna Patterns





# DUAL RIDGED ANTENNA

**SAV-0434031427-KF-U5**

4 to 40 GHz

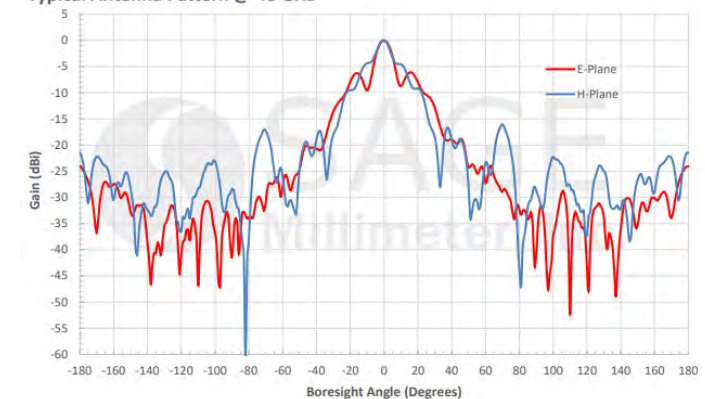
## Features:

- 4 to 40 GHz
- Linear Polarized
- 6 Models to Cover up to 110 GHz



Parameter	Minimum	Typical	Maximum
Frequency	4 GHz		40 GHz
Gain		14 dBi	
Polarization	Linear		
E-Plane 3 dB Beamwidth		27°	
H-Plane 3 dB Beamwidth		27°	
E-Plane Sidelobe Levels		-10 dB	
H-Plane Sidelobe Levels		-15 dB	
Return Loss		14 dB	
Cross Polarization	25 dB	30 dB	
Power Handling			10 W (CW)
Specification Temperature		+25°C	
Operating Temperature	-40°C		+85°C

Typical Antenna Pattern @ 40 GHz



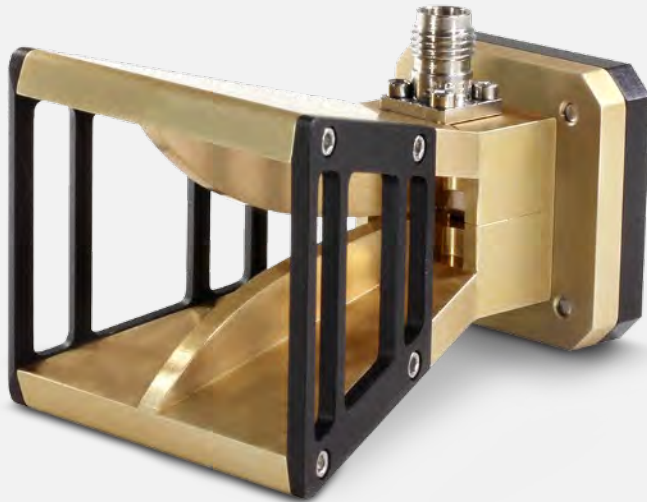
# DUAL RIDGED ANTENNA

**SAV-4525031429-2F-U5**

4.5 to 50 GHz

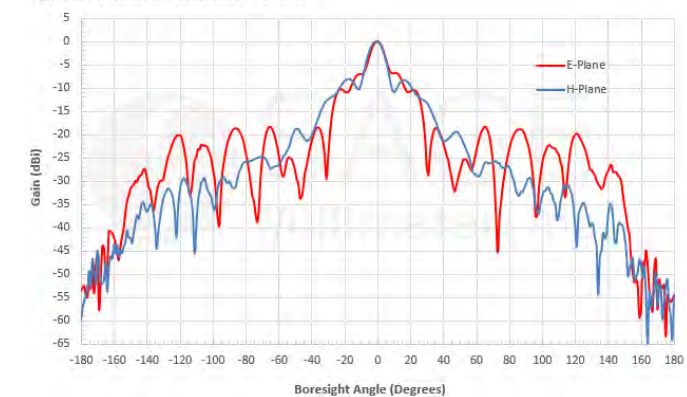
## Features:

- 4.5 to 50 GHz
- Linear Polarized
- 6 Models to Cover up to 110 GHz



Parameter	Minimum	Typical	Maximum
Frequency	4.5 GHz		50 GHz
Gain		14 dBi	
Polarization	Linear		
E-Plane 3 dB Beamwidth		29°	
H-Plane 3 dB Beamwidth		29°	
E-Plane Sidelobe Levels		-15 dB	
H-Plane Sidelobe Levels		-10 dB	
Return Loss		14 dB	
Cross Polarization	25 dB	30 dB	
Power Handling			10 W (CW)
Specification Temperature		+25°C	
Operating Temperature	-40°C		+85°C

Typical Antenna Pattern @ 50 GHz



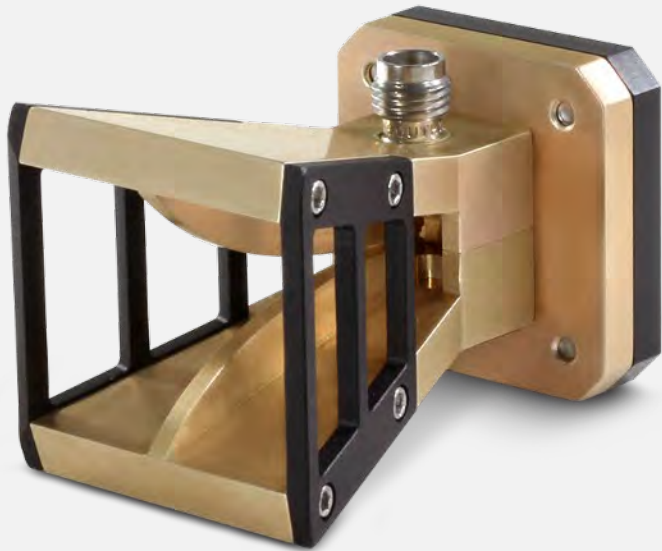
# DUAL RIDGED ANTENNA

**SAV-0636731522-VF-U5**

6 to 67 GHz

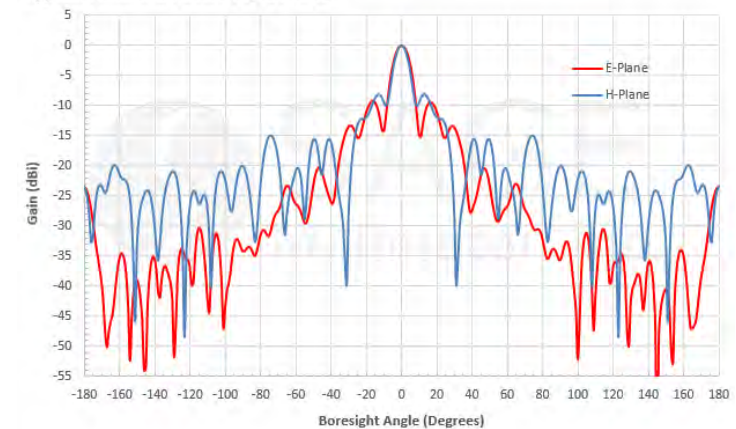
## Features:

- 6 to 67 GHz
- Linear Polarized
- 6 Models to Cover up to 110 GHz



Parameter	Minimum	Typical	Maximum
Frequency	6 GHz		67 GHz
Gain		15 dBi	
Polarization	Linear		
E-Plane 3 dB Beamwidth		22°	
H-Plane 3 dB Beamwidth		22°	
E-Plane Sidelobe Levels		-10 dB	
H-Plane Sidelobe Levels		-15 dB	
Return Loss		12 dB	
Cross Polarization	20 dB	25 dB	
Power Handling			5 W (CW)
Specification Temperature		+25°C	
Operating Temperature	-40°C		+85°C

Typical Antenna Pattern @ 67 GHz





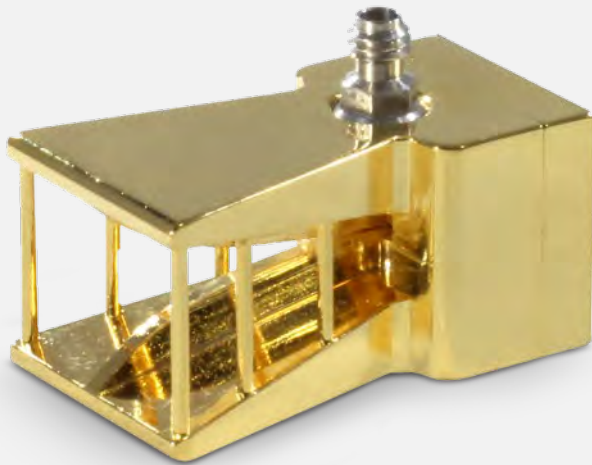
# DUAL RIDGED ANTENNA

**SAV-1431141535-1F-U5**

14 to 110 GHz

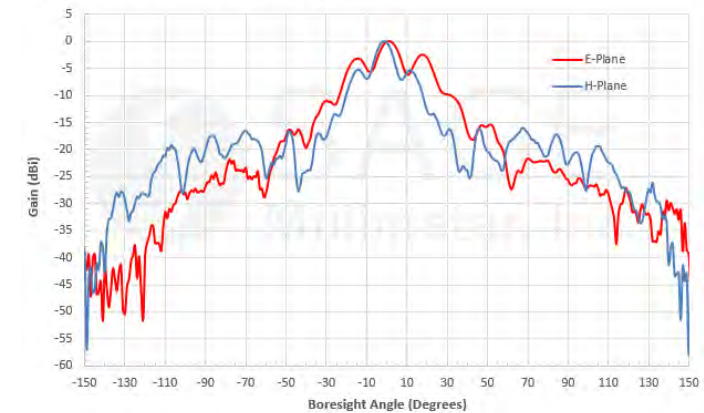
## Features:

- 14 to 110 GHz
- Linear Polarized
- 6 Models to Cover up to 110 GHz



Parameter	Minimum	Typical	Maximum
Frequency	14 GHz		110 GHz
Gain		15 dBi	
Polarization	Linear		
E-Plane 3 dB Beamwidth		35°	
H-Plane 3 dB Beamwidth		35°	
E-Plane Sidelobe Levels		-10 dB	
H-Plane Sidelobe Levels		-15 dB	
Return Loss		10 dB	
Cross Polarization	23 dB	28 dB	
Power Handling			4 W (CW)
Specification Temperature		+25°C	
Operating Temperature	-40°C		+85°C

Typical Antenna Pattern @ 110 GHz



# QUAD RIDGED, DUAL POLARIZED ANTENNA

**SAV-0130430883-SF-U4-QR**

1 to 4 GHz

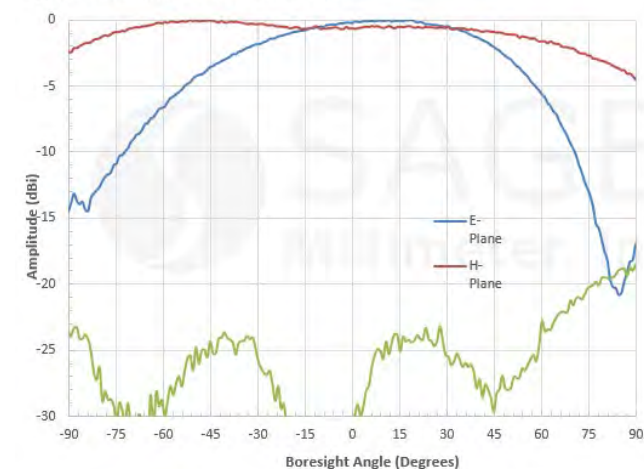
## Features:

- 1 to 4 GHz
- Dual Polarized
- 5 Models to Cover up to 50 GHz



Parameter	Minimum	Typical	Maximum
Frequency	1.0 GHz		4.0 GHz
Gain		8.0 dBi	
Polarization	Linear and Circular		
3 dB Beamwidth, E-Plane		68°	
3 dB Beamwidth, H-Plane		98°	
Side Lobes		-10 dB	
Port Isolation		20 dB	
Return Loss		9 dB	
Specification Temperature		+25 °C	
Operation Temperature	-45 °C		+85 °C

Typical Antenna Patterns @ 1 GHz



# QUAD RIDGED, DUAL POLARIZED ANTENNA

**SAV-0632531431-SF-U3-QR**

6 to 25 GHz

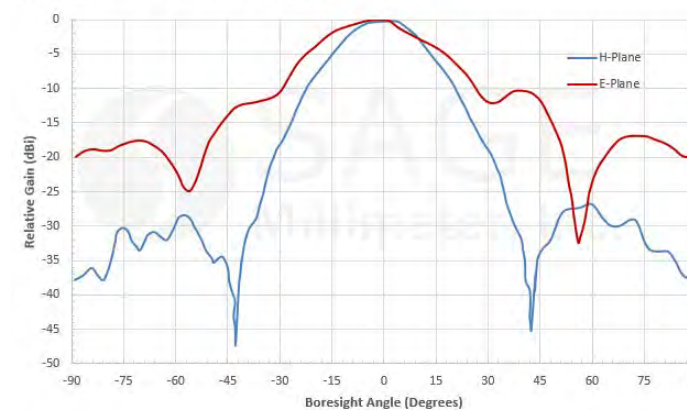
## Features:

- 6 to 24.5 GHz
- Dual Polarized
- 5 Models to Cover up to 50 GHz



Parameter	Minimum	Typical	Maximum
Frequency	6.0 GHz		24.5 GHz
Gain		14 dBi	
Polarization	Circular and Linear		
E-Plane 3 dB Beamwidth		26°	
H-Plane 3 dB Beamwidth		36°	
Port to Port Isolation		35 dB	
E-Plane Sidelobe Levels		-17 dB	
H-Plane Sidelobe Levels		-20 dB	
Return Loss		8 dB	
Cross Polarization		-30 dB	
Power Handling			25 W (CW)
Specification Temperature		+25°C	
Operating Temperature	-40°C		+85°C

Typical Antenna Pattern @ 24.5 GHz



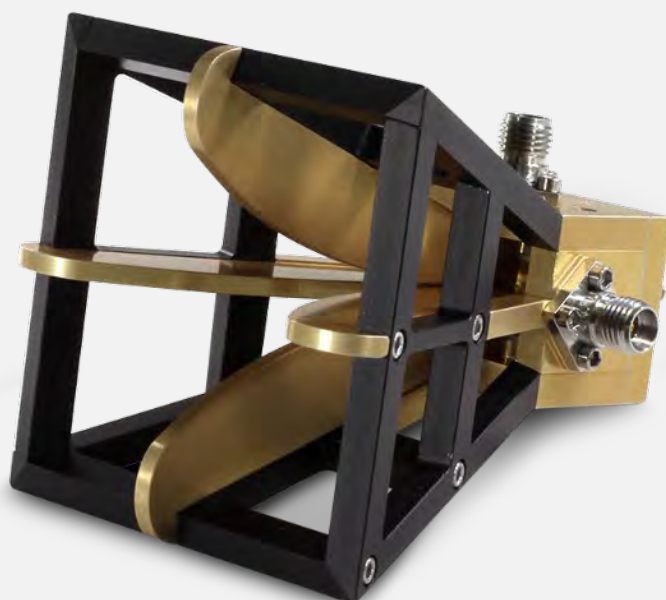
# QUAD RIDGED, DUAL POLARIZED ANTENNA

**SAV-0434031428-KF-U5-QR**

4 to 40 GHz

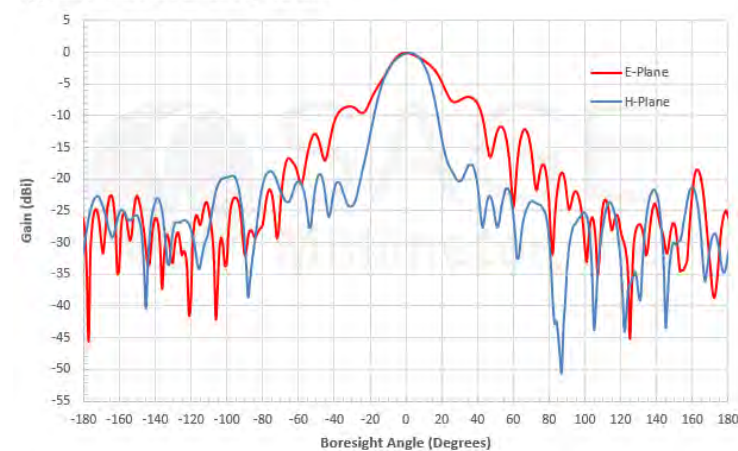
## Features:

- 4 to 40 GHz
- Dual Polarized
- 5 Models to Cover up to 50 GHz



Parameter	Minimum	Typical	Maximum
Frequency	4 GHz		40 GHz
Gain		14 dBi	
Polarization	Linear and Circular		
E-Plane 3 dB Beamwidth		28°	
H-Plane 3 dB Beamwidth		28°	
Port to Port Isolation	28 dB	30 dB	
E-Plane Sidelobe Levels		-10 dB	
H-Plane Sidelobe Levels		-15 dB	
Return Loss		10 dB	
Cross Polarization	23 dB	28 dB	
Power Handling			10 W (CW)
Specification Temperature		+25°C	
Operating Temperature	-40°C		+85°C

Typical Antenna Pattern @ 40 GHz



# QUAD RIDGED, DUAL POLARIZED ANTENNA

**SAV-0535031140-2F-U5-QR**

5 to 50 GHz

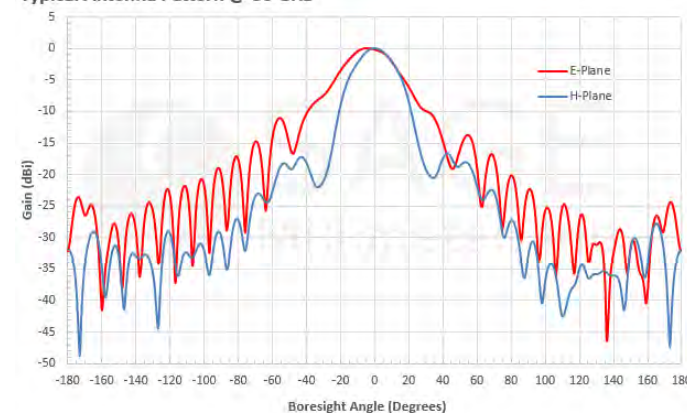
## Features:

- 5 to 50 GHz
- Dual Polarized
- 5 Models to Cover up to 50 GHz



Parameter	Minimum	Typical	Maximum
Frequency	5 GHz		50 GHz
Gain		11 dBi	
Polarization	Linear and Circular		
E-Plane 3 dB Beamwidth		40°	
H-Plane 3 dB Beamwidth		40°	
Port to Port Isolation	28 dB	30 dB	
E-Plane Sidelobe Levels		-10 dB	
H-Plane Sidelobe Levels		-15 dB	
Return Loss		10 dB	
Cross Polarization	18 dB	25 dB	
Power Handling			5 W (CW)
Specification Temperature		+25°C	
Operating Temperature	-40°C		+85°C

Typical Antenna Pattern @ 50 GHz





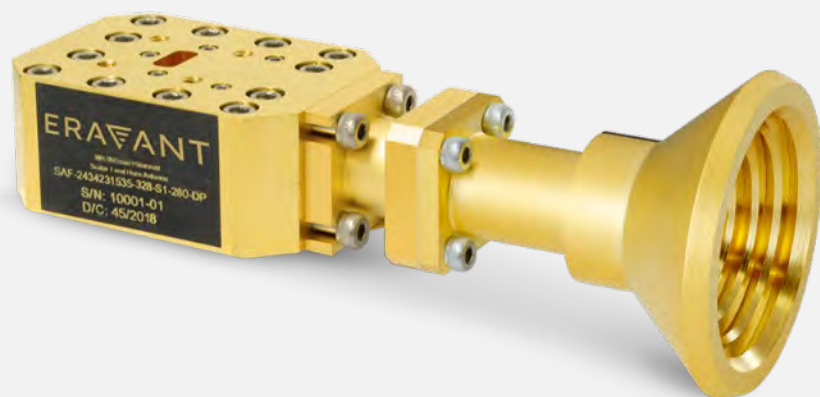
# DUAL POLARIZED SCALAR HORN ANTENNA

**SAF-2434231535-328-S1-280-DP**

24 to 42 GHz

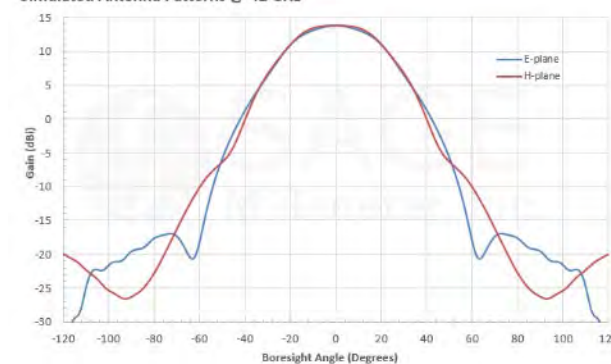
## Features:

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

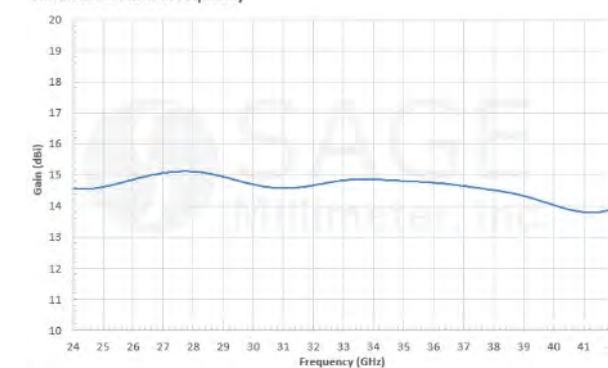


Parameter	Minimum	Typical	Maximum
Frequency	24 GHz		42 GHz
Gain		15 dBi	
3 dB Beamwidth, E-plane @ 33 GHz		35°	
3 dB Beamwidth, H-plane @ 33 GHz		35°	
Sidelobe Levels		-25 dB	
V and H Port Isolation		35 dB	
Cross Polarization Rejection		35 dB	
Port Return Loss		15 dB	
Specification Temperature		+25 °C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

Simulated Antenna Patterns @ 42 GHz



Simulated Gain vs. Frequency



# DUAL POLARIZED SCALAR HORN ANTENNA

**SAF-4036031340-219-S1-188-DP**

40 to 60 GHz

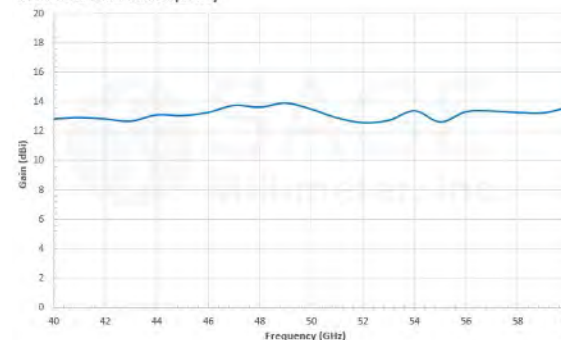
## Features:

- 40 to 60 GHz
- Gain 13 dBi
- 3 dB Beamwidth 40°
- Dual Polarized
- 7 Models to Cover up to 110 GHz

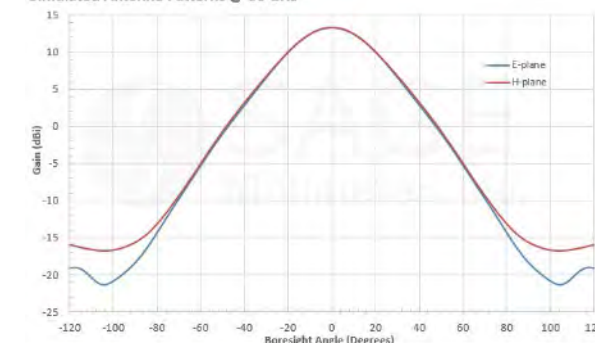


Parameter	Minimum	Typical	Maximum
Frequency	40 GHz	50 GHz	60 GHz
Gain		13 dBi	
3 dB Beamwidth, E-plane		40°	
3 dB Beamwidth, H-plane		40°	
Sidelobe Levels		-25 dB	
V and H Port Isolation		35 dB	
Cross Polarization Rejection		30 dB	
Port Return Loss		15 dB	
Specification Temperature		+25 °C	
Operating Temperature	-40 °C		+85 °C

Measured Gain vs. Frequency



Simulated Antenna Patterns @ 50 GHz



# DUAL POLARIZED SCALAR HORN ANTENNA

**SAF-6039031340-141-S1-122-DP**

60 to 90 GHz

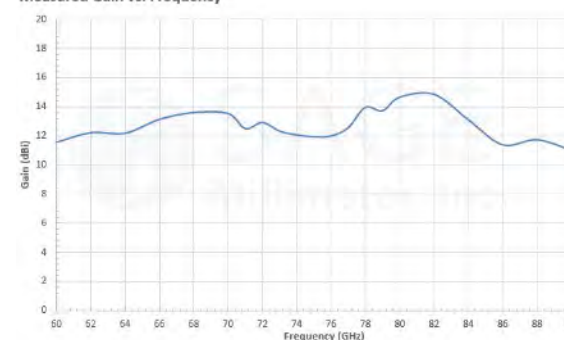
## Features:

- 60 to 90 GHz
- Gain 13 dBi
- 3 dB Beamwidth 35°
- Dual Polarized
- 7 Models to Cover up to 110 GHz

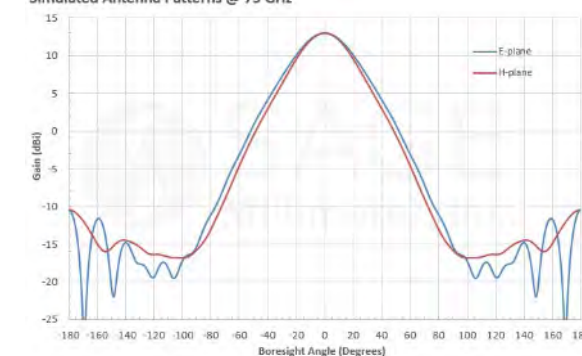


Parameter	Minimum	Typical	Maximum
Frequency	60 GHz	75 GHz	90 GHz
Gain	11 dBi	13 dBi	16 dBi
3 dB Beamwidth, E-plane		40°	
3 dB Beamwidth, H-plane		40°	
Sidelobe Levels		-25 dB	-20 dB
V and H Port Isolation	30 dB	35 dB	
Cross Polarization Rejection		30 dB	
Port Return Loss	10 dB	15 dB	
Specification Temperature		+25 °C	
Operating Temperature	-40 °C		+85 °C

Measured Gain vs. Frequency



Simulated Antenna Patterns @ 75 GHz





# DUAL POLARIZED SCALAR HORN ANTENNA

**SAF-7531141340-110-S1-100-DP**

75 to 110 GHz

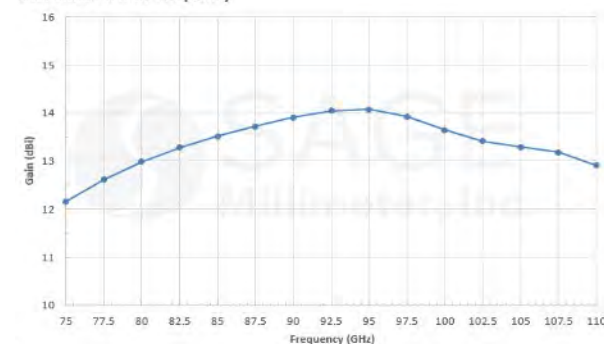
## Features:

- 75 to 110 GHz
- Gain 13 dBi
- 3 dB Beamwidth 40°
- Dual Polarized
- 7 Models to Cover up to 110 GHz

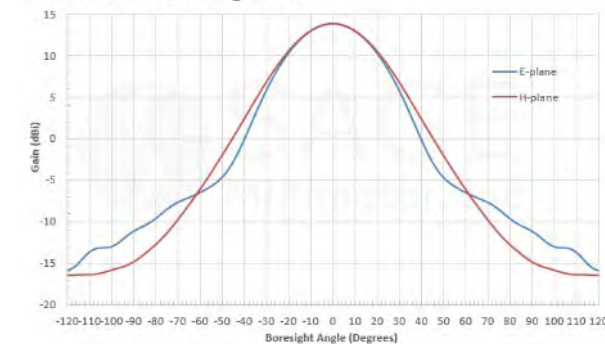


Parameter	Minimum	Typical	Maximum
Frequency	75 GHz	92.5 GHz	110 GHz
Gain		13 dBi	
3 dB Beamwidth, E-plane		40°	
3 dB Beamwidth, H-plane		40°	
Sidelobe Levels		-25 dB	
V and H Port Isolation		30 dB	
Cross Polarization Rejection		30 dB	
Port Return Loss		15 dB	
Specification Temperature		+25 °C	
Operating Temperature	-40 °C		+85 °C

Simulated Gain vs. Frequency



Simulated Antenna Patterns @ 90 GHz



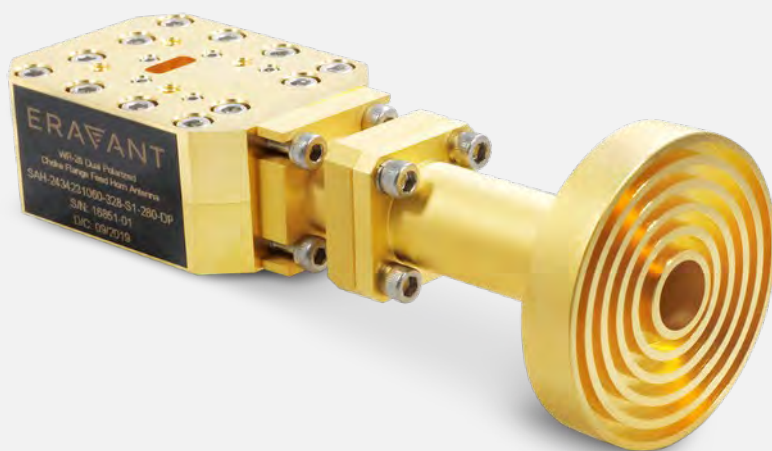
# DUAL POLRIZED CHOKE FLANGE HORN ANTENNA

**SAH-2434231060-328-S1-280-DP**

24 to 42 GHz

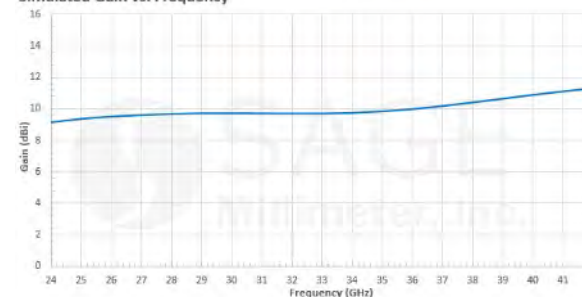
## Features:

- 24 to 42 GHz
- Gain 10 dBi
- 3 dB Beamwidth 60°
- Dual Polarized
- 4 Models to Cover up to 110 GHz

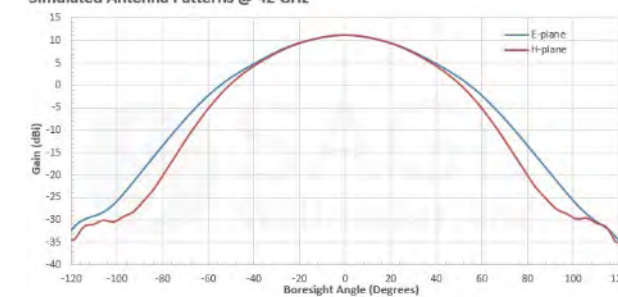


Parameter	Minimum	Typical	Maximum
Frequency	24 GHz	33 GHz	42 GHz
Gain		10 dBi	
3 dB Beamwidth, E-plane @ 33 GHz		60°	
3 dB Beamwidth, H-plane @ 33 GHz		60°	
Sidelobes, E-plane		-25 dB	
Sidelobes, H-plane		-35 dB	
V and H Port Isolation		35 dB	
Cross Polarization Rejection		35 dB	
Port Return Loss		15 dB	
Specification Temperature		+25 °C	
Operating Temperature	-40 °C		+85 °C

Simulated Gain vs. Frequency



Simulated Antenna Patterns @ 42 GHz



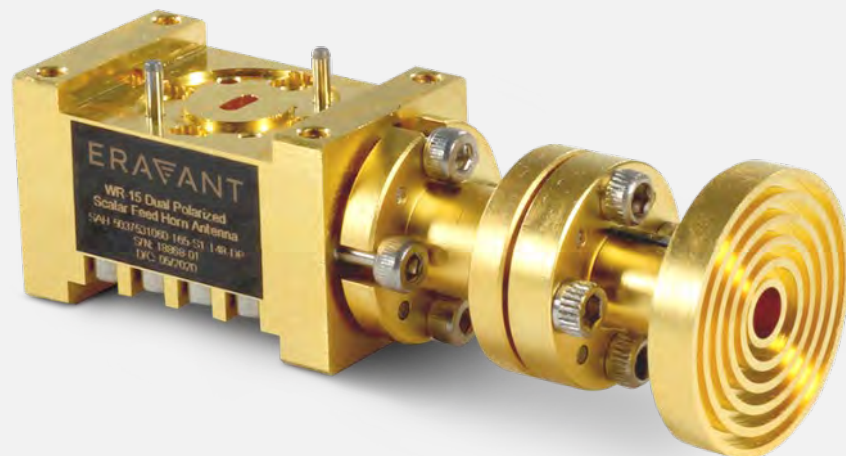
# DUAL POLRIZED CHOKE FLANGE HORN ANTENNA

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

50 to 75 GHz

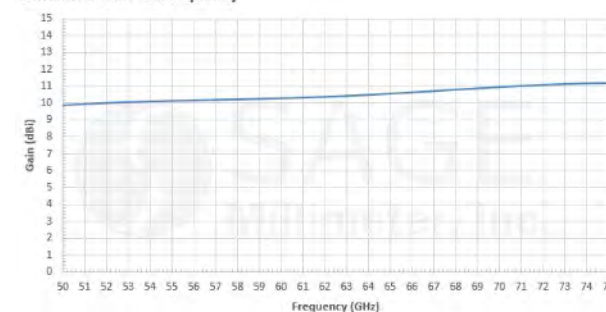
## Features:

- 50 to 75 GHz
- Gain 10 dBi
- 3 dB Beamwidth 60°
- Dual Polarized
- 4 Models to Cover up to 110 GHz

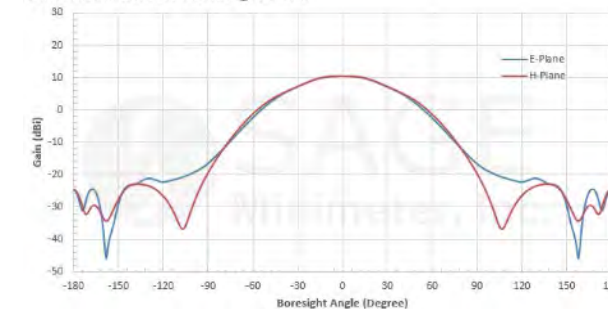


Parameter	Minimum	Typical	Maximum
Frequency	50 GHz		75 GHz
Gain		10 dBi	
3 dB Beamwidth, E-plane @ 62 GHz		60°	
3 dB Beamwidth, H-plane @ 62 GHz		60°	
Sidelobe Levels		-30 dB	
V and H Port Isolation		40 dB	
Cross Polarization Rejection		35 dB	
Port Return Loss		15 dB	
Specification Temperature		+25 °C	
Operating Temperature	-40 °C		+85 °C

Simulated Gain vs. Frequency



Simulated Antenna Patterns @ 62 GHz



# AMPLIFIERS

# ERAVANT AMPLIFIERS

The focus of this presentation section is to introduce the **Eravant** amplifier product family by highlighting some representative models. There are several hundred standard models available to satisfy all 5G system applications. The amplifier family includes the following types:

- Broad Bandwidth Amplifier
- Low Noise Amplifier
- Power Amplifier
- GaN Power Amplifier
- Bench Top Test Amplifier

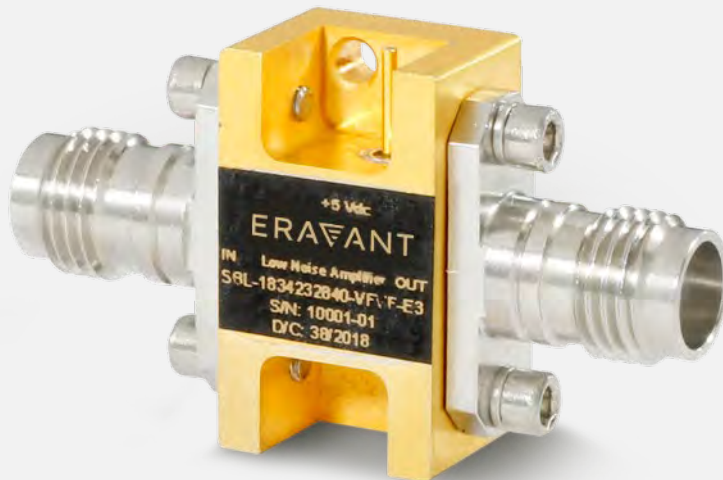
# BROADBAND AMPLIFIER

**SBB-1834232815-KFKF-E3**

18 to 42 GHz

## Features:

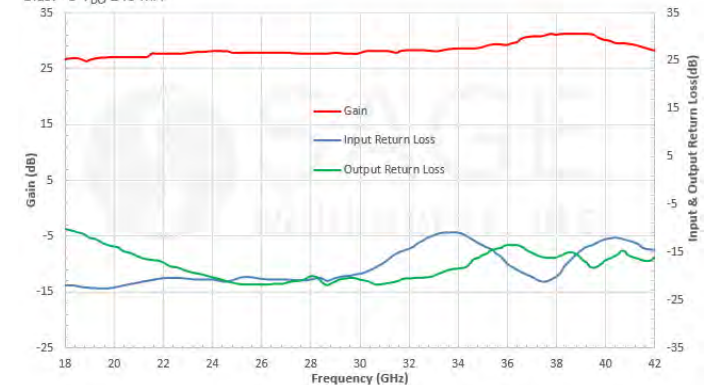
- 18 to 42 GHz
- 5G Band
- Gain 28 dBi
- SBB Family Has More than 50 Models



Parameter	Minimum	Typical	Maximum
Frequency	18 GHz		42 GHz
Gain	22 dB	28 dB	
$P_{1dB}$	+10 dBm	+15 dBm	
$P_{sat}$		+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

**SBL-1834232840-KFKF-E3-U**

18 to 42 GHz

## Features:

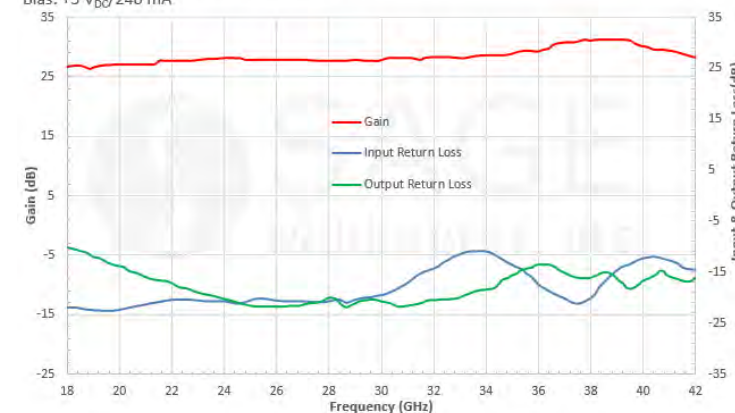
- 18 to 42 GHz
- 5G Band
- Gain 28 dBi
- USB Powered



Parameter	Minimum	Typical	Maximum
Frequency	18 GHz		42 GHz
Gain		28 dB	
Noise Figure		4 dB	
$P_{1dB}$		+15 dBm	
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>	+20 V <sub>DC</sub>
DC Supply Current		240 mA	
Specification Temperature		+25 °C	
Operating Temperature	0 °C		+60 °C

Typical Performance vs. Frequency

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



# ULTRA BROADBAND AMPLIFIER

**SBB-0117033015-VFVF-E3**

10 MHz to 70 GHz

## Features:

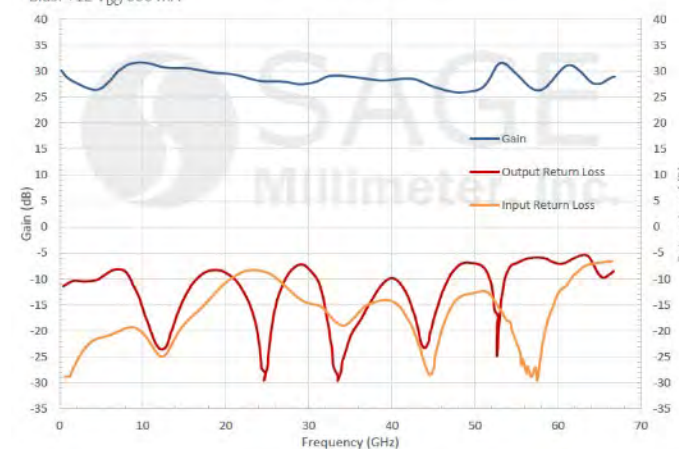
- 10 MHz to 70 GHz
- +16 dBm Psat
- 30 dB Nominal Gain
- SBB Family Covers up to 70 GHz



Parameter	Minimum	Typical	Maximum
Frequency Range	0.01 GHz		70 GHz
Gain		30 dB	
$P_{1dB}$		+15 dBm	
$P_{sat}$		+16 dBm	
Noise Figure		6.0 dB	
$P_{in}$			+5 dBm
Input Return Loss		10 dB	
Output Return Loss		10 dB	
DC Voltage		+12 V <sub>DC</sub>	
DC Supply Current		600 mA	650 mA
Specification Temperature		+25 °C	
Operating Temperature	0 °C		+50 °C

Typical Gain and Return Loss vs. Frequency

Bias: +12 V<sub>DC</sub>/600 mA





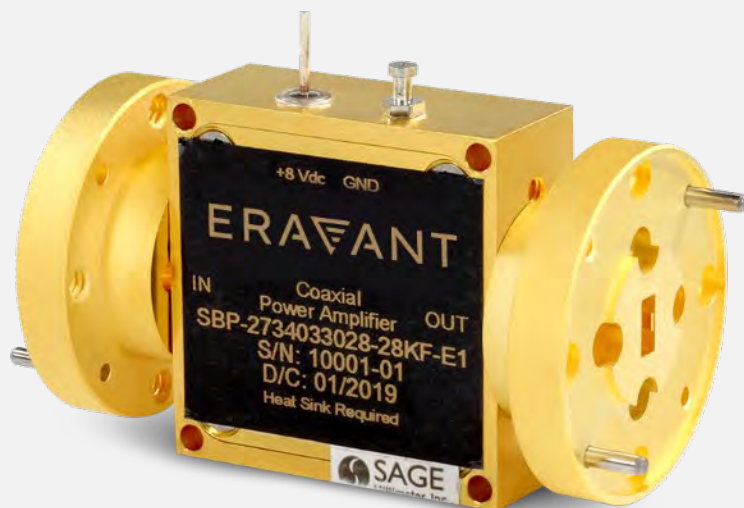
# BROADBAND LOW NOISE AMPLIFIER

**SBL-4036035060-1919-E1**

40 to 60 GHz

## Features:

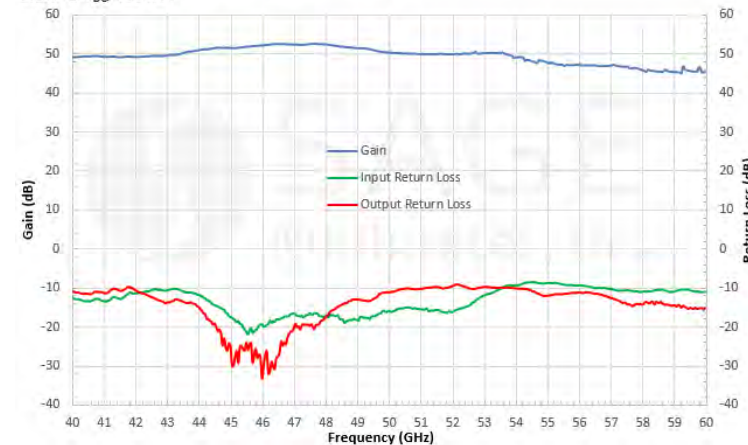
- 40 to 60 GHz
- 6 dB Noise Figure
- 50 dB Nominal Gain
- SBL Family Covers up to 170 GHz



Parameter	Minimum	Typical	Maximum
Frequency	40 GHz		60 GHz
Gain		50 dB	
Noise Figure (40-53 GHz)		6 dB	
Noise Figure (53-60 GHz)		7 dB	
$P_{1dB}$		11 dB	
$P_{in}$			-15 dBm
Input Return Loss		10 dB	
Output Return Loss		10 dB	
DC Voltage		+6 V <sub>DC</sub>	+15 V <sub>DC</sub>
DC Supply Current		450 mA	
Specification Temperature		+25 °C	
Operating Temperature	0 °C		+50 °C

**Typical Gain and Return Loss vs. Frequency**

Bias: +8 V<sub>DC</sub>/450 mA



# BROADBAND LOW NOISE AMPLIFIER

**SBL-5037533550-1515-E1**

50 to 75 GHz

## Features:

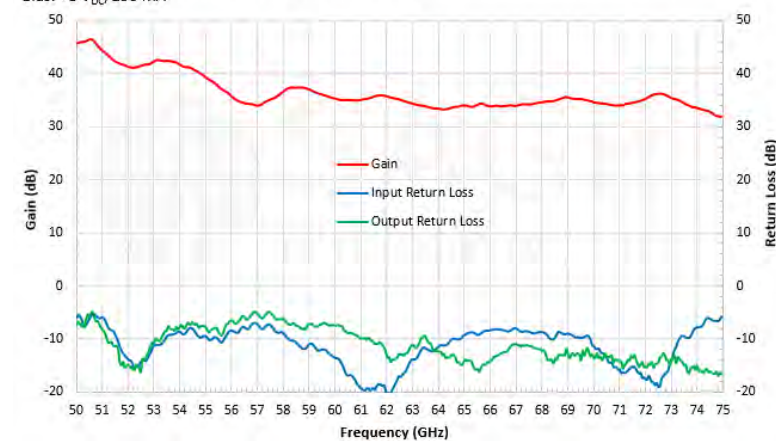
- 50 to 75 GHz
- 5 dB Noise Figure
- 35 dB Nominal Gain
- SBL Family Covers up to 170 GHz



Parameter	Minimum	Typical	Maximum
Frequency	50 GHz		75 GHz
Gain		35 dB	
Noise Figure		5 dB	
$P_{1dB}$		+11 dBm	
$P_{in}$			-20 dBm
Input Return Loss		8 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		150 mA	
Specification Temperature		+25 °C	
Operating Temperature	0 °C		+50 °C

**Typical Gain and Return Loss vs. Frequency**

Bias: +8 V<sub>DC</sub>/150 mA



# BROADBAND LOW NOISE AMPLIFIER

**SBL-5539532560-1212-E1**

55 to 95 GHz

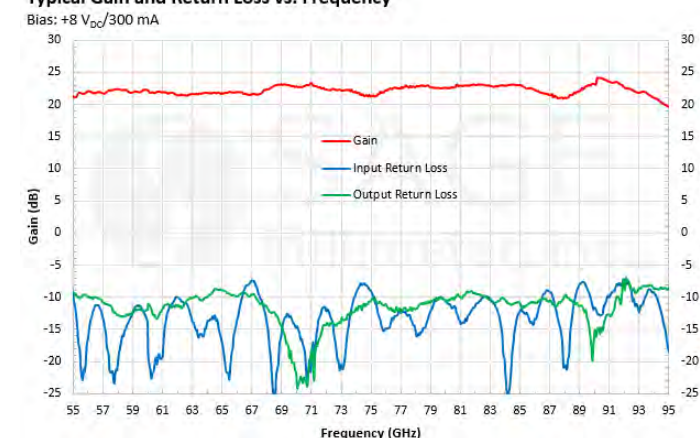
## Features:

- 55 to 95 GHz
- 6 dB Noise Figure
- 25 dB Nominal Gain
- SBL Family Cover up to 170 GHz



Parameter	Minimum	Typical	Maximum
Frequency	55 GHz		95 GHz
Gain		25 dB	
Noise Figure		6 dB	
$P_{1dB}$		+12 dBm	
$P_{sat}$		+16 dBm	
$P_{in}$			+15 dBm
Input Return Loss		10 dB	
Output Return Loss		10 dB	
DC Voltage	+6 V <sub>DC</sub>	+8 V <sub>DC</sub>	+15 V <sub>DC</sub>
DC Supply Current		300 mA	
Specification Temperature		+25 °C	
Operating Temperature	0 °C		+50 °C

Typical Gain and Return Loss vs. Frequency



# BROADBAND LOW NOISE AMPLIFIER

**SBL-7531143550-1010-E1**

75 to 110 GHz

## Features:

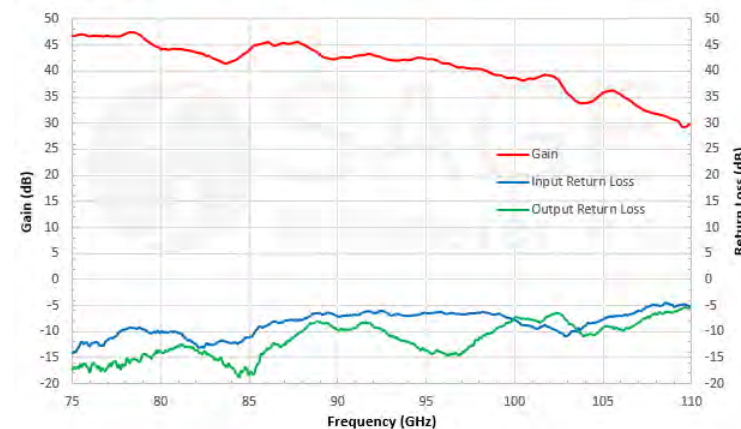
- 75 to 110 GHz
- 5 dB Noise Figure
- 35 dB Nominal Gain
- SBL Family Cover up to 170 GHz



Parameter	Minimum	Typical	Maximum
Frequency	75 GHz		110 GHz
Gain		35 dB	
Noise Figure		5 dB	
$P_{1dB}$		-5 dBm	
$P_{in}$			+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



# BROADBAND LOW NOISE AMPLIFIER

**SBL-1141741860-0606-EI**

110 to 170 GHz

## Features:

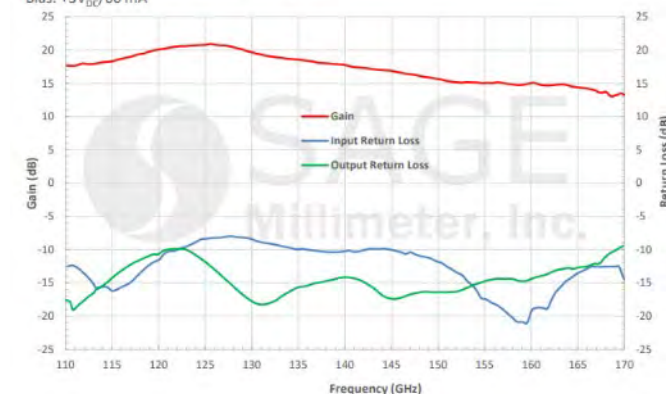
- 110 to 170 GHz
- 18 dB Nominal Gain
- 6 dB Noise Figure
- SBL Family Covers up to 170 GHz



Parameter	Minimum	Typical	Maximum
Frequency	110 GHz		170 GHz
Gain		18 dB	
Noise Figure		6 dB	
*P <sub>1dB</sub>		-5 dBm	
P <sub>in</sub>			-25 dBm
Input Return Loss		6 dB	
Output Return Loss		6 dB	
DC Voltage		+3 V <sub>DC</sub>	+5 V <sub>DC</sub>
DC Supply Current		30 mA	
Specification Temperature		+25 °C	
Operating Temperature	0 °C		+50 °C

Typical Performance vs. Frequency

Bias: +3V<sub>DC</sub>/60 mA





# BROADBAND POWER AMPLIFIER

**SBP-1834331824-KFKF-E3**

18 to 43 GHz

**Features:**

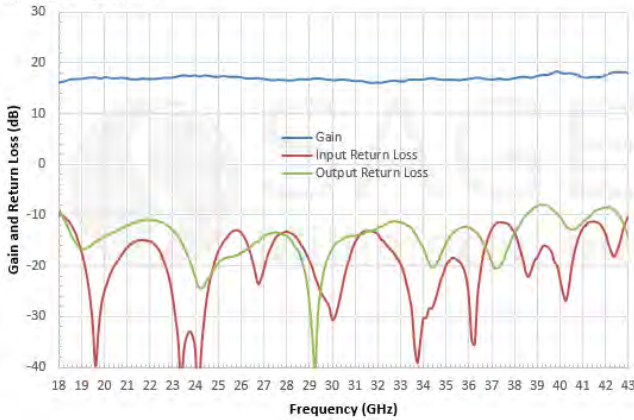
- 18 to 43 GHz
- +25 dBm Psat
- 18 dB Nominal Gain
- SBP Family Covers up to 110 GHz



Parameter	Minimum	Typical	Maximum
Frequency	18 GHz		43 GHz
Gain	15 dB	18 dB	
P <sub>1dB</sub>	+23 dBm	+24 dBm	
P <sub>sat</sub>		+25 dBm	
Output IP3		+30 dBm	
P <sub>in</sub>		+5 dBm	+10 dBm
Input Return Loss		8 dB	
Output Return Loss		8 dB	
DC Voltage	+8 V <sub>DC</sub>	+12 V <sub>DC</sub>	+15 V <sub>DC</sub>
DC Supply Current		250 mA	
Specification Temperature		+25 °C	
Case Temperature	0 °C		+50 °C

**Typical Gain and Return Loss vs. Frequency**

Bias: +12 Vdc/230 mA





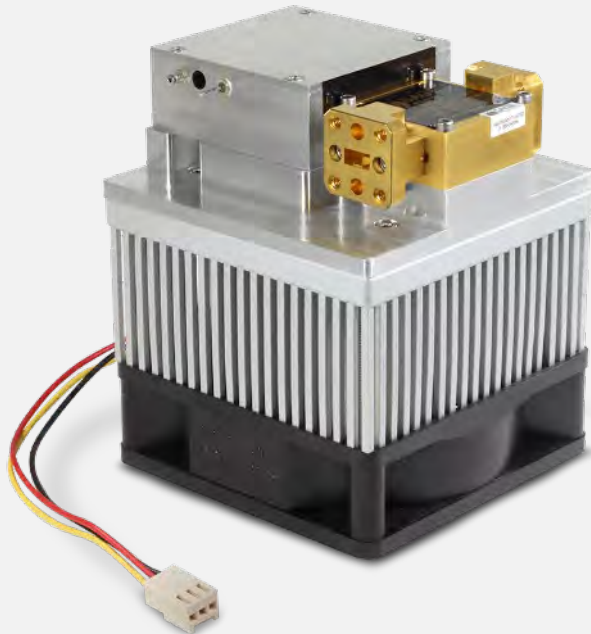
# HIGH POWER AMPLIFIER

**SBP-3133834034-KFKF-C1-2**

31 to 38 GHz

## Features:

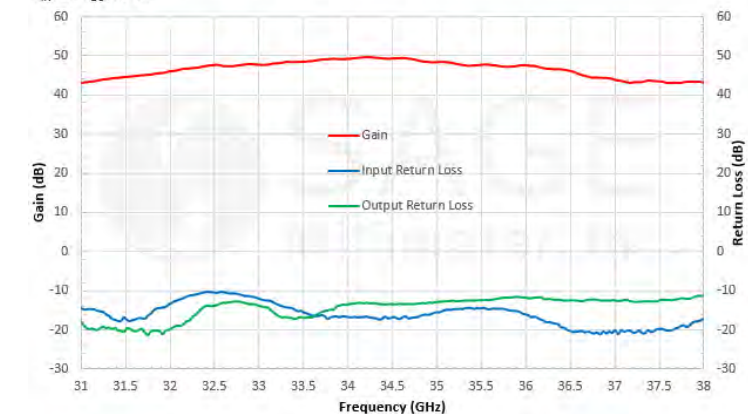
- 31 to 38 GHz
- +35 dBm Psat
- 40 dB Nominal Gain
- SBP Family Covers up to 110 GHz



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

**SBP-3433735038-KFKF-E3**

34 to 37 GHz

## Features:

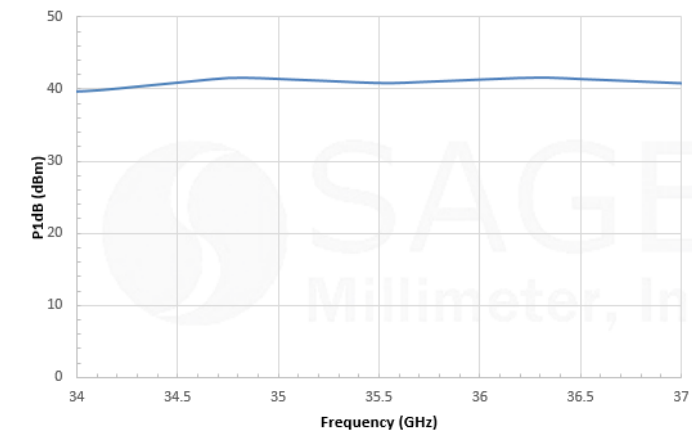
- 34 to 37 GHz
- +40 dBm Psat
- 50 dB Nominal Gain
- SBP Family Covers up to 110 GHz



Parameter	Minimum	Typical	Maximum
Frequency	34 GHz		37 GHz
Gain		50 dB	
$P_{1dB}$		+38 dBm	
$P_{sat}$		+40 dBm	
Damage $P_{in}$			+5 dBm
Input Return Loss		10 dB	
Output Return Loss		10 dB	
DC Voltage		+12 V <sub>DC</sub>	
DC Supply Current		10 A	15 A
Specification Temperature		+25 °C	
Operating Temperature	0 °C		+50 °C

**Typical  $P_{1dB}$  vs Frequency**

DC Bias: +12V / 10A



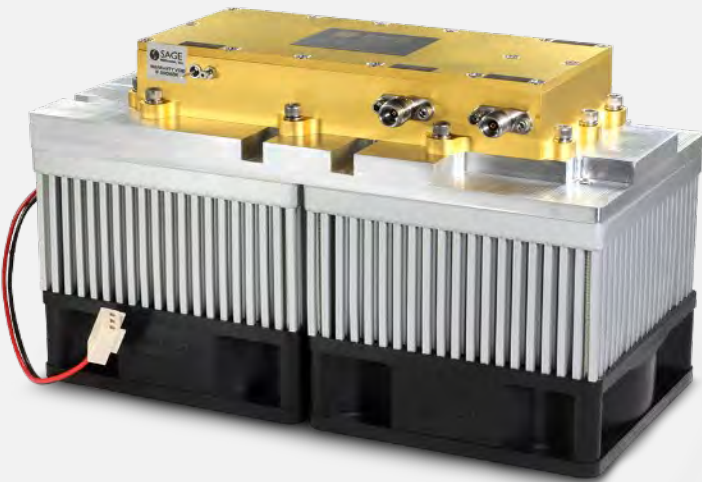
# HIGH POWER GaN AMPLIFIER

**SBP-3233831838-KFKF-E1-HR**

32 to 38 GHz

**Features:**

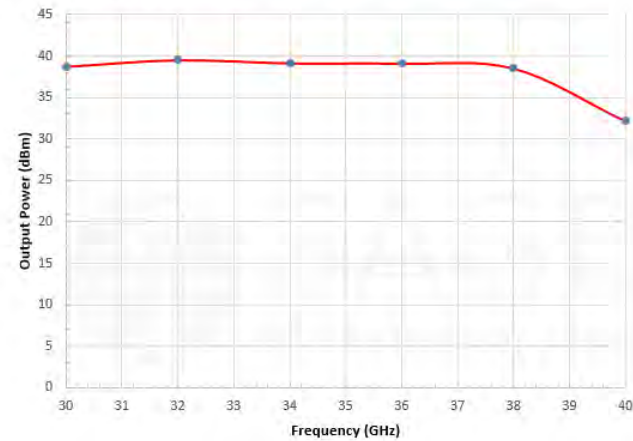
- 32 to 38 GHz
- +38 dBm Psat
- 18 dB Nominal Gain
- SBP Family Covers up to 110 GHz



Parameter	Minimum	Typical	Maximum
Frequency	32 GHz		38 GHz
Gain		18 dB	
P <sub>sat</sub>		+38 dBm	
P <sub>in</sub>			+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

**SBP-4036033519-1919-E1**

40 to 60 GHz

## Features:

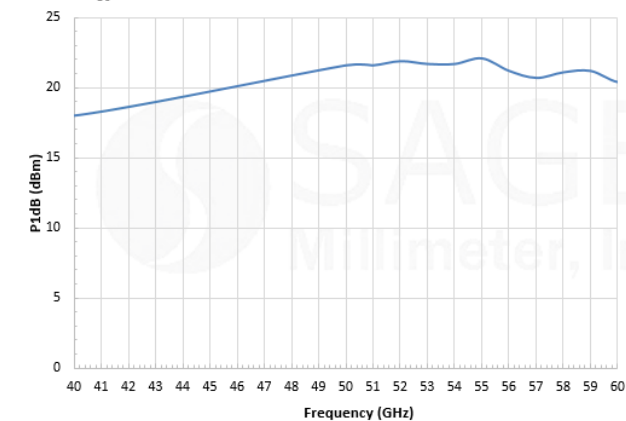
- 40 to 60 GHz
- +20 dBm Psat
- 35 dB Nominal Gain
- SBP Family Covers up to 110 GHz



Parameter	Minimum	Typical	Maximum
Frequency	40 GHz		60 GHz
Gain		35 dB	
$P_{1dB}$		+19 dBm	
$P_{sat}$		+20 dBm	
$P_{in}$			+20 dBm
Input Return Loss		10 dB	
Output Return Loss		10 dB	
DC Voltage		+8 V <sub>DC</sub>	+12 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>/850 mA



# HIGH POWER AMPLIFIER

**SBP-6737633534-1212-E1**

67 to 76 GHz

## Features:

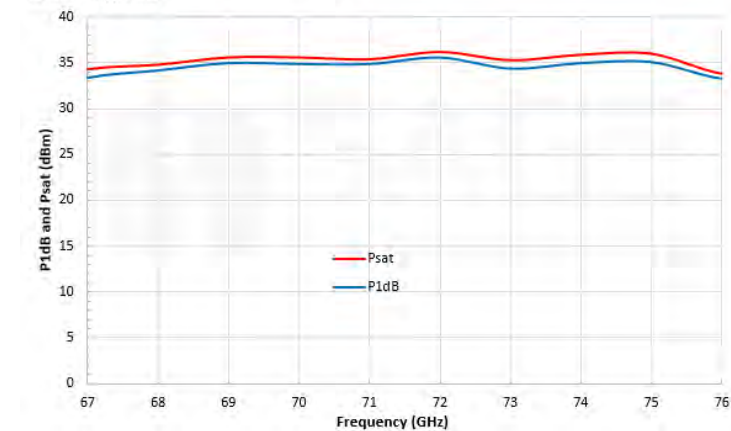
- 67 to 76 GHz
- +35 dBm Psat
- 35 dB Nominal Gain
- SBP Family Covers up to 110 GHz



Parameter	Minimum	Typical	Maximum
Frequency	67 GHz		76 GHz
Gain		35 dB	
$P_{1dB}$		+34 dBm	
$P_{sat}$		+35 dBm	
$P_{in}$			+15 dBm
Input Return Loss		10 dB	
Output Return Loss		10 dB	
DC Voltage	+6 V <sub>DC</sub>	+8 V <sub>DC</sub>	+15 V <sub>DC</sub>
DC Supply Current		7 A	
Specification Temperature		+25 °C	
Operating Temperature	0 °C		+50 °C

Typical  $P_{1dB}$  and  $P_{sat}$  vs. Frequency

Bias: +8 V<sub>DC</sub>/9.5 A



# HIGH POWER AMPLIFIER

**SBP-8138632833-1212-E1**

81 to 86 GHz

## Features:

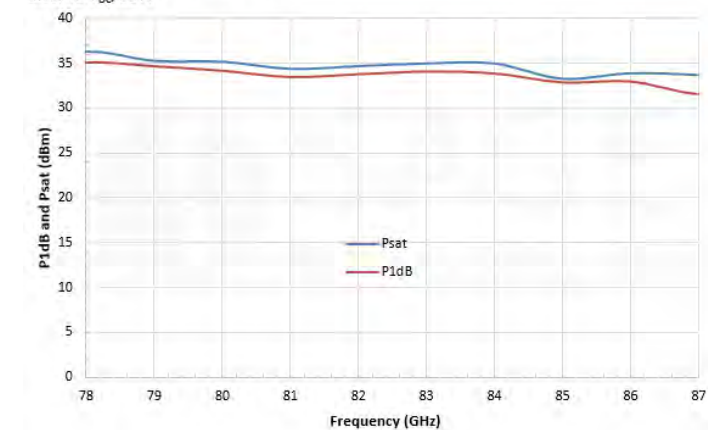
- 81 to 86 GHz
- +34 dBm Psat
- 28 dB Nominal Gain
- SBP Family Covers up to 110 GHz



Parameter	Minimum	Typical	Maximum
Frequency	81 GHz		86 GHz
Gain		28 dB	
$P_{1dB}$		+33 dBm	
$P_{sat}$		+34 dBm	
$P_{in}$			+15 dBm
Input Return Loss		10 dB	
Output Return Loss		10 dB	
DC Voltage	+6 V <sub>DC</sub>	+8 V <sub>DC</sub>	+15 V <sub>DC</sub>
DC Supply Current		9 A	
Specification Temperature		+25 °C	
Operating Temperature	0 °C		+50 °C

**$P_{1dB}$  and  $P_{sat}$  vs. Frequency**

Bias: +8 V<sub>DC</sub>/11 A





# HIGH POWER AMPLIFIER

**SBP-7531142515-1010-E1**

75 to 110 GHz

## Features:

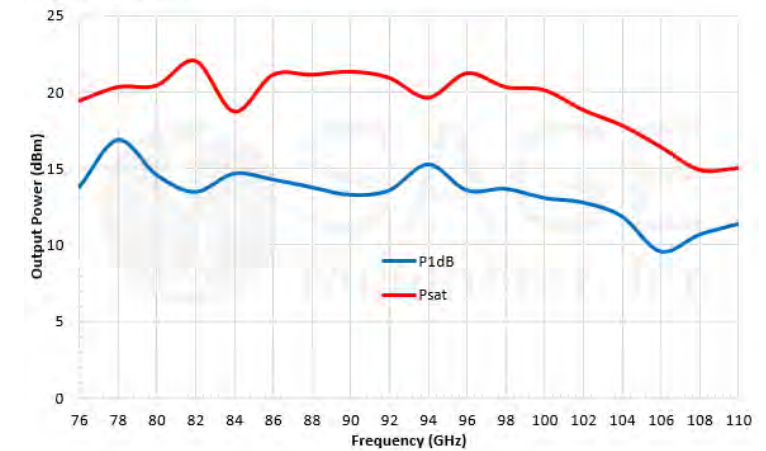
- 75 to 110 GHz
- +20 dBm Psat
- 25 dB Nominal Gain
- SBP Family Covers up to 110 GHz



Parameter	Minimum	Typical	Maximum
Frequency	75 GHz		110 GHz
Gain		25 dB	
$P_{1dB}$		+15 dBm	
$P_{sat}$		+20 dBm	
$P_{in}$			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



# CONVERTERS

# ERAVANT FREQUENCY CONVERTERS

The focus of this presentation section is to introduce the **Eravant** frequency conversion product family by highlighting some representative models. There are several hundred standard models available to satisfy all 5G system applications. The frequency converter family includes the following types:

- Balanced Mixer
- I/Q Mixer
- Subharmonically Pumped Mixer
- Harmonic Mixer
- Upconverter
- Amplitude Detector
- Active Multiplier
- Passive Multiplier

# BALANCED MIXER

**SFB-11340312-KFKFSF-N1-M**

11 to 40 GHz

## Features:

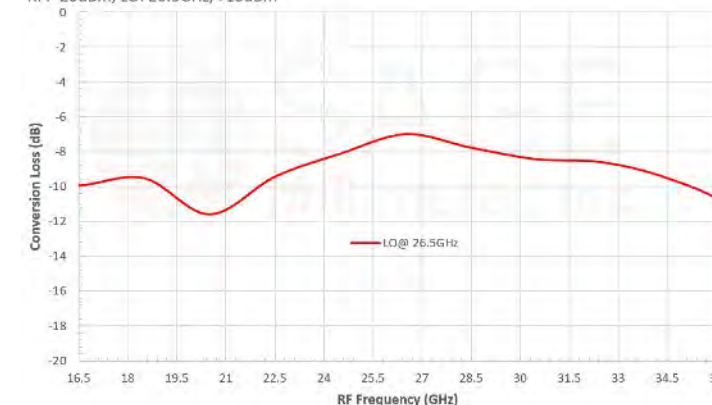
- 11 to 40 GHz
- 12 dB Conversion Loss
- Balanced Configuration
- SFB Family Has More than 30 Models



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

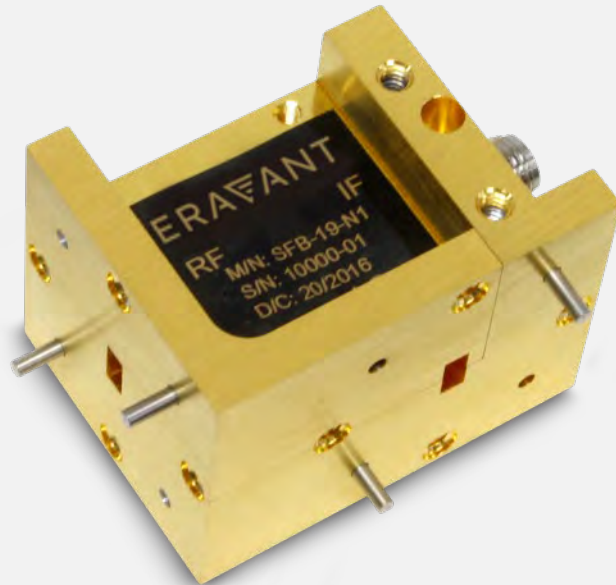


# BALANCED MIXER

**SFB-19-N1**  
40 to 60 GHz

## Features:

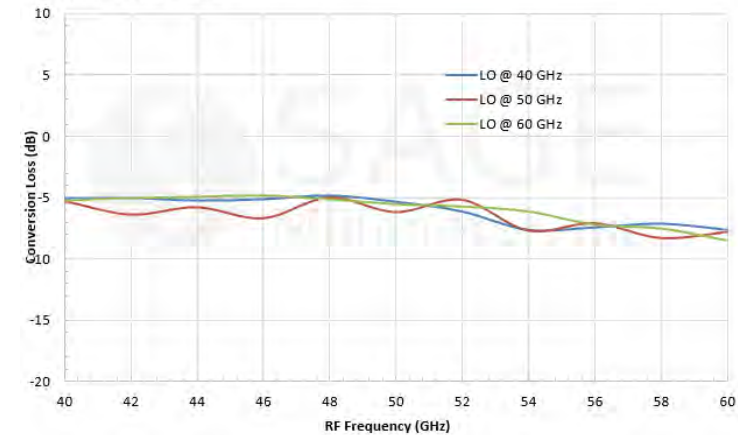
- 40 to 60 GHz
- 8 dB Conversion Loss
- Balanced Configuration
- SFB Family Has More than 30 Models



Parameter	Minimum	Typical	Maximum
RF Frequency	40 GHz		60 GHz
LO Frequency	40 GHz		60 GHz
IF Frequency	DC		20 GHz
LO Pumping Power	+10 dBm	+13 dBm	+15 dBm
Conversion Loss		8 dB	10 dB
Input P-1dB		-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: +12 dBm

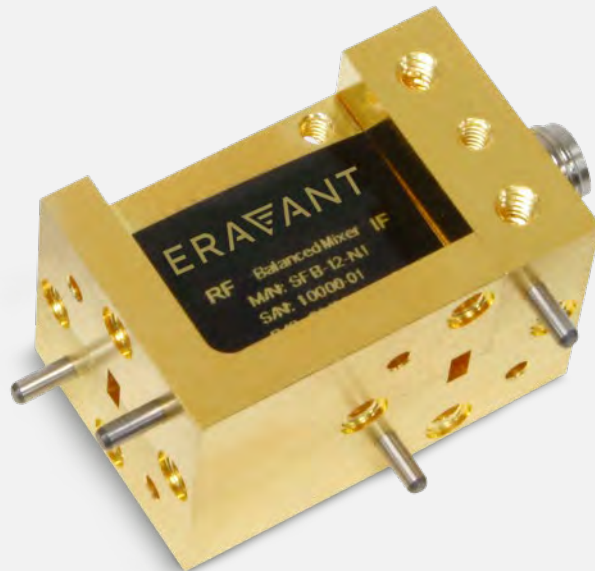


# BALANCED MIXER

**SFB-12-N1**  
60 to 90 GHz

## Features:

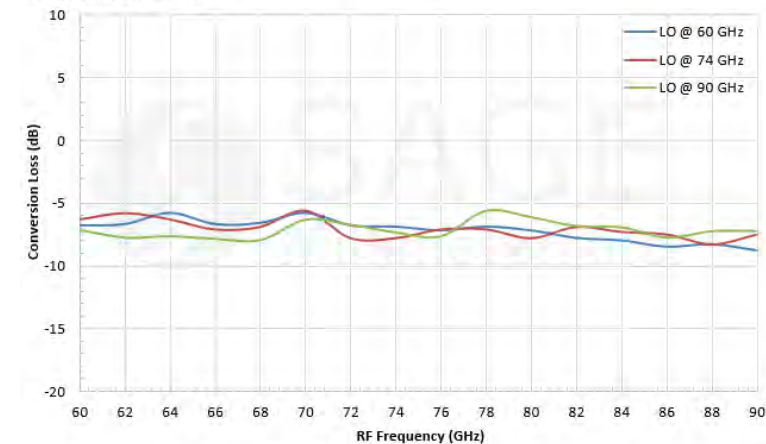
- 60 to 90 GHz
- 9 dB Conversion Loss
- Balanced Configuration
- SFB Family Has More than 30 Models



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



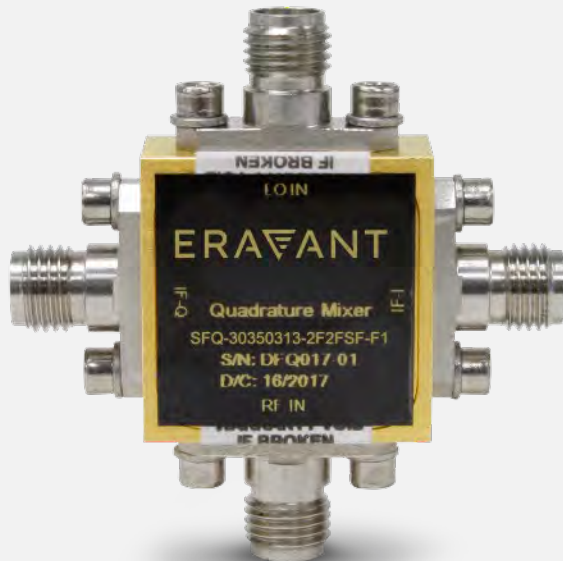


# I/Q MIXER

**SFQ-30350313-2F2FSF-N1-M**  
30 to 50 GHz

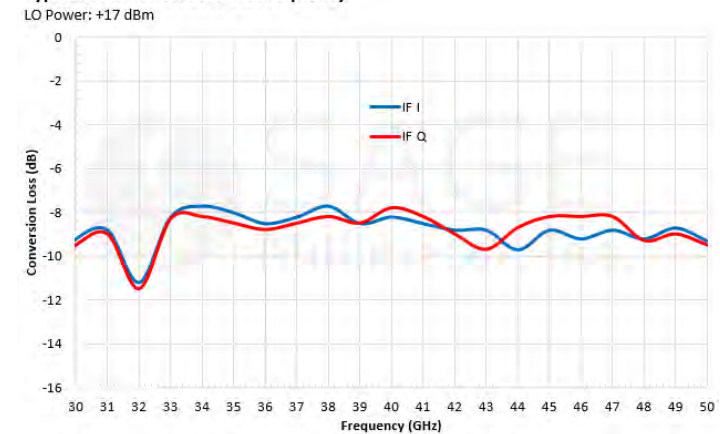
## Features:

- 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		$\pm 15^\circ$	
I/Q Amplitude Unbalance		$\pm 1.0$ 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



# I/Q MIXER

**SFQ-60390315-1212SF-E1-M**  
60 to 90 GHz

## 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		±15°	
I/Q Amplitude Unbalance		±1.5 dB	
LO to RF Port Isolations	20 dB	40 dB	
Operating Temperature	0 °C		+50 °C

Typical Conversion Loss vs. Frequency



# SUBHARMONICALLY PUMPED MIXER

**SFS-18340315-KFSFSF-N1-M**

18 to 40 GHz

## Features:

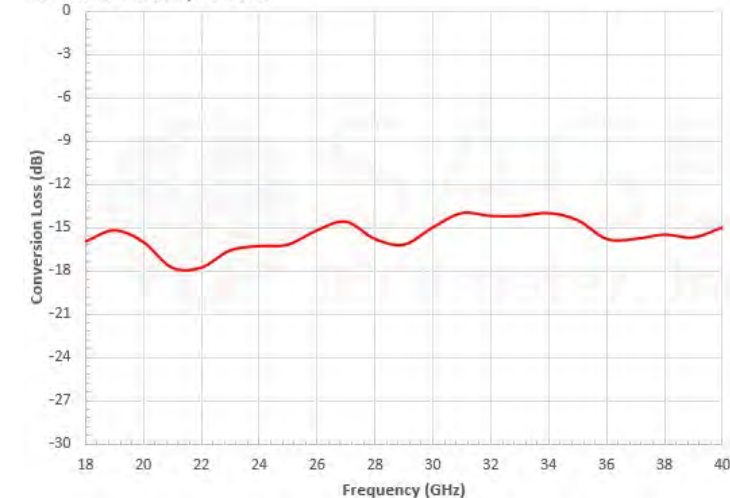
- 18 to 40 GHz
- 15 dB Conversion Loss
- Balanced Configuration
- SFS Family Covers up to 110 GHz



Parameter	Minimum	Typical	Maximum
RF Frequency	18 GHz		40 GHz
LO Frequency	9 GHz		20 GHz
IF Frequency	1.0 GHz		2.0 GHz
LO Pumping Power		+13 dBm	
Conversion Loss		15 dB	
LO to IF Isolation		50 dB	
RF to LO Isolation		20 dB	
Combined RF & LO Damage Power			+23 dBm
Specification Temperature		+25 °C	
Operating Temperature	0 °C		+50 °C

**Typical Conversion Loss vs. Frequency**

LO Power: +13 dBm; IF: 1 GHz



# SUBHARMONICALLY PUMPED MIXER

**SFS-19-N3**  
40 to 60 GHz

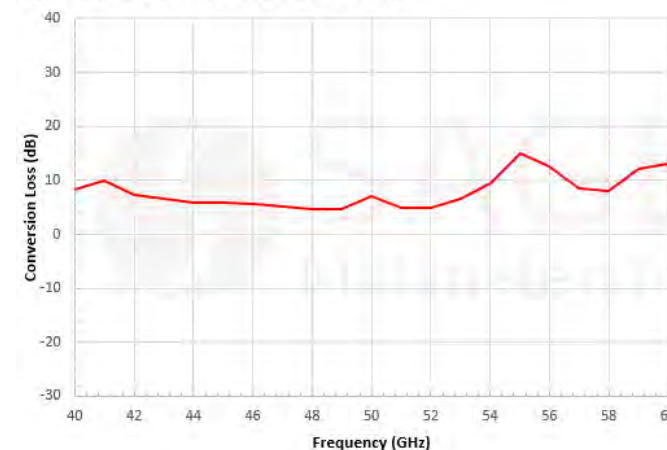
## Features:

- 40 to 60 GHz
- 14 dB Conversion Loss
- Balanced Configuration
- SFS Family Covers up to 110 GHz



Parameter	Minimum	Typical	Maximum
RF Frequency	40 GHz		60 GHz
LO Frequency	20 GHz		30 GHz
IF Frequency	DC		5.0 GHz
LO Pumping Power		+15 dBm	
Conversion Loss		14 dB	
LO to IF Isolation		30 dB	
RF to LO Isolation		15 dB	
Combined RF and LO Power			+18 dBm
Specification Temperature		+25 °C	
Operating Temperature	+0 °C		+50 °C

Typical Conversion Loss vs. Frequency



# HARMONIC MIXER

**SFH-28SF5F-A3**

26.5 to 40 GHz

## Features:

- 26.5 to 40 GHz
- 30 dB Conversion Loss
- Balanced Configuration
- Even Harmonic Mixing
- SFH Family Covers up to 170 GHz

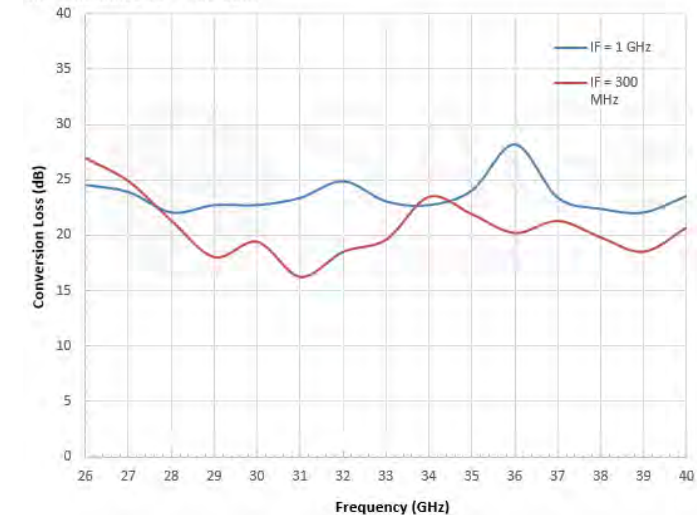


Parameter	Minimum	Typical	Maximum
RF Frequency	26.5 GHz		40 GHz
LO Frequency	3.0 GHz		6.1 GHz
IF Frequency	DC		1.3 GHz
Required LO Pumping Power		+16 dBm	+19 dBm
Conversion Loss		30 dB	
Combined Damage RF and LO Power			+20 dBm
Number of Harmonics*		8	
Specification Temperature		+25 °C	
Operation Temperature	-40 °C		+85 °C

\*Note: Other even harmonics can be used.

## Typical Conversion Loss vs. Frequency

RF = -20 dBm, LO = +16 dBm



# HARMONIC MIXER

**SFH-15SF5F-A3**

50 to 75 GHz

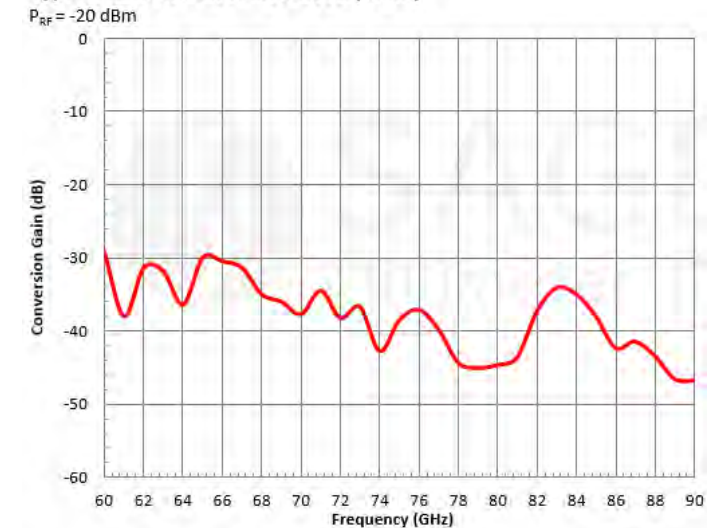
## Features:

- 50 to 75 GHz
- 40 dB Conversion Loss
- Balanced Configuration
- Even Harmonic Mixing
- SFH Family Covers up to 170 GHz



Parameter	Minimum	Typical	Maximum
RF Frequency	60 GHz		90 GHz
LO Frequency	3.0 GHz		6.1 GHz
IF Frequency	DC		1.3 GHz
Input Power		+16 dBm	+19 dBm
Harmonic Number		16	
Conversion Loss		45 dB	
Specification Temperature		+25 °C	
Operation Temperature	-40 °C		+85 °C

**Typical Conversion Gain vs. Frequency**





# HARMONIC MIXER

**SFH-12SF5F-A3**

60 to 90 GHz

## Features:

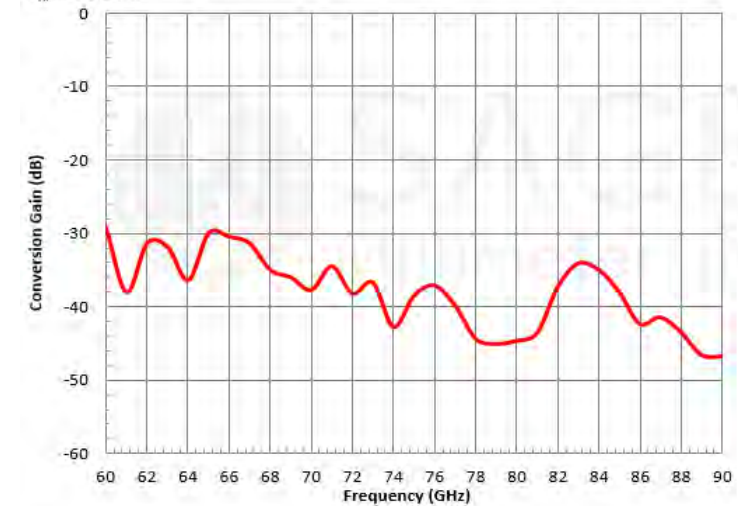
- 60 to 90 GHz
- 30 dB Conversion Loss
- Balanced Configuration
- Even Harmonic Mixing
- SFH Family Covers up to 170 GHz



Parameter	Minimum	Typical	Maximum
RF Frequency	60 GHz		90 GHz
LO Frequency	3.0 GHz		6.1 GHz
IF Frequency	DC		1.3 GHz
Input Power		+16 dBm	+19 dBm
Harmonic Number		16	
Conversion Loss		45 dB	
Specification Temperature		+25 °C	
Operation Temperature	-40 °C		+85 °C

**Typical Conversion Gain vs. Frequency**

$P_{RF} = -20$  dBm



# UPCONVERTER

**SFU-28-N1**  
26.6 to 40 GHz

## Features:

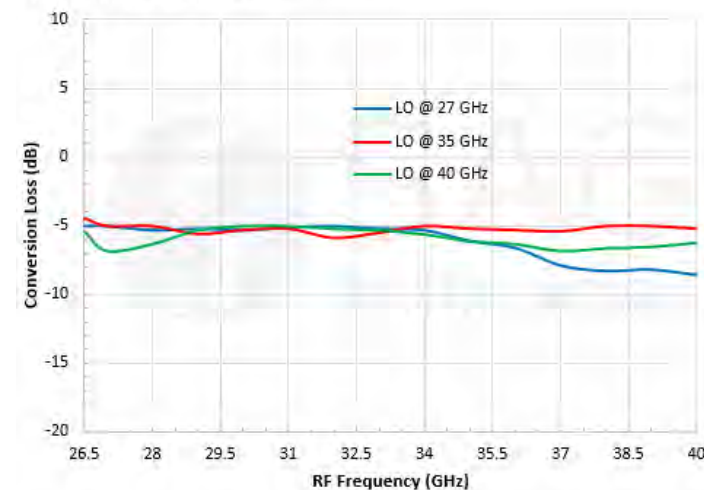
- 26.5 to 40 GHz
- 7.5 dB Conversion Loss
- Balanced Configuration
- No Bias Needed
- SFU Family Covers up to 170 GHz



Parameter	Minimum	Typical	Maximum
RF Frequency	26.5 GHz		40 GHz
LO Frequency	26.5 GHz		40 GHz
IF Frequency	DC		13.5 GHz
LO Pumping Power	+10 dBm	+13 dBm	+15 dBm
Conversion Loss		7.5 dB	9.0 dB
RF to LO Isolation		30 dB	
Combined IF and LO Power			+18 dBm
Specification Temperature		+25 °C	
Operation Temperature	-40 °C		+85 °C

## Typical Conversion Loss vs. Frequency

LO: +13 dBm, RF: -20 dBm

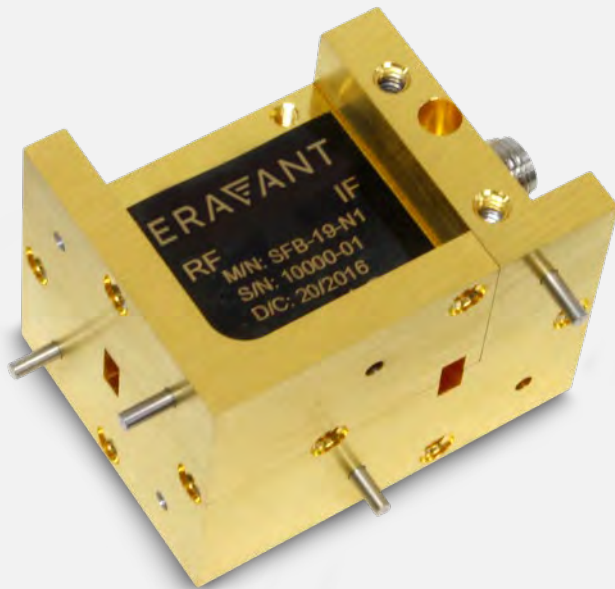


# UPCONVERTER

**SFU-19-N1**  
40 to 60 GHz

## Features:

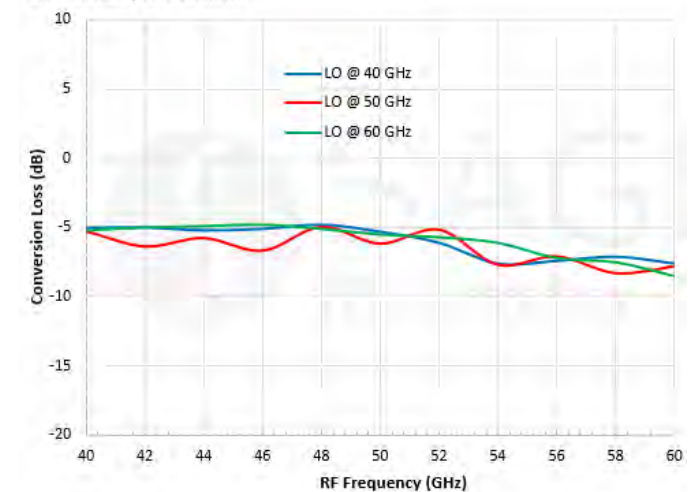
- 40 to 60 GHz
- 8.0 dB Conversion Loss
- Balanced Configuration
- No Bias Needed
- SFU Family Covers up to 170 GHz



Parameter	Minimum	Typical	Maximum
RF Frequency	40 GHz		60 GHz
LO Frequency	40 GHz		60 GHz
IF Frequency	DC		20 GHz
LO Pumping Power	+10 dBm	+13 dBm	+15 dBm
Conversion Loss		8 dB	10 dB
RF to LO Isolation		30 dB	
Combined IF and LO Power			+18 dBm
Specification Temperature		+25 °C	
Operation Temperature	-40 °C		+85°C

**Typical Conversion Loss vs. Frequency**

LO: +13 dBm, RF: -20 dBm

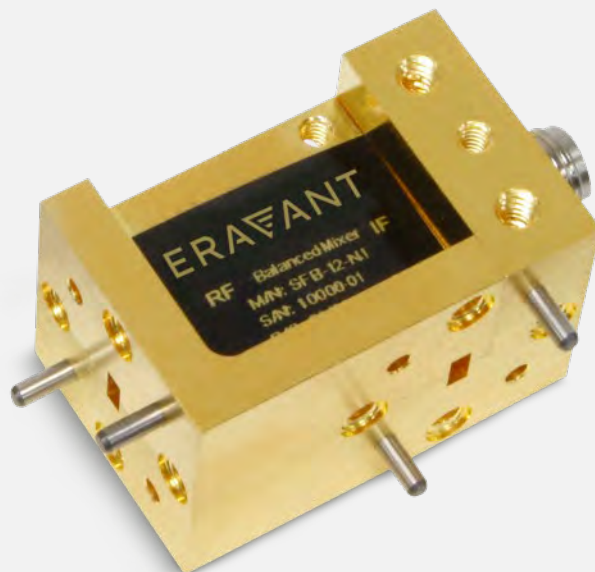


# UPCONVERTER

**SFU-12-N1**  
60 to 90 GHz

## Features:

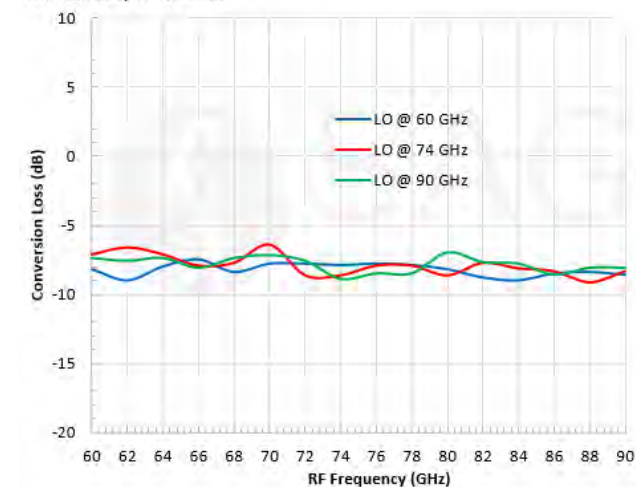
- 60 to 90 GHz
- 9.0 dB Conversion Loss
- Balanced Configuration
- No Bias Needed
- SFU Family Covers up to 170 GHz



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
RF to LO Isolation		30 dB	
Combined IF and LO Power			+18 dBm
Specification Temperature		+25 °C	
Operation Temperature	-40 °C		+85 °C

**Typical Conversion Loss vs. Frequency**

LO: +13 dBm, IF: -20 dBm



# AMPLITUDE DETECTOR

**SFD-333503-22SF-N1**

33 to 50 GHz

## Features:

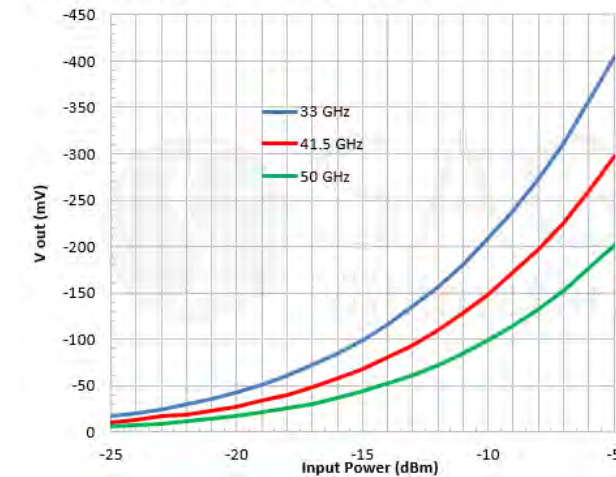
- 33 to 50 GHz
- 1,000 mV/mW Sensitivity
- No Tuning
- Positive or Negative Models
- SFD Family Covers up to 170 GHz



Parameter	Minimum	Typical	Maximum
Frequency	33 GHz		50 GHz
Sensitivity*		1200 mV/mW	
Sensitivity Flatness		±2.0 dB	
RF Input Power		-20 dBm	
RF Power Handling			+17 dBm
Video Bandwidth		10 MHz	
Detection Speed, Raise Time (50 Ohm Load)		5 Nano Second	
Output Voltage Polarity	Negative		
Specification Temperature		+25 °C	
Operating Temperature	-40 °C		+85 °C

\*Note: The sensitivity is for the input signal level -20 dBm or below.

Typical Detected Voltage vs. Input Power





# AMPLITUDE DETECTOR

**SFD-503753-15SF-N1**

50 to 75 GHz

## Features:

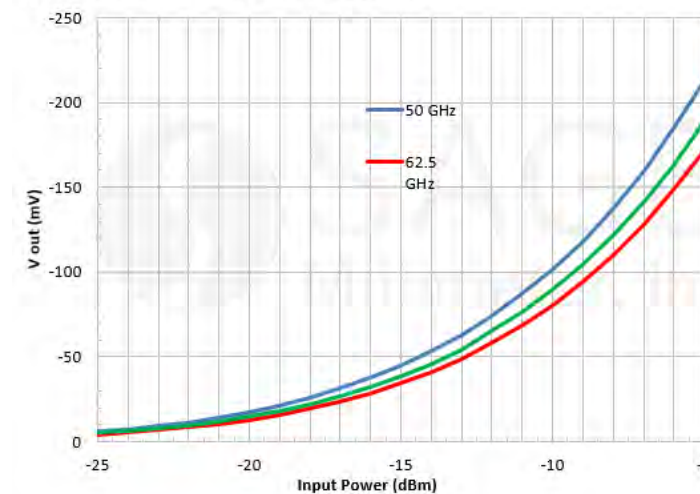
- 50 to 75 GHz
- 1,000 mV/mW Sensitivity
- No Tuning
- Positive or Negative Models
- SFD Family Covers up to 170 GHz



Parameter	Minimum	Typical	Maximum
Frequency	50 GHz		75 GHz
Sensitivity*		1,000 mV/mW	
Sensitivity Flatness		±2.0 dB	
RF Input Power		-20 dBm	
RF Power Handling			+17 dBm
Video Bandwidth		10 MHz	
Detection Speed, Raise Time (50 Ohm Load)		5 Nano Second	
Output Voltage Polarity		Negative	
Specification Temperature		+25 °C	
Operating Temperature	-40 °C		+85 °C

\*Note: The sensitivity is for the input signal level -20 dBm or below.

Typical Detected Voltage vs. Input Power





# AMPLITUDE DETECTOR

**SFD-603903-12SF-N1**

60 to 90 GHz

## Features:

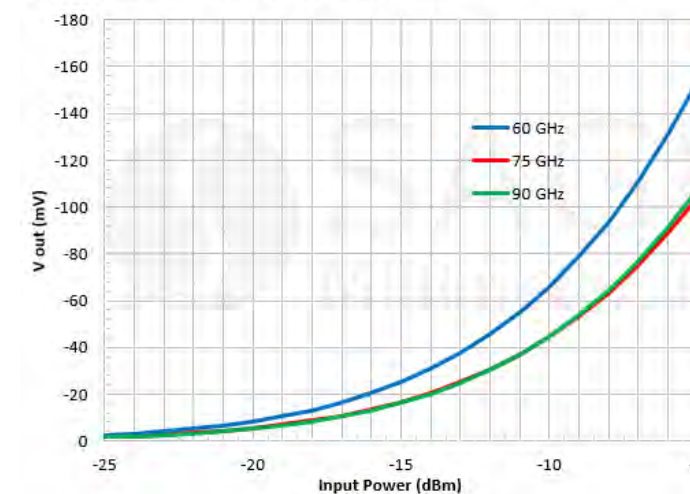
- 60 to 90 GHz
- 900 mV/mW Sensitivity
- No Tuning
- Positive or Negative Models
- SFD Family Covers up to 170 GHz



Parameter	Minimum	Typical	Maximum
Frequency	60 GHz		90 GHz
Sensitivity*		900 mV/mW	
Sensitivity Flatness		±2.0 dB	
RF Input Power		-20 dBm	
RF Power Handling			+17 dBm
Video Bandwidth		10 MHz	
Detection Speed, Raise Time (50 Ohm Load)		5 Nano Second	
Output Voltage Polarity		Negative	
Specification Temperature		+25 °C	
Operating Temperature	-40 °C		+85 °C

\*Note: The sensitivity is for the input signal level -20 dBm or below.

Typical Detected Voltage vs. Input Power



# ACTIVE MULTIPLIER

**SFA-203503410-2FSF-S1**

20 to 50 GHz

## Features:

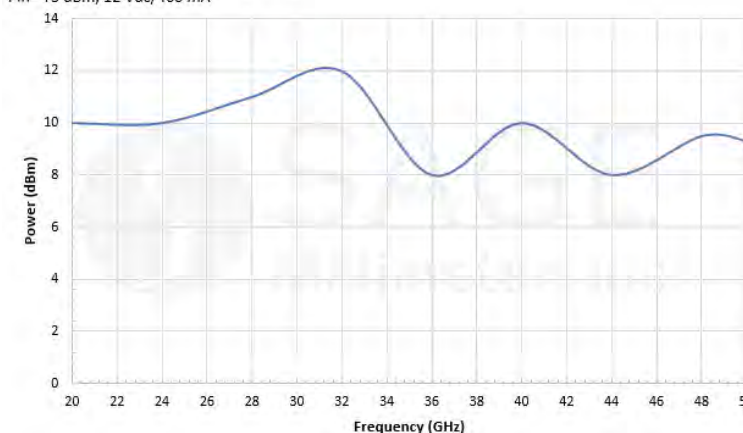
- 20 to 50 GHz
- X4 Multiplying Factor
- +10 dBm Output Power
- SFA Family Has More than 75 Models



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

**SFA-194SF-S1**  
40 to 60 GHz

## Features:

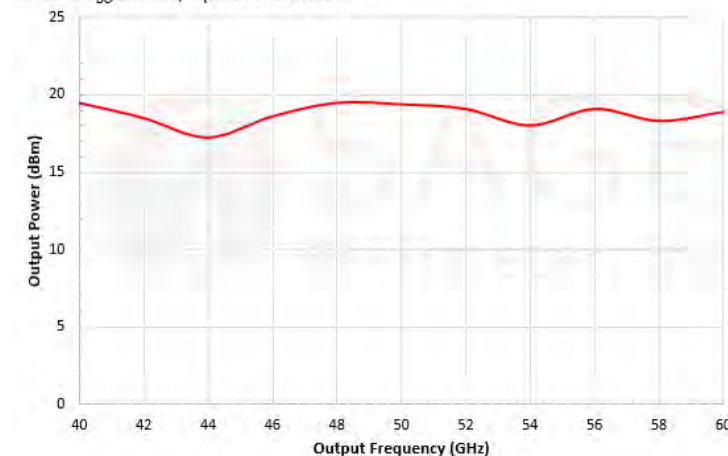
- 40 to 60 GHz
- X2 or X4 Multiplying Factor
- +18 dBm Output Power
- SFA Family Has More than 75 Models



Parameter	Minimum	Typical	Maximum
Input Frequency	10 GHz		15 GHz
Input Power		0 dBm	+20 dBm
Output Frequency	40 GHz		60 GHz
Output Power		+18 dBm	
Harmonic Suppression		-15 dBc	
Spurious		-60 dBc	
Port Return Loss		15 dB	
DC Voltage	+6 V <sub>DC</sub>	+8 V <sub>DC</sub>	+9 V <sub>DC</sub>
DC Supply Current		800 mA	
Specification Temperature		+25 °C	
Operating Temperature	0 °C		+50 °C

## Typical Output Power vs. Output Frequency

Bias: +8 V<sub>DC</sub>/800 mA; Input Power: 0 dBm



# ACTIVE MULTIPLIER

**SFA-603903816-12SF-S1**

60 to 90 GHz

## Features:

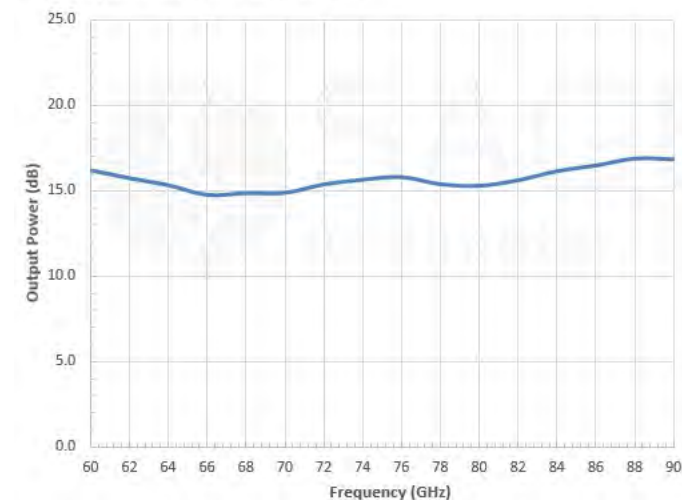
- 60 to 90 GHz
- X2, X4, X6 or X8 Multiplying Factor
- +16 dBm Output Power
- SFA Family Has More than 75 Models



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



# PASSIVE MULTIPLIER

**SFP-192KF-S1**

40 to 60 GHz

## Features:

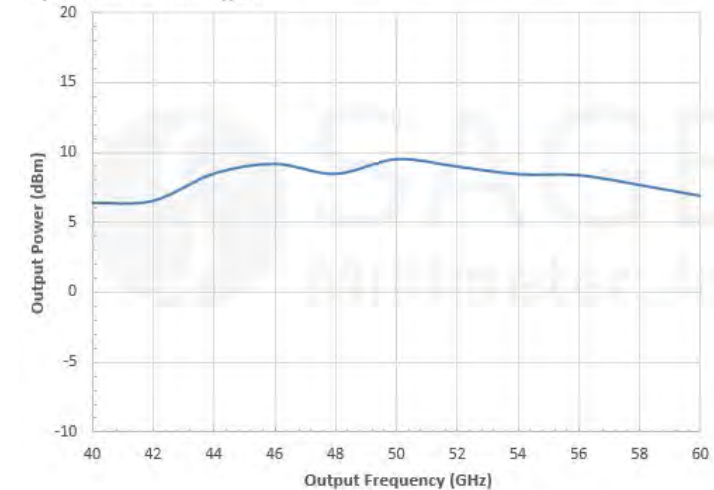
- 40 to 60 GHz
- X2 and X3 Multiplying Factor
- +5 dBm Output Power
- SFP Family Covers up to 220 GHz



Parameter	Minimum	Typical	Maximum
Input Frequency	20 GHz		30 GHz
Output Frequency	40 GHz		60 GHz
Input Power		+20 dBm	
Damage Input Power			+23 dBm
Output Power		+6 dBm	
Fundamental Rejection		40 dB	
Harmonic Suppression		20 dB	
Specification Temperature		+25 °C	
Operating Temperature	0 °C		+50 °C

**Typical Output Power vs. Output Frequency**

Input Power: +20 dBm Typical





# PASSIVE MULTIPLIER

**SFP-1222F-S1**

60 to 90 GHz

## Features:

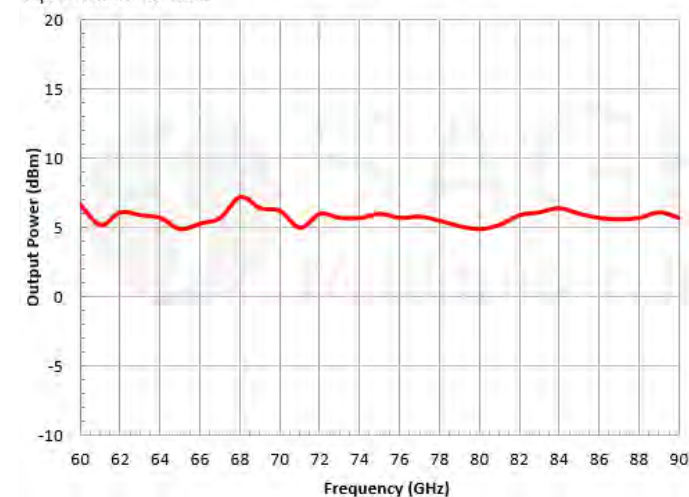
- 60 to 90 GHz
- X2 and X3 Multiplying Factor
- +5 dBm Output Power
- SFP Family Covers up to 220 GHz



Parameter	Minimum	Typical	Maximum
Input Frequency	30 GHz		45 GHz
Output Frequency	60 GHz		90 GHz
Input Power		+20 dBm	
Damage Input Power			+22 dBm
Output Power		+5 dBm	
Fundamental Rejection		40 dB	
Harmonic Suppression		20 dB	
Specification Temperature		+25 °C	
Operating Temperature	0 °C		+50 °C

**Typical Output Power vs. Output Frequency**

Input Power: +20 dBm





# CONTROL DEVICES

# ERAVANT CONTROL DEVICES

The focus of this presentation section is to introduce the **Eravant** control device product family by highlighting some representative models. There are several hundred standard models available to satisfy all 5G system applications. The control device family can be found [here](#) and [here](#) and includes the following types:

- Electrical Attenuator
- SPST PIN Diode Switch
- SPDT PIN Diode Switch
- SP4T PIN Diode Switch
- SP8T PIN Diode Switch
- Waveguide Level Setting Attenuator
- Waveguide Direct Reading Attenuator
- Waveguide Programable Attenuator
- Coaxial Programmable Attenuator
- Electro-Mechanical Switch

# ELECTRICAL ATTENUATOR

**SKA-1834033537-KFKF-A1-M**

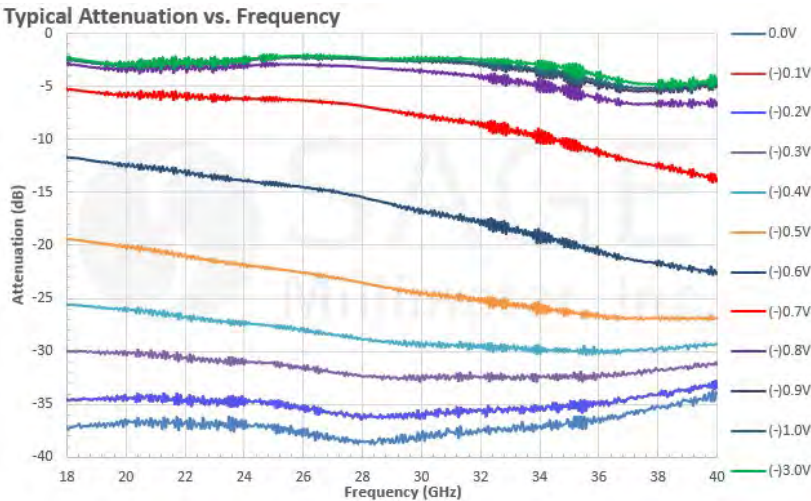
18 to 40 GHz

**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 $P_{1dB}$		+10 dBm	
Damage RF Power Level			+30 dBm
Control Voltage		0 to -3 $V_{DC}$	
Damage Control Voltage Level			-5 $V_{DC}$
Input Return Loss		8 dB	
Output Return Loss		9 dB	
Specification Temperature		+25 °C	
Operating Temperature	0 °C		+50 °C



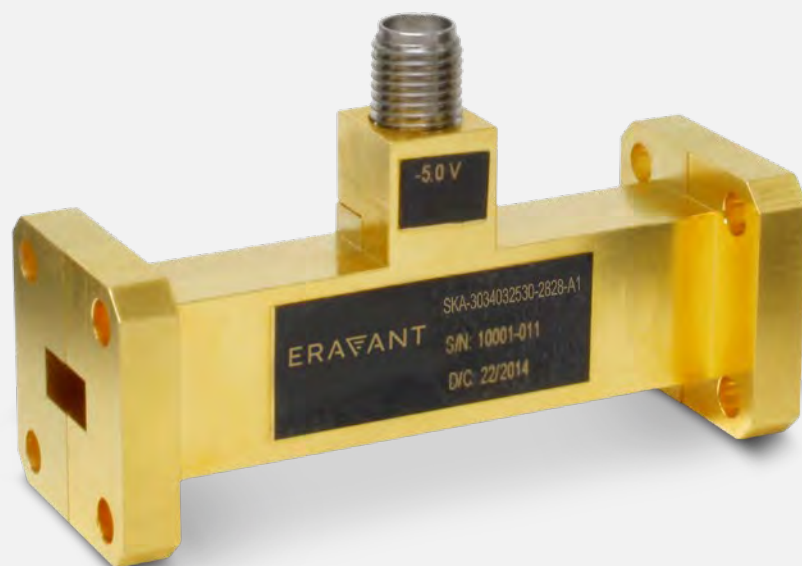
# ELECTRICAL ATTENUATOR

**SKA-2734032530-2828-A1**

26.5 to 40 GHz

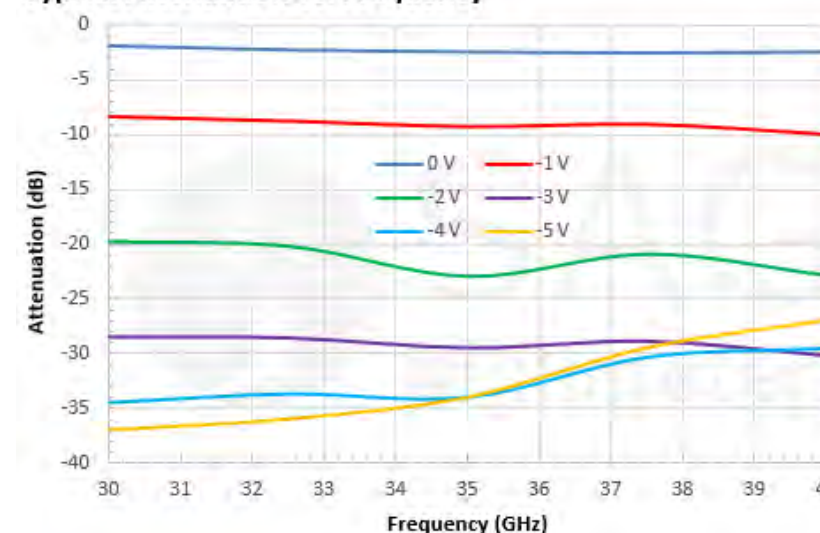
## Features:

- 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**



# ELECTRICAL ATTENUATOR

**SKA-5037533030-1515-A1**

50 to 75 GHz

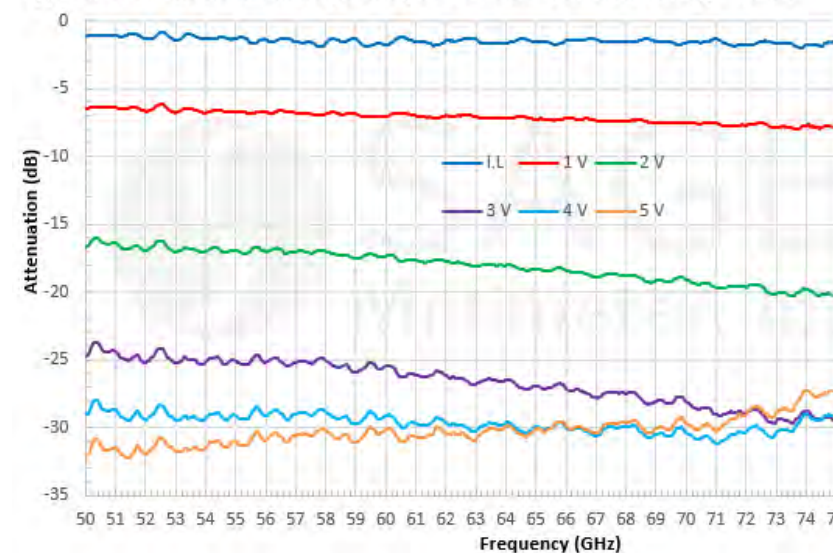
## Features:

- 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



# SPST PIN SWITCH

**SKS-3034032030-KFKF-A1-M**

30 to 40 GHz

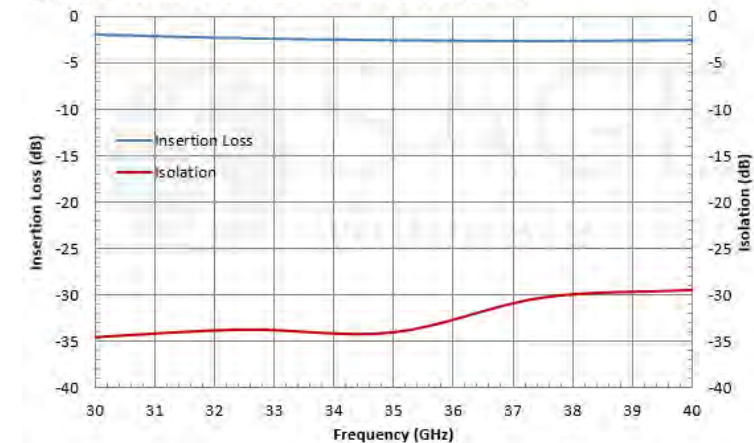
## Features:

- 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





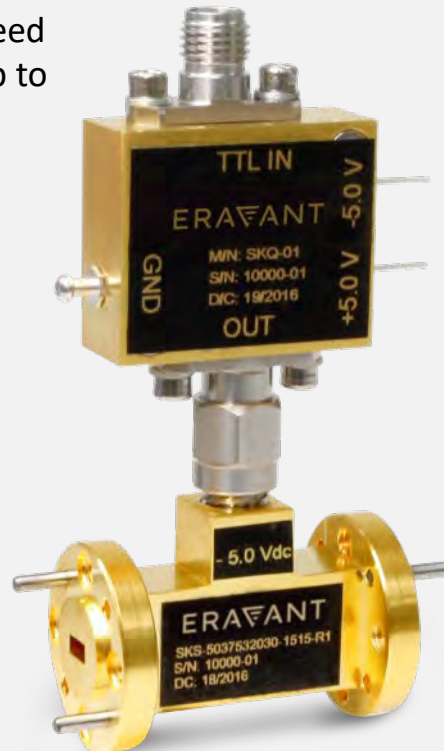
# SPST PIN SWITCH

**SKS-5037533030-1515-R1**

50 to 75 GHz

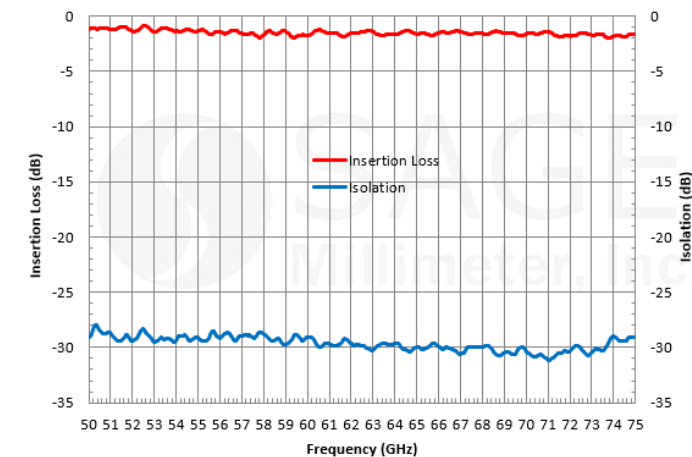
## Features:

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



Parameter	Minimum	Typical	Maximum
Frequency	50 GHz		75 GHz
Insertion Loss		2.0 dB	3.0 dB
Isolation	25 dB	30 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	-25 °C		+65 °C

Typical Insertion Loss and Isolation vs. Frequency



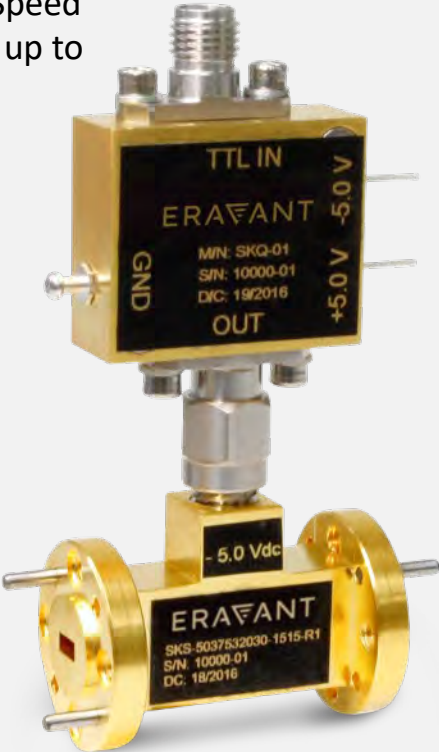
# SPST PIN SWITCH

**SKS-7531142520-1010-R1**

75 to 110 GHz

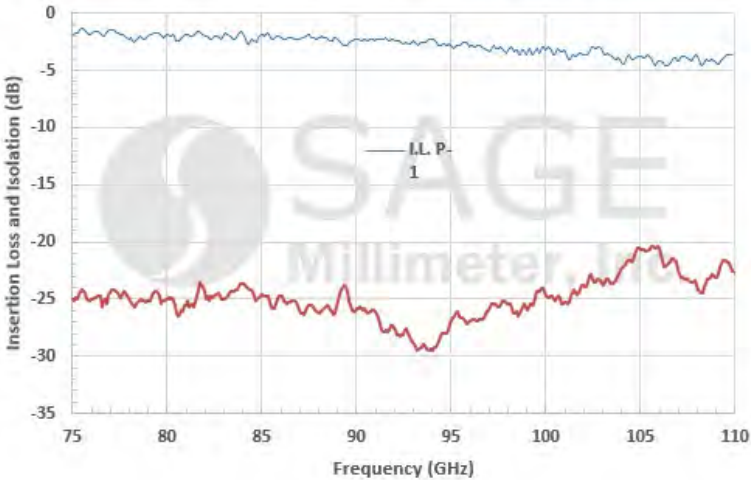
**Features:**

- 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		$\pm 5\text{ V}_{\text{DC}}$	
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



# SPDT PIN SWITCH

**SKD-0524334560-KFKF-A3**

75 to 110 GHz

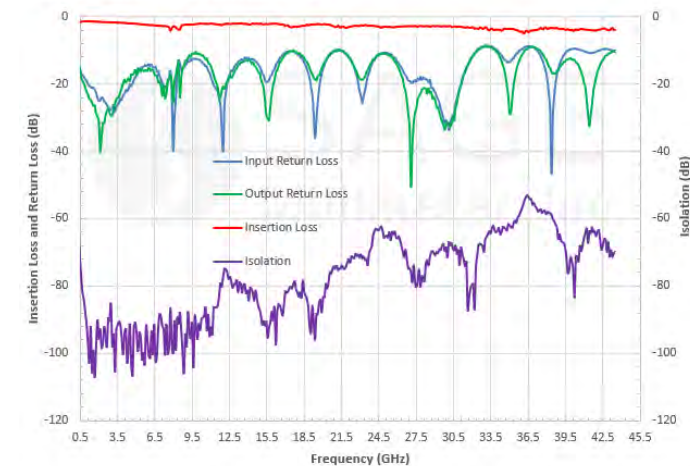
## Features:

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



Parameter	Minimum	Typical	Maximum
Frequency	0.5 GHz		43.0 GHz
Insertion Loss		4.5 dB	
Return Loss		10 dB	
Isolation		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	-45 °C		+85 °C

Typical Performance vs. Frequency



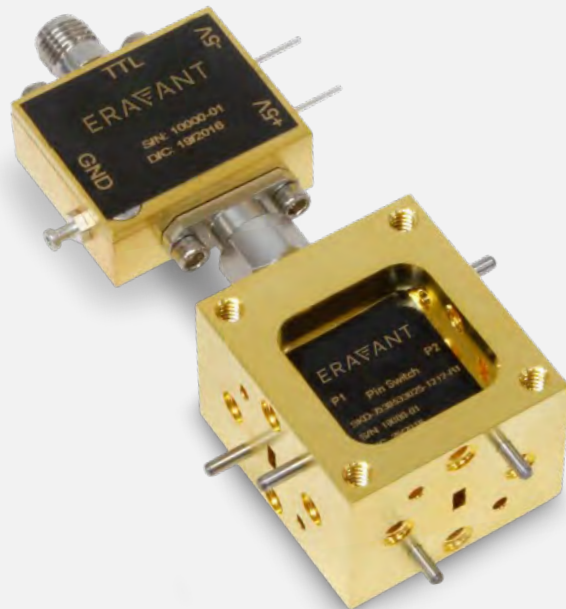
# SPDT PIN SWITCH

**SKD-6039033025-1212-R1-N**

60 to 90 GHz

## Features:

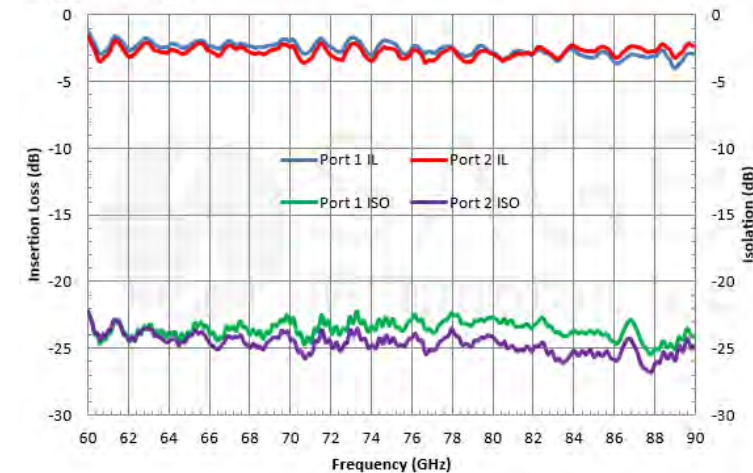
- 60 to 90 GHz
- 25 dB Control Range
- 100 ns Switching Speed
- SKD Family Covers up to 110 GHz



Parameter	Minimum	Typical	Maximum
Frequency	60 GHz		90 GHz
Insertion Loss		3.0 dB	
Isolation		25 dB	
Power Handling		+20 dBm	+23 dBm
Bias Voltage		$\pm 5 V_{DC}$	
Bias Current		10 mA	
Switching Speed		100 ns	
Specification Temperature		+25 °C	
Operating Temperature	-25 °C		+65 °C

**Typical Insertion Loss and Isolation vs Frequency**

Input Power +/- 5 Vdc



# SPDT PIN SWITCH

**SKD-7531143530-1010-R1-M**

75 to 110 GHz

## Features:

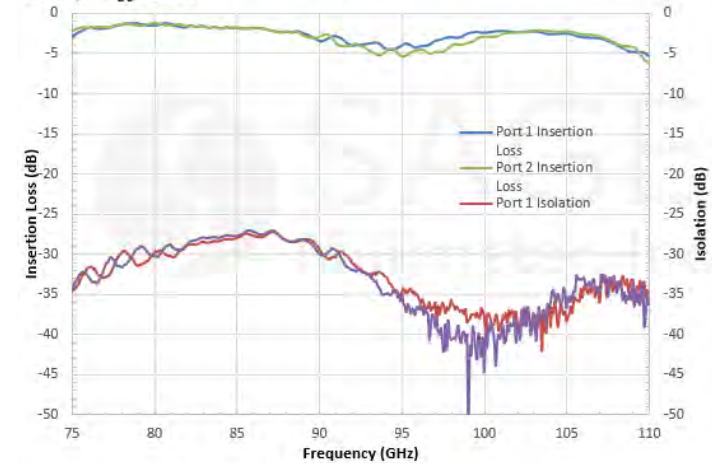
- 75 to 110 GHz
- 30 dB Control Range
- 100 ns Switching Speed
- SKD Family Covers up to 110 GHz



Parameter	Minimum	Typical	Maximum
Frequency	75 GHz		110 GHz
Insertion Loss		3.5 dB	
Isolation	25 dB	30 dB	
Maximum Input Power			+30 dBm
Control Signal		TTL	
Switching Speed		100 ns	
Bias Voltage		$\pm 5 V_{DC}$	
Bias Current		10 mA	
Specification Temperature		+25°C	
Operating Temperature	0°C		+50°C

## Typical Performance vs. Frequency

Bias:  $\pm 5 V_{DC}/12 \text{ mA}$





# SP4T PIN SWITCH

**SK4-0524335060-KFKF-A3**

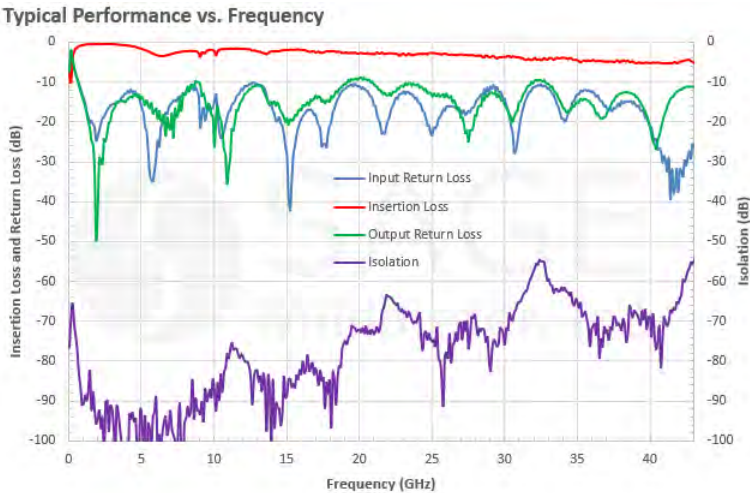
0.5 to 43 GHz

**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		±5 V <sub>DC</sub>	
Bias Current		100/50 mA	
Control		TTL	
Switching Speed		100 ns	
Specification Temperature		+25 °C	
Operation Temperature	0 °C		+50 °C



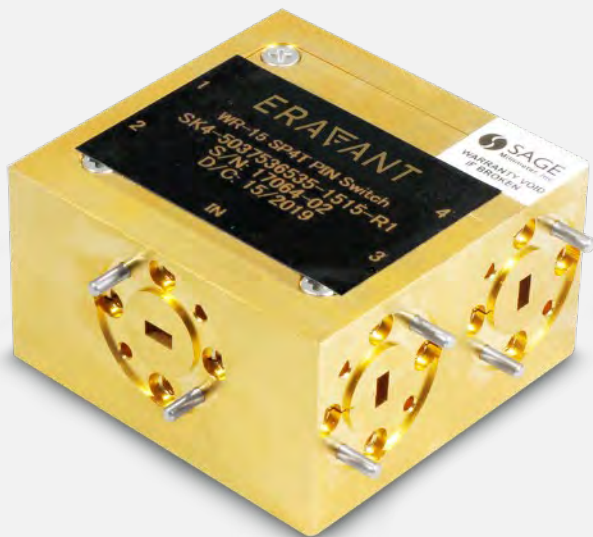


# SP4T PIN SWITCH

**SK4-5037536535-1515-R1-M**  
50 to 75 GHz

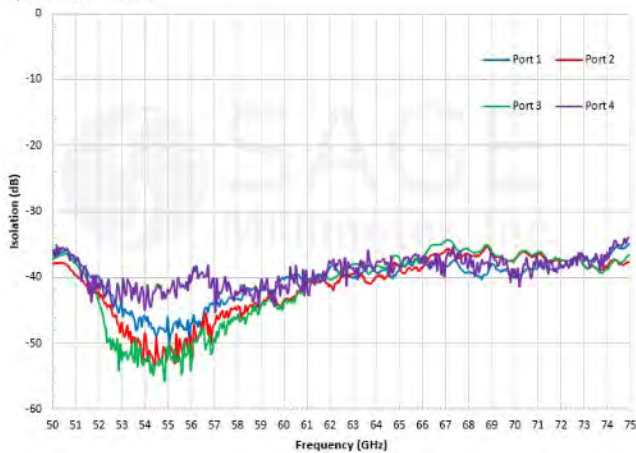
**Features:**

- 50 to 75 GHz
- 35 dB Control Range
- 100 ns Switching Speed
- SK4 Family Covers up to 110 GHz



Parameter	Minimum	Typical	Maximum
Frequency	50 GHz		75 GHz
Insertion Loss		6.5 dB	
Return Loss		5 dB	
Isolation		35 dB	
Maximum Input RF Power		+20 dBm	+23 dBm
Bias Voltage		±5 V <sub>DC</sub>	±6 V <sub>DC</sub>
Bias Current		100 mA	
Control		TTL	
Switching Speed		100 ns	
Specification Temperature		+25 °C	
Operation Temperature	0 °C		+50 °C

**Typical Isolation vs. Frequency**  
Input Power: RF -10 dBm



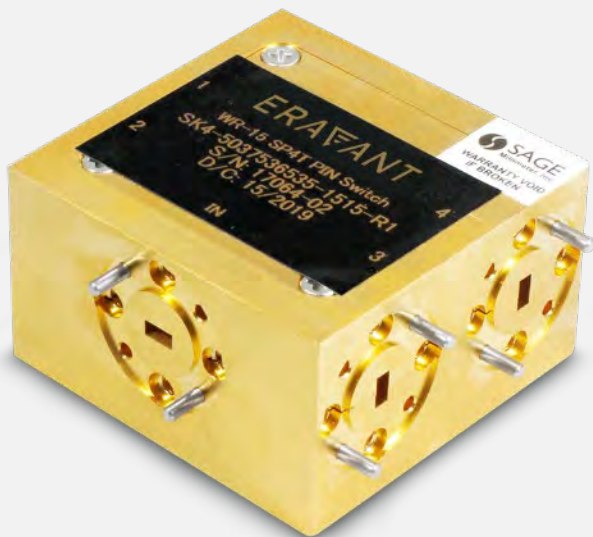
# SP4T PIN SWITCH

**SK4-6039038030-1212-R1-M**

60 to 90 GHz

**Features:**

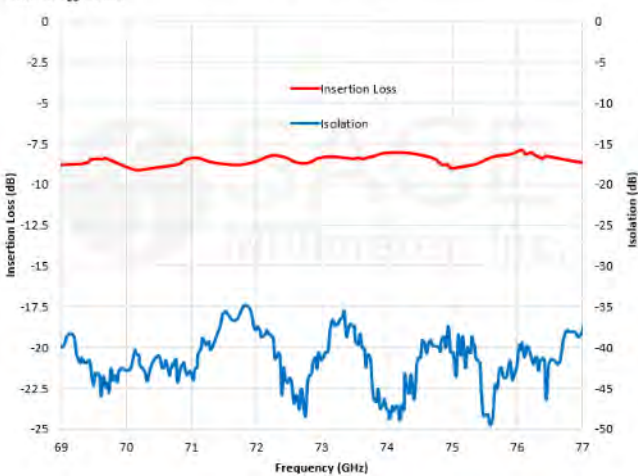
- 60 to 90 GHz
- 30 dB Control Range
- 100 ns Switching Speed
- SK4 Family Covers up to 110 GHz



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 mA



# SP8T PIN SWITCH

**SK8-0524036550-KFKF-AD1**

0.5 to 40 GHz

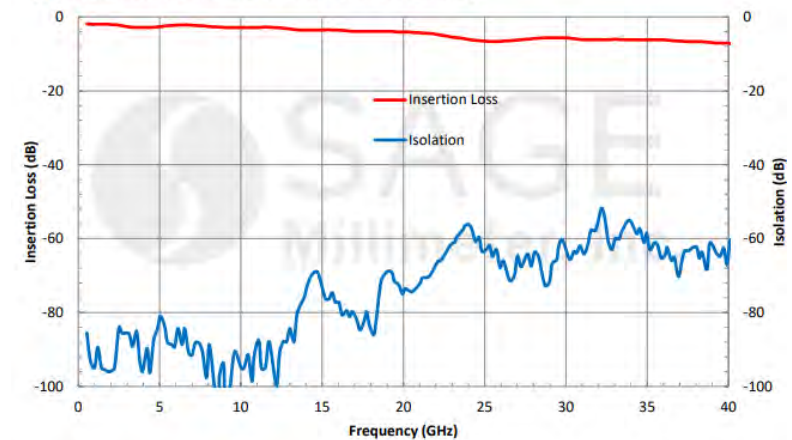
## Features:

- 0.5 to 40 GHz
- 50 dB Control Range
- 50 ns Switching Speed
- SK8 Family Covers up to 110 GHz



Parameter	Minimum	Typical	Maximum
Frequency	0.5 GHz		40 GHz
Insertion Loss		6.5 dB	8.5 dB
Isolation	50 dB		
Return Loss		7 dB	6 dB
Input RF Power		+20 dBm	+23 dBm
Bias Voltage	-5 V <sub>DC</sub>		+5 V <sub>DC</sub>
Bias Current	30 mA		100 mA
Control		TTL	
Switching Speed		50 ns	
Switch Type		Absorptive	
Specification Temperature		+25 °C	
Operating Temperature	0 °C		+50 °C

Typical Insertion Loss and Isolation vs. Frequency



# WAVEGUIDE LEVEL SETTING ATTENUATOR

**STA-30-28-M1-L-3.0**  
26.5 to 40 GHz

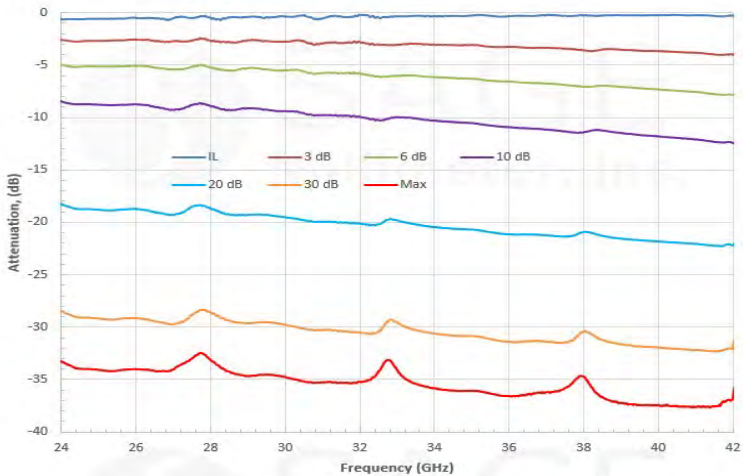
**Features:**

- 26.5 to 40 GHz
- 30 dB Control Range
- Micrometer Driven
- Level Setting
- Level Setting Covers up to 330 GHz



Parameter	Minimum	Typical	Maximum
Frequency	24 GHz		42 GHz
Insertion Loss		0.4 dB	
Attenuation	25 dB	30 dB	
Return Loss		20 dB	
Power Handling		1 W	1.2 W
Specification Temperature		+25 °C	
Operating Temperature	-40 °C		+85 °C

Typical Attenuation vs Frequency



# WAVEGUIDE DIRECT READING ATTENUATOR

**STA-60-28-D1**  
26.5 to 40 GHz

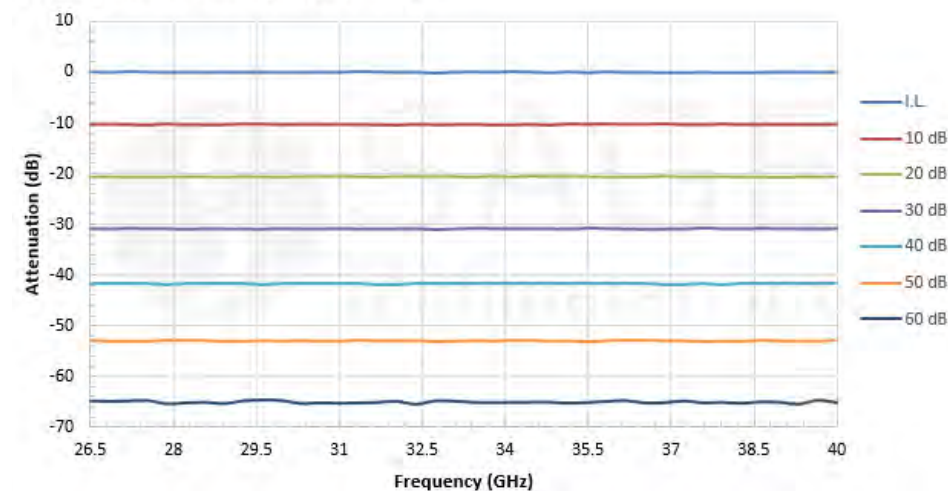
## Features:

- 26.5 to 40 GHz
- 60 dB Control Range
- Dial Driven
- Accurate Setting and Direct Reading
- The Family Covers up to 330 GHz



Parameter	Minimum	Typical	Maximum
RF Frequency Range	26.5 GHz		40.0 GHz
Insertion Loss			0.5 dB
Attenuation Range	0 dB		60 dB
Attenuation Accuracy	0.1 dB or 3% of reading, whichever is larger, up to 40 dB		
VSWR			1.15:1
Power Handling		50 mW	100 mW

Typical Attenuation vs. Frequency





# WAVEGUIDE PROGRAMMABLE ATTENUATOR

**STA-60-28-P1**  
26.5 to 40 GHz

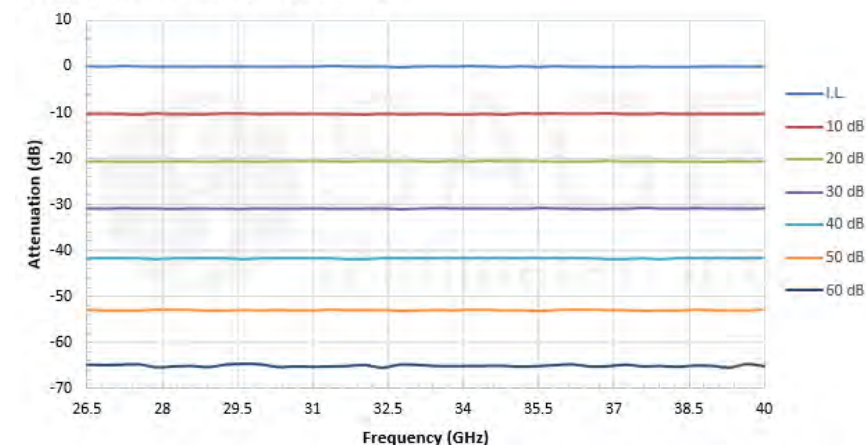
## Features:

- 26.5 to 40 GHz
- 60 dB Control Range
- Dial Driven
- Accurate Setting and Direct Reading
- The Family Covers up to 330 GHz



Parameter	Minimum	Typical	Maximum
RF Frequency Range	26.5 GHz		40 GHz
Insertion Loss		0.5 dB	
Attenuation Range	0 dB		70 dB
Attenuation Accuracy	0.1 dB or 3% of reading, whichever is larger, up to 40 dB		
Attenuation Step Size	0.05 dB from 0 to 20 dB and 0.10 dB from 20 to 70 dB		
Control Resolution	0.01 dB from 0 to 70 dB		
Return Loss		22 dB	
Operating Voltage	+24 V <sub>DC</sub> (100 to 240 V <sub>AC</sub> Adapter is Supplied)		
Power Handling		1 W	2.5 W (CW)
Absolute Maximum Power			5.0 W (CW)
Specification Temperature		+25 °C	
Operating Temperature	0 °C		+50 °C

Typical Attenuation vs. Frequency





# WAVEGUIDE MOTORIZED SWITCH

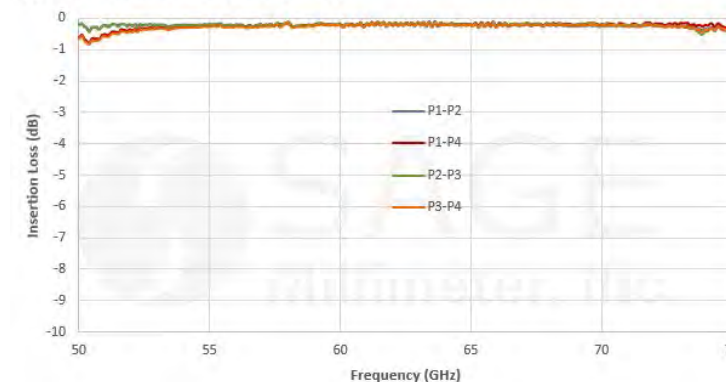
**SWJ-15-TS**  
50 to 75 GHz

## Features:

- 50 to 75 GHz
- 50 dB Control Range
- Motorized and Manual
- Low Insertion Loss and High Isolation
- The Family Covers up to 110 GHz

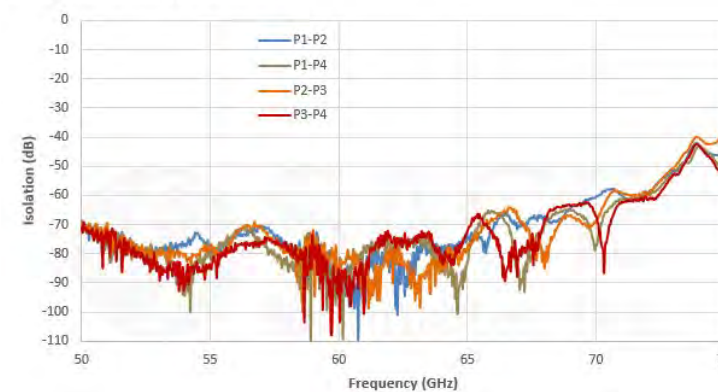


Typical Insertion Loss vs Frequency



Parameter	Minimum	Typical	Maximum
Frequency	50 GHz		75 GHz
Insertion Loss		0.6 dB	
Isolation		50 dB	
Return Loss		20 dB	
Control Signal		TTL	
Switching Speed		125 ms	
Cycle Time	250,000	1,000,000	
Power Handling			100 W (CW)
Bias Voltage		+28 V <sub>DC</sub>	
Bias Current		250 mA	
Specification Temperature		+25°C	
Operating Temperature	-25°C		+65°C

Typical Isolation vs Frequency



# FERRITE DEVICES

# ERAVANT FERRITE DEVICES

The focus of this presentation section is to introduce the **Eravant** ferrite device product family by highlighting some representative models. There are about one-hundred standard models available to satisfy all 5G system applications. The ferrite device family includes the following types:

- Full Band Coaxial Isolator and Circulator
- Full Band Waveguide Junction Isolator and Circulator
- Waveguide Junction Isolator and Circulator
- Faraday Isolator

# FULL WAVEGUIDE BAND COAXIAL ISOLATOR

**SNC-2734031614-KFKF-I7**

26.5 to 40 GHz

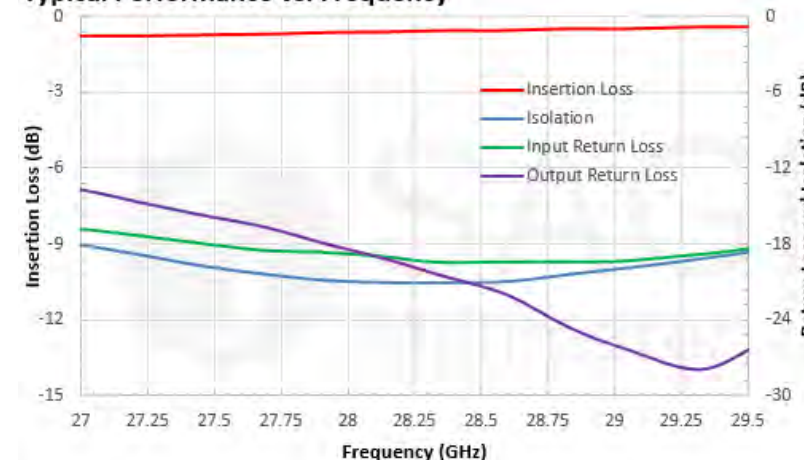
## Features:

- 26.5 to 40 GHz
- Full Waveguide Bandwidth Coverage
- 18 to 26.5 GHz and 22 to 33 GHz Models
- Total 8 Models to Support 5G Bands



Parameter	Minimum	Typical	Maximum
RF Frequency	27 GHz		29.5 GHz
Insertion Loss		1.6 dB	
Isolation		14 dB	
Return Loss		12 dB	
Forward Power Handling			10 W (CW)
Reverse Power Handling			1 W (CW)
Impedance		50 $\Omega$	
Specification Temperature		+25 $^{\circ}$ C	
Operating Temperature	-40 $^{\circ}$ C		+80 $^{\circ}$ C

Typical Performance vs. Frequency



# FULL WAVEGUIDE BAND COAXIAL CIRCULATOR

**SNC-2734031614-KFKFKF-C7**

26.5 to 40 GHz

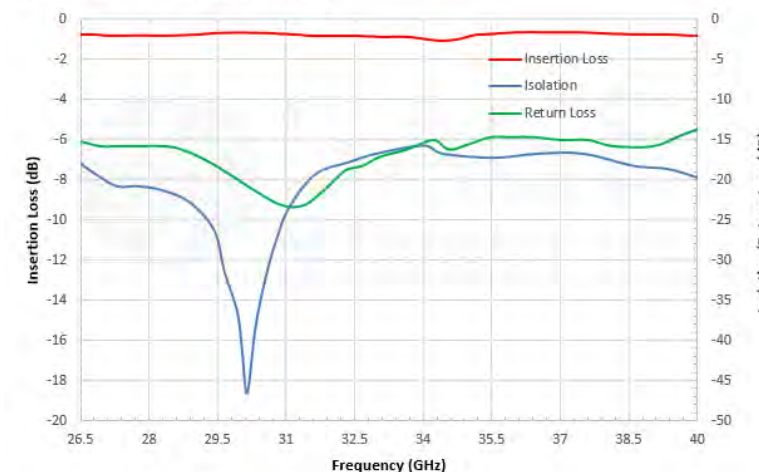
## Features:

- 26.5 to 40 GHz
- Full Waveguide Bandwidth Coverage
- 18 to 26.5 GHz and 22 to 33 GHz Models
- Total 8 Models to Support 5G Bands



Parameter	Minimum	Typical	Maximum
Frequency	26.5 GHz		40 GHz
Insertion Loss		1.6 dB	
Isolation		14 dB	
Return Loss		13 dB	
Impedance		50 $\Omega$	
Power Handling			10 W (CW)
Specification Temperature		+25 °C	
Operating Temperature	-40 °C		+80 °C

Typical Performance vs. Frequency



# FULL WAVEGUIDE JUNCTION CIRCULATOR

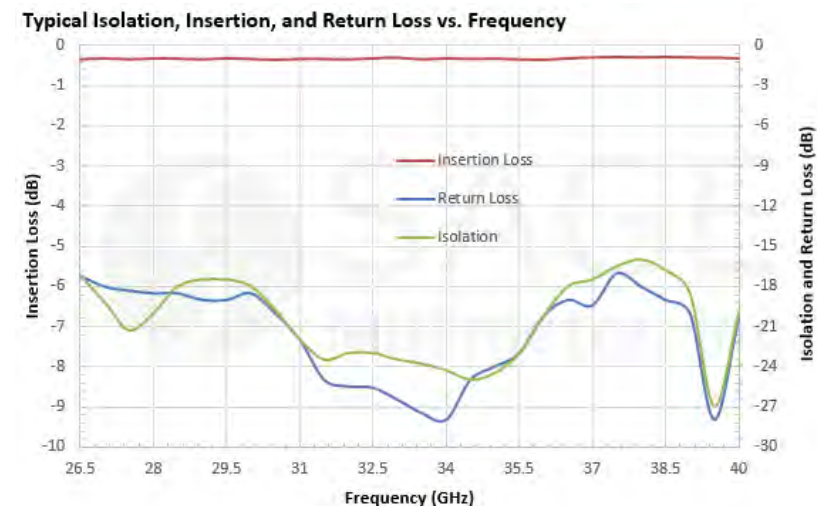
**SNF-28-C5**  
26.5 to 40 GHz

## 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



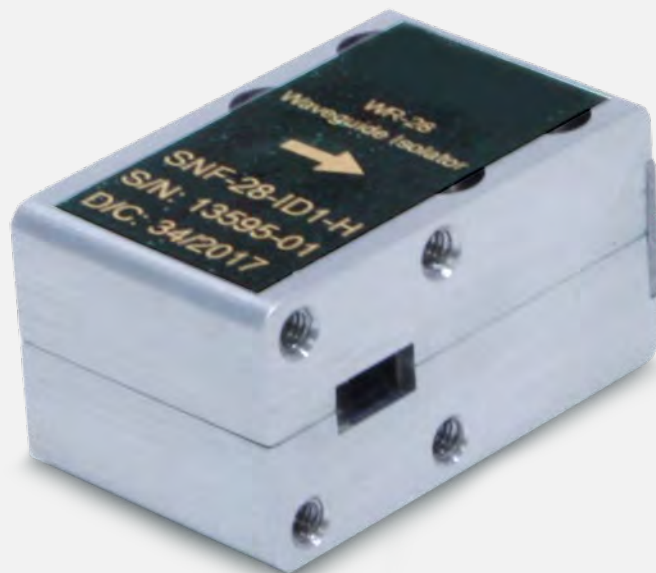


# FULL WAVEGUIDE JUNCTION ISOLATOR

**SNF-28-I5**  
26.5 to 40 GHz

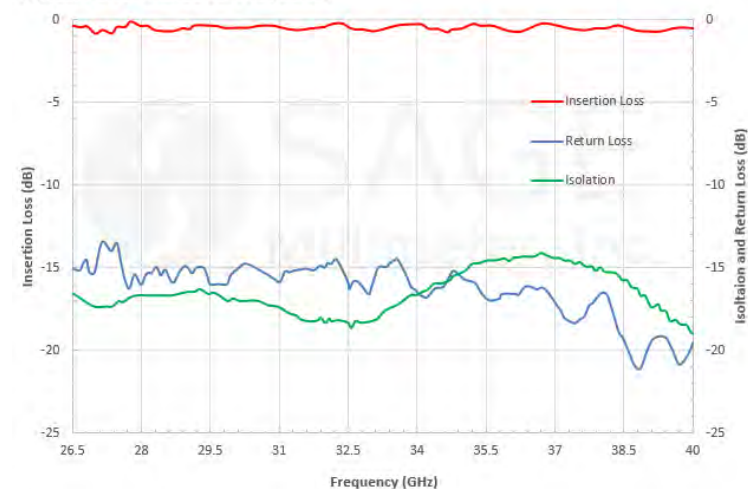
## Features:

- 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 ISOLATOR

**SNW-4735130518-22-CJ**

47 to 51 GHz

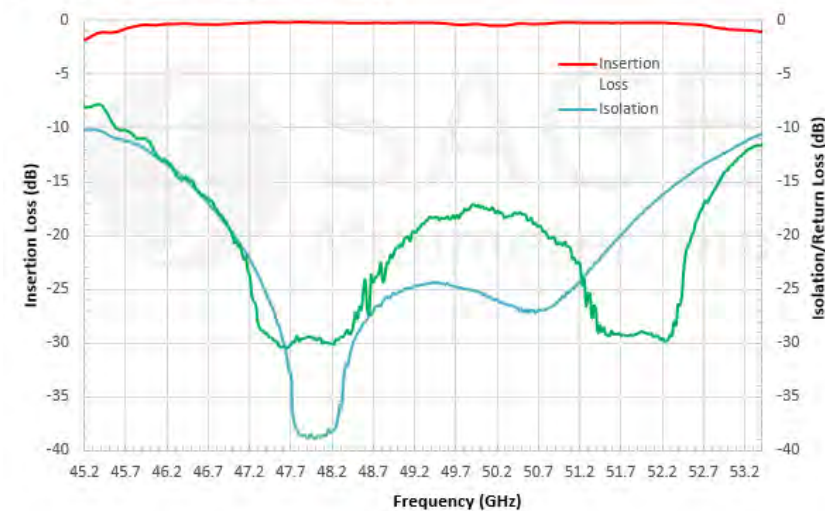
## Features:

- 47 to 51 GHz
- Broad Bandwidth Coverage
- 71 to 76 and 81 to 86 GHz Models
- 40+ Models to Support 5G Bands



Parameter	Minimum	Typical	Maximum
Frequency	47.2 GHz		51.4 GHz
Insertion Loss		0.5 dB	
Isolation		18 dB	
Return Loss		19 dB	
Forward Power Handling		5 W (CW)	
Reverse Power Handling		1 W (CW)	
Specification Temperature		+25 °C	
Operating Temperature	-40 °C		+85 °C

Typical Performance vs. Frequency



# WAVEGUIDE JUNCTION ISOLATOR

**SNW-4735130518-22-11**

47 to 51.4 GHz

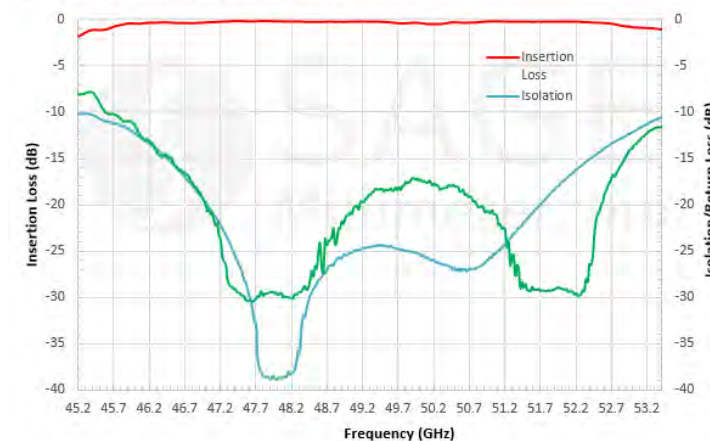
## Features:

- 47 to 51.4 GHz
- Broad Bandwidth Coverage
- 71 to 76 and 81 to 86 GHz Models
- 40+ Models to Support 5G Bands



Parameter	Minimum	Typical	Maximum
Frequency	47.2 GHz		51.4 GHz
Insertion Loss		0.5 dB	
Isolation		18 dB	
Return Loss		19 dB	
Forward Power Handling		5 W (CW)	
Reverse Power Handling		1 W (CW)	
Specification Temperature		+25 °C	
Operating Temperature	-40 °C		+85 °C

Typical Performance vs. Frequency



# WAVEGUIDE JUNCTION CIRCULATOR

**SNW-7137630818-12-C1**  
71 to 76 GHz

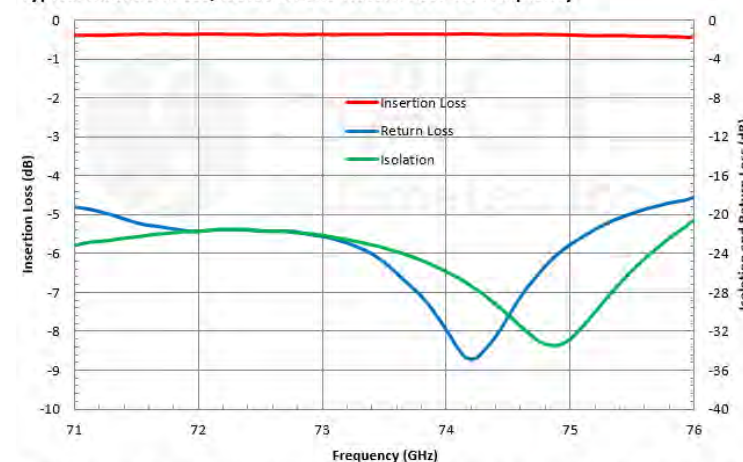
## Features:

- 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 CIRCULATOR

**SNW-7137630818-12-I1**

71 to 76 GHz

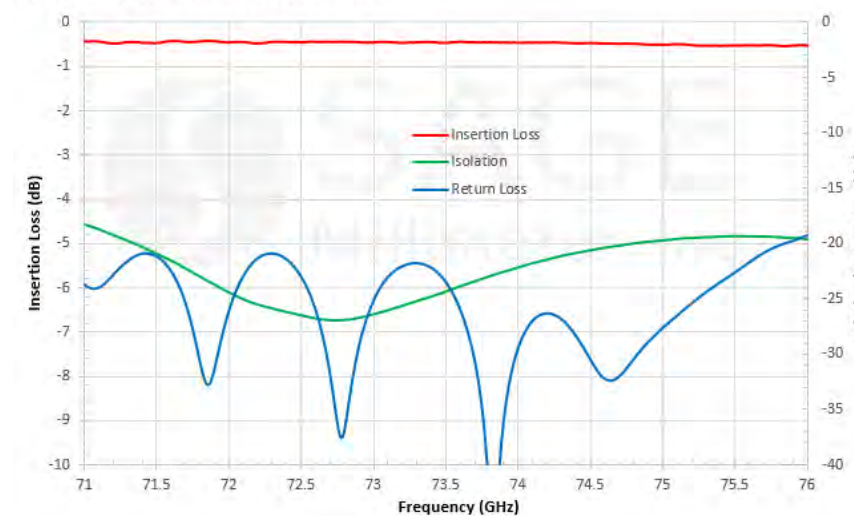
## Features:

- 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





# FARADAY ISOLATOR

**STF-28-S1**  
26.5 to 40 GHz

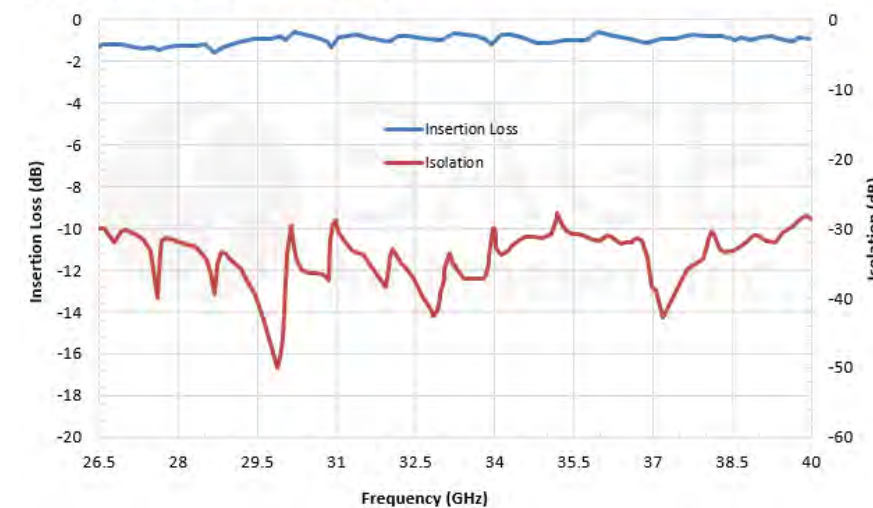
## Features:

- 26.5 to 40 GHz
- Full Waveguide Bandwidth
- 30 dB Isolation
- 18 to 220 GHz Coverage
- 40+ Models to Support 5G Bands



Parameter	Minimum	Typical	Maximum
RF Frequency*	26.5 GHz		40 GHz
Insertion Loss		1.2 dB	2.0 dB
Isolation		30 dB	
Return Loss		14 dB	
Power Handling		1.8 W (CW)	2.0 W (CW)
Specification Temperature		+25 °C	
Operating Temperature	-40 °C		+85 °C

Typical Performance vs. Frequency





# FARADAY ISOLATOR

**STF-15-S1**  
50 to 75 GHz

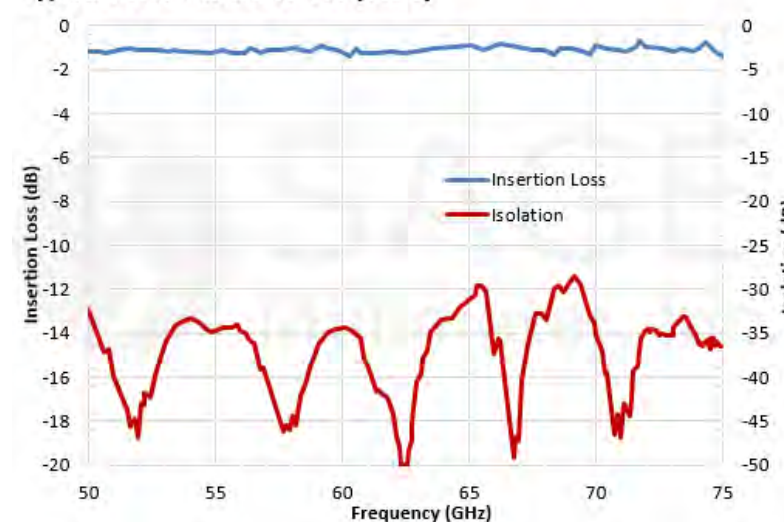
## Features:

- 50 to 75 GHz
- Full Waveguide Bandwidth
- 30 dB Isolation
- 18 to 220 GHz Coverage
- 40+ Models to Support 5G Bands



Parameter	Minimum	Typical	Maximum
RF Frequency	50 GHz		75 GHz
Insertion Loss		1.5 dB	1.8 dB
Isolation		28 dB	
Return Loss		16 dB	
Power Handling		1.0 W (CW)	1.2 W (CW)
Specification Temperature		+25 °C	
Operation Temperature	-40 °C		+85 °C

Typical Performance vs. Frequency



# FARADAY ISOLATOR, COMPACT

**STF-10-S1-C**  
75 to 110 GHz

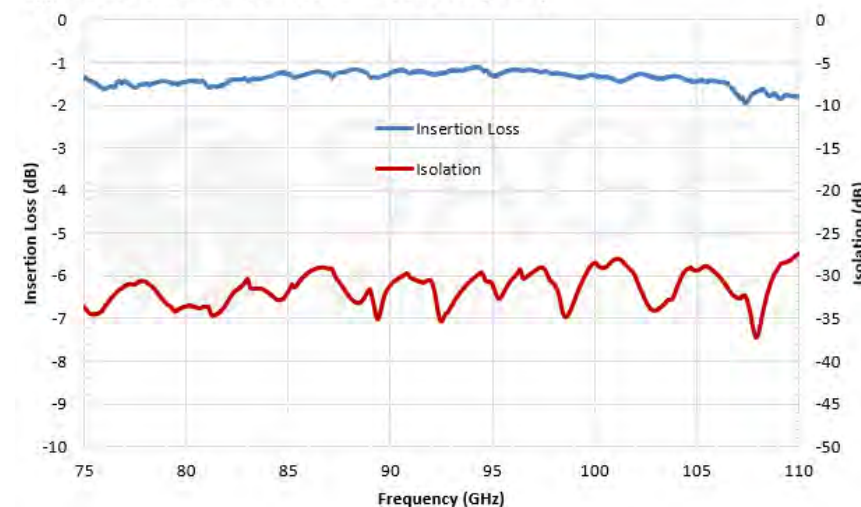
## Features:

- 75 to 110 GHz
- Full Waveguide Bandwidth
- 30 dB Isolation
- Compact Design
- 18 to 220 GHz Coverage
- 40+ Models to Support 5G Bands



Parameter	Minimum	Typical	Maximum
RF Frequency	75 GHz		110 GHz
Insertion Loss		1.5 dB	2.2 dB
Isolation		28 dB	
Return Loss		15 dB	
Power Handling		1.0 W (CW)	1.2 W (CW)
Specification Temperature		+25 °C	
Operation Temperature	-40 °C		+85 °C

Typical Insertion Loss and Isolation vs. Frequency



# OSCILLATORS

# ERAVANT OSCILLATORS

The focus of this presentation section is to introduce the **Eravant** oscillator product family by highlighting some representative models. There are several hundred standard models available to satisfy all 5G system applications. The oscillator family includes the following types:

- Dielectric Resonator Oscillator
- Mechanical Tuned Gunn Oscillator
- Bias Tuned Gunn Oscillator
- Varactor Tuned Gunn Oscillator
- Phase Locked Oscillator
- Frequency Synthesizer
- Voltage Tuned Free Running Oscillator

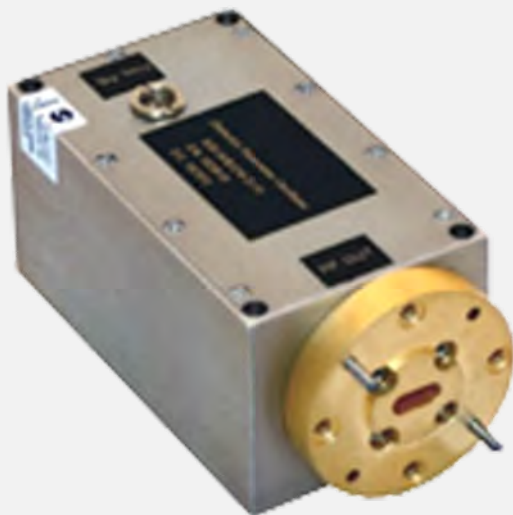
# DIELECTRIC RESONATOR OSCILLATOR

**SOD-37301213-22-S1**

37 GHz

## 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

# MECHANICALLY TUNED GUNN OSCILLATOR

**SOF-2820-M1**  
28 to 38 GHz

## Features:

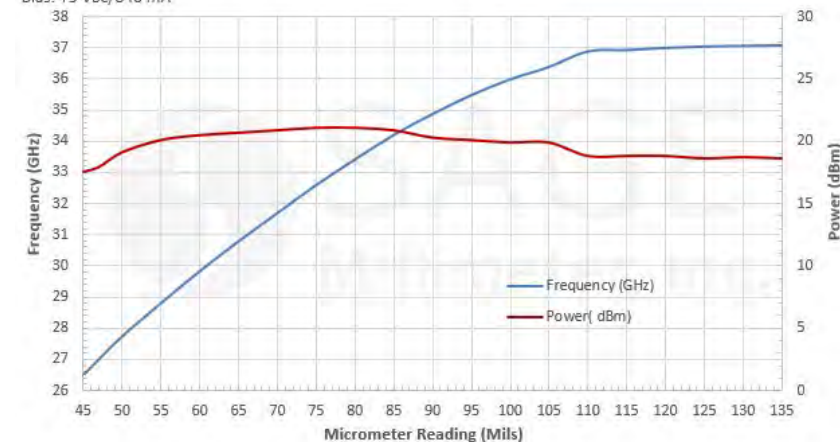
- 28 to 38 GHz
- Low AM/FM Noise and Harmonics
- Mechanical Tunable
- 50+ Models to Support 5G Bands



Parameter	Minimum	Typical	Maximum
Center Frequency	28 GHz	32 GHz	38 GHz
Mechanical Tuning Range		±5 GHz	
Output Power		+18 dBm	
Bias Voltage		+5.0 V <sub>DC</sub>	+5.5 V <sub>DC</sub>
Bias Current		850 mA	
Specification Temperature		+25°C	
Case Temperature	0°C		+50°C

Frequency and Power Output vs. Micrometer Reading

Bias: +5 V<sub>DC</sub>/846 mA





# BIAS TUNED GUNN OSCILLATOR

**SOB-94301317-10-S1**

94 GHz

## Features:

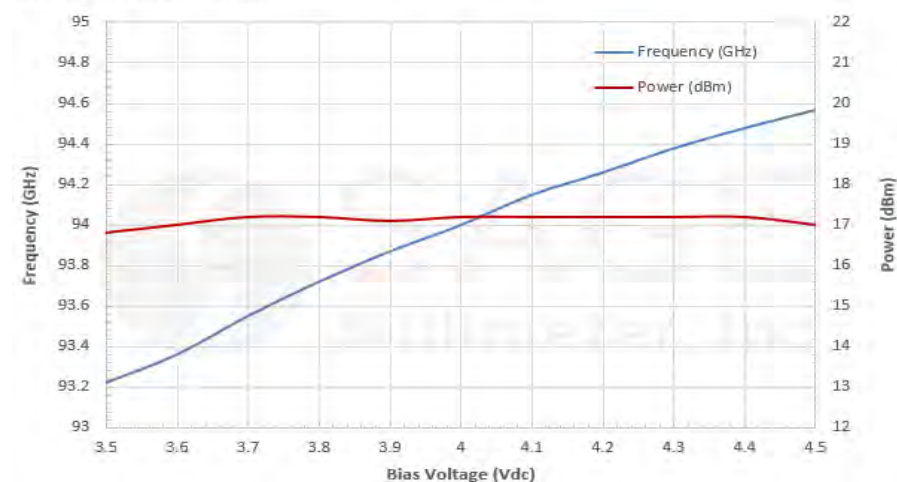
- 94 GHz
- Low AM/FM Noise and Harmonics
- Mechanical Tunable
- 10+ Models to Support 5G Bands



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

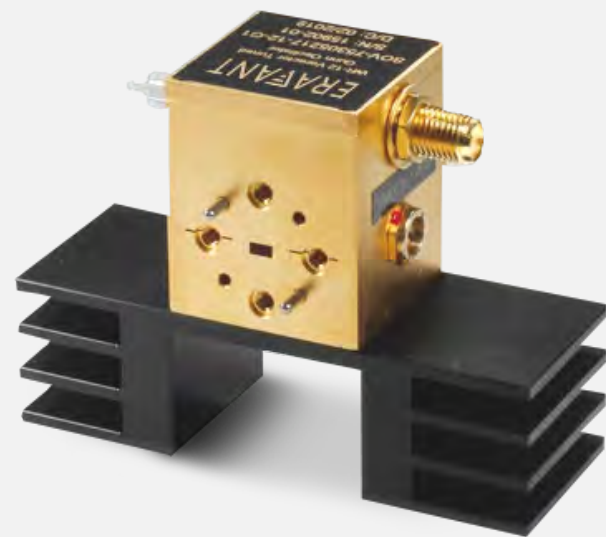


# VARACTOR GUNN OSCILLATOR

**SOV-94306310-10-G1**  
94 GHz

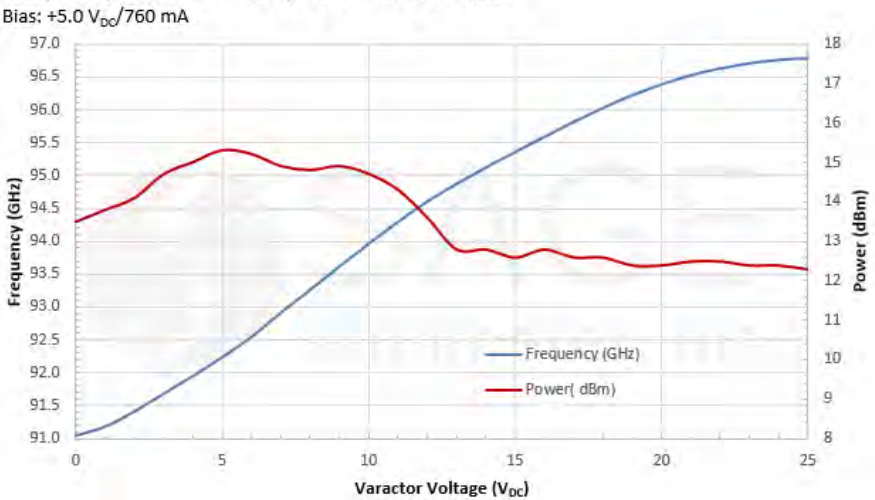
**Features:**

- 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**



# PHASE LOCKED OSCILLATOR

**SOP-28310115-KF-I1**

28 GHz

## Features:

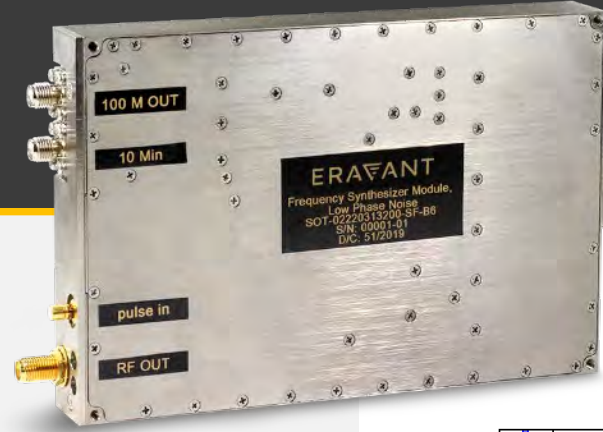
- 28 GHz
- Low Phase Noise
- Internal/External Referenced
- 50+ Models to Support 5G Bands



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

# FREQUENCY SYNTHESIZER

**SOT-02220313200-SF-B6**  
200 MHz to 20 GHz

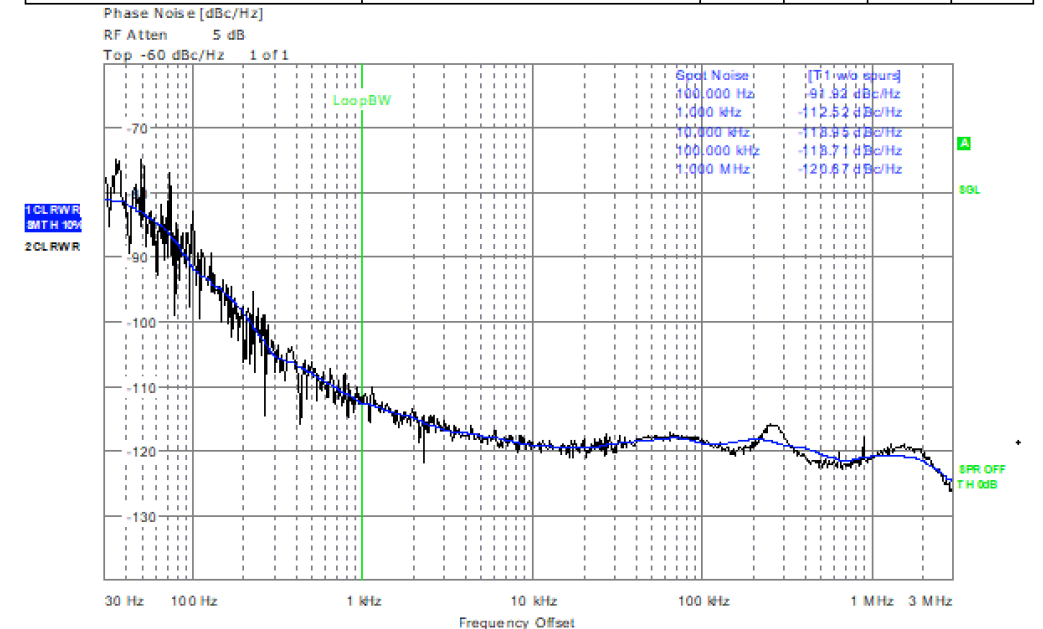


## Features:

- 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 Detector 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	



# VOLTAGE TUNED OSCILLATOR

**SOW-15303315-SM-S1-H**  
13 to 17 GHz

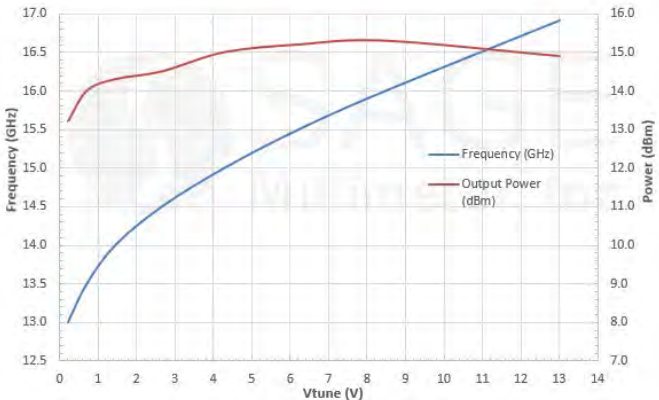
**Features:**

- 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



# RECEIVER, TRANSMITTER, TRANSCEIVER, MODULES



# RECEIVER, TRANSMITTER, TRANSCIVER, MODULES

The focus of this presentation section is to introduce the **Eravant** integrated module product family by highlighting some representative models. There are many standard models available to satisfy all 5G system applications. The integrated module family includes the following types, which can be found [here](#). Custom modules are available upon request.

- Receiver Module
- Transmitter Module
- Transceiver Module

# RECEIVER MODULE

**SSR-9430434030-10-M1-D**

92 to 96 GHz



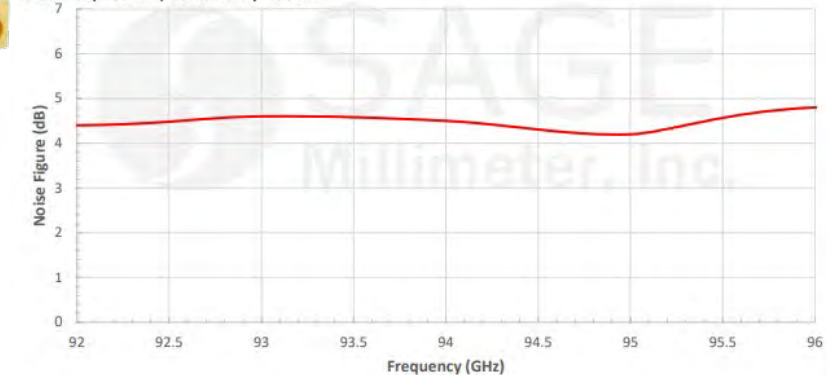
## Features:

- 92 to 96 GHz
- Compact Size
- Fully Integrated
- More than 20 Models to Support 5G

Parameter	Minimum	Typical	Maximum
RF Input Frequency	92 GHz		96 GHz
RF Input Power		-60 dBm	-24 dBm
Noise Figure		4 dB	
IF Output Frequency	4 GHz		8 GHz
I/Q Phase Unbalance		±15°	
I/Q Amplitude Unbalance		±1.0 dB	
RF to IF Conversion Gain		30 dB	
LO Frequency		11 GHz	
LO Input Power	0 dBm	+5 dBm	+10 dBm
DC Voltage Supply	+6 V <sub>DC</sub>	+8 V <sub>DC</sub>	+12 V <sub>DC</sub>
Current Supply		400 mA	
Specification Temperature		+ 25 °C	
Operating Temperature	0 °C		+ 50 °C

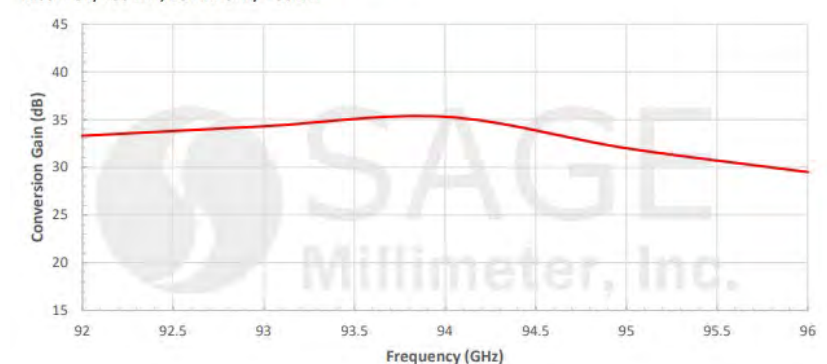
**Typical Noise Figure vs. Frequency**

Bias: +8V/400 mA, LO: 11 GHz/+ 5dBm



**Typical Conversion Gain vs. Frequency**

Bias: +8V/400 mA, LO: 11 GHz/+ 5dBm



# TRANSMITTER MODULE

**SST-9430432030-10-M1-D**

92 to 96 GHz

## Features:

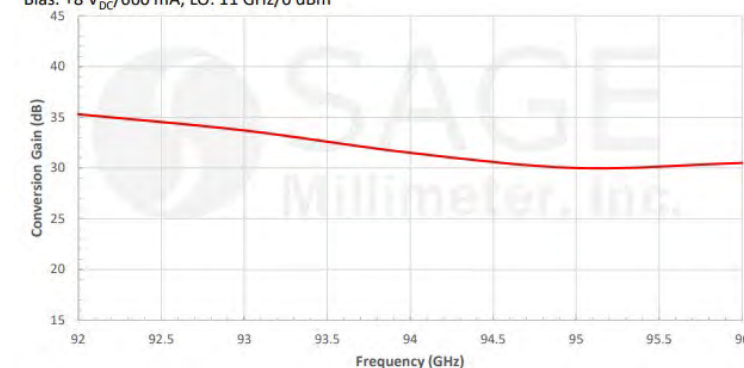
- 92 to 96 GHz
- Compact Size
- Fully Integrated
- More than 20 Models to Support 5G



Parameter	Minimum	Typical	Maximum
RF Output Frequency	92 GHz		96 GHz
IF Input Frequency	4 GHz	6 GHz	8 GHz
IF Input Power		-20 dBm	+7 dBm
RF to IF Conversion Gain		30 dB	
RF Output $P_{1dB}/P_{sat}$		+20/+24 dBm	
LO Frequency		11.00 GHz	
LO Input Power		0 dBm	+10 dBm
LO DC Voltage Supply	+6 V <sub>DC</sub>	+8 V <sub>DC</sub>	+16 V <sub>DC</sub>
LO Current Supply		750 mA	
Specification Temperature		+ 25 °C	
Operating Temperature	0 °C		+ 50 °C

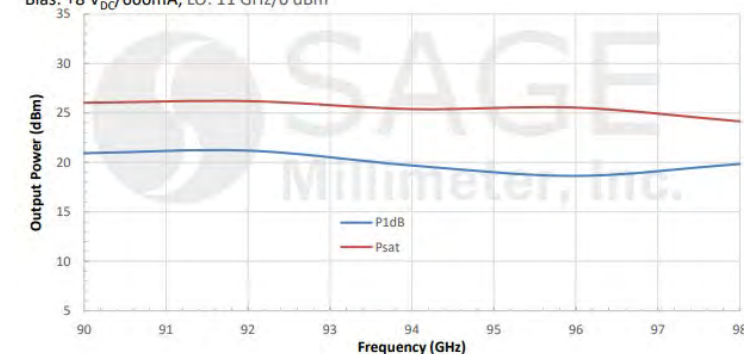
**Typical Conversion Gain vs. Frequency**

Bias: +8 V<sub>DC</sub>/660 mA, LO: 11 GHz/0 dBm



**Output Power vs. Frequency**

Bias: +8 V<sub>DC</sub>/660mA, LO: 11 GHz/0 dBm

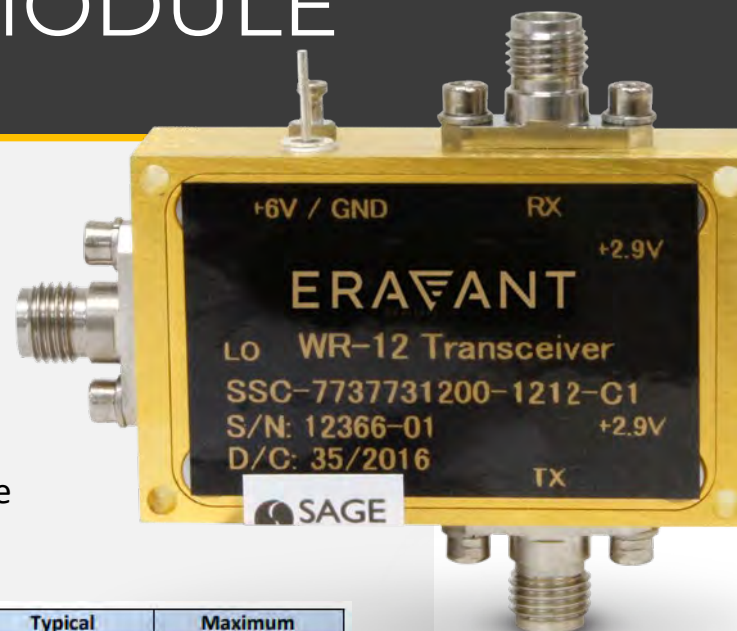


# TRANSCEIVER MODULE

SSC-7737731200-1212-C1  
76 to 78 GHz

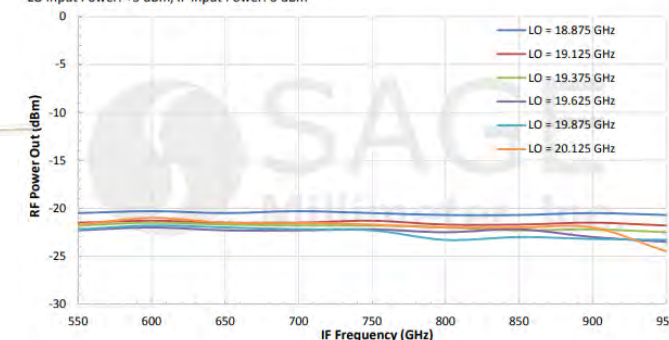
## Features:

- 76 to 78 GHz
- Compact Size
- Fully Integrated
- Custom Modules Available



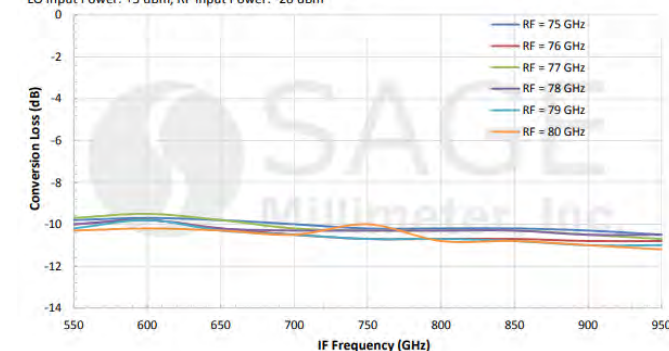
Typical TX Output Power vs. IF Frequency

LO Multiplier Bias: +6 V<sub>DC</sub>/300 mA, Mixer Bias: +2.9 V<sub>DC</sub>/2 mA  
LO Input Power: +5 dBm, IF Input Power: 0 dBm



Typical RX Conversion Loss vs. IF Frequency

LO Multiplier Bias: +6 V<sub>DC</sub>/300 mA, Mixer Bias: +2.9 V<sub>DC</sub>/2 mA  
LO Input Power: +5 dBm, RF Input Power: -20 dBm



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	

# PASSIVE WAVEGUIDE

# ERAVANT PASSIVE WAVEGUIDE

The focus of this presentation section is to introduce the **Eravant** passive waveguide product family by highlighting some representative models. There are several hundred standard models available to satisfy all 5G system applications. The passive waveguide family can be found [here](#) and [here](#) and includes the following types:

- Waveguide to Coaxial Adapter
- Waveguide Taper and Mode Transition
- Waveguide Directional Coupler
- Waveguide Crossguide Coupler
- Waveguide Power Divider
- Waveguide Magic Tee
- Waveguide Load
- Waveguide, Flexible
- Waveguide, Rigid
- Waveguide Connector - Uni-Guide



# WAVEGUIDE TO COAX ADAPTER, RIGHT ANGLE

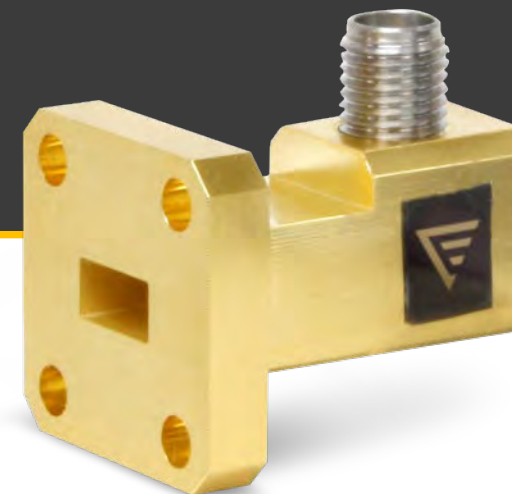
## SWC-28KF-R1 & SWC-28KM-R1

### Features:

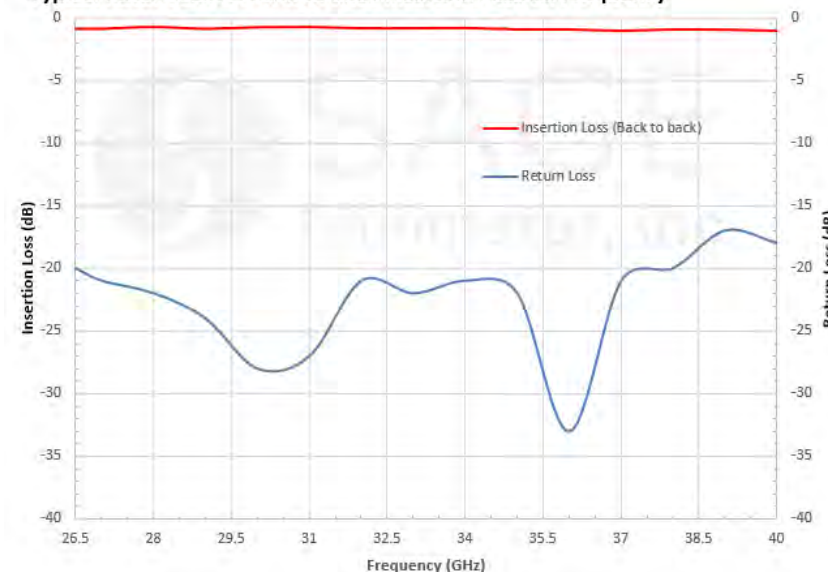
- 26 to 40 GHz
- Right Angle
- Low Insertion Loss and VSWR
- 60+ Models to Support 5G Bands
- Frequency up to 130 GHz

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.



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



# WAVEGUIDE TO COAX ADAPTER, RIGHT ANGLE

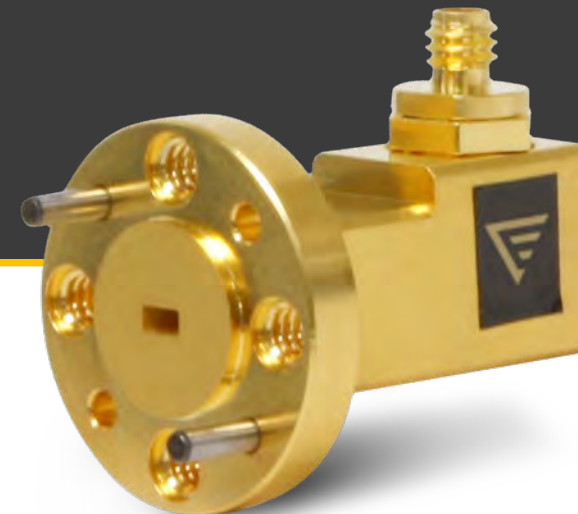
## SWC-101F-R1 & SWC-101M-R1

### Features:

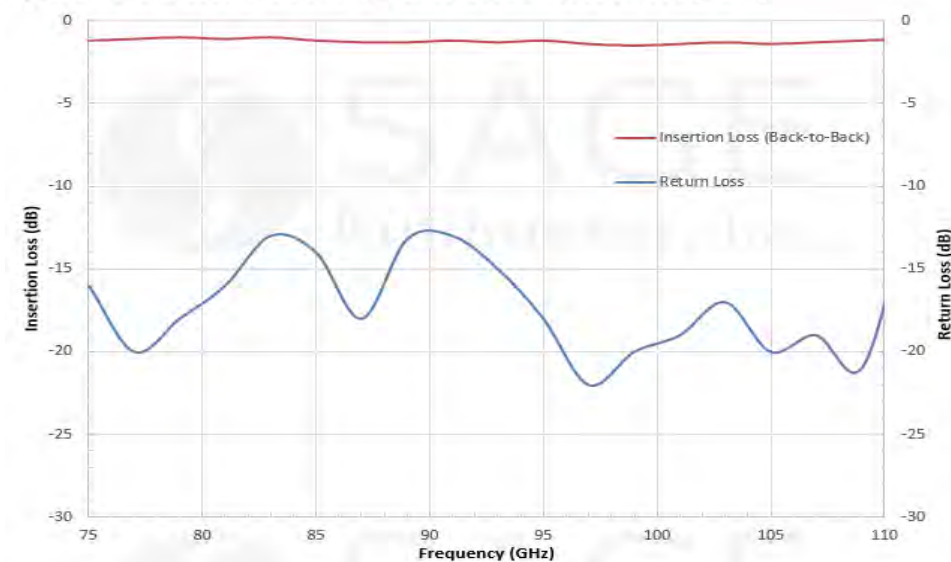
- 75 to 110 GHz
- Right Angle
- Low Insertion Loss and VSWR
- 50+ Models to Support 5G Bands
- Frequency up to 130 GHz

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 COAX ADAPTER, END LAUNCH

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

### Features:

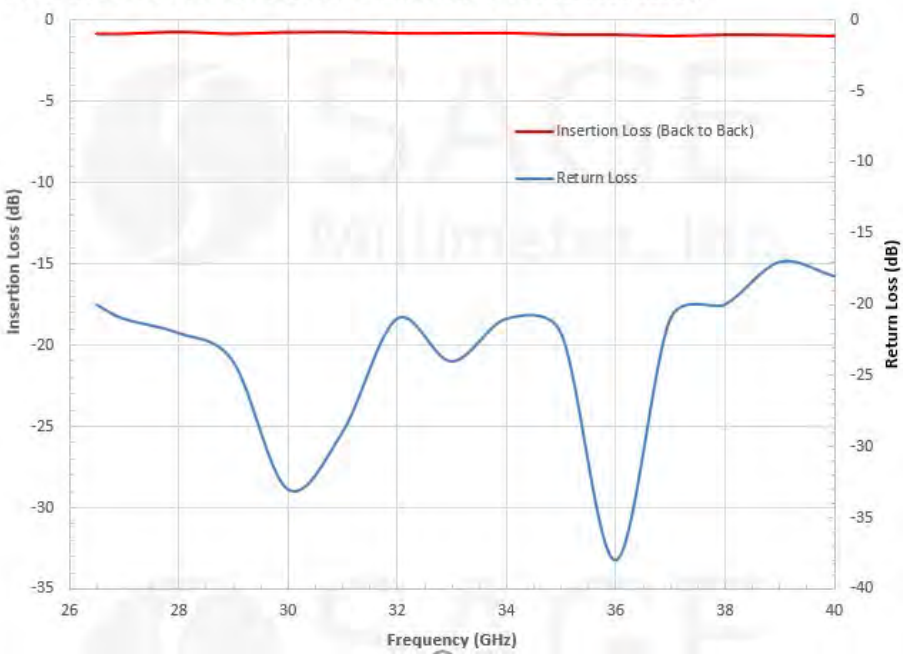
- 26 to 40 GHz
- End Launch
- Low Insertion Loss and VSWR
- 60+ Models to Support 5G Bands
- Frequency up to 130 GHz

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 COAX ADAPTER, END LAUNCH

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

### Features:

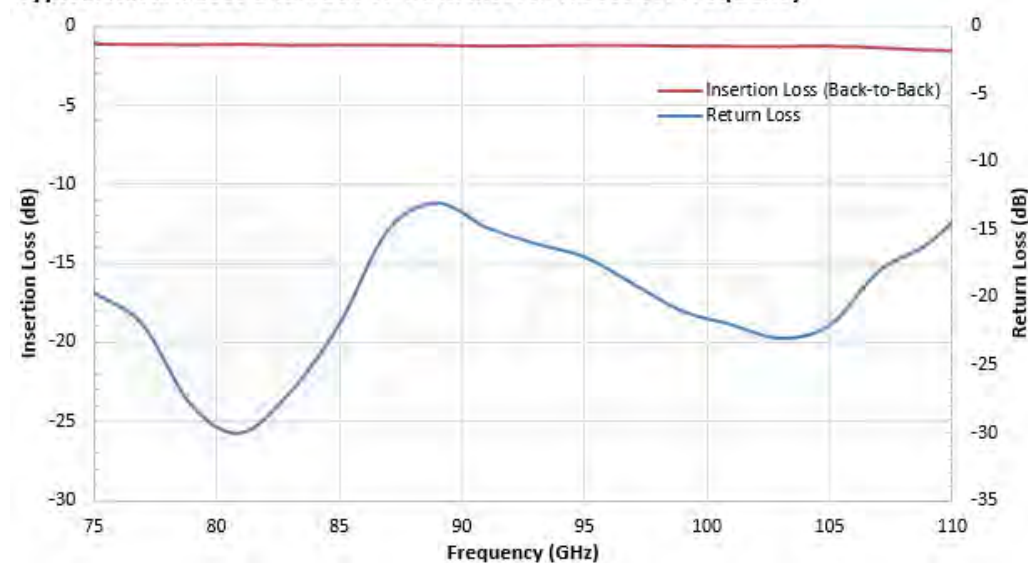
- 75 to 110 GHz
- End Launch
- Low Insertion Loss and VSWR
- 50+ Models to Support 5G Bands
- Frequency up to 130 GHz

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

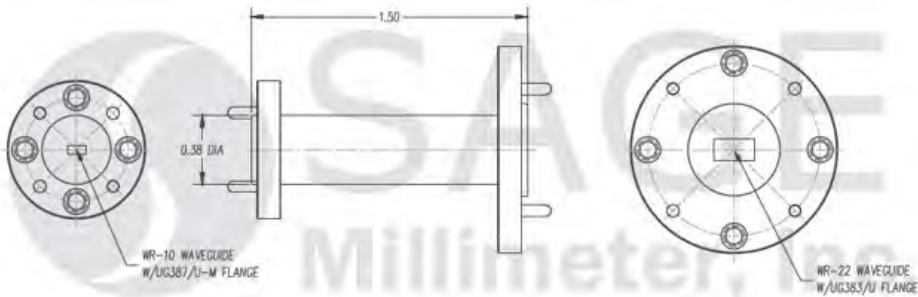
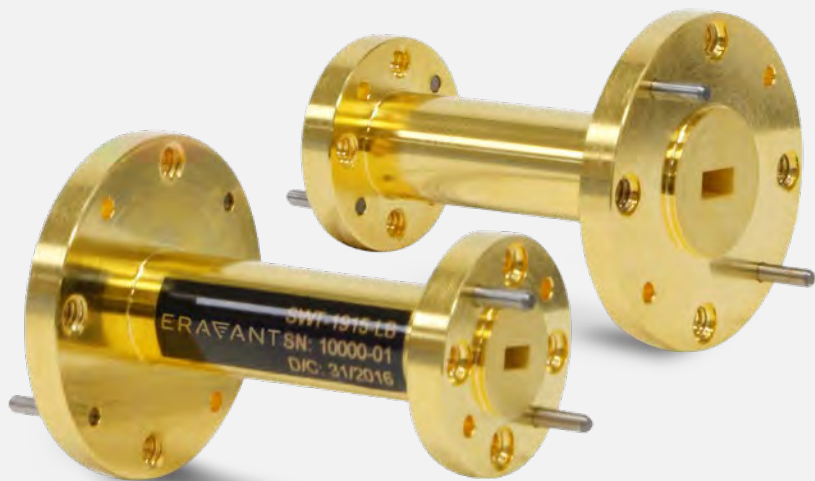


# WAVEGUIDE TAPER TRANSITION

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

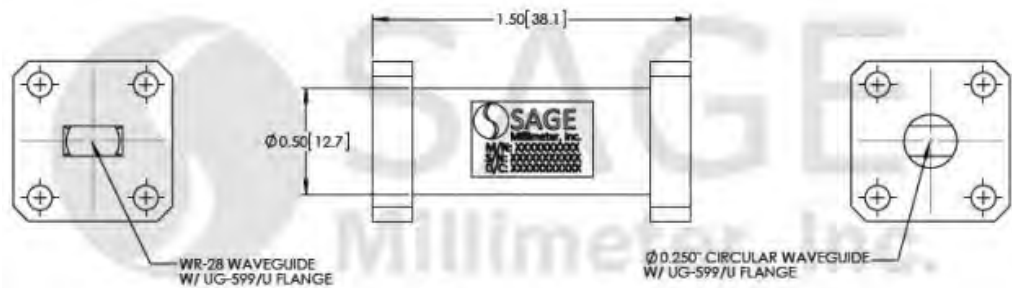


# WAVEGUIDE MODE TRANSITION

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 DIRECTIONAL COUPLER

**SWD-1040H-28-SB**

24 to 42 GHz

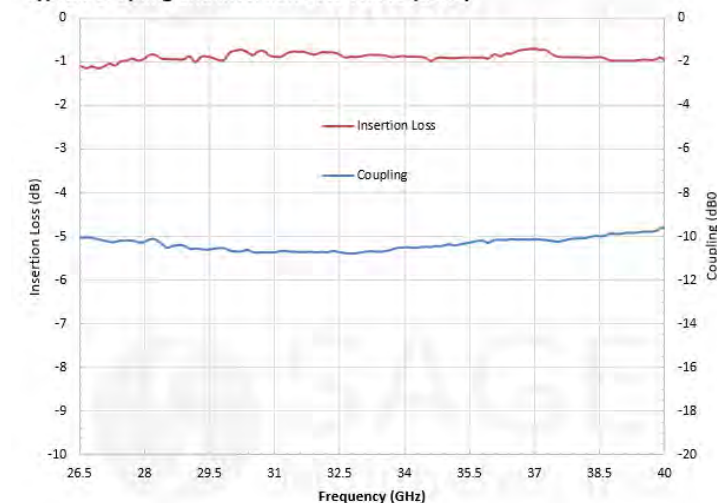
## Features:

- 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

**SWD-1040H-15-SB**

50 to 75 GHz

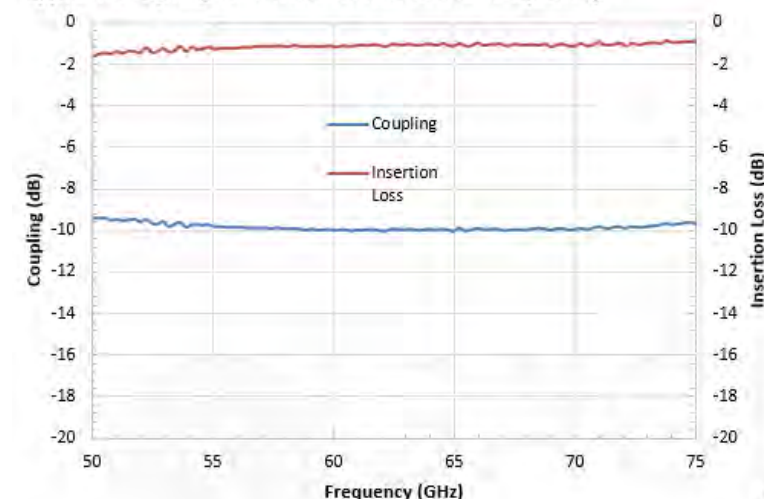
## Features:

- 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 CROSSGUIDE COUPLER

**SWX-31339330-28-4B**

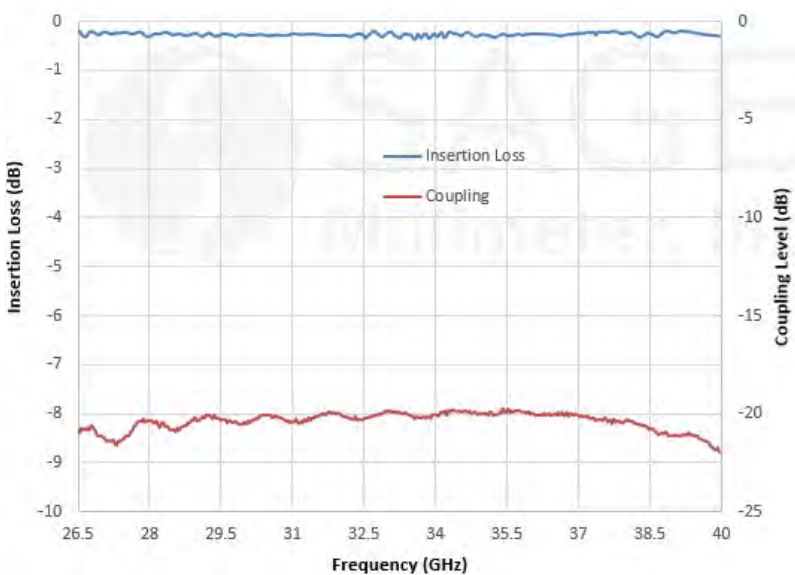
31 to 39 GHz

**Features:**

- 31 to 39 GHz
- 20, 30 and 40 dB
- 3 Port and 4 Port
- 50+ Models to Support 5G Bands
- Frequency up to 110 GHz



Parameter	Minimum	Typical	Maximum
Frequency	31 GHz		39 GHz
Coupling Level		20 dB	
Insertion Loss		0.4 dB	
Directivity		15 dB	
Input Return Loss		20 dB	
Output Return Loss		20 dB	
Specification Temperature		+25 °C	
Operating Temperature	-40 °C		+85 °C



# WAVEGUIDE CROSSGUIDE COUPLER

**SWX-40360320-19-4B**

40 to 60 GHz

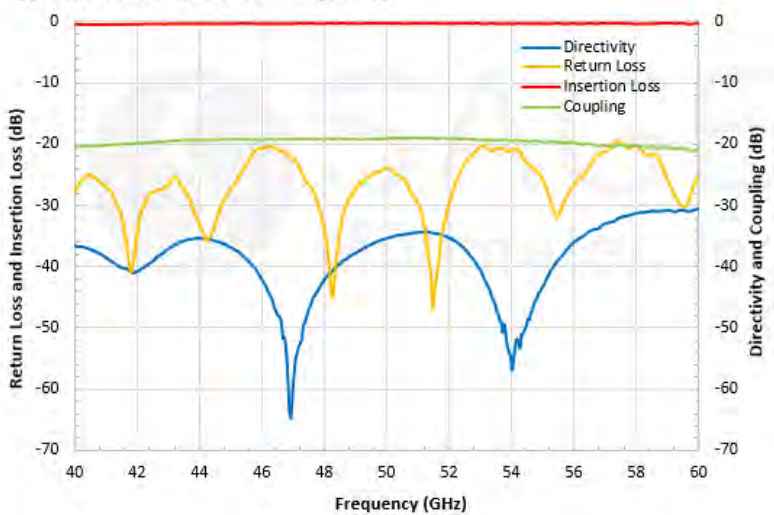
**Features:**

- 40 to 60 GHz
- 20, 30 and 40 dB
- 3 Port and 4 Port
- 50+ Models to Support 5G Bands
- Frequency up to 110 GHz



Parameter	Minimum	Typical	Maximum
Frequency Range	40 GHz		60 GHz
Coupling Level		20 dB	
Insertion Loss		0.5 dB	
Directivity		20 dB	
Input/Output VSWR		1.1:1	
Specification Temperature		+25°C	
Operating Temperature	-40°C		+85°C

Typical Performance vs. Frequency



# WAVEGUIDE POWER DIVIDER, 2 WAY, RIGHT ANGLE

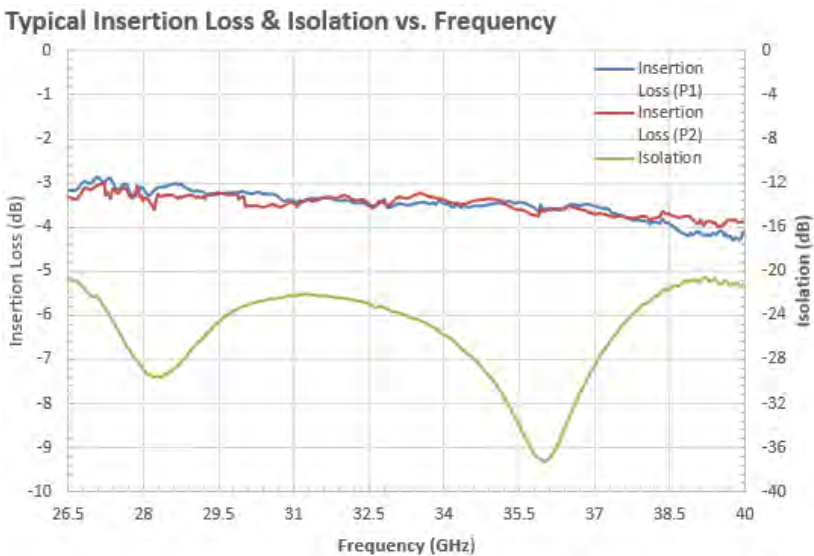
**SWP-27340302-28-S1**  
26.5 to 40 GHz

**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





# WAVEGUIDE POWER DIVIDER, 2 WAY, RIGHT ANGLE

**SWP-50375302-15-S1**

50 to 75 GHz

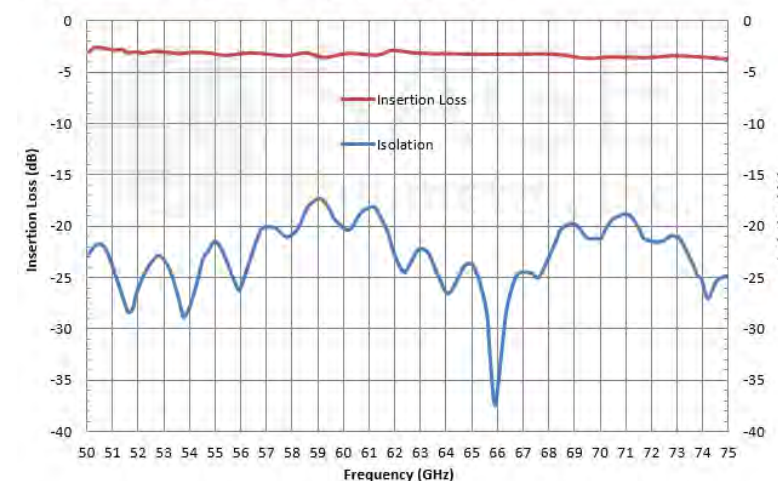
## Features:

- 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	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





# WAVEGUIDE POWER DIVIDER, 2 WAY, IN-LINE

**SWP-50375302-15-E2**  
50 to 75 GHz

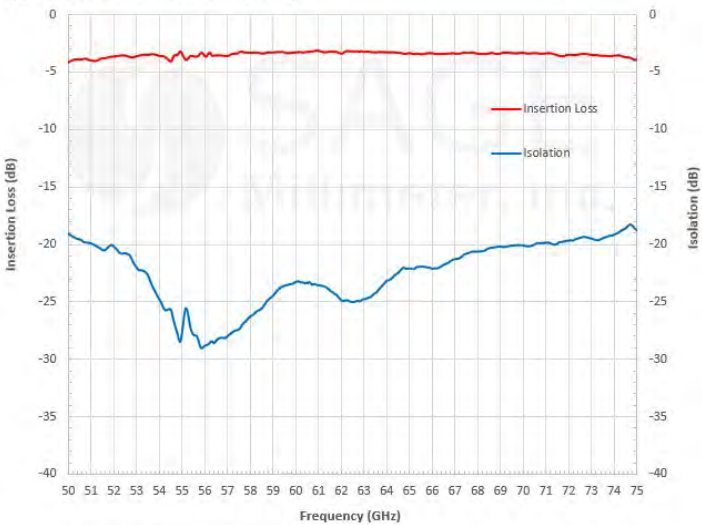
**Features:**

- 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



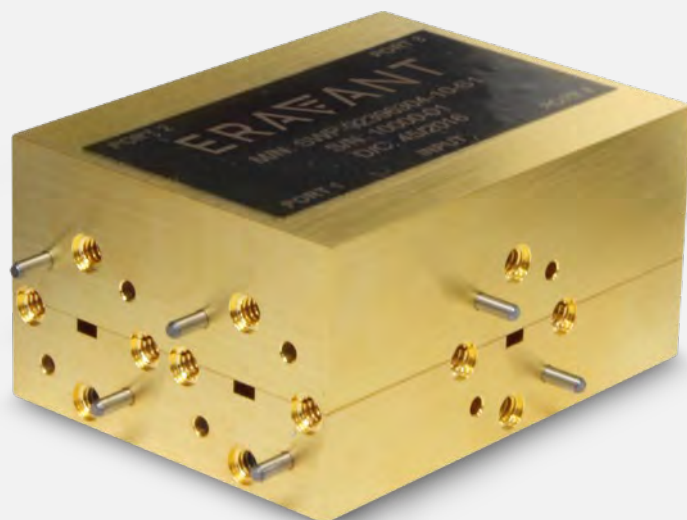
# WAVEGUIDE POWER DIVIDER, 4 WAY, IN-LINE

**SWP-62386304-12-S1**

62 to 86 GHz

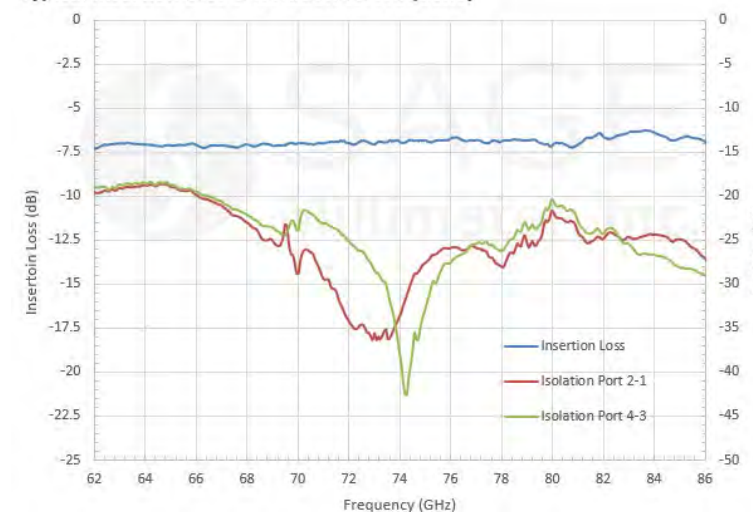
## Features:

- 62 to 86 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	62 GHz		86 GHz
Insertion Loss		0.8 dB	
Amplitude Unbalance			$\pm 0.4$ dB
Port Isolation, Adjacent Port		20 dB	
Port VSWR		1.5:1	
Specification Temperature		+25°C	
Operating Temperature	-40°C		+85°C

Typical Insertion Loss & Isolation vs. Frequency

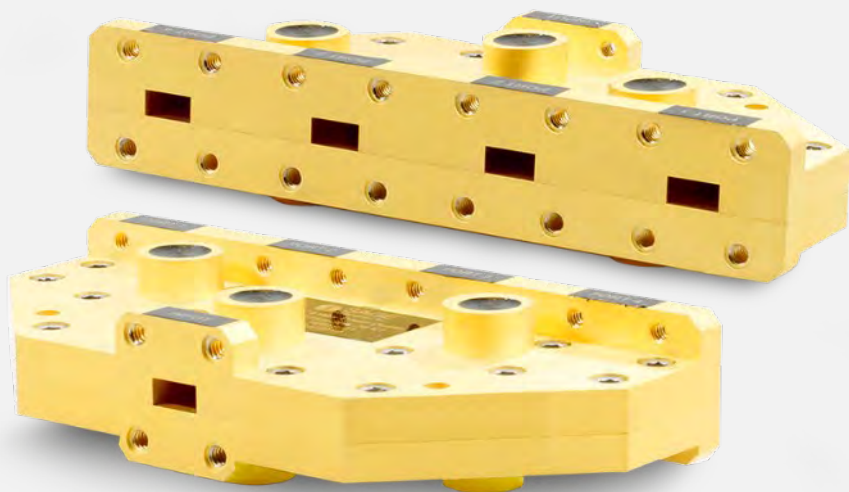


# WAVEGUIDE POWER DIVIDER, 4 WAY, IN-LINE

**SWP-30340304-28-E1**  
30 to 40 GHz

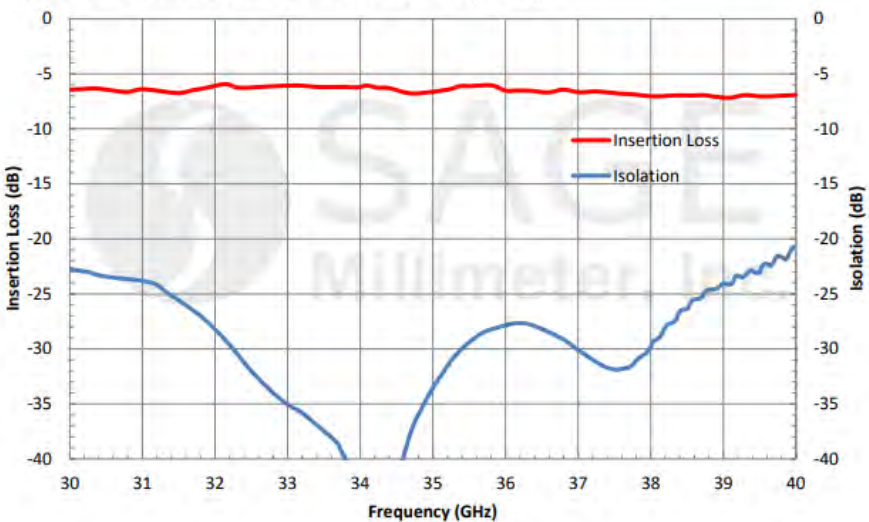
**Features:**

- 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**

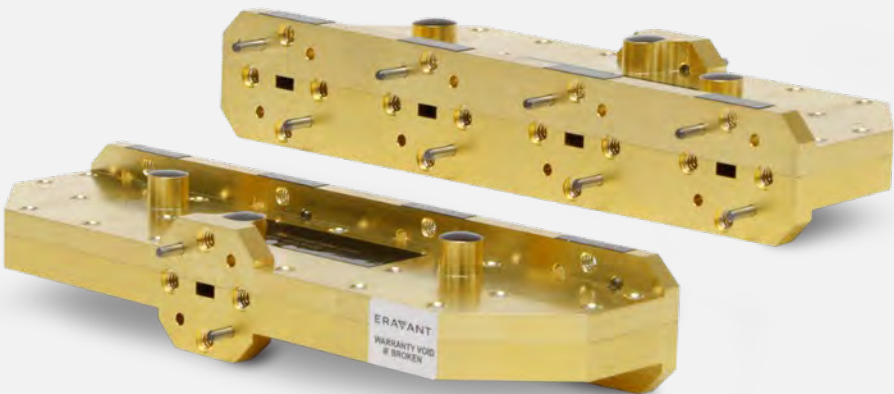


# WAVEGUIDE POWER DIVIDER, 4 WAY, IN-LINE

**SWP-50375304-15-E1**  
50 to 75 GHz

**Features:**

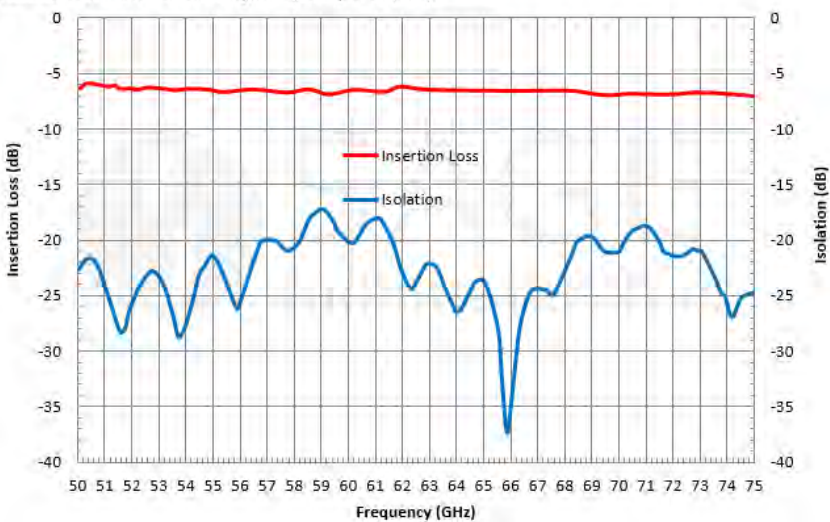
- 50 to 75 GHz
- Right Angle and End Launch
- 2-Way, 4-Way, 8-Way and 16-Way
- 50+ Models to Support 5G Bands
- Frequency up to 110 GHz



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)





# WAVEGUIDE POWER DIVIDER, 8 WAY, IN-LINE

**SWP-29331308-28-E1**  
28 to 31 GHz

**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

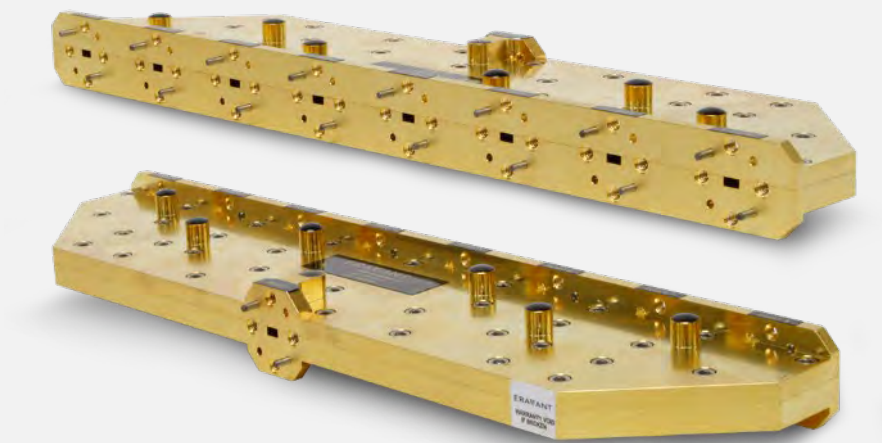


# WAVEGUIDE POWER DIVIDER, 8 WAY, IN-LINE

**SWP-50366308-15-E1**  
50 to 66 GHz

**Features:**

- 50 to 66 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

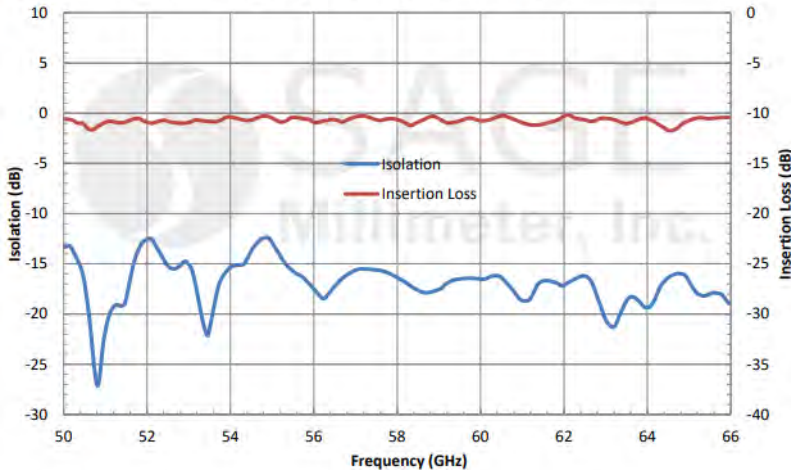


Parameter	Minimum	Typical	Maximum
Frequency	50 GHz		66 GHz
Power Unbalance		±0.4 dB	±0.5 dB
Insertion Loss*		1.7 dB	
Isolation (Adjacent Ports)		20 dB	
Isolation (Non Adjacent Ports)	20 dB	30 dB	
Input/Output VSWR			1.5:1
Specification Temperature		+25°C	
Operating Temperature	-40°C		+85°C

Note: The insertion loss does not include the power splitting loss.

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

Isolation was tested between adjacent ports (i.e. 1-2, 3-4, 5-6 and 7-8)



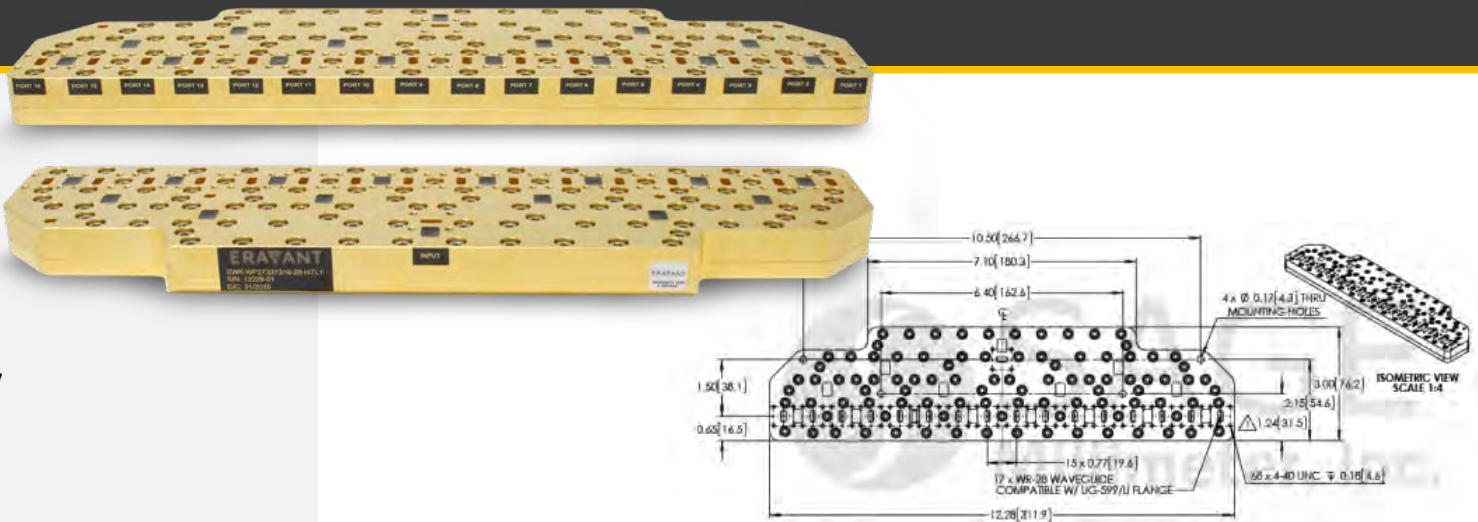


# WAVEGUIDE POWER DIVIDER, 16 WAY, IN-LINE

**SWP-27335316-28-C1**  
50 to 66 GHz

## Features:

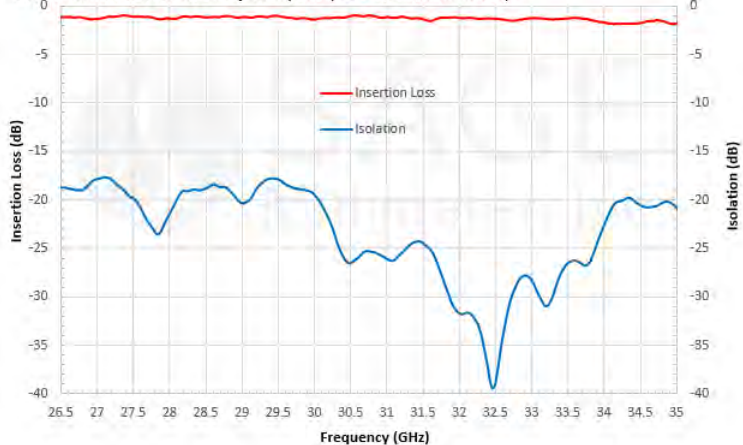
- 50 to 66 GHz
- Right Angle and End Launch
- 2-Way, 4-Way, 8-Way and 16-Way
- 50+ Models to Support 5G Bands
- Frequency up to 110 GHz



Parameter	Minimum	Typical	Maximum
Frequency	26.5 GHz		35 GHz
Insertion Loss		1.2 dB	
Power Unbalance		±0.2 dB	
Port Isolation		20 dB	
Specification Temperature		+25°C	
Operating Temperature	-40°C		+85°C

## Typical Isolation and Insertion Loss vs. Frequency

Isolation was tested between adjacent ports (i.e. 1-2, 3-4, 5-6 and 7-8)



# MAGIC TEE

**SWM-33350320-22-SB**

33 to 50 GHz

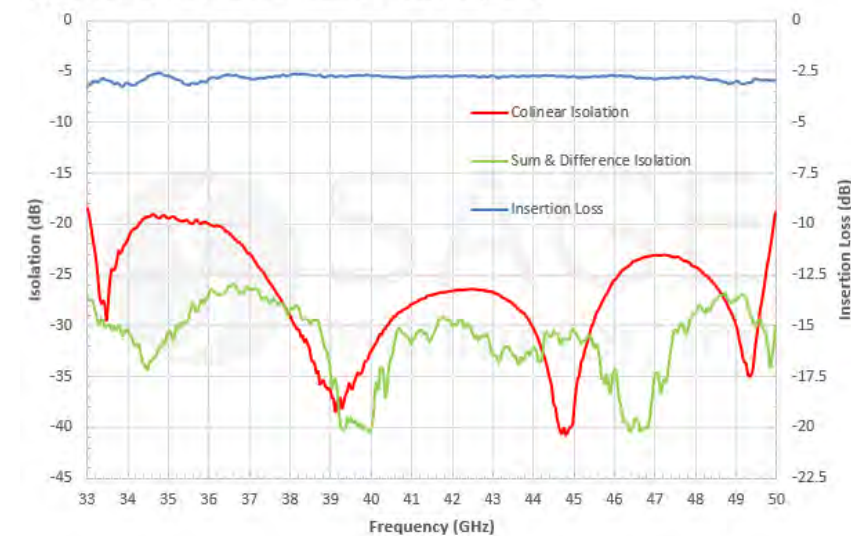
## Features:

- 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

**SWM-75311420-10-SB**

75 to 110 GHz

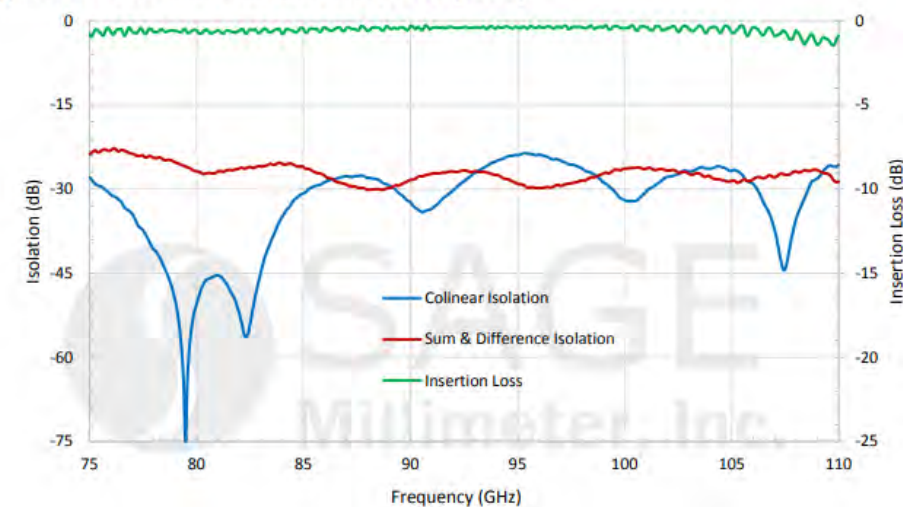
## Features:

- 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 LOAD, FIXED, LOW POWER

**SWL-1527-S1**  
50 to 75 GHz

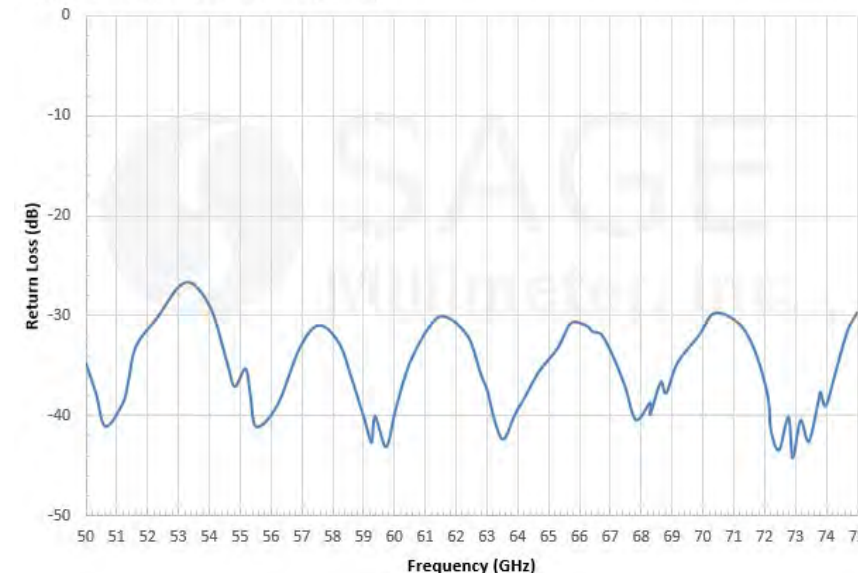
## Features:

- 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

**SWL-1537-S1**  
50 to 75 GHz

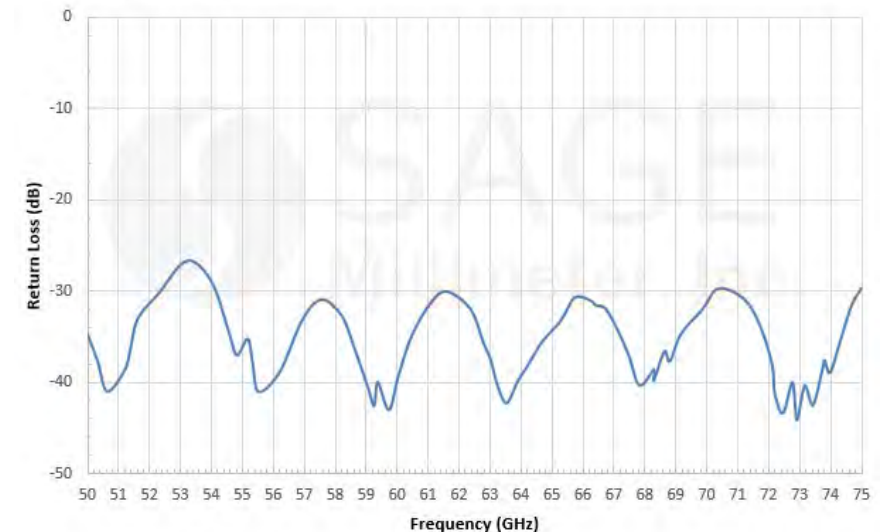
## Features:

- 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





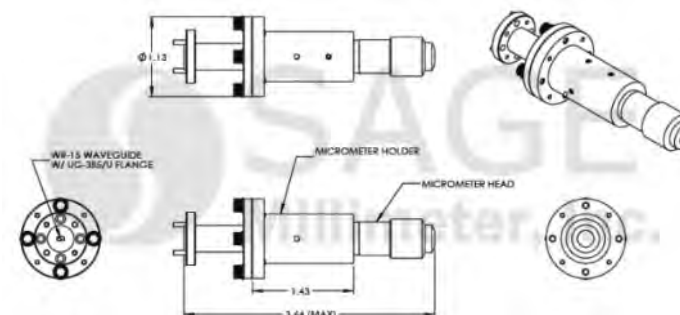
# WAVEGUIDE LOAD, TUNABLE, LOW POWER

**SWL-1523-T1**  
50 to 75 GHz

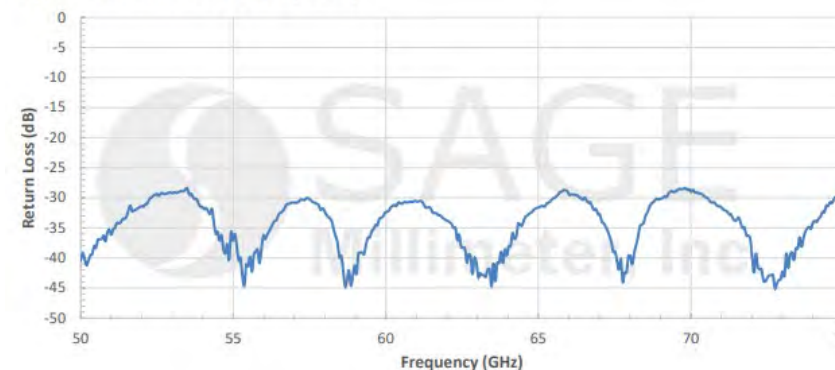
## Features:

- 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
Return Loss		30 dB	
Power Handling		+23 dBm	+25 dBm
Specification Temperature		+25 °C	
Operating Temperature	-40 °C		+85 °C



Typical Return Loss vs Frequency





# WAVEGUIDE, FLEXIBLE

**SWG-28059-FB-FT-G**

50 to 75 GHz

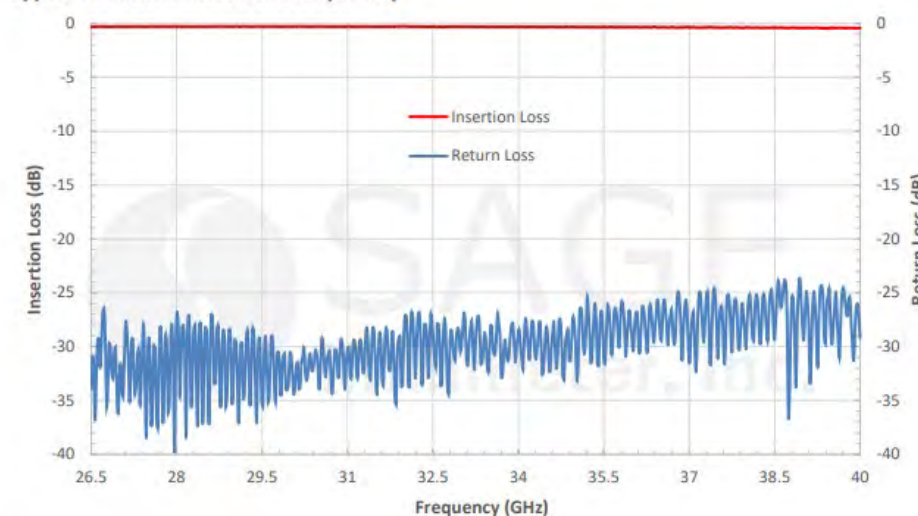
## Features:

- 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

**SWG-22354-FB-FT-A-G**

35 to 50 GHz

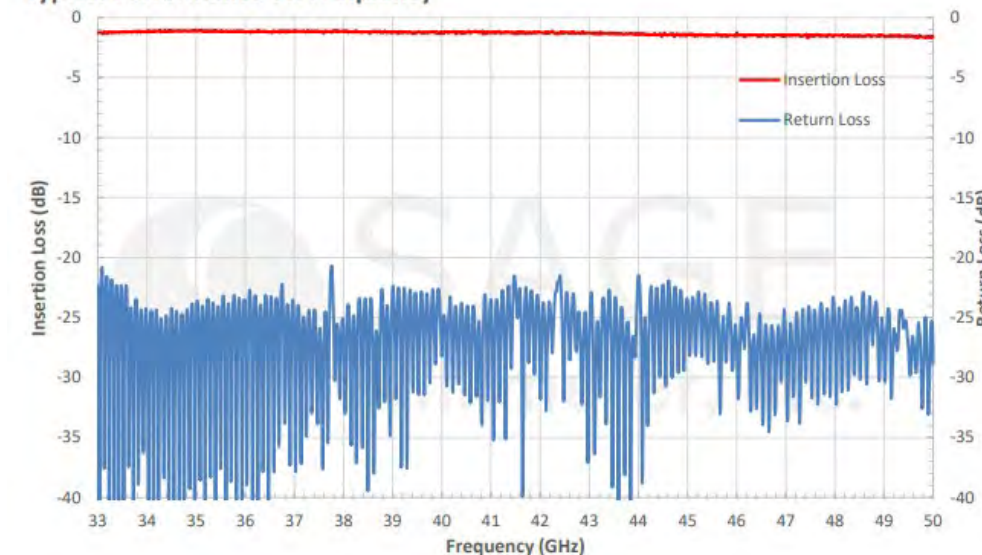
## Features:

- 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

**SWG-10020-FB-F**

75 to 110 GHz

## 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



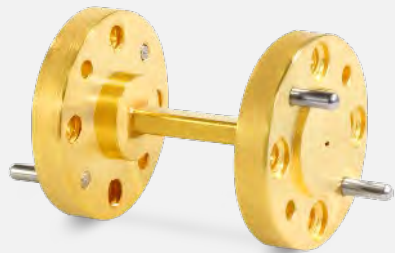
Parameter	Minimum	Typical	Maximum
Frequency	75 GHz		110 GHz
Insertion Loss		1.5 dB	
Return Loss	10 dB	15 dB	
Power Handling (CW/PK)		15 W / 1 kW	30 W / 2.5 kW
Specification Temperature		+25 °C	
Operation Temperature	-40 °C		+85 °C



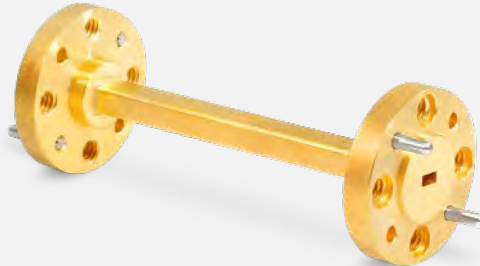
# WAVEGUIDE, RIGID

## Features:

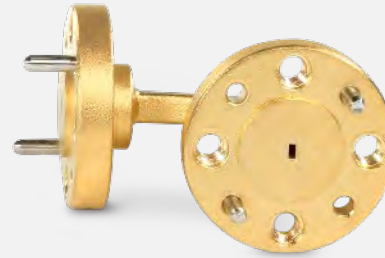
- WR-42 to WR-03
- Various Length
- 500+ Models to Support 5G Bands
- Frequency up to 325 GHz



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



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



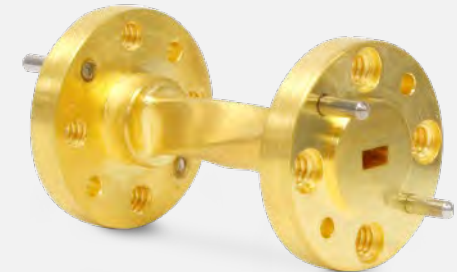
**SWB-06090-EB**  
WR-06 E-Plane Bend, 90°



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



**SWB-10090-TB**  
WR-10 Twist, 90°



**SWB-12090-TB**  
WR-12 Twist, 90°

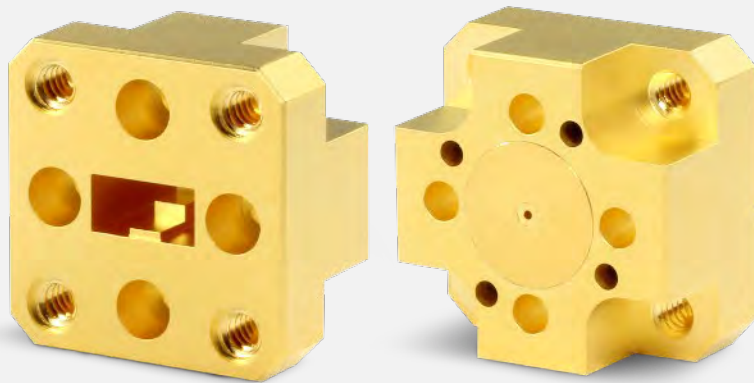
# WAVEGUIDE CONNECTOR, UNI-GUIDE™

**SUF-2812-480-S1**

26.5 to 40 GHz

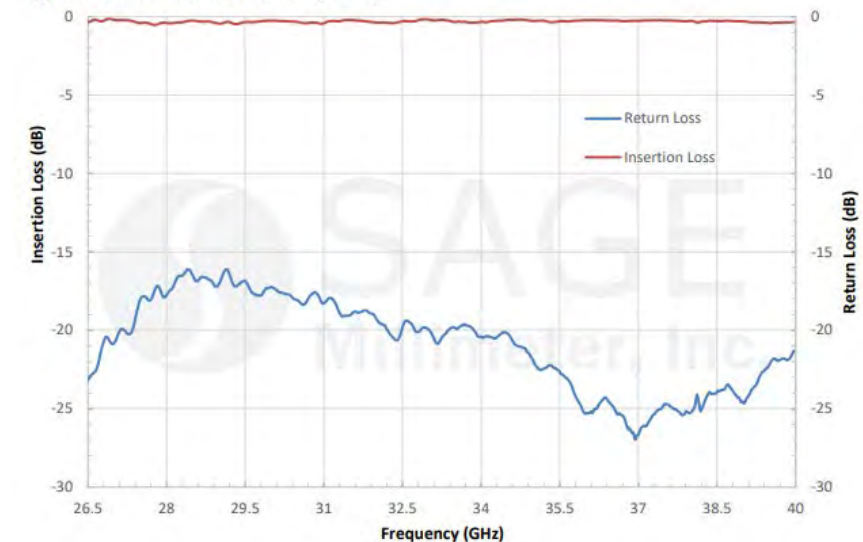
## Features:

- 26.5 to 40 GHz
- WR-28, WR-22 and WR-19 Bands
- 3 Models to Support 5G Bands
- Field Replicable
- 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™

**SUF-2212-480-S1**

33 to 50 GHz

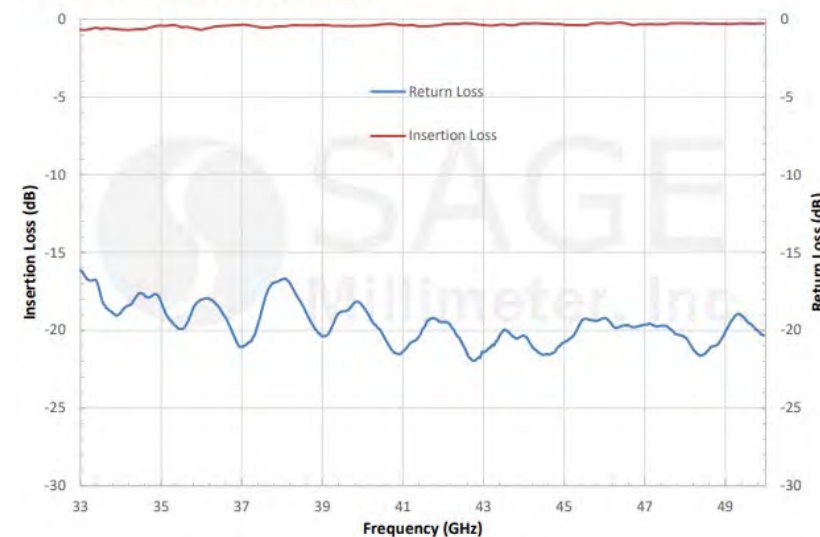
## Features:

- 33 to 50 GHz
- WR-28, WR-22 and WR-19 Bands
- 3 Models to Support 5G Bands
- Field Replicable
- 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™

**SUF-1912-480-S1**  
40 to 60 GHz

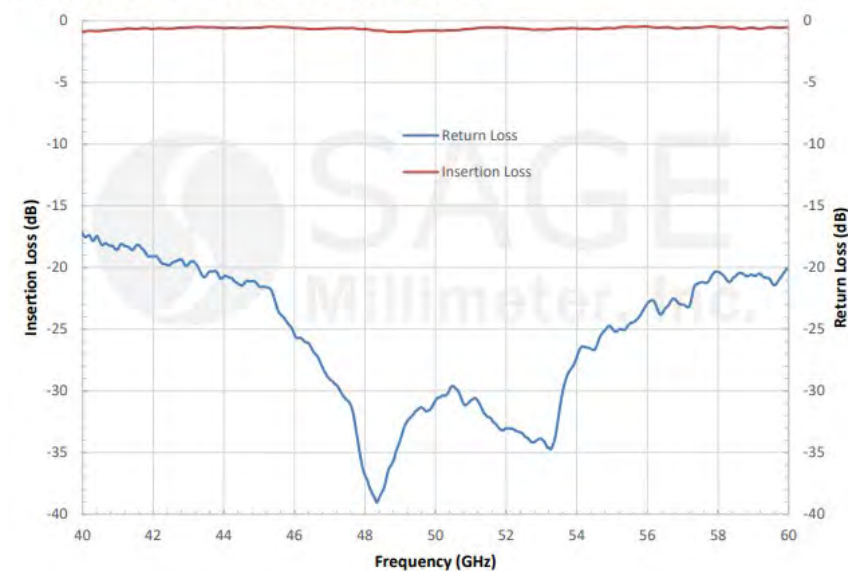
## Features:

- 40 to 60 GHz
- WR-28, WR-22 and WR-19 Bands
- 3 Models to Support 5G Bands
- Field Replicable
- 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



# PASSIVE COAXIAL PRODUCTS

# ERAVANT PASSIVE COAXIAL PRODUCTS

The focus of this presentation section is to introduce the **Eravant** passive coaxial product family by highlighting some representative models. There are several hundred standard models available to satisfy all 5G system applications. The passive coaxial family includes the following types:

- Coaxial Adapter
- Coaxial Attenuator
- Coaxial Matching Load
- Coaxial DC Block
- Coaxial Bias Tee
- Coaxial Filter
- Coaxial Directional Coupler
- Coaxial Power Divider
- Coaxial Hybrid Coupler
- Coaxial Cable

# 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

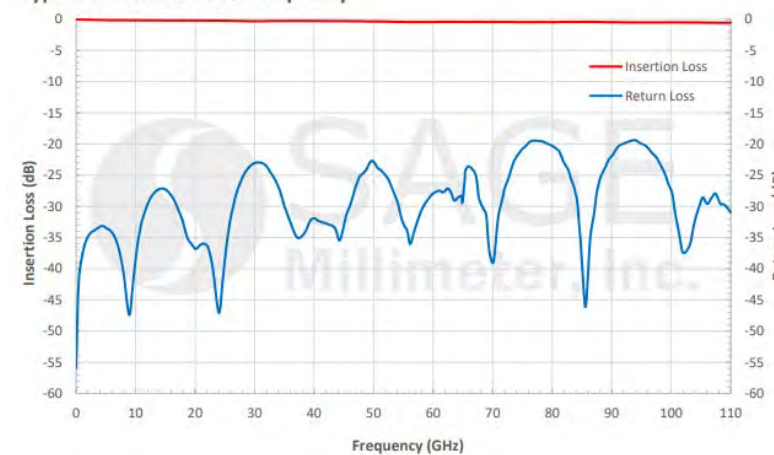


**SWC-101F-R1**  
DC to 110 GHz

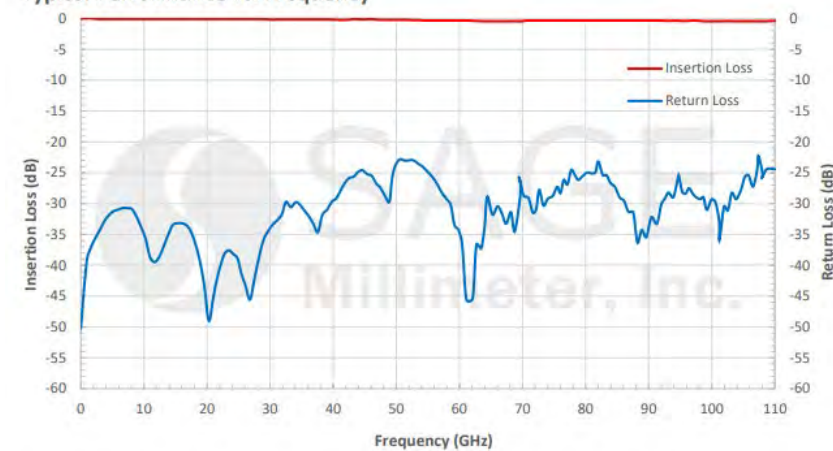


**SCT-1M1M-UB**  
DC to 110 GHz

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

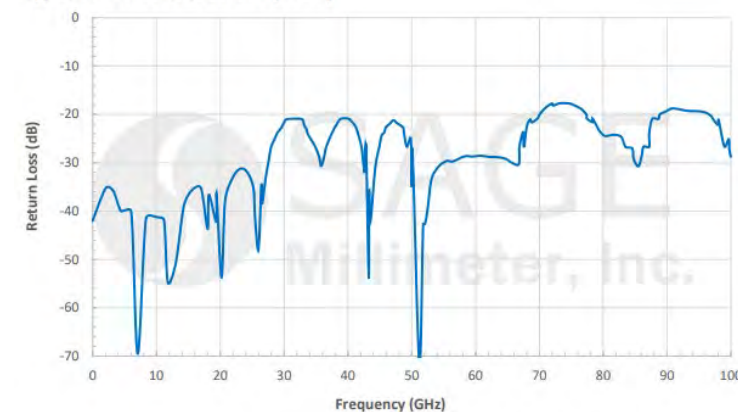


**SCT-AF1M-UB**  
DC to 100 GHz

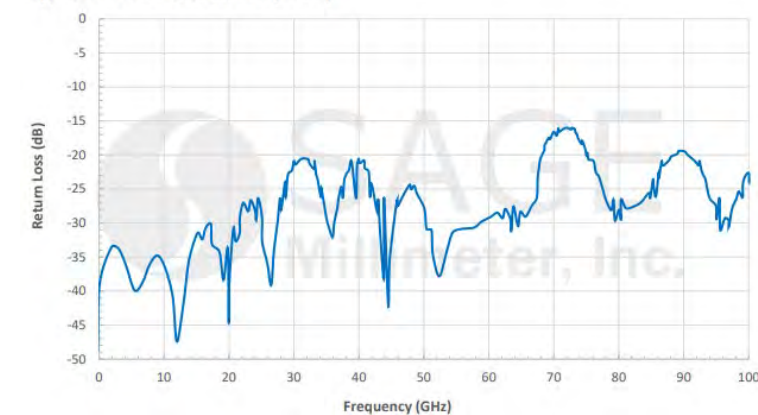


**SCT-AF1F-UB**  
DC to 100 GHz

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

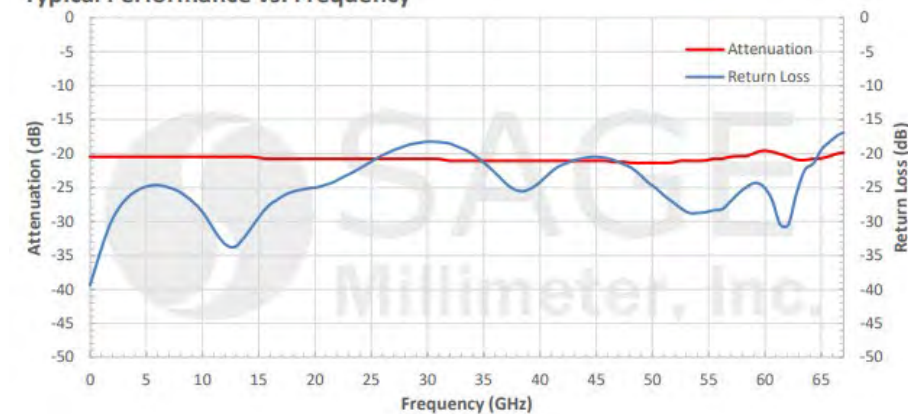


**SCA-20-VMVF-S9**  
DC to 67 GHz

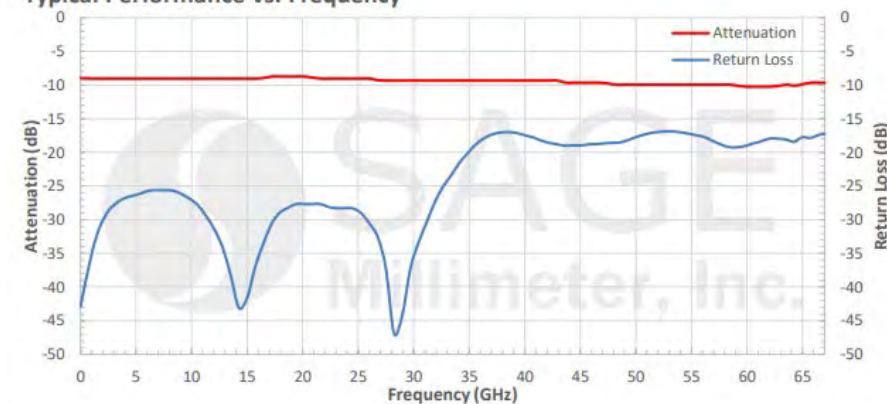


**SCA-10-VMVF-S9**  
DC to 67 GHz

Typical Performance vs. Frequency



Typical Performance vs. Frequency



# COAX MATCHING LOAD

**FAMILY: SCM**  
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

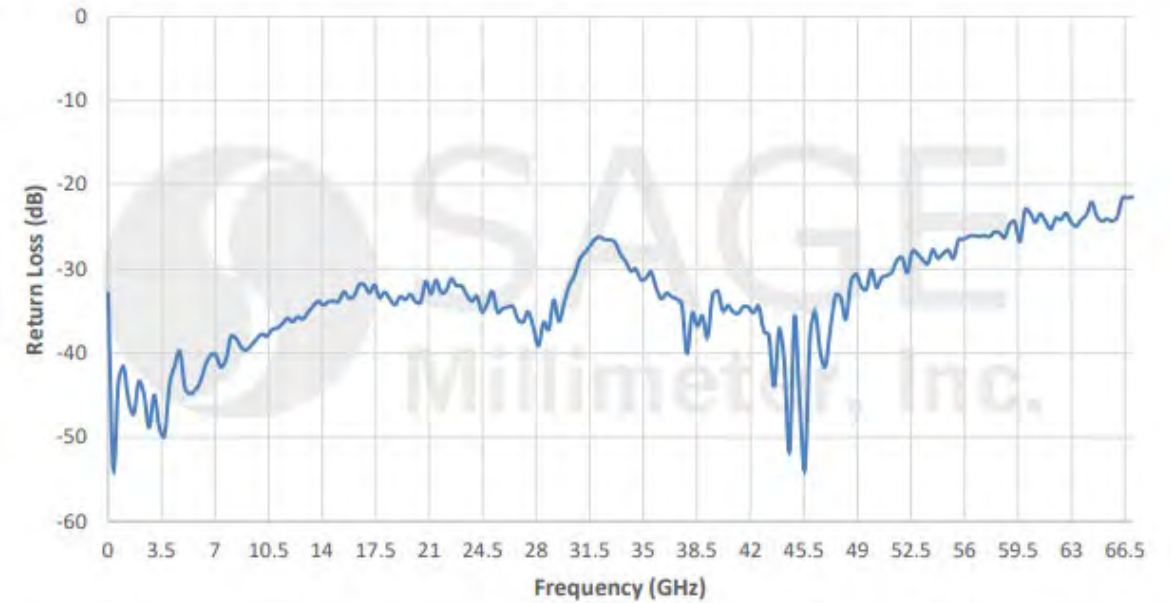


**STQ-CM-VM27-U2**  
DC to 67 GHz



**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

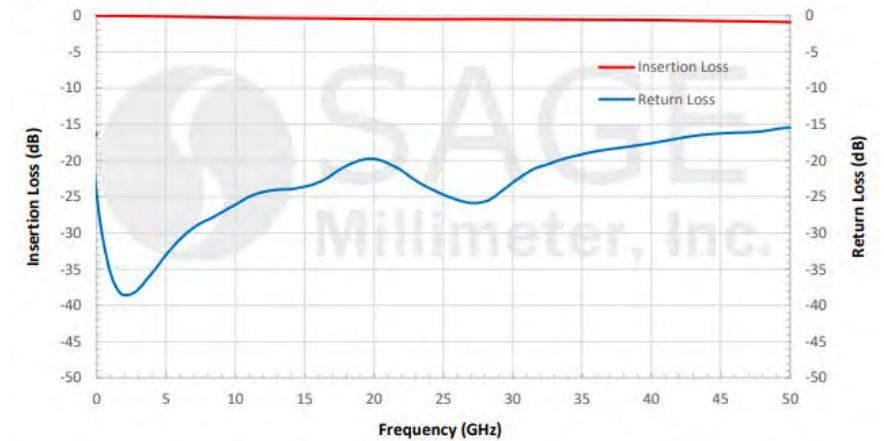


**SCB-050-2F2M-U2**  
DC to 50 GHz

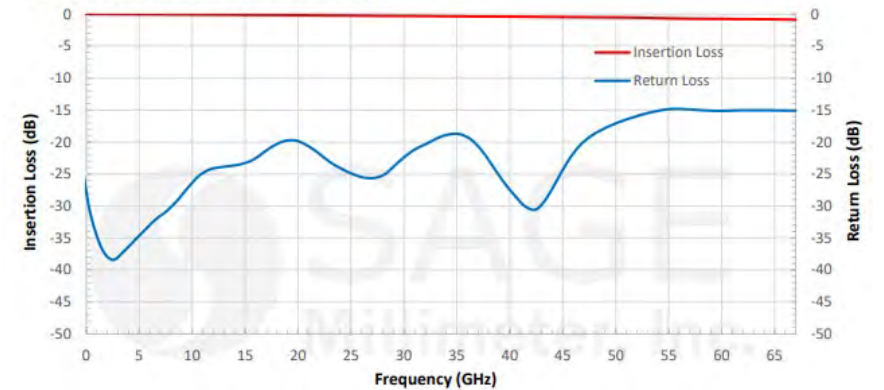


**SCB-016-VFVM-U2**  
DC to 67 GHz

**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

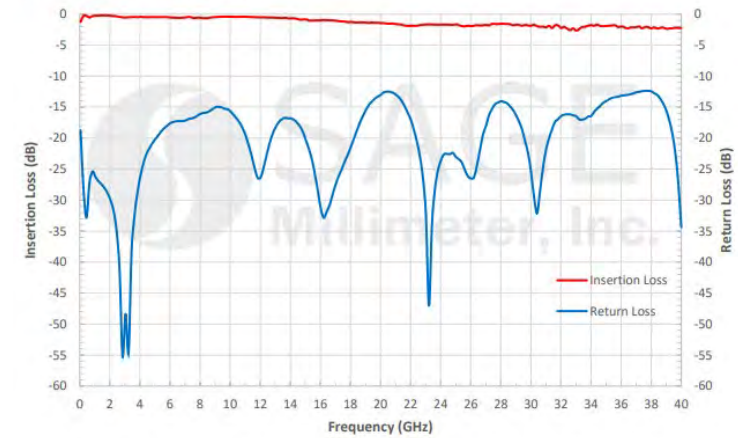


**SCV-000403302508-KFKF-U3**  
DC to 40 GHz

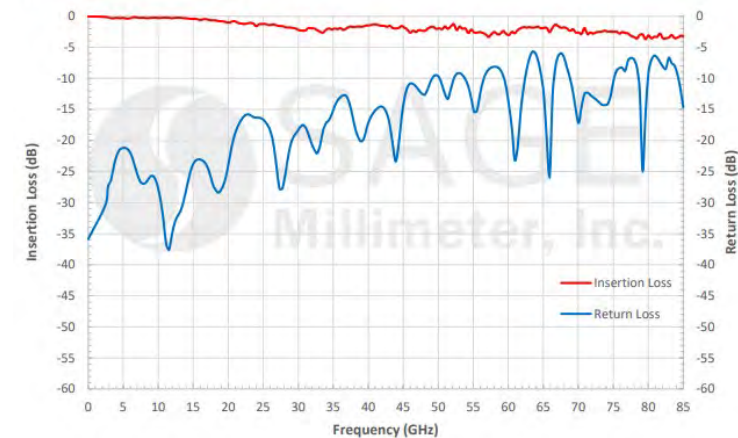


**SCV-000853402505-VFVF-U3**  
DC to 85 GHz

Typical Performance vs. Frequency



Typical Performance vs. Frequency





# COAX FILTER, BANDPASS

**FAMILY: SCF**  
2 to 40 GHz

More Than 25 Models  
Bandpass Filter

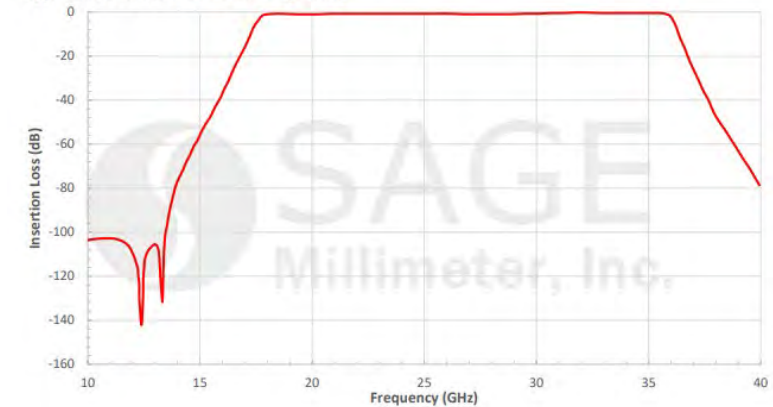


**SCF-27317335-VFVF-B1**  
Passband: 18 to 35 GHz

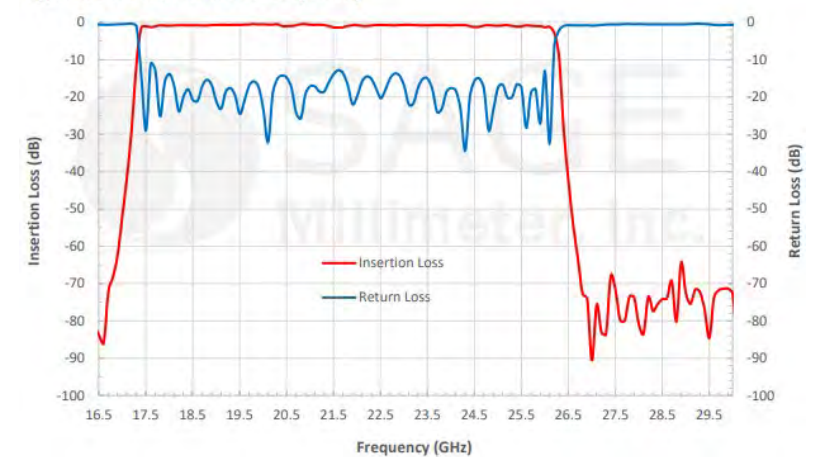


**SCF-22308340-SFSF-B3**  
Passband: 18 to 26.5 GHz

Typical Insertion Loss vs. Frequency



Typical Performance vs. Frequency



# COAX FILTER, BANDSTOP

SCF-24324340-KFKF-N3

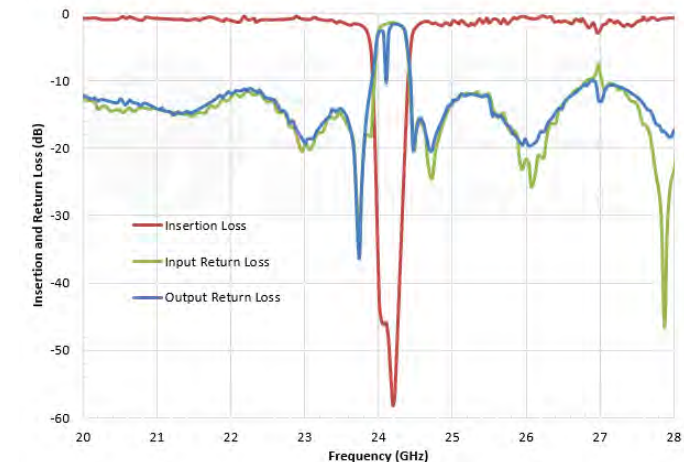
## Features:

- 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 °C	
Operating Temperature	-20 °C		+60 °C

Typical Performance vs. Frequency





# COAX FILTER, HIGHPASS

**FAMILY: SCF**  
15 to 110 GHz

10 Models  
Highpass Filter

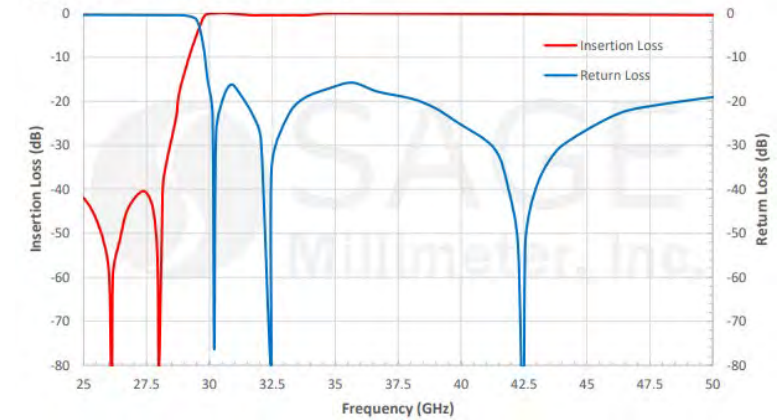


**SCF-30328330-2F2F-H3**  
Passband: 30 to 50 GHz

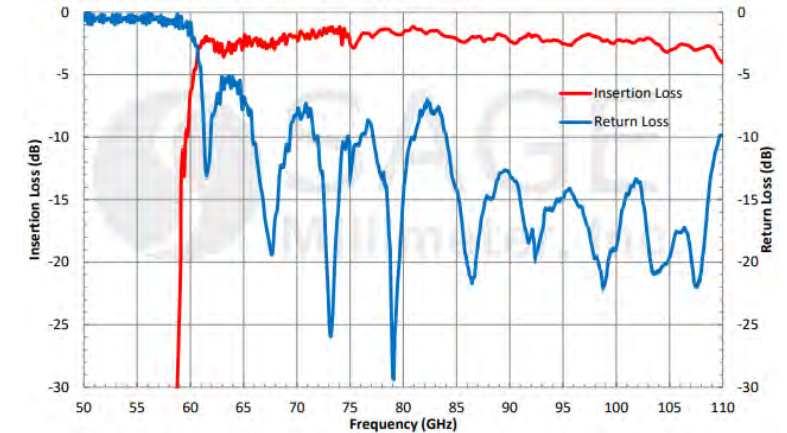


**SCF-61358340-101F1F-H1**  
Passband: 61 to 110 GHz

Typical Performance vs. Frequency



Typical Insertion and Return Loss vs. Frequency



# COAX FILTER, LOWPASS

**FAMILY: SCF**  
15 to 110 GHz

10 Models  
Highpass Filter

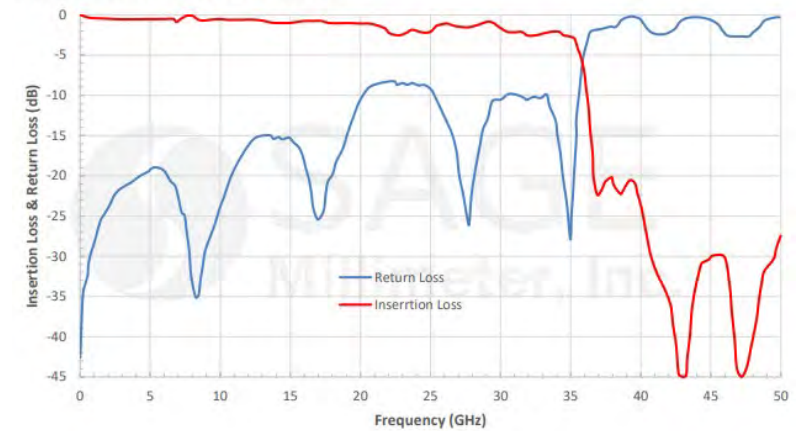


**SCF-33337325-KFKM-L3**  
Passband: DC to 30 GHz

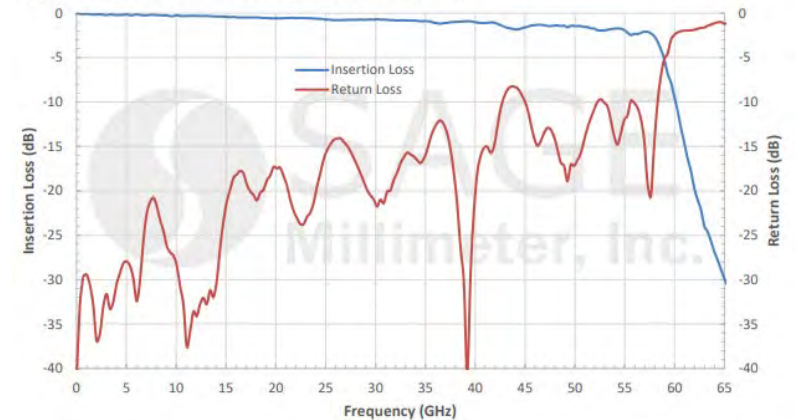


**SCF-55375330-KFKM-L1**  
Passband: DC to 55 GHz

Typical Performance vs. Frequency



Typical Insertion and Return Loss vs Frequency



# COAX DIRECTIONAL COUPLER

**FAMILY: SCD**  
1 to 67 GHz

More Than 25 Models

1.85 mm, 2.4 mm, 2.92 mm and SMA

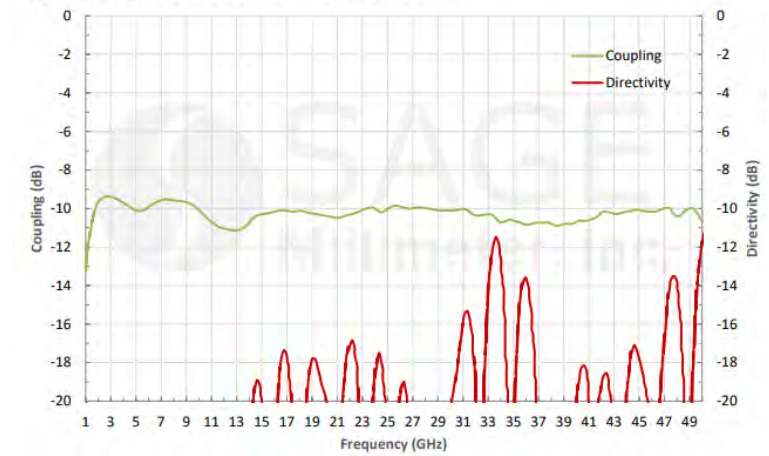


**SCD-0135031008-2F-SA**  
1 to 50 GHz, 10 dB

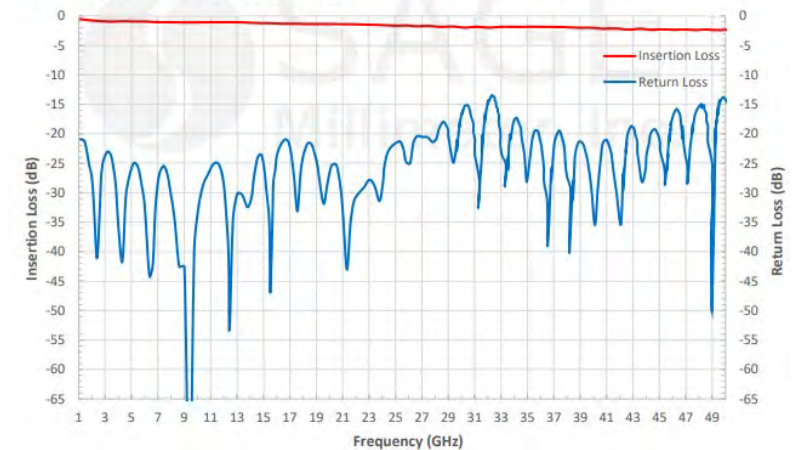


**SCD-0135032008-2F-SA**  
1 to 50 GHz, 20 dB

Typical Coupling and Directivity vs. Frequency



Typical Performance vs. Frequency



# 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**

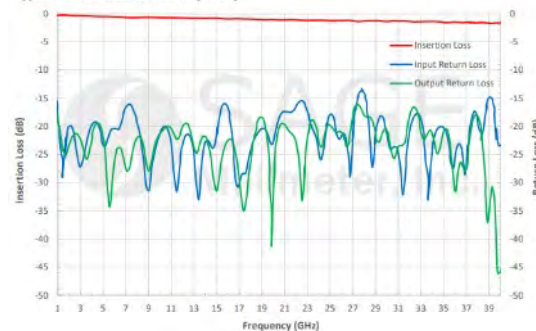


**SCS-0134035014-KFKF-42**  
**1 to 40 GHz, 4 Way**

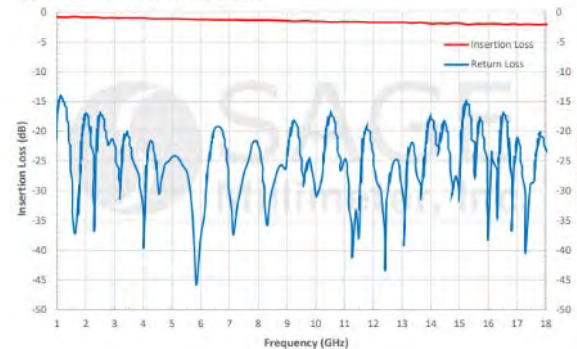


**SCS-1034032615-KFKF-82**  
**10 to 40 GHz, 8 Way**

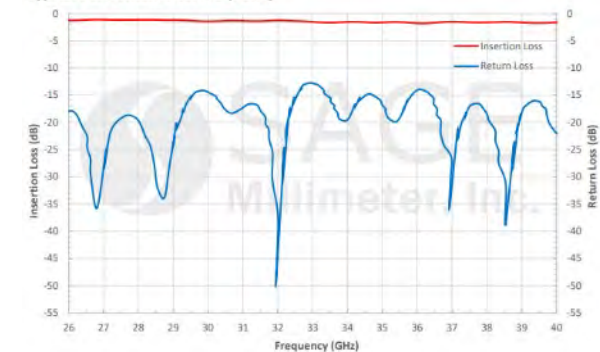
Typical Performance vs. Frequency



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

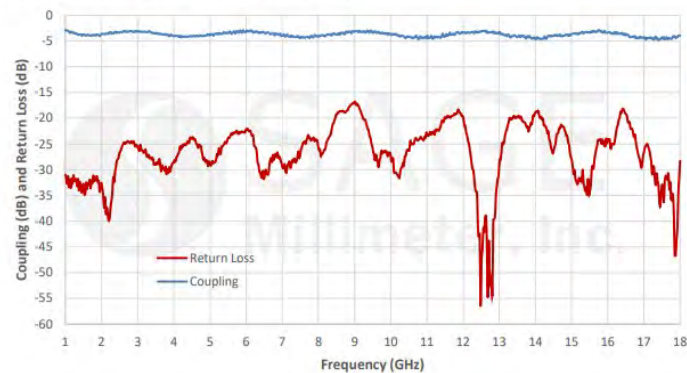


**SCZ-0432431409-SFSF-43**  
4 to 24 GHz, 90 Degree

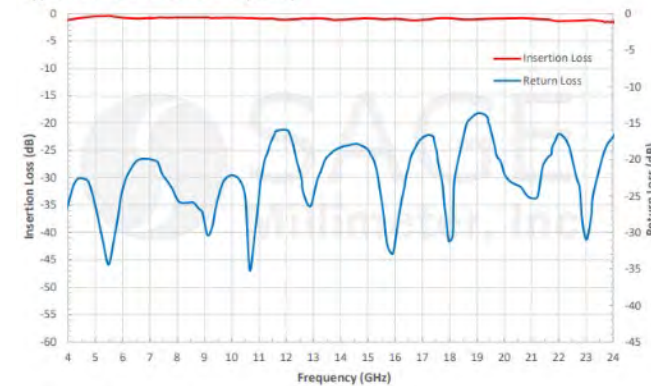


**SCZ-1834031209-KFKF-43**  
18 to 40 GHz, 90 Degree

Typical Coupling and Return Loss vs Frequency



Typical Performance vs. Frequency





# COAX CABLES (FLEXIBLE)

**FAMILY: SCW**  
DC to 110 GHz

More Than 50 Models

1 mm, 1.85 mm, 2.4 mm, 2.92 mm

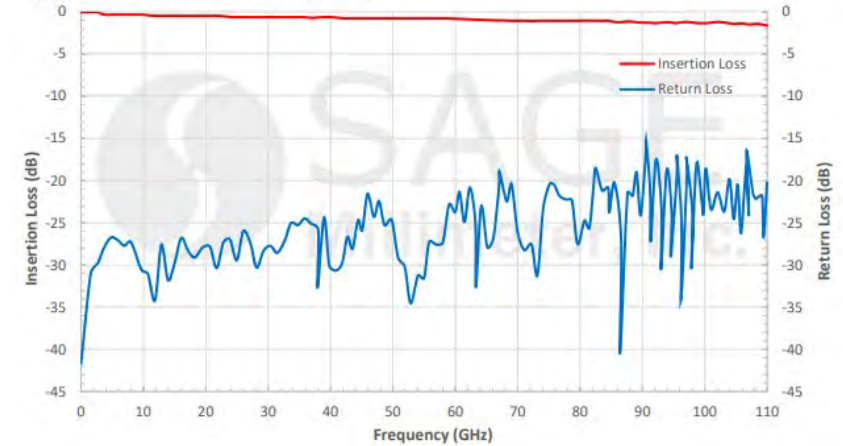


**SCW-1M1M003-F1**  
DC to 110 GHz, 3"

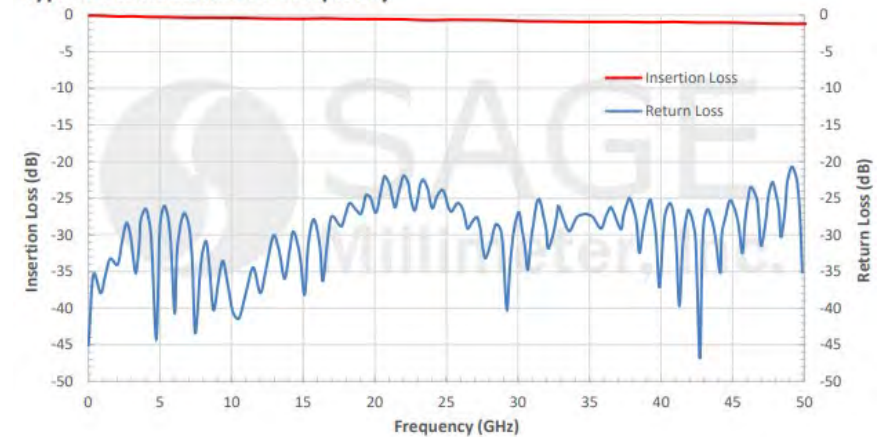


**SCW-2M2M006-F1**  
DC to 50 GHz, 6"

Typical Performance vs. Frequency



Typical Performance vs. Frequency



# COAX CABLES (SEMI RIGID)

**FAMILY: SCW**  
DC to 110 GHz

More Than 50 Models

1 mm, 1.85 mm, 2.4 mm, 2.92 mm

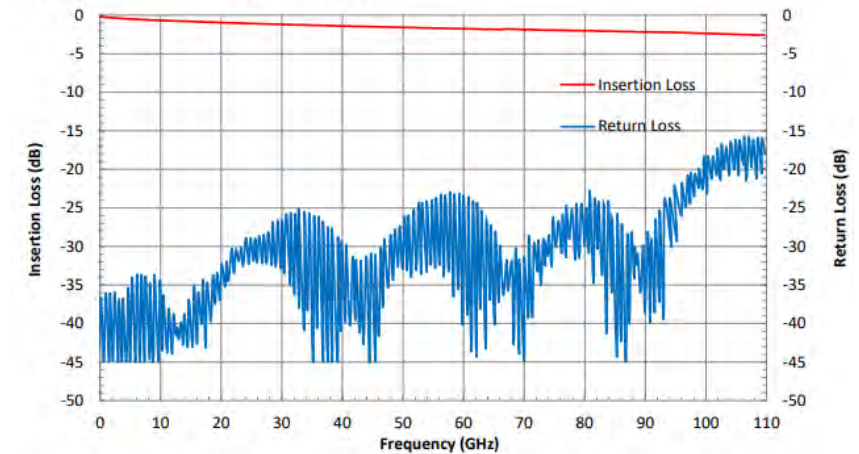


**SCW-1M1M006-S1**  
DC to 110 GHz, 6"

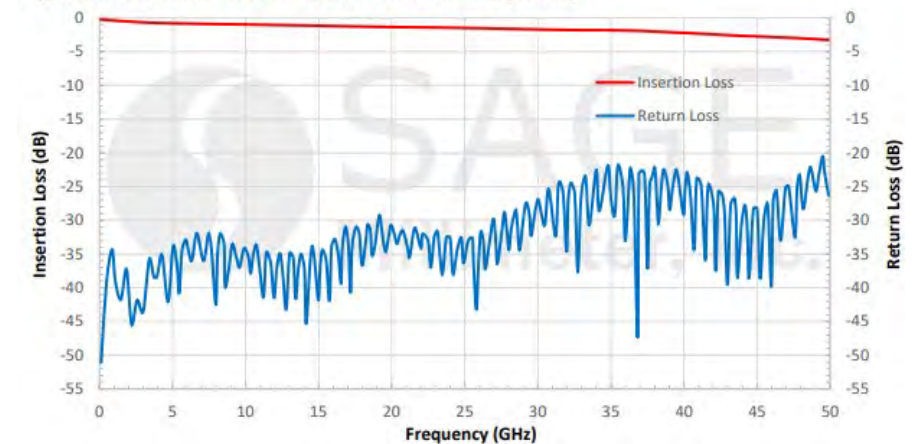


**SCW-2M2M012-S1**  
DC to 50 GHz, 12"

**Typical Performance vs. Frequency**



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



# TEST EQUIPMENT

# ERAVANT TEST EQUIPMENT

The focus of this presentation section is to introduce the **Eravant** test equipment product family by highlighting some representative models. There are many standard models available to satisfy all 5G system applications. The test equipment family includes the following types, which can be found [here](#). Custom test equipment is available upon request.

# BROAD BANDWIDTH NOISE SOURCE

**FAMILY: STZ**  
26.5 to 220 GHz

More Than 20 Models: Full Waveguide Bandwidth



**STZ-05-I1**  
140 to 220 GHz



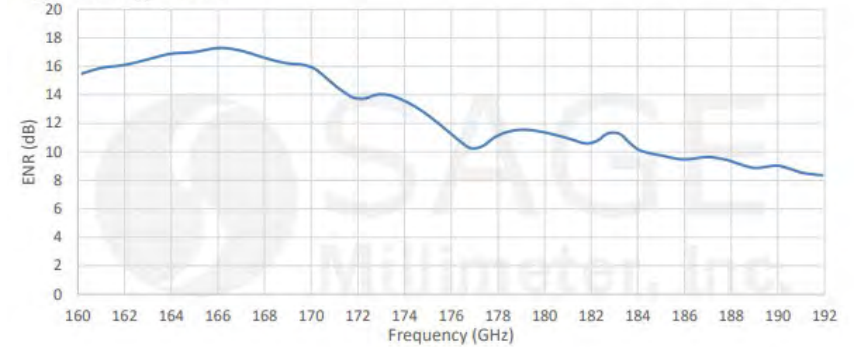
**STZ-12-I1**  
60 to 90 GHz



**STZ-06-I1**  
110 to 170 GHz

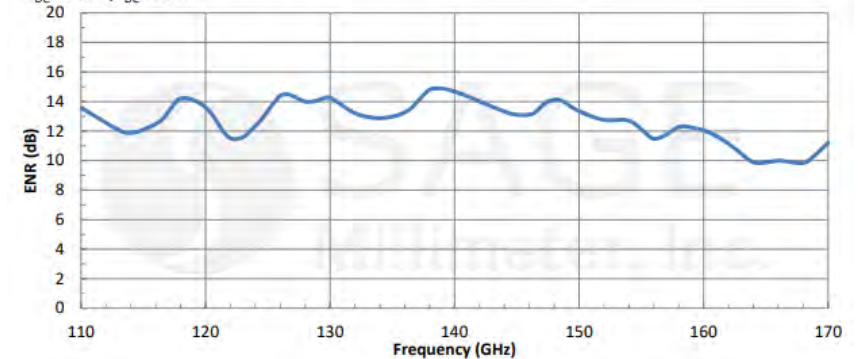
Typical ENR vs. Frequency

$V_{DC} = +28 \text{ V}$ ,  $I_{DC} = 60 \text{ mA}$



Typical ENR vs. Frequency

$V_{DC} = +28 \text{ V}$ ,  $I_{DC} = 60 \text{ mA}$





# SPECTRUM ANALYZER HARMONIC MIXER

**FAMILY: SFH**  
26.5 to 110 GHz

More Than 8 Models: Full Waveguide Bandwidth

**SFH-10SFSF-A3**  
75 to 110 GHz



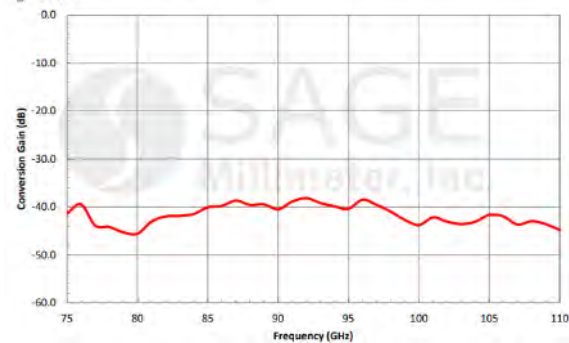
**SFH-12SFSF-A3**  
60 to 90 GHz



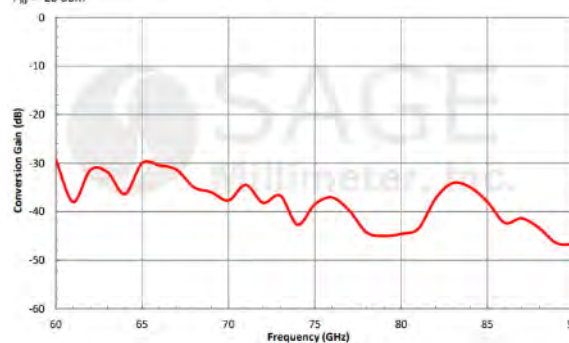
**SFH-15SFSF-A3**  
40 to 60 GHz



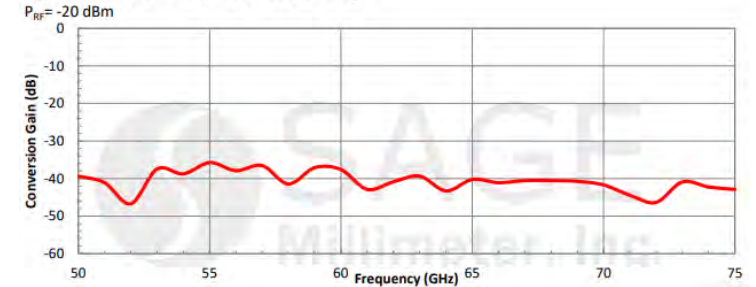
Typical Conversion Loss vs. Frequency  
 $P_{RF} = -20$  dBm



Typical Conversion Gain vs. Frequency  
 $P_{RF} = -20$  dBm



Typical Conversion Gain vs. Frequency  
 $P_{RF} = -20$  dBm



# CALIBRATION KIT (VECTOR NETWORK ANALYZER)

**FAMILY: STQ**  
DC to 220 GHz

14 Models: WR-05 to WR-42 & COAX



**STQ-TO-05-U3-CKIT1**  
WR-05, 140 to 220 GHz



**STQ-TO-10-U3-CKIT1**  
WR-10, 75 to 110 GHz



**STQ-TO-28-U3-CKIT1**  
WR-28, 26.5 to 40 GHz



**STQ-TO-VFVM-U3-CKIT1**  
1.85 mm, DC to 67 GHz



**STQ-TO-2F2M-U3-CKIT1**  
2.4 mm, DC to 50 GHz



**STQ-TO-KFKM-U3-CKIT1**  
2.92 mm, DC to 40 GHz

# SYNTHESIZER/SWEEPER FREQUENCY EXTENDER

**FAMILY: STE**  
DC to 220 GHz

More Than 20 Models: WR-05 to WR-15 Bands



**STE-KF310-15-S1**  
75 to 110 GHz, +15 dBm

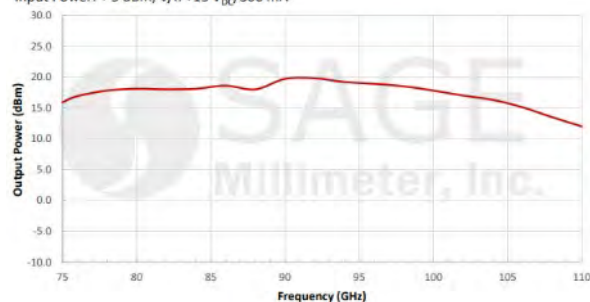


**STE-SF612-18-S1**  
60 to 90 GHz, +18 dBm

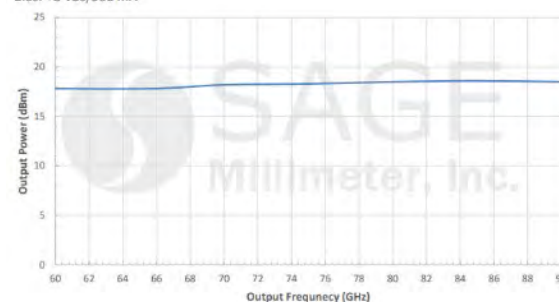


**STE-SF415-04-S1**  
50 to 75 GHz, +15 dBm

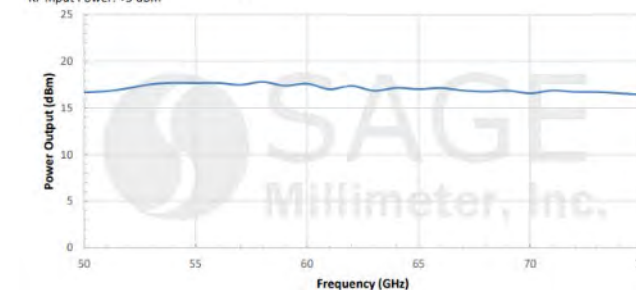
**Typical Performance vs. Frequency**  
Input Power: +5 dBm, V/I: +15 V<sub>DC</sub>/300 mA



**Typical Output Power vs. Frequency**  
Bias: +8 V<sub>DC</sub>/950 mA



**Typical Performance vs Frequency**  
RF Input Power: +5 dBm



# FREQUENCY DOWN-CONVERTER

**FAMILY: STC**  
26.5 to 170 GHz

More Than 8 Models: WR-06 to WR-28 Bands



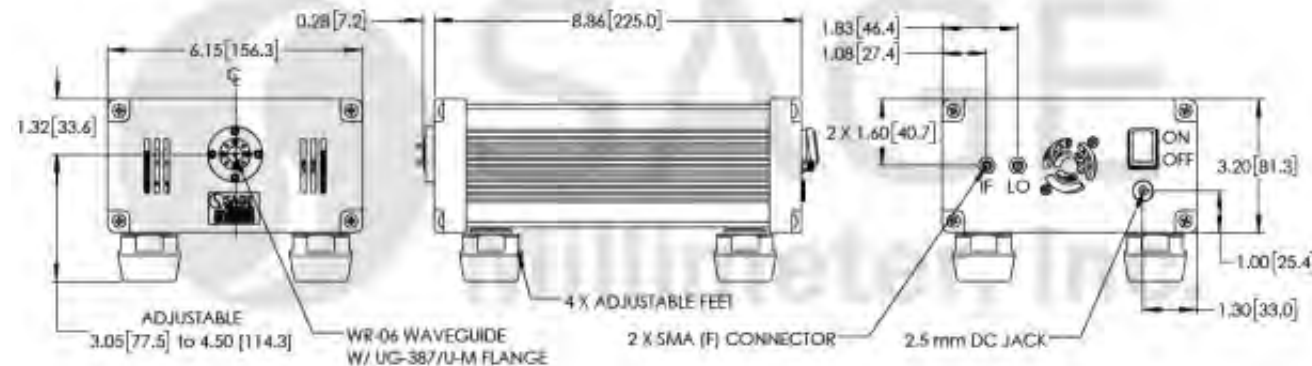
**STC-20-06-S1**  
110 to 170 GHz



**STC-20-10-S1**  
75 to 110 GHz



**STC-20-15-S1**  
50 to 75 GHz



# NOISE FIGURE & GAIN TEST EXTENDER

**FAMILY: STG**  
26.5 to 170 GHz

More Than 8 Models: WR-06 to WR-28 Bands



**STG-10-S1**  
75 to 110 GHz



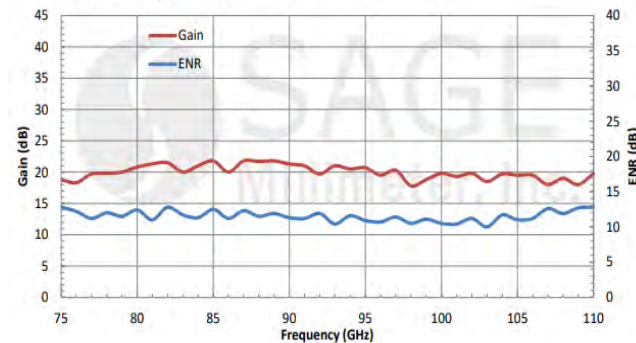
**STG-12-S1**  
60 to 90 GHz



**STG-15-S1**  
50 to 75 GHz

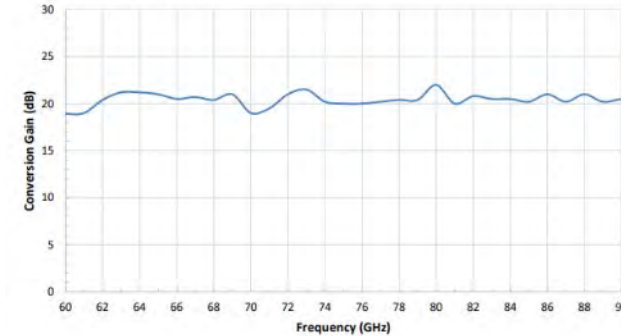
Typical Performance vs. Frequency

IF: 1 GHz, LO: +0 dBm, RF: -40 dBm



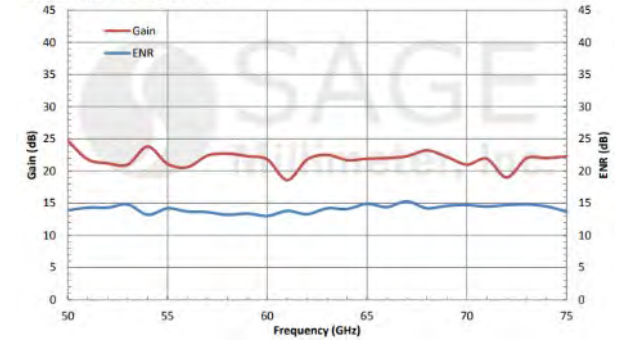
Typical Conversion Gain vs. Frequency

IF: 1 GHz, LO: +5 dBm, RF: -40 dBm



Typical Performance vs. Frequency

IF: 1 GHz, LO: +0 dBm, RF: -50 dBm





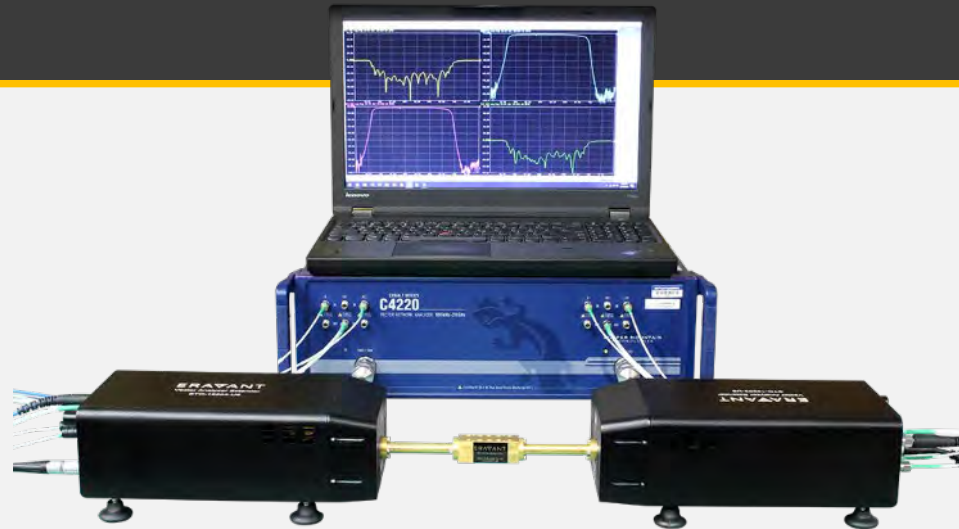
# VECTOR ANALYZER EXTENDER

**FAMILY: STO**  
50 to 170 GHz

5 Models: WR-06 to WR-15 Bands



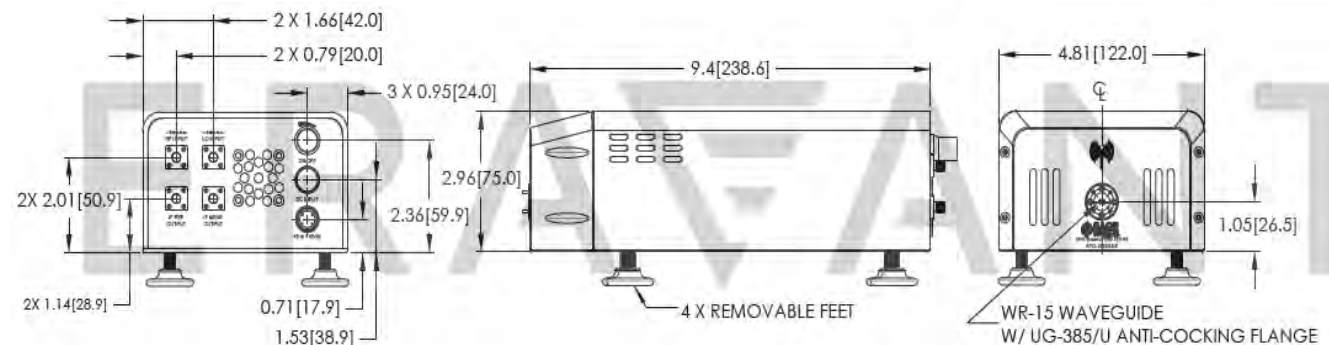
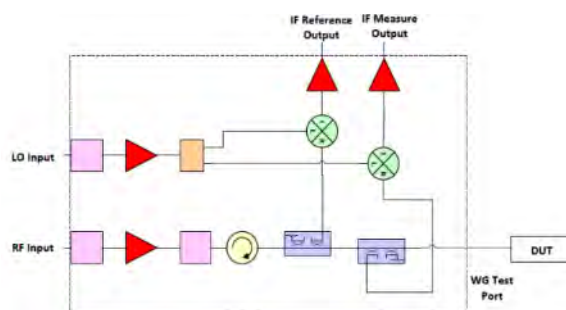
**STO-10203-U6**  
75 to 110 GHz



**STO-12203-U6**  
60 to 90 GHz



**STO-15203-U6**  
50 to 75 GHz



# COAX CABLE (VECTOR NETWORK ANALYZER)

**FAMILY: STQ**  
DC to 67 GHz

More Than 50 Models: 1.85 mm, 2.4 mm, 2.92 mm

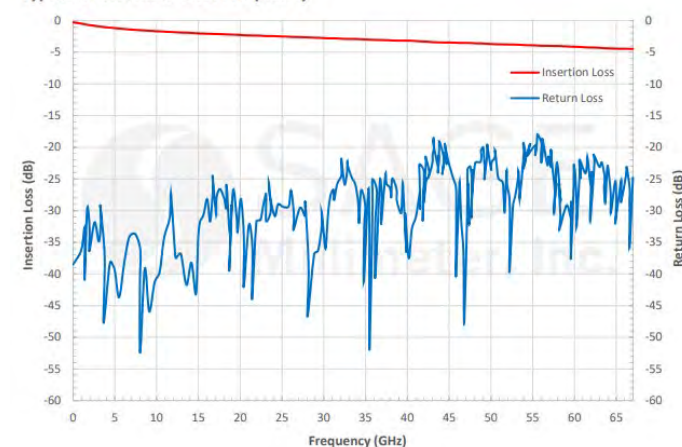


**STQ-CW-VFVF025-F1**  
DC to 67 GHz, 25"

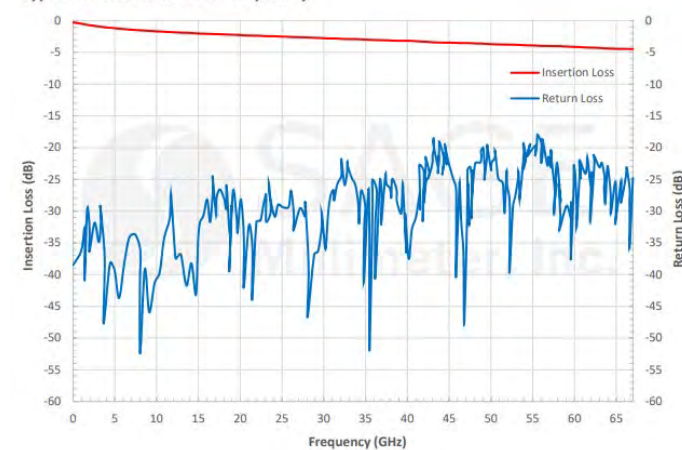


**STQ-CW-VFVM025-F1**  
DC to 67 GHz, 25"

Typical Performance vs. Frequency



Typical Performance vs. Frequency



# ERA<sup>ANT</sup>

NEXT GENERATION MILLIMETERWAVE COMPONENTS

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- Blogs, Calculators and Publications

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

**Description:**  
Model 0004-00000000-12-SB is an E-Band magic tee that couples the wave band from 60 to 120 GHz. This magic tee is a four-port hybrid coupler and/or power divider with two well-matched, in-plane (reference side) and two in-plane (out) ports. The magic tee offers less than 0.1 dB insertion loss and high isolation between the two reference arms and between the two out-of-plane arms. All waveguide ports have a standard 1.5 mm pitch and are compatible with UG-387/10 flanges.

**Features:**

- Low Insertion Loss and High Isolation
- Constant Port Impedance

**Applications:**

- Test Cells
- Test and Measurement
- Sub-System

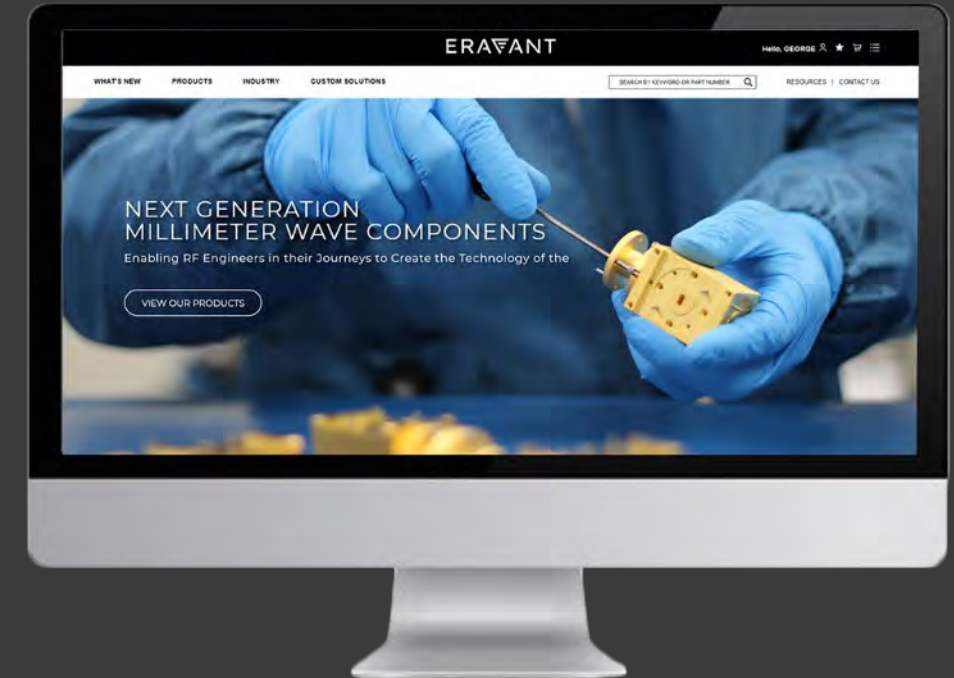
**Electrical Specifications:**

Parameter	Minimum	Typical	Maximum
Frequency (GHz)	60	120	120
Insertion Loss (dB)	0.1	0.1	0.1
Isolation (dB)	20	20	20
Port Impedance (ohms)	50	50	50

**Mechanical Specifications:**

Item	Specification
Size and Dimensions	1.5 mm pitch, 1.5 mm pitch, 1.5 mm pitch
Weight	0.1 g
Material	Aluminum
Finish	Electroless Nickel

www.sagemillimeter.com | 3045 Kachava Street, Torrance, CA 90505  
Phone: 424-757-0868 | Fax: 424-757-0868 | Email: sales@sagemillimeter.com



PASSIVE FREQUENCY MULTIPLIERS

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-00210-S2	110 GHz	170 GHz	0 dBm	55 GHz	85 GHz	+10 dBm	WR-06 Waveguide	WR-12 Waveguide	Datasheet	View
SFP-00210-US	110 GHz	170 GHz	-3 dBm	55 GHz	85 GHz	+20 dBm	WR-06 Waveguide	WR-12 Waveguide	Datasheet	View
SFP-00210-S2	140 GHz	220 GHz	-3 dBm	70 GHz	110 GHz	+17 dBm	WR-06 Waveguide	WR-12 Waveguide	Datasheet	View
SFP-24340300-28SF-S1	22 GHz	40 GHz	+5 dBm	11 GHz	20 GHz	+10 dBm	WR-28 Waveguide	SMA (F)	Datasheet STEP File	View
SFP-24340300-28SF-S1	24 GHz	42 GHz	+3 dBm	12 GHz	21 GHz	+20 dBm	WR-28 Waveguide	SMA (F)	Datasheet STEP File	View
SFP-2635F-4-9	26.5 GHz	40 GHz	+5 dBm	13.25 GHz	13.25 GHz	+20 dBm	WR-28 Waveguide	SMA (F)	Datasheet	View
SFP-27340300-28SF-S1	20.5 GHz	40 GHz	-5 dBm	10.25 GHz	13.25 GHz	+10 dBm	WR-28 Waveguide	SMA (F)	Datasheet STEP File	View
SFP-2235F-S1	33 GHz	60 GHz	+3 dBm	16.5 GHz	16.5 GHz	+20 dBm	WR-22 Waveguide	SMA (F)	Datasheet STEP File	View
SFP-2235F-S1	33 GHz	60 GHz	+7 dBm	16.5 GHz	16.5 GHz	+20 dBm	WR-22 Waveguide	2.92 mm (F)	Datasheet STEP File	View
SFP-30367300-19SF-N1	57 GHz	90 GHz	+3 dBm	12 GHz	19 GHz	+20 dBm	WR-19 Waveguide	SMA (F)	Datasheet STEP File	View
SFP-102VF-S1	40 GHz	60 GHz	+5 dBm	20 GHz	30 GHz	+20 dBm	WR-14 Waveguide	2.92 mm (F)	Datasheet STEP File	View