

# Practical Waveguide Connector Uni-Guide™

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NEXT GENERATION MILLIMETERWAVE COMPONENTS

IEEE CLASSTECH, NOV. 1, 2019, LOS ANGELES

YONGHUI SHU

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NEXT GENERATION MILLIMETERWAVE COMPONENTS

# OVERVIEW

1. How was this Product Invented?
2. What is it?
3. Performance
4. Benefits
5. Conclusions
6. Web Link



- The idea was from:
  - SAGE Millimeter's own Product Development
    - Too many product interface variations
    - Too many product packages to manage
    - Excessive product development cycle time
  - SAGE Millimeter's own Sub-Assembly Demands
  - SAGE Millimeter's Customers' Requests



HOW WAS THIS  
PRODUCT  
INVENTED?

# 2

## WHAT IS IT?

### Uni-Guide™ Informational Video



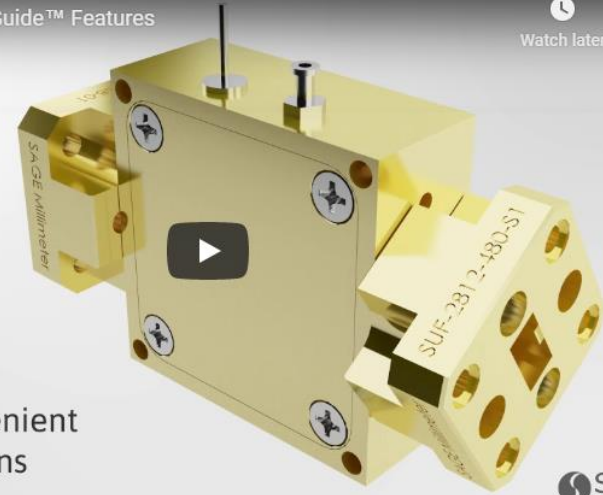
SAGE Millimeter Uni-Guide™ Features



Watch later



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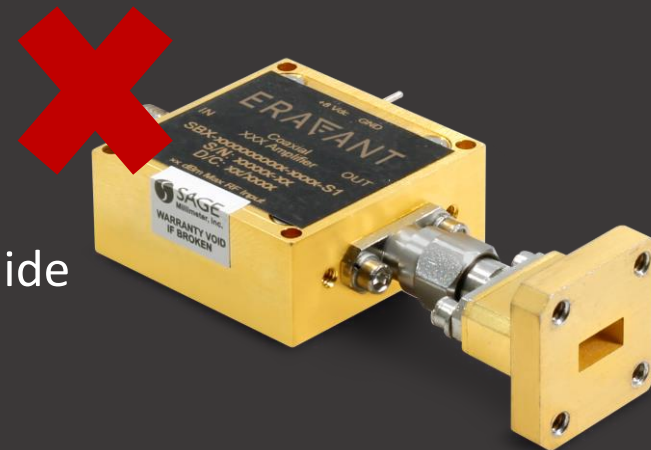
Features Convenient  
Port Orientations



# 2

## WHAT IS IT?

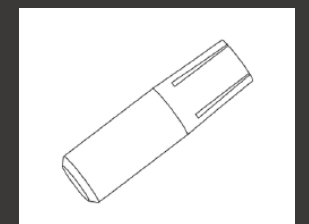
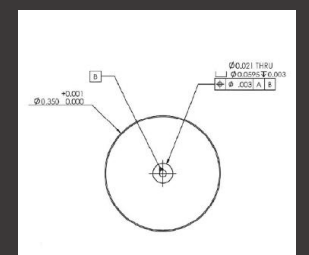
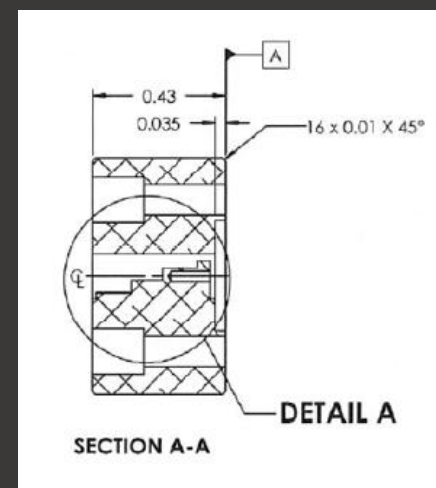
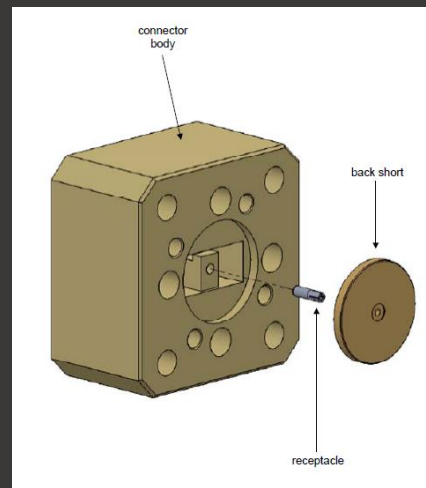
- IT is NOT a waveguide to coax adapter
- IT IS a waveguide connector



# 2

## WHAT IS IT?

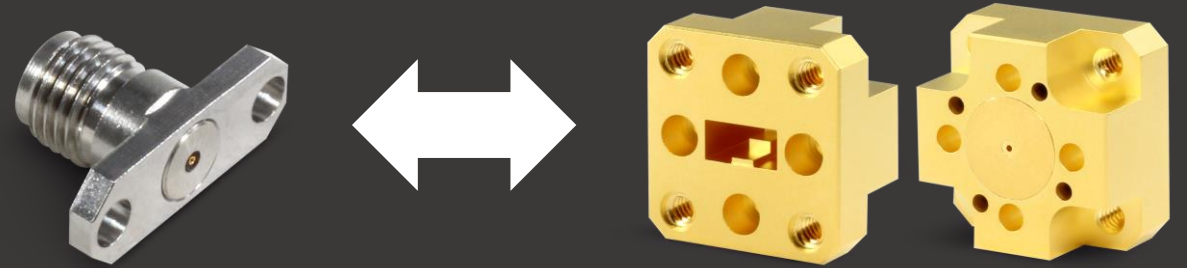
It is trademarked and patent pending.



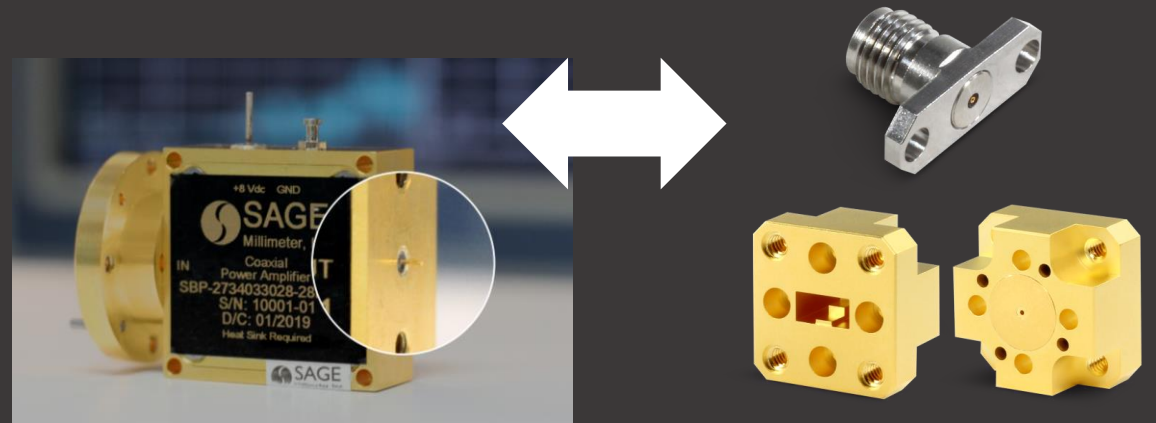
# 2

## WHAT IS IT?

- It is used in the same way as the coaxial connector



- It is field replaceable as long as glassbead is used



# 2

## WHAT IS IT?

- **COTS**

- WR-28
- WR-22
- WR-19

- **Prototype**

- WR-42
- WR-34
- WR-15

- **Under-Development**

- WR-12
- WR-10

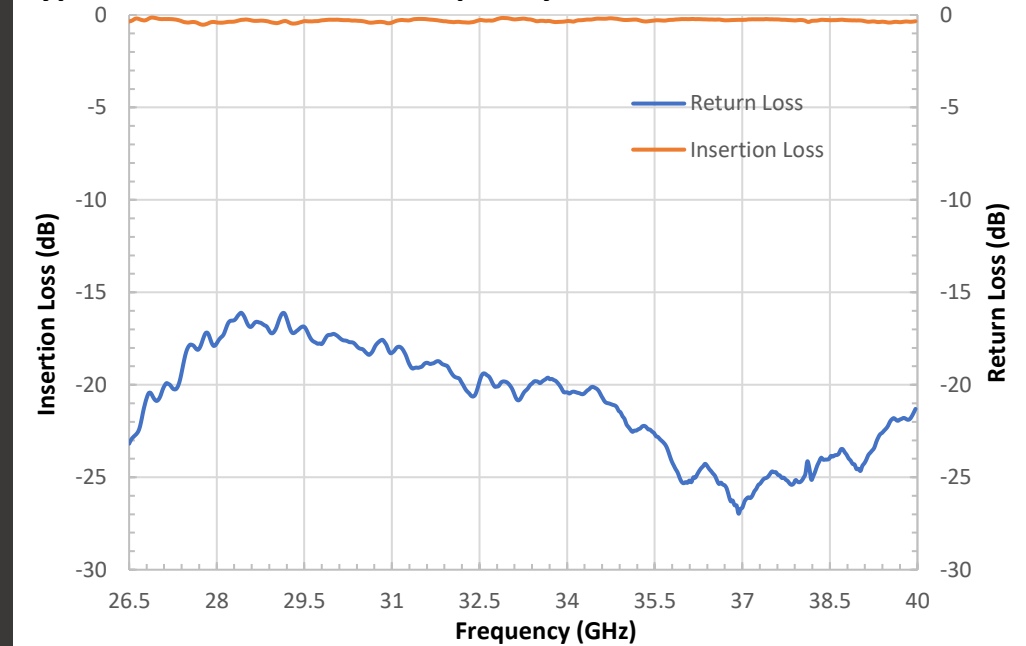


# PERFORMANCE

## Ka Band

- Model: SUF-2812-480-S1
- Frequency Range: 26.5 to 40 GHz
- Insertion Loss: 0.5 dB (Typ)
- Return Loss: 20 dB (Typ)
- Power Handling: 100 Watts (CW)
- Waveguide: WR-28
- Flange: UG-599/U Threaded
- Pin Size: 12 Mils
- Mounting Hole Separation: 0.48"

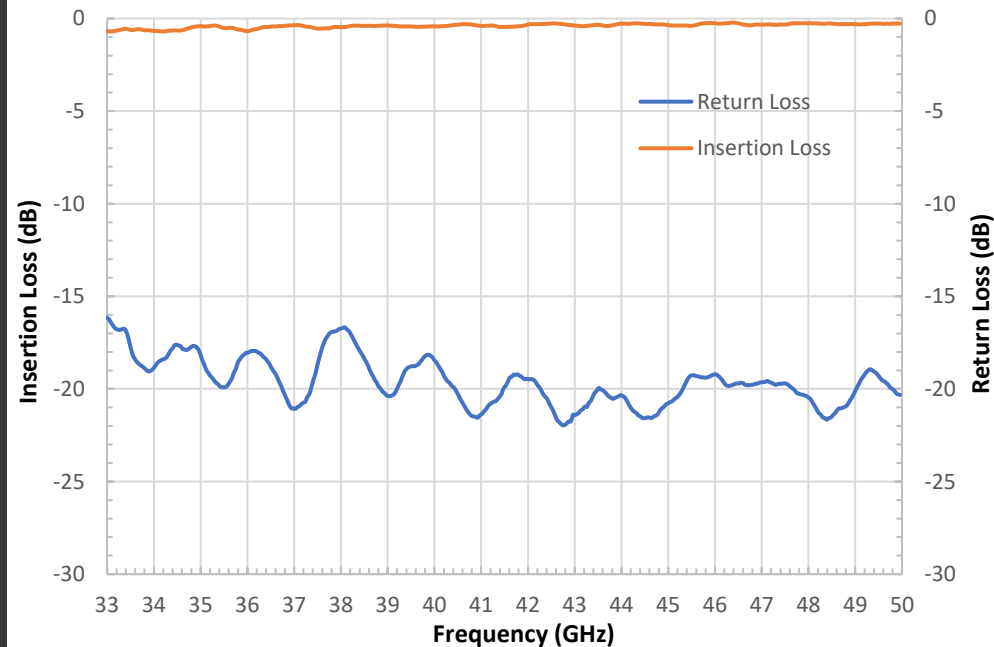
Typical Performance vs. Frequency



# PERFORMANCE

# 3

Typical Performance vs. Frequency



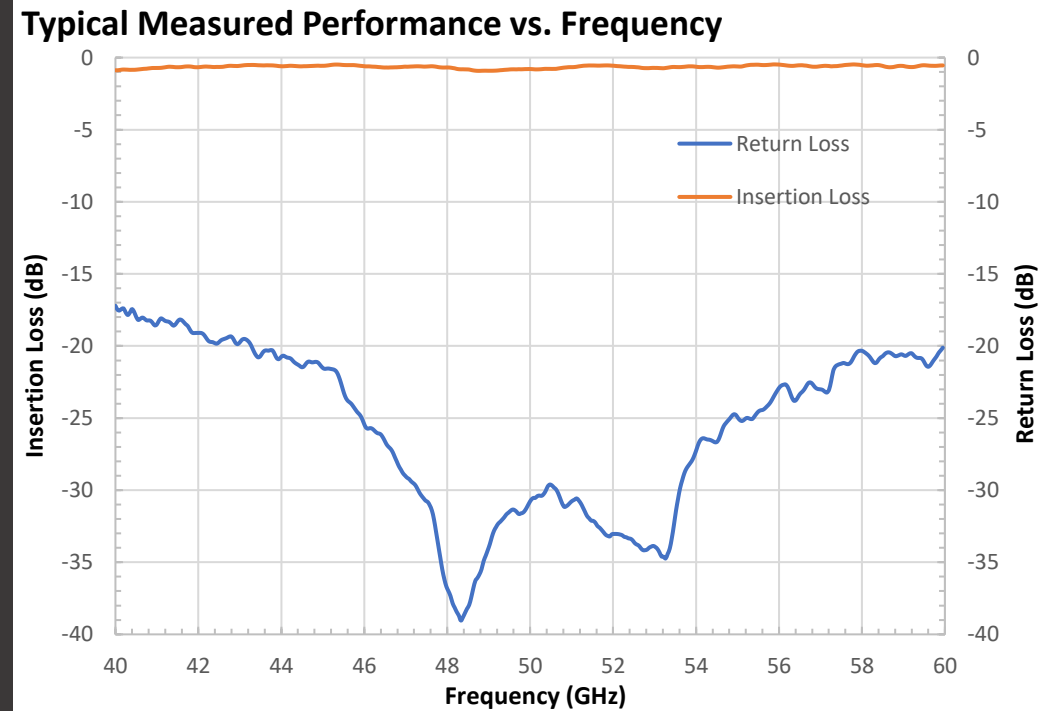
## Q Band

- Model: SUF-2212-480-S1
- Frequency Range: 33 to 50 GHz
- Insertion Loss: 0.6 dB (Typ)
- Return Loss: 20 dB (Typ)
- Power Handling: 100 Watts (CW)
- Waveguide: WR-22
- Flange: UG-383/U Anti-Cocking
- Pin Size: 12 Mils
- Mounting Hole Separation: 0.48"

# PERFORMANCE

## U Band

- Model: SUF-1912-480-S1
- Frequency Range: 40 to 60 GHz
- Insertion Loss: 0.7 dB (Typ)
- Return Loss: 20 dB (Typ)
- Power Handling: 100 Watts (CW)
- Waveguide: WR-19
- Flange: UG-383/U-M Anti-Cocking
- Pin Size: 12 Mils
- Mounting Hole Separation: 0.48"



# 4 BENEFITS

## BENEFIT 1: Various RF Interfaces

K(F) – K(F)



WG (V) – WG (V)



K(F) – WG (V)



K(F) – WG (H)



WG (V) – K(F)



WG (H) – K(F)

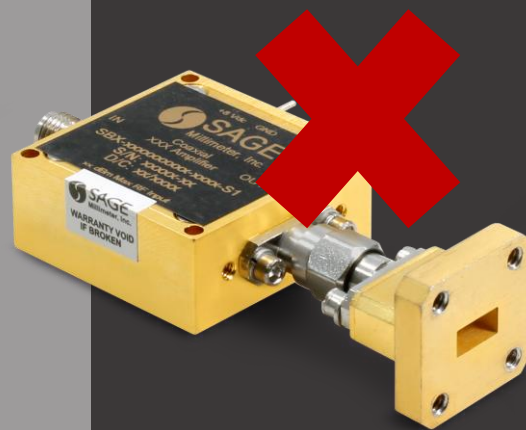


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# 4 BENEFITS

## BENEFIT 2: Compact System Integration

- Eliminating Waveguide to Coax Adapters
- Eliminating Waveguide Sections
- Eliminating Waveguide Twists



No Adapters



Create a Direct Connection



No Twists

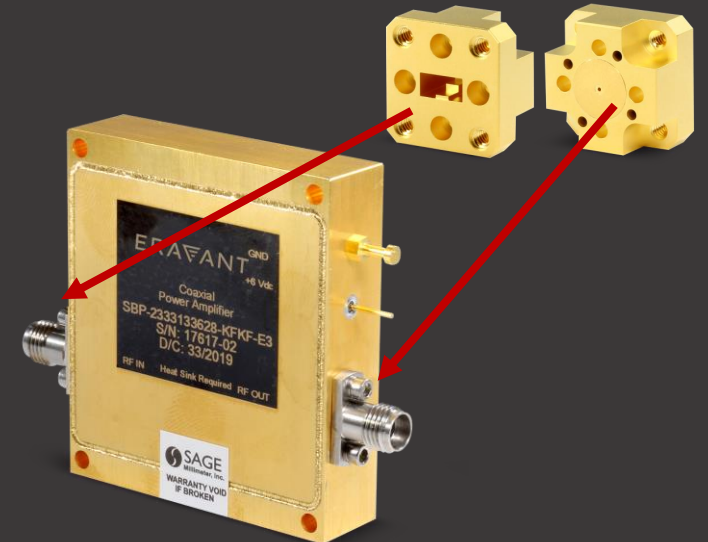
# 4 BENEFITS

## BENEFIT 3: Sealed Waveguide

- Hermetical Waveguide Solution
- Effortlessly Sealed Waveguide



Hermetically Sealed Package



Preserves Hermeticity

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# 4 BENEFITS

## BENEFIT 4: Reduced Cycle Time & Cost

- Current Waveguide Interfaced Product Development Process
  - EM Simulation, 1 to 2 Weeks
  - Mechanical Design, 1 to 2 Weeks
  - Prototyping: 6 to 8 Weeks
  - Validation: 2 to 4 Weeks
  - Total: 10 to 16 Weeks if first attempt is successful
- Uni-Guide™
  - No Cycle Time and Cost

# 4 BENEFITS

## BENEFIT 6: Improved Inventory Efficiency

Only a few standard housings are needed.

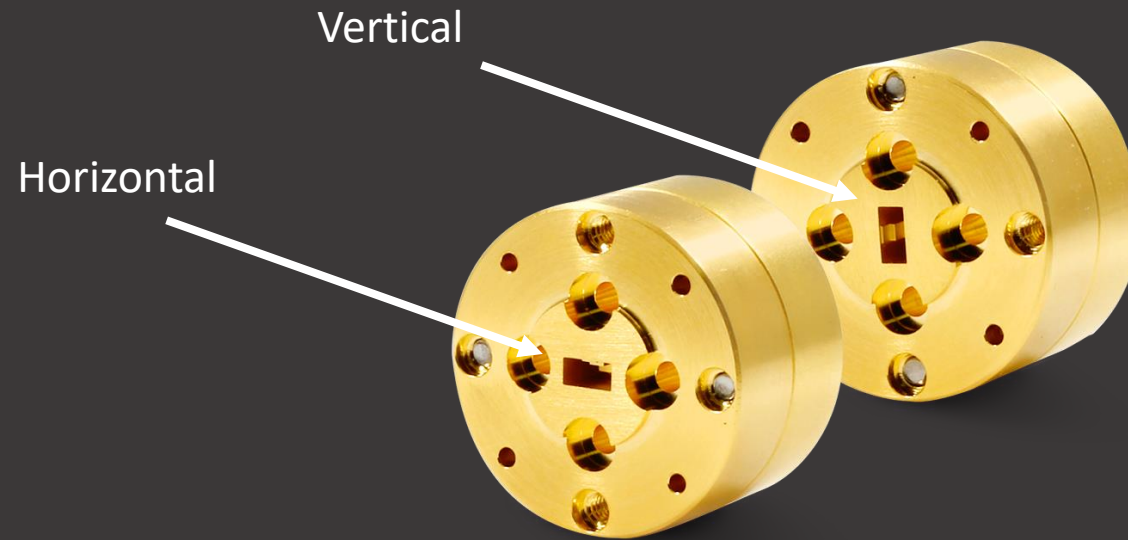


1 Standard Housing Results in 9 Packages

# 4 BENEFITS

## BENEFIT 5: By-Product Twist

- Readily Available 90 Degree Compact Waveguide Twist
- Arbitrary Angle Compact Waveguide Twist with Mechanical Modification



## Uni-Guide™ - A Revolutionary Packaging Technology

- Uni-Guide™ is a waveguide connector. The way it is used is exactly same as a coax connector but offers the waveguide interface.
- Uni-Guide™ offers flexible port configurations.
- Uni-Guide™ offers a hermetic waveguide interface automatically if the package is sealed.
- Uni-Guide™ reduces product development cycle time and cost.
- Uni-Guide™ improves inventory efficiency.
- Uni-Guide™ reshapes the current microwave and millimeter-wave packaging technology.

# 5 CONCLUSIONS

# 6

WEB LINK

## Uni-Guide™ Informational Video



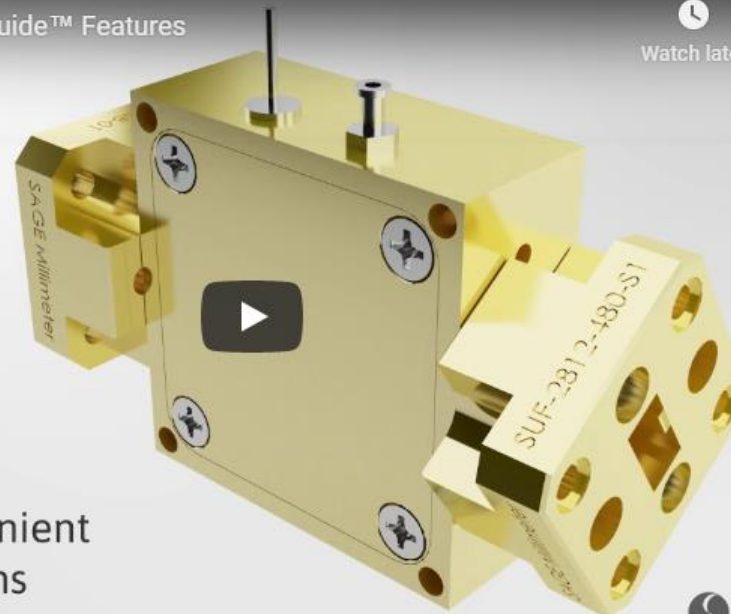
SAGE Millimeter Uni-Guide™ Features



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Features Convenient  
Port Orientations



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