

**Data Report on Sleeve Material**  
***SafeSleeve – CTG PO***  
***700191903.22031***

2022-08-30

Compass Technology Group LLC

1005 Alderman Dr, Ste 203

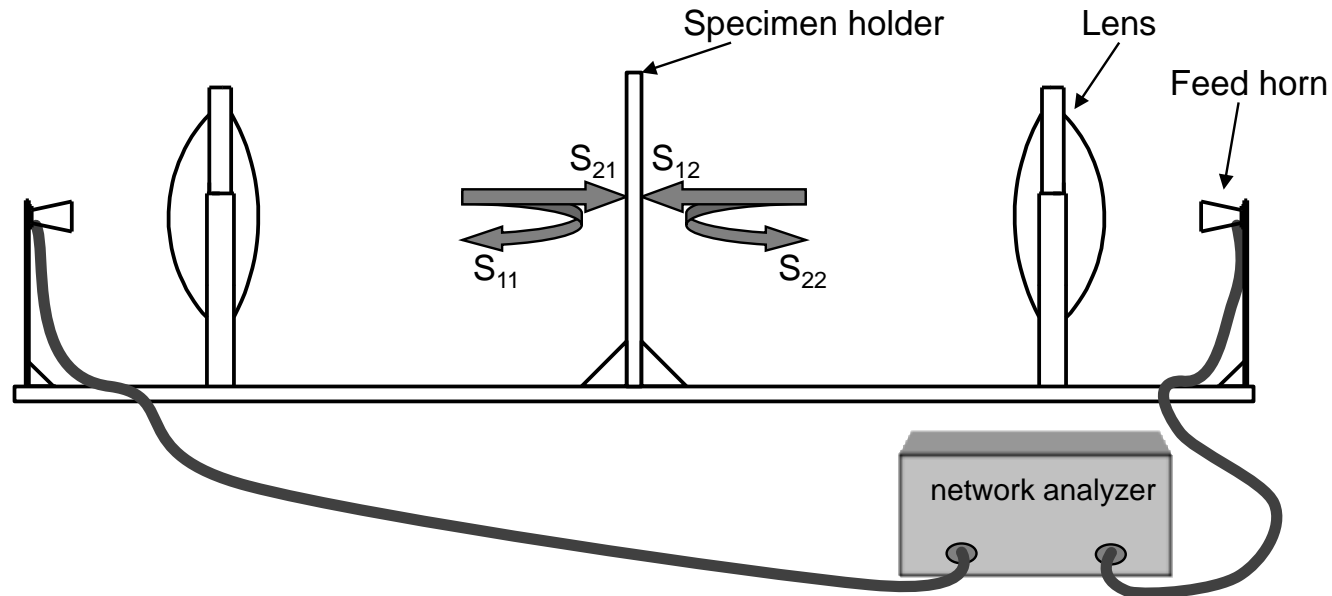
Alpharetta, GA 30005



# Overview

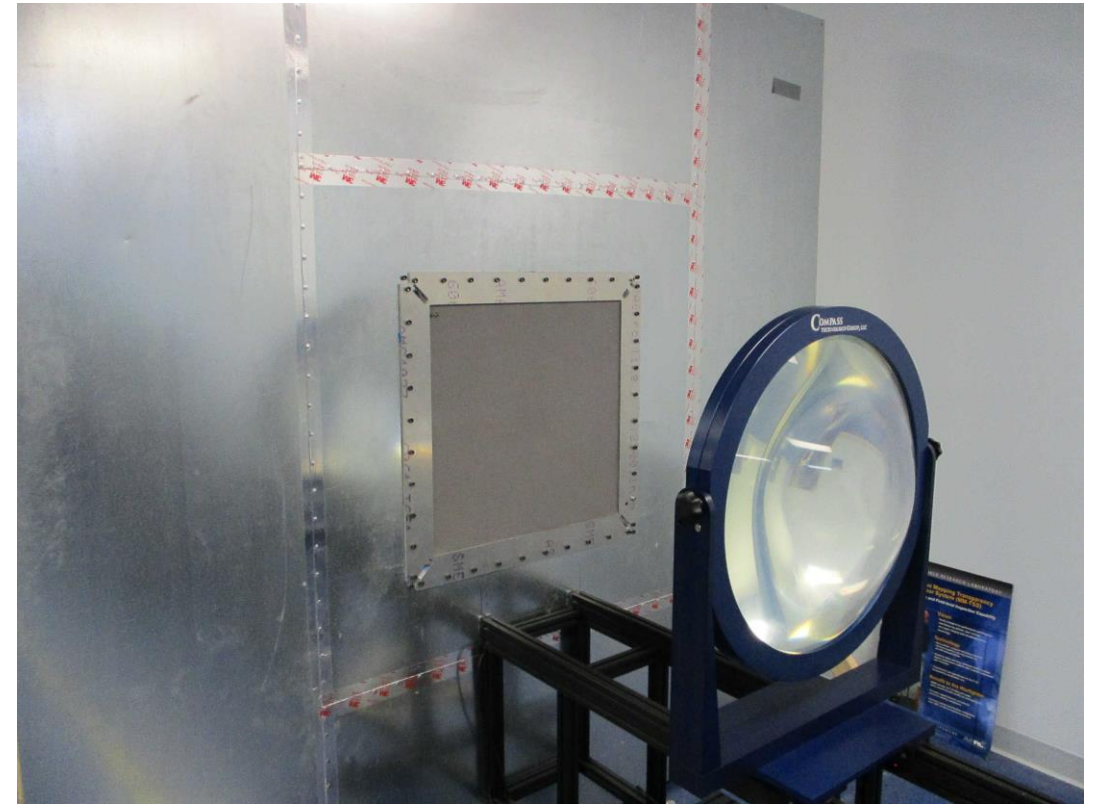
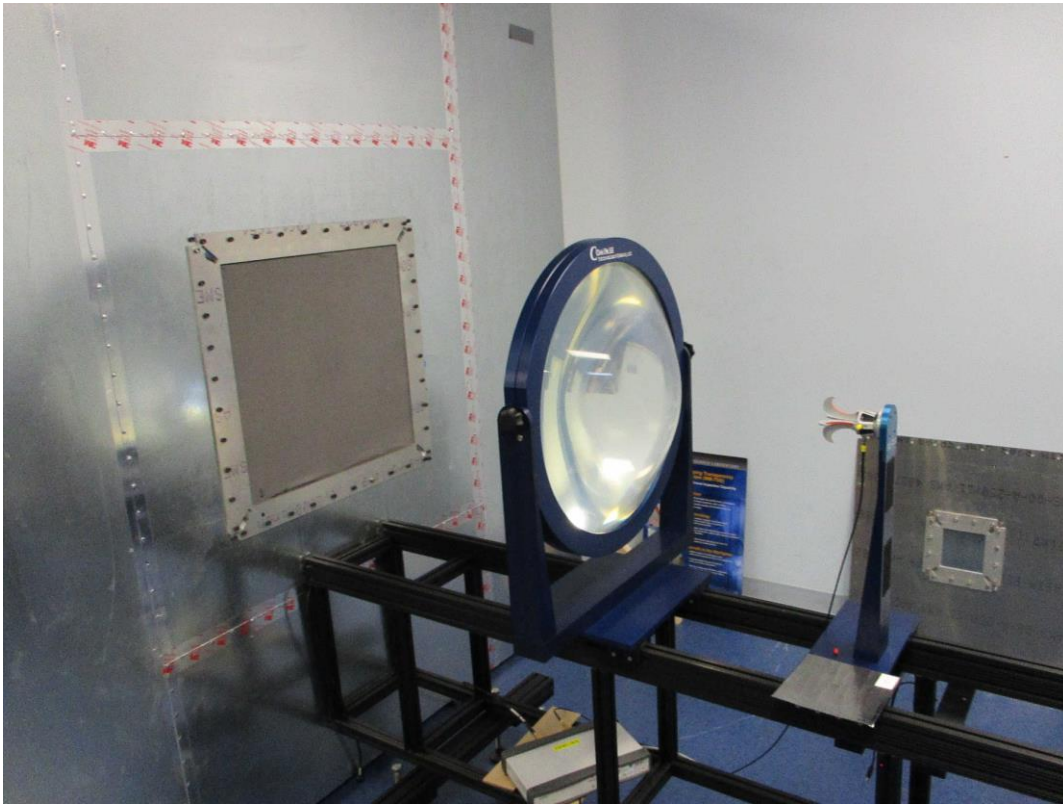
Transmission coefficients of 1 EMI shielding textiles were measured on CTG's Focused Beam and Millimeter-Wave Focused Beam (MMWFB) systems. These data were used to compute the shielding effectiveness of the materials.

- Measured by: *Nick Schultz and Brenda Negrete*
- Interpreted by: *John Schultz and Zander Borders*



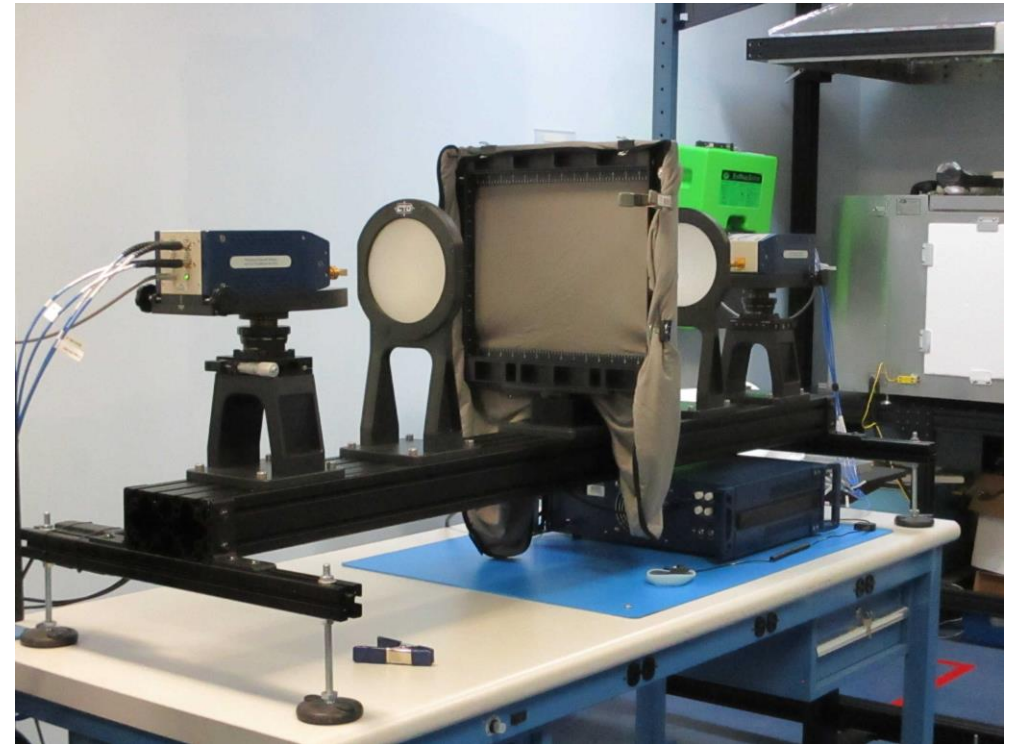
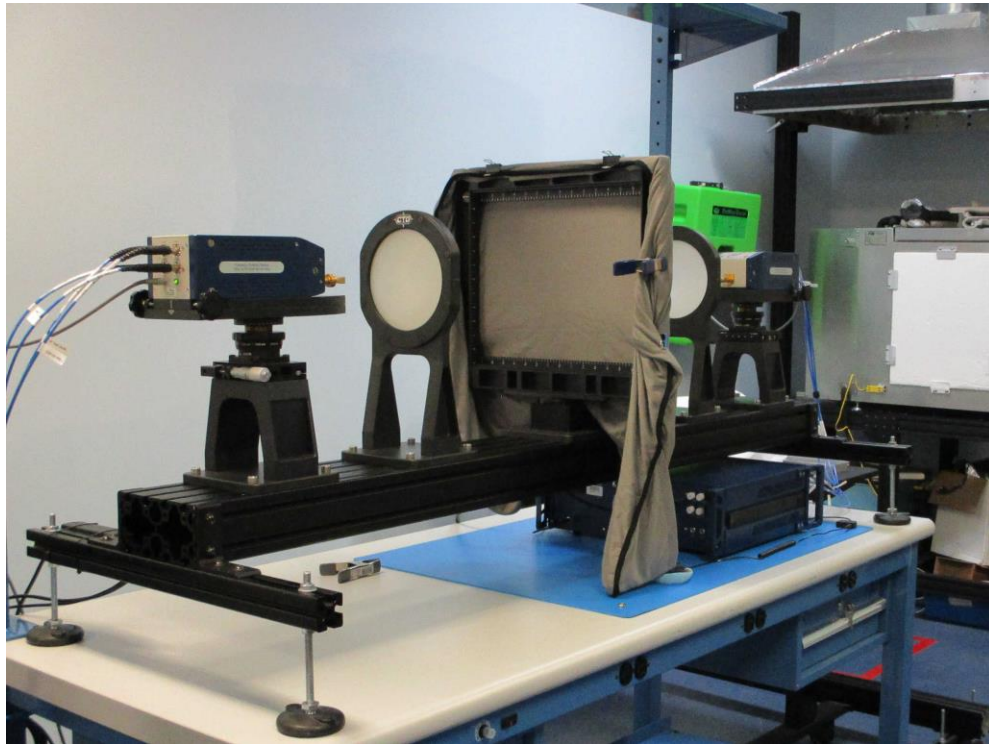
# Test Details

- Photos of SafeSleeve specimens and CTG Focused Beam system:



# Test Details

- Photos of SafeSleeve specimens and CTG MMWFB system:





# Test Details

**Table 1: Measurement Equipment**

Measurement System(s)	<ul style="list-style-type: none"><li>• CTG Focused Beam</li><li>• CTG MMWFB</li></ul>
Network Analyzer(s)	<ul style="list-style-type: none"><li>• Anritsu ShockLine MS46122B (10-40 GHz)</li><li>• Copper Mountain C4220 w/ Farran FEV-12 frequency extender modules (60-90 GHz)</li></ul>
Configuration Specifics	<ul style="list-style-type: none"><li>• Focused Beam: Inline with shielding wall, normal lens, normal incidence only, VV-pol.</li><li>• MMWFB: Inline, normal lens, normal incidence only, VV-pol.</li></ul>

# Test Details

**Table 2: Measurement Procedure**

Method/Calibration	Measured Reflection & Transmission ( $S_{11}$ , $S_{12}$ , $S_{21}$ , & $S_{22}$ ) and calibrated with a clearsite (no specimen) and metal plate.
Data Processing	Used time-domain gating with a 0.5 ns wide gate. Computed Shielding Effectiveness as $SE = - S_{21} $ in dB.
Inversion(s)	None.
Procedure	Standard Test Method: CTG-TM-0101-2020 ( <a href="https://compasstech.com/technical-library/">https://compasstech.com/technical-library/</a> )

# Specimen Description

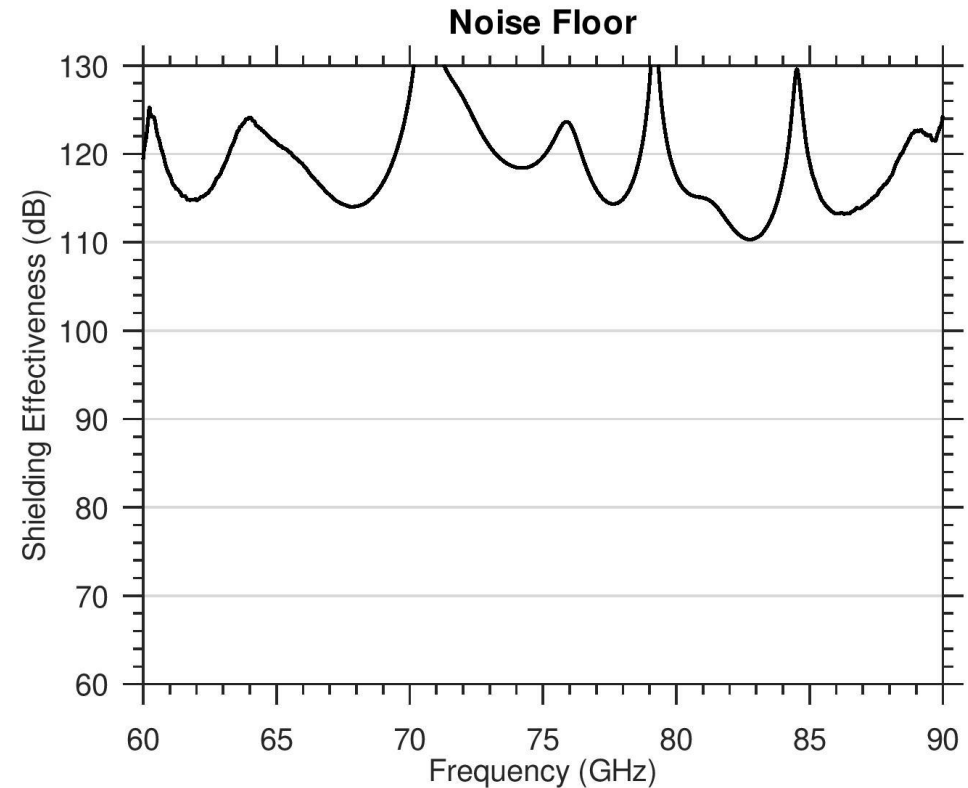
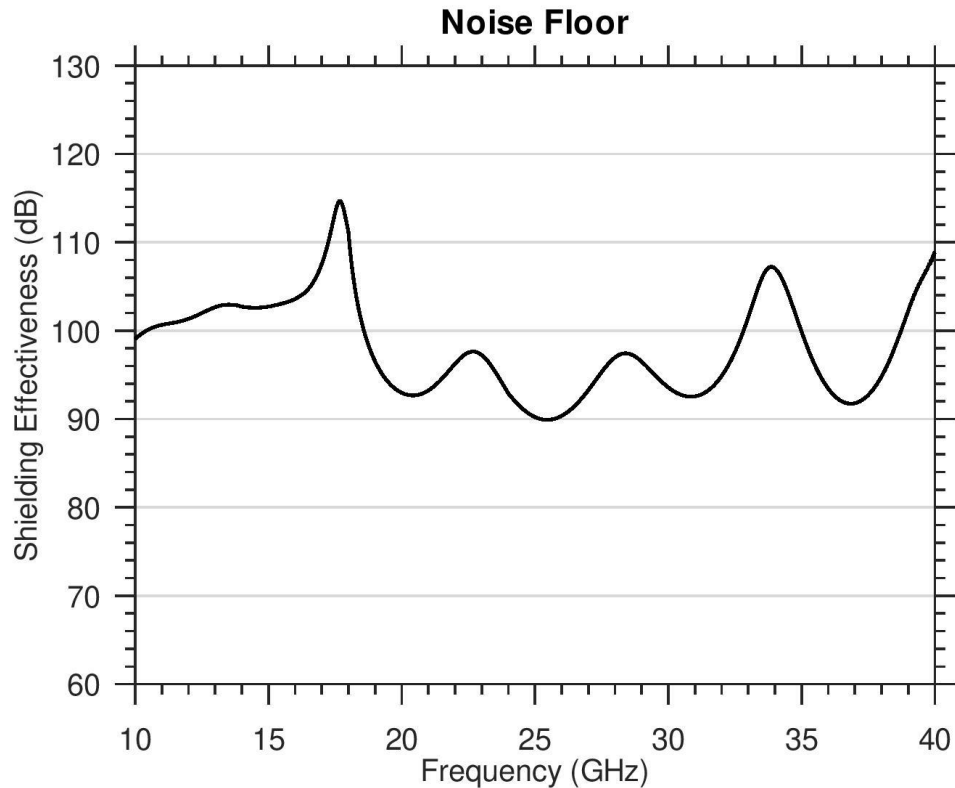
- Specimen descriptions:

CTG Label	Description	Avg. Thickness (in)
SAFS2201-01A03	Sleeve	N/A

## Remarks:

- Specimens were first measured in the MMWFB system, then cut to fit within existing 5.5" x 5.5" and 24" x 24" shielding wall specimen holders.
- Sleeve specimen (SAFS2201-01A03) was stapled around the edges to prevent layer separation after removing seam and corner pocket.

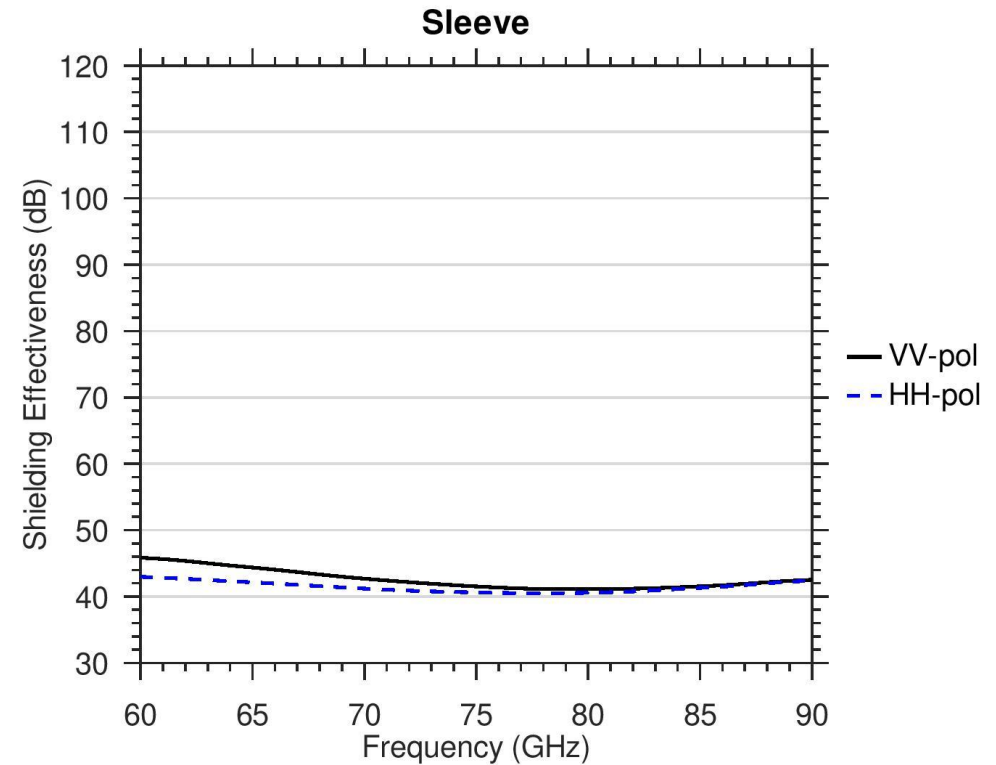
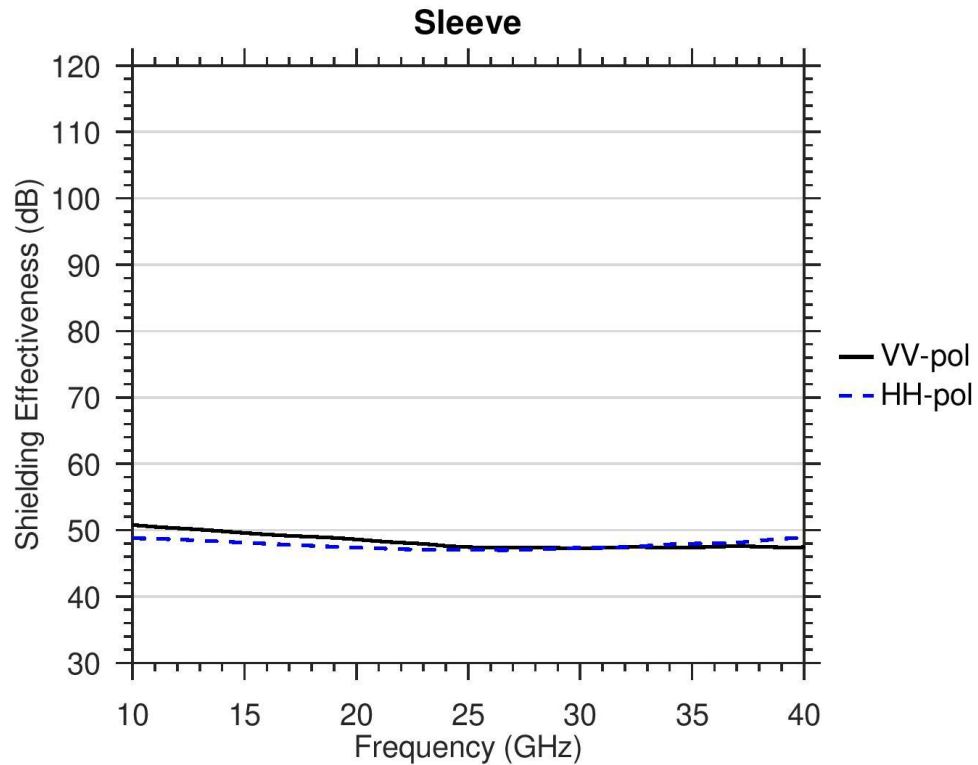
# Results:



- Plots show noise floor in terms of shielding effectiveness for the Focused Beam and MMWFB systems.
- 10-40 GHz (Focused Beam) on the right and 60-90 GHz (MMWFB) on the left.



# Results:



- Plots show shielding effectiveness of 1 specimen for 2 antenna polarizations.
- 10-40 GHz on the right and 60-90 GHz on the left.
- Solid black traces for VV-pol and dashed blue traces for HH-pol.

# Observations

- Shielding effectiveness of Sleeve specimen  $>40\text{dB}$  across all measured frequencies, i.e.  $>99.99\%$  power blocked by this material.
- Noise floor roll-off below  $10\text{GHz}$  likely caused by leakage around the  $8\text{ft} \times 8\text{ft}$  metal shielding wall.

# Company Information

Compass Technology Group (CTG) LLC was founded in 2011 and became an LLC in 2012. We started with a vision to take pioneering research and turn it into useful products that solve customers' real problems in situ, be that a manufacturing facility, field, depot or lab setting. We have grown to be a leading provider of cutting-edge radio frequency (RF) materials measurement equipment. Our systems are used in numerous manufacturing lines to provide high-quality data to electromagnetic materials and component manufacturers. We are also a go-to organization for solving some of the hardest RF materials characterization problems through contract research. And we support many customers with contract materials measurement services.

Cage Code.....6G0N3  
 Set-Aside.....WOSB  
 EIN.....45-4826162

DUNS # .....968612858  
 Organization .....LLC  
 NAICS...541712, 541330, 334511

