clearWave™ S500 is a low-loss thermoplastic material that provides excellent RF performance over the sub-6 GHz frequency range and performance superior to fiberglass over a wide range of mmW frequencies. Each sheet is pre-tested by ConcealFab to validate loss vs. frequency over mmW frequencies.

clearWave™ S500 is available for 3rd party fabricators to develop custom concealments for 4G and 5G applications. For optimized 4G and 5G concealments available from ConcealFab, please reference our Infrastructure Products Guide

KEY CHARACTERISTICS

- **Low transmission loss over a wide range of frequencies**
- **Low flammability**
- **Matte finish readily accepts paints and vinyl film**
- **Easy fabrication with common tools**
- **Bonds easily using PVC adhesives**

*****Note – Material must be painted or covered with vinyl film for long term UV protection***

SPECIFICATIONS

Property	Method	Units	Value
Thickness		mm (in)	12.7 (0.5)
Density		g/cm3	0.6
Modulus of elasticity	DIN 53 457	N/mm	975
Flexural strength	DIN 53 455	N/mm2	25
Shore hardness	DIN 53 453	Shore D	50
Heat deflection temperature	DIN 53 461	°C	60
Coefficient of linear thermal expansion	DIN 53 752	1/°C	8.0 x 10-5
Water absorption	DIN 53 495	%	<0.3
Flammability	UL 94		VO
Flame spread / smoke developed	ASTM E84-03		45 / 850
Dielectric constant	ASTM D2520, Method A		24 GHz = 1.67 28 GHz = 1.62 39 GHz = 1.57
Loss tangent	ASTM D2520, Method A		24 GHz = .0054 28 GHz = .0055 39 GHz = .0058

Values shown are standard values that apply to an average density. Small variations will occur depending on the sheet thickness. Technical specifications are subject to change.

ORDERING INFORMATION

Part Number	Description
900600-048096	clearWave™ S500 sheet, 48-inch x 96-inch

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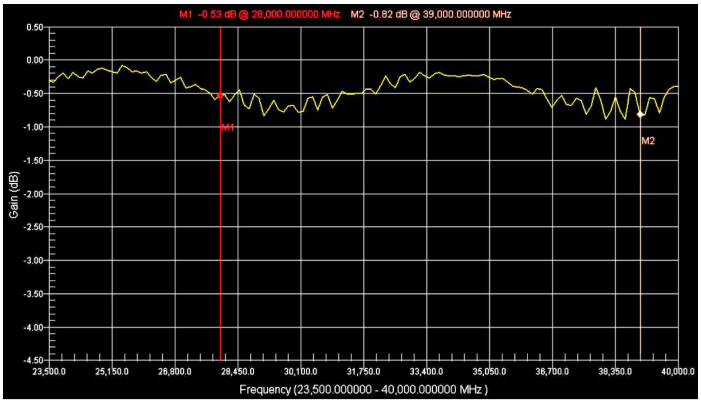
mmW PERFORMANCE

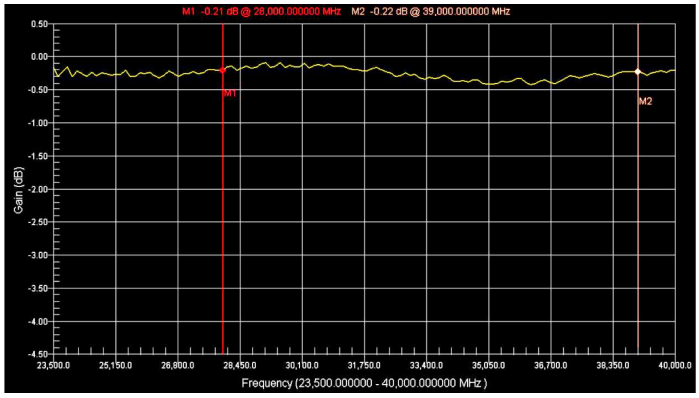
The following data is provided to show typical performance of clearWave™ S500 over mmW frequencies. Screening materials are electrically thick in this frequency range and can have a significant impact on system performance.

FAR FIELD TRANSMISSION LOSS

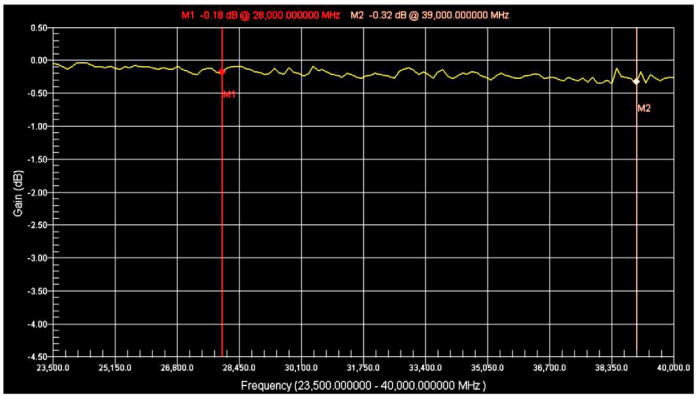
Traditional far field transmission loss data is provided from 23.5 GHz to 40 GHz, at 0, 30, 60 degree angles of incidence for both parallel and perpendicular polarizations. This test shows the energy that is lost due to reflection and absorption as the wave passes through the screen material at different angles of incidence. Reflection is minimized when the path through the material is multiples of ½ wavelength and when the electric field is parallel to the plane of incidence.



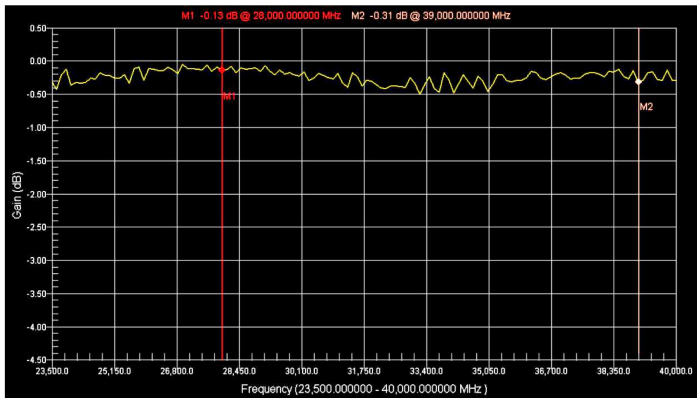
0° orientation – parallel polarization



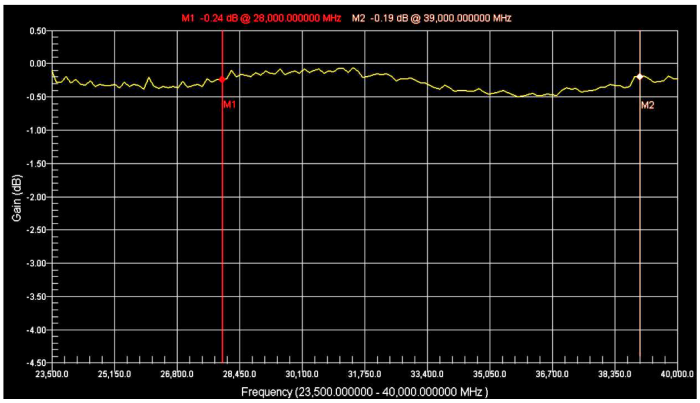
0° orientation – perpendicular polarization



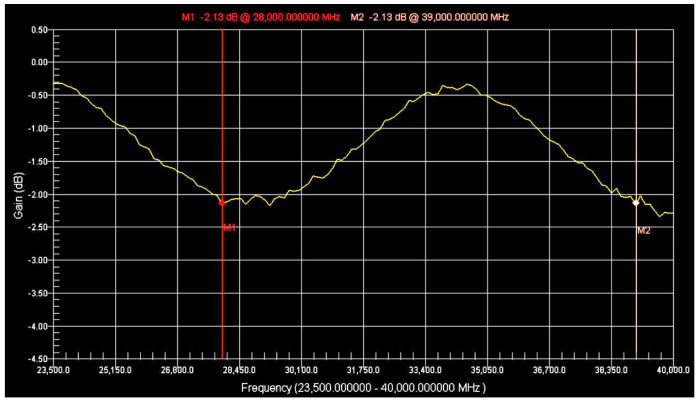
30° orientation – parallel polarization



30° orientation – perpendicular polarization



60° orientation – parallel polarization



60° orientation – perpendicular polarization

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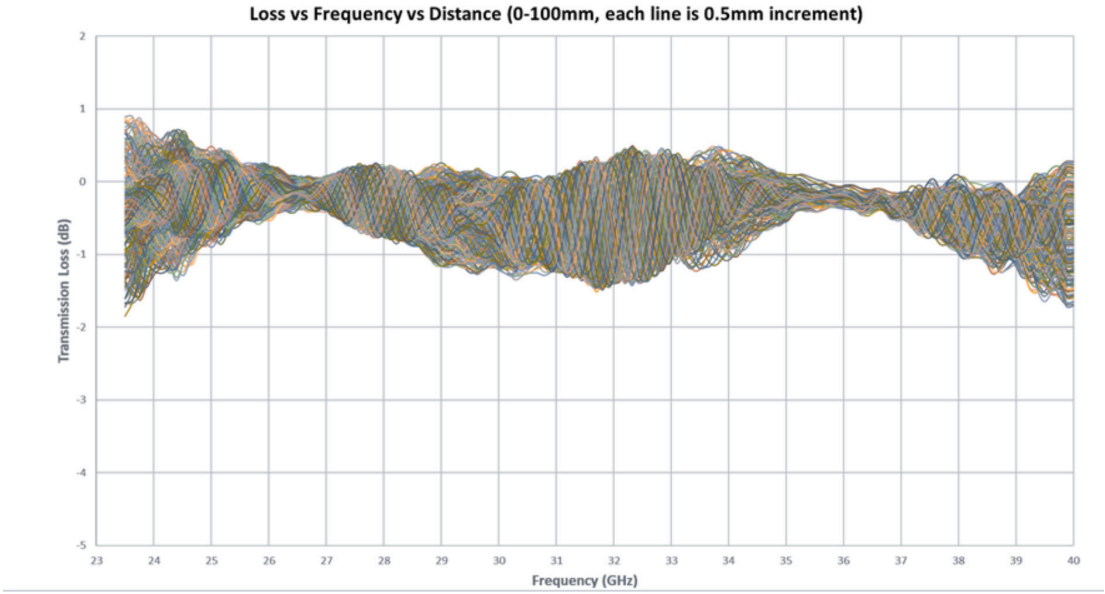
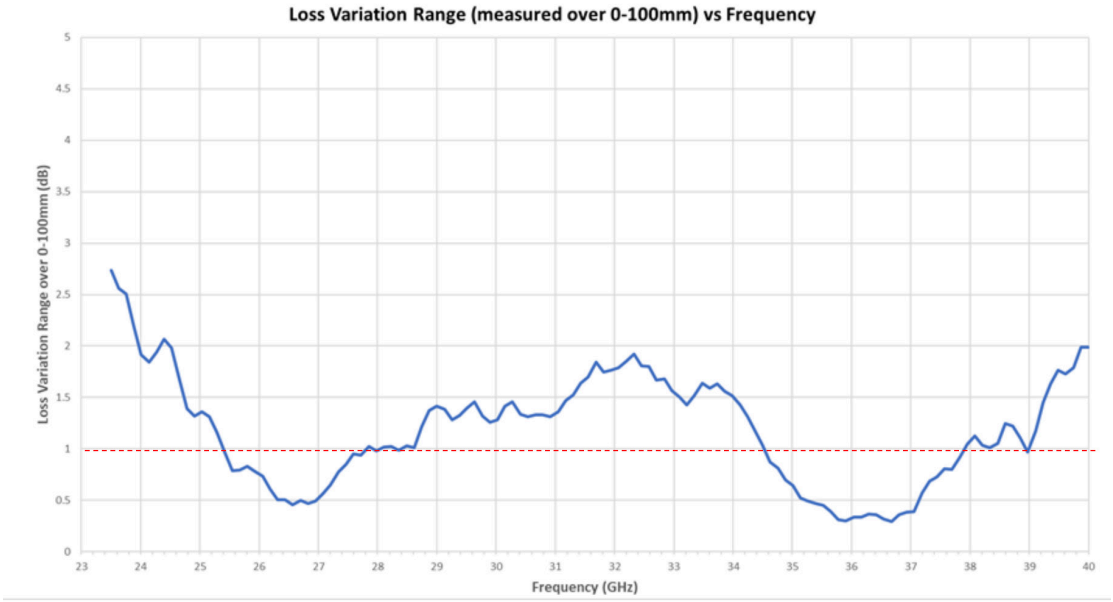
NEAR FIELD LOSS VS. DISTANCE

For typical mmW deployments the screening material is placed in the near field of the antenna, not the far field. This can cause a "lensing effect" that greatly impacts performance. The loss vs. distance test, or "Cyclone chart" shows how sensitive a material is to placement in front of the antenna. At frequencies with high variation in loss, more care must be taken to optimize screen location. At frequencies with low variation, screen placement will have less impact on over-all performance. The Cyclone chart for 0.25-inch thick fiberglass is included for reference, showing why this material is not appropriate for use in front of 5G mmW radios.

clearWave™ S500 Cyclone chart



clearWave™ S500 peak-to-peak variation summary



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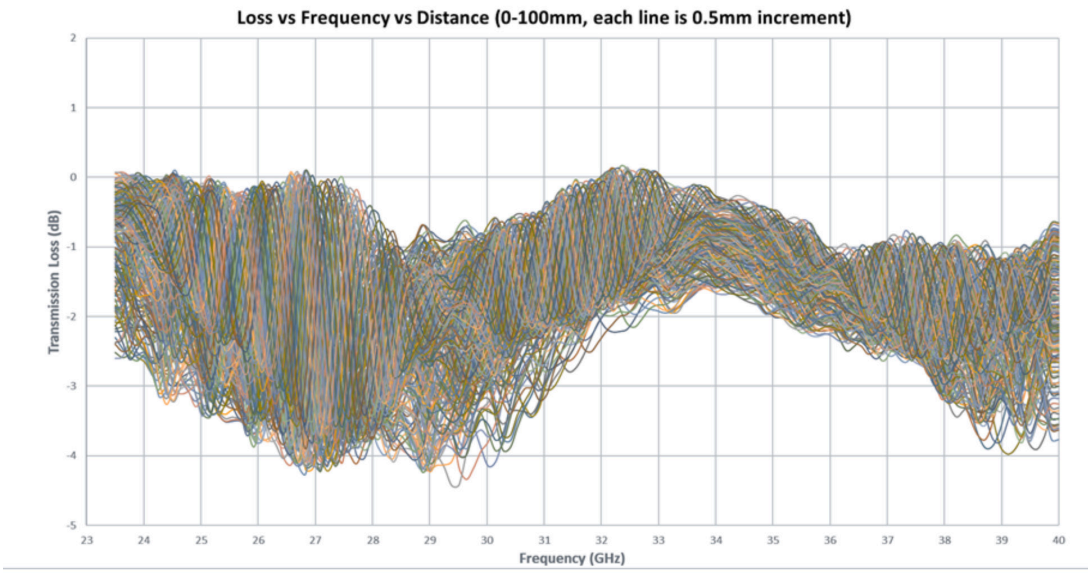
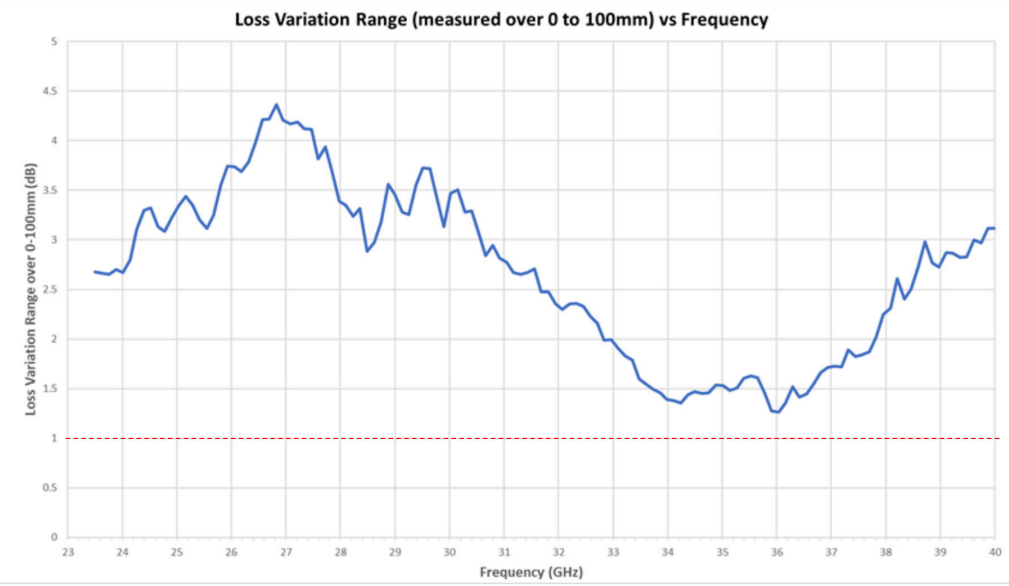
Fiberglass Cyclone chart (for comparison)



Fiberglass peak-to-peak variation summary (for comparison)



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