APPLICATION BRIEF
FDM

Advancing Your Competitive Advantage with OpenAM: Next-Generation 3D Printed EMI/RF Shielding

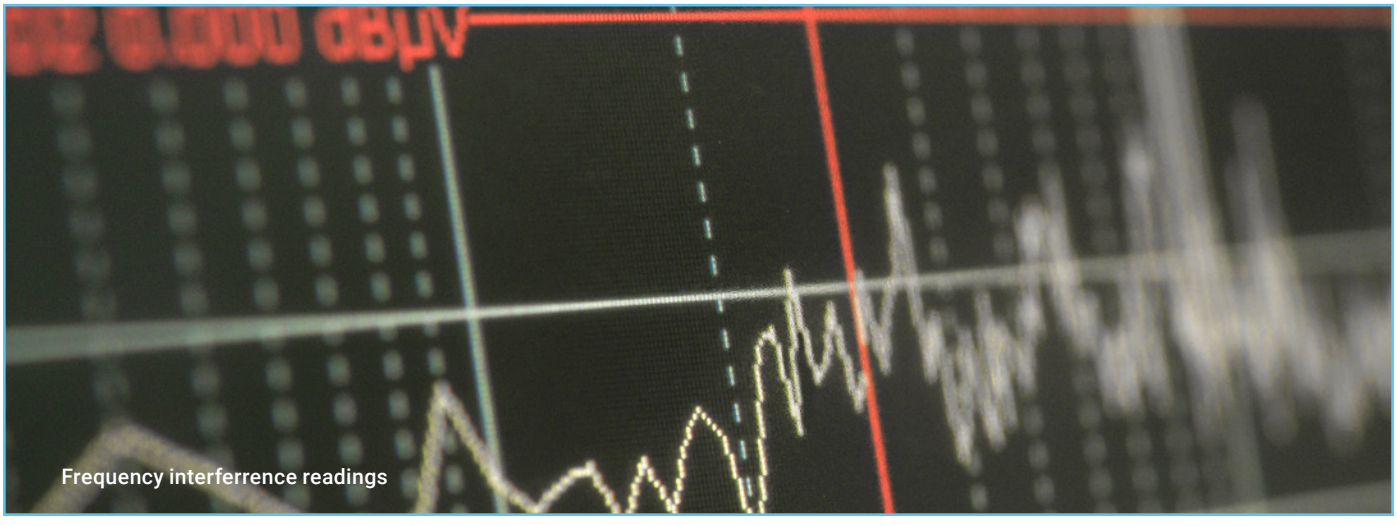
In 2023, the global EMI shielding market was valued at an impressive $7 billion, and it is expected to reach $9.4 billion by 2028. As the demand for reliable and precise protection against electromagnetic interference continues to grow, businesses must adapt to stay competitive in this rapidly evolving market.

Growing EMI Challenges

Precise protection against electromagnetic interference (EMI) is crucial for electronics to function in scenarios like natural disasters, warfare, and field medical interventions. EMI and RF shielding materials are tailored to each application, varying by area size, space shape, and the frequencies to be blocked. Military testing specifications (MIL-STD-461A through F) introduce additional complexities, such as temperature extremes. The constant arrival of new electronic devices and microwave technology calls for expanded options for advanced shielding applications. With a dynamic EMI/RF environment to address, 3D printing, especially Fused Deposition Modeling (FDM®) materials, offers quick solution production.

Filled polymer materials used in extrusion-based 3D printing provide superior EMI/RF shielding, and are lighter than all-metal alternatives. Options like copper, tungsten, or barium titanate-filled polymers cater to diverse applications. These polymer formulations negate the need for complex machining or vapor deposition processes and are relatively easy to customize. They meet the criteria for complex combinations of EMI/RF factors and physical implementation. Additionally, ongoing research suggests that adjusting fused filament (FFF/FDM) printing parameters can influence targeted adjustments to attenuation efficacy.

OpenAM™ software unlocks the full potential of the Fortus 450mc™ and F900® printers, allowing you to explore custom-filled, non-Stratasys materials and access additional printing parameters. This powerful software tool enables you to translate research findings into practical, repeatable, and reliable FDM printed applications.



Frequency interferrence readings

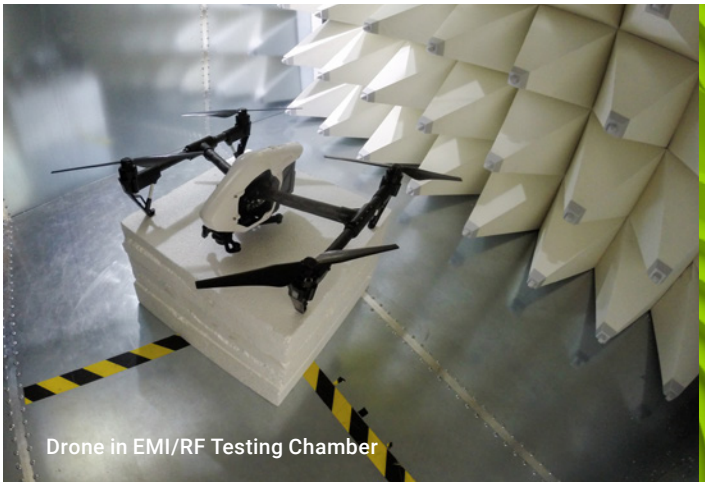
	Natural Soures	Manmade Sources	Intersystem Interference
Space	Cosmic rays	Advanced EM weaponry	
	Static noise	High altitude EMP	Space and air
Air	Atmospheric noise	Broadcast towers	Land and space
		Cell towers	Land and air
	Solar noise	Incidental EMI	Between onboard systems
		Radar	
Land	Lightening	Long and short radio waves	Land and sea
		Microwaves	Sea and space
Sea	Electromagnetic radiation	Electronic equipment	Sea and air
		Portable devices	
		Hull generated EMI	

The EMI/RF situation is congested in all environments. Disruptive frequencies are emitted by both friendly and adverse devices, overlap in range and are constantly changing as new technology is released.

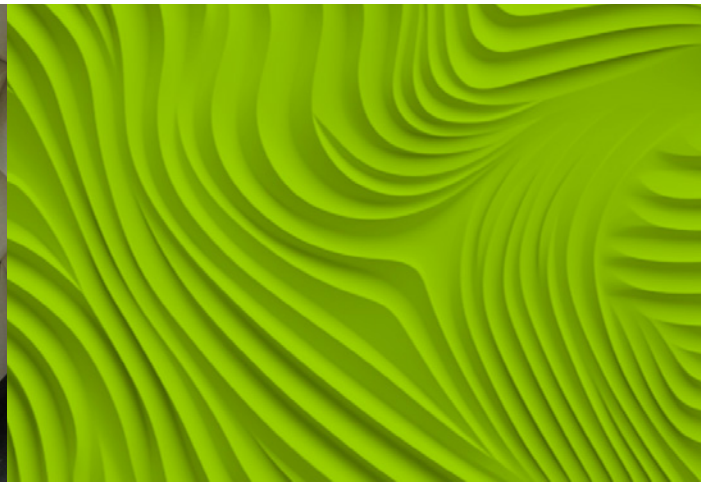
Harnessing OpenAM Software to Develop Enhanced Material Performance Results

OpenAM software grants expert FDM engineers access to 3D printer control process parameters. This allows them to adjust time and temperature variables during printing, surpassing the capabilities of Insight™ or GrabCAD Print™ software. With OpenAM, users can intentionally control mechanical properties, surface finish, and shielding levels when working with high requirement materials by adjusting nozzle temperature, oven temperature, print speed, and approximately 40 other parameters that integrate with GrabCAD Print and Insight processing software.

Compared to CNC machining and mold production, testing cycles with OpenAM on a Stratasys Fortus® printer are shorter and more cost-effective. Leveraging FDM printing and additive design enables solutions for almost any fit or form factor.



Drone in EMI/RF Testing Chamber



Ensuring Repeatable and Reliable Results with OpenAM

Adhering to defense and military standards necessitates a consistent and dependable production system. Using OpenAM on Stratasys FDM printers, users can enhance desired properties down to specific sections of a geometry, improving part performance and shielding capabilities. Testing and developing with OpenAM on the Fortus 450mc or F900 ensures repeatable and reliable results that can be seamlessly transferred to production within the OpenAM software ecosystem.

Get Expert Guidance on Optimizing Your EMI/RF Shielding

To learn how OpenAM and Stratasys printers can advance EMI/RF shielding for your applications, connect with a Stratasys representative today. Schedule a free consultation to discuss your specific needs and receive personalized recommendations from our expert team.

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Certified

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