



OTS EMSS Electromagnetic Shielded Structures On-Going Enhancements Jan. 2020

OTS constructs multi-threat configurable structures comprised of an integrated composite concrete Electromagnetic Shielding System (EMSS). Protected threats include electromagnetic shielding exceeding Mil STD 188-125.

- a) **Integrated conductive concrete and imbedded mesh composite (grounded).**
- b) **Proprietary construction methods forming a high integrity integrated structural and electromagnetic shielding envelope.**

DEVELOPMENT HISTORY:

- **Stratcom - DTRA Research Program by the University of Nebraska (UNL)**
 - **Objective: Conductive concrete as a better electromagnetic shielding construction material**
 - **Result: Initial material research and patents**
- **On-going OTS Sponsored Research Collaboration with UNL and OTS's own R&D**
 - **Results: Commercialized Constructible Structures**
 - Exclusive Patents**
 - Patent Derivatives**
 - Material and Method trade secrets**
- **OTS License for all UNL electromagnetic shielding intellectual property**
 - **All patents and derivatives.**

OTS EMSS ADVANTAGES:

OTS's Electromagnetic shielding system (EMSS) offers cost and schedule advantages over traditional shielding methodologies.

Savings over traditional steel shields:

- **Multi Threat Protection in a single structure**
 - **Kinetic Threats**
 - **Blast**
 - **Ballistic**
 - **Hurricane/Tornado/Wind**
 - **Electromagnetic Protection**



- > 30% Cost savings over steel
- 50% schedule savings over steel
- 80% annual maintenance savings over steel

CONSTRUCTION ADVANTAGES

➤ **FASTER BUILD CYCLE**

- *Hardened buildings + shielding installed in < 10 months from foundation to dried in*
- *No special attachments required for mechanical, electrical, plumbing and finish work inside shielded space*
- *No waiting for building to be completed prior to starting on a welded shielding system*
- *No waiting for the shielding system to be installed prior to installation of MEPs and finishes*
- *Reduced testing cycles due to shielding envelope being completed prior to MEP installation*

➤ **MORE DURABLE / MORE FAULT TOLERANT CONSTRUCTION MATERIAL**

- *Through initial build and throughout life cycle*
- *Shielding shotcrete structures less vulnerable to damage during both construction and operation*

➤ **EASE OF INTERIOR INSTALLATION**

- *Allows for most conventional MEP and finish work inside and outside of the shielded space*

➤ **INCREASED LONGEVITY / DECREASED MAINTENANCE**

- *Life cycle testing and maintenance requirements minimized (as compared to MIL STD require entire welded building being tested every 6 months) Degradation of some steel system can be seen in less than 6 months*
- *Reduced identification and mitigation time of leaks due to absorption properties of concrete*



OTS EMSS Successfully Deployed for Utility Projects:



OTS continues to develop onsite and offsite construction solutions to accommodate the multiple needs of our clients. These include pre-fabricated modules, and panelization for smaller projects that can be transported into remote sites for final assembly.

Scaleable levels of shielding can be provided as required with utilization of varying thickness of panels and embedded shielded elements. From 40 dB - 100 dB can be designed and constructed.

As part of the on-going R&D and continuing drive for lower cost structures, OTS constructed a prototype building, OTS Integrated Shielded Test Structure, to validate the next generation OTS EMSS materials and methods allowing the shielded envelope to be 10 inches instead of the previous 12 inches. ATSI with 28 years of military and civilian testing experience conducted the testing, Test results establishing Mil STD 188-125 shielding compliance is below:

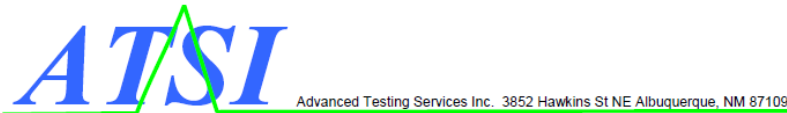


1.5 Executive Summary

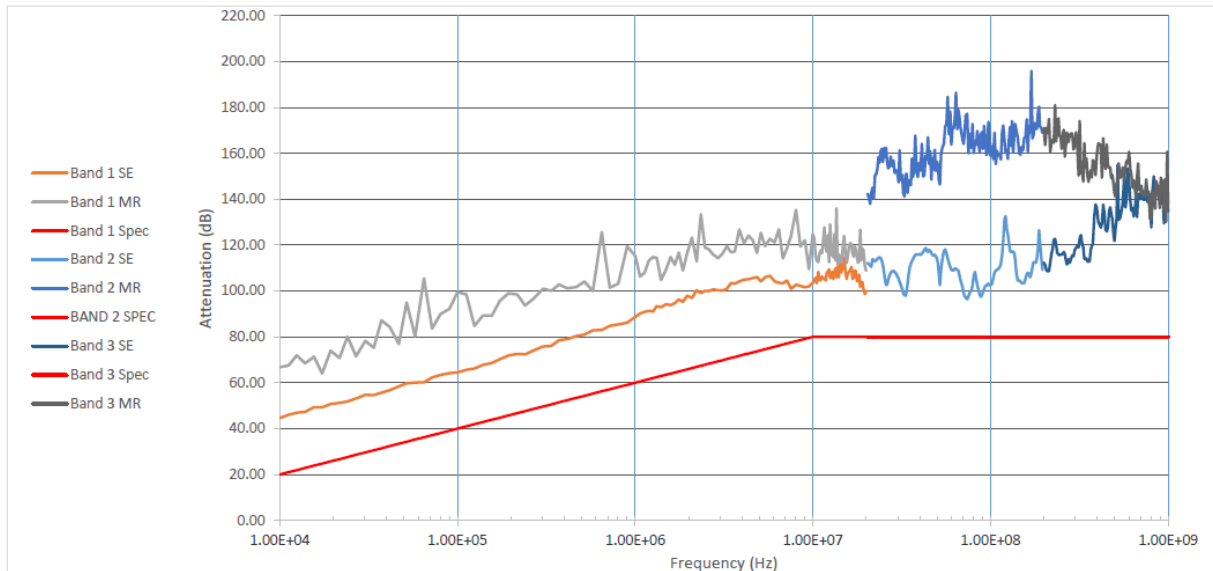
MIL-STD-188-125-1 Appendix A acceptance testing was performed on one RF shielded enclosure, the OTS Integrated Shielded Test Structure known as OTS ISTS. This testing took place at Omni-Threat Structures located in Lakeland, Florida. Testing took place on December 4, 2019. with no deviations of MIL-STD-188-125-1 Appendix A. The OTS ISTS under test successfully satisfied all pass/fail criteria specified.

2.0 OTS Integrated Shielded Test Structure Description

The OTS Integrated Shielded Test Structure consists of a 10 inch thick cube of OTS proprietary, licensed conductive concrete mix with two embedded shielding grids. The approximate dimensions of the OTS Integrated Shielded Test Structure are 8' x 8' x 10'. One RF door and four WBC pipe penetrations installed as part of the RF shield barrier.



Shielding Effectiveness Measurement-OTS Integrated Shielded Test Structure-Test Point 3 HOR



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