EMC SHIELDING EFFECTIVENESS TEST REPORT

Test Specification : MIL-DTL-83528H
Manufacturer : Specialty Silicone Products, Inc.
Test Samples :
1. ***SSP2529***
2. ***SSP2551***

DOCUMENT HISTORY				
REVISION	**ISSUE DATE**	**AFFECTED PAGE(S)**	**DESCRIPTION OF MODIFICATIONS**	**REVISED BY**
1.0	20 September 2018		Initial release	

TEST REPORT NO. 24010
from
D.L.S. Electronic Systems, Inc.

Test for Specialty Silicone Products, Inc

WRITTEN BY	**REVIEWED BY**	**REVIEWED BY**
Jereme Irwin	Jack Prawica	Brian Mattson

TEST PERSONNEL	**TITLE**
Jereme Irwin	EMC Test Engineer

TEST DATE(S)	September 19, 2018

TEST FACILITY	D.L.S. Electronic Systems,
ADDRESS	1250 Peterson Drive
CITY, STATE, ZIP CODE	Wheeling, IL. 60090
PHONE	(847) 537-6400
FAX	(847) 537-6488

ADMINISTRATIVE SUMMARY

REASON FOR TEST:

To test the shielding effectiveness of various Gasket materials as specified in MIL-DTL-83528H.

TEST SPECIFICATION:

MIL-DTL-83528H Standard for Measuring the Effectiveness of electrically conductive elastomeric shielding gaskets.

DATE(S) OF TEST:

September 19, 2018

TEST SAMPLES:

A total of two samples was presented for testing. Refer to Section 2 of this report for a description of each test sample along with the manufacturer's designation.

MANUFACTURER:

Specialty Silicone Products, Inc
Corporate Technology Park
3 McCrea Hill Road
Ballston Spa, NY 12020

MANUFACTURERS REPRESENTATIVE:

Dominic J Testo

DISPOSITION OF TEST SAMPLE:

The samples will be returned to SSP, Inc.

TEST LOCATION:

D.L.S. Electronic Systems, Inc.
1250 Peterson Drive
Wheeling, IL. 60090

TEST PERSONNEL:

Jereme Irwin	EMC Test Engineer

SUMMARY OF TEST RESULTS:

The shielding effectiveness of the test samples can be found in data sheets located in Appendix C of this report.

TABLE OF CONTENTS

INTRODUCTION

This report documents the results of a series of EMI/EMC measurements performed on the test samples described in Section 2 of this report. The purpose of this series of tests was to demonstrate compliance of the test sample(s) with the requirements of the MIL-DTL-83528H Specification for comparison data of two test samples using a MIL-DTL-83528H test fixture.

The testing procedure was verified before testing by a Specialty Silicone Products, Inc. representative.

SECTIONS

SECTION 1 - CLIENT INFORMATION

COMPANY NAME ADDRESS CITY, STATE ZIP	**Specialty Silicone Products, Inc Corporate Technology Park 3 McCrea Hill Road Ballston Spa, NY 12020**
CONTACT NAME TITLE PHONE E-MAIL	**Dominic J Testo Account Representative (518) 363-5034 DTesto@sspinc.com**

MANUFACTURER ADDRESS CITY, STATE ZIP	**Specialty Silicone Products, Inc Corporate Technology Park 3 McCrea Hill Road Ballston Spa, NY 12020**

SECTION 2 - PURPOSE OF TEST

The purpose of this series of tests was to verify the shielding effectiveness of two samples for comparison to previous testing performed at DLS Electronic Systems, Inc.
A controlled compression of the gasket was set to 10%.

SECTION 3 - TEST SAMPLE DESCRIPTION

The following table provides a list of each type of gasket tested.

NO.	*Gasket Material*	*Material Description*
1.	**SSP2529**	Nickel plated aluminum is silicone
2.	**SSP2551**	Nickel plated aluminum in fluorosilicone

SECTION 4 - TEST SITE; FACILITIES, CONDITIONS AND TOLERANCES

The EMI measurements were performed through a test fixture designed to the MIL-DTL-83528H test specification. A modified MIL-DTL-83528H test fixture was located between two adjacent shielded enclosures. The receive chamber and the control (transmit) chamber meets the applicable requirements of NSA65-6. AC power is supplied to each enclosure from a dedicated isolation transformer through low-pass line filters, which provide a minimum of 120 dB of attenuation from 10 kHz to 10 GHz.

SECTION 5 - TEST EQUIPMENT

A complete test system equipment list is provided in APPENDIX A of this report. The equipment absolute performance calibration, of the equipment requiring calibration, is performed on an as needed basis in accordance with MIL-STD-45662. However, calibration periods do not exceed one (1) year. The test equipment is capable of making measurements within tolerances of at least +/- 2 dB amplitude and +/-2% frequency deviation. Equipment certifications showing traceability to NIST (National Institute of Standards and Technology) are maintained on file at D.L.S. Electronic Systems in Wheeling, IL. All equipment is checked and verified for proper operation before and after each series of tests.

SECTION 6 - TEST RESULTS

The following table lists the results for each of the test samples.

NO.	*Material*	*MINIMUM ATTENUATION LEVEL (dB)*	*BEST-CASE ATTENUATION LEVEL (dB)*
1.	**SSP2529**	**110@20MHz**	**140@800MHz**
2.	**SSP2551**	**112@20MHz**	**143@200MHz**

The materials listed above were tested for informational purposes only. No material type was given or applied.

SECTION 7 - SHIELDING EFFECTIVENESS MEASUREMENTS

Detailed data sheets, which provide the entire shielding effectiveness results across the entire frequency range for each of one sample, are provided in APPENDIX C of this report. The following information provides a description of the test data sheet information.

All amplitude measurement levels are recorded in dBuV.
Attenuation Levels are recorded in dB.

The data sheets contain the following categories:

- Frequency: Discreet frequency at which measurement was made. Recorded as MHz or GHz.
- Reference Level: Test level with shielding material not in place. This is an amplitude level recorded in dBuV.
- Attenuation: Added attenuation (10dB) to input of receiver when measuring the reference level so not to damage receiver; attenuation removed for testing of gasket. This value is added to the test level.
- Test Level: Measurement made with shielding material in the test fixture. This is an amplitude level recorded in dBuV.
- Shielding Effectiveness: Equal to [Reference Level minus the (Test Level minus the pre-amp)]. The result is in dB units.

APPENDIX A - TEST EQUIPMENT

A.1 Specific Equipment Used

Description	Manufacturer	Model Number	Serial Number	Range	Cal On	Cal Due Dates
Antenna, Biconical	Electro-Metrics	BIA-25	2614	20-300MHz	8/30/18	8/30/19
Antenna, Horn	ETS-Lindgren	3117	00135193	1GHz-18GHz	10/27/17	10/27/18
Antenna, Horn	EMCO	3106	9501-2607	200MHz-2GHz	9/06/18	9/06/19
Antenna, Horn	EMCO	3117	00055158	1GHz-18GHz	8/26/16	8/26/17
Cable, 25ft, BNC-BNC, RG223/U	Pasternack Enterprises	PE3087-300	25ft. SN038	10kHz-1GHz	7/18/18	7/18/19
Cable, 25ft, BNC-BNC, RG223/U	Pasternack Enterprises	PE3087-36	3ft. SN06	10kHz-1GHz	7/18/18	7/18/19
Cable, 2ft, N-N	Teledyne Storm Products	57500	02	1GHz-18GHz	12/22/17	12/22/18
Cable, 2ft, N-N	Teledyne Storm Products	57500	03	1GHz-18GHz	12/22/17	12/22/18
Cable, 10ft, N-N	Teledyne Storm Products	57500	02	1GHz-18GHz	12/22/17	12/22/18
Cable, 10ft, BNC-BNC, RG223/U	Pasternack Enterprises	PE3087-72	10ft. SN01	10kHz-1GHz	7/18/18	7/18/19
Generator, Signal, 1G-40GHz	Rohde & Schwarz	SMR 40	100052	1GHz-40GHz	10/30/17	10/30/18
Generator, Signal	Rohde & Schwarz	SML01	101606	9kHz-1.1GHz	3/22/18	3/22/19
Spectrum Analyzer	Agilent Technologies	E4446A	MY46180377	3Hz-44GHz	5/01/18	5/01/19
Antenna, Biconical	EMCO	3109	9803-3163	20MHz-300MHz	N/A	N/A
Antenna, Horn	EMCO	3106	00042811	200MHz-2GHz	N/A	N/A

APPENDIX B - DESCRIPTION OF TEST METHODS

B.1 SHIELDING EFFECTIVENESS MEASUREMENTS

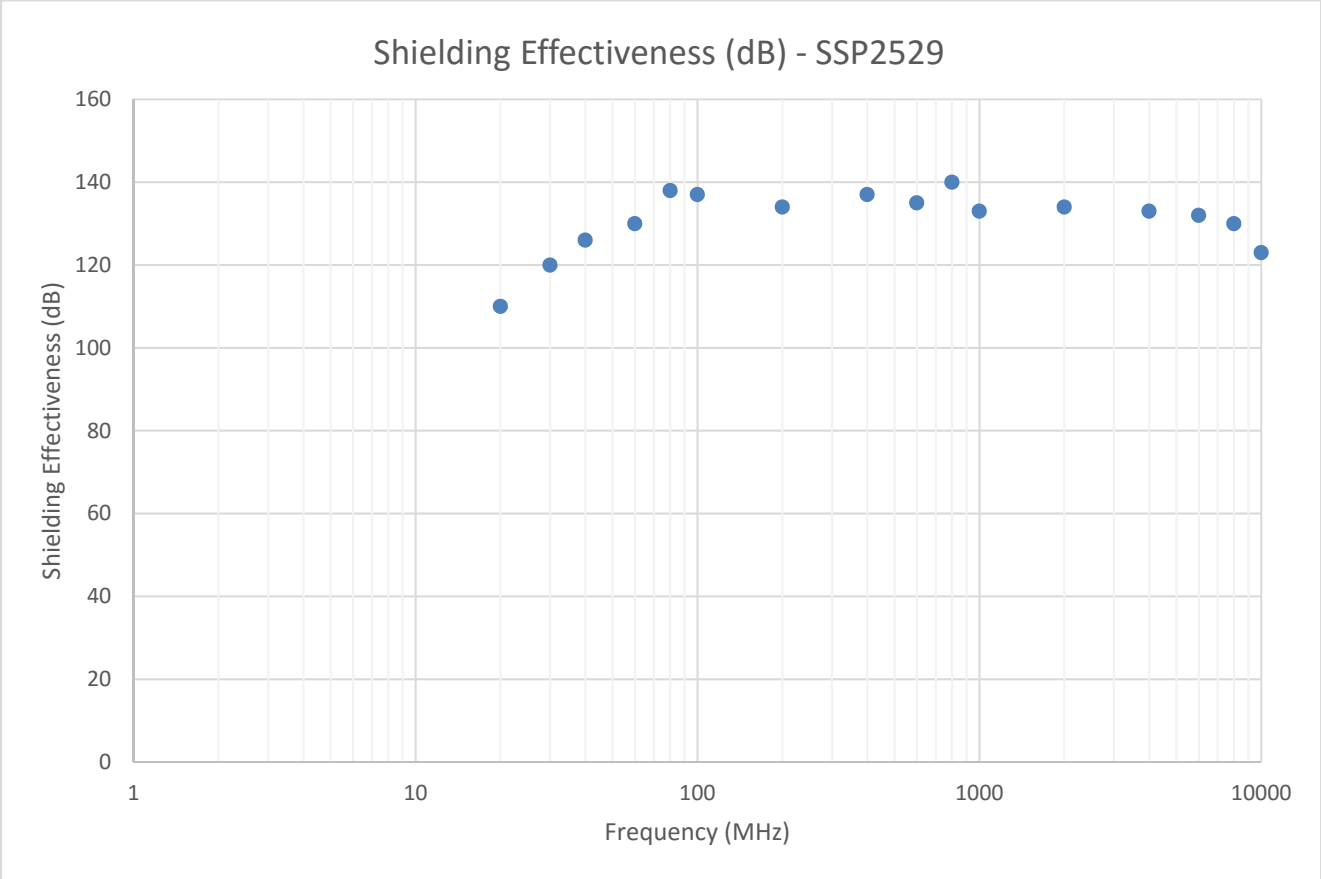
The shielding effectiveness measurements were made in accordance with MIL-DTL-83528F using a spectrum analyzer and a signal generator in conjunction with the appropriate power amplifiers and antennas. The transmitting antenna was located inside of a shielded control chamber located adjacent to the Receiving chamber. Reference levels were measured through the 26 inch by 26 inch opening in the shielded enclosure without the test sample in place. The minimum reference level recorded was 100dB for all frequencies 20MHz-10GHz. References were made with the antennas positioned in horizontal polarity separated by 2 meters for 20-1000MHz and 1 meter for 2-10GHz.

The test levels were then recorded at each frequency and attenuation values were determined by calculating the difference between the reference level and the test level.

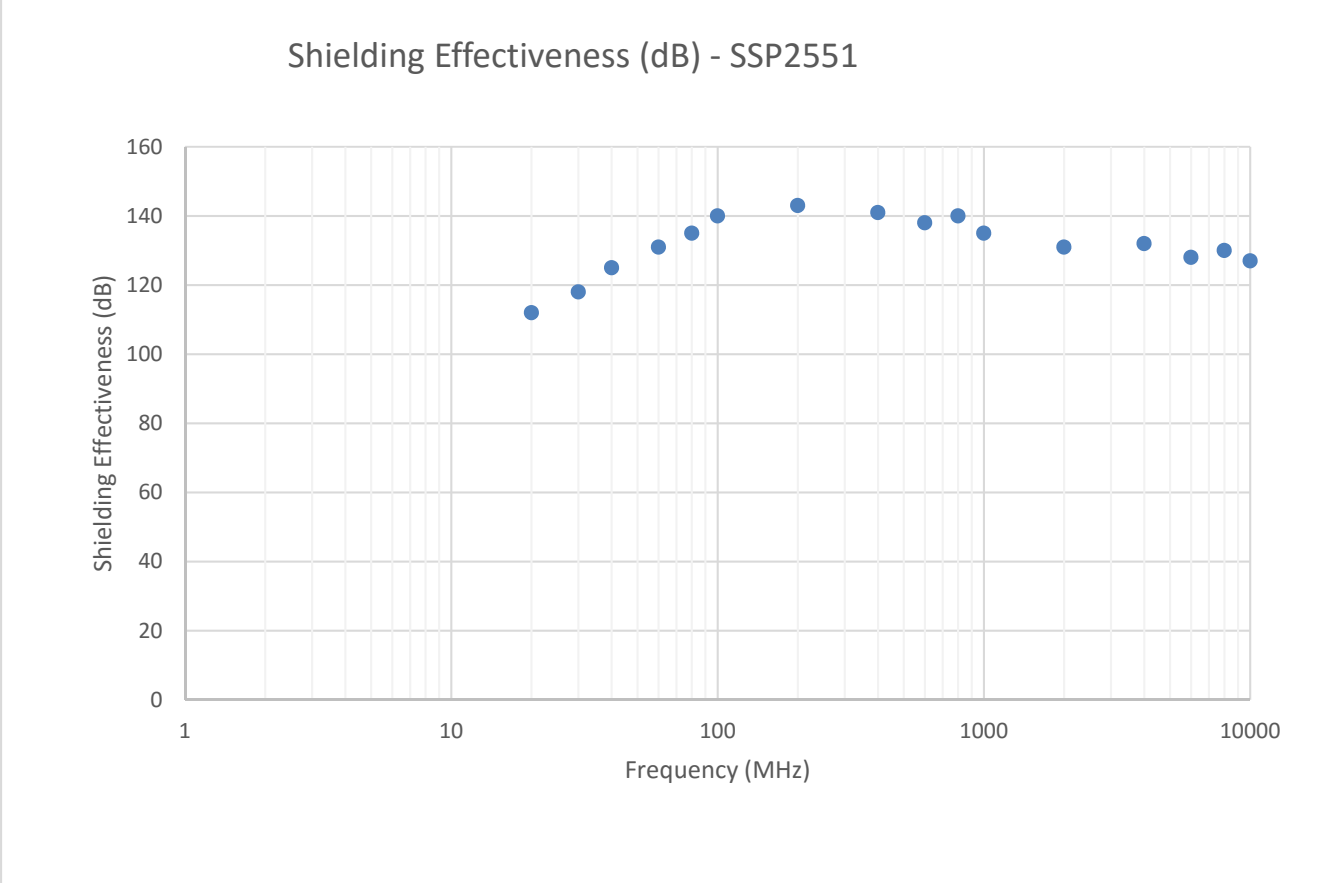
Dynamic Range is determined by placing a solid plate between the two chambers, measuring the amplitude of each frequency, then subtracting that from the reference level.

APPENDIX C - Supplemental Data

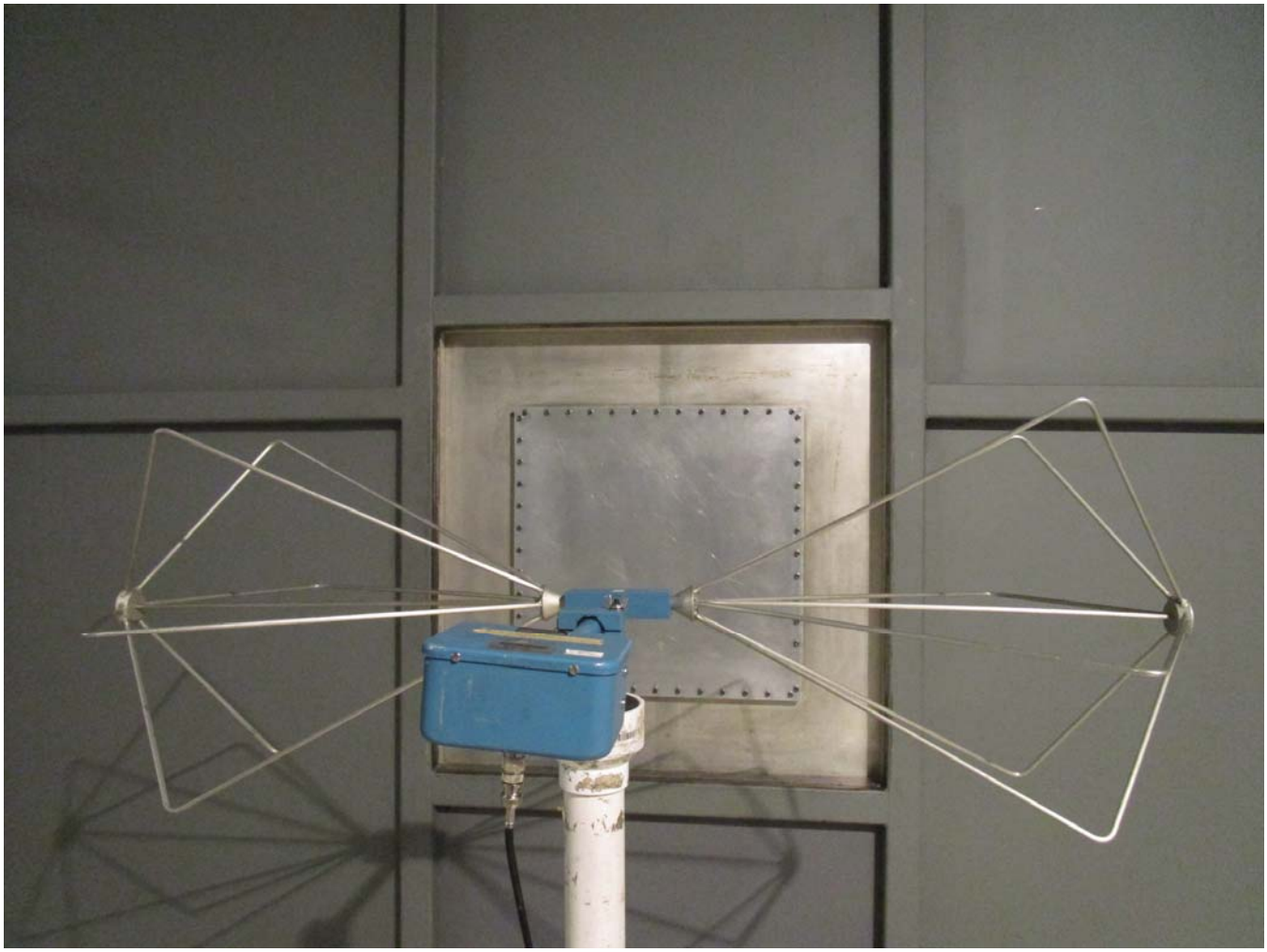
Company: SSP				**Date: 9/19/18**		
SSP2529						
Frequency MHz	**OPEN Amplitude (dBuV)**	**SOLID PLATE Ampitude (dBuV)**	**Gasket Amplitude (dBuV)**	**Signal Generator Setting (dBm)**	**Shielding Effectiveness (dB)**	**Dynamic Range (dB)**
20	95	-30	-15	-14	110	-125
30	100	-30	-20	-14	120	-130
40	105	-30	-21	-16	126	-135
60	110	-30	-20	-16	130	-140
80	120	-30	-18	-26	138	-150
100	120	-30	-17	-40	137	-150
200	120	-30	-14	-35	134	-150
400	120	-30	-17	-38	137	-150
600	120	-30	-15	-25	135	-150
800	120	-30	-20	-25	140	-150
1000	120	-30	-13	-30	133	-150
2000	120	-15	-14	-45	134	-135
4000	120	-15	-13	-48	133	-135
6000	120	-15	-12	-36	132	-135
8000	120	-15	-10	-40	130	-135
10000	120	-15	-3	-37	123	-135


Shielding Effectiveness (dB) - SSP2529
Shielding Effectiveness (dB)
160
140
120
100
80
60
40
20
0
1
10
100
1000
10000
Frequency (MHz)

Company: SSP				Date: 9/19/18		
SSP2551						
Frequency MHz	**OPEN Amplitude (dBuV)**	**SOLID PLATE Ampitude (dBuV)**	**Gasket Amplitude (dBuV)**	**Signal Generator Setting (dBm)**	**Shielding Effectiveness (dB)**	**Dynamic Range (dB)**
20	95	-30	-17	-14	112	-125
30	100	-30	-18	-14	118	-130
40	105	-30	-20	-16	125	-135
60	110	-30	-21	-16	131	-140
80	120	-30	-15	-26	135	-150
100	120	-30	-20	-40	140	-150
200	120	-30	-23	-35	143	-150
400	120	-30	-21	-38	141	-150
600	120	-30	-18	-25	138	-150
800	120	-30	-20	-25	140	-150
1000	120	-30	-15	-30	135	-150
2000	120	-15	-11	-45	131	-135
4000	120	-15	-12	-48	132	-135
6000	120	-15	-8	-36	128	-135
8000	120	-15	-10	-40	130	-135
10000	120	-15	-7	-37	127	-135

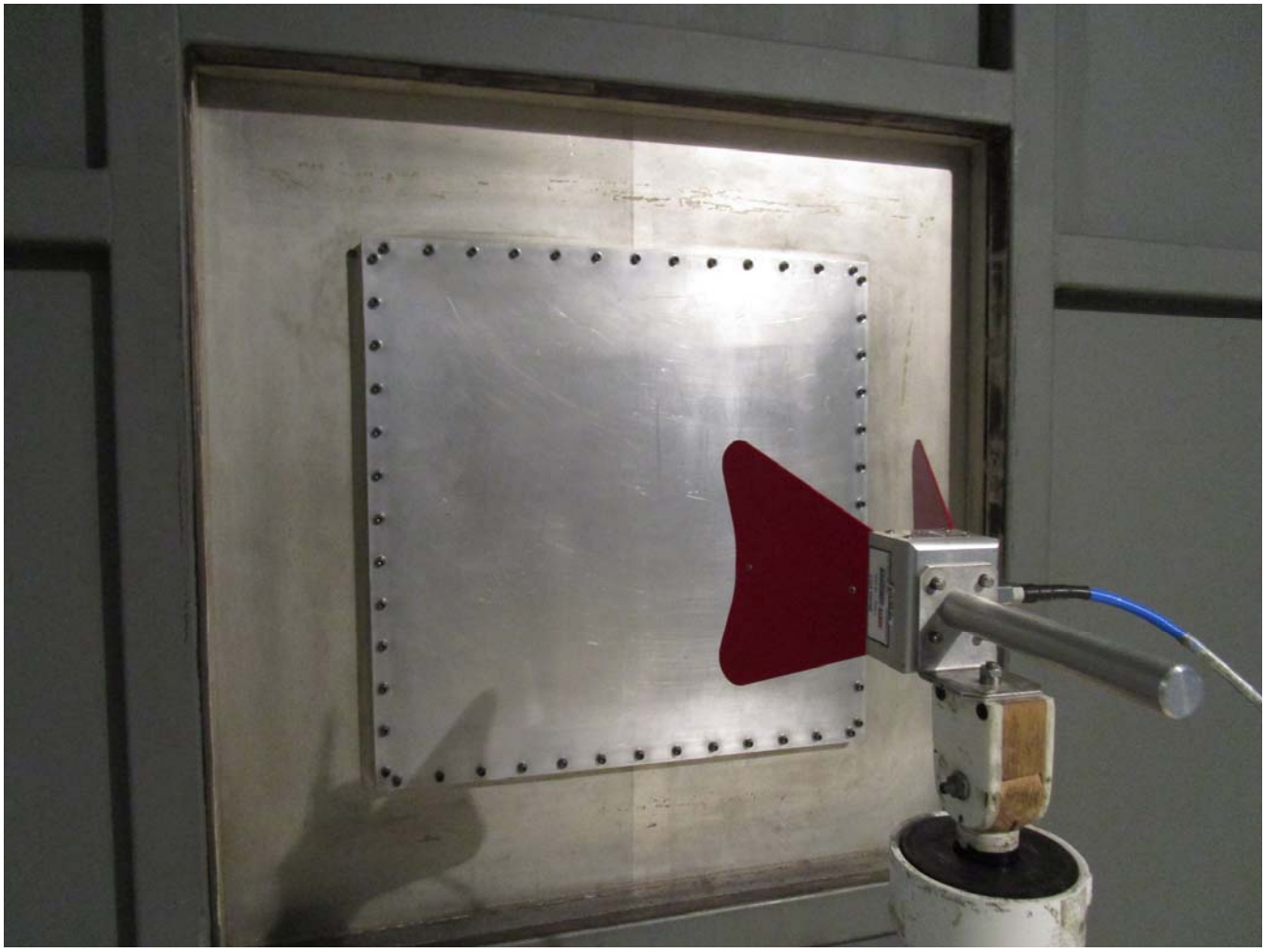

Shielding Effectiveness (dB) - SSP2551
Shielding Effectiveness (dB)
160
140
120
100
80
60
40
20
0
1
10
100
1000
10000
Frequency (MHz)

Photos taken during test:



20-100MHz Test Setup

200-1000MHz Test Setup



2-10GHz Test Setup