



**EMC Shielding Effectiveness Test Report
EMI Gaskets
TO MIL-DTL-83528H**

<i>Report No.</i> 24010	<i>Issue Date</i> September 20, 2018
<i>Revision</i> 1.0	<i>Page</i> 1 of 18

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	



**EMC Shielding Effectiveness Test Report
EMI Gaskets
TO MIL-DTL-83528H**

Report No.

24010

Issue Date

September 20,
2018

Revision

1.0

Page

2 of 18

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

Test for Specialty Silicone Products, Inc


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

TEST PERSONNEL	TITLE
Jereme Irwin	EMC Test Engineer

TEST DATE(S)	September 19, 2018
---------------------	--------------------

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

This report may be reproduced in full, partial reproduction may only be made with the written consent of the laboratory. The results in this report apply only to the equipment tested.

 <p style="text-align: center;">EMC Shielding Effectiveness Test Report EMI Gaskets TO MIL-DTL-83528H</p>	<i>Report No.</i> 24010	<i>Issue Date</i> September 20, 2018
	<i>Revision</i> 1.0	<i>Page</i> 3 of 18

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.



**EMC Shielding Effectiveness Test Report
EMI Gaskets
TO MIL-DTL-83528H**

<i>Report No.</i> 24010	<i>Issue Date</i> September 20, 2018
<i>Revision</i> 1.0	<i>Page</i> 4 of 18

TABLE OF CONTENTS

ADMINISTRATIVE SUMMARY 3

REASON FOR TEST: 3

TEST SPECIFICATION: 3

DATE(S) OF TEST: 3

TEST SAMPLES: 3

MANUFACTURER: 3

MANUFACTURERS REPRESENTATIVE: 3

DISPOSITION OF TEST SAMPLE: 3

TEST LOCATION: 3

TEST PERSONNEL: 3

SUMMARY OF TEST RESULTS: 3

INTRODUCTION 5

SECTIONS 5

SECTION 1 - CLIENT INFORMATION 5

SECTION 2 - PURPOSE OF TEST 6

SECTION 3 - TEST SAMPLE DESCRIPTION 6

SECTION 4 - TEST SITE; FACILITIES, CONDITIONS AND TOLERANCES 7

SECTION 5 - TEST EQUIPMENT 7

SECTION 6 - SUMMARY OF TEST RESULTS 8

SECTION 7 - SHIELDING EFFECTIVENESS MEASUREMENTS 9

APPENDIX A - TEST EQUIPMENT 10

A.1 Specific Equipment Used 10

APPENDIX B - DESCRIPTION OF TEST METHODS 11

B.1 SHIELDING EFFECTIVENESS MEASUREMENTS 11

APPENDIX C - SUPPLEMENTAL DATA 12



**EMC Shielding Effectiveness Test Report
EMI Gaskets
TO MIL-DTL-83528H**

<i>Report No.</i> 24010	<i>Issue Date</i> September 20, 2018
<i>Revision</i> 1.0	<i>Page</i> 5 of 18

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



**EMC Shielding Effectiveness Test Report
EMI Gaskets
TO MIL-DTL-83528H**

<i>Report No.</i> 24010	<i>Issue Date</i> September 20, 2018
<i>Revision</i> 1.0	<i>Page</i> 6 of 18


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.

<i>NO.</i>	<i>Gasket Material</i>	<i>Material Description</i>
1.	SSP2529	Nickel plated aluminum is silicone
2.	SSP2551	Nickel plated aluminum in fluorosilicone

 <p style="text-align: center;">EMC Shielding Effectiveness Test Report EMI Gaskets TO MIL-DTL-83528H</p>	<i>Report No.</i> 24010	<i>Issue Date</i> September 20, 2018
	<i>Revision</i> 1.0	<i>Page</i> 7 of 18

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.



**EMC Shielding Effectiveness Test Report
EMI Gaskets
TO MIL-DTL-83528H**


<i>Report No.</i> 24010	<i>Issue Date</i> September 20, 2018
<i>Revision</i> 1.0	<i>Page</i> 8 of 18

SECTION 6 - TEST RESULTS

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

<i>NO.</i>	<i>Material</i>	<i>MINIMUM ATTENUATION LEVEL (dB)</i>	<i>BEST-CASE ATTENUATION LEVEL (dB)</i>
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.

 <p style="text-align: center;">EMC Shielding Effectiveness Test Report EMI Gaskets TO MIL-DTL-83528H</p>	<i>Report No.</i> 24010	<i>Issue Date</i> September 20, 2018
	<i>Revision</i> 1.0	<i>Page</i> 9 of 18

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.




**EMC Shielding Effectiveness Test Report
EMI Gaskets
TO MIL-DTL-83528H**

<i>Report No.</i>	<i>Issue Date</i>
24010	September 20, 2018
<i>Revision</i>	<i>Page</i>
1.0	10 of 18

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	MY461803 77	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

 <p style="text-align: center;">EMC Shielding Effectiveness Test Report EMI Gaskets TO MIL-DTL-83528H</p>	<i>Report No.</i> 24010	<i>Issue Date</i> September 20, 2018
	<i>Revision</i> 1.0	<i>Page</i> 11 of 18

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.



**EMC Shielding Effectiveness Test Report
EMI Gaskets
TO MIL-DTL-83528H**

Report No.

24010

Issue Date

September 20,
2018

Revision

1.0

Page

12 of 18

APPENDIX C - Supplemental Data

Company: SSP				Date: 9/19/18		
SSP2529						
Frequency MHz	OPEN Amplitude (dBuV)	SOLID PLATE Amplitude (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



**EMC Shielding Effectiveness Test Report
EMI Gaskets
TO MIL-DTL-83528H**

Report No.

24010

Issue Date

September 20,
2018

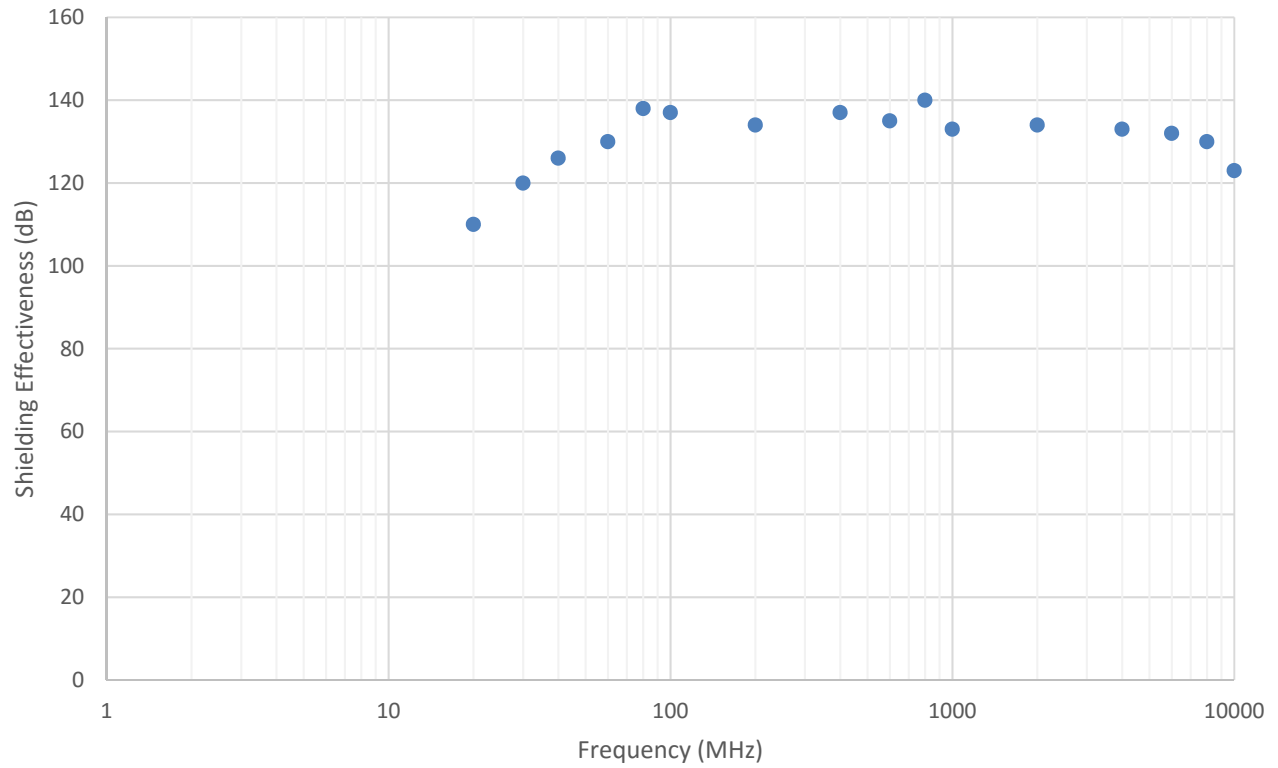
Revision

1.0

Page

13 of 18

Shielding Effectiveness (dB) - SSP2529





**EMC Shielding Effectiveness Test Report
EMI Gaskets
TO MIL-DTL-83528H**

<i>Report No.</i> 24010	<i>Issue Date</i> September 20, 2018
<i>Revision</i> 1.0	<i>Page</i> 14 of 18

Company: SSP				Date: 9/19/18		
SSP2551						
Frequency MHz	OPEN Amplitude (dBuV)	SOLID PLATE Amplitude (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



**EMC Shielding Effectiveness Test Report
EMI Gaskets
TO MIL-DTL-83528H**

Report No.

24010

Issue Date

September 20,
2018

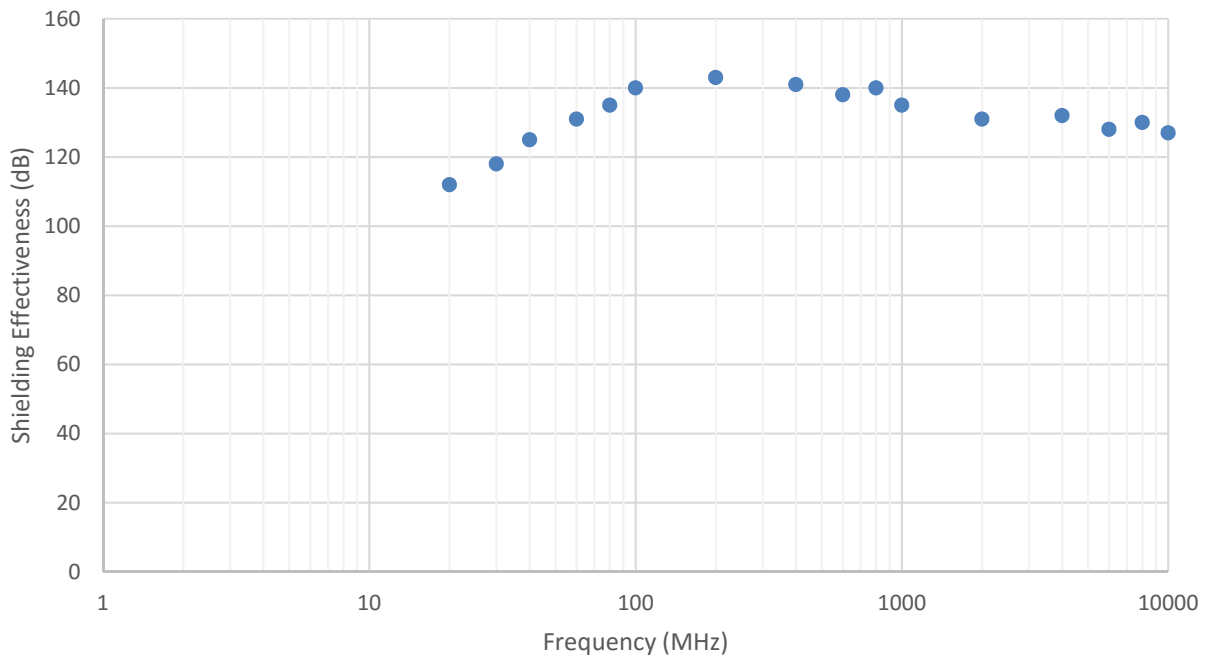
Revision

1.0

Page

15 of 18

Shielding Effectiveness (dB) - SSP2551





**EMC Shielding Effectiveness Test Report
EMI Gaskets
TO MIL-DTL-83528H**

Report No.

24010

Issue Date

September 20,
2018

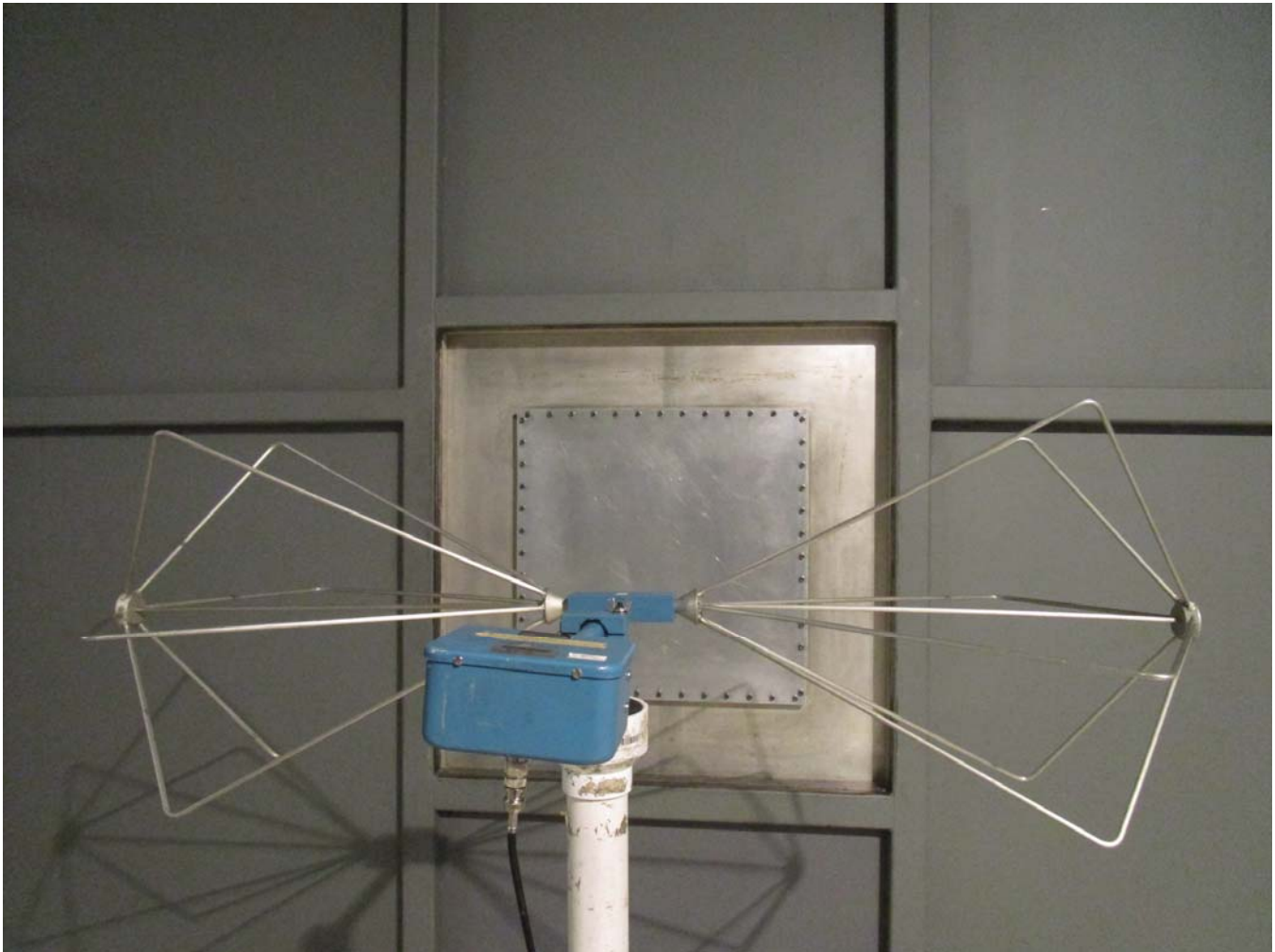
Revision

1.0

Page

16 of 18

Photos taken during test:



20-100MHz Test Setup



**EMC Shielding Effectiveness Test Report
EMI Gaskets
TO MIL-DTL-83528H**

Report No.

24010

Issue Date

September 20,
2018

Revision

1.0

Page

17 of 18



200-1000MHz Test Setup



**EMC Shielding Effectiveness Test Report
EMI Gaskets
TO MIL-DTL-83528H**

Report No.

24010

Issue Date

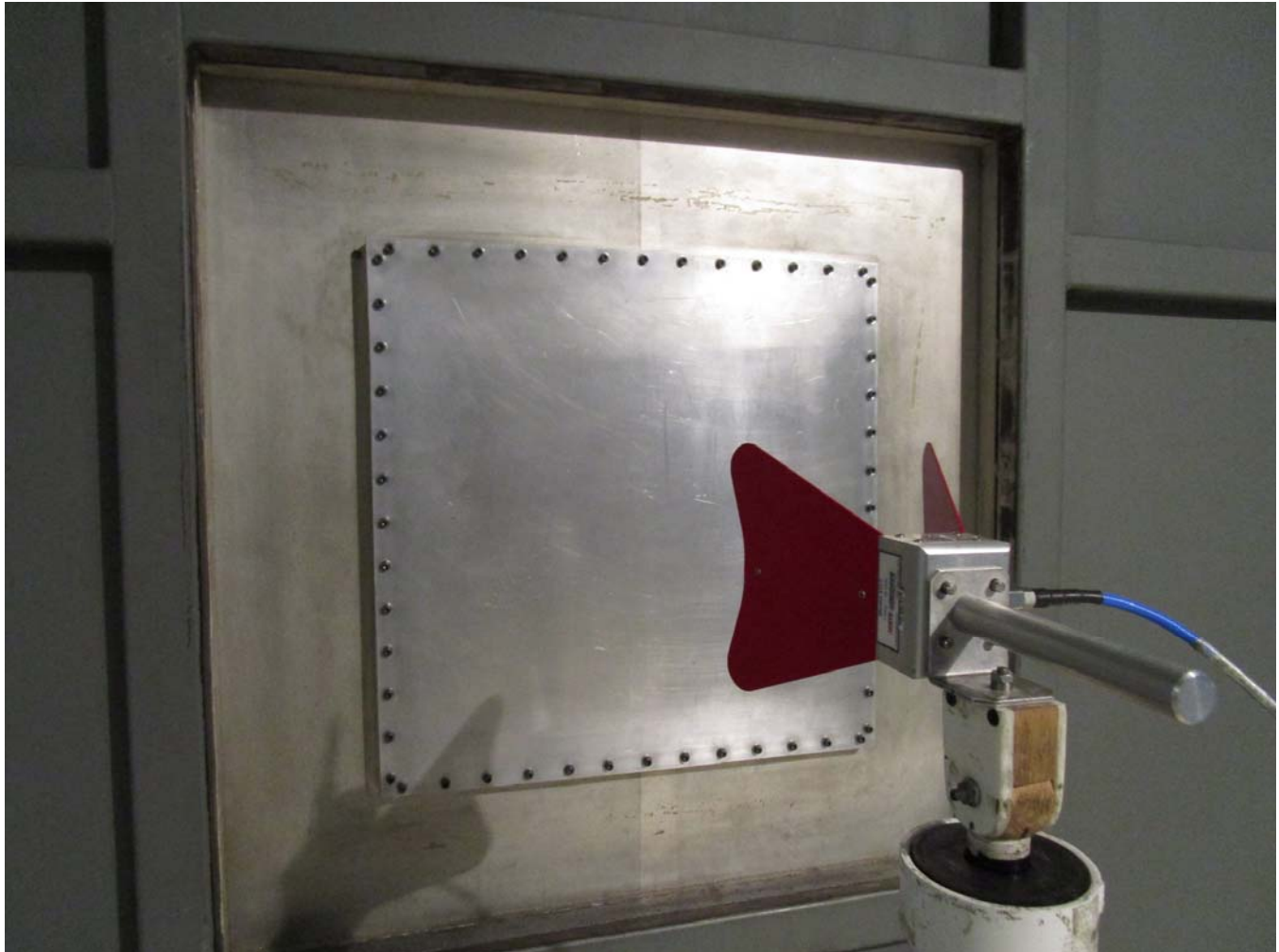
September 20,
2018

Revision

1.0

Page

18 of 18



2-10GHz Test Setup