



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

|                            |                                     |
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| <i>Report No.</i><br>22672 | <i>Issue Date</i><br>April 10, 2017 |
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**EMC SHIELDING EFFECTIVENESS TEST REPORT**

**Test Specification : MIL-DTL-83528F**  
**Manufacturer : Specialty Silicone Products**  
**Test Samples : 1. SSP502-40 Nickel Graphite in silicone 40 Shore A**  
**2. SSP502-65 Nickel Graphite in silicone 65 Shore A**

| <b>DOCUMENT HISTORY</b> |                   |                         |                                     |                   |
|-------------------------|-------------------|-------------------------|-------------------------------------|-------------------|
| <b>REVISION</b>         | <b>ISSUE DATE</b> | <b>AFFECTED PAGE(S)</b> | <b>DESCRIPTION OF MODIFICATIONS</b> | <b>REVISED BY</b> |
| 1.0                     | 10 April 2017     |                         | Initial release                     |                   |
|                         |                   |                         |                                     |                   |
|                         |                   |                         |                                     |                   |



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**TEST REPORT NO. 22672  
from  
D.L.S. Electronic Systems, Inc.**

**Test for Specialty Silicone Products, Inc**


|                                   |                                    |                                     |
|-----------------------------------|------------------------------------|-------------------------------------|
| <b>WRITTEN BY</b><br>Jereme Irwin | <b>REVIEWED BY</b><br>Jack Prawica | <b>REVIEWED BY</b><br>Brian Mattson |
|                                   |                                    |                                     |

|                       |                   |
|-----------------------|-------------------|
| <b>TEST PERSONNEL</b> | <b>TITLE</b>      |
| Jereme Irwin          | EMC Test Engineer |
|                       |                   |

|                     |                 |
|---------------------|-----------------|
| <b>TEST DATE(S)</b> | April 5-6, 2017 |
|---------------------|-----------------|

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

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|  |                            |                                     |
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## ADMINISTRATIVE SUMMARY

### REASON FOR TEST:

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

### TEST SPECIFICATION:

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

### DATE(S) OF TEST:

April 5-6, 2017

### 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.



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**MANUFACTURERS REPRESENTATIVE:** ..... 3

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## 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-83528F Specification for comparison data of two different test samples using a MIL-DTL-83528F test fixture.

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

## SECTIONS

### SECTION 1 - CLIENT INFORMATION

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



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**SECTION 2 - PURPOSE OF TEST**

The purpose of this series of tests was to verify the shielding effectiveness of the 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.         | SSP502-40              | Nickel Graphite in silicone 40 Shore A |
| 2.         | SSP502-65              | Nickel Graphite in silicone 65 Shore A |
|            |                        |  |
|            |                        |  |
|            |                        |  |
|            |                        |  |
|            |                        |  |

|  |                            |                                     |
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**SECTION 4 - TEST SITE; FACILITIES, CONDITIONS AND TOLERANCES**

The EMI measurements were performed through a test fixture designed to the MIL-DTL-83528F test specification. A modified MIL-DTL-83528F 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.



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**SECTION 6 - TEST RESULTS**

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

| <i>NO.</i> | <i>Material</i>  | <i>MINIMUM<br/>ATTENUATION LEVEL<br/>(dB)</i> | <i>BEST-CASE<br/>ATTENUATION<br/>LEVEL (dB)</i> |
|------------|------------------|---|---|
| 1.         | <b>SSP502-40</b> | <b>115@20MHz</b>                              | <b>142@100MHz</b>                               |
| 2.         | <b>SSP502-65</b> | <b>113@20MHz</b>                              | <b>141@200MHz</b>                               |
|            |                  |   |   |
|            |                  |   |   |
|            |                  |   |   |
|            |                  |   |   |
|            |                  |   |   |

**All samples tested met the minimum requirements for shielding effectiveness per MIL-DTL-83528F.**



|  |                            |                                     |
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## SECTION 7 - SHIELDING EFFECTIVENESS MEASUREMENTS

Detailed data sheets, which provide the entire shielding effectiveness results across the entire frequency range for each of the two samples, 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.



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**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    | 8/04/16  | 8/04/17       |
| Antenna, Horn                 | ETS-Lindgren            | 3117         | 00135193      | 1GHz-18GHz   | 8/06/16  | 8/06/17       |
| Antenna, Horn                 | EMCO                    | 3106         | 2127          | 200MHz-2GHz  | 11/14/16 | 11/14/17      |
| 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   | 1/26/17  | 1/26/18       |
| Cable, 25ft, BNC-BNC, RG223/U | Pasternack Enterprises  | PE3087-36    | 3ft. SN06     | 10kHz-1GHz   | 1/26/17  | 1/26/18       |
| Cable, 6ft, N-N               | Teledyne Storm Products | 57500        | 02            | 1GHz-18GHz   | 1/04/17  | 1/04/18       |
| Cable, 2ft, N-N               | Teledyne Storm Products | 57500        | 03            | 1GHz-18GHz   | 1/05/17  | 1/05/18       |
| Cable, 6ft, N-N               | Teledyne Storm Products | 57500        | 01            | 1GHz-18GHz   | 1/04/17  | 1/04/18       |
| Cable, 10ft, BNC-BNC, RG223/U | Pasternack Enterprises  | PE3087-72    | 10ft. SN01    | 10kHz-1GHz   | 8/31/16  | 8/31/17       |
| Generator, Signal, 1G-40GHz   | Rohde & Schwarz         | SMR 40       | 100052        | 1GHz-40GHz   | 10/15/16 | 10/15/17      |
| Generator, Signal             | Rohde & Schwarz         | SMY02        | DE26648       | 9kHz-2GHz    | 6/16/16  | 6/16/17       |
| Spectrum Analyzer             | Agilent Technologies    | E4440A       | MY46186619    | 3Hz-26.5GHz  | 8/31/16  | 8/31/17       |
| Antenna, Biconical            | EMCO                    | 3109         | 9803-3163     | 20MHz-300MHz | N/A      | N/A           |
| Antenna, Horn                 | EMCO                    | 3106         | 00042811      | 200MHz-2GHz  | N/A      | N/A           |

|  |                                   |  |
|--|-----------------------------------|--|
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**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 95dB 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.



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**APPENDIX C - Supplemental Data**

| Company: Specialty Silicone Products |                             |                                    |                               | Date: 4/05/17                           |                                    |                       |
|--------------------------------------|-----------------------------|------------------------------------|-------------------------------|---|------------------------------------|-----------------------|
| Sample: SSP502-40                    |                             |                                    |                               |   |                                    |                       |
| Frequency<br>MHz                     | OPEN<br>Amplitude<br>(dBuV) | SOLID PLATE<br>Amplitude<br>(dBuV) | Gasket<br>Amplitude<br>(dBuV) | Signal<br>Generator<br>Setting<br>(dBm) | Shielding<br>Effectiveness<br>(dB) | Dynamic<br>Range (dB) |
| 20                                   | 95                          | -30                                | -20                           | -15                                     | 115                                | -125                  |
| 30                                   | 100                         | -30                                | -21                           | -15                                     | 121                                | -130                  |
| 40                                   | 100                         | -30                                | -21                           | -23                                     | 121                                | -130                  |
| 60                                   | 100                         | -30                                | -20                           | -27                                     | 120                                | -130                  |
| 80                                   | 120                         | -30                                | -20                           | -27                                     | 140                                | -150                  |
| 100                                  | 120                         | -30                                | -22                           | -47                                     | 142                                | -150                  |
| 200                                  | 120                         | -30                                | -19                           | -37                                     | 139                                | -150                  |
| 400                                  | 120                         | -30                                | -20                           | -37                                     | 140                                | -150                  |
| 600                                  | 120                         | -30                                | -21                           | -42                                     | 141                                | -150                  |
| 800                                  | 120                         | -30                                | -20                           | -35                                     | 140                                | -150                  |
| 1000                                 | 120                         | -30                                | -18                           | -35                                     | 138                                | -150                  |
| 2000                                 | 120                         | -15                                | -10                           | -47                                     | 130                                | -135                  |
| 4000                                 | 120                         | -15                                | -6                            | -38                                     | 126                                | -135                  |
| 6000                                 | 120                         | -15                                | -10                           | -38                                     | 130                                | -135                  |
| 8000                                 | 120                         | -15                                | -11                           | -42                                     | 131                                | -135                  |
| 10000                                | 120                         | -15                                | -12                           | -38                                     | 132                                | -135                  |



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| Company: Specialty Silicone Products |                             |                                    |                               | Date: 4/05/17                           |                                    |                       |
|--------------------------------------|-----------------------------|------------------------------------|-------------------------------|---|------------------------------------|-----------------------|
| Sample: SSP502-65                    |                             |                                    |                               |   |                                    |                       |
| Frequency<br>MHz                     | OPEN<br>Amplitude<br>(dBuV) | SOLID PLATE<br>Amplitude<br>(dBuV) | Gasket<br>Amplitude<br>(dBuV) | Signal<br>Generator<br>Setting<br>(dBm) | Shielding<br>Effectiveness<br>(dB) | Dynamic<br>Range (dB) |
| 20                                   | 95                          | -30                                | -18                           | -15                                     | 113                                | -125                  |
| 30                                   | 100                         | -30                                | -20                           | -15                                     | 120                                | -130                  |
| 40                                   | 100                         | -30                                | -20                           | -23                                     | 120                                | -130                  |
| 60                                   | 100                         | -30                                | -19                           | -27                                     | 119                                | -130                  |
| 80                                   | 120                         | -30                                | -19                           | -27                                     | 139                                | -150                  |
| 100                                  | 120                         | -30                                | -20                           | -47                                     | 140                                | -150                  |
| 200                                  | 120                         | -30                                | -21                           | -37                                     | 141                                | -150                  |
| 400                                  | 120                         | -30                                | -17                           | -37                                     | 137                                | -150                  |
| 600                                  | 120                         | -30                                | -16                           | -42                                     | 136                                | -150                  |
| 800                                  | 120                         | -30                                | -17                           | -35                                     | 137                                | -150                  |
| 1000                                 | 120                         | -30                                | -19                           | -35                                     | 139                                | -150                  |
| 2000                                 | 120                         | -15                                | -14                           | -47                                     | 134                                | -135                  |
| 4000                                 | 120                         | -15                                | -12                           | -38                                     | 132                                | -135                  |
| 6000                                 | 120                         | -15                                | -13                           | -38                                     | 133                                | -135                  |
| 8000                                 | 120                         | -15                                | -14                           | -42                                     | 134                                | -135                  |
| 10000                                | 120                         | -15                                | -13                           | -38                                     | 133                                | -135                  |



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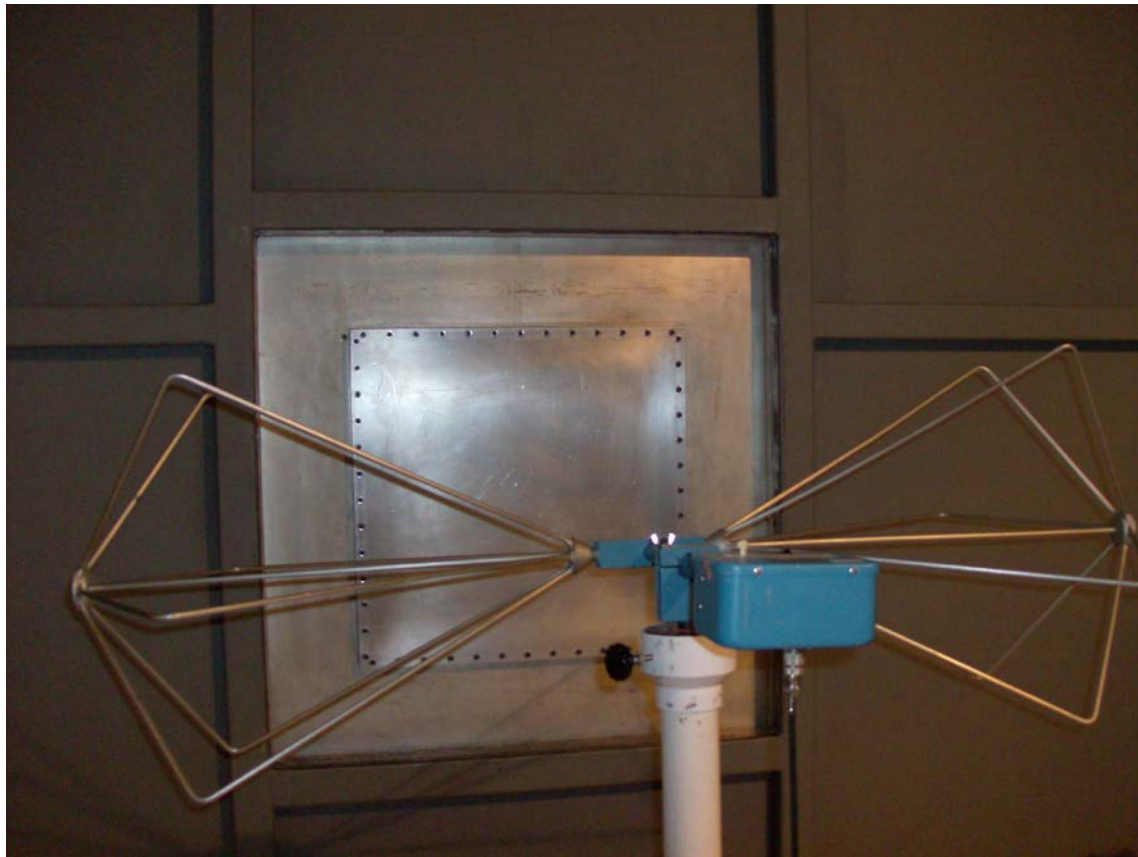
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**Photos taken during test:**



**20-100MHz Test Setup**



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**200-1000MHz Test Setup**



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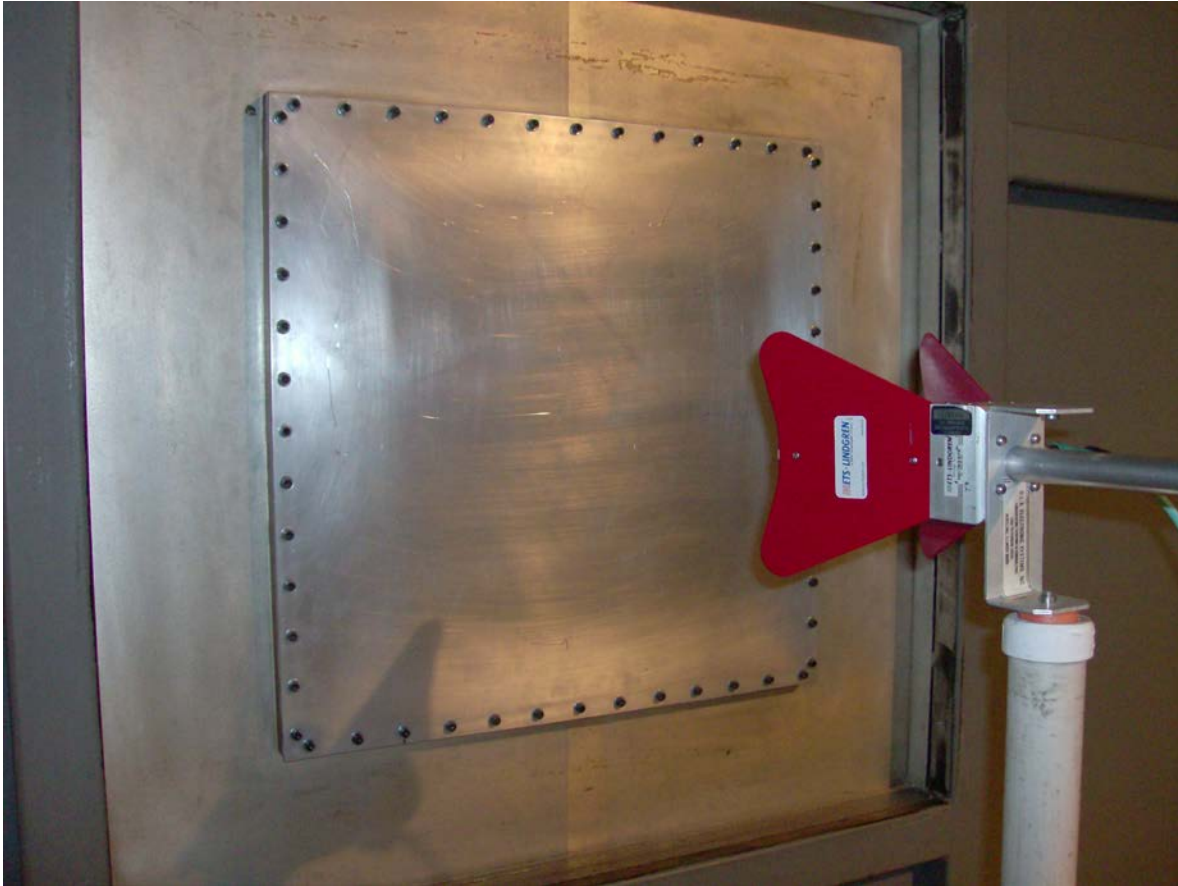
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**2-10GHz Test Setup**