Test Report

According to

Test Item：MIL-STD-461G

(CE102; RE102; CS101; CS114; CS115; CS116; RS103)

Product： **SYSTEM**

Trade Name： 7Starlake

Model Number： AV800; AVR800-X1A

Prepared for

7Starlake Co., Ltd.

2F., No. 190, Sec. 2, Zhongxing Rd., Xindian Dist.,
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Remark:

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The test result in this report is only subjected to the test sample.

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Statement of Compliance

Applicant : **7Starlake Co., Ltd.**
2F., No. 190, Sec. 2, Zhongxing Rd., Xindian Dist.,
New Taipei City 23146, Taiwan (R.O.C.)

Manufacturer : **7Starlake Co., Ltd.**
2F., No. 190, Sec. 2, Zhongxing Rd., Xindian Dist.,
New Taipei City 23146, Taiwan (R.O.C.)

Product : SYSTEM

Model No. : AV800; AVR800-X1A

Tested Power Voltage : DC 28 V

Date of Final Test : Sep. 11, 2023

Measurement Procedures and Standards Used :

☒ Test result is compliance with MIL-STD-461G

Applicable Standards			
Standard	**Special**	**Location of Test**	**Test Result**
MIL-STD-461G (CE102)	Frequency Range: 10 kHz - 10 MHz	IETC LAB	PASS
MIL-STD-461G (RE102)	Frequency Range: 2 MHz - 18 GHz	IETC LAB	PASS
MIL-STD-461G (CS101)	Frequency Range: 30 Hz - 150 kHz	IETC LAB	PASS
MIL-STD-461G (CS114)	Frequency Range: 10 kHz - 200 MHz	IETC LAB	PASS
MIL-STD-461G (CS115)	Repetition Rate: 30 Hz	IETC LAB	PASS
MIL-STD-461G (CS116)	Frequency Range: 10 kHz - 100 MHz	IETC LAB	PASS
MIL-STD-461G (RS103)	Frequency Range: 2 MHz - 18 GHz	IETC LAB	PASS

The measurement results in this test report were performed at Interocean EMC Technology Corp. the responsibility of measurement result is only subjected to the tested sample. This report shows the EUT is technically compliance with the above official standards. This report shall not be partial reproduced without written approval by Interocean EMC Technology Corporation. Judgment of conformity is based on test result, regardless of measurement uncertainty.

Report Issued: 2023/10/26

Approved: Mike Huang
Mike Huang

General Information

Product	**:** SYSTEM
Model Number	**:** AV800; AVR800-X1A
Serial Number	**:** AV80000101 (For AV800 only)
Applicant	**:** **7Starlake Co., Ltd.** 2F., No. 190, Sec. 2, Zhongxing Rd., Xindian Dist., New Taipei City 23146, Taiwan (R.O.C.)
Manufacturer	**:** **7Starlake Co., Ltd.** 2F., No. 190, Sec. 2, Zhongxing Rd., Xindian Dist., New Taipei City 23146, Taiwan (R.O.C.)
Power Supply	**:** Input: DC 18~36 V
Receipt Date of EUT	**:** Jun. 12, 2023
Date of Test	**:** Aug. 29 ~ Sep. 11, 2023
Additional Description	**:** 1.) The test model is "**AV800**", designated by the applicant and included in this report. 2.) The difference for all models included in this report is only for different market. (**AV800** is for Global Market, and **AVR800-X1A** is for Israel Market.) 3.) The differences of all models included in this report are provided by the applicant, and the lab disclaims any liability related to reporting, if incorrect, from such provision. 4.) For more detailed specification about EUT, please refer to the user's manual.

1 Conducted emissions, power leads Test (CE102)

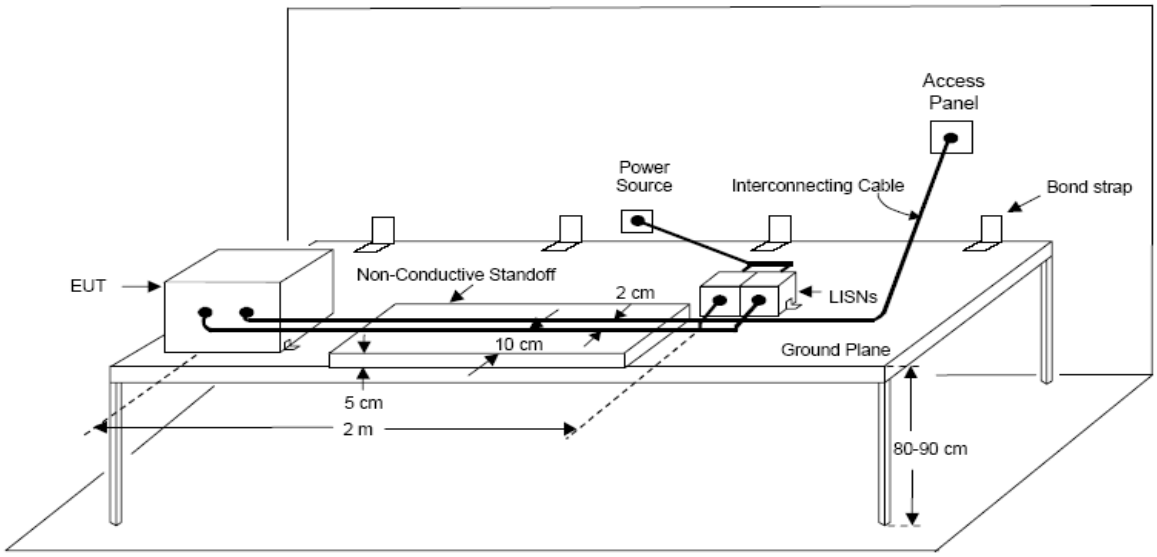
1.1 Instrument

☒Chamber 2

Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
EMI Test Receiver	Agilent	N9038A	MY51210178	2024/08/10
DC LISN	Schwarzbeck	NNBL 8226	8226-519	2024/06/15
DC LISN	Schwarzbeck	NNBL 8226	8226-520	2024/06/15
Attenuator	Marvelous Microwave	MVE2215-20	001	2024/08/13
RF Cable	EMCI	EM106-SMSM-500	CBL75	2024/02/15
RF Cable	EMCI	EM106-SMSM-290	01	2024/02/15

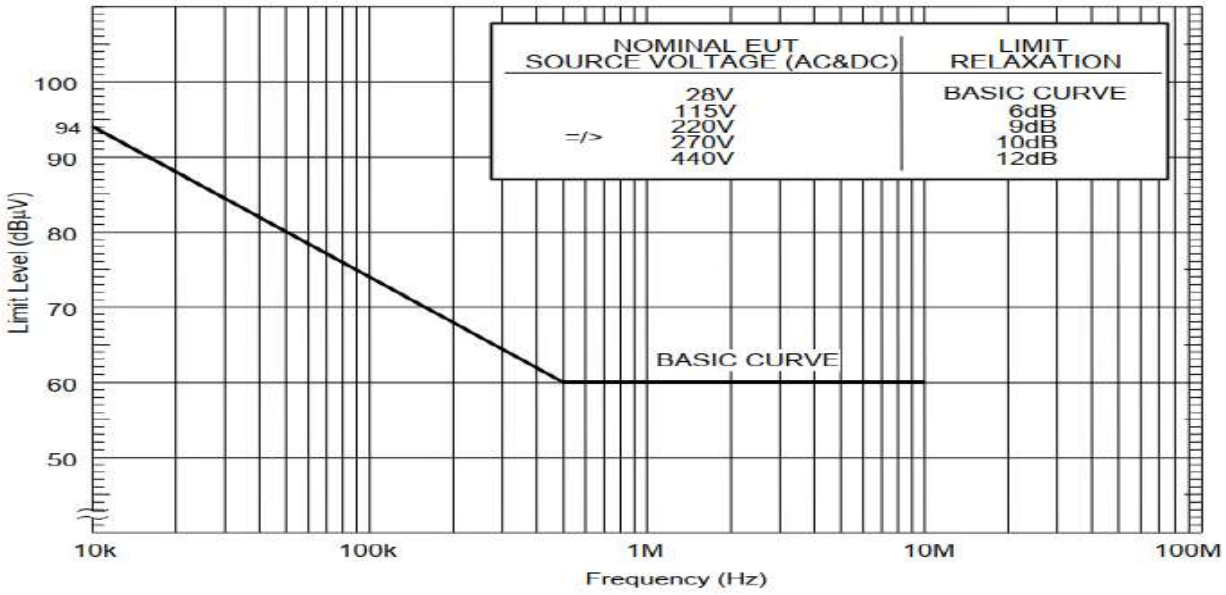
Note: The above equipments are within the valid calibration period.

1.2 Block Diagram of Test Configuration



1.3 Test Limit

According to MIL-STD-461G sub clause 5.5.2 CE102 limit figure CE102-1.



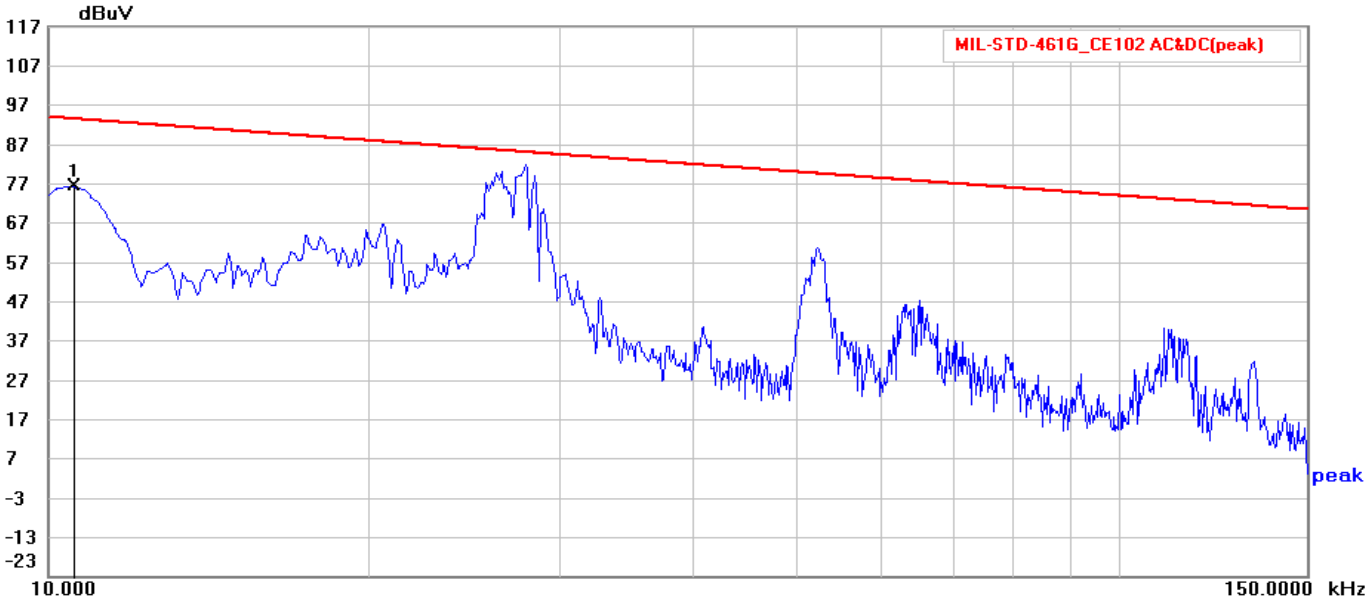
1.4 Configuration of Measurement

1.4.1 Measurement system integrity check. Perform the measurement system check using the measurement system check setup of MIL-STD-461G Figure CE102-2.

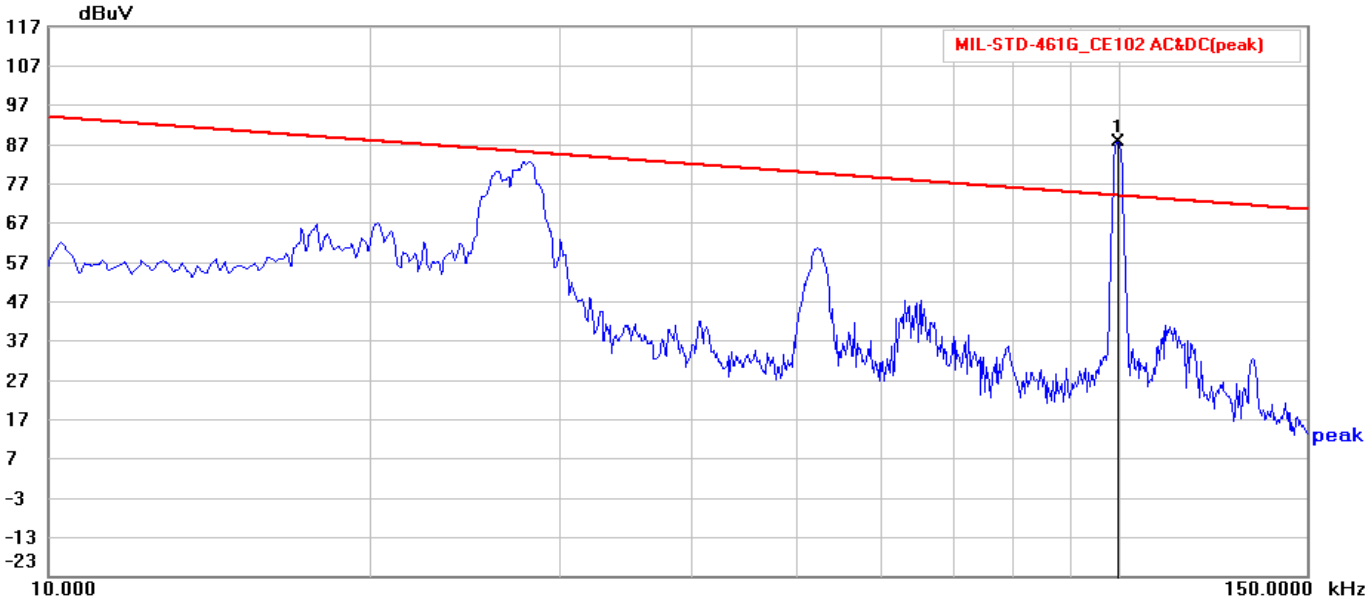
(a) Turn on the measurement equipment and allow a sufficient time for stabilization.

(b) Apply a signal level of 90 dBμV at 10.5 kHz and 100 kHz to the power output terminal of the LISN. At 10.5 kHz and 100 kHz, use an oscilloscope, in high impedance mode, to verify that there is a proper signal level at the LISN and verify that it is sinusoidal. After establishing the proper signal at the LISN, disconnect LISN and measure resulting voltage using an oscilloscope with 50 ohm input impedance. The ratio of the LISN voltage to the 50 ohm voltage measurement must be within the following tolerances: at 10.5 kHz = -14 dB (+1 dB/-2 dB) and at 100 kHz = -3 dB (+1 dB/-2 dB).

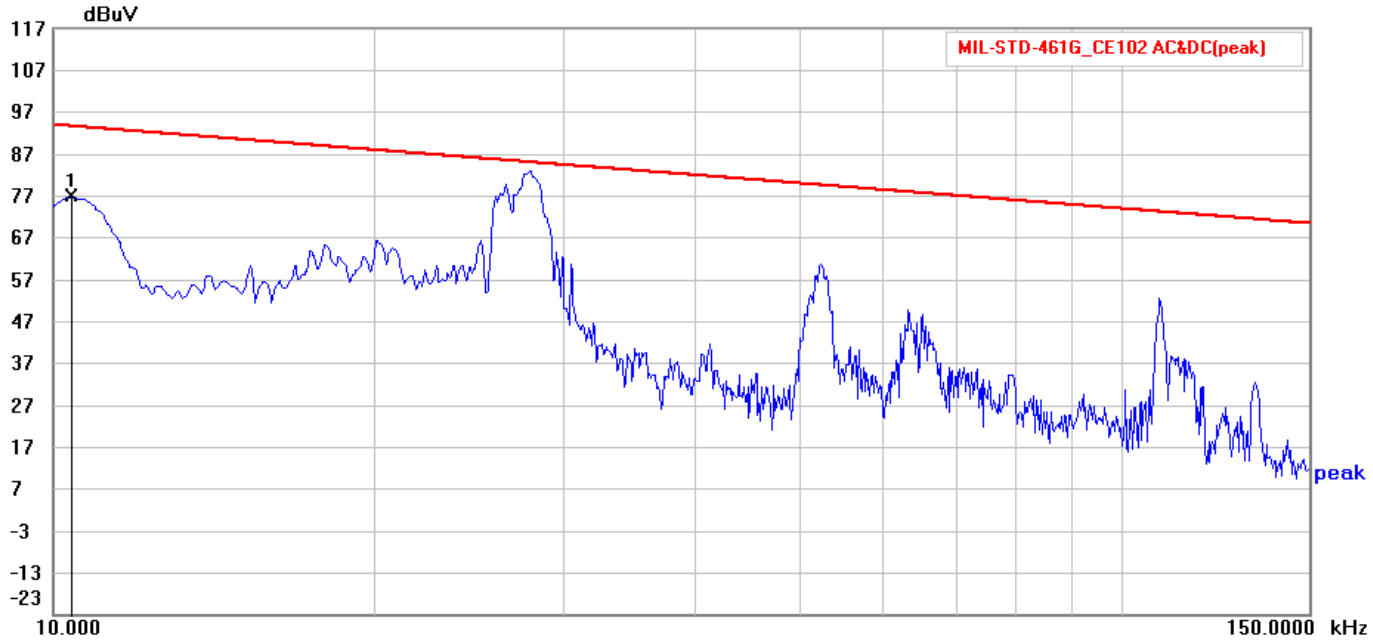
1) MIL-STD-461G_CE102_10 kHz-150 kHz-L1-# 80 (10.5 kHz)-PK



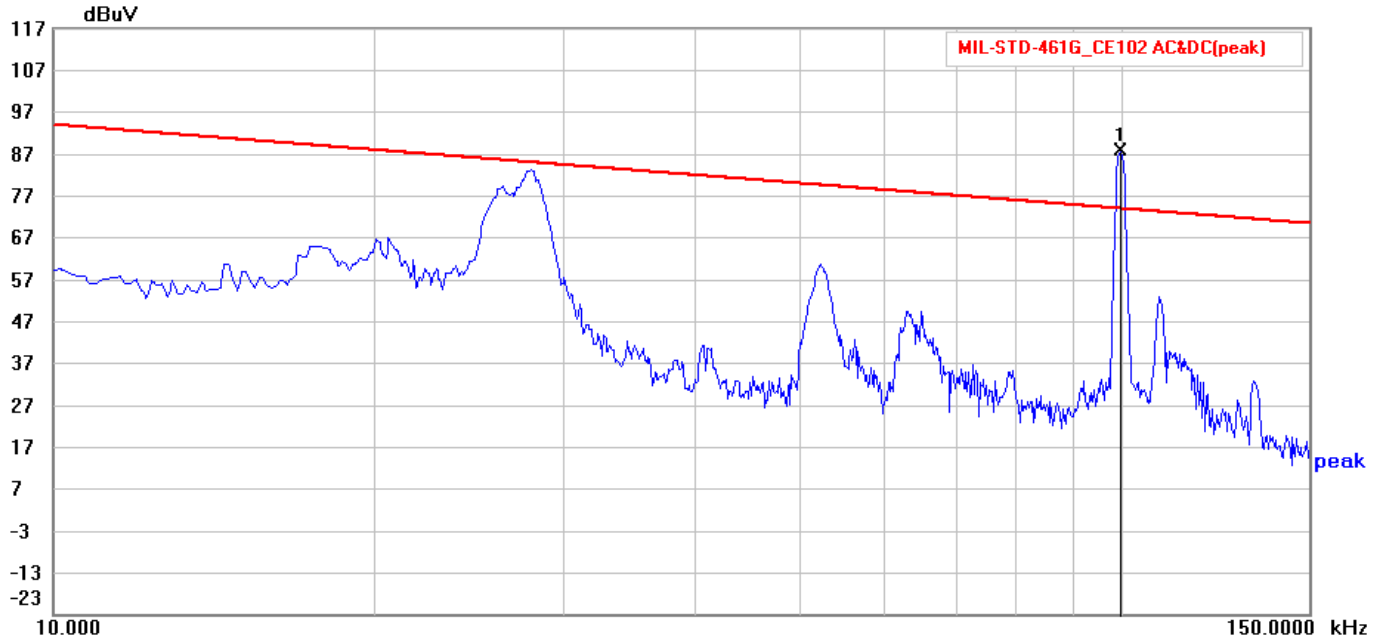
2) MIL-STD-461G_CE102_10 kHz-150 kHz-L1-# 79 (100 kHz)-PK



3) MIL-STD-461G_CE102_10 kHz-150 kHz-N-# 83 (10.5 kHz)-PK



4) MIL-STD-461G_CE102_10 kHz-150 kHz-N-# 84 (100 kHz)-PK



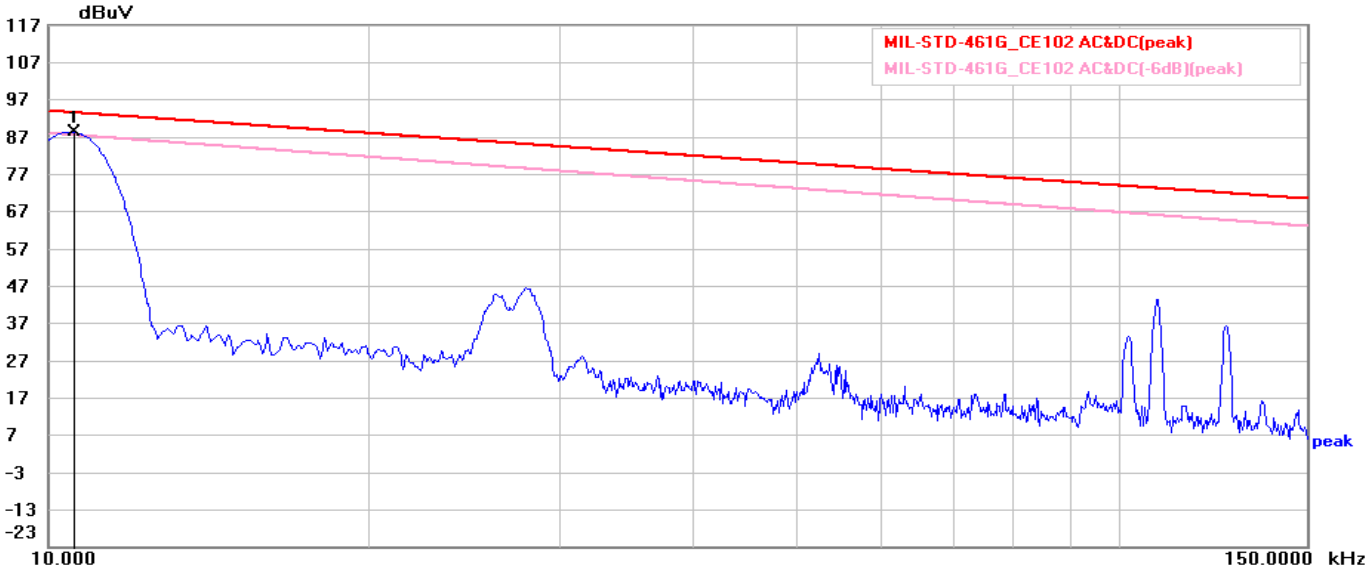
(c) Apply a signal level that is at least 6 dB below the limit at 10.5 kHz, 100 kHz, 1.95 MHz and 9.8 MHz to the power output terminal of the LISN. At 10.5 kHz and 100 kHz, use an oscilloscope to calibrate the signal level. At 1.95 MHz and 9.8 MHz, use a calibrated output level directly from a 50 Ω signal generator.

(d) Scan the measurement receiver for each frequency in the same manner as a normal data scan. Verify that the measurement receiver indicates a level within ±3 dB of the injected level. Correction factors shall be applied for the 20 dB attenuator and the voltage drop due to the LISN 0.25 µF coupling capacitor (see Figure 6).

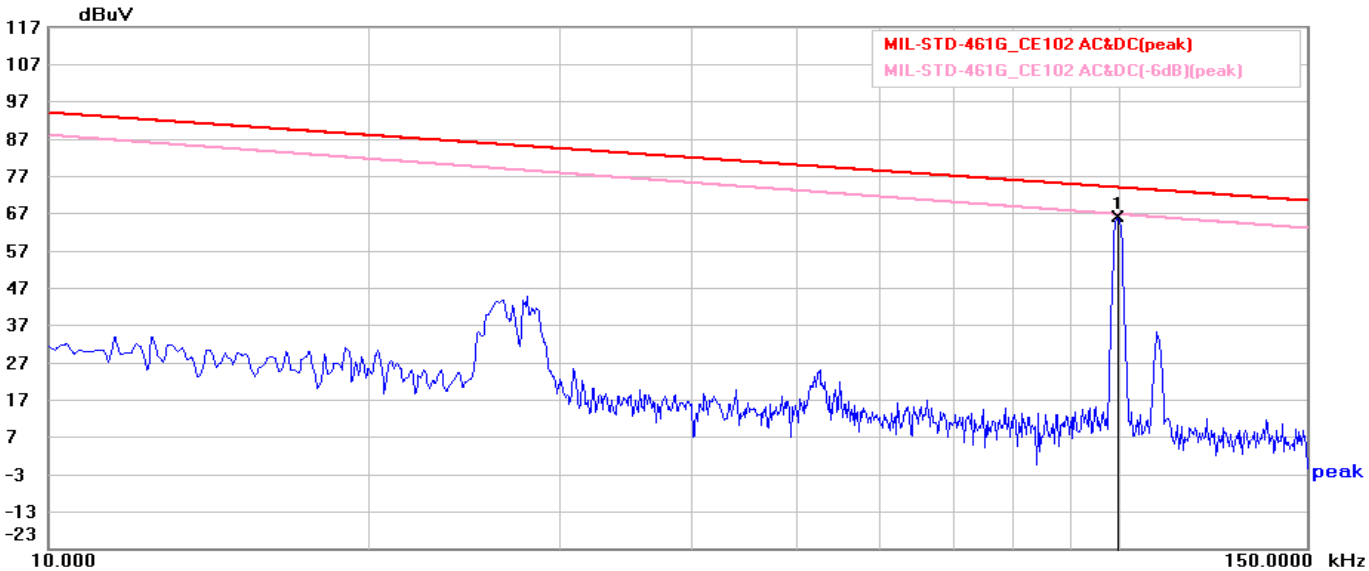
(e) If readings are obtained which deviate by more than ±3 dB, locate the source of the error and correct the deficiency prior to proceeding with the testing.

(f) Repeat MIL-STD-461G sub clause 5.5.3.4a(2) through MIL-STD-461G sub clause 5.5.3.4a(5) for each LISN.

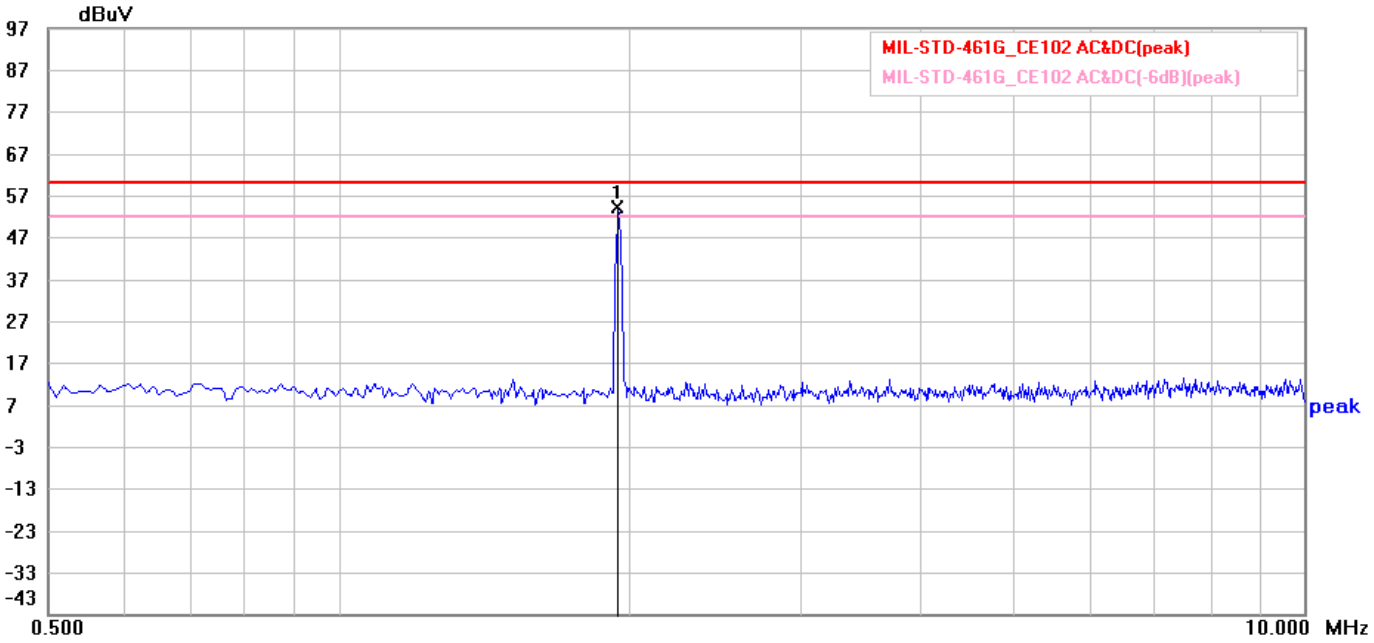
1) MIL-STD-461G_CE102_10.5 kHz-L1-# 92-PK



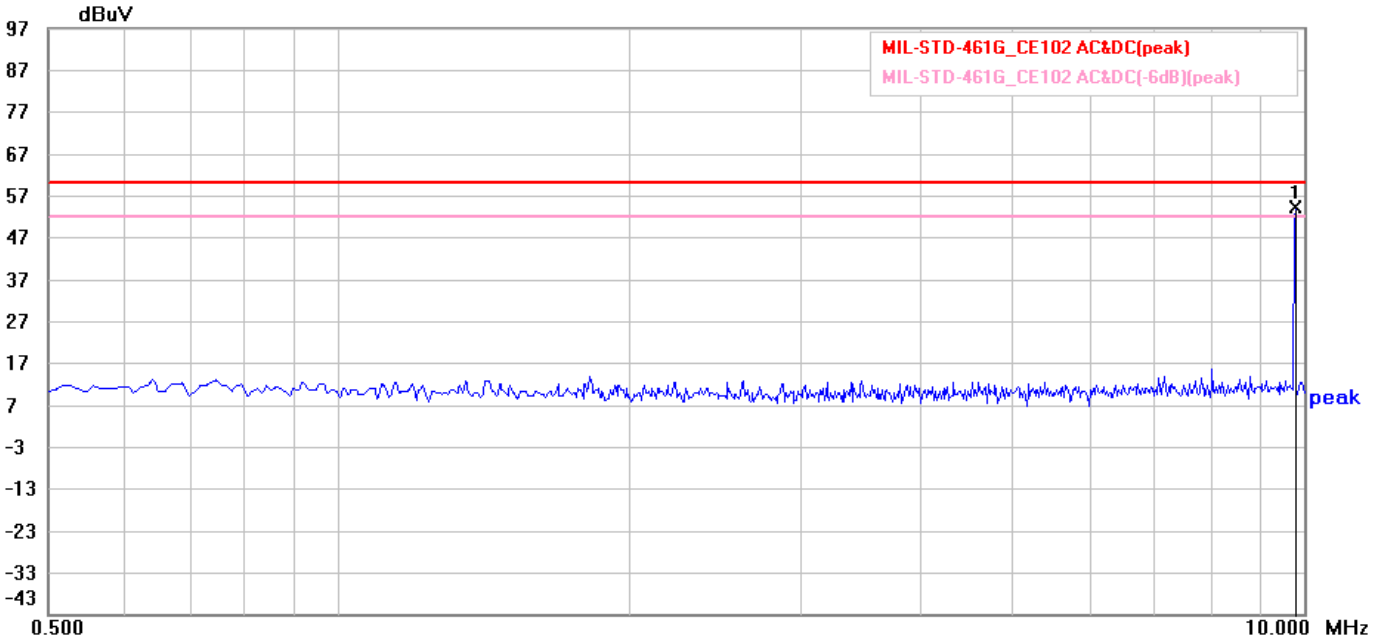
2) MIL-STD-461G_CE102_100 kHz-L1-# 91-PK



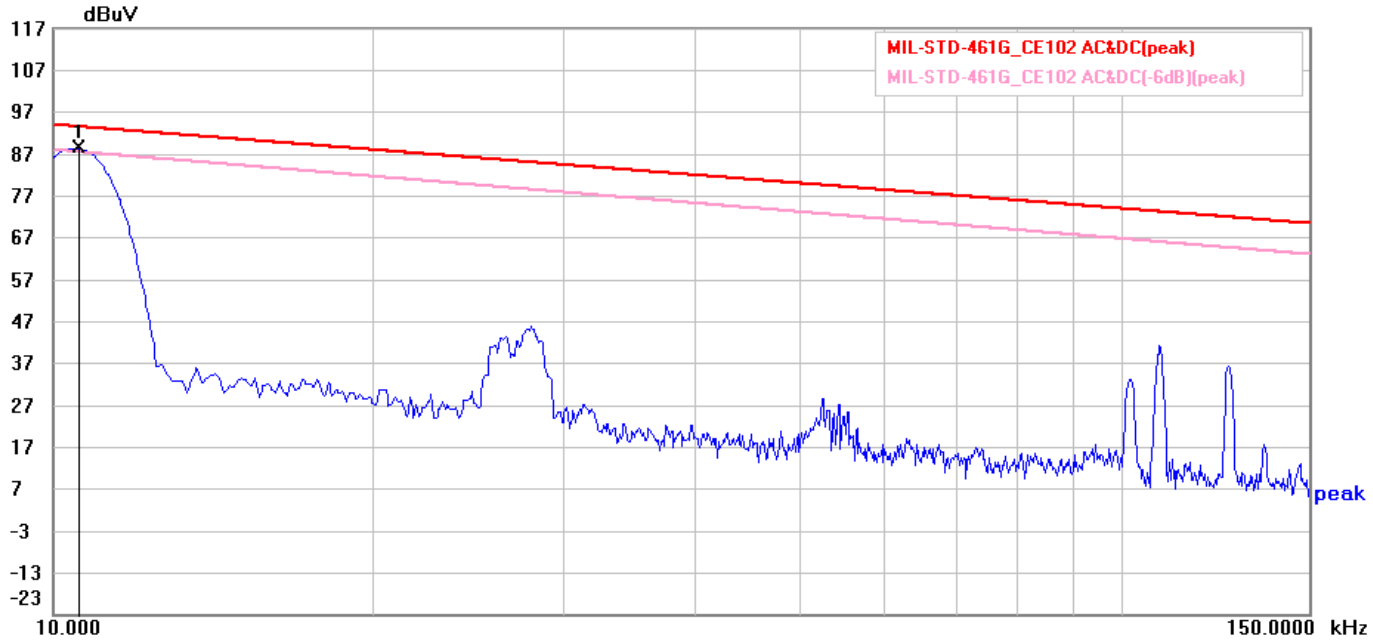
3) MIL-STD-461G_CE102_1.95 MHz-L1-# 89-PK



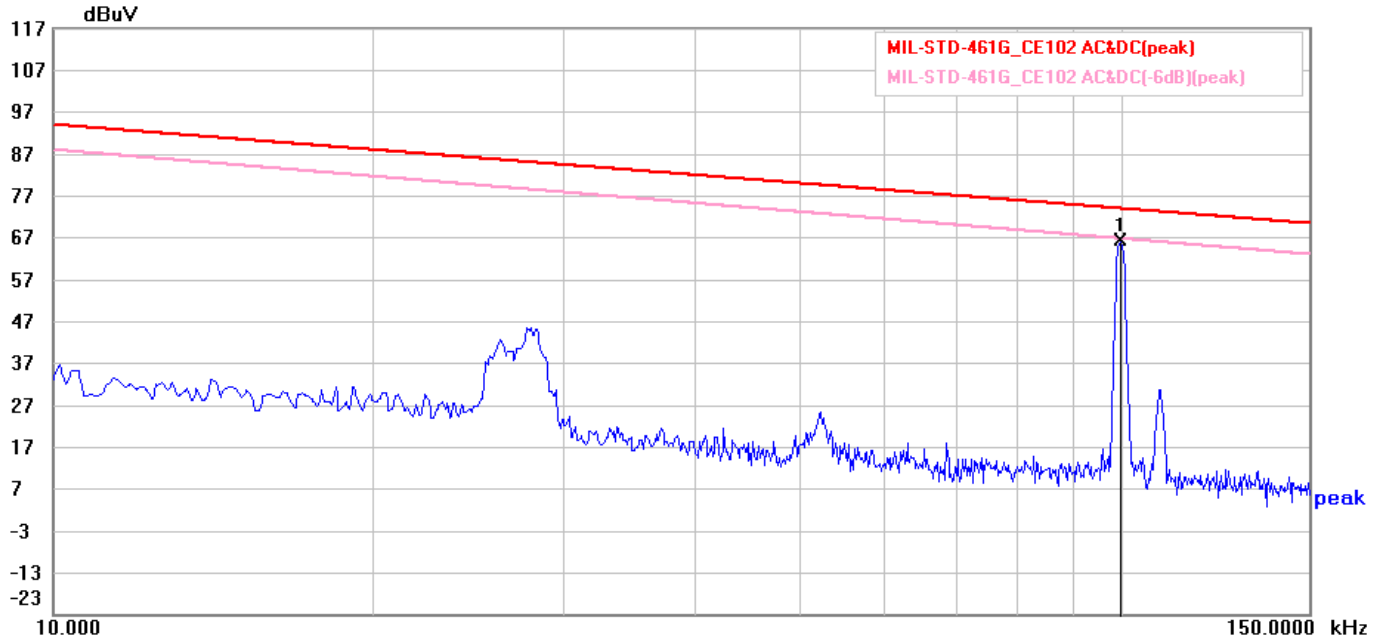
4) MIL-STD-461G_CE102_9.8 MHz-L1-# 90-PK



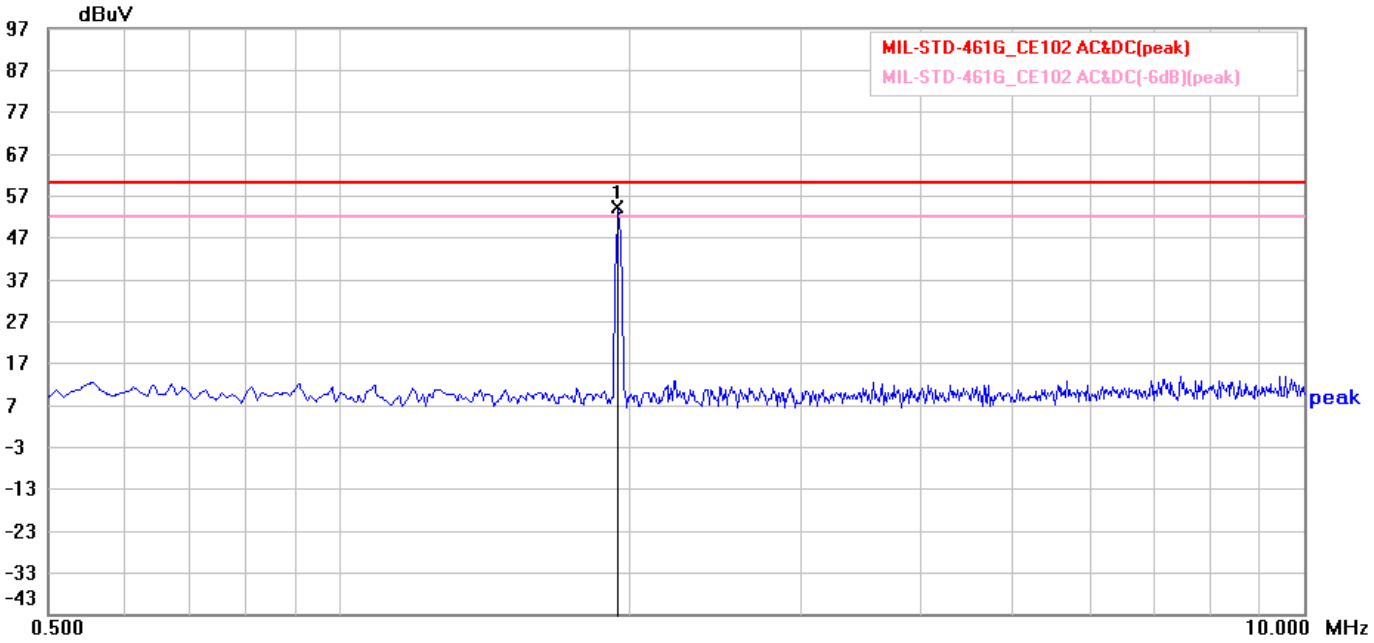
5) MIL-STD-461G_CE102_10.5 kHz-N-# 93-PK



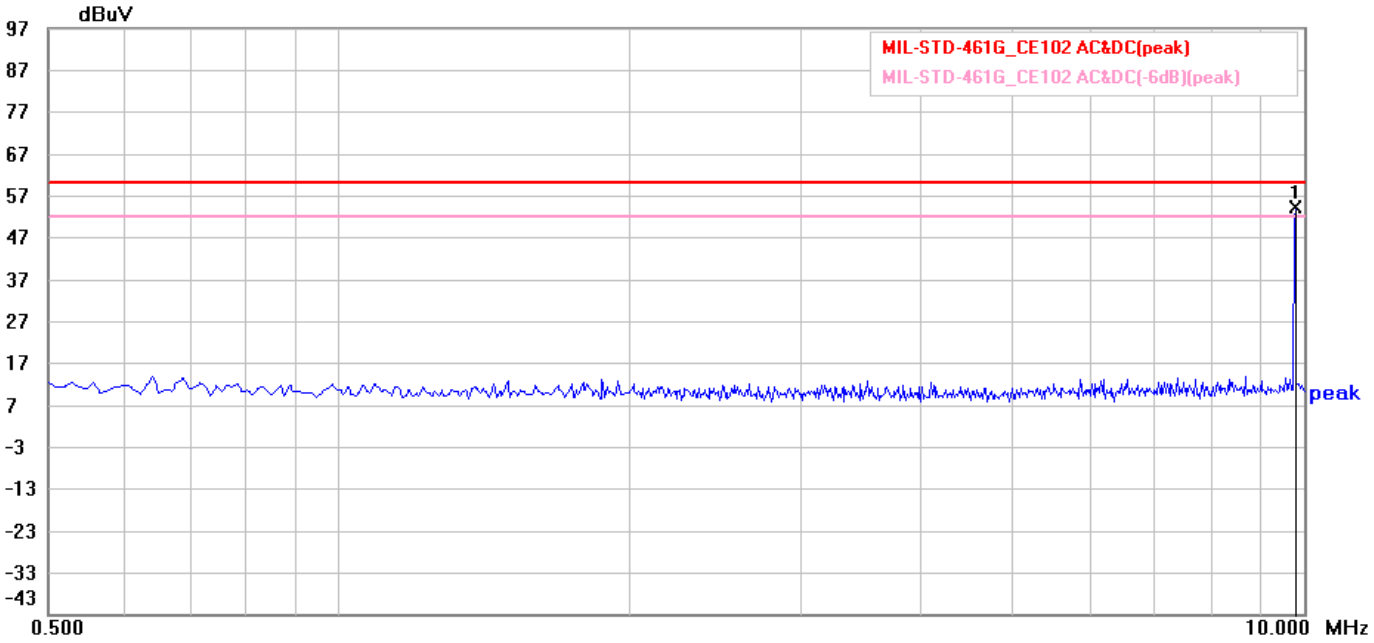
6) MIL-STD-461G_CE102_100 kHz-N-# 95- PK



7) MIL-STD-461G_CE102_1.95 MHz-N-# 96-PK



8) MIL-STD-461G_CE102_9.8 MHz-N-# 97-PK



1.4.2 EUT testing. Perform emission data scans using the measurement setup of **MIL-STD-461G Figure CE102-3**.

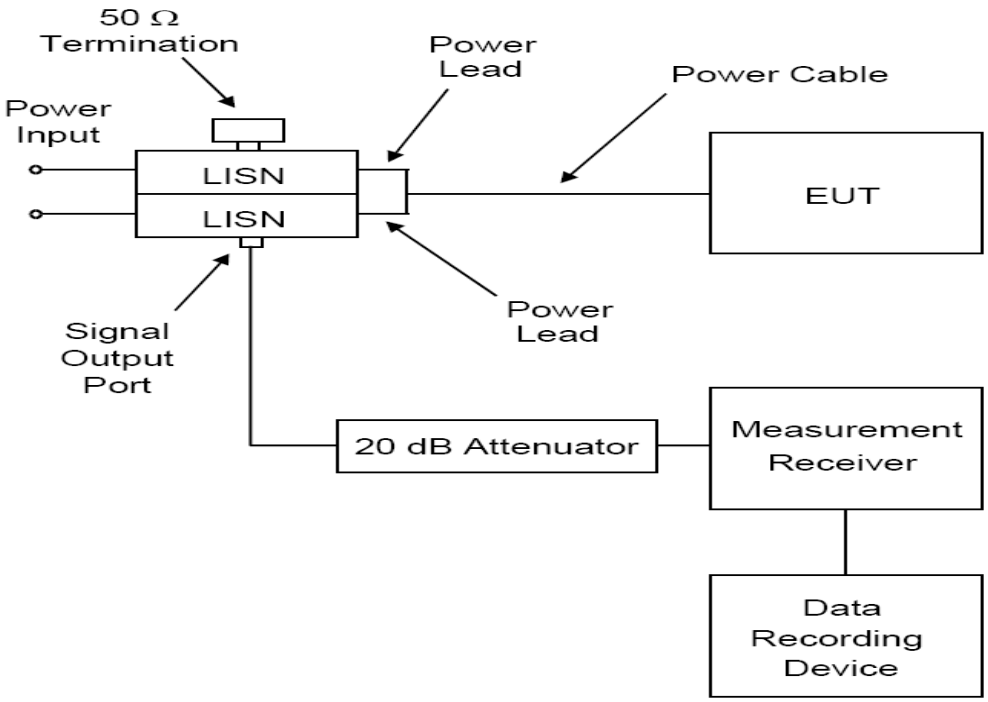
(a) Turn on the EUT and allow a sufficient time for stabilization.

(b) Select an appropriate lead for testing.

(c) Scan the measurement receiver over the applicable frequency range, using the bandwidths and minimum measurement times in the MIL-STD-461G Table II.

(d) Repeat MIL-STD-461G sub clause 5.5.3.4b(2) and MIL-STD-461G sub clause 5.5.3.4b(3) for each power lead.

FIGURE CE102-3. Measurement setup.



1.5 System Calibration Check

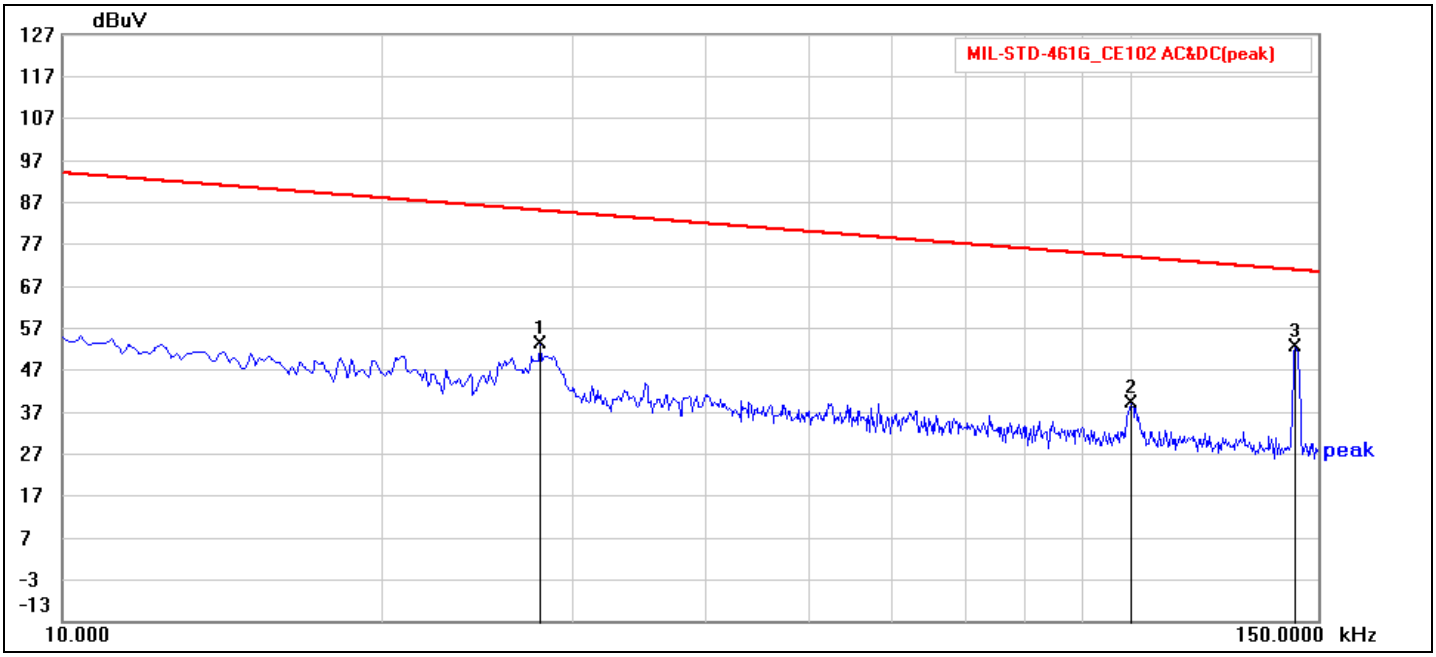
Based on MIL-STD-461G sub clause 5.5.3.4 system calibration requirement to verify the calibration level within ±3 dB at 10 kHz, 100 kHz, 2 MHz and 10 MHz.

1.6 Test Result

The final test data is shown as following pages.

Job No.:	**23A060603M**	**Polarization:**	**L1**
Standard:	**MIL-STD-461G_CE102 AC&DC**	**Power Source:**	**DC 28 V**
Test item:	**Conduction Test**	**Date:**	**2023 / 8 / 29**
Company:	**7Starlake Co., Ltd.**	**Time:**	**上午 10:41:06**
EUT Name:	**SYSTEM**	**Temp.(℃)/Hum.(%):**	**24.2 (℃) / 52 %**
EUT Model:	**AV800**	**Engineer Signature:**	**Max Chiu**
Distance:			
Note:			

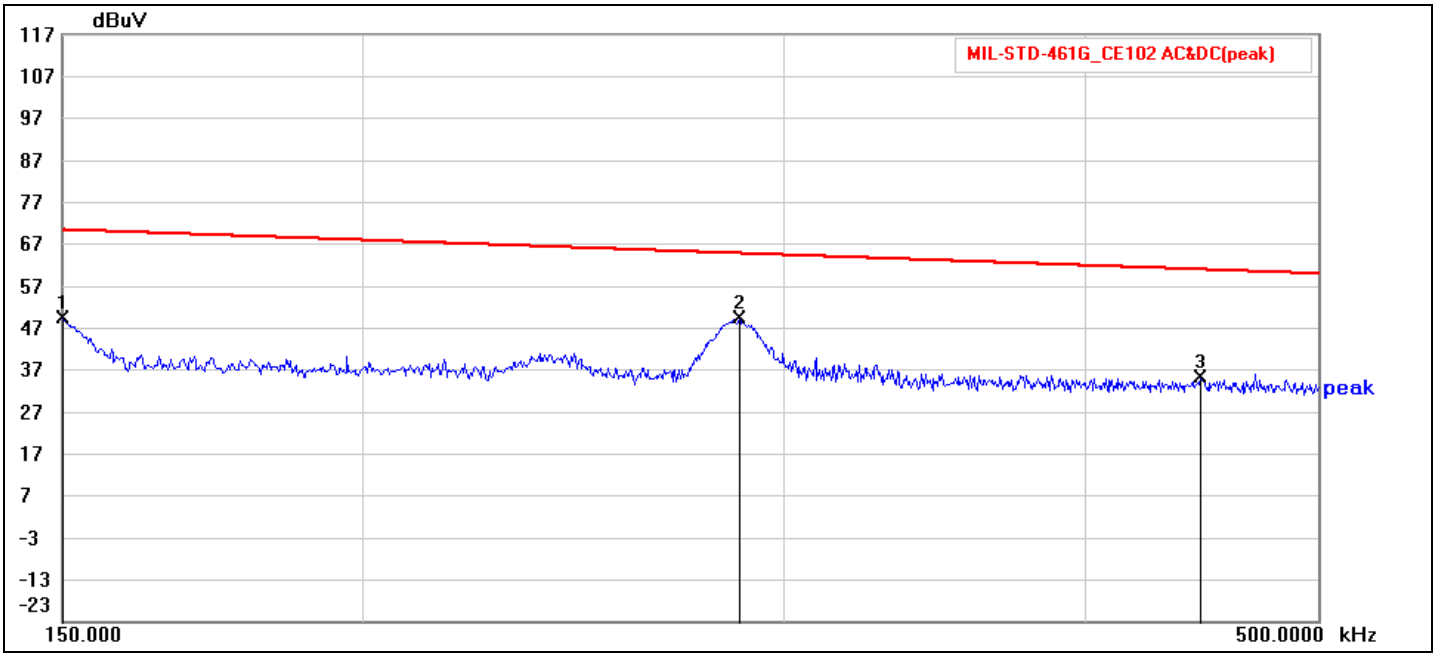
Range1 :0.01--0.15(MHz) / RBW:1(kHz) / VBW:3(kHz)	



No.	Frequency (kHz)	Reading (dBuV)	Correction Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	28.060	31.51	21.72	53.23	85.03	-31.80	peak	P	
2	100.440	18.63	20.52	39.15	73.95	-34.80	peak	P	
3	143.140	31.90	20.51	52.41	70.87	-18.46	peak	P	

Job No.:	**23A060603M**	**Polarization:**	**L1**
Standard:	**MIL-STD-461G_CE102 AC&DC**	**Power Source:**	**DC 28 V**
Test item:	**Conduction Test**	**Date:**	**2023 / 8 / 29**
Company:	**7Starlake Co., Ltd.**	**Time:**	**上午 10:42:32**
EUT Name:	**SYSTEM**	**Temp.(℃)/Hum.(%):**	**24.2 (℃) / 52 %**
EUT Model:	**AV800**	**Engineer Signature:**	**Max Chiu**
Distance:			
Note:			

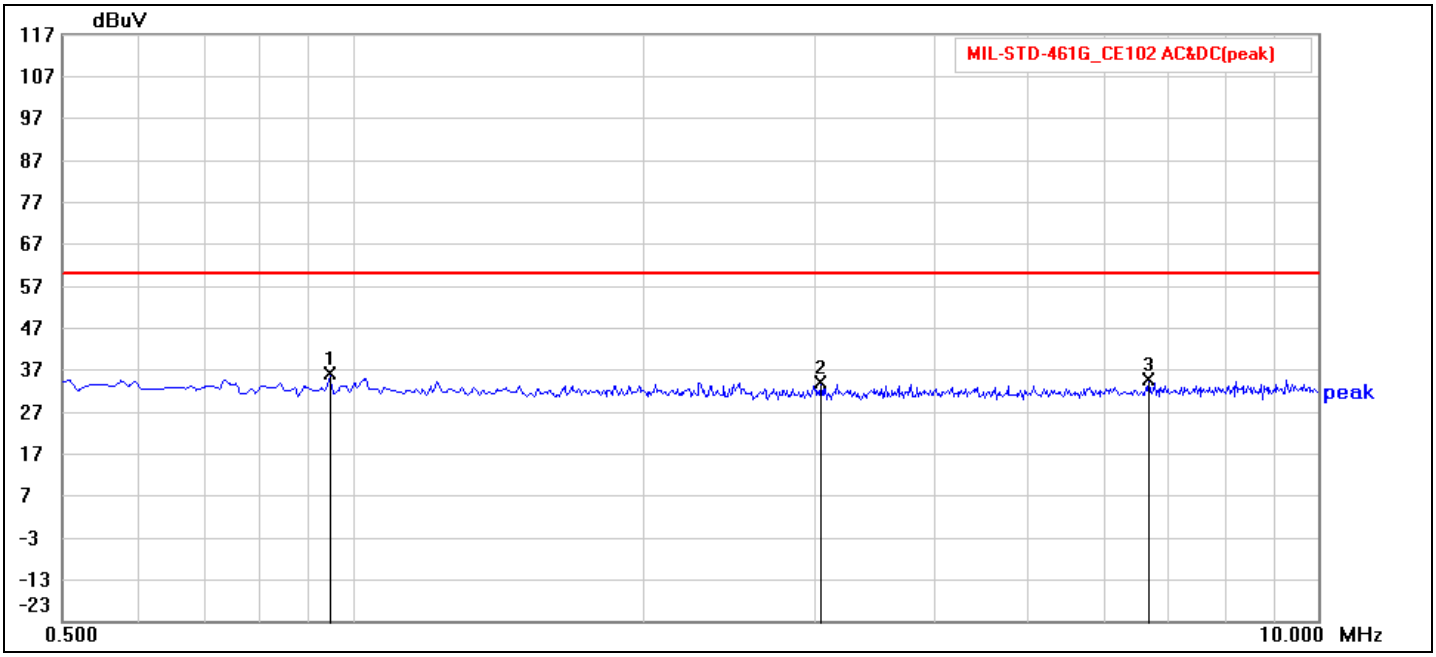
Range1 :0.15--0.5(MHz) / RBW:10(kHz) / VBW:30(kHz)	



No.	Frequency (kHz)	Reading (dBuV)	Correction Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	150.000	28.60	20.51	49.11	70.46	-21.35	peak	P	
2	287.200	28.54	20.61	49.15	64.82	-15.67	peak	P	
3	446.800	14.39	20.60	34.99	60.98	-25.99	peak	P	

Job No.:	**23A060603M**	**Polarization:**	**L1**
Standard:	**MIL-STD-461G_CE102 AC&DC**	**Power Source:**	**DC 28 V**
Test item:	**Conduction Test**	**Date:**	**2023 / 8 / 29**
Company:	**7Starlake Co., Ltd.**	**Time:**	**上午 10:43:53**
EUT Name:	**SYSTEM**	**Temp.(℃)/Hum.(%):**	**24.2 (℃) / 52 %**
EUT Model:	**AV800**	**Engineer Signature:**	**Max Chiu**
Distance:			
Note:			

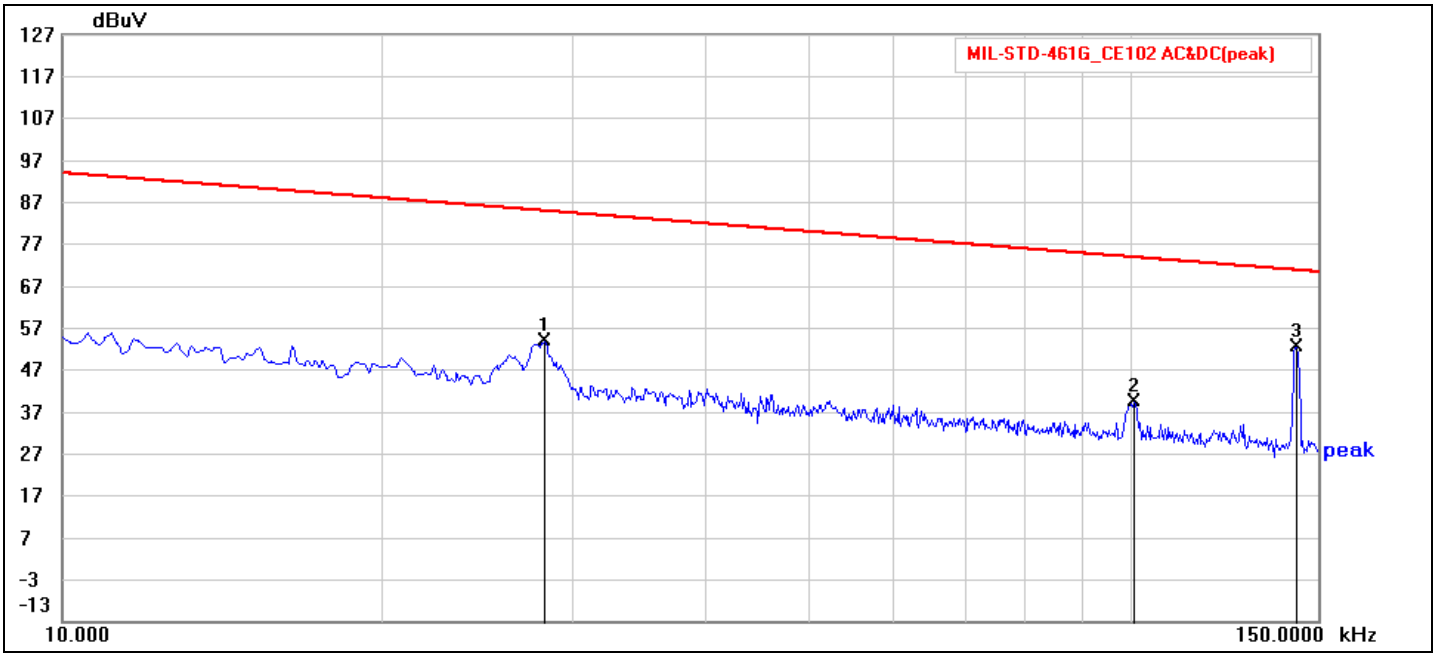
Range1 :0.5--10(MHz) / RBW:10(kHz) / VBW:30(kHz)	



No.	Frequency (MHz)	Reading (dBuV)	Correction Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.947	15.34	20.46	35.80	60.00	-24.20	peak	P	
2	3.055	13.29	20.39	33.68	60.00	-26.32	peak	P	
3	6.684	13.97	20.50	34.47	60.00	-25.53	peak	P	

Job No.:	**23A060603M**	**Polarization:**	**N**
Standard:	**MIL-STD-461G_CE102 AC&DC**	**Power Source:**	**DC 28 V**
Test item:	**Conduction Test**	**Date:**	**2023 / 8 / 29**
Company:	**7Starlake Co., Ltd.**	**Time:**	**上午 10:48:28**
EUT Name:	**SYSTEM**	**Temp.(℃)/Hum.(%):**	**24.2 (℃) / 52 %**
EUT Model:	**AV800**	**Engineer Signature:**	**Max Chiu**
Distance:			
Note:			

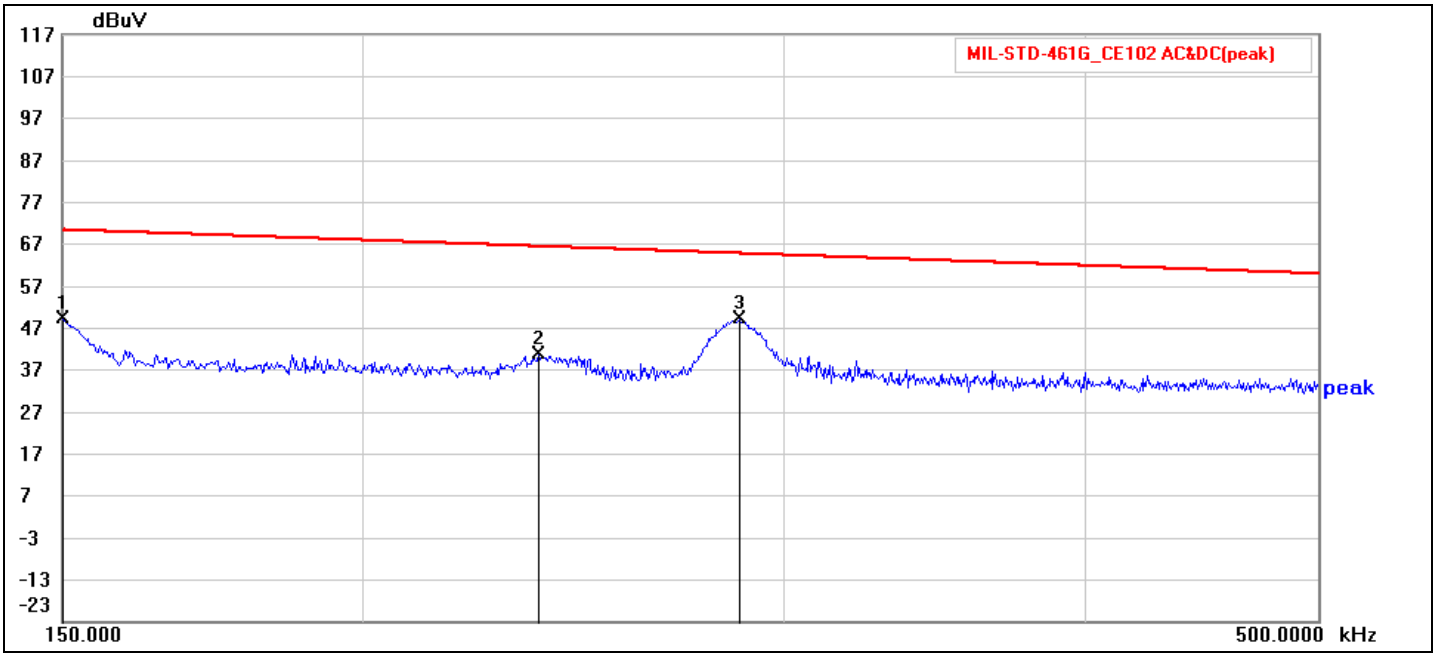
Range1 :0.01--0.15(MHz) / RBW:1(kHz) / VBW:3(kHz)	



No.	Frequency (kHz)	Reading (dBuV)	Correction Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	28.340	32.03	21.71	53.74	84.95	-31.21	peak	P	
2	100.860	18.93	20.58	39.51	73.91	-34.40	peak	P	
3	143.280	32.00	20.52	52.52	70.86	-18.34	peak	P	

Job No.:	**23A060603M**	**Polarization:**	**N**
Standard:	**MIL-STD-461G_CE102 AC&DC**	**Power Source:**	**DC 28 V**
Test item:	**Conduction Test**	**Date:**	**2023 / 8 / 29**
Company:	**7Starlake Co., Ltd.**	**Time:**	**上午 10:47:11**
EUT Name:	**SYSTEM**	**Temp.(℃)/Hum.(%):**	**24.2 (℃) / 52 %**
EUT Model:	**AV800**	**Engineer Signature:**	**Max Chiu**
Distance:			
Note:			

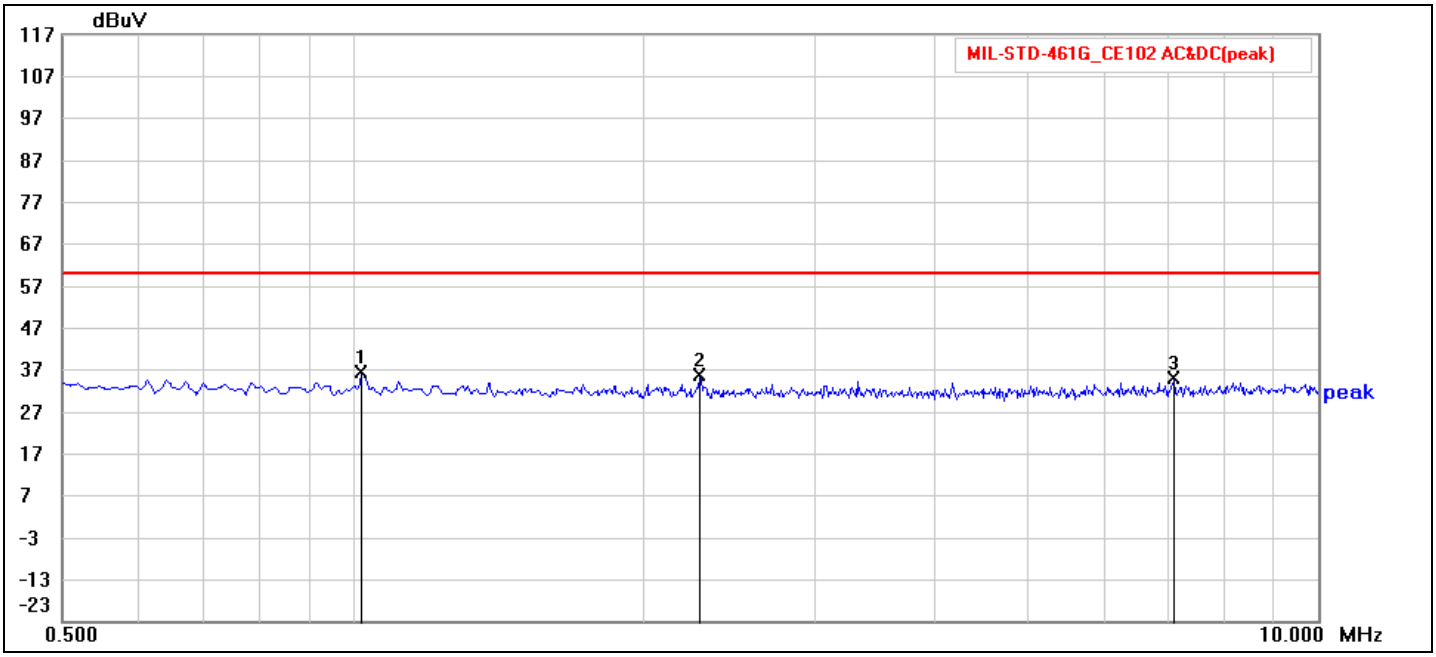
Range1 :0.15--0.5(MHz) / RBW:10(kHz) / VBW:30(kHz)	



No.	Frequency (kHz)	Reading (dBuV)	Correction Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	150.000	28.57	20.51	49.08	70.46	-21.38	peak	P	
2	236.800	20.09	20.57	40.66	66.50	-25.84	peak	P	
3	287.200	28.44	20.62	49.06	64.82	-15.76	peak	P	

Job No.:	**23A060603M**	**Polarization:**	**N**
Standard:	**MIL-STD-461G_CE102 AC&DC**	**Power Source:**	**DC 28 V**
Test item:	**Conduction Test**	**Date:**	**2023 / 8 / 29**
Company:	**7Starlake Co., Ltd.**	**Time:**	**上午 10:46:07**
EUT Name:	**SYSTEM**	**Temp.(℃)/Hum.(%):**	**24.2 (℃) / 52 %**
EUT Model:	**AV800**	**Engineer Signature:**	**Max Chiu**
Distance:			
Note:			

Range1 :0.5--10(MHz) / RBW:10(kHz) / VBW:30(kHz)	



No.	Frequency (MHz)	Reading (dBuV)	Correction Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	1.022	15.73	20.46	36.19	60.00	-23.81	peak	P	
2	2.296	15.02	20.39	35.41	60.00	-24.59	peak	P	
3	7.093	14.14	20.55	34.69	60.00	-25.31	peak	P	

2 Radiated emissions, electric field Test (RE102)

2.1 Instrument

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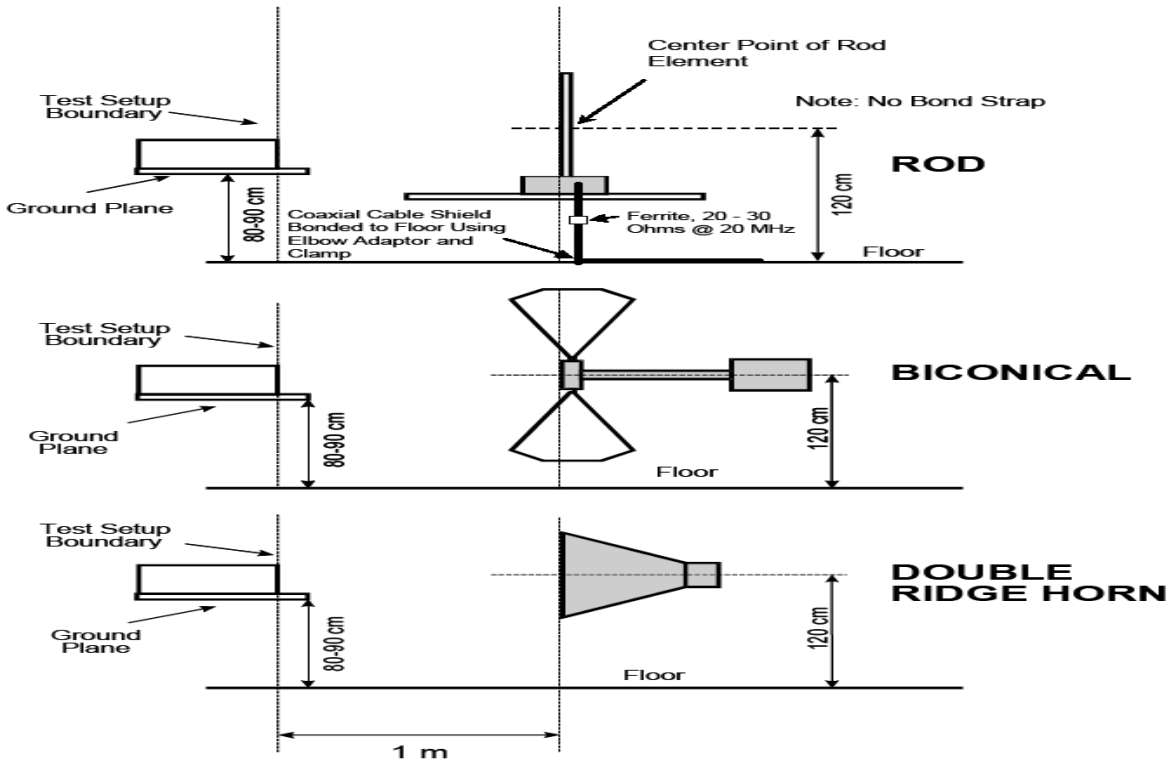
Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
Monopole Antenna	A.H. Systems	SAS-550-2B	290	2024/08/14
Biconical Antenna	Schwarzbeck	VHA 9103 & BBA 9106	VHA 9103-2484	2024/06/26
Horn Antenna	ETS-Lindgren	3106B	00224879	2024/07/24
Horn Antenna	Schwarzbeck	BBHA 9120 D	9120D-583	2023/10/11
Pre-Amplifier	EMCI	EMC330	980003	2024/06/04
Pre-Amplifier	EMCI	EMC051845	980110	2024/06/04
EMI Test Receiver	Agilent	N9038A	MY51210178	2024/08/10
Spectrum Analyzer	R&S	FSP40	100478	2024/07/30
DC LISN	Schwarzbeck	NNBL 8226	8226-519	2024/06/15
DC LISN	Schwarzbeck	NNBL 8226	8226-520	2024/06/15
RF Cable	EMCI	EM106-SMSM-500	CBL75	2024/02/15
RF Cable	EMCI	EM106-SMSM-290	01	2024/02/15
RF Cable	EMCI	EM106-SMSM-80	01	2024/02/15

Note: The above equipments are within the valid calibration period.

2.2 Block Diagram of Test Configuration

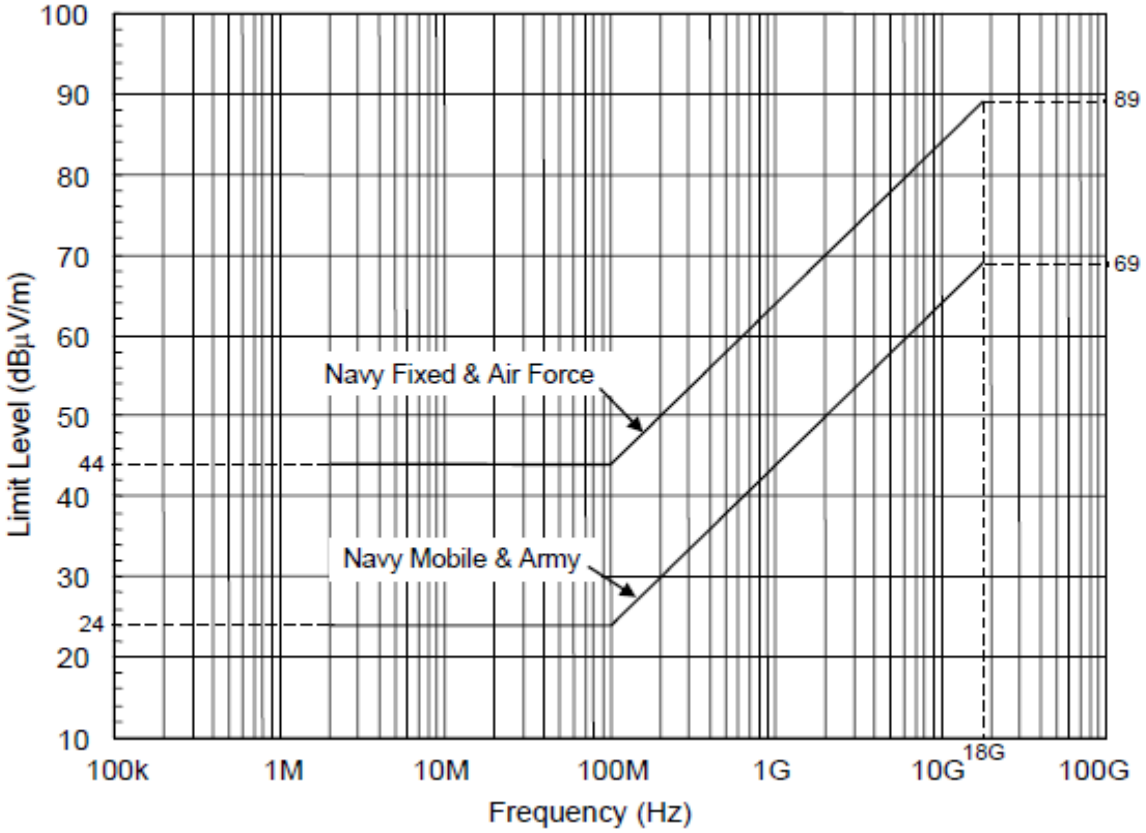


2.3 RE102 Application

2.3.1 This requirement is applicable for radiated emissions from equipment and subsystem enclosures, and all interconnecting cables. For equipment with permanently mounted antennas this requirement does not apply at the transmitter fundamental frequency and the necessary occupied bandwidth of the signal. The requirement is applicable as follows:

☒ Ground	2 MHz to 18 GHz
☐ Ships, surface	10 kHz to 18 GHz
☐ Submarines	10 kHz to 18 GHz
☐ Aircraft (Army and Navy)	10 kHz to 18 GHz
☐ Aircraft (Air Force)	2 MHz to 18 GHz
☐ Space	10 kHz to 18 GHz

FIGURE RE102-4. RE102 limit for ground applications.



2.4 Configuration of Measurement

2.4.1 Verify that the ambient requirements specified in MIL-STD-461G sub clause 4.3.4 are met. Take plots of the ambient when required by the referenced paragraph.

2.4.2 Turn on the measurement equipment and allow a sufficient time for stabilization.

2.4.3 Using the system check path of MIL-STD-461G Figure RE102-5, perform the following evaluation of the overall measurement system from the coaxial cable end used at each antenna to the data output device at 10.5 kHz (only for measurements implemented between 10 kHz and 2 MHz), 2.1 MHz, 12 MHz and 29.5 MHz for active rod antennas, 197 MHz for the biconical antenna, 990 MHz for the large double ridge horn and 17.5 GHz for the small double ridge horn. For rod antennas that use passive matching networks, the evaluation shall be performed at the center frequency of each band. A check shall also be performed when the measurement path is changed for a particular antenna such as the coaxial cable, addition or removal of preamplifiers, or different ports used on the measurement receiver. System check path verification shall be performed near the upper end of the affected frequency band.

2.4.4 Turn on the measurement equipment and allow sufficient time for stabilization.

(a) Apply a calibrated signal level, which is at least 6 dB below the limit (limit minus antenna factor), to the coaxial cable at the antenna connection point.

(b) Scan the measurement receiver in the same manner as a normal data scan. Verify that the data recording device indicates a level within ±3 dB of the injected signal level.

(c) For the 104 cm rod antenna, remove the rod element and apply the signal to the antenna matching network through a capacitor connected to the rod mount as shown on MIL-STD-461G Figure RE102-8. The capacitor value is nominally 10 pF, but shall be per the manufacturer’s instruction. Commercial calibration jigs or injection networks shall not be used.

(d) If readings are obtained which deviate by more than ±3 dB, locate the source of the error and correct the deficiency prior to proceeding with the testing.

2.4.5 Using the measurement path of MIL-STD-461G Figure RE102-5, perform the following evaluation for each antenna to demonstrate that there is electrical continuity through the antenna.

(a) Visually inspect each antenna for physical damage. Radiate a signal using an antenna or stub radiator at the highest measurement frequency of each antenna.

(b) Tune the measurement receiver to the frequency of the applied signal and verify that a received signal of appropriate amplitude is present. Note: This evaluation is intended to provide a coarse indication that the antenna is functioning properly. There is no requirement to accurately measure the signal level.

2.4.6 Turn on the EUT and allow sufficient time for stabilization.

2.4.7 Using the measurement path of MIL-STD-461G Figure RE102-5, determine the radiated emissions from the EUT and its associated cabling.

(a) Scan the measurement receiver for each applicable frequency range, using the bandwidths and minimum measurement times in Table II.

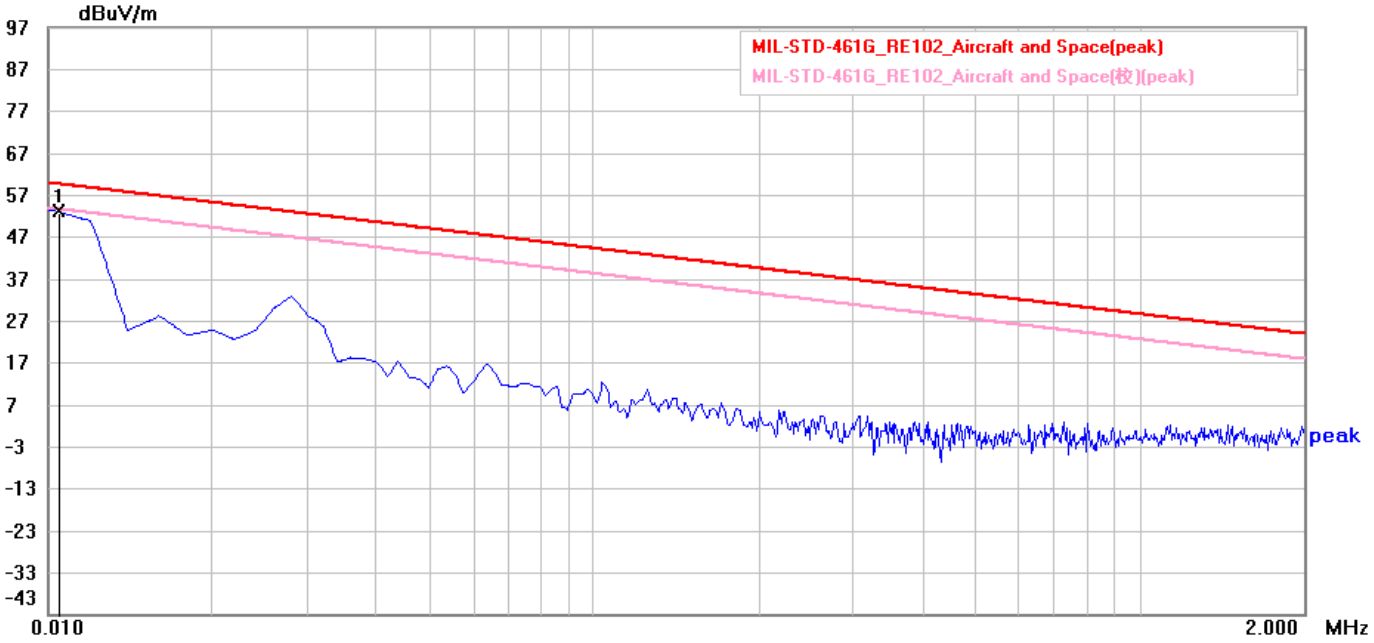
(b) Above 30 MHz, orient the antennas for both horizontally and vertically polarized fields.

(c) Take measurements for each antenna position determined under MIL-STD-461G sub clause 5.18.3.3c(2)(c) above.

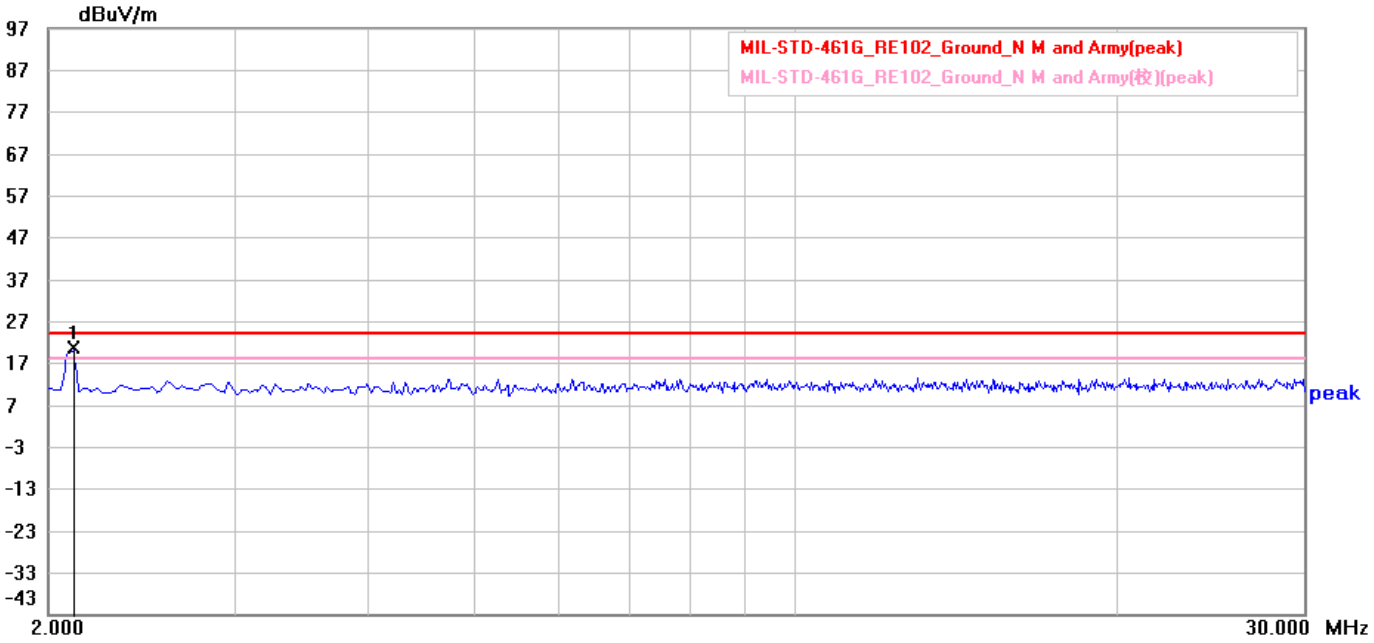
2.5 System Calibration Check

Based on MIL-STD-461G sub clause 5.18.3.4 system calibration requirement to verify the calibration level within ±3 dB in all test frequency.

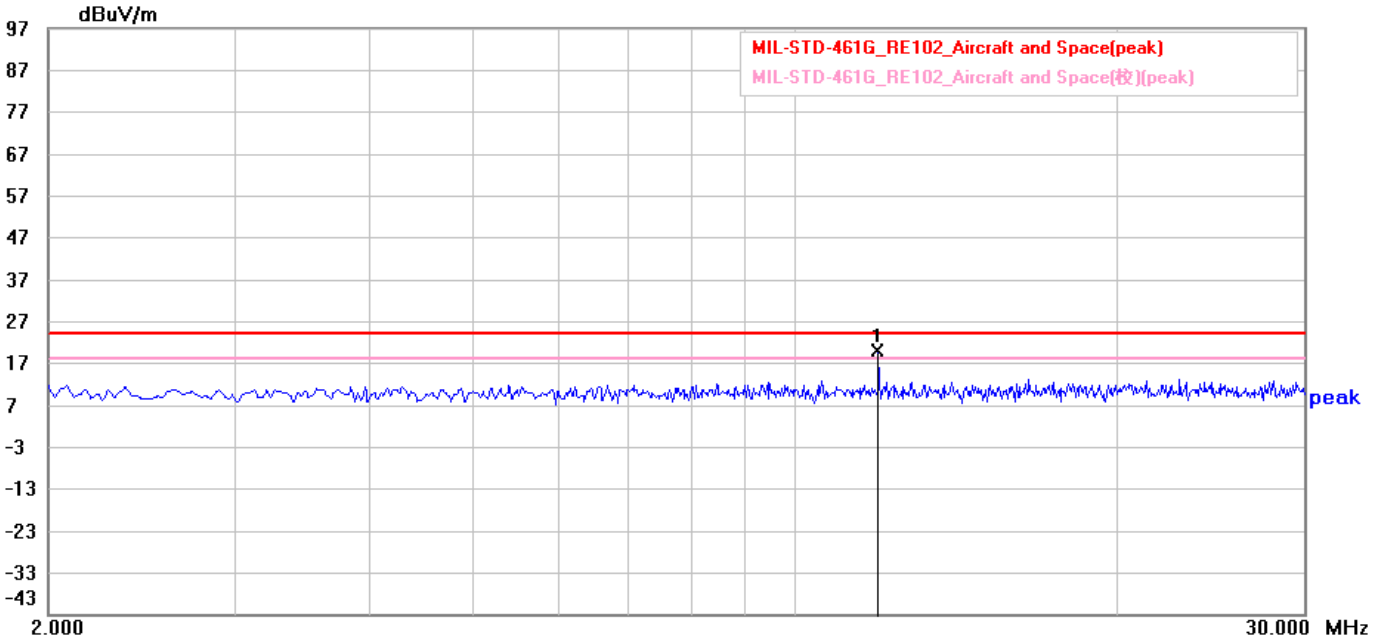
1) MIL-STD-461G_RE102_10.5 kHz-V-# 111-PK



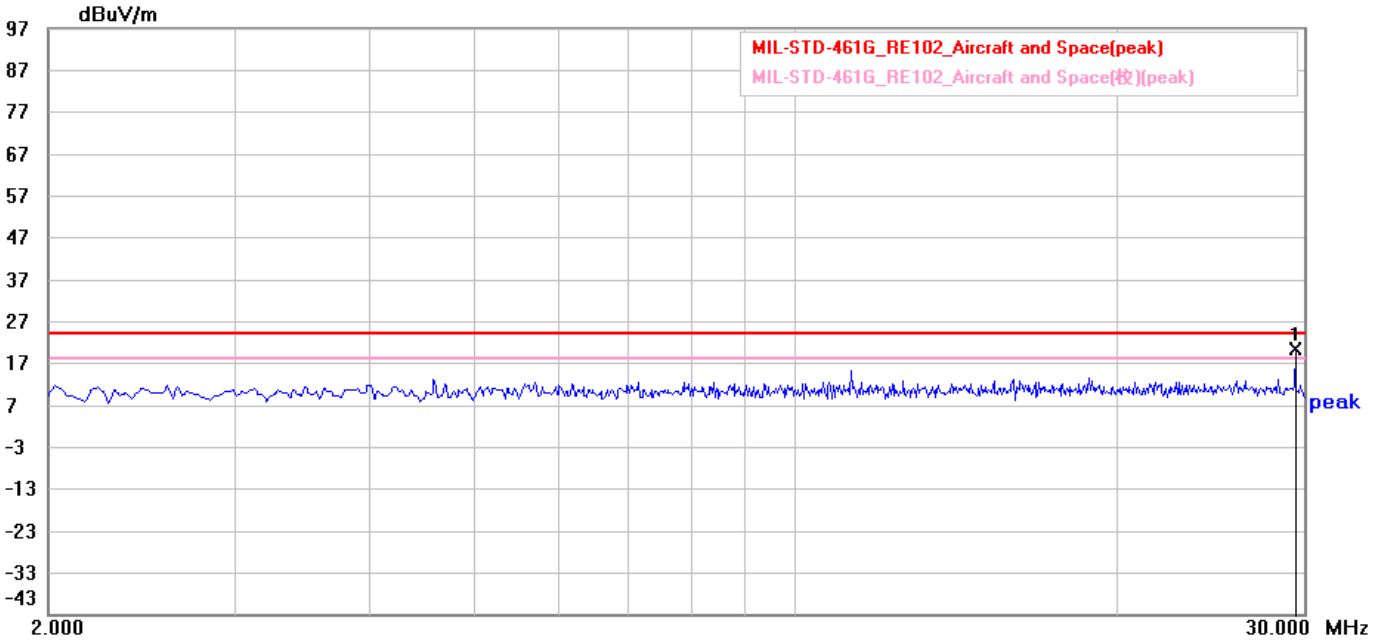
2) MIL-STD-461G_RE102_2.1 MHz-V-# 107-PK



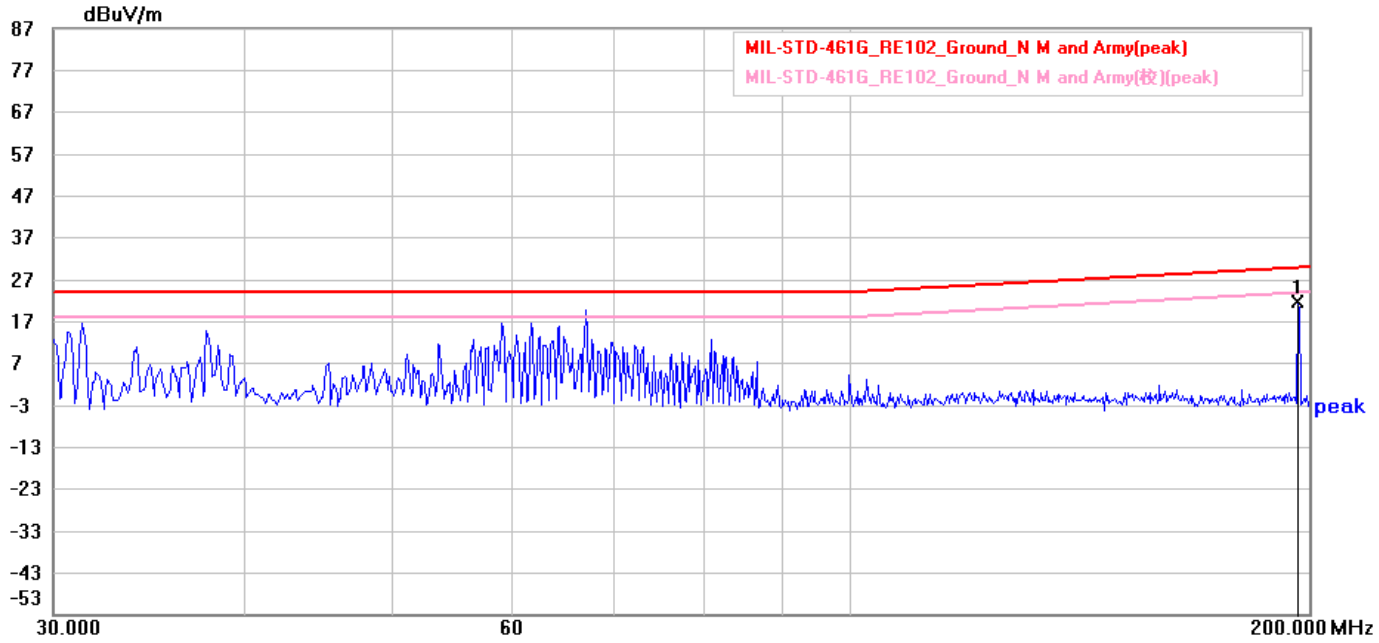
3) MIL-STD-461G_RE102_12 MHz-V-# 112-PK



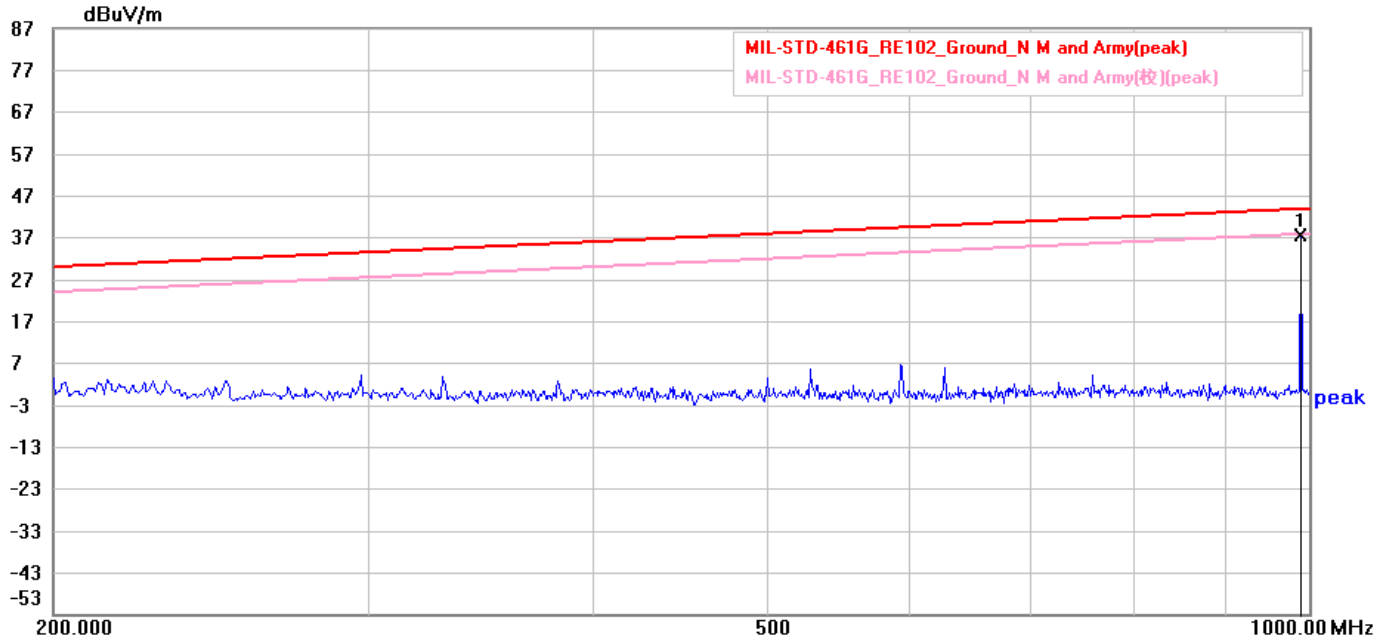
4) MIL-STD-461G_RE102_29.5 MHz-V-# 113-PK



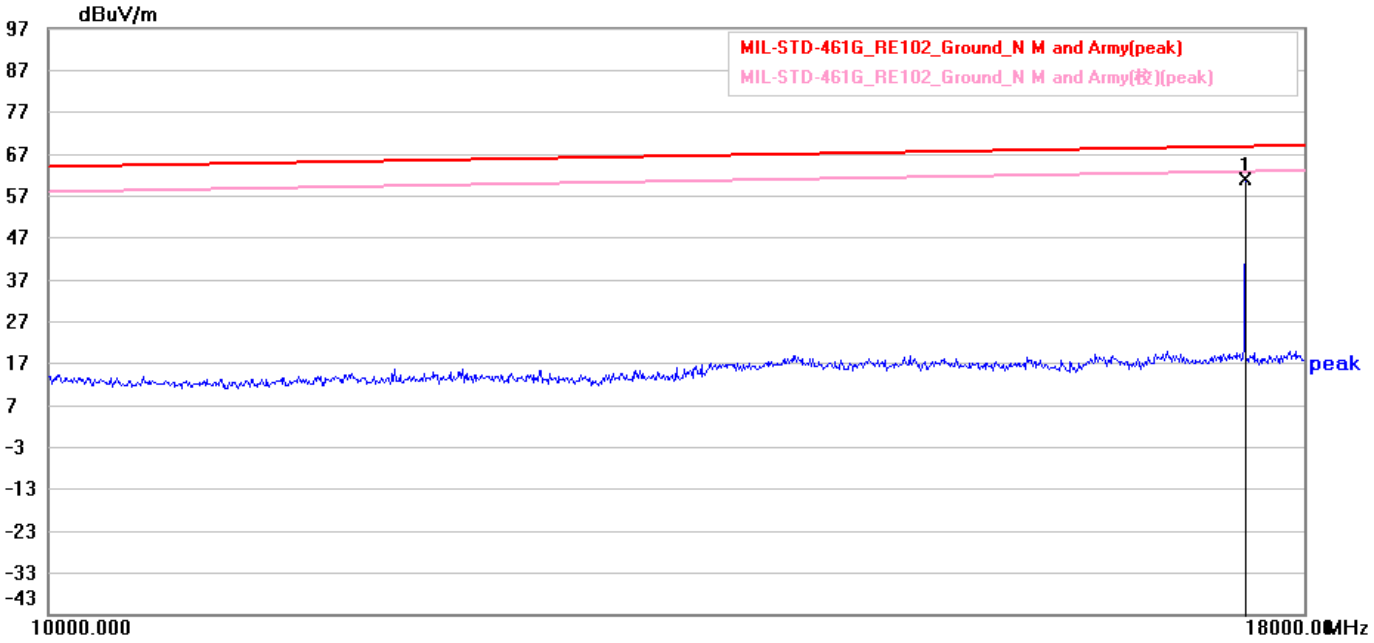
5) MIL-STD-461G_RE102_197 MHz-V-# 118-PK



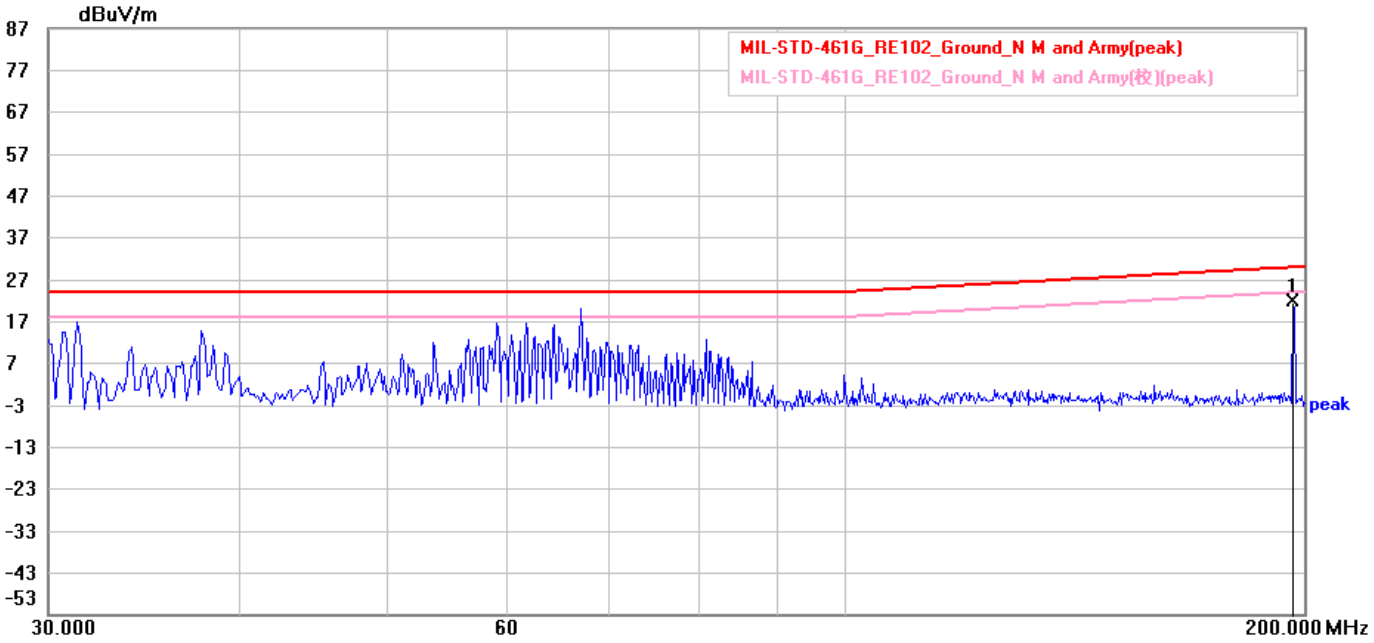
6) MIL-STD-461G_RE102_990 MHz-V-# 119-PK



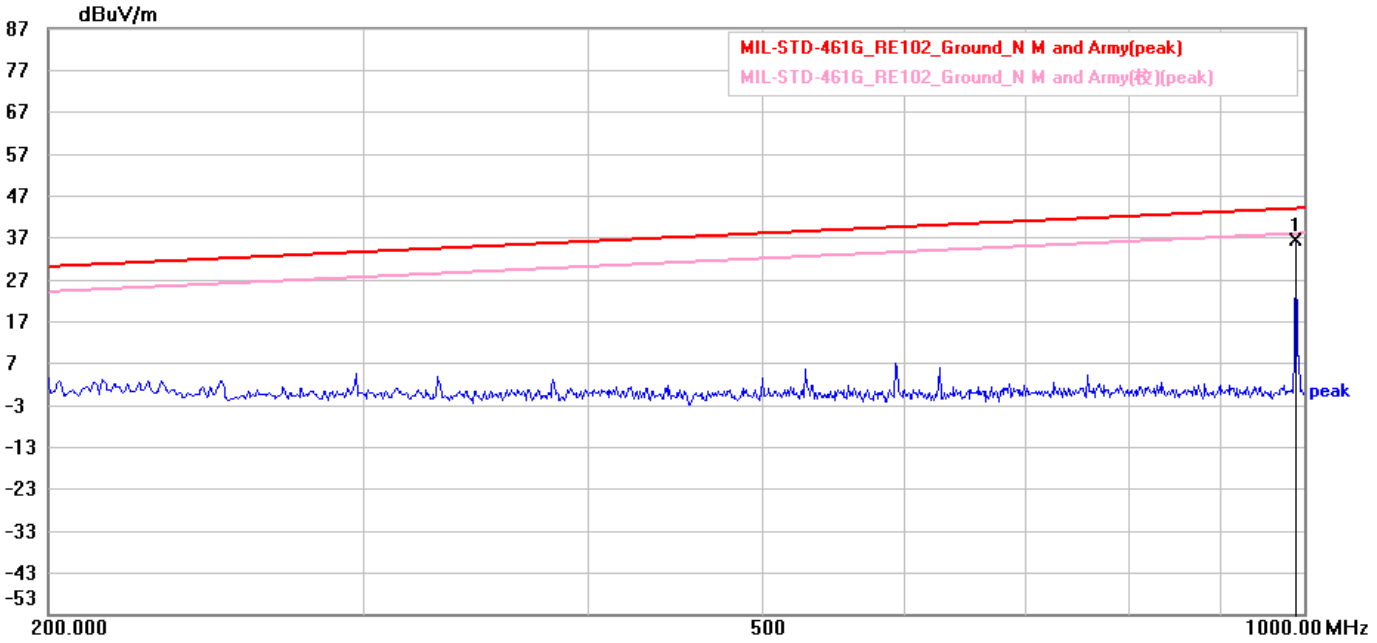
7) MIL-STD-461G_RE102_17500 MHz-V-# 125-PK



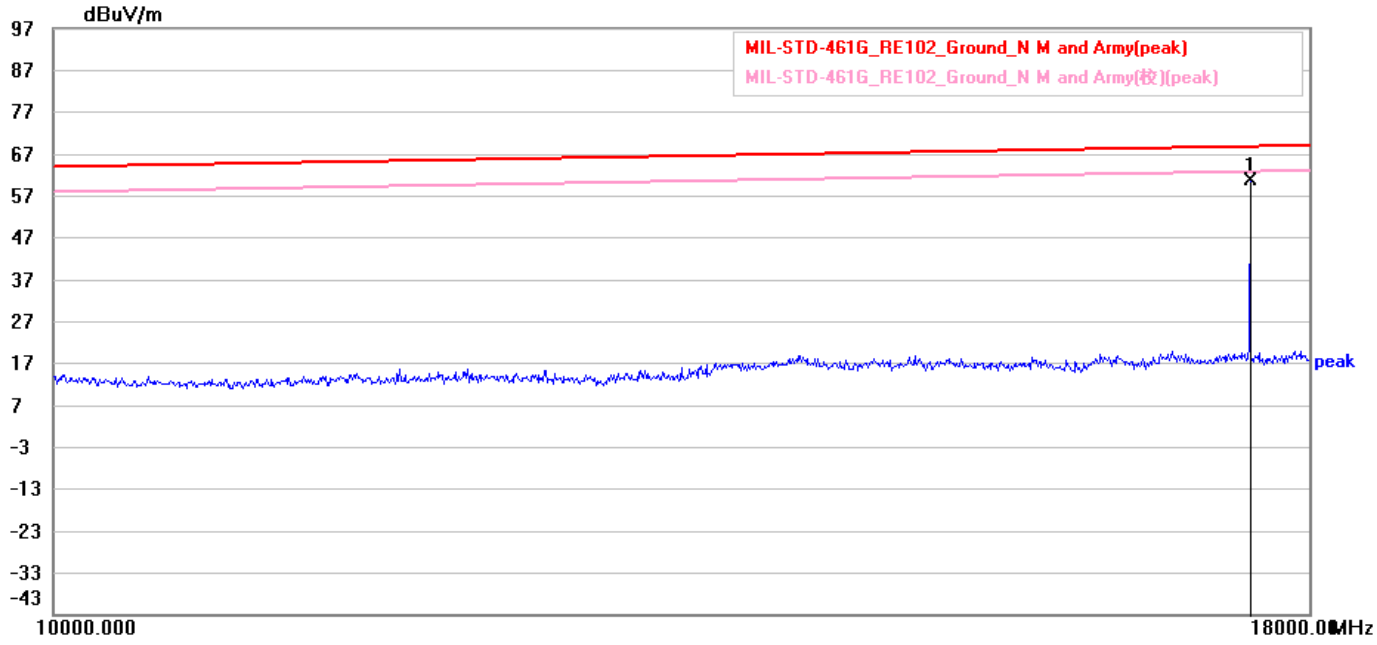
8) MIL-STD-461G_RE102_197 MHz-H-# 134-PK



9) MIL-STD-461G_RE102_990 MHz-H-# 129-PK



10) MIL-STD-461G_RE102_17500 MHz-H-# 135-PK

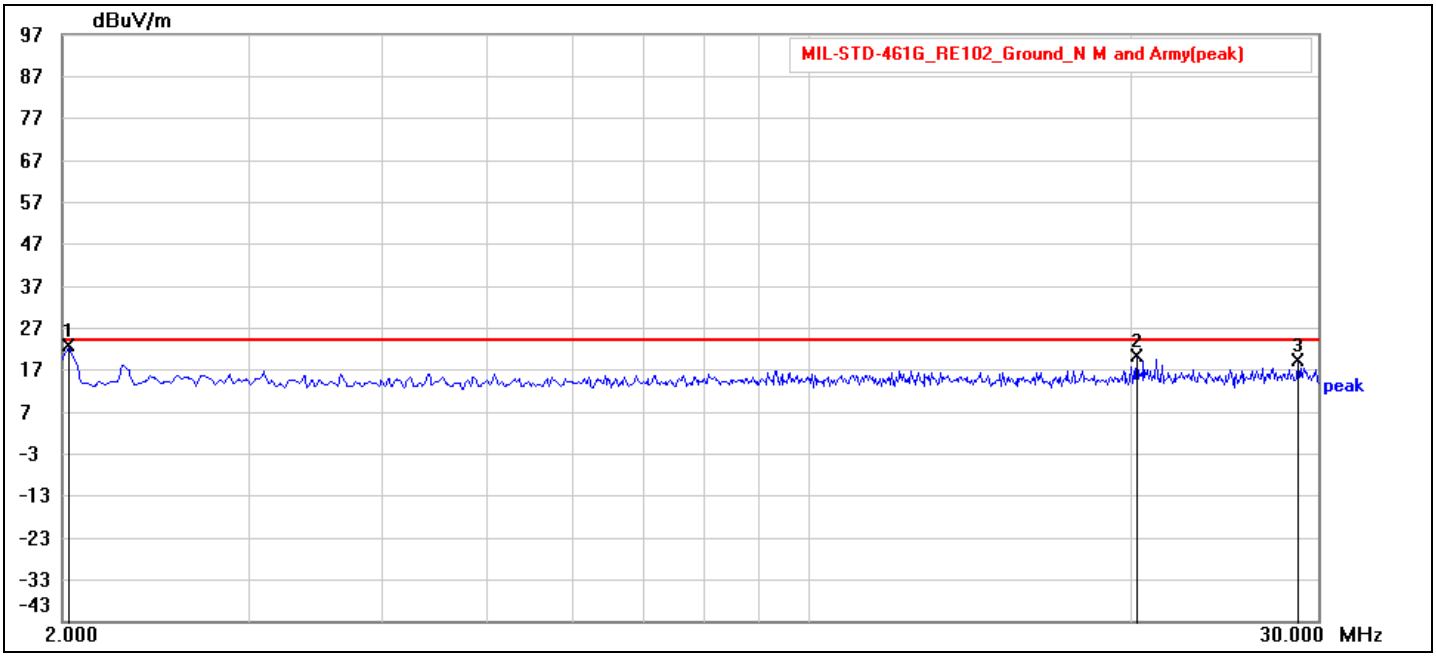


2.6 Test Result

The final test data is shown as following pages.

Job No.:	**23A060603M**	**Polarization:**	**Vertical**
Standard:	**MIL-STD-461G_RE102_Ground_N M and Army**	**Power Source:**	**DC 28 V**
Test item:	**Radiation Test**	**Date:**	**2023 / 8 / 29**
Company:	**7Starlake Co., Ltd.**	**Time:**	**上午 10:01:49**
EUT Name:	**SYSTEM**	**Temp.(℃)/Hum.(%):**	**24.2 (℃) / 52 %**
EUT Model:	**AV800**	**Engineer Signature:**	**Max Chiu**
Distance:	**1m**		
Note:			

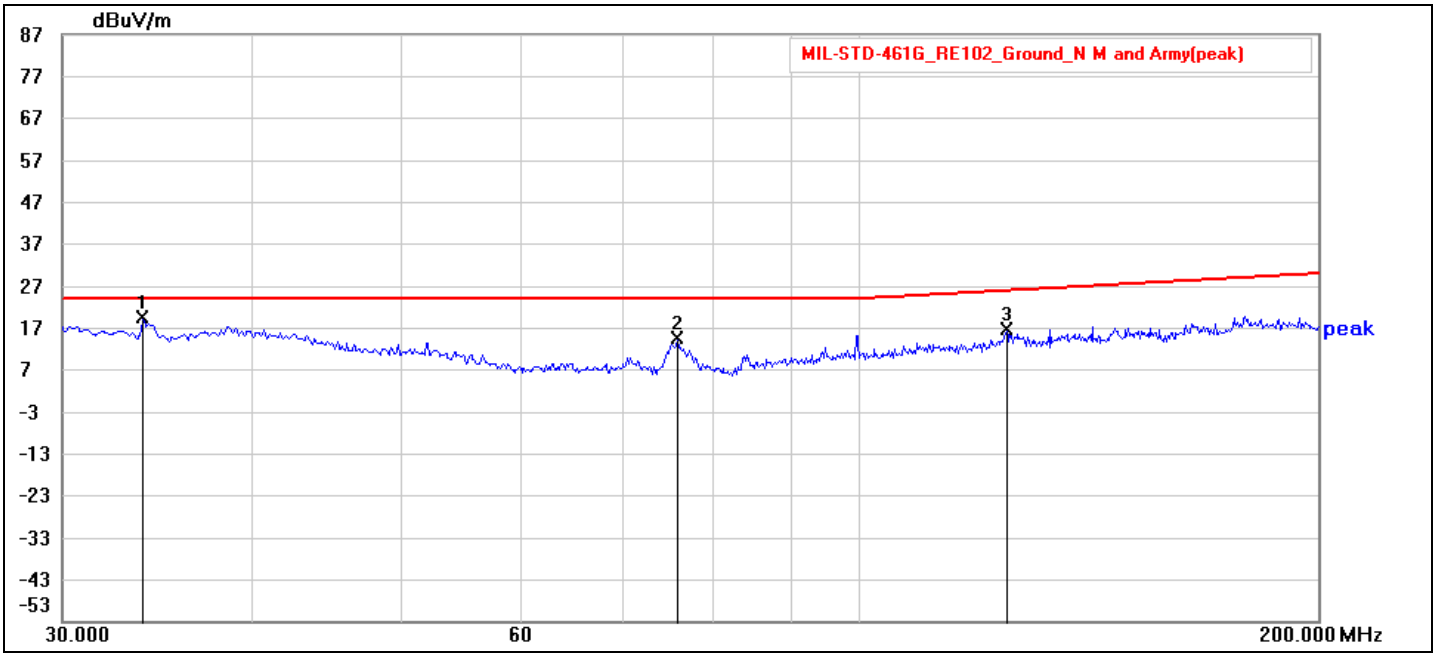
Range1 :2--30(MHz) / RBW:10(kHz) / VBW:30(kHz)	



No.	Frequency (MHz)	Reading (dBuV)	Correction Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	2.028	22.10	0.30	22.40	24.00	-1.60	peak	P	
2	20.340	19.33	0.59	19.92	24.00	-4.08	peak	P	
3	28.768	18.48	0.50	18.98	24.00	-5.02	peak	P	

Job No.:	**23A060603M**	**Polarization:**	**Vertical**
Standard:	**MIL-STD-461G_RE102_Ground_N M and Army**	**Power Source:**	**DC 28 V**
Test item:	**Radiation Test**	**Date:**	**2023 / 8 / 29**
Company:	**7Starlake Co., Ltd.**	**Time:**	**上午 10:07:55**
EUT Name:	**SYSTEM**	**Temp.(℃)/Hum.(%):**	**24.2 (℃) / 52 %**
EUT Model:	**AV800**	**Engineer Signature:**	**Max Chiu**
Distance:	**1m**		
Note:			

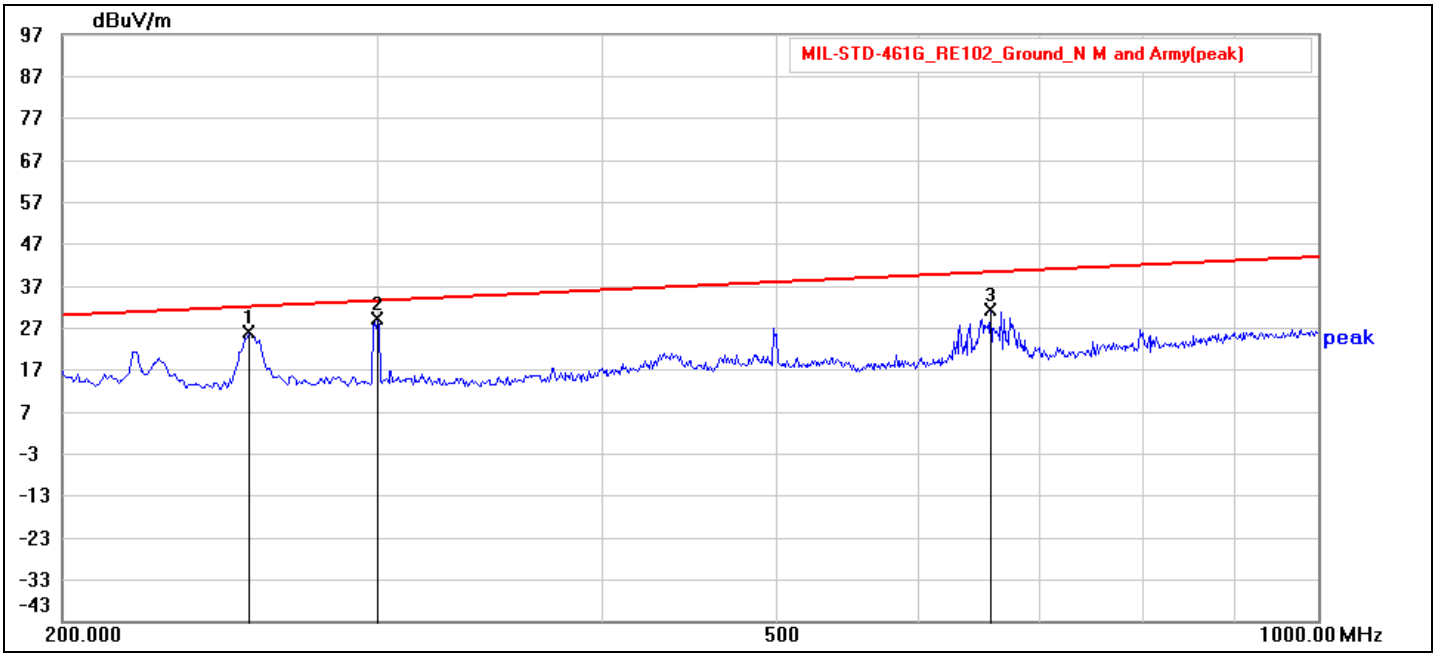
Range1 :30--200(MHz) / RBW:100(kHz) / VBW:300(kHz)	



No.	Frequency (MHz)	Reading (dBuV)	Correction Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	33.910	33.16	-14.06	19.10	24.00	-4.90	peak	P	
2	76.070	38.47	-24.41	14.06	24.00	-9.94	peak	P	
3	125.030	33.92	-17.54	16.38	25.94	-9.56	peak	P	

Job No.:	**23A060603M**	**Polarization:**	**Vertical**
Standard:	**MIL-STD-461G_RE102_Ground_N M and Army**	**Power Source:**	**DC 28 V**
Test item:	**Radiation Test**	**Date:**	**2023 / 8 / 29**
Company:	**7Starlake Co., Ltd.**	**Time:**	**上午 10:15:09**
EUT Name:	**SYSTEM**	**Temp.(℃)/Hum.(%):**	**24.2 (℃) / 52 %**
EUT Model:	**AV800**	**Engineer Signature:**	**Max Chiu**
Distance:	**1m**		
Note:			

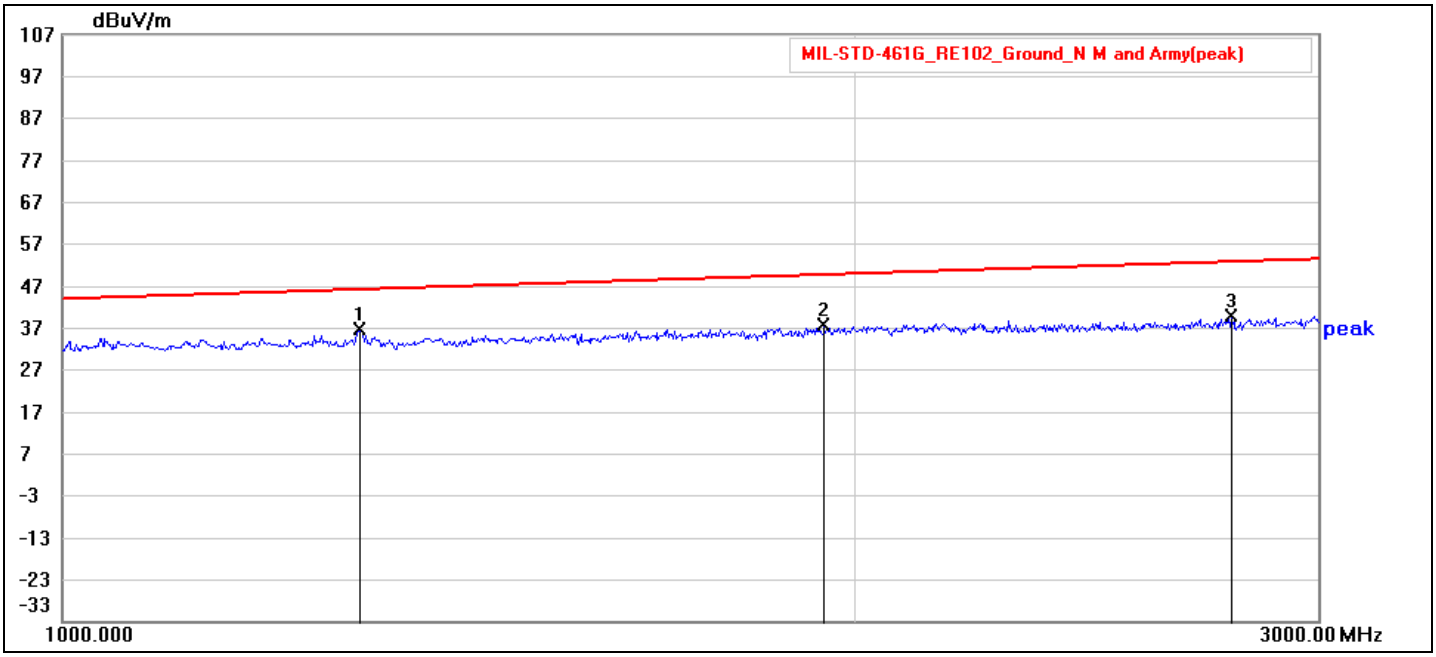
Range1 :200--1000(MHz) / RBW:100(kHz) / VBW:300(kHz)	



No.	Frequency (MHz)	Reading (dBuV)	Correction Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	254.400	44.14	-18.58	25.56	32.09	-6.53	peak	P	
2	300.000	46.64	-17.83	28.81	33.52	-4.71	peak	P	
3	657.600	41.99	-11.18	30.81	40.32	-9.51	peak	P	

Job No.:	**23A060603M**	**Polarization:**	**Vertical**
Standard:	**MIL-STD-461G_RE102_Ground_N M and Army**	**Power Source:**	**DC 28 V**
Test item:	**Radiation Test**	**Date:**	**2023 / 8 / 29**
Company:	**7Starlake Co., Ltd.**	**Time:**	**上午 10:35:35**
EUT Name:	**SYSTEM**	**Temp.(℃)/Hum.(%):**	**24.2 (℃) / 52 %**
EUT Model:	**AV800**	**Engineer Signature:**	**Max Chiu**
Distance:	**1m**		
Note:			

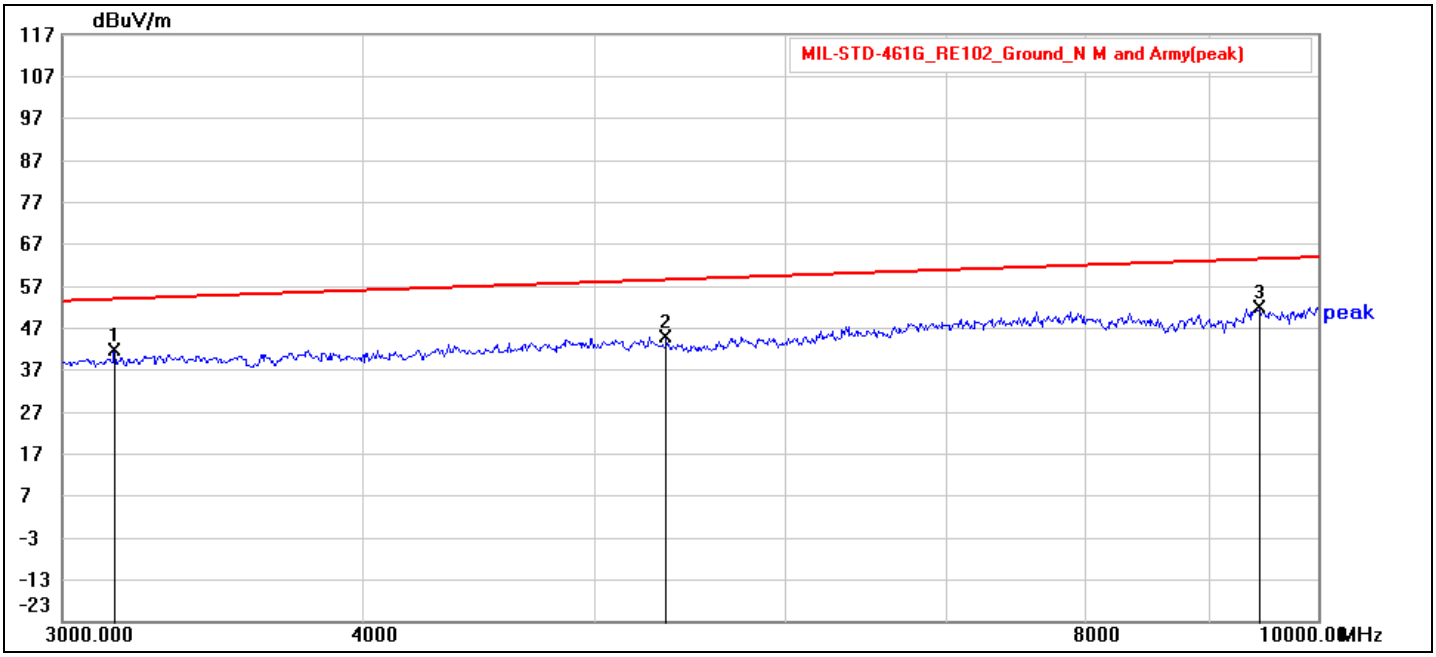
Range1 :1000--3000(MHz) / RBW:1000(kHz) / VBW:3000(kHz)	



No.	Frequency (MHz)	Reading (dBuV)	Correction Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	1295.987	60.40	-23.97	36.43	46.20	-9.77	peak	P	
2	1946.000	58.39	-20.96	37.43	49.72	-12.29	peak	P	
3	2780.000	58.51	-18.87	39.64	52.81	-13.17	peak	P	

Job No.:	**23A060603M**	**Polarization:**	**Vertical**
Standard:	**MIL-STD-461G_RE102_Ground_N M and Army**	**Power Source:**	**DC 28 V**
Test item:	**Radiation Test**	**Date:**	**2023 / 8 / 29**
Company:	**7Starlake Co., Ltd.**	**Time:**	**上午 10:34:32**
EUT Name:	**SYSTEM**	**Temp.(℃)/Hum.(%):**	**24.2 (℃) / 52 %**
EUT Model:	**AV800**	**Engineer Signature:**	**Max Chiu**
Distance:	**1m**		
Note:			

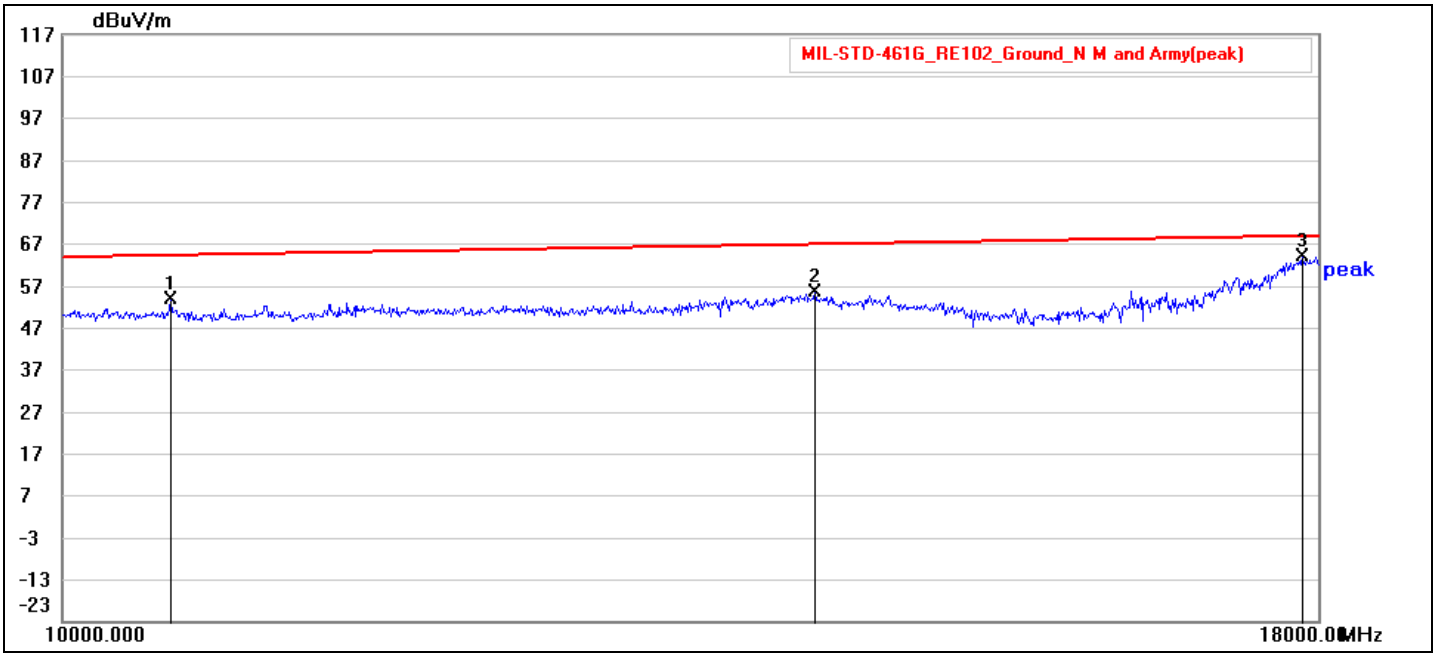
Range1 :3000--10000(MHz) / RBW:1000(kHz) / VBW:3000(kHz)	



No.	Frequency (MHz)	Reading (dBuV)	Correction Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	3151.805	59.18	-17.96	41.22	53.90	-12.68	peak	P	
2	5352.000	57.94	-13.34	44.60	58.49	-13.89	peak	P	
3	9454.000	57.72	-6.00	51.72	63.42	-11.70	peak	P	

Job No.:	**23A060603M**	**Polarization:**	**Vertical**
Standard:	**MIL-STD-461G_RE102_Ground_N M and Army**	**Power Source:**	**DC 28 V**
Test item:	**Radiation Test**	**Date:**	**2023 / 8 / 29**
Company:	**7Starlake Co., Ltd.**	**Time:**	**上午 10:33:01**
EUT Name:	**SYSTEM**	**Temp.(℃)/Hum.(%):**	**24.2 (℃) / 52 %**
EUT Model:	**AV800**	**Engineer Signature:**	**Max Chiu**
Distance:	**1m**		
Note:			

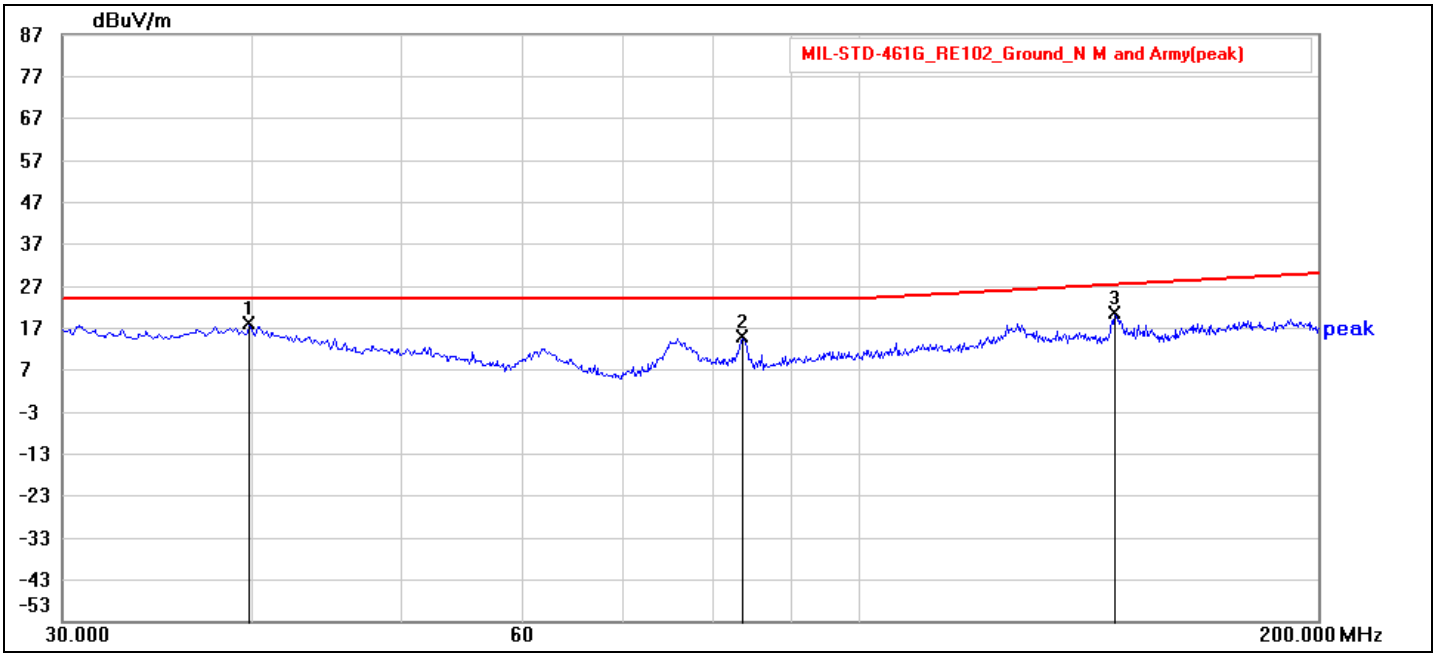
Range1 :10000--18000(MHz) / RBW:1000(kHz) / VBW:3000(kHz)	



No.	Frequency (MHz)	Reading (dBuV)	Correction Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	10518.491	59.06	-5.41	53.65	64.35	-10.70	peak	P	
2	14216.000	58.68	-3.24	55.44	66.96	-11.52	peak	P	
3	17864.000	55.89	8.18	64.07	68.93	-4.86	peak	P	

Job No.:	**23A060603M**	**Polarization:**	**Horizontal**
Standard:	**MIL-STD-461G_RE102_Ground_N M and Army**	**Power Source:**	**DC 28 V**
Test item:	**Radiation Test**	**Date:**	**2023 / 8 / 29**
Company:	**7Starlake Co., Ltd.**	**Time:**	**上午 10:09:54**
EUT Name:	**SYSTEM**	**Temp.(℃)/Hum.(%):**	**24.2 (℃) / 52 %**
EUT Model:	**AV800**	**Engineer Signature:**	**Max Chiu**
Distance:	**1m**		
Note:			

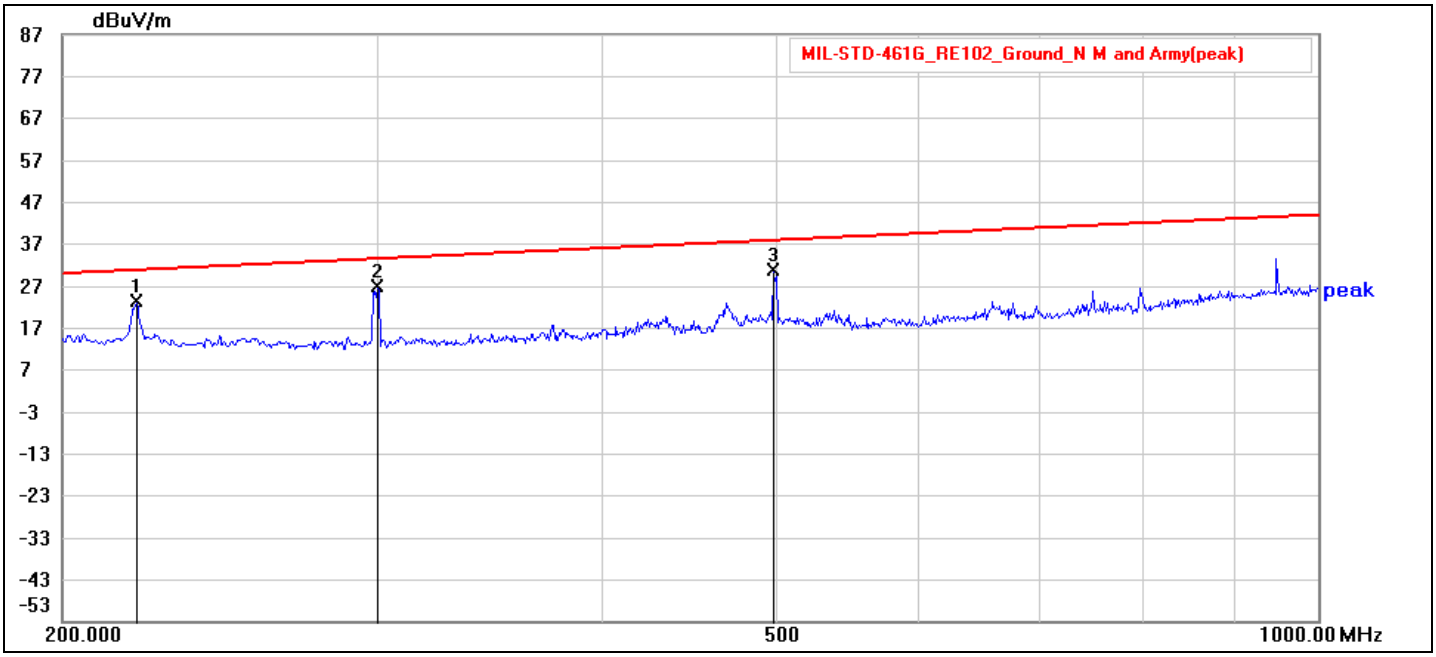
Range1 :30--200(MHz) / RBW:100(kHz) / VBW:300(kHz)	



No.	Frequency (MHz)	Reading (dBuV)	Correction Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	39.860	33.01	-15.41	17.60	24.00	-6.40	peak	P	
2	83.890	37.77	-23.36	14.41	24.00	-9.59	peak	P	
3	147.300	36.14	-16.07	20.07	27.36	-7.29	peak	P	

Job No.:	**23A060603M**	**Polarization:**	**Horizontal**
Standard:	**MIL-STD-461G_RE102_Ground_N M and Army**	**Power Source:**	**DC 28 V**
Test item:	**Radiation Test**	**Date:**	**2023 / 8 / 29**
Company:	**7Starlake Co., Ltd.**	**Time:**	**上午 10:12:55**
EUT Name:	**SYSTEM**	**Temp.(℃)/Hum.(%):**	**24.2 (℃) / 52 %**
EUT Model:	**AV800**	**Engineer Signature:**	**Max Chiu**
Distance:	**1m**		
Note:			

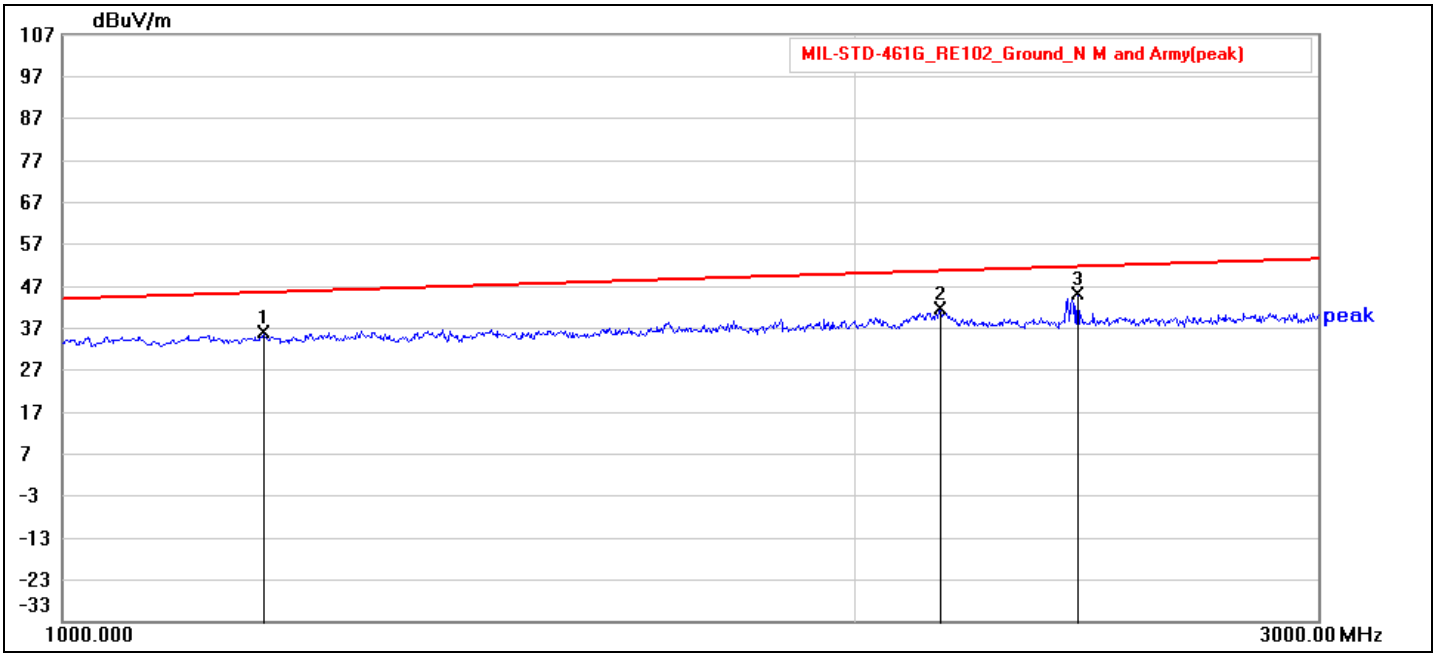
Range1 :200--1000(MHz) / RBW:100(kHz) / VBW:300(kHz)	



No.	Frequency (MHz)	Reading (dBuV)	Correction Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	220.000	40.41	-17.31	23.10	30.83	-7.73	peak	P	
2	300.000	44.49	-17.83	26.66	33.52	-6.86	peak	P	
3	497.600	43.36	-12.98	30.38	37.90	-7.52	peak	P	

Job No.:	**23A060603M**	**Polarization:**	**Horizontal**
Standard:	**MIL-STD-461G_RE102_Ground_N M and Army**	**Power Source:**	**DC 28 V**
Test item:	**Radiation Test**	**Date:**	**2023 / 8 / 29**
Company:	**7Starlake Co., Ltd.**	**Time:**	**上午 10:22:51**
EUT Name:	**SYSTEM**	**Temp.(℃)/Hum.(%):**	**24.2 (℃) / 52 %**
EUT Model:	**AV800**	**Engineer Signature:**	**Max Chiu**
Distance:	**1m**		
Note:			

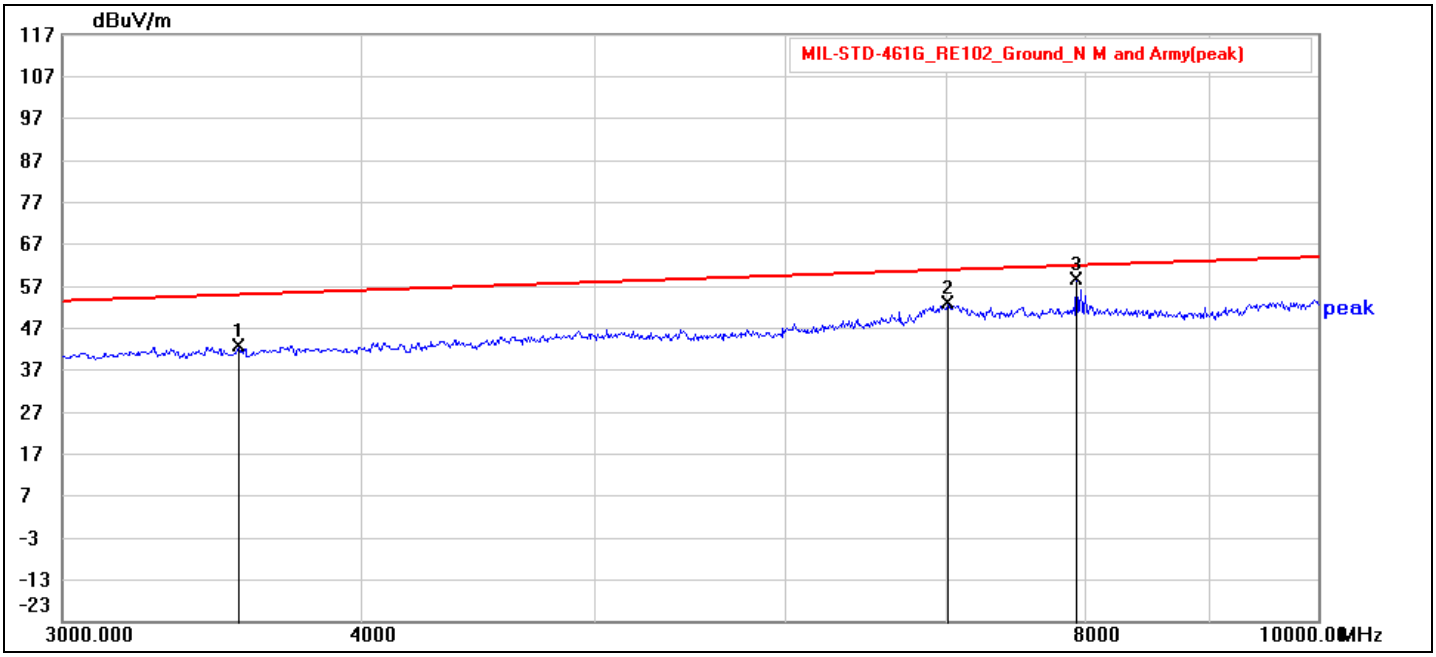
Range1 :1000--3000(MHz) / RBW:1000(kHz) / VBW:3000(kHz)	



No.	Frequency (MHz)	Reading (dBuV)	Correction Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	1192.000	60.06	-24.37	35.69	45.47	-9.78	peak	P	
2	2154.000	61.77	-20.37	41.40	50.60	-9.20	peak	P	
3	2430.000	64.44	-19.78	44.66	51.64	-6.98	peak	P	

Job No.:	**23A060603M**	**Polarization:**	**Horizontal**
Standard:	**MIL-STD-461G_RE102_Ground_N M and Army**	**Power Source:**	**DC 28 V**
Test item:	**Radiation Test**	**Date:**	**2023 / 8 / 29**
Company:	**7Starlake Co., Ltd.**	**Time:**	**上午 10:25:39**
EUT Name:	**SYSTEM**	**Temp.(℃)/Hum.(%):**	**24.2 (℃) / 52 %**
EUT Model:	**AV800**	**Engineer Signature:**	**Max Chiu**
Distance:	**1m**		
Note:			

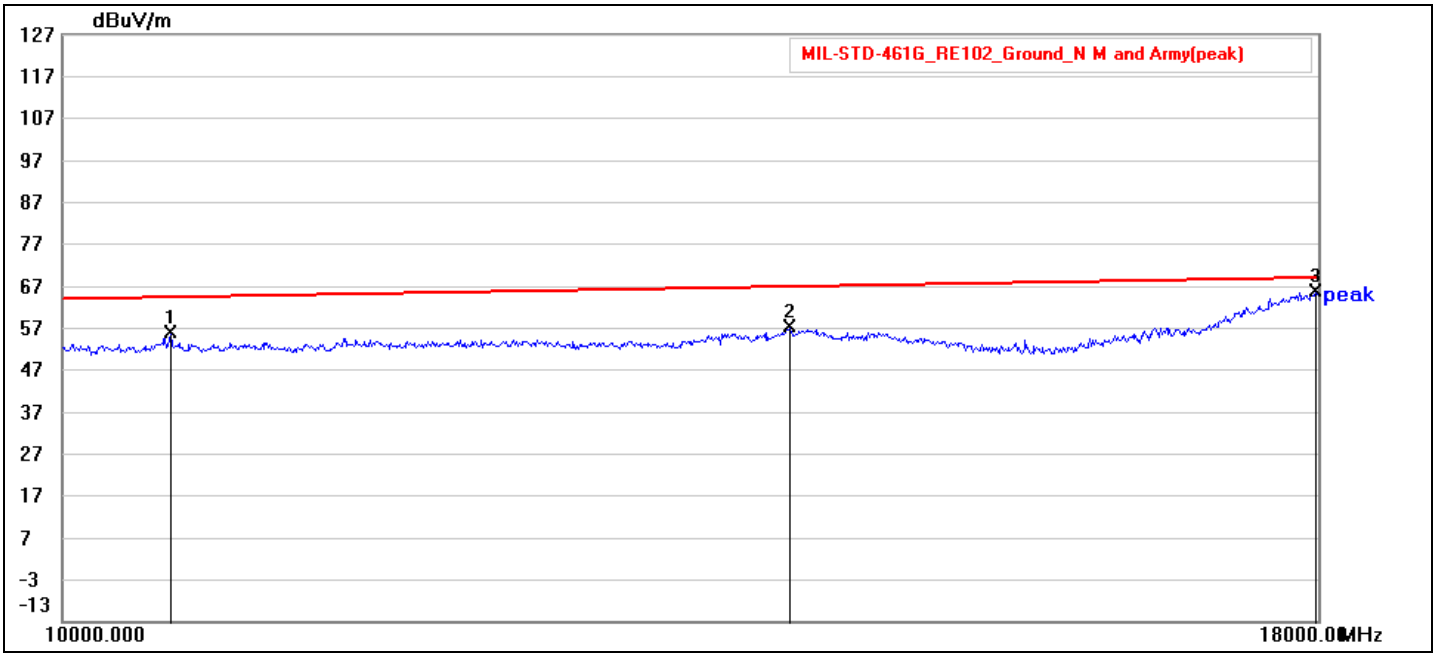
Range1 :3000--10000(MHz) / RBW:1000(kHz) / VBW:3000(kHz)	



No.	Frequency (MHz)	Reading (dBuV)	Correction Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	3550.784	59.55	-17.19	42.36	54.93	-12.57	peak	P	
2	7004.000	60.75	-8.21	52.54	60.82	-8.28	peak	P	
3	7935.000	65.28	-6.89	58.39	61.90	-3.51	peak	P	

Job No.:	**23A060603M**	**Polarization:**	**Horizontal**
Standard:	**MIL-STD-461G_RE102_Ground_N M and Army**	**Power Source:**	**DC 28 V**
Test item:	**Radiation Test**	**Date:**	**2023 / 8 / 29**
Company:	**7Starlake Co., Ltd.**	**Time:**	**上午 10:30:50**
EUT Name:	**SYSTEM**	**Temp.(℃)/Hum.(%):**	**24.2 (℃) / 52 %**
EUT Model:	**AV800**	**Engineer Signature:**	**Max Chiu**
Distance:	**1m**		
Note:			

Range1 :10000--18000(MHz) / RBW:1000(kHz) / VBW:3000(kHz)	



No.	Frequency (MHz)	Reading (dBuV)	Correction Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	10520.000	61.05	-5.41	55.64	64.35	-8.71	peak	P	
2	14048.000	60.26	-3.28	56.98	66.85	-9.87	peak	P	
3	17976.000	56.25	9.39	65.64	68.99	-3.35	peak	P	

3 Conducted susceptibility, power leads Test (CS101)

3.1 Instrument

☒Transient Room 2

Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
Function / Arbitrary Waveform Generator	HP	33120A	US36007235	2024/08/03
DC Power Supply	Chroma	62024P-80-60	62024PA00552	2024/03/08
Monaural Power Amplifier	TRIGON	MONOLOG	2025	N.C.R.
Isolation Transformer	SOLAR	6220-1A	N/A	N.C.R.
DC LISN	Schwarzbeck	NNBL 8226-HV	05037	2023/12/19
DC LISN	Schwarzbeck	NNBL 8226-HV	05039	2023/12/19

Note: The above equipments are within the valid calibration period.

3.2 Block Diagram of Test Configuration

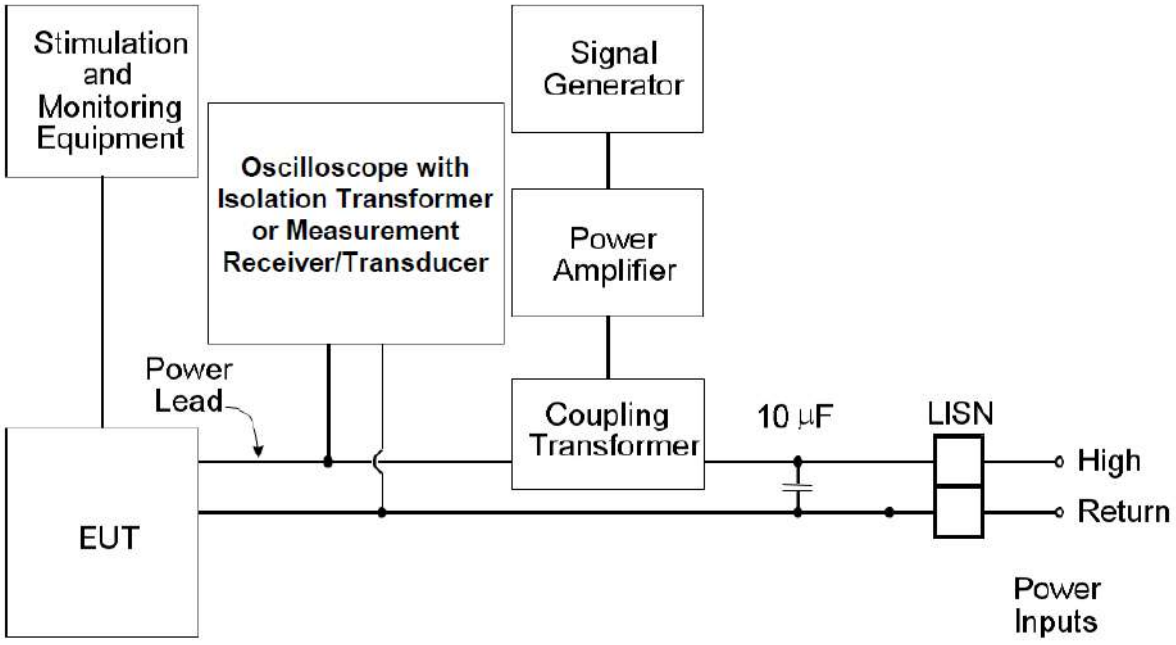
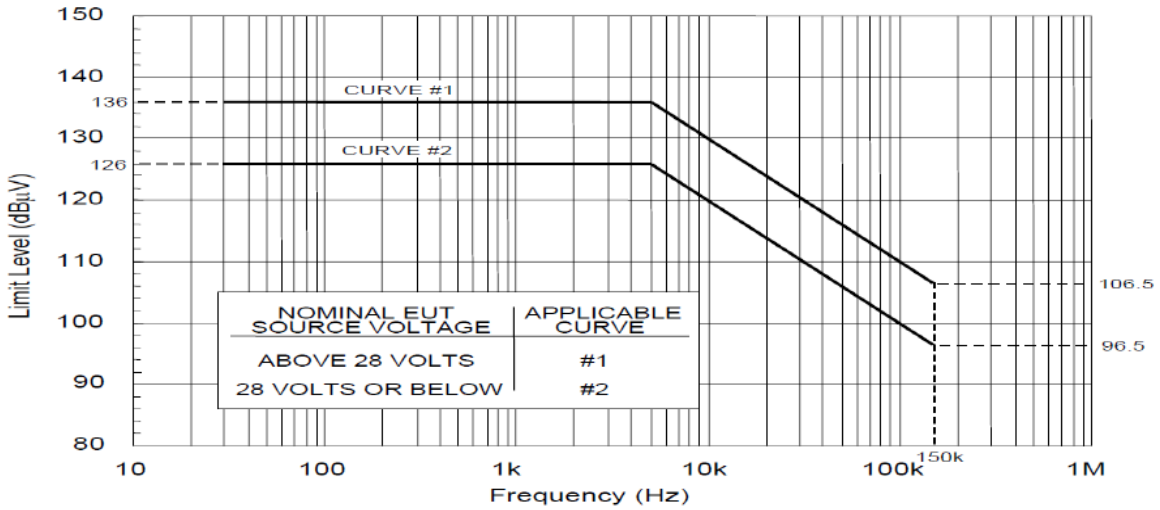


FIGURE CS101-4. Signal injection, DC or single phase AC.

3.3 Test Limit

According to MIL-STD-461G sub clause 5.7.2 CS101 limit.



3.4 Configuration of Measurement

3.4.1 Turn on the measurement equipment and allow sufficient time for stabilization.

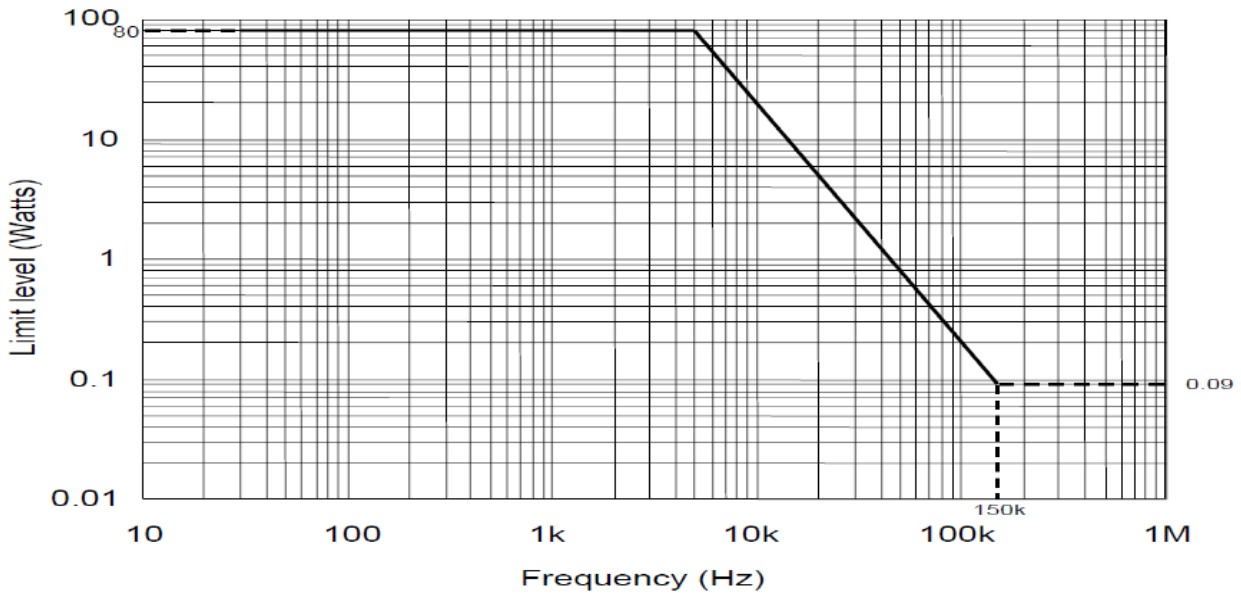
3.4.2 Calibration.

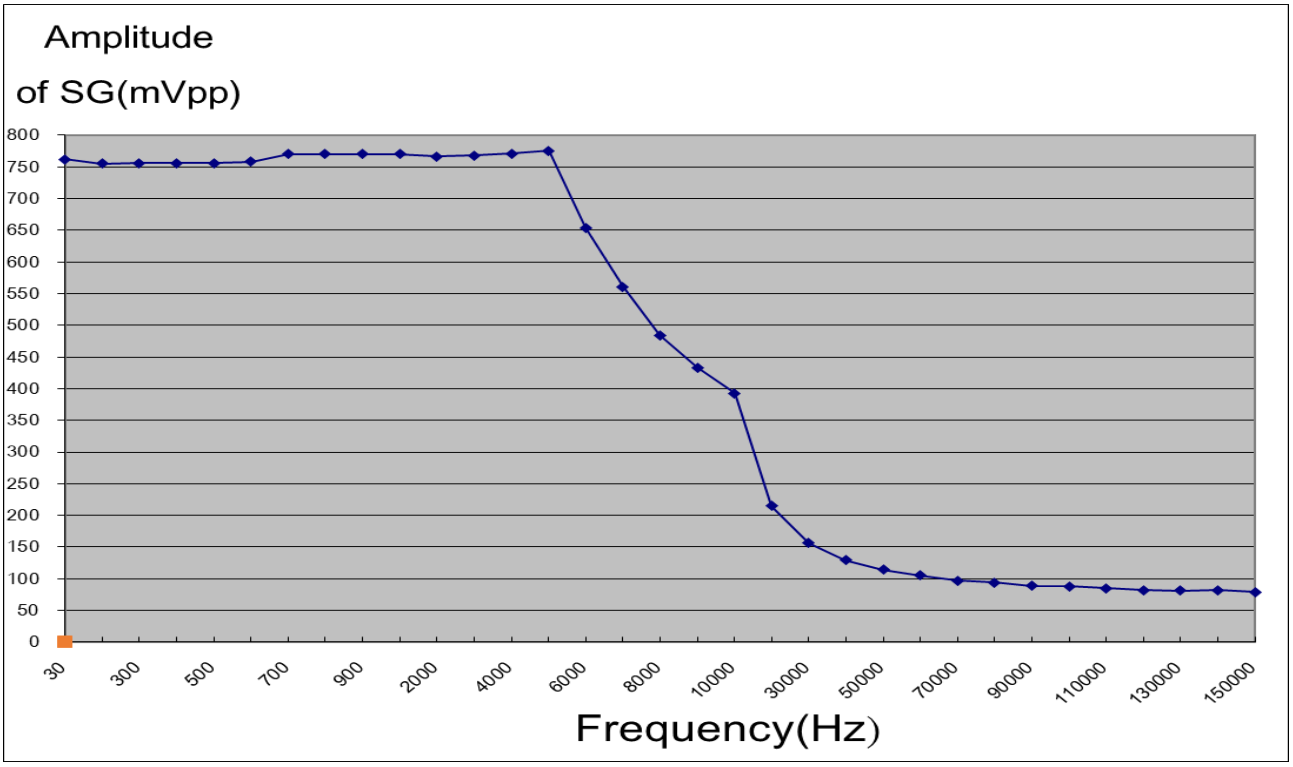
(a) Set the signal generator to the lowest test frequency.

(b) Increase the applied signal until the oscilloscope indicates the voltage level corresponding to the maximum required power level specified for the limit. Verify the output waveform is sinusoidal.

(c) Record the setting of the signal source.

(d) Scan the required frequency range for testing and record the signal source setting needed to maintain the required power level.





3.4.3 EUT Testing.

(a) Turn on the EUT and allow sufficient time for stabilization. CAUTION: Exercise care when performing this test since the "safety ground" of the oscilloscope is disconnected due to the isolation transformer and a shock hazard may be present.

(b) Set the signal generator to the lowest test frequency. Increase the signal level until the required voltage or power level is reached on the power lead. (Note: Power is limited to the level calibrated in MIL-STD-461G sub clause 5.7.3.4b(2).)

(c) While maintaining at least the required signal level, scan through the required frequency range at a rate no greater than specified in MIL-STD-461G Table III.

(d) Susceptibility evaluation.

- Monitor the EUT for degradation of performance.
- If susceptibility is noted, determine the threshold level in accordance with MIL-STD-461G sub clause 4.3.10.4.3 and verify that it is above the limit.

(e) Repeat MIL-STD-461G sub clause 5.7.3.4c(2) through MIL-STD-461G sub clause 5.7.3.4c(4) for each power lead, as required. For three phase ungrounded power, the measurements shall be made according to the following MIL-STD-461G sub clause 5.7.3.4c(5) table.

3.5 Test Result

The final test data is shown as following pages.

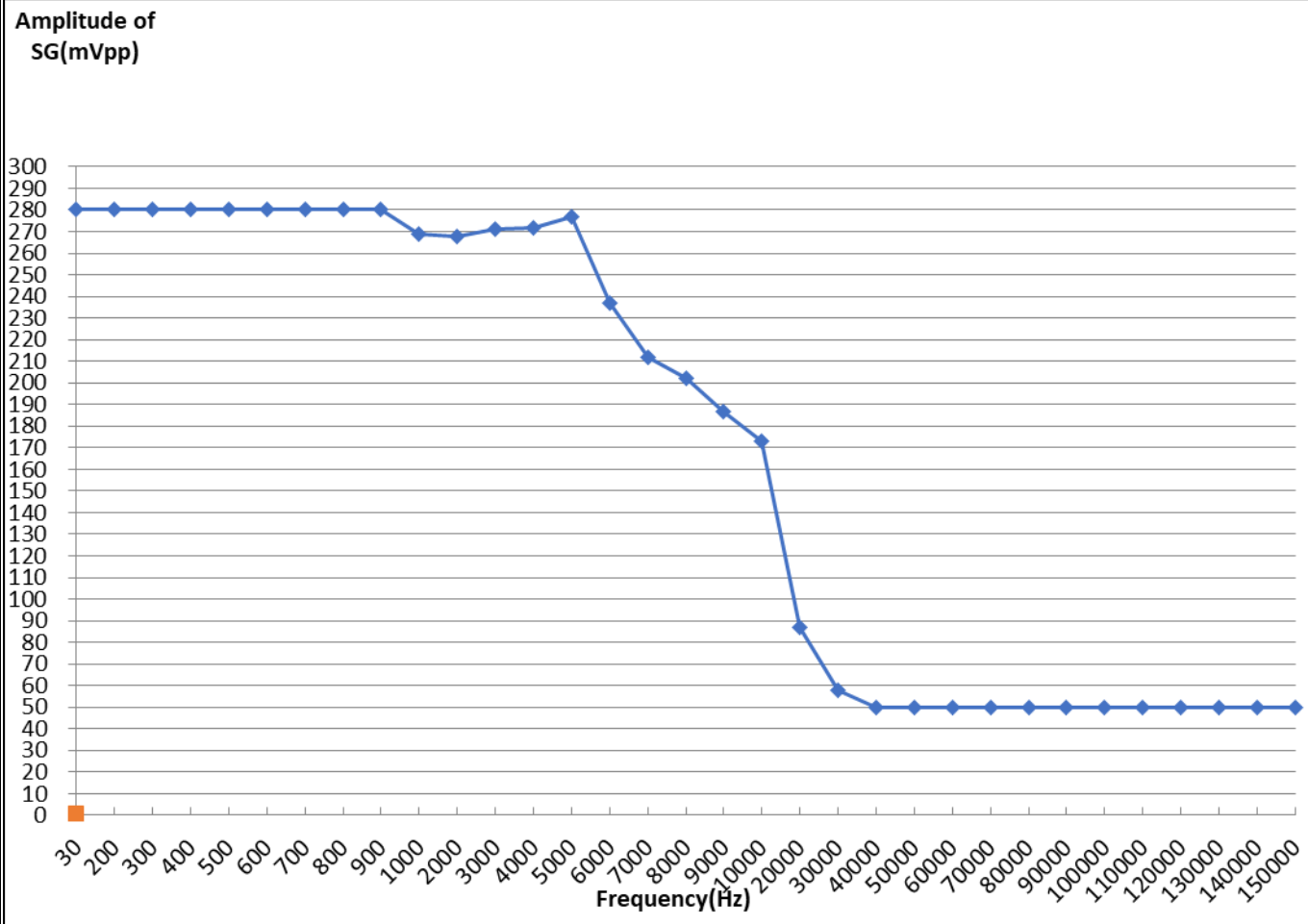
Applicant：7Starlake Co., Ltd.	Date of Measurement：2023 / 09 / 01
EUT：SYSTEM	Temp./Humidity/Atm.press.：25.2°C / 50% / 992hPa
M/N：AV800	Test Mode：Working Mode
Input Voltage：DC 28 V	Test Engineer：Eric Chen

Frequency Range (kHz)	Voltage limit (dBμV)	Results
0.03 - 5	126	As in NOTE.
5 - 150	126 - 96.5	As in NOTE.

■ CURVE #2

NOTE：

■ Monitoring method: Observe screen then record the phenomena.
■ Before the test: The screen shows image is in normal state.
■ During the test: The screen shows image is in normal state.
■ After the test: The screen shows image is in normal state.



4 Conducted susceptibility, bulk cable injection Test (CS114)

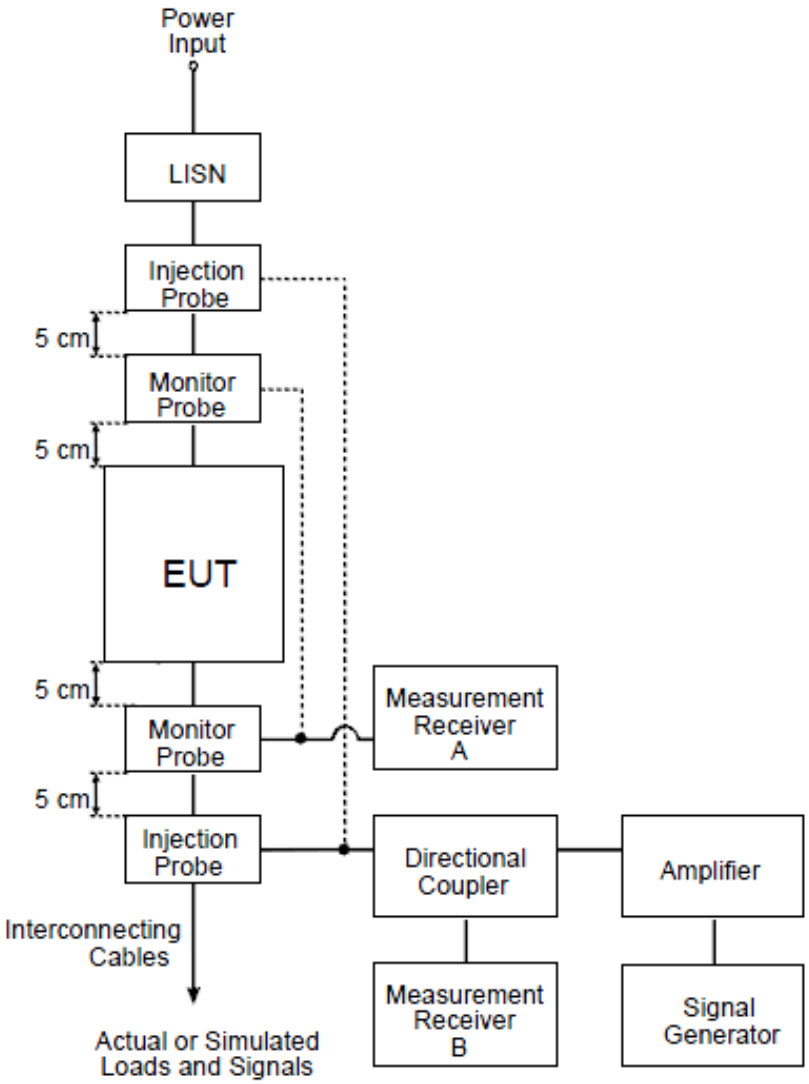
4.1 Instrument

☒Shielding Room 3

Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
Signal Generator	R&S	SMC100A	104370	2024/05/03
RF Power Amplifier	TESEQ AG	CBA400M-260	T44718	N.C.R.
Attenuator	Marvelous Microwave	MVE2754-03	20180412001	N.C.R.
Bulk Current Injection Probe	FCC	F-140	616	N.C.R.
Injection Current Probe	A.H. Systems	ICP-521	198	N.C.R.
Current Probe	FCC	F-65A	141	2024/07/16
Receiver	R&S	ESCI	100836	2024/04/26
DC LISN	Schwarzbeck	NNBL 8225	8225-120	2024/05/17
DC LISN	Schwarzbeck	NNBL 8225	8225-121	2024/05/17

Note: The above equipments are within the valid calibration period.

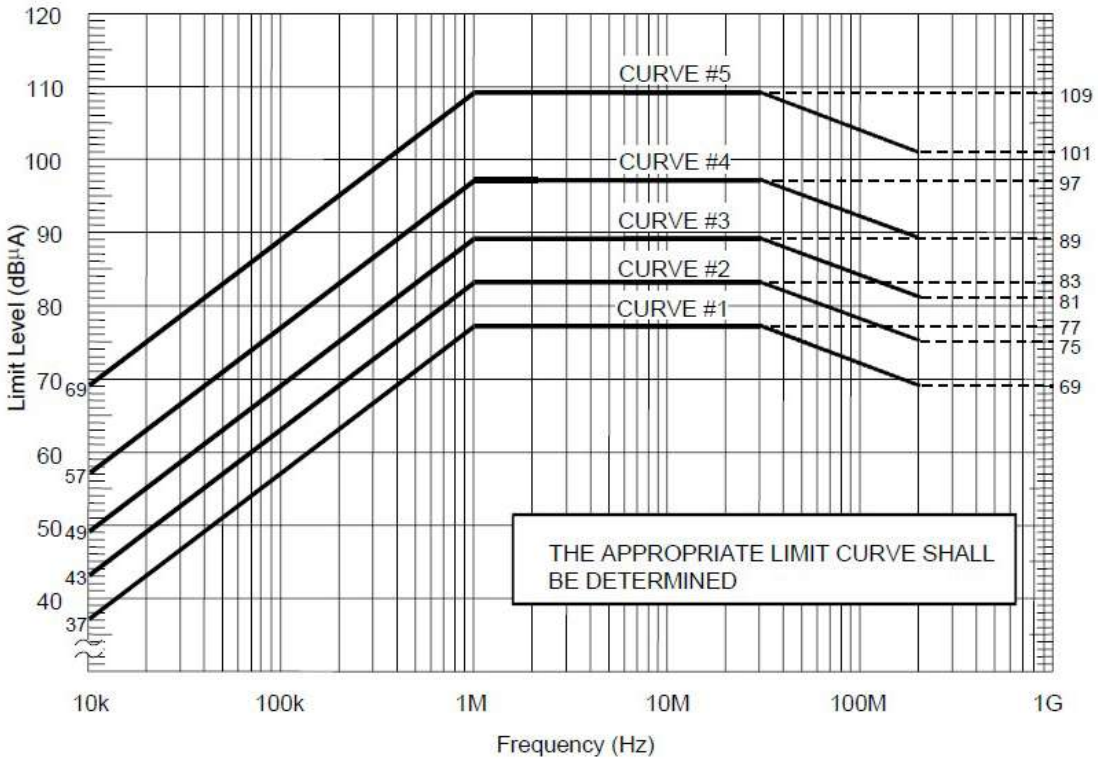
4.2 Block Diagram of Test Configuration



4.3 Test Limit

According to MIL-STD-461G sub clause 5.12.2 CS114 limit.

		LIMIT CURVE NUMBERS SHOWN IN FIGURE CS-114-1 AND LIMITS							
PLATFORM / FREQUENCY RANGE		AIRCRFAFT (EXTERNAL OR SAFETY CRITICAL)	AIRCRAFT INTERNAL	ALL SHIPS (ABOVE DECK & EXPOSED BELOW DECK) AND SUBMARINES (EXTERNAL)*	SHIPS (METALLIC) (BELOW DECKS)	SHIPS (NON-METALLIC) (BELOW DECK)**	SUBMARINE (INTERNAL)	GROUND	SPACE
4 kHz to 1MHz	N	-	-	77 dBµA	77 dBµA	77 dBµA	77 dBµA	-	-
10 kHz to 2 MHz	A	5	5	2	2	2	1	3	3
	N	5	3	2	2	2	1	2	3
	AF	5	3	-	-	-	-	2	3
2 MHz to 30 MHz	A	5	5	5	2	4	1	4	3
	N	5	5	5	2	4	1	2	3
	AF	5	3	-	-	-	-	2	3
30 MHz to 200 MHZ	A	5	5	5	2	2	2	4	3
	N	5	5	5	2	2	2	2	3
	AF	5	3	-	-	-	-	2	3



4.4 Configuration of Measurement

4.4.1 Turn on the measurement equipment and allow sufficient time for stabilization.

4.4.2 Calibration. Perform the following procedures using the calibration setup.

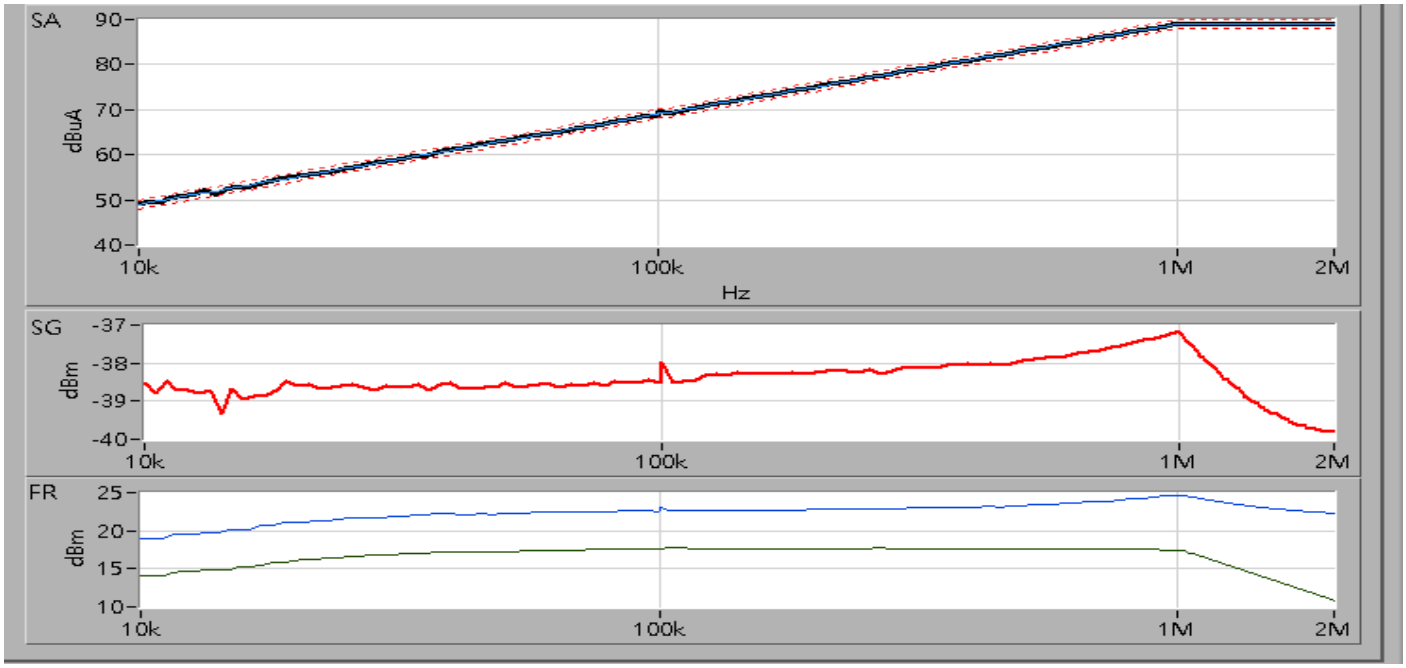
(a) Set the signal generator to 10 kHz, unmodulated.

(b) Increase the applied signal until measurement receiver A indicates the current level specified in the applicable limit exists in the center conductor of the calibration fixture.

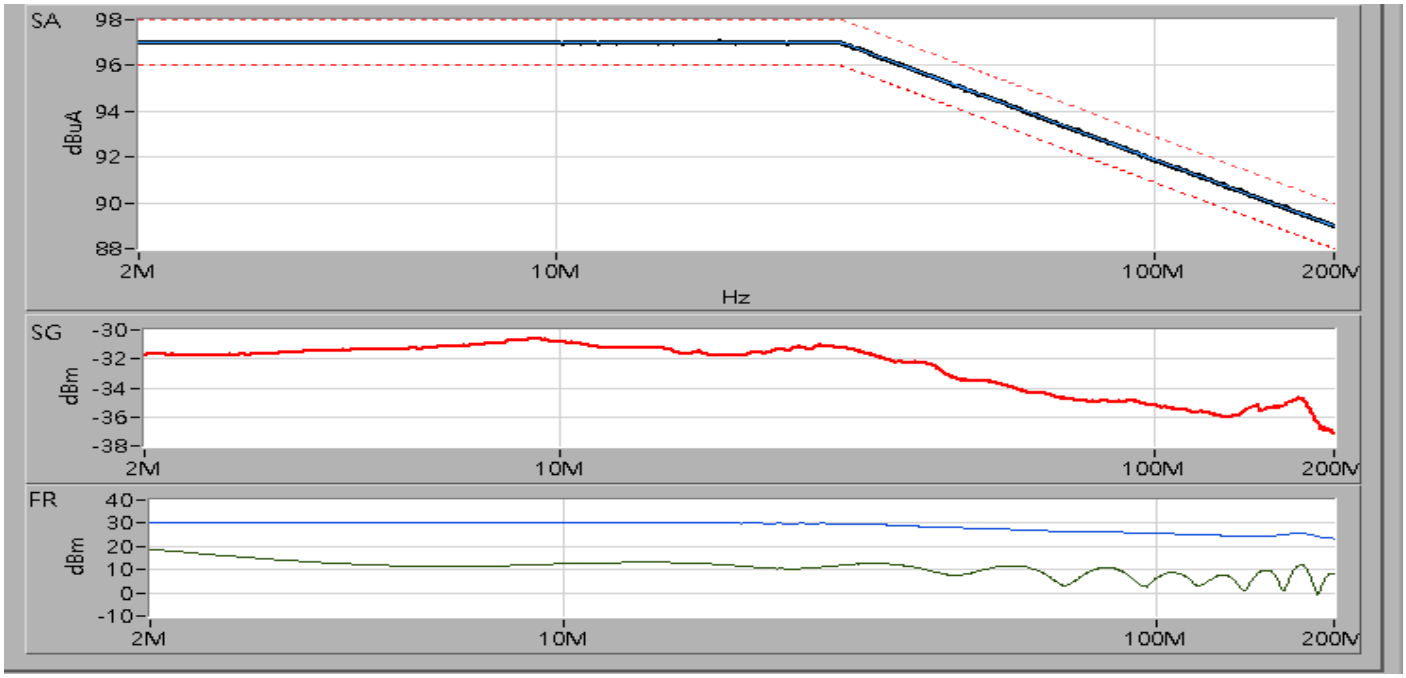
(c) Record the "forward power" to the injection probe indicated on measurement receiver B.

(d) Scan the frequency band from 10 kHz to 200 MHz and record the forward power needed to maintain the required current amplitude.

1) MIL-STD-461G_CS114_CURVE #3_10 kHz - 2 MHz



2) MIL-STD-461G_CS114_CURVE #4_2 MHz - 200 MHz



4.4.3 EUT testing. Configure the test as indicated on MIL-STD-461G Figure CS114-5. Perform the following procedures on each cable bundle interfacing with each electrical connector on the EUT including complete power cables (high sides and returns). Also perform the procedures on power cables with the power returns and chassis grounds (green wires) excluded from the cable bundle. For connectors which include both interconnecting leads and power, perform the procedures on the entire bundle, on the power leads (including returns and grounds) grouped separately, and on the power leads grouped with the returns and grounds removed.

(1) Turn on the EUT and allow sufficient time for stabilization.

(2) Susceptibility evaluation.

(a) Set the signal generator to 10 kHz with 1 kHz pulse modulation, 50% duty cycle. Verify that the modulation is present on the drive signal for each signal generator/modulation source combination. Ensure that the modulation frequency, waveform and depth (40 dB minimum from peak to baseline) are correct.

(b) Apply the forward power level determined under MIL-STD-461G sub clause 5.12.3.4b(4) to the injection probe while monitoring the induced current. For shielded cables or low impedance circuits, it may be preferable to increase the signal gradually to limit the current.

(c) Scan the required frequency range in accordance with MIL-STD-461G sub clause 4.3.10.4.1 and Table III while maintaining the forward power level at the calibration level determined under MIL-STD-461G sub clause 5.12.3.4b(4), or the maximum current level for the applicable limit, whichever is less stringent.

(d) Monitor the EUT for degradation of performance during testing.

(e) Whenever susceptibility is noted, determine the threshold level in accordance with MIL-STD-461G sub clause 4.3.10.4.3.

(f) For EUTs with redundant cabling for safety critical reasons such as multiple data buses, use simultaneous multi-cable injection techniques.

4.5 Test Result

The final test data is shown as following pages.

Applicant：7Starlake Co., Ltd.	Date of Measurement：2023 / 09 / 11
EUT：SYSTEM	Temp./Humidity/Atm.press.：24.8°C / 42% / 999hPa
M/N：AV800	Test Mode：Working Mode
Input Voltage：DC 28 V	Test Engineer：Peter Su

Frequency Range (Hz)	Requirement (dBμA)	Current Distance (cm)	Modulation	Results
10 k - 2 M	49 - 89 (curve #3)	10	PM 50%	As in NOTE
2 M - 30 M	97 - 97 (curve #4)			
30 M - 200 M	97 - 89 (curve #4)			

■ PLATFORM：Army /GROUND

NOTE：

■ Monitoring method: Observe screen then record the phenomena.

■ Power line test
■ Before the test: The screen shows image is in normal state.
■ During the test:

Power line(positive & Negative)	The screen shows image is in normal state.
Power line(positive)	The screen shows image is in normal state.

■ After the test: The screen shows image is in normal state.

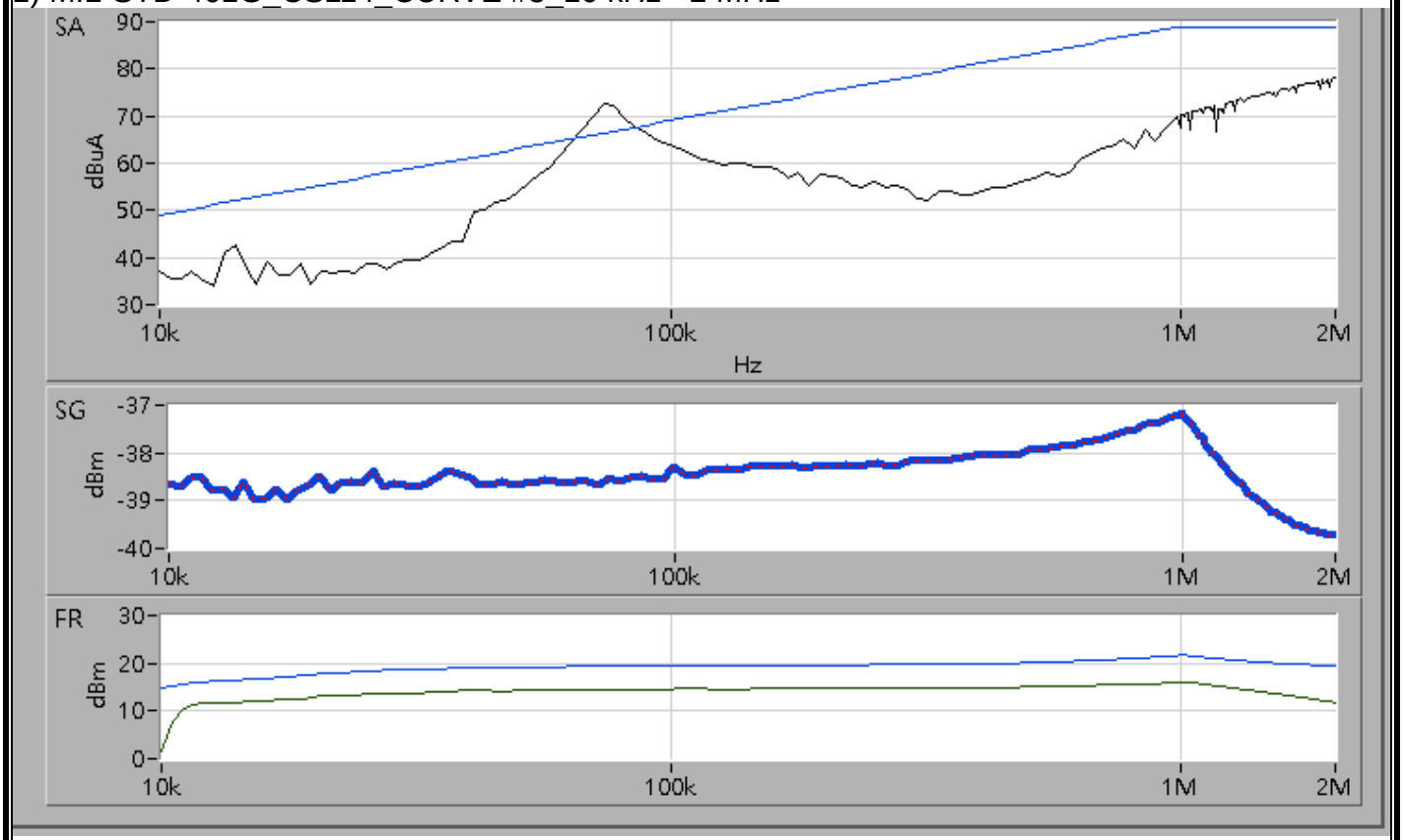
■ Signal line test
■ Before the test: The screen shows image is in normal state.
■ During the test:

USB CABLE	The screen shows image is in normal state.
VGA CABLE	The screen shows image is in normal state.
LAN CABLE	The screen shows image is in normal state.

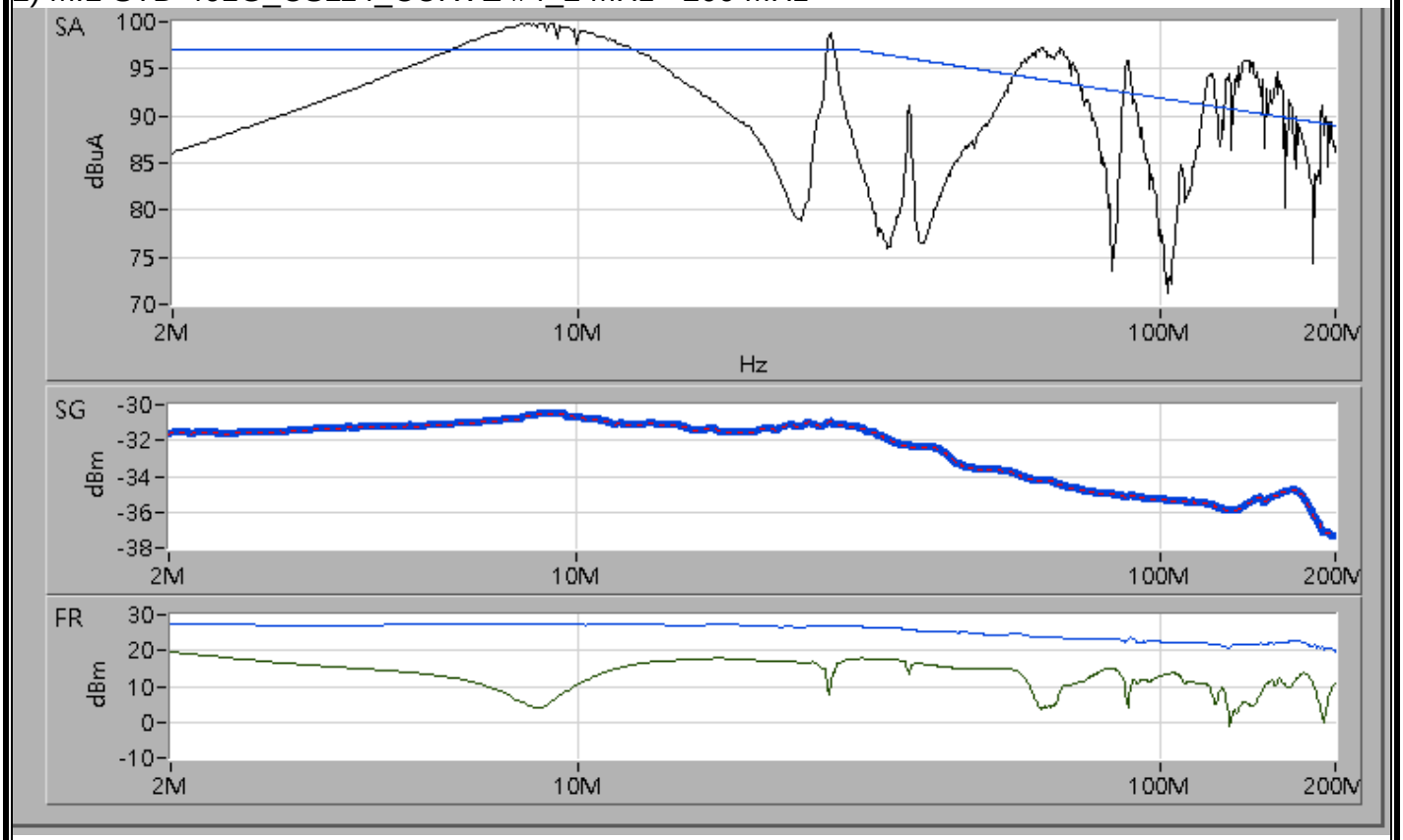
■ After the test: The screen shows image is in normal state.

A) Power line(positive & Negative)

1) MIL-STD-461G_CS114_CURVE #3_10 kHz - 2 MHz

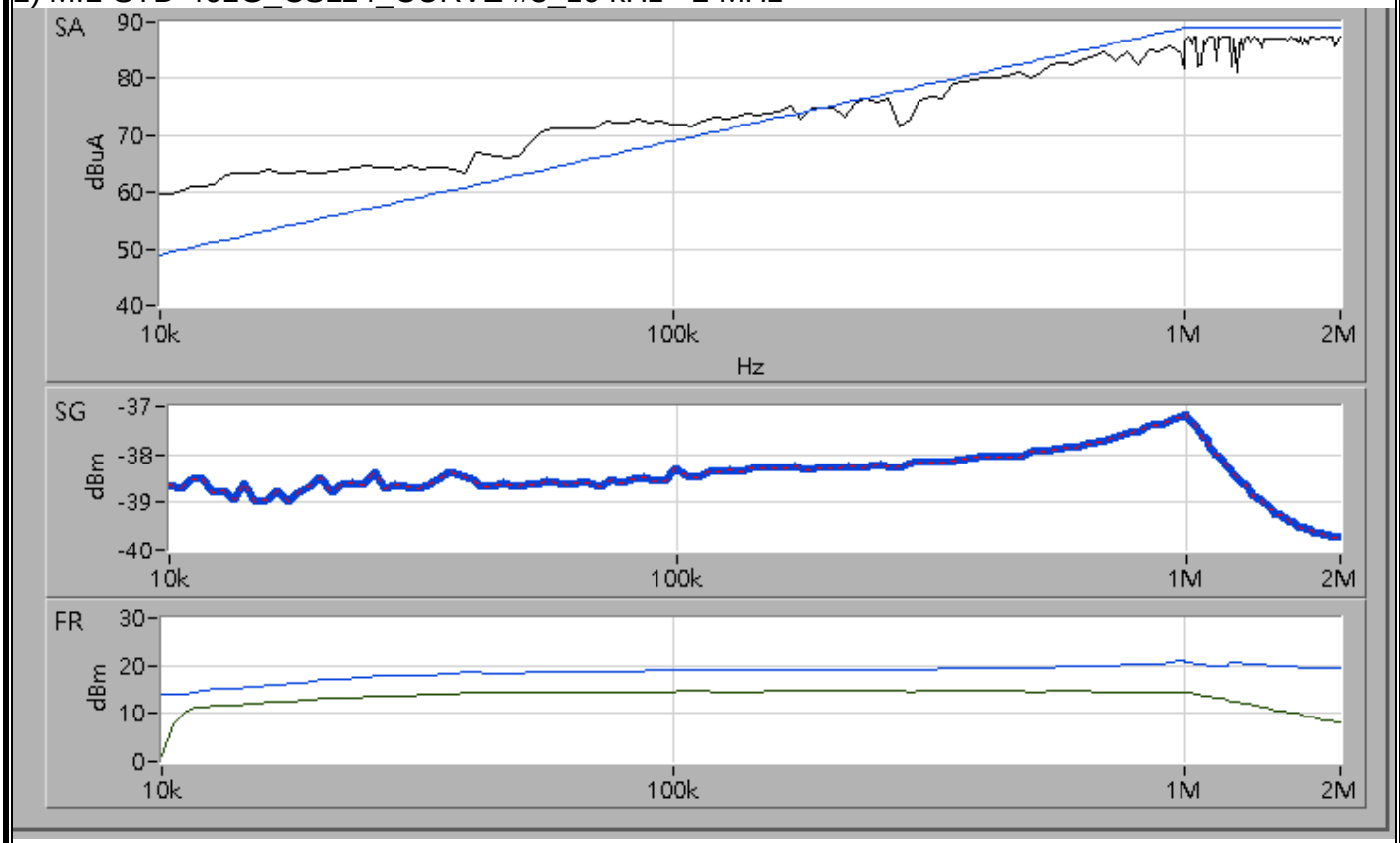


2) MIL-STD-461G_CS114_CURVE #4_2 MHz - 200 MHz

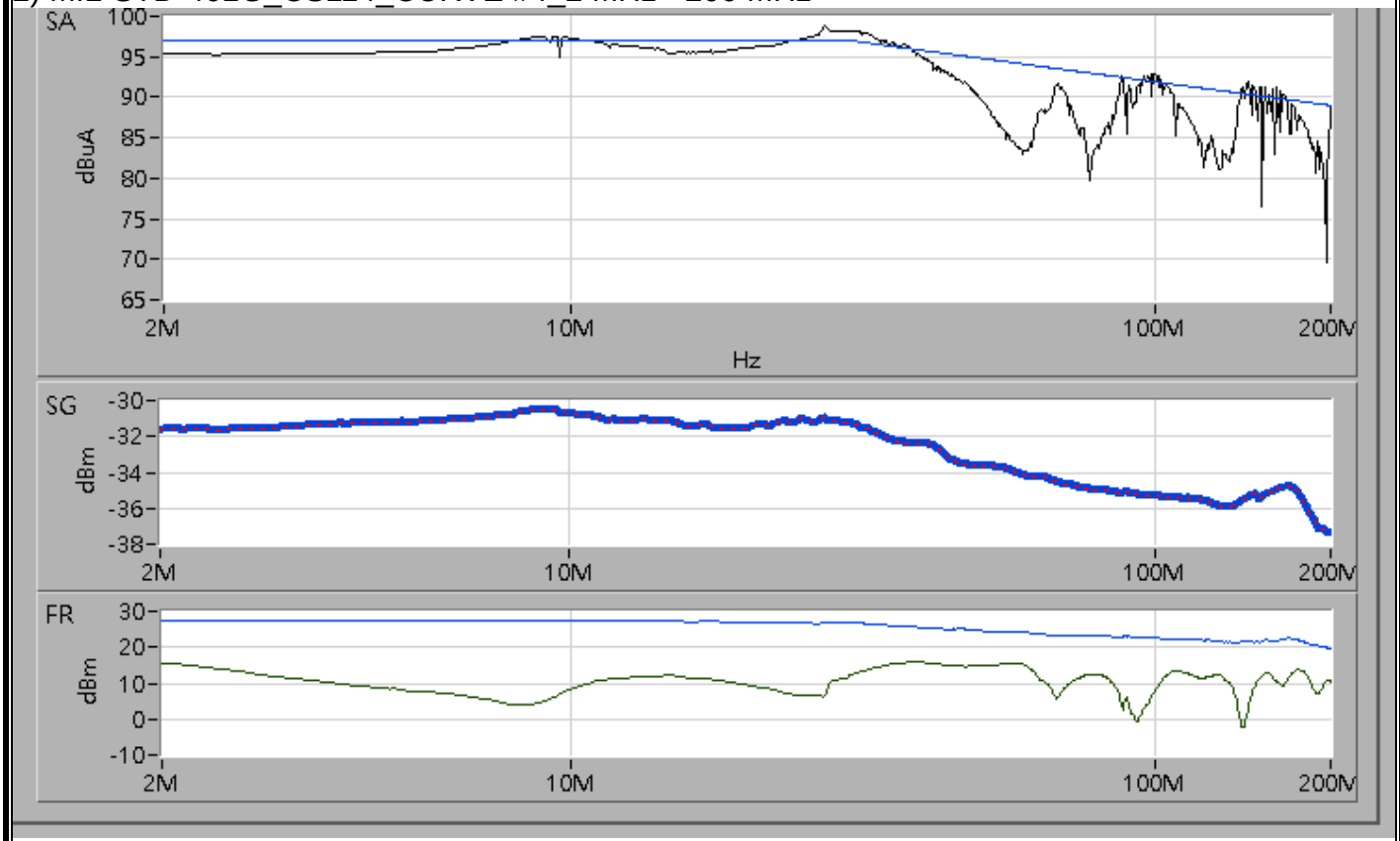


B) Power line(positive)

1) MIL-STD-461G_CS114_CURVE #3_10 kHz - 2 MHz

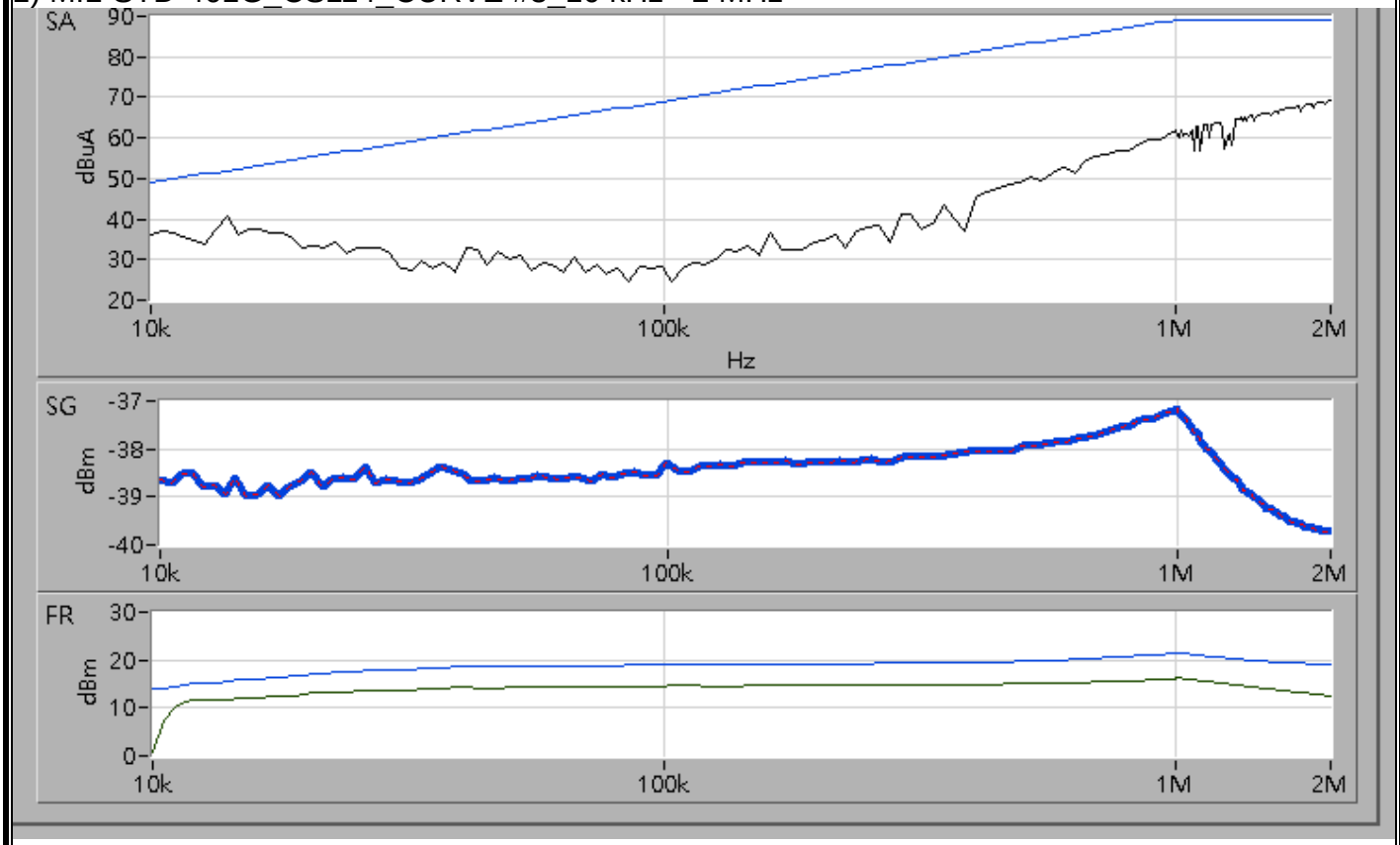


2) MIL-STD-461G_CS114_CURVE #4_2 MHz - 200 MHz

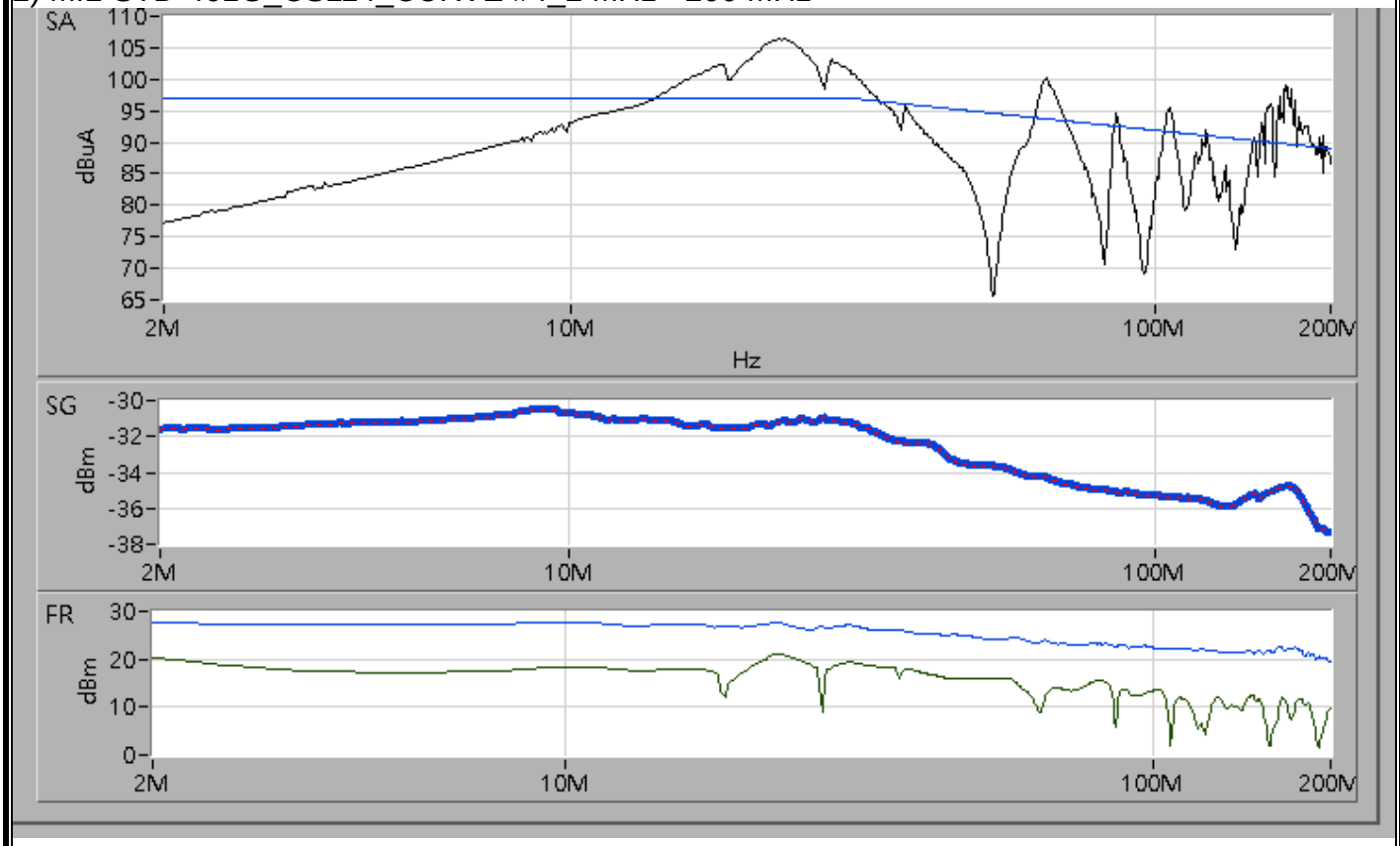


C) USB CABLE

1) MIL-STD-461G_CS114_CURVE #3_10 kHz - 2 MHz

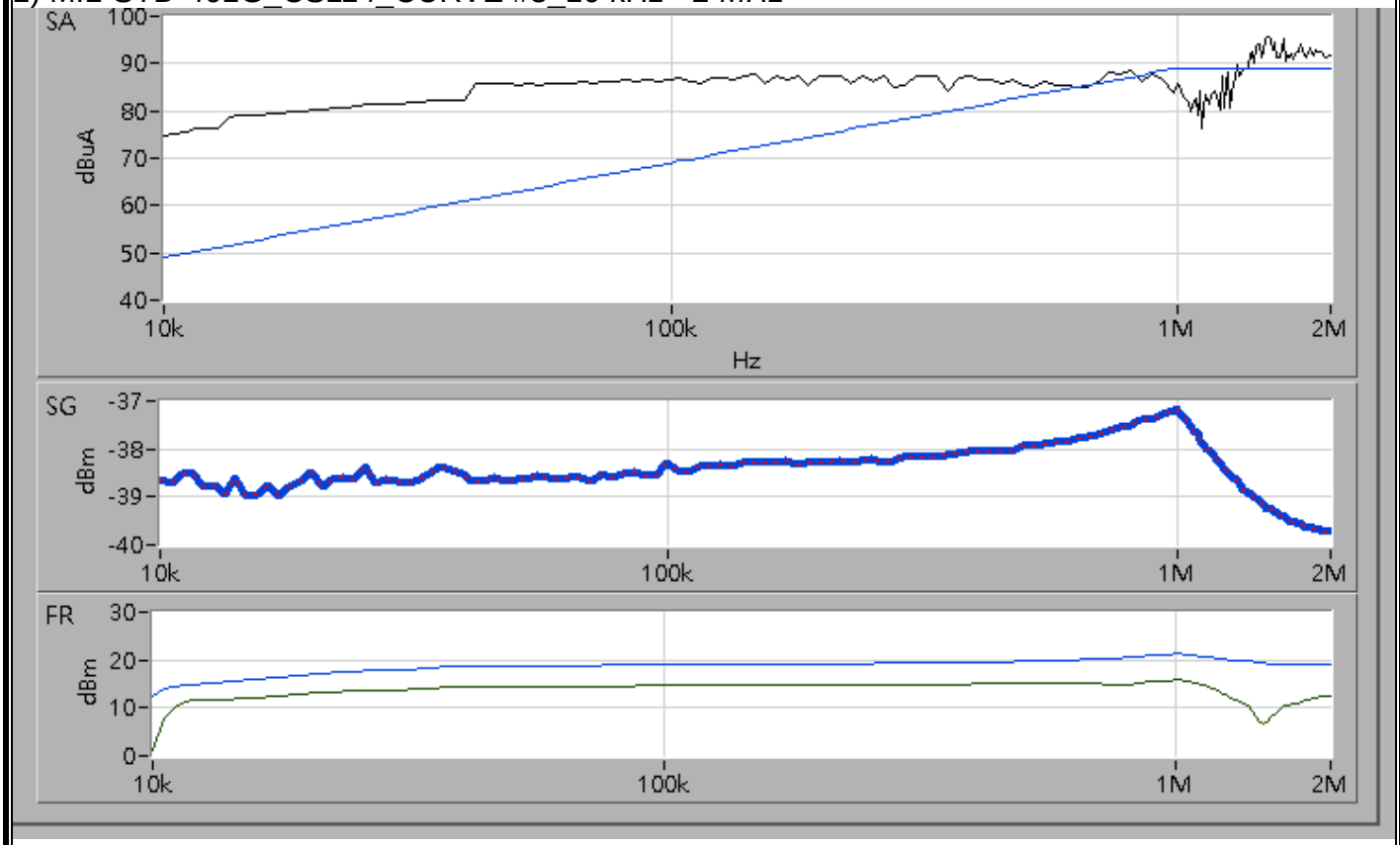


2) MIL-STD-461G_CS114_CURVE #4_2 MHz - 200 MHz

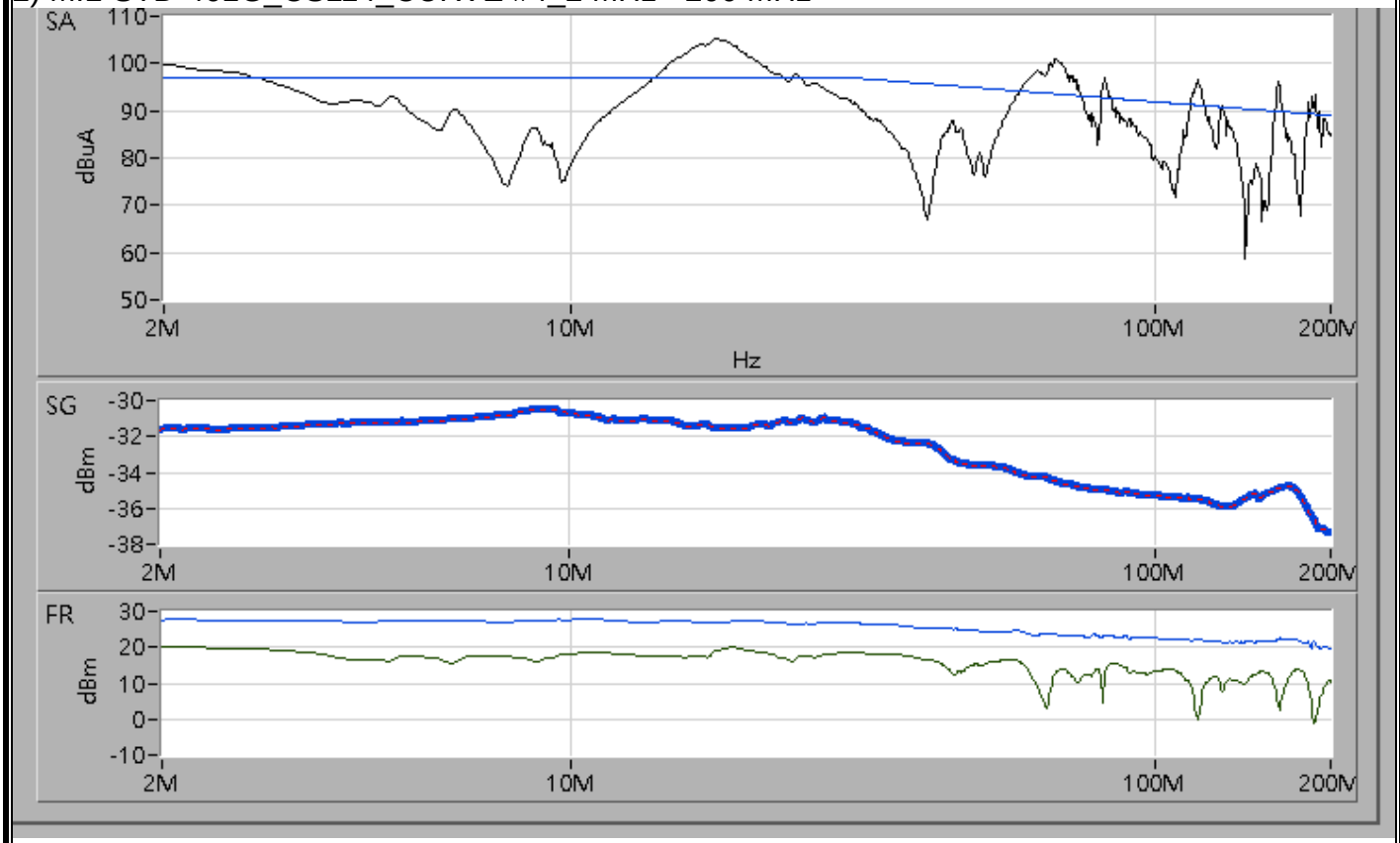


D) VGA CABLE

1) MIL-STD-461G_CS114_CURVE #3_10 kHz - 2 MHz

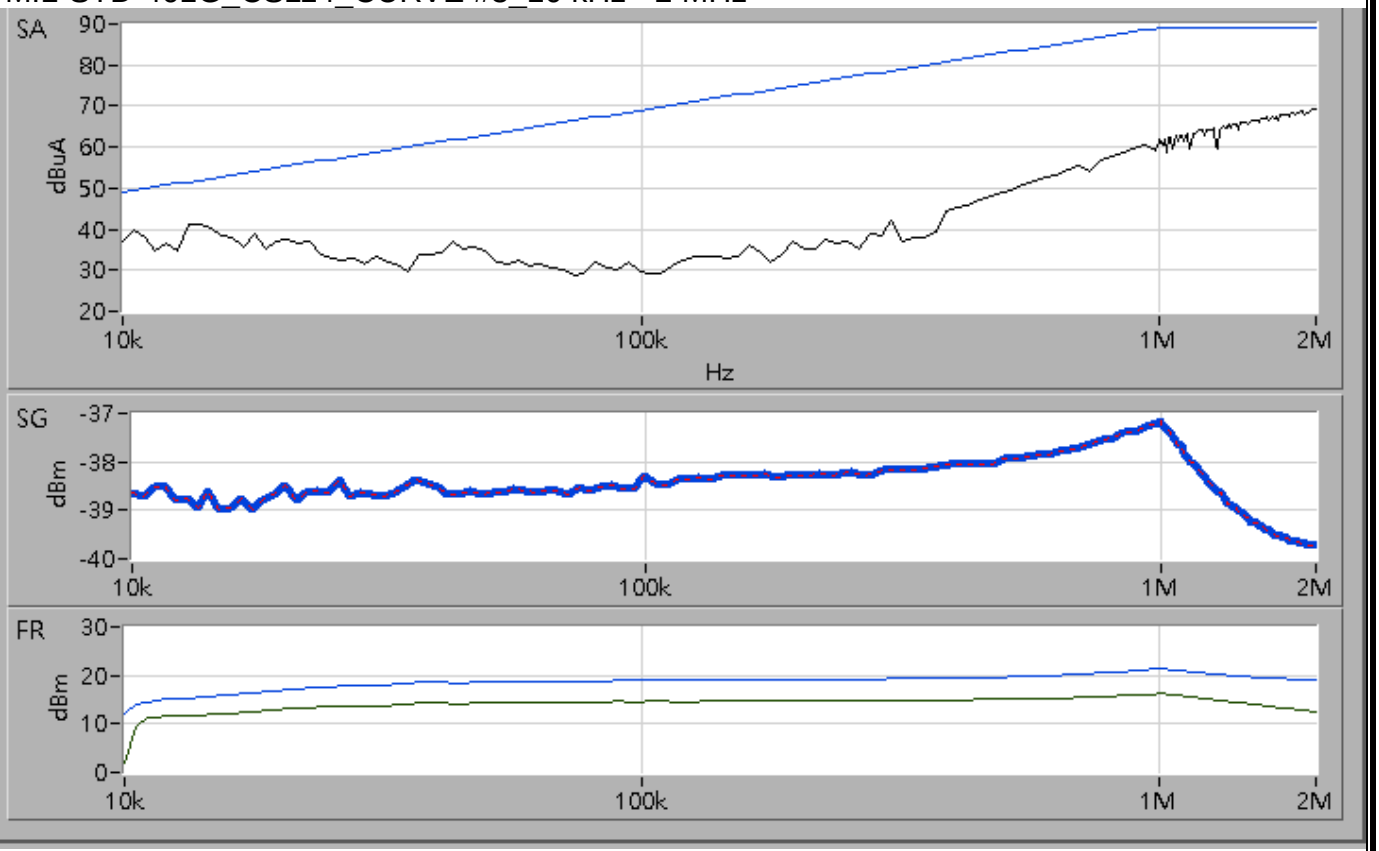


2) MIL-STD-461G_CS114_CURVE #4_2 MHz - 200 MHz

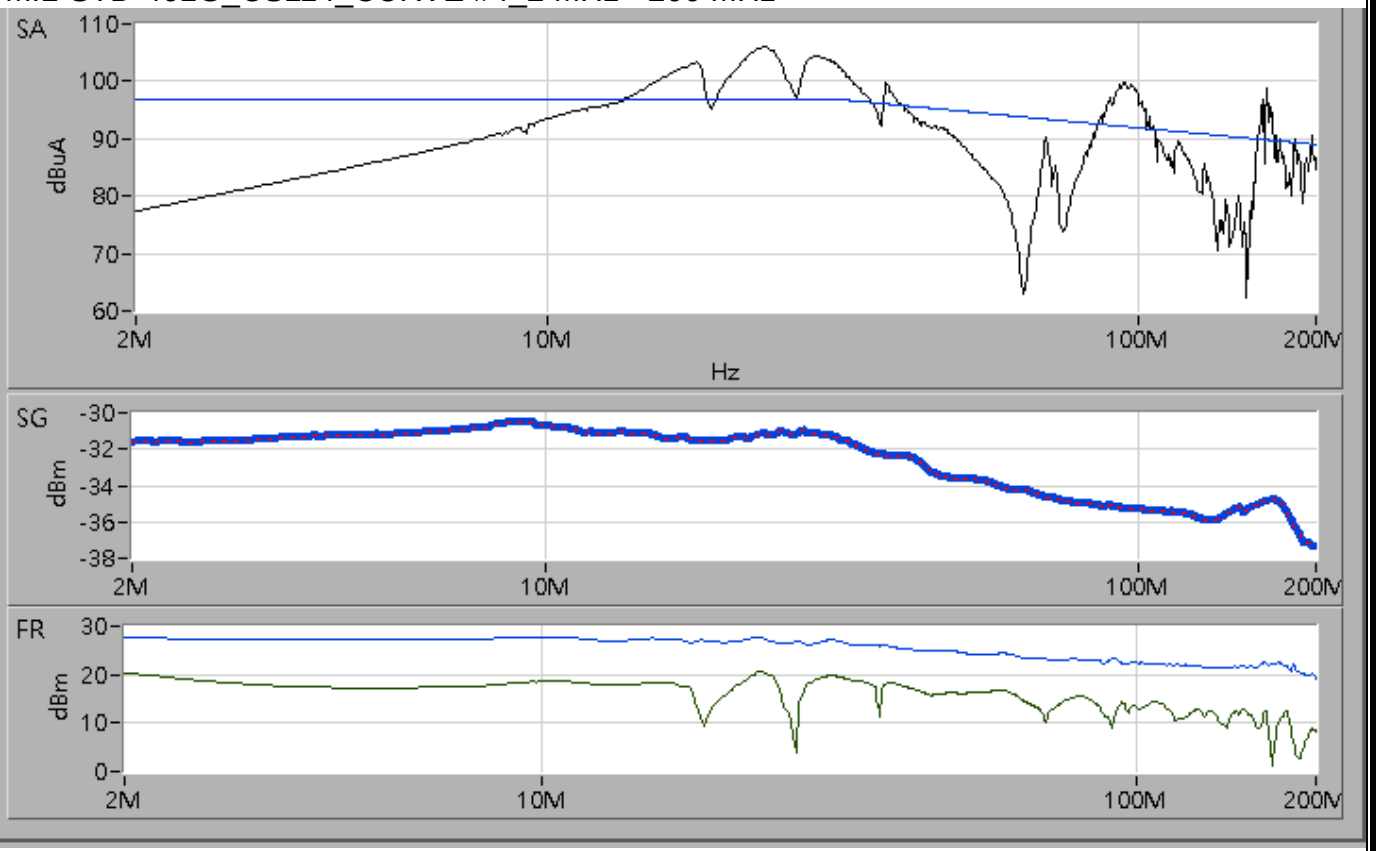


E) LAN CABLE

1) MIL-STD-461G_CS114_CURVE #3_10 kHz - 2 MHz



2) MIL-STD-461G_CS114_CURVE #4_2 MHz - 200 MHz



5 Bulk cable injection, impulse excitation (CS115)

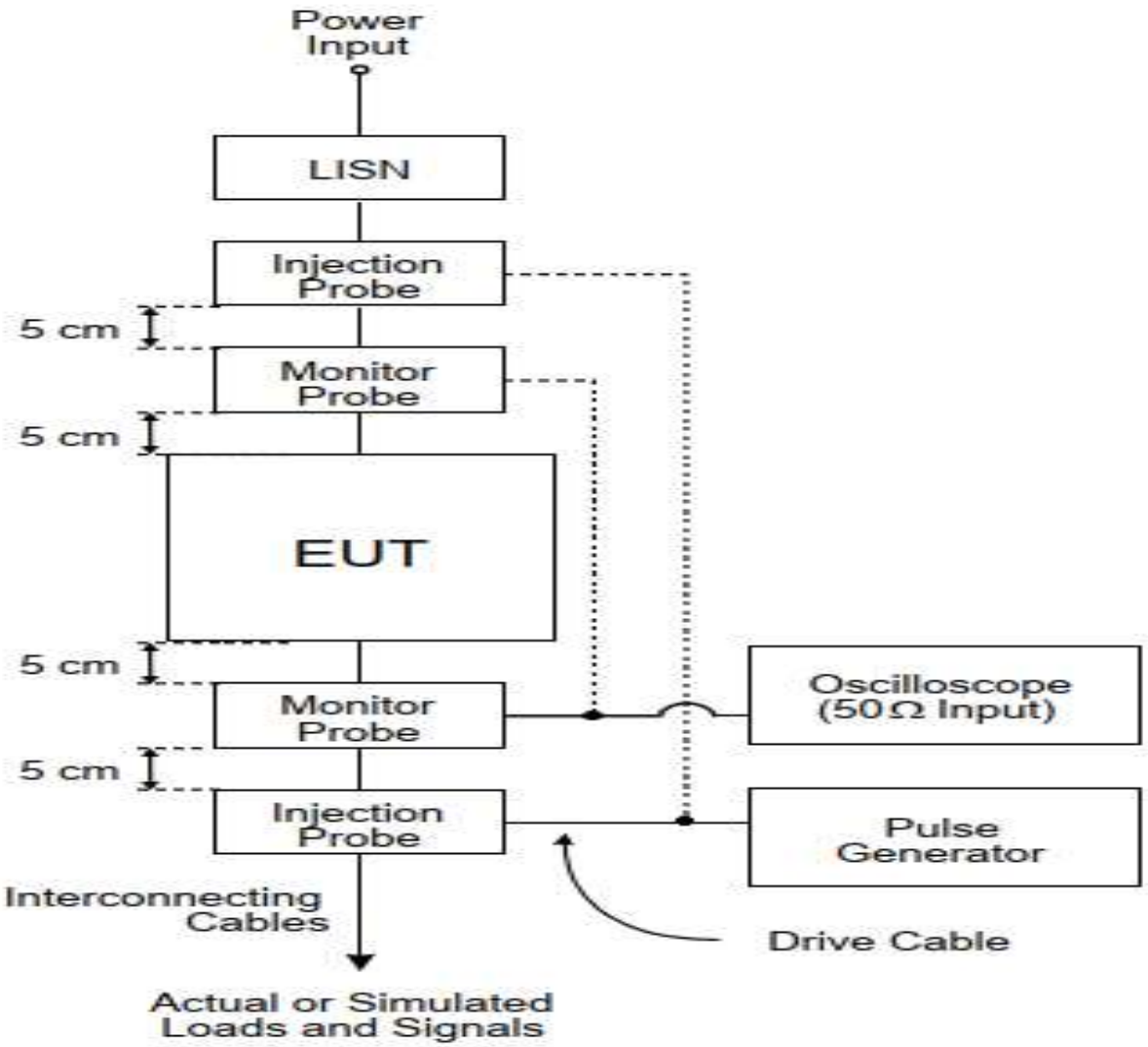
5.1 Instrument

☒Chamber 1

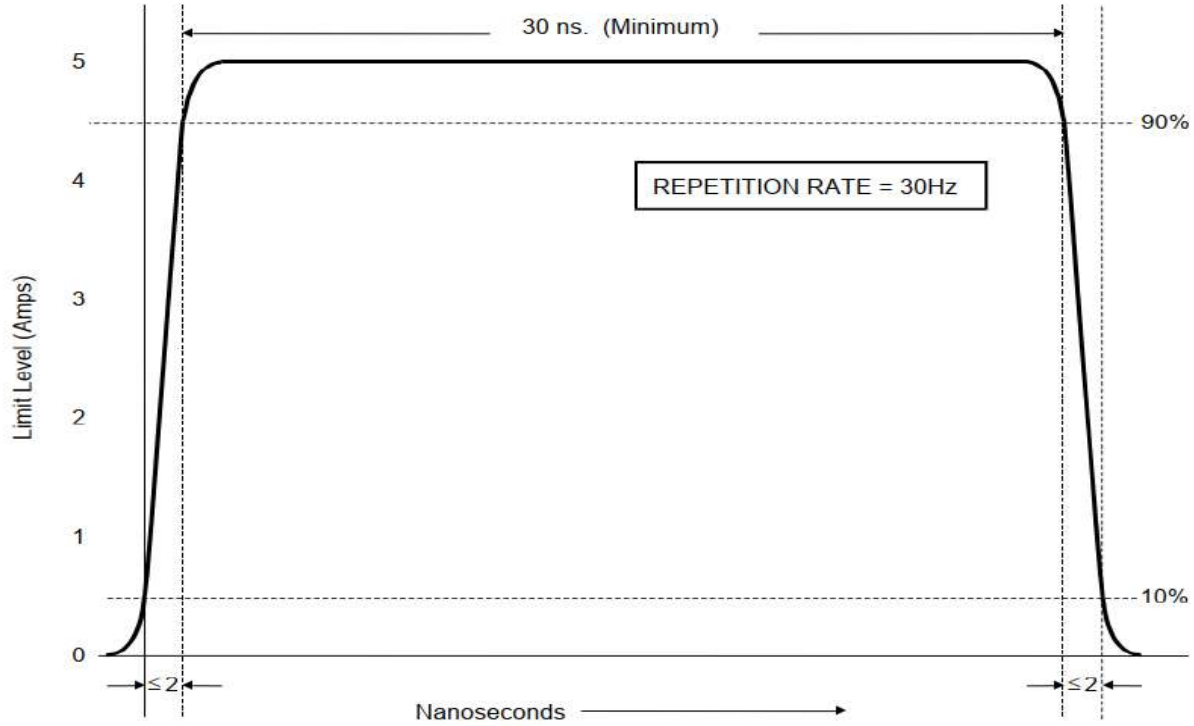
Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
CS115 Generator	Montena	M-CS115	6411	2024/08/03
Oscilloscope	Tektronix	MDO 3034	C011004	2024/05/10
Monitor Current Probe	Pearson	8705C	176230	N.C.R.
Bulk Current Injection Probe	PRANA	IP-DR250	1905-2514	N.C.R.
DC LISN	Schwarzbeck	NNBL 8229-HV	00106	2024/06/15
DC LISN	Schwarzbeck	NNBL 8229-HV	00107	2024/06/15

Note: The above equipments are within the valid calibration period.

5.2 Block Diagram of Test Configuration



CS115 signal characteristics for all applications



5.3 CS115 Application

5.3.1 This requirement is applicable to all aircraft, space, and ground system interconnecting cables, including power cables. The requirement is also applicable for surface ship and submarine subsystems and equipment when specified by the procuring activity.

5.4 Configuration of Measurement

5.4.1 Configure the test equipment as shown on MIL-STD-461G_CS115_ Figure CS115-3 for testing of the EUT.

5.4.2 Turn on the measurement equipment and allow sufficient time for stabilization.

5.4.3 Adjust the pulse generator, as a minimum, for the amplitude setting determined in MIL-STD-461G_CS115_5.13.3.4b(4).

5.4.4 Apply the test signal at the pulse repetition rate and for the duration specified in the requirement.

5.4.5 Monitor the EUT for degradation of performance during testing.

5.4.6 Whenever susceptibility is noted, determine the threshold level in accordance with MIL-STD-461G_4.3.10.4.3.

5.4.7 Record the peak current induced in the cable as indicated on the oscilloscope.

5.4.8 Repeat MIL-STD-461G_CS115_5.13.3.4c(2)(a) through 5.13.3.4c(2)(e) on each cable bundle interfacing with each electrical connector on the EUT. For power cables, perform MIL-STD-461G_CS115_5.13.3.4c(2)(a) through 5.13.3.4c(2)(e) on complete power cables (high sides and returns) and on the power cables with the power returns and chassis grounds (green wires) excluded from the cable bundle. For connectors which include both interconnecting leads and power, perform MIL-STD-461G_ CS115_5.13.3.4c(2)(a) through 5.13.3.4c(2)(e) on the entire bundle, on the power leads (including returns and grounds) grouped separately, and on the power leads grouped with the returns and grounds removed.

5.5 System Calibration Check

Configure the test equipment in accordance with MIL-STD-461G_CS115_ Figure CS115-2 for calibrating the injection probe.

5.6 Test Result

The final test data is shown as following pages.

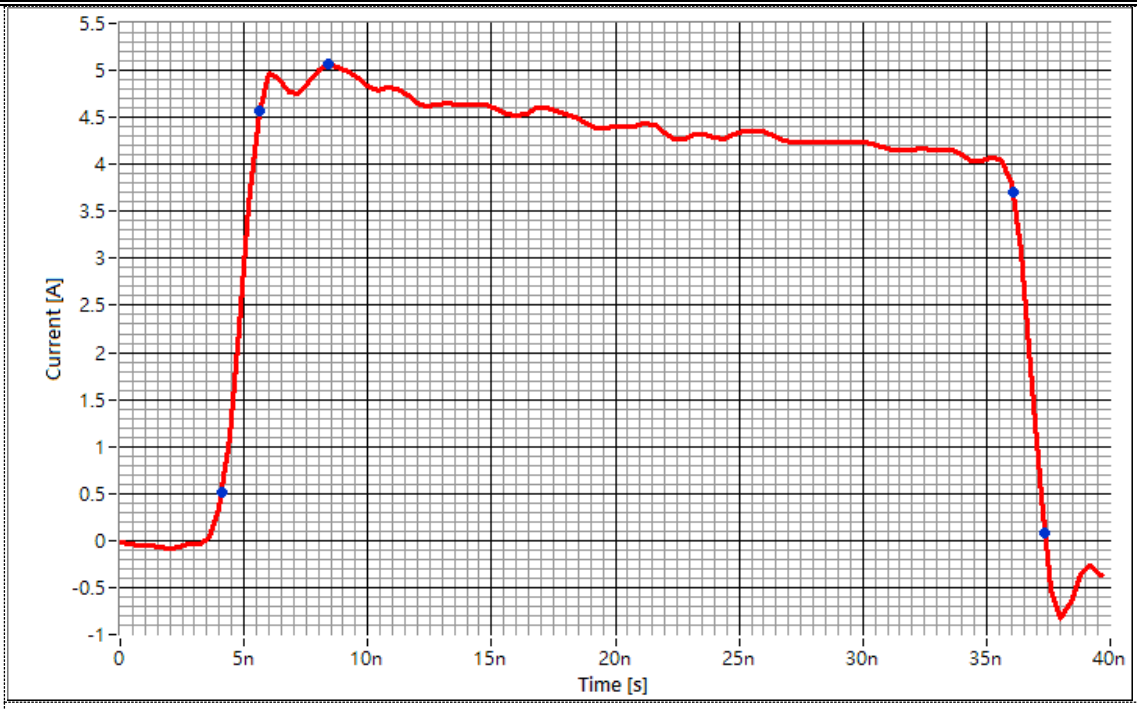
Applicant：7Starlake Co., Ltd.	Date of Measurement：2023 / 08 / 29
EUT：SYSTEM	Temp./Humidity/Atm.press.：24.5°C / 52% / 992hPa
M/N：AV800	Test Mode：Working Mode
Input Voltage：DC 28 V	Test Engineer：Eric Chen

Limit level (A)	Repetition (Hz)	Injection probe test distance (cm)	Test time (minute)	Results
5	30	10	1	As in note

- NOTE:
- Monitoring method: Observe EUT function then record the phenomena.
- Before the test: The function is in normal state.
- During the test:

Power line(positive & Negative)	The screen shows image is in normal state.
Power line(positive)	The screen shows image is in normal state.
USB CABLE	The screen shows image is in normal state.
VGA CABLE	The screen shows image is in normal state.
LAN CABLE	The screen shows image is in normal state.

- After the test: The screen shows image is in normal state.



Peak Current Limit [A]: 5.0
Charging Voltage [%]: 56.4
Peak Current, Cpeak [A]: 5.1
Rise-time, tr [s]: 1.52n
Fall-time, tf [s]: 1.30n
Duration, td [s]: 30.45n

6 Damped sinusoidal transients, cables and power leads (CS116)

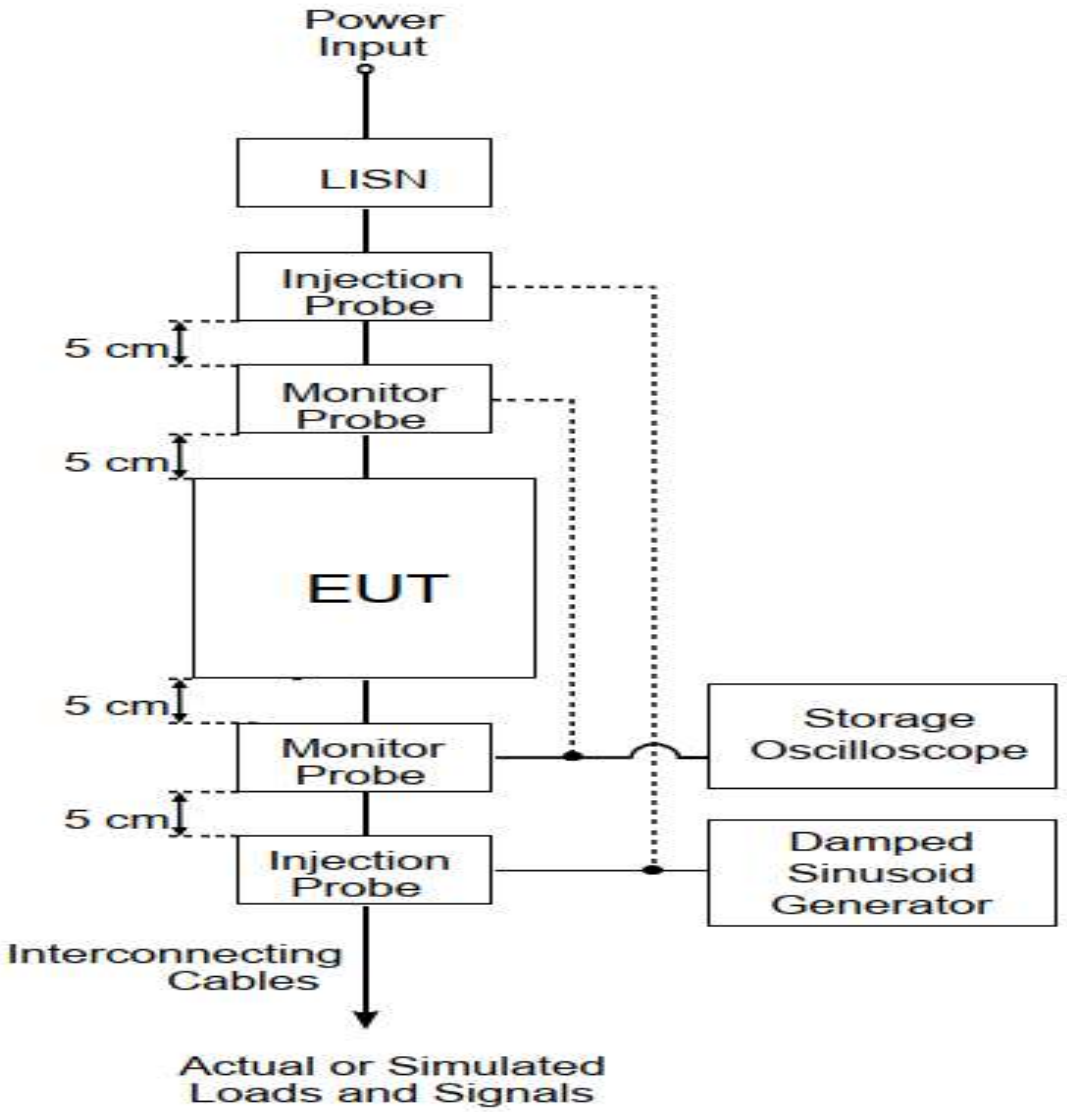
6.1 Instrument

☒Chamber 1

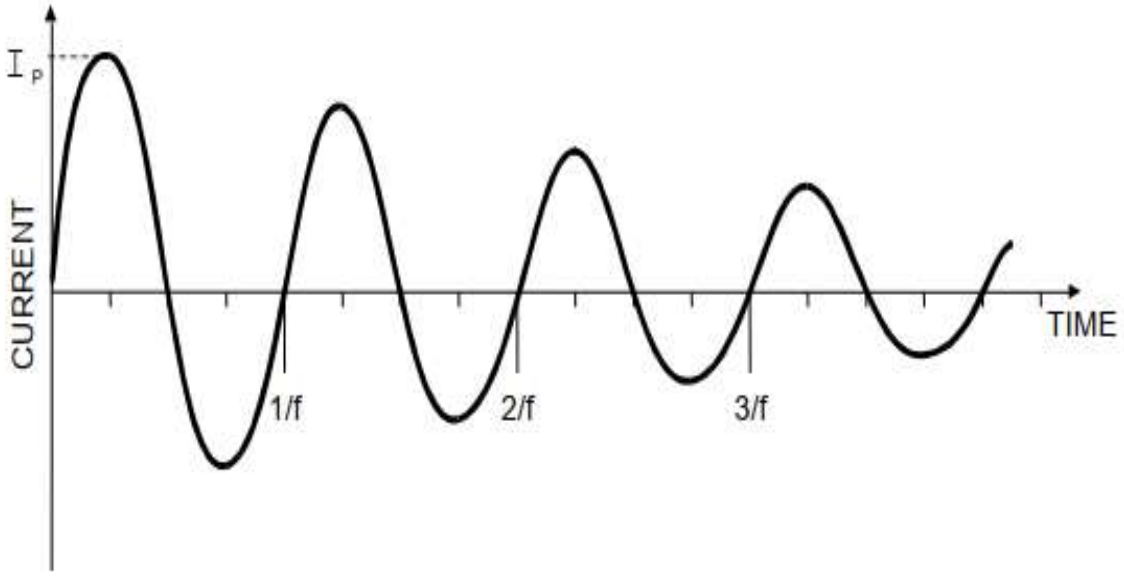
Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
CS116 Generator	Montena	POG-CS116-9	6472	2024/08/03
Oscilloscope	Tektronix	MDO 3034	C011004	2024/05/10
Monitor Current Probe	Pearson	8705C	176230	N.C.R.
Bulk Current Injection Probe	PRANA	IP-DR250	1905-2514	N.C.R.
DC LISN	Schwarzbeck	NNBL 8229-HV	00106	2024/06/15
DC LISN	Schwarzbeck	NNBL 8229-HV	00107	2024/06/15

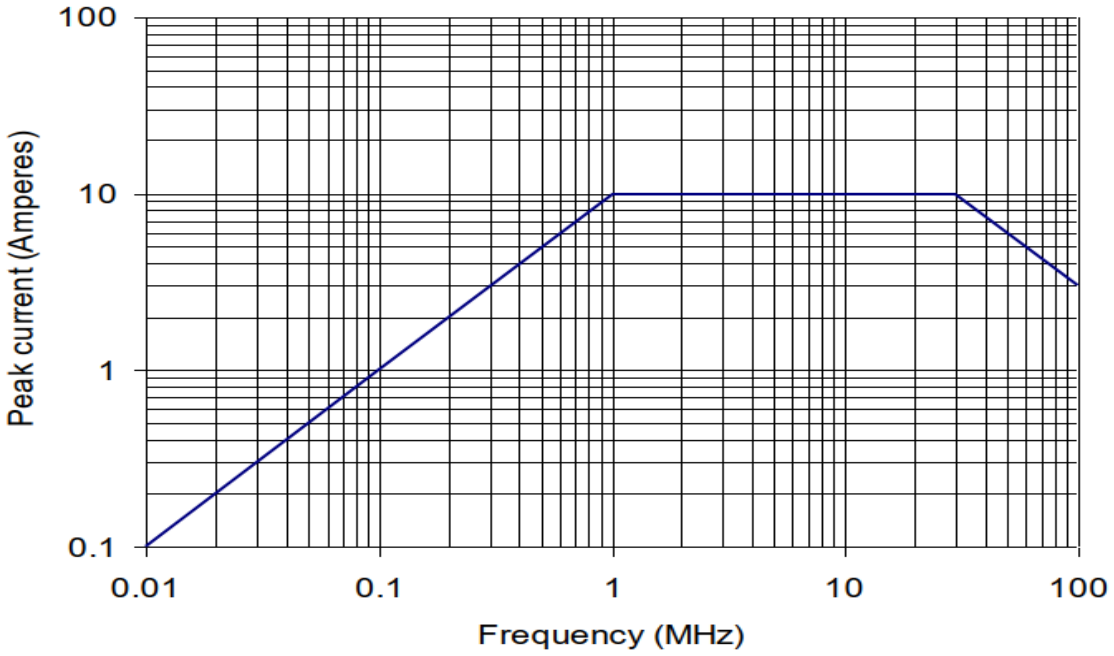
Note: The above equipments are within the valid calibration period.

6.2 Block Diagram of Test Configuration



Typical CS116 damped sinusoidal waveform and limit





6.3 Test Limit

6.3.1 This requirement is applicable from 10 kHz to 100 MHz (10k, 100k, 1M, 10M, 30M, 100MHz) for all interconnecting cables, including power cables, and individual high side power leads. Power returns and neutrals need not be tested individually. For submarine applications, this requirement is applicable only to cables and leads external to or that exit the pressure hull.

6.4 Configuration of Measurement

6.4.1 Perform the following procedures, using the EUT test setup on each cable bundle interfacing with each connector on the EUT including complete power cables. Also perform tests on each individual high side power lead (individual power returns and neutrals are not required to be tested). For delta configured power leads, test each power lead separately in addition to bulk cable.

6.4.2 Turn on the EUT and measurement equipment to allow sufficient time for stabilization.

6.4.3 Set the damped sine generator to a test frequency.

6.4.4 Apply the calibrated test signals to each cable or power lead of the EUT sequentially. Reduce the signal, if necessary, to produce the required current. For shielded cables or low impedance circuits, it may be preferable to increase the signal gradually to limit the current. Record the peak current obtained.

6.4.5 Monitor the EUT for degradation of performance.

6.4.6 If susceptibility is noted, determine the threshold level in accordance with MIL-STD-461G _4.3.10.4.3.

6.4.7 Repeat MIL-STD-461G_CS116_5.14.3.4c(2) through 5.14.3.4c(5) for each test frequency as specified in the requirement.

6.5 System Calibration Check

Configure the test equipment in accordance with MIL-STD-461G_CS116_Figure CS116-3 for verification of the waveform.

6.6 Test Result

The final test data is shown as following pages.

Applicant：7Starlake Co., Ltd.	Date of Measurement：2023 / 08 / 29
EUT：SYSTEM	Temp./Humidity/Atm.press.：24.5°C / 52% / 992hPa
M/N：AV800	Test Mode：Working Mode
Input Voltage：DC 28 V	Test Engineer：Eric Chen

Frequency (Hz)	Peak level (A)	Damping factor	Injection probe test distance (cm)	Test time (minutes)	Results
10 k	0.1	15 ± 5	10	5	As in note
100 k	1				As in note
1 M	10				As in note
10 M	10				As in note
30 M	10				As in note
100 M	3				As in note

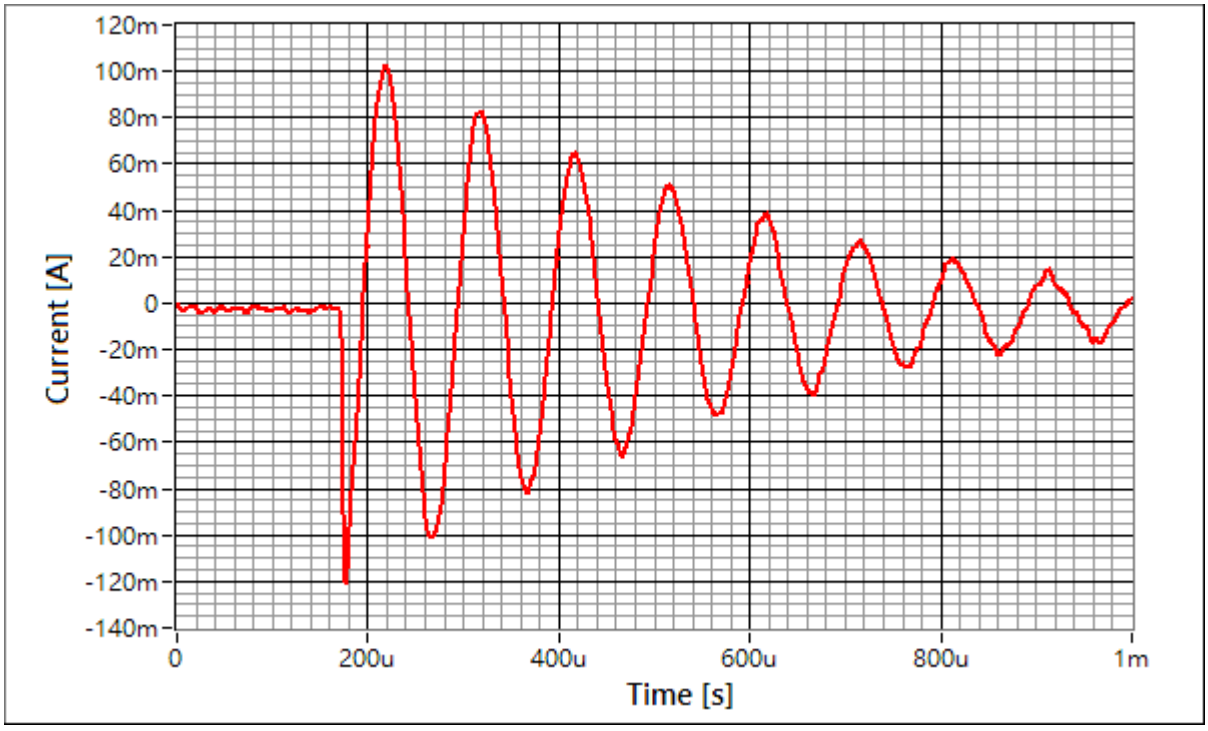
■ Pulsing rate：1 Hz

■ NOTE:
■ Monitoring method: Observe EUT function then record the phenomena.
■ Before the test: The function is in normal state.
■ During the test:

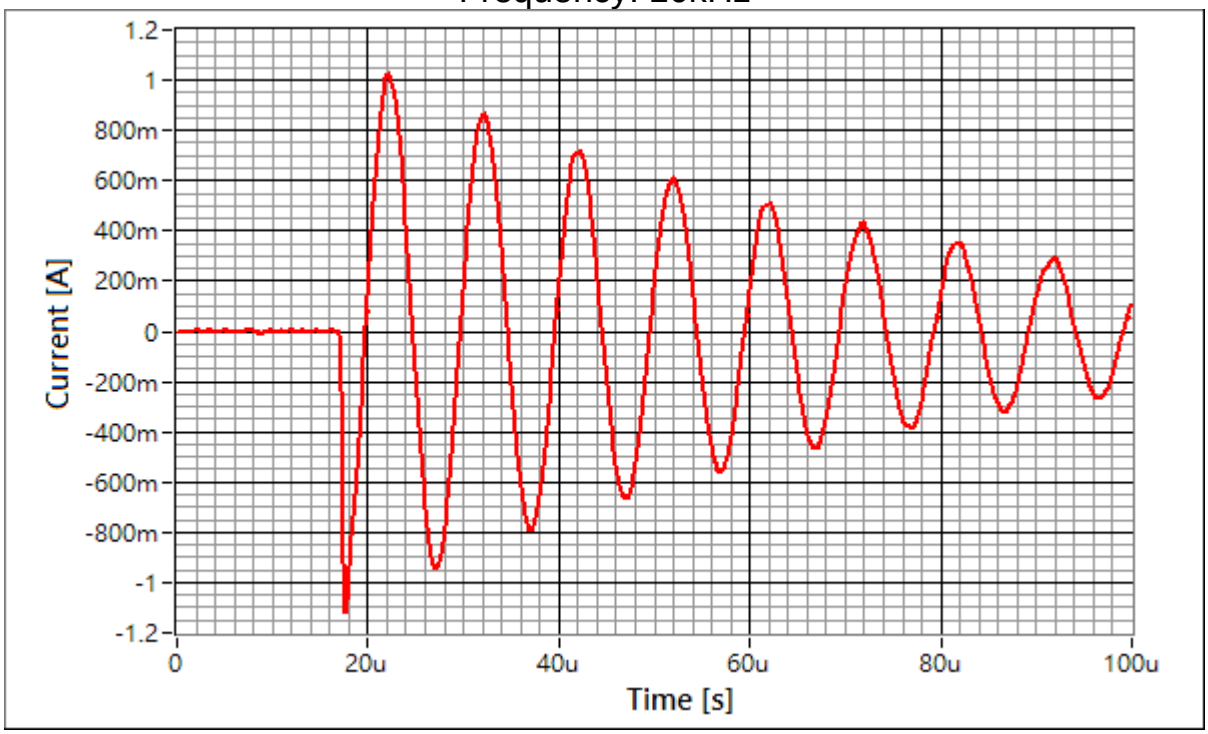
Power line(positive &Negative)	The screen shows image is in normal state.
Power line(positive)	The screen shows image is in normal state.
USB CABLE	The screen shows image is in normal state.
VGA CABLE	The screen shows image is in normal state.
LAN CABLE	The screen shows image is in normal state.

■ After the test: The screen shows image is automatic recover to normal state.

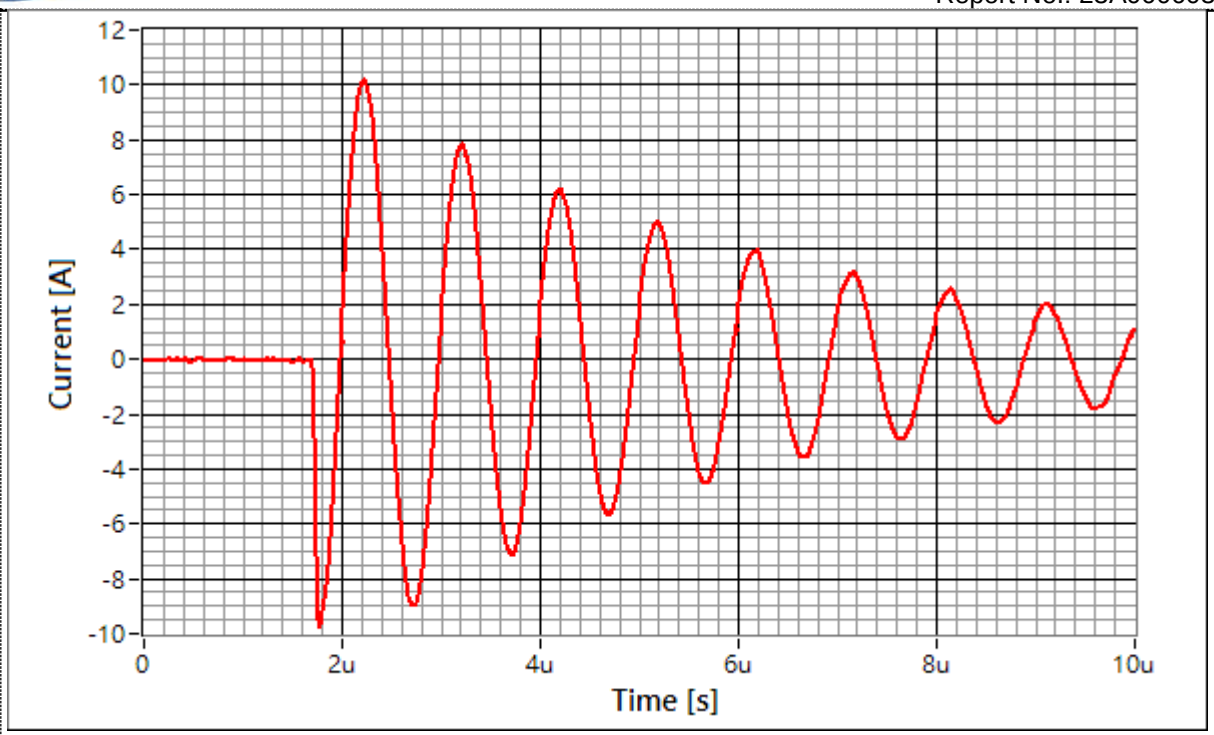
GRAPHS



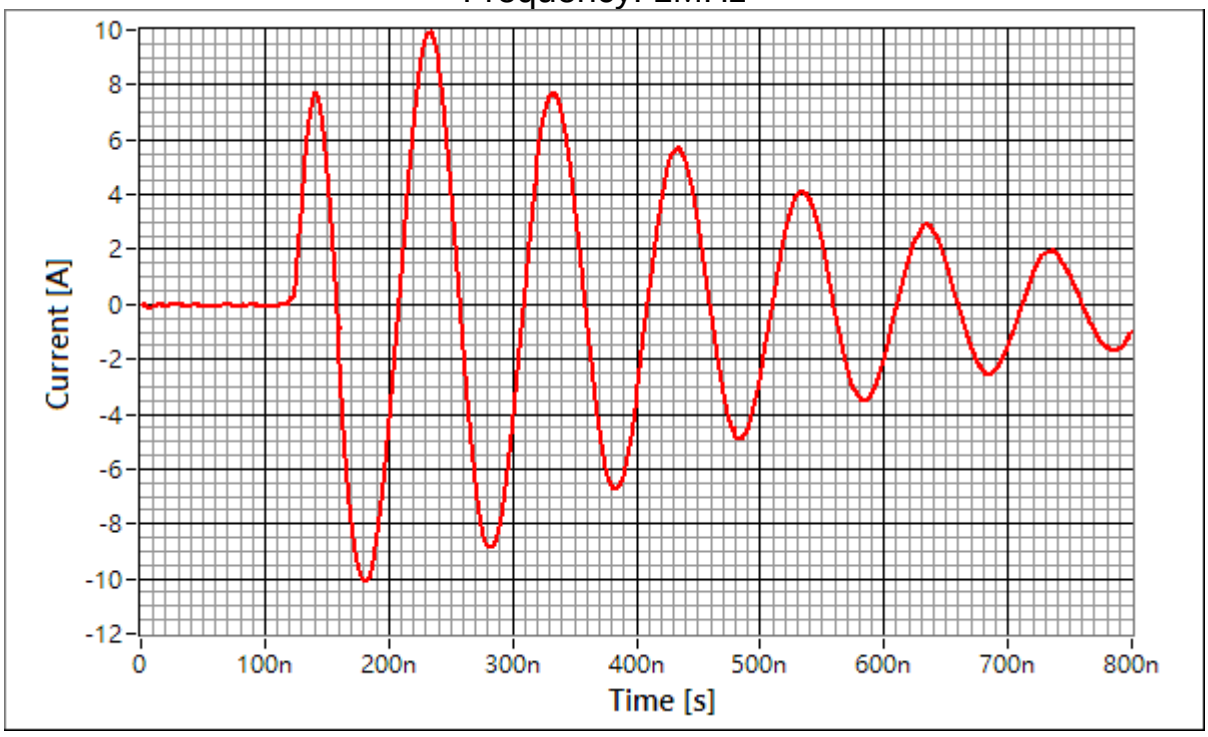
Frequency: 10kHz



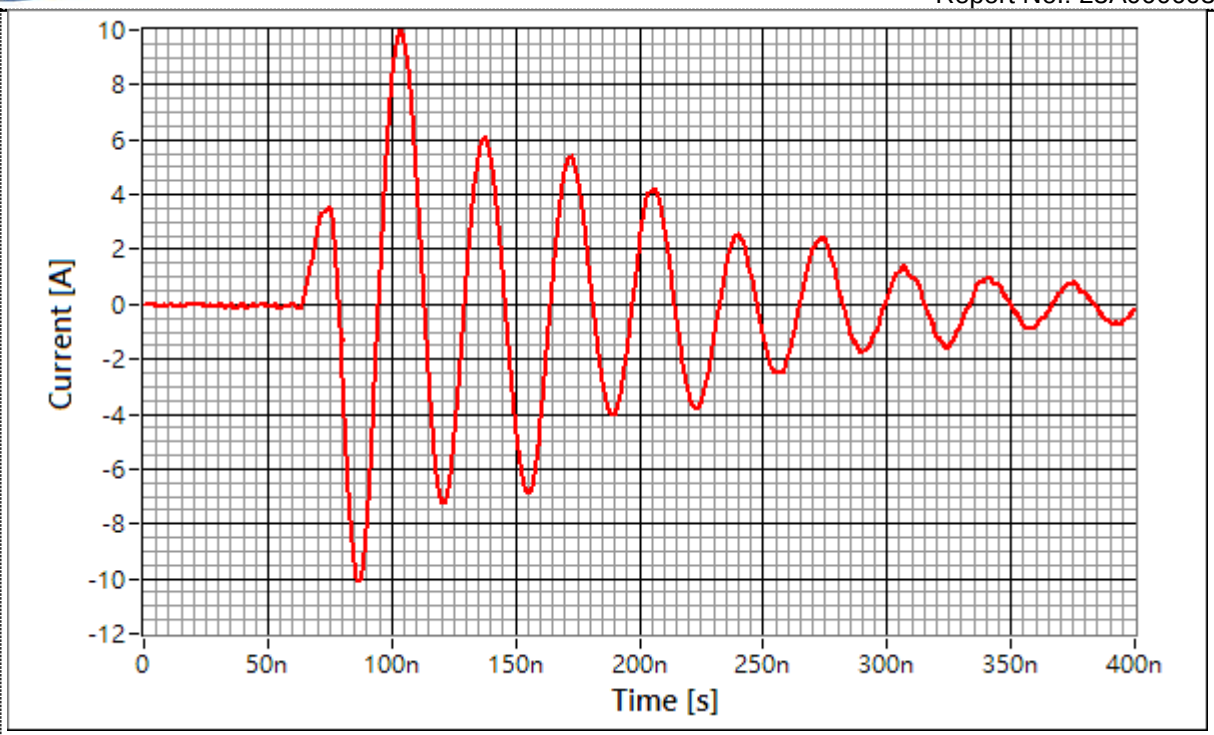
Frequency: 100kHz



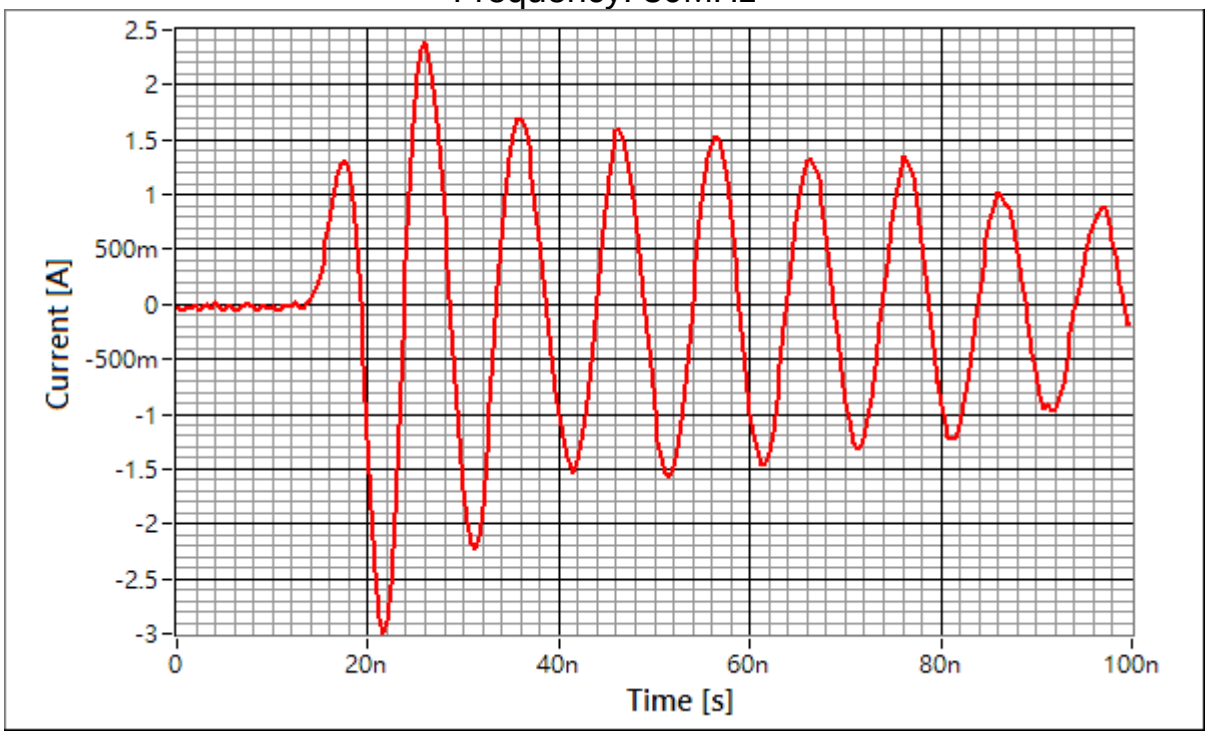
Frequency: 1MHz



Frequency: 10MHz



Frequency: 30MHz



Frequency: 100MHz

Frequency	Limit Current	Charging Voltage	Measured Peak Current	Measured Quality Factor	Measured Frequency
[Hz]	[A]	[%]	[A]	15±5	[Hz]
10k	0.1	60.7	0.1	13.3	10.08k
100k	1	88	1.02	18.2	100.76k
1M	10	89.2	10.17	13.1	1.02M
10M	10	74.8	10.09	13.1	9.94M
30M	10	79.1	10.13	14.3	29.07M
100M	3	74.7	3.0	14.4	100M

7 Radiated susceptibility, electric field test (RS103)

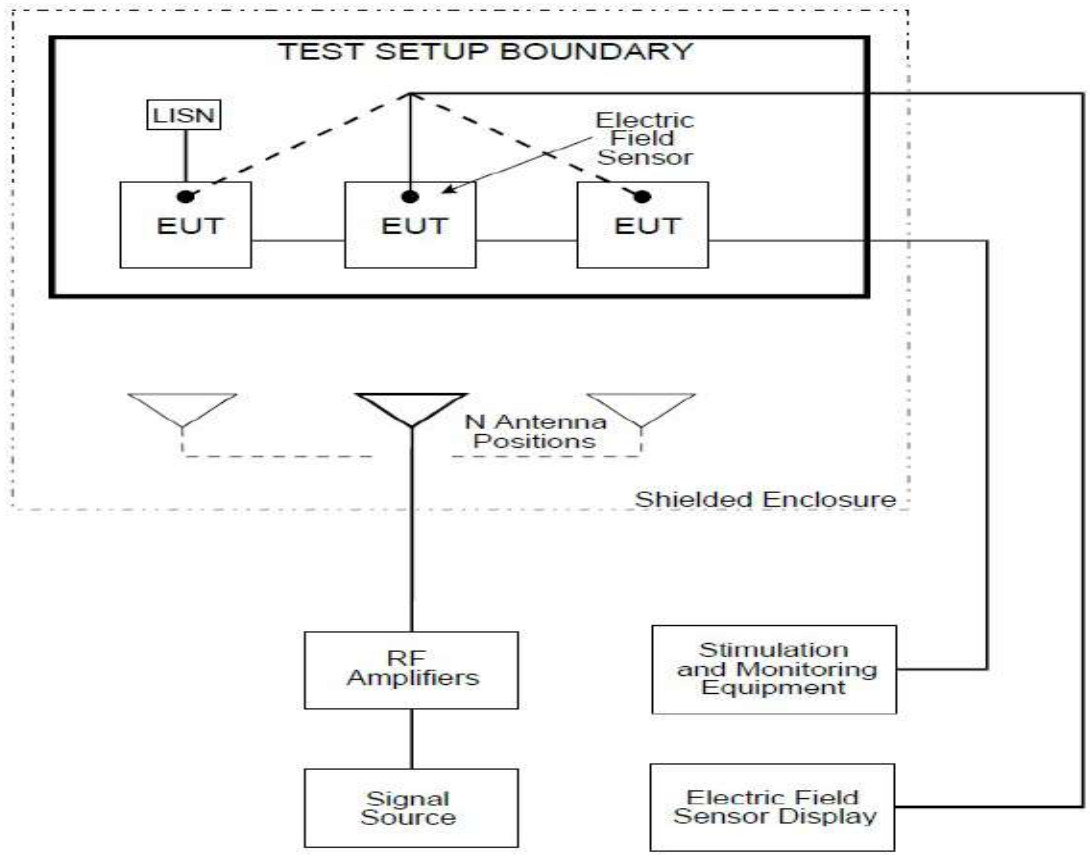
7.1 Instrument

☒Chamber 3

Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
Signal Generator	Anapico	APSIN20G	121-33B6D0010-2271	2023/10/17
RF Power Amplifier	R&K	A009K251-5757R	B41240-1	N.C.R.
RF Power Amplifier	R&K	A080M102-5555R	B30850	N.C.R.
RF Power Amplifier	R&K	A701M402-4747R	B30850	N.C.R.
RF Power Amplifier	R&K	GA252M602-4747R	B60243	N.C.R.
RF Power Amplifier	CPI	TE03MI-C-0004	1832698	N.C.R.
Attenuator	SCHAFFNER	ATN6075	22300	N.C.R.
Broadband E-field Generator	AR	ATE10K100M	0358751	N.C.R.
Log Antenna	Schwarzbeck	VULP 9118 G Special	9118GS912	N.C.R.
Horn Antenna	ETS-Lindgren	3106B	00154771	N.C.R.
Horn Antenna	AR	ATH800M6G	0357373	N.C.R.
Horn Antenna	AR	ATH6G18A	0358391	N.C.R.
DC LISN	Schwarzbeck	NNBL 8225	8225-120	2024/05/17
DC LISN	Schwarzbeck	NNBL 8225	8225-121	2024/05/17

Note: The above equipments are within the valid calibration period.

7.2 Block Diagram of Test Configuration



7.3 Test Limit

According to MIL-STD-461G sub clause 5.21.2 RS103 limit.

FREQUENCY RANGE / PLATFORM		LIMIT LEVELS (VOLTS/METER)							
		AIRCRFAFT (EXTERNAL OR SAFETY CRITICAL)	AIRCRAFT INTERNAL	ALL SHIPS (ABOVE DECK & EXPOSED BELOW DECK) AND SUBMARINES (EXTERNAL)*	SHIPS (METALLIC) (BELOW DECKS)	SHIPS (NON-METALLIC) (BELOW DECK)**	SUBMARINE (INTERNAL)	GROUND	SPACE
2 MHz to 30 MHz	A	200	200	200	10	50	5	50	20
	N	200	200	200	10	50	5	10	20
	AF	200	20	-	-	-	-	10	20
30 MHz to 1 GHz	A	200	200	200	10	10	10	50	20
	N	200	200	200	10	10	10	10	20
	AF	200	20	-	-	-	-	10	20
1 GHz to 18 GHz	A	200	200	200	10	10	10	50	20
	N	200	200	200	10	10	10	50	20
	AF	200	60	-	-	-	-	50	20
18 GHz to 40 GHZ	A	200	200	200	10	10	10	50	20
	N	200	60	200	10	10	10	50	20
	AF	200	60	-	-	-	-	50	20

7.4 Procedure

7.4.1 Turn on the measurement equipment and EUT and allow a sufficient time for stabilization.

7.4.2 Assess the test area for potential RF hazards and take necessary precautionary steps to assure safety of test personnel.

7.4.3 EUT Testing.

(1) Perform testing over the required frequency range with the transient antenna vertically polarized:

(a) Set the signal source to 1 kHz pulse modulation, 50% duty cycle, verify that the modulation is present on the drive signal for each signal generator/modulation source combination. Ensure that the modulation frequency, waveform and depth(40 dB minimum from peak to baseline) are corrent. Using appropriate amplifier and transient antenna, establish an electric field at the test start frequency. Gradually increase the electric field level until it reaches the applicable limit.

(b) Scan the required frequency ranges in accordance with the rates and durations specified in Table III. Maintain field strength levels in accordance with the applicable limit. Monitor EUT performance for susceptibility effects.

(c) Ensure that the E-field sensor is indicating the field from the fundamental frequency and not from the harmonics.

(2) If susceptibility is noted, determine the threshold level in accordance with MIL-STD-461G sub clause 4.3.10.4.3.

(3) Repeat the test above 30MHz with the transient antenna horizontally polarized.

(4) Repeat MIL-STD-461G sub clause 5.21.3.4c for each transient antenna position required by MIL-STD-461G sub clause 5.21.3.3c.

7.5 Test Result

The final test data is shown as following pages.

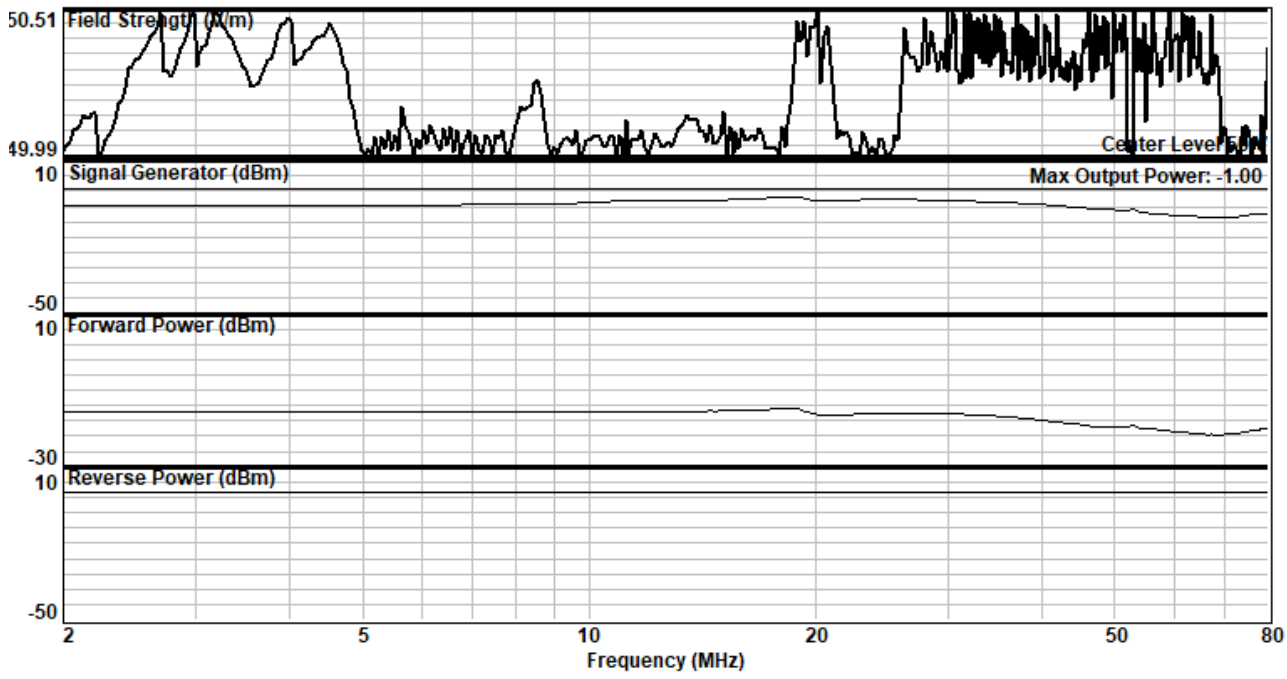
Applicant：7Starlake Co., Ltd.	Date of Measurement：2023 / 08 / 30
EUT：SYSTEM	Temp./Humidity/Atm.press.：25.5°C / 52% / 996hPa
M/N：AV800	Test Mode：Working Mode
Input Voltage：DC 28 V	Test Engineer：Scott Chang

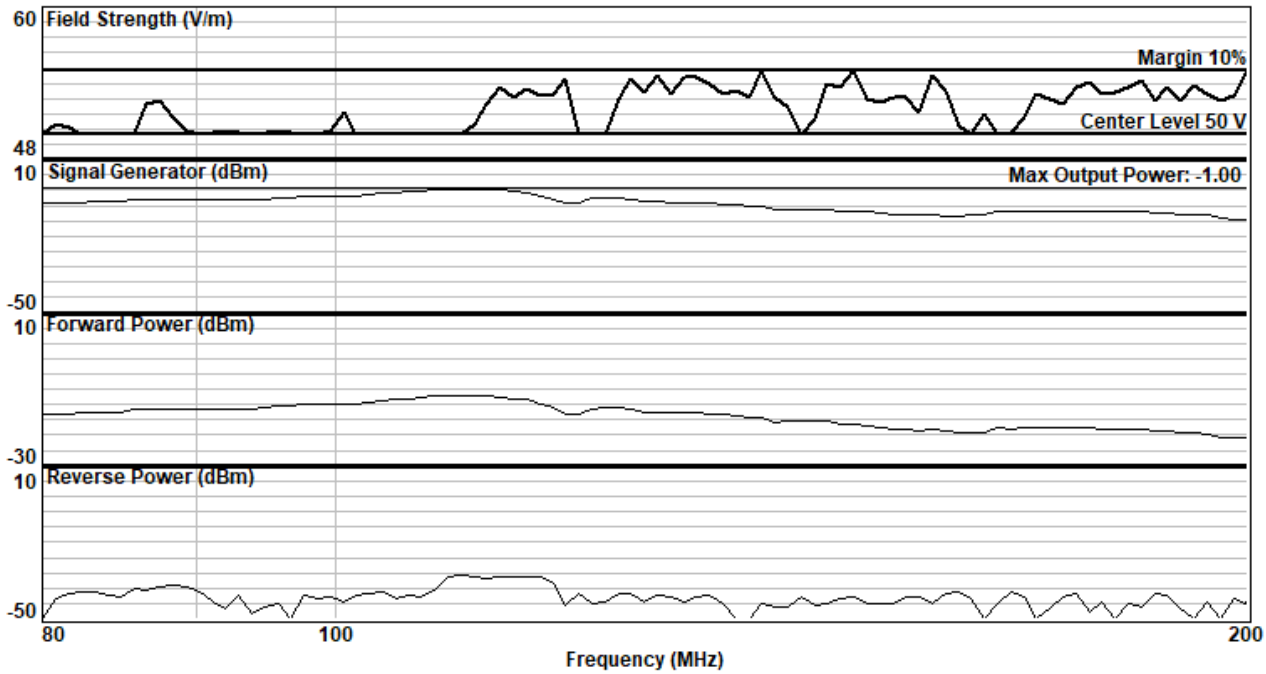
Frequency Range (MHz)	Field Strength (V/m)	Modulation	Antenna Polarity		Results
			Horizontal	Vertical	
2 - 30	50	PM 50%	-	○	As in NOTE
30 - 18000	50	PM 50%	○	○	As in NOTE

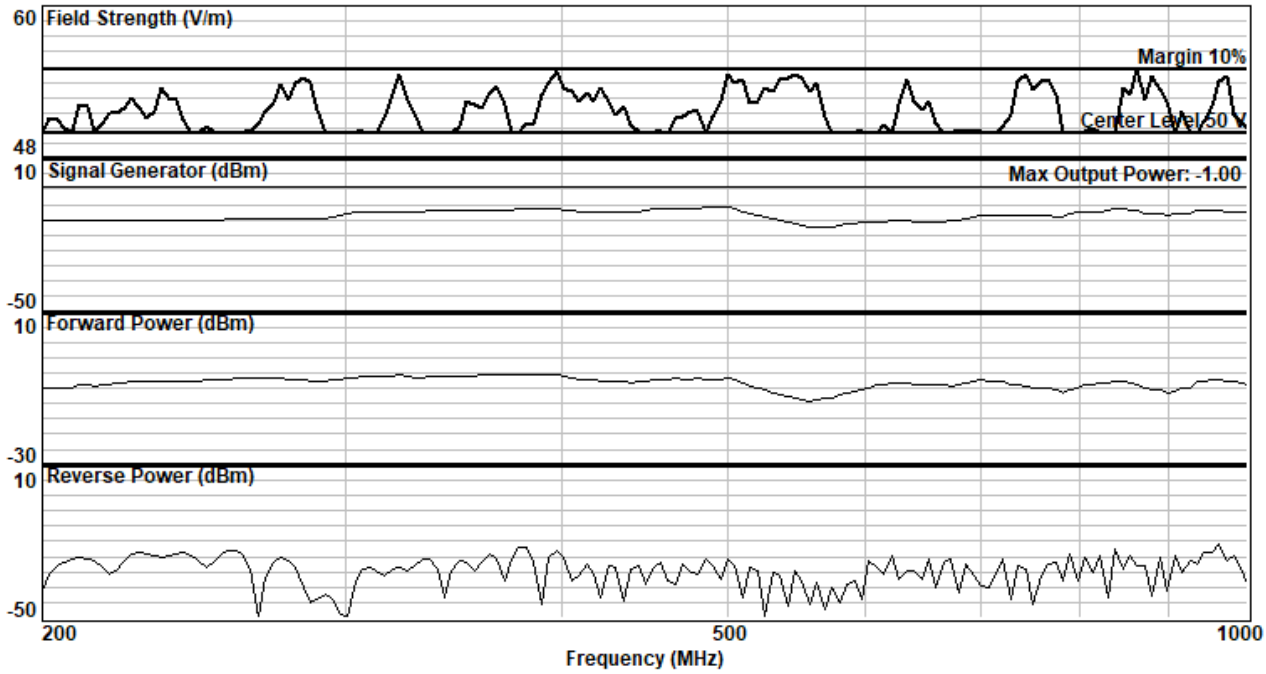
NOTE：

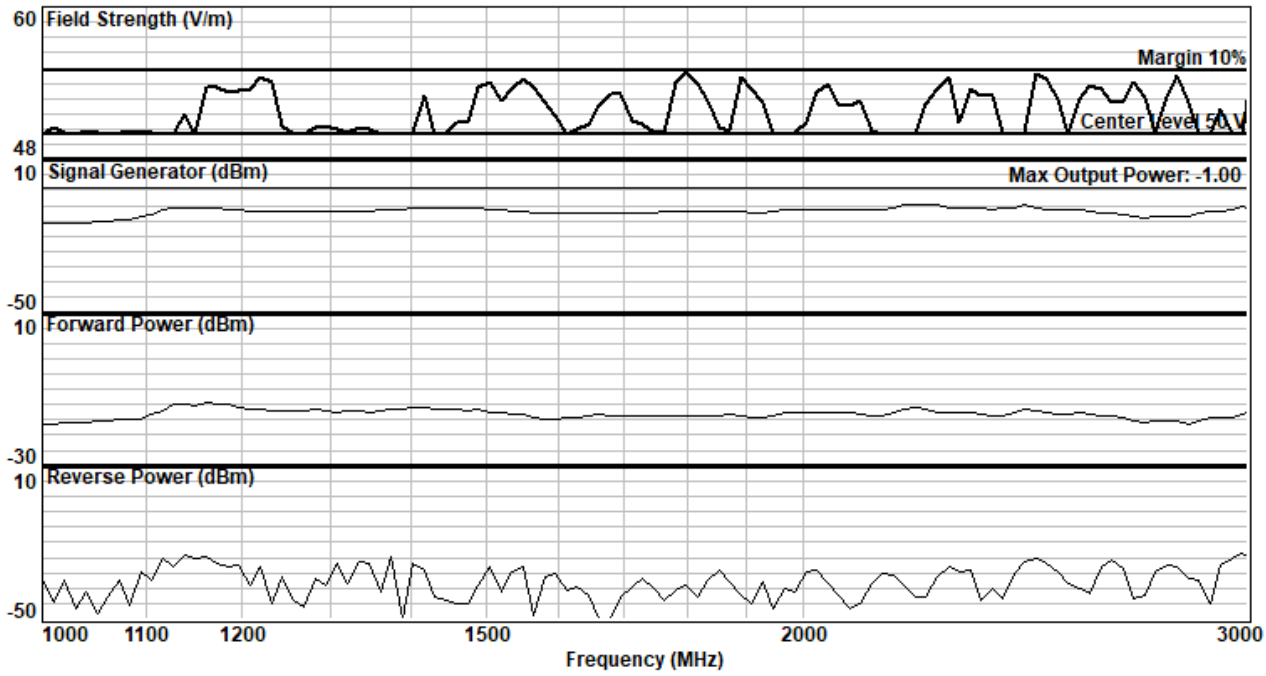
- GROUND, Army
- Monitoring method: Observe screen then record the phenomena.

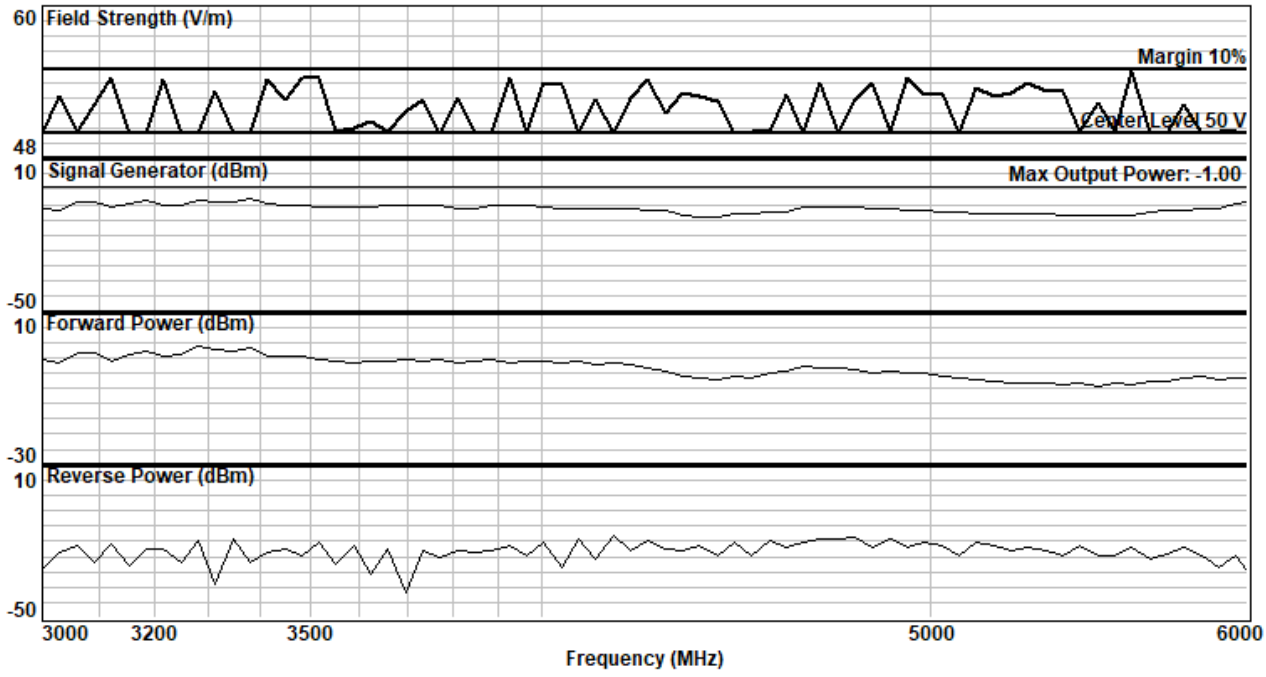
- Before the test: The screen shows image is in normal state.
- During the test: The screen shows image is in normal state.
- After the test: The screen shows image is in normal state.

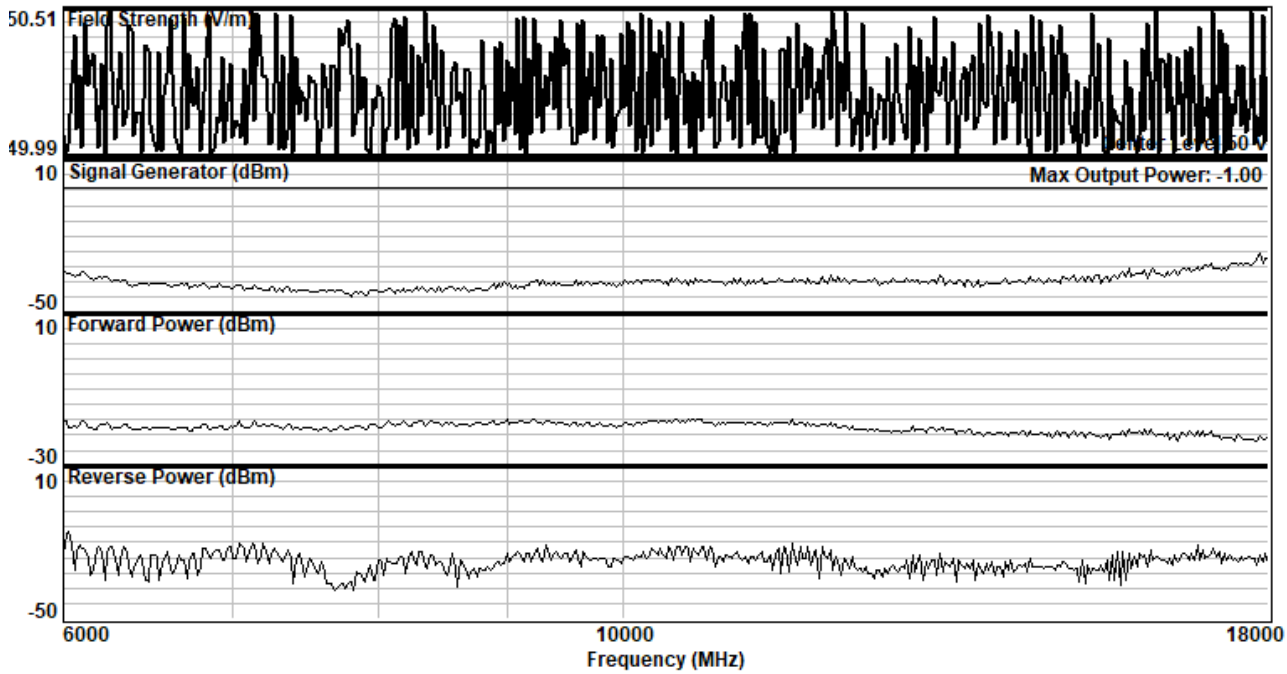



60
Field Strength (V/m)
Margin 10%
Center Level 50 V
48
10
Signal Generator (dBm)
Max Output Power: -1.00
-50
10
Forward Power (dBm)
-30
10
Reverse Power (dBm)
-50
80
100
200
Frequency (MHz)


60
Field Strength (V/m)
Margin 10%
Center Level 50 V
48
10
Signal Generator (dBm)
Max Output Power: -1.00
-50
10
Forward Power (dBm)
-30
10
Reverse Power (dBm)
-50
200
500
1000
Frequency (MHz)

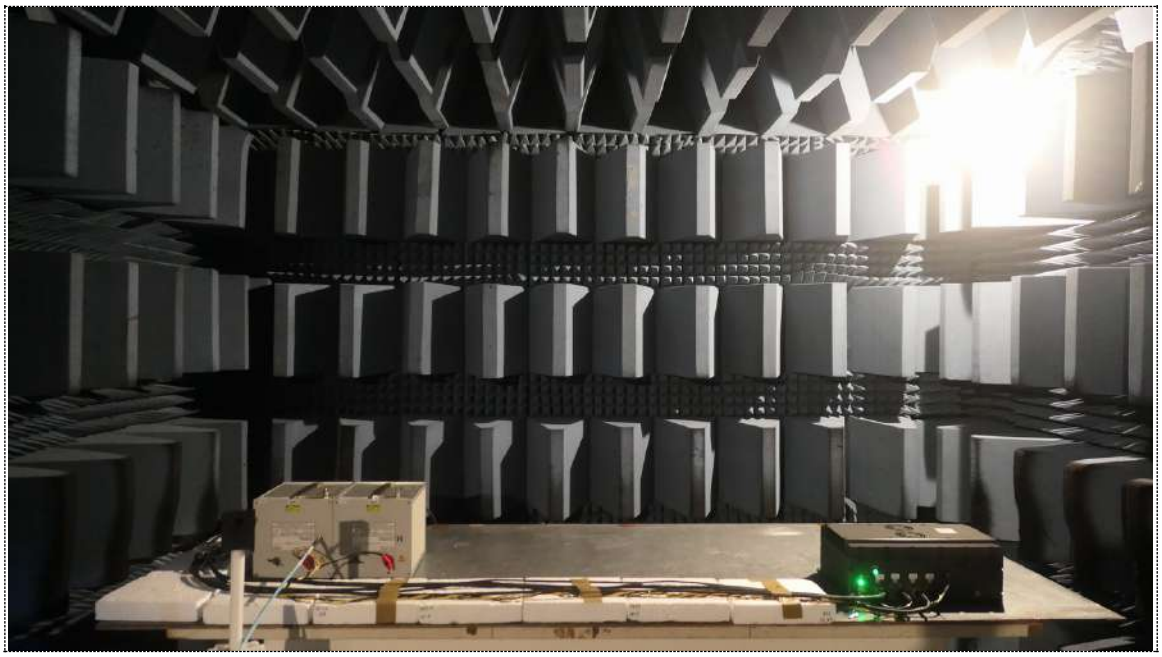

60
Field Strength (V/m)
Margin 10%
Center Level 50 V
48
10
Signal Generator (dBm)
Max Output Power: -1.00
-50
10
Forward Power (dBm)
-30
10
Reverse Power (dBm)
-50
1000
1100
1200
1500
2000
3000
Frequency (MHz)


60
Field Strength (V/m)
Margin 10%
Center Level 50 V
48
10
Signal Generator (dBm)
Max Output Power: -1.00
-50
10
Forward Power (dBm)
-30
10
Reverse Power (dBm)
-50
3000
3200
3500
5000
6000
Frequency (MHz)


50.51
Field Strength (V/m)
49.99
10
Signal Generator (dBm)
Max Output Power: -1.00
-50
10
Forward Power (dBm)
-30
10
Reverse Power (dBm)
-50
6000
10000
18000
Frequency (MHz)

8 Photographs of Test

8.1 Conducted emissions, power leads Test (CE102)



8.2 Radiated emissions, electric field Test (RE102)

View of Measurement (Frequency: 2 MHz - 30 MHz)

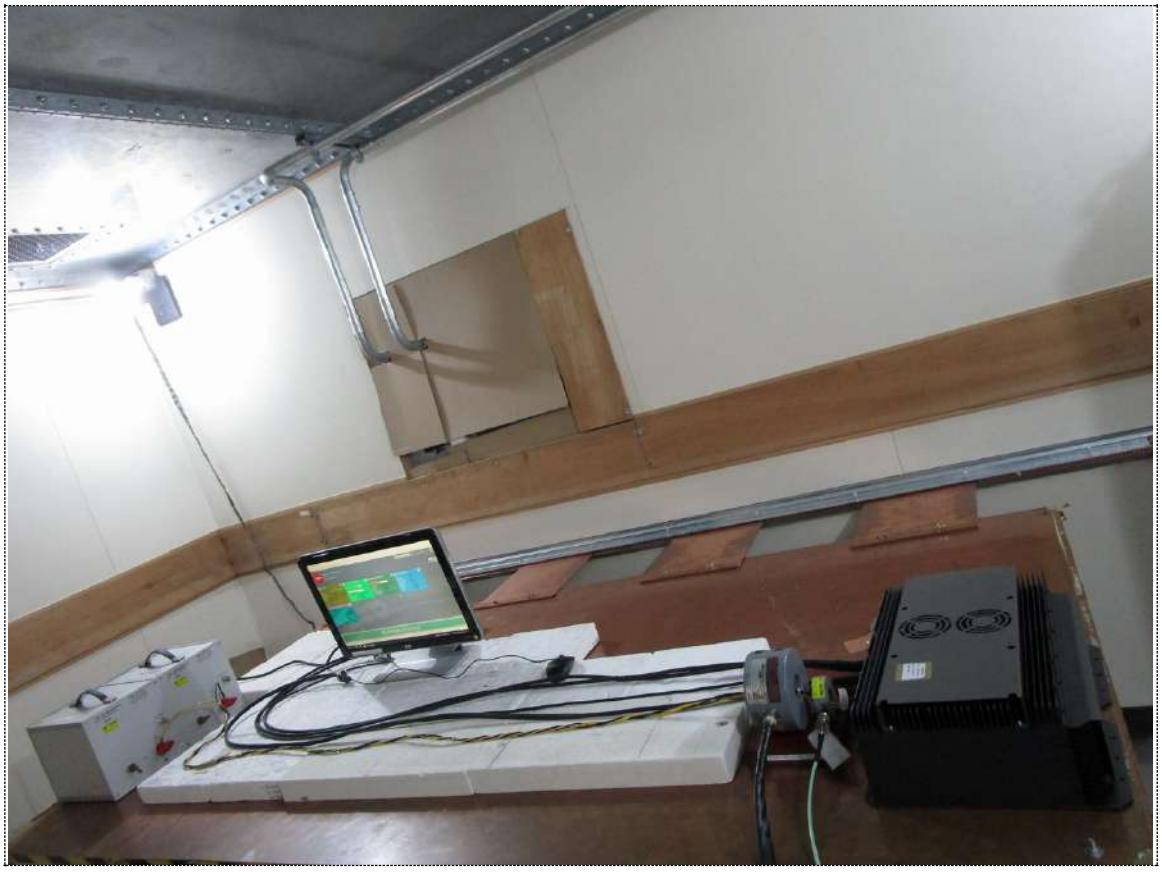
View of Measurement (Frequency: 30 MHz - 200 MHz)

View of Measurement (Frequency: 200 MHz - 1 GHz)

View of Measurement (Frequency: 1 GHz - 18 GHz)

8.3 Conducted susceptibility, power leads Test (CS101)

8.4 Conducted susceptibility, bulk cable injection Test (CS114)



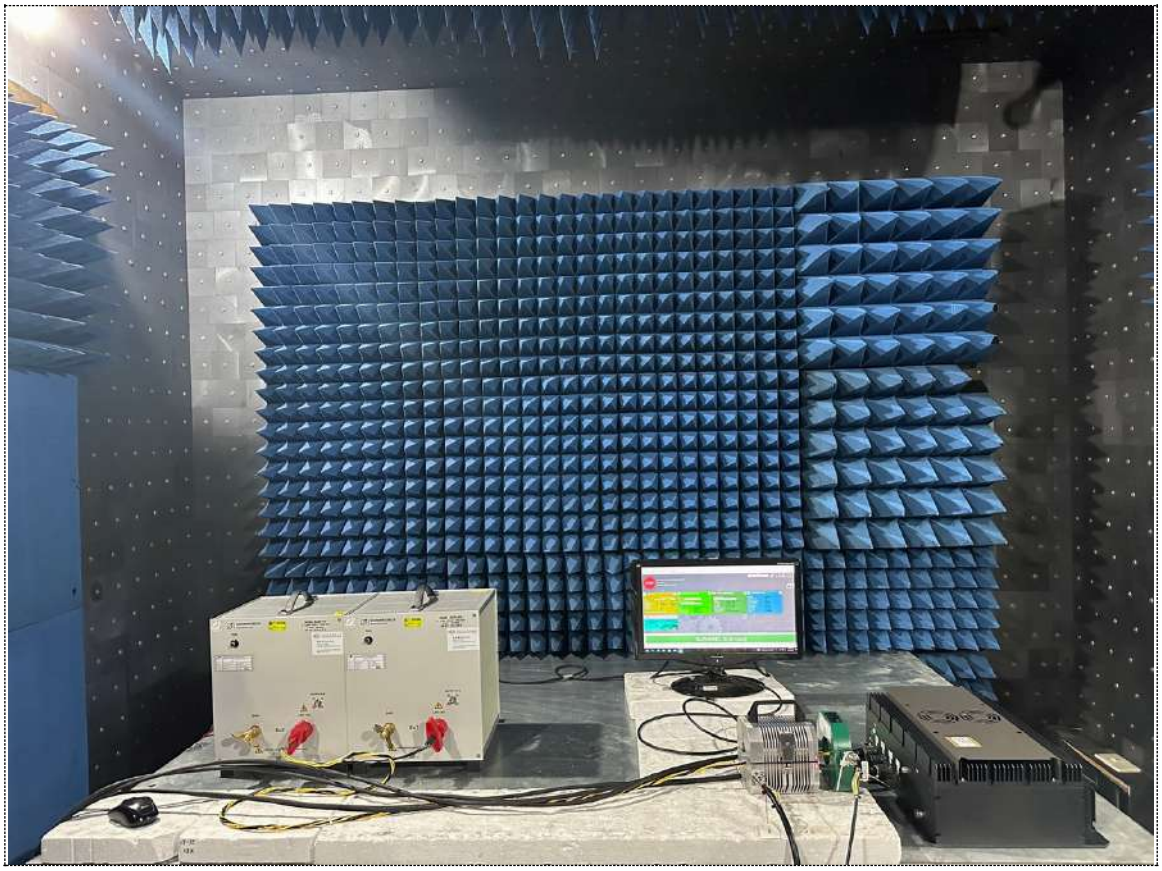
View of Measurement (Power line)

View of Measurement (Signal line)-1

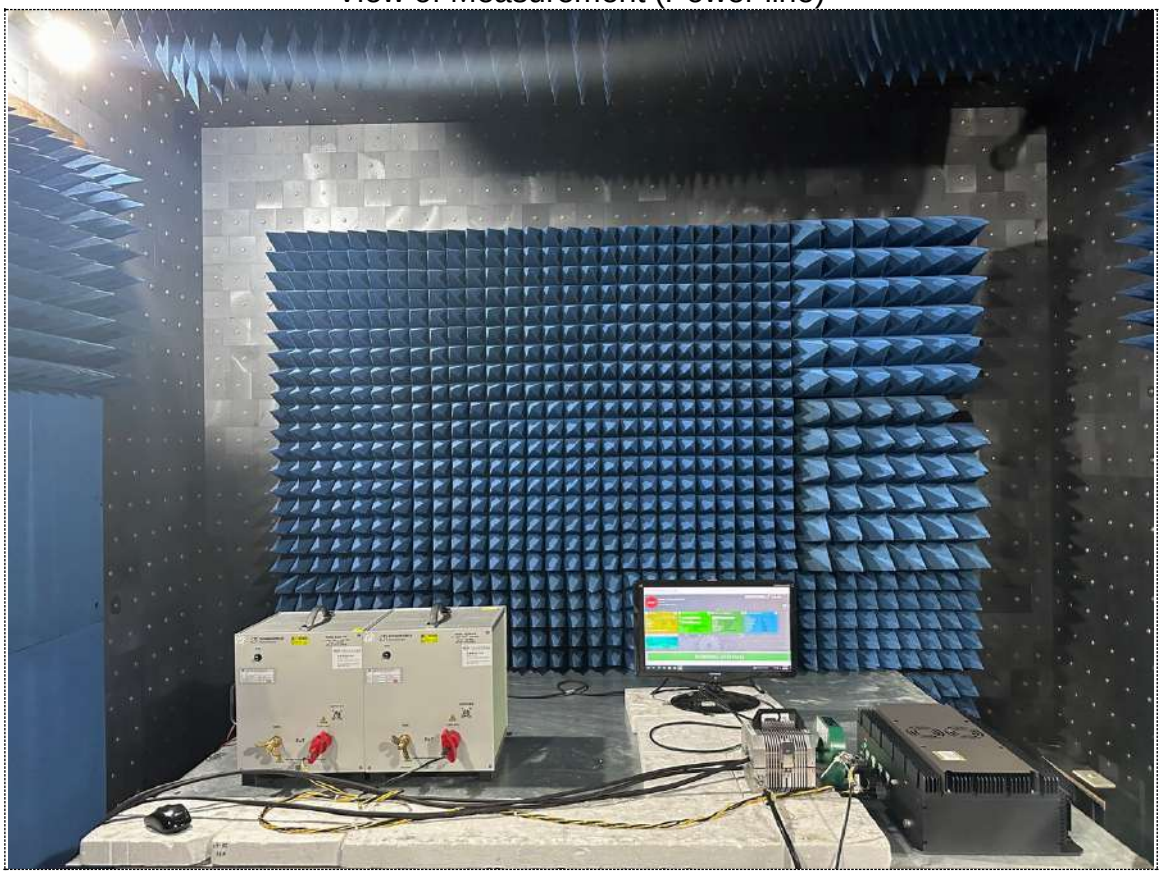
View of Measurement (Signal line)-2

View of Measurement (Signal line)-3

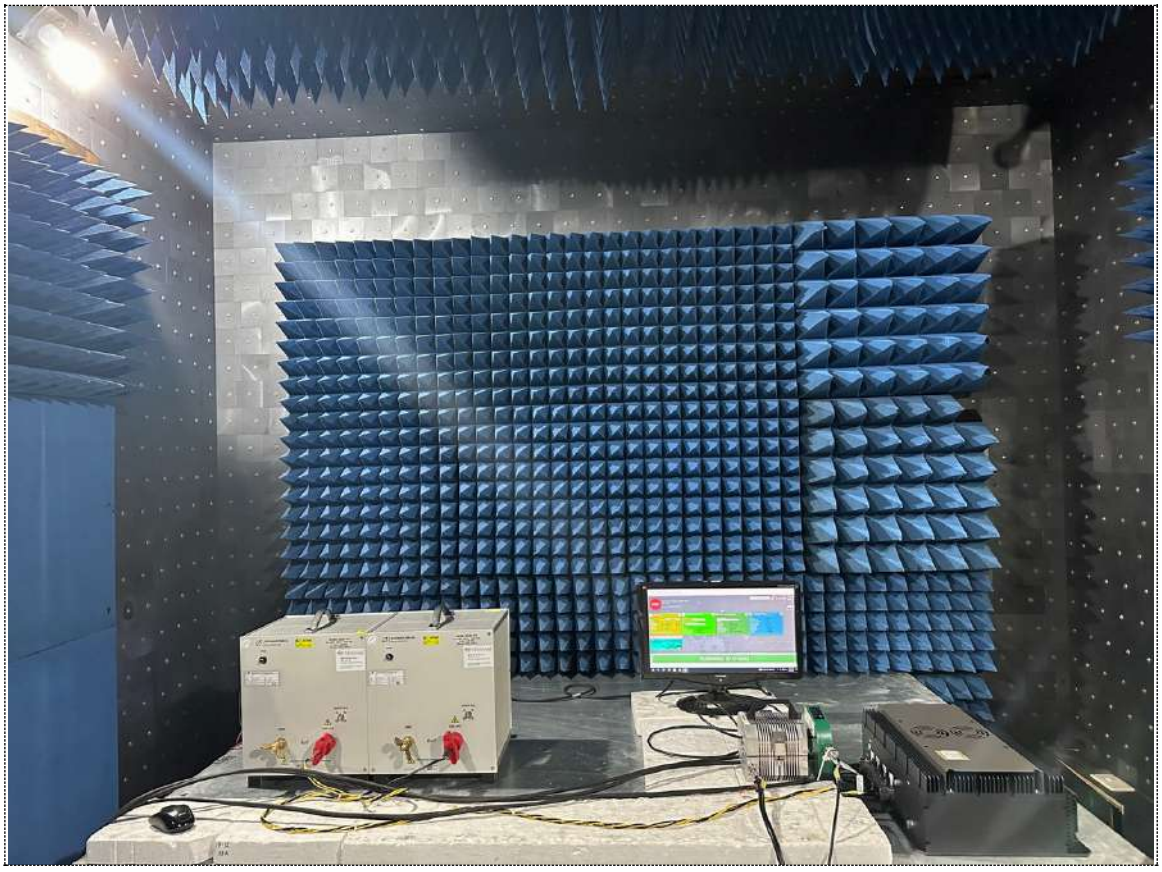
8.5 Bulk cable injection, impulse excitation (CS115)



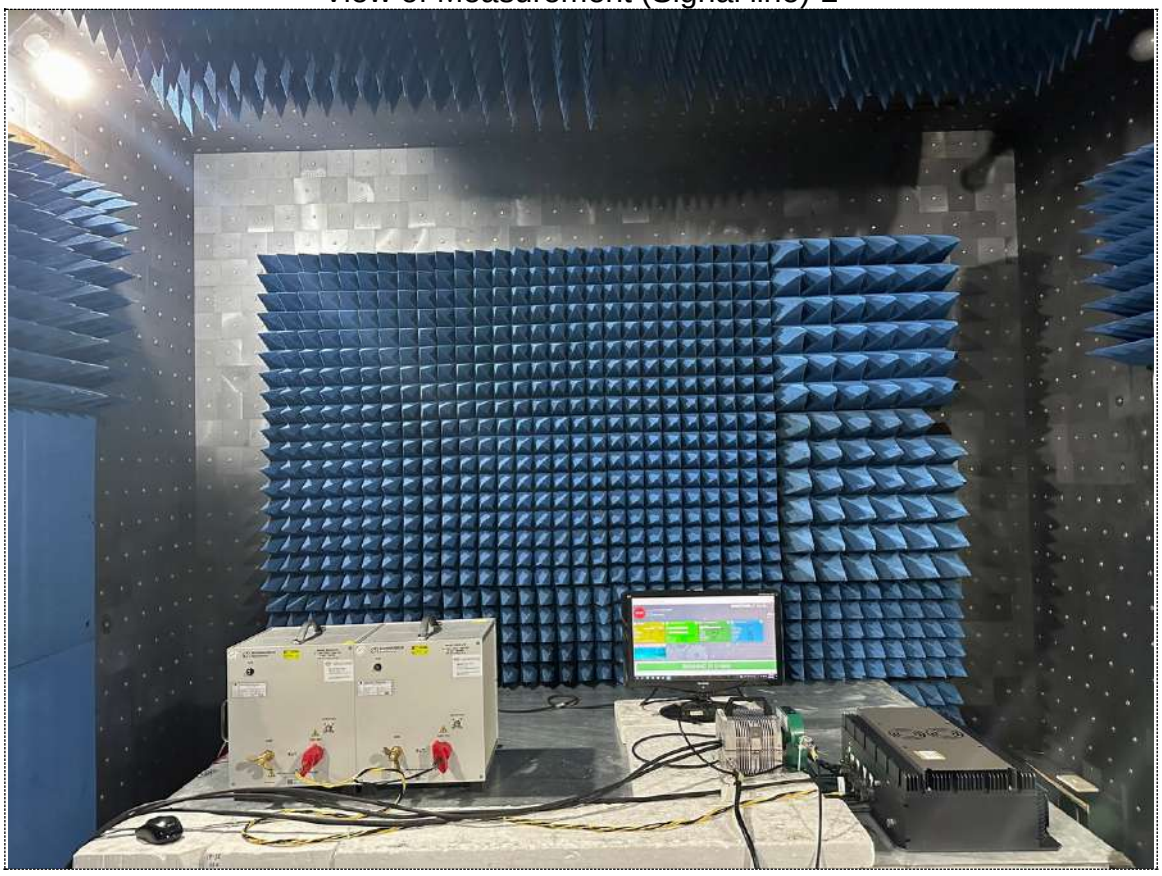
View of Measurement (Power line)



View of Measurement (Signal line)-1

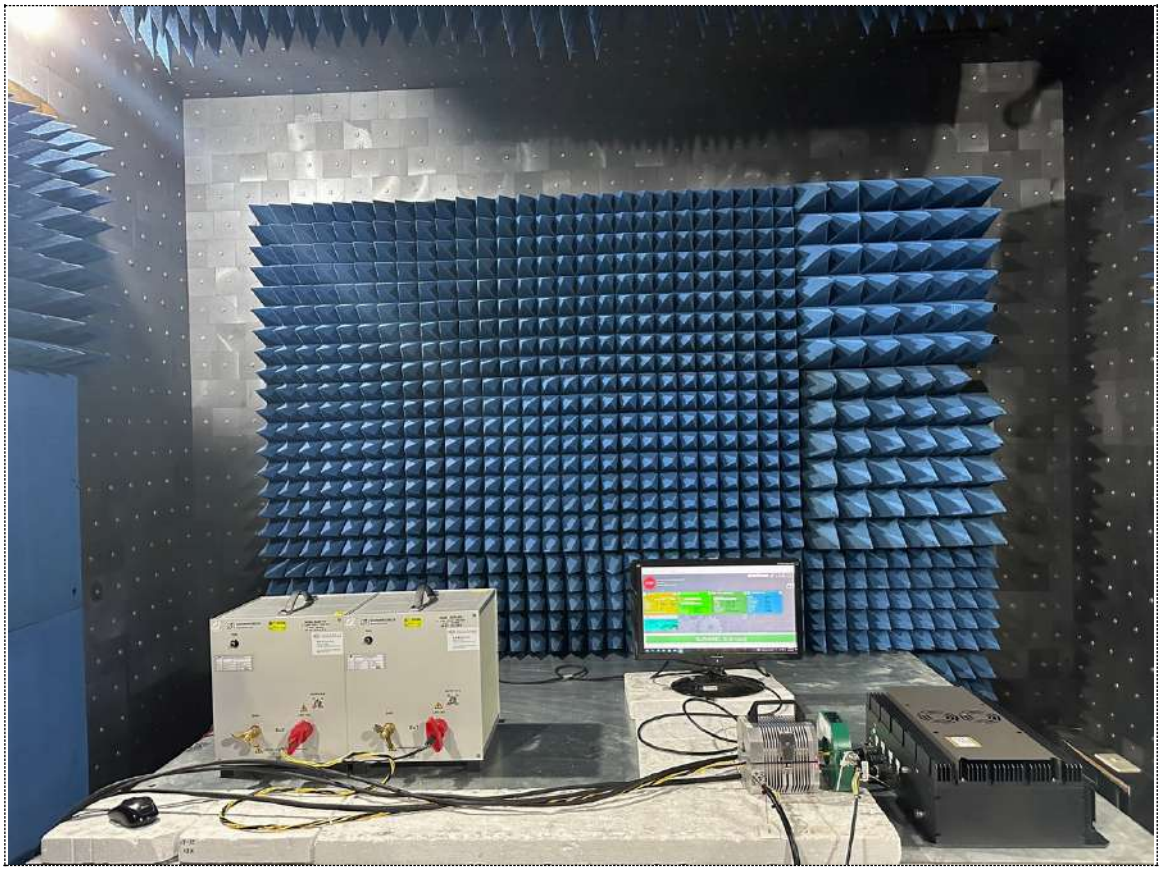


View of Measurement (Signal line)-2

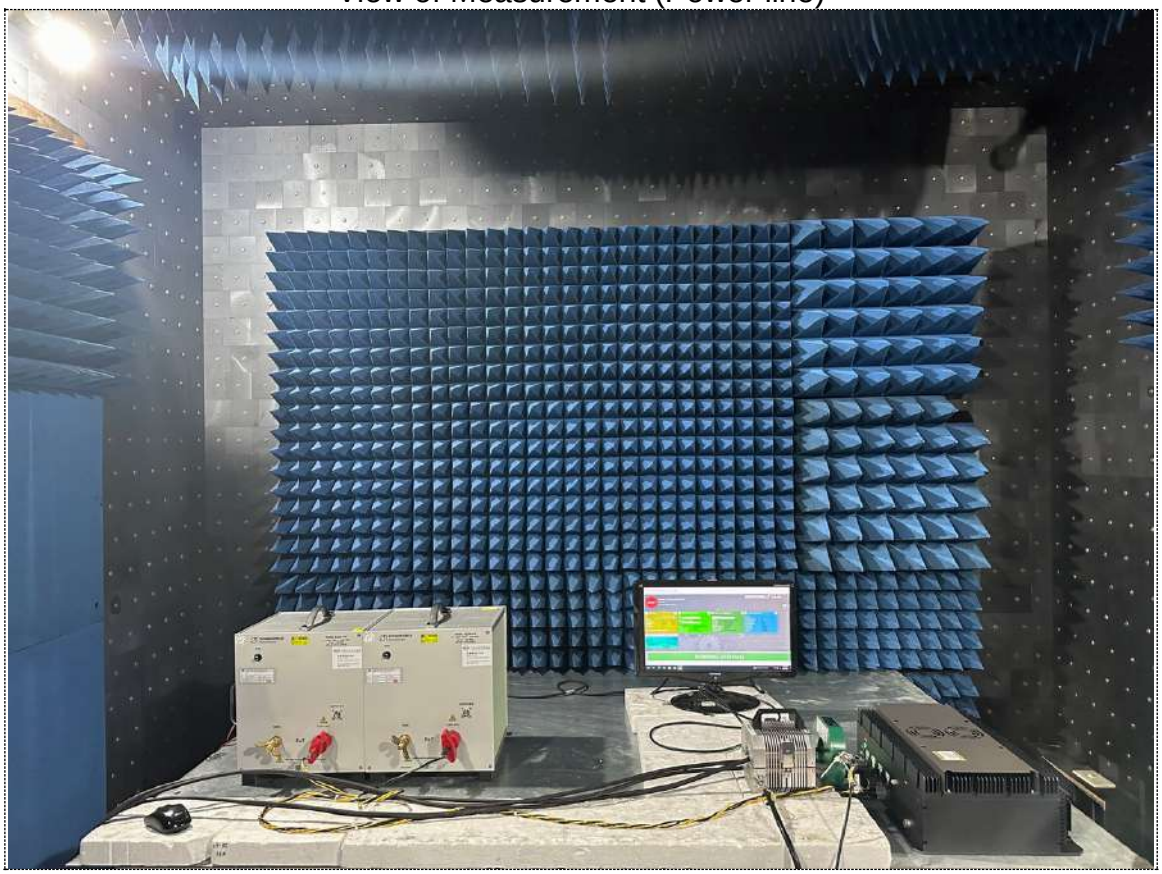


View of Measurement (Signal line)-3

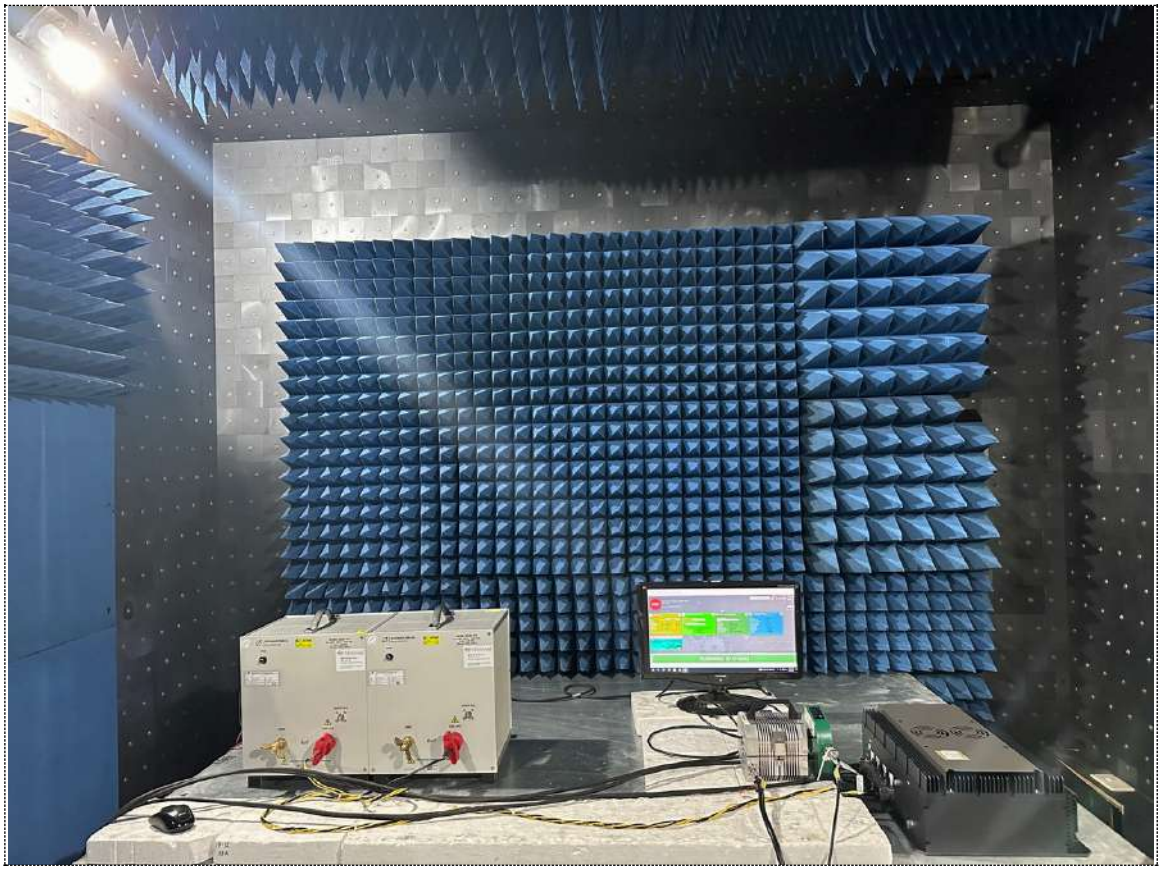
8.6 Damped sinusoidal transients, cables and power leads (CS116)



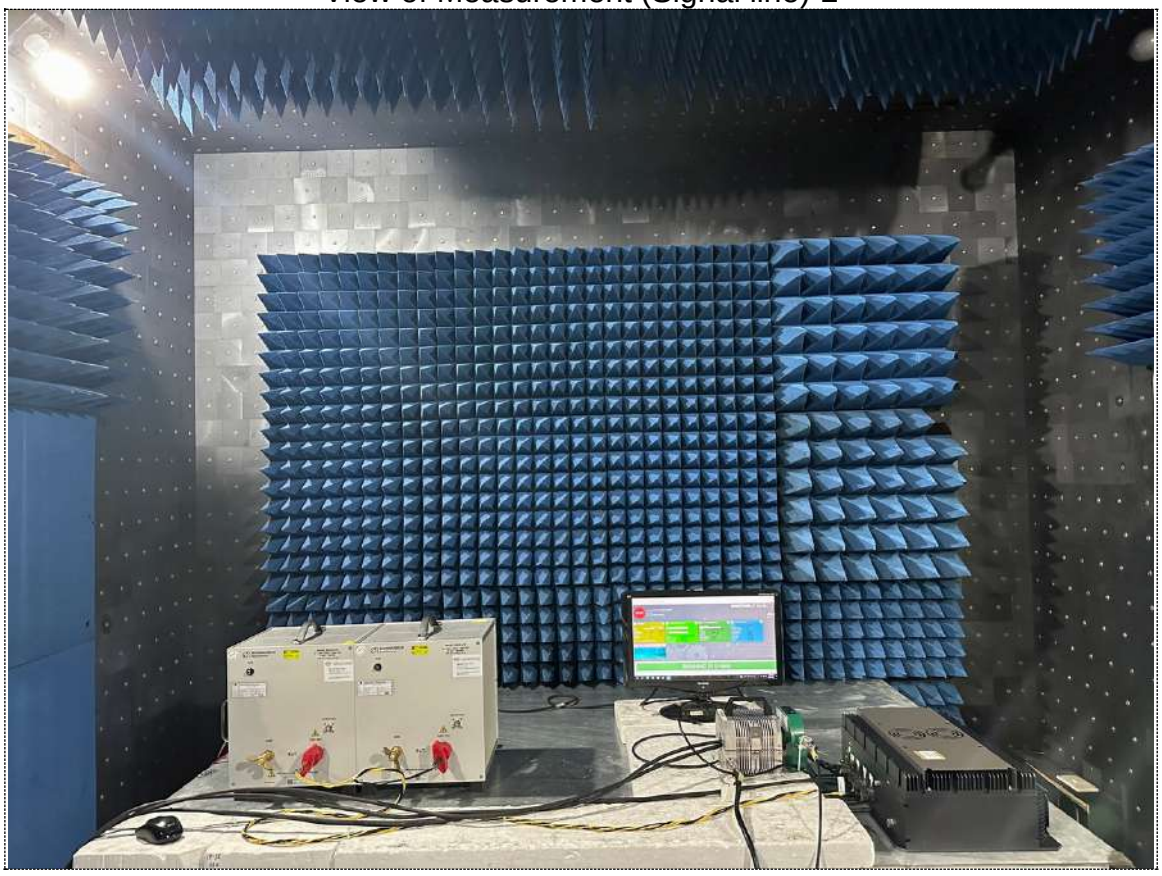
View of Measurement (Power line)



View of Measurement (Signal line)-1



View of Measurement (Signal line)-2

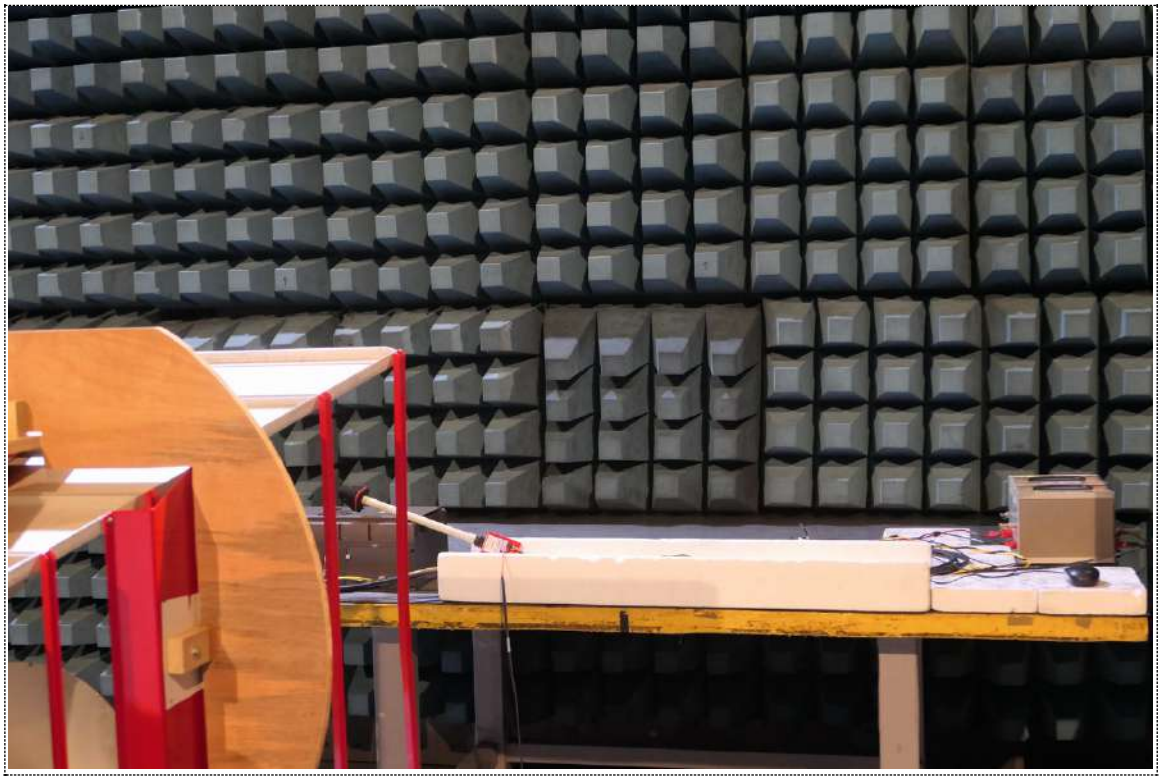


View of Measurement (Signal line)-3

8.7 Radiated susceptibility, electric field test (RS103)

View of Measurement (Frequency: 2 MHz - 80 MHz)

View of Measurement (Frequency: 80 MHz - 200 MHz)



View of Measurement (Frequency: 200 MHz - 1 GHz)

View of Measurement (Frequency: 1 GHz - 6 GHz)

View of Measurement (Frequency: 6 GHz - 18 GHz)

9 Photographs of EUT

9.1 Model No.: AV800

Front View of EUT

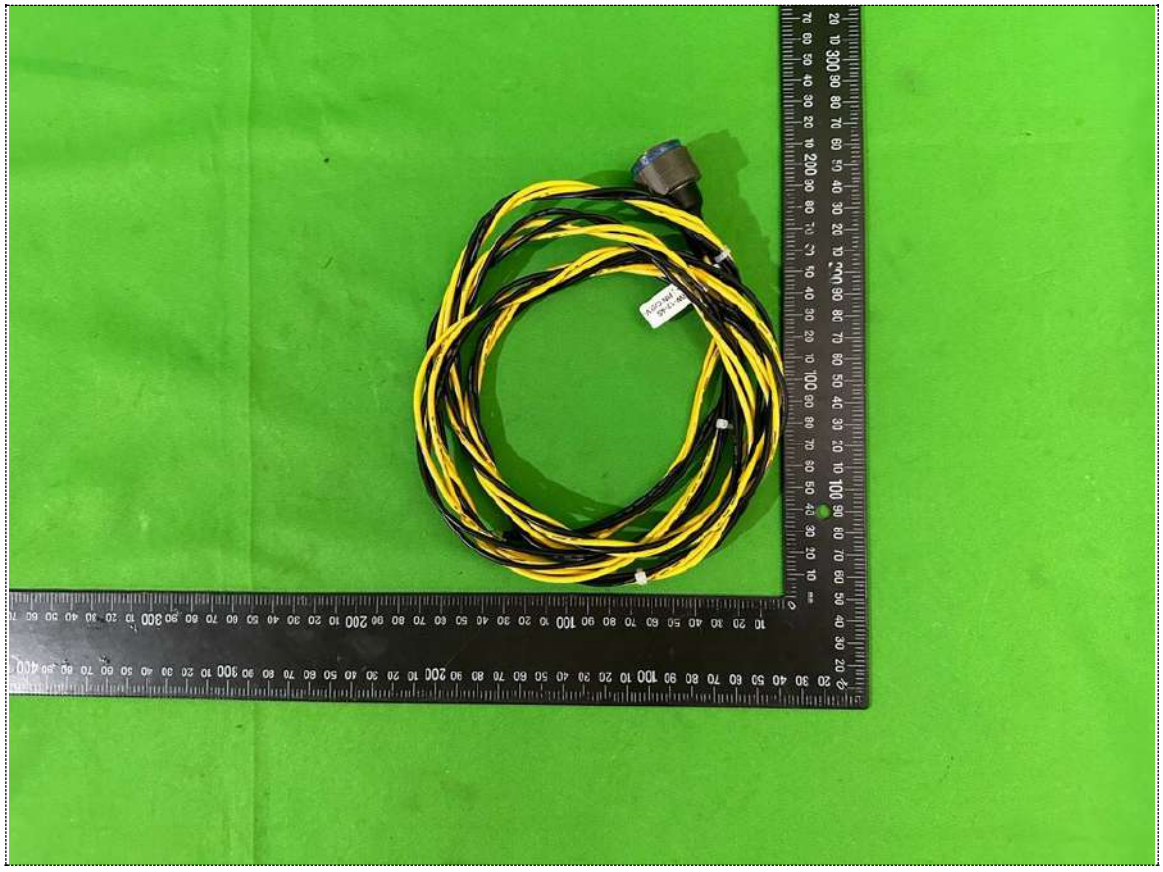
Rear View of EUT

View of I/O Port

View of VGA Cable

View of LAN Cable

View of USB Cable



View of Power Cable