Report on the Testing of the

Lind Electronics LLC
MIL 1560-5729

In accordance with:
MIL-STD-461G:2015
(CE102 & RE102)

America

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Prepared for: Lind Electronics LLC
14850 Deveau Place
Minnetonka, Minnesota, 55345

COMMERCIAL-IN-CONFIDENCE

Document Number: NC72011486.1 | Issue: 1

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NAME	**JOB TITLE**	**RESPONSIBLE FOR**	**ISSUE DATE**
Brad A Reasoner	EMC Technical Lead	**Authorized Signatory**	4 June 2025

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD America, Inc. document control rules.

EXECUTIVE SUMMARY
A sample of this product was tested and found to be compliant with the standards listed above.

A2LA Cert. No. 2955.11

ACCREDITATION
Our A2LA Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our A2LA Accreditation.

TÜV SÜD America Inc
141 14th Street NW
New Brighton, MN 55112

Phone: 651-631-2487
www.tuv-sud-america.com

Contents

1 Report Summary

1.1 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

Table 1.1-1 – Modification Record

Issue	Description of Change	Date of Issue
1	First Issue	4 June 2025

1.2 Introduction

Applicant	Lind Electronics LLC
Manufacturer	Lind Electronics LLC
Applicant's Email Address	Jay.Aigner@lindelectronics.com
Model Number(s)	MIL 1560-5729
Lot Number(s)	2523
Number of Samples Tested	1
Test Specification/Issue/Date	MIL-STD-461G:2015
Order Number	721011486
Date of Receipt of EUT	23 May 2025
Condition of EUT	Normal – No Damage
Start of Test	27 May 2025
Finish of Test	4 June 2025
Related Document(s)	No test plan provided

1.3 Summary of Results

A summary of the tests carried out in accordance with the specifications shown below.

Table 1.3-1 – Summary of Accreditation

Report Section	Specification Clause	Test Description	Accreditation	Comments/Base Standard
2.1	5.5	CE102 – Conducted Emissions Power Leads	A2LA	MIL-STD-461G
2.2	5.18	RE102 – Radiated Emissions Electrical Field	A2LA	MIL-STD-461G

Table 1.3-2 – Summary of Results

Test Name	Name of Tester(s)	Result / Comment
CE102 – Conducted Emissions Power Leads	Jordan Kirby	Pass
RE102 – Radiated Emissions Electric Field	Jordan Kirby	Pass

1.4 Product Information

1.4.1 Technical Description

The Equipment Under Test (EUT) was a DC-DC converter.

A full description and detailed product specification details are available from the manufacturer.

Photo 1.4-1 – Top View of the EUT

Photo 1.4-2 – Bottom View of the EUT

Table 1.4-1 – Cable Descriptions

Cable/Port	Description
Power Input	28 VDC power input
Power Output	15 VDC power output

Table 1.4-2 – Support Equipment Descriptions

Make/Model	Description
N/A	N/A

1.4.2 Modes of Operation

The tested mode of operation was operational with a 2.5 Ω resistive load on the output.

1.5 Deviations from the Standard

No deviations from the applicable test standard were made during testing.

1.6 EUT Modification Record

The table below details modifications made to the EUT during the test program. The modifications incorporated during each test are recorded on the appropriate test pages.

Table 1.6-1 – Modification Record

Modification State	Description of Modification still fitted to EUT	Modification Fitted By	Date Modification Fitted
0	Initial State, latest version with capacitors C29, C30 and C32	N/A	N/A

1.7 Test Location

TÜV SÜD conducted the following tests at our New Brighton, MN test laboratory.

Office address:
TÜV SÜD America
141 14th St NW
New Brighton, MN 55112 USA

2 Test Details

2.1 CE102 – Conducted Emissions Power Leads

2.1.1 Specification Reference

MIL-STD-461G Section 5.5

2.1.2 Equipment Under Test and Modification State

As shown in §1.4 with modification state “0”, as noted in §1.6.

2.1.3 Test Voltage

28 VDC

2.1.4 Date of Test

27 and 28 May 2025

2.1.5 Test Method

The EUT was setup in a semi-anechoic chamber and laid on a non-conductive support 5cm above a copper ground plane table with a height of 90cm (±10cm). The EUT was placed 10cm from the front edge of the ground plane while the stretched-out cable bundle was 10cm from the front edge. Each of the power input lines from EUT were connected to 50uH LISNs which were bonded to the ground plane table.

Prior to testing an equipment system verification was performed by removing the EUT power lines from the LISNs. An oscilloscope was used to verify the impedance of each LISN at 10.5 kHz and 100 kHz, using the method described in MIL-STD-461G Section 5.5.3.4. A signal generator was then used to inject an RF signal into the LISNs that had an amplitude of 6dB below the CE102 Basic Curve at the designated frequencies. Using the same measuring instrumentation as during the test, the RF signal was measured and ensured to be 6dB below limit, +/-3dB, using the method described in MIL-STD-461G Section 5.5.3.4.

With input power and a resistive load matching that of the EUT, an ambient measurement scan was taken at each LISN to ensure ambient RF levels were at least 6dB below the applicable limit.

The EUT emission profile was made using a spectrum analyzer that utilized a peak detector for the required frequency ranges. The peak data collected was compared to the applicable test limits via software to determine pass or fail conditions.

2.1.6 Environmental Conditions

The EUT was evaluated within the temperature and humidity range of the EUT as specified by the manufacturer. When the manufacturer does not specify climatic parameters for the EUT, all tests are performed within the ambient temperature range of 20°C to 40°C and humidity range of 30% to 80%.

2.1.7 Additional Observations

The frequency range investigated was 10 kHz to 10 MHz.

Measurements were made using BAT-EMC (2024.0.9.5) automated software. Reported level is the actual level with all the correction factors factored in. Correction Factor column is for informational purposes only.

2.1.8 Sample Computation (Conducted Emissions)

Measuring equipment raw measurement (dBµV) @ 150 kHz			30.0
Correction Factor (dB)	20dB Attenuator	20.00	30.50
	Cable 1	10.50	
Reported Peak Final Measurement (dBµV) @ 150 kHz			60.50

2.1.9 Test Results

Test Summary: EUT recorded emissions were below the required limit.

Test Result: Pass

See data below for detailed results.

2.1.10 LISN Impedance Verification

Table 2.1-1 – Requirements

LISN	Frequency (kHz)	Injected Signal Level (dBµV)	Signal Measurement with High Impedance (mV)	Signal Measurement with 50Ω Impedance (mV)	Required Measurement Ratio (dB)	Calculated Measurement Ratio (dB)
1 (DC+)	10.5	90	31.603	166.00	-14 (+1/-2)	-14.41
2 (DC-)	10.5	90	31.584	166.54	-14 (+1/-2)	-14.44
1 (DC+)	100	90	31.619	41.690	-3(+1/-2)	-2.40
2 (DC-)	100	90	31.607	40.222	-3(+1/-2)	-2.09

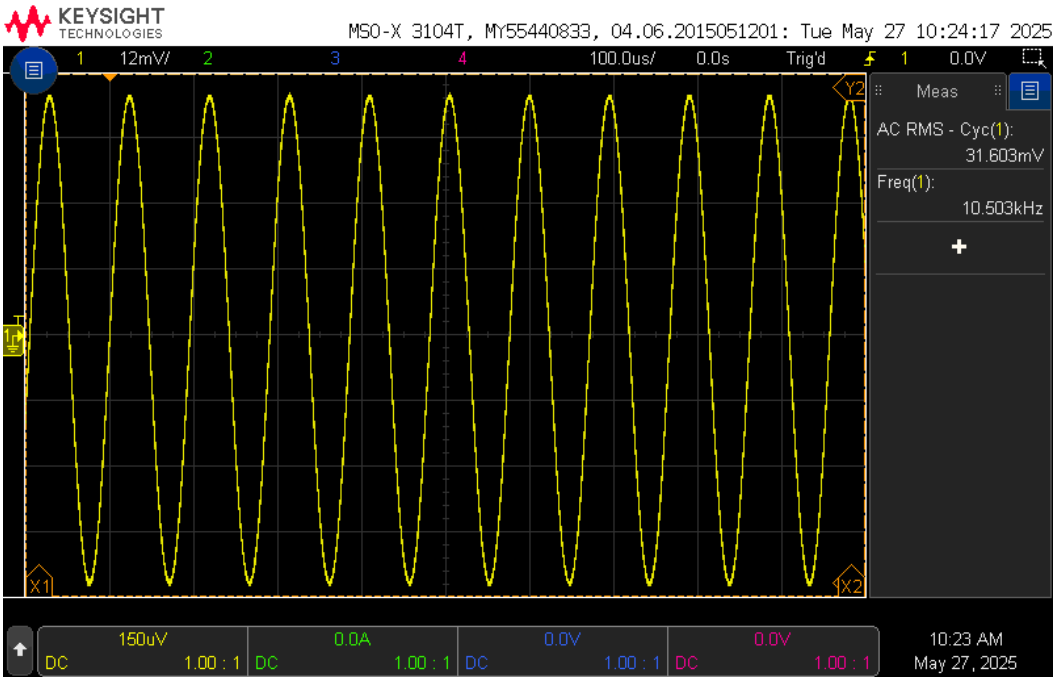


Figure 2.1-1 – 10.5 kHz Impedance Verification – High Impedance – LISN 1 (DC+)

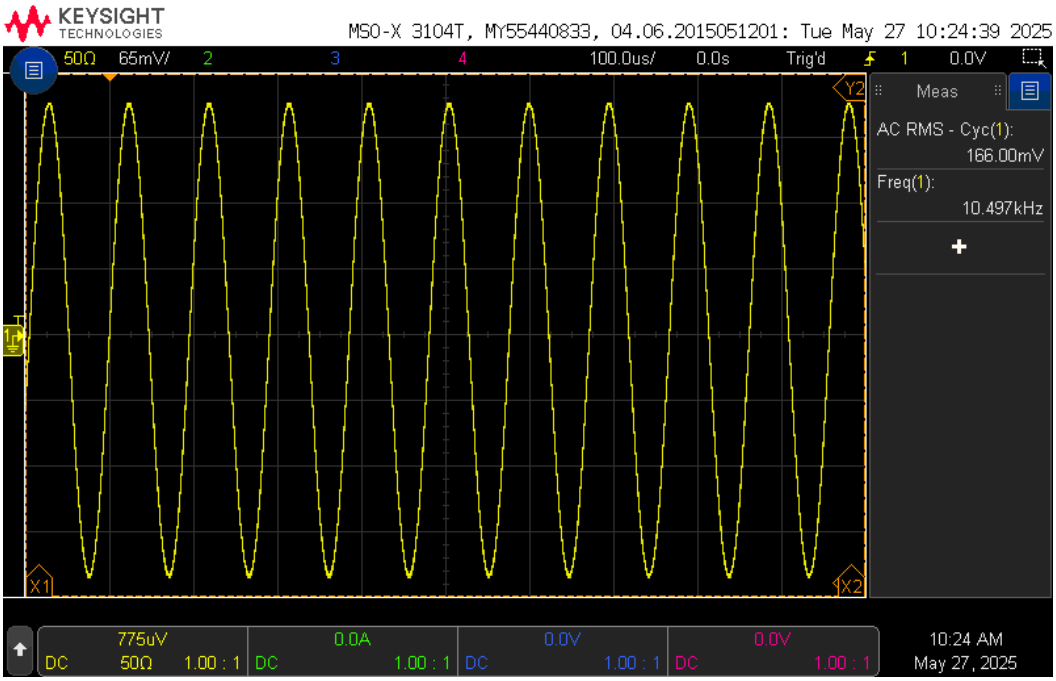


Figure 2.1-2 – 10.5 kHz Impedance Verification – 50Ω Impedance – LISN 1 (DC+)

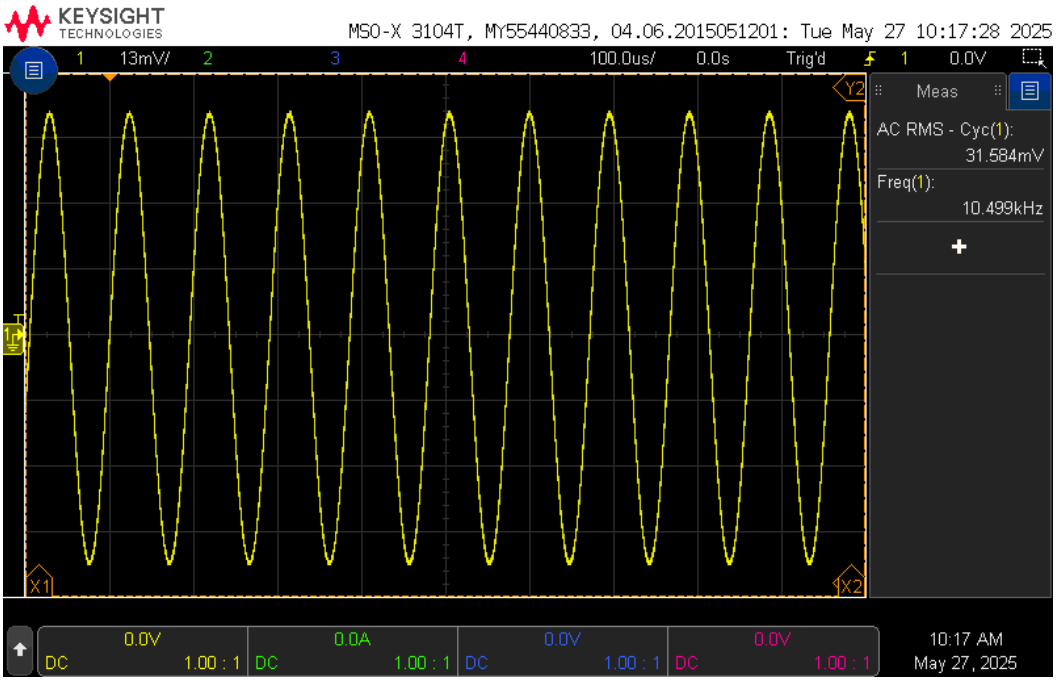


Figure 2.1-3 – 10.5 kHz Impedance Verification – High Impedance – LISN 2 (DC-)

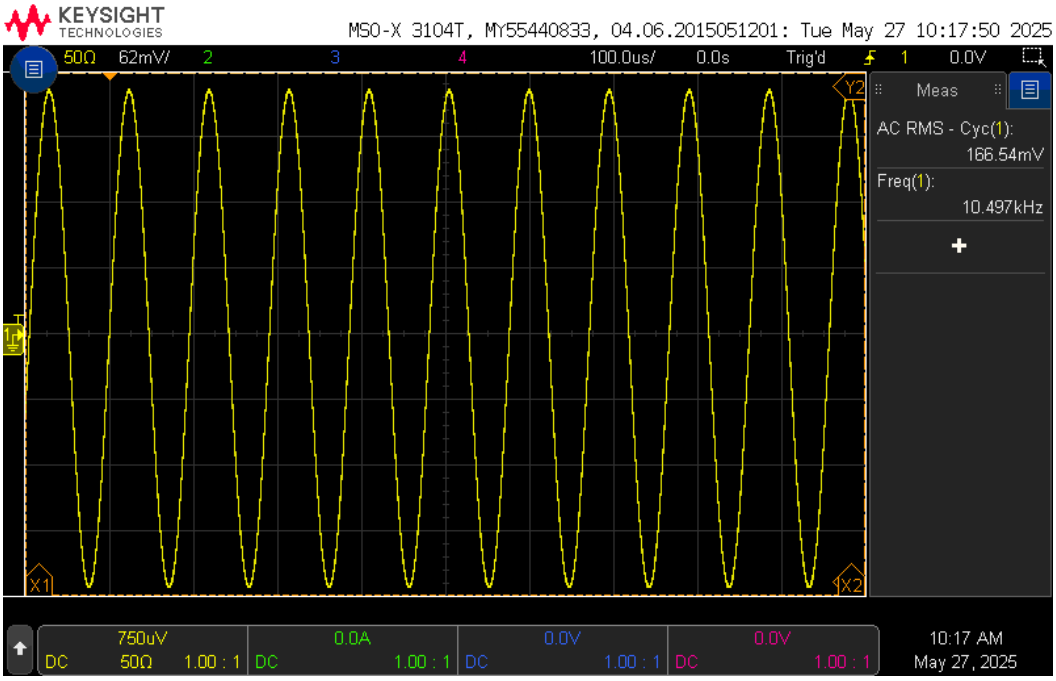


Figure 2.1-4 – 10.5 kHz Impedance Verification – 50Ω Impedance – LISN 2 (DC-)

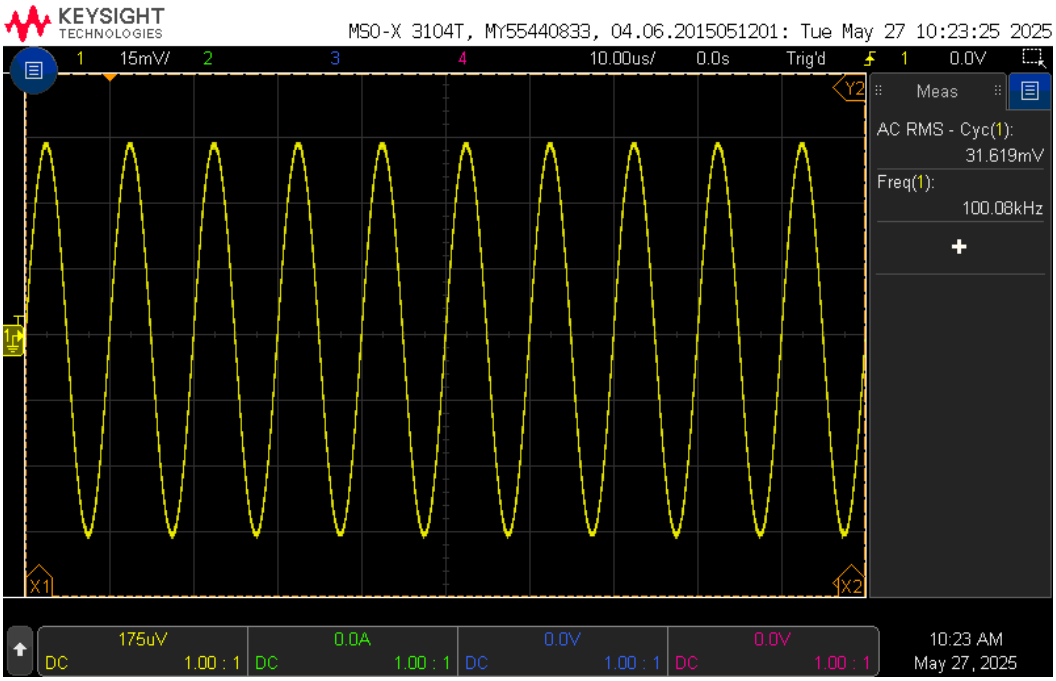


Figure 2.1-5 – 100 kHz Impedance Verification – High Impedance – LISN 1 (DC+)

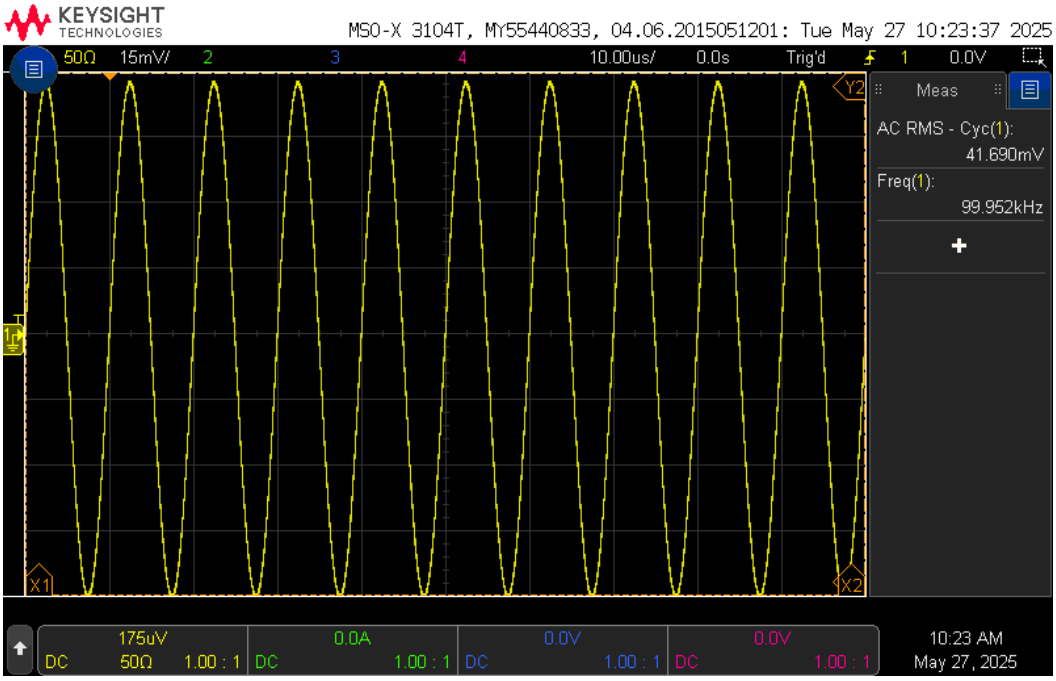


Figure 2.1-6 – 100 kHz Impedance Verification – 50Ω Impedance – LISN 1 (DC+)

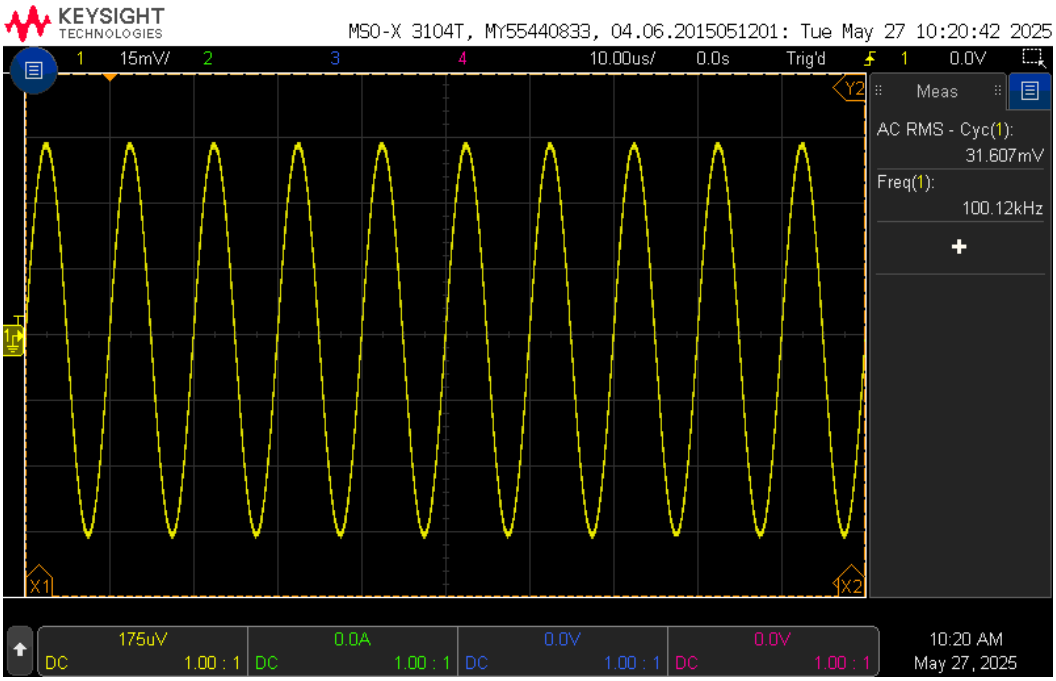


Figure 2.1-7 – 100 kHz Impedance Verification – High Impedance – LISN 2 (DC-)

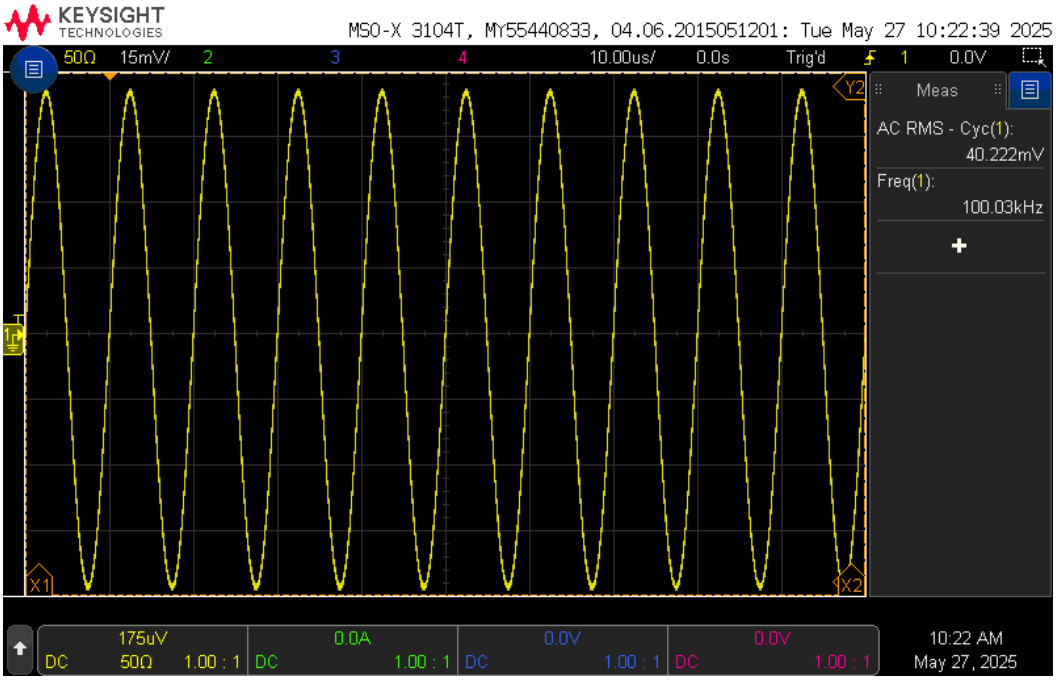
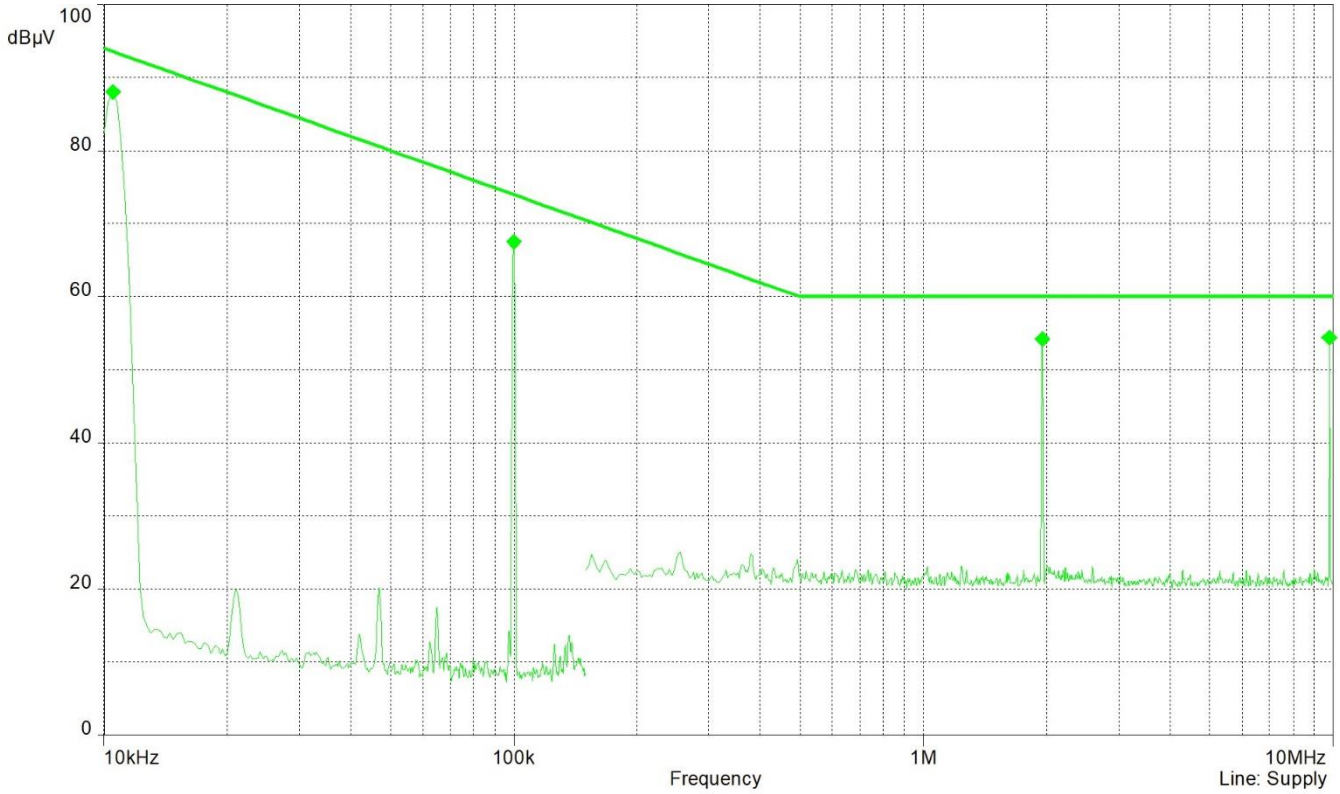


Figure 2.1-8 – 100 kHz Impedance Verification – 50Ω Impedance – LISN 2 (DC-)

2.1.11 CE102 Data Plots

CE102 – System Verification – LISN 1 (DC+)

Frequency Range	Line Tested	RBW	Sweep Time
10kHz- 50kHz	DC High	1kHz	1000 ms
50kHz- 150kHz	DC High	1kHz	1000 ms
150kHz- 5MHz	DC High	10kHz	1000 ms
5MHz- 10MHz	DC High	10kHz	1000 ms



Upper Green Trace – Test Limit (dBµV)
Lower Green Trace – Corrected Measurement Data (dBµV)
Green Diamonds – Peak (pass)

Limit:	Test Results:
CE102 - Basic Curve	Pass

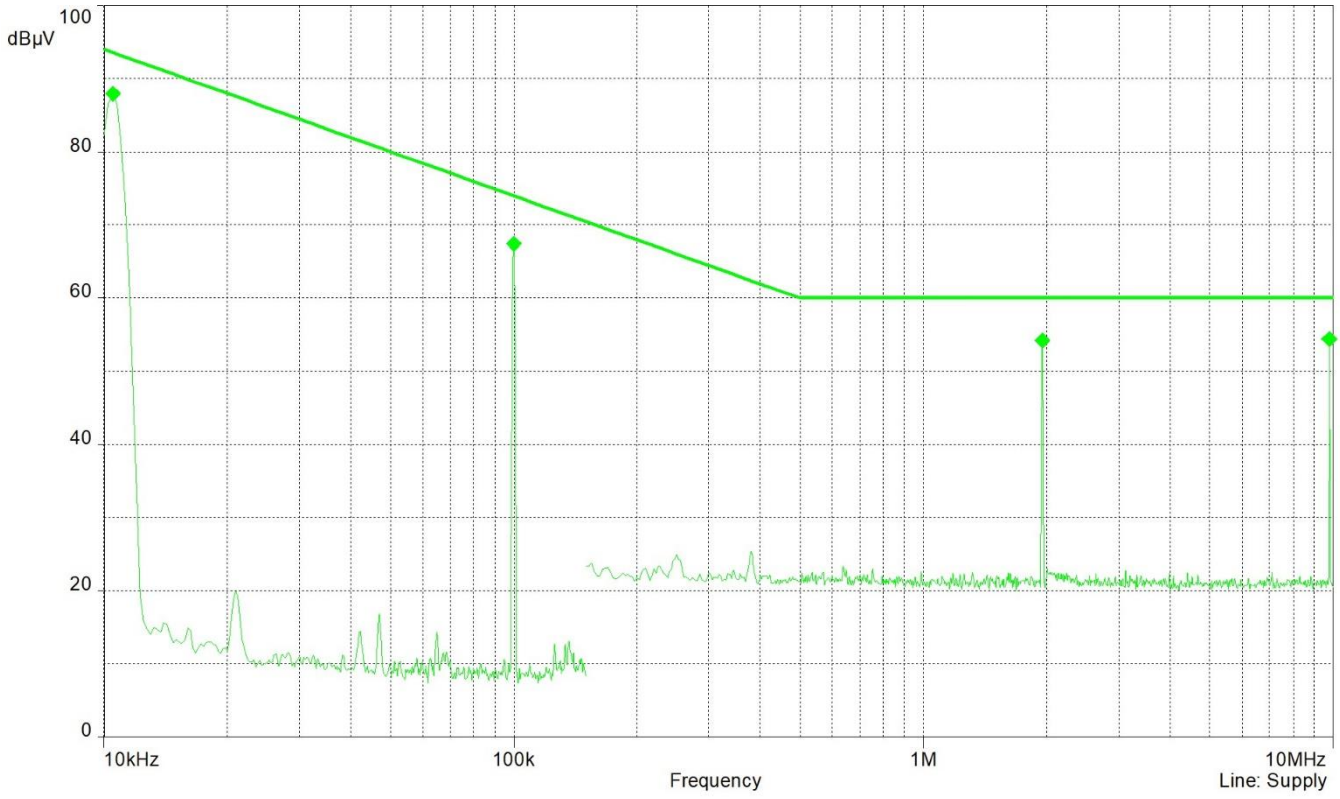
Figure 2.1-9 – CE102 – System Verification – LISN 1 (DC+)

Table 2.1-2 – CE102 – System Verification – LISN 1 (DC+)

Frequency	Peak (dBuV)	Peak Limit (dBuV)	Peak Margin (dB)	Results
10.5kHz	88.03	93.58	-5.55	Pass
100kHz	67.57	73.99	-6.42	Pass
1.95MHz	54.24	60.00	-5.76	Pass
9.8MHz	54.42	60.00	-5.58	Pass

CE102 – System Verification – LISN 2 (DC-)

Frequency Range	Line Tested	RBW	Sweep Time
10kHz- 50kHz	DC Return	1kHz	1000 ms
50kHz- 150kHz	DC Return	1kHz	1000 ms
150kHz- 5MHz	DC Return	10kHz	1000 ms
5MHz- 10MHz	DC Return	10kHz	1000 ms



Upper Green Trace – Test Limit (dBµV)
Lower Green Trace – Corrected Measurement Data (dBµV)
Green Diamonds – Peak (pass)

Limit:
CE102 - Basic Curve

Test Results:
Pass

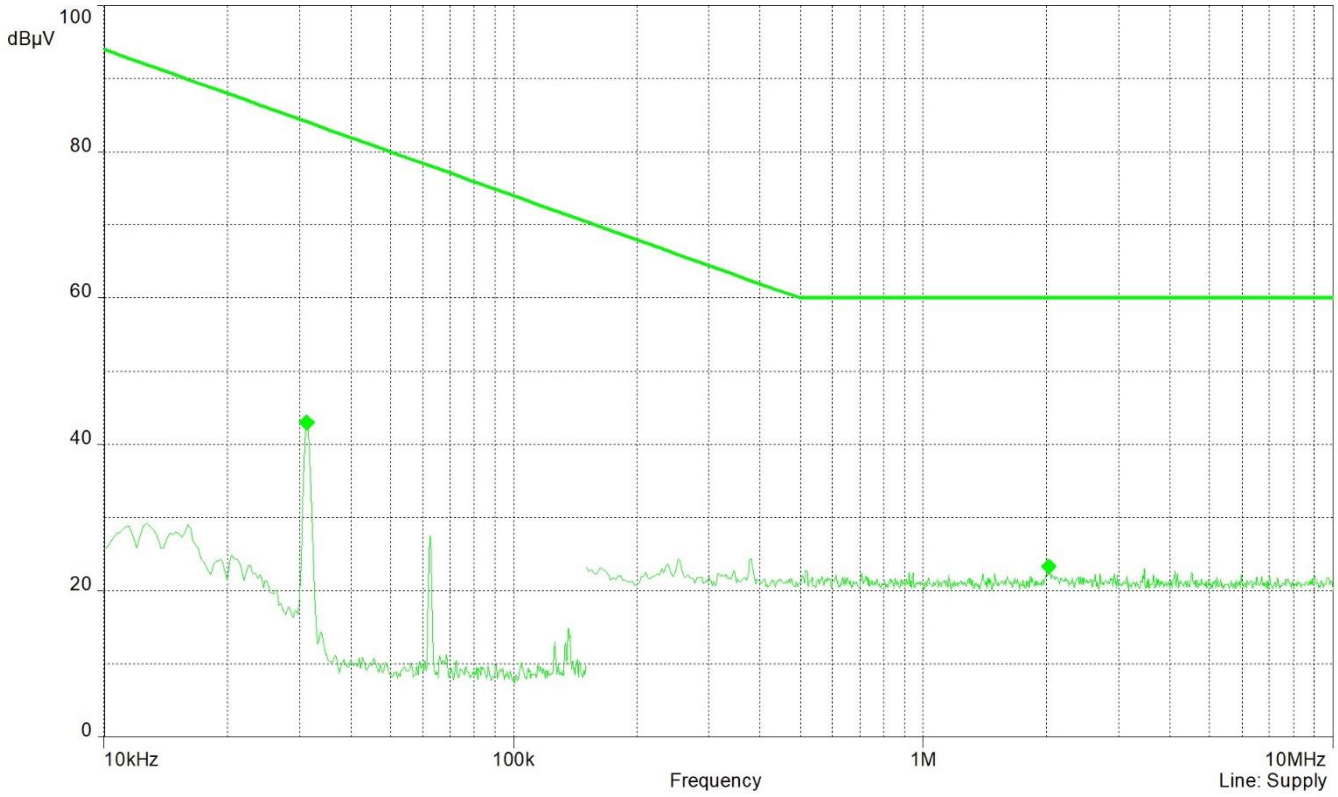
Figure 2.1-10 – CE102 – System Verification – LISN 2 (DC-)

Table 2.1-3 – CE102 – System Verification – LISN 2 (DC-)

Frequency	Peak (dBuV)	Peak Limit (dBuV)	Peak Margin (dB)	Results
10.5kHz	87.97	93.58	-5.60	Pass
100kHz	67.49	73.99	-6.50	Pass
1.95MHz	54.23	60.00	-5.77	Pass
9.8MHz	54.40	60.00	-5.60	Pass

CE102 – Ambient – LISN 1 (DC+)

Frequency Range	Line Tested	RBW	Sweep Time
10kHz- 150kHz	DC High	1kHz	1000 ms
150kHz- 10MHz	DC High	10kHz	1000 ms



Upper Green Trace – Test Limit (dBµV)
Lower Green Trace – Corrected Measurement Data (dBµV)
Green Diamonds – Peak (pass)

Limit:
CE102 - Basic Curve

Test Results:
Pass

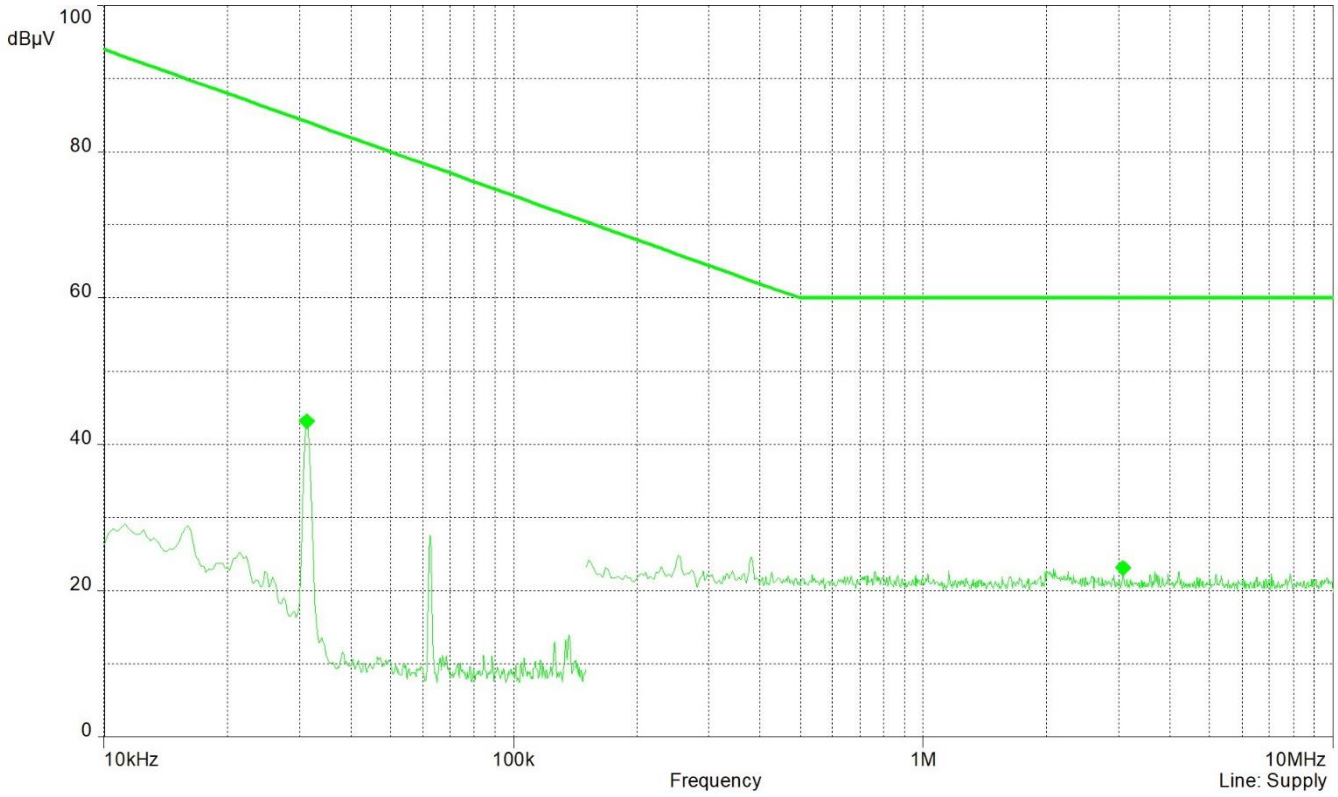
Figure 2.1-11 – CE102 – Ambient – LISN 1 (DC+)

Table 2.1-4 – CE102 – Ambient – LISN 1 (DC+)

Frequency	Peak (dBuV)	Peak Limit (dBuV)	Peak Margin (dB)	Results
31.25kHz	43.04	84.10	-41.05	Pass
2.025MHz	23.33	60.00	-36.67	Pass

CE102 – Ambient – LISN 2 (DC-)

Frequency Range	Line Tested	RBW	Sweep Time
10kHz- 150kHz	DC Return	1kHz	1000 ms
150kHz- 10MHz	DC Return	10kHz	1000 ms



Upper Green Trace – Test Limit (dBµV)
Lower Green Trace – Corrected Measurement Data (dBµV)
Green Diamonds – Peak (pass)

Limit:
CE102 - Basic Curve

Test Results:
Pass

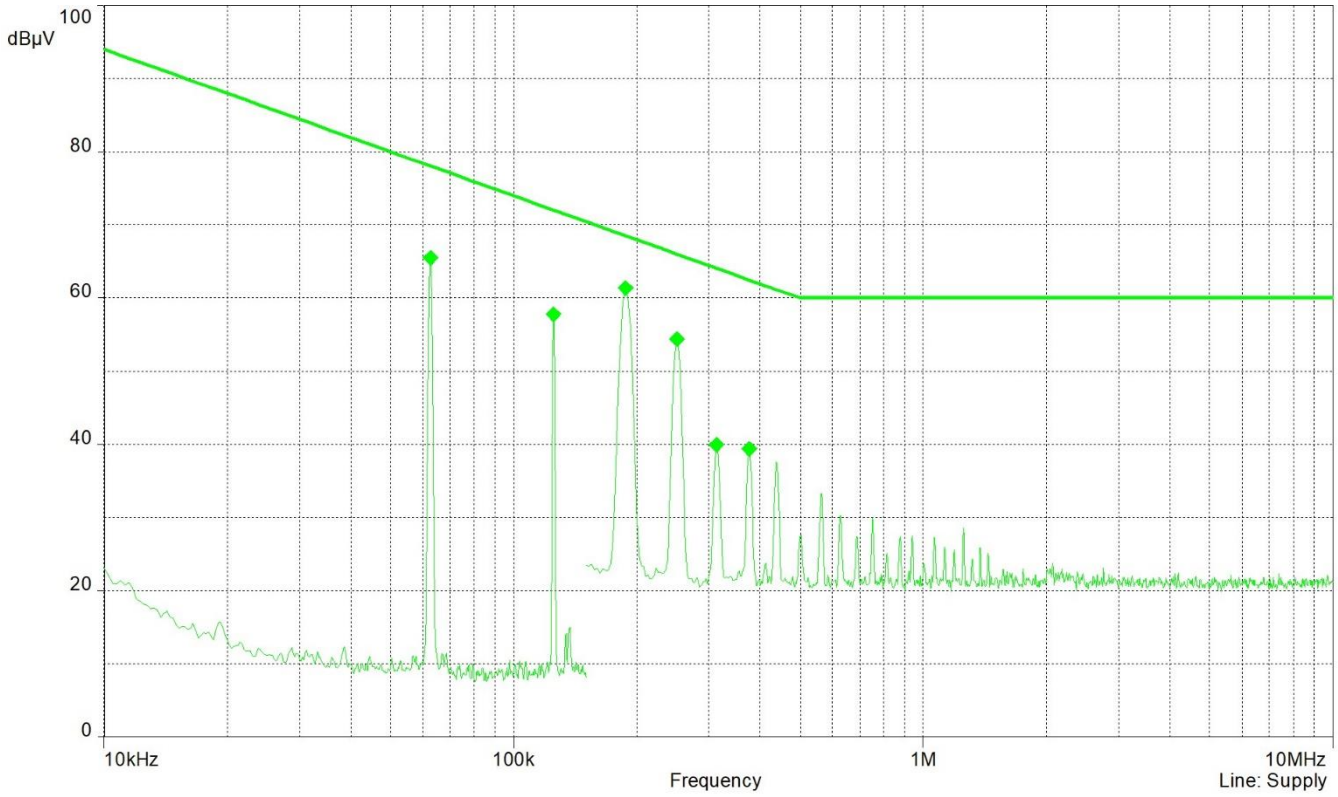
Figure 2.1-12 – CE102 – Ambient – LISN 2 (DC-)

Table 2.1-5 – CE102 – Ambient – LISN 2 (DC-)

Frequency	Peak (dBuV)	Peak Limit (dBuV)	Peak Margin (dB)	Results
31.25kHz	43.20	84.10	-40.90	Pass
3.075MHz	23.18	60.00	-36.82	Pass

CE102 – Operational – LISN 1 (DC+)

Frequency Range	Line Tested	RBW	Sweep Time
10kHz- 150kHz	DC High	1kHz	1000 ms
150kHz- 10MHz	DC High	10kHz	1000 ms



Upper Green Trace – Test Limit (dBµV)
Lower Green Trace – Corrected Measurement Data (dBµV)
Green Diamonds – Peak (pass)

Limit:
CE102 - Basic Curve

Test Results:
Pass

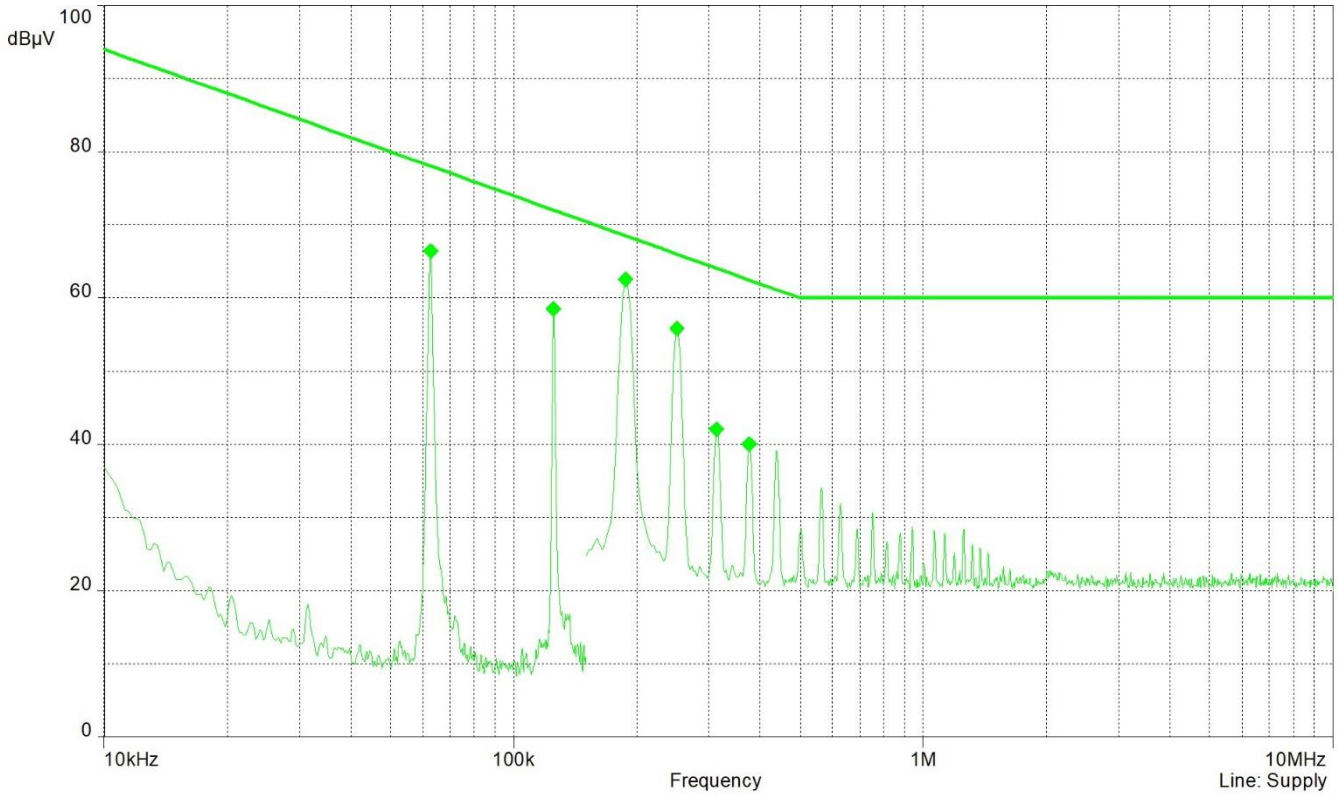
Figure 2.1-13 – CE102 – Operational – LISN 1 (DC+)

Table 2.1-6 – CE102 – Operational – LISN 1 (DC+)

Frequency	Peak (dBuV)	Peak Limit (dBuV)	Peak Margin (dB)	Results
62.75kHz	65.51	78.04	-12.53	Pass
125.25kHz	57.84	72.03	-14.19	Pass
187.5kHz	61.36	68.52	-7.16	Pass
250kHz	54.42	66.02	-11.61	Pass
312.5kHz	39.95	64.08	-24.14	Pass
375kHz	39.43	62.50	-23.07	Pass

CE102 – Operational – LISN 2 (DC-)

Frequency Range	Line Tested	RBW	Sweep Time
10kHz- 150kHz	DC Return	1kHz	1000 ms
150kHz- 10MHz	DC Return	10kHz	1000 ms



Upper Green Trace – Test Limit (dBµV)
Lower Green Trace – Corrected Measurement Data (dBµV)
Green Diamonds – Peak (pass)

Limit:
CE102 - Basic Curve

Test Results:
Pass

Figure 2.1-14 – CE102 – Operational – LISN 2 (DC-)

Table 2.1-7 – CE102 – Operational – LISN 2 (DC-)

Frequency	Peak (dBuV)	Peak Limit (dBuV)	Peak Margin (dB)	Results
62.75kHz	66.42	78.04	-11.62	Pass
125.25kHz	58.59	72.03	-13.44	Pass
187.5kHz	62.58	68.52	-5.95	Pass
250kHz	55.92	66.02	-10.10	Pass
312.5kHz	42.13	64.08	-21.96	Pass
375kHz	40.09	62.50	-22.41	Pass

2.1.12 CE102 Test Setup Photos

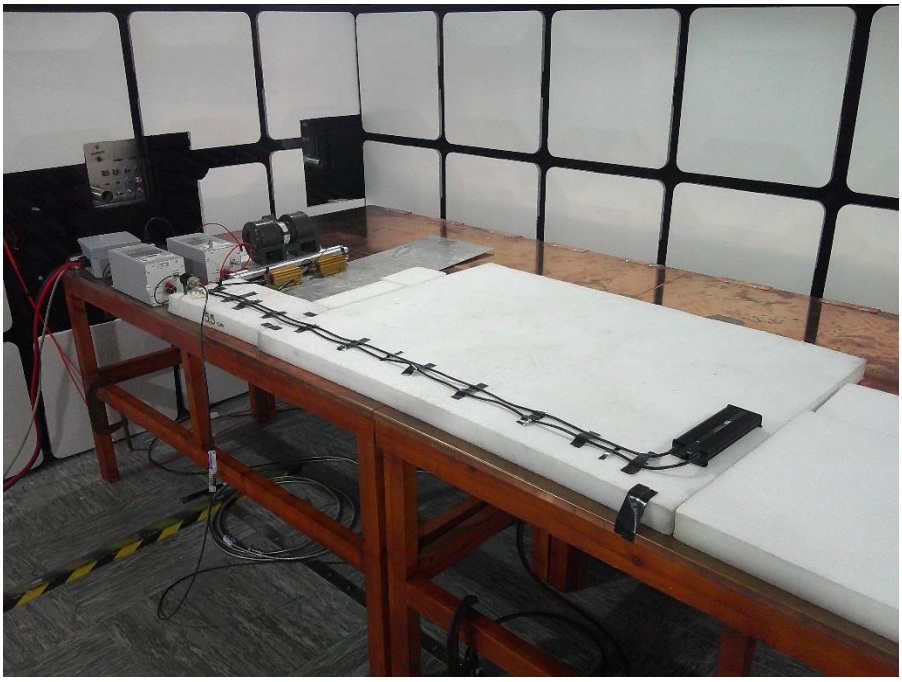


Photo 2.1-1 – CE102 General Setup

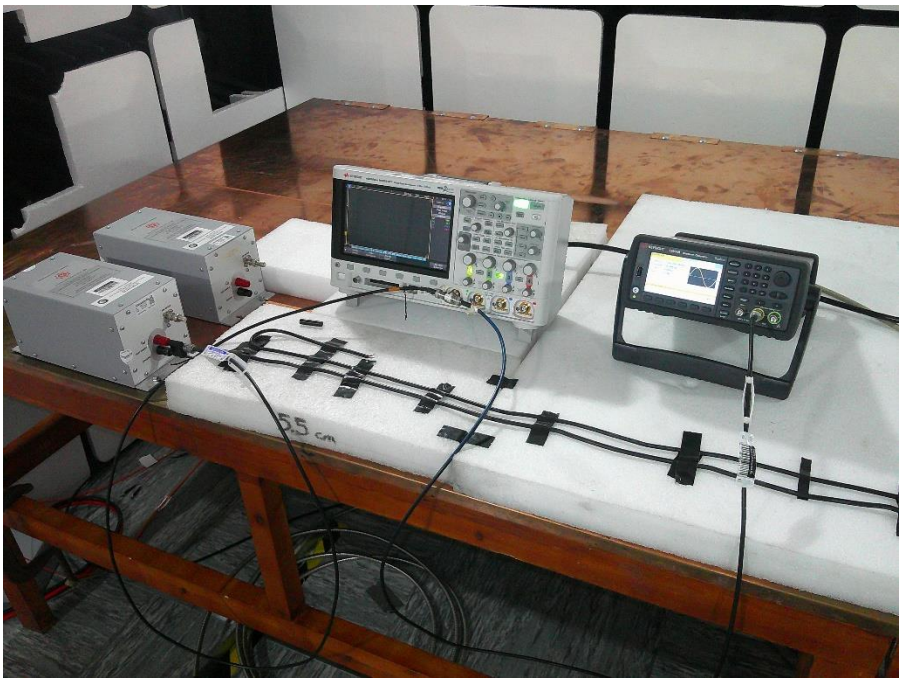


Photo 2.1-2 – CE102 LISN Verification Setup

Photo 2.1-3 – CE102 System Check Setup

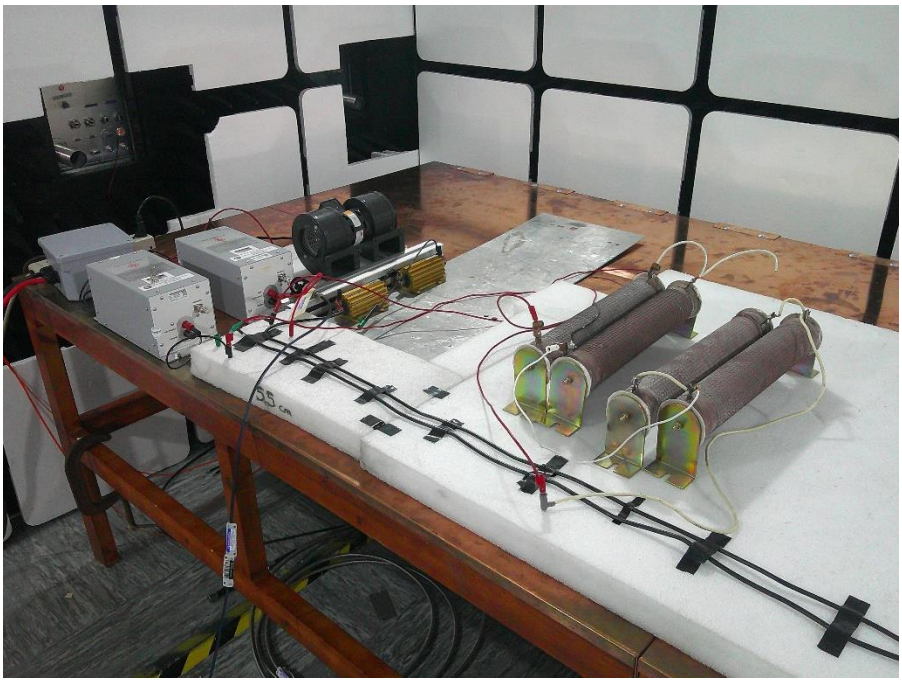


Photo 2.1-4 – CE102 Ambient Setup

Photo 2.1-5 – CE102 Test Setup – LISN 1 (DC+)

Photo 2.1-6 – CE102 Test Setup – LISN 2 (DC-)

2.1.13 Test Location and Test Equipment Used

The tests were carried out in New Brighton, MN using equipment listed below.
Test Area: SAC3

Table 2.1-8 – CE102 Equipment List

Device #	Manufacturer	Description	Model	Serial #	Cal Code	Cal Date	Cal Due
NBLE02652	Rohde & Schwarz	Signal Generator, 9 KHz-2.08 GHz	SMY02	DE11277	G	07/31/2024	07/31/2025
NBLE02786	Keithley	Micro-Ohmmeter	580	635342	G	07/31/2024	07/31/2025
NBLE03489	Xantrex	Power Supply, DC 40V 150A	XDC40-150	E000084327	Y	n/a	n/a
NBLE10466	Weinschel	Attenuator, 20 dB	34-20-34	BR2651	B	03/24/2025	03/24/2026
NBLE11428	Keysight Technologies	Oscilloscope, 4-CH	MSO-X 3104T	MY55440833	G	01/15/2025	01/15/2026
NBLE11731	Solar	LISN, 50 uH	8028-50-BP-25-BNC	221792-1A	G	02/13/2025	02/13/2027
NBLE11735	Solar	LISN, 50 uH	8028-50-BP-25-BNC	221799-1B	G	03/17/2025	03/17/2027
NBLE11754	Rohde & Schwarz	Receiver, 1 Hz-44 GHz	ESW44	103037	G	10/01/2024	10/01/2025
NBLE11959	Keysight	Waveform Generator	33600A	MY590005253	G	02/11/2025	02/11/2026

Cal Code G = Calibration performed by an accredited outside source.
Cal Code B = Calibration verification performed internally.
Cal Code Y = Passive Device, or Calibration not required when used with other calibrated equipment.

2.2 RE102 – Radiated Emissions Electrical Field

2.2.1 Specification Reference

MIL-STD-461G Section 5.18

2.2.2 Equipment Under Test and Modification State

As shown in §1.4 with modification state “0”, as noted in §1.6.

2.2.3 Test Voltage

28 VDC

2.2.4 Date of Test

29 May 2025 & 3-4 June 2025

2.2.5 Test Method

The EUT was set up in a semi-anechoic chamber and laid on a non-conductive support 5cm above a copper ground plane table with a height of 90cm (±10cm). The EUT was placed 10cm from the front edge of the ground plane while the stretched-out cable bundle was 10cm from the front edge. Each measurement antenna had a height of 30cm above the ground plane table and a measurement distance of 1m from the front edge of the routed cabling.

The EUT emission profile was made using a spectrum analyzer that utilized a peak detector for the required frequency ranges. The peak data collected was compared to the applicable test limits via software to determine pass or fail conditions. The test measurements were made in both horizontal and vertical antenna orientation for all frequencies above 30 MHz.

2.2.6 Environmental Conditions

The EUT was evaluated within the temperature and humidity range of the EUT as specified by the manufacturer. When the manufacturer does not specify climatic parameters for the EUT, all tests are performed within the ambient temperature range of 20°C to 40°C and humidity range of 30% to 80%.

2.2.7 Additional Observations

The frequency range investigated was 2 MHz to 18 GHz.

Measurements were made using BAT-EMC (2024.0.9.5) automated software. Reported level is the actual level with all the correction factors factored in. Correction Factor column is for informational purposes only.

2.2.8 Sample Computation (Radiated Emissions)

Measuring equipment raw measurement (dBµV/m) @ 30 MHz			20.0
Correction Factor (dB/m)	Cable 2	0.24	18.94
	TEMC00011 (antenna)	18.70	
Reported Peak Final Measurement (dBµV/m) @ 30 MHz			38.94

2.2.9 Test Results

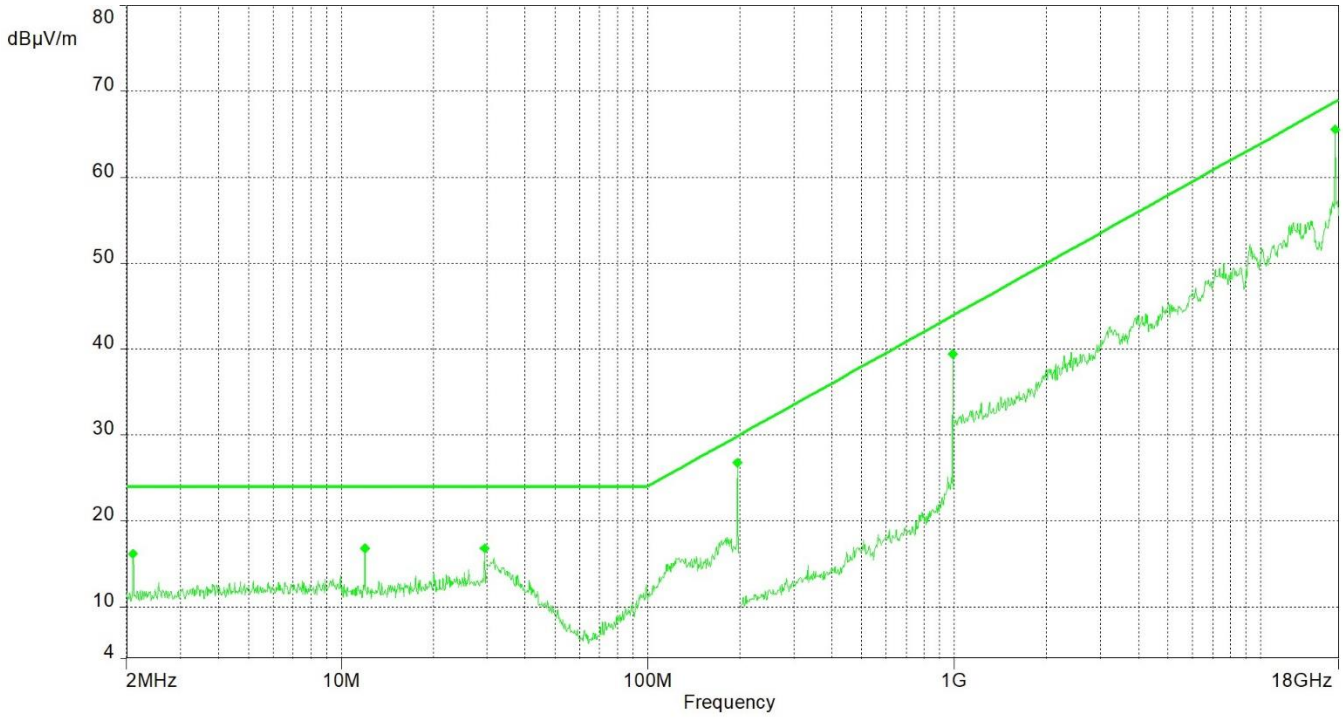
Test Summary: EUT recorded emissions were below the required limit.

Test Result: Pass

See data below for detailed results.

2 MHz-18 GHz – System Verification

Frequency Range	Antenna Distance	Antenna Height	Antenna Polarization	RBW	Step Size	Sweep Time
2MHz- 10MHz	1m	1.2m	N/A	10kHz	2.5kHz	1000 ms
10MHz- 20MHz	1m	1.2m	N/A	10kHz	2.5kHz	150 ms
20MHz- 30MHz	1m	1.2m	N/A	10kHz	2.5kHz	150 ms
30MHz- 200MHz	1m	1.2m	N/A	100kHz	25kHz	150 ms
200MHz- 1GHz	1m	1.2m	N/A	100kHz	25kHz	150 ms
1GHz- 18GHz	1m	1.2m	N/A	1MHz	250kHz	15 ms



Upper Green Trace – Test Limit (dBµV/m)
Lower Green Trace – Corrected Measurement Data (dBµV/m)
Green Diamonds – Peak (pass)
Green X's – Peak (fail)

Limit:	EUT Orientation:	Test Results:
RE102-4 - lower limit - limit for ground applications	N/A	Pass

Figure 2.2-1 – RE102 – System Verification

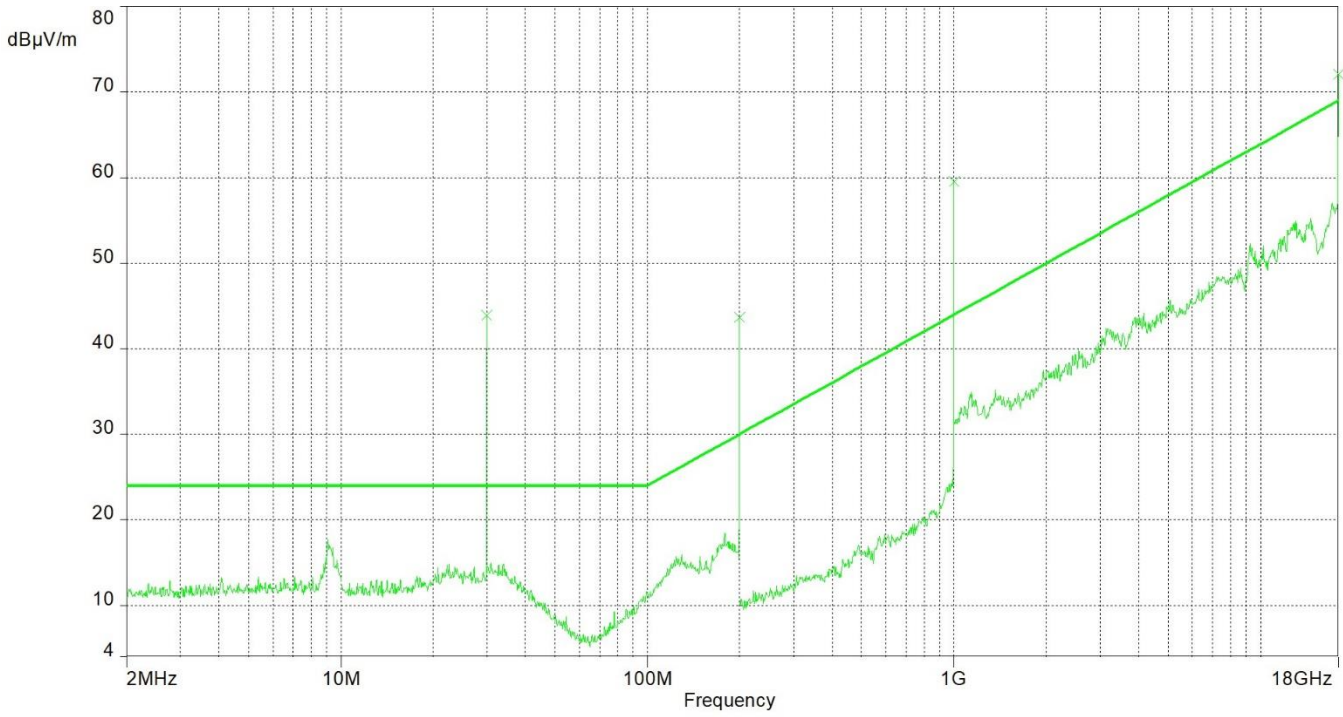
Table 2.2-1 – RE102 – System Verification

Frequency	Peak (dBuV/m)	Peak Limit (dBuV/m)	Peak Margin (dB)*	Results
2.1MHz	16.14	24.00	-7.86	Pass
12MHz	16.83	24.00	-7.17	Pass
29.5MHz	16.84	24.00	-7.16	Pass
197MHz	26.76	29.88	-3.12	Pass
990MHz	39.38	43.87	-4.48	Pass
17.5GHz	65.56	68.76	-3.20	Pass

*Requirement is -6 dB ±3 dB

2 MHz-18 GHz – Antenna Continuity Check

Frequency Range	Antenna Distance	Antenna Height	Antenna Polarization	RBW	Step Size	Sweep Time
2MHz- 10MHz	1m	1.2m	Vertical	10kHz	2.5kHz	1000 ms
10MHz- 30MHz	1m	1.2m	Vertical	10kHz	2.5kHz	150 ms
30MHz- 200MHz	1m	1.2m	Vertical	100kHz	25kHz	150 ms
200MHz- 1GHz	1m	1.2m	Vertical	100kHz	25kHz	150 ms
1GHz- 18GHz	1m	1.2m	Vertical	1MHz	250kHz	15 ms



Upper Green Trace – Test Limit (dBµV/m)
Lower Green Trace – Corrected Measurement Data (dBµV/m)
Green Diamonds – Peak (pass)
Green X's – Peak (fail)

Limit:	EUT Orientation:	Test Results:
RE102-4 - lower limit - limit for ground applications	N/A	N/A

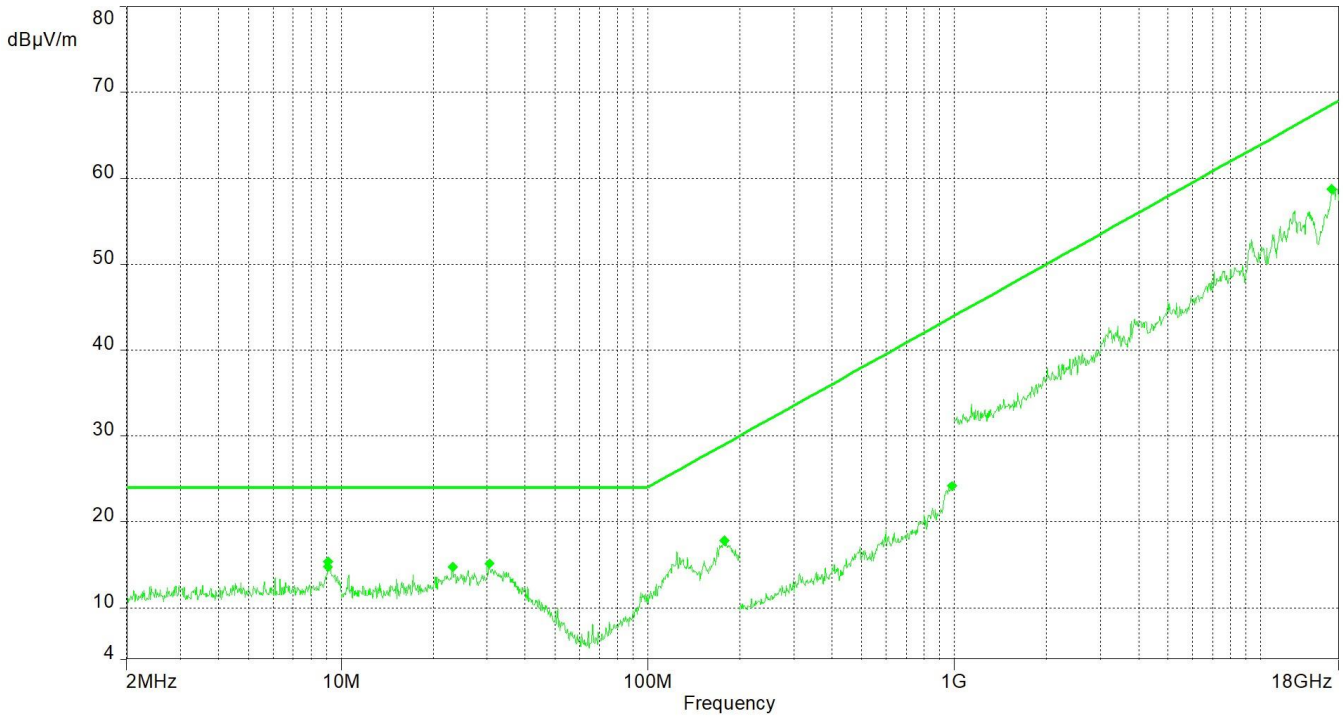
Figure 2.2-2 – RE102 – Antenna Continuity Check

Table 2.2-2 – RE102 –Antenna Continuity Check

Frequency	Peak (dBuV/m)	Peak Limit (dBuV/m)	Peak Margin (dB)	Results
30MHz	43.86	24.00	19.86	N/A
200MHz	43.67	30.01	13.67	N/A
1GHz	59.48	43.95	15.52	N/A
18GHz	72.06	69.00	3.06	N/A

2 MHz-18 GHz – Vertical – Ambient

Frequency Range	Antenna Distance	Antenna Height	Antenna Polarization	RBW	Step Size	Sweep Time
2MHz- 10MHz	1m	1.2m	Vertical	10kHz	2.5kHz	1000 ms
10MHz- 30MHz	1m	1.2m	Vertical	10kHz	2.5kHz	150 ms
30MHz- 200MHz	1m	1.2m	Vertical	100kHz	25kHz	150 ms
200MHz- 1GHz	1m	1.2m	Vertical	100kHz	25kHz	150 ms
1GHz- 18GHz	1m	1.2m	Vertical	1MHz	250kHz	15 ms



Upper Green Trace – Test Limit (dBµV/m)
Lower Green Trace – Corrected Measurement Data (dBµV/m)
Green Diamonds – Peak (pass)
Green X's – Peak (fail)

Limit:	EUT Orientation:	Test Results:
RE102-4 - lower limit - limit for ground applications	N/A	Pass

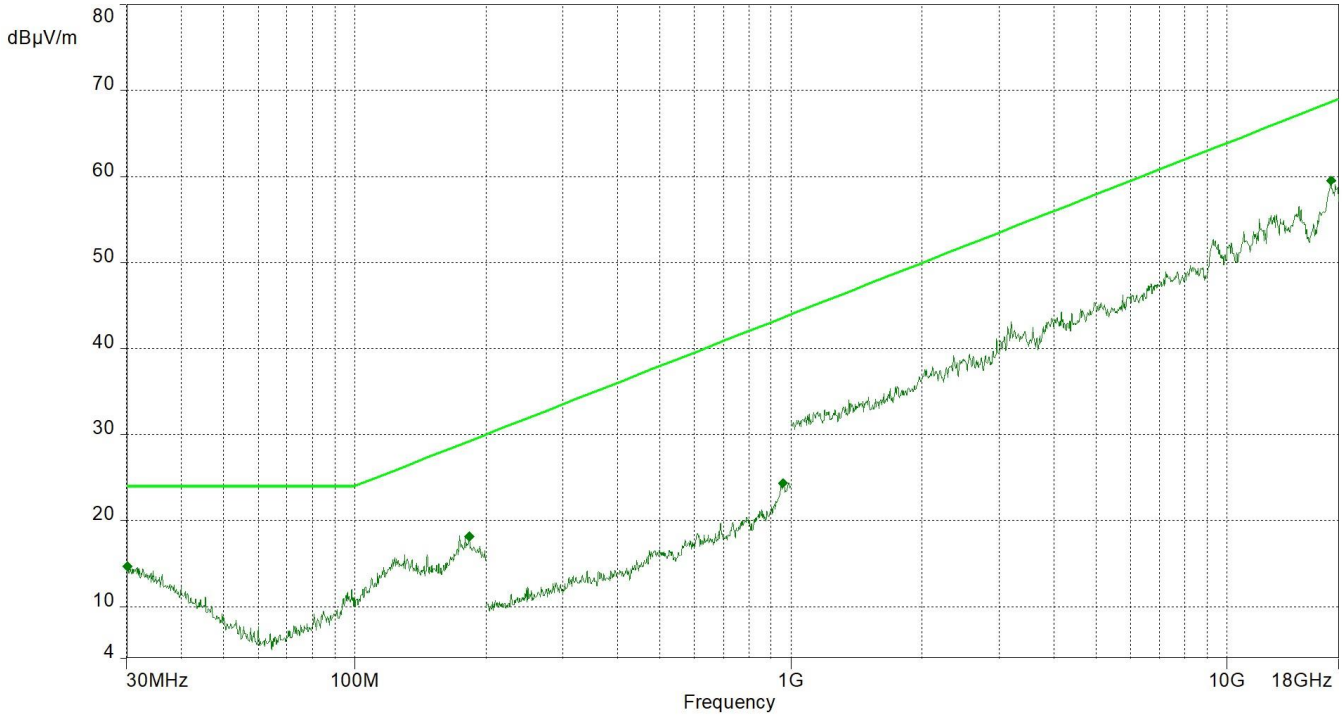
Figure 2.2-3 – RE102 – Vertical – Ambient

Table 2.2-3 – RE102 – Vertical – Ambient

Frequency	Peak (dBuV/m)	Peak Limit (dBuV/m)	Peak Margin (dB)	Results
9.09MHz	14.76	24.00	-9.24	Pass
9.0925MHz	15.35	24.00	-8.65	Pass
23.1475MHz	14.78	24.00	-9.22	Pass
23.15MHz	14.78	24.00	-9.22	Pass
30.575MHz	15.12	24.00	-8.88	Pass
177.775MHz	17.86	28.99	-11.13	Pass
984.775MHz	24.20	43.82	-19.62	Pass
17.1305GHz	58.74	68.57	-9.83	Pass

30 MHz-18 GHz – Horizontal – Ambient

Frequency Range	Antenna Distance	Antenna Height	Antenna Polarization	RBW	Step Size	Sweep Time
30MHz- 200MHz	1m	1.2m	Horizontal	100kHz	25kHz	150 ms
200MHz- 1GHz	1m	1.2m	Horizontal	100kHz	25kHz	150 ms
1GHz- 18GHz	1m	1.2m	Horizontal	1MHz	250kHz	15 ms



Upper Green Trace – Test Limit (dBµV/m)
Lower Green Trace – Corrected Measurement Data (dBµV/m)
Green Diamonds – Peak (pass)
Green X's – Peak (fail)

Limit:	EUT Orientation:	Test Results:
RE102-4 - lower limit - limit for ground applications	N/A	Pass

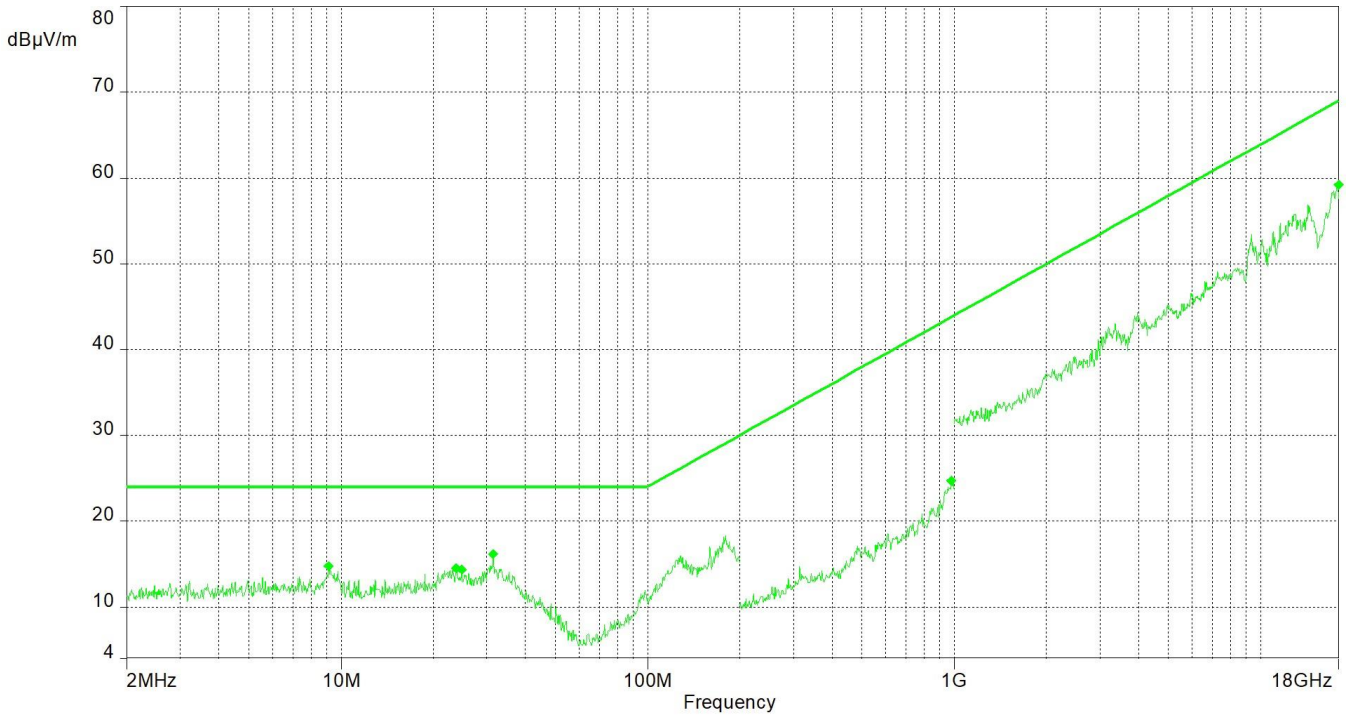
Figure 2.2-4 – RE102 – Horizontal – Ambient

Table 2.2-4 – RE102 – Horizontal – Ambient

Frequency	Peak (dBuV/m)	Peak Limit (dBuV/m)	Peak Margin (dB)	Results
30.1MHz	14.70	24.00	-9.30	Pass
182.925MHz	18.16	29.23	-11.07	Pass
955.85MHz	24.31	43.56	-19.26	Pass
17.265GHz	59.48	68.64	-9.16	Pass

2 MHz-18 GHz – Vertical – Operational

Frequency Range	Antenna Distance	Antenna Height	Antenna Polarization	RBW	Step Size	Sweep Time
2MHz- 10MHz	1m	1.2m	Vertical	10kHz	2.5kHz	1000 ms
10MHz- 30MHz	1m	1.2m	Vertical	10kHz	2.5kHz	150 ms
30MHz- 200MHz	1m	1.2m	Vertical	100kHz	25kHz	150 ms
200MHz- 1GHz	1m	1.2m	Vertical	100kHz	25kHz	150 ms
1GHz- 18GHz	1m	1.2m	Vertical	1MHz	250kHz	15 ms



Upper Green Trace – Test Limit (dBµV/m)
Lower Green Trace – Corrected Measurement Data (dBµV/m)
Green Diamonds – Peak (pass)
Green X's – Peak (fail)

Limit:	EUT Orientation:	Test Results:
RE102-4 - lower limit - limit for ground applications	Front	Pass

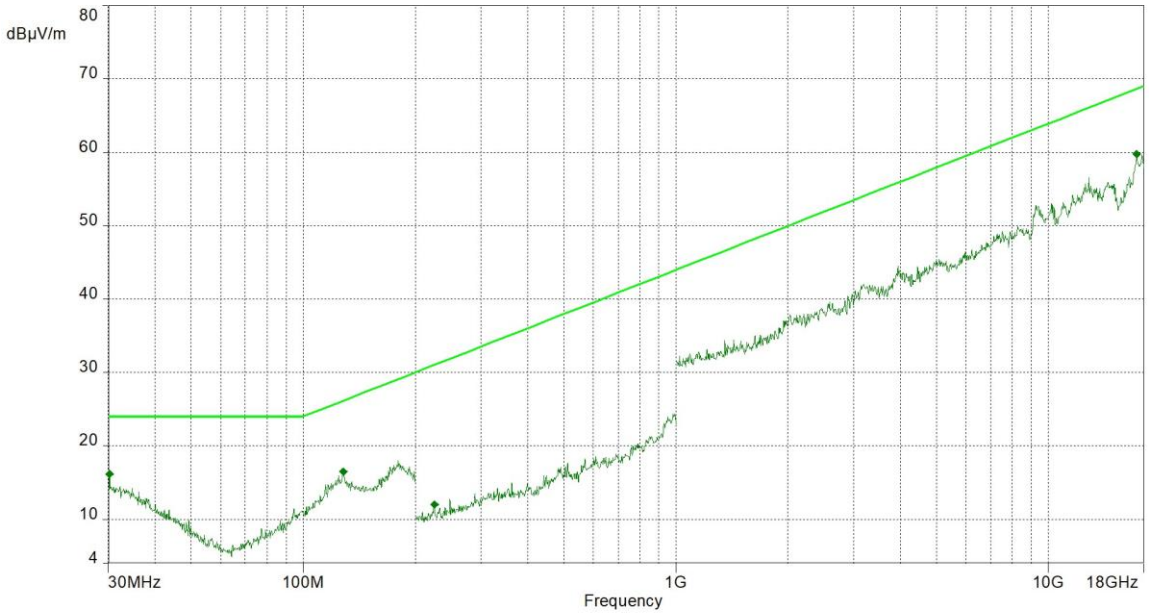
Figure 2.2-5 – RE102 – Vertical – Operational

Table 2.2-5 – RE102 – Vertical – Operational

Frequency	Peak (dBuV/m)	Peak Limit (dBuV/m)	Peak Margin (dB)	Results
9.1125MHz	14.80	24.00	-9.20	Pass
9.115MHz	14.80	24.00	-9.20	Pass
23.7275MHz	14.52	24.00	-9.48	Pass
24.845MHz	14.39	24.00	-9.61	Pass
31.4MHz	16.19	24.00	-7.81	Pass
981.475MHz	24.72	43.79	-19.07	Pass
17.96225GHz	59.24	68.98	-9.74	Pass

30 MHz-18 GHz – Horizontal – Operational

Frequency Range	Antenna Distance	Antenna Height	Antenna Polarization	RBW	Step Size	Sweep Time
30MHz- 200MHz	1m	1.2m	Horizontal	100kHz	25kHz	150 ms
200MHz- 1GHz	1m	1.2m	Horizontal	100kHz	25kHz	150 ms
1GHz- 18GHz	1m	1.2m	Horizontal	1MHz	250kHz	15 ms



Upper Green Trace – Test Limit (dBµV/m)
Lower Green Trace – Corrected Measurement Data (dBµV/m)
Green Diamonds – Peak (pass)
Green X's – Peak (fail)

Limit:	EUT Orientation:	Test Results:
RE102-4 - lower limit - limit for ground applications	Front	Pass

Figure 2.2-6 – RE102 – Horizontal – Operational

Table 2.2-6 – RE102 – Horizontal – Operational

Frequency	Peak (dBuV/m)	Peak Limit (dBuV/m)	Peak Margin (dB)	Results
30.225MHz	16.18	24.00	-7.82	Pass
128MHz	16.51	26.14	-9.63	Pass
224.6MHz	11.99	31.01	-19.02	Pass
17.23625GHz	59.77	68.62	-8.85	Pass

2.2.10 RE102 Test Setup Photos

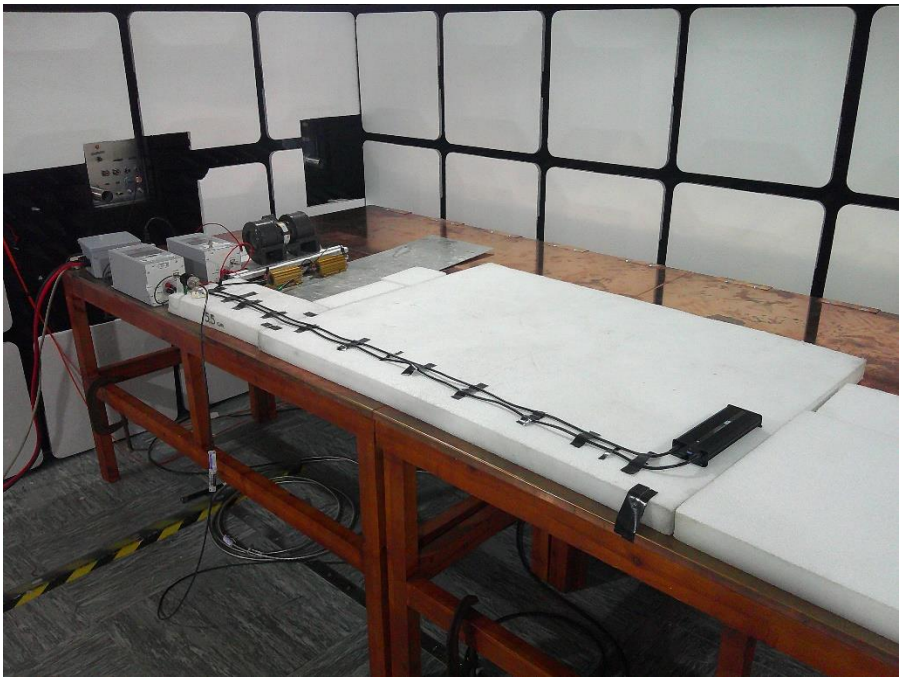


Photo 2.2-1 – RE102 General Setup

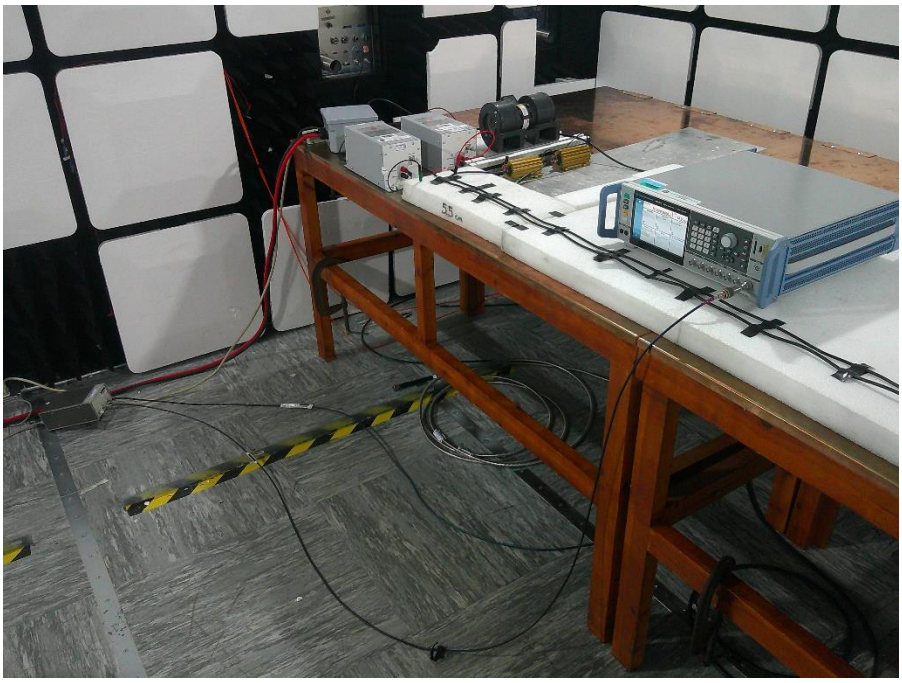


Photo 2.2-2 – RE102 System Verification Setup

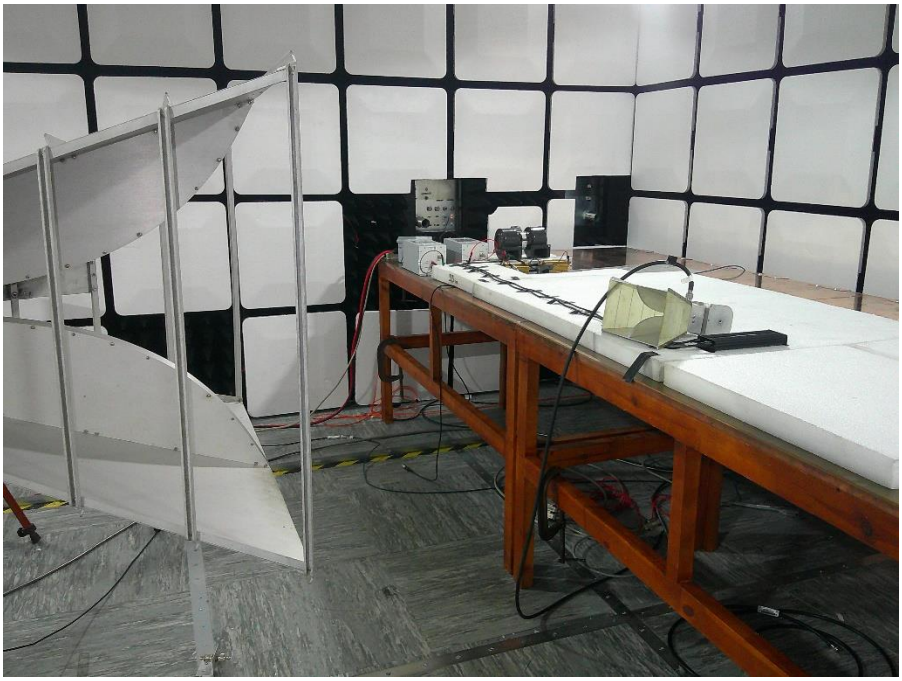


Photo 2.2-3 – RE102 Antenna Continuity Check Setup

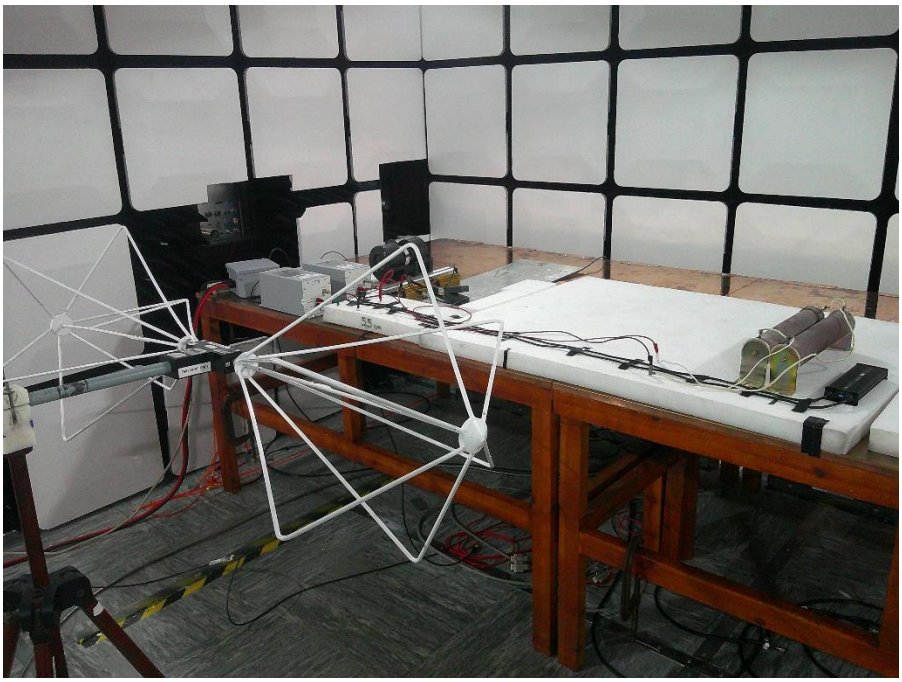


Photo 2.2-4 – RE102 Ambient Setup

Photo 2.2-5 – RE102 Test Setup – 2 – 30 MHz (representative, ambient load not present during test)

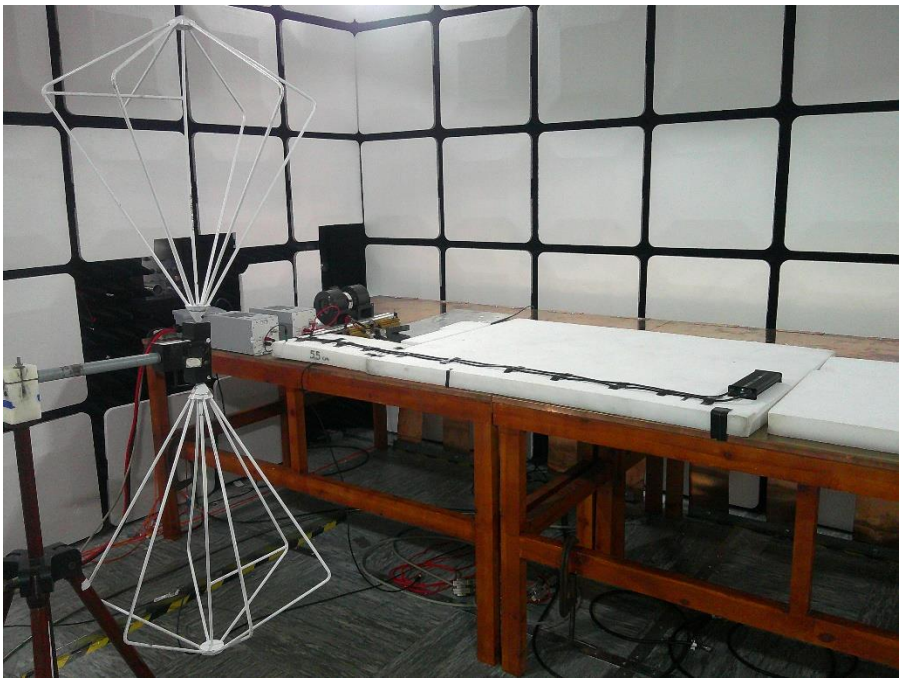


Photo 2.2-6 – RE102 Test Setup – 30 – 200 MHz

Photo 2.2-7 – RE102 Test Setup – 200 MHz – 1 GHz

Photo 2.2-8 – RE102 Test Setup – 1 - 18 GHz

2.2.11 Test Location and Test Equipment Used

The tests were carried out in New Brighton, MN using equipment listed below.
Test Area: SAC3

Table 2.2-7 – RE102 Equipment List

Device #	Manufacturer	Description	Model	Serial #	Cal Code	Cal Date	Cal Due
NBLE02355	Tensor	Antenna, 200 MHz-2 GHz	4106	2014	G	08/28/2024	08/28/2026
NBLE02786	Keithley	Micro-Ohmmeter	580	635342	G	07/31/2024	07/31/2025
NBLE03346	Electro-metrics	Antenna, Bicon 20-300 MHz	6912	635	G	06/12/2023	06/12/2025
NBLE10305	AH Systems	Antenna, DRG 1-18 GHz	SAS-200/571	371	G	03/18/2025	03/18/2027
NBLE10985	Agilent Technologies	Preamplifier, 0.1-1300 MHz	8447D	2443A04180	B	01/13/2025	01/13/2026
NBLE11500	Ametek CTS Europe GmbH	Power Supply	XHR33-33	1725A02285	Y	N/A	N/A
WRLE11519	Com-Power Corp.	Preamplifier, 500 MHz-18 GHz	PAM-118A	18040002	B	01/23/2025	01/23/2026
NBLE11731	Solar	LISN, 50 uH	8028-50-BP-25-BNC	221792-1A	G	02/13/2025	02/13/2027
NBLE11735	Solar	LISN, 50 uH	8028-50-BP-25-BNC	221799-1B	G	03/17/2025	03/17/2027
NBLE11754	Rohde & Schwarz	Receiver, 1 Hz-44 GHz	ESW44	103037	G	10/01/2024	10/01/2025
NBLE11814	Rohde & Schwarz	Signal Generator, 8 kHz-50 GHz	SMA100B	107016	G	09/27/2024	09/27/2025
NBLE11887	Schwarzbeck	Antenna, Active Rod, 9 kHz-30 MHz	VAMP 9243 B	01602	B	05/29/2025	05/31/2027

Cal Code G = Calibration performed by an accredited outside source.
Cal Code B = Calibration verification performed internally.
Cal Code Y = Passive Device, or Calibration not required when used with other calibrated equipment.

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The data and results referenced in this document are accurate. The reader is cautioned that there is some measurement variability due to the tolerances of the test equipment that can contribute to a nominal product measurement uncertainty. Furthermore, component differences and manufacturing process variability of production units similar to that tested may result in additional product uncertainty. If necessary, refer to the test lab for the actual measurement uncertainty for specific tests.

STATEMENT OF MEASUREMENT UNCERTAINTY – Emissions

The test system for conducted emissions is defined as the LISN, tuned receiver or spectrum analyzer, and coaxial cable. This test system has a measurement uncertainty of ±3.30 dB. The test system for radiated emissions is defined as the antenna, the pre-amplifier, the spectrum analyzer, and the coaxial cable. This test system for 30-1000 MHz has a measurement uncertainty of ±5.88 dB and above 1 GHz a measurement uncertainty of ±4.47 dB. The measurement uncertainty values for conducted and radiated emissions meet the requirements as expressed in CISPR 16-4-2. The equipment comprising the test systems is calibrated on an annual basis.

TEST EQUIPMENT
All measurement instrumentation is traceable to the National Institute of Standards and Technology and is calibrated to meet test method standard requirements and/or manufacturer's specifications.