



Test Report – FCC Part 15B Unintentional Radiator

Applicant: Lautech Systems Ltd.

Approved for Release By:

Signature: Bruno Clavier

Name & Title: Bruno Clavier, General Manager

Date of Signature 10/20/2022

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(352) 472-5500 / testing@timcoengr.com

1. Customer Information

Applicant: Lautech Systems Ltd.
Address: 56 Packspur Drive
Flat Bush, Auckland, 2016, New Zealand

1.1 Test Result Summary

The following test procedure was used ANSI C63.4-2014. Full test results are available in this report.

No additions to the test methods were needed. There were no deviations, or exclusions from the test methods. No test results are from external providers or from the customer. The test results relate only to the items tested. Timco does not offer opinions and interpretations, only a pass/fail statement.

Clauses	Description of the Requirements	Result (Pass, Fail or N/A)
Applicable Clauses from FCC 15 B		
15.107	Conducted Emission Limits	Pass
15.109	Radiated Emission Limits	Pass



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2. Location of Testing

2.1 Test Laboratory

Timco Engineering Inc. is a subsidiary of Industrial Inspection & Analysis, Inc. ("IIA"). Testing was performed at Timco's permanent laboratory located at 849 NW State Road 45, Newberry, Florida 32669

FCC test firm # 578780

FCC Designation # US1070

FCC site registration is under A2LA certificate # 0955.01

ISED Canada test site registration # 2056A

EU Notified Body # 1177

For all designations see A2LA scope # 0955.01

2.2 Testing was performed, reviewed by

Dates of Testing: 10/4/2022

Signature:

Sr. EMC Engineer
EMC-003838-NE



Name & Title:

Tim Royer, EMC Engineer

Date of Signature

10/20/2022

Signature:

Name & Title:

Kristoffer Costa, EMC Technician

Date of Signature

10/20/2022



3. Test Sample(s) (EUT/DUT)

The test sample was received: 10/3/2022

3.1 Description of the EUT

A description as well as unambiguous identification of the EUT(s) tested. Where more than one sample is required for technical reasons (such as the use of connected units for the purpose of conducted output power testing where the product units will have integral antennas), each specific test shall identify which unit was tested.

Identification	
FCC ID:	2A8UWRTLSDR
Brief Description	SDR Radio Receiver
Model(s) #	N/A
Firmware version	N/A
Software version	N/A
Serial Number	N/A

Technical Characteristics	
Technology	SDR Radio Receiver
Frequency	30 MHz- 960 MHz
Antenna Connector	SMA
Voltage Rating (AC or Batt.)	3VDC



3.2 Configuration of EUT

Band (MHz)	Mode	Number of Ant.
30 MHz- 960 MHz	Receive	1

Operating conditions during Testing:

No modifications of the device under test (including firmware, specific software settings, and input/output signal levels to the EUT). The EUT was configured as a Computer Peripheral.

Peripherals used during Testing:

A laptop was used to program the EUT.

3.3 Test Setup of EUT

Equipment, antenna, and cable arrangement. The setup of the equipment and cable or wire placement on the test site that produces the highest radiated and the highest ac power-line conducted emissions shall be shown clearly and described. Information on the orientation of portable equipment during testing shall be included. Drawings or photographs may be used for this purpose.

Test Setups are included in the test report.



4. Test methods & Applicable Regulatory Limits

4.1 Test methods/Standards/Guidance

The measurement was performed as per ANSI 63.4. Full test results are available in this report.

Limits and Regulatory Limits:

- 1) FCC 15B

5. Measurement Uncertainty

Parameter	Uncertainty (dB)
Conducted Emissions	± 3.14 dB
Radiated Emissions (9kHz – 30 MHz)	± 3.08 dB
Radiated Emissions (30 – 200 MHz)	± 2.16 dB
Radiated Emissions (200 – 1000 MHz)	± 2.15 dB
Radiated Emissions (1 GHz – 18 GHz)	± 2.14 dB
Radiated Emissions (18 GHz – 40 GHz)	± 2.31 dB
Note: The uncertainties provided in this table represent an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of K=2.	

6. Environmental Conditions

Temperature & Humidity

Measurements performed at the test site did not exceed the following:

Parameter	Measurement
Temperature	23 C +/- 5%
Humidity	55% +/- 5%
Barometric Pressure	30.05 in Hg
Note: Specific environmental conditions that are applicable to a specific test are available in the test result section.	



7. List of Test Equipment and Test Facility

The test equipment used identified by type, manufacturer, serial number, or other identification and the date on which the next calibration or service check is due.

Description of the firmware or software used to operate EUT for testing purposes.

A complete list of all test equipment used shall be included with the test report. The manufacturer's model and serial numbers, and date of last calibration, and calibration interval shall be included. Measurement cable loss, measuring instrument bandwidth and detector function, video bandwidth, if appropriate, and antenna factors shall also be included where applicable.

List of Test Equipment

Test Equipment						
Type	Device	Manufacturer	Model	SN#	Current Cal	Cal Due
Antenna	Biconical 1057	Eaton	94455-1	1057	10/16/20	10/16/2023
Antenna, NSA	Log-Periodic 1243	Eaton	96005	1243	5/4/21	5/3/2024
Antenna	Double-Ridged Horn/ETS Horn 1	ETS-Lindgren	3117	00035923	2/25/20	2/24/2023
CHAMBER	CHAMBER	Panashield	3M	N/A	3/12/19	12/21/2023
Pre-amp	Pre-amp	RF-LAMBDA	RLNA00M45GA	NA	2/27/19	7/26/2025
Receiver	EMI Test Receiver R&S ESW44	Rohde & Schwarz	ESW44	103049	10/13/21	10/12/2024
LISN	LISN (Primary)	Electro-Metrics	ANS-25/2	225363	9/16/20	9/16/2023



8. Test Results

The results of the test are usually indicated in the form of tables, spectrum analyzer plots, charts, sample calculations, as appropriate for each test procedure.

A description and/or a block diagram of the test setup is usually provided.

The measurement results, along with the appropriate limits for comparison, may be presented in tabular or graphical form. In addition, any variation in the measurement environment may be reported if applicable (e.g., a significant change of temperature that could affect the cable loss and amplifier response).

Units of measurement

Unless noted otherwise in the referenced standard, the measurements of ac power-line conducted emissions and conducted power output will be reported in units of dB μ V. Unless noted otherwise in the referenced standard, the measurements of radiated emissions will be reported in units of decibels, referenced to one microvolt per meter (dB μ V/m) for electric fields, or to one ampere per meter (dBA/m) for magnetic fields, at the distance specified in the appropriate standards or requirements. The measurements of antenna-conducted power for receivers may be reported in units of dB μ V if the impedance of the measuring instrument is also reported. Otherwise, antenna-conducted power will be reported in units of decibels referenced to one milliwatt (dBm). All formulas for data conversions and conversion factors, if used, will be included in this measurement report.

Example:

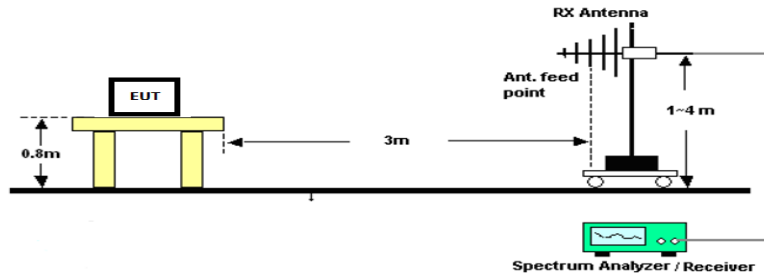
Freq (MHz)	Meter Reading	+ ACF	+CL	= FS
33	20 dB μ V	+ 10.36 dB/m	+0.40 dB	=30.36 dB μ V/m @ 3m

$$\text{EIRP} = \text{Pcond (dBm)} + \text{dBi}$$

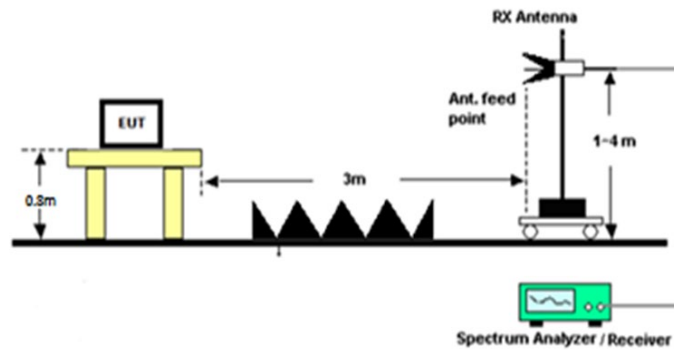
8.1 Radiated Emissions

Limits from FCC 15.109 and test procedure from ANSI C63.4-2014.

Radiated Test Setup, 30 – 1000 MHz

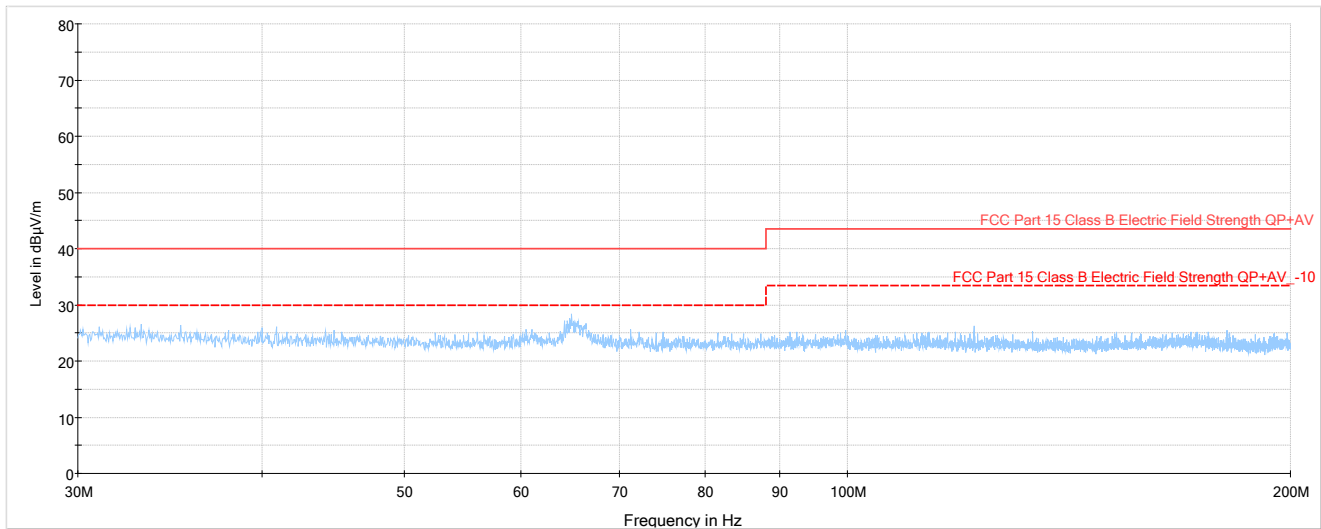


Radiated Test Setup, Above 1000 MHz



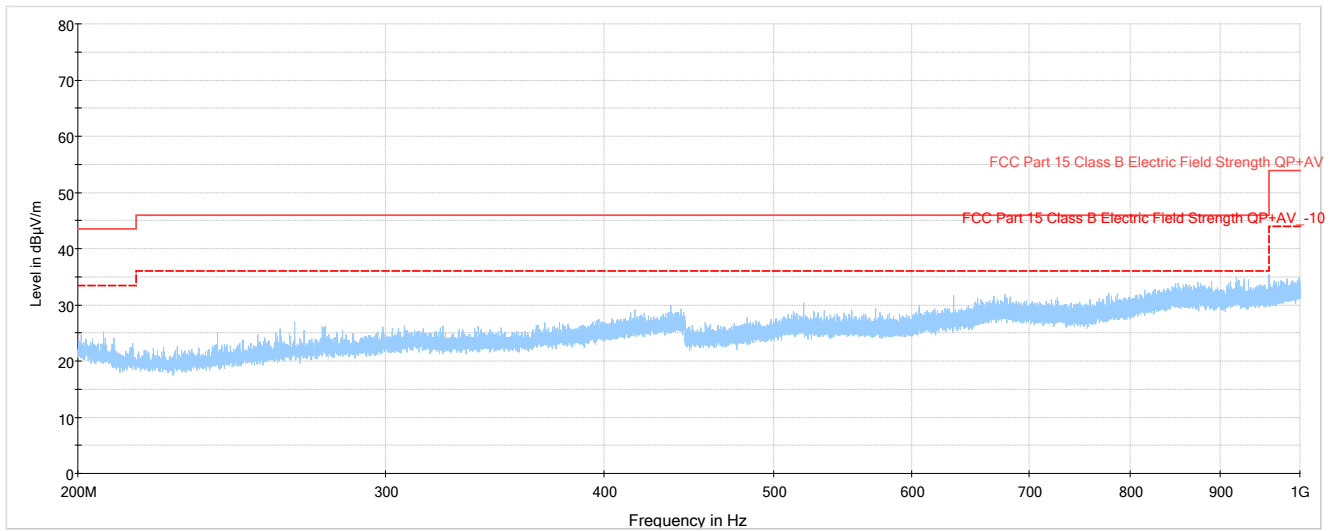


8.1.1 30 MHz to 200 MHz, Horizontal/ Vertical Polarity Plot





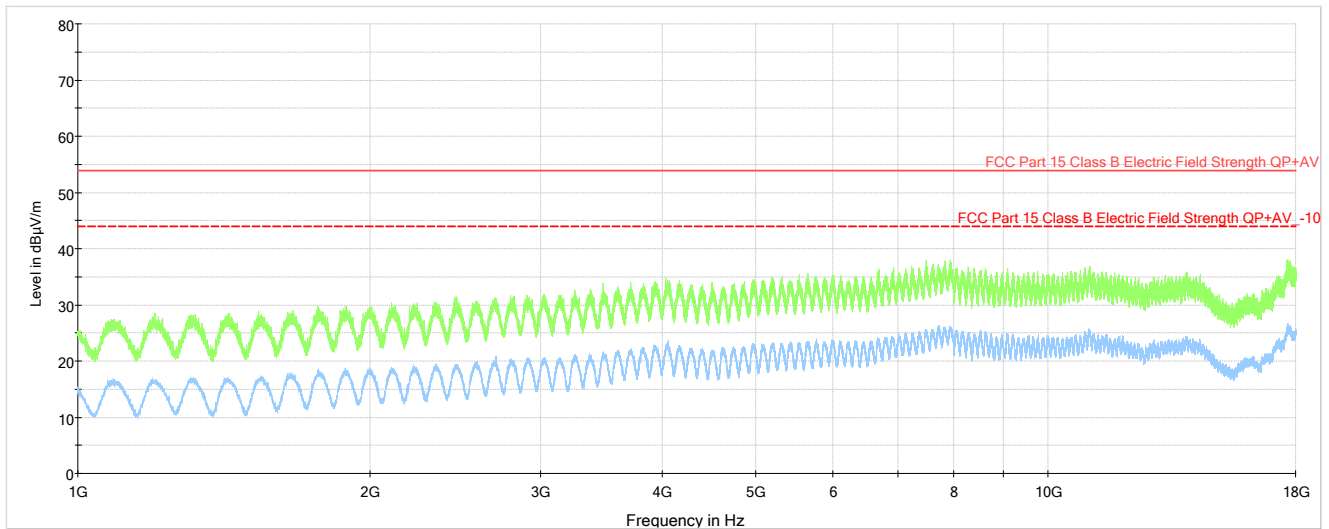
8.1.2 200 MHz to 1000 MHz, Horizontal/ Vertical Polarity Plot





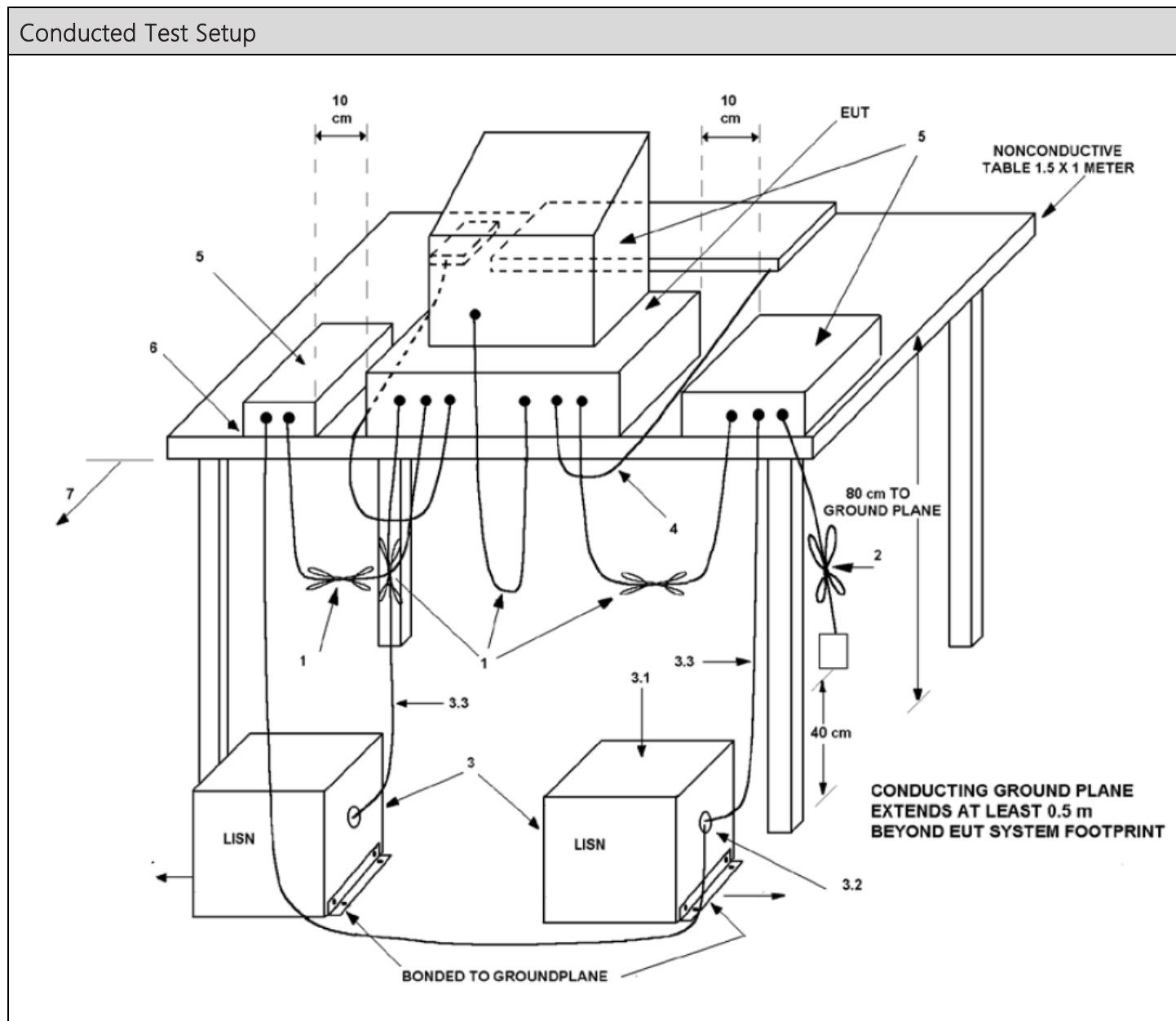
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8.1.3 Above 1000 MHz, Horizontal/ Vertical Polarity Plot



8.2 Conducted Emissions

Limits from FCC 15.107 and test procedure from ANSI C63.4-2014.





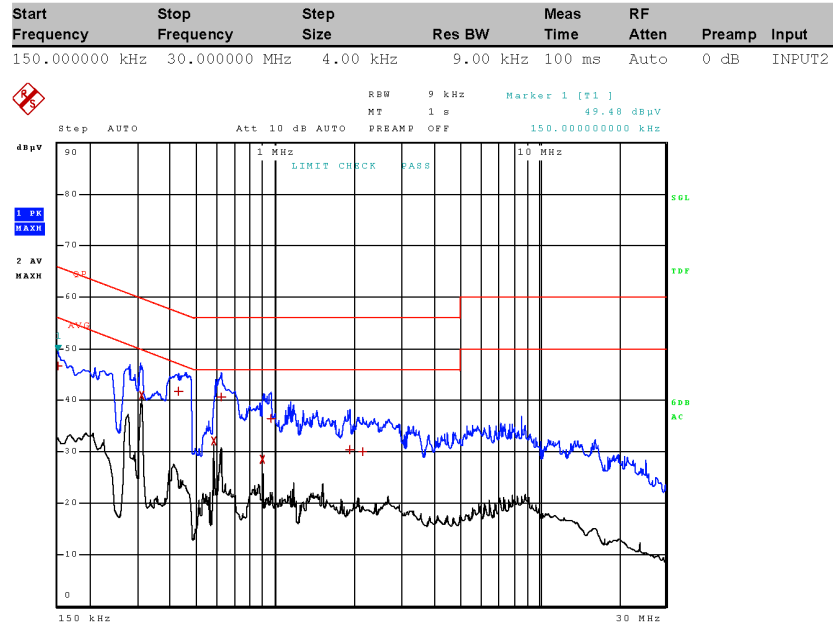
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8.2.1 Line 1 Plot

07.Oct 22 14:01

Stepped Scan (1 Range)

Scan Start: 150 kHz
Scan Stop: 30 MHz
Detector: Trace 1: MAX PEAK Trace 2: Average
Transducer: tdf_20



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8.2.2 Line 1 Table

07.Oct 22 14:01

Final Measurement

Meas Time: 1 s
Margin: 20 dB
Subranges: 9

Trace	Frequency	Level (dBμV)	Detector	Delta Limit/dB
1	150.000000000 kHz	46.60	Quasi Peak	-19.40
2	310.000000000 kHz	41.01	Average	-8.96
1	426.000000000 kHz	41.76	Quasi Peak	-15.57
2	582.000000000 kHz	32.03	Average	-13.97
1	618.000000000 kHz	40.48	Quasi Peak	-15.52
2	890.000000000 kHz	28.54	Average	-17.46
1	962.000000000 kHz	36.33	Quasi Peak	-19.67
1	1.918000000 MHz	30.42	Quasi Peak	-25.58
1	2.130000000 MHz	29.93	Quasi Peak	-26.07

Transducer Table

Name: tdf_20
Interpolation: LIN
Comment: ANS 25/2 Primary LISN IL Line 1 + Coax Cable IL

Frequency	Factor (dB)
150.00 kHz	0.19
170.00 kHz	0.17
200.00 kHz	0.16
250.00 kHz	0.13
300.00 kHz	0.12
350.00 kHz	0.12
400.00 kHz	0.11
500.00 kHz	0.12
600.00 kHz	0.12
700.00 kHz	0.11
800.00 kHz	0.13
900.00 kHz	0.12
1.00 MHz	0.21
1.20 MHz	0.22
1.50 MHz	0.28
2.00 MHz	0.37
2.50 MHz	0.41
3.00 MHz	0.59
4.00 MHz	0.40
5.00 MHz	0.47
7.00 MHz	0.63
10.00 MHz	0.88
15.00 MHz	1.08
20.00 MHz	1.01
30.00 MHz	1.80

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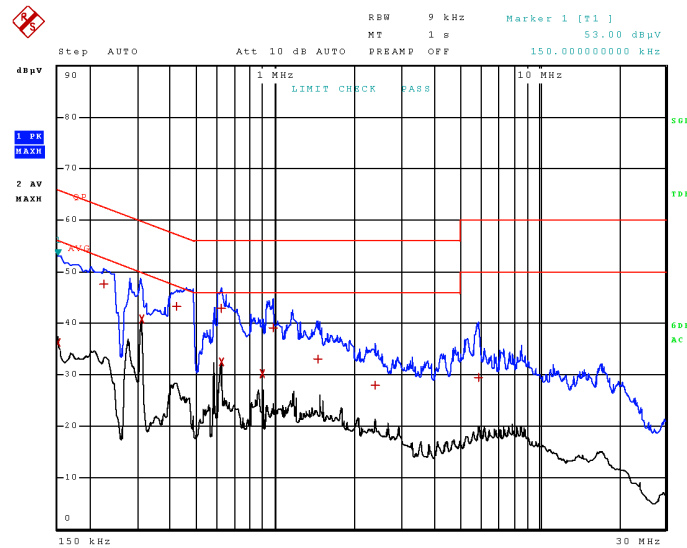
8.2.3 Line 2 Plot

07.Oct 22 14:15

Stepped Scan (1 Range)

Scan Start: 150 kHz
Scan Stop: 30 MHz
Detector: Trace 1: MAX PEAK Trace 2: Average
Transducer: tdf_20

Start Frequency	Stop Frequency	Step Size	Res BW	Meas Time	RF Atten	Preamp	Input
150.000000 kHz	30.000000 MHz	4.00 kHz	9.00 kHz	100 ms	Auto	0 dB	INPUT2





8.2.4 Line 2 Table

07.Oct 22 14:15

Final Measurement

Meas Time: 1 s
Margin: 20 dB
Subranges: 11

Trace	Frequency	Level (dBμV)	Detector	Delta Limit/dB
2	150.000000000 kHz	36.11	Average	-19.89
1	226.000000000 kHz	47.65	Quasi Peak	-14.95
2	310.000000000 kHz	40.67	Average	-9.30
1	418.000000000 kHz	43.17	Quasi Peak	-14.32
1	618.000000000 kHz	42.82	Quasi Peak	-13.18
2	618.000000000 kHz	32.45	Average	-13.55
2	890.000000000 kHz	30.10	Average	-15.90
1	978.000000000 kHz	39.08	Quasi Peak	-16.92
1	1.438000000 MHz	33.04	Quasi Peak	-22.96
1	2.390000000 MHz	27.80	Quasi Peak	-28.20
1	5.870000000 MHz	29.42	Quasi Peak	-30.58

Transducer Table

Name: tdf_20
Interpolation: LIN
Comment: ANS 25/2 Primary LISN IL Line 1 + Coax Cable IL

Frequency	Factor (dB)
150.00 kHz	0.19
170.00 kHz	0.17
200.00 kHz	0.16
250.00 kHz	0.13
300.00 kHz	0.12
350.00 kHz	0.12
400.00 kHz	0.11
500.00 kHz	0.12
600.00 kHz	0.12
700.00 kHz	0.11
800.00 kHz	0.13
900.00 kHz	0.12
1.00 MHz	0.21
1.20 MHz	0.22
1.50 MHz	0.28
2.00 MHz	0.37
2.50 MHz	0.41
3.00 MHz	0.59
4.00 MHz	0.40
5.00 MHz	0.47
7.00 MHz	0.63
10.00 MHz	0.88
15.00 MHz	1.08
20.00 MHz	1.01
30.00 MHz	1.80



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9. History of Test Report Changes

Test Report #	Revision #	Description	Date of Issue
TR_4503-22_FCC 15B_JBP	1	Initial release	10/20/2022



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END OF TEST REPORT
