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CERTIFICATION TEST REPORT

Manufacturer: **SECO S.p.A.**
Via Achille Grandi 20
Arezzo 52100 ITALY

Applicant: **Same As Above**

Product Name: **KarL4 MDB**

Model: **KarL4 Contactless Payment Controller LTE USA**

FCC ID: **2ALZB-PN5180**

Product Description: KarL4 is a contactless-only reader (COR) payment terminal. It enables your customers to make payments for amounts up to EUR 50 in a secure and intuitive manner from their debit and credit card without having to enter a PIN. KarL4 uses Near Field Communication (NFC) to transfer data.

Operating Voltage/Frequency: 12VDC from external power supply

Testing Commenced: 2026-05-01

Testing Ended: 2026-05-11

Summary of Test Results: **In Compliance**

Standards:

- ❖ **FCC Part 15 Subpart C, Section 15.209**
- ❖ **FCC Part 15 Subpart C, Section 15.215(c) – Additional provisions to the general radiated emission limitations**
- ❖ **FCC Part 15 Subpart A, Section 15.31(e) – Measurement Standards**
- ❖ **FCC15.207 - Conducted Limits**



Order No(s): F2X36998-C1

Applicant: SECO S.p.A.
Model(s): KarL4 Contactless Payment Controller LTE USA

Evaluation Conducted by:

Erik Tobin, EMC Engineer

Report Reviewed by:

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1 ADMINISTRATIVE INFORMATION

1.1 Measurement Location:

F2 Labs in Middlefield, Ohio. Site description and attenuation data are on file with the FCC's Sampling and Measurement Branch at the FCC Laboratory in Columbia, MD.

1.2 Measurement Procedure:

All measurements were performed according to ANSI C63.10:2020 and recommended FCC procedure of measurement of equipment operating under Section 15.209. A list of the measurement equipment can be found in Section 6.

1.3 Uncertainty Budget:

The uncertainty in EMC measurements arises from several factors which affect the results, some associated with environmental conditions in the measurement room, the test equipment being used, and the measurement techniques adopted.

The measurement uncertainty budgets detailed below are calculated from the test and calibration data and are expressed with a 95% confidence factor using a coverage factor of $k=2$. The Uncertainty for a laboratory is referred to as U_{lab} . For Radiated and Conducted Emissions, the Expanded Uncertainty is compared to the U_{cispr} values to determine if a specific margin is required to deem compliance.

U_{lab}

Measurement Range	Combined Uncertainty	Expanded Uncertainty
Radiated Emissions <1 GHz @ 3m	2.54	5.07dB
Radiated Emissions <1 GHz @ 10m	2.55	5.09dB
Radiated Emissions 1 GHz to 2.7 GHz	1.81	3.62dB
Radiated Emissions 2.7 GHz to 18 GHz	1.55	3.10dB
AC Power Line Conducted Emissions, 150kHz to 30 MHz	1.38	2.76dB
AC Power Line Conducted Emissions, 9kHz to 150kHz	1.66	3.32dB

U_{cispr}

Measurement Range	Expanded Uncertainty
Radiated Emissions <1 GHz @ 3m	5.2dB
Radiated Emissions <1 GHz @ 10m	5.2dB
Radiated Emissions 1 GHz to 2.7 GHz	Under Consideration
Radiated Emissions 2.7 GHz to 18 GHz	Under Consideration
AC Power Line Conducted Emissions, 150kHz to 30 MHz	3.6dB
AC Power Line Conducted Emissions, 9kHz to 150kHz	4.0dB

If U_{lab} is less than or equal to U_{cispr} , then:

- compliance is deemed to occur if no measured disturbance exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance exceeds the disturbance limit.

If U_{lab} is greater than U_{cispr} in table 1, then:

- compliance is deemed to occur if no measured disturbance, increased by $(U_{lab} - U_{cispr})$, exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance, increased by $(U_{lab} - U_{cispr})$, exceeds the disturbance limit.

Note: Only measurements listed in the above tables that relate to tests included in this Test Report are applicable.



Order No(s): F2X36998-C1

Applicant: SECO S.p.A.
Model(s): KarL4 Contactless Payment Controller LTE USA

1.4 Document History:

Document Number	Description	Issue Date	Approved By
F2X36998-C1-01E	First Issue	2026-05-12	K. Littell

**2 SUMMARY OF TEST RESULTS**

Test Name	Standard(s)	Results
-20dB Occupied Bandwidth	CFR 47 Part 15.215(c)	N/A
Field Strength of Emissions	CFR 47 Part 15.209	Complies
Radiated Spurious Emissions	CFR 47 Part 15.209	Complies
Variation of the Input Power	CFR 47 Part 15.31(e)	Complies
Conducted Emissions	CFR 47, Part 15.207(a)	Complies*

**Voltage Variation testing for 15.31(3)(e) was performed at the nominal voltage, and then at 85% and 115% of that voltage also.*

Modifications Made to the Equipment
No modifications were made to the EUT.

3 TABLE OF MEASURED RESULTS

Test		13.56 MHz
Field Strength of Fundamental at 1m		-
¹ Field Strength of Fundamental at 3m		71.4 $\mu\text{V/m}$ / 37.071 dB $\mu\text{V/m}$
¹ Field Strength of Fundamental corrected for 40dB/decade 30m distance correction		0.714 $\mu\text{V/m}$ / -2.929 dB $\mu\text{V/m}$
¹ Field Strength of Fundamental corrected for 40dB/decade 300m distance correction		-
Limit for Fundamental at 30m		30 $\mu\text{V/m}$ / 29.54 dB $\mu\text{V/m}$
Limit for Fundamental at 300m		-
-20dB Occupied Bandwidth		-
99% Occupied Bandwidth		-
² Variation of Input Power @ 12VDC corrected for distance	Nominal	37.071 dB $\mu\text{V/m}$
	-15%	35.544 dB $\mu\text{V/m}$
	+15%	35.268 dB $\mu\text{V/m}$

¹ 13.56MHz field strength was measured at 3m.

² The voltage variation testing was done at 12VDC nominal. Readings were recorded at 3m distance.



4 ENGINEERING STATEMENT

This report has been prepared on behalf of SECO S.p.A. to provide documentation for the testing described herein. This equipment has been tested and found to comply with Part 15.209 of the FCC Rules using ANSI C63.10 and Part 15 standards. The test results found in this test report relate only to the items tested.

**5 EUT INFORMATION AND DATA****5.1 Equipment Under Test:**

Product: KarL4 MDB

Model(s): KarL4 Contactless Payment Controller LTE USA

Serial Number: 04884662

KarL4 Firmware Version: 238a1cde

KarL4 Software Version: (identified as KarL4 Firmware above)

FCC ID: 2ALZB-PN5180**5.2 Trade Name:****KarL4****5.3 Power Supply:**

Device	Manufacturer	Model Number	Serial Number
Power Supply	Hewlett Packard	6206B	2228A-07438

5.4 Applicable Rules:

CFR 47, Part 15.209

5.5 Antenna:

SECO S.p.A. 4GH903-0657RE-01P PCB Trace

5.6 Accessories:

Device	Manufacturer	Model Number	Serial Number
Simulated Vending Machine	S.E.C.O S.p.A.	SANTOKA	03025809

5.7 Test Item Condition:

The equipment to be tested was received in good condition.

5.8 Testing Algorithm:

EUT was powered, and NFC transmitter was set to continuously transmit at max power (13.56 MHz).

**5 LIST OF MEASUREMENT INSTRUMENTATION**

Equipment Type	Asset Number	Manufacturer	Model	Serial Number	Calibration Due Date
Shielded Chamber	CL166-E	Albatross Projects	B83117-DF435-T261	US140023	2027-05-07
Receiver	CL151	Rohde & Schwarz	ESU40	100319	2027-04-08
Receiver	CL204	Rohde & Schwarz	ESR7	101714	2027-04-09
Low Loss Cable Set	CL315 / CL318	Fairview Microwave	FMC0202914-72/FMC0202914-240	None Spec.	2027-04-10
Preamplifier	CL284	A.H. Systems, Inc.	PAM-0101	131	2027-04-09
Antenna, JB3 Combination	CL175	Sunol Sciences	JB3	A030315	2026-09-02
18" Active Loop	CL194	AH Systems, Inc.	SAS-562B	281	2026-05-15
Software:	Tile Version 3.4.B.3.		Software Verified: 2026-05-11		
Software:	EMC 32, Version 8.53.0		Software Verified: 2026-05-11		
Temp/Hum Rec	CL327	Thermpro	TP50	8	2028-03-20
Spectrum Analyzer	0141	Hewlett Packard	8591E	3520A04145	2027-04-10
Transient Limiter	CL102	Hewlett Packard	11947A	3107A03325	2027-04-09
Software:	Tile Version 3.4.B.3.		Software Verified: 2026-05-01		
LISN	CL181	Com-Power	LI-125A	191226	2026-11-20
LISN	CL182	Com-Power	LI-125A	191225	2026-11-21
Temp/Hum Rec	CL297	Extech	445703	0721	2027-10-08

7 FIELD STRENGTH OF EMISSIONS FROM INTENTIONAL RADIATORS / RADIATED SPURIOUS EMISSIONS

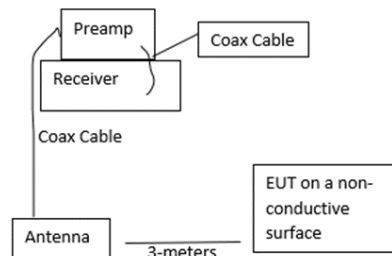
Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

Notes:

During the pre-scan evaluation, the EUT was rotated in all possible directions and all three orthogonal positions to find the maximum emissions. The orthogonal position that showed the highest emissions was used. The antenna was raised between 1 and 4 meters and the EUT turntable was rotated 360 degrees to maximize the emissions. The following plots are just prescan plots and do not necessarily reflect the actual limits. The measurement table has the correct limits.

13.56 Field Strength was measured at 3m.

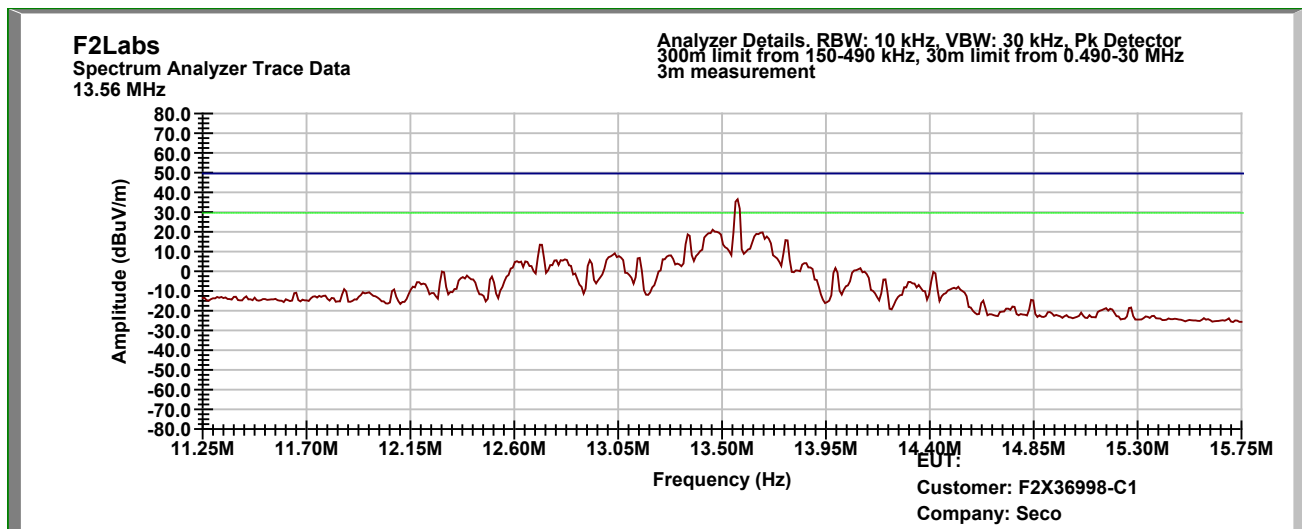




7.1 Test Data - Field Strength of Emissions from Intentional Radiators

Test Date(s):	2026-05-11	Test Engineer(s):	E. Tobin
Standards:	CFR 47 Part 15.209	Air Temperature:	22.9°C
Results:	Complies	Relative Humidity:	35%

13.56 MHz Field Strength



Field Strength of Fundamental at 3m for 13.56 MHz = 71.4 μ V/m / 37.071 dB μ V/m



7.2 Test Data – Spurious Emissions

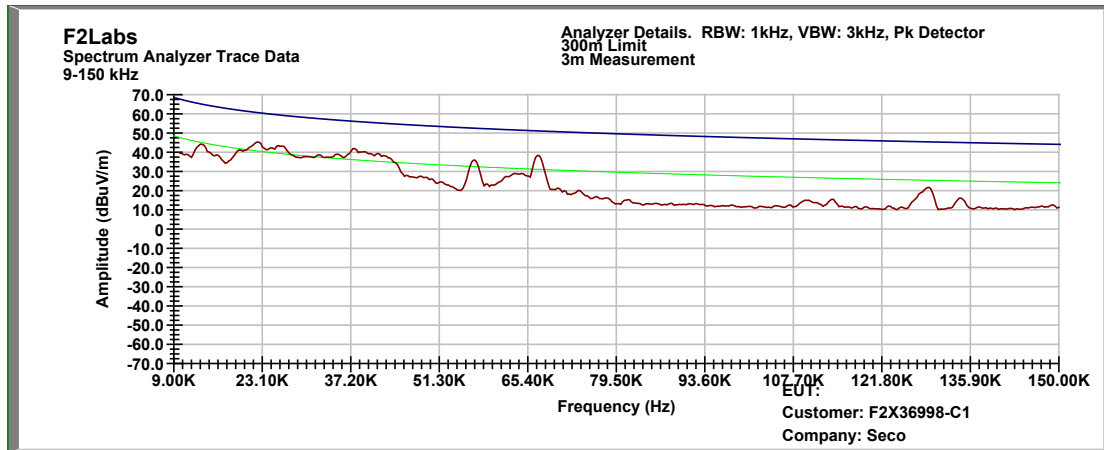
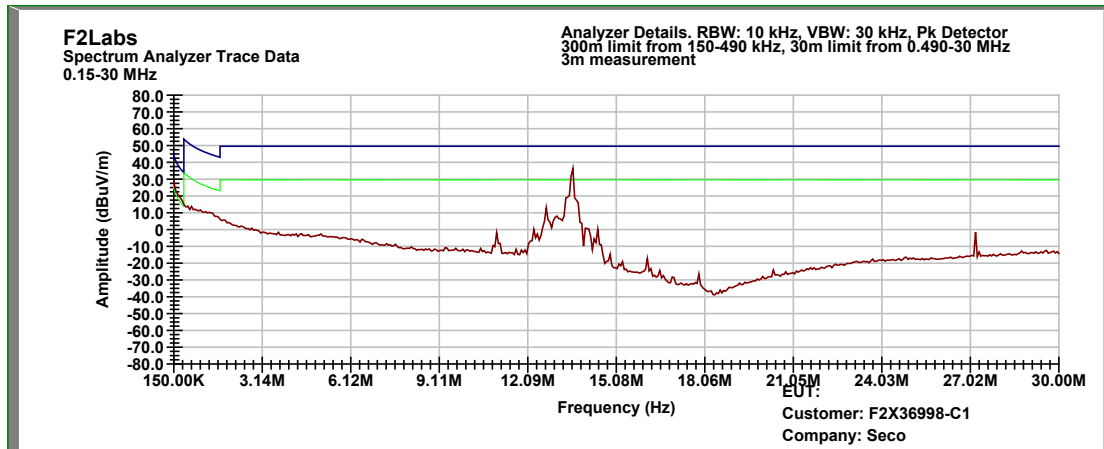
Notes: Plots are peak, max hold pre-scan data included only to determine what frequencies to investigate and measure. During the pre-scan evaluation, the EUT was rotated in all possible directions and three orthogonal positions to find the maximum emissions. The orthogonal position that showed the highest emissions was used. At some frequencies, no emissions from the EUT were measurable over the ambient noise floor. The readings did not change with EUT on and EUT off.

At least 6 of the highest frequencies were measured per ANSI 63.4 in a 3-meter anechoic chamber. Frequencies below 1GHz were measured using a quasi-peak detector. The antenna was raised between 1 and 4 meters and the EUT turntable was rotated 360 degrees to maximize the emissions. Some of the frequencies did not change with the EUT on or off. At those frequencies, the test distance was shortened to 1 meter and still no emissions from the EUT were visible or over the ambient or limit. Frequencies were scanned from 9kHz to 1000 MHz and the highest emissions are presented.

In the following plots, the red line indicates the measurement with the EUT on. Emissions to be found by the EUT were measured and listed in the measurement tables.



Test Date(s):	2026-05-11	Test Engineer(s):	E. Tobin
Standards:	CFR 47 Part 15.209	Air Temperature:	22.9°C
Results:	Complies	Relative Humidity:	35%

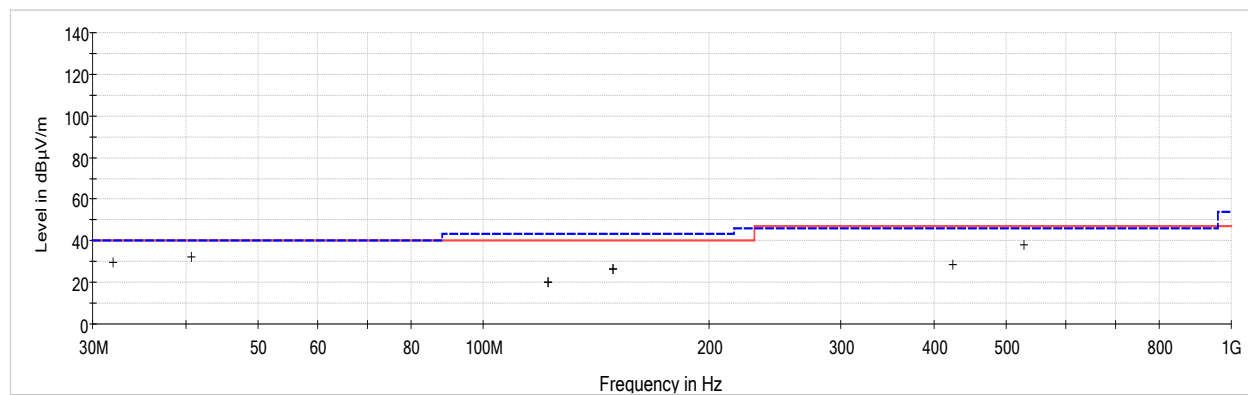
Characterization Scan, 0.009 MHz to 0.15 MHz (Loop Antenna)**Characterization Scan, 0.15 MHz to 30 MHz (Loop Antenna)**

Note: Measurements taken at a closer distance than the limits; peak trace to be extrapolated by adding 40dB per decade.



30 MHz to 1000 MHz

Frequency (MHz)	Ant. Pol.	Azimuth (degrees)	Reading (dBμV)	Cable Loss & Antenna Factor (dB)	Emission (dBμV/m)	Limit (dBμV/m)	Margin (dB)
31.940000	V	0.00	50.1	-20.5	29.60	40.0	-10.4
40.670000	V	0.00	59.0	-27.0	32.00	40.0	-8.0
121.956000	H	1.00	45.6	-25.6	20.00	40.0	-20.0
121.956000	V	0.00	45.5	-25.6	19.90	40.0	-20.1
149.116000	H	358.00	53.5	-26.8	26.70	40.0	-13.3
149.116000	V	0.00	53.3	-26.8	26.50	40.0	-13.5
424.014000	H	0.00	50.3	-21.9	28.40	47.0	-18.6
527.998000	H	0.00	58.2	-20.3	37.90	47.0	-9.1





8 VARIATION OF THE INPUT POWER, 15.31(e)

8.1 Requirements:

For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. For battery operated equipment, the equipment tests shall be performed using a new battery.

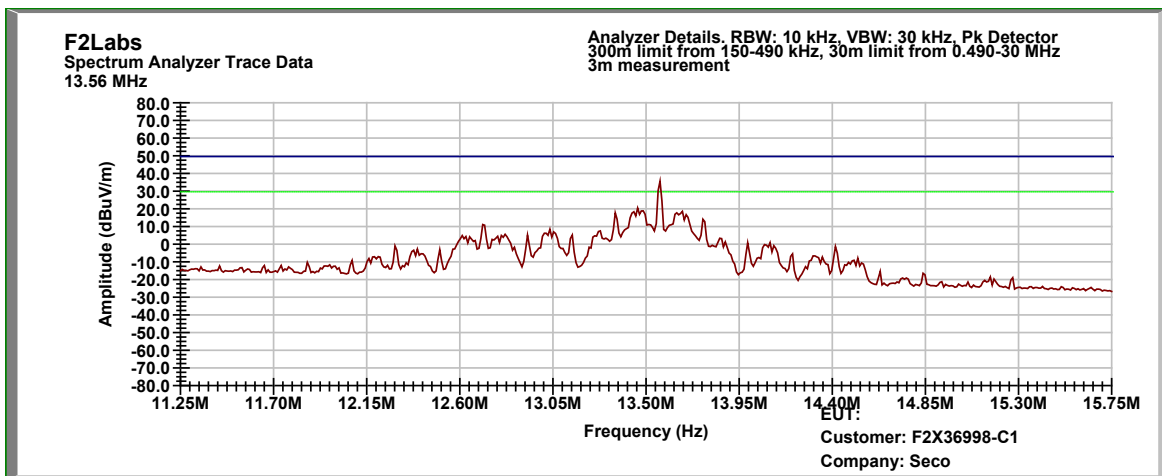


8.2 Test Data – Variation of the Input Power

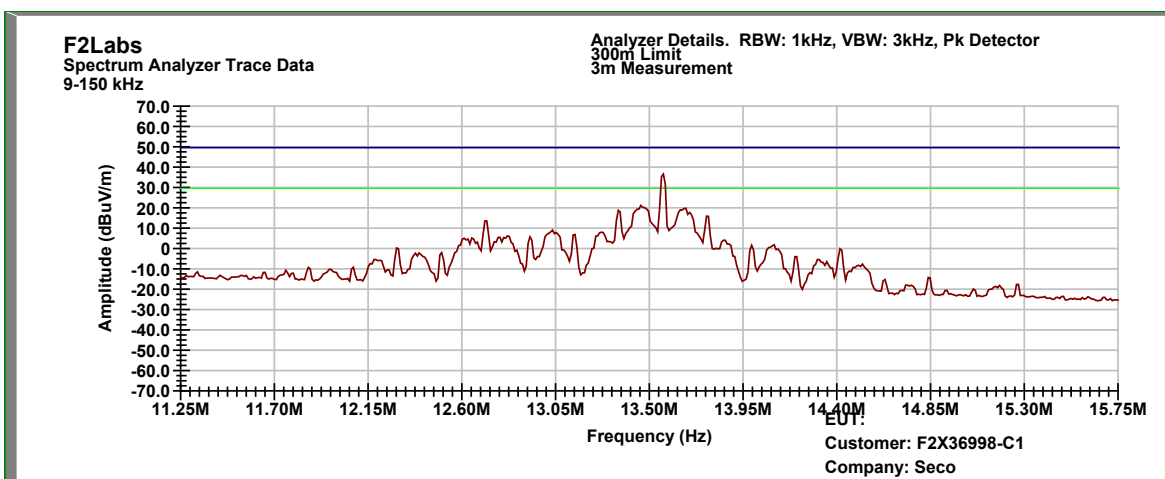
Test Date(s):	2026-05-11	Test Engineer(s):	E. Tobin
Standards:	CFR 47 Part 15.31(e)	Air Temperature:	22.9°C
Results:	Complies*	Relative Humidity:	35%

**The results show that the fundamental frequency did not move outside the frequency band and the field strength did not increase above the limit during the variations.*

-15%



+15%





9 CONDUCTED EMISSIONS

9.1 Requirements

In accordance with FCC CFR 47 Part 15.207(a), "Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of Emission (MHz)	Conducted Limit (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

9.2 Procedure

The EUT was placed on a 1.0 x 1.5 meter non-conductive table, 0.8 meter above a horizontal ground plane and 0.4 meter from a vertical ground plane. Power was provided to the EUT through a LISN bonded to a 3 x 2 meter ground plane. The LISN and peripherals were supplied power through a filtered AC power source. The output of the LISN was connected to the input of the receiver via a transient limiter, and emissions in the range 150 kHz to 30 MHz were measured. The measurements were recorded using the quasi-peak and average detectors as directed by the standard, and the resolution bandwidth during testing was 9 kHz. The raw measurements were corrected to allow for attenuation from the LISN, transient limiter and cables.

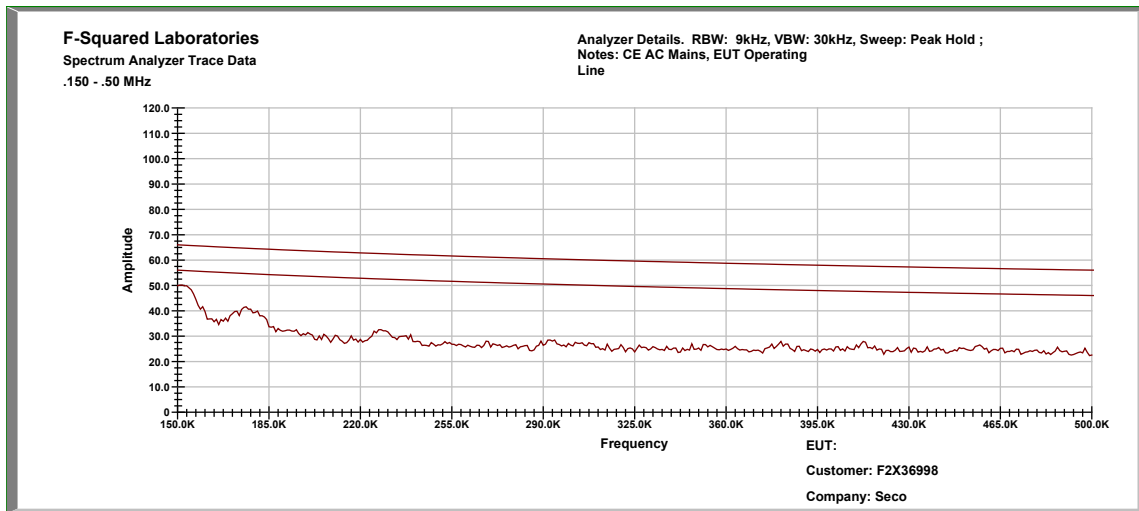


9.3 Conducted Emissions Test Data

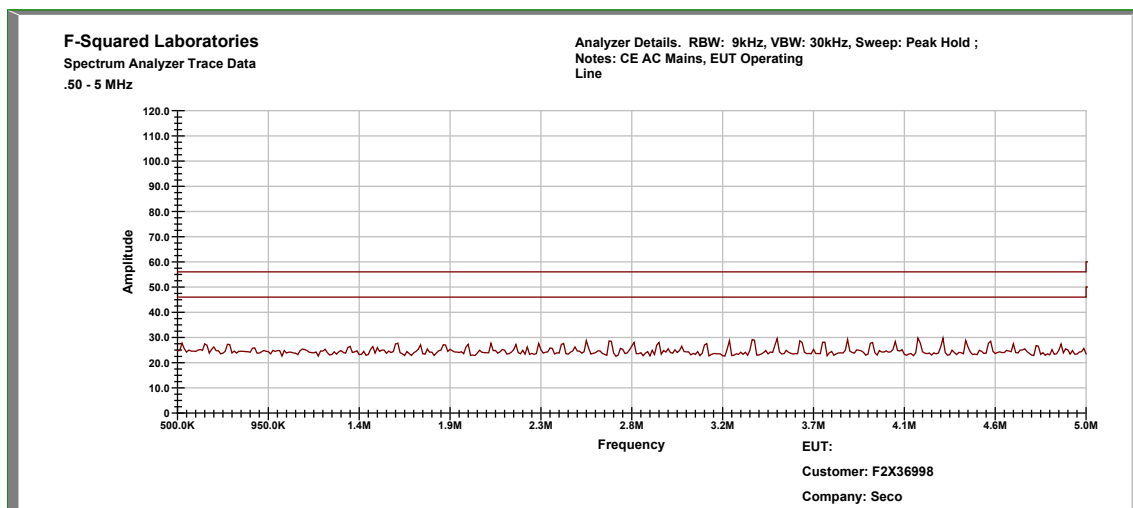
Test Date(s):	2026-05-01	Test Engineer:	E. Tobin
Rule:	15.207	Air Temperature:	19.8° C
Test Results:	Complies	Relative Humidity:	37%

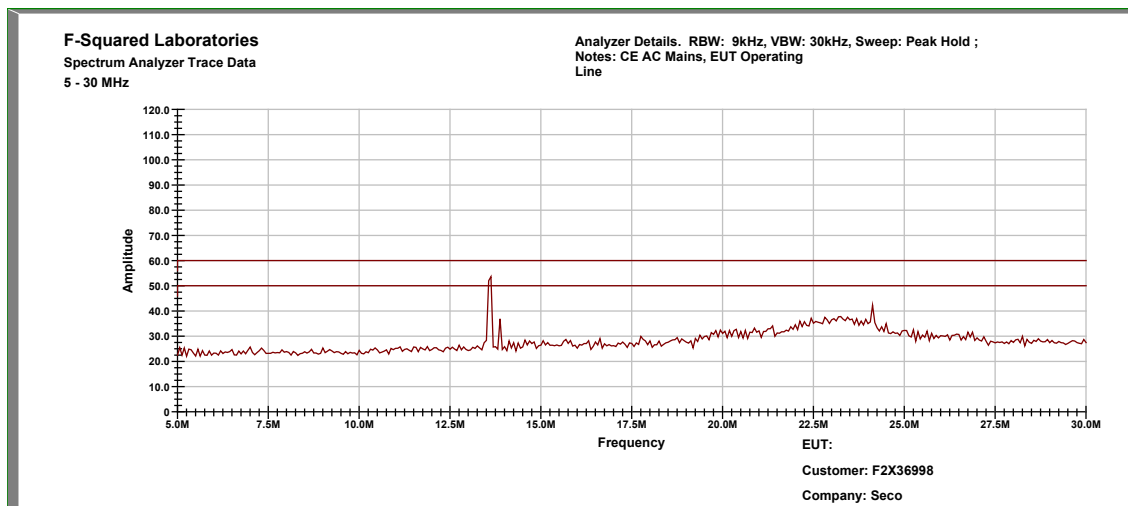
Note: Graphs are Peak detector scans.
Peak emissions that were below the AVG limit were not measured.

Conducted Test – Live: 0.15 MHz to 0.5 MHz



Conducted Test – Live: 0.5 MHz to 5.0 MHz

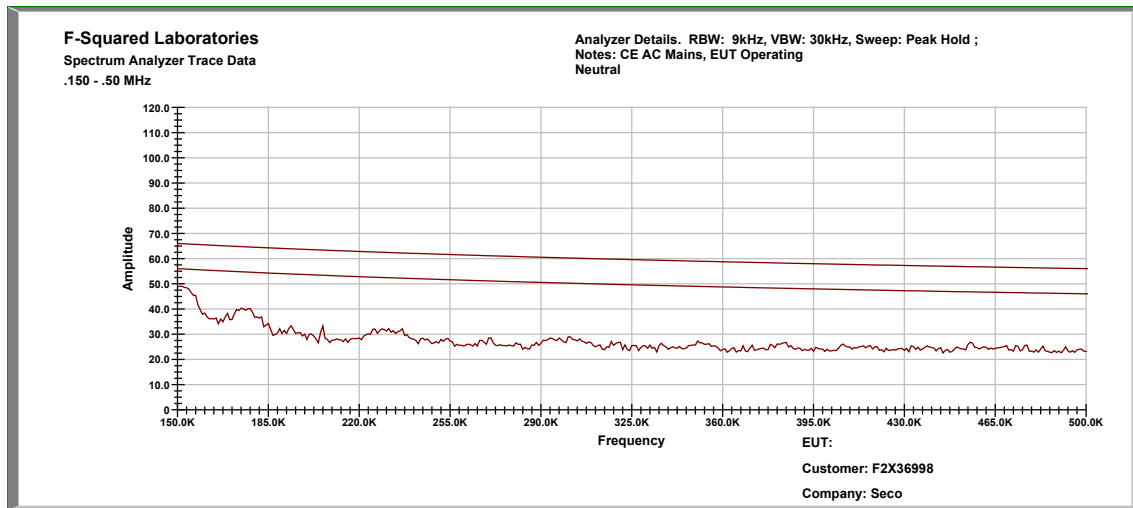


**Conducted Test – Live: 5.0 MHz to 30.0 MHz**

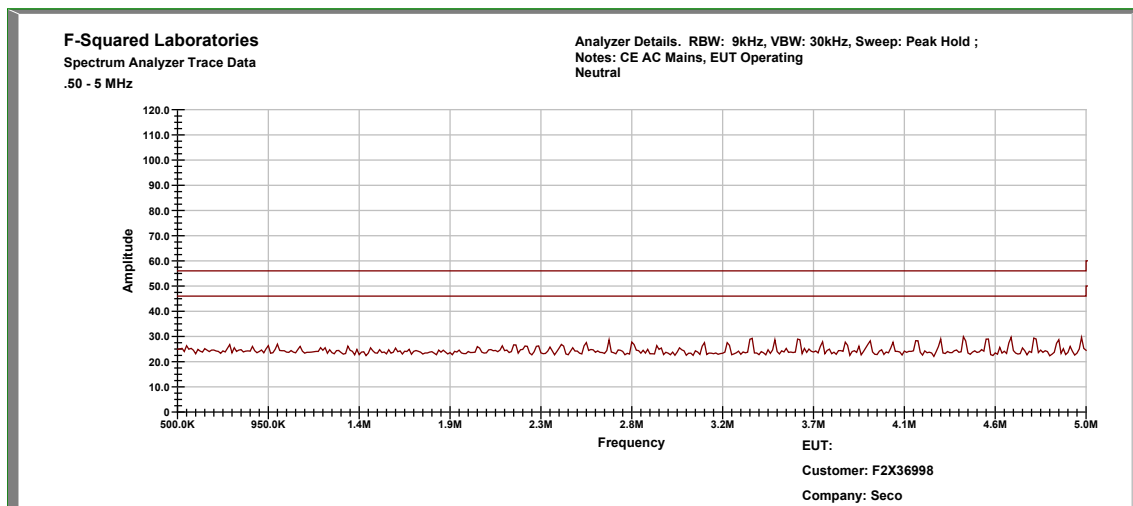
Top Discrete Measurements								
No.	Conductor	Frequency (MHz)	Detector	Level (dBμV)	Adjustment (dB)	Results (dBμV)	Limit (dBμV)	Margin (dB)
1	Live	13.6	Quasi-Peak	32.41	12.235	44.65	60	-15.4
			Average	31.925	12.235	44.16	50	-5.8

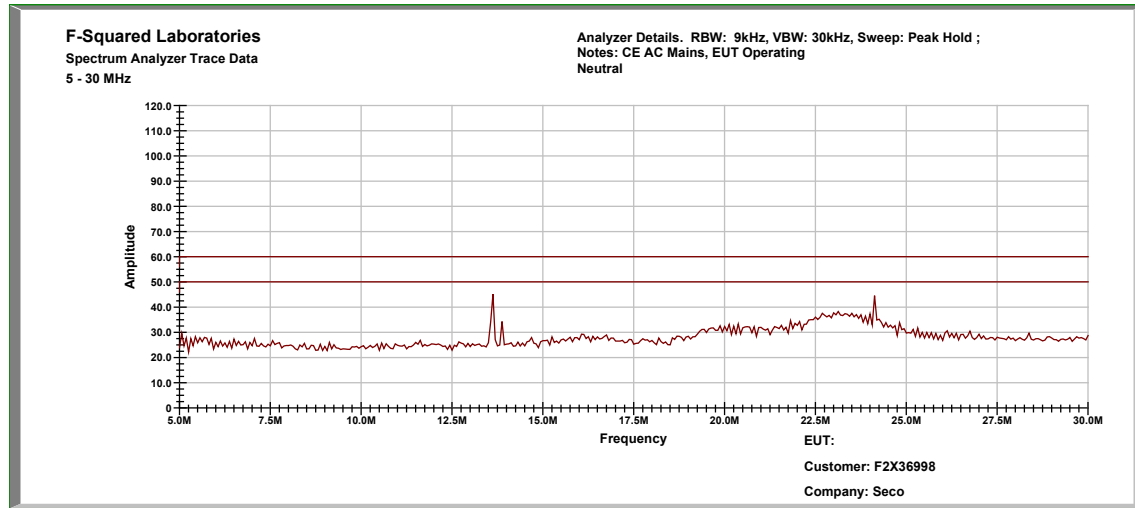


Conducted Test – Neutral: 0.15 MHz to 0.5 MHz



Conducted Test – Neutral: 0.5 MHz to 5.0 MHz



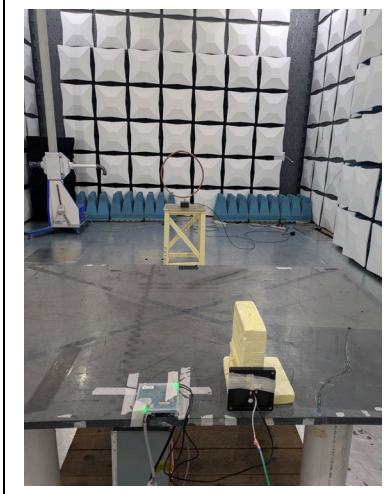
**Conducted Test – Neutral: 5.0 MHz to 30.0 MHz**

Note: Graph displays Peak emissions.
Emissions that were under the AVG limit were not measured.

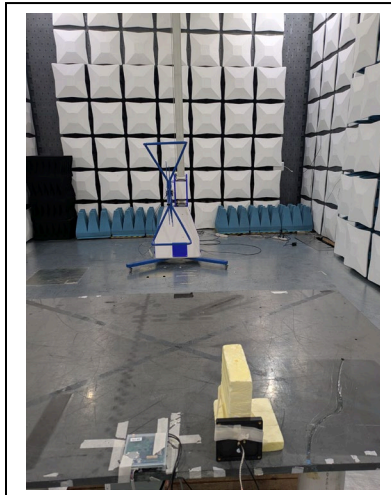
Top Discrete Measurements								
No.	Conductor	Frequency (MHz)	Detector	Level (dBμV)	Adjustment (dB)	Results (dBμV)	Limit (dBμV)	Margin (dB)
1	Neutral	13.56	Quasi-Peak	32.51	12.145	44.66	60	-15.3
			Average	32.03	12.145	44.18	50	-5.8

10 TEST SETUP PHOTOGRAPHS

Radiated Emissions: 9kHz to 30 MHz, Variation of the Input Power



Radiated Emissions: 30 MHz to 1000 MHz





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Conducted Emissions

