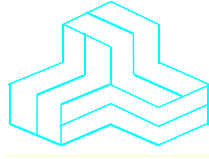


ENGINEERING TEST REPORT



IXM ROSTO FR2
Model: IXM081
FCC ID: S38-ROENXP

Applicant:

Invoxium Access Inc.
111 Gordon Baker Road, Suite 300
Toronto, Ontario
Canada M2H 3R1

In Accordance With
Federal Communications Commission (FCC)
Part 15, Subpart C, Section 15.209

UltraTech's File No.: 25INVX169_FCC15C209

This Test report is Issued under the Authority of
Tri M. Luu
Vice President of Engineering
UltraTech Group of Labs

Date: April 7, 2026

Report Prepared by: Dan Huynh

Tested by: Angus Au

Issued Date: April 7, 2026

Test Date(s):
September 17 - November 18, 2025

- *The results in this Test Report apply only to the sample(s) tested, and the sample tested is randomly selected.*
- *This report must not be used by the client to claim product endorsement by any agency of the US Government.*
- *This test report shall not be reproduced, except in full, without a written approval from UltraTech*

UltraTech

3000 Bristol Circle, Oakville, Ontario, Canada, L6H 6G4
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Website: www.ultratech-labs.com, Email: vic@ultratech-labs.com, Email: tri@ultratech-labs.com



Lab Code: 0685



APEC TEL CA0001



1309



CA 0001/2049



AT-1945



SL2-IN-E-1119R



Korea KCC-RRR
CA0001

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EXHIBIT 1. INTRODUCTION

1.1. SCOPE

Reference:	FCC Part 15, Subpart C
Title:	Code of Federal Regulations (CFR), Title 47 Telecommunication, Part 15, Subpart C Intentional Radiators
Purpose of Test:	Equipment Certification for FCC Part 15C.
Test Procedures:	ANSI C63.4 and ANSI C63.10
Environmental Classification:	Commercial, industrial or business environment

1.2. RELATED SUBMITTAL(S)/GRANT(S)

None.

1.3. NORMATIVE REFERENCES

Publication	Year	Title
FCC 47 CFR 15	2025	Code of Federal Regulations (CFR), Title 47 – Telecommunication, Part 15 – Radio Frequency Devices
ANSI C63.4	2014	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 KHz to 40 GHz
ANSI C63.10	2020	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

EXHIBIT 2. PERFORMANCE ASSESSMENT

2.1. CLIENT INFORMATION

Applicant	
Name:	Invoxium Access Inc.
Address:	111 Gordon Baker Road, Suite 300 Toronto, Ontario Canada M2H 3R1

Manufacturer	
Name:	Mara Technologies Inc.
Address:	5680 14th Avenue Markham, Ontario Canada L3S 3K8

2.2. EQUIPMENT UNDER TEST (EUT) INFORMATION

The following information (with the exception of the Date of Receipt) has been supplied by the applicant.

Brand Name:	Invoxium Access Inc.
Product Name:	IXM ROSTO FR2
Model Name or Number:	IXM081
Serial Number:	Test sample
Type of Equipment:	Part 15 Low Power Transmitter Below 1705 kHz
Input Power Supply Type:	12VDC/2A, 24VDC/1A DC external power supply / Power over Ethernet (PoE)
Primary User Functions of EUT:	Access Control

2.3. EUT'S TECHNICAL SPECIFICATIONS

Transmitter	
Intended Operating Environment:	Commercial, light industry & heavy industry
Power Supply Requirement:	5V, 3.3V DC
RF Output Power Rating:	74.47 dBμV/m peak at 3m distance
Operating Frequency Range:	130 kHz
20 dB Bandwidth:	9.696 kHz
Modulation Type:	Load modulation
Antenna Connector Type:	Integral, Invixium Access Inc. 125 kHz Loop antenna (860uH coil)

The EUT contained an integrated certified u-blox AG WLAN/Bluetooth host-based multiradio module (FCC ID: XPYMAYAW166). The module test data were leveraged in this filing.

2.4. LIST OF EUT'S PORTS

Port Number	EUT's Port Description	Number of Identical Ports	Connector Type	Cable Type (Shielded/Non-shielded)
1	Vin+, Vin-	1	Header	Non-Shielded, <3m
2	Wiegand Input (2 Lines)	1	Header	Non-Shielded >3m
3	Wiegand Output (2 Lines)	1	Header	Non-Shielded, > 3m
4	RS-485 (3 lines)	1	Header	Non-Shielded, > 3m
5	RS-232 (Tx, Rx)	1	Header	Non-Shielded, Service Port
6	USB 2.0 OTG	1	USB uAB	Service Port
7	Gigabit Ethernet	1	RJ-45	Non-Shielded, > 3m
8	Form C Relay, 3 lines	1	Header	Non-Shielded
9	General Purpose Output	2	Header	Non-Shielded
10	General Purpose Input	2	Header	Non-Shielded
11	General Purpose I/O for Door control	4	Header	Non-Shielded
12	GND for different interfaces	4	Header	Non-Shielded
13	EGND	1	Header	Non-Shielded
14	DS_OUT	1	Header	Non-Shielded
15	Access Control Panel LED	2	Header	Non-Shielded

2.5. ANCILLARY EQUIPMENT

The EUT was tested while connected to the following representative configuration of ancillary equipment necessary to exercise the ports during tests:

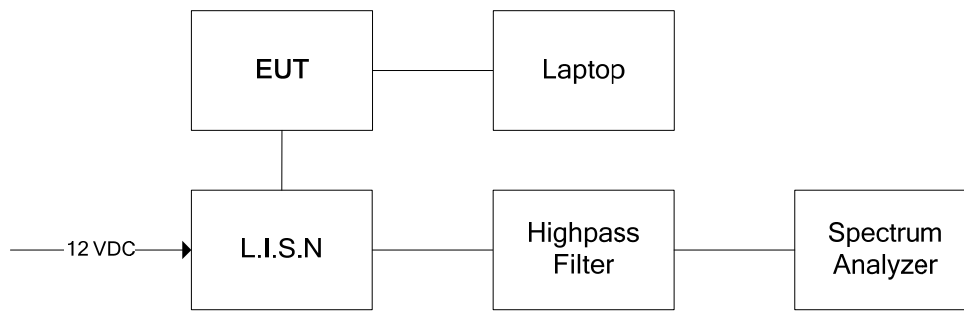
- 1) Cisco Power Injector, M/N: POE16U-1AF

NOTE: Invixium neither sells or recommends used of power injector.

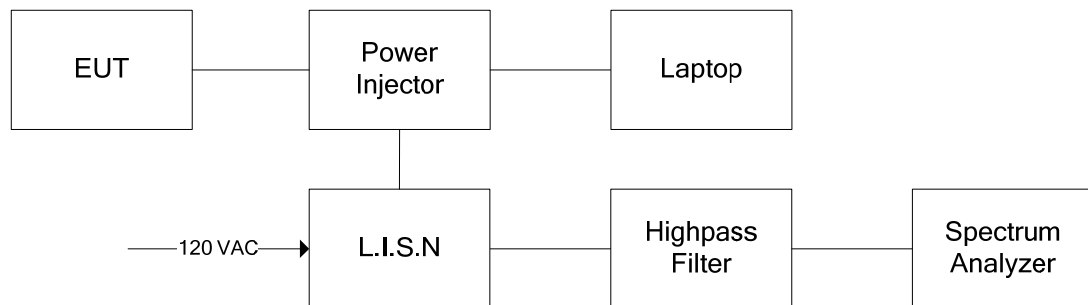
2.6. TEST SETUP BLOCK DIAGRAM

2.6.1. Conducted Emissions

EUT Powered by External DC Power Supply

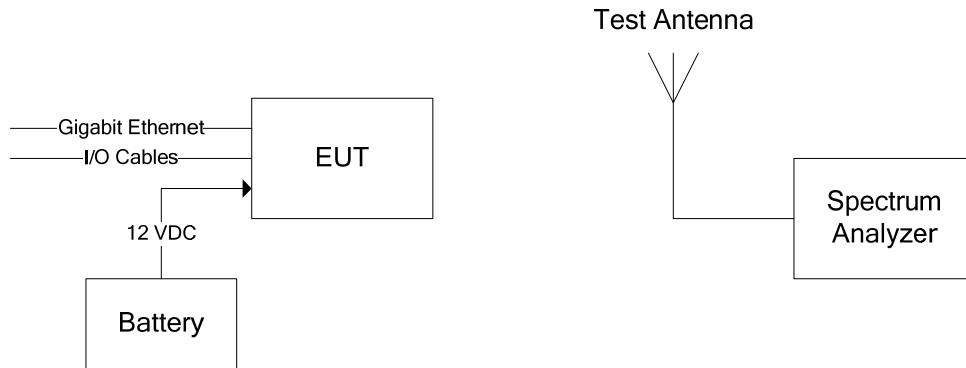


EUT Powered by PoE Adapter



2.6.2. Radiated Emissions

EUT Powered by External DC Power Supply



EUT Powered by PoE Adapter

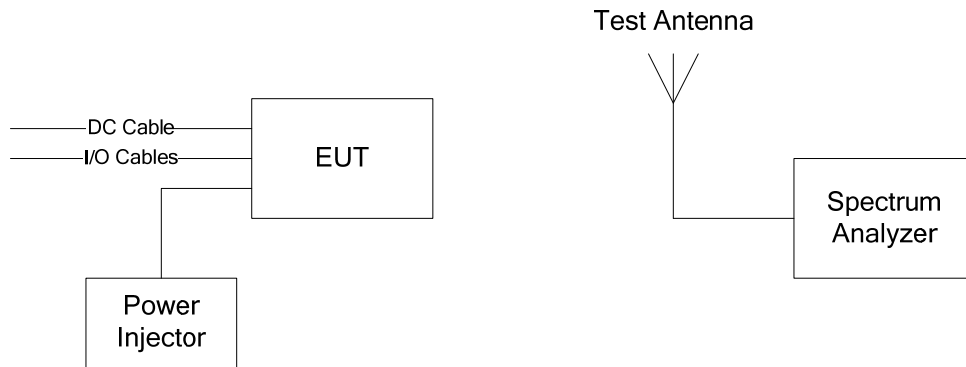


EXHIBIT 3. EUT OPERATING CONDITIONS AND CONFIGURATIONS DURING TESTS

3.1. CLIMATE TEST CONDITIONS

The climate conditions of the test environment are as follows:

Temperature:	21 to 23 °C
Humidity:	45 to 58%
Pressure:	102 kPa
Power input source:	12-24V DC / Power over Ethernet (PoE)

3.2. OPERATIONAL TEST CONDITIONS & ARRANGEMENT FOR TESTS

Operating Modes:	The EUT was configured for continuous transmission for the duration of testing.
Special Test Software:	N/A
Special Hardware Used:	N/A
Transmitter Test Antenna:	The EUT was tested with the antenna fitted in a manner typical of normal intended use as integral antenna equipment.

Transmitter Test Signals	
Frequency Band(s):	130 kHz
Test Frequency(ies):	130 kHz
RF Power Output:	74.47 dBμV/m Peak at 3m distance
Normal Test Modulation:	Load modulation
Modulating Signal Source:	Internal

EXHIBIT 4. SUMMARY OF TEST RESULTS

4.1. TEST LAB AND LOCATION

Company Name:	Ultratech Engineering labs Inc.	
Address:	3000 Bristol Circle, Oakville, Ontario, Canada, L6H 6G4 Tel.: (905) 829-1570 Fax.: (905) 829-8050 Website: www.ultratech-labs.com ,	
Test Site/Company Number:	FCC	ISED
	MRA: APEC TEL Designation no. CA0001 FRN: 0003781366	Company No.: 2049A CAB Identifier: CA0001

4.2. APPLICABILITY & SUMMARY OF EMC EMISSION TEST RESULTS

FCC Section(s)	Test Requirements	Compliance (Yes/No)
15.203	Antenna Requirement	Yes*
15.207(a)	Power Line Conducted Emissions	Yes
15.209(a)	20 dB Bandwidth	Yes
15.209	Transmitter Radiated Emissions - Fundamental, Harmonic and Spurious Emissions	Yes

* The EUT complies with the requirement; it employs integral antenna.

4.3. MODIFICATIONS INCORPORATED IN THE EUT FOR COMPLIANCE PURPOSES

Wurth Ferrite 2 1/2 loops on V+ and V- Part Number: 742 716 33 S (Box A9)



ULTRATECH GROUP OF LABS

3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 25INVX169_FCC15C209
April 7, 2026

All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

EXHIBIT 5. TEST DATA

5.1. POWER LINE CONDUCTED EMISSIONS [§15.207(a)]

5.1.1. Limit(s)

The equipment shall meet the limits of the following table:

Frequency of emission (MHz)	Conducted Limits (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 linearly with the logarithm of the frequency

5.1.2. Method of Measurements

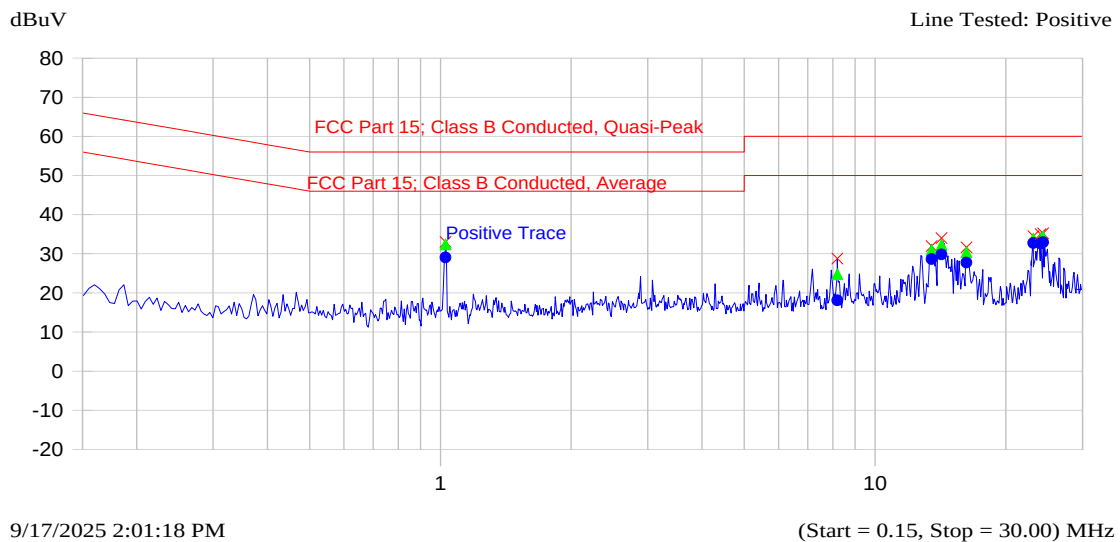
ANSI C63.4

5.1.3. Test Data

Note: The radiated emissions from intentional radiator below 30MHz (13.56 MHz Tx) were shielded by wrapping the EUT with aluminum foil for the purpose of eliminating any radiated coupling onto the device's AC power cable or LISN during testing.

Plot 5.1.3.1. Power Line Conducted Emissions
Line Voltage: 12 VDC; Line Tested: Positive

Current Graph

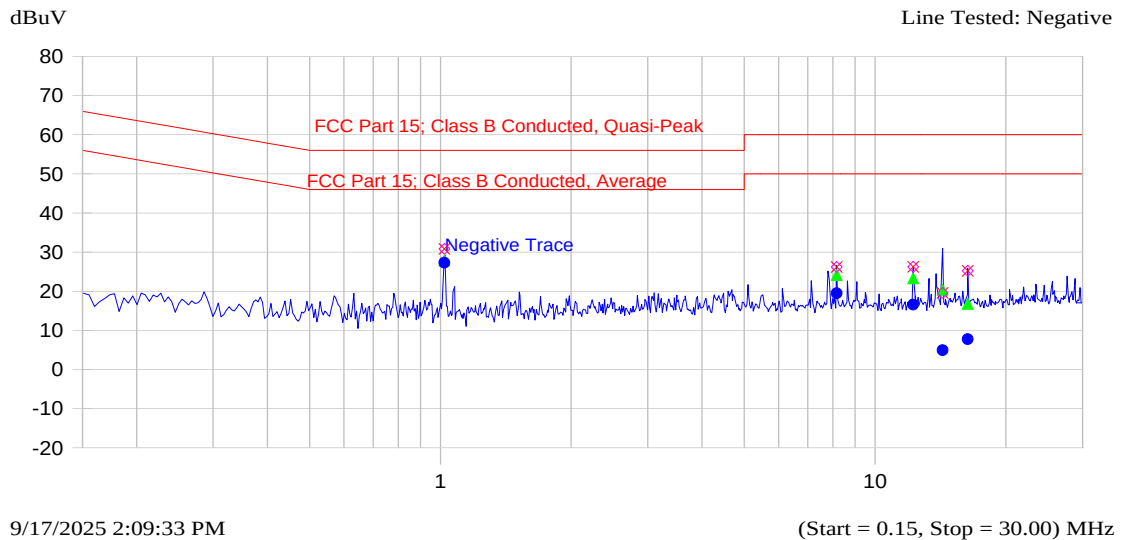


Current List

Frequency MHz	Peak dBuV	QP dBuV	QP-QP Limit dB	Avg dBuV	Avg-Avg Limit dB	Trace Name
1.027	33.0	32.4	-23.6	29.0	-17.0	Positive Trace
8.191	28.8	24.8	-35.2	18.1	-31.9	Positive Trace
13.480	32.0	31.0	-29.0	28.6	-21.4	Positive Trace
14.213	34.0	32.3	-27.7	29.9	-20.1	Positive Trace
16.228	31.6	30.4	-29.6	27.8	-22.2	Positive Trace
23.129	34.5	33.9	-26.1	32.7	-17.3	Positive Trace
24.044	35.0	34.0	-26.0	32.6	-17.4	Positive Trace
24.350	35.2	34.3	-25.7	32.9	-17.1	Positive Trace

Plot 5.1.3.2. Power Line Conducted Emissions
Line Voltage: 12 VDC; Line Tested: Negative

Current Graph

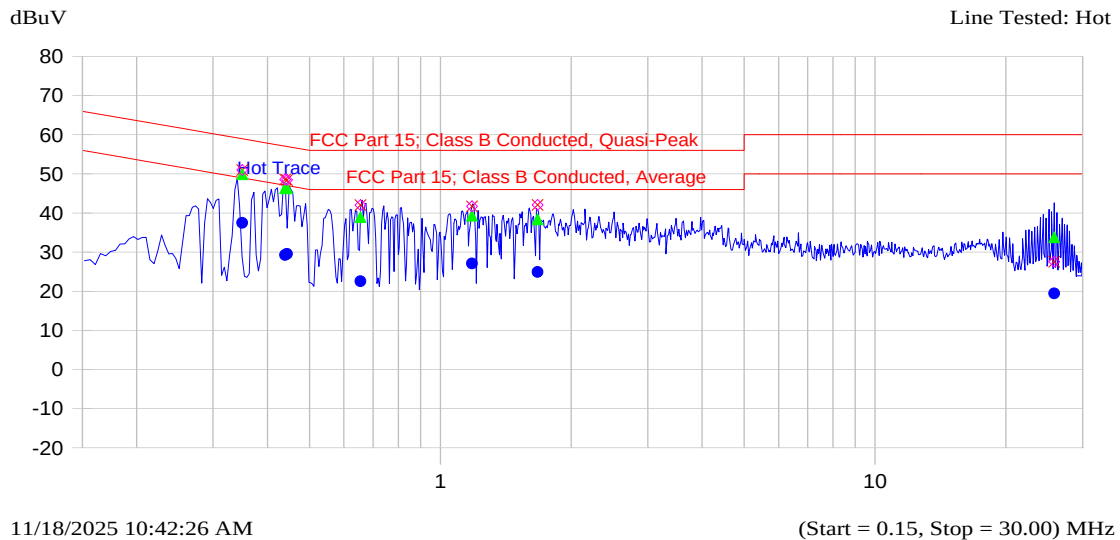


Current List

Frequency MHz	Peak dBuV	QP dBuV	QP-QP Limit dB	Avg dBuV	Avg-Avg Limit dB	Trace Name
1.021	30.8	27.8	-28.2	27.3	-18.7	Negative Trace
8.158	26.2	24.1	-35.9	19.5	-30.5	Negative Trace
12.237	26.2	23.3	-36.7	16.6	-33.4	Negative Trace
14.303	19.5	20.4	-39.6	4.9	-45.1	Negative Trace
16.336	25.2	16.8	-43.2	7.7	-42.3	Negative Trace

Plot 5.1.3.3. Power Line Conducted Emissions
PoE, Line Voltage 120 VAC, Line Tested: Hot

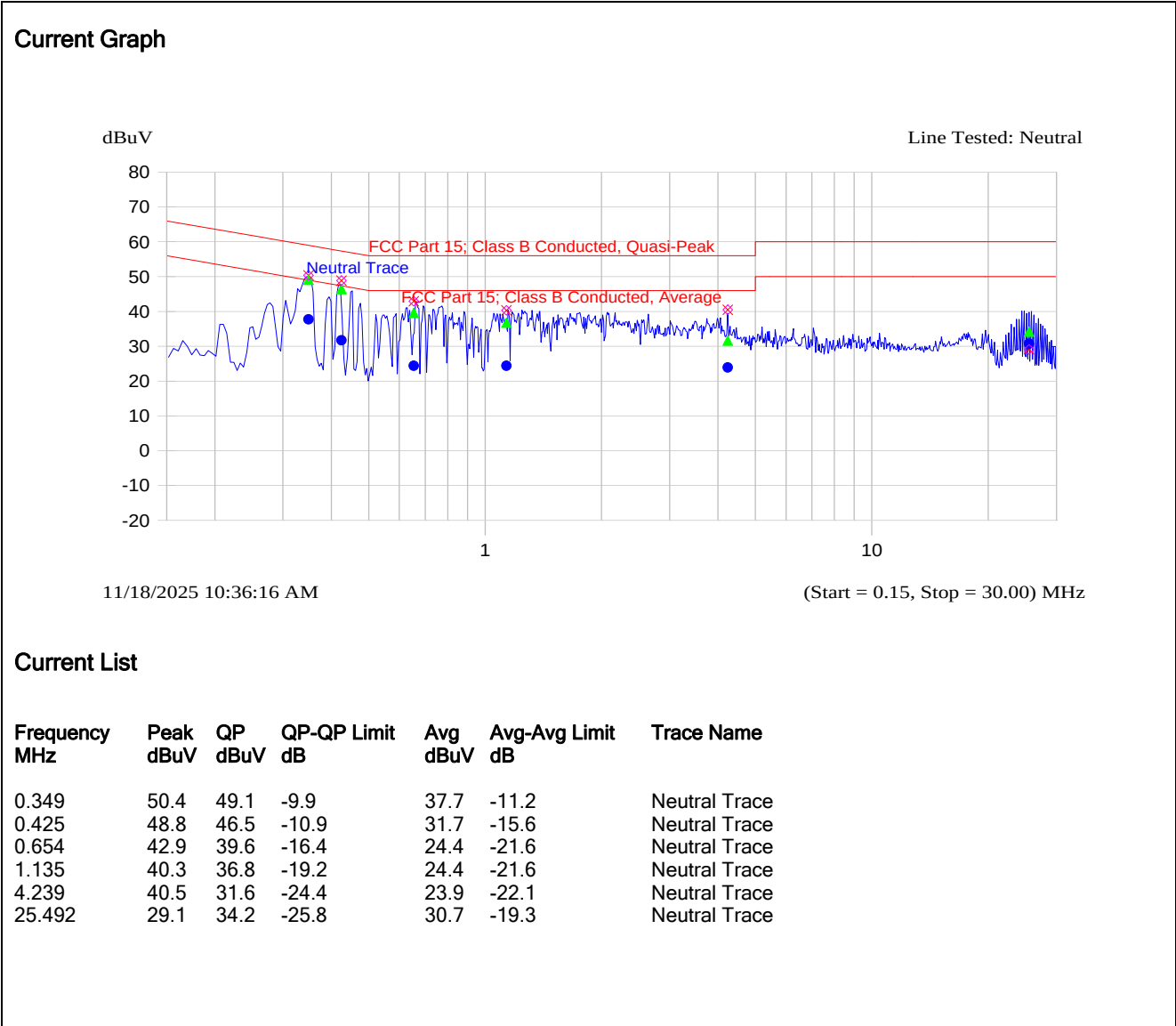
Current Graph



Current List

Frequency MHz	Peak dBuV	QP dBuV	QP-QP Limit dB	Avg dBuV	Avg-Avg Limit dB	Trace Name
0.350	51.0	49.9	-9.1	37.5	-11.5	Hot Trace
0.444	48.4	46.3	-10.7	29.6	-17.4	Hot Trace
0.440	48.6	46.4	-10.7	29.3	-17.8	Hot Trace
0.655	42.0	38.9	-17.1	22.5	-23.5	Hot Trace
1.183	41.7	39.3	-16.7	27.1	-18.9	Hot Trace
1.674	42.1	38.4	-17.6	24.9	-21.1	Hot Trace
25.840	27.5	33.8	-26.2	19.4	-30.6	Hot Trace

Plot 5.1.3.4. Power Line Conducted Emissions
PoE, Line Voltage120 VAC, Line Tested: Neutral



5.2. TRANSMITTER RADIATED EMISSIONS [47 CFR §§ 15.209 & 15.205]

5.2.1. Limit(s)

§ 15.209 Radiated emission limits; general requirements.

(a) 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

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.

(b) In the emission table above, the tighter limit applies at the band edges.

(c) The level of any unwanted emissions from an intentional radiator operating under these general provisions shall not exceed the level of the fundamental emission. For intentional radiators which operate under the provisions of other sections within this part and which are required to reduce their unwanted emissions to the limits specified in this table, the limits in this table are based on the frequency of the unwanted emission and not the fundamental frequency. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.

(d) The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

(e) The provisions in §§15.31, 15.33, and 15.35 for measuring emissions at distances other than the distances specified in the above table, determining the frequency range over which radiated emissions are to be measured, and limiting peak emissions apply to all devices operated under this part.

(f) In accordance with §15.33(a), in some cases the emissions from an intentional radiator must be measured to beyond the tenth harmonic of the highest fundamental frequency designed to be emitted by the intentional radiator because of the incorporation of a digital device. If measurements above the tenth harmonic are so required, the radiated emissions above the tenth harmonic shall comply with the general radiated emission limits applicable to the incorporated digital device, as shown in §15.109 and as based on the frequency of the emission being measured, or, except for emissions contained in the restricted frequency bands shown in §15.205, the limit on spurious emissions specified for the intentional radiator, whichever is the higher limit. Emissions which must be measured above the tenth harmonic of the highest fundamental frequency designed to be emitted by the

intentional radiator and which fall within the restricted bands shall comply with the general radiated emission limits in §15.109 that are applicable to the incorporated digital device.

(g) Perimeter protection systems may operate in the 54-72 MHz and 76-88 MHz bands under the provisions of this section. The use of such perimeter protection systems is limited to industrial, business and commercial applications.

5.2.2. Method of Measurements

ANSI C63.10 for measurement methods.

5.2.3. Test Data

Remarks:

- The measuring receiver shall be tuned over the frequency range 10 kHz to 1 GHz.
- All spurious emissions that are in excess of 20 dB below the specified limit shall be recorded.
- EUT was initially tested at 3m and the value measured at 3m shall be extrapolated as applicable to compare with limit and measurement distance specified in section 15.209(a).

5.2.3.1. Fundamental Emissions

Remarks:

- Field strength limit of the fundamental 130 kHz at 300m distance is $20 \cdot \log(2400/130) = 25.3$ dB μ V/m
- For frequency band 0.009- 0.490 MHz, the measured E-Field at 3m (column 2) will be extrapolated to 300m E-Field Level (column 3) using the extrapolation factor of $40 \cdot \log(3/300) = -80$ dB

EUT Powered by External DC Power Supply					
Frequency (kHz)	Peak E-Field at 3m (dB μ V/m)	Extrapolated E-Field Level at 300m (dB μ V/m)	Antenna Plane (H/V)	§ 15.209 (a) Limits @ 300m (dB μ V/m)	Margin (dB)
130	74.08	-5.92	V	25.3	-31.2
130	70.35	-9.65	H	25.3	-35.0

EUT Powered by PoE Adapter					
Frequency (kHz)	Peak E-Field at 3m (dB μ V/m)	Extrapolated E-Field Level at 300m (dB μ V/m)	Antenna Plane (H/V)	§ 15.209 (a) Limits @ 300m (dB μ V/m)	Margin (dB)
130	74.47	-5.53	V	25.3	-30.8
130	70.88	-9.12	H	25.3	-34.4

5.2.3.2. Harmonic/Spurious Emissions

Remarks:

- For frequency band 0.009- 0.490 MHz, the measured E-Field at 3m (column 2) will be extrapolated to 300m E-Field Level (column 3) using the extrapolation factor of $40 \cdot \log(3/300) = -80$ dB
- For frequency bands 0.490-1.705 MHz and 1.705-30.0 MHz, the measured E-Field at 3m (column 2) will be extrapolated to 30m E-Field Level (column 3) using the extrapolation factor of $40 \cdot \log(3/30) = -40$ dB

Frequency (MHz)	Peak E-Field @ 3m (dB μ V/m)	Extrapolated E-Field Level (dB μ V/m)	Antenna Plane (H/V)	§ 15.209 (a) Limits (dB μ V/m)	Margin (dB)
0.010 - 0.490	*	*	H / V	*	*
0.490 - 1.705	*	*	H / V	*	*
1.705 - 30.0	*	*	H / V	*	*

* No emissions or harmonics were detected within 20 dB of the limit.

5.3. 20 dB BANDWIDTH [47 CFR 15.209 (a)]

5.3.1. Limit(s)

Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., [§§ 15.231](#) and [15.241](#).

5.3.2. Method of Measurements

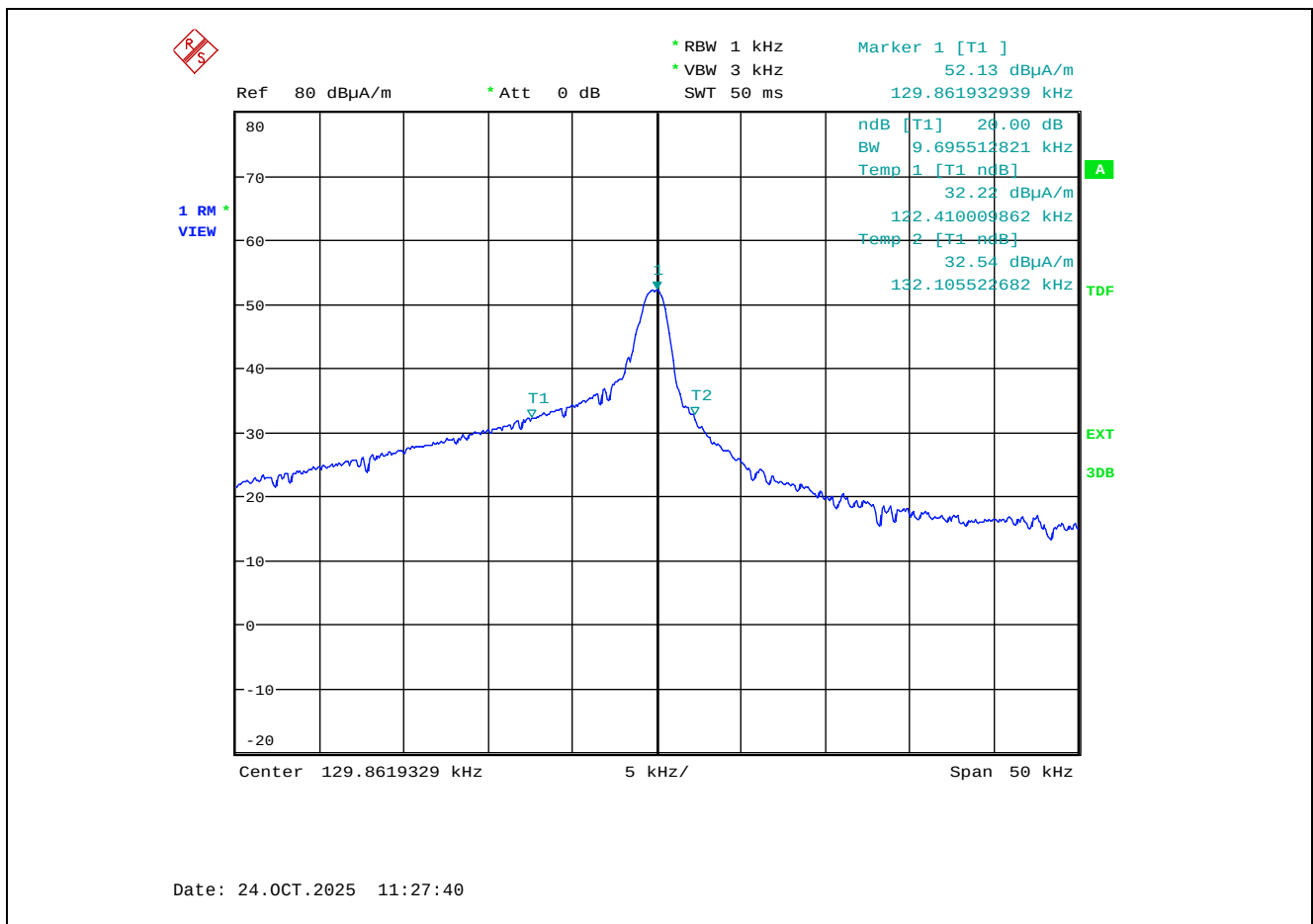
ANSI C63.10

5.3.3. Test Data

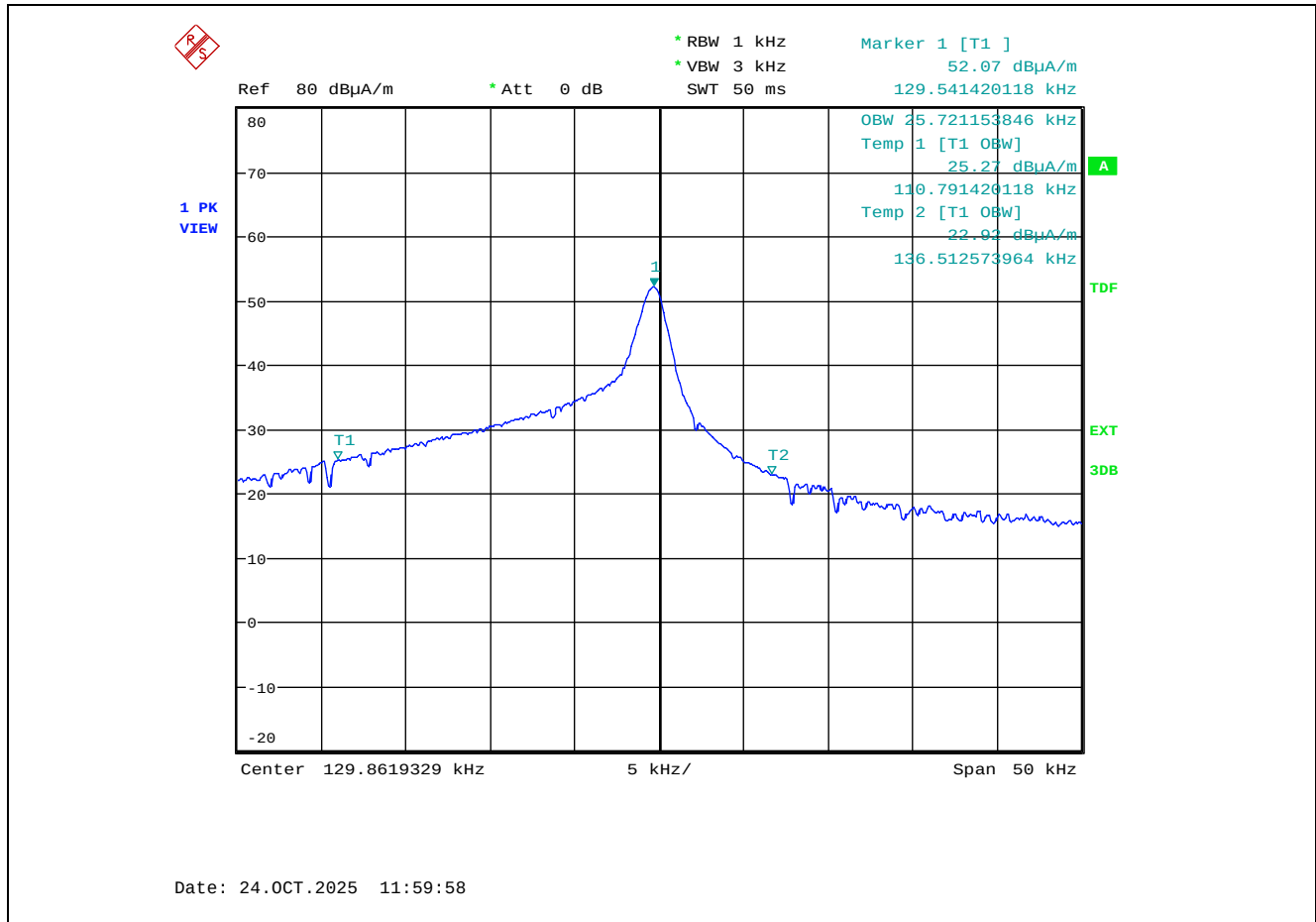
Channel Frequency	20 dB Bandwidth	99 %Occupied Bandwidth
130 kHz	9.696 kHz	25.721 kHz

See the following plot for details.

Plot 5.3.3.1. 20 dB Bandwidth, Fc: 130 kHz



Plot 5.3.3.2. 99% Occupied Bandwidth, Fc: 130 kHz



ULTRATECH GROUP OF LABS

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File #: 25INVX169_FCC15C209

April 7, 2026

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EXHIBIT 6. TEST EQUIPMENT LIST

Test Instruments	Manufacturer	Model No.	Serial No.	Frequency Range	Cal. Due Date
Spectrum Analyzer	Rohde & Schwarz	FSU26	100398	20Hz–26.5 GHz	26 Sep 2027
Loop Antenna	EMCO	6502	9104-2611	0.01 – 30 MHz	13 Jun 2026
Biconilog Antenna	EMCO	3142C	00034792	26 – 3000 MHz	16 Dec 2025
EMI Analyzer	HP	8593EM	3412A00103	9 kHz–26.5 GHz	20 Oct 2026
LISN	Schwarzbeck Mess Elektronik	NSLK 8127	8127276	9 kHz - 30 MHz	13 Dec 2025
High-pass Filter	Rohde & Schwarz	EZ-25	100064	150 kHz - 30 MHz	29 Oct 2026

ULTRATECH GROUP OF LABS

3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

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EXHIBIT 7. MEASUREMENT UNCERTAINTY

The measurement uncertainties stated were calculated in accordance with the requirements of CISPR 16-4-2 @ IEC:2003 and JCGM 100:2008 (GUM 1995) – Guide to the Expression of Uncertainty in Measurement.

Test Description	Expanded Uncertainty, K=2 for 95% Confidence Level
Power Line Conducted Emissions	± 2.62 dB
Radiated Emissions	± 2.68 dB (10 kHz - 30 MHz)
	± 4.30 dB (30 MHz – 1 GHz)
Frequency Stability/Bandwidth	± 2 Hz

ULTRATECH GROUP OF LABS

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