FCC and ISED Test Report

Apple Inc
Model: A3247

In accordance with FCC 47 CFR Part 15C and ISED RSS-247 and ISED RSS-GEN

TUV SUD Digitally signed by TUV SUD Date: 2024.07.16 13:35:24 +01'00'

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Cupertino
California
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FCC ID: BCGA3247 IC: 579C-A3247

COMMERCIAL-IN-CONFIDENCE

Document 75960488-12 Issue 01

SIGNATURE			
			
NAME	**JOB TITLE**	**RESPONSIBLE FOR**	**ISSUE DATE**
John Laydon	General Manager	Authorised Signatory	16 July 2024

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

ENGINEERING STATEMENT
The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate limited compliance with FCC 47 CFR Part 15C and ISED RSS-247 and ISED RSS-GEN. The sample tested was found to comply with the requirements defined in the applied rules.

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Testing	Nathan Harrison	16 July 2024	
Testing	Matthew Dawkins	16 July 2024	

FCC Accreditation
492497/UK2010 Octagon House, Fareham Test Laboratory

ISED Accreditation
12669A Octagon House, Fareham Test Laboratory

EXECUTIVE SUMMARY
A sample of this product was tested and found to be compliant with FCC 47 CFR Part 15C, ISED RSS-247 and ISED RSS-GEN: 2023, Issue 3 (2023-08) and Issue 5 (2018-04) + A2 (2021-02) for the tests detailed in section 1.3.

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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.

Issue	Description of Change	Date of Issue
1	First Issue	16 July 2024

Table 1

1.2 Introduction

Applicant	Apple Inc
Manufacturer	Apple Inc
EUT/Sample Identification	Refer to section 1.6
Test Specification/Issue/Date	FCC 47 CFR Part 15C, ISED RSS-247 and ISED RSS-GEN: 2023, Issue 3 (2023-08) and Issue 5 (2018-04) + A2 (2021-02)
Start of Test	12-June-2024
Finish of Test	14-June-2024
Name of Engineer(s)	Nathan Harrison and Matthew Dawkins
Related Document(s)	ANSI C63.10 (2020) ANSI C63.10 (2013)

1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 15C and ISED RSS-247 and ISED RSS-GEN is shown below.

Section	Specification Clause	Test Description	Result	Comments/Base Standard
Configuration and Mode: AC Powered - 2.4 GHz Bluetooth				
2.1	15.207, 3.1 and 8.8	AC Power Line Conducted Emissions	Pass	ANSI C63.10
Configuration and Mode: AC Powered - 2.4 GHz WLAN				
2.1	15.207, 3.1 and 8.8	AC Power Line Conducted Emissions	Pass	ANSI C63.10
Configuration and Mode: AC Powered - 5 GHz WLAN				
2.1	15.207, 3.1 and 8.8	AC Power Line Conducted Emissions	Pass	ANSI C63.10
Configuration and Mode: AC Powered - 6 GHz WLAN				
2.1	15.207, 3.1 and 8.8	AC Power Line Conducted Emissions	Pass	ANSI C63.10
Configuration and Mode: AC Powered - Thread				
2.1	15.207, 3.1 and 8.8	AC Power Line Conducted Emissions	Pass	ANSI C63.10
Configuration and Mode: AC Powered - Narrowband				
2.1	15.207, 3.1 and 8.8	AC Power Line Conducted Emissions	Pass	ANSI C63.10

Table 2

1.4 Product Information

1.4.1 Technical Description

The equipment under test (EUT) was a desktop computer.

1.4.2 EUT Port/Cable Identification

Port	Max Cable Length specified	Usage	Type	Screened
Configuration and Mode: AC Powered – All Modes				
AC Power	3 m	Power	AC/DC converter power brick with mag safe connector.	No
USB 1 Port	1 m	Data	USB Type C	No
USB 2 Port	1 m	Data	USB Type C	No
USB 3 Port	Unterminated	Data	USB Type C	No
USB 4 Port	Unterminated	Data	USB Type C	No
Audio Jack Port	Unterminated	Data	Audio Jack 3.5mm	No

Table 3

1.4.3 Test Configuration

Configuration	Description
AC Powered	The EUT was powered from a 120 V 60 Hz AC supply. A ethernet switch was used to terminate the ethernet port located on the PSU. A 3.5 mm audio jack port was unterminated. A mouse was used to terminate a USB-C port. A keyboard was used to terminate a USB-C port. Two USB-C ports were unterminated. PSU model: A2390

Table 4

1.4.4 Modes of Operation

Mode	Description
2.4 GHz Bluetooth	The EUT was powered with a connection established with a CMW 500 test set.
2.4 GHz WLAN	The EUT was powered with a network link established with an access point.
5 GHz WLAN	The EUT was powered with a network link established with an access point.
6 GHz WLAN	The EUT was powered with a network link established with an access point.
Narrowband	The EUT was powered and placed in a link with another customer provided slave device.
Thread	The EUT was powered and placed in a link with another customer provided slave device.

Table 5

1.5 Deviations from the Standard

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

1.6 Identification of the EUT

The table below details identification of the EUT(s) that have been used to carry out the testing within this report.

Model: A3247			
Serial Number	Hardware Version	Software Version	Firmware
L9L40D9RHJ	REV1.0	24A81452a	WLAN: 23.30.16 Bluetooth: 22.1.65.459
LXP594GVK3	REV1.0	24A81452a	WLAN: 23.30.16 Bluetooth: 22.1.65.459

Table 6

1.7 EUT Modification Record

The table below details modifications made to the EUT during the test programme.

The modifications incorporated during each test are recorded on the appropriate test pages.

Modification State	Description of Modification still fitted to EUT	Modification Fitted By	Date Modification Fitted
Model: A3247, Serial Number: L9L40D9RHJ			
0	As supplied by the customer	Not Applicable	Not Applicable
Model: A3247, Serial Number: LXP594GVK3			
0	As supplied by the customer	Not Applicable	Not Applicable

Table 7

1.8 Test Location

TÜV SÜD conducted the following tests at our Octagon House Test Laboratory.

Test Name	Name of Engineer(s)	Accreditation
Configuration and Mode: AC Powered - 2.4 GHz Bluetooth		
AC Power Line Conducted Emissions	Nathan Harrison	UKAS
Configuration and Mode: AC Powered - 2.4 GHz WLAN		
AC Power Line Conducted Emissions	Matthew Dawkins	UKAS
Configuration and Mode: AC Powered - 5 GHz WLAN		
AC Power Line Conducted Emissions	Matthew Dawkins	UKAS
Configuration and Mode: AC Powered - 6 GHz WLAN		
AC Power Line Conducted Emissions	Matthew Dawkins	UKAS
Configuration and Mode: AC Powered - Thread		
AC Power Line Conducted Emissions	Matthew Dawkins	UKAS
Configuration and Mode: AC Powered - Narrowband		
AC Power Line Conducted Emissions	Nathan Harrison	UKAS

Table 8

Office Address:

TÜV SÜD
Octagon House
Concorde Way
Fareham
Hampshire
PO15 5RL
United Kingdom

2 Test Details

2.1 AC Power Line Conducted Emissions

2.1.1 Specification Reference

FCC 47 CFR Part 15C, ISED RSS-247 and ISED RSS-GEN, Clause 15.207, 3.1 and 8.8

2.1.2 Equipment Under Test and Modification State

A3247, S/N: L9L40D9RHJ - Modification State 0
A3247, S/N: LXP594GVK3 - Modification State 0

2.1.3 Date of Test

12-June-2024 to 14-June-2024

2.1.4 Test Method

The test was performed in accordance with ANSI C63.10, clause 6.2.

The EUT was placed on a non-conductive table 0.8m above a reference ground plane and 0.4m away from a vertical coupling plane.

All power was connected to the EUT through an Artificial Mains Network (AMN).

Conducted disturbance voltage measurements on mains lines were made at the output of the AMN.

2.1.5 Example Calculation

Quasi-Peak level (dBµV) = Receiver level (dBµV) + Correction Factor (dB)
Margin (dB) = Quasi-Peak level (dBµV) - Limit (dBµV)

CISPR Average level (dBµV) = Receiver level (dBµV) + Correction Factor (dB)
Margin (dB) = CISPR Average level (dBµV) - Limit (dBµV)

2.1.6 Example Test Setup Diagram

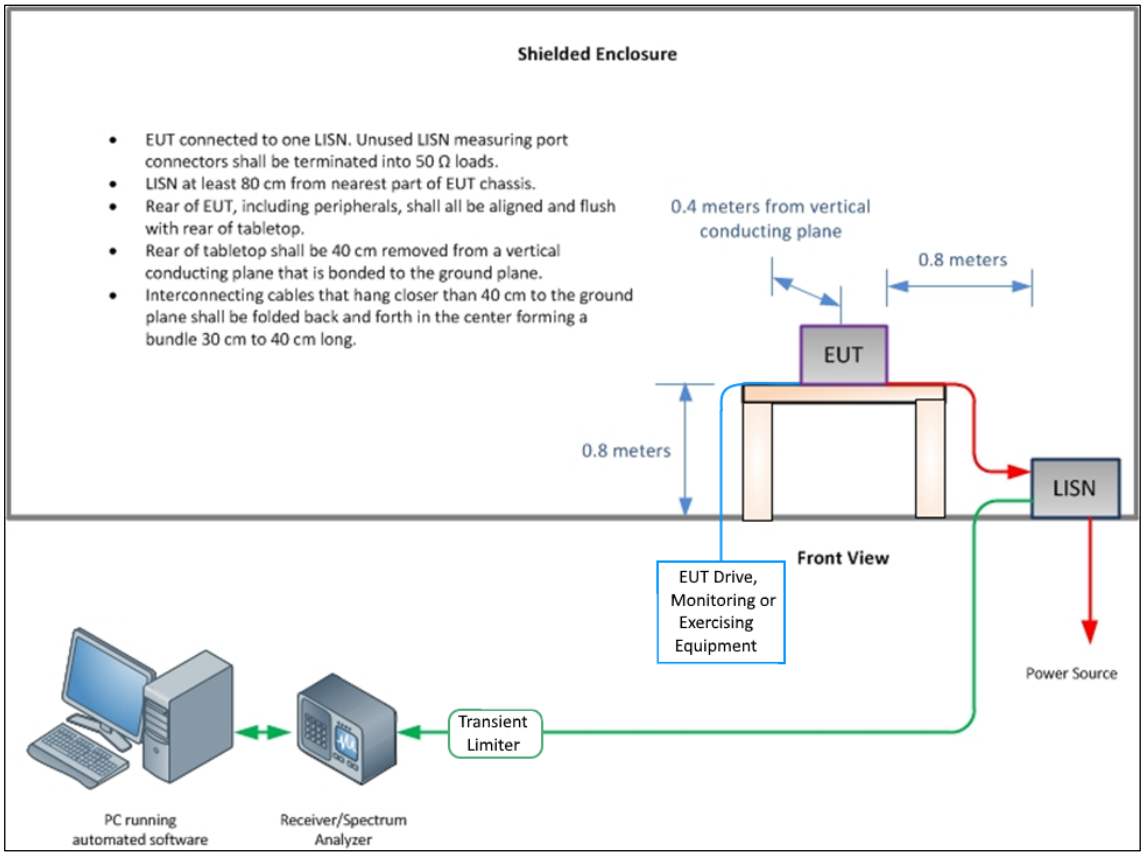

Figure 1 - Conducted Disturbance

2.1.7 Environmental Conditions

Ambient Temperature	19.8 °C
Relative Humidity	50.7 %

2.1.8 Specification Limits

Frequency of Emission (MHz)	Conducted Limit (dBµV)	
	Quasi-Peak	CISPR Average
0.15 to 0.5	66 to 56*	56 to 46*
0.5 to 5	56	46
5 to 30	60	50

Table 9

*Decreases with the logarithm of the frequency.

2.1.9 Test Results

AC Powered - 2.4 GHz Bluetooth

Applied supply voltage: 120 V AC
Applied supply frequency: 60 Hz

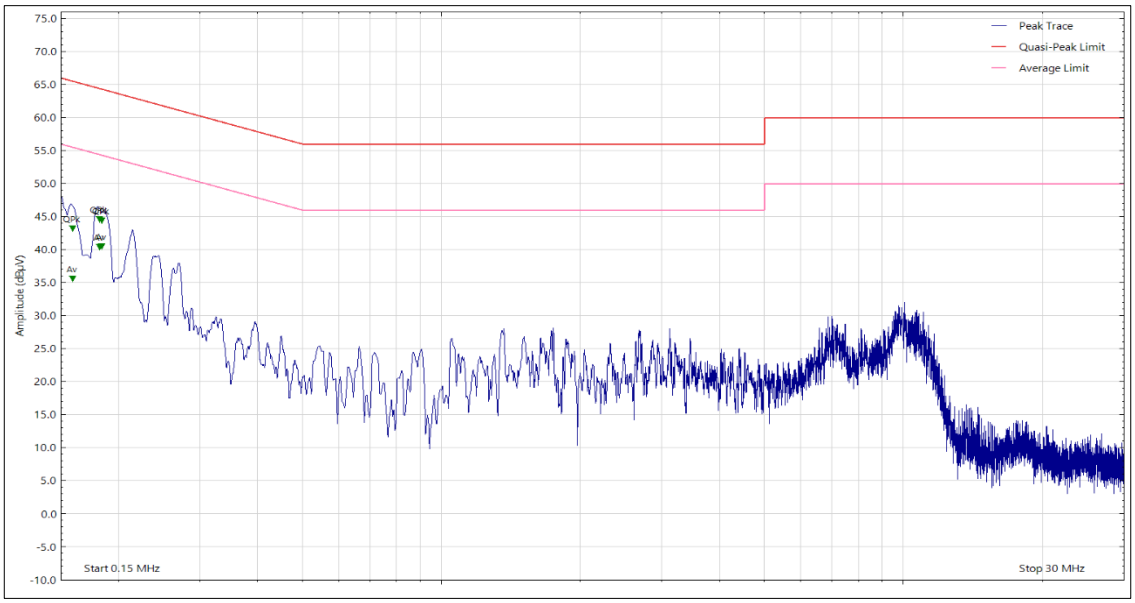

Figure 2 - Live Line - 150 kHz to 30 MHz

Frequency (MHz)	Level (dBµV)	Limit (dBµV)	Margin (dB)	Detector
0.159	42.49	65.50	-23.01	Q-Peak
0.159	34.89	55.50	-20.61	CISPR Avg
0.182	43.89	64.40	-20.51	Q-Peak
0.182	39.68	54.40	-14.72	CISPR Avg
0.184	43.72	64.30	-20.58	Q-Peak
0.184	39.79	54.30	-14.51	CISPR Avg

Table 10 - Live Line Emissions Results

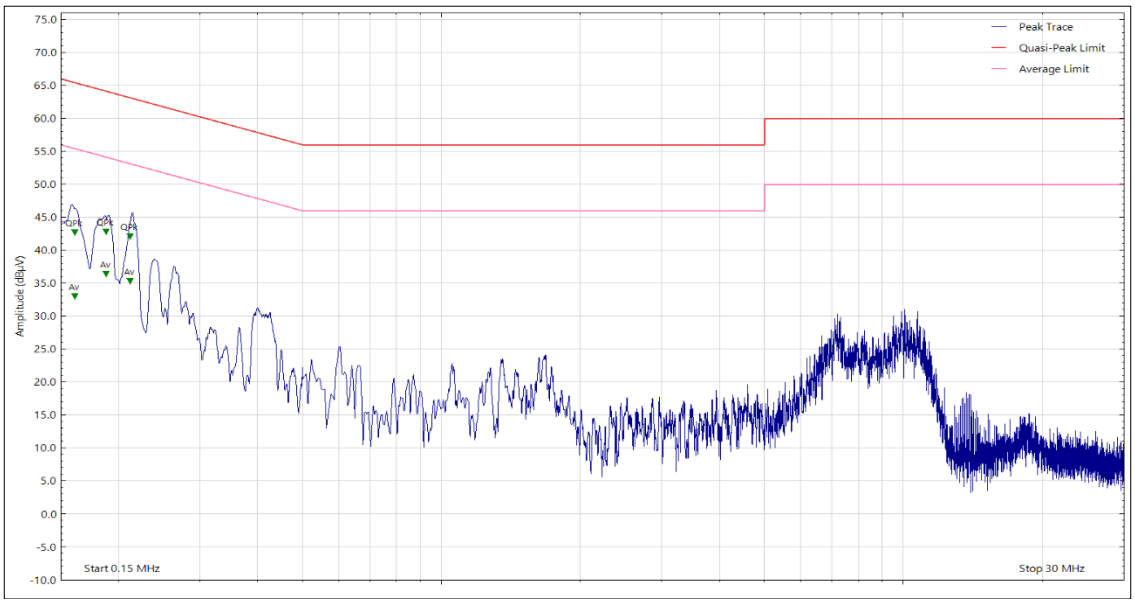

Figure 3 - Neutral Line - 150 kHz to 30 MHz

Frequency (MHz)	Level (dBµV)	Limit (dBµV)	Margin (dB)	Detector
0.161	41.98	65.40	-23.42	Q-Peak
0.161	32.27	55.40	-23.13	CISPR Avg
0.188	42.10	64.10	-22.00	Q-Peak
0.188	35.73	54.10	-18.37	CISPR Avg
0.212	41.43	63.10	-21.67	Q-Peak
0.212	34.62	53.10	-18.48	CISPR Avg

Table 11 - Neutral Line Emissions Results

AC Powered - 2.4 GHz WLAN

Applied supply voltage: 120 V AC
Applied supply frequency: 60 Hz

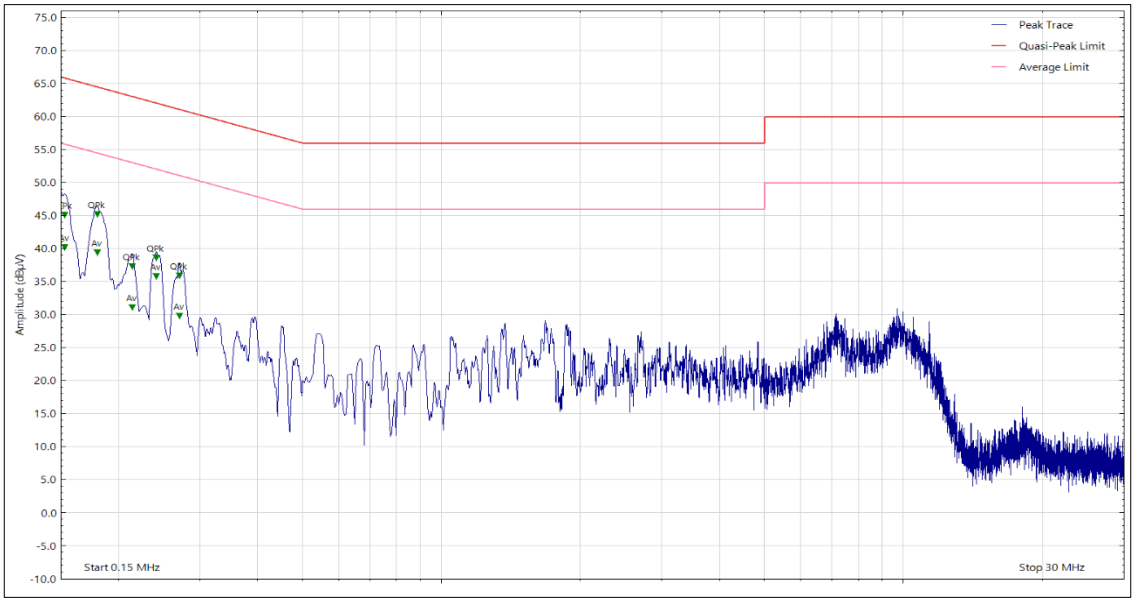

Figure 4 - Live Line - 150 kHz to 30 MHz

Frequency (MHz)	Level (dBµV)	Limit (dBµV)	Margin (dB)	Detector
0.153	44.37	65.80	-21.43	Q-Peak
0.153	39.54	55.80	-16.26	CISPR Avg
0.180	44.44	64.50	-20.06	Q-Peak
0.180	38.72	54.50	-15.78	CISPR Avg
0.214	36.59	63.00	-26.41	Q-Peak
0.214	30.45	53.00	-22.55	CISPR Avg
0.242	37.85	62.00	-24.15	Q-Peak
0.242	35.13	52.00	-16.87	CISPR Avg
0.271	29.12	51.10	-21.98	CISPR Avg
0.271	35.16	61.10	-25.94	Q-Peak

Table 12 - Live Line Emissions Results

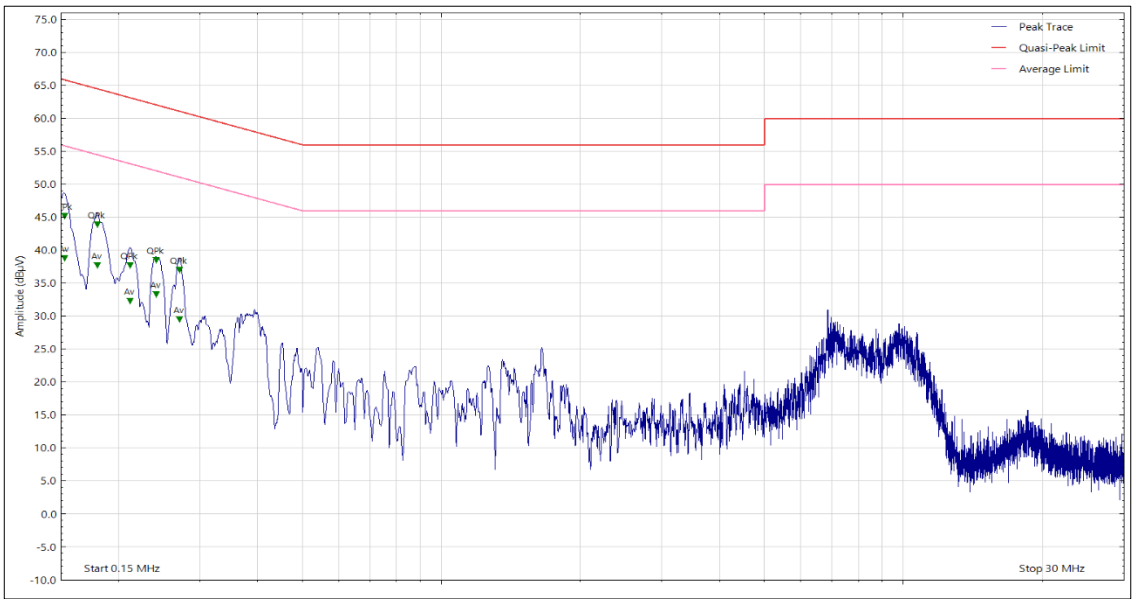

Figure 5 - Neutral Line - 150 kHz to 30 MHz

Frequency (MHz)	Level (dBµV)	Limit (dBµV)	Margin (dB)	Detector
0.153	44.45	65.90	-21.45	Q-Peak
0.153	38.07	55.90	-17.83	CISPR Avg
0.180	43.15	64.50	-21.35	Q-Peak
0.180	37.00	54.50	-17.50	CISPR Avg
0.212	36.96	63.10	-26.14	Q-Peak
0.212	31.64	53.10	-21.46	CISPR Avg
0.242	32.64	52.00	-19.36	CISPR Avg
0.242	37.80	62.00	-24.20	Q-Peak
0.271	36.31	61.10	-24.79	Q-Peak
0.271	28.82	51.10	-22.28	CISPR Avg

Table 13 - Neutral Line Emissions Results

AC Powered - 5 GHz WLAN

Applied supply voltage: 120 V AC
Applied supply frequency: 60 Hz

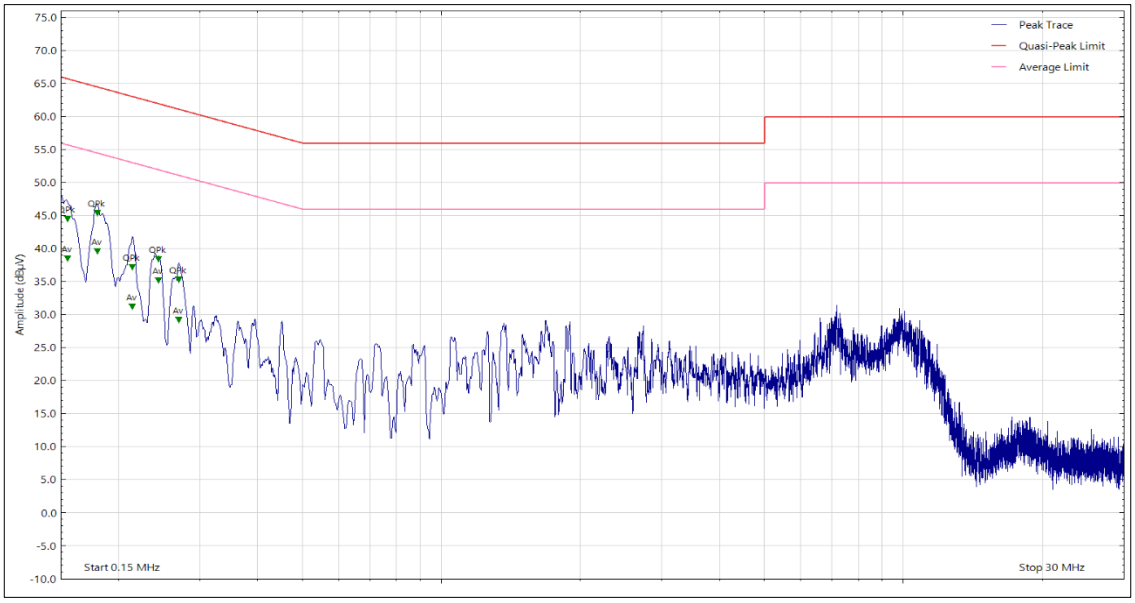

Figure 6 - Live Line - 150 kHz to 30 MHz

Frequency (MHz)	Level (dBµV)	Limit (dBµV)	Margin (dB)	Detector
0.153	44.37	65.80	-21.43	Q-Peak
0.153	39.54	55.80	-16.26	CISPR Avg
0.180	44.44	64.50	-20.06	Q-Peak
0.180	38.72	54.50	-15.78	CISPR Avg
0.214	36.59	63.00	-26.41	Q-Peak
0.214	30.45	53.00	-22.55	CISPR Avg
0.242	37.85	62.00	-24.15	Q-Peak
0.242	35.13	52.00	-16.87	CISPR Avg
0.271	29.12	51.10	-21.98	CISPR Avg
0.271	35.16	61.10	-25.94	Q-Peak

Table 14 - Live Line Emissions Results

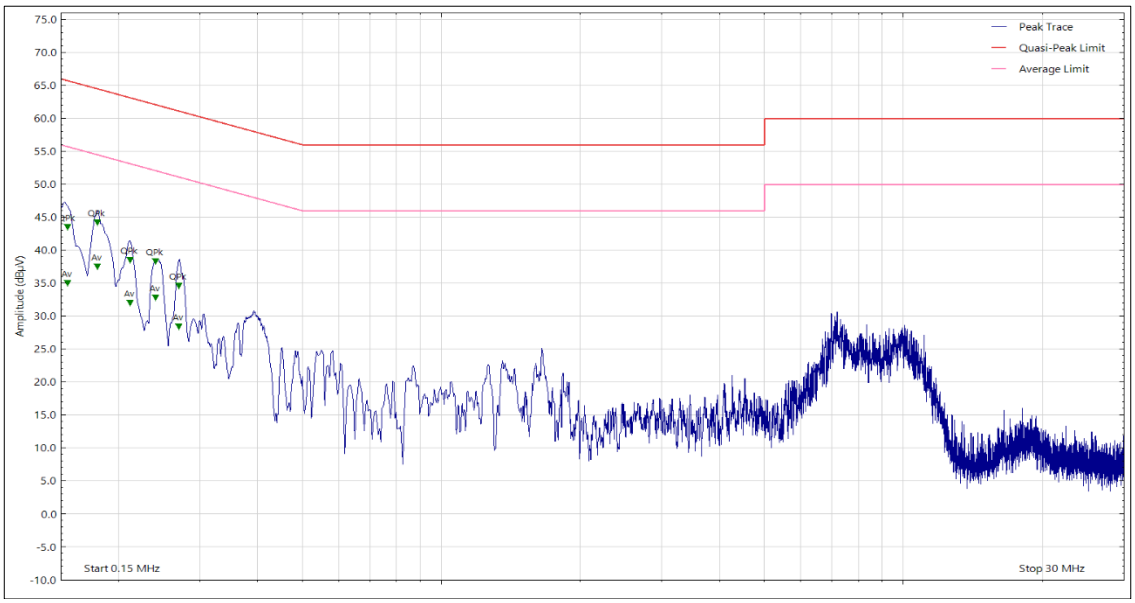

Figure 7 - Neutral Line - 150 kHz to 30 MHz

Frequency (MHz)	Level (dBµV)	Limit (dBµV)	Margin (dB)	Detector
0.153	44.45	65.90	-21.45	Q-Peak
0.153	38.07	55.90	-17.83	CISPR Avg
0.180	43.15	64.50	-21.35	Q-Peak
0.180	37.00	54.50	-17.50	CISPR Avg
0.212	36.96	63.10	-26.14	Q-Peak
0.212	31.64	53.10	-21.46	CISPR Avg
0.242	32.64	52.00	-19.36	CISPR Avg
0.242	37.80	62.00	-24.20	Q-Peak
0.271	36.31	61.10	-24.79	Q-Peak
0.271	28.82	51.10	-22.28	CISPR Avg

Table 15 - Neutral Line Emissions Results

AC Powered - 6 GHz WLAN

Applied supply voltage: 120 V AC
Applied supply frequency: 60 Hz

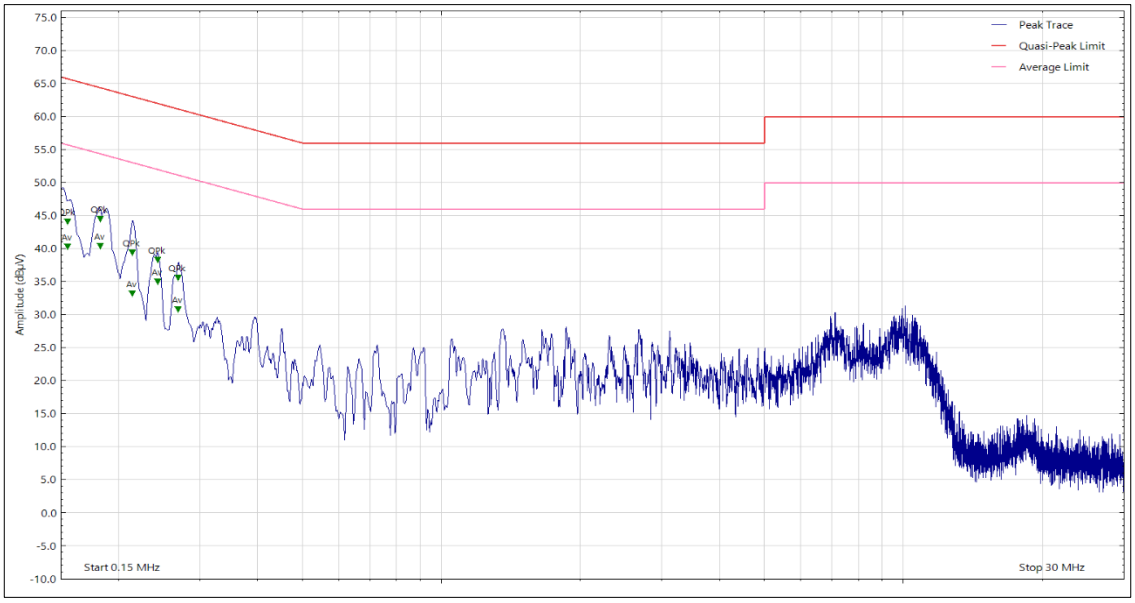

Figure 8 - Live Line - 150 kHz to 30 MHz

Frequency (MHz)	Level (dBµV)	Limit (dBµV)	Margin (dB)	Detector
0.155	39.58	55.80	-16.22	CISPR Avg
0.155	43.41	65.80	-22.39	Q-Peak
0.183	39.74	54.40	-14.66	CISPR Avg
0.183	43.74	64.40	-20.66	Q-Peak
0.214	32.47	53.00	-20.53	CISPR Avg
0.214	38.72	63.00	-24.28	Q-Peak
0.243	34.25	52.00	-17.75	CISPR Avg
0.243	37.60	62.00	-24.40	Q-Peak
0.269	34.89	61.10	-26.21	Q-Peak
0.269	30.12	51.10	-20.98	CISPR Avg

Table 16 - Live Line Emissions Results

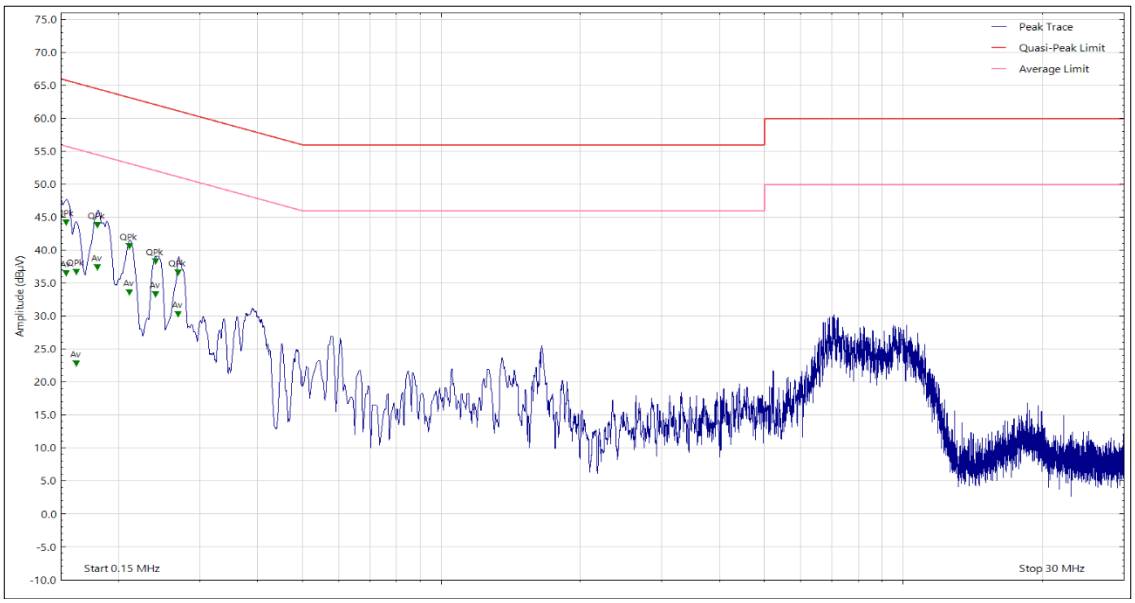

Figure 9 - Neutral Line - 150 kHz to 30 MHz

Frequency (MHz)	Level (dBµV)	Limit (dBµV)	Margin (dB)	Detector
0.154	43.49	65.80	-22.31	Q-Peak
0.154	35.77	55.80	-20.03	CISPR Avg
0.162	35.98	65.30	-29.32	Q-Peak
0.162	22.10	55.30	-33.20	CISPR Avg
0.180	43.04	64.50	-21.46	Q-Peak
0.180	36.66	54.50	-17.84	CISPR Avg
0.211	39.85	63.20	-23.35	Q-Peak
0.211	32.88	53.20	-20.32	CISPR Avg
0.241	32.61	52.10	-19.49	CISPR Avg
0.241	37.63	62.10	-24.47	Q-Peak
0.269	35.89	61.10	-25.21	Q-Peak
0.269	29.64	51.10	-21.46	CISPR Avg

Table 17 - Neutral Line Emissions Results

AC Powered - Thread

Applied supply voltage: 120 V AC
Applied supply frequency: 60 Hz

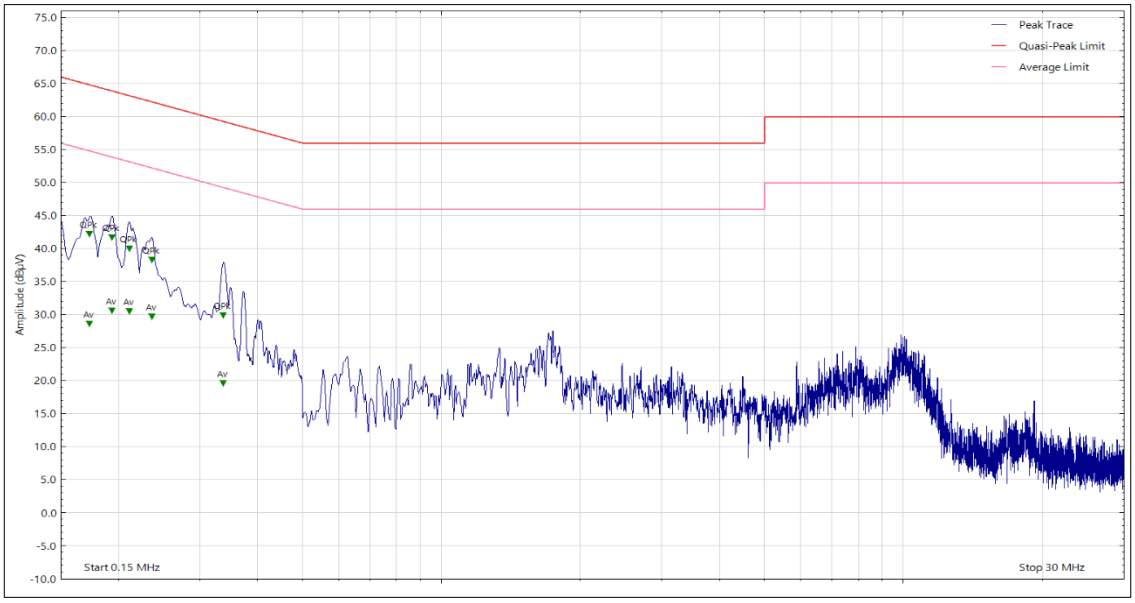

Figure 10 - Live Line - 150 kHz to 30 MHz

Frequency (MHz)	Level (dBµV)	Limit (dBµV)	Margin (dB)	Detector
0.173	41.45	64.80	-23.35	Q-Peak
0.173	27.95	54.80	-26.85	CISPR Avg
0.194	29.90	53.90	-24.00	CISPR Avg
0.194	41.03	63.90	-22.87	Q-Peak
0.211	29.83	53.20	-23.37	CISPR Avg
0.211	39.29	63.20	-23.91	Q-Peak
0.236	37.55	62.20	-24.65	Q-Peak
0.236	29.02	52.20	-23.18	CISPR Avg
0.337	29.18	59.30	-30.12	Q-Peak
0.337	18.95	49.30	-30.35	CISPR Avg

Table 18 - Live Line Emissions Results

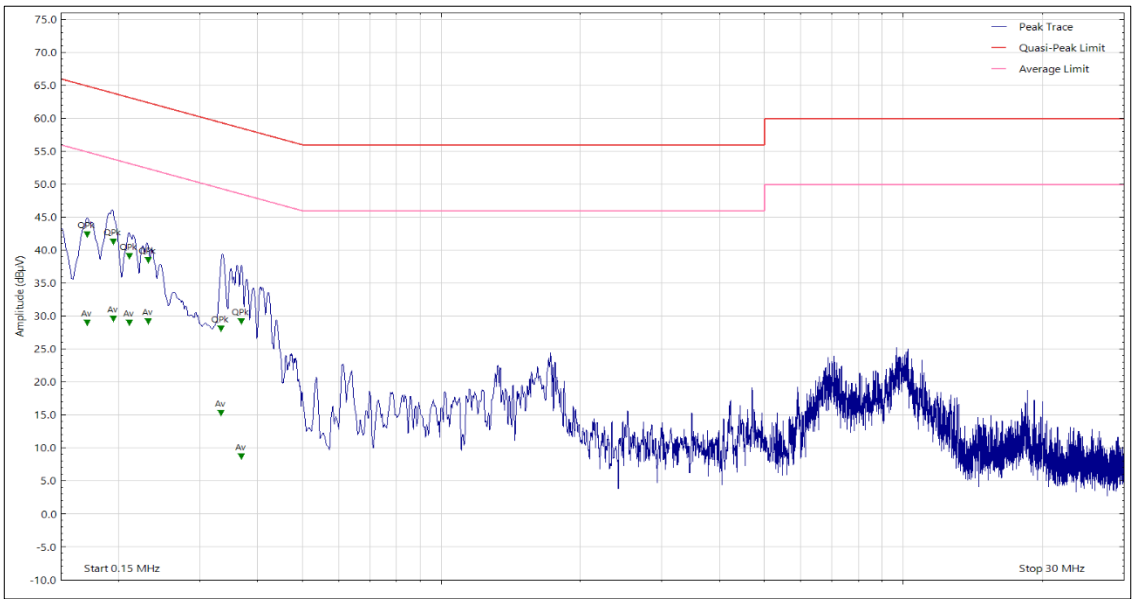

Figure 11 - Neutral Line - 150 kHz to 30 MHz

Frequency (MHz)	Level (dBµV)	Limit (dBµV)	Margin (dB)	Detector
0.171	41.70	64.90	-23.20	Q-Peak
0.171	28.27	54.90	-26.63	CISPR Avg
0.195	28.87	53.80	-24.93	CISPR Avg
0.195	40.64	63.80	-23.16	Q-Peak
0.211	38.38	63.20	-24.82	Q-Peak
0.211	28.33	53.20	-24.87	CISPR Avg
0.232	37.82	62.40	-24.58	Q-Peak
0.232	28.50	52.40	-23.90	CISPR Avg
0.334	27.37	59.30	-31.93	Q-Peak
0.334	14.63	49.30	-34.67	CISPR Avg
0.369	28.47	58.50	-30.03	Q-Peak
0.369	8.02	48.50	-40.48	CISPR Avg

Table 19 - Neutral Line Emissions Results

AC Powered - Narrowband

Applied supply voltage: 120 V AC
Applied supply frequency: 60 Hz

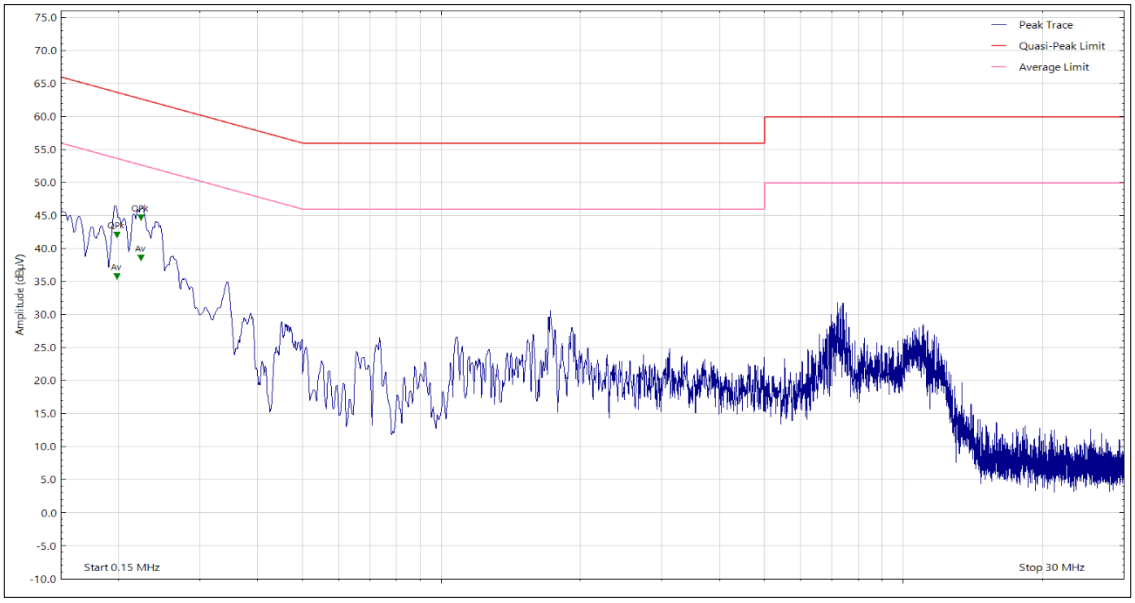

Figure 12 - Live Line - 150 kHz to 30 MHz

Frequency (MHz)	Level (dBµV)	Limit (dBµV)	Margin (dB)	Detector
0.199	41.38	63.60	-22.22	Q-Peak
0.199	35.11	53.60	-18.49	CISPR Avg
0.224	43.98	62.70	-18.72	Q-Peak
0.224	37.94	52.70	-14.76	CISPR Avg

Table 20 - Live Line Emissions Results

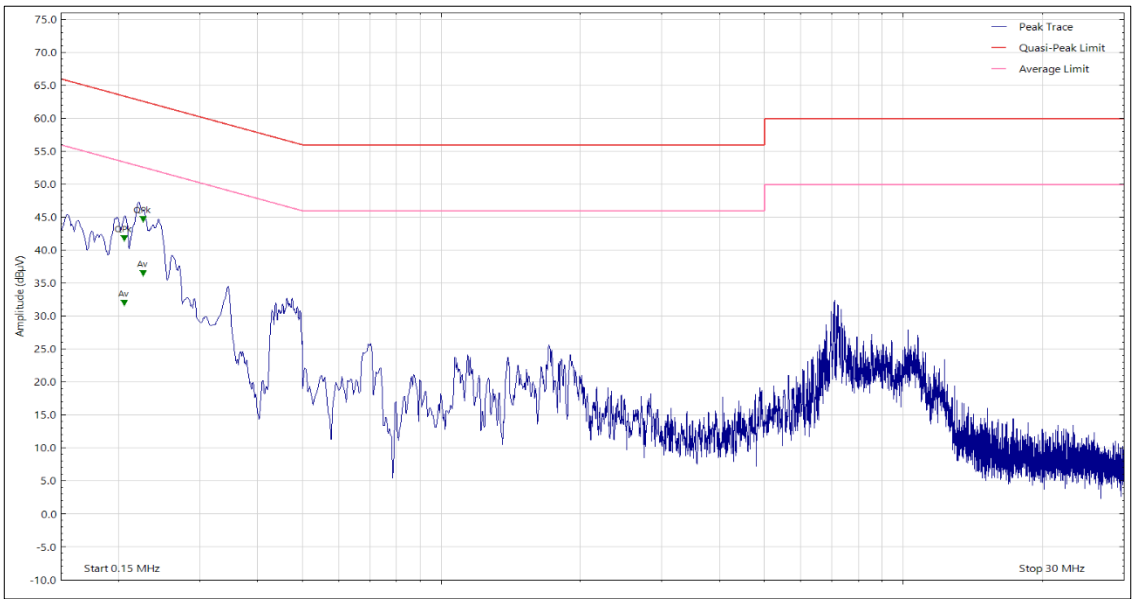

Figure 13 - Neutral Line - 150 kHz to 30 MHz

Frequency (MHz)	Level (dBµV)	Limit (dBµV)	Margin (dB)	Detector
0.206	41.07	63.30	-22.23	Q-Peak
0.206	31.31	53.30	-21.99	CISPR Avg
0.226	43.96	62.60	-18.64	Q-Peak
0.226	35.78	52.60	-16.82	CISPR Avg

Table 21 - Neutral Line Emissions Results

2.1.10 Test Location and Test Equipment Used

This test was carried out in EMC Chamber 12.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
Transient Limiter	Hewlett Packard	11947A	15	12	24-Oct-2024
LISN (CISPR 16, Single Phase)	Rohde & Schwarz	ESH3-Z5	1390	12	01-Feb-2025
Emissions Software	TUV SUD	EmX V3.2.0	5125	-	Software
Thermo-Hygro-Barometer	PCE Instruments	PCE-THB 40	5478	12	13-May-2025
EMI Test Receiver	Rohde & Schwarz	ESW44	5527	12	15-Jun-2024
3m Semi-Anechoic Chamber	MVG	EMC Chamber 12	5621	36	07-Aug-2026
Cable (N-Type, 10 Hz-18 GHz)	Junkosha	MWX221-02000AMSAMS	5724	6	17-Aug-2024
Cable (N-Type to N-Type, 8 m)	Junkosha	MWX221-08000NMSNMS/B	6321	12	04-Feb-2025

Table 22

3 Incident Reports

No incidents reports were raised.

4 Measurement Uncertainty

For a 95% confidence level, the measurement uncertainties for defined systems are:

Test Name	Measurement Uncertainty
AC Power Line Conducted Emissions	150 kHz to 30 MHz, LISN, ± 3.7 dB

Table 23

Measurement Uncertainty Decision Rule – Accuracy Method

Determination of conformity with the specification limits is based on the decision rule according to IEC Guide 115:2021, Clause 4.4.3 (Procedure 2). The measurement results are directly compared with the test limit to determine conformance with the requirements of the standard.

Risk: The uncertainty of measurement about the measured result is negligible with regard to the final pass/fail decision. The measurement result can be directly compared with the test limit to determine conformance with the requirement (compare IEC Guide 115). The level of risk to falsely accept and falsely reject items is further described in ILAC-G8.