

FCC and ISED Test Report

Apple Inc
Model: A3448



In accordance with FCC 47 CFR Part 15B,
ICES-003 and ISED RSS-GEN

Prepared for: Apple Inc
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SIGNATURE

A. Lawson

NAME	JOB TITLE	RESPONSIBLE FOR	ISSUE DATE
Andrew Lawson	Chief Engineer, EMC	Authorised Signatory	30 October 2025

Signatures in this approval box have checked this document in line with the requirements of TUV SUD 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 15B and ICES-003 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	30 October 2025	<i>NH</i>
	Adam Holloway	30 October 2025	<i>AH</i>

FCC Accreditation 492497/UK2010 Octagon House, Fareham Test Laboratory

ISED Accreditation

12669A/UK0003 Octagon House, Fareham Test Laboratory

EXECUTIVE SUMMARY

A sample of this product was tested and found to be compliant with FCC 47 CFR Part 15B, ICES-003 and ISED RSS-GEN: 2024, Issue 7: 2020 and Issue 5 and A2 (2021-02) for the tests detailed in section 1.3.



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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	30 October 2025

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 15B: 2024 ICES-003, Issue 7: 2020 ISED RSS-GEN, Issue 5, A2 (2021-02)
Start of Test	22-September-2025
Finish of Test	23-September-2025
Name of Engineer(s)	Nathan Harrison and Adam Holloway
Related Document(s)	ANSI C63.4: 2014



1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 15B, ICES-003 and ISED RSS-GEN is shown below.

Section	Specification Clause	Test Description	Result	Comments/Base Standard
Configuration and Mode: AC Powered - Transmitters Idle				
2.1	15.109, 3.2.2 and 4.4	Radiated Disturbance	Pass	ANSI C63.4: 2014
2.2	15.107, 3.2.1 and 4.4	Conducted Disturbance at Mains Terminals	Pass	ANSI C63.4: 2014

Table 2

1.4 Product Information

1.4.1 Technical Description

The equipment under test (EUT) was a portable laptop computer.

1.4.2 EUT Port/Cable Identification

Port	Max Cable Length specified	Usage	Type	Screened
Configuration and Mode: AC Powered - Transmitters Idle				
AC Power Port	2 m	Main Power	AC to DC Power Adapter with USB-C output.	No
USB Port 1	1.5 m	Power/Data	USB Type-C	Yes
USB Port 2	1.5 m	Power/Data	USB Type-C	Yes
Audio Jack Port	1 m	Analogue Audio Output	3.5 mm Jack	No

Table 3

1.4.3 Test Configuration

Configuration	Description
AC Powered	The EUT was powered from a 120 V 60 Hz AC supply using an AC to DC adapter with USB-C output and MagSafe cable. PSU Model: A2676 A mouse was used to terminate USB Port 1. A set of headphones were used to terminate the Audio Jack Port. USB Port 2 was unterminated.

Table 4

1.4.4 Modes of Operation

Mode	Description
Transmitters Idle	The EUT was powered with all internal transmitters disabled.

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: A3448		
Serial Number	Hardware Version	Software Version
C2WXM4N3TQ	REV1.0	25A12710v

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: A3448, Serial Number: C2WXM4N3TQ			
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 - Transmitters Idle		
Radiated Disturbance	Nathan Harrison	UKAS
Conducted Disturbance at Mains Terminals	Adam Holloway	UKAS

Table 8

Office Address:

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



2 Test Details

2.1 Radiated Disturbance

2.1.1 Specification Reference

FCC 47 CFR Part 15B, ICES-003 and ISSED RSS-GEN, Clause 15.109, 3.2.2 and 4.4

2.1.2 Equipment Under Test and Modification State

A3448, S/N: C2WXM4N3TQ - Modification State 0

2.1.3 Date of Test

22-September-2025 to 23-September-2025

2.1.4 Test Method

The EUT was set up in a semi-anechoic chamber in the centre of a remotely controlled turntable and placed on a non-conductive table 0.8 m above a reference ground plane.

A Peak detector pre-scan of the EUT emissions profile was measured across the appropriate frequency range while varying the antenna-to-EUT azimuth and polarisation. Measurements were made using a 3 m distance between the declared antenna measurement point and the EUT.

Where all pre-scan peak emissions measured were greater than 20 dB below the test limit, no final measurements were made in accordance with ANSI C63.4.

Where any pre-scan peak emissions were within 20 dB of the test limit, the six highest pre-scan peak emissions seen across the frequency range were maximised by adjusting antenna height, polarisation and angle and then measured for at least 15 seconds using a Peak, Quasi-Peak or CISPR Average detector as appropriate to the test limit being measured against.

2.1.5 Example Calculation

Below 1 GHz:

$$\begin{aligned}\text{Quasi-Peak level (dB}\mu\text{V/m)} &= \text{Receiver level (dB}\mu\text{V)} + \text{Correction Factor (dB/m)} \\ \text{Margin (dB)} &= \text{Quasi-Peak level (dB}\mu\text{V/m)} - \text{Limit (dB}\mu\text{V/m)}\end{aligned}$$

Above 1 GHz:

$$\begin{aligned}\text{CISPR Average level (dB}\mu\text{V/m)} &= \text{Receiver level (dB}\mu\text{V)} + \text{Correction Factor (dB/m)} \\ \text{Margin (dB)} &= \text{CISPR Average level (dB}\mu\text{V/m)} - \text{Limit (dB}\mu\text{V/m)}\end{aligned}$$

$$\begin{aligned}\text{Peak level (dB}\mu\text{V/m)} &= \text{Receiver level (dB}\mu\text{V)} + \text{Correction Factor (dB/m)} \\ \text{Margin (dB)} &= \text{Peak level (dB}\mu\text{V/m)} - \text{Limit (dB}\mu\text{V/m)}\end{aligned}$$

2.1.6 Example Test Setup Diagram

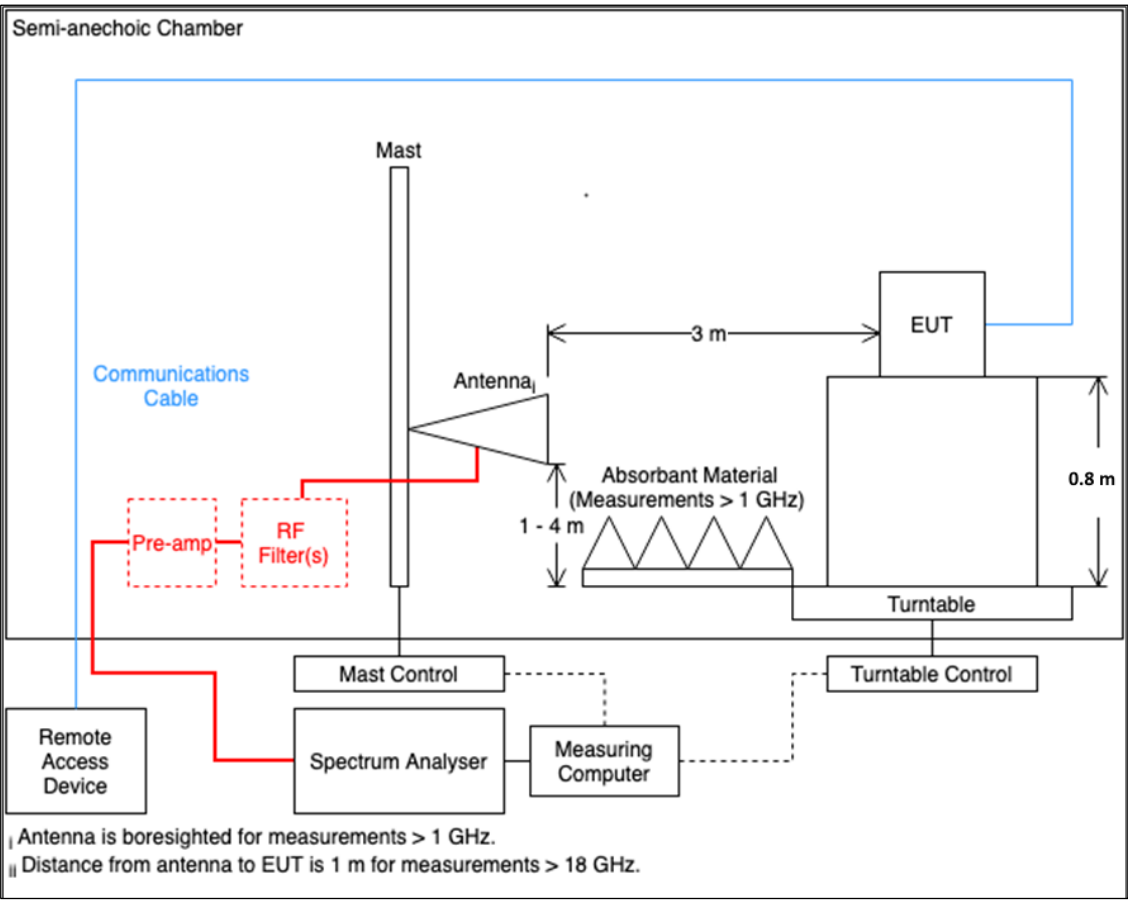


Figure 1 - Radiated Disturbance Example Test Setup

2.1.7 Environmental Conditions

Ambient Temperature 22.0 °C
Relative Humidity 48.0 %
Atmospheric Pressure 1020.0 mbar

2.1.8 Specification Limits

Required Specification Limits, Field Strength - Class B Test Limit at a 3 m Measurement Distance		
Frequency Range (MHz)	Test Limit (µV/m)	Test Limit (dBµV/m)
30 to 88	100	40.0
88 to 216	150	43.5
216 to 960	200	46.0
Above 960	500	54.0

Supplementary information:
Note 1. A Quasi-peak detector is to be used for measurements below 1 GHz.
Note 2. A CISPR Average detector is to be used for measurements above 1 GHz.
Note 3. The Peak test limit above 1 GHz is 20 dB higher than the CISPR Average test limit.

Table 9



2.1.9 Test Results

Results for Configuration and Mode: AC Powered - Transmitters Idle.

This test was performed to the requirements of the Class B limits.

Performance assessment of the EUT made during this test: Pass.

Detailed results are shown below.

Highest frequency generated or used within the EUT: 6 GHz
Which necessitates an upper frequency test limit of: 30 GHz

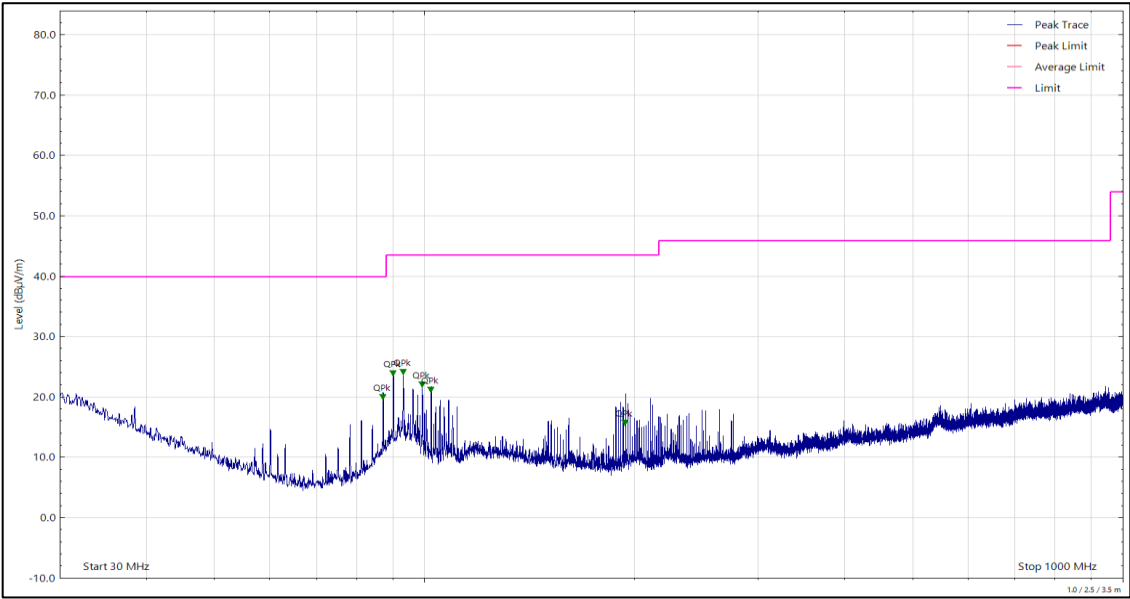


Figure 2 - 30 MHz to 1 GHz, Quasi-Peak, Horizontal

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
87.109	19.17	40.00	-20.83	Q-Peak	300	258	Horizontal
90.103	23.09	43.50	-20.41	Q-Peak	303	242	Horizontal
93.102	23.31	43.50	-20.19	Q-Peak	306	390	Horizontal
99.116	21.24	43.50	-22.26	Q-Peak	314	258	Horizontal
102.111	20.38	43.50	-23.12	Q-Peak	305	344	Horizontal
193.721	14.90	43.50	-28.60	Q-Peak	260	240	Horizontal

Table 10

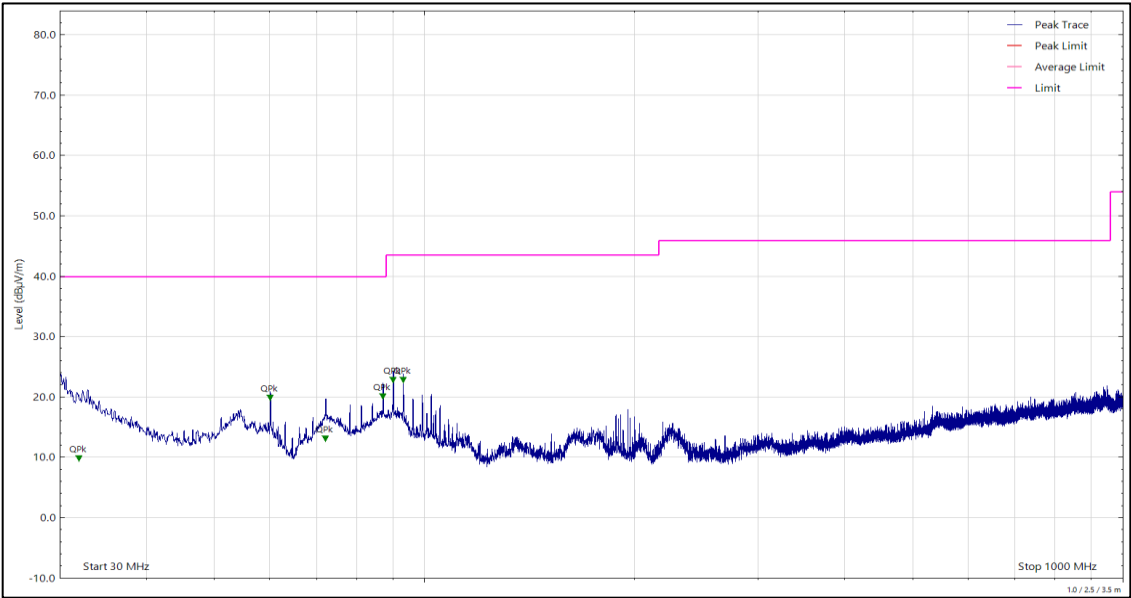


Figure 3 - 30 MHz to 1 GHz, Quasi-Peak, Vertical

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
31.962	9.05	40.00	-30.95	Q-Peak	40	250	Vertical
60.065	19.08	40.00	-20.92	Q-Peak	207	100	Vertical
72.024	12.29	40.00	-27.71	Q-Peak	220	154	Vertical
87.100	19.31	40.00	-20.69	Q-Peak	39	100	Vertical
90.103	22.07	43.50	-21.43	Q-Peak	10	143	Vertical
93.098	22.09	43.50	-21.41	Q-Peak	13	104	Vertical

Table 11

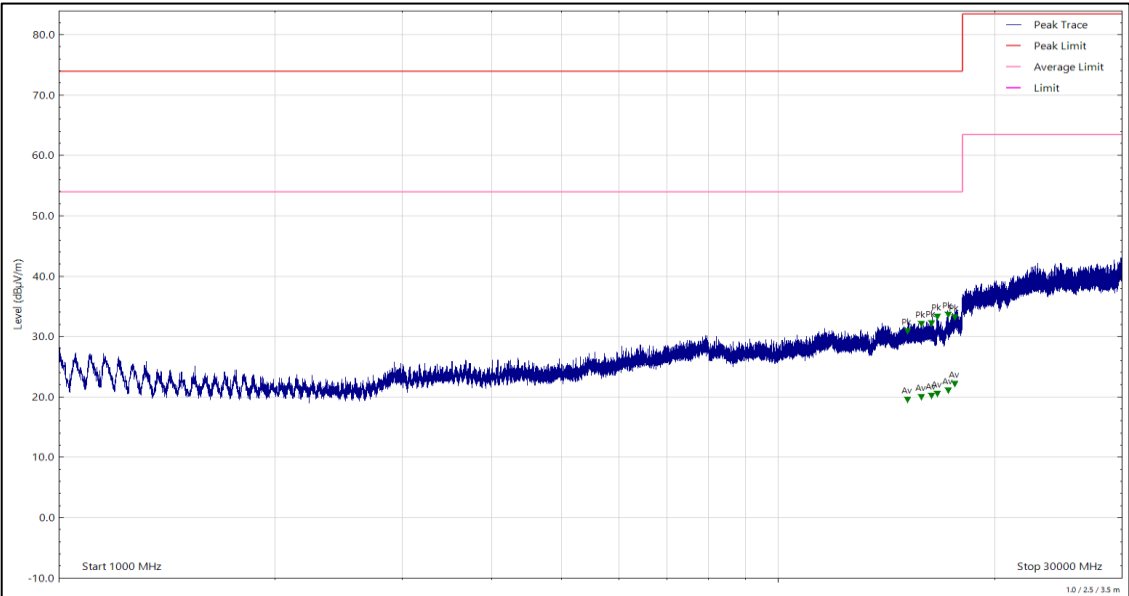


Figure 4 - 1 GHz to 30 GHz, Peak & CISPR Average, Horizontal

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
15135.500	30.17	74.00	-43.83	Peak	112	240	Horizontal
15135.500	18.79	54.00	-35.21	CISPR Avg	112	240	Horizontal
15807.500	31.34	74.00	-42.66	Peak	347	357	Horizontal
15807.500	19.17	54.00	-34.83	CISPR Avg	347	357	Horizontal
16337.920	31.47	74.00	-42.53	Peak	134	358	Horizontal
16337.920	19.45	54.00	-34.55	CISPR Avg	134	358	Horizontal
16620.970	32.47	74.00	-41.53	Peak	23	107	Horizontal
16620.970	19.72	54.00	-34.28	CISPR Avg	23	107	Horizontal
17232.450	32.83	74.00	-41.17	Peak	108	246	Horizontal
17232.450	20.27	54.00	-33.73	CISPR Avg	108	246	Horizontal
17586.880	32.46	74.00	-41.54	Peak	91	348	Horizontal
17586.880	21.43	54.00	-32.57	CISPR Avg	91	348	Horizontal

Table 12

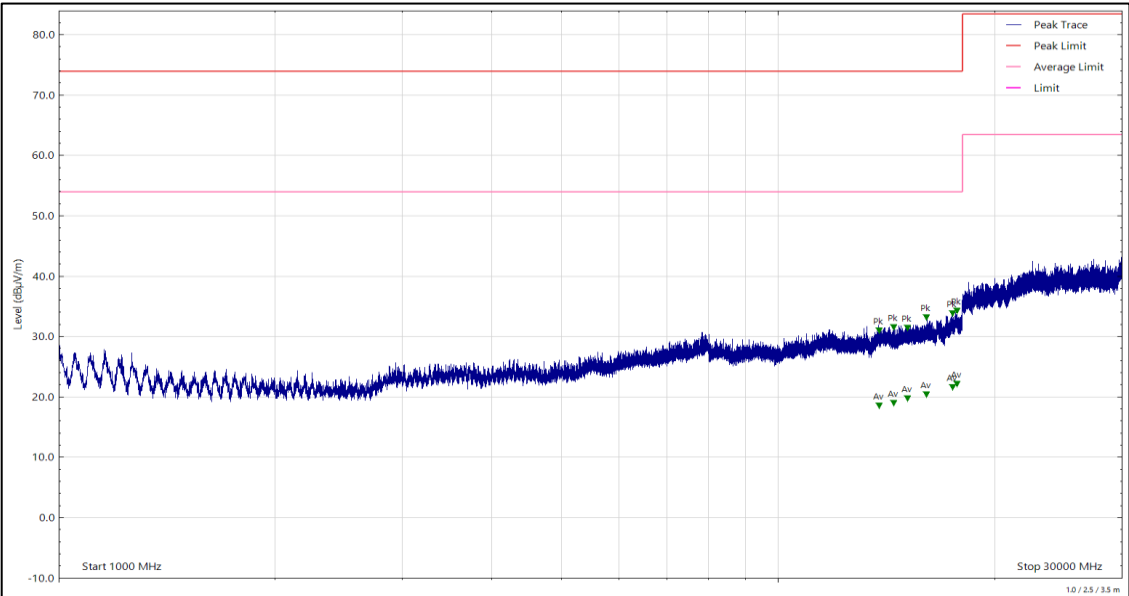


Figure 5 - 1 GHz to 30 GHz, Peak & CISPR Average, Vertical

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
13817.960	30.23	74.00	-43.77	Peak	83	246	Vertical
13817.960	17.81	54.00	-36.19	CISPR Avg	83	246	Vertical
14460.130	30.81	74.00	-43.19	Peak	0	355	Vertical
14460.130	18.24	54.00	-35.76	CISPR Avg	0	355	Vertical
15105.060	30.69	74.00	-43.31	Peak	350	302	Vertical
15105.060	18.96	54.00	-35.04	CISPR Avg	350	302	Vertical
16067.300	32.46	74.00	-41.54	Peak	216	390	Vertical
16067.300	19.59	54.00	-34.41	CISPR Avg	216	390	Vertical
17448.370	33.03	74.00	-40.97	Peak	76	391	Vertical
17448.370	20.87	54.00	-33.13	CISPR Avg	76	391	Vertical
17713.480	33.52	74.00	-40.48	Peak	73	344	Vertical
17713.480	21.37	54.00	-32.63	CISPR Avg	73	344	Vertical

Table 13



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
3m Semi-Anechoic Chamber	MVG	EMC Chamber 12	5621	36	07-Aug-2026
Emissions Software	TUV SUD	EmX V3.5.4	5125	-	Software
Test Receiver	Rohde & Schwarz	ESW44	5802	12	25-Oct-2025
Turntable & Mast Controller	Maturo Gmbh	NCD/498/2799.01	5612	-	TU
Tilt Antenna Mast	Maturo Gmbh	TAM 4.0-P	5613	-	TU
Cable (K-Type to K-Type, 1 m)	Junkosha	MWX241-01000KMSKMS/A	5511	12	06-Jun-2026
Cable (K-Type to K-Type, 1 m)	Junkosha	MWX241-01000KMSKMS/A	5512	12	06-Jun-2026
Cable (N to N, 2 m)	Junkosha	MWX221-02000AMSAMS/B	5725	6	12-Dec-2025
Cable (2.92 mm(f)-N(m), 2 m)	Junkosha	MWX241-02000KFSNMS/B	6332	12	27-Sep-2025
Cable (N-Type to N-Type, 8 m)	Junkosha	MWX221-08000NMSNMS/B	7054	12	01-Jun-2026
Pre-Amplifier (1 GHz to 18 GHz)	Schwarzbeck	BBV 9718 C	5350	12	16-Dec-2025
Pre-Amplifier (18 GHz to 40 GHz)	Narda	NARDA DB02-0447	237	12	30-Apr-2026
Antenna (Bilog with attenuator, 30 MHz to 3 GHz)	Schaffner	CBL6143	287	24	29-Aug-2026
Antenna (DRG, 1 GHz to 10.5 GHz)	Schwarzbeck	BBHA9120B	4848	12	05-Jul-2026
Antenna (DRG, 18 GHz to 40 GHz)	Link Microtek Ltd	AM180HA-K-TU2	230	24	08-Oct-2026
Thermo-Hygro-Barometer	PCE Instruments	PCE-THB-40	5471	12	14-May-2026

Table 14

TU - Traceability Unscheduled

2.2 Conducted Disturbance at Mains Terminals

2.2.1 Specification Reference

FCC 47 CFR Part 15B, ICES-003 and ISED RSS-GEN, Clause 15.107, 3.2.1 and 4.4

2.2.2 Equipment Under Test and Modification State

A3448, S/N: C2WXM4N3TQ - Modification State 0

2.2.3 Date of Test

23-September-2025

2.2.4 Test Method

The EUT was setup according to ANSI C63.4, clause 5.2.

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

A Line Impedance Stabilisation Network (LISN) was directly bonded to the ground-plane. The EUT was located so that the distance between the boundary of the EUT and the closest surface of the LISN was 0.8 m.

Interconnecting cables that hanged closer than 0.4 m to the ground plane were folded back and forth in the centre forming a bundle 0.3 m to 0.4 m long.

Input and output cables were terminated with equipment or loads representative of real usage conditions.

The EUT was configured to give the highest level of emissions within reason of a typical installation as described by the manufacturer.

A Peak detector pre-scan of the EUT emissions profile was measured across the appropriate frequency range.

Where all pre-scan peak emissions measured were greater than 20 dB below the CISPR Average test limit, no final measurements were made in accordance with ANSI C63.4.

Where any pre-scan peak emissions were within 20 dB of the CISPR Average test limit, the six highest pre-scan emissions seen across the frequency range were measured for at least 15 seconds using a Peak, Quasi-Peak or CISPR Average detector as appropriate to the test limit being measured against.

2.2.5 Example Calculation

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

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

2.2.6 Example Test Setup Diagram

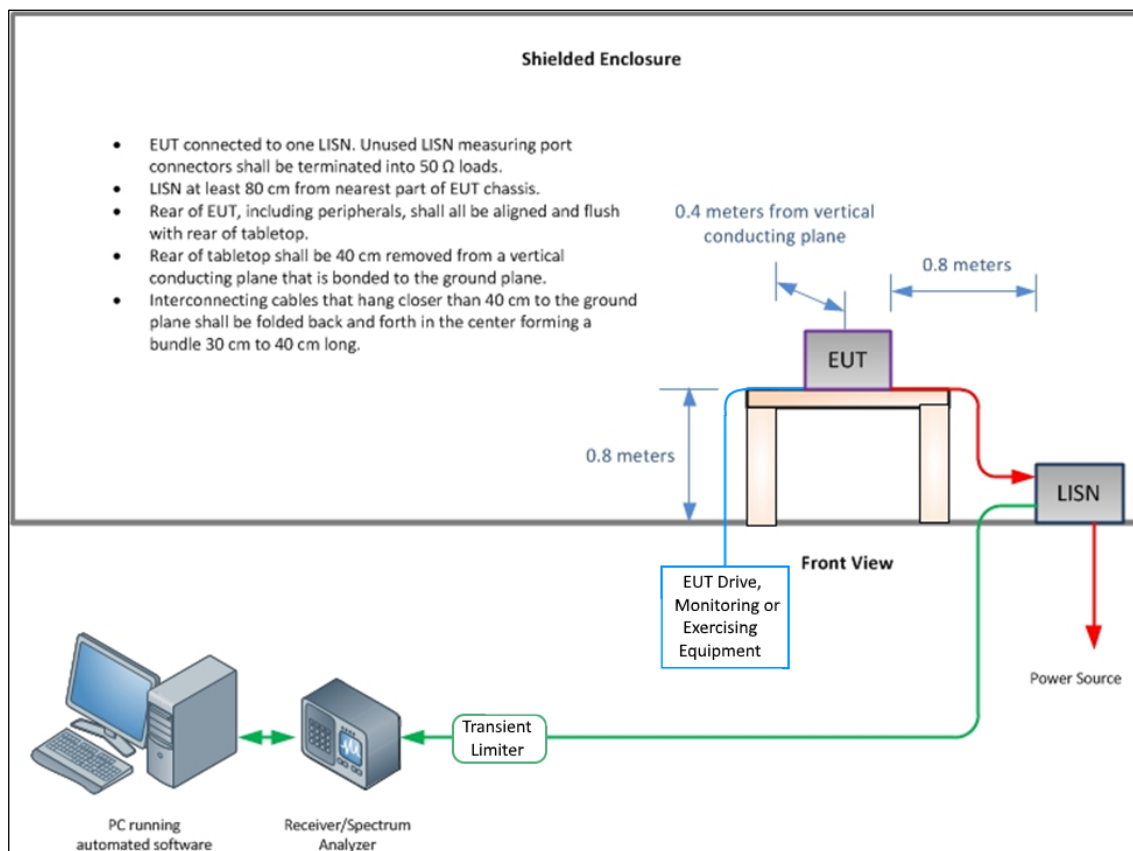


Figure 6 - Conducted Disturbance

2.2.7 Environmental Conditions

Ambient Temperature	23.3 °C
Relative Humidity	39.9 %
Atmospheric Pressure	1009.0 mbar

2.2.8 Specification Limits

Required Specification Limits - Class B			
Line Under Test	Frequency Range (MHz)	Quasi-Peak Test Limit (dBμV)	CISPR Average Test Limit (dBμV)
AC Power Port	0.15 to 0.5	66 to 56 ⁽¹⁾	56 to 46 ⁽¹⁾
	0.5 to 5	56	46
	5 to 30	60	50
Supplementary information: Note 1. Decreases with the logarithm of the frequency.			

Table 15

2.2.9 Test Results

Results for Configuration and Mode: AC Powered - Transmitters Idle.

This test was performed to the requirements of the Class B limits.

Performance assessment of the EUT made during this test: Pass.

Detailed results are shown below.

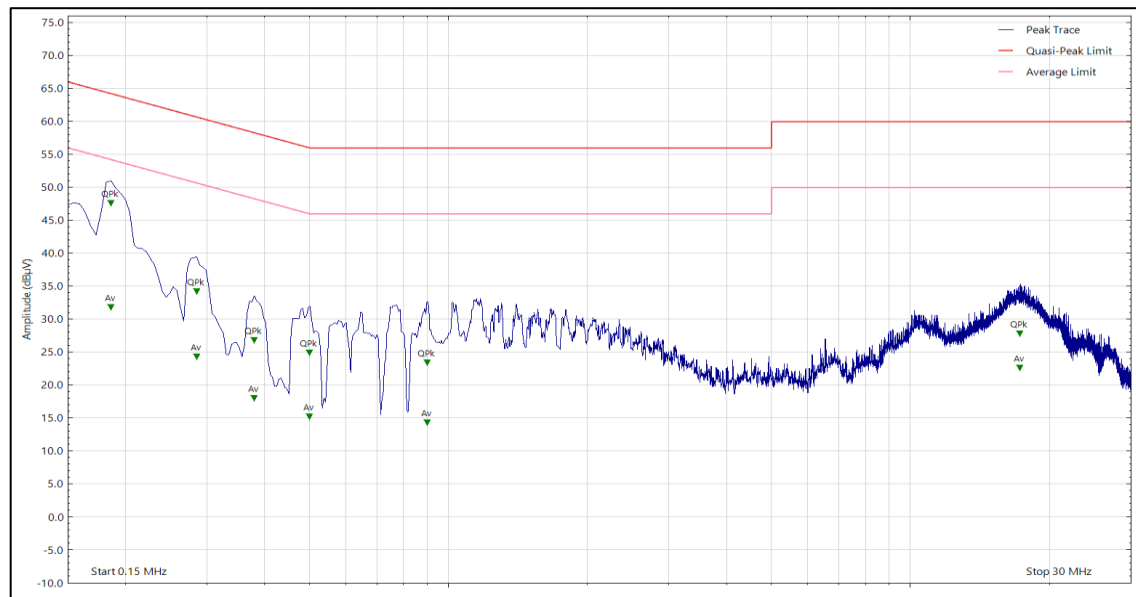


Figure 7 - Graphical Results - AC Power Port Live

Frequency (MHz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
0.186	46.87	64.20	-17.33	Q-Peak
0.186	31.10	54.20	-23.10	CISPR Avg
0.285	33.46	60.70	-27.24	Q-Peak
0.285	23.65	50.70	-27.05	CISPR Avg
0.380	26.08	58.30	-32.22	Q-Peak
0.380	17.29	48.30	-31.01	CISPR Avg
0.501	24.23	56.00	-31.77	Q-Peak
0.501	14.54	46.00	-31.46	CISPR Avg
0.901	22.68	56.00	-33.32	Q-Peak
0.901	13.66	46.00	-32.34	CISPR Avg
17.237	27.09	60.00	-32.91	Q-Peak
17.237	21.94	50.00	-28.06	CISPR Avg

Table 16

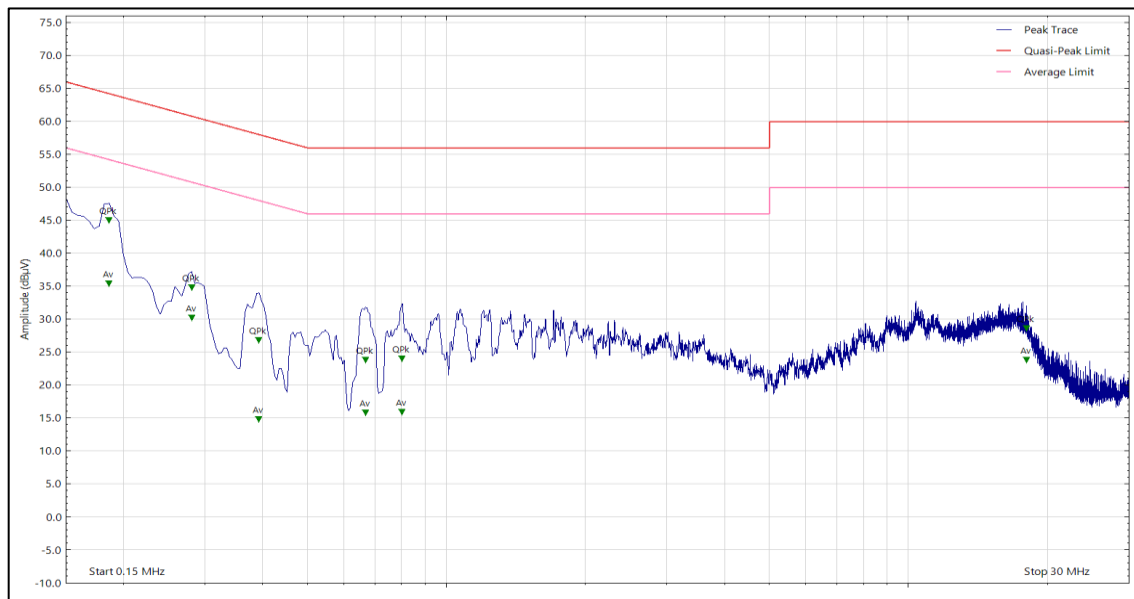


Figure 8 - Graphical Results - AC Power Port Neutral

Frequency (MHz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
0.186	44.25	64.20	-19.95	Q-Peak
0.186	34.69	54.20	-19.51	CISPR Avg
0.281	34.14	60.80	-26.66	Q-Peak
0.281	29.46	50.80	-21.34	CISPR Avg
0.393	26.10	58.00	-31.90	Q-Peak
0.393	14.16	48.00	-33.84	CISPR Avg
0.668	23.14	56.00	-32.86	Q-Peak
0.668	15.12	46.00	-30.88	CISPR Avg
0.803	23.32	56.00	-32.68	Q-Peak
0.803	15.27	46.00	-30.73	CISPR Avg
18.023	27.87	60.00	-32.13	Q-Peak
18.023	23.15	50.00	-26.85	CISPR Avg

Table 17



2.2.10 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
Emissions Software	TUV SUD	EmX V3.5.4	5125	-	Software
Test Receiver	Rohde & Schwarz	ESW44	5802	12	25-Oct-2025
Transient Limiter	Hewlett Packard	11947A	2378	12	28-Oct-2025
Cable (N to N, 2 m)	Junkosha	MWX221-02000AMSAMS/B	5725	6	12-Dec-2025
Cable (N-Type to N-Type, 8 m)	Junkosha	MWX221-08000NMSNMS/B	7054	12	01-Jun-2026
LISN (CISPR 16, Single Phase)	Rohde & Schwarz	ESH3-Z5	1390	12	04-Feb-2026
Thermo-Hygro-Barometer	PCE Instruments	PCE-THB-40	5471	12	14-May-2026

Table 18



3 Test Equipment Information

3.1 General Test Equipment Used

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
Multimeter	Fluke	79 Series III	498	12	26-Feb-2026
Milliohm Meter	VICI	2682132	7012	12	21-May-2026

Table 19



4 Incident Reports

No incidents reports were raised.

5 Measurement Uncertainty

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

Test Name	Measurement Uncertainty
Radiated Disturbance	30 MHz to 1 GHz, Bilog Antenna ± 5.17 dB 1 GHz to 6 GHz, Horn Antenna ± 5.05 dB 6 GHz to 18 GHz, Horn Antenna ± 4.94 dB 18 GHz to 40 GHz, Horn Antenna ± 6.28 dB
Conducted Disturbance at Mains Terminals	150 kHz to 30 MHz, LISN, ± 3.14 dB

Table 20

Worst case error for both Time and Frequency measurement 12 parts in 10^6 .

Measurement Uncertainty Decision Rule

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.