

FCC and ISED Test Report

Apple Inc
Model: A3449



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

Prepared for: Apple Inc
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SIGNATURE

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	
	Adam Holloway	30 October 2025	

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: A3449		
Serial Number	Hardware Version	Software Version
D3Y74YF6K3	REV1.0	25B40a

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: A3449, Serial Number: D3Y74YF6K3			
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

A3449, S/N: D3Y74YF6K3 - Modification State 0

2.1.3 Date of Test

22-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

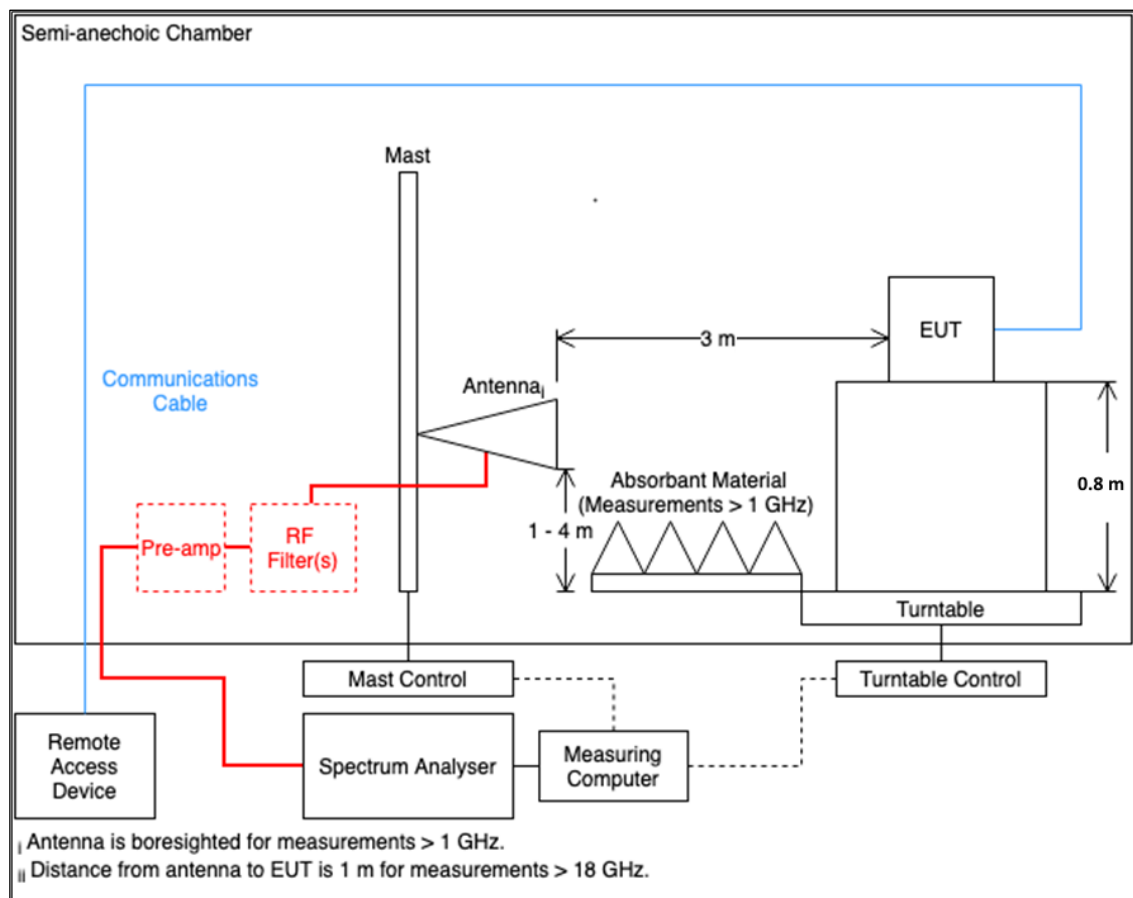
Below 1 GHz:

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

Above 1 GHz:

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

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



Required Specification Limits, Field Strength - Class B Test Limit at a 3 m Measurement Distance		
Frequency Range (MHz)	Test Limit ($\mu\text{V/m}$)	Test Limit (dB $\mu\text{V/m}$)
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.

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

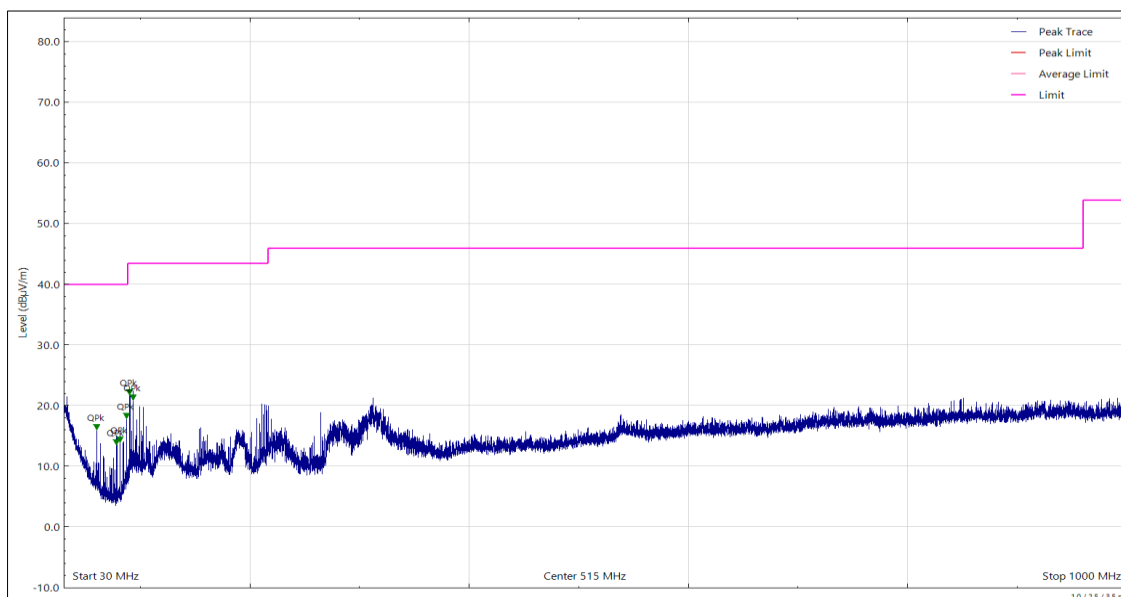


Figure 2 - 30 MHz to 1 GHz, Quasi-Peak, Horizontal

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
60.063	15.71	40.00	-24.29	Q-Peak	303	379	Horizontal
78.077	13.17	40.00	-26.83	Q-Peak	284	258	Horizontal
81.092	13.65	40.00	-26.35	Q-Peak	283	240	Horizontal
87.100	17.58	40.00	-22.42	Q-Peak	289	240	Horizontal
90.105	21.44	43.50	-22.06	Q-Peak	302	244	Horizontal
93.111	20.57	43.50	-22.93	Q-Peak	318	360	Horizontal

Table 10

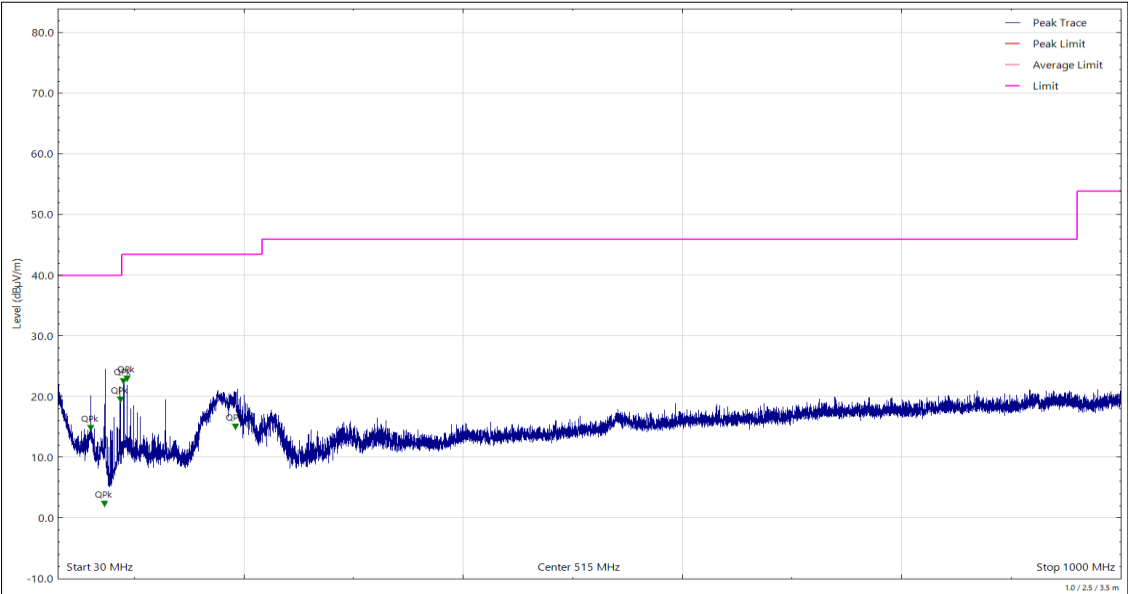


Figure 3 - 30 MHz to 1 GHz, Quasi-Peak, Vertical

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
60.061	14.09	40.00	-25.91	Q-Peak	288	100	Vertical
72.582	1.56	40.00	-38.44	Q-Peak	225	240	Vertical
87.098	18.74	40.00	-21.26	Q-Peak	236	386	Vertical
90.108	21.80	43.50	-21.70	Q-Peak	16	190	Vertical
93.105	22.19	43.50	-21.31	Q-Peak	199	390	Vertical
192.213	14.25	43.50	-29.25	Q-Peak	292	100	Vertical

Table 11

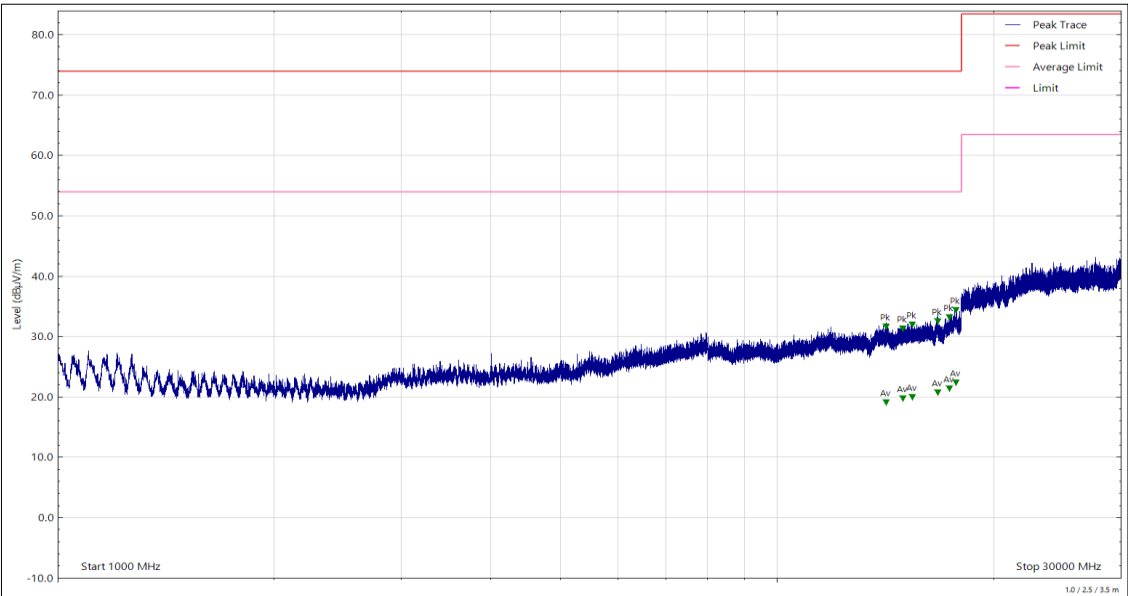


Figure 4 - 1 GHz to 18 GHz, Peak & CISPR Average, Horizontal

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
14178.560	30.90	74.00	-43.10	Peak	360	381	Horizontal
14178.560	18.37	54.00	-35.63	CISPR Avg	360	381	Horizontal
14955.370	30.60	74.00	-43.40	Peak	265	220	Horizontal
14955.370	18.98	54.00	-35.02	CISPR Avg	265	220	Horizontal
15393.050	31.23	74.00	-42.77	Peak	321	100	Horizontal
15393.050	19.20	54.00	-34.80	CISPR Avg	321	100	Horizontal
16707.070	31.71	74.00	-42.29	Peak	0	350	Horizontal
16707.070	19.98	54.00	-34.02	CISPR Avg	0	350	Horizontal
17363.340	32.45	74.00	-41.55	Peak	208	103	Horizontal
17363.340	20.64	54.00	-33.36	CISPR Avg	208	103	Horizontal
17700.080	33.62	74.00	-40.38	Peak	288	340	Horizontal
17700.080	21.62	54.00	-32.38	CISPR Avg	288	340	Horizontal

Table 12

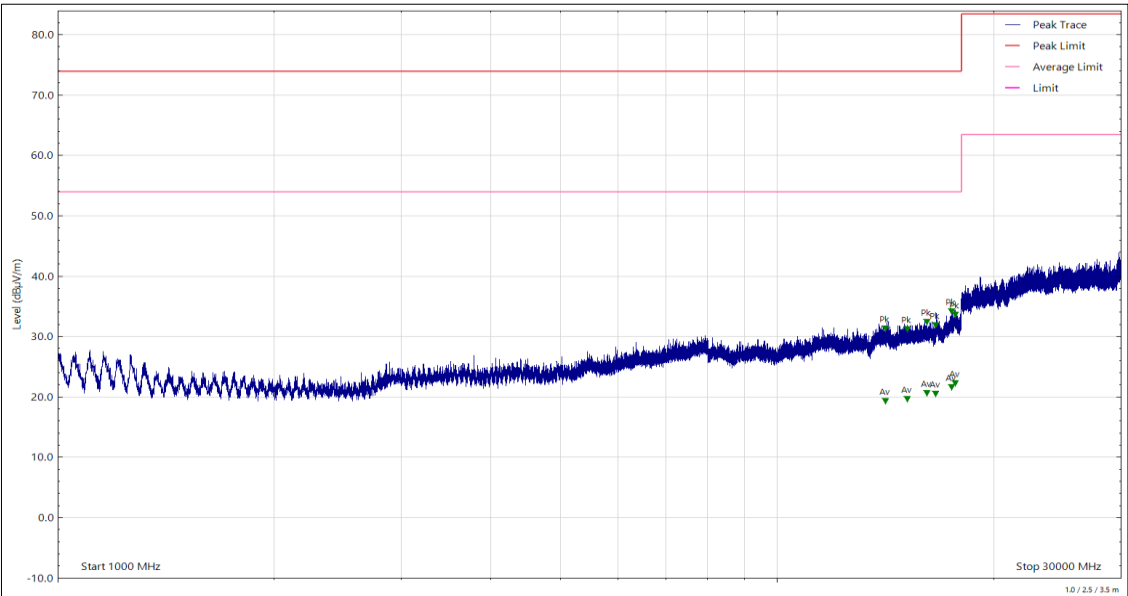


Figure 5 - 1 GHz to 18 GHz, Peak & CISPR Average, Vertical

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
14140.140	30.58	74.00	-43.42	Peak	288	341	Vertical
14140.140	18.53	54.00	-35.47	CISPR Avg	288	341	Vertical
15162.200	30.45	74.00	-43.55	Peak	19	354	Vertical
15162.200	18.86	54.00	-35.14	CISPR Avg	19	354	Vertical
16134.580	31.62	74.00	-42.38	Peak	284	360	Vertical
16134.580	19.85	54.00	-34.15	CISPR Avg	284	360	Vertical
16603.910	31.06	74.00	-42.94	Peak	232	253	Vertical
16603.910	19.72	54.00	-34.28	CISPR Avg	232	253	Vertical
17457.480	33.42	74.00	-40.58	Peak	350	100	Vertical
17457.480	20.85	54.00	-33.15	CISPR Avg	350	100	Vertical
17674.050	32.85	74.00	-41.15	Peak	233	103	Vertical
17674.050	21.45	54.00	-32.55	CISPR Avg	233	103	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	7-Aug-2026
Emissions Software	TUV SUD	EmX V3.5.4	5125	-	N/A - 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	6-Jun-2026
Cable (K-Type to K-Type, 1 m)	Junkosha	MWX241-01000KMSKMS/A	5512	12	6-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	1-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	5-Jul-2026
Antenna (DRG, 18 GHz to 40 GHz)	Link Microtek Ltd	AM180HA-K-TU2	230	24	8-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 ISSED RSS-GEN, Clause 15.107, 3.2.1 and 4.4

2.2.2 Equipment Under Test and Modification State

A3449, S/N: D3Y74YF6K3 - 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

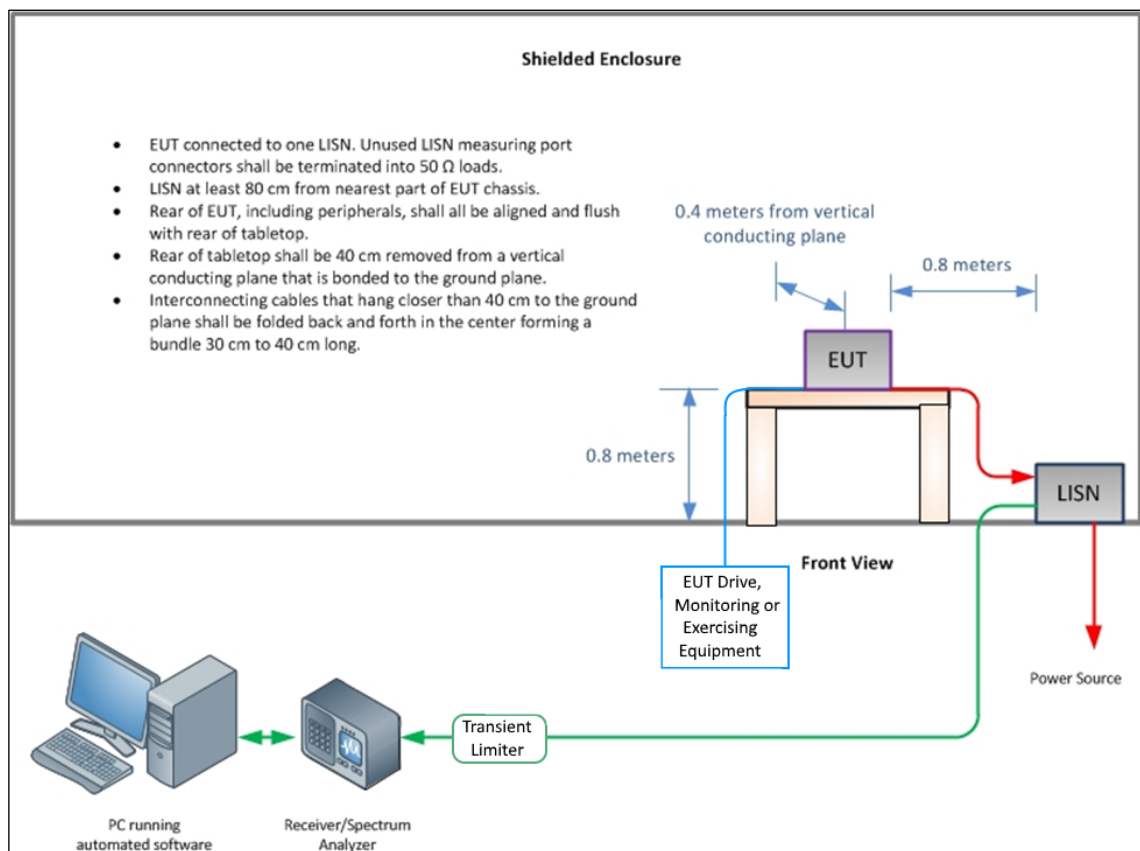


Figure 6 - Conducted Disturbance

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 (dB μ V)	CISPR Average Test Limit (dB μ V)
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.

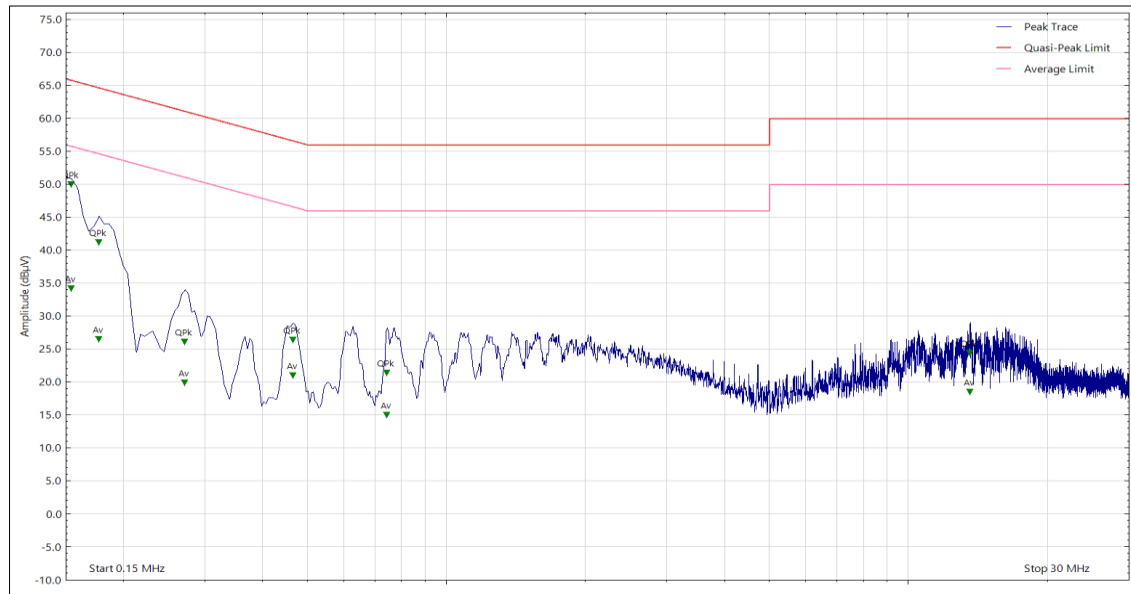


Figure 7 - Graphical Results - AC Power Port Live

Frequency (MHz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
0.154	49.31	65.80	-16.49	Q-Peak
0.154	33.49	55.80	-22.31	CISPR Avg
0.177	40.47	64.60	-24.13	Q-Peak
0.177	25.77	54.60	-28.83	CISPR Avg
0.271	25.37	61.10	-35.73	Q-Peak
0.271	19.23	51.10	-31.87	CISPR Avg
0.465	25.68	56.60	-30.92	Q-Peak
0.465	20.34	46.60	-26.26	CISPR Avg
0.744	20.74	56.00	-35.26	Q-Peak
0.744	14.32	46.00	-31.68	CISPR Avg
13.592	23.73	60.00	-36.27	Q-Peak
13.592	17.86	50.00	-32.14	CISPR Avg

Table 16

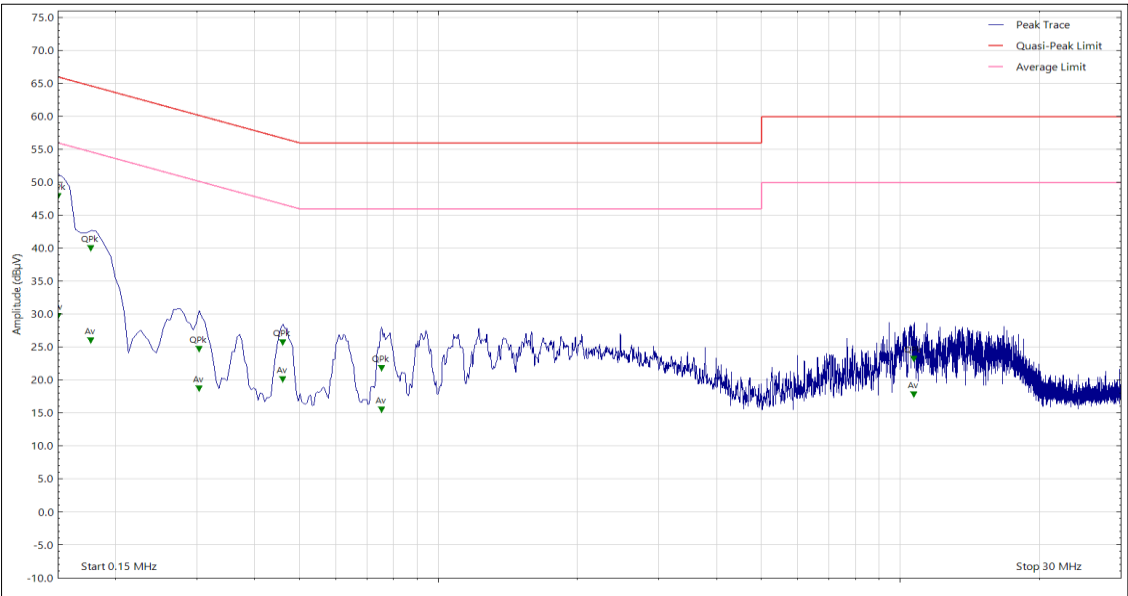


Figure 8 - Graphical Results - AC Power Port Neutral

Frequency (MHz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
0.150	47.14	66.00	-18.86	Q-Peak
0.150	29.05	56.00	-26.95	CISPR Avg
0.177	39.31	64.60	-25.29	Q-Peak
0.177	25.26	54.60	-29.34	CISPR Avg
0.303	24.02	60.20	-36.18	Q-Peak
0.303	17.97	50.20	-32.23	CISPR Avg
0.460	25.01	56.70	-31.69	Q-Peak
0.460	19.41	46.70	-27.29	CISPR Avg
0.753	21.07	56.00	-34.93	Q-Peak
0.753	14.80	46.00	-31.20	CISPR Avg
10.699	22.53	60.00	-37.47	Q-Peak
10.699	17.16	50.00	-32.84	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.