FCC and ISED Test Report

Apple Inc
Model: A2330

In accordance with FCC 47 CFR Part 15C and ISED RSS-GEN (2.4 GHz Bluetooth, 2.4 GHz WLAN and 5 GHz WLAN)

Prepared for: Apple Inc
One Apple Park Way
Cupertino, California, 95014, USA

FCC ID: BCGA2330 IC: 579C-A2330

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Document 75948763-13 Issue 01

SIGNATURE			
AJ Lawson.			
NAME	**JOB TITLE**	**RESPONSIBLE FOR**	**ISSUE DATE**
Andy Lawson	Senior Engineer	Authorised Signatory	10 June 2020

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-GEN. The sample tested was found to comply with the requirements defined in the applied rules.

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Testing	Connor Lee	10 June 2020	

FCC Accreditation
90987 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: 2019 and ISED RSS-GEN: Issue 5 (04-2018) + A1 (03-2019) 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	10 June 2020

Table 1

1.2 Introduction

Applicant	Apple Inc
Manufacturer	Apple Inc
Model Number(s)	A2330
Serial Number(s)	C07CF029PW92
Hardware Version(s)	REV1.0
Software Version(s)	20A2236b
Number of Samples Tested	1
Test Specification/Issue/Date	FCC 47 CFR Part 15C: 2019 ISED RSS-GEN: Issue 5 (04-2018) + A1 (03-2019)
Order Number Date	0540201015 07-April-2020
Date of Receipt of EUT	08-April-2020 and 28-April-2020
Start of Test	06-May-2020
Finish of Test	06-May-2020
Name of Engineer(s)	Connor Lee
Related Document(s)	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-GEN is shown below.

Section	Specification Clause		Test Description	Result	Comments/Base Standard
	Part 15C	RSS-GEN			
Configuration and Mode: 5 GHz WLAN					
2.1	15.207	8.8	AC Power Line Conducted Emissions	Pass	ANSI C63.10 (2013)
Configuration and Mode: 2.4 GHz WLAN					
2.1	15.207	8.8	AC Power Line Conducted Emissions	Pass	ANSI C63.10 (2013)
Configuration and Mode: 2.4 GHz Bluetooth					
2.1	15.207	8.8	AC Power Line Conducted Emissions	Pass	ANSI C63.10 (2013)

Table 2

1.4 Product Information

1.4.1 Technical Description

The Equipment Under Test (EUT) was a desktop computer with Bluetooth, Bluetooth Low Energy and 802.11 a/b/g/n/ac/ax capabilities in the 2.4 GHz and 5 GHz bands.

1.5 Deviations from the Standard

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

1.6 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: A2330, Serial Number: C07CF029PW92			
0	As supplied by the customer	Not Applicable	Not Applicable

Table 3

1.7 Test Location

TÜV SÜD conducted the following tests at our Fareham Test Laboratory.

Test Name	Name of Engineer(s)	Accreditation
Configuration and Mode: 5 GHz WLAN		
AC Power Line Conducted Emissions	Connor Lee	UKAS
Configuration and Mode: 2.4 GHz WLAN		
AC Power Line Conducted Emissions	Connor Lee	UKAS
Configuration and Mode: 2.4 GHz Bluetooth		
AC Power Line Conducted Emissions	Connor Lee	UKAS

Table 4

Office Address:

Octagon House
Concorde Way
Segensworth North
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, Clause 15.207
ISED RSS-GEN, Clause 8.8

2.1.2 Equipment Under Test and Modification State

A2330, S/N: C07CF029PW92 - Modification State 0

2.1.3 Date of Test

06-May-2020

2.1.4 Test Method

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

2.1.5 Environmental Conditions

Ambient Temperature	18.8 °C
Relative Humidity	40.1 %

2.1.6 Test Results

5 GHz WLAN

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

Frequency (MHz)	QP Level (dBµV)	QP Limit (dBµV)	QP Margin (dB)	CISPR Average Level (dBµV)	CISPR Average Limit (dBµV)	CISPR Average Margin (dB)
0.380	36.8	58.3	-21.5	23.5	48.3	-24.8
0.411	38.2	57.6	-19.5	30.1	47.6	-17.6
0.523	38.4	56.0	-17.6	28.5	46.0	-17.5
0.693	40.0	56.0	-16.0	24.9	46.0	-21.1
0.741	39.7	56.0	-16.3	29.8	46.0	-16.2
0.905	35.3	56.0	-20.7	27.6	46.0	-18.4

Table 5 - Live Line Emissions Results

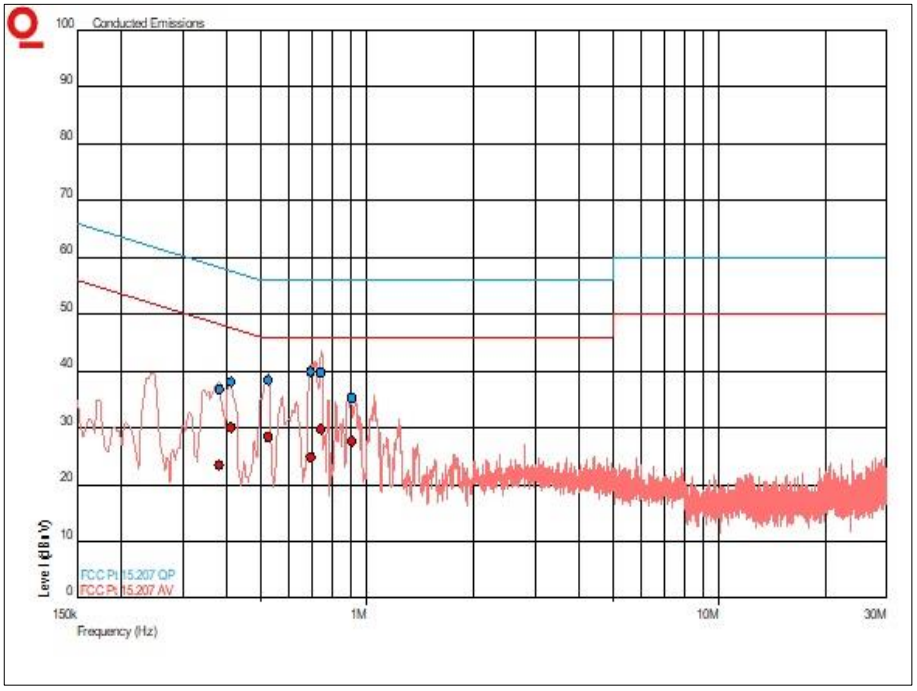

Figure 1 - Live Line - 150 kHz to 30 MHz

Frequency (MHz)	QP Level (dBµV)	QP Limit (dBµV)	QP Margin (dB)	CISPR Average Level (dBµV)	CISPR Average Limit (dBµV)	CISPR Average Margin (dB)
0.414	37.2	57.6	-20.4	28.4	47.6	-19.1
0.525	38.6	56.0	-17.4	27.7	46.0	-18.3
0.693	39.7	56.0	-16.3	24.6	46.0	-21.4
0.738	40.0	56.0	-16.0	32.2	46.0	-13.8
0.899	35.3	56.0	-20.7	30.0	46.0	-16.0
1.057	32.3	56.0	-23.7	25.9	46.0	-20.1

Table 6 - Neutral Line Emissions Results

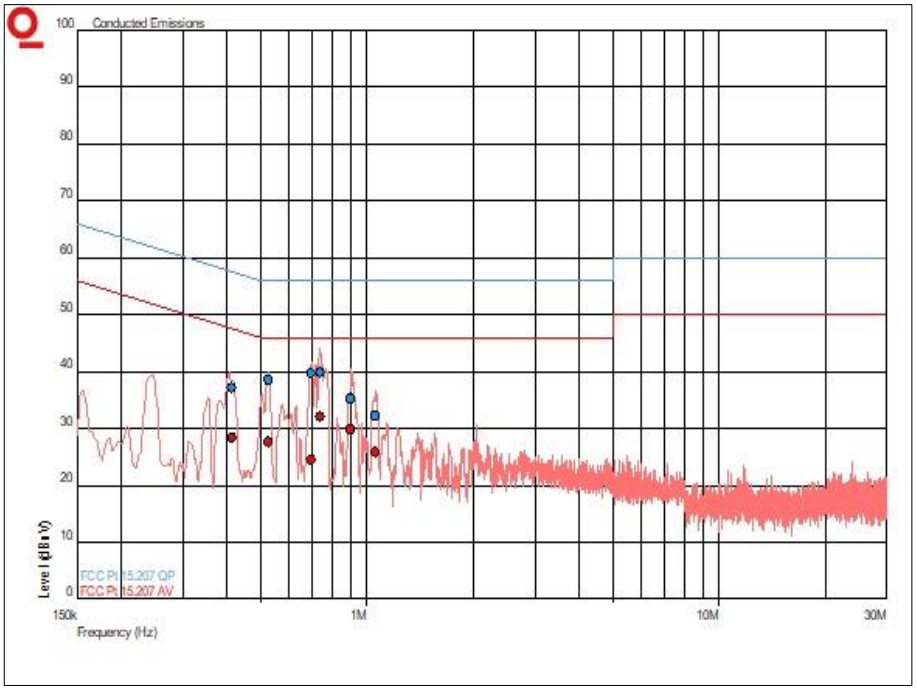

Figure 2 - Neutral Line - 150 kHz to 30 MHz

2.4 GHz WLAN

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

Frequency (MHz)	QP Level (dBµV)	QP Limit (dBµV)	QP Margin (dB)	CISPR Average Level (dBµV)	CISPR Average Limit (dBµV)	CISPR Average Margin (dB)
0.374	36.1	58.4	-22.3	22.1	48.4	-26.3
0.415	38.1	57.5	-19.4	27.9	47.5	-19.7
0.538	38.4	56.0	-17.6	27.3	46.0	-18.7
0.729	40.8	56.0	-15.2	27.7	46.0	-18.3
0.747	40.7	56.0	-15.3	28.8	46.0	-17.2
0.804	38.3	56.0	-17.7	19.4	46.0	-26.6
0.913	33.6	56.0	-22.4	23.7	46.0	-22.3

Table 7 - Live Line Emissions Results

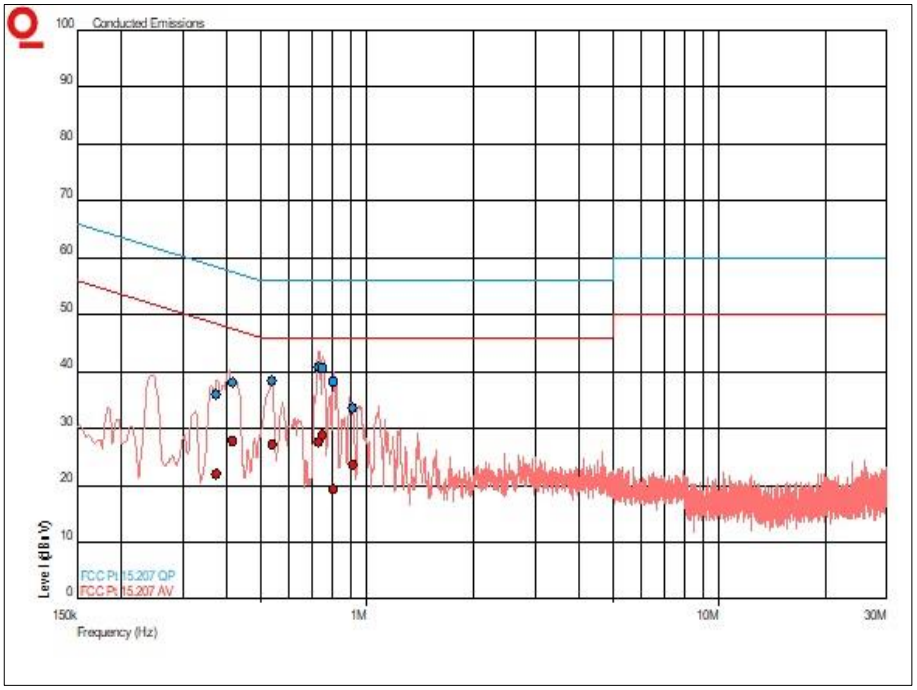

Figure 3 - Live Line - 150 kHz to 30 MHz

Frequency (MHz)	QP Level (dBµV)	QP Limit (dBµV)	QP Margin (dB)	CISPR Average Level (dBµV)	CISPR Average Limit (dBµV)	CISPR Average Margin (dB)
0.398	35.9	57.9	-22.0	19.1	47.9	-28.8
0.413	38.1	57.6	-19.5	29.7	47.6	-17.9
0.541	37.7	56.0	-18.3	25.4	46.0	-20.6
0.737	41.4	56.0	-14.6	32.1	46.0	-13.9
0.789	35.2	56.0	-20.8	15.6	46.0	-30.4
1.081	33.9	56.0	-22.1	24.5	46.0	-21.5

Table 8 - Neutral Line Emissions Results

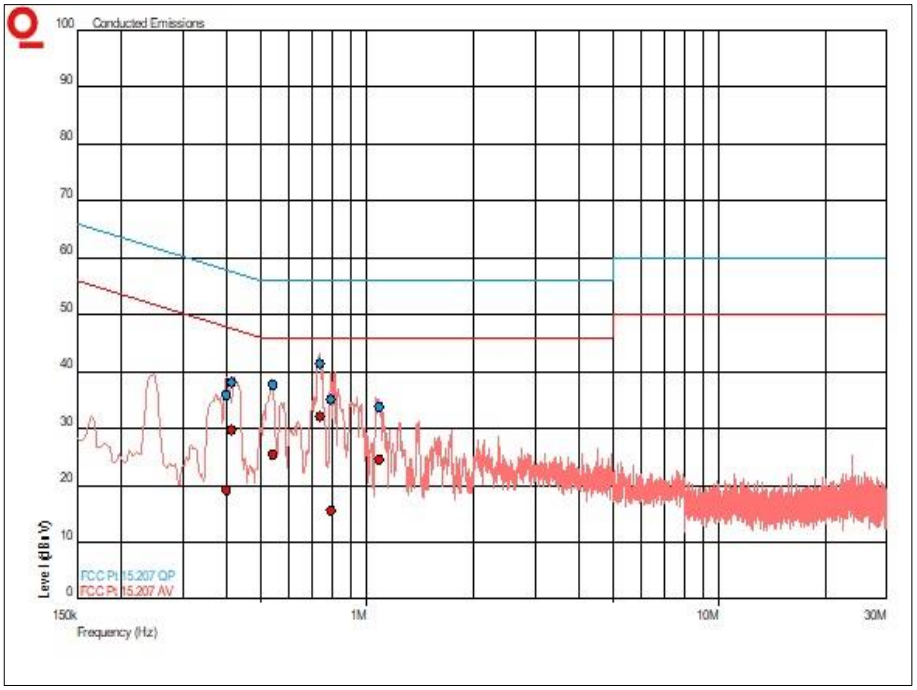

Figure 4 - Neutral Line - 150 kHz to 30 MHz

2.4 GHz Bluetooth

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

Frequency (MHz)	QP Level (dBµV)	QP Limit (dBµV)	QP Margin (dB)	CISPR Average Level (dBµV)	CISPR Average Limit (dBµV)	CISPR Average Margin (dB)
0.413	39.5	57.6	-18.1	31.6	47.6	-16.0
0.440	38.8	57.1	-18.3	26.7	47.1	-20.4
0.557	37.9	56.0	-18.1	25.6	46.0	-20.4
0.762	41.2	56.0	-14.8	27.1	46.0	-18.9
0.810	39.9	56.0	-16.1	21.5	46.0	-24.5
0.848	36.6	56.0	-19.4	17.1	46.0	-28.9

Table 9 - Live Line Emissions Results

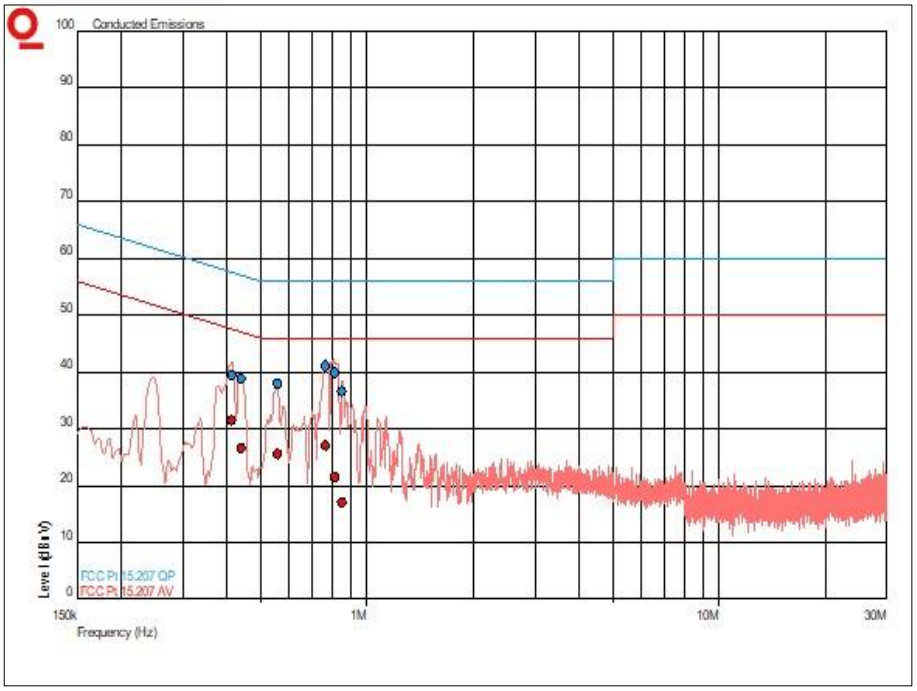

Figure 5 - Live Line - 150 kHz to 30 MHz

Frequency (MHz)	QP Level (dBµV)	QP Limit (dBµV)	QP Margin (dB)	CISPR Average Level (dBµV)	CISPR Average Limit (dBµV)	CISPR Average Margin (dB)
0.417	38.7	57.5	-18.8	29.0	47.5	-18.5
0.555	37.6	56.0	-18.4	25.5	46.0	-20.5
0.753	40.5	56.0	-15.5	26.8	46.0	-19.2
0.804	39.9	56.0	-16.1	21.5	46.0	-24.5
0.848	36.5	56.0	-19.5	16.9	46.0	-29.1
0.911	33.9	56.0	-22.1	30.5	46.0	-15.5

Table 10 - Neutral Line Emissions Results

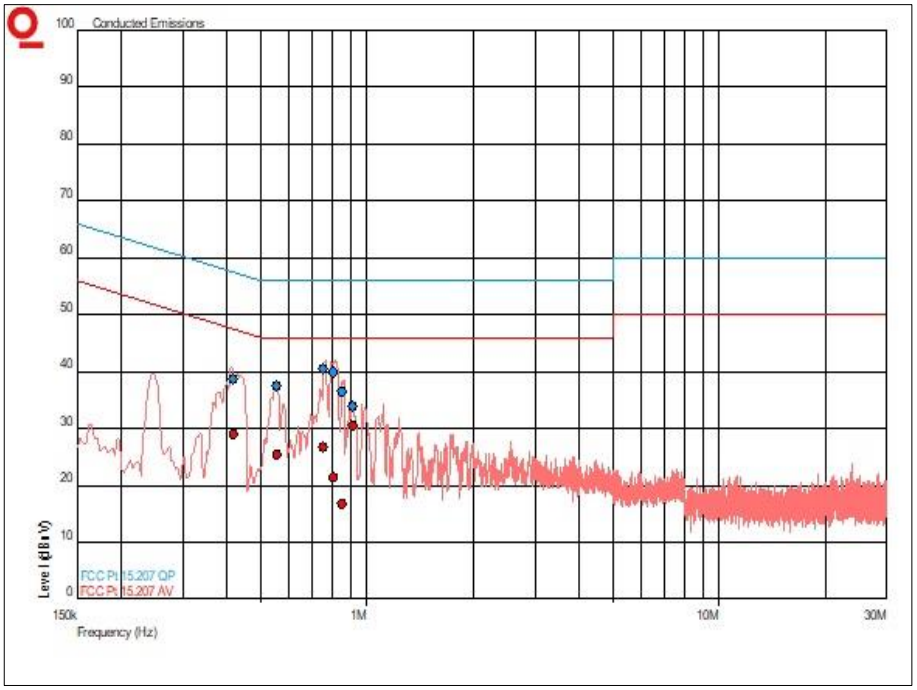

Figure 6 - Neutral Line - 150 kHz to 30 MHz

FCC 47 CFR Part 15, Limit Clause 15.207 and ISED RSS-GEN, Limit Clause 8.8

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 11

*Decreases with the logarithm of the frequency.

2.1.7 Test Location and Test Equipment Used

This test was carried out in EMC Chamber 5.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Screened Room (5)	Rainford	Rainford	1545	36	23-Jan-2021
Compliance 5 Emissions	Teseq	V5.26.51	3275	-	Software
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	03-Jan-2021
Transient Limiter	Hewlett Packard	11947A	15	12	02-Oct-2020
Spectrum Analyser	Hewlett Packard	8562A	14	12	04-Mar-2021
3 phase LISN	Rohde & Schwarz	ESH2-Z5	323	12	21-Jan-2021
8 Meter Cable	Teledyne	PR90-088-8MTR	5212	12	30-Aug-2020
Cable	Teledyne	PRO-088-8MTR	5462	6	06-Sep-2020

Table 12

3 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 13

Measurement Uncertainty Decision Rule

Determination of conformity with the specification limits is based on the decision rule according to IEC Guide 115: 2007, clause 4.4.3 and 4.5.1.