



TEST REPORT

Report Number : 13911918-E10V4

Applicant : APPLE, INC
1 APPLE PARK WAY
CUPERTINO, CA 95014, U.S.A.

Model : A2783, A2784, AND A2785

Brand : APPLE

FCC ID : BCG-E4083A AND BCG-E8076A

EUT Description : SMARTPHONE

Test Standard(s) : FCC CFR 47 Part 2, Part 22, Part 27 and Part 96

Date Of Issue:
FEBRUARY 17, 2022

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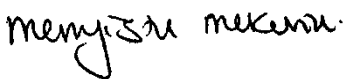

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	1/21/2022	Initial Review	Mengistu Mekuria
V2	2/02/2022	Corrected LTE Band 41 Output Power	John Thompson
V3	2/11/2022	Removed ULCA B66 Data	Mengistu Mekuria
V4	02/17/2022	Updated EUT descriptions in Section 5.1, 5.2, and 5.3	Mengistu Mekuria

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1. ATTESTATION OF TEST RESULTS

Applicant Name and Address	APPLE, INC 1 APPLE PARK WAY CUPERTINO, CA 95014, U.S.A.
Model	A2783, A2784, AND A2785
Brand	APPLE
FCC ID	BCG-E4083A AND BCG-E8076A
EUT Description	SMARTPHONE
Serial Number	FG112930BM117XT6J (Conducted) AND KW223CKQDY (Radiated)
Sample Receipt Date	OCTOBER 5, 2021
Date Tested	OCTOBER 5, 2021 to JANUARY 21, 2022
Applicable Standards	FCC CFR 47 Part 2, Part 22, Part 27 and Part 96
Test Results	COMPLIES
<p>UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.</p> <p>The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.</p> <p>This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by A2LA, NIST, any agency of the Federal Government, or any agency of the U.S. government.</p>	
Approved & Released By:	Reviewed By:
	
Mengistu Mekuria Staff Engineer UL Verification Services Inc.	John Thompson Test Engineer UL Verification Services Inc.

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with the following:

- ANSI C63.26:2015
- FCC CFR 47 Part 2, Part 22, Part 27 and Part 96
- [FCC KDB 971168 D01 v03r01](#): Power Meas License Digital Systems
- [FCC KDB 971168 D02 v02r01](#): Misc Rev Approv License Devices
- [FCC KDB 412172 D01 v01r01](#): Determining ERP and EIRP

3. FACILITIES AND ACCREDITATION

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0, for all testing performed within the scope of this report. Testing was performed at the locations noted below.

	Address	ISED CABID	ISED Company Number	FCC Registration
<input type="checkbox"/>	Building 1: 47173 Benicia Street, Fremont, California, USA	US0104	2324A	550739
<input checked="" type="checkbox"/>	Building 2: 47266 Benicia Street, Fremont, California, USA	US0104	22541	550739
<input type="checkbox"/>	Building 4: 47658 Kato Rd, Fremont, California, USA	US0104	2324B	550739

4. DECISION RULES AND MEASUREMENT UNCERTAINTY

4.1. METROLOGICAL TRACEABILITY

All test and measuring equipment utilized to perform the tests documented in this report are calibrated on a regular basis, with a maximum time between calibrations of one year or the manufacturers' recommendation, whichever is less, and where applicable is traceable to recognized national standards.

4.2. DECISION RULES

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4:2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	U _{Lab}
Worst Case Radiated Disturbance, 9KHz to 30 MHz	2.87 dB
Worst Case Radiated Disturbance, 30 to 1000 MHz	6.01 dB
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.73 dB
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.51 dB
Worst Case Radiated Disturbance, 26000 to 40000 MHz	5.29 dB
Occupied Channel Bandwidth	±1.22 %
Temperature	±2.26%
Supply voltages	±0.57 %
Time	±3.39 %

Uncertainty figures are valid to a confidence level of 95%.

4.4. SAMPLE CALCULATION

RADIATED EMISSIONS

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)
36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

MAINS CONDUCTED EMISSIONS

Where relevant, the following sample calculation is provided:

Final Voltage (dBuV) = Measured Voltage (dBuV) + Cable Loss (dB) + Limiter Factor (dB) + LISN Insertion Loss.
36.5 dBuV + 0 dB + 10.1 dB + 0 dB = 46.6 dBuV

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The Apple iPhone is a smartphone with multimedia functions (music, application support, and video), cellular GSM, GPRS, EGPRS, UMTS, LTE, 5G FR1, IEEE 802.11a/b/g/n/ac/ax, Bluetooth, GPS, and NFC. All models support at least one UICC based SIM. The second SIM is an UICC based e-SIM (electronic SIM) in some models. China model has 1 p-SIM (physical SIM) only. The device supports a built-in inductive charging receiver. The rechargeable battery is not user accessible

5.2. INTRODUCTION

This application for certification is leveraging the data reuse procedures from KDB 484596 D01 based on reference FCC ID: BCG- E4082A to cover variant model FCC ID: BCG-E4083A, and FCC ID: BCG- E8076A. The major difference between the parent/reference model and the variant model is the de-population in the variant model of some LTE and 5G NR Bands. All other circuitry and features are identical. The data reuse test plan was approved via manufacturer KDB inquiry.

5.3. MODEL DIFFERENCES

The manufacturer hereby declares the following for models A2595, A2783, A2784, and A2785.

A2595, A2783, A2784, and A2785 are highly similar, with the only differences being listed on the table below:

Model	FCC ID	Model Changes
A2595	BCG-E4082A	Main Reference Model
A2783	BCG-E4083A	B14/71 Removed
A2784	BCG-E8076A	B14/71 Removed
A2785	BCG-E8076A*	B14/71 Removed

*Note: Model A2785 supports only p-SIM while A2784 supports p-SIM + e-SIM. Both A2785 and A2784 are electrically identical.

They have the same PCB layout, design, common components, antennas, antenna locations and housing cases.

More specifically, their cellular modem, Wi-Fi, BT, and NFC transmitters are identical, and removal of LTE bands in some models is done by de-population of directly related components.

Spot check verification has been done on models A2783, A2784, and A2785 in accordance with the test plan approved via KDB inquiry. Comparison of the models, upper deviation is within 3dB range and all tests are under FCC/ISED Technical Limits. The results documented for model A2595 may be applied as representative to models A2783, A2784, and A2785.

5.4. SPOT CHECK VERIFICATION RESULTS SUMMARY FOR A2783

A2783 Spotcheck Results							
Technology	Worst Mode	Test Item	Measured	Original Model: A2595	Sub Model: A2783	Delta (dB)	Remarks
			Frequency (MHz)	FCC ID: BCG-E4082A (dBm)	FCC ID: BCG-E4083A (dBm)		
LTE 5 CA	QPSK @ 10 MHz +10MHz BW	Cond Power	824-849	25.7	25.7	0.00	
LTE 7 CA	QPSK @ 20 MHz +20MHz BW	Cond Power	2500-2570	25	25	0.00	
LTE 41 CA	QPSK @ 20 MHz +5MHz BW	Cond Power	2496-2690	28	28	0.00	
LTE 48 CA	QPSK @ 20 MHz +15MHz BW	Cond Power	3550-3700	22.7	22.7	0.00	
LTE 66C CA	QPSK @ 20 MHz +20MHz BW	Cond Power	1710-1780	25.7	25.7	0.00	

5.5. SPOT CHECK VERIFICATION RESULTS SUMMARY FOR A2784 AND A2785

A2784 And A2785 Spotcheck Results							
Technology	Worst Mode	Test Item	Measured	Original Model: A2595	Sub Model: A2784 and A2785	Delta (dB)	Remarks
			Frequency (MHz)	FCC ID: BCG-E4082A (dBm)	FCC ID: BCG-E8076A (dBm)		
LTE 5 CA	QPSK @ 10 MHz +10MHz BW	Cond Power	824-849	25.7	25.7	0.00	
LTE 7 CA	QPSK @ 20 MHz +20MHz BW	Cond Power	2500-2570	25	25	0.00	
LTE 41 CA	QPSK @ 20 MHz +5MHz BW	Cond Power	2496-2690	28	28	0.00	
LTE 48 CA	QPSK @ 20 MHz +15MHz BW	Cond Power	3550-3700	22.7	22.7	0.00	
LTE 66C CA	QPSK @ 20 MHz +20MHz BW	Cond Power	1710-1780	25.7	25.7	0.00	

5.6. REFERENCE DETAIL

Reference application that contains the reused reference data.

Equipment Class	Reference FCC ID	Reference Application	Report Title/Section
PCE, CBE, TNE	BCG-E4082A	13911916-E10	FCC LTE Carrier Aggregation Report / All Sections

5.7. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was version 0.13.02.

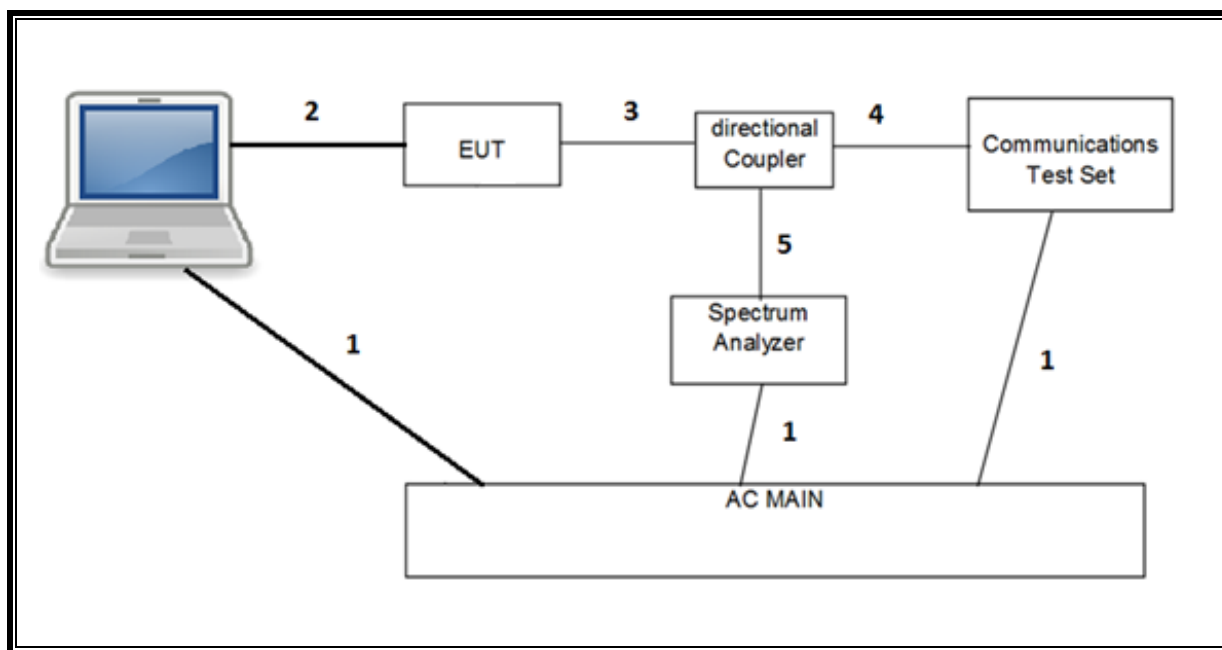
5.8. SPOT CHECK WORST-CASE CONFIGURATION AND MODE

The spot checks were performed on the worst case configurations based on the parent model of reference report.

5.9. DESCRIPTION OF TEST SETUP

SUPPORT TEST EQUIPMENT						
Description		Manufacturer	Model	Serial Number		FCC ID/ DoC
Laptop		Apple	MacBook Pro	QDS-BRCM1069		A1398
AC/DC adapter		Apple	B123	N/A		PA-1450-BA1
I/O CABLES (RF CONDUCTED TEST)						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	3	US 115V	Un-shielded	2.0	N/A
2	USB	1	DC	Un-shielded	1.0	N/A
3	RF In/Out	1	EUT	Un-shielded	0.6	N/A
4	RF In/Out	1	Communication Test Set	Un-shielded	1.2	N/A
5	RF In/Out	1	Barrel	N/A	N/A	N/A

CONDUCTED SETUP



6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

TEST EQUIPMENT LIST				
Description	Manufacturer	Model	Asset	Cal Due
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight Technologies Inc	N9030A	T905	1/21/2022
Wideband Radio Communications Tester	Rohde & Schwarz (Koeln) GmbH & Co. KG	CMW500	T964	2/17/2022
Directional Coupler	KRYTAR	152613	T1536	9/23/2022
UL AUTOMATION SOFTWARE				
Power Measurement Software	UL	UL RF	Ver 3.1.2 5/17/2021	

NOTES:

- * Testing is completed before equipment expiration date.

Appendix A – Reference Test Report

Attached is the test report (13911916-E10) containing the reference data from the parent model as detailed in section 5.4.6.