TEST REPORT

Report Number: 13587906-E7V2

Applicant	:	APPLE, INC. 1 APPLE PARK WAY CUPERTINO, CA 95014, U.S.A
Model	:	A2641, A2643, A2644, AND A2645
Brand	:	APPLE
FCC ID	:	BCG-E4005A, BCG-E4035A, BCG-E4036A
IC	:	579C-E4005A, 579C-E4035A, 579C-E4036A
EUT Description	:	SMARTPHONE
Test Standard(s)	:	FCC CFR47 PART 22H, 24E, 27L, AND 90S ISED RSS-GEN ISSUE 5, RSS-132 ISSUE 3, RSS-133 ISSUE 6, AND RSS-139 ISSUE 3

Date Of Issue:
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ACCREDITED
CERT #0751.05

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	08/05/2021	Initial Review	Mengistu Mekuria
V2	08/10/2021	Updated Section 5 according to TCB Feedback. Removed reference to setup photos, as that is covered by referenced report in appendix A.	John Thompson

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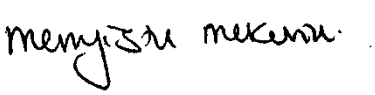
1. ATTESTATION OF TEST RESULTS

Applicant Name and Address	APPLE, INC. 1 APPLE PARK WAY CUPERTINO, CA 95014, U.S.A
Model	A2641, A2643, A2644, AND A2645
Brand	APPLE
FCC ID	BCG-E4005A, BCG-E4035A, BCG-E4036A
IC	579C-E4005A, 579C-E4035A, 579C-E4036A
EUT Description	SMARTPHONE
Serial Number	MODEL (A2641): C07116600N90G3C3 (CONDUCTED), J9CP2T29W6 (RADIATED) MODEL (A2643): C071175015X18J31 (CONDUCTED), Q63F0Y0HYH (RADIATED) MODEL (A2645): C071173000K18J61 (CONDUCTED), M4D6RLJQ25 (RADIATED)
Sample Receipt Date	JUNE 04, 2021
Date Tested	JUNE 09, 2021 to JUNE 09, 2021
Applicable Standards	FCC CFR47 PART 22H, 24E, 27L, AND 90S ISED RSS-GEN ISSUE 5, RSS-132 ISSUE 3, RSS-133 ISSUE 6, AND RSS-139 ISSUE 3
Test Results	COMPLIES

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.

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.

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.

Approved & Released By:	Reviewed By:	Prepared By:
		
Mengistu Mekuria Lead Test Engineer UL Verification Services Inc.	John Thompson Laboratory Engineer UL Verification Services Inc.	Tony Li 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 24, Part 27 and Part 90
- 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
- ISED RSS-GEN Issue 5, RSS-132 Issue 3, RSS-133 Issue 6, RSS-139 Issue 3.

3. FACILITIES AND ACCREDITATION

UL Verification Services Inc. is accredited by A2LA, certification #0751.05, 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
☐	Building 1: 47173 Benicia Street, Fremont, CA 94538, USA	US0104	2324A	208313
☒	Building 2: 47266 Benicia Street, Fremont, CA 94538, USA	US0104	22541	208313
☐	Building 4: 47658 Kato Rd, Fremont, CA 94538, USA	US0104	2324B	208313

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

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, CDMA, IEEE 802.11a/b/g/n/ac/ax, Bluetooth, Ultra-Wideband, GPS, and NFC. All models support at least one UICC based SIM. The second SIM is either an UICC based p-SIM (physical SIM) or e-SIM (electronic SIM). The device supports a built-in inductive charging transmitter and 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-E4003A / IC: 579C-E4003A to cover variant model FCC ID: BCG-E4005A / IC: 579C-E4005A, FCC ID: BCG-E4035A / IC: 579C-E4035A, and FCC ID: BCG-E4036A / IC: 579C-E4036A. The major difference between the parent/reference model and the variant model is the depopulation in the variant model of the mmWave transmitter, and 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 A2484, A2641, A2643, A2644, and A2645.

A2484, A2641, A2643, A2644, and A2645 are highly similar, with the only differences being listed on the table below:

Model	FCC ID	IC ID	Model Changes
A2484	BCG-E4003A	579C-E4003A	Main Reference Model
A2641	BCG-E4005A	579C-E4005A	FR2 removed
A2643	BCG-E4035A	579C-E4035A	FR2 and B14/71 removed
A2644*	BCG-E4036A	579C-E4036A	FR2 and B14/71 removed
A2645	BCG-E4036A	579C-E4036A	FR2 and B14/71 removed

*Note: Model only support (pSIM + pSIM) instead of (pSIM + eSIM). A2644 is electrically identical to A2645.

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

More specifically, their cellular modem, Wi-Fi, BT, NFC, WPT and UWB transmitters are identical, and removal of cellular bands is done by software and depopulation of band-specific components associated with the removed bands.

Spot check verification has been done on models A2641, A2643, A2644, and A2645 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 A2484 may be applied as representative to models A2641, A2643, A2644, and A2645.

5.4. SPOT CHECK VERIFICATION RESULTS SUMMARY FOR A2641

A2641 SPOT CHECK RESULTS							
Technology	Worst Mode	Test Item	Measured	Original Model: A2484	Sub Model: A2641	Delta (dB)	Remarks
			Frequency MHz	FCC ID : BCG-E4003A IC : 579C-E4003A (dBm)	FCC ID: BCG-E4005A IC : 579C-E4005A (dBm)		
GSM 850	GPRS 1 Slot	Cond Power	824-849	33.50	33.50	0	
GSM 1900	GPRS 1 Slot	Cond Power	1850-1910	32.00	32.00	0	
CDMA BC10	1xEVDO Rel 0	Cond Power	816-824	25.70	25.70	0	
CDMA BC0	1xEVDO Rel A	Cond Power	824-849	23.50	23.50	0	
CDMA BC1	1xEVDO Rel A	Cond Power	1850-1910	25.70	25.70	0	
WCDMA B5	REL 99	Cond Power	824-849	25.70	25.70	0	
WCDMA B2	REL 99	Cond Power	1852.4	25.70	25.70	0	
WCDMA B4	REL 99	Cond Power	1732.6	25.70	25.70	0	

5.5. SPOT CHECK VERIFICATION RESULTS SUMMARY FOR A2643

A2643 SPOT CHECK RESULTS							
Technology	Worst Mode	Test Item	Measured	Original Model: A2484	Sub Model: A2643	Delta (dB)	Remarks
			Frequency MHz	FCC ID : BCG-E4003A IC : 579C-E4003A (dBm)	FCC ID: BCG-E4035A IC : 579C-E4035A (dBm)		
GSM 850	GPRS 1 Slot	Cond Power	824-849	33.50	33.50	0	
GSM 1900	GPRS 1 Slot	Cond Power	1850-1910	32.00	32.00	0	
CDMA BC10	1xEVDO Rel 0	Cond Power	816-824	25.70	25.70	0	
CDMA BC0	1xEVDO Rel A	Cond Power	824-849	23.50	23.50	0	
CDMA BC1	1xEVDO Rel A	Cond Power	1850-1910	25.70	25.70	0	
WCDMA B5	REL 99	Cond Power	824-849	25.70	25.70	0	
WCDMA B2	REL 99	Cond Power	1852.4	25.70	25.70	0	
WCDMA B4	REL 99	Cond Power	1732.6	25.70	25.70	0	

5.6. SPOT CHECK VERIFICATION RESULTS SUMMARY FOR A2644 AND A2645

A2644 AND A2645 SPOT CHECK RESULTS							
Technology	Worst Mode	Test Item	Measured	Original Model: A2484	Sub Model: A2644 and A2645	Delta (dB)	Remarks
			Frequency MHz	FCC ID : BCG-E4003A IC : 579C-E4003A (dBm)	FCC ID: BCG-E4036A IC : 579C-E4036A (dBm)		
GSM 850	GPRS 1 Slot	Cond Power	824-849	33.50	33.50	0	
GSM 1900	GPRS 1 Slot	Cond Power	1850-1910	32.00	32.00	0	
CDMA BC10	1xEVDO Rel 0	Cond Power	816-824	25.70	25.70	0	
CDMA BC0	1xEVDO Rel A	Cond Power	824-849	23.50	23.50	0	
CDMA BC1	1xEVDO Rel A	Cond Power	1850-1910	25.70	25.70	0	
WCDMA B5	REL 99	Cond Power	824-849	25.70	25.70	0	
WCDMA B2	REL 99	Cond Power	1852.4	25.70	25.70	0	
WCDMA B4	REL 99	Cond Power	1732.6	25.70	25.70	0	

5.7. REFERENCE DETAIL

Reference application that contains the reused reference data.

Equipment Class	Reference FCC ID / IC ID	Reference Application	Report Title/Section
PCE, TNE	BCG-E4003A/ 579C-E4003A	13573771-E7	FCC_IC 2G/3G Report / All Sections

5.8. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was version 0.21.02-1.

5.9. SPOT CHECK WORST-CASE CONFIGURATION AND MODE

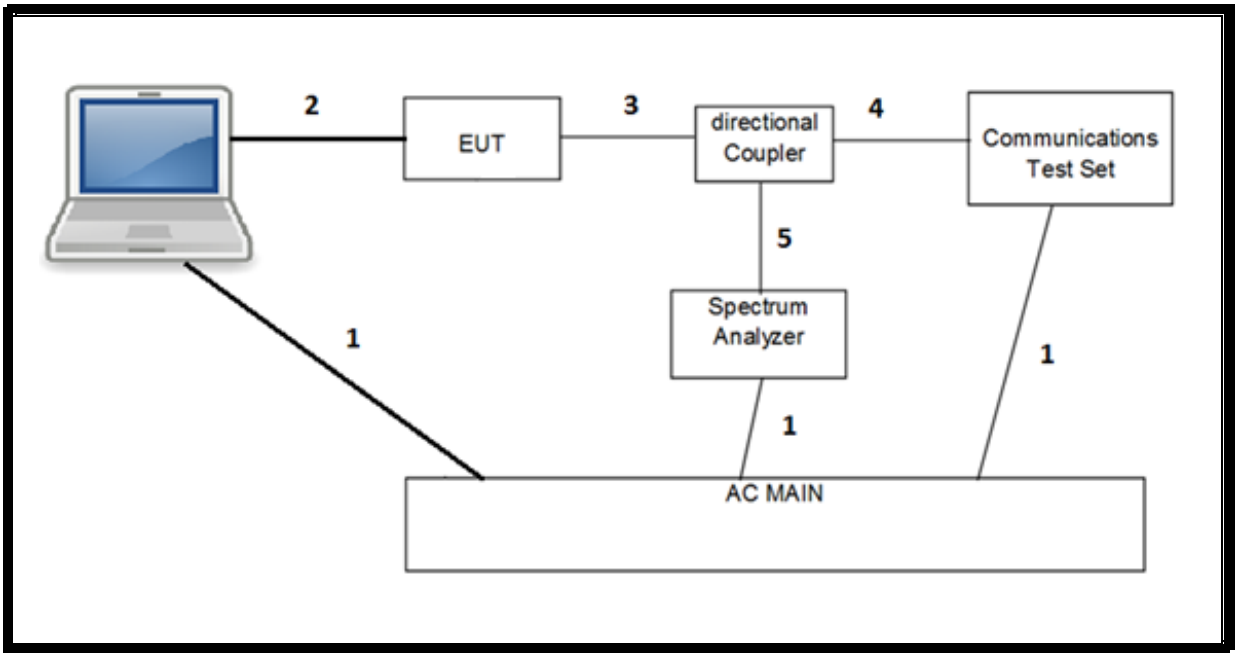
The spot checks were performed on the worst case configurations based on the parent model of reference report.

5.10. DESCRIPTION OF TEST SETUP

SUPPORT TEST EQUIPMENT				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID/ DoC**
Laptop	A1398	C02PM012G3QD	QDS-BRCM1069	A1398
AC/DC adapter	PA-1450-BA1	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**
Power Meter, P-series single channel	Keysight Technologies Inc.	N1912A	T1245	01/21/2022
Power Sensor, P-series 50MHz to 18GHz	Keysight Technologies Inc.	N1921A	T1226	02/19/2022
Wideband Radio Communications Tester	Rohde & Schwarz (Koeln) GmbH & Co. KG	CMW500	T964	02/21/2022
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight Technologies Inc.	N9030A	T905	01/28/2022
Directional Coupler	KRYTAR	152613	T1536	09/16/2021
UL AUTOMATION SOFTWARE				
CLT Software	UL	UL RF	Ver 3.1.4 April 13, 2021	
Power Measurement Software	UL	UL RF	Ver 2.9.4 April 1, 2021	

NOTES:

* Testing is completed before equipment expiration date.

Appendix A – Reference Test Report

Attached is the test report (13573771-E7) containing the reference data from the parent model as detailed in section 5.7.