

TEST REPORT

Report Number : 14040863-E13V2

- Applicant : APPLE, INC. 1 APPLE PARK WAY CUPERTINO, CA. 95014, U.S.A.
 - Model : A2650 (Parent Model) A2889, A2890, A2891, A2892 (Variant Models)
 - FCC ID : BCG-E8140A (Parent Model) BCG-E8150A, BCG-E8151A, BCG-E8152A (Variant Models)
- EUT Description : SMARTPHONE
- Test Standard(s) : FCC PART 96.47

Date Of Issue: July 14, 2022

Prepared by: UL LLC 47173 Benicia Street Fremont, CA 94538, U.S.A. TEL: (510) 771-1000 FAX: (510) 661-0888



Revision History

Rev.	lssue Date	Revisions	Revised By
V1	6/21/2022	Initial Issue	Steven Tran
V2	7/14/2022	Added receiving antenna info	Steven Tran

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1. ATTESTATION OF TEST RESULTS

Applicant Name and Address	APPLE INC. 1 APPLE PARK WAY CUPERTINO CA 95104, U.S.A.
Model	A2650 (Parent Model) A2889, A2890, A2891, A2892 (Variant Models)
Model Of Testing	A2889
Brand	APPLE
FCC ID	BCG-E8140A (Parent Model) BCG-E8150A, BCG-E8151A, BCG-E8152A (Variant Models)
EUT Description	SMART PHONE
Serial Number	Y70XFJYX5T
Sample Receipt Date	05/17/2022
Date Tested	05/26/2022
Applicable Standards	FCC CFR47 PART 96.47
Test Results	COMPLIES

UL LLC 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 LLC and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL LLC 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:	Tested By:
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Thu Chan	Mengistu Mekuria	Steven Tran
Staff Engineer	Staff Lab Engineer	Project Engineer
UL LLC	UL LLC	UL LLC

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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC Part 96.47, KDB 940660 D01 Part 96 CBRS Eqpt v03 and WINNF-TS-0122-v1.0.2.

3. FACILITIES AND ACCREDITATION

UL LLC 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	US0104	2324A	550739
\boxtimes	Building 2: 47266 Benicia Street, Fremont, CA 94538	US0104	22541	550739
	Building 4: 47658 Kato Rd, Fremont, CA 94538	US0104	2324B	550739

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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 Conducted Disturbance, 9KHz to 0.15 MHz	3.78 dB
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.40 dB
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

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

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4.4. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

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, IEEE 802.11a/b/g/n/ac/ax, Bluetooth, Ultra-Wideband, GPS, NFC and MSS. 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) in some models. The device supports a built-in inductive charging transmitter and receiver. The rechargeable battery is not user accessible. However, the test data in this report refers only to LTE Band 48 that operates in the CBRS band.

Testing was performed on the variant model and is used to support the application for the parent and variants identified in this report based on the test plan submitted and approved via KDB inquiry by the FCC. Due to physical restriction from parent model (e-SIM only), variant model was tested in place since it supports the physical SIM slot required to connect to LTE AP equipment.

The Model and FCC ID covered by this report includes:

Parent Model: A2650, FCC ID: BCG-E8140A

Variant Models: A2889, FCC ID: BCG-E8150A A2890; FCC ID: BCG-E8151A A2891 & A2892, FCC ID: BCG-E8152A

5.2. SOFTWARE AND FIRMWARE

The test utility software used during testing was 0.15.02.

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5.3. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Router/AC/DC adapter	ASUS	AC1900	GCIAGO000300	MSQ-RTAC6Uv2
Laptop AC/DC adapter	Lenovo	4236B92	PBFBKHK	ODS-BRCM1046

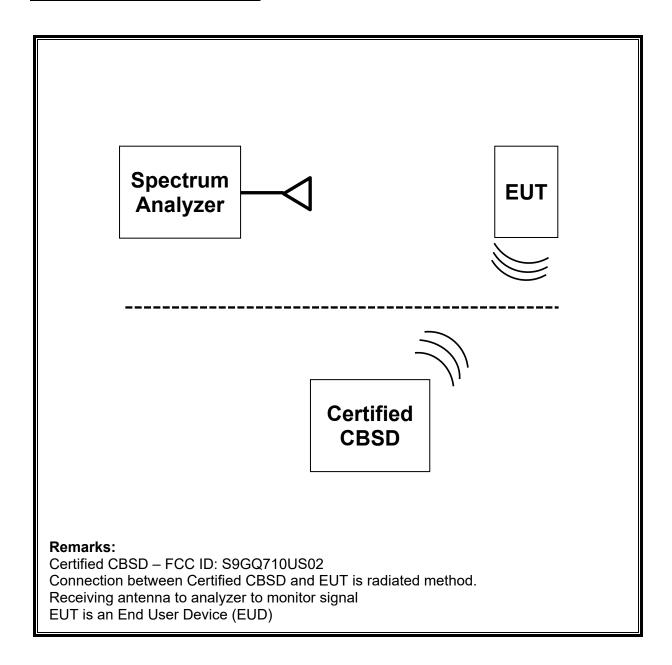
I/O CABLES

			1/0	O Cable List		
Cable	Port	# of identical	Connector	Cable Type	Cable	Remarks
No		ports	Туре		Length (m)	
1	AC	1	AC	Un-Shielded	1	N/A
3	RJ45	3	Ethernet	Un-Shielded	1	N/A
2	RF Port	2	SMA	Shielded	0.5	N/A

TEST SETUP

The standalone EUT connected to a certified CBSD and Spectrum Analyzer via air and an RF cable respectively.

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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	ID Num	Cal Due
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	125179	02/01/2023
Mount Antenna	Wilson Amplifiers	301126	-	-

т	est Software		
Description	Manufacturer	Model	Version Number
Laptop (Local SAS – WINNForum Test Harness)	Lenovo	PBFBKHK	2.0

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7. END USER DEVICE ADDITIONAL REQUIREMENT

7.1. TEST REQUIREMENT

FCC Part 96.47

- (a) End User Devices may operate only if they can positively receive and decode an authorization signal transmitted by a CBSD, including the frequencies and power limits for their operation.
- (1) An End User Device must discontinue operations, change frequencies, or change its operational power level within 10 seconds of receiving instructions from its associated CBSD.

8. TEST PROCEDURE AND EUT CONFIGURATION

KDB 940660 D01 Part 96 CBRS v03, WINNF-TS-0122 V1.0.2

Additional requirements are required to End-User Device LTE Band 48 device base on CBSD protocol. During the test, the EUT and its companion certified CBSD (FCC ID: S9GQ710US02) device communicate with each other via air.

Configuration	Frequency (MHz)	Power (dBm/MHz)	Bandwidth (MHz)
1	3615 - 3635	13	20
2	3665 - 3675	8	10

Configuration 1

- a) Setup WINNF.PT.C.HBT.1 with 3615MHz-3635MHz and power level 13 dBm/MHz
- b) Enable AP service from Ruckus Cloud Management
- c) Check EUT Transmitter Frequency and power
- d) Disable AP service from Ruckus Cloud management and check EUT stop transmission within 10s.

Configuration 2

- a) Setup WINNF.PT.C.HBT.1 with 3665MHz-3675MHz and power level 8 dBm/MHz
- b) Enable AP service from Ruckus Cloud Management
- c) Check EUT Transmitter Frequency and power
- d) Disable AP service from Ruckus Cloud Management and check EUT stop transmission within 10s.

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TEST RESULTS

8.1. END USER DEVICE CONFIGURATION 1 (3615MHz - 3635MHz; MaxEIRP: 13 dBm/MHz)

SENSE:INT ALIGN AUTO 01:42:28 PMMay 26,2022 System NO: Fast Trig: Free Run Avg Type: RMS TRACE [1 2 3 4 5 6 System Morrison Hatten: 10 dB Mkr2 3.635 00 GHz Showl Showl Mkr2 3.635 00 GHz -62.973 dBm Power On Image: Sense Line Image: Sense Line Image: Sense Line Image: Sense Line Image: Sense Line Image: Sense Line Image: Sense Line Image: Sense Line Image: Sense Line Image: Sense Line Image: Sense Line Image: Sense Line Image: Sense Line Image: Sense Line Image: Sense Line Image: Sense Line Image: Sense Lin		e Run 0 dB	Trig: Free #Atten: 1		NO: Fast Gain:Low	PN	50 Ω AC	⊧ 5 ef 0.00	v R e	dB/di g
NO: Fast Gain:Low Trig: Free Run HAvg Hold: 100/100 TYPE MANANANA DET ANNANA Gain:Low #Atten: 10 dB Mkr2 3.635 00 GHz -62.973 dBm Mkr2 3.635 00 GHz -62.973 dBm Power On Image: Stree Run Hard Street Run Hard		0 dB	#Atten: 1) dBm	ef 0.00	Re	
Mkr2 3.635 00 GHz -62.973 dBm Show Power On 1 2 4 1 2	2				Gain:Low	IFG) dBm	ef 0.00	Re	
Power On	2	Legtrer) dBm	ef 0.00	Re	
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Stop 3.70000 GHz		<u> </u>						GHZ	55000	art 3
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10 GHz -64.620 dBm						3.615 00			1 f	N
		Зm	2.973 di	_	0 GHz	3.635 00	3		1 f	Ν
Control Panel										
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1 o										
									i i	
STATUS										
Operation Mode	on M	oera	Or							

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Marker 3-4 Delta: 10 seconds has elapsed since CBSD has sent a signal to stop LTE transmission to EUT.

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8.2. END USER DEVICE CONFIGURATION 2 (3665MHz - 3675MHz; MaxEIRP: 8 dBm/MHz)

Keysight Spectrum Analyzer -					
RF 5	0Ω AC	SENSE:INT	ALIGN AUTO Avg Type: RMS	02:15:46 PM May 26, 2022 TRACE 1 2 3 4 5 6	Frequency
	PNO: Fast	Trig: Free Run	Avg Hold:>100/100	TYPE M WWWWW	
	IFGain:Low	#Atten: 10 dB		DET A NNNNN	
			Mkr	2 3.675 00 GHz	Auto Tur
0 dB/div Ref 0.00	dBm			-62.274 dBm	
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20.0					3.625000000 G
30.0					
10.0					Otort Fr
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Res BW 1.0 MHz	#VE	W 3.0 MHz*	Sweep 1	.000 ms (1001 pts)	15.000000 M Auto M
KR MODE TRC SCL	Х		JNCTION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> III
1 N 1 f 2 N 1 f	3.665 00 GHz 3.675 00 GHz	-60.235 dBm -62.274 dBm			
3		02.274 0.211			Freq Offs
4 5					0
6					
7 8					Scale Ty
9					
10 11					Log <u>L</u>
		III		•	
5G			STATUS		Ľ
		Onoratio	n Mada		
		<u>Operatio</u>			

DATE: 7/14/2022

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RF 50 Ω AC SENSE:INT ALIGN AUTO 02:31:18 PM ay 26, 2022 PNO: Fast Trig: Free Run IFGain:Low Trig: Free Run #Atten: 10 dB TRACE 12:34:56 Frequence OMMkr3 5.150 s -8.07 dB Auto Auto Auto Auto 0
ΔMkr3 5.150 s Auto dB/div Ref 0.00 dBm -8.07 dB 0 -8.07 dB -8.07 dB 0 -8.07 dB <t< th=""></t<>
Center Center <td< th=""></td<>
1.0 Start
nter 3.67000000 GHz s BW 8 MHz #VBW 50 MHz* Sweep 25.00 s (1001 pts)
Allo Y FUNCTION FUNCTION WIDTH FUNCTION VALUE Allo Δ2 1 t (Δ) -8.09 dB F F 1 t 7.875 s -61.05 dBm F F F T t 7.875 s -61.05 dBm F F T t 7.875 s -61.05 dBm F F T T T 7.875 s -61.05 dBm F F T T T T F F T T T T T T F F T T T T T T F T
Scale
STATUS

Marker 2: Time elapsed since signal to stop LTE transmission. EUD has stopped transmission. Marker 3-4 Delta: 10 seconds has elapsed since CBSD has sent a signal to stop LTE transmission to EUT.

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9. SETUP PHOTOS

Please refer to 14040863-EP1V1 for setup photos

END OF REPORT

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