TEST REPORT

Report Number : 14040867-E13V2

Applicant	:	APPLE, INC. 1 APPLE PARK WAY CUPERTINO, CA. 95014, U.S.A.
Model	:	A2649 (Parent Model) A2881, A2882, A2883, A2884 (Variant Models)
FCC ID	:	BCG-E8138A (Parent Model) BCG-E8142A, BCG-E8143A, BCG-E8144A (Variant Models)
EUT Description	:	SMARTPHONE
Test Standard(s)	:	FCC PART 96.47

Date Of Issue:
July 15, 2022

Prepared by:
UL LLC
47173 Benicia Street
Fremont, CA 94538, U.S.A.
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ACCREDITED
CERT #0751.05

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	6/21/2022	Initial Issue	Steven Tran
V2	7/15/2022	Added support equipment info	Steven Tran

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UL LLC FORM NO: CCSUP4701I
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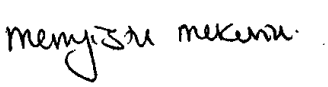
1. ATTESTATION OF TEST RESULTS

Applicant Name and Address	APPLE INC. 1 APPLE PARK WAY CUPERTINO CA 95104, U.S.A.
Model	A2649 (Parent Model) A2881, A2882, A2883, A2884 (Variant Models)
Model Of Testing	A2884
Brand	APPLE
FCC ID	BCG-E8138A (Parent Model) BCG-E8142A, BCG-E8143A, BCG-E8144A (Variant Models)
EUT Description	SMART PHONE
Serial Number	R54KXLK2G1
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:
		
Thu Chan Staff Engineer UL LLC	Mengistu Mekuria Staff Lab Engineer UL LLC	Steven Tran Project Engineer UL LLC

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
☒	Building 2: 47266 Benicia Street, Fremont, CA 94538	US0104	22541	550739
☐	Building 4: 47658 Kato Rd, Fremont, CA 94538	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 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%.

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: A2649, FCC ID: BCG-E8138A

Variant Models: A2881, FCC ID: BCG-E8142A
A2882; FCC ID: BCG-E8143A
A2883 & A2884, FCC ID: BCG-E8144A

5.2. SOFTWARE AND FIRMWARE

The test utility software used during testing was 0.15.02.

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

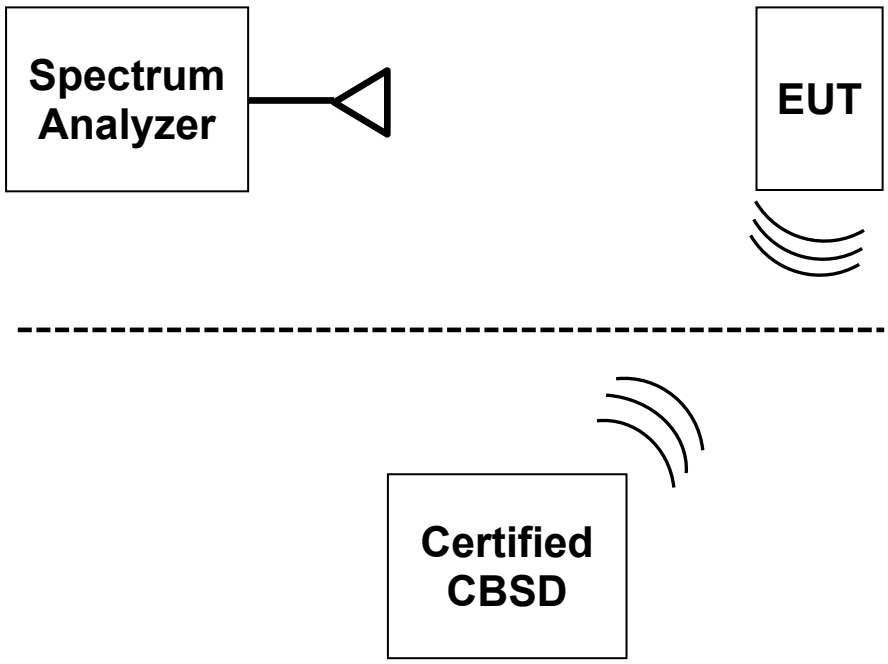
I/O CABLES

I/O Cable List						
Cable No	**Port**	**# of identical ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
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.

SETUP DIAGRAM OF TEST SYSTEM



Remarks:
Certified CBSD – FCC ID: S9GQ710US02
Connection between Certified CBSD and EUT is radiated method.
Receiving antenna to analyzer to monitor signal
EUT is an End User Device (EUD)

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	-	-

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

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

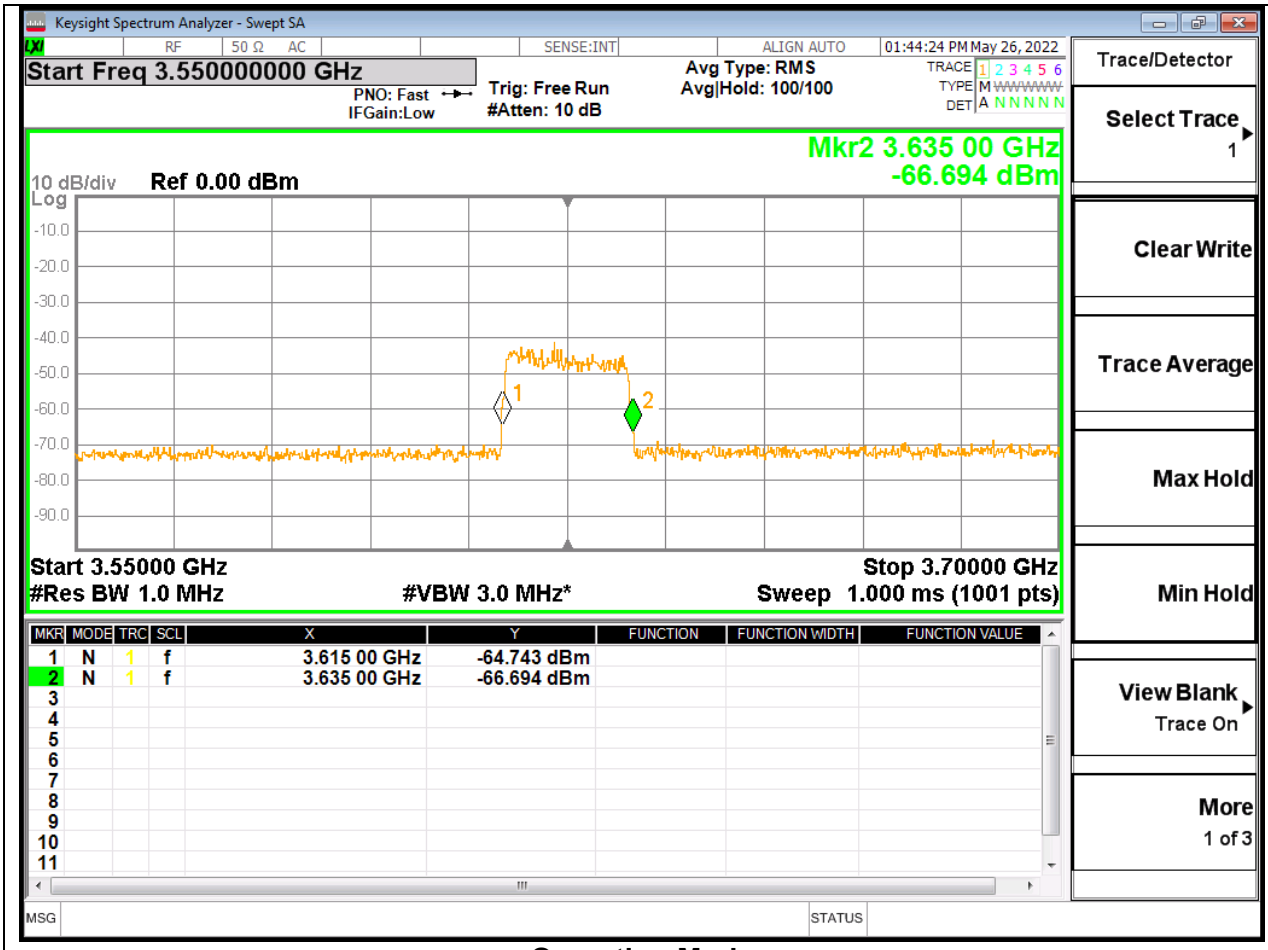
a) Setup WINNF.PT.C.HBT.1 with 3615MHz-3635MHz and power level 13 dBm/MHz
b) Enable AP service from Ruckus Cloud Management
c) Check EUT Transmitter Frequency and power
d) Disable AP service from Ruckus Cloud management and check EUT stop transmission within 10s.

Configuration 2

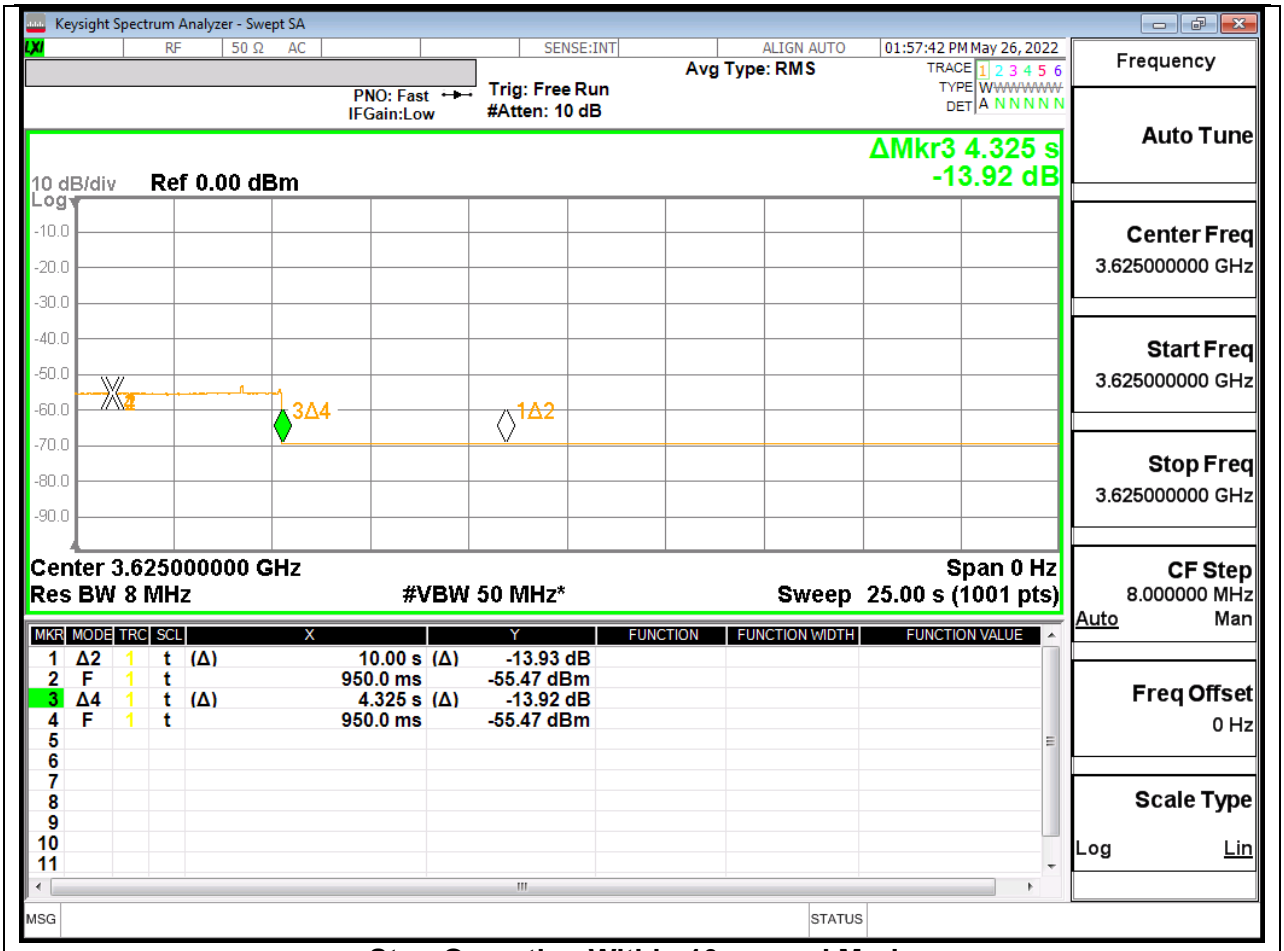
a) Setup WINNF.PT.C.HBT.1 with 3665MHz-3675MHz and power level 8 dBm/MHz
b) Enable AP service from Ruckus Cloud Management
c) Check EUT Transmitter Frequency and power
d) Disable AP service from Ruckus Cloud Management and check EUT stop transmission within 10s.

TEST RESULTS

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



Operation Mode

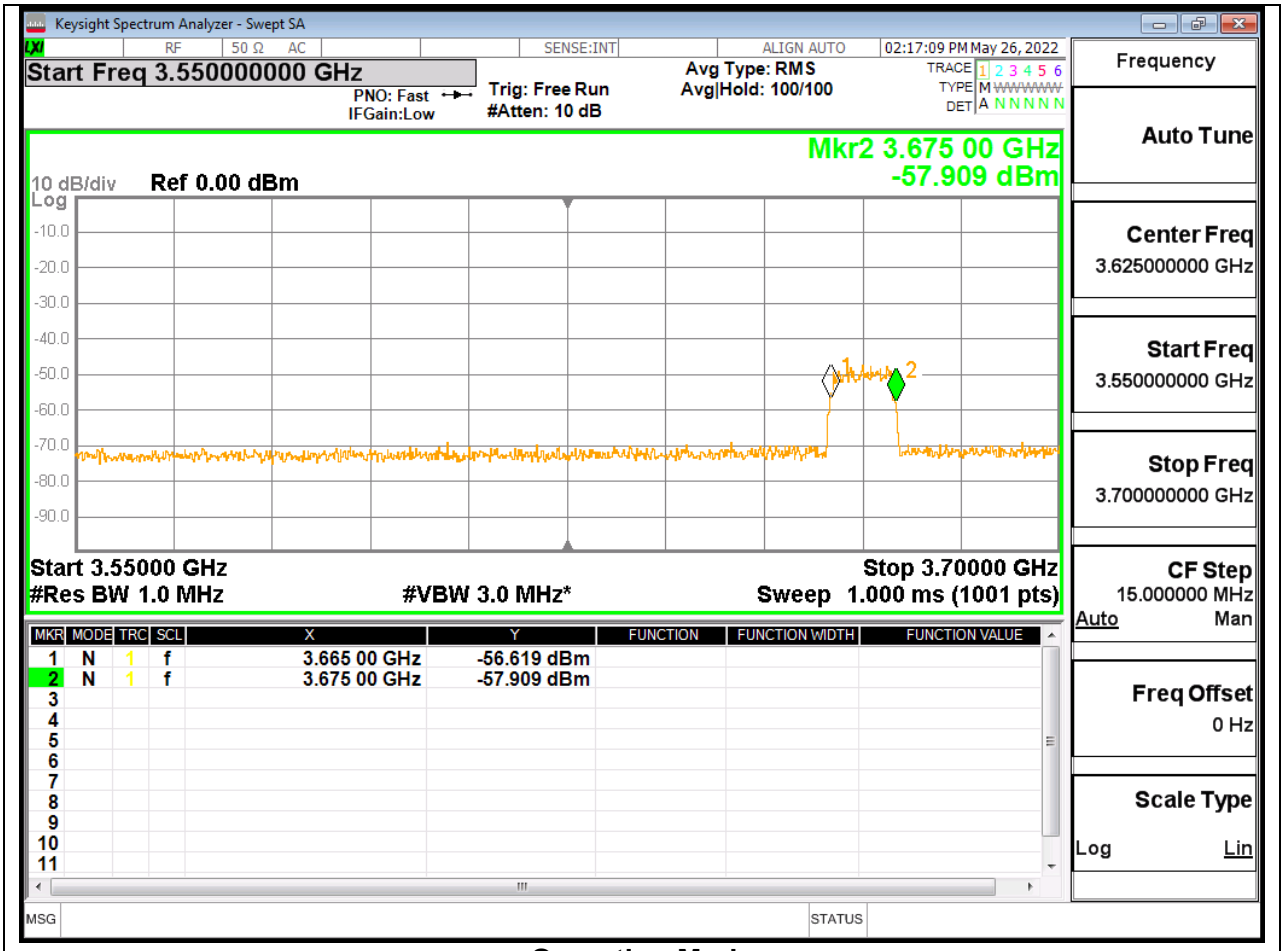


Stop Operation Within 10 second Mode

NOTE:

Marker 1: Authorized CBSD sends a signal to stop LTE transmission.
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.

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



Operation Mode

Stop Operation Within 10 second Mode

NOTE:

Marker 1: Authorized CBSD sends a signal to stop LTE transmission.
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.

9. SETUP PHOTOS

Please refer to 14040867-EP1V1 for setup photos

END OF REPORT

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