



## **TEST REPORT**

**Report Number. :** 12607346-E15V1

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

**Model :** A2160, A2216, AND A2217

**FCC ID :** BCG-E3305A

**EUT Description :** SMARTPHONE

**Test Standard(s) :** FCC PART 96.47

**Date Of Issue:**

July 31, 2019

**Prepared by:**

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NVLAP LAB CODE 200065-0

Revision History

| Rev. | Issue Date | Revisions     | Revised By |
|------|------------|---------------|------------|
| V1   | 7/30/2019  | Initial Issue | Thu Chan   |

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## 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** APPLE, INC.  
1 APPLE PARK WAY  
CUPERTINO, CA 95014, U.S.A.

**EUT DESCRIPTION:** SMARTPHONE

**MODEL:** A2160, A2216, AND A2217

**SERIAL NUMBER:** C7CYQ00AMTCF

**DATE TESTED:** JULY 24, 2019

| APPLICABLE STANDARDS |              |
|----------------------|--------------|
| STANDARD             | TEST RESULTS |
| FCC PART 96.47       | Complies     |

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Verification Services Inc. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

**Note:** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. 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 NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

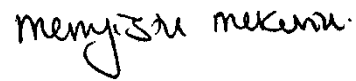
Approved & Released For  
UL Verification Services Inc. By:



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Thu Chan  
Operations Leader  
UL Verification Services Inc.

Prepared By:



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Mengistu Mekuria  
Lead Test Engineer  
UL Verification Services Inc.

Tested By:



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Steven Tran  
Project Engineer  
UL Verification Services Inc.

## 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 v02 and WINNF-TS-0122-v1.0.0.

## 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, Fremont, California, USA. Line conducted emissions are measured only at the 47173 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

| 47173 Benicia Street               | 47266 Benicia Street               |
|------------------------------------|------------------------------------|
| <input type="checkbox"/> Chamber A | <input type="checkbox"/> Chamber D |
| <input type="checkbox"/> Chamber B | <input type="checkbox"/> Chamber E |
| <input type="checkbox"/> Chamber C | <input type="checkbox"/> Chamber F |
|                                    | <input type="checkbox"/> Chamber G |
|                                    | <input type="checkbox"/> Chamber H |

The above test sites and facilities are covered under FCC Test Firm Registration # 208313. Chambers A through C are covered under ISED company address code 2324B with site numbers 2324B -1 through 2324B-3, respectively. Chambers D through H are covered under ISED Canada company address code 22541 with site numbers 22541 -1 through 22541-5, respectively.

The above test sites and facilities are covered under FCC Test Firm Registration # 208313. UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at [NVLAP Lab Search](#).

## 4. CALIBRATION

### 4.1. 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

EUT is a smartphone with multimedia functions (music, application support, and video), cellular GSM, GPRS, EGPRS, UMTS, LTE, TD-SCDMA, CDMA, IEEE 802.11a/b/g/n/ac/ax, Bluetooth, Ultra-Wide band, GPS and NFC. All models support at least one UICC based SIM. The second SIM, if present, is either UICC based pSIM (physical SIM) or e-SIM (electronic SIM). The device has a built-in inductive charging receiver. The rechargeable battery is also not user accessible. However, the test data in this report refers only to LTE Band 48 that operates in the CBRS band.

### 5.2. SOFTWARE AND FIRMWARE

The test utility software used during testing was WINNF-TS-0122 V1.0.0.

### 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 |
| Directional Coupler    | Krytar       | 152613  | T1537         | NA           |

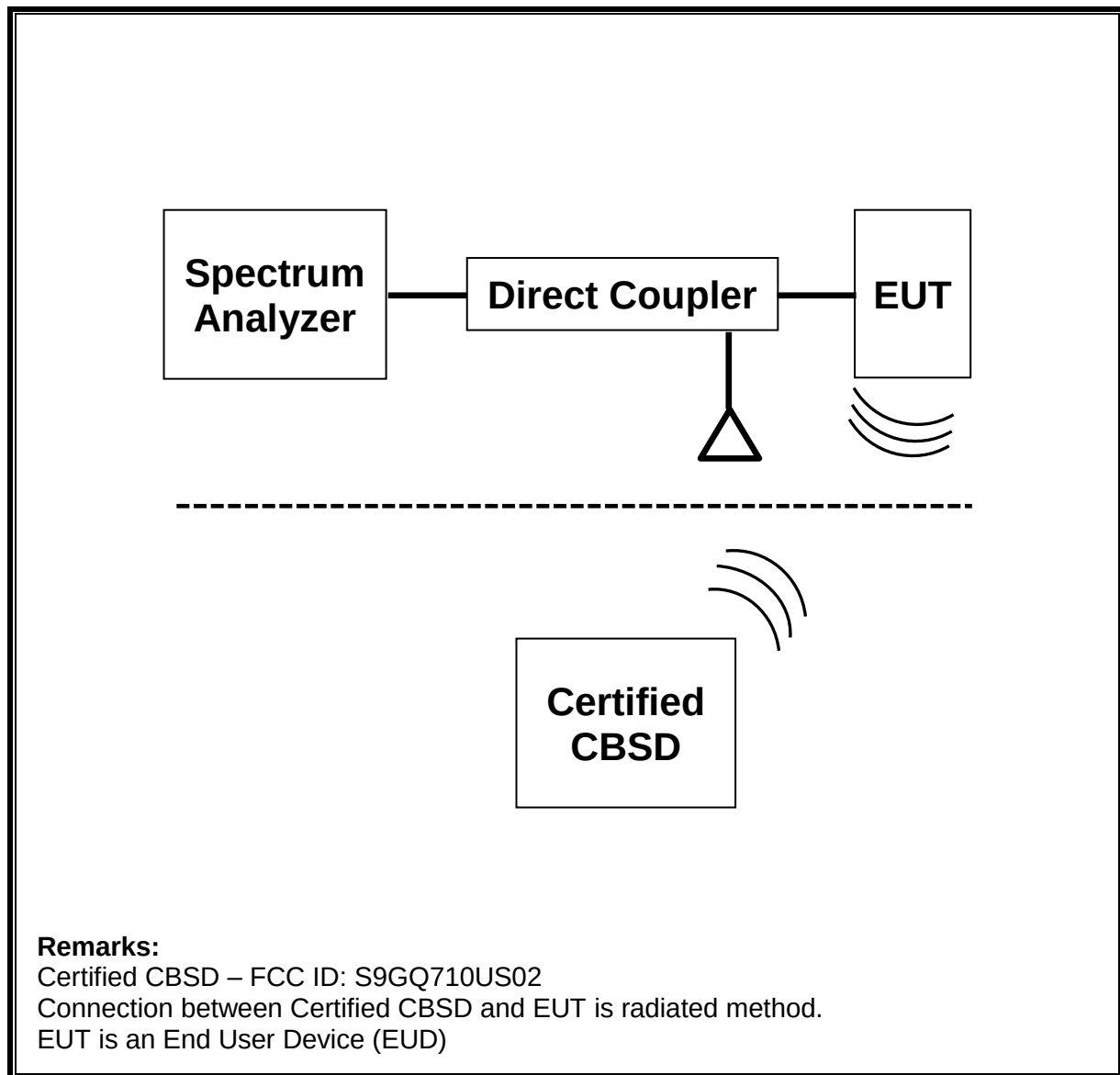
#### I/O CABLES

| 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**





## 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 | T342   | 01/23/2020 |
| Directional Coupler                  | Krytar                          | 152613 | T1537  | 06/08/2020 |

| 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 v01, WINNF-TS-0122 V1.0.0

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             | 3660 - 3670     | 8               | 10              |

### Configuration 1

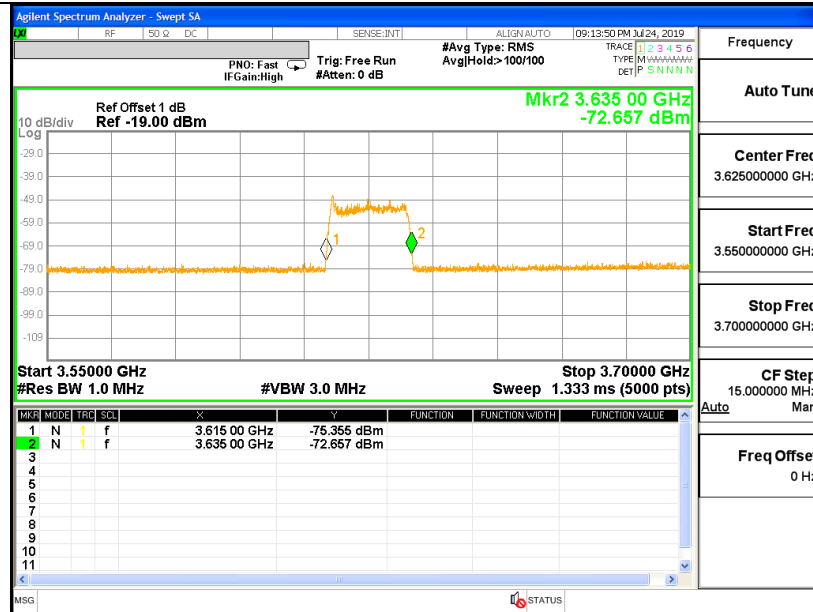
- a) Setup WINNF.PT.C.HBT.1 with 3615MHz-3635MHz and power level 13 dBm/MHz
- b) Enable AP service from Ruckus Cloud Management
- c) Check EUT Transmitter Frequency and power
- d) Disable AP service from Ruckus Cloud management and check EUT stop transmission within 10s.

### Configuration 2

- a) Setup WINNF.PT.C.HBT.1 with 3660MHz-3670MHz 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**

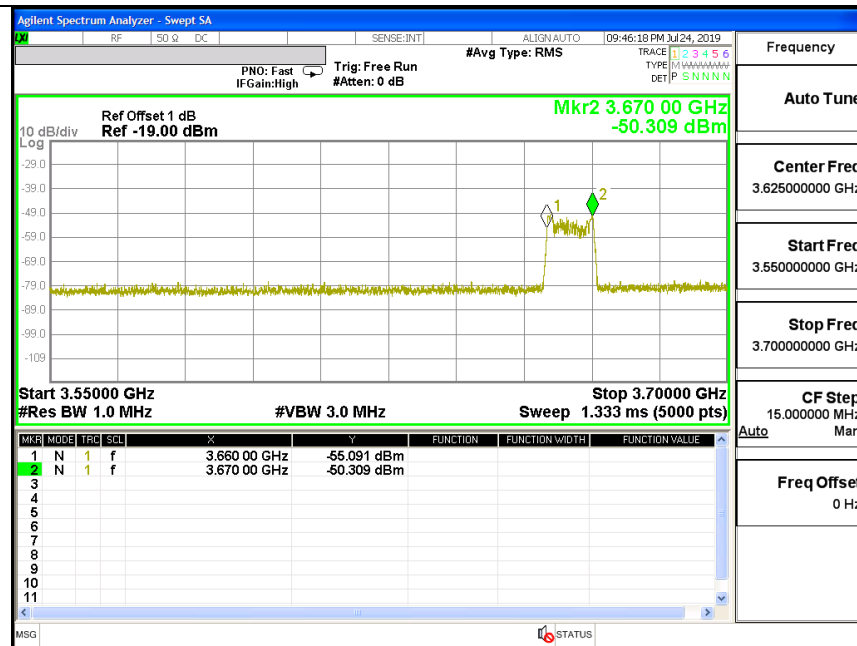
**NOTE:**

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 (3660MHz - 3670MHz; 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 see setup report 12696945-EP1V1

**END OF REPORT**