



# **TEST REPORT**

**Report Number. :** 13179116-E15V2

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

**Model :** A2172 (Tested)  
A2402  
A2403, A2404, A2405

**FCC ID :** BCG-E3542A (Tested)  
BCG-E3543A  
BCG-E3544A

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

**Date Of Issue:**  
September 02, 2020

**Prepared by:**  
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NVLAP LAB CODE 200065-0

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Revision History

| <u>Rev.</u> | <u>Issue Date</u> | <u>Revisions</u>          | <u>Revised By</u> |
|-------------|-------------------|---------------------------|-------------------|
| V1          | 8/7/2020          | Initial Issue             | T. Chan           |
| V2          | 9/2/2020          | Addressed TCB's Questions | T. 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:** A2172 (Tested)  
A2402  
A2403, A2404, A2405

**SERIAL NUMBER:** C7CC806EPVGL

**DATE TESTED:** 6/17/2020

| 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.

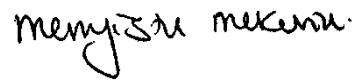
Approved & Released For  
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Tested By:



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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-v1.0.1.

## 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, and 47658 Kato Road, 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               | 47658 Kato Road                    |
|------------------------------------|------------------------------------|------------------------------------|
| <input type="checkbox"/> Chamber A | <input type="checkbox"/> Chamber D | <input type="checkbox"/> Chamber I |
| <input type="checkbox"/> Chamber B | <input type="checkbox"/> Chamber E | <input type="checkbox"/> Chamber J |
| <input type="checkbox"/> Chamber C | <input type="checkbox"/> Chamber F | <input type="checkbox"/> Chamber K |
|                                    | <input type="checkbox"/> Chamber G | <input type="checkbox"/> Chamber L |
|                                    | <input type="checkbox"/> Chamber H | <input type="checkbox"/> Chamber M |

The above test sites and facilities are covered under FCC Test Firm Registration # 208313. Chambers above are covered under Industry Canada company address and respective code: 2324A.

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0

## 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 <sub>LAB</sub> |
|---|------------------|
| Worst Case Conducted Disturbance, 9KHz to 0.15 MHz  | 3.39 dB          |
| Worst Case Conducted Disturbance, 0.15 to 30 MHz    | 3.07 dB          |
| Worst Case Radiated Disturbance, 9KHz to 30 MHz     | 2.52 dB          |
| Worst Case Radiated Disturbance, 30 to 1000 MHz     | 4.88 dB          |
| Worst Case Radiated Disturbance, 1000 to 18000 MHz  | 4.24 dB          |
| Worst Case Radiated Disturbance, 18000 to 26000 MHz | 4.37 dB          |
| Worst Case Radiated Disturbance, 26000 to 40000 MHz | 5.17 dB          |

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

## 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, NFC and WPT. 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. However, the test data in this report refers only to LTE Band 48 that operates in the CBRS band.

### 5.2. INTRODUCTION

This test report covers 3 FCC IDs: BCG-E3542A, BCG-E3543A and BCG-E3544A and Model 2172A under FCC ID BCG-E3542A was set for test. The major difference among the models documented under these 3 FCC IDs is the cellular bands enabled, details please refer to the technical description. Since they use the same rf module and CBRS testing is performed by the software, therefore the FCC ID BCG-E3542A test data shall remain representative of FCC ID BCG-3543A and FCC ID BCG-E3544A.

### 5.3. SOFTWARE AND FIRMWARE

The test utility software used during testing was WINNF-TS-0122 V1.0.1.

### 5.4. 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

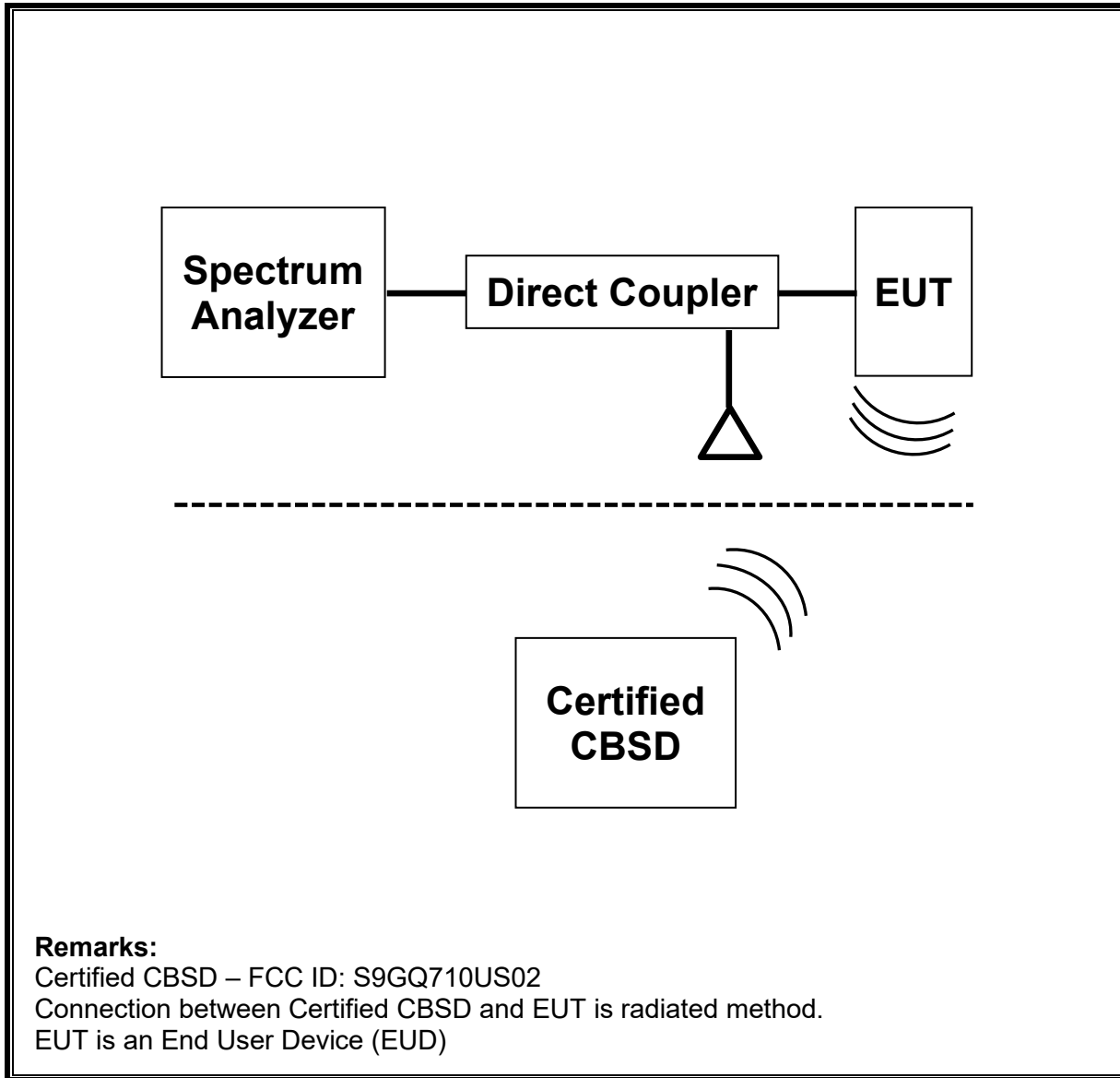
| I/O Cable List |         |                      |                |             |                  |         |
|----------------|---------|----------------------|----------------|-------------|------------------|---------|
| Cable No       | Port    | # of identical ports | Connector Type | Cable Type  | 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 | T906   | 07/24/2020 |

| 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

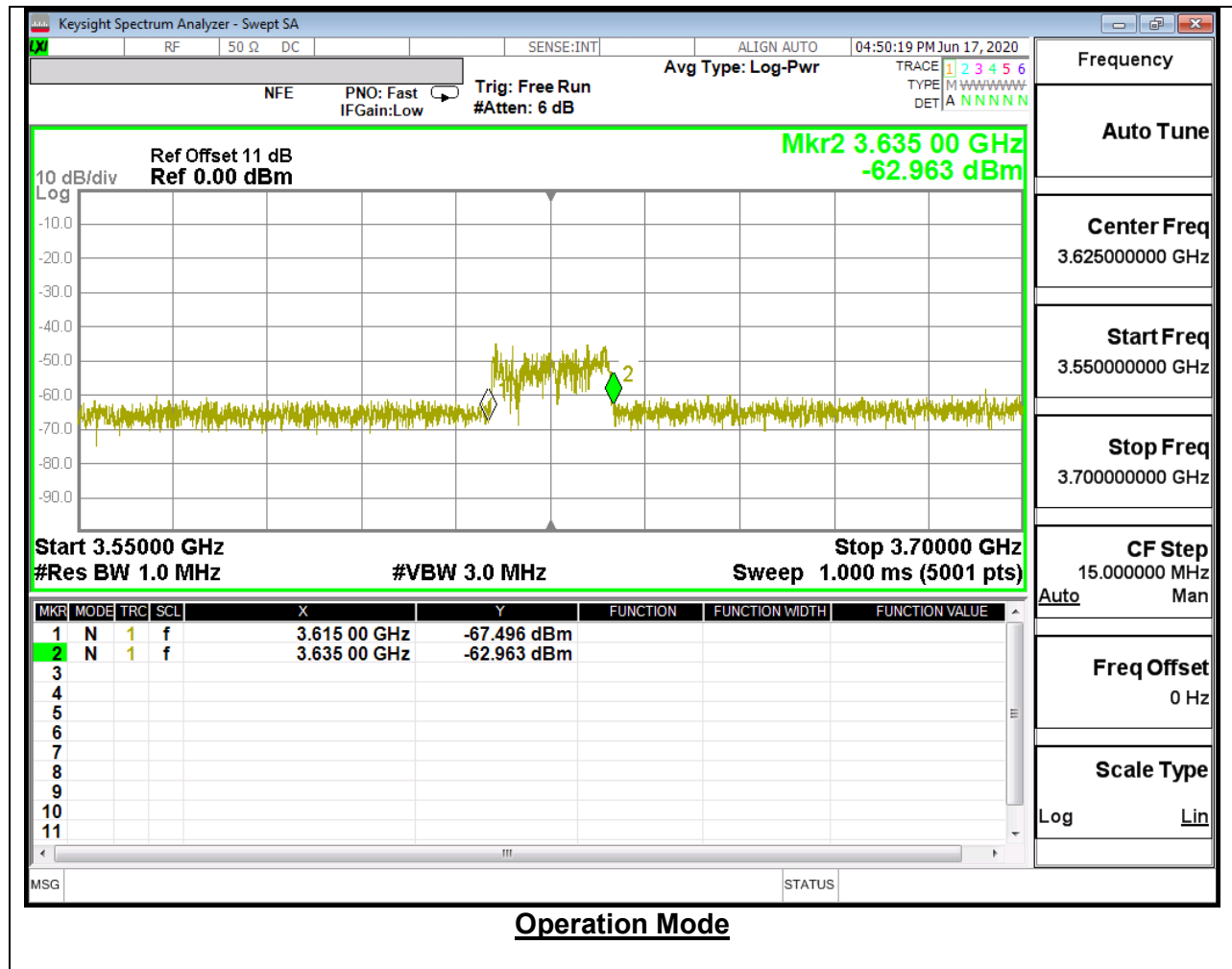
- a) Setup WINNF.PT.C.HBT.1 with 3615MHz-3635MHz and power level 13 dBm/MHz
- b) Enable AP service from Ruckus Cloud Management
- c) Check EUT Transmitter Frequency and power
- d) Disable AP service from Ruckus Cloud management and check EUT stop transmission within 10s.

#### 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)





**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)





**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 13179116-EP1V1

**END OF REPORT**