



# **TEST REPORT**

**Report Number:** 14523759-E2V2

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

**Model :** A3089, A3090, A3092

**Brand :** APPLE

**FCC ID :** BCG-E8428A, BCG-E8429A, BCG-E8430A

**EUT Description :** SMARTPHONE

**Test Standard(s) :** FCC 47 CFR PART 2, 22H, 24E, 27, 90S, 90R, AND 96

**Date Of Issue:**

2023-08-25

**Prepared by:**

UL Verification Services Inc.  
47173 Benicia Street  
Fremont, CA 94538, U.S.A.  
TEL: (510) 319-4000  
FAX: (510) 661-0888



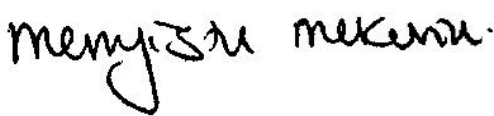
Revision History

| Rev. | Issue Date | Revisions                              | Revised By       |
|------|------------|--|------------------|
| V1   | 2023-07-06 | Initial Review                         | --               |
| V2   | 2023-08-25 | Addressed TCB Questions at Section 5.7 | Mengistu Mekuria |

## TABLE OF CONTENTS

|   |           |
|---|-----------|
| <b>1. ATTESTATION OF TEST RESULTS</b>                 | <b>4</b>  |
| <b>2. TEST METHODOLOGY</b>                            | <b>5</b>  |
| <b>3. FACILITIES AND ACCREDITATION</b>                | <b>5</b>  |
| <b>4. DECISION RULES AND MEASUREMENT UNCERTAINTY</b>  | <b>6</b>  |
| 4.1 METROLOGICAL TRACEABILITY                         | 6         |
| 4.2 DECISION RULES                                    | 6         |
| 4.3 MEASUREMENT UNCERTAINTY                           | 6         |
| 4.4 SAMPLE CALCULATION                                | 6         |
| <b>5. INTRODUCTION OF TEST DATA REUSE</b>             | <b>7</b>  |
| 5.1 DESCRIPTION OF EUT                                | 7         |
| 5.2 INTRODUCTION                                      | 7         |
| 5.3 MODEL DIFFERENCES                                 | 7         |
| 5.4 SPOT CHECK VERIFICATION RESULTS SUMMARY FOR A3089 | 8         |
| 5.5 SPOT CHECK VERIFICATION RESULTS SUMMARY FOR A3090 | 9         |
| 5.6 SPOT CHECK VERIFICATION RESULTS SUMMARY FOR A3092 | 10        |
| 5.7 REFERENCE DETAIL                                  | 11        |
| 5.8 SOFTWARE AND FIRMWARE                             | 12        |
| 5.9 SPOT CHECK WORST-CASE CONFIGURATION AND MODE      | 12        |
| 5.10 DESCRIPTION OF TEST SETUP                        | 13        |
| <b>6. TEST AND MEASUREMENT EQUIPMENT</b>              | <b>15</b> |
| <b>7. Appendix A – Reference Test Report</b>          | <b>16</b> |

## 1. ATTESTATION OF TEST RESULTS

|   |  |
|---|--|
| Applicant Name and Address  | APPLE, INC<br>1 APPLE PARK WAY<br>CUPERTINO, CA 95014, U.S.A.  |
| Model   | A3089, A3090, A3092  |
| Brand   | APPLE  |
| FCC ID  | BCG-E8428A, BCG -E8429A, BCG -E8430A   |
| EUT Description   | SMARTPHONE   |
| Serial Number   | TM69JWV5W3, Y6F3HQH71K, M6V1FVVQCX, TKJFCV99TK, GJ6H0KK452, WX7MQC7JTP(CONDUCTED) AND FLXXR0CGFH, M73M9YT6CD, JQH2QTD9C (RADIATED) |
| Sample Receipt date   | 2023-05-23   |
| Date Tested   | 2023-05-23 TO 2023-06-23   |
| Applicable Standards  | FCC 47 CFR PART 2, 22H, 24E, 27, 90S, 90R, AND 96  |
| Test Results  | COMPLIES   |
| <p>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.</p> <p>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.</p> <p>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.</p> |  |
| Approved & Released By:   | Prepared By:   |
|    |   |
| Mengistu Mekuria<br>Staff Engineer<br>UL LLC.   | Alex Chen<br>Laboratory Engineer<br>UL LLC.  |

## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with the following:

- ANSI C63.26:2015
- FCC 47 CFR Part 2, Part 22, Part 24, Part 27, Part 90, and Part 96
- [FCC KDB 971168 D01 v03r01](#): Power Meas License Digital Systems
- [FCC KDB 971168 D02 v02r02](#): Misc Rev Approv License Devices
- [FCC KDB 412172 D01 v01r01](#): Determining ERP and EIRP

## 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<br>CABID | ISED<br>Company<br>Number | FCC<br>Registration |
|-------------------------------------|--|---------------|---------------------------|---------------------|
| <input checked="" type="checkbox"/> | Building 1: 47173 Benicia Street, Fremont, CA 94538, USA | US0104        | 2324A                     | 550739              |
| <input checked="" type="checkbox"/> | Building 2: 47266 Benicia Street, Fremont, CA 94538, USA |               |                           |                     |
| <input type="checkbox"/>            | Building 3: 843 Auburn Court, Fremont, CA 94538, USA     |               |                           |                     |
| <input checked="" type="checkbox"/> | Building 4: 47658 Kato Rd, Fremont, CA 94538, USA        |               |                           |                     |
| <input checked="" type="checkbox"/> | Building 5: 47670 Kato Rd, Fremont, CA 94538, USA        |               |                           |                     |

## 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>               |
|--|--------------------------------|
| Conducted Antenna Port Emission Measurement          | 1.940 db                       |
| Power Spectral Density                               | 2.466 db                       |
| Time Domain Measurements Using SA                    | 3.39 %                         |
| RF Power Measurement Direct Method Using Power Meter | 0.450 db Peak<br>1.300 db Ave. |
| Radio Frequency (Spectrum Analyzer)                  | 141.16 Hz                      |
| Occupied Bandwidth                                   | 1.22%                          |
| 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 SAMPLE CALCULATION

#### RADIATED EMISSIONS

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)  
36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

## 5. INTRODUCTION OF TEST DATA REUSE

### 5.1 DESCRIPTION OF EUT

The Apple iPhone is a smartphone with cellular GSM, GPRS, EGPRS, UMTS, LTE, 5GNR1, 5GNR2, IEEE 802.11a/b/g/n/ac/ax, Bluetooth (BT), Ultra-Wideband (UWB), GPS, NFC, NB UNII, 802.15.4, 802.15ab-NB and MSS technologies. The rechargeable battery is not user accessible.

Testing was performed on the parent 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.

### 5.2 INTRODUCTION

This application for certification is leveraging the data reuse procedures from KDB 484596 D01 based on reference FCC ID: BCG-E8427A to cover variant model FCC ID: BCG-E8428A, FCC ID: BCG-E8429A, and FCC ID: BCG-E8430A. 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 A2846, A3089, A3090, and A3092,

A2846, A3089, A3090, and A3092 are highly similar, with the only differences being listed on the table below:

| Model | FCC ID     | Model Changes  |
|-------|------------|--|
| A2846 | BCG-E8427A | Reference Model  |
| A3089 | BCG-E8428A | Variant model, Removed FR2 from the reference model  |
| A3090 | BCG-E8429A | Variant model,<br>Removed FR2, LTE B11/14/21/29/71, and 5G NR n14/n71 from the reference model           |
| A3092 | BCG-E8430A | Variant model,<br>Removed FR2, LTE B11/14/29/53/71, MSS, and 5G NR n14/n53/n71 from the reference Model. |

\*Note:

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 A3089, A3090, and A3092 in accordance with the test plan approved via KDB inquiry. Comparison of the models, upper deviation is within 0.5dB range of antenna port data and all tests are under FCC Technical Limits. The results documented for model A2846 may be applied as representative to models A3089, A3090, and A3092.

## 5.4 SPOT CHECK VERIFICATION RESULTS SUMMARY FOR A3089

| AA3089 SPOT CHECK RESULTS |                   |            |                 |                          |                          |            |             |
|---------------------------|-------------------|------------|-----------------|--------------------------|--------------------------|------------|-------------|
| Technology                | Worst Mode        | Test Item  | Measured        | Original Model: A2846    | Sub Model: A3089         | Delta (dB) | Remarks     |
|                           |                   |            | Frequency (MHz) | FCC ID: BCG-E8427A (dBm) | FCC ID: BCG-E8428A (dBm) |            |             |
| LTE BAND 7                | QPSK @ 20 MHz BW  | Cond Power | 2500-2570       | 25.70                    | 25.70                    | 0          | Noise floor |
|                           | QPSK @ highest BW | RSE        |                 | -52.14                   | -47.57                   | 4.57       |             |
| 5G NR BAND N7             | BPSK @ 40 MHz BW  | Cond Power | 2500-2570       | 25.70                    | 25.70                    | 0          |             |
| LTE BAND 12               | QPSK @ 10 MHz BW  | Cond Power | 699-716         | 25.70                    | 25.70                    | 0          |             |
| 5G NR BAND N12            | BPSK @ 15 MHz BW  | Cond Power | 699-716         | 25.70                    | 25.70                    | 0          |             |
| LTE BAND 13               | QPSK @ 10 MHz BW  | Cond Power | 777-787         | 25.70                    | 25.70                    | 0          |             |
| LTE BAND 14               | QPSK @ 10 MHz BW  | Cond Power | 788-798         | 25.70                    | 25.70                    | 0          |             |
| 5G NR BAND N14            | BPSK @ 10 MHz BW  | Cond Power | 788-798         | 25.70                    | 25.70                    | 0          |             |
| LTE BAND 17               | QPSK @ 10 MHz BW  | Cond Power | 704-716         | 25.70                    | 25.70                    | 0          |             |
| LTE BAND 25               | QPSK @ 20 MHz BW  | Cond Power | 1850-1915       | 25.70                    | 25.70                    | 0          | Noise floor |
|                           | QPSK @ highest BW | RSE        |                 | -48.73                   | -50.66                   | -1.93      |             |
| 5G NR BAND N25            | BPSK @ 40 MHz BW  | Cond Power | 1850-1915       | 25.70                    | 25.70                    | 0          |             |
| LTE BAND 26 (90S)         | QPSK @ 10 MHz BW  | Cond Power | 814-824         | 25.70                    | 25.70                    | 0          |             |
| 5G NR BAND N26 (90S)      | BPSK @ 10 MHz BW  | Cond Power | 814-824         | 25.70                    | 25.70                    | 0          |             |
| LTE BAND 26 (P22)         | QPSK @ 10 MHz BW  | Cond Power | 824-849         | 25.70                    | 25.70                    | 0          |             |
| 5G NR BAND N26 (P22)      | BPSK @ 20 MHz BW  | Cond Power | 824-849         | 25.70                    | 25.70                    | 0          |             |
| LTE BAND 30               | QPSK @ 10 MHz BW  | Cond Power | 2305-2315       | 25.20                    | 25.20                    | 0          |             |
| 5G NR BAND N30            | BPSK @ 10 MHz BW  | Cond Power | 2305-2315       | 25.20                    | 25.20                    | 0          |             |
| LTE BAND 41               | QPSK @ 20 MHz BW  | Cond Power | 2496-2690       | 28.70                    | 28.70                    | 0          |             |
| 5G NR BAND N41            | BPSK @ 100 MHz BW | Cond Power | 2496-2690       | 28.70                    | 28.70                    | 0          |             |
| LTE BAND 41               | 16QAM @ 20 MHz BW | Cond Power | 2500-2690       | 28.70                    | 28.70                    | 0          |             |
| 5G NR BAND N41            | BPSK @ 100 MHz BW | Cond Power | 2500-2690       | 28.70                    | 28.70                    | 0          | Ant2        |
| LTE BAND 48               | QPSK @ 20 MHz BW  | Cond Power | 3550-3700       | 26.00                    | 26.00                    | 0          | Noise floor |
|                           |                   | RSE        |                 | -19.94                   | -14.61                   | 5.33       |             |
| 5G NR BAND N48            | QPSK @ 20 MHz BW  | Cond Power | 3550-3700       | 26.00                    | 26.00                    | 0          |             |
| LTE BAND 66               | QPSK @ 20 MHz BW  | Cond Power | 1710-1780       | 25.70                    | 25.70                    | 0          |             |
| 5G NR BAND N66            | BPSK @ 40 MHz BW  | Cond Power | 1710-1780       | 25.70                    | 25.70                    | 0          |             |
| 5G NR BAND n70            | BPSK @ 15 MHz BW  | Cond Power | 1695-1710       | 25.70                    | 25.70                    | 0          |             |
| LTE BAND 71               | QPSK @ 20 MHz BW  | Cond Power | 663-698         | 25.70                    | 25.70                    | 0          |             |
| 5G NR BAND n71            | BPSK @ 20 MHz BW  | Cond Power | 663-698         | 25.70                    | 25.70                    | 0          |             |
| 5G NR BAND N77            | BPSK @ 100 MHz BW | Cond Power | 3450-3550       | 28.70                    | 28.70                    | 0          |             |
| 5G NR BAND N77            | BPSK @ 100 MHz BW | Cond Power | 3700-3980       | 28.70                    | 28.70                    | 0          |             |
| 5G NR BAND N79            | BPSK @ 50 MHz BW  | Cond Power | 4940-4990       | 20                       | 20                       | 0          |             |
| LTE BAND 53               | QPSK @ 10 MHz BW  | Cond Power | 2483.5-2495     | 20.7                     | 20.7                     | 0          |             |
| 5G NR BAND 53             | BPSK @ 10 MHz BW  | Cond Power | 2483.5-2495     | 20.7                     | 20.7                     | 0          |             |



## 5.5 SPOT CHECK VERIFICATION RESULTS SUMMARY FOR A3090

| Technology           | Worst Mode        | Test Item  | Measured        | Original Model: A2846    | Sub Model: A3090         | Delta (dB) | Remarks     |
|----------------------|-------------------|------------|-----------------|--------------------------|--------------------------|------------|-------------|
|                      |                   |            | Frequency (MHz) | FCC ID: BCG-E8427A (dBm) | FCC ID: BCG-E8429A (dBm) |            |             |
| LTE BAND 7           | QPSK @ 20 MHz BW  | Cond Power | 2500-2570       | 25.70                    | 25.70                    | 0          |             |
|                      | QPSK @ highest BW | RSE        |                 | -52.14                   | -52.68                   | -0.54      | Noise floor |
| 5G NR BAND N7        | BPSK @ 40 MHz BW  | Cond Power | 2500-2570       | 25.70                    | 25.70                    | 0          |             |
| LTE BAND 12          | QPSK @ 10 MHz BW  | Cond Power | 699-716         | 25.70                    | 25.70                    | 0          |             |
| 5G NR BAND N12       | BPSK @ 15 MHz BW  | Cond Power | 699-716         | 25.70                    | 25.70                    | 0          |             |
| LTE BAND 13          | QPSK @ 10 MHz BW  | Cond Power | 777-787         | 25.70                    | 25.70                    | 0          |             |
| LTE BAND 17          | QPSK @ 10 MHz BW  | Cond Power | 704-716         | 25.70                    | 25.70                    | 0          |             |
| LTE BAND 25          | QPSK @ 20 MHz BW  | Cond Power | 1850-1915       | 25.70                    | 25.70                    | 0          |             |
|                      | QPSK @ highest BW | RSE        |                 | -48.73                   | -52.25                   | -3.52      | Noise floor |
| 5G NR BAND N25       | BPSK @ 40 MHz BW  | Cond Power | 1850-1915       | 25.70                    | 25.70                    | 0          |             |
| LTE BAND 26 (90S)    | QPSK @ 10 MHz BW  | Cond Power | 814-824         | 25.70                    | 25.70                    | 0          |             |
| 5G NR BAND N26 (90S) | BPSK @ 10 MHz BW  | Cond Power | 814-824         | 25.70                    | 25.70                    | 0          |             |
| LTE BAND 26 (P22)    | QPSK @ 10 MHz BW  | Cond Power | 824-849         | 25.70                    | 25.70                    | 0          |             |
| 5G NR BAND N26 (P22) | BPSK @ 20 MHz BW  | Cond Power | 824-849         | 25.70                    | 25.70                    | 0          |             |
| LTE BAND 30          | QPSK @ 10 MHz BW  | Cond Power | 2305-2315       | 25.20                    | 25.20                    | 0          |             |
| 5G NR BAND N30       | BPSK @ 10 MHz BW  | Cond Power | 2305-2315       | 25.20                    | 25.20                    | 0          |             |
| LTE BAND 41          | QPSK @ 20 MHz BW  | Cond Power | 2496-2690       | 28.70                    | 28.20                    | -0.5       |             |
| 5G NR BAND N41       | BPSK @ 100 MHz BW | Cond Power | 2496-2690       | 28.70                    | 28.70                    | 0          |             |
| LTE BAND 48          | QPSK @ 20 MHz BW  | Cond Power | 3550-3700       | 26.00                    | 25.83                    | -0.17      |             |
|                      |                   | RSE        |                 | -19.94                   | -16.90                   | 3.04       | Noise floor |
| 5G NR BAND N48       | QPSK @ 20 MHz BW  | Cond Power | 3550-3700       | 26.00                    | 26.00                    | 0          |             |
| LTE BAND 66          | QPSK @ 20 MHz BW  | Cond Power | 1710-1780       | 25.70                    | 25.70                    | 0          |             |
| 5G NR BAND N66       | BPSK @ 40 MHz BW  | Cond Power | 1710-1780       | 25.70                    | 25.70                    | 0          |             |
| 5G NR BAND n70       | BPSK @ 15 MHz BW  | Cond Power | 1695-1710       | 25.70                    | 25.70                    | 0          |             |
| 5G NR BAND N77       | BPSK @ 100 MHz BW | Cond Power | 3450-3550       | 28.70                    | 28.70                    | 0          |             |
| 5G NR BAND N77       | BPSK @ 100 MHz BW | Cond Power | 3700-3980       | 28.70                    | 28.70                    | 0          |             |
| 5G NR BAND N79       | BPSK @ 50 MHz BW  | Cond Power | 4940-4990       | 20                       | 20                       | 0          |             |
| LTE BAND 53          | QPSK @ 10 MHz BW  | Cond Power | 2483.5-2495     | 20.7                     | 20.7                     | 0          |             |
| 5G NR BAND 53        | BPSK @ 10 MHz BW  | Cond Power | 2483.5-2495     | 20.7                     | 20.7                     | 0          |             |

## 5.6 SPOT CHECK VERIFICATION RESULTS SUMMARY FOR A3092

| A3092 SPOT CHECK RESULTS |                   |            |                 |                          |                          |            |             |
|--------------------------|-------------------|------------|-----------------|--------------------------|--------------------------|------------|-------------|
| Technology               | Worst Mode        | Test Item  | Measured        | Original Model: A2846    | Sub Model: A3092         | Delta (dB) | Remarks     |
|                          |                   |            | Frequency (MHz) | FCC ID: BCG-E8427A (dBm) | FCC ID: BCG-E8430A (dBm) |            |             |
| LTE BAND 7               | QPSK @ 20 MHz BW  | Cond Power | 2500-2570       | 25.70                    | 25.70                    | 0          |             |
|                          | QPSK @ highest BW | RSE        |                 | -52.14                   | -40.01                   | 12.13      | Noise Floor |
| 5G NR BAND N7            | BPSK @ 40 MHz BW  | Cond Power | 2500-2570       | 25.70                    | 25.70                    | 0          |             |
| LTE BAND 12              | QPSK @ 10 MHz BW  | Cond Power | 699-716         | 25.70                    | 25.70                    | 0          |             |
| 5G NR BAND N12           | BPSK @ 15 MHz BW  | Cond Power | 699-716         | 25.70                    | 25.70                    | 0          |             |
| LTE BAND 13              | QPSK @ 10 MHz BW  | Cond Power | 777-787         | 25.70                    | 25.70                    | 0          |             |
| LTE BAND 17              | QPSK @ 10 MHz BW  | Cond Power | 704-716         | 25.70                    | 25.70                    | 0          |             |
| LTE BAND 25              | QPSK @ 20 MHz BW  | Cond Power | 1850-1915       | 25.70                    | 25.70                    | 0          |             |
|                          | QPSK @ highest BW | RSE        |                 | -51.76                   | -52.25                   | -0.49      | Noise Floor |
| 5G NR BAND N25           | BPSK @ 40 MHz BW  | Cond Power | 1850-1915       | 25.70                    | 25.70                    | 0          |             |
| LTE BAND 26 (90S)        | QPSK @10 MHz BW   | Cond Power | 814-824         | 25.70                    | 25.70                    | 0          |             |
| 5G NR BAND N26 (90S)     | BPSK @10 MHz BW   | Cond Power | 814-824         | 25.70                    | 25.70                    | 0          |             |
| LTE BAND 26 (P22)        | QPSK @10 MHz BW   | Cond Power | 824-849         | 25.70                    | 25.70                    | 0          |             |
| 5G NR BAND N26 (P22)     | BPSK @ 20 MHz BW  | Cond Power | 824-849         | 25.70                    | 25.70                    | 0          |             |
| LTE BAND 30              | QPSK @ 10 MHz BW  | Cond Power | 2305-2315       | 25.20                    | 25.20                    | 0          |             |
| 5G NR BAND N30           | BPSK @ 10 MHz BW  | Cond Power | 2305-2315       | 25.20                    | 25.20                    | 0          |             |
| LTE BAND 41              | QPSK @ 20 MHz BW  | Cond Power | 2496-2690       | 28.70                    | 28.59                    | -0.11      |             |
| 5G NR BAND N41           | BPSK @ 100 MHz BW | Cond Power | 2496-2690       | 28.70                    | 28.70                    | 0          |             |
| LTE BAND 48              | QPSK @ 20 MHz BW  | Cond Power | 3550-3700       | 26.00                    | 26.00                    | 0          |             |
|                          |                   | RSE        |                 | -54.99                   | -56.63                   | -1.64      | Noise Floor |
| 5G NR BAND N48           | QPSK @ 20 MHz BW  | Cond Power | 1710-1780       | 26.00                    | 26.00                    | 0          |             |
| 5G NR BAND N66           | BPSK @ 40 MHz BW  | Cond Power | 1710-1780       | 25.70                    | 25.70                    | 0          |             |
| 5G NR BAND n70           | BPSK @ 15 MHz BW  | Cond Power | 1695-1710       | 25.70                    | 25.70                    | 0          |             |
| 5G NR BAND N77           | BPSK @ 100 MHz BW | Cond Power | 3450-3550       | 28.70                    | 28.70                    | 0          |             |
| 5G NR BAND N77           | BPSK @ 100 MHz BW | Cond Power | 3700-3980       | 28.70                    | 28.70                    | 0          |             |
| 5G NR BAND N79           | BPSK @ 50 MHz BW  | Cond Power | 4940-4990       | 20                       | 20                       | 0          |             |

## 5.7 REFERENCE DETAIL

Reference application that contains the reused reference data.

| Equipment Class | Reference FCC ID | Reference Application | Variant model FCC ID | Report Title/Section  |
|-----------------|------------------|-----------------------|----------------------|---|
| PCE, CBE, TNE   | BCG-E8427A       | 14523758-E14          | BCG-E8428A           | FCC LTE Report / All Sections                                       |
| PCE, CBE, TNE   |                  |                       | BCG-E8429A           | FCC LTE Report / All Sections except LTE/5G NR Band B14/71 sections |
| PCE, CBE        |                  |                       | BCG-E8430A           | FCC LTE Report / All Sections except LTE/5G NR Band B14/71 sections |

## 5.8 SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was version: 0.15.02

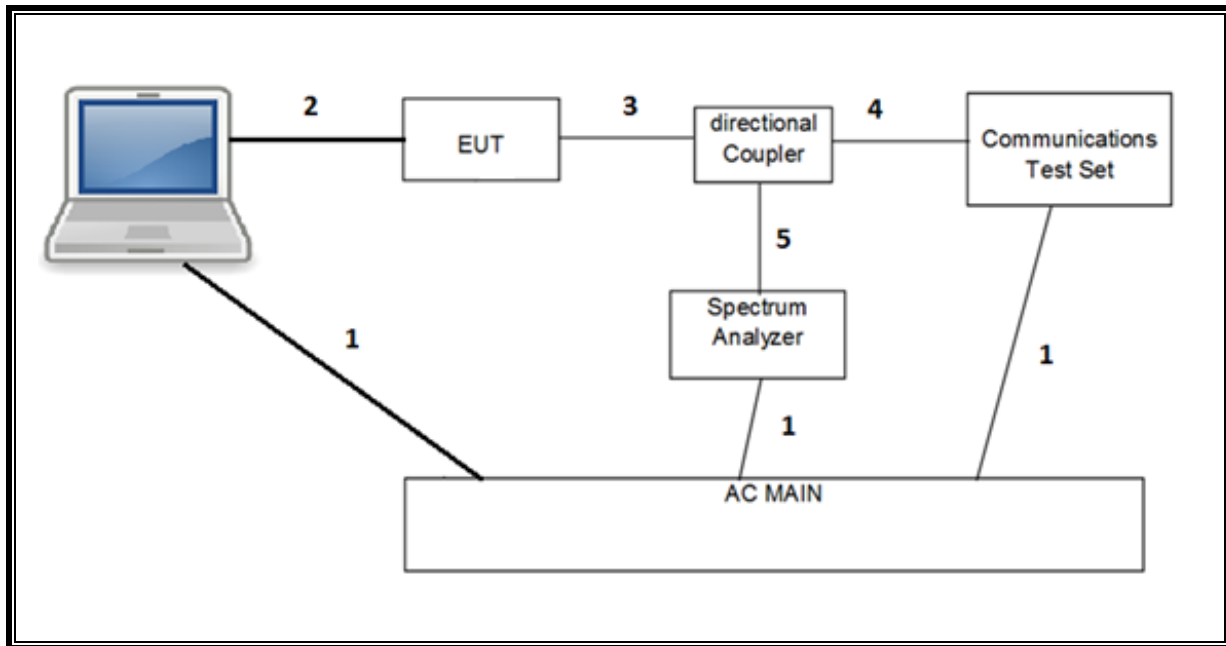
## 5.9 SPOT CHECK WORST-CASE CONFIGURATION AND MODE

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

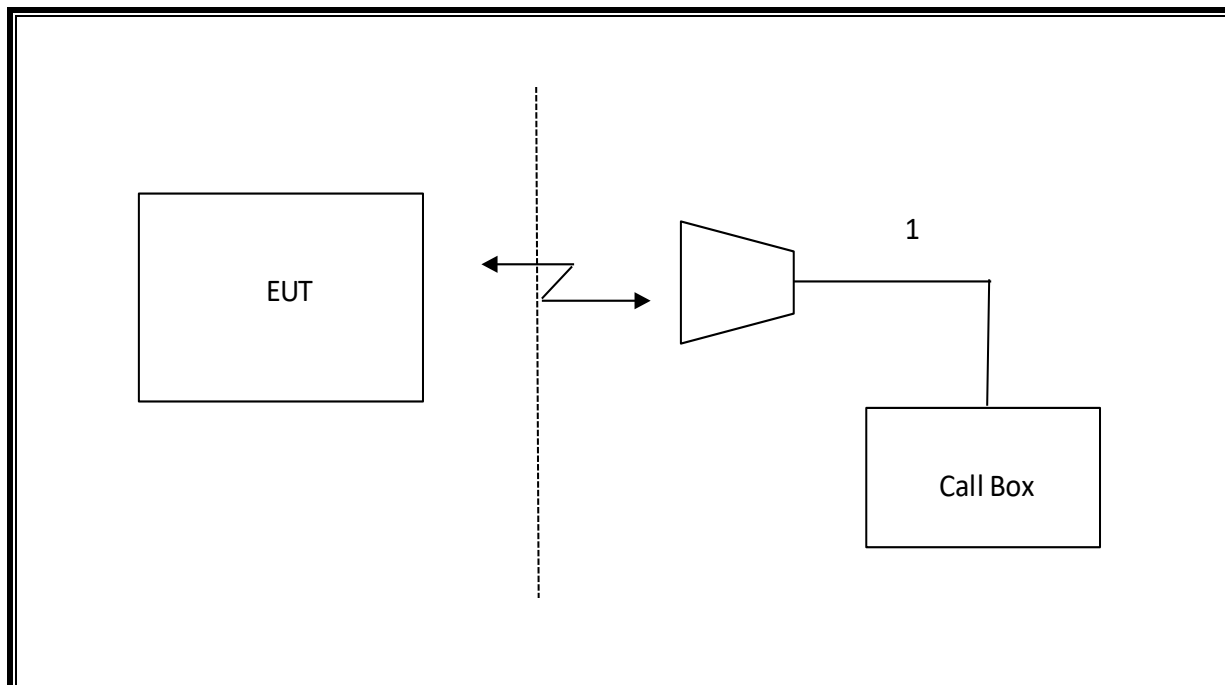
## 5.10 DESCRIPTION OF TEST SETUP

| SUPPORT TEST EQUIPMENT         |           |                      |                        |                   |                  |             |
|--------------------------------|-----------|----------------------|------------------------|-------------------|------------------|-------------|
| Description                    |           | Manufacturer         | Model                  | Serial Number     |                  | FCC ID/ DoC |
| Laptop                         |           | Apple                | MacBook Pro            | HRP082673         |                  | BCGA1708    |
| AC/DC adapter                  |           | Apple                | A1718                  | C4H64450HH3GN8RA6 |                  | --          |
| 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         |
| I/O CABLES (RF RADIATED TEST)  |           |                      |                        |                   |                  |             |
| Cable No.                      | Port      | # of Identical Ports | Connector Type         | Cable Type        | Cable Length (m) | Remarks     |
| 1                              | RF In/Out | 1                    | Antenna                | Un-shielded       | 5.0              | N/A         |

## CONDUCTED SETUP



## RADIATED 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    |
| *Antenna, Horn 1-18GHz                             | ETS Lindgren           | 3117          | 79834                     | 06/08/2203 |
| Antenna, Broadband Hybrid, 30MHz to 2000MHz        | Sunol Sciences         | JB3           | 85151                     | 04/30/2024 |
| Spectrum Analyzer, PXA, 3Hz to 44GHz               | Keysight               | N9030A        | 85313                     | 02/29/2024 |
| Spectrum Analyzer, PXA                             | Keysight               | N9030B        | 222074                    | 07/16/2023 |
| Spectrum Analyzer, PXA, 3Hz to 44GHz               | Keysight               | N9030A        | 85201                     | 02/29/2024 |
| Spectrum Analyzer, PXA                             | Keysight               | N9030B        | 85214                     | 07/18/2023 |
| Spectrum Analyzer, PXA                             | Keysight               | N9030B        | 222073                    | 07/22/2023 |
| PXA Signal Analyzer                                | Keysight               | N9030B        | 222073                    | 07/22/2023 |
| EMI TEST RECEIVER                                  | Rohde & Schwarz        | ESW44         | 230548                    | 02/29/2024 |
| EMI TEST RECEIVER                                  | Rohde & Schwarz        | ESW44         | 201498                    | 02/29/2024 |
| Directional Coupler                                | KRYTAR                 | 152610        | 198816                    | 09/23/2023 |
| Directional Coupler                                | KRYTAR                 | 152610        | 198817                    | 09/23/2023 |
| Directional Coupler                                | KRYTAR                 | 152610        | 135712                    | 09/23/2023 |
| Power Meter, P-series single channel               | Keysight               | N1912A        | 90630                     | 01/24/2024 |
| Power Meter, P-series single channel               | Keysight               | N1912A        | 90719                     | 01/31/2024 |
| Power Meter, P-series single channel               | Agilent                | N1911A        | 82174                     | 01/31/2024 |
| Power Sensor, P – series, 50MHz to 18GHz, Wideband | Keysight               | N1921A        | 90389                     | 01/31/2024 |
| Filter, BRF 2495 – 2690 MHz                        | Micro-Tronics          | 155050        | 155055                    | 12/28/2023 |
| Filter, BRF 3.4 – 3.8GHz                           | Micro-Tronics          | 208398        | 208398                    | 08/19/2023 |
| Wideband Communication Test Set, Call Box          | Rohde & Schwarz        | CMW500        | 222792                    | 02/29/2024 |
| Wideband Communication Test Set, Call Box          | Rohde & Schwarz        | CMW500        | 230298                    | 02/29/2024 |
| Wideband Communication Test Set, Call Box          | Rohde & Schwarz        | CMW500        | 230295                    | 02/29/2024 |
| Wideband Communication Test Set, Call Box          | Rohde & Schwarz        | CMW500        | 22796                     | 02/29/2024 |
| Wideband Communication Test Set, Call Box          | Rohde & Schwarz        | CMW500        | 230297                    | 02/29/2024 |
| *5G NR Communication Test Set, Call Box            | Keysight               | UXM           | 207269                    | 01/31/2024 |
| *5G NR Communication Test Set, Call Box            | Keysight               | UXM           | 199836                    | 01/31/2024 |
| *Amplifier, 218GHz to 26.5GHz                      | Amplical               | AMP18G26.5-60 | 215705                    | 02/26/2023 |
| *Amplifier, 26.5GHz to 40GHz                       | Amplical               | AMP26G40-65   | 172346                    | 02/29/2024 |
| Antenna, Horn 18 to 26.5GHz                        | ARA                    | MWH-1826/B    | 172362                    | 03/31/2024 |
| Antenna, Horn 26.5GHz to 40GHz                     | ARA                    | MWH-2640/B    | 172365                    | 03/31/2024 |
| *Antenna, Active Loop 100KHz to 30MHz              | ELECTRO-METRICS        | EM-6872       | 219911                    | 05/10/2023 |
| *Antenna, Active Loop 30Hz to 1MHz                 | ELECTRO-METRICS        | EM-6871       | 219909                    | 05/10/2023 |
| 10dB Fixed Attenuator                              | Pasternack Enterprises | PE7087-10     | 236360                    | N/A        |
| 10dB Fixed Attenuator                              | Pasternack Enterprises | PE7087-10     | 236285                    | N/A        |
| 10dB Fixed Attenuator                              | Pasternack Enterprises | PE7087-10     | 236355                    | N/A        |
| UL AUTOMATION SOFTWARE                             |                        |               |                           |            |
| CLT Software                                       | UL                     | UL RF         | Ver 3.4, May 20, 2022     |            |
| Power Measurement Software                         | UL                     | UL RF         | Ver 3.1.4, April 29, 2022 |            |
| Radiated test software                             | UL                     | UL RF         | Ver 9.5, Jan 21, 2022     |            |

### NOTES:

\* Testing is completed before equipment expiration date.

## 7. Appendix A – Reference Test Report

Attached is the test report (14523758-E14) containing the reference data from the parent model as detailed in section 5.7.