



# **TEST REPORT**

**Report Number :** 13190901-E10V2

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

**Model :** A2398

**FCC ID :** BCG-E3540A

**EUT Description :** SMARTPHONE

**Test Standard(s) :** FCC CFR47 22H, 27L, 27M, and 96

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

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NVLAP Lab code: 200065-0

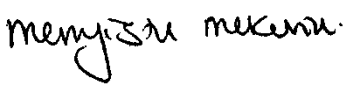
Revision History

| Rev. | Issue Date | Revisions              | Revised By       |
|------|------------|------------------------|------------------|
| V1   | 9/25/2020  | Initial Review         | Mengistu Mekuria |
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## 1. ATTESTATION OF TEST RESULTS

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| Applicant Name and Address                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | APPLE, INC<br>1 APPLE PARK WAY<br>CUPERTINO, CA 95014, U.S.A.                        |
| Model                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | A2398                                                                                |
| FCC ID                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | BCG-E3540A                                                                           |
| EUT Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | SMARTPHONE                                                                           |
| Serial Number                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | MODEL (A2398): C07028700B8P5595 (Conducted) and G6TD200504HT (Radiated)              |
| Date Tested                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | MAY 19, 2017 to SEPTEMBER 20, 2020                                                   |
| Applicable Standards                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | FCC CFR47 22H, 27L, 27M, 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 NVLAP, NIST, any agency of the Federal Government, or any agency of the U.S. government.</p> |                                                                                      |
| Approved & Released By:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Prepared By:                                                                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |
| Mengistu Mekuria<br>Lead Test Engineer<br>UL Verification Services Inc.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | John Thompson<br>Laboratory Engineer<br>UL Verification Services Inc.                |

## 2. TEST METHODOLOGY

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

- ANSI C63.26:2015
- FCC CFR 47 Part 2, Part 22, Part 27 and Part 96
- [FCC KDB 971168 D01 v03r01](#): Power Meas License Digital Systems
- [FCC KDB 971168 D02 v02r01](#): Misc Rev Approv License Devices
- [FCC KDB 412172 D01 v01r01](#): Determining ERP and EIRP

## 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. 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 checked="" 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          |
| Occupied Channel Bandwidth                          | ±0.39 %          |
| Temperature                                         | ±0.9 °C          |
| Supply voltages                                     | ±0.45 %          |
| Time                                                | ±0.02 %          |

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

#### MAINS CONDUCTED EMISSIONS

Where relevant, the following sample calculation is provided:

Final Voltage (dBuV) = Measured Voltage (dBuV) + Cable Loss (dB) + Limiter Factor (dB) + LISN Insertion Loss.  
36.5 dBuV + 0 dB + 10.1 dB + 0 dB = 46.6 dBuV

## 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.

### 5.2. INTRODUCTION

This application for certification is leveraging the data reuse procedures from KDB 484596 D01 based on reference FCC ID BCG-E3539A to cover variant model FCC ID BCG-E3540A. The major difference between the parent/reference model and the variant model is the depopulation in the variant model of the mmWave transmitter. 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 A2176 and A2398.

A2176 and A2398 are highly similar, with the only difference being the supported cellular bands.

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 and additional full radiated spurious emission test on ANT2 have been done on model A2398 in accordance with the test plan approved via KDB inquiry. Comparison of the models, upper deviation is within 3dB range and all tests are under FCC Technical Limits. The results documented for model A2176 may be applied as representative to model A2398.

## 5.4. SPOT CHECK VERIFICATION RESULTS SUMMARY

| A2398 Spotcheck Results |                      |           |         |                 |                       |                    |            |                   |
|-------------------------|----------------------|-----------|---------|-----------------|-----------------------|--------------------|------------|-------------------|
| Technology              | Worst Mode           | Test Item | Channel | Measured        | Original Model: A2176 | Sub Model: A2398   | Delta (dB) | Remarks           |
|                         |                      |           |         | Frequency (MHz) | FCC ID: BCG-E3539A    | FCC ID: BCG-E3540A |            |                   |
| LTE 5CA                 | QPSK @ 1-49RB&1-0RB  | ERP       | Mid     | 831.5/ 841.4    | 19.95 dBm             | 19.69 dBm          | -0.26      |                   |
|                         | QPSK @ 1-49RB&1-0RB  | RSE       | Low     | 3317.65         | -52.09 dBm            | -53.16 dBm         | -1.07      | Noise Floor Level |
| LTE 7CA                 | QPSK @ 1-99RB&1-0RB  | EIRP      | Low     | 2510/ 2529.8    | 24 dBm                | 23.65 dBm          | -0.35      |                   |
|                         | QPSK @ 1-99RB&1-0RB  | RSE       | High    | 5101.98         | -39.43 dBm            | -40.9 dBm          | -1.47      | Noise Floor Level |
| LTE 41CA                | QPSK @ 1-74RB&1-0RB  | EIRP      | Mid     | 2585.6/ 2602.7  | 28.3 dBm              | 28.18 dBm          | -0.12      |                   |
| LTE 48CA                | 16QAM @ 1-99RB&1-0RB | EIRP      | Mid     | 3617.6/ 3634.7  | 22.5 dBm              | 22.5 dBm           | 0          |                   |

## 5.5. REFERENCE DETAIL

Reference application that contains the reused reference data.

| Equipment Class | Reference FCC ID | Reference Application | Report Title/Section                                                                        |
|-----------------|------------------|-----------------------|---------------------------------------------------------------------------------------------|
| PCE, CBE        | BCG-E3539A       | 13179110-E10          | FCC LTE Carrier Aggregation Report / All Sections except Radiated spurious emission on ANT2 |

## 5.6. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was version 0.28.03-1.

## 5.7. MAXIMUM ANTENNA GAIN

Please see table below:

| LTE Bands                    | Antenna Gain (dBi) |       |       |       |       |       |       |
|------------------------------|--------------------|-------|-------|-------|-------|-------|-------|
|                              | ANT 1              | ANT 2 | ANT 3 | ANT 4 | ANT 7 | ANT 8 | ANT 9 |
| LTE Band 5, 824 – 849 MHz    | -3.6               | -4.2  | NA    | NA    | NA    | NA    | NA    |
| LTE Band 7, 2500 – 2570 MHz  | -2.2               | -0.7  | -1    | -3.3  | NA    | NA    | NA    |
| LTE Band 41, 2496 – 2690 MHz | -0.1               | 1.7   | 1.3   | -1.7  | NA    | NA    | NA    |
| LTE Band 48, 3550 – 3700 MHz | NA                 | NA    | NA    | -2.1  | -0.7  | 0     | -2.2  |

## 5.8. WORST-CASE CONFIGURATION AND MODE

The EUT supports LTE dual carrier Bands of: Band 5, Band 7, Band 41 and Band 48.

The worst-case scenario for all measurements is based on an engineering evaluation and QPSK was observed as the worst one and set for all conducted and radiated. Output power measurements were measured on QPSK, 16QAM, 64QAM, and 256QAM modulations. Conducted tests were performed on the worst case antenna because it has the highest conducted power. ANT1 is the worst case for all bands except Band 48. For band 48 ANT9 is the worst case antenna.

The EUT was investigated in three orthogonal orientations X/Y/Z on all ANT 1, ANT2, ANT3, ANT4, ANT7, ANT8 and ANT 9 antennas to determine the worst case orientation. The following table exhibit the worst case orientation for different frequency bands. The full tests of the EUT have made upon the orientations that shown in the table below.

| Bands         | ANT1 | ANT2 | ANT3 | ANT4 | ANT7 | ANT8 | ANT9 |
|---------------|------|------|------|------|------|------|------|
| Cell (850MHz) | Y    | X    | N/A  | N/A  | N/A  | N/A  | N/A  |
| Band 7, 41    | Y    | Y    | Y    | X    | N/A  | N/A  | N/A  |
| Band 48       | N/A  | N/A  | N/A  | X    | Y    | X    | Y    |

For Band Edge and Emission Mask: The highest bandwidth combo was tested. The RB combinations were selected such that the signal is active closest to the band limit, as this is the worst case.

For Out of Band Emissions: The highest bandwidth combination was tested. The highest power RB combination was selected as worst case.

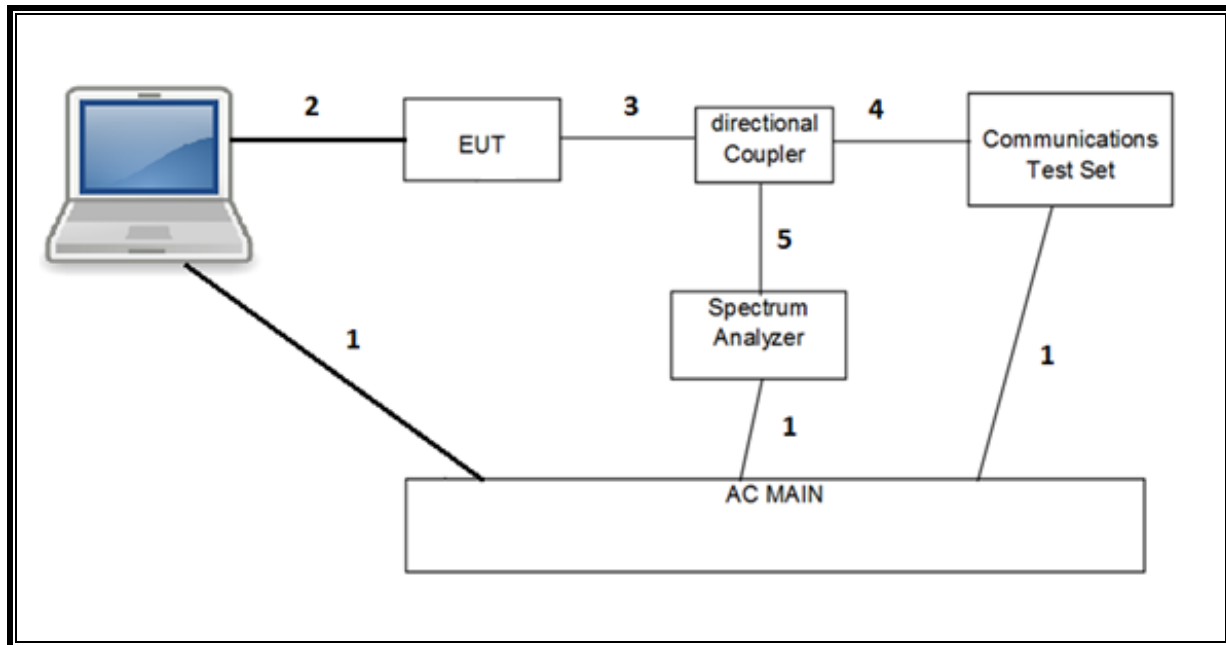
Radiated spurious emissions were investigated from 9kHz to 30MHz, 30MHz-1GHz and above 1GHz. There were no emissions found with less than 20dB of margin from 9kHz to 1GHz.

For interband transmission of multiple channels in different antenna combination in Cellular bands, tests were conducted for various configurations having the highest power, least separation in frequencies and widest operation bandwidths. No noticeable new emission was found.

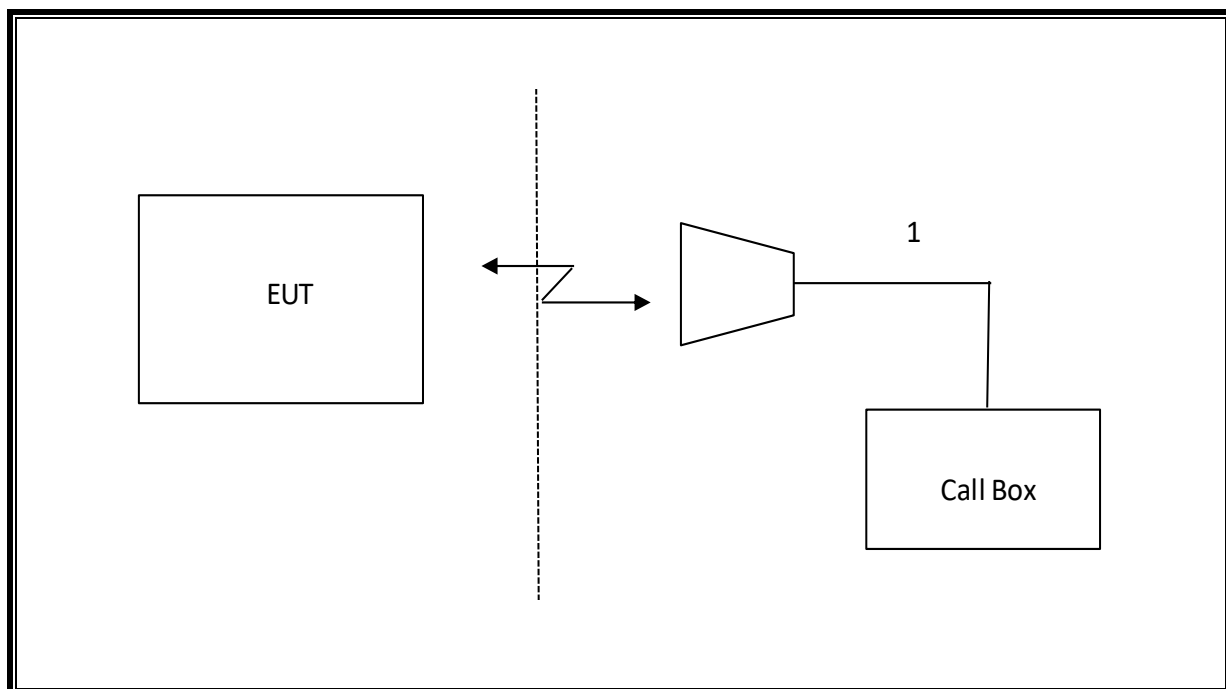
## 5.9. DESCRIPTION OF TEST SETUP

| SUPPORT TEST EQUIPMENT         |           |                      |                        |               |                  |              |
|--------------------------------|-----------|----------------------|------------------------|---------------|------------------|--------------|
| Description                    |           | Manufacturer         | Model                  | Serial Number |                  | FCC ID/ DoC  |
| Laptop                         |           | Apple                | A1398                  | C02PM012G3QD  |                  | QDS-BRCM1069 |
| Laptop AC/DC adapter           |           | Liteon Technology    | PA-1450-BA1            | B123          |                  | N/A          |
| 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                       | A.H. Systems, Inc.   | SAS-571                | T961                       | 01/25/2021 |
| Antenna, Horn 1-18GHz                       | ETS Lindgren         | 3117                   | T136                       | 07/07/2021 |
| Antenna, Broadband Hybrid, 30MHz to 2000MHz | Sunol Sciences Corp. | JB3                    | T407                       | 05/20/2021 |
| Amplifier, 1 to 18GHz                       | MITEQ                | AFS42-00101800-25-S-42 | T931                       | 05/11/2021 |
| Amplifier, 1 to 18GHz                       | MITEQ                | AFS42-00101800-25-S-42 | T1165                      | 08/10/2021 |
| Amplifier, 9KHz to 1GHz, 32dB               | SONOMA INSTRUMENT    | 310                    | PRE0180176                 | 07/14/2021 |
| Filter, BRF 2495 to 2690MHz                 | MICRO-TRONICS        | BRM50709-02            | T1790                      | 06/23/2021 |
| Filter, BRF 1850 – 1910 MHz                 | Micro-Tronics        | BRM50714-02            | T1796                      | 06/23/2021 |
| Filter, BRF 824 – 848 MHz                   | Micro-Tronics        | BRM20025               | PRE0191180                 | 06/23/2021 |
| *Directional Coupler                        | KRYTAR               | 152610                 | T1161                      | 08/14/2020 |
| Spectrum Analyzer, PXA 3Hz to 44GHZ         | Keysight             | N9030A                 | T340                       | 01/22/2021 |
| Spectrum Analyzer, PXA 3Hz to 44GHZ         | Keysight             | N9030A                 | T907                       | 01/22/2021 |
| Wideband Communication Test Set, Call Box   | R&S GmbH & Co. KG    | CMW500                 | T260                       | 02/19/2021 |
| Wideband Communication Test Set, Call Box   | R&S GmbH & Co. KG    | CMW500                 | T959                       | 02/19/2021 |
| Wideband Communication Test Set, Call Box   | R&S GmbH & Co. KG    | CMW500                 | T1871                      | 02/25/2021 |
| Power Meter, P-series single channel        | Keysight             | N1912A                 | T1245                      | 01/22/2021 |
| Power Sensor                                | Keysight             | N1921A                 | T1225                      | 02/23/2021 |
| UL AUTOMATION SOFTWARE                      |                      |                        |                            |            |
| CLT Software                                | UL                   | UL RF                  | Ver 7.6, November 11, 2017 |            |
| Power Measurement Software                  | UL                   | UL RF                  | Ver 2.7, 2019              |            |
| Radiated test software                      | UL                   | UL RF                  | Ver 9.5 June 15, 2019      |            |

### NOTES:

\* Testing is completed before equipment expiration date.

## 7. RADIATED TEST RESULTS

### 7.1. FIELD STRENGTH OF SPURIOUS RADIATION, ABOVE 1GHz, ANT2

#### TEST PROCEDURE

KDB 971168 D01 v03r01/D02 v02/r01

#### RESULTS

Maximum + maximum bandwidth combinations of QPSK mode was tested, QPSK results are reported as worst case.

## 7.1.1. LTE BAND 5

### LIMIT

FCC: §22.917(a)

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log (P)$  dB.

### QPSK LTE BAND 5 (10.0MHZ + 10.0MHZ BANDWIDTH)

|                |                   |
|----------------|-------------------|
| Project #:     | 13190901          |
| Date:          | 9/3/2020          |
| Test Engineer: | 45258             |
| Configuration: | EUT Only          |
| Mode:          | Band 5 QPSK 10+10 |
| Chamber #:     | Chamber B         |

| Frequency (GHz)                  | Meter Reading (dBUV) | Det | AF T962 (dB/m) | Amp/Cbl (dB) | HPF 1.2GHz T1737 1-18GHz | EIRP CF | Corrected Reading (dBm) | LIMIT | Margin (dB) | Polarity |
|----------------------------------|----------------------|-----|----------------|--------------|--------------------------|---------|-------------------------|-------|-------------|----------|
| Low Channel, 829MHz + 838.9MHz   |                      |     |                |              |                          |         |                         |       |             |          |
| 1.66661                          | 40.2                 | Pk  | 25             | -30.5        | .7                       | -95.2   | -59.8                   | -13   | -46.8       | H        |
| 1.66957                          | 40.09                | Pk  | 25             | -30.4        | .7                       | -95.2   | -59.81                  | -13   | -46.81      | V        |
| 2.5015                           | 39.77                | Pk  | 29             | -29.3        | .6                       | -95.2   | -55.13                  | -13   | -42.13      | H        |
| 2.50259                          | 40.57                | Pk  | 29             | -29.3        | .6                       | -95.2   | -54.33                  | -13   | -41.33      | V        |
| 3.33508                          | 38.15                | Pk  | 31.1           | -28.2        | .6                       | -95.2   | -53.55                  | -13   | -40.55      | V        |
| 3.33714                          | 38.54                | Pk  | 31.1           | -28.2        | .6                       | -95.2   | -53.16                  | -13   | -40.16      | H        |
| Mid Channel, 831.6MHz + 841.5MHz |                      |     |                |              |                          |         |                         |       |             |          |
| 1.62534                          | 42.69                | Pk  | 25             | -30.5        | .7                       | -95.2   | -57.31                  | -13   | -44.31      | H        |
| 1.6283                           | 41.89                | Pk  | 25             | -30.5        | .7                       | -95.2   | -58.11                  | -13   | -45.11      | V        |
| 2.12998                          | 40.71                | Pk  | 26.9           | -29.6        | .5                       | -95.2   | -56.69                  | -13   | -43.69      | H        |
| 2.51143                          | 41.18                | Pk  | 29.1           | -29.3        | .7                       | -95.2   | -53.52                  | -13   | -40.52      | V        |
| 3.19863                          | 40.67                | Pk  | 31.2           | -28.5        | .6                       | -95.2   | -51.23                  | -13   | -38.23      | V        |
| 3.26327                          | 40.1                 | Pk  | 31.4           | -28.3        | .5                       | -95.2   | -51.5                   | -13   | -38.5       | H        |
| High Channel, 834.1MHz + 844MHz  |                      |     |                |              |                          |         |                         |       |             |          |
| 1.67722                          | 42.09                | Pk  | 25             | -30.4        | .7                       | -95.2   | -57.81                  | -13   | -44.81      | H        |
| 1.67939                          | 41.68                | Pk  | 24.9           | -30.4        | .7                       | -95.2   | -58.32                  | -13   | -45.32      | V        |
| 2.51727                          | 39.25                | Pk  | 29.2           | -29.3        | .8                       | -95.2   | -55.25                  | -13   | -42.25      | H        |
| 2.51776                          | 40.13                | Pk  | 29.2           | -29.3        | .8                       | -95.2   | -54.37                  | -13   | -41.37      | V        |
| 3.3543                           | 39.29                | Pk  | 31             | -28.1        | .6                       | -95.2   | -52.41                  | -13   | -39.41      | H        |
| 3.35705                          | 38.26                | Pk  | 31             | -28          | .6                       | -95.2   | -53.34                  | -13   | -40.34      | V        |

## 7.1.2. LTE BAND 7

### LIMIT

FCC: §27.53 (m)

At least 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section.

### QPSK LTE BAND 7 (20.0MHZ + 20.0MHZ BANDWIDTH)

|                |                   |
|----------------|-------------------|
| Project #:     | 13190901          |
| Date:          | 9/4/2020          |
| Test Engineer: | 45258             |
| Configuration: | EUT Only          |
| Mode:          | Band 7 QPSK 20+20 |
| Chamber #:     | Chamber B         |

| Frequency (GHz)                    | Meter Reading (dBm) | Det | AF T962 (dB/m) | Amp/Cbl (dB) | BRF 2495-2690MHz T1790 1-18GHz | EIRP CF | Corrected Reading (dBm) | LIMIT | Margin (dB) | Polarity |
|------------------------------------|---------------------|-----|----------------|--------------|--------------------------------|---------|-------------------------|-------|-------------|----------|
| Low Channel, 2510MHz + 2529.8MHz   |                     |     |                |              |                                |         |                         |       |             |          |
| 5.04139                            | 37.6                | Pk  | 33.7           | -26.2        | .6                             | -95.2   | -49.5                   | -25   | -24.5       | V        |
| 5.04157                            | 37.78               | Pk  | 33.7           | -26.2        | .6                             | -95.2   | -49.32                  | -25   | -24.32      | H        |
| 7.55925                            | 35.79               | Pk  | 36.8           | -24.1        | .3                             | -95.2   | -46.41                  | -25   | -21.41      | H        |
| 7.56025                            | 35.81               | Pk  | 36.8           | -24.1        | .3                             | -95.2   | -46.39                  | -25   | -21.39      | V        |
| 10.07952                           | 33.32               | Pk  | 38.4           | -20.1        | .6                             | -95.2   | -42.98                  | -25   | -17.98      | H        |
| 10.08136                           | 35.46               | Pk  | 38.4           | -20.1        | .6                             | -95.2   | -40.84                  | -25   | -15.84      | V        |
| Mid Channel, 2525.1MHz + 2544.9MHz |                     |     |                |              |                                |         |                         |       |             |          |
| 5.10649                            | 37.74               | Pk  | 34             | -26.4        | .8                             | -95.2   | -49.06                  | -25   | -24.06      | H        |
| 5.5405                             | 37.75               | Pk  | 33.2           | -26.1        | .7                             | -95.2   | -49.65                  | -25   | -24.65      | V        |
| 7.01445                            | 37.16               | Pk  | 36.5           | -24.1        | .2                             | -95.2   | -45.44                  | -25   | -20.44      | H        |
| 7.26994                            | 37.09               | Pk  | 37.2           | -23.4        | .5                             | -95.2   | -43.81                  | -25   | -18.81      | V        |
| 10.45172                           | 34.43               | Pk  | 39.4           | -19.3        | .7                             | -95.2   | -39.97                  | -25   | -14.97      | H        |
| 10.58497                           | 26.18               | Pk  | 39.5           | -19.5        | .9                             | -95.2   | -48.12                  | -25   | -23.12      | V        |
| High Channel, 2540.2MHz + 2560MHz  |                     |     |                |              |                                |         |                         |       |             |          |
| 5.10074                            | 37.23               | Pk  | 33.9           | -26.4        | .8                             | -95.2   | -49.67                  | -25   | -24.67      | H        |
| 5.10218                            | 37.94               | Pk  | 34             | -26.4        | .8                             | -95.2   | -48.86                  | -25   | -23.86      | V        |
| 7.64923                            | 35.98               | Pk  | 36.9           | -23.5        | .3                             | -95.2   | -45.52                  | -25   | -20.52      | H        |
| 7.65132                            | 35.39               | Pk  | 36.9           | -23.4        | .3                             | -95.2   | -46.01                  | -25   | -21.01      | V        |
| 10.19894                           | 33.93               | Pk  | 38.7           | -19.8        | .8                             | -95.2   | -41.57                  | -25   | -16.57      | V        |
| 10.19944                           | 34.2                | Pk  | 38.7           | -19.8        | .8                             | -95.2   | -41.3                   | -25   | -16.3       | H        |

### 7.1.3. LTE BAND 41

#### LIMIT

FCC: §27.53 (m)

At least 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section.

#### QPSK LTE BAND 41 (20.0MHZ + 20.0MHZ BANDWIDTH)

|                |                    |
|----------------|--------------------|
| Project #:     | 13190901           |
| Date:          | 9/4/2020           |
| Test Engineer: | 45258              |
| Configuration: | EUT Only           |
| Mode:          | Band 41 QPSK 20+20 |
| Chamber #:     | Chamber B          |

| Frequency (GHz)                    | Meter Reading (dBm) | Det | AF T962 (dB/m) | Amp/Cbl (dB) | BRF 2495-2690MHz T1790 1-18GHz | EIRP CF | Corrected Reading (dBm) | LIMIT | Margin (dB) | Polarity |
|------------------------------------|---------------------|-----|----------------|--------------|--------------------------------|---------|-------------------------|-------|-------------|----------|
| Low Channel, 2506MHz + 2525.8MHz   |                     |     |                |              |                                |         |                         |       |             |          |
| 5.03222                            | 38.55               | Pk  | 33.7           | -26          | .7                             | -95.2   | -48.25                  | -25   | -23.25      | V        |
| 5.03304                            | 38                  | Pk  | 33.7           | -26          | .7                             | -95.2   | -48.8                   | -25   | -23.8       | H        |
| 7.54829                            | 36.2                | Pk  | 36.9           | -24          | .3                             | -95.2   | -45.8                   | -25   | -20.8       | H        |
| 7.54921                            | 36.46               | Pk  | 36.9           | -24          | .3                             | -95.2   | -45.54                  | -25   | -20.54      | V        |
| 10.06265                           | 34.23               | Pk  | 38.4           | -19.9        | .7                             | -95.2   | -41.77                  | -25   | -16.77      | H        |
| 10.06458                           | 34.42               | Pk  | 38.4           | -19.9        | .7                             | -95.2   | -41.58                  | -25   | -16.58      | V        |
| Mid Channel, 2583.1MHz + 2602.9MHz |                     |     |                |              |                                |         |                         |       |             |          |
| 5.21713                            | 37.74               | Pk  | 33.5           | -26.3        | 1                              | -95.2   | -49.26                  | -25   | -24.26      | V        |
| 5.98045                            | 37.42               | Pk  | 34.4           | -25.7        | .6                             | -95.2   | -48.48                  | -25   | -23.48      | H        |
| 7.01537                            | 36.71               | Pk  | 36.4           | -24          | .2                             | -95.2   | -45.89                  | -25   | -20.89      | H        |
| 7.06486                            | 35.79               | Pk  | 36.6           | -23.9        | .7                             | -95.2   | -46.01                  | -25   | -21.01      | V        |
| 10.91764                           | 34.59               | Pk  | 39.4           | -19.7        | .7                             | -95.2   | -40.21                  | -25   | -15.21      | V        |
| 11.23879                           | 34.17               | Pk  | 39.1           | -20          | .8                             | -95.2   | -41.13                  | -25   | -16.13      | H        |
| High Channel, 2660.2MHz + 2680MHz  |                     |     |                |              |                                |         |                         |       |             |          |
| 5.3421                             | 37.52               | Pk  | 33.1           | -26.6        | .6                             | -95.2   | -50.58                  | -25   | -25.58      | V        |
| 5.34215                            | 38.27               | Pk  | 33.1           | -26.6        | .6                             | -95.2   | -49.83                  | -25   | -24.83      | H        |
| 8.01109                            | 36.11               | Pk  | 37.1           | -22.9        | .3                             | -95.2   | -44.59                  | -25   | -19.59      | V        |
| 8.01168                            | 35.38               | Pk  | 37.1           | -22.9        | .3                             | -95.2   | -45.32                  | -25   | -20.32      | H        |
| 10.67881                           | 34.47               | Pk  | 39.4           | -19.5        | .5                             | -95.2   | -40.33                  | -25   | -15.33      | V        |
| 10.68145                           | 33.93               | Pk  | 39.4           | -19.5        | .5                             | -95.2   | -40.87                  | -25   | -15.87      | H        |

## 8. SETUP PHOTOS

Please refer to 13179110-EP1V1 for setup photos

## Appendix A – Reference Test Report

Attached is the test report (13179110-E10) containing the reference data from the parent model as detailed in section 5.5.



# **TEST REPORT**

**Report Number :** 13179110-E10V2

**Applicant :** APPLE, INC  
1 APPLE PARK WAY  
CUPERTINO, CA 95014

**Model :** A2176

**FCC ID :** BCG-E3539A

**EUT Description :** SMARTPHONE

**Test Standard(s) :** FCC CFR47 22H, 27L, 27M, and 96

**Date Of Issue:**  
OCTOBER 01, 2020

**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   | 9/27/2020  | Initial Review       | Mengistu Mekuria |
| V2   | 10/1/2020  | Address TCB Feedback | Sintia Andrean   |

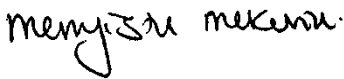
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# 1. ATTESTATION OF TEST RESULTS

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| Applicant Name and Address                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | APPLE, INC<br>1 APPLE PARK WAY<br>CUPERTINO, CA 95014                                |
| Model                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | A2176                                                                                |
| FCC ID                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | BCG-E3539A                                                                           |
| EUT Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | SMARTPHONE                                                                           |
| Serial Number                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | MODEL (2176): C7H03030030P54X57 (CONDUCTED) AND C7CC904SPVG2 (RADIATED)              |
| Date Tested                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | JULY 01, 2020 to SEPTEMBER 28, 2020                                                  |
| Applicable Standards                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | FCC CFR47 22H, 27L, 27M, 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 NVLAP, NIST, any agency of the Federal Government, or any agency of the U.S. government.</p> |                                                                                      |
| Approved & Released By:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Prepared By:                                                                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |
| Mengistu Mekuria<br>Lead Test Engineer<br>UL Verification Services Inc.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | John Thompson<br>Laboratory Engineer<br>UL Verification Services Inc.                |

## 2. TEST METHODOLOGY

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

- ANSI C63.26:2015
- FCC CFR 47 Part 2, Part 22, Part 27 and Part 96
- [FCC KDB 971168 D01 v03r01](#): Power Meas License Digital Systems
- [FCC KDB 971168 D02 v02r01](#): Misc Rev Approv License Devices
- [FCC KDB 412172 D01 v01r01](#): Determining ERP and EIRP

## 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. 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 checked="" 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          |
| Occupied Channel Bandwidth                          | ±0.39 %          |
| Temperature                                         | ±0.9 °C          |
| Supply voltages                                     | ±0.45 %          |
| Time                                                | ±0.02 %          |

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

#### MAINS CONDUCTED EMISSIONS

Where relevant, the following sample calculation is provided:

Final Voltage (dBuV) = Measured Voltage (dBuV) + Cable Loss (dB) + Limiter Factor (dB) + LISN Insertion Loss.  
36.5 dBuV + 0 dB + 10.1 dB + 0 dB = 46.6 dBuV

## 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.

### 5.2. MAXIMUM OUTPUT POWER

#### ERP/EIRP TEST PROCEDURE

ANSI C63.26:2015  
KDB 971168 D01 Section 5.6

$$\text{ERP/EIRP} = \text{PMeas} + \text{GT} - \text{LC}$$

where: ERP/EIRP = effective or equivalent radiated power, respectively (expressed in the same units as PMeas, typically dBW or dBm);

PMeas = measured transmitter output power or PSD, in dBm or dBW;

GT = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP);

LC = signal attenuation in the connecting cable between the transmitter and antenna, in dB.

For devices utilizing multiple antennas, KDB 662911 provides guidance for determining the effective array transmit antenna gain term to be used in the above equation.

EUT includes different power levels for head use configuration and body use configuration and the below tables contain the highest of all configurations average conducted and ERP/EIRP output powers as follows:

### OUTPUT POWER FOR LTE BAND 5

| RSS 132            |            |                     |                       |                         |                   |                 |              |                     |
|--------------------|------------|---------------------|-----------------------|-------------------------|-------------------|-----------------|--------------|---------------------|
| EIRP Limit (W)     |            | 11.50               |                       |                         |                   |                 |              |                     |
| Antenna Gain (dBi) |            | -3.60               |                       |                         |                   |                 |              |                     |
| Bandwidth (MHz)    | Modulation | Low Frequency (MHz) | Upper Frequency (MHz) | Conducted Average (dBm) | ERP Average (dBm) | ERP Average (W) | 99% BW (kHz) | Emission Designator |
| 5+10               | QPSK       | 826.5               | 844.0                 | 25.70                   | 19.95             | 0.099           | 13835.6      | 13M8G7W             |
|                    | 16QAM      |                     |                       | 24.81                   | 19.06             | 0.081           | 13784.7      | 13M8D7W             |
| 10+5               | QPSK       | 829.0               | 846.5                 | 25.70                   | 19.95             | 0.099           | 13853.8      | 13M9G7W             |
|                    | 16QAM      |                     |                       | 24.79                   | 19.04             | 0.080           | 13873.3      | 13M9D7W             |
| 10+10              | QPSK       | 829.0               | 844.0                 | 25.70                   | 19.95             | 0.099           | 18794.7      | 18M8G7W             |
|                    | 16QAM      |                     |                       | 24.72                   | 18.97             | 0.079           | 18764.5      | 18M8D7W             |

### OUTPUT POWER FOR LTE BAND 7

| Part 27 / RSS 199  |            |                     |                       |                         |                    |                  |              |                     |
|--------------------|------------|---------------------|-----------------------|-------------------------|--------------------|------------------|--------------|---------------------|
| EIRP Limit (W)     |            | 2.00                |                       |                         |                    |                  |              |                     |
| Antenna Gain (dBi) |            | -1.00               |                       |                         |                    |                  |              |                     |
| Bandwidth (MHz)    | Modulation | Low Frequency (MHz) | Upper Frequency (MHz) | Conducted Average (dBm) | EIRP Average (dBm) | EIRP Average (W) | 99% BW (kHz) | Emission Designator |
| 10+20              | QPSK       | 2505.5              | 2560.0                | 25.00                   | 24.00              | 0.251            | 28013.8      | 28M0G7W             |
|                    | 16QAM      |                     |                       | 24.04                   | 23.04              | 0.201            | 27974.2      | 28M0D7W             |
| 20+10              | QPSK       | 2510.0              | 2564.5                | 25.00                   | 24.00              | 0.251            | 28030.7      | 28M0G7W             |
|                    | 16QAM      |                     |                       | 24.07                   | 23.07              | 0.203            | 27932.8      | 27M9D7W             |
| 15+15              | QPSK       | 2507.5              | 2562.5                | 25.00                   | 24.00              | 0.251            | 28559        | 28M6G7W             |
|                    | 16QAM      |                     |                       | 24.06                   | 23.06              | 0.202            | 28527.3      | 28M5D7W             |
| 15+20              | QPSK       | 2507.8              | 2560.0                | 25.00                   | 24.00              | 0.251            | 32729.8      | 32M7G7W             |
|                    | 16QAM      |                     |                       | 24.07                   | 23.07              | 0.203            | 32752.9      | 32M8D7W             |
| 20+15              | QPSK       | 2510.0              | 2562.2                | 25.00                   | 24.00              | 0.251            | 32768        | 32M8G7W             |
|                    | 16QAM      |                     |                       | 24.07                   | 23.07              | 0.203            | 32751.4      | 32M8D7W             |
| 20+20              | QPSK       | 2510.0              | 2560.0                | 25.00                   | 24.00              | 0.251            | 37629.6      | 37M6G7W             |
|                    | 16QAM      |                     |                       | 24.13                   | 23.13              | 0.206            | 37634.9      | 37M6D7W             |

### OUTPUT POWER FOR LTE BAND 41

| Part 27            |            |                     |                       |                         |                    |                  |              |                     |
|--------------------|------------|---------------------|-----------------------|-------------------------|--------------------|------------------|--------------|---------------------|
| EIRP Limit (W)     |            | 2.00                |                       |                         |                    |                  |              |                     |
| Antenna Gain (dBi) |            | 1.30                |                       |                         |                    |                  |              |                     |
| Bandwidth (MHz)    | Modulation | Low Frequency (MHz) | Upper Frequency (MHz) | Conducted Average (dBm) | EIRP Average (dBm) | EIRP Average (W) | 99% BW (kHz) | Emission Designator |
| 5+20               | QPSK       | 2499.3              | 2680.0                | 26.99                   | 28.29              | 0.675            | 22816.6      | 22M8G7W             |
|                    | 16QAM      |                     |                       | 25.48                   | 26.78              | 0.476            | 22826.1      | 22M8D7W             |
| 20+5               | QPSK       | 2506.0              | 2686.7                | 27.00                   | 28.30              | 0.676            | 22817.8      | 22M8G7W             |
|                    | 16QAM      |                     |                       | 25.49                   | 26.79              | 0.478            | 22825.7      | 22M8D7W             |
| 10+20              | QPSK       | 2501.5              | 2680.0                | 27.00                   | 28.30              | 0.676            | 27696.8      | 27M7G7W             |
|                    | 16QAM      |                     |                       | 25.34                   | 26.64              | 0.461            | 27696        | 27M7D7W             |
| 20+10              | QPSK       | 2506.0              | 2684.5                | 27.00                   | 28.30              | 0.676            | 27607.2      | 27M6G7W             |
|                    | 16QAM      |                     |                       | 25.44                   | 26.74              | 0.472            | 27651.2      | 27M7D7W             |
| 15+15              | QPSK       | 2503.5              | 2682.5                | 26.91                   | 28.21              | 0.662            | 28238.1      | 28M2G7W             |
|                    | 16QAM      |                     |                       | 25.39                   | 26.69              | 0.467            | 28240.9      | 28M2D7W             |
| 15+20              | QPSK       | 2503.8              | 2680.0                | 26.84                   | 28.14              | 0.652            | 32531.6      | 32M5G7W             |
|                    | 16QAM      |                     |                       | 25.22                   | 26.52              | 0.449            | 32555.1      | 32M6D7W             |
| 20+15              | QPSK       | 2506.0              | 2682.2                | 27.00                   | 28.30              | 0.676            | 32575.1      | 32M6G7W             |
|                    | 16QAM      |                     |                       | 25.47                   | 26.77              | 0.475            | 32542.5      | 32M5D7W             |
| 20+20              | QPSK       | 2506.0              | 2680.0                | 26.71                   | 28.01              | 0.632            | 37377.4      | 37M4G7W             |
|                    | 16QAM      |                     |                       | 25.41                   | 26.71              | 0.469            | 37367.2      | 37M4D7W             |

### OUTPUT POWER FOR LTE BAND 48

| Part 96               |            |                     |                       |                         |                    |                  |              |                     |
|-----------------------|------------|---------------------|-----------------------|-------------------------|--------------------|------------------|--------------|---------------------|
| EIRP Limit (W)/ 10MHz |            | 0.20                |                       |                         |                    |                  |              |                     |
| Antenna Gain (dBi)    |            | -2.20               |                       |                         |                    |                  |              |                     |
| Bandwidth (MHz)       | Modulation | Low Frequency (MHz) | Upper Frequency (MHz) | Conducted Average (dBm) | EIRP Average (dBm) | EIRP Average (W) | 99% BW (kHz) | Emission Designator |
| 5+20                  | QPSK       | 3553.3              | 3690.0                | 23.60                   | 21.40              | 0.138            | 23242.7      | 23M2G7W             |
|                       | 16QAM      |                     |                       | 23.41                   | 21.21              | 0.132            | 23291.7      | 23M3D7W             |
| 20+5                  | QPSK       | 3560.0              | 3696.7                | 23.60                   | 21.40              | 0.138            | 23264.5      | 23M3G7W             |
|                       | 16QAM      |                     |                       | 23.36                   | 21.16              | 0.131            | 23262.4      | 23M3D7W             |
| 10+20                 | QPSK       | 3555.5              | 3690.0                | 24.03                   | 21.83              | 0.152            | 27992.5      | 28M0G7W             |
|                       | 16QAM      |                     |                       | 24.10                   | 22.00              | 0.158            | 27920.5      | 27M9D7W             |
| 20+10                 | QPSK       | 3560.0              | 3694.5                | 24.10                   | 21.90              | 0.155            | 28074.9      | 28M1G7W             |
|                       | 16QAM      |                     |                       | 24.07                   | 22.00              | 0.158            | 28026.7      | 28M0D7W             |
| 15+20                 | QPSK       | 3557.8              | 3690.0                | 24.50                   | 22.30              | 0.170            | 32807.8      | 32M8G7W             |
|                       | 16QAM      |                     |                       | 24.60                   | 22.50              | 0.178            | 32852.7      | 32M9D7W             |
| 20+15                 | QPSK       | 3560.0              | 3692.2                | 24.58                   | 22.38              | 0.173            | 32714.5      | 32M7G7W             |
|                       | 16QAM      |                     |                       | 24.60                   | 22.50              | 0.178            | 32709        | 32M7D7W             |
| 20+20                 | QPSK       | 3560.0              | 3690.0                | 24.50                   | 22.30              | 0.170            | 37686.1      | 37M7G7W             |
|                       | 16QAM      |                     |                       | 24.43                   | 22.23              | 0.167            | 37647.9      | 37M6D7W             |

### 5.3. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was version 0.28.03-1.

### 5.4. MAXIMUM ANTENNA GAIN

Please see table below:

| LTE Bands                    | Antenna Gain (dBi) |       |       |       |       |       |       |
|------------------------------|--------------------|-------|-------|-------|-------|-------|-------|
|                              | ANT 1              | ANT 2 | ANT 3 | ANT 4 | ANT 7 | ANT 8 | ANT 9 |
| LTE Band 5, 824 – 849 MHz    | -3.6               | -4.8  | NA    | NA    | NA    | NA    | NA    |
| LTE Band 7, 2500 – 2570 MHz  | -2.2               | -0.7  | -1    | -3.3  | NA    | NA    | NA    |
| LTE Band 41, 2496 – 2690 MHz | -0.1               | 0.5   | 1.3   | -1.7  | NA    | NA    | NA    |
| LTE Band 48, 3550 – 3700 MHz | NA                 | NA    | NA    | -2.1  | -0.7  | 0     | -2.2  |

## 5.5. WORST-CASE CONFIGURATION AND MODE

The EUT supports LTE dual carrier Bands of: Band 5, Band 7, Band 41 and Band 48.

The worst-case scenario for all measurements is based on an engineering evaluation and QPSK was observed as the worst one and set for all conducted and radiated. Output power measurements were measured on QPSK, 16QAM, 64QAM, 256QAM modulations. For testing purposes emissions on sections 8 and 9 were measured while QPSK was set at or above target power for all bands. Conducted tests were performed on the worst case antenna because it has the highest conducted power. ANT1 is the worst case for all bands except Band 48. For band 48 ANT9 is the worst case antenna.

The EUT was investigated in three orthogonal orientations X/Y/Z on all ANT 1, ANT2, ANT3, ANT4, ANT7, ANT8 and ANT 9 antennas to determine the worst case orientation. The following table exhibit the worst case orientation for different frequency bands. The full tests of the EUT have made upon the orientations that shown in the table below.

| Frequency Bands | ANT1 | ANT2 | ANT3 | ANT4 | ANT7 | ANT8 | ANT9 |
|-----------------|------|------|------|------|------|------|------|
| 663 – 849 MHz   | X    | Y    | N/A  | N/A  | N/A  | N/A  | N/A  |
| 1710 – 1915 MHz | X    | X    | X    | X    | N/A  | N/A  | N/A  |
| 2300 – 2700 MHz | X    | X    | X    | X    | N/A  | N/A  | N/A  |
| 3300 – 3980 MHz | N/A  | N/A  | N/A  | X    | X    | Y    | Y    |

For Band Edge and Emission Mask: The highest bandwidth combo was tested. The RB combinations were selected such that the signal is active closest to the band limit, as this is the worst case.

For Out of Band Emissions: The highest bandwidth combination was tested. The highest power RB combination was selected as worst case.

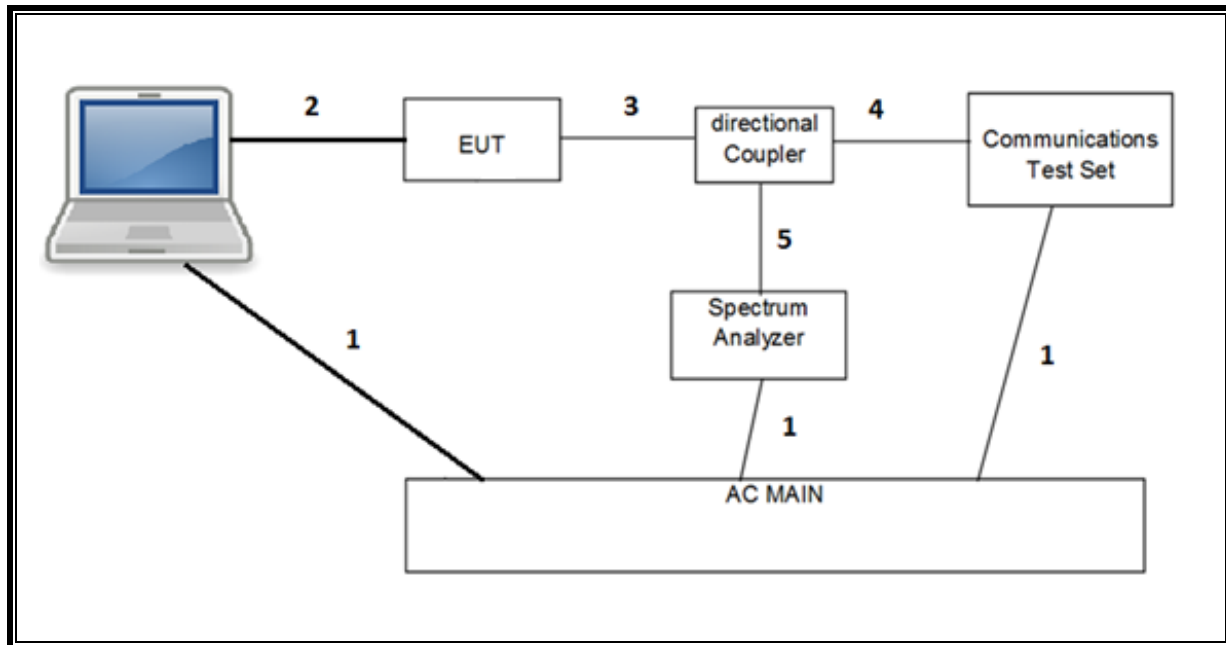
Radiated spurious emissions were investigated from 9kHz to 30MHz, 30MHz-1GHz and above 1GHz. There were no emissions found with less than 20dB of margin from 9kHz to 1GHz.

For interband transmission of multiple channels in different antenna combination in Cellular bands, tests were conducted for various configurations having the highest power, least separation in frequencies and widest operation bandwidths. No noticeable new emission was found.

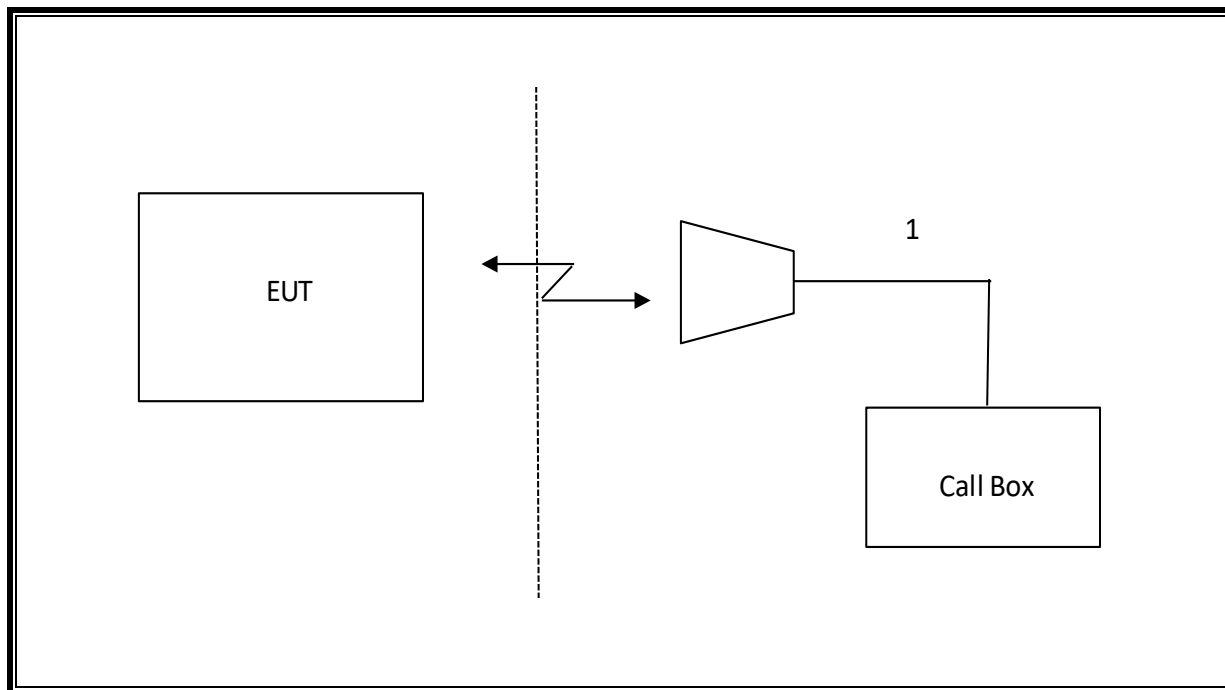
## 5.6. DESCRIPTION OF TEST SETUP

| SUPPORT TEST EQUIPMENT         |           |                      |                        |               |                  |              |
|--------------------------------|-----------|----------------------|------------------------|---------------|------------------|--------------|
| Description                    |           | Manufacturer         | Model                  | Serial Number |                  | FCC ID/ DoC  |
| Laptop                         |           | Apple                | A1398                  | C02PM012G3QD  |                  | QDS-BRCM1069 |
| Laptop AC/DC adapter           |           | Liteon Technology    | PA-1450-BA1            | B123          |                  | N/A          |
| 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                            | A.H. Systems, Inc.  | SAS-571                | T962                       | 01/25/2021 |
| Antenna, Horn 1-18GHz                            | ETS Lindgren        | 3117                   | T346                       | 07/20/2021 |
| Antenna, Horn 1-18GHz                            | ETS Lindgren        | 3117                   | T136                       | 07/07/2021 |
| Antenna, Broadband Hybrid, 30MHz to 2000MHz      | Sunol Sciences      | JB3                    | T407                       | 05/20/2021 |
| Antenna, Broadband Hybrid, 30MHz to 2000MHz      | Sunol Sciences      | JB3                    | PRE0184052                 | 11/12/2020 |
| *Antenna, Broadband Hybrid, 30MHz to 2000MHz     | Sunol Sciences      | JB3                    | PRE0181575                 | 09/05/2020 |
| Antenna, Active Loop 9KHz to 30MHz               | ETS-Lindgren        | 6502                   | T757                       | 10/01/2020 |
| Antenna Horn, 18 to 26GHz                        | ARA                 | SWH-28                 | T125                       | 04/17/2021 |
| Antenna, Horn 26-40GHz                           | ARA                 | MWH-2640/B             | PRE0182203                 | 04/17/2021 |
| Amplifier, 1 to 18GHz                            | MITEQ               | AFS42-00101800-25-S-42 | T1165                      | 08/10/2021 |
| Amplifier, 1 to 18GHz                            | MITEQ               | AFS42-00101800-25-S-42 | PRE0181078                 | 05/06/2021 |
| Amplifier, 10KHz to 1GHz, 32dB                   | Sonoma              | 310N                   | PRE0180176                 | 07/14/2021 |
| Amplifier, 100KHz to 1GHz, 32dB                  | Keysight            | 8447D                  | T15                        | 10/26/2020 |
| Pre-Amp 18-26GHz                                 | Agilent Technology  | 8449B                  | T404                       | 04/8/2021  |
| Amplifier, 26-40GHz                              | Miteq               | TTA2640                | T1864                      | 04/08/2021 |
| Filter, BRF 1850 – 1910 MHz                      | Micro-Tronics       | BRM50714-02            | T1796                      | 06/23/2021 |
| Filter, BRF 824 – 848 MHz                        | Micro-Tronics       | BRM20025               | PRE0191180                 | 06/23/2021 |
| Filter, HPF 1.2 GHz                              | MICRO-TRONICS       | MICRO-TRONICS          | T1737                      | 06/23/2021 |
| Directional Coupler                              | KRYTAR              | 152610                 | 198816                     | 05/15/2021 |
| *Directional Coupler                             | KRYTAR              | 152610                 | T1161                      | 08/14/2020 |
| Directional Coupler                              | KRYTAR              | 152613                 | 198817                     | 05/15/2021 |
| Spectrum Analyzer, PXA 3Hz to 44GHz              | Keysight            | N9030A                 | T340                       | 01/22/2021 |
| Spectrum Analyzer, PXA 3Hz to 44GHz              | Keysight            | N9030A                 | T1454                      | 07/15/2021 |
| Spectrum Analyzer, PXA 3Hz to 44GHz              | Keysight            | N9030A                 | T907                       | 01/22/2021 |
| Spectrum Analyzer, PSA, 3Hz to 44GHz             | Keysight            | N9030A                 | T908                       | 05/05/2021 |
| Spectrum Analyzer, PSA, 3Hz to 26.5GHz           | Keysight            | E4440A                 | T198                       | 01/28/2021 |
| Spectrum Analyzer, PSA, 3Hz to 44GHz             | Keysight            | E4440A                 | T200                       | 01/24/2021 |
| EMI TEST RECEIVER                                | Rohde & Schwarz     | ESW44                  | PRE0179522                 | 02/18/2021 |
| Wireless Communications Test Set, 8960 Series 10 | Agilent             | E5515C                 | T211                       | 02/18/2021 |
| Wideband Communication Test Set, Call Box        | R&S GmbH & Co. KG   | CMW500                 | T948                       | 08/10/2021 |
| Wideband Communication Test Set, Call Box        | R&S GmbH & Co. KG   | CMW500                 | T1871                      | 02/25/2021 |
| Wideband Communication Test Set, Call Box        | R&S GmbH & Co. KG   | CMW500                 | T972                       | 02/24/2021 |
| Wideband Communication Test Set, Call Box        | R&S GmbH & Co. KG   | CMW500                 | T260                       | 02/19/2021 |
| Wideband Communication Test Set, Call Box        | R&S GmbH & Co. KG   | CMW500                 | T959                       | 02/19/2021 |
| Chamber, Environmental                           | Cincinnati Sub Zero | ZPHS-8-3.5-SCT/WC      | T754                       | 12/22/2020 |
| Environmental Chamber                            | Cincinnati Sub Zero | ZPHS-8-3.5-SCT/WC      | T1154                      | 12/22/2020 |
| Power Meter, P-series single channel             | Keysight            | N1912A                 | T1245                      | 01/22/2021 |
| Power Sensor                                     | Keysight            | N1921A                 | T1225                      | 02/23/2021 |
| UL AUTOMATION SOFTWARE                           |                     |                        |                            |            |
| CLT Software                                     | UL                  | UL RF                  | Ver 7.6, November 11, 2017 |            |
| Power Measurement Software                       | UL                  | UL RF                  | Ver 2.7, 2019              |            |
| Radiated test software                           | UL                  | UL RF                  | Ver 9.5 June 15, 2019      |            |

### NOTES:

\* Testing is completed before equipment expiration date.

## 7. RF OUTPUT POWER VERIFICATION

### RULE PART(S)

FCC: §2.1046, §27.50

### RESULT

EUT includes different power levels for head use configuration and body use configuration and the below tables contain the highest of all configurations average conducted output powers as follows:

## 7.1. LTE BAND 5

|                   |       |            |          |
|-------------------|-------|------------|----------|
| Test Engineer ID: | 10641 | Test Date: | 8/5/2020 |
|-------------------|-------|------------|----------|

### OUTPUT POWER FOR LTE BAND 5 (5.0MHz + 10.0MHz)

| Bandwidth    | PCC Frequency (MHz) | SCC1 Frequency (MHz) | Conducted Average (dBm) |               |              |                |              |              |              |              |
|--------------|---------------------|----------------------|-------------------------|---------------|--------------|----------------|--------------|--------------|--------------|--------------|
|              |                     |                      | ANT 1                   |               |              |                | ANT 2        |              |              |              |
|              |                     |                      | PCC RB Size             | PCC RB Offset | SCC1 RB Size | SCC1 RB Offset | QPSK         | 16QAM        | 64QAM        | 256QAM       |
| 5MHz / 10MHz | 826.5               | 833.7                | 1                       | 24            | 1            | 0              | 25.70        | <b>24.81</b> | 23.78        | 20.77        |
|              |                     |                      | 25                      | 0             | 50           | 0              | 23.81        | 22.84        | 22.83        | <b>20.85</b> |
|              | 831.6               | 838.8                | 1                       | 24            | 1            | 0              | 25.69        | 24.73        | 23.81        | 20.71        |
|              |                     |                      | 25                      | 0             | 50           | 0              | 23.81        | 22.80        | 22.86        | 20.78        |
|              | 836.8               | 844.0                | 1                       | 24            | 1            | 0              | <b>25.70</b> | 24.76        | <b>23.85</b> | 20.67        |
|              |                     |                      | 25                      | 0             | 50           | 0              | 23.87        | 22.88        | 22.86        | 20.85        |

### OUTPUT POWER FOR LTE BAND 5 (10.0MHz + 5.0MHz)

| Bandwidth   | PCC Frequency (MHz) | SCC1 Frequency (MHz) | Conducted Average (dBm) |               |              |                |              |              |              |              |
|-------------|---------------------|----------------------|-------------------------|---------------|--------------|----------------|--------------|--------------|--------------|--------------|
|             |                     |                      | ANT 1                   |               |              |                | ANT 2        |              |              |              |
|             |                     |                      | PCC RB Size             | PCC RB Offset | SCC1 RB Size | SCC1 RB Offset | QPSK         | 16QAM        | 64QAM        | 256QAM       |
| 10MHz/ 5MHz | 829.0               | 836.2                | 1                       | 49            | 1            | 0              | 25.66        | 24.62        | <b>23.78</b> | 20.72        |
|             |                     |                      | 50                      | 0             | 25           | 0              | 23.83        | 22.84        | 22.88        | 20.87        |
|             | 834.3               | 841.5                | 1                       | 49            | 1            | 0              | <b>25.70</b> | 24.64        | 23.67        | 20.87        |
|             |                     |                      | 50                      | 0             | 25           | 0              | 23.85        | 22.84        | 22.87        | 20.90        |
|             | 839.3               | 846.5                | 1                       | 49            | 1            | 0              | 25.64        | <b>24.79</b> | 23.07        | 20.84        |
|             |                     |                      | 50                      | 0             | 25           | 0              | 23.89        | 22.92        | 22.88        | <b>20.92</b> |

### OUTPUT POWER FOR LTE BAND 5 (10.0MHz + 10.0MHz)

| Bandwidth    | PCC Frequency (MHz) | SCC1 Frequency (MHz) | Conducted Average (dBm) |               |              |                |              |              |              |              |
|--------------|---------------------|----------------------|-------------------------|---------------|--------------|----------------|--------------|--------------|--------------|--------------|
|              |                     |                      | ANT 1                   |               |              |                | ANT 2        |              |              |              |
|              |                     |                      | PCC RB Size             | PCC RB Offset | SCC1 RB Size | SCC1 RB Offset | QPSK         | 16QAM        | 64QAM        | 256QAM       |
| 10MHz/ 10MHz | 829.0               | 838.9                | 1                       | 49            | 1            | 0              | <b>25.70</b> | 24.66        | 23.68        | 20.70        |
|              |                     |                      | 1                       | 0             | 1            | 49             | 15.45        | 15.33        | 15.35        | 15.42        |
|              |                     |                      | 50                      | 0             | 50           | 0              | 23.88        | 22.89        | 22.90        | <b>20.94</b> |
|              |                     |                      | 1                       | 49            | 1            | 0              | 25.66        | <b>24.72</b> | 23.76        | 20.83        |
|              | 831.5               | 841.4                | 1                       | 0             | 1            | 49             | 15.41        | 15.43        | 15.42        | 15.48        |
|              |                     |                      | 50                      | 0             | 50           | 0              | 23.87        | 22.86        | 22.90        | 20.93        |
|              |                     |                      | 1                       | 49            | 1            | 0              | 25.66        | 24.67        | <b>23.80</b> | 20.80        |
|              |                     |                      | 1                       | 0             | 1            | 49             | 15.43        | 15.29        | 15.45        | 15.48        |
|              | 834.1               | 844.0                | 1                       | 0             | 1            | 49             | 15.43        | 15.29        | 15.45        | 15.48        |
|              |                     |                      | 50                      | 0             | 50           | 0              | 23.92        | 22.89        | 22.94        | 20.94        |
|              |                     |                      | 1                       | 49            | 1            | 0              | 25.66        | 24.67        | <b>23.80</b> | 20.80        |
|              |                     |                      | 1                       | 0             | 1            | 49             | 15.43        | 15.29        | 15.45        | 15.48        |

## 7.2. LTE BAND 7

|                   |       |            |           |
|-------------------|-------|------------|-----------|
| Test Engineer ID: | 10646 | Test Date: | 8/30/2020 |
|-------------------|-------|------------|-----------|

### OUTPUT POWER FOR LTE BAND 7 (10.0MHz + 20.0MHz)

| Bandwidth     | PCC Frequency (MHz) | SCC1 Frequency (MHz) | PCC RB Size | PCC RB Offset | SCC1 RB Size | SCC1 RB Offset | Conducted Average (dBm) |       |       |        |       |       |       |        |       |       |       |        |       |       |       |        |
|---------------|---------------------|----------------------|-------------|---------------|--------------|----------------|-------------------------|-------|-------|--------|-------|-------|-------|--------|-------|-------|-------|--------|-------|-------|-------|--------|
|               |                     |                      |             |               |              |                | ANT 1                   |       |       |        | ANT 2 |       |       |        | ANT 3 |       |       |        | ANT 4 |       |       |        |
|               |                     |                      |             |               |              |                | QPSK                    | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM |
| 10MHz / 20MHz | 2505.5              | 2519.9               | 1           | 49            | 1            | 0              | 25.70                   | 24.76 | 23.81 | 20.77  | 22.69 | 21.85 | 20.96 | 17.97  | 25.00 | 24.04 | 22.94 | 20.13  | 22.50 | 21.55 | 20.42 | 17.70  |
|               |                     |                      | 50          | 0             | 100          | 0              | 23.72                   | 22.73 | 22.70 | 20.76  | 20.80 | 19.82 | 19.84 | 17.87  | 23.01 | 22.00 | 22.01 | 20.04  | 20.49 | 19.51 | 19.47 | 17.55  |
|               |                     |                      | 1           | 49            | 1            | 0              | 25.61                   | 24.59 | 23.71 | 20.79  | 22.77 | 21.76 | 20.90 | 17.82  | 24.88 | 23.88 | 22.99 | 19.91  | 22.15 | 21.13 | 20.25 | 17.13  |
|               | 2525.6              | 2540.0               | 50          | 0             | 100          | 0              | 23.74                   | 22.74 | 22.70 | 20.79  | 20.87 | 19.88 | 19.92 | 17.91  | 23.02 | 22.02 | 21.99 | 20.04  | 20.24 | 19.25 | 19.27 | 17.27  |
|               |                     |                      | 1           | 49            | 1            | 0              | 25.69                   | 24.69 | 23.79 | 20.89  | 22.80 | 21.80 | 20.99 | 17.92  | 24.84 | 23.86 | 22.91 | 20.02  | 22.11 | 21.12 | 20.22 | 17.18  |
|               |                     |                      | 50          | 0             | 100          | 0              | 23.77                   | 22.77 | 22.75 | 20.83  | 20.89 | 19.89 | 19.89 | 17.93  | 22.97 | 21.96 | 21.94 | 19.98  | 20.14 | 19.12 | 19.16 | 17.18  |

### OUTPUT POWER FOR LTE BAND 7 (20.0MHz + 10.0MHz)

| Bandwidth     | PCC Frequency (MHz) | SCC1 Frequency (MHz) | PCC RB Size | PCC RB Offset | SCC1 RB Size | SCC1 RB Offset | Conducted Average (dBm) |       |       |        |       |       |       |        |       |       |       |        |       |       |       |        |
|---------------|---------------------|----------------------|-------------|---------------|--------------|----------------|-------------------------|-------|-------|--------|-------|-------|-------|--------|-------|-------|-------|--------|-------|-------|-------|--------|
|               |                     |                      |             |               |              |                | ANT 1                   |       |       |        | ANT 2 |       |       |        | ANT 3 |       |       |        | ANT 4 |       |       |        |
|               |                     |                      |             |               |              |                | QPSK                    | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM |
| 20MHz / 10MHz | 2510.0              | 2524.4               | 1           | 99            | 1            | 0              | 25.56                   | 24.57 | 23.67 | 20.50  | 22.72 | 21.72 | 20.72 | 17.60  | 25.00 | 24.07 | 23.00 | 20.11  | 22.50 | 21.62 | 20.48 | 17.65  |
|               |                     |                      | 100         | 0             | 50           | 0              | 23.61                   | 22.64 | 22.61 | 20.67  | 20.78 | 19.75 | 19.76 | 17.81  | 23.02 | 22.04 | 22.05 | 20.07  | 20.62 | 19.64 | 19.62 | 17.67  |
|               | 2530.1              | 2544.5               | 1           | 99            | 1            | 0              | 25.54                   | 24.61 | 23.65 | 20.85  | 22.78 | 21.86 | 20.79 | 17.94  | 24.89 | 23.89 | 22.95 | 19.94  | 22.26 | 21.37 | 20.35 | 17.36  |
|               |                     |                      | 100         | 0             | 50           | 0              | 23.64                   | 22.64 | 22.63 | 20.71  | 20.82 | 19.84 | 19.83 | 17.84  | 23.00 | 22.02 | 21.98 | 20.01  | 20.37 | 19.40 | 19.40 | 17.42  |
|               | 2550.1              | 2564.5               | 1           | 99            | 1            | 0              | 25.70                   | 24.75 | 23.73 | 20.66  | 22.80 | 21.86 | 20.86 | 17.80  | 24.87 | 23.93 | 22.98 | 19.84  | 22.19 | 21.28 | 20.31 | 17.22  |
|               |                     |                      | 100         | 0             | 50           | 0              | 23.67                   | 22.68 | 22.68 | 20.71  | 20.81 | 19.83 | 19.80 | 17.82  | 22.88 | 21.89 | 21.91 | 19.95  | 20.25 | 19.25 | 19.28 | 17.29  |

### OUTPUT POWER FOR LTE BAND 7 (15.0MHz + 15.0MHz)

| Bandwidth     | PCC Frequency (MHz) | SCC1 Frequency (MHz) | PCC RB Size | PCC RB Offset | SCC1 RB Size | SCC1 RB Offset | Conducted Average (dBm) |       |       |        |       |       |       |        |       |       |       |        |       |       |       |        |
|---------------|---------------------|----------------------|-------------|---------------|--------------|----------------|-------------------------|-------|-------|--------|-------|-------|-------|--------|-------|-------|-------|--------|-------|-------|-------|--------|
|               |                     |                      |             |               |              |                | ANT 1                   |       |       |        | ANT 2 |       |       |        | ANT 3 |       |       |        | ANT 4 |       |       |        |
|               |                     |                      |             |               |              |                | QPSK                    | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM |
| 15MHz / 15MHz | 2507.5              | 2522.5               | 1           | 74            | 1            | 0              | 25.46                   | 24.68 | 23.76 | 20.80  | 22.65 | 21.64 | 20.68 | 17.85  | 25.00 | 24.06 | 22.60 | 20.17  | 22.50 | 21.55 | 20.25 | 17.72  |
|               |                     |                      | 75          | 0             | 75           | 0              | 23.69                   | 22.69 | 22.71 | 20.76  | 20.75 | 19.77 | 19.77 | 17.80  | 23.04 | 22.06 | 22.08 | 20.07  | 20.60 | 19.60 | 19.60 | 17.64  |
|               | 2527.5              | 2542.5               | 1           | 74            | 1            | 0              | 25.58                   | 24.71 | 23.69 | 20.74  | 22.72 | 21.90 | 20.85 | 17.77  | 24.84 | 23.94 | 22.97 | 19.96  | 22.16 | 21.21 | 20.27 | 17.24  |
|               |                     |                      | 75          | 0             | 75           | 0              | 23.71                   | 22.73 | 22.72 | 20.77  | 20.81 | 19.81 | 19.86 | 17.87  | 23.04 | 22.06 | 22.03 | 20.06  | 20.34 | 19.34 | 19.39 | 17.39  |
|               | 2547.5              | 2562.5               | 1           | 74            | 1            | 0              | 25.70                   | 24.69 | 23.81 | 20.73  | 22.80 | 21.71 | 20.85 | 17.81  | 24.88 | 23.91 | 22.97 | 19.87  | 22.21 | 21.16 | 20.27 | 17.13  |
|               |                     |                      | 75          | 0             | 75           | 0              | 23.75                   | 22.75 | 22.76 | 20.80  | 20.81 | 19.84 | 19.82 | 17.85  | 22.92 | 21.91 | 21.95 | 19.95  | 20.22 | 19.22 | 19.27 | 17.25  |

### OUTPUT POWER FOR LTE BAND 7 (15.0MHz + 20.0MHz)

| Bandwidth     | PCC Frequency (MHz) | SCC1 Frequency (MHz) | PCC RB Size | PCC RB Offset | SCC1 RB Size | SCC1 RB Offset | Conducted Average (dBm) |       |       |        |       |       |       |        |       |       |       |        |       |       |       |        |
|---------------|---------------------|----------------------|-------------|---------------|--------------|----------------|-------------------------|-------|-------|--------|-------|-------|-------|--------|-------|-------|-------|--------|-------|-------|-------|--------|
|               |                     |                      |             |               |              |                | ANT 1                   |       |       |        | ANT 2 |       |       |        | ANT 3 |       |       |        | ANT 4 |       |       |        |
|               |                     |                      |             |               |              |                | QPSK                    | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM |
| 15MHz / 20MHz | 2507.8              | 2524.9               | 1           | 74            | 1            | 0              | 25.64                   | 24.68 | 23.76 | 20.79  | 22.72 | 21.69 | 20.75 | 17.77  | 25.00 | 24.07 | 22.97 | 20.21  | 22.50 | 21.51 | 20.19 | 17.66  |
|               |                     |                      | 75          | 0             | 100          | 0              | 23.67                   | 22.69 | 22.68 | 20.68  | 20.79 | 19.80 | 19.79 | 17.83  | 23.01 | 22.04 | 22.04 | 20.07  | 20.53 | 19.53 | 19.52 | 17.57  |
|               | 2525.3              | 2542.4               | 1           | 74            | 1            | 0              | 25.56                   | 24.69 | 23.66 | 20.68  | 22.80 | 21.77 | 20.80 | 17.89  | 24.92 | 23.85 | 22.98 | 19.91  | 22.19 | 21.19 | 20.25 | 17.31  |
|               |                     |                      | 75          | 0             | 100          | 0              | 23.70                   | 22.72 | 22.69 | 20.71  | 20.84 | 19.84 | 19.86 | 17.88  | 23.04 | 22.05 | 22.03 | 20.05  | 20.33 | 19.34 | 19.38 | 17.36  |
|               | 2542.9              | 2560.0               | 1           | 74            | 1            | 0              | 25.70                   | 24.71 | 23.71 | 20.69  | 22.76 | 21.70 | 20.90 | 17.86  | 24.88 | 23.91 | 22.98 | 20.03  | 22.19 | 21.20 | 20.38 | 17.35  |
|               |                     |                      | 75          | 0             | 100          | 0              | 23.72                   | 22.72 | 22.72 | 20.73  | 20.82 | 19.85 | 19.84 | 17.87  | 22.99 | 21.98 | 21.98 | 20.00  | 20.19 | 19.20 | 19.21 | 17.22  |

### OUTPUT POWER FOR LTE BAND 7 (20.0MHz + 15.0MHz)

| Bandwidth        | PCC<br>Frequency<br>(MHz) | SCC1<br>Frequency<br>(MHz) | PCC<br>RB<br>Size | PCC<br>RB<br>Offset | SCC1<br>RB<br>Size | SCC1<br>RB<br>Offset | Conducted Average (dBm) |       |       |        |       |       |       |        |       |       |       |        |       |       |       |        |
|------------------|---------------------------|----------------------------|-------------------|---------------------|--------------------|----------------------|-------------------------|-------|-------|--------|-------|-------|-------|--------|-------|-------|-------|--------|-------|-------|-------|--------|
|                  |                           |                            |                   |                     |                    |                      | ANT 1                   |       |       |        | ANT 2 |       |       |        | ANT 3 |       |       |        | ANT 4 |       |       |        |
|                  |                           |                            |                   |                     |                    |                      | QPSK                    | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM |
| 20MHz /<br>15MHz | 2510.0                    | 2527.1                     | 1                 | 99                  | 1                  | 0                    | 25.59                   | 24.60 | 23.67 | 20.57  | 22.70 | 21.71 | 20.83 | 17.74  | 25.00 | 24.07 | 22.88 | 20.02  | 22.50 | 21.63 | 20.40 | 17.56  |
|                  |                           |                            | 100               | 0                   | 75                 | 0                    | 23.68                   | 22.65 | 22.65 | 20.67  | 20.75 | 19.76 | 19.77 | 17.82  | 23.04 | 22.04 | 22.04 | 20.04  | 20.62 | 19.62 | 19.59 | 17.64  |
|                  |                           |                            | 1                 | 99                  | 1                  | 0                    | 25.58                   | 24.66 | 23.59 | 20.70  | 22.77 | 21.88 | 20.89 | 17.83  | 24.96 | 23.94 | 22.92 | 20.04  | 22.23 | 21.38 | 20.46 | 17.43  |
|                  | 2527.6                    | 2544.7                     | 100               | 0                   | 75                 | 0                    | 23.68                   | 22.71 | 22.68 | 20.69  | 20.85 | 19.83 | 19.84 | 17.88  | 23.02 | 22.04 | 21.99 | 20.04  | 20.43 | 19.44 | 19.45 | 17.47  |
|                  |                           |                            | 1                 | 99                  | 1                  | 0                    | 25.70                   | 24.73 | 23.82 | 20.77  | 22.80 | 21.84 | 20.91 | 17.87  | 24.89 | 23.90 | 22.98 | 19.93  | 22.27 | 21.27 | 20.40 | 17.39  |
|                  |                           |                            | 100               | 0                   | 75                 | 0                    | 23.70                   | 22.72 | 22.69 | 20.71  | 20.81 | 19.84 | 19.83 | 17.86  | 22.91 | 21.92 | 21.93 | 19.94  | 20.28 | 19.29 | 19.32 | 17.31  |

### OUTPUT POWER FOR LTE BAND 7 (20.0MHz + 20.0MHz)

| Bandwidth       | PCC Frequency (MHz) | SCC1 Frequency (MHz) | PCC RB Size | PCC RB Offset | SCC1 RB Size | SCC1 RB Offset | Conducted Average (dBm) |       |       |        |       |       |       |        |       |       |       |        |       |       |       |        |
|-----------------|---------------------|----------------------|-------------|---------------|--------------|----------------|-------------------------|-------|-------|--------|-------|-------|-------|--------|-------|-------|-------|--------|-------|-------|-------|--------|
|                 |                     |                      |             |               |              |                | ANT 1                   |       |       |        | ANT 2 |       |       |        | ANT 3 |       |       |        | ANT 4 |       |       |        |
|                 |                     |                      |             |               |              |                | QPSK                    | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM |
| 20MHz/<br>20MHz | 2510.0              | 2529.8               | 1           | 99            | 1            | 0              | 25.69                   | 24.70 | 23.77 | 20.64  | 22.75 | 21.69 | 20.85 | 17.78  | 25.00 | 24.13 | 23.01 | 20.18  | 22.50 | 21.56 | 20.48 | 17.52  |
|                 |                     |                      | 1           | 0             | 1            | 99             | 16.72                   | 16.81 | 16.80 | 16.77  | 13.43 | 13.22 | 13.14 | 12.21  | 16.01 | 15.98 | 15.95 | 16.09  | 13.44 | 11.60 | 11.48 | 13.58  |
|                 |                     |                      | 100         | 0             | 100          | 0              | 23.68                   | 22.68 | 22.66 | 20.66  | 20.73 | 19.74 | 19.75 | 17.81  | 22.97 | 20.00 | 21.99 | 20.02  | 19.99 | 19.51 | 17.50 | 17.52  |
|                 |                     |                      | 1           | 99            | 1            | 0              | 25.59                   | 24.68 | 23.67 | 20.74  | 22.73 | 21.83 | 20.90 | 17.82  | 24.86 | 23.95 | 22.95 | 19.91  | 22.23 | 21.41 | 20.26 | 17.40  |
|                 | 2525.1              | 2544.9               | 1           | 0             | 1            | 99             | 16.87                   | 16.98 | 16.97 | 17.07  | 13.89 | 14.02 | 13.98 | 13.38  | 15.64 | 15.51 | 15.51 | 15.79  | 12.67 | 12.65 | 12.58 | 12.35  |
|                 |                     |                      | 100         | 0             | 100          | 0              | 23.68                   | 22.71 | 22.68 | 20.71  | 20.82 | 19.82 | 19.83 | 17.88  | 23.02 | 22.00 | 22.00 | 20.05  | 20.38 | 19.40 | 19.43 | 17.43  |
|                 |                     |                      | 1           | 99            | 1            | 0              | 25.70                   | 24.69 | 23.73 | 20.72  | 22.80 | 21.89 | 20.84 | 17.82  | 24.90 | 23.90 | 22.98 | 19.88  | 22.27 | 21.26 | 20.38 | 17.37  |
|                 |                     |                      | 100         | 0             | 100          | 0              | 16.72                   | 16.82 | 16.74 | 16.70  | 13.39 | 13.30 | 13.20 | 12.99  | 15.34 | 15.24 | 15.19 | 14.98  | 11.91 | 11.75 | 11.78 | 11.47  |
|                 | 2540.2              | 2560.0               | 1           | 0             | 1            | 99             | 16.87                   | 16.82 | 16.74 | 16.70  | 13.39 | 13.30 | 13.20 | 12.99  | 15.34 | 15.24 | 15.19 | 14.98  | 11.91 | 11.75 | 11.78 | 11.47  |
|                 |                     |                      | 100         | 0             | 100          | 0              | 23.67                   | 23.68 | 23.67 | 20.70  | 20.77 | 19.77 | 19.79 | 12.94  | 23.99 | 23.98 | 23.99 | 19.93  | 20.21 | 19.23 | 19.24 | 17.34  |

### 7.3. LTE BAND 41

|                   |       |            |           |
|-------------------|-------|------------|-----------|
| Test Engineer ID: | 10646 | Test Date: | 8/30/2020 |
|-------------------|-------|------------|-----------|

#### OUTPUT POWER FOR LTE BAND 41 (5.0MHz + 20.0MHz)

| Bandwidth    | PCC Frequency (MHz) | SCC1 Frequency (MHz) | PCC RB Size | PCC RB Offset | SCC1 RB Size | SCC1 RB Offset | Conducted Average (dBm) |       |       |        |       |       |       |        |       |       |       |        |
|--------------|---------------------|----------------------|-------------|---------------|--------------|----------------|-------------------------|-------|-------|--------|-------|-------|-------|--------|-------|-------|-------|--------|
|              |                     |                      |             |               |              |                | ANT 1                   |       |       |        | ANT 2 |       |       |        | ANT 3 |       |       |        |
|              |                     |                      |             |               |              |                | QPSK                    | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM |
| 5MHz / 20MHz | 2499.3              | 2511.0               | 1           | 24            | 1            | 0              | 22.73                   | 22.70 | 22.58 | 22.46  | 19.87 | 19.47 | 19.24 | 19.90  | 22.02 | 21.46 | 22.09 | 21.94  |
|              |                     |                      | 25          | 0             | 100          | 0              | 22.68                   | 22.11 | 21.84 | 22.60  | 19.80 | 19.31 | 19.31 | 19.78  | 21.99 | 21.52 | 21.53 | 21.97  |
|              | 2583.8              | 2595.5               | 1           | 24            | 1            | 0              | 27.70                   | 26.27 | 24.89 | 22.80  | 24.50 | 23.25 | 23.20 | 19.52  | 26.99 | 25.48 | 25.13 | 22.11  |
|              |                     |                      | 25          | 0             | 100          | 0              | 25.86                   | 24.87 | 24.88 | 22.89  | 22.98 | 22.00 | 21.95 | 20.00  | 25.12 | 24.13 | 24.11 | 22.12  |
|              | 2668.3              | 2680.0               | 1           | 24            | 1            | 0              | 27.70                   | 26.23 | 25.00 | 22.99  | 24.80 | 23.25 | 22.47 | 20.00  | 26.69 | 25.23 | 24.41 | 21.93  |
|              |                     |                      | 25          | 0             | 100          | 0              | 25.94                   | 24.93 | 24.94 | 22.92  | 22.99 | 22.00 | 21.97 | 19.98  | 24.98 | 24.95 | 24.03 | 21.95  |

#### OUTPUT POWER FOR LTE BAND 41 (20.0MHz + 5.0MHz)

| Bandwidth    | PCC Frequency (MHz) | SCC1 Frequency (MHz) | PCC RB Size | PCC RB Offset | SCC1 RB Size | SCC1 RB Offset | Conducted Average (dBm) |       |       |        |       |       |       |        |       |       |       |        |
|--------------|---------------------|----------------------|-------------|---------------|--------------|----------------|-------------------------|-------|-------|--------|-------|-------|-------|--------|-------|-------|-------|--------|
|              |                     |                      |             |               |              |                | ANT 1                   |       |       |        | ANT 2 |       |       |        | ANT 3 |       |       |        |
|              |                     |                      |             |               |              |                | QPSK                    | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM |
| 20MHz / 5MHz | 2506.0              | 2517.7               | 1           | 99            | 1            | 0              | 26.70                   | 26.24 | 24.98 | 22.81  | 23.80 | 23.45 | 21.97 | 19.91  | 26.04 | 25.23 | 24.43 | 21.65  |
|              |                     |                      | 100         | 0             | 25           | 0              | 22.72                   | 21.74 | 21.23 | 22.92  | 19.89 | 18.90 | 18.59 | 16.90  | 22.09 | 21.11 | 20.43 | 19.10  |
|              | 2590.5              | 2602.2               | 1           | 99            | 1            | 0              | 27.70                   | 26.21 | 25.67 | 22.75  | 24.80 | 23.39 | 22.75 | 19.99  | 27.00 | 25.49 | 25.07 | 22.24  |
|              |                     |                      | 100         | 0             | 25           | 0              | 25.82                   | 24.81 | 24.85 | 22.86  | 22.88 | 21.82 | 21.86 | 19.91  | 25.11 | 24.11 | 24.15 | 22.11  |
|              | 2675.0              | 2686.7               | 1           | 99            | 1            | 0              | 27.70                   | 26.22 | 24.91 | 22.91  | 24.80 | 23.37 | 23.07 | 19.92  | 26.83 | 25.45 | 25.30 | 22.11  |
|              |                     |                      | 100         | 0             | 25           | 0              | 25.73                   | 24.74 | 24.76 | 22.77  | 22.93 | 21.91 | 21.90 | 19.92  | 24.96 | 23.99 | 24.00 | 21.96  |

#### OUTPUT POWER FOR LTE BAND 41 (10.0MHz + 20.0MHz)

| Bandwidth     | PCC Frequency (MHz) | SCC1 Frequency (MHz) | PCC RB Size | PCC RB Offset | SCC1 RB Size | SCC1 RB Offset | Conducted Average (dBm) |       |       |        |       |       |       |        |       |       |       |        |
|---------------|---------------------|----------------------|-------------|---------------|--------------|----------------|-------------------------|-------|-------|--------|-------|-------|-------|--------|-------|-------|-------|--------|
|               |                     |                      |             |               |              |                | ANT 1                   |       |       |        | ANT 2 |       |       |        | ANT 3 |       |       |        |
|               |                     |                      |             |               |              |                | QPSK                    | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM |
| 10MHz / 20MHz | 2501.5              | 2515.9               | 1           | 49            | 1            | 0              | 22.73                   | 22.58 | 22.54 | 22.64  | 19.67 | 19.80 | 19.69 | 19.75  | 21.88 | 21.91 | 21.89 | 21.90  |
|               |                     |                      | 50          | 0             | 100          | 0              | 22.50                   | 22.21 | 22.70 | 22.53  | 19.80 | 19.73 | 19.78 | 19.76  | 21.88 | 21.86 | 22.00 | 21.99  |
|               | 2583.6              | 2598.0               | 1           | 49            | 1            | 0              | 27.70                   | 26.24 | 25.58 | 22.80  | 24.80 | 23.18 | 22.67 | 19.86  | 26.67 | 25.34 | 25.09 | 22.34  |
|               |                     |                      | 50          | 0             | 100          | 0              | 25.88                   | 24.87 | 24.88 | 22.86  | 22.94 | 21.97 | 21.92 | 19.97  | 25.13 | 24.16 | 24.18 | 22.14  |
|               | 2665.6              | 2680.0               | 1           | 49            | 1            | 0              | 27.70                   | 26.32 | 25.22 | 22.89  | 24.80 | 23.44 | 23.12 | 20.00  | 27.00 | 25.18 | 23.56 | 21.87  |
|               |                     |                      | 50          | 0             | 100          | 0              | 25.93                   | 24.93 | 24.92 | 22.93  | 22.84 | 22.04 | 22.01 | 20.03  | 24.96 | 24.01 | 23.96 | 21.99  |

#### OUTPUT POWER FOR LTE BAND 41 (20.0MHz + 10.0MHz)

| Bandwidth     | PCC Frequency (MHz) | SCC1 Frequency (MHz) | PCC RB Size | PCC RB Offset | SCC1 RB Size | SCC1 RB Offset | Conducted Average (dBm) |       |       |        |       |       |       |        |       |       |       |        |
|---------------|---------------------|----------------------|-------------|---------------|--------------|----------------|-------------------------|-------|-------|--------|-------|-------|-------|--------|-------|-------|-------|--------|
|               |                     |                      |             |               |              |                | ANT 1                   |       |       |        | ANT 2 |       |       |        | ANT 3 |       |       |        |
|               |                     |                      |             |               |              |                | QPSK                    | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM |
| 20MHz / 10MHz | 2506.0              | 2520.4               | 1           | 99            | 1            | 0              | 26.70                   | 26.32 | 24.78 | 22.89  | 23.80 | 23.48 | 21.97 | 20.13  | 26.01 | 25.26 | 23.41 | 21.72  |
|               |                     |                      | 100         | 0             | 50           | 0              | 22.72                   | 21.69 | 21.16 | 19.73  | 19.83 | 18.87 | 18.55 | 16.86  | 22.02 | 21.04 | 20.46 | 19.04  |
|               | 2588.1              | 2602.5               | 1           | 99            | 1            | 0              | 27.70                   | 26.25 | 25.64 | 22.89  | 24.80 | 23.42 | 22.79 | 20.02  | 27.00 | 25.44 | 25.00 | 22.23  |
|               |                     |                      | 100         | 0             | 50           | 0              | 25.73                   | 24.76 | 24.80 | 22.79  | 22.89 | 21.89 | 21.93 | 19.92  | 25.10 | 24.10 | 24.16 | 22.13  |
|               | 2670.1              | 2684.5               | 1           | 99            | 1            | 0              | 27.70                   | 26.17 | 25.31 | 22.95  | 24.80 | 23.29 | 23.16 | 19.87  | 26.82 | 25.32 | 24.93 | 22.09  |
|               |                     |                      | 100         | 0             | 50           | 0              | 25.90                   | 24.88 | 24.87 | 22.90  | 22.93 | 21.94 | 21.92 | 19.92  | 25.00 | 24.03 | 24.05 | 21.96  |

#### OUTPUT POWER FOR LTE BAND 41 (15.0MHz + 15.0MHz)

| Bandwidth     | PCC Frequency (MHz) | SCC1 Frequency (MHz) | PCC RB Size | PCC RB Offset | SCC1 RB Size | SCC1 RB Offset | Conducted Average (dBm) |       |       |        |       |       |       |        |       |       |       |        |
|---------------|---------------------|----------------------|-------------|---------------|--------------|----------------|-------------------------|-------|-------|--------|-------|-------|-------|--------|-------|-------|-------|--------|
|               |                     |                      |             |               |              |                | ANT 1                   |       |       |        | ANT 2 |       |       |        | ANT 3 |       |       |        |
|               |                     |                      |             |               |              |                | QPSK                    | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM |
| 15MHz / 15MHz | 2503.5              | 2518.5               | 1           | 74            | 1            | 0              | 27.70                   | 26.31 | 24.74 | 23.00  | 24.80 | 23.40 | 22.10 | 19.92  | 26.46 | 25.01 | 23.07 | 21.57  |
|               |                     |                      | 75          | 0             | 75           | 0              | 22.86                   | 21.91 | 21.34 | 22.94  | 19.81 | 18.85 | 18.63 | 16.89  | 22.02 | 21.00 | 20.57 | 19.02  |
|               | 2585.5              | 2600.5               | 1           | 74            | 1            | 0              | 27.70                   | 26.20 | 25.60 | 22.77  | 24.80 | 23.14 | 22.80 | 20.06  | 26.89 | 25.39 | 24.87 | 22.15  |
|               |                     |                      | 75          | 0             | 75           | 0              | 25.88                   | 24.87 | 24.92 | 22.88  | 22.89 | 21.91 | 21.93 | 19.95  | 25.09 | 24.10 | 24.20 | 22.13  |
|               | 2667.5              | 2682.5               | 1           | 74            | 1            | 0              | 27.70                   | 26.33 | 25.18 | 22.91  | 24.80 | 23.32 | 22.75 | 19.89  | 26.91 | 25.18 | 23.96 | 21.82  |
|               |                     |                      | 75          | 0             | 75           | 0              | 25.93                   | 24.96 | 24.98 | 22.99  | 22.89 | 22.02 | 22.00 | 20.03  | 24.96 | 23.99 | 24.05 | 22.00  |

#### OUTPUT POWER FOR LTE BAND 41 (15.0MHz + 20.0MHz)

| Bandwidth     | PCC Frequency (MHz) | SCC1 Frequency (MHz) | PCC RB Size | PCC RB Offset | SCC1 RB Size | SCC1 RB Offset | Conducted Average (dBm) |       |       |        |       |       |       |        |       |       |       |        |
|---------------|---------------------|----------------------|-------------|---------------|--------------|----------------|-------------------------|-------|-------|--------|-------|-------|-------|--------|-------|-------|-------|--------|
|               |                     |                      |             |               |              |                | ANT 1                   |       |       |        | ANT 2 |       |       |        | ANT 3 |       |       |        |
|               |                     |                      |             |               |              |                | QPSK                    | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM |
| 15MHz / 20MHz | 2503.8              | 2520.9               | 1           | 74            | 1            | 0              | 27.70                   | 26.09 | 24.41 | 22.68  | 24.80 | 23.36 | 21.93 | 20.10  | 26.64 | 25.14 | 22.99 | 21.90  |
|               |                     |                      | 75          | 0             | 100          | 0              | 22.74                   | 22.74 | 22.80 | 21.81  | 19.85 | 19.87 | 18.87 | 18.87  | 22.07 | 22.08 | 22.10 | 21.07  |
|               | 2583.3              | 2600.4               | 1           | 74            | 1            | 0              | 27.70                   | 26.35 | 26.06 | 22.88  | 24.80 | 23.18 | 22.67 | 19.90  | 26.84 | 25.18 | 24.67 | 21.96  |
|               |                     |                      | 75          | 0             | 100          | 0              | 25.97                   | 24.92 | 25.01 | 22.98  | 22.80 | 22.02 | 21.99 | 20.02  | 25.12 | 24.13 | 24.15 | 22.15  |
|               | 2662.9              | 2680.0               | 1           | 74            | 1            | 0              | 27.70                   | 26.30 | 25.02 | 22.99  | 24.80 | 23.49 | 23.21 | 20.02  | 26.72 | 25.22 | 23.90 | 21.80  |
|               |                     |                      | 75          | 0             | 100          | 0              | 25.91                   | 24.92 | 24.87 | 22.94  | 22.80 | 22.10 | 22.11 | 20.06  | 24.99 | 23.99 | 23.93 | 21.97  |

### OUTPUT POWER FOR LTE BAND 41 (20.0MHz + 15.0MHz)

| Bandwidth     | PCC Frequency (MHz) | SCC1 Frequency (MHz) | PCC RB Size | PCC RB Offset | SCC1 RB Size | SCC1 RB Offset | Conducted Average (dBm) |       |       |        |       |       |       |        |       |       |       |        |       |       |       |        |
|---------------|---------------------|----------------------|-------------|---------------|--------------|----------------|-------------------------|-------|-------|--------|-------|-------|-------|--------|-------|-------|-------|--------|-------|-------|-------|--------|
|               |                     |                      |             |               |              |                | ANT 1                   |       |       |        | ANT 2 |       |       |        | ANT 3 |       |       |        | ANT 4 |       |       |        |
|               |                     |                      |             |               |              |                | QPSK                    | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM |
| 20MHz / 15MHz | 2506.0              | 2523.1               | 1           | 99            | 1            | 0              | 27.70                   | 26.26 | 24.60 | 22.74  | 24.80 | 23.39 | 21.93 | 19.94  | 26.67 | 25.20 | 23.43 | 21.76  | 19.50 | 18.08 | 16.29 | 14.70  |
|               |                     |                      | 100         | 0             | 75           | 0              | 22.73                   | 21.74 | 21.16 | 19.77  | 19.84 | 18.85 | 18.63 | 16.84  | 22.03 | 21.02 | 20.60 | 19.06  | 22.71 | 21.73 | 21.04 | 19.78  |
|               | 2585.6              | 2602.7               | 1           | 99            | 1            | 0              | 27.70                   | 26.29 | 25.67 | 22.91  | 24.80 | 23.40 | 22.77 | 20.03  | 27.00 | 25.47 | 25.03 | 22.23  | 24.25 | 22.89 | 22.29 | 19.52  |
|               |                     |                      | 100         | 0             | 75           | 0              | 25.80                   | 24.84 | 24.83 | 22.85  | 22.83 | 21.98 | 21.94 | 19.96  | 25.16 | 24.17 | 24.20 | 22.18  | 22.41 | 21.42 | 21.46 | 19.50  |
|               | 2665.1              | 2682.2               | 1           | 99            | 1            | 0              | 27.70                   | 26.23 | 25.31 | 22.89  | 24.80 | 23.37 | 23.20 | 19.95  | 26.77 | 25.28 | 24.59 | 21.99  | 24.42 | 22.94 | 23.02 | 19.78  |
|               |                     |                      | 100         | 0             | 75           | 0              | 25.88                   | 24.92 | 24.85 | 22.88  | 22.81 | 22.07 | 22.03 | 20.04  | 24.99 | 24.07 | 24.04 | 21.99  | 22.59 | 21.62 | 21.57 | 19.65  |

### OUTPUT POWER FOR LTE BAND 41 (20.0MHz + 20.0MHz)

| Bandwidth     | PCC Frequency (MHz) | SCC1 Frequency (MHz) | PCC RB Size | PCC RB Offset | SCC1 RB Size | SCC1 RB Offset | Conducted Average (dBm) |       |       |        |       |       |       |        |       |       |       |        |       |       |       |        |
|---------------|---------------------|----------------------|-------------|---------------|--------------|----------------|-------------------------|-------|-------|--------|-------|-------|-------|--------|-------|-------|-------|--------|-------|-------|-------|--------|
|               |                     |                      |             |               |              |                | ANT 1                   |       |       |        | ANT 2 |       |       |        | ANT 3 |       |       |        | ANT 4 |       |       |        |
|               |                     |                      |             |               |              |                | QPSK                    | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM |
| 20MHz / 20MHz | 2506.0              | 2525.8               | 1           | 99            | 1            | 0              | 27.70                   | 26.29 | 24.82 | 22.86  | 24.80 | 23.38 | 21.88 | 19.92  | 26.67 | 25.21 | 23.45 | 21.71  | 24.50 | 23.02 | 21.34 | 19.51  |
|               |                     |                      | 1           | 0             | 1            | 99             | 14.78                   | 14.41 | 14.83 | 14.05  | 11.85 | 10.94 | 11.67 | 11.90  | 14.07 | 14.01 | 14.20 | 14.00  | 11.59 | 11.60 | 11.65 | 11.51  |
|               |                     |                      | 100         | 0             | 100          | 0              | 22.70                   | 21.68 | 21.67 | 20.64  | 19.81 | 18.80 | 18.83 | 17.80  | 22.08 | 21.07 | 21.07 | 20.03  | 21.73 | 20.71 | 20.72 | 19.74  |
|               | 2583.1              | 2602.9               | 1           | 99            | 1            | 0              | 27.70                   | 26.27 | 25.62 | 22.86  | 24.80 | 23.20 | 22.71 | 19.94  | 26.71 | 25.41 | 24.96 | 22.06  | 24.29 | 22.66 | 22.29 | 19.47  |
|               |                     |                      | 1           | 0             | 1            | 99             | 18.15                   | 18.21 | 17.65 | 17.53  | 14.73 | 14.17 | 14.40 | 14.69  | 16.75 | 16.87 | 16.80 | 16.96  | 13.99 | 14.10 | 13.99 | 14.15  |
|               |                     |                      | 100         | 0             | 100          | 0              | 25.84                   | 24.84 | 24.86 | 22.80  | 22.83 | 21.92 | 21.95 | 19.93  | 25.14 | 24.18 | 24.20 | 22.18  | 22.43 | 21.43 | 21.43 | 19.38  |
|               | 2660.2              | 2680.0               | 1           | 99            | 1            | 0              | 27.70                   | 26.22 | 25.35 | 22.87  | 24.80 | 23.36 | 23.32 | 19.88  | 26.65 | 25.16 | 24.19 | 21.84  | 24.30 | 22.83 | 22.89 | 19.65  |
|               |                     |                      | 1           | 0             | 1            | 99             | 18.32                   | 18.36 | 17.46 | 18.10  | 15.44 | 15.36 | 14.47 | 14.70  | 16.37 | 16.40 | 16.92 | 16.60  | 13.90 | 13.83 | 14.36 | 14.13  |
|               |                     |                      | 100         | 0             | 100          | 0              | 25.97                   | 24.99 | 24.87 | 23.00  | 22.86 | 22.09 | 22.08 | 20.10  | 24.98 | 23.98 | 23.95 | 21.96  | 22.55 | 21.57 | 21.53 | 19.53  |

## 7.4. LTE BAND 48

|                   |       |            |           |
|-------------------|-------|------------|-----------|
| Test Engineer ID: | 10646 | Test Date: | 8/30/2020 |
|-------------------|-------|------------|-----------|

### OUTPUT POWER FOR LTE BAND 48 (5.0MHz + 20.0MHz)

| Bandwidth    | PCC Frequency (MHz) | SCC1 Frequency (MHz) | PCC RB Size | PCC RB Offset | SCC1 RB Size | SCC1 RB Offset | Conducted Average (dBm) |       |       |        |       |       |       |        |       |       |       |        |       |       |       |        |
|--------------|---------------------|----------------------|-------------|---------------|--------------|----------------|-------------------------|-------|-------|--------|-------|-------|-------|--------|-------|-------|-------|--------|-------|-------|-------|--------|
|              |                     |                      |             |               |              |                | ANT 7                   |       |       |        | ANT 4 |       |       |        | ANT 9 |       |       |        | ANT 8 |       |       |        |
|              |                     |                      |             |               |              |                | QPSK                    | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM |
| 5MHz / 20MHz | 3553.3              | 3565.0               | 1           | 24            | 1            | 0              | 17.50                   | 17.00 | 17.00 | 17.29  | 16.52 | 16.51 | 17.00 | 16.69  | 19.60 | 19.66 | 20.10 | 19.85  | 16.63 | 16.66 | 17.10 | 16.72  |
|              |                     |                      | 25          | 0             | 100          | 0              | 10.70                   | 10.73 | 10.68 | 10.70  | 10.29 | 10.31 | 10.26 | 10.29  | 13.36 | 13.38 | 13.28 | 13.32  | 10.43 | 10.40 | 10.37 | 10.38  |
|              | 3615.8              | 3627.5               | 1           | 24            | 1            | 0              | 21.00                   | 20.84 | 20.83 | 18.06  | 20.37 | 20.32 | 20.50 | 17.53  | 23.60 | 23.41 | 23.45 | 20.60  | 19.95 | 19.78 | 20.00 | 17.22  |
|              |                     |                      | 25          | 0             | 100          | 0              | 19.08                   | 19.03 | 19.04 | 18.08  | 18.59 | 18.56 | 18.53 | 17.59  | 21.70 | 21.63 | 21.61 | 20.68  | 18.08 | 18.07 | 18.08 | 17.17  |
|              | 3678.3              | 3690.0               | 1           | 24            | 1            | 0              | 17.50                   | 17.31 | 17.11 | 17.43  | 16.72 | 16.61 | 16.40 | 17.00  | 20.05 | 19.96 | 19.72 | 20.10  | 16.73 | 16.63 | 16.45 | 16.90  |
|              |                     |                      | 25          | 0             | 100          | 0              | 11.15                   | 11.17 | 11.16 | 11.03  | 10.46 | 10.43 | 10.48 | 10.58  | 13.82 | 13.77 | 13.74 | 13.68  | 10.51 | 10.49 | 10.51 | 10.50  |

### OUTPUT POWER FOR LTE BAND 48 (20.0MHz + 5.0MHz)

| Bandwidth    | PCC Frequency (MHz) | SCC1 Frequency (MHz) | PCC RB Size | PCC RB Offset | SCC1 RB Size | SCC1 RB Offset | Conducted Average (dBm) |       |       |        |       |       |       |        |       |       |       |        |       |       |       |        |
|--------------|---------------------|----------------------|-------------|---------------|--------------|----------------|-------------------------|-------|-------|--------|-------|-------|-------|--------|-------|-------|-------|--------|-------|-------|-------|--------|
|              |                     |                      |             |               |              |                | ANT 7                   |       |       |        | ANT 4 |       |       |        | ANT 9 |       |       |        | ANT 8 |       |       |        |
|              |                     |                      |             |               |              |                | QPSK                    | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM |
| 20MHz / 5MHz | 3560.0              | 3571.7               | 1           | 99            | 1            | 0              | 17.50                   | 17.32 | 17.49 | 17.31  | 16.97 | 16.81 | 17.00 | 16.78  | 19.64 | 19.62 | 20.10 | 19.91  | 17.06 | 16.88 | 17.09 | 17.30  |
|              |                     |                      | 100         | 0             | 25           | 0              | 10.64                   | 10.69 | 10.68 | 10.64  | 10.14 | 10.14 | 10.16 | 10.19  | 12.89 | 12.90 | 12.81 | 12.81  | 10.28 | 10.26 | 10.27 | 10.27  |
|              | 3622.5              | 3634.2               | 1           | 99            | 1            | 0              | 21.00                   | 20.92 | 20.95 | 18.11  | 20.41 | 20.50 | 20.42 | 17.61  | 23.60 | 23.36 | 23.55 | 20.80  | 20.20 | 20.30 | 20.21 | 17.40  |
|              |                     |                      | 100         | 0             | 25           | 0              | 18.89                   | 18.92 | 18.93 | 17.92  | 18.43 | 18.40 | 18.45 | 17.46  | 21.61 | 21.61 | 21.62 | 20.60  | 18.20 | 18.19 | 18.21 | 17.21  |
|              | 3685.0              | 3696.7               | 1           | 99            | 1            | 0              | 16.99                   | 17.03 | 17.50 | 17.30  | 16.50 | 16.51 | 17.00 | 16.39  | 19.94 | 20.10 | 19.97 | 19.72  | 16.77 | 16.79 | 17.30 | 16.64  |
|              |                     |                      | 100         | 0             | 25           | 0              | 10.24                   | 10.19 | 10.24 | 10.13  | 9.71  | 9.68  | 9.67  | 9.81   | 12.98 | 13.00 | 12.95 | 12.98  | 9.97  | 9.94  | 9.94  | 9.97   |

### OUTPUT POWER FOR LTE BAND 48 (10.0MHz + 20.0MHz)

| Bandwidth     | PCC Frequency (MHz) | SCC1 Frequency (MHz) | PCC RB Size | PCC RB Offset | SCC1 RB Size | SCC1 RB Offset | Conducted Average (dBm) |       |       |        |       |       |       |        |       |       |       |        |       |       |       |        |
|---------------|---------------------|----------------------|-------------|---------------|--------------|----------------|-------------------------|-------|-------|--------|-------|-------|-------|--------|-------|-------|-------|--------|-------|-------|-------|--------|
|               |                     |                      |             |               |              |                | ANT 7                   |       |       |        | ANT 4 |       |       |        | ANT 9 |       |       |        | ANT 8 |       |       |        |
|               |                     |                      |             |               |              |                | QPSK                    | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM |
| 10MHz / 20MHz | 3555.5              | 3569.9               | 1           | 49            | 1            | 0              | 16.78                   | 16.72 | 17.00 | 16.74  | 16.36 | 16.40 | 16.50 | 16.28  | 19.36 | 19.33 | 19.60 | 19.10  | 16.15 | 16.20 | 16.02 | 16.18  |
|               |                     |                      | 50          | 0             | 100          | 0              | 11.89                   | 11.95 | 11.87 | 11.88  | 11.48 | 11.51 | 11.53 | 11.51  | 14.53 | 14.46 | 14.47 | 14.24  | 11.40 | 11.44 | 11.41 | 11.41  |
|               | 3615.6              | 3630.0               | 1           | 49            | 1            | 0              | 21.50                   | 21.41 | 21.14 | 18.37  | 21.00 | 20.87 | 20.30 | 17.89  | 24.03 | 24.10 | 23.70 | 20.75  | 20.50 | 20.44 | 20.28 | 17.46  |
|               |                     |                      | 50          | 0             | 100          | 0              | 18.63                   | 18.63 | 18.64 | 18.16  | 18.16 | 18.17 | 18.19 | 17.68  | 21.21 | 21.24 | 21.27 | 20.51  | 17.65 | 17.67 | 17.64 | 17.24  |
|               | 3675.6              | 3690.0               | 1           | 49            | 1            | 0              | 16.91                   | 16.93 | 16.78 | 17.00  | 16.27 | 16.21 | 16.50 | 16.31  | 19.60 | 19.60 | 19.45 | 19.44  | 16.26 | 16.40 | 16.37 | 16.24  |
|               |                     |                      | 50          | 0             | 100          | 0              | 12.16                   | 12.19 | 12.10 | 12.13  | 11.48 | 11.52 | 11.55 | 11.54  | 14.85 | 14.76 | 14.74 | 14.55  | 11.46 | 11.46 | 11.51 | 11.54  |

### OUTPUT POWER FOR LTE BAND 48 (20.0MHz + 10.0MHz)

| Bandwidth     | PCC Frequency (MHz) | SCC1 Frequency (MHz) | PCC RB Size | PCC RB Offset | SCC1 RB Size | SCC1 RB Offset | Conducted Average (dBm) |       |       |        |       |       |       |        |       |       |       |        |       |       |       |        |
|---------------|---------------------|----------------------|-------------|---------------|--------------|----------------|-------------------------|-------|-------|--------|-------|-------|-------|--------|-------|-------|-------|--------|-------|-------|-------|--------|
|               |                     |                      |             |               |              |                | ANT 7                   |       |       |        | ANT 4 |       |       |        | ANT 9 |       |       |        | ANT 8 |       |       |        |
|               |                     |                      |             |               |              |                | QPSK                    | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM |
| 20MHz / 10MHz | 3560.0              | 3574.4               | 1           | 99            | 1            | 0              | 16.96                   | 16.81 | 17.00 | 16.87  | 16.44 | 16.29 | 16.50 | 16.31  | 19.10 | 19.09 | 19.60 | 18.90  | 16.24 | 16.13 | 16.30 | 16.15  |
|               |                     |                      | 100         | 0             | 50           | 0              | 12.14                   | 12.15 | 12.10 | 12.15  | 11.63 | 11.66 | 11.65 | 11.67  | 14.34 | 14.31 | 14.27 | 14.17  | 11.43 | 11.43 | 11.45 | 11.47  |
|               | 3620.1              | 3634.5               | 1           | 99            | 1            | 0              | 21.50                   | 21.45 | 21.00 | 18.14  | 20.97 | 21.00 | 20.47 | 17.66  | 24.10 | 24.07 | 23.74 | 20.72  | 20.86 | 20.90 | 20.28 | 17.52  |
|               |                     |                      | 100         | 0             | 50           | 0              | 18.40                   | 18.41 | 18.43 | 17.91  | 17.93 | 17.88 | 17.96 | 17.43  | 21.20 | 21.17 | 21.14 | 20.47  | 17.72 | 17.73 | 17.73 | 17.28  |
|               | 3680.1              | 3694.5               | 1           | 99            | 1            | 0              | 16.46                   | 16.47 | 17.00 | 16.71  | 15.99 | 16.00 | 16.50 | 16.25  | 19.49 | 19.60 | 19.49 | 19.06  | 16.24 | 16.25 | 16.80 | 16.45  |
|               |                     |                      | 100         | 0             | 50           | 0              | 11.63                   | 11.63 | 11.55 | 11.55  | 11.15 | 11.19 | 11.21 | 11.15  | 14.46 | 14.43 | 14.45 | 14.23  | 11.36 | 11.38 | 11.37 | 11.41  |

### OUTPUT POWER FOR LTE BAND 48 (15.0MHz + 20.0MHz)

| Bandwidth     | PCC Frequency (MHz) | SCC1 Frequency (MHz) | PCC RB Size | PCC RB Offset | SCC1 RB Size | SCC1 RB Offset | Conducted Average (dBm) |       |       |        |       |       |       |        |       |       |       |        |       |       |       |        |
|---------------|---------------------|----------------------|-------------|---------------|--------------|----------------|-------------------------|-------|-------|--------|-------|-------|-------|--------|-------|-------|-------|--------|-------|-------|-------|--------|
|               |                     |                      |             |               |              |                | ANT 7                   |       |       |        | ANT 4 |       |       |        | ANT 9 |       |       |        | ANT 8 |       |       |        |
|               |                     |                      |             |               |              |                | QPSK                    | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM |
| 15MHz / 20MHz | 3557.8              | 3574.9               | 1           | 74            | 1            | 0              | 16.79                   | 16.75 | 17.00 | 16.77  | 16.28 | 16.30 | 16.50 | 16.28  | 19.37 | 19.39 | 19.60 | 19.20  | 16.24 | 16.19 | 16.10 | 16.60  |
|               |                     |                      | 75          | 0             | 100          | 0              | 11.95                   | 11.96 | 11.91 | 11.92  | 11.46 | 11.48 | 11.52 | 11.55  | 14.57 | 14.56 | 14.56 | 14.29  | 11.41 | 11.48 | 11.46 | 11.52  |
|               | 3615.3              | 3632.4               | 1           | 74            | 1            | 0              | 22.00                   | 21.86 | 20.86 | 18.21  | 21.38 | 21.50 | 20.38 | 17.41  | 24.50 | 24.60 | 23.51 | 20.70  | 21.05 | 21.10 | 20.40 | 17.29  |
|               |                     |                      | 75          | 0             | 100          | 0              | 18.45                   | 18.46 | 18.51 | 17.97  | 17.97 | 18.01 | 18.01 | 17.48  | 21.10 | 21.10 | 21.11 | 20.41  | 17.71 | 17.70 | 17.70 | 17.25  |
|               | 3672.9              | 3690.0               | 1           | 74            | 1            | 0              | 16.85                   | 16.80 | 16.74 | 17.00  | 16.50 | 16.48 | 16.34 | 16.44  | 19.60 | 19.55 | 19.46 | 19.48  | 16.24 | 16.50 | 16.23 | 16.17  |
|               |                     |                      | 75          | 0             | 100          | 0              | 12.09                   | 12.12 | 12.03 | 12.04  | 11.69 | 11.73 | 11.77 | 11.67  | 14.81 | 14.74 | 14.74 | 14.51  | 11.42 | 11.45 | 11.47 | 11.46  |

### OUTPUT POWER FOR LTE BAND 48 (20.0MHz + 15.0MHz)

| Bandwidth        | PCC<br>Frequency<br>(MHz) | SCC1<br>Frequency<br>(MHz) | PCC<br>RB<br>Size | PCC<br>RB<br>Offset | SCC1<br>RB<br>Size | SCC1<br>RB<br>Offset | Conducted Average (dBm) |       |       |        |       |       |       |        |       |       |       |        |       |       |       |        |
|------------------|---------------------------|----------------------------|-------------------|---------------------|--------------------|----------------------|-------------------------|-------|-------|--------|-------|-------|-------|--------|-------|-------|-------|--------|-------|-------|-------|--------|
|                  |                           |                            |                   |                     |                    |                      | ANT 7                   |       |       |        | ANT 4 |       |       |        | ANT 9 |       |       |        | ANT 8 |       |       |        |
|                  |                           |                            |                   |                     |                    |                      | QPSK                    | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM |
| 20MHz /<br>15MHz | 3560.0                    | 3577.1                     | 1                 | 99                  | 1                  | 0                    | 16.90                   | 16.80 | 17.00 | 16.85  | 16.26 | 16.14 | 16.37 | 16.50  | 19.51 | 19.41 | 19.60 | 19.34  | 16.26 | 16.15 | 16.36 | 16.21  |
|                  |                           |                            | 100               | 0                   | 75                 | 0                    | 12.07                   | 12.09 | 12.09 | 12.12  | 11.47 | 11.48 | 11.48 | 11.52  | 14.77 | 14.67 | 14.69 | 14.57  | 11.43 | 11.45 | 11.44 | 11.52  |
|                  | 3617.6                    | 3634.7                     | 1                 | 99                  | 1                  | 0                    | 22.00                   | 21.98 | 20.97 | 18.18  | 21.47 | 21.50 | 20.48 | 17.63  | 24.58 | 24.60 | 23.59 | 20.65  | 21.38 | 21.40 | 20.35 | 17.54  |
|                  |                           |                            | 100               | 0                   | 75                 | 0                    | 18.39                   | 18.38 | 18.43 | 17.92  | 17.92 | 17.91 | 18.00 | 17.42  | 21.04 | 21.04 | 21.06 | 20.41  | 17.76 | 17.78 | 17.79 | 17.32  |
|                  | 3675.1                    | 3692.2                     | 1                 | 99                  | 1                  | 0                    | 16.45                   | 16.46 | 17.00 | 16.67  | 16.01 | 16.01 | 16.50 | 15.96  | 19.08 | 19.10 | 19.60 | 19.24  | 16.26 | 16.28 | 16.80 | 16.47  |
|                  |                           |                            | 100               | 0                   | 75                 | 0                    | 11.64                   | 11.63 | 11.56 | 11.58  | 11.13 | 11.17 | 11.16 | 11.22  | 14.25 | 14.17 | 14.18 | 14.05  | 11.44 | 11.44 | 11.45 | 11.48  |

**OUTPUT POWER FOR LTE BAND 48 (20.0MHz + 20.0MHz)**

| Bandwidth     | PCC Frequency (MHz) | SCC1 Frequency (MHz) | PCC RB Size | PCC RB Offset | SCC1 RB Size | SCC1 RB Offset | Conducted Average (dBm) |       |       |        |       |       |       |        |       |       |       |        |       |       |       |        |
|---------------|---------------------|----------------------|-------------|---------------|--------------|----------------|-------------------------|-------|-------|--------|-------|-------|-------|--------|-------|-------|-------|--------|-------|-------|-------|--------|
|               |                     |                      |             |               |              |                | ANT 7                   |       |       |        | ANT 4 |       |       |        | ANT 9 |       |       |        | ANT 8 |       |       |        |
|               |                     |                      |             |               |              |                | QPSK                    | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM | QPSK  | 16QAM | 64QAM | 256QAM |
| 20MHz / 20MHz | 3560.0              | 3579.8               | 1           | 99            | 1            | 0              | 18.42                   | 18.29 | 18.50 | 17.81  | 17.95 | 17.85 | 18.00 | 17.37  | 20.53 | 20.53 | 21.00 | 19.86  | 17.76 | 17.61 | 17.80 | 17.19  |
|               |                     |                      | 1           | 0             | 1            | 99             | 4.84                    | 4.78  | 4.97  | 4.79   | 4.22  | 4.21  | 4.37  | 4.20   | 7.01  | 6.96  | 7.43  | 6.83   | 4.01  | 3.95  | 4.35  | 4.30   |
|               |                     |                      | 100         | 0             | 100          | 0              | 12.06                   | 12.06 | 12.08 | 12.07  | 11.57 | 11.59 | 11.65 | 11.61  | 14.28 | 14.23 | 14.22 | 14.07  | 11.33 | 11.32 | 11.34 | 11.38  |
|               | 3615.1              | 3634.9               | 1           | 99            | 1            | 0              | 22.00                   | 21.95 | 20.96 | 18.11  | 21.47 | 21.50 | 20.47 | 17.63  | 24.50 | 24.43 | 23.61 | 20.63  | 21.10 | 20.95 | 20.16 | 17.37  |
|               |                     |                      | 1           | 0             | 1            | 99             | 11.33                   | 11.45 | 11.31 | 11.50  | 10.79 | 10.91 | 10.83 | 11.01  | 14.00 | 14.00 | 14.09 | 13.99  | 10.64 | 10.57 | 10.74 | 10.74  |
|               |                     |                      | 100         | 0             | 100          | 0              | 18.42                   | 18.45 | 18.45 | 17.93  | 17.97 | 18.00 | 18.02 | 17.49  | 21.15 | 21.09 | 21.10 | 20.43  | 17.71 | 17.71 | 17.70 | 17.24  |
|               | 3670.2              | 3690.0               | 1           | 99            | 1            | 0              | 17.98                   | 17.92 | 18.50 | 17.80  | 17.47 | 17.46 | 18.00 | 17.31  | 20.98 | 21.00 | 20.92 | 20.31  | 18.02 | 18.10 | 17.93 | 17.21  |
|               |                     |                      | 1           | 0             | 1            | 99             | 4.31                    | 4.27  | 4.73  | 4.46   | 3.81  | 3.79  | 4.24  | 3.96   | 7.18  | 7.22  | 7.18  | 7.04   | 4.26  | 4.32  | 4.24  | 4.17   |
|               |                     |                      | 100         | 0             | 100          | 0              | 11.65                   | 11.67 | 11.55 | 11.55  | 11.14 | 11.17 | 11.20 | 11.21  | 14.38 | 14.31 | 14.33 | 14.16  | 11.44 | 11.45 | 11.53 | 11.50  |

## 8. CONDUCTED TEST RESULTS

### 8.1. OCCUPIED BANDWIDTH

#### RULE PART(S)

FCC: §2.1049

#### LIMITS

For reporting purposes only

#### TEST PROCEDURE

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer. The occupied bandwidth was measured with the spectrum analyzer at the middle channel in each band. The 99% and -26dB bandwidths was also measured and recorded.

#### RESULTS

There is no limit required and power is the same for low, middle and high channel; therefore, only middle channel was tested. Only QPSK plots are reported to show setting parameter complies with testing method/procedure.

### LTE BAND 5

| Band       | Mode                     | RB Allocation/RB Offset | f (MHz) | 99% BW (MHz) | - 26dB BW (MHz) |
|------------|--------------------------|-------------------------|---------|--------------|-----------------|
| LTE BAND 5 | 5MHz + 10MHz BAND QPSK   | 25/0 + 50/0             | 836.5   | 13.8356      | 14.481          |
|            | 5MHz + 10MHz BAND 16QAM  |                         |         | 13.7847      | 14.434          |
|            | 5MHz + 10MHz BAND 64QAM  |                         |         | 13.8993      | 14.384          |
|            | 10MHz + 5MHz BAND QPSK   | 50/0 + 25/0             |         | 13.8538      | 14.502          |
|            | 10MHz + 5MHz BAND 16QAM  |                         |         | 13.8733      | 14.462          |
|            | 10MHz + 5MHz BAND 64QAM  |                         |         | 13.8698      | 14.431          |
|            | 10MHz + 10MHz BAND QPSK  | 50/0 + 50/0             |         | 18.7947      | 19.755          |
|            | 10MHz + 10MHz BAND 16QAM |                         |         | 18.7645      | 19.785          |
|            | 10MHz + 10MHz BAND 64QAM |                         |         | 18.6787      | 19.866          |

### LTE BAND 7

| Band       | Mode                     | RB Allocation/RB Offset | f (MHz) | 99% BW (MHz) | - 26dB BW (MHz) |
|------------|--------------------------|-------------------------|---------|--------------|-----------------|
| LTE BAND 7 | 10MHz + 20MHz BAND QPSK  | 50/0 + 100/0            | 2535    | 28.0138      | 30.178          |
|            | 10MHz + 20MHz BAND 16QAM |                         |         | 27.9742      | 30.055          |
|            | 10MHz + 20MHz BAND 64QAM |                         |         | 27.9747      | 30.066          |
|            | 20MHz + 10MHz BAND QPSK  | 100/0 + 50/0            |         | 28.0307      | 30.340          |
|            | 20MHz + 10MHz BAND 16QAM |                         |         | 27.9328      | 30.027          |
|            | 20MHz + 10MHz BAND 64QAM |                         |         | 27.9865      | 29.958          |
|            | 15MHz + 15MHz BAND QPSK  | 75/0 + 75/0             |         | 28.5590      | 30.777          |
|            | 15MHz + 15MHz BAND 16QAM |                         |         | 28.5273      | 30.729          |
|            | 15MHz + 15MHz BAND 64QAM |                         |         | 28.5803      | 30.694          |
|            | 15MHz + 20MHz BAND QPSK  | 75/0 + 100/0            |         | 32.7298      | 34.972          |
|            | 15MHz + 20MHz BAND 16QAM |                         |         | 32.7529      | 35.072          |
|            | 15MHz + 20MHz BAND 64QAM |                         |         | 32.7891      | 35.069          |
|            | 20MHz + 15MHz BAND QPSK  | 100/0 + 75/0            |         | 32.7680      | 34.975          |
|            | 20MHz + 15MHz BAND 16QAM |                         |         | 32.7514      | 35.086          |
|            | 20MHz + 15MHz BAND 64QAM |                         |         | 32.7702      | 35.094          |
|            | 20MHz + 20MHz BAND QPSK  | 100/0 + 100/0           |         | 37.6296      | 39.903          |
|            | 20MHz + 20MHz BAND 16QAM |                         |         | 37.6349      | 40.098          |
|            | 20MHz + 20MHz BAND 64QAM |                         |         | 37.5818      | 40.071          |

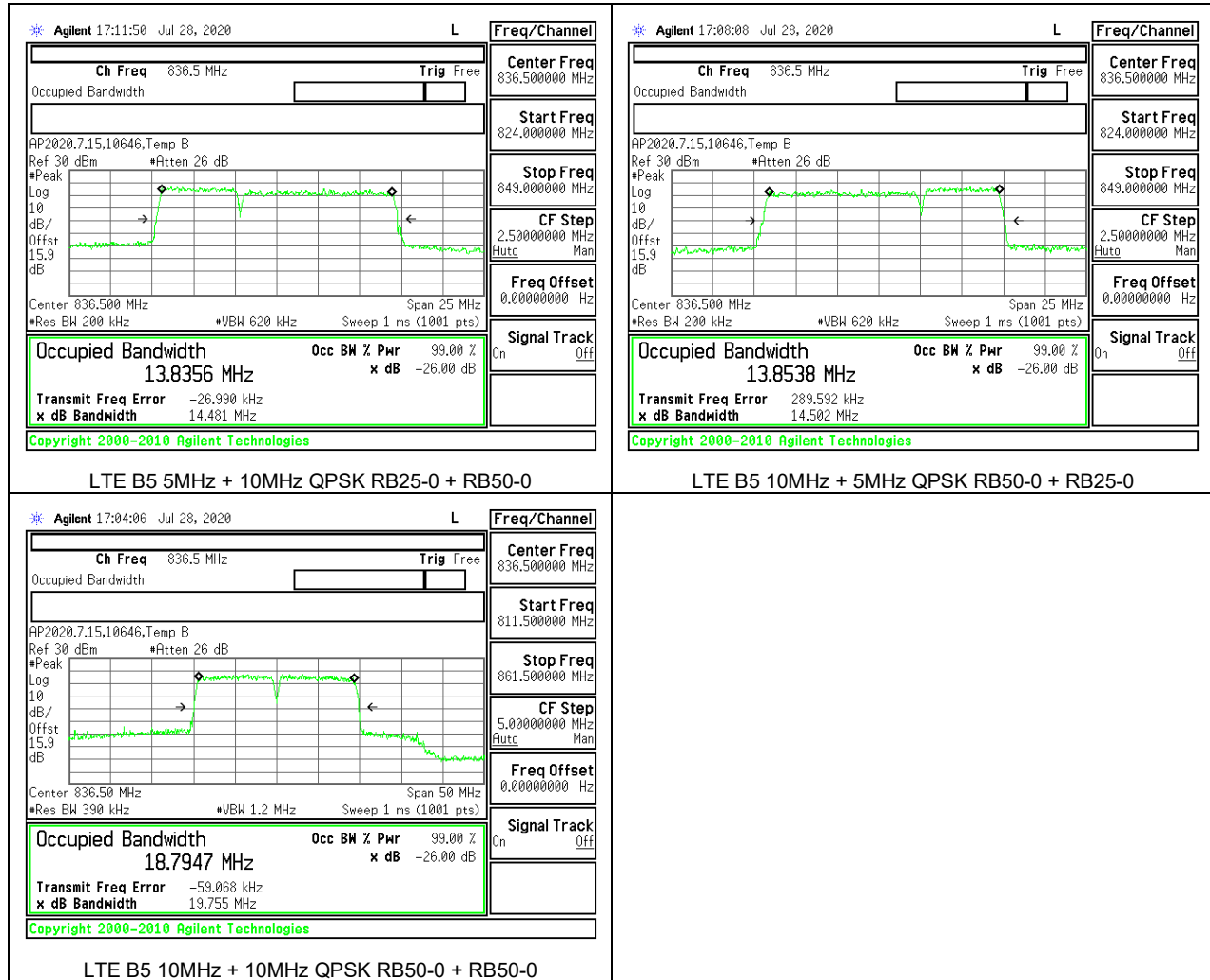
**LTE BAND 41**

| Band              | Mode                     | RB Allocation/RB Offset | f (MHz) | 99% BW (MHz) | - 26dB BW (MHz) |
|-------------------|--------------------------|-------------------------|---------|--------------|-----------------|
| LTE BAND 41 (FCC) | 5MHz + 20MHz BAND QPSK   | 25/0 + 100/0            | 2593    | 22.8166      | 23.831          |
|                   | 5MHz + 20MHz BAND 16QAM  |                         |         | 22.8261      | 23.952          |
|                   | 5MHz + 20MHz BAND 64QAM  |                         |         | 22.7966      | 23.762          |
|                   | 20MHz + 5MHz BAND QPSK   | 100/0 + 25/0            |         | 22.8178      | 23.819          |
|                   | 20MHz + 5MHz BAND 16QAM  |                         |         | 22.8257      | 23.717          |
|                   | 20MHz + 5MHz BAND 64QAM  |                         |         | 22.8160      | 23.852          |
|                   | 10MHz + 20MHz BAND QPSK  | 50/0 + 100/0            |         | 27.6968      | 28.898          |
|                   | 10MHz + 20MHz BAND 16QAM |                         |         | 27.6960      | 28.961          |
|                   | 10MHz + 20MHz BAND 64QAM |                         |         | 27.6583      | 28.689          |
|                   | 20MHz + 10MHz BAND QPSK  | 100/0 + 50/0            |         | 27.6072      | 28.929          |
|                   | 20MHz + 10MHz BAND 16QAM |                         |         | 27.6512      | 28.871          |
|                   | 20MHz + 10MHz BAND 64QAM |                         |         | 27.7284      | 28.794          |
|                   | 15MHz + 15MHz BAND QPSK  | 75/0 + 75/0             |         | 28.2381      | 29.678          |
|                   | 15MHz + 15MHz BAND 16QAM |                         |         | 28.2409      | 29.592          |
|                   | 15MHz + 15MHz BAND 64QAM |                         |         | 28.2577      | 29.520          |
|                   | 15MHz + 20MHz BAND QPSK  | 75/0 + 100/0            |         | 32.5316      | 33.687          |
|                   | 15MHz + 20MHz BAND 16QAM |                         |         | 32.5551      | 33.667          |
|                   | 15MHz + 20MHz BAND 64QAM |                         |         | 32.5476      | 33.740          |
|                   | 20MHz + 15MHz BAND QPSK  | 100/0 + 75/0            |         | 32.5751      | 33.768          |
|                   | 20MHz + 15MHz BAND 16QAM |                         |         | 32.5425      | 34.120          |
|                   | 20MHz + 15MHz BAND 64QAM |                         |         | 32.7010      | 33.808          |
|                   | 20MHz + 20MHz BAND QPSK  | 100/0 + 100/0           |         | 37.3774      | 38.989          |
|                   | 20MHz + 20MHz BAND 16QAM |                         |         | 37.3473      | 38.935          |
|                   | 20MHz + 20MHz BAND 64QAM |                         |         | 37.3672      | 38.997          |

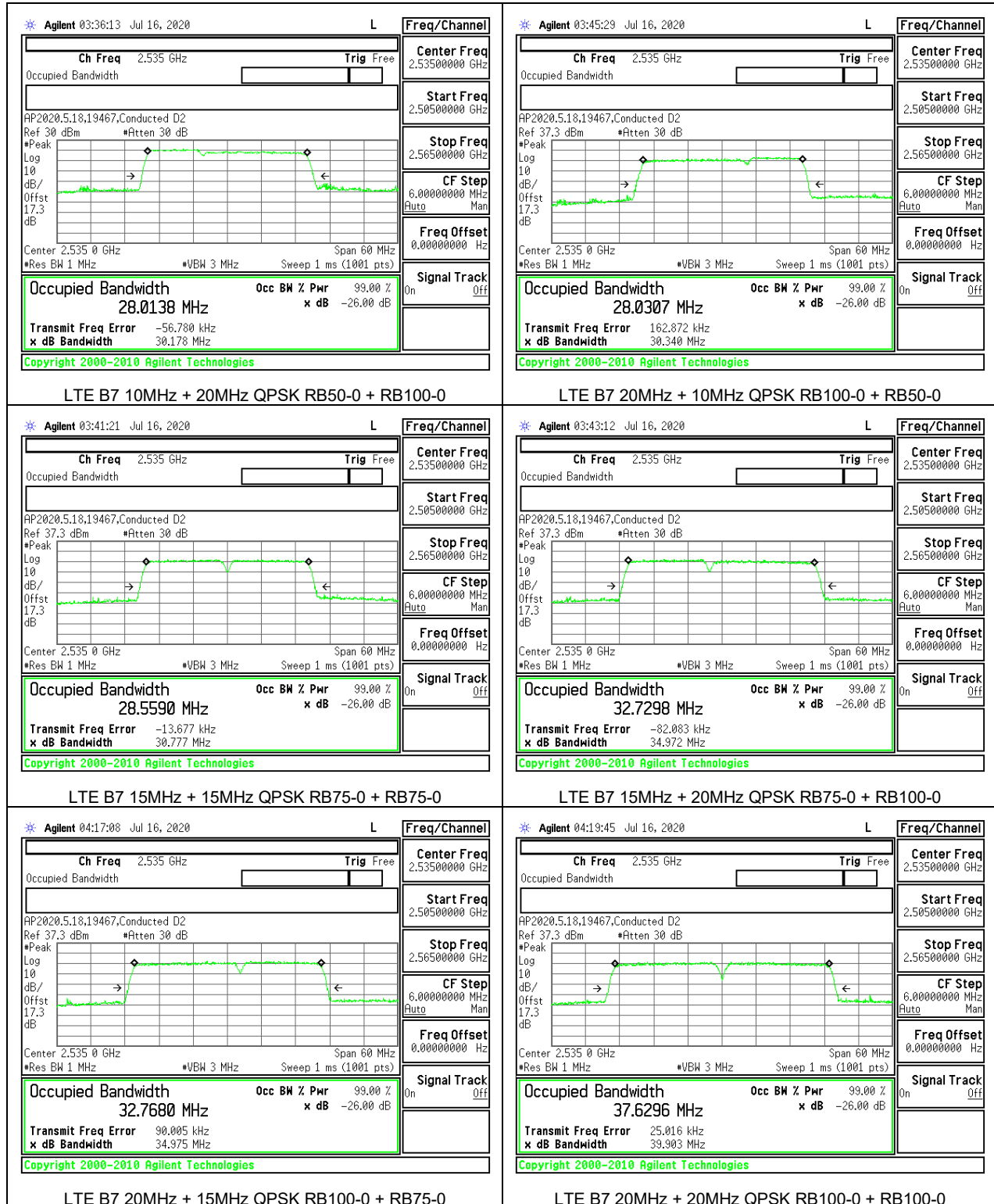
**LTE BAND 48**

| Band              | Mode                     | RB Allocation/RB Offset | f (MHz) | 99% BW (MHz) | - 26dB BW (MHz) |
|-------------------|--------------------------|-------------------------|---------|--------------|-----------------|
| LTE BAND 48 (FCC) | 5MHz + 20MHz BAND QPSK   | 25/0 + 100/0            | 3625    | 23.2427      | 24.894          |
|                   | 5MHz + 20MHz BAND 16QAM  |                         |         | 23.2917      | 25.048          |
|                   | 5MHz + 20MHz BAND 64QAM  |                         |         | 23.3005      | 25.205          |
|                   | 20MHz + 5MHz BAND QPSK   | 100/0 + 25/0            |         | 23.2645      | 24.917          |
|                   | 20MHz + 5MHz BAND 16QAM  |                         |         | 23.2624      | 24.922          |
|                   | 20MHz + 5MHz BAND 64QAM  |                         |         | 23.2973      | 24.992          |
|                   | 10MHz + 20MHz BAND QPSK  | 50/0 + 100/0            |         | 27.9925      | 29.840          |
|                   | 10MHz + 20MHz BAND 16QAM |                         |         | 27.9205      | 30.019          |
|                   | 10MHz + 20MHz BAND 64QAM |                         |         | 28.0390      | 29.906          |
|                   | 20MHz + 10MHz BAND QPSK  | 100/0 + 50/0            |         | 28.0749      | 30.196          |
|                   | 20MHz + 10MHz BAND 16QAM |                         |         | 28.0267      | 30.007          |
|                   | 20MHz + 10MHz BAND 64QAM |                         |         | 28.0150      | 29.856          |
|                   | 15MHz + 20MHz BAND QPSK  | 75/0 + 100/0            |         | 32.8078      | 34.992          |
|                   | 15MHz + 20MHz BAND 16QAM |                         |         | 32.8527      | 35.115          |
|                   | 15MHz + 20MHz BAND 64QAM |                         |         | 32.8298      | 34.987          |
|                   | 20MHz + 15MHz BAND QPSK  | 100/0 + 75/0            |         | 32.7145      | 34.890          |
|                   | 20MHz + 15MHz BAND 16QAM |                         |         | 32.7090      | 34.953          |
|                   | 20MHz + 15MHz BAND 64QAM |                         |         | 32.8139      | 34.843          |
|                   | 20MHz + 20MHz BAND QPSK  | 100/0 + 100/0           |         | 37.6861      | 40.006          |
|                   | 20MHz + 20MHz BAND 16QAM |                         |         | 37.6479      | 39.903          |
|                   | 20MHz + 20MHz BAND 64QAM |                         |         | 37.6903      | 39.904          |

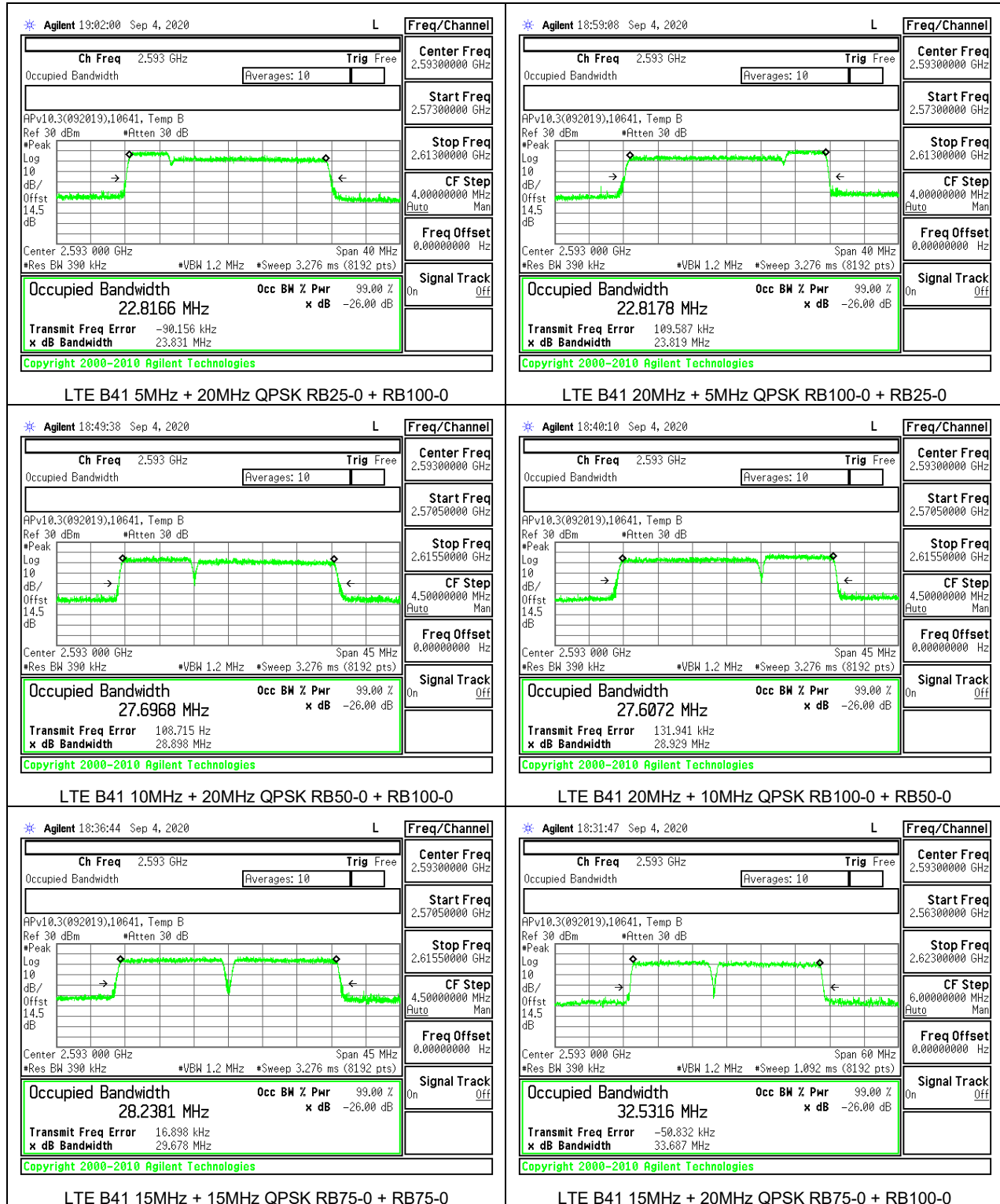
## 8.1.1. LTE BAND 5

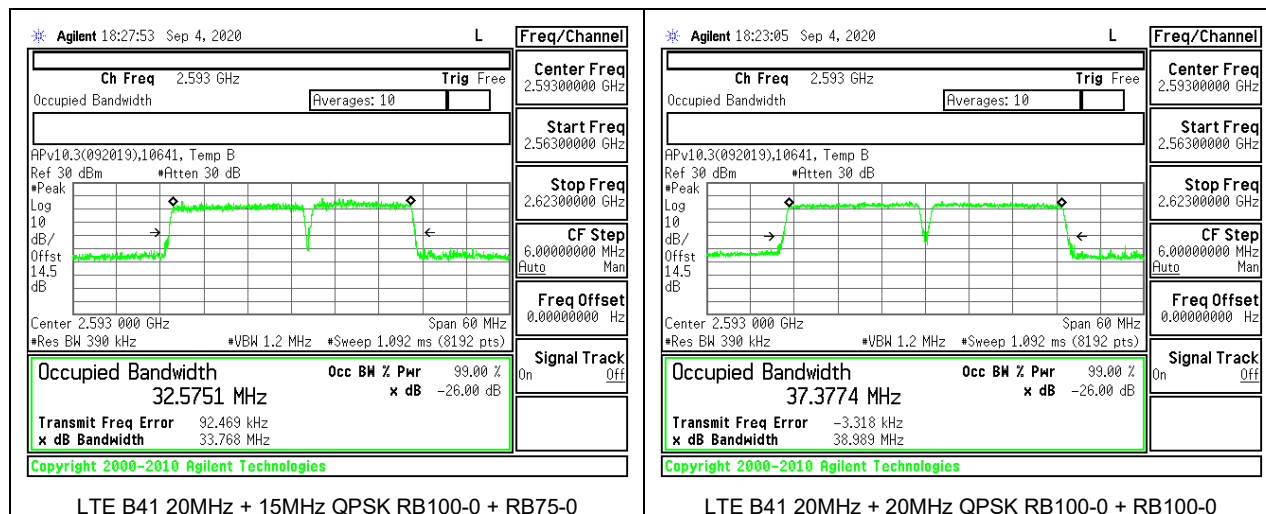


## 8.1.2. LTE BAND 7

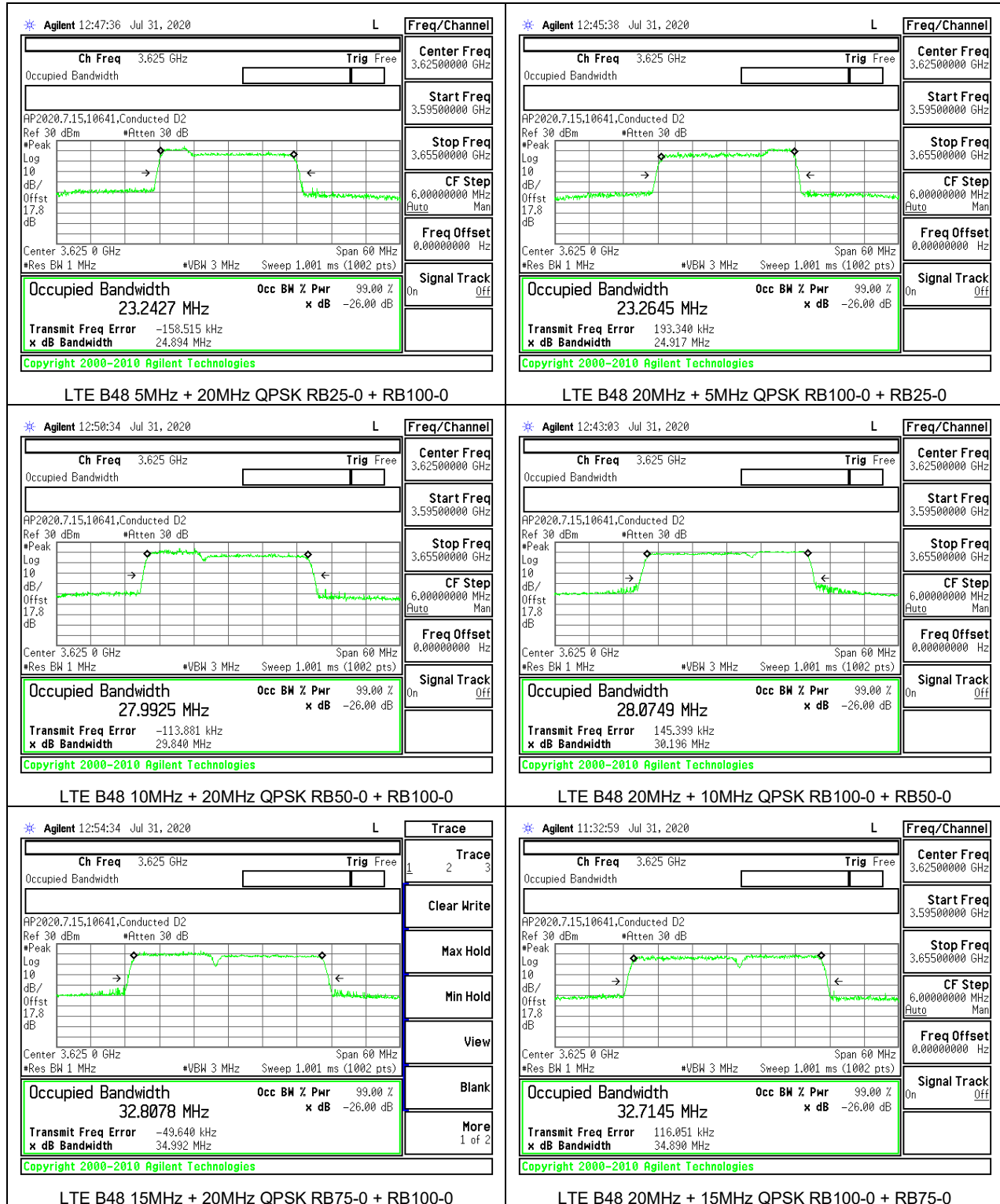


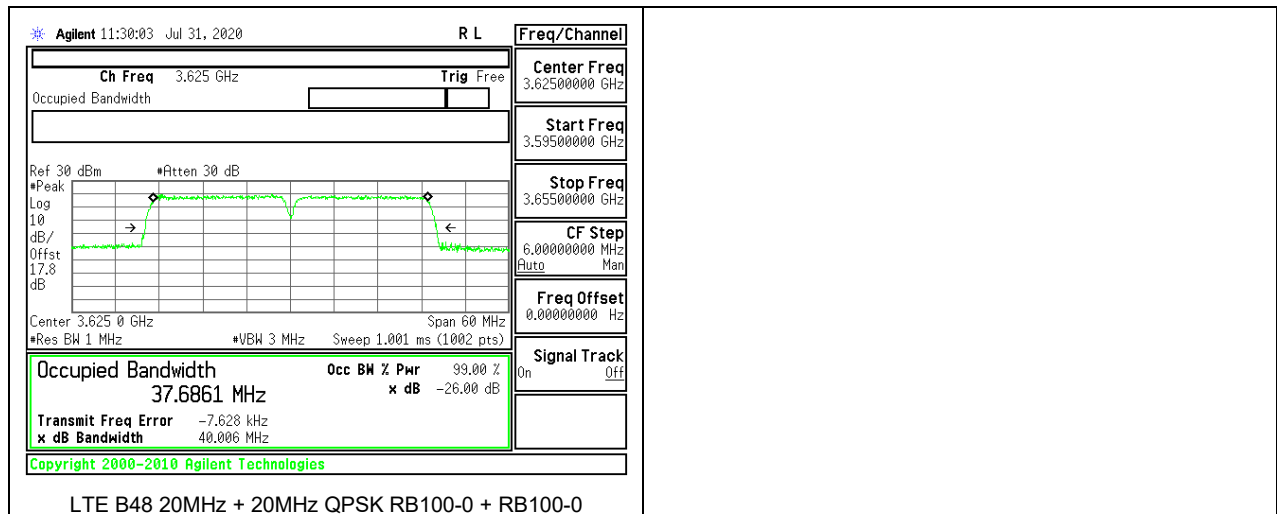
### 8.1.3. LTE BAND 41





## 8.1.4. LTE BAND 48





## 8.2. BAND EDGE AND EMISSION MASK

### TEST PROCEDURE

The transmitter output was connected to a R&S CMW500 Test Set and configured to operate at maximum power. The band edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer.

For each band edge measurement:

- Set the spectrum analyzer span to include the block edge frequency.
- Set a marker to point the corresponding band edge frequency in each test case.
- Set display line at -13 dBm
- Set resolution bandwidth to at least 1% of emission bandwidth.

### TEST PROCEDURE FOR FCC PART 27

(m)(6) Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed; for mobile digital stations, in the 1 megahertz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least two percent may be employed, except when the 1 megahertz band is 2495-2496 MHz, in which case a resolution bandwidth of at least one percent may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 megahertz or 1 percent of emission bandwidth, as specified; or 1 megahertz or 2 percent for mobile digital stations, except in the band 2495-2496 MHz). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power. With respect to television operations, measurements must be made of the separate visual and aural operating powers at sufficiently frequent intervals to ensure compliance with the rules.

### TEST PROCEDURE FOR FCC PART 96

(3) Measurement procedure.

(i) Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's authorized frequency channel, a resolution bandwidth of no less than one percent of the fundamental emission bandwidth may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full reference bandwidth (i.e., 1 MHz or 1 percent of emission bandwidth, as specified). The fundamental emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

(ii) When measuring unwanted emissions to demonstrate compliance with the limits, the CBSD and End User Device nominal carrier frequency/channel shall be adjusted as close to the licensee's authorized frequency block edges, both upper and lower, as the design permits.

(iii) Compliance with emission limits shall be demonstrated using either average (RMS)-detected or peak-detected power measurement techniques.

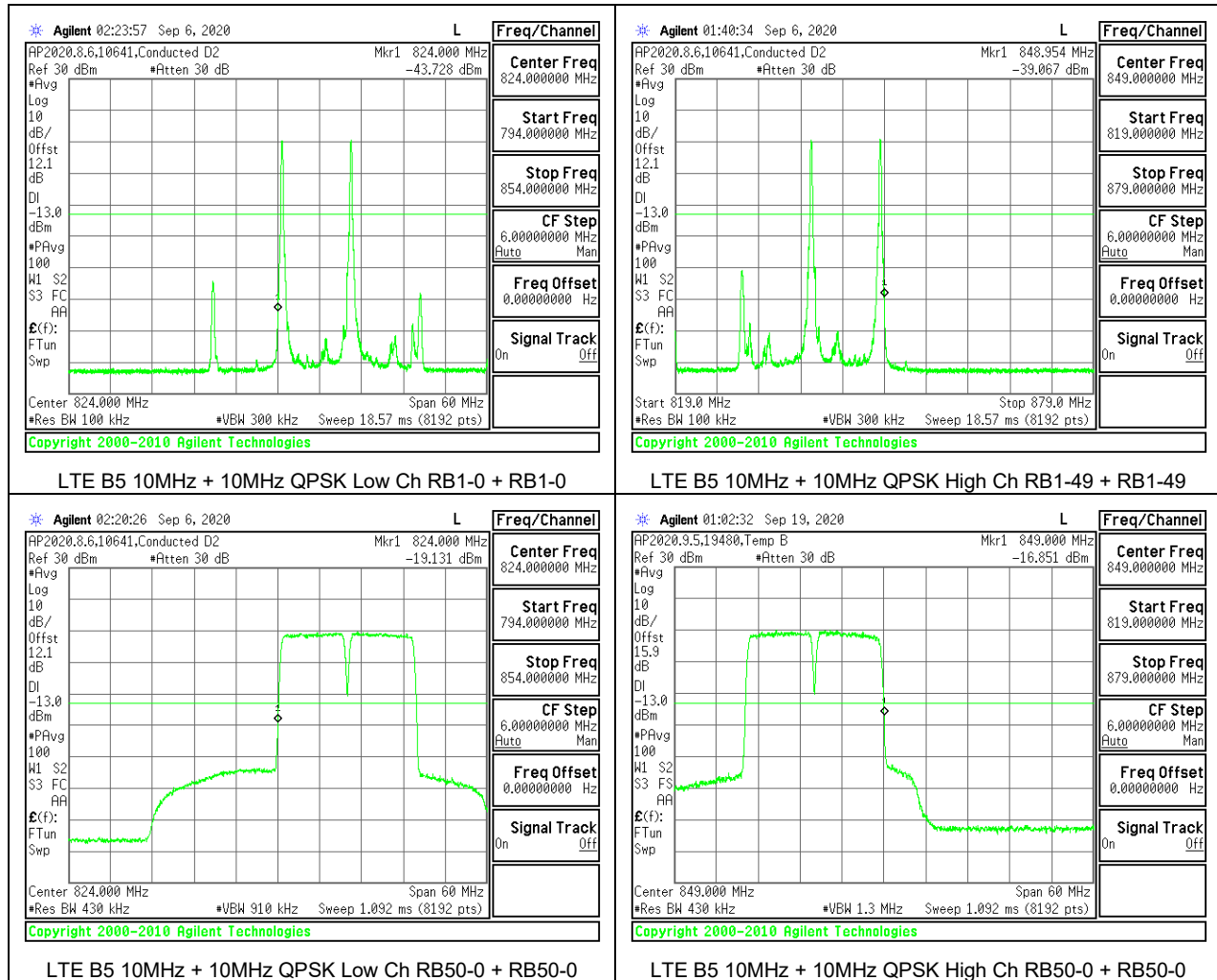
### RESULTS

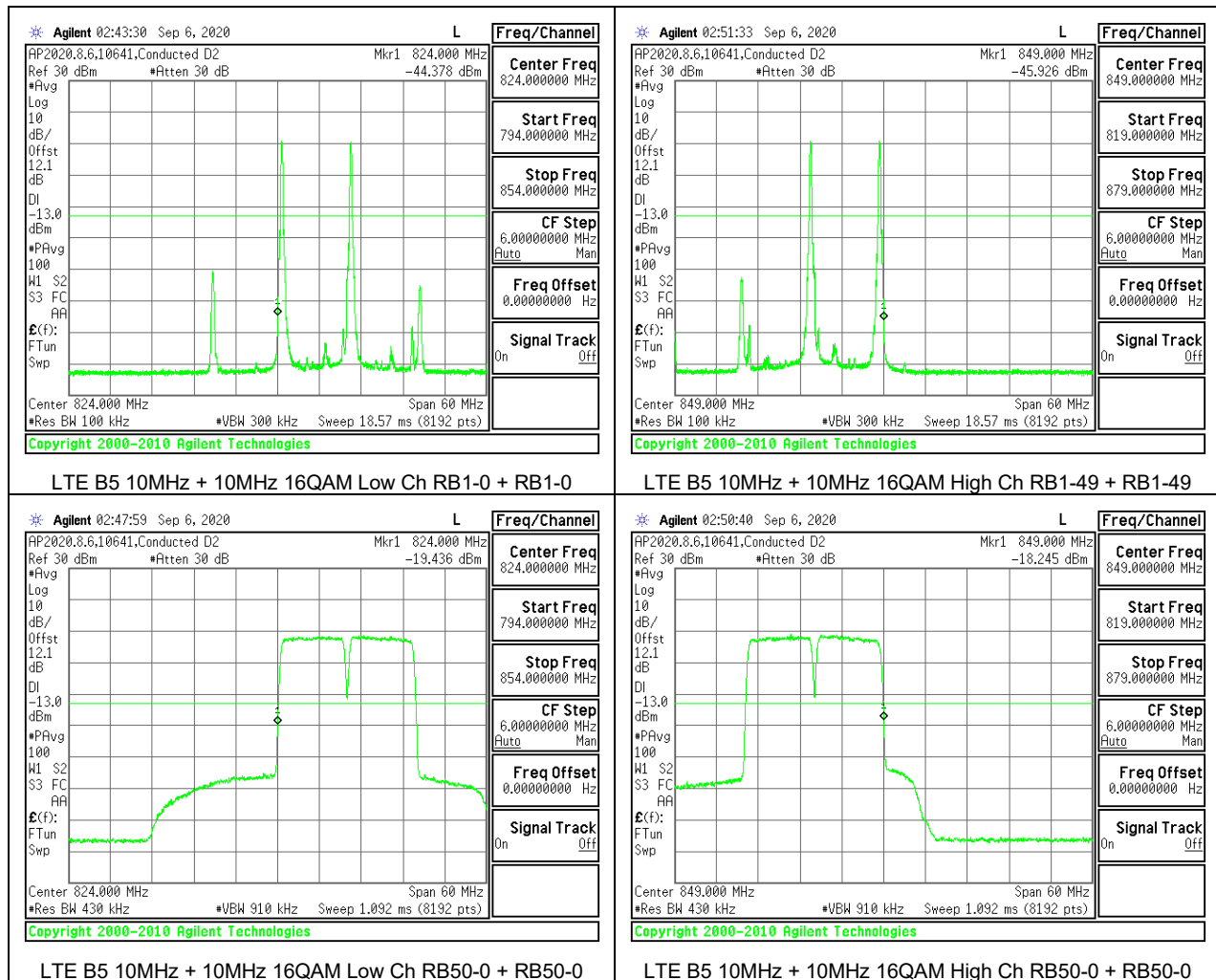
## 8.2.1. LTE BAND 5

### LIMITS

FCC: §22.917

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log (P)$  dB.

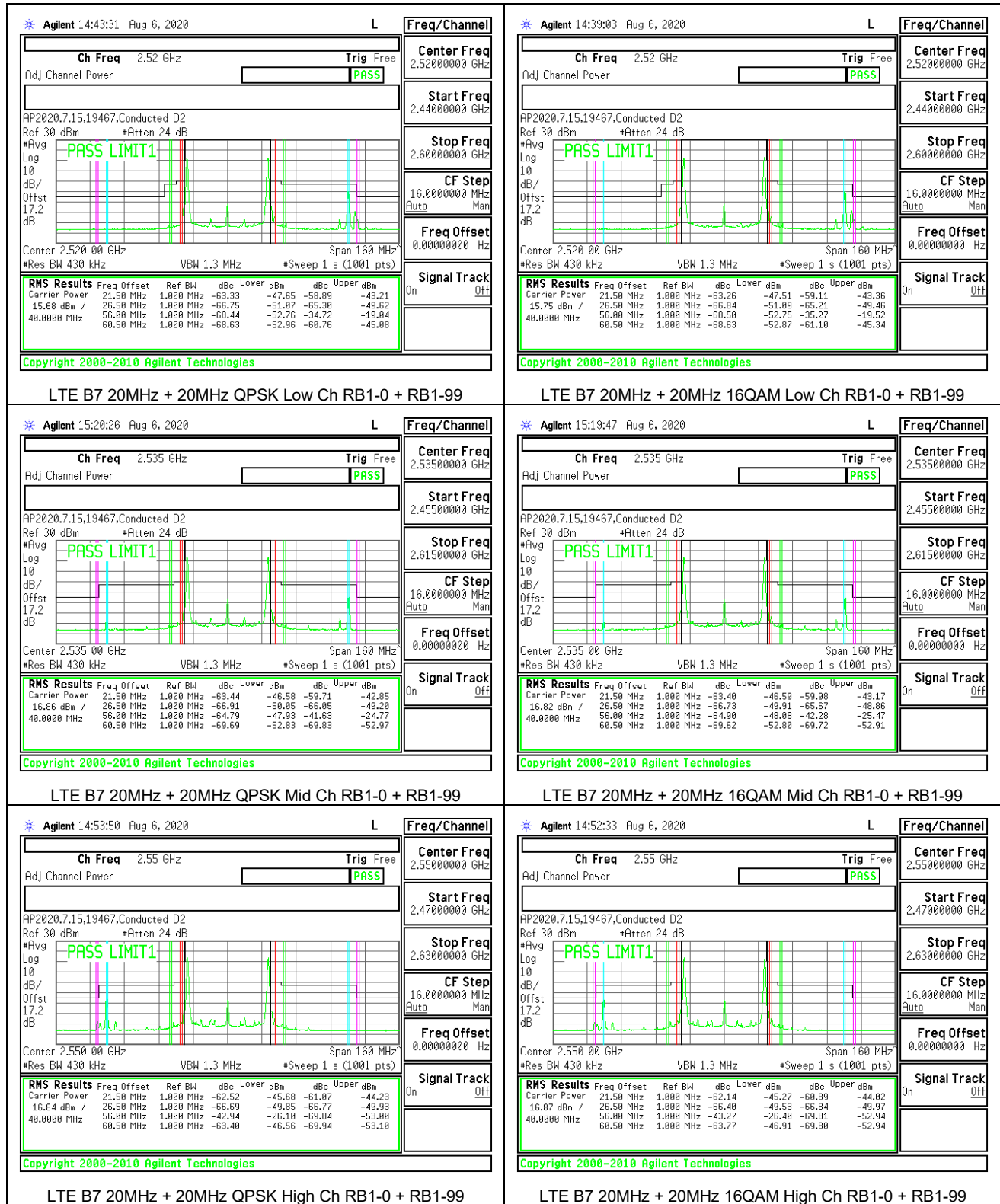


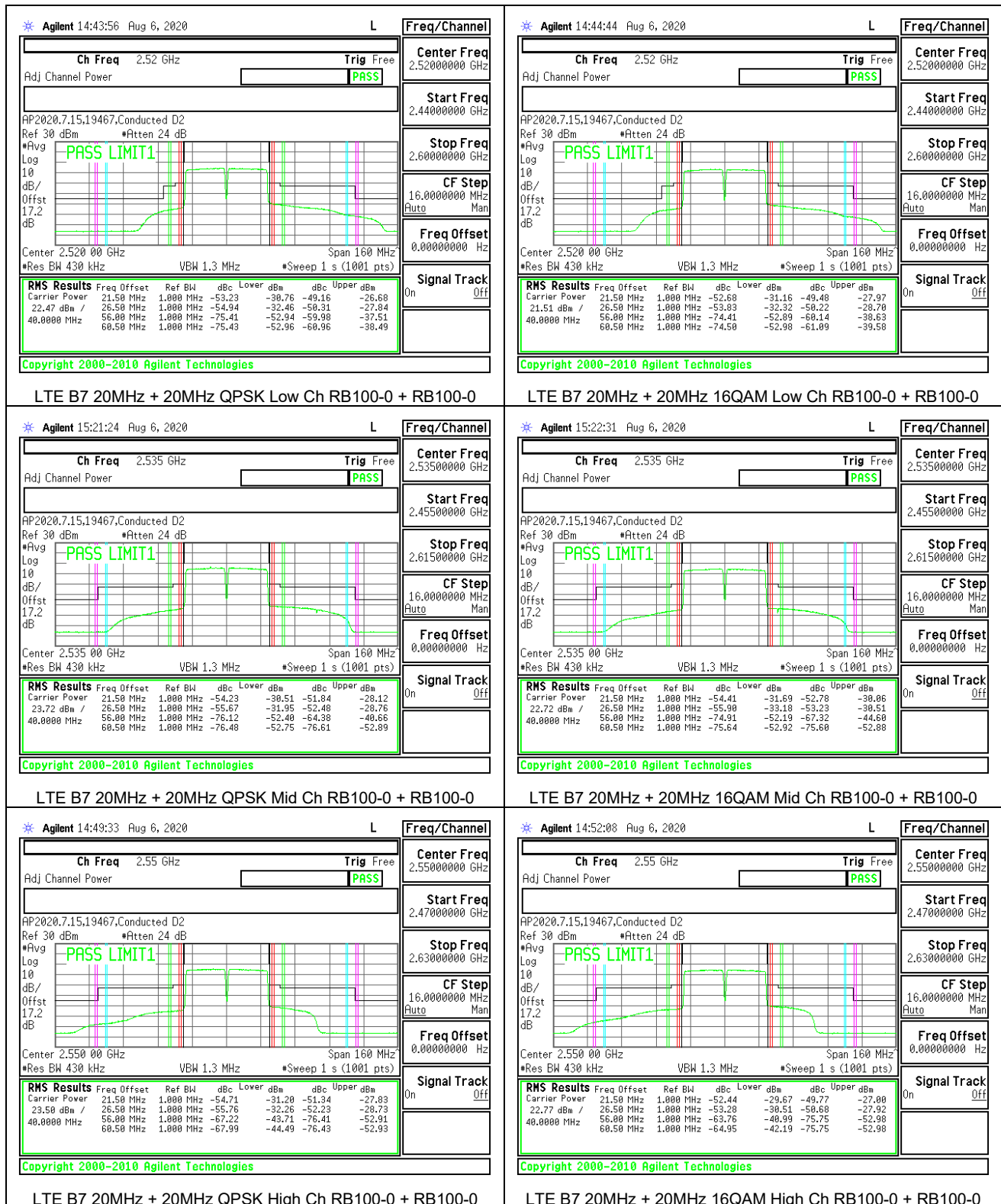


## 8.2.2. LTE BAND 7

### LIMITS

FCC: §27.53(m)(4) For mobile digital stations, the attenuation factor shall be not less than  $40 + 10 \log (P)$  dB on all frequencies between the channel edge and 5 megahertz from the channel edge,  $43 + 10 \log (P)$  dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and  $55 + 10 \log (P)$  dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than  $43 + 10 \log (P)$  dB on all frequencies between 2490.5 MHz and 2496 MHz and  $55 + 10 \log (P)$  dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

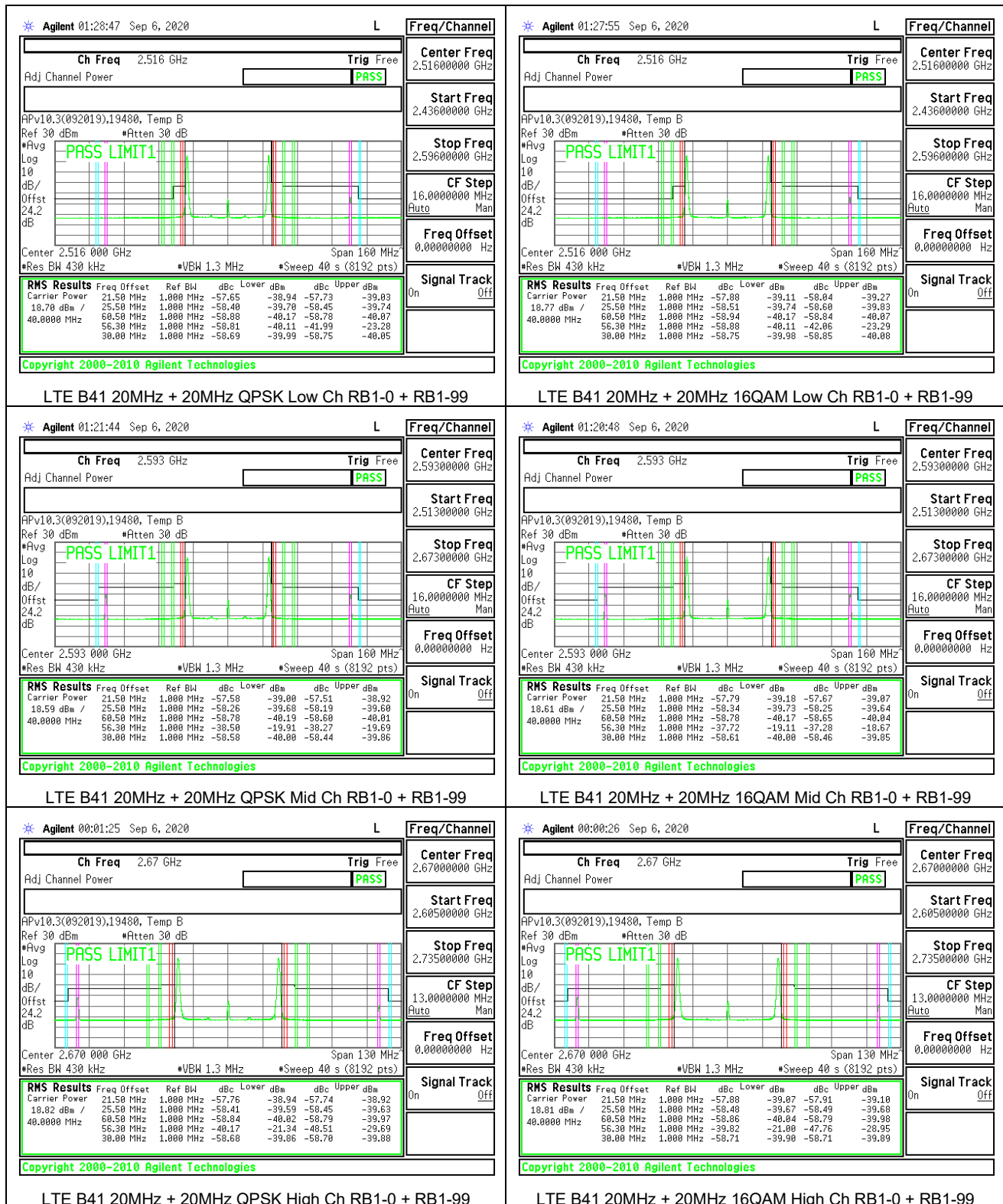


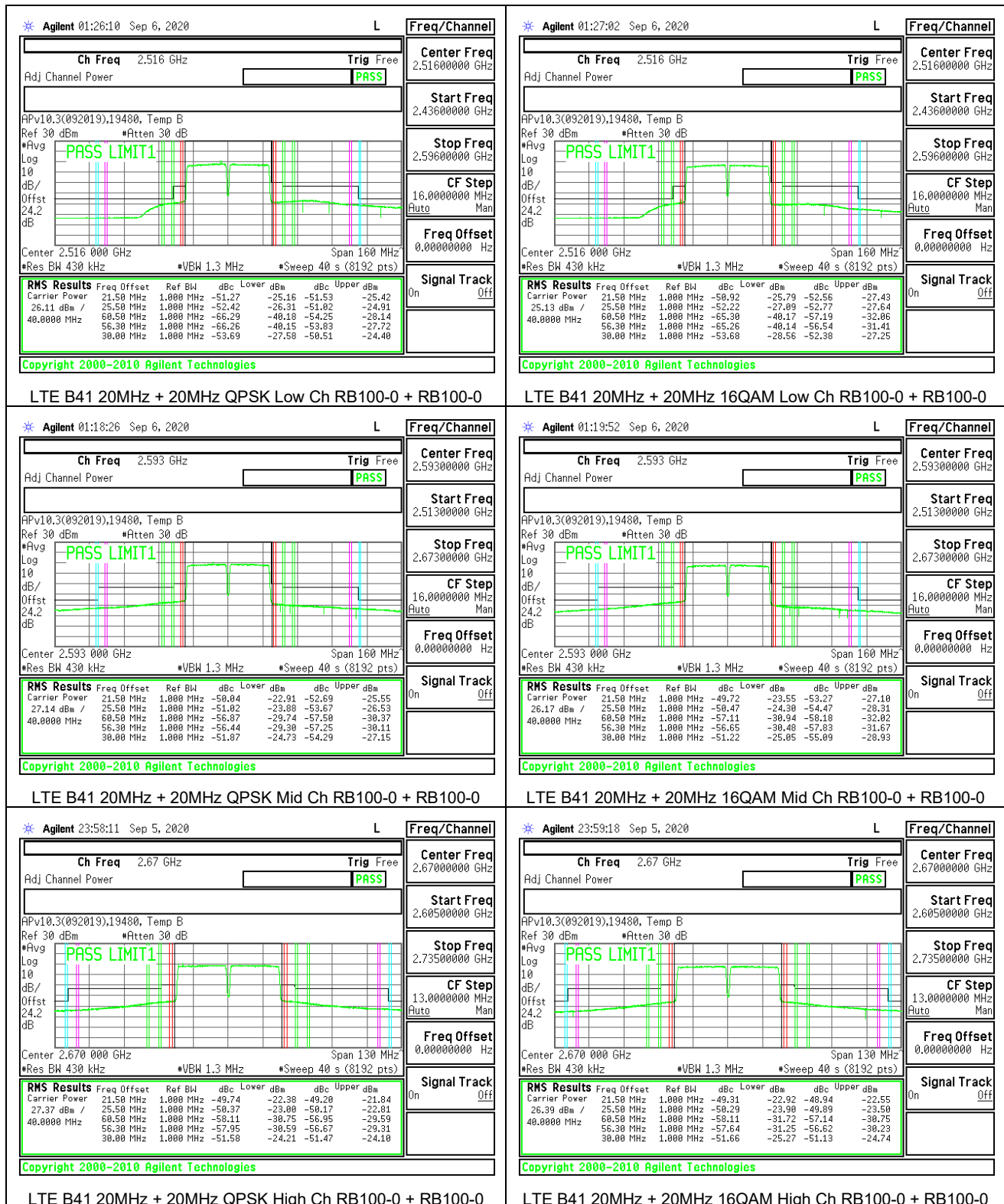


### 8.2.3. LTE BAND 41

#### LIMITS

FCC: §27.53(m)(4) For mobile digital stations, the attenuation factor shall be not less than  $40 + 10 \log (P)$  dB on all frequencies between the channel edge and 5 megahertz from the channel edge,  $43 + 10 \log (P)$  dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and  $55 + 10 \log (P)$  dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than  $43 + 10 \log (P)$  dB on all frequencies between 2490.5 MHz and 2496 MHz and  $55 + 10 \log (P)$  dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.





## 8.2.4. LTE BAND 48

### LIMITS

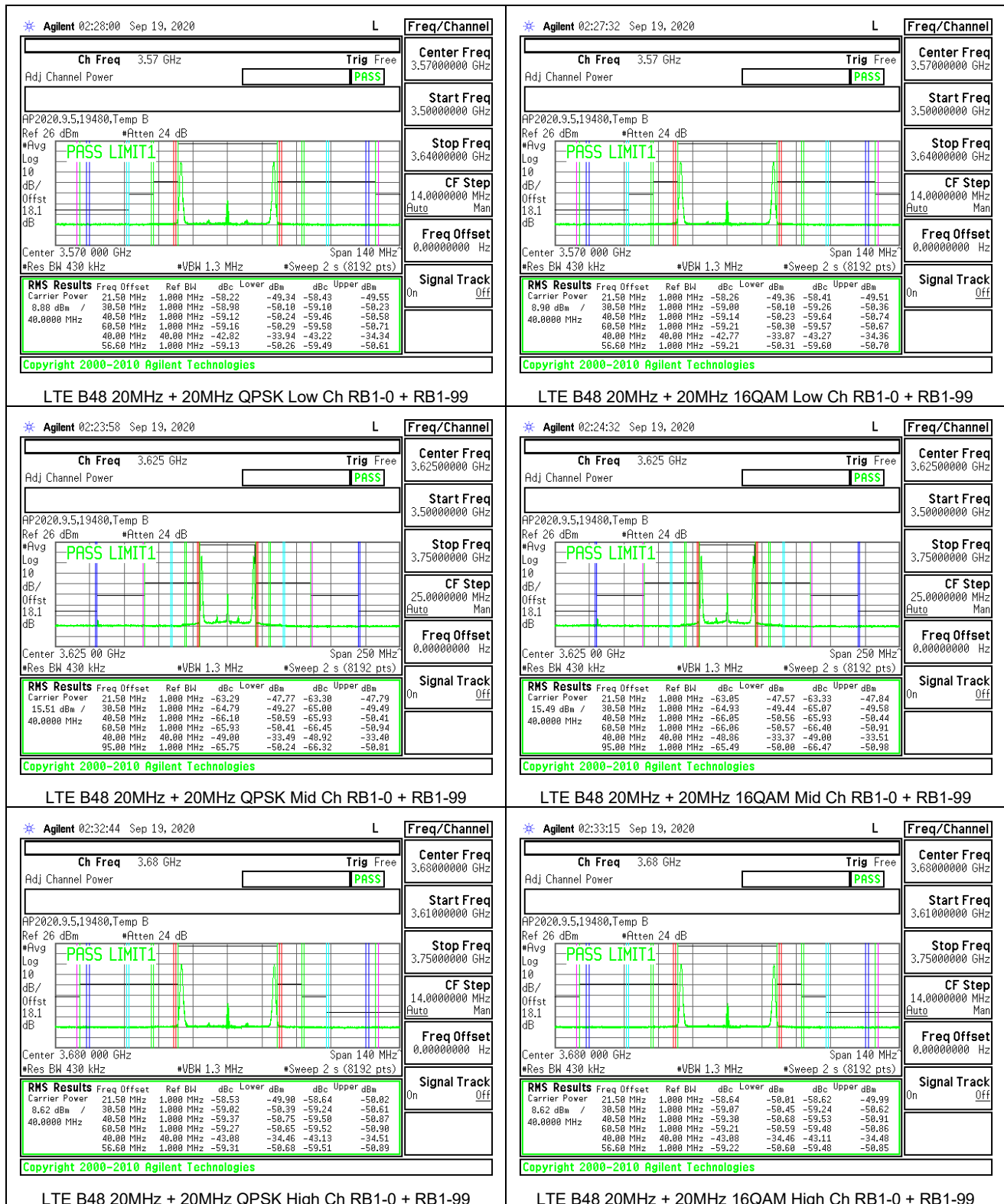
FCC: §96.41

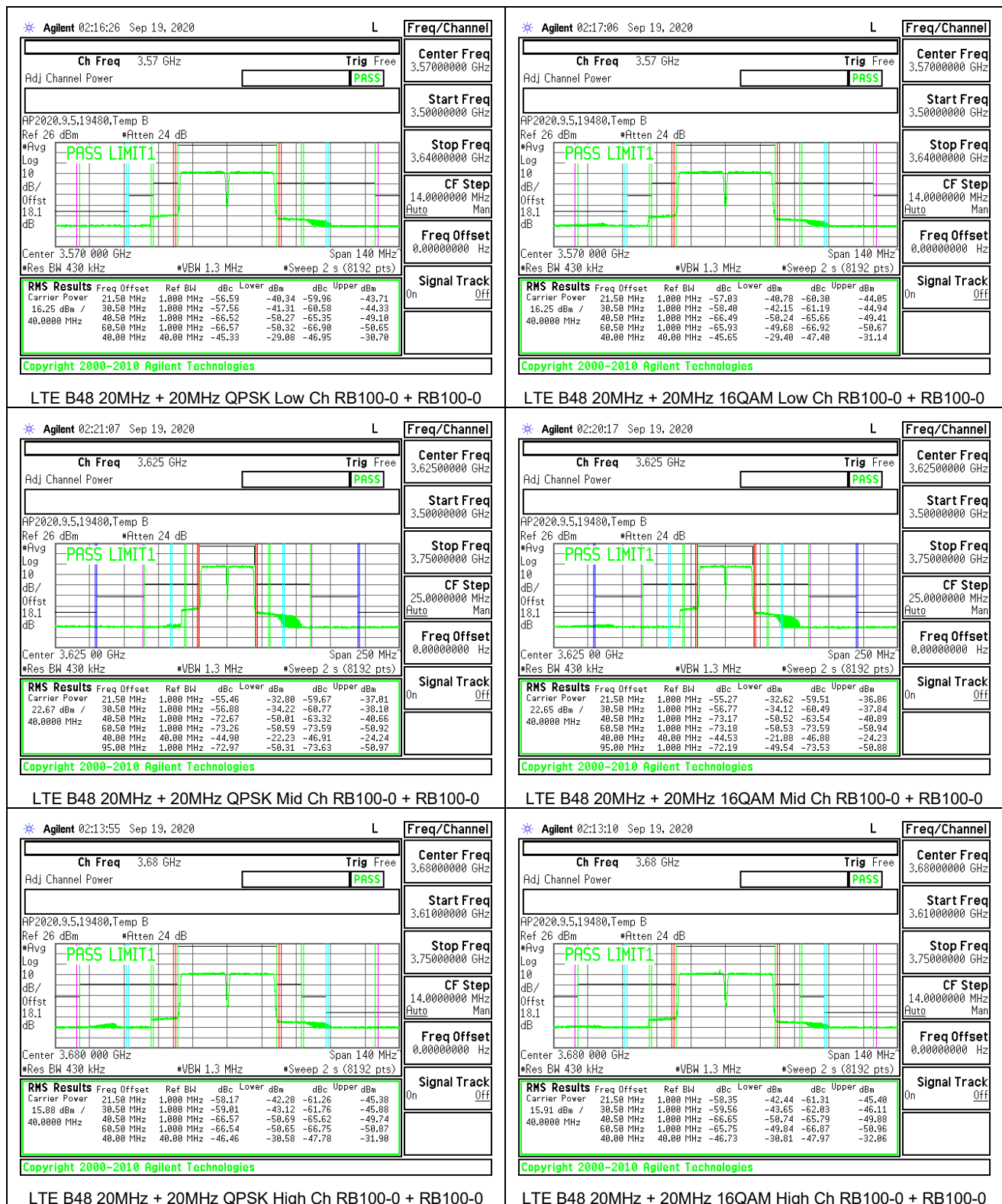
(e) 3.5 GHz Emissions and Interference Limits—

(1) General protection levels

(ii) Except as otherwise specified in paragraph (e)(2) of this section, for channel and frequency assignments made by a CBSD to End User Devices, the conducted power of any End User Device emission outside the fundamental emission (whether in or outside of the authorized band) shall not exceed  $-13$  dBm/MHz within 0 to B megahertz (where B is the bandwidth in megahertz of the assigned channel or multiple contiguous channels of the End User Device) above the upper CBSD-assigned channel edge and within 0 to B megahertz below the lower CBSD-assigned channel edge. At all frequencies greater than B megahertz above the upper CBSD assigned channel edge and less than B megahertz below the lower CBSD-assigned channel edge, the conducted power of any End User Device emission shall not exceed  $-25$  dBm/MHz. Notwithstanding the emission limits in this paragraph, the Adjacent Channel Leakage Ratio for End User Devices shall be at least 30 dB.

(2) Additional protection levels. Notwithstanding paragraph (e)(1) of this section, for CBSDs and End User Devices, the conducted power of emissions below 3540 MHz or above 3710 MHz shall not exceed  $-25$  dBm/MHz, and the conducted power of emissions below 3530 MHz or above 3720 MHz shall not exceed  $-40$  dBm/MHz.  
licensees.





### 8.3. OUT OF BAND EMISSIONS

#### TEST PROCEDURE

The RF output of the transmitter was connected to a spectrum analyzer through a calibrated coaxial cable. Sufficient scans were taken to show the out-of-band Emissions, if any, up to 10th harmonic. Multiple sweeps were recorded in maximum hold mode using a peak detector to ensure that the worst-case emissions were caught.

For each out of band emissions measurement:

- Set display line at -13 dBm to band 5 and -25 dBm to band 7 and 41
- Set RBW & VBW to 100 kHz for the measurement below 1 GHz, and 1 MHz for the measurement above 1 GHz.  
(NOTE: Worst case set RBW/VBW to 1MHz/3MHz)

#### RESULTS

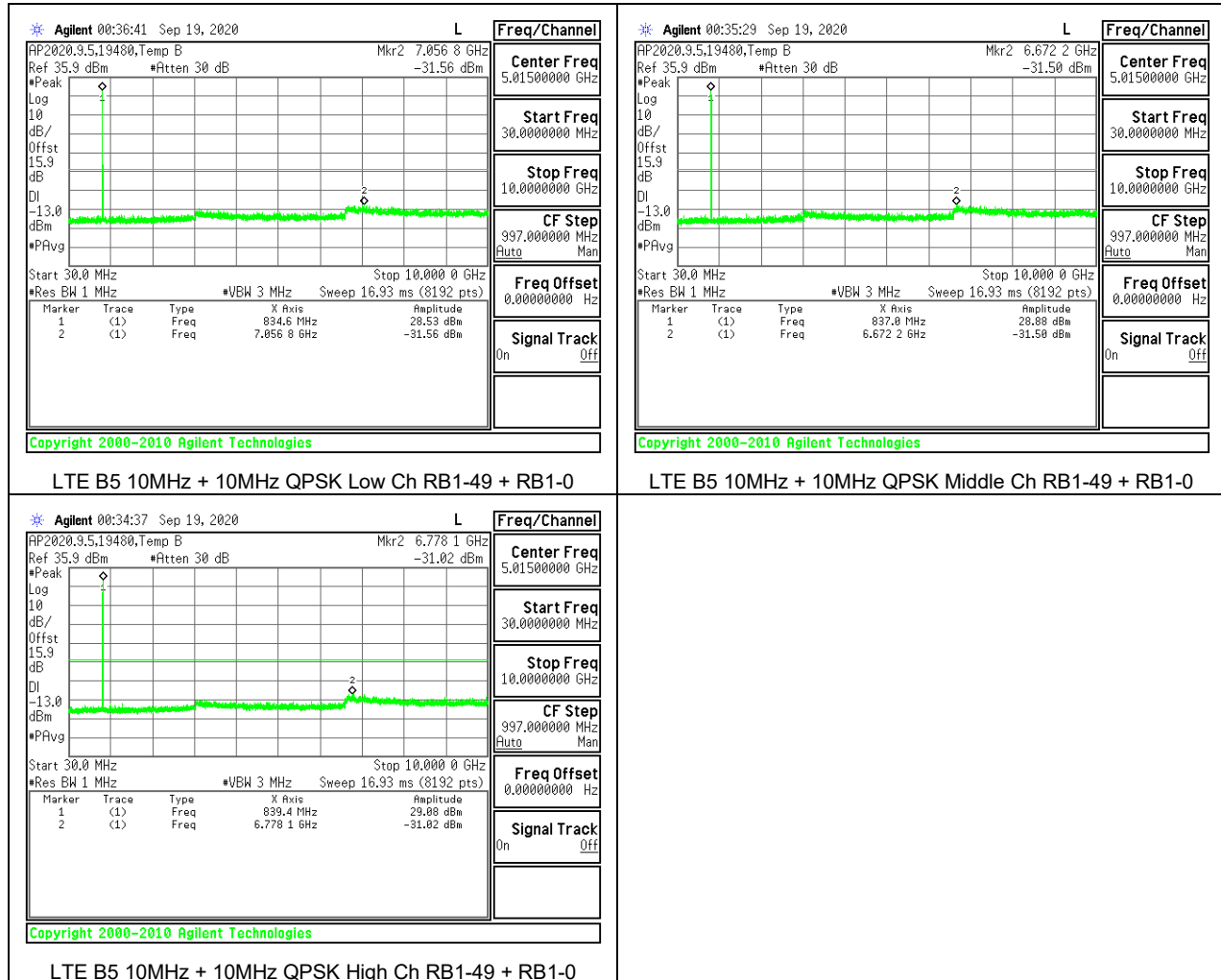
Both maximum + maximum bandwidth combinations of QPSK and 16QAM modes are tested, QPSK results are reported as worst case.

### 8.3.1. LTE BAND 5

#### LIMITS

FCC: §22.917

The minimum permissible attenuation level of any spurious emissions is  $43 + 10 \log (P)$  dB where transmitting power (P) in Watts.

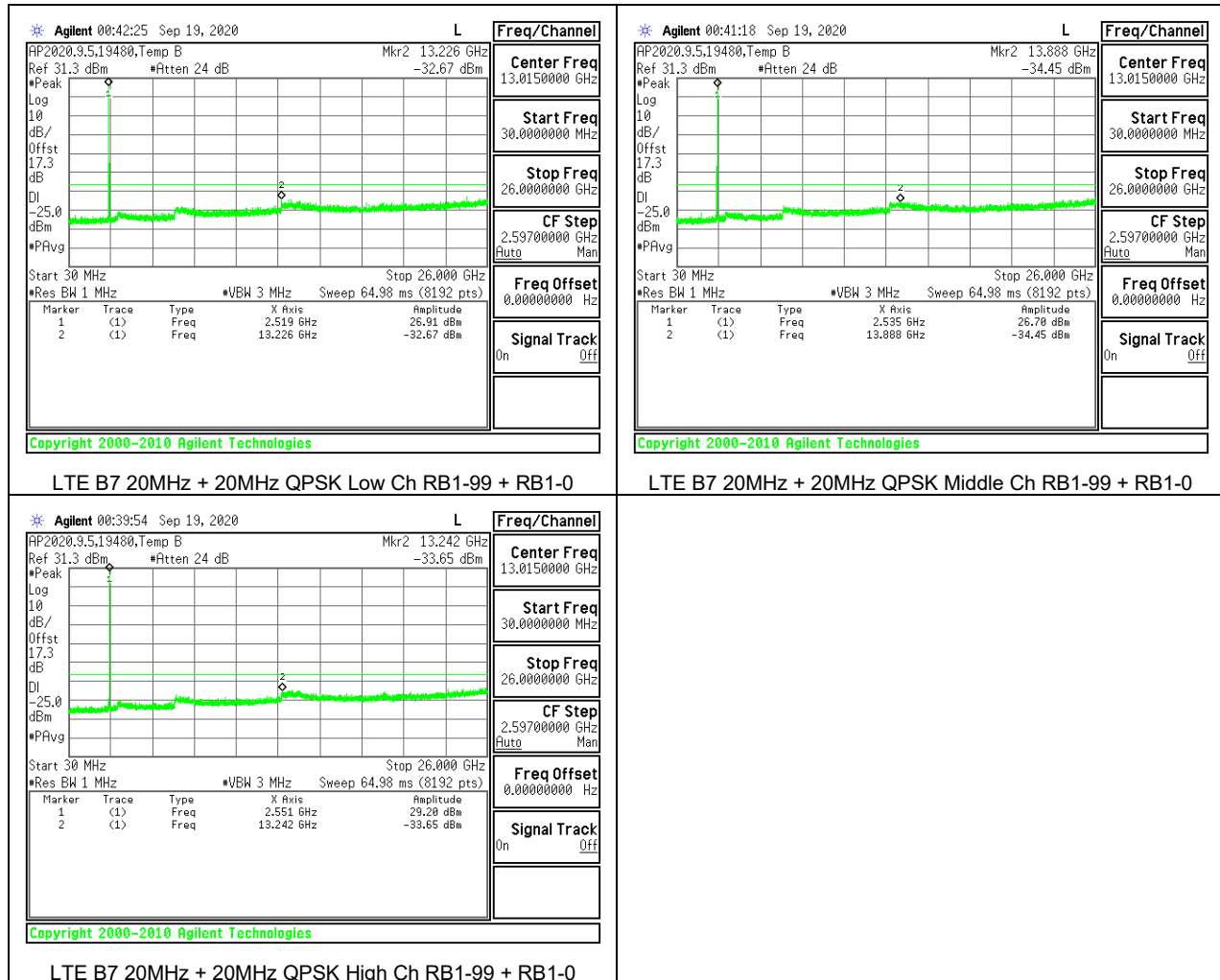


## 8.3.2. LTE BAND 7

### LIMITS

FCC: §27.53 (m)

The minimum permissible attenuation level of any spurious emissions is  $55 + 10 \log (P)$  dB where transmitting power (P) in Watts.

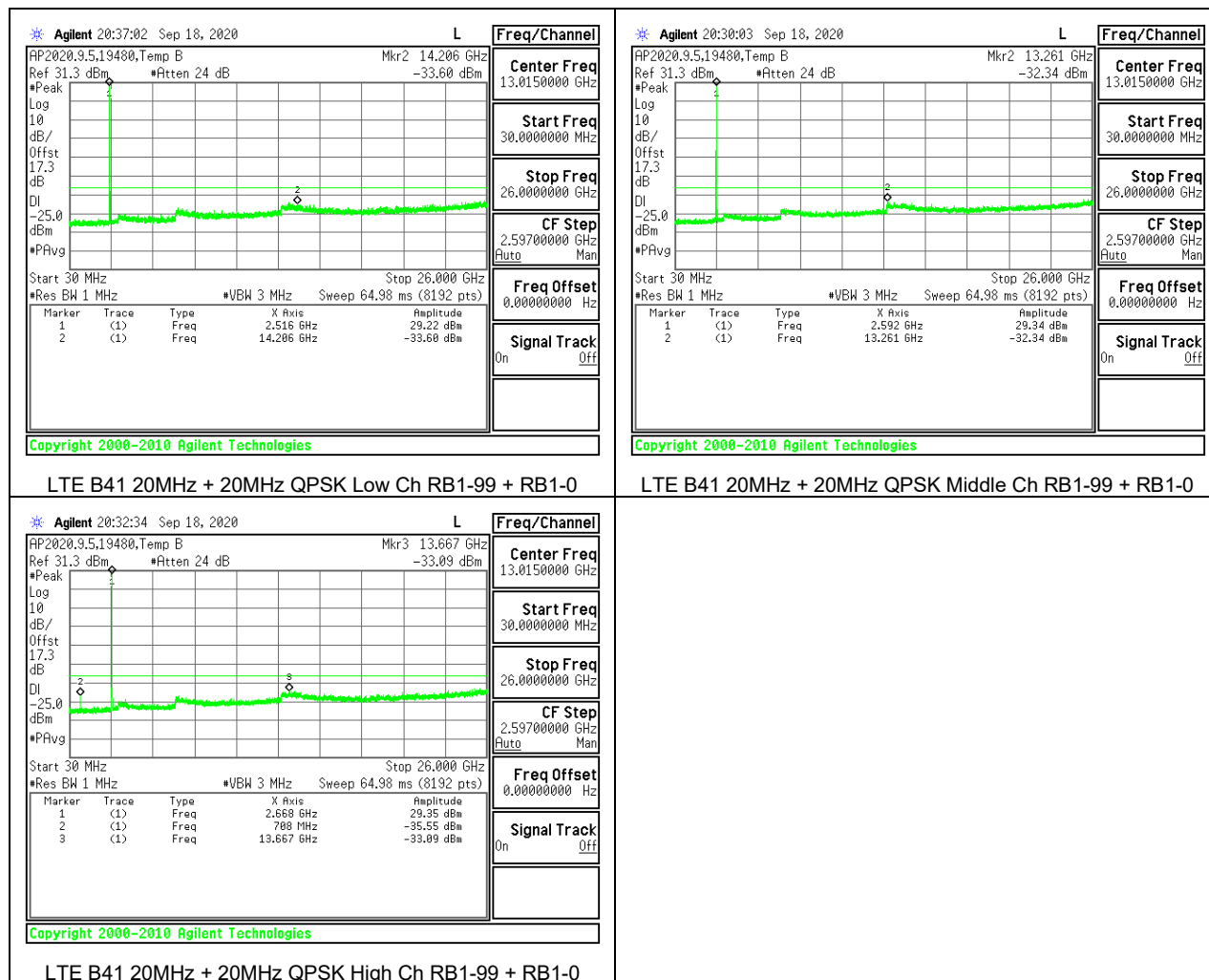


### 8.3.3. LTE BAND 41

#### LIMITS

FCC: §27.53 (m)

The minimum permissible attenuation level of any spurious emissions is  $55 + 10 \log (P)$  dB where transmitting power (P) in Watts.



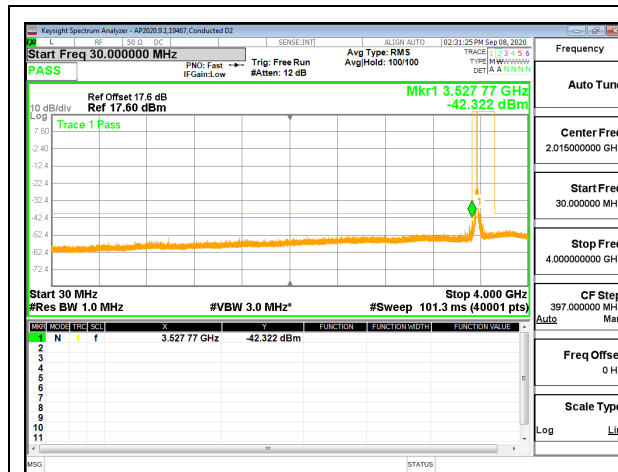
### 8.3.4. LTE BAND 48

#### LIMITS

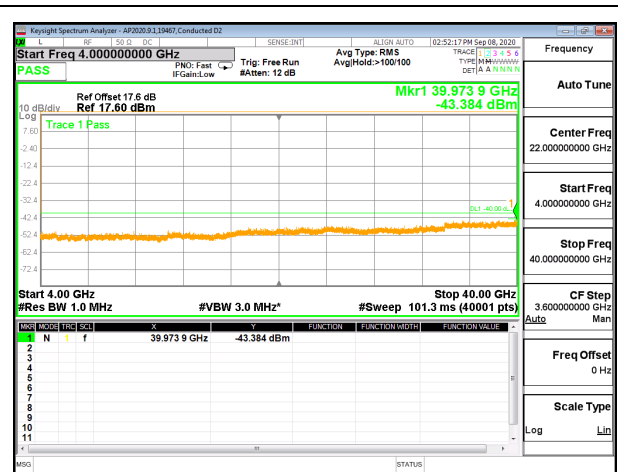
FCC: §96.41

(e) 3.5 GHz Emissions and Interference Limits—

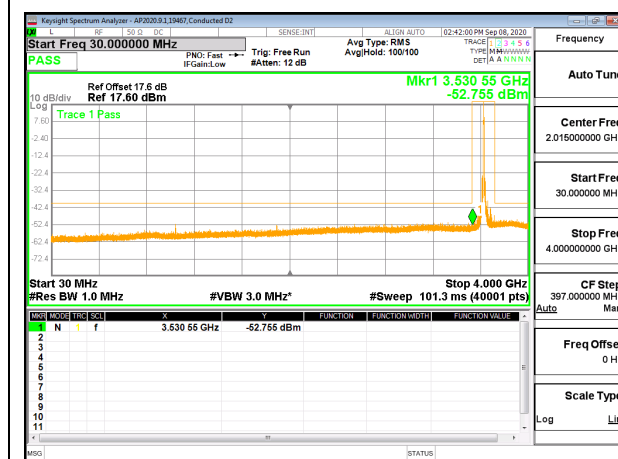
(2) Additional protection levels. Notwithstanding paragraph (e)(1) of this section, for CBSDs and End User Devices, the conducted power of emissions below 3540 MHz or above 3710 MHz shall not exceed -25 dBm/MHz, and the conducted power of emissions below 3530 MHz or above 3720 MHz shall not exceed -40dBm/MHz.



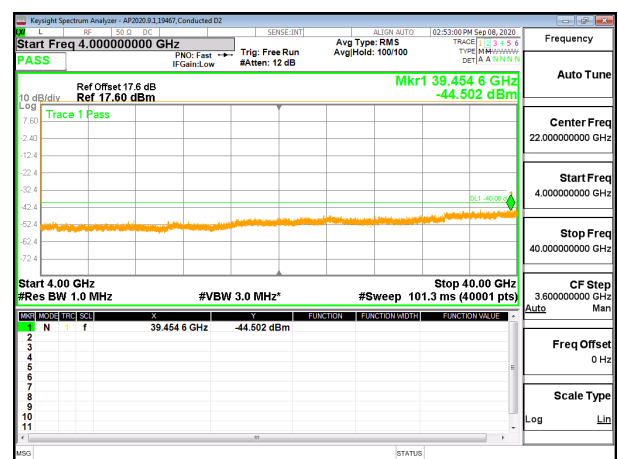
LTE B48 20MHz + 20MHz QPSK Low Ch RB1-99 + RB1-0  
30MHz-4GHz



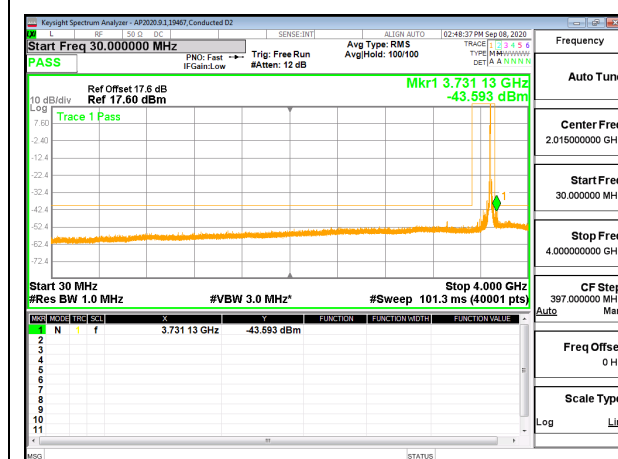
LTE B48 20MHz + 20MHz QPSK Low Ch RB1-99 + RB1-0  
4GHz-40GHz



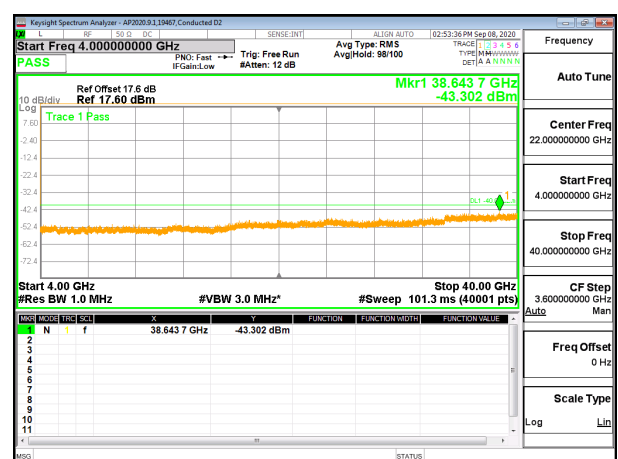
LTE B48 20MHz + 20MHz QPSK Mid Ch RB1-99 + RB1-0  
30MHz-4GHz



LTE B48 20MHz + 20MHz QPSK Mid Ch RB1-99 + RB1-0  
4GHz-40GHz



LTE B48 20MHz + 20MHz QPSK High Ch RB1-99 + RB1-0  
30MHz-4GHz



LTE B48 20MHz + 20MHz QPSK High Ch RB1-99 + RB1-0  
4GHz-40GHz

## 8.4. FREQUENCY STABILITY

### **TEST PROCEDURE**

Use CMW 500 with Frequency Error measurement capability.

- Temp. = -30°C to +50°C
- Voltage = (85% - 115%)

Low voltage, 3.23VDC, Normal, 3.8VDC and High voltage, 4.37VDC.  
End Voltage, 3.2VDC.

#### **Frequency Stability vs Temperature:**

The EUT is placed inside a temperature chamber. The temperature is set to 20°C and allowed to stabilize. After sufficient soak time, the transmitting frequency error is measured. The temperature is increased by 10 degrees, allowed to stabilize and soak, and then the measurement is repeated. This is repeated until +50°C is reached.

#### **Frequency Stability vs Voltage:**

The peak frequency error is recorded (worst-case).

### **RESULTS**

See the following pages.

### 8.4.1. LTE BAND 5

#### LIMITS

FCC §22.355

The carrier frequency shall not depart from the reference frequency in excess of  $\pm 2.5$  ppm for mobile stations.

|                   |       |            |           |
|-------------------|-------|------------|-----------|
| Test Engineer ID: | 38602 | Test Date: | 7/29/2020 |
|-------------------|-------|------------|-----------|

#### QPSK, (10MHz + 10MHz BANDWIDTH)

| Limit          |           | 824               | 849                | Delta<br>(Hz) | Frequency<br>Stability<br>(ppm) |
|----------------|-----------|-------------------|--------------------|---------------|---------------------------------|
| Condition      |           | F low @<br>-13dBm | F high @<br>-13dBm |               |                                 |
| Temperature    | Voltage   | (MHz)             | (MHz)              |               |                                 |
| Normal (20C)   | Normal    | 824.5272000       | 848.4886000        |               |                                 |
| Extreme (50C)  |           | 824.5272225       | 848.4886225        | 22.5          | 0.027                           |
| Extreme (40C)  |           | 824.5272184       | 848.4886184        | 18.4          | 0.022                           |
| Extreme (30C)  |           | 824.5272156       | 848.4886156        | 15.6          | 0.019                           |
| Extreme (10C)  |           | 824.5272150       | 848.4886150        | 15.0          | 0.018                           |
| Extreme (0C)   |           | 824.5271983       | 848.4885983        | -1.7          | -0.002                          |
| Extreme (-10C) |           | 824.5271935       | 848.4885935        | -6.5          | -0.008                          |
| Extreme (-20C) |           | 824.5271886       | 848.4885886        | -11.4         | -0.014                          |
| Extreme (-30C) |           | 824.5271824       | 848.4885824        | -17.6         | -0.021                          |
|                |           |                   |                    |               |                                 |
| 20C            | 15%       | 824.5272115       | 848.4886115        | 11.5          | 0.014                           |
|                | -15%      | 824.5271972       | 848.4885972        | -2.8          | -0.003                          |
|                | End Point | 824.5271956       | 848.4885956        | -4.4          | -0.005                          |

## 8.4.2. LTE BAND 7

### LIMITS

FCC: §27.54

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

|                   |       |            |           |
|-------------------|-------|------------|-----------|
| Test Engineer ID: | 38602 | Test Date: | 7/29/2020 |
|-------------------|-------|------------|-----------|

### QPSK, (20MHz + 20MHz BANDWIDTH)

| Limit          |           | 2500                       | 2570                        | Delta<br>(Hz) | Frequency<br>Stability<br>(ppm) |
|----------------|-----------|----------------------------|-----------------------------|---------------|---------------------------------|
| Condition      |           | F low @<br>-13dBm<br>(MHz) | F high @<br>-13dBm<br>(MHz) |               |                                 |
| Temperature    | Voltage   |                            |                             |               |                                 |
| Normal (20C)   | Normal    | 2501.0534000               | 2568.9308000                |               |                                 |
| Extreme (50C)  |           | 2501.0534396               | 2568.9308396                | 39.6          | 0.016                           |
| Extreme (40C)  |           | 2501.0534275               | 2568.9308275                | 27.5          | 0.011                           |
| Extreme (30C)  |           | 2501.0534102               | 2568.9308102                | 10.2          | 0.004                           |
| Extreme (10C)  |           | 2501.0533976               | 2568.9307976                | -2.4          | -0.001                          |
| Extreme (0C)   |           | 2501.0533785               | 2568.9307785                | -21.5         | -0.008                          |
| Extreme (-10C) |           | 2501.0534186               | 2568.9308186                | 18.6          | 0.007                           |
| Extreme (-20C) |           | 2501.0534053               | 2568.9308053                | 5.3           | 0.002                           |
| Extreme (-30C) |           | 2501.0533834               | 2568.9307834                | -16.6         | -0.007                          |
|                |           |                            |                             |               |                                 |
| 20C            | 15%       | 2501.0534048               | 2568.9308048                | 4.8           | 0.002                           |
|                | -15%      | 2501.0533936               | 2568.9307936                | -6.4          | -0.003                          |
|                | End Point | 2501.0533918               | 2568.9307918                | -8.2          | -0.003                          |

### 8.4.3. LTE BAND 41

#### LIMITS

FCC: §27.54

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

|                   |       |            |           |
|-------------------|-------|------------|-----------|
| Test Engineer ID: | 38602 | Test Date: | 7/29/2020 |
|-------------------|-------|------------|-----------|

#### QPSK, (20MHz + 20MHz BANDWIDTH)

| Limit          |           | 2496                       | 2690                        | Delta<br>(Hz) | Frequency<br>Stability<br>(ppm) |
|----------------|-----------|----------------------------|-----------------------------|---------------|---------------------------------|
| Condition      |           | F low @<br>-13dBm<br>(MHz) | F high @<br>-13dBm<br>(MHz) |               |                                 |
| Temperature    | Voltage   |                            |                             |               |                                 |
| Normal (20C)   | Normal    | 2496.4146000               | 2689.0805000                |               |                                 |
| Extreme (50C)  |           | 2496.4146296               | 2689.0805296                | 29.6          | 0.011                           |
| Extreme (40C)  |           | 2496.4146049               | 2689.0805049                | 4.9           | 0.002                           |
| Extreme (30C)  |           | 2496.4145916               | 2689.0804916                | -8.4          | -0.003                          |
| Extreme (10C)  |           | 2496.4145755               | 2689.0804755                | -24.5         | -0.009                          |
| Extreme (0C)   |           | 2496.4145617               | 2689.0804617                | -38.3         | -0.015                          |
| Extreme (-10C) |           | 2496.4146071               | 2689.0805071                | 7.1           | 0.003                           |
| Extreme (-20C) |           | 2496.4145882               | 2689.0804882                | -11.8         | -0.005                          |
| Extreme (-30C) |           | 2496.4145695               | 2689.0804695                | -30.5         | -0.012                          |
|                |           |                            |                             |               |                                 |
| 20C            | 15%       | 2496.4146332               | 2689.0805332                | 33.2          | 0.013                           |
|                | -15%      | 2496.4146241               | 2689.0805241                | 24.1          | 0.009                           |
|                | End Point | 2496.4146226               | 2689.0805226                | 22.6          | 0.009                           |

#### 8.4.4. LTE BAND 48

|                   |       |            |           |
|-------------------|-------|------------|-----------|
| Test Engineer ID: | 38602 | Test Date: | 7/31/2020 |
|-------------------|-------|------------|-----------|

#### QPSK, (20MHz + 20MHz BANDWIDTH)

| Limit          |           | 3550              | 3700               | Delta<br>(Hz) | Frequency<br>Stability<br>(ppm) |
|----------------|-----------|-------------------|--------------------|---------------|---------------------------------|
| Condition      |           | F low @<br>-13dBm | F high @<br>-13dBm |               |                                 |
| Temperature    | Voltage   | (MHz)             | (MHz)              |               |                                 |
| Normal (20C)   | Normal    | 3551.3074000      | 3699.6532000       |               |                                 |
| Extreme (50C)  |           | 3551.3073527      | 3699.6531527       | -47.3         | -0.013                          |
| Extreme (40C)  |           | 3551.3073622      | 3699.6531622       | -37.8         | -0.010                          |
| Extreme (30C)  |           | 3551.3073794      | 3699.6531794       | -20.6         | -0.006                          |
| Extreme (10C)  |           | 3551.3073917      | 3699.6531917       | -8.3          | -0.002                          |
| Extreme (0C)   |           | 3551.3073938      | 3699.6531938       | -6.2          | -0.002                          |
| Extreme (-10C) |           | 3551.3073949      | 3699.6531949       | -5.1          | -0.001                          |
| Extreme (-20C) |           | 3551.3073716      | 3699.6531716       | -28.4         | -0.008                          |
| Extreme (-30C) |           | 3551.3074026      | 3699.6532026       | 2.6           | 0.001                           |
|                |           |                   |                    |               |                                 |
| 20C            | 15%       | 3551.3073647      | 3699.6531647       | -35.3         | -0.010                          |
|                | -15%      | 3551.3073614      | 3699.6531614       | -38.6         | -0.011                          |
|                | End Point | 3551.3073626      | 3699.6531626       | -37.4         | -0.010                          |

## **8.5. PEAK-TO-AVERAGE POWER RATIO**

### **LIMIT**

In addition, the peak-to-average power ratio (PAPR) of the transmitter shall not exceed 13 dB for more than 0.1% of the time and shall use a signal corresponding to the highest PAPR during periods of continuous transmission.

### **RESULT**

Test was performed on Antenna 1; full resource block (FRB) for each bandwidth was used to measure as the worst case. The results from all CCDF measurements are passed with 13dB peak-to-average ratio criteria.

### 8.5.1. LTE BAND 5

|                          |       |                   |           |
|--------------------------|-------|-------------------|-----------|
| <b>Test Engineer ID:</b> | 10641 | <b>Test Date:</b> | 7/30/2020 |
|--------------------------|-------|-------------------|-----------|

| Band                                                                                       | Bandwidth (MHz) | PCC f (MHz) | SCC1 f (MHz) | Modulation | Conducted Power (dBm) |         | Peak-to-Average Power Ratio (dB) |
|--------------------------------------------------------------------------------------------|-----------------|-------------|--------------|------------|-----------------------|---------|----------------------------------|
|                                                                                            |                 |             |              |            | Peak                  | Average |                                  |
| Band 5                                                                                     | 5MHz / 10MHz    | 831.8       | 839.0        | QPSK       | 32.30                 | 24.88   | 7.42                             |
|                                                                                            |                 |             |              | 16QAM      | 32.34                 | 23.89   | 8.45                             |
|                                                                                            | 10MHz / 5MHz    | 834.3       | 841.5        | QPSK       | 32.17                 | 24.86   | 7.31                             |
|                                                                                            |                 |             |              | 16QAM      | 32.13                 | 23.88   | 8.25                             |
|                                                                                            | 10MHz / 10MHz   | 831.6       | 831.5        | QPSK       | 32.14                 | 24.9    | 7.24                             |
|                                                                                            |                 |             |              | 16QAM      | 32.29                 | 23.9    | 8.39                             |
| Duty Cycle Correction Factor (dB) =                                                        |                 |             | 0.00         |            |                       |         |                                  |
| Peak-to-Average Power Ratio= Peak Reading - Average Reading - Duty Cycle Correction Factor |                 |             |              |            |                       |         |                                  |

### 8.5.2. LTE BAND 7

|                          |       |                   |           |
|--------------------------|-------|-------------------|-----------|
| <b>Test Engineer ID:</b> | 10641 | <b>Test Date:</b> | 7/30/2020 |
|--------------------------|-------|-------------------|-----------|

| Band                                                                                       | Bandwidth (MHz) | PCC f (MHz) | SCC1 f (MHz) | Modulation | Conducted Power (dBm) |         | Peak-to-Average Power Ratio (dB) |
|--------------------------------------------------------------------------------------------|-----------------|-------------|--------------|------------|-----------------------|---------|----------------------------------|
|                                                                                            |                 |             |              |            | Peak                  | Average |                                  |
| Band 7                                                                                     | 10MHz / 20MHz   | 2525.6      | 2540.0       | QPSK       | 31.94                 | 24.24   | 7.70                             |
|                                                                                            |                 |             |              | 16QAM      | 31.59                 | 23.19   | 8.40                             |
|                                                                                            | 20MHz / 10MHz   | 2530.1      | 2544.5       | QPSK       | 32.06                 | 24.17   | 7.89                             |
|                                                                                            |                 |             |              | 16QAM      | 31.93                 | 23.23   | 8.70                             |
|                                                                                            | 15 MHz / 15MHz  | 2527.5      | 2542.5       | QPSK       | 32.10                 | 24.16   | 7.94                             |
|                                                                                            |                 |             |              | 16QAM      | 31.76                 | 23.23   | 8.53                             |
|                                                                                            | 15MHz / 20MHz   | 2525.3      | 2542.4       | QPSK       | 31.89                 | 24.15   | 7.74                             |
|                                                                                            |                 |             |              | 16QAM      | 31.76                 | 23.15   | 8.61                             |
|                                                                                            | 20MHz / 15MHz   | 2527.6      | 2544.7       | QPSK       | 32.02                 | 24.11   | 7.91                             |
|                                                                                            |                 |             |              | 16QAM      | 31.83                 | 23.16   | 8.67                             |
| 20MHz / 20MHz                                                                              | 2525.1          | 2544.9      | QPSK         | 31.96      | 24.16                 | 7.80    |                                  |
|                                                                                            |                 |             | 16QAM        | 31.81      | 23.19                 | 8.62    |                                  |
| Duty Cycle Correction Factor (dB) =                                                        |                 |             | 0.00         |            |                       |         |                                  |
| Peak-to-Average Power Ratio= Peak Reading - Average Reading - Duty Cycle Correction Factor |                 |             |              |            |                       |         |                                  |

### 8.5.3. LTE BAND 41

|                   |       |            |          |
|-------------------|-------|------------|----------|
| Test Engineer ID: | 10641 | Test Date: | 9/4/2020 |
|-------------------|-------|------------|----------|

| Band                                                                                       | Bandwidth (MHz) | PCC f (MHz) | SCC1 f (MHz) | Modulation | Conducted Power (dBm) |         | Peak-to-Average Power Ratio (dB) |
|--------------------------------------------------------------------------------------------|-----------------|-------------|--------------|------------|-----------------------|---------|----------------------------------|
|                                                                                            |                 |             |              |            | Peak                  | Average |                                  |
| Band 41 (FCC)                                                                              | 5MHz / 20MHz    | 2583.8      | 2595.5       | QPSK       | 32.11                 | 17.18   | 7.93                             |
|                                                                                            |                 |             |              | 16QAM      | 32.12                 | 16.70   | 8.42                             |
|                                                                                            | 20MHz / 5MHz    | 2590.5      | 2602.2       | QPSK       | 31.90                 | 18.23   | 6.67                             |
|                                                                                            |                 |             |              | 16QAM      | 31.88                 | 17.24   | 7.64                             |
|                                                                                            | 10MHz / 20MHz   | 2583.6      | 2598.0       | QPSK       | 29.38                 | 16.13   | 6.25                             |
|                                                                                            |                 |             |              | 16QAM      | 31.85                 | 16.18   | 8.67                             |
|                                                                                            | 20MHz / 10MHz   | 2588.1      | 2602.5       | QPSK       | 31.91                 | 18.2    | 6.71                             |
|                                                                                            |                 |             |              | 16QAM      | 31.89                 | 17.2    | 7.69                             |
|                                                                                            | 15MHz / 15MHz   | 2585.5      | 2600.5       | QPSK       | 32.07                 | 18.15   | 6.92                             |
|                                                                                            |                 |             |              | 16QAM      | 32.07                 | 17.16   | 7.91                             |
|                                                                                            | 15MHz / 20MHz   | 2583.3      | 2600.4       | QPSK       | 31.09                 | 16.40   | 7.69                             |
|                                                                                            |                 |             |              | 16QAM      | 31.84                 | 16.43   | 8.41                             |
|                                                                                            | 20MHz / 15MHz   | 2585.6      | 2602.7       | QPSK       | 31.91                 | 18.11   | 6.80                             |
|                                                                                            |                 |             |              | 16QAM      | 32.03                 | 17.15   | 7.88                             |
|                                                                                            | 20MHz / 20MHz   | 2583.1      | 2602.9       | QPSK       | 31.92                 | 18.06   | 6.86                             |
|                                                                                            |                 |             |              | 16QAM      | 31.94                 | 17.08   | 7.86                             |
| Duty Cycle Correction Factor (dB) =                                                        |                 |             | 7.00         |            |                       |         |                                  |
| Peak-to-Average Power Ratio= Peak Reading - Average Reading - Duty Cycle Correction Factor |                 |             |              |            |                       |         |                                  |

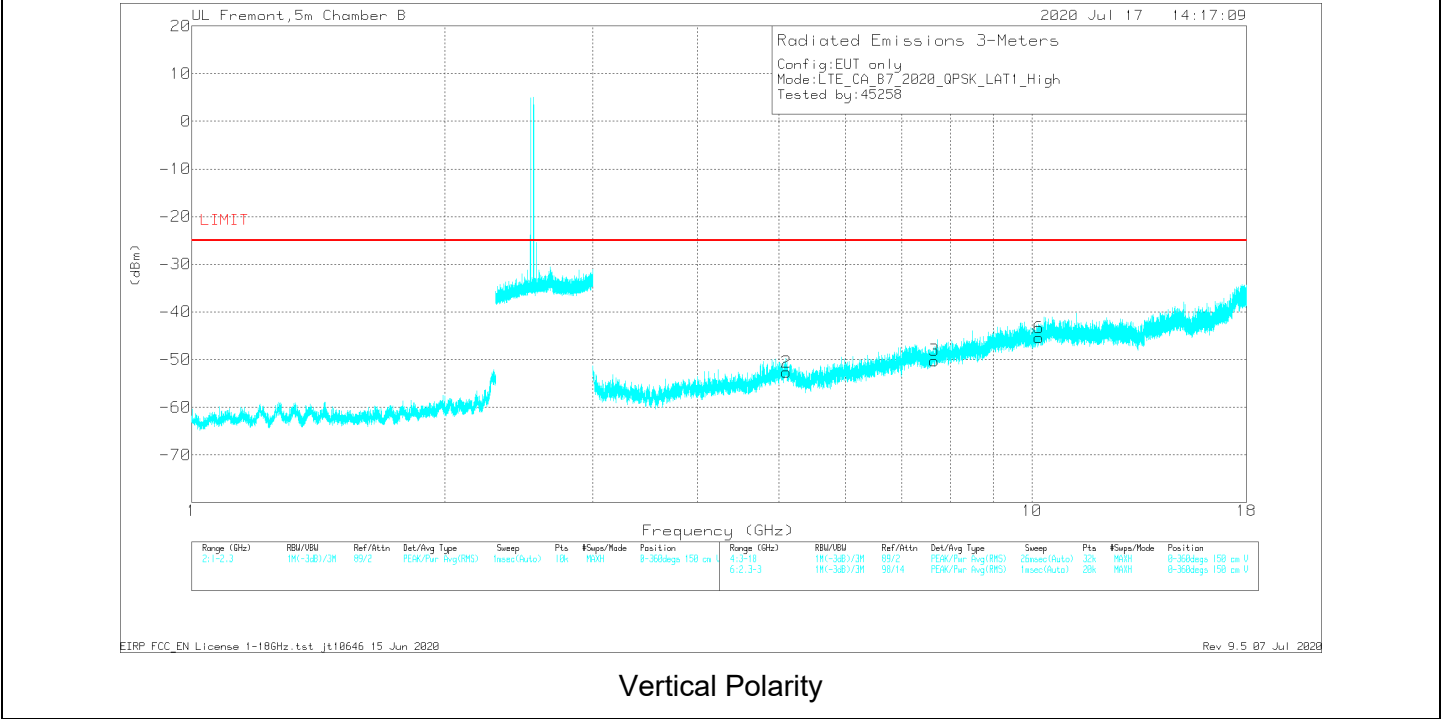
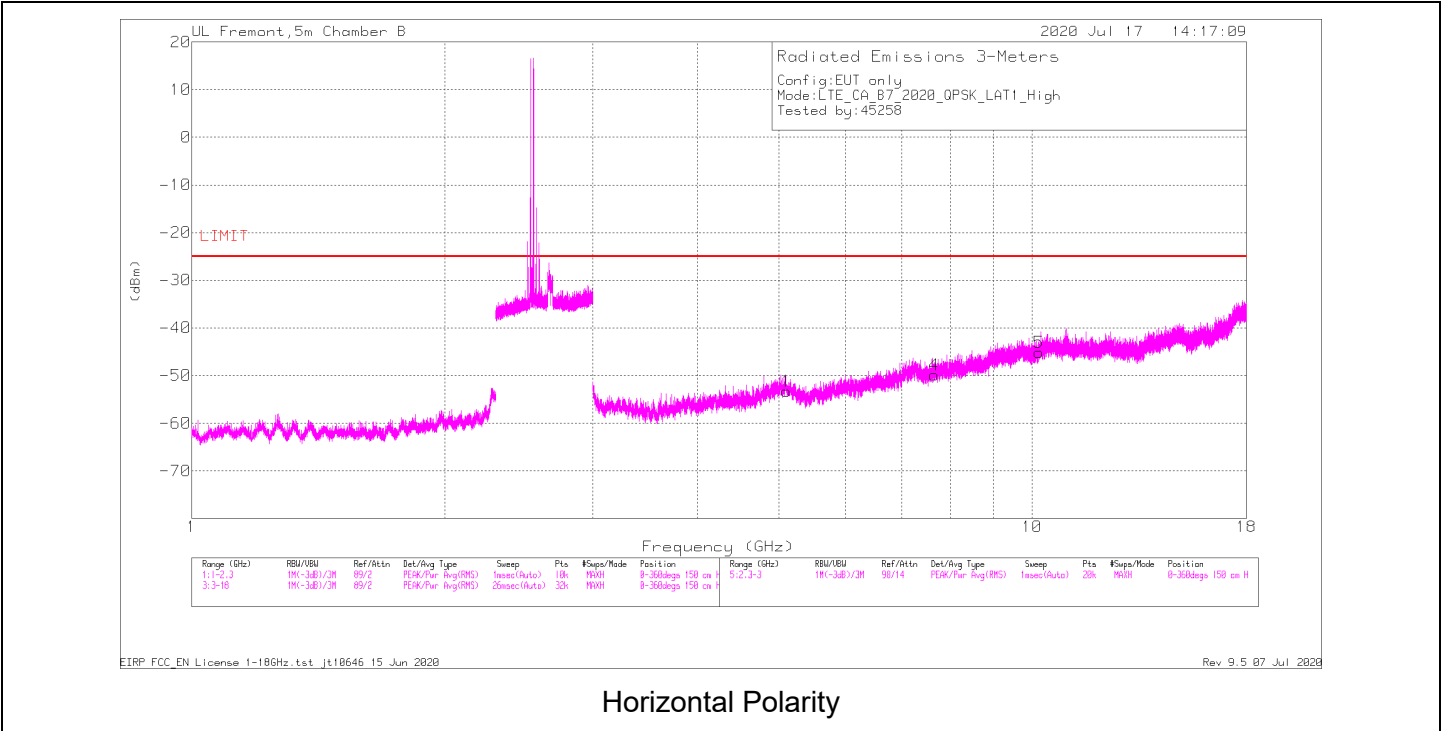
### 8.5.4. LTE BAND 48

|                   |       |            |          |
|-------------------|-------|------------|----------|
| Test Engineer ID: | 10641 | Test Date: | 9/4/2020 |
|-------------------|-------|------------|----------|

| Band                                                                                       | Bandwidth (MHz) | PCC f (MHz) | SCC1 f (MHz) | Modulation | Conducted Power (dBm) |         | Peak-to-Average Power Ratio (dB) |
|--------------------------------------------------------------------------------------------|-----------------|-------------|--------------|------------|-----------------------|---------|----------------------------------|
|                                                                                            |                 |             |              |            | Peak                  | Average |                                  |
| Band 41 (FCC)                                                                              | 5MHz / 20MHz    | 3615.8      | 3627.5       | QPSK       | 32.27                 | 17.30   | 7.97                             |
|                                                                                            |                 |             |              | 16QAM      | 32.81                 | 17.30   | 8.51                             |
|                                                                                            | 20MHz / 5MHz    | 3622.5      | 3634.2       | QPSK       | 32.05                 | 17.35   | 7.70                             |
|                                                                                            |                 |             |              | 16QAM      | 32.77                 | 17.32   | 8.45                             |
|                                                                                            | 10MHz / 20MHz   | 3615.6      | 3630.0       | QPSK       | 31.61                 | 16.74   | 7.87                             |
|                                                                                            |                 |             |              | 16QAM      | 32.19                 | 16.77   | 8.42                             |
|                                                                                            | 20MHz / 10MHz   | 3620.1      | 3634.5       | QPSK       | 31.68                 | 16.93   | 7.75                             |
|                                                                                            |                 |             |              | 16QAM      | 32.53                 | 16.93   | 8.60                             |
|                                                                                            | 15MHz / 20MHz   | 3615.3      | 3632.4       | QPSK       | 31.79                 | 16.82   | 7.97                             |
|                                                                                            |                 |             |              | 16QAM      | 32.59                 | 16.86   | 8.73                             |
|                                                                                            | 20MHz / 15MHz   | 3617.6      | 3634.7       | QPSK       | 32.68                 | 16.91   | 8.77                             |
|                                                                                            |                 |             |              | 16QAM      | 32.78                 | 16.91   | 8.87                             |
|                                                                                            | 20MHz / 20MHz   | 3615.1      | 3634.9       | QPSK       | 32.07                 | 16.9    | 8.17                             |
|                                                                                            |                 |             |              | 16QAM      | 32.68                 | 16.91   | 8.77                             |
| Duty Cycle Correction Factor (dB) =                                                        |                 |             | 7.00         |            |                       |         |                                  |
| Peak-to-Average Power Ratio= Peak Reading - Average Reading - Duty Cycle Correction Factor |                 |             |              |            |                       |         |                                  |

9. RADIATED TEST RESULTS

9.1. Example Plot



## Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T962 (dB/m) | Amp/Cbl (dB) | BRF 2495-2690MHz T1790 1-18GHz | EIRP CF | Corrected Reading (dBm) | LIMIT | Margin (dB) | Polarity |
|--------|-----------------|----------------------|-----|----------------|--------------|--------------------------------|---------|-------------------------|-------|-------------|----------|
| 1      | 5.1             | 33.62                | Pk  | 33.9           | -26.4        | .8                             | -95.2   | -53.28                  | -25   | -28.28      | H        |
| 2      | 5.1             | 34.28                | Pk  | 33.9           | -26.4        | .8                             | -95.2   | -52.62                  | -25   | -27.62      | V        |
| 4      | 7.65047         | 31.54                | Pk  | 36.9           | -23.4        | .3                             | -95.2   | -49.86                  | -25   | -24.86      | H        |
| 3      | 7.65047         | 31.2                 | Pk  | 36.9           | -23.4        | .3                             | -95.2   | -50.2                   | -25   | -25.2       | V        |
| 5      | 10.20047        | 30.34                | Pk  | 38.7           | -19.8        | .8                             | -95.2   | -45.16                  | -25   | -20.16      | H        |
| 6      | 10.20047        | 30.09                | Pk  | 38.7           | -19.8        | .8                             | -95.2   | -45.41                  | -25   | -20.41      | V        |

Pk - Peak detector

## Radiated Emissions

| Frequency (GHz) | Meter Reading (dBuV) | Det | AF T962 (dB/m) | Amp/Cbl (dB) | BRF 2495-2690MHz T1790 1-18GHz | EIRP CF | Corrected Reading (dBm) | LIMIT | Margin (dB) | Polarity |
|-----------------|----------------------|-----|----------------|--------------|--------------------------------|---------|-------------------------|-------|-------------|----------|
| 5.09891         | 37.2                 | Pk  | 33.9           | -26.4        | .8                             | -95.2   | -49.7                   | -25   | -24.7       | V        |
| 5.10198         | 47.47                | Pk  | 33.9           | -26.4        | .8                             | -95.2   | -39.43                  | -25   | -14.43      | H        |
| 7.64923         | 35.46                | Pk  | 36.9           | -23.5        | .3                             | -95.2   | -46.04                  | -25   | -21.04      | H        |
| 7.65095         | 35.35                | Pk  | 36.9           | -23.4        | .3                             | -95.2   | -46.05                  | -25   | -21.05      | V        |
| 10.1987         | 34.35                | Pk  | 38.7           | -19.8        | .8                             | -95.2   | -41.15                  | -25   | -16.15      | V        |
| 10.20171        | 33.97                | Pk  | 38.7           | -19.9        | .8                             | -95.2   | -41.63                  | -25   | -16.63      | H        |

Pk - Peak detector

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## **9.2. FIELD STRENGTH OF SPURIOUS RADIATION, ABOVE 1GHz, ANT1**

### **TEST PROCEDURE**

KDB 971168 D01/D02 v02r01

### **RESULTS**

Maximum + maximum bandwidth combinations of QPSK mode was tested, QPSK results are reported as worst case.

## 9.2.1. LTE BAND 5

### LIMIT

FCC: §22.917(a)

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log (P)$  dB.

### QPSK LTE BAND 5 (10.0MHZ + 10.0MHZ BANDWIDTH)

|                |                      |
|----------------|----------------------|
| Project #:     | 13179110             |
| Date:          | 7/16/2020            |
| Test Engineer: | 19410                |
| Configuration: | EUT Only             |
| Mode:          | Band 5 QPSK 10+10MHz |
| Chamber #:     | Chamber B            |

| Frequency (GHz)                  | Meter Reading (dBuV) | Det | AF T962 (dB/m) | Amp/Cbl (dB) | HPF 1.2GHz T1737 1-18GHz | EIRP CF | Corrected Reading (dBm) | LIMIT | Margin (dB) | Polarity |
|----------------------------------|----------------------|-----|----------------|--------------|--------------------------|---------|-------------------------|-------|-------------|----------|
| Low Channel, 829MHz + 838.9MHz   |                      |     |                |              |                          |         |                         |       |             |          |
| 1.65644                          | 42.04                | Pk  | 25             | -30.5        | .8                       | -95.2   | -57.86                  | -13   | -44.86      | V        |
| 1.65894                          | 40.63                | Pk  | 25             | -30.4        | .8                       | -95.2   | -59.17                  | -13   | -46.17      | H        |
| 2.48862                          | 40.25                | Pk  | 29             | -29.2        | .5                       | -95.2   | -54.65                  | -13   | -41.65      | V        |
| 2.48908                          | 39.25                | Pk  | 29             | -29.2        | .6                       | -95.2   | -55.55                  | -13   | -42.55      | H        |
| 3.31643                          | 39.19                | Pk  | 31.1           | -28.1        | .6                       | -95.2   | -52.41                  | -13   | -39.41      | H        |
| 3.31765                          | 39.51                | Pk  | 31.1           | -28.1        | .6                       | -95.2   | -52.09                  | -13   | -39.09      | V        |
| Mid Channel, 831.6MHz + 841.5MHz |                      |     |                |              |                          |         |                         |       |             |          |
| 1.66324                          | 40.38                | Pk  | 25             | -30.4        | .8                       | -95.2   | -59.42                  | -13   | -46.42      | H        |
| 1.66401                          | 40.38                | Pk  | 25             | -30.4        | .8                       | -95.2   | -59.42                  | -13   | -46.42      | V        |
| 2.49316                          | 39.75                | Pk  | 29             | -29.3        | .6                       | -95.2   | -55.15                  | -13   | -42.15      | H        |
| 2.49585                          | 40.6                 | Pk  | 29             | -29.3        | .6                       | -95.2   | -54.3                   | -13   | -41.3       | V        |
| 3.36205                          | 37.72                | Pk  | 30.9           | -28.1        | .6                       | -95.2   | -54.08                  | -13   | -41.08      | V        |
| 3.36224                          | 37.69                | Pk  | 30.9           | -28          | .6                       | -95.2   | -54.01                  | -13   | -41.01      | H        |
| High Channel, 834.1MHz + 844MHz  |                      |     |                |              |                          |         |                         |       |             |          |
| 1.68944                          | 41.18                | Pk  | 25             | -30.4        | .7                       | -95.2   | -58.72                  | -13   | -45.72      | V        |
| 1.68965                          | 41.4                 | Pk  | 25             | -30.4        | .7                       | -95.2   | -58.5                   | -13   | -45.5       | H        |
| 2.53042                          | 38.84                | Pk  | 29.2           | -29.4        | .8                       | -95.2   | -55.76                  | -13   | -42.76      | V        |
| 2.53255                          | 38.4                 | Pk  | 29.2           | -29.3        | .8                       | -95.2   | -56.1                   | -13   | -43.1       | H        |
| 3.37693                          | 38.96                | Pk  | 30.8           | -28          | .6                       | -95.2   | -52.84                  | -13   | -39.84      | H        |
| 3.37719                          | 39.22                | Pk  | 30.8           | -28.1        | .6                       | -95.2   | -52.68                  | -13   | -39.68      | V        |

## 9.2.2. LTE BAND 7

### LIMIT

FCC: §27.53 (m)

At least 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section.

### QPSK LTE BAND 7 (20.0MHZ + 20.0MHZ BANDWIDTH)

|                |                      |
|----------------|----------------------|
| Project #:     | 131719110            |
| Date:          | 7/17/2020            |
| Test Engineer: | 45258                |
| Configuration: | EUT Only             |
| Mode:          | Band 7 QPSK 20+20MHz |
| Chamber #:     | Chamber B            |

| Frequency (GHz)                    | Meter Reading (dBuV) | Det | AF T962 (dB/m) | Amp/Cbl (dB) | BRF 2495-2690MHz T1790 1-18GHz | EIRP CF | Corrected Reading (dBm) | LIMIT | Margin (dB) | Polarity |
|------------------------------------|----------------------|-----|----------------|--------------|--------------------------------|---------|-------------------------|-------|-------------|----------|
| Low Channel, 2510MHz + 2529.8MHz   |                      |     |                |              |                                |         |                         |       |             |          |
| 5.04072                            | 37.93                | Pk  | 33.7           | -26.2        | .6                             | -95.2   | -49.17                  | -25   | -24.17      | V        |
| 5.04112                            | 38.33                | Pk  | 33.7           | -26.2        | .6                             | -95.2   | -48.77                  | -25   | -23.77      | H        |
| 7.55956                            | 36.13                | Pk  | 36.8           | -24.1        | .3                             | -95.2   | -46.07                  | -25   | -21.07      | H        |
| 7.56097                            | 35.28                | Pk  | 36.8           | -24.1        | .4                             | -95.2   | -46.82                  | -25   | -21.82      | V        |
| 10.07775                           | 33.65                | Pk  | 38.4           | -20.1        | .7                             | -95.2   | -42.55                  | -25   | -17.55      | V        |
| 10.07924                           | 33.89                | Pk  | 38.4           | -20.1        | .6                             | -95.2   | -42.41                  | -25   | -17.41      | H        |
| Mid Channel, 2525.1MHz + 2544.9MHz |                      |     |                |              |                                |         |                         |       |             |          |
| 5.06972                            | 37.82                | Pk  | 33.8           | -26.1        | .7                             | -95.2   | -48.98                  | -25   | -23.98      | V        |
| 5.07193                            | 43.67                | Pk  | 33.8           | -26.1        | .7                             | -95.2   | -43.13                  | -25   | -18.13      | H        |
| 7.60316                            | 36.2                 | Pk  | 36.9           | -23.7        | .4                             | -95.2   | -45.4                   | -25   | -20.4       | H        |
| 7.60329                            | 35.56                | Pk  | 36.9           | -23.7        | .4                             | -95.2   | -46.04                  | -25   | -21.04      | V        |
| 10.13837                           | 34.55                | Pk  | 38.4           | -19.9        | .7                             | -95.2   | -41.45                  | -25   | -16.45      | H        |
| 10.13993                           | 34.24                | Pk  | 38.4           | -19.9        | .7                             | -95.2   | -41.76                  | -25   | -16.76      | V        |
| High Channel, 2540.2MHz + 2560MHz  |                      |     |                |              |                                |         |                         |       |             |          |
| 5.09891                            | 37.2                 | Pk  | 33.9           | -26.4        | .8                             | -95.2   | -49.7                   | -25   | -24.7       | V        |
| 5.10198                            | 47.47                | Pk  | 33.9           | -26.4        | .8                             | -95.2   | -39.43                  | -25   | -14.43      | H        |
| 7.64923                            | 35.46                | Pk  | 36.9           | -23.5        | .3                             | -95.2   | -46.04                  | -25   | -21.04      | H        |
| 7.65095                            | 35.35                | Pk  | 36.9           | -23.4        | .3                             | -95.2   | -46.05                  | -25   | -21.05      | V        |
| 10.1987                            | 34.35                | Pk  | 38.7           | -19.8        | .8                             | -95.2   | -41.15                  | -25   | -16.15      | V        |
| 10.20171                           | 33.97                | Pk  | 38.7           | -19.9        | .8                             | -95.2   | -41.63                  | -25   | -16.63      | H        |

### 9.2.3. LTE BAND 41

#### LIMIT

FCC: §27.53 (m)

At least 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section.

#### QPSK LTE BAND 41 (20.0MHZ + 20.0MHZ BANDWIDTH)

|                |                          |
|----------------|--------------------------|
| Project #:     | 13179110                 |
| Date:          | 7/19/2020                |
| Test Engineer: | 19410                    |
| Configuration: | EUT Only                 |
| Mode:          | Band 41FCC QPSK 20+20MHz |
| Chamber #:     | Chamber B                |

| Frequency (GHz)                    | Meter Reading (dBuV) | Det | AF T962 (dB/m) | Amp/Cbl (dB) | BRF 2495-2690MHz<br>T1790 1-18GHz | EIRP CF | Corrected Reading (dBm) | LIMIT | Margin (dB) | Polarity |
|------------------------------------|----------------------|-----|----------------|--------------|-----------------------------------|---------|-------------------------|-------|-------------|----------|
| Low Channel, 2506MHz + 2525.8MHz   |                      |     |                |              |                                   |         |                         |       |             |          |
| 5.03059                            | 37.85                | Pk  | 33.7           | -26          | .7                                | -95.2   | -48.95                  | -25   | -23.95      | H        |
| 5.03074                            | 37.51                | Pk  | 33.7           | -26          | .7                                | -95.2   | -49.29                  | -25   | -24.29      | V        |
| 7.54646                            | 36.33                | Pk  | 36.9           | -23.9        | .3                                | -95.2   | -45.57                  | -25   | -20.57      | V        |
| 7.54949                            | 36.03                | Pk  | 36.9           | -24          | .3                                | -95.2   | -45.97                  | -25   | -20.97      | H        |
| 10.06329                           | 34.97                | Pk  | 38.4           | -19.9        | .7                                | -95.2   | -41.03                  | -25   | -16.03      | H        |
| 10.06548                           | 35.45                | Pk  | 38.4           | -19.9        | .7                                | -95.2   | -40.55                  | -25   | -15.55      | V        |
| Mid Channel, 2583.1MHz + 2602.9MHz |                      |     |                |              |                                   |         |                         |       |             |          |
| 5.18593                            | 37.31                | Pk  | 33.6           | -26.4        | .8                                | -95.2   | -49.89                  | -25   | -24.89      | V        |
| 5.18775                            | 36.53                | Pk  | 33.6           | -26.4        | .8                                | -95.2   | -50.67                  | -25   | -25.67      | H        |
| 7.77783                            | 35.23                | Pk  | 37.2           | -23.4        | .3                                | -95.2   | -45.87                  | -25   | -20.87      | V        |
| 7.77994                            | 36.02                | Pk  | 37.2           | -23.3        | .3                                | -95.2   | -44.98                  | -25   | -19.98      | H        |
| 10.37069                           | 34.43                | Pk  | 39.2           | -19.3        | .8                                | -95.2   | -40.07                  | -25   | -15.07      | V        |
| 10.37183                           | 33.12                | Pk  | 39.2           | -19.3        | .8                                | -95.2   | -41.38                  | -25   | -16.38      | H        |
| High Channel, 2660.2MHz + 2680MHz  |                      |     |                |              |                                   |         |                         |       |             |          |
| 5.33899                            | 36.98                | Pk  | 33.2           | -26.5        | .6                                | -95.2   | -50.92                  | -25   | -25.92      | V        |
| 5.33934                            | 37.29                | Pk  | 33.2           | -26.5        | .6                                | -95.2   | -50.61                  | -25   | -25.61      | H        |
| 8.00926                            | 34.78                | Pk  | 37.1           | -22.9        | .3                                | -95.2   | -45.92                  | -25   | -20.92      | H        |
| 8.01245                            | 35.22                | Pk  | 37.1           | -22.9        | .3                                | -95.2   | -45.48                  | -25   | -20.48      | V        |
| 10.67859                           | 34.44                | Pk  | 39.4           | -19.5        | .5                                | -95.2   | -40.36                  | -25   | -15.36      | V        |
| 10.6793                            | 33.99                | Pk  | 39.4           | -19.5        | .5                                | -95.2   | -40.81                  | -25   | -15.81      | H        |

### **9.3. FIELD STRENGTH OF SPURIOUS RADIATION, ABOVE 1GHz, ANT2**

#### **TEST PROCEDURE**

KDB 971168 D01/D02 v02r01

#### **RESULTS**

Maximum + maximum bandwidth combinations of QPSK mode was tested, QPSK results are reported as worst case.

### 9.3.1. LTE BAND 5

#### LIMIT

FCC: §22.917(a)

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log (P)$  dB.

#### QPSK LTE BAND 5 (10.0MHZ + 10.0MHZ BANDWIDTH)

|                |                      |
|----------------|----------------------|
| Project #:     | 13179110             |
| Date:          | 7/17/2020            |
| Test Engineer: | 45258                |
| Configuration: | EUT Only             |
| Mode:          | Band 5 QPSK 10+10MHz |
| Chamber #:     | Chamber B            |

| Frequency (GHz)                  | Meter Reading (dBuV) | Det | AF T962 (dB/m) | Amp/Cbl (dB) | HPF 1.2GHz T1737 1-18GHz | EIRP CF | Corrected Reading (dBm) | LIMIT | Margin (dB) | Polarity |
|----------------------------------|----------------------|-----|----------------|--------------|--------------------------|---------|-------------------------|-------|-------------|----------|
| Low Channel, 829MHz + 838.9MHz   |                      |     |                |              |                          |         |                         |       |             |          |
| 1.66903                          | 40.93                | Pk  | 25             | -30.4        | .7                       | -95.2   | -58.97                  | -13   | -45.97      | H        |
| 1.66922                          | 40.58                | Pk  | 25             | -30.4        | .7                       | -95.2   | -59.32                  | -13   | -46.32      | V        |
| 2.50124                          | 40.44                | Pk  | 29             | -29.3        | .6                       | -95.2   | -54.46                  | -13   | -41.46      | H        |
| 2.50249                          | 40.18                | Pk  | 29             | -29.3        | .6                       | -95.2   | -54.72                  | -13   | -41.72      | V        |
| 3.33578                          | 39.38                | Pk  | 31.1           | -28.2        | .6                       | -95.2   | -52.32                  | -13   | -39.32      | H        |
| 3.33603                          | 38.61                | Pk  | 31.1           | -28.2        | .6                       | -95.2   | -53.09                  | -13   | -40.09      | V        |
| Mid Channel, 831.6MHz + 841.5MHz |                      |     |                |              |                          |         |                         |       |             |          |
| 1.67193                          | 40.94                | Pk  | 25             | -30.4        | .7                       | -95.2   | -58.96                  | -13   | -45.96      | V        |
| 1.67204                          | 40.94                | Pk  | 25             | -30.4        | .7                       | -95.2   | -58.96                  | -13   | -45.96      | H        |
| 2.50856                          | 40.23                | Pk  | 29.1           | -29.3        | .7                       | -95.2   | -54.47                  | -13   | -41.47      | H        |
| 2.50872                          | 39.67                | Pk  | 29.1           | -29.3        | .7                       | -95.2   | -55.03                  | -13   | -42.03      | V        |
| 3.34539                          | 37.98                | Pk  | 30.9           | -28.2        | .6                       | -95.2   | -53.92                  | -13   | -40.92      | V        |
| 3.34633                          | 37.95                | Pk  | 31             | -28.2        | .6                       | -95.2   | -53.85                  | -13   | -40.85      | H        |
| High Channel, 834.1MHz + 844MHz  |                      |     |                |              |                          |         |                         |       |             |          |
| 1.67823                          | 40.53                | Pk  | 24.9           | -30.4        | .7                       | -95.2   | -59.47                  | -13   | -46.47      | V        |
| 1.67975                          | 40.95                | Pk  | 24.9           | -30.4        | .7                       | -95.2   | -59.05                  | -13   | -46.05      | H        |
| 2.51549                          | 39.18                | Pk  | 29.2           | -29.3        | .7                       | -95.2   | -55.42                  | -13   | -42.42      | H        |
| 2.51771                          | 39.74                | Pk  | 29.2           | -29.3        | .8                       | -95.2   | -54.76                  | -13   | -41.76      | V        |
| 3.35456                          | 37.71                | Pk  | 31             | -28          | .6                       | -95.2   | -53.89                  | -13   | -40.89      | H        |
| 3.35521                          | 38.04                | Pk  | 31             | -28          | .6                       | -95.2   | -53.56                  | -13   | -40.56      | V        |

## 9.3.2. LTE BAND 7

### LIMIT

FCC: §27.53 (m)

At least 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section.

### QPSK LTE BAND 7 (20.0MHZ + 20.0MHZ BANDWIDTH)

|                |                      |
|----------------|----------------------|
| Project #:     | 13179110             |
| Date:          | 7/18/2020            |
| Test Engineer: | 45258                |
| Configuration: | EUT Only             |
| Mode:          | Band 5 QPSK 20+20MHz |
| Chamber #:     | Chamber B            |

| Frequency (GHz)                    | Meter Reading (dBuV) | Det | AF T962 (dB/m) | Amp/Cbl (dB) | BRF 2495-2690MHz T1790 1-18GHz | EIRP CF | Corrected Reading (dBm) | LIMIT | Margin (dB) | Polarity |
|------------------------------------|----------------------|-----|----------------|--------------|--------------------------------|---------|-------------------------|-------|-------------|----------|
| Low Channel, 2510MHz + 2529.8MHz   |                      |     |                |              |                                |         |                         |       |             |          |
| 5.04121                            | 37.45                | Pk  | 33.7           | -26.2        | .6                             | -95.2   | -49.65                  | -25   | -24.65      | H        |
| 5.04144                            | 37.97                | Pk  | 33.7           | -26.2        | .6                             | -95.2   | -49.13                  | -25   | -24.13      | V        |
| 7.5587                             | 36.05                | Pk  | 36.8           | -24.1        | .3                             | -95.2   | -46.15                  | -25   | -21.15      | V        |
| 7.56041                            | 35.51                | Pk  | 36.8           | -24.1        | .3                             | -95.2   | -46.69                  | -25   | -21.69      | H        |
| 10.08053                           | 34.61                | Pk  | 38.4           | -20.1        | .6                             | -95.2   | -41.69                  | -25   | -16.69      | H        |
| 10.08126                           | 34.49                | Pk  | 38.4           | -20.1        | .6                             | -95.2   | -41.81                  | -25   | -16.81      | V        |
| Mid Channel, 2525.1MHz + 2544.9MHz |                      |     |                |              |                                |         |                         |       |             |          |
| 5.0707                             | 37.31                | Pk  | 33.8           | -26.1        | .7                             | -95.2   | -49.49                  | -25   | -24.49      | V        |
| 5.07086                            | 37.31                | Pk  | 33.8           | -26.1        | .7                             | -95.2   | -49.49                  | -25   | -24.49      | H        |
| 7.64949                            | 36.09                | Pk  | 36.9           | -23.4        | .3                             | -95.2   | -45.31                  | -25   | -20.31      | V        |
| 7.64984                            | 34.8                 | Pk  | 36.9           | -23.4        | .3                             | -95.2   | -46.6                   | -25   | -21.6       | H        |
| 10.14055                           | 35.41                | Pk  | 38.4           | -19.9        | .6                             | -95.2   | -40.69                  | -25   | -15.69      | V        |
| 10.14078                           | 34.63                | Pk  | 38.4           | -19.9        | .6                             | -95.2   | -41.47                  | -25   | -16.47      | H        |
| High Channel, 2540.2MHz + 2560MHz  |                      |     |                |              |                                |         |                         |       |             |          |
| 5.10095                            | 38.51                | Pk  | 33.9           | -26.4        | .8                             | -95.2   | -48.39                  | -25   | -23.39      | V        |
| 5.10162                            | 37.73                | Pk  | 33.9           | -26.4        | .8                             | -95.2   | -49.17                  | -25   | -24.17      | H        |
| 7.64909                            | 35.21                | Pk  | 36.9           | -23.5        | .3                             | -95.2   | -46.29                  | -25   | -21.29      | H        |
| 7.65209                            | 35.17                | Pk  | 36.9           | -23.4        | .3                             | -95.2   | -46.23                  | -25   | -21.23      | V        |
| 10.19869                           | 34.14                | Pk  | 38.7           | -19.8        | .8                             | -95.2   | -41.36                  | -25   | -16.36      | V        |
| 10.20176                           | 35.48                | Pk  | 38.7           | -19.9        | .8                             | -95.2   | -40.12                  | -25   | -15.12      | H        |

### 9.3.3. LTE BAND 41

#### LIMIT

FCC: §27.53 (m)

At least 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section.

#### QPSK LTE BAND 41 (20.0MHZ + 20.0MHZ BANDWIDTH)

|                |                          |
|----------------|--------------------------|
| Project #:     | 13179110                 |
| Date:          | 7/20/2020                |
| Test Engineer: | 19480                    |
| Configuration: | EUT Only                 |
| Mode:          | Band 41FCC QPSK 20+20MHz |
| Chamber #:     | Chamber B                |

| Frequency (GHz)                    | Meter Reading (dBuV) | Det | AF T962 (dB/m) | Amp/Cbl (dB) | BRF 2495-2690MHz<br>T1790 1-18GHz | EIRP CF | Corrected Reading (dBm) | LIMIT | Margin (dB) | Polarity |
|------------------------------------|----------------------|-----|----------------|--------------|-----------------------------------|---------|-------------------------|-------|-------------|----------|
| Low Channel, 2506MHz + 2525.8MHz   |                      |     |                |              |                                   |         |                         |       |             |          |
| 5.02811                            | 38.25                | Pk  | 33.7           | -26.1        | .7                                | -95.2   | -48.65                  | -25   | -23.65      | V        |
| 5.03043                            | 38.28                | Pk  | 33.7           | -26          | .7                                | -95.2   | -48.52                  | -25   | -23.52      | H        |
| 7.55362                            | 35.91                | Pk  | 36.9           | -24          | .3                                | -95.2   | -46.09                  | -25   | -21.09      | V        |
| 7.55514                            | 36.43                | Pk  | 36.8           | -24          | .3                                | -95.2   | -45.67                  | -25   | -20.67      | H        |
| 10.06117                           | 35.16                | Pk  | 38.4           | -19.9        | .7                                | -95.2   | -40.84                  | -25   | -15.84      | H        |
| 10.06676                           | 35                   | Pk  | 38.3           | -20          | .7                                | -95.2   | -41.2                   | -25   | -16.2       | V        |
| Mid Channel, 2583.1MHz + 2602.9MHz |                      |     |                |              |                                   |         |                         |       |             |          |
| 5.18348                            | 38                   | Pk  | 33.6           | -26.4        | .7                                | -95.2   | -49.3                   | -25   | -24.3       | H        |
| 5.18411                            | 37.17                | Pk  | 33.6           | -26.4        | .7                                | -95.2   | -50.13                  | -25   | -25.13      | V        |
| 7.77968                            | 35.97                | Pk  | 37.2           | -23.3        | .3                                | -95.2   | -45.03                  | -25   | -20.03      | V        |
| 7.78157                            | 35.93                | Pk  | 37.2           | -23.3        | .3                                | -95.2   | -45.07                  | -25   | -20.07      | H        |
| 10.37128                           | 34.84                | Pk  | 39.2           | -19.3        | .8                                | -95.2   | -39.66                  | -25   | -14.66      | V        |
| 10.37275                           | 33.93                | Pk  | 39.2           | -19.3        | .8                                | -95.2   | -40.57                  | -25   | -15.57      | H        |
| High Channel, 2660.2MHz + 2680MHz  |                      |     |                |              |                                   |         |                         |       |             |          |
| 5.33862                            | 37.75                | Pk  | 33.2           | -26.5        | .6                                | -95.2   | -50.15                  | -25   | -25.15      | V        |
| 5.34591                            | 37.66                | Pk  | 33.1           | -26.6        | .5                                | -95.2   | -50.54                  | -25   | -25.54      | H        |
| 8.01049                            | 35.72                | Pk  | 37.1           | -22.9        | .3                                | -95.2   | -44.98                  | -25   | -19.98      | V        |
| 8.01785                            | 35.42                | Pk  | 37.1           | -22.8        | .3                                | -95.2   | -45.18                  | -25   | -20.18      | H        |
| 10.66724                           | 34.32                | Pk  | 39.4           | -19.7        | .5                                | -95.2   | -40.68                  | -25   | -15.68      | V        |
| 10.68419                           | 34.34                | Pk  | 39.4           | -19.5        | .5                                | -95.2   | -40.46                  | -25   | -15.46      | H        |

## **9.4. FIELD STRENGTH OF SPURIOUS RADIATION, ABOVE 1GHz, ANT3**

### **TEST PROCEDURE**

KDB 971168 D01/D02 v02r01

### **RESULTS**

Maximum + maximum bandwidth combinations of QPSK mode was tested, QPSK results are reported as worst case.

## 9.4.1. LTE BAND 7

### LIMIT

FCC: §27.53 (m)

At least 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section.

### QPSK LTE BAND 7 (20.0MHZ + 20.0MHZ BANDWIDTH)

|                |                      |
|----------------|----------------------|
| Project #:     | 13179110             |
| Date:          | 7/21/2020            |
| Test Engineer: | 19206                |
| Configuration: | EUT Only             |
| Mode:          | Band 7 QPSK 20+20MHz |
| Chamber #:     | Chamber B            |

| Frequency (GHz)                    | Meter Reading (dBuV) | Det | AF T962 (dB/m) | Amp/Cbl (dB) | BRF 2495-2690MHz T1790 1-18GHz | EIRP CF | Corrected Reading (dBm) | LIMIT | Margin (dB) | Polarity |
|------------------------------------|----------------------|-----|----------------|--------------|--------------------------------|---------|-------------------------|-------|-------------|----------|
| Low Channel, 2510MHz + 2529.8MHz   |                      |     |                |              |                                |         |                         |       |             |          |
| 4.89307                            | 36.93                | Pk  | 33.3           | -26.5        | .9                             | -95.2   | -50.57                  | -25   | -25.57      | H        |
| 5.02613                            | 37.34                | Pk  | 33.7           | -26          | .7                             | -95.2   | -49.46                  | -25   | -24.46      | V        |
| 7.90993                            | 34.91                | Pk  | 37.2           | -22.6        | .3                             | -95.2   | -45.39                  | -25   | -20.39      | H        |
| 8.002                              | 36.23                | Pk  | 37.1           | -23          | .3                             | -95.2   | -44.57                  | -25   | -19.57      | V        |
| 10.60032                           | 34.33                | Pk  | 39.6           | -19.8        | .8                             | -95.2   | -40.27                  | -25   | -15.27      | H        |
| 10.9848                            | 33.9                 | Pk  | 39.5           | -19.7        | .7                             | -95.2   | -40.8                   | -25   | -15.8       | V        |
| Mid Channel, 2525.1MHz + 2544.9MHz |                      |     |                |              |                                |         |                         |       |             |          |
| 5.0851                             | 37.48                | Pk  | 33.8           | -26.2        | .8                             | -95.2   | -49.32                  | -25   | -24.32      | H        |
| 5.08943                            | 37.57                | Pk  | 33.8           | -26.2        | .8                             | -95.2   | -49.23                  | -25   | -24.23      | V        |
| 8.1092                             | 35.85                | Pk  | 37.2           | -22.6        | .3                             | -95.2   | -44.45                  | -25   | -19.45      | H        |
| 8.23057                            | 35.89                | Pk  | 37.4           | -22.7        | .3                             | -95.2   | -44.31                  | -25   | -19.31      | V        |
| 10.57518                           | 34.07                | Pk  | 39.5           | -19.4        | .9                             | -95.2   | -40.13                  | -25   | -15.13      | H        |
| 11.08907                           | 33.82                | Pk  | 39.3           | -19.5        | .8                             | -95.2   | -40.78                  | -25   | -15.78      | V        |
| High Channel, 2540.2MHz + 2560MHz  |                      |     |                |              |                                |         |                         |       |             |          |
| 5.01688                            | 37.52                | Pk  | 33.8           | -26          | .8                             | -95.2   | -49.08                  | -25   | -24.08      | H        |
| 5.08362                            | 37.39                | Pk  | 33.8           | -26.2        | .8                             | -95.2   | -49.41                  | -25   | -24.41      | V        |
| 7.1382                             | 36.16                | Pk  | 36.8           | -24          | .4                             | -95.2   | -45.84                  | -25   | -20.84      | H        |
| 7.20576                            | 35.56                | Pk  | 37             | -23.8        | .4                             | -95.2   | -46.04                  | -25   | -21.04      | V        |
| 10.43624                           | 33.8                 | Pk  | 39.4           | -19.3        | .8                             | -95.2   | -40.5                   | -25   | -15.5       | V        |
| 10.50035                           | 33.73                | Pk  | 39.5           | -19.2        | .6                             | -95.2   | -40.57                  | -25   | -15.57      | H        |

## 9.4.2. LTE BAND 41

### LIMIT

FCC: §27.53 (m)

At least 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section.

### QPSK LTE BAND 41 (20.0MHZ + 20.0MHZ BANDWIDTH)

|                |                          |
|----------------|--------------------------|
| Project #:     | 13179110                 |
| Date:          | 7/20/2020                |
| Test Engineer: | 19410                    |
| Configuration: | EUT Only                 |
| Mode:          | Band 41FCC QPSK 20+20MHz |
| Chamber #:     | Chamber B                |

| Frequency (GHz)                    | Meter Reading (dBuV) | Det | AF T962 (dB/m) | Amp/Cbl (dB) | BRF 2495-2690MHz<br>T1790 1-18GHz | EIRP CF | Corrected Reading (dBm) | LIMIT | Margin (dB) | Polarity |
|------------------------------------|----------------------|-----|----------------|--------------|-----------------------------------|---------|-------------------------|-------|-------------|----------|
| Low Channel, 2506MHz + 2525.8MHz   |                      |     |                |              |                                   |         |                         |       |             |          |
| 5.03082                            | 37.82                | Pk  | 33.7           | -26          | .7                                | -95.2   | -48.98                  | -25   | -23.98      | H        |
| 5.03099                            | 37.78                | Pk  | 33.7           | -26          | .7                                | -95.2   | -49.02                  | -25   | -24.02      | V        |
| 7.54673                            | 36.05                | Pk  | 36.9           | -23.9        | .3                                | -95.2   | -45.85                  | -25   | -20.85      | H        |
| 7.54891                            | 36.41                | Pk  | 36.9           | -24          | .3                                | -95.2   | -45.59                  | -25   | -20.59      | V        |
| 10.06393                           | 34.5                 | Pk  | 38.3           | -19.9        | .7                                | -95.2   | -41.6                   | -25   | -16.6       | V        |
| 10.0642                            | 34.39                | Pk  | 38.3           | -19.9        | .7                                | -95.2   | -41.71                  | -25   | -16.71      | H        |
| Mid Channel, 2583.1MHz + 2602.9MHz |                      |     |                |              |                                   |         |                         |       |             |          |
| 5.18441                            | 36.86                | Pk  | 33.6           | -26.4        | .7                                | -95.2   | -50.44                  | -25   | -25.44      | H        |
| 5.18514                            | 36.54                | Pk  | 33.6           | -26.4        | .8                                | -95.2   | -50.66                  | -25   | -25.66      | V        |
| 7.77772                            | 35.78                | Pk  | 37.2           | -23.4        | .3                                | -95.2   | -45.32                  | -25   | -20.32      | H        |
| 7.77979                            | 35.44                | Pk  | 37.2           | -23.3        | .3                                | -95.2   | -45.56                  | -25   | -20.56      | V        |
| 10.37149                           | 34.31                | Pk  | 39.2           | -19.3        | .8                                | -95.2   | -40.19                  | -25   | -15.19      | V        |
| 10.37281                           | 34.45                | Pk  | 39.2           | -19.3        | .8                                | -95.2   | -40.05                  | -25   | -15.05      | H        |
| High Channel, 2660.2MHz + 2680MHz  |                      |     |                |              |                                   |         |                         |       |             |          |
| 5.3407                             | 37.44                | Pk  | 33.2           | -26.5        | .6                                | -95.2   | -50.46                  | -25   | -25.46      | V        |
| 5.34129                            | 37.23                | Pk  | 33.1           | -26.6        | .6                                | -95.2   | -50.87                  | -25   | -25.87      | H        |
| 8.00892                            | 35.36                | Pk  | 37.1           | -22.9        | .3                                | -95.2   | -45.34                  | -25   | -20.34      | V        |
| 8.01024                            | 34.94                | Pk  | 37.1           | -22.9        | .3                                | -95.2   | -45.76                  | -25   | -20.76      | H        |
| 10.68065                           | 33.97                | Pk  | 39.4           | -19.5        | .5                                | -95.2   | -40.83                  | -25   | -15.83      | V        |
| 10.68127                           | 33.65                | Pk  | 39.4           | -19.5        | .5                                | -95.2   | -41.15                  | -25   | -16.15      | H        |

## **9.5. FIELD STRENGTH OF SPURIOUS RADIATION, ABOVE 1GHz, ANT4**

### **TEST PROCEDURE**

KDB 971168 D01/D02 v02r01

### **RESULTS**

Maximum + maximum bandwidth combinations of QPSK mode was tested, QPSK results are reported as worst case.

## 9.5.1. LTE BAND 7

### LIMIT

FCC: §27.53 (m)

At least 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section.

### QPSK LTE BAND 7 (20.0MHZ + 20.0MHZ BANDWIDTH)

|                |                      |
|----------------|----------------------|
| Project #:     | 13179110             |
| Date:          | 7/21/2020            |
| Test Engineer: | 19206                |
| Configuration: | EUT Only             |
| Mode:          | Band 7 QPSK 20+20MHz |
| Chamber #:     | Chamber B            |

| Frequency (GHz)                    | Meter Reading (dBuV) | Det | AF T962 (dB/m) | Amp/Cbl (dB) | BRF 2495-2690MHz T1790 1-18GHz | EIRP CF | Corrected Reading (dBm) | LIMIT | Margin (dB) | Polarity |
|------------------------------------|----------------------|-----|----------------|--------------|--------------------------------|---------|-------------------------|-------|-------------|----------|
| Low Channel, 2510MHz + 2529.8MHz   |                      |     |                |              |                                |         |                         |       |             |          |
| 5.01582                            | 37.25                | Pk  | 33.7           | -26          | .8                             | -95.2   | -49.45                  | -25   | -24.45      | H        |
| 5.09377                            | 37.45                | Pk  | 33.9           | -26.3        | .8                             | -95.2   | -49.35                  | -25   | -24.35      | V        |
| 7.19252                            | 35.8                 | Pk  | 37             | -24          | .4                             | -95.2   | -46                     | -25   | -21         | H        |
| 7.21086                            | 35.69                | Pk  | 37.1           | -23.7        | .4                             | -95.2   | -45.71                  | -25   | -20.71      | V        |
| 10.9042                            | 33.6                 | Pk  | 39.4           | -19.5        | .7                             | -95.2   | -41                     | -25   | -16         | H        |
| 11.03972                           | 34.13                | Pk  | 39.4           | -19.7        | .5                             | -95.2   | -40.87                  | -25   | -15.87      | V        |
| Mid Channel, 2525.1MHz + 2544.9MHz |                      |     |                |              |                                |         |                         |       |             |          |
| 5.03222                            | 38.91                | Pk  | 33.7           | -26          | .7                             | -95.2   | -47.89                  | -25   | -22.89      | H        |
| 5.15047                            | 37.42                | Pk  | 33.8           | -26.3        | .8                             | -95.2   | -49.48                  | -25   | -24.48      | V        |
| 7.29257                            | 35.67                | Pk  | 37.1           | -23.2        | .4                             | -95.2   | -45.23                  | -25   | -20.23      | V        |
| 7.35869                            | 35.45                | Pk  | 36.9           | -23.7        | .5                             | -95.2   | -46.05                  | -25   | -21.05      | H        |
| 10.38589                           | 33.71                | Pk  | 39.2           | -19.4        | .8                             | -95.2   | -40.89                  | -25   | -15.89      | V        |
| 10.56324                           | 34.55                | Pk  | 39.6           | -19.4        | .8                             | -95.2   | -39.65                  | -25   | -14.65      | H        |
| High Channel, 2540.2MHz + 2560MHz  |                      |     |                |              |                                |         |                         |       |             |          |
| 5.003                              | 37.95                | Pk  | 33.7           | -25.9        | .8                             | -95.2   | -48.65                  | -25   | -23.65      | V        |
| 5.0168                             | 36.77                | Pk  | 33.8           | -26          | .8                             | -95.2   | -49.83                  | -25   | -24.83      | H        |
| 7.2084                             | 36.32                | Pk  | 37.1           | -23.8        | .4                             | -95.2   | -45.18                  | -25   | -20.18      | H        |
| 7.20927                            | 35.72                | Pk  | 37.1           | -23.7        | .4                             | -95.2   | -45.68                  | -25   | -20.68      | V        |
| 9.72353                            | 34.33                | Pk  | 38.7           | -20          | .8                             | -95.2   | -41.37                  | -25   | -16.37      | V        |
| 9.81179                            | 34.77                | Pk  | 38.6           | -20          | .5                             | -95.2   | -41.33                  | -25   | -16.33      | H        |

## 9.5.2. LTE BAND 41

### LIMIT

FCC: §27.53 (m)

At least 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section.

### QPSK LTE BAND 41 (20.0MHZ + 20.0MHZ BANDWIDTH)

|                |                          |
|----------------|--------------------------|
| Project #:     | 13179110                 |
| Date:          | 7/21/2020                |
| Test Engineer: | 19410                    |
| Configuration: | EUT Only                 |
| Mode:          | Band 41FCC QPSK 20+20MHz |
| Chamber #:     | Chamber B                |

| Frequency (GHz)                    | Meter Reading (dBuV) | Det | AF T962 (dB/m) | Amp/Cbl (dB) | BRF 2495-2690MHz T1790 1-18GHz | EIRP CF | Corrected Reading (dBm) | LIMIT | Margin (dB) | Polarity |
|------------------------------------|----------------------|-----|----------------|--------------|--------------------------------|---------|-------------------------|-------|-------------|----------|
| Low Channel, 2506MHz + 2525.8MHz   |                      |     |                |              |                                |         |                         |       |             |          |
| 5.0311                             | 38.56                | Pk  | 33.7           | -26          | .7                             | -95.2   | -48.24                  | -25   | -23.24      | H        |
| 5.0334                             | 38.54                | Pk  | 33.7           | -26          | .7                             | -95.2   | -48.26                  | -25   | -23.26      | V        |
| 7.54588                            | 36                   | Pk  | 36.9           | -23.9        | .3                             | -95.2   | -45.9                   | -25   | -20.9       | H        |
| 7.54856                            | 35.28                | Pk  | 36.9           | -24          | .3                             | -95.2   | -46.72                  | -25   | -21.72      | V        |
| 10.06277                           | 34.31                | Pk  | 38.4           | -19.9        | .7                             | -95.2   | -41.69                  | -25   | -16.69      | V        |
| 10.06399                           | 34.01                | Pk  | 38.3           | -19.9        | .7                             | -95.2   | -42.09                  | -25   | -17.09      | H        |
| Mid Channel, 2583.1MHz + 2602.9MHz |                      |     |                |              |                                |         |                         |       |             |          |
| 5.18505                            | 37.07                | Pk  | 33.6           | -26.4        | .8                             | -95.2   | -50.13                  | -25   | -25.13      | H        |
| 5.186                              | 36.71                | Pk  | 33.6           | -26.4        | .8                             | -95.2   | -50.49                  | -25   | -25.49      | V        |
| 7.77947                            | 35.41                | Pk  | 37.2           | -23.4        | .3                             | -95.2   | -45.69                  | -25   | -20.69      | V        |
| 7.7798                             | 35.09                | Pk  | 37.2           | -23.3        | .3                             | -95.2   | -45.91                  | -25   | -20.91      | H        |
| 10.37034                           | 33.46                | Pk  | 39.2           | -19.3        | .8                             | -95.2   | -41.04                  | -25   | -16.04      | V        |
| 10.37397                           | 34.09                | Pk  | 39.2           | -19.3        | .8                             | -95.2   | -40.41                  | -25   | -15.41      | H        |
| High Channel, 2660.2MHz + 2680MHz  |                      |     |                |              |                                |         |                         |       |             |          |
| 5.33818                            | 37.26                | Pk  | 33.2           | -26.5        | .6                             | -95.2   | -50.64                  | -25   | -25.64      | H        |
| 5.34055                            | 37.2                 | Pk  | 33.2           | -26.5        | .6                             | -95.2   | -50.7                   | -25   | -25.7       | V        |
| 8.0109                             | 34.83                | Pk  | 37.1           | -22.9        | .3                             | -95.2   | -45.87                  | -25   | -20.87      | V        |
| 8.01229                            | 34.79                | Pk  | 37.1           | -22.9        | .3                             | -95.2   | -45.91                  | -25   | -20.91      | H        |
| 10.67862                           | 34.05                | Pk  | 39.4           | -19.5        | .5                             | -95.2   | -40.75                  | -25   | -15.75      | V        |
| 10.68073                           | 34.14                | Pk  | 39.4           | -19.5        | .5                             | -95.2   | -40.66                  | -25   | -15.66      | H        |

### 9.5.3. LTE BAND 48

#### LIMIT

FCC: §96.41

(e) 3.5 GHz Emissions and Interference Limits—

(2) Additional protection levels. Notwithstanding paragraph (d)(1) of this section, the conducted power of any emissions below 3530 MHz or above 3720 MHz shall not exceed -40dBm/MHz.

#### QPSK LTE BAND 48((20.0MHZ + 20.0MHZ BANDWIDTH)

|                |                       |
|----------------|-----------------------|
| Project #:     | 13179110              |
| Date:          | 8/5/2020              |
| Test Engineer: | 19206                 |
| Configuration: | EUT Only              |
| Mode:          | Band 48 QPSK 20+20MHz |
| Chamber #:     | Chamber B             |

| Frequency (GHz)                    | Meter Reading (dBuV) | Det | AF T962 (dB/m) | Amp/Cbl (dB) | T1792 3400-3800MHz BRF | EIRP CF | Corrected Reading (dBm) | LIMIT | Margin (dB) | Polarity |
|------------------------------------|----------------------|-----|----------------|--------------|------------------------|---------|-------------------------|-------|-------------|----------|
| Low Channel, 3560MHz + 3579.8MHz   |                      |     |                |              |                        |         |                         |       |             |          |
| 4.99223                            | 31.51                | RMS | 33.6           | -26          | .5                     | -95.2   | -55.59                  | -40   | -15.59      | H        |
| 5.05848                            | 32.41                | RMS | 33.8           | -26.1        | .4                     | -95.2   | -54.69                  | -40   | -14.69      | V        |
| 6.18871                            | 30.93                | RMS | 34.6           | -25.7        | .5                     | -95.2   | -54.87                  | -40   | -14.87      | H        |
| 6.26234                            | 30.32                | RMS | 34.5           | -25.1        | .4                     | -95.2   | -55.08                  | -40   | -15.08      | V        |
| 7.14146                            | 29.85                | RMS | 36.9           | -23.9        | .6                     | -95.2   | -51.75                  | -40   | -11.75      | V        |
| 7.28543                            | 30.02                | RMS | 37.1           | -23.1        | .5                     | -95.2   | -50.68                  | -40   | -10.68      | H        |
| Mid Channel, 3615.1MHz + 3634.9MHz |                      |     |                |              |                        |         |                         |       |             |          |
| 5.11014                            | 32.02                | RMS | 33.9           | -26.4        | .5                     | -95.2   | -55.18                  | -40   | -15.18      | V        |
| 5.18454                            | 31.95                | RMS | 33.6           | -26.4        | .6                     | -95.2   | -55.45                  | -40   | -15.45      | H        |
| 6.20022                            | 30.89                | RMS | 34.5           | -25.7        | .5                     | -95.2   | -55.01                  | -40   | -15.01      | V        |
| 6.38205                            | 30.57                | RMS | 34.6           | -24.9        | .6                     | -95.2   | -54.33                  | -40   | -14.33      | H        |
| 7.20461                            | 29.85                | RMS | 37.1           | -23.8        | .6                     | -95.2   | -51.45                  | -40   | -11.45      | H        |
| 7.20495                            | 29.86                | RMS | 37.1           | -23.8        | .6                     | -95.2   | -51.44                  | -40   | -11.44      | V        |
| High Channel, 3670.2MHz + 3690MHz  |                      |     |                |              |                        |         |                         |       |             |          |
| 4.99134                            | 31.59                | RMS | 33.6           | -26          | .5                     | -95.2   | -55.51                  | -40   | -15.51      | V        |
| 5.18471                            | 31.61                | RMS | 33.6           | -26.4        | .6                     | -95.2   | -55.79                  | -40   | -15.79      | H        |
| 6.50668                            | 29.76                | RMS | 35.3           | -24.4        | .5                     | -95.2   | -54.04                  | -40   | -14.04      | V        |
| 6.64073                            | 30.15                | RMS | 35.7           | -24.7        | .4                     | -95.2   | -53.65                  | -40   | -13.65      | H        |
| 8.41957                            | 28.85                | RMS | 37.5           | -22.2        | .9                     | -95.2   | -50.15                  | -40   | -10.15      | V        |
| 8.48825                            | 29.17                | RMS | 37.5           | -22.2        | .8                     | -95.2   | -49.93                  | -40   | -9.93       | H        |

## **9.6. FIELD STRENGTH OF SPURIOUS RADIATION, ABOVE 1GHz, ANT7**

### **TEST PROCEDURE**

KDB 971168 D01/D02 v02r01

### **RESULTS**

Maximum + maximum bandwidth combinations of QPSK mode was tested, QPSK results are reported as worst case.

## 9.6.1. LTE BAND 48

### LIMIT

FCC: §96.41

(e) 3.5 GHz Emissions and Interference Limits

(2) Additional protection levels. Notwithstanding paragraph (d)(1) of this section, the conducted power of any emissions below 3530 MHz or above 3720 MHz shall not exceed -40dBm/MHz.

### QPSK LTE BAND 48((20.0MHZ + 20.0MHZ BANDWIDTH)

|                |                       |
|----------------|-----------------------|
| Project #:     | 13179110              |
| Date:          | 8/05/2020             |
| Test Engineer: | 19206                 |
| Configuration: | EUT Only              |
| Mode:          | Band 48 QPSK 20+20MHz |
| Chamber #:     | Chamber B             |

| Frequency (GHz)                    | Meter Reading (dBuV) | Det | AF T962 (dB/m) | Amp/Cbl (dB) | T1792 3400-3800MHz BRF | EIRP CF | Corrected Reading (dBm) | LIMIT | Margin (dB) | Polarity |
|------------------------------------|----------------------|-----|----------------|--------------|------------------------|---------|-------------------------|-------|-------------|----------|
| Low Channel, 3560MHz + 3579.8MHz   |                      |     |                |              |                        |         |                         |       |             |          |
| 5.10978                            | 31.65                | RMS | 33.9           | -26.4        | .5                     | -95.2   | -55.55                  | -40   | -15.55      | V        |
| 5.11952                            | 32.29                | RMS | 33.9           | -26.4        | .5                     | -95.2   | -54.91                  | -40   | -14.91      | H        |
| 6.51478                            | 29.67                | RMS | 35.2           | -24.3        | .5                     | -95.2   | -54.13                  | -40   | -14.13      | H        |
| 6.5754                             | 29.85                | RMS | 35.5           | -24.3        | .6                     | -95.2   | -53.55                  | -40   | -13.55      | V        |
| 7.27303                            | 29.38                | RMS | 37.2           | -23.3        | .5                     | -95.2   | -51.42                  | -40   | -11.42      | H        |
| 7.27388                            | 30.07                | RMS | 37.1           | -23.3        | .5                     | -95.2   | -50.83                  | -40   | -10.83      | V        |
| Mid Channel, 3615.1MHz + 3634.9MHz |                      |     |                |              |                        |         |                         |       |             |          |
| 5.05835                            | 31.53                | RMS | 33.8           | -26.1        | .4                     | -95.2   | -55.57                  | -40   | -15.57      | V        |
| 5.06389                            | 31.51                | RMS | 33.9           | -26.1        | .5                     | -95.2   | -55.39                  | -40   | -15.39      | H        |
| 6.13221                            | 31.5                 | RMS | 34.6           | -25.7        | .5                     | -95.2   | -54.3                   | -40   | -14.3       | H        |
| 6.18717                            | 30.95                | RMS | 34.6           | -25.7        | .5                     | -95.2   | -54.85                  | -40   | -14.85      | V        |
| 7.20049                            | 30.21                | RMS | 37.1           | -23.9        | .6                     | -95.2   | -51.19                  | -40   | -11.19      | V        |
| 7.20792                            | 30.56                | RMS | 37.1           | -23.8        | .6                     | -95.2   | -50.74                  | -40   | -10.74      | H        |
| High Channel, 3670.2MHz + 3690MHz  |                      |     |                |              |                        |         |                         |       |             |          |
| 5.05592                            | 31.99                | RMS | 33.8           | -26.2        | .4                     | -95.2   | -55.21                  | -40   | -15.21      | V        |
| 5.05954                            | 31.7                 | RMS | 33.8           | -26.1        | .5                     | -95.2   | -55.3                   | -40   | -15.3       | H        |
| 6.45219                            | 30.02                | RMS | 35             | -24.8        | .6                     | -95.2   | -54.38                  | -40   | -14.38      | V        |
| 6.50554                            | 30.4                 | RMS | 35.3           | -24.4        | .5                     | -95.2   | -53.4                   | -40   | -13.4       | H        |
| 8.09889                            | 29.66                | RMS | 37.2           | -22.5        | .6                     | -95.2   | -50.24                  | -40   | -10.24      | V        |
| 8.36743                            | 29.22                | RMS | 37.6           | -22.6        | .7                     | -95.2   | -50.28                  | -40   | -10.28      | H        |

## **9.7. FIELD STRENGTH OF SPURIOUS RADIATION, ABOVE 1GHz, ANT8**

### **TEST PROCEDURE**

KDB 971168 D01/D02 v02r01

### **RESULTS**

Maximum + maximum bandwidth combinations of QPSK mode was tested, QPSK results are reported as worst case.

## 9.7.1. LTE BAND 48

### LIMIT

FCC: §96.41

(e) 3.5 GHz Emissions and Interference Limits—

(2) Additional protection levels. Notwithstanding paragraph (d)(1) of this section, the conducted power of any emissions below 3530 MHz or above 3720 MHz shall not exceed -40dBm/MHz.

### QPSK LTE BAND 48((20.0MHZ + 20.0MHZ BANDWIDTH)

|                |                       |
|----------------|-----------------------|
| Project #:     | 13179110              |
| Date:          | 9/3/2020              |
| Test Engineer: | 50822                 |
| Configuration: | EUT Only              |
| Mode:          | Band 48 QPSK 20+20MHz |
| Chamber #:     | Chamber B             |

| Frequency (GHz)                    | Meter Reading (dBuV) | Det | AF T962 (dB/m) | Amp/Cbl (dB) | T1792 3400-3800MHz BRF | EIRP CF | Corrected Reading (dBm) | LIMIT | Margin (dB) | Polarity |
|------------------------------------|----------------------|-----|----------------|--------------|------------------------|---------|-------------------------|-------|-------------|----------|
| Low Channel, 3560MHz + 3579.8MHz   |                      |     |                |              |                        |         |                         |       |             |          |
| 5.05412                            | 31.9                 | RMS | 33.8           | -26.2        | .4                     | -95.2   | -55.3                   | -40   | -15.3       | H        |
| 5.18281                            | 31.23                | RMS | 33.6           | -26.4        | .6                     | -95.2   | -56.17                  | -40   | -16.17      | V        |
| 6.1203                             | 31.01                | RMS | 34.6           | -25.8        | .4                     | -95.2   | -54.99                  | -40   | -14.99      | H        |
| 6.12676                            | 30.88                | RMS | 34.6           | -25.7        | .5                     | -95.2   | -54.92                  | -40   | -14.92      | V        |
| 7.20422                            | 29.83                | RMS | 37.1           | -23.8        | .6                     | -95.2   | -51.47                  | -40   | -11.47      | V        |
| 7.27874                            | 29.89                | RMS | 37.1           | -23.2        | .5                     | -95.2   | -50.91                  | -40   | -10.91      | H        |
| Mid Channel, 3615.1MHz + 3634.9MHz |                      |     |                |              |                        |         |                         |       |             |          |
| 6.88616                            | 31.13                | RMS | 36.2           | -24.6        | .6                     | -95.2   | -51.87                  | -40   | -11.87      | H        |
| 6.88989                            | 30.31                | RMS | 36.1           | -24.5        | .6                     | -95.2   | -52.69                  | -40   | -12.69      | V        |
| 8.91693                            | 28.39                | RMS | 38             | -21.6        | .5                     | -95.2   | -49.91                  | -40   | -9.91       | H        |
| 8.92642                            | 29.74                | RMS | 38             | -21.5        | .5                     | -95.2   | -48.46                  | -40   | -8.46       | V        |
| 11.9408                            | 26.89                | RMS | 39.5           | -20          | .9                     | -95.2   | -47.91                  | -40   | -7.91       | H        |
| 12.06602                           | 27.49                | RMS | 39.9           | -20          | .9                     | -95.2   | -46.91                  | -40   | -6.91       | V        |
| High Channel, 3670.2MHz + 3690MHz  |                      |     |                |              |                        |         |                         |       |             |          |
| 7.27125                            | 30.08                | RMS | 37.2           | -23.4        | .5                     | -95.2   | -50.82                  | -40   | -10.82      | H        |
| 7.32847                            | 29.44                | RMS | 37             | -23.7        | .5                     | -95.2   | -51.96                  | -40   | -11.96      | V        |
| 9.82333                            | 28.36                | RMS | 38.6           | -20.3        | .6                     | -95.2   | -47.94                  | -40   | -7.94       | V        |
| 9.95                               | 27.47                | RMS | 38.3           | -20          | .6                     | -95.2   | -48.83                  | -40   | -8.83       | H        |
| 13.19803                           | 28.66                | RMS | 40.1           | -21          | .6                     | -95.2   | -46.84                  | -40   | -6.84       | V        |
| 13.22907                           | 27.37                | RMS | 40             | -20.9        | .6                     | -95.2   | -48.13                  | -40   | -8.13       | H        |

## **9.8. FIELD STRENGTH OF SPURIOUS RADIATION, ABOVE 1GHz, ANT9**

### **TEST PROCEDURE**

KDB 971168 D01/D02 v02r01

### **RESULTS**

Maximum + maximum bandwidth combinations of QPSK mode was tested, QPSK results are reported as worst case.

## 9.8.1. LTE BAND 48

### LIMIT

FCC: §96.41

(e) 3.5 GHz Emissions and Interference Limits—

(2) Additional protection levels. Notwithstanding paragraph (d)(1) of this section, the conducted power of any emissions below 3530 MHz or above 3720 MHz shall not exceed -40dBm/MHz.

### QPSK LTE BAND 48((20.0MHZ + 20.0MHZ BANDWIDTH)

|                |                       |
|----------------|-----------------------|
| Project #:     | 13179110              |
| Date:          | 8/06/2020             |
| Test Engineer: | 19206                 |
| Configuration: | EUT Only              |
| Mode:          | Band 48 QPSK 20+20MHz |
| Chamber #:     | Chamber B             |

| Frequency (GHz)                    | Meter Reading (dBuV) | Det | AF T962 (dB/m) | Amp/Cbl (dB) | T1792 3400-3800MHz BRF | EIRP CF | Corrected Reading (dBm) | LIMIT | Margin (dB) | Polarity |
|------------------------------------|----------------------|-----|----------------|--------------|------------------------|---------|-------------------------|-------|-------------|----------|
| Low Channel, 3560MHz + 3579.8MHz   |                      |     |                |              |                        |         |                         |       |             |          |
| 4.86171                            | 31.89                | RMS | 33.3           | -26.9        | .5                     | -95.2   | -56.41                  | -40   | -16.41      | H        |
| 4.989                              | 31.26                | RMS | 33.6           | -26          | .5                     | -95.2   | -55.84                  | -40   | -15.84      | V        |
| 6.0048                             | 30.73                | RMS | 34.4           | -25.6        | .5                     | -95.2   | -55.17                  | -40   | -15.17      | V        |
| 6.00827                            | 30.84                | RMS | 34.5           | -25.7        | .5                     | -95.2   | -55.06                  | -40   | -15.06      | H        |
| 7.26455                            | 29.43                | RMS | 37.1           | -23.4        | .6                     | -95.2   | -51.47                  | -40   | -11.47      | V        |
| 7.26538                            | 29.66                | RMS | 37.1           | -23.4        | .6                     | -95.2   | -51.24                  | -40   | -11.24      | H        |
| Mid Channel, 3615.1MHz + 3634.9MHz |                      |     |                |              |                        |         |                         |       |             |          |
| 4.81008                            | 32.93                | RMS | 33             | -27          | .5                     | -95.2   | -55.77                  | -40   | -15.77      | H        |
| 5.06211                            | 31.77                | RMS | 33.9           | -26.1        | .5                     | -95.2   | -55.13                  | -40   | -15.13      | V        |
| 5.87675                            | 31.33                | RMS | 33.8           | -25.9        | .4                     | -95.2   | -55.57                  | -40   | -15.57      | H        |
| 5.95107                            | 31.39                | RMS | 34.3           | -25.6        | .3                     | -95.2   | -54.81                  | -40   | -14.81      | V        |
| 7.18357                            | 29.54                | RMS | 37             | -24.1        | .6                     | -95.2   | -52.16                  | -40   | -12.16      | V        |
| 7.27686                            | 29.23                | RMS | 37.1           | -23.2        | .5                     | -95.2   | -51.57                  | -40   | -11.57      | H        |
| High Channel, 3670.2MHz + 3690MHz  |                      |     |                |              |                        |         |                         |       |             |          |
| 5.18716                            | 31.68                | RMS | 33.6           | -26.4        | .6                     | -95.2   | -55.72                  | -40   | -15.72      | V        |
| 5.20281                            | 31.44                | RMS | 33.6           | -26.2        | .6                     | -95.2   | -55.76                  | -40   | -15.76      | H        |
| 6.75664                            | 30.06                | RMS | 35.8           | -24.8        | .6                     | -95.2   | -53.54                  | -40   | -13.54      | V        |
| 6.87823                            | 29.95                | RMS | 36.3           | -24.7        | .6                     | -95.2   | -53.05                  | -40   | -13.05      | H        |
| 8.41453                            | 29.82                | RMS | 37.6           | -22.2        | .8                     | -95.2   | -49.18                  | -40   | -9.18       | V        |
| 8.48127                            | 29.01                | RMS | 37.5           | -22.1        | .7                     | -95.2   | -50.09                  | -40   | -10.09      | H        |

## 10. SETUP PHOTOS

Please refer to 13179110-EP1V1 for setup photos.

## END OF REPORT