

## FCC Test Report (Part 27 – CA mode: LTE Band 41C)

**Report No.:** RFBCKT-WTW-P22010886-7

**FCC ID:** HFSQTAD53N

**Test Model:** QTAD53

**Received Date:** Feb. 10, 2022

**Test Date:** Feb. 27 ~ Mar. 06, 2022

**Issued Date:** Mar. 30, 2022

**Applicant:** Quanta Computer Inc.

**Address:** NO. 188, Wenhua 2nd Rd., Guishan Dist., Taoyuan City 33377, Taiwan  
(R.O.C)

**Issued By:** Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch  
Lin Kou Laboratories

**Lab Address:** No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan

**Test Location:** No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City  
33383, Taiwan

**FCC Registration /  
Designation Number:** 788550 / TW0003



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### Release Control Record

| Issue No.              | Description      | Date Issued   |
|------------------------|------------------|---------------|
| RFBCKT-WTW-P22010886-7 | Original release | Mar. 30, 2022 |

## 1 Certificate of Conformity

**Product:** 5G Hotspot

**Brand:** T-Mobile

**Test Model:** QTAD53

**Sample Status:** Engineering sample

**Applicant:** Quanta Computer Inc.

**Test Date:** Feb. 27 ~ Mar. 06, 2022

**Standards:** FCC Part 27, Subpart C, M

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

**Prepared by :** Pettie Chen, **Date:** Mar. 30, 2022  
Pettie Chen / Senior Specialist

**Approved by :** Jeremy Lin, **Date:** Mar. 30, 2022  
Jeremy Lin / Project Engineer

## 2 Summary of Test Results

| Applied Standard: FCC Part 27 & Part 2 |                                                                    |        |                                                                                   |
|----------------------------------------|--------------------------------------------------------------------|--------|-----------------------------------------------------------------------------------|
| FCC Clause                             | Test Item                                                          | Result | Remarks                                                                           |
| 2.1046<br>27.50<br>(h)(2)              | Equivalent Isotropically Radiated Power                            | Pass   | Meet the requirement of limit.                                                    |
| 2.1047                                 | Modulation Characteristics                                         | Pass   | Refer to Note 2                                                                   |
| ---                                    | Peak To Average Ratio                                              | Pass   | Meet the requirement of limit.                                                    |
| 2.1055<br>27.54                        | Frequency Stability<br>Stay with the authorized bands of operation | Pass   | Meet the requirement of limit.                                                    |
| 2.1049                                 | Emission Bandwidth                                                 | Pass   | Meet the requirement of limit.                                                    |
| 2.1051<br>27.53<br>(m)(4)(6)           | Band Edge Measurements                                             | Pass   | Meet the requirement of limit.                                                    |
| 2.1051<br>27.53<br>(m)(4)(6)           | Conducted Spurious Emissions                                       | Pass   | Meet the requirement of limit.                                                    |
| 2.1053 27.53<br>(m)(4)(6)              | Radiated Spurious Emissions                                        | Pass   | Meet the requirement of limit.<br>Minimum passing margin is -25.3dB at 167.74MHz. |

Note:

- Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
- LTE CA mode is similar to digital modulation in LTE single frequency band, so please refer to BV CPS report no.: RFBCKT-WTW-P22010886-5 for the modulation characteristics data of CA mode.

### 2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

| Measurement                    | Frequency        | Expanded Uncertainty (k=2) (±) |
|--------------------------------|------------------|--------------------------------|
| Radiated Emissions up to 1 GHz | 9kHz ~ 30MHz     | 3.04 dB                        |
|                                | 30MHz ~ 200MHz   | 3.59 dB                        |
|                                | 200MHz ~ 1000MHz | 3.60 dB                        |
| Radiated Emissions above 1 GHz | 1GHz ~ 18GHz     | 2.29 dB                        |
|                                | 18GHz ~ 40GHz    | 2.29 dB                        |

## 2.2 Test Site and Instruments

| Description & Manufacturer                                  | Model No.                              | Serial No.                      | Cal. Date     | Cal. Due      |
|-------------------------------------------------------------|----------------------------------------|---------------------------------|---------------|---------------|
| Test Receiver<br>KEYSIGHT                                   | N9038A                                 | MY55420137                      | Apr. 09, 2021 | Apr. 08, 2022 |
| Spectrum Analyzer<br>ROHDE & SCHWARZ                        | FSP40                                  | 100039                          | Jun. 10, 2021 | Jun. 09, 2022 |
| MXG Vector signal generator<br>Agilent                      | N5182B                                 | MY53050430                      | Nov. 25, 2021 | Nov. 24, 2022 |
| Radio Communication<br>Analyzer<br>Anritsu                  | MT8821C                                | 6261806803                      | Feb. 16, 2022 | Feb. 15, 2023 |
| BILOG Antenna<br>SCHWARZBECK                                | VULB9168                               | 9168-160                        | Oct. 28, 2021 | Oct. 27, 2022 |
| HORN Antenna<br>SCHWARZBECK                                 | BBHA 9120 D                            | 9120D-1169                      | Nov. 14, 2021 | Nov. 13, 2022 |
| HORN Antenna<br>SCHWARZBECK                                 | BBHA 9170                              | BBHA9170241                     | Oct. 26, 2021 | Oct. 25, 2022 |
| Loop Antenna<br>TESEQ                                       | HLA 6121                               | 45745                           | Jul. 21, 2021 | Jul. 20, 2022 |
| Preamplifier<br>Agilent<br>(Below 1GHz)                     | 8447D                                  | 2944A10638                      | Jun. 05, 2021 | Jun. 04, 2022 |
| Preamplifier<br>Agilent<br>(Above 1GHz)                     | 8449B                                  | 3008A01887                      | Feb. 17, 2022 | Feb. 16, 2023 |
| RF signal cable<br>HUBER+SUHNER&EMCI                        | SUCOFLEX 104 &<br>EMC104-SM-<br>SM8000 | CABLE-CH9-02<br>(248780+171006) | Jan. 15, 2022 | Jan. 14, 2023 |
| RF signal cable<br>HUBER+SUHNER                             | SUCOFLEX 104                           | CABLE-CH9-<br>(250795/4)        | Jan. 15, 2022 | Jan. 14, 2023 |
| RF signal cable<br>Woken                                    | 8D-FB                                  | Cable-CH9-01                    | Jun. 05, 2021 | Jun. 04, 2022 |
| Software<br>BV ADT                                          | ADT_Radiated_<br>V7.6.15.9.5           | NA                              | NA            | NA            |
| Antenna Tower & Turn<br>BV ADT                              | AT100                                  | AT93021705                      | NA            | NA            |
| Turn Table<br>BV ADT                                        | TT100                                  | TT93021705                      | NA            | NA            |
| Turn Table Controller<br>BV ADT                             | SC100                                  | SC93021705                      | NA            | NA            |
| Boresight Antenna Fixture                                   | FBA-01                                 | FBA-SIP01                       | NA            | NA            |
| Standard Temperature And<br>Humidity Chamber<br>GIANT FORCE | GTH-120-40-CP-AR                       | MAA1306-019                     | Sep. 10, 2021 | Sep. 09, 2022 |
| JFW 20dB attenuation                                        | 50HF-020-SMA                           | NA                              | NA            | NA            |
| True RMS Clamp Meter<br>Fluke                               | 325                                    | 31130711WS                      | Jun. 02, 2021 | Jun. 01, 2022 |
| DC power supply<br>Keysight                                 | U8002A                                 | MY56330015                      | NA            | NA            |

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
2. The test was performed in HwaYa Chamber 9.

### 3 General Information

#### 3.1 General Description of EUT

|                     |                                                    |                       |                      |                      |                     |
|---------------------|----------------------------------------------------|-----------------------|----------------------|----------------------|---------------------|
| Product             | 5G Hotspot                                         |                       |                      |                      |                     |
| Brand               | T-Mobile                                           |                       |                      |                      |                     |
| Test Model          | QTAD53                                             |                       |                      |                      |                     |
| Sample Status       | Engineering sample                                 |                       |                      |                      |                     |
| Power Supply Rating | 5Vdc / 9Vdc / 12Vdc (Adapter)<br>3.85Vdc (Battery) |                       |                      |                      |                     |
| Modulation Type     | QPSK, 16QAM, 64QAM, 256QAM                         |                       |                      |                      |                     |
| Operating Frequency | LTE Band 41C (20MHz + 20MHz)                       | 2506.0MHz ~ 2680.0MHz |                      |                      |                     |
| Max. EIRP Power     |                                                    | QPSK                  | 16QAM                | 64QAM                | 256QAM              |
|                     | LTE Band 41C (20MHz + 20MHz)                       | 281.838mW (24.50dBm)  | 218.776mW (23.40dBm) | 168.655mW (22.27dBm) | 91.201mW (19.60dBm) |
| Emission Designator |                                                    | QPSK                  | 16QAM                | 64QAM                | 256QAM              |
|                     | LTE Band 41C (20MHz + 20MHz)                       | 37M4G7D               | 37M4D7W              | 37M4D7W              | 37M6D7W             |
| Antenna Type        | Refer to Note as below                             |                       |                      |                      |                     |
| Antenna Connector   | Refer to Note as below                             |                       |                      |                      |                     |
| Accessory Device    | Refer to Note as below                             |                       |                      |                      |                     |
| Cable Supplied      | Refer to Note as below                             |                       |                      |                      |                     |

Note:

1. The EUT contains following accessory devices.

| Product     | Brand                      | Model             | Description                                                         |
|-------------|----------------------------|-------------------|---------------------------------------------------------------------|
| Adapter 1   | TEN PAO INTERNATIONAL LTD. | S018BYU1200150    | I/P: 100-240Vac, 50/60Hz, 600mA<br>O/P: 5Vdc/9Vdc/12Vdc=3A/2A/1.5A  |
| Adapter 2   | Aohai Technology Co., Ltd  | A138A-120150U-US2 | I/P: 100-240V~50/60Hz, 0.5A<br>O/P: 5Vdc, 2.5A/9Vdc, 2A/12Vdc, 1.5A |
| USB Cable 1 | Electronics Taiwai Ltd.    | DDEMU110079       | 0.95m shielded USB cable without core                               |
| USB Cable 2 | IMEX INC                   | 60-6382-520-FA    | 0.97m shielded USB cable without core                               |
| Battery     | VEKEN                      | 141033            | 3.85Vdc, 6460mAh, 24.87Wh                                           |

\* After pre-tested, adapter 2 and USB cable 1 were the worst case and chosen for final test.

2. There are two sources for EUT's memory. Only the supplier is different and the rest of the specifications are the same.

| Sample | Item            | Brand                        | Model             |
|--------|-----------------|------------------------------|-------------------|
| A      | Memory - Main   | Nanya Technology Corporation | NM4888KSPAXAI-3E  |
| B      | Memory - Second | Jeju Semiconductor Corp.     | JSFDDQ5QHAFGD-405 |

\* After pre-tested, sample A was the worse and chosen for final test.

3. The following antennas were provided to the EUT.

| LTE Band |      |           |            |          |          |         |          |          |         |          |          |         |          |          |
|----------|------|-----------|------------|----------|----------|---------|----------|----------|---------|----------|----------|---------|----------|----------|
| Ant. No. | Type | Connector | Gain (dBi) |          |          |         |          |          |         |          |          |         |          |          |
|          |      |           | B2         | B4       | B5       | B7      | B12      | B13      | B25     | B26      | B38      | B41     | B66      | B71      |
| 0        | PIFA | MUR       | 1.23871    | 3.16163  | 0.345671 | 1.15435 | 0.154297 | -3.23099 | 1.23871 | 0.702007 | 0.371642 | 1.15435 | 3.16163  | 0.426023 |
| 1        | PIFA | IPEX      | -          | -        | -        | -       | -        | -        | -       | -        | -        | -       | -        | -        |
| 2        | PIFA | IPEX      | 0.861738   | 0.805343 | -        | -       | -        | -        | -       | -        | -        | -       | 0.805343 | -        |
| 3        | PIFA | MUR       | -          | -        | -        | -       | -        | -        | -       | -        | -        | -       | -        | -        |
| 4        | PIFA | IPEX      | -          | -        | -        | -       | -        | -        | -       | -        | -        | -       | -        | -        |

\* The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

4. For CA mode configuration, please consult the manufacturer to declare the test mode.

5. The EUT support the following CA Configuration.

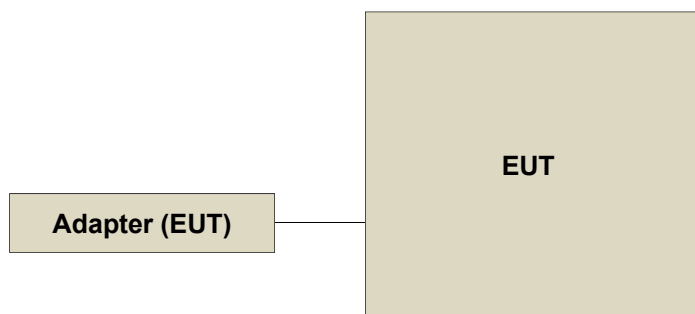
| Band Configuration |
|--------------------|
| 41C                |

6. E-UTRA CA configuration / Bandwidth combination set.

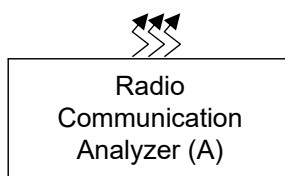
| E-UTRA CA configuration / Bandwidth combination set |                          |                                                             |                                      |                                    |                           |
|-----------------------------------------------------|--------------------------|-------------------------------------------------------------|--------------------------------------|------------------------------------|---------------------------|
| E-UTRA CA configuration                             | Uplink CA configurations | Component carriers in order of increasing carrier frequency |                                      | Maximum aggregated bandwidth [MHz] | Bandwidth combination set |
|                                                     |                          | Channel bandwidths for carrier [MHz]                        | Channel bandwidths for carrier [MHz] |                                    |                           |
| CA_41C                                              | CA_41C                   | 10                                                          | 20                                   | 40                                 | 0                         |
|                                                     |                          | 15                                                          | 15, 20                               |                                    |                           |
|                                                     |                          | 20                                                          | 10, 15, 20                           |                                    |                           |
|                                                     |                          | 5, 10                                                       | 20                                   | 40                                 | 1                         |
|                                                     |                          | 15                                                          | 15, 20                               |                                    |                           |
|                                                     |                          | 20                                                          | 5, 10, 15, 20                        |                                    |                           |
|                                                     |                          | 10                                                          | 15, 20                               | 40                                 | 2                         |
|                                                     |                          | 15                                                          | 10, 15, 20                           |                                    |                           |
|                                                     |                          | 20                                                          | 10, 15, 20                           |                                    |                           |
|                                                     |                          | 10                                                          | 20                                   | 40                                 | 3                         |
|                                                     |                          | 20                                                          | 20                                   |                                    |                           |

\*41C is continuous CA and maximum combination is 20M+20M.

### 3.2 Configuration of System under Test



Remote site



#### 3.2.1 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

| ID | Product                      | Brand   | Model No. | Serial No. | FCC ID | Remarks |
|----|------------------------------|---------|-----------|------------|--------|---------|
| A. | Radio Communication Analyzer | Anritsu | MT8821C   | 6261806803 | NA     | -       |

Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Item A acted as a communication partner to transfer data.

### 3.3 Test Mode Applicability and Tested Channel Detail

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports. The worst case was found when positioned as the table below. Following channel(s) was (were) selected for the final test as listed below:

| Band         | Radiated Emission |
|--------------|-------------------|
| LTE Band 41C | X-plane           |

#### LTE Band 41 (CA 41C)

| EUT Configure Mode | Test item             | Available channel                | Tested channel                                                                                                                     | Channel Bandwidth | Modulation                          | Mode                                                              |
|--------------------|-----------------------|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------|-------------------|-------------------------------------|-------------------------------------------------------------------|
| -                  | EIRP                  | 39750 to 41292<br>39948 to 41490 | 39750 (2506.0MHz) +<br>39948 (2525.8MHz),<br>40521 (2583.1MHz) +<br>40719 (2602.9MHz),<br>41292 (2660.2MHz) +<br>41490 (2680.0MHz) | 20MHz<br>+ 20MHz  | QPSK / 16QAM /<br>64QAM /<br>256QAM | 1 RB / 0 RB Offset<br>1 RB / 99 RB Offset                         |
| -                  | Frequency Stability   | 39750 to 41292<br>39948 to 41490 | 41292 (2660.2MHz)+<br>41490 (2680.0MHz)                                                                                            | 20MHz<br>+ 20MHz  | QPSK                                | 100 RB / 0 RB Offset                                              |
| -                  | Occupied Bandwidth    | 39750 to 41292<br>39948 to 41490 | 39750 (2506.0MHz) +<br>39948 (2525.8MHz),<br>40521 (2583.1MHz) +<br>40719 (2602.9MHz),<br>41292 (2660.2MHz) +<br>41490 (2680.0MHz) | 20MHz<br>+ 20MHz  | QPSK / 16QAM /<br>64QAM /<br>256QAM | 1 RB / 0 RB Offset<br>1 RB / 99 RB Offset                         |
| -                  | Emission Mask         | 39750 to 41292<br>39948 to 41490 | 39750 (2506.0MHz) +<br>39948 (2525.8MHz),<br>40521 (2583.1MHz) +<br>40719 (2602.9MHz),<br>41292 (2660.2MHz) +<br>41490 (2680.0MHz) | 20MHz<br>+ 20MHz  | QPSK                                | 1 RB / 0 RB Offset<br>1 RB / 99 RB Offset<br>100 RB / 0 RB Offset |
| -                  | Peak to Average Ratio | 39750 to 41292<br>39948 to 41490 | 39750 (2506.0MHz) +<br>39948 (2525.8MHz),<br>40521 (2583.1MHz) +<br>40719 (2602.9MHz),<br>41292 (2660.2MHz) +<br>41490 (2680.0MHz) | 20MHz<br>+ 20MHz  | QPSK / 16QAM /<br>64QAM /<br>256QAM | 1 RB / 0 RB Offset<br>1 RB / 99 RB Offset                         |
| -                  | Conducted Emission    | 39750 to 41292<br>39948 to 41490 | 39750 (2506.0MHz) +<br>39948 (2525.8MHz),<br>40521 (2583.1MHz) +<br>40719 (2602.9MHz),<br>41292 (2660.2MHz) +<br>41490 (2680.0MHz) | 20MHz<br>+ 20MHz  | QPSK                                | 1 RB / 0 RB Offset<br>1 RB / 99 RB Offset                         |

| EUT<br>Configure<br>Mode | Test item                       | Available channel                | Tested channel                                                                                                                     | Channel<br>Bandwidth | Modulation | Mode                                      |
|--------------------------|---------------------------------|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------|----------------------|------------|-------------------------------------------|
| -                        | Radiated Emission<br>Below 1GHz | 39750 to 41292<br>39948 to 41490 | 39750 (2506.0MHz) +<br>39948 (2525.8MHz)                                                                                           | 20MHz<br>+ 20MHz     | QPSK       | 1 RB / 0 RB Offset<br>1 RB / 99 RB Offset |
| -                        | Radiated Emission<br>Above 1GHz | 39750 to 41292<br>39948 to 41490 | 39750 (2506.0MHz) +<br>39948 (2525.8MHz),<br>40521 (2583.1MHz) +<br>40719 (2602.9MHz),<br>41292 (2660.2MHz) +<br>41490 (2680.0MHz) | 20MHz<br>+ 20MHz     | QPSK       | 1 RB / 0 RB Offset<br>1 RB / 99 RB Offset |

**Note:**

1. This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.
2. LTE CA mode is similar to digital modulation in LTE single frequency band, so please refer to BV CPS report no.: RFBCKT-WTW-P22010886-5 for the modulation characteristics data of CA mode.

**Test Condition:**

| Test Item             | Environmental Conditions | Input Power  | Tested By   |
|-----------------------|--------------------------|--------------|-------------|
| EIRP                  | 25deg. C, 60%RH          | 120Vac, 60Hz | James Yang  |
| Frequency Stability   | 25deg. C, 60%RH          | 3.85Vdc      | James Yang  |
| Occupied Bandwidth    | 25deg. C, 60%RH          | 120Vac, 60Hz | James Yang  |
| Band Edge             | 25deg. C, 60%RH          | 120Vac, 60Hz | James Yang  |
| Peak To Average Ratio | 25deg. C, 60%RH          | 120Vac, 60Hz | James Yang  |
| Conducted Emission    | 25deg. C, 60%RH          | 120Vac, 60Hz | James Yang  |
| Radiated Emission     | 23deg. C, 65%RH          | 120Vac, 60Hz | Jones Chang |

### **3.4 EUT Operating Conditions**

The EUT makes a call to the communication simulator. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency

### **3.5 General Description of Applied Standards and References**

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards and References:

#### **Test Standard:**

**FCC 47 CFR Part 2**

**FCC 47 CFR Part 27**

**ANSI/TIA/EIA-603-E 2016**

ANSI 63.26-2015

All test items have been performed and recorded as per the above standards.

#### **References Test Guidance:**

**KDB 971168 D01 Power Meas License Digital Systems v03r01**

All test items have been performed as a reference to the above KDB test guidance.

## 4 Test Types and Results

### 4.1 Output Power Measurement

#### 4.1.1 Limits of Output Power Measurement

Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.

#### 4.1.2 Test Procedures

##### Conducted Power Measurement:

The EUT was set up for the maximum power with LTE link data modulation and link up with simulator. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

##### Maximum EIRP

The relevant equation for determining the maximum ERP or EIRP from the measured RF output power is

given in Equation as follows:

$$\text{ERP or EIRP} = P_{\text{Meas}} + G_T$$

where

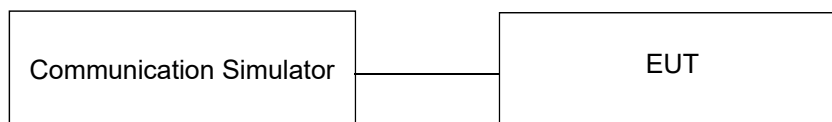
ERP or EIRP effective radiated power or equivalent isotropically radiated power, respectively  
(expressed in the same units as  $P_{\text{Meas}}$ , e.g., dBm or dBW)

$P_{\text{Meas}}$  measured transmitter output power or PSD, in dBm or dBW

$G_T$  gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP)

#### 4.1.3 Test Setup

Conducted Power Measurement:



#### 4.1.4 Test Results

##### Conducted Output Power (dBm)

LTE Band 41 (CA 41C)

| Con-<br>figure                   | Com-<br>bination | PCC   |             |                 |            |              |             |                      | SCC  |             |                 |            |              |             |                      | Measurement<br>Power                   |
|----------------------------------|------------------|-------|-------------|-----------------|------------|--------------|-------------|----------------------|------|-------------|-----------------|------------|--------------|-------------|----------------------|----------------------------------------|
|                                  |                  | Band  | BW<br>(MHz) | Modu-<br>lation | RB<br>Size | RB<br>Offset | UL<br>Chan. | UL<br>Freq.<br>(MHz) | Band | BW<br>(MHz) | Modu-<br>lation | RB<br>Size | RB<br>Offset | UL<br>Chan. | UL<br>Freq.<br>(MHz) | Tx Power<br>with UL-CA<br>Active (dBm) |
|                                  |                  | Total |             |                 |            |              |             |                      |      |             |                 |            |              |             |                      |                                        |
| Intra<br>Band<br>Conti-<br>guous | CA_41C           | 41    | 20          | QPSK            | 1          | 0            | 39750       | 2506                 | 41   | 20          | QPSK            | 1          | 99           | 39948       | 2525.8               | 14.46                                  |
|                                  |                  |       |             |                 | 1          | 99           |             |                      |      |             |                 | 1          | 0            |             |                      | 23.14                                  |
|                                  |                  | 41    | 20          | QPSK            | 1          | 0            | 40521       | 2583.1               | 41   | 20          | QPSK            | 1          | 99           | 40719       | 2602.9               | 14.55                                  |
|                                  |                  |       |             |                 | 1          | 99           |             |                      |      |             |                 | 1          | 0            |             |                      | 23.35                                  |
|                                  |                  | 41    | 20          | QPSK            | 1          | 0            | 41292       | 2660.2               | 41   | 20          | QPSK            | 1          | 99           | 41490       | 2680                 | 14.54                                  |
|                                  |                  |       |             |                 | 1          | 99           |             |                      |      |             |                 | 1          | 0            |             |                      | 23.06                                  |
| Intra<br>Band<br>Conti-<br>guous | CA_41C           | 41    | 20          | 16QAM           | 1          | 0            | 39750       | 2506                 | 41   | 20          | 16QAM           | 1          | 99           | 39948       | 2525.8               | 13.56                                  |
|                                  |                  |       |             |                 | 1          | 99           |             |                      |      |             |                 | 1          | 0            |             |                      | 22.25                                  |
|                                  |                  | 41    | 20          | 16QAM           | 1          | 0            | 40521       | 2583.1               | 41   | 20          | 16QAM           | 1          | 99           | 40719       | 2602.9               | 13.66                                  |
|                                  |                  |       |             |                 | 1          | 99           |             |                      |      |             |                 | 1          | 0            |             |                      | 22.24                                  |
|                                  |                  | 41    | 20          | 16QAM           | 1          | 0            | 41292       | 2660.2               | 41   | 20          | 16QAM           | 1          | 99           | 41490       | 2680                 | 13.65                                  |
|                                  |                  |       |             |                 | 1          | 99           |             |                      |      |             |                 | 1          | 0            |             |                      | 22.18                                  |
| Intra<br>Band<br>Conti-<br>guous | CA_41C           | 41    | 20          | 64QAM           | 1          | 0            | 39750       | 2506                 | 41   | 20          | 64QAM           | 1          | 99           | 39948       | 2525.8               | 12.24                                  |
|                                  |                  |       |             |                 | 1          | 99           |             |                      |      |             |                 | 1          | 0            |             |                      | 20.89                                  |
|                                  |                  | 41    | 20          | 64QAM           | 1          | 0            | 40521       | 2583.1               | 41   | 20          | 64QAM           | 1          | 99           | 40719       | 2602.9               | 12.33                                  |
|                                  |                  |       |             |                 | 1          | 99           |             |                      |      |             |                 | 1          | 0            |             |                      | 21.12                                  |
|                                  |                  | 41    | 20          | 64QAM           | 1          | 0            | 41292       | 2660.2               | 41   | 20          | 64QAM           | 1          | 99           | 41490       | 2680                 | 12.32                                  |
|                                  |                  |       |             |                 | 1          | 99           |             |                      |      |             |                 | 1          | 0            |             |                      | 20.83                                  |
| Intra<br>Band<br>Conti-<br>guous | CA_41C           | 41    | 20          | 256QAM          | 1          | 0            | 39750       | 2506                 | 41   | 20          | 256QAM          | 1          | 99           | 39948       | 2525.8               | 9.84                                   |
|                                  |                  |       |             |                 | 1          | 99           |             |                      |      |             |                 | 1          | 0            |             |                      | 18.19                                  |
|                                  |                  | 41    | 20          | 256QAM          | 1          | 0            | 40521       | 2583.1               | 41   | 20          | 256QAM          | 1          | 99           | 40719       | 2602.9               | 9.94                                   |
|                                  |                  |       |             |                 | 1          | 99           |             |                      |      |             |                 | 1          | 0            |             |                      | 18.17                                  |
|                                  |                  | 41    | 20          | 256QAM          | 1          | 0            | 41292       | 2660.2               | 41   | 20          | 256QAM          | 1          | 99           | 41490       | 2680                 | 9.87                                   |
|                                  |                  |       |             |                 | 1          | 99           |             |                      |      |             |                 | 1          | 0            |             |                      | 18.45                                  |

# EIRP Power (dBm)

## LTE Band 41 (CA 41C)

| Con-<br>figure                   | Com-<br>bination | PCC   |             |               |            |              |             |                      | SCC  |             |                 |            |              |             |                      | Measurement<br>Power |
|----------------------------------|------------------|-------|-------------|---------------|------------|--------------|-------------|----------------------|------|-------------|-----------------|------------|--------------|-------------|----------------------|----------------------|
|                                  |                  | Band  | BW<br>(MHz) | EIRP<br>(dBm) | RB<br>Size | RB<br>Offset | UL<br>Chan. | UL<br>Freq.<br>(MHz) | Band | BW<br>(MHz) | Modu-<br>lation | RB<br>Size | RB<br>Offset | UL<br>Chan. | UL<br>Freq.<br>(MHz) | EIRP (dBm)           |
|                                  |                  | Total |             |               |            |              |             |                      |      |             |                 |            |              |             |                      |                      |
| Intra<br>Band<br>Conti-<br>guous | CA_41C           | 41    | 20          | QPSK          | 1          | 0            | 39750       | 2506                 | 41   | 20          | QPSK            | 1          | 99           | 39948       | 2525.8               | 15.61                |
|                                  |                  |       |             |               | 1          | 99           |             |                      |      |             |                 | 1          | 0            |             |                      | 24.29                |
|                                  |                  | 41    | 20          | QPSK          | 1          | 0            | 40521       | 2583.1               | 41   | 20          | QPSK            | 1          | 99           | 40719       | 2602.9               | 15.70                |
|                                  |                  |       |             |               | 1          | 99           |             |                      |      |             |                 | 1          | 0            |             |                      | 24.50                |
|                                  |                  | 41    | 20          | QPSK          | 1          | 0            | 41292       | 2660.2               | 41   | 20          | QPSK            | 1          | 99           | 41490       | 2680                 | 15.69                |
|                                  |                  |       |             |               | 1          | 99           |             |                      |      |             |                 | 1          | 0            |             |                      | 24.21                |
| Intra<br>Band<br>Conti-<br>guous | CA_41C           | 41    | 20          | 16QAM         | 1          | 0            | 39750       | 2506                 | 41   | 20          | 16QAM           | 1          | 99           | 39948       | 2525.8               | 14.71                |
|                                  |                  |       |             |               | 1          | 99           |             |                      |      |             |                 | 1          | 0            |             |                      | 23.40                |
|                                  |                  | 41    | 20          | 16QAM         | 1          | 0            | 40521       | 2583.1               | 41   | 20          | 16QAM           | 1          | 99           | 40719       | 2602.9               | 14.81                |
|                                  |                  |       |             |               | 1          | 99           |             |                      |      |             |                 | 1          | 0            |             |                      | 23.39                |
|                                  |                  | 41    | 20          | 16QAM         | 1          | 0            | 41292       | 2660.2               | 41   | 20          | 16QAM           | 1          | 99           | 41490       | 2680                 | 14.80                |
|                                  |                  |       |             |               | 1          | 99           |             |                      |      |             |                 | 1          | 0            |             |                      | 23.33                |
| Intra<br>Band<br>Conti-<br>guous | CA_41C           | 41    | 20          | 64QAM         | 1          | 0            | 39750       | 2506                 | 41   | 20          | 64QAM           | 1          | 99           | 39948       | 2525.8               | 13.39                |
|                                  |                  |       |             |               | 1          | 99           |             |                      |      |             |                 | 1          | 0            |             |                      | 22.04                |
|                                  |                  | 41    | 20          | 64QAM         | 1          | 0            | 40521       | 2583.1               | 41   | 20          | 64QAM           | 1          | 99           | 40719       | 2602.9               | 13.48                |
|                                  |                  |       |             |               | 1          | 99           |             |                      |      |             |                 | 1          | 0            |             |                      | 22.27                |
|                                  |                  | 41    | 20          | 64QAM         | 1          | 0            | 41292       | 2660.2               | 41   | 20          | 64QAM           | 1          | 99           | 41490       | 2680                 | 13.47                |
|                                  |                  |       |             |               | 1          | 99           |             |                      |      |             |                 | 1          | 0            |             |                      | 21.98                |
| Intra<br>Band<br>Conti-<br>guous | CA_41C           | 41    | 20          | 256QAM        | 1          | 0            | 39750       | 2506                 | 41   | 20          | 256QAM          | 1          | 99           | 39948       | 2525.8               | 10.99                |
|                                  |                  |       |             |               | 1          | 99           |             |                      |      |             |                 | 1          | 0            |             |                      | 19.34                |
|                                  |                  | 41    | 20          | 256QAM        | 1          | 0            | 40521       | 2583.1               | 41   | 20          | 256QAM          | 1          | 99           | 40719       | 2602.9               | 11.09                |
|                                  |                  |       |             |               | 1          | 99           |             |                      |      |             |                 | 1          | 0            |             |                      | 19.32                |
|                                  |                  | 41    | 20          | 256QAM        | 1          | 0            | 41292       | 2660.2               | 41   | 20          | 256QAM          | 1          | 99           | 41490       | 2680                 | 11.02                |
|                                  |                  |       |             |               | 1          | 99           |             |                      |      |             |                 | 1          | 0            |             |                      | 19.60                |

## 4.2 Frequency Stability Measurement

### 4.2.1 Limits of Frequency Stability Measurement

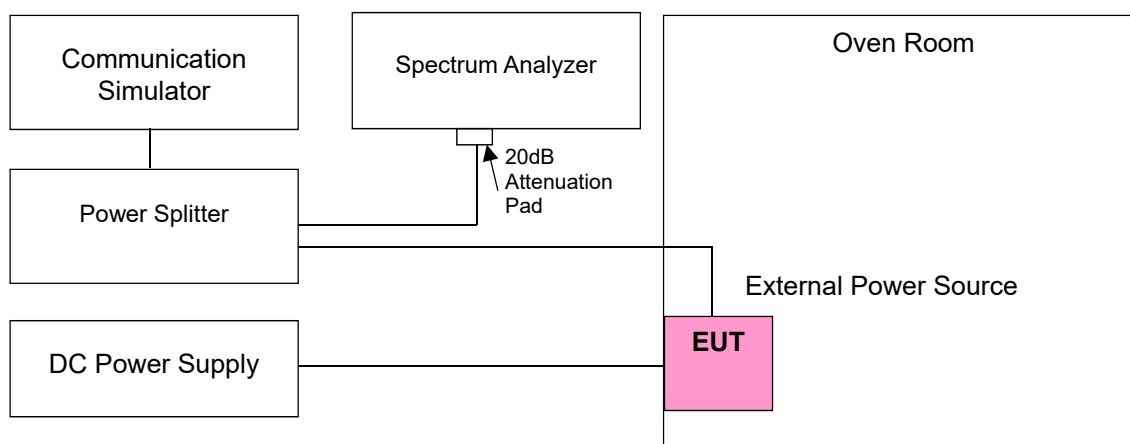
According to the FCC part 2.1055 shall be tested the frequency stability. The rule is defined that "The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block." The test extreme voltage is according to the 2.1055(d)(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment and the extreme temperature rule is comply with specification of EUT  $-30^{\circ}\text{C} \sim 50^{\circ}\text{C}$ .

### 4.2.2 Test Procedure

- Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.
- EUT is connected the external power supply to control the DC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.
- The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the  $\pm 0.5^{\circ}\text{C}$  during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

Note: The frequency error was recorded frequency error from the communication simulator.

### 4.2.3 Test Setup



#### 4.2.4 Test Results

##### Frequency Error vs. Voltage

| Voltage<br>(Volts) | LTE Band 41 (CA 41C), Channel Bandwidth 20MHz + 20MHz |                       |                 |                       |
|--------------------|-------------------------------------------------------|-----------------------|-----------------|-----------------------|
|                    | Low Channel                                           |                       | High Channel    |                       |
|                    | Frequency (MHz)                                       | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| 4.43               | 2660.200005                                           | 0.002                 | 2680.000004     | 0.001                 |
| 3.85               | 2660.199997                                           | -0.001                | 2680.000007     | 0.003                 |
| 3.28               | 2660.200004                                           | 0.002                 | 2680.000006     | 0.002                 |

Note: The applicant defined the normal working voltage is from 3.28Vdc to 4.43Vdc.

##### Frequency Error vs. Temperature

| Temp. (°C) | LTE Band 41 (CA 41C), Channel Bandwidth 20MHz + 20MHz |                       |                 |                       |
|------------|-------------------------------------------------------|-----------------------|-----------------|-----------------------|
|            | Low Channel                                           |                       | High Channel    |                       |
|            | Frequency (MHz)                                       | Frequency Error (ppm) | Frequency (MHz) | Frequency Error (ppm) |
| -30        | 2660.200008                                           | 0.003                 | 2679.999994     | -0.002                |
| -20        | 2660.200006                                           | 0.002                 | 2680.000007     | 0.003                 |
| -10        | 2660.200005                                           | 0.002                 | 2679.999996     | -0.001                |
| 0          | 2660.200002                                           | 0.001                 | 2680.000008     | 0.003                 |
| 10         | 2660.199996                                           | -0.002                | 2679.999998     | -0.001                |
| 20         | 2660.200005                                           | 0.002                 | 2679.999996     | -0.001                |
| 30         | 2660.199997                                           | -0.001                | 2680.000007     | 0.003                 |
| 40         | 2660.200002                                           | 0.001                 | 2680.000009     | 0.003                 |
| 50         | 2660.199994                                           | -0.002                | 2680.000006     | 0.002                 |

### 4.3 Occupied Bandwidth Measurement

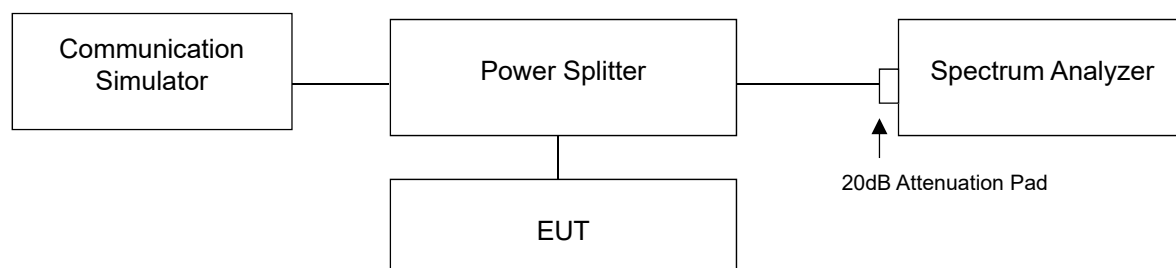
#### 4.3.1 Limits of Occupied Bandwidth Measurement

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission

#### 4.3.2 Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with RBW = 430kHz and VBW = 1.3MHz (Channel Bandwidth: 20MHz + 20MHz). The 26dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 26dB.

#### 4.3.3 Test Setup



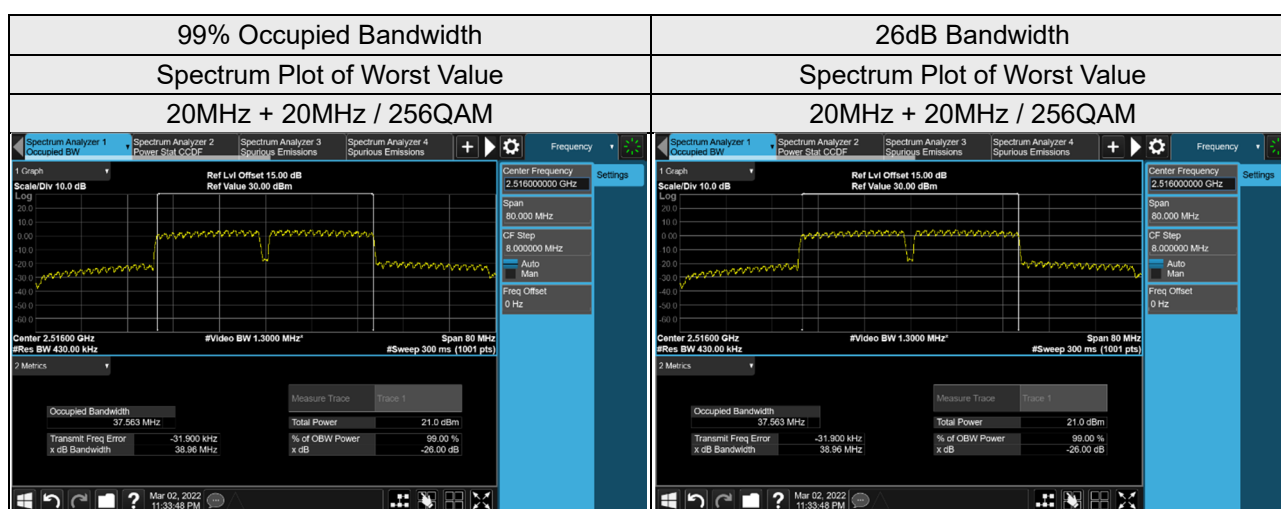
#### 4.3.4 Test Result

##### Occupied Bandwidth

| LTE Band 41 (CA 41C), Channel Bandwidth 20MHz + 20MHz |                 |                              |       |       |        |
|-------------------------------------------------------|-----------------|------------------------------|-------|-------|--------|
| Channel                                               | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |       |       |        |
|                                                       |                 | QPSK                         | 16QAM | 64QAM | 256QAM |
| 39750 + 39948                                         | 2506.0 + 2525.8 | 37.34                        | 37.40 | 37.43 | 37.56  |
| 40521 + 40719                                         | 2583.1 + 2602.9 | 37.37                        | 37.39 | 37.33 | 37.45  |
| 41292 + 41490                                         | 2660.2 + 2680.0 | 37.37                        | 37.43 | 37.30 | 37.39  |

##### 26dB Bandwidth

| LTE Band 41 (CA 41C), Channel Bandwidth 20MHz + 20MHz |                 |                      |       |       |        |
|-------------------------------------------------------|-----------------|----------------------|-------|-------|--------|
| Channel                                               | Frequency (MHz) | 26dB Bandwidth (MHz) |       |       |        |
|                                                       |                 | QPSK                 | 16QAM | 64QAM | 256QAM |
| 39750 + 39948                                         | 2506.0 + 2525.8 | 38.79                | 38.69 | 38.67 | 38.96  |
| 40521 + 40719                                         | 2583.1 + 2602.9 | 38.70                | 38.72 | 38.78 | 38.89  |
| 41292 + 41490                                         | 2660.2 + 2680.0 | 38.68                | 38.74 | 38.77 | 38.84  |

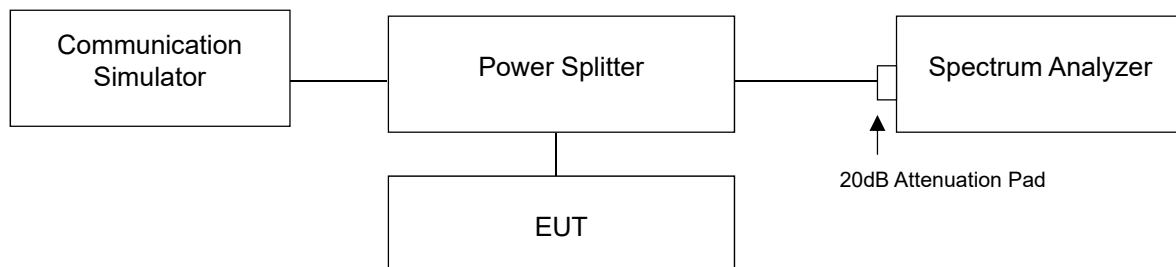


## 4.4 Channel Edge Measurement

### 4.4.1 Limits of Band Edge Measurement

According to FCC 27.53(m)(4) specified that power of any emission outside of the channel edge must be attenuated below the transmitting power (P) by a 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. In addition, the attenuation factor shall not be less that  $43 + 10 \log (P)$  dB on all frequencies between 2490.5 MHz and 2496 MHz and  $55 + 10 \log (P)$  dB at or below 2490.5 MHz. In the 1 MHz 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.

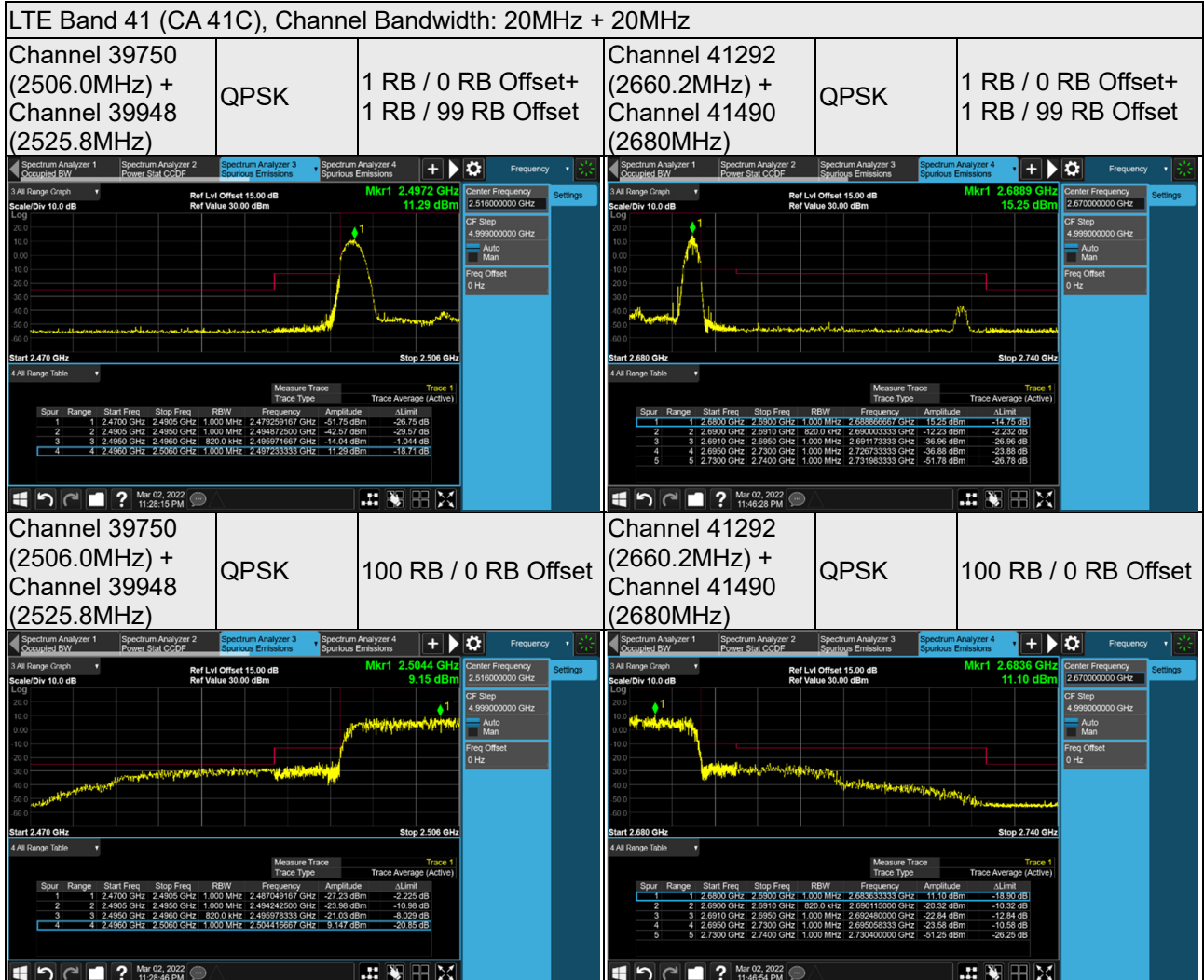
### 4.4.2 Test Setup



### 4.4.3 Test Procedures

- The EUT was set up for the rated peak power. The power was measured with Spectrum Analyzer. All measurements were done at 2 channels: low and high operational frequency range.
- For the measurement method of LTE Band 41C, please refer to 27.53(m)(4)(6).
- Record the max trace plot into the test report.

#### 4.4.4 Test Results

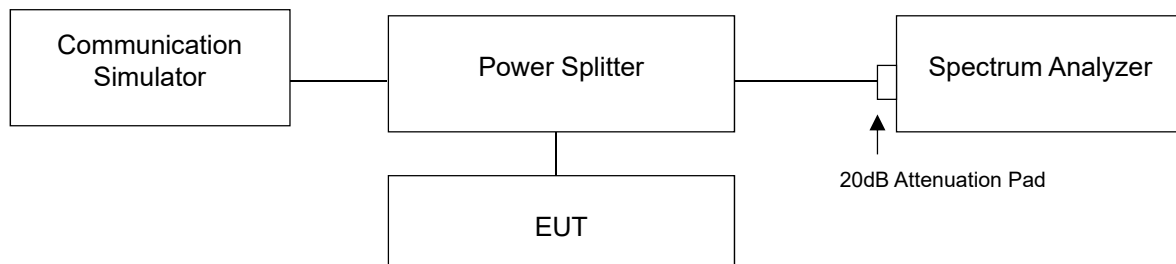


## 4.5 Peak to Average Ratio

### 4.5.1 Limits of Peak to Average Ratio Measurement

In measuring transmissions in this band using an average power technique, the peak to-average ratio (PAR) of the transmission may not exceed 13 dB

### 4.5.2 Test Setup

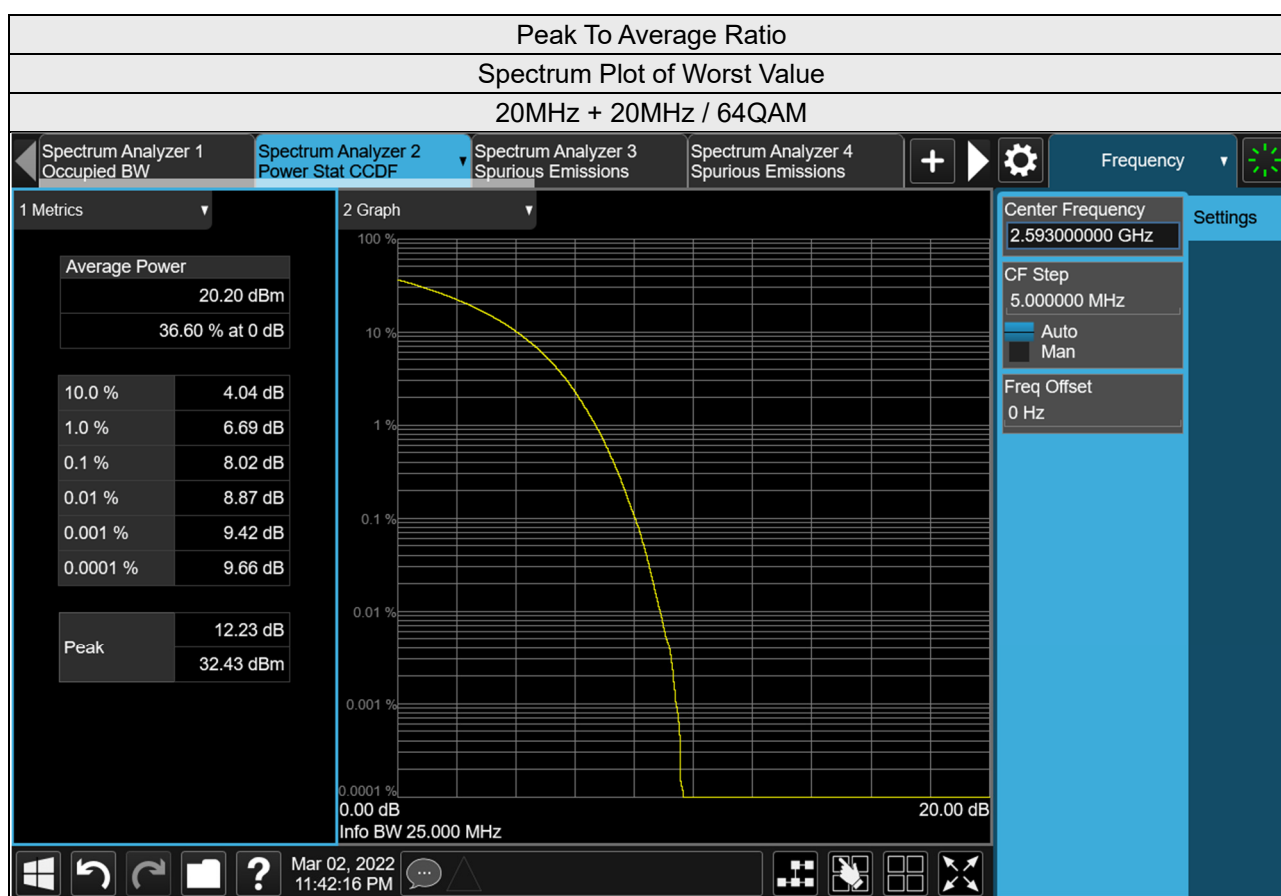


### 4.5.3 Test Procedures

- Set resolution/measurement bandwidth  $\geq$  signal's occupied bandwidth;
- Set the number of counts to a value that stabilizes the measured CCDF curve;
- Record the maximum PAPR level associated with a probability of 0.1%.

#### 4.5.4 Test Results

| LTE Band 41 (CA 41C), Channel Bandwidth 20MHz + 20MHz |                 |                            |       |       |        |
|-------------------------------------------------------|-----------------|----------------------------|-------|-------|--------|
| Channel                                               | Frequency (MHz) | Peak To Average Ratio (dB) |       |       |        |
|                                                       |                 | QPSK                       | 16QAM | 64QAM | 256QAM |
| 39750 + 39948                                         | 2506.0 + 2525.8 | 5.22                       | 6.47  | 7.91  | 7.09   |
| 40521 + 40719                                         | 2583.1 + 2602.9 | 6.49                       | 7.62  | 8.02  | 7.22   |
| 41292 + 41490                                         | 2660.2 + 2680.0 | 6.64                       | 7.78  | 7.95  | 7.43   |

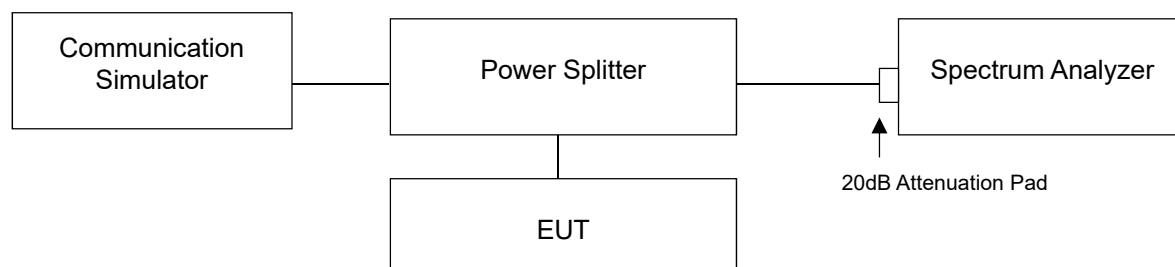


## 4.6 Conducted Spurious Emissions

### 4.6.1 Limits of Conducted Spurious Emissions Measurement

In the FCC 27.53(m)(4), On any frequency outside a licensee's frequency block, The power of any emission shall be attenuated below the transmitter power (P) by at least  $55 + 10 \log (P)$  dB. The emission limit equal to  $-25\text{dBm}$ .

### 4.6.2 Test Setup



### 4.6.3 Test Procedure

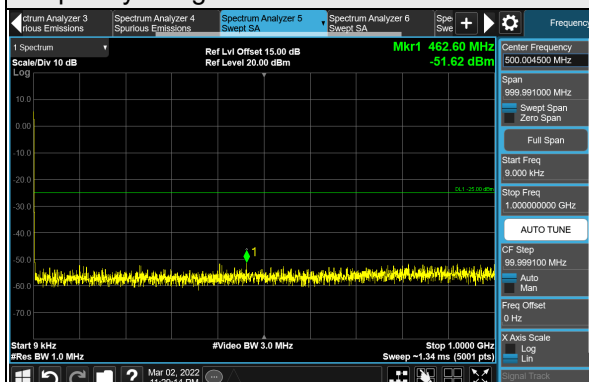
- All measurements were done at 3 channels: low, middle and high operational frequency range.
- When the spectrum scanned from 9kHz to 40GHz, it shall be connected to the attenuator with the carried frequency.

#### 4.6.4 Test Results

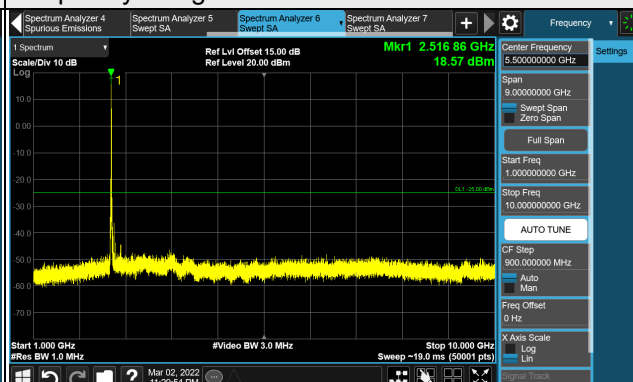
LTE Band 41 (CA 41C), Channel Band width: 20MHz + 20MHz

Channel 39750 (2506.0MHz) + 39948 (2525.8MHz)

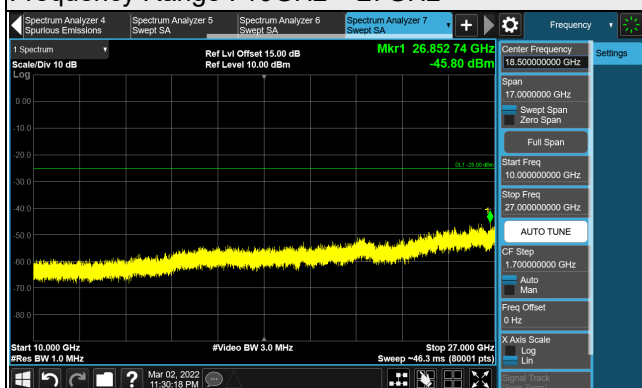
Frequency Range : 9kHz ~ 1GHz



Frequency Range : 1GHz ~ 10GHz



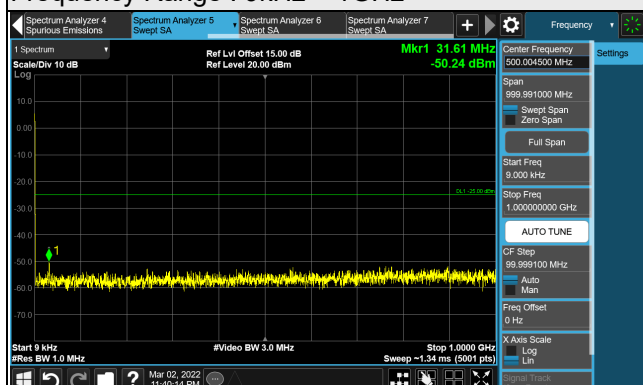
Frequency Range : 10GHz ~ 27GHz



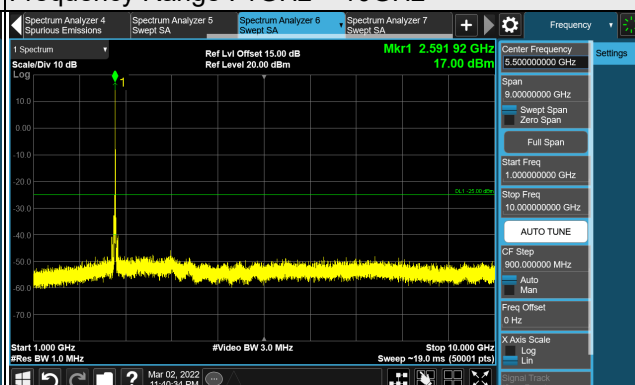
\*The 9kHz signal over the limit is from Spectrum.

# LTE Band 41 (CA 41C), Channel 40521 (2583.1MHz) + 40719 (2602.9MHz)

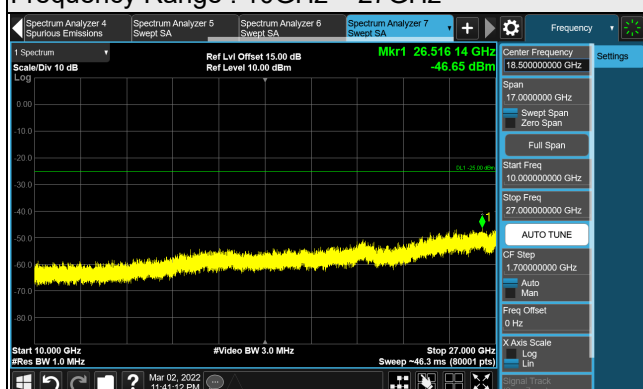
## Frequency Range : 9kHz ~ 1GHz



## Frequency Range : 1GHz ~ 10GHz



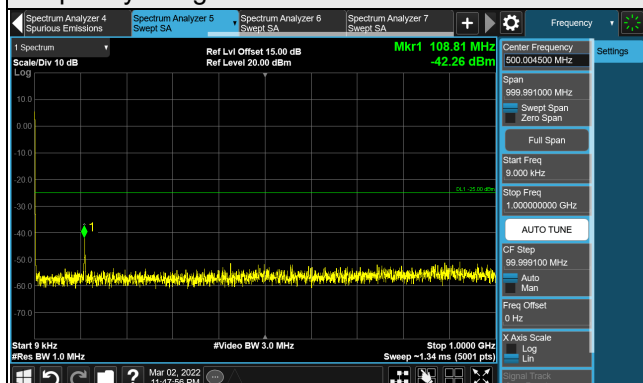
## Frequency Range : 10GHz ~ 27GHz



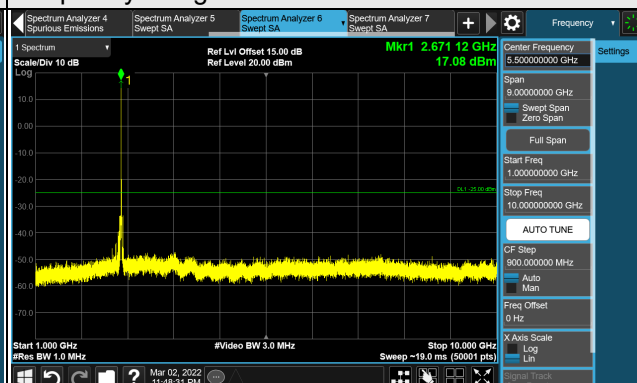
\*The 9kHz signal over the limit is from Spectrum.

# LTE Band 41 (CA 41C), Channel 41292 (2660.2MHz) + 41490 (2680.0MHz)

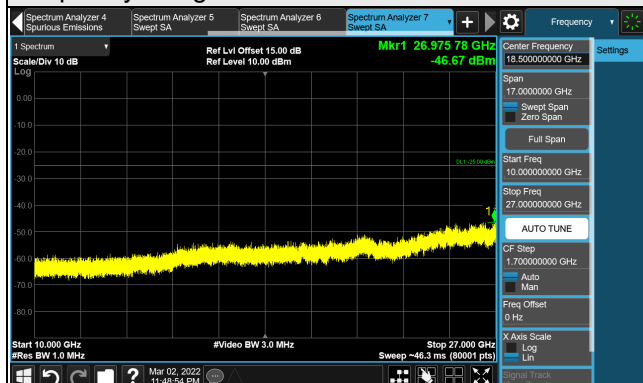
## Frequency Range : 9kHz ~ 1GHz



## Frequency Range : 1GHz ~ 10GHz



## Frequency Range : 10GHz ~ 27GHz



\*The 9kHz signal over the limit is from Spectrum.

## 4.7 Radiated Emission Measurement

### 4.7.1 Limits of Radiated Emission Measurement

In the FCC 27.53(m) (4)(6), On any frequency outside a licensee's frequency block, The power of any emission shall be attenuated below the transmitter power (P) by at least  $55 + 10 \log (P)$  dB. The emission limit equal to  $-25\text{dBm}$ .

### 4.7.2 Test Procedure

- a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m(below or equal 1GHz) and/or 1.5m(above 1GHz) height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- b. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- c. Perform a field strength measurement and record the worse read value, is the field strength value via a spectrum reading obtained corrected for antenna factor, cable loss and pre-amplifier factor and then mathematically convert the measured field strength level to EIRP/ERP level.
- d. Following C63.26 section 5.5 and 5.2.7
  - $\text{EIRP (dBm)} = E (\text{dB}\mu\text{V/m}) + 20\log(D) - 104.8$ ; where D is the measurement distance (in the far field region) in m.
  - $\text{ERP (dBm)} = E (\text{dB}\mu\text{V/m}) + 20\log(D) - 104.8 - 2.15$ ; where D is the measurement distance (in the far field region) in m.

Note:

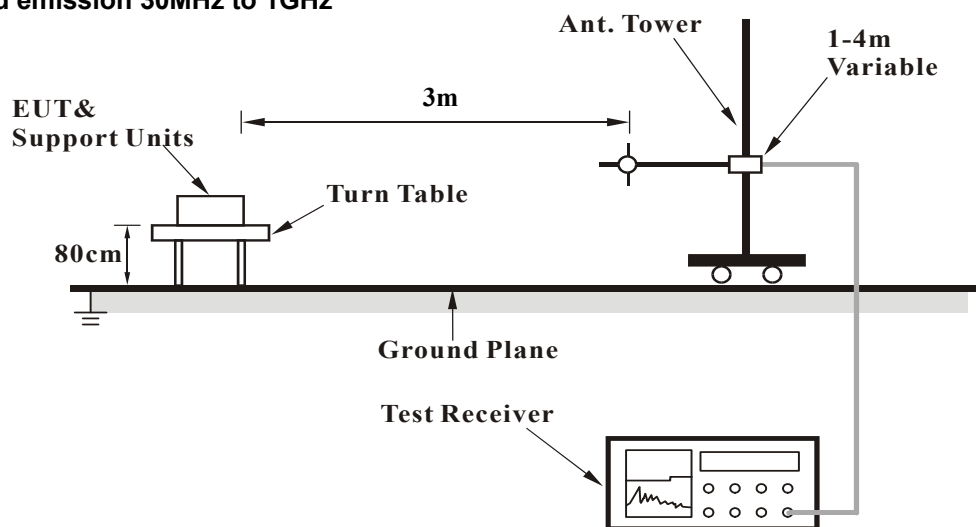
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.
2. The emission levels were against the limit of frequency range 9 kHz ~ 30 MHz:  
The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

### 4.7.3 Deviation from Test Standard

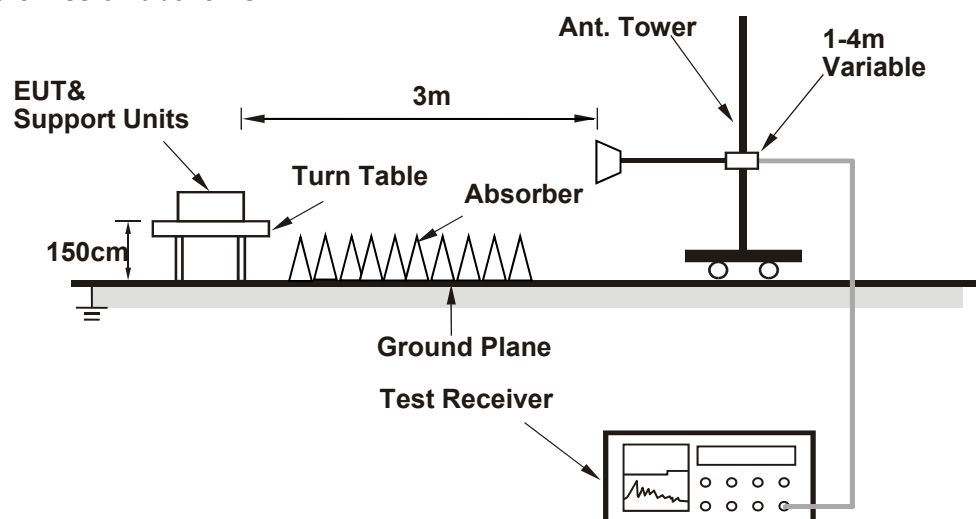
No deviation.

#### 4.7.4 Test Setup

For radiated emission 30MHz to 1GHz



For radiated emission above 1GHz



For the actual test configuration, please refer to the attached file (Test Setup Photo).

#### 4.7.5 Test Results

Below 1GHz

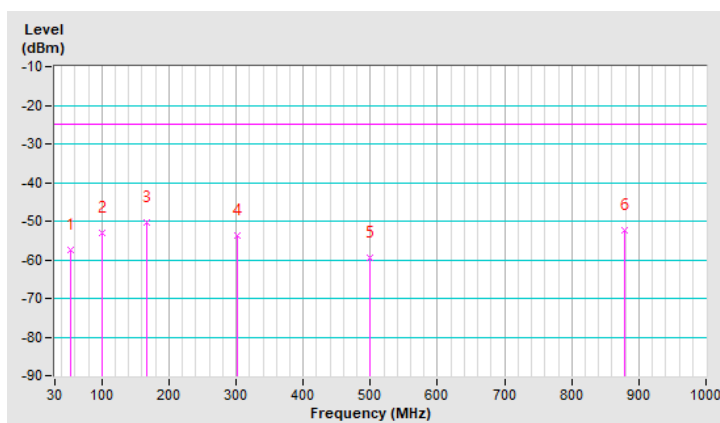
LTE Band 41 (CA 41C)

|                          |                                                        |                 |                |
|--------------------------|--------------------------------------------------------|-----------------|----------------|
| Mode                     | TX channel 39750<br>(2506.0MHz) +<br>39948 (2525.8MHz) | Frequency Range | Below 1000 MHz |
| Environmental Conditions | 23deg. C, 65%RH                                        | Input Power     | 120Vac, 60Hz   |
| Tested By                | Jones Chang                                            |                 |                |

| Antenna Polarity & Test Distance : Horizontal at 3 m |                    |               |                |                |                          |                            |                        |                                |
|------------------------------------------------------|--------------------|---------------|----------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|
| No                                                   | Frequency<br>(MHz) | EIRP<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) | Antenna<br>Height<br>(m) | Table<br>Angle<br>(Degree) | Raw<br>Value<br>(dBuV) | Correction<br>Factor<br>(dB/m) |
| 1                                                    | 53.28              | -57.45        | -25.00         | -32.45         | 1.00 H                   | 102                        | 46.45                  | -103.90                        |
| 2                                                    | 99.84              | -52.92        | -25.00         | -27.92         | 1.00 H                   | 255                        | 55.69                  | -108.61                        |
| 3                                                    | 167.74             | -50.30        | -25.00         | -25.30         | 1.50 H                   | 130                        | 53.96                  | -104.26                        |
| 4                                                    | 301.60             | -53.66        | -25.00         | -28.66         | 1.50 H                   | 184                        | 49.07                  | -102.73                        |
| 5                                                    | 499.48             | -59.57        | -25.00         | -34.57         | 1.50 H                   | 22                         | 39.67                  | -99.24                         |
| 6                                                    | 877.78             | -52.33        | -25.00         | -27.33         | 1.00 H                   | 66                         | 38.91                  | -91.24                         |

Remarks:

1.  $EIRP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2.  $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8$
3.  $Margin\ value = EIRP - Limit\ value$
4. The other EIRP levels were very low against the limit.

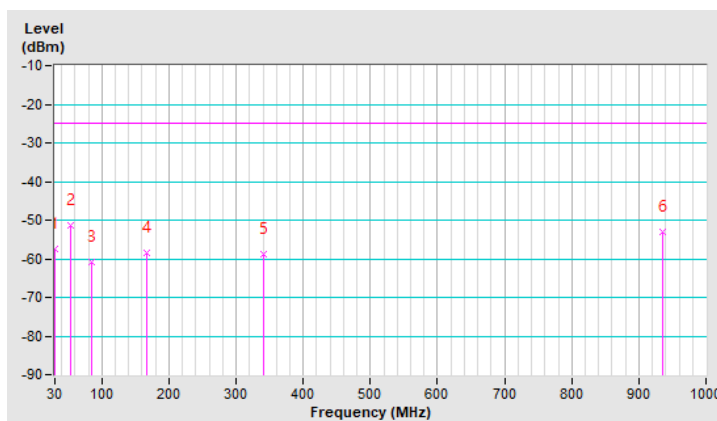


|                          |                                                  |                 |                |
|--------------------------|--------------------------------------------------|-----------------|----------------|
| Mode                     | TX channel 39750 (2506.0MHz) + 39948 (2525.8MHz) | Frequency Range | Below 1000 MHz |
| Environmental Conditions | 23deg. C, 65%RH                                  | Input Power     | 120Vac, 60Hz   |
| Tested By                | Jones Chang                                      |                 |                |

| Antenna Polarity & Test Distance : Vertical at 3m |                 |            |             |             |                    |                      |                  |                          |
|---------------------------------------------------|-----------------|------------|-------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No                                                | Frequency (MHz) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1                                                 | 30.00           | -57.46     | -25.00      | -32.46      | 1.00 V             | 147                  | 51.79            | -109.25                  |
| 2                                                 | 53.28           | -51.38     | -25.00      | -26.38      | 1.50 V             | 208                  | 56.42            | -107.80                  |
| 3                                                 | 84.32           | -60.84     | -25.00      | -35.84      | 1.50 V             | 119                  | 52.30            | -113.14                  |
| 4                                                 | 167.74          | -58.54     | -25.00      | -33.54      | 1.50 V             | 23                   | 49.76            | -108.30                  |
| 5                                                 | 340.40          | -58.96     | -25.00      | -33.96      | 1.50 V             | 131                  | 47.64            | -106.60                  |
| 6                                                 | 935.98          | -53.10     | -25.00      | -28.10      | 1.50 V             | 263                  | 44.08            | -97.18                   |

Remarks:

1.  $EIRP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2.  $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8$
3.  $Margin\ value = EIRP - Limit\ value$
4. The other EIRP levels were very low against the limit.



Above 1GHz

LTE Band 41 (CA 41C)

|                          |                                                        |                 |              |
|--------------------------|--------------------------------------------------------|-----------------|--------------|
| Mode                     | TX channel 39750<br>(2506.0MHz) +<br>39948 (2525.8MHz) | Frequency Range | 1GHz ~ 40GHz |
| Environmental Conditions | 23deg. C, 65%RH                                        | Input Power     | 120Vac, 60Hz |
| Tested By                | Jones Chang                                            |                 |              |

| Antenna Polarity & Test Distance : Horizontal at 3 m |                    |               |                |                |                          |                            |                        |                                |
|------------------------------------------------------|--------------------|---------------|----------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|
| No                                                   | Frequency<br>(MHz) | EIRP<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) | Antenna<br>Height<br>(m) | Table<br>Angle<br>(Degree) | Raw<br>Value<br>(dBuV) | Correction<br>Factor<br>(dB/m) |
| 1                                                    | 5012.00            | -45.38        | -25.00         | -20.38         | 1.66 H                   | 43                         | 44.44                  | -89.82                         |
| 2                                                    | 5051.60            | -44.46        | -25.00         | -19.46         | 1.60 H                   | 59                         | 44.89                  | -89.35                         |
| Antenna Polarity & Test Distance : Vertical at 3m    |                    |               |                |                |                          |                            |                        |                                |
| No                                                   | Frequency<br>(MHz) | EIRP<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) | Antenna<br>Height<br>(m) | Table<br>Angle<br>(Degree) | Raw<br>Value<br>(dBuV) | Correction<br>Factor<br>(dB/m) |
| 1                                                    | 5012.00            | -46.68        | -25.00         | -21.68         | 2.33 V                   | 215                        | 43.14                  | -89.82                         |
| 2                                                    | 5051.60            | -45.81        | -25.00         | -20.81         | 2.30 V                   | 229                        | 43.54                  | -89.35                         |

Remarks:

1.  $EIRP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2.  $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8$
3.  $Margin\ value = EIRP - Limit\ value$
4. The other EIRP levels were very low against the limit.

|                          |                                                        |                 |              |
|--------------------------|--------------------------------------------------------|-----------------|--------------|
| Mode                     | TX channel 40521<br>(2583.1MHz) +<br>40719 (2602.9MHz) | Frequency Range | 1GHz ~ 40GHz |
| Environmental Conditions | 23deg. C, 65%RH                                        | Input Power     | 120Vac, 60Hz |
| Tested By                | Jones Chang                                            |                 |              |

| Antenna Polarity & Test Distance : Horizontal at 3 m |                    |               |                |                |                          |                            |                        |                                |
|------------------------------------------------------|--------------------|---------------|----------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|
| No                                                   | Frequency<br>(MHz) | EIRP<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) | Antenna<br>Height<br>(m) | Table<br>Angle<br>(Degree) | Raw<br>Value<br>(dBuV) | Correction<br>Factor<br>(dB/m) |
| 1                                                    | 5051.60            | -44.46        | -25.00         | -19.46         | 1.60 H                   | 59                         | 44.89                  | -89.35                         |
| 2                                                    | 5204.40            | -45.63        | -25.00         | -20.63         | 1.79 H                   | 70                         | 44.01                  | -89.64                         |
| Antenna Polarity & Test Distance : Vertical at 3m    |                    |               |                |                |                          |                            |                        |                                |
| No                                                   | Frequency<br>(MHz) | EIRP<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) | Antenna<br>Height<br>(m) | Table<br>Angle<br>(Degree) | Raw<br>Value<br>(dBuV) | Correction<br>Factor<br>(dB/m) |
| 1                                                    | 5320.40            | -46.61        | -25.00         | -21.61         | 2.23 V                   | 205                        | 43.40                  | -90.01                         |
| 2                                                    | 5360.00            | -46.53        | -25.00         | -21.53         | 2.10 V                   | 220                        | 43.38                  | -89.91                         |

Remarks:

1.  $EIRP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2.  $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8$
3.  $Margin\ value = EIRP - Limit\ value$
4. The other EIRP levels were very low against the limit.

|                          |                                                        |                 |              |
|--------------------------|--------------------------------------------------------|-----------------|--------------|
| Mode                     | TX channel 41292<br>(2660.2MHz) +<br>41490 (2680.0MHz) | Frequency Range | 1GHz ~ 40GHz |
| Environmental Conditions | 23deg. C, 65%RH                                        | Input Power     | 120Vac, 60Hz |
| Tested By                | Jones Chang                                            |                 |              |

| Antenna Polarity & Test Distance : Horizontal at 3 m |                    |               |                |                |                          |                            |                        |                                |
|------------------------------------------------------|--------------------|---------------|----------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|
| No                                                   | Frequency<br>(MHz) | EIRP<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) | Antenna<br>Height<br>(m) | Table<br>Angle<br>(Degree) | Raw<br>Value<br>(dBuV) | Correction<br>Factor<br>(dB/m) |
| 1                                                    | 5320.40            | -45.52        | -25.00         | -20.52         | 1.59 H                   | 49                         | 44.49                  | -90.01                         |
| 2                                                    | 5360.00            | -46.01        | -25.00         | -21.01         | 1.70 H                   | 40                         | 43.90                  | -89.91                         |
| Antenna Polarity & Test Distance : Vertical at 3m    |                    |               |                |                |                          |                            |                        |                                |
| No                                                   | Frequency<br>(MHz) | EIRP<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) | Antenna<br>Height<br>(m) | Table<br>Angle<br>(Degree) | Raw<br>Value<br>(dBuV) | Correction<br>Factor<br>(dB/m) |
| 1                                                    | 5320.40            | -46.96        | -25.00         | -21.96         | 2.19 V                   | 200                        | 43.05                  | -90.01                         |
| 2                                                    | 5360.00            | -46.12        | -25.00         | -21.12         | 2.00 V                   | 120                        | 43.79                  | -89.91                         |

Remarks:

1.  $EIRP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2.  $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8$
3.  $Margin\ value = EIRP - Limit\ value$
4. The other EIRP levels were very low against the limit.

## 5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

## Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited and approved according to ISO/IEC 17025.

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The address and road map of all our labs can be found in our web site also.

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