

FCC Test Report

(PART 24)

Report No.: RF150720C24A

FCC ID: HFS-QTAIR7

Test Model: QTAIR7

Received Date: Jul. 20, 2015

Test Date: Aug. 04, 2015 ~ Aug. 07, 2015

Issued Date: Sep. 01, 2015

Applicant: Quanta Computer Inc.

Address: No. 188, Wen Hwa 2nd RD., Kuei Shan Hsiang, Tao Yuan Shien, Taiwan

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

Lab Address: No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
(R.O.C)

Test Location: No. 19, Hwa Ya 2nd Rd, Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan
Hsien 333, Taiwan, R.O.C.



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A D T

Release Control Record

| Issue No. | Description | Date Issued |
|--------------|------------------|---------------|
| RF150720C24A | Original Release | Sep. 01, 2015 |



1 Certificate of Conformity

Product: Tablet PC
Brand: Verizon
Test Model: QTAIR7
Sample Status: Identical Prototype
Applicant: Quanta Computer Inc.
Test Date: Aug. 04, 2015 ~ Aug. 07, 2015
Standards: FCC Part 24, Subpart E

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 EMC characteristics under the conditions specified in this report.

Prepared by : Ivonne Wu , **Date:** Sep. 01, 2015
Ivonne Wu / Supervisor

Approved by : Kay Wu , **Date:** Sep. 01, 2015
Kay Wu / Supervisor

2 Summary of Test Results

| Applied Standard: FCC Part 24 & Part 2 | | | |
|--|------------------------------------|--------|---|
| FCC Clause | Test Item | Result | Remarks |
| 2.1046 24.232 | Effective Isotropic Radiated Power | PASS | Meet the requirement of limit. |
| 2.1046 24.232(d) | Peak To Average Ratio | PASS | Meet the requirement of limit. |
| 2.1055 24.235 | Frequency Stability | PASS | Meet the requirement of limit. |
| 2.1049 24.238(b) | Occupied Bandwidth | PASS | Meet the requirement of limit. |
| 24.238(b) | Band Edge Measurements | PASS | Meet the requirement of limit. |
| 2.1051 24.238 | Conducted Spurious Emissions | PASS | Meet the requirement of limit. |
| 2.1053 24.238 | Radiated Spurious Emissions | PASS | Meet the requirement of limit. Minimum passing margin is -22.88dB at 40.80MHz. |

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) (\pm) |
|------------------------------------|------------------|--------------------------------------|
| Conducted Emissions at mains ports | 150kHz ~ 30MHz | 2.44 dB |
| Radiated Emissions up to 1 GHz | 30MHz ~ 200MHz | 2.93 dB |
| | 200MHz ~ 1000MHz | 2.95 dB |
| Radiated Emissions above 1 GHz | 1GHz ~ 18GHz | 2.26 dB |
| | 18GHz ~ 40GHz | 1.94 dB |

2.2 Test Site And Instruments

| Description & Manufacturer | Model No. | Serial No. | Date of Calibration | Due Date of Calibration |
|--|----------------|---------------------|---------------------|-------------------------|
| Test Receiver Agilent | N9038A | MY51210203 | Jan. 21, 2015 | Jan. 21, 2016 |
| Spectrum Analyzer Agilent | N9010A | MY52220314 | Sep. 03, 2014 | Sep. 02, 2015 |
| Spectrum Analyzer ROHDE & SCHWARZ | FSU43 | 101261 | Dec. 10, 2014 | Dec. 09, 2015 |
| BILOG Antenna SCHWARZBECK | VULB9168 | 9168-472 | Feb. 04, 2015 | Feb. 04, 2016 |
| HORN Antenna SCHWARZBECK | BBHA 9120 D | 9120D-969 | Feb. 09, 2015 | Feb. 09, 2016 |
| HORN Antenna SCHWARZBECK | BBHA 9170 | 9170-480 | Feb. 04, 2015 | Feb. 04, 2016 |
| Preamplifier EMCI | EMC 012645 | 980115 | Dec. 12, 2014 | Dec. 11, 2015 |
| Preamplifier EMCI | EMC 184045 | 980116 | Jan. 09, 2015 | Jan. 08, 2016 |
| Preamplifier EMCI | EMC 330H | 980112 | Dec. 27, 2014 | Dec. 26, 2015 |
| Power Meter Anritsu | ML2495A | 1232002 | Sep. 17, 2014 | Sep. 16, 2015 |
| Power Sensor Anritsu | MA2411B | 1207325 | Sep. 17, 2014 | Sep. 16, 2015 |
| RF signal cable HUBER+SUHNNER | SUCOFLEX 104 | 309219/4 2950114 | Oct. 18, 2014 | Oct. 17, 2015 |
| RF signal cable HUBER+SUHNNER | SUCOFLEX 104 | 250130/4 | Oct. 18, 2014 | Oct. 17, 2015 |
| RF Coaxial Cable Worken | 8D-FB | Cable-Ch10-01 | Nov. 07, 2014 | Nov. 06, 2015 |
| Software BV ADT | E3 6.120103 | NA | NA | NA |
| Antenna Tower MF | MFA-440H | NA | NA | NA |
| Turn Table MF | MFT-201SS | NA | NA | NA |
| Antenna Tower & Turn Table Controller MF | MF-7802 | NA | 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 10.
3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The FCC Site Registration No. is 690701.
5. The IC Site Registration No. is IC7450F-10.

3 General Information

3.1 General Description of EUT

| | | |
|---------------------|--|---------------------|
| Product | Tablet PC | |
| Brand | Verizon | |
| Test Model | QTAIR7 | |
| Status of EUT | Identical Prototype | |
| Power Supply Rating | 5.0Vdc (adapter or host equipment) 3.85Vdc (Li-ion battery) | |
| Modulation Type | LTE | QPSK, 16QAM |
| Frequency Range | LTE Band 2 (Channel Bandwidth: 1.4MHz) | 1850.7 ~ 1909.3 MHz |
| | LTE Band 2 (Channel Bandwidth: 3MHz) | 1851.5 ~ 1908.5 MHz |
| | LTE Band 2 (Channel Bandwidth: 5MHz) | 1852.5 ~ 1907.5 MHz |
| | LTE Band 2 (Channel Bandwidth: 10MHz) | 1855.0 ~ 1905.0 MHz |
| | LTE Band 2 (Channel Bandwidth: 15MHz) | 1857.5 ~ 1902.5 MHz |
| | LTE Band 2 (Channel Bandwidth: 20MHz) | 1860.0 ~ 1900.0 MHz |
| Max. EIRP Power | LTE Band 2 (Channel Bandwidth: 1.4MHz) | 194.67mW |
| | LTE Band 2 (Channel Bandwidth: 3MHz) | 196.47mW |
| | LTE Band 2 (Channel Bandwidth: 5MHz) | 199.57mW |
| | LTE Band 2 (Channel Bandwidth: 10MHz) | 209.46mW |
| | LTE Band 2 (Channel Bandwidth: 15MHz) | 208.50mW |
| | LTE Band 2 (Channel Bandwidth: 20MHz) | 215.28mW |
| Emission Designator | LTE Band 2 (Channel Bandwidth: 1.4MHz) | 1M10G7D |
| | LTE Band 2 (Channel Bandwidth: 3MHz) | 2M70G7D |
| | LTE Band 2 (Channel Bandwidth: 5MHz) | 4M49W7D |
| | LTE Band 2 (Channel Bandwidth: 10MHz) | 8M98G7D |
| | LTE Band 2 (Channel Bandwidth: 15MHz) | 13M5W7D |
| | LTE Band 2 (Channel Bandwidth: 20MHz) | 17M9G7D |
| Antenna Type | Fixed Internal Antenna | |
| Accessory Device | Refer to Note as below | |
| Data Cable Supplied | Refer to Note as below | |

Note:

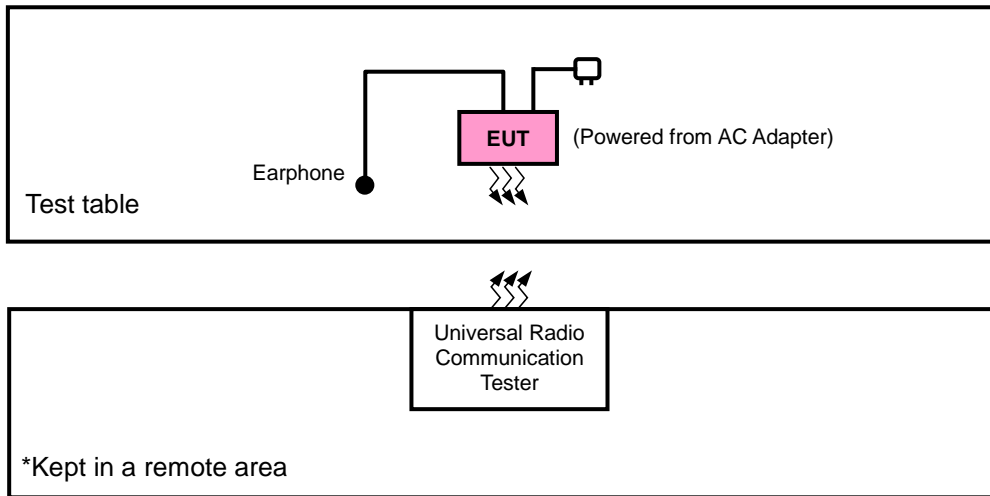
1. The EUT contains following accessory devices.

| Product | Brand | Model | Description |
|------------|---------|---------------|------------------|
| Battery | McNair | MLP3276120-2P | 3.85Vdc, 9100mAh |
| LTE Module | Marvell | 88RF858 | -- |
| WLAN Chip | Marvell | 88W8887 | -- |

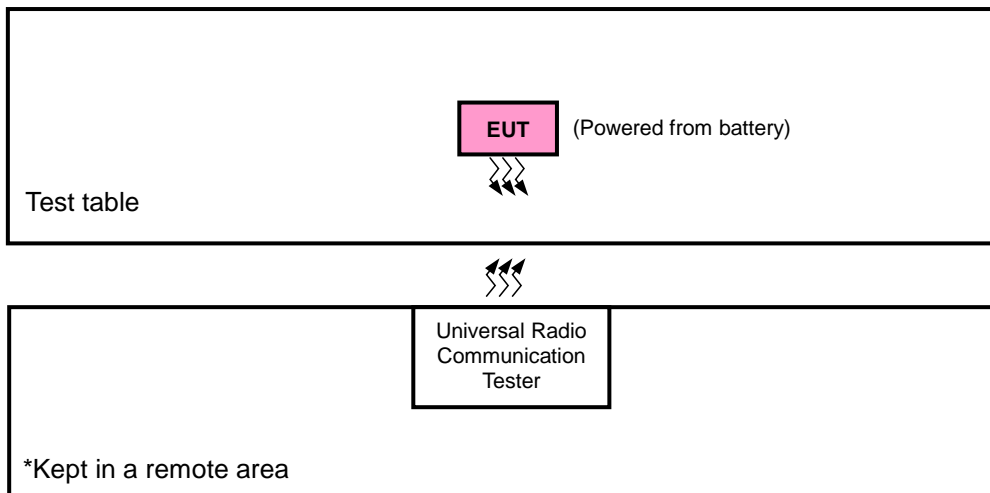
2. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3.2 Configuration Of System Under Test

<Radiated Emission Test>



<E.I.R.P. Test>



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.

| No. | Product | Brand | Model No. | Serial No. | FCC ID |
|-----|----------|--------|-----------|------------|--------|
| A. | Earphone | Cotron | Max-301 | N/A | N/A |
| B. | Adapter | N/A | N/A | N/A | N/A |

Note:

1. All power cords of the above support units are non-shielded (1.8m).

| No. | Signal Cable Description Of The Above Support Units |
|-----|---|
| 1. | N/A |
| 2. | N/A |

Note:

1. All power cords of the above support units are non-shielded (1.8m).

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 | ERP | Radiated Emission |
|------------|---------|-------------------|
| LTE Band 2 | Z-plane | Z-axis |

LTE BAND 2 MODE

| EUT Configure Mode | Test Item | Available Channel | Tested Channel | Channel Bandwidth | Modulation | Mode |
|--------------------|-----------------------|-------------------|---------------------|-------------------|-------------|----------------------|
| - | EIRP | 18607 to 19193 | 18607, 18900, 19193 | 1.4MHz | QPSK, 16QAM | 1 RB / 2 RB Offset |
| | | 18615 to 19185 | 18615, 18900, 19185 | 3MHz | QPSK, 16QAM | 1 RB / 7 RB Offset |
| | | 18625 to 19175 | 18625, 18900, 19175 | 5MHz | QPSK, 16QAM | 1 RB / 12 RB Offset |
| | | 18650 to 19150 | 18650, 18900, 19150 | 10MHz | QPSK, 16QAM | 1 RB / 24 RB Offset |
| | | 18675 to 19125 | 18675, 18900, 19125 | 15MHz | QPSK, 16QAM | 1 RB / 37 RB Offset |
| | | 18700 to 19100 | 18700, 18900, 19100 | 20MHz | QPSK, 16QAM | 1 RB / 50 RB Offset |
| - | Frequency Stability | 18607 to 19193 | 18900 | 1.4MHz | QPSK | 1 RB / 2 RB Offset |
| | | 18615 to 19185 | 18900 | 3MHz | QPSK | 1 RB / 7 RB Offset |
| | | 18625 to 19175 | 18900 | 5MHz | QPSK | 1 RB / 12 RB Offset |
| | | 18650 to 19150 | 18900 | 10MHz | QPSK | 1 RB / 24 RB Offset |
| | | 18675 to 19125 | 18900 | 15MHz | QPSK | 1 RB / 37 RB Offset |
| | | 18700 to 19100 | 18900 | 20MHz | QPSK | 1 RB / 50 RB Offset |
| - | Occupied Bandwidth | 18607 to 19193 | 18607, 18900, 19193 | 1.4MHz | QPSK, 16QAM | 6 RB / 0 RB Offset |
| | | 18615 to 19185 | 18615, 18900, 19185 | 3MHz | QPSK, 16QAM | 15 RB / 0 RB Offset |
| | | 18625 to 19175 | 18625, 18900, 19175 | 5MHz | QPSK, 16QAM | 25 RB / 0 RB Offset |
| | | 18650 to 19150 | 18650, 18900, 19150 | 10MHz | QPSK, 16QAM | 50 RB / 0 RB Offset |
| | | 18675 to 19125 | 18675, 18900, 19125 | 15MHz | QPSK, 16QAM | 75 RB / 0 RB Offset |
| | | 18700 to 19100 | 18700, 18900, 19100 | 20MHz | QPSK, 16QAM | 100 RB / 0 RB Offset |
| - | Peak to Average Ratio | 18607 to 19193 | 18607, 18900, 19193 | 1.4MHz | QPSK, 16QAM | 1 RB / 0 RB Offset |
| | | 18615 to 19185 | 18615, 18900, 19185 | 3MHz | QPSK, 16QAM | 1 RB / 0 RB Offset |
| | | 18625 to 19175 | 18625, 18900, 19175 | 5MHz | QPSK, 16QAM | 1 RB / 0 RB Offset |
| | | 18650 to 19150 | 18650, 18900, 19150 | 10MHz | QPSK, 16QAM | 1 RB / 0 RB Offset |
| | | 18675 to 19125 | 18675, 18900, 19125 | 15MHz | QPSK, 16QAM | 1 RB / 0 RB Offset |
| | | 18700 to 19100 | 18700, 18900, 19100 | 20MHz | QPSK, 16QAM | 1 RB / 0 RB Offset |

| EUT Configure Mode | Test Item | Available Channel | Tested Channel | Channel Bandwidth | Modulation | Mode | | |
|--------------------|-------------------|-------------------|--------------------|-------------------|------------|---|------|--------------------|
| - | Band Edge | 18607 to 19193 | 18607 | 1.4MHz | QPSK | 1 RB / 0 RB Offset 6 RB / 0 RB Offset | | |
| | | | 19193 | 1.4MHz | QPSK | 1 RB / 5 RB Offset 6 RB / 0 RB Offset | | |
| | | 18615 to 19185 | 18615 | 3MHz | QPSK | 1 RB / 0 RB Offset 15 RB / 0 RB Offset | | |
| | | | 19185 | 3MHz | QPSK | 1 RB / 14 RB Offset 15 RB / 0 RB Offset | | |
| | | 18625 to 19175 | 18625 | 5MHz | QPSK | 1 RB / 0 RB Offset 25 RB / 0 RB Offset | | |
| | | | 19175 | 5MHz | QPSK | 1 RB / 24 RB Offset 25 RB / 0 RB Offset | | |
| | | 18650 to 19150 | 18650 | 10MHz | QPSK | 1 RB / 0 RB Offset 50 RB / 0 RB Offset | | |
| | | | 19150 | 10MHz | QPSK | 1 RB / 49 RB Offset 50 RB / 0 RB Offset | | |
| | | 18675 to 19125 | 18675 | 15MHz | QPSK | 1 RB / 0 RB Offset 75 RB / 0 RB Offset | | |
| | | | 19125 | 15MHz | QPSK | 1 RB / 74 RB Offset 75 RB / 0 RB Offset | | |
| | | 18700 to 19100 | 18700 | 20MHz | QPSK | 1 RB / 0 RB Offset 100 RB / 0 RB Offset | | |
| | | | 19100 | 20MHz | QPSK | 1 RB / 99 RB Offset 100 RB / 0 RB Offset | | |
| | | - | Conducted Emission | 18607 to 19193 | 18900 | 1.4MHz | QPSK | 1 RB / 0 RB Offset |
| | | | | 18615 to 19185 | 18900 | 3MHz | QPSK | 1 RB / 0 RB Offset |
| 18625 to 19175 | 18900 | | | 5MHz | QPSK | 1 RB / 0 RB Offset | | |
| 18650 to 19150 | 18900 | | | 10MHz | QPSK | 1 RB / 0 RB Offset | | |
| 18675 to 19125 | 18900 | | | 15MHz | QPSK | 1 RB / 0 RB Offset | | |
| 18700 to 19100 | 18900 | | | 20MHz | QPSK | 1 RB / 0 RB Offset | | |
| - | Radiated Emission | 18700 to 19100 | 18900 | 20MHz | QPSK | 1 RB / 50 RB Offset | | |

Note: This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.

Test Condition:

| Test Item | Environmental Conditions | Input Power | Tested By |
|-----------------------|--------------------------|--------------|-------------|
| EIRP | 26deg. C, 58%RH | 3.85Vdc | Gavin Wu |
| Frequency Stability | 26deg. C, 58%RH | 3.85Vdc | Carlos Chen |
| Occupied Bandwidth | 26deg. C, 58%RH | 3.85Vdc | Carlos Chen |
| Band Edge | 26deg. C, 58%RH | 3.85Vdc | Carlos Chen |
| Peak To Average Ratio | 26deg. C, 58%RH | 3.85Vdc | Carlos Chen |
| Condcudeted Emission | 26deg. C, 58%RH | 3.85Vdc | Carlos Chen |
| Radiated Emission | 25deg. C, 65%RH | 120Vac, 60Hz | Gavin Wu |

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

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

FCC 47 CFR Part 2

FCC 47 CFR Part 24

ANSI/TIA/EIA-603-C 2004

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

4 Test Types and Results

4.1 Output Power Measurement

4.1.1 Limits of Output Power Measurement

Mobile / Portable station are limited to 2 watts e.i.r.p.

4.1.2 Test Procedures

EIRP / ERP Measurement:

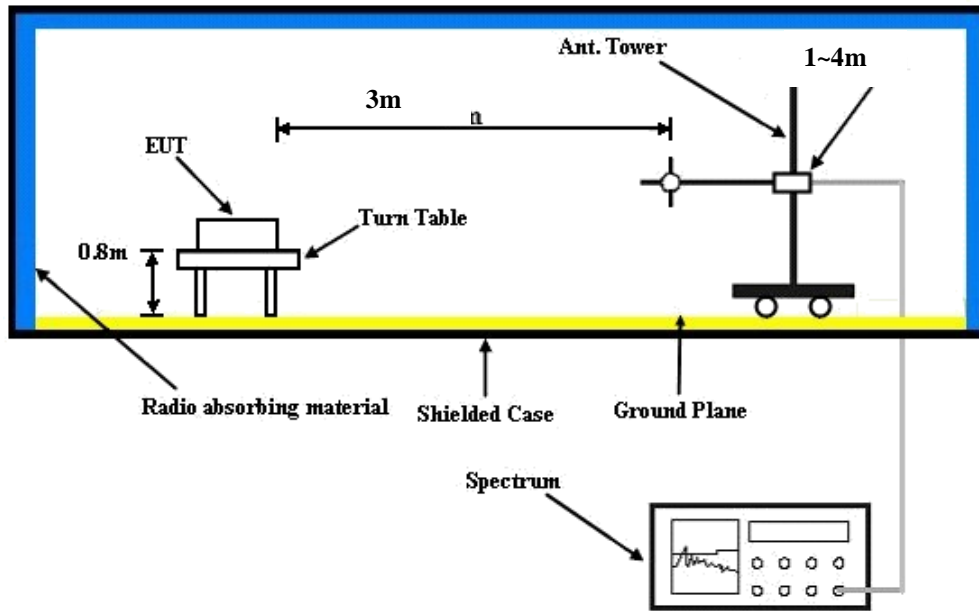
- a. All measurements were done at low, middle and high operational frequency range. RBW and VBW is 1MHz for GSM, GPRS & EDGE, 5MHz for WCDMA and CDMA, and 10MHz for LTE mode.
- b. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn 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.
- c. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a tx cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to "Read Value" of step b. Record the power level of S.G
- d. $EIRP = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}$. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, $E.R.P \text{ power} = E.I.P.R \text{ power} - 2.15\text{dBi}$.

Conducted Power Measurement:

The EUT was set up for the maximum power with GSM, GPRS, EDGE, WCDMA, CDMA, and 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.

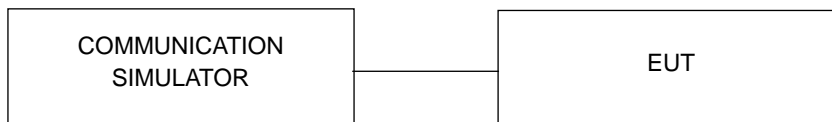
4.1.3 Test Setup

EIRP / ERP MEASUREMENT:



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

CONDUCTED POWER MEASUREMENT:



4.1.4 Test Results

CONDUCTED OUTPUT POWER (dBm)

| Band / BW | RB Size | RB Offset | QPSK | | | 3GPP MPR (dB) | 16QAM | | | 3GPP MPR (dB) |
|-----------|---------|-----------|--------------|--------------|---------------|---------------|--------------|--------------|---------------|---------------|
| | | | Low Ch 18607 | Mid Ch 18900 | High Ch 19193 | | Low Ch 18607 | Mid Ch 18900 | High Ch 19193 | |
| | | | 1850.7 MHz | 1880.0 MHz | 1909.3 MHz | | 1850.7 MHz | 1880.0 MHz | 1909.3 MHz | |
| 2 / 1.4M | 1 | 0 | 22.70 | 23.03 | 22.96 | 0 | 21.65 | 21.98 | 21.91 | 1 |
| | 1 | 2 | 23.27 | 23.60 | 23.53 | 0 | 22.22 | 22.55 | 22.48 | 1 |
| | 1 | 5 | 22.63 | 22.96 | 22.89 | 0 | 21.58 | 21.91 | 21.84 | 1 |
| | 3 | 0 | 22.10 | 22.43 | 22.36 | 0 | 21.05 | 21.38 | 21.31 | 1 |
| | 3 | 1 | 22.28 | 22.61 | 22.54 | 0 | 21.23 | 21.56 | 21.49 | 1 |
| | 3 | 3 | 22.20 | 22.53 | 22.46 | 0 | 21.15 | 21.48 | 21.41 | 1 |
| | 6 | 0 | 22.44 | 22.77 | 22.70 | 1 | 21.39 | 21.72 | 21.65 | 2 |

| Band / BW | RB Size | RB Offset | QPSK | | | 3GPP MPR (dB) | 16QAM | | | 3GPP MPR (dB) |
|-----------|---------|-----------|--------------|--------------|---------------|---------------|--------------|--------------|---------------|---------------|
| | | | Low Ch 18615 | Mid Ch 18900 | High Ch 19185 | | Low Ch 18615 | Mid Ch 18900 | High Ch 19185 | |
| | | | 1851.5 MHz | 1880.0 MHz | 1908.5 MHz | | 1851.5 MHz | 1880.0 MHz | 1908.5 MHz | |
| 2 / 3M | 1 | 0 | 22.81 | 23.14 | 23.07 | 0 | 21.76 | 22.09 | 22.02 | 1 |
| | 1 | 7 | 23.38 | 23.71 | 23.64 | 0 | 22.33 | 22.66 | 22.59 | 1 |
| | 1 | 14 | 22.74 | 23.07 | 23.00 | 0 | 21.69 | 22.02 | 21.95 | 1 |
| | 8 | 0 | 22.21 | 22.54 | 22.47 | 1 | 21.16 | 21.49 | 21.42 | 2 |
| | 8 | 3 | 22.39 | 22.72 | 22.65 | 1 | 21.34 | 21.67 | 21.60 | 2 |
| | 8 | 7 | 22.31 | 22.64 | 22.57 | 1 | 21.26 | 21.59 | 21.52 | 2 |
| | 15 | 0 | 22.55 | 22.88 | 22.81 | 1 | 21.50 | 21.83 | 21.76 | 2 |

| Band / BW | RB Size | RB Offset | QPSK | | | 3GPP MPR (dB) | 16QAM | | | 3GPP MPR (dB) |
|-----------|---------|-----------|--------------|--------------|---------------|---------------|--------------|--------------|---------------|---------------|
| | | | Low Ch 18625 | Mid Ch 18900 | High Ch 19175 | | Low Ch 18625 | Mid Ch 18900 | High Ch 19175 | |
| | | | 1852.5 MHz | 1880.0 MHz | 1907.5 MHz | | 1852.5 MHz | 1880.0 MHz | 1907.5 MHz | |
| 2 / 5M | 1 | 0 | 22.88 | 23.21 | 23.14 | 0 | 21.83 | 22.16 | 22.09 | 1 |
| | 1 | 12 | 23.45 | 23.78 | 23.71 | 0 | 22.40 | 22.73 | 22.66 | 1 |
| | 1 | 24 | 22.81 | 23.14 | 23.07 | 0 | 21.76 | 22.09 | 22.02 | 1 |
| | 12 | 0 | 22.28 | 22.61 | 22.54 | 1 | 21.23 | 21.56 | 21.49 | 2 |
| | 12 | 6 | 22.46 | 22.79 | 22.72 | 1 | 21.41 | 21.74 | 21.67 | 2 |
| | 12 | 13 | 22.38 | 22.71 | 22.64 | 1 | 21.33 | 21.66 | 21.59 | 2 |
| | 25 | 0 | 22.62 | 22.95 | 22.88 | 1 | 21.57 | 21.90 | 21.83 | 2 |

| Band / BW | RB Size | RB Offset | QPSK | | | 3GPP MPR (dB) | 16QAM | | | 3GPP MPR (dB) |
|-----------|---------|-----------|--------------|--------------|---------------|---------------|--------------|--------------|---------------|---------------|
| | | | Low Ch 18650 | Mid Ch 18900 | High Ch 19150 | | Low Ch 18650 | Mid Ch 18900 | High Ch 19150 | |
| | | | 1855.0 MHz | 1880.0 MHz | 1905.0 MHz | | 1855.0 MHz | 1880.0 MHz | 1905.0 MHz | |
| 2 / 10M | 1 | 0 | 22.98 | 23.31 | 23.24 | 0 | 21.93 | 22.26 | 22.19 | 1 |
| | 1 | 24 | 23.55 | 23.88 | 23.81 | 0 | 22.50 | 22.83 | 22.76 | 1 |
| | 1 | 49 | 22.91 | 23.24 | 23.17 | 0 | 21.86 | 22.19 | 22.12 | 1 |
| | 25 | 0 | 22.38 | 22.71 | 22.64 | 1 | 21.33 | 21.66 | 21.59 | 2 |
| | 25 | 12 | 22.56 | 22.89 | 22.82 | 1 | 21.51 | 21.84 | 21.77 | 2 |
| | 25 | 25 | 22.48 | 22.81 | 22.74 | 1 | 21.43 | 21.76 | 21.69 | 2 |
| | 50 | 0 | 22.72 | 23.05 | 22.98 | 1 | 21.67 | 22.00 | 21.93 | 2 |

| Band / BW | RB Size | RB Offset | QPSK | | | 3GPP MPR (dB) | 16QAM | | | 3GPP MPR (dB) |
|-----------|---------|-----------|--------------|--------------|---------------|---------------|--------------|--------------|---------------|---------------|
| | | | Low Ch 18675 | Mid Ch 18900 | High Ch 19125 | | Low Ch 18675 | Mid Ch 18900 | High Ch 19125 | |
| | | | 1857.5 MHz | 1880.0 MHz | 1902.5 MHz | | 1857.5 MHz | 1880.0 MHz | 1902.5 MHz | |
| 2 / 15M | 1 | 0 | 23.06 | 23.39 | 23.32 | 0 | 22.01 | 22.34 | 22.27 | 1 |
| | 1 | 37 | 23.63 | 23.96 | 23.89 | 0 | 22.58 | 22.91 | 22.84 | 1 |
| | 1 | 74 | 22.99 | 23.32 | 23.25 | 0 | 21.94 | 22.27 | 22.20 | 1 |
| | 36 | 0 | 22.46 | 22.79 | 22.72 | 1 | 21.41 | 21.74 | 21.67 | 2 |
| | 36 | 19 | 22.64 | 22.97 | 22.90 | 1 | 21.59 | 21.92 | 21.85 | 2 |
| | 36 | 39 | 22.56 | 22.89 | 22.82 | 1 | 21.51 | 21.84 | 21.77 | 2 |
| | 75 | 0 | 22.80 | 23.13 | 23.06 | 1 | 21.75 | 22.08 | 22.01 | 2 |

| Band / BW | RB Size | RB Offset | QPSK | | | 3GPP MPR (dB) | 16QAM | | | 3GPP MPR (dB) |
|-----------|---------|-----------|--------------|--------------|---------------|---------------|--------------|--------------|---------------|---------------|
| | | | Low Ch 18700 | Mid Ch 18900 | High Ch 19100 | | Low Ch 18700 | Mid Ch 18900 | High Ch 19100 | |
| | | | 1860.0 MHz | 1880.0 MHz | 1900.0 MHz | | 1860.0 MHz | 1880.0 MHz | 1900.0 MHz | |
| 2 / 20M | 1 | 0 | 23.18 | 23.51 | 23.44 | 0 | 22.13 | 22.46 | 22.39 | 1 |
| | 1 | 50 | 23.75 | 24.08 | 24.01 | 0 | 22.70 | 23.03 | 22.96 | 1 |
| | 1 | 99 | 23.11 | 23.44 | 23.37 | 0 | 22.06 | 22.39 | 22.32 | 1 |
| | 50 | 0 | 22.58 | 22.91 | 22.84 | 1 | 21.53 | 21.86 | 21.79 | 2 |
| | 50 | 25 | 22.76 | 23.09 | 23.02 | 1 | 21.71 | 22.04 | 21.97 | 2 |
| | 50 | 50 | 22.68 | 23.01 | 22.94 | 1 | 21.63 | 21.96 | 21.89 | 2 |
| | 100 | 0 | 22.92 | 23.25 | 23.18 | 1 | 21.87 | 22.20 | 22.13 | 2 |

EIRP Power (dBm)

| LTE Band 2 | | | | | | | |
|----------------------------------|---------|-----------------|-----------|-----------------------|-----------|----------|--------------------|
| Channel Bandwidth: 1.4MHz / QPSK | | | | | | | |
| Plane | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| Z | 18607 | 1850.7 | -15.40 | 36.57 | 21.17 | 130.98 | H |
| | 18900 | 1880.0 | -15.70 | 37.22 | 21.52 | 142.04 | |
| | 19193 | 1909.3 | -15.73 | 37.18 | 21.45 | 139.70 | |
| | 18607 | 1850.7 | -14.97 | 37.65 | 22.68 | 185.40 | V |
| | 18900 | 1880.0 | -14.69 | 37.58 | 22.89 | 194.67 | |
| | 19193 | 1909.3 | -14.92 | 37.48 | 22.56 | 180.30 | |

| LTE Band 2 | | | | | | | |
|-----------------------------------|---------|-----------------|-----------|-----------------------|-----------|----------|--------------------|
| Channel Bandwidth: 1.4MHz / 16QAM | | | | | | | |
| Plane | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| Z | 18607 | 1850.7 | -15.85 | 36.57 | 20.72 | 118.09 | H |
| | 18900 | 1880.0 | -16.23 | 37.22 | 20.99 | 125.72 | |
| | 19193 | 1909.3 | -16.45 | 37.18 | 20.73 | 118.36 | |
| | 18607 | 1850.7 | -15.84 | 37.65 | 21.81 | 151.74 | V |
| | 18900 | 1880.0 | -15.47 | 37.58 | 22.11 | 162.67 | |
| | 19193 | 1909.3 | -15.72 | 37.48 | 21.76 | 149.97 | |

| LTE Band 2 | | | | | | | |
|--------------------------------|---------|-----------------|-----------|-----------------------|-----------|----------|--------------------|
| Channel Bandwidth: 3MHz / QPSK | | | | | | | |
| Plane | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| Z | 18615 | 1851.5 | -14.92 | 36.57 | 21.65 | 146.29 | H |
| | 18900 | 1880.0 | -15.52 | 37.22 | 21.70 | 148.05 | |
| | 19185 | 1908.5 | -15.48 | 37.18 | 21.70 | 147.98 | |
| | 18615 | 1851.5 | -15.18 | 37.65 | 22.47 | 176.64 | V |
| | 18900 | 1880.0 | -14.65 | 37.58 | 22.93 | 196.47 | |
| | 19185 | 1908.5 | -15.02 | 37.48 | 22.46 | 176.20 | |



| LTE Band 2 | | | | | | | |
|---------------------------------|---------|-----------------|-----------|-----------------------|-----------|----------|--------------------|
| Channel Bandwidth: 3MHz / 16QAM | | | | | | | |
| Plane | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| Z | 18615 | 1851.5 | -15.91 | 36.57 | 20.66 | 116.47 | H |
| | 18900 | 1880.0 | -16.39 | 37.22 | 20.83 | 121.17 | |
| | 19185 | 1908.5 | -16.64 | 37.18 | 20.54 | 113.29 | |
| | 18615 | 1851.5 | -15.80 | 37.65 | 21.85 | 153.14 | V |
| | 18900 | 1880.0 | -15.59 | 37.58 | 21.99 | 158.23 | |
| | 19185 | 1908.5 | -15.83 | 37.48 | 21.65 | 146.22 | |

| LTE Band 2 | | | | | | | |
|--------------------------------|---------|-----------------|-----------|-----------------------|-----------|----------|--------------------|
| Channel Bandwidth: 5MHz / QPSK | | | | | | | |
| Plane | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| Z | 18625 | 1852.5 | -15.02 | 36.57 | 21.55 | 142.96 | H |
| | 18900 | 1880.0 | -15.80 | 37.22 | 21.42 | 138.80 | |
| | 19175 | 1907.5 | -15.88 | 37.18 | 21.30 | 134.96 | |
| | 18625 | 1852.5 | -14.65 | 37.65 | 23.00 | 199.57 | V |
| | 18900 | 1880.0 | -14.92 | 37.58 | 22.66 | 184.63 | |
| | 19175 | 1907.5 | -14.55 | 37.48 | 22.93 | 196.34 | |

| LTE Band 2 | | | | | | | |
|---------------------------------|---------|-----------------|-----------|-----------------------|-----------|----------|--------------------|
| Channel Bandwidth: 5MHz / 16QAM | | | | | | | |
| Plane | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| Z | 18625 | 1852.5 | -15.91 | 36.57 | 20.66 | 116.47 | H |
| | 18900 | 1880.0 | -16.41 | 37.22 | 20.81 | 120.61 | |
| | 19175 | 1907.5 | -16.68 | 37.18 | 20.50 | 112.25 | |
| | 18625 | 1852.5 | -15.20 | 37.65 | 22.45 | 175.83 | V |
| | 18900 | 1880.0 | -15.41 | 37.58 | 22.17 | 164.93 | |
| | 19175 | 1907.5 | -15.15 | 37.48 | 22.33 | 171.00 | |



| LTE Band 2 | | | | | | | |
|---------------------------------|---------|-----------------|-----------|-----------------------|-----------|----------|--------------------|
| Channel Bandwidth: 10MHz / QPSK | | | | | | | |
| Plane | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| Z | 18650 | 1855.0 | -15.33 | 36.57 | 21.24 | 133.11 | H |
| | 18900 | 1880.0 | -15.76 | 37.22 | 21.46 | 140.09 | |
| | 19150 | 1905.0 | -15.56 | 37.18 | 21.62 | 145.28 | |
| | 18650 | 1855.0 | -14.44 | 37.65 | 23.21 | 209.46 | V |
| | 18900 | 1880.0 | -14.78 | 37.58 | 22.80 | 190.68 | |
| | 19150 | 1905.0 | -14.64 | 37.48 | 22.84 | 192.31 | |

| LTE Band 2 | | | | | | | |
|----------------------------------|---------|-----------------|-----------|-----------------------|-----------|----------|--------------------|
| Channel Bandwidth: 10MHz / 16QAM | | | | | | | |
| Plane | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| Z | 18650 | 1855.0 | -15.62 | 36.57 | 20.95 | 124.51 | H |
| | 18900 | 1880.0 | -16.08 | 37.22 | 21.14 | 130.14 | |
| | 19150 | 1905.0 | -15.95 | 37.18 | 21.23 | 132.80 | |
| | 18650 | 1855.0 | -14.98 | 37.65 | 22.67 | 184.97 | V |
| | 18900 | 1880.0 | -15.46 | 37.58 | 22.12 | 163.04 | |
| | 19150 | 1905.0 | -15.46 | 37.48 | 22.02 | 159.22 | |

| LTE Band 2 | | | | | | | |
|---------------------------------|---------|-----------------|-----------|-----------------------|-----------|----------|--------------------|
| Channel Bandwidth: 15MHz / QPSK | | | | | | | |
| Plane | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| Z | 18675 | 1857.5 | -15.01 | 36.57 | 21.56 | 143.28 | H |
| | 18900 | 1880.0 | -15.73 | 37.22 | 21.49 | 141.06 | |
| | 19125 | 1902.5 | -15.65 | 37.18 | 21.53 | 142.30 | |
| | 18675 | 1857.5 | -14.46 | 37.65 | 23.19 | 208.50 | V |
| | 18900 | 1880.0 | -14.75 | 37.58 | 22.83 | 192.00 | |
| | 19125 | 1902.5 | -14.78 | 37.48 | 22.70 | 186.21 | |

| LTE Band 2 | | | | | | | |
|----------------------------------|---------|-----------------|-----------|-----------------------|-----------|----------|--------------------|
| Channel Bandwidth: 15MHz / 16QAM | | | | | | | |
| Plane | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| Z | 18675 | 1857.5 | -15.45 | 36.57 | 21.12 | 129.48 | H |
| | 18900 | 1880.0 | -16.20 | 37.22 | 21.02 | 126.59 | |
| | 19125 | 1902.5 | -15.72 | 37.18 | 21.46 | 140.02 | |
| | 18675 | 1857.5 | -14.89 | 37.65 | 22.76 | 188.84 | V |
| | 18900 | 1880.0 | -15.33 | 37.58 | 22.25 | 168.00 | |
| | 19125 | 1902.5 | -15.46 | 37.48 | 22.02 | 159.22 | |

| LTE Band 2 | | | | | | | |
|---------------------------------|---------|-----------------|-----------|-----------------------|-----------|----------|--------------------|
| Channel Bandwidth: 20MHz / QPSK | | | | | | | |
| Plane | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| Z | 18700 | 1860.0 | -14.65 | 36.57 | 21.92 | 155.67 | H |
| | 18900 | 1880.0 | -15.27 | 37.22 | 21.95 | 156.82 | |
| | 19100 | 1900.0 | -15.02 | 37.18 | 22.16 | 164.51 | |
| | 18700 | 1860.0 | -14.74 | 37.65 | 22.91 | 195.48 | V |
| | 18900 | 1880.0 | -14.73 | 37.58 | 22.85 | 192.89 | |
| | 19100 | 1900.0 | -14.15 | 37.48 | 23.33 | 215.28 | |

| LTE Band 2 | | | | | | | |
|----------------------------------|---------|-----------------|-----------|-----------------------|-----------|----------|--------------------|
| Channel Bandwidth: 20MHz / 16QAM | | | | | | | |
| Plane | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| Z | 18700 | 1860.0 | -14.86 | 36.57 | 21.71 | 148.32 | H |
| | 18900 | 1880.0 | -15.44 | 37.22 | 21.78 | 150.80 | |
| | 19100 | 1900.0 | -15.30 | 37.18 | 21.88 | 154.24 | |
| | 18700 | 1860.0 | -15.04 | 37.65 | 22.61 | 182.43 | V |
| | 18900 | 1880.0 | -15.05 | 37.58 | 22.53 | 179.18 | |
| | 19100 | 1900.0 | -15.06 | 37.48 | 22.42 | 174.58 | |

4.2 Frequency Stability Measurement

4.2.1 Limits of Frequency Stability Measurement

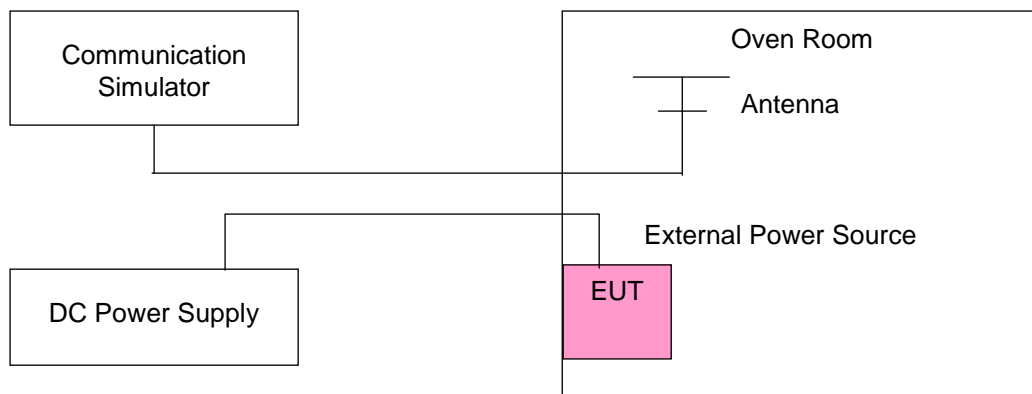
The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

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 ± 0.5 °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 (Volts) | Frequency Error (ppm) | | | | | | Limit (ppm) |
|-----------------|-----------------------|---------|---------|---------|---------|---------|-------------|
| | LTE Band 25 | | | | | | |
| | 1.4MHz | 3MHz | 5MHz | 10MHz | 15MHz | 20MHz | |
| 3.85 | 0.00046 | 0.00072 | 0.00131 | 0.00157 | 0.00053 | 0.00153 | 2.5 |
| 3.5 | 0.00107 | 0.00146 | 0.00207 | 0.00188 | 0.00003 | 0.00015 | 2.5 |
| 4.4 | 0.00170 | 0.00190 | 0.00039 | 0.00133 | 0.00103 | 0.00099 | 2.5 |

NOTE: The applicant defined the normal working voltage of the battery is from 3.6Vdc to 4.35Vdc.

Frequency Error vs. Temperature

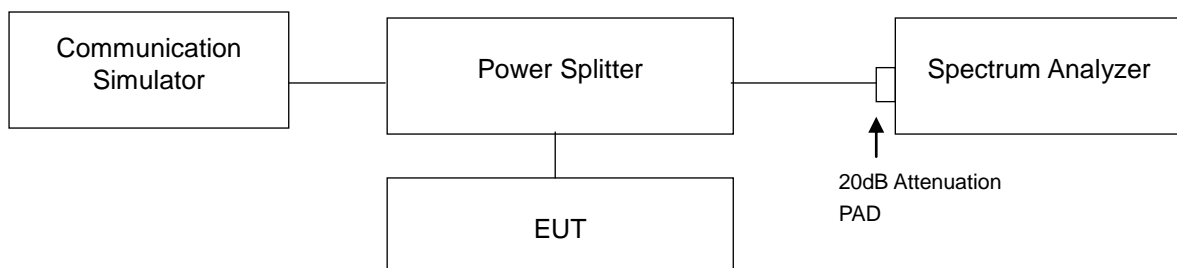
| Temp. (°C) | Frequency Error (ppm) | | | | | | Limit (ppm) |
|------------|-----------------------|----------|----------|----------|----------|----------|-------------|
| | LTE Band 25 | | | | | | |
| | 1.4MHz | 3MHz | 5MHz | 10MHz | 1.4MHz | 3MHz | |
| -30 | 0.00159 | 0.00005 | 0.00029 | 0.00107 | 0.00004 | 0.00110 | 2.5 |
| -20 | 0.00143 | 0.00084 | 0.00001 | 0.00197 | 0.00045 | 0.00186 | 2.5 |
| -10 | 0.00131 | 0.00105 | 0.00138 | 0.00082 | 0.00065 | 0.00209 | 2.5 |
| 0 | 0.00189 | 0.00048 | 0.00200 | 0.00044 | 0.00050 | 0.00129 | 2.5 |
| 10 | 0.00136 | 0.00129 | 0.00164 | 0.00107 | 0.00102 | 0.00181 | 2.5 |
| 20 | -0.00163 | -0.00143 | -0.00049 | -0.00158 | -0.00068 | -0.00106 | 2.5 |
| 30 | -0.00204 | -0.00072 | -0.00174 | -0.00037 | -0.00206 | -0.00086 | 2.5 |
| 40 | -0.00121 | -0.00151 | -0.00149 | -0.00107 | -0.00047 | -0.00106 | 2.5 |
| 50 | -0.00039 | -0.00165 | -0.00001 | -0.00020 | -0.00089 | -0.00206 | 2.5 |

4.3 Occupied Bandwidth Measurement

4.3.1 Test Procedure

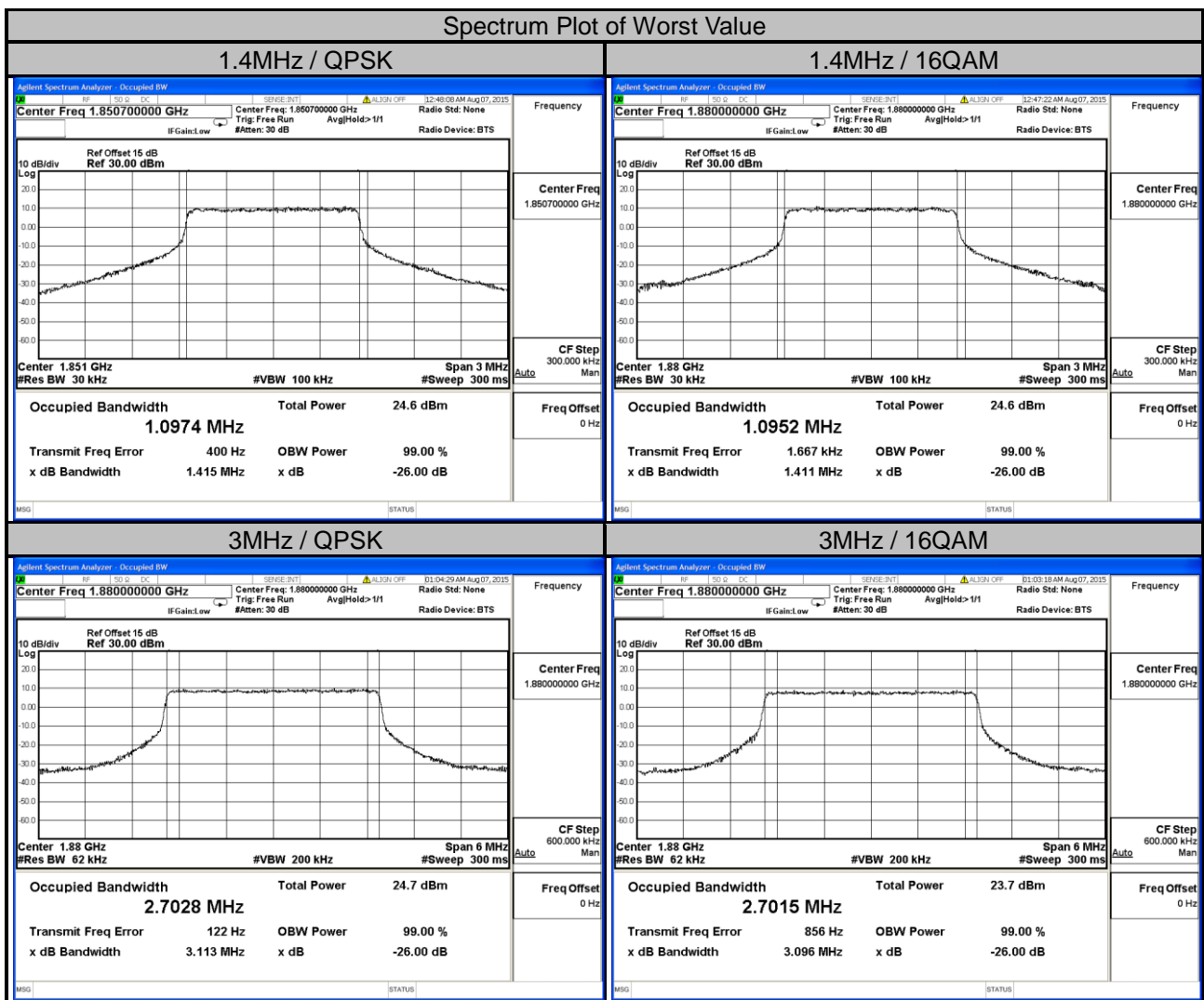
The EUT makes a call to the communication simulator. All measurements were done at low, middle and high operational frequency range. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

4.3.2 Test Setup



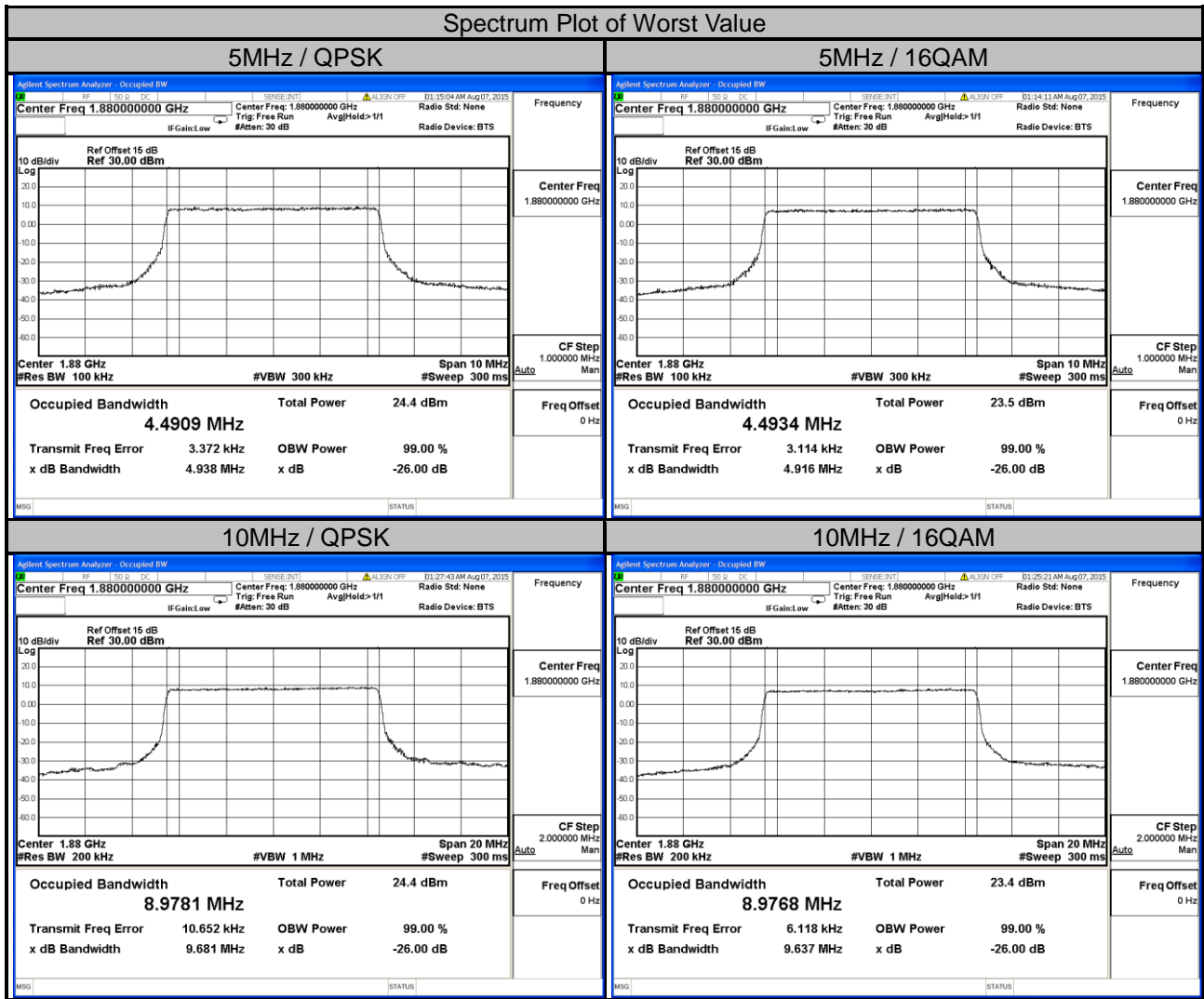
4.3.3 Test Result

| LTE Band 2 | | | | | | | |
|---------------------------|-----------------|------------------------------|--------|-------------------------|-----------------|------------------------------|--------|
| Channel Bandwidth: 1.4MHz | | | | Channel Bandwidth: 3MHz | | | |
| Channel | Frequency (MHz) | 99% Occupied Bandwidth (MHz) | | Channel | Frequency (MHz) | 99% Occupied Bandwidth (MHz) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 18607 | 1850.7 | 1.0974 | 1.0945 | 18615 | 1851.5 | 2.6981 | 2.6988 |
| 18900 | 1880.0 | 1.0969 | 1.0952 | 18900 | 1880.0 | 2.7028 | 2.7015 |
| 19193 | 1909.3 | 1.0965 | 1.0943 | 19185 | 1908.5 | 2.7006 | 2.6993 |



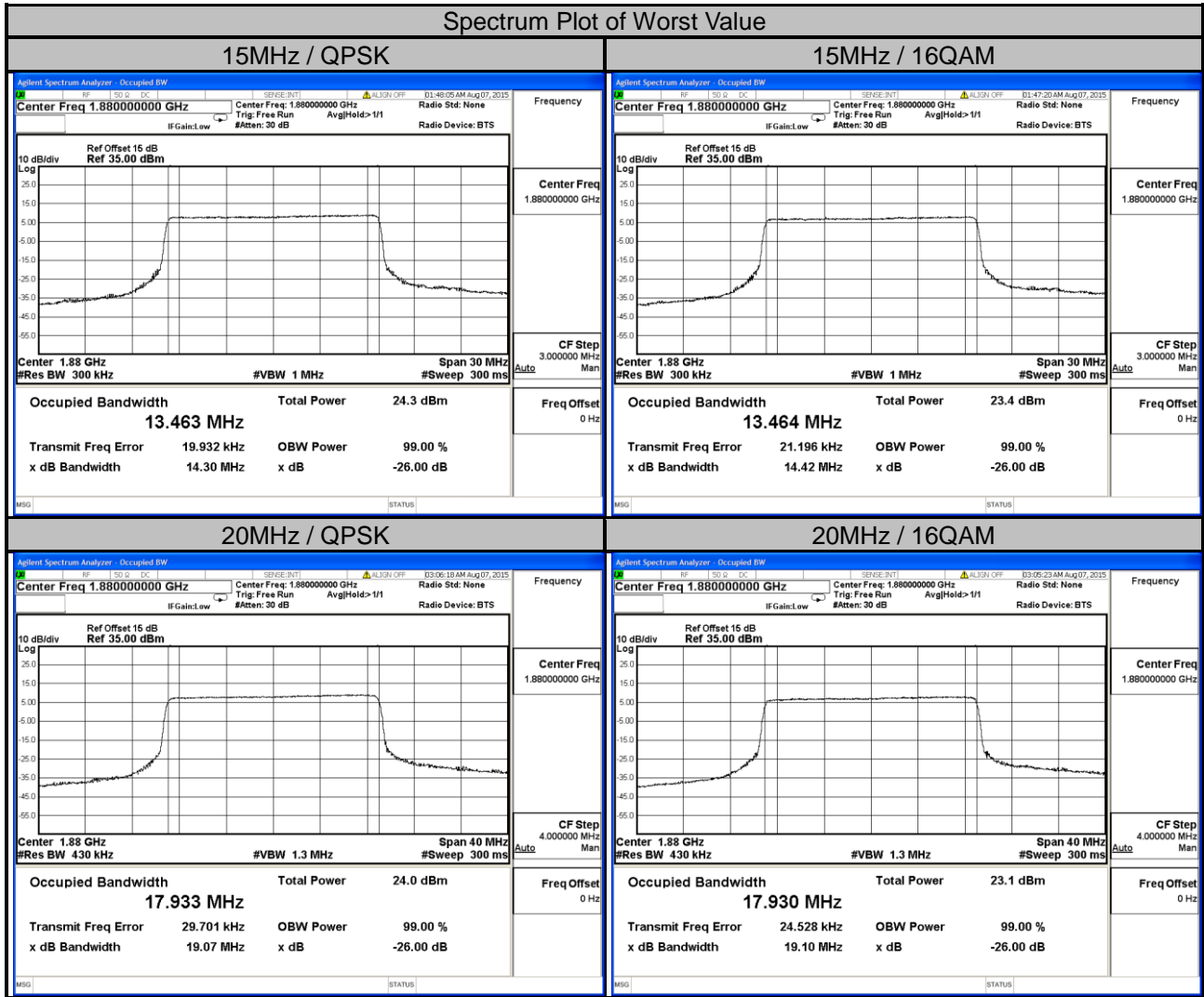


| LTE Band 2 | | | | | | | |
|-------------------------|-----------------|------------------------------|--------|--------------------------|-----------------|------------------------------|--------|
| Channel Bandwidth: 5MHz | | | | Channel Bandwidth: 10MHz | | | |
| Channel | Frequency (MHz) | 99% Occupied Bandwidth (MHz) | | Channel | Frequency (MHz) | 99% Occupied Bandwidth (MHz) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 18625 | 1852.5 | 4.4893 | 4.4889 | 18650 | 1855.0 | 8.9645 | 8.9619 |
| 18900 | 1880.0 | 4.4909 | 4.4934 | 18900 | 1880.0 | 8.9781 | 8.9768 |
| 19175 | 1907.5 | 4.4894 | 4.4868 | 19150 | 1905.0 | 8.9653 | 8.9633 |





| LTE Band 2 | | | | | | | |
|--------------------------|-----------------|------------------------------|--------|--------------------------|-----------------|------------------------------|--------|
| Channel Bandwidth: 15MHz | | | | Channel Bandwidth: 20MHz | | | |
| Channel | Frequency (MHz) | 99% Occupied Bandwidth (MHz) | | Channel | Frequency (MHz) | 99% Occupied Bandwidth (MHz) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 18675 | 1857.5 | 13.437 | 13.435 | 18700 | 1860.0 | 17.918 | 17.929 |
| 18900 | 1880.0 | 13.463 | 13.464 | 18900 | 1880.0 | 17.933 | 17.930 |
| 19125 | 1902.5 | 13.440 | 13.424 | 19100 | 1900.0 | 17.863 | 17.868 |

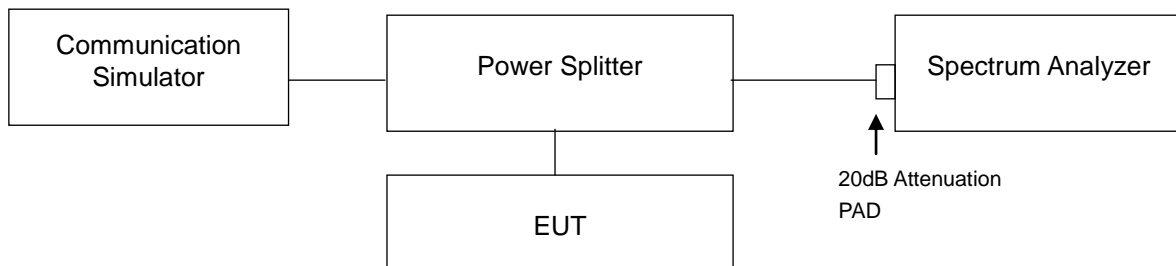


4.4 Band Edge Measurement

4.4.1 Limits of Band Edge Measurement

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. 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.

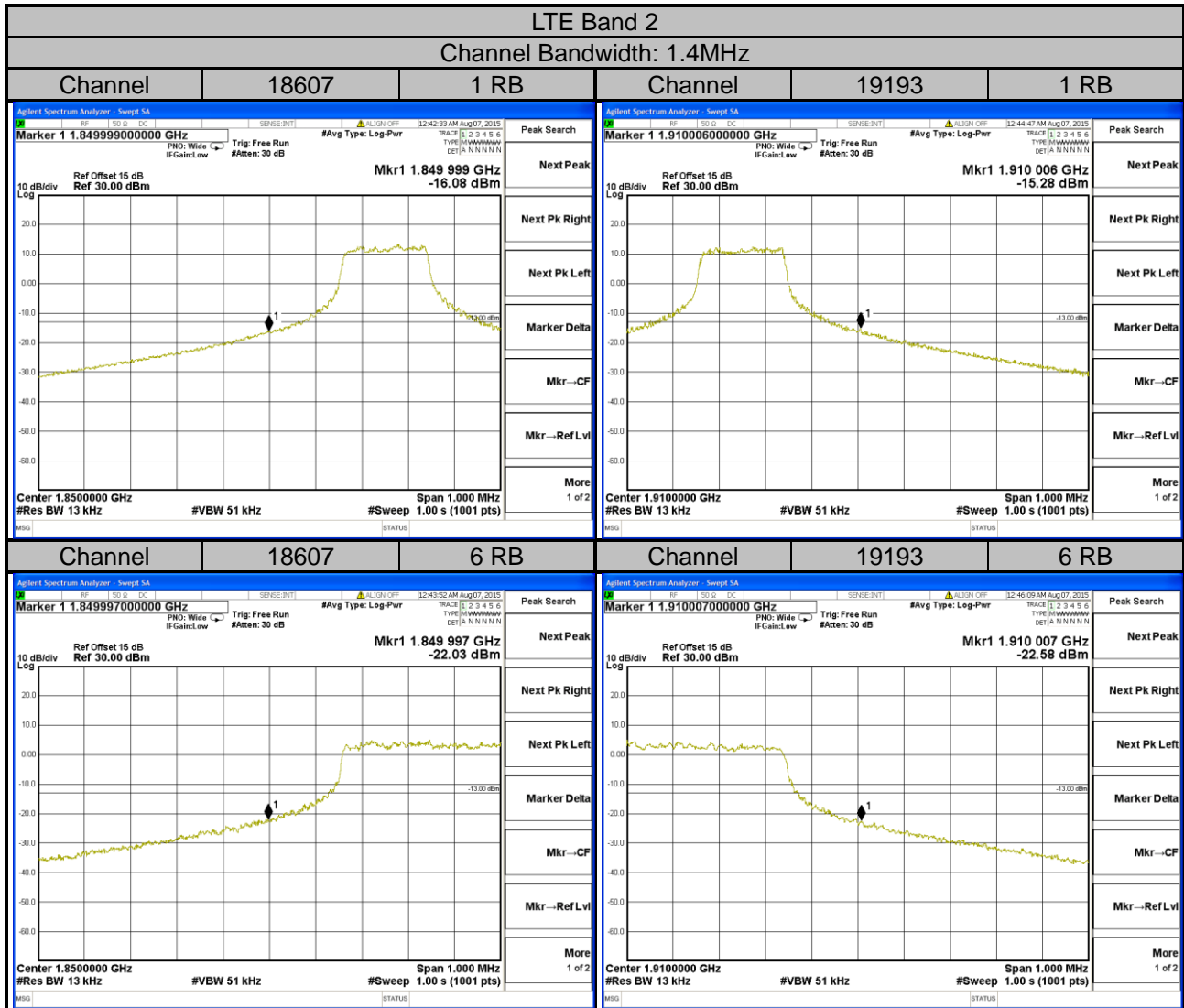
4.4.2 Test Setup



4.4.3 Test Procedures

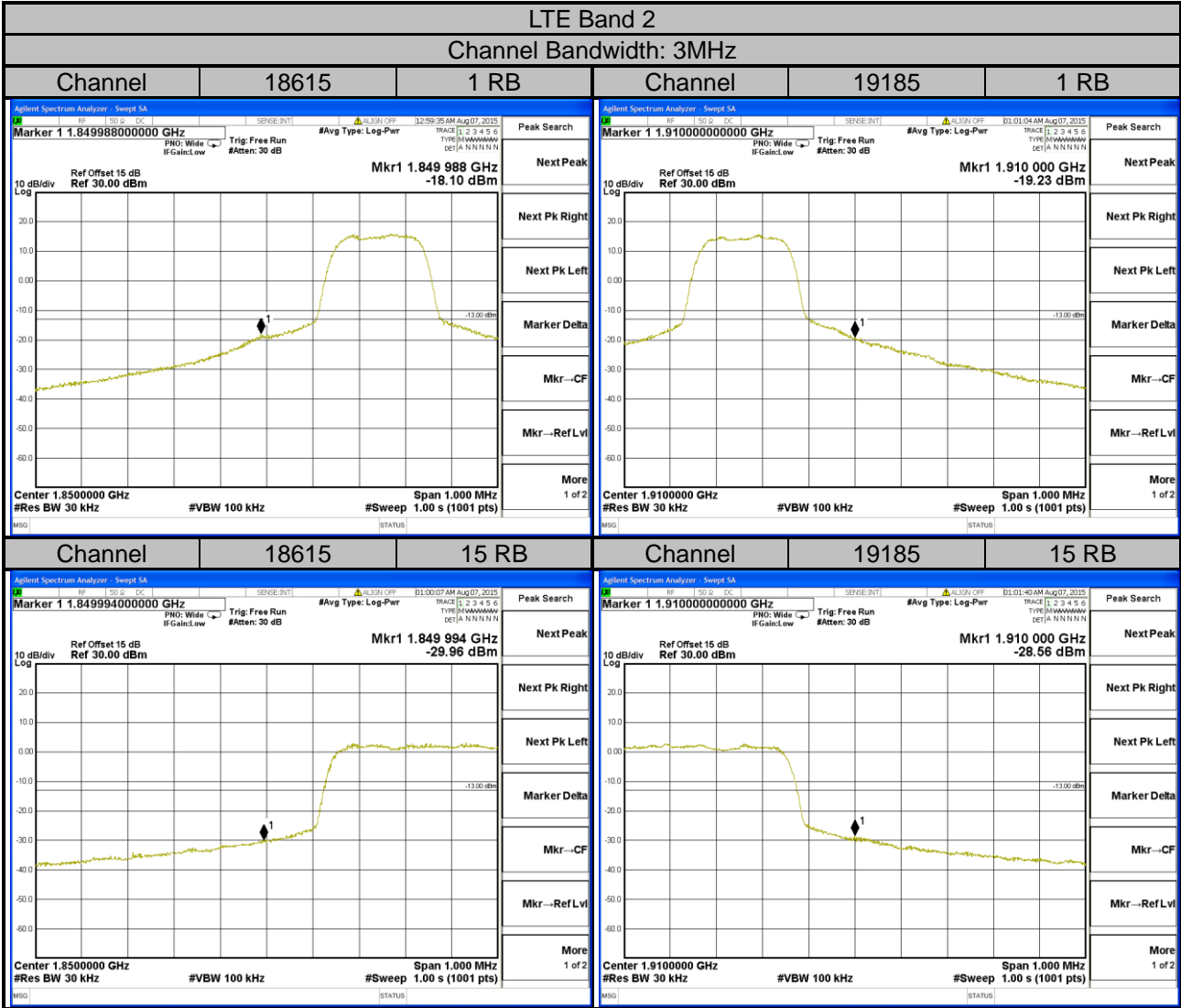
- All measurements were done at low and high operational frequency range.
- The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 13kHz and VB of the spectrum is 51kHz (LTE Bandwidth 1.4MHz).
- The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 30kHz and VB of the spectrum is 100kHz (LTE Bandwidth 3MHz).
- The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 100kHz and VB of the spectrum is 300kHz (LTE Bandwidth 5MHz/10MHz).
- The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 150kHz and VB of the spectrum is 470kHz (LTE Bandwidth 15MHz).
- The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 180kHz and VB of the spectrum is 560kHz (LTE Bandwidth 20MHz).
- Record the max trace plot into the test report.

4.4.4 Test Results





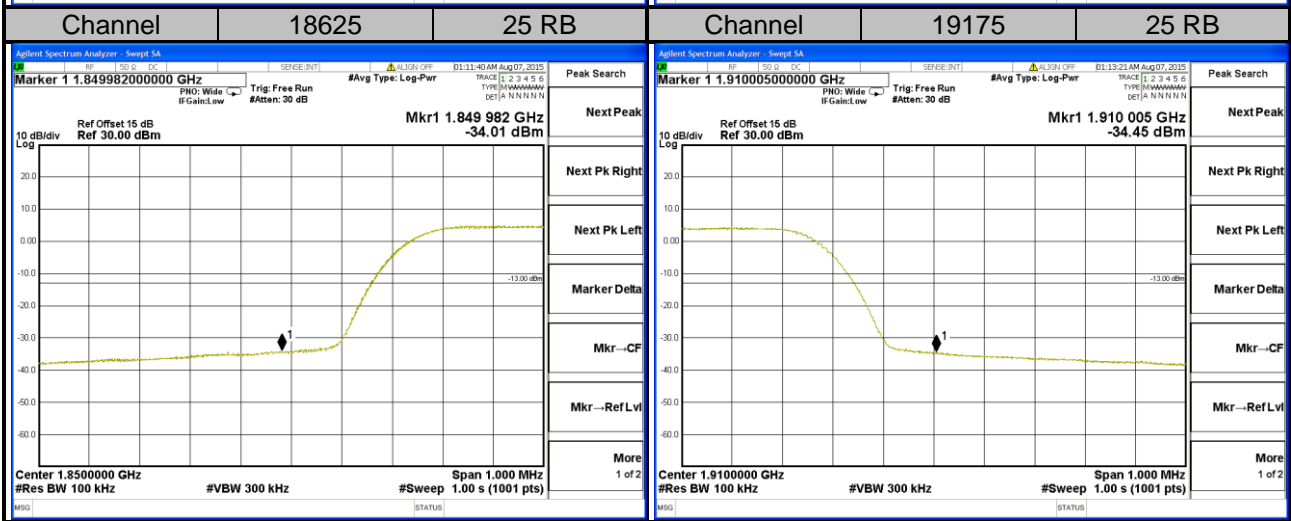
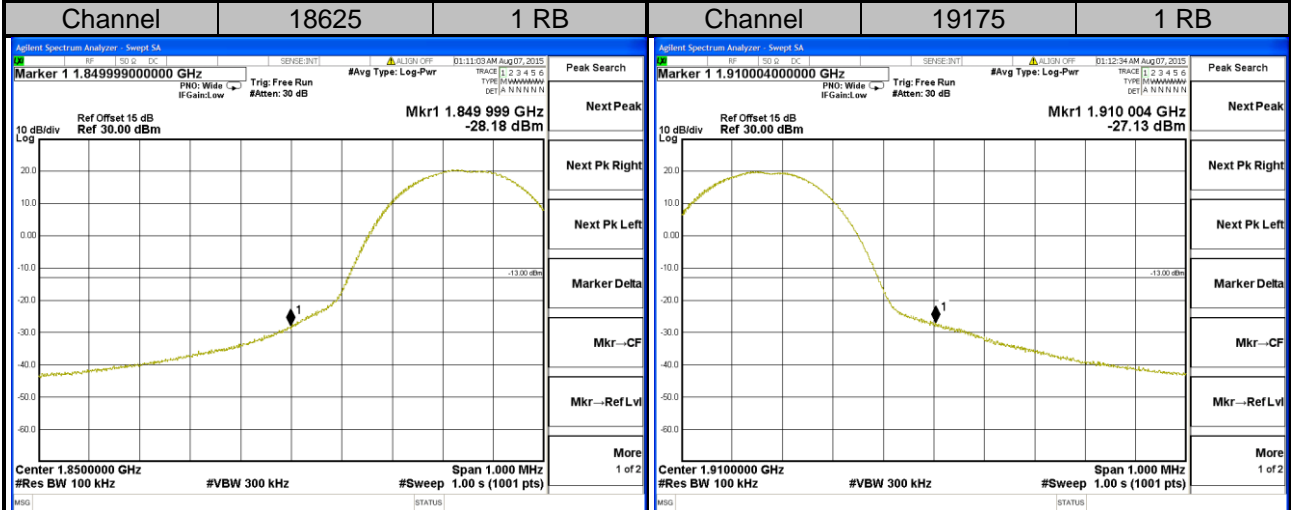
A D T





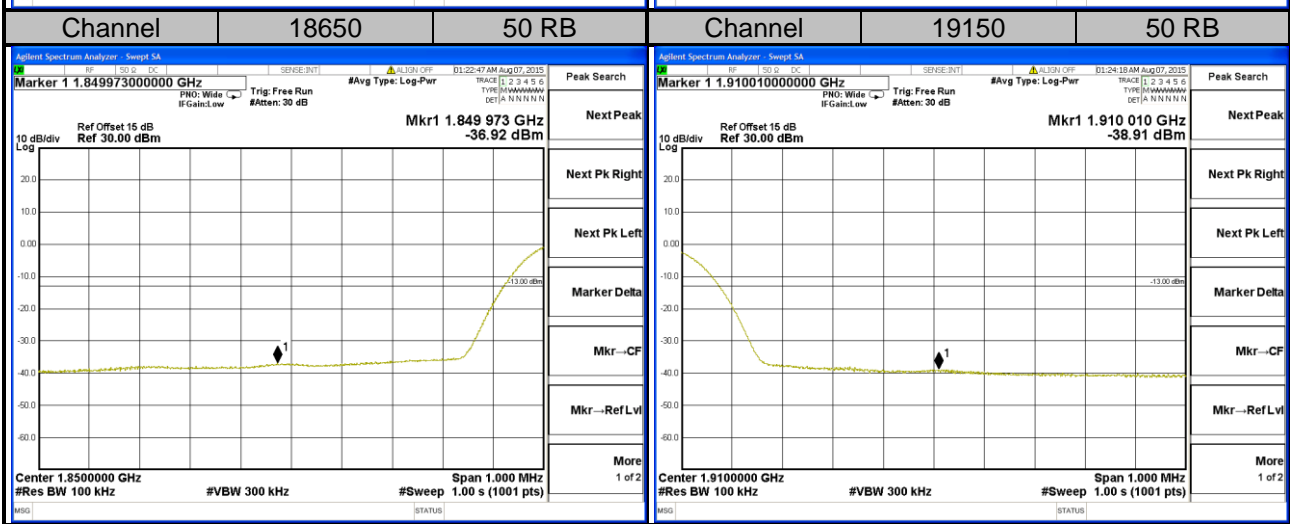
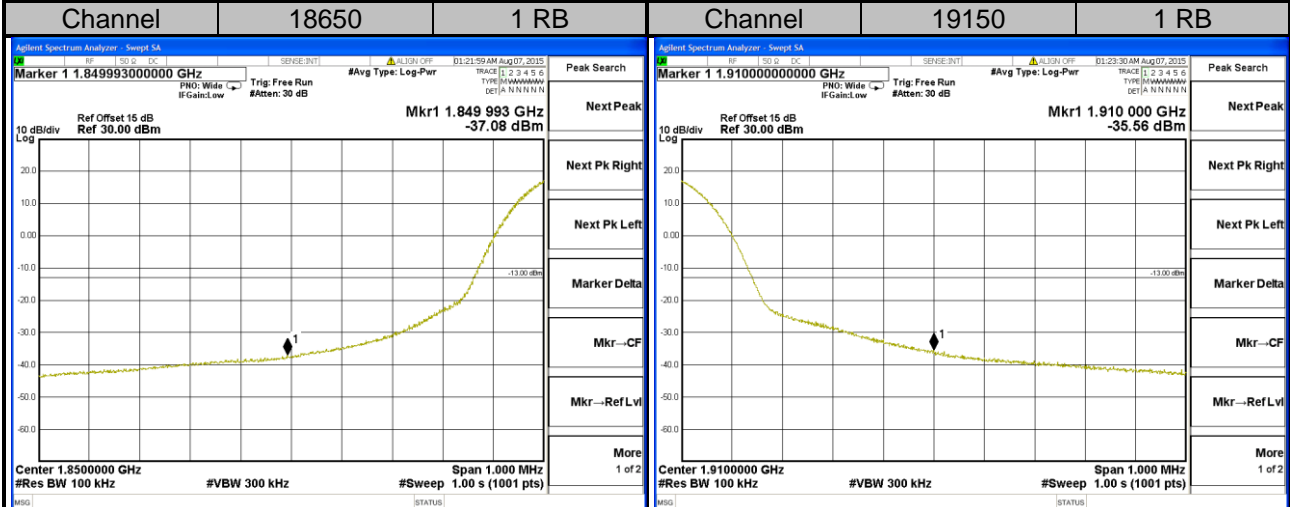
LTE Band 2

Channel Bandwidth: 5MHz



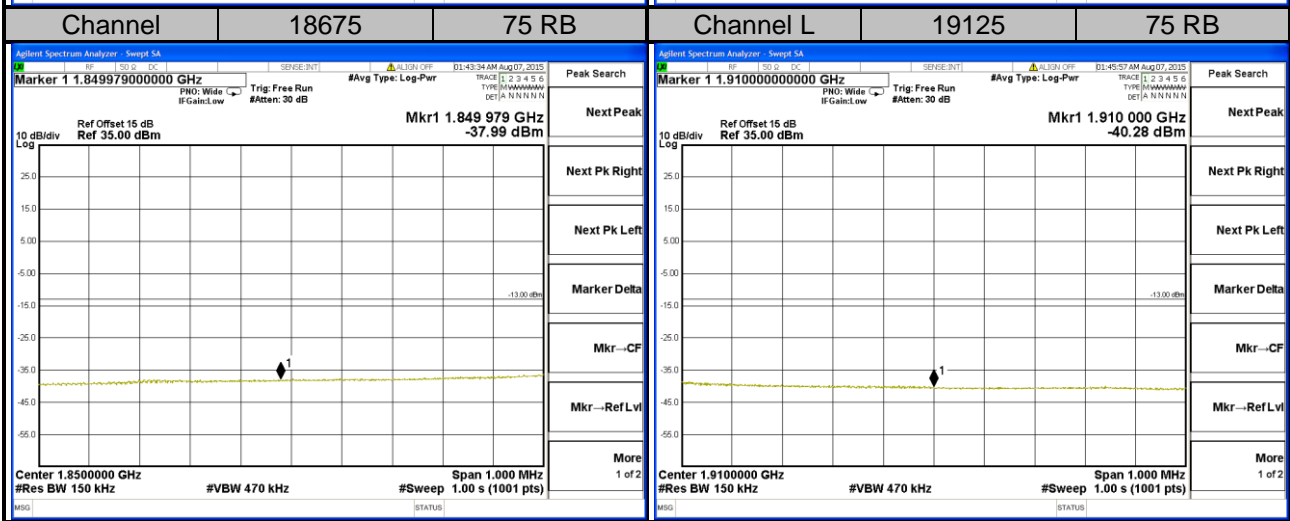
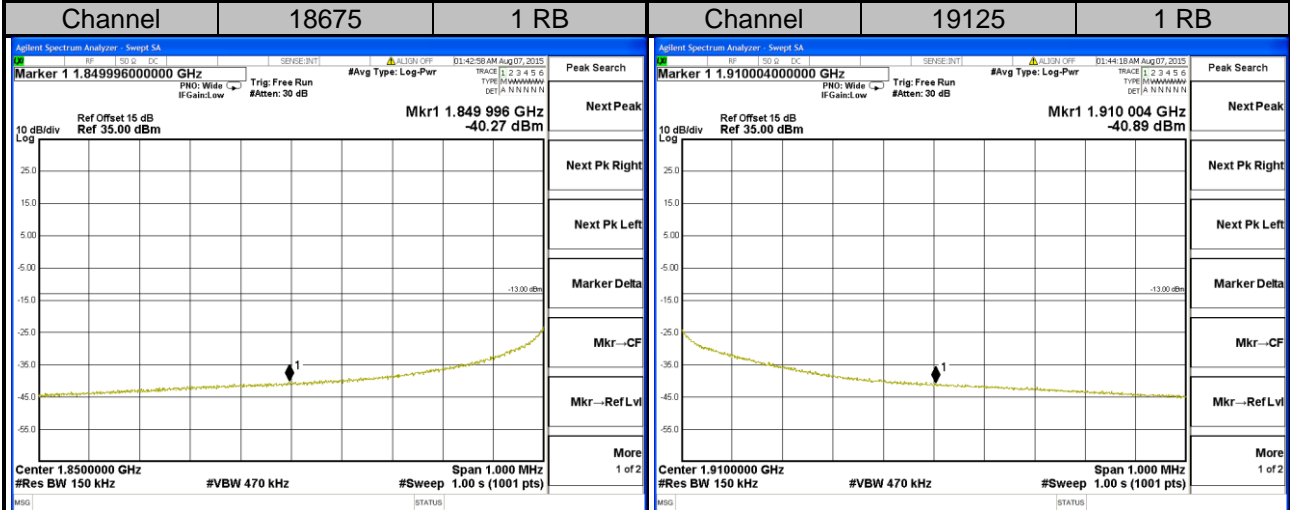


LTE Band 2
Channel Bandwidth: 10MHz



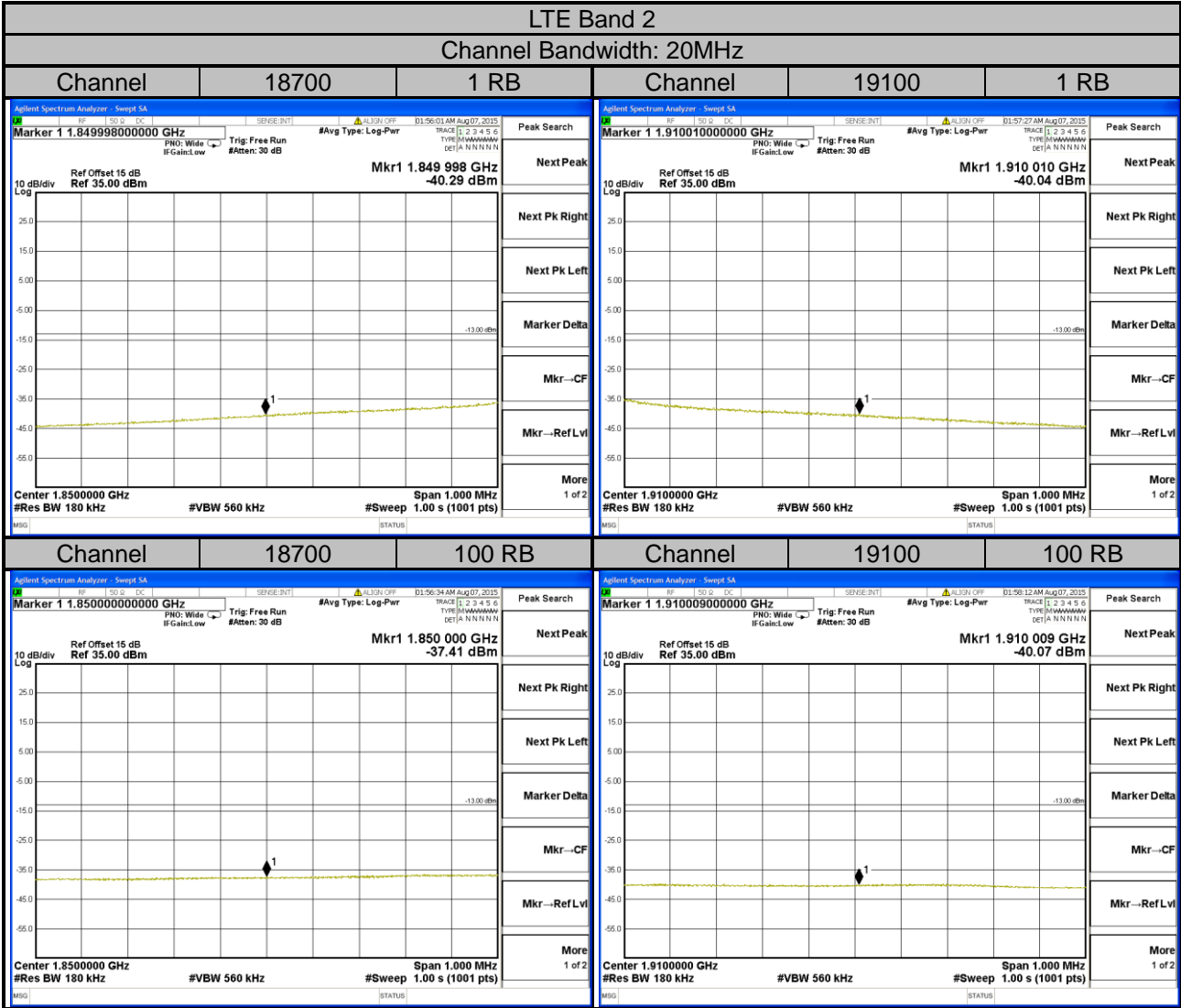


LTE Band 2
Channel Bandwidth: 15MHz





A D T

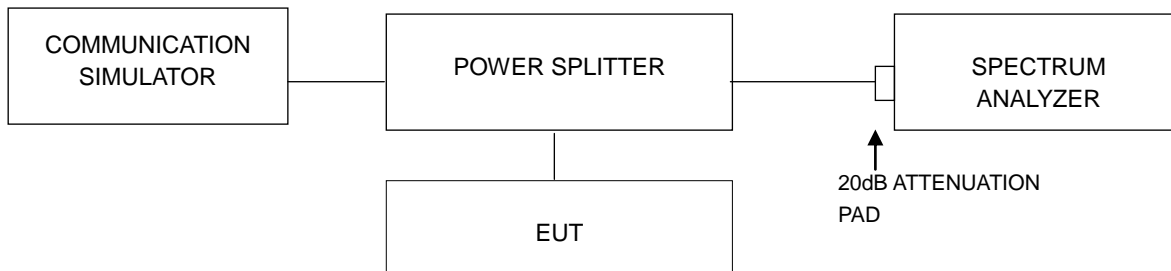


4.5 Peak To Average Ratio

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

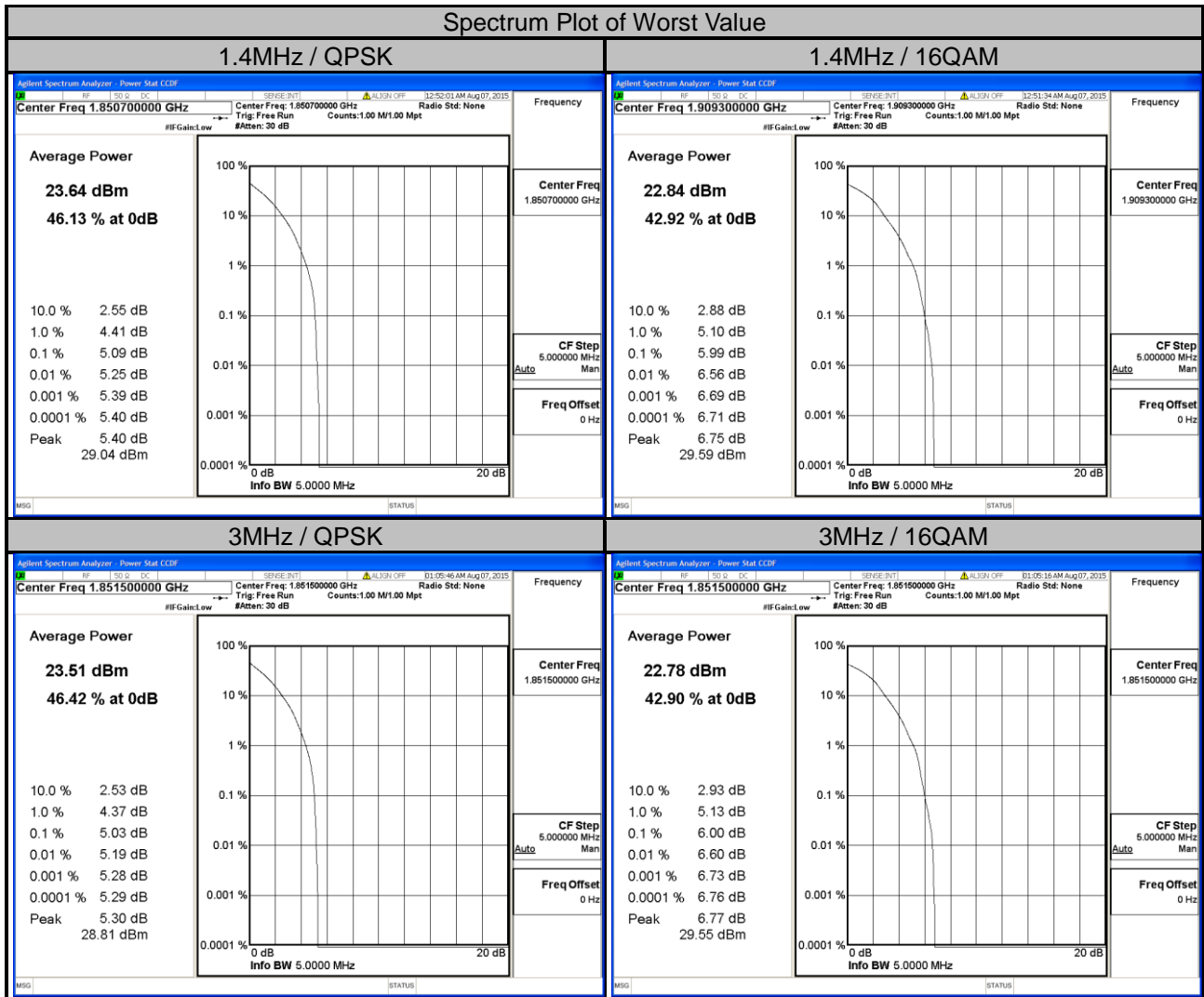


4.5.3 Test Procedures

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

4.5.4 Test Results

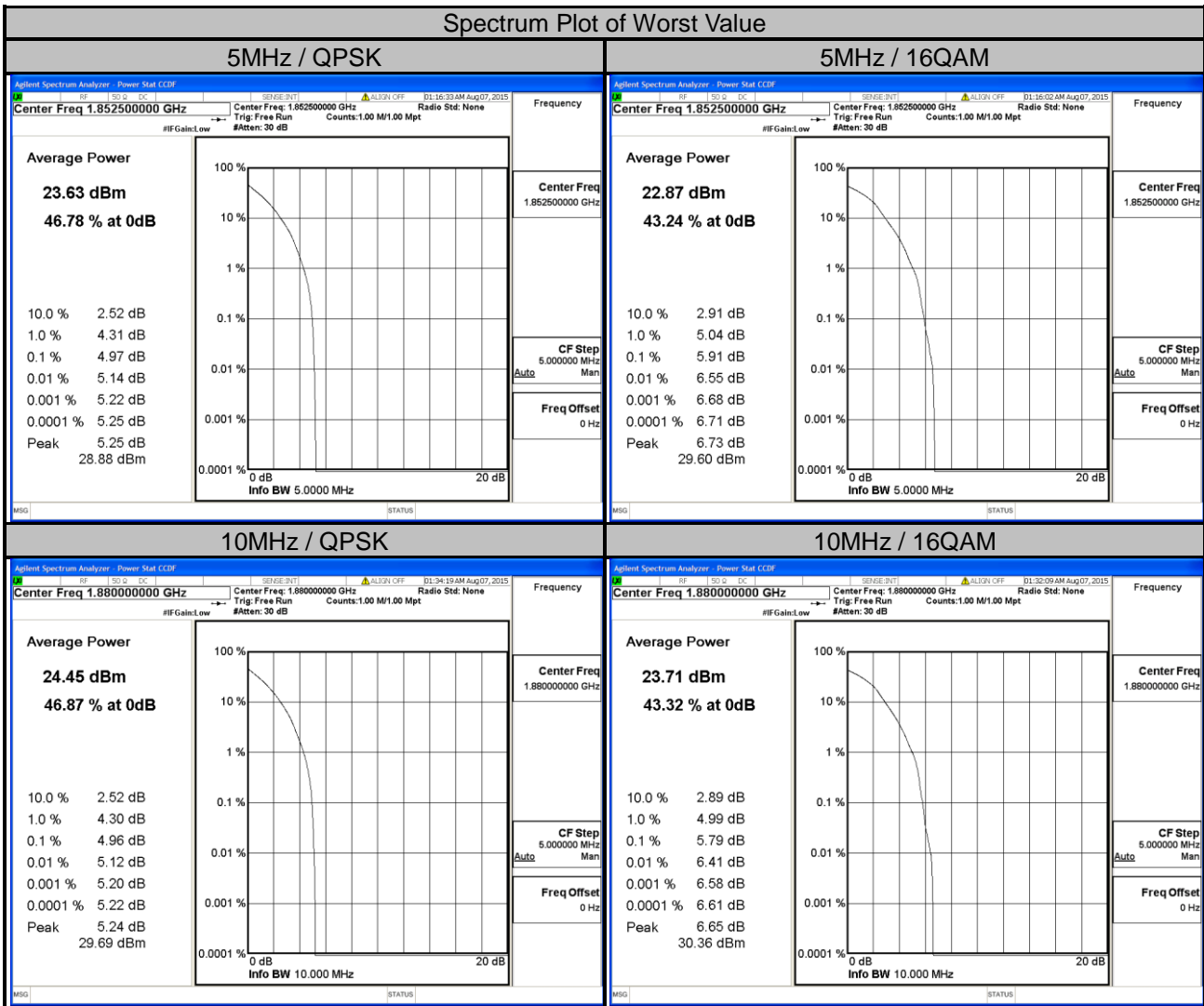
| LTE Band 2 | | | | | | | |
|---------------------------|-----------------|----------------------------|-------|-------------------------|-----------------|----------------------------|-------|
| Channel Bandwidth: 1.4MHz | | | | Channel Bandwidth: 3MHz | | | |
| Channel | Frequency (MHz) | Peak to Average Ratio (dB) | | Channel | Frequency (MHz) | Peak to Average Ratio (dB) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 18607 | 1850.7 | 5.09 | 5.98 | 18615 | 1851.5 | 5.03 | 6.00 |
| 18900 | 1880.0 | 4.86 | 5.78 | 18900 | 1880.0 | 4.84 | 5.73 |
| 19193 | 1909.3 | 5.07 | 5.99 | 19185 | 1908.5 | 4.91 | 5.78 |





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| LTE Band 2 | | | | | | | |
|-------------------------|-----------------|----------------------------|-------|--------------------------|-----------------|----------------------------|-------|
| Channel Bandwidth: 5MHz | | | | Channel Bandwidth: 10MHz | | | |
| Channel | Frequency (MHz) | Peak to Average Ratio (dB) | | Channel | Frequency (MHz) | Peak to Average Ratio (dB) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 18625 | 1852.5 | 4.97 | 5.91 | 18650 | 1855.0 | 4.90 | 5.75 |
| 18900 | 1880.0 | 4.88 | 5.73 | 18900 | 1880.0 | 4.96 | 5.79 |
| 19175 | 1907.5 | 4.91 | 5.84 | 19150 | 1905.0 | 4.89 | 5.79 |





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LTE Band 2

Channel Bandwidth: 15MHz

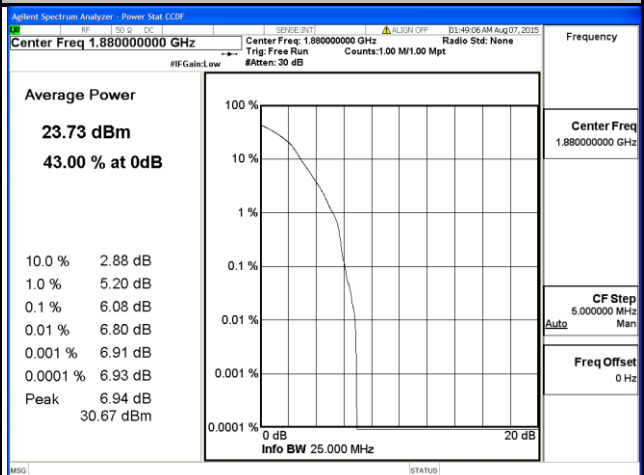
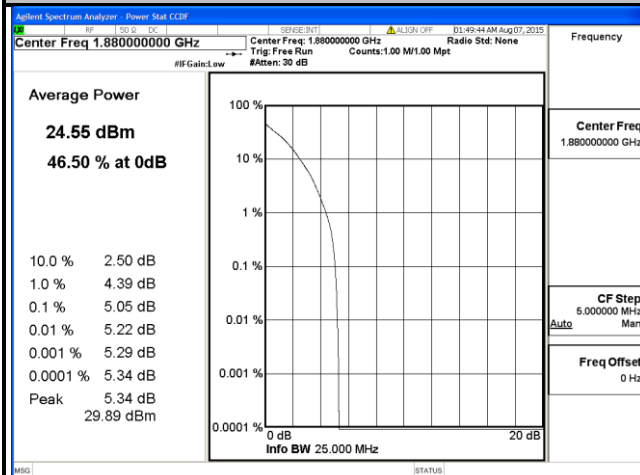
Channel Bandwidth: 20MHz

| Channel | Frequency (MHz) | Peak to Average Ratio (dB) | | Channel | Frequency (MHz) | Peak to Average Ratio (dB) | |
|---------|-----------------|----------------------------|-------|---------|-----------------|----------------------------|-------|
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 18675 | 1857.5 | 4.81 | 5.62 | 18700 | 1860.0 | 4.96 | 5.82 |
| 18900 | 1880.0 | 5.05 | 6.08 | 18900 | 1880.0 | 5.31 | 6.43 |
| 19125 | 1902.5 | 4.64 | 5.33 | 19100 | 1900.0 | 4.99 | 5.74 |

Spectrum Plot of Worst Value

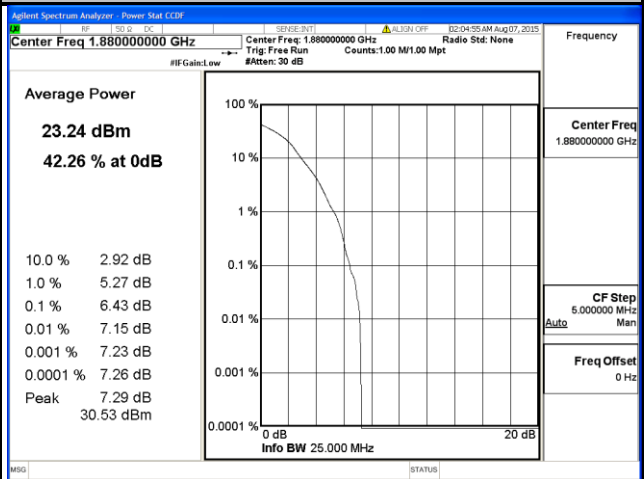
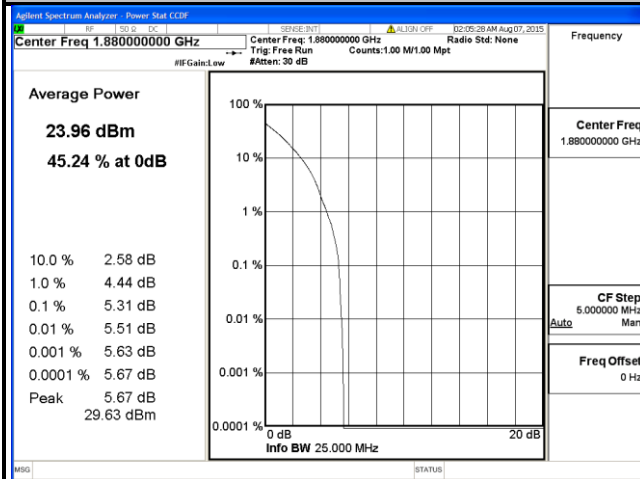
15MHz / QPSK

15MHz / 16QAM



20MHz / QPSK

20MHz / 16QAM

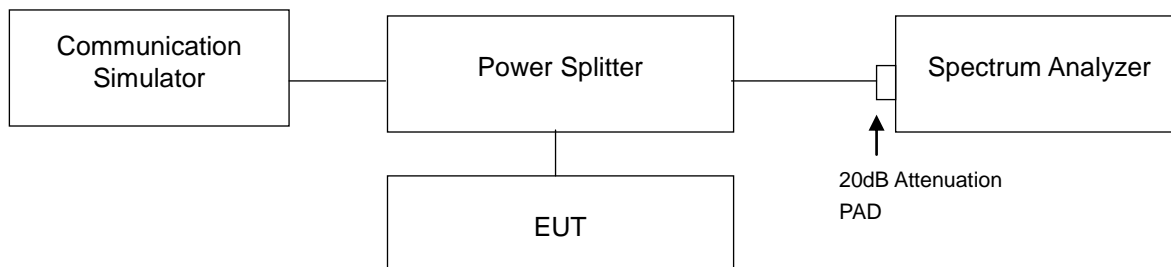


4.6 Conducted Spurious Emissions

4.6.1 Limits of Conducted Spurious Emissions Measurement

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. The emission limit equal to -13dBm .

4.6.2 Test Setup



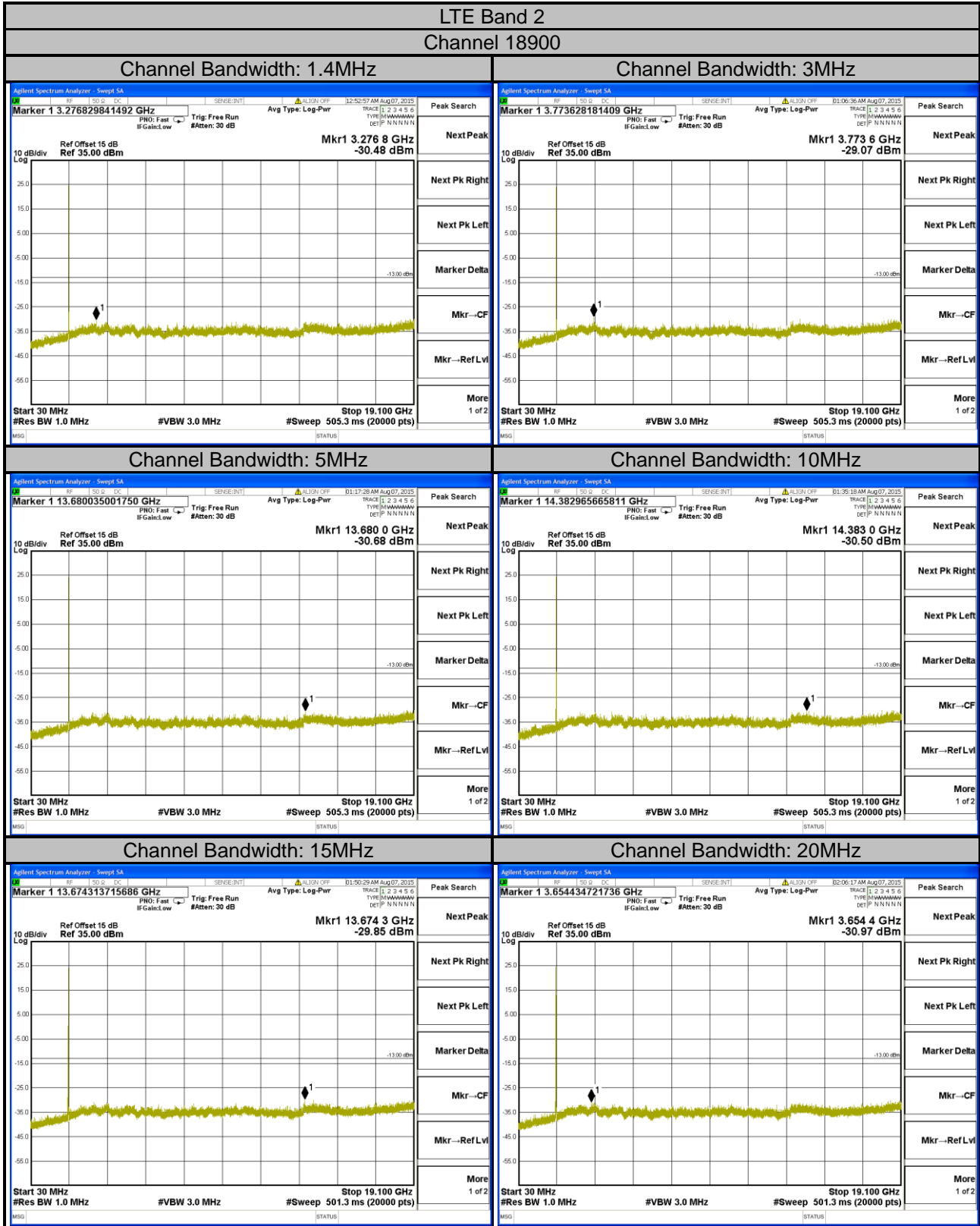
4.6.3 Test Procedure

- The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
- Measuring frequency range is from 9 kHz to 9GHz. 20dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz is used for conducted emission measurement.



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4.6.4 Test Results



4.7 Radiated Emission Measurement

4.7.1 Limits of Radiated Emission Measurement

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. The emission limit equal to -13dBm .

4.7.2 Test Procedure

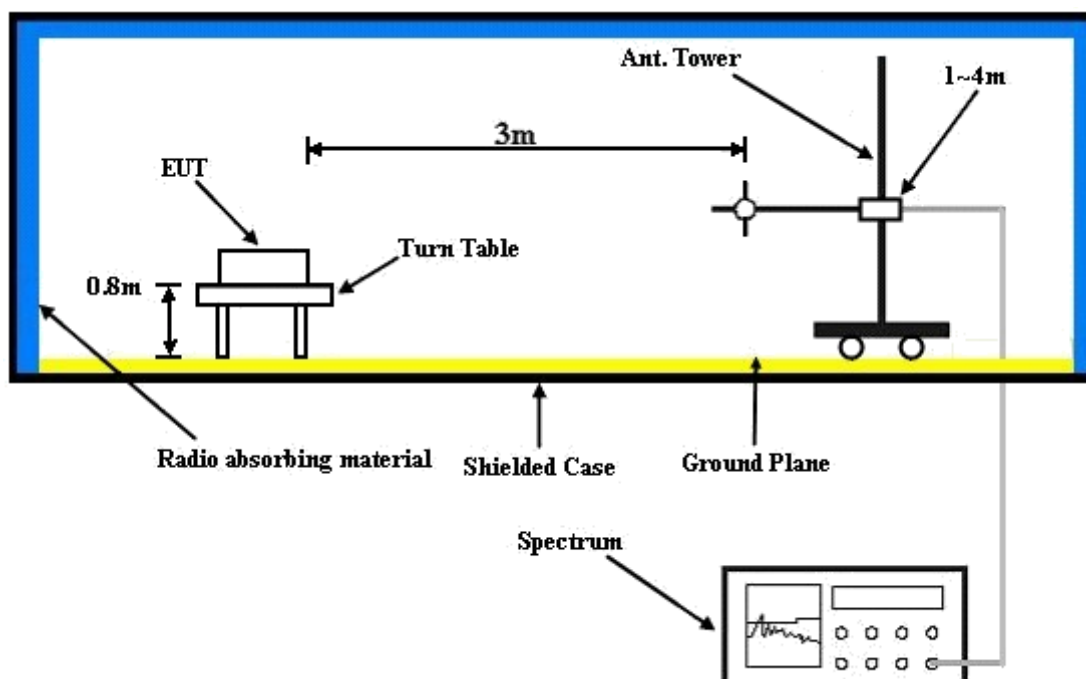
- Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to "Read Value" of step a. Record the power level of S.G
- $\text{EIRP} = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}$.
- E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, $\text{E.R.P power} = \text{E.I.P.R power} - 2.15\text{dBi}$.

NOTE: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

4.7.3 Deviation from Test Standard

No deviation.

4.7.4 Test Setup



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

4.7.5 Test Results

LTE Band 2

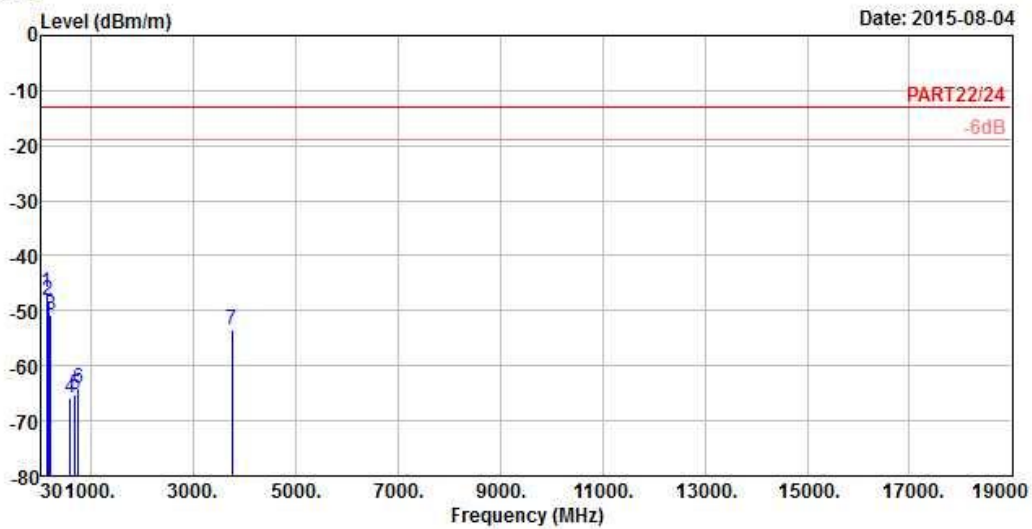
Channel Bandwidth: 20MHz / QPSK



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Data: 9



Site : 966 Chamber 5
 Condition: PART22/24 3m HORIZONTAL
 Remak : LTE Band II_QPSK_20M(1.50)
 Tested by: Gavin Wu
 Plane : Z

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|------|---------|--------|------------|------------|------------|--------|--------|
| | MHz | dBm/m | dBm | dBm/m | dB | dB/m | |
| 1 pp | 127.47 | -46.54 | -37.50 | -13.00 | -33.54 | -9.04 | Peak |
| 2 | 160.14 | -48.02 | -43.18 | -13.00 | -35.02 | -4.84 | Peak |
| 3 | 206.31 | -50.72 | -42.97 | -13.00 | -37.72 | -7.75 | Peak |
| 4 | 595.40 | -65.86 | -64.91 | -13.00 | -52.86 | -0.95 | Peak |
| 5 | 679.40 | -65.39 | -64.96 | -13.00 | -52.39 | -0.43 | Peak |
| 6 | 747.30 | -63.94 | -64.76 | -13.00 | -50.94 | 0.82 | Peak |
| 7 | 3760.00 | -53.55 | -45.49 | -13.00 | -40.55 | -8.06 | Peak |

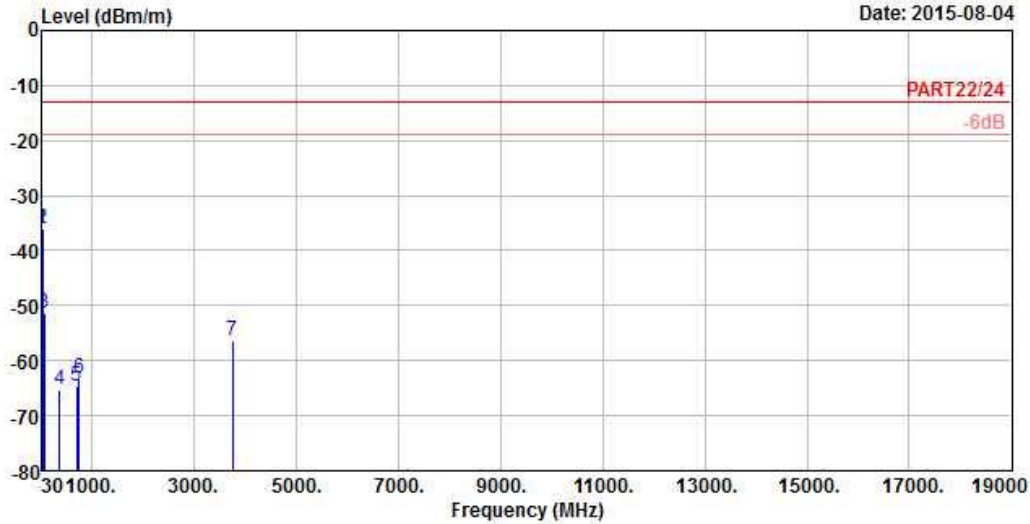


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Data: 10

Date: 2015-08-04



Site : 966 Chamber 5
 Condition: PART22/24 3m VERTICAL
 Remak : LTE Band II_QPSK_20M(1.50)
 Tested by: Gavin Wu
 Plane : Z

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|------|---------|--------|------------|------------|------------|--------|--------|
| | MHz | dBm/m | dBm | dBm/m | dB | dB/m | |
| 1 | 30.27 | -36.13 | -36.51 | -13.00 | -23.13 | 0.38 | Peak |
| 2 pp | 40.80 | -35.88 | -36.00 | -13.00 | -22.88 | 0.12 | Peak |
| 3 | 68.88 | -51.25 | -42.93 | -13.00 | -38.25 | -8.32 | Peak |
| 4 | 367.90 | -65.35 | -59.21 | -13.00 | -52.35 | -6.14 | Peak |
| 5 | 695.50 | -64.61 | -64.44 | -13.00 | -51.61 | -0.17 | Peak |
| 6 | 755.00 | -63.27 | -64.14 | -13.00 | -50.27 | 0.87 | Peak |
| 7 | 3760.00 | -56.35 | -48.29 | -13.00 | -43.35 | -8.06 | Peak |



5 Pictures of Test Arrangements

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



Appendix – Information on 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 accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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Fax: 886-2-26051924

Hsin Chu EMC/RF Lab/Telecom Lab

Tel: 886-3-5935343

Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety

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Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

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

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