# FCC TEST REPORT
# (PART 27)

**Product:** LTE Cellular Router

**Model Name:** CDS-9070

**FCC ID:** 2AJLF-CDS-9070

**Applicant:** DataRemote Incorporated

**Address:** 17755 Homestead Avenue, Miami, FL 33157

**Manufacturer:** DataRemote Incorporated

**Address:** 17755 Homestead Avenue, Miami, FL 33157

**Prepared by:** Bureau Veritas Shenzhen Co., Ltd. Dongguan Branch

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**Report No.:** RE160830W002-4

**Received Date:** Sep. 10, 2016

**Test Date:** Sep. 11, 2016 ~ Nov. 07, 2016

**Issued Date:** Nov. 08, 2016

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# RELEASE CONTROL RECORD

| ISSUE NO. | REASON FOR CHANGE | DATE ISSUED |
|---|---|---|
| RE160830W002-4 | Original release | Nov. 08, 2016 |

# 1 CERTIFICATION

| | |
|---|---|
| **PRODUCT:** | LTE Cellular Router |
| **BRAND NAME:** | DataRemote |
| **MODEL NAME:** | CDS-9070 |
| **APPLICANT:** | DataRemote Incorporated |
| **TESTED:** | Sep. 11, 2016 ~ Nov. 07, 2016 |
| **TEST SAMPLE:** | Identical Prototype |
| **TEST STANDARDS:** | **FCC Part 27, Subpart C, L** |
| | **FCC Part 2** |
| | ANSI/TIE/EIA-603-D |

The above equipment has been tested by **Bureau Veritas Shenzhen Co., Ltd. Dongguan 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** : _____ , **DATE:** Nov. 08, 2016
(Yuqiang Yin/ Engineer)

**APPROVED BY** : _____ , **DATE:** Nov. 08, 2016
( Bill Yao / Manager)

# 2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

| APPLIED STANDARD: FCC Part 27 & Part 2 | | | |
|---|---|---|---|
| **STANDARD SECTION** | **TEST TYPE AND LIMIT** | **RESULT** | **REMARK** |
| 2.1046<br>27.50(d)(4) | Maximum Peak Output Power | PASS | Meet the requirement of limit. |
| 2.1055<br>27.54 | Frequency Stability | PASS | Meet the requirement of limit. |
| 2.1049<br>27.53(h) | Occupied Bandwidth | PASS | Meet the requirement of limit. |
| 27.50(d)(5) | Peak to average ratio | PASS | Meet the requirement of limit. |
| 27.53(h) | Band Edge Measurements | PASS | Meet the requirement of limit. |
| 2.1051<br>27.53(h) | Conducted Spurious Emissions | PASS | Meet the requirement of limit. |
| 2.1053<br>27.53(h) | Radiated Spurious Emissions | PASS | Meet the requirement of limit.<br>Minimum passing margin is -25.91dB at 37.76MHz. |

## 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 | UNCERTAINTY |
|---|---|---|
| Conducted emissions | 9kHz~30MHz | 2.66dB |
| Radiated emissions | 9KHz ~ 30MHz | 2.74dB |
| | 30MHz ~ 1GMHz | 3.55dB |
| | 1GHz ~ 18GHz | 4.84dB |
| | 18GHz ~ 40GHz | 1.94dB |

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

## 2.2 TEST SITE AND INSTRUMENTS

| Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Next Cal. |
|---|---|---|---|---|---|
| EMI Test Receiver | Rohde&Schwarz | ESR7 | 101494 | Apr. 05,16 | Apr. 04,17 |
| Signal and Spectrum Analyzer | Rohde&Schwarz | FSV7 | 102331 | Nov. 04,16 | Nov. 03,17 |
| Signal and Spectrum Analyzer | Rohde&Schwarz | FSV40 | 101094 | Apr. 05,16 | Apr. 04,17 |
| Bilog Antenna 1 | Teseq | CBL 6111D | 30643 | Jul. 14, 16 | Jul. 13, 17 |
| Bilog Antenna 2 | Teseq | CBL 6111D | 27089 | Jul. 14, 16 | Jul. 13, 17 |
| Loop antenna | Daze | ZN30900A | 0708 | Dec. 30, 15 | Dec. 29, 16 |
| Horn Antenna (1GHz -18GHz) | ETS -Lindgren | 3117 | 00062558 | May 18,16 | May 17,17 |
| Horn Antenna (1GHz -18GHz) | ETS -Lindgren | 3117 | 00062557 | May 18,16 | May 17,17 |
| 3m Semi-anechoic Chamber | ETS-LINDGREN | 9m*6m*6m | NSEMC003 | Mar. 12,16 | Mar. 11,18 |
| Test Software | ADT | ADT_Radiated _V7.6.15.9.2 | N/A | N/A | N/A |
| 10dB Attenuator | JFW/USA | 50HF-010-SM A | 1505 | Jul. 27, 16 | Jul. 26, 17 |
| Horn Antenna (15GHz-40GHz) | SCHWARZBECK | BBHA 9170 | BBHA9170147 | Mar. 12,16 | Mar. 11,17 |
| Horn Antenna (15GHz-40GHz) | SCHWARZBECK | BBHA 9170 | BBHA9170242 | Mar. 12,16 | Mar. 11,17 |
| Amplifier | Burgeon | BPA-530 | 100220 | Apr. 05,16 | Apr. 04,17 |
| Amplifier (9kHz-1GHz) | SONOMA | 310D | 186955 | Mar. 04,16 | Mar. 03, 17 |
| Pre-Amplifier(1-18G) | HP | 8449B | 3008A00409 | Apr. 25,16 | Apr. 24,17 |
| Pre-Amplifier (18GHz-40GHz) | EMCI | EMC 184045 | 980102 | Nov. 04,16 | Nov. 03,17 |
| Humid & Temp Programmable Tester | Haida | HD-2257 | 110807201 | Sep.05,16 | Sep. 04,17 |
| Signal Generator | Agilent | N5183A | MY50140980 | Nov. 04,16 | Nov. 03,17 |

**NOTE:** 1. The calibration interval of the above test instruments is 12 months or 24 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

2. The test was performed in Dongguan 966 Chamber.

3. The horn antenna are used only for the measurement of emission frequency above 1GHz if tested.

4. The FCC Site Registration No. is 502831.

# 3 GENERAL INFORMATION

## 3.1 GENERAL DESCRIPTION OF EUT

| | | |
|---|---|---|
| **PRODUCT** | LTE Cellular Router | |
| **MODEL NAME** | CDS-9070 | |
| **POWER SUPPLY** | 15.0Vdc (adapter or host equipment)<br>7.2Vdc (battery) | |
| **MODULATION TECHNOLOGY** | **LTE** | QPSK, 16QAM |
| **FREQUENCY RANGE** | **LTE Band 4<br>Channel Bandwidth: 1.4MHz** | 1710.7MHz ~ 1754.3MHz |
| | **LTE Band 4<br>Channel Bandwidth: 3MHz** | 1711.5MHz ~ 1753.5MHz |
| | **LTE Band 4<br>Channel Bandwidth: 5MHz** | 1712.5MHz ~ 1752.5MHz |
| | **LTE Band 4<br>Channel Bandwidth: 10MHz** | 1715.0MHz ~ 1750.0MHz |
| | **LTE Band 4<br>Channel Bandwidth: 15MHz** | 1717.5MHz ~ 1747.5MHz |
| | **LTE Band 4<br>Channel Bandwidth: 20MHz** | 1720.0MHz ~ 1745.0MHz |
| | **LTE Band 17<br>Channel Bandwidth: 5MHz** | 706.5MHz ~ 713.5MHz |
| | **LTE Band 17<br>Channel Bandwidth: 10MHz** | 709.0MHz ~ 711.0MHz |
| **EMISSION DESIGNATOR** | **LTE Band 4<br>Channel Bandwidth: 1.4MHz** | QPSK: 1M09G7D |
| | | 16QAM: 1M09W7D |
| | **LTE Band 4<br>Channel Bandwidth: 3MHz** | QPSK: 2M69G7D |
| | | 16QAM: 2M69W7D |
| | **LTE Band 4<br>Channel Bandwidth: 5MHz** | QPSK: 4M48G7D |
| | | 16QAM: 4M48W7D |
| | **LTE Band 4<br>Channel Bandwidth: 10MHz** | QPSK: 8M95G7D |
| | | 16QAM: 8M94W7D |
| | **LTE Band 4<br>Channel Bandwidth: 15MHz** | QPSK: 13M4G7D |
| | | 16QAM: 13M4W7D |
| | **LTE Band 4<br>Channel Bandwidth: 20MHz** | QPSK: 17M9G7D |
| | | 16QAM: 17M9W7D |
| | **LTE Band 17<br>Channel Bandwidth: 5MHz** | QPSK: 4M49G7D |
| | | 16QAM: 4M47W7D |
| | **LTE Band 17<br>Channel Bandwidth: 10MHz** | QPSK: 8M95G7D |
| | | 16QAM: 8M96W7D |

| | | |
|---|---|---|
| MAX. ERP/EIRP POWER | LTE Band 4<br>Channel Bandwidth: 1.4MHz | 296mW |
| | LTE Band 4<br>Channel Bandwidth: 3MHz | 300mW |
| | LTE Band 4<br>Channel Bandwidth: 5MHz | 295mW |
| | LTE Band 4<br>Channel Bandwidth: 10MHz | 303mW |
| | LTE Band 4<br>Channel Bandwidth: 15MHz | 283mW |
| | LTE Band 4<br>Channel Bandwidth: 20MHz | 230mW |
| | LTE Band 17<br>Channel Bandwidth: 5MHz | 79mW |
| | LTE Band 17<br>Channel Bandwidth: 10MHz | 71mW |
| ANTENNA TYPE | LTE Band 4 | Fixed External Antenna with 2.26dBi |
| | LTE Band 17 | Fixed External Antenna with -1.3dBi |
| HW VERSION | CDS-9070_V1_4 | |
| SW VERSION | V3.10(201608251158) | |
| ACCESSORY DEVICE | Refer to note as below | |
| DATA CABLE | N/A | |

**NOTE**:

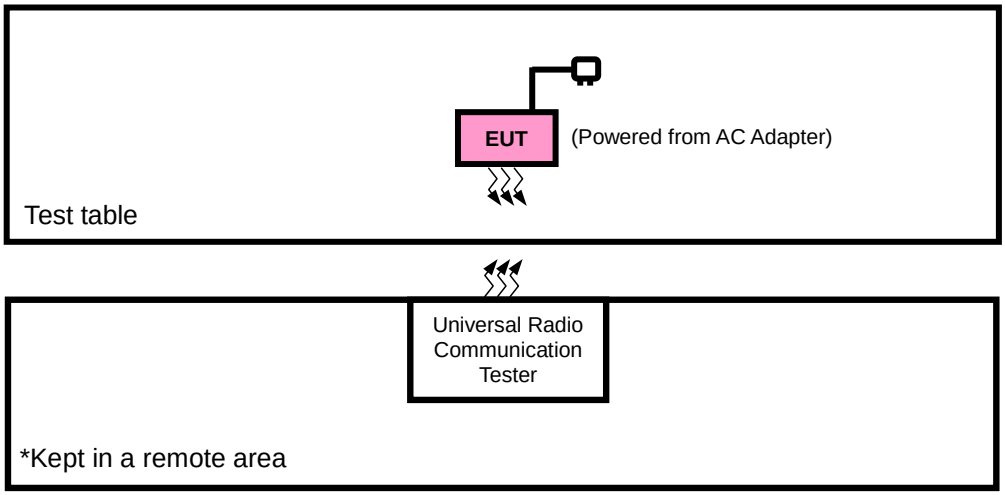
1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
2. The EUT was powered by the following adapter:

| ADAPTER 1 | |
|---|---|
| BRAND: | RUIDE |
| MODEL: | STC-A515A-Z |
| INPUT: | AC 100-240V, 600mA |
| OUTPUT: | DC 5V, 1500mA |

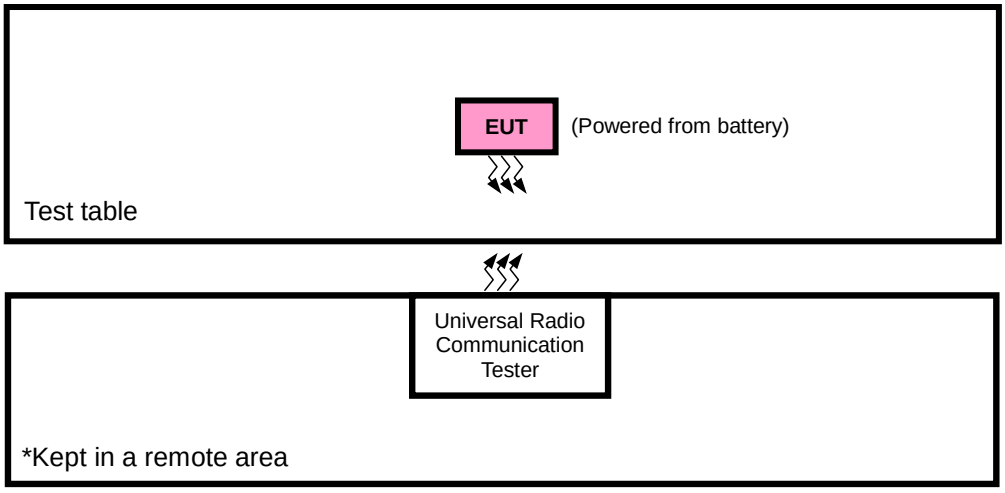
3. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

## 3.2 CONFIGURATION OF SYSTEM UNDER TEST

### FOR RADIATION EMISSION TEST




### FOR E.R.P./E.I.R.P TEST



## 3.3 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 |
|---|---|---|---|---|---|
| 1 | DC source | LONG WEI | PS-6403D | 010934269 | N/A |
| 2 | PC | HP | A6608CN | 3CR83825X3 | N/A |

| NO. | SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS |
|---|---|
| 1 | DC Line: Unshielded, Detachable 1.0m |
| 2 | AC Line: Unshielded, Detachable 1.5m |

**NOTE:**

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

## 3.4 DESCRIPTION OF TEST MODES

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 in EIRP and radiated emission was found when positioned Z-plane for LTE. Following channel(s) was (were) selected for the final test as listed below:

| EUT CONFIGURE MODE | DESCRIPTION |
|---|---|
| **A** | **EUT + Adapter with LTE link** |
| B | EUT + Battery with **LTE link** |

## LTE BAND 4

| EUT CONFIGURE MODE | TEST ITEM | AVAILABLE CHANNEL | TESTED CHANNEL | CHANNEL BANDWIDTH | MODULATION | MODE |
|---|---|---|---|---|---|---|
| - | EIRP | 19957 to 20393 | 19957, 20175, 20393 | 1.4MHz | QPSK, 16QAM | 1 RB / 0 RB Offset |
| | | 19965 to 20385 | 19965, 20175, 20385 | 3MHz | QPSK, 16QAM | 1 RB / 0 RB Offset |
| | | 19975 to 20375 | 19975, 20175, 20375 | 5MHz | QPSK, 16QAM | 1 RB / 0 RB Offset |
| | | 20000 to 20350 | 20000, 20175, 20350 | 10MHz | QPSK, 16QAM | 1 RB / 0 RB Offset |
| | | 20025 to 20325 | 20025, 20175, 20325 | 15MHz | QPSK, 16QAM | 1 RB / 0 RB Offset |
| | | 20050 to 20300 | 20050, 20175, 20300 | 20MHz | QPSK, 16QAM | 1 RB / 0 RB Offset |
| - | FREQUENCY STABILITY | 19957 to 20393 | 20175 | 1.4MHz | QPSK | 1 RB / 0 RB Offset |
| | | 19965 to 20385 | 20175 | 3MHz | QPSK | 1 RB / 0 RB Offset |
| | | 19975 to 20375 | 20175 | 5MHz | QPSK | 1 RB / 0 RB Offset |
| | | 20000 to 20350 | 20175 | 10MHz | QPSK | 1 RB / 0 RB Offset |
| | | 20025 to 20325 | 20175 | 15MHz | QPSK | 1 RB / 0 RB Offset |
| | | 20050 to 20300 | 20175 | 20MHz | QPSK | 1 RB / 0 RB Offset |
| - | OCCUPIED BANDWIDTH | 19957 to 20393 | 19957, 20175, 20393 | 1.4MHz | QPSK, 16QAM | 6 RB / 0 RB Offset |
| | | 19965 to 20385 | 19965, 20175, 20385 | 3MHz | QPSK, 16QAM | 15 RB / 0 RB Offset |
| | | 19975 to 20375 | 19975, 20175, 20375 | 5MHz | QPSK, 16QAM | 25 RB / 0 RB Offset |
| | | 20000 to 20350 | 20000, 20175, 20350 | 10MHz | QPSK, 16QAM | 50 RB / 0 RB Offset |
| | | 20025 to 20325 | 20025, 20175, 20325 | 15MHz | QPSK, 16QAM | 75 RB / 0 RB Offset |
| | | 20050 to 20300 | 20050, 20175, 20300 | 20MHz | QPSK, 16QAM | 100 RB / 0 RB Offset |
| - | PEAK TO AVERAGE RATIO | 19957 to 20393 | 19957, 20175, 20393 | 1.4MHz | QPSK, 16QAM | 1 RB / 0 RB Offset |
| | | 19965 to 20385 | 19965, 20175, 20385 | 3MHz | QPSK, 16QAM | 1 RB / 0 RB Offset |
| | | 19975 to 20375 | 19975, 20175, 20375 | 5MHz | QPSK, 16QAM | 1 RB / 0 RB Offset |
| | | 20000 to 20350 | 20000, 20175, 20350 | 10MHz | QPSK, 16QAM | 1 RB / 0 RB Offset |
| | | 20025 to 20325 | 20025, 20175, 20325 | 15MHz | QPSK, 16QAM | 1 RB / 0 RB Offset |
| | | 20050 to 20300 | 20050, 20175, 20300 | 20MHz | QPSK, 16QAM | 1 RB / 0 RB Offset |
| - | BAND EDGE | 19957 to 20393 | 19957 | 1.4MHz | QPSK | 1 RB / 0 RB Offset |
| | | | | | | 6 RB / 0 RB Offset |
| | | | 20393 | 1.4MHz | QPSK | 1 RB / 5 RB Offset |
| | | | | | | 6 RB / 0 RB Offset |
| | | 19965 to 20385 | 19965 | 3MHz | QPSK | 1 RB / 0 RB Offset |
| | | | | | | 15 RB / 0 RB Offset |
| | | | 20385 | 3MHz | QPSK | 1 RB / 14 RB Offset |
| | | | | | | 15 RB / 0 RB Offset |
| | | 19975 to 20375 | 19975 | 5MHz | QPSK | 1 RB / 0 RB Offset |
| | | | | | | 25 RB / 0 RB Offset |
| | | | 20375 | 5MHz | QPSK | 1 RB / 24 RB Offset |
| | | | | | | 25 RB / 0 RB Offset |
| | | 20000 to 20350 | 20000 | 10MHz | QPSK | 1 RB / 0 RB Offset |
| | | | | | | 50 RB / 0 RB Offset |
| | | | 20350 | 10MHz | QPSK | 1 RB / 49 RB Offset |
| | | | | | | 50 RB / 0 RB Offset |

| | | | | | | |
|---|---|---|---|---|---|---|
| - | BAND EDGE | 20025 to 20325 | 20025 | 15MHz | QPSK | 1 RB / 0 RB Offset |
| | | | | | | 75 RB / 0 RB Offset |
| | | | 20325 | 15MHz | QPSK | 1 RB / 74 RB Offset |
| | | | | | | 75 RB / 0 RB Offset |
| | | 20050 to 20300 | 20050 | 20MHz | QPSK | 1 RB / 0 RB Offset |
| | | | | | | 100 RB / 0 RB Offset |
| | | | 20300 | 20MHz | QPSK | 1 RB / 99 RB Offset |
| | | | | | | 100 RB / 0 RB Offset |
| - | CONDCUDETED EMISSION | 19957 to 20393 | 20175 | 1.4MHz | QPSK | 1 RB / 0 RB Offset |
| | | 19965 to 20385 | 20175 | 3MHz | QPSK | 1 RB / 0 RB Offset |
| | | 19975 to 20375 | 20175 | 5MHz | QPSK | 1 RB / 0 RB Offset |
| | | 20000 to 20350 | 20175 | 10MHz | QPSK | 1 RB / 0 RB Offset |
| | | 20025 to 20325 | 20175 | 15MHz | QPSK | 1 RB / 0 RB Offset |
| | | 20050 to 20300 | 20175 | 20MHz | QPSK | 1 RB / 0 RB Offset |
| - | RADIATED EMISSION | 19957 to 20393 | 20175 | 1.4MHz | QPSK | 1 RB / 0 RB Offset |
| | | 19965 to 20385 | 20175 | 3MHz | QPSK | 1 RB / 0 RB Offset |
| | | 19975 to 20375 | 20175 | 5MHz | QPSK | 1 RB / 0 RB Offset |
| | | 20000 to 20350 | 20175 | 10MHz | QPSK | 1 RB / 0 RB Offset |
| | | 20025 to 20325 | 20175 | 15MHz | QPSK | 1 RB / 0 RB Offset |
| | | 20050 to 20300 | 20175 | 20MHz | QPSK | 1 RB / 0 RB Offset |

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

**LTE BAND 17**

| EUT CONFIGURE MODE | TEST ITEM | AVAILABLE CHANNEL | TESTED CHANNEL | CHANNEL BANDWIDTH | MODULATION | MODE |
|---|---|---|---|---|---|---|
| - | ERP | 23755 to 23825 | 23755, 23790, 23825 | 5MHz | QPSK, 16QAM | 1 RB / 0 RB Offset |
| | | 23780 to 23800 | 23780, 23790, 23800 | 10MHz | QPSK, 16QAM | 1 RB / 0 RB Offset |
| - | FREQUENCY STABILITY | 23755 to 23825 | 23790 | 5MHz | QPSK | 1 RB / 0 RB Offset |
| | | 23780 to 23800 | 23790 | 10MHz | QPSK | 1 RB / 0 RB Offset |
| - | OCCUPIED BANDWIDTH | 23755 to 23825 | 23755, 23790, 23825 | 5MHz | QPSK, 16QAM | 25 RB / 0 RB Offset |
| | | 23780 to 23800 | 23780, 23790, 23800 | 10MHz | QPSK, 16QAM | 50 RB / 0 RB Offset |
| - | PEAK TO AVERAGE RATIO | 23755 to 23825 | 23755, 23790, 23825 | 5MHz | QPSK, 16QAM | 1 RB / 0 RB Offset |
| | | 23780 to 23800 | 23780, 23790, 23800 | 10MHz | QPSK, 16QAM | 1 RB / 0 RB Offset |
| - | BAND EDGE | 23755 to 23825 | 23755 | 5MHz | QPSK | 1 RB / 0 RB Offset |
| | | | | | | 25 RB / 0 RB Offset |
| | | | 23825 | 5MHz | QPSK | 1 RB / 24 RB Offset |
| | | | | | | 25 RB / 0 RB Offset |
| | | 23780 to 23800 | 23780 | 10MHz | QPSK | 1 RB / 0 RB Offset |
| | | | | | | 50 RB / 0 RB Offset |
| | | | 23800 | 10MHz | QPSK | 1 RB / 49 RB Offset |
| | | | | | | 50 RB / 0 RB Offset |
| - | CONDCUDETED EMISSION | 23755 to 23825 | 23790 | 5MHz | QPSK | 1 RB / 0 RB Offset |
| | | 23780 to 23800 | 23790 | 10MHz | QPSK | 1 RB / 0 RB Offset |
| - | RADIATED EMISSION | 23755 to 23825 | 23790 | 5MHz | QPSK | 1 RB / 0 RB Offset |
| | | 23780 to 23800 | 23790 | 10MHz | QPSK | 1 RB / 0 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(ERP) | 24deg. C, 60%RH | 7.2Vdc from Battery | Yuqiang Yin |
| FREQUENCY STABILITY | 24deg. C, 61%RH | 7.2Vdc from Battery | Yuqiang Yin |
| OCCUPIED BANDWIDTH | 24deg. C, 61%RH | 7.2Vdc from Battery | Yuqiang Yin |
| PEAK TO AVERAGE RATIO | 24deg. C, 61%RH | 7.2Vdc from Battery | Yuqiang Yin |
| BAND EDGE | 24deg. C, 61%RH | 7.2Vdc from Battery | Yuqiang Yin |
| CONDCUDETED EMISSION | 24deg. C, 61%RH | 15Vdc from adapter | Yuqiang Yin |
| RADIATED EMISSION | 24deg. C, 60%RH | 15Vdc from adapter | Tony |

## 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 27**

**KDB 971168 D01 Power Meas License Digital Systems v02r02**

**ANSI/TIA/EIA-603-D**

**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

Fixed, mobile, and portable (hand-held) stations operating in the 1710–1755 MHz band are limited to 1 watt EIRP.

Portable stations (hand-held devices) operating in the 704-716 MHz bands are limited to 3 watts ERP.

### 4.1.2 TEST PROCEDURES

**EIRP / ERP MEASUREMENT:**

a. The EUT was set up for the maximum power with LTE link data modulation. The power was measured with R&S Spectrum Analyzer. All measurements were done at 3 channels (low, middle and high operational frequency range). RBW and VBW is 10MHz for LTE.

b. E.I.R.P power 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 a. Record the power level of S.G

d. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn

e. E.R.P = E.I.R.P- 2.15 dB

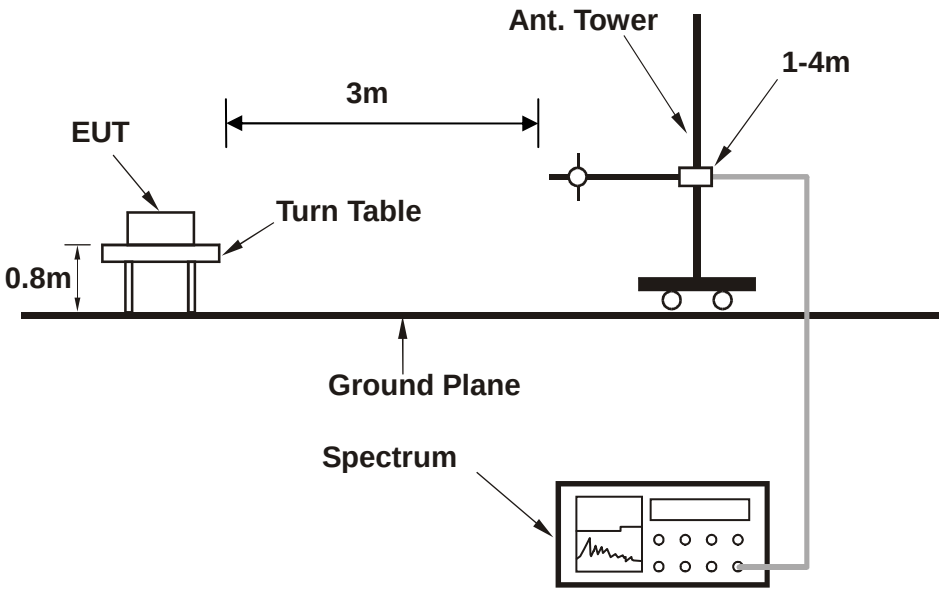
**CONDUCTED POWER MEASUREMENT:**

a. The EUT was set up for the maximum power with LTE link data modulation and link up with simulator.

b. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

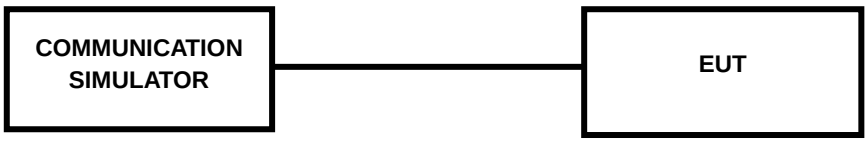
### 4.1.3 TEST SETUP

**EIRP / ERP MEASUREMENT:**




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

**CONDUCTED POWER MEASUREMENT:**




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

## 4.1.4 TEST RESULTS

### AVERAGE CONDUCTED OUTPUT POWER (dBm)

| LTE Band 4 | | | | | | | |
|---|---|---|---|---|---|---|---|
| BW | Modulation | RB Size | RB Offset | Low CH 19957 | Mid CH 20175 | High CH 20393 | MPR |
| | | | | Frequency 1710.7 MHz | Frequency 1732.5 MHz | Frequency 1754.3 MHz | |
| 1.4MHz | QPSK | 1 | 0 | 23.37 | 23.25 | 23.13 | 0 |
| | | 1 | 2 | 23.32 | 23.20 | 23.08 | 0 |
| | | 1 | 5 | 23.22 | 23.10 | 22.98 | 0 |
| | | 3 | 0 | 23.35 | 23.23 | 23.11 | 0 |
| | | 3 | 1 | 23.30 | 23.18 | 23.06 | 0 |
| | | 3 | 3 | 23.20 | 23.08 | 22.96 | 0 |
| | | 6 | 0 | 22.49 | 22.37 | 22.25 | 1 |
| | 16QAM | 1 | 0 | 22.47 | 22.35 | 22.23 | 1 |
| | | 1 | 2 | 22.27 | 22.15 | 22.03 | 1 |
| | | 1 | 5 | 22.23 | 22.11 | 21.99 | 1 |
| | | 3 | 0 | 22.46 | 22.34 | 22.22 | 1 |
| | | 3 | 1 | 22.26 | 22.14 | 22.02 | 1 |
| | | 3 | 3 | 22.22 | 22.10 | 21.98 | 1 |
| | | 6 | 0 | 21.43 | 21.31 | 21.19 | 2 |
| BW | Modulation | RB Size | RB Offset | Low CH 19965 | Mid CH 20175 | High CH 20385 | MPR |
| | | | | Frequency 1711.5 MHz | Frequency 1732.5 MHz | Frequency 1753.5 MHz | |
| 3 MHz | QPSK | 1 | 0 | 23.38 | 23.26 | 23.14 | 0 |
| | | 1 | 7 | 23.33 | 23.21 | 23.09 | 0 |
| | | 1 | 14 | 23.23 | 23.11 | 22.99 | 0 |
| | | 8 | 0 | 22.37 | 22.25 | 22.13 | 1 |
| | | 8 | 3 | 22.31 | 22.19 | 22.07 | 1 |
| | | 8 | 7 | 22.23 | 22.11 | 21.99 | 1 |
| | | 15 | 0 | 22.50 | 22.38 | 22.26 | 1 |
| | 16QAM | 1 | 0 | 22.48 | 22.36 | 22.24 | 1 |
| | | 1 | 7 | 22.28 | 22.16 | 22.04 | 1 |
| | | 1 | 14 | 22.24 | 22.12 | 22.00 | 1 |
| | | 8 | 0 | 21.43 | 21.31 | 21.19 | 2 |
| | | 8 | 3 | 21.31 | 21.19 | 21.07 | 2 |
| | | 8 | 7 | 21.25 | 21.13 | 21.01 | 2 |
| | | 15 | 0 | 21.44 | 21.32 | 21.20 | 2 |

| LTE Band 4 | | | | | | | |
|---|---|---|---|---|---|---|---|
| BW | Modulation | RB Size | RB Offset | Low CH 19975 | Mid CH 20175 | High CH 20375 | MPR |
| | | | | Frequency 1712.5 MHz | Frequency 1732.5 MHz | Frequency 1752.5 MHz | |
| 5 MHz | QPSK | 1 | 0 | 23.41 | 23.29 | 23.17 | 0 |
| | | 1 | 12 | 23.36 | 23.24 | 23.12 | 0 |
| | | 1 | 24 | 23.26 | 23.14 | 23.02 | 0 |
| | | 12 | 0 | 22.40 | 22.28 | 22.16 | 1 |
| | | 12 | 6 | 22.34 | 22.22 | 22.10 | 1 |
| | | 12 | 13 | 22.26 | 22.14 | 22.02 | 1 |
| | | 25 | 0 | 22.53 | 22.41 | 22.29 | 1 |
| | 16QAM | 1 | 0 | 22.51 | 22.39 | 22.27 | 1 |
| | | 1 | 12 | 22.31 | 22.19 | 22.07 | 1 |
| | | 1 | 24 | 22.27 | 22.15 | 22.03 | 1 |
| | | 12 | 0 | 21.46 | 21.34 | 21.22 | 2 |
| | | 12 | 6 | 21.34 | 21.22 | 21.10 | 2 |
| | | 12 | 13 | 21.28 | 21.16 | 21.04 | 2 |
| | | 25 | 0 | 21.47 | 21.35 | 21.23 | 2 |
| BW | Modulation | RB Size | RB Offset | Low CH 20000 | Mid CH 20175 | High CH 20350 | MPR |
| | | | | Frequency 1715 MHz | Frequency 1732.5 MHz | Frequency 1750 MHz | |
| 10 MHz | QPSK | 1 | 0 | 23.45 | 23.33 | 23.21 | 0 |
| | | 1 | 24 | 23.40 | 23.28 | 23.16 | 0 |
| | | 1 | 49 | 23.30 | 23.18 | 23.06 | 0 |
| | | 25 | 0 | 22.44 | 22.32 | 22.20 | 1 |
| | | 25 | 12 | 22.38 | 22.26 | 22.14 | 1 |
| | | 25 | 25 | 22.30 | 22.18 | 22.06 | 1 |
| | | 50 | 0 | 22.57 | 22.45 | 22.33 | 1 |
| | 16QAM | 1 | 0 | 22.55 | 22.43 | 22.31 | 1 |
| | | 1 | 24 | 22.35 | 22.23 | 22.11 | 1 |
| | | 1 | 49 | 22.31 | 22.19 | 22.07 | 1 |
| | | 25 | 0 | 21.50 | 21.38 | 21.26 | 2 |
| | | 25 | 12 | 21.38 | 21.26 | 21.14 | 2 |
| | | 25 | 25 | 21.32 | 21.20 | 21.08 | 2 |
| | | 50 | 0 | 21.51 | 21.39 | 21.27 | 2 |

| LTE Band 4 | | | | | | | |
|---|---|---|---|---|---|---|---|
| BW | Modulation | RB Size | RB Offset | Low CH 20025 | Mid CH 20175 | High CH 20325 | MPR |
| | | | | Frequency 1717.5 MHz | Frequency 1732.5 MHz | Frequency 1747.5 MHz | |
| 15 MHz | QPSK | 1 | 0 | 23.51 | 23.39 | 23.27 | 0 |
| | | 1 | 37 | 23.46 | 23.34 | 23.22 | 0 |
| | | 1 | 74 | 23.36 | 23.24 | 23.12 | 0 |
| | | 36 | 0 | 22.50 | 22.38 | 22.26 | 1 |
| | | 36 | 19 | 22.44 | 22.32 | 22.20 | 1 |
| | | 36 | 39 | 22.36 | 22.24 | 22.12 | 1 |
| | | 75 | 0 | 22.63 | 22.51 | 22.39 | 1 |
| | 16QAM | 1 | 0 | 22.61 | 22.49 | 22.37 | 1 |
| | | 1 | 37 | 22.41 | 22.29 | 22.17 | 1 |
| | | 1 | 74 | 22.37 | 22.25 | 22.13 | 1 |
| | | 36 | 0 | 21.56 | 21.44 | 21.32 | 2 |
| | | 36 | 19 | 21.44 | 21.32 | 21.20 | 2 |
| | | 36 | 39 | 21.38 | 21.26 | 21.14 | 2 |
| | | 75 | 0 | 21.57 | 21.45 | 21.33 | 2 |
| BW | Modulation | RB Size | RB Offset | Low CH 20050 | Mid CH 20175 | High CH 20300 | MPR |
| | | | | Frequency 1720 MHz | Frequency 1732.5 MHz | Frequency 1745 MHz | |
| 20MHz | QPSK | 1 | 0 | **23.54** | 23.42 | 23.30 | 0 |
| | | 1 | 50 | 23.49 | 23.37 | 23.25 | 0 |
| | | 1 | 99 | 23.39 | 23.27 | 23.15 | 0 |
| | | 50 | 0 | 22.53 | 22.41 | 22.29 | 1 |
| | | 50 | 25 | 22.47 | 22.35 | 22.23 | 1 |
| | | 50 | 50 | 22.39 | 22.27 | 22.15 | 1 |
| | | 100 | 0 | 22.66 | 22.54 | 22.42 | 1 |
| | 16QAM | 1 | 0 | 22.64 | 22.52 | 22.40 | 1 |
| | | 1 | 50 | 22.44 | 22.32 | 22.20 | 1 |
| | | 1 | 99 | 22.40 | 22.28 | 22.16 | 1 |
| | | 50 | 0 | 21.59 | 21.47 | 21.35 | 2 |
| | | 50 | 25 | 21.47 | 21.35 | 21.23 | 2 |
| | | 50 | 50 | 21.41 | 21.29 | 21.17 | 2 |
| | | 100 | 0 | 21.60 | 21.48 | 21.36 | 2 |

| LTE Band 17 | | | | | | | |
|---|---|---|---|---|---|---|---|
| BW | Modulation | RB Size | RB Offset | Low CH 23755 | Mid CH 23790 | High CH 23825 | MPR |
| | | | | Frequency 706.5 MHz | Frequency 710 MHz | Frequency 713.5 MHz | |
| 5 MHz | QPSK | 1 | 0 | 23.04 | 23.21 | 23.01 | 0 |
| | | 1 | 12 | 22.90 | 23.07 | 22.87 | 0 |
| | | 1 | 24 | 22.84 | 23.01 | 22.81 | 0 |
| | | 12 | 0 | 21.82 | 21.99 | 21.79 | 1 |
| | | 12 | 6 | 21.98 | 22.15 | 21.95 | 1 |
| | | 12 | 13 | 21.94 | 22.11 | 21.91 | 1 |
| | | 25 | 0 | 21.90 | 22.07 | 21.87 | 1 |
| | 16QAM | 1 | 0 | 22.20 | 22.37 | 22.17 | 1 |
| | | 1 | 12 | 22.02 | 22.19 | 21.99 | 1 |
| | | 1 | 24 | 21.93 | 22.10 | 21.90 | 1 |
| | | 12 | 0 | 21.02 | 21.19 | 20.99 | 2 |
| | | 12 | 6 | 20.93 | 21.10 | 20.90 | 2 |
| | | 12 | 13 | 20.90 | 21.07 | 20.87 | 2 |
| | | 25 | 0 | 20.97 | 21.14 | 20.94 | 2 |
| BW | Modulation | RB Size | RB Offset | Low CH 23780 | Mid CH 23790 | High CH 23800 | MPR |
| | | | | Frequency 709 MHz | Frequency 710 MHz | Frequency 711 MHz | |
| 10 MHz | QPSK | 1 | 0 | 23.08 | **23.25** | 23.05 | 0 |
| | | 1 | 24 | 22.94 | 23.11 | 22.91 | 0 |
| | | 1 | 49 | 22.88 | 23.05 | 22.85 | 0 |
| | | 25 | 0 | 21.86 | 22.03 | 21.83 | 1 |
| | | 25 | 12 | 22.02 | 22.19 | 21.99 | 1 |
| | | 25 | 25 | 21.98 | 22.15 | 21.95 | 1 |
| | | 50 | 0 | 21.94 | 22.11 | 21.91 | 1 |
| | 16QAM | 1 | 0 | 22.24 | 22.41 | 22.21 | 1 |
| | | 1 | 24 | 22.06 | 22.23 | 22.03 | 1 |
| | | 1 | 49 | 21.97 | 22.14 | 21.94 | 1 |
| | | 25 | 0 | 21.06 | 21.23 | 21.03 | 2 |
| | | 25 | 12 | 20.97 | 21.14 | 20.94 | 2 |
| | | 25 | 25 | 20.94 | 21.11 | 20.91 | 2 |
| | | 50 | 0 | 21.01 | 21.18 | 20.98 | 2 |

## EIRP

### LTE BAND 4

### CHANNEL BANDWIDTH: 1.4MHz QPSK

| Channel | Frequency (MHz) | SPA LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) | LIMIT (W) |
|---|---|---|---|---|---|---|---|
| 19957 | 1710.7 | -18.64 | 41.29 | 22.65 | 184.25 | H | 1 |
| 20175 | 1732.5 | -17.64 | 41.36 | 23.72 | 235.50 | H | 1 |
| 20393 | 1754.3 | -18.03 | 42.74 | 24.71 | **295.67** | H | 1 |
| 19957 | 1710.7 | -20.24 | 44.25 | 24.01 | 251.48 | V | 1 |
| 20175 | 1732.5 | -20.26 | 44.20 | 23.94 | 247.74 | V | 1 |
| 20393 | 1754.3 | -19.85 | 44.09 | 24.24 | 265.16 | V | 1 |

### CHANNEL BANDWIDTH: 1.4MHz 16QAM

| Channel | Frequency (MHz) | SPA LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) | LIMIT (W) |
|---|---|---|---|---|---|---|---|
| 19957 | 1710.7 | -19.51 | 41.29 | 21.78 | 150.80 | H | 1 |
| 20175 | 1732.5 | -18.57 | 41.36 | 22.79 | 190.11 | H | 1 |
| 20393 | 1754.3 | -18.99 | 42.74 | 23.75 | 237.03 | H | 1 |
| 19957 | 1710.7 | -21.11 | 44.25 | 23.14 | 205.83 | V | 1 |
| 20175 | 1732.5 | -21.19 | 44.20 | 23.01 | 199.99 | V | 1 |
| 20393 | 1754.3 | -20.81 | 44.09 | 23.28 | 212.57 | V | 1 |

### LTE BAND 4

### CHANNEL BANDWIDTH: 3MHz QPSK

| Channel | Frequency (MHz) | SPA LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) | LIMIT (W) |
|---|---|---|---|---|---|---|---|
| 19965 | 1711.5 | -18.62 | 41.27 | 22.65 | 183.95 | H | 1 |
| 20175 | 1732.5 | -17.70 | 41.36 | 23.66 | 232.27 | H | 1 |
| 20385 | 1753.5 | -17.98 | 42.76 | 24.78 | **300.40** | H | 1 |
| 19965 | 1711.5 | -20.22 | 44.26 | 24.04 | 253.63 | V | 1 |
| 20175 | 1732.5 | -20.32 | 44.20 | 23.88 | 244.34 | V | 1 |
| 20385 | 1753.5 | -19.80 | 44.23 | 24.43 | 277.46 | V | 1 |

### CHANNEL BANDWIDTH: 3MHz 16QAM

| Channel | Frequency (MHz) | SPA LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) | LIMIT (W) |
|---|---|---|---|---|---|---|---|
| 19965 | 1711.5 | -19.69 | 41.27 | 21.58 | 143.78 | H | 1 |
| 20175 | 1732.5 | -18.59 | 41.36 | 22.77 | 189.23 | H | 1 |
| 20385 | 1753.5 | -18.97 | 42.76 | 23.79 | 239.17 | H | 1 |
| 19965 | 1711.5 | -21.29 | 44.26 | 22.97 | 198.24 | V | 1 |
| 20175 | 1732.5 | -21.21 | 44.20 | 22.99 | 199.07 | V | 1 |
| 20385 | 1753.5 | -20.79 | 44.23 | 23.44 | 220.90 | V | 1 |

## LTE BAND 4

### CHANNEL BANDWIDTH: 5MHz QPSK

| Channel | Frequency (MHz) | SPA LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) | LIMIT (W) |
|---|---|---|---|---|---|---|---|
| 19975 | 1712.5 | -18.68 | 41.39 | 22.71 | 186.59 | H | 1 |
| 20175 | 1732.5 | -17.65 | 41.36 | 23.71 | 234.96 | H | 1 |
| 20375 | 1752.5 | -17.93 | 42.63 | 24.70 | **295.05** | H | 1 |
| 19975 | 1712.5 | -20.28 | 44.17 | 23.89 | 244.68 | V | 1 |
| 20175 | 1732.5 | -20.27 | 44.20 | 23.93 | 247.17 | V | 1 |
| 20375 | 1752.5 | -19.75 | 44.35 | 24.60 | 288.07 | V | 1 |

### CHANNEL BANDWIDTH: 5MHz 16QAM

| Channel | Frequency (MHz) | SPA LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) | LIMIT (W) |
|---|---|---|---|---|---|---|---|
| 19975 | 1712.5 | -19.51 | 41.39 | 21.88 | 154.13 | H | 1 |
| 20175 | 1732.5 | -18.67 | 41.36 | 22.69 | 185.78 | H | 1 |
| 20375 | 1752.5 | -19.03 | 42.63 | 23.60 | 229.03 | H | 1 |
| 19975 | 1712.5 | -21.11 | 44.17 | 23.06 | 202.12 | V | 1 |
| 20175 | 1732.5 | -21.29 | 44.20 | 22.91 | 195.43 | V | 1 |
| 20375 | 1752.5 | -20.85 | 44.35 | 23.50 | 223.61 | V | 1 |

## LTE BAND 4

### CHANNEL BANDWIDTH: 10MHz QPSK

| Channel | Frequency (MHz) | SPA LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) | LIMIT (W) |
|---|---|---|---|---|---|---|---|
| 20000 | 1715.0 | -18.49 | 41.49 | 23.00 | 199.34 | H | 1 |
| 20175 | 1732.5 | -17.59 | 41.36 | 23.77 | 238.23 | H | 1 |
| 20350 | 1750.0 | -17.80 | 42.28 | 24.48 | 280.74 | H | 1 |
| 20000 | 1715.0 | -20.09 | 44.06 | 23.97 | 249.63 | V | 1 |
| 20175 | 1732.5 | -20.21 | 44.20 | 23.99 | 250.61 | V | 1 |
| 20350 | 1750.0 | -19.62 | 44.43 | 24.81 | **302.69** | V | 1 |

### CHANNEL BANDWIDTH: 10MHz 16QAM

| Channel | Frequency (MHz) | SPA LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) | LIMIT (W) |
|---|---|---|---|---|---|---|---|
| 20000 | 1715.0 | -19.64 | 41.49 | 21.85 | 152.97 | H | 1 |
| 20175 | 1732.5 | -18.69 | 41.36 | 22.67 | 184.93 | H | 1 |
| 20350 | 1750.0 | -18.96 | 42.28 | 23.32 | 214.93 | H | 1 |
| 20000 | 1715.0 | -21.24 | 44.06 | 22.82 | 191.56 | V | 1 |
| 20175 | 1732.5 | -21.31 | 44.20 | 22.89 | 194.54 | V | 1 |
| 20350 | 1750.0 | -20.78 | 44.43 | 23.65 | 231.74 | V | 1 |

## LTE BAND 4

### CHANNEL BANDWIDTH: 15MHz QPSK

| Channel | Frequency (MHz) | SPA LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) | LIMIT (W) |
|---|---|---|---|---|---|---|---|
| 20025 | 1717.5 | -18.50 | 41.34 | 22.84 | 192.22 | H | 1 |
| 20175 | 1732.5 | -17.66 | 41.36 | 23.70 | 234.42 | H | 1 |
| 20325 | 1747.5 | -17.87 | 42.09 | 24.22 | 264.00 | H | 1 |
| 20025 | 1717.5 | -20.10 | 44.04 | 23.94 | 247.97 | V | 1 |
| 20175 | 1732.5 | -20.28 | 44.20 | 23.92 | 246.60 | V | 1 |
| 20325 | 1747.5 | -19.69 | 44.22 | 24.53 | **283.47** | V | 1 |

### CHANNEL BANDWIDTH: 15MHz 16QAM

| Channel | Frequency (MHz) | SPA LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) | LIMIT (W) |
|---|---|---|---|---|---|---|---|
| 20025 | 1717.5 | -19.36 | 41.34 | 21.98 | 157.69 | H | 1 |
| 20175 | 1732.5 | -18.53 | 41.36 | 22.83 | 191.87 | H | 1 |
| 20325 | 1747.5 | -18.72 | 42.09 | 23.37 | 217.07 | H | 1 |
| 20025 | 1717.5 | -20.96 | 44.04 | 23.08 | 203.42 | V | 1 |
| 20175 | 1732.5 | -21.15 | 44.20 | 23.05 | 201.84 | V | 1 |
| 20325 | 1747.5 | -20.54 | 44.22 | 23.68 | 233.08 | V | 1 |

## LTE BAND 4

### CHANNEL BANDWIDTH: 20MHz QPSK

| Channel | Frequency (MHz) | SPA LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) | LIMIT (W) |
|---|---|---|---|---|---|---|---|
| 20050 | 1720.0 | -19.08 | 41.28 | 22.20 | 166.00 | H | 1 |
| 20175 | 1732.5 | -18.11 | 41.36 | 23.25 | 211.40 | H | 1 |
| 20300 | 1745.0 | -18.45 | 41.96 | 23.51 | 224.23 | H | 1 |
| 20050 | 1720.0 | -20.68 | 44.14 | 23.46 | 221.56 | V | 1 |
| 20175 | 1732.5 | -20.73 | 44.20 | 23.47 | 222.13 | V | 1 |
| 20300 | 1745.0 | -20.27 | 43.88 | 23.61 | **229.72** | V | 1 |

### CHANNEL BANDWIDTH: 20MHz 16QAM

| Channel | Frequency (MHz) | SPA LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) | LIMIT (W) |
|---|---|---|---|---|---|---|---|
| 20050 | 1720.0 | -20.01 | 41.28 | 21.27 | 134.00 | H | 1 |
| 20175 | 1732.5 | -19.18 | 41.36 | 22.18 | 165.23 | H | 1 |
| 20300 | 1745.0 | -19.28 | 41.96 | 22.68 | 185.23 | H | 1 |
| 20050 | 1720.0 | -21.61 | 44.14 | 22.53 | 178.85 | V | 1 |
| 20175 | 1732.5 | -21.80 | 44.20 | 22.40 | 173.62 | V | 1 |
| 20300 | 1745.0 | -21.10 | 43.88 | 22.78 | 189.76 | V | 1 |

**REMARKS:** 1. EIRP Output Power (dBm) = SPA LVL (dBm) + Correction Factor (dB).
2. Correction factor (dB) = Free Space Loss + Antenna Factor + Cable Loss

## LTE BAND 17

### CHANNEL BANDWIDTH: 5MHz QPSK

| Channel | Frequency (MHz) | SPA LVL (dBm) | Correction Factor(dB) | ERP(dBm) | ERP(mW) | Polarization (H/V) | LIMIT (W) |
|---|---|---|---|---|---|---|---|
| 23755 | 706.5 | -11.98 | 32.64 | 18.51 | 70.88 | H | 3 |
| 23790 | 710.0 | -11.97 | 32.92 | 18.80 | 75.86 | H | 3 |
| 23825 | 713.5 | -11.68 | 32.83 | 19.00 | **79.36** | H | 3 |
| 23755 | 706.5 | -19.71 | 32.14 | 10.28 | 10.66 | V | 3 |
| 23790 | 710.0 | -20.17 | 32.18 | 9.86 | 9.68 | V | 3 |
| 23825 | 713.5 | -19.95 | 31.95 | 9.85 | 9.67 | V | 3 |

### CHANNEL BANDWIDTH: 5MHz 16QAM

| Channel | Frequency (MHz) | SPA LVL (dBm) | Correction Factor(dB) | ERP(dBm) | ERP(mW) | Polarization (H/V) | LIMIT (W) |
|---|---|---|---|---|---|---|---|
| 23755 | 706.5 | -12.84 | 32.64 | 17.65 | 58.14 | H | 3 |
| 23790 | 710.0 | -12.84 | 32.92 | 17.93 | 62.09 | H | 3 |
| 23825 | 713.5 | -12.53 | 32.83 | 18.15 | 65.25 | H | 3 |
| 23755 | 706.5 | -20.57 | 32.14 | 9.42 | 8.74 | V | 3 |
| 23790 | 710.0 | -21.04 | 32.18 | 8.99 | 7.93 | V | 3 |
| 23825 | 713.5 | -20.80 | 31.95 | 9.00 | 7.95 | V | 3 |

## LTE BAND 17

### CHANNEL BANDWIDTH: 10MHz QPSK

| Channel | Frequency (MHz) | SPA LVL (dBm) | Correction Factor(dB) | ERP(dBm) | ERP(mW) | Polarization (H/V) | LIMIT (W) |
|---|---|---|---|---|---|---|---|
| 23780 | 709.0 | -12.56 | 32.90 | 18.19 | 65.84 | H | 3 |
| 23790 | 710.0 | -12.42 | 32.92 | 18.35 | 68.36 | H | 3 |
| 23800 | 711.0 | -12.26 | 32.92 | 18.51 | **70.97** | H | 3 |
| 23780 | 709.0 | -20.29 | 32.20 | 9.76 | 9.45 | V | 3 |
| 23790 | 710.0 | -20.62 | 32.18 | 9.41 | 8.73 | V | 3 |
| 23800 | 711.0 | -20.53 | 32.13 | 9.45 | 8.81 | V | 3 |

### CHANNEL BANDWIDTH: 10MHz 16QAM

| Channel | Frequency (MHz) | SPA LVL (dBm) | Correction Factor(dB) | ERP(dBm) | ERP(mW) | Polarization (H/V) | LIMIT (W) |
|---|---|---|---|---|---|---|---|
| 23780 | 709.0 | -13.49 | 32.90 | 17.26 | 53.15 | H | 3 |
| 23790 | 710.0 | -13.49 | 32.92 | 17.28 | 53.43 | H | 3 |
| 23800 | 711.0 | -13.09 | 32.92 | 17.68 | 58.63 | H | 3 |
| 23780 | 709.0 | -21.22 | 32.20 | 8.83 | 7.63 | V | 3 |
| 23790 | 710.0 | -21.69 | 32.18 | 8.34 | 6.83 | V | 3 |
| 23800 | 711.0 | -21.36 | 32.13 | 8.62 | 7.28 | V | 3 |

**REMARKS:** 1. ERP Output Power (dBm) = SPA LVL (dBm) + Correction Factor (dB) -2.15(dB).
2. Correction factor (dB) = Free Space Loss + Antenna Factor + Cable Loss

## 4.2 FREQUENCY STABILITY MEASUREMENT

### 4.2.1 LIMITS OF FREQUENCY STABILIITY MEASUREMENT

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

### 4.2.2 TEST PROCEDURE

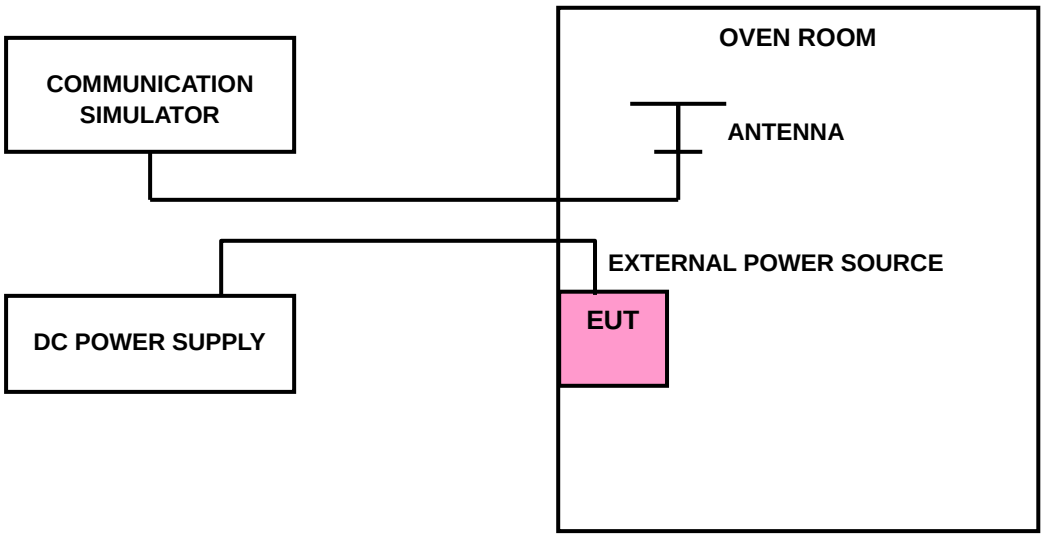
a. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.

b. 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.

c. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the ±0.5℃ 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) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | LTE Band 4 | | | | | | LTE Band 17 | | LIMIT (ppm) |
| | 1.4MHz | 3MHz | 5MHz | 10MHz | 15MHz | 20MHz | 5MHz | 10MHz | |
| 12 | 0.0014 | 0.0014 | 0.0013 | 0.0014 | 0.0014 | 0.0014 | 0.0033 | 0.0033 | 2.5 |
| 7 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0009 | 0.0032 | 2.5 |
| 30 | 0.0013 | 0.0013 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0008 | 0.0030 | 2.5 |

**NOTE:** The applicant defined the normal working voltage of the battery is from 7Vdc to 30Vdc.

**FREQUENCY ERROR vs. TEMPERATURE.**

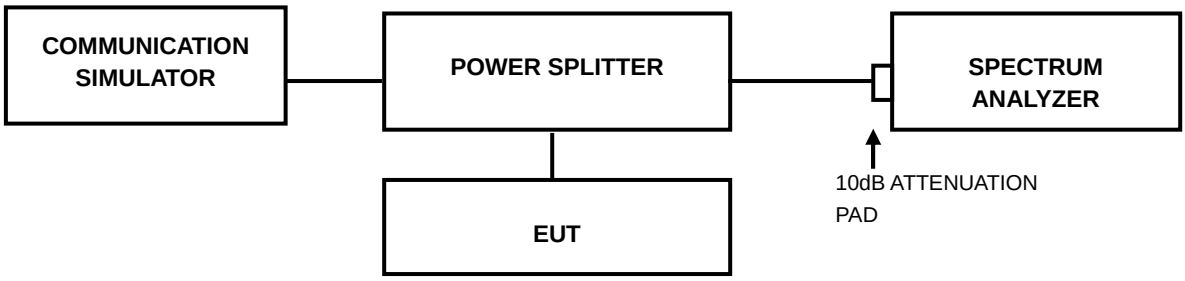
| | Frequency Error (PPM) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| TEMP. (℃) | LTE Band 4 | | | | | | LTE Band 17 | | LIMIT (ppm) |
| | 1.4MHz | 3MHz | 5MHz | 10MHz | 15MHz | 20MHz | 5MHz | 10MHz | |
| -30 | 0.0056 | 0.0056 | 0.0056 | 0.0056 | 0.0056 | 0.0052 | 0.0136 | 0.0136 | 2.5 |
| -20 | 0.0054 | 0.0048 | 0.0054 | 0.0051 | 0.0053 | 0.0050 | 0.0128 | 0.0129 | 2.5 |
| -10 | 0.0049 | 0.0047 | 0.0050 | 0.0048 | 0.0051 | 0.0045 | 0.0124 | 0.0124 | 2.5 |
| 0 | 0.0048 | 0.0044 | 0.0047 | 0.0046 | 0.0048 | 0.0043 | 0.0117 | 0.0117 | 2.5 |
| 10 | 0.0043 | 0.0041 | 0.0044 | 0.0041 | 0.0044 | 0.0040 | 0.0108 | 0.0108 | 2.5 |
| 20 | 0.0041 | 0.0038 | 0.0042 | 0.0040 | 0.0041 | 0.0036 | 0.0102 | 0.0099 | 2.5 |
| 30 | 0.0037 | 0.0036 | 0.0037 | 0.0037 | 0.0037 | 0.0032 | 0.0097 | 0.0097 | 2.5 |
| 40 | 0.0036 | 0.0034 | 0.0034 | 0.0031 | 0.0035 | 0.0030 | 0.0088 | 0.0089 | 2.5 |
| 50 | 0.0034 | 0.0032 | 0.0029 | 0.0027 | 0.0034 | 0.0028 | 0.0076 | 0.0081 | 2.5 |
| 60 | 0.0027 | 0.0027 | 0.0025 | 0.0024 | 0.0027 | 0.0025 | 0.0065 | 0.0071 | 2.5 |

## 4.3 OCCUPIED BANDWIDTH MEASUREMENT

### 4.3.1 LIMITS OF OCCUPIED BANDWIDTH MEASUREMENT

The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 %of the total mean power of a given emission.

### 4.3.2 TEST SETUP




### 4.3.3 TEST PROCEDURES

a. The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

b. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

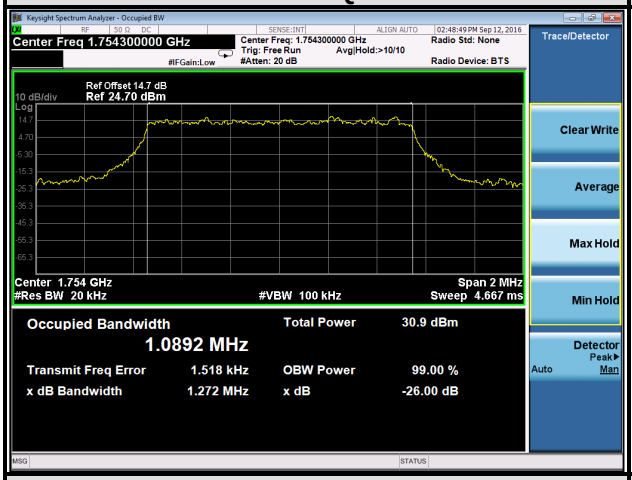
## 4.3.4 TEST RESULTS

### LTE BAND 4

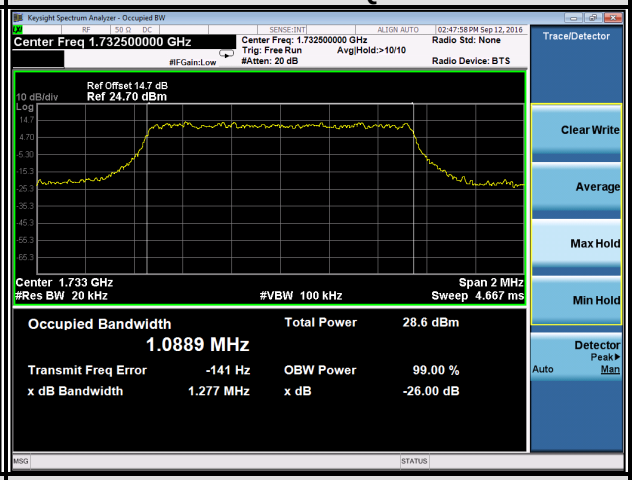
| CHANNEL BANDWIDTH: 1.4MHz | | | | CHANNEL BANDWIDTH: 3MHz | | | |
|---|---|---|---|---|---|---|---|
| CHANNEL | Frequency (MHz) | 99% OCCUPIED Bandwidth (MHz) | | CHANNEL | Frequency (MHz) | 99% OCCUPIED Bandwidth (MHz) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 19957 | 1710.7 | 1.09 | 1.08 | 19965 | 1711.5 | 2.69 | 2.69 |
| 20175 | 1732.5 | 1.09 | 1.09 | 20175 | 1732.5 | 2.69 | 2.68 |
| 20393 | 1754.3 | 1.09 | 1.09 | 20385 | 1753.5 | 2.69 | 2.69 |

**SPECTRUM PLOT OF WORST VALUE**

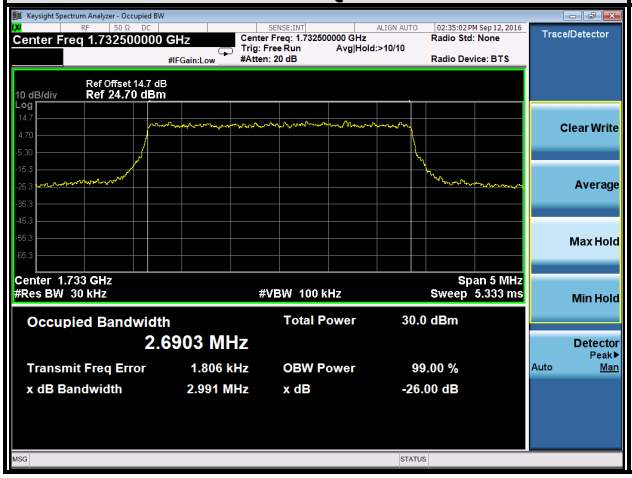
**1.4MHz / QPSK**



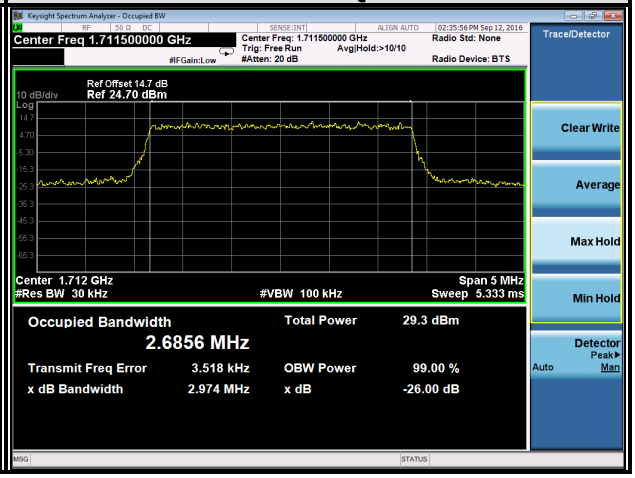

**1.4MHz / 16QAM**




**3MHz / QPSK**




**3MHz / 16QAM**

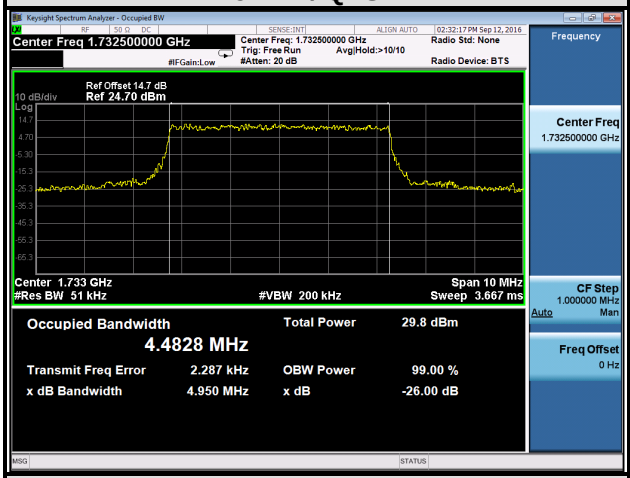


## LTE BAND 4

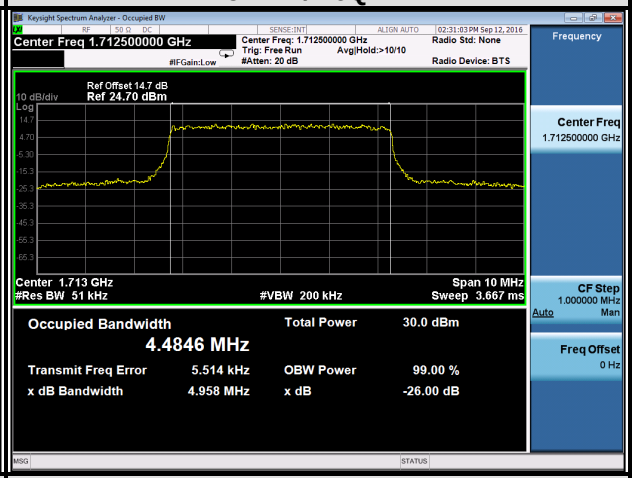
| CHANNEL BANDWIDTH: 5MHz | | | | CHANNEL BANDWIDTH: 10MHz | | | |
|---|---|---|---|---|---|---|---|
| CHANNEL | Frequency (MHz) | 99% OCCUPIED Bandwidth (MHz) | | CHANNEL | Frequency (MHz) | 99% OCCUPIED Bandwidth (MHz) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 19975 | 1712.5 | 4.48 | 4.48 | 20000 | 1715 | 8.95 | 8.93 |
| 20175 | 1732.5 | 4.48 | 4.47 | 20175 | 1732.5 | 8.95 | 8.94 |
| 20375 | 1752.5 | 4.47 | 4.46 | 20350 | 1750 | 8.94 | 8.94 |

### SPECTRUM PLOT OF WORST VALUE

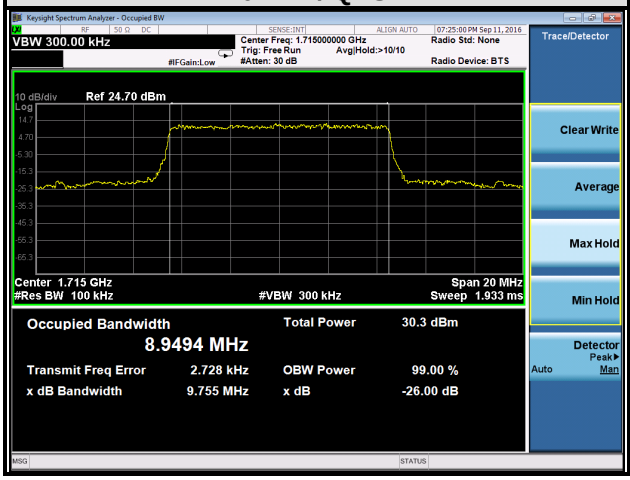
**5MHz / QPSK**



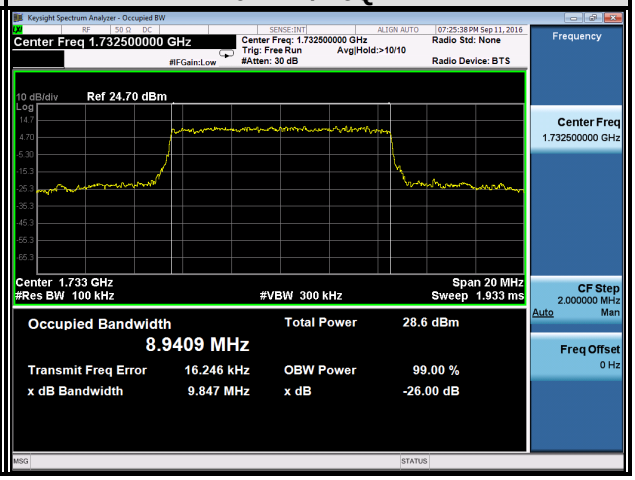

**5MHz / 16QAM**




**10MHz / QPSK**




**10MHz / 16QAM**

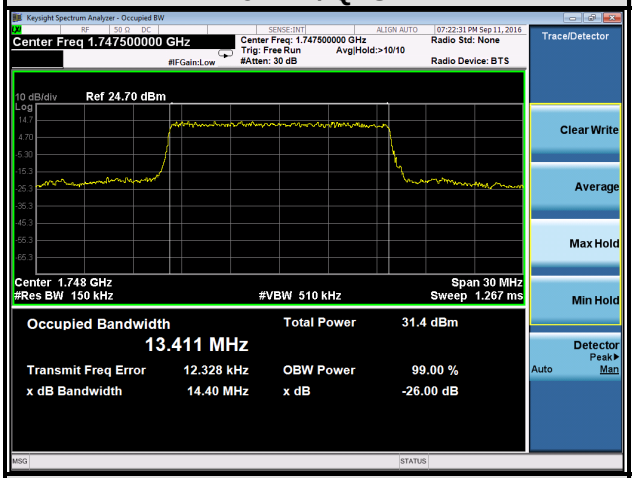


## LTE BAND 4

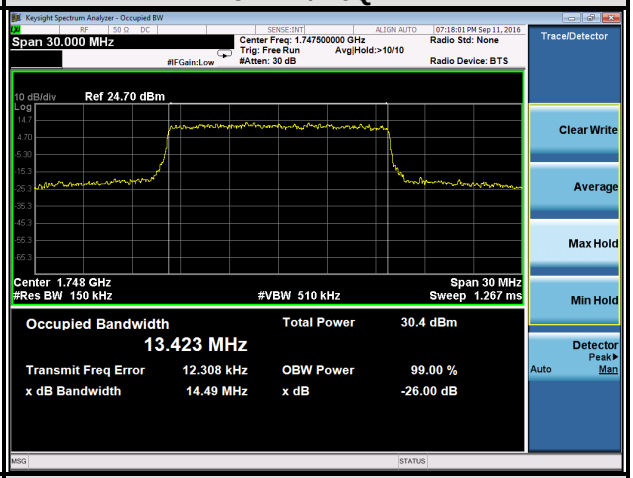
| CHANNEL BANDWIDTH: 15MHz | | | | CHANNEL BANDWIDTH: 20MHz | | | |
|---|---|---|---|---|---|---|---|
| CHANNEL | FREQUENCY (MHz) | 99% OCCUPIED BANDWIDTH (MHz) | | CHANNEL | FREQUENCY (MHz) | 99% OCCUPIED BANDWIDTH (MHz) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 20025 | 1717.5 | 13.40 | 13.40 | 20050 | 1720 | 17.86 | 17.85 |
| 20175 | 1732.5 | 13.38 | 13.39 | 20175 | 1732.5 | 17.92 | 17.83 |
| 20325 | 1747.5 | 13.41 | 13.42 | 20300 | 1745 | 17.89 | 17.82 |

### SPECTRUM PLOT OF WORST VALUE

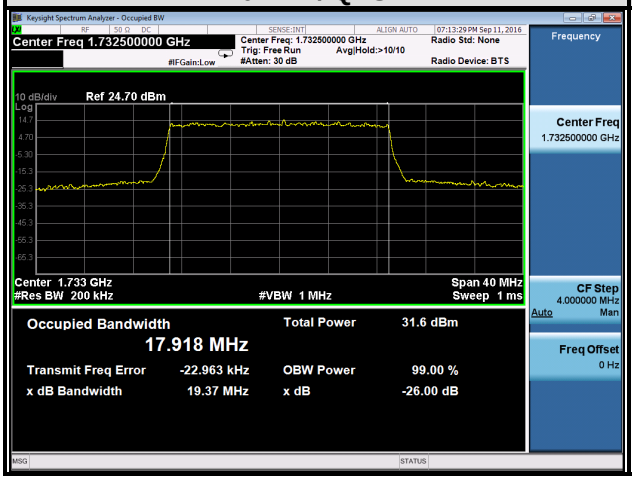
**15MHz / QPSK**



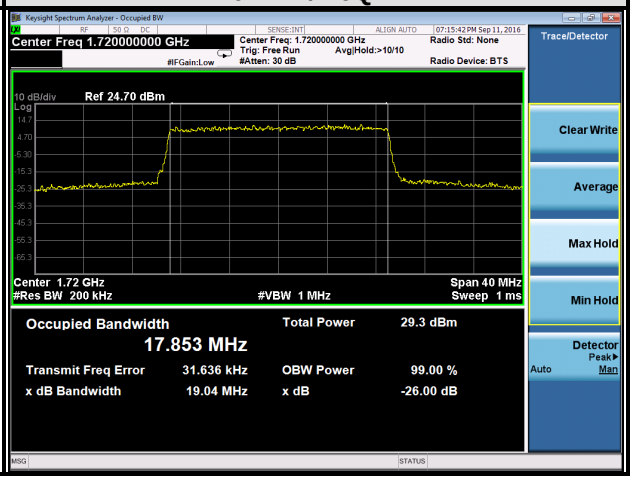

**15MHz / 16QAM**




**20MHz / QPSK**




**20MHz / 16QAM**

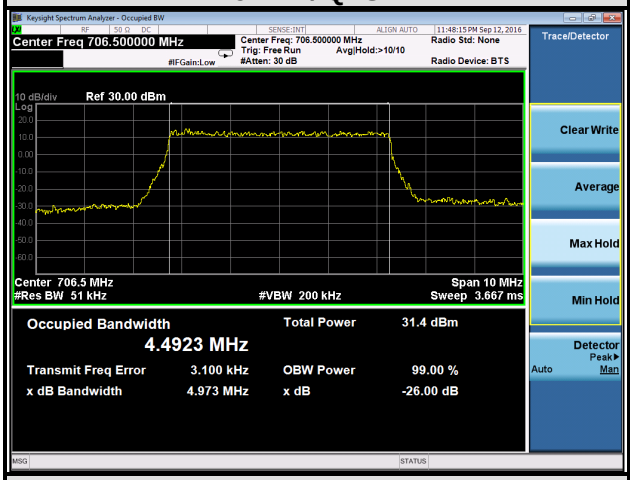


## LTE BAND 17

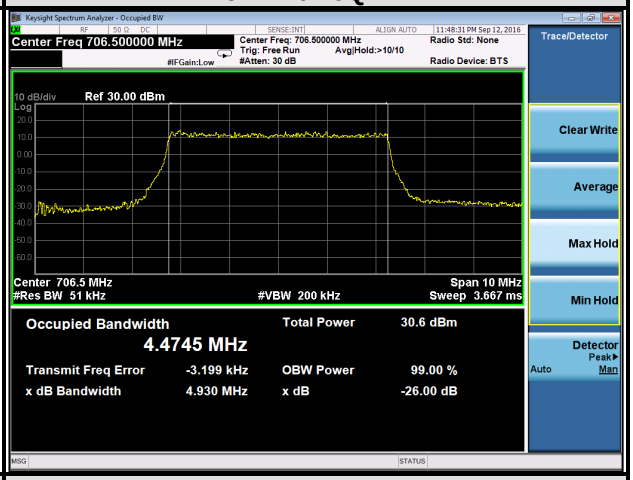
| CHANNEL BANDWIDTH: 5MHz | | | | CHANNEL BANDWIDTH: 10MHz | | | |
|---|---|---|---|---|---|---|---|
| CHANNEL | Frequency (MHz) | 99% OCCUPIED Bandwidth (MHz) | | CHANNEL | Frequency (MHz) | 99% OCCUPIED Bandwidth (MHz) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 23755 | 706.5 | 4.49 | 4.47 | 23780 | 709 | 8.95 | 8.96 |
| 23790 | 710 | 4.47 | 4.47 | 23790 | 710 | 8.93 | 8.93 |
| 23825 | 713.5 | 4.49 | 4.47 | 23800 | 711 | 8.92 | 8.93 |

### SPECTRUM PLOT OF WORST VALUE

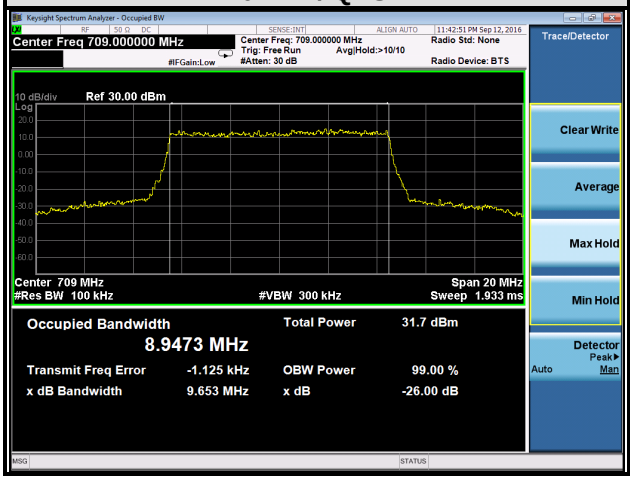
**5MHz / QPSK**



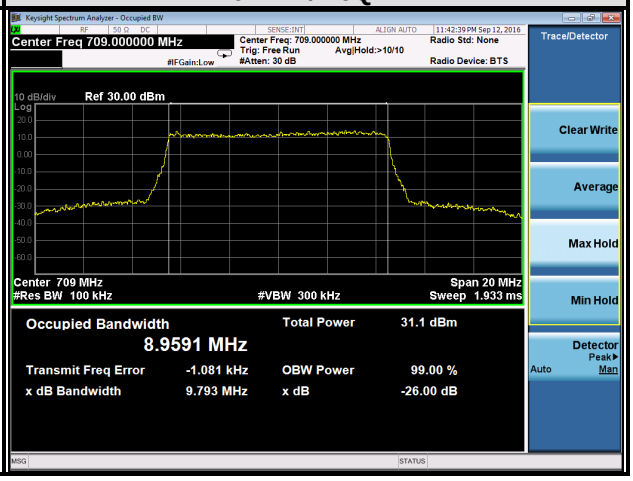

**5MHz / 16QAM**




**10MHz / QPSK**




**10MHz / 16QAM**

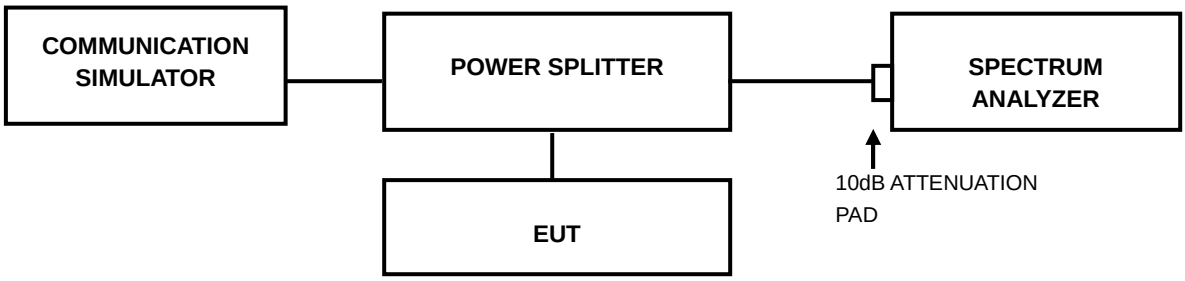


## 4.4 PEAK TO AVERAGE RATIO

### 4.4.1 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

### 4.4.2 TEST SETUP




### 4.4.3 TEST PROCEDURES

1. Set resolution/measurement bandwidth ≥ 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%.

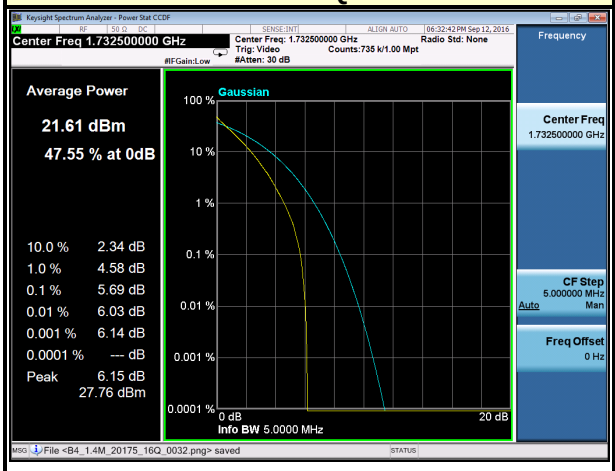
## 4.4.4 TEST RESULTS

### LTE BAND 4

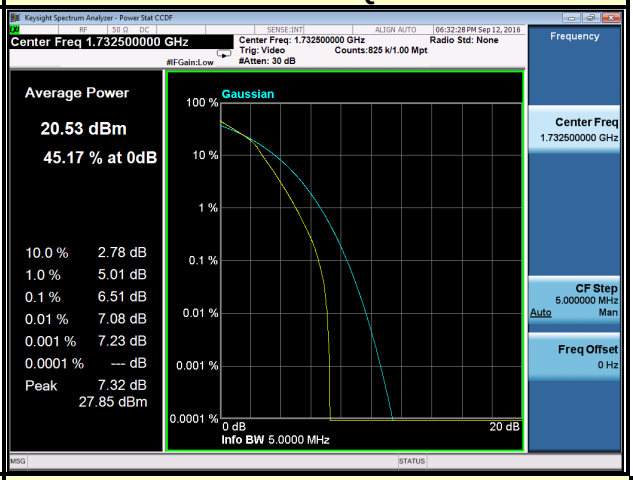
| CHANNEL BANDWIDTH: 1.4MHz | | | | CHANNEL BANDWIDTH: 3MHz | | | |
|---|---|---|---|---|---|---|---|
| CHANNEL | FREQUENCY (MHz) | PEAK TO AVERAGE RATIO (dB) | | CHANNEL | FREQUENCY (MHz) | PEAK TO AVERAGE RATIO (dB) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 19957 | 1710.7 | 5.31 | 6.20 | 19965 | 1711.5 | 5.43 | 6.09 |
| 20175 | 1732.5 | 5.69 | 6.51 | 20175 | 1732.5 | 5.65 | 6.32 |
| 20393 | 1754.3 | 5.33 | 6.23 | 20385 | 1753.5 | 5.36 | 6.36 |

**SPECTRUM PLOT OF WORST VALUE**

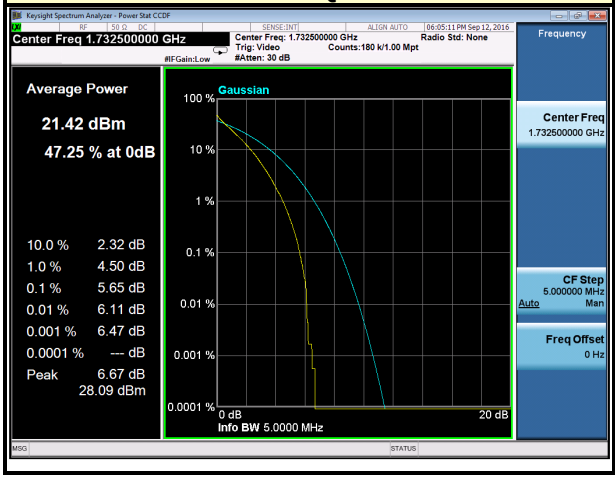
**1.4MHz / QPSK**



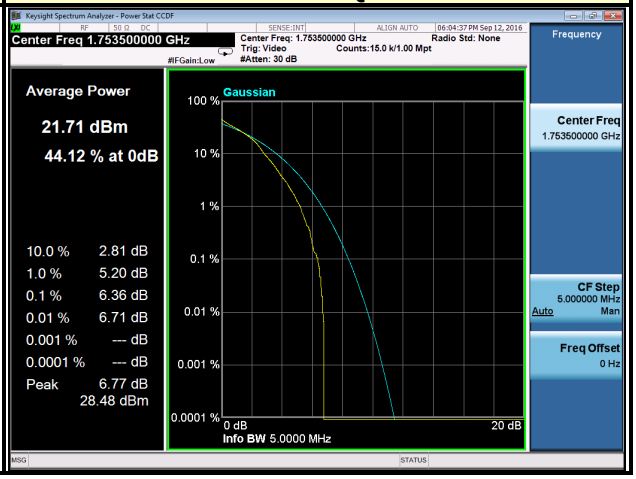

**1.4MHz / 16QAM**




**3MHz / QPSK**



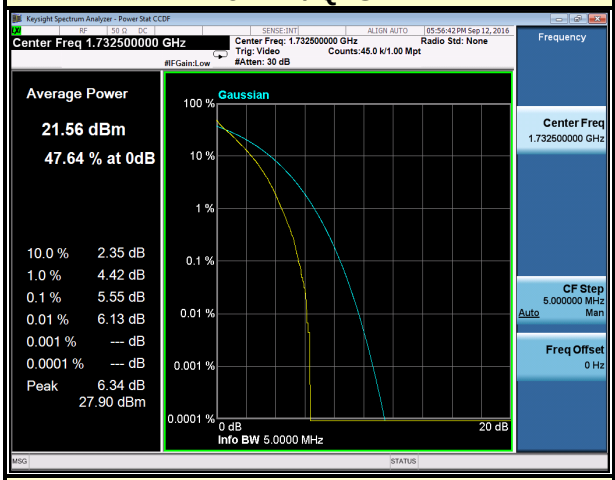

**3MHz / 16QAM**



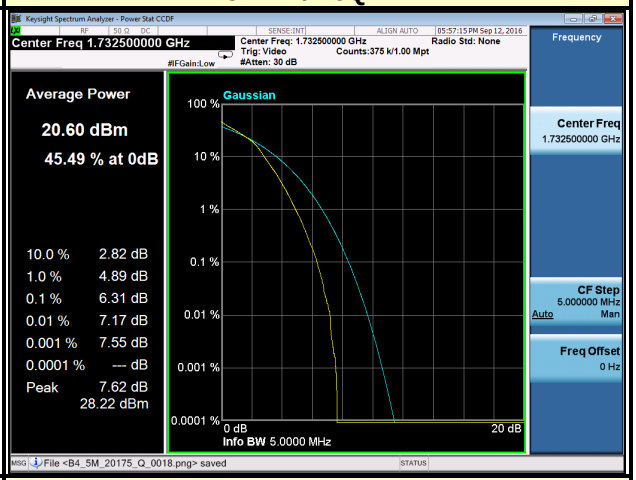
| CHANNEL BANDWIDTH: 5MHz | | | | CHANNEL BANDWIDTH: 10MHz | | | |
|---|---|---|---|---|---|---|---|
| CHANNEL | FREQUENCY (MHz) | PEAK TO AVERAGE RATIO (dB) | | CHANNEL | FREQUENCY (MHz) | PEAK TO AVERAGE RATIO (dB) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 19975 | 1712.5 | 5.45 | 6.17 | 20000 | 1715 | 5.49 | 6.13 |
| 20175 | 1732.5 | 5.55 | 6.31 | 20175 | 1732.5 | 5.58 | 6.33 |
| 20375 | 1752.5 | 5.48 | 6.22 | 20350 | 1750 | 5.35 | 6.14 |

**SPECTRUM PLOT OF WORST VALUE**

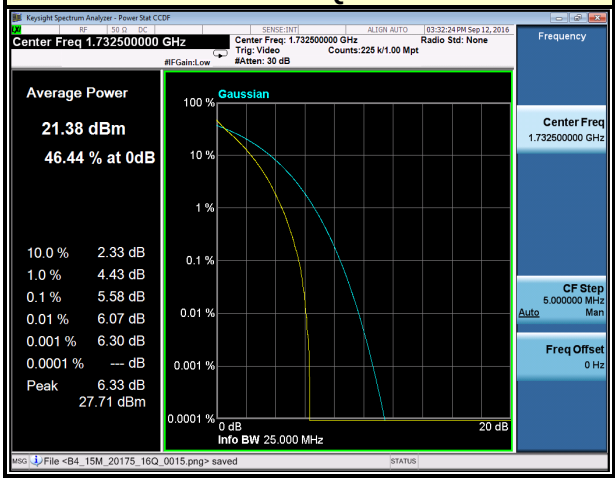
**5MHz / QPSK**



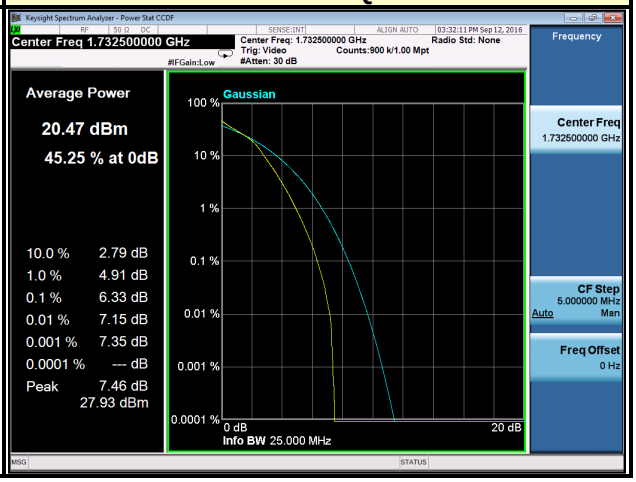

**5MHz / 16QAM**




**10MHz / QPSK**



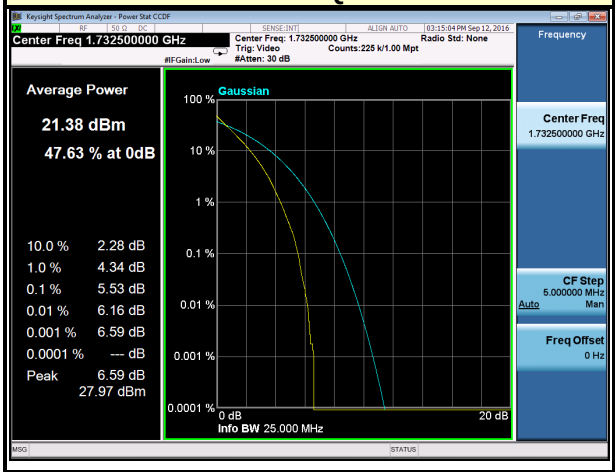

**10MHz / 16QAM**



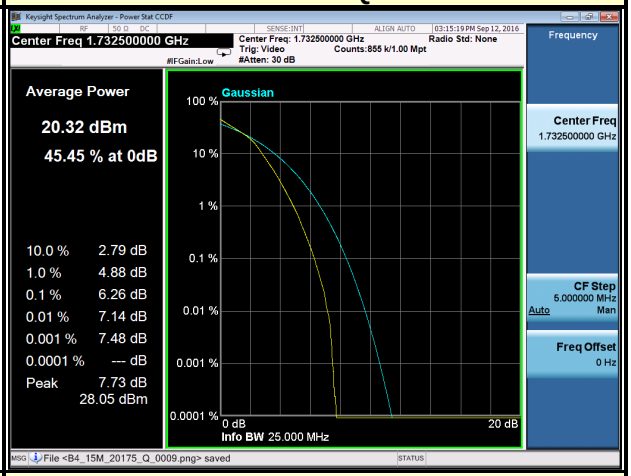
| CHANNEL BANDWIDTH: 15MHz | | | | CHANNEL BANDWIDTH: 20MHz | | | |
|---|---|---|---|---|---|---|---|
| CHANNEL | FREQUENCY (MHz) | PEAK TO AVERAGE RATIO (dB) | | CHANNEL | FREQUENCY (MHz) | PEAK TO AVERAGE RATIO (dB) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 20025 | 1717.5 | 5.42 | 6.14 | 20050 | 1720 | 5.46 | 6.27 |
| 20175 | 1732.5 | 5.53 | 6.26 | 20175 | 1732.5 | 5.49 | 6.23 |
| 20325 | 1747.5 | 5.35 | 6.15 | 20300 | 1745 | 5.38 | 6.18 |

**SPECTRUM PLOT OF WORST VALUE**

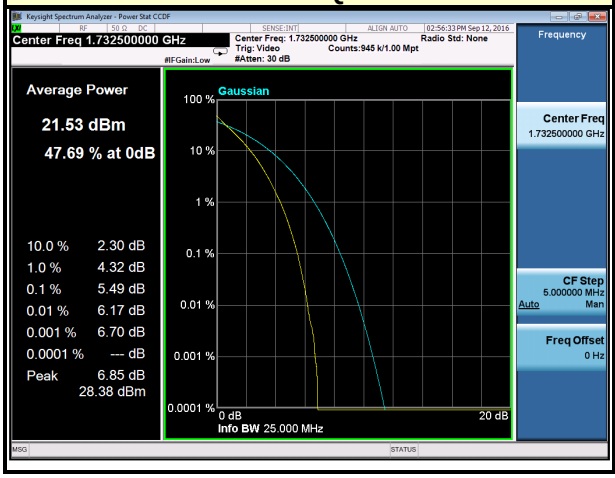
**15MHz / QPSK**



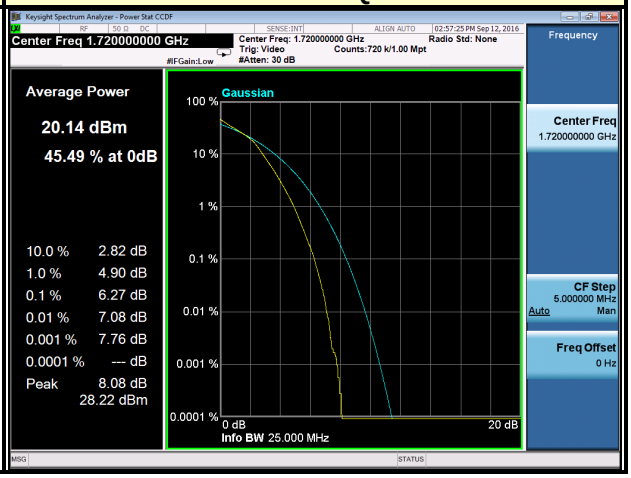

**15MHz / 16QAM**




**20MHz / QPSK**




**20MHz / 16QAM**

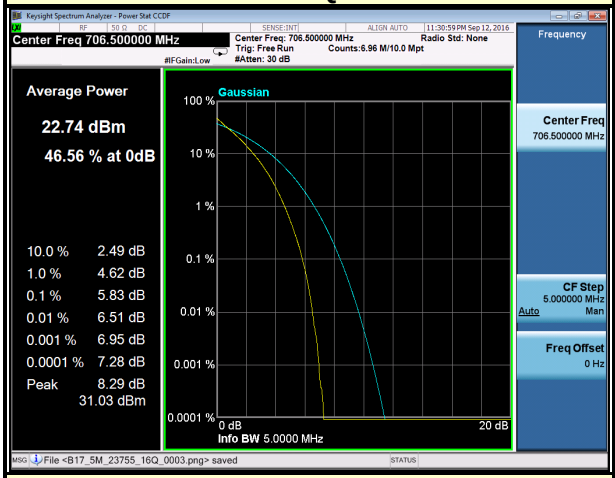


## LTE BAND 17

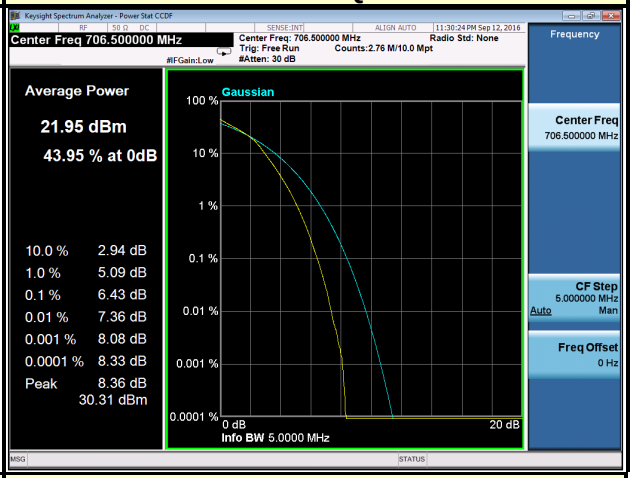
| CHANNEL BANDWIDTH: 5MHz | | | | CHANNEL BANDWIDTH: 10MHz | | | |
|---|---|---|---|---|---|---|---|
| CHANNEL | FREQUENCY (MHz) | PEAK TO AVERAGE RATIO (dB) | | CHANNEL | FREQUENCY (MHz) | PEAK TO AVERAGE RATIO (dB) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 23755 | 706.5 | 5.83 | 6.43 | 23780 | 709 | 5.83 | 6.46 |
| 23790 | 710 | 5.61 | 6.30 | 23790 | 710 | 5.82 | 6.37 |
| 23825 | 713.5 | 5.43 | 6.14 | 23800 | 711 | 5.56 | 6.27 |

### SPECTRUM PLOT OF WORST VALUE

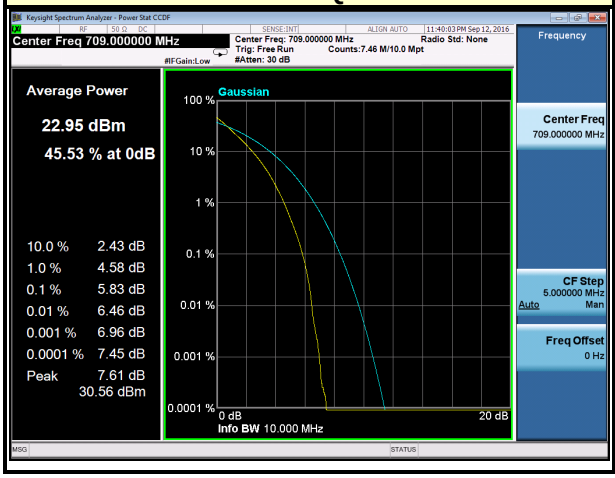
**5MHz / QPSK**



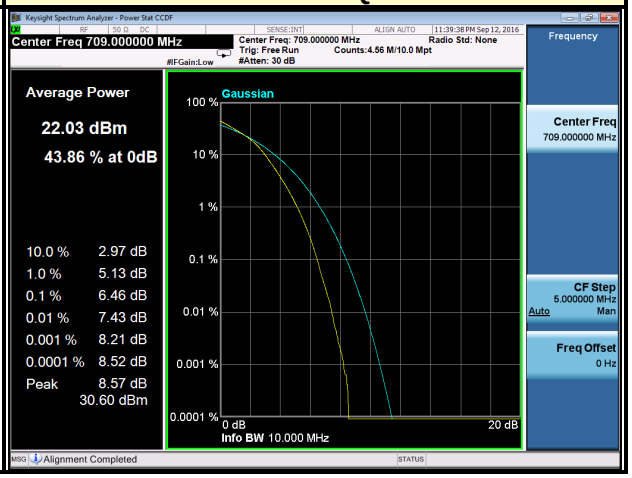

**5MHz / 16QAM**




**10MHz / QPSK**




**10MHz / 16QAM**

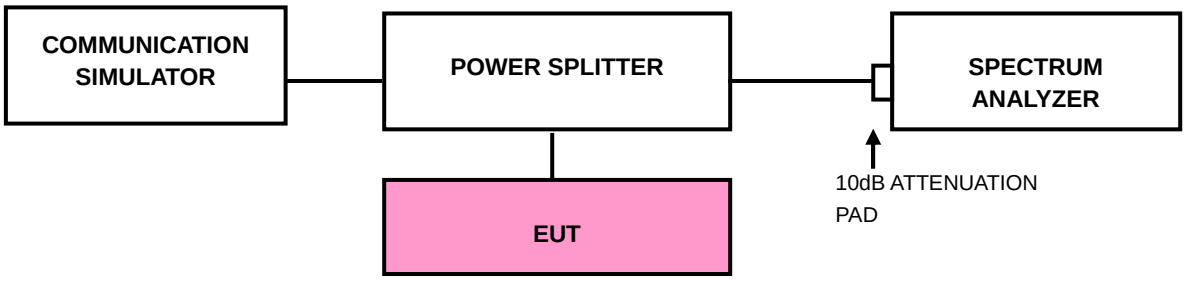


## 4.5 BAND EDGE MEASUREMENT

### 4.5.1 LIMITS OF BAND EDGE MEASUREMENT

The power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater.
However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

### 4.5.2 TEST SETUP



### 4.5.3 TEST PROCEDURES

a. The EUT was set up for the maximum peak power with LTE link data modulation. The power was measured with R&S Spectrum Analyzer. All measurements were done at 2 channels (low and high operational frequency range.).

b. The band edge measurement used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

c. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 20kHz and VBW of the spectrum is 100 kHz. (LTE bandwidth 1.4MHz)

d. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 30kHz and VBW of the spectrum is 100kHz. (LTE bandwidth 3MHz)

e. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 50kHz and VBW of the spectrum is 200kHz. (LTE bandwidth 5MHz)

f. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 100kHz and VBW of the spectrum is 300kHz. (LTE bandwidth 10MHz)

g. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 200kHz and VBW of the spectrum is 1MHz. (LTE bandwidth 15MHz)

h. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 200kHz and VBW of the spectrum is 1MHz. (LTE bandwidth 20MHz)

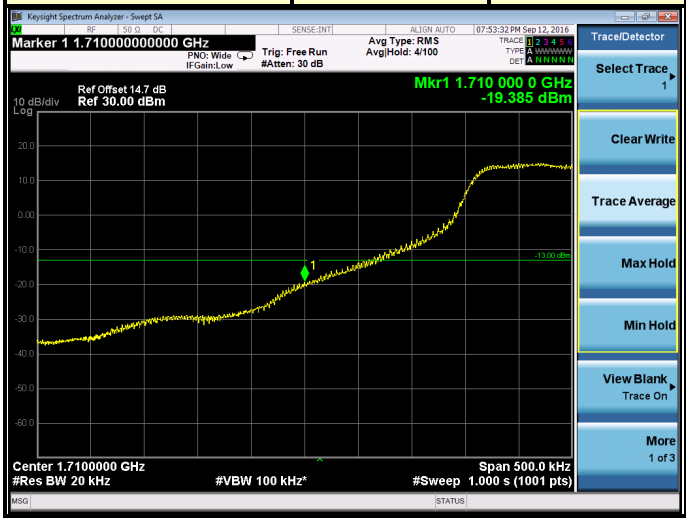
i. Record the max trace plot into the test report.

## 4.5.4 TEST RESULTS

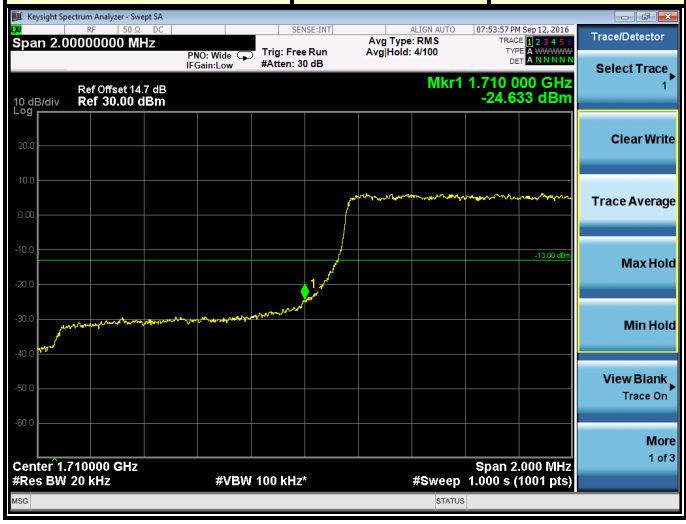
### LTE BAND 4

**Channel Bandwidth: 1.4MHz**

| CHANNEL | 19957 | 1 RB | CHANNEL | 20393 | 1 RB |
|---|---|---|---|---|---|



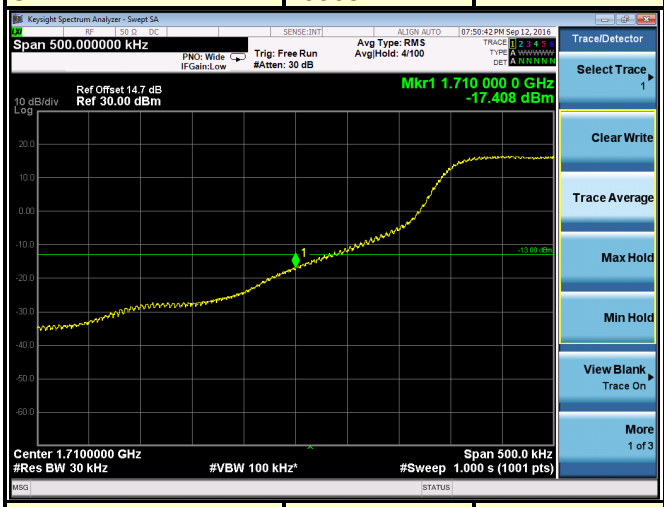
| CHANNEL | 19957 | Full RB | CHANNEL | 20393 | Full RB |
|---|---|---|---|---|---|



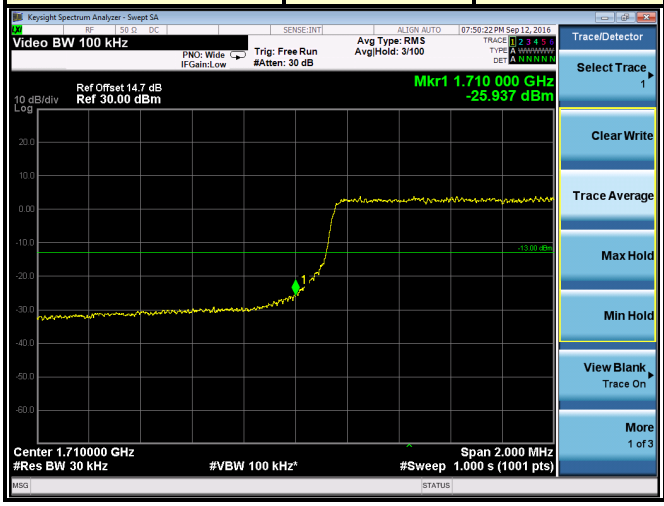
## LTE BAND 4

### Channel Bandwidth: 3MHz

| CHANNEL | 19965 | 1 RB | CHANNEL | 20385 | 1 RB |
|---|---|---|---|---|---|



| CHANNEL | 19965 | Full RB | CHANNEL | 20385 | Full RB |
|---|---|---|---|---|---|

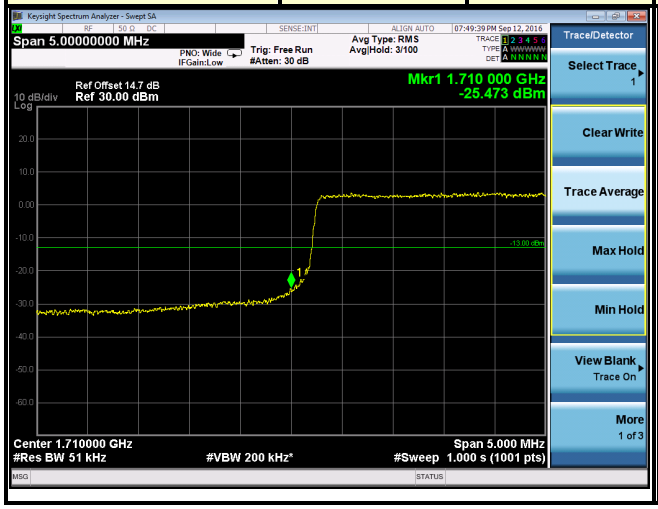


## LTE BAND 4

### Channel Bandwidth: 5MHz

| CHANNEL | 19975 | 1 RB | CHANNEL | 20375 | 1 RB |
|---|---|---|---|---|---|

| CHANNEL | 19975 | Full RB | CHANNEL | 20375 | Full RB |
|---|---|---|---|---|---|



## LTE BAND 4

### Channel Bandwidth: 10MHz

| CHANNEL | 20000 | 1 RB | CHANNEL | 20350 | 1 RB |
|---|---|---|---|---|---|

| CHANNEL | 20000 | Full RB | CHANNEL | 20350 | Full RB |
|---|---|---|---|---|---|

## LTE BAND 4

### Channel Bandwidth: 15MHz

| CHANNEL | 20025 | 1 RB | CHANNEL | 20325 | 1 RB |
|---|---|---|---|---|---|

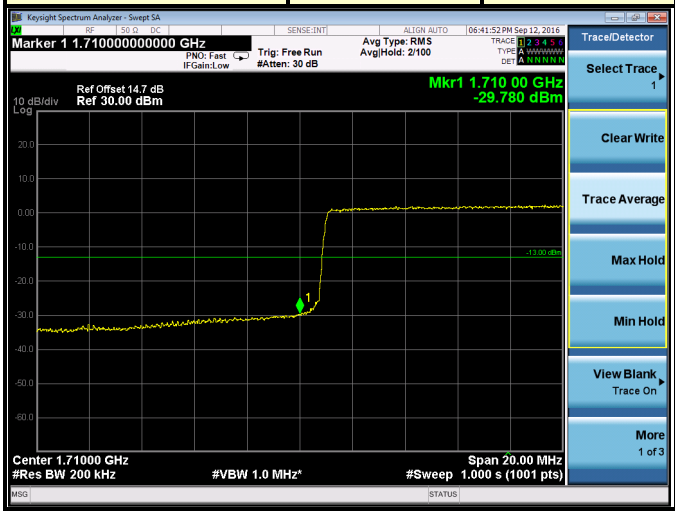
| CHANNEL | 20025 | Full RB | CHANNEL | 20325 | Full RB |
|---|---|---|---|---|---|

## LTE BAND 4

### Channel Bandwidth: 20MHz

| CHANNEL | 20050 | 1 RB | CHANNEL | 20300 | 1 RB |
|---|---|---|---|---|---|

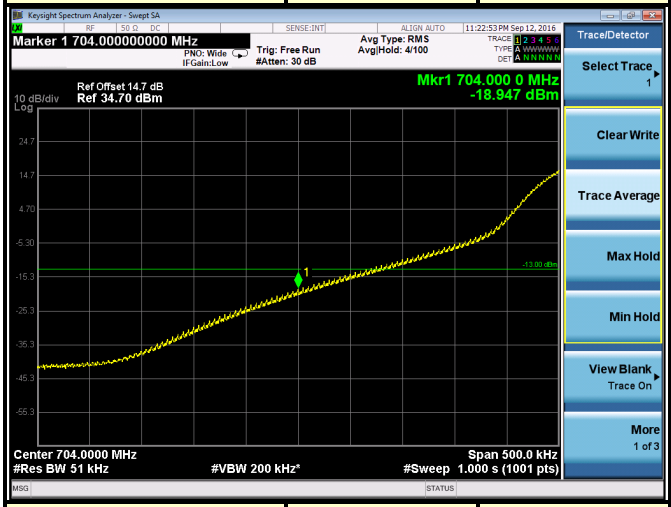
| CHANNEL | 20050 | Full RB | CHANNEL | 20300 | Full RB |
|---|---|---|---|---|---|



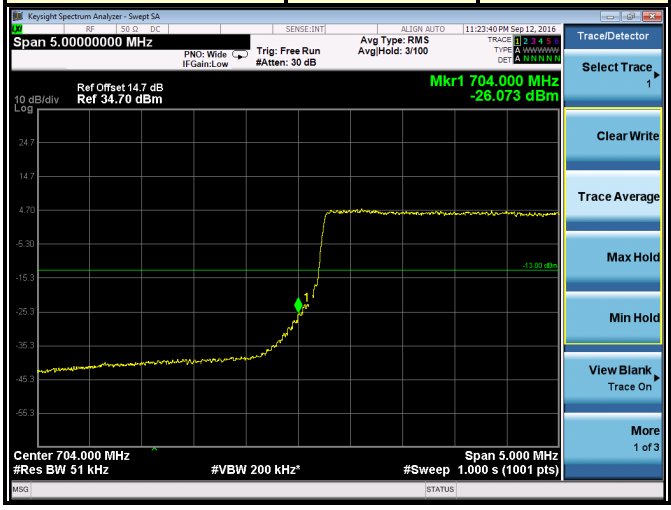
## LTE BAND 17

### Channel Bandwidth: 5MHz

| CHANNEL | 23755 | 1 RB | CHANNEL | 23825 | 1 RB |
|---|---|---|---|---|---|



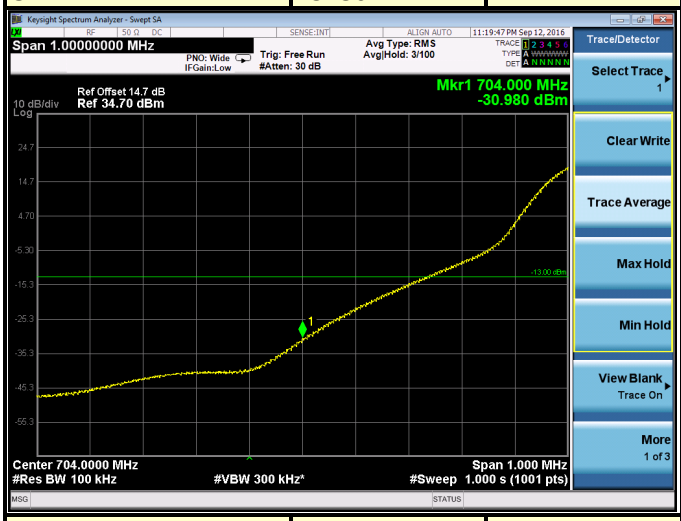
| CHANNEL | 23755 | Full RB | CHANNEL | 23825 | Full RB |
|---|---|---|---|---|---|

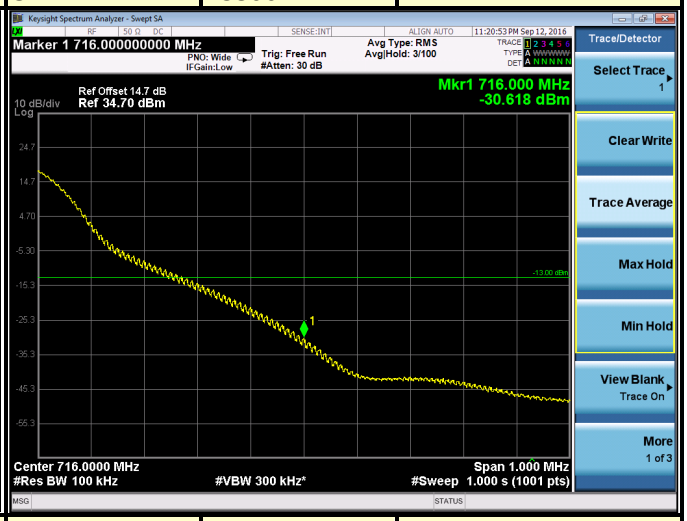


## LTE BAND 17

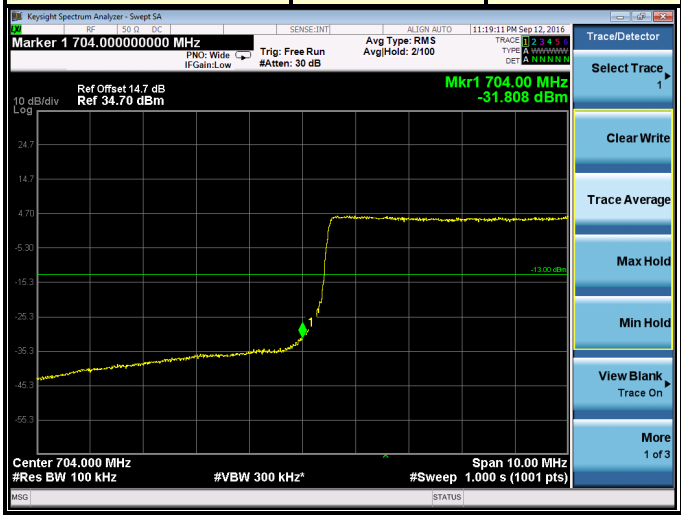
### Channel Bandwidth: 10MHz

| CHANNEL | 23780 | 1 RB | CHANNEL | 23800 | 1 RB |
|---|---|---|---|---|---|




| CHANNEL | 23780 | Full RB | CHANNEL | 23800 | Full RB |
|---|---|---|---|---|---|



## 4.6 CONDUCTED SPURIOUS EMISSIONS

### 4.6.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

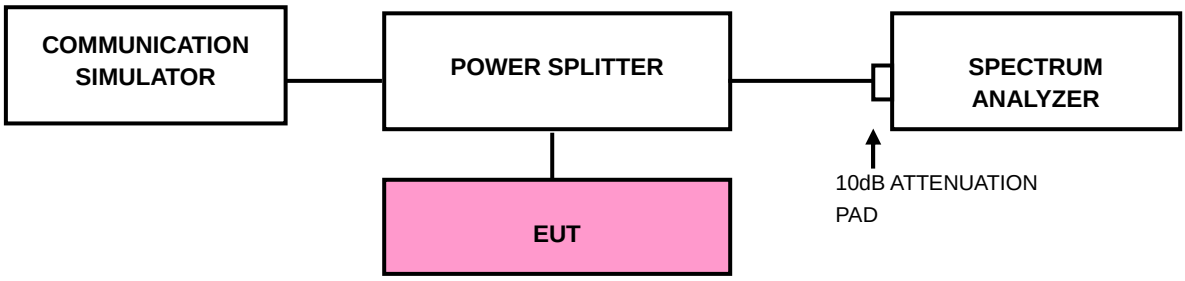
The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 43 +10 log10(P) dB. The limit of emission equal to –13dBm

### 4.6.2 TEST PROCEDURE

a. The EUT makes a phone call to the communication simulator. All measurements were done at middle operational frequency range.

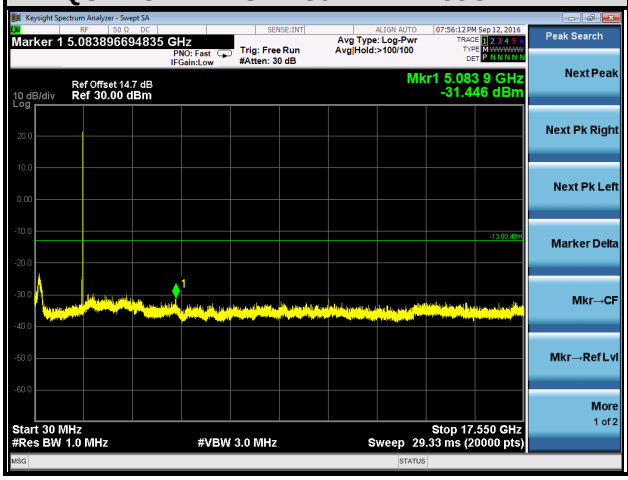
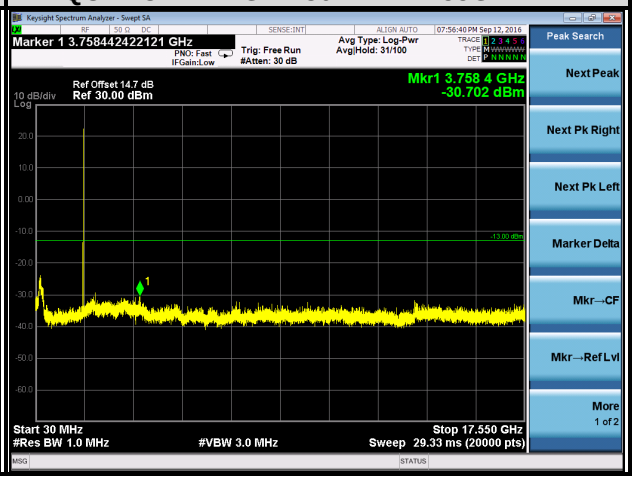
b. Measuring frequency range is from 30 MHz to 17.55GHz for LTE Band 4, and 30 MHz to 9GHz for LTE Band 17. 10dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz are used for conducted emission measurement.

### 4.6.3 TEST SETUP



## 4.6.4 TEST RESULTS

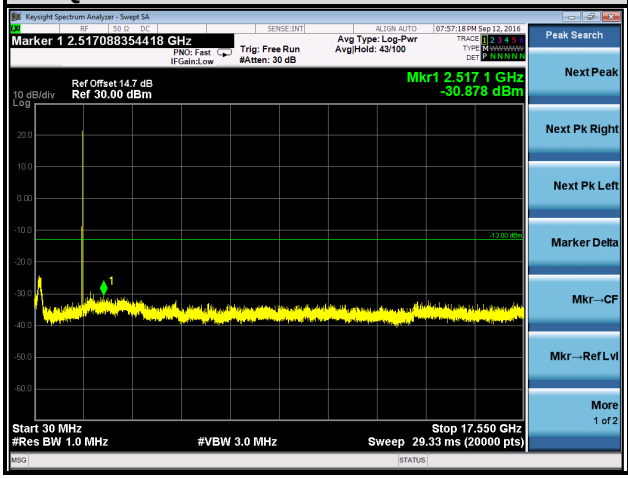
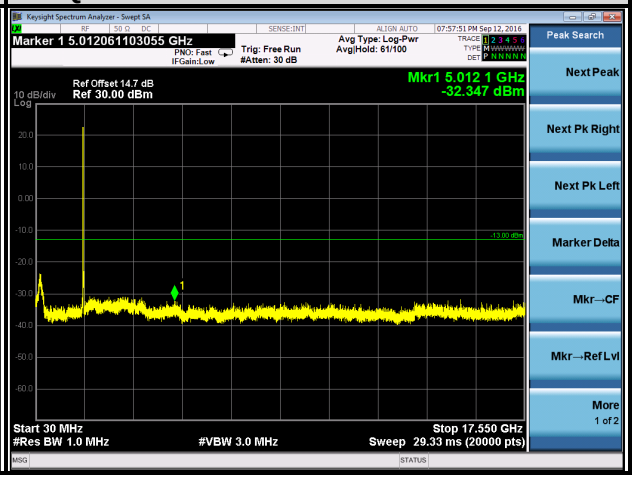
### LTE BAND 4

| CHANNEL 20175 | CHANNEL 20175 |
|---|---|
| 1.4MHz / QPSK | 3MHz / QPSK |
| FREQUENCY RANGE : 30MHz~17.55GHz | FREQUENCY RANGE : 30MHz~17.55GHz |
|  |  |



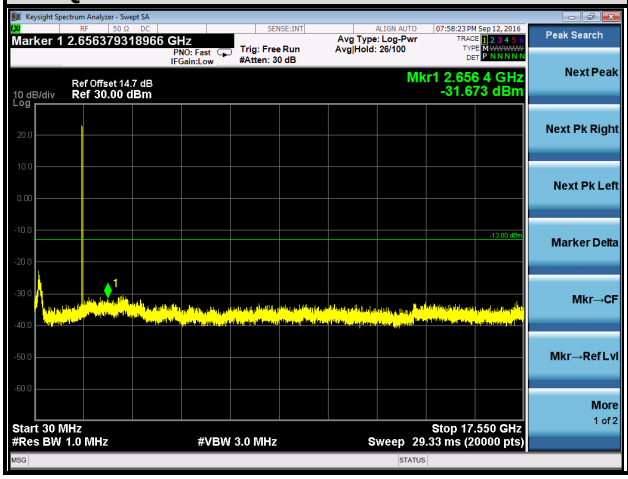


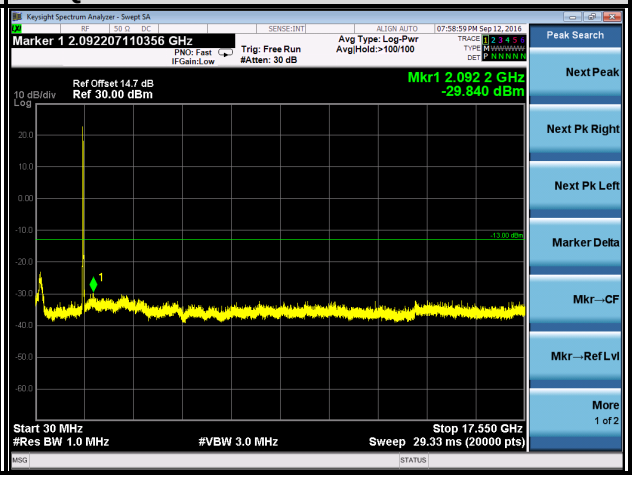
### LTE BAND 4

| CHANNEL 20175 | CHANNEL 20175 |
|---|---|
| 5MHz / QPSK | 10MHz / QPSK |
| FREQUENCY RANGE : 30MHz~17.55GHz | FREQUENCY RANGE : 30MHz~17.55GHz |
|  |  |

## LTE BAND 4

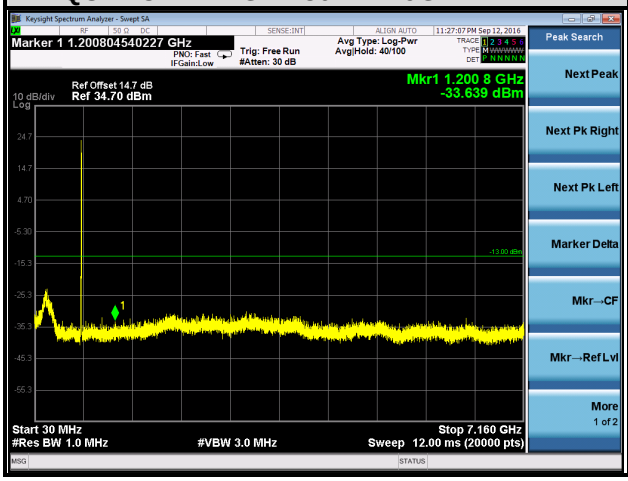
| CHANNEL 20175 | CHANNEL 20175 |
|---|---|
| 15MHz / QPSK | 20MHz / QPSK |
| FREQUENCY RANGE : 30MHz~17.55GHz | FREQUENCY RANGE : 30MHz~17.55GHz |

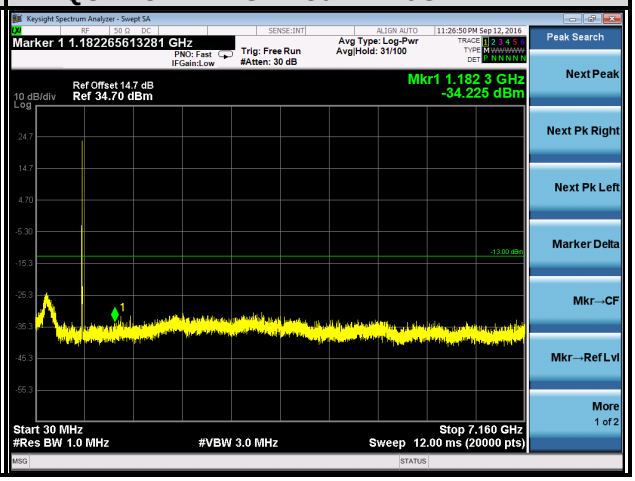



## LTE BAND 17

| CHANNEL 23790 | CHANNEL 23790 |
|---|---|
| 5MHz / QPSK | 10MHz / QPSK |
| FREQUENCY RANGE : 30MHz~9GHz | FREQUENCY RANGE : 30MHz~9GHz |



## 4.7 RADIATED EMISSION MEASUREMENT

### 4.7.1 LIMITS OF RADIATED EMISSION MEASUREMENT

The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 43 +10 log10(P) dB. The limit of emission equal to –13dBm

### 4.7.2 TEST PROCEDURES

a. 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.

b. 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

c. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn.

d. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.P.R power - 2.15dBi.

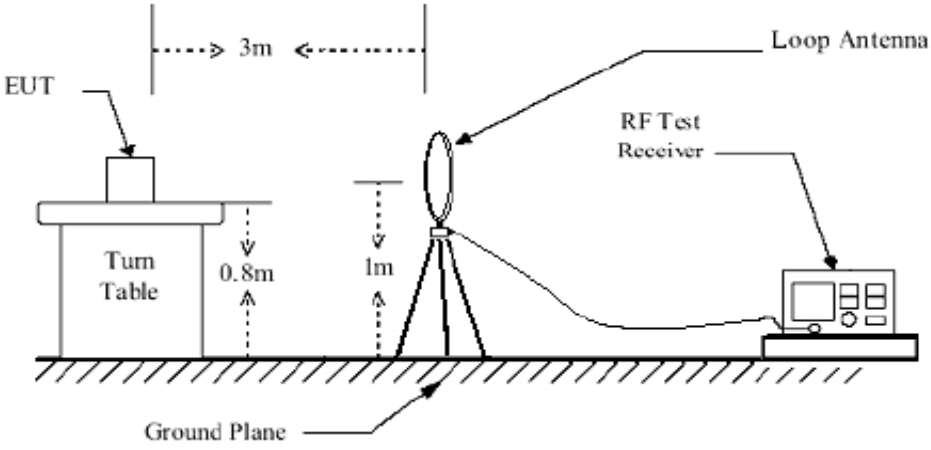
**NOTE:** The resolution bandwidth of spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz.

### 4.7.3 DEVIATION FROM TEST STANDARD

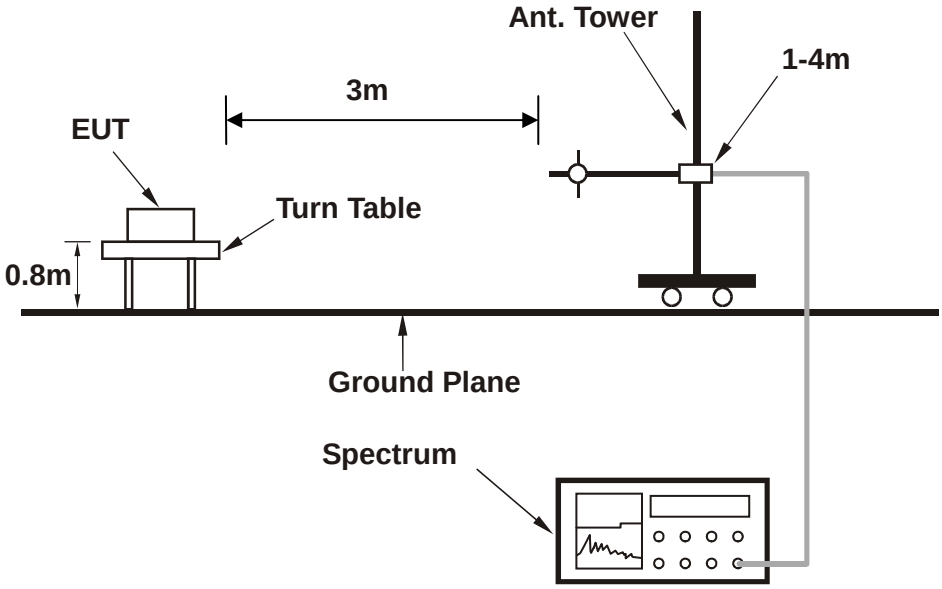
No deviation

## 4.7.4 TEST SETUP

**<Below 30MHz>**




**<Above 30MHz>**




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

## 4.7.5 TEST RESULTS

**BELOW 1GHz WORST-CASE DATA**

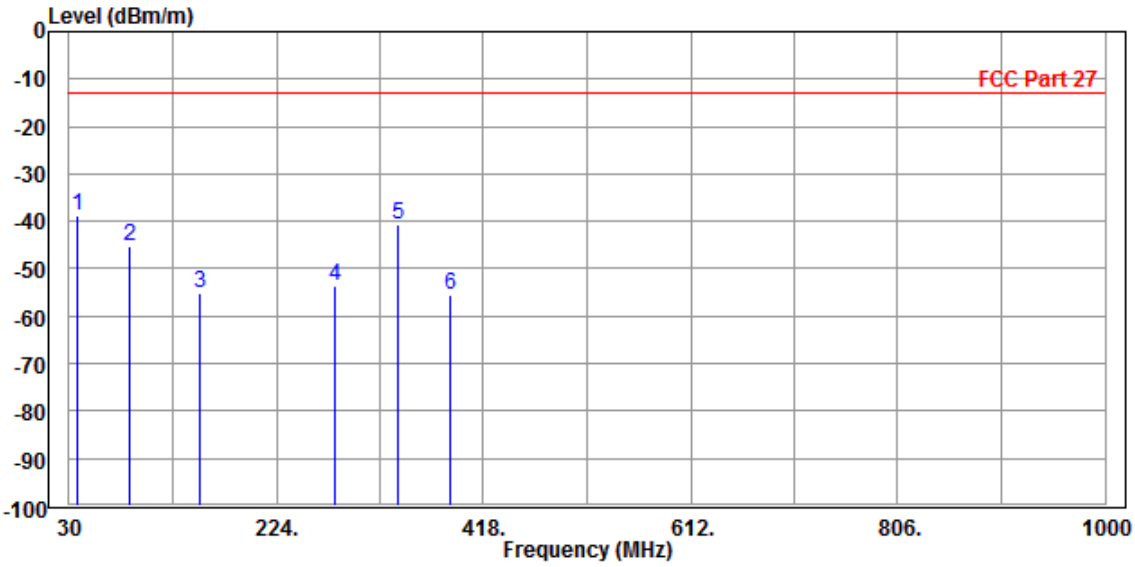
**9 KHz – 30 KHz data:** the amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required in the report.

**30 MHz – 1GHz data:**

**LTE Band 4:**

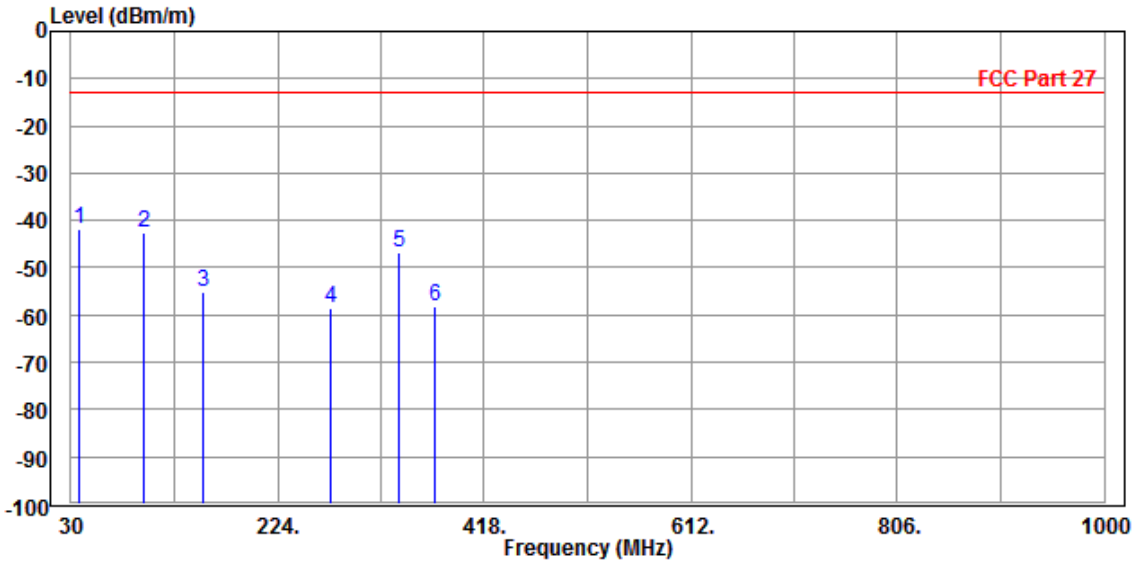
| | | | |
|---|---|---|---|
| **MODE** | TX channel 20175 | **FREQUENCY RANGE** | Below 1000MHz |
| **ENVIRONMENTAL CONDITIONS** | 26deg. C, 56%RH | **INPUT POWER** | DC 15V from adapter |
| **TESTED BY** | Tony | | |
| **ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M** | | | |

| | | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBm/m | dBm | dBm/m | dB | dB/m | | |
| 1 | PP | 37.760 | -38.91 | -51.15 | -13.00 | -25.91 | 12.24 | Peak | Horizontal |
| 2 | | 87.230 | -45.07 | -36.41 | -13.00 | -32.07 | -8.66 | Peak | Horizontal |
| 3 | | 152.220 | -55.06 | -36.08 | -13.00 | -42.06 | -18.98 | Peak | Horizontal |
| 4 | | 278.320 | -53.48 | -38.60 | -13.00 | -40.48 | -14.88 | Peak | Horizontal |
| 5 | | 338.460 | -40.79 | -28.27 | -13.00 | -27.79 | -12.52 | Peak | Horizontal |
| 6 | | 386.960 | -55.54 | -44.64 | -13.00 | -42.54 | -10.90 | Peak | Horizontal |



| MODE | TX channel 20175 | FREQUENCY RANGE | Below 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 26deg. C, 56%RH | INPUT POWER | DC 15V from adapter |
| TESTED BY | Tony | | |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | |

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBm/m | dBm | dBm/m | dB | dB/m | | |
| 1 PP | 37.760 | -41.90 | -40.60 | -13.00 | -28.90 | -1.30 | Peak | Vertical |
| 2 | 97.900 | -42.58 | -31.94 | -13.00 | -29.58 | -10.64 | Peak | Vertical |
| 3 | 154.160 | -55.04 | -39.35 | -13.00 | -42.04 | -15.69 | Peak | Vertical |
| 4 | 274.440 | -58.40 | -46.99 | -13.00 | -45.40 | -11.41 | Peak | Vertical |
| 5 | 338.460 | -46.76 | -35.60 | -13.00 | -33.76 | -11.16 | Peak | Vertical |
| 6 | 372.410 | -58.32 | -47.29 | -13.00 | -45.32 | -11.03 | Peak | Vertical |



## ABOVE 1GHz

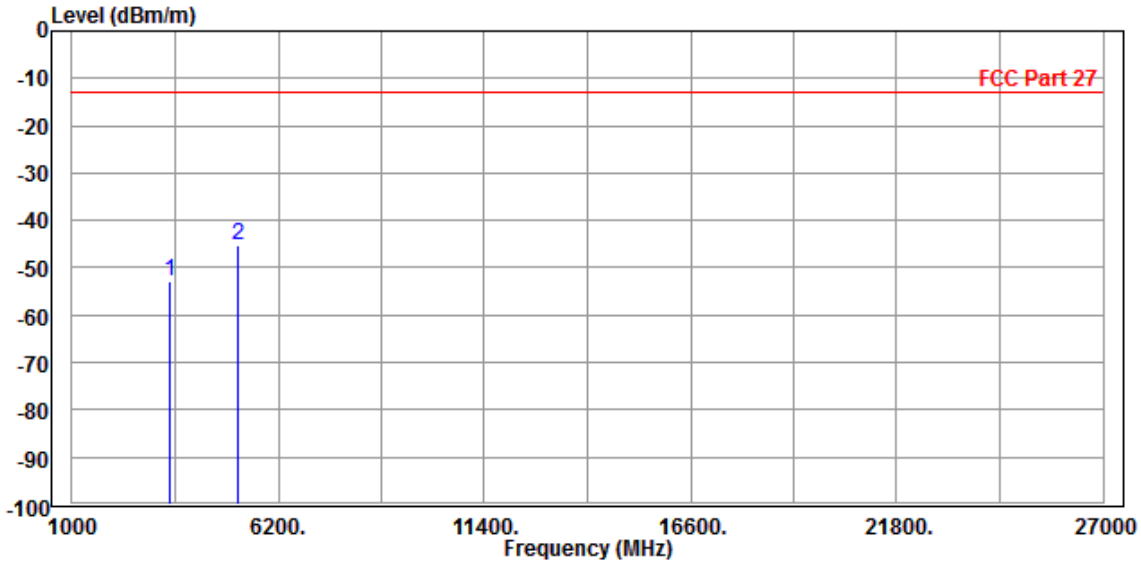
**Note:** For higher frequency, the emission is too low to be detected.

## LTE BAND 4

## CHANNEL BANDWIDTH: 1.4MHz / QPSK

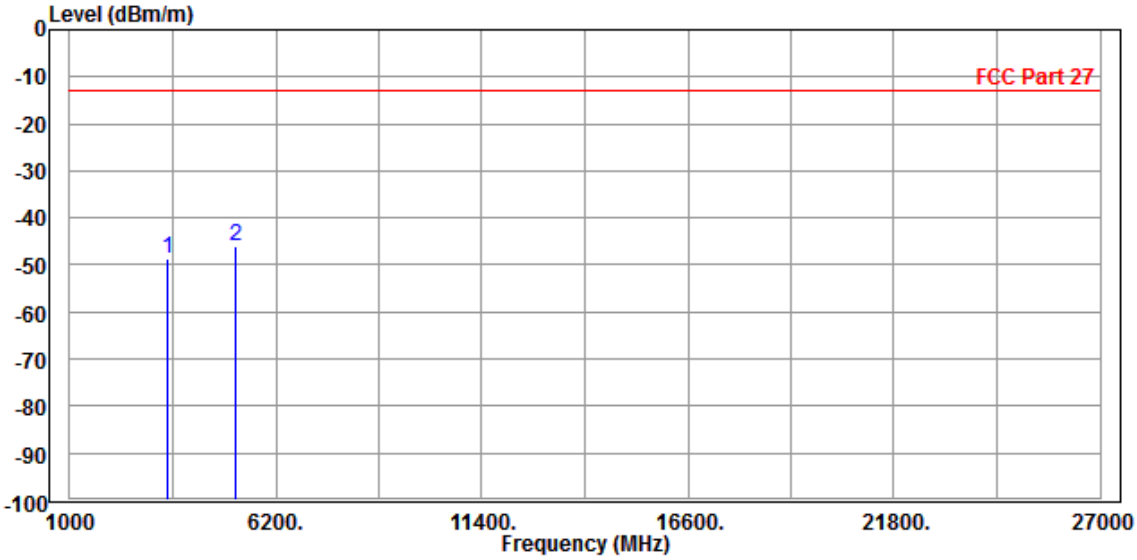
| MODE | TX channel 20175 | FREQUENCY RANGE | Above 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 26deg. C, 56%RH | INPUT POWER | DC 15V from adapter |
| TESTED BY | Tony | | |
| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | |

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBm/m | dBm | dBm/m | dB | dB/m | | |
| 1 | 3465.000 | -52.69 | -54.72 | -13.00 | -39.69 | 2.03 | Peak | Horizontal |
| 2 PP | 5197.500 | -45.20 | -53.81 | -13.00 | -32.20 | 8.61 | Peak | Horizontal |



| MODE | TX channel 20175 | FREQUENCY RANGE | Above 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 26deg. C, 56%RH | INPUT POWER | DC 15V from adapter |
| TESTED BY | Tony | | |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | |

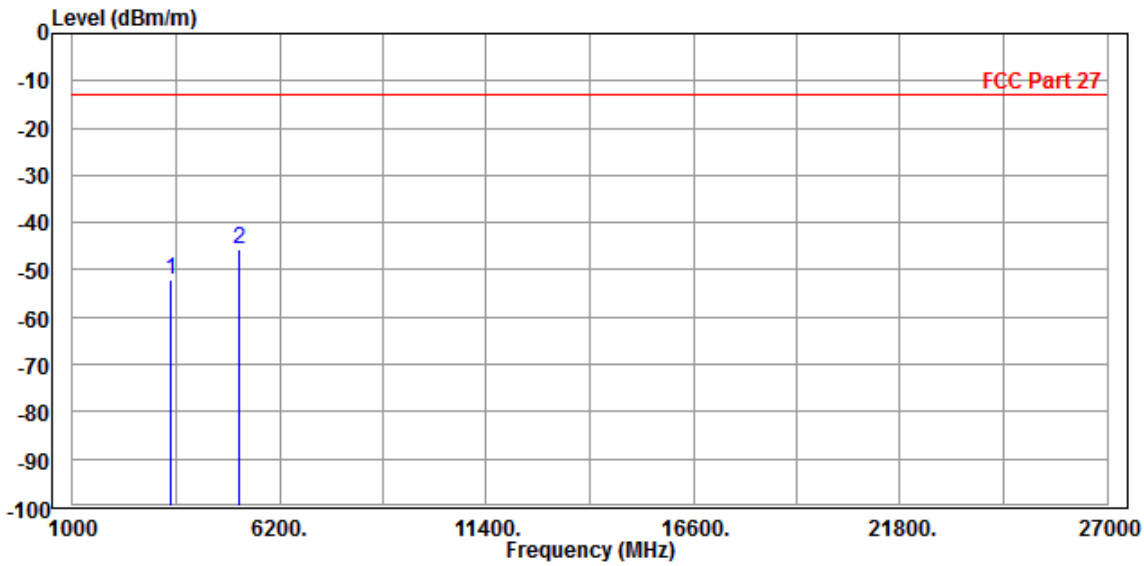
| | | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBm/m | dBm | dBm/m | dB | dB/m | | |
| 1 | | 3465.000 | -48.64 | -51.17 | -13.00 | -35.64 | 2.53 | Peak | Vertical |
| 2 | PP | 5197.500 | -46.13 | -54.11 | -13.00 | -33.13 | 7.98 | Peak | Vertical |



## CHANNEL BANDWIDTH: 3MHz / QPSK

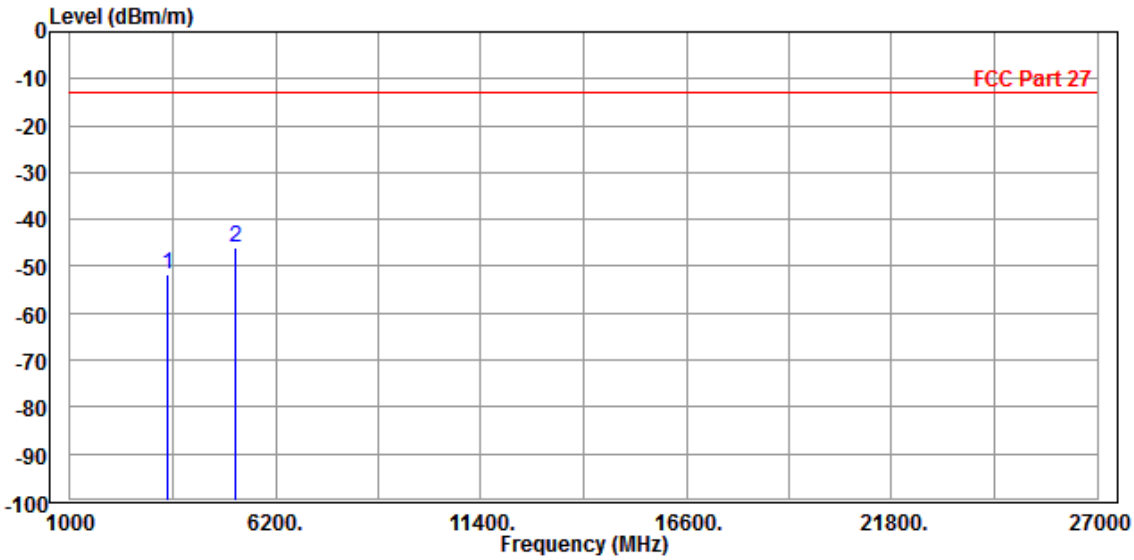
| MODE | TX channel 20175 | FREQUENCY RANGE | Above 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 26deg. C, 56%RH | INPUT POWER | DC 15V from adapter |
| TESTED BY | Tony | | |
| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | |

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBm/m | dBm | dBm/m | dB | dB/m | | |
| 1 | 3465.000 | -52.09 | -54.12 | -13.00 | -39.09 | 2.03 | Peak | Horizontal |
| 2 PP | 5197.500 | -45.60 | -54.21 | -13.00 | -32.60 | 8.61 | Peak | Horizontal |



| MODE | TX channel 20175 | FREQUENCY RANGE | Above 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 26deg. C, 56%RH | INPUT POWER | DC 15V from adapter |
| TESTED BY | Tony | | |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | |

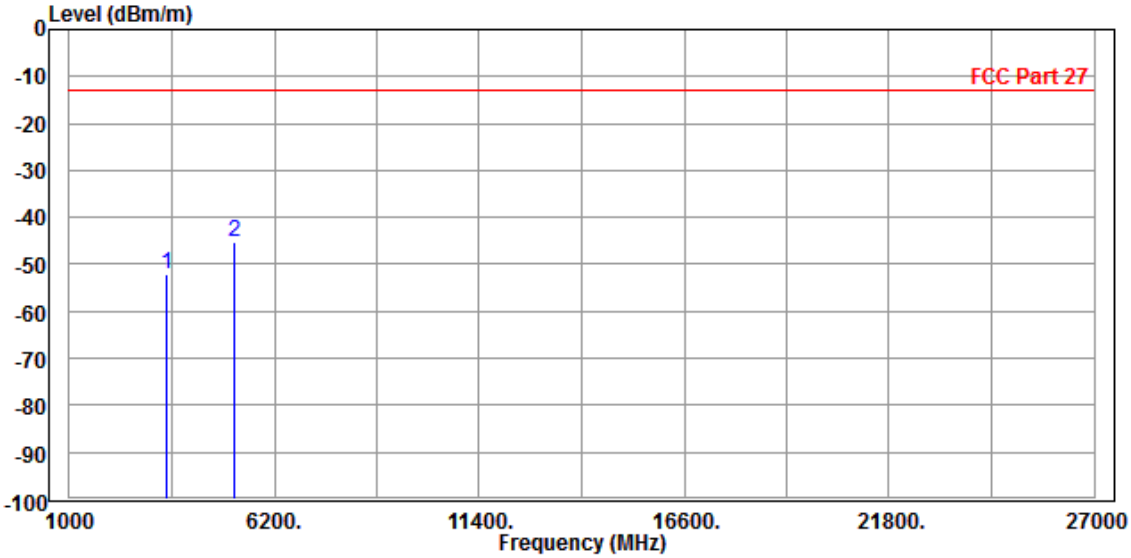
| | | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBm/m | dBm | dBm/m | dB | dB/m | | |
| 1 | | 3465.000 | -51.59 | -54.12 | -13.00 | -38.59 | 2.53 | Peak | Vertical |
| 2 | PP | 5197.500 | -45.99 | -53.97 | -13.00 | -32.99 | 7.98 | Peak | Vertical |



## CHANNEL BANDWIDTH: 5MHz / QPSK

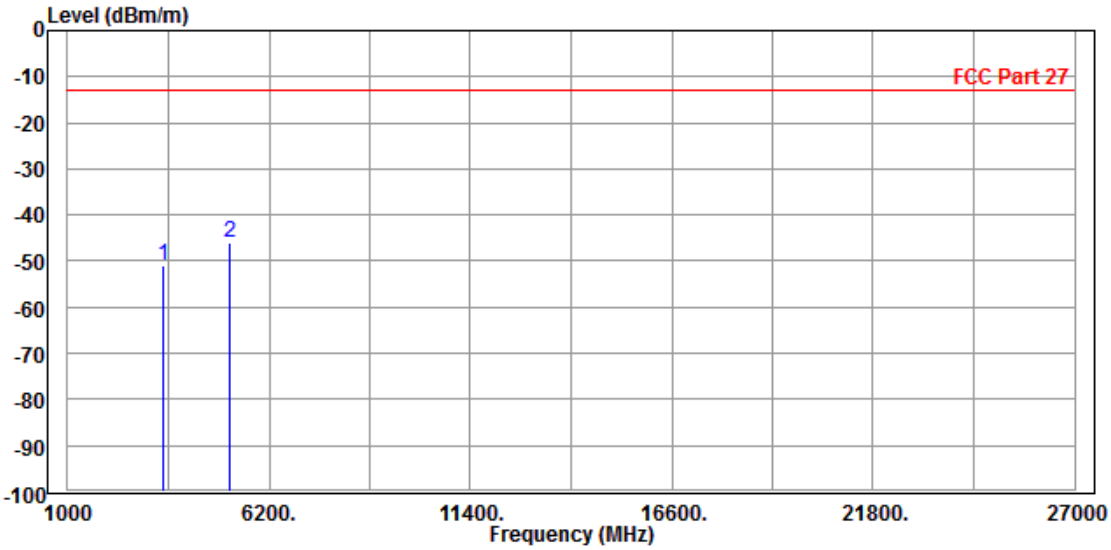
| MODE | TX channel 20175 | FREQUENCY RANGE | Above 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 26deg. C, 56%RH | INPUT POWER | DC 15V from adapter |
| TESTED BY | Tony | | |
| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | |

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBm/m | dBm | dBm/m | dB | dB/m | | |
| 1 | 3465.000 | -52.28 | -54.31 | -13.00 | -39.28 | 2.03 | Peak | Horizontal |
| 2 PP | 5197.500 | -45.10 | -53.71 | -13.00 | -32.10 | 8.61 | Peak | Horizontal |



| MODE | TX channel 20175 | FREQUENCY RANGE | Above 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 26deg. C, 56%RH | INPUT POWER | DC 15V from adapter |
| TESTED BY | Tony | | |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | |

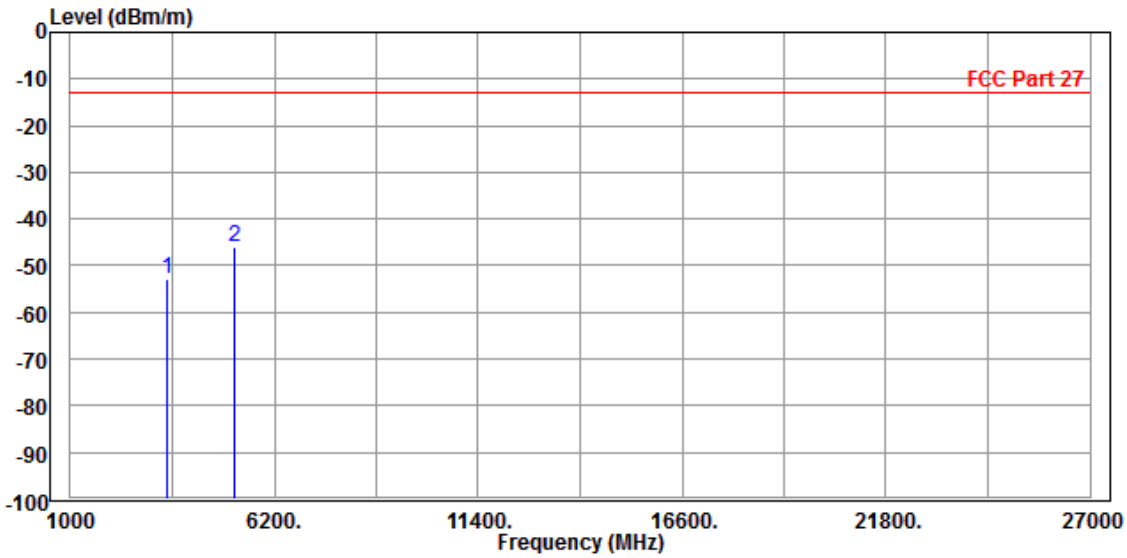
| | | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBm/m | dBm | dBm/m | dB | dB/m | | |
| 1 | | 3465.000 | -51.00 | -53.53 | -13.00 | -38.00 | 2.53 | Peak | Vertical |
| 2 | PP | 5197.500 | -46.19 | -54.17 | -13.00 | -33.19 | 7.98 | Peak | Vertical |



## CHANNEL BANDWIDTH: 10MHz / QPSK

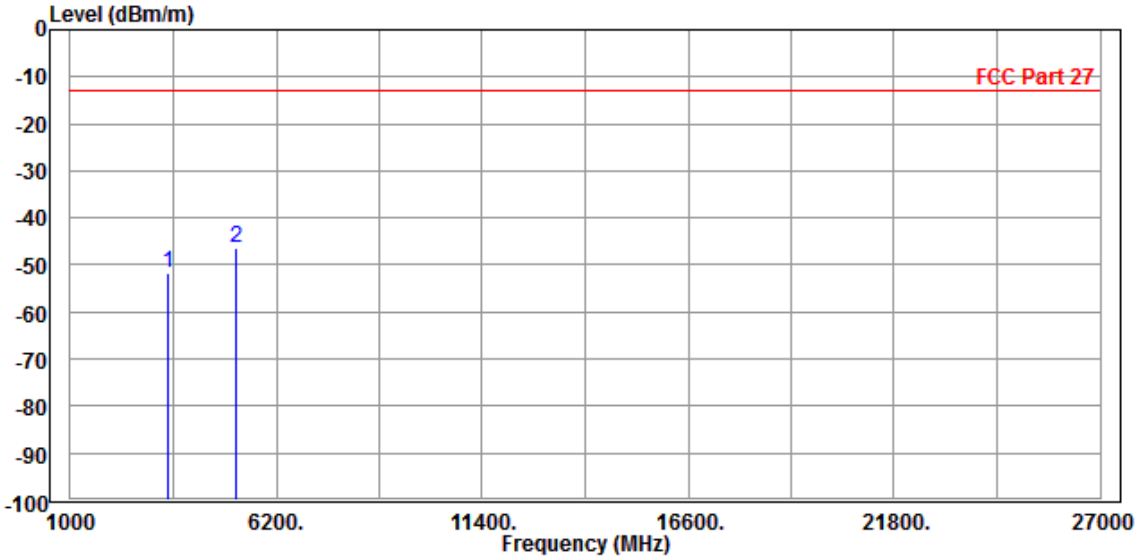
| MODE | TX channel 20175 | FREQUENCY RANGE | Above 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 26deg. C, 56%RH | INPUT POWER | DC 15V from adapter |
| TESTED BY | Tony | | |
| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | |

| | | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBm/m | dBm | dBm/m | dB | dB/m | | |
| 1 | | 3465.000 | -52.95 | -54.98 | -13.00 | -39.95 | 2.03 | Peak | Horizontal |
| 2 | PP | 5197.500 | -45.84 | -54.45 | -13.00 | -32.84 | 8.61 | Peak | Horizontal |



| MODE | TX channel 20175 | FREQUENCY RANGE | Above 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 26deg. C, 56%RH | INPUT POWER | DC 15V from adapter |
| TESTED BY | Tony | | |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | |

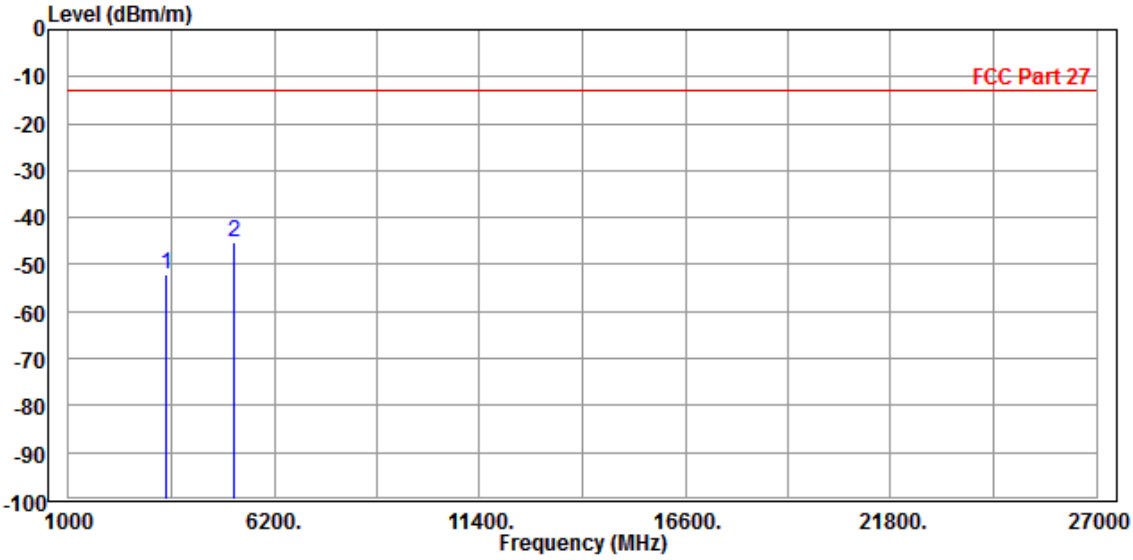
| | | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBm/m | dBm | dBm/m | dB | dB/m | | |
| 1 | | 3465.000 | -51.86 | -54.39 | -13.00 | -38.86 | 2.53 | Peak | Vertical |
| 2 | PP | 5197.500 | -46.51 | -54.49 | -13.00 | -33.51 | 7.98 | Peak | Vertical |



## CHANNEL BANDWIDTH: 15MHz / QPSK

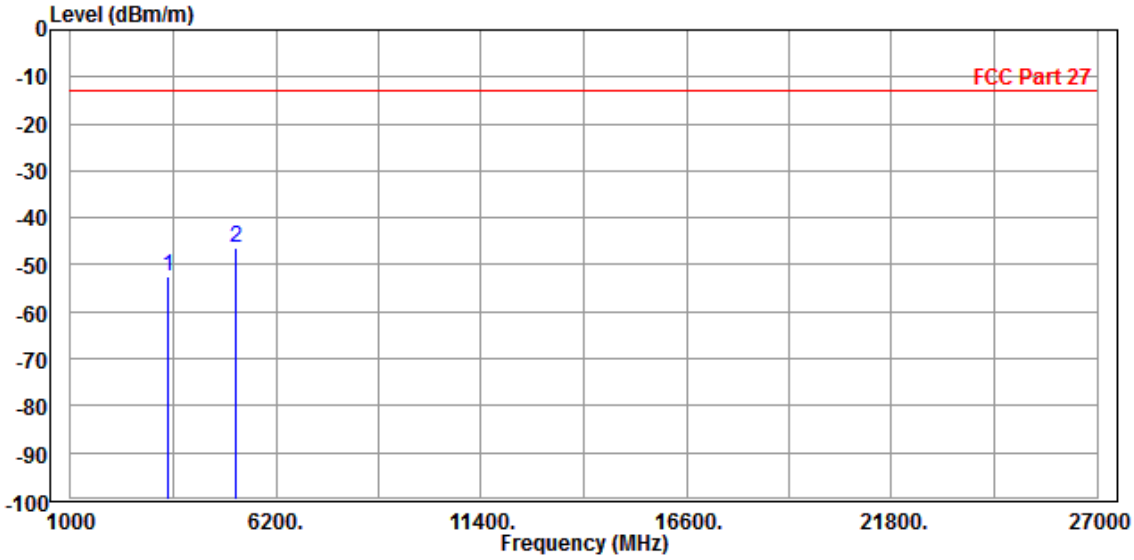
| MODE | TX channel 20175 | FREQUENCY RANGE | Above 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 26deg. C, 56%RH | INPUT POWER | DC 15V from adapter |
| TESTED BY | Tony | | |
| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | |

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBm/m | dBm | dBm/m | dB | dB/m | | |
| 1 | 3465.000 | -51.93 | -53.96 | -13.00 | -38.93 | 2.03 | Peak | Horizontal |
| 2 PP | 5197.500 | -45.39 | -54.00 | -13.00 | -32.39 | 8.61 | Peak | Horizontal |



| MODE | TX channel 20175 | FREQUENCY RANGE | Above 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 26deg. C, 56%RH | INPUT POWER | DC 15V from adapter |
| TESTED BY | Tony | | |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | |

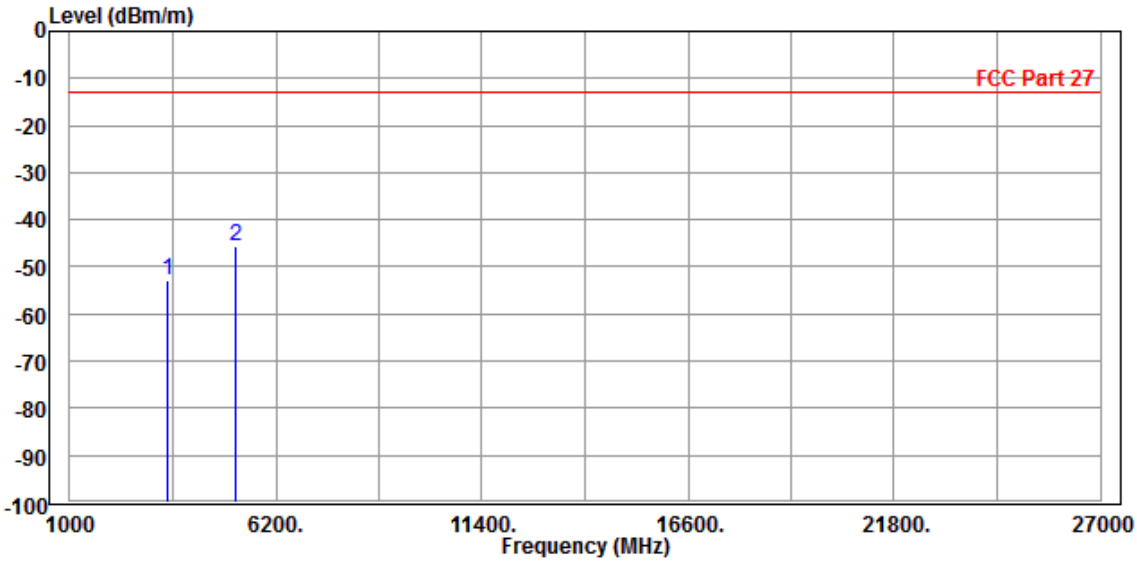
| | | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBm/m | dBm | dBm/m | dB | dB/m | | |
| 1 | | 3465.000 | -52.35 | -54.88 | -13.00 | -39.35 | 2.53 | Peak | Vertical |
| 2 | PP | 5197.500 | -46.37 | -54.35 | -13.00 | -33.37 | 7.98 | Peak | Vertical |



## CHANNEL BANDWIDTH: 20MHz / QPSK

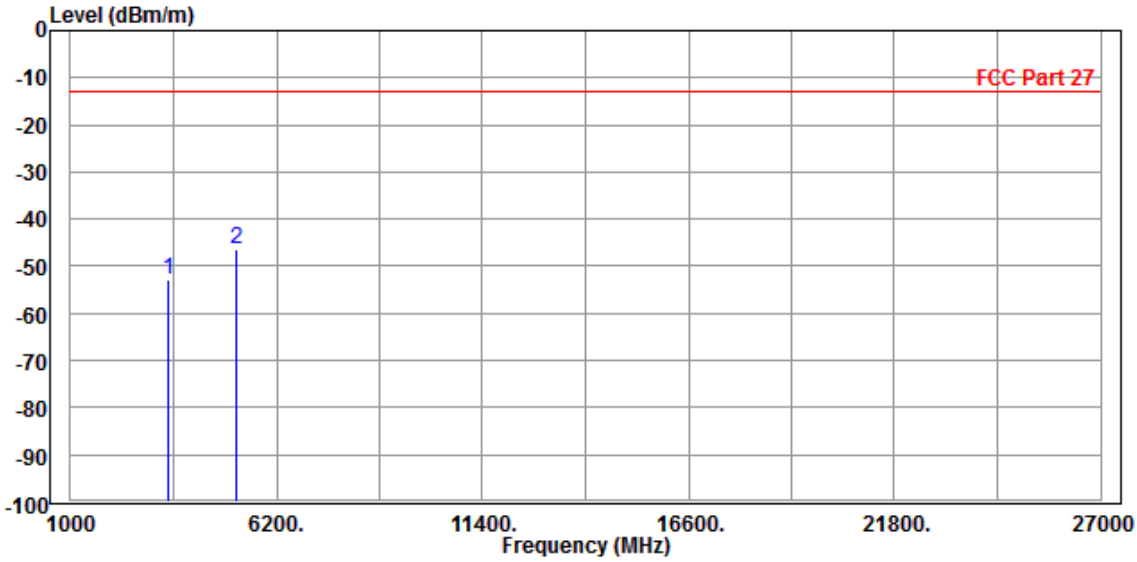
| MODE | TX channel 20175 | FREQUENCY RANGE | Above 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 26deg. C, 56%RH | INPUT POWER | DC 15V from adapter |
| TESTED BY | Tony | | |
| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | |

| | | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBm/m | dBm | dBm/m | dB | dB/m | | |
| 1 | | 3465.000 | -52.79 | -54.82 | -13.00 | -39.79 | 2.03 | Peak | Horizontal |
| 2 | PP | 5197.500 | -45.79 | -54.40 | -13.00 | -32.79 | 8.61 | Peak | Horizontal |



| MODE | TX channel 20175 | FREQUENCY RANGE | Above 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 26deg. C, 56%RH | INPUT POWER | DC 15V from adapter |
| TESTED BY | Tony | | |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | |

| | | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBm/m | dBm | dBm/m | dB | dB/m | | |
| 1 | | 3465.000 | -52.83 | -55.36 | -13.00 | -39.83 | 2.53 | Peak | Vertical |
| 2 | PP | 5197.500 | -46.55 | -54.53 | -13.00 | -33.55 | 7.98 | Peak | Vertical |

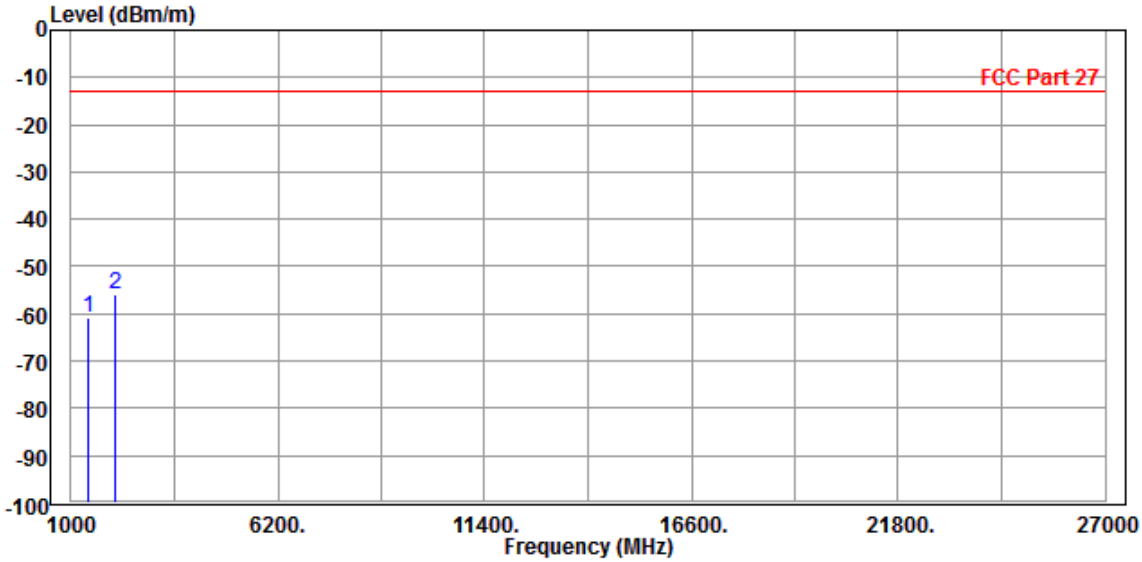


## LTE Band 17

### CHANNEL BANDWIDTH: 5MHz / QPSK

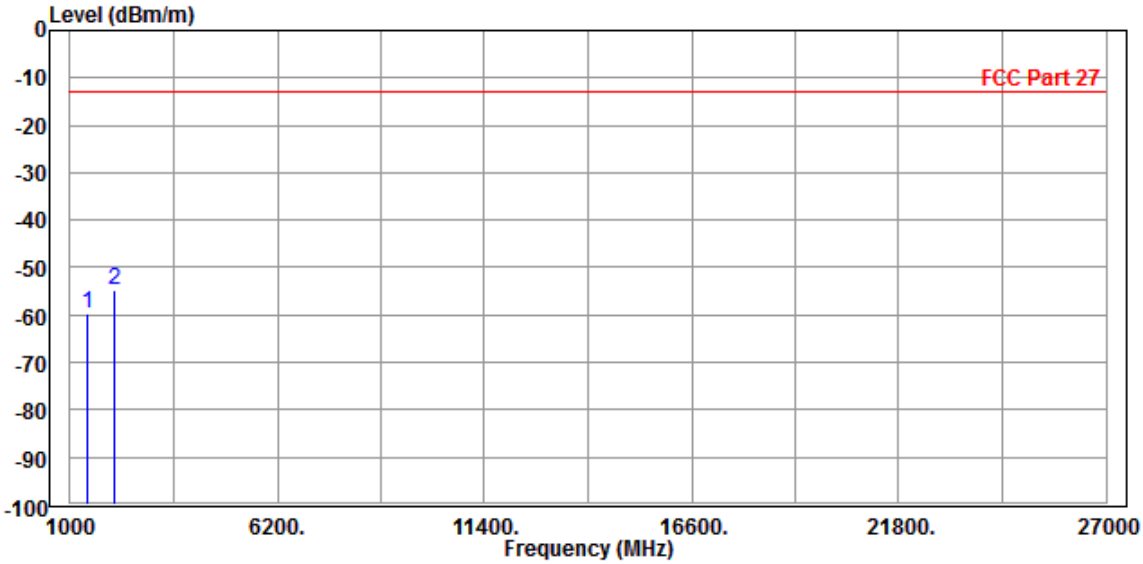
| | | | |
|---|---|---|---|
| **MODE** | TX channel 23790 | **FREQUENCY RANGE** | Above 1000MHz |
| **ENVIRONMENTAL CONDITIONS** | 26deg. C, 56%RH | **INPUT POWER** | DC 15V from adapter |
| **TESTED BY** | Tony | | |
| **ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M** | | | |

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBm/m | dBm | dBm/m | dB | dB/m | | |
| 1 | 1416.000 | -61.00 | -54.28 | -13.00 | -48.00 | -6.72 | Peak | Horizontal |
| 2 PP | 2130.000 | -56.08 | -54.15 | -13.00 | -43.08 | -1.93 | Peak | Horizontal |



| MODE | TX channel 23790 | FREQUENCY RANGE | Above 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 26deg. C, 56%RH | INPUT POWER | DC 15V from adapter |
| TESTED BY | Tony | | |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | |

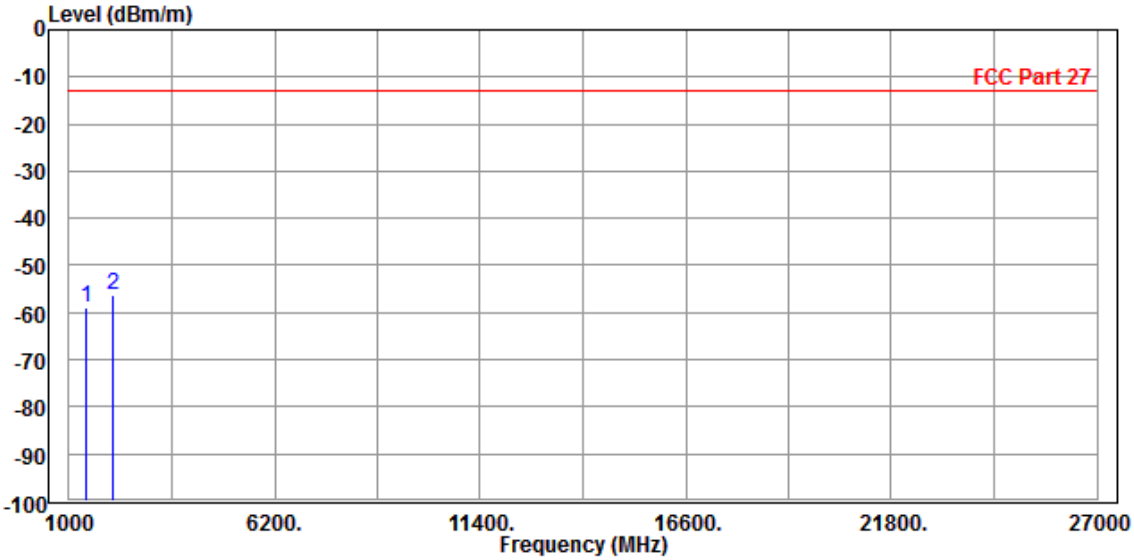
| | | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBm/m | dBm | dBm/m | dB | dB/m | | |
| 1 | | 1416.000 | -59.63 | -54.19 | -13.00 | -46.63 | -5.44 | Peak | Vertical |
| 2 | PP | 2130.000 | -54.81 | -54.57 | -13.00 | -41.81 | -0.24 | Peak | Vertical |



## CHANNEL BANDWIDTH: 10MHz / QPSK

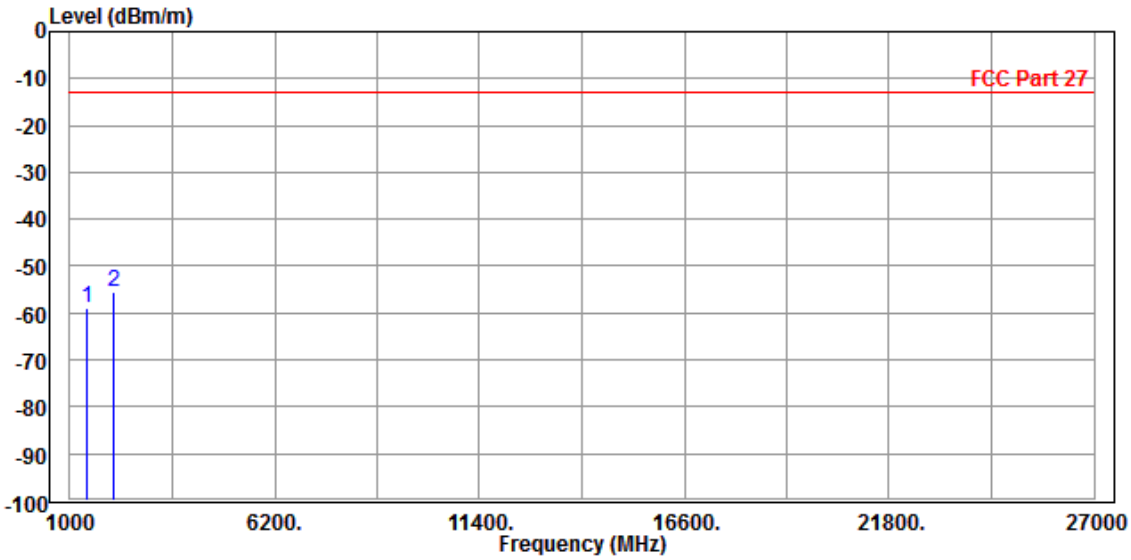
| MODE | TX channel 23790 | FREQUENCY RANGE | Above 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 26deg. C, 56%RH | INPUT POWER | DC 15V from adapter |
| TESTED BY | Tony | | |
| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | |

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBm/m | dBm | dBm/m | dB | dB/m | | |
| 1 | 1416.000 | -58.75 | -52.03 | -13.00 | -45.75 | -6.72 | Peak | Horizontal |
| 2 PP | 2130.000 | -56.39 | -54.46 | -13.00 | -43.39 | -1.93 | Peak | Horizontal |



| MODE | TX channel 23790 | FREQUENCY RANGE | Above 1000MHz |
|---|---|---|---|
| ENVIRONMENTAL CONDITIONS | 26deg. C, 56%RH | INPUT POWER | DC 15V from adapter |
| TESTED BY | Tony | | |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | |

| | | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBm/m | dBm | dBm/m | dB | dB/m | | |
| 1 | | 1416.000 | -59.11 | -53.67 | -13.00 | -46.11 | -5.44 | Peak | Vertical |
| 2 | PP | 2130.000 | -55.40 | -55.16 | -13.00 | -42.40 | -0.24 | Peak | Vertical |



# 5 INFORMATION ON THE TESTING LABORATORIES

We, Bureau Veritas Shenzhen Co., Ltd. Dongguan Branch, were founded in 2002 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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**Email:** customerservice.dg@cn.bureauveritas.com
**Web Site**: www.adt.com.tw

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

# 6 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No modifications were made to the EUT by the lab during the test.

**---END---**