

# FCC TEST REPORT (PART 24)

**Product:** smartphone

**Model Name:** Ilium LT520

**FCC ID:** ZC4LT520

**Applicant:** Corporativo Lanix S.A. de C.V.

**Address:** Carretera Internacional Hermosillo-Nogales Km 8.5, Hermosillo  
Sonora, Mexico

**Manufacturer:** Corporativo Lanix S.A. de C.V.

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**Report No.:** RF170118W004R1-4

**Received Date:** Jan. 18, 2017

**Test Date:** Jan. 19, 2017 ~ Feb. 18, 2017

**Issued Date:** Aug. 28, 2017

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## RELEASE CONTROL RECORD

| ISSUE NO.        | REASON FOR CHANGE                                                           | DATE ISSUED   |
|------------------|-----------------------------------------------------------------------------|---------------|
| RF170118W004-4   | Original release                                                            | Feb. 20, 2017 |
| RF170118W004R1-4 | Based on the original report RF170118W004-4 changing the manufacturer name. | Aug. 28, 2017 |



Test Report No.: RF170118W004R1-4

## 1 CERTIFICATION

**PRODUCT:** smartphone  
**BRAND NAME:** LANIX  
**MODEL NAME:** Ilium LT520  
**APPLICANT:** Corporativo Lanix S.A. de C.V.  
**TESTED:** Jan. 19, 2017 ~ Feb. 18, 2017  
**TEST SAMPLE:** Identical Prototype  
**STANDARDS:** FCC Part 24, Subpart E

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 :** Harry, **DATE:** Aug. 28, 2017  
(Harry Li/ Engineer)

**APPROVED BY :** Sam Tung, **DATE:** Aug. 28, 2017  
( Sam Tung / Manager)

## 2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

| APPLIED STANDARD: FCC Part 24 & Part 2 |                                     |        |                                                                                   |
|----------------------------------------|-------------------------------------|--------|-----------------------------------------------------------------------------------|
| STANDARD SECTION                       | TEST TYPE                           | RESULT | REMARK                                                                            |
| 2.1046<br>24.232                       | Equivalent Isotropic Radiated Power | PASS   | Meet the requirement of limit.                                                    |
| 2.1055<br>24.235                       | Frequency Stability                 | PASS   | Meet the requirement of limit.                                                    |
| 2.1049<br>24.238(b)                    | Occupied Bandwidth                  | PASS   | Meet the requirement of limit.                                                    |
| 24.232(d)                              | Peak to average ratio               | PASS   | Meet the requirement of limit.                                                    |
| 24.238(b)                              | Band Edge Measurements              | PASS   | Meet the requirement of limit.                                                    |
| 2.1051<br>24.238                       | Conducted Spurious Emissions        | PASS   | Meet the requirement of limit.                                                    |
| 2.1053<br>24.238                       | Radiated Spurious Emissions         | PASS   | Meet the requirement of limit.<br>Minimum passing margin is -14.48dB at 39.70MHz. |

### 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    | 2.70dB      |
| Radiated emissions  | 9KHz ~ 30MHz  | 2.90dB      |
|                     | 30MHz ~ 1GHz  | 4.06dB      |
|                     | 1GHz ~ 18GHz  | 4.58dB      |
|                     | 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        | Nov. 28, 16 | Nov. 27, 17 |
| 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   |
| 10m Semi-anechoic Chamber        | CHANGLING     | 21.4m*12.1m*8.8m         | NSEMC006    | Mar. 12,16  | Mar. 11,18  |
| Test Software                    | E3            | V 9.160323               | N/A         | N/A         | N/A         |
| 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, GREGT/CHINA and NIM/CHINA.
2. The test was performed in 10m Semi-anechoic Chamber and RF Oven Room.
3. The horn antenna is used only for the measurement of emission frequency above 1GHz if tested.

### 3 GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

|                        |                                                                                                            |                       |
|------------------------|------------------------------------------------------------------------------------------------------------|-----------------------|
| <b>PRODUCT</b>         | smartphone                                                                                                 |                       |
| <b>BRAND NAME</b>      | LANIX                                                                                                      |                       |
| <b>MODEL NAME</b>      | Ilium LT520                                                                                                |                       |
| <b>POWER SUPPLY</b>    | 5.0Vdc (adapter or host equipment)<br>3.8Vdc (Li-ion, battery)                                             |                       |
| <b>MODULATION TYPE</b> | <b>GSM, GPRS:</b> GMSK<br><b>EDGE:</b> GMSK, 8PSK<br><b>WCDMA :</b> BPSK<br><b>LTE Band 2:</b> QPSK, 16QAM |                       |
| <b>FREQUENCY RANGE</b> | <b>GSM, GPRS, EDGE:</b> 1850.2MHz ~ 1909.8MHz                                                              |                       |
|                        | <b>WCDMA:</b> 1852.4MHz ~ 1907.6MHz                                                                        |                       |
|                        | <b>LTE Band 2<br/>Channel Bandwidth: 1.4MHz</b>                                                            | 1850.7MHz ~ 1909.3MHz |
|                        | <b>LTE Band 2<br/>Channel Bandwidth: 3MHz</b>                                                              | 1851.5MHz ~ 1908.5MHz |
|                        | <b>LTE Band 2<br/>Channel Bandwidth: 5MHz</b>                                                              | 1852.5MHz ~ 1907.5MHz |
|                        | <b>LTE Band 2<br/>Channel Bandwidth: 10MHz</b>                                                             | 1855.0MHz ~ 1905.0MHz |
|                        | <b>LTE Band 2<br/>Channel Bandwidth: 15MHz</b>                                                             | 1857.5MHz ~ 1902.5MHz |
|                        | <b>LTE Band 2<br/>Channel Bandwidth: 20MHz</b>                                                             | 1860.0MHz ~ 1900.0MHz |
| <b>MAX. EIRP POWER</b> | <b>GSM</b>                                                                                                 | 612mW                 |
|                        | <b>EDGE</b>                                                                                                | 648mW                 |
|                        | <b>WCDMA</b>                                                                                               | 133mW                 |
|                        | <b>LTE Band 2<br/>Channel Bandwidth: 1.4MHz</b>                                                            | 277mW                 |
|                        | <b>LTE Band 2<br/>Channel Bandwidth: 3MHz</b>                                                              | 281mW                 |
|                        | <b>LTE Band 2<br/>Channel Bandwidth: 5MHz</b>                                                              | 278mW                 |
|                        | <b>LTE Band 2<br/>Channel Bandwidth: 10MHz</b>                                                             | 278mW                 |
|                        | <b>LTE Band 2<br/>Channel Bandwidth: 15MHz</b>                                                             | 270mW                 |
|                        | <b>LTE Band 2<br/>Channel Bandwidth: 20MHz</b>                                                             | 243mW                 |

|                            |                                                                                             |                                 |
|----------------------------|---------------------------------------------------------------------------------------------|---------------------------------|
| <b>EMISSION DESIGNATOR</b> | <b>GSM</b>                                                                                  | 247KGXW                         |
|                            | <b>EDGE</b>                                                                                 | 246KG7W                         |
|                            | <b>WCDMA</b>                                                                                | 4M23F9W                         |
|                            | <b>LTE Band 2<br/>Channel Bandwidth: 1.4MHz</b>                                             | QPSK: 1M09G7D<br>16QAM: 1M08W7D |
|                            | <b>LTE Band 2<br/>Channel Bandwidth: 3MHz</b>                                               | QPSK: 2M68G7D<br>16QAM: 2M68W7D |
|                            | <b>LTE Band 2<br/>Channel Bandwidth: 5MHz</b>                                               | QPSK: 4M49G7D<br>16QAM: 4M47W7D |
|                            | <b>LTE Band 2<br/>Channel Bandwidth: 10MHz</b>                                              | QPSK: 8M94G7D<br>16QAM: 8M94W7D |
|                            | <b>LTE Band 2<br/>Channel Bandwidth: 15MHz</b>                                              | QPSK: 13M4G7D<br>16QAM: 13M4W7D |
|                            | <b>LTE Band 2<br/>Channel Bandwidth: 20MHz</b>                                              | QPSK: 18M0G7D<br>16QAM: 17M9W7D |
| <b>ANTENNA TYPE</b>        | Fixed Internal antenna with 0.5dBi gain                                                     |                                 |
| <b>HW VERSION</b>          | V1                                                                                          |                                 |
| <b>SW VERSION</b>          | Ilium LT520_TELCEL_SW_01                                                                    |                                 |
| <b>I/O PORTS</b>           | Refer to user's manual                                                                      |                                 |
| <b>CABLE SUPPLIED</b>      | USB cable: non-shielded, detachable, 1.0m<br>Earphone cable: non-shielded, detachable, 1.0m |                                 |

**NOTE:**

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

| <b>ADAPTER</b> |                    |
|----------------|--------------------|
| <b>BRAND:</b>  | Lanix              |
| <b>MODEL:</b>  | Ilium LT520        |
| <b>INPUT:</b>  | AC 100-240V, 120mA |
| <b>OUTPUT:</b> | DC 5V, 1000mA      |

- The EUT matched the following USB cable and Earphone:

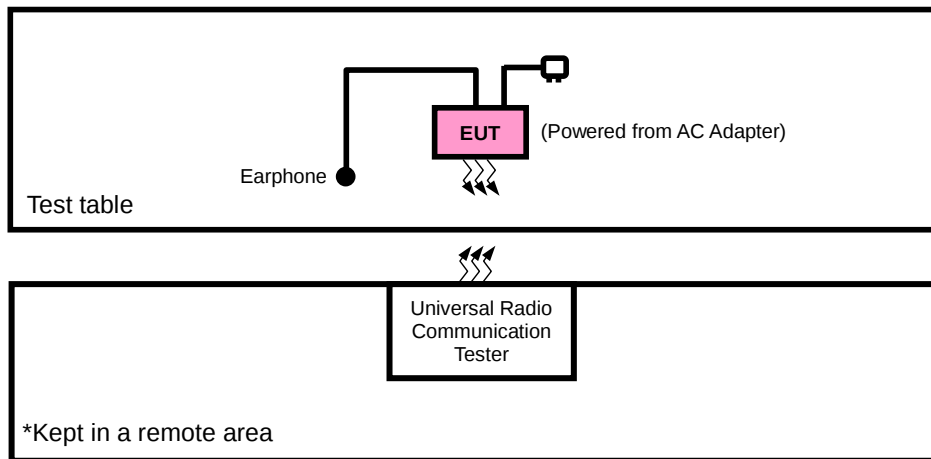
| <b>USB CABLE</b>    |             |
|---------------------|-------------|
| <b>BRAND:</b>       | LANIX       |
| <b>MODEL:</b>       | Ilium LT520 |
| <b>SIGNAL LINE:</b> | 1.0 METER   |

| <b>EARPHONE</b>     |             |
|---------------------|-------------|
| <b>BRAND:</b>       | LANIX       |
| <b>MODEL:</b>       | Ilium LT520 |
| <b>SIGNAL LINE:</b> | 1.0 METER   |

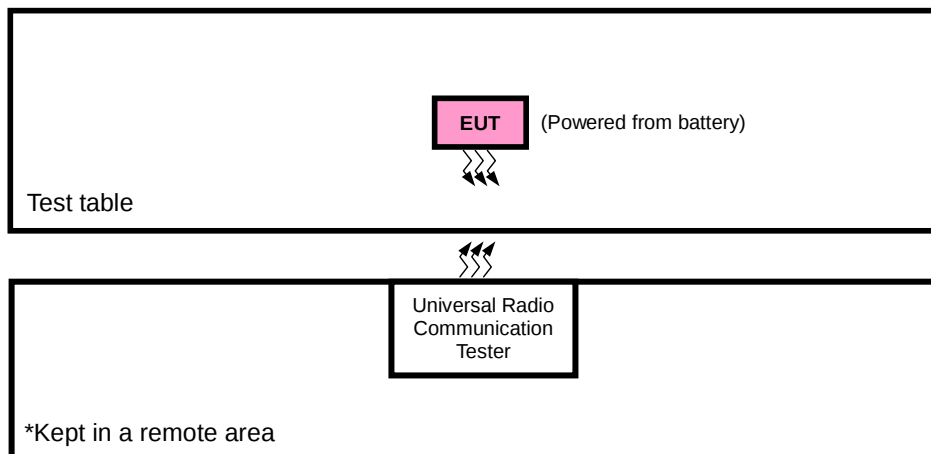
- For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

### 3.2 CONFIGURATION OF SYSTEM UNDER TEST

#### FOR RADIATION EMISSION TEST



#### FOR CONDUCTED & 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 TEST ITEM AND TEST CONFIGURATION

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 on X-plane for GSM/EDGE/WCDMA and Z-plane for LTE. Following channel(s) was (were) selected for the final test as listed below:

| EUT CONFIGURE MODE | DESCRIPTION                                                      |
|--------------------|------------------------------------------------------------------|
| A                  | EUT + Adapter + USB Cable + Earphone with GSM ,WCDMA or LTE link |
| B                  | EUT + Battery+ USB Cable + Earphone with GSM ,WCDMA or LTE link  |

#### GSM MODE

| EUT CONFIGURE MODE | TEST ITEM             | AVAILABLE CHANNEL | TESTED CHANNEL | MODE      |
|--------------------|-----------------------|-------------------|----------------|-----------|
| B                  | EIRP                  | 512 to 810        | 512, 661, 810  | GSM, EDGE |
| B                  | FREQUENCY STABILITY   | 512 to 810        | 661            | GSM, EDGE |
| B                  | OCCUPIED BANDWIDTH    | 512 to 810        | 512, 661, 810  | GSM, EDGE |
| B                  | PEAK TO AVERAGE RATIO | 512 to 810        | 661            | GSM, EDGE |
| B                  | BAND EDGE             | 512 to 810        | 512, 810       | GSM, EDGE |
| B                  | CONDCUETED EMISSION   | 512 to 810        | 661            | GSM, EDGE |
| A                  | RADIATED EMISSION     | 512 to 810        | 661            | GSM, EDGE |

### WCDMA MODE

| EUT<br>CONFIGURE<br>MODE | TEST ITEM             | AVAILABLE CHANNEL | TESTED CHANNEL   | MODE  |
|--------------------------|-----------------------|-------------------|------------------|-------|
| B                        | EIRP                  | 9262 to 9538      | 9262, 9400, 9538 | WCDMA |
| B                        | FREQUENCY STABILITY   | 9262 to 9538      | 9400             | WCDMA |
| B                        | OCCUPIED BANDWIDTH    | 9262 to 9538      | 9262, 9400, 9538 | WCDMA |
| B                        | PEAK TO AVERAGE RATIO | 9262 to 9538      | 9400             | WCDMA |
| B                        | BAND EDGE             | 9262 to 9538      | 9262, 9538       | WCDMA |
| B                        | CONDCUDED EMISSION    | 9262 to 9538      | 9400             | WCDMA |
| A                        | RADIATED EMISSION     | 9262 to 9538      | 9400             | WCDMA |

### LTE BAND 2

| EUT<br>CONFIGURE<br>MODE | TEST ITEM                   | AVAILABLE<br>CHANNEL | TESTED CHANNEL      | CHANNEL<br>BANDWIDTH | MODULATION | MODE                 |
|--------------------------|-----------------------------|----------------------|---------------------|----------------------|------------|----------------------|
| B                        | EIRP                        | 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   |
| B                        | FREQUENCY<br>STABILITY      | 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   |
| B                        | OCCUPIED<br>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 |
| B                        | PEAK TO<br>AVERAGE<br>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   |

|   |                     |                |       |        |      |                      |
|---|---------------------|----------------|-------|--------|------|----------------------|
| B | BAND EDGE           | 18607 to 19193 | 18607 | 1.4MHz | QPSK | 1 RB / 0 RB Offset   |
|   |                     |                | 19193 | 1.4MHz | QPSK | 6 RB / 0 RB Offset   |
|   |                     | 18615 to 19185 | 18615 | 3MHz   | QPSK | 1 RB / 5 RB Offset   |
|   |                     |                | 19185 | 3MHz   | QPSK | 6 RB / 0 RB Offset   |
|   |                     | 18625 to 19175 | 18625 | 5MHz   | QPSK | 1 RB / 0 RB Offset   |
|   |                     |                | 19175 | 5MHz   | QPSK | 15 RB / 0 RB Offset  |
|   |                     |                |       |        |      | 1 RB / 14 RB Offset  |
|   |                     |                |       |        |      | 15 RB / 0 RB Offset  |
|   |                     | 18650 to 19150 | 18650 | 10MHz  | QPSK | 1 RB / 0 RB Offset   |
|   |                     |                | 19150 | 10MHz  | QPSK | 25 RB / 0 RB Offset  |
|   |                     |                |       |        |      | 1 RB / 24 RB Offset  |
|   |                     |                |       |        |      | 25 RB / 0 RB Offset  |
|   |                     | 18675 to 19125 | 18675 | 15MHz  | QPSK | 1 RB / 0 RB Offset   |
|   |                     |                | 19125 | 15MHz  | QPSK | 75 RB / 0 RB Offset  |
|   |                     |                |       |        |      | 1 RB / 74 RB Offset  |
|   |                     |                |       |        |      | 75 RB / 0 RB Offset  |
|   |                     | 18700 to 19100 | 18700 | 20MHz  | QPSK | 1 RB / 0 RB Offset   |
|   |                     |                | 19100 | 20MHz  | QPSK | 100 RB / 0 RB Offset |
|   |                     |                |       |        |      | 1 RB / 99 RB Offset  |
| B | CONDCUETED EMISSION | 18607 to 19193 | 18900 | 1.4MHz | QPSK | 100 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   |
| A | RADIATED 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   |

**TEST CONDITION:**

| TEST ITEM             | ENVIRONMENTAL CONDITIONS | INPUT POWER         | TESTED BY   |
|-----------------------|--------------------------|---------------------|-------------|
| EIRP                  | 25deg. C, 57%RH          | 3.8Vdc from Battery | Wenliang Wu |
| FREQUENCY STABILITY   | 23deg. C, 61%RH          | 3.8Vdc from Battery | Wenliang Wu |
| OCCUPIED BANDWIDTH    | 23deg. C, 61%RH          | 3.8Vdc from Battery | Wenliang Wu |
| PEAK TO AVERAGE RATIO | 23deg. C, 61%RH          | 3.8Vdc from Battery | Moon Xiong  |
| BAND EDGE             | 23deg. C, 61%RH          | 3.8Vdc from Battery | Moon Xiong  |
| CONDUCTED EMISSION    | 23deg. C, 61%RH          | 3.8Vdc from Battery | Moon Xiong  |
| RADIATED EMISSION     | 25deg. C, 57%RH          | 5Vdc from adapter   | Tony Zou    |

### 3.5 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

### 3.6 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**

**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

Mobile and portable stations are limited to 2 watts EIRP.

#### 4.1.2 TEST PROCEDURES

##### EIRP MEASUREMENT:

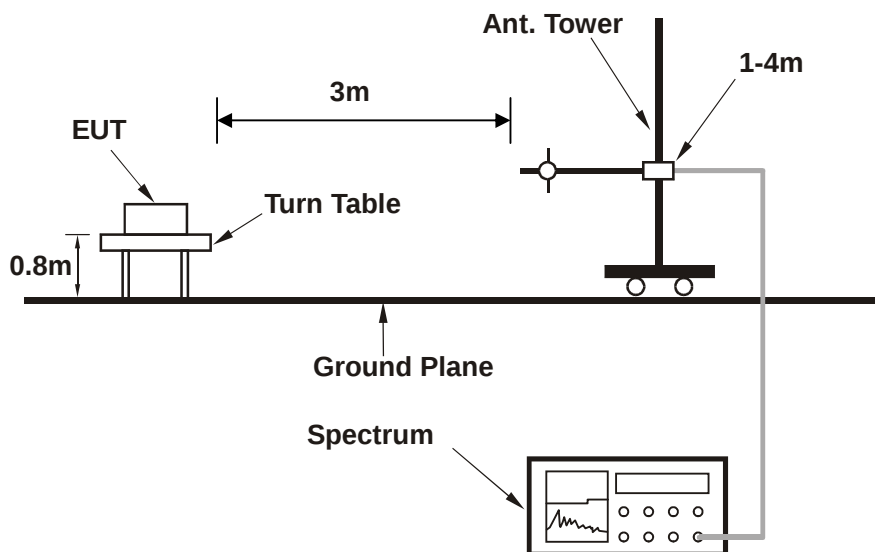
- a. All measurements were done at low, middle and high operational frequency range. RBW and VBW is 1MHz for GSM & GPRS, 5MHz for WCDMA mode, and 10MHz for LTE mode.
- b. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated 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.  $EIRP = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}.$

##### CONDUCTED POWER MEASUREMENT:

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

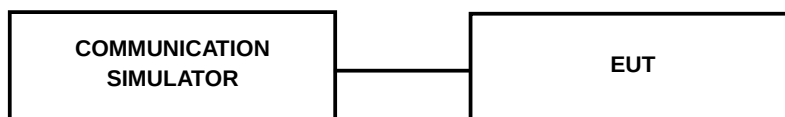
#### 4.1.3 TEST SETUP

##### EIRP 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

##### CONDUCTED OUTPUT POWER (dBm)

| Band            | GSM1900 |        |        |
|-----------------|---------|--------|--------|
| Channel         | 512     | 661    | 810    |
| Frequency (MHz) | 1850.2  | 1880.0 | 1909.8 |
| GSM             | 30.94   | 30.46  | 30.21  |
| GPRS 8          | 30.93   | 30.45  | 30.20  |
| GPRS 10         | 30.18   | 29.70  | 29.45  |
| GPRS 11         | 28.43   | 27.95  | 27.70  |
| GPRS 12         | 27.38   | 26.90  | 26.65  |
| EDGE 8 (MCS9)   | 28.03   | 27.55  | 27.30  |
| EDGE 10 (MCS9)  | 26.66   | 26.18  | 25.93  |
| EDGE 11 (MCS9)  | 25.03   | 24.55  | 24.30  |
| EDGE 12 (MCS9)  | 23.81   | 23.33  | 23.08  |

| Band            | WCDMA II |        |        |
|-----------------|----------|--------|--------|
| Channel         | 9262     | 9400   | 9538   |
| Frequency (MHz) | 1852.4   | 1880.0 | 1907.6 |
| RMC 12.2K       | 23.68    | 23.90  | 24.04  |
| HSPA            |          |        |        |
| HSDPA Subtest-1 | 22.39    | 22.61  | 22.75  |
| HSDPA Subtest-2 | 22.35    | 22.57  | 22.71  |
| HSDPA Subtest-3 | 21.82    | 22.04  | 22.18  |
| HSDPA Subtest-4 | 21.78    | 22.00  | 22.14  |
| HSUPA Subtest-1 | 22.51    | 22.73  | 22.87  |
| HSUPA Subtest-2 | 20.48    | 20.70  | 20.84  |
| HSUPA Subtest-3 | 21.46    | 21.68  | 21.82  |
| HSUPA Subtest-4 | 20.47    | 20.69  | 20.83  |
| HSUPA Subtest-5 | 22.70    | 22.92  | 23.06  |

| LTE Band 2 |            |         |           |                      |                    |                      |               |
|------------|------------|---------|-----------|----------------------|--------------------|----------------------|---------------|
| BW         | Modulation | RB Size | RB Offset | Low CH 18607         | Mid CH 18900       | High CH 19193        | 3GPP MPR (dB) |
|            |            |         |           | Frequency 1850.7 MHz | Frequency 1880 MHz | Frequency 1909.3 MHz |               |
| 1.4MHz     | QPSK       | 1       | 0         | 23.17                | 23.22              | 23.45                | 0             |
|            |            | 1       | 2         | 23.13                | 23.18              | 23.41                | 0             |
|            |            | 1       | 5         | 23.11                | 23.16              | 23.39                | 0             |
|            |            | 3       | 0         | 23.16                | 23.21              | 23.44                | 0             |
|            |            | 3       | 1         | 23.12                | 23.17              | 23.40                | 0             |
|            |            | 3       | 3         | 23.10                | 23.15              | 23.38                | 0             |
|            |            | 6       | 0         | 22.36                | 22.41              | 22.64                | 1             |
|            | 16QAM      | 1       | 0         | 22.22                | 22.27              | 22.50                | 1             |
|            |            | 1       | 2         | 22.18                | 22.23              | 22.46                | 1             |
|            |            | 1       | 5         | 22.13                | 22.18              | 22.41                | 1             |
|            |            | 3       | 0         | 22.20                | 22.25              | 22.48                | 1             |
|            |            | 3       | 1         | 22.16                | 22.21              | 22.44                | 1             |
|            |            | 3       | 3         | 22.11                | 22.16              | 22.39                | 1             |
|            |            | 6       | 0         | 21.35                | 21.40              | 21.63                | 2             |
| BW         | Modulation | RB Size | RB Offset | Low CH 18615         | Mid CH 18900       | High CH 19185        | 3GPP MPR (dB) |
|            |            |         |           | Frequency 1851.5 MHz | Frequency 1880 MHz | Frequency 1908.5 MHz |               |
| 3 MHz      | QPSK       | 1       | 0         | 23.20                | 23.25              | 23.48                | 0             |
|            |            | 1       | 7         | 23.16                | 23.21              | 23.44                | 0             |
|            |            | 1       | 14        | 23.14                | 23.19              | 23.42                | 0             |
|            |            | 8       | 0         | 22.37                | 22.42              | 22.65                | 1             |
|            |            | 8       | 3         | 22.33                | 22.38              | 22.61                | 1             |
|            |            | 8       | 7         | 22.28                | 22.33              | 22.56                | 1             |
|            |            | 15      | 0         | 22.39                | 22.44              | 22.67                | 1             |
|            | 16QAM      | 1       | 0         | 22.25                | 22.30              | 22.53                | 1             |
|            |            | 1       | 7         | 22.21                | 22.26              | 22.49                | 1             |
|            |            | 1       | 14        | 22.16                | 22.21              | 22.44                | 1             |
|            |            | 8       | 0         | 21.49                | 21.54              | 21.77                | 2             |
|            |            | 8       | 3         | 21.46                | 21.51              | 21.74                | 2             |
|            |            | 8       | 7         | 21.42                | 21.47              | 21.70                | 2             |
|            |            | 15      | 0         | 21.38                | 21.43              | 21.66                | 2             |

| LTE Band 2 |            |         |           |                         |                       |                         |                     |
|------------|------------|---------|-----------|-------------------------|-----------------------|-------------------------|---------------------|
| BW         | Modulation | RB Size | RB Offset | Low CH<br>18625         | Mid CH<br>18900       | High CH<br>19175        | 3GPP<br>MPR<br>(dB) |
|            |            |         |           | Frequency<br>1852.5 MHz | Frequency<br>1880 MHz | Frequency<br>1907.5 MHz |                     |
| 5 MHz      | QPSK       | 1       | 0         | 23.23                   | 23.28                 | 23.51                   | 0                   |
|            |            | 1       | 12        | 23.19                   | 23.24                 | 23.47                   | 0                   |
|            |            | 1       | 24        | 23.17                   | 23.22                 | 23.45                   | 0                   |
|            |            | 12      | 0         | 22.40                   | 22.45                 | 22.68                   | 1                   |
|            |            | 12      | 6         | 22.36                   | 22.41                 | 22.64                   | 1                   |
|            |            | 12      | 13        | 22.31                   | 22.36                 | 22.59                   | 1                   |
|            |            | 25      | 0         | 22.42                   | 22.47                 | 22.70                   | 1                   |
|            | 16QAM      | 1       | 0         | 22.28                   | 22.33                 | 22.56                   | 1                   |
|            |            | 1       | 12        | 22.24                   | 22.29                 | 22.52                   | 1                   |
|            |            | 1       | 24        | 22.19                   | 22.24                 | 22.47                   | 1                   |
|            |            | 12      | 0         | 21.52                   | 21.57                 | 21.80                   | 2                   |
|            |            | 12      | 6         | 21.49                   | 21.54                 | 21.77                   | 2                   |
|            |            | 12      | 13        | 21.45                   | 21.50                 | 21.73                   | 2                   |
|            |            | 25      | 0         | 21.41                   | 21.46                 | 21.69                   | 2                   |
| BW         | Modulation | RB Size | RB Offset | Low CH<br>18650         | Mid CH<br>18900       | High CH<br>19150        | 3GPP<br>MPR<br>(dB) |
|            |            |         |           | Frequency<br>1855 MHz   | Frequency<br>1880 MHz | Frequency<br>1905 MHz   |                     |
| 10 MHz     | QPSK       | 1       | 0         | 23.25                   | 23.30                 | 23.53                   | 0                   |
|            |            | 1       | 24        | 23.21                   | 23.26                 | 23.49                   | 0                   |
|            |            | 1       | 49        | 23.19                   | 23.24                 | 23.47                   | 0                   |
|            |            | 25      | 0         | 22.42                   | 22.47                 | 22.70                   | 1                   |
|            |            | 25      | 12        | 22.38                   | 22.43                 | 22.66                   | 1                   |
|            |            | 25      | 25        | 22.33                   | 22.38                 | 22.61                   | 1                   |
|            |            | 50      | 0         | 22.44                   | 22.49                 | 22.72                   | 1                   |
|            | 16QAM      | 1       | 0         | 22.30                   | 22.35                 | 22.58                   | 1                   |
|            |            | 1       | 24        | 22.26                   | 22.31                 | 22.54                   | 1                   |
|            |            | 1       | 49        | 22.21                   | 22.26                 | 22.49                   | 1                   |
|            |            | 25      | 0         | 21.54                   | 21.59                 | 21.82                   | 2                   |
|            |            | 25      | 12        | 21.51                   | 21.56                 | 21.79                   | 2                   |
|            |            | 25      | 25        | 21.47                   | 21.52                 | 21.75                   | 2                   |
|            |            | 50      | 0         | 21.43                   | 21.48                 | 21.71                   | 2                   |

| LTE Band 2 |            |         |           |                         |                       |                         |                     |
|------------|------------|---------|-----------|-------------------------|-----------------------|-------------------------|---------------------|
| BW         | Modulation | RB Size | RB Offset | Low CH<br>18675         | Mid CH<br>18900       | High CH<br>19125        | 3GPP<br>MPR<br>(dB) |
|            |            |         |           | Frequency<br>1857.5 MHz | Frequency<br>1880 MHz | Frequency<br>1902.5 MHz |                     |
| 15 MHz     | QPSK       | 1       | 0         | 23.28                   | 23.33                 | 23.56                   | 0                   |
|            |            | 1       | 37        | 23.24                   | 23.29                 | 23.52                   | 0                   |
|            |            | 1       | 74        | 23.22                   | 23.27                 | 23.50                   | 0                   |
|            |            | 36      | 0         | 22.45                   | 22.50                 | 22.73                   | 1                   |
|            |            | 36      | 19        | 22.41                   | 22.46                 | 22.69                   | 1                   |
|            |            | 36      | 39        | 22.36                   | 22.41                 | 22.64                   | 1                   |
|            |            | 75      | 0         | 22.47                   | 22.52                 | 22.75                   | 1                   |
|            | 16QAM      | 1       | 0         | 22.33                   | 22.38                 | 22.61                   | 1                   |
|            |            | 1       | 37        | 22.29                   | 22.34                 | 22.57                   | 1                   |
|            |            | 1       | 74        | 22.24                   | 22.29                 | 22.52                   | 1                   |
|            |            | 36      | 0         | 21.57                   | 21.62                 | 21.85                   | 2                   |
|            |            | 36      | 19        | 21.54                   | 21.59                 | 21.82                   | 2                   |
|            |            | 36      | 39        | 21.50                   | 21.55                 | 21.78                   | 2                   |
|            |            | 75      | 0         | 21.46                   | 21.51                 | 21.74                   | 2                   |
| BW         | Modulation | RB Size | RB Offset | Low CH<br>18700         | Mid CH<br>18900       | High CH<br>19100        | 3GPP<br>MPR<br>(dB) |
|            |            |         |           | Frequency<br>1860 MHz   | Frequency<br>1880 MHz | Frequency<br>1900 MHz   |                     |
| 20MHz      | QPSK       | 1       | 0         | 23.33                   | 23.38                 | 23.61                   | 0                   |
|            |            | 1       | 50        | 23.29                   | 23.34                 | 23.57                   | 0                   |
|            |            | 1       | 99        | 23.27                   | 23.32                 | 23.55                   | 0                   |
|            |            | 50      | 0         | 22.50                   | 22.55                 | 22.78                   | 1                   |
|            |            | 50      | 25        | 22.46                   | 22.51                 | 22.74                   | 1                   |
|            |            | 50      | 50        | 22.41                   | 22.46                 | 22.69                   | 1                   |
|            |            | 100     | 0         | 22.52                   | 22.57                 | 22.80                   | 1                   |
|            | 16QAM      | 1       | 0         | 22.38                   | 22.43                 | 22.66                   | 1                   |
|            |            | 1       | 50        | 22.34                   | 22.39                 | 22.62                   | 1                   |
|            |            | 1       | 99        | 22.29                   | 22.34                 | 22.57                   | 1                   |
|            |            | 50      | 0         | 21.62                   | 21.67                 | 21.90                   | 2                   |
|            |            | 50      | 25        | 21.59                   | 21.64                 | 21.87                   | 2                   |
|            |            | 50      | 50        | 21.55                   | 21.60                 | 21.83                   | 2                   |
|            |            | 100     | 0         | 21.51                   | 21.56                 | 21.79                   | 2                   |

### EIRP POWER (dBm)

#### GSM

| Channel | Frequency (MHz) | SPA LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW)      | Polarization (H/V) |
|---------|-----------------|---------------|-----------------------|-----------|---------------|--------------------|
| 512     | 1850.2          | -26.12        | 43.83                 | 17.71     | 59.02         | H                  |
| 661     | 1880.0          | -25.32        | 43.57                 | 18.25     | 66.83         | H                  |
| 810     | 1909.8          | -26.25        | 44.57                 | 18.32     | 67.92         | H                  |
| 512     | 1850.2          | -19.97        | 46.39                 | 26.42     | 438.53        | V                  |
| 661     | 1880.0          | -19.23        | 47.10                 | 27.87     | <b>612.07</b> | V                  |
| 810     | 1909.8          | -20.12        | 45.98                 | 25.86     | 385.12        | V                  |

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

#### EDGE

| Channel | Frequency (MHz) | SPA LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW)      | Polarization (H/V) |
|---------|-----------------|---------------|-----------------------|-----------|---------------|--------------------|
| 512     | 1850.2          | -25.32        | 43.83                 | 18.51     | 70.96         | H                  |
| 661     | 1880.0          | -24.49        | 43.57                 | 19.08     | 80.91         | H                  |
| 810     | 1909.8          | -25.34        | 44.57                 | 19.23     | 83.75         | H                  |
| 512     | 1850.2          | -19.32        | 46.39                 | 27.07     | 509.33        | V                  |
| 661     | 1880.0          | -18.98        | 47.10                 | 28.12     | <b>648.34</b> | V                  |
| 810     | 1909.8          | -18.72        | 45.98                 | 27.26     | 531.62        | V                  |

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

#### WCDMA

| Channel | Frequency (MHz) | SPA LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW)      | Polarization (H/V) |
|---------|-----------------|---------------|-----------------------|-----------|---------------|--------------------|
| 9262    | 1852.4          | -32.53        | 43.83                 | 11.30     | 13.49         | H                  |
| 9400    | 1880.0          | -31.98        | 43.57                 | 11.59     | 14.42         | H                  |
| 9538    | 1907.6          | -32.80        | 44.57                 | 11.77     | 15.03         | H                  |
| 9262    | 1852.4          | -26.41        | 46.39                 | 19.98     | 99.54         | V                  |
| 9400    | 1880.0          | -25.86        | 47.10                 | 21.24     | <b>132.98</b> | V                  |
| 9538    | 1907.6          | -25.66        | 45.98                 | 20.32     | 107.55        | V                  |

**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 2

### CHANNEL BANDWIDTH: 1.4MHz QPSK

| Channel | Frequency (MHz) | SPA LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW)      | Polarization (H/V) | LIMIT (W) |
|---------|-----------------|---------------|-----------------------|-----------|---------------|--------------------|-----------|
| 18607   | 1850.7          | -26.07        | 43.83                 | 17.76     | 59.76         | H                  | 2         |
| 18900   | 1880.0          | -26.10        | 43.57                 | 17.47     | 55.85         | H                  | 2         |
| 19193   | 1909.3          | -25.39        | 44.32                 | 18.93     | 78.14         | H                  | 2         |
| 18607   | 1850.7          | -21.99        | 46.41                 | 24.42     | <b>276.76</b> | V                  | 2         |
| 18900   | 1880.0          | -22.74        | 47.07                 | 24.33     | 271.02        | V                  | 2         |
| 19193   | 1909.3          | -23.19        | 45.88                 | 22.69     | 185.95        | V                  | 2         |

### CHANNEL BANDWIDTH: 1.4MHz 16QAM

| Channel | Frequency (MHz) | SPA LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) | LIMIT (W) |
|---------|-----------------|---------------|-----------------------|-----------|----------|--------------------|-----------|
| 18607   | 1850.7          | -26.94        | 43.83                 | 16.89     | 48.91    | H                  | 2         |
| 18900   | 1880.0          | -27.03        | 43.57                 | 16.54     | 45.08    | H                  | 2         |
| 19193   | 1909.3          | -26.35        | 44.32                 | 17.97     | 62.65    | H                  | 2         |
| 18607   | 1850.7          | -22.86        | 46.41                 | 23.55     | 226.52   | V                  | 2         |
| 18900   | 1880.0          | -23.67        | 47.07                 | 23.40     | 218.78   | V                  | 2         |
| 19193   | 1909.3          | -24.15        | 45.88                 | 21.73     | 149.07   | V                  | 2         |

### CHANNEL BANDWIDTH: 3MHz QPSK

| Channel | Frequency (MHz) | SPA LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW)      | Polarization (H/V) | LIMIT (W) |
|---------|-----------------|---------------|-----------------------|-----------|---------------|--------------------|-----------|
| 18615   | 1851.5          | -26.05        | 43.82                 | 17.77     | 59.87         | H                  | 2         |
| 18900   | 1880.0          | -26.16        | 43.57                 | 17.41     | 55.08         | H                  | 2         |
| 19185   | 1908.5          | -25.34        | 44.38                 | 19.04     | 80.09         | H                  | 2         |
| 18615   | 1851.5          | -21.97        | 46.45                 | 24.48     | <b>280.61</b> | V                  | 2         |
| 18900   | 1880.0          | -22.80        | 47.07                 | 24.27     | 267.30        | V                  | 2         |
| 19185   | 1908.5          | -23.14        | 45.88                 | 22.74     | 187.93        | V                  | 2         |

CHANNEL BANDWIDTH: 3MHz 16QAM

| Channel | Frequency (MHz) | SPA LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) | LIMIT (W) |
|---------|-----------------|---------------|-----------------------|-----------|----------|--------------------|-----------|
| 18615   | 1851.5          | -27.12        | 43.82                 | 16.70     | 46.80    | H                  | 2         |
| 18900   | 1880.0          | -27.05        | 43.57                 | 16.52     | 44.87    | H                  | 2         |
| 19185   | 1908.5          | -26.33        | 44.38                 | 18.05     | 63.77    | H                  | 2         |
| 18615   | 1851.5          | -23.04        | 46.45                 | 23.41     | 219.33   | V                  | 2         |
| 18900   | 1880.0          | -23.69        | 47.07                 | 23.38     | 217.77   | V                  | 2         |
| 19185   | 1908.5          | -24.13        | 45.88                 | 21.75     | 149.62   | V                  | 2         |

CHANNEL BANDWIDTH: 5MHz QPSK

| Channel | Frequency (MHz) | SPA LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW)      | Polarization (H/V) | LIMIT (W) |
|---------|-----------------|---------------|-----------------------|-----------|---------------|--------------------|-----------|
| 18625   | 1852.5          | -26.11        | 43.83                 | 17.72     | 59.13         | H                  | 2         |
| 18900   | 1880.0          | -26.11        | 43.57                 | 17.46     | 55.72         | H                  | 2         |
| 19175   | 1907.5          | -25.29        | 44.19                 | 18.90     | 77.59         | H                  | 2         |
| 18625   | 1852.5          | -22.03        | 46.46                 | 24.43     | <b>277.52</b> | V                  | 2         |
| 18900   | 1880.0          | -22.75        | 47.07                 | 24.32     | 270.40        | V                  | 2         |
| 19175   | 1907.5          | -23.09        | 45.89                 | 22.80     | 190.59        | V                  | 2         |

CHANNEL BANDWIDTH: 5MHz 16QAM

| Channel | Frequency (MHz) | SPA LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) | LIMIT (W) |
|---------|-----------------|---------------|-----------------------|-----------|----------|--------------------|-----------|
| 18625   | 1852.5          | -26.94        | 43.83                 | 16.89     | 48.84    | H                  | 2         |
| 18900   | 1880.0          | -27.13        | 43.57                 | 16.44     | 44.06    | H                  | 2         |
| 19175   | 1907.5          | -26.39        | 44.19                 | 17.80     | 60.23    | H                  | 2         |
| 18625   | 1852.5          | -22.86        | 46.46                 | 23.60     | 229.25   | V                  | 2         |
| 18900   | 1880.0          | -23.77        | 47.07                 | 23.30     | 213.80   | V                  | 2         |
| 19175   | 1907.5          | -24.19        | 45.89                 | 21.70     | 147.94   | V                  | 2         |

CHANNEL BANDWIDTH: 10MHz QPSK

| Channel | Frequency (MHz) | SPA LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW)      | Polarization (H/V) | LIMIT (W) |
|---------|-----------------|---------------|-----------------------|-----------|---------------|--------------------|-----------|
| 18650   | 1855.0          | -25.92        | 43.86                 | 17.94     | 62.24         | H                  | 2         |
| 18900   | 1880.0          | -26.05        | 43.57                 | 17.52     | 56.49         | H                  | 2         |
| 19150   | 1905.0          | -25.16        | 43.99                 | 18.83     | 76.45         | H                  | 2         |
| 18650   | 1855.0          | -21.84        | 46.28                 | 24.44     | <b>277.84</b> | V                  | 2         |
| 18900   | 1880.0          | -22.69        | 47.07                 | 24.38     | 274.16        | V                  | 2         |
| 19150   | 1905.0          | -22.96        | 45.92                 | 22.96     | 197.79        | V                  | 2         |

CHANNEL BANDWIDTH: 10MHz 16QAM

| Channel | Frequency (MHz) | SPA LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) | LIMIT (W) |
|---------|-----------------|---------------|-----------------------|-----------|----------|--------------------|-----------|
| 18650   | 1855.0          | -27.07        | 43.86                 | 16.79     | 47.76    | H                  | 2         |
| 18900   | 1880.0          | -27.15        | 43.57                 | 16.42     | 43.85    | H                  | 2         |
| 19150   | 1905.0          | -26.32        | 43.99                 | 17.67     | 58.53    | H                  | 2         |
| 18650   | 1855.0          | -22.99        | 46.28                 | 23.29     | 213.21   | V                  | 2         |
| 18900   | 1880.0          | -23.79        | 47.07                 | 23.28     | 212.81   | V                  | 2         |
| 19150   | 1905.0          | -24.12        | 45.92                 | 21.80     | 151.43   | V                  | 2         |

CHANNEL BANDWIDTH: 15MHz QPSK

| Channel | Frequency (MHz) | SPA LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW)      | Polarization (H/V) | LIMIT (W) |
|---------|-----------------|---------------|-----------------------|-----------|---------------|--------------------|-----------|
| 18675   | 1857.5          | -25.93        | 43.99                 | 18.06     | 64.00         | H                  | 2         |
| 18900   | 1880.0          | -26.12        | 43.57                 | 17.45     | 55.59         | H                  | 2         |
| 19125   | 1902.5          | -25.23        | 43.66                 | 18.43     | 69.58         | H                  | 2         |
| 18675   | 1857.5          | -21.85        | 45.93                 | 24.08     | 255.68        | V                  | 2         |
| 18900   | 1880.0          | -22.76        | 47.07                 | 24.31     | <b>269.77</b> | V                  | 2         |
| 19125   | 1902.5          | -23.03        | 46.20                 | 23.17     | 207.59        | V                  | 2         |

**CHANNEL BANDWIDTH: 15MHz 16QAM**

| Channel | Frequency (MHz) | SPA LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) | LIMIT (W) |
|---------|-----------------|---------------|-----------------------|-----------|----------|--------------------|-----------|
| 18675   | 1857.5          | -26.79        | 43.99                 | 17.20     | 52.50    | H                  | 2         |
| 18900   | 1880.0          | -26.99        | 43.57                 | 16.58     | 45.50    | H                  | 2         |
| 19125   | 1902.5          | -26.08        | 43.66                 | 17.58     | 57.21    | H                  | 2         |
| 18675   | 1857.5          | -22.71        | 45.93                 | 23.22     | 209.75   | V                  | 2         |
| 18900   | 1880.0          | -23.63        | 47.07                 | 23.44     | 220.80   | V                  | 2         |
| 19125   | 1902.5          | -23.88        | 46.20                 | 22.32     | 170.69   | V                  | 2         |

**CHANNEL BANDWIDTH: 20MHz QPSK**

| Channel | Frequency (MHz) | SPA LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW)      | Polarization (H/V) | LIMIT (W) |
|---------|-----------------|---------------|-----------------------|-----------|---------------|--------------------|-----------|
| 18700   | 1860.0          | -26.51        | 43.50                 | 16.99     | 49.99         | H                  | 2         |
| 18900   | 1880.0          | -26.57        | 43.57                 | 17.00     | 50.12         | H                  | 2         |
| 19100   | 1900.0          | -25.81        | 43.62                 | 17.81     | 60.34         | H                  | 2         |
| 18700   | 1860.0          | -22.43        | 45.57                 | 23.14     | 206.06        | V                  | 2         |
| 18900   | 1880.0          | -23.21        | 47.07                 | 23.86     | <b>243.22</b> | V                  | 2         |
| 19100   | 1900.0          | -23.61        | 46.26                 | 22.65     | 184.12        | V                  | 2         |

**CHANNEL BANDWIDTH: 20MHz 16QAM**

| Channel | Frequency (MHz) | SPA LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) | LIMIT (W) |
|---------|-----------------|---------------|-----------------------|-----------|----------|--------------------|-----------|
| 18700   | 1860.0          | -27.44        | 43.50                 | 16.06     | 40.36    | H                  | 2         |
| 18900   | 1880.0          | -27.64        | 43.57                 | 15.93     | 39.17    | H                  | 2         |
| 19100   | 1900.0          | -26.64        | 43.62                 | 16.98     | 49.84    | H                  | 2         |
| 18700   | 1860.0          | -23.36        | 45.57                 | 22.21     | 166.34   | V                  | 2         |
| 18900   | 1880.0          | -24.28        | 47.07                 | 22.79     | 190.11   | V                  | 2         |
| 19100   | 1900.0          | -24.44        | 46.26                 | 21.82     | 152.09   | V                  | 2         |

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

## 4.2 FREQUENCY STABILITY MEASUREMENT

### 4.2.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

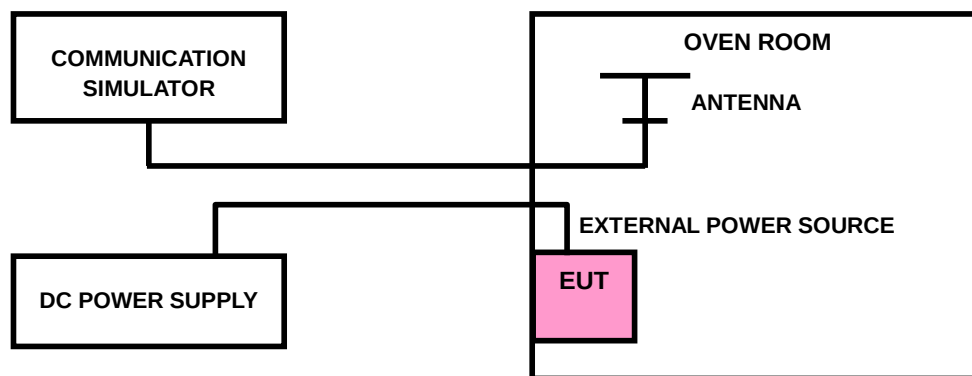
The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

### 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  $\pm 0.5^{\circ}\text{C}$  during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

**NOTE:** The frequency error was recorded frequency error from the communication simulator.

### 4.2.3 TEST SETUP



#### 4.2.4 TEST RESULTS

##### GSM1900

##### FREQUENCY ERROR VS. VOLTAGE

| VOLTAGE (Volts) | FREQUENCY ERROR (ppm) |              | LIMIT (ppm) |
|-----------------|-----------------------|--------------|-------------|
|                 | Low Channel           | High Channel |             |
| 3.8             | 0.0010                | 0.0010       | 2.5         |
| 3.5             | -0.0011               | -0.0012      | 2.5         |
| 4.4             | 0.0010                | 0.0011       | 2.5         |

**NOTE:** The applicant defined the normal working voltage of the battery is from 3.5Vdc to 4.4Vdc.

##### FREQUENCY ERROR vs. TEMPERATURE.

| TEMP. (°C) | FREQUENCY ERROR (ppm) |              | LIMIT (ppm) |
|------------|-----------------------|--------------|-------------|
|            | Low Channel           | High Channel |             |
| -30        | -0.0057               | -0.0056      | 2.5         |
| -20        | -0.0053               | -0.0051      | 2.5         |
| -10        | -0.0045               | -0.0043      | 2.5         |
| 0          | -0.0041               | -0.0039      | 2.5         |
| 10         | -0.0032               | -0.0031      | 2.5         |
| 20         | -0.0033               | -0.0029      | 2.5         |
| 30         | -0.0024               | -0.0021      | 2.5         |
| 40         | -0.0019               | -0.0016      | 2.5         |
| 50         | -0.0007               | -0.0006      | 2.5         |
| 60         | -0.0001               | 0.0000       | 2.5         |

**EDGE 1900**

**FREQUENCY ERROR VS. VOLTAGE**

| VOLTAGE (Volts) | FREQUENCY ERROR (ppm) |              | LIMIT (ppm) |
|-----------------|-----------------------|--------------|-------------|
|                 | Low Channel           | High Channel |             |
| 3.8             | 0.0011                | 0.0013       | 2.5         |
| 3.5             | -0.0014               | -0.0016      | 2.5         |
| 4.4             | 0.0014                | 0.0015       | 2.5         |

**NOTE:** The applicant defined the normal working voltage of the battery is from 3.5Vdc to 4.4Vdc.

**FREQUENCY ERROR vs. TEMPERATURE.**

| TEMP. (°C) | FREQUENCY ERROR (ppm) |              | LIMIT (ppm) |
|------------|-----------------------|--------------|-------------|
|            | Low Channel           | High Channel |             |
| -30        | -0.0055               | -0.0055      | 2.5         |
| -20        | -0.0048               | -0.0049      | 2.5         |
| -10        | -0.0043               | -0.0042      | 2.5         |
| 0          | -0.0037               | -0.0036      | 2.5         |
| 10         | -0.0031               | -0.0030      | 2.5         |
| 20         | -0.0024               | -0.0023      | 2.5         |
| 30         | -0.0018               | -0.0016      | 2.5         |
| 40         | -0.0012               | -0.0010      | 2.5         |
| 50         | -0.0007               | -0.0005      | 2.5         |
| 60         | -0.0001               | 0.0001       | 2.5         |

## WCDMA BAND II

### FREQUENCY ERROR VS. VOLTAGE

| VOLTAGE (Volts) | FREQUENCY ERROR (ppm) |              | LIMIT (ppm) |
|-----------------|-----------------------|--------------|-------------|
|                 | Low Channel           | High Channel |             |
| 3.8             | 0.0014                | 0.0012       | 2.5         |
| 3.5             | -0.0015               | -0.0014      | 2.5         |
| 4.4             | 0.0014                | 0.0013       | 2.5         |

**NOTE:** The applicant defined the normal working voltage of the battery is from 3.5Vdc to 4.4Vdc.

### FREQUENCY ERROR vs. TEMPERATURE.

| TEMP. (°C) | FREQUENCY ERROR (ppm) |              | LIMIT (ppm) |
|------------|-----------------------|--------------|-------------|
|            | Low Channel           | High Channel |             |
| -30        | -0.0056               | -0.0057      | 2.5         |
| -20        | -0.0050               | -0.0051      | 2.5         |
| -10        | -0.0044               | -0.0044      | 2.5         |
| 0          | -0.0038               | -0.0038      | 2.5         |
| 10         | -0.0032               | -0.0032      | 2.5         |
| 20         | -0.0025               | -0.0025      | 2.5         |
| 30         | -0.0019               | -0.0019      | 2.5         |
| 40         | -0.0012               | -0.0012      | 2.5         |
| 50         | -0.0006               | -0.0006      | 2.5         |
| 60         | 0.0001                | 0.0001       | 2.5         |

## LTE BAND 2

### FREQUENCY ERROR VS. VOLTAGE

| VOLTAGE (Volts) | 1.4MHz                |              | LIMIT (ppm) |
|-----------------|-----------------------|--------------|-------------|
|                 | FREQUENCY ERROR (ppm) |              |             |
|                 | Low Channel           | High Channel |             |
| 3.8             | 0.0009                | 0.0010       | 2.5         |
| 3.5             | -0.0012               | -0.0011      | 2.5         |
| 4.4             | 0.0010                | 0.0011       | 2.5         |

**NOTE:** The applicant defined the normal working voltage of the battery is from 3.5Vdc to 4.4Vdc.

### FREQUENCY ERROR vs. TEMPERATURE.

| TEMP. (°C) | 1.4MHz                |              | LIMIT (ppm) |
|------------|-----------------------|--------------|-------------|
|            | FREQUENCY ERROR (ppm) |              |             |
|            | Low Channel           | High Channel |             |
| -30        | -0.0059               | -0.0063      | 2.5         |
| -20        | -0.0052               | -0.0056      | 2.5         |
| -10        | -0.0045               | -0.0049      | 2.5         |
| 0          | -0.0039               | -0.0042      | 2.5         |
| 10         | -0.0033               | -0.0035      | 2.5         |
| 20         | -0.0028               | -0.0029      | 2.5         |
| 30         | -0.0021               | -0.0022      | 2.5         |
| 40         | -0.0013               | -0.0014      | 2.5         |
| 50         | -0.0007               | -0.0008      | 2.5         |
| 60         | -0.0001               | -0.0001      | 2.5         |

#### FREQUENCY ERROR VS. VOLTAGE

| VOLTAGE (Volts) | 3MHz                  |              | LIMIT (ppm) |
|-----------------|-----------------------|--------------|-------------|
|                 | FREQUENCY ERROR (ppm) |              |             |
|                 | Low Channel           | High Channel |             |
| 3.8             | 0.0010                | 0.0011       | 2.5         |
| 3.5             | -0.0013               | -0.0013      | 2.5         |
| 4.4             | 0.0012                | 0.0012       | 2.5         |

**NOTE:** The applicant defined the normal working voltage of the battery is from 3.5Vdc to 4.4Vdc.

#### FREQUENCY ERROR vs. TEMPERATURE.

| TEMP. (°C) | 3MHz                  |              | LIMIT (ppm) |
|------------|-----------------------|--------------|-------------|
|            | FREQUENCY ERROR (ppm) |              |             |
|            | Low Channel           | High Channel |             |
| -30        | -0.0057               | -0.0061      | 2.5         |
| -20        | -0.0051               | -0.0055      | 2.5         |
| -10        | -0.0044               | -0.0047      | 2.5         |
| 0          | -0.0037               | -0.0040      | 2.5         |
| 10         | -0.0031               | -0.0033      | 2.5         |
| 20         | -0.0023               | -0.0025      | 2.5         |
| 30         | -0.0017               | -0.0018      | 2.5         |
| 40         | -0.0010               | -0.0011      | 2.5         |
| 50         | -0.0004               | -0.0004      | 2.5         |
| 60         | 0.0002                | 0.0002       | 2.5         |

#### FREQUENCY ERROR VS. VOLTAGE

| VOLTAGE (Volts) | 5MHz                  |              | LIMIT (ppm) |
|-----------------|-----------------------|--------------|-------------|
|                 | FREQUENCY ERROR (ppm) |              |             |
|                 | Low Channel           | High Channel |             |
| 3.8             | 0.0011                | 0.0012       | 2.5         |
| 3.5             | -0.0014               | -0.0016      | 2.5         |
| 4.4             | 0.0013                | 0.0014       | 2.5         |

**NOTE:** The applicant defined the normal working voltage of the battery is from 3.5Vdc to 4.4Vdc.

#### FREQUENCY ERROR vs. TEMPERATURE.

| TEMP. (°C) | 5MHz                  |              | LIMIT (ppm) |
|------------|-----------------------|--------------|-------------|
|            | FREQUENCY ERROR (ppm) |              |             |
|            | Low Channel           | High Channel |             |
| -30        | -0.0053               | -0.0057      | 2.5         |
| -20        | -0.0046               | -0.0049      | 2.5         |
| -10        | -0.0040               | -0.0043      | 2.5         |
| 0          | -0.0034               | -0.0037      | 2.5         |
| 10         | -0.0028               | -0.0030      | 2.5         |
| 20         | -0.0023               | -0.0024      | 2.5         |
| 30         | -0.0017               | -0.0018      | 2.5         |
| 40         | -0.0011               | -0.0012      | 2.5         |
| 50         | -0.0004               | -0.0005      | 2.5         |
| 60         | 0.0001                | 0.0001       | 2.5         |

#### FREQUENCY ERROR VS. VOLTAGE

| VOLTAGE (Volts) | 10MHz                 |              | LIMIT (ppm) |
|-----------------|-----------------------|--------------|-------------|
|                 | FREQUENCY ERROR (ppm) |              |             |
|                 | Low Channel           | High Channel |             |
| 3.8             | 0.0012                | -0.0012      | 2.5         |
| 3.5             | -0.0016               | -0.0016      | 2.5         |
| 4.4             | 0.0013                | 0.0013       | 2.5         |

**NOTE:** The applicant defined the normal working voltage of the battery is from 3.5Vdc to 4.4Vdc.

#### FREQUENCY ERROR vs. TEMPERATURE.

| TEMP. (°C) | 10MHz                 |              | LIMIT (ppm) |
|------------|-----------------------|--------------|-------------|
|            | FREQUENCY ERROR (ppm) |              |             |
|            | Low Channel           | High Channel |             |
| -30        | -0.0056               | -0.0059      | 2.5         |
| -20        | -0.0052               | -0.0055      | 2.5         |
| -10        | -0.0045               | -0.0047      | 2.5         |
| 0          | -0.0038               | -0.0040      | 2.5         |
| 10         | -0.0032               | -0.0033      | 2.5         |
| 20         | -0.0025               | -0.0026      | 2.5         |
| 30         | -0.0018               | -0.0018      | 2.5         |
| 40         | -0.0011               | -0.0011      | 2.5         |
| 50         | -0.0005               | -0.0005      | 2.5         |
| 60         | 0.0002                | 0.0002       | 2.5         |

#### FREQUENCY ERROR VS. VOLTAGE

| VOLTAGE (Volts) | 15MHz                 |              | LIMIT (ppm) |
|-----------------|-----------------------|--------------|-------------|
|                 | FREQUENCY ERROR (ppm) |              |             |
|                 | Low Channel           | High Channel |             |
| 3.8             | 0.0012                | 0.0013       | 2.5         |
| 3.5             | -0.0014               | -0.0014      | 2.5         |
| 4.4             | 0.0013                | 0.0013       | 2.5         |

**NOTE:** The applicant defined the normal working voltage of the battery is from 3.5Vdc to 4.4Vdc.

#### FREQUENCY ERROR vs. TEMPERATURE.

| TEMP. (°C) | 15MHz                 |              | LIMIT (ppm) |
|------------|-----------------------|--------------|-------------|
|            | FREQUENCY ERROR (ppm) |              |             |
|            | Low Channel           | High Channel |             |
| -30        | -0.0061               | -0.0062      | 2.5         |
| -20        | -0.0057               | -0.0059      | 2.5         |
| -10        | -0.0051               | -0.0052      | 2.5         |
| 0          | -0.0045               | -0.0046      | 2.5         |
| 10         | -0.0039               | -0.0040      | 2.5         |
| 20         | -0.0031               | -0.0032      | 2.5         |
| 30         | -0.0025               | -0.0026      | 2.5         |
| 40         | -0.0018               | -0.0018      | 2.5         |
| 50         | -0.0012               | -0.0012      | 2.5         |
| 60         | -0.0003               | -0.0003      | 2.5         |

#### FREQUENCY ERROR VS. VOLTAGE

| VOLTAGE (Volts) | 20MHz                 |              | LIMIT (ppm) |
|-----------------|-----------------------|--------------|-------------|
|                 | FREQUENCY ERROR (ppm) |              |             |
|                 | Low Channel           | High Channel |             |
| 3.8             | 0.0010                | 0.0011       | 2.5         |
| 3.5             | -0.0012               | -0.0013      | 2.5         |
| 4.4             | 0.0011                | 0.0011       | 2.5         |

**NOTE:** The applicant defined the normal working voltage of the battery is from 3.5Vdc to 4.4Vdc.

#### FREQUENCY ERROR vs. TEMPERATURE.

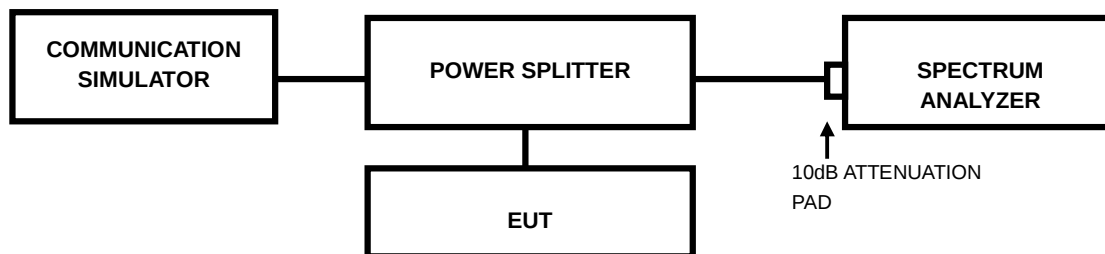
| TEMP. (°C) | 20MHz                 |              | LIMIT (ppm) |
|------------|-----------------------|--------------|-------------|
|            | FREQUENCY ERROR (ppm) |              |             |
|            | Low Channel           | High Channel |             |
| -30        | -0.0057               | -0.0059      | 2.5         |
| -20        | -0.0049               | -0.0051      | 2.5         |
| -10        | -0.0043               | -0.0045      | 2.5         |
| 0          | -0.0037               | -0.0038      | 2.5         |
| 10         | -0.0029               | -0.0030      | 2.5         |
| 20         | -0.0024               | -0.0025      | 2.5         |
| 30         | -0.0018               | -0.0018      | 2.5         |
| 40         | -0.0012               | -0.0012      | 2.5         |
| 50         | -0.0005               | -0.0005      | 2.5         |
| 60         | 0.0002                | 0.0002       | 2.5         |

### 4.3 OCCUPIED BANDWIDTH MEASUREMENT

#### 4.3.1 TEST PROCEDURES

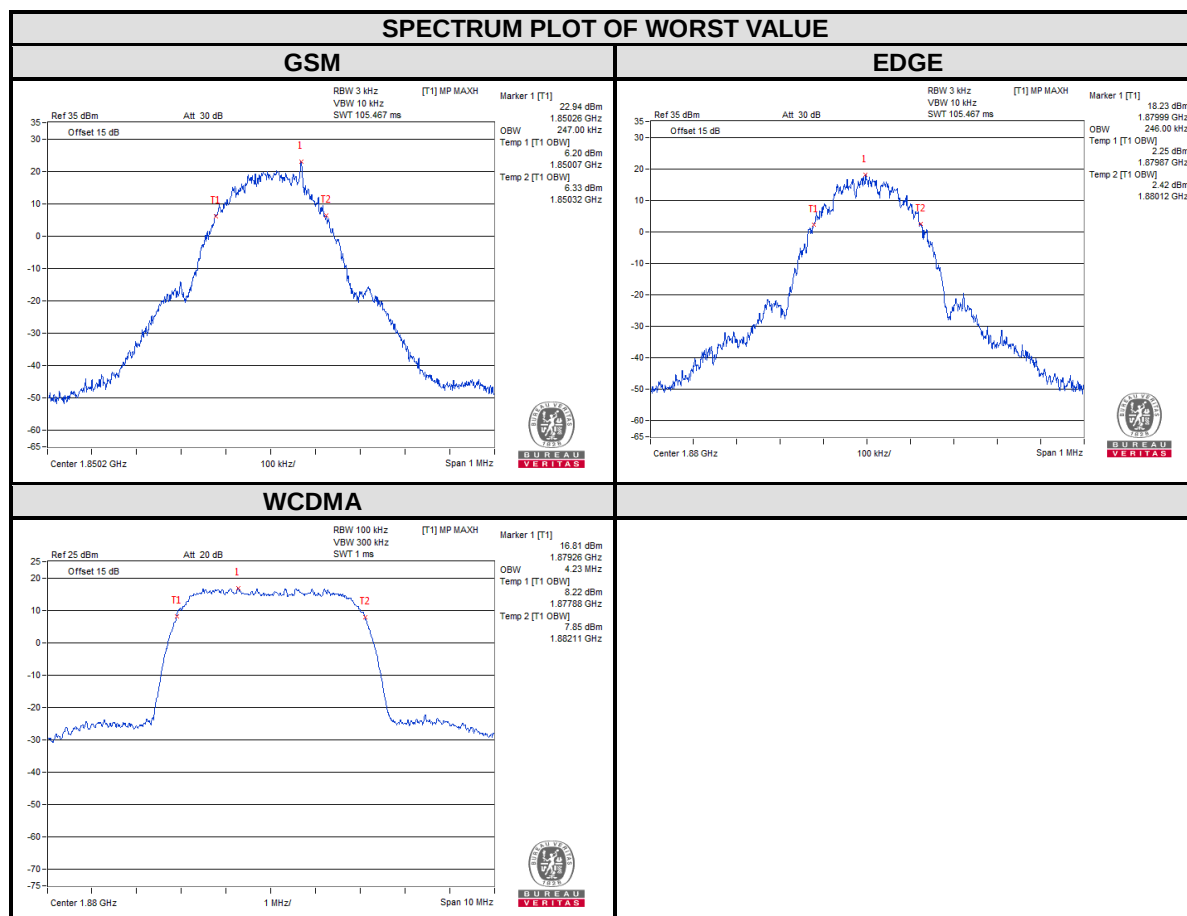
The EUT makes a call to the communication simulator. All measurements were done at low, middle and high operational frequency range. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function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

#### 4.3.2 TEST SETUP

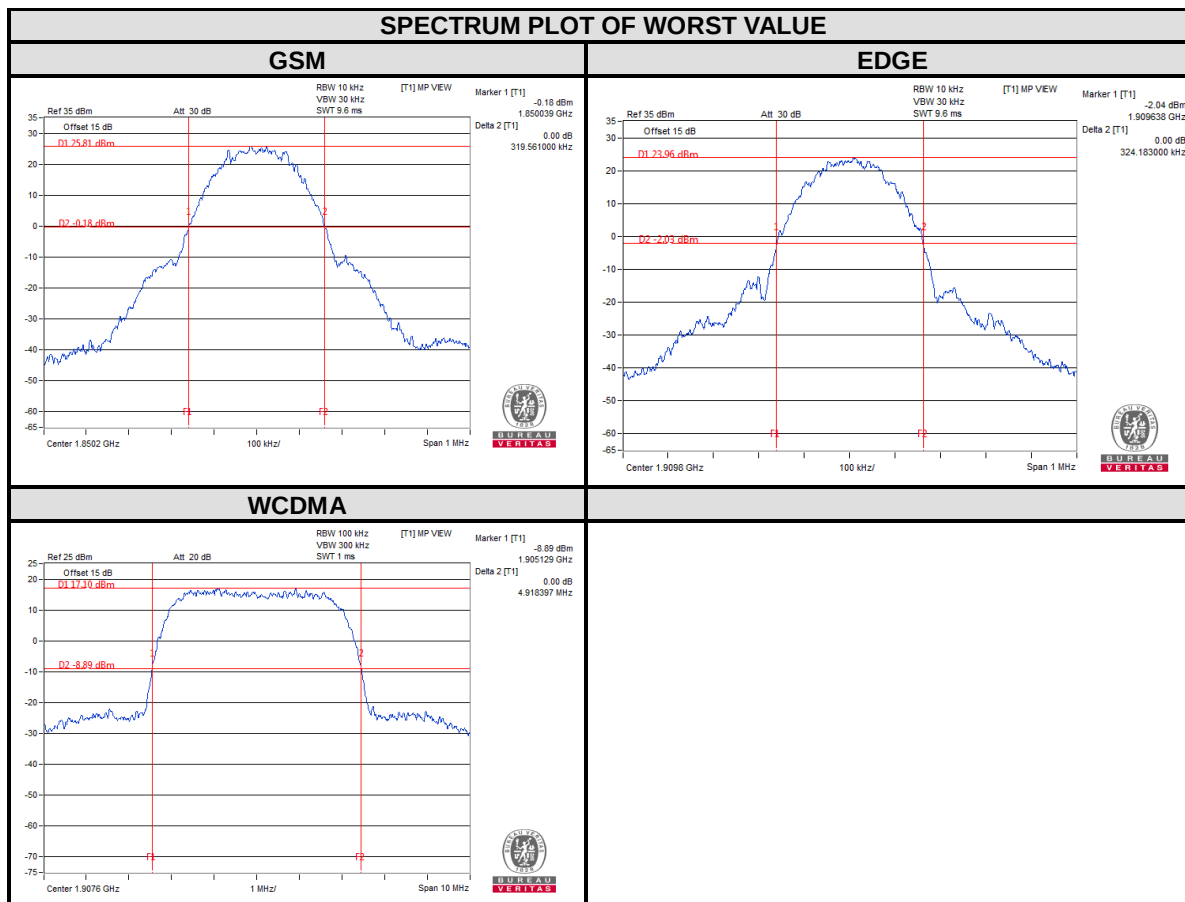


### 4.3.3 TEST RESULTS

| Channel | Frequency (MHz) | 99% Occupied bandwidth (kHz) |        | Channel | Frequency (MHz) | 99% Occupied bandwidth (MHz) |
|---------|-----------------|------------------------------|--------|---------|-----------------|------------------------------|
|         |                 | GSM                          | EDGE   |         |                 |                              |
| 512     | 1850.2          | 247.00                       | 244.00 | 9262    | 1852.4          | 4.21                         |
| 661     | 1880.0          | 243.00                       | 246.00 | 9400    | 1880.0          | 4.23                         |
| 810     | 1909.8          | 244.00                       | 246.00 | 9538    | 1907.6          | 4.22                         |



| Channel | Frequency<br>(MHz) | 26dB bandwidth<br>(kHz) |        | CHANNEL | FREQUENCY<br>(MHz) | 26dB bandwidth<br>(MHz) |
|---------|--------------------|-------------------------|--------|---------|--------------------|-------------------------|
|         |                    | GSM                     | EDGE   |         |                    | WCDMA                   |
| 512     | 1850.2             | 319.56                  | 321.17 | 9262    | 1852.4             | 4.88                    |
| 661     | 1880.0             | 318.66                  | 314.65 | 9400    | 1880.0             | 4.88                    |
| 810     | 1909.8             | 316.29                  | 324.18 | 9538    | 1907.6             | 4.92                    |



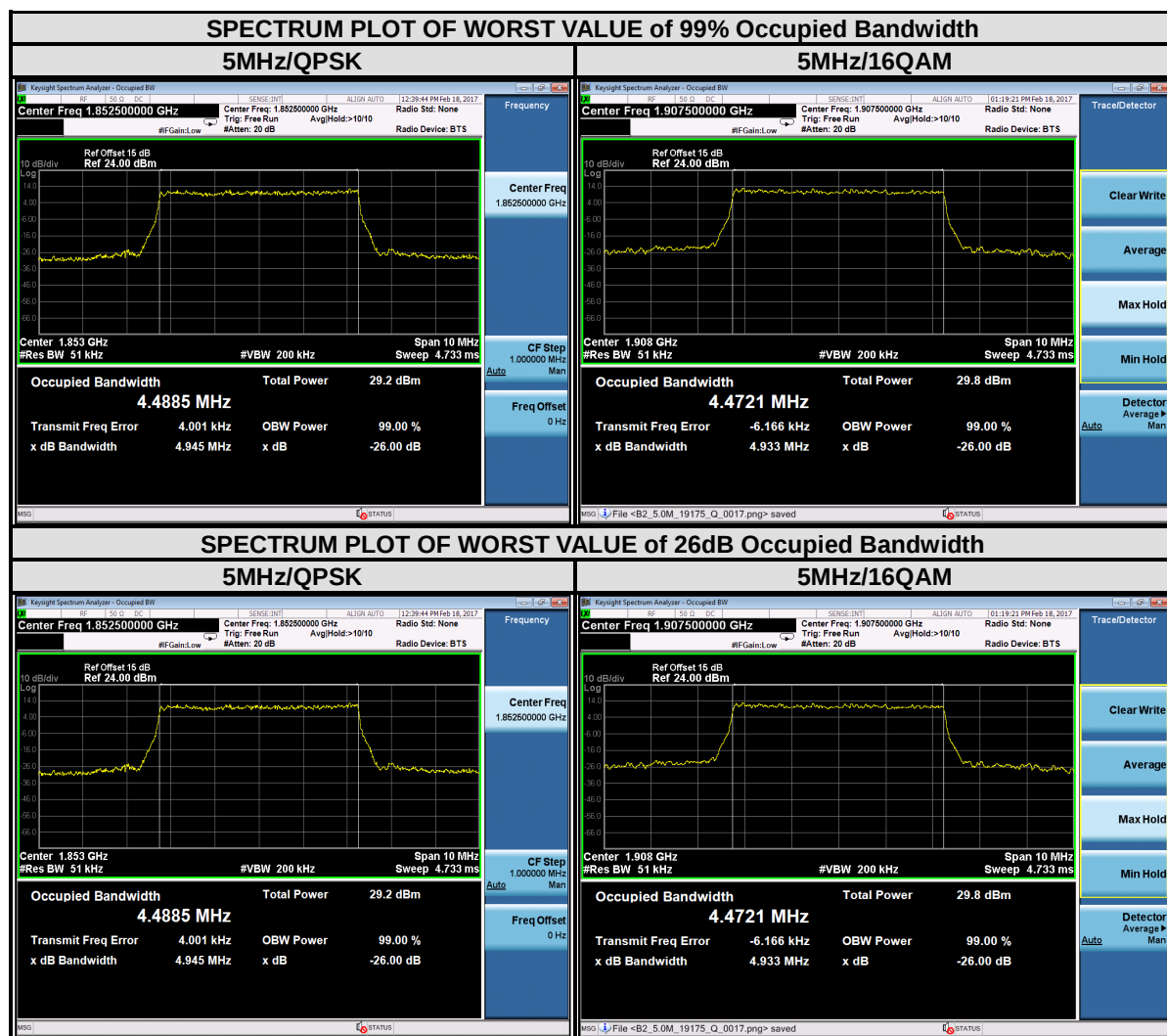
| LTE band 2                 |                 |                              |       |         |                 |                      |       |
|----------------------------|-----------------|------------------------------|-------|---------|-----------------|----------------------|-------|
| Channel Bandwidth : 1.4MHz |                 |                              |       |         |                 |                      |       |
| Channel                    | Frequency (MHz) | 99% Occupied bandwidth (MHz) |       | Channel | Frequency (MHz) | 26dB bandwidth (MHz) |       |
|                            |                 | QPSK                         | 16QAM |         |                 | QPSK                 | 16QAM |
| 18607                      | 1850.7          | 1.09                         | 1.08  | 18607   | 1850.7          | 1.25                 | 1.25  |
| 18900                      | 1880            | 1.09                         | 1.08  | 18900   | 1880            | 1.25                 | 1.25  |
| 19193                      | 1909.3          | 1.09                         | 1.08  | 19193   | 1909.3          | 1.25                 | 1.25  |



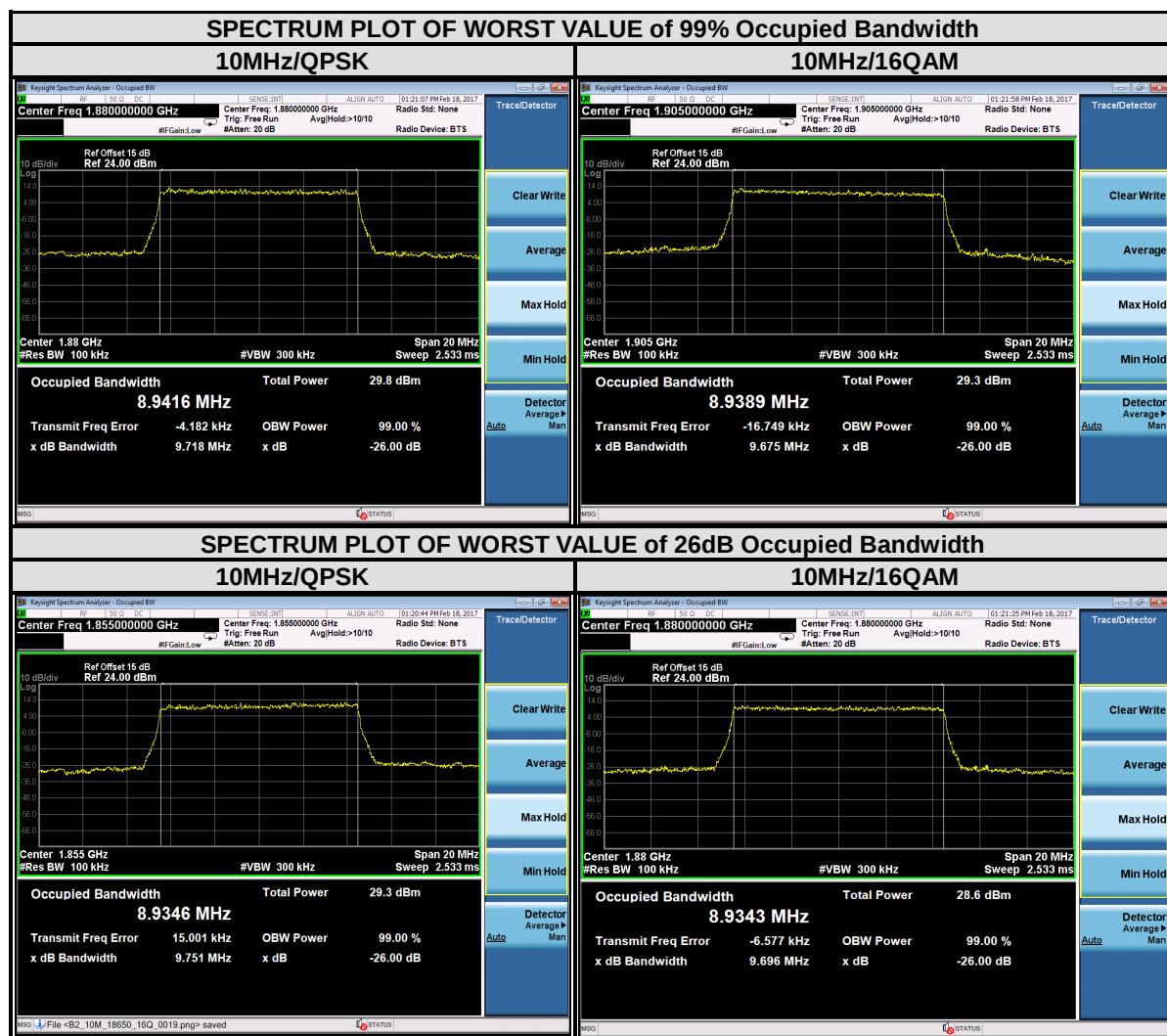
| LTE band 2               |                 |                              |       |         |                 |                      |       |
|--------------------------|-----------------|------------------------------|-------|---------|-----------------|----------------------|-------|
| Channel Bandwidth : 3MHz |                 |                              |       |         |                 |                      |       |
| Channel                  | Frequency (MHz) | 99% Occupied bandwidth (MHz) |       | Channel | Frequency (MHz) | 26dB bandwidth (MHz) |       |
|                          |                 | QPSK                         | 16QAM |         |                 | QPSK                 | 16QAM |
| 18615                    | 1851.5          | 2.68                         | 2.68  | 18615   | 1851.5          | 2.92                 | 2.91  |
| 18900                    | 1880            | 2.68                         | 2.68  | 18900   | 1880            | 2.92                 | 2.92  |
| 19185                    | 1908.5          | 2.68                         | 2.68  | 19185   | 1908.5          | 2.92                 | 2.91  |



| LTE band 2                |                 |                              |       |         |                 |                      |       |
|---------------------------|-----------------|------------------------------|-------|---------|-----------------|----------------------|-------|
| Channel Bandwidth : 5 MHz |                 |                              |       |         |                 |                      |       |
| Channel                   | Frequency (MHz) | 99% Occupied bandwidth (MHz) |       | Channel | Frequency (MHz) | 26dB bandwidth (MHz) |       |
|                           |                 | QPSK                         | 16QAM |         |                 | QPSK                 | 16QAM |
| 18625                     | 1852.5          | 4.49                         | 4.47  | 18625   | 1852.5          | 4.95                 | 4.89  |
| 18900                     | 1880            | 4.49                         | 4.47  | 18900   | 1880            | 4.92                 | 4.91  |
| 19175                     | 1907.5          | 4.48                         | 4.47  | 19175   | 1907.5          | 4.94                 | 4.93  |



| LTE band 2                 |                 |                              |       |         |                 |                      |       |
|----------------------------|-----------------|------------------------------|-------|---------|-----------------|----------------------|-------|
| Channel Bandwidth : 10 MHz |                 |                              |       |         |                 |                      |       |
| Channel                    | Frequency (MHz) | 99% Occupied bandwidth (MHz) |       | Channel | Frequency (MHz) | 26dB bandwidth (MHz) |       |
|                            |                 | QPSK                         | 16QAM |         |                 | QPSK                 | 16QAM |
| 18650                      | 1855            | 8.93                         | 8.92  | 18650   | 1855            | 9.75                 | 9.65  |
| 18900                      | 1880            | 8.94                         | 8.93  | 18900   | 1880            | 9.72                 | 9.70  |
| 19150                      | 1905            | 8.93                         | 8.94  | 19150   | 1905            | 9.74                 | 9.68  |





| LTE band 2                 |                 |                              |       |         |                 |                      |       |
|----------------------------|-----------------|------------------------------|-------|---------|-----------------|----------------------|-------|
| Channel Bandwidth : 20 MHz |                 |                              |       |         |                 |                      |       |
| Channel                    | Frequency (MHz) | 99% Occupied bandwidth (MHz) |       | Channel | Frequency (MHz) | 26dB bandwidth (MHz) |       |
|                            |                 | QPSK                         | 16QAM |         |                 | QPSK                 | 16QAM |
| 18700                      | 1860            | 17.86                        | 17.83 | 18700   | 1860            | 18.98                | 19.10 |
| 18900                      | 1880            | 17.96                        | 17.90 | 18900   | 1880            | 19.35                | 19.10 |
| 19100                      | 1900            | 17.85                        | 17.77 | 19100   | 1900            | 18.75                | 18.93 |

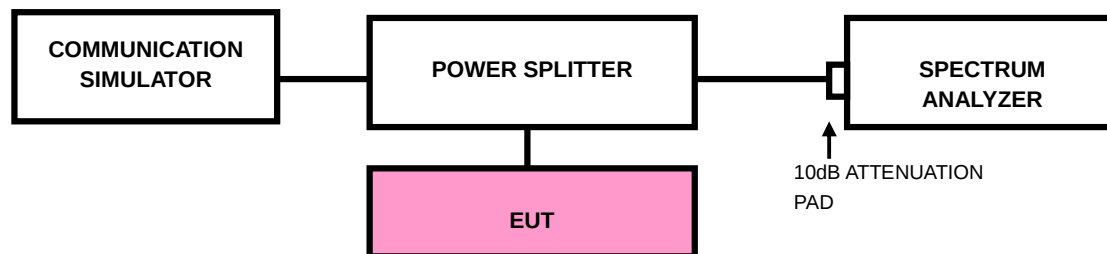


## 4.4 BAND EDGE MEASUREMENT

### 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

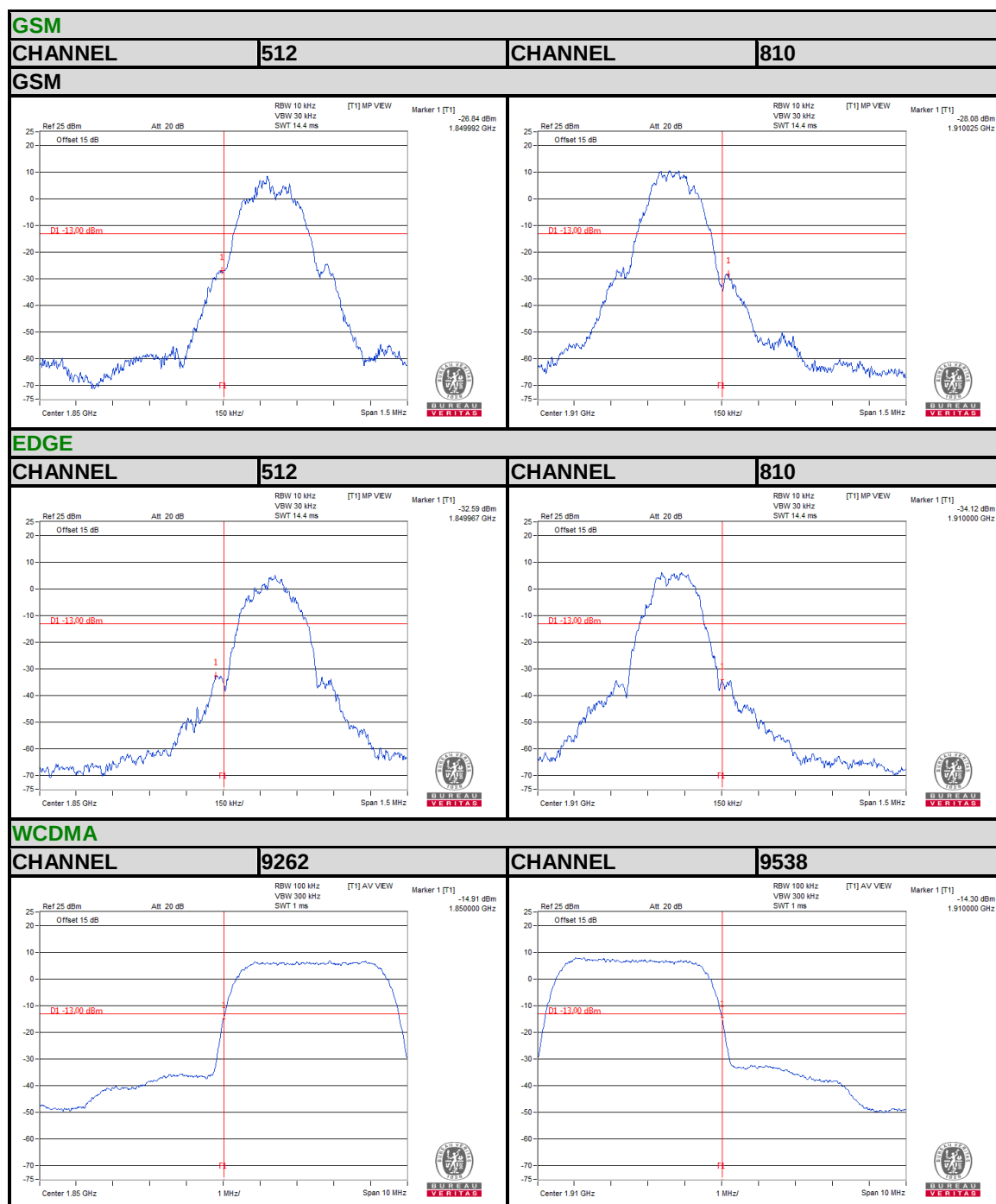


### 4.4.3 TEST PROCEDURES

- All measurements were done at low and high operational frequency range.
- The center frequency of spectrum is the band edge frequency and span is 1.5 MHz. RBW of the spectrum is 10kHz and VBW of the spectrum is 30kHz (GSM/GPRS/ EDGE).
- The center frequency of spectrum is the band edge frequency and span is 10MHz. RBW of the spectrum is 100kHz and VBW of the spectrum is 300kHz (WCDMA).
- 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)
- 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)

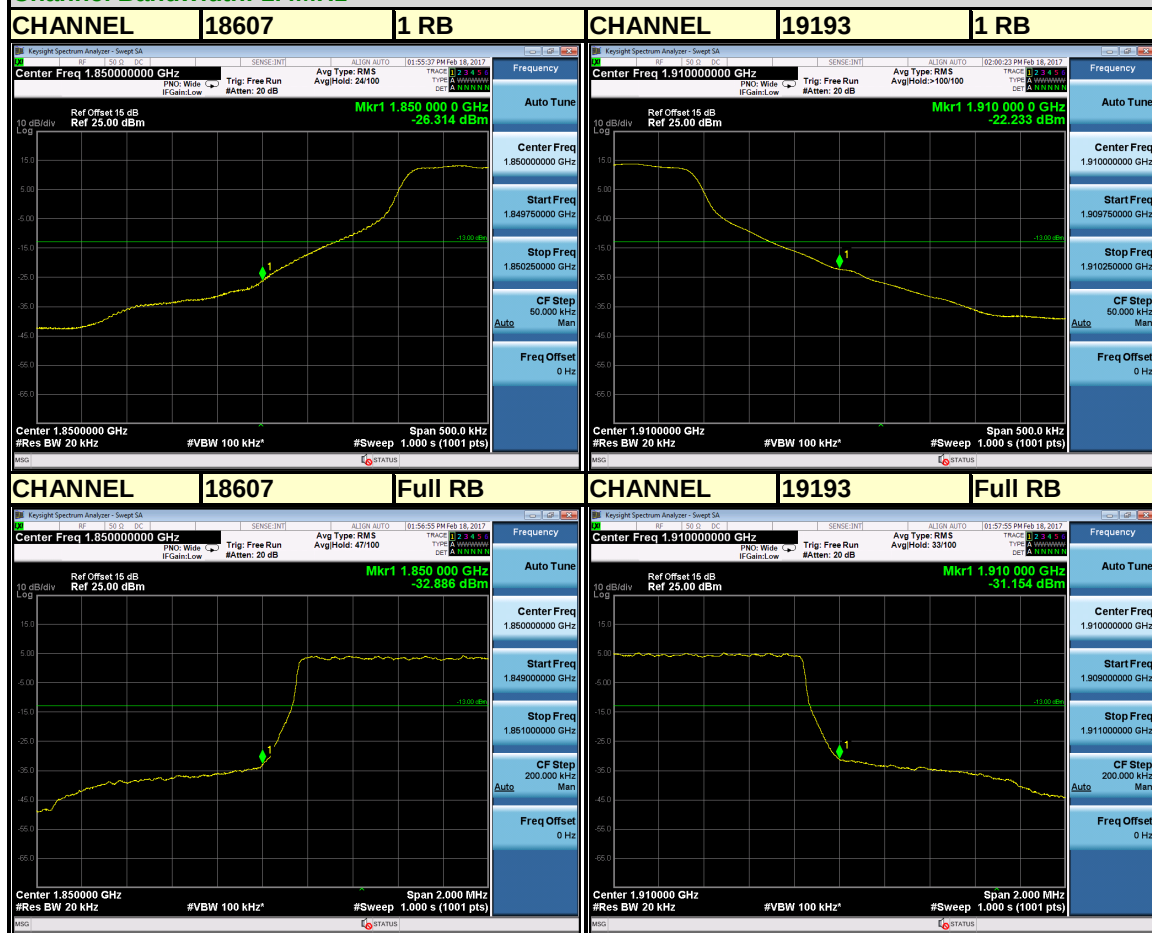
- f. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 50kHz and VBW of the spectrum is 200kHz. (LTE bandwidth 5MHz)
- g. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 100kHz and VBW of the spectrum is 300kHz. (LTE bandwidth 10MHz)
- 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 15MHz)
- i. 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)
- j. Record the max trace plot into the test report.

#### 4.4.4. TEST RESULTS



## LTE BAND 2

Channel Bandwidth: 1.4MHz





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## LTE BAND 2

Channel Bandwidth: 3MHz



Bureau Veritas Shenzhen Co., Ltd.  
Dongguan Branch

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Email: [customerservice.dg@cn.bureauveritas.com](mailto:customerservice.dg@cn.bureauveritas.com)



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## LTE BAND 2

Channel Bandwidth: 5MHz



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## LTE BAND 2

Channel Bandwidth: 10MHz



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## LTE BAND 2

Channel Bandwidth: 15MHz



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## LTE BAND 2

Channel Bandwidth: 20MHz



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## 4.5 CONDUCTED SPURIOUS EMISSIONS

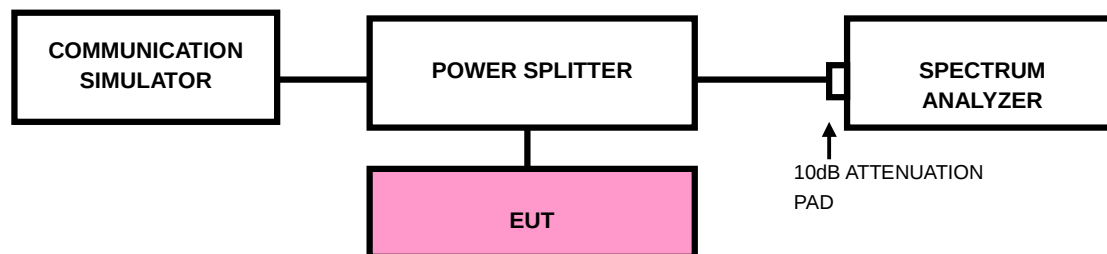
### 4.5.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

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  $-13\text{dBm}$ .

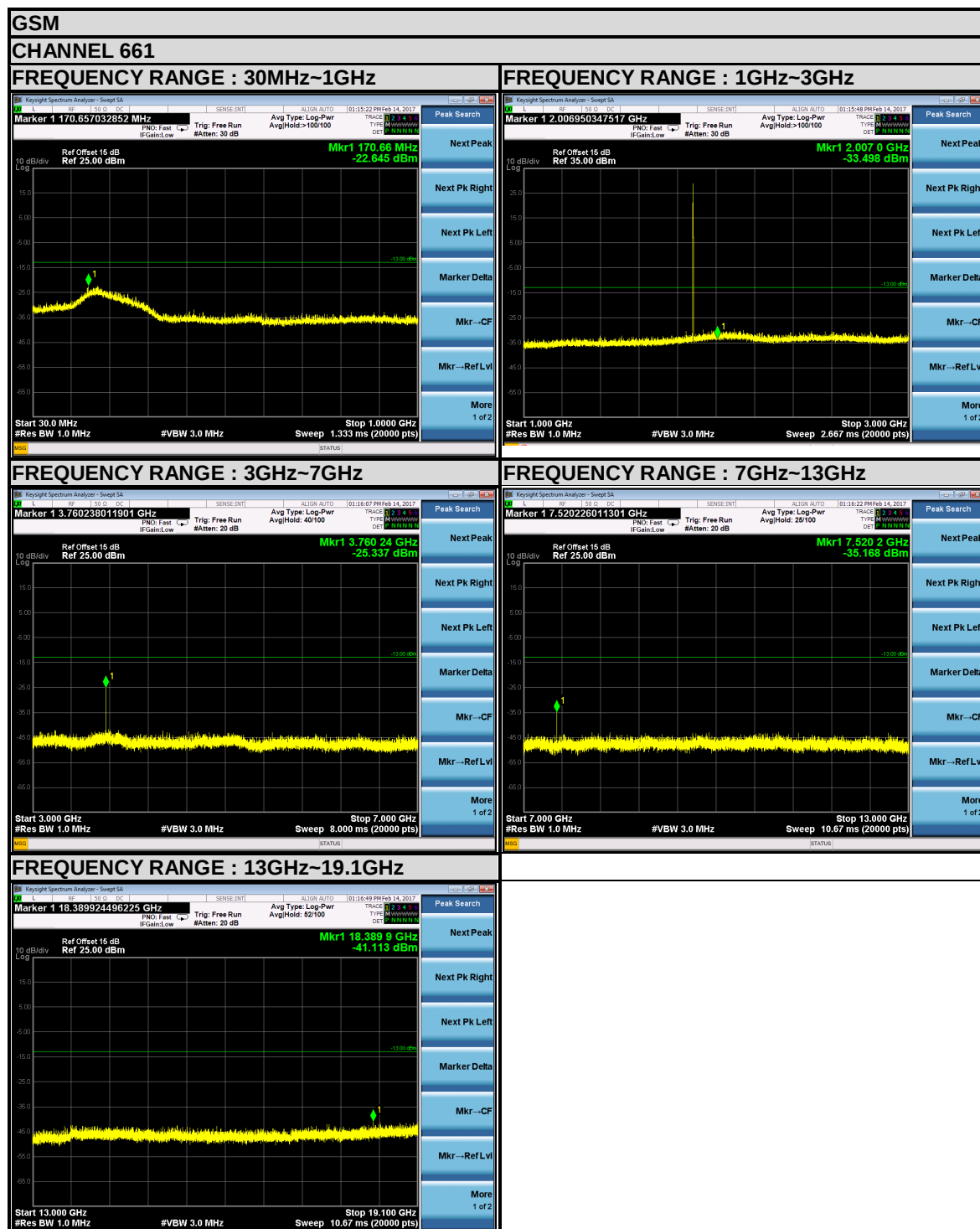
### 4.5.2 TEST PROCEDURE

- 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 19.1GHz. 20dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz is used for conducted emission measurement.

### 4.5.3 TEST SETUP



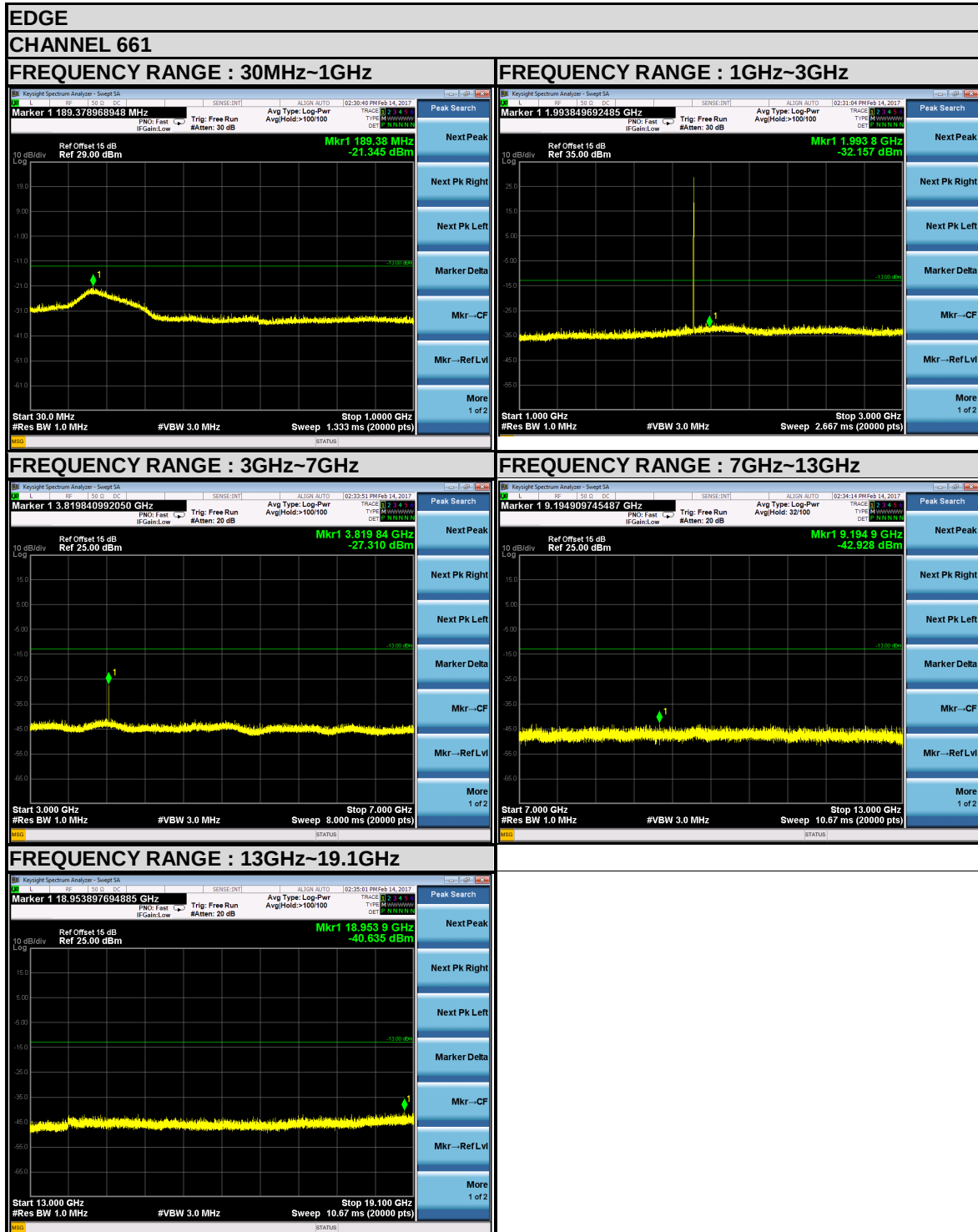
## 4.5.4 TEST RESULTS





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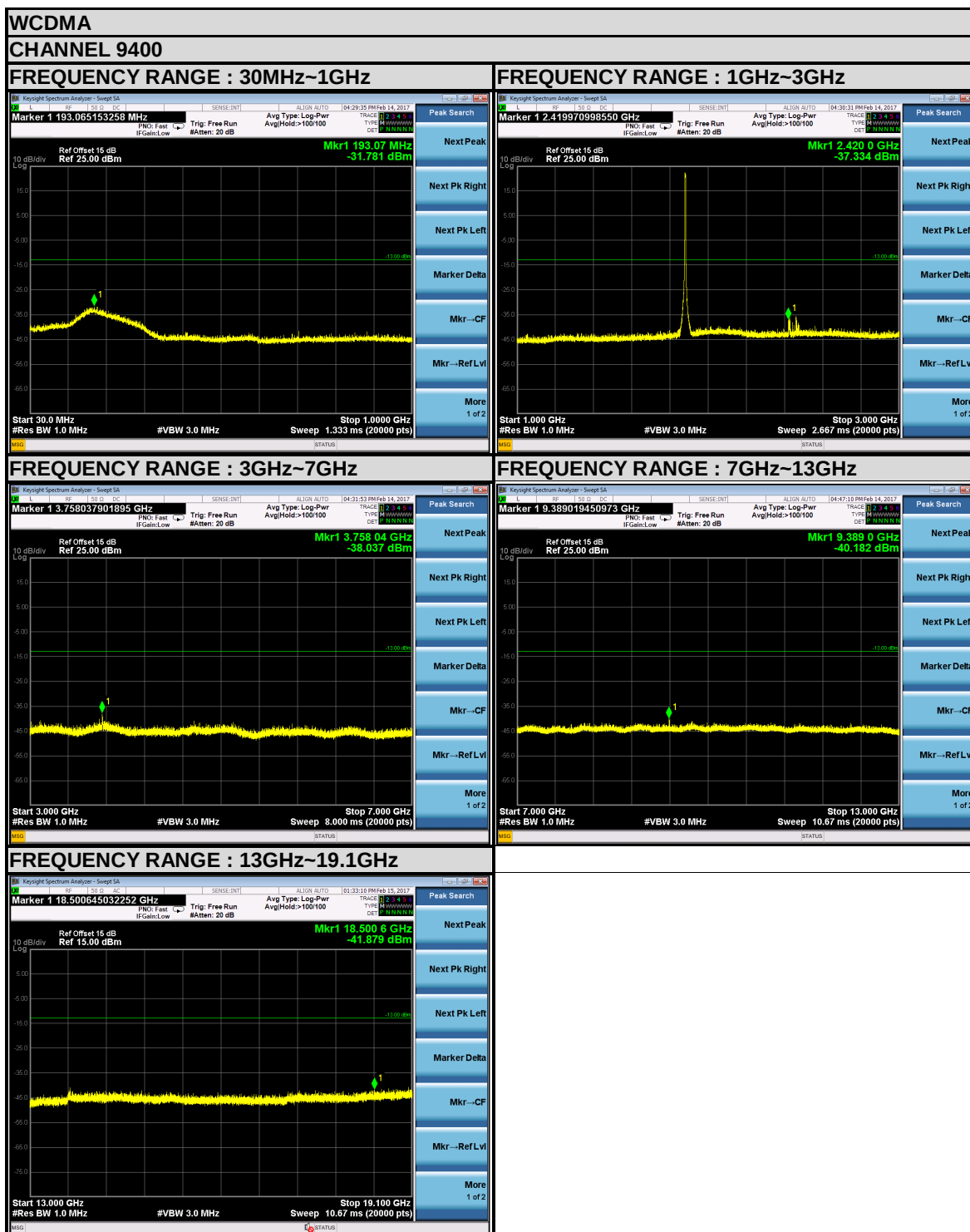
Test Report No.: RF170118W004R1-4



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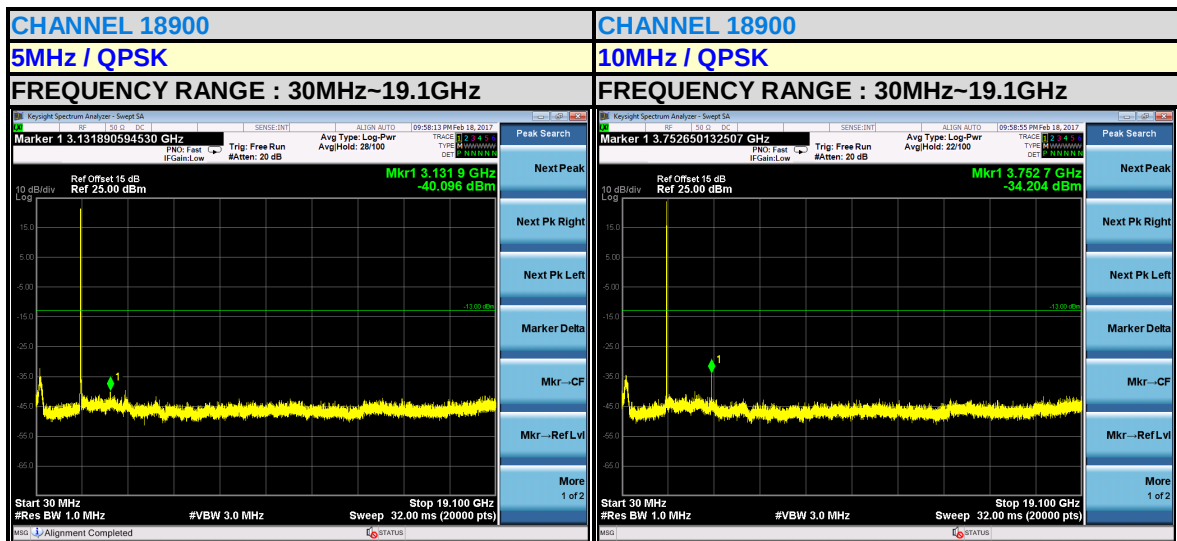
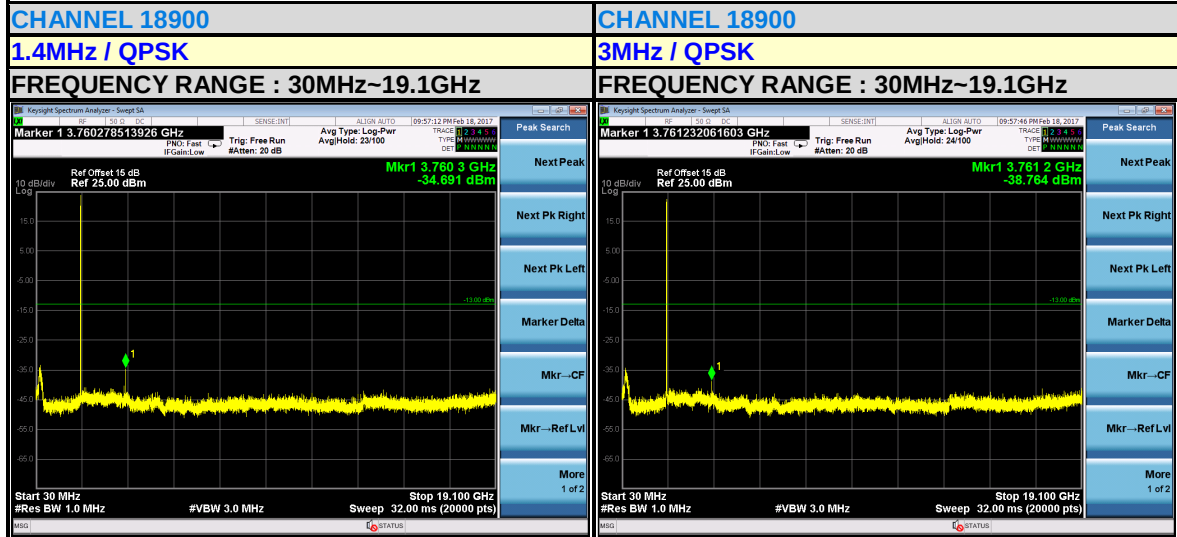




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Test Report No.: RF170118W004R1-4

## LTE BAND 2



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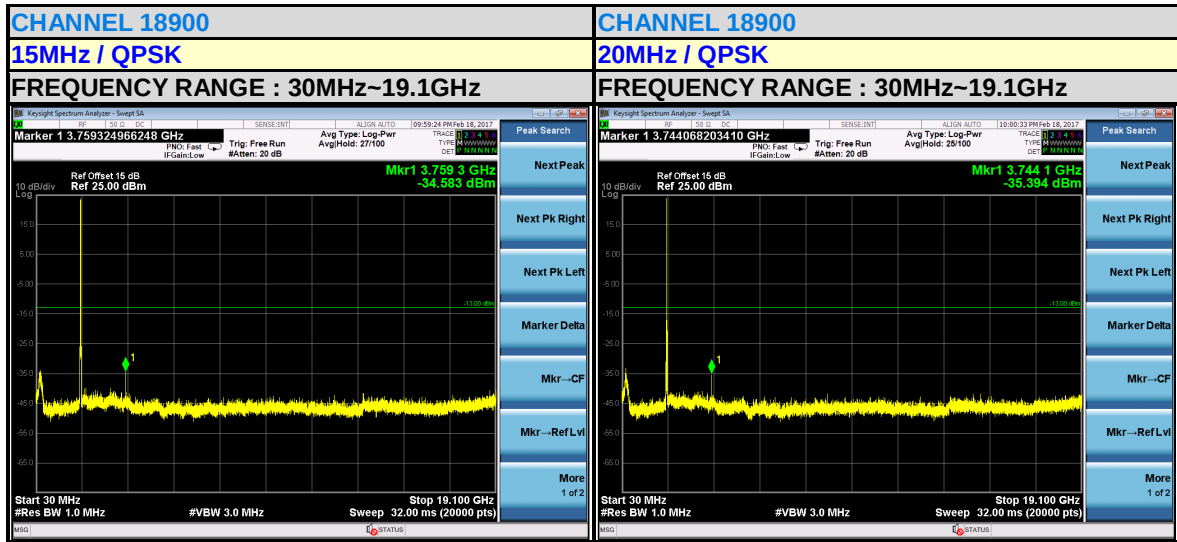
No. 34, Chenwulu Section, Guantai Rd.,  
Houjie Town, Dongguan City,  
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## 4.6 RADIATED EMISSION MEASUREMENT

### 4.6.1 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  $-13\text{dBm}$ .

### 4.6.2 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.  $\text{EIRP} = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}.$

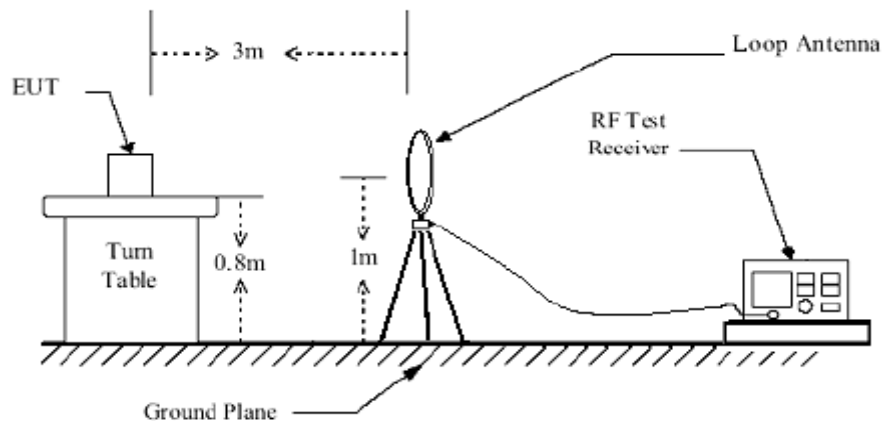
**NOTE:** The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

### 4.6.3 DEVIATION FROM TEST STANDARD

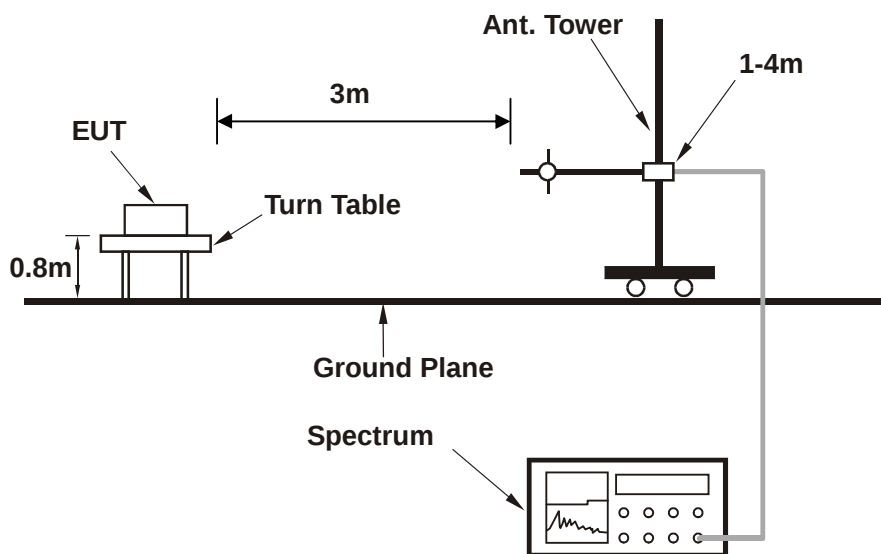
No deviation

#### 4.6.4 TEST SETUP

<Below 30MHz>



<Above 30MHz>



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

#### 4.6.5 TEST RESULTS

##### BELOW 1GHz WORST-CASE DATA

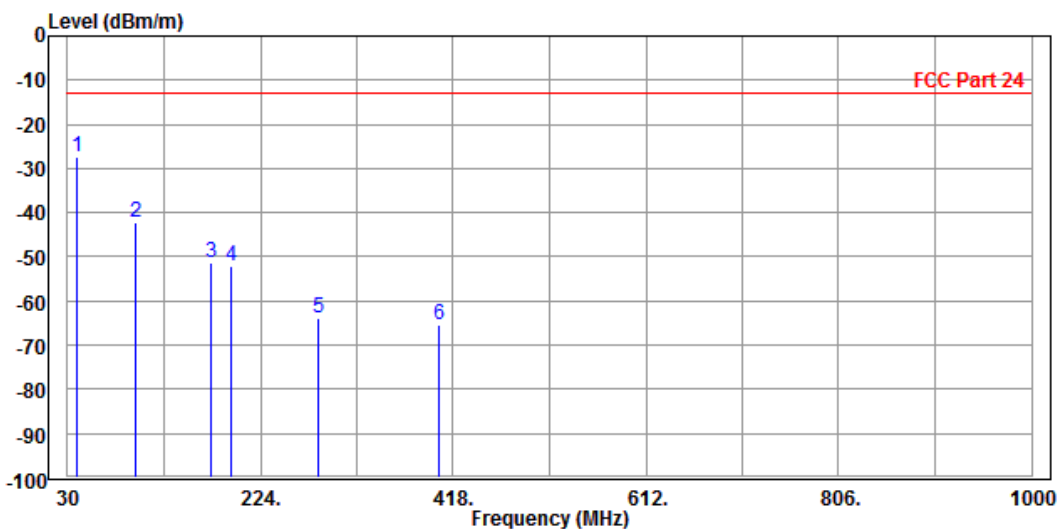
**9 KHz – 30 KHz data:** the amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required in the report.

**30 MHz – 1GHz data:**

**PCS 1900:**

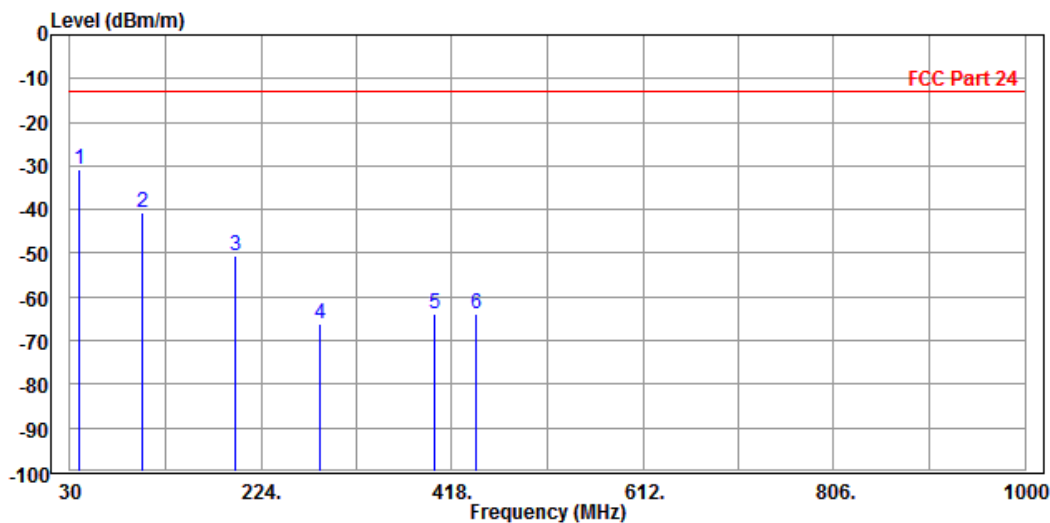
|                                                     |                 |                 |                    |
|-----------------------------------------------------|-----------------|-----------------|--------------------|
| MODE                                                | TX channel 661  | FREQUENCY RANGE | Below 1000MHz      |
| ENVIRONMENTAL CONDITIONS                            | 26deg. C, 56%RH | INPUT POWER     | DC 5V from adapter |
| TESTED BY                                           | Tony Zou        |                 |                    |
| 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   | 39.700  | -27.48     | -39.56     | -13.00     | -14.48 | 12.08 Peak  | Horizontal |
| 2 |      | 97.900  | -42.07     | -31.36     | -13.00     | -29.07 | -10.71 Peak | Horizontal |
| 3 |      | 173.560 | -51.51     | -33.52     | -13.00     | -38.51 | -17.99 Peak | Horizontal |
| 4 |      | 193.930 | -52.22     | -34.83     | -13.00     | -39.22 | -17.39 Peak | Horizontal |
| 5 |      | 282.200 | -63.82     | -49.13     | -13.00     | -50.82 | -14.69 Peak | Horizontal |
| 6 |      | 403.450 | -65.22     | -54.76     | -13.00     | -52.22 | -10.46 Peak | Horizontal |



|                                                   |                 |                 |                    |
|---------------------------------------------------|-----------------|-----------------|--------------------|
| MODE                                              | TX channel 661  | FREQUENCY RANGE | Below 1000MHz      |
| ENVIRONMENTAL CONDITIONS                          | 26deg. C, 56%RH | INPUT POWER     | DC 5V from adapter |
| TESTED BY                                         | Tony Zou        |                 |                    |
| 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 | 39.700  | -30.97 | -29.69     | -13.00     | -17.97     | -1.28  | Peak   | Vertical  |
| 2 |    | 102.750 | -40.82 | -29.78     | -13.00     | -27.82     | -11.04 | Peak   | Vertical  |
| 3 |    | 197.810 | -50.59 | -39.68     | -13.00     | -37.59     | -10.91 | Peak   | Vertical  |
| 4 |    | 283.170 | -66.16 | -54.79     | -13.00     | -53.16     | -11.37 | Peak   | Vertical  |
| 5 |    | 399.570 | -63.93 | -52.99     | -13.00     | -50.93     | -10.94 | Peak   | Vertical  |
| 6 |    | 443.220 | -63.93 | -54.59     | -13.00     | -50.93     | -9.34  | Peak   | Vertical  |



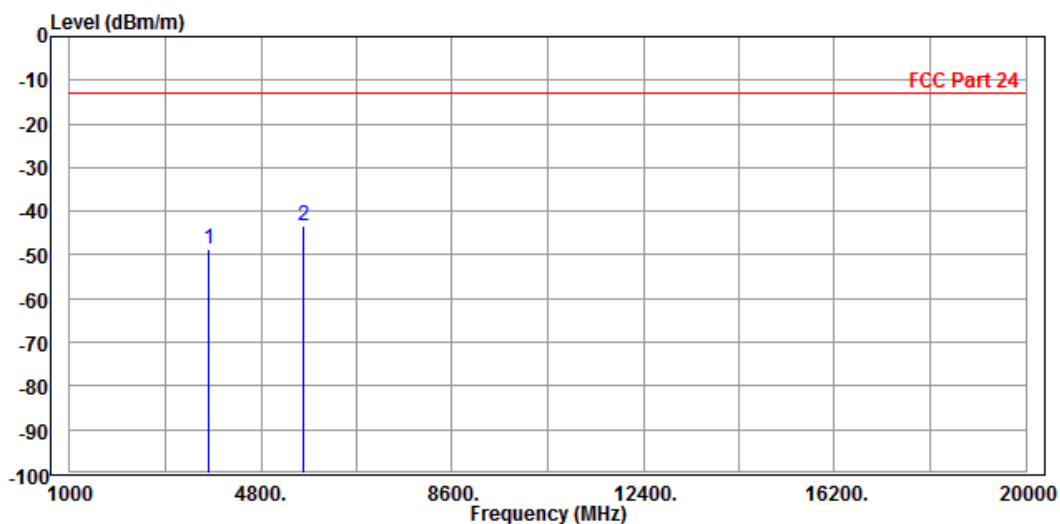
### ABOVE 1GHz DATA

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

### PCS 1900:

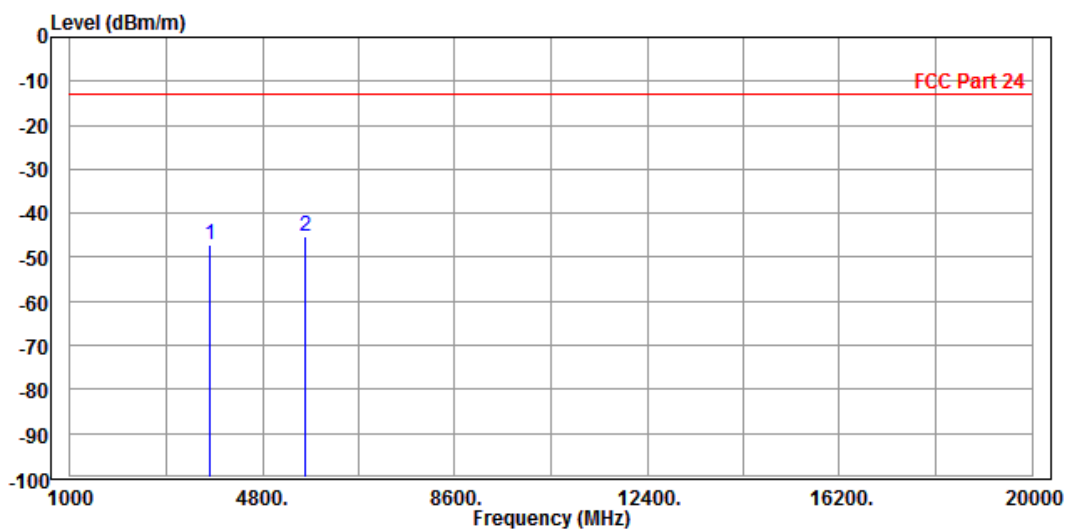
|                                                     |                 |                 |                    |
|-----------------------------------------------------|-----------------|-----------------|--------------------|
| MODE                                                | TX channel 661  | FREQUENCY RANGE | Above 1000MHz      |
| ENVIRONMENTAL CONDITIONS                            | 26deg. C, 56%RH | INPUT POWER     | DC 5V from adapter |
| TESTED BY                                           | Tony Zou        |                 |                    |
| 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    | 3755.000 | -48.54 | -51.93     | -13.00     | -35.54     | 3.39   | Peak   | Horizontal |
| 2 PP | 5640.000 | -43.42 | -52.54     | -13.00     | -30.42     | 9.12   | Peak   | Horizontal |



|                                                   |                 |                 |                    |
|---------------------------------------------------|-----------------|-----------------|--------------------|
| MODE                                              | TX channel 661  | FREQUENCY RANGE | Above 1000MHz      |
| ENVIRONMENTAL CONDITIONS                          | 26deg. C, 56%RH | INPUT POWER     | DC 5V from adapter |
| TESTED BY                                         | Tony Zou        |                 |                    |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M |                 |                 |                    |

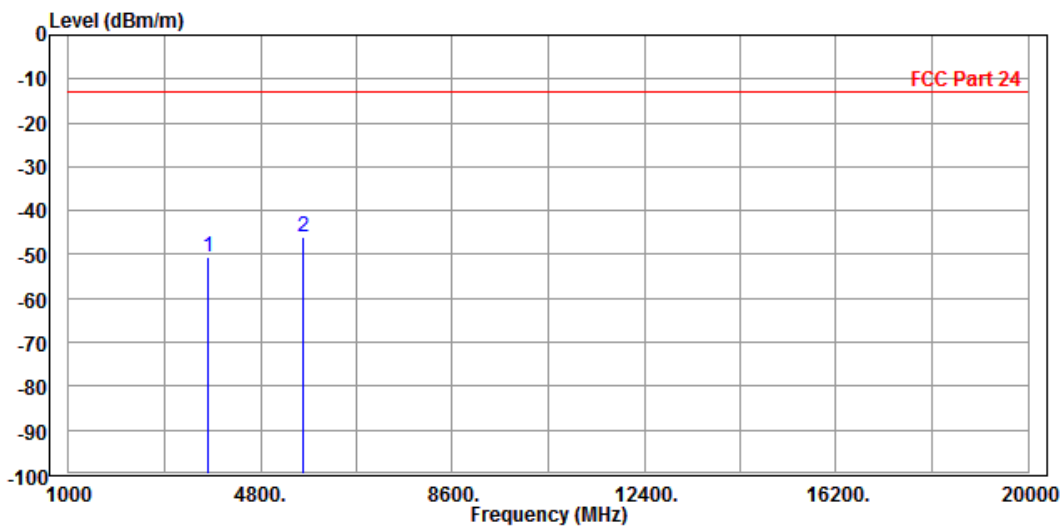
|      | Freq     | Level  | Read Level | Limit  | Over Limit | Factor | Remark | Pol/Phase |
|------|----------|--------|------------|--------|------------|--------|--------|-----------|
|      | MHz      | dBm/m  | dBm        | dBm/m  | dB         | dB/m   |        |           |
| 1    | 3755.000 | -47.13 | -50.98     | -13.00 | -34.13     | 3.85   | Peak   | Vertical  |
| 2 PP | 5640.000 | -45.26 | -53.52     | -13.00 | -32.26     | 8.26   | Peak   | Vertical  |



EDGE 1900:

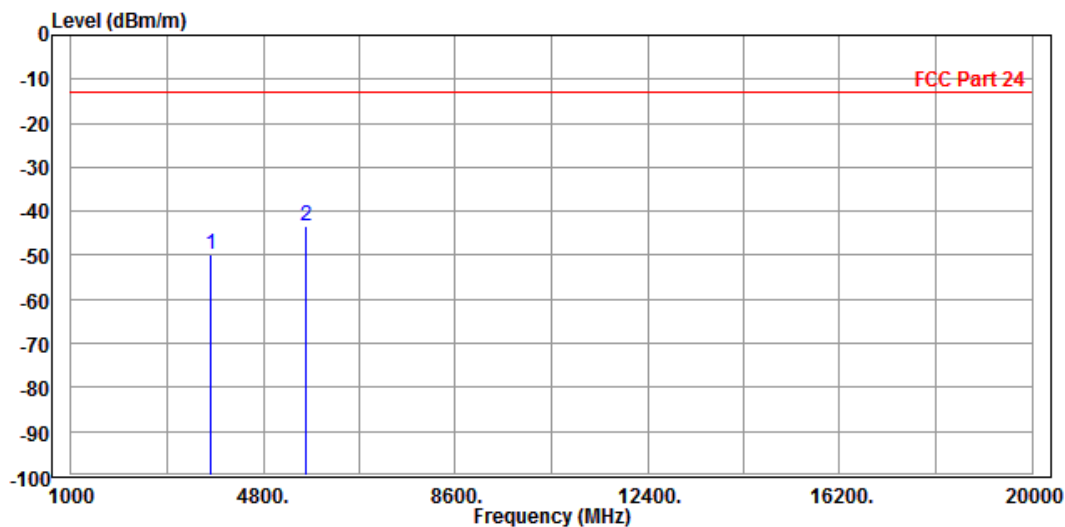
|                                                     |                 |                 |                    |
|-----------------------------------------------------|-----------------|-----------------|--------------------|
| MODE                                                | TX channel 661  | FREQUENCY RANGE | Above 1000MHz      |
| ENVIRONMENTAL CONDITIONS                            | 26deg. C, 56%RH | INPUT POWER     | DC 5V from adapter |
| TESTED BY                                           | Tony Zou        |                 |                    |
| 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    | 3755.000 | -50.59 | -53.98     | -13.00     | -37.59     | 3.39   | Peak   | Horizontal |
| 2 PP | 5640.000 | -45.99 | -55.11     | -13.00     | -32.99     | 9.12   | Peak   | Horizontal |



|                                                   |                 |                 |                    |
|---------------------------------------------------|-----------------|-----------------|--------------------|
| MODE                                              | TX channel 661  | FREQUENCY RANGE | Above 1000MHz      |
| ENVIRONMENTAL CONDITIONS                          | 26deg. C, 56%RH | INPUT POWER     | DC 5V from adapter |
| TESTED BY                                         | Tony Zou        |                 |                    |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M |                 |                 |                    |

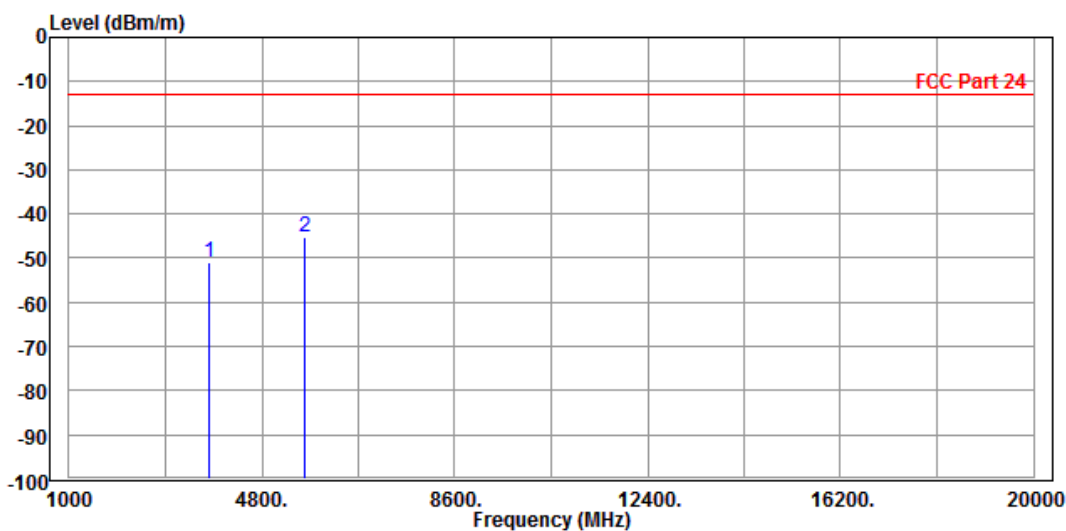
|      | Freq     | Level  | Read Level | Limit Line | Over Limit | Factor | Remark | Pol/Phase |
|------|----------|--------|------------|------------|------------|--------|--------|-----------|
|      | MHz      | dBm/m  | dBm        | dBm/m      | dB         | dB/m   |        |           |
| 1    | 3755.000 | -49.68 | -53.53     | -13.00     | -36.68     | 3.85   | Peak   | Vertical  |
| 2 PP | 5640.000 | -43.49 | -51.75     | -13.00     | -30.49     | 8.26   | Peak   | Vertical  |



WCDMA Band II:

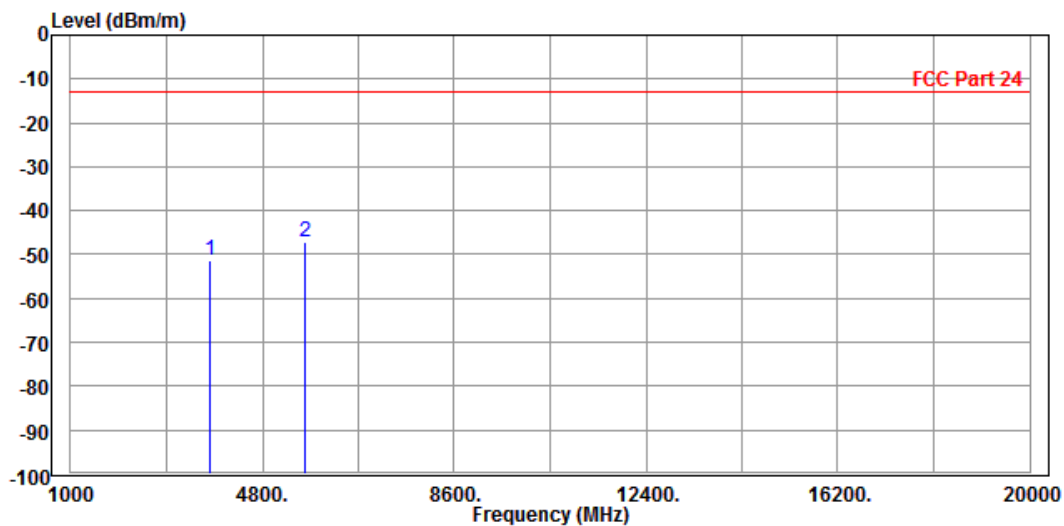
|                                                     |                 |                 |                    |
|-----------------------------------------------------|-----------------|-----------------|--------------------|
| MODE                                                | TX channel 9400 | FREQUENCY RANGE | Above 1000MHz      |
| ENVIRONMENTAL CONDITIONS                            | 26deg. C, 56%RH | INPUT POWER     | DC 5V from adapter |
| TESTED BY                                           | Tony Zou        |                 |                    |
| 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    | 3755.000 | -51.06 | -54.45     | -13.00     | -38.06     | 3.39   | Peak   | Horizontal |
| 2 PP | 5640.000 | -45.39 | -54.51     | -13.00     | -32.39     | 9.12   | Peak   | Horizontal |



|                                                   |                 |                 |                    |
|---------------------------------------------------|-----------------|-----------------|--------------------|
| MODE                                              | TX channel 9400 | FREQUENCY RANGE | Above 1000MHz      |
| ENVIRONMENTAL CONDITIONS                          | 26deg. C, 56%RH | INPUT POWER     | DC 5V from adapter |
| TESTED BY                                         | Tony Zou        |                 |                    |
| 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    | 3755.000 | -51.48 | -55.33     | -13.00     | -38.48     | 3.85   | Peak   | Vertical  |
| 2 PP | 5640.000 | -47.00 | -55.26     | -13.00     | -34.00     | 8.26   | Peak   | Vertical  |





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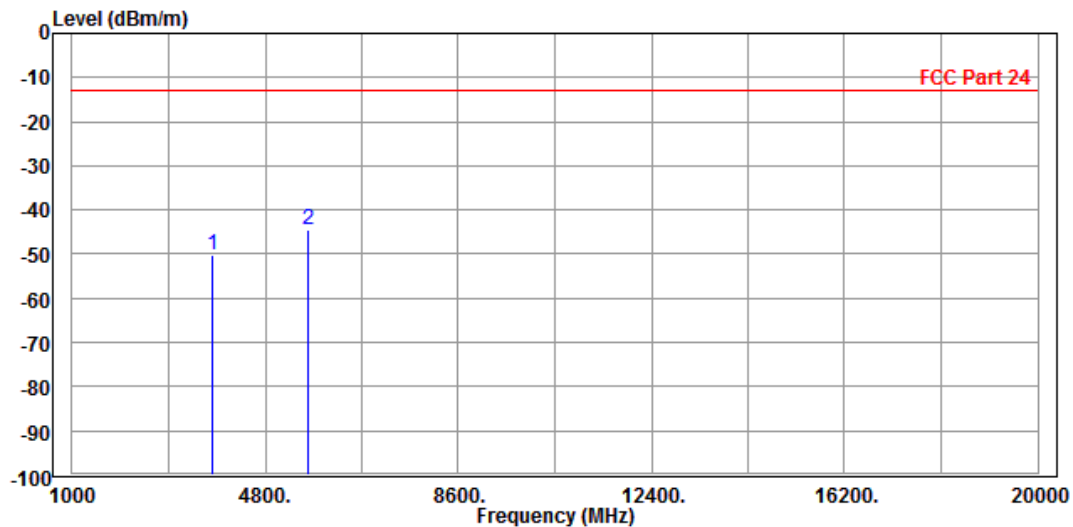
Test Report No.: RF170118W004R1-4

LTE Band 2

CHANNEL BANDWIDTH: 1.4MHz / QPSK

|                                                     |                  |                 |                    |
|-----------------------------------------------------|------------------|-----------------|--------------------|
| MODE                                                | TX channel 18900 | FREQUENCY RANGE | Above 1000MHz      |
| ENVIRONMENTAL CONDITIONS                            | 26deg. C, 56%RH  | INPUT POWER     | DC 5V from adapter |
| TESTED BY                                           | Tony Zou         |                 |                    |
| 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    | 3755.000 | -50.05 | -53.44     | -13.00     | -37.05     | 3.39   | Peak   | Horizontal |
| 2 PP | 5640.000 | -44.62 | -53.74     | -13.00     | -31.62     | 9.12   | Peak   | Horizontal |



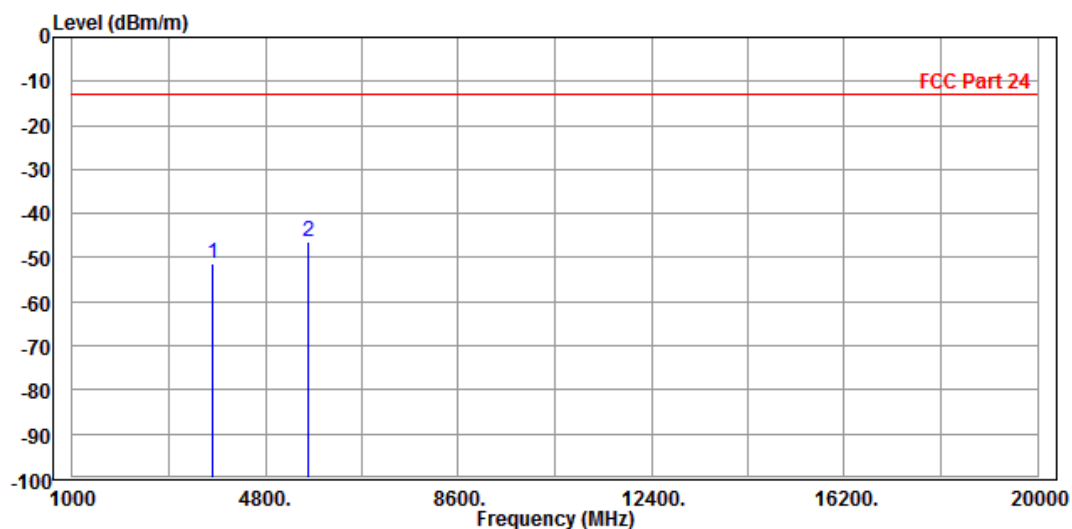
Bureau Veritas Shenzhen Co., Ltd.  
Dongguan Branch

No. 34, Chenwulu Section, Guantai Rd.,  
Houjie Town, Dongguan City,  
Guangdong 523942, China

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|                                                   |                  |                 |                    |
|---------------------------------------------------|------------------|-----------------|--------------------|
| MODE                                              | TX channel 18900 | FREQUENCY RANGE | Above 1000MHz      |
| ENVIRONMENTAL CONDITIONS                          | 26deg. C, 56%RH  | INPUT POWER     | DC 5V from adapter |
| TESTED BY                                         | Tony Zou         |                 |                    |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M |                  |                 |                    |

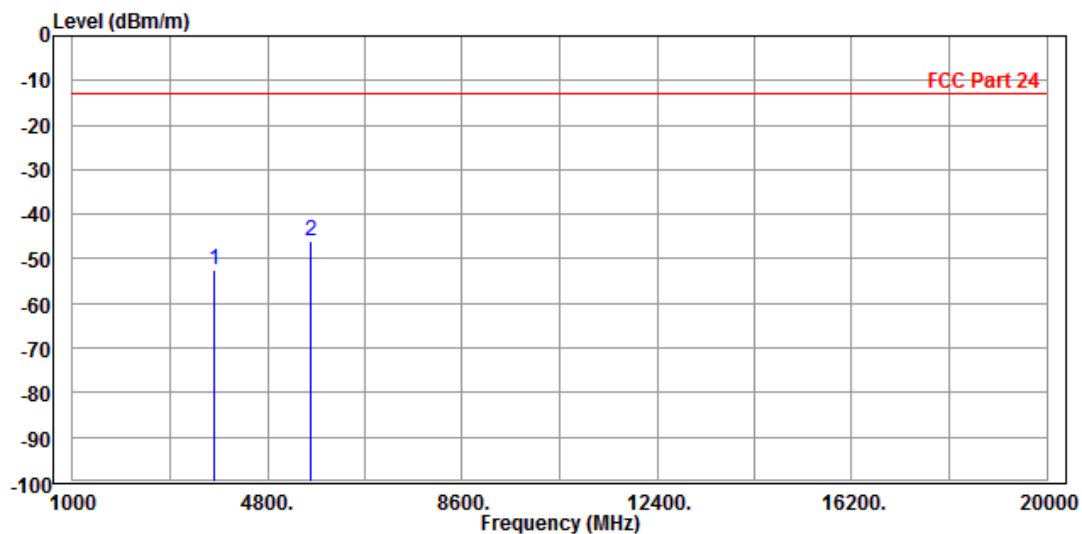
|      | Freq     | Level  | Read Level | Limit Line | Over Limit | Factor | Remark | Pol/Phase |
|------|----------|--------|------------|------------|------------|--------|--------|-----------|
|      | MHz      | dBm/m  | dBm        | dBm/m      | dB         | dB/m   |        |           |
| 1    | 3755.000 | -51.16 | -55.01     | -13.00     | -38.16     | 3.85   | Peak   | Vertical  |
| 2 PP | 5640.000 | -46.39 | -54.65     | -13.00     | -33.39     | 8.26   | Peak   | Vertical  |



CHANNEL BANDWIDTH: 3MHz / QPSK

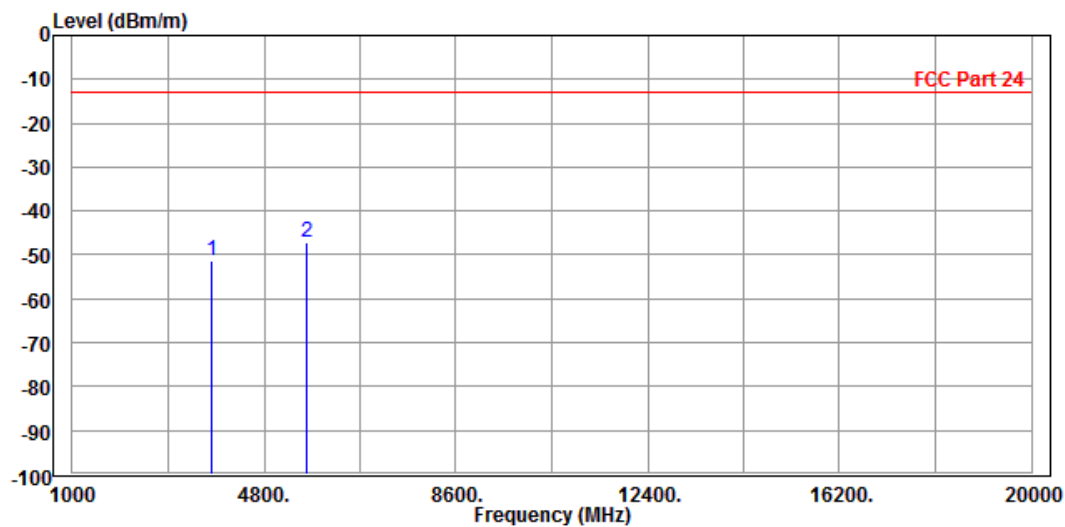
|                                                     |                  |                 |                    |
|-----------------------------------------------------|------------------|-----------------|--------------------|
| MODE                                                | TX channel 18900 | FREQUENCY RANGE | Above 1000MHz      |
| ENVIRONMENTAL CONDITIONS                            | 26deg. C, 56%RH  | INPUT POWER     | DC 5V from adapter |
| TESTED BY                                           | Tony Zou         |                 |                    |
| 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    | 3755.000 | -52.53 | -55.92     | -13.00     | -39.53     | 3.39   | Peak   | Horizontal |
| 2 PP | 5640.000 | -45.92 | -55.04     | -13.00     | -32.92     | 9.12   | Peak   | Horizontal |



|                                                   |                  |                 |                    |
|---------------------------------------------------|------------------|-----------------|--------------------|
| MODE                                              | TX channel 18900 | FREQUENCY RANGE | Above 1000MHz      |
| ENVIRONMENTAL CONDITIONS                          | 26deg. C, 56%RH  | INPUT POWER     | DC 5V from adapter |
| TESTED BY                                         | Tony Zou         |                 |                    |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M |                  |                 |                    |

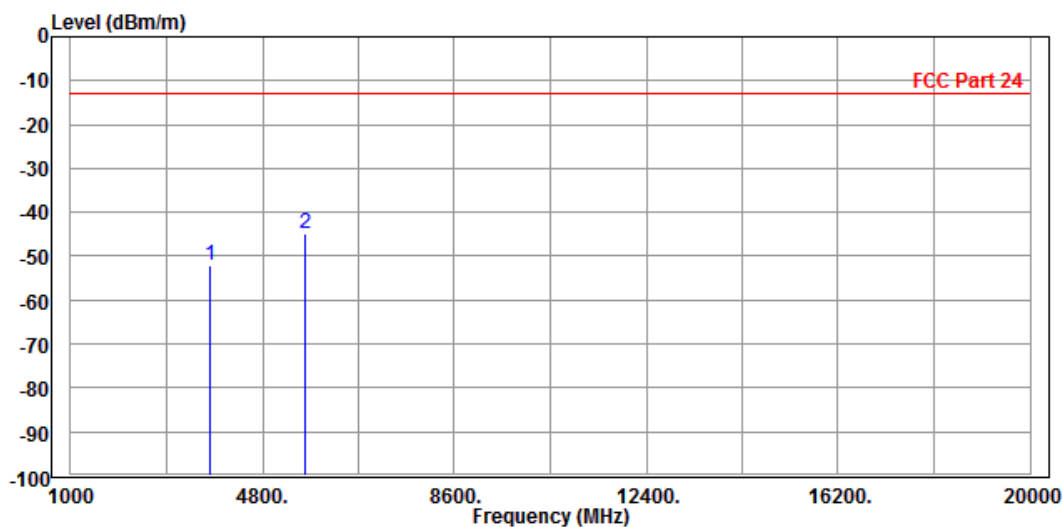
|      | Freq     | Level  | Read Level | Limit Line | Over Limit | Factor | Remark | Pol/Phase |
|------|----------|--------|------------|------------|------------|--------|--------|-----------|
|      | MHz      | dBm/m  | dBm        | dBm/m      | dB         | dB/m   |        |           |
| 1    | 3755.000 | -51.16 | -55.01     | -13.00     | -38.16     | 3.85   | Peak   | Vertical  |
| 2 PP | 5640.000 | -47.15 | -55.41     | -13.00     | -34.15     | 8.26   | Peak   | Vertical  |



CHANNEL BANDWIDTH: 5MHz / QPSK

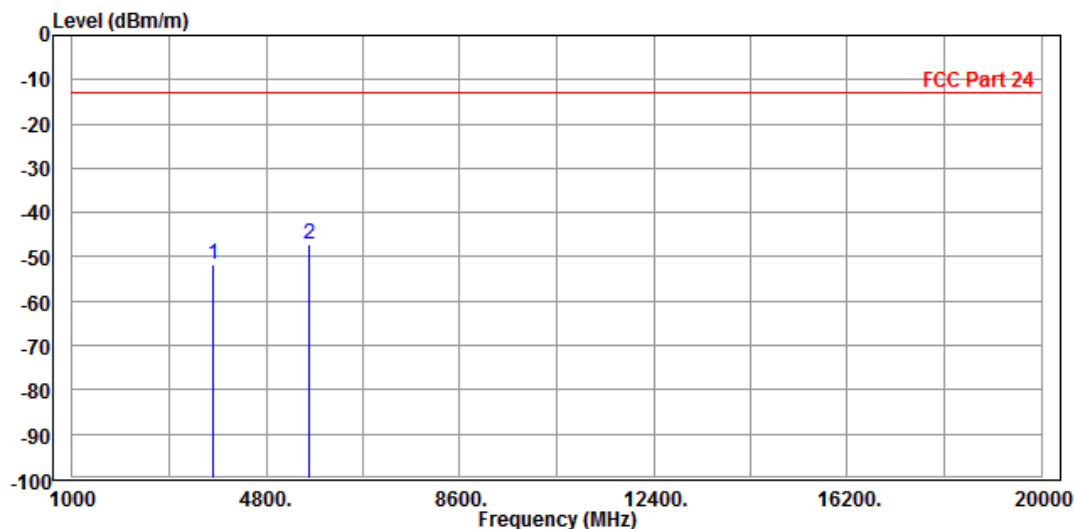
|                                                     |                  |                 |                    |
|-----------------------------------------------------|------------------|-----------------|--------------------|
| MODE                                                | TX channel 18900 | FREQUENCY RANGE | Above 1000MHz      |
| ENVIRONMENTAL CONDITIONS                            | 26deg. C, 56%RH  | INPUT POWER     | DC 5V from adapter |
| TESTED BY                                           | Tony Zou         |                 |                    |
| 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    | 3755.000 | -52.21 | -55.60     | -13.00     | -39.21     | 3.39   | Peak   | Horizontal |
| 2 PP | 5640.000 | -44.79 | -53.91     | -13.00     | -31.79     | 9.12   | Peak   | Horizontal |



|                                                   |                  |                 |                    |
|---------------------------------------------------|------------------|-----------------|--------------------|
| MODE                                              | TX channel 18900 | FREQUENCY RANGE | Above 1000MHz      |
| ENVIRONMENTAL CONDITIONS                          | 26deg. C, 56%RH  | INPUT POWER     | DC 5V from adapter |
| TESTED BY                                         | Tony Zou         |                 |                    |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M |                  |                 |                    |

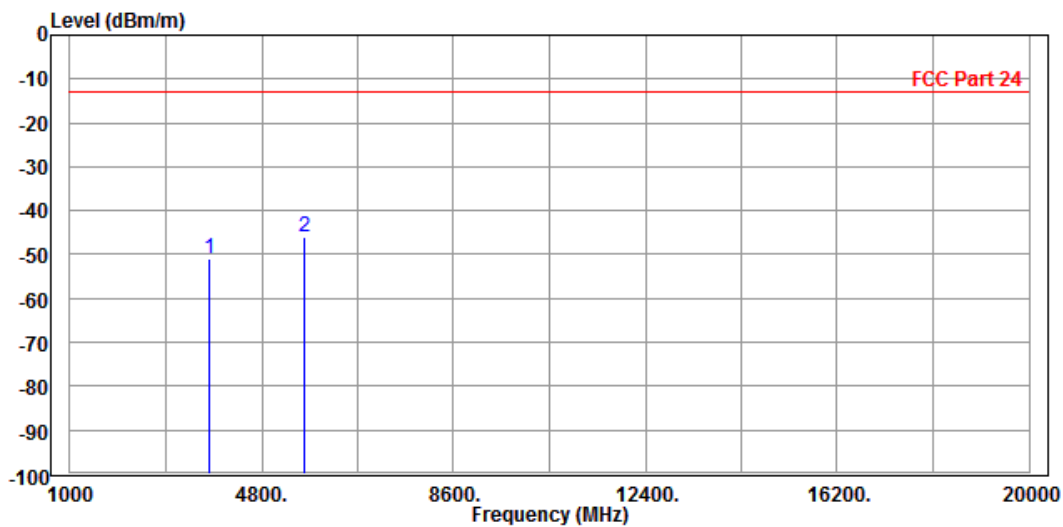
|      | Freq     | Level  | Read Level | Limit Line | Over Limit | Factor | Remark | Pol/Phase |
|------|----------|--------|------------|------------|------------|--------|--------|-----------|
|      | MHz      | dBm/m  | dBm        | dBm/m      | dB         | dB/m   |        |           |
| 1    | 3755.000 | -51.72 | -55.57     | -13.00     | -38.72     | 3.85   | Peak   | Vertical  |
| 2 PP | 5640.000 | -47.31 | -55.57     | -13.00     | -34.31     | 8.26   | Peak   | Vertical  |



CHANNEL BANDWIDTH: 10MHz / QPSK

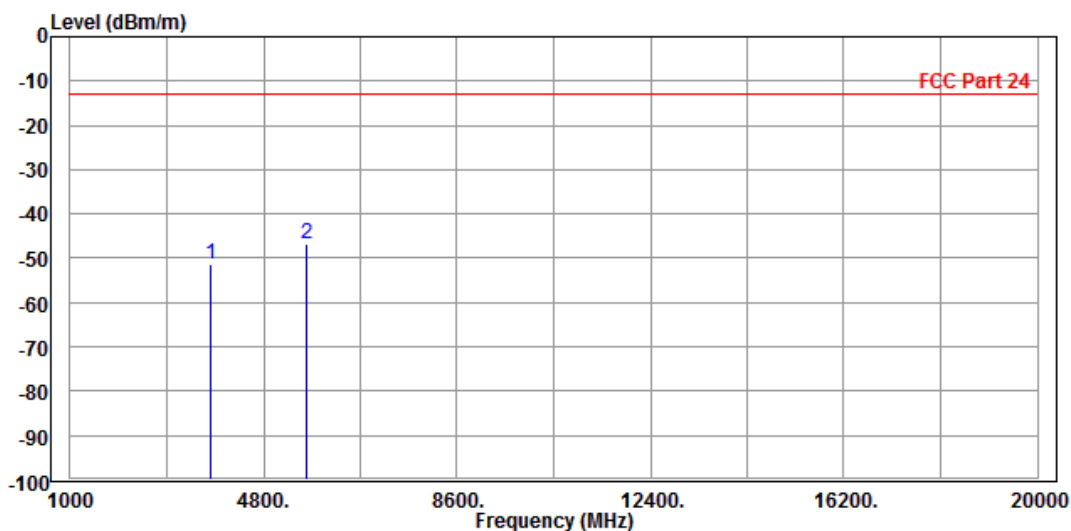
|                                                     |                  |                 |                    |
|-----------------------------------------------------|------------------|-----------------|--------------------|
| MODE                                                | TX channel 18900 | FREQUENCY RANGE | Above 1000MHz      |
| ENVIRONMENTAL CONDITIONS                            | 26deg. C, 56%RH  | INPUT POWER     | DC 5V from adapter |
| TESTED BY                                           | Tony Zou         |                 |                    |
| 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    | 3755.000 | -51.11 | -54.50     | -13.00     | -38.11     | 3.39   | Peak   | Horizontal |
| 2 PP | 5640.000 | -46.03 | -55.15     | -13.00     | -33.03     | 9.12   | Peak   | Horizontal |



|                                                   |                  |                 |                    |
|---------------------------------------------------|------------------|-----------------|--------------------|
| MODE                                              | TX channel 18900 | FREQUENCY RANGE | Above 1000MHz      |
| ENVIRONMENTAL CONDITIONS                          | 26deg. C, 56%RH  | INPUT POWER     | DC 5V from adapter |
| TESTED BY                                         | Tony Zou         |                 |                    |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M |                  |                 |                    |

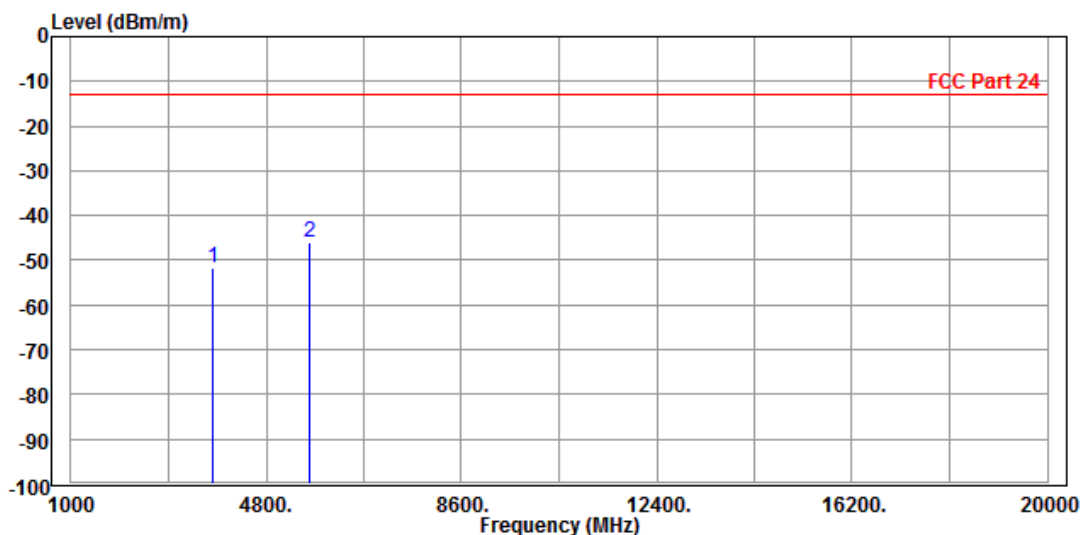
|      | Freq     | Level  | Read Level | Limit Line | Over Limit | Factor | Remark | Pol/Phase |
|------|----------|--------|------------|------------|------------|--------|--------|-----------|
|      | MHz      | dBm/m  | dBm        | dBm/m      | dB         | dB/m   |        |           |
| 1    | 3755.000 | -51.35 | -55.20     | -13.00     | -38.35     | 3.85   | Peak   | Vertical  |
| 2 PP | 5640.000 | -46.84 | -55.10     | -13.00     | -33.84     | 8.26   | Peak   | Vertical  |



CHANNEL BANDWIDTH: 15MHz / QPSK

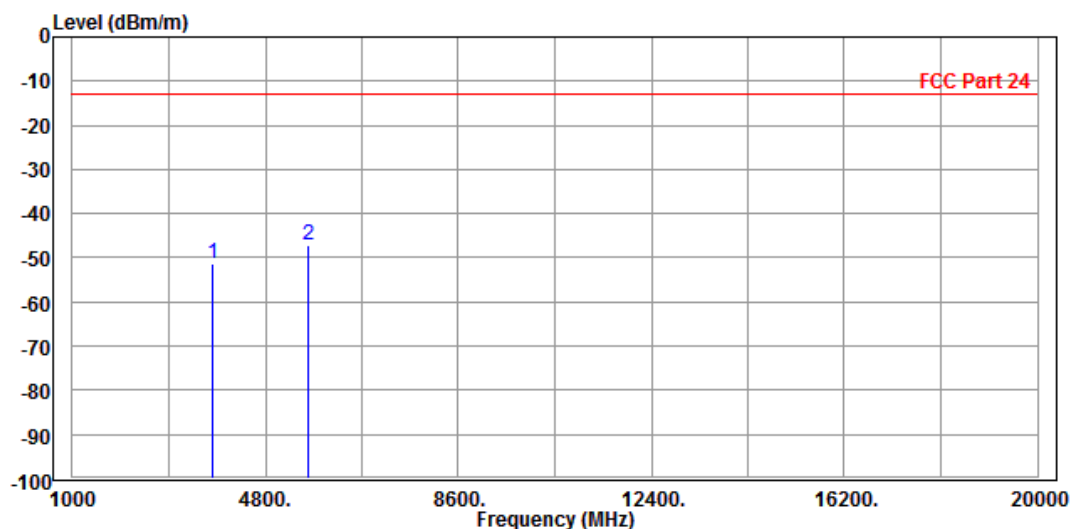
|                                                     |                  |                 |                    |
|-----------------------------------------------------|------------------|-----------------|--------------------|
| MODE                                                | TX channel 18900 | FREQUENCY RANGE | Above 1000MHz      |
| ENVIRONMENTAL CONDITIONS                            | 26deg. C, 56%RH  | INPUT POWER     | DC 5V from adapter |
| TESTED BY                                           | Tony Zou         |                 |                    |
| 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    | 3755.000 | -51.59 | -54.98     | -13.00     | -38.59     | 3.39   | Peak   | Horizontal |
| 2 PP | 5640.000 | -46.01 | -55.13     | -13.00     | -33.01     | 9.12   | Peak   | Horizontal |



|                                                   |                  |                 |                    |
|---------------------------------------------------|------------------|-----------------|--------------------|
| MODE                                              | TX channel 18900 | FREQUENCY RANGE | Above 1000MHz      |
| ENVIRONMENTAL CONDITIONS                          | 26deg. C, 56%RH  | INPUT POWER     | DC 5V from adapter |
| TESTED BY                                         | Tony Zou         |                 |                    |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M |                  |                 |                    |

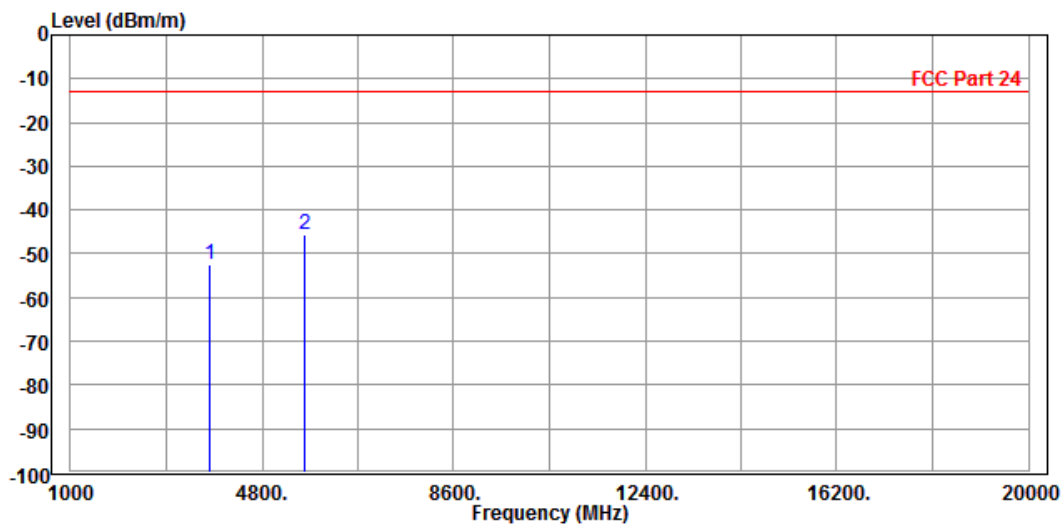
|      | Freq     | Level  | Read Level | Limit Line | Over Limit | Factor | Remark | Pol/Phase |
|------|----------|--------|------------|------------|------------|--------|--------|-----------|
|      | MHz      | dBm/m  | dBm        | dBm/m      | dB         | dB/m   |        |           |
| 1    | 3755.000 | -51.33 | -55.18     | -13.00     | -38.33     | 3.85   | Peak   | Vertical  |
| 2 PP | 5640.000 | -47.19 | -55.45     | -13.00     | -34.19     | 8.26   | Peak   | Vertical  |



CHANNEL BANDWIDTH: 20MHz / QPSK

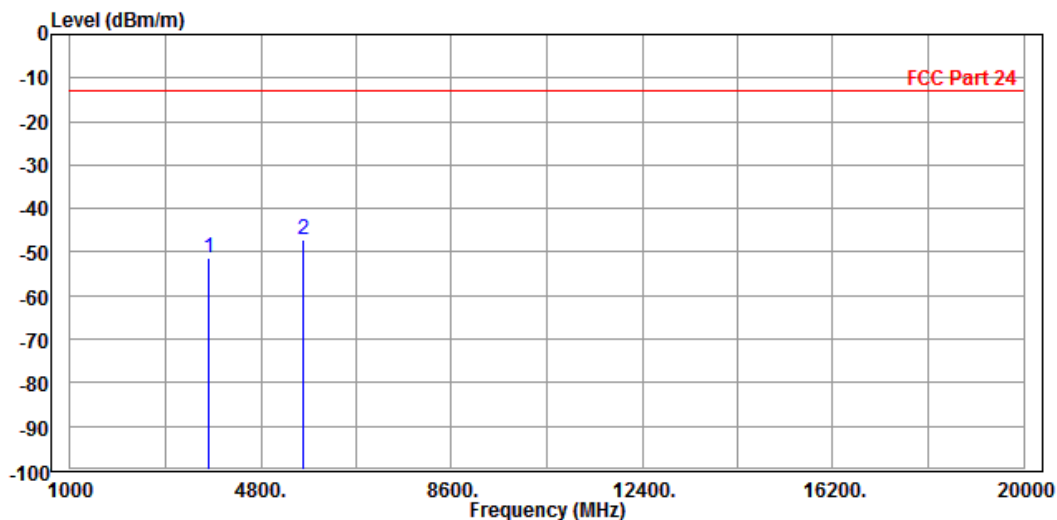
|                                                     |                  |                 |                    |
|-----------------------------------------------------|------------------|-----------------|--------------------|
| MODE                                                | TX channel 18900 | FREQUENCY RANGE | Above 1000MHz      |
| ENVIRONMENTAL CONDITIONS                            | 26deg. C, 56%RH  | INPUT POWER     | DC 5V from adapter |
| TESTED BY                                           | Tony Zou         |                 |                    |
| 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    | 3755.000 | -52.43 | -55.82     | -13.00     | -39.43     | 3.39   | Peak   | Horizontal |
| 2 PP | 5640.000 | -45.45 | -54.57     | -13.00     | -32.45     | 9.12   | Peak   | Horizontal |



|                                                   |                  |                 |                    |
|---------------------------------------------------|------------------|-----------------|--------------------|
| MODE                                              | TX channel 18900 | FREQUENCY RANGE | Above 1000MHz      |
| ENVIRONMENTAL CONDITIONS                          | 26deg. C, 56%RH  | INPUT POWER     | DC 5V from adapter |
| TESTED BY                                         | Tony Zou         |                 |                    |
| 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    | 3755.000 | -51.46 | -55.31     | -13.00     | -38.46     | 3.85   | Peak   | Vertical  |
| 2 PP | 5640.000 | -47.22 | -55.48     | -13.00     | -34.22     | 8.26   | Peak   | Vertical  |

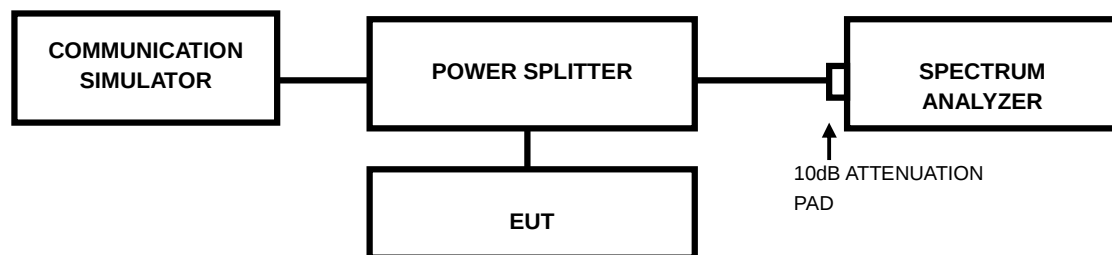


## 4.7 PEAK TO AVERAGE RATIO

### 4.7.1 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

### 4.7.2 TEST SETUP



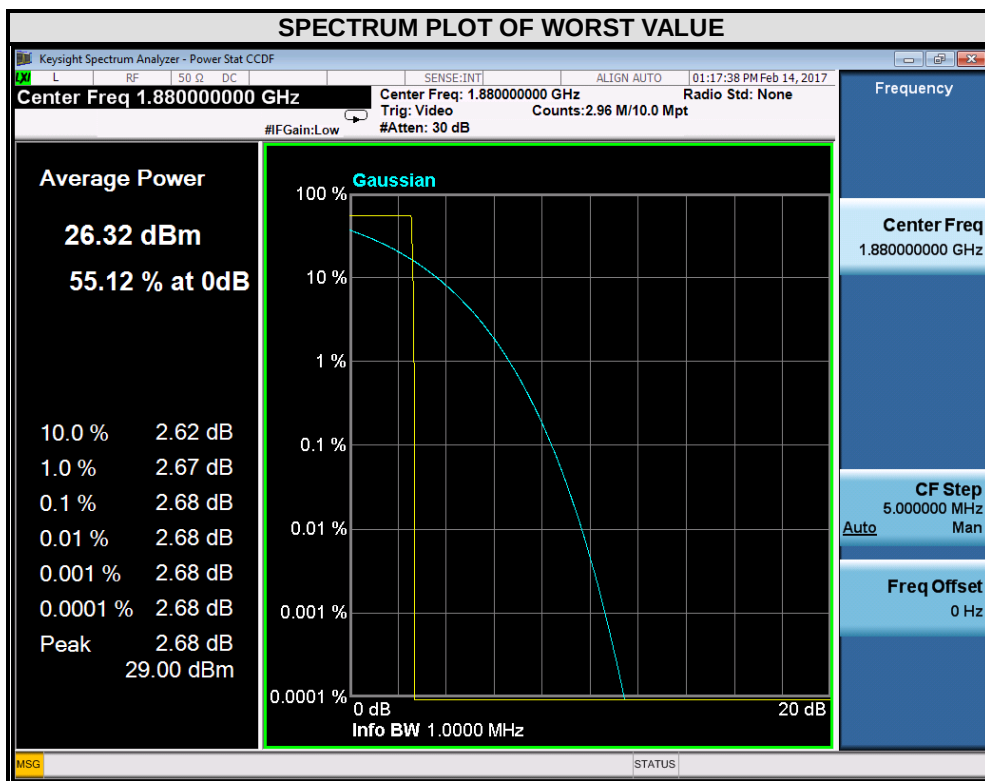
### 4.7.3 TEST PROCEDURES

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%.

#### 4.7.4 TEST RESULTS

##### GSM

| CHANNEL | FREQUENCY (MHz) | PEAK TO AVERAGE RATIO (dB) |
|---------|-----------------|----------------------------|
| 661     | 1880            | 2.68                       |



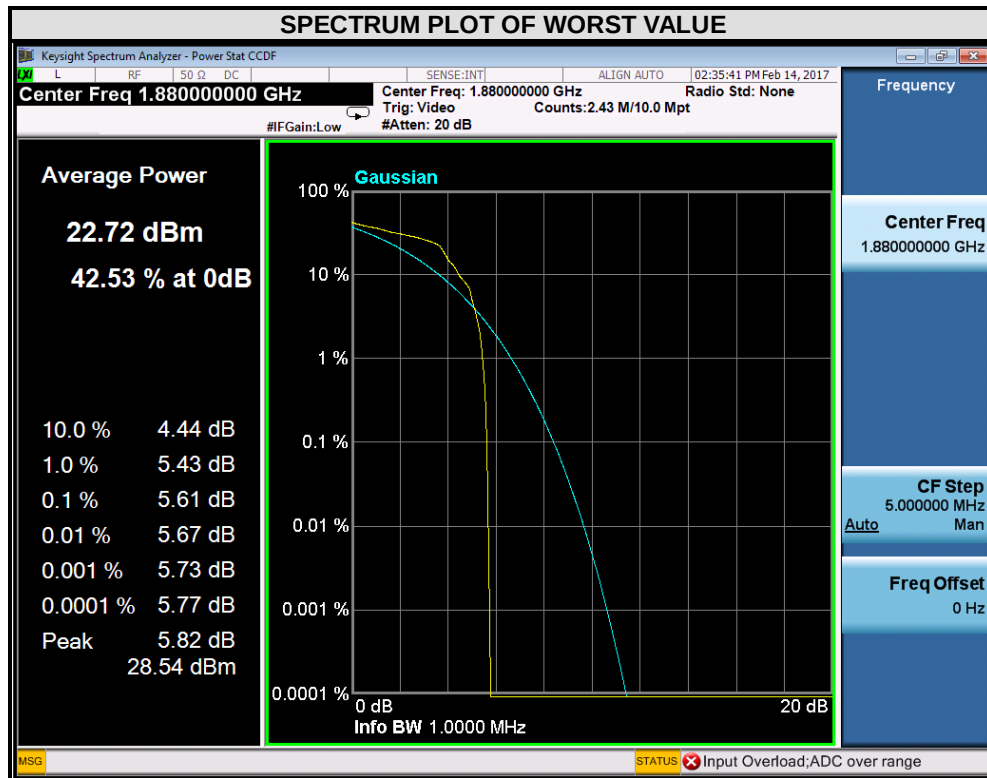


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Test Report No.: RF170118W004R1-4

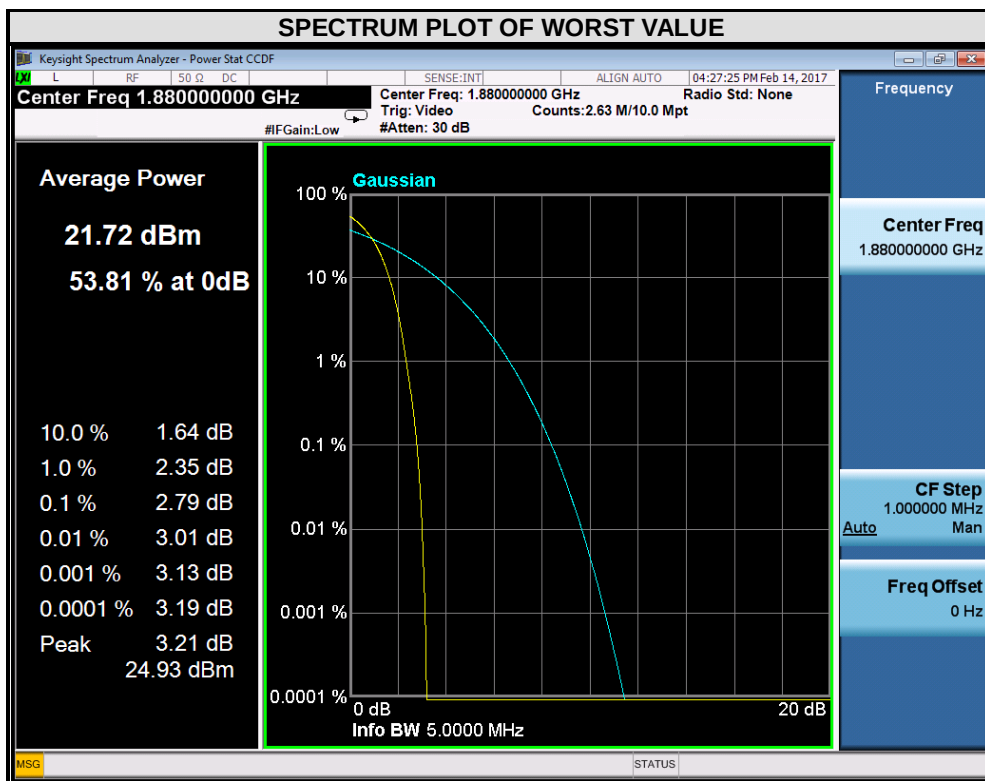
## EDGE

| CHANNEL | FREQUENCY (MHz) | PEAK TO AVERAGE RATIO (dB) |
|---------|-----------------|----------------------------|
| 661     | 1880            | 5.61                       |



WCDMA

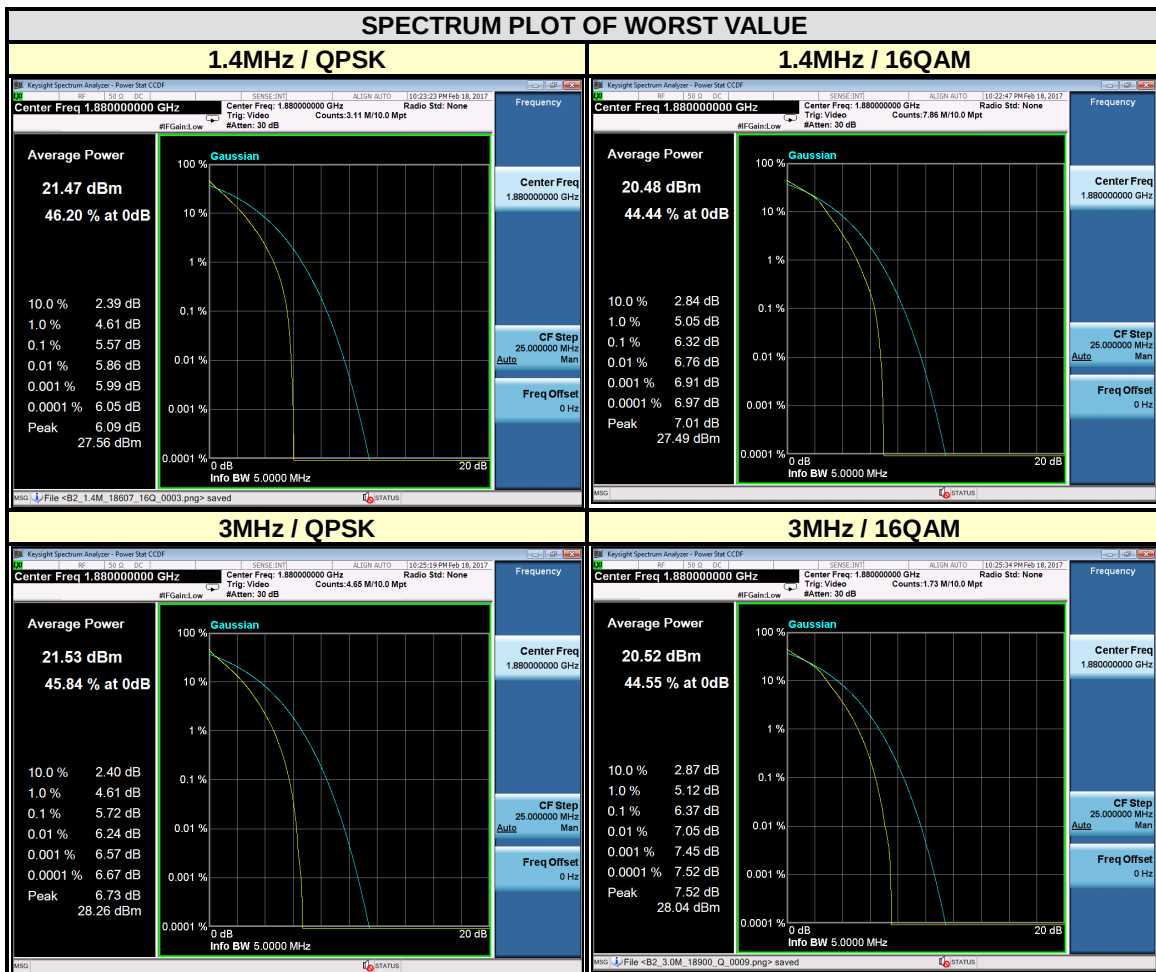
| CHANNEL | FREQUENCY (MHz) | PEAK TO AVERAGE RATIO (dB) |
|---------|-----------------|----------------------------|
| 9400    | 1880            | 2.79                       |



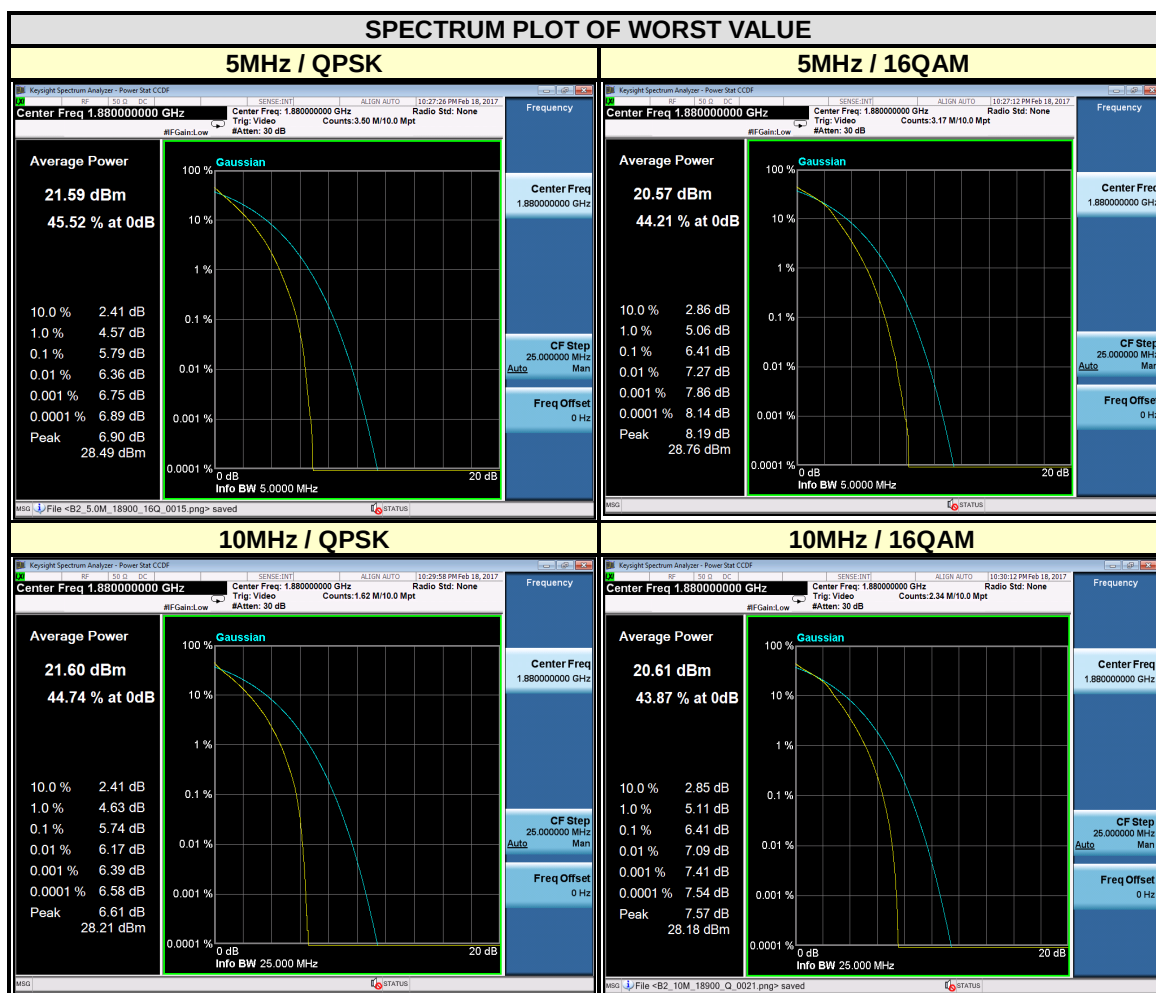


## LTE BAND 2

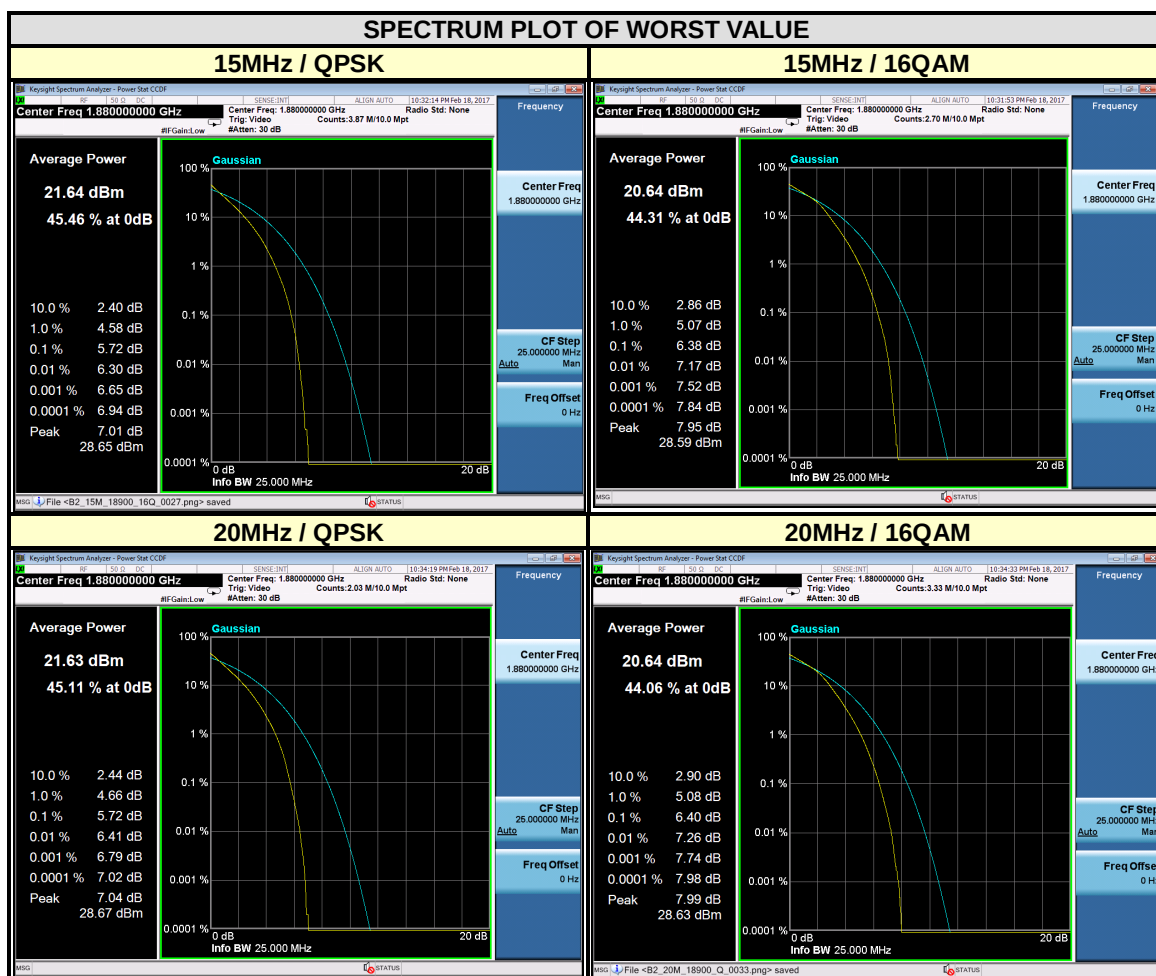
| CHANNEL BANDWIDTH: 1.4MHz |                 |                            |       | CHANNEL BANDWIDTH: 3MHz |                 |                            |       |
|---------------------------|-----------------|----------------------------|-------|-------------------------|-----------------|----------------------------|-------|
| CHANNEL                   | FREQUENCY (MHz) | PEAK TO AVERAGE RATIO (dB) |       | CHANNEL                 | FREQUENCY (MHz) | PEAK TO AVERAGE RATIO (dB) |       |
|                           |                 | QPSK                       | 16QAM |                         |                 | QPSK                       | 16QAM |
| 18607                     | 1850.7          | 5.35                       | 6.11  | 18615                   | 1851.5          | 5.48                       | 6.13  |
| 18900                     | 1880            | 5.57                       | 6.32  | 18900                   | 1880            | 5.72                       | 6.37  |
| 19193                     | 1909.3          | 5.02                       | 5.88  | 19185                   | 1908.5          | 5.37                       | 6.11  |



| 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          | 5.63                       | 6.21  | 18650                    | 1855            | 5.27                       | 5.98  |
| 18900                   | 1880            | 5.79                       | 6.41  | 18900                    | 1880            | 5.74                       | 6.41  |
| 19175                   | 1907.5          | 5.51                       | 6.21  | 19150                    | 1905            | 5.25                       | 5.99  |



| 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          | 5.22                       | 5.96  | 18700                    | 1860            | 5.20                       | 5.98  |
| 18900                    | 1880            | 5.72                       | 6.38  | 18900                    | 1880            | 5.72                       | 6.40  |
| 19125                    | 1902.5          | 5.18                       | 5.93  | 19100                    | 1900            | 5.15                       | 5.93  |





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## 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:

**Dongguan EMC/RF Lab:**

Tel: +86-769-85935656

Fax: +86-769-85931080

**Email:** [customerservice.dg@cn.bureauveritas.com](mailto:customerservice.dg@cn.bureauveritas.com)

**Web Site:** [www.adt.com.tw](http://www.adt.com.tw)

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



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

No any modifications are made to the EUT by the lab during the test.

**---END---**