

# FCC TEST REPORT

## (PART 24)

**REPORT NO.:** RF150519C09B-1

**MODEL NO.:** Lenovo A2010-I

**FCC ID:** YCNA2010-L

**RECEIVED:** May 29, 2015

**TESTED:** Jun. 01, 2015 ~ Jun. 07, 2015

**ISSUED:** Jun. 18, 2015

**APPLICANT:** Lenovo Mobile Communication Technology Ltd.

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**ISSUED BY:** Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch

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

**TEST LOCATION:** No. 19, Hwa Ya 2nd Rd, Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 333, Taiwan, R.O.C.

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## RELEASE CONTROL RECORD

| ISSUE NO.      | REASON FOR CHANGE | DATE ISSUED   |
|----------------|-------------------|---------------|
| RF150519C09B-1 | Original release  | Jun. 18, 2015 |



A D T

## 1 CERTIFICATION

**PRODUCT:** Lenovo Mobile Phone

**MODEL:** Lenovo A2010-I

**BRAND:** lenovo

**APPLICANT:** Lenovo Mobile Communication Technology Ltd.

**TESTED:** Jun. 01, 2015 ~ Jun. 07, 2015

**TEST SAMPLE:** Production Unit

**STANDARDS:** FCC Part 24, Subpart E

The above equipment (model: Lenovo A2010-I) has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

**PREPARED BY** : Ivonne Wu , **DATE** : Jun. 18, 2015

Ivonne Wu / Supervisor

**APPROVED BY** : Kay Wu , **DATE** : Jun. 18, 2015

Kay Wu / Supervisor

## 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 -31.20dB at 5640.00MHz. |

### 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      | 2.44 dB     |
| Radiated emissions  | 30MHz ~ 200MHz  | 2.93 dB     |
|                     | 200MHz ~1000MHz | 2.95 dB     |
|                     | 1GHz ~ 18GHz    | 2.26 dB     |
|                     | 18GHz ~ 40GHz   | 1.94 dB     |

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

| DESCRIPTION & MANUFACTURER                     | MODEL NO.      | SERIAL NO.          | DATE OF CALIBRATION | DUE DATE OF CALIBRATION |
|------------------------------------------------|----------------|---------------------|---------------------|-------------------------|
| Test Receiver<br>Agilent                       | N9038A         | MY51210203          | Jan. 21, 2015       | Jan. 21, 2016           |
| Spectrum Analyzer<br>Agilent                   | N9010A         | MY52220314          | Sep. 03, 2014       | Sep. 02, 2015           |
| Spectrum Analyzer<br>ROHDE & SCHWARZ           | FSU43          | 101261              | Dec. 10, 2014       | Dec. 09, 2015           |
| BILOG Antenna<br>SCHWARZBECK                   | VULB9168       | 9168-472            | Feb. 04, 2015       | Feb. 04, 2016           |
| HORN Antenna<br>SCHWARZBECK                    | BBHA 9120 D    | 9120D-969           | Feb. 09, 2015       | Feb. 09, 2016           |
| HORN Antenna<br>SCHWARZBECK                    | BBHA 9170      | 9170-480            | Feb. 04, 2015       | Feb. 04, 2016           |
| Preamplifier<br>EMCI                           | EMC 012645     | 980115              | Dec. 12, 2014       | Dec. 11, 2015           |
| Preamplifier<br>EMCI                           | EMC 184045     | 980116              | Jan. 09, 2015       | Jan. 08, 2016           |
| Preamplifier<br>EMCI                           | EMC 330H       | 980112              | Dec. 27, 2014       | Dec. 26, 2015           |
| Power Meter<br>Anritsu                         | ML2495A        | 1232002             | Sep. 17, 2014       | Sep. 16, 2015           |
| Power Sensor<br>Anritsu                        | MA2411B        | 1207325             | Sep. 17, 2014       | Sep. 16, 2015           |
| RF signal cable<br>HUBER+SUHNNER               | SUCOFLEX 104   | 309219/4<br>2950114 | Oct. 18, 2014       | Oct. 17, 2015           |
| RF signal cable<br>HUBER+SUHNNER               | SUCOFLEX 104   | 250130/4            | Oct. 18, 2014       | Oct. 17, 2015           |
| RF Coaxial Cable<br>Worken                     | 8D-FB          | Cable-Ch10-01       | Nov. 07, 2014       | Nov. 06, 2015           |
| Software<br>BV ADT                             | E3<br>6.120103 | NA                  | NA                  | NA                      |
| Antenna Tower                                  | MFA-440H       | NA                  | NA                  | NA                      |
| Turn Table                                     | MFT-201SS      | NA                  | NA                  | NA                      |
| Antenna Tower & Turn Table<br>Controller<br>MF | MF-7802        | NA                  | NA                  | NA                      |
| Communications<br>Tester-Wireless<br>Agilent   | 8960 Series 10 | MY53201073          | Jul. 05, 2013       | Jul. 04, 2015           |
| Radio Communication<br>Analyzer<br>Anritsu     | MT8820C        | 6201300640          | Aug. 01, 2013       | Jul. 31, 2015           |

- NOTE:** 1. The calibration interval of the above test instruments is 12 / 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 10.
3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The FCC Site Registration No. is 690701.
5. The IC Site Registration No. is IC 7450F-10.

### 3 GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

|                     |                                                        |                       |
|---------------------|--------------------------------------------------------|-----------------------|
| EUT                 | Lenovo Mobile Phone                                    |                       |
| MODEL NO.           | Lenovo A2010-I                                         |                       |
| POWER SUPPLY        | 5.0Vdc (adapter or host equipment)<br>3.8Vdc (battery) |                       |
| MODULATION TYPE     | GSM/GPRS                                               | GMSK                  |
|                     | EDGE                                                   | GMSK, 8PSK            |
|                     | WCDMA                                                  | BPSK                  |
|                     | LTE Band 2                                             | QPSK, 16QAM           |
| FREQUENCY RANGE     | GSM/GPRS/EDGE                                          | 1850.2MHz ~ 1909.8MHz |
|                     | WCDMA                                                  | 1852.4MHz ~ 1907.6MHz |
|                     | LTE Band 2 (Channel Bandwidth: 1.4MHz)                 | 1850.7MHz ~ 1909.3MHz |
|                     | LTE Band 2 (Channel Bandwidth: 3MHz)                   | 1851.5MHz ~ 1908.5MHz |
|                     | LTE Band 2 (Channel Bandwidth: 5MHz)                   | 1852.5MHz ~ 1907.5MHz |
|                     | LTE Band 2 (Channel Bandwidth: 10MHz)                  | 1855.0MHz ~ 1905.0MHz |
|                     | LTE Band 2 (Channel Bandwidth: 15MHz)                  | 1857.5MHz ~ 1902.5MHz |
|                     | LTE Band 2 (Channel Bandwidth: 20MHz)                  | 1860.0MHz ~ 1900.0MHz |
| MAX. EIRP POWER     | GSM                                                    | 843.92mW              |
|                     | EDGE                                                   | 487.87mW              |
|                     | WCDMA                                                  | 188.50mW              |
|                     | LTE Band 2 (Channel Bandwidth: 1.4MHz)                 | 118.58mW              |
|                     | LTE Band 2 (Channel Bandwidth: 3MHz)                   | 117.76mW              |
|                     | LTE Band 2 (Channel Bandwidth: 5MHz)                   | 116.95mW              |
|                     | LTE Band 2 (Channel Bandwidth: 10MHz)                  | 123.31mW              |
|                     | LTE Band 2 (Channel Bandwidth: 15MHz)                  | 122.18mW              |
|                     | LTE Band 2 (Channel Bandwidth: 20MHz)                  | 136.14mW              |
| EMISSION DESIGNATOR | GSM                                                    | 249KGXW               |
|                     | EDGE                                                   | 246KG7W               |
|                     | WCDMA                                                  | 4M24F9W               |
|                     | LTE Band 2 (Channel Bandwidth: 1.4MHz)                 | 1M09G7D               |
|                     | LTE Band 2 (Channel Bandwidth: 3MHz)                   | 2M70G7D               |
|                     | LTE Band 2 (Channel Bandwidth: 5MHz)                   | 4M51G7D               |
|                     | LTE Band 2 (Channel Bandwidth: 10MHz)                  | 8M98G7D               |
|                     | LTE Band 2 (Channel Bandwidth: 15MHz)                  | 13M5G7D               |
|                     | LTE Band 2 (Channel Bandwidth: 20MHz)                  | 18M0W7D               |

|                          |                        |
|--------------------------|------------------------|
| <b>ANTENNA TYPE</b>      | Fixed Internal Antenna |
| <b>I/O PORTS</b>         | Refer to users' manual |
| <b>DATA CABLE</b>        | Refer to NOTE as below |
| <b>ACCESSORY DEVICES</b> | Refer to NOTE as below |

**NOTE:**

- There're 2 configurations for the EUT listed as below.

Main sample (A): LCD Panel 1 + Front Camera 1 + Rear Camera 1 + eMMC 1

2<sup>nd</sup> sample (B): LCD Panel 2 + Front Camera 2 + Rear Camera 2 + eMMC 2

✧ Only the worst data was presented in the report.

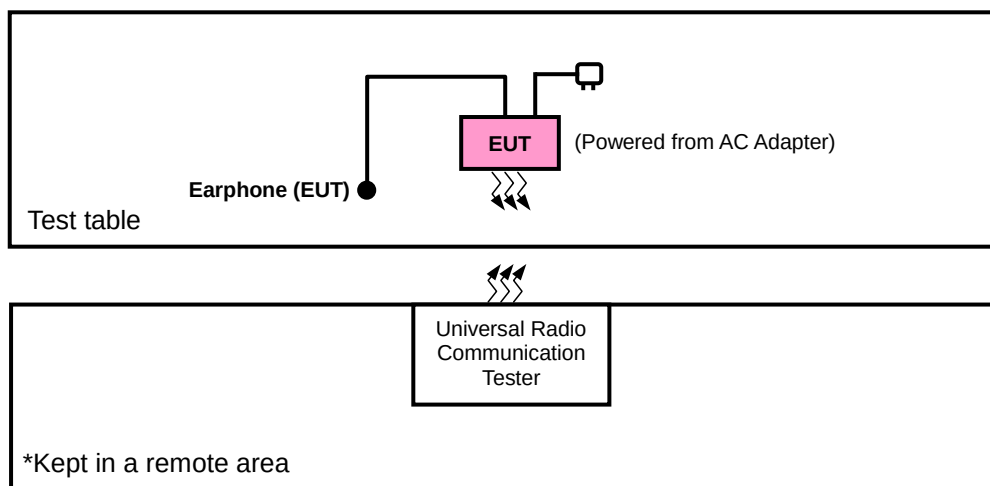
- The EUT contains following accessory devices.

| ITEM           | BRAND      | MODEL                                | SPECIFICATION                                                         |
|----------------|------------|--------------------------------------|-----------------------------------------------------------------------|
| Adapter 1      | lenovo     | C-P56                                | I/P: 100-240Vac, 0.13A<br>O/P: 5.0Vdc, 1.0A<br>Manufacturer: chenyang |
| Adapter 2      | lenovo     | C-P56                                | I/P: 100-240Vac, 0.13A<br>O/P: 5.0Vdc, 1.0A<br>Manufacturer: Acbel    |
| Battery        | lenovo     | BL253                                | 3.8Vdc, 2000mAh<br>Manufacturer: SUNWODA                              |
| Earphone 1     | LIANYUN    | TS990B-28AMS05-M<br>TS990B-28AMS06-M | 1.3m non-shielded cable w/o core                                      |
| Earphone 2     | TIANZHI    | TJ101247A<br>TJ-101406               | 1.3m non-shielded cable w/o core                                      |
| USB Cable 1    | LIQI       | L16B-05100070L<br>L16w-05100070L     | 0.7m shielded cable w/o core                                          |
| USB Cable 2    | FUKANGYUAN | F16B-05100070L<br>F16w-05100070L     | 0.7m shielded cable w/o core                                          |
| LCD Panel 1    | TONGXINGDA | TXDT450SKP-73V6                      | --                                                                    |
| LCD Panel 2    | Arising    | ART45PI6031A-1                       | --                                                                    |
| Front Camera 1 | HUAQUAN    | G6P2-AL712HQ                         | --                                                                    |
| Front Camera 2 | QUNHUI     | GV5893A1D-0P0J0                      | --                                                                    |
| Rear Camera 1  | HUAQUAN    | H7B5-AL711BHQ                        | --                                                                    |
| Rear Camera 2  | QUNHUI     | OX5892B1S-0P0J0                      | --                                                                    |
| eMMC 1         | Samsung    | KMQ72000SM-B316                      | MCP_8GB-eMMC_8Gb-LPDDR3                                               |
| eMMC 2         | hynix      | H9TQ64A8GTMCUR-KUM                   | MCP_8GB-eMMC_8Gb-LPDDR3                                               |
| CPU            | MediaTek   | MT6735V/WM                           | 641pin                                                                |

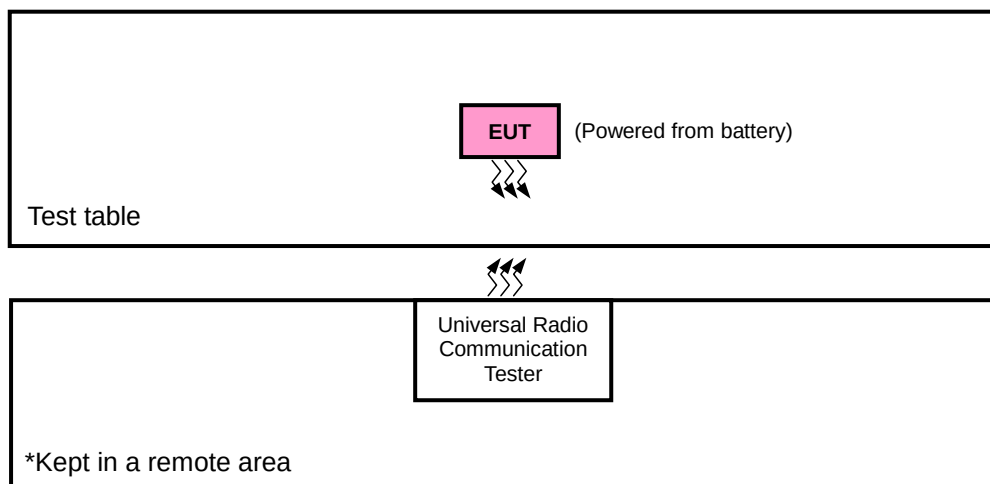
- The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

### 3.2 CONFIGURATION OF SYSTEM UNDER TEST

#### FOR RADIATION EMISSION TEST



#### FOR 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.

### 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 was found as the list below. Following channel(s) was (were) selected for the final test as listed below:

| EUT CONFIGURE MODE | DESCRIPTION            |
|--------------------|------------------------|
| A                  | Main sample            |
| B                  | 2 <sup>nd</sup> sample |

| EUT CONFIGURE MODE | EIRP    | RADIATED EMISSION                           |
|--------------------|---------|---------------------------------------------|
| A                  | X-plane | X-axis (GSM / EDGE / WCDMA)<br>Z-axis (LTE) |
| B                  | X-plane | X-axis                                      |

#### GSM MODE

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

### WCDMA MODE

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

### LTE BAND 2 MODE

| EUT CONFIGURE MODE | TEST ITEM             | AVAILABLE CHANNEL | TESTED CHANNEL      | CHANNEL BANDWIDTH | MODULATION  | MODE                 |
|--------------------|-----------------------|-------------------|---------------------|-------------------|-------------|----------------------|
| A                  | 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                  | EIRP                  | 18700 to 19100    | 18700, 18900, 19100 | 20MHz             | QPSK, 16QAM | 1 RB / 0 RB Offset   |
| A                  | FREQUENCY 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   |
| A                  | OCCUPIED BANDWIDTH    | 18607 to 19193    | 18607, 18900, 19193 | 1.4MHz            | QPSK, 16QAM | 6 RB / 0 RB Offset   |
|                    |                       | 18615 to 19185    | 18615, 18900, 19185 | 3MHz              | QPSK, 16QAM | 15 RB / 0 RB Offset  |
|                    |                       | 18625 to 19175    | 18625, 18900, 19175 | 5MHz              | QPSK, 16QAM | 25 RB / 0 RB Offset  |
|                    |                       | 18650 to 19150    | 18650, 18900, 19150 | 10MHz             | QPSK, 16QAM | 50 RB / 0 RB Offset  |
|                    |                       | 18675 to 19125    | 18675, 18900, 19125 | 15MHz             | QPSK, 16QAM | 75 RB / 0 RB Offset  |
|                    |                       | 18700 to 19100    | 18700, 18900, 19100 | 20MHz             | QPSK, 16QAM | 100 RB / 0 RB Offset |
| A                  | PEAK TO AVERAGE RATIO | 18607 to 19193    | 18607, 18900, 19193 | 1.4MHz            | QPSK, 16QAM | 1 RB / 0 RB Offset   |
|                    |                       | 18615 to 19185    | 18615, 18900, 19185 | 3MHz              | QPSK, 16QAM | 1 RB / 0 RB Offset   |
|                    |                       | 18625 to 19175    | 18625, 18900, 19175 | 5MHz              | QPSK, 16QAM | 1 RB / 0 RB Offset   |
|                    |                       | 18650 to 19150    | 18650, 18900, 19150 | 10MHz             | QPSK, 16QAM | 1 RB / 0 RB Offset   |
|                    |                       | 18675 to 19125    | 18675, 18900, 19125 | 15MHz             | QPSK, 16QAM | 1 RB / 0 RB Offset   |
|                    |                       | 18700 to 19100    | 18700, 18900, 19100 | 20MHz             | QPSK, 16QAM | 1 RB / 0 RB Offset   |

| EUT CONFIGURE MODE | TEST ITEM          | AVAILABLE CHANNEL | TESTED CHANNEL | CHANNEL BANDWIDTH | MODULATION | MODE                |
|--------------------|--------------------|-------------------|----------------|-------------------|------------|---------------------|
| A                  | BAND EDGE          | 18607 to 19193    | 18607          | 1.4MHz            | QPSK       | 1 RB / 0 RB Offset  |
|                    |                    |                   |                |                   |            | 6 RB / 0 RB Offset  |
|                    |                    |                   | 19193          | 1.4MHz            | QPSK       | 1 RB / 5 RB Offset  |
|                    |                    |                   |                |                   |            | 6 RB / 0 RB Offset  |
|                    |                    | 18615 to 19185    | 18615          | 3MHz              | QPSK       | 1 RB / 0 RB Offset  |
|                    |                    |                   |                |                   |            | 15 RB / 0 RB Offset |
|                    |                    |                   | 19185          | 3MHz              | QPSK       | 1 RB / 14 RB Offset |
|                    |                    |                   |                |                   |            | 15 RB / 0 RB Offset |
|                    |                    | 18625 to 19175    | 18625          | 5MHz              | QPSK       | 1 RB / 0 RB Offset  |
|                    |                    |                   |                |                   |            | 25 RB / 0 RB Offset |
|                    |                    |                   | 19175          | 5MHz              | QPSK       | 1 RB / 24 RB Offset |
|                    |                    |                   |                |                   |            | 25 RB / 0 RB Offset |
|                    |                    | 18650 to 19150    | 18650          | 10MHz             | QPSK       | 1 RB / 0 RB Offset  |
|                    |                    |                   |                |                   |            | 50 RB / 0 RB Offset |
|                    |                    |                   | 19150          | 10MHz             | QPSK       | 1 RB / 49 RB Offset |
|                    |                    |                   |                |                   |            | 50 RB / 0 RB Offset |
| A                  | CONDUCTED EMISSION | 18607 to 19193    | 18900          | 1.4MHz            | QPSK       | 1 RB / 0 RB Offset  |
|                    |                    | 18615 to 19185    | 18900          | 3MHz              | QPSK       | 1 RB / 0 RB Offset  |
|                    |                    | 18625 to 19175    | 18900          | 5MHz              | QPSK       | 1 RB / 0 RB Offset  |
|                    |                    | 18650 to 19150    | 18900          | 10MHz             | QPSK       | 1 RB / 0 RB Offset  |
|                    |                    | 18675 to 19125    | 18900          | 15MHz             | QPSK       | 1 RB / 0 RB Offset  |
|                    |                    | 18700 to 19100    | 18900          | 20MHz             | QPSK       | 1 RB / 0 RB Offset  |
| A, B               | RADIATED EMISSION  | 18700 to 19100    | 18900          | 20MHz             | QPSK       | 1 RB / 0 RB Offset  |

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

**TEST CONDITION:**

| Test Item             | Environmental Conditions | Input Power  | Tested by                                 |
|-----------------------|--------------------------|--------------|-------------------------------------------|
| ERP                   | 26deg. C, 58%RH          | 3.8Vdc       | Charles Hsiao                             |
| FREQUENCY STABILITY   | 26deg. C, 58%RH          | 3.8Vdc       | Luke Chen                                 |
| OCCUPIED BANDWIDTH    | 26deg. C, 58%RH          | 3.8Vdc       | Luke Chen                                 |
| PEAK TO AVERAGE RATIO | 26deg. C, 58%RH          | 3.8Vdc       | Luke Chen                                 |
| BAND EDGE             | 26deg. C, 58%RH          | 3.8Vdc       | Luke Chen                                 |
| CONDUCTED EMISSION    | 26deg. C, 58%RH          | 3.8Vdc       | Luke Chen                                 |
| RADIATED EMISSION     | 25deg. C, 65%RH          | 120Vac, 60Hz | Charles Hsiao / Will Chen /<br>Hwa Chiang |

**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**

**ANSI/TIA/EIA-603-C 2004**

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

## 4 TEST TYPES AND RESULTS

### 4.1 OUTPUT POWER MEASUREMENT

#### 4.1.1 LIMITS OF OUTPUT POWER MEASUREMENT

Mobile and portable stations are limited to 2 watts EIRP.

#### 4.1.2 TEST PROCEDURES

##### EIRP MEASUREMENT:

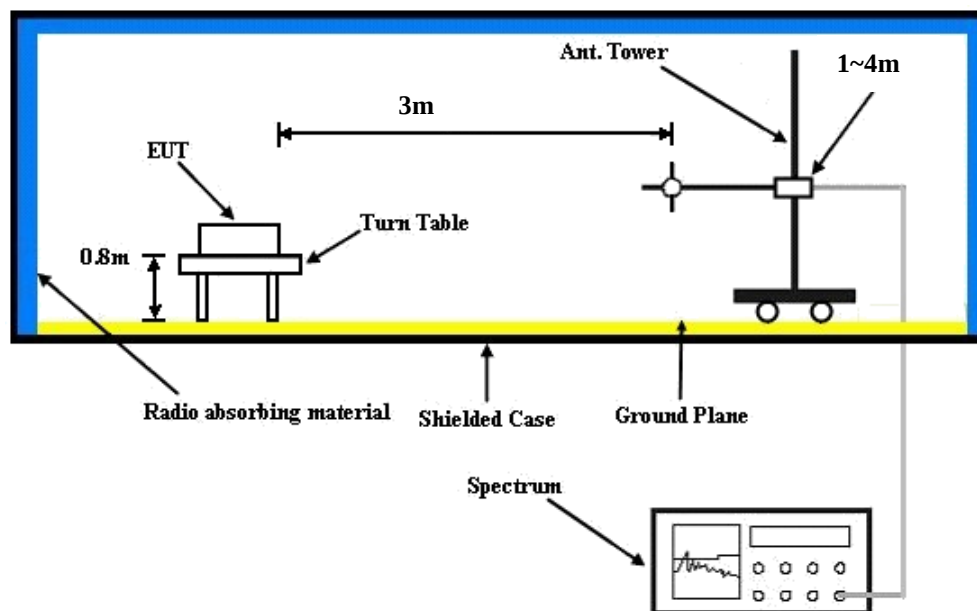
- a. All measurements were done at low, middle and high operational frequency range. RBW and VBW is 1MHz for GSM, GPRS & EDGE, 5MHz for WCDMA, and 10MHz for LTE mode.
- b. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated 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:

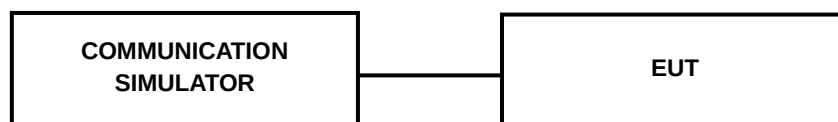
The EUT was set up for the maximum power with GSM, GPRS, EDGE & WCDMA & LTE link data modulation and link up with simulator. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

### 4.1.3 TEST SETUP

#### EIRP / ERP MEASUREMENT:



#### CONDUCTED POWER MEASUREMENT:



#### 4.1.4 TEST RESULTS

##### CONDUCTED OUTPUT POWER (dBm)

| Band                     | GSM1900 |        |        |
|--------------------------|---------|--------|--------|
| Channel                  | 512     | 661    | 810    |
| Frequency (MHz)          | 1850.2  | 1880.0 | 1909.8 |
| GSM (1 Uplink)           | 29.30   | 29.19  | 29.29  |
| GPRS 8 (GMSK, 1 slot)    | 29.29   | 29.18  | 29.28  |
| GPRS 10 (GMSK, 2 slot)   | 28.69   | 28.58  | 28.68  |
| GPRS 11 (GMSK, 3 slot)   | 27.06   | 26.95  | 27.05  |
| GPRS 12 (GMSK, 4 slot)   | 26.06   | 25.95  | 26.05  |
| EDGE 8 (8PSK, 1 Uplink)  | 26.73   | 26.62  | 26.72  |
| EDGE 10 (8PSK, 2 Uplink) | 25.89   | 25.78  | 25.88  |
| EDGE 11 (8PSK, 3 Uplink) | 23.88   | 23.77  | 23.87  |
| EDGE 12 (8PSK, 4 Uplink) | 23.05   | 22.94  | 23.04  |

| Band            | WCDMA II |        |        |
|-----------------|----------|--------|--------|
| Channel         | 9262     | 9400   | 9538   |
| Frequency (MHz) | 1852.4   | 1880.0 | 1907.6 |
| RMC 12.2K       | 23.03    | 22.73  | 22.91  |
| HSDPA Subtest-1 | 22.03    | 21.73  | 21.91  |
| HSDPA Subtest-2 | 22.05    | 21.75  | 21.93  |
| HSDPA Subtest-3 | 21.63    | 21.33  | 21.51  |
| HSDPA Subtest-4 | 21.62    | 21.32  | 21.50  |
| HSUPA Subtest-1 | 20.17    | 19.87  | 20.05  |
| HSUPA Subtest-2 | 19.16    | 18.85  | 19.03  |
| HSUPA Subtest-3 | 20.16    | 19.84  | 20.01  |
| HSUPA Subtest-4 | 19.16    | 18.86  | 19.04  |
| HSUPA Subtest-5 | 21.08    | 20.78  | 20.50  |

| Band / BW | RB Size | RB Offset | QPSK         |              |               | 3GPP MPR (dB) | 16QAM        |              |               | 3GPP MPR (dB) |
|-----------|---------|-----------|--------------|--------------|---------------|---------------|--------------|--------------|---------------|---------------|
|           |         |           | Low CH 18607 | Mid CH 18900 | High CH 19193 |               | Low CH 18607 | Mid CH 18900 | High CH 19193 |               |
|           |         |           | 1850.7 MHz   | 1880.0 MHz   | 1909.3 MHz    |               | 1850.7 MHz   | 1880.0 MHz   | 1909.3 MHz    |               |
| 2 / 1.4M  | 1       | 0         | 22.02        | 21.62        | 21.46         | 0             | 21.00        | 20.60        | 20.44         | 1             |
|           | 1       | 2         | 21.82        | 21.42        | 21.26         | 0             | 20.80        | 20.40        | 20.24         | 1             |
|           | 1       | 5         | 21.54        | 21.14        | 20.98         | 0             | 20.52        | 20.12        | 19.96         | 1             |
|           | 3       | 0         | 21.06        | 20.66        | 20.50         | 0             | 20.04        | 19.64        | 19.48         | 1             |
|           | 3       | 1         | 20.92        | 20.52        | 20.36         | 0             | 19.90        | 19.50        | 19.34         | 1             |
|           | 3       | 3         | 20.78        | 20.38        | 20.22         | 0             | 19.76        | 19.36        | 19.20         | 1             |
|           | 6       | 0         | 20.90        | 20.50        | 20.34         | 1             | 19.88        | 19.48        | 19.32         | 2             |

| Band / BW | RB Size | RB Offset | QPSK         |              |               | 3GPP MPR (dB) | 16QAM        |              |               | 3GPP MPR (dB) |
|-----------|---------|-----------|--------------|--------------|---------------|---------------|--------------|--------------|---------------|---------------|
|           |         |           | Low CH 18615 | Mid CH 18900 | High CH 19185 |               | Low CH 18615 | Mid CH 18900 | High CH 19185 |               |
|           |         |           | 1851.5 MHz   | 1880.0 MHz   | 1908.5 MHz    |               | 1851.5 MHz   | 1880.0 MHz   | 1908.5 MHz    |               |
| 2 / 3M    | 1       | 0         | 22.04        | 21.64        | 21.48         | 0             | 21.02        | 20.62        | 20.46         | 1             |
|           | 1       | 7         | 21.84        | 21.44        | 21.28         | 0             | 20.82        | 20.42        | 20.26         | 1             |
|           | 1       | 14        | 21.56        | 21.16        | 21.00         | 0             | 20.54        | 20.14        | 19.98         | 1             |
|           | 8       | 0         | 21.08        | 20.68        | 20.52         | 1             | 20.06        | 19.66        | 19.50         | 2             |
|           | 8       | 3         | 20.94        | 20.54        | 20.38         | 1             | 19.92        | 19.52        | 19.36         | 2             |
|           | 8       | 7         | 20.80        | 20.40        | 20.24         | 1             | 19.78        | 19.38        | 19.22         | 2             |
|           | 15      | 0         | 20.92        | 20.52        | 20.36         | 1             | 19.90        | 19.50        | 19.34         | 2             |

| Band / BW | RB Size | RB Offset | QPSK         |              |               | 3GPP MPR (dB) | 16QAM        |              |               | 3GPP MPR (dB) |
|-----------|---------|-----------|--------------|--------------|---------------|---------------|--------------|--------------|---------------|---------------|
|           |         |           | Low CH 18625 | Mid CH 18900 | High CH 19175 |               | Low CH 18625 | Mid CH 18900 | High CH 19175 |               |
|           |         |           | 1852.5 MHz   | 1880.0 MHz   | 1907.5 MHz    |               | 1852.5 MHz   | 1880.0 MHz   | 1907.5 MHz    |               |
| 2 / 5M    | 1       | 0         | 22.09        | 21.69        | 21.53         | 0             | 21.07        | 20.67        | 20.51         | 1             |
|           | 1       | 12        | 21.89        | 21.49        | 21.33         | 0             | 20.87        | 20.47        | 20.31         | 1             |
|           | 1       | 24        | 21.61        | 21.21        | 21.05         | 0             | 20.59        | 20.19        | 20.03         | 1             |
|           | 12      | 0         | 21.13        | 20.73        | 20.57         | 1             | 20.11        | 19.71        | 19.55         | 2             |
|           | 12      | 6         | 20.99        | 20.59        | 20.43         | 1             | 19.97        | 19.57        | 19.41         | 2             |
|           | 12      | 13        | 20.85        | 20.45        | 20.29         | 1             | 19.83        | 19.43        | 19.27         | 2             |
|           | 25      | 0         | 20.97        | 20.57        | 20.41         | 1             | 19.95        | 19.55        | 19.39         | 2             |

| Band / BW | RB Size | RB Offset | QPSK         |              |               | 3GPP MPR (dB) | 16QAM        |              |               | 3GPP MPR (dB) |
|-----------|---------|-----------|--------------|--------------|---------------|---------------|--------------|--------------|---------------|---------------|
|           |         |           | Low CH 18650 | Mid CH 18900 | High CH 19150 |               | Low CH 18650 | Mid CH 18900 | High CH 19150 |               |
|           |         |           | 1855.0 MHz   | 1880.0 MHz   | 1905.0 MHz    |               | 1855.0 MHz   | 1880.0 MHz   | 1905.0 MHz    |               |
| 2 / 10M   | 1       | 0         | 22.11        | 21.71        | 21.55         | 0             | 21.09        | 20.69        | 20.53         | 1             |
|           | 1       | 24        | 21.91        | 21.51        | 21.35         | 0             | 20.89        | 20.49        | 20.33         | 1             |
|           | 1       | 49        | 21.63        | 21.23        | 21.07         | 0             | 20.61        | 20.21        | 20.05         | 1             |
|           | 25      | 0         | 21.15        | 20.75        | 20.59         | 1             | 20.13        | 19.73        | 19.57         | 2             |
|           | 25      | 12        | 21.01        | 20.61        | 20.45         | 1             | 19.99        | 19.59        | 19.43         | 2             |
|           | 25      | 25        | 20.87        | 20.47        | 20.31         | 1             | 19.85        | 19.45        | 19.29         | 2             |
|           | 50      | 0         | 20.99        | 20.59        | 20.43         | 1             | 19.97        | 19.57        | 19.41         | 2             |

| Band / BW | RB Size | RB Offset | QPSK         |              |               | 3GPP MPR (dB) | 16QAM        |              |               | 3GPP MPR (dB) |
|-----------|---------|-----------|--------------|--------------|---------------|---------------|--------------|--------------|---------------|---------------|
|           |         |           | Low CH 18675 | Mid CH 18900 | High CH 19125 |               | Low CH 18675 | Mid CH 18900 | High CH 19125 |               |
|           |         |           | 1857.5 MHz   | 1880.0 MHz   | 1902.5 MHz    |               | 1857.5 MHz   | 1880.0 MHz   | 1902.5 MHz    |               |
| 2 / 15M   | 1       | 0         | 22.26        | 21.86        | 21.70         | 0             | 21.24        | 20.84        | 20.68         | 1             |
|           | 1       | 37        | 22.06        | 21.66        | 21.50         | 0             | 21.04        | 20.64        | 20.48         | 1             |
|           | 1       | 74        | 21.78        | 21.38        | 21.22         | 0             | 20.76        | 20.36        | 20.20         | 1             |
|           | 36      | 0         | 21.30        | 20.90        | 20.74         | 1             | 20.28        | 19.88        | 19.72         | 2             |
|           | 36      | 19        | 21.16        | 20.76        | 20.60         | 1             | 20.14        | 19.74        | 19.58         | 2             |
|           | 36      | 39        | 21.02        | 20.62        | 20.46         | 1             | 20.00        | 19.60        | 19.44         | 2             |
|           | 75      | 0         | 21.14        | 20.74        | 20.58         | 1             | 20.12        | 19.72        | 19.56         | 2             |

| Band / BW | RB Size | RB Offset | QPSK         |              |               | 3GPP MPR (dB) | 16QAM        |              |               | 3GPP MPR (dB) |
|-----------|---------|-----------|--------------|--------------|---------------|---------------|--------------|--------------|---------------|---------------|
|           |         |           | Low CH 18700 | Mid CH 18900 | High CH 19100 |               | Low CH 18700 | Mid CH 18900 | High CH 19100 |               |
|           |         |           | 1860.0 MHz   | 1880.0 MHz   | 1900.0 MHz    |               | 1860.0 MHz   | 1880.0 MHz   | 1900.0 MHz    |               |
| 2 / 20M   | 1       | 0         | 22.31        | 21.91        | 21.75         | 0             | 21.29        | 20.89        | 20.73         | 1             |
|           | 1       | 50        | 22.11        | 21.71        | 21.55         | 0             | 21.09        | 20.69        | 20.53         | 1             |
|           | 1       | 99        | 21.83        | 21.43        | 21.27         | 0             | 20.81        | 20.41        | 20.25         | 1             |
|           | 50      | 0         | 21.35        | 20.95        | 20.79         | 1             | 20.33        | 19.93        | 19.77         | 2             |
|           | 50      | 25        | 21.21        | 20.81        | 20.65         | 1             | 20.19        | 19.79        | 19.63         | 2             |
|           | 50      | 50        | 21.07        | 20.67        | 20.51         | 1             | 20.05        | 19.65        | 19.49         | 2             |
|           | 100     | 0         | 21.19        | 20.79        | 20.63         | 1             | 20.17        | 19.77        | 19.61         | 2             |

# EIRP POWER (dBm)

## MODE A

| GSM   |         |                 |           |                       |           |          |                    |
|-------|---------|-----------------|-----------|-----------------------|-----------|----------|--------------------|
| Plane | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| X     | 512     | 1850.2          | -16.12    | 44.70                 | 28.58     | 721.11   | H                  |
|       | 661     | 1880.0          | -15.83    | 44.70                 | 28.87     | 770.90   | H                  |
|       | 810     | 1909.8          | -15.37    | 44.57                 | 29.20     | 832.34   | H                  |
|       | 512     | 1850.2          | -22.21    | 44.27                 | 22.06     | 160.69   | V                  |
|       | 661     | 1880.0          | -22.36    | 44.87                 | 22.51     | 178.24   | V                  |
|       | 810     | 1909.8          | -22.18    | 44.61                 | 22.43     | 175.11   | V                  |

| EDGE  |         |                 |           |                       |           |          |                    |
|-------|---------|-----------------|-----------|-----------------------|-----------|----------|--------------------|
| Plane | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| X     | 512     | 1850.2          | -18.18    | 44.70                 | 26.52     | 448.75   | H                  |
|       | 661     | 1880.0          | -18.60    | 44.70                 | 26.10     | 407.38   | H                  |
|       | 810     | 1909.8          | -17.69    | 44.57                 | 26.88     | 487.87   | H                  |
|       | 512     | 1850.2          | -24.16    | 44.27                 | 20.11     | 102.57   | V                  |
|       | 661     | 1880.0          | -25.04    | 44.87                 | 19.83     | 96.16    | V                  |
|       | 810     | 1909.8          | -24.52    | 44.61                 | 20.09     | 102.16   | V                  |

| WCDMA |         |                 |           |                       |           |          |                    |
|-------|---------|-----------------|-----------|-----------------------|-----------|----------|--------------------|
| Plane | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| X     | 9262    | 1852.4          | -22.44    | 44.70                 | 22.26     | 168.27   | H                  |
|       | 9400    | 1880.0          | -22.40    | 44.70                 | 22.30     | 169.82   | H                  |
|       | 9538    | 1907.6          | -21.82    | 44.57                 | 22.75     | 188.50   | H                  |
|       | 9262    | 1852.4          | -28.62    | 44.27                 | 15.65     | 36.73    | V                  |
|       | 9400    | 1880.0          | -29.22    | 44.87                 | 15.65     | 36.73    | V                  |
|       | 9538    | 1907.6          | -28.56    | 44.61                 | 16.05     | 40.30    | V                  |

| LTE Band 2                       |         |                 |           |                       |           |          |                    |
|----------------------------------|---------|-----------------|-----------|-----------------------|-----------|----------|--------------------|
| Channel Bandwidth: 1.4MHz / QPSK |         |                 |           |                       |           |          |                    |
| Plane                            | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| X                                | 18607   | 1850.7          | -23.96    | 44.70                 | 20.74     | 118.58   | H                  |
|                                  | 18900   | 1880.0          | -24.79    | 44.70                 | 19.91     | 97.95    | H                  |
|                                  | 19193   | 1909.3          | -24.39    | 44.57                 | 20.18     | 104.30   | H                  |
|                                  | 18607   | 1850.7          | -28.14    | 44.27                 | 16.13     | 41.02    | V                  |
|                                  | 18900   | 1880.0          | -28.40    | 44.87                 | 16.47     | 44.36    | V                  |
|                                  | 19193   | 1909.3          | -28.02    | 44.61                 | 16.59     | 45.64    | V                  |

| LTE Band 2                        |         |                 |           |                       |           |          |                    |
|-----------------------------------|---------|-----------------|-----------|-----------------------|-----------|----------|--------------------|
| Channel Bandwidth: 1.4MHz / 16QAM |         |                 |           |                       |           |          |                    |
| Plane                             | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| X                                 | 18607   | 1850.7          | -25.06    | 44.70                 | 19.64     | 92.04    | H                  |
|                                   | 18900   | 1880.0          | -25.33    | 44.70                 | 19.37     | 86.50    | H                  |
|                                   | 19193   | 1909.3          | -24.94    | 44.57                 | 19.63     | 91.90    | H                  |
|                                   | 18607   | 1850.7          | -29.12    | 44.27                 | 15.15     | 32.73    | V                  |
|                                   | 18900   | 1880.0          | -29.99    | 44.87                 | 14.88     | 30.76    | V                  |
|                                   | 19193   | 1909.3          | -29.63    | 44.61                 | 14.98     | 31.50    | V                  |

| LTE Band 2                     |         |                 |           |                       |           |          |                    |
|--------------------------------|---------|-----------------|-----------|-----------------------|-----------|----------|--------------------|
| Channel Bandwidth: 3MHz / QPSK |         |                 |           |                       |           |          |                    |
| Plane                          | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| X                              | 18615   | 1851.5          | -23.99    | 44.70                 | 20.71     | 117.76   | H                  |
|                                | 18900   | 1880.0          | -24.66    | 44.70                 | 20.04     | 100.93   | H                  |
|                                | 19185   | 1908.5          | -24.29    | 44.57                 | 20.28     | 106.73   | H                  |
|                                | 18615   | 1851.5          | -28.14    | 44.27                 | 16.13     | 41.02    | V                  |
|                                | 18900   | 1880.0          | -28.65    | 44.87                 | 16.22     | 41.88    | V                  |
|                                | 19185   | 1908.5          | -27.78    | 44.61                 | 16.83     | 48.23    | V                  |

| LTE Band 2                      |         |                 |           |                       |           |          |                    |
|---------------------------------|---------|-----------------|-----------|-----------------------|-----------|----------|--------------------|
| Channel Bandwidth: 3MHz / 16QAM |         |                 |           |                       |           |          |                    |
| Plane                           | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| X                               | 18615   | 1851.5          | -25.00    | 44.70                 | 19.70     | 93.33    | H                  |
|                                 | 18900   | 1880.0          | -25.22    | 44.70                 | 19.48     | 88.72    | H                  |
|                                 | 19185   | 1908.5          | -24.84    | 44.57                 | 19.73     | 94.04    | H                  |
|                                 | 18615   | 1851.5          | -29.07    | 44.27                 | 15.20     | 33.11    | V                  |
|                                 | 18900   | 1880.0          | -29.43    | 44.87                 | 15.44     | 34.99    | V                  |
|                                 | 19185   | 1908.5          | -29.43    | 44.61                 | 15.18     | 32.98    | V                  |

| LTE Band 2                     |         |                 |           |                       |           |          |                    |
|--------------------------------|---------|-----------------|-----------|-----------------------|-----------|----------|--------------------|
| Channel Bandwidth: 5MHz / QPSK |         |                 |           |                       |           |          |                    |
| Plane                          | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| X                              | 18625   | 1852.5          | -24.02    | 44.70                 | 20.68     | 116.95   | H                  |
|                                | 18900   | 1880.0          | -24.67    | 44.70                 | 20.03     | 100.69   | H                  |
|                                | 19175   | 1907.5          | -24.34    | 44.57                 | 20.23     | 105.51   | H                  |
|                                | 18625   | 1852.5          | -28.15    | 44.27                 | 16.12     | 40.93    | V                  |
|                                | 18900   | 1880.0          | -28.51    | 44.87                 | 16.36     | 43.25    | V                  |
|                                | 19175   | 1907.5          | -27.81    | 44.61                 | 16.80     | 47.90    | V                  |

| LTE Band 2                      |         |                 |           |                       |           |          |                    |
|---------------------------------|---------|-----------------|-----------|-----------------------|-----------|----------|--------------------|
| Channel Bandwidth: 5MHz / 16QAM |         |                 |           |                       |           |          |                    |
| Plane                           | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| X                               | 18625   | 1852.5          | -24.91    | 44.70                 | 19.79     | 95.28    | H                  |
|                                 | 18900   | 1880.0          | -25.18    | 44.70                 | 19.52     | 89.54    | H                  |
|                                 | 19175   | 1907.5          | -25.12    | 44.57                 | 19.45     | 88.17    | H                  |
|                                 | 18625   | 1852.5          | -28.92    | 44.27                 | 15.35     | 34.28    | V                  |
|                                 | 18900   | 1880.0          | -29.91    | 44.87                 | 14.96     | 31.33    | V                  |
|                                 | 19175   | 1907.5          | -29.32    | 44.61                 | 15.29     | 33.83    | V                  |

| LTE Band 2                      |         |                 |           |                       |           |          |                    |
|---------------------------------|---------|-----------------|-----------|-----------------------|-----------|----------|--------------------|
| Channel Bandwidth: 10MHz / QPSK |         |                 |           |                       |           |          |                    |
| Plane                           | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| X                               | 18650   | 1855.0          | -23.95    | 44.70                 | 20.75     | 118.85   | H                  |
|                                 | 18900   | 1880.0          | -23.79    | 44.70                 | 20.91     | 123.31   | H                  |
|                                 | 19150   | 1905.0          | -24.17    | 44.57                 | 20.40     | 109.72   | H                  |
|                                 | 18650   | 1855.0          | -27.50    | 44.27                 | 16.77     | 47.53    | V                  |
|                                 | 18900   | 1880.0          | -28.69    | 44.87                 | 16.18     | 41.50    | V                  |
|                                 | 19150   | 1905.0          | -27.82    | 44.61                 | 16.79     | 47.79    | V                  |

| LTE Band 2                       |         |                 |           |                       |           |          |                    |
|----------------------------------|---------|-----------------|-----------|-----------------------|-----------|----------|--------------------|
| Channel Bandwidth: 10MHz / 16QAM |         |                 |           |                       |           |          |                    |
| Plane                            | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| X                                | 18650   | 1855.0          | -24.82    | 44.70                 | 19.88     | 97.27    | H                  |
|                                  | 18900   | 1880.0          | -25.31    | 44.70                 | 19.39     | 86.90    | H                  |
|                                  | 19150   | 1905.0          | -25.46    | 44.57                 | 19.11     | 81.53    | H                  |
|                                  | 18650   | 1855.0          | -29.16    | 44.27                 | 15.11     | 32.43    | V                  |
|                                  | 18900   | 1880.0          | -29.85    | 44.87                 | 15.02     | 31.77    | V                  |
|                                  | 19150   | 1905.0          | -29.61    | 44.61                 | 15.00     | 31.64    | V                  |

| LTE Band 2                      |         |                 |           |                       |           |          |                    |
|---------------------------------|---------|-----------------|-----------|-----------------------|-----------|----------|--------------------|
| Channel Bandwidth: 15MHz / QPSK |         |                 |           |                       |           |          |                    |
| Plane                           | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| X                               | 18675   | 1857.5          | -24.22    | 44.70                 | 20.48     | 111.69   | H                  |
|                                 | 18900   | 1880.0          | -23.83    | 44.70                 | 20.87     | 122.18   | H                  |
|                                 | 19125   | 1902.5          | -23.84    | 44.57                 | 20.73     | 118.39   | H                  |
|                                 | 18675   | 1857.5          | -27.80    | 44.27                 | 16.47     | 44.36    | V                  |
|                                 | 18900   | 1880.0          | -28.34    | 44.87                 | 16.53     | 44.98    | V                  |
|                                 | 19125   | 1902.5          | -27.66    | 44.61                 | 16.95     | 49.58    | V                  |

| LTE Band 2                       |         |                 |           |                       |           |          |                    |
|----------------------------------|---------|-----------------|-----------|-----------------------|-----------|----------|--------------------|
| Channel Bandwidth: 15MHz / 16QAM |         |                 |           |                       |           |          |                    |
| Plane                            | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| X                                | 18675   | 1857.5          | -24.88    | 44.70                 | 19.82     | 95.94    | H                  |
|                                  | 18900   | 1880.0          | -25.36    | 44.70                 | 19.34     | 85.90    | H                  |
|                                  | 19125   | 1902.5          | -25.22    | 44.57                 | 19.35     | 86.16    | H                  |
|                                  | 18675   | 1857.5          | -28.44    | 44.27                 | 15.83     | 38.28    | V                  |
|                                  | 18900   | 1880.0          | -28.89    | 44.87                 | 15.98     | 39.63    | V                  |
|                                  | 19125   | 1902.5          | -28.87    | 44.61                 | 15.74     | 37.52    | V                  |

| LTE Band 2                      |         |                 |           |                       |           |          |                    |
|---------------------------------|---------|-----------------|-----------|-----------------------|-----------|----------|--------------------|
| Channel Bandwidth: 20MHz / QPSK |         |                 |           |                       |           |          |                    |
| Plane                           | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| X                               | 18700   | 1860.0          | -24.33    | 44.70                 | 20.37     | 108.89   | H                  |
|                                 | 18900   | 1880.0          | -23.60    | 44.70                 | 21.10     | 128.82   | H                  |
|                                 | 19100   | 1900.0          | -23.64    | 44.57                 | 20.93     | 123.97   | H                  |
|                                 | 18700   | 1860.0          | -27.27    | 44.27                 | 17.00     | 50.12    | V                  |
|                                 | 18900   | 1880.0          | -28.36    | 44.87                 | 16.51     | 44.77    | V                  |
|                                 | 19100   | 1900.0          | -28.22    | 44.61                 | 16.39     | 43.58    | V                  |

| LTE Band 2                       |         |                 |           |                       |           |          |                    |
|----------------------------------|---------|-----------------|-----------|-----------------------|-----------|----------|--------------------|
| Channel Bandwidth: 20MHz / 16QAM |         |                 |           |                       |           |          |                    |
| Plane                            | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| X                                | 18700   | 1860.0          | -24.95    | 44.70                 | 19.75     | 94.41    | H                  |
|                                  | 18900   | 1880.0          | -25.18    | 44.70                 | 19.52     | 89.54    | H                  |
|                                  | 19100   | 1900.0          | -25.15    | 44.57                 | 19.42     | 87.56    | H                  |
|                                  | 18700   | 1860.0          | -28.70    | 44.27                 | 15.57     | 36.06    | V                  |
|                                  | 18900   | 1880.0          | -28.75    | 44.87                 | 16.12     | 40.93    | V                  |
|                                  | 19100   | 1900.0          | -28.81    | 44.61                 | 15.80     | 38.05    | V                  |

# MODE B

| GSM   |         |                 |           |                       |           |          |                    |
|-------|---------|-----------------|-----------|-----------------------|-----------|----------|--------------------|
| Plane | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| X     | 512     | 1850.2          | -15.82    | 44.70                 | 28.88     | 772.68   | H                  |
|       | 661     | 1880.0          | -15.58    | 44.70                 | 29.12     | 816.58   | H                  |
|       | 810     | 1909.8          | -15.31    | 44.57                 | 29.26     | 843.92   | H                  |
|       | 512     | 1850.2          | -22.41    | 44.27                 | 21.86     | 153.46   | V                  |
|       | 661     | 1880.0          | -22.53    | 44.87                 | 22.34     | 171.40   | V                  |
|       | 810     | 1909.8          | -22.46    | 44.61                 | 22.15     | 164.17   | V                  |

| LTE Band 2                      |         |                 |           |                       |           |          |                    |
|---------------------------------|---------|-----------------|-----------|-----------------------|-----------|----------|--------------------|
| Channel Bandwidth: 20MHz / QPSK |         |                 |           |                       |           |          |                    |
| Plane                           | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| X                               | 18700   | 1860.0          | -23.36    | 44.70                 | 21.34     | 136.14   | H                  |
|                                 | 18900   | 1880.0          | -23.66    | 44.70                 | 21.04     | 127.06   | H                  |
|                                 | 19100   | 1900.0          | -23.37    | 44.57                 | 21.20     | 131.92   | H                  |
|                                 | 18700   | 1860.0          | -27.10    | 44.27                 | 17.17     | 52.12    | V                  |
|                                 | 18900   | 1880.0          | -27.95    | 44.87                 | 16.92     | 49.20    | V                  |
|                                 | 19100   | 1900.0          | -27.54    | 44.61                 | 17.07     | 50.97    | V                  |

| LTE Band 2                       |         |                 |           |                       |           |          |                    |
|----------------------------------|---------|-----------------|-----------|-----------------------|-----------|----------|--------------------|
| Channel Bandwidth: 20MHz / 16QAM |         |                 |           |                       |           |          |                    |
| Plane                            | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
| X                                | 18700   | 1860.0          | -25.03    | 44.70                 | 19.67     | 92.68    | H                  |
|                                  | 18900   | 1880.0          | -24.58    | 44.70                 | 20.12     | 102.80   | H                  |
|                                  | 19100   | 1900.0          | -24.96    | 44.57                 | 19.61     | 91.47    | H                  |
|                                  | 18700   | 1860.0          | -28.81    | 44.27                 | 15.46     | 35.16    | V                  |
|                                  | 18900   | 1880.0          | -28.97    | 44.87                 | 15.90     | 38.90    | V                  |
|                                  | 19100   | 1900.0          | -28.41    | 44.61                 | 16.20     | 41.72    | V                  |

## 4.2 FREQUENCY STABILITY MEASUREMENT

### 4.2.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

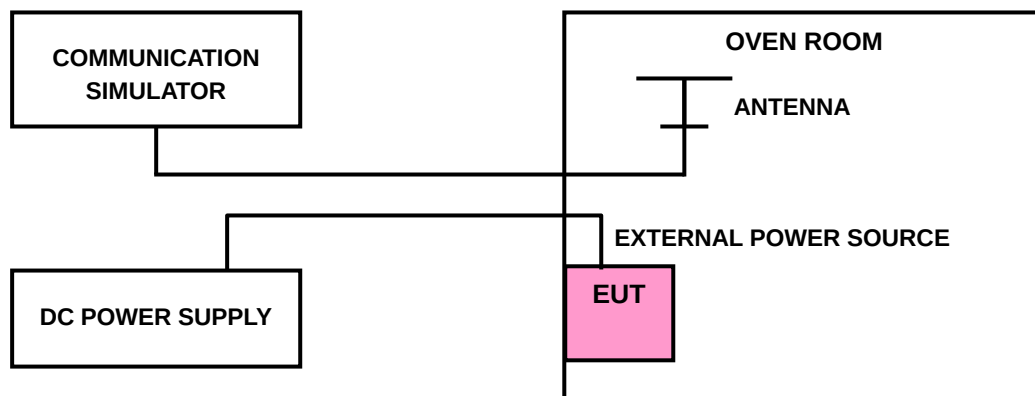
The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

### 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

##### FREQUENCY ERROR vs. VOLTAGE

| VOLTAGE<br>(Volts) | FREQUENCY ERROR (ppm) |       |       |            |        |        |        |        |        | LIMIT<br>(ppm) |
|--------------------|-----------------------|-------|-------|------------|--------|--------|--------|--------|--------|----------------|
|                    | GSM                   | EDGE  | WCDMA | LTE Band 2 |        |        |        |        |        |                |
|                    |                       |       |       | 1.4MHz     | 3MHz   | 5MHz   | 10MHz  | 15MHz  | 20MHz  |                |
| 3.8                | 0.001                 | 0.001 | 0.001 | -0.001     | -0.001 | -0.002 | 0.001  | -0.002 | -0.001 | 2.5            |
| 3.6                | 0.002                 | 0.001 | 0.001 | -0.001     | -0.001 | 0.001  | 0.001  | -0.001 | -0.001 | 2.5            |
| 4.2                | 0.001                 | 0.002 | 0.001 | 0.001      | 0.002  | -0.001 | -0.001 | -0.001 | 0.001  | 2.5            |

**NOTE:** The applicant defined the normal working voltage of the battery is from 3.6Vdc to 4.2Vdc.

##### FREQUENCY ERROR vs. TEMPERATURE

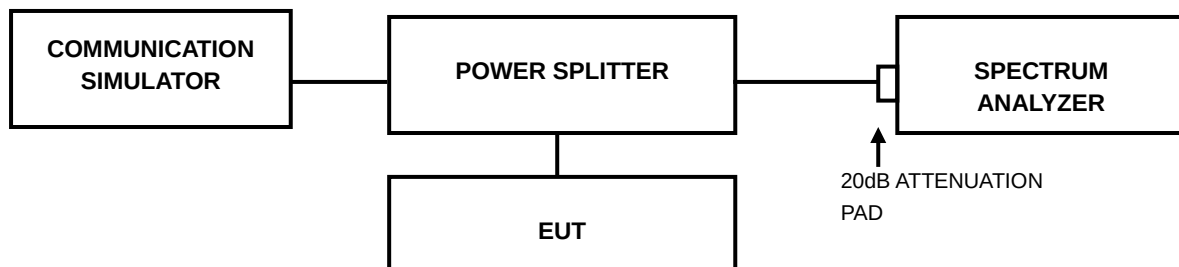
| TEMP.<br>(°C) | FREQUENCY ERROR (ppm) |        |        |            |       |        |        |        |        | LIMIT<br>(ppm) |
|---------------|-----------------------|--------|--------|------------|-------|--------|--------|--------|--------|----------------|
|               | GSM                   | EDGE   | WCDMA  | LTE Band 2 |       |        |        |        |        |                |
|               |                       |        |        | 1.4MHz     | 3MHz  | 5MHz   | 10MHz  | 15MHz  | 20MHz  |                |
| -30           | -0.001                | 0.001  | -0.001 | -0.002     | 0.001 | 0.001  | 0.001  | -0.002 | 0.001  | 2.5            |
| -20           | -0.002                | 0.002  | -0.001 | -0.001     | 0.002 | 0.001  | 0.001  | -0.001 | 0.002  | 2.5            |
| -10           | -0.001                | 0.001  | -0.002 | -0.001     | 0.001 | 0.002  | 0.002  | -0.002 | 0.002  | 2.5            |
| 0             | -0.001                | 0.001  | -0.001 | -0.002     | 0.002 | -0.001 | 0.001  | -0.001 | 0.001  | 2.5            |
| 10            | 0.001                 | 0.001  | -0.001 | 0.001      | 0.001 | -0.001 | 0.001  | -0.001 | 0.001  | 2.5            |
| 20            | 0.001                 | 0.002  | 0.001  | 0.001      | 0.001 | -0.001 | 0.001  | -0.001 | 0.002  | 2.5            |
| 30            | 0.002                 | -0.001 | 0.001  | 0.002      | 0.002 | -0.002 | -0.002 | -0.001 | 0.001  | 2.5            |
| 40            | 0.002                 | -0.002 | -0.001 | 0.001      | 0.001 | -0.001 | -0.001 | 0.001  | -0.001 | 2.5            |
| 50            | -0.001                | -0.001 | -0.002 | 0.001      | 0.001 | 0.001  | -0.001 | 0.001  | -0.001 | 2.5            |

## 4.3 OCCUPIED BANDWIDTH MEASUREMENT

### 4.3.1 TEST PROCEDURES

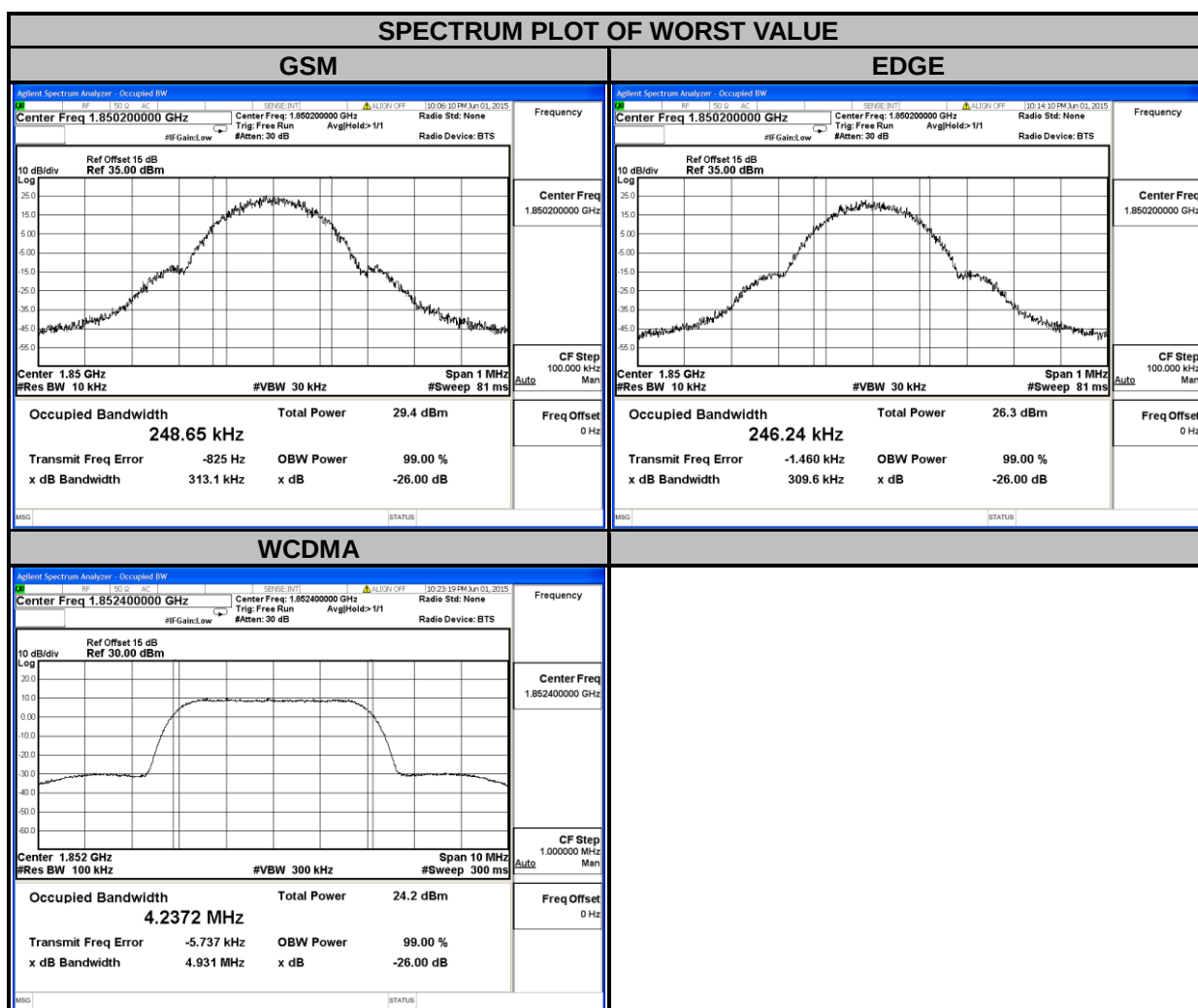
The EUT makes a call to the communication simulator. All measurements were done at low, middle and high operational frequency range. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function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

### 4.3.2 TEST SETUP



### 4.3.3 TEST RESULTS

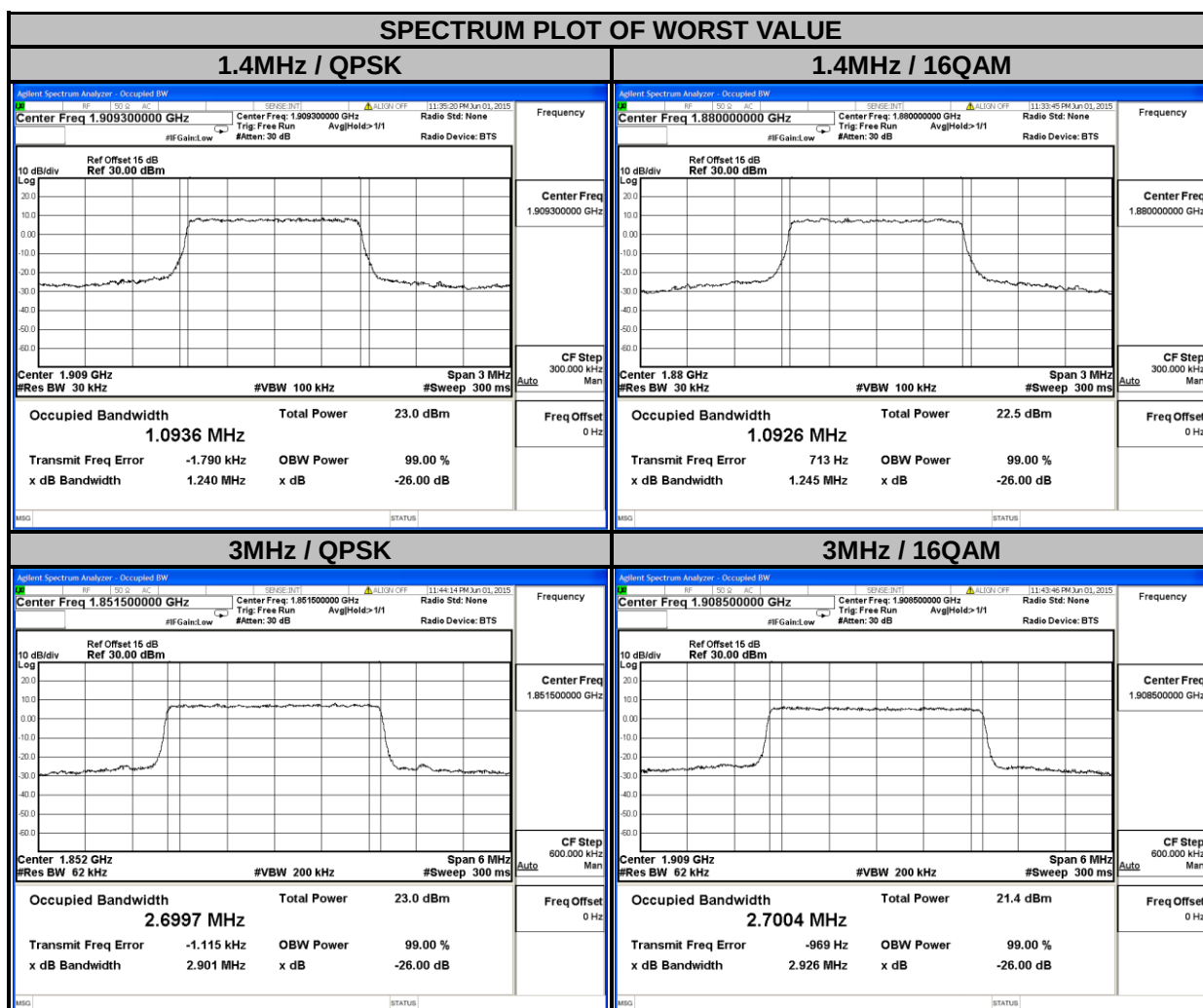
| CHANNEL | FREQUENCY | 99% OCCUPIED BANDWIDTH (kHz) |        | CHANNEL | FREQUENCY | 99% OCCUPIED BANDWIDTH (MHz) |
|---------|-----------|------------------------------|--------|---------|-----------|------------------------------|
|         |           | GSM                          | EDGE   |         |           | WCDMA                        |
| 512     | 1850.2    | 248.65                       | 246.24 | 9262    | 1852.4    | 4.2372                       |
| 661     | 1880.0    | 245.41                       | 245.46 | 9400    | 1880.0    | 4.2306                       |
| 810     | 1909.8    | 244.96                       | 244.42 | 9538    | 1907.6    | 4.2230                       |
| CHANNEL | FREQUENCY | 26dB BANDWIDTH (kHz)         |        | CHANNEL | FREQUENCY | 26dB BANDWIDTH (MHz)         |
|         |           | GSM                          | EDGE   |         |           | WCDMA                        |
| 512     | 1850.2    | 313.10                       | 309.60 | 9262    | 1852.4    | 4.931                        |
| 661     | 1880.0    | 314.70                       | 312.90 | 9400    | 1880.0    | 4.903                        |
| 810     | 1909.8    | 311.70                       | 311.00 | 9538    | 1907.6    | 4.891                        |





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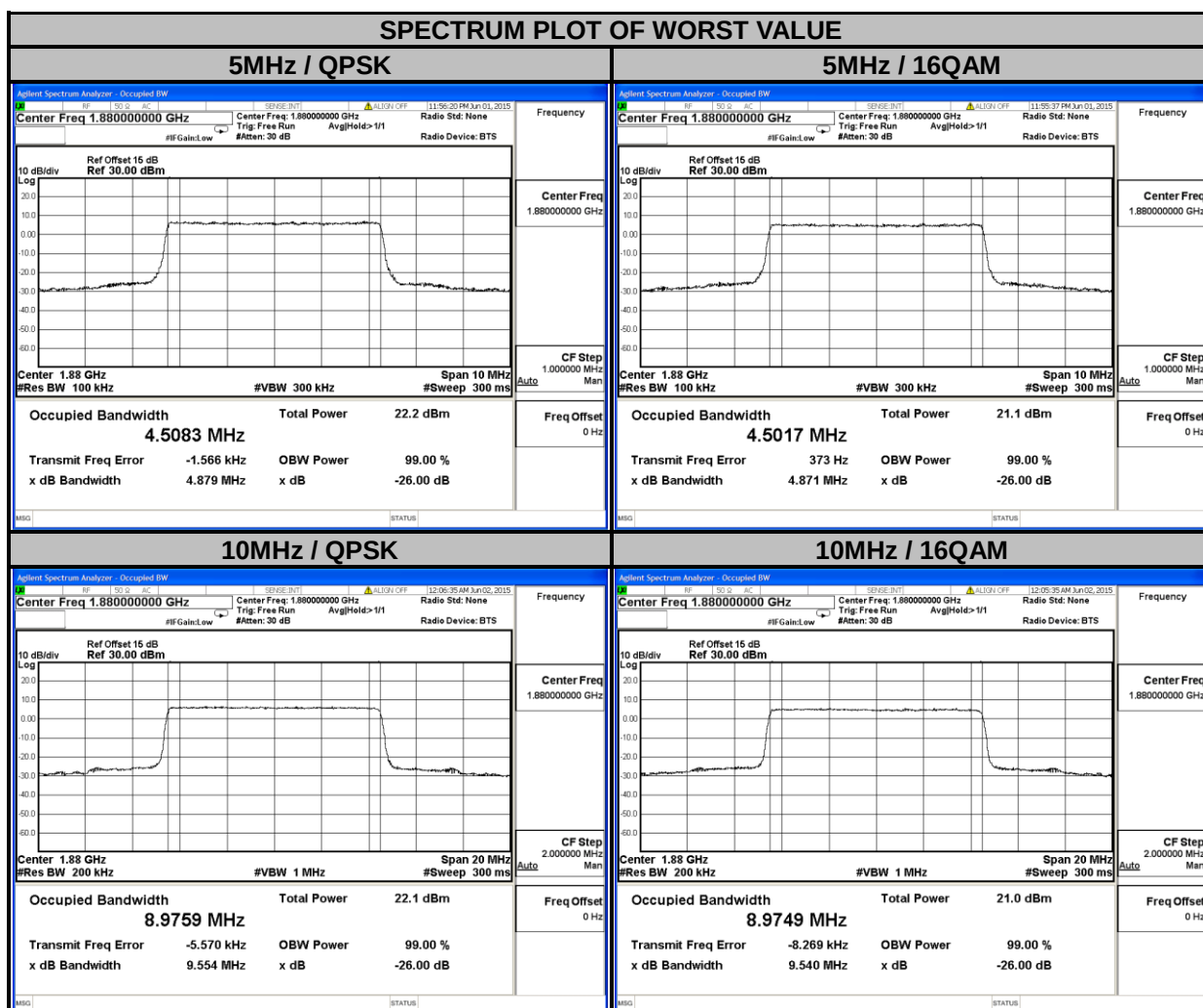
| LTE BAND 2                |           |                              |        |                         |           |                              |        |
|---------------------------|-----------|------------------------------|--------|-------------------------|-----------|------------------------------|--------|
| CHANNEL BANDWIDTH: 1.4MHz |           |                              |        | CHANNEL BANDWIDTH: 3MHz |           |                              |        |
| CHANNEL                   | FREQUENCY | 99% OCCUPIED BANDWIDTH (MHz) |        | CHANNEL                 | FREQUENCY | 99% OCCUPIED BANDWIDTH (MHz) |        |
|                           |           | QPSK                         | 16QAM  |                         |           | QPSK                         | 16QAM  |
| 18607                     | 1850.7    | 1.0901                       | 1.0899 | 18615                   | 1851.5    | 2.6997                       | 2.6989 |
| 18900                     | 1880.0    | 1.0915                       | 1.0926 | 18900                   | 1880.0    | 2.6996                       | 2.6989 |
| 19193                     | 1909.3    | 1.0936                       | 1.0915 | 19185                   | 1908.5    | 2.6985                       | 2.7004 |
| CHANNEL                   | FREQUENCY | 26dB BANDWIDTH (MHz)         |        | CHANNEL                 | FREQUENCY | 26dB BANDWIDTH (MHz)         |        |
|                           |           | QPSK                         | 16QAM  |                         |           | QPSK                         | 16QAM  |
| 18607                     | 1850.7    | 1.234                        | 1.249  | 18615                   | 1851.5    | 2.901                        | 2.909  |
| 18900                     | 1880.0    | 1.245                        | 1.245  | 18900                   | 1880.0    | 2.899                        | 2.918  |
| 19193                     | 1909.3    | 1.240                        | 1.242  | 19185                   | 1908.5    | 2.887                        | 2.926  |





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| LTE BAND 2              |           |                              |        |                          |           |                              |        |
|-------------------------|-----------|------------------------------|--------|--------------------------|-----------|------------------------------|--------|
| CHANNEL BANDWIDTH: 5MHz |           |                              |        | CHANNEL BANDWIDTH: 10MHz |           |                              |        |
| CHANNEL                 | FREQUENCY | 99% OCCUPIED BANDWIDTH (MHz) |        | CHANNEL                  | FREQUENCY | 99% OCCUPIED BANDWIDTH (MHz) |        |
|                         |           | QPSK                         | 16QAM  |                          |           | QPSK                         | 16QAM  |
| 18625                   | 1852.5    | 4.5049                       | 4.5014 | 18650                    | 1855.0    | 8.9732                       | 8.9704 |
| 18900                   | 1880.0    | 4.5083                       | 4.5017 | 18900                    | 1880.0    | 8.9759                       | 8.9749 |
| 19175                   | 1907.5    | 4.5032                       | 4.5016 | 19150                    | 1905.0    | 8.9728                       | 8.9743 |
| CHANNEL                 | FREQUENCY | 26dB BANDWIDTH (MHz)         |        | CHANNEL                  | FREQUENCY | 26dB BANDWIDTH (MHz)         |        |
|                         |           | QPSK                         | 16QAM  |                          |           | QPSK                         | 16QAM  |
| 18625                   | 1852.5    | 4.849                        | 4.871  | 18650                    | 1855.0    | 9.521                        | 9.519  |
| 18900                   | 1880.0    | 4.879                        | 4.871  | 18900                    | 1880.0    | 9.554                        | 9.540  |
| 19175                   | 1907.5    | 4.869                        | 4.867  | 19150                    | 1905.0    | 9.548                        | 9.529  |



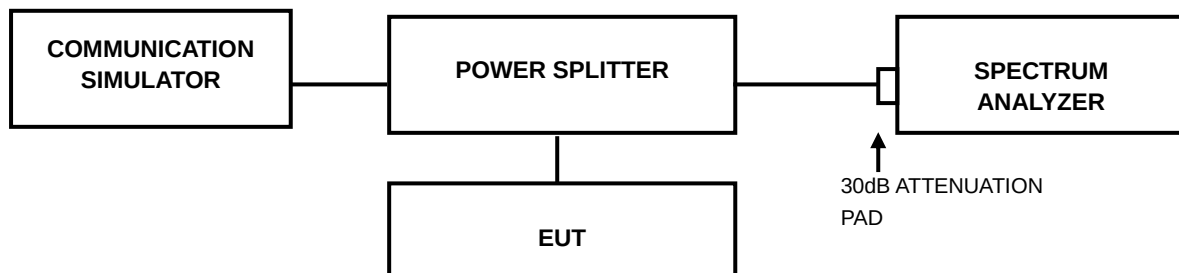


## 4.4 PEAK TO AVERAGE RATIO

### 4.4.1 LIMITS OF PEAK TO AVERAGE RATIO MEASUREMENT

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

### 4.4.2 TEST SETUP

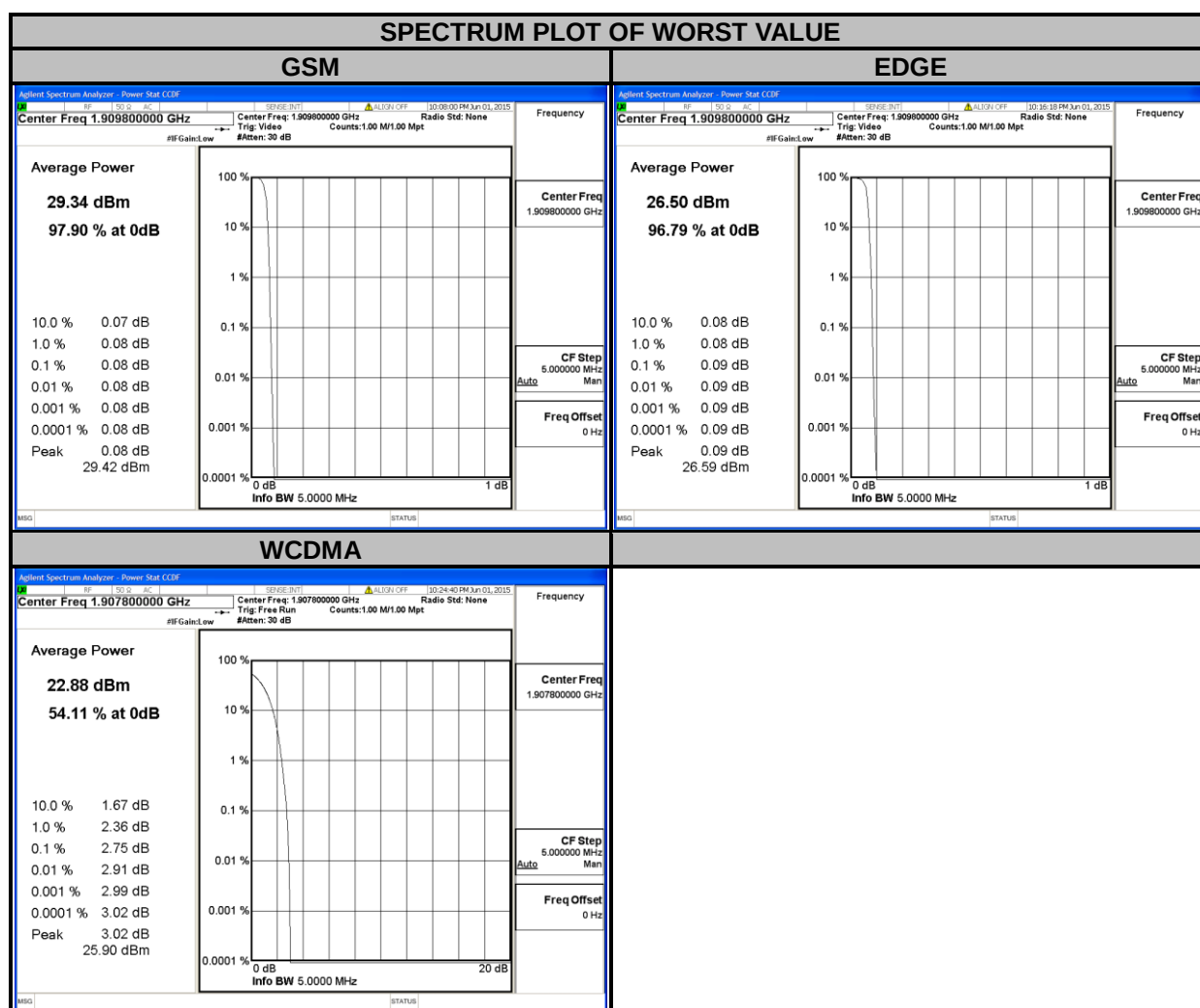


### 4.4.3 TEST PROCEDURES

1. Set resolution/measurement bandwidth  $\geq$  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%.

#### 4.4.4 TEST RESULTS

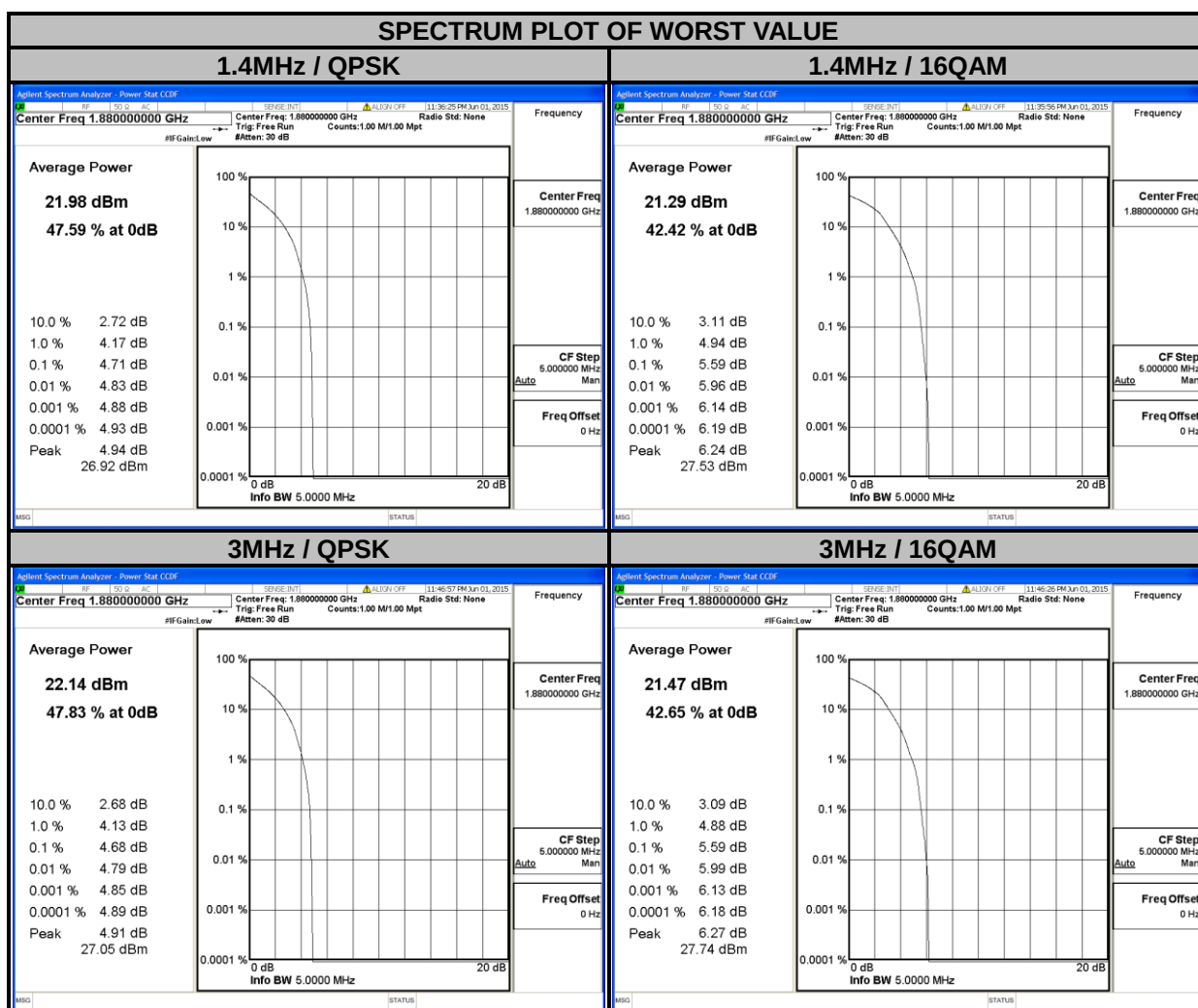
| CHANNEL | FREQUENCY (MHz) | PEAK TO AVERAGE RATIO (dB) |      | CHANNEL | FREQUENCY (MHz) | PEAK TO AVERAGE RATIO (dB) |
|---------|-----------------|----------------------------|------|---------|-----------------|----------------------------|
|         |                 | GSM                        | EDGE |         |                 | WCDMA                      |
| 512     | 1850.2          | 0.08                       | 0.09 | 9262    | 1852.4          | 2.45                       |
| 661     | 1880.0          | 0.08                       | 0.09 | 9400    | 1880.0          | 2.72                       |
| 810     | 1909.8          | 0.08                       | 0.09 | 9538    | 1907.6          | 2.75                       |





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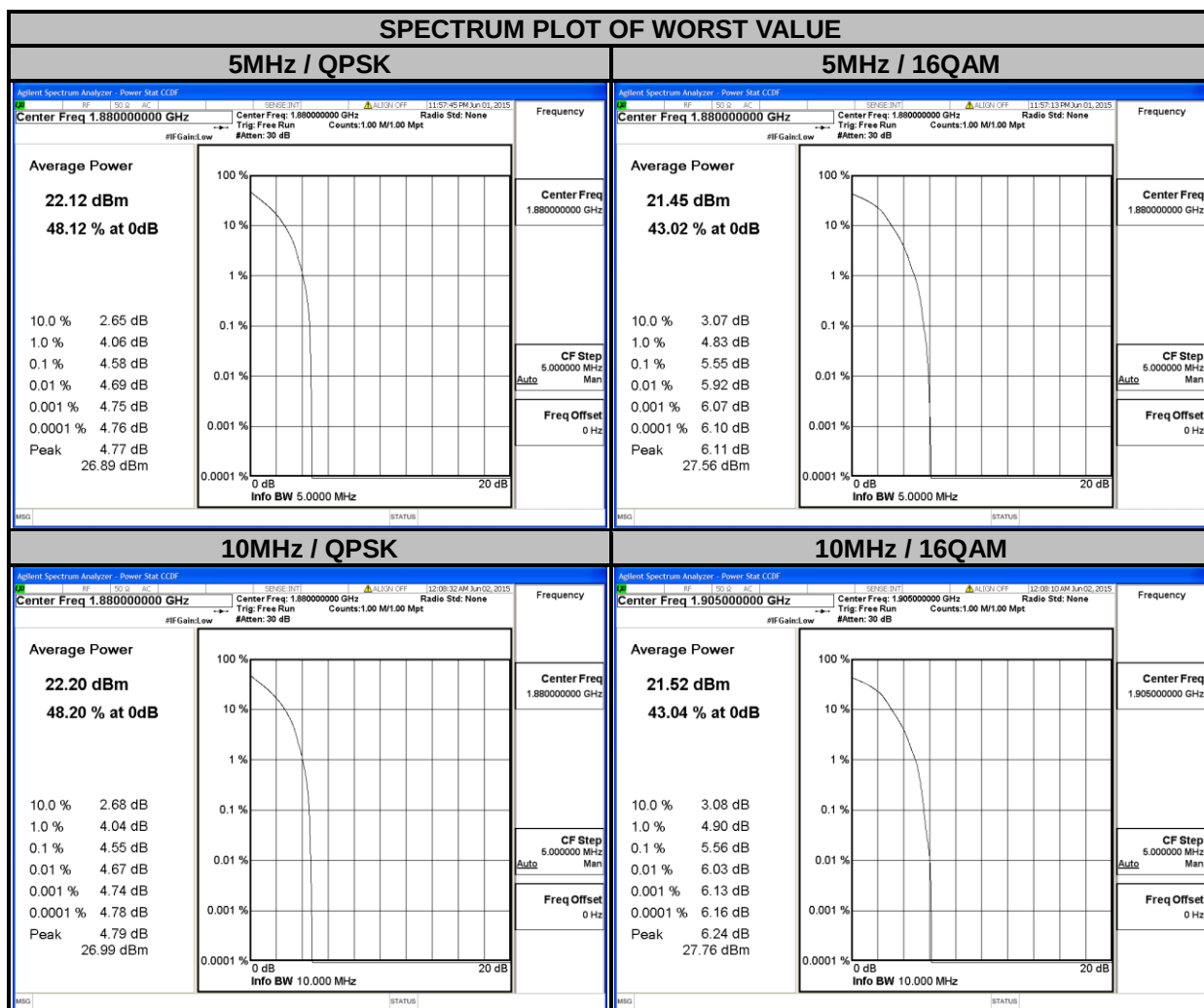
| LTE BAND 2                |                 |                            |       |                         |                 |                            |       |
|---------------------------|-----------------|----------------------------|-------|-------------------------|-----------------|----------------------------|-------|
| 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          | 3.80                       | 4.76  | 18615                   | 1851.5          | 3.78                       | 4.69  |
| 18900                     | 1880.0          | 4.71                       | 5.59  | 18900                   | 1880.0          | 4.68                       | 5.59  |
| 19193                     | 1909.3          | 4.39                       | 5.41  | 19185                   | 1908.5          | 4.44                       | 5.43  |





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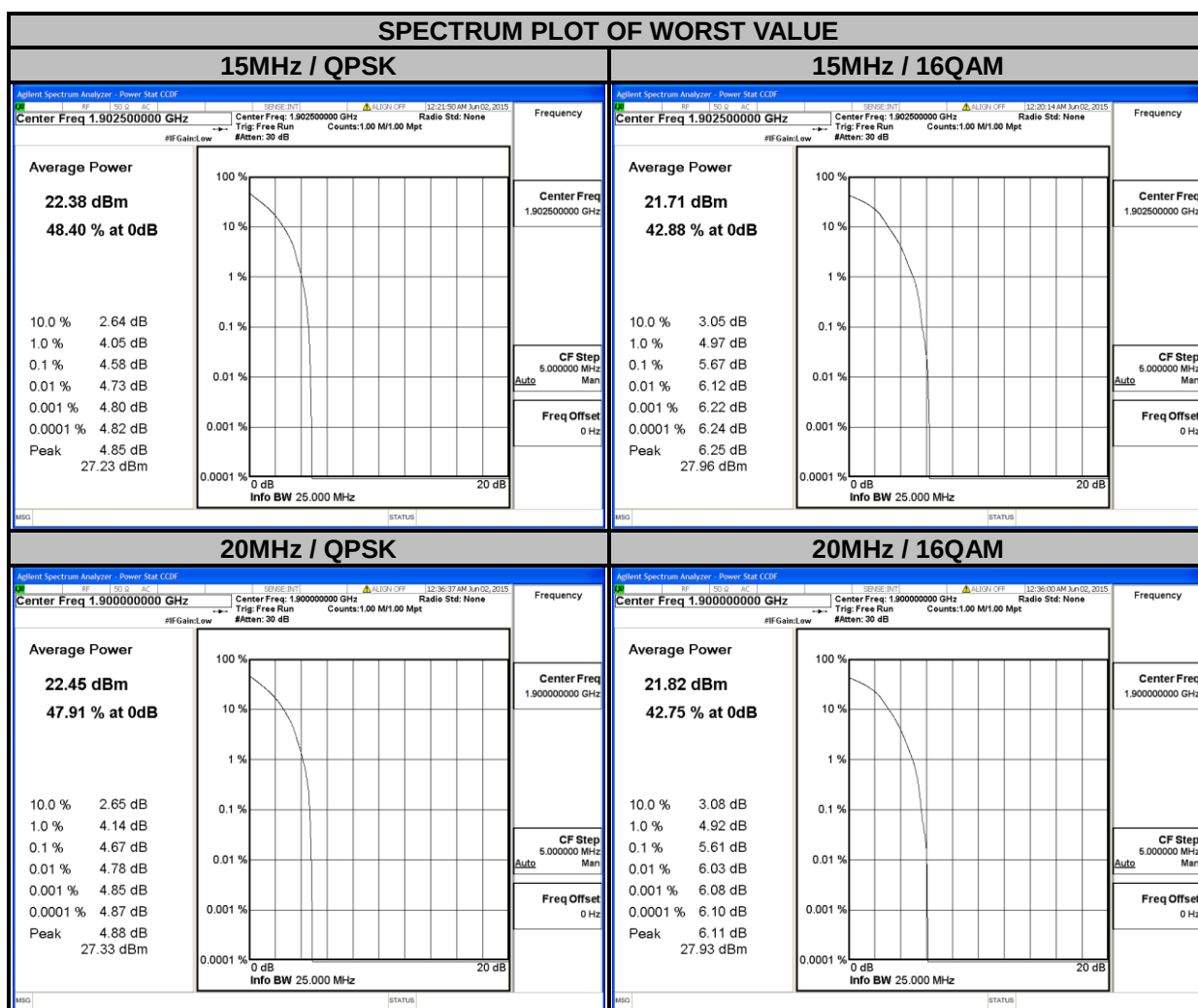
| LTE BAND 2              |                 |                            |       |                          |                 |                            |       |
|-------------------------|-----------------|----------------------------|-------|--------------------------|-----------------|----------------------------|-------|
| CHANNEL BANDWIDTH: 5MHz |                 |                            |       | CHANNEL BANDWIDTH: 10MHz |                 |                            |       |
| CHANNEL                 | FREQUENCY (MHz) | PEAK TO AVERAGE RATIO (dB) |       | CHANNEL                  | FREQUENCY (MHz) | PEAK TO AVERAGE RATIO (dB) |       |
|                         |                 | QPSK                       | 16QAM |                          |                 | QPSK                       | 16QAM |
| 18625                   | 1852.5          | 3.70                       | 4.71  | 18650                    | 1855.0          | 3.70                       | 4.73  |
| 18900                   | 1880.0          | 4.58                       | 5.55  | 18900                    | 1880.0          | 4.55                       | 5.52  |
| 19175                   | 1907.5          | 4.45                       | 5.44  | 19150                    | 1905.0          | 4.54                       | 5.56  |





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| LTE BAND 2               |                 |                            |       |                          |                 |                            |       |
|--------------------------|-----------------|----------------------------|-------|--------------------------|-----------------|----------------------------|-------|
| CHANNEL BANDWIDTH: 15MHz |                 |                            |       | CHANNEL BANDWIDTH: 20MHz |                 |                            |       |
| CHANNEL                  | FREQUENCY (MHz) | PEAK TO AVERAGE RATIO (dB) |       | CHANNEL                  | FREQUENCY (MHz) | PEAK TO AVERAGE RATIO (dB) |       |
|                          |                 | QPSK                       | 16QAM |                          |                 | QPSK                       | 16QAM |
| 18675                    | 1857.5          | 3.69                       | 4.74  | 18700                    | 1860.0          | 3.72                       | 4.65  |
| 18900                    | 1880.0          | 4.42                       | 5.29  | 18900                    | 1880.0          | 4.38                       | 5.26  |
| 19125                    | 1902.5          | 4.58                       | 5.67  | 19100                    | 1900.0          | 4.67                       | 5.61  |

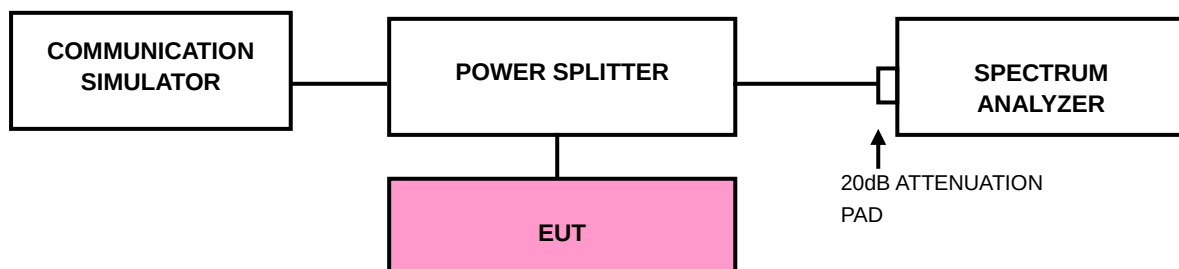


## 4.5 BAND EDGE MEASUREMENT

### 4.5.1 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.

### 4.5.2 TEST SETUP



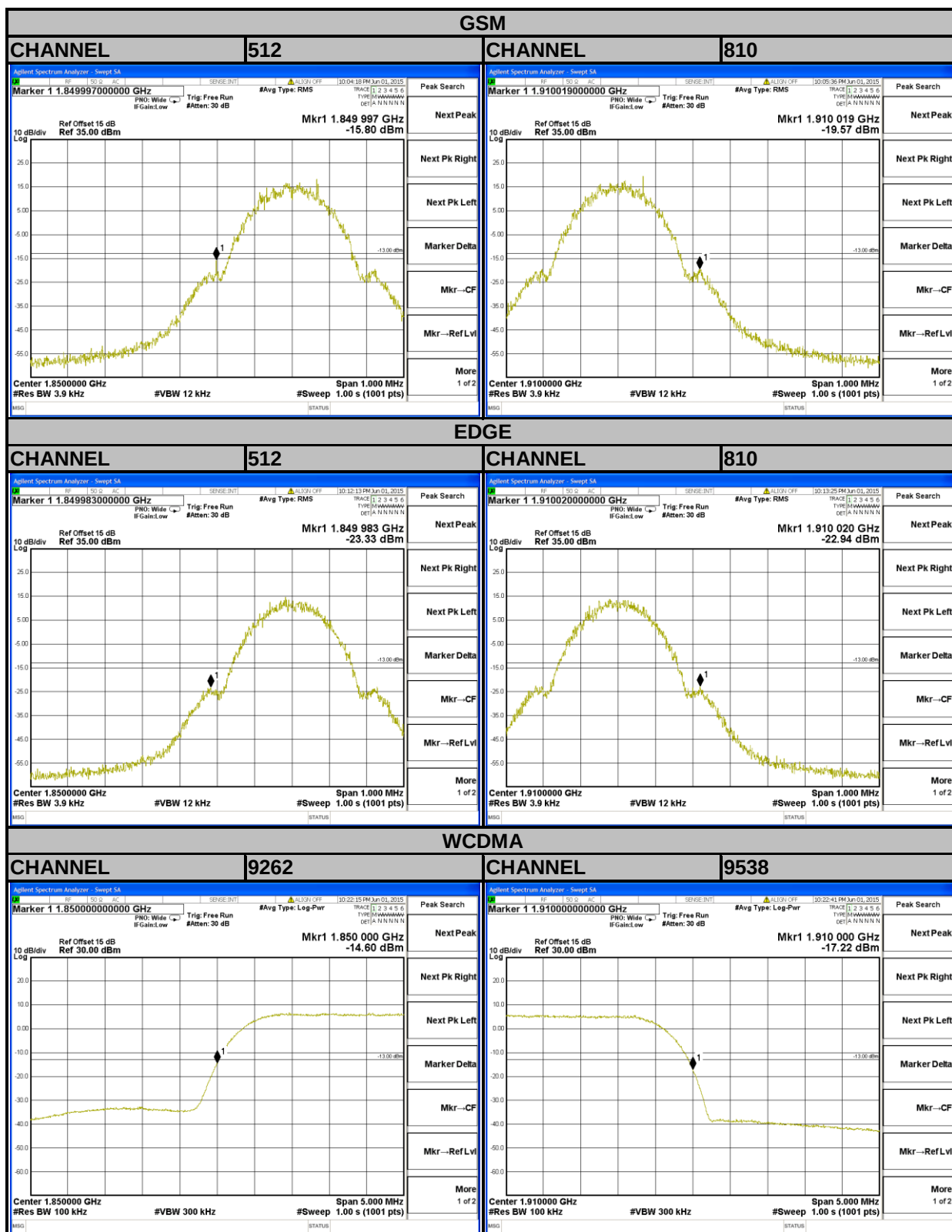
### 4.5.3 TEST PROCEDURES

- All measurements were done at low and high operational frequency range.
- The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 3.9kHz and VB of the spectrum is 12kHz (GSM/GPRS/EDGE).
- The center frequency of spectrum is the band edge frequency and span is 5MHz. RB of the spectrum is 100kHz and VB of the spectrum is 300kHz (WCDMA).
- The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 13kHz and VB of the spectrum is 51kHz (LTE Bandwidth 1.4MHz).
- The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 30kHz and VB of the spectrum is 100kHz (LTE Bandwidth 3MHz).
- The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 100kHz and VB of the spectrum is 300kHz (LTE Bandwidth 5MHz/10MHz).
- The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 150kHz and VB of the spectrum is 470kHz (LTE Bandwidth 15MHz).
- The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 180kHz and VB of the spectrum is 560kHz (LTE Bandwidth 20MHz).
- Record the max trace plot into the test report.



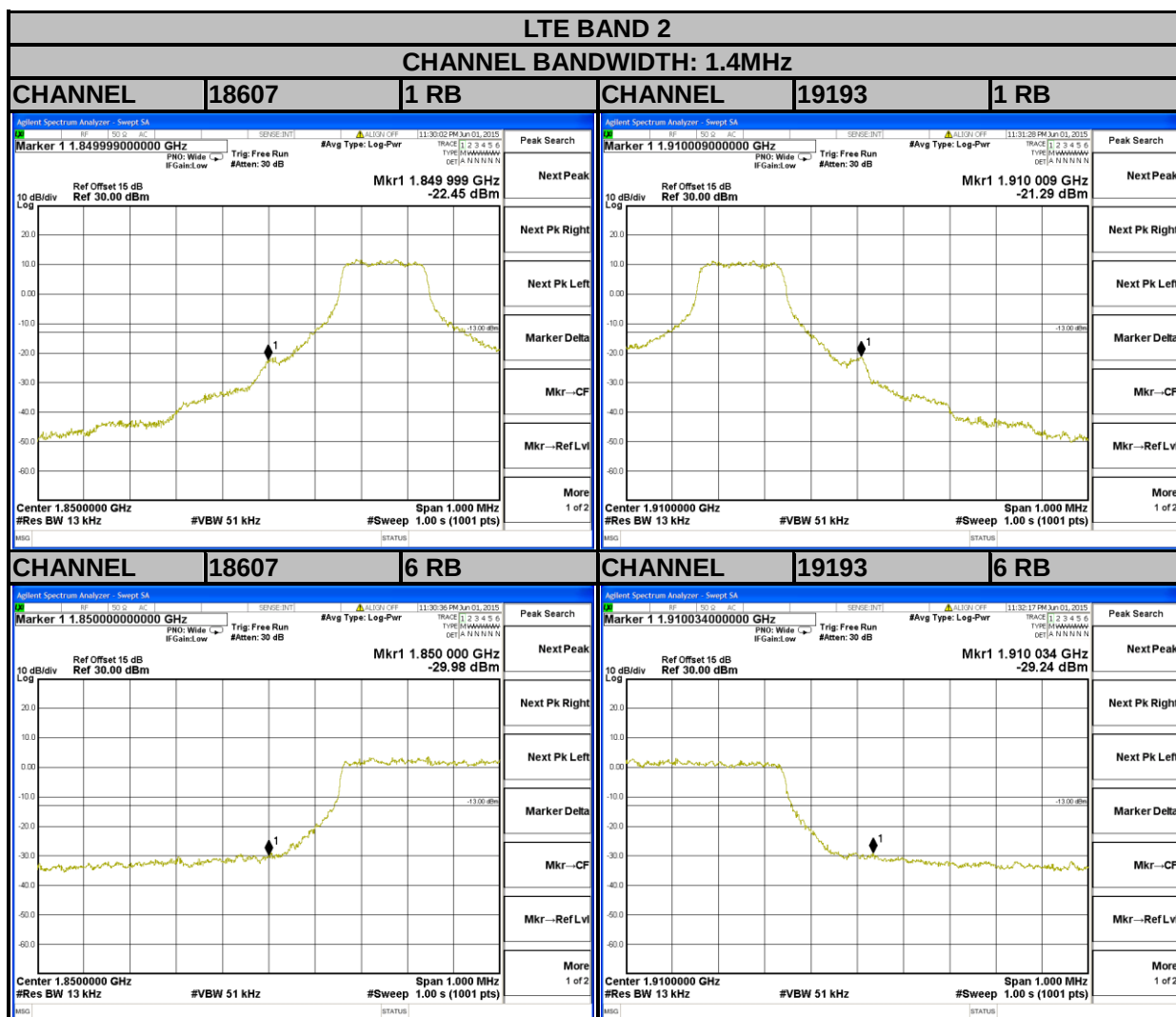
A D T

## 4.5.4 TEST RESULTS



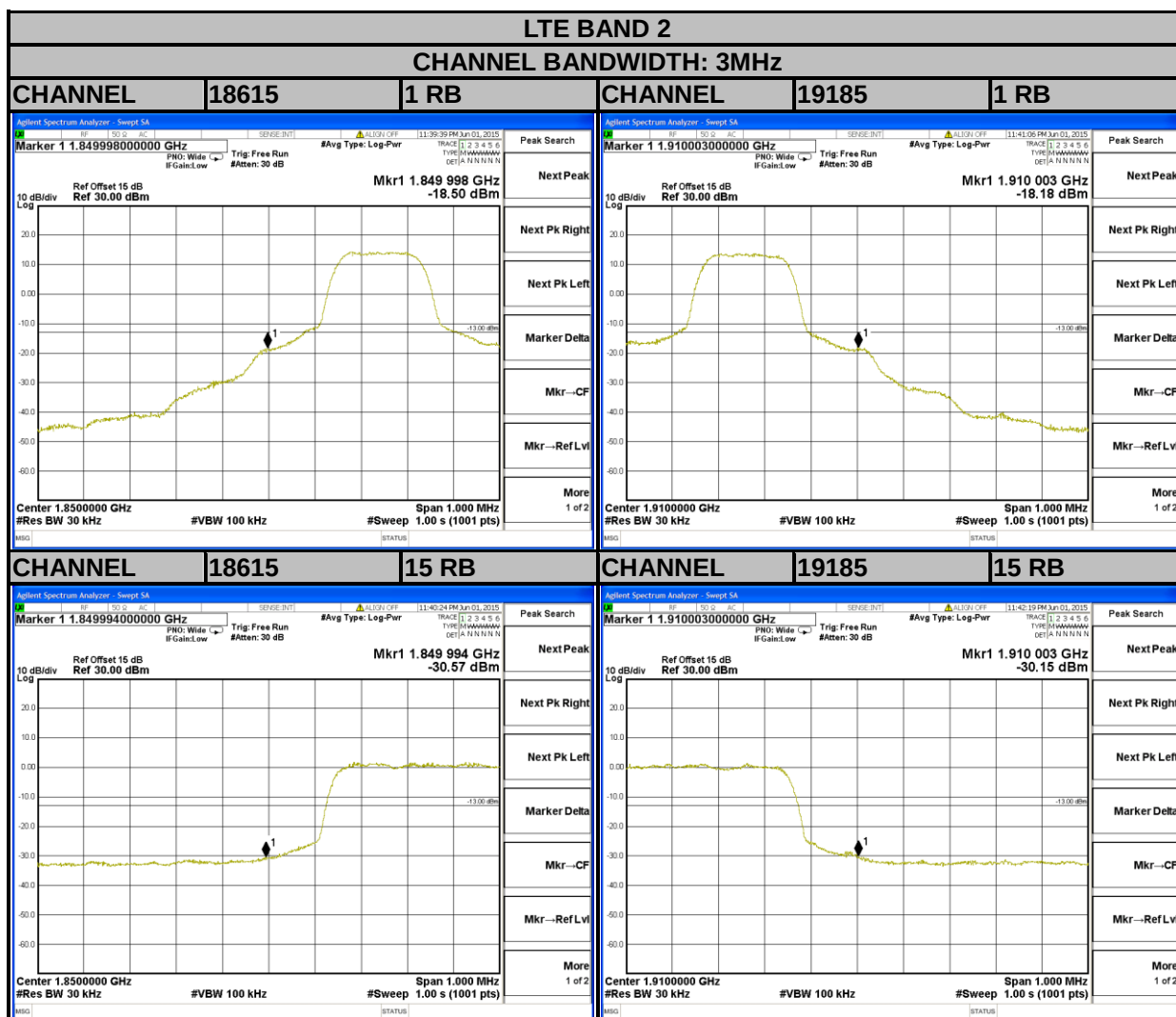


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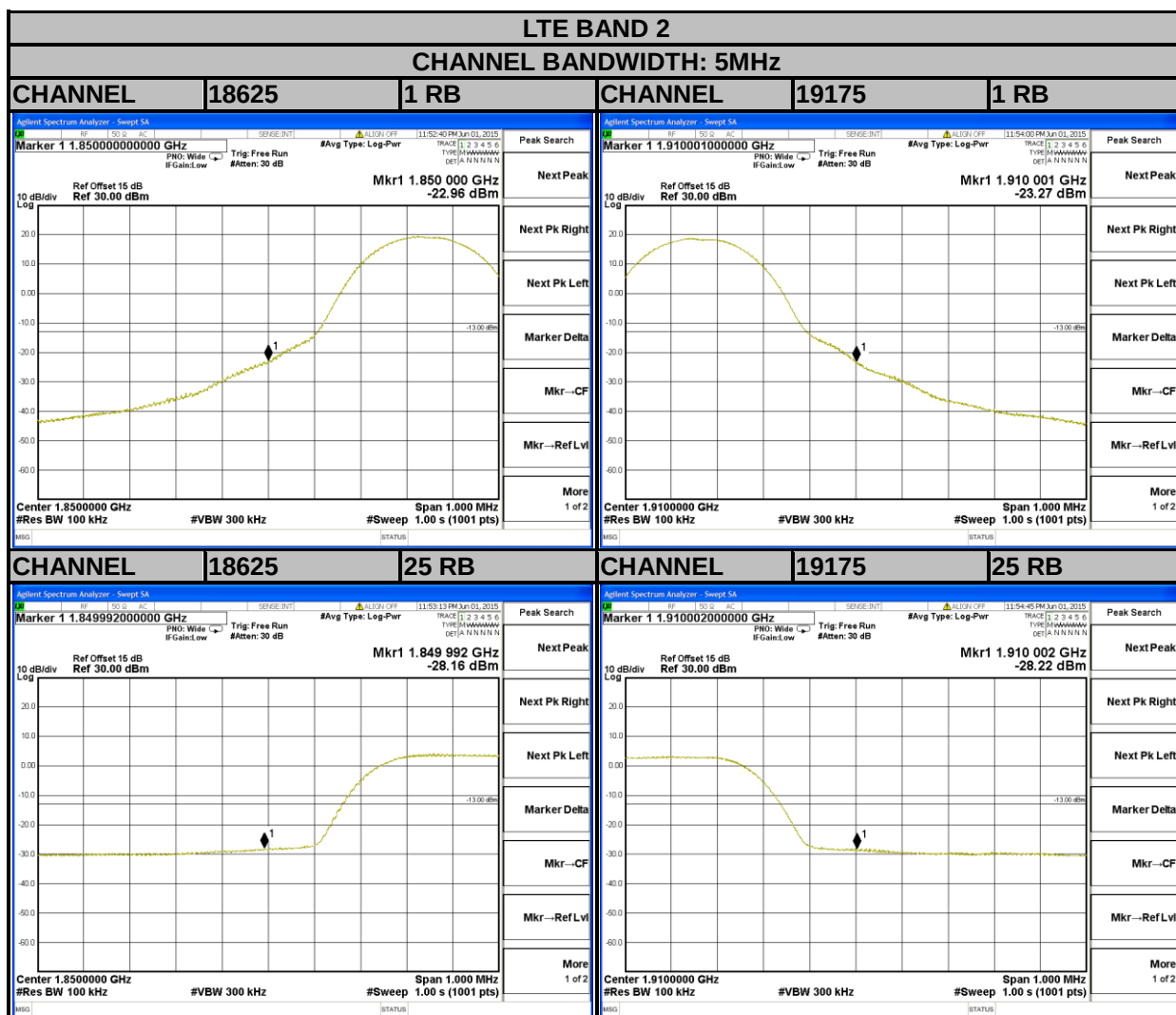


A D T



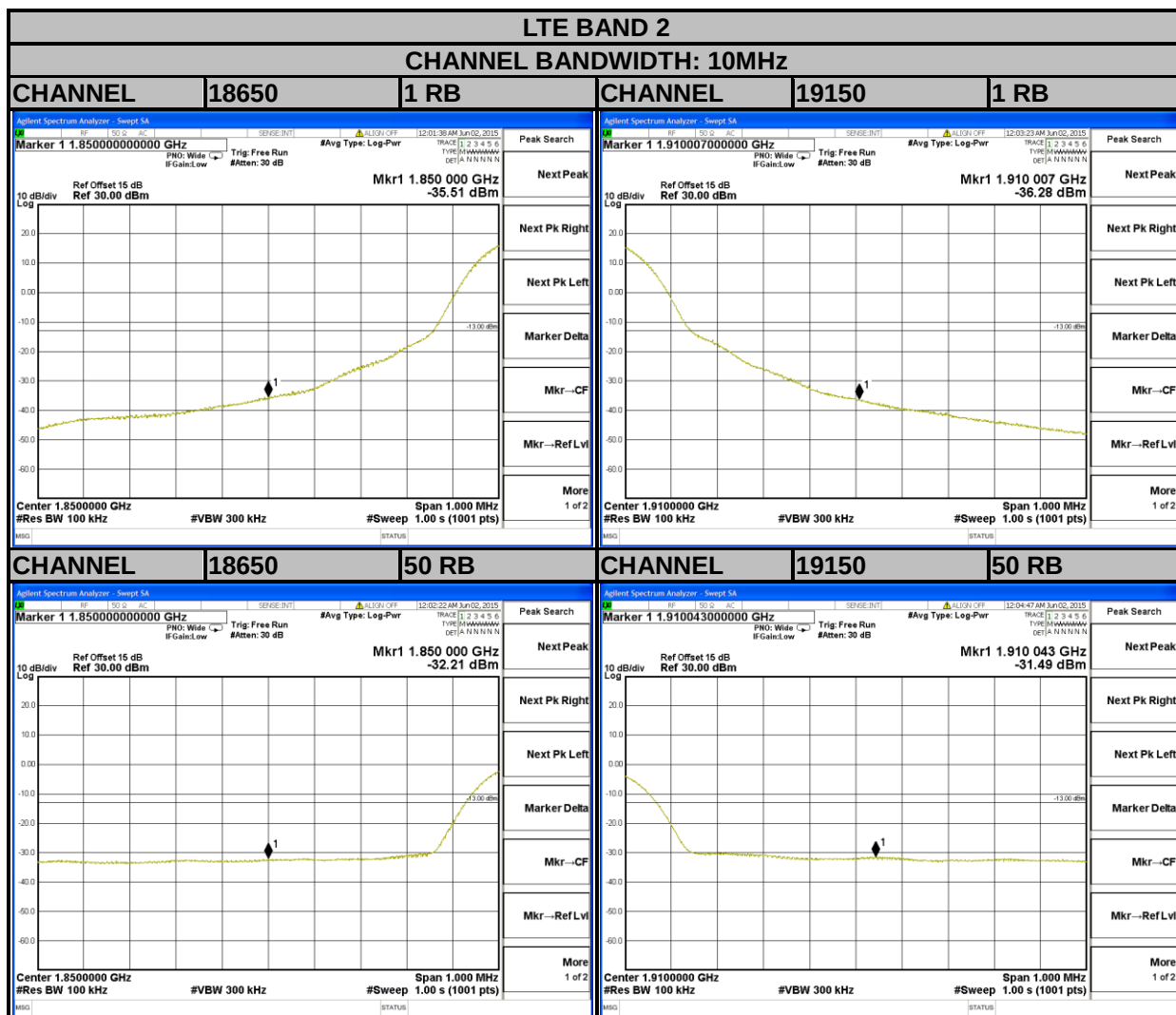


A D T



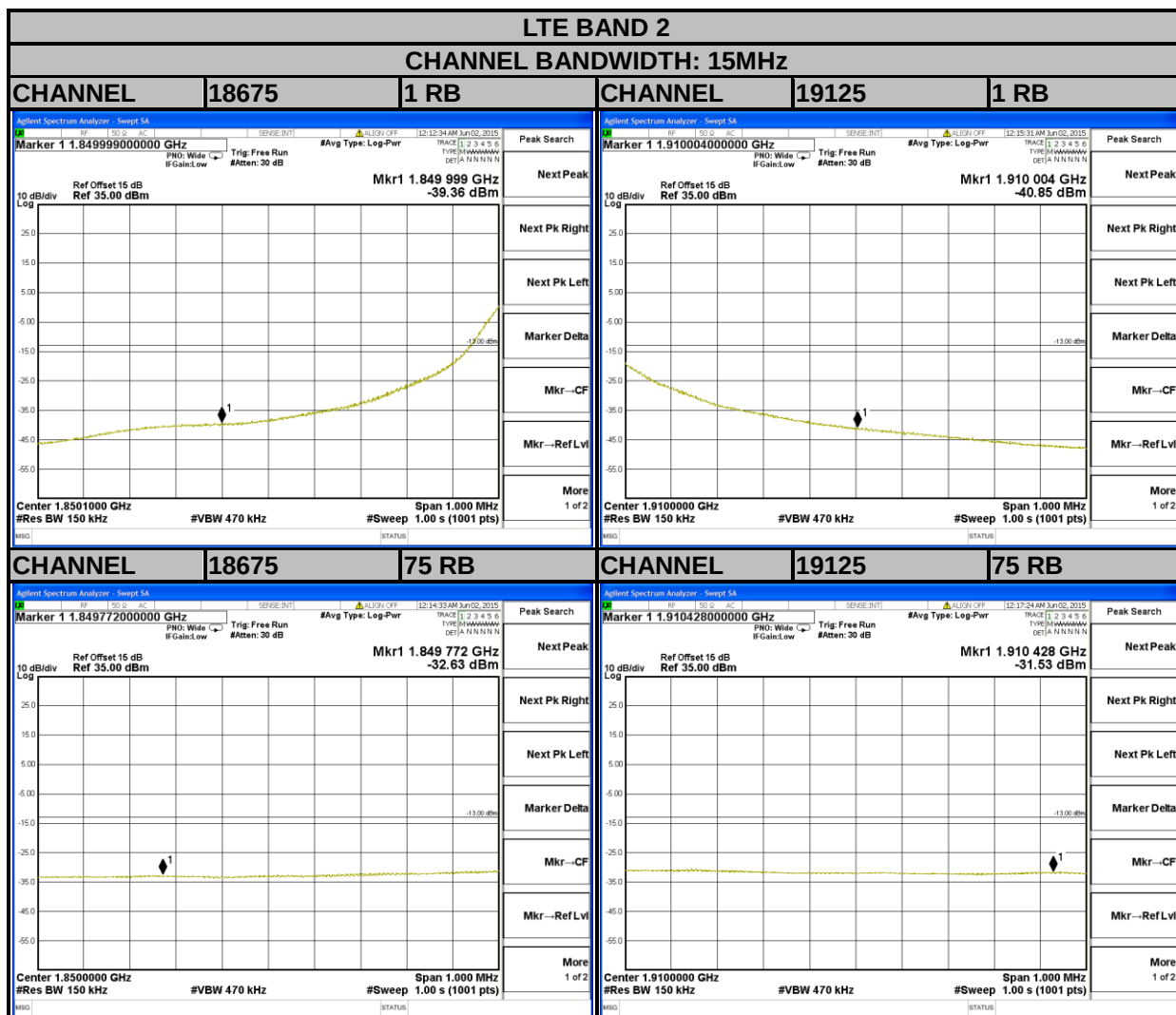


A D T



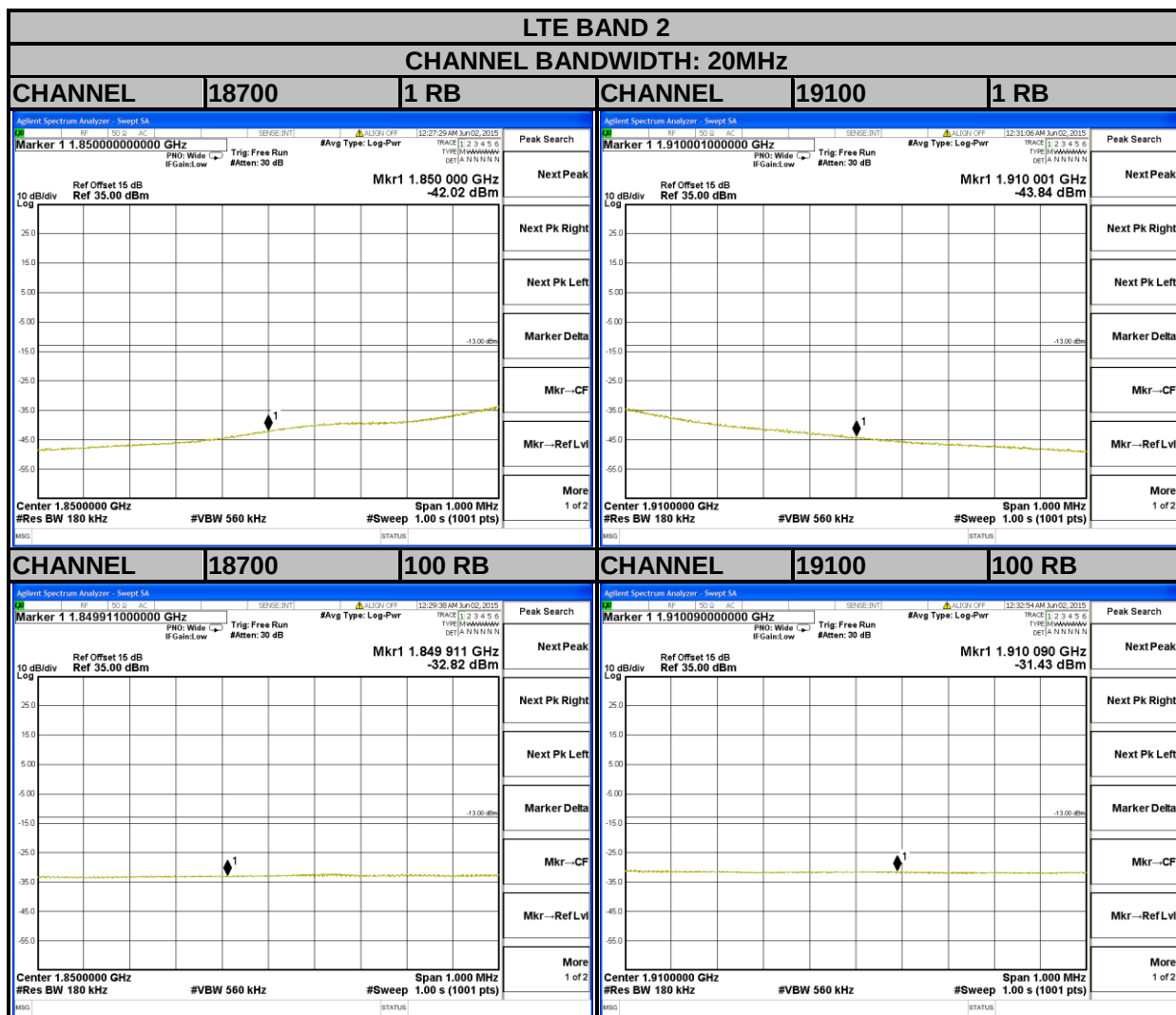


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## 4.6 CONDUCTED SPURIOUS EMISSIONS

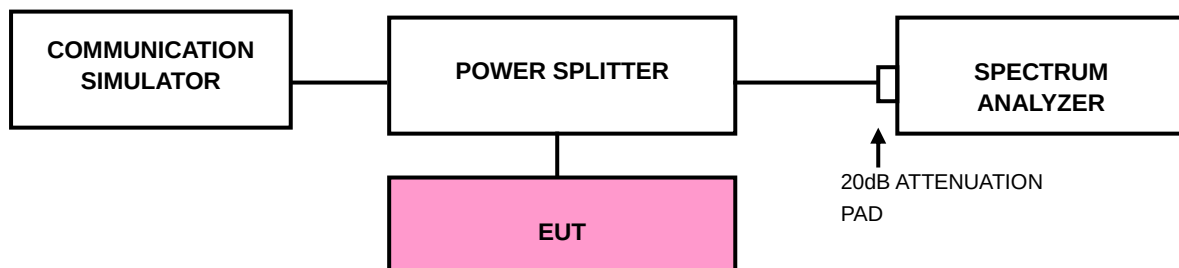
### 4.6.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB. The emission limit is equal to -13dBm.

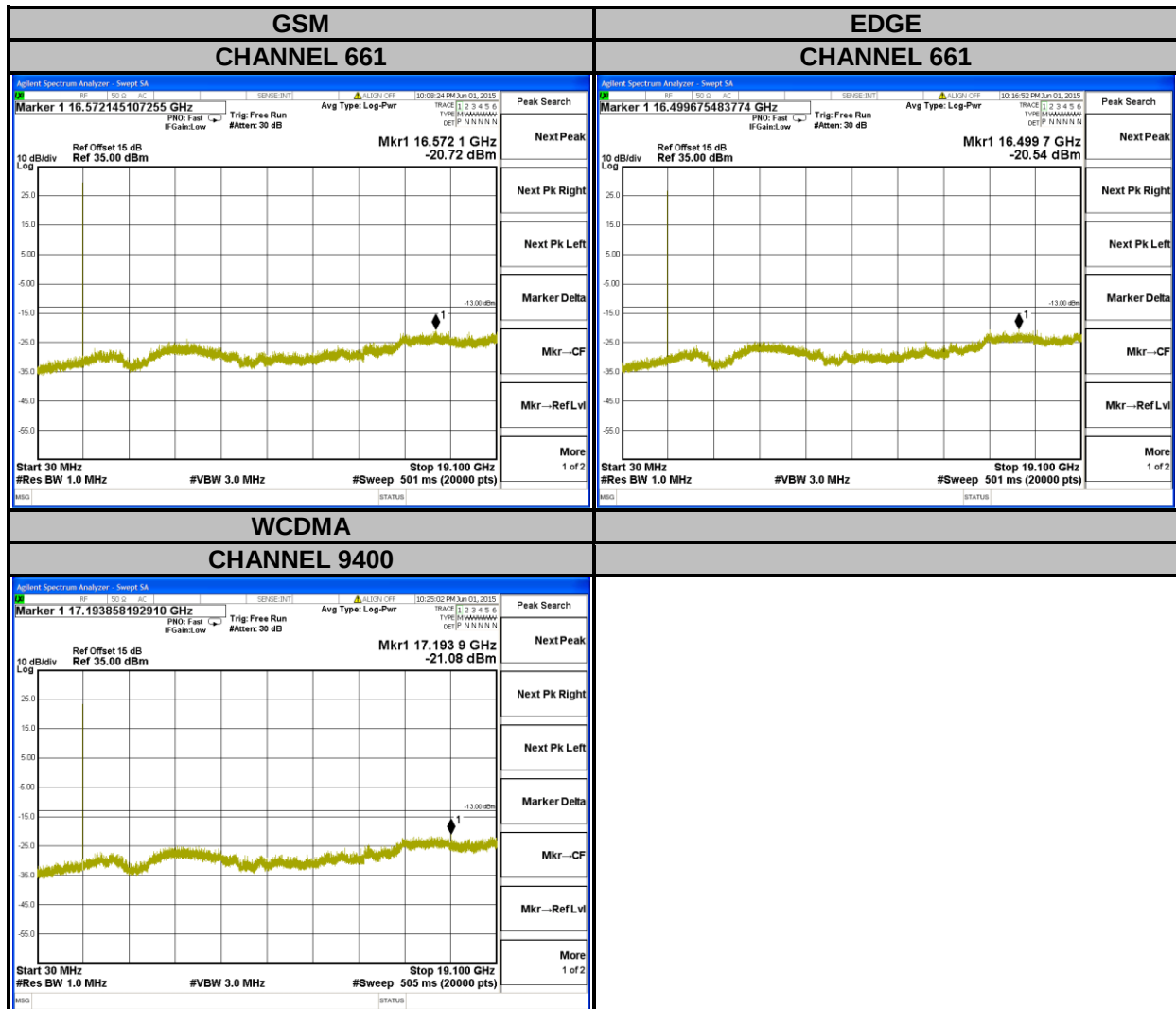
### 4.6.2 TEST PROCEDURE

- 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 30 MHz to 19.1GHz. 10dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz is used for conducted emission measurement.

### 4.6.3 TEST SETUP



#### 4.6.4 TEST RESULTS





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## 4.7 RADIATED EMISSION MEASUREMENT

### 4.7.1 LIMITS OF RADIATED EMISSION MEASUREMENT

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB. The emission limit is equal to -13dBm.

### 4.7.2 TEST PROCEDURES

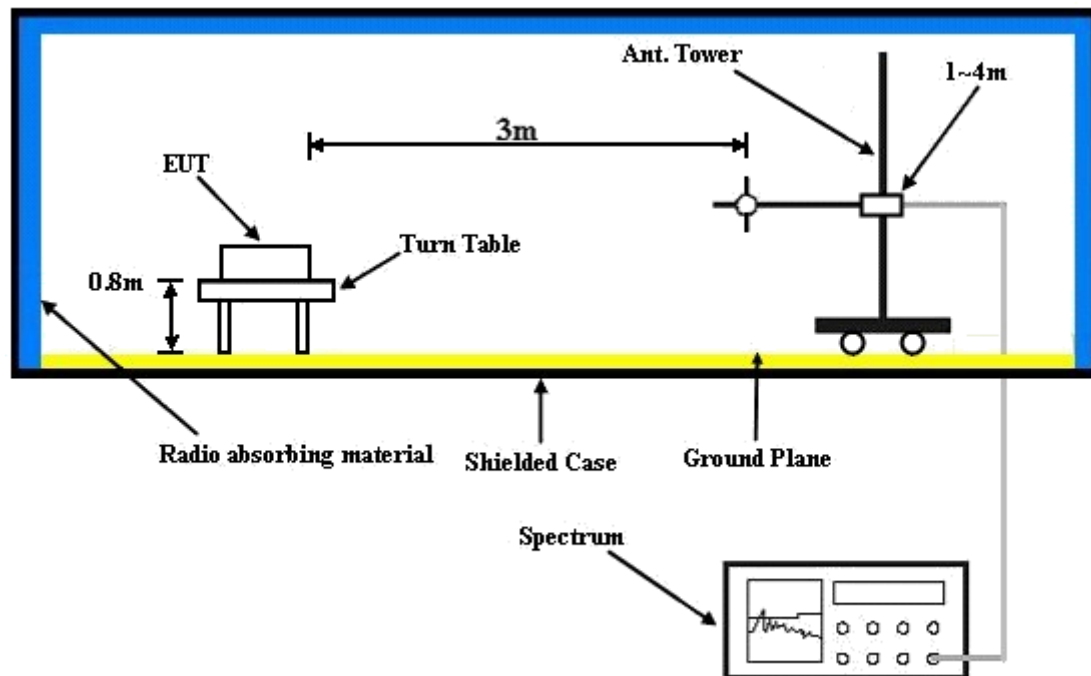
- a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from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

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

### 4.7.3 DEVIATION FROM TEST STANDARD

No deviation

#### 4.7.4 TEST SETUP



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



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## 4.7.5 TEST RESULTS

MODE A

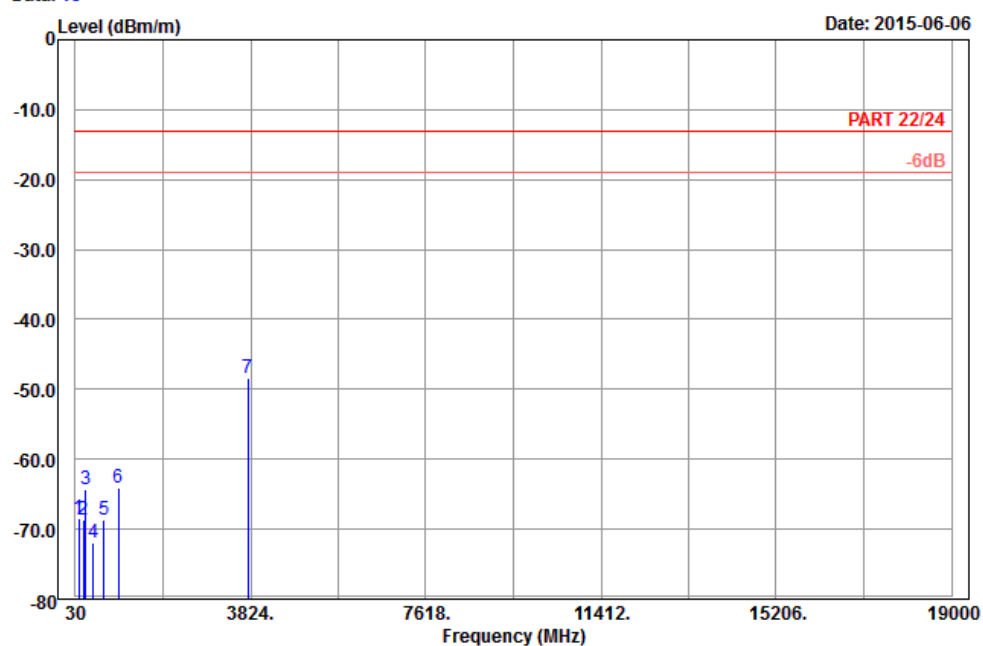
GSM:



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A D T

Data: 13



Site : 966 chamber 1  
Condition: PART 22/24 3m Horizontal  
Remark : PCS 1900\_Link\_CH661  
Tested by: Charles Hsiao  
Plane : X

|      |         |        | Read   | Limit  | Over   |        |        |
|------|---------|--------|--------|--------|--------|--------|--------|
|      | Freq    | Level  | Level  | Line   | Limit  | Factor | Remark |
|      | MHz     | dBm/m  | dBm    | dBm/m  | dB     | dB/m   |        |
| 1    | 101.55  | -68.43 | -58.54 | -13.00 | -55.43 | -9.89  | Peak   |
| 2    | 206.31  | -68.64 | -62.55 | -13.00 | -55.64 | -6.09  | Peak   |
| 3    | 253.02  | -64.23 | -58.70 | -13.00 | -51.23 | -5.53  | Peak   |
| 4    | 416.20  | -72.00 | -68.90 | -13.00 | -59.00 | -3.10  | Peak   |
| 5    | 655.60  | -68.75 | -68.59 | -13.00 | -55.75 | -0.16  | Peak   |
| 6    | 955.90  | -64.12 | -69.25 | -13.00 | -51.12 | 5.13   | Peak   |
| 7 pp | 3760.00 | -48.42 | -64.56 | -13.00 | -35.42 | 16.14  | Peak   |



A D T

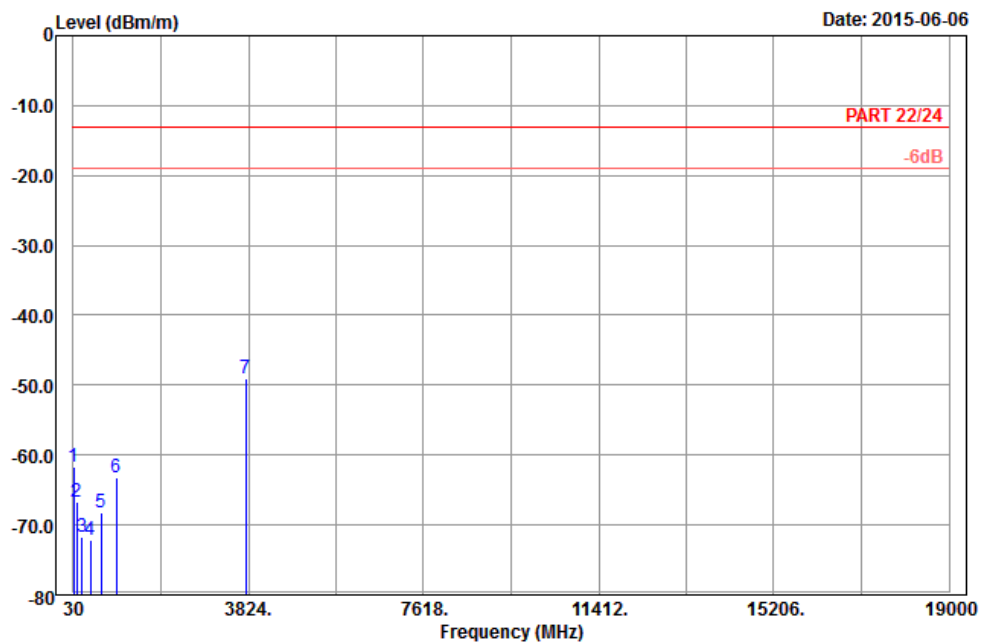


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A D T

Data: 14

Date: 2015-06-06



Site : 966 chamber 1  
Condition: PART 22/24 3m Vertical  
Remark : PCS 1900\_Link\_CH661  
Tested by: Charles Hsiao  
Plane : X

|      |         |        | Read   | Limit  | Over   |        |        |
|------|---------|--------|--------|--------|--------|--------|--------|
|      | Freq    | Level  | Level  | Line   | Limit  | Factor | Remark |
|      | MHz     | dBm/m  | dBm    | dBm/m  | dB     | dB/m   |        |
| 1    | 31.62   | -61.73 | -50.97 | -13.00 | -48.73 | -10.76 | Peak   |
| 2    | 109.65  | -66.69 | -57.74 | -13.00 | -53.69 | -8.95  | Peak   |
| 3    | 227.37  | -71.65 | -65.83 | -13.00 | -58.65 | -5.82  | Peak   |
| 4    | 402.20  | -72.12 | -69.32 | -13.00 | -59.12 | -2.80  | Peak   |
| 5    | 627.60  | -68.32 | -68.44 | -13.00 | -55.32 | 0.12   | Peak   |
| 6    | 962.90  | -63.22 | -68.37 | -13.00 | -50.22 | 5.15   | Peak   |
| 7 pp | 3760.00 | -49.04 | -65.18 | -13.00 | -36.04 | 16.14  | Peak   |



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EDGE:

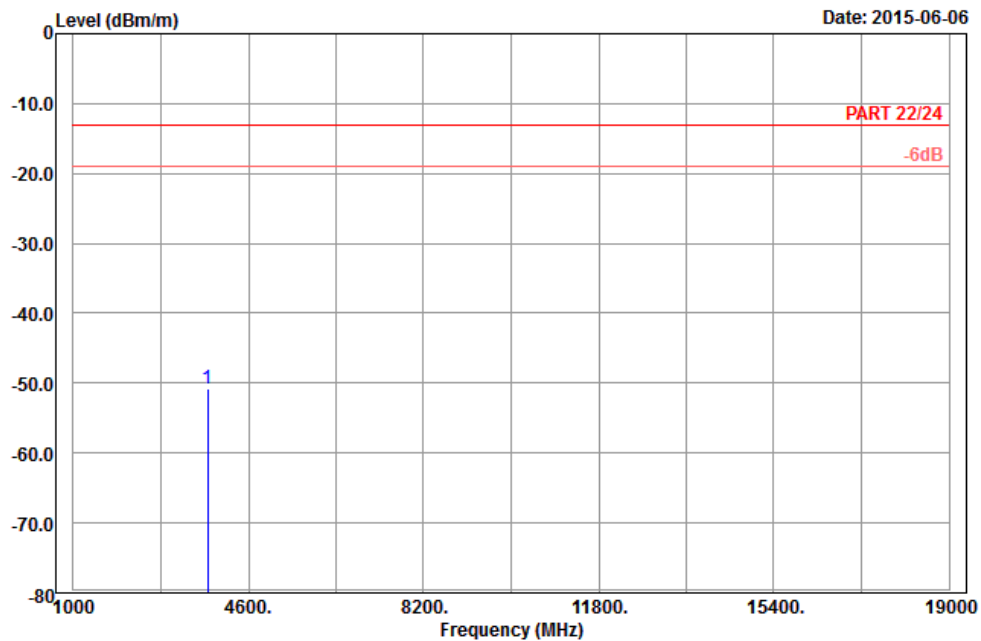


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A D T

Data: 9

Date: 2015-06-06



Site : 966 chamber 1  
Condition: PART 22/24 3m Horizontal  
Remark : EDGE 1900\_Link\_CH661  
Tested by: Charles Hsiao  
Plane : X

|      |         | Read   | Limit  | Over   |        |            |
|------|---------|--------|--------|--------|--------|------------|
| Freq | Level   | Level  | Line   | Limit  | Factor | Remark     |
| MHz  | dBm/m   | dBm    | dBm/m  | dB     | dB/m   |            |
| 1 pp | 3760.00 | -50.80 | -66.94 | -13.00 | -37.80 | 16.14 Peak |



A D T

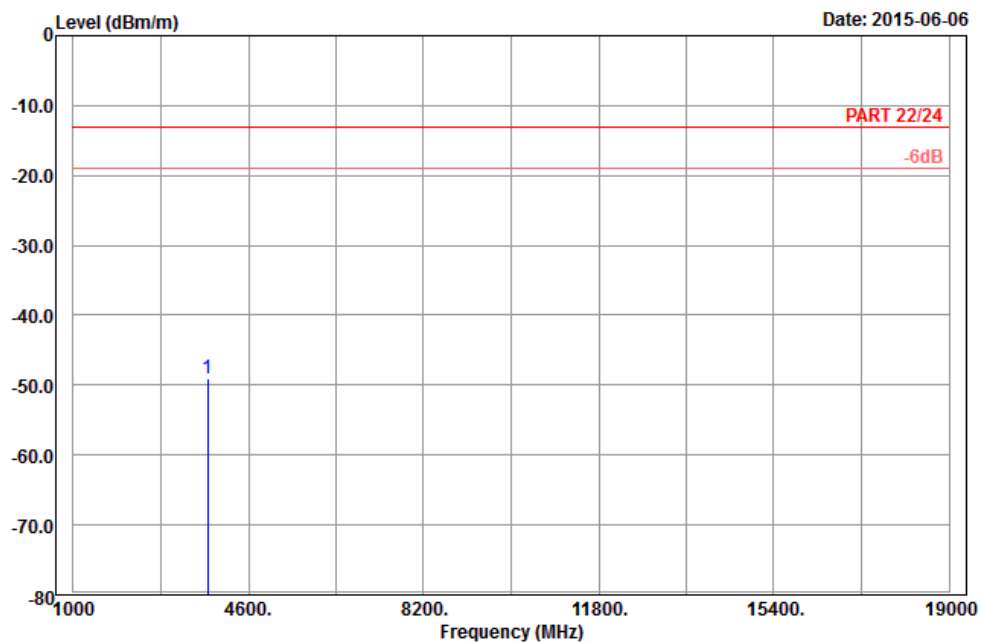


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A D T

Data: 10

Date: 2015-06-06



Site : 966 chamber 1  
Condition: PART 22/24 3m Vertical  
Remark : EDGE 1900\_Link\_CH661  
Tested by: Charles Hsiao  
Plane : X

| Freq         | Level  | Read   | Limit  | Over   |        | Remark |
|--------------|--------|--------|--------|--------|--------|--------|
|              |        | Level  | Line   | Limit  | Factor |        |
| MHz          | dBm/m  | dBm    | dBm/m  | dB     | dB/m   |        |
| 1 pp 3760.00 | -49.15 | -65.29 | -13.00 | -36.15 | 16.14  | Peak   |



A D T

WCDMA:

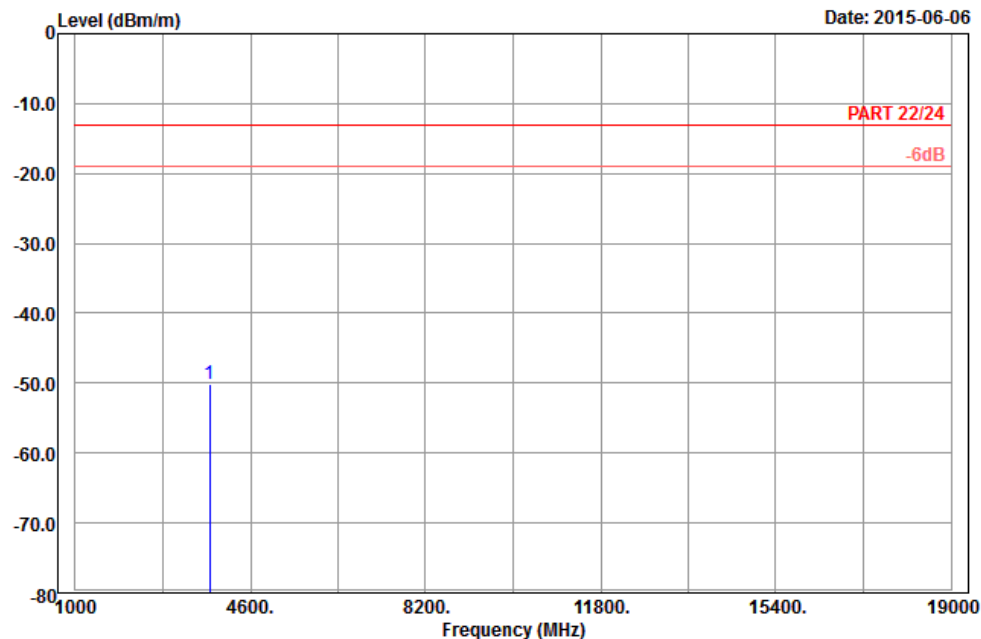


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A D T

Data: 9

Date: 2015-06-06



Site : 966 chamber 1  
Condition: PART 22/24 3m Horizontal  
Remark : Bnad II\_Link\_CH9400  
Tested by: Charles Hsiao  
Plane : X

|      |         | Read   | Limit  | Over   |        |            |
|------|---------|--------|--------|--------|--------|------------|
| Freq | Level   | Level  | Line   | Limit  | Factor | Remark     |
| MHz  | dBm/m   | dBm    | dBm/m  | dB     | dB/m   |            |
| 1 pp | 3760.00 | -50.24 | -66.38 | -13.00 | -37.24 | 16.14 Peak |



A D T

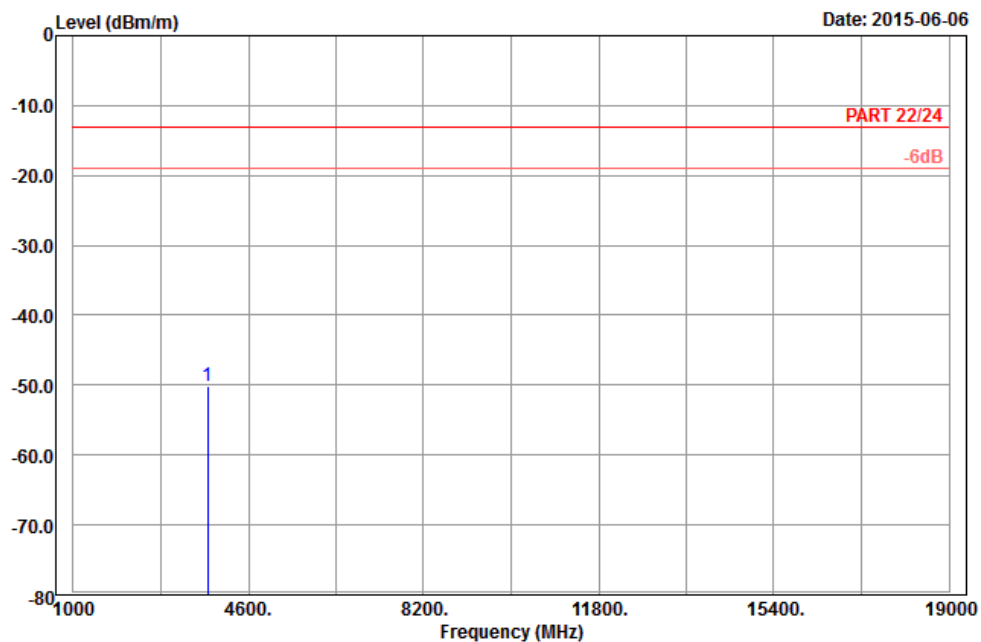


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A D T

Data: 10

Date: 2015-06-06



Site : 966 chamber 1  
Condition: PART 22/24 3m Vertical  
Remark : Bnad II\_Link\_CH9400  
Tested by: Charles Hsiao  
Plane : X

| Freq         | Level  | Read   | Limit  | Over   |        | Remark |
|--------------|--------|--------|--------|--------|--------|--------|
|              |        | Level  | Line   | Limit  | Factor |        |
| MHz          | dBm/m  | dBm    | dBm/m  | dB     | dB/m   |        |
| 1 pp 3760.00 | -50.22 | -66.36 | -13.00 | -37.22 | 16.14  | Peak   |



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## LTE BAND 2

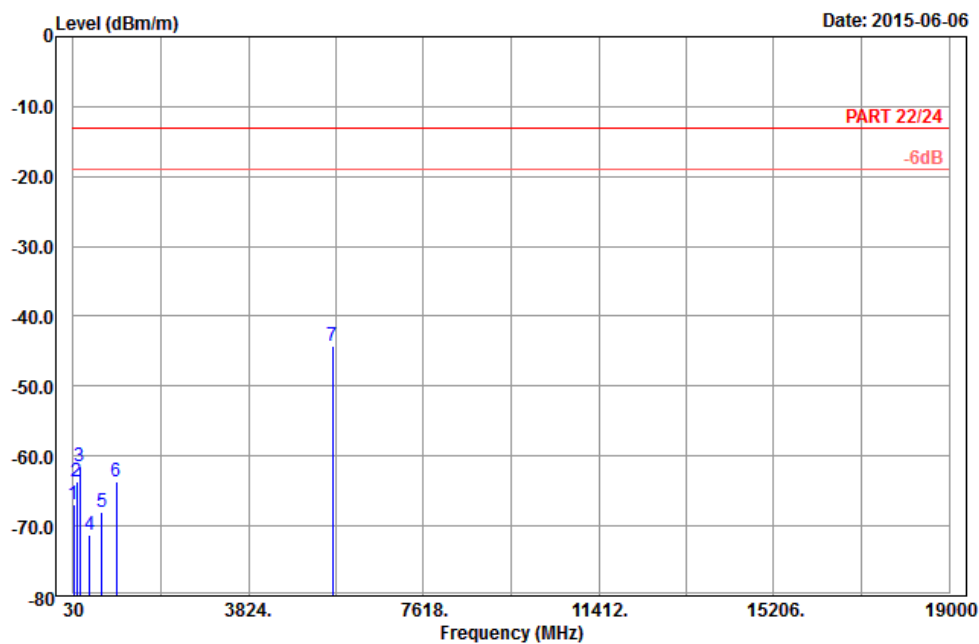
CHANNEL BANDWIDTH: 20MHz / QPSK



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A D T

Data: 11



Site : 966 chamber 1  
Condition: PART 22/24 3m Horizontal  
Remark : LTE\_Band 2\_QPSK(1,0)\_20M\_CH18900  
Tested by: Will Chen  
Plane : Z

|      | Freq    | Level  | Read Level | Limit Line | Over Limit | Factor | Remark |
|------|---------|--------|------------|------------|------------|--------|--------|
|      | MHz     | dBm/m  | dBm        | dBm/m      | dB         | dB/m   |        |
| 1    | 31.62   | -66.97 | -56.21     | -13.00     | -53.97     | -10.76 | Peak   |
| 2    | 102.36  | -63.62 | -53.85     | -13.00     | -50.62     | -9.77  | Peak   |
| 3    | 162.03  | -61.43 | -53.96     | -13.00     | -48.43     | -7.47  | Peak   |
| 4    | 389.60  | -71.27 | -68.01     | -13.00     | -58.27     | -3.26  | Peak   |
| 5    | 654.20  | -67.97 | -67.81     | -13.00     | -54.97     | -0.16  | Peak   |
| 6    | 969.90  | -63.71 | -68.88     | -13.00     | -50.71     | 5.17   | Peak   |
| 7 pp | 5640.00 | -44.20 | -64.67     | -13.00     | -31.20     | 20.47  | Peak   |



A D T

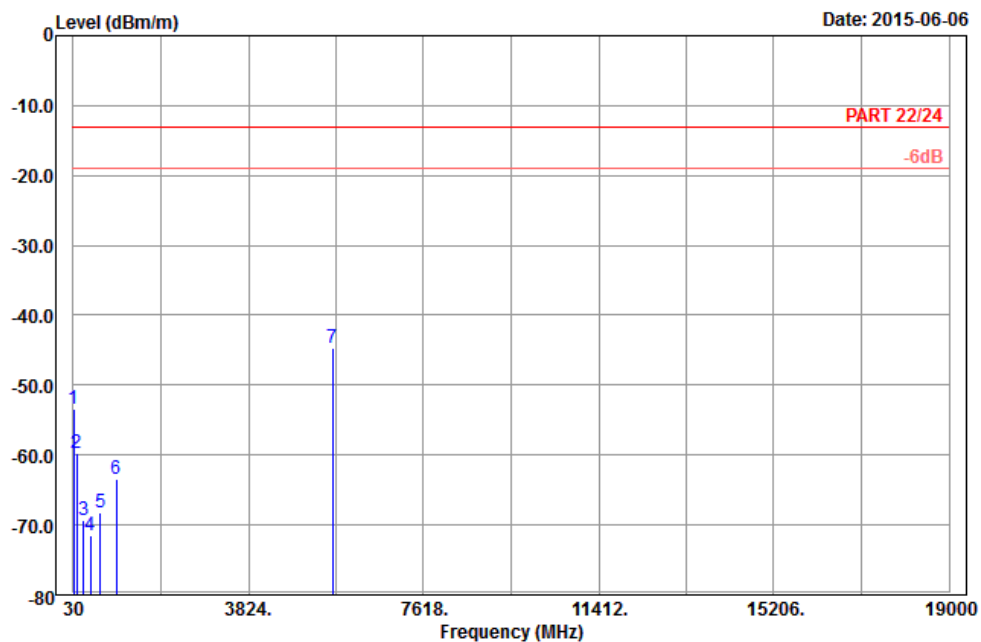


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A D T

Data: 12

Date: 2015-06-06



Site : 966 chamber 1  
Condition: PART 22/24 3m Vertical  
Remark : LTE\_Band 2\_QPSK(1,0)\_20M\_CH18900  
Tested by: Will Chen  
Plane : Z

|      |         |        | Read   | Limit  | Over   |        |        |
|------|---------|--------|--------|--------|--------|--------|--------|
|      | Freq    | Level  | Level  | Line   | Limit  | Factor | Remark |
|      | MHz     | dBm/m  | dBm    | dBm/m  | dB     | dB/m   |        |
| 1    | 31.62   | -53.45 | -42.69 | -13.00 | -40.45 | -10.76 | Peak   |
| 2    | 108.84  | -59.79 | -50.72 | -13.00 | -46.79 | -9.07  | Peak   |
| 3    | 253.02  | -69.25 | -63.72 | -13.00 | -56.25 | -5.53  | Peak   |
| 4    | 394.50  | -71.42 | -68.42 | -13.00 | -58.42 | -3.00  | Peak   |
| 5    | 623.40  | -68.25 | -68.41 | -13.00 | -55.25 | 0.16   | Peak   |
| 6    | 966.40  | -63.40 | -68.56 | -13.00 | -50.40 | 5.16   | Peak   |
| 7 pp | 5640.00 | -44.62 | -65.09 | -13.00 | -31.62 | 20.47  | Peak   |



A D T

## MODE B

GSM:

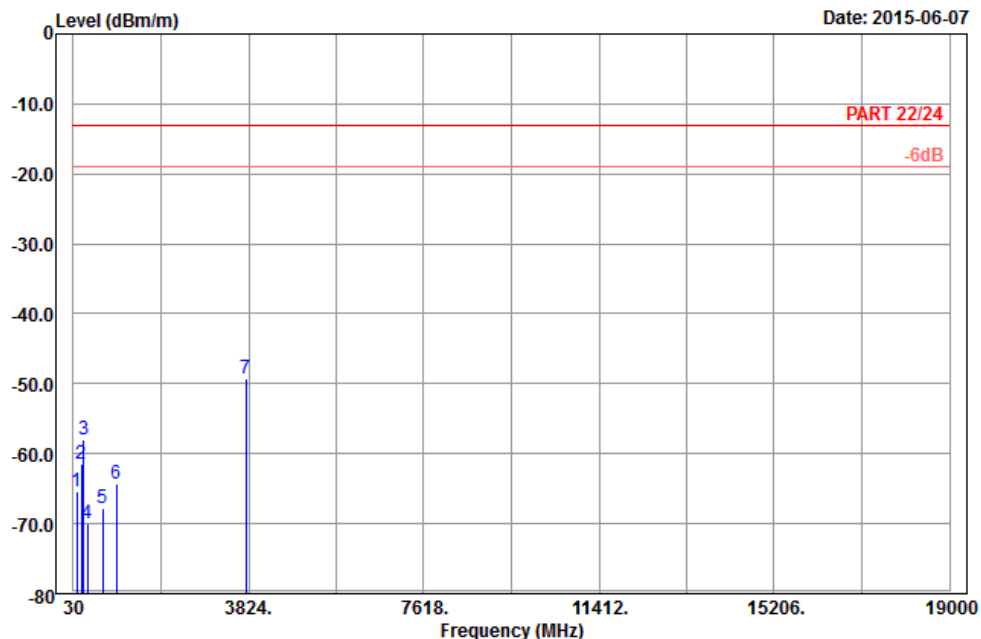


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A D T

Data: 13

Date: 2015-06-07



Site : 966 chamber 1  
Condition: PART 22/24 3m Horizontal  
Remark : PCS 1900\_Link\_CH661  
Tested by: Hwa Chiang  
Plane : X

|      |         |        | Read   | Limit  | Over   |        |        |
|------|---------|--------|--------|--------|--------|--------|--------|
|      | Freq    | Level  | Level  | Line   | Limit  | Factor | Remark |
|      | MHz     | dBm/m  | dBm    | dBm/m  | dB     | dB/m   |        |
| 1    | 109.11  | -65.29 | -56.34 | -13.00 | -52.29 | -8.95  | Peak   |
| 2    | 197.67  | -61.52 | -55.43 | -13.00 | -48.52 | -6.09  | Peak   |
| 3    | 253.56  | -57.95 | -52.42 | -13.00 | -44.95 | -5.53  | Peak   |
| 4    | 342.00  | -70.02 | -64.55 | -13.00 | -57.02 | -5.47  | Peak   |
| 5    | 659.80  | -67.80 | -67.62 | -13.00 | -54.80 | -0.18  | Peak   |
| 6    | 959.40  | -64.20 | -69.34 | -13.00 | -51.20 | 5.14   | Peak   |
| 7 pp | 3760.00 | -49.26 | -65.40 | -13.00 | -36.26 | 16.14  | Peak   |



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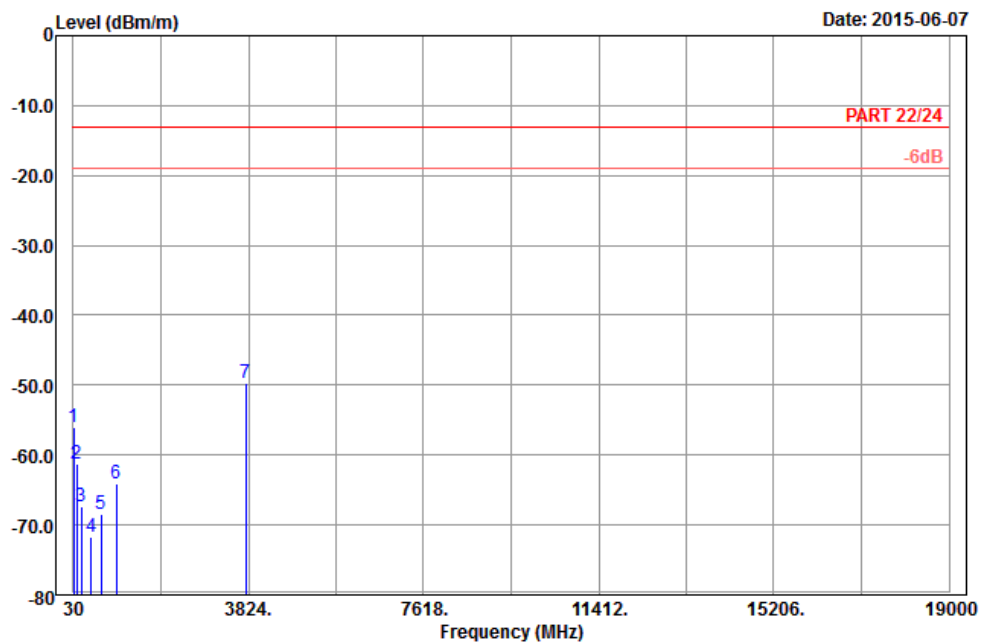


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A D T

Data: 14

Date: 2015-06-07



Site : 966 chamber 1  
Condition: PART 22/24 3m Vertical  
Remark : PCS 1900\_Link\_CH661  
Tested by: Hwa Chiang  
Plane : X

|      |         |        | Read   | Limit  | Over   |        |        |
|------|---------|--------|--------|--------|--------|--------|--------|
|      | Freq    | Level  | Level  | Line   | Limit  | Factor | Remark |
|      | MHz     | dBm/m  | dBm    | dBm/m  | dB     | dB/m   |        |
| 1    | 30.81   | -56.06 | -45.41 | -13.00 | -43.06 | -10.65 | Peak   |
| 2    | 108.84  | -61.18 | -52.11 | -13.00 | -48.18 | -9.07  | Peak   |
| 3    | 202.80  | -67.40 | -61.26 | -13.00 | -54.40 | -6.14  | Peak   |
| 4    | 421.80  | -71.74 | -68.51 | -13.00 | -58.74 | -3.23  | Peak   |
| 5    | 626.20  | -68.40 | -68.53 | -13.00 | -55.40 | 0.13   | Peak   |
| 6    | 966.40  | -64.18 | -69.34 | -13.00 | -51.18 | 5.16   | Peak   |
| 7 pp | 3760.00 | -49.73 | -65.87 | -13.00 | -36.73 | 16.14  | Peak   |



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## LTE BAND 2

CHANNEL BANDWIDTH: 20MHz / QPSK

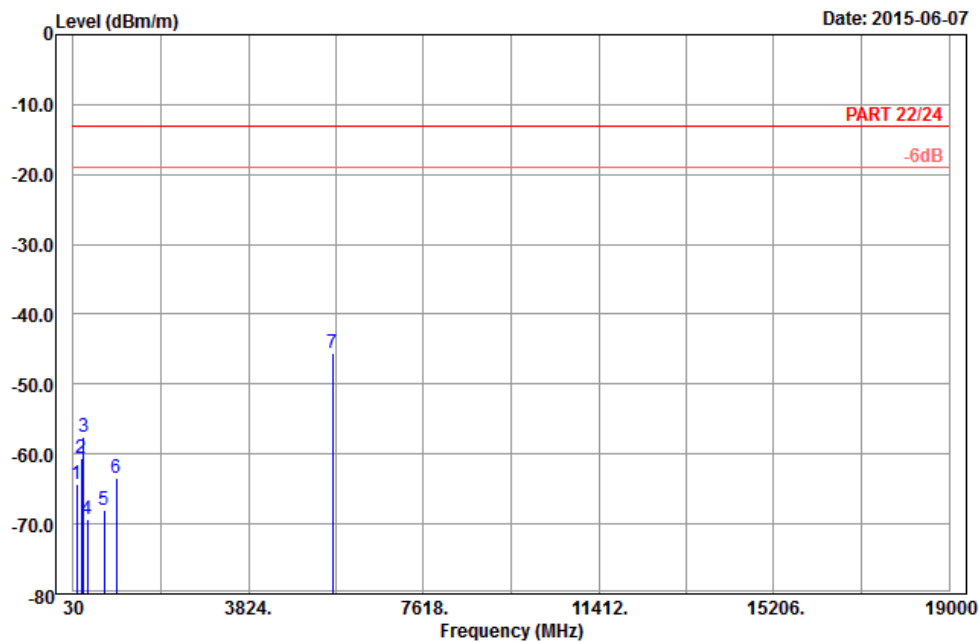


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 13

Date: 2015-06-07



Site : 966 chamber 1  
Condition: PART 22/24 3m Horizontal  
Remark : LTE\_Band 2\_QPSK(1,0)\_20M\_CH18900  
Tested by: Hwa Chiang  
Plane : X

|      |         |        | Read   | Limit  | Over   |        |        |
|------|---------|--------|--------|--------|--------|--------|--------|
|      | Freq    | Level  | Level  | Line   | Limit  | Factor | Remark |
|      | MHz     | dBm/m  | dBm    | dBm/m  | dB     | dB/m   |        |
| 1    | 109.65  | -64.27 | -55.32 | -13.00 | -51.27 | -8.95  | Peak   |
| 2    | 200.37  | -60.62 | -54.45 | -13.00 | -47.62 | -6.17  | Peak   |
| 3    | 253.83  | -57.61 | -52.07 | -13.00 | -44.61 | -5.54  | Peak   |
| 4    | 337.10  | -69.39 | -63.87 | -13.00 | -56.39 | -5.52  | Peak   |
| 5    | 696.90  | -67.99 | -67.63 | -13.00 | -54.99 | -0.36  | Peak   |
| 6    | 958.70  | -63.54 | -68.67 | -13.00 | -50.54 | 5.13   | Peak   |
| 7 pp | 5640.00 | -45.54 | -66.01 | -13.00 | -32.54 | 20.47  | Peak   |



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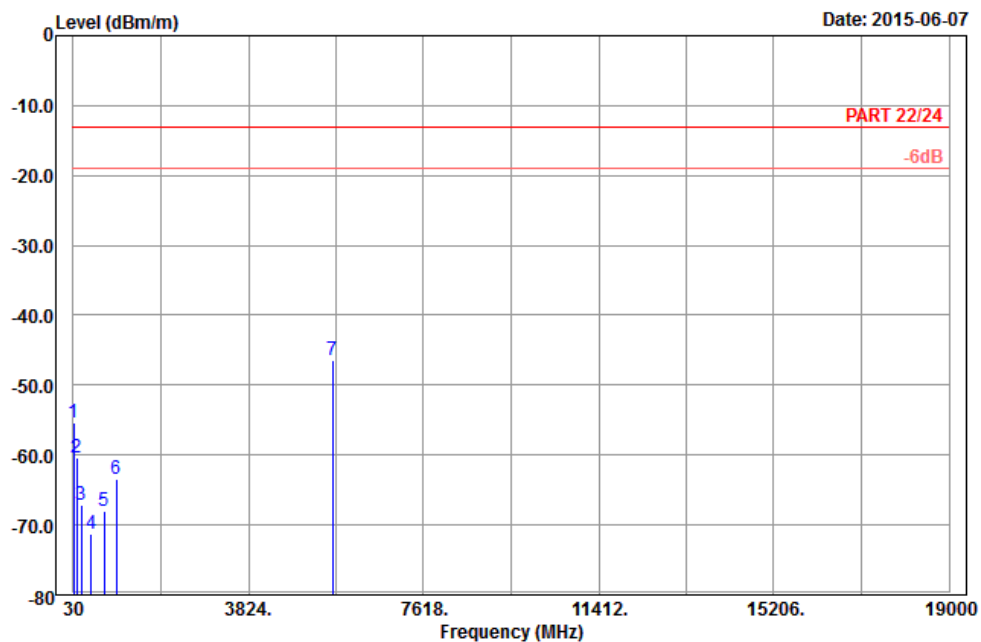


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A D T

Data: 14

Date: 2015-06-07



Site : 966 chamber 1  
Condition: PART 22/24 3m Vertical  
Remark : LTE\_Band 2\_QPSK(1,0)\_20M\_CH18900  
Tested by: Hwa Chiang  
Plane : X

|      |         |        | Read   | Limit  | Over   |        |        |
|------|---------|--------|--------|--------|--------|--------|--------|
|      | Freq    | Level  | Level  | Line   | Limit  | Factor | Remark |
|      | MHz     | dBm/m  | dBm    | dBm/m  | dB     | dB/m   |        |
| 1    | 30.54   | -55.43 | -44.78 | -13.00 | -42.43 | -10.65 | Peak   |
| 2    | 109.38  | -60.32 | -51.37 | -13.00 | -47.32 | -8.95  | Peak   |
| 3    | 198.48  | -67.11 | -60.97 | -13.00 | -54.11 | -6.14  | Peak   |
| 4    | 410.60  | -71.27 | -68.30 | -13.00 | -58.27 | -2.97  | Peak   |
| 5    | 691.30  | -68.09 | -67.75 | -13.00 | -55.09 | -0.34  | Peak   |
| 6    | 966.40  | -63.53 | -68.69 | -13.00 | -50.53 | 5.16   | Peak   |
| 7 pp | 5640.00 | -46.37 | -66.84 | -13.00 | -33.37 | 20.47  | Peak   |

## 5 PHOTOGRAPHS OF THE TEST CONFIGURATION

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

## 6 INFORMATION ON THE TESTING LABORATORIES

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

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

**Linko EMC/RF Lab:**

Tel: 886-2-26052180

Fax: 886-2-26051924

**Hsin Chu EMC/RF/Telecom Lab:**

Tel: 886-3-5935343

Fax: 886-3-5935342

**Hwa Ya EMC/RF/Safety Lab:**

Tel: 886-3-3183232

Fax: 886-3-3270892

**Email:** [service.adt@tw.bureauveritas.com](mailto:service.adt@tw.bureauveritas.com)

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

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



A D T

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

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

---END---