

# FCC Radio Test Report

## FCC ID: ZMOLC116LA

**This report concerns: Original Grant**

**Project No.** : 2111C168  
**Equipment** : LTE Module  
**Brand Name** : Fibocom  
**Test Model** : LC116-LA  
**Series Model** : N/A  
**Applicant** : Fibocom Wireless Inc.  
**Address** : 1101,Tower A, Building 6, Shenzhen International Innovation Valley, Dashi  
1st Rd, Nanshan,Shenzhen,China  
**Manufacturer** : Fibocom Wireless Inc.  
**Address** : 1101,Tower A, Building 6, Shenzhen International Innovation Valley, Dashi  
1st Rd, Nanshan,Shenzhen,China  
**Factory** : Huizhou HYE Technology Co., Ltd.  
**Address** : No. 237, Sanhe group, Sanhe village, Tonghu Town, Zhongkai hi tech Zone,  
Huizhou  
**Date of Receipt** : Nov. 29, 2021  
**Date of Test** : Dec. 20, 2021 ~ Jan. 08, 2022  
**Issued Date** : Feb. 17, 2022  
**Report Version** : R00  
**Test Sample** : Engineering Sample No.: DG2021122079 for conducted,  
DG2021122077 for radiated.  
**Standard(s)** : 47 CFR FCC Part 22 Subpart H  
47 CFR FCC Part 2  
ANSI/TIA/EIA-603-E-2016  
FCC KDB 971168 D01 Power Meas License Digital Systems v03r01

The above equipment has been tested and found compliance with the requirement of the relative standards by BTL Inc.

*Edward Li*

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TESTING CERT #5123.02

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**BTL** represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with standards traceable to international standard(s) and/or national standard(s).

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**BTL's** laboratory quality assurance procedures are in compliance with the **ISO/IEC 17025** requirements, and accredited by the conformity assessment authorities listed in this test report.

**BTL** is not responsible for the sampling stage, so the results only apply to the sample as received.

The information, data and test plan are provided by manufacturer which may affect the validity of results, so it is manufacturer's responsibility to ensure that the apparatus meets the essential requirements of applied standards and in all the possible configurations as representative of its intended use.

**Limitation**

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.

Please note that the measurement uncertainty is provided for informational purpose only and is not use in determining the Pass/Fail results.

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**REPORT ISSUED HISTORY**

| Report Version | Description     | Issued Date   |
|----------------|-----------------|---------------|
| R00            | Original Issue. | Feb. 17, 2022 |

## 1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standard(s):

| FCC Part 22 Subpart H & Part 2 |                              |          |             |
|--------------------------------|------------------------------|----------|-------------|
| Standard(s) Section            | Test Item                    | Judgment | Remark      |
| 2.1046<br>22.913(a)(5)         | Effective Radiated Power     | PASS     | -----       |
| 2.1049                         | Occupied Bandwidth           | PASS     | -----       |
| 2.1051<br>22.917(a)            | Conducted Spurious Emissions | PASS     | -----       |
| 2.1053<br>22.917(a)            | Radiated Spurious Emissions  | PASS     | -----       |
| 22.917(a)                      | Band Edge Measurements       | PASS     | -----       |
| -                              | Peak To Average Ratio        | PASS     | Record Only |
| 2.1055<br>22.355               | Frequency Stability          | PASS     | -----       |

Note:

(1) "N/A" denotes test is not applicable in this test report.

## 1.1 TEST FACILITY

The test facilities used to collect the test data of radiated in this report is at the location of No. 3 Jinshagang 1st Rd. Shixia, Dalang Town Dongguan City, Guangdong 523792 People's Republic of China.

The test facilities used to collect the test data of conducted in this report is at the location of Room 108, Building 2, No.1, Yile Road, Songshan Lake Zone, Dongguan City, Guangdong, People's Republic of China.

BTL's Test Firm Registration Number for FCC: 357015

BTL's Designation Number for FCC: CN1240

## 1.2 MEASUREMENT UNCERTAINTY

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2))

The BTL measurement uncertainty as below table:

### A. Radiated Measurement:

| Test Site | Method | Measurement Frequency Range | U,(dB) |
|-----------|--------|-----------------------------|--------|
| DG-CB01   | CISPR  | 9kHz ~ 30MHz                | 2.36   |

| Test Site | Method | Measurement Frequency Range | Ant.<br>H / V | U,(dB) |
|-----------|--------|-----------------------------|---------------|--------|
| DG-CB03   | CISPR  | 30MHz ~ 200MHz              | V             | 4.36   |
|           |        | 30MHz ~ 200MHz              | H             | 3.32   |
|           |        | 200MHz ~ 1,000MHz           | V             | 4.08   |
|           |        | 200MHz ~ 1,000MHz           | H             | 3.96   |
|           |        | 1GHz ~ 6GHz                 | -             | 3.80   |
|           |        | 6GHz ~ 18GHz                | -             | 4.82   |

### B. Other Measurement:

| Parameter              | Uncertainty |
|------------------------|-------------|
| Spectrum Bandwidth     | ±3.8 %      |
| Maximum Output Power   | ±0.95 dB    |
| Power Spectral Density | ±0.86 dB    |
| Frequency Stability    | ±0.16 dB    |
| Temperature            | ±0.08 °C    |
| Time                   | ±0.58 %     |
| Supply voltages        | ±0.3 %      |

Note: Unless specifically mentioned, the uncertainty of measurement has not been taken into account to declare the compliance or non-compliance to the specification.

### 1.3 TEST ENVIRONMENT CONDITIONS

| Test Item                                           | Temperature      | Humidity | Test Voltage     | Tested By    |
|-----------------------------------------------------|------------------|----------|------------------|--------------|
| Output Power & ERP                                  | 25°C             | 46%      | DC 3.8V          | Rick Liao    |
| Occupied Bandwidth                                  | 25°C             | 46%      | DC 3.8V          | Rick Liao    |
| Conducted Spurious Emissions                        | 25°C             | 46%      | DC 3.8V          | Rick Liao    |
| Radiated Spurious Emissions<br>(9 kHz to 30 MHz)    | 16°C             | 55%      | DC 3.8V          | Torocat Yuan |
| Radiated Spurious Emissions<br>(30 MHz to 1000 MHz) | 20°C             | 52%      | DC 3.8V          | Kwok Guo     |
| Radiated Spurious Emissions<br>(Above 1000 MHz)     | 20°C             | 52%      | DC 3.8V          | Kwok Guo     |
| Band Edge                                           | 25°C             | 46%      | DC 3.8V          | Rick Liao    |
| Peak to Average Ratio                               | 25°C             | 46%      | DC 3.8V          | Rick Liao    |
| Frequency Stability                                 | Normal & Extreme | 46%      | Normal & Extreme | Rick Liao    |

## 2. GENERAL INFORMATION

### 2.1 GENERAL DESCRIPTION OF EUT

|                     |                                                 |                         |                                           |             |
|---------------------|-------------------------------------------------|-------------------------|-------------------------------------------|-------------|
| Equipment           | LTE Module                                      |                         |                                           |             |
| Brand Name          | Fibocom                                         |                         |                                           |             |
| Test Model          | LC116-LA                                        |                         |                                           |             |
| Series Model        | N/A                                             |                         |                                           |             |
| Model Difference(s) | N/A                                             |                         |                                           |             |
| Power Source        | DC Voltage supplied from external power supply. |                         |                                           |             |
| Power Rating        | DC 3.3V~4.3V                                    |                         |                                           |             |
| IMEI No.            | Radiated                                        | 865619050001685         |                                           |             |
|                     | Conducted                                       | 865619050003673         |                                           |             |
| Modulation Type     | GSM/GPRS                                        |                         | GMSK                                      |             |
|                     | EDGE                                            |                         | GMSK, 8PSK                                |             |
|                     | WCDMA/HSDPA/HSUPA                               |                         | UL: QPSK<br>DL: QPSK, 16QAM               |             |
|                     | LTE                                             |                         | UL: QPSK, 16QAM<br>DL: QPSK, 16QAM, 64QAM |             |
| Max. ERP            | GSM 850 / GPRS 850                              |                         | GMSK                                      | 28.33 dBm   |
|                     | EDGE 850                                        |                         | 8PSK                                      | 23.83 dBm   |
|                     | WCDMA Band V                                    |                         | QPSK                                      | 20.02 dBm   |
|                     | HSDPA Band V                                    |                         | QPSK                                      | 19.14 dBm   |
|                     | HSUPA Band V                                    |                         | QPSK                                      | 19.12 dBm   |
|                     | LTE                                             | Channel Bandwidth (MHz) | QPSK (dBm)                                | 16QAM (dBm) |
|                     | Band 5                                          | 1.4                     | 19.37                                     | 18.79       |
|                     |                                                 | 3                       | 19.64                                     | 18.79       |
|                     |                                                 | 5                       | 19.31                                     | 18.32       |
|                     |                                                 | 10                      | 19.48                                     | 18.65       |

**Note:**

- For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

**2. Channel List:**

| GSM 850           |        |                           |        |                             |
|-------------------|--------|---------------------------|--------|-----------------------------|
| Test Frequency ID | UARFCN | Frequency of Uplink (MHz) | UARFCN | Frequency of Downlink (MHz) |
| Low Range         | 128    | 824.2                     | 137    | 869.2                       |
| Mid Range         | 190    | 836.6                     | 199    | 881.6                       |
| High Range        | 251    | 848.8                     | 260    | 893.8                       |

| WCDMA Band V      |        |                           |        |                             |
|-------------------|--------|---------------------------|--------|-----------------------------|
| Test Frequency ID | UARFCN | Frequency of Uplink (MHz) | UARFCN | Frequency of Downlink (MHz) |
| Low Range         | 4132   | 826.4                     | 4357   | 871.4                       |
| Mid Range         | 4182   | 836.4                     | 4407   | 881.4                       |
| High Range        | 4233   | 846.6                     | 4458   | 891.6                       |

| LTE Band 5        |                 |                 |                           |                 |                             |
|-------------------|-----------------|-----------------|---------------------------|-----------------|-----------------------------|
| Test Frequency ID | Bandwidth (MHz) | N <sub>UL</sub> | Frequency of Uplink (MHz) | N <sub>DL</sub> | Frequency of Downlink (MHz) |
| Low Range         | 1.4             | 20407           | 824.7                     | 2407            | 869.7                       |
|                   | 3               | 20415           | 825.5                     | 2415            | 870.5                       |
|                   | 5               | 20425           | 826.5                     | 2425            | 871.5                       |
|                   | 10              | 20450           | 829                       | 2450            | 874                         |
| Mid Range         | 1.4/3/5/10      | 20525           | 836.5                     | 2525            | 881.5                       |
| High Range        | 1.4             | 20643           | 848.3                     | 2643            | 893.3                       |
|                   | 3               | 20635           | 847.5                     | 2635            | 892.5                       |
|                   | 5               | 20625           | 846.5                     | 2625            | 891.5                       |
|                   | 10              | 20600           | 844                       | 2600            | 889                         |

**3. Table for Filed Antenna:**

| Brand | Model Name | Antenna Type | Connector | Gain (dBi) | Note         |
|-------|------------|--------------|-----------|------------|--------------|
| N/A   | N/A        | Dipole       | SMA       | -1.4       | GSM 850      |
| N/A   | N/A        | Dipole       | SMA       | -1.4       | WCDMA Band V |
| N/A   | N/A        | Dipole       | SMA       | -1.4       | LTE Band 5   |

Note: The antenna gain is provided by the manufacturer.

## 2.2 DESCRIPTION OF TEST MODES

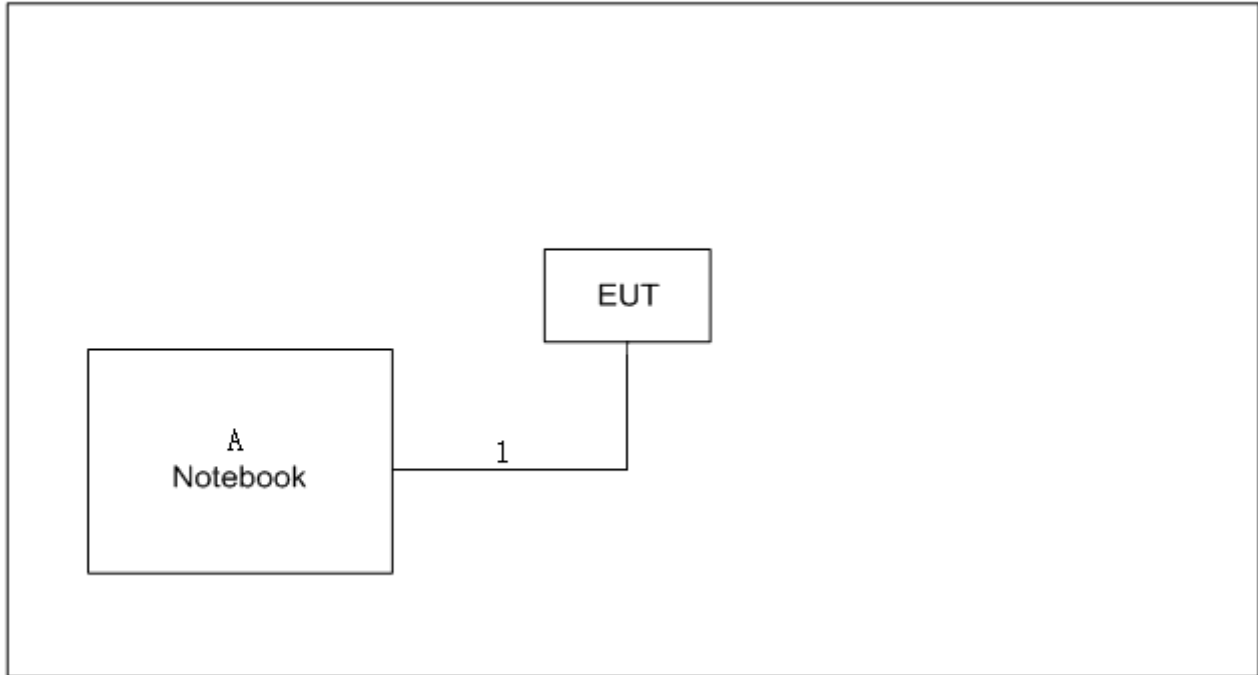
Following mode(s) is (were) found to be the worst case(s) and selected for the final test.

| GSM MODE                     |                   |                |                 |
|------------------------------|-------------------|----------------|-----------------|
| Test Item                    | Available Channel | Tested Channel | Mode            |
| Output Power & ERP           | 128 to 251        | 128, 190, 251  | GSM, GPRS, EDGE |
| Occupied Bandwidth           | 128 to 251        | 128, 190, 251  | GSM, EDGE       |
| Conducted Spurious Emissions | 128 to 251        | 190            | GSM, EDGE       |
| Radiated Spurious Emissions  | 128 to 251        | 190            | GSM             |
| Band Edge                    | 128 to 251        | 128, 251       | GSM, EDGE       |
| Peak to Average Ratio        | 128 to 251        | 128, 190, 251  | GSM, EDGE       |
| Frequency Stability          | 128 to 251        | 190            | GSM             |

| WCDMA BAND V MODE            |                   |                  |                     |
|------------------------------|-------------------|------------------|---------------------|
| Test Item                    | Available Channel | Tested Channel   | Mode                |
| Output Power & ERP           | 4132 to 4233      | 4132, 4182, 4233 | WCDMA, HSDPA, HSUPA |
| Occupied Bandwidth           | 4132 to 4233      | 4132, 4182, 4233 | WCDMA               |
| Conducted Spurious Emissions | 4132 to 4233      | 4182             | WCDMA               |
| Radiated Spurious Emissions  | 4132 to 4233      | 4182             | WCDMA               |
| Band Edge                    | 4132 to 4233      | 4132, 4233       | WCDMA               |
| Peak to Average Ratio        | 4132 to 4233      | 4132, 4182, 4233 | WCDMA               |
| Frequency Stability          | 4132 to 4233      | 4182             | WCDMA               |

| LTE BAND 5 MODE              |                   |                     |                   |             |               |
|------------------------------|-------------------|---------------------|-------------------|-------------|---------------|
| Test Item                    | Available Channel | Tested Channel      | Channel Bandwidth | Modulation  | Mode          |
| Output Power & ERP           | 20407 to 20643    | 20407, 20525, 20643 | 1.4MHz            | QPSK, 16QAM | 1RB/3RB/6RB   |
|                              | 20415 to 20635    | 20415, 20525, 20635 | 3MHz              | QPSK, 16QAM | 1RB/8RB/15RB  |
|                              | 20425 to 20625    | 20425, 20525, 20625 | 5MHz              | QPSK, 16QAM | 1RB/12RB/25RB |
|                              | 20450 to 20600    | 20450, 20525, 20600 | 10MHz             | QPSK, 16QAM | 1RB/25RB/50RB |
| Occupied Bandwidth           | 20407 to 20643    | 20407, 20525, 20643 | 1.4MHz            | QPSK, 16QAM | 6RB           |
|                              | 20415 to 20635    | 20415, 20525, 20635 | 3MHz              | QPSK, 16QAM | 15RB          |
|                              | 20425 to 20625    | 20425, 20525, 20625 | 5MHz              | QPSK, 16QAM | 25RB          |
|                              | 20450 to 20600    | 20450, 20525, 20600 | 10MHz             | QPSK, 16QAM | 50RB          |
| Conducted Spurious Emissions | 20407 to 20643    | 20525               | 1.4MHz            | QPSK        | 1RB           |
|                              | 20425 to 20625    | 20525               | 5MHz              | QPSK        | 1RB           |
|                              | 20450 to 20600    | 20525               | 10MHz             | QPSK        | 1RB           |
| Radiated Spurious Emissions  | 20407 to 20643    | 20525               | 1.4MHz            | QPSK        | 1RB           |
|                              | 20425 to 20625    | 20525               | 5MHz              | QPSK        | 1RB           |
|                              | 20450 to 20600    | 20525               | 10MHz             | QPSK        | 1RB           |
| Band Edge                    | 20407 to 20643    | 20407, 20643        | 1.4MHz            | QPSK        | 1RB/6RB       |
|                              | 20415 to 20635    | 20415, 20635        | 3MHz              | QPSK        | 1RB/15RB      |
|                              | 20425 to 20625    | 20425, 20625        | 5MHz              | QPSK        | 1RB/25RB      |
|                              | 20450 to 20600    | 20450, 20600        | 10MHz             | QPSK        | 1RB/50RB      |
| Peak To Average Ratio        | 20407 to 20643    | 20407, 20525, 20643 | 1.4MHz            | QPSK, 16QAM | 1RB           |
|                              | 20415 to 20635    | 20415, 20525, 20635 | 3MHz              | QPSK, 16QAM | 1RB           |
|                              | 20425 to 20625    | 20425, 20525, 20625 | 5MHz              | QPSK, 16QAM | 1RB           |
|                              | 20450 to 20600    | 20450, 20525, 20600 | 10MHz             | QPSK, 16QAM | 1RB           |
| Frequency Stability          | 20450 to 20600    | 20525               | 10MHz             | QPSK        | 1RB           |

### 2.3 BLOCK DIGRAM SHOWING THE CONFIGURATIONOFSYSTEMTESTED



### 2.4 DESCRIPTION OF SUPPORT UNITS

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

| Item | Equipment | Brand | Model No.  | Series No. |
|------|-----------|-------|------------|------------|
| A    | Notebook  | HONOR | NBLK-WAX9X | N/A        |

| Item | Cable Type | Shielded Type | Ferrite Core | Length |
|------|------------|---------------|--------------|--------|
| 1    | USB Cable  | NO            | NO           | 0.8m   |

### 3. TEST RESULT

#### 3.1 OUTPUT POWER MEASUREMENT

##### 3.1.1 LIMIT

Mobile / Portable station are limited to 7 watts e.r.p.

##### 3.1.2 TEST PROCEDURE

The testing follows FCC KDB 971168 v03r01 Section 5.

##### EIRP / ERP:

EIRP = Output Power + Antenan gain

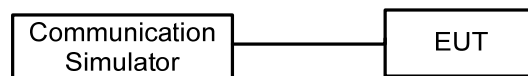
ERP = EIPR - 2.15dBi

##### Output Power:

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

##### 3.1.3 TEST SETUP LAYOUT

##### Output Power Measurement



##### 3.1.4 TEST DEVIATION

No deviation

##### 3.1.5 TEST RESULTS

Please refer to the APPENDIX A.

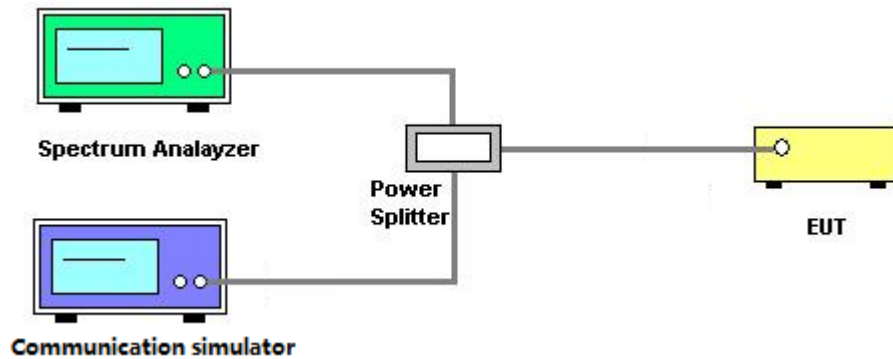
### 3.2 OCCUPIED BANDWIDTH MEASUREMENT

#### 3.2.1 TEST PROCEDURE

The testing follows FCC KDB 971168 v03r01 Section 4.

1. 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 and 26dB bandwidth.
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3.  $RBW = (1\% \sim 5\%) * EBW$   
 $VBW \geq 3 * RBW$
4. Set spectrum analyzer with Peak detector.

#### 3.2.2 TEST SETUP LAYOUT



#### 3.2.3 TEST DEVIATION

No deviation

#### 3.2.4 TEST RESULTS

Please refer to the APPENDIX B.

### 3.3 CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

#### 3.3.1 LIMIT

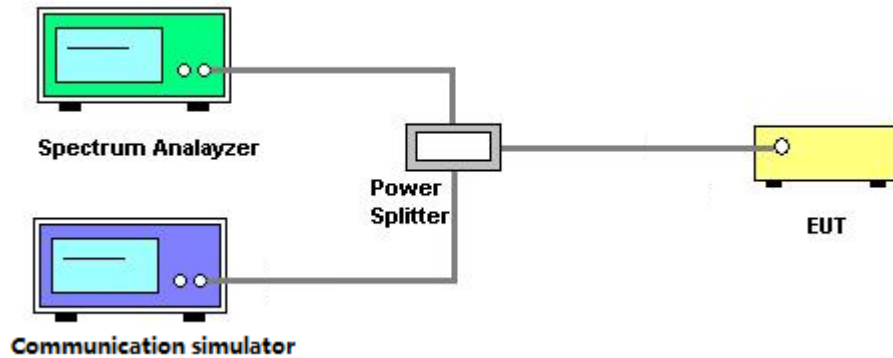
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB. The emission limit equal to -13dBm.

#### 3.3.2 TEST PROCEDURES

The testing follows FCC KDB 971168 v03r01 Section 6.

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The band edges of low and high channels for the highest RF powers were measured. Set RBW  $\geq 1\%$  EBW in the 1MHz band immediately outside and adjacent to the band edge.
3. Set spectrum analyzer with Peak detector.
4. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

#### 3.3.3 TEST SETUP LAYOUT



#### 3.3.4 TEST DEVIATION

No deviation

#### 3.3.5 TEST RESULTS

Please refer to the APPENDIX C.

### **3.4 RADIATED SPURIOUS EMISSIONS MEASUREMENT**

#### **3.4.1 LIMIT**

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

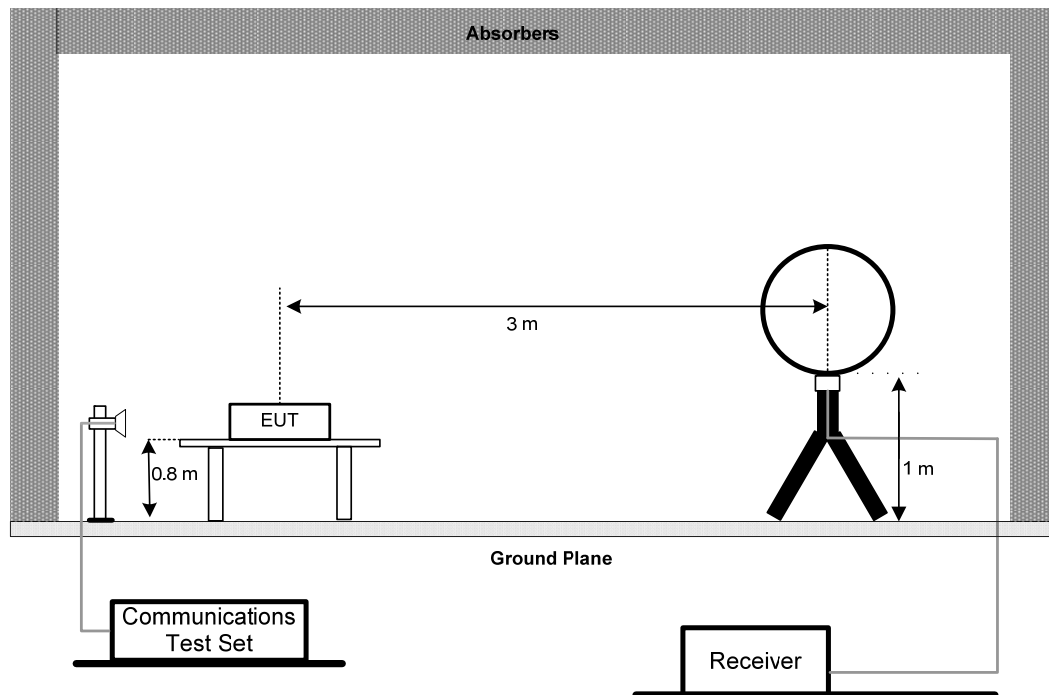
#### **3.4.2 TEST PROCEDURES**

The testing follows FCC KDB 971168 v03r01 Section 6.2.

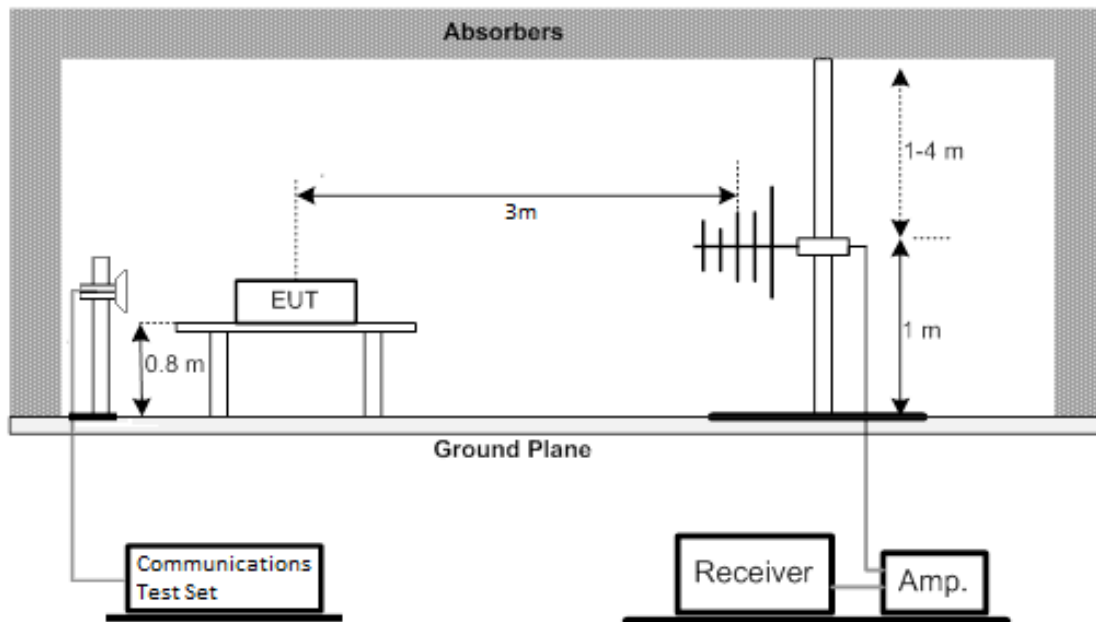
1. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
2. 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
3.  $EIRP = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}.$
4. ERP can be calculated form EIRP by subtracting the gain of dipole,  $ERP = EIPR - 2.15\text{dBi}.$
5. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

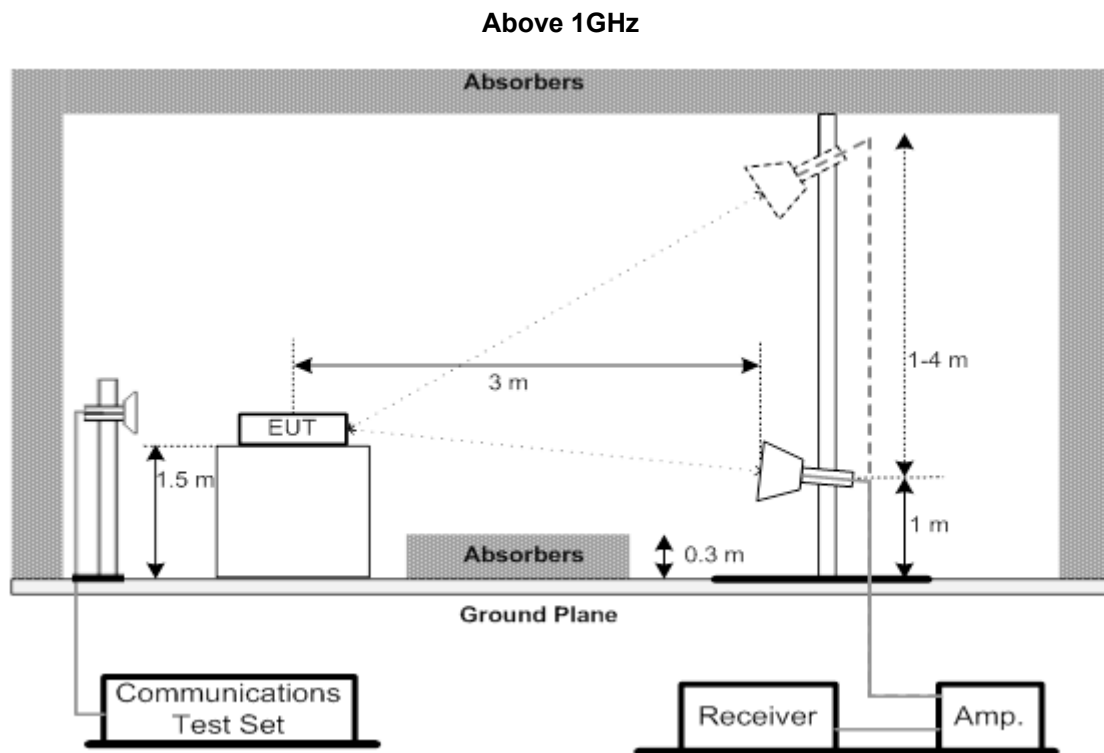
### 3.4.3 TEST SETUP LAYOUT

#### Below 30MHz



#### 30MHz to 1000MHz





#### 3.4.4 TEST DEVIATION

No deviation

#### 3.4.5 TEST RESULTS (9KHZ TO 30MHZ)

Please refer to the APPENDIX D.

#### 3.4.6 TEST RESULTS (30MHZ TO 1000MHZ)

Please refer to the APPENDIX E.

#### 3.4.7 TEST RESULTS (ABOVE 1000MHZ)

Please refer to the APPENDIX F.

### 3.5 BAND EDGE MEASUREMENT

#### 3.5.1 LIMIT

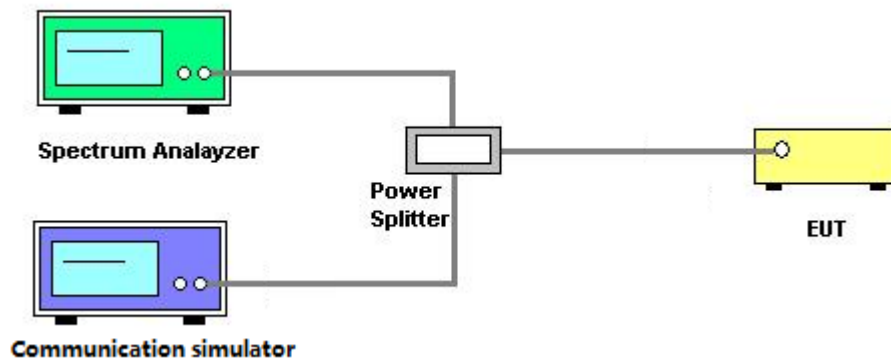
A Power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

#### 3.5.2 TEST PROCEDURES

The testing follows FCC KDB 971168 v03r01 Section 6.

1. All measurements were done at low and high operational frequency range.
2. Record the max trace plot into the test report.

#### 3.5.3 TEST SETUP LAYOUT



#### 3.5.4 TEST DEVIATION

No deviation

#### 3.5.5 TEST RESULTS

Please refer to the APPENDIX G.

### 3.6 PEAK TO AVERAGE RATIO MEASUREMENT

#### 3.6.1 LIMIT

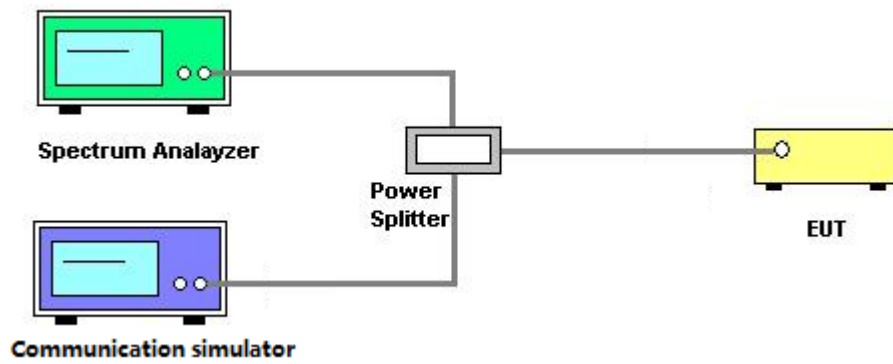
In measuring transmissions in this band using an average power technique, the peak to-average ratio (PAR) of the transmission may not exceed 13 dB.

#### 3.6.2 TEST PROCEDURES

The testing follows FCC KDB 971168 v03r01 Section 5.7.

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%.

#### 3.6.3 TEST SETUP LAYOUT



#### 3.6.4 TEST DEVIATION

No deviation

#### 3.6.5 TEST RESULTS

Please refer to the APPENDIX H.

### 3.7 FREQUENCY STABILITY MEASUREMENT

#### 3.7.1 LIMIT

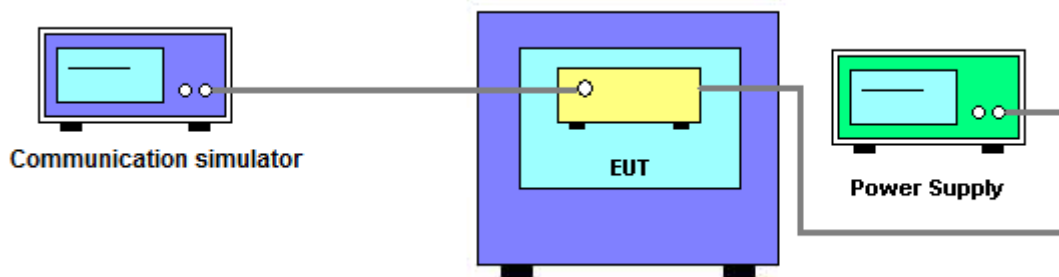
$\pm 1.5$  ppm is for base and fixed station.  $\pm 2.5$  ppm is for mobile station.

#### 3.7.2 TEST PROCEDURES

The testing follows FCC KDB 971168 v03r01 Section 9.

1. 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.
2. 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.
3. 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.
4. The frequency error was recorded frequency error from the communication simulator.

#### 3.7.3 TEST SETUP LAYOUT



#### 3.7.4 TEST DEVIATION

No deviation

#### 3.7.5 TEST RESULTS

Please refer to the APPENDIX I.

#### 4. LIST OF MEASUREMENT EQUIPMENTS

| Radiated Emissions - 9 kHz to 30 MHz |                                        |              |                          |            |                  |
|--------------------------------------|----------------------------------------|--------------|--------------------------|------------|------------------|
| Item                                 | Kind of Equipment                      | Manufacturer | Type No.                 | Serial No. | Calibrated until |
| 1                                    | MXE EMI Receiver                       | Keysight     | N9038A                   | MY56400091 | Feb. 27, 2022    |
| 2*                                   | Active Loop Antenna                    | R&S          | HFH2-Z2                  | 830749/020 | Aug. 23, 2024    |
| 3                                    | Cable                                  | N/A          | RG 213/U<br>(9kHz~1GHz)  | N/A        | May 27, 2022     |
| 4                                    | Measurement Software                   | Farad        | EZ-EMC<br>Ver.NB-03A1-01 | N/A        | N/A              |
| 5                                    | wideband radio<br>communication tester | R&S          | CMW500                   | 152372     | Feb. 27, 2022    |
| 6                                    | Wireless Communication<br>Test SET     | Agilent      | E5515C                   | MY48364183 | Feb. 28, 2022    |
| 7                                    | 966 Chamber Room                       | ETS          | 9*6*6                    | N/A        | Jul. 17, 2022    |

| Radiated Emissions - 30 MHz to 1 GHz |                                        |              |                          |             |                  |
|--------------------------------------|----------------------------------------|--------------|--------------------------|-------------|------------------|
| Item                                 | Kind of Equipment                      | Manufacturer | Type No.                 | Serial No.  | Calibrated until |
| 1                                    | Antenna                                | Schwarzbeck  | VULB9160                 | 9160-3232   | Mar. 15, 2022    |
| 2                                    | Amplifier                              | HP           | 8447D                    | 2944A08742  | Feb. 28, 2022    |
| 3                                    | Cable                                  | emci         | LMR-400                  | N/A         | May 20, 2022     |
| 4                                    | Controller                             | CT           | SC100                    | N/A         | N/A              |
| 5                                    | Controller                             | MF           | MF-7802                  | MF780208416 | N/A              |
| 6                                    | Receiver                               | Agilent      | N9038A                   | MY52130039  | Mar. 19, 2022    |
| 7                                    | Measurement Software                   | Farad        | EZ-EMC<br>Ver.NB-03A1-01 | N/A         | N/A              |
| 8                                    | wideband radio<br>communication tester | R&S          | CMW500                   | 152372      | Feb. 27, 2022    |
| 9                                    | Wireless<br>Communication Test<br>SET  | Agilent      | E5515C                   | MY48364183  | Feb. 28, 2022    |
| 10                                   | 966 Chamber Room                       | RM           | 9*6*6                    | N/A         | Jul. 24, 2022    |

| Radiated Emissions - Above 1 GHz |                                     |                  |                           |             |                  |
|----------------------------------|-------------------------------------|------------------|---------------------------|-------------|------------------|
| Item                             | Kind of Equipment                   | Manufacturer     | Type No.                  | Serial No.  | Calibrated until |
| 1                                | Double Ridged Horn Antenna          | ARA              | DRG-118A                  | 16554       | Apr. 21, 2022    |
| 2                                | Broad-Band Horn Antenna             | Schwarzbeck      | BBHA 9170                 | 9170319     | Jun. 30, 2022    |
| 3                                | Amplifier                           | Agilent          | 8449B                     | 3008A02584  | Jul. 10, 2022    |
| 4                                | Controller                          | CT               | SC100                     | N/A         | N/A              |
| 5                                | Controller                          | MF               | MF-7802                   | MF780208416 | N/A              |
| 6                                | Receiver                            | Agilent          | N9038A                    | MY52130039  | Mar. 19, 2022    |
| 7                                | EXA Spectrum Analyzer               | Keysight         | N9010A                    | MY56480488  | Feb. 28, 2022    |
| 8                                | Low Noise Amplifier                 | CONNPHY          | CLN-18G40G<br>-4330-K     | 619413      | Jul. 16, 2022    |
| 9                                | Cable                               | N/A              | A81-SMAMSMAM<br>-12.5M    | N/A         | Oct. 15, 2022    |
| 10                               | Cable                               | Talent microwave | A40-2.92M2.92M<br>-2.5M   | N/A         | Nov. 30, 2022    |
| 11                               | Filter                              | STI              | STI15-9912                | N/A         | Jul. 10, 2022    |
| 12                               | Measurement Software                | Farad            | EZ-EMC Ver.NB<br>-03A1-01 | N/A         | N/A              |
| 13                               | wideband radio communication tester | R&S              | CMW500                    | 152372      | Feb. 27, 2022    |
| 14                               | Wireless Communication Test SET     | Agilent          | E5515C                    | MY48364183  | Feb. 28, 2022    |
| 15                               | 966 Chamber Room                    | RM               | 9*6*6                     | N/A         | Jul. 24, 2022    |

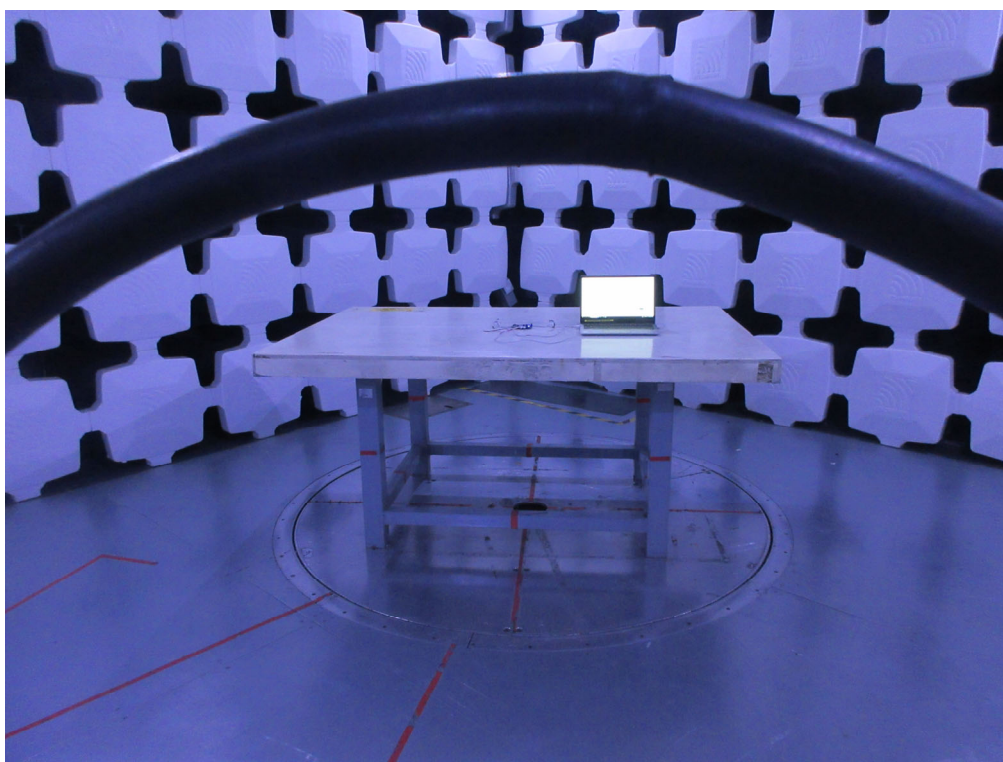
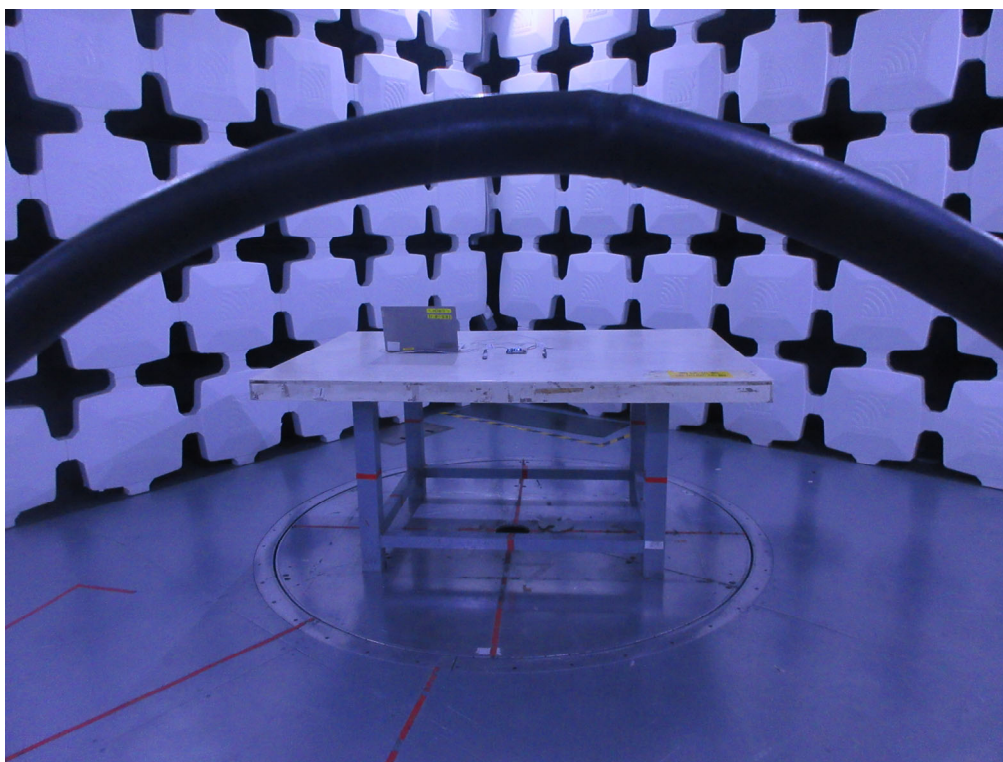
| Conducted Measurement |                                      |               |              |              |                  |
|-----------------------|--------------------------------------|---------------|--------------|--------------|------------------|
| Item                  | Kind of Equipment                    | Manufacturer  | Type No.     | Serial No.   | Calibrated until |
| 1                     | 8960 Series 10 Wireless Com Test set | Agilent       | E5515E       | MY52112163   | Jul. 24, 2022    |
| 2                     | MXA Signal Analyzer                  | Keysight      | N9020A       | MY49100060   | Jul. 24, 2022    |
| 3                     | Power Splitter                       | Mini-Circuits | ZFRSC-183-S+ | SF103501511S | Jul. 24, 2022    |
| 4                     | wideband radio communication tester  | R&S           | CMW500       | 104462       | Jul. 24, 2022    |
| 5                     | Const Temp. & Humidity Chamber       | Bell          | BTH-50C      | 20170306001  | Feb. 27, 2022    |
| 6*                    | Multi-output DC Power Supply         | GW Instek     | GPC-3030DN   | EK880675     | Jul. 25, 2023    |
| 7                     | Signal Analyzer                      | R&S           | FSQ-26       | 200822       | Feb. 27, 2022    |

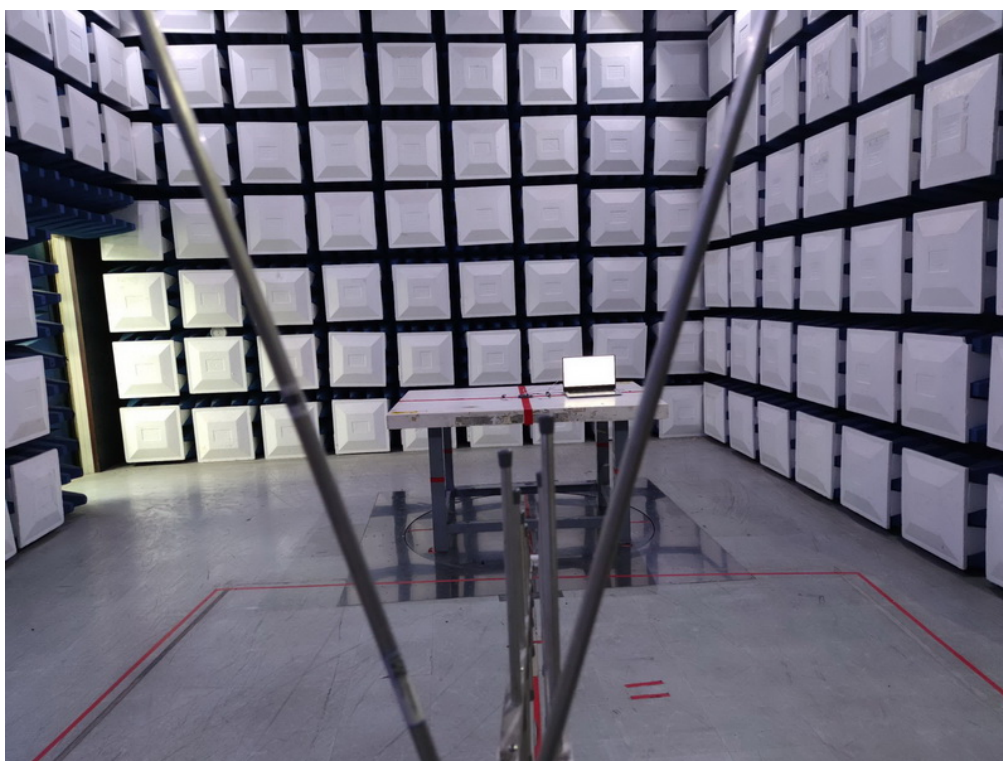
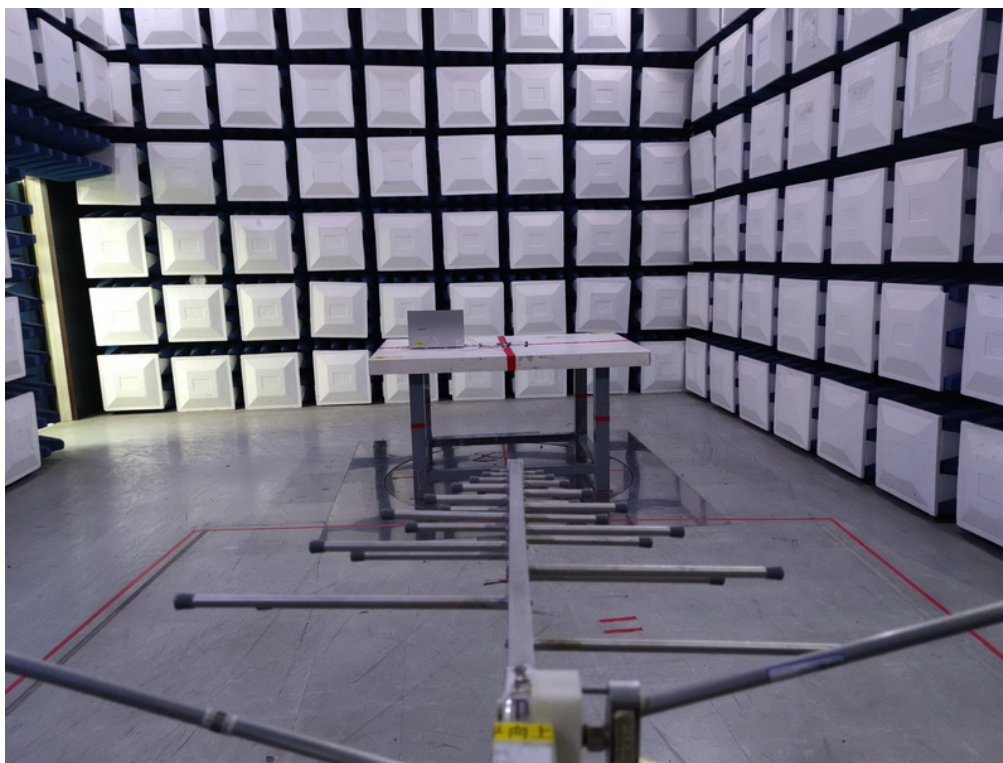
Remark: "N/A" denotes no model name, serial no. or calibration specified.  
Except \* item, all calibration period of equipment list is one year.  
"6\*" calibration period of equipment list is three year.

## 5. EUT TEST PHOTO

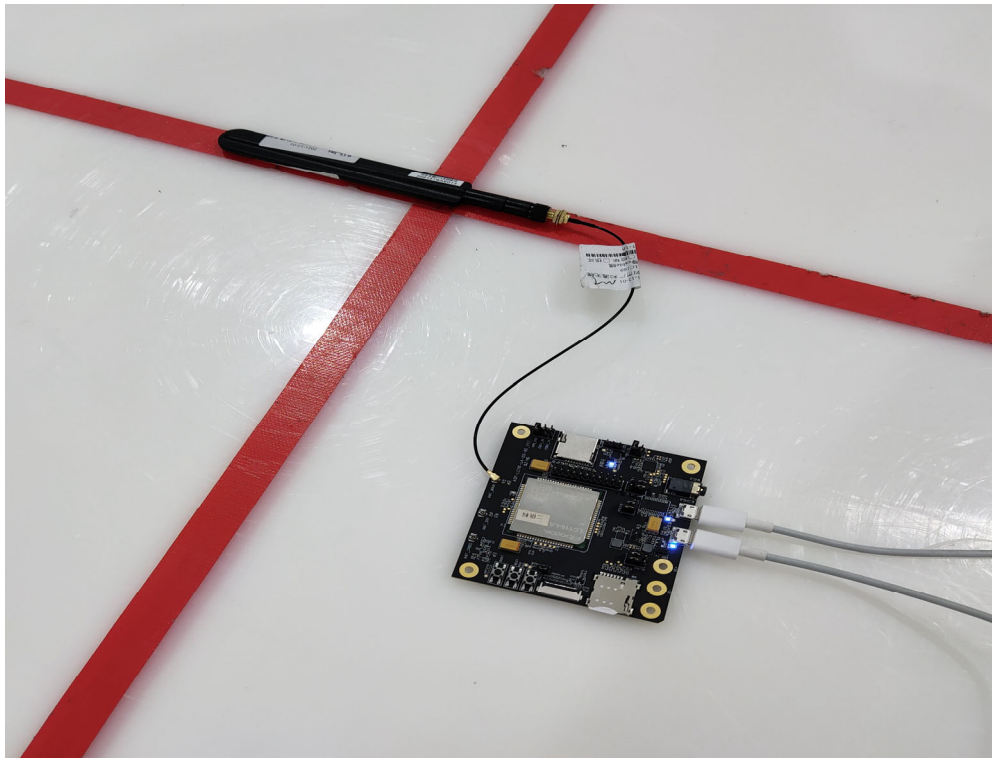
### Radiated Emissions Test Photos

9 kHz to 30 MHz



**Radiated Emissions Test Photos****30 MHz to 1 GHz**

**Radiated Emissions Test Photos****Above 1 GHz**



## **APPENDIX A - OUTPUT POWER**

### Output Power (dBm)

| GSM850              |           | 128CH    | 190CH    | 251CH    |
|---------------------|-----------|----------|----------|----------|
|                     |           | 824.2MHz | 836.6MHz | 848.8MHz |
| GSM (CS)            |           | 31.66    | 31.78    | 31.88    |
| GPRS/EDGE<br>(GMSK) | 1 Tx Slot | 31.46    | 31.49    | 31.58    |
|                     | 2 Tx Slot | 29.33    | 29.40    | 29.43    |
|                     | 3 Tx Slot | 28.22    | 28.27    | 28.29    |
|                     | 4 Tx Slot | 27.21    | 27.26    | 27.27    |
| EDGE<br>(8PSK)      | 1 Tx Slot | 27.07    | 27.38    | 26.92    |
|                     | 2 Tx Slot | 27.04    | 27.23    | 26.98    |
|                     | 3 Tx Slot | 26.67    | 26.97    | 26.38    |
|                     | 4 Tx Slot | 26.57    | 26.51    | 26.34    |

| Modulation | Band            | WCDMA Band V |          |          |
|------------|-----------------|--------------|----------|----------|
|            | Tx Channel      | 4132CH       | 4182CH   | 4233CH   |
|            | Frequency       | 826.4MHz     | 836.4MHz | 846.6MHz |
| QPSK       | RMC 12.2K       | 23.25        | 23.53    | 23.47    |
|            | RMC 64K         | 23.23        | 23.52    | 23.46    |
|            | RMC 144K        | 23.29        | 23.57    | 23.45    |
|            | RMC 384K        | 23.28        | 23.55    | 23.51    |
|            | HSDPA Subtest-1 | 22.3         | 22.69    | 22.57    |
|            | HSDPA Subtest-2 | 22.43        | 22.65    | 22.56    |
|            | HSDPA Subtest-3 | 21.98        | 22.22    | 22.12    |
|            | HSDPA Subtest-4 | 21.96        | 22.21    | 22.11    |
|            | HSUPA Subtest-1 | 22.11        | 22.28    | 22.36    |
|            | HSUPA Subtest-2 | 21.43        | 21.73    | 21.57    |
|            | HSUPA Subtest-3 | 21.18        | 21.33    | 21.26    |
|            | HSUPA Subtest-4 | 21.61        | 21.72    | 21.56    |
|            | HSUPA Subtest-5 | 22.45        | 22.67    | 22.58    |

| LTE Band / BW | Modulation | RB Size | RB Offset | Low CH   | Mid CH   | High CH  |
|---------------|------------|---------|-----------|----------|----------|----------|
|               |            |         |           | 20407CH  | 20525CH  | 20643CH  |
|               |            |         |           | 824.7MHz | 836.5MHz | 848.3MHz |
| 5 / 1.4MHz    | QPSK       | 1       | 0         | 22.70    | 22.76    | 22.92    |
|               |            | 1       | 2         | 22.71    | 22.75    | 22.77    |
|               |            | 1       | 5         | 22.62    | 22.57    | 22.66    |
|               |            | 3       | 0         | 22.75    | 22.72    | 22.78    |
|               |            | 3       | 1         | 22.85    | 22.72    | 22.81    |
|               |            | 3       | 2         | 22.79    | 22.53    | 22.81    |
|               | 16QAM      | 6       | 0         | 21.74    | 21.71    | 21.72    |
|               |            | 1       | 0         | 21.85    | 21.74    | 22.03    |
|               |            | 1       | 2         | 21.91    | 21.92    | 21.94    |
|               |            | 1       | 5         | 21.88    | 21.68    | 21.95    |
|               |            | 3       | 0         | 22.29    | 21.64    | 21.74    |
|               |            | 3       | 1         | 22.32    | 21.66    | 21.75    |
|               |            | 3       | 2         | 22.34    | 21.75    | 21.66    |
|               |            | 6       | 0         | 21.26    | 20.82    | 20.75    |

| LTE Band / BW | Modulation | RB Size | RB Offset | Low CH   | Mid CH   | High CH  |
|---------------|------------|---------|-----------|----------|----------|----------|
|               |            |         |           | 20415CH  | 20525CH  | 20635CH  |
|               |            |         |           | 825.5MHz | 836.5MHz | 847.5MHz |
| 5 / 3MHz      | QPSK       | 1       | 0         | 23.11    | 22.75    | 23.19    |
|               |            | 1       | 7         | 23.05    | 22.53    | 22.76    |
|               |            | 1       | 14        | 23.18    | 22.61    | 22.80    |
|               |            | 8       | 0         | 21.86    | 21.66    | 21.95    |
|               |            | 8       | 4         | 21.89    | 21.70    | 22.01    |
|               |            | 8       | 7         | 21.94    | 21.77    | 22.00    |
|               |            | 15      | 0         | 21.97    | 21.84    | 21.96    |
|               | 16QAM      | 1       | 0         | 21.96    | 21.82    | 22.03    |
|               |            | 1       | 7         | 22.20    | 21.27    | 21.97    |
|               |            | 1       | 14        | 22.34    | 21.39    | 21.96    |
|               |            | 8       | 0         | 20.95    | 20.86    | 20.64    |
|               |            | 8       | 4         | 20.97    | 20.80    | 20.93    |
|               |            | 8       | 7         | 21.03    | 20.84    | 21.11    |
|               |            | 15      | 0         | 20.97    | 20.87    | 21.01    |

| LTE Band / BW | Modulation | RB Size | RB Offset | Low CH   | Mid CH   | High CH  |
|---------------|------------|---------|-----------|----------|----------|----------|
|               |            |         |           | 20425CH  | 20525CH  | 20625CH  |
|               |            |         |           | 826.5MHz | 836.5MHz | 846.5MHz |
| 5 / 5MHz      | QPSK       | 1       | 0         | 22.66    | 22.49    | 22.81    |
|               |            | 1       | 13        | 22.69    | 22.39    | 22.71    |
|               |            | 1       | 24        | 22.86    | 22.39    | 22.51    |
|               |            | 12      | 0         | 21.73    | 21.78    | 21.79    |
|               |            | 12      | 6         | 21.88    | 21.62    | 21.84    |
|               |            | 12      | 11        | 22.00    | 21.89    | 21.90    |
|               |            | 25      | 0         | 21.78    | 21.85    | 21.93    |
|               | 16QAM      | 1       | 0         | 21.69    | 21.87    | 21.54    |
|               |            | 1       | 13        | 21.77    | 21.32    | 21.42    |
|               |            | 1       | 24        | 21.84    | 21.52    | 21.57    |
|               |            | 12      | 0         | 20.83    | 20.88    | 20.89    |
|               |            | 12      | 6         | 20.75    | 20.66    | 21.05    |
|               |            | 12      | 11        | 20.86    | 20.88    | 21.08    |
|               |            | 25      | 0         | 21.06    | 21.11    | 21.02    |

| LTE Band / BW | Modulation | RB Size | RB Offset | Low CH   | Mid CH   | High CH  |
|---------------|------------|---------|-----------|----------|----------|----------|
|               |            |         |           | 20450CH  | 20525CH  | 20600CH  |
|               |            |         |           | 829.0MHz | 836.5MHz | 844.0MHz |
| 5 / 10MHz     | QPSK       | 1       | 0         | 22.71    | 22.97    | 22.62    |
|               |            | 1       | 25        | 23.01    | 22.56    | 22.83    |
|               |            | 1       | 49        | 23.03    | 22.57    | 22.93    |
|               |            | 25      | 0         | 21.76    | 21.88    | 21.78    |
|               |            | 25      | 13        | 21.90    | 21.74    | 21.86    |
|               |            | 25      | 25        | 22.10    | 21.72    | 21.86    |
|               |            | 50      | 0         | 21.85    | 21.81    | 21.79    |
|               | 16QAM      | 1       | 0         | 21.93    | 21.96    | 21.92    |
|               |            | 1       | 25        | 22.02    | 21.81    | 21.76    |
|               |            | 1       | 49        | 22.20    | 21.89    | 21.97    |
|               |            | 25      | 0         | 20.84    | 21.19    | 20.95    |
|               |            | 25      | 13        | 20.98    | 20.87    | 20.92    |
|               |            | 25      | 25        | 21.19    | 20.96    | 21.11    |
|               |            | 50      | 0         | 21.00    | 21.00    | 20.87    |

| ERP (dBm)           |           |          |          |          |
|---------------------|-----------|----------|----------|----------|
| GSM850              |           | 128CH    | 190CH    | 251CH    |
|                     |           | 824.2MHz | 836.6MHz | 848.8MHz |
| GSM (CS)            |           | 28.11    | 28.23    | 28.33    |
| GPRS/EDGE<br>(GMSK) | 1 Tx Slot | 27.91    | 27.94    | 28.03    |
|                     | 2 Tx Slot | 25.78    | 25.85    | 25.88    |
|                     | 3 Tx Slot | 24.67    | 24.72    | 24.74    |
|                     | 4 Tx Slot | 23.66    | 23.71    | 23.72    |
| EDGE<br>(8PSK)      | 1 Tx Slot | 23.52    | 23.83    | 23.37    |
|                     | 2 Tx Slot | 23.49    | 23.68    | 23.43    |
|                     | 3 Tx Slot | 23.12    | 23.42    | 22.83    |
|                     | 4 Tx Slot | 23.02    | 22.96    | 22.79    |

| Modulation | Band            | WCDMA Band V |          |          |
|------------|-----------------|--------------|----------|----------|
|            | Tx Channel      | 4132CH       | 4182CH   | 4233CH   |
|            | Frequency       | 826.4MHz     | 836.4MHz | 846.6MHz |
| QPSK       | RMC 12.2K       | 19.70        | 19.98    | 19.92    |
|            | RMC 64K         | 19.68        | 19.97    | 19.91    |
|            | RMC 144K        | 19.74        | 20.02    | 19.90    |
|            | RMC 384K        | 19.73        | 20.00    | 19.96    |
|            | HSDPA Subtest-1 | 18.75        | 19.14    | 19.02    |
|            | HSDPA Subtest-2 | 18.88        | 19.10    | 19.01    |
|            | HSDPA Subtest-3 | 18.43        | 18.67    | 18.57    |
|            | HSDPA Subtest-4 | 18.41        | 18.66    | 18.56    |
|            | HSUPA Subtest-1 | 18.56        | 18.73    | 18.81    |
|            | HSUPA Subtest-2 | 17.88        | 18.18    | 18.02    |
|            | HSUPA Subtest-3 | 17.63        | 17.78    | 17.71    |
|            | HSUPA Subtest-4 | 18.06        | 18.17    | 18.01    |
|            | HSUPA Subtest-5 | 18.90        | 19.12    | 19.03    |

| LTE Band / BW | Modulation | RB Size | RB Offset | Low CH   | Mid CH   | High CH  |
|---------------|------------|---------|-----------|----------|----------|----------|
|               |            |         |           | 20407CH  | 20525CH  | 20643CH  |
|               |            |         |           | 824.7MHz | 836.5MHz | 848.3MHz |
| 5 / 1.4MHz    | QPSK       | 1       | 0         | 19.15    | 19.21    | 19.37    |
|               |            | 1       | 2         | 19.16    | 19.20    | 19.22    |
|               |            | 1       | 5         | 19.07    | 19.02    | 19.11    |
|               |            | 3       | 0         | 19.20    | 19.17    | 19.23    |
|               |            | 3       | 1         | 19.30    | 19.17    | 19.26    |
|               |            | 3       | 2         | 19.24    | 18.98    | 19.26    |
|               |            | 6       | 0         | 18.19    | 18.16    | 18.17    |
|               | 16QAM      | 1       | 0         | 18.30    | 18.19    | 18.48    |
|               |            | 1       | 2         | 18.36    | 18.37    | 18.39    |
|               |            | 1       | 5         | 18.33    | 18.13    | 18.40    |
|               |            | 3       | 0         | 18.74    | 18.09    | 18.19    |
|               |            | 3       | 1         | 18.77    | 18.11    | 18.20    |
|               |            | 3       | 2         | 18.79    | 18.20    | 18.11    |
|               |            | 6       | 0         | 17.71    | 17.27    | 17.20    |

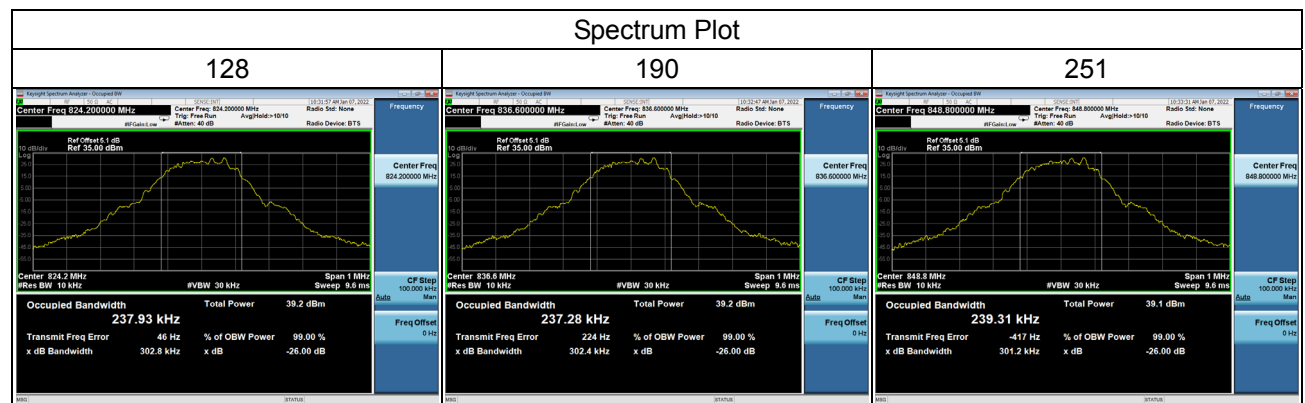
| LTE Band / BW | Modulation | RB Size | RB Offset | Low CH   | Mid CH   | High CH  |
|---------------|------------|---------|-----------|----------|----------|----------|
|               |            |         |           | 20415CH  | 20525CH  | 20635CH  |
|               |            |         |           | 825.5MHz | 836.5MHz | 847.5MHz |
| 5 / 3MHz      | QPSK       | 1       | 0         | 19.56    | 19.20    | 19.64    |
|               |            | 1       | 7         | 19.50    | 18.98    | 19.21    |
|               |            | 1       | 14        | 19.63    | 19.06    | 19.25    |
|               |            | 8       | 0         | 18.31    | 18.11    | 18.40    |
|               |            | 8       | 4         | 18.34    | 18.15    | 18.46    |
|               |            | 8       | 7         | 18.39    | 18.22    | 18.45    |
|               |            | 15      | 0         | 18.42    | 18.29    | 18.41    |
|               | 16QAM      | 1       | 0         | 18.41    | 18.27    | 18.48    |
|               |            | 1       | 7         | 18.65    | 17.72    | 18.42    |
|               |            | 1       | 14        | 18.79    | 17.84    | 18.41    |
|               |            | 8       | 0         | 17.40    | 17.31    | 17.09    |
|               |            | 8       | 4         | 17.42    | 17.25    | 17.38    |
|               |            | 8       | 7         | 17.48    | 17.29    | 17.56    |
|               |            | 15      | 0         | 17.42    | 17.32    | 17.46    |

| LTE Band / BW | Modulation | RB Size | RB Offset | Low CH   | Mid CH   | High CH  |
|---------------|------------|---------|-----------|----------|----------|----------|
|               |            |         |           | 20425CH  | 20525CH  | 20625CH  |
|               |            |         |           | 826.5MHz | 836.5MHz | 846.5MHz |
| 5 / 5MHz      | QPSK       | 1       | 0         | 19.11    | 18.94    | 19.26    |
|               |            | 1       | 13        | 19.14    | 18.84    | 19.16    |
|               |            | 1       | 24        | 19.31    | 18.84    | 18.96    |
|               |            | 12      | 0         | 18.18    | 18.23    | 18.24    |
|               |            | 12      | 6         | 18.33    | 18.07    | 18.29    |
|               |            | 12      | 11        | 18.45    | 18.34    | 18.35    |
|               |            | 25      | 0         | 18.23    | 18.30    | 18.38    |
|               | 16QAM      | 1       | 0         | 18.14    | 18.32    | 17.99    |
|               |            | 1       | 13        | 18.22    | 17.77    | 17.87    |
|               |            | 1       | 24        | 18.29    | 17.97    | 18.02    |
|               |            | 12      | 0         | 17.28    | 17.33    | 17.34    |
|               |            | 12      | 6         | 17.20    | 17.11    | 17.50    |
|               |            | 12      | 11        | 17.31    | 17.33    | 17.53    |
|               |            | 25      | 0         | 17.51    | 17.56    | 17.47    |

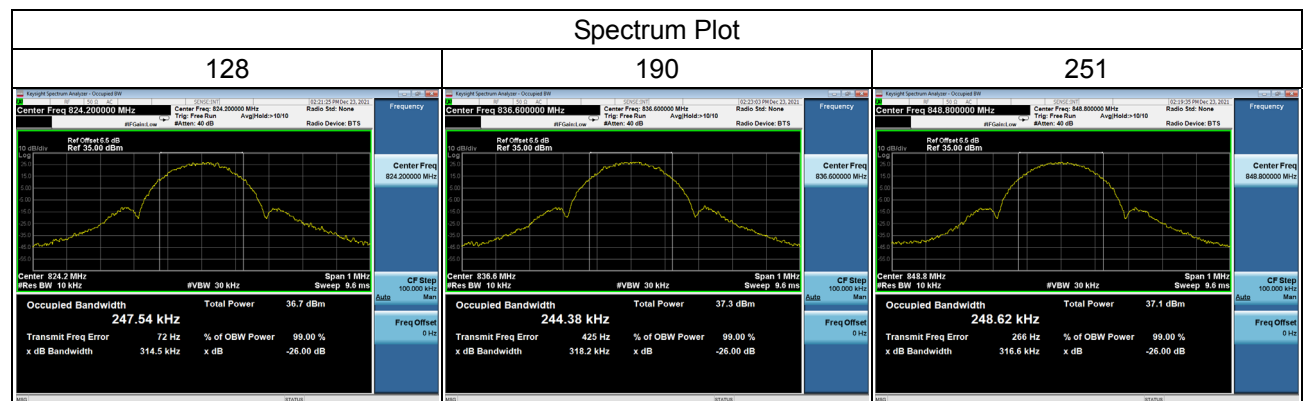
| LTE Band / BW | Modulation | RB Size | RB Offset | Low CH   | Mid CH   | High CH  |
|---------------|------------|---------|-----------|----------|----------|----------|
|               |            |         |           | 20450CH  | 20525CH  | 20600CH  |
|               |            |         |           | 829.0MHz | 836.5MHz | 844.0MHz |
| 5 / 10MHz     | QPSK       | 1       | 0         | 19.16    | 19.42    | 19.07    |
|               |            | 1       | 25        | 19.46    | 19.01    | 19.28    |
|               |            | 1       | 49        | 19.48    | 19.02    | 19.38    |
|               |            | 25      | 0         | 18.21    | 18.33    | 18.23    |
|               |            | 25      | 13        | 18.35    | 18.19    | 18.31    |
|               |            | 25      | 25        | 18.55    | 18.17    | 18.31    |
|               |            | 50      | 0         | 18.30    | 18.26    | 18.24    |
|               | 16QAM      | 1       | 0         | 18.38    | 18.41    | 18.37    |
|               |            | 1       | 25        | 18.47    | 18.26    | 18.21    |
|               |            | 1       | 49        | 18.65    | 18.34    | 18.42    |
|               |            | 25      | 0         | 17.29    | 17.64    | 17.40    |
|               |            | 25      | 13        | 17.43    | 17.32    | 17.37    |
|               |            | 25      | 25        | 17.64    | 17.41    | 17.56    |
|               |            | 50      | 0         | 17.45    | 17.45    | 17.32    |

## **APPENDIX B - OCCUPIED BANDWIDTH**

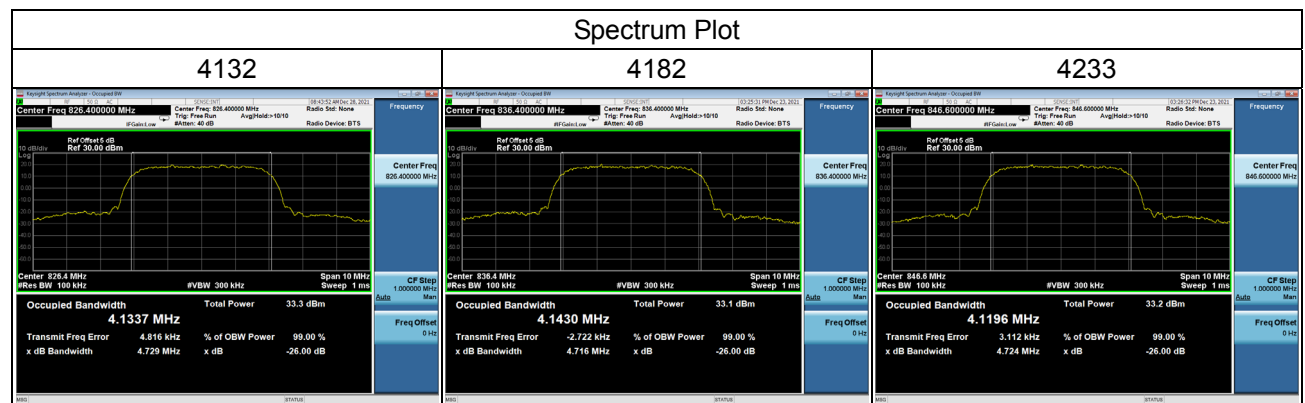
| GSM850_GSM |                 |                              |                      |
|------------|-----------------|------------------------------|----------------------|
| Channel    | Frequency (MHz) | 99% Occupied Bandwidth (MHz) | 26dB Bandwidth (MHz) |
|            |                 | QPSK                         | QPSK                 |
| 128        | 824.2           | 0.2379                       | 0.3028               |
| 190        | 836.6           | 0.2373                       | 0.3024               |
| 251        | 848.8           | 0.2393                       | 0.3012               |



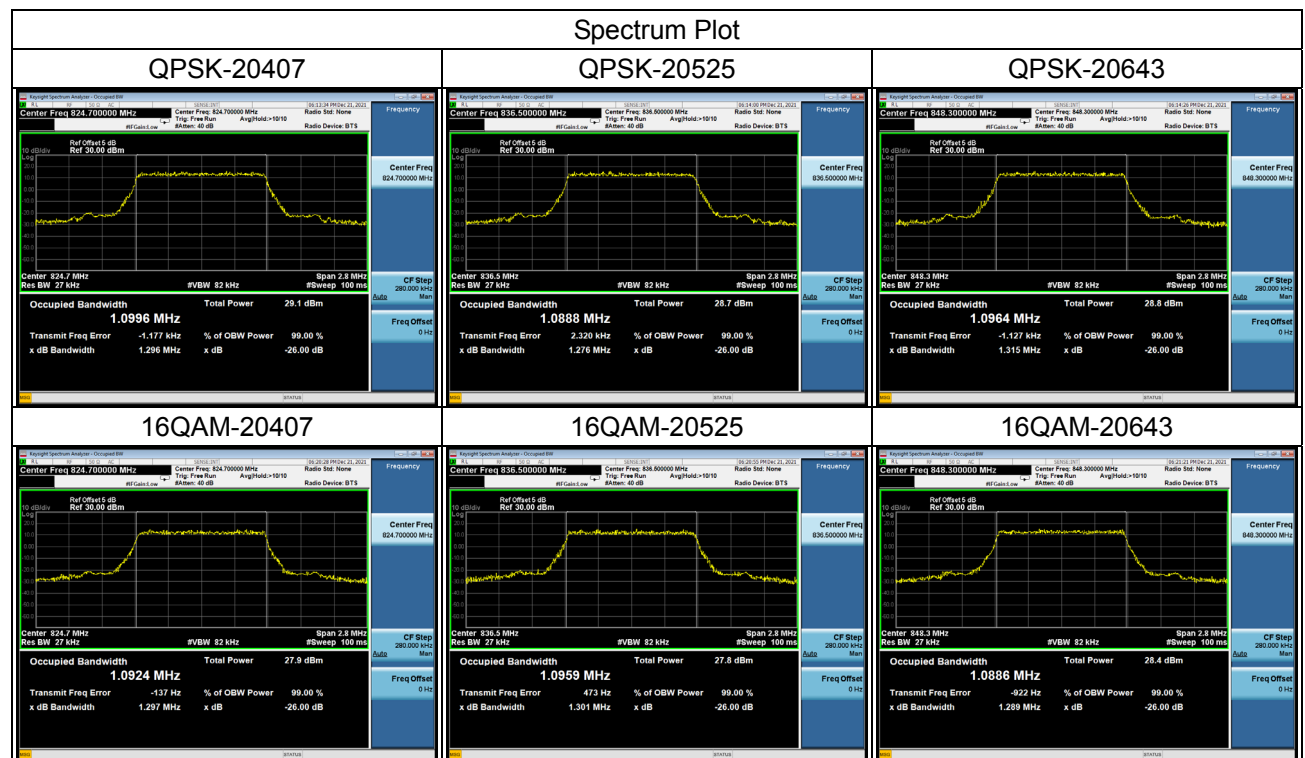
| GSM850_EDGE |                 |                              |                      |
|-------------|-----------------|------------------------------|----------------------|
| Channel     | Frequency (MHz) | 99% Occupied Bandwidth (MHz) | 26dB Bandwidth (MHz) |
|             |                 | QPSK                         | QPSK                 |
| 128         | 824.2           | 0.2475                       | 0.3145               |
| 190         | 836.6           | 0.2444                       | 0.3182               |
| 251         | 848.8           | 0.2486                       | 0.3166               |



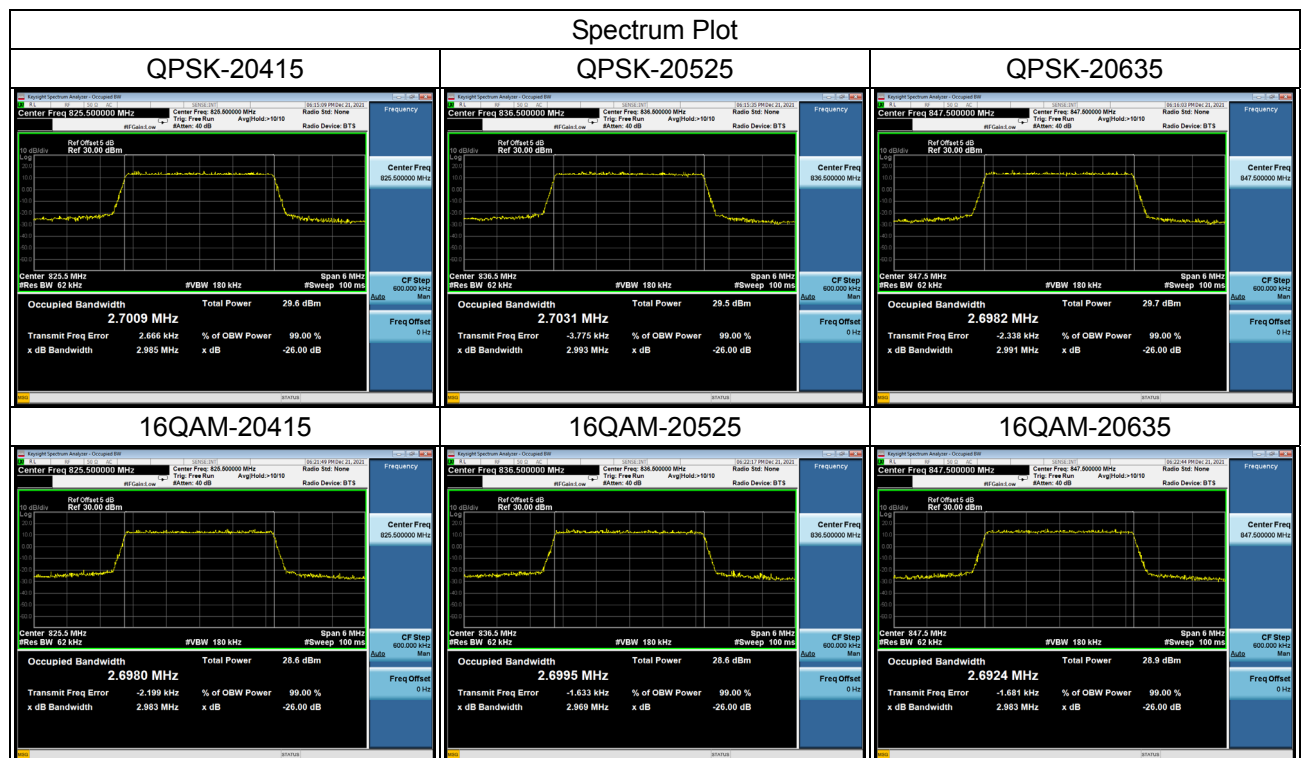
| WCDMA Band V_WCDMA |                 |                              |                      |
|--------------------|-----------------|------------------------------|----------------------|
| Channel            | Frequency (MHz) | 99% Occupied Bandwidth (MHz) | 26dB Bandwidth (MHz) |
|                    |                 | QPSK                         | QPSK                 |
| 4132               | 826.4           | 4.1337                       | 4.729                |
| 4182               | 836.4           | 4.1430                       | 4.716                |
| 4233               | 846.6           | 4.1196                       | 4.724                |



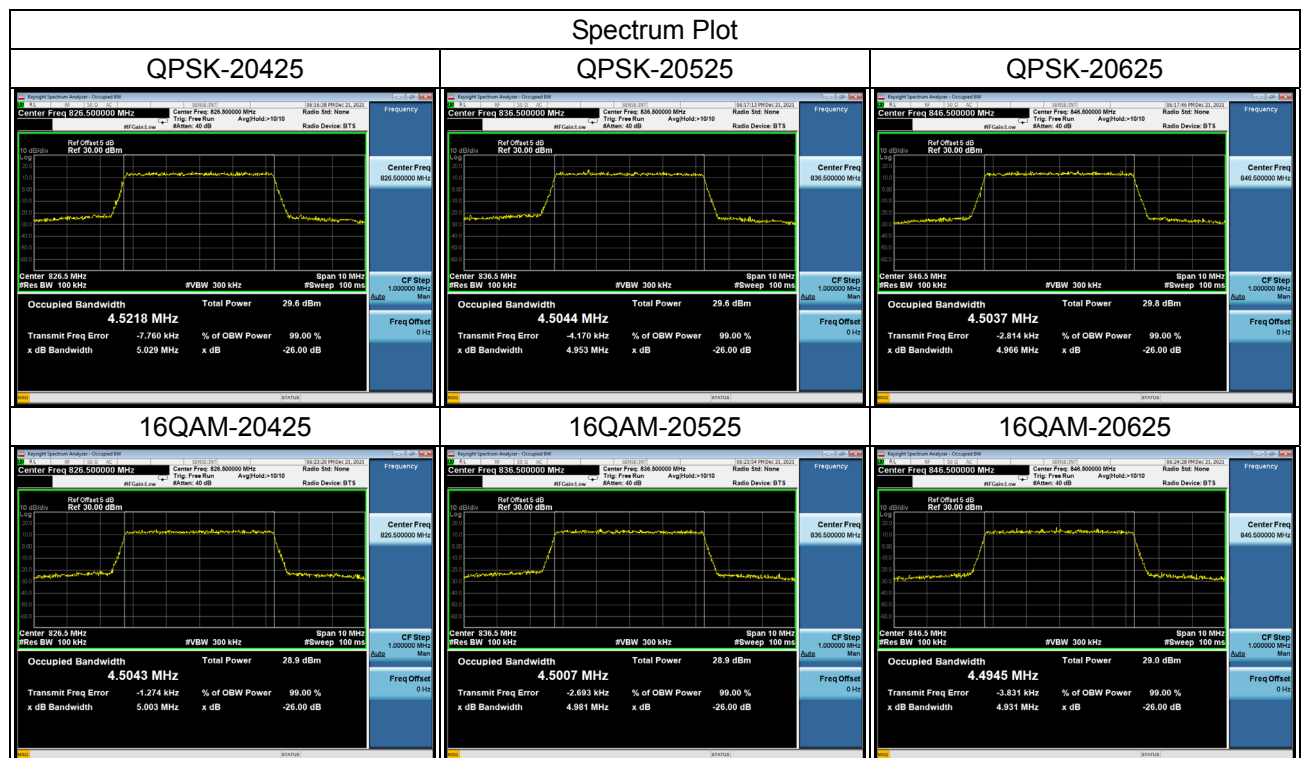
| LTE Band 5_1.4MHz |                 |                              |        |                      |       |
|-------------------|-----------------|------------------------------|--------|----------------------|-------|
| Channel           | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |        | 26dB Bandwidth (MHz) |       |
|                   |                 | QPSK                         | 16QAM  | QPSK                 | 16QAM |
| 20407             | 824.7           | 1.0996                       | 1.0924 | 1.296                | 1.297 |
| 20525             | 836.5           | 1.0888                       | 1.0959 | 1.276                | 1.301 |
| 20643             | 848.3           | 1.0964                       | 1.0886 | 1.315                | 1.289 |



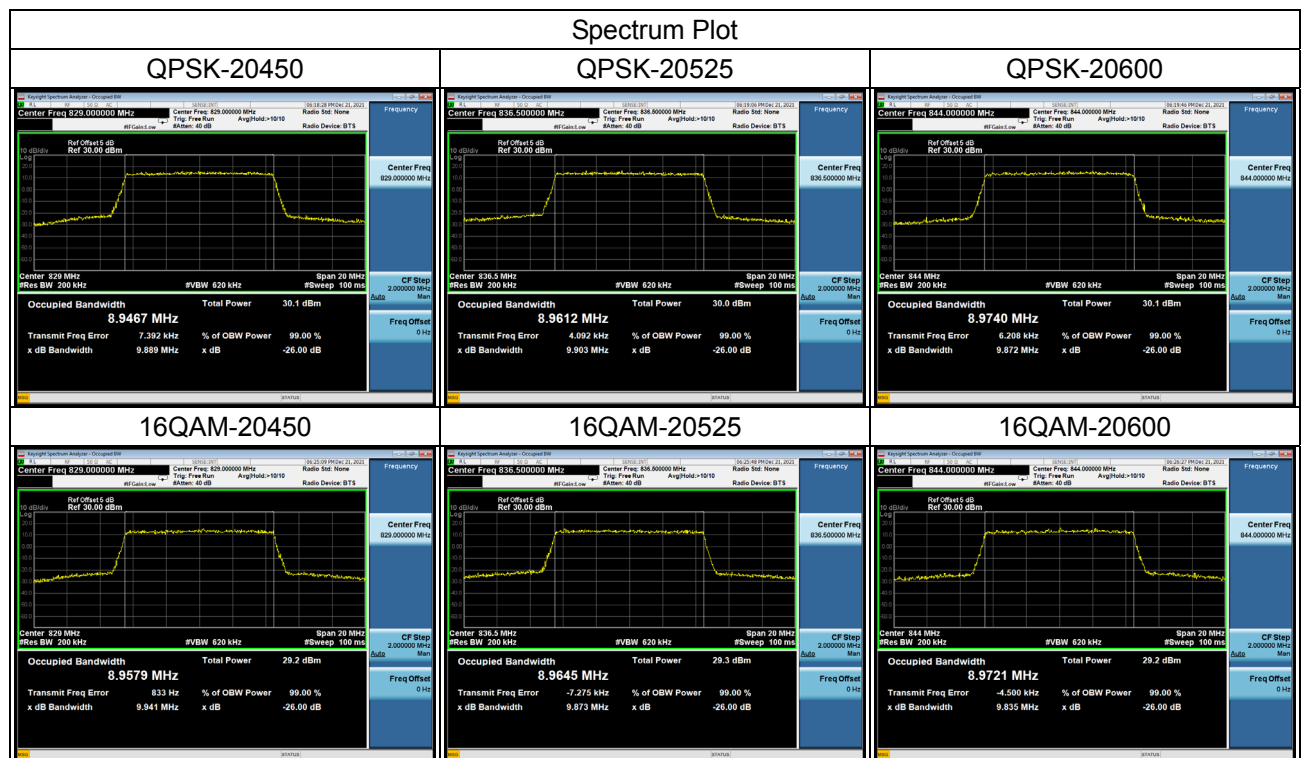
| LTE Band 5_3MHz |                 |                              |        |                      |       |
|-----------------|-----------------|------------------------------|--------|----------------------|-------|
| Channel         | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |        | 26dB Bandwidth (MHz) |       |
|                 |                 | QPSK                         | 16QAM  | QPSK                 | 16QAM |
| 20415           | 825.5           | 2.7009                       | 2.6980 | 2.985                | 2.983 |
| 20525           | 836.5           | 2.7031                       | 2.6995 | 2.993                | 2.969 |
| 20635           | 847.5           | 2.6982                       | 2.6924 | 2.991                | 2.983 |



| LTE Band 5_5MHz |                 |                              |        |                      |       |
|-----------------|-----------------|------------------------------|--------|----------------------|-------|
| Channel         | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |        | 26dB Bandwidth (MHz) |       |
|                 |                 | QPSK                         | 16QAM  | QPSK                 | 16QAM |
| 20425           | 826.5           | 4.5218                       | 4.5043 | 5.029                | 5.003 |
| 20525           | 836.5           | 4.5044                       | 4.5007 | 4.953                | 4.981 |
| 20625           | 846.5           | 4.5037                       | 4.4945 | 4.966                | 4.931 |

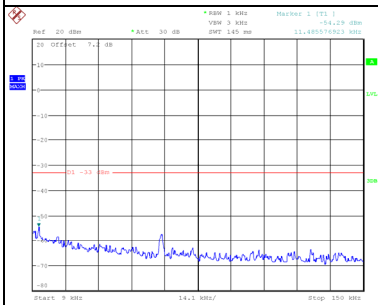


| LTE Band 5_10MHz |                 |                              |        |                      |       |
|------------------|-----------------|------------------------------|--------|----------------------|-------|
| Channel          | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |        | 26dB Bandwidth (MHz) |       |
|                  |                 | QPSK                         | 16QAM  | QPSK                 | 16QAM |
| 20450            | 829.0           | 8.9467                       | 8.9579 | 9.889                | 9.941 |
| 20525            | 836.5           | 8.9612                       | 8.9645 | 9.903                | 9.873 |
| 20600            | 844.0           | 8.9740                       | 8.9721 | 9.872                | 9.835 |

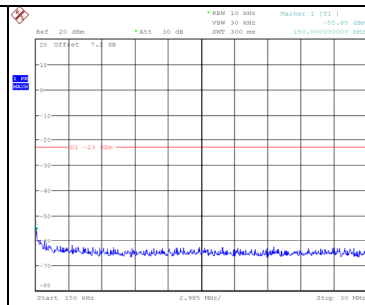


## **APPENDIX C - CONDUCTED SPURIOUS EMISSIONS**

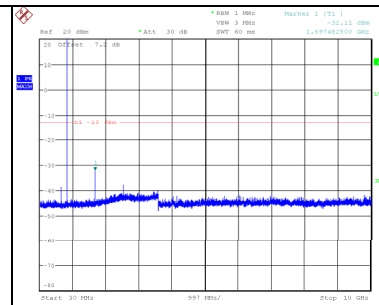
## GSM850\_GSM\_CH190 Spectrum Plot



Dates: 6, JAN, 2022 13:29:03

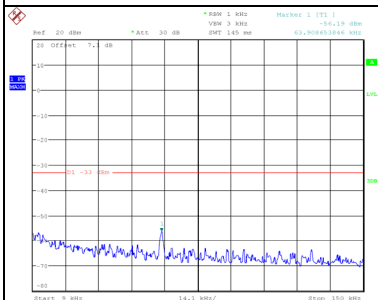


Dates: 6, JAN, 2022 13:30:33

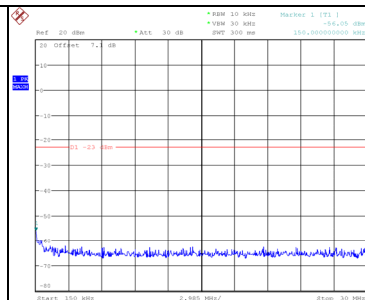


Dates: 6, JAN, 2022 13:32:02

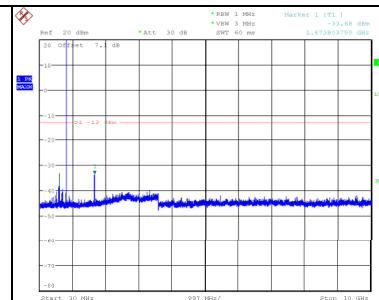
## GSM850\_EDGE\_CH190 Spectrum Plot



Dates: 23, DEC, 2021 15:02:10

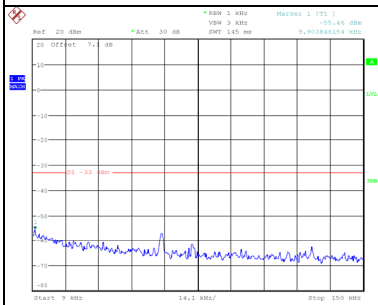


Dates: 23, DEC, 2021 15:05:41

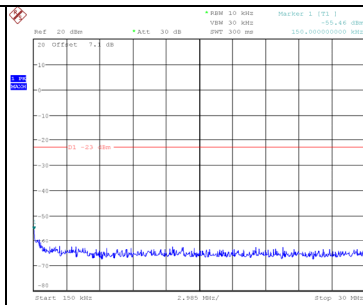


Dates: 23, DEC, 2021 15:12:23

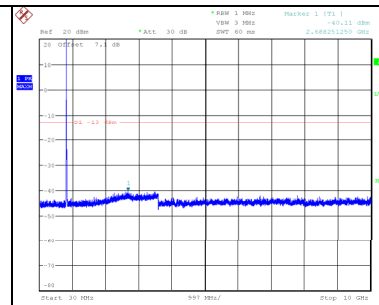
## WCDMA Band V\_WCDMA\_CH4182 Spectrum Plot



Date: 23, DEC, 2021 15:15:33

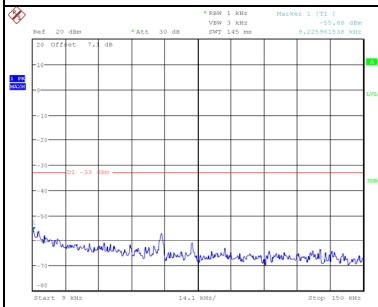


Date: 23, DEC, 2021 15:16:26

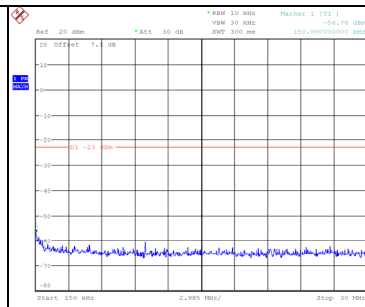


Date: 23, DEC, 2021 15:17:05

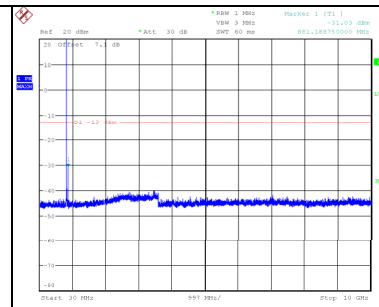
## LTE Band 5\_1.4MHz\_CH20525 Spectrum Plot



Date: 23-Dec-2021 13:18:46

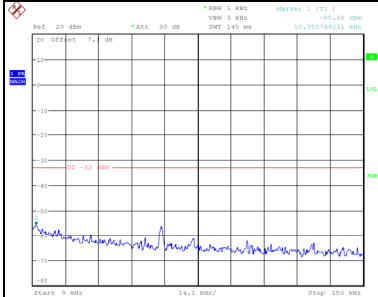


Date: 23-Dec-2021 13:18:46

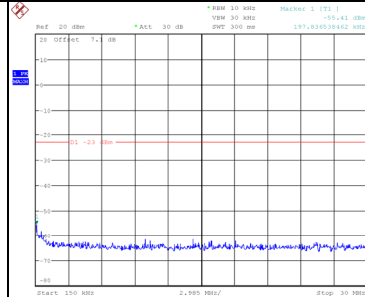


Date: 23-Dec-2021 13:18:46

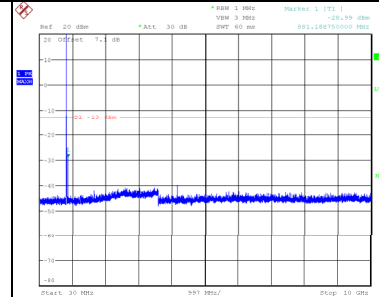
## LTE Band 5\_5MHz\_CH20525 Spectrum Plot



Date: 23-Dec-2021 13:18:46

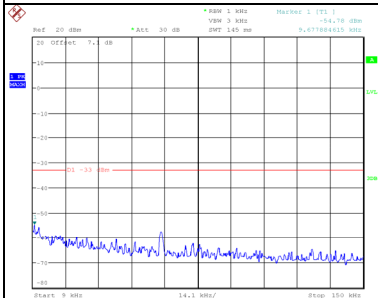


Date: 23-Dec-2021 13:18:46

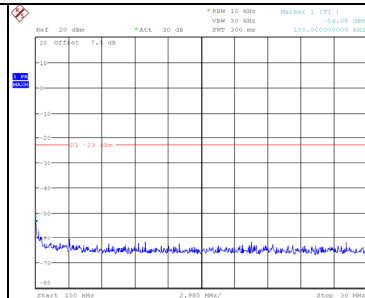


Date: 23-Dec-2021 13:18:46

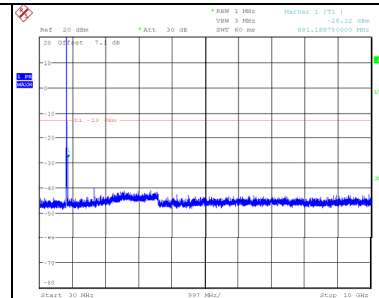
## LTE Band 5\_10MHz\_CH20525 Spectrum Plot



Date: 23-Dec-2021 13:18:46



Date: 23-Dec-2021 13:18:46

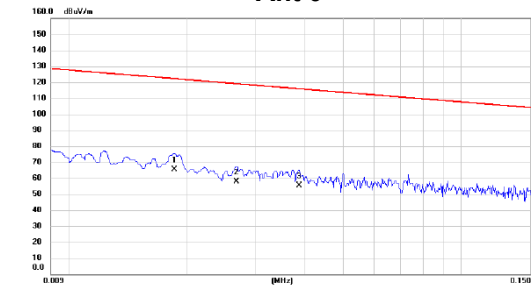


Date: 23-Dec-2021 13:18:46

## **APPENDIX D - RADIATED SPURIOUS EMISSIONS (9KHZ TO 30MHZ)**

Test Mode : TX Mode

Ant 0°



| No. | Mk. | Freq.  | Reading Level | Correct Factor | Measurement | Limit  | Margin | Detector | Comment |
|-----|-----|--------|---------------|----------------|-------------|--------|--------|----------|---------|
|     |     | MHz    | dBμV/m        | dB             | dBμV/m      | dBμV/m | dB     |          |         |
| 1   | *   | 0.0186 | 50.84         | 14.73          | 65.57       | 122.21 | -56.64 | AVG      |         |
| 2   |     | 0.0288 | 43.62         | 14.13          | 57.75       | 119.04 | -61.29 | AVG      |         |
| 3   |     | 0.0386 | 41.66         | 13.86          | 55.52       | 115.87 | -60.35 | AVG      |         |

Test Mode : TX Mode

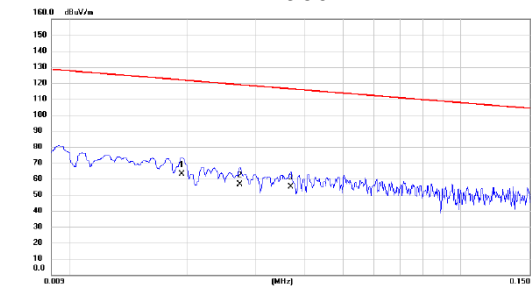
Ant 0°



| No. | Mk. | Freq.  | Reading Level | Correct Factor | Measurement | Limit  | Margin | Detector | Comment |
|-----|-----|--------|---------------|----------------|-------------|--------|--------|----------|---------|
|     |     | MHz    | dBμV/m        | dB             | dBμV/m      | dBμV/m | dB     |          |         |
| 1   |     | 0.4485 | 32.54         | 13.40          | 45.94       | 94.57  | -48.63 | AVG      |         |
| 2   | *   | 2.1798 | 22.54         | 12.02          | 34.56       | 69.54  | -34.98 | QP       |         |
| 3   |     | 4.2693 | 20.94         | 11.73          | 32.67       | 69.54  | -36.87 | QP       |         |

Test Mode : TX Mode

Ant 90°



| No. | Mk. | Freq.  | Reading Level | Correct Factor | Measurement | Limit  | Margin | Detector | Comment |
|-----|-----|--------|---------------|----------------|-------------|--------|--------|----------|---------|
|     |     | MHz    | dBμV/m        | dB             | dBμV/m      | dBμV/m | dB     |          |         |
| 1   | *   | 0.0194 | 48.52         | 14.48          | 63.00       | 121.85 | -58.85 | AVG      |         |
| 2   |     | 0.0273 | 42.66         | 14.12          | 56.78       | 118.88 | -62.10 | AVG      |         |
| 3   |     | 0.0368 | 40.96         | 13.90          | 54.86       | 116.29 | -61.43 | AVG      |         |

Test Mode : TX Mode

Ant 90°

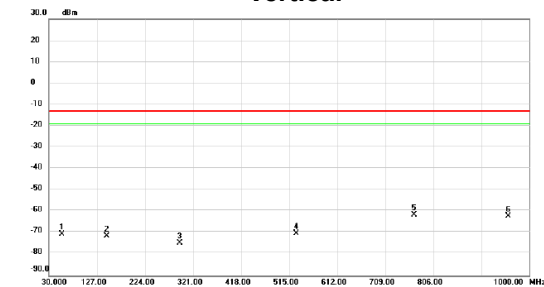


| No. | Mk. | Freq.  | Reading Level | Correct Factor | Measurement | Limit  | Margin | Detector | Comment |
|-----|-----|--------|---------------|----------------|-------------|--------|--------|----------|---------|
|     |     | MHz    | dBμV/m        | dB             | dBμV/m      | dBμV/m | dB     |          |         |
| 1   |     | 0.4237 | 31.85         | 13.43          | 45.28       | 95.06  | -49.78 | AVG      |         |
| 2   |     | 1.7620 | 20.41         | 12.27          | 32.68       | 69.54  | -36.86 | QP       |         |
| 3   | *   | 2.2992 | 21.66         | 11.97          | 33.63       | 69.54  | -35.91 | QP       |         |

## **APPENDIX E - RADIATED SPURIOUS EMISSIONS (30MHZ TO 1000MHZ)**

Test Mode : GSM850\_TX CH190\_GSM

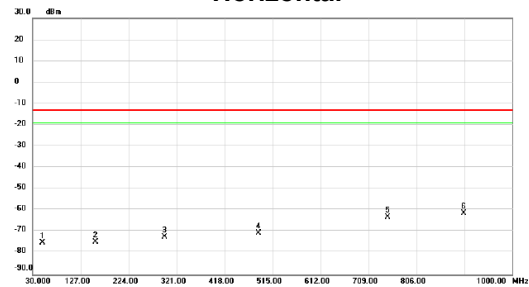
## Vertical



| No. | Mk. | Freq.    | Reading | Correct | Measure- | Limit  | Margin |          |         |
|-----|-----|----------|---------|---------|----------|--------|--------|----------|---------|
|     |     | MHz      | Level   | Factor  | ment     |        |        | Detector | Comment |
|     |     |          | dBm     | dB      | dBm      | dBm    | dB     |          |         |
| 1   |     | 56.1900  | -68.35  | -2.23   | -70.58   | -13.00 | -57.58 | peak     |         |
| 2   |     | 147.3700 | -69.17  | -2.23   | -71.40   | -13.00 | -58.40 | peak     |         |
| 3   |     | 294.3250 | -72.90  | -1.88   | -74.78   | -13.00 | -61.78 | peak     |         |
| 4   |     | 530.0350 | -73.52  | 3.21    | -70.31   | -13.00 | -57.31 | peak     |         |
| 5 * |     | 768.1700 | -69.23  | 7.62    | -61.61   | -13.00 | -48.61 | peak     |         |
| 6   |     | 957.8050 | -71.67  | 9.47    | -62.20   | -13.00 | -49.20 | peak     |         |

Test Mode : GSM850\_TX CH190\_GSM

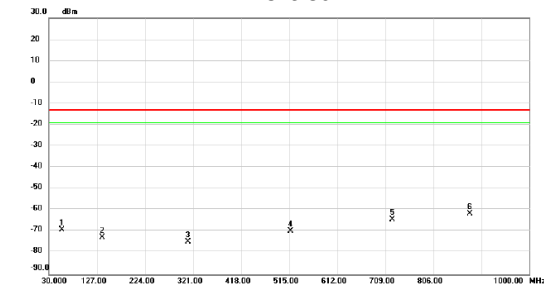
## Horizontal



| No. | Mk. | Freq.    | Reading | Correct | Measure- | Limit  | Margin |          |         |
|-----|-----|----------|---------|---------|----------|--------|--------|----------|---------|
|     |     | MHz      | Level   | Factor  | ment     |        |        | Detector | Comment |
|     |     |          | dBm     | dB      | dBm      | dBm    | dB     |          |         |
| 1   |     | 50.3700  | -73.22  | -1.94   | -75.16   | -13.00 | -62.16 | peak     |         |
| 2   |     | 157.5550 | -72.81  | -2.06   | -74.87   | -13.00 | -61.87 | peak     |         |
| 3   |     | 296.7500 | -70.68  | -1.83   | -72.51   | -13.00 | -59.51 | peak     |         |
| 4   |     | 486.8700 | -72.99  | 2.49    | -70.50   | -13.00 | -57.50 | peak     |         |
| 5   |     | 748.7700 | -70.54  | 7.45    | -63.09   | -13.00 | -50.09 | peak     |         |
| 6 * |     | 902.0300 | -70.03  | 8.62    | -61.41   | -13.00 | -48.41 | peak     |         |

Test Mode : WCDMA Band V\_TX CH4182

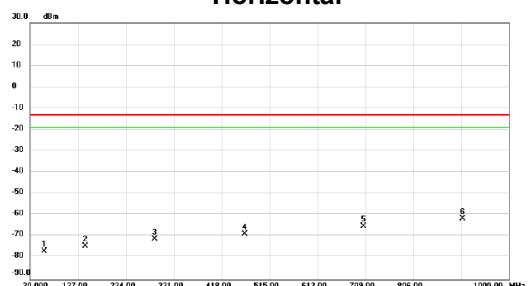
## Vertical



| No. | Mk. | Freq.    | Reading | Correct | Measure- | Limit  | Margin |          |         |
|-----|-----|----------|---------|---------|----------|--------|--------|----------|---------|
|     |     | MHz      | Level   | Factor  | ment     |        |        | Detector | Comment |
|     |     |          | dBm     | dB      | dBm      | dBm    | dB     |          |         |
| 1   |     | 56.6750  | -57.41  | -11.86  | -69.27   | -13.00 | -56.27 | peak     |         |
| 2   |     | 138.6400 | -60.51  | -12.30  | -72.81   | -13.00 | -59.81 | peak     |         |
| 3   |     | 310.8150 | -63.88  | -11.00  | -74.88   | -13.00 | -61.88 | peak     |         |
| 4   |     | 517.9100 | -63.14  | -6.59   | -69.73   | -13.00 | -56.73 | peak     |         |
| 5   |     | 724.0350 | -61.88  | -2.51   | -64.39   | -13.00 | -51.39 | peak     |         |
| 6 * |     | 879.7200 | -60.66  | -0.98   | -61.64   | -13.00 | -48.64 | peak     |         |

Test Mode : WCDMA Band V\_TX CH4182

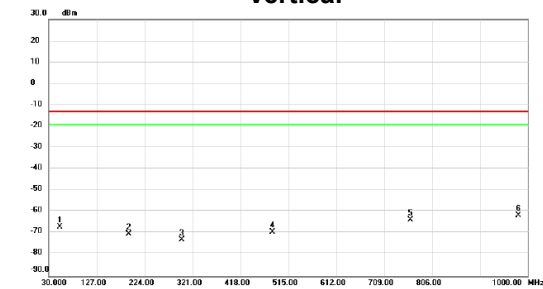
## Horizontal



| No. | Mk. | Freq.    | Reading | Correct | Measure- | Limit  | Margin |          |         |
|-----|-----|----------|---------|---------|----------|--------|--------|----------|---------|
|     |     | MHz      | Level   | Factor  | ment     |        |        | Detector | Comment |
|     |     |          | dBm     | dB      | dBm      | dBm    | dB     |          |         |
| 1   |     | 58.6150  | -64.79  | -12.05  | -76.84   | -13.00 | -63.84 | peak     |         |
| 2   |     | 141.5500 | -62.59  | -12.10  | -74.69   | -13.00 | -61.69 | peak     |         |
| 3   |     | 283.1700 | -59.61  | -11.74  | -71.35   | -13.00 | -58.35 | peak     |         |
| 4   |     | 465.5300 | -61.51  | -7.39   | -68.90   | -13.00 | -55.90 | peak     |         |
| 5   |     | 706.0900 | -62.60  | -2.78   | -65.38   | -13.00 | -52.38 | peak     |         |
| 6 * |     | 906.3950 | -60.60  | -0.90   | -61.50   | -13.00 | -48.50 | peak     |         |

Test Mode : LTE Band 5\_TX CH20525\_1.4MHz

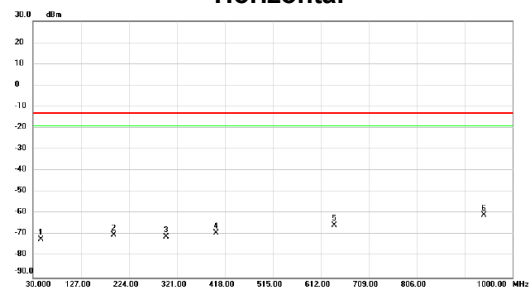
Vertical



| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBm | Correct<br>Factor<br>dB | Measure-<br>ment<br>dBm | Limit<br>dBm | Margin<br>dB | Detector | Comment |
|-----|-----|--------------|-------------------------|-------------------------|-------------------------|--------------|--------------|----------|---------|
| 1   |     | 52.3100      | -55.42                  | -11.61                  | -67.03                  | -13.00       | -54.03       | peak     |         |
| 2   |     | 191.9900     | -55.94                  | -14.39                  | -70.33                  | -13.00       | -57.33       | peak     |         |
| 3   |     | 300.1450     | -61.67                  | -11.34                  | -73.01                  | -13.00       | -60.01       | peak     |         |
| 4   |     | 483.4750     | -62.19                  | -7.14                   | -69.33                  | -13.00       | -56.33       | peak     |         |
| 5   |     | 762.8350     | -61.86                  | -2.01                   | -63.87                  | -13.00       | -50.87       | peak     |         |
| 6   | *   | 980.6000     | -61.72                  | 0.07                    | -61.65                  | -13.00       | -48.65       | peak     |         |

Test Mode : LTE Band 5\_TX CH20525\_1.4MHz

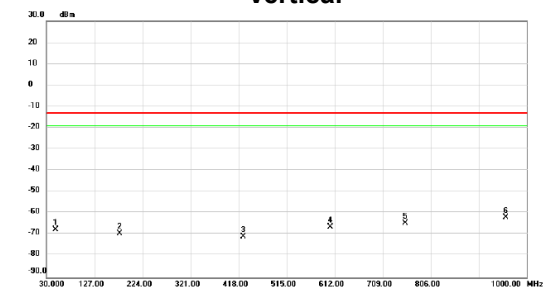
Horizontal



| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBm | Correct<br>Factor<br>dB | Measure-<br>ment<br>dBm | Limit<br>dBm | Margin<br>dB | Detector | Comment |
|-----|-----|--------------|-------------------------|-------------------------|-------------------------|--------------|--------------|----------|---------|
| 1   |     | 45.5200      | -60.52                  | -11.67                  | -72.19                  | -13.00       | -59.19       | peak     |         |
| 2   |     | 193.4450     | -56.65                  | -14.48                  | -70.13                  | -13.00       | -57.13       | peak     |         |
| 3   |     | 300.1450     | -59.52                  | -11.34                  | -70.86                  | -13.00       | -57.86       | peak     |         |
| 4   |     | 400.5400     | -59.97                  | -9.10                   | -69.07                  | -13.00       | -56.07       | peak     |         |
| 5   |     | 639.6450     | -61.66                  | -3.99                   | -65.65                  | -13.00       | -52.65       | peak     |         |
| 6   | *   | 941.8000     | -60.54                  | -0.32                   | -60.86                  | -13.00       | -47.86       | peak     |         |

Test Mode : LTE Band 5\_TX CH20525\_5MHz

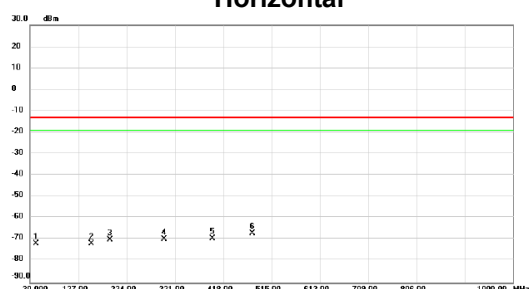
Vertical



| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBm | Correct<br>Factor<br>dB | Measure-<br>ment<br>dBm | Limit<br>dBm | Margin<br>dB | Detector | Comment |
|-----|-----|--------------|-------------------------|-------------------------|-------------------------|--------------|--------------|----------|---------|
| 1   |     | 48.4300      | -56.02                  | -11.58                  | -67.60                  | -13.00       | -54.60       | peak     |         |
| 2   |     | 178.4100     | -56.60                  | -12.90                  | -69.50                  | -13.00       | -56.50       | peak     |         |
| 3   |     | 428.1850     | -62.78                  | -8.27                   | -71.05                  | -13.00       | -58.05       | peak     |         |
| 4   |     | 603.2700     | -62.12                  | -4.33                   | -66.45                  | -13.00       | -53.45       | peak     |         |
| 5   |     | 755.0750     | -62.65                  | -2.07                   | -64.72                  | -13.00       | -51.72       | peak     |         |
| 6   | *   | 958.2900     | -61.80                  | -0.11                   | -61.91                  | -13.00       | -48.91       | peak     |         |

Test Mode : LTE Band 5\_TX CH20525\_5MHz

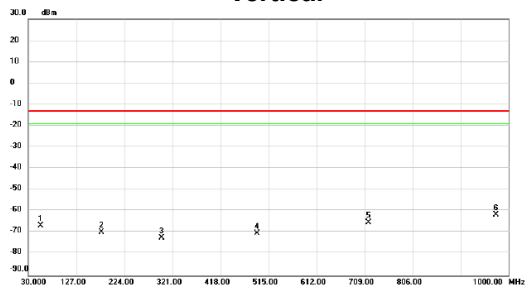
Horizontal



| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBm | Correct<br>Factor<br>dB | Measure-<br>ment<br>dBm | Limit<br>dBm | Margin<br>dB | Detector | Comment |
|-----|-----|--------------|-------------------------|-------------------------|-------------------------|--------------|--------------|----------|---------|
| 1   |     | 42.6100      | -59.88                  | -11.91                  | -71.79                  | -13.00       | -58.79       | peak     |         |
| 2   |     | 153.1900     | -60.18                  | -11.68                  | -71.86                  | -13.00       | -58.86       | peak     |         |
| 3   |     | 191.0200     | -55.58                  | -14.33                  | -69.91                  | -13.00       | -56.91       | peak     |         |
| 4   |     | 300.1450     | -58.35                  | -11.34                  | -69.69                  | -13.00       | -56.69       | peak     |         |
| 5   |     | 396.1750     | -60.22                  | -9.20                   | -69.42                  | -13.00       | -56.42       | peak     |         |
| 6   | *   | 477.1700     | -59.82                  | -7.24                   | -67.06                  | -13.00       | -54.06       | peak     |         |

Test Mode : LTE Band 5\_TX CH20525\_10MHz

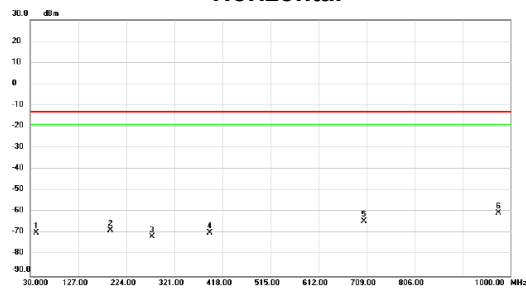
## Vertical



| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBm | Correct<br>Factor<br>dB | Measure-<br>ment<br>dBm | Limit<br>dBm | Margin<br>dB | Detector | Comment |
|-----|-----|--------------|-------------------------|-------------------------|-------------------------|--------------|--------------|----------|---------|
| 1   |     | 55.7050      | -54.92                  | -11.77                  | -66.69                  | -13.00       | -53.69       | peak     |         |
| 2   |     | 177.9250     | -56.81                  | -12.85                  | -69.66                  | -13.00       | -56.66       | peak     |         |
| 3   |     | 300.1450     | -61.10                  | -11.34                  | -72.44                  | -13.00       | -59.44       | peak     |         |
| 4   |     | 491.7200     | -63.31                  | -7.04                   | -70.35                  | -13.00       | -57.35       | peak     |         |
| 5   |     | 716.7600     | -62.65                  | -2.62                   | -65.27                  | -13.00       | -52.27       | peak     |         |
| 6   | *   | 974.2950     | -61.77                  | 0.02                    | -61.75                  | -13.00       | -48.75       | peak     |         |

Test Mode : LTE Band 5\_TX CH20525\_10MHz

## Horizontal

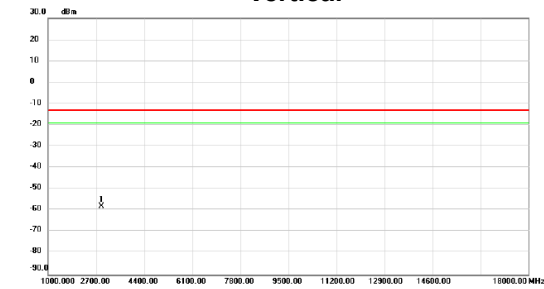


| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBm | Correct<br>Factor<br>dB | Measure-<br>ment<br>dBm | Limit<br>dBm | Margin<br>dB | Detector | Comment |
|-----|-----|--------------|-------------------------|-------------------------|-------------------------|--------------|--------------|----------|---------|
| 1   |     | 41.6400      | -57.60                  | -12.01                  | -69.61                  | -13.00       | -56.61       | peak     |         |
| 2   |     | 192.4750     | -54.21                  | -14.42                  | -68.63                  | -13.00       | -55.63       | peak     |         |
| 3   |     | 275.8950     | -59.69                  | -12.00                  | -71.69                  | -13.00       | -58.69       | peak     |         |
| 4   |     | 392.7800     | -60.40                  | -9.27                   | -69.67                  | -13.00       | -56.67       | peak     |         |
| 5   |     | 704.1500     | -61.56                  | -2.80                   | -64.36                  | -13.00       | -51.36       | peak     |         |
| 6   | *   | 976.2350     | -60.53                  | 0.04                    | -60.49                  | -13.00       | -47.49       | peak     |         |

## **APPENDIX F - RADIATED SPURIOUS EMISSIONS (ABOVE 1000MHZ)**

Test Mode : GSM850\_TX CH190\_GSM

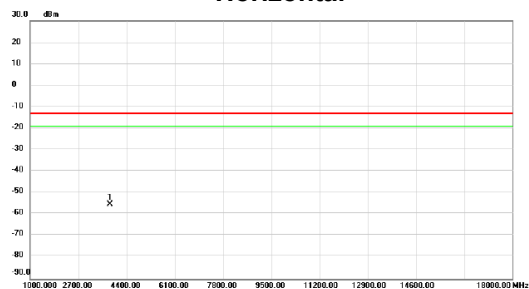
Vertical



| No. | Mk. | Freq.    | Reading Level | Correct Factor | Measurement | Limit  | Margin | Detector | Comment |
|-----|-----|----------|---------------|----------------|-------------|--------|--------|----------|---------|
|     |     | MHz      | dBm           | dB             | dBm         | dBm    | dB     |          |         |
| 1   | *   | 2895.500 | -66.78        | 8.66           | -58.12      | -13.00 | -45.12 | peak     |         |

Test Mode : GSM850\_TX CH190\_GSM

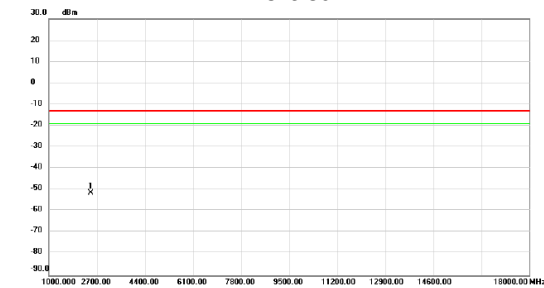
Horizontal



| No. | Mk. | Freq.    | Reading Level | Correct Factor | Measurement | Limit  | Margin | Detector | Comment |
|-----|-----|----------|---------------|----------------|-------------|--------|--------|----------|---------|
|     |     | MHz      | dBm           | dB             | dBm         | dBm    | dB     |          |         |
| 1   | *   | 3822.000 | -66.45        | 11.10          | -55.35      | -13.00 | -42.35 | peak     |         |

Test Mode : WCDMA Band V\_TX CH4182

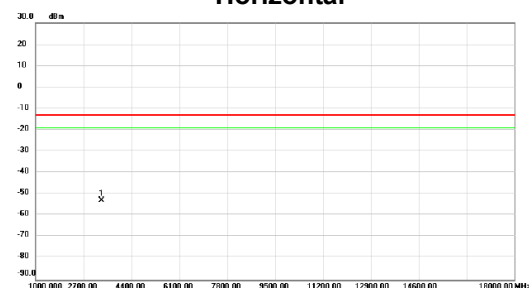
Vertical



| No. | Mk. | Freq.    | Reading Level | Correct Factor | Measurement | Limit  | Margin | Detector | Comment |
|-----|-----|----------|---------------|----------------|-------------|--------|--------|----------|---------|
|     |     | MHz      | dBm           | dB             | dBm         | dBm    | dB     |          |         |
| 1   | *   | 2487.500 | -47.05        | -4.31          | -51.36      | -13.00 | -38.36 | peak     |         |

Test Mode : WCDMA Band V\_TX CH4182

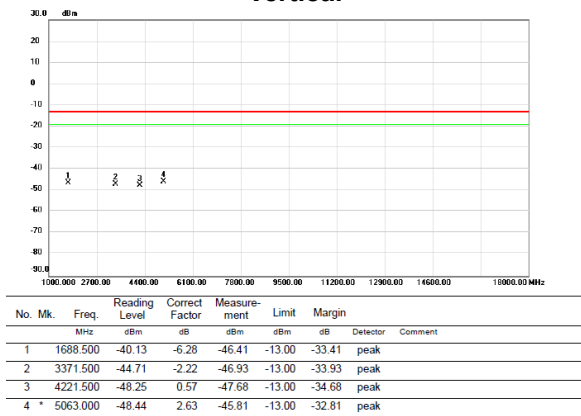
Horizontal



| No. | Mk. | Freq.    | Reading Level | Correct Factor | Measurement | Limit  | Margin | Detector | Comment |
|-----|-----|----------|---------------|----------------|-------------|--------|--------|----------|---------|
|     |     | MHz      | dBm           | dB             | dBm         | dBm    | dB     |          |         |
| 1   | *   | 3337.500 | -50.67        | -2.28          | -52.95      | -13.00 | -39.95 | peak     |         |

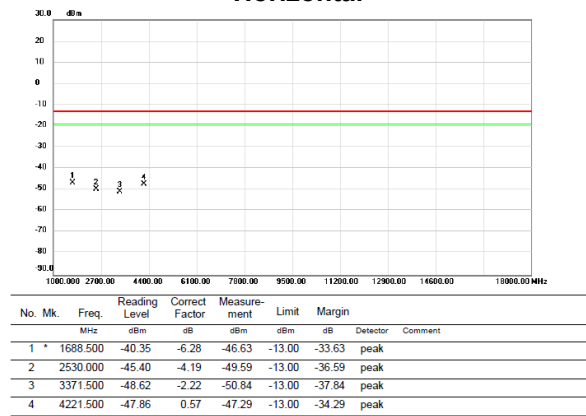
Test Mode : LTE Band 5\_TX CH20525\_1.4MHz

## Vertical



Test Mode : LTE Band 5\_TX CH20525\_1.4MHz

## Horizontal



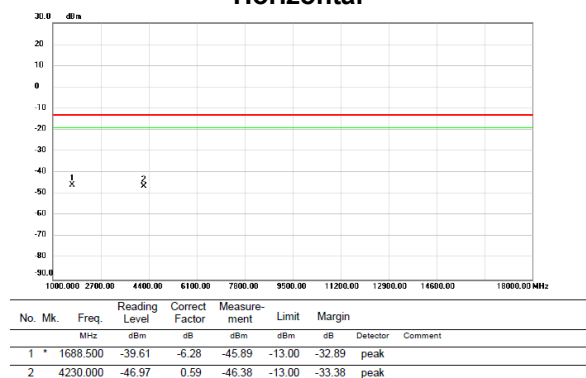
Test Mode : LTE Band 5\_TX CH20525\_5MHz

## Vertical



Test Mode : LTE Band 5\_TX CH20525\_5MHz

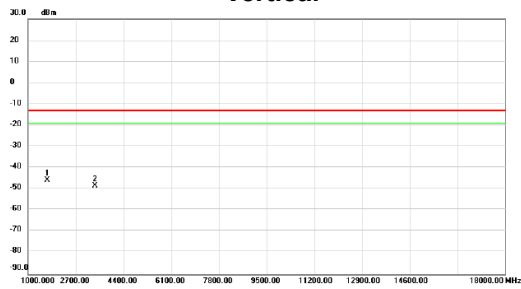
## Horizontal



Test Mode : LTE Band 5\_TX CH20525\_10MHz

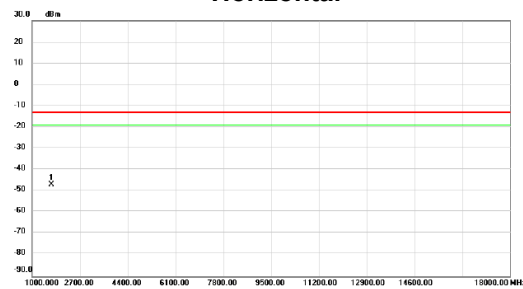
Test Mode : LTE Band 5\_TX CH20525\_10MHz

## Vertical



| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBm | Correct<br>Factor<br>dB | Measure-<br>ment<br>dBm | Limit<br>dBm | Margin<br>dB | Detector | Comment |
|-----|-----|--------------|-------------------------|-------------------------|-------------------------|--------------|--------------|----------|---------|
| 1   | *   | 1697.000     | -39.36                  | -6.26                   | -45.62                  | -13.00       | -32.62       | peak     |         |
| 2   |     | 3397.000     | -46.26                  | -2.19                   | -48.45                  | -13.00       | -35.45       | peak     |         |

## Horizontal



| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBm | Correct<br>Factor<br>dB | Measure-<br>ment<br>dBm | Limit<br>dBm | Margin<br>dB | Detector | Comment |
|-----|-----|--------------|-------------------------|-------------------------|-------------------------|--------------|--------------|----------|---------|
| 1   | *   | 1697.000     | -40.56                  | -6.26                   | -46.82                  | -13.00       | -33.82       | peak     |         |

## **APPENDIX G - BAND EDGE**