



# TEST REPORT

Applicant Name : Shenzhen Youmi Intelligent Technology Co., Ltd.  
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Report Number : SZNS220313-08566E-RF-00C  
FCC ID: 2ATZ4-A13PF

## Test Standard (s)

FCC PART 27; FCC PART 22H; FCC PART 24E

## Sample Description

Product Type: Smart phone  
Model No.: A13 Pro  
Multiple Model(s) No.: F3S(Please refer to DOS for Model difference)  
Trade Mark: UMIDIGI  
Date Received: 2022/03/13  
Report Date: 2022/05/18

|              |       |
|--------------|-------|
| Test Result: | Pass* |
|--------------|-------|

\* In the configuration tested, the EUT complied with the standards above.

## Prepared and Checked By:

Ting Lü  
EMC Engineer

## Approved By:

Robert Li  
EMC Engineer

Note: This report may contain data that are not covered by the A2LA accreditation and are marked with an asterisk "★".

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Page 1 of 87

FCC -2G,3G,4G

## **TABLE OF CONTENTS**

|                                                                                                             |           |
|-------------------------------------------------------------------------------------------------------------|-----------|
| <b>GENERAL INFORMATION.....</b>                                                                             | <b>3</b>  |
| PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT) .....                                                    | 3         |
| OBJECTIVE .....                                                                                             | 3         |
| TEST METHODOLOGY .....                                                                                      | 4         |
| MEASUREMENT UNCERTAINTY .....                                                                               | 4         |
| TEST FACILITY .....                                                                                         | 4         |
| <b>SYSTEM TEST CONFIGURATION.....</b>                                                                       | <b>5</b>  |
| DESCRIPTION OF TEST CONFIGURATION .....                                                                     | 5         |
| EQUIPMENT MODIFICATIONS .....                                                                               | 5         |
| SUPPORT EQUIPMENT LIST AND DETAILS .....                                                                    | 6         |
| SUPPORT CABLE DESCRIPTION .....                                                                             | 6         |
| BLOCK DIAGRAM OF TEST SETUP .....                                                                           | 6         |
| <b>SUMMARY OF TEST RESULTS .....</b>                                                                        | <b>7</b>  |
| <b>TEST EQUIPMENT LIST .....</b>                                                                            | <b>8</b>  |
| <b>FCC §1.1307(B)&amp;§2.1093 - RF EXPOSURE INFORMATION.....</b>                                            | <b>9</b>  |
| <b>FCC§2.1047 - MODULATION CHARACTERISTIC .....</b>                                                         | <b>10</b> |
| <b>FCC § 2.1046,§ 22.913 (A)&amp;§ 24.232 (C); §27.50(B)(C)(H)- RF OUTPUT POWER.....</b>                    | <b>11</b> |
| APPLICABLE STANDARD .....                                                                                   | 11        |
| TEST PROCEDURE .....                                                                                        | 11        |
| TEST DATA .....                                                                                             | 11        |
| <b>FCC §2.1049, §22.917, §22.905 &amp; §24.238&amp;§27.53 - OCCUPIED BANDWIDTH .....</b>                    | <b>27</b> |
| APPLICABLE STANDARD .....                                                                                   | 27        |
| TEST PROCEDURE .....                                                                                        | 27        |
| TEST DATA .....                                                                                             | 27        |
| <b>FCC §2.1051, §22.917(A) &amp; §24.238(A)&amp; §27.53 - SPURIOUS EMISSIONS AT ANTENNA TERMINALS .....</b> | <b>43</b> |
| APPLICABLE STANDARD .....                                                                                   | 43        |
| TEST PROCEDURE .....                                                                                        | 43        |
| TEST DATA .....                                                                                             | 43        |
| <b>FCC § 2.1053; § 22.917 (A);§ 24.238 (A); §27.53 - SPURIOUS RADIATED EMISSIONS.....</b>                   | <b>59</b> |
| APPLICABLE STANDARD .....                                                                                   | 59        |
| TEST PROCEDURE .....                                                                                        | 59        |
| TEST DATA .....                                                                                             | 59        |
| <b>FCC§ 22.917 (A);§ 24.238 (A); §27.53 (C)(H)(M) - BAND EDGES.....</b>                                     | <b>69</b> |
| APPLICABLE STANDARD .....                                                                                   | 69        |
| TEST PROCEDURE .....                                                                                        | 69        |
| TEST DATA .....                                                                                             | 70        |
| <b>FCC § 2.1055; § 22.355; § 24.235; §27.54 - FREQUENCY STABILITY .....</b>                                 | <b>79</b> |
| APPLICABLE STANDARD .....                                                                                   | 79        |
| TEST PROCEDURE .....                                                                                        | 79        |
| TEST DATA .....                                                                                             | 80        |

## GENERAL INFORMATION

### Product Description for Equipment under Test (EUT)

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                               |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Frequency Range          | GSM 850: 824-849MHz(TX); 869-894MHz(RX)<br>PCS 1900: 1850-1910MHz(TX); 1930-1990MHz(RX)<br>WCDMA Band 2: 1850-1910MHz(TX); 1930-1990MHz(RX)<br>WCDMA Band 5: 824-849MHz(TX); 869-894MHz(RX)<br>LTE Band 2: 1850-1910MHz(TX); 1930-1990MHz(RX)<br>LTE Band 5: 824-849MHz(TX); 869-894MHz(RX)<br>LTE Band 12: 699-716MHz(TX); 729-746MHz(RX)<br>LTE Band 13: 777-787MHz(TX); 746-756MHz(RX)<br>LTE Band 41: 2535-2655MHz(TX/RX) |
| Modulation Technique     | 2G: GMSK<br>3G: BPSK, QPSK, 16QAM<br>4G: QPSK, 16QAM                                                                                                                                                                                                                                                                                                                                                                          |
| Antenna Specification*   | GSM850/WCDMA 850/LTE B5 : -2.28dBi<br>WCDMA 1900/PCS1900/LTE B2 : 0.83dBi<br>LTE B12/B13 : -1.01dBi<br>LTE B41 : -1.33dBi (provided by the applicant)                                                                                                                                                                                                                                                                         |
| Voltage Range            | DC 3.85V from battery or DC 5V from adapter                                                                                                                                                                                                                                                                                                                                                                                   |
| Sample serial number     | SZNS220313-08566E-RF-S1 for Radiated Emissions<br>SZNS220313-08566E-RF-S2 for RF Conducted Test<br>(Assigned by ATC)                                                                                                                                                                                                                                                                                                          |
| Sample/EUT Status        | Good condition                                                                                                                                                                                                                                                                                                                                                                                                                |
| Adapter information      | Model: HJ-0502000W2-US<br>Input: AC 100-240V, 50/60Hz, 0.3A<br>Output: DC 5.0V, 2.0A                                                                                                                                                                                                                                                                                                                                          |
| Normal/Extreme Condition | L.V.: Low Voltage 3.45V <sub>DC</sub><br>N.V.: Normal Voltage 3.85V <sub>DC</sub><br>H.V.: High Voltage 4.4V <sub>DC</sub>                                                                                                                                                                                                                                                                                                    |

Note: The series model F3S is electrical identical to the model A13 pro, the difference between them is back cover shape, the material is same, so the difference will not affect the test result, only the model A13 pro was tested.

### Objective

This test report is in accordance with Part 2-Subpart J, Part 22-Subpart H, Part 24-Subpart E, and Subpart 27 of the Federal Communication Commission's rules.

The objective is to determine the compliance of the EUT with FCC rules for output power, modulation characteristic, occupied bandwidth, and spurious emission at antenna terminal, spurious radiated emission, frequency stability and band edge.

## Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2-Subpart J as well as the following parts:

Part 22 Subpart H - Public Mobile Services  
 Part 24 Subpart E - Personal Communication Services  
 Part 27 - Miscellaneous Wireless Communications Services

ANSI C63.26-2015: American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services

All emissions measurement was performed at Shenzhen Accurate Technology Co., Ltd. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.  
 Each test item follows test standards and with no deviation.

## Measurement Uncertainty

| Parameter                          |                | Uncertainty            |
|------------------------------------|----------------|------------------------|
| Occupied Channel Bandwidth         |                | 5%                     |
| RF Frequency                       |                | $0.082 \times 10^{-7}$ |
| RF output power, conducted         |                | 0.73dB                 |
| Unwanted Emission, conducted       |                | 1.6dB                  |
| AC Power Lines Conducted Emissions |                | 2.72dB                 |
| Emissions,<br>Radiated             | 9kHz - 30MHz   | 2.66dB                 |
|                                    | 30MHz - 1GHz   | 4.28dB                 |
|                                    | 1GHz - 18GHz   | 4.98dB                 |
|                                    | 18GHz -26.5GHz | 5.06dB                 |
|                                    | 26.5GHz -40GHz | 4.72dB                 |
| Temperature                        |                | 1°C                    |
| Humidity                           |                | 6%                     |
| Supply voltages                    |                | 0.4%                   |

*Note: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.*

## Test Facility

The Test site used by Shenzhen Accurate Technology Co., Ltd. to collect test data is located on the 1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China.

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No.: 708358, the FCC Designation No.: CN1189. Accredited by American Association for Laboratory Accreditation (A2LA) The Certificate Number is 429 7.01.

Listed by Innovation, Science and Economic Development Canada (ISED), the Registration Number is 5077A.

## SYSTEM TEST CONFIGURATION

### Description of Test Configuration

The final qualification test was performed with the EUT operating at normal mode.

| Frequency band | Bandwidth (MHz) | Test Frequency(MHz) |        |        |
|----------------|-----------------|---------------------|--------|--------|
|                |                 | Low                 | Middle | High   |
| GSM850         | 0.25            | 824.2               | 836.6  | 848.8  |
| PCS1900        | 0.25            | 1850.2              | 1880   | 1909.8 |
| WCDMA B2       | 4.2             | 1852.4              | 1880   | 1907.6 |
| WCDMA B5       | 4.2             | 826.4               | 836.6  | 846.6  |
| LTE B2         | 1.4             | 1850.7              | 1880   | 1909.3 |
|                | 3               | 1851.5              | 1880   | 1908.5 |
|                | 5               | 1852.5              | 1880   | 1907.5 |
|                | 10              | 1855                | 1880   | 1905   |
|                | 15              | 1857.5              | 1880   | 1902.5 |
|                | 20              | 1860                | 1880   | 1900   |
| LTE B5         | 1.4             | 824.7               | 836.5  | 848.3  |
|                | 3               | 825.5               | 836.5  | 847.5  |
|                | 5               | 826.5               | 836.5  | 846.5  |
|                | 10              | 829                 | 836.5  | 844    |
| LTE B12        | 1.4             | 699.7               | 707.5  | 715.3  |
|                | 3               | 700.5               | 707.5  | 714.5  |
|                | 5               | 701.5               | 707.5  | 713.5  |
|                | 10              | 704.0               | 707.5  | 711.0  |
| LTE B13        | 5               | 779.5               | 782.0  | 784.5  |
|                | 10              | /                   | 782.0  | /      |
| LTE B41        | 5               | 2537.5              | 2595   | 2652.5 |
|                | 10              | 2540                | 2595   | 2650   |
|                | 15              | 2542.5              | 2595   | 2647.5 |
|                | 20              | 2545                | 2595   | 2645   |

### Equipment Modifications

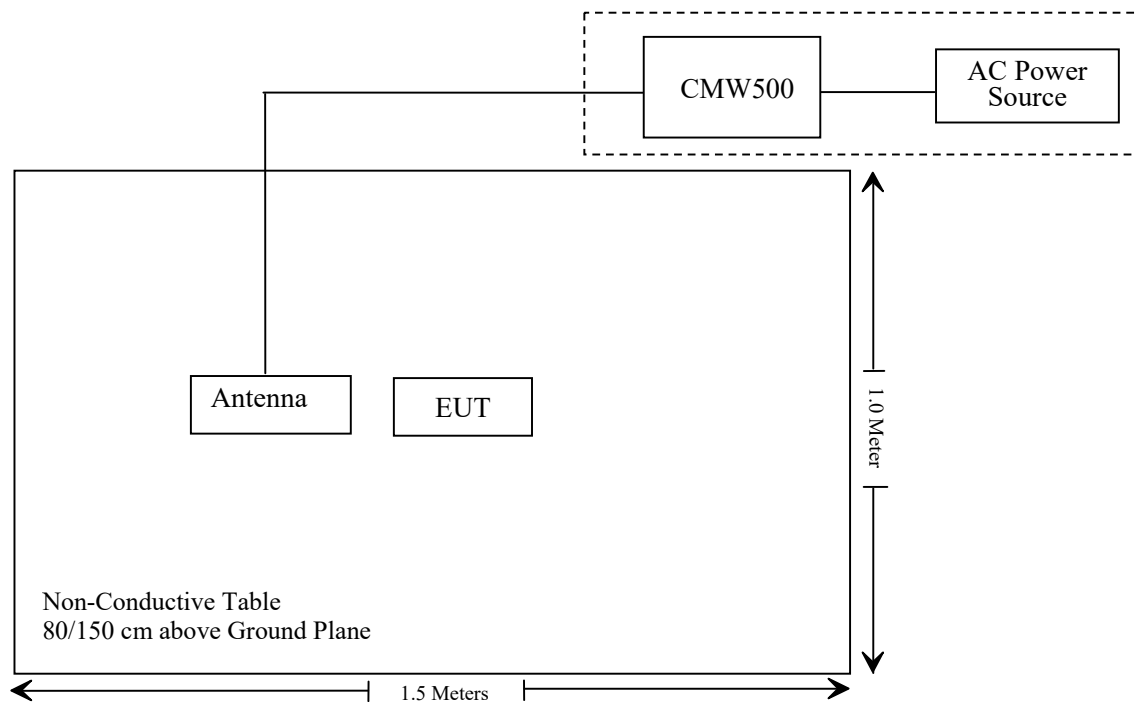
No modification was made to the EUT.

**Support Equipment List and Details**

| Manufacturer    | Description                         | Model  | Serial Number             |
|-----------------|-------------------------------------|--------|---------------------------|
| Rohde & Schwarz | Wideband Radio Communication Tester | CMW500 | 1201.002K50-11621<br>8-UY |

**Support Cable Description**

| Cable Description                 | Length (m) | From / Port | To     |
|-----------------------------------|------------|-------------|--------|
| Unshielded Un-detachable AC cable | 1.2        | AC Power    | CMW500 |

**Block Diagram of Test Setup**

**SUMMARY OF TEST RESULTS**

| FCC Rules                                                   | Description of Test                    | Result         |
|-------------------------------------------------------------|----------------------------------------|----------------|
| § 1.1307 ,§2.1093                                           | RF Exposure (SAR)                      | Compliant      |
| §2.1046; § 22.913 (a);<br>§ 24.232 (c); §27.50 (b) (c) (h); | RF Output Power                        | Compliant      |
| § 2.1047                                                    | Modulation Characteristics             | Not Applicable |
| § 2.1049; § 22.905;<br>§ 22.917; § 24.238; §27.53           | Occupied Bandwidth                     | Compliant      |
| § 2.1051; §22.917 (a);<br>§ 24.238 (a); §27.53;             | Spurious Emissions at Antenna Terminal | Compliant      |
| § 2.1053; § 22.917 (a);<br>§ 24.238 (a); §27.53             | Field Strength of Spurious Radiation   | Compliant      |
| § 22.917 (a);<br>§ 24.238 (a); §27.53 (c) (h) (m)           | Band Edge                              | Compliant      |
| § 2.1055; § 22.355;<br>§ 24.235; §27.54;                    | Frequency stability                    | Compliant      |

**TEST EQUIPMENT LIST**

| Manufacturer           | Description                         | Model                | Serial Number | Calibration Date | Calibration Due Date |
|------------------------|-------------------------------------|----------------------|---------------|------------------|----------------------|
| Radiated Emission Test |                                     |                      |               |                  |                      |
| Rohde& Schwarz         | Test Receiver                       | ESR                  | 102725        | 2021/12/13       | 2022/12/12           |
| Rohde&Schwarz          | Spectrum Analyzer                   | FSV40                | 101949        | 2021/12/13       | 2022/12/12           |
| SONOMA INSTRUMENT      | Amplifier                           | 310 N                | 186131        | 2021/11/09       | 2022/11/08           |
| A.H. Systems, inc.     | Preamplifier                        | PAM-0118P            | 135           | 2021/11/09       | 2022/11/08           |
| Quinstar               | Amplifier                           | QLW-18405536-J0      | 15964001002   | 2021/11/11       | 2022/11/10           |
| Unknown                | RF Coaxial Cable                    | No.10                | N050          | 2021/12/14       | 2022/12/13           |
| Unknown                | RF Coaxial Cable                    | No.11                | N1000         | 2021/12/14       | 2022/12/13           |
| Unknown                | RF Coaxial Cable                    | No.12                | N040          | 2021/12/14       | 2022/12/13           |
| Unknown                | RF Coaxial Cable                    | No.13                | N300          | 2021/12/14       | 2022/12/13           |
| Unknown                | RF Coaxial Cable                    | No.14                | N800          | 2021/12/14       | 2022/12/13           |
| Unknown                | RF Coaxial Cable                    | No.15                | N600          | 2021/12/14       | 2022/12/13           |
| Unknown                | RF Coaxial Cable                    | No.16                | N650          | 2021/12/14       | 2022/12/13           |
| Schwarzbeck            | Bilog Antenna                       | VULB9163             | 9163-194      | 2020/01/05       | 2023/01/04           |
| Schwarzbeck            | Bilog Antenna                       | VULB9163             | 9163-323      | 2021/07/06       | 2024/07/05           |
| Schwarzbeck            | Horn Antenna                        | BBHA9120D            | 9120D-655     | 2020/01/05       | 2023/01/04           |
| Schwarzbeck            | Horn Antenna                        | BBHA9120D            | 9120D-1067    | 2020/01/05       | 2023/01/04           |
| PASTERNAK              | Horn Antenn                         | PE9852/2F-20         | 1120          | 2020/01/05       | 2023/01/04           |
| PASTERNAK              | Horn Antenn                         | PE9852/2F-20         | 1120          | 2020/01/05       | 2023/01/04           |
| Agilent                | Signal Generator                    | N5183A               | MY51040755    | 2021/12/13       | 2022/12/12           |
| Wainwright             | High Pass Filter                    | WHKX3.6/18G-10S<br>S | 5             | 2021/12/14       | 2022/12/13           |
| CD                     | High Pass Filter                    | HPM-1.2/18G-60       | 110           | 2021/12/14       | 2022/12/13           |
| RF Conducted Test      |                                     |                      |               |                  |                      |
| SPECTRUM ANALYZER      | Rohde & Schwarz                     | FSU26                | 200982        | 2021/07/06       | 2022/07/05           |
| Rohde&Schwarz          | Spectrum Analyzer                   | FSV-40               | 101948        | 2021/12/13       | 2022/12/12           |
| Rohde & Schwarz        | Wideband Radio Communication Tester | CMW500               | 154606        | 2021/12/13       | 2022/12/12           |
| Mini-Circuits          | Power Splitter                      | DC-18000MHz          | SF10944151S   | 2021/12/14       | 2022/12/13           |
| Gongwen                | Temp. & Humid. Chamber              | HSD-500              | 109           | 2021/10/14       | 2022/10/13           |
| Fluke                  | Multi Meter                         | 45                   | 7664009       | 2021/12/14       | 2022/12/13           |
| Manson                 | DC Power Source                     | KPS-6604             | ATCS-205      | NCR              | NCR                  |
| Unknown                | RF Cable                            | Unknown              | Unknown       | Each time        | /                    |
| HP                     | 6dB Attenuator                      | 8493B                | 06151         | 2021/12/14       | 2022/12/13           |

\* Statement of Traceability: Shenzhen Accurate Technology Co., Ltd. attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

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## **FCC §1.1307(b)&§2.1093 - RF EXPOSURE INFORMATION**

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### **Applicable Standard**

FCC§1.1310 and §2.1093.

### **Test Result**

Compliant, please refer to the SAR report: CR22030066-20A.

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## **FCC§2.1047 - MODULATION CHARACTERISTIC**

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According to FCC § 2.1047(d), Part 22H,24E&27 there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

## FCC § 2.1046,§ 22.913 (a)&§ 24.232 (c); §27.50(b)(c)(h)- RF OUTPUT POWER

### Applicable Standard

According to FCC §2.1046 and §22.913 (a), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.

According to FCC §2.1046 and §24.232 (c), mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

The peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB.

According to §27.50(c), Control and mobile stations in the 698-746 MHz band are limited to 30 watts ERP. And Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP.

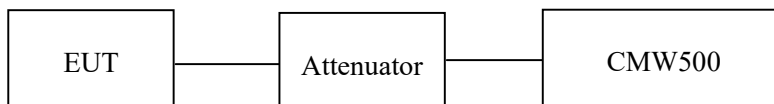
According to §27.50(b), Portable stations (hand-held devices) transmitting in the 746-757 MHz, 776-788 MHz, and 805-806 MHz bands are limited to 3 watts ERP.

According to §27.50(h), the maximum EIRP must not exceed 2Watts (33dBm) for 2496-2690MHz.

### Test Procedure

*Conducted method:*

The RF output of the transmitter was connected to the CMW500 through sufficient attenuation.



ANSI C63.26-2015 Section 5.5.

### Test Data

#### Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 26 °C     |
| Relative Humidity: | 56 %      |
| ATM Pressure:      | 101.0 kPa |

*The testing was performed by Key Pei from 2022-03-24 to 2022-05-17.*

**Conducted Power****Cellular Band (Part 22H)**

| Mode | Channel | Frequency (MHz) | Average Output Power (dBm) | ERP(dBm) | Limit (dBm) |
|------|---------|-----------------|----------------------------|----------|-------------|
| GSM  | 128     | 824.2           | 31.60                      | 26.67    | 38.45       |
|      | 190     | 836.6           | 31.50                      | 26.57    | 38.45       |
|      | 251     | 848.8           | 31.50                      | 26.57    | 38.45       |

| Mode | Channel | Frequency (MHz) | Average Output Power (dBm) |         |         |         | ERP(dBm) |         |         |         | Limit (dBm) |
|------|---------|-----------------|----------------------------|---------|---------|---------|----------|---------|---------|---------|-------------|
|      |         |                 | 1 slot                     | 2 slots | 3 slots | 4 slots | 1 slot   | 2 slots | 3 slots | 4 slots |             |
| GPRS | 128     | 824.2           | 31.57                      | 29.49   | 27.52   | 25.85   | 26.64    | 24.56   | 22.59   | 20.92   | 38.45       |
|      | 190     | 836.6           | 31.54                      | 29.35   | 27.42   | 25.86   | 26.61    | 24.42   | 22.49   | 20.93   | 38.45       |
|      | 251     | 848.8           | 31.55                      | 29.16   | 27.19   | 25.66   | 26.62    | 24.23   | 22.26   | 20.73   | 38.45       |

| Mode  | Test Mode | 3GPP Sub Test | Average Output Power (dBm) |       |       | ERP(dBm) |       |       |
|-------|-----------|---------------|----------------------------|-------|-------|----------|-------|-------|
|       |           |               | Low                        | Mid   | High  | Low      | Mid   | High  |
| WCDMA | RMC12.2k  |               | 21.83                      | 21.85 | 21.83 | 16.90    | 16.92 | 16.90 |
|       | HSDPA     | 1             | 21.82                      | 21.79 | 21.74 | 16.89    | 16.86 | 16.81 |
|       |           | 2             | 21.83                      | 21.52 | 21.58 | 16.90    | 16.59 | 16.65 |
|       |           | 3             | 21.77                      | 21.33 | 21.44 | 16.84    | 16.40 | 16.51 |
|       |           | 4             | 21.59                      | 21.45 | 21.53 | 16.66    | 16.52 | 16.60 |
|       | HSUPA     | 1             | 21.86                      | 21.74 | 21.72 | 16.93    | 16.81 | 16.79 |
|       |           | 2             | 21.73                      | 21.42 | 21.55 | 16.80    | 16.49 | 16.62 |
|       |           | 3             | 21.55                      | 21.56 | 21.46 | 16.62    | 16.63 | 16.53 |
|       |           | 4             | 21.46                      | 21.43 | 21.72 | 16.53    | 16.50 | 16.79 |
|       |           | 5             | 21.59                      | 21.46 | 21.55 | 16.66    | 16.53 | 16.62 |
|       | HSPA+     | 1             | 21.47                      | 21.8  | 21.46 | 16.54    | 16.87 | 16.53 |

Note: ERP(dBm) = Conducted Power(dBm) + Antenna Gain(dBd) - Cable loss(dB)  
 For GSM850/WCDMA Band5: Antenna Gain = -2.28dBi = -4.43dBd (0dBd=2.15dBi)  
 Cable Loss=0.5dB\* (provided by the applicant)  
 Limit: ERP≤38.45dBm

**PCS Band (Part 24E)**

| Mode | Channel | Frequency (MHz) | Average Output Power (dBm) | EIRP(dBm) | Limit (dBm) |
|------|---------|-----------------|----------------------------|-----------|-------------|
| GSM  | 512     | 1850.2          | 29.50                      | 29.53     | 33          |
|      | 661     | 1880.0          | 29.70                      | 29.73     | 33          |
|      | 810     | 1909.8          | 29.60                      | 29.63     | 33          |

| Mode | Channel | Frequency (MHz) | Average Output Power (dBm) |         |         |         | EIRP(dBm) |         |         |         | Limit (dBm) |
|------|---------|-----------------|----------------------------|---------|---------|---------|-----------|---------|---------|---------|-------------|
|      |         |                 | 1 slot                     | 2 slots | 3 slots | 4 slots | 1 slot    | 2 slots | 3 slots | 4 slots |             |
| GPRS | 512     | 1850.2          | 29.38                      | 27.08   | 25.69   | 23.71   | 29.41     | 27.11   | 25.72   | 23.74   | 33          |
|      | 661     | 1880.0          | 29.61                      | 26.95   | 25.44   | 23.67   | 29.64     | 26.98   | 25.47   | 23.70   | 33          |
|      | 810     | 1909.8          | 29.53                      | 26.63   | 25.32   | 23.66   | 29.56     | 26.66   | 25.35   | 23.69   | 33          |

| Mode              | Test Mode | 3GPP Sub Test | Average Output Power (dBm) |       |       | EIRP(dBm) |       |       |
|-------------------|-----------|---------------|----------------------------|-------|-------|-----------|-------|-------|
|                   |           |               | Low                        | Mid   | High  | Low       | Mid   | High  |
| WCDMA<br>(Band 2) | RMC12.2k  |               | 22.31                      | 22.28 | 22.30 | 22.34     | 22.31 | 22.33 |
|                   | HSDPA     | 1             | 21.96                      | 22.00 | 21.77 | 21.99     | 22.03 | 21.80 |
|                   |           | 2             | 21.88                      | 21.97 | 21.58 | 21.91     | 22.00 | 21.61 |
|                   |           | 3             | 21.92                      | 21.95 | 21.66 | 21.95     | 21.98 | 21.69 |
|                   |           | 4             | 21.69                      | 21.89 | 21.84 | 21.72     | 21.92 | 21.87 |
|                   | HSUPA     | 1             | 22.03                      | 22.01 | 21.76 | 22.06     | 22.04 | 21.79 |
|                   |           | 2             | 22.01                      | 21.99 | 21.88 | 22.04     | 22.02 | 21.91 |
|                   |           | 3             | 21.98                      | 21.85 | 21.93 | 22.01     | 21.88 | 21.96 |
|                   |           | 4             | 21.96                      | 21.87 | 21.46 | 21.99     | 21.90 | 21.49 |
|                   |           | 5             | 22.14                      | 21.76 | 21.58 | 22.17     | 21.79 | 21.61 |
|                   | HSPA+     | 1             | 22.03                      | 21.92 | 21.55 | 22.06     | 21.95 | 21.58 |

Note: EIRP(dBm) = Conducted Power(dBm) + Antenna Gain(dBi) - Cable loss(dB)

For PCS1900 / WCDMA Band2: Antenna Gain =0.83dBi

Cable Loss=0.8dB\*(provided by the applicant)

Limit: EIRP≤33dBm

**LTE Band 2**

| Bandwidth<br>(MHz) | Modulation | RB size/<br>RB Offset | Conducted Average Output<br>Power (dBm) |       |       | EIRP(dBm) |       |       |
|--------------------|------------|-----------------------|-----------------------------------------|-------|-------|-----------|-------|-------|
|                    |            |                       | Low                                     | Mid   | High  | Low       | Mid   | High  |
| 1.4                | QPSK       | RB1#0                 | 20.09                                   | 19.85 | 18.98 | 20.12     | 19.88 | 19.01 |
|                    |            | RB1#3                 | 20.01                                   | 19.85 | 18.99 | 20.04     | 19.88 | 19.02 |
|                    |            | RB1#5                 | 19.95                                   | 19.84 | 19.01 | 19.98     | 19.87 | 19.04 |
|                    |            | RB3#0                 | 20.03                                   | 19.88 | 19.07 | 20.06     | 19.91 | 19.10 |
|                    |            | RB3#3                 | 20.15                                   | 19.92 | 18.93 | 20.18     | 19.95 | 18.96 |
|                    |            | RB6#0                 | 18.94                                   | 18.86 | 17.90 | 18.97     | 18.89 | 17.93 |
|                    | 16QAM      | RB1#0                 | 19.65                                   | 19.38 | 18.07 | 19.68     | 19.41 | 18.10 |
|                    |            | RB1#3                 | 19.69                                   | 19.42 | 18.12 | 19.72     | 19.45 | 18.15 |
|                    |            | RB1#5                 | 19.65                                   | 19.33 | 18.15 | 19.68     | 19.36 | 18.18 |
|                    |            | RB3#0                 | 19.12                                   | 18.89 | 17.80 | 19.15     | 18.92 | 17.83 |
|                    |            | RB3#3                 | 19.13                                   | 18.78 | 17.75 | 19.16     | 18.81 | 17.78 |
|                    |            | RB6#0                 | 18.22                                   | 18.03 | 17.00 | 18.25     | 18.06 | 17.03 |
| 3.0                | QPSK       | RB1#0                 | 19.57                                   | 18.95 | 18.69 | 19.60     | 18.98 | 18.72 |
|                    |            | RB1#8                 | 19.47                                   | 18.94 | 18.70 | 19.50     | 18.97 | 18.73 |
|                    |            | RB1#14                | 19.51                                   | 18.91 | 18.63 | 19.54     | 18.94 | 18.66 |
|                    |            | RB6#0                 | 18.54                                   | 18.02 | 17.67 | 18.57     | 18.05 | 17.70 |
|                    |            | RB6#9                 | 18.56                                   | 17.89 | 17.56 | 18.59     | 17.92 | 17.59 |
|                    |            | RB15#0                | 18.62                                   | 17.95 | 17.65 | 18.65     | 17.98 | 17.68 |
|                    | 16QAM      | RB1#0                 | 19.01                                   | 18.24 | 17.12 | 19.04     | 18.27 | 17.15 |
|                    |            | RB1#8                 | 18.94                                   | 18.11 | 17.06 | 18.97     | 18.14 | 17.09 |
|                    |            | RB1#14                | 18.91                                   | 18.07 | 17.06 | 18.94     | 18.10 | 17.09 |
|                    |            | RB6#0                 | 17.54                                   | 17.10 | 16.68 | 17.57     | 17.13 | 16.71 |
|                    |            | RB6#9                 | 17.52                                   | 17.10 | 16.67 | 17.55     | 17.13 | 16.70 |
|                    |            | RB15#0                | 17.60                                   | 17.08 | 16.74 | 17.63     | 17.11 | 16.77 |

| Bandwidth<br>(MHz) | Modulation | RB size/<br>RB Offset | Conducted Average Output<br>Power (dBm) |       |       | EIRP(dBm) |       |       |
|--------------------|------------|-----------------------|-----------------------------------------|-------|-------|-----------|-------|-------|
|                    |            |                       | Low                                     | Mid   | High  | Low       | Mid   | High  |
| 5.0                | QPSK       | RB1#0                 | 19.57                                   | 19.59 | 18.92 | 19.60     | 19.62 | 18.95 |
|                    |            | RB1#13                | 19.52                                   | 19.57 | 18.84 | 19.55     | 19.60 | 18.87 |
|                    |            | RB1#24                | 19.45                                   | 19.60 | 18.87 | 19.48     | 19.63 | 18.90 |
|                    |            | RB15#0                | 18.65                                   | 18.52 | 18.12 | 18.68     | 18.55 | 18.15 |
|                    |            | RB15#10               | 18.58                                   | 18.52 | 18.04 | 18.61     | 18.55 | 18.07 |
|                    |            | RB25#0                | 18.58                                   | 18.54 | 18.05 | 18.61     | 18.57 | 18.08 |
|                    | 16QAM      | RB1#0                 | 17.66                                   | 18.53 | 18.10 | 17.69     | 18.56 | 18.13 |
|                    |            | RB1#13                | 17.69                                   | 18.49 | 18.01 | 17.72     | 18.52 | 18.04 |
|                    |            | RB1#24                | 17.66                                   | 18.48 | 18.05 | 17.69     | 18.51 | 18.08 |
|                    |            | RB15#0                | 17.63                                   | 17.43 | 17.01 | 17.66     | 17.46 | 17.04 |
|                    |            | RB15#10               | 17.61                                   | 17.38 | 17.06 | 17.64     | 17.41 | 17.09 |
|                    |            | RB25#0                | 17.71                                   | 17.56 | 17.18 | 17.74     | 17.59 | 17.21 |
| 10.0               | QPSK       | RB1#0                 | 19.45                                   | 19.10 | 19.41 | 19.48     | 19.13 | 19.44 |
|                    |            | RB1#25                | 19.39                                   | 19.03 | 19.40 | 19.42     | 19.06 | 19.43 |
|                    |            | RB1#49                | 19.35                                   | 19.08 | 19.31 | 19.38     | 19.11 | 19.34 |
|                    |            | RB25#0                | 18.39                                   | 18.04 | 18.57 | 18.42     | 18.07 | 18.60 |
|                    |            | RB25#25               | 18.44                                   | 17.96 | 18.43 | 18.47     | 17.99 | 18.46 |
|                    |            | RB50#0                | 18.41                                   | 18.05 | 18.52 | 18.44     | 18.08 | 18.55 |
|                    | 16QAM      | RB1#0                 | 18.89                                   | 18.88 | 18.26 | 18.92     | 18.91 | 18.29 |
|                    |            | RB1#25                | 18.76                                   | 18.79 | 18.20 | 18.79     | 18.82 | 18.23 |
|                    |            | RB1#49                | 18.80                                   | 18.76 | 18.15 | 18.83     | 18.79 | 18.18 |
|                    |            | RB25#0                | 17.54                                   | 17.23 | 17.72 | 17.57     | 17.26 | 17.75 |
|                    |            | RB25#25               | 17.50                                   | 17.16 | 17.68 | 17.53     | 17.19 | 17.71 |
|                    |            | RB50#0                | 17.44                                   | 17.17 | 17.52 | 17.47     | 17.20 | 17.55 |

| Bandwidth<br>(MHz) | Modulation | RB size/<br>RB Offset | Conducted Average Output<br>Power (dBm) |       |       | EIRP(dBm) |       |       |
|--------------------|------------|-----------------------|-----------------------------------------|-------|-------|-----------|-------|-------|
|                    |            |                       | Low                                     | Mid   | High  | Low       | Mid   | High  |
| 15.0               | QPSK       | RB1#0                 | 19.78                                   | 19.39 | 18.58 | 19.81     | 19.42 | 18.61 |
|                    |            | RB1#38                | 19.79                                   | 19.30 | 18.47 | 19.82     | 19.33 | 18.50 |
|                    |            | RB1#74                | 19.68                                   | 19.28 | 18.38 | 19.71     | 19.31 | 18.41 |
|                    |            | RB36#0                | 18.83                                   | 18.45 | 17.83 | 18.86     | 18.48 | 17.86 |
|                    |            | RB36#39               | 18.82                                   | 18.40 | 17.61 | 18.85     | 18.43 | 17.64 |
|                    |            | RB75#0                | 18.82                                   | 18.25 | 17.65 | 18.85     | 18.28 | 17.68 |
|                    | 16QAM      | RB1#0                 | 19.07                                   | 19.21 | 17.95 | 19.10     | 19.24 | 17.98 |
|                    |            | RB1#38                | 19.07                                   | 19.07 | 17.84 | 19.10     | 19.10 | 17.87 |
|                    |            | RB1#74                | 18.95                                   | 18.97 | 17.70 | 18.98     | 19.00 | 17.73 |
|                    |            | RB36#0                | 17.98                                   | 17.48 | 16.85 | 18.01     | 17.51 | 16.88 |
|                    |            | RB36#39               | 18.39                                   | 17.48 | 16.72 | 18.42     | 17.51 | 16.75 |
|                    |            | RB75#0                | 18.04                                   | 17.39 | 16.75 | 18.07     | 17.42 | 16.78 |
| 20.0               | QPSK       | RB1#0                 | 19.46                                   | 19.86 | 19.21 | 19.49     | 19.89 | 19.24 |
|                    |            | RB1#50                | 19.41                                   | 19.69 | 19.10 | 19.44     | 19.72 | 19.13 |
|                    |            | RB1#99                | 19.22                                   | 19.76 | 18.94 | 19.25     | 19.79 | 18.97 |
|                    |            | RB50#0                | 18.24                                   | 18.63 | 18.15 | 18.27     | 18.66 | 18.18 |
|                    |            | RB50#50               | 18.26                                   | 18.57 | 18.00 | 18.29     | 18.60 | 18.03 |
|                    |            | RB100#0               | 18.38                                   | 18.59 | 18.00 | 18.41     | 18.62 | 18.03 |
|                    | 16QAM      | RB1#0                 | 18.33                                   | 18.63 | 18.99 | 18.36     | 18.66 | 19.02 |
|                    |            | RB1#50                | 18.28                                   | 18.41 | 18.81 | 18.31     | 18.44 | 18.84 |
|                    |            | RB1#99                | 18.18                                   | 18.47 | 18.63 | 18.21     | 18.50 | 18.66 |
|                    |            | RB50#0                | 17.38                                   | 17.69 | 17.27 | 17.41     | 17.72 | 17.30 |
|                    |            | RB50#50               | 17.36                                   | 17.56 | 17.00 | 17.39     | 17.59 | 17.03 |
|                    |            | RB100#0               | 17.34                                   | 17.66 | 17.15 | 17.37     | 17.69 | 17.18 |

Note: EIRP(dBm) = Conducted Power(dBm) + Antenna Gain(dBi) - Cable Loss(dB)

For Band2: Antenna Gain = 0.83dBi

Cable Loss=0.8dB\*(provided by the applicant)

Limit: EIRP ≤ 33dBm

## LTE Band 5

| Bandwidth<br>(MHz) | Modulation | RB size/<br>RB Offset | Conducted Average Output<br>Power (dBm) |       |       | ERP(dBm) |       |       |
|--------------------|------------|-----------------------|-----------------------------------------|-------|-------|----------|-------|-------|
|                    |            |                       | Low                                     | Mid   | High  | Low      | Mid   | High  |
| 1.4                | QPSK       | RB1#0                 | 22.27                                   | 22.16 | 22.20 | 17.34    | 17.23 | 17.27 |
|                    |            | RB1#3                 | 22.33                                   | 22.26 | 22.21 | 17.40    | 17.33 | 17.28 |
|                    |            | RB1#5                 | 22.30                                   | 22.31 | 22.20 | 17.37    | 17.38 | 17.27 |
|                    |            | RB3#0                 | 22.38                                   | 22.35 | 22.16 | 17.45    | 17.42 | 17.23 |
|                    |            | RB3#3                 | 22.38                                   | 22.21 | 22.19 | 17.45    | 17.28 | 17.26 |
|                    |            | RB6#0                 | 21.36                                   | 21.25 | 21.00 | 16.43    | 16.32 | 16.07 |
|                    | 16QAM      | RB1#0                 | 21.92                                   | 20.86 | 21.36 | 16.99    | 15.93 | 16.43 |
|                    |            | RB1#3                 | 21.91                                   | 20.59 | 21.46 | 16.98    | 15.66 | 16.53 |
|                    |            | RB1#5                 | 21.93                                   | 20.68 | 21.41 | 17.00    | 15.75 | 16.48 |
|                    |            | RB3#0                 | 21.30                                   | 20.99 | 20.93 | 16.37    | 16.06 | 16.00 |
|                    |            | RB3#3                 | 21.30                                   | 21.00 | 20.97 | 16.37    | 16.07 | 16.04 |
|                    |            | RB6#0                 | 20.47                                   | 20.21 | 20.16 | 15.54    | 15.28 | 15.23 |
| 3.0                | QPSK       | RB1#0                 | 22.28                                   | 22.25 | 22.29 | 17.35    | 17.32 | 17.36 |
|                    |            | RB1#8                 | 22.32                                   | 22.28 | 22.25 | 17.39    | 17.35 | 17.32 |
|                    |            | RB1#14                | 22.30                                   | 22.25 | 22.28 | 17.37    | 17.32 | 17.35 |
|                    |            | RB6#0                 | 21.33                                   | 21.34 | 21.18 | 16.40    | 16.41 | 16.25 |
|                    |            | RB6#9                 | 21.41                                   | 21.12 | 21.02 | 16.48    | 16.19 | 16.09 |
|                    |            | RB15#0                | 21.27                                   | 21.22 | 21.11 | 16.34    | 16.29 | 16.18 |
|                    | 16QAM      | RB1#0                 | 21.69                                   | 21.45 | 20.71 | 16.76    | 16.52 | 15.78 |
|                    |            | RB1#8                 | 21.58                                   | 21.22 | 20.62 | 16.65    | 16.29 | 15.69 |
|                    |            | RB1#14                | 21.59                                   | 21.29 | 20.75 | 16.66    | 16.36 | 15.82 |
|                    |            | RB6#0                 | 20.39                                   | 20.97 | 20.22 | 15.46    | 16.04 | 15.29 |
|                    |            | RB6#9                 | 20.35                                   | 20.45 | 20.20 | 15.42    | 15.52 | 15.27 |
|                    |            | RB15#0                | 20.49                                   | 20.27 | 20.04 | 15.56    | 15.34 | 15.11 |

| Bandwidth<br>(MHz) | Modulation | RB size/<br>RB Offset | Conducted Average Output<br>Power (dBm) |       |       | ERP(dBm) |       |       |
|--------------------|------------|-----------------------|-----------------------------------------|-------|-------|----------|-------|-------|
|                    |            |                       | Low                                     | Mid   | High  | Low      | Mid   | High  |
| 5.0                | QPSK       | RB1#0                 | 22.34                                   | 22.32 | 22.05 | 17.41    | 17.39 | 17.12 |
|                    |            | RB1#13                | 22.35                                   | 22.34 | 22.08 | 17.42    | 17.41 | 17.15 |
|                    |            | RB1#24                | 22.27                                   | 22.26 | 22.03 | 17.34    | 17.33 | 17.10 |
|                    |            | RB15#0                | 21.36                                   | 21.32 | 21.23 | 16.43    | 16.39 | 16.30 |
|                    |            | RB15#10               | 21.47                                   | 21.10 | 21.05 | 16.54    | 16.17 | 16.12 |
|                    |            | RB25#0                | 21.38                                   | 21.11 | 21.12 | 16.45    | 16.18 | 16.19 |
|                    | 16QAM      | RB1#0                 | 20.46                                   | 21.29 | 21.14 | 15.53    | 16.36 | 16.21 |
|                    |            | RB1#13                | 20.41                                   | 21.17 | 21.10 | 15.48    | 16.24 | 16.17 |
|                    |            | RB1#24                | 20.47                                   | 21.08 | 21.18 | 15.54    | 16.15 | 16.25 |
|                    |            | RB15#0                | 20.49                                   | 20.74 | 20.04 | 15.56    | 15.81 | 15.11 |
|                    |            | RB15#10               | 20.49                                   | 20.16 | 20.00 | 15.56    | 15.23 | 15.07 |
|                    |            | RB25#0                | 20.54                                   | 20.18 | 20.09 | 15.61    | 15.25 | 15.16 |
| 10.0               | QPSK       | RB1#0                 | 22.37                                   | 22.35 | 22.16 | 17.44    | 17.42 | 17.23 |
|                    |            | RB1#25                | 22.37                                   | 22.28 | 22.04 | 17.44    | 17.35 | 17.11 |
|                    |            | RB1#49                | 22.32                                   | 22.30 | 22.04 | 17.39    | 17.37 | 17.11 |
|                    |            | RB25#0                | 21.35                                   | 21.31 | 21.32 | 16.42    | 16.38 | 16.39 |
|                    |            | RB25#25               | 21.38                                   | 21.19 | 21.20 | 16.45    | 16.26 | 16.27 |
|                    |            | RB50#0                | 21.32                                   | 21.29 | 21.20 | 16.39    | 16.36 | 16.27 |
|                    | 16QAM      | RB1#0                 | 21.75                                   | 22.01 | 20.96 | 16.82    | 17.08 | 16.03 |
|                    |            | RB1#25                | 21.78                                   | 21.89 | 20.92 | 16.85    | 16.96 | 15.99 |
|                    |            | RB1#49                | 21.71                                   | 21.95 | 20.91 | 16.78    | 17.02 | 15.98 |
|                    |            | RB25#0                | 20.48                                   | 20.91 | 20.40 | 15.55    | 15.98 | 15.47 |
|                    |            | RB25#25               | 20.36                                   | 20.32 | 20.28 | 15.43    | 15.39 | 15.35 |
|                    |            | RB50#0                | 20.42                                   | 20.21 | 20.18 | 15.49    | 15.28 | 15.25 |

Note: ERP(dBm) = Conducted Power(dBm) + Antenna Gain(dBd) - Cable Loss(dB)

For Band5: Antenna Gain = -2.28dBi = -4.43dBd (0dBd=2.15dBi)

Cable Loss=0.5dB\*(provided by the applicant)

Limit: ERP ≤ 38.45dBm

**LTE Band 12**

| Bandwidth<br>(MHz) | Modulation | RB size/<br>RB Offset | Conducted Average Output<br>Power (dBm) |       |       | ERP(dBm) |       |       |
|--------------------|------------|-----------------------|-----------------------------------------|-------|-------|----------|-------|-------|
|                    |            |                       | Low                                     | Mid   | High  | Low      | Mid   | High  |
| 1.4                | QPSK       | RB1#0                 | 22.40                                   | 22.32 | 22.47 | 18.74    | 18.66 | 18.81 |
|                    |            | RB1#3                 | 22.55                                   | 22.43 | 21.33 | 18.89    | 18.77 | 17.67 |
|                    |            | RB1#5                 | 22.52                                   | 22.39 | 20.56 | 18.86    | 18.73 | 16.90 |
|                    |            | RB3#0                 | 22.62                                   | 22.39 | 21.89 | 18.96    | 18.73 | 18.23 |
|                    |            | RB3#3                 | 22.64                                   | 22.41 | 20.84 | 18.98    | 18.75 | 17.18 |
|                    |            | RB6#0                 | 21.44                                   | 21.42 | 21.29 | 17.78    | 17.76 | 17.63 |
|                    | 16QAM      | RB1#0                 | 21.76                                   | 20.99 | 21.70 | 18.10    | 17.33 | 18.04 |
|                    |            | RB1#3                 | 22.22                                   | 21.25 | 21.58 | 18.56    | 17.59 | 17.92 |
|                    |            | RB1#5                 | 22.21                                   | 21.23 | 20.70 | 18.55    | 17.57 | 17.04 |
|                    |            | RB3#0                 | 21.78                                   | 21.38 | 21.52 | 18.12    | 17.72 | 17.86 |
|                    |            | RB3#3                 | 21.76                                   | 21.37 | 20.92 | 18.10    | 17.71 | 17.26 |
|                    |            | RB6#0                 | 20.94                                   | 20.36 | 20.84 | 17.28    | 16.70 | 17.18 |
| 3.0                | QPSK       | RB1#0                 | 22.76                                   | 22.75 | 22.86 | 19.10    | 19.09 | 19.20 |
|                    |            | RB1#8                 | 22.77                                   | 22.70 | 22.75 | 19.11    | 19.04 | 19.09 |
|                    |            | RB1#14                | 22.88                                   | 22.66 | 20.80 | 19.22    | 19.00 | 17.14 |
|                    |            | RB6#0                 | 21.77                                   | 21.66 | 21.76 | 18.11    | 18.00 | 18.10 |
|                    |            | RB6#9                 | 21.81                                   | 21.83 | 21.67 | 18.15    | 18.17 | 18.01 |
|                    |            | RB15#0                | 21.77                                   | 21.85 | 21.78 | 18.11    | 18.19 | 18.12 |
|                    | 16QAM      | RB1#0                 | 22.08                                   | 21.82 | 21.27 | 18.42    | 18.16 | 17.61 |
|                    |            | RB1#8                 | 22.07                                   | 21.95 | 21.20 | 18.41    | 18.29 | 17.54 |
|                    |            | RB1#14                | 22.05                                   | 21.98 | 20.88 | 18.39    | 18.32 | 17.22 |
|                    |            | RB6#0                 | 21.00                                   | 21.37 | 20.82 | 17.34    | 17.71 | 17.16 |
|                    |            | RB6#9                 | 21.01                                   | 20.95 | 20.81 | 17.35    | 17.29 | 17.15 |
|                    |            | RB15#0                | 20.90                                   | 20.75 | 20.66 | 17.24    | 17.09 | 17.00 |

| Bandwidth<br>(MHz) | Modulation | RB size/<br>RB Offset | Conducted Average Output<br>Power (dBm) |       |       | ERP(dBm) |       |       |
|--------------------|------------|-----------------------|-----------------------------------------|-------|-------|----------|-------|-------|
|                    |            |                       | Low                                     | Mid   | High  | Low      | Mid   | High  |
| 5.0                | QPSK       | RB1#0                 | 22.65                                   | 21.85 | 21.81 | 18.99    | 18.19 | 18.15 |
|                    |            | RB1#13                | 23.07                                   | 21.86 | 21.77 | 19.41    | 18.20 | 18.11 |
|                    |            | RB1#24                | 22.92                                   | 22.31 | 22.31 | 19.26    | 18.65 | 18.65 |
|                    |            | RB15#0                | 21.78                                   | 21.73 | 21.82 | 18.12    | 18.07 | 18.16 |
|                    |            | RB15#10               | 21.92                                   | 21.96 | 21.73 | 18.26    | 18.30 | 18.07 |
|                    |            | RB25#0                | 21.86                                   | 21.88 | 21.79 | 18.20    | 18.22 | 18.13 |
|                    | 16QAM      | RB1#0                 | 21.94                                   | 20.98 | 21.82 | 18.28    | 17.32 | 18.16 |
|                    |            | RB1#13                | 21.96                                   | 21.22 | 21.58 | 18.30    | 17.56 | 17.92 |
|                    |            | RB1#24                | 21.91                                   | 21.48 | 21.36 | 18.25    | 17.82 | 17.70 |
|                    |            | RB15#0                | 20.85                                   | 21.21 | 20.71 | 17.19    | 17.55 | 17.05 |
|                    |            | RB15#10               | 20.84                                   | 20.89 | 20.57 | 17.18    | 17.23 | 16.91 |
|                    |            | RB25#0                | 20.95                                   | 20.90 | 20.75 | 17.29    | 17.24 | 17.09 |
| 10.0               | QPSK       | RB1#0                 | 21.88                                   | 22.62 | 22.93 | 18.22    | 18.96 | 19.27 |
|                    |            | RB1#25                | 22.01                                   | 22.30 | 22.53 | 18.35    | 18.64 | 18.87 |
|                    |            | RB1#49                | 21.79                                   | 22.30 | 22.17 | 18.13    | 18.64 | 18.51 |
|                    |            | RB25#0                | 21.09                                   | 21.46 | 21.72 | 17.43    | 17.80 | 18.06 |
|                    |            | RB25#25               | 20.94                                   | 21.63 | 21.31 | 17.28    | 17.97 | 17.65 |
|                    |            | RB50#0                | 21.09                                   | 21.51 | 21.78 | 17.43    | 17.85 | 18.12 |
|                    | 16QAM      | RB1#0                 | 21.04                                   | 22.08 | 21.33 | 17.38    | 18.42 | 17.67 |
|                    |            | RB1#25                | 20.94                                   | 21.73 | 21.90 | 17.28    | 18.07 | 18.24 |
|                    |            | RB1#49                | 20.96                                   | 21.79 | 21.34 | 17.30    | 18.13 | 17.68 |
|                    |            | RB25#0                | 20.05                                   | 20.98 | 20.15 | 16.39    | 17.32 | 16.49 |
|                    |            | RB25#25               | 20.32                                   | 20.67 | 20.39 | 16.66    | 17.01 | 16.73 |
|                    |            | RB50#0                | 20.37                                   | 20.54 | 20.57 | 16.71    | 16.88 | 16.91 |

Note: ERP(dBm) = Conducted Power(dBm) + Antenna Gain(dBd) - Cable Loss(dB)

For Band12: Antenna Gain = -1.01dBi = -3.16dBd (0dBd=2.15dBi)

Cable Loss=0.5dB\* (provided by the applicant)

Limit: ERP≤34.77dBm

**LTE Band 13**

| Bandwidth<br>(MHz) | Modulation | RB size/<br>RB Offset | Conducted Average Output<br>Power (dBm) |       |       | ERP(dBm) |       |       |
|--------------------|------------|-----------------------|-----------------------------------------|-------|-------|----------|-------|-------|
|                    |            |                       | Low                                     | Mid   | High  | Low      | Mid   | High  |
| 5.0                | QPSK       | RB1#0                 | 21.96                                   | 21.69 | 21.13 | 18.30    | 18.03 | 17.47 |
|                    |            | RB1#13                | 21.72                                   | 21.68 | 21.15 | 18.06    | 18.02 | 17.49 |
|                    |            | RB1#24                | 21.67                                   | 21.78 | 21.12 | 18.01    | 18.12 | 17.46 |
|                    |            | RB15#0                | 20.89                                   | 20.54 | 20.39 | 17.23    | 16.88 | 16.73 |
|                    |            | RB15#10               | 20.77                                   | 20.54 | 20.23 | 17.11    | 16.88 | 16.57 |
|                    |            | RB25#0                | 20.79                                   | 20.65 | 20.35 | 17.13    | 16.99 | 16.69 |
|                    | 16QAM      | RB1#0                 | 20.00                                   | 20.56 | 20.21 | 16.34    | 16.90 | 16.55 |
|                    |            | RB1#13                | 19.70                                   | 20.61 | 20.23 | 16.04    | 16.95 | 16.57 |
|                    |            | RB1#24                | 19.78                                   | 20.55 | 20.32 | 16.12    | 16.89 | 16.66 |
|                    |            | RB15#0                | 20.03                                   | 19.52 | 19.28 | 16.37    | 15.86 | 15.62 |
|                    |            | RB15#10               | 19.89                                   | 19.46 | 19.25 | 16.23    | 15.80 | 15.59 |
|                    |            | RB25#0                | 19.88                                   | 19.58 | 19.38 | 16.22    | 15.92 | 15.72 |
| 10.0               | QPSK       | RB1#0                 | /                                       | 22.05 | /     | /        | 18.39 | /     |
|                    |            | RB1#25                | /                                       | 21.84 | /     | /        | 18.18 | /     |
|                    |            | RB1#49                | /                                       | 21.81 | /     | /        | 18.15 | /     |
|                    |            | RB25#0                | /                                       | 20.96 | /     | /        | 17.30 | /     |
|                    |            | RB25#25               | /                                       | 20.79 | /     | /        | 17.13 | /     |
|                    |            | RB50#0                | /                                       | 20.92 | /     | /        | 17.26 | /     |
|                    | 16QAM      | RB1#0                 | /                                       | 21.47 | /     | /        | 17.81 | /     |
|                    |            | RB1#25                | /                                       | 21.20 | /     | /        | 17.54 | /     |
|                    |            | RB1#49                | /                                       | 21.22 | /     | /        | 17.56 | /     |
|                    |            | RB25#0                | /                                       | 19.97 | /     | /        | 16.31 | /     |
|                    |            | RB25#25               | /                                       | 19.98 | /     | /        | 16.32 | /     |
|                    |            | RB50#0                | /                                       | 19.83 | /     | /        | 16.17 | /     |

Note: ERP(dBm) = Conducted Power(dBm) + Antenna Gain(dBd) - Cable Loss(dB)

For Band13: Antenna Gain = -1.01dBi = -3.16dBd (0dBd=2.15dBi)

Cable Loss=0.5dB\* (provided by the applicant)

Limit: ERP≤34.77dBm

**LTE Band 41:**

| Bandwidth<br>(MHz) | Modulation | RB size/<br>RB Offset | Conducted Average Output<br>Power (dBm) |       |       | EIRP(dBm) |       |       |
|--------------------|------------|-----------------------|-----------------------------------------|-------|-------|-----------|-------|-------|
|                    |            |                       | Low                                     | Mid   | High  | Low       | Mid   | High  |
| 5.0                | QPSK       | RB1#0                 | 20.01                                   | 20.03 | 19.97 | 17.88     | 17.90 | 17.84 |
|                    |            | RB1#13                | 20.02                                   | 20.11 | 19.80 | 17.89     | 17.98 | 17.67 |
|                    |            | RB1#24                | 19.95                                   | 20.02 | 19.84 | 17.82     | 17.89 | 17.71 |
|                    |            | RB15#0                | 19.11                                   | 19.01 | 18.98 | 16.98     | 16.88 | 16.85 |
|                    |            | RB15#10               | 19.15                                   | 19.08 | 18.74 | 17.02     | 16.95 | 16.61 |
|                    |            | RB25#0                | 19.13                                   | 18.99 | 18.72 | 17.00     | 16.86 | 16.59 |
|                    | 16QAM      | RB1#0                 | 19.05                                   | 18.72 | 19.47 | 16.92     | 16.59 | 17.34 |
|                    |            | RB1#13                | 19.01                                   | 18.73 | 19.38 | 16.88     | 16.60 | 17.25 |
|                    |            | RB1#24                | 18.76                                   | 18.69 | 19.34 | 16.63     | 16.56 | 17.21 |
|                    |            | RB15#0                | 18.46                                   | 17.78 | 18.12 | 16.33     | 15.65 | 15.99 |
|                    |            | RB15#10               | 18.40                                   | 17.90 | 18.07 | 16.27     | 15.77 | 15.94 |
|                    |            | RB25#0                | 17.92                                   | 18.11 | 17.84 | 15.79     | 15.98 | 15.71 |
| 10.0               | QPSK       | RB1#0                 | 19.98                                   | 20.04 | 19.87 | 17.85     | 17.91 | 17.74 |
|                    |            | RB1#25                | 19.99                                   | 20.04 | 19.92 | 17.86     | 17.91 | 17.79 |
|                    |            | RB1#49                | 19.97                                   | 20.07 | 19.95 | 17.84     | 17.94 | 17.82 |
|                    |            | RB25#0                | 18.94                                   | 19.11 | 18.90 | 16.81     | 16.98 | 16.77 |
|                    |            | RB25#25               | 19.09                                   | 18.96 | 18.90 | 16.96     | 16.83 | 16.77 |
|                    |            | RB50#0                | 19.13                                   | 19.12 | 18.73 | 17.00     | 16.99 | 16.60 |
|                    | 16QAM      | RB1#0                 | 19.05                                   | 18.70 | 19.44 | 16.92     | 16.57 | 17.31 |
|                    |            | RB1#25                | 18.87                                   | 18.64 | 19.45 | 16.74     | 16.51 | 17.32 |
|                    |            | RB1#49                | 18.79                                   | 18.69 | 19.33 | 16.66     | 16.56 | 17.20 |
|                    |            | RB25#0                | 18.31                                   | 17.91 | 18.06 | 16.18     | 15.78 | 15.93 |
|                    |            | RB25#25               | 18.24                                   | 17.95 | 18.03 | 16.11     | 15.82 | 15.90 |
|                    |            | RB50#0                | 17.97                                   | 18.26 | 17.87 | 15.84     | 16.13 | 15.74 |

| Bandwidth<br>(MHz) | Modulation | RB size/<br>RB Offset | Conducted Average Output<br>Power (dBm) |       |       | EIRP(dBm) |       |       |
|--------------------|------------|-----------------------|-----------------------------------------|-------|-------|-----------|-------|-------|
|                    |            |                       | Low                                     | Mid   | High  | Low       | Mid   | High  |
| 15.0               | QPSK       | RB1#0                 | 20.00                                   | 20.10 | 20.05 | 17.87     | 17.97 | 17.92 |
|                    |            | RB1#38                | 19.94                                   | 20.28 | 19.97 | 17.81     | 18.15 | 17.84 |
|                    |            | RB1#74                | 20.04                                   | 20.38 | 20.02 | 17.91     | 18.25 | 17.89 |
|                    |            | RB36#0                | 19.10                                   | 19.18 | 18.94 | 16.97     | 17.05 | 16.81 |
|                    |            | RB36#39               | 19.03                                   | 19.04 | 18.75 | 16.90     | 16.91 | 16.62 |
|                    |            | RB75#0                | 18.53                                   | 18.71 | 18.51 | 16.40     | 16.58 | 16.38 |
|                    | 16QAM      | RB1#0                 | 18.73                                   | 19.53 | 18.38 | 16.60     | 17.40 | 16.25 |
|                    |            | RB1#38                | 18.88                                   | 19.37 | 18.20 | 16.75     | 17.24 | 16.07 |
|                    |            | RB1#74                | 18.90                                   | 19.29 | 17.91 | 16.77     | 17.16 | 15.78 |
|                    |            | RB36#0                | 17.97                                   | 17.97 | 18.26 | 15.84     | 15.84 | 16.13 |
|                    |            | RB36#39               | 18.07                                   | 18.02 | 18.14 | 15.94     | 15.89 | 16.01 |
|                    |            | RB75#0                | 17.79                                   | 17.85 | 17.81 | 15.66     | 15.72 | 15.68 |
| 20.0               | QPSK       | RB1#0                 | 20.27                                   | 20.20 | 20.03 | 18.14     | 18.07 | 17.90 |
|                    |            | RB1#50                | 20.20                                   | 20.14 | 20.09 | 18.07     | 18.01 | 17.96 |
|                    |            | RB1#99                | 20.24                                   | 20.01 | 20.10 | 18.11     | 17.88 | 17.97 |
|                    |            | RB50#0                | 19.07                                   | 19.07 | 18.94 | 16.94     | 16.94 | 16.81 |
|                    |            | RB50#50               | 19.22                                   | 19.23 | 18.75 | 17.09     | 17.10 | 16.62 |
|                    |            | RB100#0               | 18.78                                   | 18.74 | 18.46 | 16.65     | 16.61 | 16.33 |
|                    | 16QAM      | RB1#0                 | 19.35                                   | 18.90 | 19.85 | 17.22     | 16.77 | 17.72 |
|                    |            | RB1#50                | 19.27                                   | 18.87 | 19.76 | 17.14     | 16.74 | 17.63 |
|                    |            | RB1#99                | 19.33                                   | 18.76 | 19.91 | 17.20     | 16.63 | 17.78 |
|                    |            | RB50#0                | 18.26                                   | 18.22 | 18.16 | 16.13     | 16.09 | 16.03 |
|                    |            | RB50#50               | 18.35                                   | 18.07 | 17.95 | 16.22     | 15.94 | 15.82 |
|                    |            | RB100#0               | 17.91                                   | 17.82 | 17.68 | 15.78     | 15.69 | 15.55 |

Note: EIRP(dBm) = Conducted Power(dBm) + Antenna Gain(dBi) - Cable Loss(dB)

For Band 41: Antenna Gain = -1.33dBi

Cable Loss=0.8dB\* (provided by the applicant)

Limit: EIRP ≤ 33dBm

**Peak-to-average ratio (PAR)****Cellular Band**

| Mode | Channel | PAR (dB) | Limit (dB) |
|------|---------|----------|------------|
| GSM  | Low     | 3.22     | 13         |
|      | Middle  | 3.35     | 13         |
|      | High    | 3.42     | 13         |

| Mode             | Channel | PAR (dB) | Limit (dB) |
|------------------|---------|----------|------------|
| RMC<br>(BPSK)    | Low     | 3.17     | 13         |
|                  | Middle  | 3.32     | 13         |
|                  | High    | 3.25     | 13         |
| HSDPA<br>(16QAM) | Low     | 4.22     | 13         |
|                  | Middle  | 3.52     | 13         |
|                  | High    | 3.71     | 13         |
| HSUPA<br>(QPSK)  | Low     | 3.45     | 13         |
|                  | Middle  | 3.67     | 13         |
|                  | High    | 3.63     | 13         |
| HSPA+            | Low     | 3.35     | 13         |
|                  | Middle  | 3.24     | 13         |
|                  | High    | 3.52     | 13         |

**PCS Band**

| Mode | Channel | PAR (dB) | Limit (dB) |
|------|---------|----------|------------|
| GSM  | Low     | 3.37     | 13         |
|      | Middle  | 3.25     | 13         |
|      | High    | 3.72     | 13         |

| Mode             | Channel | PAR (dB) | Limit (dB) |
|------------------|---------|----------|------------|
| RMC<br>(BPSK)    | Low     | 3.25     | 13         |
|                  | Middle  | 3.24     | 13         |
|                  | High    | 3.52     | 13         |
| HSDPA<br>(16QAM) | Low     | 4.67     | 13         |
|                  | Middle  | 4.22     | 13         |
|                  | High    | 4.49     | 13         |
| HSUPA<br>(QPSK)  | Low     | 3.65     | 13         |
|                  | Middle  | 3.72     | 13         |
|                  | High    | 3.87     | 13         |
| HSPA+            | Low     | 3.33     | 13         |
|                  | Middle  | 3.25     | 13         |
|                  | High    | 3.64     | 13         |

**LTE Band 2 20MHz Bandwidth**

| Modulation         | Low channel (dB) | Middle channel (dB) | High channel (dB) | PAR Limit (dB) | Result |
|--------------------|------------------|---------------------|-------------------|----------------|--------|
| QPSK (1RB Size)    | 4.42             | 5.35                | 5.42              | 13             | Pass   |
| QPSK (100RB Size)  | 5.42             | 5.74                | 5.61              | 13             | Pass   |
| 16QAM (1RB Size)   | 5.54             | 6.22                | 6.92              | 13             | Pass   |
| 16QAM (100RB Size) | 6.28             | 6.54                | 6.41              | 13             | Pass   |

**LTE Band 5 10MHz Bandwidth**

| Modulation        | Low channel (dB) | Middle channel (dB) | High channel (dB) | PAR Limit (dB) | Result |
|-------------------|------------------|---------------------|-------------------|----------------|--------|
| QPSK (1RB Size)   | 5.00             | 5.54                | 5.10              | 13             | Pass   |
| QPSK (50RB Size)  | 5.64             | 5.67                | 5.61              | 13             | Pass   |
| 16QAM (1RB Size)  | 6.35             | 6.25                | 6.09              | 13             | Pass   |
| 16QAM (50RB Size) | 6.51             | 6.57                | 6.57              | 13             | Pass   |

**LTE Band 12 10MHz Bandwidth**

| Modulation        | Low channel (dB) | Middle channel (dB) | High channel (dB) | PAR Limit (dB) | Result |
|-------------------|------------------|---------------------|-------------------|----------------|--------|
| QPSK (1RB Size)   | 3.33             | 9.35                | 5.35              | 13             | Pass   |
| QPSK (50RB Size)  | 4.71             | 8.74                | 5.73              | 13             | Pass   |
| 16QAM (1RB Size)  | 4.17             | 7.22                | 6.22              | 13             | Pass   |
| 16QAM (50RB Size) | 5.32             | 6.54                | 6.54              | 13             | Pass   |

**LTE Band 13 10MHz Bandwidth**

| Modulation        | Low channel (dB) | Middle channel (dB) | High channel (dB) | PAR Limit (dB) | Result |
|-------------------|------------------|---------------------|-------------------|----------------|--------|
| QPSK (1RB Size)   | /                | 3.33                | /                 | 13             | Pass   |
| QPSK (50RB Size)  | /                | 4.71                | /                 | 13             | Pass   |
| 16QAM (1RB Size)  | /                | 4.17                | /                 | 13             | Pass   |
| 16QAM (50RB Size) | /                | 5.32                | /                 | 13             | Pass   |

**LTE Band 41 20MHz Bandwidth**

| <b>Modulation</b>     | <b>Low channel<br/>(dB)</b> | <b>Middle channel<br/>(dB)</b> | <b>High channel<br/>(dB)</b> | <b>PAR<br/>Limit<br/>(dB)</b> | <b>Result</b> |
|-----------------------|-----------------------------|--------------------------------|------------------------------|-------------------------------|---------------|
| QPSK<br>(1RB Size)    | 7.72                        | 7.24                           | 7.66                         | 13                            | Pass          |
| QPSK<br>(100RB Size)  | 10.43                       | 7.82                           | 7.24                         | 13                            | Pass          |
| 16QAM<br>(1RB Size)   | 8.94                        | 7.24                           | 8.43                         | 13                            | Pass          |
| 16QAM<br>(100RB Size) | 10.61                       | 8.01                           | 11.96                        | 13                            | Pass          |

## FCC §2.1049, §22.917, §22.905 & §24.238&§27.53 - OCCUPIED BANDWIDTH

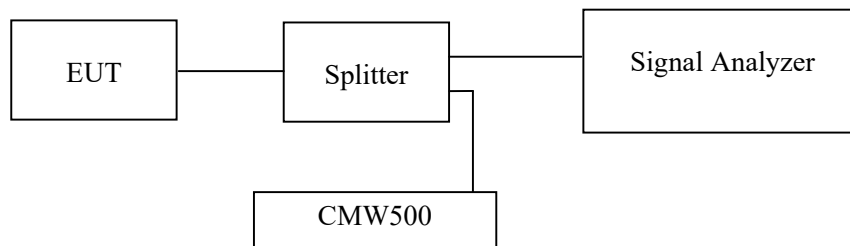
### Applicable Standard

FCC 47 §2.1049, §22.917, §22.905, §24.238 and §27.53.

### Test Procedure

The RF output of the transmitter was connected to the simulator and the spectrum analyzer through sufficient attenuation.

The resolution bandwidth of the spectrum analyzer was set at 1% to 5% of the anticipated emission bandwidth and the 26 dB & 99% bandwidth was recorded.



### Test Data

#### Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 26 °C     |
| Relative Humidity: | 56 %      |
| ATM Pressure:      | 101.0 kPa |

*The testing was performed by Key Pei from 2022-03-24 to 2022-05-17.*

*EUT operation mode: Transmitting*

#### Test Result: Pass

*Please refer to the following tables and plots.*

**Cellular Band (Part 22H)**

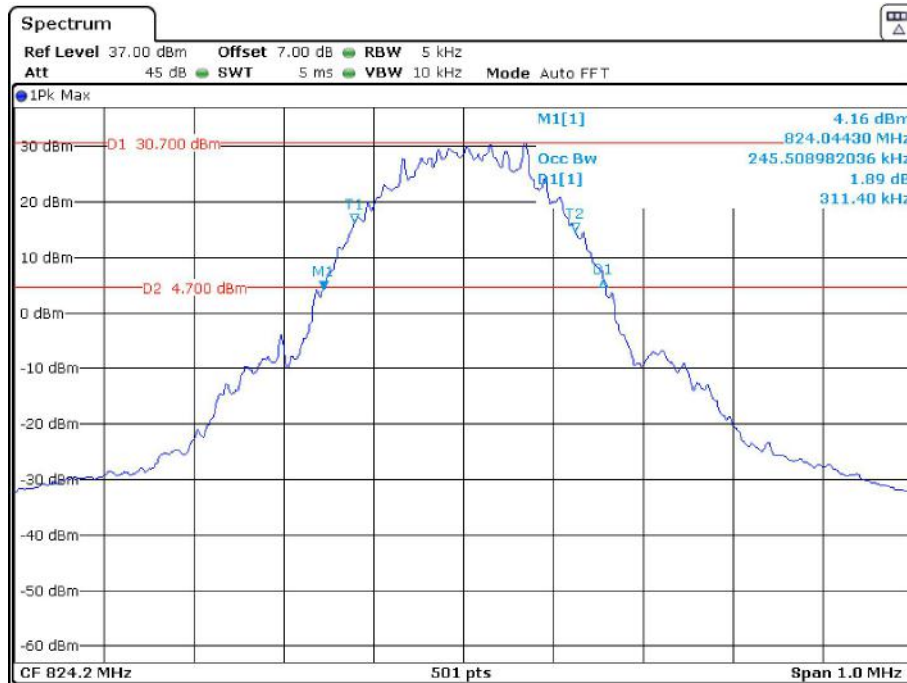
| Mode      | Channel | Frequency (MHz) | 99% Occupied Bandwidth (kHz) | 26 dB Emission Bandwidth (kHz) |
|-----------|---------|-----------------|------------------------------|--------------------------------|
| GSM(GMSK) | 128     | 824.2           | 245.51                       | 311.40                         |
|           | 190     | 836.6           | 243.51                       | 309.40                         |
|           | 251     | 848.8           | 243.51                       | 311.40                         |

| Frequency (MHz) |       | Occupied Bandwidth (MHz) | 26dB Bandwidth (MHz) |
|-----------------|-------|--------------------------|----------------------|
| RMC             | 826.4 | 4.15                     | 4.67                 |
|                 | 836.6 | 4.15                     | 4.67                 |
|                 | 846.6 | 4.15                     | 4.67                 |
| HSDPA           | 826.4 | 4.15                     | 4.69                 |
|                 | 836.6 | 4.15                     | 4.67                 |
|                 | 846.6 | 4.15                     | 4.69                 |
| HSUPA           | 826.4 | 4.15                     | 4.68                 |
|                 | 836.6 | 4.15                     | 4.69                 |
|                 | 846.6 | 4.15                     | 4.69                 |

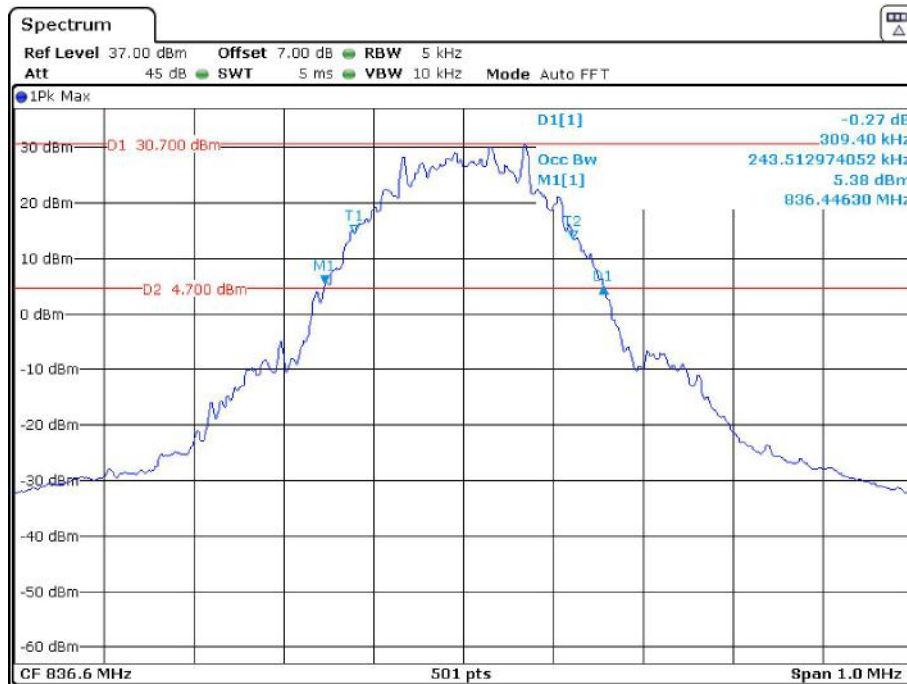
**PCS Band (Part 24E)**

| Mode      | Channel | Frequency (MHz) | 99% Occupied Bandwidth (kHz) | 26 dB Emission Bandwidth (kHz) |
|-----------|---------|-----------------|------------------------------|--------------------------------|
| GSM(GMSK) | 512     | 1850.2          | 245.51                       | 317.40                         |
|           | 661     | 1880.0          | 245.51                       | 309.40                         |
|           | 810     | 1909.8          | 243.51                       | 309.40                         |

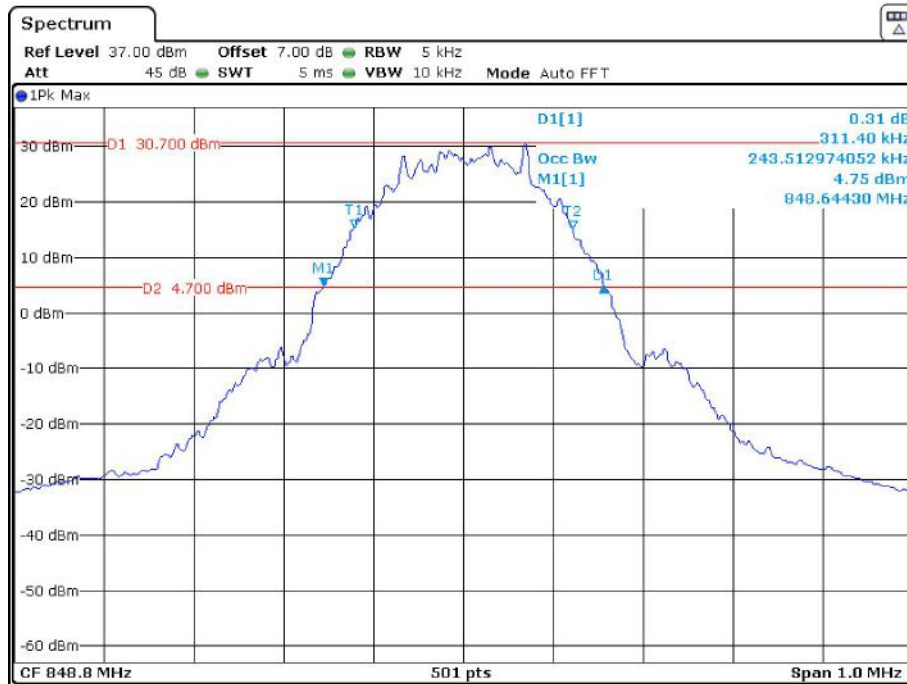
| Frequency (MHz) |        | Occupied Bandwidth (MHz) | 26dB Bandwidth (MHz) |
|-----------------|--------|--------------------------|----------------------|
| RMC             | 1852.4 | 4.15                     | 4.67                 |
|                 | 1880.0 | 4.15                     | 4.67                 |
|                 | 1907.6 | 4.15                     | 4.67                 |
| HSDPA           | 1852.4 | 4.15                     | 4.67                 |
|                 | 1880.0 | 4.15                     | 4.69                 |
|                 | 1907.6 | 4.15                     | 4.67                 |
| HSUPA           | 1852.4 | 4.15                     | 4.67                 |
|                 | 1880.0 | 4.15                     | 4.69                 |
|                 | 1907.6 | 4.15                     | 4.69                 |

**Cellular Band****26 dB Emissions & 99% Occupied Bandwidth for GSM(GMSK) Mode, Low channel**

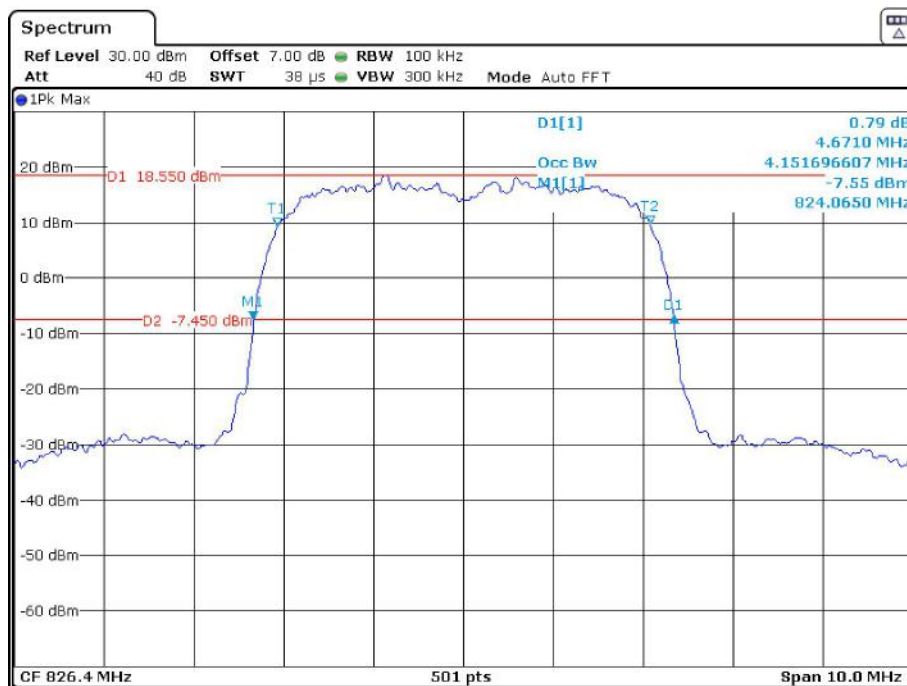
Date: 31.MAR.2022 15:45:37

**26 dB Emissions & 99% Occupied Bandwidth for GSM(GMSK) Mode, Middle channel**

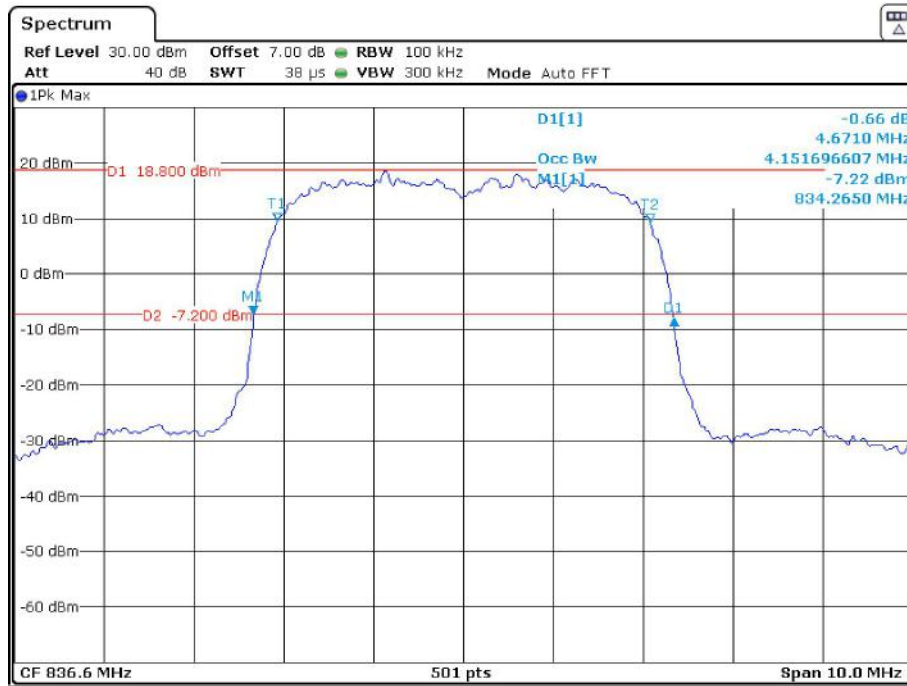
Date: 31.MAR.2022 15:46:00

**26 dB Emissions & 99% Occupied Bandwidth for GSM(GMSK) Mode, High channel**

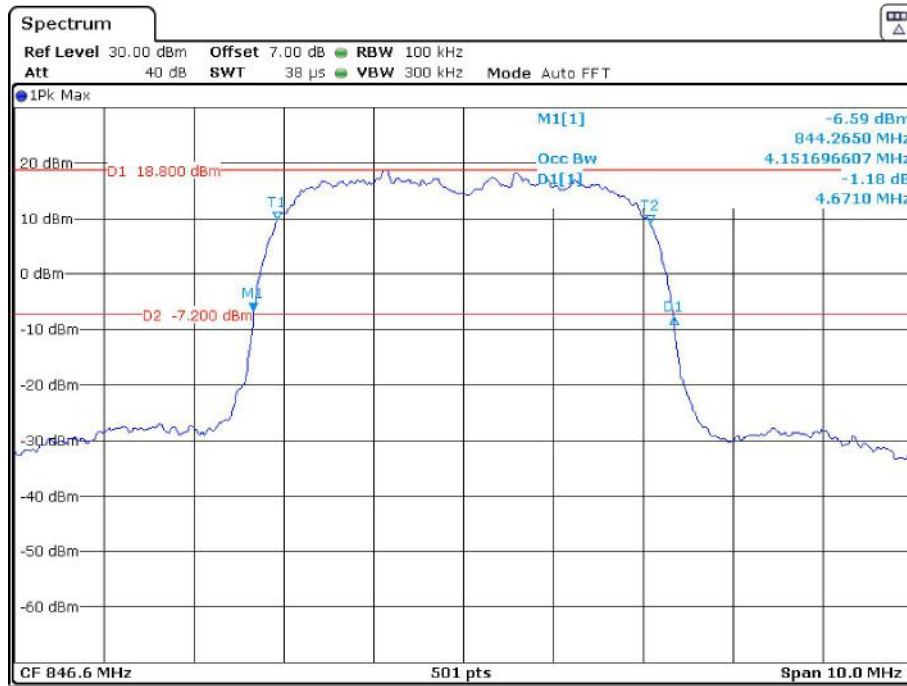
Date: 31.MAR.2022 15:46:37

**26 dB Emissions & 99% Occupied Bandwidth for RMC (BPSK) Mode, Low channel**

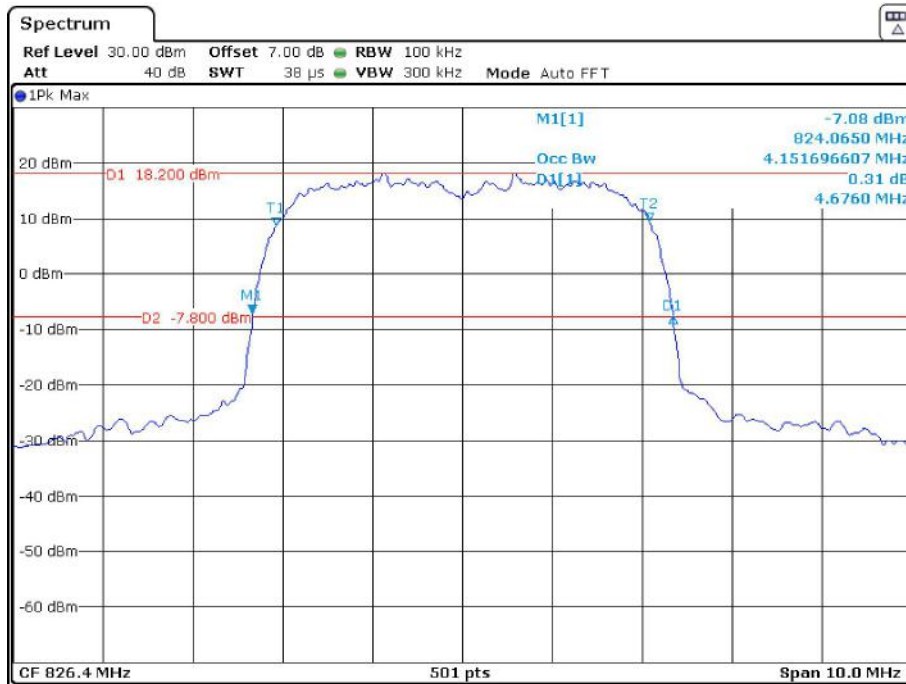
Date: 31.MAR.2022 17:01:46

**26 dB Emissions & 99% Occupied Bandwidth for RMC (BPSK) Mode, Middle channel**

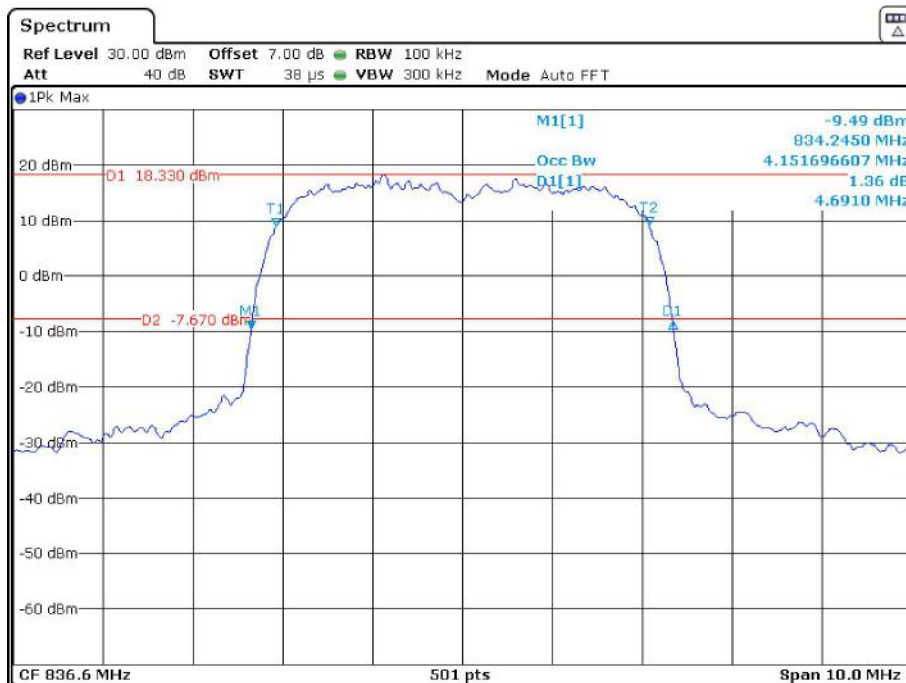
Date: 31.MAR.2022 17:04:49

**26 dB Emissions & 99% Occupied Bandwidth for RMC (BPSK) Mode, High channel**

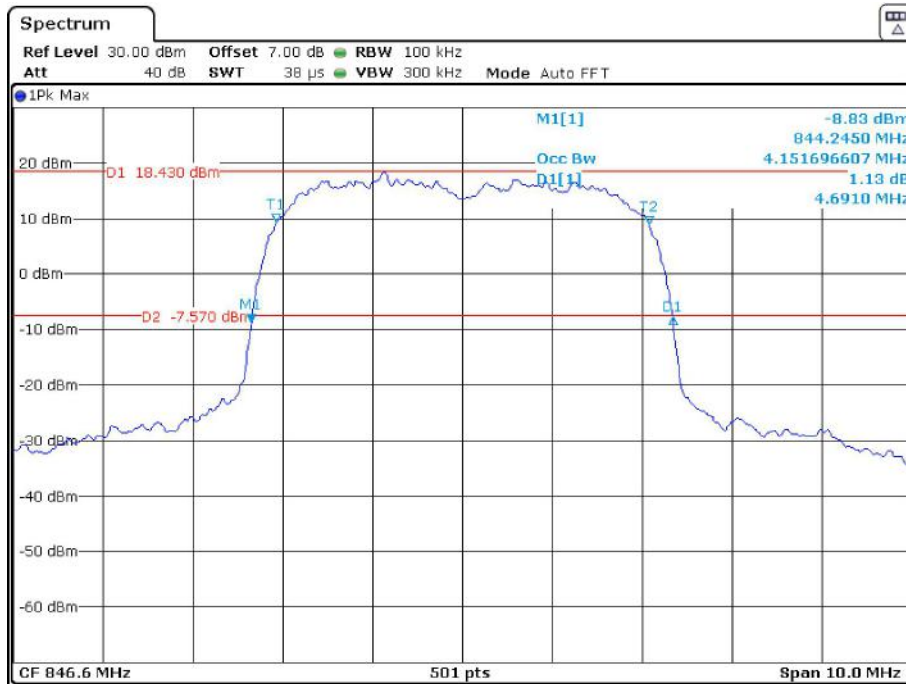
Date: 31.MAR.2022 17:03:58

**26 dB Emissions & 99% Occupied Bandwidth for HSUPA (QPSK) Mode, Low channel**

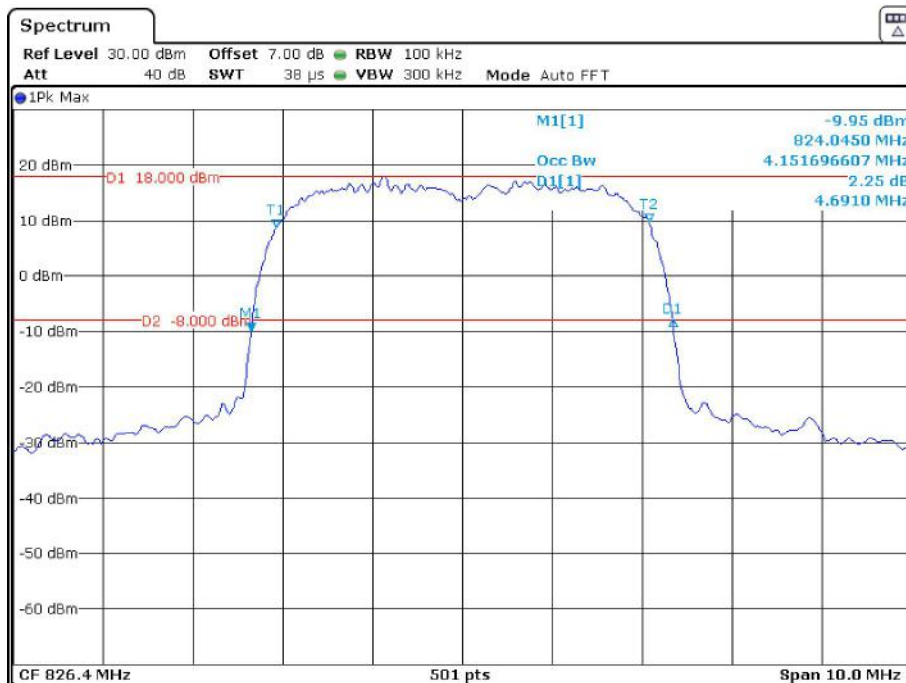
Date: 31.MAR.2022 17:15:16

**26 dB Emissions & 99% Occupied Bandwidth for HSUPA (QPSK) Mode, Middle channel**

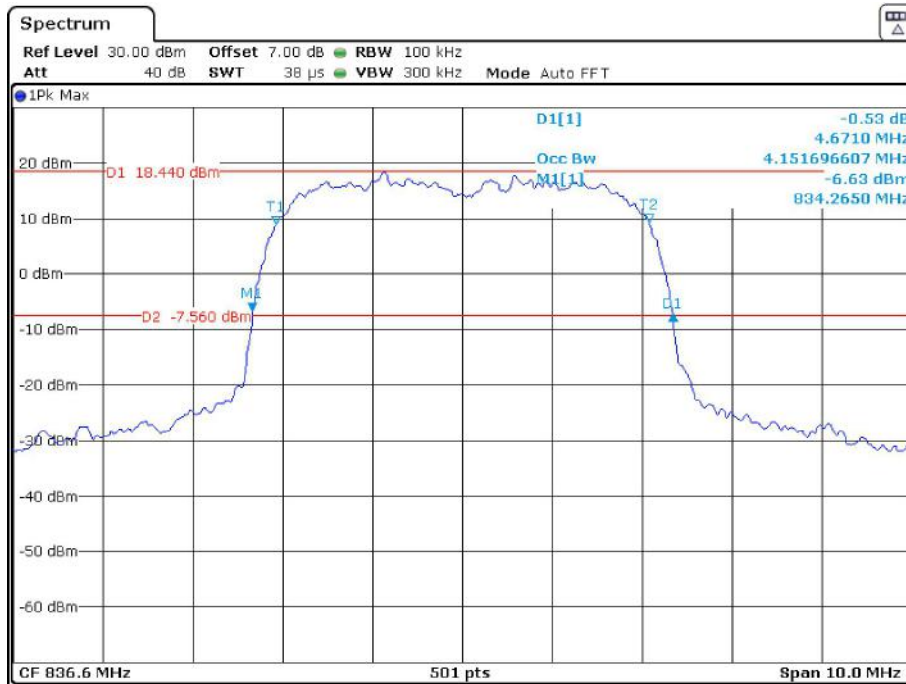
Date: 31.MAR.2022 17:16:33

**26 dB Emissions & 99% Occupied Bandwidth for HSUPA (QPSK) Mode, High channel**

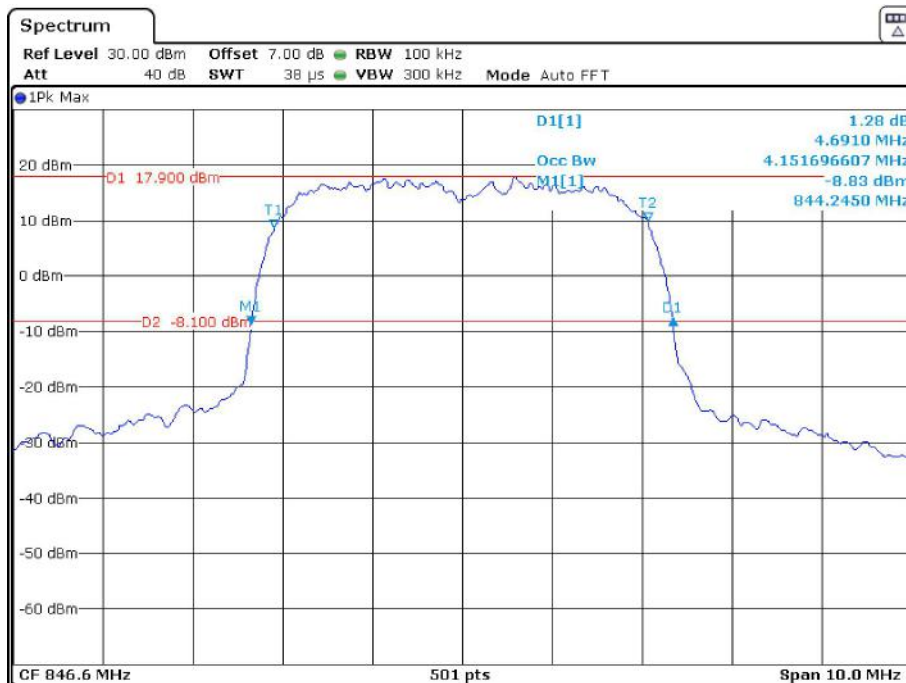
Date: 31.MAR.2022 17:17:48

**26 dB Emissions & 99% Occupied Bandwidth for HSDPA (16QAM) Mode, Low channel**

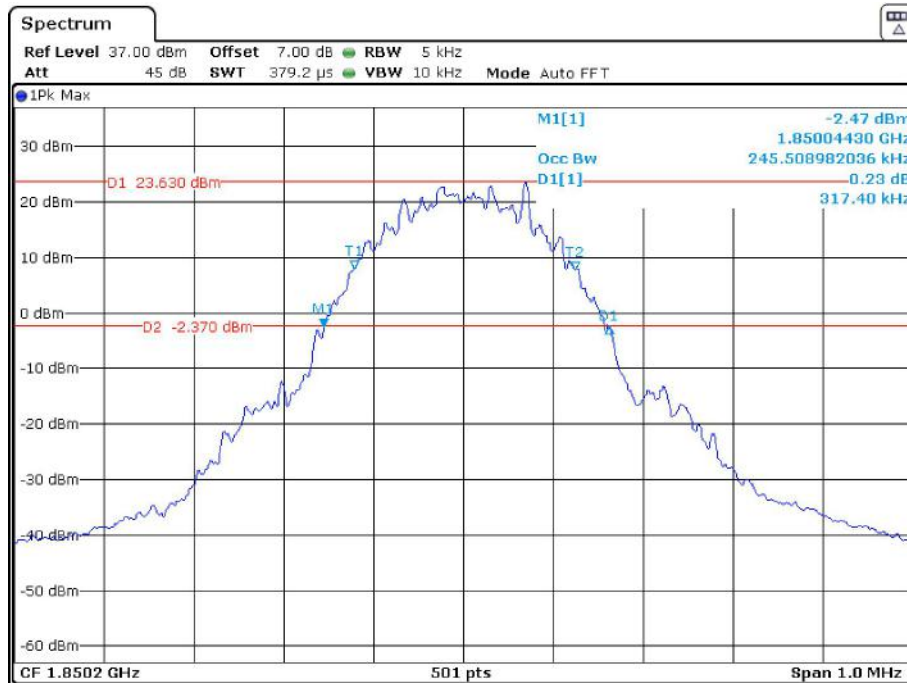
Date: 31.MAR.2022 17:08:57

**26 dB Emissions & 99% Occupied Bandwidth for HSDPA (16QAM) Mode, Middle channel**

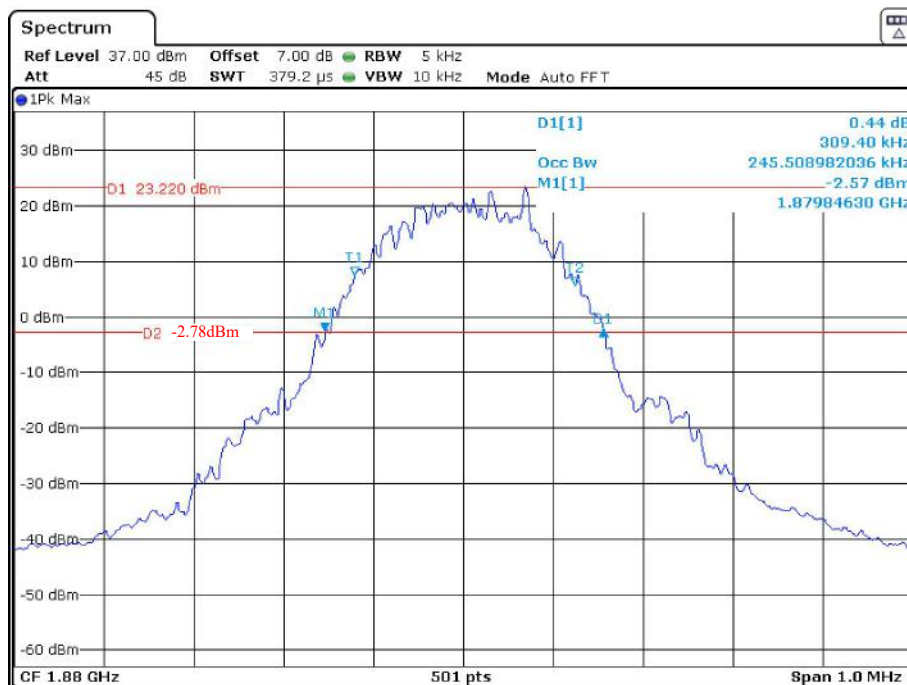
Date: 31.MAR.2022 17:10:09

**26 dB Emissions & 99% Occupied Bandwidth for HSDPA (16QAM) Mode, High channel**

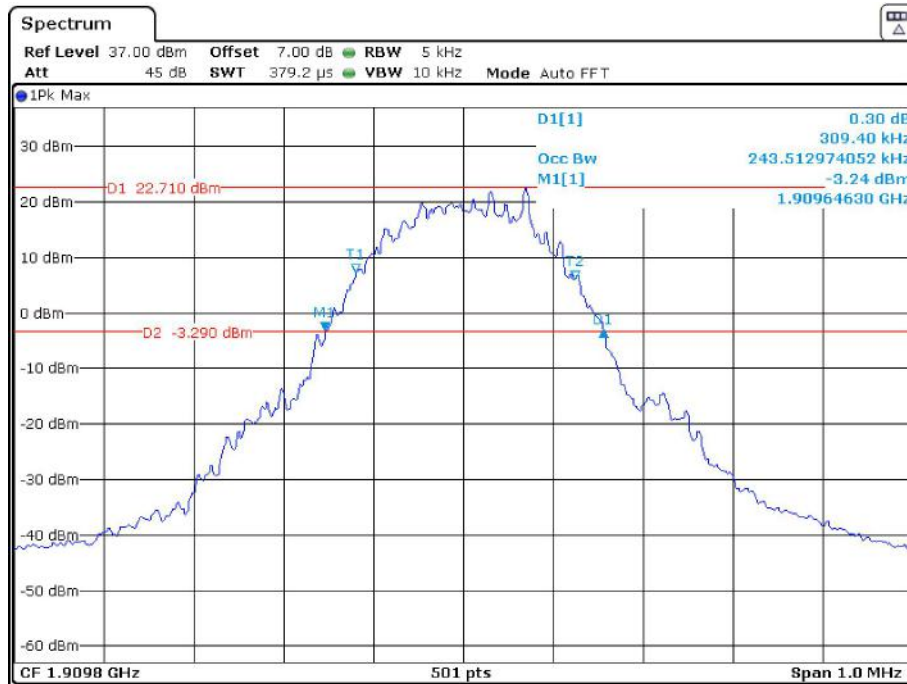
Date: 31.MAR.2022 17:12:46

**PCS Band****26 dB Emissions & 99% Occupied Bandwidth for GSM (GMSK) Mode, Low channel**

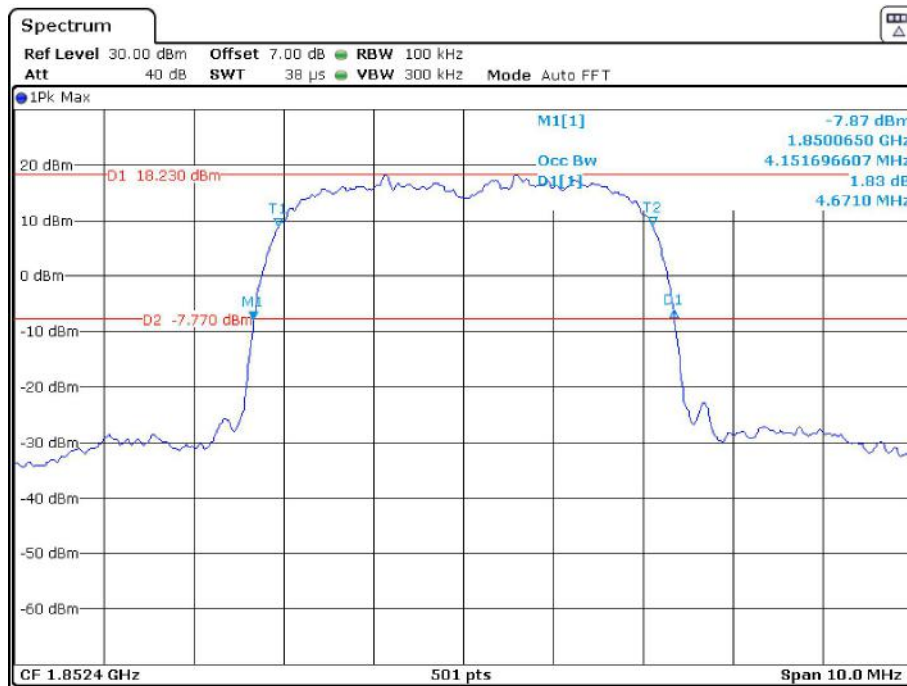
Date: 31.MAR.2022 16:02:43

**26 dB Emissions & 99% Occupied Bandwidth for GSM (GMSK) Mode, Middle channel**

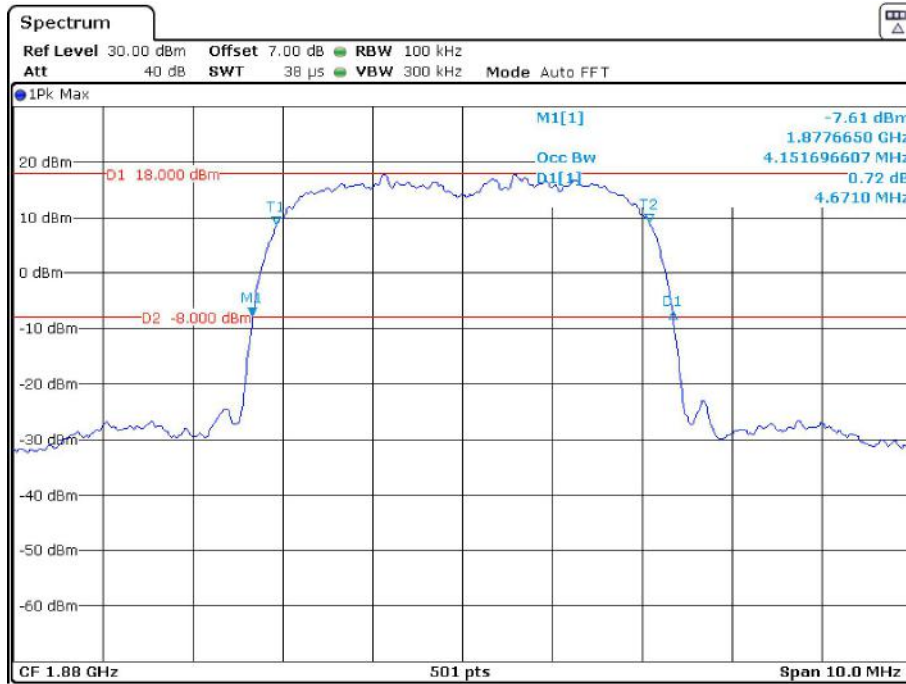
Date: 31.MAR.2022 16:01:40

**26 dB Emissions & 99% Occupied Bandwidth for GSM (GMSK) Mode, High channel**

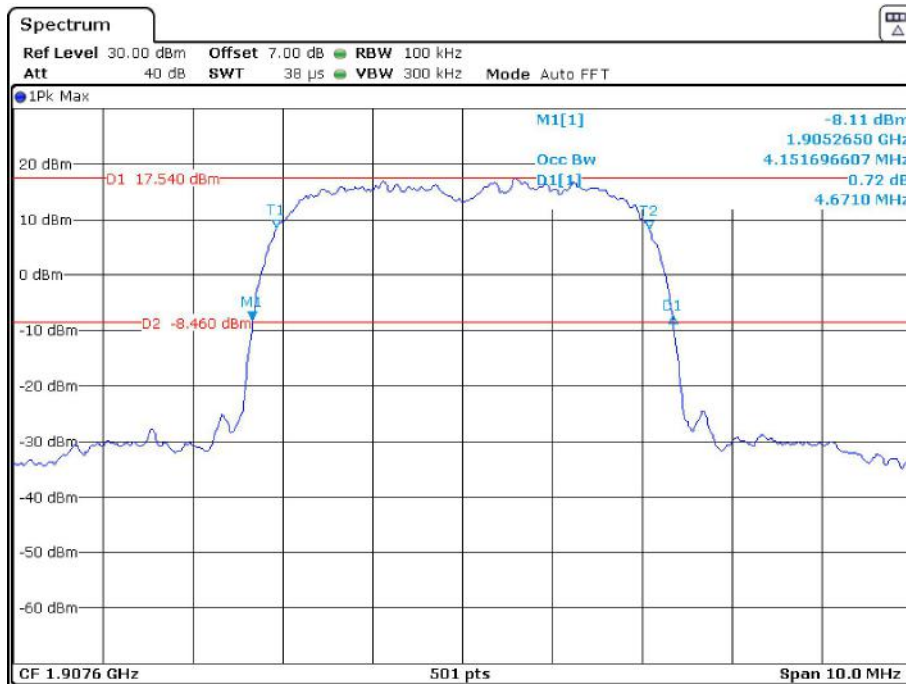
Date: 31.MAR.2022 16:03:23

**26 dB Emissions & 99% Occupied Bandwidth for RMC (BPSK) Mode, Low channel**

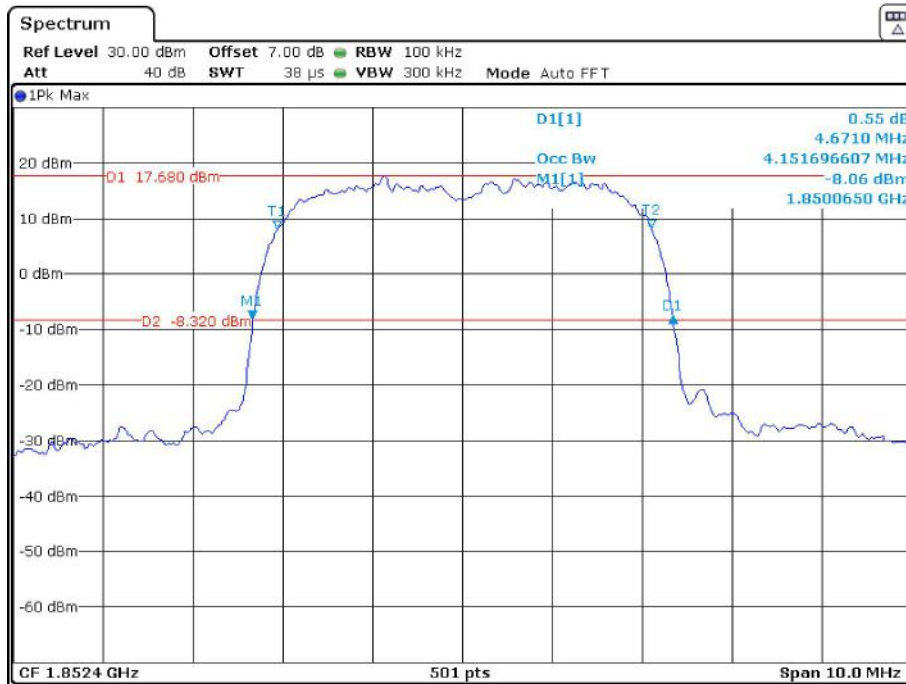
Date: 31.MAR.2022 16:37:56

**26 dB Emissions & 99% Occupied Bandwidth for RMC (BPSK) Mode, Middle channel**

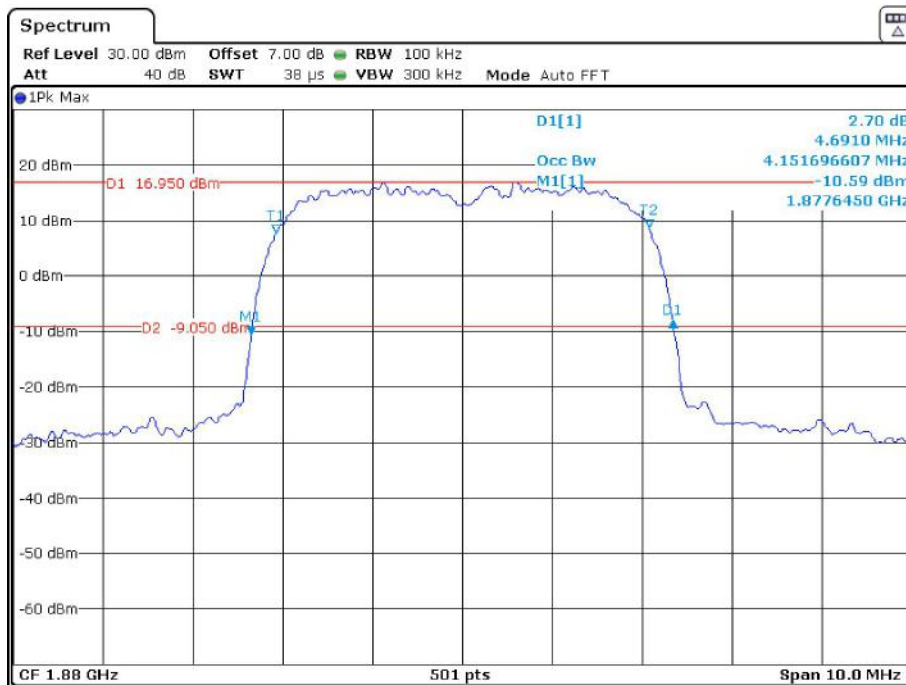
Date: 31.MAR.2022 16:39:29

**26 dB Emissions & 99% Occupied Bandwidth for RMC (BPSK) Mode, High channel**

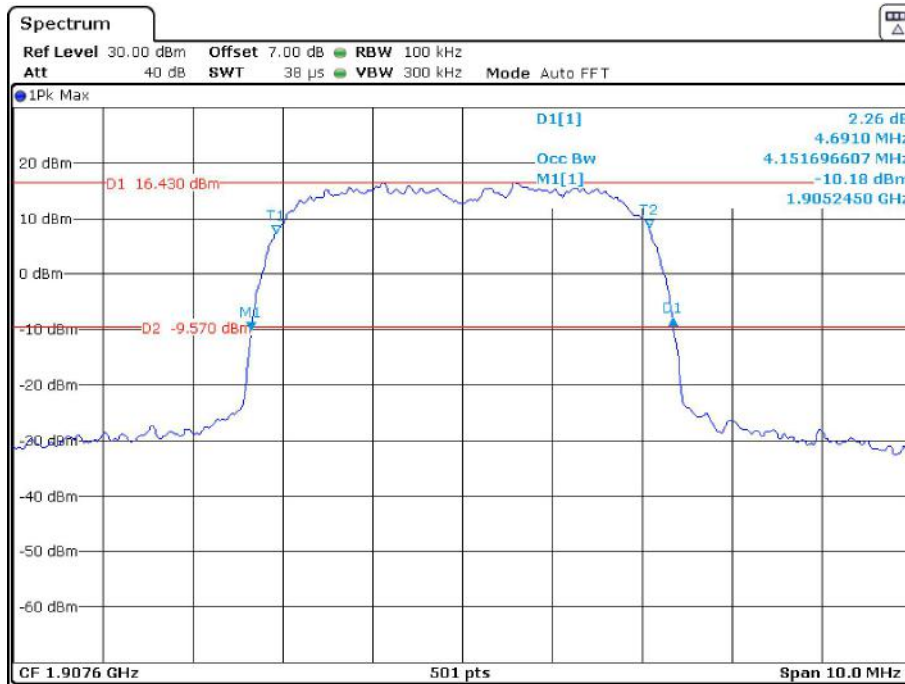
Date: 31.MAR.2022 16:40:23

**26 dB Emissions & 99% Occupied Bandwidth for HSUPA (QPSK) Mode, Low channel**

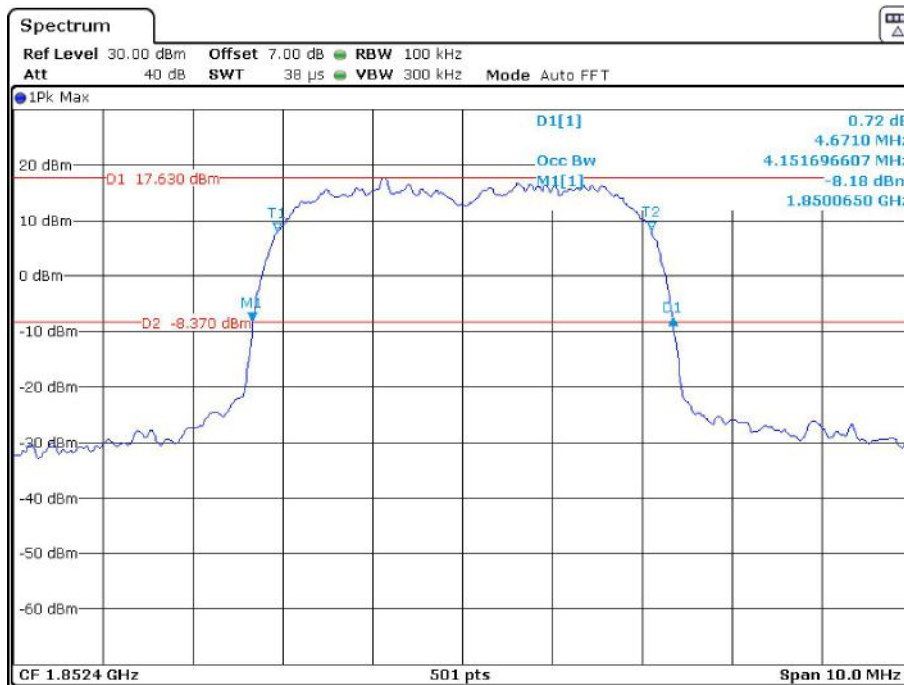
Date: 31.MAR.2022 16:49:05

**26 dB Emissions & 99% Occupied Bandwidth for HSUPA (QPSK) Mode, Middle channel**

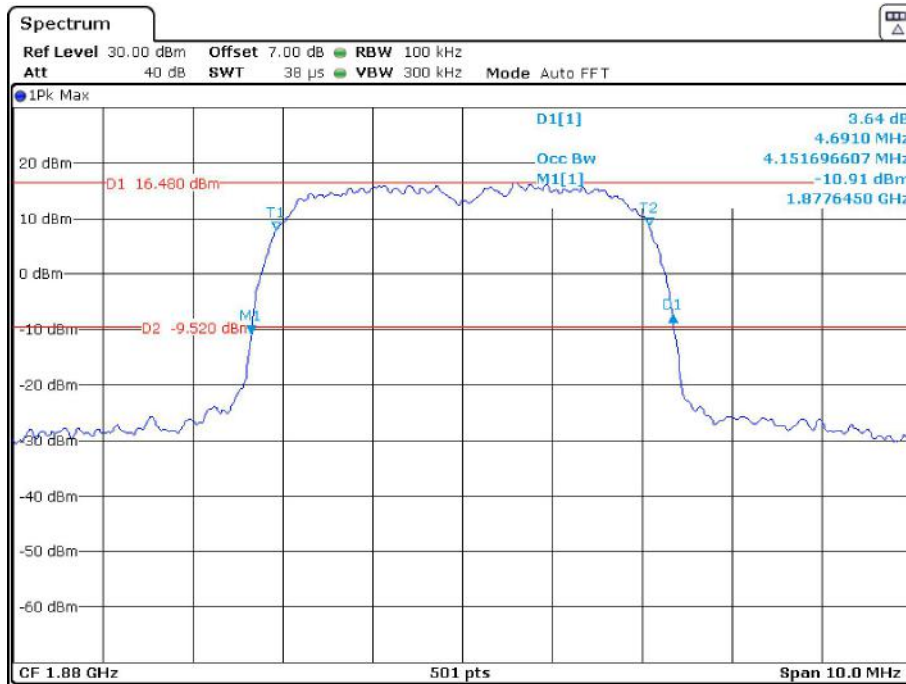
Date: 31.MAR.2022 16:50:17

**26 dB Emissions & 99% Occupied Bandwidth for HSUPA (QPSK) Mode, High channel**

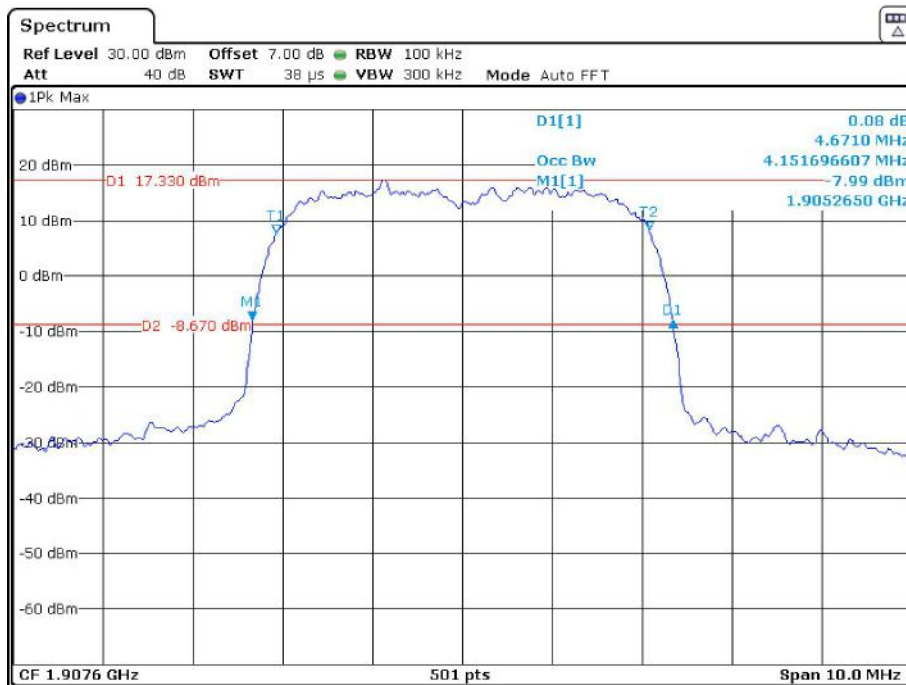
Date: 31.MAR.2022 16:51:37

**26 dB Emissions & 99% Occupied Bandwidth for HSDPA (16QAM) Mode, Low channel**

Date: 31.MAR.2022 16:58:21

**26 dB Emissions & 99% Occupied Bandwidth for HSDPA (16QAM) Mode, Middle channel**

Date: 31.MAR.2022 16:57:23

**26 dB Emissions & 99% Occupied Bandwidth for HSDPA (16QAM) Mode, High channel**

Date: 31.MAR.2022 16:56:30

**LTE Band 2:**

| Bandwidth | Modulation | Low channel |                | Middle channel |                | High channel |                |
|-----------|------------|-------------|----------------|----------------|----------------|--------------|----------------|
|           |            | OBW (MHz)   | 26dB EBW (MHz) | OBW (MHz)      | 26dB EBW (MHz) | OBW (MHz)    | 26dB EBW (MHz) |
| 1.4 MHz   | QPSK       | 1.110       | 1.266          | 1.104          | 1.248          | 1.104        | 1.254          |
|           | 16QAM      | 1.104       | 1.260          | 1.104          | 1.260          | 1.098        | 1.254          |
| 3 MHz     | QPSK       | 2.700       | 3.000          | 2.700          | 3.012          | 2.700        | 3.024          |
|           | 16QAM      | 2.700       | 3.024          | 2.688          | 3.000          | 2.700        | 3.012          |
| 5 MHz     | QPSK       | 4.540       | 4.980          | 4.520          | 5.000          | 4.520        | 4.960          |
|           | 16QAM      | 4.500       | 5.000          | 4.540          | 5.020          | 4.520        | 5.000          |
| 10 MHz    | QPSK       | 8.960       | 9.720          | 9.000          | 9.720          | 8.960        | 9.720          |
|           | 16QAM      | 8.960       | 9.680          | 9.000          | 9.760          | 8.960        | 9.720          |
| 15 MHz    | QPSK       | 13.560      | 15.000         | 13.500         | 15.000         | 13.560       | 15.120         |
|           | 16QAM      | 13.560      | 15.000         | 13.560         | 15.000         | 13.500       | 14.880         |
| 20 MHz    | QPSK       | 18.000      | 19.600         | 18.080         | 19.520         | 18.000       | 19.760         |
|           | 16QAM      | 18.000      | 19.600         | 18.000         | 19.680         | 18.000       | 19.600         |

**LTE Band 5:**

| Bandwidth | Modulation | Low channel |                | Middle channel |                | High channel |                |
|-----------|------------|-------------|----------------|----------------|----------------|--------------|----------------|
|           |            | OBW (MHz)   | 26dB EBW (MHz) | OBW (MHz)      | 26dB EBW (MHz) | OBW (MHz)    | 26dB EBW (MHz) |
| 1.4 MHz   | QPSK       | 1.104       | 1.260          | 1.098          | 1.254          | 1.104        | 1.260          |
|           | 16QAM      | 1.104       | 1.254          | 1.104          | 1.260          | 1.098        | 1.248          |
| 3 MHz     | QPSK       | 2.712       | 2.976          | 2.700          | 3.012          | 2.700        | 3.024          |
|           | 16QAM      | 2.700       | 2.988          | 2.688          | 3.000          | 2.700        | 3.024          |
| 5 MHz     | QPSK       | 4.540       | 4.960          | 4.520          | 4.960          | 4.500        | 4.960          |
|           | 16QAM      | 4.520       | 4.960          | 4.520          | 4.980          | 4.520        | 4.960          |
| 10 MHz    | QPSK       | 9.000       | 9.760          | 8.960          | 9.680          | 8.960        | 9.720          |
|           | 16QAM      | 8.960       | 9.680          | 8.960          | 9.760          | 8.960        | 9.720          |

**LTE Band 12:**

| Bandwidth | Modulation | Low channel |                | Middle channel |                | High channel |                |
|-----------|------------|-------------|----------------|----------------|----------------|--------------|----------------|
|           |            | OBW (MHz)   | 26dB EBW (MHz) | OBW (MHz)      | 26dB EBW (MHz) | OBW (MHz)    | 26dB EBW (MHz) |
| 1.4 MHz   | QPSK       | 1.134       | 1.968          | 1.116          | 1.296          | 1.116        | 1.920          |
|           | 16QAM      | 1.128       | 1.794          | 1.110          | 1.260          | 1.116        | 1.266          |
| 3 MHz     | QPSK       | 2.700       | 3.024          | 2.712          | 3.204          | 2.700        | 3.036          |
|           | 16QAM      | 2.700       | 3.036          | 2.688          | 3.024          | 2.700        | 3.000          |
| 5 MHz     | QPSK       | 4.520       | 4.980          | 4.540          | 6.180          | 4.500        | 5.000          |
|           | 16QAM      | 4.500       | 5.000          | 4.560          | 5.000          | 4.520        | 5.000          |
| 10 MHz    | QPSK       | 8.960       | 9.800          | 9.000          | 11.600         | 8.960        | 9.760          |
|           | 16QAM      | 8.960       | 9.720          | 9.000          | 10.640         | 8.960        | 9.760          |

**LTE Band 13:**

| Bandwidth | Modulation | Low channel |                | Middle channel |                | High channel |                |
|-----------|------------|-------------|----------------|----------------|----------------|--------------|----------------|
|           |            | OBW (MHz)   | 26dB EBW (MHz) | OBW (MHz)      | 26dB EBW (MHz) | OBW (MHz)    | 26dB EBW (MHz) |
| 5 MHz     | QPSK       | 4.520       | 5.000          | 4.520          | 5.020          | 4.500        | 4.960          |
|           | 16QAM      | 4.520       | 5.000          | 4.540          | 5.000          | 4.540        | 5.000          |
| 10 MHz    | QPSK       | /           | /              | 9.000          | 9.760          | /            | /              |
|           | 16QAM      | /           | /              | 9.000          | 9.720          | /            | /              |

**LTE Band 41**

| Bandwidth | Modulation | Low channel |                | Middle channel |                | High channel |                |
|-----------|------------|-------------|----------------|----------------|----------------|--------------|----------------|
|           |            | OBW (MHz)   | 26dB EBW (MHz) | OBW (MHz)      | 26dB EBW (MHz) | OBW (MHz)    | 26dB EBW (MHz) |
| 5 MHz     | QPSK       | 4.540       | 5.360          | 4.520          | 5.520          | 4.520        | 5.060          |
|           | 16QAM      | 4.520       | 5.080          | 4.500          | 5.000          | 4.520        | 5.100          |
| 10 MHz    | QPSK       | 8.960       | 9.880          | 8.960          | 9.720          | 8.960        | 9.680          |
|           | 16QAM      | 8.960       | 9.520          | 8.960          | 9.560          | 8.960        | 9.640          |
| 15 MHz    | QPSK       | 13.560      | 14.760         | 13.500         | 15.360         | 13.500       | 15.000         |
|           | 16QAM      | 13.500      | 15.060         | 13.560         | 14.820         | 13.500       | 15.360         |
| 20 MHz    | QPSK       | 18.000      | 19.360         | 18.000         | 19.680         | 18.000       | 19.520         |
|           | 16QAM      | 18.000      | 19.360         | 18.000         | 19.840         | 17.920       | 19.440         |

The test plots of LTE band please refer to the Appendix A.

## FCC §2.1051, §22.917(a) & §24.238(a)& §27.53 - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

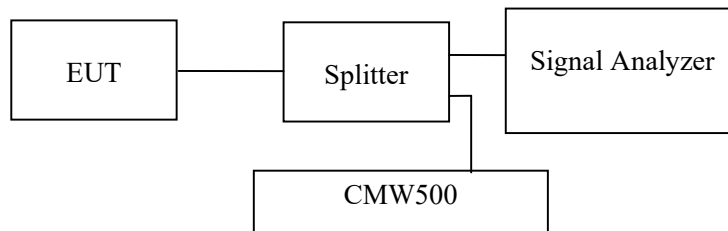
### Applicable Standard

FCC §2.1051, §22.917(a) & §24.238(a)&§27.53.

The spectrum was to be investigated to the tenth harmonics of the highest fundamental frequency as specified in § 2.1051.

### Test Procedure

The RF output of the transceiver was connected to a spectrum analyzer and simulator through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 1MHz. Sufficient scans were taken to show any out of band emissions up to 10<sup>th</sup> harmonic.



### Test Data

#### Environmental Conditions

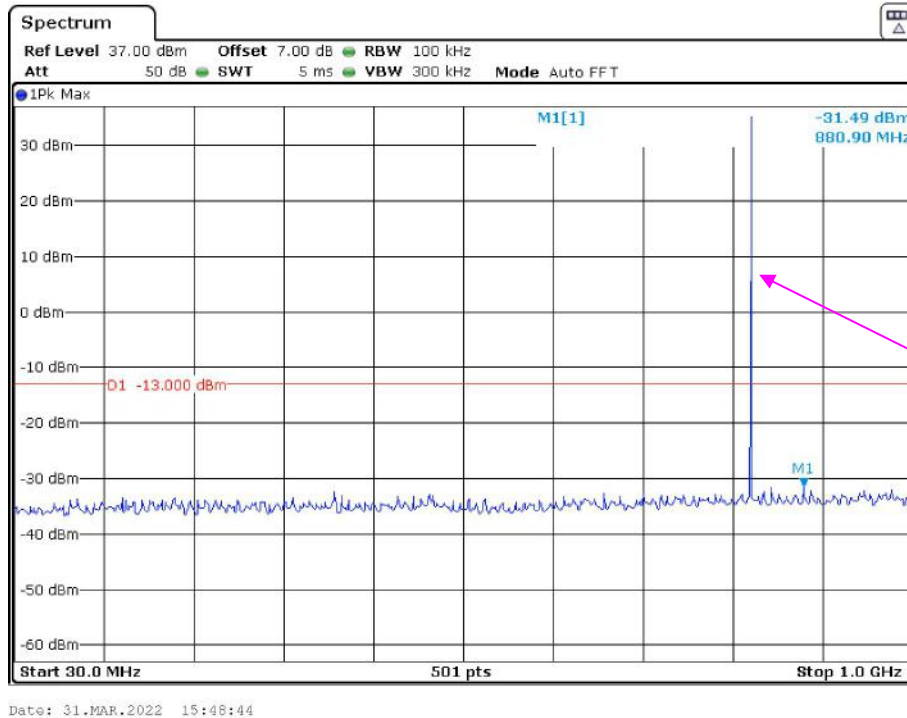
|                    |           |
|--------------------|-----------|
| Temperature:       | 26 °C     |
| Relative Humidity: | 56 %      |
| ATM Pressure:      | 101.0 kPa |

*The testing was performed by Key Pei from 2022-2022-03-24 to 2022-05-18*

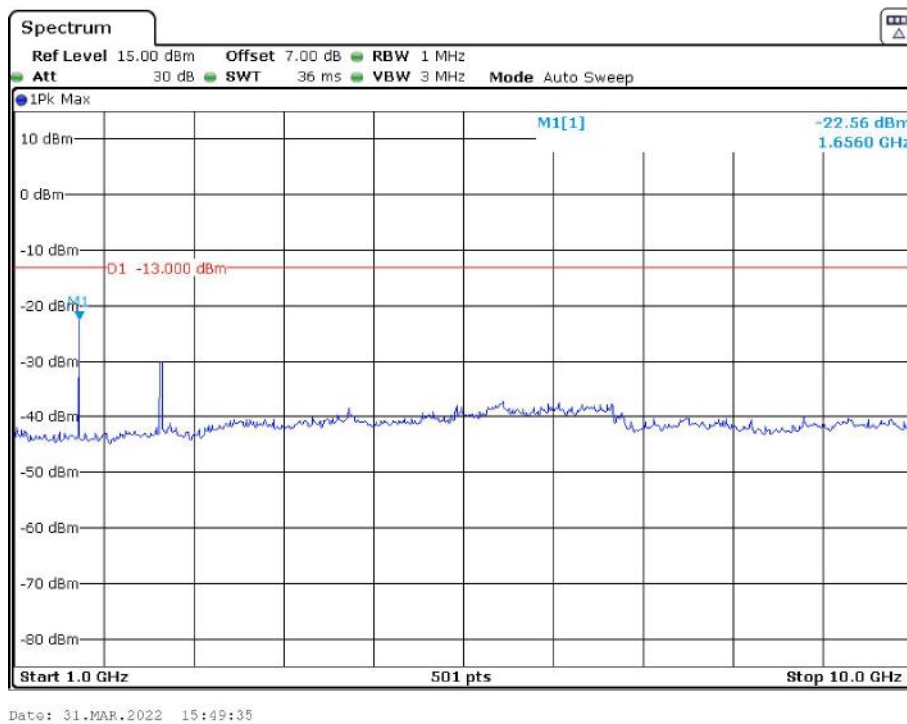
*EUT operation mode: Transmitting*

**Test result: Pass**

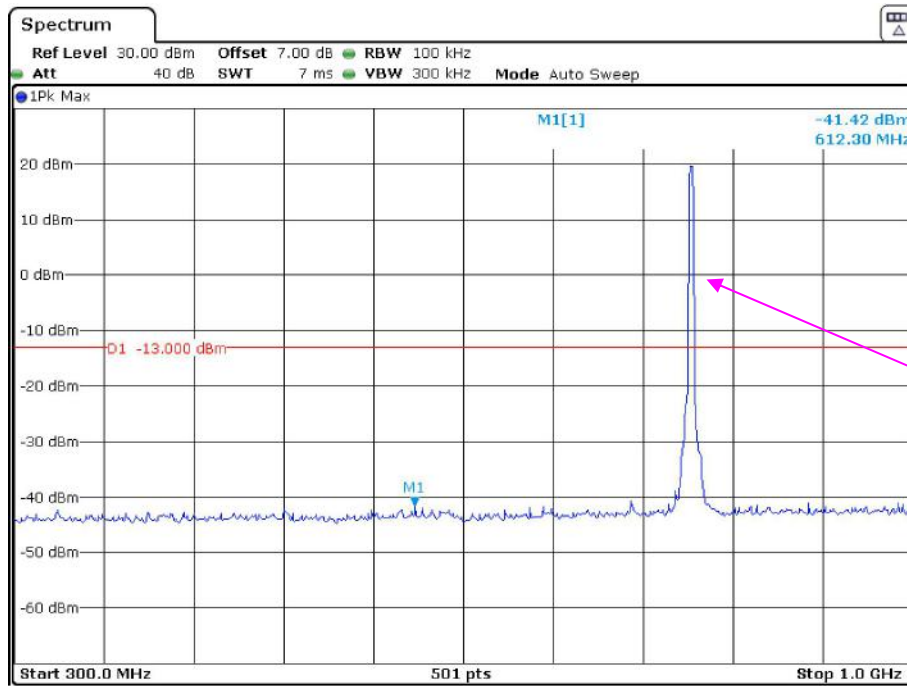
*Please refer to the following plots.*

**Cellular Band  
Low Channel:****30 MHz – 1 GHz (GSM Mode)**

Fundamental test

**1 GHz – 10 GHz (GSM Mode)**

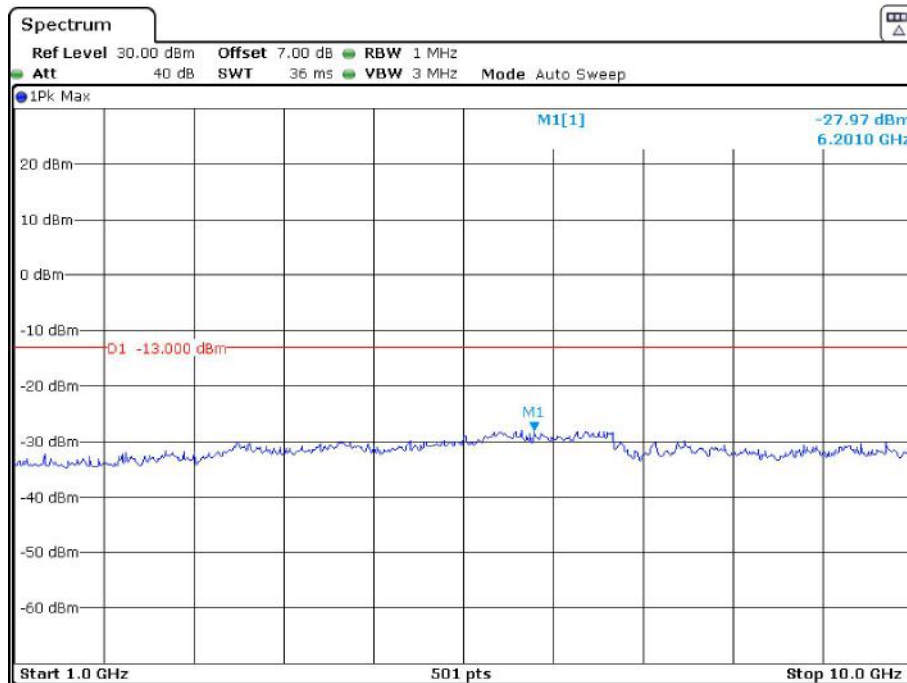
## 30 MHz – 1 GHz (WCDMA Mode)



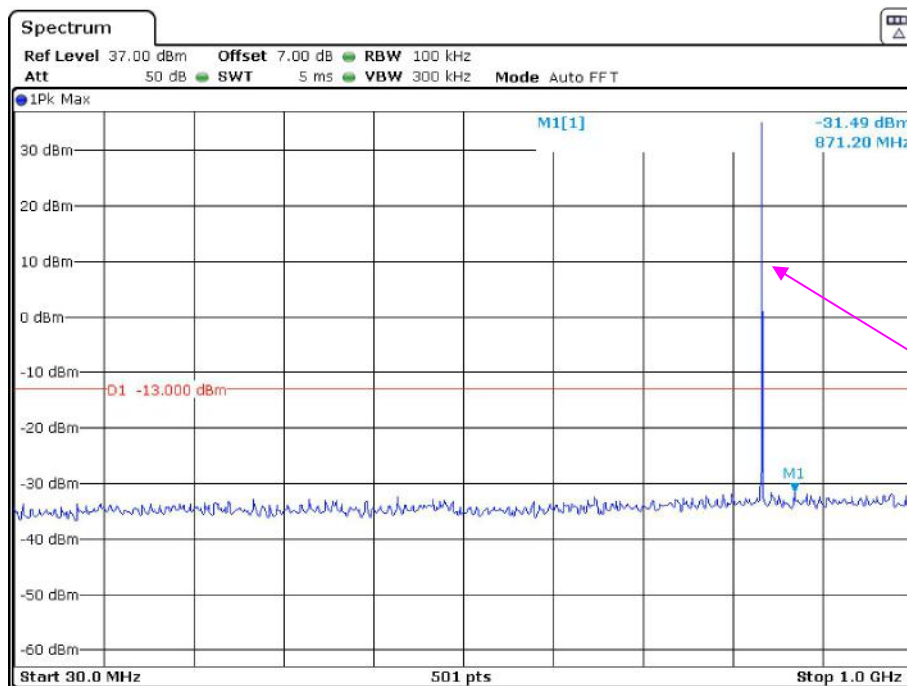
Date: 31.MAR.2022 22:07:21

Fundamental test

## 1 GHz – 10 GHz (WCDMA Mode)

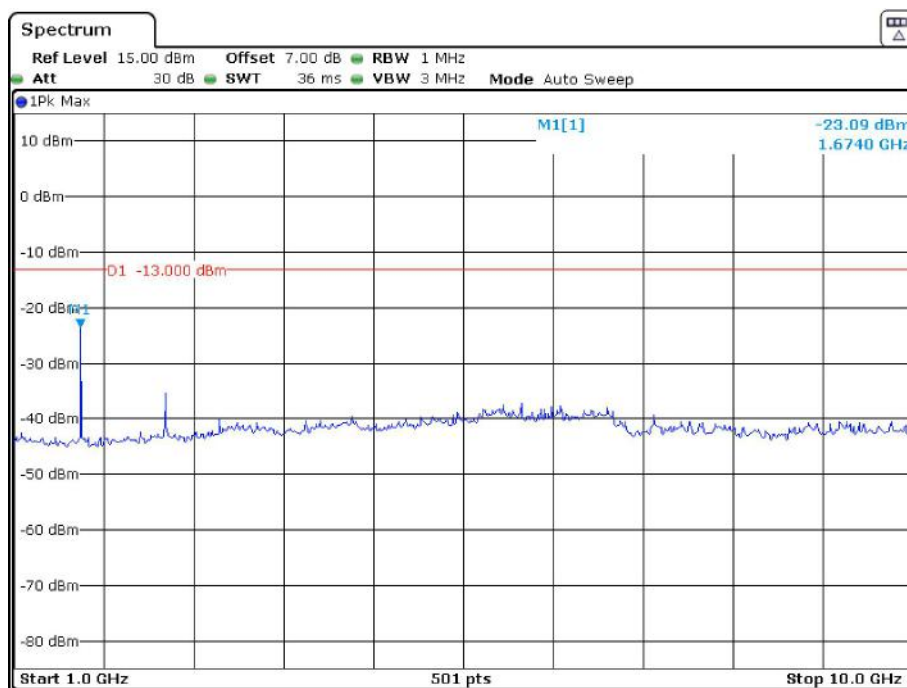


Date: 31.MAR.2022 22:09:43

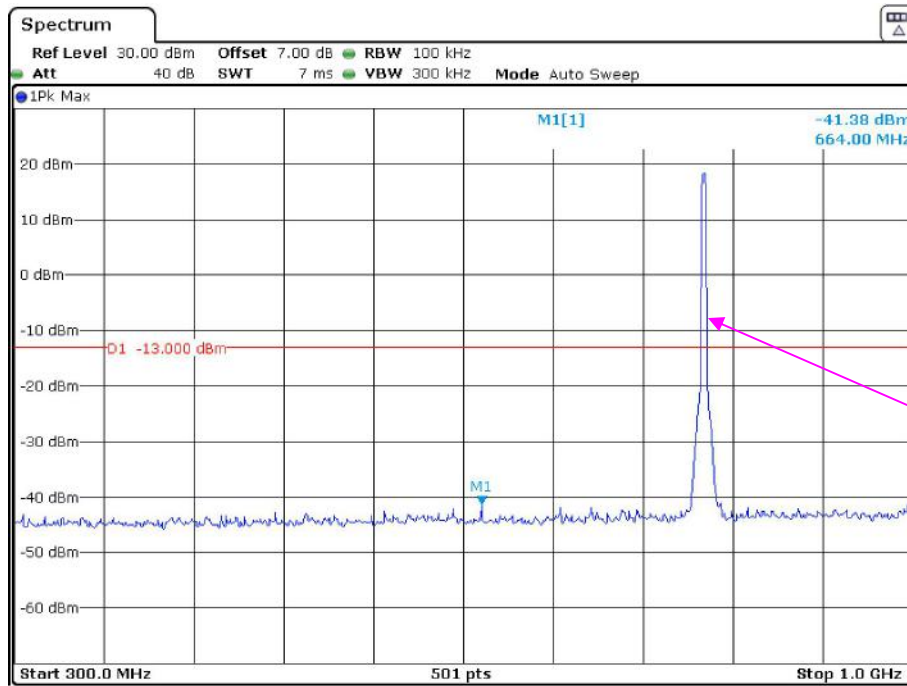
**Middle Channel:****30 MHz – 1 GHz (GSM Mode)**

Date: 31.MAR.2022 15:48:21

Fundamental test

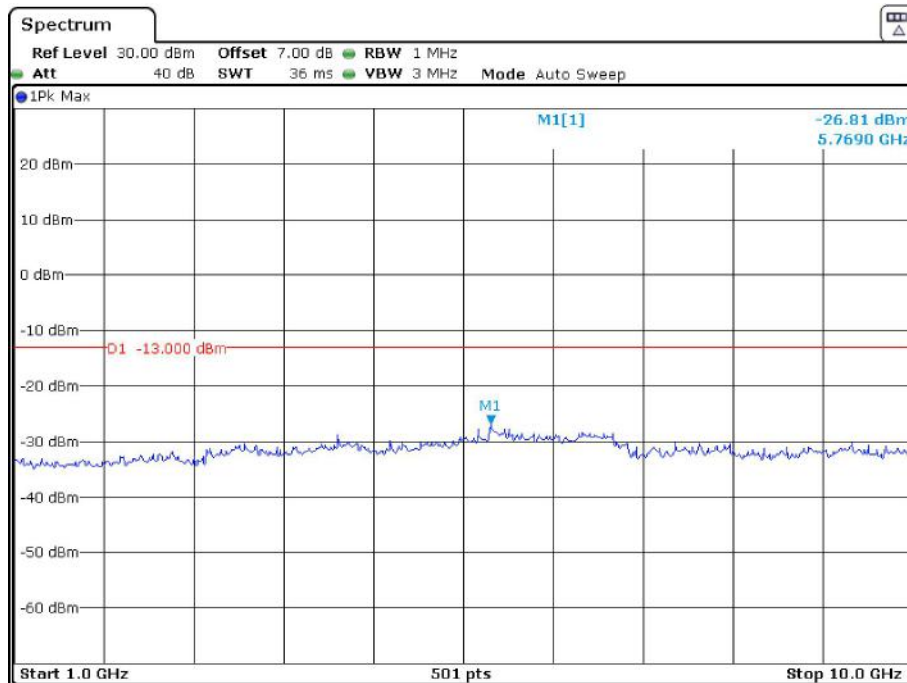
**1 GHz – 10 GHz (GSM Mode)**

Date: 31.MAR.2022 15:49:47

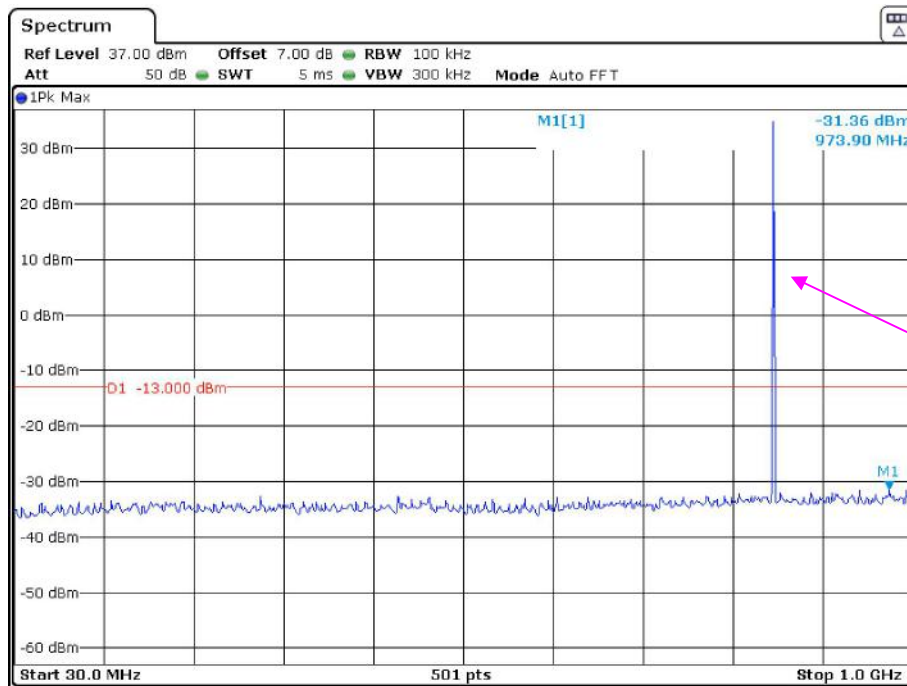
**30 MHz – 1 GHz (WCDMA Mode)**

Date: 31.MAR.2022 22:07:58

Fundamental test

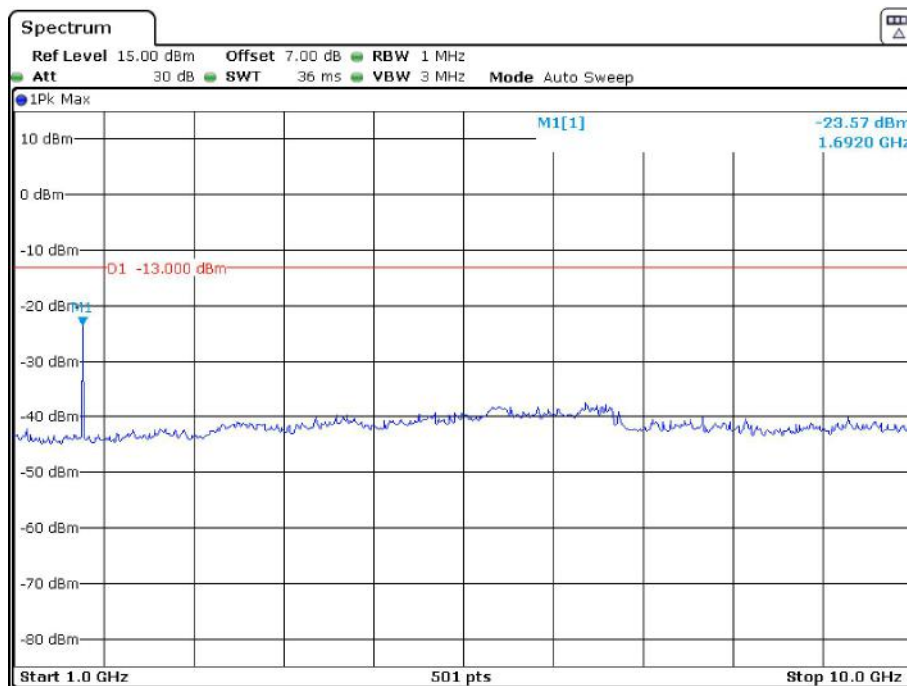
**1 GHz – 10 GHz (WCDMA Mode)**

Date: 31.MAR.2022 22:09:16

**High Channel:****30 MHz – 1 GHz (GSM Mode)**

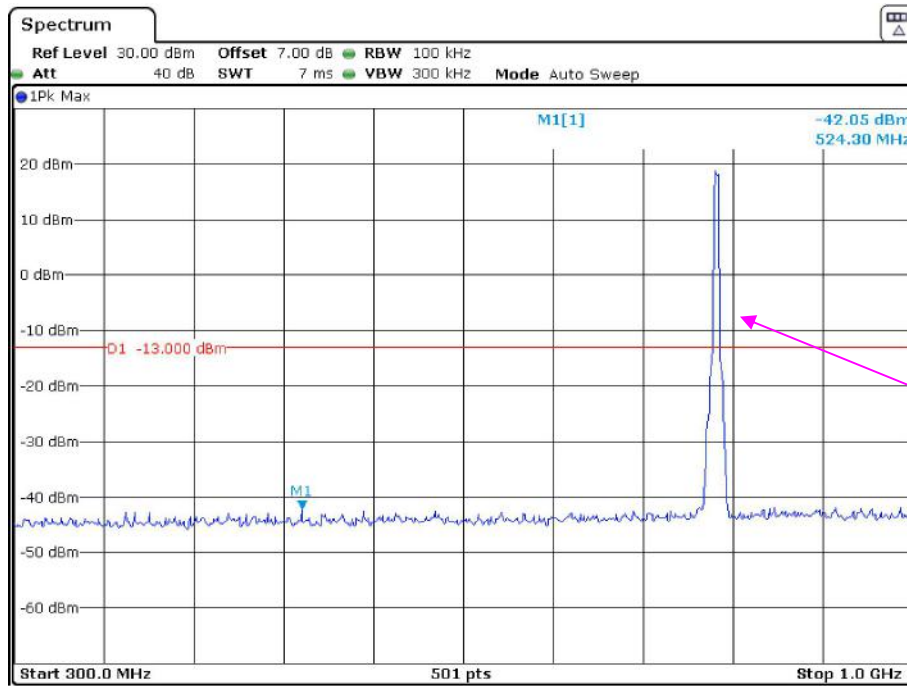
Date: 31.MAR.2022 15:47:32

Fundamental test

**1 GHz – 10 GHz (GSM Mode)**

Date: 31.MAR.2022 15:50:07

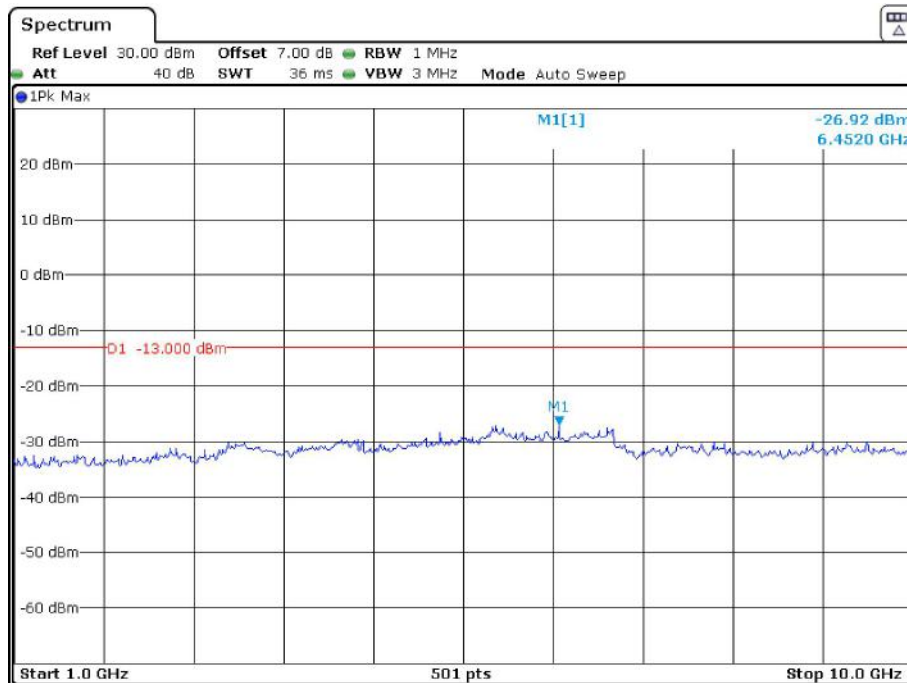
## 30 MHz – 1 GHz (WCDMA Mode)



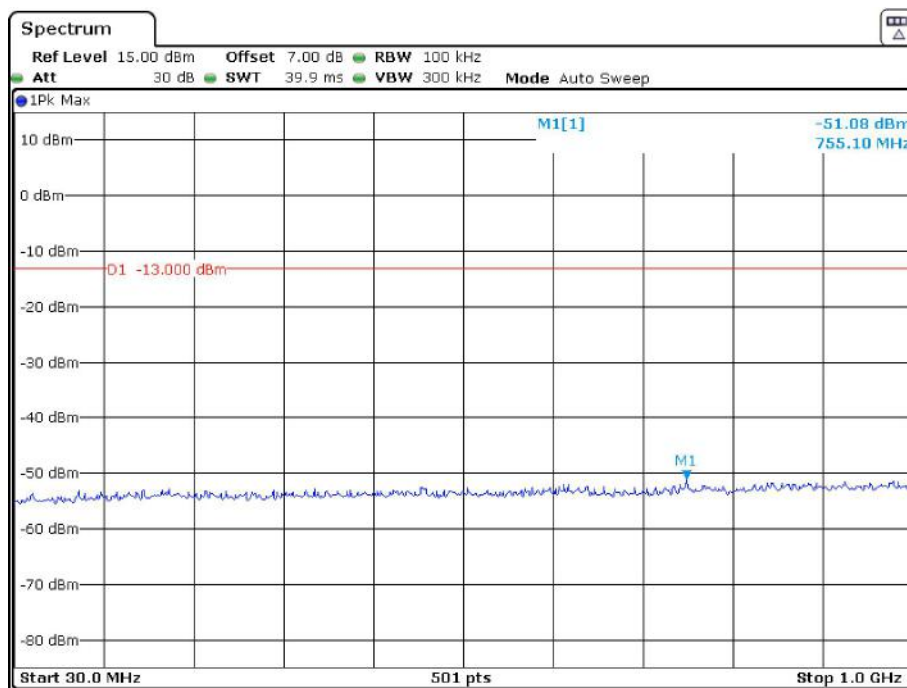
Date: 31.MAR.2022 22:08:21

Fundamental test

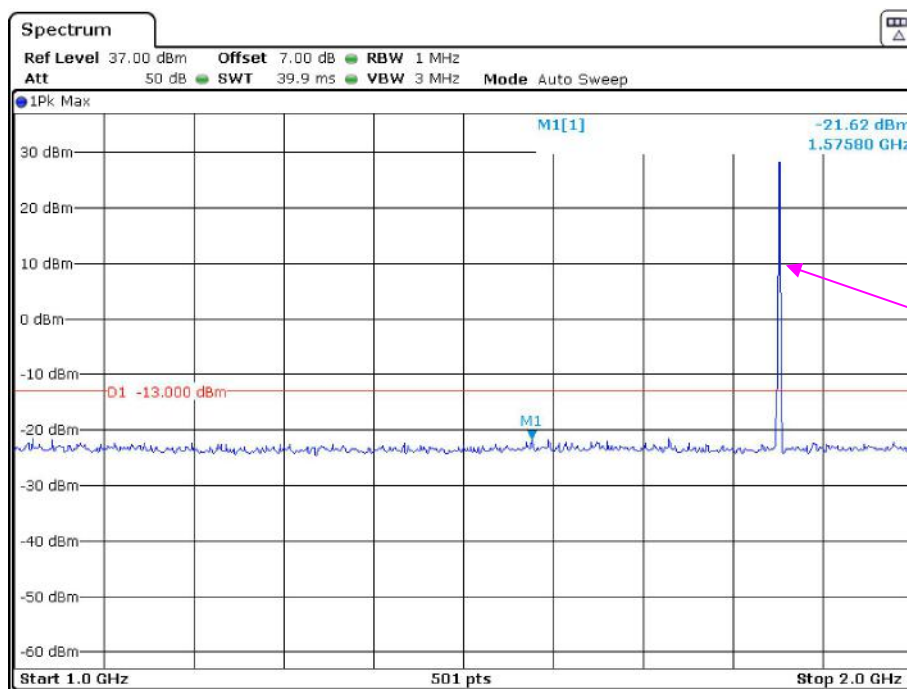
## 1 GHz – 10 GHz (WCDMA Mode)



Date: 31.MAR.2022 22:08:58

**PCS Band  
Low Channel:****30 MHz – 1 GHz (GSM Mode)**

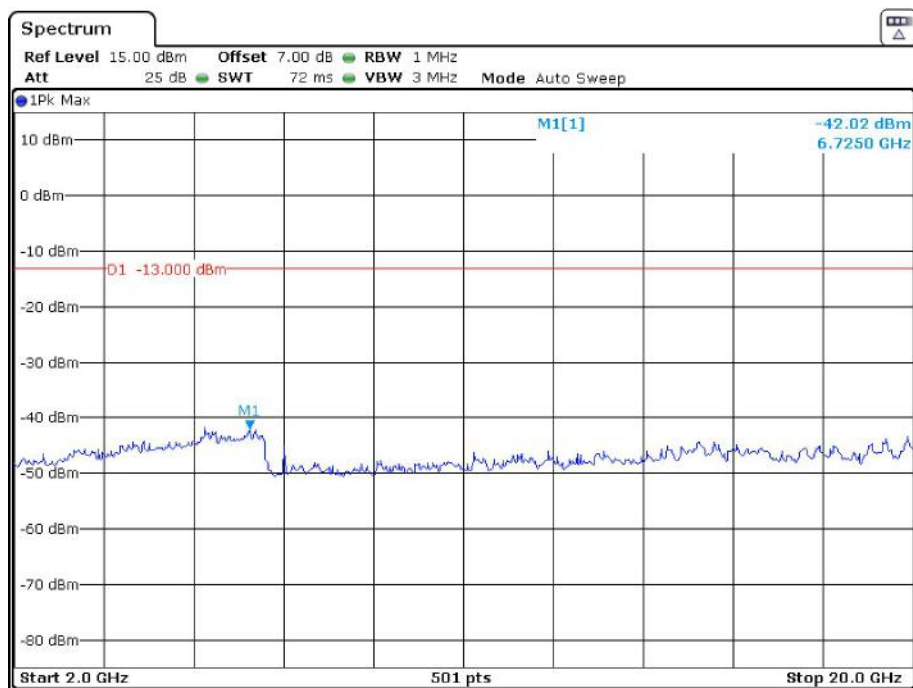
Date: 31.MAR.2022 15:54:32

**1 GHz – 2 GHz (GSM Mode)**

Date: 31.MAR.2022 15:57:05

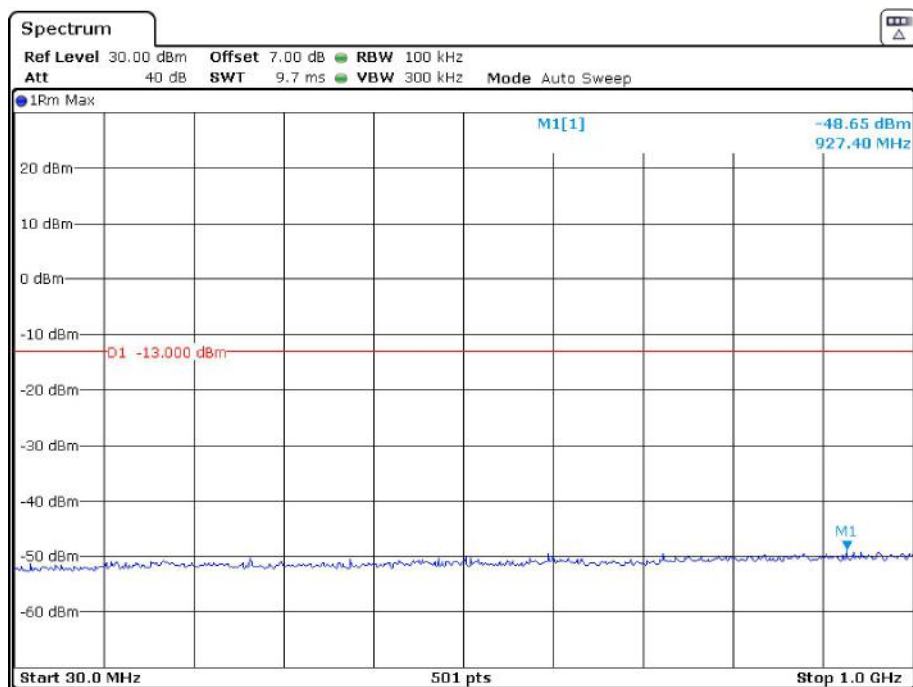
Fundamental test

## 2 GHz – 20 GHz (GSM Mode)



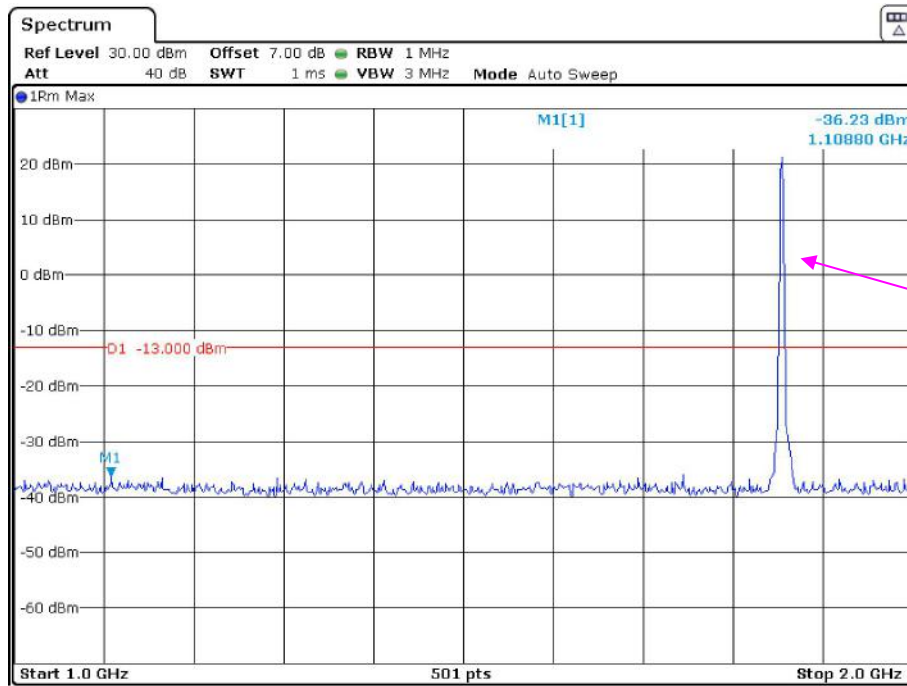
Date: 31.MAR.2022 15:57:40

## 30 MHz – 1 GHz (WCDMA Mode)



Date: 31.MAR.2022 16:42:32

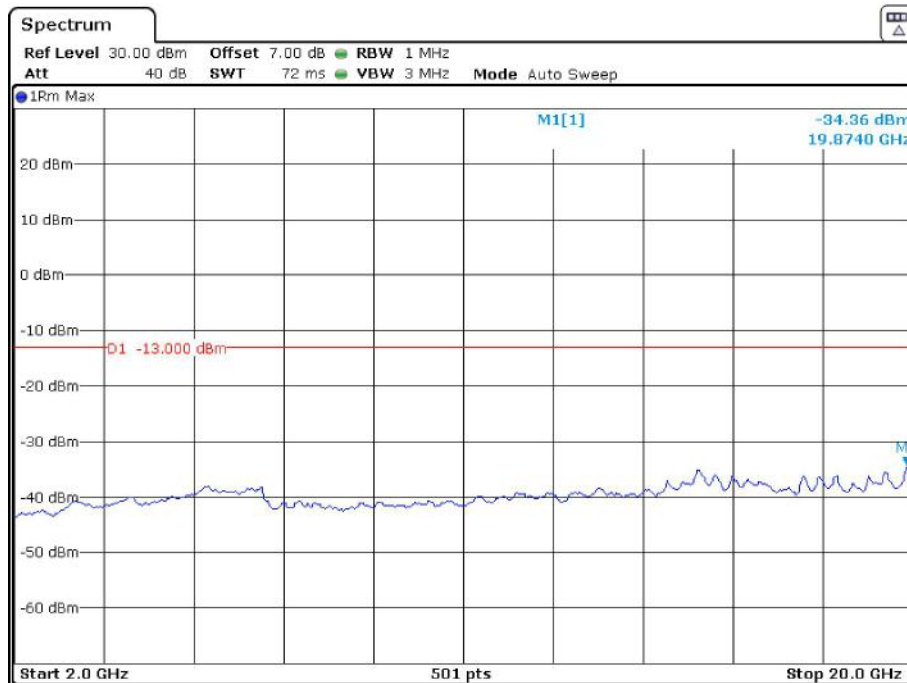
## 1 GHz – 2 GHz (WCDMA Mode)



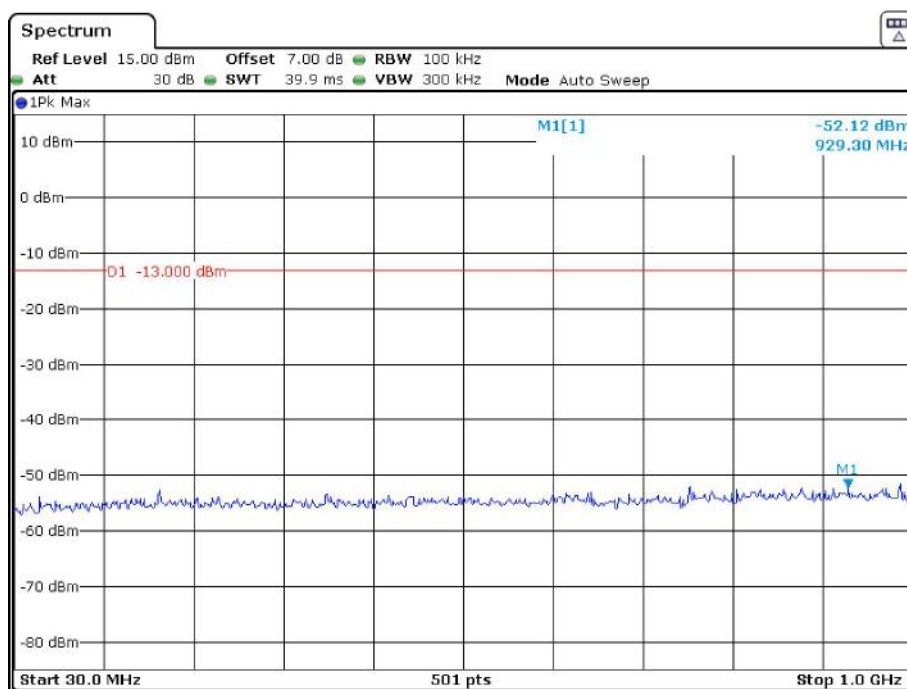
Date: 31.MAR.2022 16:45:06

Fundamental test

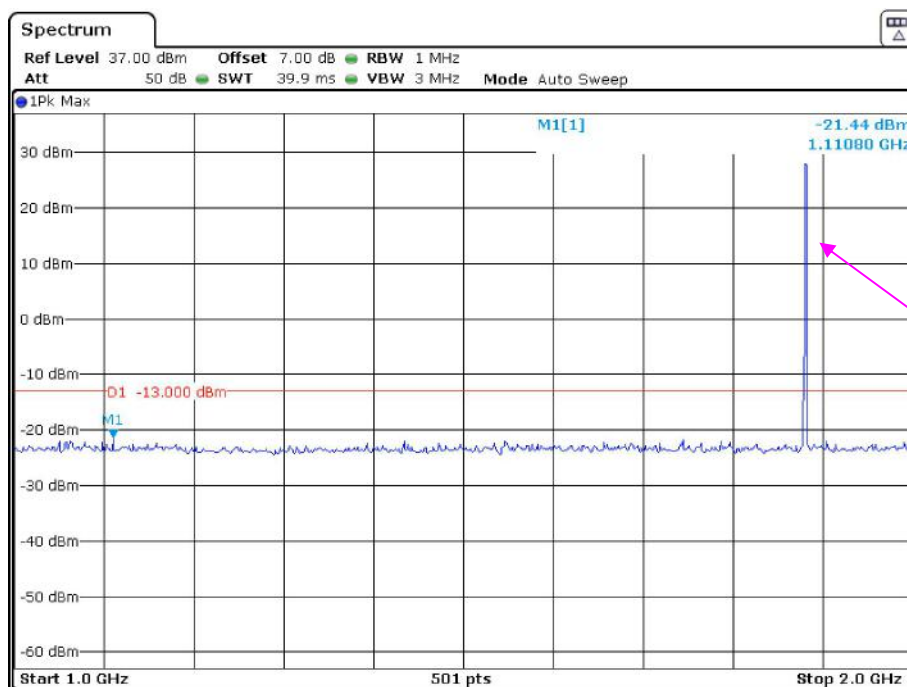
## 2 GHz – 20 GHz (WCDMA Mode)



Date: 31.MAR.2022 16:45:43

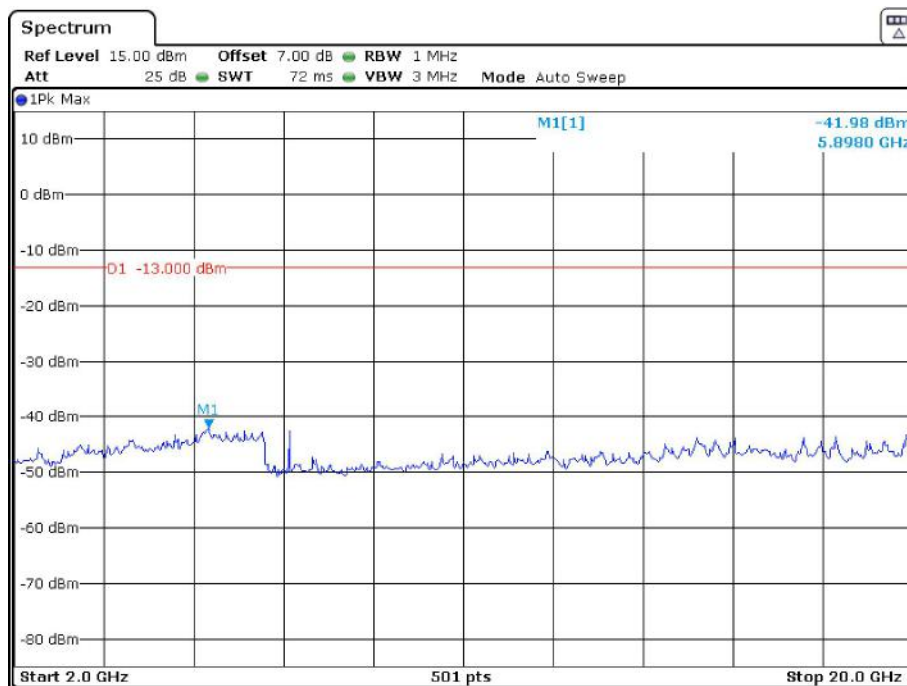
**Middle Channel:****30 MHz – 1 GHz (GSM Mode)**

Date: 31.MAR.2022 15:54:47

**1 GHz – 2 GHz (GSM Mode)**

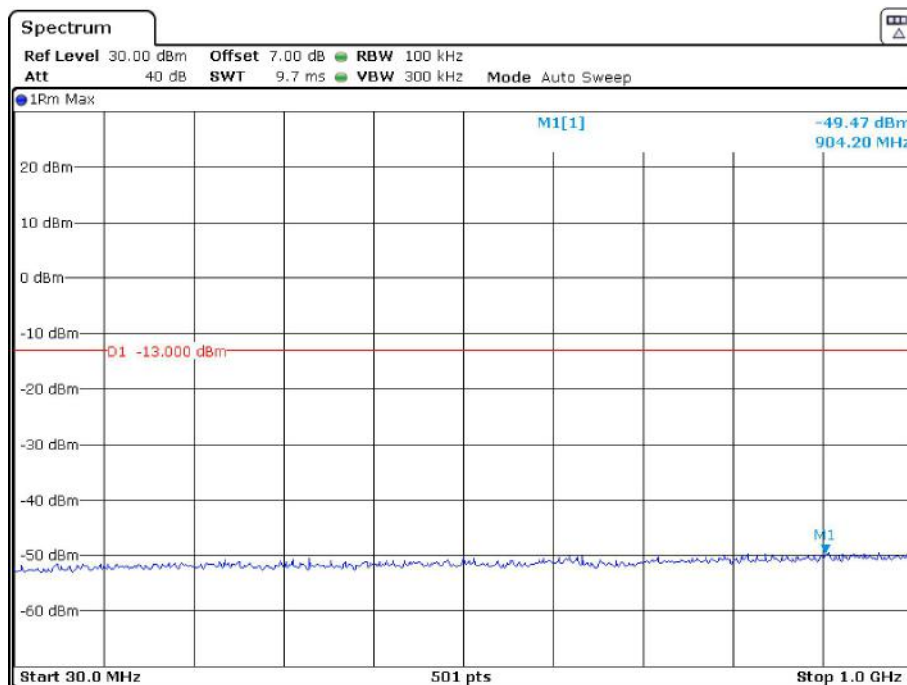
Date: 31.MAR.2022 15:56:42

## 2 GHz– 20 GHz (GSMMode)



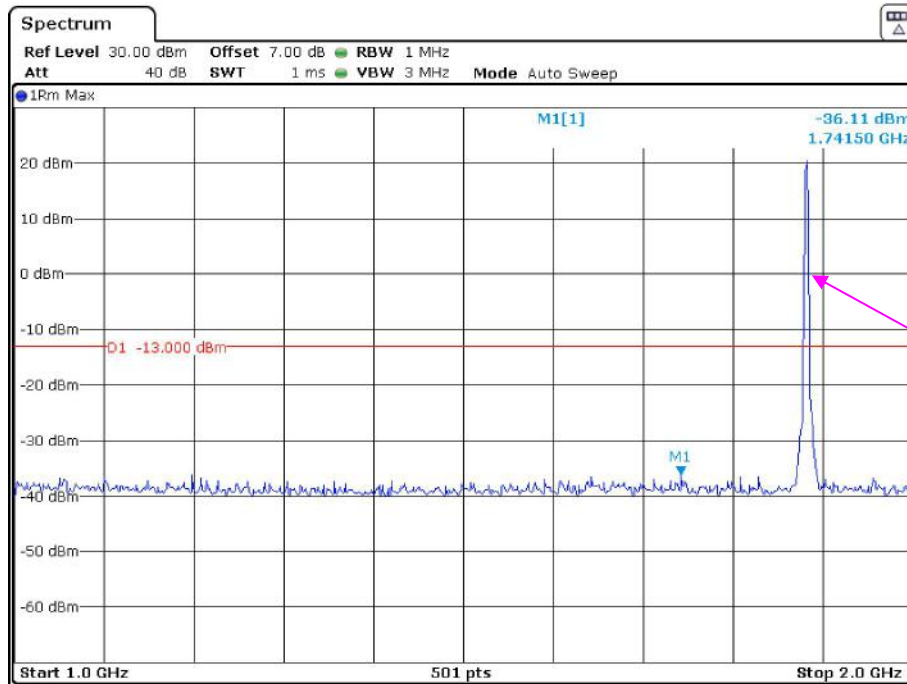
Date: 31.MAR.2022 15:57:58

## 30 MHz – 1 GHz (WCDMA Mode)



Date: 31.MAR.2022 16:42:50

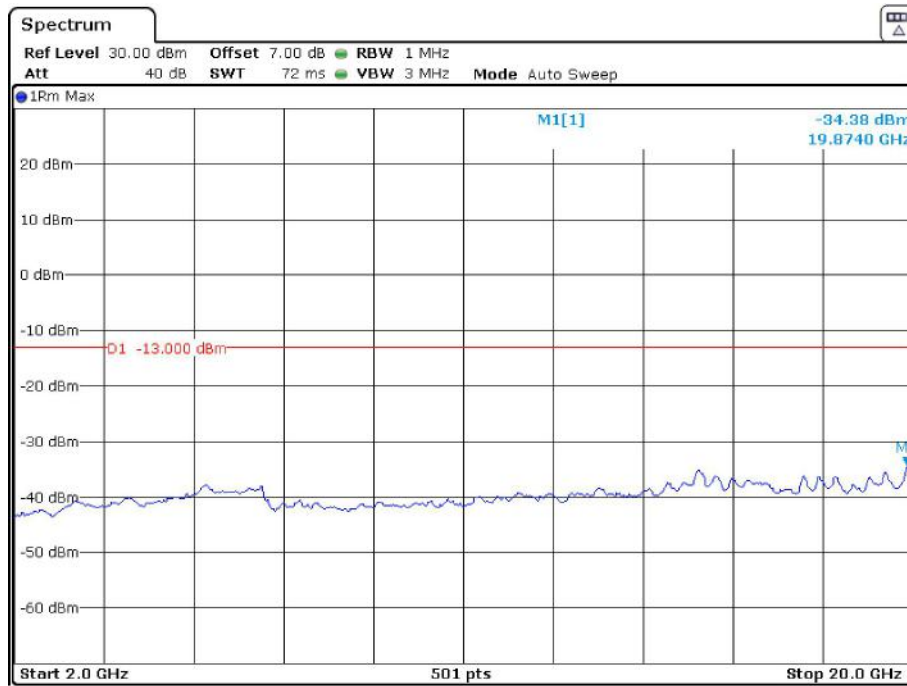
## 1 GHz – 2 GHz (WCDMA Mode)



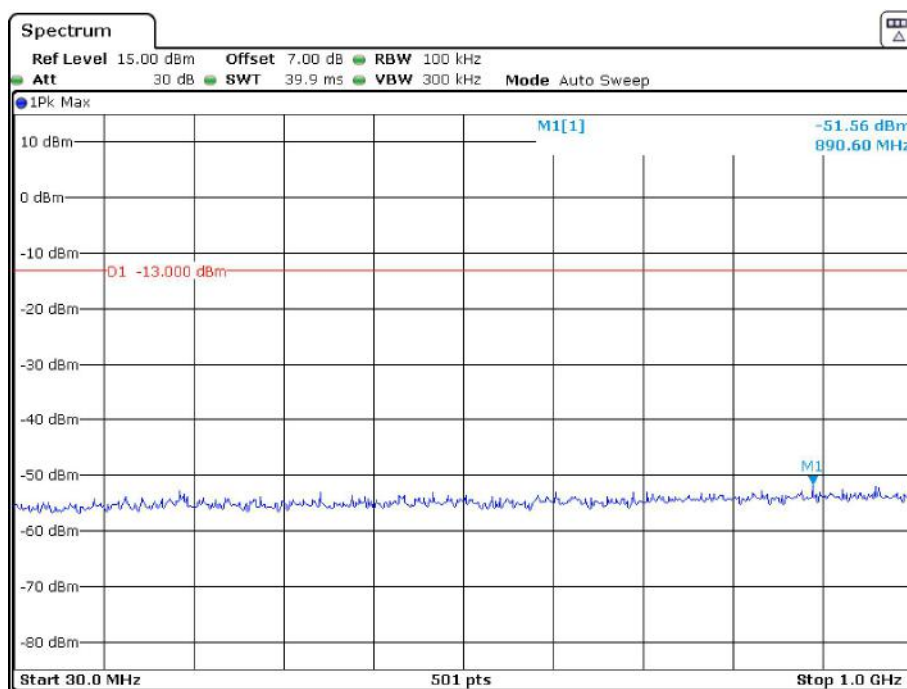
Date: 31.MAR.2022 16:44:09

Fundamental test

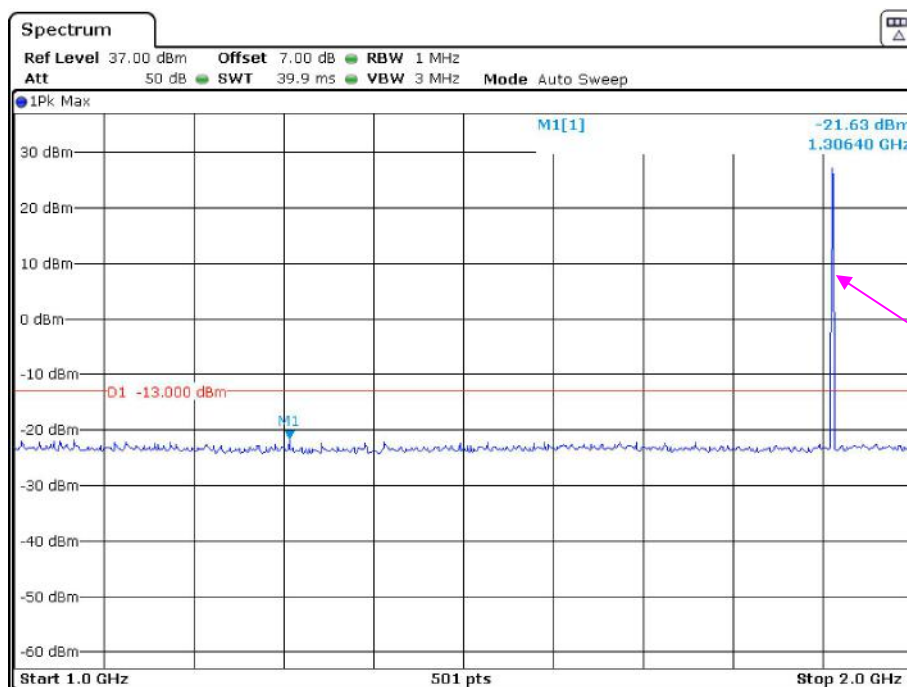
## 2 GHz – 20 GHz (WCDMA Mode)



Date: 31.MAR.2022 16:46:02

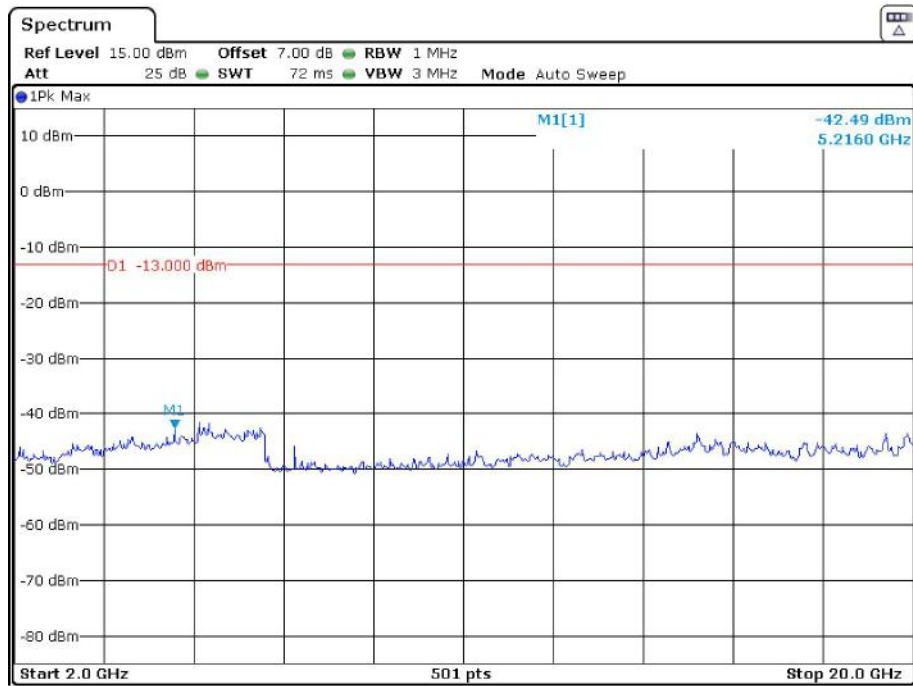
**High Channel:****30 MHz – 1 GHz (GSM Mode)**

Date: 31.MAR.2022 15:55:00

**1 GHz– 2 GHz (GSM Mode)**

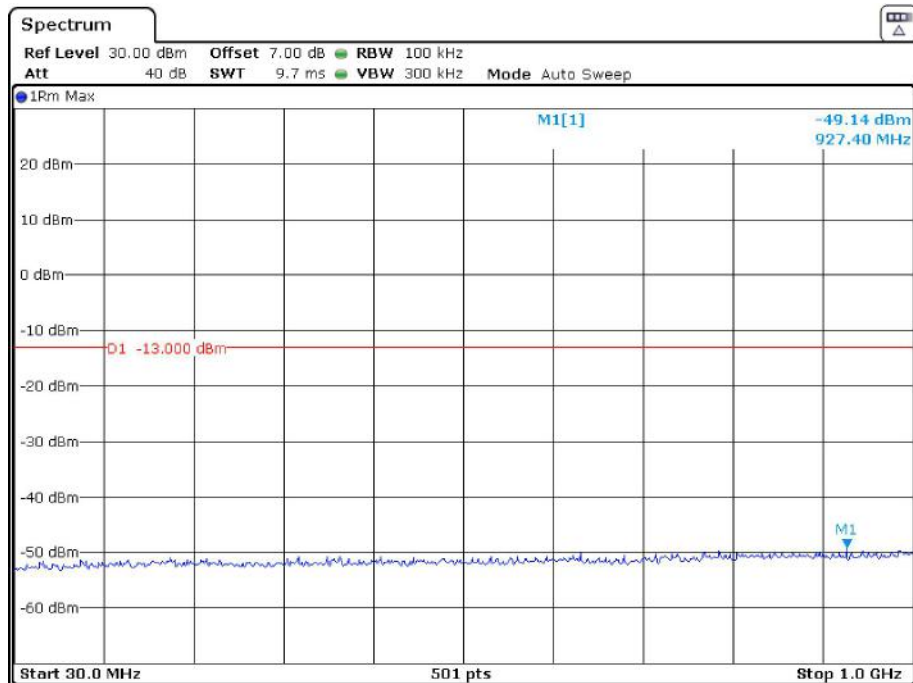
Date: 31.MAR.2022 15:56:20

## 2 GHz– 20 GHz (GSM Mode)



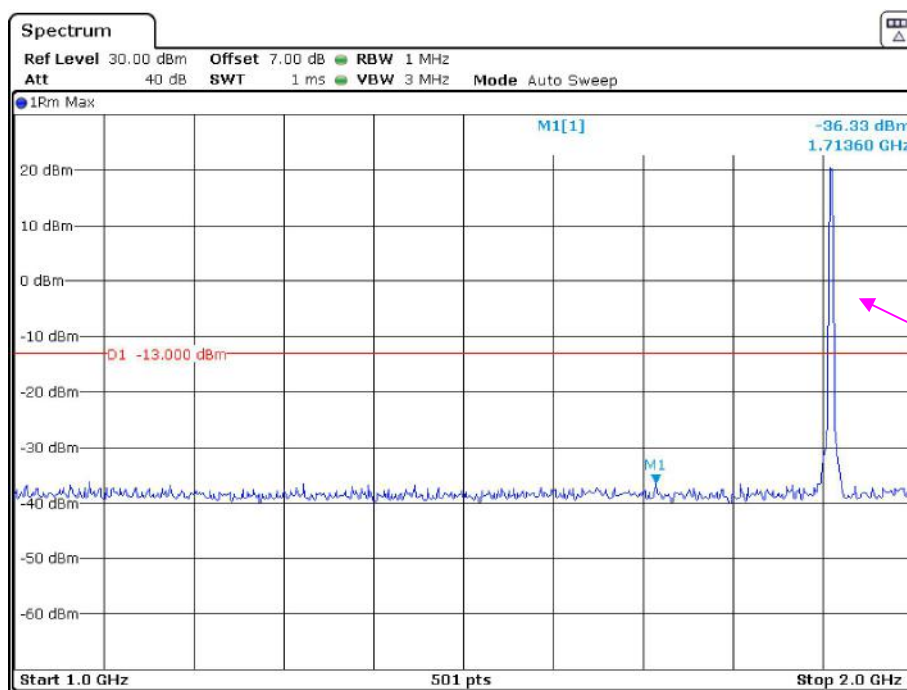
Date: 31.MAR.2022 15:58:11

## 30 MHz – 1 GHz (WCDMA Mode)



Date: 31.MAR.2022 16:43:03

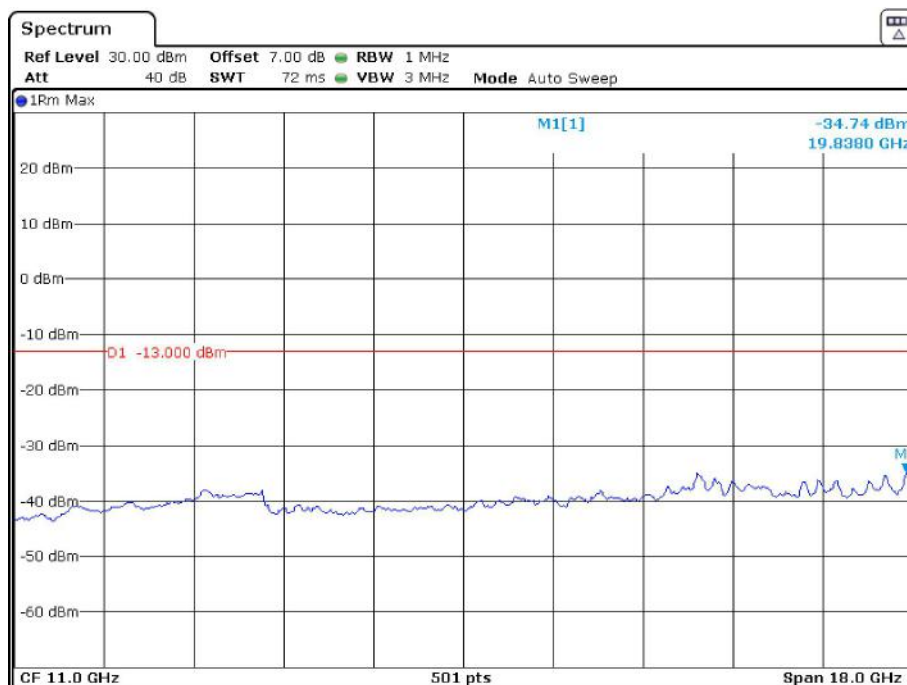
## 1 GHz – 2 GHz (WCDMA Mode)



Date: 31.MAR.2022 16:43:51

Fundamental test

## 2GHz – 20 GHz (WCDMA Mode)



Date: 31.MAR.2022 16:46:17

The test plots of LTE band please refer to the Appendix B.

**FCC § 2.1053; § 22.917 (a); § 24.238 (a); § 27.53 - SPURIOUS RADIATED EMISSIONS****Applicable Standard**

FCC § 2.1053, § 22.917(a) & § 24.238(a) & § 27.53.

**Test Procedure**

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the receiving antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to tenth harmonic of the fundamental frequency was investigated.

**Test Data****Environmental Conditions**

|                           |           |
|---------------------------|-----------|
| <b>Temperature:</b>       | 25.5 °C   |
| <b>Relative Humidity:</b> | 50 %      |
| <b>ATM Pressure:</b>      | 101.0 kPa |

*The testing was performed by I Icey Huang from 2022-04-10 to 2022-04-13*

*EUT operation mode: Transmitting (Pre-scan in the X,Y and Z axes of orientation, the worst case Y-axes of orientation was recorded)*

The worst case is as below:

| Frequency<br>(MHz)                | Receiver<br>Reading<br>(dBm) | Turntable<br>Degree | Rx Antenna    |                | Substituted<br>Factor<br>(dB) | Absolute<br>Level<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) |
|-----------------------------------|------------------------------|---------------------|---------------|----------------|-------------------------------|----------------------------|----------------|----------------|
|                                   |                              |                     | Height<br>(m) | Polar<br>(H/V) |                               |                            |                |                |
| GSM850                            |                              |                     |               |                |                               |                            |                |                |
| Test frequency range: 30MHz-10GHz |                              |                     |               |                |                               |                            |                |                |
| Low channel                       |                              |                     |               |                |                               |                            |                |                |
| 45.05                             | -73.31                       | 30                  | 1.9           | H              | 6.6                           | -66.7                      | -13            | -53.7          |
| 199.98                            | -62.61                       | 177                 | 2.1           | V              | -2.0                          | -64.6                      | -13            | -51.6          |
| 1648.4                            | -60.2                        | 274                 | 1.9           | H              | 3.5                           | -56.70                     | -13            | -43.70         |
| 1648.4                            | -59.9                        | 65                  | 1.8           | V              | 3.1                           | -56.80                     | -13            | -43.80         |
| 2472.6                            | -47.2                        | 18                  | 1.6           | H              | 6.6                           | -40.60                     | -13            | -27.60         |
| 2472.6                            | -44.2                        | 60                  | 1.7           | V              | 5.8                           | -38.40                     | -13            | -25.40         |
| 3296.8                            | -53.1                        | 237                 | 1.6           | H              | 6.4                           | -46.70                     | -13            | -33.70         |
| 3296.8                            | -52.2                        | 232                 | 2.1           | V              | 5.7                           | -46.50                     | -13            | -33.50         |
| Middle channel                    |                              |                     |               |                |                               |                            |                |                |
| 45.05                             | -74.49                       | 171                 | 2.0           | H              | 6.6                           | -67.9                      | -13            | -54.9          |
| 199.98                            | -62.83                       | 166                 | 1.6           | V              | -2.0                          | -64.8                      | -13            | -51.8          |
| 1673.2                            | -55.9                        | 138                 | 1.9           | H              | 3.8                           | -52.10                     | -13            | -39.10         |
| 1673.2                            | -55.4                        | 34                  | 1.6           | V              | 3.1                           | -52.30                     | -13            | -39.30         |
| 2509.8                            | -48.3                        | 163                 | 1.8           | H              | 6.2                           | -42.10                     | -13            | -29.10         |
| 2509.8                            | -44.3                        | 93                  | 2.0           | V              | 5.6                           | -38.70                     | -13            | -25.70         |
| 3346.4                            | -51.7                        | 240                 | 1.6           | H              | 6.6                           | -45.10                     | -13            | -32.10         |
| 3346.4                            | -50.3                        | 131                 | 1.6           | V              | 5.4                           | -44.90                     | -13            | -31.90         |
| High channel                      |                              |                     |               |                |                               |                            |                |                |
| 45.05                             | -74.36                       | 50                  | 2.0           | H              | 6.6                           | -67.8                      | -13            | -54.8          |
| 199.98                            | -61.81                       | 196                 | 1.8           | V              | -2.0                          | -63.8                      | -13            | -50.8          |
| 1697.6                            | -56.7                        | 97                  | 1.9           | H              | 4.1                           | -52.60                     | -13            | -39.60         |
| 1697.6                            | -56.2                        | 59                  | 1.7           | V              | 3.1                           | -53.10                     | -13            | -40.10         |
| 2546.4                            | -47.6                        | 301                 | 1.9           | H              | 6.1                           | -41.50                     | -13            | -28.50         |
| 2546.4                            | -45.0                        | 320                 | 1.9           | V              | 5.8                           | -39.20                     | -13            | -26.20         |
| 3395.2                            | -51.3                        | 163                 | 1.6           | H              | 6.2                           | -45.10                     | -13            | -32.10         |
| 3395.2                            | -50.0                        | 36                  | 1.9           | V              | 5.4                           | -44.60                     | -13            | -31.60         |

| Frequency<br>(MHz)                | Receiver<br>Reading<br>(dBm) | Turntable<br>Degree | Rx Antenna    |                | Substituted<br>Factor<br>(dB) | Absolute<br>Level<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) |
|-----------------------------------|------------------------------|---------------------|---------------|----------------|-------------------------------|----------------------------|----------------|----------------|
|                                   |                              |                     | Height<br>(m) | Polar<br>(H/V) |                               |                            |                |                |
| GSM1900                           |                              |                     |               |                |                               |                            |                |                |
| Test frequency range: 30MHz-20GHz |                              |                     |               |                |                               |                            |                |                |
| Low channel                       |                              |                     |               |                |                               |                            |                |                |
| 45.05                             | -73.36                       | 230                 | 1.8           | H              | 6.6                           | -66.8                      | -13            | -53.8          |
| 199.98                            | -61.08                       | 29                  | 2.0           | V              | -2.0                          | -63.1                      | -13            | -50.1          |
| 3700.4                            | -54.7                        | 34                  | 1.7           | H              | 8.1                           | -46.60                     | -13            | -33.60         |
| 3700.4                            | -54.2                        | 338                 | 1.8           | V              | 7.6                           | -46.60                     | -13            | -33.60         |
| 5550.6                            | -52.3                        | 7                   | 1.8           | H              | 9.6                           | -42.70                     | -13            | -29.70         |
| 5550.6                            | -48.8                        | 336                 | 2.0           | V              | 9.1                           | -39.70                     | -13            | -26.70         |
| Middle channel                    |                              |                     |               |                |                               |                            |                |                |
| 45.05                             | -73.43                       | 86                  | 1.6           | H              | 6.6                           | -66.8                      | -13            | -53.8          |
| 199.98                            | -62.00                       | 209                 | 2.0           | V              | -2.0                          | -64.0                      | -13            | -51.0          |
| 3760                              | -55.3                        | 278                 | 1.9           | H              | 8.8                           | -46.50                     | -13            | -33.50         |
| 3760                              | -54.4                        | 131                 | 1.8           | V              | 8                             | -46.40                     | -13            | -33.40         |
| 5640                              | -54.1                        | 138                 | 2.0           | H              | 10.2                          | -43.90                     | -13            | -30.90         |
| 5640                              | -49.1                        | 275                 | 1.9           | V              | 9.4                           | -39.70                     | -13            | -26.70         |
| High channel                      |                              |                     |               |                |                               |                            |                |                |
| 45.05                             | -74.19                       | 7                   | 1.9           | H              | 6.6                           | -67.6                      | -13            | -54.6          |
| 199.98                            | -63.00                       | 294                 | 1.5           | V              | -2.0                          | -65.0                      | -13            | -52.0          |
| 3819.6                            | -55.6                        | 238                 | 2.0           | H              | 8.7                           | -46.90                     | -13            | -33.90         |
| 3819.6                            | -54.8                        | 260                 | 1.8           | V              | 8                             | -46.80                     | -13            | -33.80         |
| 5729.4                            | -52.4                        | 233                 | 1.5           | H              | 10.6                          | -41.80                     | -13            | -28.80         |
| 5729.4                            | -49.3                        | 165                 | 2.0           | V              | 10.2                          | -39.10                     | -13            | -26.10         |

| Frequency<br>(MHz)                | Receiver<br>Reading<br>(dBm) | Turntable<br>Degree | Rx Antenna    |                | Substituted<br>Factor<br>(dB) | Absolute<br>Level<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) |
|-----------------------------------|------------------------------|---------------------|---------------|----------------|-------------------------------|----------------------------|----------------|----------------|
|                                   |                              |                     | Height<br>(m) | Polar<br>(H/V) |                               |                            |                |                |
| WCDMA Band2                       |                              |                     |               |                |                               |                            |                |                |
| Test frequency range: 30MHz-20GHz |                              |                     |               |                |                               |                            |                |                |
| Low channel                       |                              |                     |               |                |                               |                            |                |                |
| 45.05                             | -73.64                       | 324                 | 1.8           | H              | 6.6                           | -67.0                      | -13            | -54.0          |
| 199.98                            | -62.20                       | 60                  | 1.6           | V              | -2.0                          | -64.2                      | -13            | -51.2          |
| 3704.8                            | -55                          | 245                 | 1.7           | H              | 8.2                           | -46.8                      | -13            | -33.8          |
| 3704.8                            | -54.3                        | 0                   | 1.6           | V              | 7.6                           | -46.7                      | -13            | -33.7          |
| 5557.2                            | -53.9                        | 14                  | 2.0           | H              | 9.7                           | -44.2                      | -13            | -31.2          |
| 5557.2                            | -52.7                        | 262                 | 1.7           | V              | 9.1                           | -43.6                      | -13            | -30.6          |
| Middle channel                    |                              |                     |               |                |                               |                            |                |                |
| 45.05                             | -74.44                       | 24                  | 1.8           | H              | 6.6                           | -67.8                      | -13            | -54.8          |
| 199.98                            | -62.58                       | 58                  | 1.8           | V              | -2.0                          | -64.6                      | -13            | -51.6          |
| 3760                              | -56.6                        | 349                 | 1.9           | H              | 8.8                           | -47.8                      | -13            | -34.8          |
| 3760                              | -55.6                        | 266                 | 1.8           | V              | 8                             | -47.6                      | -13            | -34.6          |
| 5640                              | -55.5                        | 10                  | 1.8           | H              | 10.2                          | -45.3                      | -13            | -32.3          |
| 5640                              | -54.2                        | 316                 | 1.6           | V              | 9.4                           | -44.8                      | -13            | -31.8          |
| High channel                      |                              |                     |               |                |                               |                            |                |                |
| 45.05                             | -73.04                       | 199                 | 1.9           | H              | 6.6                           | -66.4                      | -13            | -53.4          |
| 199.98                            | -61.66                       | 270                 | 1.7           | V              | -2.0                          | -63.7                      | -13            | -50.7          |
| 3815.2                            | -56.2                        | 197                 | 1.8           | H              | 8.7                           | -47.5                      | -13            | -34.5          |
| 3815.2                            | -55.2                        | 30                  | 2.0           | V              | 7.9                           | -47.3                      | -13            | -34.3          |
| 5722.8                            | -55.3                        | 351                 | 1.6           | H              | 10.6                          | -44.7                      | -13            | -31.7          |
| 5722.8                            | -54                          | 25                  | 1.7           | V              | 10.1                          | -43.9                      | -13            | -30.9          |

| Frequency<br>(MHz)                | Receiver<br>Reading<br>(dBm) | Turntable<br>Degree | Rx Antenna    |                | Substituted<br>Factor<br>(dB) | Absolute<br>Level<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) |
|-----------------------------------|------------------------------|---------------------|---------------|----------------|-------------------------------|----------------------------|----------------|----------------|
|                                   |                              |                     | Height<br>(m) | Polar<br>(H/V) |                               |                            |                |                |
| WCDMA Band5                       |                              |                     |               |                |                               |                            |                |                |
| Test frequency range: 30MHz-10GHz |                              |                     |               |                |                               |                            |                |                |
| Low channel                       |                              |                     |               |                |                               |                            |                |                |
| 45.05                             | -73.63                       | 43                  | 1.5           | H              | 6.6                           | -67.0                      | -13            | -54.0          |
| 199.98                            | -62.47                       | 54                  | 1.8           | V              | -2.0                          | -64.5                      | -13            | -51.5          |
| 1652.8                            | -54.5                        | 251                 | 1.6           | H              | 3.5                           | -51                        | -13            | -38            |
| 1652.8                            | -54.8                        | 228                 | 1.7           | V              | 3.1                           | -51.7                      | -13            | -38.7          |
| 2479.2                            | -50.7                        | 136                 | 1.9           | H              | 6.5                           | -44.2                      | -13            | -31.2          |
| 2479.2                            | -50.1                        | 350                 | 1.9           | V              | 5.7                           | -44.4                      | -13            | -31.4          |
| 3305.6                            | -51.6                        | 211                 | 1.8           | H              | 6.4                           | -45.2                      | -13            | -32.2          |
| 3305.6                            | -51.5                        | 263                 | 2.1           | V              | 5.7                           | -45.8                      | -13            | -32.8          |
| Middle channel                    |                              |                     |               |                |                               |                            |                |                |
| 45.05                             | -74.12                       | 24                  | 1.8           | H              | 6.6                           | -67.5                      | -13            | -54.5          |
| 199.98                            | -62.76                       | 284                 | 2.0           | V              | -2.0                          | -64.8                      | -13            | -51.8          |
| 1673.2                            | -50.6                        | 149                 | 2.1           | H              | 3.8                           | -46.8                      | -13            | -33.8          |
| 1673.2                            | -50.6                        | 144                 | 2.1           | V              | 3.1                           | -47.5                      | -13            | -34.5          |
| 2509.8                            | -51.1                        | 178                 | 2.0           | H              | 6.2                           | -44.9                      | -13            | -31.9          |
| 2509.8                            | -50.9                        | 343                 | 2.0           | V              | 5.7                           | -45.2                      | -13            | -32.2          |
| 3346.4                            | -52.1                        | 42                  | 1.7           | H              | 6.6                           | -45.5                      | -13            | -32.5          |
| 3346.4                            | -51.3                        | 116                 | 2.0           | V              | 5.4                           | -45.9                      | -13            | -32.9          |
| High channel                      |                              |                     |               |                |                               |                            |                |                |
| 45.05                             | -73.69                       | 39                  | 1.7           | H              | 6.6                           | -67.1                      | -13            | -54.1          |
| 199.98                            | -62.82                       | 178                 | 1.5           | V              | -2.0                          | -64.8                      | -13            | -51.8          |
| 1693.2                            | -55.7                        | 99                  | 1.6           | H              | 4                             | -51.7                      | -13            | -38.7          |
| 1693.2                            | -55.6                        | 82                  | 2.0           | V              | 3.1                           | -52.5                      | -13            | -39.5          |
| 2509.8                            | -56.3                        | 114                 | 1.8           | H              | 6.1                           | -50.2                      | -13            | -37.2          |
| 2509.8                            | -55.7                        | 202                 | 1.7           | V              | 5.7                           | -50                        | -13            | -37            |
| 3386.4                            | -51.9                        | 237                 | 2.0           | H              | 6.3                           | -45.6                      | -13            | -32.6          |
| 3386.4                            | -51.2                        | 328                 | 1.5           | V              | 5.4                           | -45.8                      | -13            | -32.8          |

**LTE Bands:** (pre-scan all bandwidths, the worst case as below)

| Frequency<br>(MHz)                | Receiver<br>Reading<br>(dBm) | Turntable<br>Degree | Rx Antenna    |                | Substituted<br>Factor<br>(dB) | Absolute<br>Level<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) |
|-----------------------------------|------------------------------|---------------------|---------------|----------------|-------------------------------|----------------------------|----------------|----------------|
|                                   |                              |                     | Height<br>(m) | Polar<br>(H/V) |                               |                            |                |                |
| LTE Band 2                        |                              |                     |               |                |                               |                            |                |                |
| Test frequency range: 30MHz-20GHz |                              |                     |               |                |                               |                            |                |                |
| 1.4MHz, Low channel               |                              |                     |               |                |                               |                            |                |                |
| 45.05                             | -73.40                       | 155                 | 2.1           | H              | 6.6                           | -66.8                      | -13            | -53.8          |
| 199.98                            | -62.43                       | 231                 | 2.0           | V              | -2.0                          | -64.4                      | -13            | -51.4          |
| 3701.4                            | -55.2                        | 350                 | 2.0           | H              | 8.1                           | -47.1                      | -13            | -34.1          |
| 3701.4                            | -53.5                        | 288                 | 1.7           | V              | 7.6                           | -45.9                      | -13            | -32.9          |
| 5552.1                            | -52                          | 1                   | 1.6           | H              | 9.6                           | -42.4                      | -13            | -29.4          |
| 5552.1                            | -48.5                        | 16                  | 1.5           | V              | 9.1                           | -39.4                      | -13            | -26.4          |
| 1.4MHz, Middle channel            |                              |                     |               |                |                               |                            |                |                |
| 45.05                             | -72.80                       | 54                  | 1.6           | H              | 6.6                           | -66.2                      | -13            | -53.2          |
| 199.98                            | -61.81                       | 158                 | 1.9           | V              | -2.0                          | -63.8                      | -13            | -50.8          |
| 3760                              | -56.2                        | 111                 | 1.8           | H              | 8.8                           | -47.4                      | -13            | -34.4          |
| 3760                              | -54.3                        | 75                  | 1.7           | V              | 8                             | -46.3                      | -13            | -33.3          |
| 5640                              | -53.8                        | 148                 | 1.8           | H              | 10.2                          | -43.6                      | -13            | -30.6          |
| 5640                              | -49.1                        | 220                 | 1.8           | V              | 9.4                           | -39.7                      | -13            | -26.7          |
| 1.4MHz, High channel              |                              |                     |               |                |                               |                            |                |                |
| 45.05                             | -73.98                       | 58                  | 1.6           | H              | 6.6                           | -67.4                      | -13            | -54.4          |
| 199.98                            | -61.06                       | 149                 | 1.6           | V              | -2.0                          | -63.1                      | -13            | -50.1          |
| 3818.6                            | -55.6                        | 211                 | 1.5           | H              | 8.7                           | -46.9                      | -13            | -33.9          |
| 3818.6                            | -53.7                        | 287                 | 1.8           | V              | 8                             | -45.7                      | -13            | -32.7          |
| 5727.9                            | -53.7                        | 283                 | 2.0           | H              | 10.6                          | -43.1                      | -13            | -30.1          |
| 5727.9                            | -49.8                        | 181                 | 1.6           | V              | 10.2                          | -39.6                      | -13            | -26.6          |

| Frequency<br>(MHz)                | Receiver<br>Reading<br>(dBm) | Turntable<br>Degree | Rx Antenna    |                | Substituted<br>Factor<br>(dB) | Absolute<br>Level<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) |
|-----------------------------------|------------------------------|---------------------|---------------|----------------|-------------------------------|----------------------------|----------------|----------------|
|                                   |                              |                     | Height<br>(m) | Polar<br>(H/V) |                               |                            |                |                |
| LTE Band 5                        |                              |                     |               |                |                               |                            |                |                |
| Test frequency range: 30MHz-10GHz |                              |                     |               |                |                               |                            |                |                |
| 1.4MHz, Low channel               |                              |                     |               |                |                               |                            |                |                |
| 45.05                             | -74.10                       | 270                 | 1.7           | H              | 6.6                           | -67.5                      | -13            | -54.5          |
| 199.98                            | -62.21                       | 46                  | 2.1           | V              | -2.0                          | -64.2                      | -13            | -51.2          |
| 1649.4                            | -54.7                        | 307                 | 2.0           | H              | 3.2                           | -51.5                      | -13            | -38.5          |
| 1649.4                            | -56.2                        | 52                  | 1.7           | V              | 3.1                           | -53.1                      | -13            | -40.1          |
| 2474.1                            | -44.9                        | 135                 | 1.6           | H              | 6.6                           | -38.3                      | -13            | -25.3          |
| 2474.1                            | -42.4                        | 168                 | 1.8           | V              | 5.8                           | -36.6                      | -13            | -23.6          |
| 3298.8                            | -51.7                        | 262                 | 1.7           | H              | 6.4                           | -45.3                      | -13            | -32.3          |
| 3298.8                            | -50.9                        | 276                 | 1.6           | V              | 5.7                           | -45.2                      | -13            | -32.2          |
| 1.4MHz, Middle channel            |                              |                     |               |                |                               |                            |                |                |
| 45.05                             | -72.68                       | 315                 | 1.8           | H              | 6.6                           | -66.1                      | -13            | -53.1          |
| 199.98                            | -61.03                       | 90                  | 2.1           | V              | -2.0                          | -63.0                      | -13            | -50.0          |
| 1673.0                            | -50.1                        | 37                  | 1.7           | H              | 3.8                           | -46.3                      | -13            | -33.3          |
| 1673.0                            | -50.3                        | 149                 | 1.7           | V              | 3.1                           | -47.2                      | -13            | -34.2          |
| 2509.5                            | -43                          | 47                  | 2.0           | H              | 6.2                           | -36.8                      | -13            | -23.8          |
| 2509.5                            | -41                          | 199                 | 1.9           | V              | 5.6                           | -35.4                      | -13            | -22.4          |
| 3346.0                            | -51.4                        | 153                 | 1.5           | H              | 6.6                           | -44.8                      | -13            | -31.8          |
| 3346.0                            | -50                          | 202                 | 1.7           | V              | 5.4                           | -44.6                      | -13            | -31.6          |
| 1.4MHz, High channel              |                              |                     |               |                |                               |                            |                |                |
| 45.05                             | -72.80                       | 349                 | 1.5           | H              | 6.6                           | -66.2                      | -13            | -53.2          |
| 199.98                            | -62.29                       | 28                  | 1.8           | V              | -2.0                          | -64.3                      | -13            | -51.3          |
| 1696.6                            | -53.3                        | 204                 | 1.7           | H              | 4.1                           | -49.2                      | -13            | -36.2          |
| 1696.6                            | -52.4                        | 132                 | 2.0           | V              | 3.1                           | -49.3                      | -13            | -36.3          |
| 2544.9                            | -42.2                        | 322                 | 2.1           | H              | 6.1                           | -36.1                      | -13            | -23.1          |
| 2544.9                            | -29.1                        | 102                 | 1.8           | V              | 5.8                           | -23.3                      | -13            | -10.3          |
| 3393.2                            | -51.6                        | 177                 | 2.1           | H              | 6.3                           | -45.3                      | -13            | -32.3          |
| 3393.2                            | -50.1                        | 298                 | 1.6           | V              | 5.4                           | -44.7                      | -13            | -31.7          |

| Frequency<br>(MHz)                | Receiver<br>Reading<br>(dBm) | Turntable<br>Degree | Rx Antenna    |                | Substituted<br>Factor<br>(dB) | Absolute<br>Level<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) |
|-----------------------------------|------------------------------|---------------------|---------------|----------------|-------------------------------|----------------------------|----------------|----------------|
|                                   |                              |                     | Height<br>(m) | Polar<br>(H/V) |                               |                            |                |                |
| LTE Band12                        |                              |                     |               |                |                               |                            |                |                |
| Test frequency range: 30MHz-10GHz |                              |                     |               |                |                               |                            |                |                |
| 1.4MHz, Low channel               |                              |                     |               |                |                               |                            |                |                |
| 45.05                             | -74.34                       | 5                   | 1.7           | H              | 6.6                           | -67.7                      | -13            | -54.7          |
| 199.98                            | -61.96                       | 262                 | 1.9           | V              | -2.0                          | -64.0                      | -13            | -51.0          |
| 1399.4                            | -54.5                        | 77                  | 1.5           | H              | 5.9                           | -48.6                      | -13            | -35.6          |
| 1399.4                            | -57.2                        | 105                 | 1.7           | V              | 5.9                           | -51.3                      | -13            | -38.3          |
| 2099.1                            | -38.5                        | 0                   | 2.1           | H              | 6.3                           | -32.2                      | -13            | -19.2          |
| 2099.1                            | -40.5                        | 29                  | 1.7           | V              | 5.1                           | -35.4                      | -13            | -22.4          |
| 1.4MHz, Middle channel            |                              |                     |               |                |                               |                            |                |                |
| 45.05                             | -74.28                       | 69                  | 1.8           | H              | 6.6                           | -67.7                      | -13            | -54.7          |
| 199.98                            | -61.43                       | 228                 | 1.8           | V              | -2.0                          | -63.4                      | -13            | -50.4          |
| 1415                              | -59.7                        | 227                 | 2.1           | H              | 5.7                           | -54.0                      | -13            | -41.0          |
| 1415                              | -57.3                        | 201                 | 2.0           | V              | 5.4                           | -51.9                      | -13            | -38.9          |
| 2122.5                            | -42.9                        | 42                  | 1.7           | H              | 6.7                           | -36.2                      | -13            | -23.2          |
| 2122.5                            | -38.7                        | 314                 | 1.7           | V              | 5.8                           | -32.9                      | -13            | -19.9          |
| 1.4MHz, High channel              |                              |                     |               |                |                               |                            |                |                |
| 45.05                             | -74.42                       | 89                  | 1.8           | H              | 6.6                           | -67.8                      | -13            | -54.8          |
| 199.98                            | -62.97                       | 25                  | 1.5           | V              | -2.0                          | -65.0                      | -13            | -52.0          |
| 1430.6                            | -56.3                        | 263                 | 1.7           | H              | 5.4                           | -50.9                      | -13            | -37.9          |
| 1430.6                            | -54.5                        | 182                 | 1.6           | V              | 4.8                           | -49.7                      | -13            | -36.7          |
| 2145.9                            | -39.3                        | 285                 | 1.6           | H              | 7                             | -32.3                      | -13            | -19.3          |
| 2145.9                            | -43.1                        | 152                 | 1.6           | V              | 6.6                           | -36.5                      | -13            | -23.5          |

| Frequency<br>(MHz)                | Receiver<br>Reading<br>(dBm) | Turntable<br>Degree | Rx Antenna    |                | Substituted<br>Factor<br>(dB) | Absolute<br>Level<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) |
|-----------------------------------|------------------------------|---------------------|---------------|----------------|-------------------------------|----------------------------|----------------|----------------|
|                                   |                              |                     | Height<br>(m) | Polar<br>(H/V) |                               |                            |                |                |
| LTE Band13                        |                              |                     |               |                |                               |                            |                |                |
| Test frequency range: 30MHz-10GHz |                              |                     |               |                |                               |                            |                |                |
| 1.4MHz, Low channel               |                              |                     |               |                |                               |                            |                |                |
| 45.05                             | -73.60                       | 351                 | 1.9           | H              | 6.6                           | -67.0                      | -13            | -54.0          |
| 199.98                            | -61.07                       | 8                   | 2.0           | V              | -2.0                          | -63.1                      | -13            | -50.1          |
| 1559                              | -53.9                        | 174                 | 2.0           | H              | 4.2                           | -49.7                      | -40            | -9.7           |
| 1559                              | -54.4                        | 98                  | 1.7           | V              | 3.3                           | -51.1                      | -40            | -11.1          |
| 2338.5                            | -40                          | 160                 | 1.9           | H              | 7.3                           | -32.7                      | -13            | -19.7          |
| 2338.5                            | -38.8                        | 309                 | 2.0           | V              | 6.5                           | -32.3                      | -13            | -19.3          |
| 3118                              | -53.3                        | 81                  | 1.6           | H              | 7.3                           | -46.0                      | -13            | -33.0          |
| 3118                              | -51.7                        | 311                 | 1.8           | V              | 6.5                           | -45.2                      | -13            | -32.2          |
| 1.4MHz, Middle channel            |                              |                     |               |                |                               |                            |                |                |
| 45.05                             | -74.10                       | 116                 | 2.0           | H              | 6.6                           | -67.5                      | -13            | -54.5          |
| 199.98                            | -61.11                       | 326                 | 1.8           | V              | -2.0                          | -63.1                      | -13            | -50.1          |
| 1564                              | -56                          | 130                 | 1.7           | H              | 4.2                           | -51.8                      | -40            | -11.8          |
| 1564                              | -55.5                        | 161                 | 2.0           | V              | 3.3                           | -52.2                      | -40            | -12.2          |
| 2346                              | -43.8                        | 289                 | 1.9           | H              | 7.3                           | -36.5                      | -13            | -23.5          |
| 2346                              | -40.8                        | 37                  | 1.7           | V              | 6.4                           | -34.4                      | -13            | -21.4          |
| 3128                              | -53.9                        | 31                  | 1.8           | H              | 7.3                           | -46.6                      | -13            | -33.6          |
| 3128                              | -52.2                        | 290                 | 1.9           | V              | 6.6                           | -45.6                      | -13            | -32.6          |
| 1.4MHz, High channel              |                              |                     |               |                |                               |                            |                |                |
| 45.05                             | -74.45                       | 140                 | 1.8           | H              | 6.6                           | -67.9                      | -13            | -54.9          |
| 199.98                            | -61.63                       | 93                  | 1.8           | V              | -2.0                          | -63.6                      | -13            | -50.6          |
| 1569                              | -58.2                        | 131                 | 1.5           | H              | 4.2                           | -54.0                      | -40            | -14.0          |
| 1569                              | -54.7                        | 203                 | 1.9           | V              | 3.3                           | -51.4                      | -40            | -11.4          |
| 2353.5                            | -51.6                        | 338                 | 1.7           | H              | 7.3                           | -44.3                      | -13            | -31.3          |
| 2353.5                            | -43.7                        | 252                 | 1.8           | V              | 6.4                           | -37.3                      | -13            | -24.3          |
| 3138                              | -52.9                        | 169                 | 2.1           | H              | 7.4                           | -45.5                      | -13            | -32.5          |
| 3138                              | -51.7                        | 325                 | 1.9           | V              | 6.6                           | -45.1                      | -13            | -32.1          |

| Frequency<br>(MHz)                  | Receiver<br>Reading<br>(dBm) | Turntable<br>Degree | Rx Antenna    |                | Substituted<br>Factor<br>(dB) | Absolute<br>Level<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) |
|-------------------------------------|------------------------------|---------------------|---------------|----------------|-------------------------------|----------------------------|----------------|----------------|
|                                     |                              |                     | Height<br>(m) | Polar<br>(H/V) |                               |                            |                |                |
| LTE Band41                          |                              |                     |               |                |                               |                            |                |                |
| Test frequency range: 30MHz-26.5GHz |                              |                     |               |                |                               |                            |                |                |
| 5MHz, Low channel                   |                              |                     |               |                |                               |                            |                |                |
| 45.05                               | -72.69                       | 319                 | 2.1           | H              | 6.6                           | -66.1                      | -25            | -41.1          |
| 199.98                              | -61.62                       | 68                  | 1.9           | V              | -2.0                          | -63.6                      | -25            | -38.6          |
| 5075                                | -52.5                        | 12                  | 1.6           | H              | 11.2                          | -41.3                      | -25            | -16.3          |
| 5075                                | -53.3                        | 78                  | 1.6           | V              | 10.8                          | -42.5                      | -25            | -17.5          |
| 7612.5                              | -64.6                        | 320                 | 1.9           | H              | 21.2                          | -43.4                      | -25            | -18.4          |
| 7612.5                              | -64.9                        | 125                 | 1.9           | V              | 20.2                          | -44.7                      | -25            | -19.7          |
| 5MHz, Middle channel                |                              |                     |               |                |                               |                            |                |                |
| 45.05                               | -74.33                       | 15                  | 2.0           | H              | 6.6                           | -67.7                      | -25            | -42.7          |
| 199.98                              | -61.36                       | 249                 | 1.6           | V              | -2.0                          | -63.4                      | -25            | -38.4          |
| 5190                                | -54.92                       | 306                 | 2.0           | H              | 10.52                         | -44.4                      | -25            | -19.4          |
| 5190                                | -54.7                        | 5                   | 2.0           | V              | 10                            | -44.7                      | -25            | -19.7          |
| 7785                                | -61.5                        | 234                 | 2.0           | H              | 18.3                          | -43.2                      | -25            | -18.2          |
| 7785                                | -59.7                        | 345                 | 1.6           | V              | 18                            | -41.7                      | -25            | -16.7          |
| 5MHz, High channel                  |                              |                     |               |                |                               |                            |                |                |
| 45.05                               | -73.99                       | 236                 | 2.1           | H              | 6.6                           | -67.4                      | -25            | -42.4          |
| 199.98                              | -61.98                       | 8                   | 1.5           | V              | -2.0                          | -64.0                      | -25            | -39.0          |
| 5305                                | -52.1                        | 137                 | 2.1           | H              | 9.6                           | -42.5                      | -25            | -17.5          |
| 5305                                | -50                          | 344                 | 1.8           | V              | 8.8                           | -41.2                      | -25            | -16.2          |
| 7957.5                              | -64.1                        | 84                  | 1.8           | H              | 18.9                          | -45.2                      | -25            | -20.2          |
| 7957.5                              | -63.1                        | 225                 | 1.7           | V              | 18.5                          | -44.6                      | -25            | -19.6          |

**Note:**

Absolute Level = Reading Level + Substituted Factor

Substituted Factor contains: SG Level - Cable loss+ Antenna Gain

Margin = Absolute Level - Limit

**FCC§ 22.917 (a);§ 24.238 (a); §27.53 (c)(h)(m) - BAND EDGES****Applicable Standard**

According to § 22.917(a), the power of any emissions 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.

According to §24.238(a), the power of any emissions 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.

According to FCC §27.53 (c), For operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

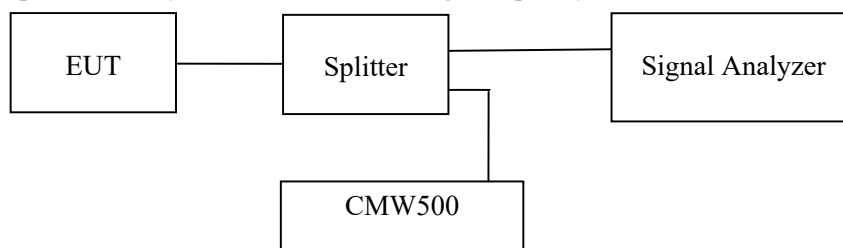
- (1) On any frequency outside the 746-758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least  $43 + 10 \log(P)$  dB;
- (2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least  $43 + 10 \log(P)$  dB;
- (3) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than  $76 + 10 \log(P)$  dB in a 6.25 kHz band segment, for base and fixed stations;
- (4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than  $65 + 10 \log(P)$  dB in a 6.25 kHz band segment, for mobile and portable stations;

According to FCC §27.53 (h)(m), 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.

**Test Procedure**

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

The center of the spectrum analyzer was set to block edge frequency



**Test Data****Environmental Conditions**

|                           |           |
|---------------------------|-----------|
| <b>Temperature:</b>       | 26 °C     |
| <b>Relative Humidity:</b> | 56 %      |
| <b>ATM Pressure:</b>      | 101.0 kPa |

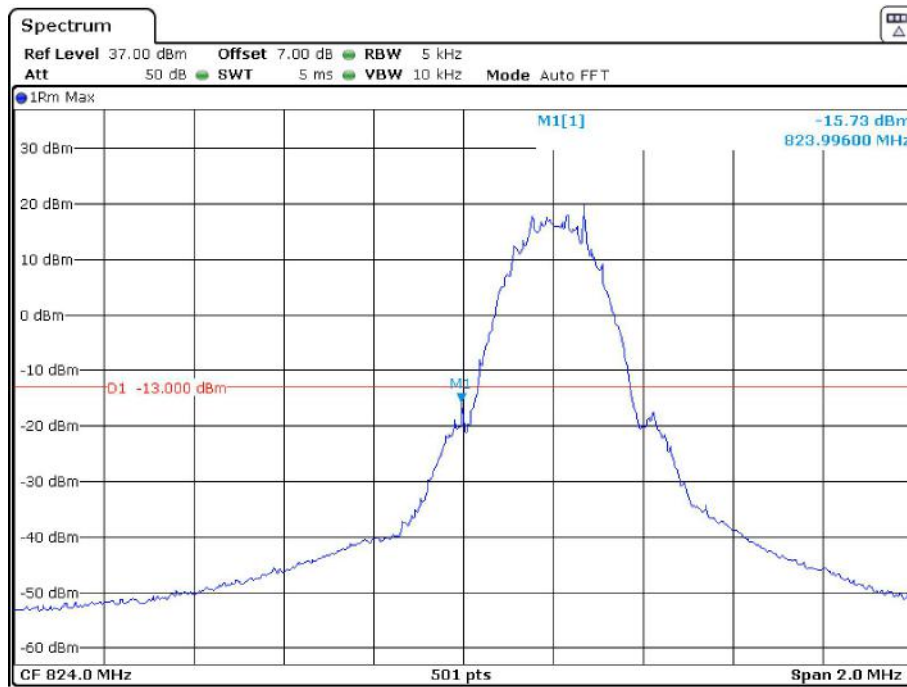
*The testing was performed by Key Pei from 2022-2022-03-24 to 2022-05-17*

*EUT operation mode: Transmitting (Worst case)*

**Test Result: Pass**

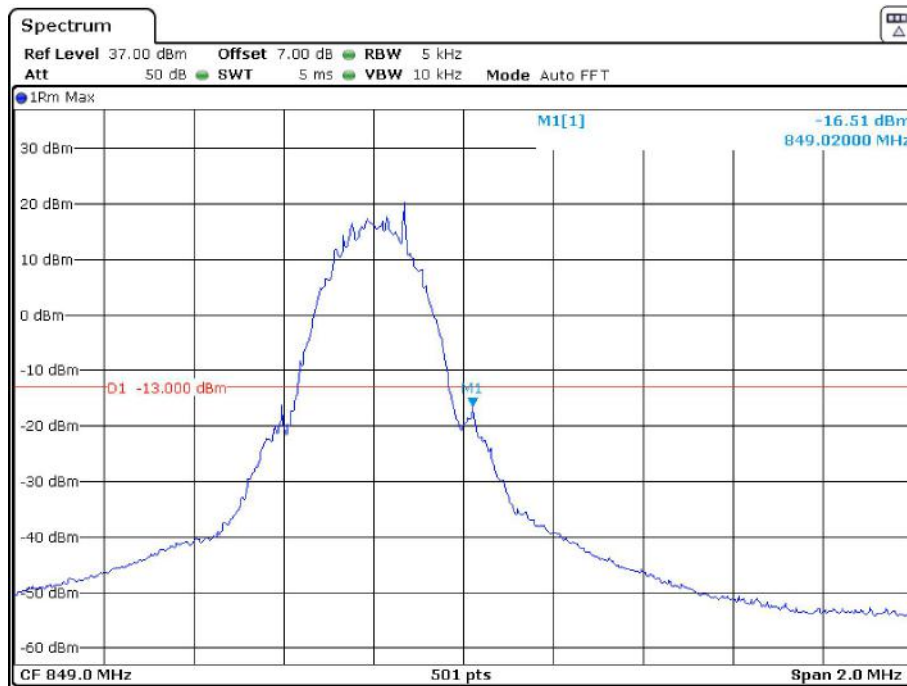
*Please refer to the following plots.*

## Cellular Band, Left Band Edge for GSM (GMSK) Mode



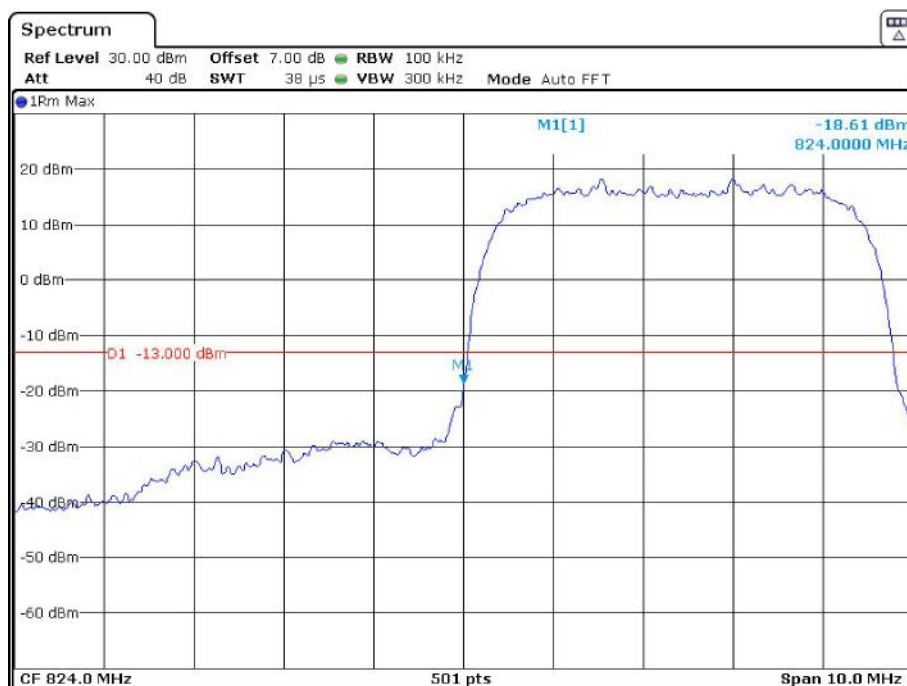
Date: 31.MAR.2022 15:43:16

## Cellular Band, Right Band Edge for GSM (GMSK) Mode



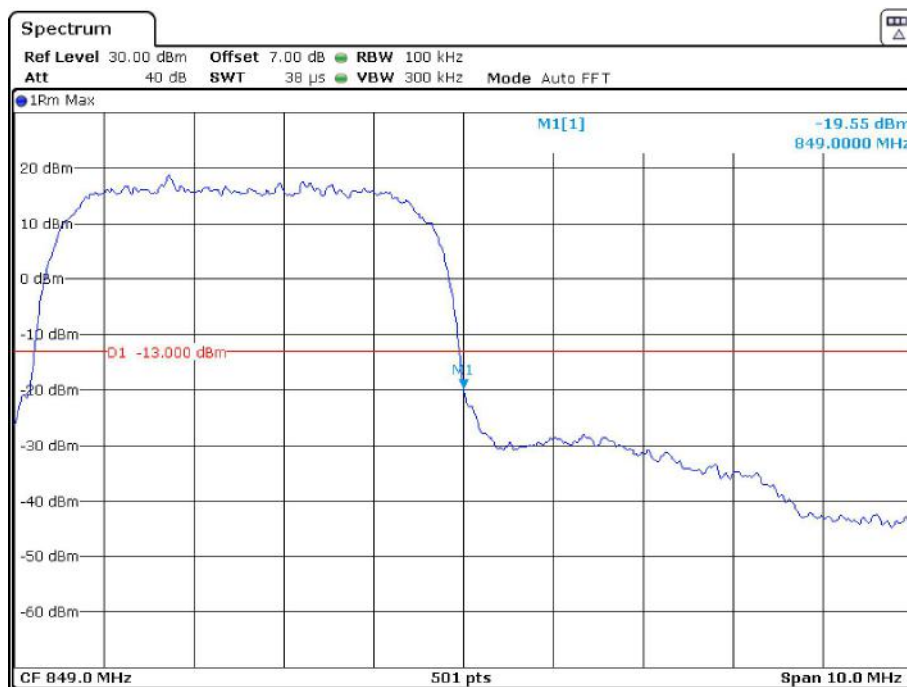
Date: 31.MAR.2022 15:43:49

## Cellular Band, Left Band Edge for RMC (BPSK) Mode



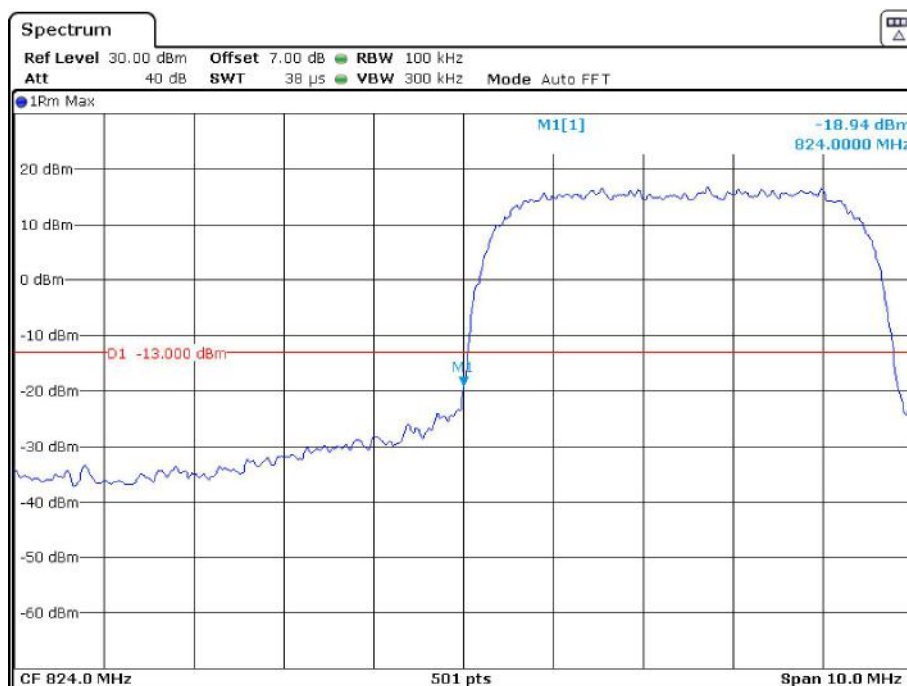
Date: 31.MAR.2022 17:05:39

## Cellular Band, Right Band Edge for RMC (BPSK) Mode



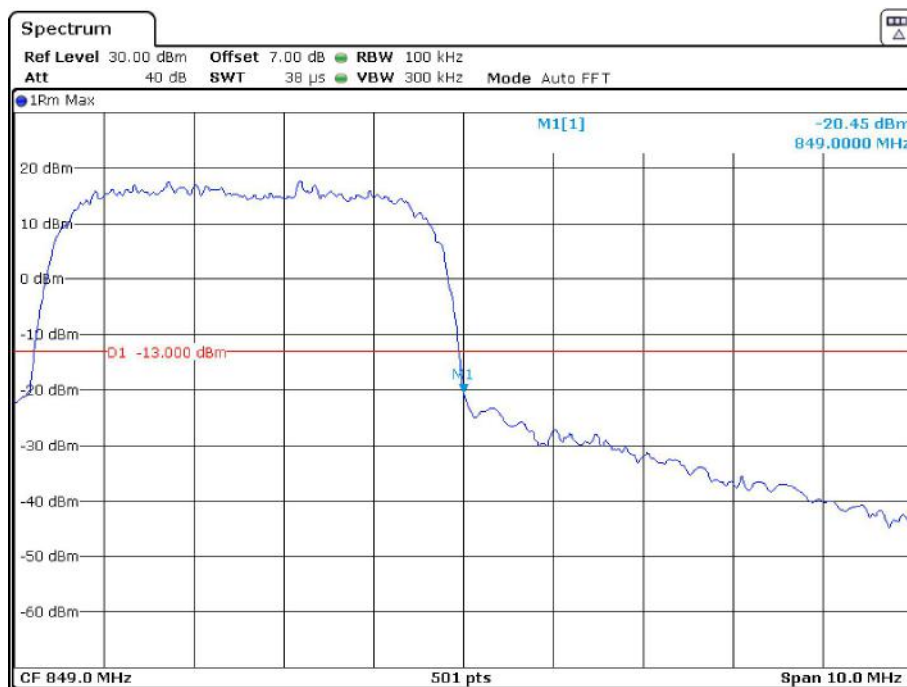
Date: 31.MAR.2022 17:06:09

## Cellular Band, Left Band Edge for HSDPA(16QAM) Mode



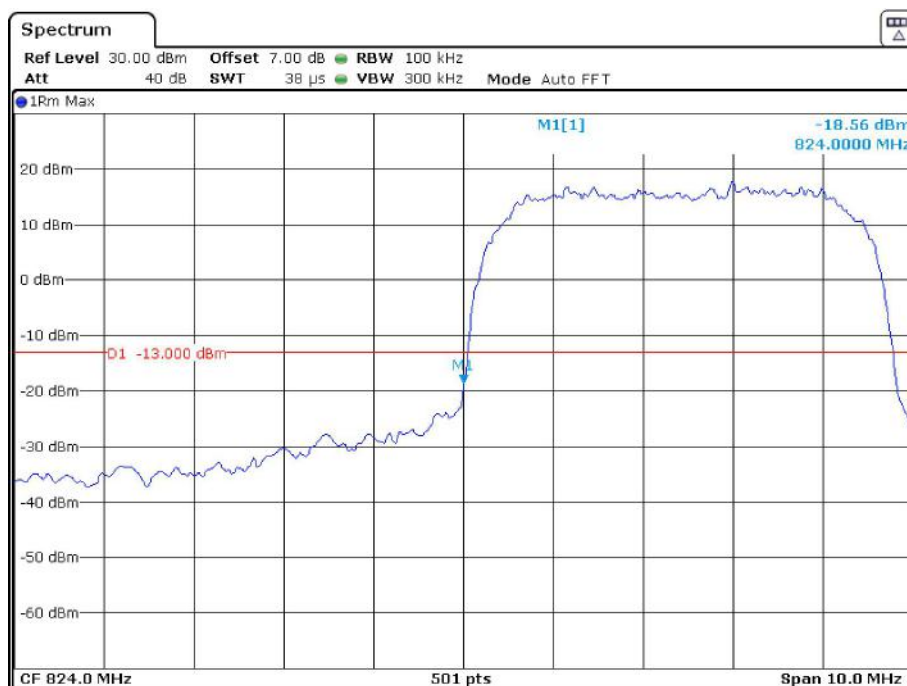
Date: 31.MAR.2022 17:07:48

## Cellular Band, Right Band Edge for HSDPA (16QAM) Mode



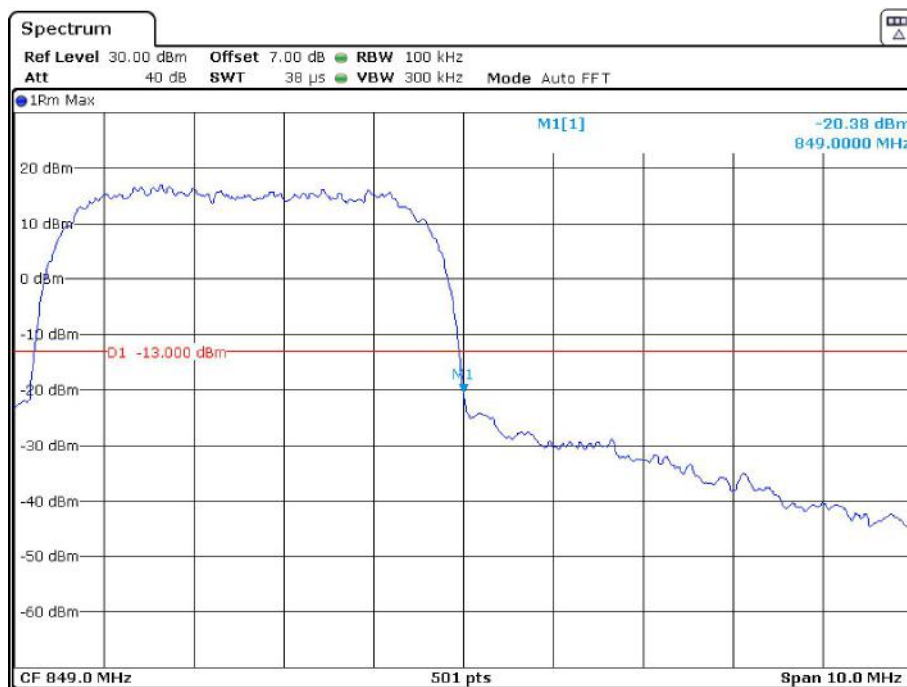
Date: 31.MAR.2022 17:07:29

## Cellular Band, Left Band Edge for HSUPA (QPSK) Mode



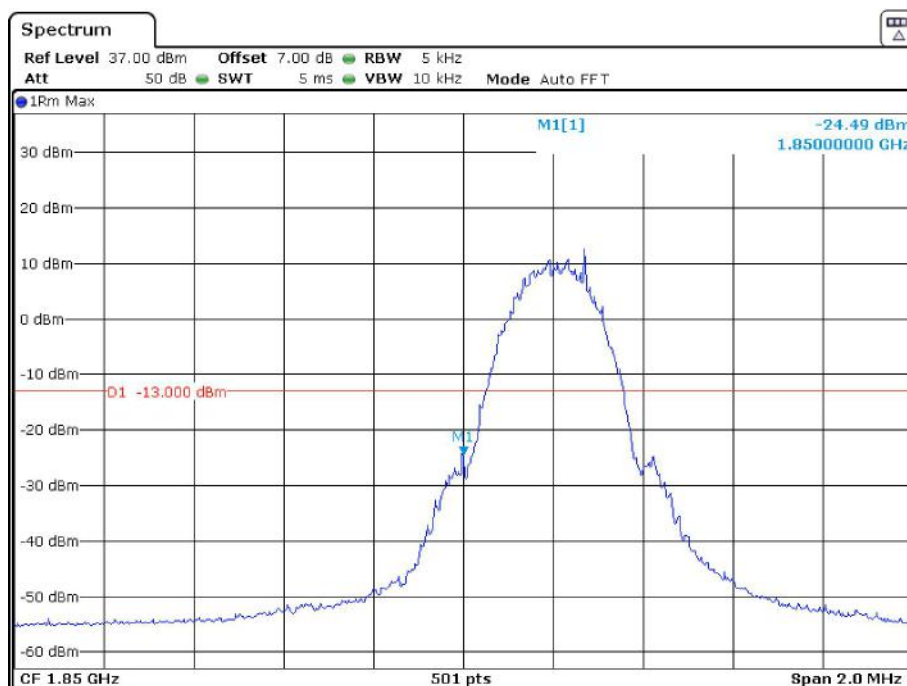
Date: 31.MAR.2022 17:18:47

## Cellular Band, Right Band Edge for HSUPA (QPSK) Mode



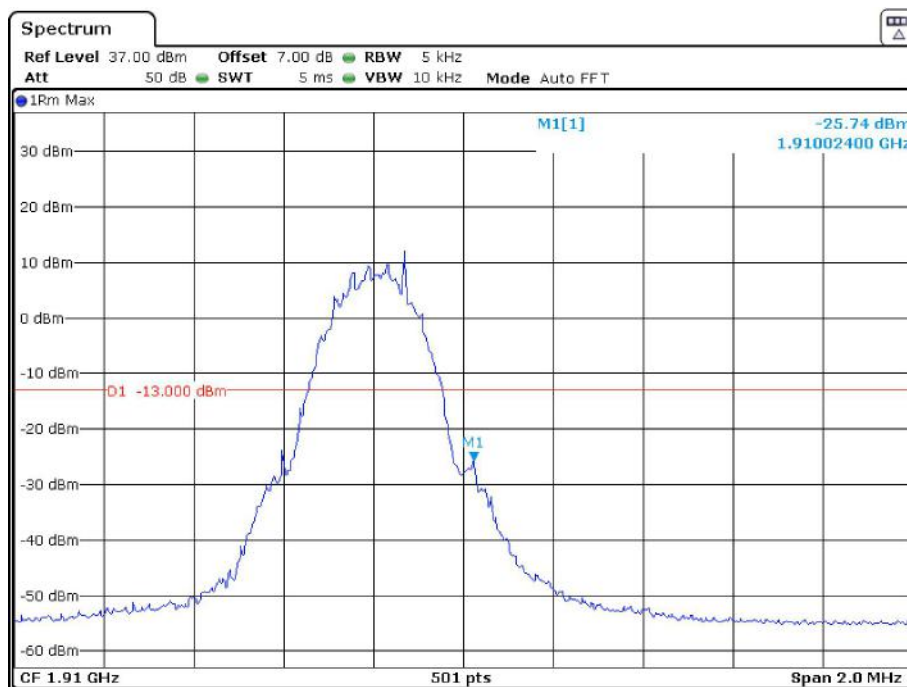
Date: 31.MAR.2022 17:19:08

## PCS Band, Left Band Edge for GSM (GMSK) Mode



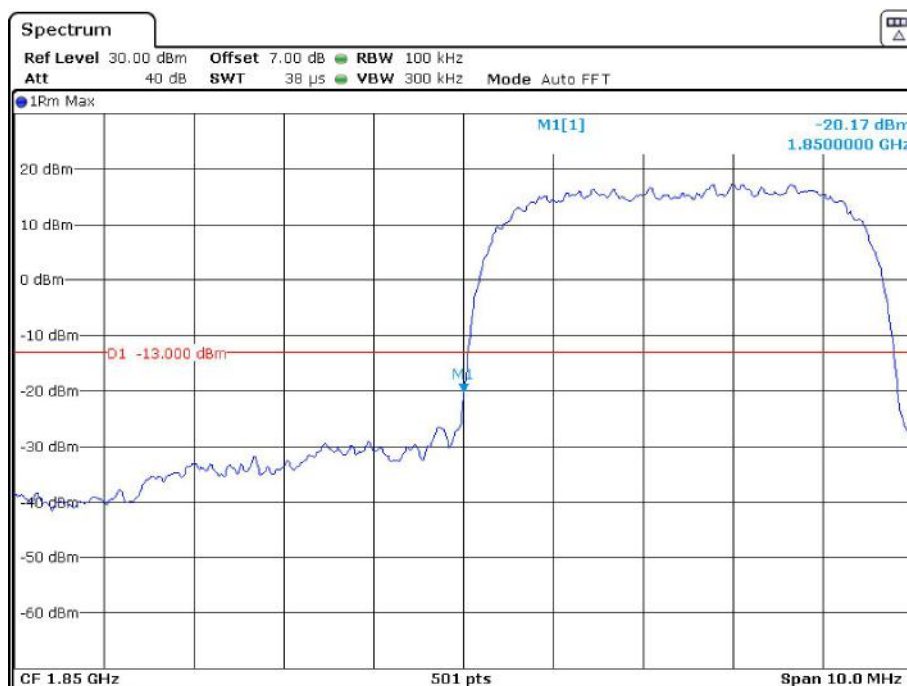
Date: 31.MAR.2022 16:04:16

## PCS Band, Right Band Edge for GSM (GMSK) Mode



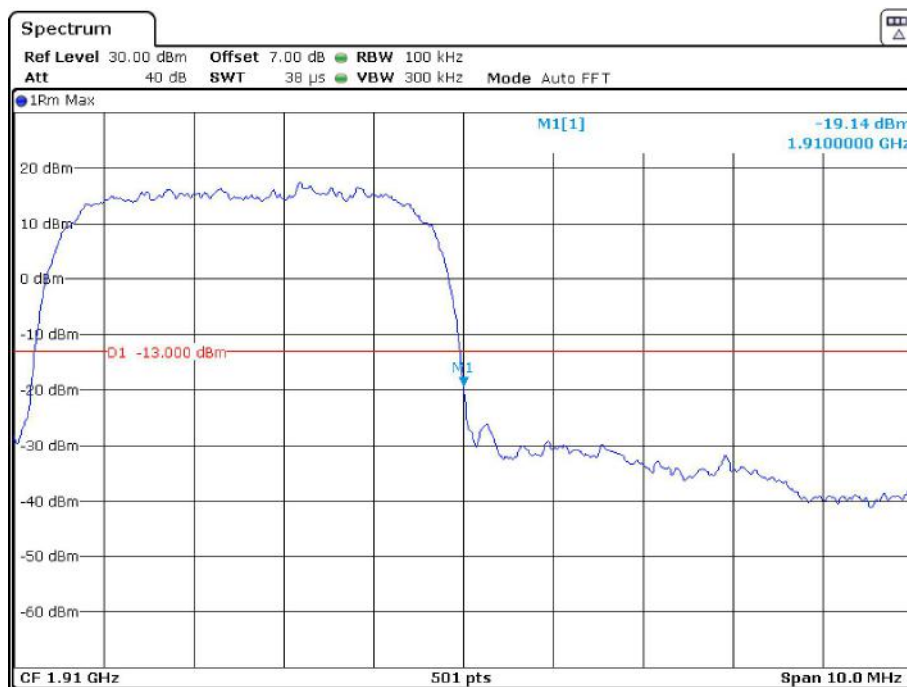
Date: 31.MAR.2022 16:04:56

## PCS Band, Left Band Edge for RMC (BPSK) Mode



Date: 31.MAR.2022 16:41:30

## PCS Band, Right Band Edge for RMC (BPSK) Mode



Date: 31.MAR.2022 16:41:13

**Spectrum**

Ref Level 30.00 dBm Offset 7.00 dB RBW 100 kHz  
Att 40 dB SWT 38  $\mu$ s VBW 300 kHz Mode Auto FFT

1Rm Max

20 dBm  
10 dBm  
0 dBm  
-10 dBm  
-20 dBm  
-30 dBm  
-40 dBm  
-50 dBm  
-60 dBm

M1[1] -20.26 dBm  
1.8500000 GHz

D1 -13.000 dBm

CF 1.85 GHz 501 pts Span 10.0 MHz

**Spectrum**

Ref Level 30.00 dBm Offset 7.00 dB RBW 100 kHz  
 Att 40 dB SWT 38  $\mu$ s VBW 300 kHz Mode Auto FFT

1Rm Max

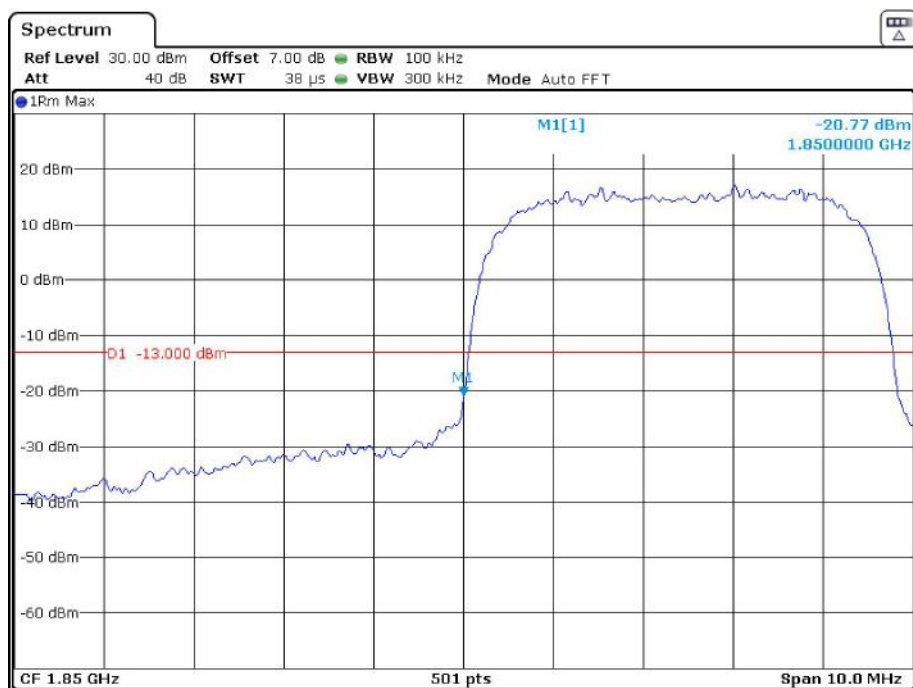
M1[1] -19.32 dBm  
 1.9100000 GHz

D1 -13.000 dBm

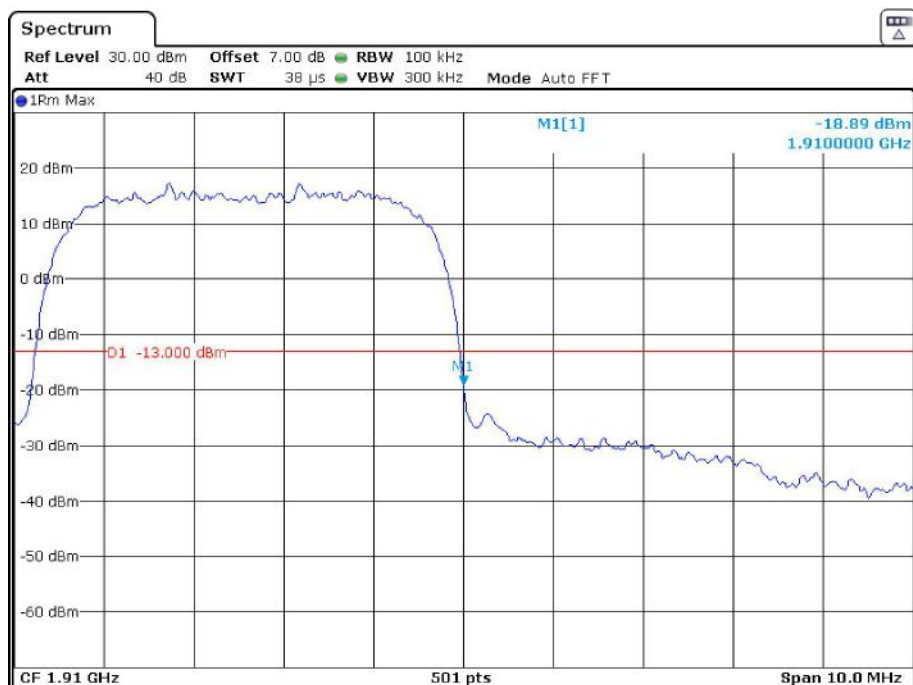
N1

CF 1.91 GHz 501 pts Span 10.0 MHz

FCC -2G,3G,4G

**PCS Band, Left Band Edge for HSUPA (QPSK) Mode**

Date: 31.MAR.2022 16:52:54

**PCS Band, Right Band Edge for HSUPA (QPSK) Mode**

Date: 31.MAR.2022 16:52:34

The test plots of LTE bands please refer to the Appendix C.

## **FCC § 2.1055; § 22.355; § 24.235; §27.54 - FREQUENCY STABILITY**

### **Applicable Standard**

FCC § 2.1055, §22.355, §24.235&§27.54.

According to FCC §2.1055, the frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

According to §22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table below:

Frequency Tolerance for Transmitters in the Public Mobile Services

| Frequency Range (MHz) | Base, fixed (ppm) | Mobile ≤ 3 watts (ppm) | Mobile > 3 watts (ppm) |
|-----------------------|-------------------|------------------------|------------------------|
| 25 to 50              | 20.0              | 20.0                   | 50.0                   |
| 50 to 450             | 5.0               | 5.0                    | 50.0                   |
| 450 to 512            | 2.5               | 5.0                    | 5.0                    |
| 821 to 896            | 1.5               | 2.5                    | 2.5                    |
| 928 to 929.           | 5.0               | N/A                    | N/A                    |
| 929 to 960.           | 1.5               | N/A                    | N/A                    |
| 2110 to 2220          | 10.0              | N/A                    | N/A                    |

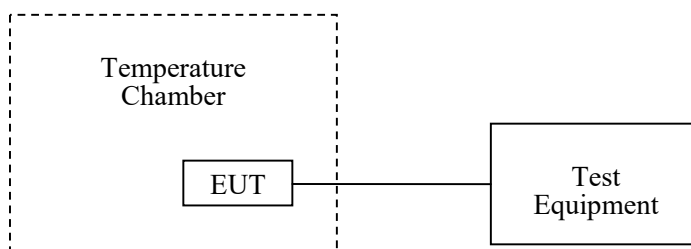
According to §24.235&§27.54, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

### **Test Procedure**

**Frequency Stability vs. Temperature:** The equipment under test was connected to an external AC power supply and the RF output was connected to communication test set via feed-through attenuators. The EUT was placed inside the temperature chamber. The AC leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the communication test set.

**Frequency Stability vs. Voltage:** For hand carried, battery powered equipment; reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.



**Test Data****Environmental Conditions**

|                           |           |
|---------------------------|-----------|
| <b>Temperature:</b>       | 26 °C     |
| <b>Relative Humidity:</b> | 56 %      |
| <b>ATM Pressure:</b>      | 101.0 kPa |

*The testing was performed by Key Pei from 2022-03-24 to 2022-05-09.*

*EUT operation mode: Transmitting*

**Test Result: Pass**

*Please refer to the following tables.*

**Cellular Band (Part 22H)****GSM Mode**

| Middle Channel, $f_0 = 836.6\text{MHz}$ |                                     |                      |                       |             |
|-----------------------------------------|-------------------------------------|----------------------|-----------------------|-------------|
| Temperature (°C)                        | Voltage Supplied (V <sub>DC</sub> ) | Frequency Error (Hz) | Frequency Error (ppm) | Limit (ppm) |
| -30                                     | N.V.                                | 3                    | 0.0036                | 2.5         |
| -20                                     |                                     | 4                    | 0.0048                | 2.5         |
| -10                                     |                                     | 6                    | 0.0072                | 2.5         |
| 0                                       |                                     | 7                    | 0.0084                | 2.5         |
| 10                                      |                                     | 8                    | 0.0096                | 2.5         |
| 20                                      |                                     | 10                   | 0.0120                | 2.5         |
| 30                                      |                                     | 9                    | 0.0108                | 2.5         |
| 40                                      |                                     | 6                    | 0.0072                | 2.5         |
| 50                                      |                                     | 8                    | 0.0096                | 2.5         |
| 20                                      | L.V.                                | 6                    | 0.0072                | 2.5         |
|                                         | H.V.                                | 4                    | 0.0048                | 2.5         |

**WCDMA Mode**

| <b>Middle Channel, <math>f_0 = 836.6\text{MHz}</math></b> |                                                  |                                     |                                      |                        |
|-----------------------------------------------------------|--------------------------------------------------|-------------------------------------|--------------------------------------|------------------------|
| <b>Temperature<br/>(°C)</b>                               | <b>Voltage<br/>Supplied<br/>(V<sub>DC</sub>)</b> | <b>Frequency<br/>Error<br/>(Hz)</b> | <b>Frequency<br/>Error<br/>(ppm)</b> | <b>Limit<br/>(ppm)</b> |
| -30                                                       | N.V.                                             | 1.23                                | 0.0015                               | 2.5                    |
| -20                                                       |                                                  | 2.37                                | 0.0028                               | 2.5                    |
| -10                                                       |                                                  | 3.21                                | 0.0038                               | 2.5                    |
| 0                                                         |                                                  | 1.52                                | 0.0018                               | 2.5                    |
| 10                                                        |                                                  | -1.33                               | -0.0016                              | 2.5                    |
| 20                                                        |                                                  | 0.83                                | 0.0010                               | 2.5                    |
| 30                                                        |                                                  | 1.96                                | 0.0023                               | 2.5                    |
| 40                                                        |                                                  | 1.47                                | 0.0018                               | 2.5                    |
| 50                                                        |                                                  | 1.62                                | 0.0019                               | 2.5                    |
| 20                                                        | L.V.                                             | 1.88                                | 0.0022                               | 2.5                    |
|                                                           | H.V.                                             | 1.73                                | 0.0021                               | 2.5                    |

**PCS Band (Part 24E)**  
**GSM Mode**

| Middle Channel, $f_0=1880.0$ MHz |                                     |                      |                       |        |
|----------------------------------|-------------------------------------|----------------------|-----------------------|--------|
| Temperature (°C)                 | Voltage Supplied (V <sub>DC</sub> ) | Frequency Error (Hz) | Frequency Error (ppm) | Result |
| -30                              | N.V.                                | 8                    | 0.0043                | pass   |
| -20                              |                                     | -6                   | -0.0032               | pass   |
| -10                              |                                     | 15                   | 0.0080                | pass   |
| 0                                |                                     | 11                   | 0.0059                | pass   |
| 10                               |                                     | -12                  | -0.0064               | pass   |
| 20                               |                                     | -7                   | -0.0037               | pass   |
| 30                               |                                     | -9                   | -0.0048               | pass   |
| 40                               |                                     | -14                  | -0.0074               | pass   |
| 50                               |                                     | 6                    | 0.0032                | pass   |
| 20                               | L.V.                                | 8                    | 0.0043                | pass   |
|                                  | H.V.                                | -10                  | -0.0053               | pass   |

**WCDMA Mode**

| Middle Channel, $f_0=1880.0$ MHz |                                     |                      |                       |        |
|----------------------------------|-------------------------------------|----------------------|-----------------------|--------|
| Temperature (°C)                 | Voltage Supplied (V <sub>DC</sub> ) | Frequency Error (Hz) | Frequency Error (ppm) | Result |
| -30                              | N.V.                                | 1.45                 | 0.0008                | pass   |
| -20                              |                                     | 1.33                 | 0.0007                | pass   |
| -10                              |                                     | 1.26                 | 0.0007                | pass   |
| 0                                |                                     | 1.29                 | 0.0007                | pass   |
| 10                               |                                     | 2.17                 | 0.0012                | pass   |
| 20                               |                                     | 1.07                 | 0.0006                | pass   |
| 30                               |                                     | 2.31                 | 0.0012                | pass   |
| 40                               |                                     | 1.22                 | 0.0006                | pass   |
| 50                               |                                     | 1.42                 | 0.0008                | pass   |
| 20                               | L.V.                                | 1.32                 | 0.0007                | pass   |
|                                  | H.V.                                | 1.46                 | 0.0008                | pass   |

**LTE:**  
**QPSK:**  
**Band 2:**

| 10.0 MHz Middle Channel, $f_0=1880\text{MHz}$ |                                     |                      |                       |        |
|-----------------------------------------------|-------------------------------------|----------------------|-----------------------|--------|
| Temperature (°C)                              | Voltage Supplied (V <sub>DC</sub> ) | Frequency Error (Hz) | Frequency Error (ppm) | Result |
| -30                                           | 7.6                                 | 21.84                | 0.0116                | pass   |
| -20                                           |                                     | -9.97                | -0.0053               | pass   |
| -10                                           |                                     | -6.13                | -0.0033               | pass   |
| 0                                             |                                     | 6.17                 | 0.0033                | pass   |
| 10                                            |                                     | 7.92                 | 0.0042                | pass   |
| 20                                            |                                     | 6.46                 | 0.0034                | pass   |
| 30                                            |                                     | -6.52                | -0.0035               | pass   |
| 40                                            |                                     | 7.18                 | 0.0038                | pass   |
| 50                                            |                                     | -9.69                | -0.0052               | pass   |
| 20                                            | L.V.                                | -8.17                | -0.0043               | pass   |
|                                               | H.V.                                | -7.05                | -0.0038               | pass   |

**Band 5:**

| 10.0 MHz Middle Channel, $f_0=836.5\text{MHz}$ |                                     |                      |                       |             |
|------------------------------------------------|-------------------------------------|----------------------|-----------------------|-------------|
| Temperature (°C)                               | Voltage Supplied (V <sub>DC</sub> ) | Frequency Error (Hz) | Frequency Error (ppm) | Limit (ppm) |
| -30                                            | N.V.                                | 19.74                | 0.0236                | 2.5         |
| -20                                            |                                     | -9.97                | -0.0119               | 2.5         |
| -10                                            |                                     | -6.13                | -0.0073               | 2.5         |
| 0                                              |                                     | 6.17                 | 0.0074                | 2.5         |
| 10                                             |                                     | 7.92                 | 0.0095                | 2.5         |
| 20                                             |                                     | 6.46                 | 0.0077                | 2.5         |
| 30                                             |                                     | -6.52                | -0.0078               | 2.5         |
| 40                                             |                                     | 7.18                 | 0.0086                | 2.5         |
| 50                                             |                                     | -9.69                | -0.0116               | 2.5         |
| 20                                             | L.V.                                | -8.17                | -0.0098               | 2.5         |
|                                                | H.V.                                | -7.05                | -0.0084               | 2.5         |

**Band 12:**

| 10 MHz Bandwidth |                                   |                      |                      |                            |                            |
|------------------|-----------------------------------|----------------------|----------------------|----------------------------|----------------------------|
| Temperature (°C) | Power Supplied (V <sub>DC</sub> ) | F <sub>L</sub> (MHz) | F <sub>H</sub> (MHz) | F <sub>L</sub> Limit (MHz) | F <sub>H</sub> Limit (MHz) |
| -30              | N.V.                              | 699.0374             | 715.9632             | 699                        | 716                        |
| -20              |                                   | 699.0362             | 715.9627             | 699                        | 716                        |
| -10              |                                   | 699.0362             | 715.9671             | 699                        | 716                        |
| 0                |                                   | 699.0318             | 715.9665             | 699                        | 716                        |
| 10               |                                   | 699.0345             | 715.9647             | 699                        | 716                        |
| 20               |                                   | 699.0384             | 715.9672             | 699                        | 716                        |
| 30               |                                   | 699.0378             | 715.9665             | 699                        | 716                        |
| 40               |                                   | 699.0377             | 715.9691             | 699                        | 716                        |
| 50               |                                   | 699.0362             | 715.9654             | 699                        | 716                        |
| 20               | L.V.                              | 699.0338             | 715.9672             | 699                        | 716                        |
|                  | H.V.                              | 699.0375             | 715.9647             | 699                        | 716                        |

**Band 13:**

| 10 MHz Bandwidth |                                   |                      |                      |                            |                            |
|------------------|-----------------------------------|----------------------|----------------------|----------------------------|----------------------------|
| Temperature (°C) | Power Supplied (V <sub>DC</sub> ) | F <sub>L</sub> (MHz) | F <sub>H</sub> (MHz) | F <sub>L</sub> Limit (MHz) | F <sub>H</sub> Limit (MHz) |
| -30              | N.V.                              | 777.1295             | 786.8467             | 777                        | 787                        |
| -20              |                                   | 777.1237             | 786.8437             | 777                        | 787                        |
| -10              |                                   | 777.1276             | 786.8445             | 777                        | 787                        |
| 0                |                                   | 777.1216             | 786.8465             | 777                        | 787                        |
| 10               |                                   | 777.1248             | 786.8456             | 777                        | 787                        |
| 20               |                                   | 777.1297             | 786.8482             | 777                        | 787                        |
| 30               |                                   | 777.1256             | 786.8487             | 777                        | 787                        |
| 40               |                                   | 777.1295             | 786.8495             | 777                        | 787                        |
| 50               |                                   | 777.1264             | 786.8452             | 777                        | 787                        |
| 20               | L.V.                              | 777.1212             | 786.8461             | 777                        | 787                        |
|                  | H.V.                              | 777.1267             | 786.8445             | 777                        | 787                        |

**Band 41:**

| 10 MHz Bandwidth |                                   |                      |                      |                            |                            |
|------------------|-----------------------------------|----------------------|----------------------|----------------------------|----------------------------|
| Temperature (°C) | Power Supplied (V <sub>DC</sub> ) | F <sub>L</sub> (MHz) | F <sub>H</sub> (MHz) | F <sub>L</sub> Limit (MHz) | F <sub>H</sub> Limit (MHz) |
| -30              | N.V.                              | 2535.0567            | 2654.9455            | 2535                       | 2655                       |
| -20              |                                   | 2535.0558            | 2654.9468            | 2535                       | 2655                       |
| -10              |                                   | 2535.0525            | 2654.9406            | 2535                       | 2655                       |
| 0                |                                   | 2535.0539            | 2654.9427            | 2535                       | 2655                       |
| 10               |                                   | 2535.0528            | 2654.9425            | 2535                       | 2655                       |
| 20               |                                   | 2535.0526            | 2654.9472            | 2535                       | 2655                       |
| 30               |                                   | 2535.0512            | 2654.9467            | 2535                       | 2655                       |
| 40               |                                   | 2535.0565            | 2654.9452            | 2535                       | 2655                       |
| 50               |                                   | 2535.0574            | 2654.9395            | 2535                       | 2655                       |
| 20               | L.V.                              | 2535.0497            | 2654.9414            | 2535                       | 2655                       |
|                  | H.V.                              | 2535.0512            | 2654.9422            | 2535                       | 2655                       |

Note: the frequency range of LTE B41 is 2535-2655MHz which was declared by applicant.

**16QAM:****Band 2:**

| 10.0 MHz Middle Channel, f <sub>0</sub> =1880MHz |                                     |                      |                       |        |
|--------------------------------------------------|-------------------------------------|----------------------|-----------------------|--------|
| Temperature (°C)                                 | Voltage Supplied (V <sub>DC</sub> ) | Frequency Error (Hz) | Frequency Error (ppm) | Result |
| -30                                              | N.V.                                | 35.69                | 0.0190                | pass   |
| -20                                              |                                     | -6.68                | -0.0036               | pass   |
| -10                                              |                                     | 9.77                 | 0.0052                | pass   |
| 0                                                |                                     | -7.62                | -0.0041               | pass   |
| 10                                               |                                     | -9.91                | -0.0053               | pass   |
| 20                                               |                                     | -9.82                | -0.0052               | pass   |
| 30                                               |                                     | -6.68                | -0.0036               | pass   |
| 40                                               |                                     | -8.85                | -0.0047               | pass   |
| 50                                               |                                     | 5.67                 | 0.0030                | pass   |
| 20                                               | L.V.                                | 6.05                 | 0.0032                | pass   |
|                                                  | H.V.                                | 7.52                 | 0.0040                | pass   |

**Band 5:**

| 10.0 MHz Middle Channel, $f_0=836.5\text{MHz}$ |                               |                      |                       |             |
|------------------------------------------------|-------------------------------|----------------------|-----------------------|-------------|
| Temperature (°C)                               | Voltage Supplied ( $V_{DC}$ ) | Frequency Error (Hz) | Frequency Error (ppm) | Limit (ppm) |
| -30                                            | N.V.                          | -18.50               | -0.0221               | 2.5         |
| -20                                            |                               | -6.68                | -0.0080               | 2.5         |
| -10                                            |                               | 9.77                 | 0.0117                | 2.5         |
| 0                                              |                               | -7.62                | -0.0091               | 2.5         |
| 10                                             |                               | -9.91                | -0.0118               | 2.5         |
| 20                                             |                               | -9.82                | -0.0117               | 2.5         |
| 30                                             |                               | -6.68                | -0.0080               | 2.5         |
| 40                                             |                               | -8.85                | -0.0106               | 2.5         |
| 50                                             |                               | 5.67                 | 0.0068                | 2.5         |
| 20                                             | L.V.                          | 6.05                 | 0.0072                | 2.5         |
|                                                | H.V.                          | 7.52                 | 0.0090                | 2.5         |

**Band 12:**

| 10 MHz Bandwidth |                             |             |             |                   |                   |
|------------------|-----------------------------|-------------|-------------|-------------------|-------------------|
| Temperature (°C) | Power Supplied ( $V_{DC}$ ) | $F_L$ (MHz) | $F_H$ (MHz) | $F_L$ Limit (MHz) | $F_H$ Limit (MHz) |
| -30              | N.V.                        | 699.0387    | 715.9688    | 699               | 716               |
| -20              |                             | 699.0355    | 715.9627    | 699               | 716               |
| -10              |                             | 699.0398    | 715.9674    | 699               | 716               |
| 0                |                             | 699.0345    | 715.9676    | 699               | 716               |
| 10               |                             | 699.0355    | 715.9657    | 699               | 716               |
| 20               |                             | 699.0407    | 715.9628    | 699               | 716               |
| 30               |                             | 699.0355    | 715.9626    | 699               | 716               |
| 40               |                             | 699.0342    | 715.9644    | 699               | 716               |
| 50               |                             | 699.0385    | 715.9636    | 699               | 716               |
| 20               | L.V.                        | 699.0367    | 715.9665    | 699               | 716               |
|                  | H.V.                        | 699.0345    | 715.9676    | 699               | 716               |

**Band 13:**

| 10 MHz Bandwidth |                                   |                      |                      |                            |                            |
|------------------|-----------------------------------|----------------------|----------------------|----------------------------|----------------------------|
| Temperature (°C) | Power Supplied (V <sub>DC</sub> ) | F <sub>L</sub> (MHz) | F <sub>H</sub> (MHz) | F <sub>L</sub> Limit (MHz) | F <sub>H</sub> Limit (MHz) |
| -30              | N.V.                              | 777.0316             | 786.9217             | 777                        | 787                        |
| -20              |                                   | 777.0362             | 786.9243             | 777                        | 787                        |
| -10              |                                   | 777.0357             | 786.9245             | 777                        | 787                        |
| 0                |                                   | 777.0365             | 786.9276             | 777                        | 787                        |
| 10               |                                   | 777.0317             | 786.9237             | 777                        | 787                        |
| 20               |                                   | 777.0328             | 786.9248             | 777                        | 787                        |
| 30               |                                   | 777.0332             | 786.9217             | 777                        | 787                        |
| 40               |                                   | 777.0315             | 786.9249             | 777                        | 787                        |
| 50               |                                   | 777.0297             | 786.9247             | 777                        | 787                        |
| 20               | L.V.                              | 777.0342             | 786.9253             | 777                        | 787                        |
|                  | H.V.                              | 777.0346             | 786.9214             | 777                        | 787                        |

**Band 41:**

| 10 MHz Bandwidth |                                   |                      |                      |                            |                            |
|------------------|-----------------------------------|----------------------|----------------------|----------------------------|----------------------------|
| Temperature (°C) | Power Supplied (V <sub>DC</sub> ) | F <sub>L</sub> (MHz) | F <sub>H</sub> (MHz) | F <sub>L</sub> Limit (MHz) | F <sub>H</sub> Limit (MHz) |
| -30              | N.V.                              | 2535.0512            | 2654.8539            | 2535                       | 2655                       |
| -20              |                                   | 2535.0495            | 2654.8532            | 2535                       | 2655                       |
| -10              |                                   | 2535.0432            | 2654.8556            | 2535                       | 2655                       |
| 0                |                                   | 2535.0458            | 2654.8582            | 2535                       | 2655                       |
| 10               |                                   | 2535.0457            | 2654.8548            | 2535                       | 2655                       |
| 20               |                                   | 2535.0433            | 2654.8555            | 2535                       | 2655                       |
| 30               |                                   | 2535.0472            | 2654.8562            | 2535                       | 2655                       |
| 40               |                                   | 2535.0445            | 2654.8536            | 2535                       | 2655                       |
| 50               |                                   | 2535.0462            | 2654.8595            | 2535                       | 2655                       |
| 20               | L.V.                              | 2535.0487            | 2654.8547            | 2535                       | 2655                       |
|                  | H.V.                              | 2535.0428            | 2654.8553            | 2535                       | 2655                       |

Note: the frequency range of LTE B41 is 2535-2655MHz which was declared by applicant.

\*\*\*\*\* **END OF REPORT** \*\*\*\*\*