



# TESTREPORT

Applicant Name : Bolt Modus Corp  
Address : Oficina N.33 Edificio Ofidepositos Central, Calidonia - Distrito  
Federal, Panama  
Report Number : RA221205-59242E-RF-00C  
FCC ID: 2APW4LIV3S

## Test Standard (s)

FCC PART 22H; FCC PART 24E

## Sample Description

Product Type: 3G Smart Phone  
Model No.: LIV3S  
Multiple Model(s) No.: N/A  
Trade Mark: YEZZ  
Date Received: 2022/12/05  
Report Date: 2022/12/21

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

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

**Prepared and Checked By:**

**Approved By:**

*Andy Yu*

Andy Yu  
EMC Engineer

*Candy Li*

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

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**DOCUMENT REVISION HISTORY**

| Revision Number | Report Number          | Description of Revision | Date of Revision |
|-----------------|------------------------|-------------------------|------------------|
| 0               | RA221205-59242E-RF-00C | Original Report         | 2022/12/21       |

## 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) |
| Modulation Technique   | 2G: GMSK<br>3G: BPSK, QPSK, 16QAM                                                                                                                                                           |
| Antenna Specification* | GSM850/WCDMA Band 5: -2.0dBi<br>PCS 1900/WCDMA Band 2: -1.6dBi<br>(provided by the applicant)                                                                                               |
| Voltage Range          | DC 3.85V from battery or DC 5V from adapter                                                                                                                                                 |
| Sample serial number   | 1U07-4 for Radiated Emissions Test<br>1TYL-1 for RF Conducted Test<br>(Assigned by ATC)                                                                                                     |
| Sample/EUT Status      | Good condition                                                                                                                                                                              |
| Adapter information    | Model: CLIV3S<br>Input: AC 100-240V, 50/60Hz<br>Output: DC 5.0V, 1A                                                                                                                         |
| Extreme condition*     | L.V.: Low Voltage 3.45V<br>N.V.: Normal Voltage 3.85V<br>H.V.: High Voltage 4.4V<br>(provided by the applicant)                                                                             |

### Objective

This test report is in accordance with Part 2-Subpart J, Part 22-Subpart H, Part24-Subpart E 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

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 output power, conducted   |                 | ±0.73dB                 |
| Unwanted Emission, conducted |                 | ±1.6dB                  |
| RF Frequency                 |                 | ±0.082*10 <sup>-7</sup> |
| Emissions,<br>Radiated       | 30MHz - 1GHz    | ±4.28dB                 |
|                              | 1GHz - 18GHz    | ±4.98dB                 |
|                              | 18GHz - 26.5GHz | ±5.06dB                 |
| 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.

Test was performed as below table:

| 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  |

### Equipment Modifications

No modification was made to the EUT.

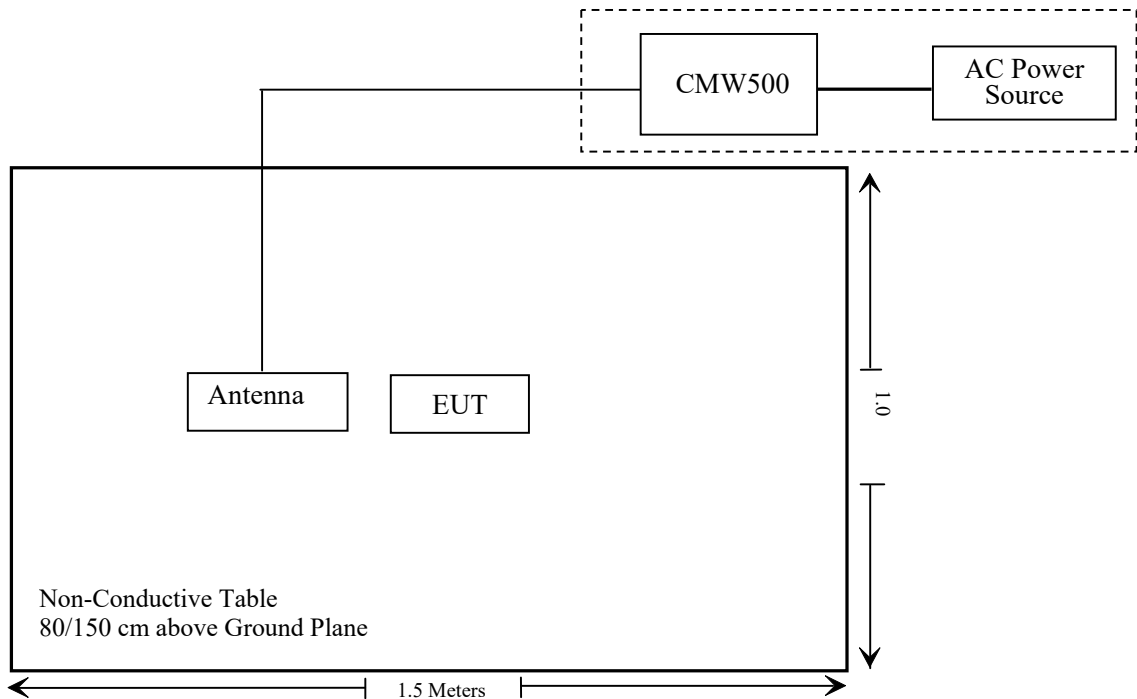
### Support Equipment List and Details

| Manufacturer    | Description                         | Model  | Serial Number |
|-----------------|-------------------------------------|--------|---------------|
| Rohde & Schwarz | Wideband Radio Communication Tester | CMW500 | 154606        |

### 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) (d);<br>§ 24.232 (c) (d) | RF Output Power                        | Compliant      |
| § 2.1047                                       | Modulation Characteristics             | Not Applicable |
| § 2.1049; § 22.905;<br>§ 22.917; § 24.238      | Occupied Bandwidth                     | Compliant      |
| § 2.1051; §22.917 (a);<br>§ 24.238 (a)         | Spurious Emissions at Antenna Terminal | Compliant      |
| § 2.1053; § 22.917 (a);<br>§ 24.238 (a)        | Field Strength of Spurious Radiation   | Compliant      |
| § 22.917 (a);<br>§ 24.238 (a);                 | Band Edge                              | Compliant      |
| § 2.1055; § 22.355;<br>§ 24.235                | 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                 | 2022/11/25       | 2023/11/24           |
| Rohde&Schwarz                                   | Spectrum Analyzer | FSV40                | 101949                 | 2022/11/25       | 2023/11/24           |
| SONOMA INSTRUMENT                               | Amplifier         | 310 N                | 186131                 | 2022/11/08       | 2023/11/07           |
| A.H. Systems, inc.                              | Preamplifier      | PAM-0118P            | 135                    | 2022/11/08       | 2023/11/07           |
| Quinstar                                        | Amplifier         | QLW-184055<br>36-J0  | 15964001002            | 2022/11/08       | 2023/11/07           |
| Radiated Emission Test Software: e3 19821b (V9) |                   |                      |                        |                  |                      |
| Unknown                                         | RF Coaxial Cable  | No.10                | N050                   | 2022/11/25       | 2023/11/24           |
| Unknown                                         | RF Coaxial Cable  | No.11                | N1000                  | 2022/11/25       | 2023/11/24           |
| Unknown                                         | RF Coaxial Cable  | No.12                | N040                   | 2022/11/25       | 2023/11/24           |
| Unknown                                         | RF Coaxial Cable  | No.13                | N300                   | 2022/11/25       | 2023/11/24           |
| Unknown                                         | RF Coaxial Cable  | No.14                | N800                   | 2022/11/25       | 2023/11/24           |
| Unknown                                         | RF Coaxial Cable  | No.15                | N600                   | 2022/11/25       | 2023/11/24           |
| Unknown                                         | RF Coaxial Cable  | No.16                | N650                   | 2022/11/25       | 2023/11/24           |
| 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<br>(ATC-BA-024-1) | 2020/01/05       | 2023/01/04           |
| PASTERNAK                                       | Horn Antenn       | PE9852/2F-20         | 1120<br>(ATC-BA-025-1) | 2020/01/05       | 2023/01/04           |
| Wainwright                                      | High Pass Filter  | WHKX3.6/18<br>G-10SS | 5                      | 2021/12/14       | 2022/12/13           |
| CD                                              | High Pass Filter  | HPM-1.2/18G<br>-60   | 110                    | 2021/12/14       | 2022/12/13           |
| Unknown                                         | RF Coaxial Cable  | No.16                | N200                   | 2022/11/25       | 2023/11/24           |
| Agilent                                         | Signal Generator  | N5183A               | MY51040755             | 2022/11/25       | 2023/11/24           |

| Manufacturer      | Description                         | Model       | Serial Number | Calibration Date | Calibration Due Date |
|-------------------|-------------------------------------|-------------|---------------|------------------|----------------------|
| RF Conducted Test |                                     |             |               |                  |                      |
| SPECTRUM ANALYZER | Rohde & Schwarz                     | FSU26       | 200982        | 2022/07/04       | 2023/07/03           |
| Rohde & Schwarz   | Wideband Radio Communication Tester | CMW500      | 154606        | 2022/11/25       | 2023/11/24           |
| Mini-Circuits     | Power Splitter                      | DC-18000MHz | SF10944151S   | 2022/11/25       | 2023/11/24           |
| REALE             | Temp. & Humid. Chamber              | RHP-800BT   | R20170318310  | 2022/11/23       | 2023/11/22           |
| Fluke             | Multi Meter                         | 45          | 7664009       | 2021/12/14       | 2022/12/13           |
| Manson            | DC Power Source                     | KPS-6604    | ATCS-205      | NCR              | NCR                  |
| Unknown           | RF Coaxial Cable                    | No.33       | RF-03         | Each time        |                      |

\* 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§1.1307 and §2.1093.

### **Test Result**

Compliant, please refer to the SAR report: RA221205-59242E-SA.

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

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

## **FCC § 2.1046, § 22.913 (a) (d) & § 24.232(c) (d) - 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.

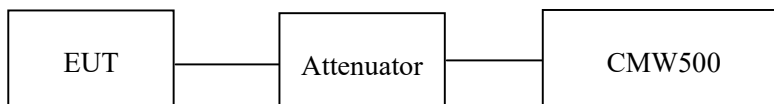
According to FCC §2.1046 and §24.232 (c), mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

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

### **Test Procedure**

*Conducted method:*

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



Note: the path loss (cable loss and attenuator) has included in the result.

### **Test Data**

#### **Environmental Conditions**

|                           |           |
|---------------------------|-----------|
| <b>Temperature:</b>       | 25.7 °C   |
| <b>Relative Humidity:</b> | 58.2 %    |
| <b>ATM Pressure:</b>      | 101.0 kPa |

*The testing was performed by Glenn Jiang on 2022-12-12 and 2022-12-13.*

**Cellular Band (Part 22H)**

| Mode | Channel | Frequency (MHz) | Average Output Power (dBm) | ERP(dBm)     | Limit (dBm) |
|------|---------|-----------------|----------------------------|--------------|-------------|
| GSM  | 128     | 824.2           | 32.30                      | 27.65        | 38.45       |
|      | 190     | 836.6           | 32.40                      | 27.75        | 38.45       |
|      | 251     | 848.8           | 32.60                      | <b>27.95</b> | 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           | 32.22                      | 30.49   | 28.93   | 27.16   | 27.57    | 25.84   | 24.28   | 22.51   | 38.45       |
|      | 190     | 836.6           | 32.36                      | 30.51   | 28.93   | 27.14   | 27.71    | 25.86   | 24.28   | 22.49   | 38.45       |
|      | 251     | 848.8           | 32.54                      | 30.56   | 28.91   | 27.06   | 27.89    | 25.91   | 24.26   | 22.41   | 38.45       |

| Mode              | Test Mode | 3GPP Sub Test | Average Output Power (dBm) |       |       | ERP(dBm) |              |       |
|-------------------|-----------|---------------|----------------------------|-------|-------|----------|--------------|-------|
|                   |           |               | Low                        | Mid   | High  | Low      | Mid          | High  |
| WCDMA<br>(Band 5) | RMC12.2k  |               | 22.02                      | 23.41 | 21.77 | 17.37    | <b>18.76</b> | 17.12 |
|                   | HSDPA     | 1             | 20.84                      | 22.53 | 20.45 | 16.19    | 17.88        | 15.80 |
|                   |           | 2             | 20.77                      | 22.41 | 20.34 | 16.12    | 17.76        | 15.69 |
|                   |           | 3             | 20.69                      | 22.39 | 20.37 | 16.04    | 17.74        | 15.72 |
|                   |           | 4             | 20.57                      | 22.28 | 20.41 | 15.92    | 17.63        | 15.76 |
|                   | HSUPA     | 1             | 20.82                      | 22.23 | 20.43 | 16.17    | 17.58        | 15.78 |
|                   |           | 2             | 20.75                      | 22.14 | 20.41 | 16.10    | 17.49        | 15.76 |
|                   |           | 3             | 20.68                      | 22.26 | 20.37 | 16.03    | 17.61        | 15.72 |
|                   |           | 4             | 20.59                      | 22.31 | 20.42 | 15.94    | 17.66        | 15.77 |
|                   |           | 5             | 20.74                      | 22.18 | 20.39 | 16.09    | 17.53        | 15.74 |
|                   | HSPA+     | 1             | 20.63                      | 22.19 | 20.47 | 15.98    | 17.54        | 15.82 |

Note: ERP(dBm) = Conducted Power(dBm) + Antenna Gain(dBd) - L<sub>C</sub> (dB)

For GSM850 / WCDMA Band5: Antenna Gain = -2.0 dBi = -4.15dBd (0dBd=2.15dBi)

L<sub>C</sub> = signal attenuation in the connecting cable between the transmitter and antenna in 0.5dB

Limit: ERP ≤ 38.45dBm

**PCS Band (Part 24E)**

| Mode | Channel | Frequency (MHz) | Average Output Power (dBm) | EIRP(dBm) | Limit (dBm) |
|------|---------|-----------------|----------------------------|-----------|-------------|
| GSM  | 512     | 1850.2          | 29.00                      | 26.40     | 33          |
|      | 661     | 1880.0          | 29.00                      | 26.40     | 33          |
|      | 810     | 1909.8          | 29.10                      | 26.50     | 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          | 28.96                      | 26.64   | 25.35   | 23.48   | 26.36        | 24.04   | 22.75   | 20.88   | 33          |
|      | 661     | 1880.0          | 28.97                      | 26.55   | 25.25   | 23.38   | 26.37        | 23.95   | 22.65   | 20.78   | 33          |
|      | 810     | 1909.8          | 29.16                      | 26.66   | 25.34   | 23.47   | <b>26.56</b> | 24.06   | 22.74   | 20.87   | 33          |

| Mode           | Test Mode | 3GPP Sub Test | Average Output Power (dBm) |       |       | EIRP(dBm) |       |       |
|----------------|-----------|---------------|----------------------------|-------|-------|-----------|-------|-------|
|                |           |               | Low                        | Mid   | High  | Low       | Mid   | High  |
| WCDMA (Band 2) | RMC12.2k  |               | 21.94                      | 21.93 | 22.11 | 19.34     | 19.33 | 19.51 |
|                | HSDPA     | 1             | 21.48                      | 20.89 | 21.29 | 18.88     | 18.29 | 18.69 |
|                |           | 2             | 21.36                      | 20.78 | 21.22 | 18.76     | 18.18 | 18.62 |
|                |           | 3             | 21.28                      | 20.84 | 21.23 | 18.68     | 18.24 | 18.63 |
|                |           | 4             | 21.25                      | 20.81 | 21.17 | 18.65     | 18.21 | 18.57 |
|                | HSUPA     | 1             | 21.39                      | 20.77 | 21.27 | 18.79     | 18.17 | 18.67 |
|                |           | 2             | 21.33                      | 20.68 | 21.11 | 18.73     | 18.08 | 18.51 |
|                |           | 3             | 21.28                      | 20.59 | 21.17 | 18.68     | 17.99 | 18.57 |
|                |           | 4             | 21.25                      | 20.71 | 21.16 | 18.65     | 18.11 | 18.56 |
|                |           | 5             | 21.31                      | 20.66 | 21.15 | 18.71     | 18.06 | 18.55 |
|                | HSPA+     | 1             | 21.27                      | 20.58 | 21.18 | 18.67     | 17.98 | 18.58 |

Note: EIRP(dBm) = Conducted Power(dBm) + Antenna Gain(dBi) - L<sub>C</sub> (dB)

For PCS1900 / WCDMA Band2: Antenna Gain = -1.60dBi

L<sub>C</sub> = signal attenuation in the connecting cable between the transmitter and antenna in 1.0dB

Limit: EIRP ≤ 33dBm

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

| Mode | Channel | PAR (dB) | Limit (dB) |
|------|---------|----------|------------|
| GSM  | Low     | 3.65     | 13         |
|      | Middle  | 3.36     | 13         |
|      | High    | 4.42     | 13         |

| Mode             | Channel | PAR (dB) | Limit (dB) |
|------------------|---------|----------|------------|
| RMC<br>(BPSK)    | Low     | 3.08     | 13         |
|                  | Middle  | 2.88     | 13         |
|                  | High    | 3.11     | 13         |
| HSDPA<br>(16QAM) | Low     | 4.81     | 13         |
|                  | Middle  | 4.68     | 13         |
|                  | High    | 4.87     | 13         |
| HSUPA<br>(BPSK)  | Low     | 3.43     | 13         |
|                  | Middle  | 3.27     | 13         |
|                  | High    | 3.46     | 13         |
| HSPA+            | Low     | 3.28     | 13         |
|                  | Middle  | 3.19     | 13         |
|                  | High    | 3.26     | 13         |

**PCS Band**

| Mode | Channel | PAR (dB) | Limit (dB) |
|------|---------|----------|------------|
| GSM  | Low     | 3.62     | 13         |
|      | Middle  | 4.16     | 13         |
|      | High    | 4.19     | 13         |

| Mode             | Channel | PAR (dB) | Limit (dB) |
|------------------|---------|----------|------------|
| RMC<br>(BPSK)    | Low     | 2.60     | 13         |
|                  | Middle  | 2.63     | 13         |
|                  | High    | 2.60     | 13         |
| HSDPA<br>(16QAM) | Low     | 3.88     | 13         |
|                  | Middle  | 4.17     | 13         |
|                  | High    | 2.63     | 13         |
| HSUPA<br>(BPSK)  | Low     | 2.85     | 13         |
|                  | Middle  | 3.08     | 13         |
|                  | High    | 3.11     | 13         |
| HSPA+            | Low     | 3.05     | 13         |
|                  | Middle  | 3.16     | 13         |
|                  | High    | 3.22     | 13         |

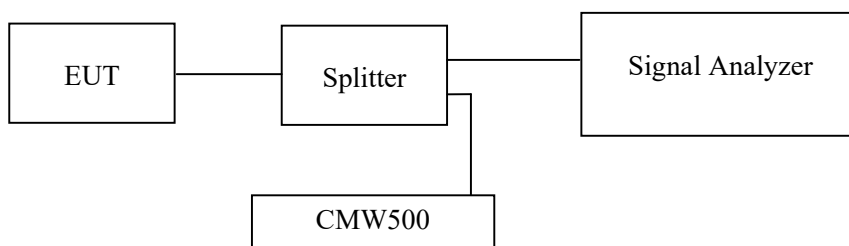
**FCC §2.1049, §22.917, §22.905 & §24.238 - OCCUPIED BANDWIDTH****Applicable Standard**

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

**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.



Note: the path loss (cable loss and attenuator) has included in the result.

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

|                    |           |
|--------------------|-----------|
| Temperature:       | 25.7 °C   |
| Relative Humidity: | 58.2 %    |
| ATM Pressure:      | 101.0 kPa |

*The testing was performed by Glenn Jiang on 2022-12-12 and 2022-12-13.*

*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           | 242.00                       | 316.00                         |
|           | 190     | 836.6           | 244.00                       | 315.00                         |
|           | 251     | 848.8           | 244.00                       | 322.00                         |

|       | Frequency (MHz) | Occupied Bandwidth (MHz) | 26dB Bandwidth (MHz) |
|-------|-----------------|--------------------------|----------------------|
| RMC   | 826.4           | 4.13                     | 4.68                 |
|       | 836.6           | 4.14                     | 4.71                 |
|       | 846.6           | 4.16                     | 4.68                 |
| HSDPA | 826.4           | 4.16                     | 4.71                 |
|       | 836.6           | 4.14                     | 4.70                 |
|       | 846.6           | 4.14                     | 4.70                 |
| HSUPA | 826.4           | 4.13                     | 4.68                 |
|       | 836.6           | 4.14                     | 4.70                 |
|       | 846.6           | 4.16                     | 4.68                 |

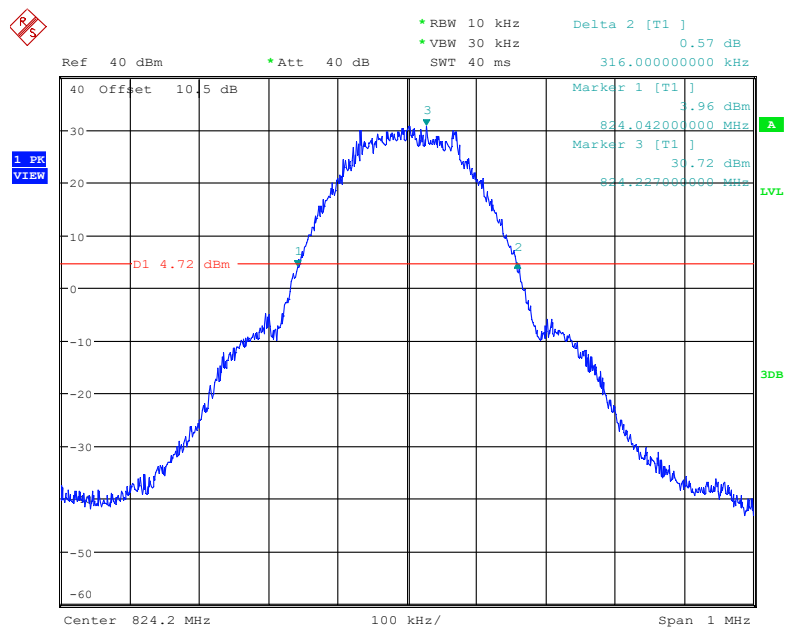
**PCS Band (Part 24E)**

| Mode      | Channel | Frequency (MHz) | 99% Occupied Bandwidth (kHz) | 26 dB Emission Bandwidth (kHz) |
|-----------|---------|-----------------|------------------------------|--------------------------------|
| GSM(GMSK) | 512     | 1850.2          | 245.00                       | 314.00                         |
|           | 661     | 1880.0          | 244.00                       | 318.00                         |
|           | 810     | 1909.8          | 246.00                       | 320.00                         |

|       | Frequency (MHz) | Occupied Bandwidth (MHz) | 26dB Bandwidth (MHz) |
|-------|-----------------|--------------------------|----------------------|
| RMC   | 1852.4          | 4.14                     | 4.71                 |
|       | 1880.0          | 4.14                     | 4.73                 |
|       | 1907.6          | 4.13                     | 4.70                 |
| HSDPA | 1852.4          | 4.17                     | 4.68                 |
|       | 1880.0          | 4.14                     | 4.70                 |
|       | 1907.6          | 4.20                     | 5.81                 |
| HSUPA | 1852.4          | 4.14                     | 4.70                 |
|       | 1880.0          | 4.14                     | 4.71                 |
|       | 1907.6          | 4.11                     | 4.68                 |

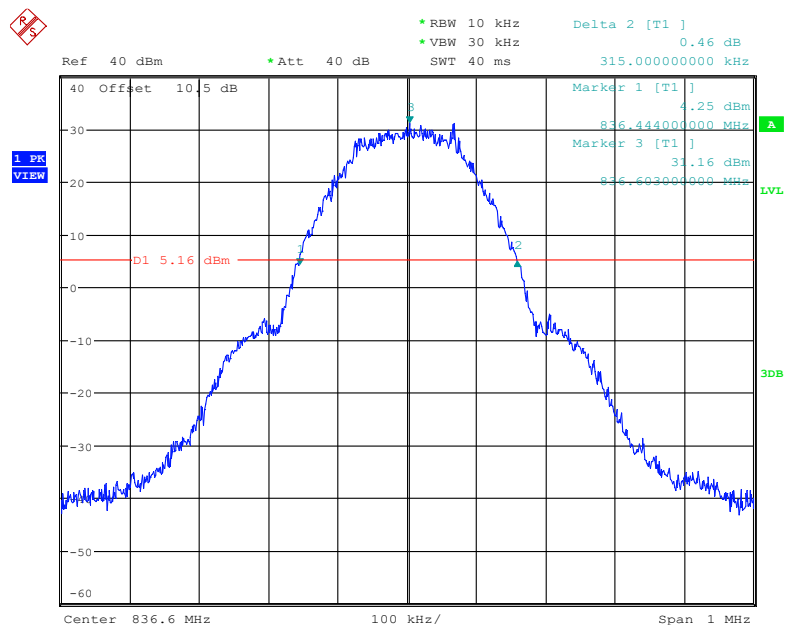
## Cellular Band (Part 22H)

## 26 dB Emissions for GSM (GMSK) Mode, Low channel

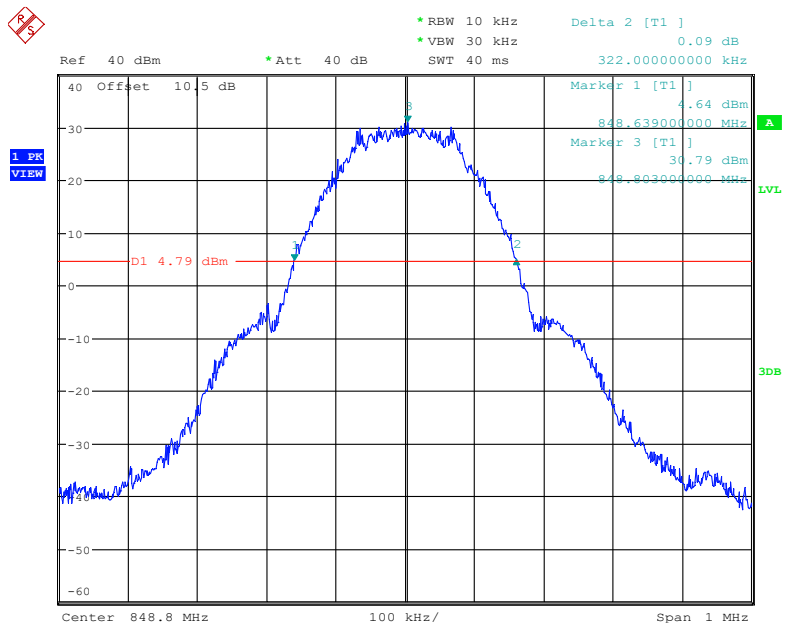


Date: 12.DEC.2022 10:23:36

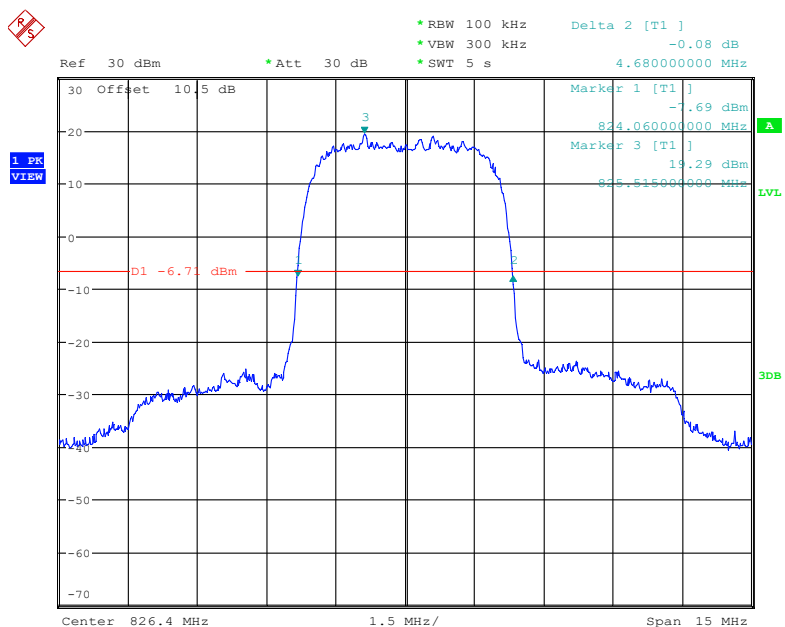
## 26 dB Emissions for GSM (GMSK) Mode, Middle channel



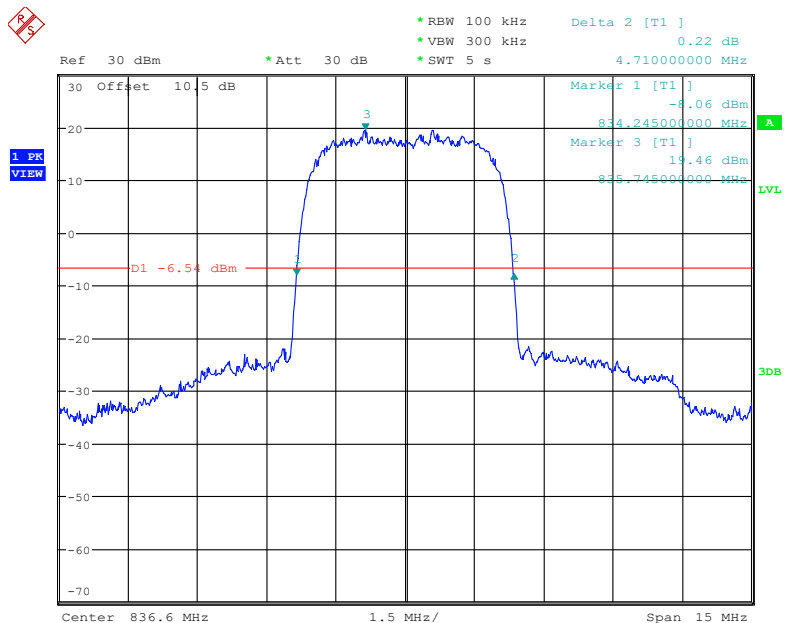
Date: 12.DEC.2022 10:29:34

**26 dB Emissions for GSM (GMSK) Mode, High channel**

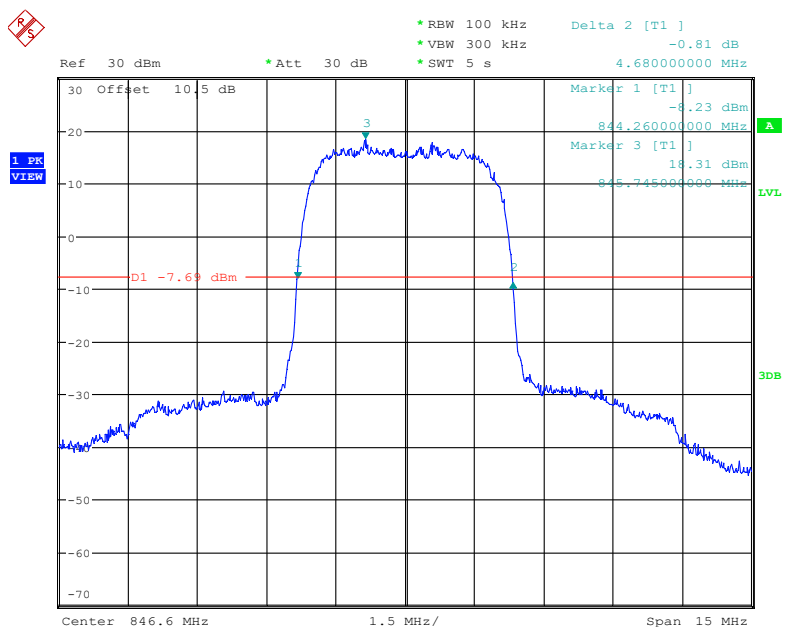
Date: 12.DEC.2022 10:33:37

**26 dB Emissions for RMC (BPSK) Mode, Low channel**

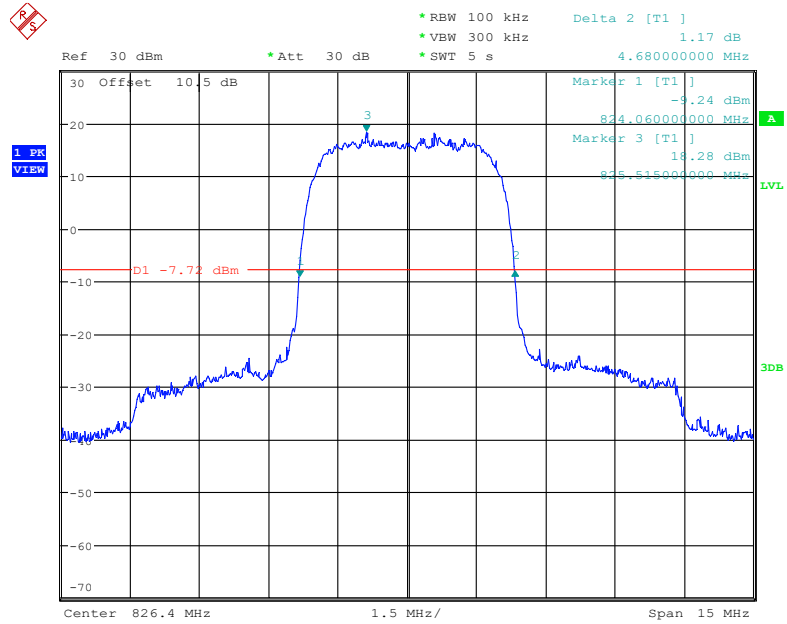
Date: 12.DEC.2022 14:05:38

**26 dB Emissions for RMC (BPSK) Mode, Middle channel**

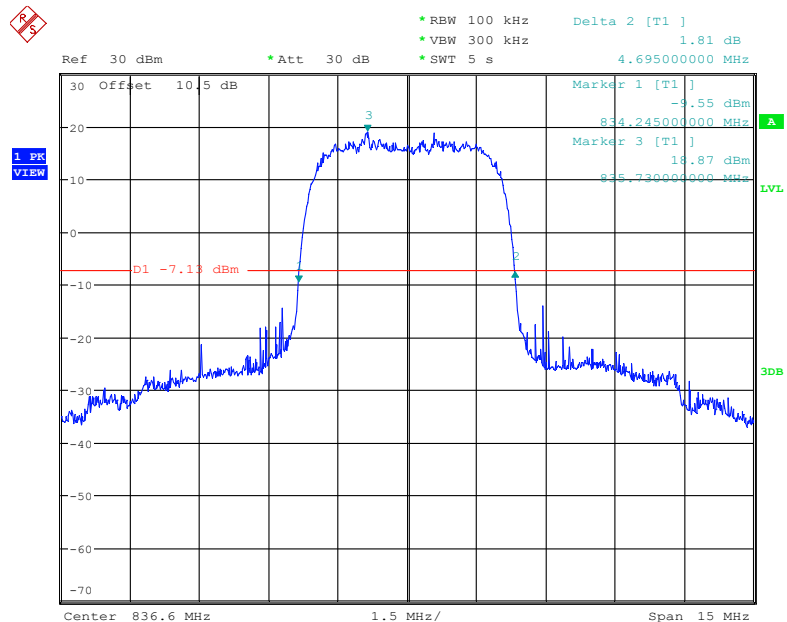
Date: 12.DEC.2022 14:09:03

**26 dB Emissions for RMC (BPSK) Mode, High channel**

Date: 12.DEC.2022 14:11:43

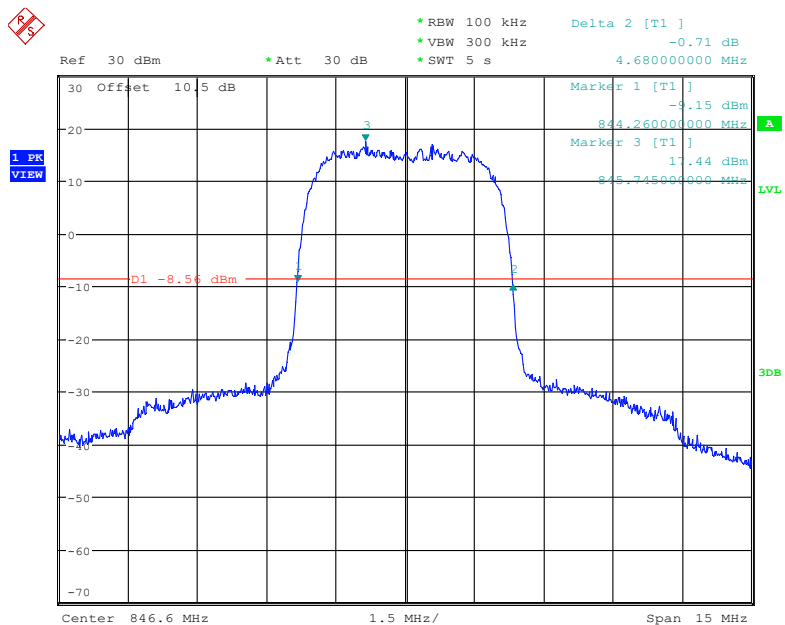
**26 dB Emissions for HSUPA (QPSK) Mode, Low channel**

Date: 12.DEC.2022 14:48:32

**26 dB Emissions for HSUPA (QPSK) Mode, Middle channel**

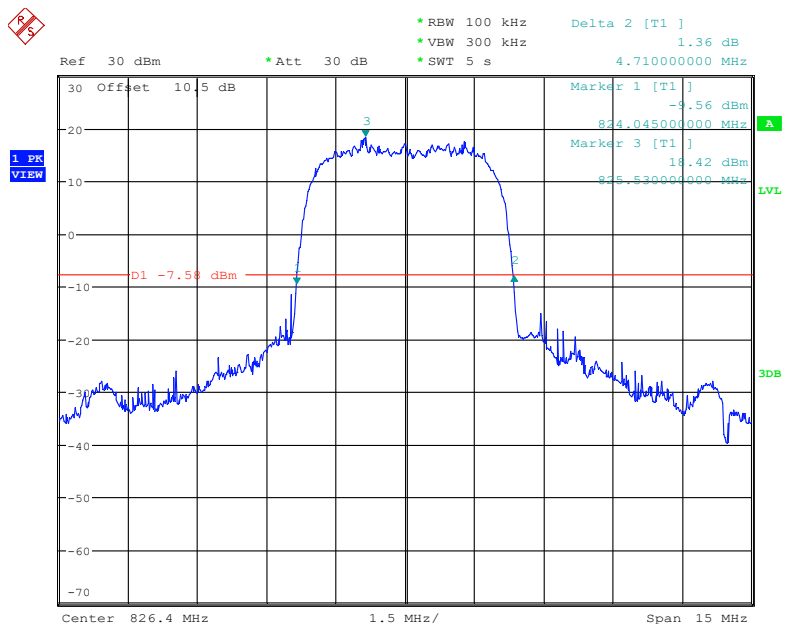
Date: 13.DEC.2022 09:23:23

## 26 dB Emissions for HSUPA (QPSK) Mode, High channel

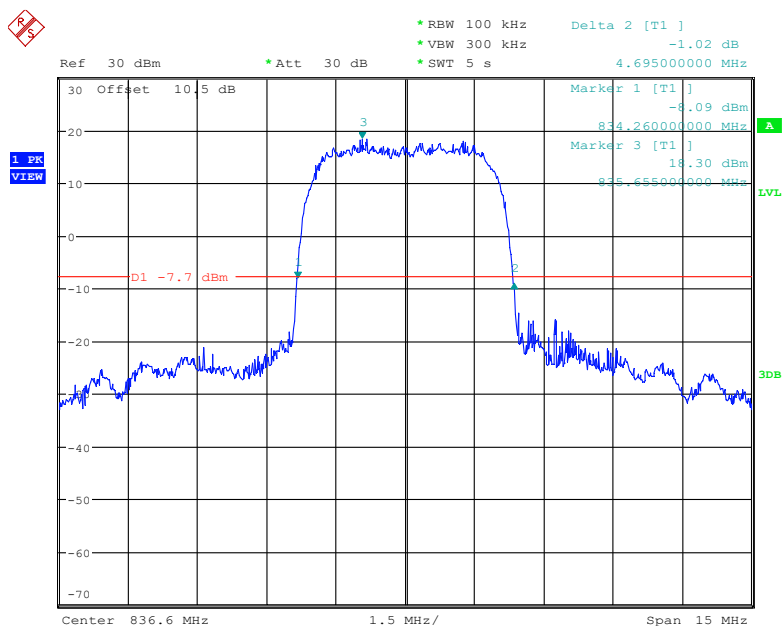


Date: 12.DEC.2022 14:56:08

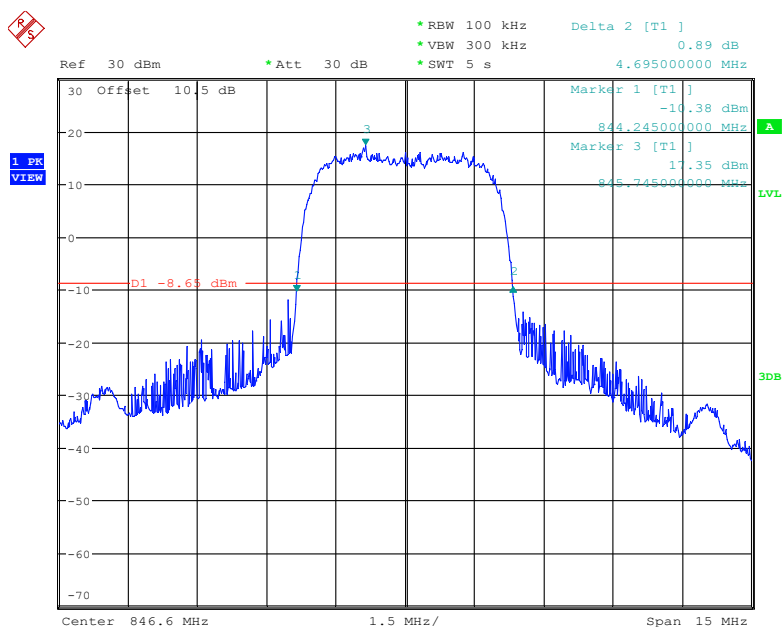
## 26 dB Emissions for HSDPA (16QAM) Mode, Low channel



Date: 12.DEC.2022 14:30:03

**26 dB Emissions for HSDPA (16QAM) Mode, Middle channel**

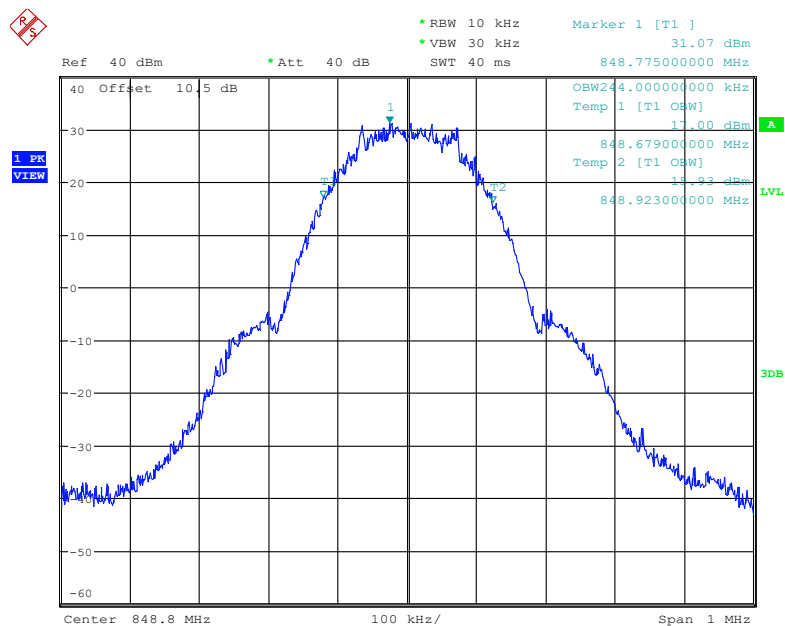
Date: 12.DEC.2022 14:34:50

**26 dB Emissions for HSDPA (16QAM) Mode, High channel**

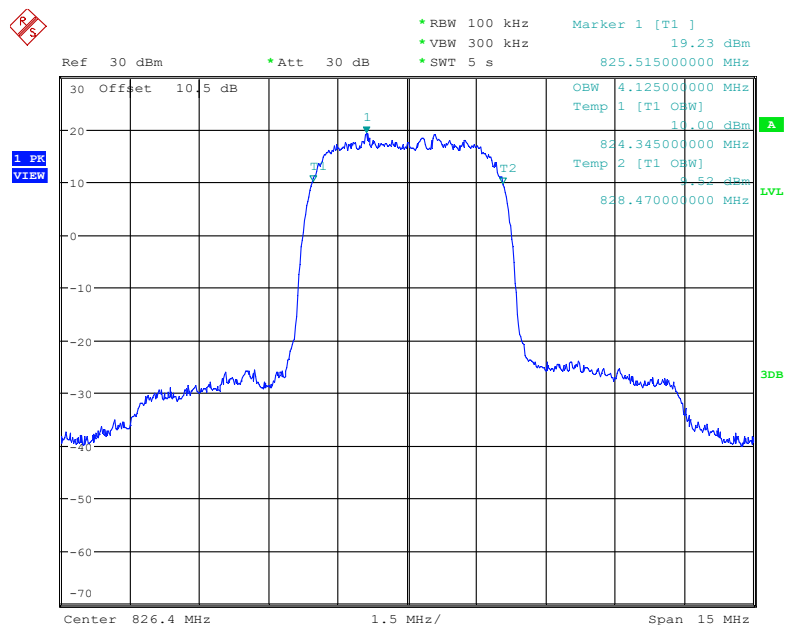
Date: 12.DEC.2022 14:43:37

[illegible]

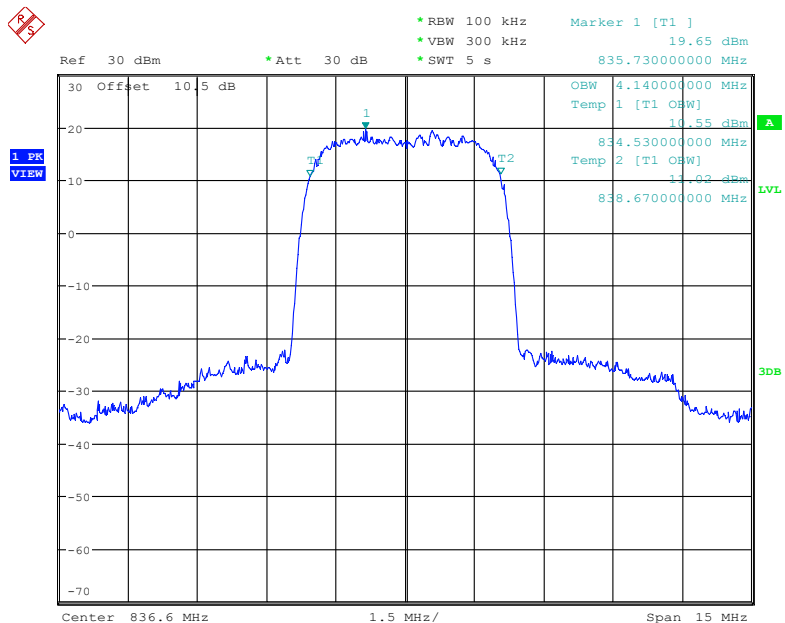
FCC- 2G,3G

**99% Occupied Bandwidth for GSM (GMSK) Mode, High channel**

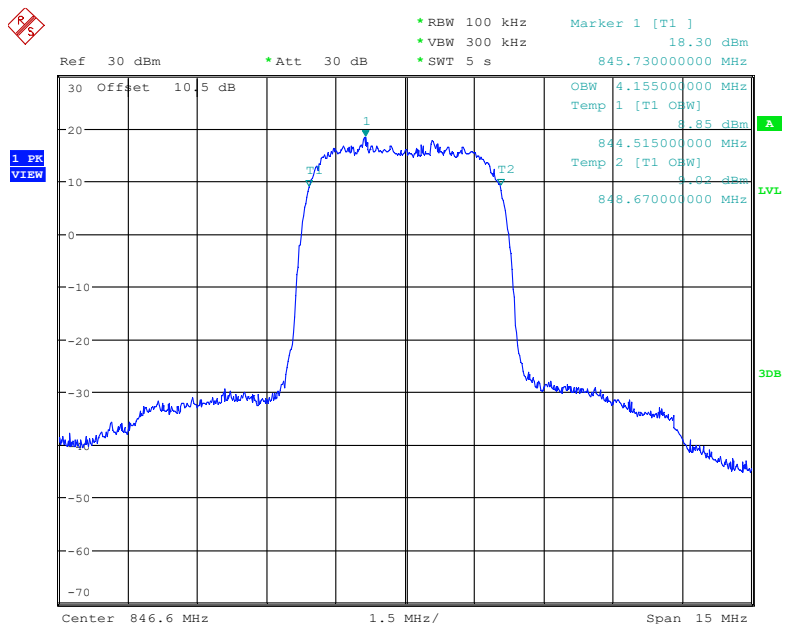
Date: 12.DEC.2022 10:32:57

**99% Occupied Bandwidth for RMC (BPSK) Mode, Low channel**

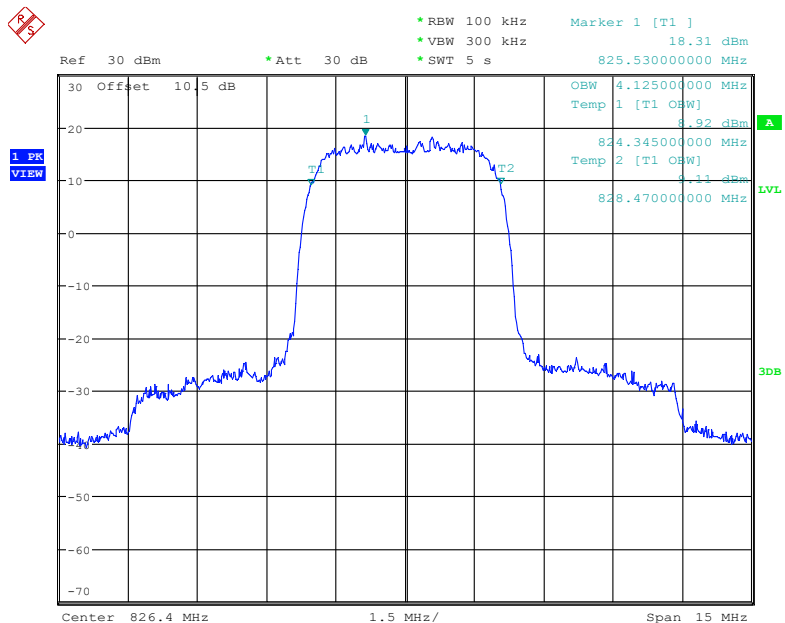
Date: 12.DEC.2022 14:04:58

**99% Occupied Bandwidth for RMC (BPSK) Mode, Middle channel**

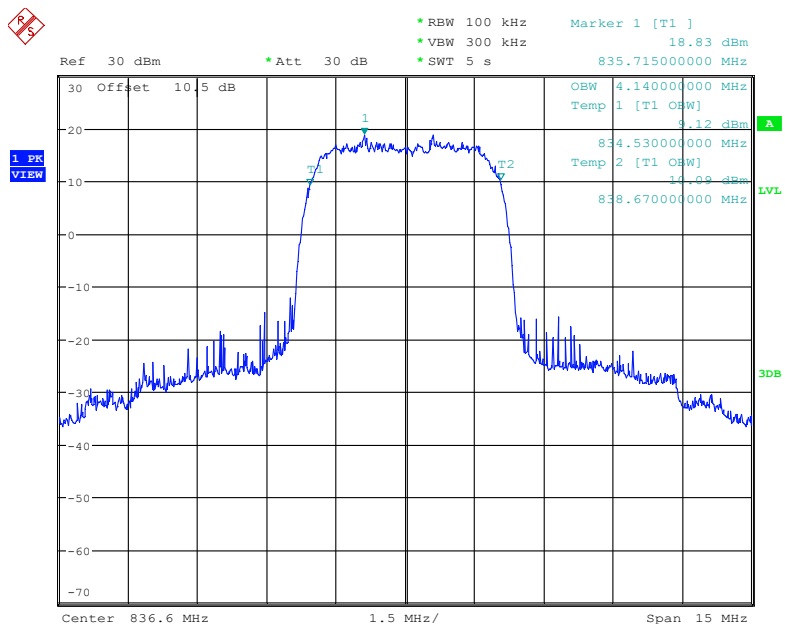
Date: 12.DEC.2022 14:08:24

**99% Occupied Bandwidth for RMC (BPSK) Mode, High channel**

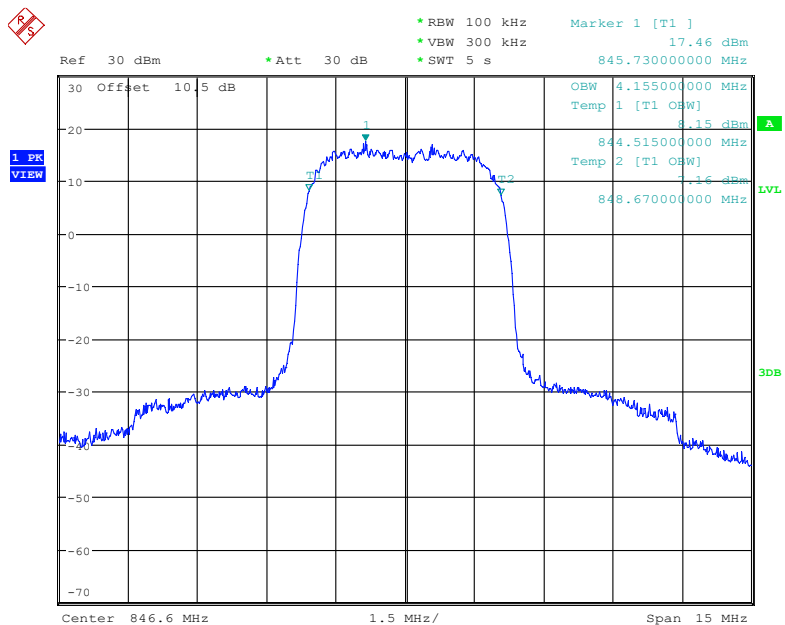
Date: 12.DEC.2022 14:11:03

**99% Occupied Bandwidth for HSUPA (QPSK) Mode, Low channel**

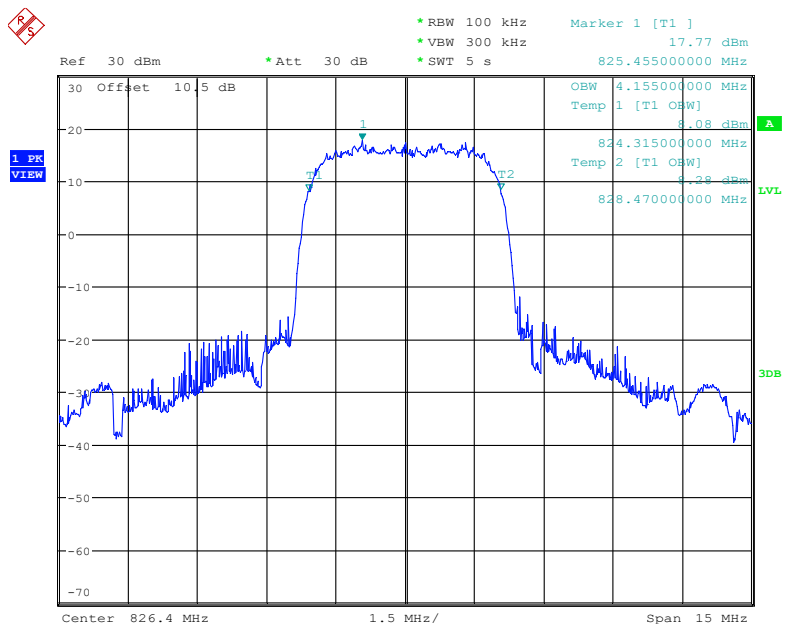
Date: 12.DEC.2022 14:47:54

**99% Occupied Bandwidth for HSUPA (QPSK) Mode, Middle channel**

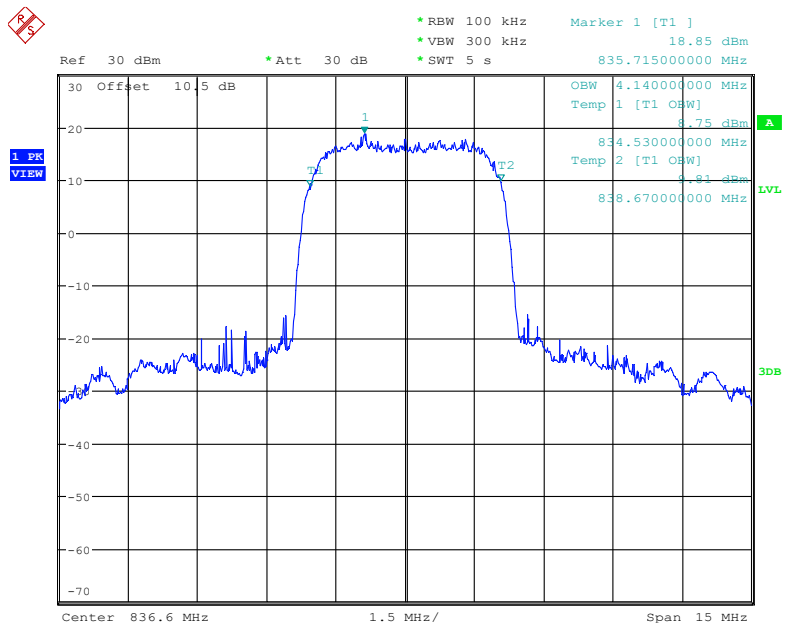
Date: 13.DEC.2022 09:22:41

**99% Occupied Bandwidth for HSUPA (QPSK) Mode, High channel**

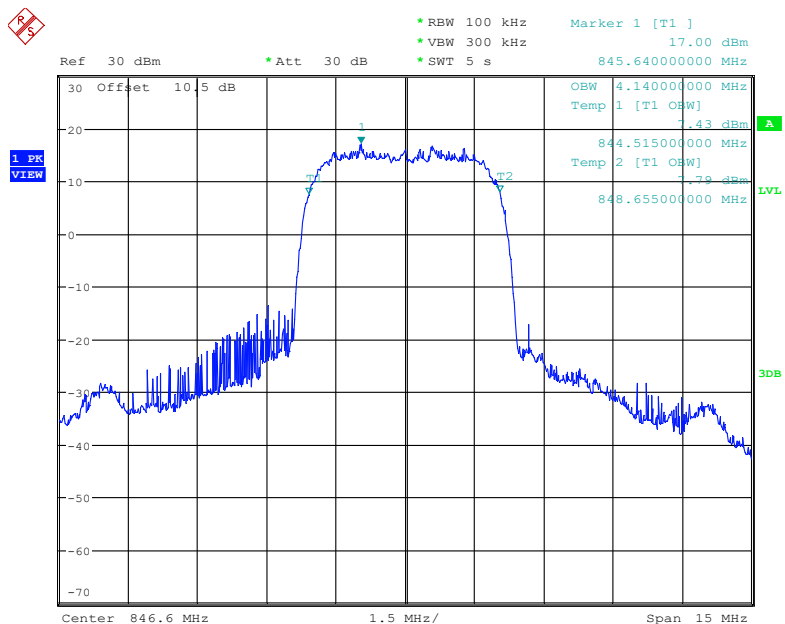
Date: 12.DEC.2022 14:55:27

**99% Occupied Bandwidth for HSDPA (16QAM) Mode, Low channel**

Date: 12.DEC.2022 14:29:24

**99% Occupied Bandwidth for HSDPA (16QAM) Mode, Middle channel**

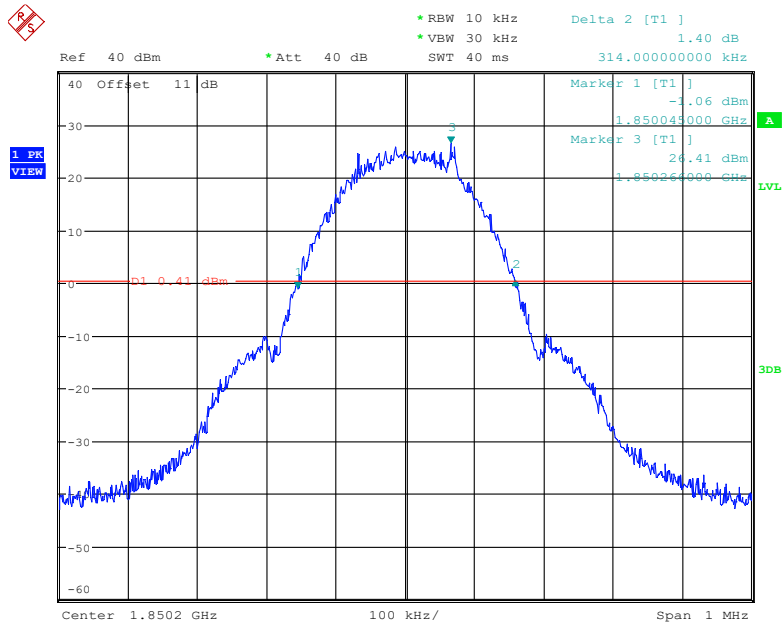
Date: 12.DEC.2022 14:34:11

**99% Occupied Bandwidth for HSDPA (16QAM) Mode, High channel**

Date: 12.DEC.2022 14:42:58

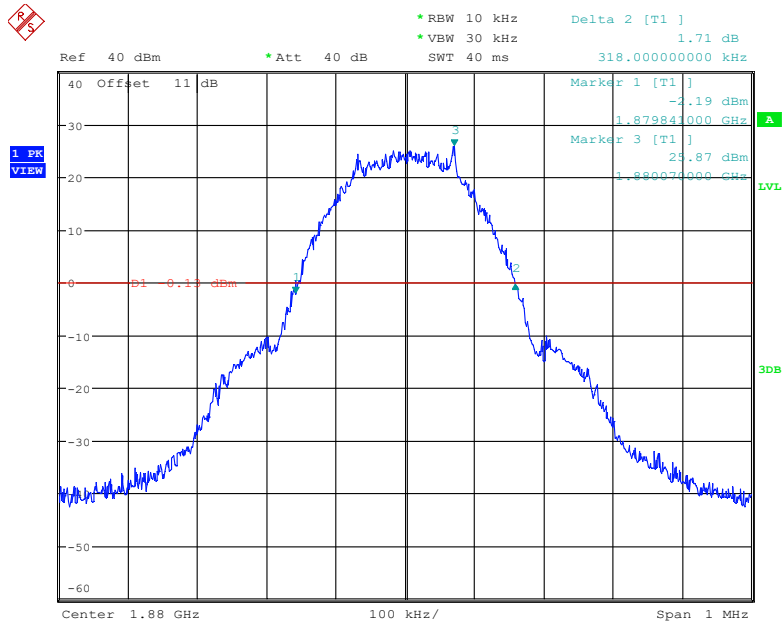
PCS Band (Part 24E)

26 dB Emissions for GSM (GMSK) Mode, Low channel

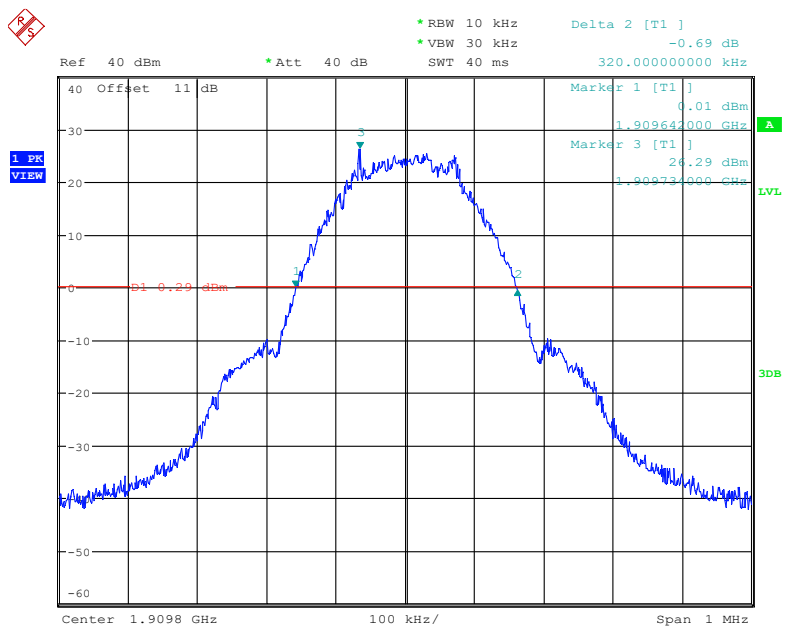


Date: 12.DEC.2022 11:15:14

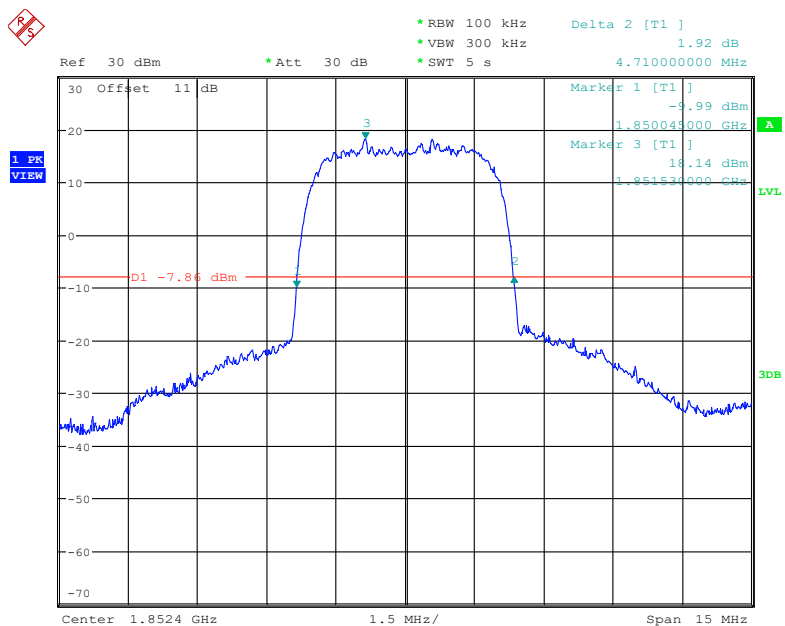
26 dB Emissions for GSM (GMSK) Mode, Middle channel



Date: 12.DEC.2022 11:21:10

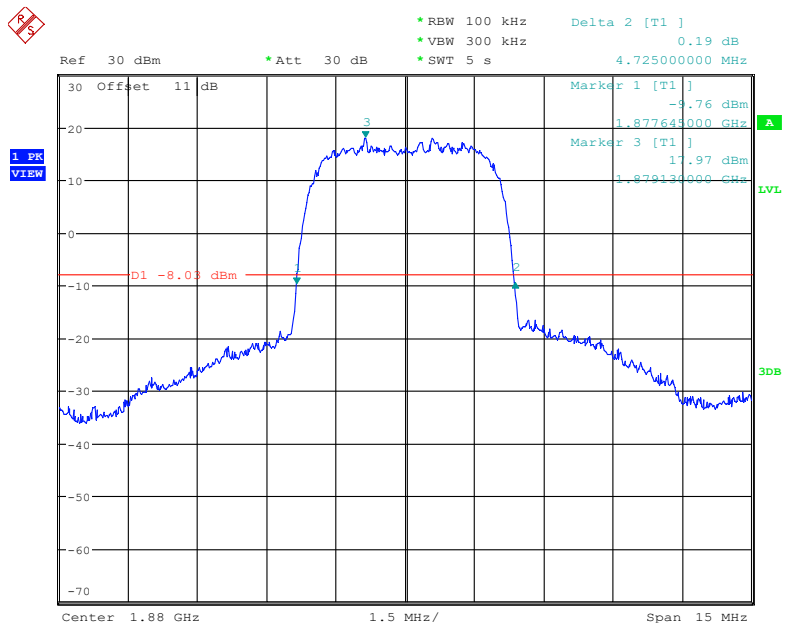
**26 dB Emissions for GSM (GMSK) Mode, High channel**

Date: 12.DEC.2022 11:31:08

**26 dB Emissions for RMC (BPSK) Mode, Low channel**

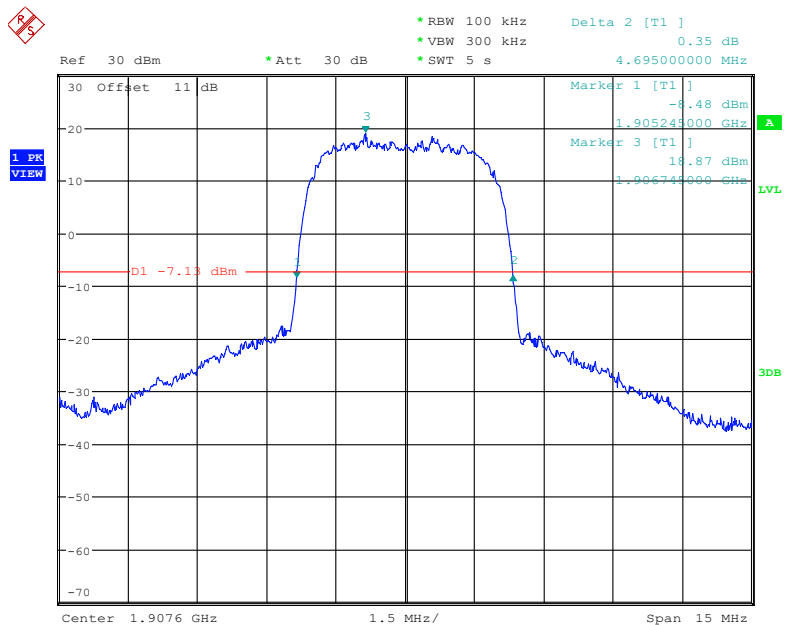
Date: 12.DEC.2022 13:31:27

## 26 dB Emissions for RMC (BPSK) Mode, Middle channel



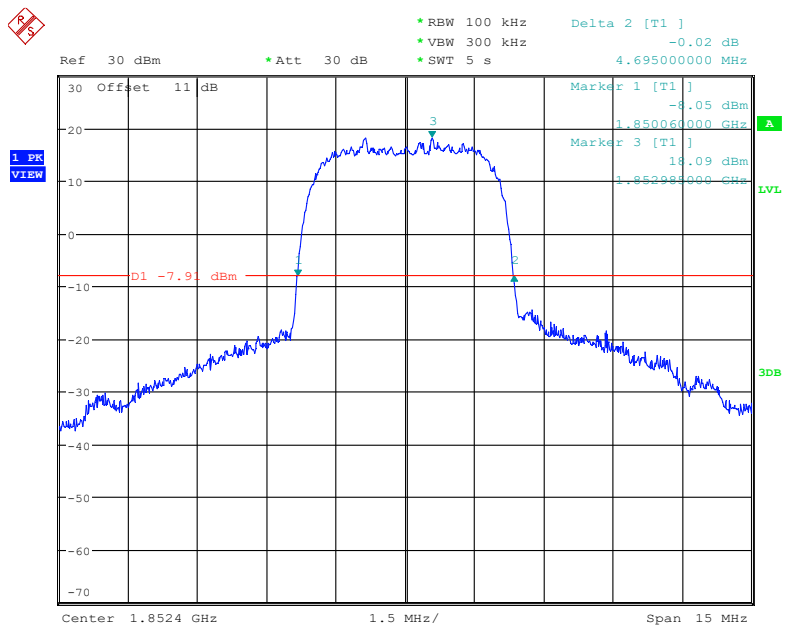
Date: 12.DEC.2022 13:37:27

## 26 dB Emissions for RMC (BPSK) Mode, High channel



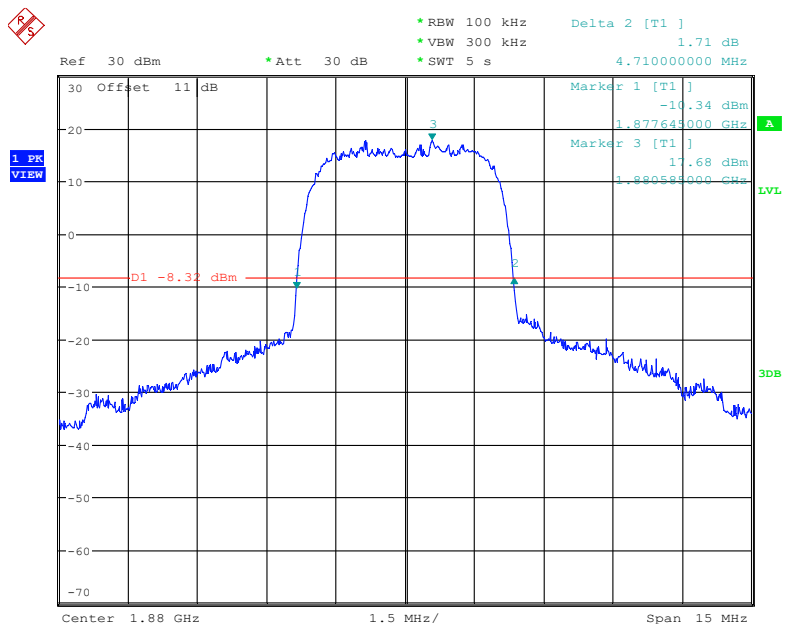
Date: 12.DEC.2022 13:54:25

## 26 dB Emissions for HSUPA (QPSK) Mode, Low channel

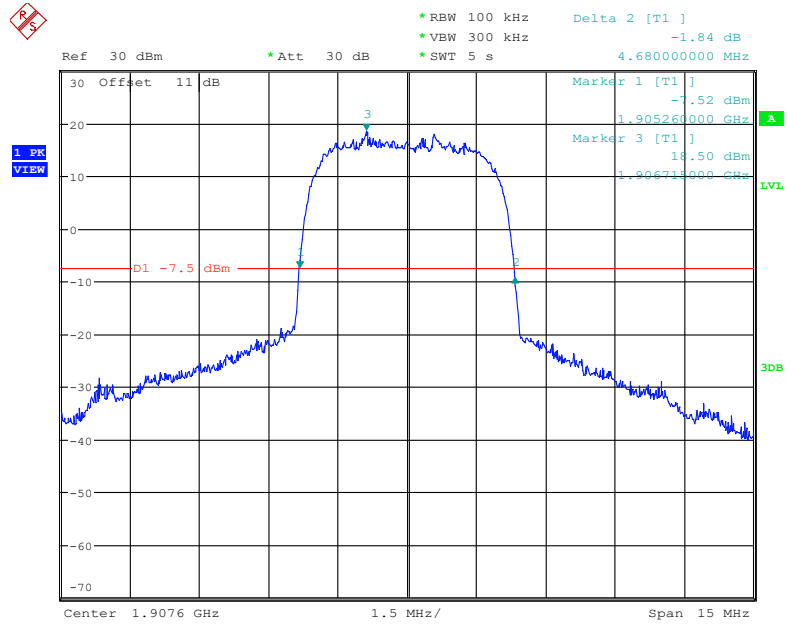


Date: 12.DEC.2022 15:00:07

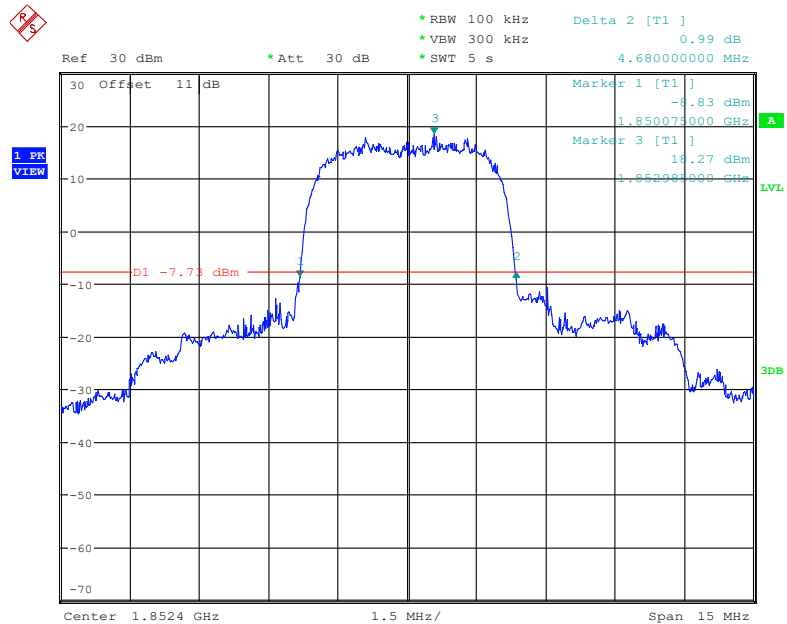
## 26 dB Emissions for HSUPA (QPSK) Mode, Middle channel



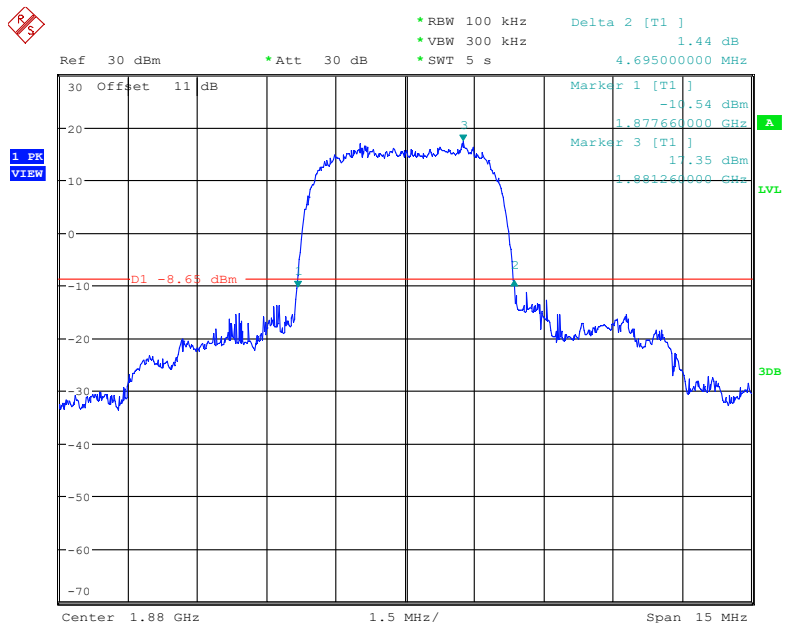
Date: 12.DEC.2022 15:04:06

**26 dB Emissions for HSUPA (QPSK) Mode, High channel**

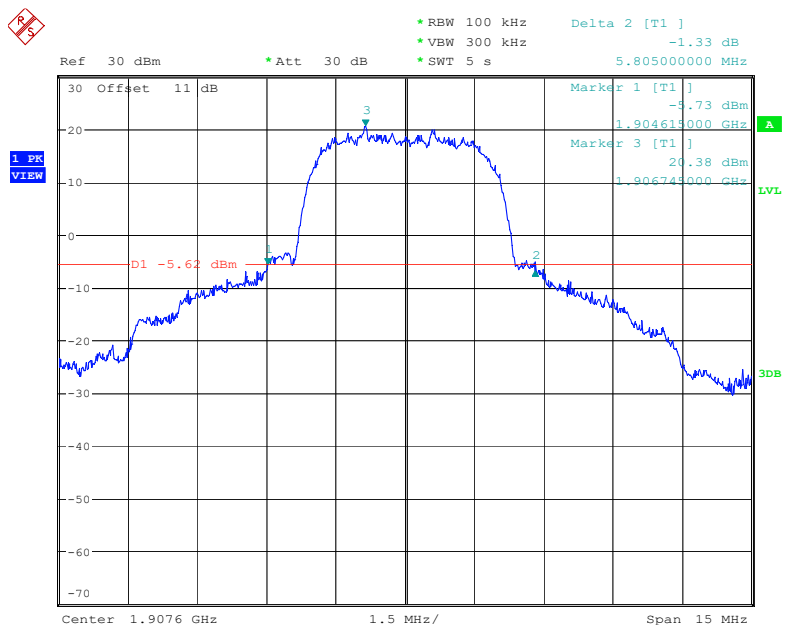
Date: 12.DEC.2022 15:07:54

**26 dB Emissions for HSDPA (16QAM) Mode, Low channel**

Date: 12.DEC.2022 14:19:40

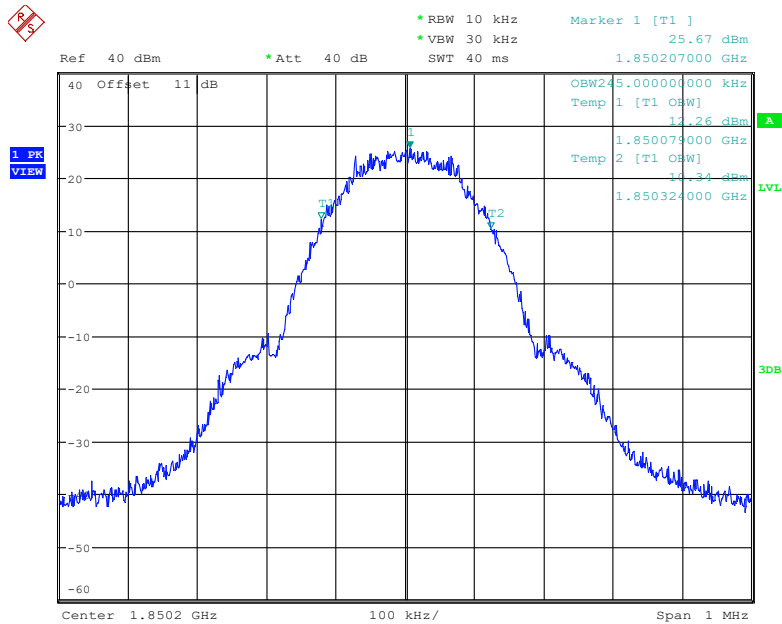
**26 dB Emissions for HSDPA (16QAM) Mode, Middle channel**

Date: 12.DEC.2022 14:26:25

**26 dB Emissions for HSDPA (16QAM) Mode, High channel**

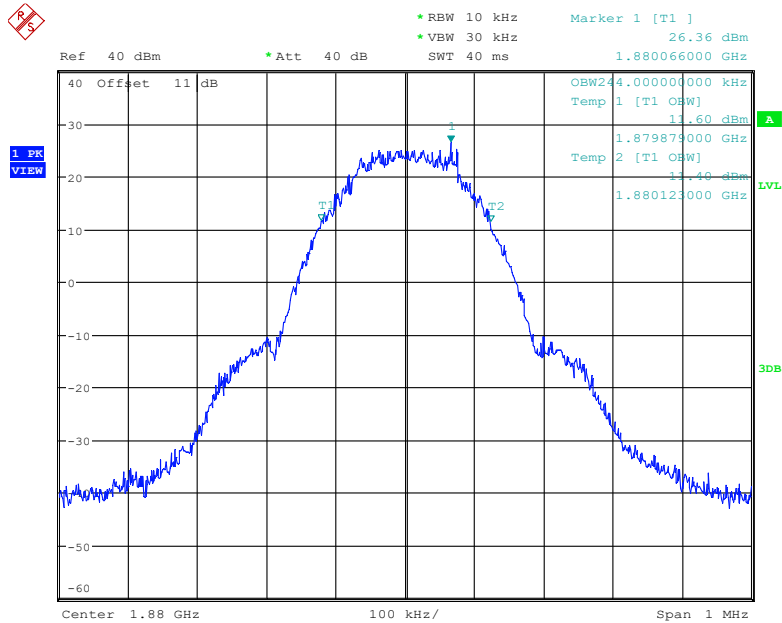
Date: 12.DEC.2022 20:04:44

99% Occupied Bandwidth for GSM (GMSK) Mode, Low channel



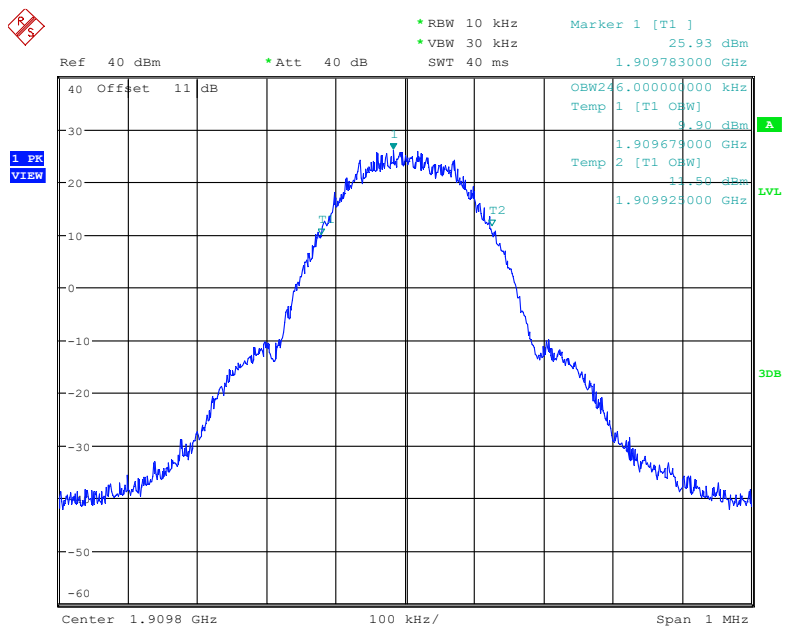
Date: 12.DEC.2022 11:14:34

99% Occupied Bandwidth for GSM (GMSK) Mode, Middle channel



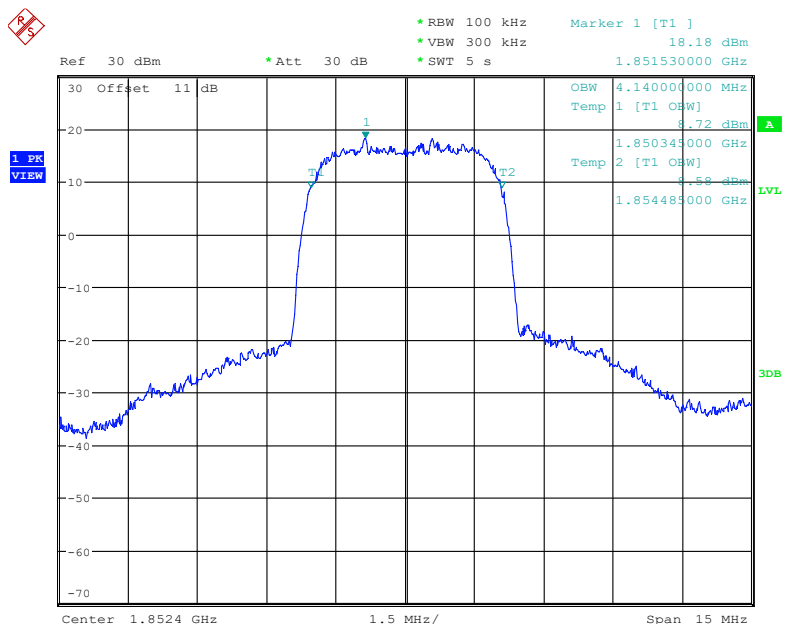
Date: 12.DEC.2022 11:20:30

## 99% Occupied Bandwidth for GSM (GMSK) Mode, High channel

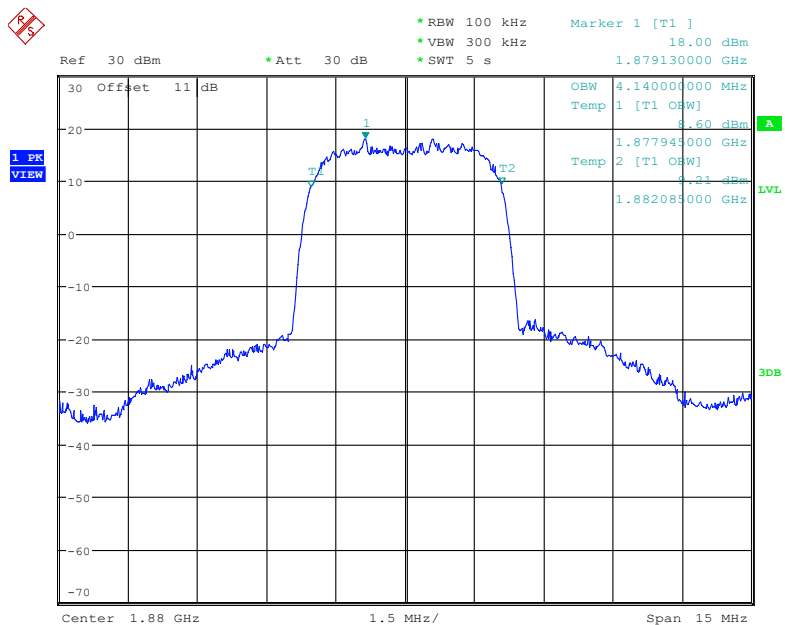


Date: 12.DEC.2022 11:30:28

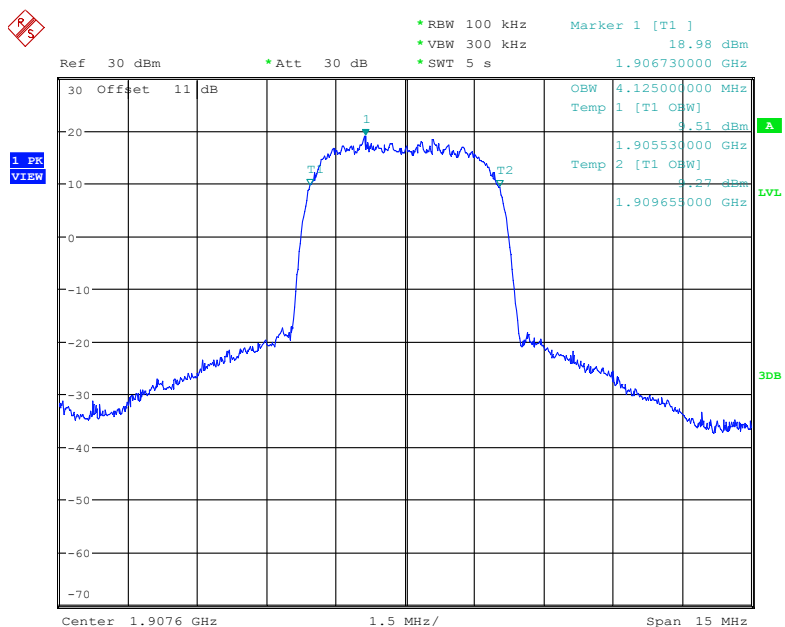
## 99% Occupied Bandwidth for RMC (BPSK) Mode, Low channel



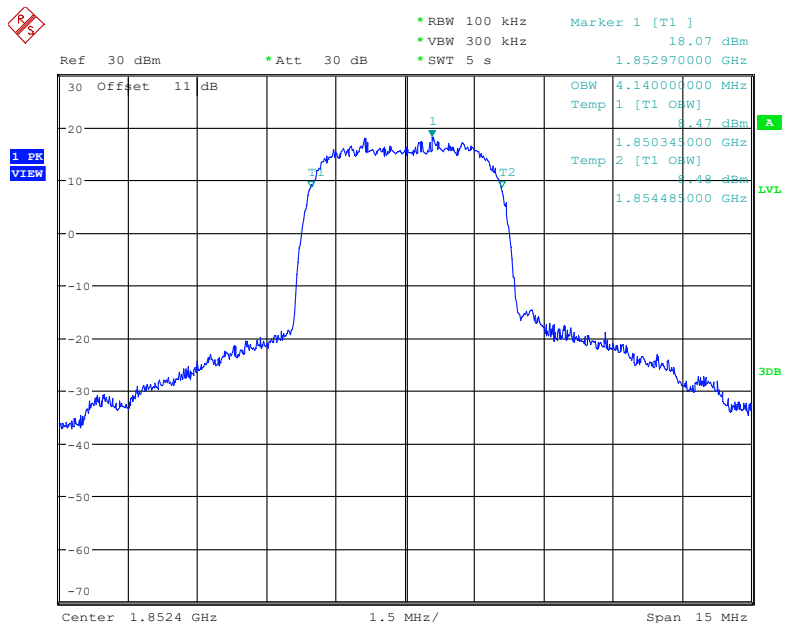
Date: 12.DEC.2022 13:30:48

**99% Occupied Bandwidth for RMC (BPSK) Mode, Middle channel**

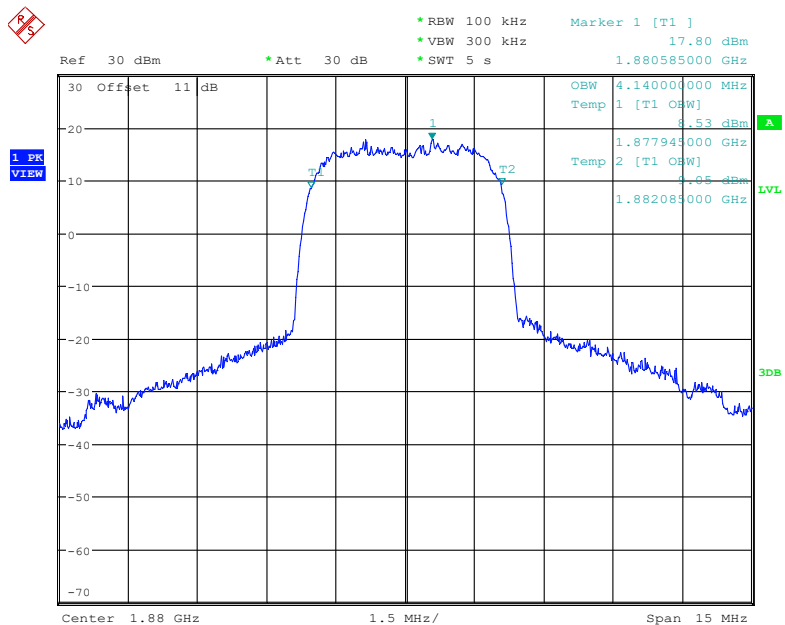
Date: 12.DEC.2022 13:36:47

**99% Occupied Bandwidth for RMC (BPSK) Mode, High channel**

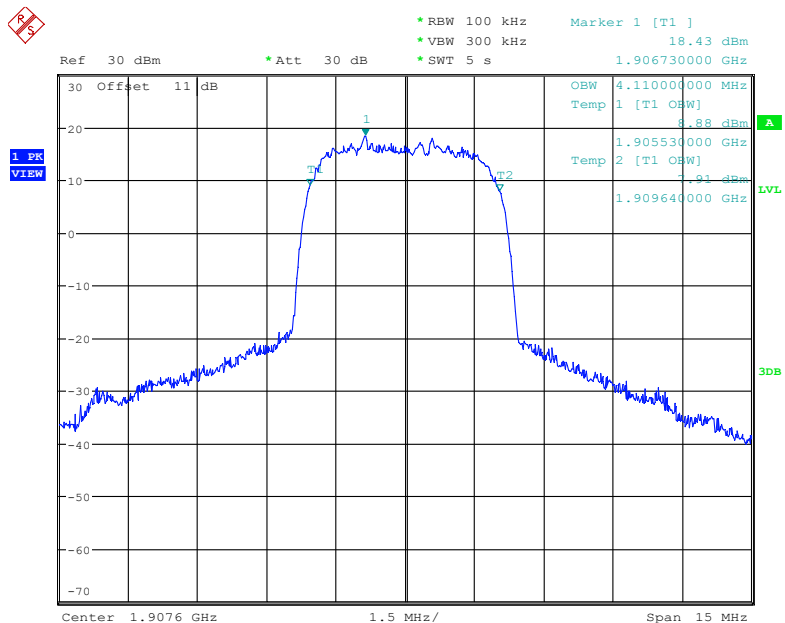
Date: 12.DEC.2022 13:53:46

**99% Occupied Bandwidth for HSUPA (QPSK) Mode, Low channel**

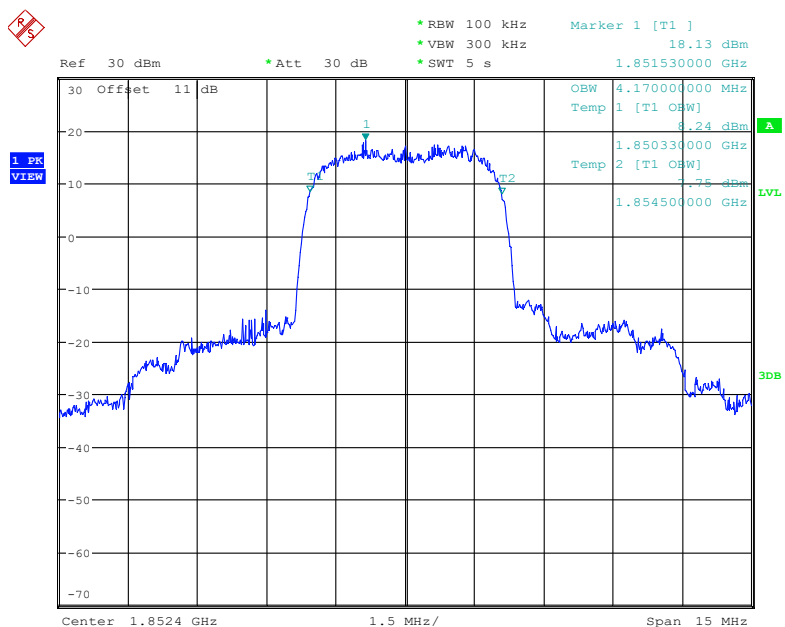
Date: 12.DEC.2022 14:59:27

**99% Occupied Bandwidth for HSUPA (QPSK) Mode, Middle channel**

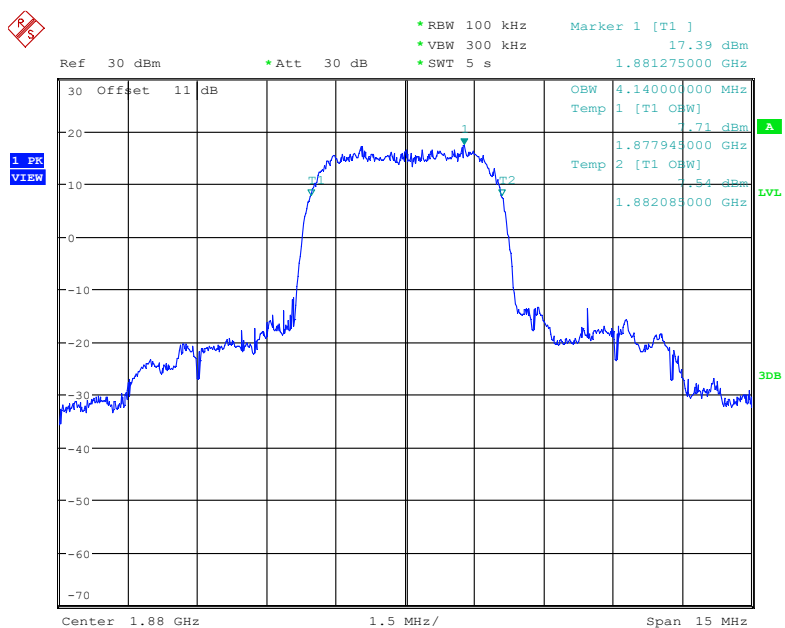
Date: 12.DEC.2022 15:03:26

**99% Occupied Bandwidth for HSUPA (QPSK) Mode, High channel**

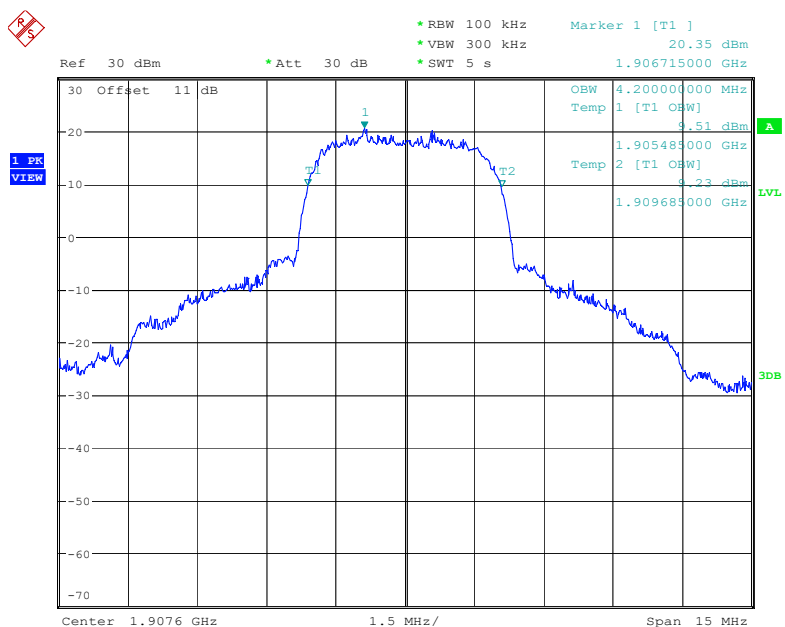
Date: 12.DEC.2022 15:07:15

**99% Occupied Bandwidth for HSDPA (16QAM) Mode, Low channel**

Date: 12.DEC.2022 14:19:01

**99% Occupied Bandwidth for HSDPA (16QAM) Mode, Middle channel**

Date: 12.DEC.2022 14:25:45

**99% Occupied Bandwidth for HSDPA (16QAM) Mode, High channel**

Date: 12.DEC.2022 20:04:05

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

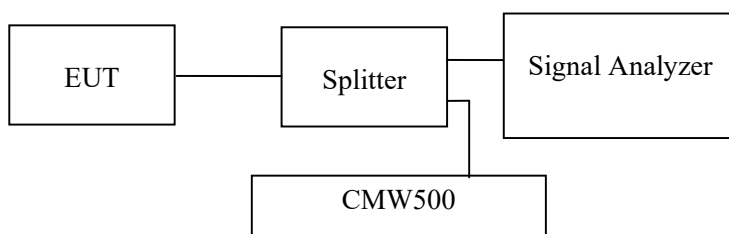
### Applicable Standard

FCC §2.1051, §22.917(a) & §24.238(a).

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.



Note: the path loss (cable loss and attenuator) has included in the result.

### Test Data

#### Environmental Conditions

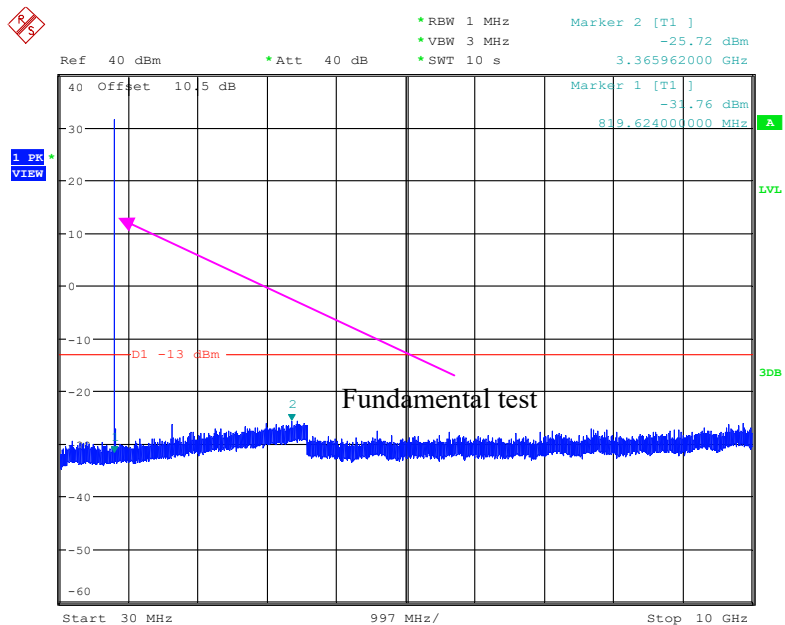
|                    |           |
|--------------------|-----------|
| Temperature:       | 25.7 °C   |
| Relative Humidity: | 58.2 %    |
| ATM Pressure:      | 101.0 kPa |

*The testing was performed by Glenn Jiang on 2022-12-12.*

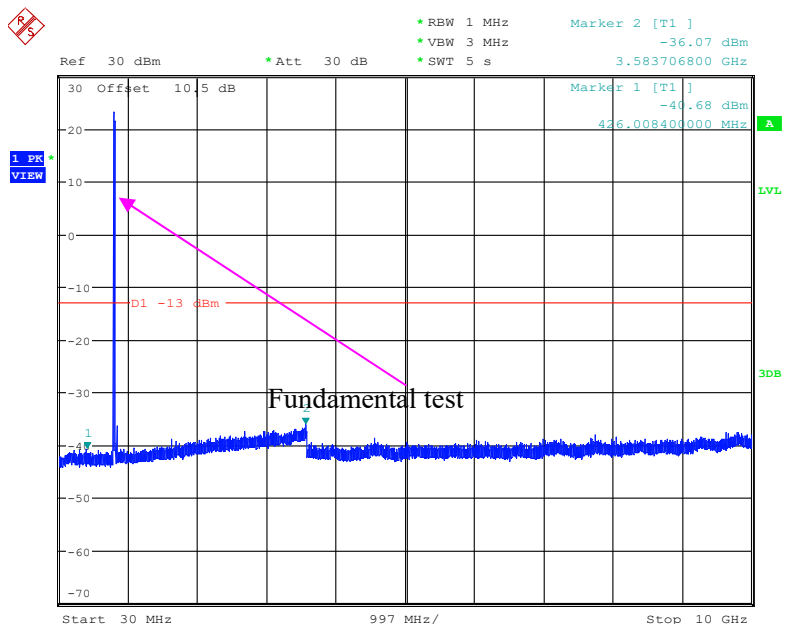
*EUT operation mode: Transmitting*

**Test result: Pass**

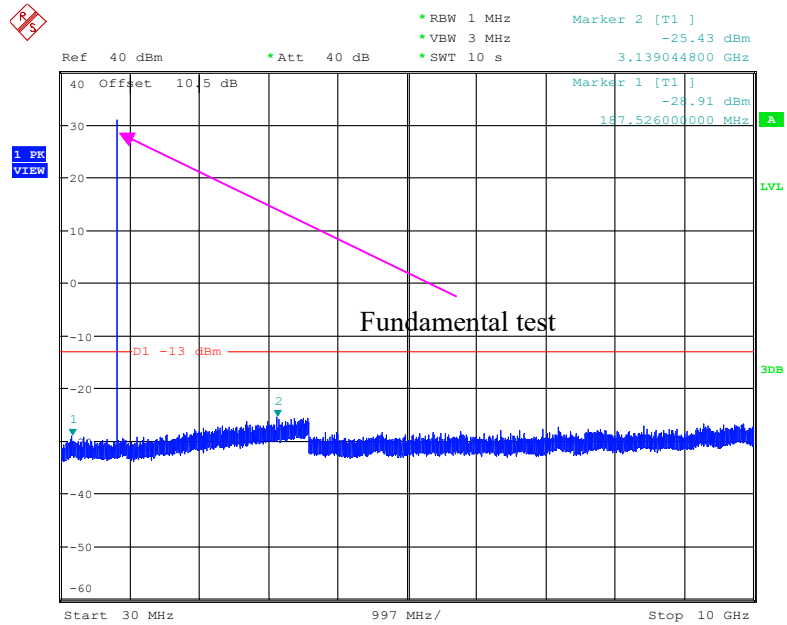
*Please refer to the following plots.*

**Cellular Band (Part 22H)****Low Channel:****30 MHz – 10GHz (GSM Mode)**

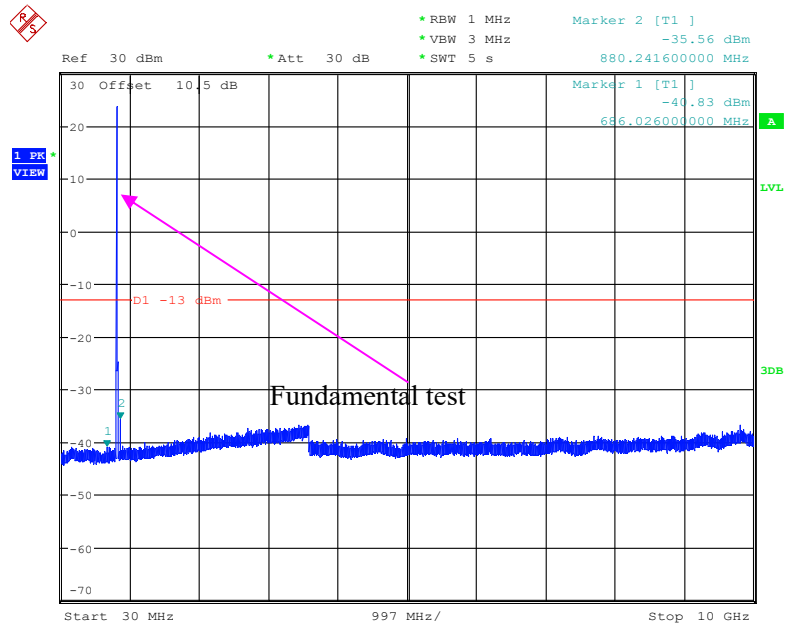
Date: 12.DEC.2022 10:27:19

**30 MHz – 10 GHz (RMC Mode)**

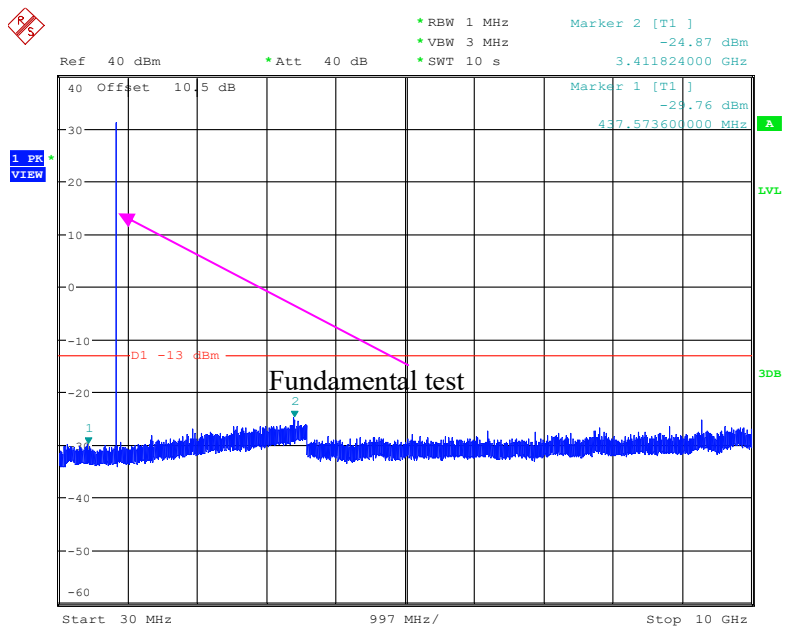
Date: 12.DEC.2022 14:06:58

**Middle Channel:****30 MHz – 10 GHz (GSM Mode)**

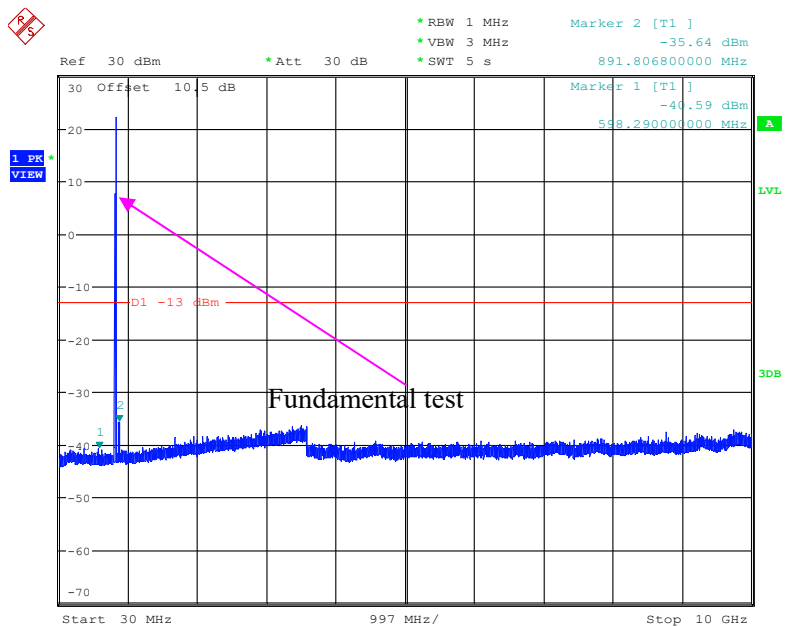
Date: 12.DEC.2022 10:31:31

**30 MHz – 10 GHz (RMC Mode)**

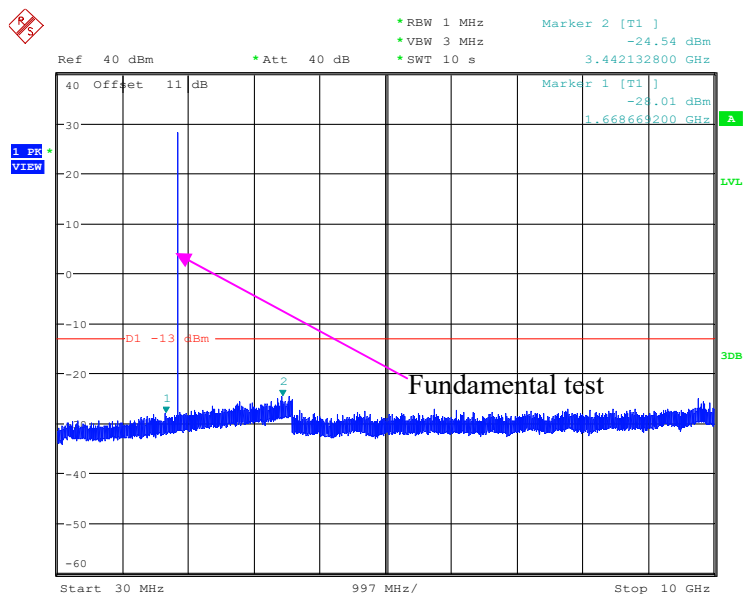
Date: 12.DEC.2022 14:09:44

**High Channel:****30 MHz – 10 GHz (GSM Mode)**

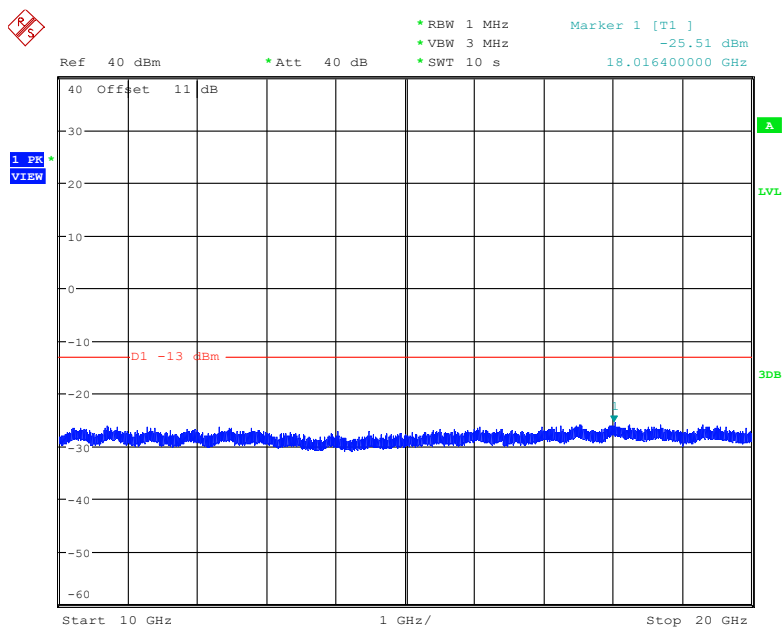
Date: 12.DEC.2022 10:37:43

**30 MHz – 10 GHz (RMC Mode)**

Date: 12.DEC.2022 14:13:03

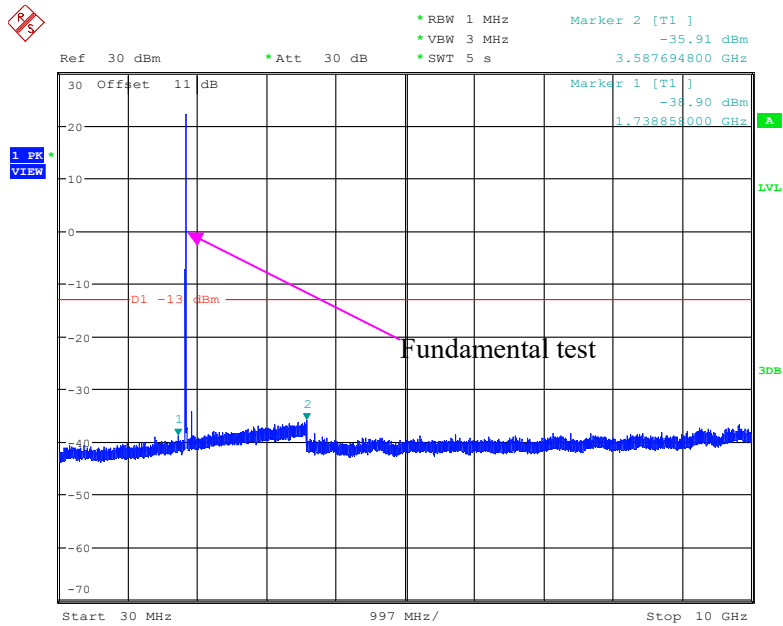
**PCS Band (Part 24E)**  
**Low Channel:****30 MHz – 10 GHz (GSM Mode)**

Date: 19.DEC.2022 17:04:22

**10 GHz – 20 GHz (GSM Mode)**

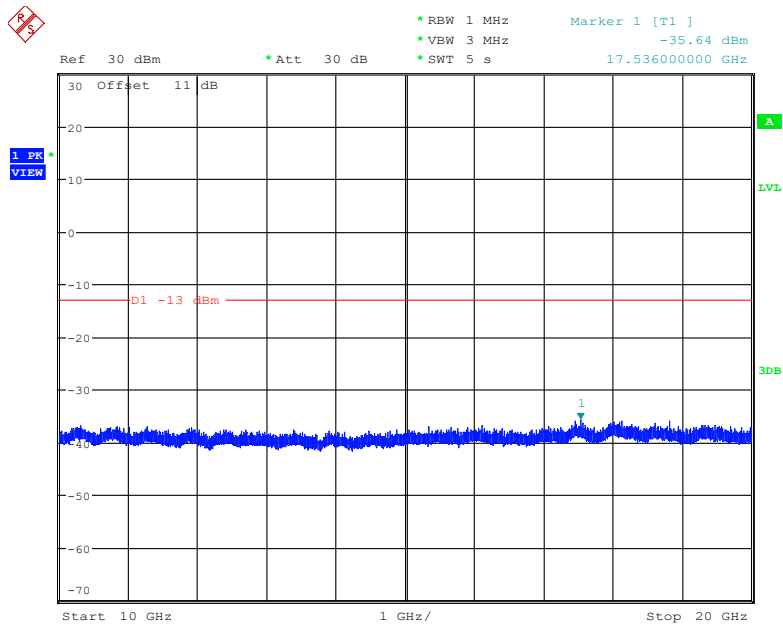
Date: 12.DEC.2022 11:18:28

30 MHz – 10 GHz (RMC Mode)

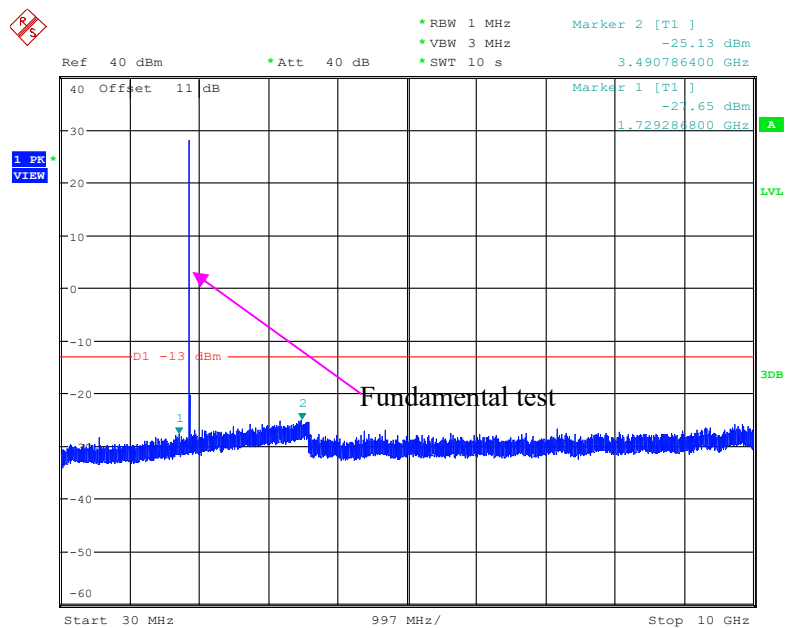


Date: 12.DEC.2022 13:32:47

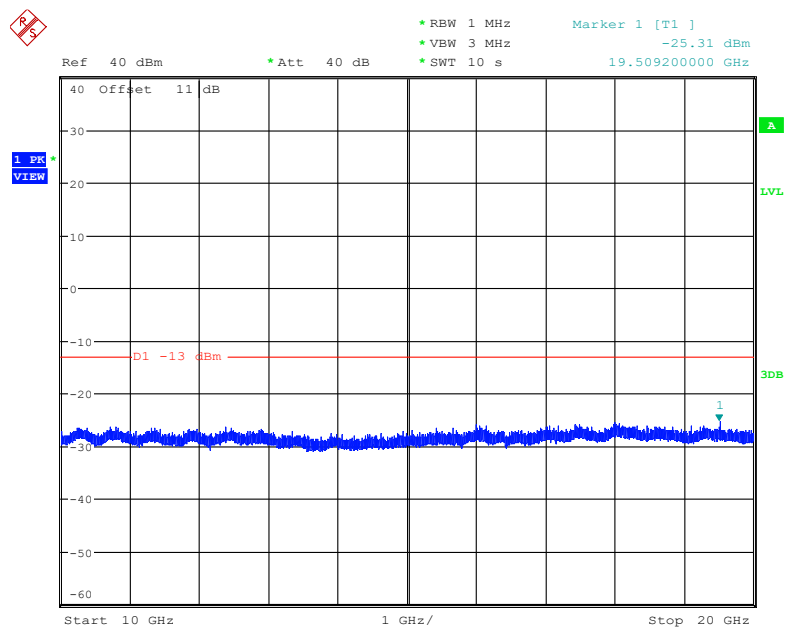
10 GHz – 20GHz (RMC Mode)



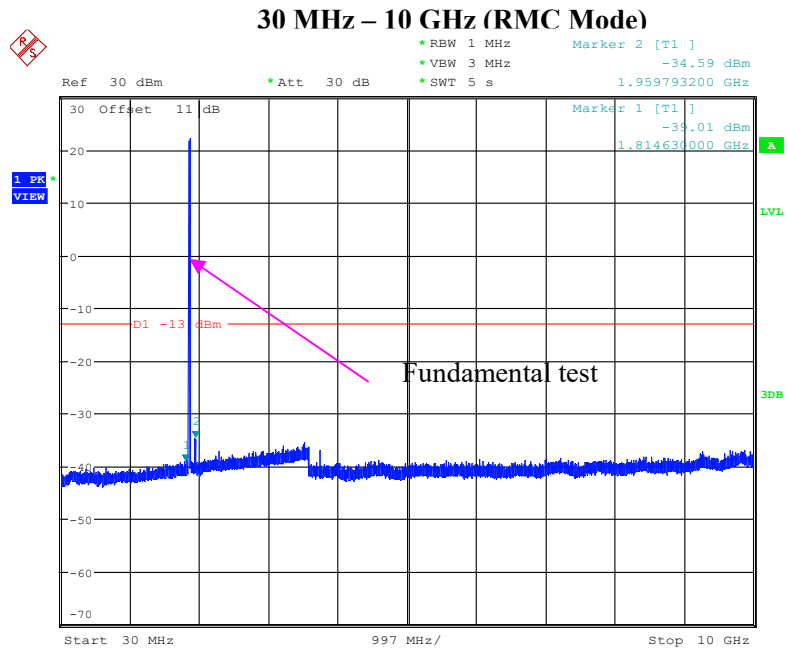
Date: 12.DEC.2022 13:33:29

**Middle Channel:****30 MHz – 10 GHz (GSM Mode)**

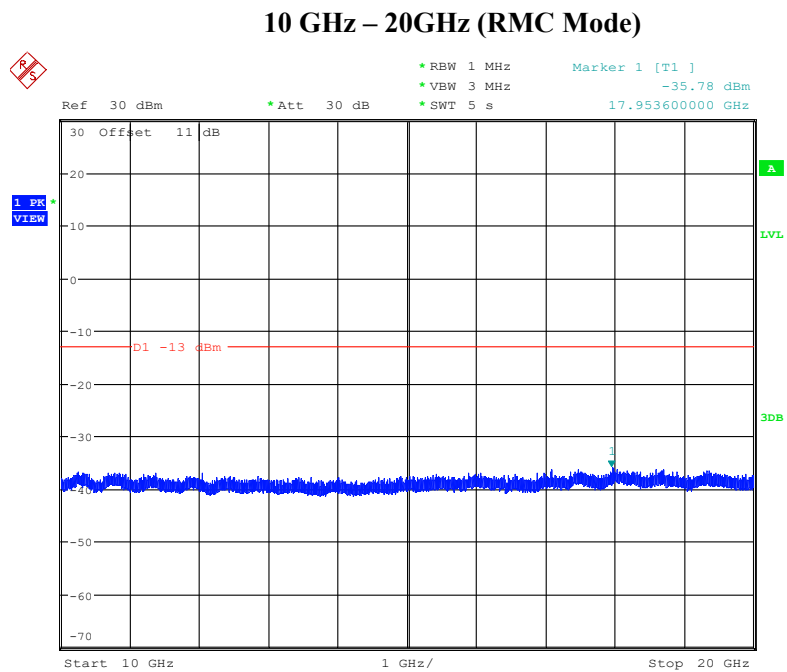
Date: 12.DEC.2022 11:22:30

**10 GHz – 20 GHz (GSM Mode)**

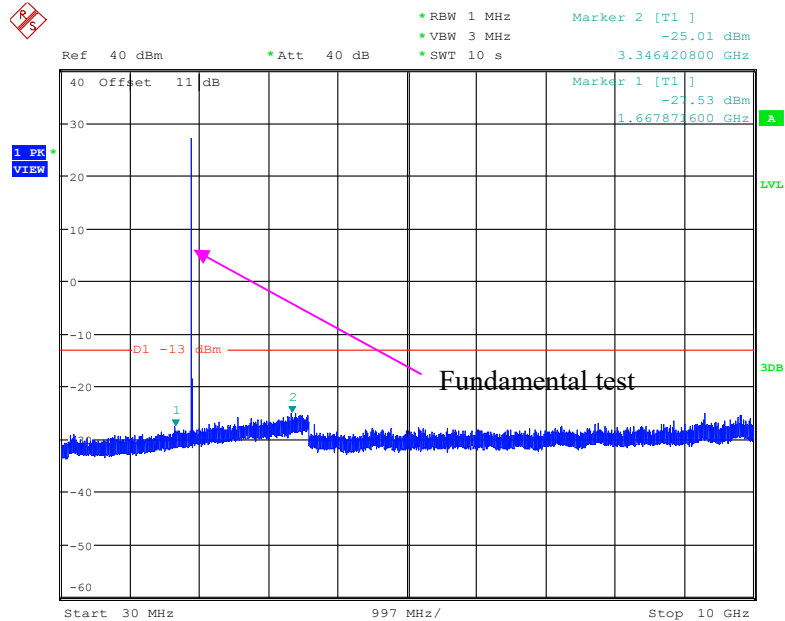
Date: 12.DEC.2022 11:23:42



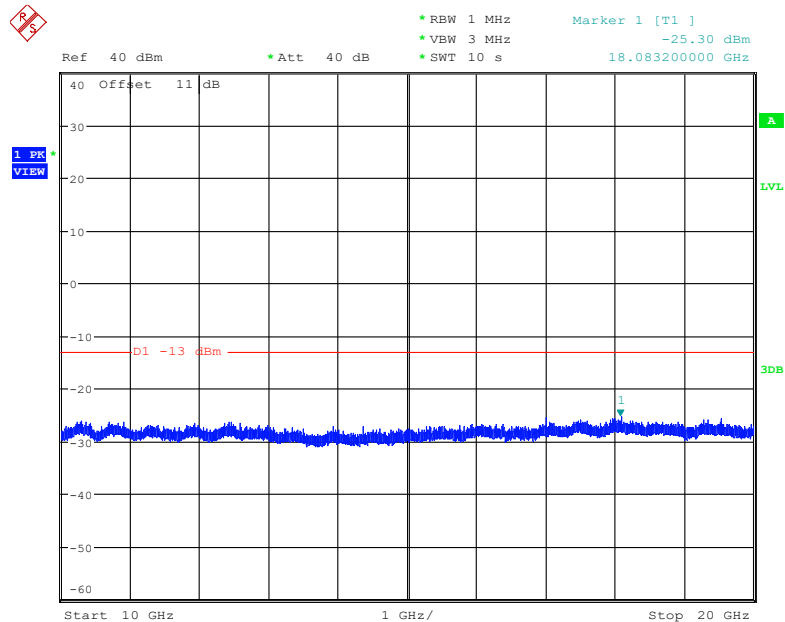
Date: 12.DEC.2022 13:38:08



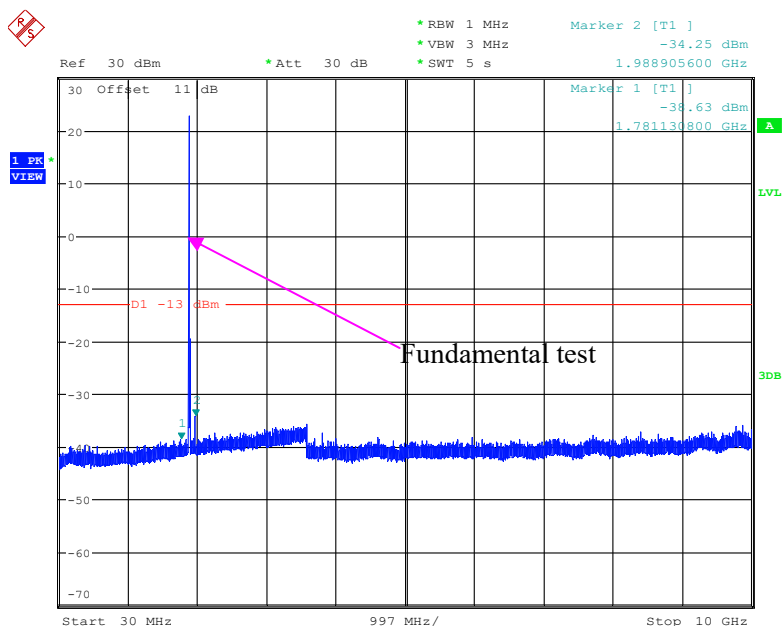
Date: 12.DEC.2022 13:38:49

**High Channel:****30 MHz – 10 GHz (GSM Mode)**

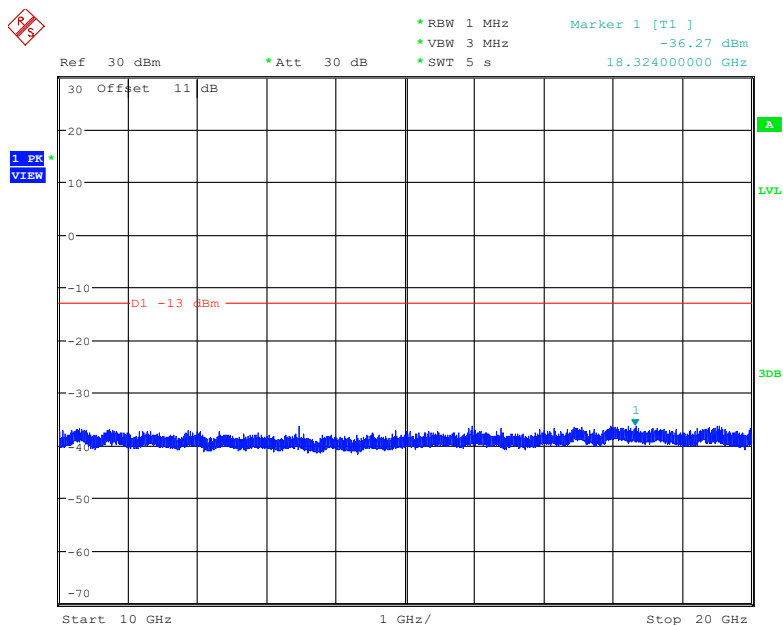
Date: 12.DEC.2022 11:33:07

**10 GHz – 20 GHz (GSM Mode)**

Date: 12.DEC.2022 11:34:20

**30 MHz – 10 GHz (RMC Mode)**

Date: 12.DEC.2022 13:55:34

**10 GHz – 20GHz (RMC Mode)**

Date: 12.DEC.2022 13:56:16

## **FCC § 2.1053; § 22.917 (a);§ 24.238 (a) - SPURIOUS RADIATED EMISSIONS**

### **Applicable Standard**

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

### **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>       | 25.9 °C   |
| <b>Relative Humidity:</b> | 58 %      |
| <b>ATM Pressure:</b>      | 101.0 kPa |

*The testing was performed by Jason Liu on 2022-12-08.*

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

*The worst case is as below:*

**30MHz-10GHz:****Cellular Band (Part 22H)**

| Frequency<br>(MHz) | Receiver<br>Reading<br>(dBm) | Turntable<br>Degree | Rx Antenna    |                | Substitute<br>d Factor<br>(dB) | Absolute<br>Level<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) |
|--------------------|------------------------------|---------------------|---------------|----------------|--------------------------------|----------------------------|----------------|----------------|
|                    |                              |                     | Height<br>(m) | Polar<br>(H/V) |                                |                            |                |                |
| GSM850             |                              |                     |               |                |                                |                            |                |                |
| Low Channel        |                              |                     |               |                |                                |                            |                |                |
| 950.03             | -72.64                       | 81                  | 2.0           | H              | 10.0                           | -62.64                     | -13            | -49.64         |
| 950.03             | -74.85                       | 344                 | 1.1           | V              | 11.7                           | -63.15                     | -13            | -50.15         |
| 1648.4             | -45.00                       | 22                  | 2.2           | H              | 3.5                            | -41.50                     | -13            | -28.50         |
| 1648.4             | -43.50                       | 349                 | 1.6           | V              | 3.1                            | -40.40                     | -13            | -27.40         |
| 2472.6             | -45.80                       | 270                 | 1.6           | H              | 6.6                            | -39.20                     | -13            | -26.20         |
| 2472.6             | -41.40                       | 158                 | 1.8           | V              | 5.8                            | -35.60                     | -13            | -22.60         |
| 3296.8             | -48.40                       | 278                 | 1.2           | H              | 6.4                            | -42.00                     | -13            | -29.00         |
| 3296.8             | -47.50                       | 27                  | 1.2           | V              | 5.7                            | -41.80                     | -13            | -28.80         |
| Middle Channel     |                              |                     |               |                |                                |                            |                |                |
| 952.39             | -72.35                       | 80                  | 2.3           | H              | 10.0                           | -62.35                     | -13            | -49.35         |
| 952.39             | -74.77                       | 235                 | 1.5           | V              | 11.7                           | -63.07                     | -13            | -50.07         |
| 1673.2             | -44.10                       | 320                 | 2.1           | H              | 3.8                            | -40.30                     | -13            | -27.30         |
| 1673.2             | -41.10                       | 116                 | 2.1           | V              | 3.1                            | -38.00                     | -13            | -25.00         |
| 2509.8             | -45.70                       | 152                 | 1.3           | H              | 6.2                            | -39.50                     | -13            | -26.50         |
| 2509.8             | -40.00                       | 303                 | 1.8           | V              | 5.6                            | -34.40                     | -13            | -21.40         |
| 3346.4             | -49.00                       | 342                 | 1.6           | H              | 6.6                            | -42.40                     | -13            | -29.40         |
| 3346.4             | -46.60                       | 198                 | 1.3           | V              | 5.4                            | -41.20                     | -13            | -28.20         |
| High Channel       |                              |                     |               |                |                                |                            |                |                |
| 956.82             | -71.12                       | 175                 | 2.0           | H              | 10.0                           | -61.12                     | -13            | -48.12         |
| 956.82             | -77.52                       | 331                 | 2.1           | V              | 11.7                           | -65.82                     | -13            | -52.82         |
| 1697.6             | -43.10                       | 235                 | 1.8           | H              | 4.1                            | -39.00                     | -13            | -26.00         |
| 1697.6             | -41.10                       | 358                 | 1.4           | V              | 3.1                            | -38.00                     | -13            | -25.00         |
| 2546.4             | -44.40                       | 209                 | 2.3           | H              | 6.1                            | -38.30                     | -13            | -25.30         |
| 2546.4             | -39.40                       | 323                 | 1.6           | V              | 5.8                            | -33.60                     | -13            | -20.60         |
| 3395.2             | -48.10                       | 72                  | 1.3           | H              | 6.2                            | -41.90                     | -13            | -28.90         |
| 3395.2             | -47.20                       | 140                 | 1.4           | V              | 5.4                            | -41.80                     | -13            | -28.80         |

| Frequency<br>(MHz) | Receiver<br>Reading<br>(dBm) | Turntable<br>Degree | Rx Antenna    |                | Substitute<br>d Factor<br>(dB) | Absolute<br>Level<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) |
|--------------------|------------------------------|---------------------|---------------|----------------|--------------------------------|----------------------------|----------------|----------------|
|                    |                              |                     | Height<br>(m) | Polar<br>(H/V) |                                |                            |                |                |
| WCDMA Band 5       |                              |                     |               |                |                                |                            |                |                |
| Low Channel        |                              |                     |               |                |                                |                            |                |                |
| 950.95             | -72.75                       | 151                 | 2.4           | H              | 10.0                           | -62.75                     | -13            | -49.75         |
| 950.95             | -77.35                       | 169                 | 2.4           | V              | 11.7                           | -65.65                     | -13            | -52.65         |
| 1652.8             | -46.90                       | 294                 | 2.4           | H              | 3.5                            | -43.40                     | -13            | -30.40         |
| 1652.8             | -44.30                       | 191                 | 1.5           | V              | 3.1                            | -41.20                     | -13            | -28.20         |
| 2479.2             | -56.10                       | 57                  | 1.5           | H              | 6.6                            | -49.50                     | -13            | -36.50         |
| 2479.2             | -55.00                       | 162                 | 1.5           | V              | 5.8                            | -49.20                     | -13            | -36.20         |
| 3305.6             | -51.90                       | 201                 | 1.7           | H              | 6.4                            | -45.50                     | -13            | -32.50         |
| 3305.6             | -50.70                       | 174                 | 1.1           | V              | 5.7                            | -45.00                     | -13            | -32.00         |
| Middle Channel     |                              |                     |               |                |                                |                            |                |                |
| 951.74             | -70.55                       | 101                 | 1.1           | H              | 10.0                           | -60.55                     | -13            | -47.55         |
| 951.74             | -77.39                       | 142                 | 2.2           | V              | 11.7                           | -65.69                     | -13            | -52.69         |
| 1673.2             | -46.60                       | 222                 | 2.3           | H              | 3.8                            | -42.80                     | -13            | -29.80         |
| 1673.2             | -44.80                       | 98                  | 2.1           | V              | 3.1                            | -41.70                     | -13            | -28.70         |
| 2509.8             | -55.80                       | 336                 | 2.3           | H              | 6.2                            | -49.60                     | -13            | -36.60         |
| 2509.8             | -54.70                       | 128                 | 2.3           | V              | 5.6                            | -49.10                     | -13            | -36.10         |
| 3346.4             | -51.50                       | 232                 | 2             | H              | 6.6                            | -44.90                     | -13            | -31.90         |
| 3346.4             | -50.30                       | 11                  | 1.1           | V              | 5.4                            | -44.90                     | -13            | -31.90         |
| High Channel       |                              |                     |               |                |                                |                            |                |                |
| 951.54             | -71.06                       | 323                 | 2.1           | H              | 10.0                           | -61.06                     | -13            | -48.06         |
| 951.54             | -75.98                       | 179                 | 1.6           | V              | 11.7                           | -64.28                     | -13            | -51.28         |
| 1693.2             | -47.60                       | 337                 | 1.7           | H              | 4.1                            | -43.50                     | -13            | -30.50         |
| 1693.2             | -44.00                       | 328                 | 1.4           | V              | 3.1                            | -40.90                     | -13            | -27.90         |
| 2539.8             | -55.60                       | 248                 | 2.5           | H              | 6.1                            | -49.50                     | -13            | -36.50         |
| 2539.8             | -54.80                       | 206                 | 1.0           | V              | 5.8                            | -49.00                     | -13            | -36.00         |
| 3386.4             | -51.20                       | 52                  | 2.4           | H              | 6.2                            | -45.00                     | -13            | -32.00         |
| 3386.4             | -50.10                       | 48                  | 1.6           | V              | 5.4                            | -44.70                     | -13            | -31.70         |

**30MHz-20GHz:****PCS Band (Part 24E)**

| Frequency<br>(MHz) | Receiver<br>Reading<br>(dBm) | Turntable<br>Degree | Rx Antenna    |                | Substitute<br>d Factor<br>(dB) | Absolute<br>Level<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) |
|--------------------|------------------------------|---------------------|---------------|----------------|--------------------------------|----------------------------|----------------|----------------|
|                    |                              |                     | Height<br>(m) | Polar<br>(H/V) |                                |                            |                |                |
| GSM 1900           |                              |                     |               |                |                                |                            |                |                |
| Low Channel        |                              |                     |               |                |                                |                            |                |                |
| 950.30             | -71.50                       | 345                 | 1.9           | H              | 10.0                           | -61.50                     | -13            | -48.50         |
| 950.30             | -76.65                       | 21                  | 2.4           | V              | 11.7                           | -64.95                     | -13            | -51.95         |
| 3700.4             | -51.50                       | 180                 | 1.1           | H              | 8.1                            | -43.40                     | -13            | -30.40         |
| 3700.4             | -50.10                       | 29                  | 1.6           | V              | 7.6                            | -42.50                     | -13            | -29.50         |
| Middle Channel     |                              |                     |               |                |                                |                            |                |                |
| 951.49             | -70.19                       | 125                 | 1.9           | H              | 10.0                           | -60.19                     | -13            | -47.19         |
| 951.49             | -76.58                       | 245                 | 2.1           | V              | 11.7                           | -64.88                     | -13            | -51.88         |
| 3760               | -53.30                       | 138                 | 2             | H              | 8.8                            | -44.50                     | -13            | -31.50         |
| 3760               | -51.60                       | 47                  | 1             | V              | 8                              | -43.60                     | -13            | -30.60         |
| High Channel       |                              |                     |               |                |                                |                            |                |                |
| 951.74             | -71.55                       | 7                   | 1.1           | H              | 10.0                           | -61.55                     | -13            | -48.55         |
| 951.74             | -75.58                       | 344                 | 1.7           | V              | 11.7                           | -63.88                     | -13            | -50.88         |
| 3819.6             | -52.50                       | 188                 | 2.2           | H              | 8.7                            | -43.80                     | -13            | -30.80         |
| 3819.6             | -50.90                       | 243                 | 2.5           | V              | 7.9                            | -43.00                     | -13            | -30.00         |

| Frequency<br>(MHz) | Receiver<br>Reading<br>(dBm) | Turntable<br>Degree | Rx Antenna    |                | Substitute<br>d Factor<br>(dB) | Absolute<br>Level<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) |
|--------------------|------------------------------|---------------------|---------------|----------------|--------------------------------|----------------------------|----------------|----------------|
|                    |                              |                     | Height<br>(m) | Polar<br>(H/V) |                                |                            |                |                |
| WCDMA Band 2       |                              |                     |               |                |                                |                            |                |                |
| Low Channel        |                              |                     |               |                |                                |                            |                |                |
| 953.60             | -72.50                       | 27                  | 1.7           | H              | 10.0                           | -62.50                     | -13            | -49.50         |
| 953.60             | -75.45                       | 141                 | 2.3           | V              | 11.7                           | -63.75                     | -13            | -50.75         |
| 3704.8             | -47.90                       | 300                 | 1.8           | H              | 8.1                            | -39.80                     | -13            | -26.80         |
| 3704.8             | -45.40                       | 175                 | 2.1           | V              | 7.6                            | -37.80                     | -13            | -24.80         |
| Middle Channel     |                              |                     |               |                |                                |                            |                |                |
| 952.67             | -70.82                       | 277                 | 2.1           | H              | 10.0                           | -60.82                     | -13            | -47.82         |
| 952.67             | -75.44                       | 213                 | 2.3           | V              | 11.7                           | -63.74                     | -13            | -50.74         |
| 3760               | -49.00                       | 319                 | 2.4           | H              | 8.8                            | -40.20                     | -13            | -27.20         |
| 3760               | -46.30                       | 307                 | 1.7           | V              | 8                              | -38.30                     | -13            | -25.30         |
| High Channel       |                              |                     |               |                |                                |                            |                |                |
| 954.66             | -70.10                       | 145                 | 1.5           | H              | 10.0                           | -60.10                     | -13            | -47.10         |
| 954.66             | -75.05                       | 138                 | 1.9           | V              | 11.7                           | -63.35                     | -13            | -50.35         |
| 3815.2             | -48.90                       | 193                 | 1.9           | H              | 8.7                            | -40.20                     | -13            | -27.20         |
| 3815.2             | -46.20                       | 121                 | 2.2           | V              | 7.9                            | -38.30                     | -13            | -25.30         |

**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)- BAND EDGES

### Applicable Standard

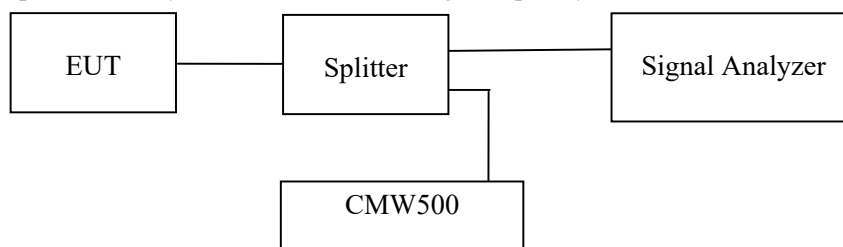
According to § 22.917(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.

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.

### 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



Note: the path loss (cable loss and attenuator) has included in the result.

### Test Data

#### Environmental Conditions

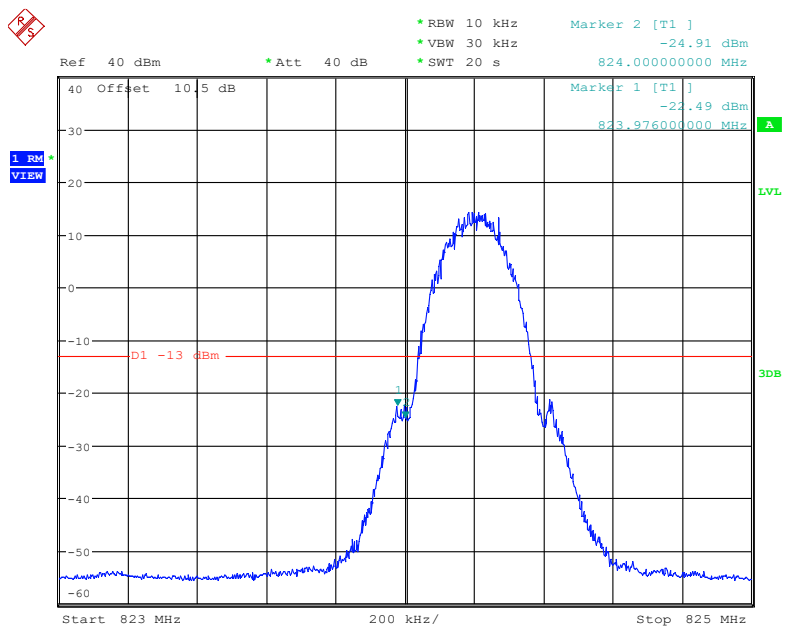
|                    |           |
|--------------------|-----------|
| Temperature:       | 25.7 °C   |
| Relative Humidity: | 58.2 %    |
| ATM Pressure:      | 101.0 kPa |

The testing was performed by Glenn Jiang on 2022-12-12.

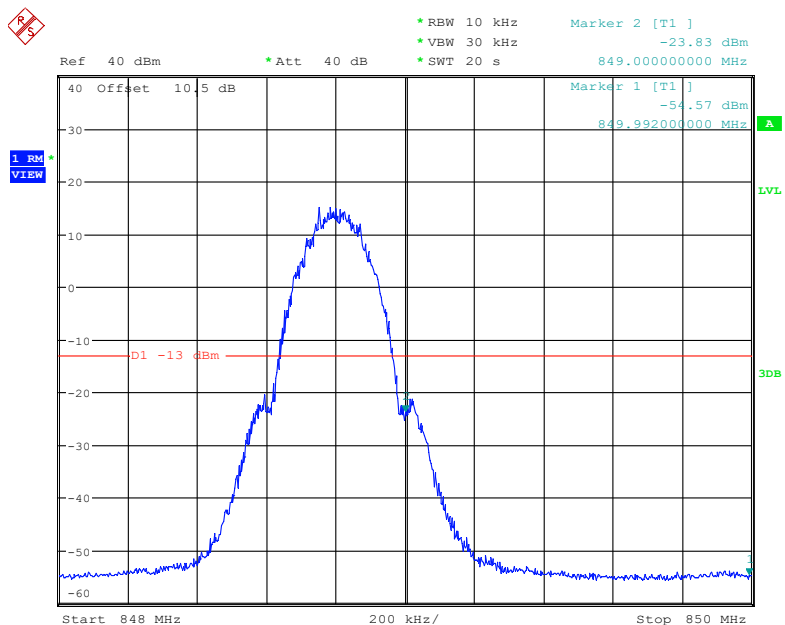
EUT operation mode: Transmitting (Worst case)

**Test Result: Pass**

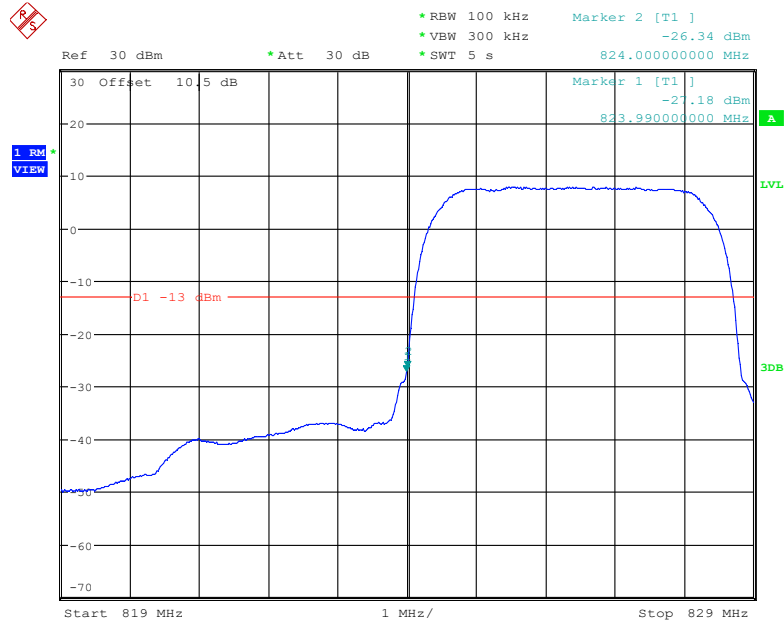
Please refer to the following plots.

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

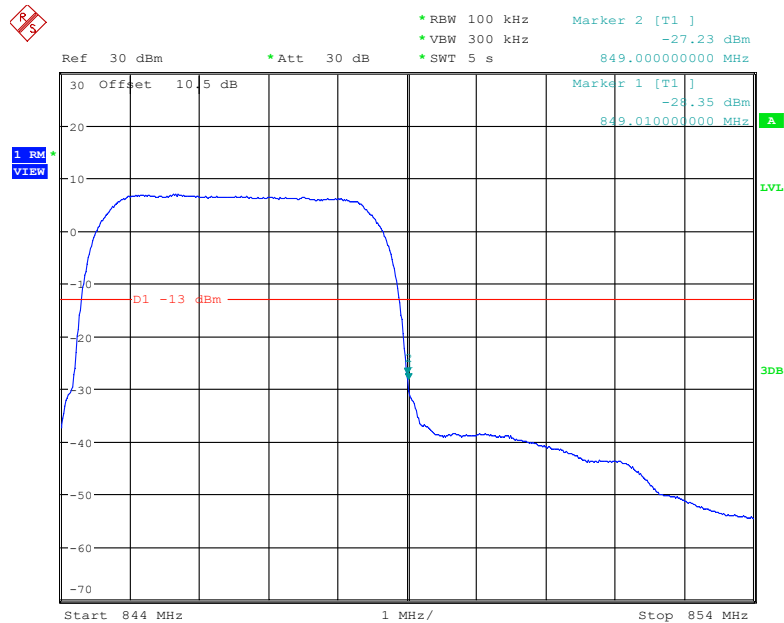
Date: 12.DEC.2022 10:25:56

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

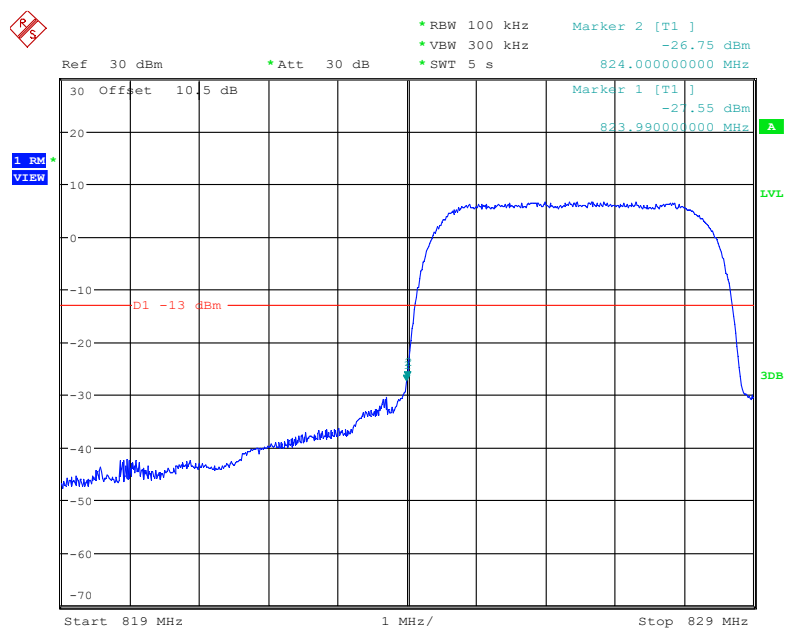
Date: 12.DEC.2022 10:35:08

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

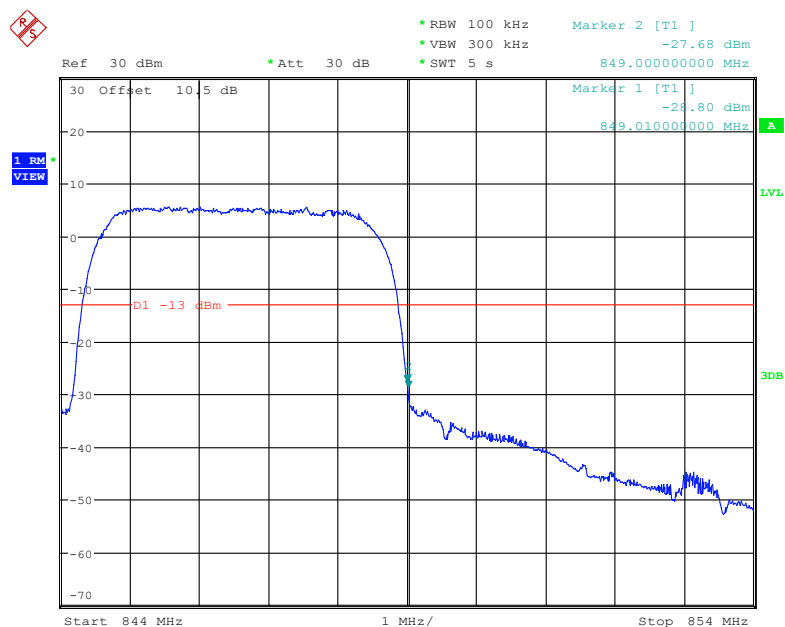
Date: 12.DEC.2022 14:06:17

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

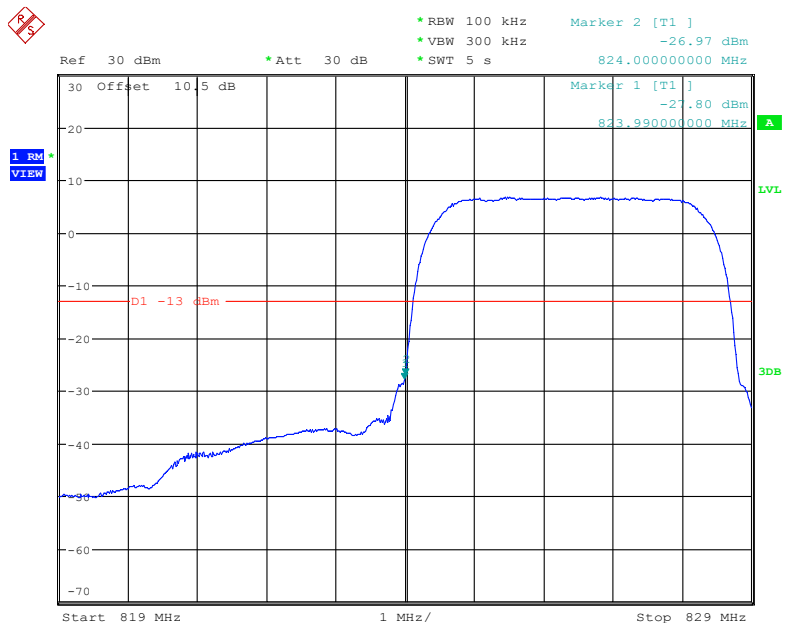
Date: 12.DEC.2022 14:12:22

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

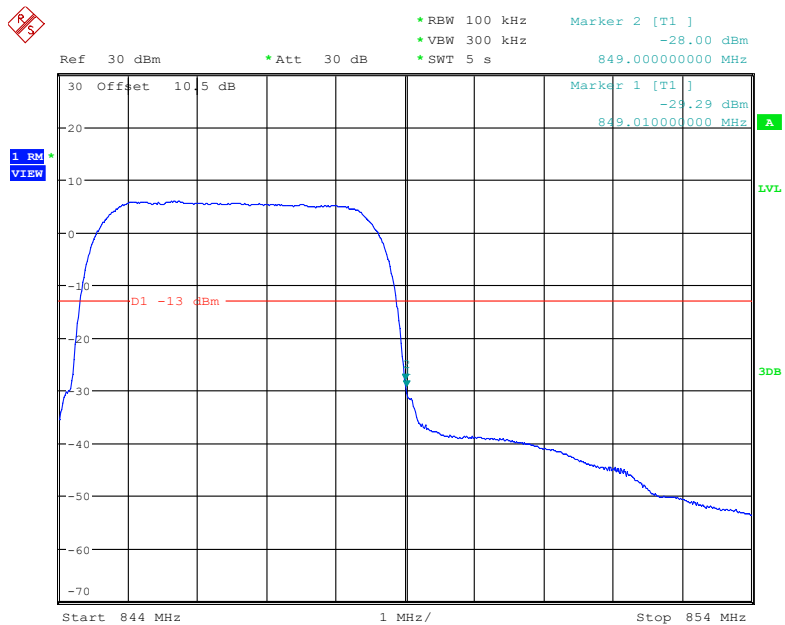
Date: 12.DEC.2022 14:30:43

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

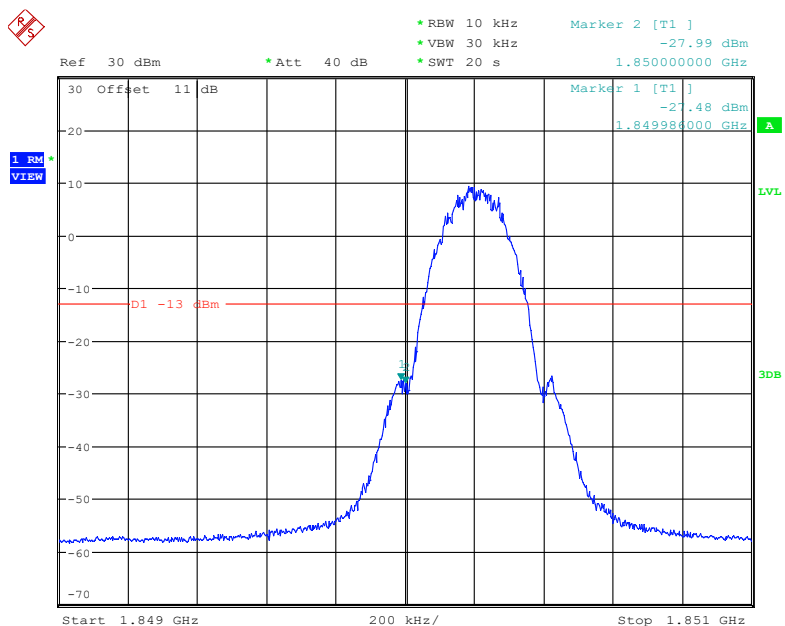
Date: 12.DEC.2022 14:44:17

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

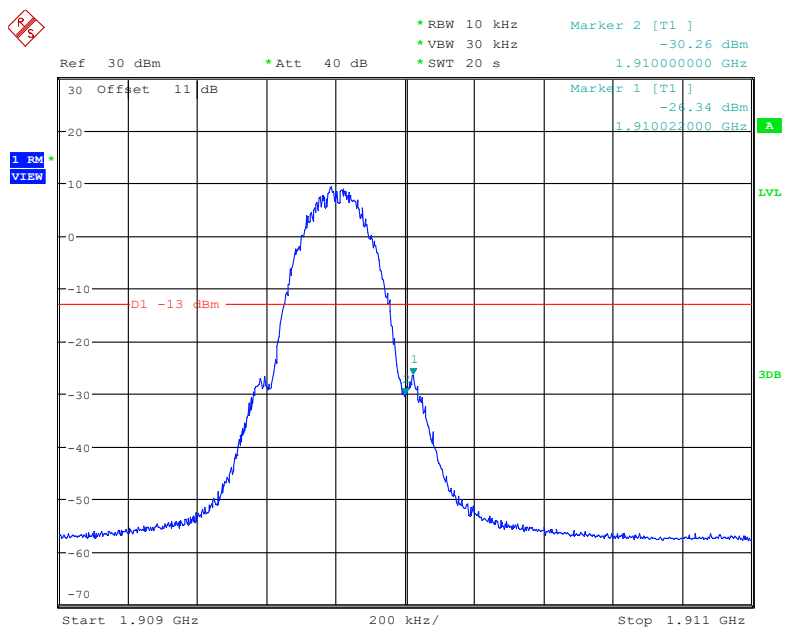
Date: 12.DEC.2022 14:49:13

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

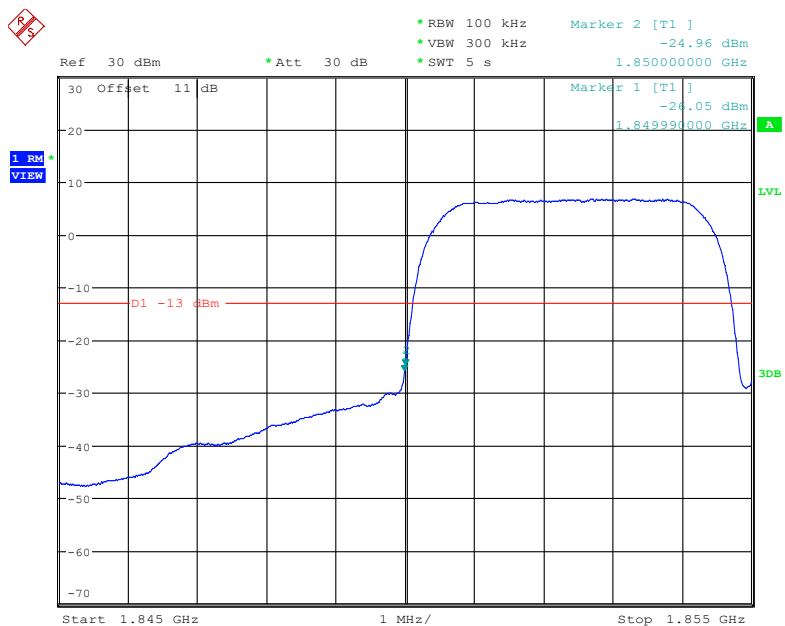
Date: 12.DEC.2022 14:56:46

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

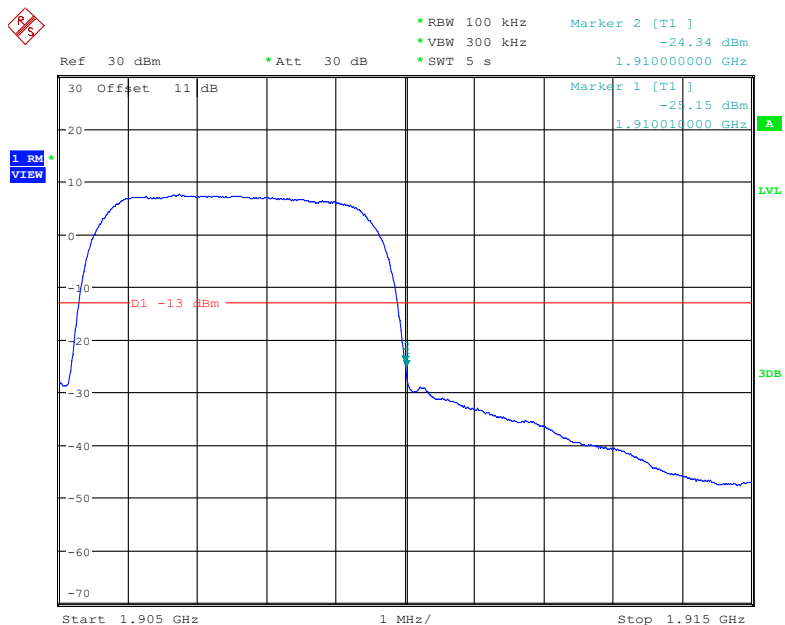
Date: 12.DEC.2022 11:16:44

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

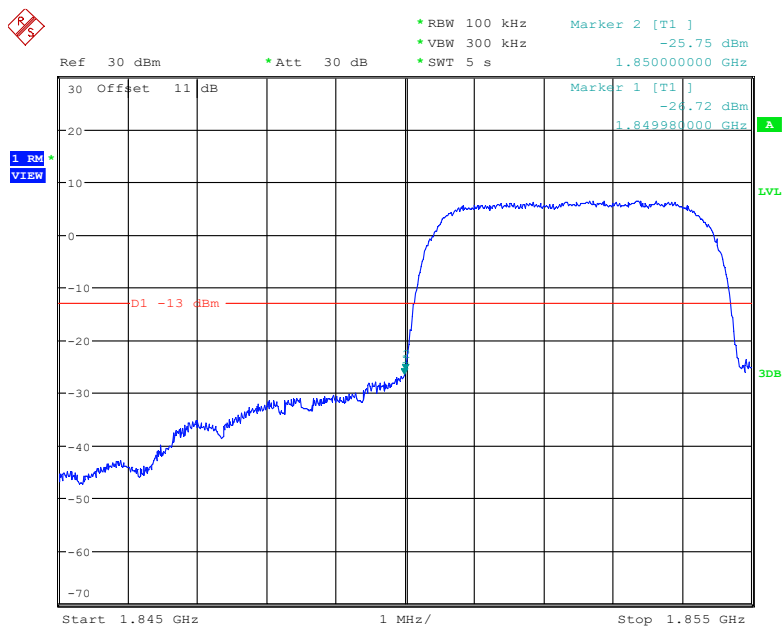
Date: 12.DEC.2022 11:32:38

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

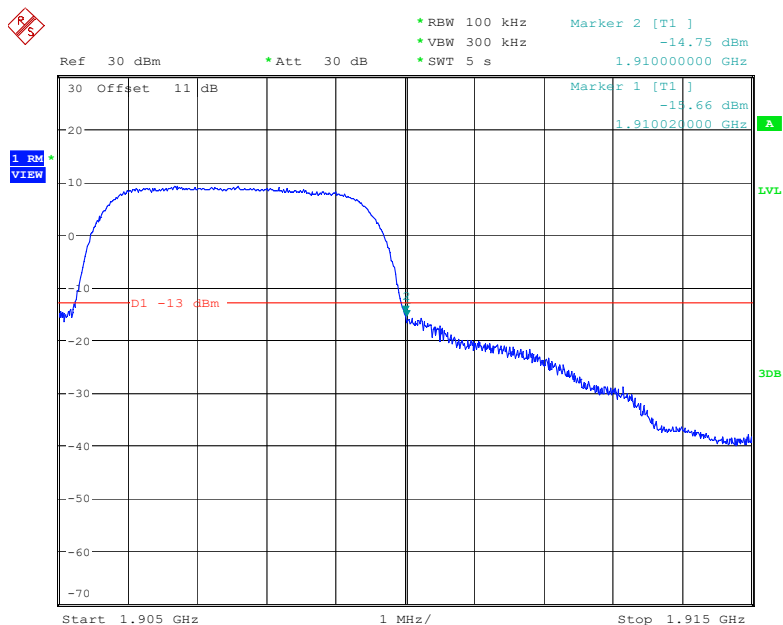
Date: 12.DEC.2022 13:32:08

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

Date: 12.DEC.2022 13:55:05

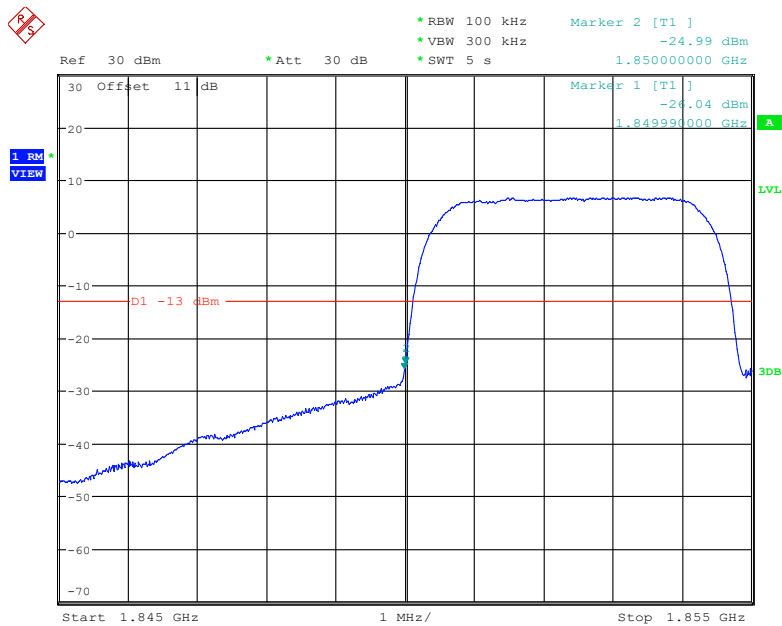
**PCS Band, Left Band Edge for HSDPA(16QAM) Mode**

Date: 12.DEC.2022 14:20:20

**PCS Band, Right Band Edge for HSDPA (16QAM) Mode**

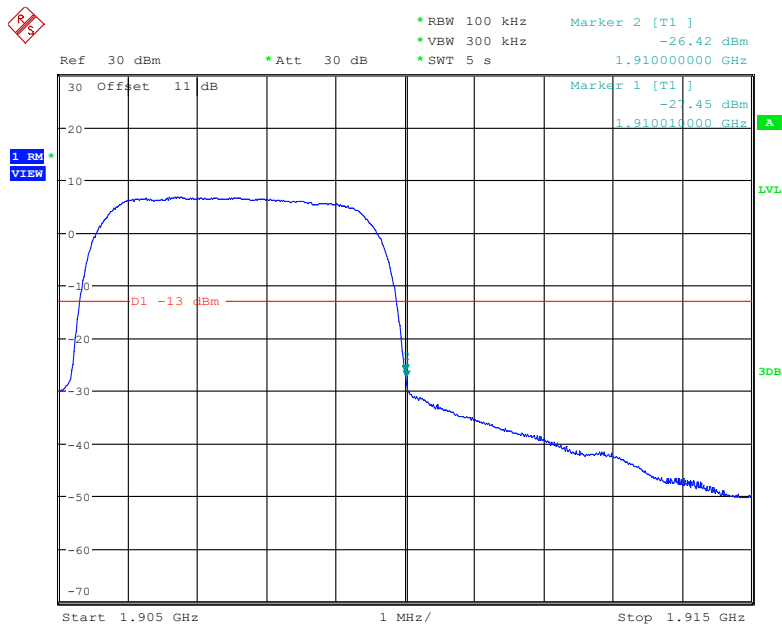
Date: 12.DEC.2022 20:01:27

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



Date: 12.DEC.2022 15:00:47

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



Date: 12.DEC.2022 15:08:35

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

### Applicable Standard

FCC § 2.1055, §22.355, §24.235.

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                    |

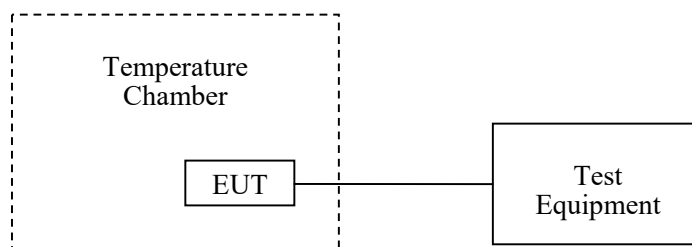
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

### 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>       | 25.7 °C   |
| <b>Relative Humidity:</b> | 58.2 %    |
| <b>ATM Pressure:</b>      | 101.0 kPa |

*The testing was performed by Glenn Jiang on 2022-12-12 and 2022-12-13.*

*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.                                | 2                    | 0.0024                | 2.5         |
| -20                                     |                                     | -3                   | -0.0036               | 2.5         |
| -10                                     |                                     | 4                    | 0.0048                | 2.5         |
| 0                                       |                                     | 3                    | 0.0036                | 2.5         |
| 10                                      |                                     | -7                   | -0.0084               | 2.5         |
| 20                                      |                                     | 19                   | 0.0192                | 2.5         |
| 30                                      |                                     | 5                    | 0.0060                | 2.5         |
| 40                                      |                                     | -3                   | -0.0036               | 2.5         |
| 50                                      |                                     | -6                   | -0.0072               | 2.5         |
| 20                                      | L.V.                                | -8                   | -0.0096               | 2.5         |
|                                         | H.V.                                | -9                   | -0.0108               | 2.5         |

**WCDMA Mode**

| Middle Channel, $f_0=836.6\text{MHz}$ |                               |                      |                       |             |
|---------------------------------------|-------------------------------|----------------------|-----------------------|-------------|
| Temperature (°C)                      | Voltage Supplied ( $V_{DC}$ ) | Frequency Error (Hz) | Frequency Error (ppm) | Limit (ppm) |
| -30                                   | N.V.                          | 1.39                 | 0.0017                | 2.5         |
| -20                                   |                               | 1.41                 | 0.0017                | 2.5         |
| -10                                   |                               | 1.58                 | 0.0019                | 2.5         |
| 0                                     |                               | 1.46                 | 0.0017                | 2.5         |
| 10                                    |                               | 1.33                 | 0.0016                | 2.5         |
| 20                                    |                               | 1.07                 | 0.0013                | 2.5         |
| 30                                    |                               | 1.29                 | 0.0015                | 2.5         |
| 40                                    |                               | 1.34                 | 0.0016                | 2.5         |
| 50                                    |                               | 1.34                 | 0.0016                | 2.5         |
| 20                                    | L.V.                          | 1.26                 | 0.0015                | 2.5         |
|                                       | H.V.                          | 1.28                 | 0.0015                | 2.5         |

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

| Temperature (°C) | Power Supplied ( $V_{DC}$ ) | $F_L$ (MHz) | $F_H$ (MHz) | $F_L$ Limit (MHz) | $F_H$ Limit (MHz) |
|------------------|-----------------------------|-------------|-------------|-------------------|-------------------|
| -30              | N.V.                        | 1850.0652   | 1909.9346   | 1850              | 1910              |
| -20              |                             | 1850.0661   | 1909.9291   | 1850              | 1910              |
| -10              |                             | 1850.0720   | 1909.9322   | 1850              | 1910              |
| 0                |                             | 1850.0709   | 1909.9303   | 1850              | 1910              |
| 10               |                             | 1850.0681   | 1909.9317   | 1850              | 1910              |
| 20               |                             | 1850.0729   | 1909.9328   | 1850              | 1910              |
| 30               |                             | 1850.0718   | 1909.9290   | 1850              | 1910              |
| 40               |                             | 1850.0711   | 1909.9316   | 1850              | 1910              |
| 50               |                             | 1850.0664   | 1909.9287   | 1850              | 1910              |
| 20               | L.V.                        | 1850.0720   | 1909.9344   | 1850              | 1910              |
|                  | H.V.                        | 1850.0704   | 1909.9358   | 1850              | 1910              |

**WCDMA Mode**

| Temperature<br>(°C) | Power<br>Supplied<br>(V <sub>DC</sub> ) | F <sub>L</sub><br>(MHz) | F <sub>H</sub><br>(MHz) | F <sub>L</sub> Limit<br>(MHz) | F <sub>H</sub> Limit<br>(MHz) |
|---------------------|-----------------------------------------|-------------------------|-------------------------|-------------------------------|-------------------------------|
| -30                 | N.V.                                    | 1850.3449               | 1909.6575               | 1850                          | 1910                          |
| -20                 |                                         | 1850.3434               | 1909.6587               | 1850                          | 1910                          |
| -10                 |                                         | 1850.3453               | 1909.6556               | 1850                          | 1910                          |
| 0                   |                                         | 1850.3449               | 1909.6555               | 1850                          | 1910                          |
| 10                  |                                         | 1850.3433               | 1909.6568               | 1850                          | 1910                          |
| 20                  |                                         | 1850.3459               | 1909.6567               | 1850                          | 1910                          |
| 30                  |                                         | 1850.3471               | 1909.6577               | 1850                          | 1910                          |
| 40                  |                                         | 1850.3466               | 1909.6583               | 1850                          | 1910                          |
| 50                  |                                         | 1850.3414               | 1909.6608               | 1850                          | 1910                          |
| 20                  | L.V.                                    | 1850.3447               | 1909.6615               | 1850                          | 1910                          |
|                     | H.V.                                    | 1850.3474               | 1909.6577               | 1850                          | 1910                          |

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