

# TEST REPORT

|                                        |                                                                                                                                                                                             |                                                                                       |
|----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| FCC ID..... :                          | 2AHZ5X70                                                                                                                                                                                    |                                                                                       |
| Test Report No..... :                  | TCT230423E058                                                                                                                                                                               |                                                                                       |
| Date of issue..... :                   | May 29, 2023                                                                                                                                                                                |                                                                                       |
| Testing laboratory .....               | SHENZHEN TONGCE TESTING LAB                                                                                                                                                                 |                                                                                       |
| Testing location/ address:             | 2101 & 2201, Zhenchang Factory, Renshan Industrial Zone, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, 518103, People's Republic of China                                        |                                                                                       |
| Applicant's name..... :                | Shenzhen Huafului Technology Co., Ltd                                                                                                                                                       |                                                                                       |
| Address..... :                         | Unit 1401 14/F, Jin qi zhi gu mansion Liu xian, street, Xili, Nan shan district, Shenzhen, China                                                                                            |                                                                                       |
| Manufacturer's name ... :              | Shenzhen Huafului Technology Co., Ltd                                                                                                                                                       |                                                                                       |
| Address..... :                         | Unit 1401 14/F, Jin qi zhi gu mansion Liu xian, street, Xili, Nan shan district, Shenzhen, China                                                                                            |                                                                                       |
| Standard(s) .....                      | FCC CFR Title 47 Part 2<br>FCC CFR Title 47 Part22<br>FCC CFR Title 47 Part24<br>FCC CFR Title 47 Part27                                                                                    |                                                                                       |
| Product Name..... :                    | Smartphone                                                                                                                                                                                  |                                                                                       |
| Trade Mark .....                       | CUBOT                                                                                                                                                                                       |                                                                                       |
| Model/Type reference..... :            | X70                                                                                                                                                                                         |                                                                                       |
| Rating(s)..... :                       | Adapter Information:<br>Model: HJ-FC018K7-US<br>Input: AC 100-240V, 50/60Hz, 0.6A<br>Output: DC 5.0V, 2.0A or DC 7.0V, 2.0A or DC 9.0V, 2.0A, 18.0W<br>Rechargeable Li-ion Battery DC 3.87V |                                                                                       |
| Date of receipt of test item .....     | Apr. 23, 2023                                                                                                                                                                               |                                                                                       |
| Date (s) of performance of test..... : | Apr. 23, 2023 - May 29, 2023                                                                                                                                                                |                                                                                       |
| Tested by (+signature) ... :           | Rleo LIU                                                                                                                                                                                    |  |
| Check by (+signature).... :            | Beryl ZHAO                                                                                                                                                                                  |  |
| Approved by (+signature):              | Tomsin                                                                                                                                                                                      |  |



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## 1. General Product Information

### 1.1. EUT description

|                                       |                                                                                                                                                                                                                                                                             |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product Name.....:                    | Smartphone                                                                                                                                                                                                                                                                  |
| Model/Type reference.....:            | X70                                                                                                                                                                                                                                                                         |
| Sample Number.....:                   | TCT230423E022-0102                                                                                                                                                                                                                                                          |
| 3G Version .....                      | WCDMA: R99<br>HSDPA: Release 5<br>HSUPA: Release 6                                                                                                                                                                                                                          |
| Tx Frequency .....                    | GSM/GPRS/EGPRS 850: 824.2MHz ~ 848.8MHz<br>GSM/GPRS/EGPRS 1900: 1850.2MHz ~ 1909.8MHz<br>WCDMA Band V: 826.4MHz ~ 846.6MHz<br>WCDMA Band IV: 1712.4MHz ~ 1752.6MHz<br>WCDMA Band II: 1852.4MHz ~ 1907.6MHz                                                                  |
| Rx Frequency .....                    | GSM/GPRS/EGPRS 850: 869.2MHz ~ 893.8MHz<br>GSM/GPRS/EGPRS 1900: 1930.2MHz ~ 1989.8MHz<br>WCDMA Band V: 871.4MHz ~ 891.6MHz<br>WCDMA Band IV: 2112.4MHz ~ 2152.6MHz<br>WCDMA Band II: 1932.4MHz ~ 1987.6MHz                                                                  |
| Maximum Output Power to Antenna.....: | GSM850: 33.05dBm<br>GSM1900: 29.78dBm<br>GPRS850: 33.11dBm<br>GPRS1900: 29.84dBm<br>EGPRS850: 27.53dBm<br>EGPRS1900: 26.92dBm<br>WCDMA Band V: 23.52dBm<br>WCDMA Band IV: 23.38dBm<br>WCDMA Band II: 21.17dBm                                                               |
| 99% Occupied Bandwidth.....:          | GSM850: 248KGXW<br>GSM1900: 247KGXW<br>GPRS850 Class 8: 248KGXW<br>GPRS1900 Class 8: 247KGXW<br>EGPRS850 Class 8: 251KG7W<br>EGPRS1900 Class 8: 251KG7W<br>WCDMA Band V RMC 12.2Kbps: 4M17F9W<br>WCDMA Band IV RMC 12.2Kbps: 4M17F9W<br>WCDMA Band II RMC 12.2Kbps: 4M16F9W |
| Type of Modulation.....:              | GSM/GPRS: GMSK<br>EGPRS: 8PSK<br>WCDMA/HSDPA/HSUPA: QPSK                                                                                                                                                                                                                    |
| Antenna Type.....:                    | FPC Antenna                                                                                                                                                                                                                                                                 |
| Antenna Gain.....:                    | GSM/GPRS/EGPRS 850: -0.64dBi<br>GSM/GPRS/EGPRS 1900: 0.97dBi<br>WCDMA Band V: -0.64dBi<br>WCDMA Band IV: 0.87dBi<br>WCDMA Band II: 0.97dBi                                                                                                                                  |

Rating(s).....:

**Adapter Information:**

Model: HJ-FC018K7-US

Input: AC 100-240V, 50/60Hz, 0.6A

Output: DC 5.0V, 2.0A or DC 7.0V, 2.0A or DC 9.0V, 2.0A, 18.0W

Rechargeable Li-ion Battery DC 3.87V

Note: The antenna gain listed in this report is provided by applicant, and the test laboratory is not responsible for this parameter.

## 1.2. Model(s) list

None.

## 1.3. Operation Frequency

| GSM 850  |                 | PCS1900  |                 |
|----------|-----------------|----------|-----------------|
| Channel: | Frequency (MHz) | Channel: | Frequency (MHz) |
| 128      | 824.20          | 512      | 1850.20         |
| 129      | 824.40          | 513      | 1850.40         |
| ....     | ....            | ....     | ....            |
| 189      | 836.40          | 660      | 1879.80         |
| 190      | 836.60          | 661      | 1880.00         |
| 191      | 836.80          | 662      | 1880.20         |
| ...      | ...             | ...      | ...             |
| 250      | 848.60          | 809      | 1909.60         |
| 251      | 848.80          | 810      | 1909.80         |

| WCDMA Band IV |                 | WCDMA Band V |                 | WCDMA Band II |                 |
|---------------|-----------------|--------------|-----------------|---------------|-----------------|
| Channel:      | Frequency (MHz) | Channel:     | Frequency (MHz) | Channel:      | Frequency (MHz) |
| 1312          | 1712.4          | 4132         | 826.40          | 9262          | 1852.40         |
| ....          | ....            | 4133         | 826.60          | 9263          | 1852.60         |
| ....          | ....            | ....         | ....            | ....          | ....            |
| ....          | ....            | 4182         | 836.40          | 9399          | 1879.80         |
| 1413          | 1732.6          | 4183         | 836.60          | 9400          | 1880.00         |
| ....          | ....            | 4184         | 836.80          | 9401          | 1880.20         |
| ....          | ....            | ...          | ...             | ...           | ...             |
| 1513          | 1752.6          | 4233         | 846.60          | 9538          | 1907.60         |

## 2. Test Result Summary

| Requirement                                   | CFR 47 Section                                   | Result |
|-----------------------------------------------|--------------------------------------------------|--------|
| Conducted Output Power                        | §22.913; §2.1046<br>§24.232; §27.50(d)           | PASS   |
| Peak-to-Average Ratio                         | §2.1046; §24.232(d)<br>§22.913; §27.50(d)        | PASS   |
| Effective Radiated Power                      | §2.1046; §22.913(a)<br>§24.232; §27.50(d)        | PASS   |
| Equivalent Isotropic Radiated Power           | §2.1046; §22.913(a)<br>§24.232; §27.50(d)        | PASS   |
| Occupied Bandwidth                            | §2.1049                                          | PASS   |
| Band Edge                                     | §2.1051<br>§22.917(a)<br>§24.238(a)<br>§27.53(g) | PASS   |
| Conducted Spurious Emission                   | §2.1051; §22.917<br>§24.238; §27.53(h)           | PASS   |
| Field Strength of Spurious Radiation          | §2.1053; §22.917(a)<br>§24.238; §27.53(g)        | PASS   |
| Frequency Stability for Temperature & Voltage | §2.1055; §22.355<br>§24.235; §27.54              | PASS   |

**Note:**

1. PASS: Test item meets the requirement.
2. Fail: Test item does not meet the requirement.
3. N/A: Test case does not apply to the test object.
4. The test result judgment is decided by the limit of test standard.

### 3. General Information

#### 3.1. Test environment and mode

| Operating Environment:                                                                                                  |           |
|-------------------------------------------------------------------------------------------------------------------------|-----------|
| Temperature:                                                                                                            | 25.0 °C   |
| Humidity:                                                                                                               | 56 % RH   |
| Atmospheric Pressure:                                                                                                   | 1010 mbar |
| Remark: This product has a built-in rechargeable battery, so in an independent test, the EUT battery was fully-charged. |           |

Keep the EUT in communication with CMU200 and select channel with modulation  
All modes and data rates and positions were investigated.  
Test modes are chosen to be reported as the worst case configuration below:

| Test Mode     |                                                       |                                                       |
|---------------|-------------------------------------------------------|-------------------------------------------------------|
| Band          | Radiated TCs                                          | Conducted TCs                                         |
| GSM 850       | GSM Link<br>GPRS class 12 Link<br>EGPRS class 12 Link | GSM Link<br>GPRS class 12 Link<br>EGPRS class 12 Link |
| PCS 1900      | GSM Link<br>GPRS class 12 Link<br>EGPRS class 12 Link | GSM Link<br>GPRS class 12 Link<br>EGPRS class 12 Link |
| WCDMA Band V  | RMC 12.2Kbps Link                                     | RMC 12.2Kbps Link                                     |
| WCDMA Band IV | RMC 12.2Kbps Link                                     | RMC 12.2Kbps Link                                     |
| WCDM Band II  | RMC 12.2Kbps Link                                     | RMC 12.2Kbps Link                                     |

Antenna port conducted and radiated test items were performed according to KDB 971168 D01 Power Meas. License Digital Systems v03r01 with maximum output power. Radiated measurements were performed with rotating EUT in different three orthogonal test planes to find the maximum emission. The sample was placed (0.8m below 1GHz, 1.5m above 1GHz) above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarization. The emissions worst-case (Z axis) are shown in Test Results of the following pages.

### 3.2. Description of Support Units

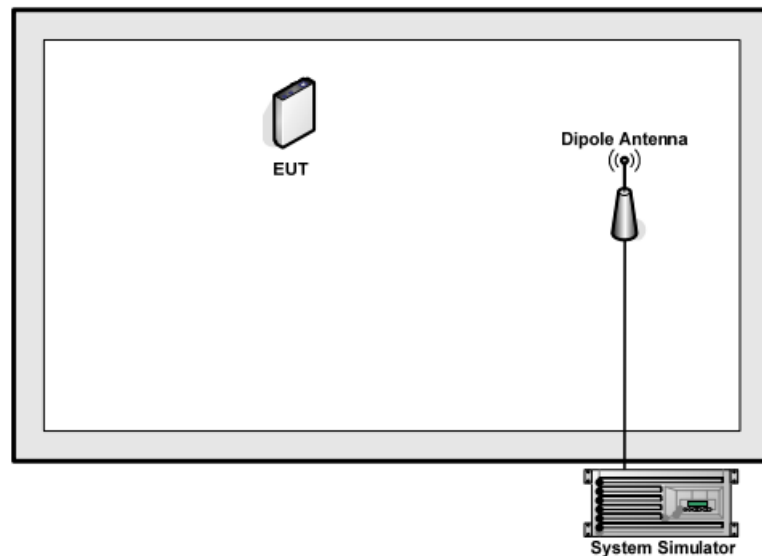
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

| Equipment | Model No. | Serial No. | FCC ID | Trade Name |
|-----------|-----------|------------|--------|------------|
| /         | /         | /          | /      | /          |

**Note:**

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

### 3.3. Configuration of Tested System



### 3.4. Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between RF conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level will be exactly the RF output level. The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

*Offset = RF cable loss + attenuator factor.*

The following shows an offset computation example with RF cable loss 3 dB and a 5dB attenuator.

Example: *Offset (dB) = RF cable loss (dB) + attenuator factor (dB).*  
*= 8(dB)*



## 4. Facilities and Accreditations

### 4.1. Facilities

The test facility is recognized, certified, or accredited by the following organizations:

- FCC - Registration No.: 645098

SHENZHEN TONGCE TESTING LAB

Designation Number: CN1205

The testing lab has been registered and fully described in a report with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.

- IC - Registration No.: 10668A-1

SHENZHEN TONGCE TESTING LAB

CAB identifier: CN0031

The testing lab has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing.

### 4.2. Location

SHENZHEN TONGCE TESTING LAB

Address: 2101 & 2201, Zhenchang Factory Renshan Industrial Zone, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, 518103, People's Republic of China

TEL: +86-755-27673339

### 4.3. Measurement Uncertainty

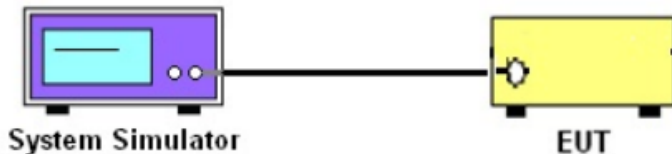
The reported uncertainty of measurement  $y \pm U$ , where expanded uncertainty  $U$  is based on a standard uncertainty multiplied by a coverage factor of  $k=2$ , providing a level of confidence of approximately 95 %.

| No. | Item                                    | MU                        |
|-----|-----------------------------------------|---------------------------|
| 1   | Conducted Emission                      | $\pm 3.10$ dB             |
| 2   | RF power, conducted                     | $\pm 0.12$ dB             |
| 3   | Spurious emissions, conducted           | $\pm 0.11$ dB             |
| 4   | All emissions, radiated(<1 GHz)         | $\pm 4.56$ dB             |
| 5   | All emissions, radiated(1 GHz - 18 GHz) | $\pm 4.22$ dB             |
| 6   | All emissions, radiated(18 GHz- 40 GHz) | $\pm 4.36$ dB             |
| 7   | Temperature                             | $\pm 0.1^{\circ}\text{C}$ |
| 8   | Humidity                                | $\pm 1.0\%$               |

## 5. Test Results and Measurement Data

### 5.1. Conducted Output Power Measurement

#### 5.1.1. Test Specification

|                          |                                                                                                                                                                                                                                                                                                                                                                                                           |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Test Requirement:</b> | FCC part 22.913(a) and FCC part 24.232(b)<br>FCC part 27.50(d);                                                                                                                                                                                                                                                                                                                                           |
| <b>Test Method:</b>      | FCC KDB 971168 D01 v03r01                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Operation mode:</b>   | Refer to item 3.1                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Limits:</b>           | GSM 850: 7W<br>PCS 1900: 2W<br>WCDMA Band V: 7W<br>WCDMA Band II: 2W<br>WCDMA Band IV: 1W                                                                                                                                                                                                                                                                                                                 |
| <b>Test Setup:</b>       |  <p>The diagram illustrates the test setup. On the left is a purple box labeled 'System Simulator' with a screen and two buttons. A black line connects it to a yellow box on the right labeled 'EUT' (Equipment Under Test), which has a circular port on its left side.</p>                                          |
| <b>Test Procedure:</b>   | <ol style="list-style-type: none"> <li>1. The transmitter output port was connected to the system simulator.</li> <li>2. Set EUT at maximum power through system simulator.</li> <li>3. Select lowest, middle, and highest channels for each band and different modulation.</li> <li>4. Measure the maximum burst average power for GSM and maximum average power for other modulation signal.</li> </ol> |
| <b>Test Result:</b>      | PASS                                                                                                                                                                                                                                                                                                                                                                                                      |

#### 5.1.2. Test Instruments

| Equipment        | Manufacturer | Model     | Serial Number | Calibration Due |
|------------------|--------------|-----------|---------------|-----------------|
| System simulator | R&S          | CMU200    | 110188        | Jul. 04, 2023   |
| Combiner Box     | Ascentest    | AT890-RFB | /             | /               |

### 5.1.3. Test data

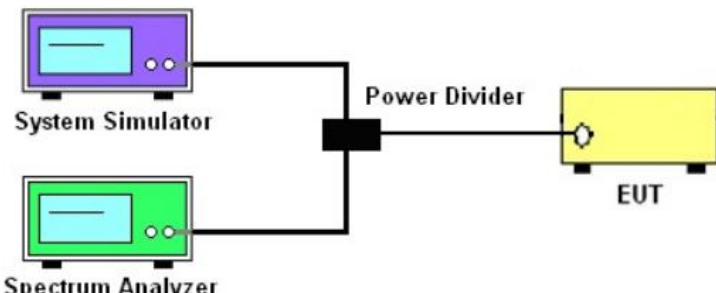
#### Conducted Power Measurement Results:

| Average Conducted Power (*Unit: dBm) |              |       |       |               |        |        |
|--------------------------------------|--------------|-------|-------|---------------|--------|--------|
| Band                                 | GSM850       |       |       | PCS 1900      |        |        |
| Channel                              | 128          | 190   | 251   | 512           | 661    | 810    |
| Frequency(MHz)                       | 824.2        | 836.6 | 848.8 | 1850.2        | 1880.0 | 1909.8 |
| GSM                                  | 33.03        | 33.05 | 32.97 | 28.96         | 29.31  | 29.78  |
| GPRS class8                          | 33.07        | 33.11 | 33.09 | 28.96         | 29.32  | 29.84  |
| GPRS class10                         | 32.18        | 32.14 | 32.18 | 27.93         | 28.24  | 28.71  |
| GPRS class11                         | 30.26        | 30.24 | 30.28 | 25.87         | 26.14  | 26.64  |
| GPRS class12                         | 28.62        | 28.54 | 28.67 | 24.60         | 24.77  | 24.97  |
| EGPRS class8                         | 27.46        | 27.42 | 27.53 | 26.27         | 26.59  | 26.92  |
| EGPRS class10                        | 26.16        | 25.92 | 25.97 | 24.92         | 25.21  | 25.59  |
| EGPRS class11                        | 23.60        | 23.37 | 23.34 | 23.47         | 23.74  | 24.14  |
| EGPRS class12                        | 21.84        | 21.77 | 21.72 | 21.78         | 22.06  | 22.35  |
| Average Conducted Power (*Unit: dBm) |              |       |       |               |        |        |
| Band                                 | WCDMA Band V |       |       | WCDMA Band II |        |        |
| Channel                              | 4132         | 4182  | 4233  | 9262          | 9400   | 9538   |
| Frequency(MHz)                       | 826.4        | 836.4 | 846.6 | 1852.4        | 1880.0 | 1907.6 |
| WCDMA RMC 12.2K                      | 23.47        | 23.39 | 23.52 | 20.52         | 20.67  | 21.17  |
| HSDPA Subtest-1                      | 22.41        | 22.38 | 22.51 | 20.16         | 20.61  | 21.09  |
| HSDPA Subtest-2                      | 22.27        | 22.16 | 22.36 | 20.09         | 20.49  | 21.07  |
| HSDPA Subtest-3                      | 21.84        | 21.65 | 21.79 | 19.94         | 20.26  | 20.83  |
| HSDPA Subtest-4                      | 21.57        | 21.30 | 21.42 | 19.72         | 19.85  | 20.25  |
| HSUPA Subtest-1                      | 22.07        | 22.04 | 22.13 | 20.72         | 20.22  | 20.72  |
| HSUPA Subtest-2                      | 22.06        | 22.01 | 22.11 | 20.69         | 20.18  | 20.68  |
| HSUPA Subtest-3                      | 21.75        | 21.79 | 21.54 | 20.27         | 20.04  | 20.26  |
| HSUPA Subtest-4                      | 21.37        | 21.36 | 21.17 | 20.01         | 19.92  | 20.08  |
| HSUPA Subtest-5                      | 20.44        | 20.50 | 20.39 | 19.87         | 19.45  | 19.84  |

| Conducted Power (*Unit: dBm) |               |        |        |
|------------------------------|---------------|--------|--------|
| Band                         | WCDMA Band IV |        |        |
| Channel                      | 1312          | 1413   | 1513   |
| Frequency(MHz)               | 1712.4        | 1732.6 | 1752.6 |
| WCDMA RMC 12.2K              | 23.38         | 23.11  | 22.76  |
| HSDPA Subtest-1              | 22.32         | 22.07  | 21.73  |
| HSDPA Subtest-2              | 22.14         | 21.76  | 21.54  |
| HSDPA Subtest-3              | 21.78         | 21.29  | 21.17  |
| HSDPA Subtest-4              | 21.36         | 20.54  | 20.56  |
| HSUPA Subtest-1              | 21.94         | 21.66  | 21.34  |
| HSUPA Subtest-2              | 21.89         | 21.62  | 21.27  |
| HSUPA Subtest-3              | 20.92         | 21.12  | 21.08  |
| HSUPA Subtest-4              | 20.65         | 20.80  | 20.78  |
| HSUPA Subtest-5              | 20.27         | 20.49  | 20.48  |

## 5.2. Peak to Average Ratio

### 5.2.1. Test Specification

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Test Requirement:</b> | FCC part 24.232(d); FCC part 22.913;<br>FCC part 27.50(d);                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Test Method:</b>      | ANSI C63.26:2013                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Operation mode:</b>   | Refer to item 3.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Limit:</b>            | The peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Test Setup:</b>       |  <p>The diagram shows a System Simulator (purple box) and a Spectrum Analyzer (green box) connected to a Power Divider (black box). The Power Divider is then connected to the EUT (yellow box).</p>                                                                                                                                                                                                                                                                                                                   |
| <b>Test Procedure:</b>   | <ol style="list-style-type: none"> <li>1. The testing follows FCC KDB 971168 D01v03r01 Section 5.7.1.</li> <li>2. The EUT was connected to spectrum analyzer and system simulator via a power divider.</li> <li>3. Set EUT to transmit at maximum output power.</li> <li>4. For GSM/EGPRS operating modes, signal gating is implemented on the spectrum analyzer by triggering from the system simulator.</li> <li>5. Set the CCDF (Complementary Cumulative Distribution Function) option of the spectrum analyzer.<br/>Record the maximum PAPR level associated with a probability of 0.1%.</li> </ol> |
| <b>Test Result:</b>      | PASS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

### 5.2.2. Test Instruments

| Equipment         | Manufacturer | Model     | Serial Number | Calibration Due |
|-------------------|--------------|-----------|---------------|-----------------|
| System simulator  | R&S          | CMU200    | 110188        | Jul. 04, 2023   |
| Spectrum Analyzer | Agilent      | N9020A    | MY49100619    | Jul. 04, 2023   |
| Combiner Box      | Ascentest    | AT890-RFB | /             | /               |

### 5.2.3. Test Data

| Cellular Band              |        |       |       |
|----------------------------|--------|-------|-------|
| Mode                       | GSM850 |       |       |
| Channel                    | 128    | 190   | 251   |
| Frequency (MHz)            | 824.2  | 836.6 | 848.8 |
| Peak-to-Average Ratio (dB) | 9.31   | 9.44  | 9.66  |

| PCS Band                   |          |      |        |
|----------------------------|----------|------|--------|
| Mode                       | GSM 1900 |      |        |
| Channel                    | 512      | 661  | 810    |
| Frequency (MHz)            | 1850.2   | 1880 | 1909.8 |
| Peak-to-Average Ratio (dB) | 9.48     | 9.76 | 9.66   |

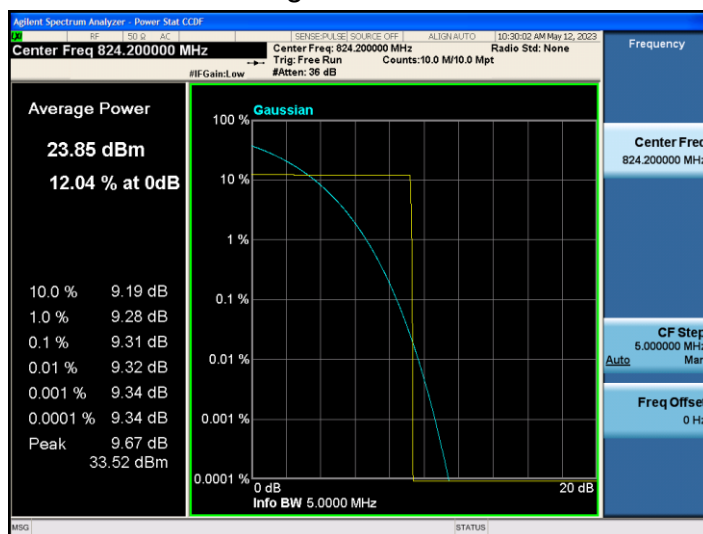
| Cellular Band              |                                |       |       |                                 |        |        |                                 |      |        |
|----------------------------|--------------------------------|-------|-------|---------------------------------|--------|--------|---------------------------------|------|--------|
| Mode                       | WCDMA Band V<br>(RMC 12.2Kbps) |       |       | WCDMA Band IV<br>(RMC 12.2Kbps) |        |        | WCDMA Band II<br>(RMC 12.2Kbps) |      |        |
| Channel                    | 4132                           | 4182  | 4233  | 1312                            | 1413   | 1513   | 9262                            | 9400 | 9538   |
| Frequency (MHz)            | 826.4                          | 836.4 | 846.6 | 1712.4                          | 1732.6 | 1752.6 | 1852.4                          | 1880 | 1907.6 |
| Peak-to-Average Ratio (dB) | 3.05                           | 3.20  | 3.12  | 3.20                            | 3.01   | 3.03   | 3.21                            | 3.21 | 3.06   |

**Note:** Measurements were conducted in all GMSK modulation (GSM/GPRS/EGPRS) and the worst case Mode (GSM) was submitted only.

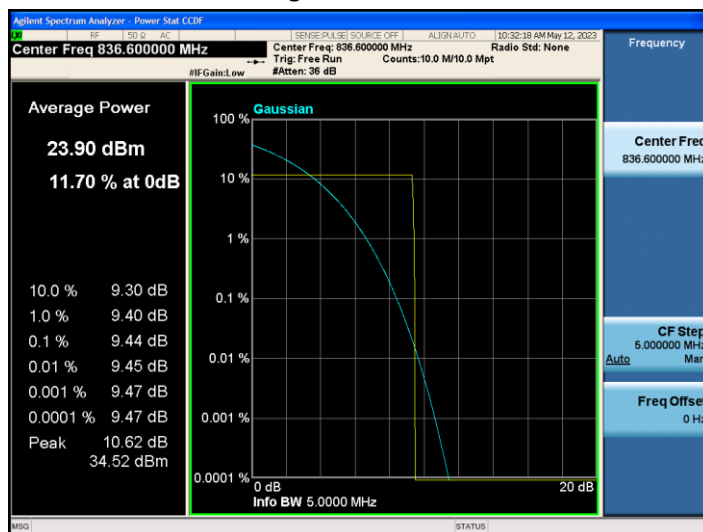
Test plots as follows:

## GSM 850

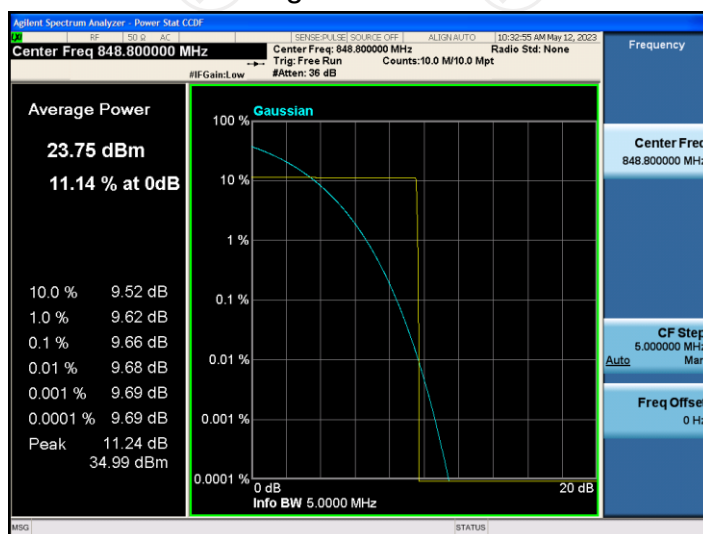
### Peak-to-Average Ratio on Channel 128



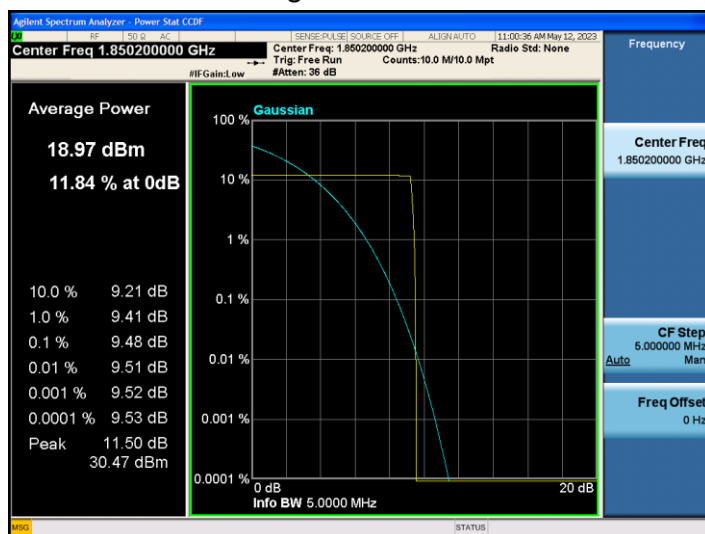
### Peak-to-Average Ratio on Channel 190



### Peak-to-Average Ratio on Channel 251



### Peak-to-Average Ratio on Channel 512



### Peak-to-Average Ratio on Channel 661



### Peak-to-Average Ratio on Channel 810





### Peak-to-Average Ratio on Channel 4132



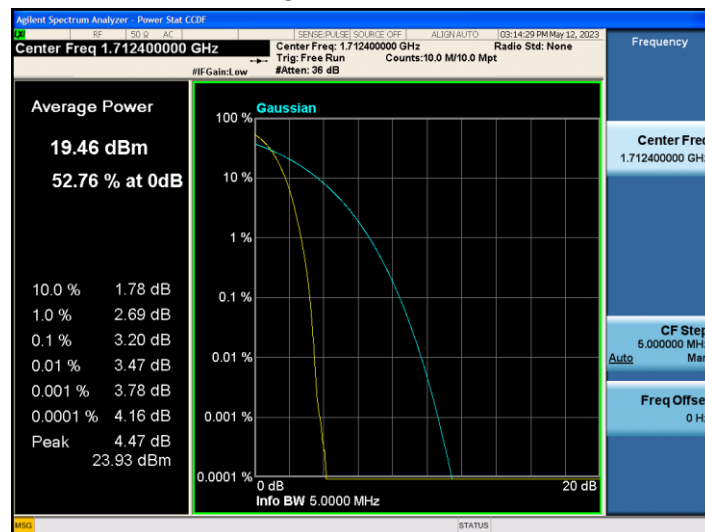
### Peak-to-Average Ratio on Channel 4182



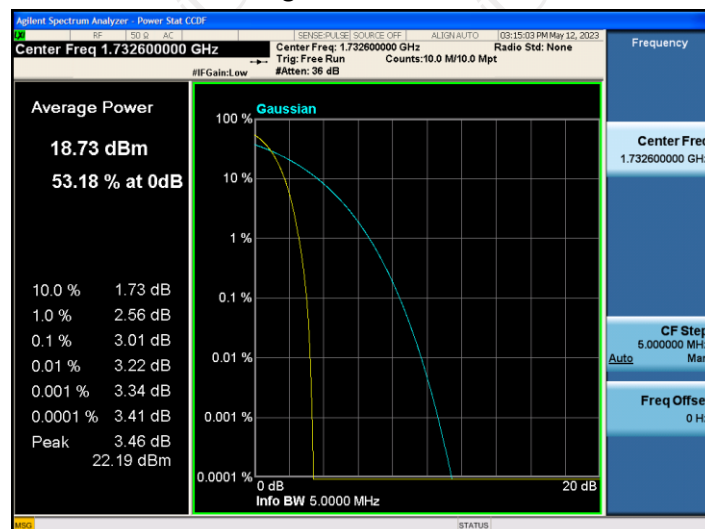
### Peak-to-Average Ratio on Channel 4233



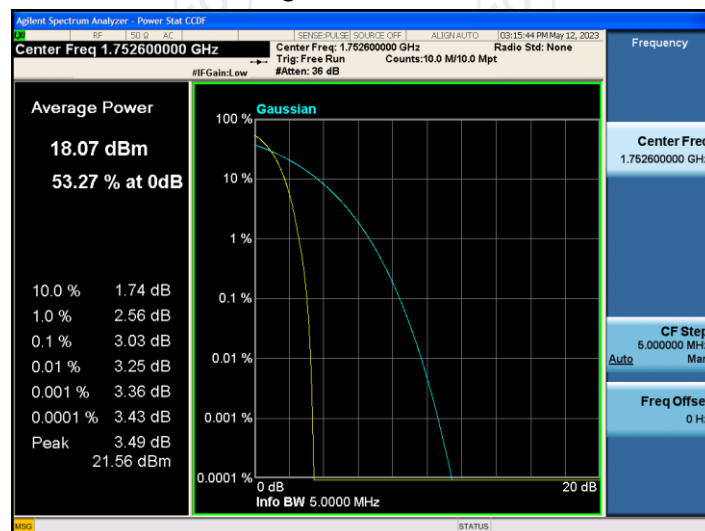
### Peak-to-Average Ratio on Channel 1312



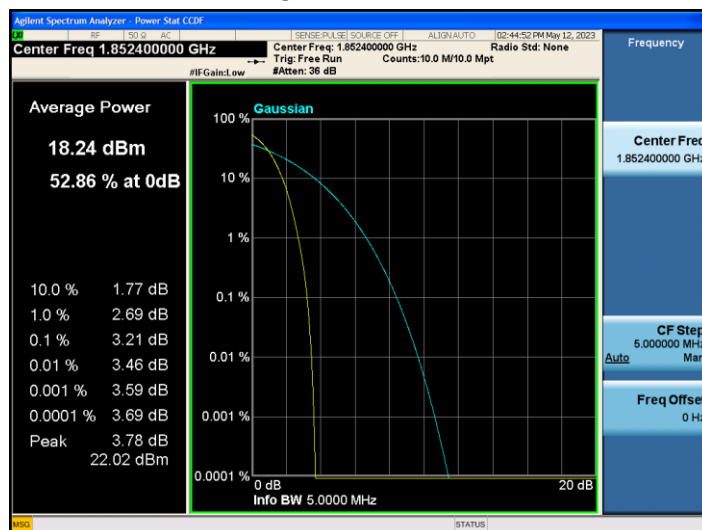
### Peak-to-Average Ratio on Channel 1413



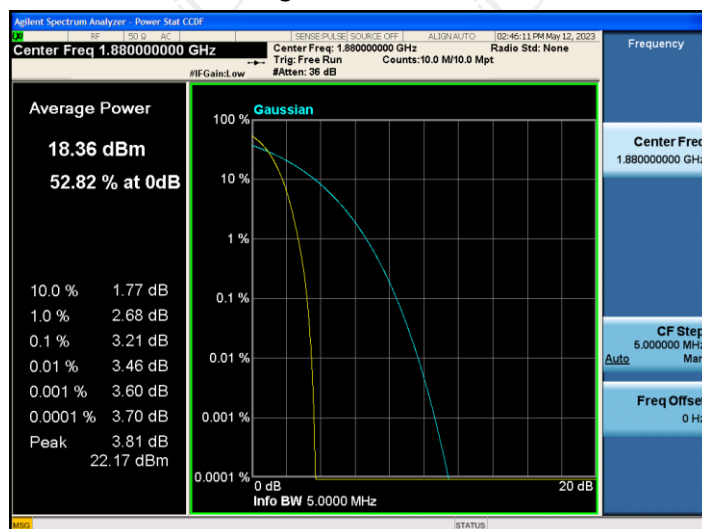
### Peak-to-Average Ratio on Channel 1513



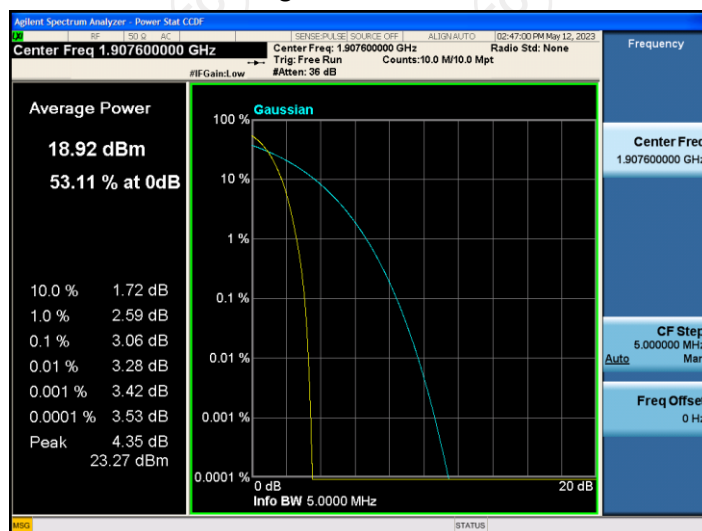
## Peak-to-Average Ratio on Channel 9262



## Peak-to-Average Ratio on Channel 9400

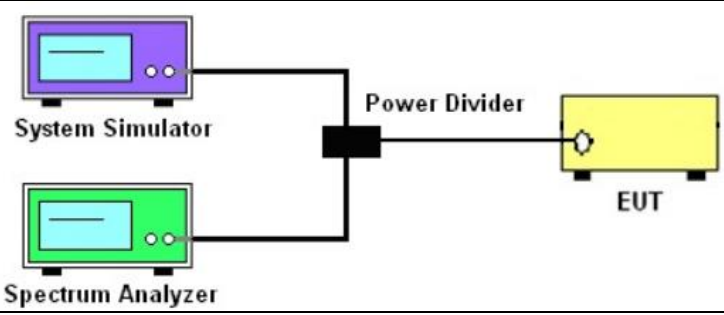


## Peak-to-Average Ratio on Channel 9538



### 5.3. 99% Occupied Bandwidth and 26dB Bandwidth Measurement

#### 5.3.1. Test Specification

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Test Requirement:</b> | FCC part 2.1049                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Test Method:</b>      | FCC KDB 971168 D01v03r01                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Operation mode:</b>   | Refer to item 3.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Limit:</b>            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Test Setup:</b>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Test Procedure:</b>   | <ol style="list-style-type: none"> <li>1. The testing follows FCC KDB 971168 D01v03r01 Section 4.2.</li> <li>2. The EUT was connected to the spectrum analyzer and system simulator via a power divider.</li> <li>3. The RF output of the EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.</li> <li>4. The 99% occupied bandwidth were measured, set RBW= 1% of span, VBW= 3*RBW, sample detector, trace maximum hold.</li> <li>5. The 26dB bandwidth were measured, set RBW= 1% of EBW, VBW= 3*RBW, peak detector, trace maximum hold.</li> </ol> |
| <b>Test Result:</b>      | PASS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

#### 5.3.2. Test Instruments

| Equipment         | Manufacturer | Model     | Serial Number | Calibration Due |
|-------------------|--------------|-----------|---------------|-----------------|
| System simulator  | R&S          | CMU200    | 110188        | Jul. 04, 2023   |
| Spectrum Analyzer | Agilent      | N9020A    | MY49100619    | Jul. 04, 2023   |
| Combiner Box      | Ascentest    | AT890-RFB | /             | /               |

## 5.3.3. Test data

| Cellular Band   |        |        |        |
|-----------------|--------|--------|--------|
| Mode            | GSM850 |        |        |
| Channel         | 128    | 190    | 251    |
| Frequency (MHz) | 824.2  | 836.6  | 848.8  |
| 99% OBW (kHz)   | 247.61 | 248.06 | 245.67 |
| 26dB BW (kHz)   | 314.30 | 313.60 | 316.10 |

| Cellular Band   |         |        |        |
|-----------------|---------|--------|--------|
| Mode            | GSM1900 |        |        |
| Channel         | 512     | 661    | 810    |
| Frequency (MHz) | 1850.2  | 1880.0 | 1909.8 |
| 99% OBW (kHz)   | 247.23  | 245.10 | 247.09 |
| 26dB BW (kHz)   | 321.40  | 311.70 | 316.70 |

| Cellular Band   |          |        |        |
|-----------------|----------|--------|--------|
| Mode            | EGPRS850 |        |        |
| Channel         | 128      | 190    | 251    |
| Frequency (MHz) | 824.2    | 836.6  | 848.8  |
| 99% OBW (kHz)   | 248.57   | 250.55 | 247.71 |
| 26dB BW (kHz)   | 323.60   | 326.20 | 309.60 |

| Cellular Band   |           |        |        |
|-----------------|-----------|--------|--------|
| Mode            | EGPRS1900 |        |        |
| Channel         | 512       | 661    | 810    |
| Frequency (MHz) | 1850.2    | 1880.0 | 1909.8 |
| 99% OBW (kHz)   | 250.58    | 247.00 | 244.66 |
| 26dB BW (kHz)   | 314.60    | 317.50 | 317.50 |

| Cellular Band   |                             |       |       |
|-----------------|-----------------------------|-------|-------|
| Mode            | WCDMA Band V (RMC 12.2Kbps) |       |       |
| Channel         | 4132                        | 4182  | 4233  |
| Frequency (MHz) | 826.4                       | 836.4 | 846.6 |
| 99% OBW (MHz)   | 4.16                        | 4.16  | 4.17  |
| 26dB BW (MHz)   | 4.70                        | 4.70  | 4.70  |

| Cellular Band   |                              |        |        |
|-----------------|------------------------------|--------|--------|
| Mode            | WCDMA Band IV (RMC 12.2Kbps) |        |        |
| Channel         | 1312                         | 1413   | 1513   |
| Frequency (MHz) | 1712.4                       | 1732.6 | 1752.6 |
| 99% OBW (MHz)   | 4.17                         | 4.16   | 4.16   |
| 26dB BW (MHz)   | 4.69                         | 4.70   | 4.70   |

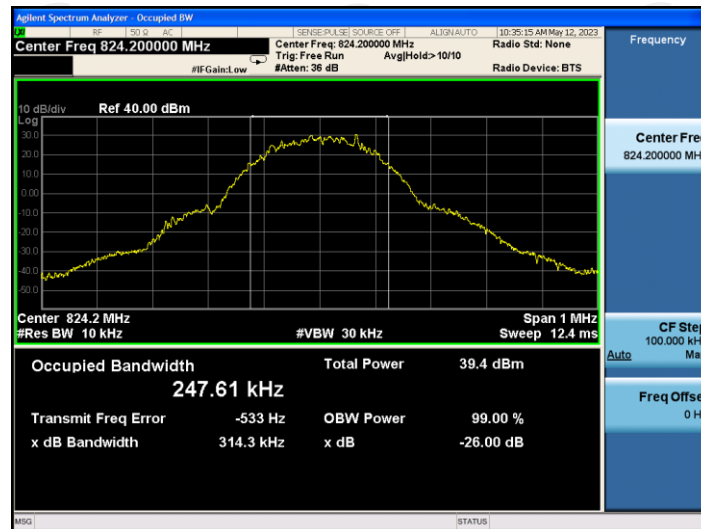
| Cellular Band   |                              |      |        |
|-----------------|------------------------------|------|--------|
| Mode            | WCDMA Band II (RMC 12.2Kbps) |      |        |
| Channel         | 9262                         | 9400 | 9538   |
| Frequency (MHz) | 1852.4                       | 1880 | 1907.6 |
| 99% OBW (MHz)   | 4.15                         | 4.16 | 4.14   |
| 26dB BW (MHz)   | 4.69                         | 4.68 | 4.70   |

**Note:** Measurements were conducted in all GMSK modulation (GSM/GPRS/EGPRS) and the worst case Mode (GSM) was submitted only.

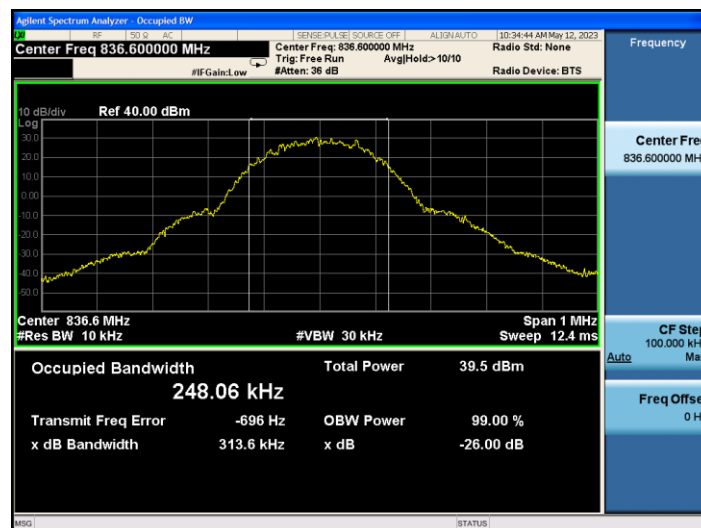
Test plots as follows:

|       |         |            |                 |
|-------|---------|------------|-----------------|
| Band: | GSM 850 | Test Mode: | GSM Link (GMSK) |
|-------|---------|------------|-----------------|

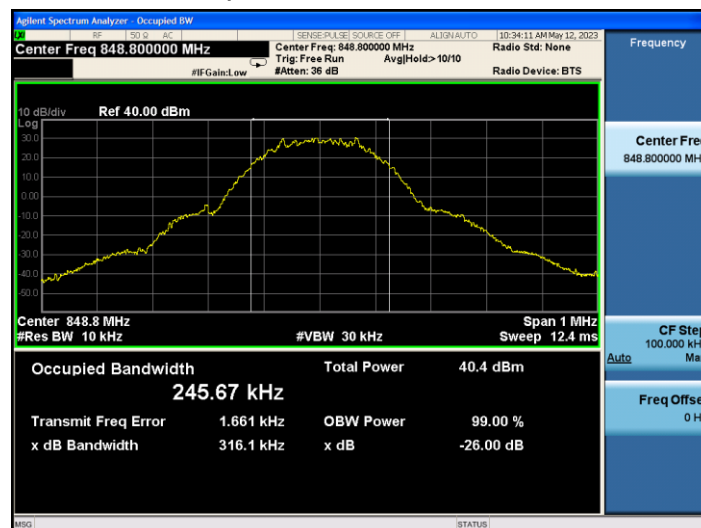
26dB&99% Occupied Bandwidth Plot on Channel 128



26dB&99% Occupied Bandwidth Plot on Channel 190



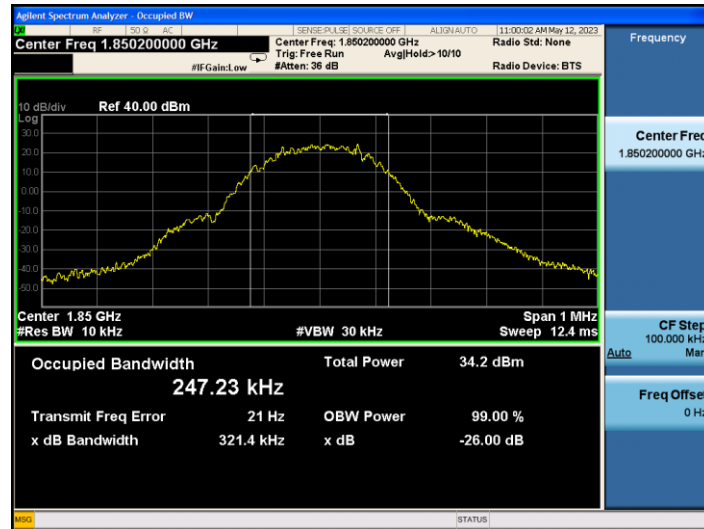
26dB&99% Occupied Bandwidth Plot on Channel 251



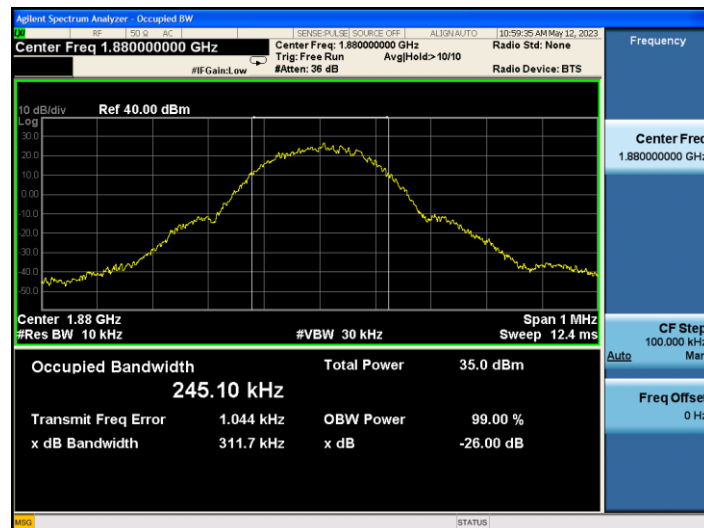


|       |          |            |                 |
|-------|----------|------------|-----------------|
| Band: | GSM 1900 | Test Mode: | GSM Link (GMSK) |
|-------|----------|------------|-----------------|

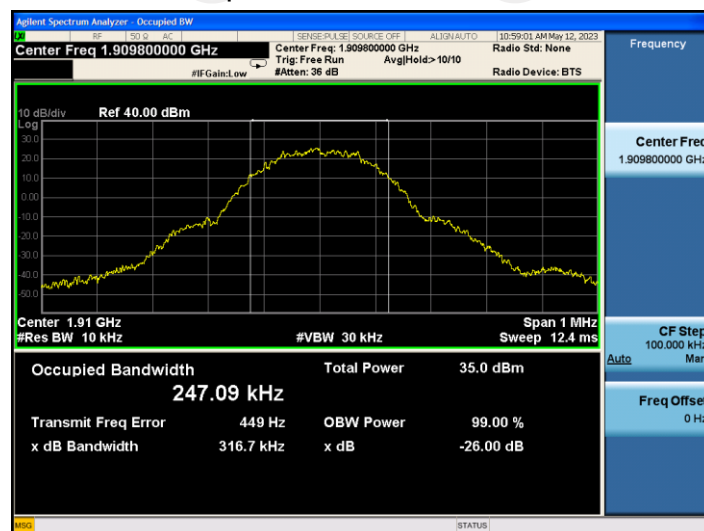
26dB&99% Occupied Bandwidth Plot on Channel 512



26dB&99% Occupied Bandwidth Plot on Channel 661



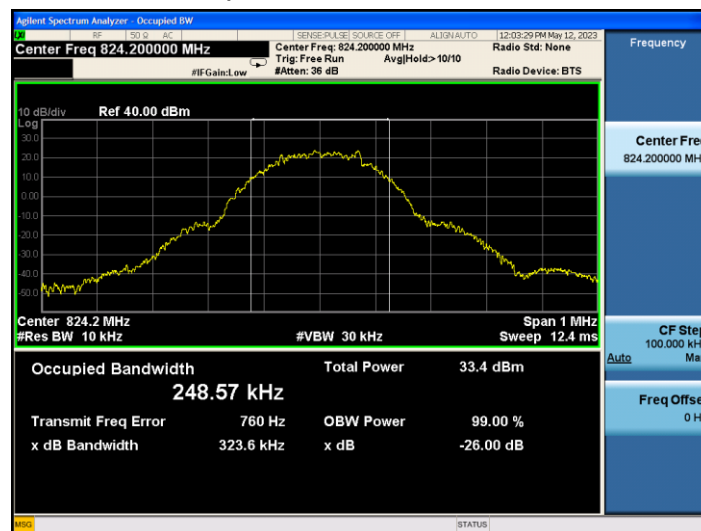
26dB&99% Occupied Bandwidth Plot on Channel 810



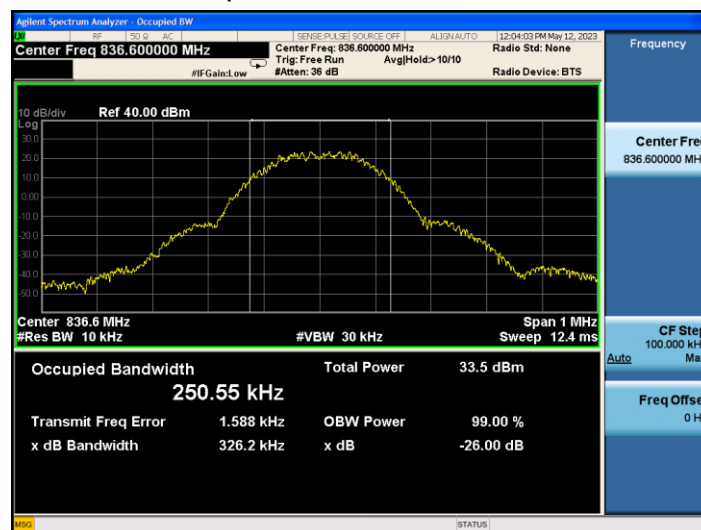


|       |           |            |                               |
|-------|-----------|------------|-------------------------------|
| Band: | EGPRS 850 | Test Mode: | EGPRS class 12<br>Link (8PSK) |
|-------|-----------|------------|-------------------------------|

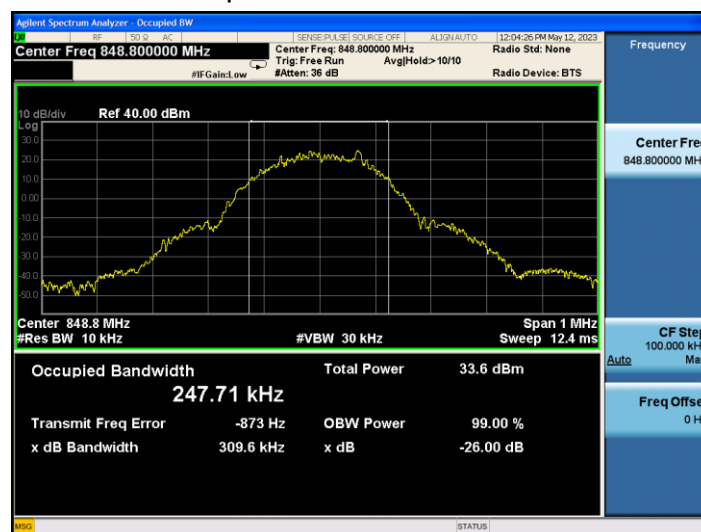
26dB&99% Occupied Bandwidth Plot on Channel 128



26dB&99% Occupied Bandwidth Plot on Channel 190



26dB&99% Occupied Bandwidth Plot on Channel 251



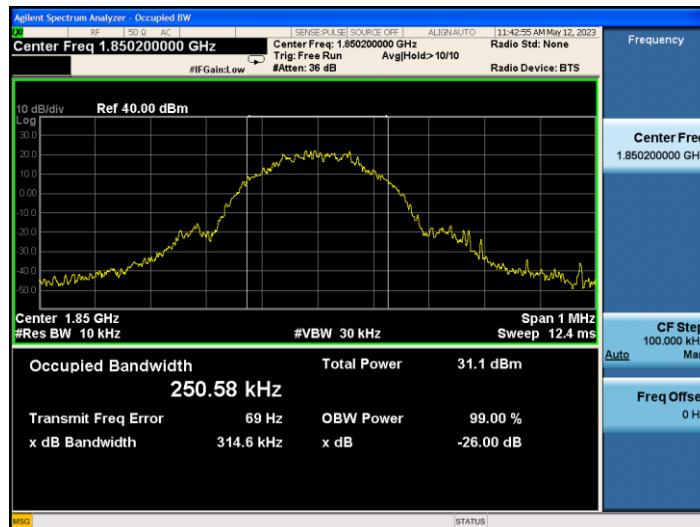
Band:

EGPRS 1900

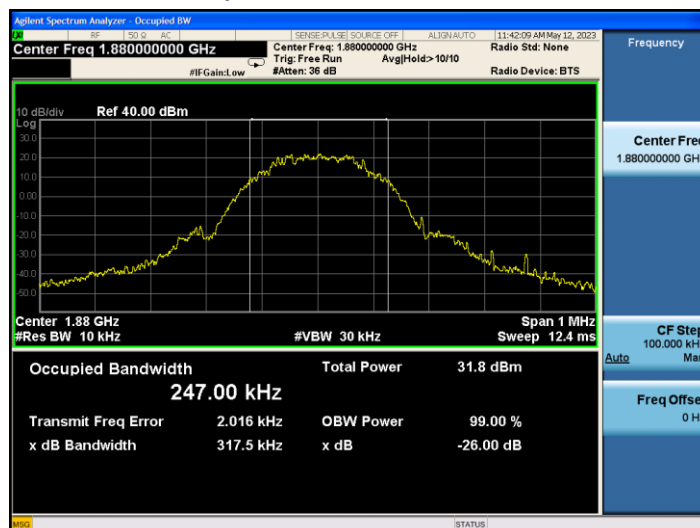
Test Mode:

EGPRS class 12 Link (8PSK)

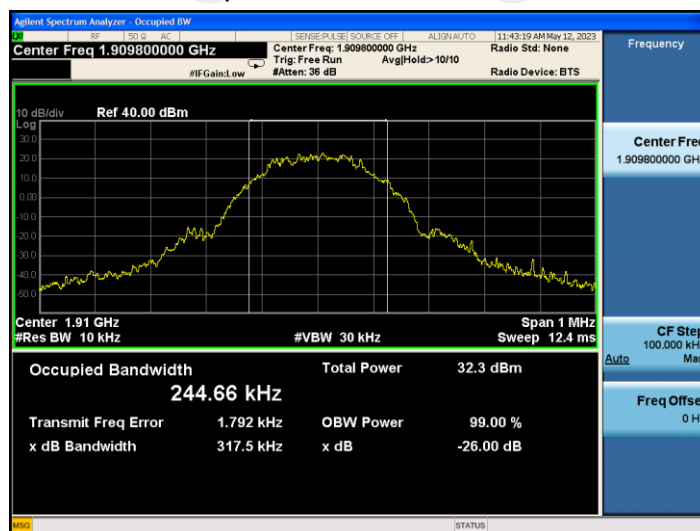
## 26dB&99% Occupied Bandwidth Plot on Channel 512



## 26dB&99% Occupied Bandwidth Plot on Channel 661

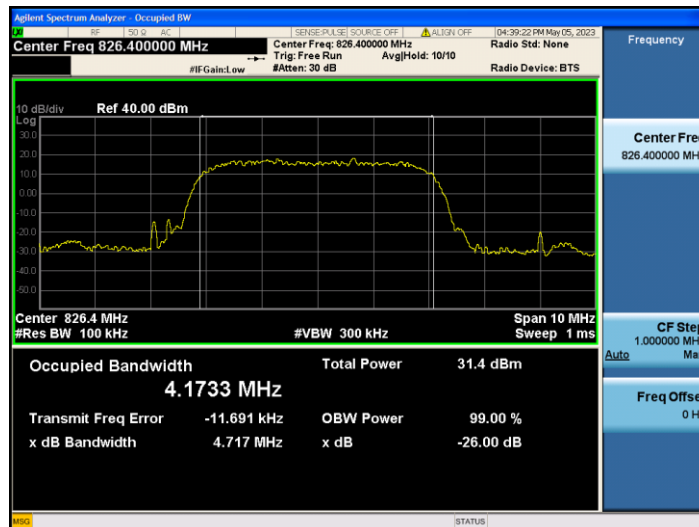


## 26dB&99% Occupied Bandwidth Plot on Channel 810

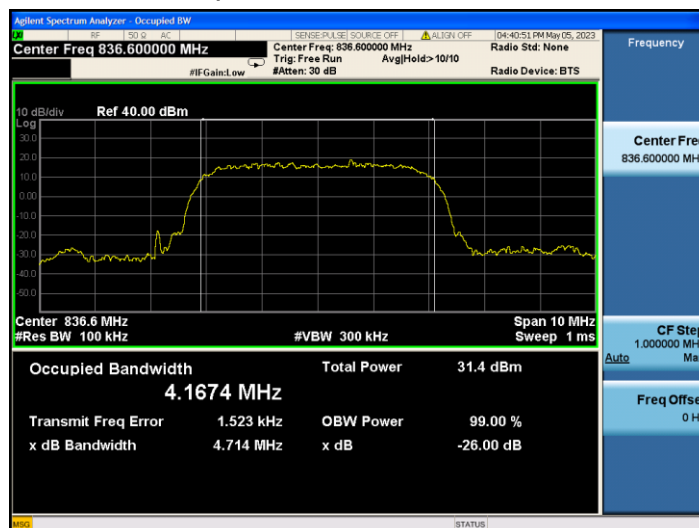


Band: WCDMA Band V Test Mode: RMC 12.2Kbps Link (QPSK)

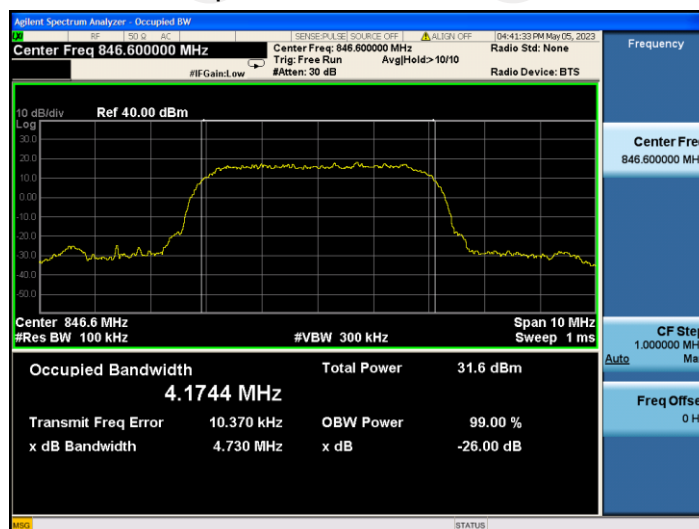
26dB&99% Occupied Bandwidth Plot on Channel 4132



26dB&99% Occupied Bandwidth Plot on Channel 4183

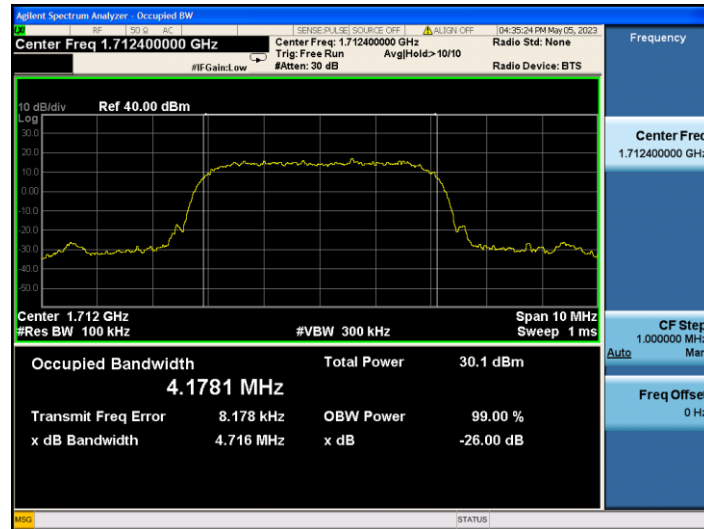


26dB&99% Occupied Bandwidth Plot on Channel 4233

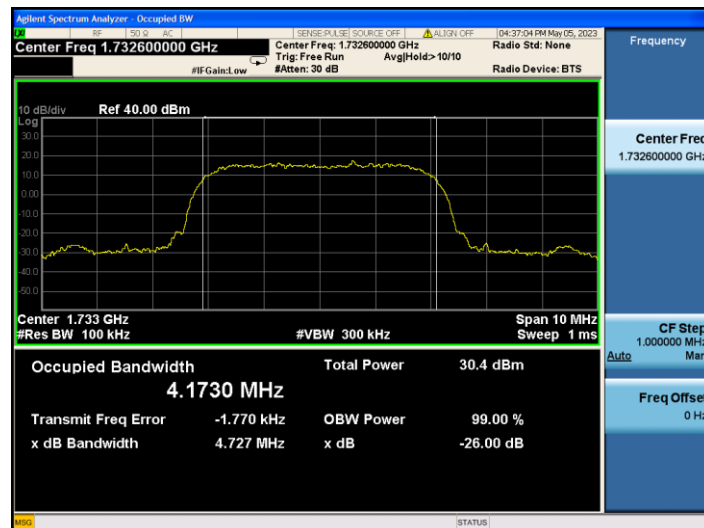


|       |               |            |                          |
|-------|---------------|------------|--------------------------|
| Band: | WCDMA Band IV | Test Mode: | RMC 12.2Kbps Link (QPSK) |
|-------|---------------|------------|--------------------------|

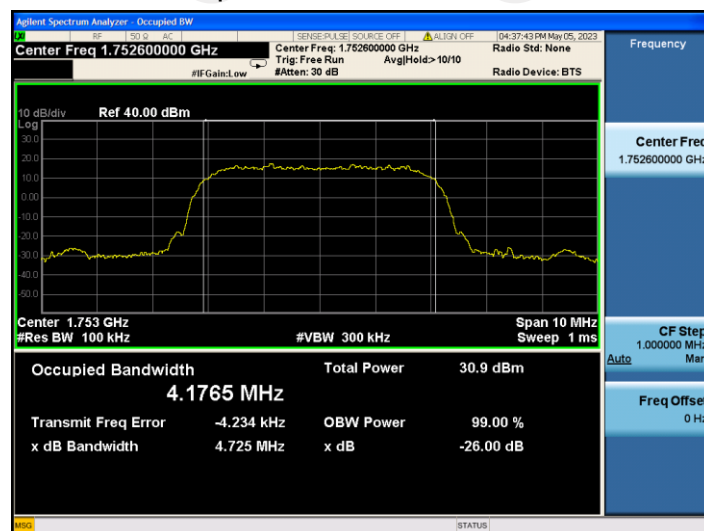
26dB&99% Occupied Bandwidth Plot on Channel 1312



26dB&99% Occupied Bandwidth Plot on Channel 1413



26dB&99% Occupied Bandwidth Plot on Channel 1513



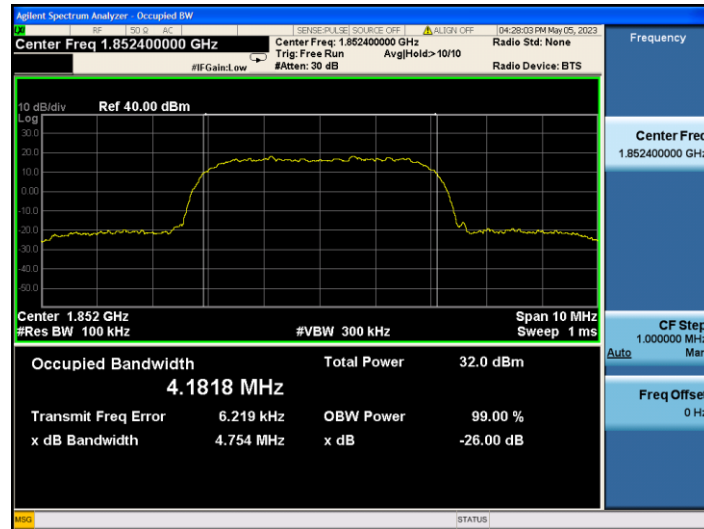
Band:

WCDMA Band II

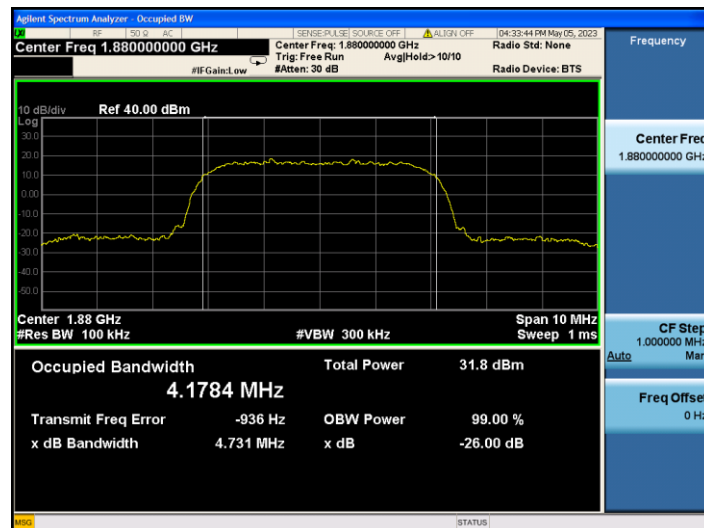
Test Mode:

RMC 12.2Kbps Link (QPSK)

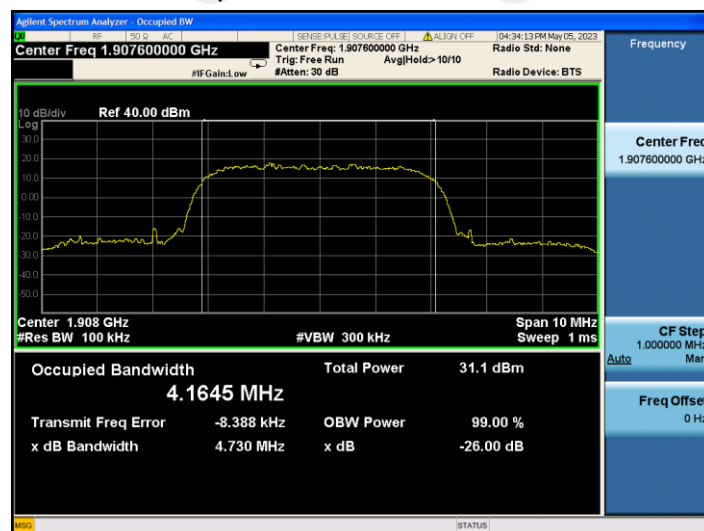
26dB&99% Occupied Bandwidth Plot on Channel 9262



26dB&99% Occupied Bandwidth Plot on Channel 9400

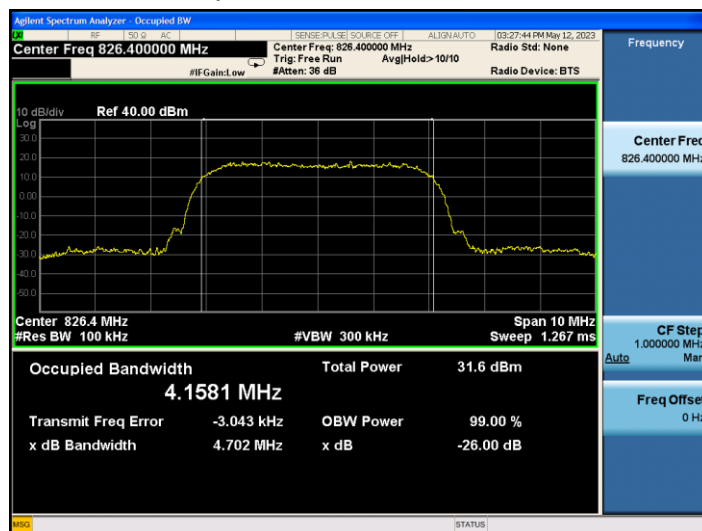


26dB&99% Occupied Bandwidth Plot on Channel 9538

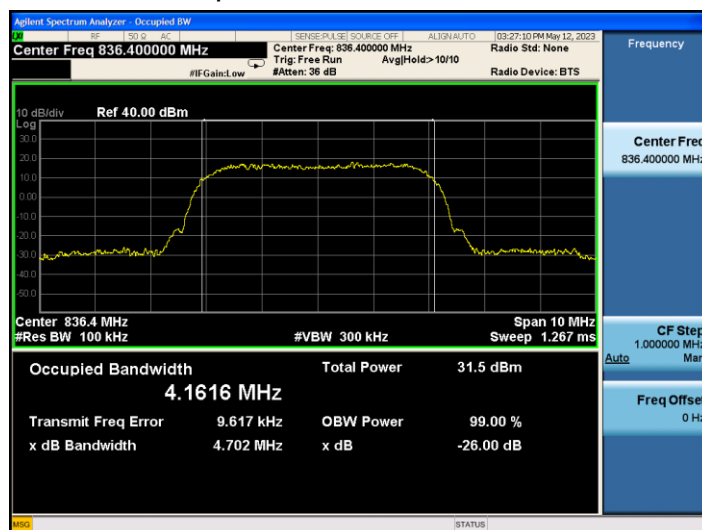


|       |              |            |                          |
|-------|--------------|------------|--------------------------|
| Band: | WCDMA Band V | Test Mode: | RMC 12.2Kbps Link (QPSK) |
|-------|--------------|------------|--------------------------|

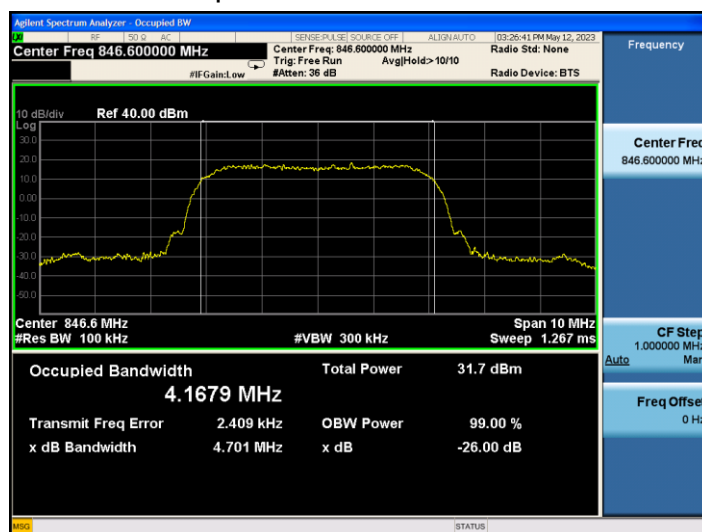
26dB&99% Occupied Bandwidth Plot on Channel 4132



26dB&99% Occupied Bandwidth Plot on Channel 4182



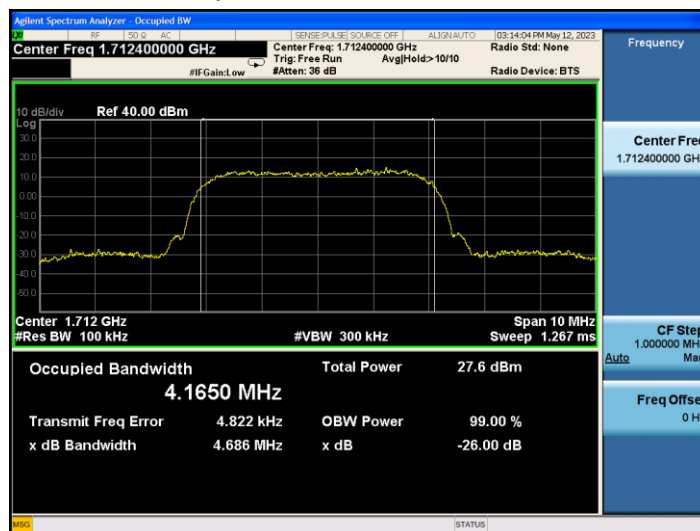
26dB&99% Occupied Bandwidth Plot on Channel 4233



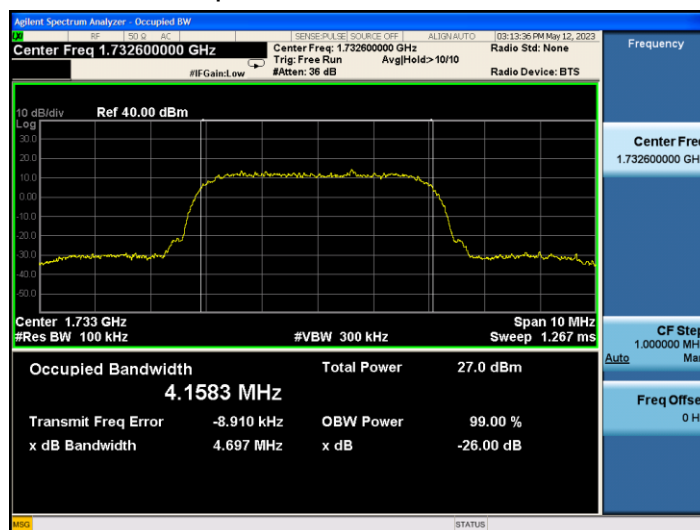


|       |               |            |                          |
|-------|---------------|------------|--------------------------|
| Band: | WCDMA Band IV | Test Mode: | RMC 12.2Kbps Link (QPSK) |
|-------|---------------|------------|--------------------------|

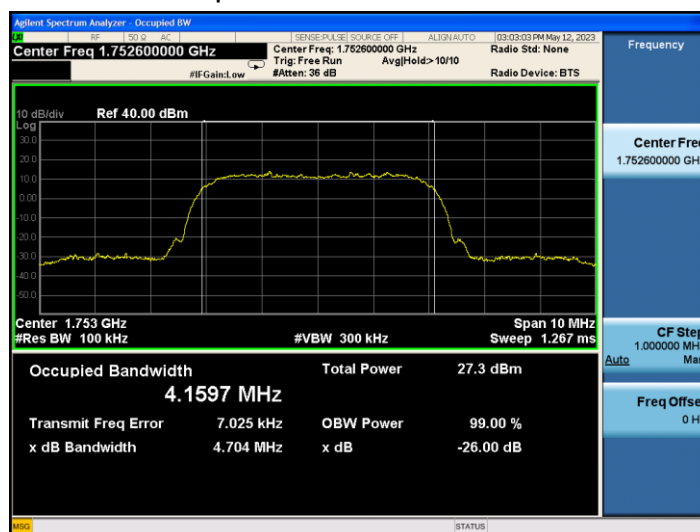
26dB&99% Occupied Bandwidth Plot on Channel 1312



26dB&99% Occupied Bandwidth Plot on Channel 1413



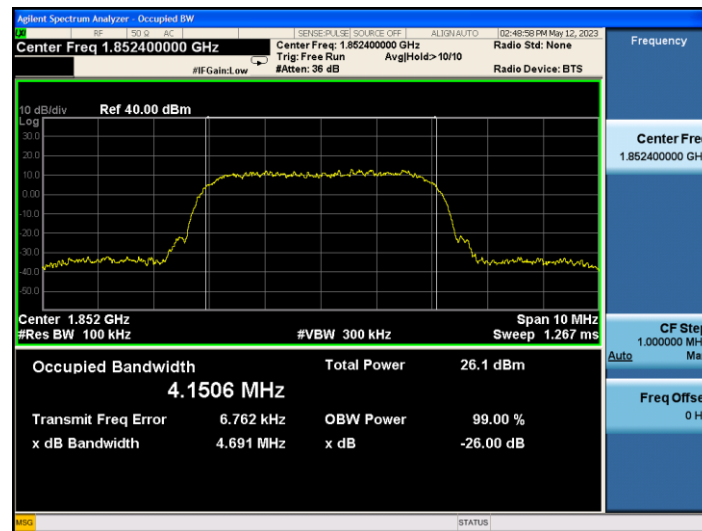
26dB&99% Occupied Bandwidth Plot on Channel 1513



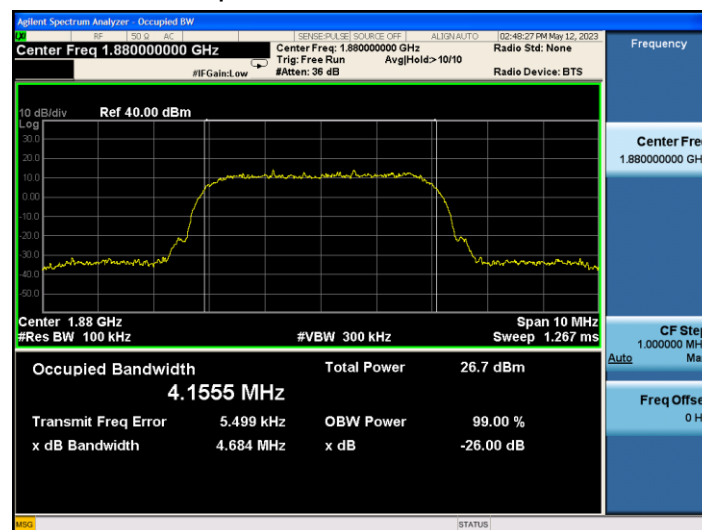


|       |               |            |                          |
|-------|---------------|------------|--------------------------|
| Band: | WCDMA Band II | Test Mode: | RMC 12.2Kbps Link (QPSK) |
|-------|---------------|------------|--------------------------|

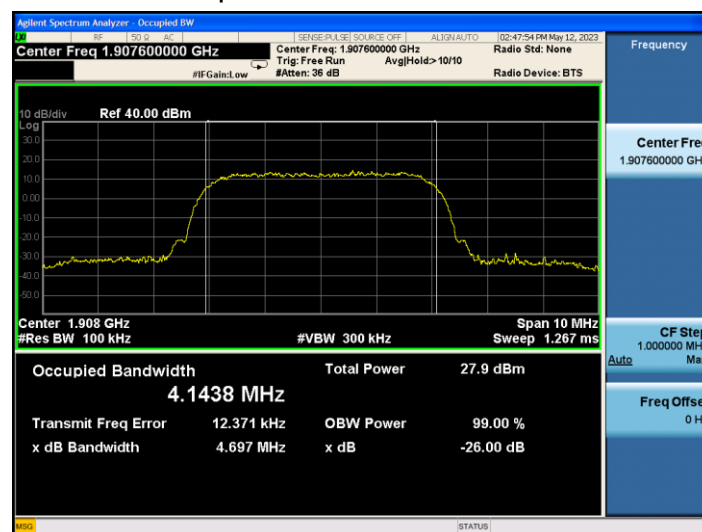
26dB&99% Occupied Bandwidth Plot on Channel 9262



26dB&99% Occupied Bandwidth Plot on Channel 9400

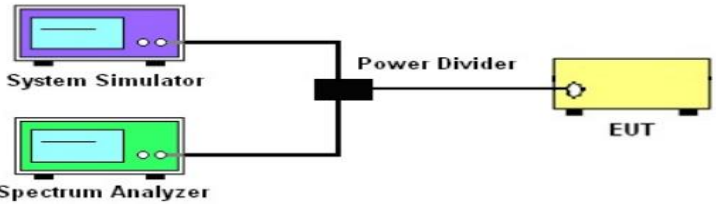


26dB&99% Occupied Bandwidth Plot on Channel 9538



## 5.4. Band Edge and Conducted Spurious Emission Measurement

### 5.4.1. Test Specification

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Test Requirement:</b> | FCC part22.917(a) and FCC part24.238(a)<br>FCC part27.53(g)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Test Method:</b>      | FCC KDB 971168 D01v03r01                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Operation mode:</b>   | Refer to item 3.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Limit:</b>            | -13dBm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Test Setup:</b>       |  <p>The diagram shows a System Simulator (purple box) and a Spectrum Analyzer (green box) connected to a Power Divider (black box). The Power Divider is connected to the EUT (yellow box).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Test Procedure:</b>   | <ol style="list-style-type: none"> <li>1. The testing follows FCC KDB 971168 D01v03r01 Section 6.0.</li> <li>2. The EUT was connected to the spectrum analyzer and system simulator via a power divider.</li> <li>3. The RF output of EUT was connected to the spectrum analyzer by an RF cable and attenuator. The path loss was compensated to the results for each measurement.</li> <li>4. The band edges of low and high channels for the highest RF powers were measured.</li> <li>5. The conducted spurious emission for the whole frequency range was taken.</li> <li>6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.</li> <li>7. The limit line is derived from <math>43 + 10\log(P)</math> dB below the transmitter power<br/> <math>P(\text{Watts}) = P(\text{W}) - [43 + 10\log(P)] (\text{dB}) = [30 + 10\log(P)] (\text{dBm}) - [43 + 10\log(P)] (\text{dB}) = -13\text{dBm}.</math> </li> </ol> |
| <b>Test Result:</b>      | PASS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

### 5.4.2. Test Instruments

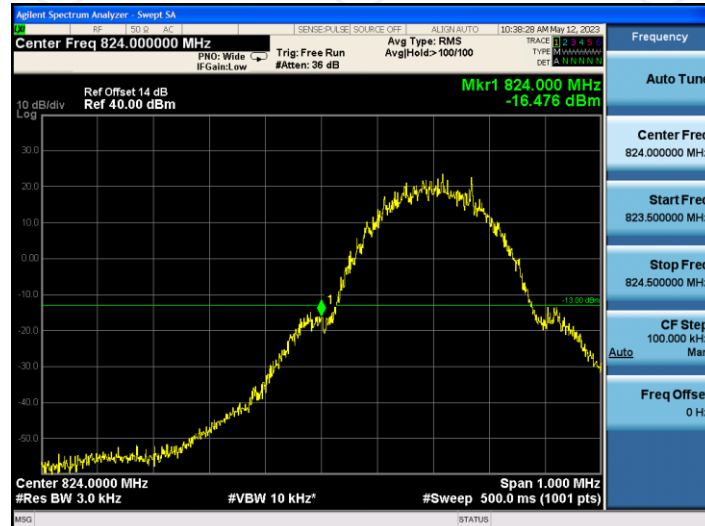
| Equipment         | Manufacturer | Model     | Serial Number | Calibration Due |
|-------------------|--------------|-----------|---------------|-----------------|
| System simulator  | R&S          | CMU200    | 110188        | Jul. 04, 2023   |
| Spectrum Analyzer | Agilent      | N9020A    | MY49100619    | Jul. 04, 2023   |
| Combiner Box      | Ascentest    | AT890-RFB | /             | /               |

## 5.4.3. Test data

Test plots as follows:

|       |         |            |                 |
|-------|---------|------------|-----------------|
| Band: | GSM 850 | Test Mode: | GSM Link (GMSK) |
|-------|---------|------------|-----------------|

Lower Band Edge Plot on Channel 128



Higher Band Edge Plot on Channel 251

