



## FCC&IC TEST REPORT

FCC ID: 2A7ZC-FC2

On Behalf of

GEOMATE POSITIONING PTE. LTD.

Handheld GNSS Data Collector

Model No.: FC2

Prepared for : GEOMATE POSITIONING PTE. LTD.  
Address : 808 FRENCH ROAD #04-167 KITCHENER COMPLEX SINGAPORE  
(200808)

Prepared By : Shenzhen Alpha Product Testing Co., Ltd.  
Address : Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103,  
Shenzhen, Guangdong, China

Report Number : A2312102-C01-R06  
Date of Receipt : December 25, 2023  
Date of Test : December 25, 2023 - April 8, 2024  
Date of Report : April 8, 2024  
Version Number : V0  
**Test Result : Pass**

**TABLE OF CONTENTS**

|          | <b>Description</b>                                     | <b>Page</b> |
|----------|--------------------------------------------------------|-------------|
| <b>1</b> | <b>TEST SUMMARY .....</b>                              | <b>5</b>    |
| <b>2</b> | <b>GENERAL INFORMATION .....</b>                       | <b>6</b>    |
| 2.1      | GENERAL DESCRIPTION OF EUT .....                       | 6           |
| 2.2      | RELATED SUBMITTAL(S) / GRANT (S) .....                 | 8           |
| 2.3      | TEST METHODOLOGY .....                                 | 8           |
| 2.4      | TEST FACILITY .....                                    | 8           |
| 2.5      | ACCESSORIES OF DEVICE (EUT) .....                      | 8           |
| 2.6      | TESTED SUPPORTING SYSTEM DETAILS .....                 | 8           |
| 2.7      | TEST CONDITIONS .....                                  | 8           |
| 2.8      | MEASUREMENT UNCERTAINTY .....                          | 9           |
| <b>3</b> | <b>TEST INSTRUMENTS LIST .....</b>                     | <b>10</b>   |
| <b>4</b> | <b>SYSTEM TEST CONFIGURATION .....</b>                 | <b>11</b>   |
| 4.1      | TEST MODE .....                                        | 11          |
| 4.2      | CONFIGURATION OF TESTED SYSTEM .....                   | 11          |
| 4.3      | CONDUCTED AV OUTPUT POWER .....                        | 12          |
| 4.4      | PEAK-TO-AVERAGE RATIO .....                            | 14          |
| 4.5      | OCCUPY BANDWIDTH .....                                 | 17          |
| 4.6      | MODULATION CHARACTERISTIC .....                        | 24          |
| 4.7      | OUT OF BAND EMISSION AT ANTENNA TERMINALS .....        | 24          |
| 4.8      | ERP, EIRP MEASUREMENT .....                            | 37          |
| 4.9      | FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT ..... | 48          |
| 4.10     | FREQUENCY STABILITY V.S. TEMPERATURE MEASUREMENT ..... | 55          |
| 4.11     | FREQUENCY STABILITY V.S. VOLTAGE MEASUREMENT .....     | 59          |
| <b>5</b> | <b>TEST SETUP PHOTO .....</b>                          | <b>63</b>   |

## TEST REPORT DECLARATION

Applicant : GEOMATE POSITIONING PTE. LTD.  
Address : 808 FRENCH ROAD #04-167 KITCHENER COMPLEX SINGAPORE (200808)  
Manufacturer : GEOMATE POSITIONING PTE. LTD.  
Address : 808 FRENCH ROAD #04-167 KITCHENER COMPLEX SINGAPORE (200808)  
EUT Description : Handheld GNSS Data Collector  
(A) Model No. : FC2  
(B) Trademark : 

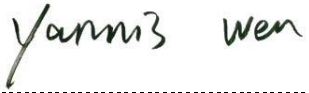
Measurement Standard Used:

**FCC CFR Title 47 Part 2**  
**FCC CFR Title 47 Part 22 Subpart H**  
**FCC CFR Title 47 Part 24 Subpart E**  
**FCC CFR Title 47 Part 27**

The device described above is tested by Shenzhen Alpha Product Testing Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C limits both conducted and radiated emissions. The test results are contained in this test report and Shenzhen Alpha Product Testing Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

After the test, our opinion is that EUT compliance with the requirement of the above standards.

This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Shenzhen Alpha Product Testing Co., Ltd.

|                                      |                                |                                                                                                |
|--------------------------------------|--------------------------------|------------------------------------------------------------------------------------------------|
| Tested by (name + signature).....:   | Yannis Wen<br>Project Engineer | <br>..... |
| Approved by (name + signature).....: | Reak Yang<br>Project Manager   | <br>..... |
| Date of issue.....                   | April 8, 2024                  |                                                                                                |

**Revision History**

| Revision | Issue Date    | Revisions              | Revised By |
|----------|---------------|------------------------|------------|
| V0       | April 8, 2024 | Initial released Issue | Yannis Wen |

## 1 Test Summary

| Test Item                              | Section in CFR 47                                                        | Result                                |
|----------------------------------------|--------------------------------------------------------------------------|---------------------------------------|
| RF Exposure (SAR)                      | Part 1.1307<br>Part 2.1093                                               | Pass*<br>(Please refer to SAR Report) |
| RF Output Power                        | Part 2.1046<br>Part 22.913 (a)(2)<br>Part 24.232 (c)<br>Part 27.50(d)(4) | Pass                                  |
| Peak-to-Average Ratio                  | Part 2.1046<br>Part 22.913(d)<br>Part 24.232 (d)<br>Part 27.50(d)(5)     | Pass                                  |
| Modulation Characteristics             | Part 2.1047                                                              | Pass                                  |
| 99% & -26 dB Occupied Bandwidth        | Part 2.1049<br>Part 22.917<br>Part 24.238<br>Part 27.53(h)               | Pass                                  |
| Spurious Emissions at Antenna Terminal | Part 2.1051<br>Part 22.917 (a)<br>Part 24.238 (a)<br>Part 27.53(h)       | Pass                                  |
| Field Strength of Spurious Radiation   | Part 2.1053<br>Part 22.917 (a)<br>Part 24.238 (a)<br>Part 27.53(h)       | Pass                                  |
| Out of band emission, Band Edge        | Part 22.917 (a)<br>Part 24.238 (a)<br>Part 27.53(h)                      | Pass                                  |
| Frequency stability vs. temperature    | Part 2.1055(a)(1)(b)                                                     | Pass                                  |
| Frequency stability vs. voltage        | Part 2.1055(d)(1)(2)                                                     | Pass                                  |

Note: 1. Pass: The EUT complies with the essential requirements in the standard.

2. The conclusion of this test report is judged by actual test data without considering measurement uncertainty.

## 2 General Information

### 2.1 General Description of EUT

|                  |                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description/PMN  | : Handheld GNSS Data Collector                                                                                                                                                                                                                                                                                                                                      |
| Model Number     | : FC2                                                                                                                                                                                                                                                                                                                                                               |
| Diff             | : N/A                                                                                                                                                                                                                                                                                                                                                               |
| Test Voltage     | : DC 5V from adapter and DC 3.8V from battery.                                                                                                                                                                                                                                                                                                                      |
| Support Networks | : GSM, GPRS, EGPRS, WCDMA                                                                                                                                                                                                                                                                                                                                           |
| Support Bands    | : GSM850, PCS1900, WCDMA Band V, WCDMA Band IV, WCDMA Band II                                                                                                                                                                                                                                                                                                       |
| TX Frequency     | : GSM850: 824.20MHz-848.80MHz<br>PCS1900: 1850.20MHz-1909.80MHz<br>WCDMA Band V: 826.40MHz -846.60MHz<br>WCDMA Band II: 1852.40MHz -1907.60MHz<br>WCDMA Band IV: 1710MHz -1755MHz                                                                                                                                                                                   |
| GPRS Class       | : 12                                                                                                                                                                                                                                                                                                                                                                |
| EGPRS Class      | : 12                                                                                                                                                                                                                                                                                                                                                                |
| Modulation type  | : GSM/GPRS: GMSK<br>EGPRS: GMSK/8PSK<br>WCDMA Band II/IV/V: QPSK                                                                                                                                                                                                                                                                                                    |
| Antenna type     | : Internal antenna                                                                                                                                                                                                                                                                                                                                                  |
| Antenna gain     | : Maximum Gain is -4.7dBi for GSM 850<br>Maximum Gain is -4.1dBi for PCS1900<br>Maximum Gain is -4.7dBi for WCDMA Band V<br>Maximum Gain is -4.1dBi for WCDMA Band IV<br>Maximum Gain is -5.06dBi for WCDMA Band II<br>(Antenna information is provided by applicant.)<br>There is WWAN diversity antenna inside the product, which is only for receiving function. |
| Software version | : V1.0                                                                                                                                                                                                                                                                                                                                                              |
| Hardware version | : V1.0                                                                                                                                                                                                                                                                                                                                                              |

Remark: 1.The worst-case simultaneous transmission configuration was evaluated with no non-compliance found. Results in this report are only for 2G and 3G function, and there is no other transmitter involved.

**Operation Frequency List:**

| GSM 850 |                 | PCS1900 |                 | WCDMA Band V |                 | WCDMA Band II |                 |
|---------|-----------------|---------|-----------------|--------------|-----------------|---------------|-----------------|
| Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel      | Frequency (MHz) | Channel       | Frequency (MHz) |
| 128     | 824.20          | 512     | 1850.20         | 4132         | 826.40          | 9262          | 1852.40         |
| 129     | 824.40          | 513     | 1850.40         | 4133         | 826.60          | 9263          | 1852.60         |
| · ∴     | · ∴             | · ∴     | · ∴             | · ∴          | · ∴             | · ∴           | · ∴             |
| 189     | 836.40          | 660     | 1879.80         | 4181         | 836.20          | 9399          | 1879.80         |
| 190     | 836.60          | 661     | 1880.00         | 4182         | 836.40          | 9400          | 1880.00         |
| 191     | 836.80          | 662     | 1880.20         | 4183         | 836.60          | 9401          | 1880.20         |
| · ∴     | · ∴             | · ∴     | · ∴             | · ∴          | · ∴             | · ∴           | · ∴             |
| 250     | 848.60          | 809     | 1909.60         | 4232         | 846.40          | 9537          | 1907.40         |
| 251     | 848.80          | 810     | 1909.80         | 4233         | 846.60          | 9538          | 1907.60         |

Regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

**Final test channel:**

| GSM 850       |                 | PCS1900         |                 | WCDMA Band V |                 | WCDMA Band II |                 |
|---------------|-----------------|-----------------|-----------------|--------------|-----------------|---------------|-----------------|
| Channel       | Frequency (MHz) | Channel         | Frequency (MHz) | Channel      | Frequency (MHz) | Channel       | Frequency (MHz) |
| 128           | 824.20          | 512             | 1850.20         | 4132         | 826.40          | 9262          | 1852.40         |
| 190           | 836.60          | 661             | 1880.00         | 4183         | 836.60          | 9400          | 1880.00         |
| 251           | 848.80          | 810             | 1909.80         | 4233         | 846.60          | 9538          | 1907.60         |
| WCDMA Band IV |                 |                 |                 |              |                 |               |                 |
| Channel       |                 | Frequency (MHz) |                 |              |                 |               |                 |
| 1312          |                 | 1712.4          |                 |              |                 |               |                 |
| 1450          |                 | 1740.0          |                 |              |                 |               |                 |
| 1513          |                 | 1752.6          |                 |              |                 |               |                 |

## 2.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is filing to comply with Section Part 2, Part 22 subpart H, Part 24 subpart E, Part 27 subpart C of the FCC CFR 47, KDB 971168 D01 v03r01 and ANSI C63.26.

## 2.3 Test Methodology

Both conducted and radiated testing were performed according to the procedures document on TIA/EIA 603 ANSI C63.26 and FCC CFR 47.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055 and 2.1057

## 2.4 Test Facility

Shenzhen Alpha Product Testing Co., Ltd  
Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103, Shenzhen, Guangdong, China

June 21, 2018 File on Federal Communication Commission  
Registration Number: 293961

July 25, 2017 Certificated by IC  
Registration Number: 12135A

## 2.5 Accessories of Device (EUT)

Accessories 1 : AC Adapter  
Manufacturer : EDAC POWER Electronics Co., Ltd  
Model : EA1012AVRU-050  
Ratings : Input: 100-240Vac~50/60Hz 1.0A  
Output: 5.0V=2.4A

## 2.6 Tested Supporting System Details

| No. | Description | Manufacturer | Model | Serial Number | Certification or SDoC |
|-----|-------------|--------------|-------|---------------|-----------------------|
| --  | --          | --           | --    | --            | --                    |

## 2.7 Test Conditions

| Items              | Required  | Actual |
|--------------------|-----------|--------|
| Temperature range: | 15-35℃    | 24℃    |
| Humidity range:    | 25-75%    | 56%    |
| Pressure range:    | 86-106kPa | 98kPa  |

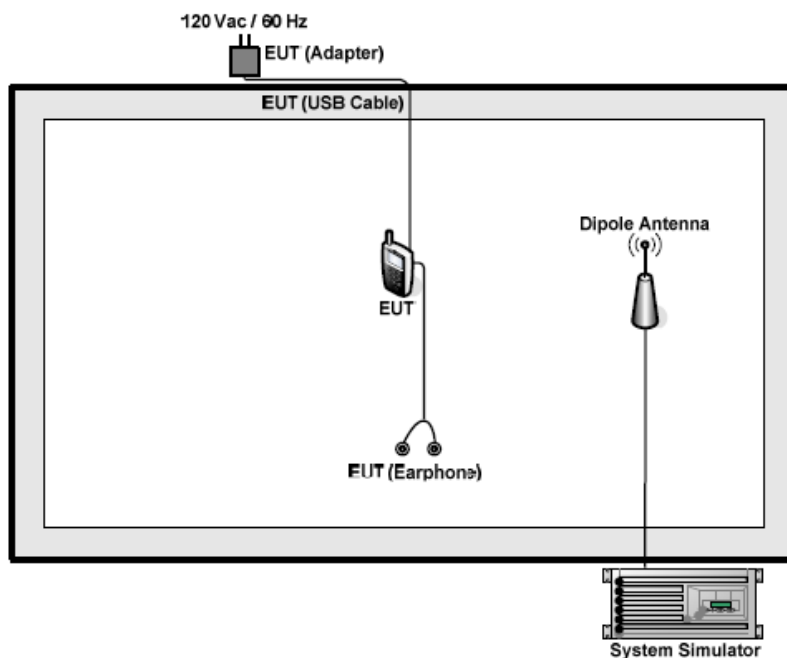
## 2.8 Measurement Uncertainty

| Item                                                                     | Uncertainty          |
|--------------------------------------------------------------------------|----------------------|
| Uncertainty for Power point Conducted Emissions Test                     | 2.74dB               |
| Uncertainty for Radiation Emission test in 3m chamber<br>(below 30MHz)   | 2.13 dB(Polarize: V) |
|                                                                          | 2.57dB(Polarize: H)  |
| Uncertainty for Radiation Emission test in 3m chamber<br>(30MHz to 1GHz) | 3.77dB(Polarize: V)  |
|                                                                          | 3.80dB(Polarize: H)  |
| Uncertainty for Radiation Emission test in 3m chamber<br>(1GHz to 25GHz) | 4.16dB(Polarize: H)  |
|                                                                          | 4.13dB(Polarize: V)  |
| Uncertainty for radio frequency                                          | 5.4×10-8             |
| Uncertainty for conducted RF Power                                       | 0.37dB               |
| Uncertainty for temperature                                              | 0.2°C                |
| Uncertainty for humidity                                                 | 1%                   |
| Uncertainty for DC and low frequency voltages                            | 0.06%                |

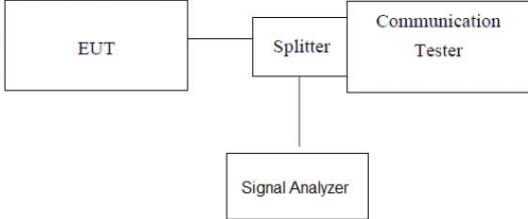
### 3 Test Instruments list

| Equipment                   | Manufacture   | Model No.    | Firmware version | Serial No.             | Last cal.  | Cal Interval |
|-----------------------------|---------------|--------------|------------------|------------------------|------------|--------------|
| 9*6*6 anechoic chamber      | CHENYU        | 9*6*6        | /                | N/A                    | 2022.05.17 | 3Year        |
| Spectrum analyzer           | ROHDE&SCHWARZ | FSV40-N      | 2.3              | 102137                 | 2023.08.16 | 1Year        |
| Spectrum analyzer           | Agilent       | N9020A       | A.14.16          | MY499100060            | 2023.08.16 | 1Year        |
| Receiver                    | ROHDE&SCHWARZ | ESR          | 2.28 SP1         | 1316.3003K03-102082-Wa | 2023.08.16 | 1Year        |
| Receiver                    | R&S           | ESCI         | 4.42 SP1         | 101165                 | 2023.08.16 | 1Year        |
| Bilog Antenna               | Schwarzbeck   | VULB 9168    | /                | VULB 9168#627          | 2023.08.28 | 1Year        |
| Horn Antenna                | SCHWARZBECK   | BBHA 9120 D  | /                | 2106                   | 2023.08.19 | 1Year        |
| Loop Antenna                | SCHWARZBECK   | FMZB 1519B   | /                | 00128                  | 2023.08.19 | 1Year        |
| RF Cable                    | Resenberger   | Cable 1      | /                | RE1                    | 2023.08.16 | 1Year        |
| RF Cable                    | Resenberger   | Cable 2      | /                | RE2                    | 2023.08.16 | 1Year        |
| RF Cable                    | Resenberger   | Cable 3      | /                | CE1                    | 2023.08.16 | 1Year        |
| Pre-amplifier               | HP            | HP8347A      | /                | 2834A00455             | 2023.08.16 | 1Year        |
| Pre-amplifier               | Agilent       | 8449B        | /                | 3008A02664             | 2023.08.16 | 1Year        |
| L.I.S.N.#1                  | Schwarzbeck   | NSLK8126     | /                | 8126-466               | 2023.08.16 | 1Year        |
| L.I.S.N.#2                  | ROHDE&SCHWARZ | ENV216       | /                | 101043                 | 2023.08.16 | 1Year        |
| Horn Antenna                | SCHWARZBECK   | BBHA 9170    | /                | 00946                  | 2023.08.19 | 1Year        |
| Preamplifier                | SKET          | LNPA_1840-50 | /                | SK2018101801           | 2023.08.16 | 1 Year       |
| Power Meter                 | Agilent       | E9300A       | /                | MY41496628             | 2023.08.16 | 1 Year       |
| Power Sensor                | DARE          | RPR3006W     | /                | 15100041SNO91          | 2023.08.16 | 1 Year       |
| Temp. & Humid. Chamber      | Teelong       | TL-HW408S    | /                | TL-20191205-01         | 2023.07.25 | 1 Year       |
| Switching Mode Power Supply | JUNKE         | JK12010S     | /                | 20140927-6             | 2023.08.16 | 1 Year       |
| Adjustable attenuator       | MWRFTest      | N/A          | /                | N/A                    | N/A        | N/A          |
| 10dB Attenuator             | Mini-Circuits | DC-6G        | /                | N/A                    | N/A        | N/A          |
| Antenna                     | SCHWARZBECK   | STLP 9149    | STLP 9149 #456   | /                      | /          |              |

| Software Information |               |              |           |
|----------------------|---------------|--------------|-----------|
| Test Item            | Software Name | Manufacturer | Version   |
| RE                   | EZ-EMC        | EZ           | Alpha-3A1 |
| CE                   | EZ-EMC        | EZ           | Alpha-3A1 |



### 4.3 Conducted AV Output Power

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | FCC part22.913(a) and FCC part24.232(b), FCC part 27.50 (d)(4)                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Test Method:      | FCC part2.1046                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Limit:            | GSM850, WCDMA Band V: 7W(38.45dbm)<br>PCS1900, WCDMA Band II: 2W(33.01dbm)<br>WCDMA Band IV: 1W(30.00dbm)                                                                                                                                                                                                                                                                                                                                                                                            |
| Test setup:       |  <p><i>Note: Measurement setup for testing on Antenna connector</i></p>                                                                                                                                                                                                                                                                                                                                            |
| Test Procedure:   | <ol style="list-style-type: none"> <li>1. The transmitter output port was connected to base station.</li> <li>2. The RF output of EUT was connected to the Signal Analyzer by RF cable and attenuator, the path loss was compensated to the results for each measurement.</li> <li>3. Set EUT at maximum power through base station.</li> <li>4. Select lowest, middle, and highest channels for each band and different modulation.</li> <li>5. Measure the maximum burst average power.</li> </ol> |
| Test Instruments: | Refer to section 3 for details                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Test mode:        | Refer to section 4.1 for details                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Test results:     | Pass                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

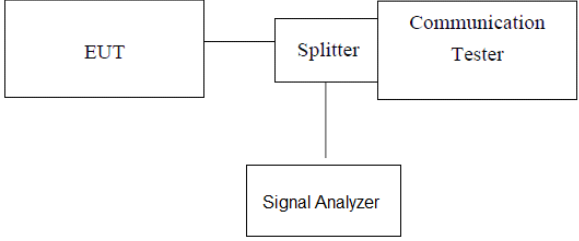
## Measurement Data

| Conducted Burst Power (dBm) |        |        |        |         |         |         |
|-----------------------------|--------|--------|--------|---------|---------|---------|
| Band                        | GSM850 |        |        | PCS1900 |         |         |
| Channel                     | 128    | 190    | 251    | 512     | 661     | 810     |
| Frequency                   | 824.20 | 836.60 | 848.80 | 1850.20 | 1880.00 | 1909.80 |
| GSM (GMSK, 1 TX slot)       | 31.91  | 31.25  | 32.54  | 31.10   | 30.78   | 30.26   |
| GPRS (GMSK, 1 TX slot)      | 30.74  | 30.44  | 30.27  | 29.41   | 29.51   | 29.84   |
| GPRS (GMSK, 2 TX slot)      | 29.02  | 28.84  | 29.91  | 28.08   | 27.31   | 28.04   |
| GPRS (GMSK, 3 TX slot)      | 28.51  | 28.24  | 27.53  | 26.71   | 27.17   | 27.07   |
| GPRS (GMSK, 4 TX slot)      | 27.02  | 27.06  | 27.15  | 26.17   | 25.75   | 25.79   |
| EGPRS (8PSK, 1 TX slot)     | 28.52  | 28.01  | 29.03  | 28.42   | 28.54   | 28.11   |
| EGPRS (8PSK, 2 TX slot)     | 27.46  | 27.32  | 27.74  | 27.17   | 27.73   | 27.41   |
| EGPRS (8PSK, 3 TX slot)     | 26.70  | 26.63  | 26.36  | 26.12   | 26.52   | 26.72   |
| EGPRS (8PSK, 4 TX slot)     | 26.10  | 25.47  | 25.80  | 25.72   | 25.48   | 26.03   |

| Burst Average Power (dBm) |               |        |        |              |       |       |
|---------------------------|---------------|--------|--------|--------------|-------|-------|
| Band                      | WCDMA Band II |        |        | WCDMA Band V |       |       |
| Channel                   | 9262          | 9400   | 9538   | 4132         | 4183  | 4233  |
| Frequency                 | 1852.4        | 1880.0 | 1907.6 | 826.4        | 836.6 | 846.6 |
| RMC 12.2Kbps              | 23.80         | 23.41  | 23.78  | 23.43        | 24.19 | 24.04 |
| HSDPA Subtest-1           | 22.90         | 23.28  | 23.39  | 23.34        | 22.55 | 23.96 |
| HSDPA Subtest-2           | 22.70         | 23.79  | 22.97  | 23.54        | 23.25 | 23.51 |
| HSDPA Subtest-3           | 23.17         | 21.72  | 22.97  | 22.64        | 23.42 | 22.78 |
| HSDPA Subtest-4           | 23.77         | 23.24  | 24.08  | 23.24        | 22.58 | 22.82 |
| HSUPA Subtest-1           | 23.24         | 21.29  | 23.66  | 22.70        | 23.25 | 22.63 |
| HSUPA Subtest-2           | 23.57         | 24.15  | 23.41  | 23.76        | 23.91 | 23.91 |
| HSUPA Subtest-3           | 23.38         | 22.47  | 23.94  | 23.18        | 23.11 | 23.16 |
| HSUPA Subtest-4           | 23.25         | 23.47  | 23.09  | 23.52        | 23.39 | 23.31 |
| HSUPA Subtest-5           | 23.11         | 22.51  | 22.80  | 23.47        | 23.88 | 23.72 |

| Burst Average Power (dBm) |               |        |        |
|---------------------------|---------------|--------|--------|
| Band                      | WCDMA Band IV |        |        |
| Channel                   | 1312          | 1450   | 1513   |
| Frequency                 | 1712.4        | 1740.0 | 1752.6 |
| RMC 12.2Kbps              | 23.64         | 23.68  | 23.77  |
| HSDPA Subtest-1           | 23.72         | 22.12  | 23.33  |
| HSDPA Subtest-2           | 23.22         | 23.72  | 23.71  |
| HSDPA Subtest-3           | 23.17         | 23.25  | 22.73  |
| HSDPA Subtest-4           | 22.97         | 22.70  | 22.40  |
| HSUPA Subtest-1           | 23.07         | 23.08  | 22.93  |
| HSUPA Subtest-2           | 23.17         | 23.38  | 23.49  |
| HSUPA Subtest-3           | 23.36         | 23.28  | 23.00  |
| HSUPA Subtest-4           | 23.09         | 23.51  | 23.29  |
| HSUPA Subtest-5           | 23.80         | 23.28  | 23.59  |

#### 4.4 Peak-to-Average Ratio

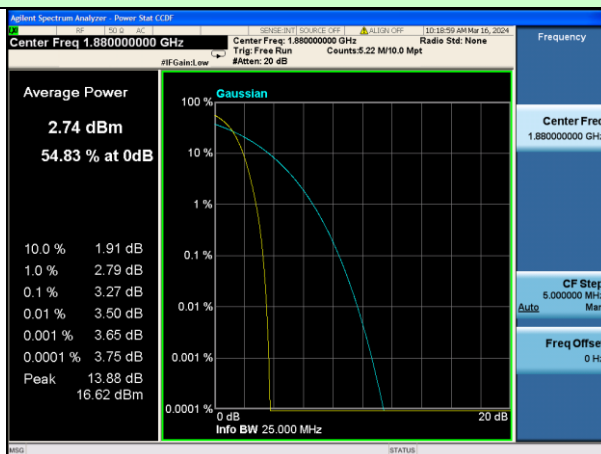
|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | Part 22.913(d), FCC part24.232(d), FCC part27.50(d)(5),                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Test Method:      | FCC part2.1046                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Limit:            | 13db                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Test setup:       |  <p><i>Note: Measurement setup for testing on Antenna connector</i></p>                                                                                                                                                                                                                                                                                                                                                                                                        |
| Test Procedure:   | <ol style="list-style-type: none"> <li>1. The transmitter output port was connected to base station.</li> <li>2. The RF output of EUT was connected to the Signal Analyzer by RF cable and attenuator, the path loss was compensated to the results for each measurement.</li> <li>3. Set EUT at maximum power through base station.</li> <li>4. Select lowest, middle, and highest channels for each band and different modulation.</li> <li>5. Measure the maximum burst average power.</li> <li>6. Record the maximum peak-to-average ratio value.</li> </ol> |
| Test Instruments: | Refer to section 3 for details                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Test mode:        | Refer to section 4.1 for details                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Test results:     | Pass                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

#### Measurement data

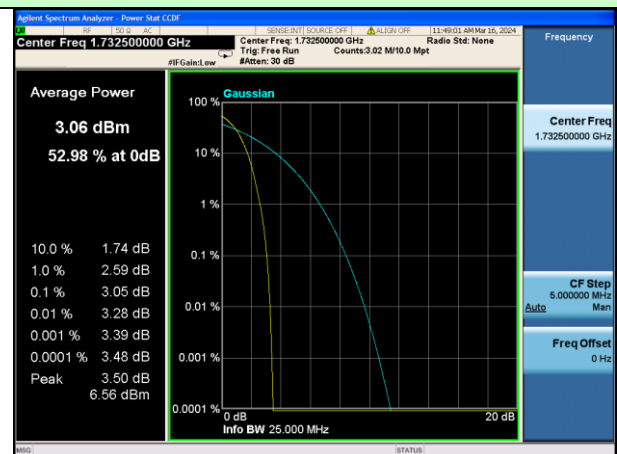
| Test mode     | Peak to Average Ratio<br>(dB) |            |          | Limit<br>(dB) | Result |
|---------------|-------------------------------|------------|----------|---------------|--------|
|               | Low Ch.                       | Middle Ch. | High Ch. |               |        |
| WCDMA Band II | 3.05                          | 3.27       | 2.89     | 13            | PASS   |
| WCDMA Band IV | 3.14                          | 3.05       | 3.09     | 13            | PASS   |
| WCDMA Band V  | 2.76                          | 2.98       | 3.00     | 13            | PASS   |

Test Mode: WCDMA Band II  
Low Ch.Test Mode: WCDMA Band IV  
Low Ch.

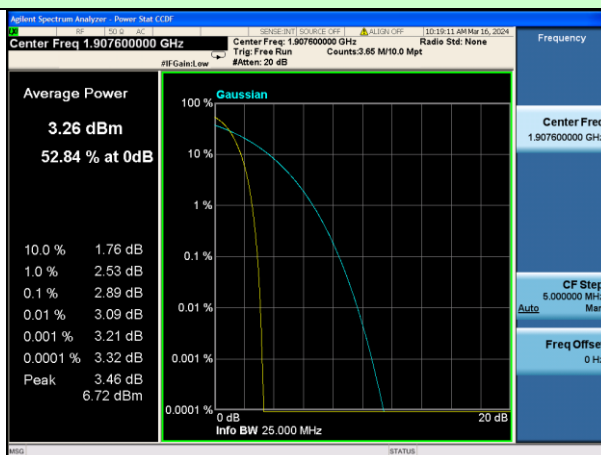
## Middle Ch.



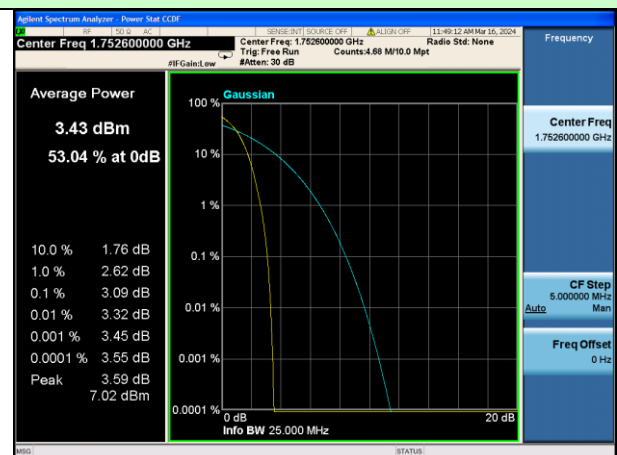
## Middle Ch.



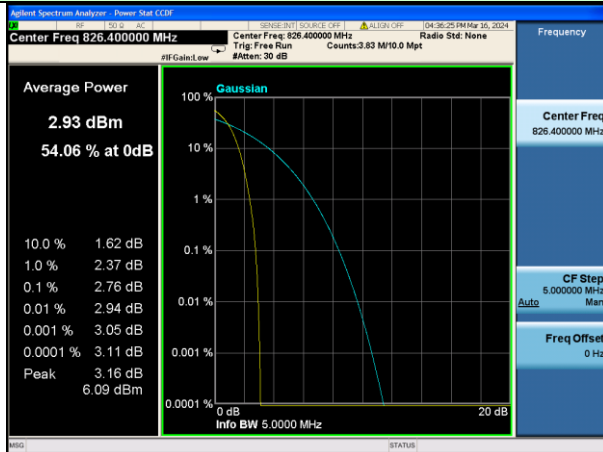
## High Ch.



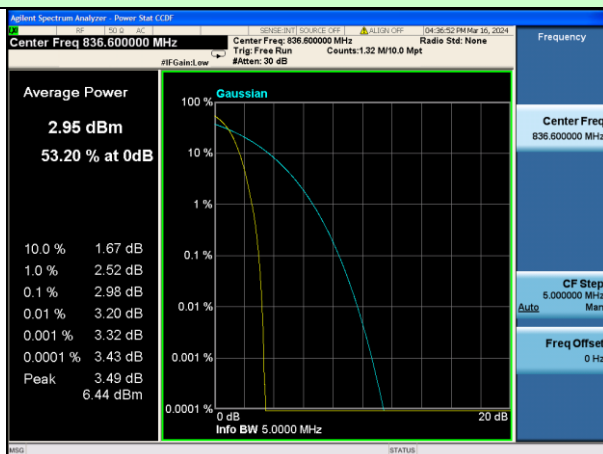
## High Ch.



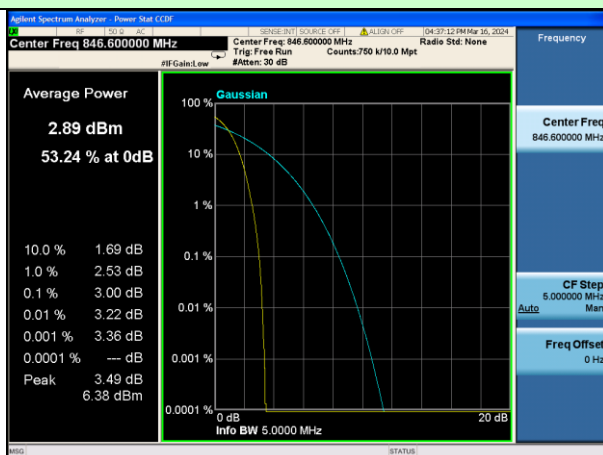
### Test Mode: WCDMA Band V Low Ch.



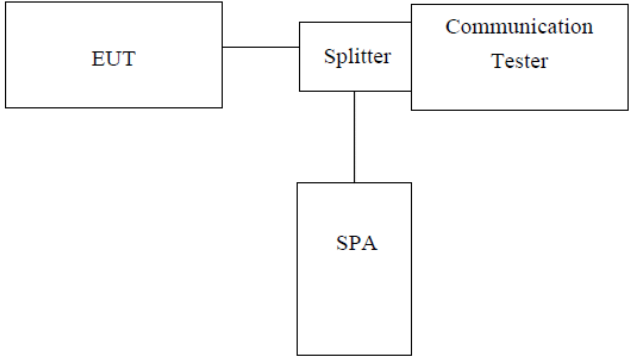
### Middle Ch.



### High Ch.



#### 4.5 Occupy Bandwidth

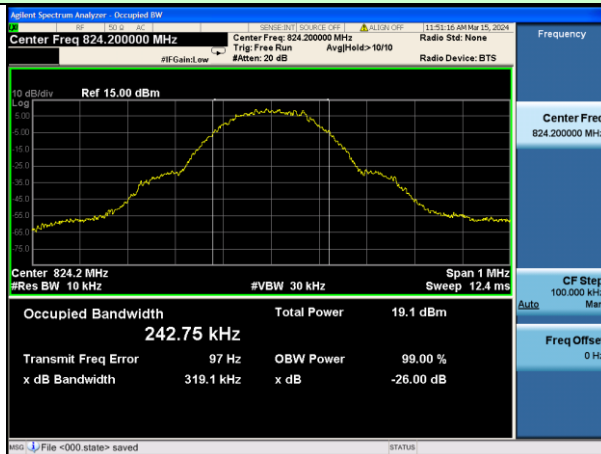
|                   |                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | FCC part22.913(a) and FCC part24.232(b), FCC part27.53(h),                                                                                                                                                                                                                                                                                                                                                               |
| Test Method:      | FCC part2.1049                                                                                                                                                                                                                                                                                                                                                                                                           |
| Test setup:       |  <pre> graph LR     EUT[EUT] --- Splitter[Splitter]     Splitter --- CT[Communication Tester]     Splitter --- SPA[SPA] </pre> <p><i>Note: Measurement setup for testing on Antenna connector</i></p>                                                                                                                                  |
| Test Procedure:   | <ol style="list-style-type: none"> <li>1. The EUT's output RF connector was connected with a short cable to the spectrum analyzer</li> <li>2. RBW was set to about 1% of emission BW, VBW= 3 times RBW.</li> <li>3. -26dBc display line was placed on the screen (or 99% bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace.</li> </ol> |
| Test Instruments: | Refer to section 3 for details                                                                                                                                                                                                                                                                                                                                                                                           |
| Test mode:        | Refer to section 4.1 for details                                                                                                                                                                                                                                                                                                                                                                                         |
| Test results:     | Pass                                                                                                                                                                                                                                                                                                                                                                                                                     |

## Measurement Data

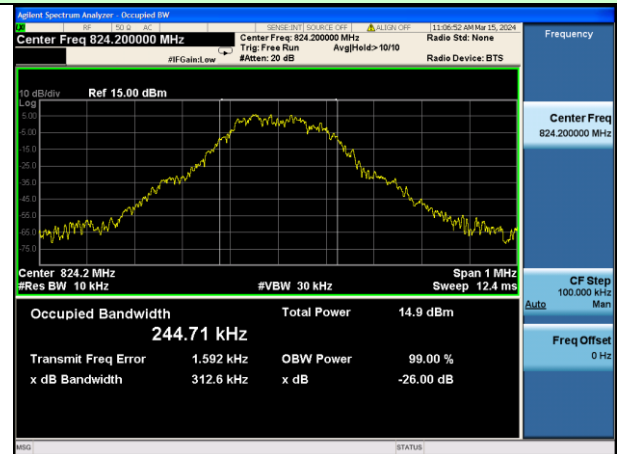
| EUT Mode                             | Channel | Frequency (MHz) | 99% Occupy bandwidth (KHz) | -26dB bandwidth (KHz) |
|--------------------------------------|---------|-----------------|----------------------------|-----------------------|
| GSM 850<br>(GSM link)                | 128     | 824.20          | 242.75                     | 319.1                 |
|                                      | 190     | 836.60          | 246.09                     | 311.0                 |
|                                      | 251     | 848.80          | 248.61                     | 321.4                 |
| GSM 850<br>(GPRS 1 link)             | 128     | 824.20          | 244.71                     | 312.6                 |
|                                      | 190     | 836.60          | 241.43                     | 307.0                 |
|                                      | 251     | 848.80          | 239.99                     | 317.4                 |
| GSM 850<br>(EGPRS 1 link)            | 128     | 824.20          | 238.59                     | 325.2                 |
|                                      | 190     | 836.60          | 238.93                     | 313.3                 |
|                                      | 251     | 848.80          | 240.43                     | 317.0                 |
| PCS 1900<br>(GSM link)               | 512     | 1850.20         | 245.25                     | 316.7                 |
|                                      | 661     | 1880.00         | 246.89                     | 313.8                 |
|                                      | 810     | 1909.80         | 249.91                     | 311.5                 |
| PCS 1900<br>(GPRS 1 link)            | 512     | 1850.20         | 243.02                     | 322.9                 |
|                                      | 661     | 1880.00         | 239.34                     | 310.0                 |
|                                      | 810     | 1909.80         | 238.25                     | 308.1                 |
| PCS 1900<br>(EGPRS 1 link)           | 512     | 1850.20         | 237.11                     | 321.3                 |
|                                      | 661     | 1880.00         | 235.23                     | 315.5                 |
|                                      | 810     | 1909.80         | 238.23                     | 314.4                 |
| WCDMA Band V<br>(RMC 12.2Kbps link)  | 4132    | 826.40          | 4155.3                     | 4720                  |
|                                      | 4183    | 836.60          | 4161.0                     | 4710                  |
|                                      | 4233    | 846.60          | 4165.7                     | 4736                  |
| WCDMA Band II<br>(RMC 12.2Kbps link) | 9262    | 1852.4          | 4159.3                     | 4709                  |
|                                      | 9400    | 1880.0          | 4162.2                     | 4697                  |
|                                      | 9538    | 1907.6          | 4170.1                     | 4720                  |
| WCDMA Band IV<br>(RMC 12.2Kbps link) | 1312    | 1712.4          | 4176.1                     | 4706                  |
|                                      | 1450    | 1740.0          | 4164.2                     | 4709                  |
|                                      | 1513    | 1752.6          | 4178.1                     | 4691                  |

Test plot as follows:

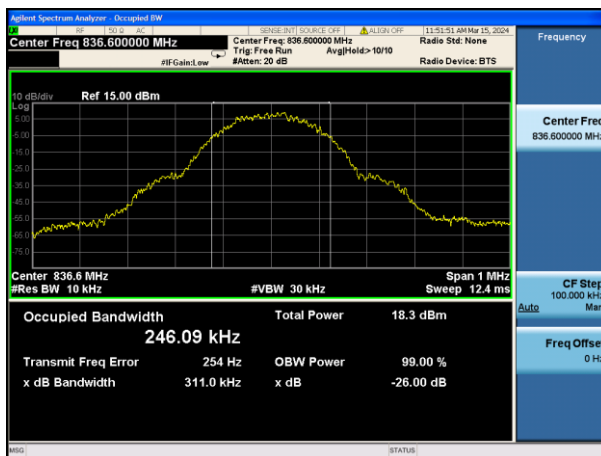
### GSM 850 (GSM link)



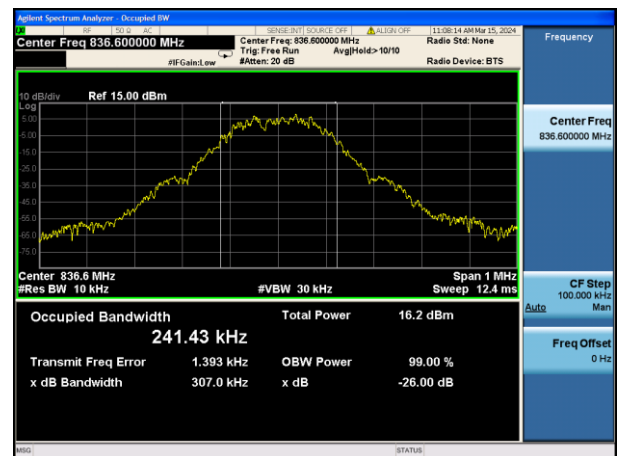
### GSM 850 (GPRS 1 link)



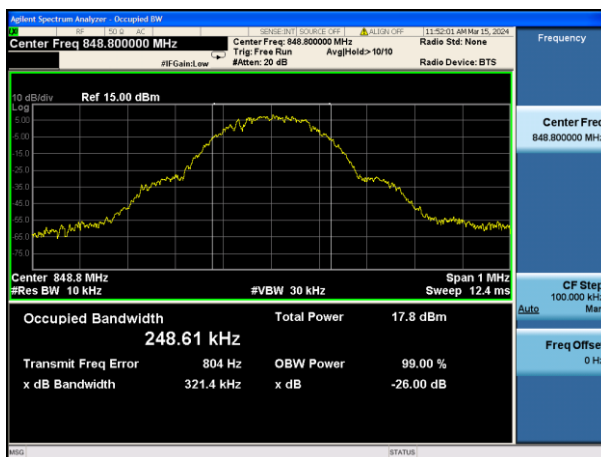
### Lowest channel



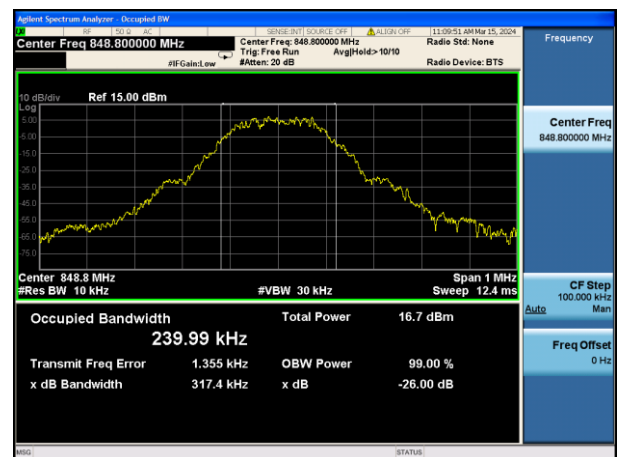
### Lowest channel



### Middle channel



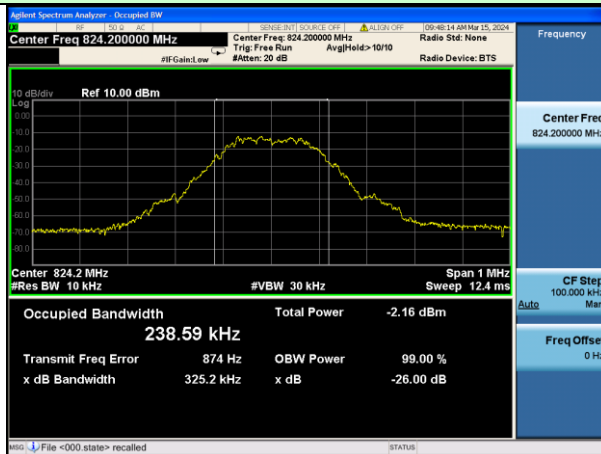
### Middle channel



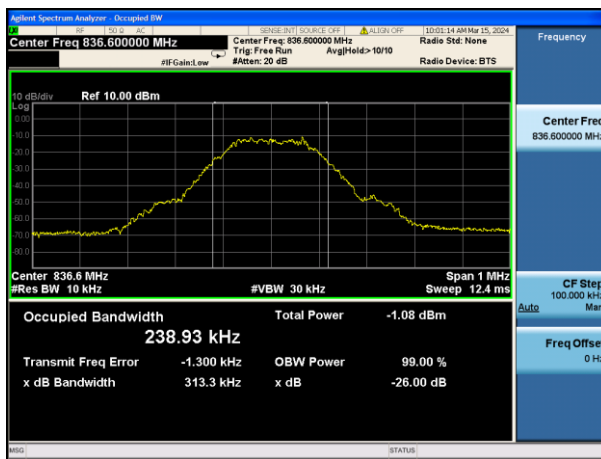
### Highest channel

### Highest channel

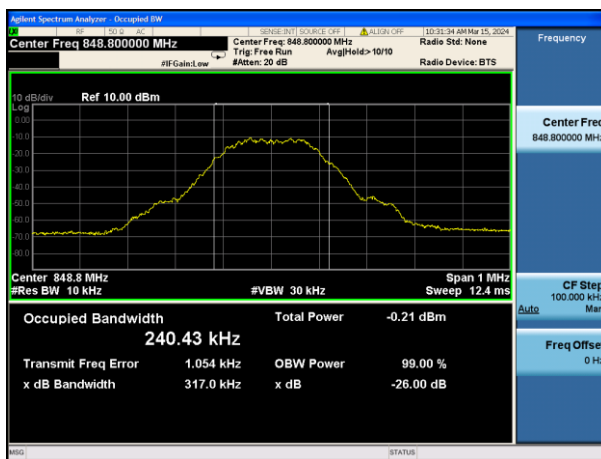
## GSM 850 (EGPRS 1 link)



Lowest channel

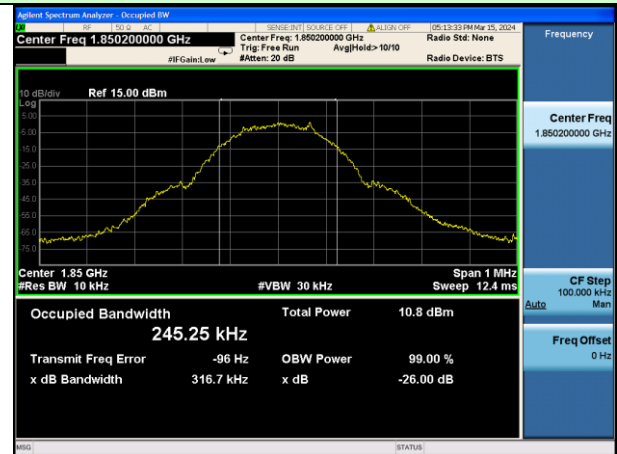


Middle channel

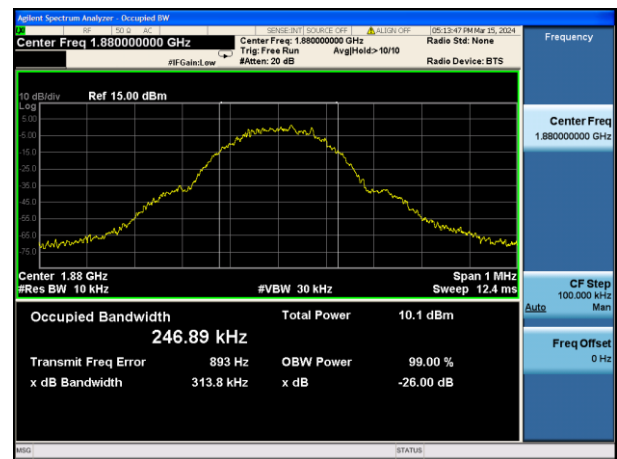


Highest channel

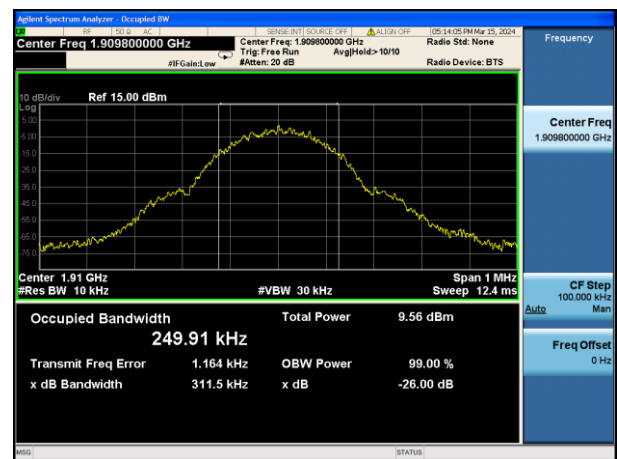
## PCS 1900 (GSM link)



Lowest channel

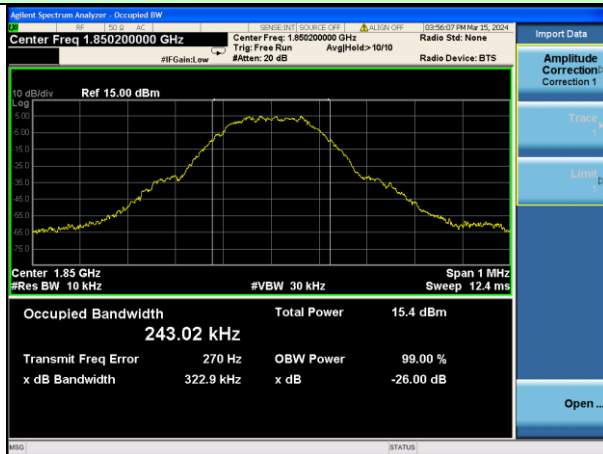


Middle channel



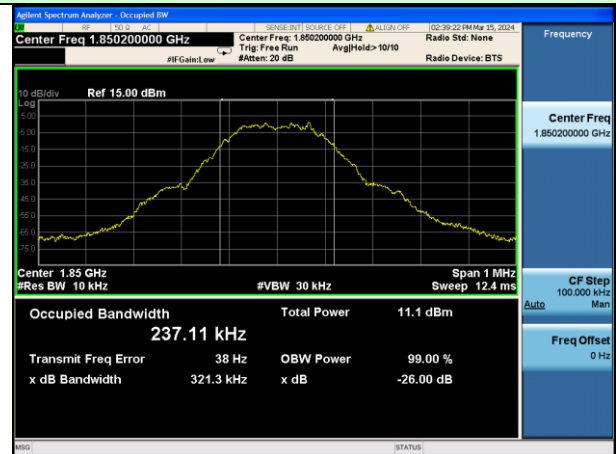
Highest channel

## PCS 1900 (GPRS 1 link)

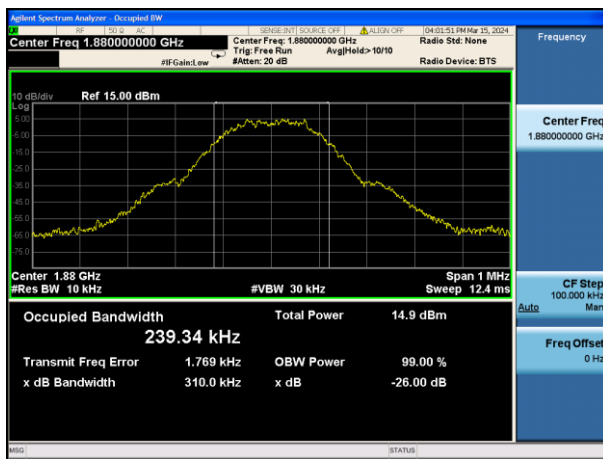


Lowest channel

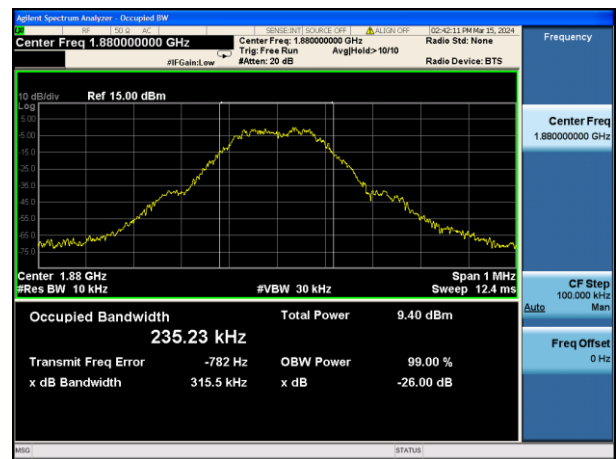
## PCS 1900 (EGPRS 1 link)



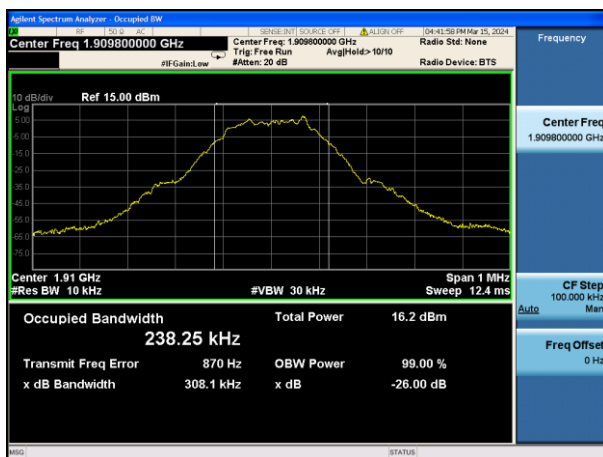
Lowest channel



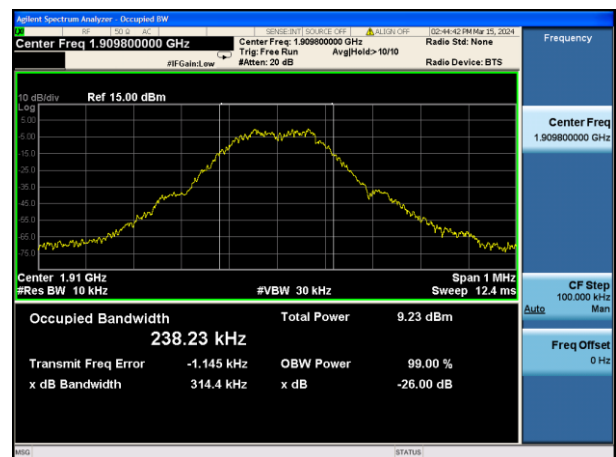
Middle channel



Middle channel

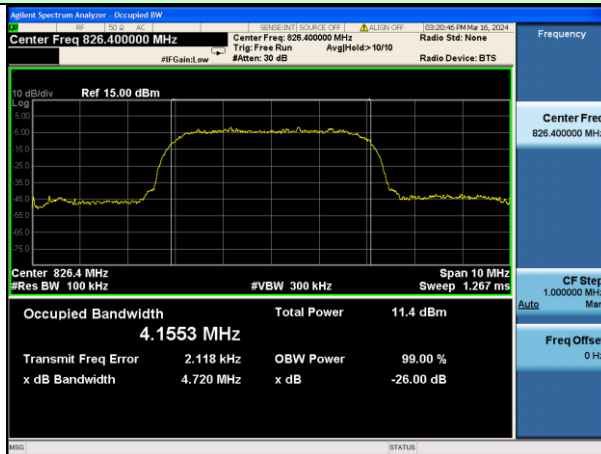


Highest channel

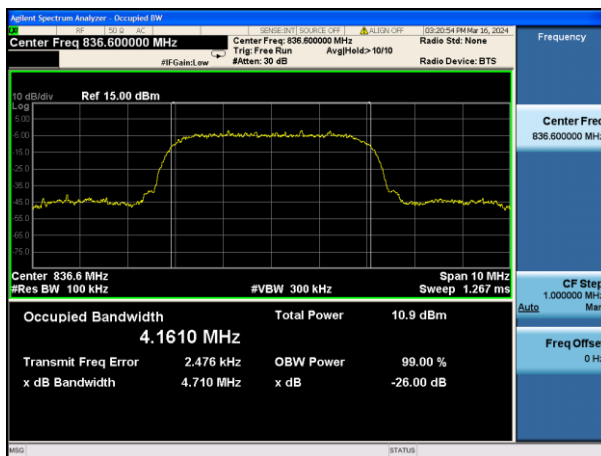


Highest channel

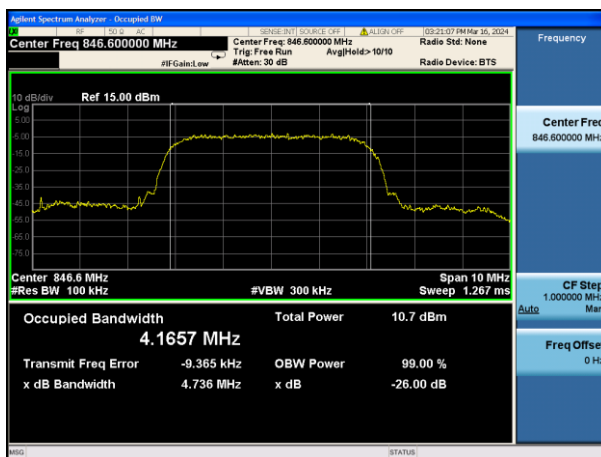
## WCDMA Band V (RMC 12.2Kbps link)



Lowest channel

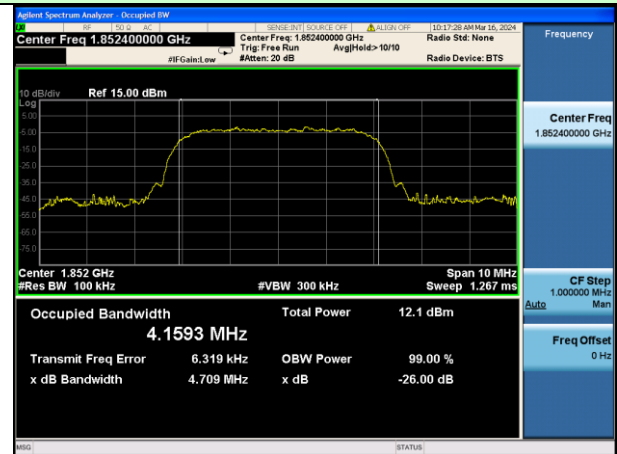


Middle channel

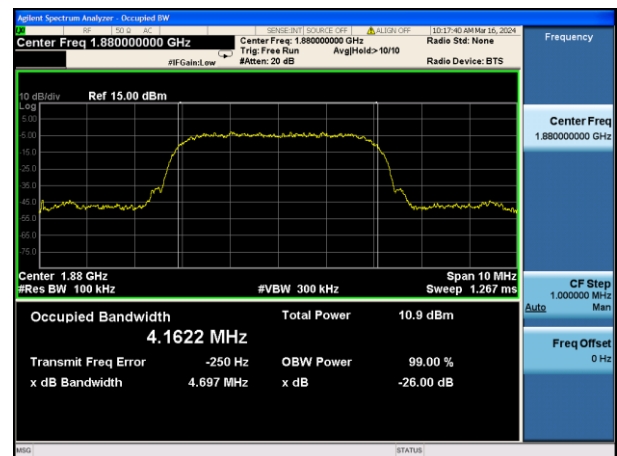


Highest channel

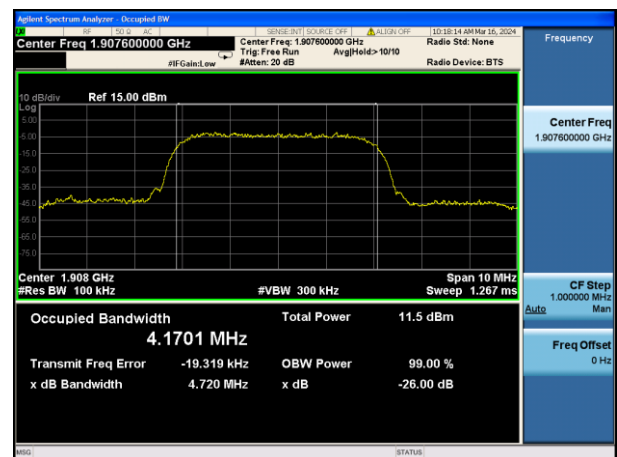
## WCDMA Band II (RMC 12.2Kbps link)



Lowest channel

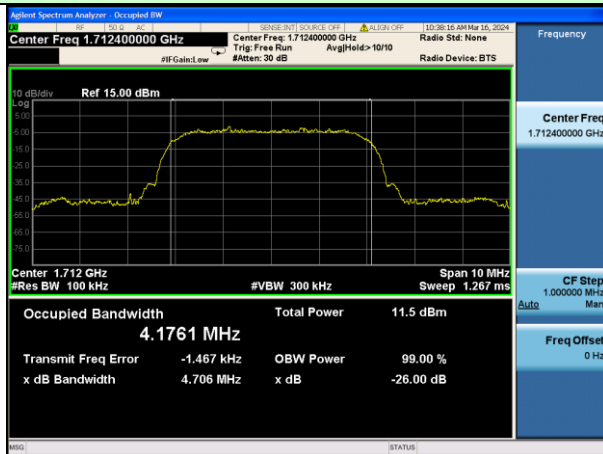


Middle channel

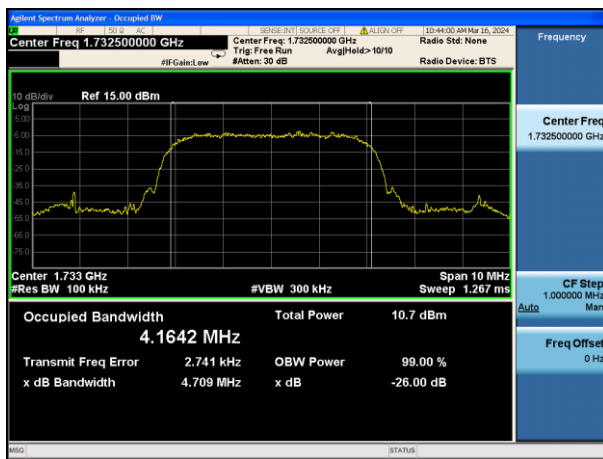


Highest channel

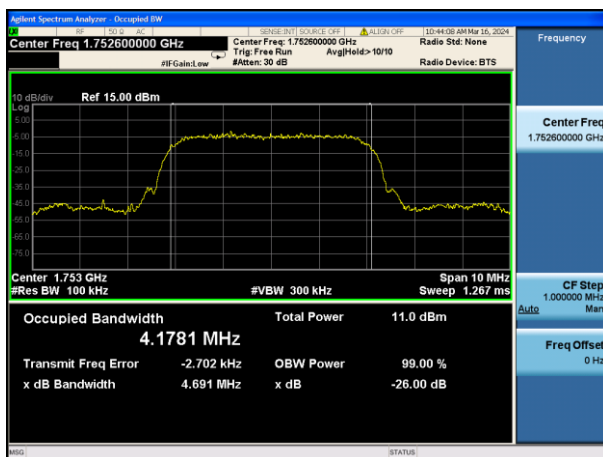
## WCDMA Band IV (RMC 12.2Kbps link)



Lowest channel



Middle channel

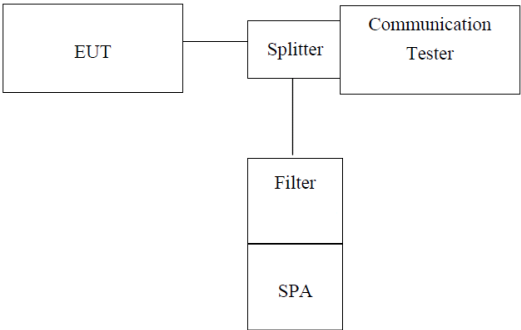


Highest channel

#### 4.6 MODULATION CHARACTERISTIC

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

#### 4.7 Out of band emission at antenna terminals

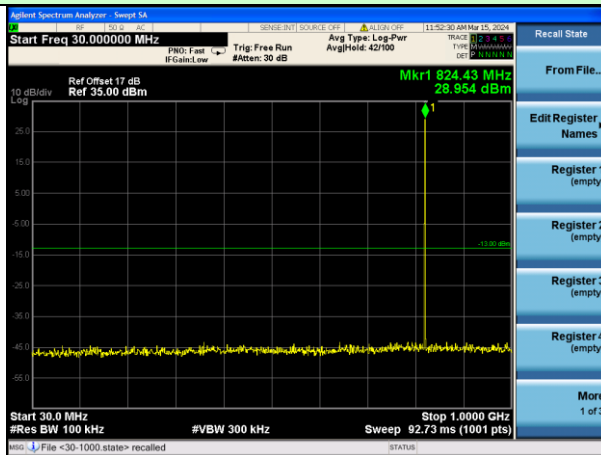
|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | FCC part22.917(a) and FCC part24.238(a), FCC part27.53(h)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Test Method:      | FCC part2.1051                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Limit:            | -13dBm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Test setup:       |  <p><i>Note: Measurement setup for testing on Antenna connector</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Test Procedure:   | <ol style="list-style-type: none"> <li>1 The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation.</li> <li>2 The resolution bandwidth of the spectrum analyzer was set at 1MHz, sufficient scans were taken to show the out of band Emissions if any up to 10th harmonic.</li> <li>3 For the out of band: Set the RBW, VBW = 1MHz, Start=30MHz, Stop= 10th harmonic.</li> <li>4 Band Edge Requirements: In the 1 MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 1 percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to measure the out of band Emissions.</li> </ol> |
| Test Instruments: | Refer to section 3 for details                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Test mode:        | Refer to section 4.1 for details                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Test results:     | Pass                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

Test plot as follows:

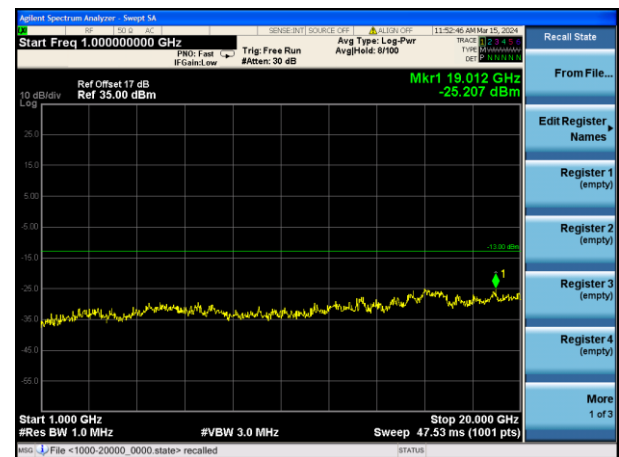
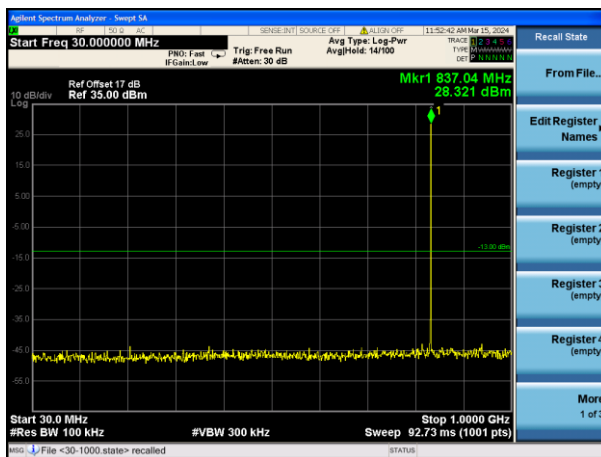
Note: During the conducted spurious emission test, a band filter was used. The information of the filter is reported at section 6.0 (refer to item 24, 25).

## Test Mode: Traffic mode

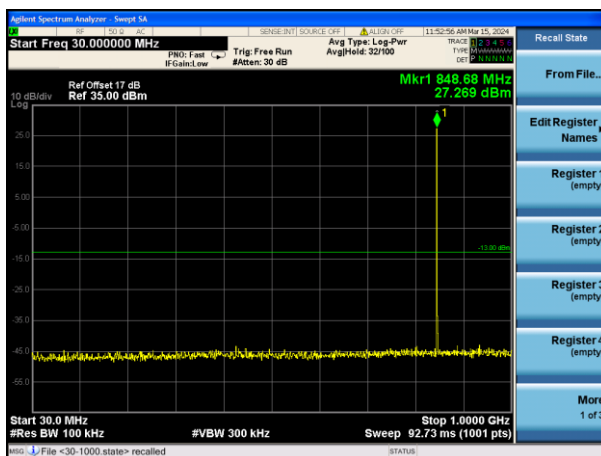
## GSM 850 (GSM link)



## Lowest channel



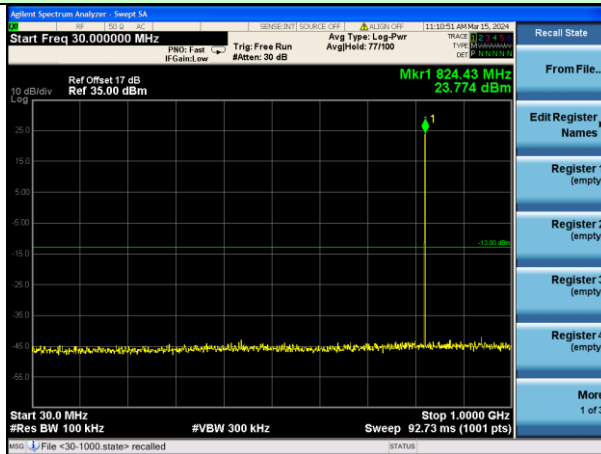
## Middle channel



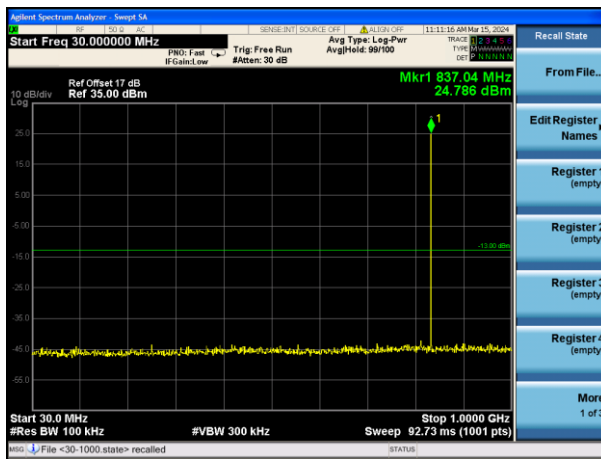
## Highest channel

## Test Mode: Traffic mode

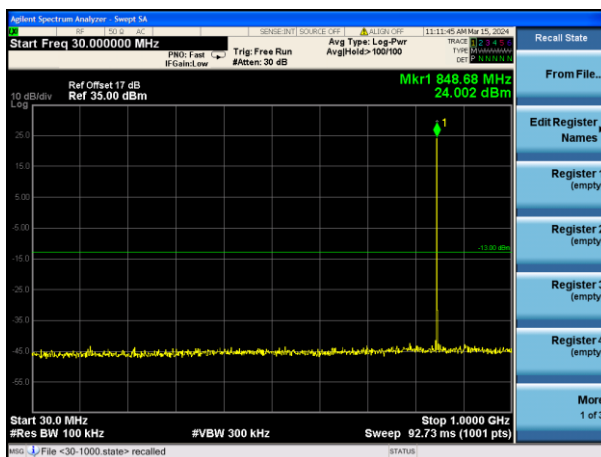
## GSM 850 (GPRS 1 link)



## Lowest channel



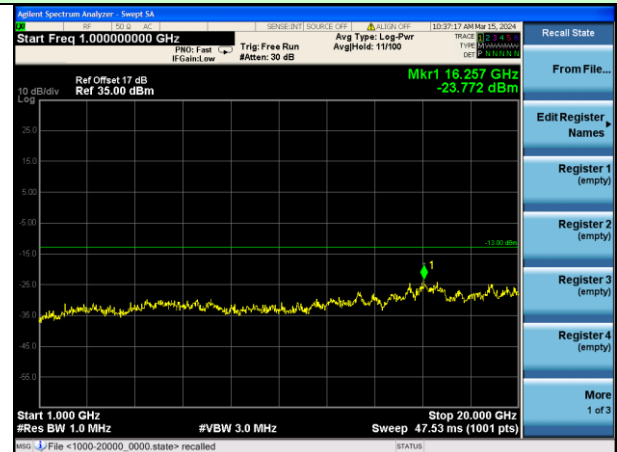
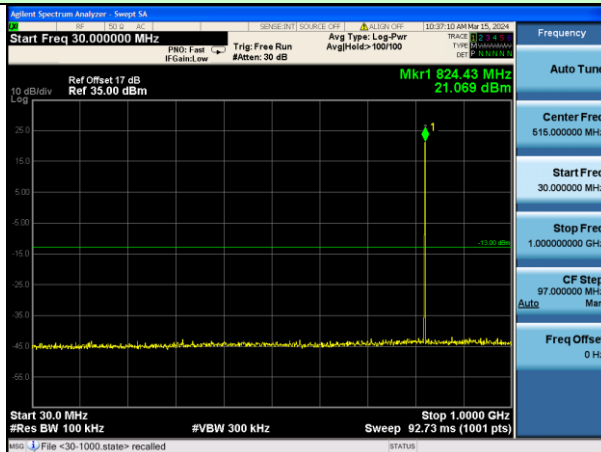
## Middle channel



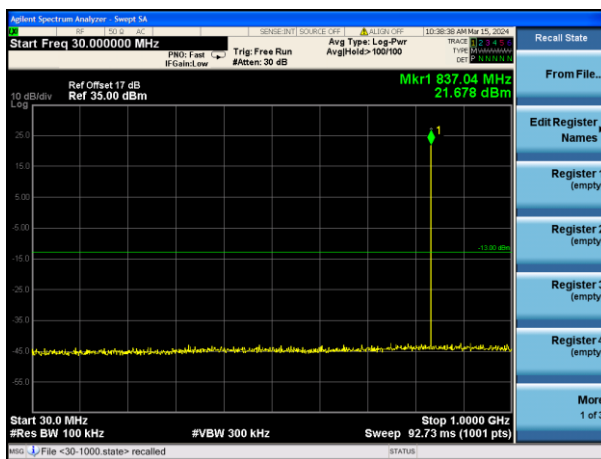
## Highest channel

## Test Mode: Traffic mode

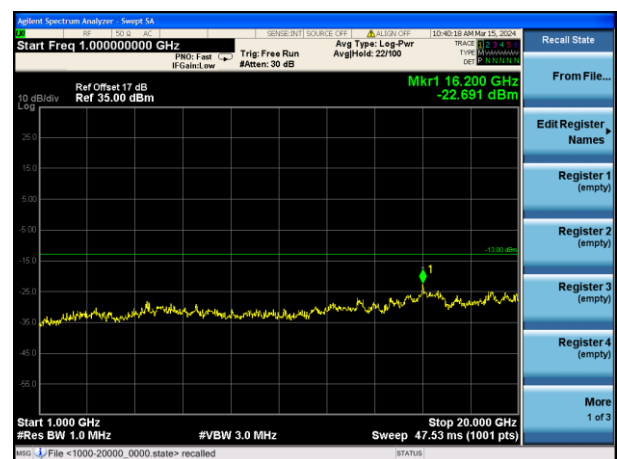
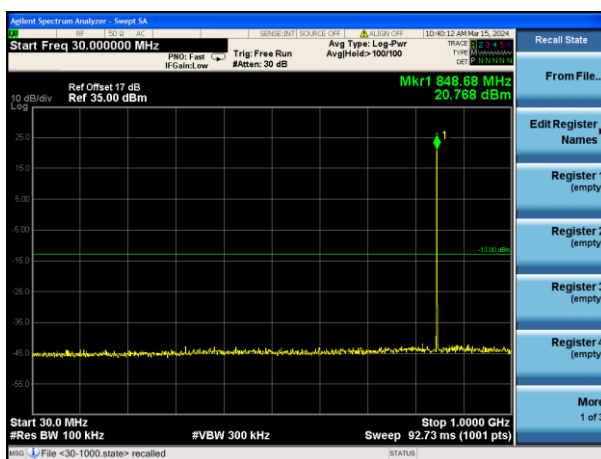
## GSM 850 (EGPRS 1 link)



## Lowest channel



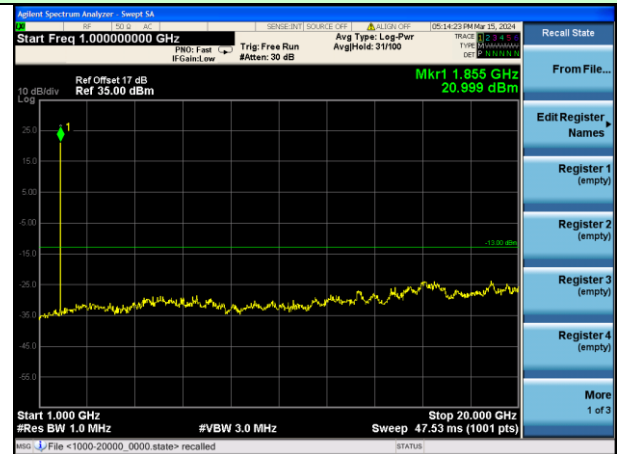
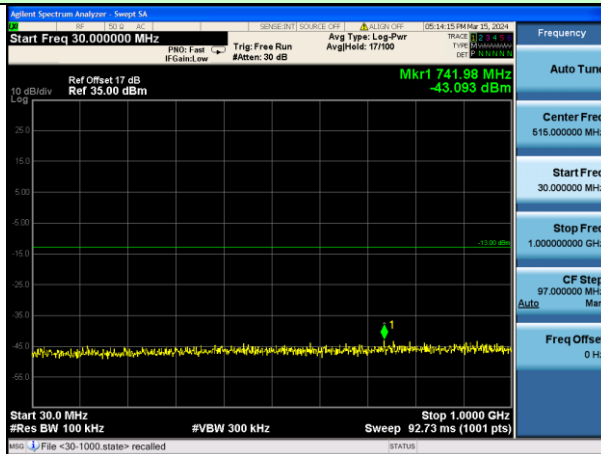
## Middle channel



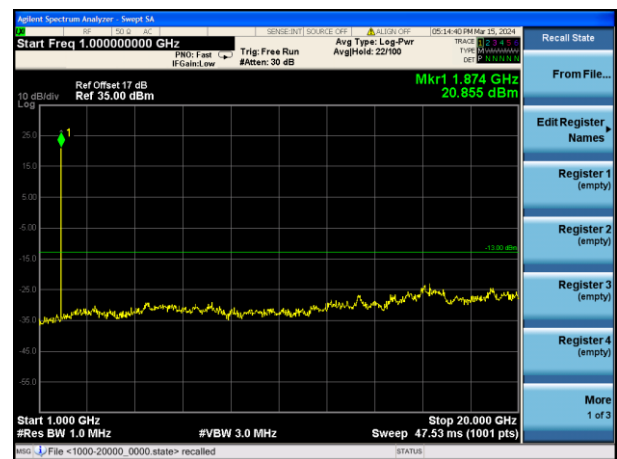
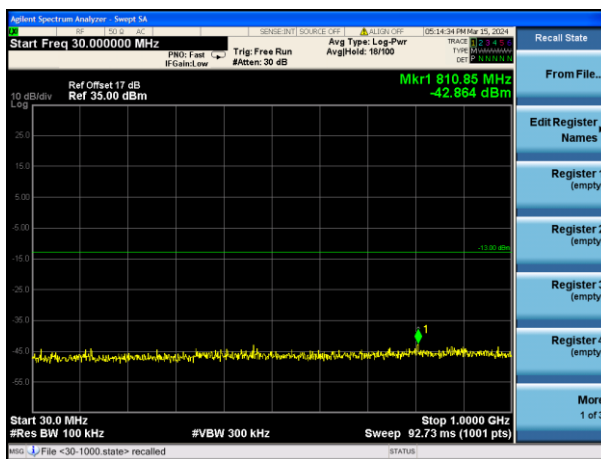
## Highest channel

## Test Mode: Traffic mode

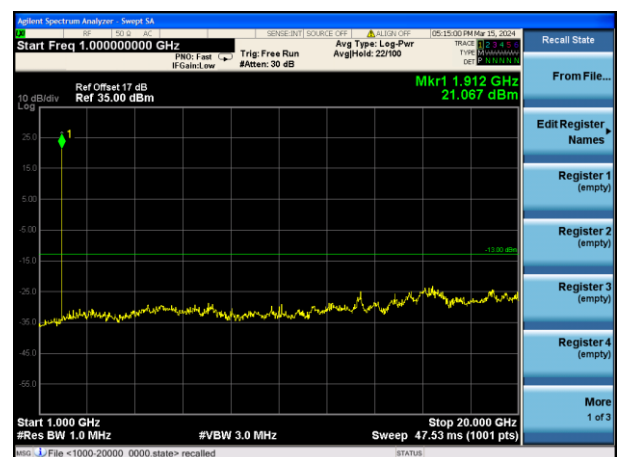
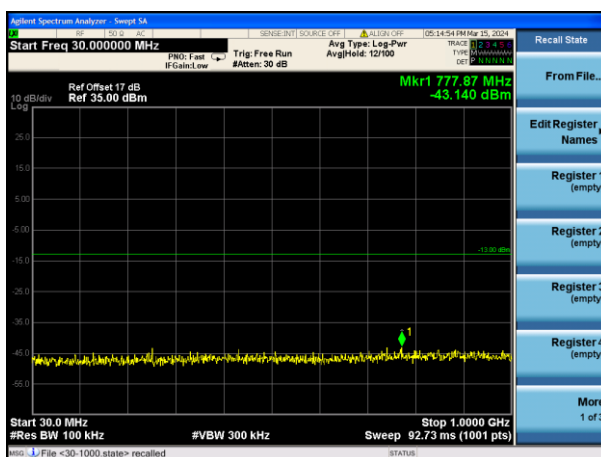
## PCS1900 (GSM link)



## Lowest channel



## Middle channel



## Highest channel