

| <b>RF TEST REPORT</b> |  |  |  |  |
|-----------------------|--|--|--|--|
| Report No.:           | SET2020-05874  |  |  |  |
| Product Name:         | USB Modem  |  |  |  |
| FCC ID:               | SRQ- MF863   |  |  |  |
| Model No. :           | 4002ZT, MF863  |  |  |  |
| Marketing Name:       | Softbank   |  |  |  |
| Applicant:            | ZTE Corporation.   |  |  |  |
| Address:              | ZTE Plaza, Keji Road South, Shenzhen, China.   |  |  |  |
| Dates of Testing:     | 05/20/2020 —06/08/2020   |  |  |  |
| Issued by:            | CCIC Southern Testing Co., Ltd.  |  |  |  |
| Lab Location:         | Electronic Testing Building, No. 43 Shahe Road, Xili Street, Nanshan District, Shenzhen, Guangdong, China. |  |  |  |
|                       | Tel: 86 755 26627338 Fax: 86 755 26627238  |  |  |  |

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# **Test Report**

| Product               | USB Modem   |
|-----------------------|---|
| Brand Name:           | ZTE   |
| Trade Name:           | ZTE   |
| Applicant:            | ZTE Corporation.  |
| Applicant Address:    | ZTE Plaza, Keji Road South, Shenzhen, China.              |
| Manufacturer:         | ZTE Corporation.  |
| Manufacturer Address: | ZTE Plaza, Keji Road South, Shenzhen, China.              |
| Test Standards        | 47 CFR FCC Part 2/22/24/27                                |
| Test Result:          | PASS  |
| Tested by             | Vincent 2020.06.08  |
|                       | Vincent, Test Engineer                                    |
| Reviewed by:          | Chris Jon 2020.06.08                                      |
|                       | Chris You, Senior Engineer                                |
| Approved by:          | Shuangwan Zhang<br>2020.06.08<br>Shuangwen Zhang, Manager |
|                       |   |



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|                              | (          | Change History |  |  |
|------------------------------|------------|----------------|--|--|
| Issue Date Reason for change |            |                |  |  |
| 1.0                          | 2020.06.08 | First edition  |  |  |
|                              |            |                |  |  |
|                              |            |                |  |  |



# 1. GENERAL INFORMATION

# 1.1 EUT Description

| EUT Type                           | USB Modem   |
|------------------------------------|---|
| EUT supports Radios application    | GPRS/EDGE/WCDMA/HSPA                                |
| Multi Slot Class                   | GPRS: Multi slot Class12, EGPRS: Multi slot Class12 |
|                                    | GPRS 850MHz:  |
|                                    | Tx: 824.2 - 848.8MHz (at intervals of 200kHz);      |
|                                    | Rx: 869.2 - 893.8MHz (at intervals of 200kHz)       |
|                                    | GPRS 1900MHz:                                       |
|                                    | Tx: 1850.2 - 1909.8MHz (at intervals of 200kHz);    |
|                                    | Rx: 1930.2 - 1989.8MHz (at intervals of 200kHz)     |
|                                    | WCDMA 850MHz  |
| Test Band                          | Tx: 826.4 - 846.6MHz (at intervals of 200kHz);      |
| Frequency Range                    | Rx: 871.4 - 891.6MHz (at intervals of 200kHz)       |
|                                    | WCDMA 1900MHz                                       |
|                                    | Tx: 1852.4 - 1907.6MHz (at intervals of 200kHz);    |
|                                    | Rx: 1932.4 - 1987.6MHz (at intervals of 200kHz)     |
|                                    | WCDMA 1700MHz                                       |
|                                    | Tx: 1712.4 - 1752.6MHz (at intervals of 200kHz);    |
|                                    | Rx: 2112.4 - 2152.6MHz (at intervals of 200kHz)     |
|                                    | GPRS 850: 32.90dBm                                  |
|                                    | GPRS 1900: 30.10dBm                                 |
| Maximum Output Bower to            | EDGE 850: 27.30dBm                                  |
| Maximum Output Power to<br>Antenna | EDGE 1900: 26.70dBm                                 |
| Antenna                            | WCDMA 850: 22.76dBm                                 |
|                                    | WCDMA 1900: 23.25dBm                                |
|                                    | WCDMA 1700: 23.58dBm                                |
|                                    | GPRS / GPRS:GMSK                                    |
|                                    | EDGE:GMSK / 8PSK                                    |
| Type of Modulation                 | WCDMA: QPSK(Uplink)                                 |
|                                    | HSDPA:QPSK(Uplink)                                  |
|                                    | HSUPA:QPSK(Uplink)                                  |
| Antenna Type                       | Internal Antenna                                    |



| 1.2 | 2 Maximum<br>Designator    | ERP/EIRP              | Power, Freq            | luency Tolerance                | e, and Emissio         | 0 <b>n</b> |
|-----|----------------------------|-----------------------|------------------------|---------------------------------|------------------------|------------|
|     | System                     | Type of<br>Modulation | Emission<br>Designator | Frequency<br>Tolerance<br>(ppm) | Maximum<br>ERP/EIRP(W) |            |
|     | GPRS 850                   | GMSK                  | 244KGXW                | 0.0090                          | 1.811                  |            |
|     | GPRS 1900                  | GMSK                  | 245KGXW                | 0.0121                          | 0.971                  |            |
|     | EDGE 850                   | 8PSK                  | 240KG7W                | 0.0060                          | 0.493                  |            |
|     | EDGE 1900                  | 8PSK                  | 247KG7W                | 0.0062                          | 0.491                  |            |
|     | WCDMA 850<br>RMC 12.2Kbps  | QPSK                  | 4M14F9W                | 0.0095                          | 0.188                  |            |
|     | WCDMA 1900<br>RMC 12.2Kbps | QPSK                  | 4M13F9W                | 0.0089                          | 0.184                  |            |
|     | WCDMA 1700<br>RMC 12.2Kbps | QPSK                  | 4M13F9W                | 0.0078                          | 0.173                  |            |





# **1.3** Test Standards and Results

1. 47 CFR Part 2, 22(H), 24(E), 27(L)

2. ANSI C63.26:2015

3. FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.

2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

Test detailed items/section required by FCC rules and results are as below:

| No.  | Section   | Description                            | Limit                      | Result |
|------|-----------|--|----------------------------|--------|
| 110. | FCC       | Description                            | Liiiit                     | Kesuit |
| 1    | 2.1046    | Conducted Output Power                 | Reporting Only             | PASS   |
| 2    | 24.232(d) | Peak to Average Radio                  | <13dBm                     | PASS   |
| 2    | 27.50(d)  | Teak to Average Radio                  |                            | IASS   |
|      | 2.1049    |  |                            |        |
| 3    | 22.917(b) | Occupied Bandwidth                     | Reporting Only             | PASS   |
| 5    | 24.238(b) | Occupied Baildwidth                    | Reporting Only             | TASS   |
|      | 27.53(g)  |  |                            |        |
|      | 2.1055    |  |                            |        |
| 4    | 22.355    | Eraguanay Stability                    | <+2 5mm                    | PASS   |
| 4    | 24.235    | Frequency Stability $\leq \pm 2.5$ ppm |                            | IASS   |
|      | 27.54     |  |                            |        |
|      | 2.1051    |  |                            |        |
| 5    | 22.917    | Conducted Out of Band                  | < 43+10log10<br>(P[Watts]) | PASS   |
| 3    | 24.238    | Emissions                              |                            |        |
|      | 27.53     |  |                            |        |
|      | 2.1051    |  |                            |        |
| 6    | 22.917    | Pand Edga                              | < 43+10log10               | PASS   |
| 0    | 24.238    | Band Edge                              | (P[Watts])                 | PASS   |
|      | 27.53     |  |                            |        |
|      | 22.913    | Effective Radiated Power               | <7Watts                    | PASS   |
| 7    | 24.232    | Equivalent Isotropic<br>Radiated Power | <2Watts                    | PASS   |
|      | 27.50(d)  | Effective Radiated Power               | <1Watts                    | PASS   |





| 27.53 | 8 | 2.1053<br>22.917<br>24.238 | Radiated Spurious<br>Emissions | < 43+10log10<br>(P[Watts]) | PASS |
|-------|---|----------------------------|--------------------------------|----------------------------|------|
|-------|---|----------------------------|--------------------------------|----------------------------|------|

# **1.4** Test Configuration of Equipment under Test

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.

Radiated emissions were investigated as following frequency range:

- 1. 30 MHz to 9000 MHz for GPRS850 and WCDMA Band V.
- 2. 30 MHz to 20000 MHz for GPRS1900 and WCDMA Band II.
- 3. 30 MHz to 18000 MHz for WCDMA Band IV.

All modes and data rates and positions were investigated.

Test modes are chosen to be reported as the worst case configuration below:

| Test Modes        |                   |                   |  |  |
|-------------------|-------------------|-------------------|--|--|
| Band Radiated TCs |                   | Conducted TCs     |  |  |
| GPRS 850          | GPRS Link         | GPRS Link         |  |  |
| GPRS 850          | GPRS Link         | GPRS Link         |  |  |
| GPRS 1900         | GPRS Link         | GPRS Link         |  |  |
| GPK5 1900         | GPRS Link         | GPRS Link         |  |  |
| WCDMA Band V      | RMC 12.2Kbps Link | RMC 12.2Kbps Link |  |  |
| WCDMA Band II     | RMC 12.2Kbps Link | RMC 12.2Kbps Link |  |  |
| WCDMA Band IV     | RMC 12.2Kbps Link | RMC 12.2Kbps Link |  |  |

Note: The maximum power levels are chosen to test as the worst case configuration as follows: GPRS mode for GMSK modulation,

EDGE multi-slot class 8 mode for 8PSK modulation,

RMC 12.2Kbps mode for WCDMA band V,

RMC 12.2Kbps mode for WCDMA band II,

RMC 12.2Kbps mode for WCDMA band IV, only these modes were used for all tests.





# **1.5** 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 EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 6B and 10dB attenuator.

Example:

Offset (dB) = RF cable loss(dB) + attenuator factor(dB).

= 7.5 + 10 = 17.5(dB)

# **1.6** Facilities and Accreditations

## **1.6.1** Test Facilities

#### NVLAP Lab Code: 201008-0

CCIC-SET is a third party testing organization accredited by NVLAP according to ISO/IEC 17025. The accreditation certificate number is 201008-0.

#### FCC- Designation Number: CN5031

CCIC-SET. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Designation Number: CN5031, valid time is until December 31, 2020.

#### **ISED Registration: 11185A**

#### CAB identifier: CN0064

CCIC Southern Testing Co., Ltd. EMC Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 11185A-1 on Aug. 04, 2016, valid time is until Dec. 31, 2020

# **1.6.2** Test Environment Conditions

During the measurement, the environmental conditions were within the listed ranges:

| Temperature (°C):           | 15°C-35°C    |
|-----------------------------|--------------|
| Relative Humidity (%):      | 30% -60%     |
| Atmospheric Pressure (kPa): | 86KPa-106KPa |





# 2. 47 CFR PART 2, PART 22H & 24E 27L REQUIREMENTS

# 2.1 Conducted RF Output Power

#### 2.1.1 Definition

A system simulator was used to establish communication with the EUT. Its parameters were set to enforce EUT transmitting at the maximum power. The measured power in the radio frequency on the transmitter output terminals shall be reported.

# 2.1.2 Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

## 2.1.3 Test Procedures

- 1. The transmitter output port was connected to the system simulator.
- 2. Set EUT at maximum power through system simulator.
- 3. Select lowest, middle, and highest channels for each band and different modulation.
- 4. Measure and record the power level from the system simulator.

# 2.1.4 Test Setup







# 2.1.5 Test Results of Conducted Output Power

# 1. Test Verdict:

| Band            | Channel | Frequency<br>(MHz) | Measured Output Power<br>dBm | Verdict |
|-----------------|---------|--------------------|------------------------------|---------|
| CDDS            | 128     | 824.2              | 32.9                         | PASS    |
| GPRS<br>850MUz  | 190     | 836.6              | 31.8                         | PASS    |
| 850MHz          | 251     | 848.8              | 32.5                         | PASS    |
| CDDS            | 512     | 1850.2             | 29.9                         | PASS    |
| GPRS            | 661     | 1880.0             | 30.1                         | PASS    |
| 1900MHz         | 810     | 1909.8             | 30.1                         | PASS    |
| EDGE            | 128     | 824.2              | 27.1                         | PASS    |
| 850MHz          | 190     | 836.6              | 27.1                         | PASS    |
| 83010112        | 251     | 848.8              | 27.3                         | PASS    |
| EDGE            | 512     | 1850.2             | 26.7                         | PASS    |
| EDGE<br>1900MHz | 661     | 1880.0             | 26.1                         | PASS    |
| THUMINZ         | 810     | 1909.8             | 26.3                         | PASS    |

Note 1: For the GPRS model, all the slots were tested and just the worst data was record in this report.



# 2. WCDMA Model Test Verdict:

| UM    | UMTS1900     |                     | Average Power (dBm) |        |  |
|-------|--------------|---------------------|---------------------|--------|--|
| (E    | (Band II)    |                     | 9400CH              | 9538cH |  |
| WCDMA | 12.2kbps RMC | 23.24               | 23.25               | 22.79  |  |
|       | Subtest 1    | 23.16               | 22.57               | 22.11  |  |
|       | Subtest 2    | 22.75               | 22.16               | 21.70  |  |
| HSDPA | Subtest 3    | 22.36               | 21.77               | 21.31  |  |
|       | Subtest 4    | 22.15               | 21.56               | 21.10  |  |
|       | Subtest 1    | 23.06               | 23.07               | 22.34  |  |
|       | Subtest 2    | 22.61               | 22.62               | 21.89  |  |
| HSUPA | Subtest 3    | 22.22               | 22.23               | 21.50  |  |
|       | Subtest 4    | 21.94               | 21.95               | 21.22  |  |
|       | Subtest 5    | 21.75               | 21.76               | 21.03  |  |
| UM    | TS1700       | Av                  | erage Power (d      | Bm)    |  |
| (B    | and IV)      | 1313CH              | 1413CH              | 1513CH |  |
| WCDMA | 12.2kbps RMC | 23.38               | 22.63               | 23.58  |  |
|       | Subtest 1    | 22.70               | 21.95               | 22.90  |  |
|       | Subtest 2    | 22.29               | 21.54               | 22.49  |  |
| HSDPA | Subtest 3    | 21.90               | 21.15               | 22.10  |  |
|       | Subtest 4    | 21.69               | 20.94               | 21.89  |  |
|       | Subtest 1    | 23.26               | 22.52               | 23.50  |  |
|       | Subtest 2    | 22.46               | 22.40               | 23.43  |  |
| HSUPA | Subtest 3    | 22.07               | 22.01               | 23.04  |  |
|       | Subtest 4    | 21.79               | 21.73               | 22.76  |  |
|       | Subtest 5    | 21.60               | 21.54               | 22.57  |  |
| UN    | /TS850       | Average Power (dBm) |                     | Bm)    |  |
| (В    | and V)       | 4132CH              | 4183CH              | 4233CH |  |
| WCDMA | 12.2kbps RMC | 22.76               | 22.46               | 22.27  |  |
|       | Subtest 1    | 22.68               | 21.78               | 21.59  |  |
|       | Subtest 2    | 22.27               | 21.37               | 21.18  |  |
| HSDPA | Subtest 3    | 21.88               | 20.98               | 20.79  |  |
|       | Subtest 4    | 21.67               | 20.77               | 20.58  |  |
|       | Subtest 1    | 22.58               | 22.28               | 21.82  |  |
|       | Subtest 2    | 22.13               | 21.83               | 21.37  |  |
| HSUPA | Subtest 3    | 21.74               | 21.44               | 20.98  |  |
|       | Subtest 4    | 21.46               | 21.16               | 20.70  |  |
|       | Subtest 5    | 21.27               | 20.97               | 20.51  |  |



# 2.2 Peak to Average Radio

## 2.2.1 Definition

Power Complementary Cumulative Distribution Function (CCDF) curves provide a means for characterizing the power peaks of a digitally modulated signal on a statistical basis. A CCDF curve depicts the probability of the peak signal amplitude exceeding the average power level. Most contemporary measurement instrumentation include the capability to produce CCDF curves for an input signal provided that the instrument's resolution bandwidth can be set wide enough to accommodate the entire input signal bandwidth. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

## 2.2.2 Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

## 2.2.3 Test Procedures

1. The testing follows FCC KDB 971168 D01 v03r01 Section 5.7.1.

2. The EUT was connected to the spectrum analyzer and system simulator via a power divider.

3. For GPRS/EGPRS operating modes:

a. Set EUT in maximum power output.

b. Set the RBW = 1MHz, VBW = 3MHz, Peak detector on spectrum analyzer for first trace.

c. Set the RBW = 1MHz, VBW = 3MHz, RMS detector on spectrum analyzer for second

trace.

d. The wanted burst signal is triggered by spectrum analyzer, and measured respectively the peak level and Mean level without burst-off time, after system simulator has synchronized with the spectrum analyzer.

4. For UMTS operating modes:

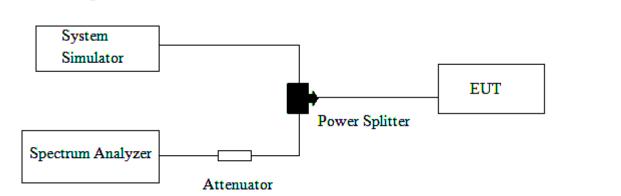
a. Set the CCDF (Complementary Cumulative Distribution Function) option on the spectrum analyzer.

b. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.

5. Record the deviation as Peak to Average Ratio.



# 2.2.4 Test Setup



# 2.2.5 Test Results of Peak-to-Average Ratio

| Dand             | Channal      | Frequency | Peak to Average radio | Limit | Mandiat |
|------------------|--------------|-----------|-----------------------|-------|---------|
| Band             | Band Channel |           | dB                    | dB    | Verdict |
| CDDS             | 512          | 1850.2    | 0.3                   |       | PASS    |
| GPRS<br>1900MHz  | 661          | 1880.0    | 0.4                   | 13    | PASS    |
| 1900101112       | 810          | 1909.8    | 0.2                   |       | PASS    |
| EDCE             | 512          | 1850.2    | 2.8                   |       | PASS    |
| EDGE<br>1900MHz  | 661          | 1880.0    | 3.5                   | 13    | PASS    |
| 190010112        | 810          | 1909.8    | 3.1                   |       | PASS    |
| WCDMA            | 9262         | 1852.4    | 2.94                  |       | PASS    |
| 1900MHz          | 9400         | 1880.0    | 3.13                  | 13    | PASS    |
| 1900101112       | 9538         | 1907.6    | 3.03                  |       | PASS    |
| WCDMA            | 1312         | 1712.4    | 2.73                  |       | PASS    |
| WCDMA<br>1700MHz | 1412         | 1732.4    | 3.15                  | 13    | PASS    |
| 1700101112       | 1513         | 1752.6    | 2.75                  |       | PASS    |



# 2.3 99% Occupied Bandwidth and 26dB Bandwidth Measurement

#### 2.3.1 Definition

The 99% occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean transmitted power.

The emission bandwidth is defined as the width of the signal between two points, located at

the 2 sides of the carrier frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

# 2.3.2 Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

# 2.3.3 Test Procedures

1. The testing follows FCC KDB 971168 D01 v03r01 Section 4.2.

2. The EUT was connected to the spectrum analyzer and system simulator via a power divider.

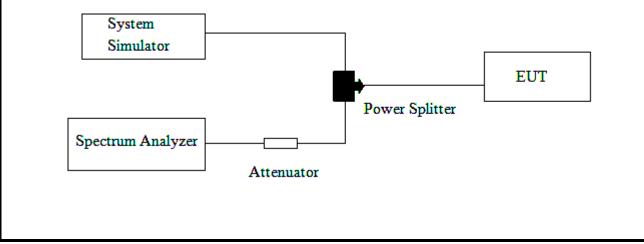
3. The RF output of the EUT was connected to the spectrum analyzer by RF cable and attenuator.

The path loss was compensated to the results for each measurement.

4. The 99% occupied bandwidth were measured, set RBW= 1% of span, VBW= 3\*RBW, sample detector, trace maximum hold.

5. The 26dB bandwidth were measured, set RBW= 1% of EBW, VBW= 3\*RBW, peak detector, trace maximum hold.

# 2.3.4 Test Setup





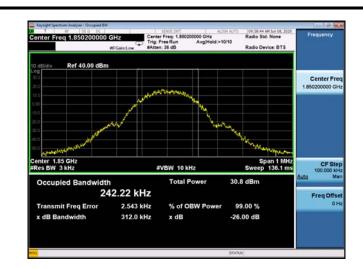
| Band          | Channel | Frequency<br>(MHz) | 26dB bandwidth<br>(KHz) | 99% Occupied<br>Bandwidth<br>(KHz) | Refer to Plot |
|---------------|---------|--------------------|-------------------------|------------------------------------|---------------|
|               | 128     | 824.2              | 313.2                   | 243.65                             | Plot A1       |
| GPRS 850MHz   | 190     | 836.6              | 311.5                   | 238.47                             | Plot A2       |
|               | 251     | 848.8              | 312.3                   | 241.81                             | Plot A3       |
|               | 512     | 1850.2             | 312                     | 242.22                             | Plot B1       |
| GPRS 1900MHz  | 661     | 1880.0             | 312.5                   | 244.66                             | Plot B2       |
|               | 810     | 1909.8             | 313                     | 242.51                             | Plot B3       |
|               | 128     | 824.2              | 301.6                   | 240.38                             | Plot C1       |
| EDGE 850MHz   | 190     | 836.6              | 294.2                   | 238.91                             | Plot C2       |
|               | 251     | 848.8              | 295.3                   | 236.86                             | Plot C3       |
|               | 512     | 1850.2             | 308.1                   | 247                                | Plot D1       |
| EDGE 1900MHz  | 661     | 1880.0             | 309.6                   | 243.76                             | Plot D2       |
|               | 810     | 1909.8             | 309.5                   | 244.69                             | Plot D3       |
|               | 4132    | 826.4              | 4750                    | 4142.6                             | Plot E1       |
| WCDMA 850MHz  | 4183    | 836.6              | 4735                    | 4126                               | Plot E2       |
|               | 4233    | 846.6              | 4724                    | 4141.1                             | Plot E3       |
|               | 9262    | 1852.4             | 4707                    | 4118                               | Plot F1       |
| WCDMA 1900MHz | 9400    | 1880               | 4701                    | 4125.2                             | Plot F2       |
|               | 9538    | 1907.6             | 4706                    | 4123.5                             | Plot F3       |
|               | 1312    | 1712.4             | 4742                    | 4128.5                             | Plot G1       |
| WCDMA 1700MHz | 1412    | 1732.4             | 4674                    | 4122.9                             | Plot G2       |
|               | 1513    | 1752.6             | 4720                    | 4131.2                             | Plot G3       |

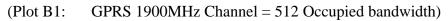
#### d D 4 764B B 14 £ 000/. A . . idtk



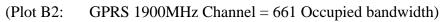
#### Test Results (Plots) of 99% Occupied Bandwidth and 26dB Bandwidth 2.3.6 Ref Offset 10.5 dB Ref 40.00 dBm Center Fre 824.200000 MI er 824.2 MH BW 3 kHz Span 1 MH ep 136.1 m CF St #VBW 10 kH SI 33.9 dB 243.65 kHz 1.628 kHz nit Freg Erro % of OBW Por 99.00 % 313.2 kHz x dB -26.00 dB GPRS 850MHz Channel = 128 Occupied bandwidth) (Plot A1: 836.60 Radio Device: BTS Ref Offset 10.5 dB Ref 40.00 dBm Center Fr Span 1 Mi p 136.1 n CF St #VBW 10 kHz 33.9 dB 238.47 kHz 700 Hz 99.00 % % of O 311.5 kHz dB (Plot A2: GPRS 850MHz Channel = 190 Occupied bandwidth) Ref Offset 10.5 dB Ref 40.00 dBm Center Fr 848.8 M Span 1 Mi CFS 34.4 dBn 241.81 kHz 1.828 kHz % of OBW Po 312.3 kHz x dB 26.00 dB (Plot A3: GPRS 850MHz Channel = 251 Occupied bandwidth)

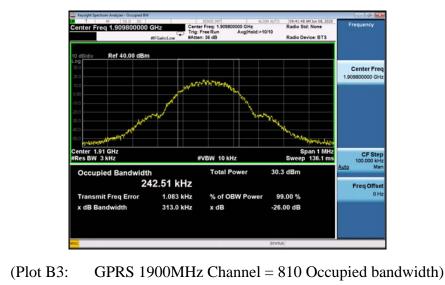




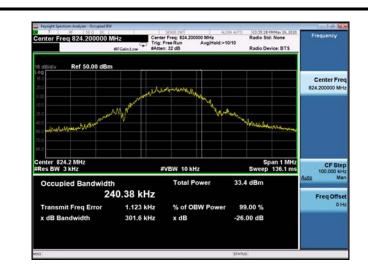


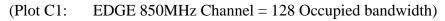




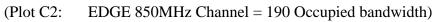










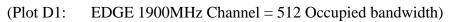


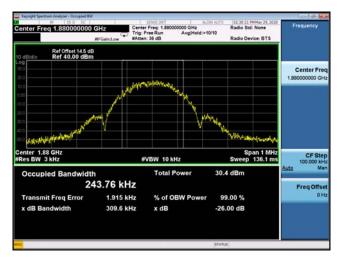


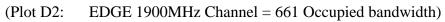
(Plot C3: EDGE 850MHz Channel = 251 Occupied bandwidth)

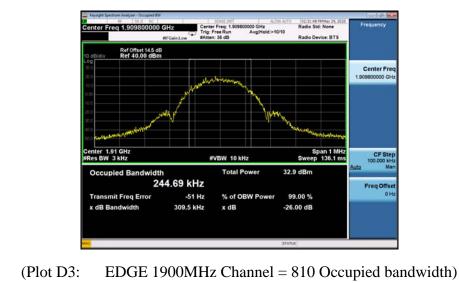






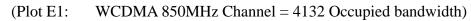






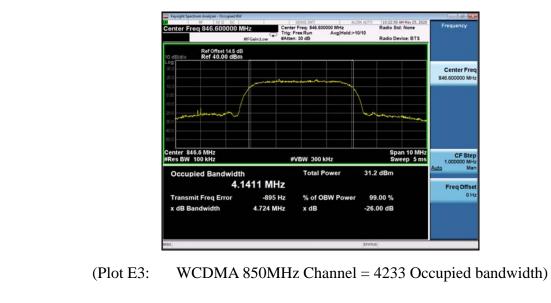


|             | NF 50 9 DC<br>9 826.400000 N        | Cent<br>Trig | sense INT<br>er Freq: 826.400000 MHz<br>Free Run Avg Hold:<br>in: 30 dB | ALIGN AUTO [19:21:44 AM M<br>Radio Std: Ni<br>>10/10<br>Radio Device | Frequency                   |
|-------------|-------------------------------------|--------------|---|--|-----------------------------|
| 10 dB/div   | Ref Offset 14.5 dB<br>Ref 40.00 dBm | 3<br>I       |   |  |                             |
| 20.0        |                                     |              |   |  | Center Fre<br>825.400000 MH |
| 10.0        |                                     | 1            |   |  | 1.1                         |
| 10.0        |                                     |              |   |  |                             |
| 30.0        |                                     |              |   |  | ~~~~                        |
| 42.0        |                                     |              |   |  |                             |
| Center 826. | A MH2                               |              |   | Snan '   | IO MHZ                      |
| #Res BW 10  |                                     |              | #VBW 300 kHz  | Sweet  | 5 ms 1,000000 MH            |
| Occupie     | ed Bandwidt                         |              | Total Power   | 31.2 dBm   | Auto Ma                     |
|             | 4.                                  | 1426 MHz     |   |  | Freq Offse                  |
|             | Freq Error                          | -2.756 kHz   | % of OBW Powe   |  | 01                          |
| x dB Ban    | idwidth                             | 4.750 MHz    | x dB  | -26.00 dB  |                             |
|             |                                     |              |   |  |                             |



| Keysigit Spectrum Analyse - Occupied In<br>Mr 50 0 DC<br>Center Freq 836.600000 | MHz Center<br>Trig: J   | SEASE INT 44<br>r Freq: 836.600000 MHz<br>Free Run Avg Hold:><br>h: 30 dB | 101 40/10 10:22:11 AM May 25, 26<br>Radio Std: None<br>10/10 Radio Device: BTS | 20 Frequency                  |
|---|-------------------------|---|--|-------------------------------|
| Ref Offset 14.5 d<br>10 dB/div Ref 40.00 dBr                                    | B                       |   |  |                               |
| 20.0  |                         | hand and a second second  |  | Center Freq<br>836.600000 MHz |
| 0.00  | 1                       |   | <b>\</b>   |                               |
| 10.0<br>20.0<br>30.0  |                         |   | hanna  |                               |
| 40.0  |                         |   |  |                               |
| Center 836.6 MHz<br>#Res BW 100 kHz   | #                       | VBW 300 kHz   | Span 10 MH<br>Sweep 5 m  | 5 1,000000 MH                 |
| Occupied Bandwid<br>4.  | հ<br>1260 MHz           | Total Power   | 30.7 dBm   | Auto Man<br>Freg Offsel       |
| Transmit Freq Error<br>x dB Bandwidth   | -2.899 kHz<br>4.735 MHz | % of OBW Power<br>x dB  | 99.00 %<br>-26.00 dB   | 0 Hz                          |
| 150   |                         |   | STATUS   |                               |

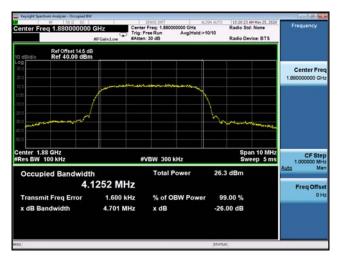
(Plot E2: WCDMA 850MHz Channel = 4183 Occupied bandwidth)



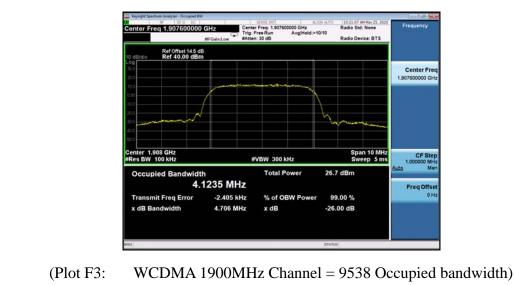


| Center Freq 1.8524000  | Trig:                  | stree INT 41<br>r Freq: 1.852400000 GHz<br>Free Run Avg[Hold:>1<br>n: 30 dB | 0/10 10:18:39 AM Nay 25, 26<br>Radio Std: None<br>Radio Device: BTS | Frequency                     |
|--|------------------------|---|---|-------------------------------|
| 10 dB/div Ref 0ffset 14.   |                        |   |   |                               |
| 20.0   |                        |   |   | Center Free<br>1.852400000 GH |
| 10.0   |                        |   | 1   |                               |
| 300 Balannes Marson  | A                      |   | Windimetalance  |                               |
| 40.0<br>   |                        |   |   |                               |
| Center 1.852 GHz<br>#Res BW 100 kHz  |                        | VBW 300 kHz   | Span 10 MH<br>Sweep 5 m   | 5 1,000000 MH                 |
| Occupied Bandw   | dth<br>4.1180 MHz      | Total Power   | 30.3 dBm  | Auto Ma                       |
| Transmit Freq Error<br>x dB Bandwidth  | 3.216 kHz<br>4.707 MHz | % of OBW Power<br>x dB  | 99.00 %<br>-26.00 dB  | он                            |
|  |                        |   |   |                               |
| wso JFile <screen 0009.png<="" td=""><td></td><td></td><td>STATUS</td><td></td></screen> |                        |   | STATUS  |                               |





(Plot F2: WCDMA 1900MHz Channel = 9400 Occupied bandwidth)





| <figure><figure><figure><figure></figure></figure></figure></figure>  |  |  |
|---|--|--|
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| <figure></figure>   |  |  |
| <figure></figure>   |  |  |
| Occupied Bandwidth       Total Power       28.8 dBm         Transmit Freq Error       5.87 kHz       % of OBW Power       99.00 %       %         x dB Bandwidth       4.674 MHz       x dB       -26.00 dB       0 Hz         w       w       w       w       w       w       w         (Plot G2:       WCDMA 1700 MHz Channel = 1412 bandwidth)       Constraint       Constraint <thconstraint< th="">       Constraint</thconstraint<> |  |  |
| Expert Section         Center Freq         Expert Section         Center Freq         Center Freq <th <="" colspan="2" td=""></th>  |  |  |
| Center Freq 1.752600000 GHz<br>#IG: Freq 1.752600000 GHz<br>#IG: Freq 1.752600000 GHz<br>#IG: Freq 1.75260000 GHz<br>#IG: Freq 1.75260000 GHz<br>#IG: Freq 1.75260000 GHz<br>Center Freq<br>1.75260000 GHz<br>Center Freq<br>1.75260000 GHz<br>Center Freq<br>1.75260000 GHz<br>Center Freq<br>1.75260000 GHz<br>#VBW 300 kHz<br>Span 10 MHz<br>Freq Offset<br>4.1312 MHz<br>Transmit Freq Error -10.536 kHz % of OBW Power 99.00 %<br>x dB Bandwidth 4.720 MHz x dB -26.00 dB<br>Tentos  |  |  |
| 11/52800000 GHz         11/5280000 GHz         11/528000 GHz <t< td=""></t<>   |  |  |
| Occupied Bandwidth     Total Power     26.9 dBm       4.1312 MHz     Freq Offset       Transmit Freq Error     -10.536 kHz     % of OBW Power     99.00 %       x dB Bandwidth     4.720 MHz     x dB     -26.00 dB   |  |  |
|   |  |  |
| (Plot G3: WCDMA 1700 MHz Channel = 1513 bandwidth)  |  |  |
|   |  |  |



# 2.4 Frequency Stability

#### 2.4.1 Requirement

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within  $\pm 0.00025\%$  ( $\pm 2.5$ ppm) of the center frequency.

#### 2.4.2 Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

#### 2.4.3 Test Procedures for Temperature Variation

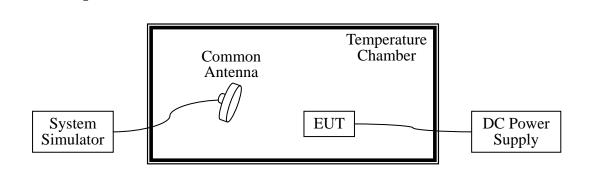
- 1. The testing follows FCC KDB 971168 D01 v03r01 Section 9.0.
- 2. The EUT was set up in the thermal chamber and connected with the system simulator.
- 3. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
- 4. With power OFF, the temperature was raised in 10°C steps up to 50°C. The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.

#### 2.4.4 Test Procedures for Voltage Variation

- 1. The testing follows FCC KDB 971168 D01 v03r01 Section 9.0.
- 2. The EUT was placed in a temperature chamber at 25±5° C and connected with the system simulator.
- 3. The power supply voltage to the EUT was varied from BEP to 115% of the nominal value measured at the input to the EUT.
- 4. The variation in frequency was measured for the worst case.



# 2.4.5 Test Setup



# 2.4.6 Test Results of Frequency Stability

#### GPRS 850MHz Band

| Band: C     |           | GPRS 850 |           | Channel:   | 190      |  |  |
|-------------|-----------|----------|-----------|------------|----------|--|--|
| Limit(ppm): |           | 2.5      |           | Frequency: | 836.6MHz |  |  |
| Power       | Tomporate | 1400     | GPRS      | EDGE       |          |  |  |
|             | Temperatu | ire      | Deviation | Deviation  | Result   |  |  |
| (VDC)       | (°C)      |          | (ppm)     | (ppm)      |          |  |  |
|             | -30       |          | 0.0012    | 0.0018     |          |  |  |
|             | -20       |          | 0.0023    | 0.0024     |          |  |  |
|             | -10       |          | 0.0018    | 0.0033     |          |  |  |
|             | 0         |          | 0.0090    | 0.0025     |          |  |  |
| 5.0         | +10       |          | 0.0025    | 0.0012     |          |  |  |
|             | +20       |          | 0.0030    | 0.0035     | PASS     |  |  |
|             | +30       |          | 0.0028    | 0.0029     |          |  |  |
|             | +40       |          | 0.0025    | 0.0024     |          |  |  |
|             | +50       |          | 0.0015    | 0.0017     |          |  |  |
| 5.5         | +25       |          | 0.0032    | 0.0009     |          |  |  |
| 4.5         | +25       |          | 0.0008    | 0.0060     |          |  |  |



| GPRS 1900M  | IHz Band   |           |           |            |           |
|-------------|------------|-----------|-----------|------------|-----------|
| Band:       |            | GPRS 1900 |           | Channel:   | 661       |
| Limit(ppm): |            | 2.5       |           | Frequency: | 1880.0MHz |
| Derror      | Tama anota |           | GPRS      | EDGE       |           |
| Power (VDC) | (°C)       | ire       | Deviation | Deviation  | Result    |
| (VDC)       | (°C)       |           | (ppm)     | (ppm)      |           |
|             | -30        |           | 0.0035    | 0.0037     |           |
|             | -20        |           | 0.0027    | 0.0028     |           |
|             | -10        |           | 0.0018    | 0.0031     |           |
|             | 0          |           | 0.0027    | 0.0029     |           |
| 5.0         | +10        |           | 0.0030    | 0.0027     |           |
|             | +20        |           | 0.0018    | 0.0045     | PASS      |
|             | +30        |           | 0.0057    | 0.0044     |           |
|             | +40        |           | 0.0121    | 0.0054     |           |
|             | +50        |           | 0.0033    | 0.0055     |           |
| 5.5         | +25        |           | 0.0074    | 0.0062     |           |
| 4.5         | 4.5 +25    |           | 0.0028    | 0.0028     |           |

# WCDMA 850MHz Band

| Band:          | WCDMA Ba           | nd V Channel:                      | 4183     |
|----------------|--------------------|------------------------------------|----------|
| Limit(ppm)     | 2.5                | Frequency:                         | 836.6MHz |
| Power<br>(VDC) | Temperature<br>(℃) | RMC 12.2Kbps<br>Deviation<br>(ppm) | Result   |
|                | -30<br>-20<br>-10  | 0.0055<br>0.0058<br>0.0068         |          |
| 5.0            | 0<br>+10           | 0.0078<br>0.0095                   |          |
|                | +20<br>+30<br>+40  | 0.0072<br>0.0061<br>0.0073         | PASS     |
| 5.5            | +40<br>+50<br>+25  | 0.0073                             |          |
| 4.5            | +25                | 0.0061                             |          |



| Band:          |   | WCDMA    | Rand II            | Channel:    | 9400      |
|----------------|---|----------|--------------------|-------------|-----------|
| Limit(ppm):    |   | 2.5      |                    | Frequency:  | 1880.0MHz |
| _              | _ |          | R                  | MC 12.2Kbps |           |
| Power<br>(VDC) | - | perature | Deviation<br>(ppm) |             | Result    |
|                |   | -30      |                    | 0.0070      |           |
|                |   | -20      |                    | 0.0050      |           |
|                |   | -10      |                    | 0.0021      |           |
|                |   | 0        |                    | 0.0089      |           |
| 5.0            | - | +10      |                    | 0.0075      |           |
|                | - | +20      |                    | 0.0045      | PASS      |
|                | - | +30      |                    | 0.0049      |           |
|                | - | +40      |                    | 0.0023      |           |
|                | - | +50      | 0.0028             |             |           |
| 5.5            | - | +25      | 0.0035             |             |           |
| 4.5            | - | +25      |                    | 0.0046      |           |

# WCDMA 1700MHz Band

| Band:          | Band: WCDMA     |   | and IV                             | Channel:      | 1412      |  |
|----------------|-----------------|---|------------------------------------|---------------|-----------|--|
| Limit(ppm):    | Limit(ppm): 2.5 |   | Frequency:                         |               | 1732.4MHz |  |
| Power<br>(VDC) | Temper<br>(℃    |   | RMC 12.2Kbps<br>Deviation<br>(ppm) |               | Result    |  |
|                | -30<br>-20      |   |                                    | 0.0070 0.0076 |           |  |
| 5.0            | -10<br>0<br>+10 |   | 0.0078<br>0.0021<br>0.0040         |               |           |  |
| 5.0            | +1<br>+2<br>+3  | 0 |                                    | 0.0059 0.0053 | PASS      |  |
|                | +40<br>+50      |   | 0.0033                             |               | -         |  |
| 5.5            |                 |   | 0.0036                             |               | -         |  |
| 4.5            | 4.5 +25         |   | 0.0049                             |               |           |  |



# 2.5 Conducted Out of Band Emissions

#### 2.5.1 Requirement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least  $43 + 10 \log (P) dB$ .

It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10th harmonic.

#### 2.5.2 Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

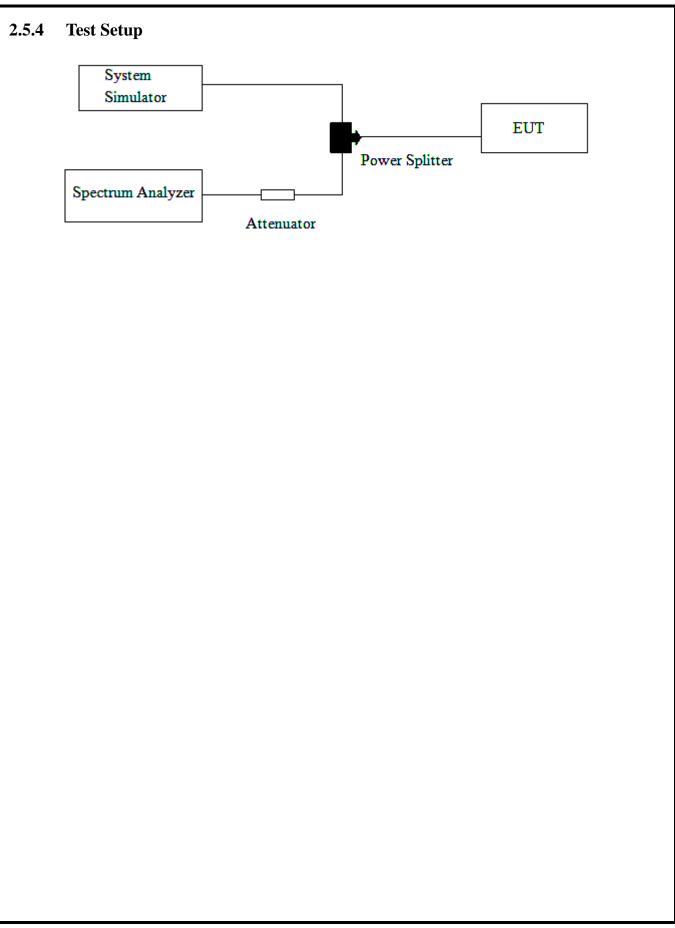
## 2.5.3 Test Procedures

- 1. The testing follows FCC KDB 971168 D01 v03r01 Section 6.0.
- 2. The EUT was connected to the spectrum analyzer and system simulator via a power divider.
- 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.
- 4. The middle channel for the highest RF power within the transmitting frequency was measured.
- 5. The conducted spurious emission for the whole frequency range was taken.
- 6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
- 7. The limit line is derived from  $43 + 10\log(P)$  dB below the transmitter power P(Watts)

= P(W) - [43 + 10log(P)] (dB)

- = [30 + 10log(P)] (dBm) [43 + 10log(P)] (dB)
- = -13dBm.
- 8. For 9KHz to 30MHz: the amplitude of spurious emissions are attenuated by more than 20dB below the permissible value has no need to be reported.

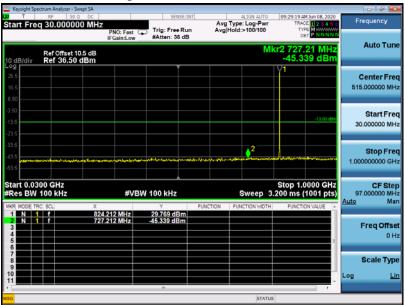




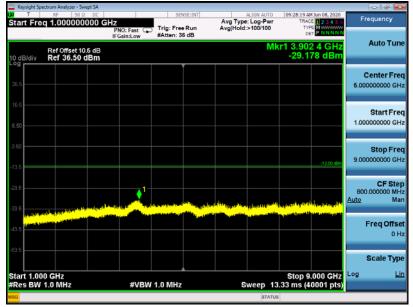


# 2.5.5 Test Result (Plots) of Conducted Spurious Emission

Note: For 9 KHz to 30MHz: the amplitude of spurious emissions is attenuated by more than 20dB below the permissible value, so we not provide the test result here.



GPRS 850MHz Channel = 128, 30MHz to 1GHz



GPRS 850MHz Channel = 128, 1GHz to 9GHz



| Keysight Spe                | RF S0 Q DC                          |                                     | SENSE:IN                  |                    | ALIGN AUTO                     | 00.20.20 0        | M Jun 08, 2020   |                                |
|-----------------------------|-------------------------------------|-------------------------------------|---------------------------|--------------------|--------------------------------|-------------------|--|--------------------------------|
| tart Fre                    | q 30.000000 MHz                     | PNO: Fast                           |                           | Avg                | Type: Log-Pwr<br>Hold:>100/100 | TRAC              | M Jun 08, 2020<br>2 1 2 3 4 5 6<br>2 M M M M M M M M M M M M M M M M M M M | Frequency                      |
| 0 dB/div                    | Ref Offset 10.5 dB<br>Ref 36.50 dBm | I GAINEON                           |                           |                    | M                              | (r2 740.<br>-46.3 | 04 MHz<br>67 dBm   | Auto Tu                        |
| .og<br>26.5<br>16.5<br>6.50 |                                     |                                     |                           |                    |                                | \?1               |  | Center Fr<br>515.000000 M      |
| 3.50<br>13.5<br>23.5        |                                     |                                     |                           |                    |                                |                   | -13.00 dðin  | Start Fr<br>30.000000 M        |
| 43.5<br>53.5                |                                     | مۇدەر بۇ يوغان <sup>م</sup> ىرمىيەن | ur sin or hours drugt for | deep-date U.c.s.cs | 2                              | aga lassa anta    | anad for the second  | Stop Fr<br>1.000000000 G       |
| tart 0.03<br>Res BW         | 100 kHz                             | #VB                                 | W 100 kHz                 | FUNCTION           | Sweep 3                        | .200 ms (         | 0000 GHz<br>1001 pts)  | CF St<br>97.000000 M<br>Auto M |
| 1 N 1                       | 1 8                                 | 37.04 MHz<br>40.04 MHz              | 29.773 dBm<br>-46.367 dBm |                    |                                |                   |  | Freq Offs<br>0                 |
| 7<br>8<br>9<br>10           |                                     |                                     |                           |                    |                                |                   |  | Scale Ty                       |
| 11                          |                                     |                                     |                           |                    |                                |                   | , -  |                                |
| _                           |                                     |                                     |                           |                    | STATUS                         |                   |  |                                |

GPRS 850MHz Channel = 190, 30MHz to 1GHz



GPRS 850MHz Channel = 190, 1GHz to 9GHz



| T                           | ectrum Analyzer - Swept SA<br>RF 50 Ω DC<br>q 30.000000 M |  | Trig: Free Rur<br>#Atten: 36 dB   | Avg      | ALIGN AUTO<br>Type: Log-Pwr<br>Hold:>100/100 | TRAC      | M Jun 08, 2020<br>DE <b>1 2 3 4 5</b> 6<br>PE <b>M</b> W W W W W | Frequency                      |
|-----------------------------|---|--|-----------------------------------|----------|--|-----------|--|--------------------------------|
| 0 dB/div                    | Ref Offset 10.5 d<br>Ref 36.50 dBr                        | 8  |                                   |          | MI   |           | 04 MHz<br>81 dBm   | Auto Tu                        |
| -og<br>26.5<br>16.5<br>6.50 |   |  |                                   |          |  | <b>∲1</b> |  | Center Fr<br>515.000000 M      |
| 3.50<br>-13.5<br>-23.5      |   |  |                                   |          |  |           | -13.00 dBm   | Start Fr<br>30.000000 M        |
| -43.5<br>-53.5              | n 19, 1979 Starked  | مىر مەربىلەر يەر بەر بەر بەر بەر بەر بەر | A to mail to mainte a special set | 2        | والإدافاتين ودارسه وتحريرا                   |           | a dharat tagan a sa sa sa sa                                     | Stop Fr<br>1.000000000 G       |
| Start 0.03<br>#Res BW       | 100 kHz   | #VB                                      | W 100 kHz                         | FUNCTION | Sweep 3                                      | .200 ms ( | 0000 GHz<br>1001 pts)  | CF St<br>97.000000 M<br>Auto M |
| 2 N 1<br>3<br>4<br>5        | f<br>f  | 848.68 MHz<br>643.04 MHz                 | 29.583 dBm<br>-45.681 dBm         |          |  |           | _  | Freq Off<br>0                  |
| 6<br>7<br>8<br>9            |   |  |                                   |          |  |           |  | Scale Ty                       |
| 11                          |   |  | н                                 |          |  |           |  | Log                            |
| sg                          |   |  |                                   |          | STATUS                                       | 5         |  |                                |

GPRS 850MHz Channel = 251, 30MHz to 1GHz



GPRS 850MHz Channel = 251, 1GHz to 9GHz



| RF 50 Ω DC<br>30.000000 MHz                               |                           |                          | SE:INT             |  | ALIGN AUTO      | 09:35:16 AM Jun 08.   | 2020       |                                 |
|---|---------------------------|--------------------------|--------------------|--|-----------------|---|------------|---------------------------------|
|   | PNO: Fast 😱<br>IFGain:Low | Trig: Free<br>#Atten: 36 | Run                | Avg Type<br>Avg Hold:                    | : Log-Pwr       | TRACE 1 2 3<br>TYPE MUN<br>DET PINN   | 456        | Frequency                       |
| Ref Offset 10.5 dB<br>Ref 36.50 dBm                       |                           |                          |                    |  | М               | kr1 750.71 N<br>-43.122 d   | iHz<br>Bm  | Auto Tur                        |
|   |                           |                          |                    |  |                 |   |            | Center Fre                      |
|   |                           |                          |                    |  |                 |   |            | Start Fre<br>30.000000 Mi       |
|   |                           |                          |                    |  |                 | 49  | 00 atim 1. | <b>Stop Fr</b><br>.000000000 GI |
|   |                           |                          |                    |  |                 |   | Aut        | CF Ste<br>97.000000 MI<br>9 M   |
| <del>مەك</del> ىتىلىرىق <sub>ئورى</sub> رىيېرىلۇنىقىدىرىم | and water and the second  | forther george           | Unit-factor Magnet | n an | 1<br>salashumah | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~  | han i      | Freq Offs                       |
|   |                           |                          |                    |  |                 |   |            | Scale Ty                        |
| 0 GHz<br>00 kHz   | #VBW                      | 100 kHz                  |                    | #5                                       | Sweep 3         | Stop 1.0000 0<br>.200 ms (1001  | anz        | · <u> </u>                      |
|   | Ref 36.50 dBm             | Ref 36.50 dBm            | Ref 36.50 dBm      | Ref 36.50 dBm                            | Ref 36.50 dBm   | Ver Umaet 10.8 db           Ver Umaet 10.8 db | -43.122 d  | Ref 36.50 dBm       -43.122 dBm |

## GPRS 1900MHz Channel = 512, 30MHz to 1GHz

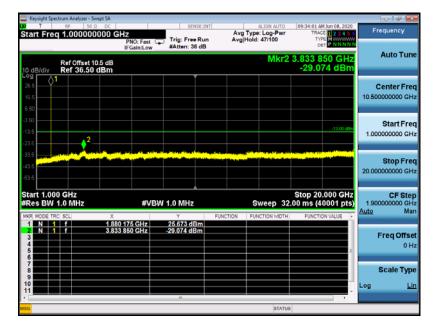


GPRS 1900MHz Channel = 512, 1GHz to 20GHz



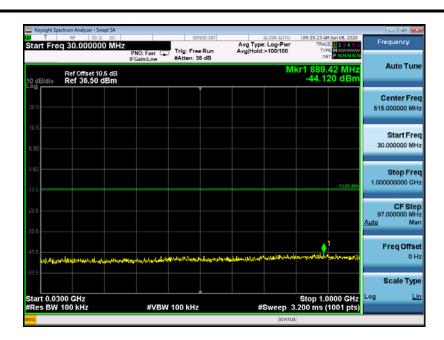
| Frequency                       | 20 AM Jun 08, 2020<br>TRACE 1 2 3 4 5 6 | TR              | ALIGN AUTO | Avg     | NSE:INT  | SEI                     |                          | Ω DC         | trum Analyzer - 5<br>RF 50<br>30.0000 | T         | XI I  |
|---------------------------------|---|-----------------|------------|---------|----------|-------------------------|--------------------------|--------------|---------------------------------------|-----------|-------|
|                                 |   | T               | d:>100/100 | Avgi    |          | Trig: Free<br>#Atten: 3 | PNO: Fast 😱<br>FGain:Low | 0011112      | 00.0000                               |           |       |
| Auto Tu                         | 70.99 MHz<br>I.179 dBm                  | kr1 870<br>-44. | M          |         |          |                         |                          |              | Ref Offset 1<br>Ref 36.50             | 3/div     | l0 de |
| Center Fr                       |   |                 |            |         |          |                         |                          |              |                                       |           | .08   |
| 515.000000 M                    |   |                 |            |         |          |                         |                          |              |                                       |           |       |
| Start Fr                        |   |                 |            |         |          |                         |                          |              |                                       |           |       |
| 30.000000 M                     |   |                 |            |         |          |                         |                          |              |                                       | <u> </u>  |       |
| Oton Er                         |   |                 |            |         |          |                         |                          |              |                                       |           |       |
| Stop Fr<br>1.000000000 G        | -13.00 dBm                              |                 |            |         |          |                         |                          |              |                                       |           |       |
|                                 |   |                 |            |         |          |                         |                          |              |                                       |           |       |
| CF Sto<br>97.000000 M<br>Auto M |   |                 |            |         |          |                         |                          |              |                                       |           |       |
| <u>Auto</u> M                   |   |                 |            |         |          |                         |                          |              |                                       | <u> </u>  |       |
| Freq Offs                       | 1                                       | Ó               |            |         |          |                         |                          |              |                                       |           |       |
| 0                               | and a start of the start of             | -()             | na maile   | munitat | Marriely | hand we have            | hally-philosophis        | the planusta | page of the sector                    | Hendomeni |       |
| Scale Ty                        |   |                 |            |         |          |                         |                          |              |                                       |           |       |
| Log j                           | 1.0000 GHz<br>is (1001 pts)             |                 | #Sween 2   |         |          | 100 kHz                 | #\/B\/                   |              | 0 GHz<br>100 kHz                      |           |       |
|                                 | is (1001 pts)                           | _               | status     |         |          | 100 KH2                 | # V D V V                |              | 100 KH2                               | 5 BW      | sa    |

GPRS 1900MHz Channel = 661, 30MHz to 1GHz

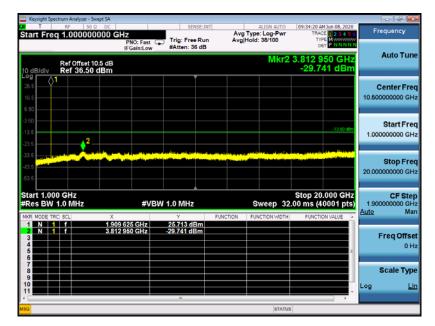


GPRS 1900MHz Channel = 661, 1GHz to 20GHz





GPRS 1900MHz Channel = 810, 30MHz to 1GHz



GPRS 1900MHz Channel = 810, 1GHz to 20GHz



| Start Fre               | g 30.00000                               |                            | st 😱 Trig: F       | ree Run<br>36 dB  | Avg Ty<br>Avg Ho | ALIGN AUTO<br>/pe: Log-Pwr<br>bid:>100/100  | 03:43:20 PMI<br>TRACE<br>TYPE<br>DET | 123456<br>M<br>PNNNNN   | Frequency                       |
|-------------------------|--|----------------------------|--------------------|---|------------------|---|--------------------------------------|---|---------------------------------|
| 10 dB/div               | Ref Offset 14<br>Ref 40.00               |                            |                    |   |                  | M   | r2 630.4<br>-43.21                   |   | Auto Tu                         |
| 20.0                    |  |                            |                    |   |                  |   | ¢1                                   |   | Center Fr<br>515.000000 M       |
| 0.00<br>-10.0<br>-20.0  |  |                            |                    |   |                  |   |                                      |   | Start Fr<br>30.000000 M         |
| -30.0<br>-40.0<br>-50.0 | an a | ويقدونها الإلغام الجريف من | upperter formulari | الي اليكوني اليوني | 2                | and a straight of the state of | .A.st. pummers                       | and an a star of a st | <b>Stop Fr</b><br>1.000000000 G |
| Start 0.03<br>#Res BW   | 100 kHz                                  | #                          | VBW 100 kł         |   |                  | #Sweep 32   | Stop 1.00<br>2.00 ms (1)             | 001 pts)  | CF St<br>97.000000 M<br>Auto M  |
| 1 N 2<br>2 N 4<br>5     | 1 1                                      | 824.43 MH<br>630.43 MH     |                    | dBm   |                  |   |                                      |   | Freq Offs<br>0                  |
| 6<br>7<br>8<br>9        |  |                            |                    |   |                  |   |                                      |   | Scale Ty                        |
| 10<br>11                |  |                            |                    |   |                  |   |                                      |   | Log j                           |

EDGE 850MHz Channel = 128, 30MHz to 1GHz



EDGE 850MHz Channel = 128, 1GHz to 9GHz



| Start Free                 | RF 50<br><b>q 30.0000</b> | 00 MHz              | PNO: Fast G      | Trig: Free Ru<br>Atten: 36 dB | Avg                               | Type: Log-Pwr<br>Hold:>100/100 | 03:43:38 PM May 26, 202<br>TRACE 2 3 4 5<br>TYPE MUNICIPAL OF PINNIN | Frequency                      |
|----------------------------|---------------------------|---------------------|------------------|-------------------------------|-----------------------------------|--------------------------------|--|--------------------------------|
| 10 dB/div                  | Ref Offset 1<br>Ref 40.00 |                     |                  |                               |                                   | M                              | r2 740.04 MH<br>-42.383 dBn  |                                |
| 20.0                       |                           |                     |                  |                               |                                   |                                | <b>♦</b> <sup>1</sup>  | Center Fr<br>515.000000 M      |
| 0.00<br>-10.0<br>-20.0     |                           |                     |                  |                               |                                   |                                |  | Start Fr<br>30.000000 M        |
| -30.0<br>-40.0<br>-50.0    | ر موالمار و مغر العالي    | un organisti pertos | wasyn sy sty     | -contestinguised              | h, he willing of the (1) Pilg the | 2                              |  | Stop Fr<br>1.000000000 G       |
| Start 0.03<br>#Res BW      | 100 kHz                   | X                   | #VB\             | V 100 kHz                     | FUNCTION                          | #Sweep 3                       | Stop 1.0000 GH<br>2.00 ms (1001 pts                                  | CF St<br>97.000000 M<br>Auto M |
| 1 N 1<br>2 N 1<br>3 4<br>5 | 1                         |                     | 04 MHz<br>04 MHz | 29.071 dBm<br>-42.383 dBm     |                                   |                                |  | Freq Off                       |
| 6<br>7<br>8<br>9           |                           |                     |                  |                               |                                   |                                |  | Scale Ty                       |
| 10                         |                           |                     |                  |                               |                                   |                                |  | Log                            |

EDGE 850MHz Channel = 190, 30MHz to 1GHz

| Keysight Sp                       | ectrum Analyzer - Swept SA   |                  | 1                                  | es nal |                              |                              |                       |               | _                  | - 2                          |
|-----------------------------------|--|------------------|------------------------------------|--------|------------------------------|------------------------------|-----------------------|---------------|--------------------|------------------------------|
| Start Fre                         | RF 50 Ω DC<br>2q 1.000000000   | GHZ<br>PNO: Fast |                                    | Run    | Avg Type<br>Avg Hold:        | LIGN AUT<br>Log-Pw<br>13/100 | r TRAC                | MMay 26, 2020 | Fn                 | equency                      |
| 10 dB/div                         | Ref Offset 14.5 dB<br>Ref 40.00 dBm  | IFGain:Low       | Atten: 36                          |        |                              |                              | Mkr1 8.21<br>-26.6    |               |                    | Auto Tun                     |
| 30.0                              |  |                  |                                    |        |                              |                              |                       |               |                    | enter Fre                    |
| 10.0                              |  |                  |                                    |        |                              |                              |                       |               | 1.000              | Start Fre                    |
| 10.00                             |  |                  |                                    |        |                              |                              |                       |               | 9.000              | <b>Stop Fr</b><br>0000000 Gi |
| 20.0                              |  |                  |                                    |        | 0.46                         |                              |                       | -13.00 dBn    | 800<br><u>Auto</u> | CF Ste<br>.000000 MI<br>M    |
| 30.0<br>40.0 <mark>-000-05</mark> | an an haife an an haife an an h-<br>an gun an h-an an taon an h-an an taonach<br>an gun an h-an an taonach |                  | relation datas.<br>Valadatin a Mar |        | in to de tra<br>Finis de tra | and a star<br>grant a star   |                       |               | F                  | Freq Offs                    |
| 50.0                              |  |                  |                                    |        |                              |                              |                       |               |                    | Scale Ty                     |
| Start 1.00<br>#Res BW             | 00 GHz<br>1.0 MHz  | #VBW             | 1.0 MHz                            |        | #S                           | weep                         | Stop 9<br>32.00 ms (4 | .000 GHZ      | Log                | L                            |
| tSG                               |  |                  |                                    |        |                              | STA                          |                       |               |                    |                              |

EDGE 850MHz Channel = 190, 1GHz to 9GHz



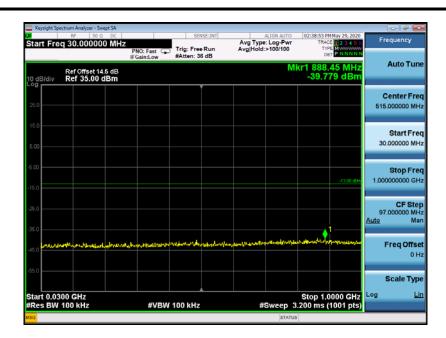
| Start Fre                | r,⊧<br>q 30.000       | 50 R DC<br>000 MHz | PNO: Fast            | Trig: Free Ru<br>Atten: 36 dB | Avg      | ALIGN AUTO<br>Type: Log-Pwr<br>Hold:>100/100 | 03:43:55 PM May 26, 2020<br>TRACE 1 2 3 4 5<br>TYPE M  | Frequency                             |
|--------------------------|-----------------------|--------------------|----------------------|-------------------------------|----------|--|--|---------------------------------------|
| 10 dB/div                | Ref Offse<br>Ref 40.0 |                    | in dume of           |                               |          | M  | cr2 654.68 MHz<br>-43.216 dBm                          |                                       |
| 20.0                     |                       |                    |                      |                               |          |  | Ŷ1   | Center Fr<br>515.000000 M             |
| 0.00<br>-10.0<br>-20.0   |                       |                    |                      |                               |          |  | -40.00 dDr   | Start Fr<br>30.000000 M               |
| -30.0<br>-40.0<br>-60.0  | are and               | 140.00 (m2.0       | monthquarte          |                               | -1       | 2<br>voutelPalminner                         | nyandar (haran madaganaya ng ng ng ng ng               | Stop Fr<br>1.0000000000 G             |
| Start 0.0<br>#Res BW     | 100 kHz               | x                  |                      | W 100 kHz                     | FUNCTION | #Sweep 3                                     | Stop 1.0000 GHz<br>2.00 ms (1001 pts<br>FUNCTION VALUE | CF St<br>97.000000 M<br><u>Auto</u> M |
| 1 N<br>2 N<br>3 4<br>5 6 |                       |                    | 3.68 MHz<br>1.68 MHz | 33,131 dBm<br>-43,216 dBm     |          |  |  | Freq Offs<br>0                        |
| 7<br>8<br>9<br>10        |                       |                    |                      |                               |          |  |  | Scale Ty                              |

EDGE 850MHz Channel = 251, 30MHz to 1GHz

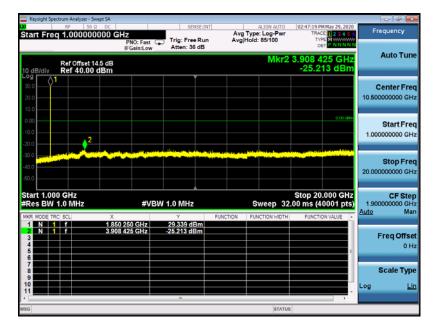
|  | RF 50 Ω DC   |                  |                            |               |                      |   |                       |  |                      | _                        |
|--|--|------------------|----------------------------|---------------|----------------------|---|-----------------------|--|----------------------|--------------------------|
| Start Freq   | 1.000000000  | SHz<br>PNO: Fast |                            | Run           | Avg Type<br>Avg Hold |   | r TRA                 | M May 26, 2020<br>CE 1 2 3 4 5 6<br>PE M | Free                 | quency                   |
|  | Ref Offset 14.5 dB<br>Ref 40.00 dBm  | IFGain:Low       | Atten: 38                  |               |                      |   | 1kr1 3.71             | 4 2 GHz<br>91 dBm                        | £                    | luto Tun                 |
| 30.0   |  |                  |                            |               |                      |   |                       |  |                      | enter Fre                |
| 10.0   |  |                  |                            |               |                      |   |                       |  |                      | Start Fre                |
| 10.00  |  |                  |                            |               |                      |   |                       |  |                      | Stop Fre                 |
| 20.0   |  |                  | half a such a              | ên            | alas sta             |   |                       | -13.00 dBn                               | 800.0<br><u>Auto</u> | CF Ste<br>00000 Mi<br>Mi |
| 30.0<br>40.0 <mark>40.0 40.0 40.0 40.0 40.0 40.0 40.0</mark> | a la constante de la constante<br>Millon de la constante de la co<br>Millon de la constante de la co | Aller Angel      | , in president and the set | della seguite |                      | ang terti<br>ng terting terting<br>ng terting terting |                       | , policypered a                          | FI                   | eq Offs<br>0 I           |
| 50.0   |  |                  |                            |               |                      |   |                       |  | S                    | cale Tyj                 |
| Start 1.000<br>#Res BW 1.                                    |  | #VBW             | / 1.0 MHz                  |               | #S                   | weep_   | Stop 9<br>32.00 ms (4 | 9.000 GHZ                                | 209                  |                          |

EDGE 850MHz Channel = 251, 1GHz to 9GHz



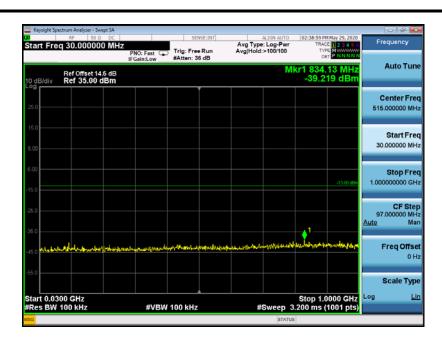


EDGE 1900MHz Channel = 512, 30MHz to 1GHz

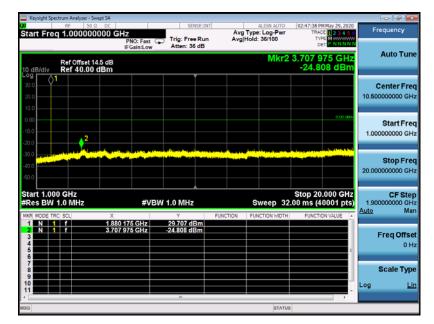


EDGE 1900MHz Channel = 512, 1GHz to 20GHz



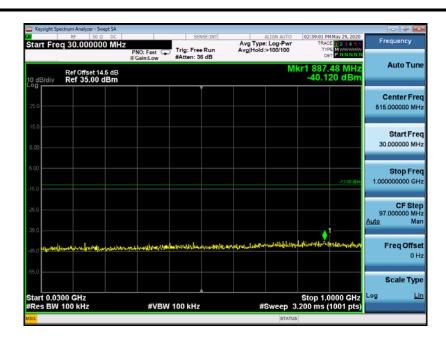


EDGE 1900MHz Channel = 661, 30MHz to 1GHz

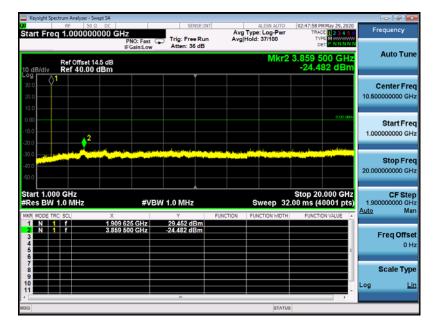


EDGE 1900MHz Channel = 661, 1GHz to 20GHz





EDGE 1900MHz Channel = 810, 30MHz to 1GHz



EDGE 1900MHz Channel = 810, 1GHz to 20GHz



| ×<br>Start Fre          | ⊮େ <u>50 ହ</u><br>ସ 30.000000                        | DC<br>) MHZ<br>PNO: Fast (<br>IFGain:Low   | Trig: Free Run<br>Atten: 36 dB          | ALIGN AUTO<br>Avg Type: Log-Pwr<br>Avg Hold:>100/100 | 10:43:43 AM May 25, 2020<br>TRACE 1 2 3 4 5 6<br>TYPE M | Frequency                             |
|-------------------------|--|--|---|--|---|---------------------------------------|
| 10 dB/div               | Ref Offset 14<br>Ref 40.00 d                         | 5 dB   | Pittern oo ob                           | M  | kr2 922.40 MHz<br>-42.175 dBm                           | Auto Tu                               |
| 20.0<br>10.0            |  |  |   |  | ¢ <sup>1</sup>  | Center Fr<br>515.000000 M             |
| 0.00<br>-10.0<br>-20.0  |  |  |   |  | -10.00 dDn  | Start Fr<br>30.000000 M               |
| -30.0<br>-40.0<br>-50.0 | mining a fair an | and the second | ىرىلى بىرىمىتىتەتلەرلۇم <sub>ق</sub> ىر |  | 2<br>   | <b>Stop Fr</b><br>1.000000000 G       |
| Start 0.03<br>#Res BW   | 100 kHz  | #VB  | W 100 kHz                               | #Sweep 3   | Stop 1.0000 GHz<br>.200 ms (1001 pts)                   | CF St<br>97.000000 M<br><u>Auto</u> M |
| 1 N 2<br>2 N 3<br>4 5   | 1 1  | 825.40 MHz<br>922.40 MHz   | 18.733 dBm<br>-42.175 dBm               |  |   | Freq Offs<br>0                        |
| 6<br>7<br>8<br>9        |  |  |   |  |   | Scale Ty                              |
| 10                      |  |  |   |  | -   | Log                                   |

WCDMA850MHz Channel = 4132, 30MHz to 1GHz



WCDMA850MHz Channel = 4132, 1GHz to 9GHz



| x<br>Start Fro         | RF 5<br>eq 30.0000     | 0 Q DC<br>DOO MHZ<br>PNO: Fa<br>IFGain:L |                                    | Avg<br>un Avg               | ALIGN AUTO<br>Type: Log-Pwr<br>Hold:>100/100 | 10:43:26 AM May 25, 2021<br>TRACE 1 2 3 4 5<br>TYPE M | Frequency                               |
|------------------------|------------------------|--|------------------------------------|-----------------------------|--|---|---|
| 10 dB/div              | Ref Offset<br>Ref 40.0 |  |                                    |                             | M  | r2 934.04 MHz<br>-40.538 dBm                          |   |
| 20.0                   |                        |  |                                    |                             |  | Ŷ   | Center Fre<br>515.000000 Mi             |
| 0.00<br>-10.0          |                        |  |                                    |                             |  | -10.00 dDr  | Start Fre<br>30.000000 MH               |
| -30.0                  | anyt new metromole     |  | an the second second second second | الاجدادام والمراد ومعالمهمي | ومدد درمانه والإعلام والمقصول ريع            | <sup>2</sup>  | Stop Fre<br>1.000000000 GF              |
|                        | 300 GHz<br>/ 100 kHz   |  | VBW 100 kHz                        | FUNCTION                    | #Sweep 3.                                    | Stop 1.0000 GHz<br>200 ms (1001 pts                   | CF Ste<br>97.000000 MI<br><u>Auto</u> M |
| 1 N<br>2 N<br>3 4<br>5 |                        | 835.10 MH<br>934.04 MH                   | z 18.434 dBm                       |                             |  |   | Freq Offs<br>01                         |
| 6<br>7<br>8<br>9       |                        |  |                                    |                             |  |   | Scale Ty                                |
| 10                     |                        |  |                                    |                             |  |   | Log L                                   |

WCDMA850MHz Channel = 4183, 30MHz to 1GHz



WCDMA850MHz Channel = 4183, 1GHz to 9GHz