

## RF TEST REPORT

### FCC ID: 2A96U-W50

**Equipment** : PDA  
**Brand Name** : N/A  
**Test Model** : W50  
**Series Model** : N/A  
**Applicant** : Shenzhen Guofeng Technology Co. , Ltd.  
**Address** : Room 201,Building 2,No. 49 Education North Road, Gaoqiao  
community, Pingdi Street, Longgang District, Shenzhen, China  
**Date of Receipt** : 2022.12.26  
**Date of Test** : 2022.12.27~2023.01.12  
**Issued Date** : 2023.01.12  
**Report Version** : V1.0  
**Test Sample** : Engineering Sample No.: AIT22122610-1  
**Standard(s)** : FCC Part 22H & 24E Rules;  
ANSI C63.26:2015

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This device described above has been tested by Dongguan Yaxu (AiT) Technology Limited and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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**Reviewed by:** **Approved by:** \_\_\_\_\_

Simba huang



Seal Chen

**REPORT REVISE RECORD**

| Report Version | Revise Time | Issued Date | Valid Version | Notes           |
|----------------|-------------|-------------|---------------|-----------------|
| V1.0           | /           | 2023.01.12  | Valid         | Initial Release |

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## 1. GENERAL INFORMATION

|                                 |                                                                                                                       |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| <b>Applicant</b>                | Shenzhen Guofeng Technology Co. , Ltd.                                                                                |
| <b>Address</b>                  | Room 201,Building 2,No. 49 Education North Road, Gaoqiao community, Pingdi Street, Longgang District, Shenzhen, China |
| <b>Manufacturer</b>             | Shenzhen Guofeng Technology Co. , Ltd.                                                                                |
| <b>Address</b>                  | Room 201,Building 2,No. 49 Education North Road, Gaoqiao community, Pingdi Street, Longgang District, Shenzhen, China |
| <b>Factory</b>                  | Shenzhen Guofeng Technology Co. , Ltd.                                                                                |
| <b>Address</b>                  | Room 201,Building 2,No. 49 Education North Road, Gaoqiao community, Pingdi Street, Longgang District, Shenzhen, China |
| <b>Product Designation</b>      | PDA                                                                                                                   |
| <b>Brand Name</b>               | N/A                                                                                                                   |
| <b>Test Model</b>               | W50                                                                                                                   |
| <b>Deviation</b>                | No any deviation from the test method.                                                                                |
| <b>Condition of Test Sample</b> | Normal                                                                                                                |

## 2. PRODUCT INFORMATION

### 2.1 PRODUCT TECHNICAL DESCRIPTION

A major technical description of EUT is described as following:

|                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |  |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|--|
| Product Designation:    | PDA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |  |
| Hardware Version:       | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |  |
| Software Version:       | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |  |
| Support Networks:       | GSM, GPRS, EDGE, WCDMA, HSDPA, HSUPA                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                   |  |
| Frequency Bands:        | <input checked="" type="checkbox"/> GPRS 850 <input checked="" type="checkbox"/> PCS1900 (U.S. Bands)<br><input checked="" type="checkbox"/> GSM 900 <input checked="" type="checkbox"/> DCS 1800 (Non-U.S. Bands)<br><input checked="" type="checkbox"/> UMTS FDD Band II <input type="checkbox"/> UMTS FDD Band IV<br><input checked="" type="checkbox"/> UMTS FDD Band V (U.S. Bands)<br><input type="checkbox"/> UMTS FDD Band I <input type="checkbox"/> UMTS FDD Band VIII (Non-U.S. Bands) |                   |  |
| Type of Modulation:     | GMSK,8PSK Modulation For GSM/GPRS/EDGE                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                   |  |
|                         | BPSK,QPSK Modulation For WCDMA/HSDPA/HSUPA                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                   |  |
| Frequency Range:        | GSM/GPRS/EDGE 850: 824.2MHz-848.8 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                   |  |
|                         | GSM/GPRS/EDGE 1900: 1850.2MHz-1909.8 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |  |
|                         | WCDMA Band II: 1852.4MHz-1907.6 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |  |
|                         | WCDMA Band V: 826.4-846.6 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                   |  |
| Emission Designator:    | GSM/GPRS 850:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 248KGXW           |  |
|                         | EDGE 850:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 259KG7W           |  |
|                         | GSM/GPRS 1900:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 247KGXW           |  |
|                         | EDGE 1900:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 248KG7W           |  |
|                         | WCDMA Band II:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 4M16F9W           |  |
|                         | WCDMA Band V:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 4M18F9W           |  |
| AntennaType:            | PIFA Antenna                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                   |  |
| Antenna gain:           | GSM850:0.91dBi                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | PCS1900: 3.42dBi  |  |
|                         | WCDMA850:0.91dBi                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | WCDMA1900:3.42dBi |  |
| Power Supply:           | DC 3.8V by Built-in Li-ion Battery                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                   |  |
| Battery parameter:      | DC 3.8V 4000mAh                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |  |
| Dual Card:              | GSM /WCDMA Card Slot                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                   |  |
| Extreme Vol. Limits:    | DC3.42V to 4.18V (Normal: DC 3.8V)                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                   |  |
| Extreme Temp. Tolerance | -10 °C to +50 °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                   |  |
| Temperature range:      | 0°C to +30°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                   |  |

**GSM/WCDMA SLOT 1:**

|              | Maximum ERP/EIRP<br>(dBm) | Max. Average<br>Burst Power (dBm) |
|--------------|---------------------------|-----------------------------------|
| GSM 850      | 33.09                     | 34.33                             |
| PCS 1900     | 33.32                     | 29.90                             |
| EDGE 850     | 27.71                     | 28.95                             |
| EDGE 1900    | 29.37                     | 25.95                             |
| UMTS BAND V  | 22.13                     | 23.37                             |
| UMTS BAND II | 27.24                     | 23.82                             |

**GSM/WCDMA SLOT 2:**

|              | Maximum ERP/EIRP<br>(dBm) | Max. Average<br>Burst Power (dBm) |
|--------------|---------------------------|-----------------------------------|
| GSM 850      | 32.11                     | 33.35                             |
| PCS 1900     | 28.86                     | 32.28                             |
| EDGE 850     | 27.86                     | 26.62                             |
| EDGE 1900    | 24.74                     | 28.16                             |
| UMTS BAND V  | 17.69                     | 18.93                             |
| UMTS BAND II | 25.83                     | 22.41                             |

## 2.2 TEST METHODOLOGY

The tests were performed according to following standards:

| No. | Identity            | Document Title                                                                                    |
|-----|---------------------|---------------------------------------------------------------------------------------------------|
| 1   | 47 CFR FCC Part 2   | Frequency allocations and radio treaty matters, general rules and regulations.                    |
| 2   | 47 CFR FCC Part 22  | Public Mobile Services.                                                                           |
| 3   | 47 CFR FCC Part 24  | Personal Communications Services.                                                                 |
| 4   | ANSI C63.26-2015    | American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services |
| 5   | ANSI/TIA-603-E-2016 | Land Mobile FM or PM Communications Equipment Measurement and Performance Standards               |
| 6   | KDB 971168          | D01 v03r01 Measurement Guidance For Certification Of Licensed Digital Transmitters.               |

## 2.3 DEVICE CAPABILITIES

850/1900 GSM/GPRS/EGPRS, 850/1900 WCDMA/HSPA, Multi-Band LTE, 802.11 b/g/n for WLAN, Bluetooth (1X, EDR, LE), GPS.

For emissions from 1GHz – 18GHz, low, mid, and high channels were tested with highest power and worst case configuration.

The emissions below 1GHz and above 18GHz were tested with the highest transmitting power channel and the worst case configuration.

The EUT was manipulated through three orthogonal planes of X-orientation (flatbed), Y-orientation (landscape), and Z-orientation (portrait) during the testing. Only the worst case emissions were reported in this test report.

## 2.4 SPECIAL ACCESSORIES

The battery was supplied by the applicant and was used as accessories and being tested with EUT intended for FCC grant together.

## 2.5 EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

## 2.7 EMISSION DESIGNATOR

### GSM Emission Designator

**Emission Designator = 249KGXW**

GSM BW = 249 kHz

G = Phase Modulation

X = Cases not otherwise covered

W = Combination (Audio/Data)

### WCDMA Emission Designator

**Emission Designator = 4M17F9W**

WCDMA BW = 4.17 MHz

F = Frequency Modulation

9 = Composite Digital Info

W = Combination (Audio/Data)

### QAM Modulation

**Emission Designator = 4M48W7D**

LTE BW = 4.48 MHz

W = Amplitude/Angle Modulated

7 = Quantized/Digital Info

D = Data transmission; telemetry; telecommand

### EDGE Emission Designator

**Emission Designator = 249KG7W**

GSM BW = 249 kHz

G = Phase Modulation

7 = Quantized/Digital Info

W = Combination (Audio/Data)

### QPSK Modulation

**Emission Designator = 4M48G7D**

LTE BW = 4.48 MHz

G = Phase Modulation

7 = Quantized/Digital Info

D = Data transmission; telemetry; telecommand

### 3. TEST ENVIRONMENT

#### 3.1 ADDRESS OF THE TEST LABORATORY

|                                         |                                                                                 |
|-----------------------------------------|---------------------------------------------------------------------------------|
| Company:                                | Dongguan Yaxu (AiT) Technology Limited                                          |
| Address:                                | No.22, Jinqianling 3rd Street, Jitigang, Huangjiang, Dongguan, Guangdong, China |
| CNAS Registration Number:               | CNAS L14158                                                                     |
| A2LA Registration Number:               | 6317.01                                                                         |
| FCC Accredited Lab. Designation Number: | CN1313                                                                          |
| FCC Test Firm Registration Number:      | 703111                                                                          |

#### 3.3 ENVIRONMENTAL CONDITIONS

|                                                                                  | NORMAL CONDITIONS | EXTREME CONDITIONS |
|----------------------------------------------------------------------------------|-------------------|--------------------|
| Temperature range                                                                | 15~35℃            | -10℃~55℃           |
| Humidity range                                                                   | 20 % to 75 %.     | 20 % to 75 %.      |
| Pressure range                                                                   | 86-106kPa         | 86-106kPa          |
| Power supply                                                                     | DC 3.8V           | DC 3.42V or 4.18V  |
| Note: The Extreme Temperature and Extreme Voltages declared by the manufacturer. |                   |                    |

#### 3.4 MEASUREMENT UNCERTAINTY

| Test                                    | Measurement Uncertainty  | Notes |
|-----------------------------------------|--------------------------|-------|
| Transmitter power conducted             | ±0.57 dB                 | (1)   |
| Transmitter power Radiated              | ±2.20 dB                 | (1)   |
| Conducted spurious emission 9KHz-40 GHz | ±2.20 dB                 | (1)   |
| Occupied Bandwidth                      | ±0.01ppm                 | (1)   |
| Radiated Emission 30~1000MHz            | ±4.10dB                  | (1)   |
| Radiated Emission Above 1GHz            | ±4.32dB                  | (1)   |
| Conducted Disturbance 0.15~30MHz        | ±3.20dB                  | (1)   |
| Radio Frequency                         | ± 6.5 x 10 <sup>-8</sup> | (1)   |
| RF Power, Conducted                     | ± 0.9 dB                 | (1)   |

Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

### 3.5 LIST OF TEST EQUIPMENT

| N<br>o | Test Equipment                         | Manufacturer    | Model No            | Serial No                  | Cal. Date  | Cal. Due<br>Date |
|--------|----------------------------------------|-----------------|---------------------|----------------------------|------------|------------------|
| 1      | Spectrum Analyzer                      | R&S             | FSV40               | 101470                     | 2022.09.02 | 2023.09.01       |
| 2      | EMI Measuring<br>Receiver              | R&S             | ESR                 | 101660                     | 2022.09.02 | 2023.09.01       |
| 3      | Low Noise Pre Amplifier                | HP              | HP8447E             | 1937A01855                 | 2022.09.02 | 2023.09.01       |
| 4      | Low Noise Pre Amplifier                | Tsj             | MLA-0120-A0<br>2-34 | 2648A04738                 | 2022.09.02 | 2023.09.01       |
| 5      | Passive Loop                           | ETS             | 6512                | 00165355                   | 2020.09.05 | 2022.09.04       |
| 6      | TRILOG Super<br>Broadband test Antenna | SCHWARZBE<br>CK | VULB9160            | 9160-3206                  | 2021.08.29 | 2024.08.28       |
| 7      | Broadband Horn<br>Antenna              | SCHWARZBE<br>CK | BBHA9120D           | 452                        | 2021.08.29 | 2024.08.28       |
| 8      | SHF-EHF Horn Antenna<br>15-40GHz       | SCHWARZBE<br>CK | BBHA9170            | BBHA91703<br>67d           | 2020.11.24 | 2023.11.23       |
| 9      | EMI Test Receiver                      | R&S             | ESCI                | 100124                     | 2022.09.02 | 2023.09.01       |
| 10     | LISN                                   | Kyoritsu        | KNW-242             | 8-837-4                    | 2022.09.02 | 2023.09.01       |
| 11     | LISN                                   | R&S             | ESH3-Z2             | 0357.8810.54-<br>101161-S2 | 2022.09.02 | 2023.09.01       |
| 12     | Pro.Temp&Humi.chamb<br>er              | MENTEK          | MHP-150-1C          | MAA081125<br>01            | 2022.09.02 | 2023.09.01       |
| 13     | RF Automatic Test<br>system            | MW              | MW100-RFCB          | 21033016                   | 2022.09.02 | 2023.09.01       |
| 14     | Signal Generator                       | Agilent         | N5182A              | MY5014300<br>9             | 2022.09.02 | 2023.09.01       |
| 15     | Wideband Radio<br>communication tester | R&S             | CMW500              | 1201.0002K<br>50           | 2022.09.02 | 2023.09.01       |
| 16     | RF Automatic Test<br>system            | MW              | MW100-RFCB          | 21033016                   | 2022.09.02 | 2023.09.01       |
| 17     | DC power supply                        | ZHAOXIN         | RXN-305D-2          | 2807000255<br>9            | N/A        | N/A              |
| 18     | RE Software                            | EZ              | EZ-EMC_RE           | Ver.AIT-03A                | N/A        | N/A              |

|    |                                   |         |           |             |            |            |
|----|-----------------------------------|---------|-----------|-------------|------------|------------|
| 19 | CE Software                       | EZ      | EZ-EMC_CE | Ver.AIT-03A | N/A        | N/A        |
| 20 | RF Software                       | MW      | MTS 8310  | 2.0.0.0     | N/A        | N/A        |
| 21 | temporary antenna connector(Note) | NTS     | R001      | N/A         | N/A        | N/A        |
| 22 | Spectrum Analyzer                 | Agilent | N9020A    | MT21033052  | 2022.09.02 | 2023.09.01 |

Note: The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.

## 4. SYSTEM TEST CONFIGURATION

### 4.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commission's requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

### 4.2 EUT EXERCISE

The Transmitter was operated in the maximum output power mode through Communication Tester. The TX frequency was fixed which was for the purpose of the measurements.

### 4.3 CONFIGURATION OF EUT SYSTEM

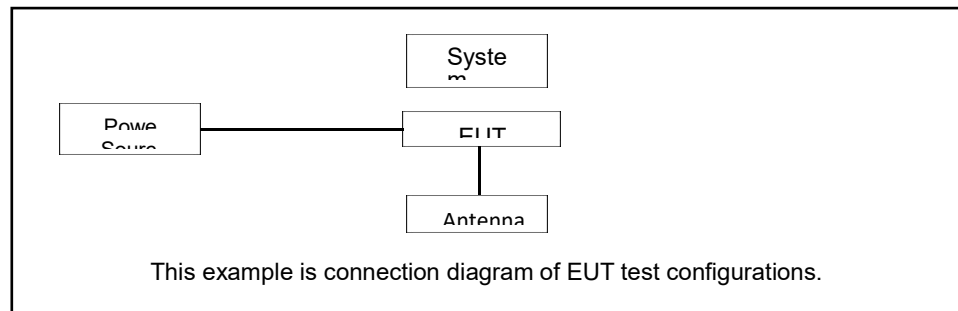


Table 2-1 Equipment Used in EUT System

### 4.4 EQUIPMENT USED IN TESTED SYSTEM

The Following Peripheral Devices And Interface Cables Were Connected During The Measurement:

☐ Test Accessories Come From The Laboratory

☒ Test Accessories Come From The Manufacturer

| Item | Equipment | Model No.      | Identifier                                    | Note |
|------|-----------|----------------|-----------------------------------------------|------|
| 1    | PDA       | W50            | --                                            | EUT  |
| 2    | Adapter   | CH010A050Z0001 | Input: AC 50/60Hz, 0.3A<br>Output: DC 5.0V 2A | AE   |
| 3    | Battery   | --             | DC 3.8V 4000mAh                               | AE   |
| 4    | USB Cable | N/A            | N/A                                           | AE   |

## 5.SUMMARY OF TEST RESULTS

### 5.1 TEST CONDITION : CONDUCTED TEST

| Item | Test Description                                                | FCC Rules                       | Result |
|------|-----------------------------------------------------------------|---------------------------------|--------|
| 1    | Occupied Bandwidth                                              | §2.1049                         | Pass   |
| 2    | Band Edge / Spurious and Harmonic Emissions at Antenna Terminal | §2.1051, §22.917(a), §24.238(a) | Pass   |
| 5    | Conducted Output Power                                          | §2.1046                         | Pass   |
| 6    | Frequency stability / variation of ambient temperature          | §2.1055, § 22.355, §24.235      | Pass   |
| 7    | Peak- to- Average Ratio                                         | §24.232(d)                      | Pass   |

### 5.2 TEST CONDITION : RADIATED TEST

| Item | Test Description                         | FCC Rules                        | Result |
|------|------------------------------------------|----------------------------------|--------|
| 1    | Effective Radiated Power                 | §22.913(a)(5)                    | Pass   |
| 2    | Equivalent Isotropic Radiated Power      | §24.232(c)                       | Pass   |
| 3    | Radiated Spurious and Harmonic Emissions | §2.1053, §22.917(a), §24.238(a), | Pass   |

## 6. DESCRIPTION OF TEST MODES

| Bands                | Tx/Rx Frequency           | RF Channel   |              |              |
|----------------------|---------------------------|--------------|--------------|--------------|
|                      |                           | Low(L)       | Middle(M)    | High(H)      |
| GSM/GPRS/<br>EDGE850 | TX<br>(824 MHz ~ 849 MHz) | Channel 128  | Channel 190  | Channel 251  |
|                      |                           | 824.2 MHz    | 836.6 MHz    | 848.8 MHz    |
| WCDMA band V         | TX<br>(824 MHz ~ 849 MHz) | Channel 4132 | Channel 4182 | Channel 4233 |
|                      |                           | 826.4 MHz    | 836.4 MHz    | 846.6 MHz    |

| Bands                 | Tx/Rx Frequency           | RF Channel   |              |              |
|-----------------------|---------------------------|--------------|--------------|--------------|
|                       |                           | Low(L)       | Middle(M)    | High(H)      |
| GSM/GPRS/<br>EDGE1900 | TX<br>(1850 MHz-1910 MHz) | Channel 512  | Channel 661  | Channel 810  |
|                       |                           | 1850.2 MHz   | 1880.0 MHz   | 1909.8 MHz   |
| WCDMA Band II         | TX<br>(1850 MHz-1910 MHz) | Channel 9262 | Channel 9400 | Channel 9538 |
|                       |                           | 1852.4 MHz   | 1880.0 MHz   | 1907.6 MHz   |

Pre-scan all bandwidth and RB, find worse case mode are chosen to the report, the worse mode applicability and tested channel detail as below:

| Band                       | Radiated                                                                           | Conducted                                                                          |
|----------------------------|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| GSM/GPRS/<br>EDGE 850/1900 | GSM (GMSK, 1Tx-slot)Link<br>GPRS (GMSK, 1Tx-slot)Link<br>EDGE (8PSK, 1Tx-slot)Link | GSM (GMSK, 1Tx-slot)Link<br>GPRS (GMSK, 1Tx-slot)Link<br>EDGE (8PSK, 1Tx-slot)Link |
| WCDMA Band II/V            | RMC 12.2kbps Link                                                                  | RMC 12.2kbps Link                                                                  |

**ACCORDING TO 3GPP 25.101 SUB-CLAUSE 6.2.2, THE MAXIMUM OUTPUT POWER IS ALLOWED TO BE REDUCED BY FOLLOWING THE TABLE.**

Table 6.1aA: UE maximum output power with HS-DPCCH and E-DCH

| UE Transmit Channel Configuration                                                                                                                                                                 | CM(db)               | MPR(db)              |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|----------------------|
| For all combinations of ,DPDCH,DPCCH<br>HS-DPDCH,E-DPDCH and E-DPCCH                                                                                                                              | $0 \leq CM \leq 3.5$ | $\text{MAX}(CM-1,0)$ |
| Note: $CM=1$ for $\beta_c/\beta_d=12/15$ , $\beta_{hs}/\beta_c=24/15$ . For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference. |                      |                      |

The device supports MPR to solve linearity issues (ACLR or SEM) due to the higher peak-to average ratios (PAR) of the HSUPA signal. This prevents saturating the full range of the TX DAC inside of device and provides a reduced power output to the RF transceiver chip according to the Cubic Metric (a function of the combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH).

When E-DPDCH channels are present the beta gains on those channels are reduced firsts to try to get the power under the allowed limit. If the beta gains are lowered as far as possible, then a hard limiting is applied at the maximum allowed level.

The SW currently recalculates the cubic metric every time the beta gains on the E-DPDCH are reduced. The cubic metric will likely get lower each time this is done .However, there is no reported reduction of maximum output power in the HSUPA mode since the device also provides a compensate for the power back-off by increasing the gain of TX\_ in the transceiver (PA) device.

The end effect is that the DUT output power is identical to the case where there is no MPR in the device.

## 7. OUTPUT POWER

### 7.1 LIMIT

The substitution method, in ANSI/TIA-603-E-2016, was used for ERP/EIRP measurement, and the spectrum analyzer configuration follows KDB 971168 D01 Power Meas. License Digital Systems v03. The ERP of mobile transmitters must not exceed 7 Watts (Cellular Band) and the EIRP of mobile transmitters are limited to 2 Watts (PCS Band).

| Mode          | Nominal Peak Power            |
|---------------|-------------------------------|
| GSM 850       | < 7 Watts max. ERP (38.45dBm) |
| PCS 1900      | < 2 Watts max. EIRP (33dBm)   |
| WCDMA Band II | < 2 Watts max. EIRP (33dBm)   |
| WCDMA Band V  | < 7 Watts max. ERP (38.45dBm) |

### 7.2 PROVISIONS APPLICABLE

The conduction test is carried out in a shielded room.

According to the test, connect the device under test to the antenna port on the non-conductive platform directly to the test device for evaluation and measurement (ANSI-C63.26-2015 Clause 5.4)

### 7.3 MEASUREMENT METHOD

- The transmitter output port was connected to base station.
- The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator.
- The path loss was compensated to the results for each measurement.

Measure the maximum burst average power and average power for othermodulation signal.

The EUT was setup for the max output power with pseudo random data modulation. Power was measured with Spectrum Analyzer. The measurements were performed on all mode (GSM/EGPRS 850, GSM/EGPRS 1900, WCDMA/HSPA band II, WCDMA/HSPA band IV ,WCDMA/HSPA band V)at 3 typical channels(the Top Channel, the Middle Channel and the Bottom Channel) for each band.

The relevant equation for determining the ERP or EIRP from the conducted RF output power measured using the guidance provided above is:

$$\text{ERP/EIRP} = \text{SGLevel} - \text{Pcl} + \text{Ga}$$

where:

ERP/EIRP = effective or equivalent radiated power, respectively (expressed in the same units as SGLevel, typically dBW or dBm);

SGLevel = Signal generator output power or PSD, in dBm or dBW;

Ga = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP);

Pcl = signal attenuation in the connecting cable between the transmitter and antenna.

The EUT is substituted for the dipole at the reference centre of the chamber and a scan is performed to obtain

the radiation pattern.

From the radiation pattern, the co-ordinates where the maximum antenna gain occurs are identified.

The EUT is then put into continuously transmitting mode at its maximum power level. Power mode measurements are performed with the receiving antenna placed at the coordinates determined in Step 3 to determine the output power as defined in Rule 24.232 (b) and (c). The "reference path loss" from Step1 is added to this result.

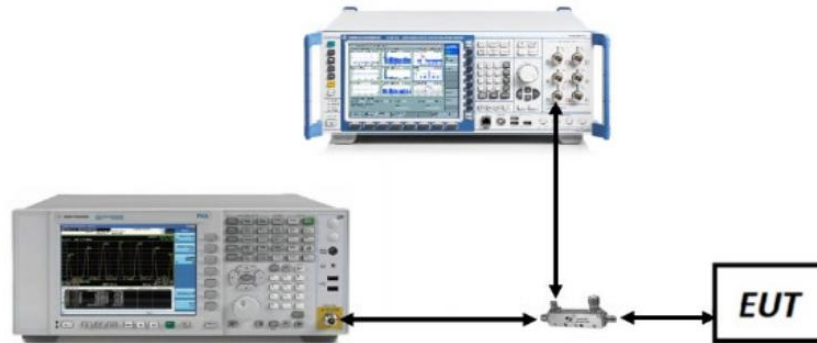
This value is EIRP since the measurement is calibrated using a half-wave dipole antenna of known gain (2.15 dBi) and known input power ( $P_{in}$ ).

ERP can be calculated from EIRP by subtracting the gain of the dipole,  $ERP = EIRP - 2.15\text{dBi}$ .

Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported.

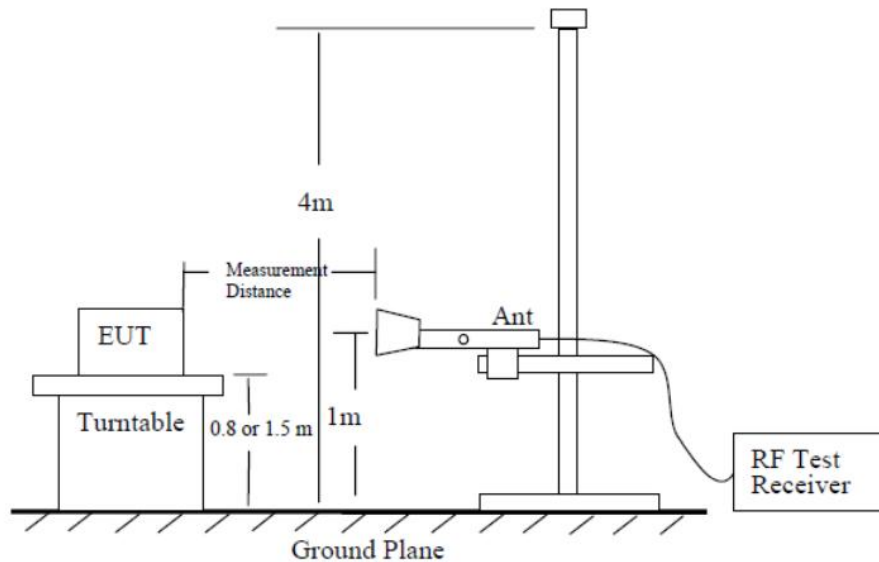
## 7.4 MEASUREMENT SETUP

Conducted method:

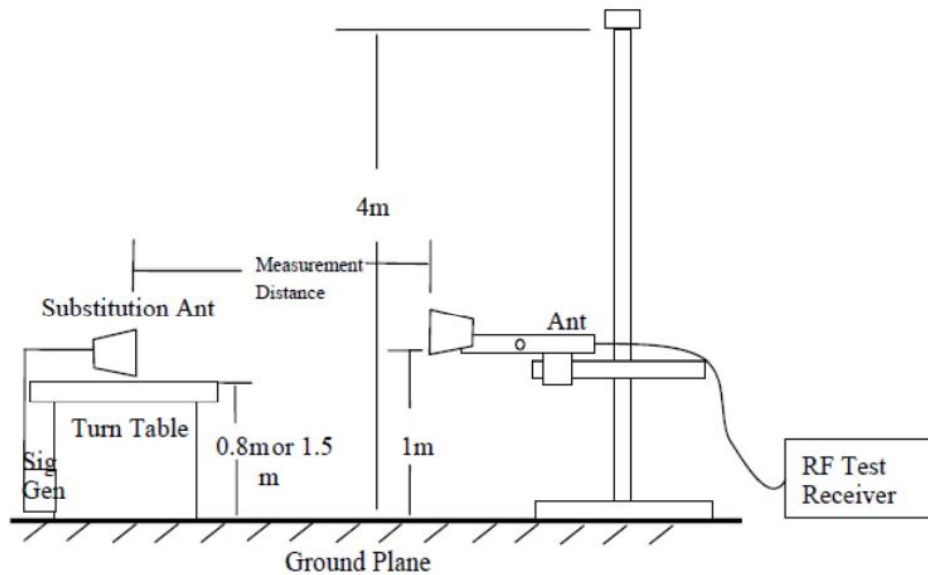


## Radiated method:

Test site-up for radiated ERP and/or EIRP measurements



Substitution method set-up for radiated emission



## 7.5 MEASUREMENT RESULT

| GSM850         |           | Tune-up       | Conducted Power (dBm) |                |                | ERP (dBm)      |                |                |
|----------------|-----------|---------------|-----------------------|----------------|----------------|----------------|----------------|----------------|
|                |           |               | Channel<br>128        | Channel<br>190 | Channel<br>251 | Channel<br>128 | Channel<br>190 | Channel<br>251 |
|                |           |               | 824.2<br>MHz          | 836.6<br>MHz   | 848.8<br>MHz   | 824.2<br>MHz   | 836.6<br>MHz   | 848.8<br>MHz   |
| GSM            |           | <b>34±2dB</b> | 34.13                 | <b>34.33</b>   | 34.31          | 32.89          | <b>33.09</b>   | 33.07          |
| GPRS<br>(GMSK) | 1 Tx Slot | 35.00         | 34.08                 | 34.25          | 34.26          | 32.84          | 33.01          | 33.02          |
|                | 2 Tx Slot | 34.00         | 33.16                 | 33.34          | <b>33.35</b>   | 31.92          | 32.1           | <b>32.11</b>   |
|                | 3 Tx Slot | 32.00         | 31.28                 | 31.45          | 31.48          | 30.04          | 30.21          | 30.24          |
|                | 4 Tx Slot | 31.00         | 30.01                 | 30.24          | 30.27          | 28.77          | 29             | 29.03          |
| EDGE<br>(8PSK) | 1 Tx Slot | 29.00         | 28.83                 | 28.85          | 28.95          | 27.59          | 27.61          | 27.71          |
|                | 2 Tx Slot | 28.00         | 27.59                 | 27.77          | 27.86          | 26.35          | 26.53          | 26.62          |
|                | 3 Tx Slot | 26.00         | 25.55                 | 25.59          | 25.67          | 24.31          | 24.35          | 24.43          |
|                | 4 Tx Slot | 25.00         | 24.30                 | 24.33          | 24.40          | 23.06          | 23.09          | 23.16          |

| GSM1900            |           | Tune-up       | Conducted Power (dBm) |                |                 | EIRP (dBm)      |                |                 |
|--------------------|-----------|---------------|-----------------------|----------------|-----------------|-----------------|----------------|-----------------|
|                    |           |               | Channel<br>512        | Channel<br>661 | Channel<br>810  | Channel<br>512  | Channel<br>661 | Channel<br>810  |
|                    |           |               | 1850.2<br>(MHz)       | 1880<br>(MHz)  | 1909.8<br>(MHz) | 1850.2<br>(MHz) | 1880<br>(MHz)  | 1909.8<br>(MHz) |
| GSM                |           | <b>30±2dB</b> | 29.2                  | 29.49          | <b>29.90</b>    | 32.62           | 32.91          | <b>33.32</b>    |
| GPRS<br>(GMSK<br>) | 1 Tx Slot | 31.00         | 29.74                 | 29.90          | 30.05           | 33.16           | 33.32          | 33.47           |
|                    | 2 Tx Slot | 29.00         | 28.5                  | 28.70          | <b>28.86</b>    | 31.92           | 32.12          | <b>32.28</b>    |
|                    | 3 Tx Slot | 28.00         | 27.29                 | 27.45          | 27.61           | 30.71           | 30.87          | 31.03           |
|                    | 4 Tx Slot | 27.00         | 25.91                 | 26.30          | 26.69           | 29.33           | 29.72          | 30.11           |
| EDGE<br>(8PSK)     | 1 Tx Slot | 26.00         | 25.32                 | 25.95          | 25.77           | 28.74           | 29.37          | 29.19           |
|                    | 2 Tx Slot | 25.00         | 24.13                 | 24.74          | 24.52           | 27.55           | 28.16          | 27.94           |
|                    | 3 Tx Slot | 24.00         | 23.23                 | 23.53          | 23.37           | 26.65           | 26.95          | 26.79           |
|                    | 4 Tx Slot | 23.00         | 22.37                 | 22.18          | 22.46           | 25.79           | 25.6           | 25.88           |

| WCDMA Band II    | Max.    | Conducted power |         |              | EIRP         |         |              |
|------------------|---------|-----------------|---------|--------------|--------------|---------|--------------|
| Tx Channel       | Tune-up | 9262            | 9400    | 9538         | 9262         | 9400    | 9538         |
| Frequency        | Power   | 1852.4MHz       | 1880MHz | 1907.6MHz    | 1852.4MHz    | 1880MHz | 1907.6MHz    |
| RMC 12.2K        | 24+1/-3 | 23.80           | 23.78   | <b>23.82</b> | 27.22        | 27.2    | <b>27.24</b> |
| RMC 64K          | 24+1/-3 | 22.63           | 22.98   | 22.96        | 26.05        | 26.4    | 26.38        |
| RMC 144K         | 24+1/-3 | 22.62           | 22.97   | 22.93        | 26.04        | 26.39   | 26.35        |
| RMC 384K         | 24+1/-3 | 22.63           | 22.96   | 22.98        | 26.05        | 26.38   | 26.4         |
| HSDPA+ Subtest-1 | 24+1/-3 | 23.47           | 23.73   | 23.60        | 26.89        | 27.15   | 27.02        |
| HSDPA+ Subtest-2 | 24+1/-3 | 22.30           | 22.31   | 22.33        | 25.72        | 25.73   | 25.75        |
| HSDPA+ Subtest-3 | 24+1/-3 | 21.84           | 21.83   | 21.90        | 25.26        | 25.25   | 25.32        |
| HSDPA+ Subtest-4 | 24+1/-3 | 21.83           | 21.82   | 21.91        | 25.25        | 25.24   | 25.33        |
| HSUPA Subtest-1  | 24+1/-3 | 22.21           | 22.25   | 22.23        | 25.63        | 25.67   | 25.65        |
| HSUPA Subtest-2  | 24+1/-3 | 21.74           | 21.71   | 21.73        | 25.16        | 25.13   | 25.15        |
| HSUPA Subtest-3  | 24+1/-3 | 22.41           | 22.34   | 22.32        | 25.83        | 25.76   | 25.74        |
| HSUPA Subtest-4  | 24+1/-3 | 22.23           | 22.30   | 22.33        | 25.65        | 25.72   | 25.75        |
| HSUPA Subtest-5  | 24+1/-3 | <b>22.41</b>    | 22.28   | 22.40        | <b>25.83</b> | 25.7    | 25.82        |

| WCDMA Band V     | Max.    | Conducted power |          |              | ERP          |          |              |
|------------------|---------|-----------------|----------|--------------|--------------|----------|--------------|
| Tx Channel       | Tune-up | 4132            | 4182     | 4233         | 4132         | 4182     | 4233         |
| Frequency        | Power   | 826.4 MHz       | 836.4MHz | 846.6 MHz    | 826.4 MHz    | 836.4MHz | 846.6 MHz    |
| RMC 12.2K        | 24+1/-3 | <b>23.37</b>    | 23.34    | 23.11        | <b>22.13</b> | 22.1     | 21.87        |
| RMC 64K          | 24+1/-3 | 22.63           | 22.98    | 22.96        | 21.39        | 21.74    | 21.72        |
| RMC 144K         | 24+1/-3 | 22.62           | 22.97    | 22.93        | 21.38        | 21.73    | 21.69        |
| RMC 384K         | 24+1/-3 | 22.63           | 22.96    | 22.98        | 21.39        | 21.72    | 21.74        |
| HSDPA+ Subtest-1 | 24+1/-3 | 22.55           | 22.12    | 22.12        | 21.31        | 20.88    | 20.88        |
| HSDPA+ Subtest-2 | 24+1/-3 | 22.19           | 22.11    | 22.11        | 20.95        | 20.87    | 20.87        |
| HSDPA+ Subtest-3 | 24+1/-3 | 22.18           | 22.11    | 22.11        | 20.94        | 20.87    | 20.87        |
| HSDPA+ Subtest-4 | 24+1/-3 | 22.18           | 22.10    | 22.10        | 20.94        | 20.86    | 20.86        |
| HSUPA Subtest-1  | 24+1/-3 | 19.71           | 19.76    | 19.63        | 18.47        | 18.52    | 18.39        |
| HSUPA Subtest-2  | 24+1/-3 | 19.76           | 19.74    | 19.73        | 18.52        | 18.5     | 18.49        |
| HSUPA Subtest-3  | 24+1/-3 | 20.71           | 20.70    | 20.66        | 19.47        | 19.46    | 19.42        |
| HSUPA Subtest-4  | 24+1/-3 | 19.31           | 19.25    | 19.19        | 18.07        | 18.01    | 17.95        |
| HSUPA Subtest-5  | 24+1/-3 | 18.64           | 18.71    | <b>18.93</b> | 17.4         | 17.47    | <b>17.69</b> |

## 8. PEAK-TO-AVERAGE RATIO

### 8.1 PROVISIONS APPLICABLE

This is the test for the Peak-to-Average Ratio from the EUT.

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.

### 8.2 MEASUREMENT METHOD

#### ① CCDF Procedure for PAPR :

1. Set resolution/measurement bandwidth  $\geq$  signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Set the measurement interval as follows:
  - for continuous transmissions, set to 1 ms,
  - or burst transmissions, employ an external trigger that is synchronized with the EUT burst timing sequence, or use the internal burst trigger with a trigger level that allows the burst to stabilize and set the measurement interval to a time that is less than or equal to the burst duration.
4. Record the maximum PAPR level associated with a probability of 0.1%.

#### ② Alternate Procedure for PAPR:

Use one of the procedures presented in 5.2(ANSI C63.26-2015) to measure the total peak power and record as PPk. Use one of the applicable procedures presented 5.2(ANSI C63.26-2015) to measure the total average power and record as PAvg. Determine the P.A.R. from:

$$\text{P.A.R(dB)} = \text{PPk (dBm)} - \text{PAvg (dBm)} \quad (\text{PAvg} = \text{Average Power} + \text{Duty cycle Factor})$$

Allow trace to fully stabilize.

Use the peak marker function to determine the peak amplitude level.

#### Test Settings(Peak Power):

The measurement instrument must have a RBW that is greater than or equal to the OBW of the signal to be measured and a VBW  $\geq 3 \times$  RBW.

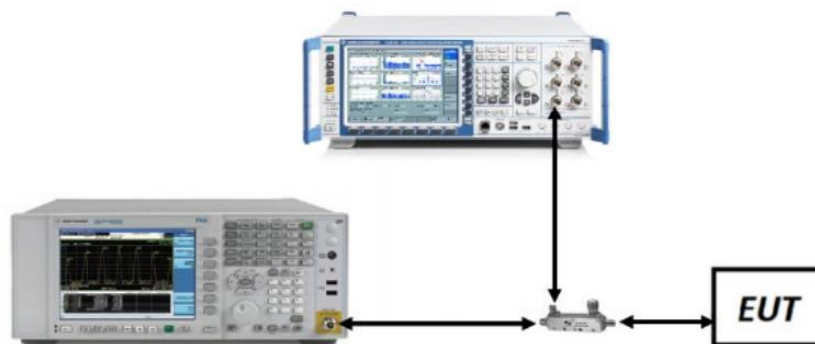
1. Set the RBW  $\geq$  OBW.
2. Set VBW  $\geq 3 \times$  RBW.

3. Set span  $\geq 2 \times \text{OBW}$ .
4. Sweep time  $\geq 10 \times (\text{number of points in sweep}) \times (\text{transmission symbol period})$ .
5. Detector = peak.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.
8. Use the peak marker function to determine the peak amplitude level.

### Test Settings(Average Power)

1. Set span to  $2 \times$  to  $3 \times$  the OBW.
2. Set RBW  $\geq \text{OBW}$ .
3. Set VBW  $\geq 3 \times \text{RBW}$ .
4. Set number of measurement points in sweep  $\geq 2 \times \text{span} / \text{RBW}$ .
5. Sweep time: Set  $\geq [10 \times (\text{number of points in sweep}) \times (\text{transmission period})]$  for single sweep (automation-compatible) measurement. The transmission period is the (on + off) time.
6. Detector = power averaging (rms).
7. Set sweep trigger to "free run."
8. Trace average at least 100 traces in power averaging (rms) mode if sweep is set to auto-couple. (To accurately determine the average power over the on and off period of the transmitter, it can be necessary to increase the number of traces to be averaged above 100 or, if using a manually configured sweep time, increase the sweep time.)
9. Use the peak marker function to determine the maximum amplitude level.
10. Add  $[10 \log (1/\text{duty cycle})]$  to the measured maximum power level to compute the average power during continuous transmission. For example, add  $[10 \log (1/0.25)] = 6 \text{ dB}$  if the duty cycle is a constant 25%.

### 8.3 MEASUREMENT SETUP



#### 8.4 MEASUREMENT RESULT

| Bands         | Modulation   | Peak-to-average ratio (dB) |        |         | Limit<br>(dB) | Result |
|---------------|--------------|----------------------------|--------|---------|---------------|--------|
|               |              | Lowest                     | Middle | Highest |               |        |
| GSM 850       | GSM          | 2.64                       | 2.67   | 2.65    | 13            | Pass   |
|               | EDGE         | 5.41                       | 5.45   | 5.45    | 13            | Pass   |
| PCS 1900      | GSM          | 2.66                       | 2.65   | 2.65    | 13            | Pass   |
|               | EDGE         | 5.55                       | 5.54   | 5.57    | 13            | Pass   |
| WCDMA Band II | RMC 12.2kbps | 3.09                       | 3.06   | 3.01    | 13            | Pass   |
| WCDMA Band II | HSUPA        | 4.55                       | 4.53   | 4.49    | 13            | Pass   |
| WCDMA Band II | HSDPA        | 3.20                       | 3.22   | 3.19    | 13            | Pass   |
| WCDMA Band V  | RMC 12.2kbps | 2.19                       | 2.35   | 2.33    | 13            | Pass   |
| WCDMA Band V  | HSUPA        | 4.31                       | 4.32   | 4.21    | 13            | Pass   |
| WCDMA Band V  | HSDPA        | 2.83                       | 2.82   | 2.74    | 13            | Pass   |

## 9. OCCUPIED BANDWIDTH

### 9.1 PROVISIONS APPLICABLE

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 power of a given emission. The EUT makes a call to the communication simulator.

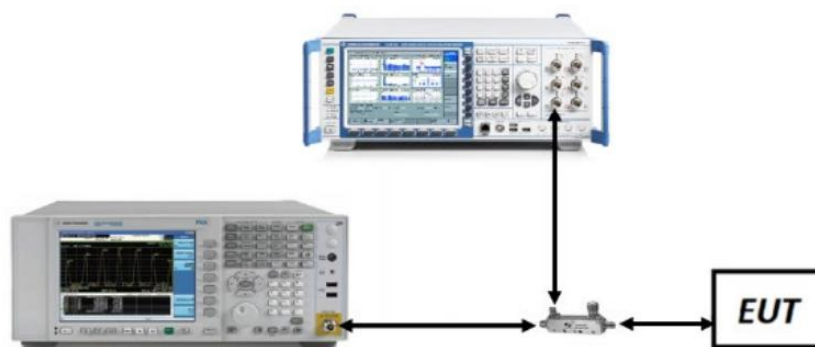
The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth

### 9.2 MEASUREMENT METHOD

1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 99% occupied bandwidth and the 26dB bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = 1 – 5% of the expected OBW
3. VBW  $\geq 3 \times$  RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. The trace was allowed to stabilize
8. If necessary, steps 2 – 7 were repeated after changing the RBW such that it would be within 1 – 5% of the 99% occupied bandwidth observed in Step 7

### 9.3 MEASUREMENT SETUP

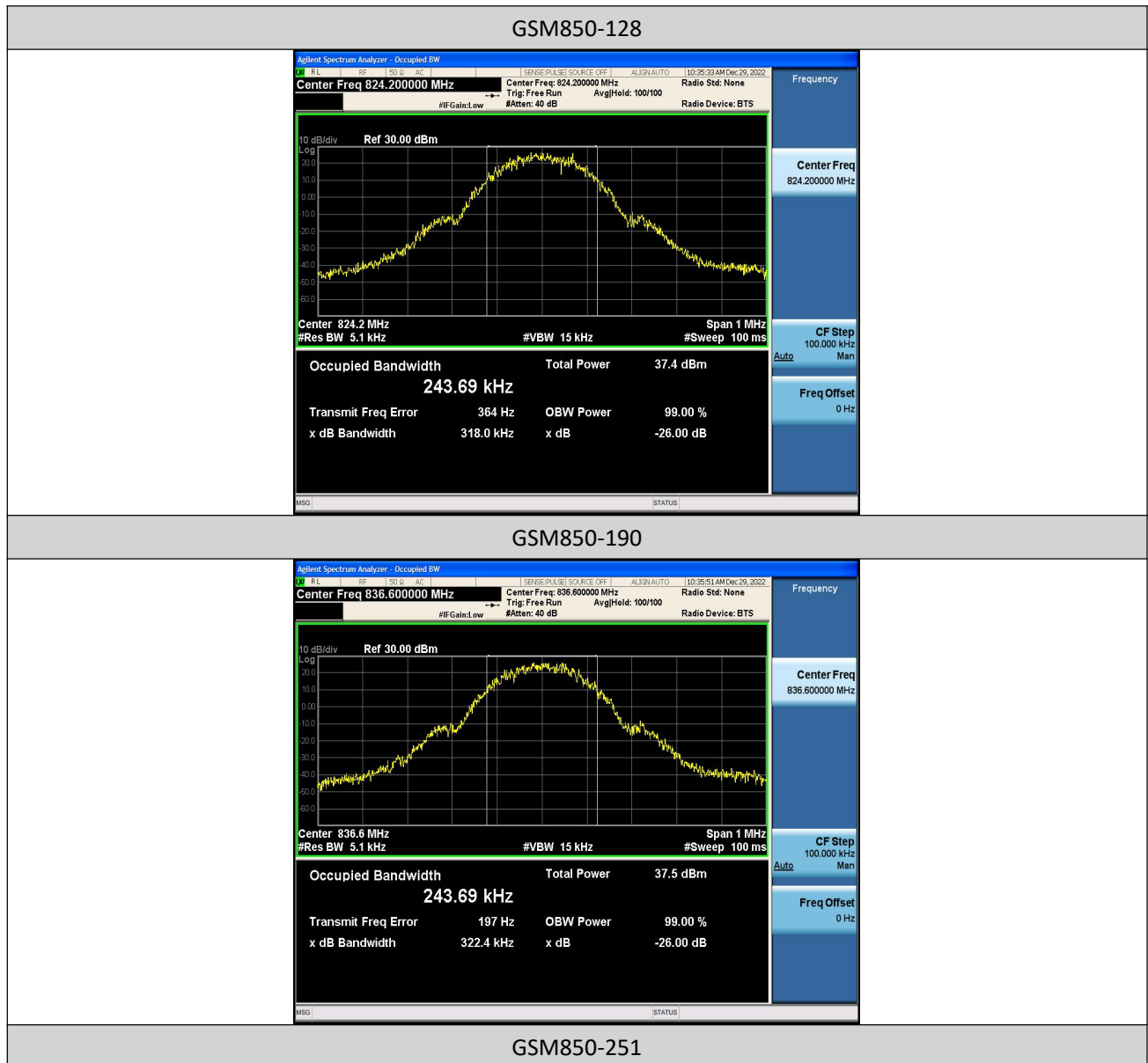


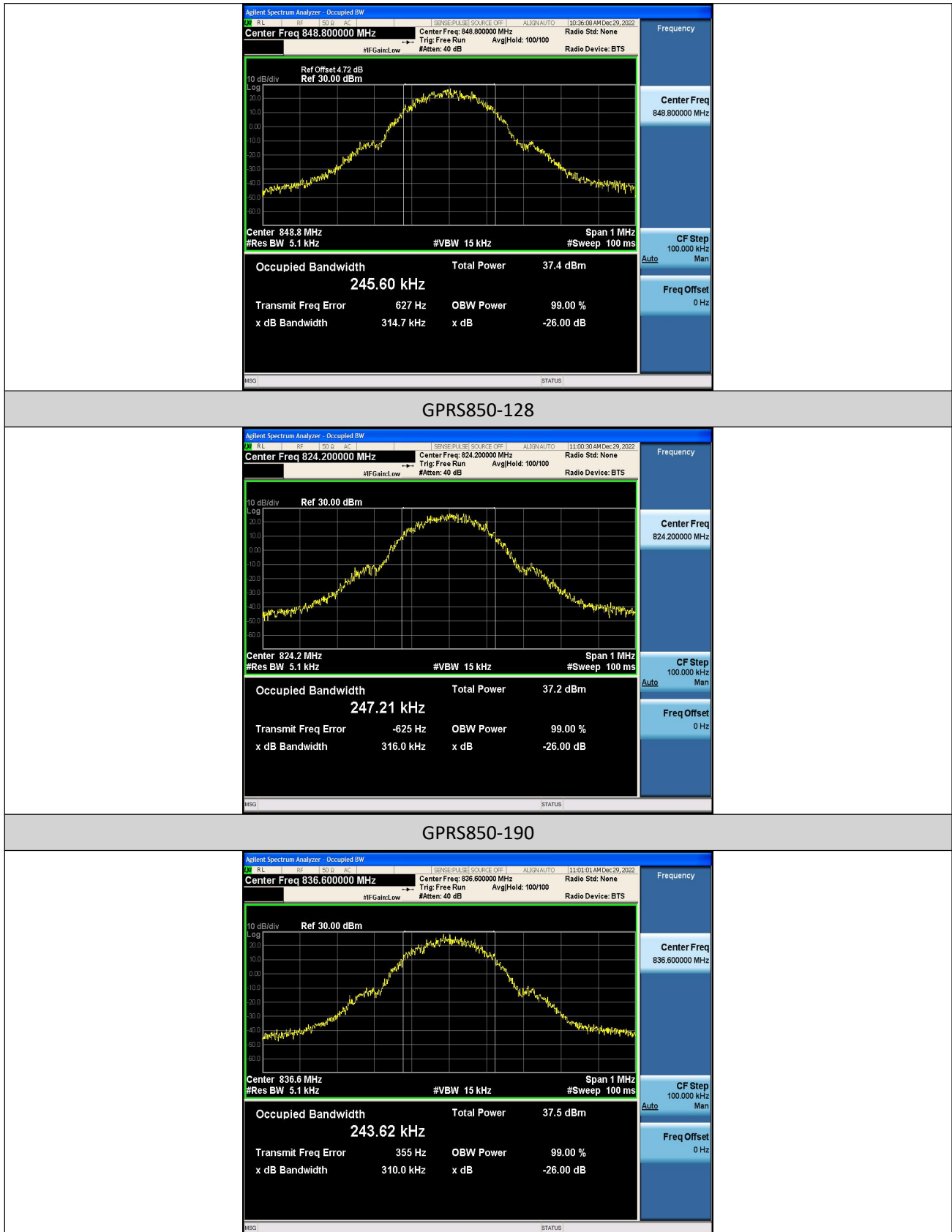
#### 9.4 MEASUREMENT RESULT

| Band      | Channel | Occupied Bandwidth (MHz) | 26dB Bandwidth (MHz) | Limit (MHz) | Verdict |
|-----------|---------|--------------------------|----------------------|-------------|---------|
| GSM850    | 128     | 0.24369                  | 0.3180               | ---         | PASS    |
| GSM850    | 190     | 0.24369                  | 0.3224               | ---         | PASS    |
| GSM850    | 251     | 0.24560                  | 0.3147               | ---         | PASS    |
| GPRS850   | 128     | 0.24721                  | 0.3160               | ---         | PASS    |
| GPRS850   | 190     | 0.24362                  | 0.3100               | ---         | PASS    |
| GPRS850   | 251     | 0.24419                  | 0.3064               | ---         | PASS    |
| EGPRS850  | 128     | 0.24991                  | 0.3075               | ---         | PASS    |
| EGPRS850  | 190     | 0.24467                  | 0.3035               | ---         | PASS    |
| EGPRS850  | 251     | 0.24664                  | 0.2903               | ---         | PASS    |
| GSM1900   | 512     | 0.24494                  | 0.3146               | ---         | PASS    |
| GSM1900   | 661     | 0.24681                  | 0.3098               | ---         | PASS    |
| GSM1900   | 810     | 0.24458                  | 0.3129               | ---         | PASS    |
| GPRS1900  | 512     | 0.24555                  | 0.3096               | ---         | PASS    |
| GPRS1900  | 661     | 0.24124                  | 0.3125               | ---         | PASS    |
| GPRS1900  | 810     | 0.24796                  | 0.3118               | ---         | PASS    |
| EGPRS1900 | 512     | 0.25091                  | 0.3136               | ---         | PASS    |
| EGPRS1900 | 661     | 0.24564                  | 0.3045               | ---         | PASS    |
| EGPRS1900 | 810     | 0.25094                  | 0.3073               | ---         | PASS    |

| Band    | Channel | Occupied Bandwidth (kHz) | 26dB Bandwidth (kHz) | Limit(kHz) | Verdict |
|---------|---------|--------------------------|----------------------|------------|---------|
| Band II | 9262    | 4.1704                   | 4.702                | ---        | PASS    |
| Band II | 9400    | 4.1753                   | 4.697                | ---        | PASS    |
| Band II | 9538    | 4.1730                   | 4.712                | ---        | PASS    |
| Band V  | 4132    | 4.1576                   | 4.690                | ---        | PASS    |
| Band V  | 4182    | 4.1661                   | 4.685                | ---        | PASS    |
| Band V  | 4233    | 4.1690                   | 4.687                | ---        | PASS    |

## Test Graphs





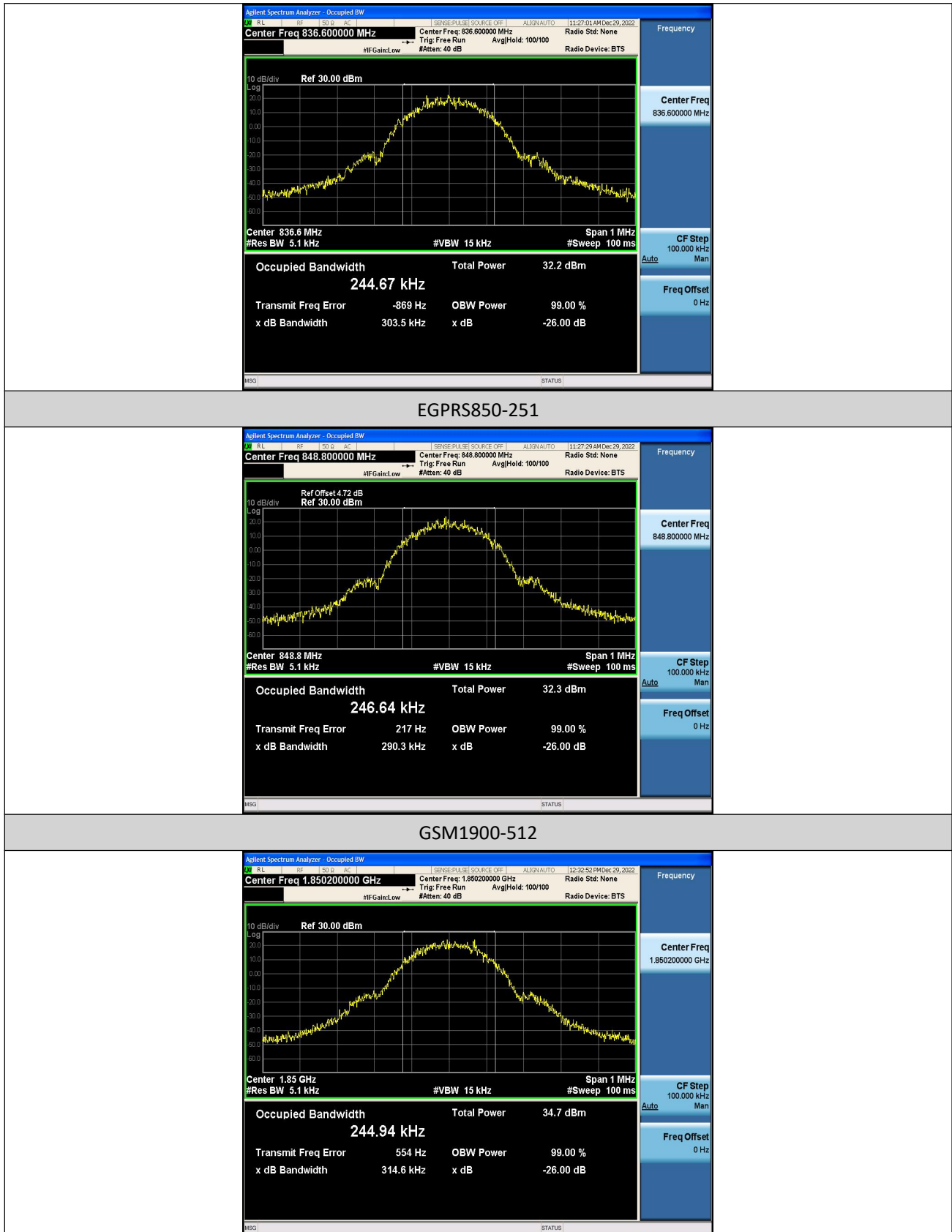
### GPRS850-251



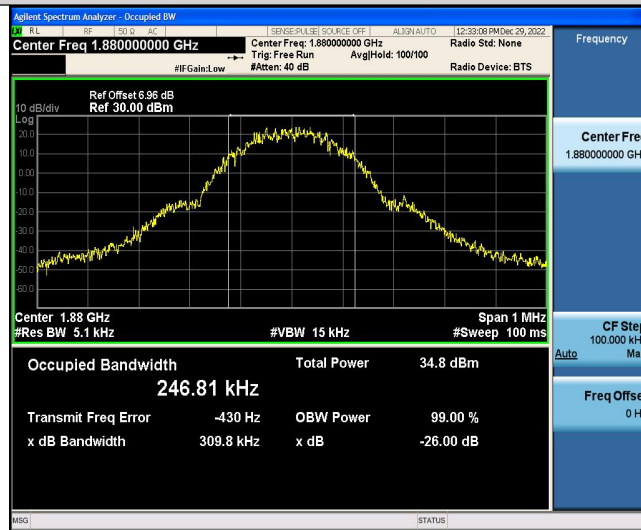
### EGPRS850-128



### EGPRS850-190



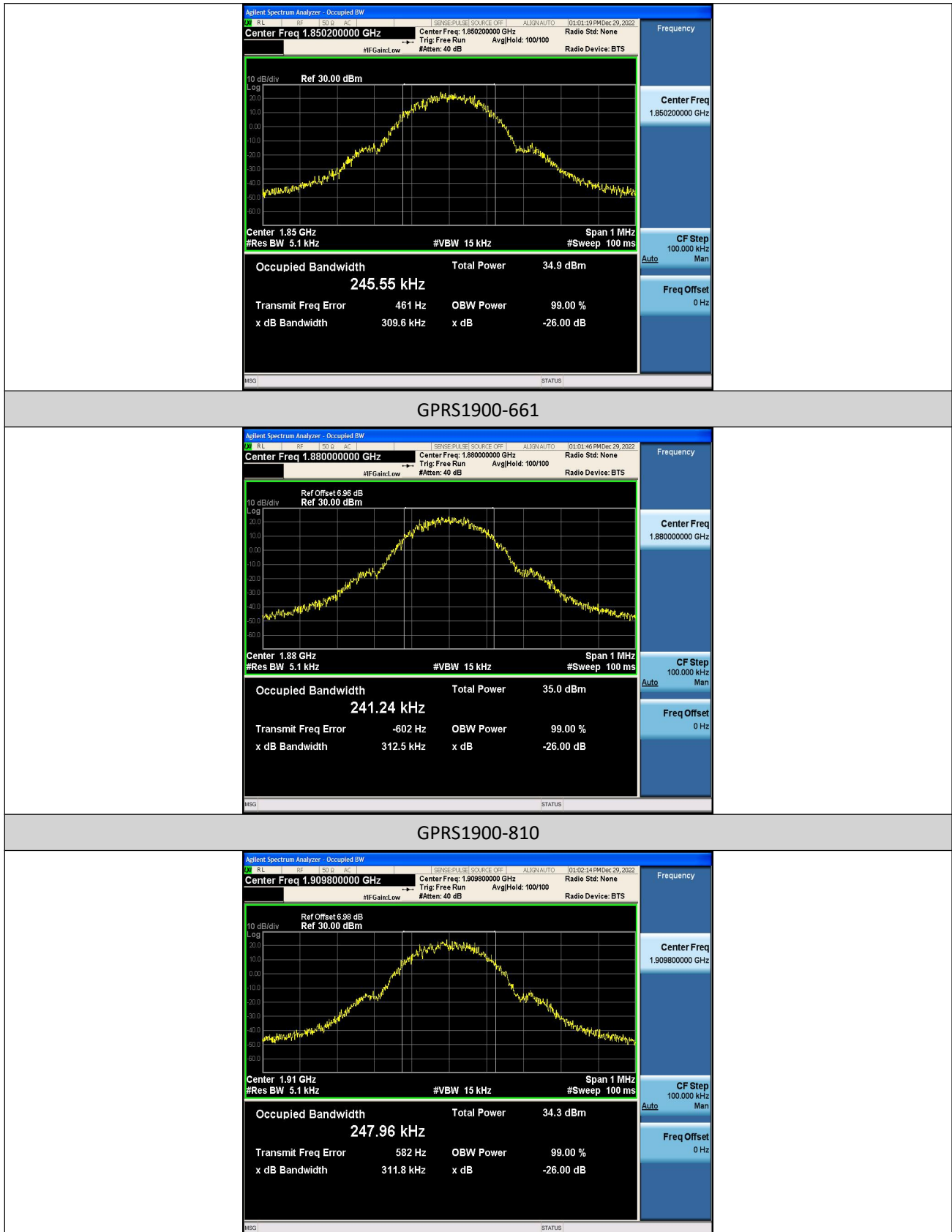
### GSM1900-661



### GSM1900-810



### GPRS1900-512



## EGPRS1900-512



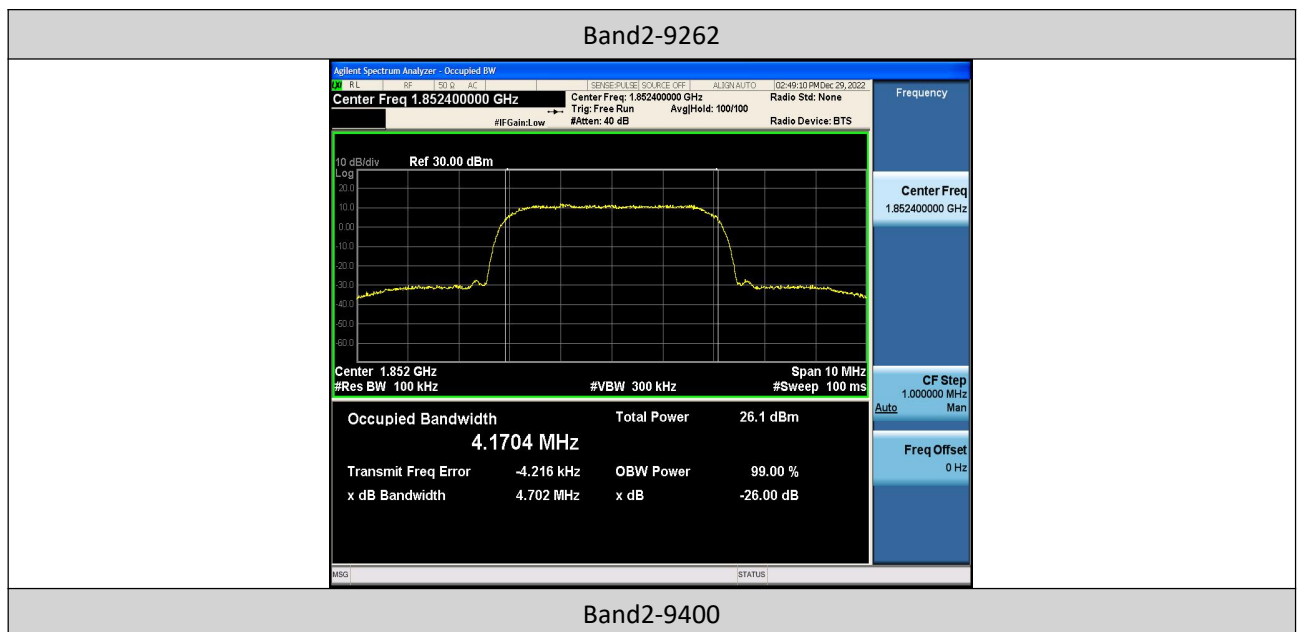
## EGPRS1900-661

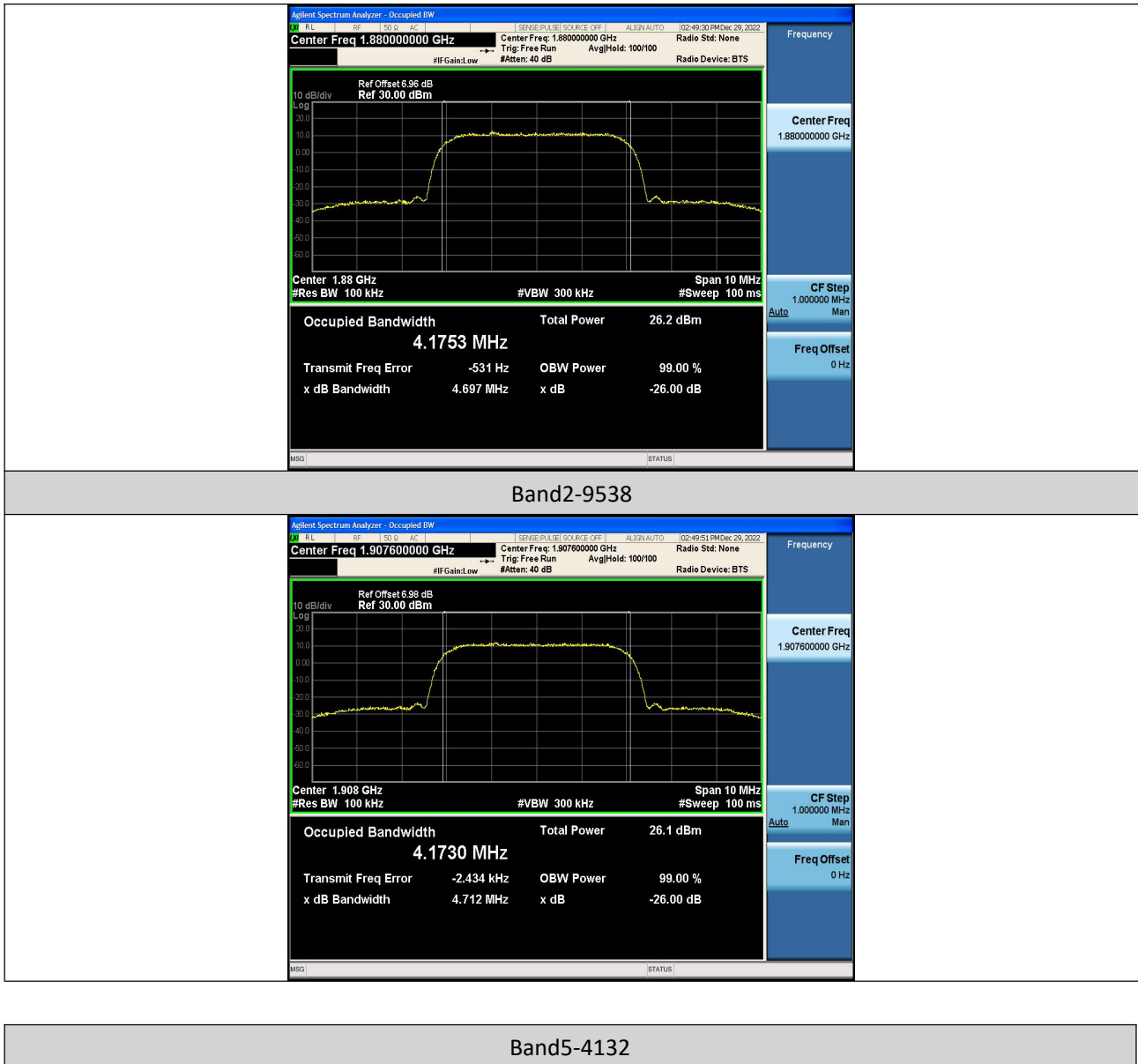


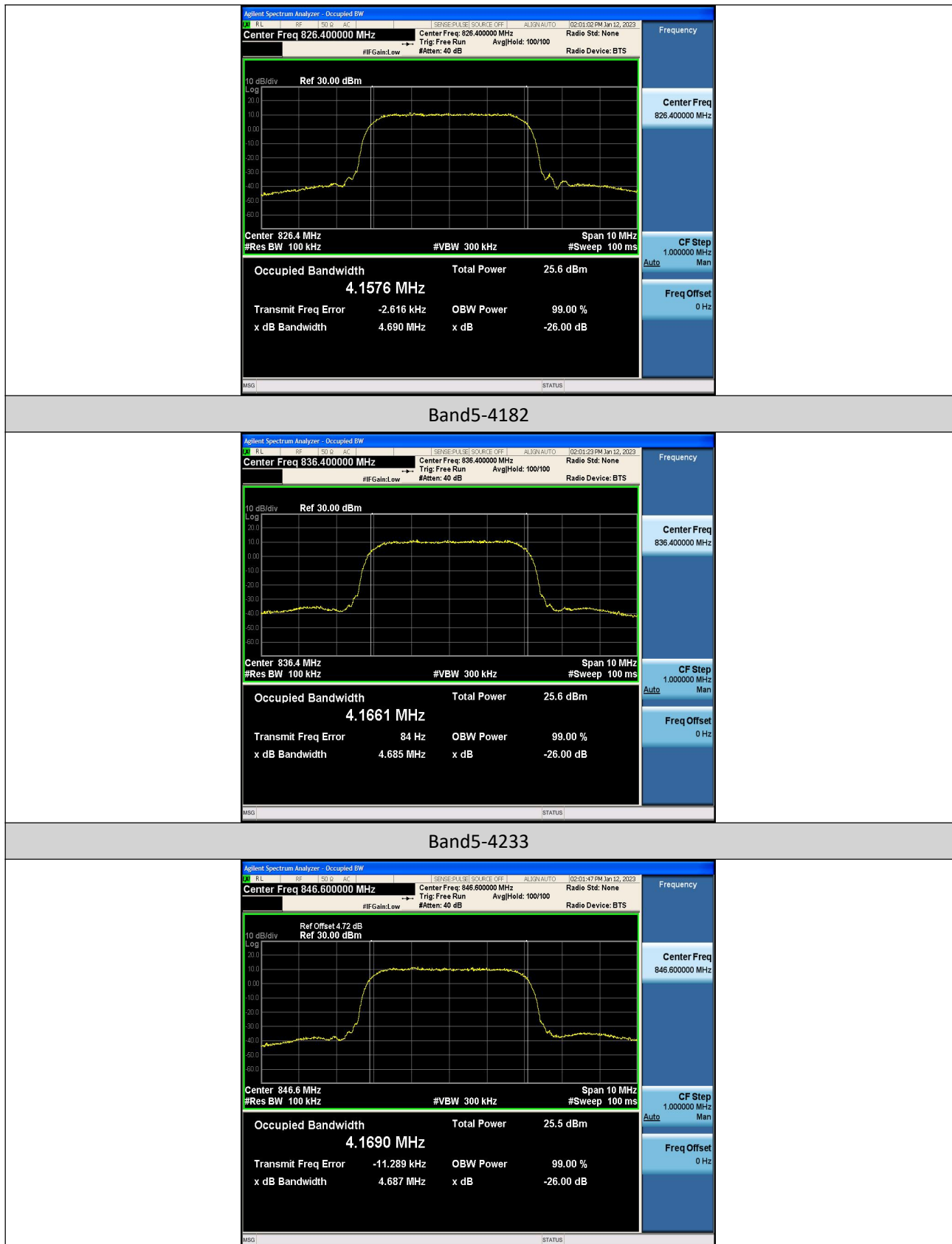
## EGPRS1900-810



### Band2-9262







## 10. BAND EDGE EMISSIONS AT ANTENNA TERMINAL

### 10.1 MEASUREMENT OVERVIEW

All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

### 10.2 MEASUREMENT METHOD

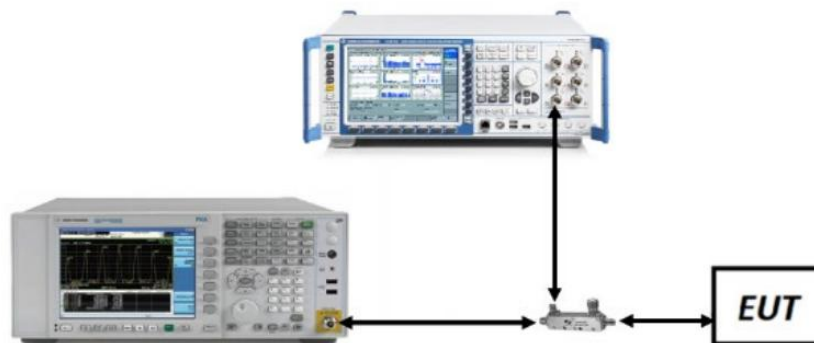
1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
2. Span was set large enough so as to capture all out of band emissions near the band edge
3. RBW > 1% of the emission bandwidth
4. VBW > 3 x RBW
5. Detector = RMS
6. Number of sweep points  $\geq 2 \times \text{Span/RBW}$
7. Trace mode = trace average
8. Sweep time = auto couple
9. The trace was allowed to stabilize

### TEST NOTE

According to FCC 22.917, 24.238, 27.53 specified that power of any emission outside of The authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. All measurements were done at 2 channels (low and high operational frequency range.)

The band edge measurement used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

### 10.3 MEASUREMENT METHOD



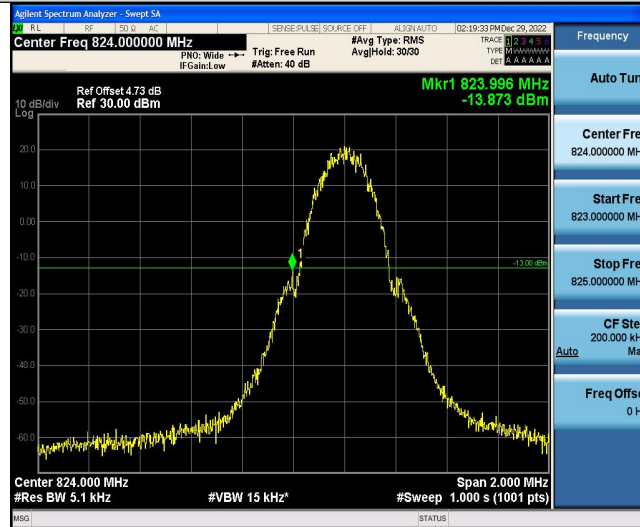
#### 10.4 MEASUREMENT RESULT

| Band      | Channel | Freq (MHz) | Result (dBm) | Limit(dBm) | Verdict |
|-----------|---------|------------|--------------|------------|---------|
| GSM850    | 128     | 824.00     | -13.87       | -13        | PASS    |
| GSM850    | 251     | 849.02     | -16.72       | -13        | PASS    |
| GPRS850   | 128     | 823.98     | -14.23       | -13        | PASS    |
| GPRS850   | 251     | 849.02     | -16.44       | -13        | PASS    |
| EGPRS850  | 128     | 823.99     | -26.55       | -13        | PASS    |
| EGPRS850  | 251     | 849.00     | -26.42       | -13        | PASS    |
| GSM1900   | 512     | 1849.98    | -17.56       | -13        | PASS    |
| GSM1900   | 810     | 1910.02    | -18.73       | -13        | PASS    |
| GPRS1900  | 512     | 1849.98    | -15.59       | -13        | PASS    |
| GPRS1900  | 810     | 1910.02    | -16.45       | -13        | PASS    |
| EGPRS1900 | 512     | 1849.99    | -20.76       | -13        | PASS    |
| EGPRS1900 | 810     | 1910.02    | -19.07       | -13        | PASS    |

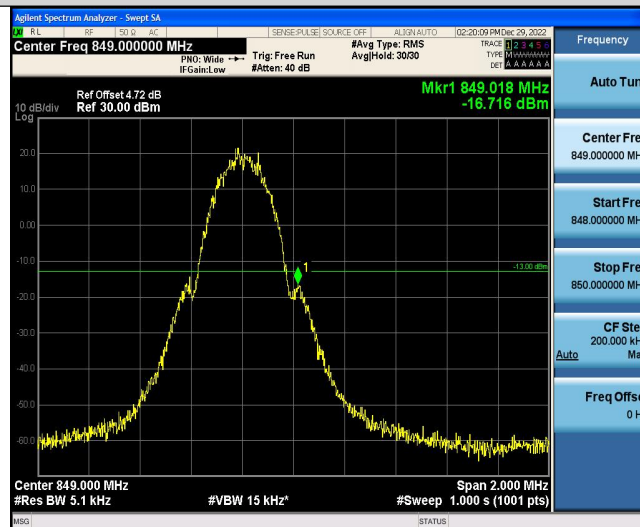
| Band  | Channel | Frequency (MHz) | Result (dBm) | Limit(dBm) | Verdict |
|-------|---------|-----------------|--------------|------------|---------|
| Band2 | 9262    | 1850.00         | -30.08       | -13        | PASS    |
| Band2 | 9538    | 1910.00         | -26.24       | -13        | PASS    |
| Band5 | 4132    | 823.93          | -33.98       | -13        | PASS    |
| Band5 | 4233    | 849.08          | -31.64       | -13        | PASS    |

## Test Graphs

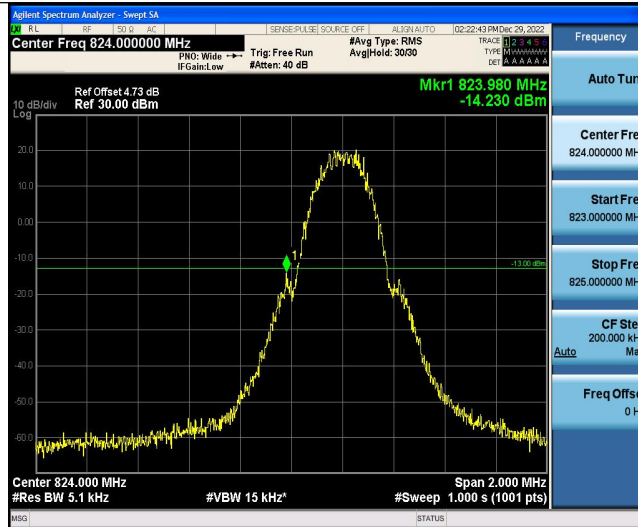
### GSM850-128



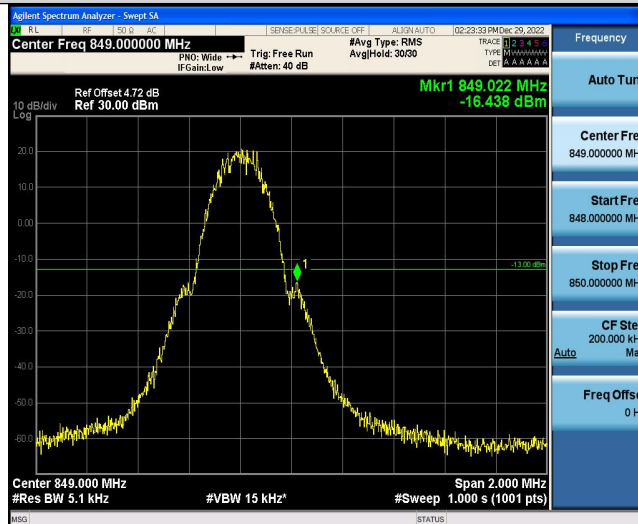
### GSM850-251



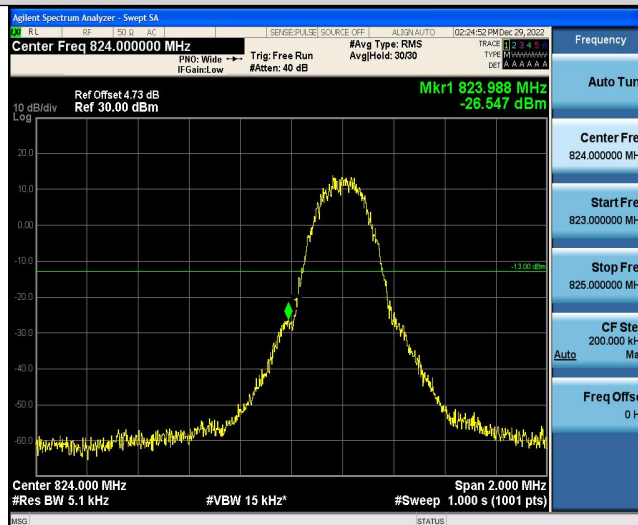
### GPRS850-128



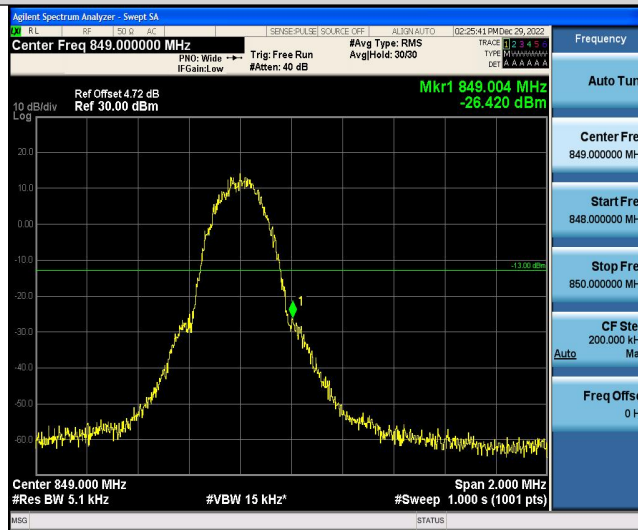
GPRS850-251



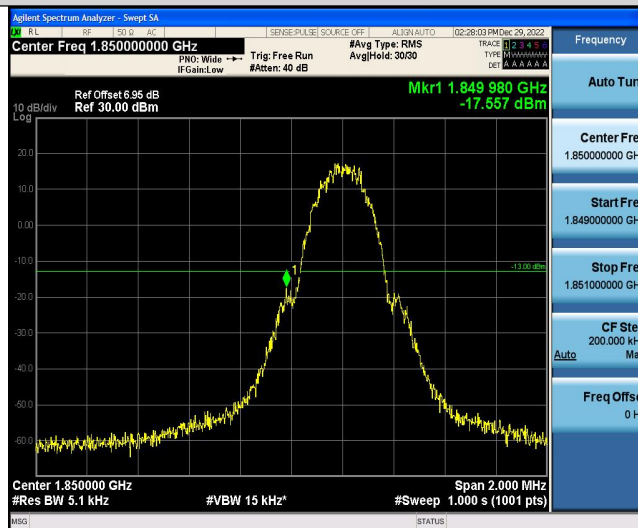
EGPRS850-128



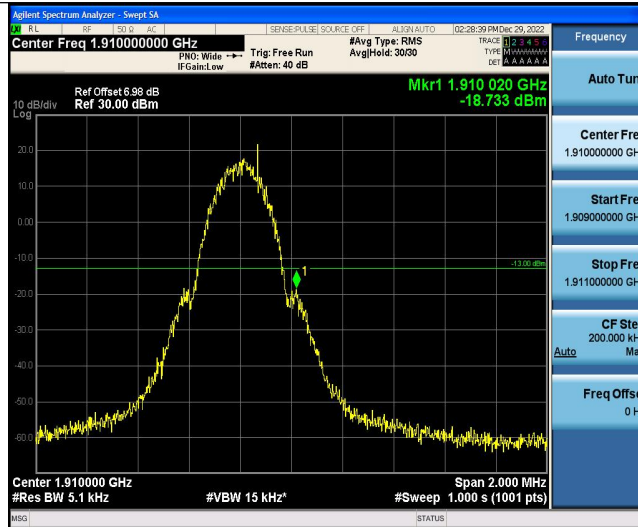
## EGPRS850-251



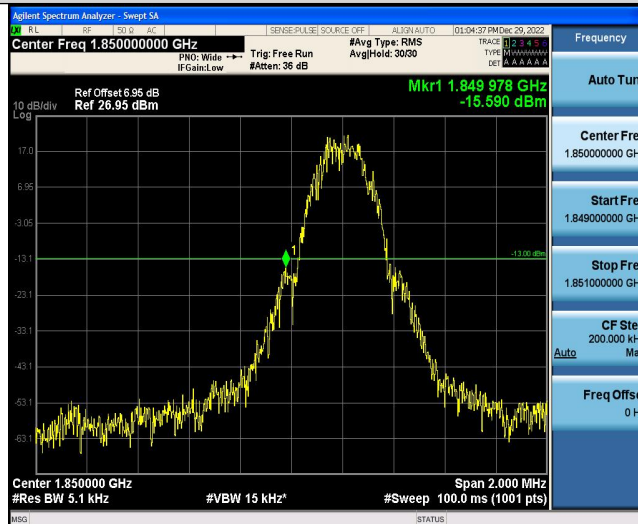
## GSM1900-512



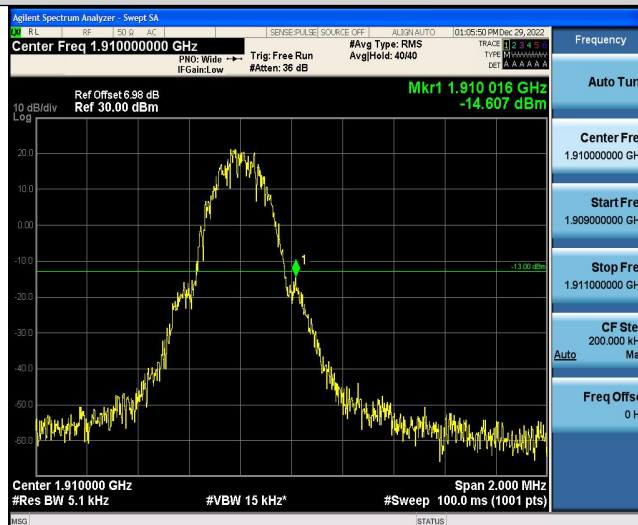
## GSM1900-810



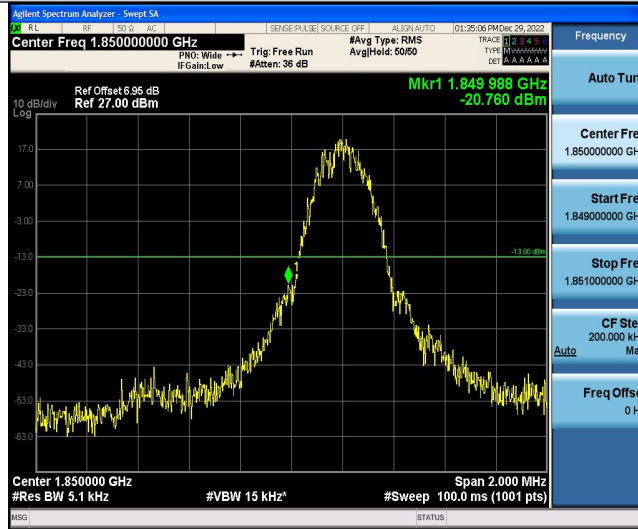
GPRS1900-512



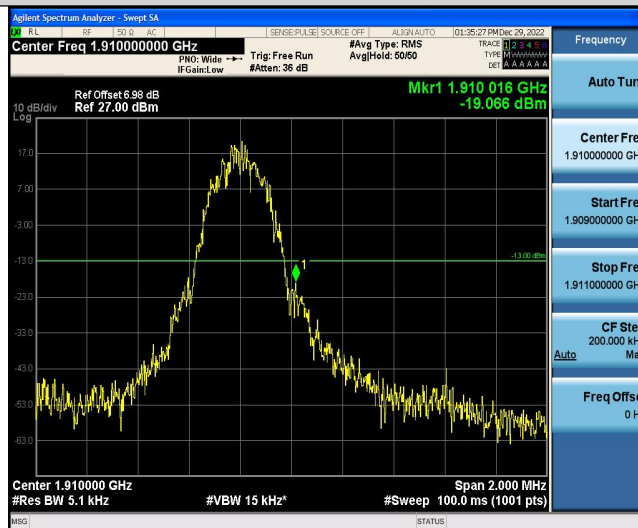
GPRS1900-810



### EGPRS1900-512



### EGPRS1900-810



### Band2-9262



### Band2-9538



### Band5-4132



### Band5-4233



## 11. SPURIOUS EMISSIONS AT ANTENNA TERMINAL

### 11.1 PROVISIONS APPLICABLE

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

### 11.2 MEASUREMENT METHOD

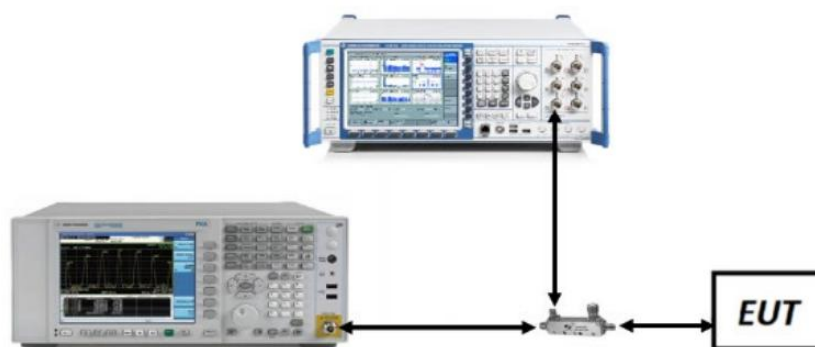
#### Test Settings (GSM)

1. RBW = 1 MHz
2. VBW  $\geq$  3 MHz
3. Detector = Peak
4. Trace Mode = max hold
5. Sweep time = auto
6. Number of points in sweep  $\geq 2 \times \text{Span} / \text{RBW}$

#### Test Settings (WCDMA)

1. RBW = 1 MHz
2. VBW  $\geq$  3 MHz
3. Detector = RMS
4. Trace Mode = trace average
5. Sweep time = auto
6. Number of points in sweep  $\geq 2 \times \text{Span} / \text{RBW}$

### 12.3 MEASUREMENT SETUP



#### 11.4 MEASUREMENT RESULT

| Band     | Channel | Frequency Range(MHz) | Max.Freq. (MHz) | Result (dBm) | Limit (dBm) | Verdict |
|----------|---------|----------------------|-----------------|--------------|-------------|---------|
| GSM850   | 128     | 0.009~0.15MHz        | 0.01            | -48.82       | -33         | PASS    |
| GSM850   | 128     | 0.15~30MHz           | 0.18            | -42.08       | -13         | PASS    |
| GSM850   | 128     | 30~1000MHz           | 950.14          | -48.64       | -13         | PASS    |
| GSM850   | 128     | 1000~10000MHz        | 2472.7          | -22          | -13         | PASS    |
| GSM850   | 190     | 0.009~0.15MHz        | 0.01            | -47.49       | -33         | PASS    |
| GSM850   | 190     | 0.15~30MHz           | 0.15            | -40.61       | -13         | PASS    |
| GSM850   | 190     | 30~1000MHz           | 707.84          | -48.42       | -13         | PASS    |
| GSM850   | 190     | 1000~10000MHz        | 2509.9          | -20.8        | -13         | PASS    |
| GSM850   | 251     | 0.009~0.15MHz        | 0.01            | -50.31       | -33         | PASS    |
| GSM850   | 251     | 0.15~30MHz           | 0.17            | -42.47       | -13         | PASS    |
| GSM850   | 251     | 30~1000MHz           | 401.41          | -48.92       | -13         | PASS    |
| GSM850   | 251     | 1000~10000MHz        | 2546.8          | -21.52       | -13         | PASS    |
| GPRS850  | 128     | 0.009~0.15MHz        | 0.01            | -48.64       | -33         | PASS    |
| GPRS850  | 128     | 0.15~30MHz           | 0.15            | -41.2        | -13         | PASS    |
| GPRS850  | 128     | 30~1000MHz           | 428.86          | -48.88       | -13         | PASS    |
| GPRS850  | 128     | 1000~10000MHz        | 2472.7          | -21.99       | -13         | PASS    |
| GPRS850  | 190     | 0.009~0.15MHz        | 0.01            | -48.23       | -33         | PASS    |
| GPRS850  | 190     | 0.15~30MHz           | 0.15            | -41.91       | -13         | PASS    |
| GPRS850  | 190     | 30~1000MHz           | 682.71          | -49.23       | -13         | PASS    |
| GPRS850  | 190     | 1000~10000MHz        | 2509.6          | -21.09       | -13         | PASS    |
| GPRS850  | 251     | 0.009~0.15MHz        | 0.01            | -48.98       | -33         | PASS    |
| GPRS850  | 251     | 0.15~30MHz           | 0.16            | -43.24       | -13         | PASS    |
| GPRS850  | 251     | 30~1000MHz           | 242.82          | -48.68       | -13         | PASS    |
| GPRS850  | 251     | 1000~10000MHz        | 2546.5          | -21.2        | -13         | PASS    |
| EGPRS850 | 128     | 0.009~0.15MHz        | 0.01            | -49.15       | -33         | PASS    |
| EGPRS850 | 128     | 0.15~30MHz           | 0.15            | -41.52       | -13         | PASS    |
| EGPRS850 | 128     | 30~1000MHz           | 935.14          | -48.14       | -13         | PASS    |
| EGPRS850 | 128     | 1000~10000MHz        | 2472.7          | -29.26       | -13         | PASS    |
| EGPRS850 | 190     | 0.009~0.15MHz        | 0.01            | -52.62       | -33         | PASS    |
| EGPRS850 | 190     | 0.15~30MHz           | 0.15            | -42.1        | -13         | PASS    |
| EGPRS850 | 190     | 30~1000MHz           | 978.4           | -49.45       | -13         | PASS    |

|           |     |               |          |        |     |      |
|-----------|-----|---------------|----------|--------|-----|------|
| EGPRS850  | 190 | 1000~10000MHz | 2509.9   | -28.36 | -13 | PASS |
| EGPRS850  | 251 | 0.009~0.15MHz | 0.01     | -52.23 | -33 | PASS |
| EGPRS850  | 251 | 0.15~30MHz    | 0.15     | -41.55 | -13 | PASS |
| EGPRS850  | 251 | 30~1000MHz    | 648.38   | -48.81 | -13 | PASS |
| EGPRS850  | 251 | 1000~10000MHz | 2546.2   | -27.82 | -13 | PASS |
| GSM1900   | 512 | 0.009~0.15MHz | 0.01     | -53.23 | -43 | PASS |
| GSM1900   | 512 | 0.15~30MHz    | 0.17     | -41.73 | -23 | PASS |
| GSM1900   | 512 | 30~1000MHz    | 662.5    | -50.48 | -13 | PASS |
| GSM1900   | 512 | 1000~18000MHz | 16421.83 | -37.26 | -13 | PASS |
| GSM1900   | 661 | 0.009~0.15MHz | 0.01     | -52.77 | -43 | PASS |
| GSM1900   | 661 | 0.15~30MHz    | 0.15     | -39.63 | -23 | PASS |
| GSM1900   | 661 | 30~1000MHz    | 754.91   | -49.49 | -13 | PASS |
| GSM1900   | 661 | 1000~18000MHz | 16490.4  | -36.56 | -13 | PASS |
| GSM1900   | 810 | 0.009~0.15MHz | 0.01     | -52.46 | -43 | PASS |
| GSM1900   | 810 | 0.15~30MHz    | 0.15     | -40.66 | -23 | PASS |
| GSM1900   | 810 | 30~1000MHz    | 957.97   | -49.95 | -13 | PASS |
| GSM1900   | 810 | 1000~18000MHz | 16533.47 | -37.19 | -13 | PASS |
| GPRS1900  | 512 | 0.009~0.15MHz | 0.01     | -53.7  | -43 | PASS |
| GPRS1900  | 512 | 0.15~30MHz    | 0.15     | -41.26 | -23 | PASS |
| GPRS1900  | 512 | 30~1000MHz    | 930.1    | -49.7  | -13 | PASS |
| GPRS1900  | 512 | 1000~18000MHz | 16666.07 | -37.17 | -13 | PASS |
| GPRS1900  | 661 | 0.009~0.15MHz | 0.01     | -55.27 | -43 | PASS |
| GPRS1900  | 661 | 0.15~30MHz    | 0.15     | -42.63 | -23 | PASS |
| GPRS1900  | 661 | 30~1000MHz    | 835.39   | -49.77 | -13 | PASS |
| GPRS1900  | 661 | 1000~18000MHz | 16469.43 | -37.14 | -13 | PASS |
| GPRS1900  | 810 | 0.009~0.15MHz | 0.01     | -52.54 | -43 | PASS |
| GPRS1900  | 810 | 0.15~30MHz    | 0.16     | -41.36 | -23 | PASS |
| GPRS1900  | 810 | 30~1000MHz    | 404.81   | -49.46 | -13 | PASS |
| GPRS1900  | 810 | 1000~18000MHz | 16509.1  | -37.45 | -13 | PASS |
| EGPRS1900 | 512 | 0.009~0.15MHz | 0.01     | -53.69 | -43 | PASS |
| EGPRS1900 | 512 | 0.15~30MHz    | 0.15     | -41.26 | -23 | PASS |
| EGPRS1900 | 512 | 30~1000MHz    | 782.4    | -49.44 | -13 | PASS |
| EGPRS1900 | 512 | 1000~18000MHz | 16430.33 | -36.8  | -13 | PASS |
| EGPRS1900 | 661 | 0.009~0.15MHz | 0.01     | -48.88 | -43 | PASS |

|           |     |               |          |        |     |      |
|-----------|-----|---------------|----------|--------|-----|------|
| EGPRS1900 | 661 | 0.15~30MHz    | 0.15     | -41    | -23 | PASS |
| EGPRS1900 | 661 | 30~1000MHz    | 867.82   | -49.79 | -13 | PASS |
| EGPRS1900 | 661 | 1000~18000MHz | 16433.73 | -37.41 | -13 | PASS |
| EGPRS1900 | 810 | 0.009~0.15MHz | 0.01     | -50.95 | -43 | PASS |
| EGPRS1900 | 810 | 0.15~30MHz    | 0.15     | -41.07 | -23 | PASS |
| EGPRS1900 | 810 | 30~1000MHz    | 937.05   | -49.34 | -13 | PASS |
| EGPRS1900 | 810 | 1000~18000MHz | 16439.97 | -35.95 | -13 | PASS |

| Band  | Channel | Frequency Range (Mhz) | Frequency (dBm) | Result (dBm) | Limit (dBm) | Verdict |
|-------|---------|-----------------------|-----------------|--------------|-------------|---------|
| Band2 | 9262    | 0.009~0.15MHz         | 0.01            | -52.99       | -43         | PASS    |
| Band2 | 9262    | 0.15~30MHz            | 0.15            | -46.8        | -23         | PASS    |
| Band2 | 9262    | 30~1000MHz            | 995.93          | -50.19       | -13         | PASS    |
| Band2 | 9262    | 1000~20000MHz         | 19138.03        | -35.74       | -13         | PASS    |
| Band2 | 9400    | 0.009~0.15MHz         | 0.01            | -53.87       | -43         | PASS    |
| Band2 | 9400    | 0.15~30MHz            | 0.15            | -46.77       | -23         | PASS    |
| Band2 | 9400    | 30~1000MHz            | 883.37          | -49.29       | -13         | PASS    |
| Band2 | 9400    | 1000~20000MHz         | 19631.4         | -35.05       | -13         | PASS    |
| Band2 | 9538    | 0.009~0.15MHz         | 0.01            | -53.53       | -43         | PASS    |
| Band2 | 9538    | 0.15~30MHz            | 0.15            | -45.15       | -23         | PASS    |
| Band2 | 9538    | 30~1000MHz            | 976.11          | -49.55       | -13         | PASS    |
| Band2 | 9538    | 1000~20000MHz         | 19647.87        | -35.95       | -13         | PASS    |
| Band5 | 4132    | 0.009~0.15MHz         | 0.01            | -52.19       | -33         | PASS    |
| Band5 | 4132    | 0.15~30MHz            | 0.16            | -44.64       | -13         | PASS    |
| Band5 | 4132    | 30~1000MHz            | 604.95          | -58.51       | -13         | PASS    |
| Band5 | 4132    | 1000~10000MHz         | 5557.3          | -41.1        | -13         | PASS    |
| Band5 | 4182    | 0.009~0.15MHz         | 0.01            | -51.65       | -33         | PASS    |
| Band5 | 4182    | 0.15~30MHz            | 0.16            | -45.88       | -13         | PASS    |
| Band5 | 4182    | 30~1000MHz            | 969.28          | -58.66       | -13         | PASS    |
| Band5 | 4182    | 1000~10000MHz         | 2423.2          | -40.76       | -13         | PASS    |
| Band5 | 4233    | 0.009~0.15MHz         | 0.01            | -52.38       | -33         | PASS    |
| Band5 | 4233    | 0.15~30MHz            | 0.16            | -46.96       | -13         | PASS    |
| Band5 | 4233    | 30~1000MHz            | 953.44          | -59.04       | -13         | PASS    |
| Band5 | 4233    | 1000~10000MHz         | 6041.5          | -40.08       | -13         | PASS    |