# TEST REPORT

| | | |
|---|---|---|
| **APPLICANT** | : | Reliance Communications LLC |
| **PRODUCT NAME** | : | Orbic Joy 2 |
| **MODEL NAME** | : | RC656L |
| **BRAND NAME** | : | Orbic |
| **FCC ID** | : | 2ABGH-RC656L |
| **STANDARD(S)** | : | 47 CFR Part 2<br>47 CFR Part 22 Subpart H<br>47 CFR Part 24 Subpart E<br>47 CFR Part 27 Subpart L |
| **RECEIPT DATE** | : | 2024-02-29 |
| **TEST DATE** | : | 2024-04-10 to 2024-04-26 |
| **ISSUE DATE** | : | 2024-05-21 |

Edited by: Peng Mi

Peng Mi (Rapporteur)

Approved by: Shen Junsheng

Shen Junsheng (Supervisor)

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MORLAB

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| Change History | | |
|---|---|---|
| Version | Date | Reason for change |
| 1.0 | 2024-05-21 | First edition |
| | | |

# 1. Technical Information

**Note:** Provide by applicant.

## 1.1. Applicant and Manufacturer Information

| | |
|---|---|
| **Applicant:** | Reliance Communications LLC |
| **Applicant Address:** | 555 Wireless Blvd. Hauppauge, NY 11788, USA |
| **Manufacturer:** | SHENZHEN CHINO-E COMMUNICATION CO., LTD |
| **Manufacturer Address:** | No. 503, 505, 5th Floor, Hengjiang Mansion, Intersection of Bulong Road and Renmin Road, Longhua New District, Shenzhen, China. |

## 1.2. Equipment Under Test (EUT) Description

| | | |
|---|---|---|
| **Product Name:** | Orbic Joy 2 | |
| **Sample No.:** | 1# | |
| **Hardware Version:** | V1.0 | |
| **Software Version:** | RC656L_V1.0.15_BLB | |
| **Modulation Type:** | GSM/GPRS Mode with GMSK Modulation<br>EDGE Mode with 8PSK Modulation<br>WCDMA Mode with QPSK Modulation<br>HSDPA Mode with QPSK Modulation<br>DC-HSDPA Mode with QPSK Modulation<br>HSUPA Mode with QPSK Modulation<br>HSPA+ Mode with 16QAM Modulation | |
| **Operating Frequency Range:** | GSM 850MHz | Tx: 824MHz-849MHz |
| | | Rx: 869MHz-894MHz |
| | GSM 1900MHz | Tx: 1850MHz-1910MHz |
| | | Rx: 1930MHz-1990MHz |
| | WCDMA Band V | Tx: 824MHz-849MHz |
| | | Rx: 869MHz-894MHz |
| | WCDMA Band IV | Tx: 1710MHz-1755MHz |
| | | Rx: 2110MHz-2155MHz |
| | WCDMA Band II | Tx: 1850MHz-1910MHz |
| | | Rx: 1930MHz-1990MHz |

| | | |
|---|---|---|
| **Antenna Type:** | PIFA Antenna | |
| **Antenna Gain:** | Top Antenna | |
| | GSM 850: | -3.05dBi |
| | GSM1900: | 0.54dBi |
| | WCDMA Band V: | -3.05dBi |
| | WCDMA Band IV: | 0.03dBi |
| | WCDMA Band II: | 0.54dBi |
| | Bottom Antenna | |
| | GSM 850: | -2.04dBi |
| | GSM1900: | 0.14dBi |
| | WCDMA Band V: | -2.04dBi |
| | WCDMA Band IV: | -0.35dBi |
| | WCDMA Band II: | 0.14dBi |
| **Accessory Information:** | Battery | |
| | Brand Name: | Orbic |
| | Model No.: | BTE-5005 |
| | Serial No.: | N/A |
| | Capacity: | 5000mAh |
| | Rated Voltage: | 3.87V |
| | Charge Limit: | 4.45V |
| | Manufacturer: | Shenzhen Aerospace Electronic Co.,Ltd. |
| | AC Adapter | |
| | Brand Name: | Orbic |
| | Model No.: | OACH023US1 |
| | Serial No.: | N/A |
| | Rated Output: | 5V⎓3A, 9V⎓2A, 12V⎓1.5A |
| | Rated Input: | 100-240V~50/60Hz,0.5A |
| | Manufacturer 1: | WATAI ELECTRONICS PRIVATE LIMITED |
| | Manufacturer 2: | KANGYIN ELECTRONIC TECHNOLOGY CO.,LTD |
| | USB Cable | |
| | Model No.: | HX-YLMK-06 |
| | Manufacturer: | HUIZHOU WASHIN ELECTRONICS CO.,LTD |

**Note 1:** The transmitter (Tx) frequency arrangement of the Cellular 850MHz band used by the EUT can be represented with the formula F(n)=824.2+0.2*(n-128), 128<=n<=251; the lowest, middle, highest channel numbers (ARFCHs) used and tested in this report are separately 128

(824.2MHz), 189 (836.4MHz) and 251 (848.8MHz).

**Note 2:** The transmitter (Tx) frequency arrangement of the PCS 1900MHz band used by the EUT can be represented with the formula F(n)=1850.2+0.2*(n-512), 512<=n<=810; the lowest, middle and highest channel numbers (ARFCHs) used and tested in this report are separately 512 (1850.2MHz), 661 (1880.0MHz) and 810 (1909.8MHz).

**Note 3:** The transmitter (Tx) frequency arrangement of the WCDMA Band V used by the EUT can be represented with the formula F(n)=826.4+0.2*(n-4132), 4132<=n<=4233; the lowest, middle and highest channel numbers (ARFCHs) used and tested in this report are separately 4132 (826.4MHz), 4182(836.4MHz) and 4233 (846.6MHz).

**Note 4:** The transmitter (Tx) frequency arrangement of the WCDMA IV band used by the EUT can be represented with the formula F(n)=1712.4+0.2*(n-1312), 1312<=n<=1513; the lowest, middle and highest channel numbers (ARFCHs) used and tested in this report are separately 1312 (1712.4MHz), 1413 (1732.6MHz) and 1513 (1752.6MHz).

**Note 5:** The transmitter (Tx) frequency arrangement of the WCDMA Band II used by the EUT can be represented with the formula F(n)=1852.4+0.2*(n-9262), 9262<=n<=9538; the lowest, middle and highest channel numbers (ARFCHs) used and tested in this report are separately 9262 (1852.4MHz), 9400 (1880MHz) and 9538 (1907.6MHz).

**Note 6:** All test modes and data rates were considered and evaluated respectively by performing full test. Test modes are chosen to be reported as the worst case below:

GSM mode and EDGE mode for GSM 850;

GSM mode and EDGE mode for GSM 1900;

WCDMA mode for WCDMA band V;

WCDMA mode for WCDMA band IV;

WCDMA mode for WCDMA band II;

**Note 7:** For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

## 1.3. Maximum E.R.P./E.I.R.P. and Emission Designator

| Test Mode | Maximum E.R.P./E.I.R.P. (W) | Emission Designator |
|---|---|---|
| GSM850(GSM) | 0.624 | 247KGXW |
| GSM850(EDGE) | 0.173 | 251KG7W |
| GSM1900(GSM) | 0.935 | 250KGXW |
| GSM1900(EDGE) | 0.377 | 246KG7W |
| WCDMA Band V | 0.068 | 4M14F9W |
| WCDMA Band IV | 0.184 | 4M15F9W |
| WCDMA Band II | 0.200 | 4M15F9W |

## 1.4. Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 2, Part 22, Part 24 and Part 27 for the EUT FCC ID Certification:

| No. | Identity | Document Title |
|---|---|---|
| 1 | 47 CFR Part 2 (10-1-12 Edition) | Frequency Allocations and Radio Treaty Matters; General Rules and Regulations |
| 2 | 47 CFR Part 22 (10-1-12 Edition) | Public Mobile Services |
| 3 | 47 CFR Part 24 (10-1-12 Edition) | Personal Communications Services |
| 4 | 47 CFR Part 27 (10-1-12 Edition) | Miscellaneous Wireless Communications Services |

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

| No. | Section | Description | Test Date | Test Engineer | Result | Method Determination/ Remark |
|---|---|---|---|---|---|---|
| 1 | 2.1046 | Conducted RF Output Power | Apr. 10, 2024 | Zheng Jianhua | PASS | No deviation |
| 2 | 24.232(d) | Peak -Average Ratio | Apr. 10, 2024 | Gan Jing | PASS | No deviation |
| 3 | 2.1049 | Occupied Bandwidth | Apr. 10, 2024 | Gan Jing | PASS | No deviation |
| 4 | 2.1055, 22.355, 24.235, 27.54 | Frequency Stability | Apr. 10, 2024 | Gan Jing | PASS | No deviation |
| 5 | 2.1051, 22.917(a), 24.238(a), 27.53(h) | Conducted Out of Band Emissions | Apr. 10, 2024 | Gan Jing | PASS | No deviation |
| 6 | 2.1051, 22.917(a), 24.238(a), 27.53(h) | Band Edge | Apr. 10, 2024 | Gan Jing | PASS | No deviation |
| 7 | 22.913(a), 24.232(c) 27.50(d) | Transmitter Radiated Power (E.I.P.R./E.R.P.) | Apr. 10, 2024 | Gan Jing | PASS | No deviation |
| 8 | 2.1051, 22.917(a), | Radiated Out of Band Emissions | Apr. 14 to 16, 2024 | Li Hanbin | PASS | No deviation |

| | | | | | | |
|---|---|---|---|---|---|---|
| | 24.238(a), 27.53(h) | | | | | |

**Note 1:** The tests were performed according to the method of measurements prescribed in KDB971168 D01 v03r01 and ANSI/TIA-603-E-2016.
**Note 2:** Additions to, deviation, or exclusions from the method shall be judged in the "method determination" column of add, deviate or exclude from the specific method shall be explained in the "Remark" of the above table.
**Note 3:** When the test result is a critical value, we will use the measurement uncertainty give the judgment result based on the 95% confidence intervals.

## 1.5. Environmental Conditions

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

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

# 2. 47 CFR Part 2, Part 22H, 24E&27L Requirements

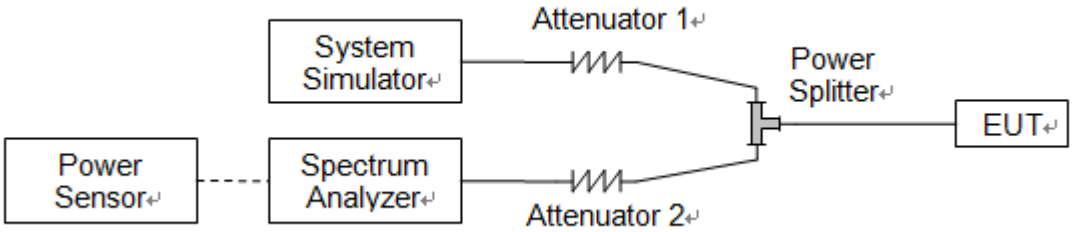
## 2.1. Conducted RF Output Power

### 2.1.1. Requirement

According to FCC section 2.1046(a), for transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in FCC section 2.1033(c)(8).

### 2.1.2. Test Description

Test Setup:




The EUT is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum output power i.e. Power Control Level (PCL) = 5 and Power Class = 4. A call is established between the EUT and the SS.

### 2.1.3.Test Results

| GSM850 | Average Power (dBm) | | |
|---|---|---|---|
| **TX Channel** | **128** | **189** | **251** |
| **Frequency (MHz)** | **824.2** | **836.4** | **848.8** |
| GSM 1 Tx slot | 32.10 | 31.93 | 31.90 |
| GPRS 1 Tx slot | 32.14 | 31.96 | 31.93 |
| GPRS 2 Tx slots | 28.90 | 28.95 | 28.92 |
| GPRS 3 Tx slots | 26.64 | 26.48 | 26.46 |
| GPRS 4 Tx slots | 24.44 | 24.31 | 24.27 |
| EDGE 1 Tx slot | 26.58 | 26.48 | 26.44 |
| EDGE 2 Tx slots | 24.55 | 24.46 | 24.41 |
| EDGE 3 Tx slots | 21.71 | 21.60 | 21.67 |
| EDGE 4 Tx slots | 20.12 | 20.01 | 20.08 |

| GSM1900 | Average Power (dBm) | | |
|---|---|---|---|
| **TX Channel** | **512** | **661** | **810** |
| **Frequency (MHz)** | **1850.2** | **1880** | **1909.8** |
| GSM 1 Tx slot | 29.52 | 29.55 | 29.47 |
| GPRS 1 Tx slot | 29.54 | 29.57 | 29.49 |
| GPRS 2 Tx slots | 28.04 | 28.05 | 27.98 |
| GPRS 3 Tx slots | 25.87 | 25.94 | 25.81 |
| GPRS 4 Tx slots | 24.63 | 24.68 | 24.57 |
| EDGE 1 Tx slot | 25.62 | 25.53 | 25.40 |
| EDGE 2 Tx slots | 23.68 | 23.54 | 23.38 |
| EDGE 3 Tx slots | 22.28 | 22.21 | 22.02 |
| EDGE 4 Tx slots | 21.04 | 21.01 | 20.95 |

| WCDMA Band V | Average Power (dBm) | | |
|---|---|---|---|
| **TX Channel** | **4132** | **4182** | **4233** |
| **Frequency (MHz)** | **826.4** | **836.4** | **846.6** |
| RMC 12.2Kbps | 22.52 | 22.54 | 22.48 |
| HSDPA Subtest-1 | 21.67 | 21.57 | 21.58 |
| HSDPA Subtest-2 | 21.84 | 21.69 | 21.71 |
| HSDPA Subtest-3 | 21.34 | 21.19 | 21.25 |
| HSDPA Subtest-4 | 21.28 | 21.24 | 21.22 |
| DC-HSDPA Subtest-1 | 21.52 | 21.46 | 21.39 |
| DC-HSDPA Subtest-2 | 21.53 | 21.45 | 21.34 |
| DC-HSDPA Subtest-3 | 21.04 | 20.92 | 20.83 |
| DC-HSDPA Subtest-4 | 21.03 | 20.92 | 20.87 |
| HSUPA Subtest-1 | 21.42 | 21.43 | 21.59 |
| HSUPA Subtest-2 | 20.87 | 21.07 | 20.94 |
| HSUPA Subtest-3 | 21.57 | 21.34 | 21.51 |
| HSUPA Subtest-4 | 21.33 | 21.33 | 21.32 |
| HSUPA Subtest-5 | 21.58 | 21.28 | 21.35 |
| HSPA+ (16QAM) Subtest-1 | 21.64 | 21.57 | 21.32 |

| WCDMA Band IV | Average Power (dBm) | | |
|---|---|---|---|
| **TX Channel** | **1312** | **1413** | **1513** |
| **Frequency (MHz)** | **1712.4** | **1732.6** | **1752.6** |
| RMC 12.2Kbps | 22.93 | 23.00 | 22.97 |
| HSDPA Subtest-1 | 21.64 | 21.76 | 21.70 |
| HSDPA Subtest-2 | 21.91 | 21.82 | 21.65 |
| HSDPA Subtest-3 | 21.12 | 21.18 | 21.01 |
| HSDPA Subtest-4 | 21.14 | 21.22 | 21.00 |
| DC-HSDPA Subtest-1 | 21.35 | 21.55 | 21.55 |
| DC-HSDPA Subtest-2 | 21.41 | 21.62 | 21.55 |
| DC-HSDPA Subtest-3 | 21.00 | 21.02 | 21.13 |
| DC-HSDPA Subtest-4 | 21.10 | 21.09 | 21.02 |
| HSUPA Subtest-1 | 21.59 | 21.77 | 21.44 |
| HSUPA Subtest-2 | 21.22 | 21.46 | 21.45 |
| HSUPA Subtest-3 | 21.65 | 21.87 | 21.60 |
| HSUPA Subtest-4 | 21.64 | 21.65 | 21.64 |
| HSUPA Subtest-5 | 21.57 | 21.54 | 21.39 |
| HSPA+ (16QAM) Subtest-1 | 21.65 | 21.63 | 21.46 |

| WCDMA Band II | Average Power (dBm) | | |
|---|---|---|---|
| **TX Channel** | **9262** | **9400** | **9538** |
| **Frequency (MHz)** | **1852.4** | **1880.0** | **1907.6** |
| RMC 12.2Kbps | 23.02 | 22.94 | 22.98 |
| HSDPA Subtest-1 | 21.80 | 21.67 | 21.71 |
| HSDPA Subtest-2 | 21.74 | 21.58 | 21.60 |
| HSDPA Subtest-3 | 21.25 | 21.06 | 20.96 |
| HSDPA Subtest-4 | 21.22 | 21.05 | 21.01 |
| DC-HSDPA Subtest-1 | 21.63 | 21.54 | 21.55 |
| DC-HSDPA Subtest-2 | 21.61 | 21.56 | 21.61 |
| DC-HSDPA Subtest-3 | 21.16 | 21.09 | 21.11 |
| DC-HSDPA Subtest-4 | 21.17 | 21.06 | 21.10 |
| HSUPA Subtest-1 | 21.87 | 21.66 | 21.49 |
| HSUPA Subtest-2 | 21.35 | 21.19 | 21.18 |
| HSUPA Subtest-3 | 21.77 | 21.68 | 21.36 |
| HSUPA Subtest-4 | 21.80 | 21.65 | 21.74 |
| HSUPA Subtest-5 | 21.85 | 21.64 | 21.55 |
| HSPA+ (16QAM) Subtest-1 | 21.93 | 21.83 | 21.48 |

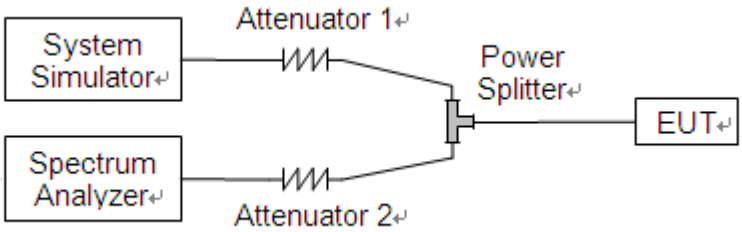
## 2.2. Peak to Average Ratio

### 2.2.1.Requirement

According to FCC 24.232(d) and 27.50(d), the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

### 2.2.2.Test Description

Test Setup:




The EUT is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum output power i.e. Power Control Level (PCL) = 5 and Power Class = 4. A call is established between the EUT and the SS.

### 2.2.3.Test procedure

1 .For GSM/EDGE operating mode:

a. Set RBW=1MHz, VBW=3MHz, peak detector in spectrum analyzer.
b. Set EUT in maximum output power, and triggered the bust signal.
c. Measured respectively the peak level and mean level, and the deviation was recorded as Peak to Average ratio.

2. For UMTS operating mode:

a. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
b. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1%.

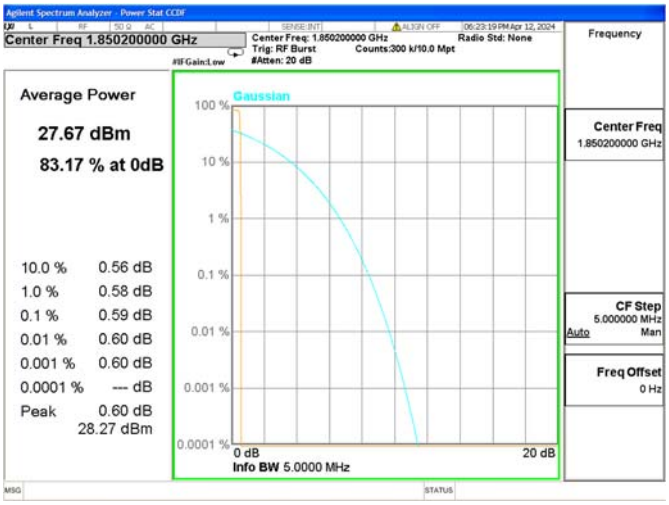
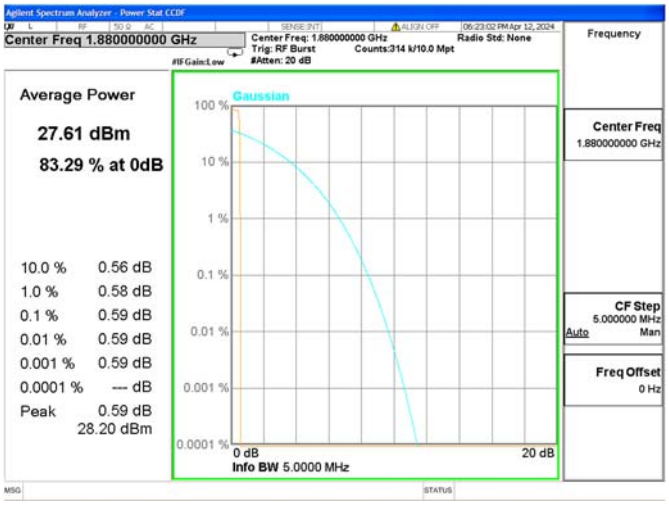
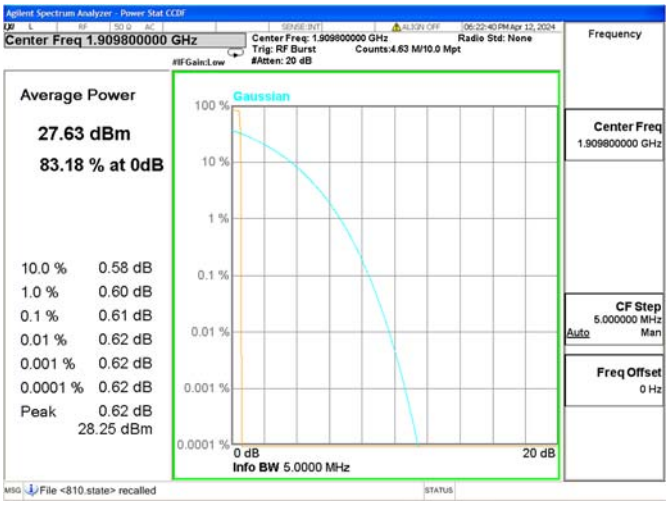
### 2.2.4.Test Result

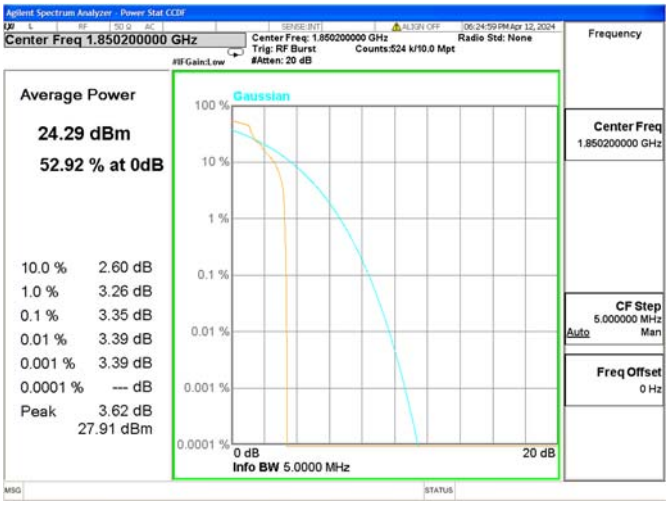
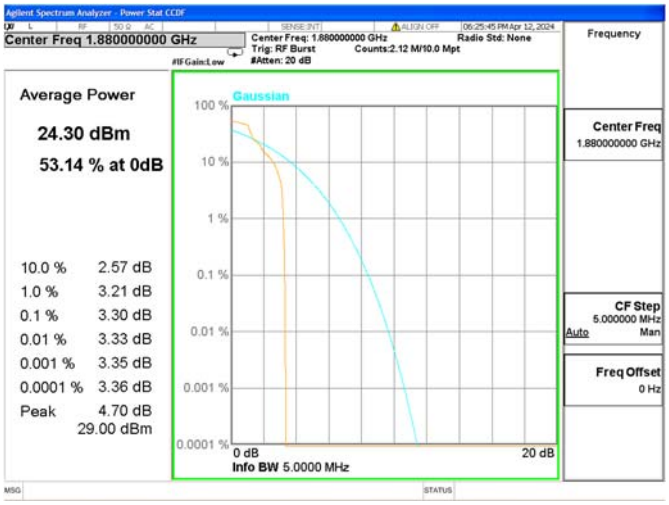
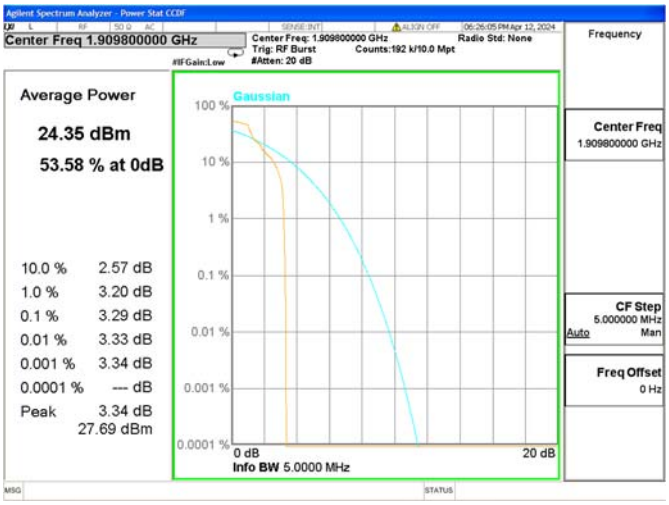
**A. Test Verdict:**

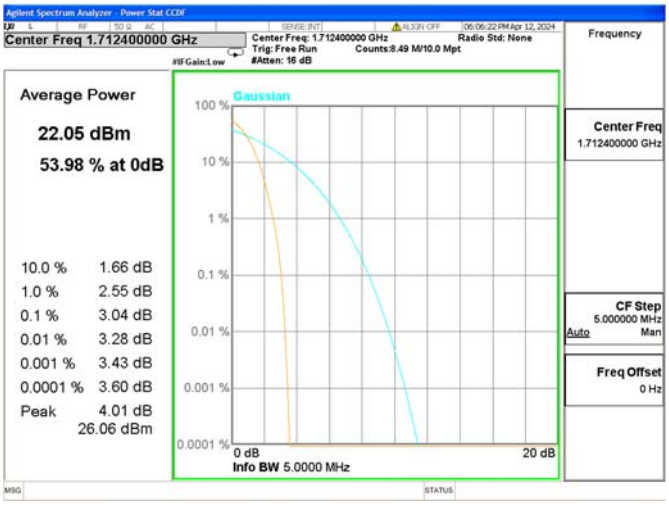
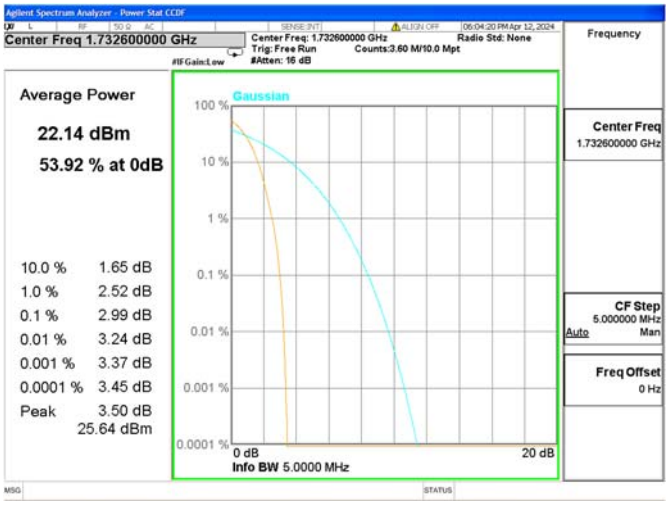
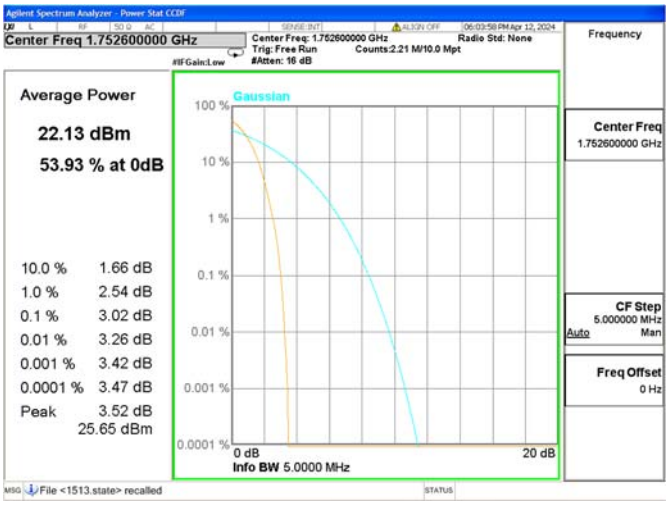
| GSM1900 | | | | | |
|---|---|---|---|---|---|
| **Mode** | **Channel** | **Frequency (MHz)** | **Peak to Average ratio (dB)** | **Limit (dB)** | **Verdict** |
| GSM | 512 | 1850.2 | 0.59 | 13 | PASS |
| | 661 | 1880.0 | 0.59 | | PASS |
| | 810 | 1909.8 | 0.61 | | PASS |
| EDGE | 512 | 1850.2 | 3.35 | | PASS |
| | 661 | 1880.0 | 3.30 | | PASS |
| | 810 | 1909.8 | 3.29 | | PASS |

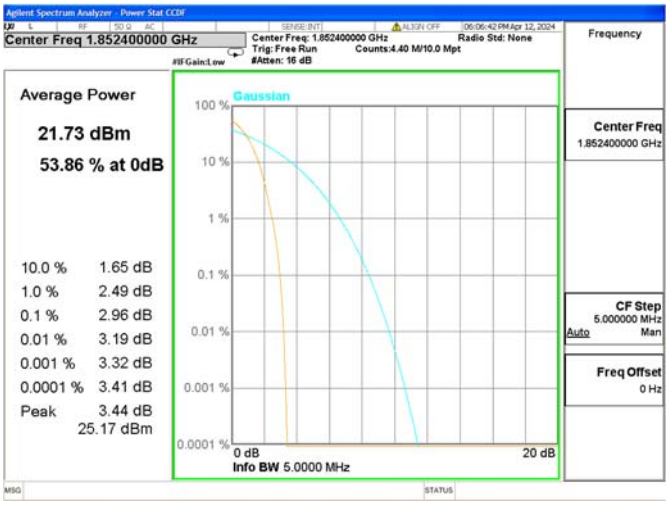
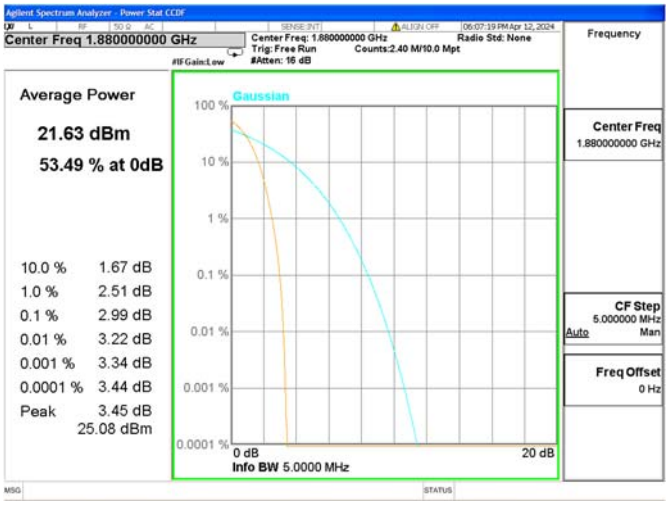
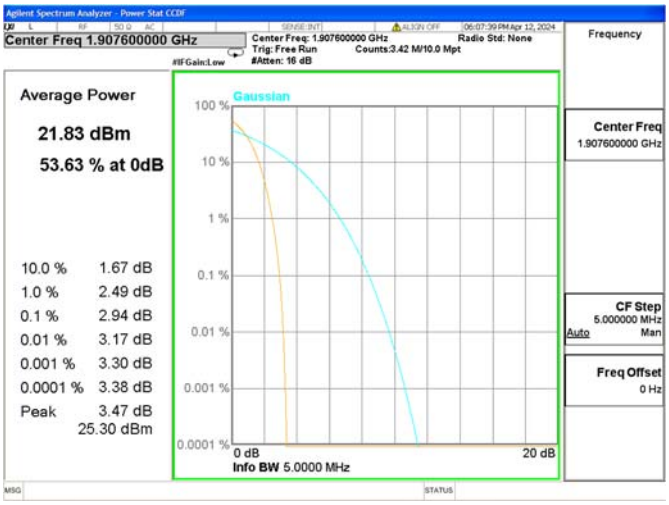
| WCDMA Band IV | | | | | |
|---|---|---|---|---|---|
| **Mode** | **Channel** | **Frequency (MHz)** | **Peak to Average ratio (dB)** | **Limit (dB)** | **Verdict** |
| WCDMA | 1312 | 1712.4 | 3.04 | 13 | PASS |
| | 1413 | 1732.6 | 2.99 | | PASS |
| | 1513 | 1752.6 | 3.02 | | PASS |

| WCDMA Band II | | | | | |
|---|---|---|---|---|---|
| **Mode** | **Channel** | **Frequency (MHz)** | **Peak to Average ratio (dB)** | **Limit (dB)** | **Verdict** |
| WCDMA | 9262 | 1852.4 | 2.96 | 13 | PASS |
| | 9400 | 1880.0 | 2.99 | | PASS |
| | 9538 | 1907.6 | 2.94 | | PASS |

| GSM1900(GSM), CH512, 1850.2MHz | GSM1900(GSM), CH661, 1880.0MHz |
|---|---|
|  |  |
| **GSM1900(GSM), CH810, 1909.8MHz** | |
|  | |

| GSM1900(EDGE), CH512, 1850.2MHz | GSM1900(EDGE), CH661, 1880.0MHz |
|---|---|
|  |  |
| **GSM1900(EDGE), CH810, 1909.8MHz** | |
|  | |

| WCDMA Band IV, CH1312, 1712.4MHz | WCDMA Band IV, CH1413, 1732.6MHz |
|---|---|
|  |  |
| **WCDMA Band IV, CH1513, 1752.6MHz** | |
|  | |

| WCDMA Band II, CH9262, 1852.4MHz | WCDMA Band II, CH9400, 1880.0MHz |
|---|---|
|  |  |
| **WCDMA Band II, CH9538, 1907.6MHz** | |
|  | |

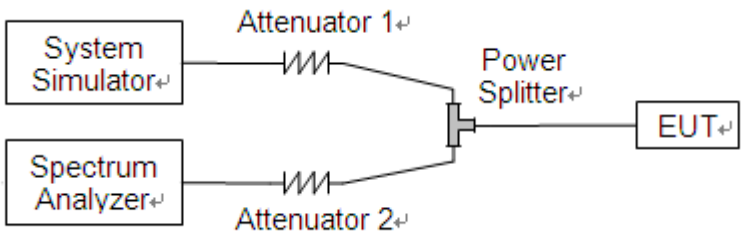
## 2.3. Occupied Bandwidth

### 2.3.1.Requirement

According to FCC section 2.1049, the occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission. Occupied bandwidth is also known as the 99% emission bandwidth.

### 2.3.2.Test Description

Test Setup:




The EUT is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum output power i.e. Power Control Level (PCL) = 5 and Power Class = 4. A call is established between the EUT and the SS.

### 2.3.3.Test Result

| GSM850 | | | | |
|---|---|---|---|---|
| **Mode** | **Channel** | **Frequency (MHz)** | **99% Occupied Bandwidth (kHz)** | **26dB Bandwidth (kHz)** |
| GSM | 128 | 824.2 | 244.67 | 309.6 |
| | 189 | 836.4 | 246.81 | 307.1 |
| | 251 | 848.8 | 245.40 | 318.9 |
| EDGE | 128 | 824.2 | 247.81 | 304.2 |
| | 189 | 836.4 | 241.42 | 296.7 |
| | 251 | 848.8 | 251.03 | 311.9 |

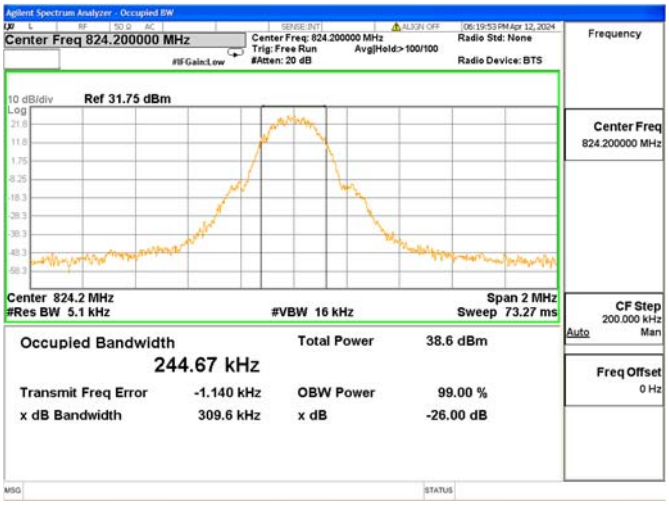
| GSM1900 | | | | |
|---|---|---|---|---|
| **Mode** | **Channel** | **Frequency (MHz)** | **99% Occupied Bandwidth (kHz)** | **26dB Bandwidth (kHz)** |
| GSM | 512 | 1850.2 | 245.53 | 319.1 |
| | 661 | 1880.0 | 243.50 | 314.7 |
| | 810 | 1909.8 | 250.42 | 312.1 |
| EDGE | 512 | 1850.2 | 243.28 | 300.9 |
| | 661 | 1880.0 | 245.83 | 305.8 |
| | 810 | 1909.8 | 246.19 | 301.2 |

| WCDMA Band V | | | | |
|---|---|---|---|---|
| **Mode** | **Channel** | **Frequency (MHz)** | **99% Occupied Bandwidth (MHz)** | **26dB Bandwidth (MHz)** |
| WCDMA | 4132 | 826.4 | 4.14 | 4.74 |
| | 4182 | 836.4 | 4.14 | 4.69 |
| | 4233 | 846.6 | 4.14 | 4.71 |

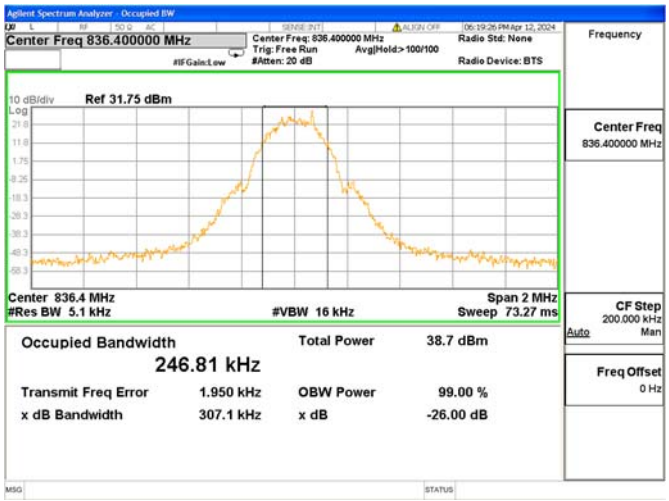
| WCDMA Band IV | | | | |
|---|---|---|---|---|
| **Mode** | **Channel** | **Frequency (MHz)** | **99% Occupied Bandwidth (MHz)** | **26dB Bandwidth (MHz)** |
| WCDMA | 1312 | 1712.4 | 4.14 | 4.70 |
| | 1413 | 1732.6 | 4.15 | 4.74 |
| | 1513 | 1752.6 | 4.14 | 4.72 |

| WCDMA Band II | | | | |
|---|---|---|---|---|
| **Mode** | **Channel** | **Frequency (MHz)** | **99% Occupied Bandwidth (MHz)** | **26dB Bandwidth (MHz)** |
| WCDMA | 9262 | 1852.4 | 4.15 | 4.71 |
| | 9400 | 1880.0 | 4.15 | 4.73 |
| | 9538 | 1907.6 | 4.15 | 4.73 |

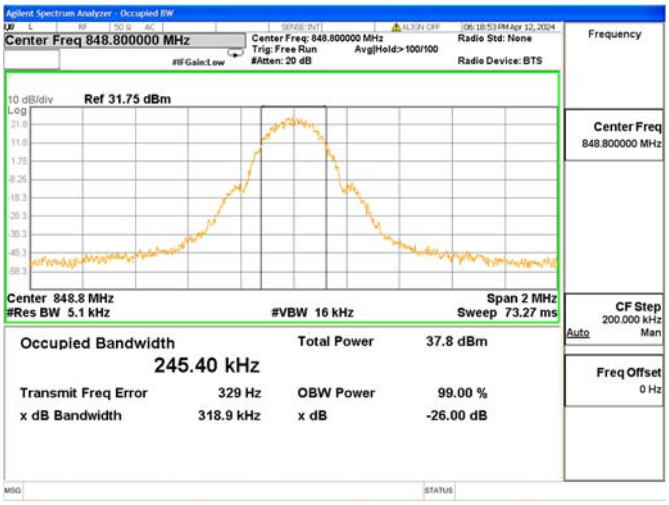
**GSM850(GSM), CH128, 824.2MHz**

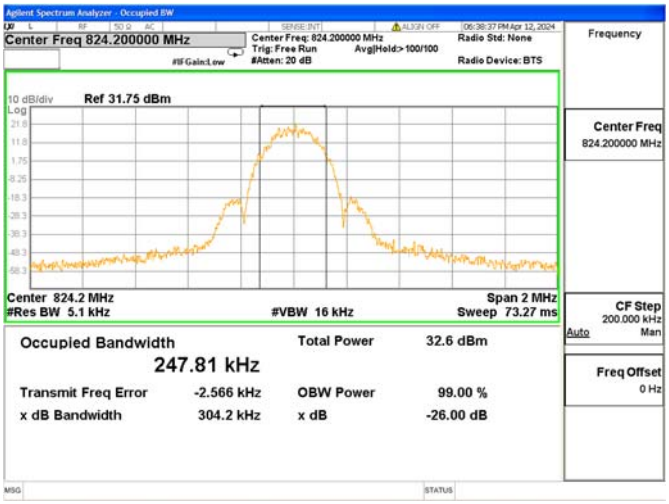
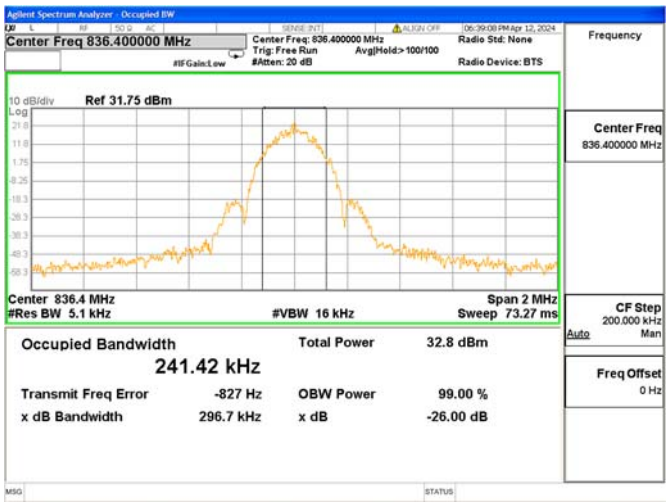
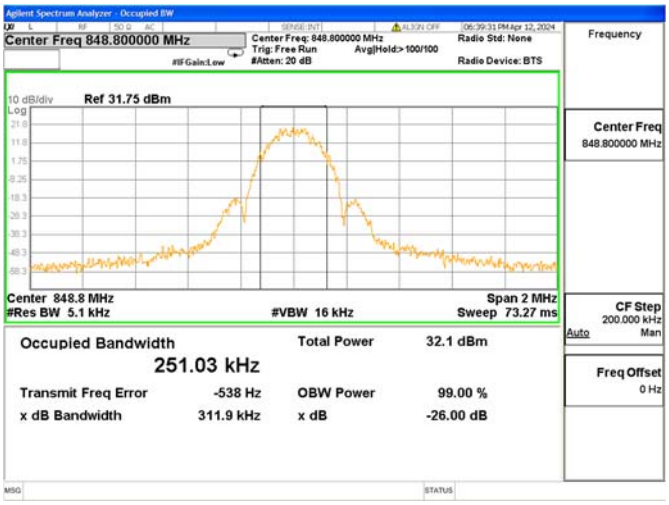


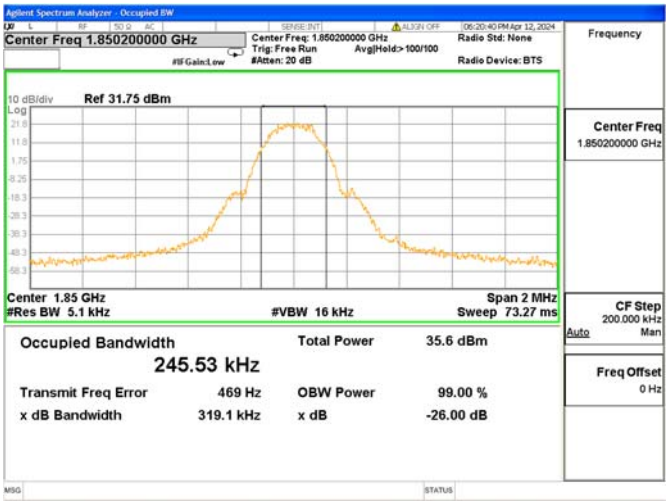
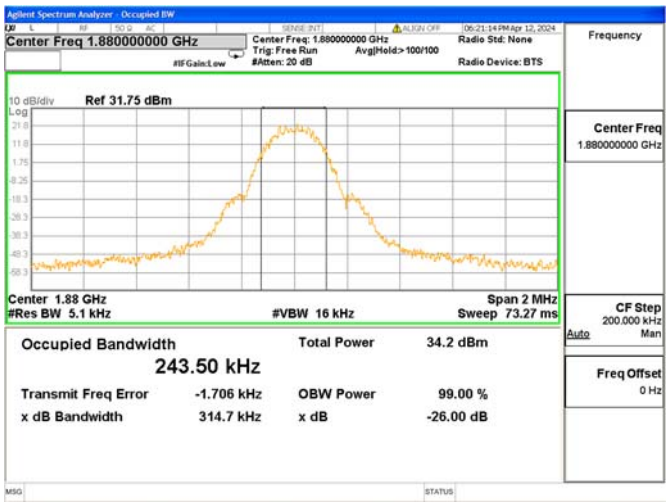
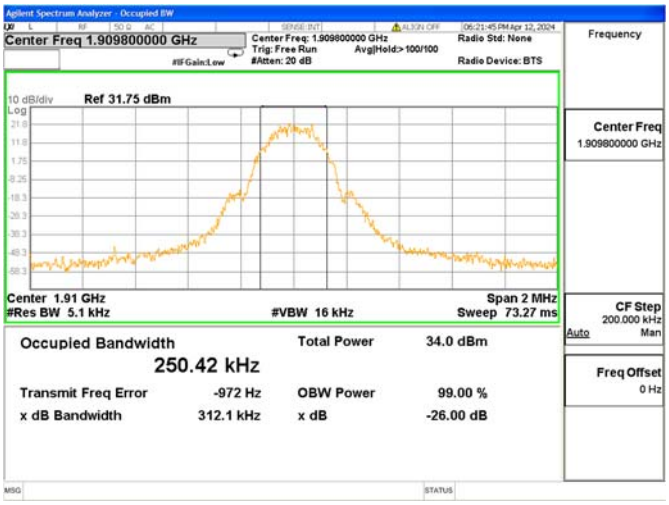

**GSM850(GSM), CH189, 836.4MHz**

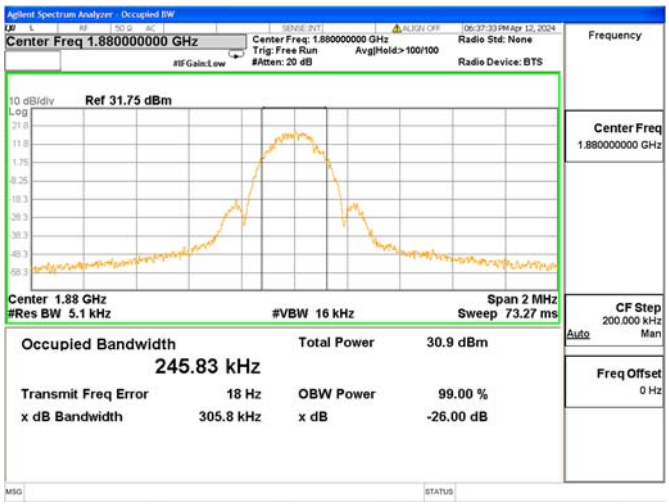
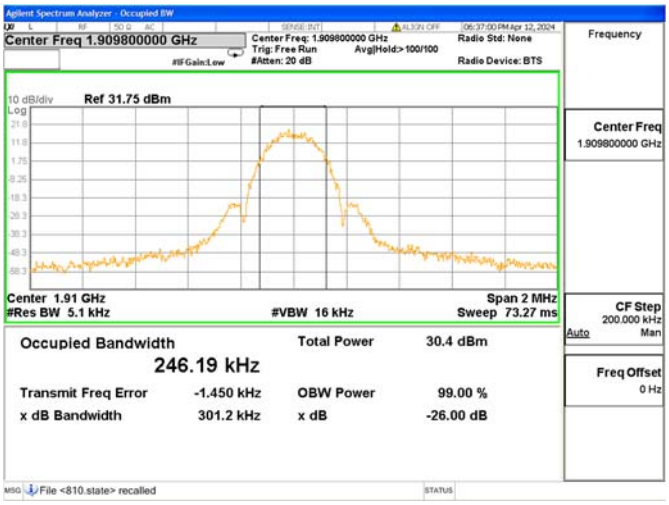



**GSM850(GSM), CH251, 848.8MHz**

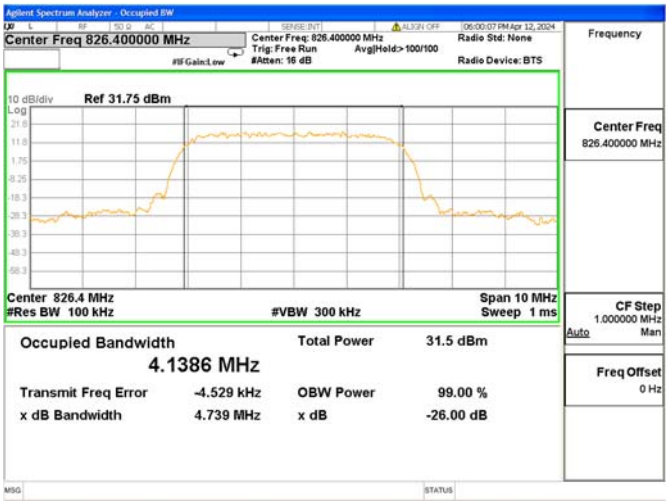


| GSM850(EDGE), CH128, 824.2MHz | GSM850(EDGE), CH189, 836.4MHz |
|---|---|
|  |  |
| **GSM850(EDGE), CH251, 848.8MHz** | |
|  | |

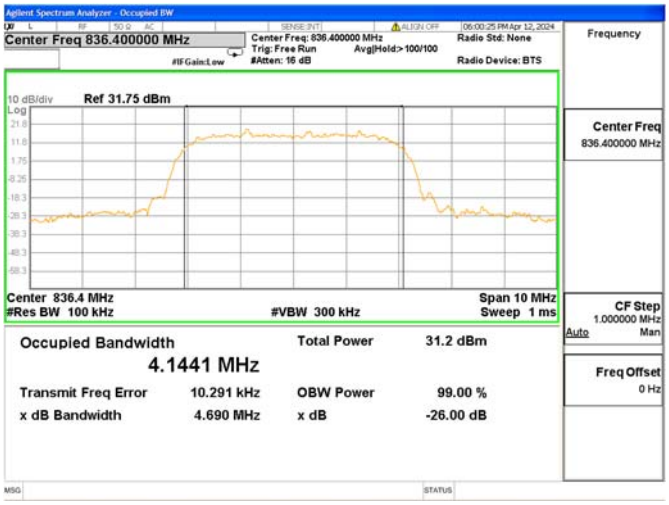
| GSM1900(GSM), CH512, 1850.2MHz | GSM1900(GSM), CH661, 1880.0MHz |
|---|---|
|  |  |
| **GSM1900(GSM), CH810, 1909.8MHz** | |
|  | |

| GSM1900(EDGE), CH512, 1850.2MHz | GSM1900(EDGE), CH661, 1880.0MHz |
|---|---|
| |  |
| **GSM1900(EDGE), CH810, 1909.8MHz** | |
|  | |

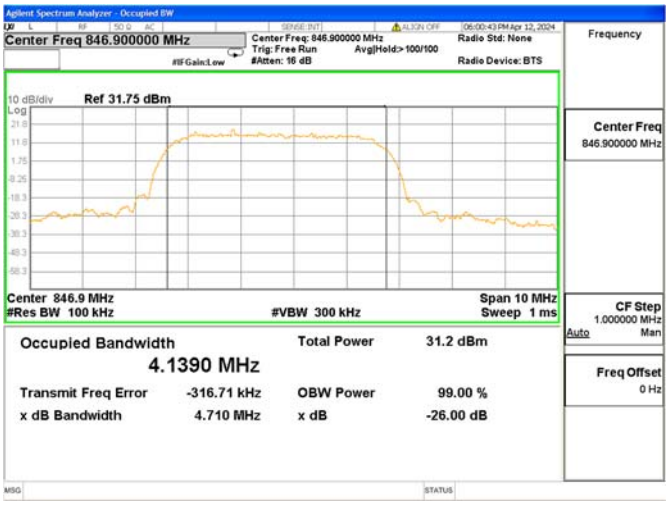
## WCDMA Band V, CH4132, 826.4MHz



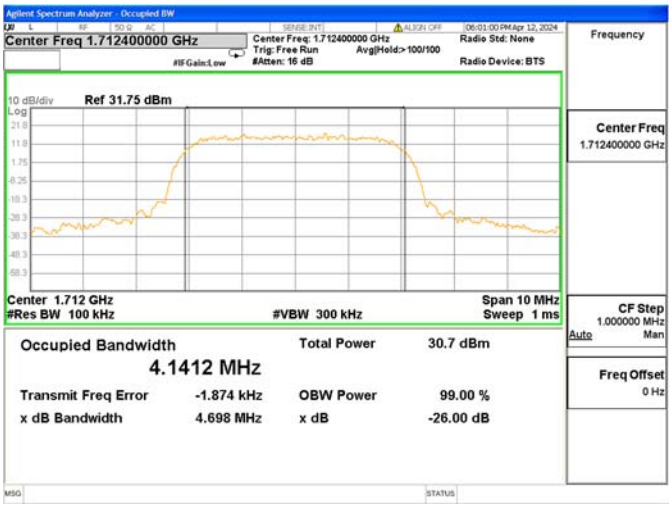

## WCDMA Band V, CH4182, 836.4MHz



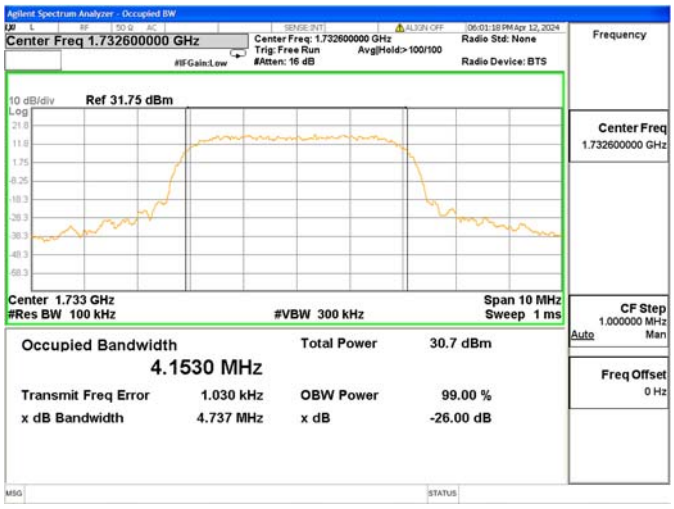

## WCDMA Band V, CH4233, 846.6MHz



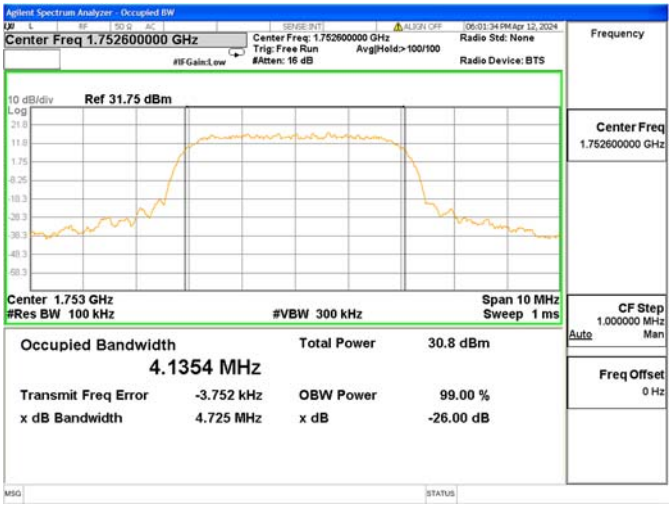
## WCDMA Band IV, CH1312, 1712.4MHz



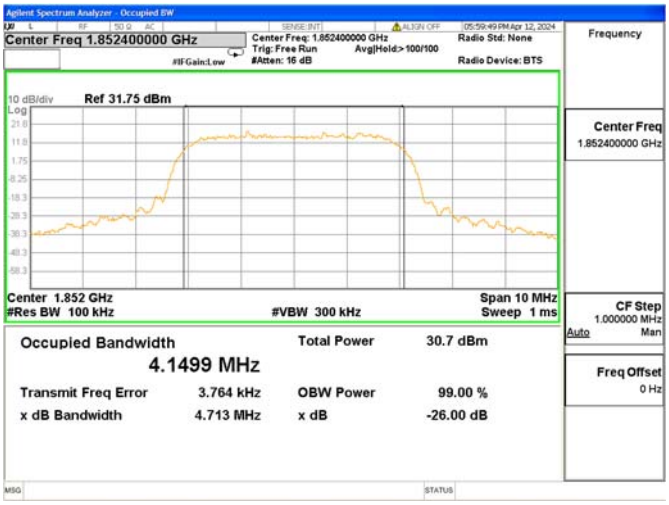

## WCDMA Band IV, CH1413, 1732.6MHz




## WCDMA Band IV, CH1513, 1752.6MHz

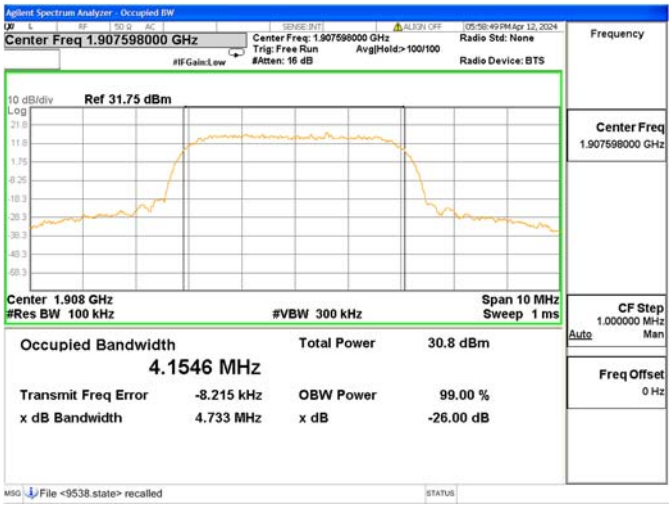


## WCDMA Band II, CH9262, 1852.4MHz




## WCDMA Band II, CH9400, 1880.0MHz

## WCDMA Band II, CH9538, 1907.6MHz



## 2.4. Frequency Stability

### 2.4.1.Requirement

According to FCC section 22.355, 24.235 and 27.54 the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. According to FCC section 2.1055, the test conditions are:

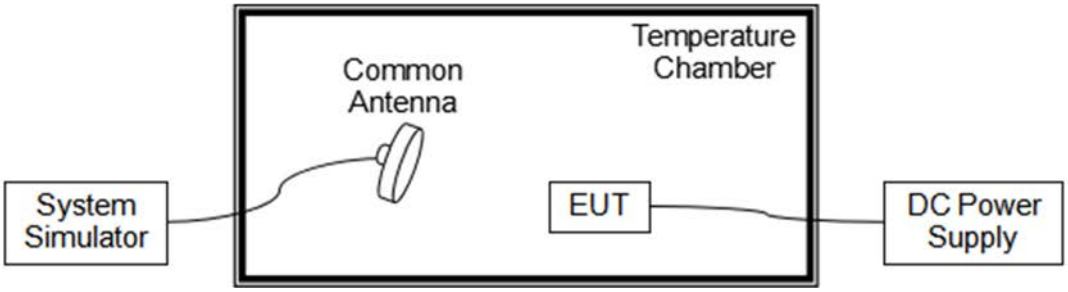
(a) The temperature is varied from-30°C to +50°C at intervals of not more than 10°C.

(b) For hand carried battery powered equipment, the primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacture. The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided.

**Note:** The operating temperature of EUT is from 0°C to 40°C, which are specified by the applicant.

### 2.4.2.Test Description

Test Setup:




The EUT, which is powered by the DC Power Supply directly, is located in the Temperature Chamber. The EUT is commanded by the System Simulator (SS) to operate at the maximum output power i.e. Power Control Level (PCL) = 5 and Power Class = 4. A call is established between the EUT and the SS via a Common Antenna.

### 2.4.3.Test Result

The nominal, highest and lowest extreme voltages are separately 3.87V, 4.45V and 3.40V, which are specified by the applicant; the normal temperature here used is 20°C.

| GSM850(GSM), CH189, 836.4MHz<br>Limit =±2.5ppm | | | | | |
|---|---|---|---|---|---|
| **Voltage (%)** | **Power (VDC)** | **Temp (°C)** | **Fre. Dev. (Hz)** | **Deviation (ppm)** | **Result** |
| Normal | 3.87 | +20(Ref) | 5 | 0.006 | PASS |
| Normal | | 0 | 17 | 0.020 | |
| Normal | | +10 | -21 | -0.025 | |
| Normal | | +20 | 13 | 0.016 | |
| Normal | | +30 | 15 | 0.018 | |
| Normal | | +40 | 20 | **0.024** | |
| High | 4.45 | +20 | 13 | 0.016 | |
| BATT.ENDPOINT | 3.40 | +20 | -19 | -0.023 | |

| GSM850(EDGE), CH189, 836.4MHz<br>Limit =±2.5ppm | | | | | |
|---|---|---|---|---|---|
| **Voltage (%)** | **Power (VDC)** | **Temp (°C)** | **Fre. Dev. (Hz)** | **Deviation (ppm)** | **Result** |
| Normal | 3.87 | +20(Ref) | 16 | 0.019 | PASS |
| Normal | | 0 | 20 | **0.024** | |
| Normal | | +10 | 16 | 0.019 | |
| Normal | | +20 | 18 | 0.022 | |
| Normal | | +30 | -1 | -0.001 | |
| Normal | | +40 | 18 | 0.022 | |
| High | 4.45 | +20 | 17 | 0.020 | |
| BATT.ENDPOINT | 3.40 | +20 | 19 | 0.023 | |

| GSM1900(GSM), CH661, 1880.0MHz<br>Limit =Within Authorized Band | | | | | |
|---|---|---|---|---|---|
| **Voltage (%)** | **Power (VDC)** | **Temp (°C)** | **Fre. Dev. (Hz)** | **Deviation (ppm)** | **Result** |
| Normal | 3.87 | +20(Ref) | 14 | 0.007 | PASS |
| Normal | | 0 | 19 | 0.010 | |
| Normal | | +10 | 20 | **0.011** | |
| Normal | | +20 | 16 | 0.009 | |
| Normal | | +30 | -21 | -0.011 | |
| Normal | | +40 | -19 | -0.010 | |
| High | 4.45 | +20 | 5 | 0.003 | |
| BATT.ENDPOINT | 3.40 | +20 | 16 | 0.009 | |

| GSM1900(EDGE), CH661, 1880.0MHz<br>Limit =Within Authorized Band | | | | | |
|---|---|---|---|---|---|
| **Voltage (%)** | **Power (VDC)** | **Temp (°C)** | **Fre. Dev. (Hz)** | **Deviation (ppm)** | **Result** |
| Normal | 3.87 | +20(Ref) | -13 | -0.007 | PASS |
| Normal | | 0 | -11 | -0.006 | |
| Normal | | +10 | 20 | **0.011** | |
| Normal | | +20 | 14 | 0.007 | |
| Normal | | +30 | 14 | 0.007 | |
| Normal | | +40 | 17 | 0.009 | |
| High | 4.45 | +20 | -22 | -0.012 | |
| BATT.ENDPOINT | 3.40 | +20 | -17 | -0.009 | |

| WCDMA Band V, CH4182, 836.4MHz<br>Limit =±2.5ppm | | | | | |
|---|---|---|---|---|---|
| **Voltage (%)** | **Power (VDC)** | **Temp (°C)** | **Fre. Dev. (Hz)** | **Deviation (ppm)** | **Result** |
| Normal | 3.87 | +20(Ref) | 10 | 0.012 | PASS |
| Normal | | 0 | 15 | 0.018 | |
| Normal | | +10 | 16 | 0.019 | |
| Normal | | +20 | 14 | 0.017 | |
| Normal | | +30 | -8 | -0.010 | |
| Normal | | +40 | 19 | **0.023** | |
| High | 4.45 | +20 | 13 | 0.016 | |
| BATT.ENDPOINT | 3.40 | +20 | 18 | 0.022 | |

| WCDMA Band IV, CH1413, 1732.6MHz<br>Limit =Within Authorized Band | | | | | |
|---|---|---|---|---|---|
| **Voltage (%)** | **Power (VDC)** | **Temp (°C)** | **Fre. Dev. (Hz)** | **Deviation (ppm)** | **Result** |
| Normal | 7.78 | +20(Ref) | 16 | 0.009 | PASS |
| Normal | | 0 | 16 | 0.009 | |
| Normal | | +10 | 18 | 0.010 | |
| Normal | | +20 | 15 | 0.009 | |
| Normal | | +30 | -11 | -0.006 | |
| Normal | | +40 | 18 | 0.010 | |
| High | 8.96 | +20 | 20 | **0.012** | |
| BATT.ENDPOINT | 6.30 | +20 | -3 | -0.002 | |

| WCDMA Band II, CH9400, 1880.0MHz<br>Limit =Within Authorized Band | | | | | |
|---|---|---|---|---|---|
| **Voltage (%)** | **Power (VDC)** | **Temp (°C)** | **Fre. Dev. (Hz)** | **Deviation (ppm)** | **Result** |
| Normal | 3.87 | +20(Ref) | -4 | -0.002 | PASS |
| Normal | | 0 | 16 | **0.009** | |
| Normal | | +10 | 15 | 0.008 | |
| Normal | | +20 | -15 | -0.008 | |
| Normal | | +30 | -4 | -0.002 | |
| Normal | | +40 | 14 | 0.007 | |
| High | 4.45 | +20 | 15 | 0.008 | |
| BATT.ENDPOINT | 3.40 | +20 | -15 | -0.008 | |

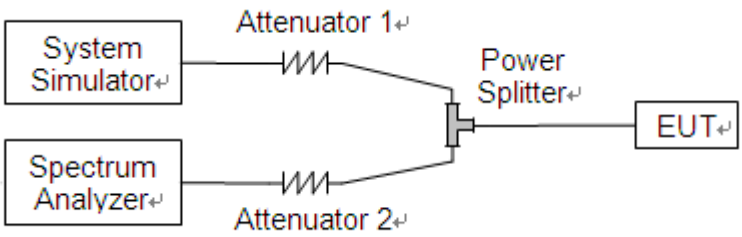
# 2.5. Conducted Out of Band Emissions

### 2.5.1. Requirement

According to FCC section 22.917(a), 24.238(a) and 27.53(h) the 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. This calculated to be -13dBm. The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency.

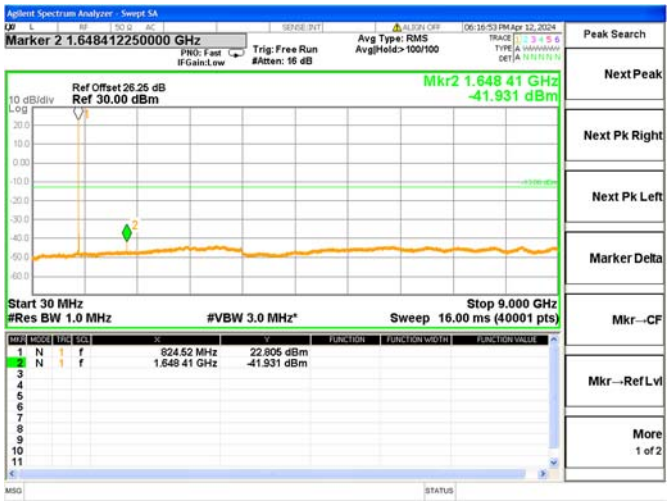
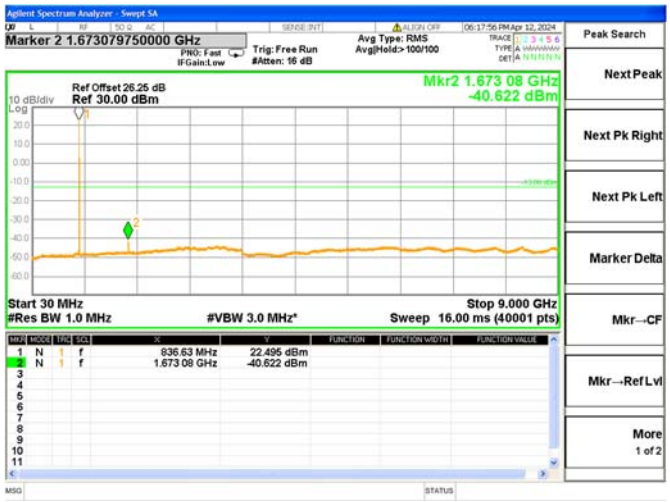
### 2.5.2. Test Description

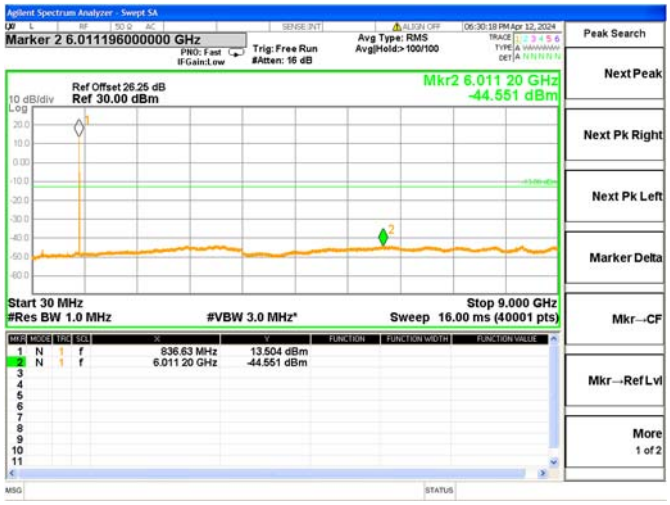
Test Setup:

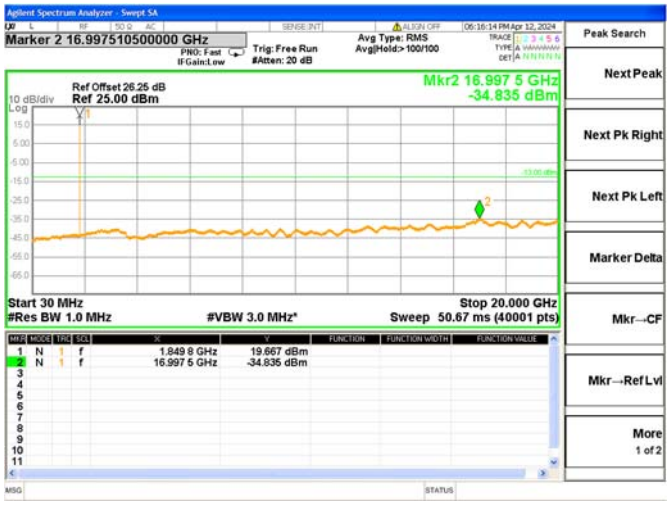
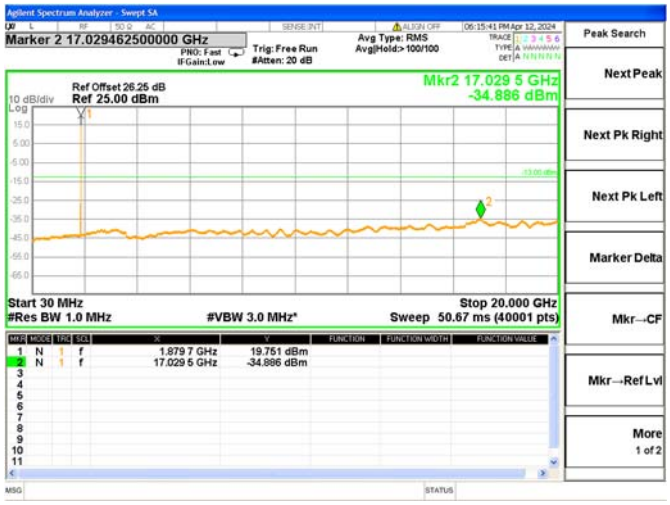
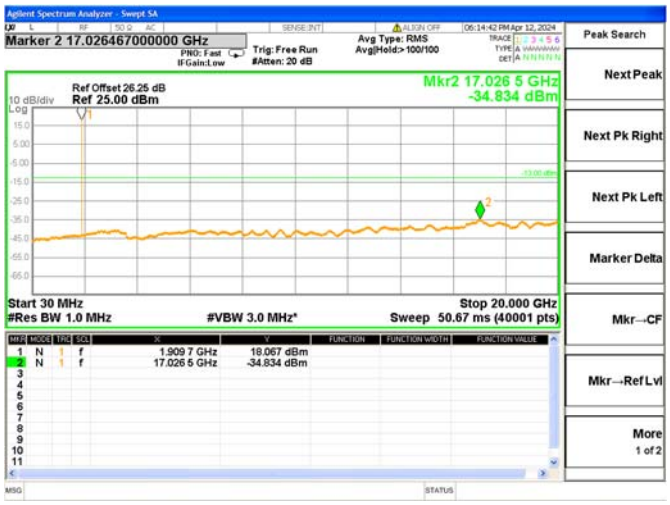


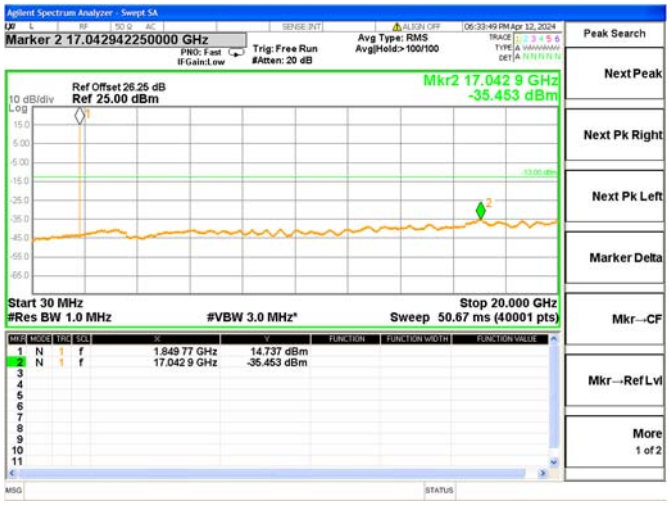
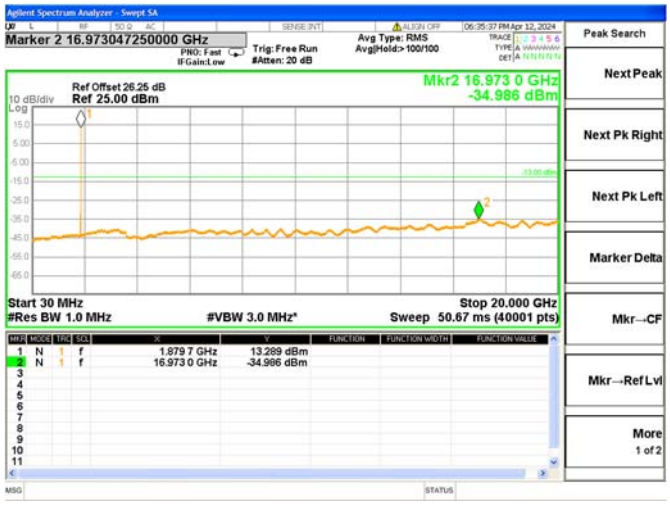
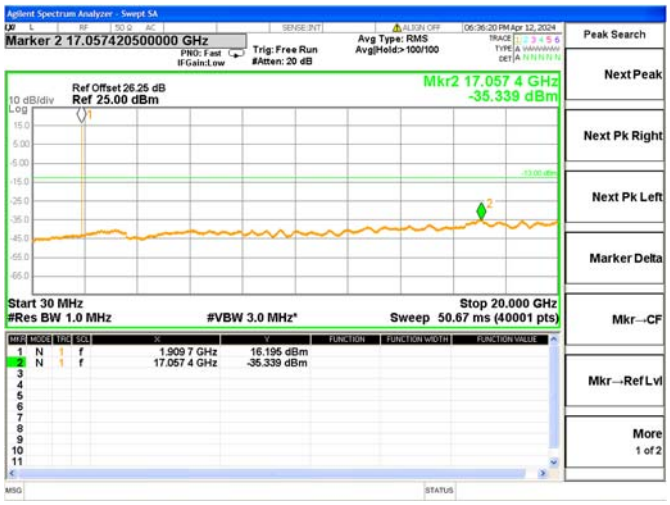

The EUT is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum output power i.e. Power Control Level (PCL) = 5 and Power Class = 4. A call is established between the EUT and the SS.

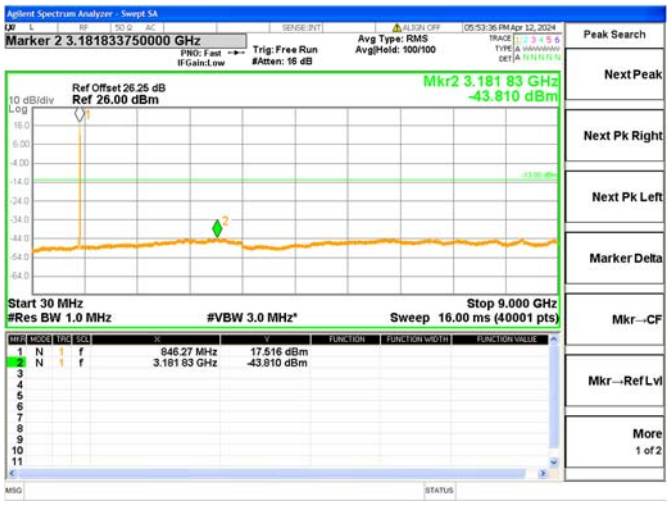
### 2.5.3.Test Result

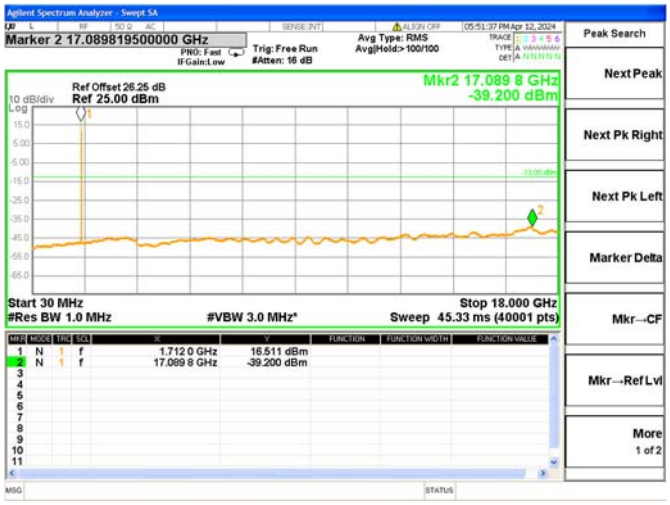
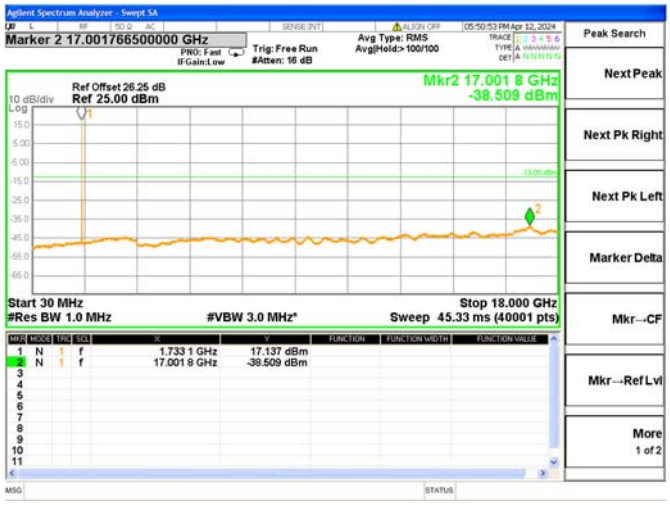
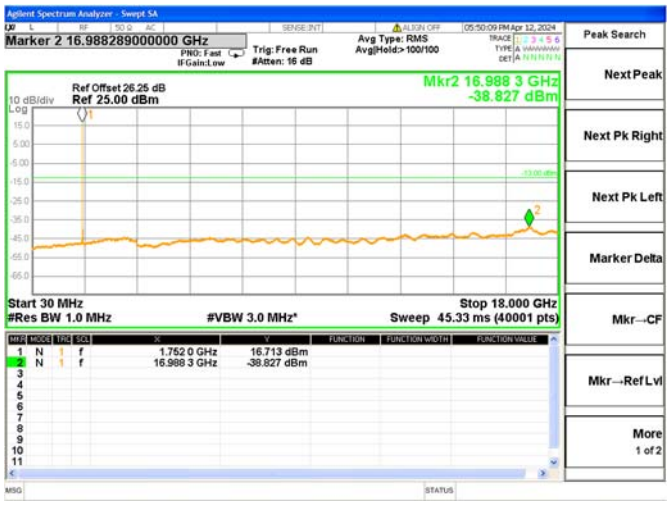
| GSM850(GSM), CH128, 824.2MHz | GSM850(GSM), CH189, 836.4MHz |
|---|---|
|  |  |
| **GSM850(GSM), CH251, 848.8MHz** | |
| | |

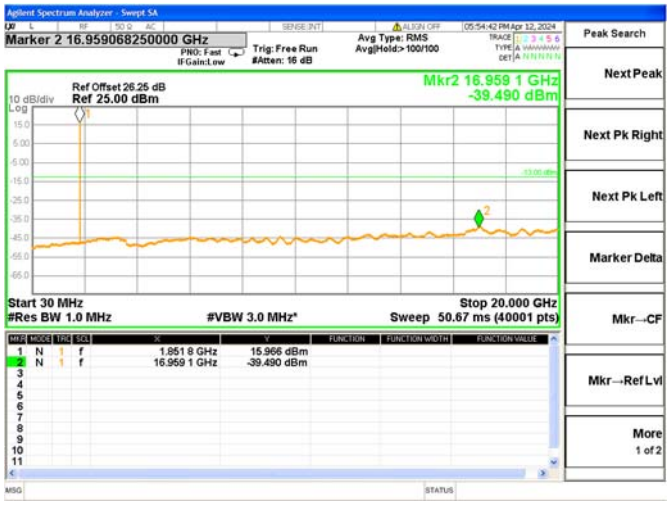
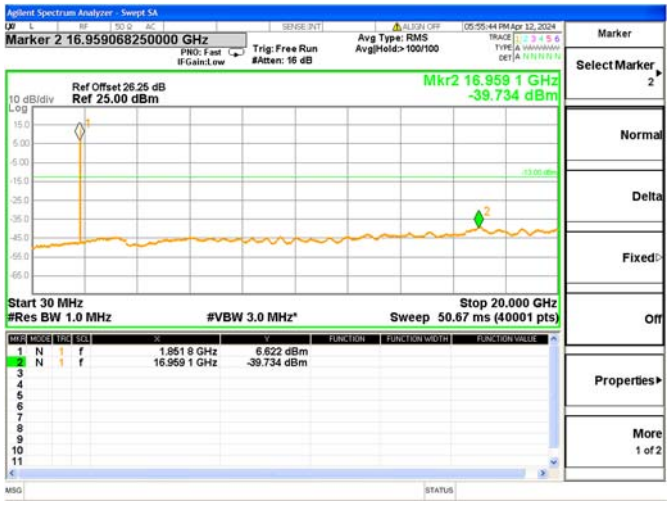
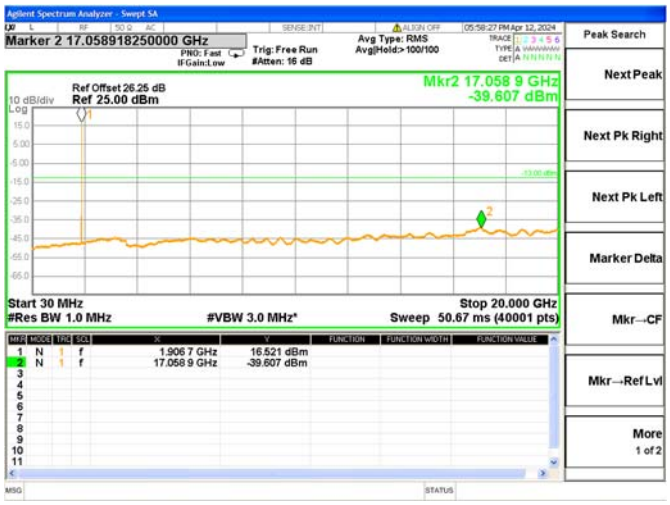
| GSM850(EDGE), CH128, 824.2MHz | GSM850(EDGE), CH189, 836.4MHz |
|---|---|
| |  |
| **GSM850(EDGE), CH251, 848.8MHz** | |
| | |

| GSM1900(GSM), CH512, 1850.2MHz | GSM1900(GSM), CH661, 1880.0MHz |
|---|---|
|  |  |
| **GSM1900(GSM), CH810, 1909.8MHz** | |
|  | |

| GSM1900(EDGE), CH512, 1850.2MHz | GSM1900(EDGE), CH661, 1880.0MHz |
|---|---|
|  |  |
| **GSM1900(EDGE), CH810, 1909.8MHz** | |
|  | |

| WCDMA Band V, CH4132, 826.4MHz | WCDMA Band V, CH4182, 836.4MHz |
|---|---|
| | |
| **WCDMA Band V, CH4233, 846.6MHz** | |
|  | |

| WCDMA Band IV,CH1312, 1712.4MHz | WCDMA Band IV, CH1413, 1732.6MHz |
|---|---|
|  |  |
| **WCDMA Band IV, CH1513, 1752.6MHz** | |
|  | |

| WCDMA Band II, CH9262, 1852.4MHz | WCDMA Band II, CH9400, 1880.0MHz |
|---|---|
|  |  |
| **WCDMA Band II, CH9538, 1907.6MHz** | |
|  | |

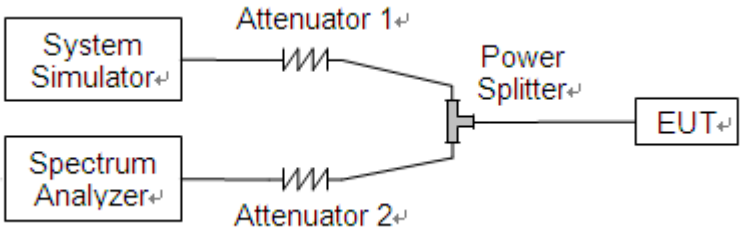
# 2.6. Band Edge

### 2.6.1.Requirement

According to FCC section 22.917(a), 24.238(a) and 27.53(h) the 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.

### 2.6.2.Test Description

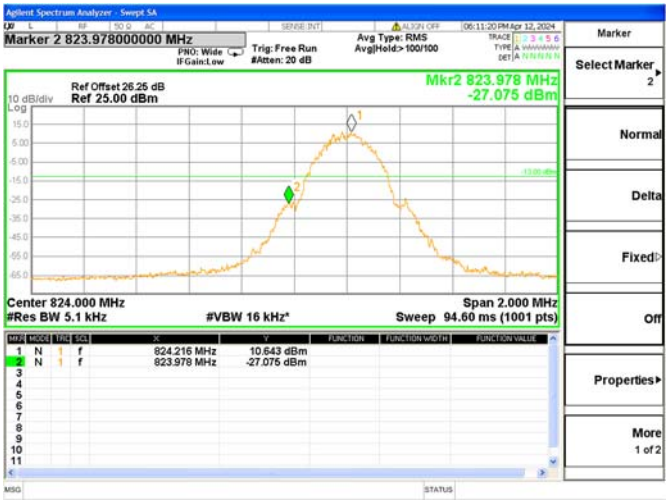
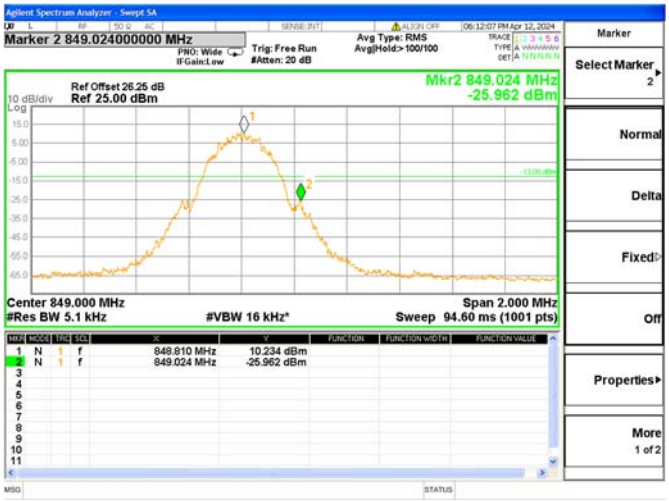
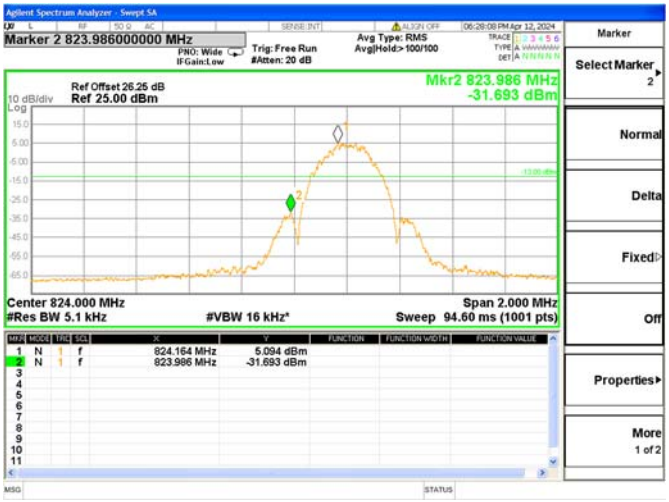
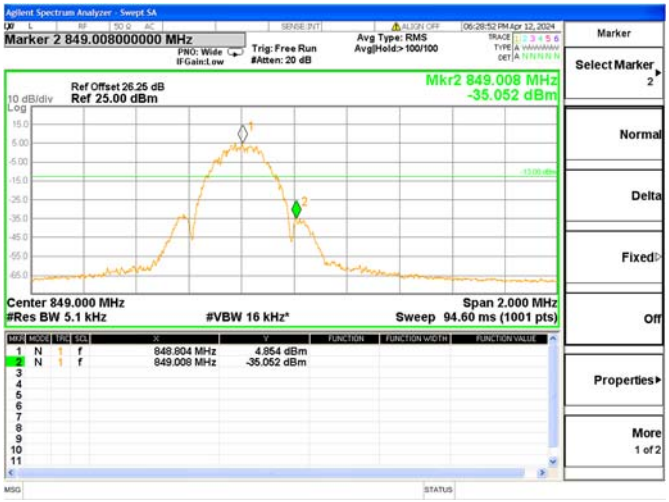
Test Setup:



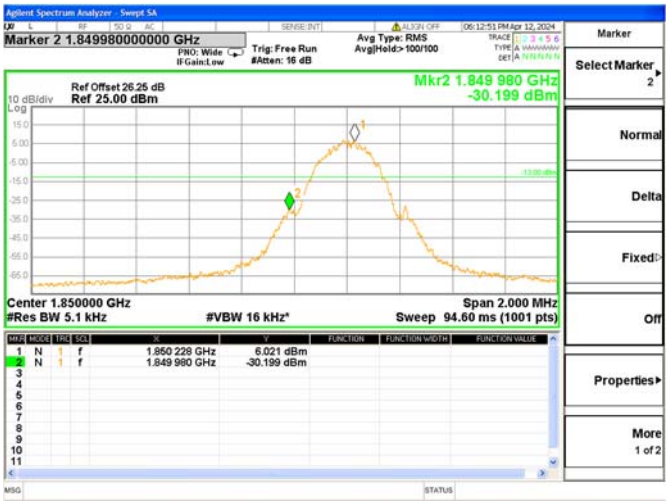

The EUT is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum output power i.e. Power Control Level (PCL) = 5 and Power Class = 4. A call is established between the EUT and the SS.

### 2.6.3.Test Result

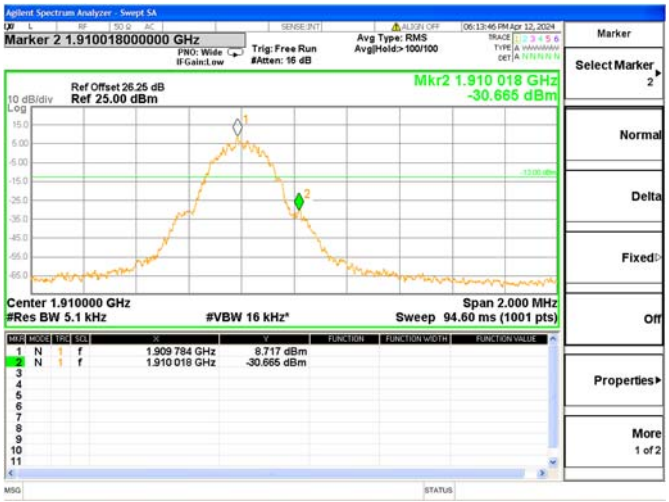
The lowest and highest channels are tested to verify the band edge emissions.

| GSM850(GSM), CH128, 824.2MHz | GSM850(GSM), CH251, 848.8MHz |
|---|---|
|  |  |
| **GSM850(EDGE), CH128, 824.2MHz** | **GSM850(EDGE), CH251, 848.8MHz** |
|  |  |

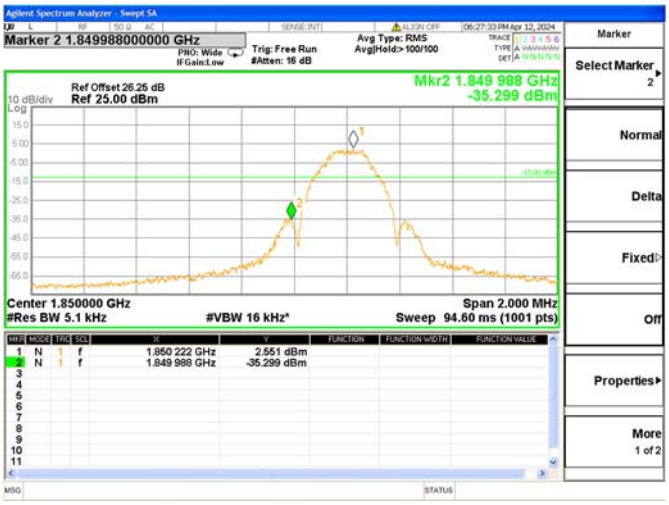
**GSM1900(GSM), CH512, 1850.2MHz**



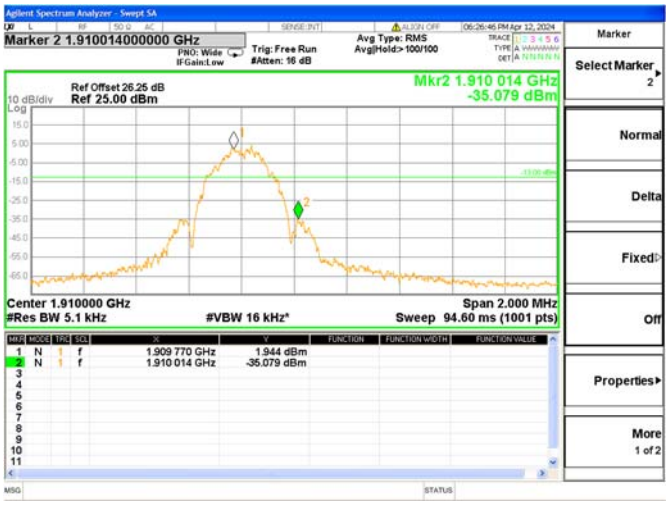

**GSM1900(GSM), CH810, 1909.8MHz**



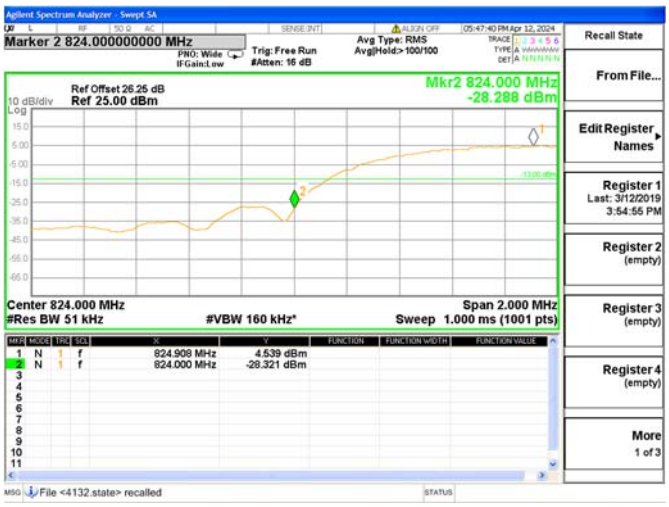

**GSM1900(EDGE), CH512, 1850.2MHz**



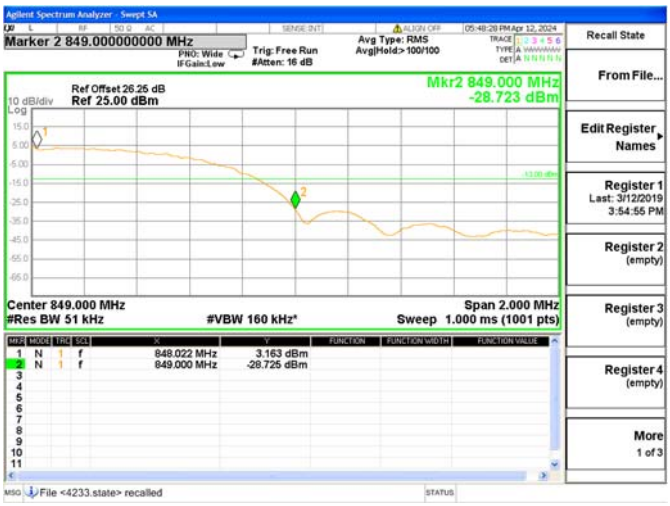

**GSM1900(EDGE), CH810, 1909.8MHz**



## WCDMA Band V, CH4132, 826.4MHz




## WCDMA Band V, CH4233, 846.6MHz




## WCDMA Band IV, CH1312, 1712.4MHz

## WCDMA Band IV, CH1513, 1752.6MHz

## WCDMA Band II, CH9262, 1852.4MHz

## WCDMA Band II, CH9538, 1907.6MHz

# 2.7. Determining E.R.P. and/or E.I.R.P. from conducted RF output power measurements

### 2.7.1. Requirement

According to FCC section 22.913, the Effective Radiated Power (E.R.P.) of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.
According to FCC section 24.232, the broadband PCS mobile station is limited to 2 Watts e.i.r.p. peak power.
According to FCC section 27.50, mobile, and portable (hand-held) stations is limited to 1 Watts e.i.r.p. peak power.

### 2.7.2. Test Description

The test setups refer to section 2.1.3
A call is established between the EUT and the SS via a Common Antenna. The EUT is commanded by the SS to operate at the maximum and minimum output power (i.e. GSM850MHz band Power Control Level (PCL) = 5/19 and Power Class = 4, GSM1900MHz band Power Control Level (PCL) = 0/15 and Power Class = 1), and only the test result of the maximum output power was recorded. Please refer to section 2.1.3 of this report.
The relevant equation for determining the maximum E.R.P. or E.I.R.P. from the measured RF output power is given in Equation (1) as follows:
E.R.P. or E.I.R.P. = $P_{Meas} + G_T$
Where:
E.R.P. or E.I.R.P. effective radiated power or equivalent isotropically radiated power, respectively (expressed in the same units as $P_{Meas}$, e.g., dBm or dBW)
$P_{Meas}$ measured transmitter output power or PSD, in dBm or dBW
$G_T$ gain of the transmitting antenna, in dBd (E.R.P.) or dBi (E.I.R.P.)
For devices utilizing multiple antennas, see ANSI C63.25-2015 6.4 for guidance with respect to determining the effective array transmit antenna gain term to be used in the above equation.
The following equations demonstrate the mathematical relationship between E.R.P. and E.I.R.P.:
a) E.R.P. = E.I.R.P. − 2.15, where E.R.P. and E.I.R.P. are expressed in consistent units.
b) E.I.R.P. = E.R.P. + 2.15, where E.R.P. and E.I.R.P. are expressed in consistent units.

### 2.7.3.Test Result

| GSM850 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Band | Channel | Frequency (MHz) | PCL | Measured E.R.P. | | Limit | | Verdict |
| | | | | dBm | W | dBm | W | |
| GSM | 128 | 824.20 | 5 | 27.91 | 0.618 | 38.5 | 7 | PASS |
| | 189 | 836.40 | 5 | 27.74 | 0.594 | | | PASS |
| | 251 | 848.80 | 5 | 27.71 | 0.590 | | | PASS |
| GPRS | 128 | 824.20 | 5 | 27.95 | 0.624 | 38.5 | 7 | PASS |
| | 189 | 836.40 | 5 | 27.77 | 0.598 | | | PASS |
| | 251 | 848.80 | 5 | 27.74 | 0.594 | | | PASS |
| EDGE | 128 | 824.20 | 5 | 22.39 | 0.173 | 38.5 | 7 | PASS |
| | 189 | 836.40 | 5 | 22.29 | 0.169 | | | PASS |
| | 251 | 848.80 | 5 | 22.25 | 0.168 | | | PASS |
| **Note 1:** For the GPRS and EDGE mode, all the slots were tested and just the worst data were recorded in this report. | | | | | | | | |

| GSM1900 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Band | Channel | Frequency (MHz) | PCL | Measured E.I.R.P. | | Limit | | Verdict |
| | | | | dBm | W | dBm | W | |
| GSM | 512 | 1850.2 | 0 | 29.66 | 0.925 | 33 | 2 | PASS |
| | 661 | 1880.0 | 0 | 29.69 | 0.931 | | | PASS |
| | 810 | 1909.8 | 0 | 29.61 | 0.914 | | | PASS |
| GPRS | 512 | 1850.2 | 0 | 29.68 | 0.929 | 33 | 2 | PASS |
| | 661 | 1880.0 | 0 | 29.71 | 0.935 | | | PASS |
| | 810 | 1909.8 | 0 | 29.63 | 0.918 | | | PASS |
| EDGE | 512 | 1850.2 | 0 | 25.76 | 0.377 | 33 | 2 | PASS |
| | 661 | 1880.0 | 0 | 25.67 | 0.369 | | | PASS |
| | 810 | 1909.8 | 0 | 25.54 | 0.358 | | | PASS |
| **Note 1:** For the GPRS and EDGE mode, all the slots were tested and just the worst data were recorded in this report. | | | | | | | | |

| WCDMA Band V | | | | | | | |
|---|---|---|---|---|---|---|---|
| Band | Channel | Frequency (MHz) | Measured E.R.P. | | Limit | | Verdict |
| | | | dBm | W | dBm | W | |
| WCDMA | 4132 | 826.4 | 18.33 | 0.068 | 38.5 | 7 | PASS |
| | 4182 | 836.4 | 18.35 | 0.068 | | | PASS |
| | 4233 | 846.6 | 18.29 | 0.067 | | | PASS |
| HSDPA | 4132 | 826.4 | 17.65 | 0.058 | 38.5 | 7 | PASS |
| | 4182 | 836.4 | 17.50 | 0.056 | | | PASS |
| | 4233 | 846.6 | 17.52 | 0.056 | | | PASS |
| DC-HSDPA | 4132 | 826.4 | 17.34 | 0.054 | 38.5 | 7 | PASS |
| | 4182 | 836.4 | 17.27 | 0.053 | | | PASS |
| | 4233 | 846.6 | 17.20 | 0.052 | | | PASS |
| HSUPA | 4132 | 826.4 | 17.39 | 0.055 | 38.5 | 7 | PASS |
| | 4182 | 836.4 | 17.24 | 0.053 | | | PASS |
| | 4233 | 846.6 | 17.40 | 0.055 | | | PASS |
| HSPA+ | 4132 | 826.4 | 17.45 | 0.056 | 38.5 | 7 | PASS |
| | 4182 | 836.4 | 17.38 | 0.055 | | | PASS |
| | 4233 | 846.6 | 17.13 | 0.052 | | | PASS |
| **Note 1:** For the HSDPA and HSUPA mode, all the subtests were tested and just the worst data were recorded in this report. | | | | | | | |

| WCDMA Band IV | | | | | | | |
|---|---|---|---|---|---|---|---|
| Band | Channel | Frequency (MHz) | Measured E.I.R.P. | | Limit | | Verdict |
| | | | dBm | W | dBm | W | |
| WCDMA | 1312 | 1712.4 | 22.58 | 0.181 | 30 | 1 | PASS |
| | 1413 | 1732.6 | 22.65 | 0.184 | | | PASS |
| | 1513 | 1752.6 | 22.62 | 0.183 | | | PASS |
| HSDPA | 1312 | 1712.4 | 21.56 | 0.143 | 30 | 1 | PASS |
| | 1413 | 1732.6 | 21.47 | 0.140 | | | PASS |
| | 1513 | 1752.6 | 21.35 | 0.136 | | | PASS |
| DC-HSDPA | 1312 | 1712.4 | 21.06 | 0.128 | 30 | 1 | PASS |
| | 1413 | 1732.6 | 21.27 | 0.134 | | | PASS |
| | 1513 | 1752.6 | 21.20 | 0.132 | | | PASS |
| HSUPA | 1312 | 1712.4 | 21.30 | 0.135 | 30 | 1 | PASS |
| | 1413 | 1732.6 | 21.52 | 0.142 | | | PASS |
| | 1513 | 1752.6 | 21.29 | 0.135 | | | PASS |
| HSPA+ | 1312 | 1712.4 | 21.30 | 0.135 | 30 | 1 | PASS |
| | 1413 | 1732.6 | 21.28 | 0.134 | | | PASS |
| | 1513 | 1752.6 | 21.11 | 0.129 | | | PASS |
| **Note 1:** For the HSDPA and HSUPA mode, all the subtests were tested and just the worst data were recorded in this report. | | | | | | | |

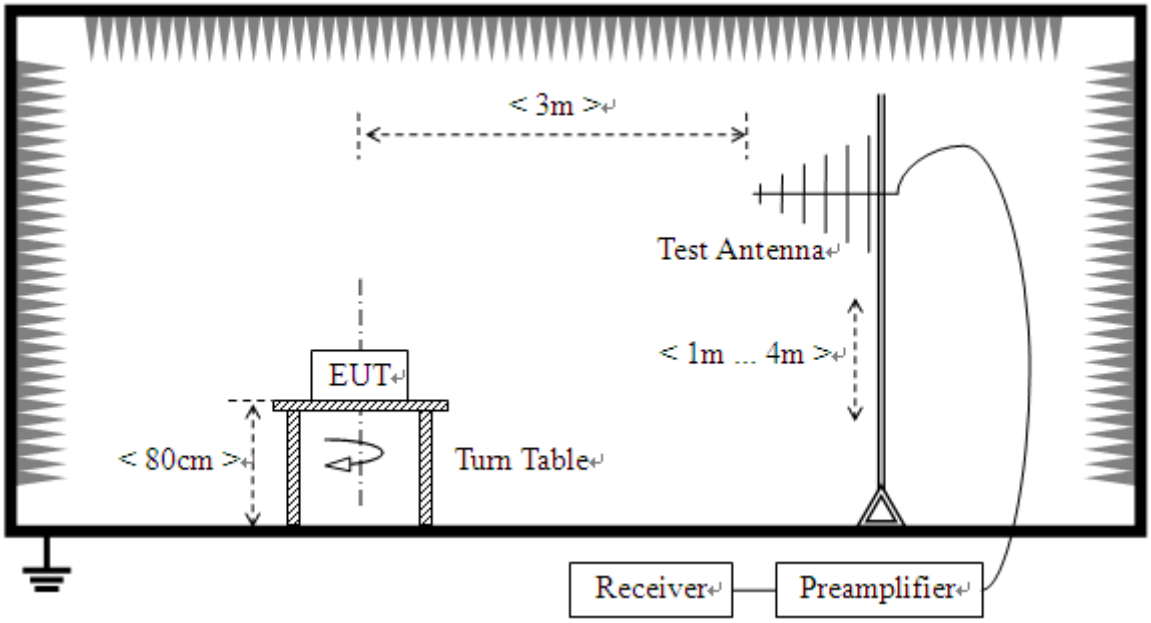
| WCDMA Band II | | | | | | | |
|---|---|---|---|---|---|---|---|
| Band | Channel | Frequency (MHz) | Measured E.I.R.P. | | Limit | | Verdict |
| | | | dBm | W | dBm | W | |
| WCDMA | 9262 | 1852.4 | 23.02 | 0.200 | 33 | 2 | PASS |
| | 9400 | 1880.0 | 22.94 | 0.197 | | | PASS |
| | 9538 | 1907.6 | 22.98 | 0.199 | | | PASS |
| HSDPA | 9262 | 1852.4 | 21.80 | 0.151 | 33 | 2 | PASS |
| | 9400 | 1880.0 | 21.67 | 0.147 | | | PASS |
| | 9538 | 1907.6 | 21.71 | 0.148 | | | PASS |
| DC-HSDPA | 9262 | 1852.4 | 21.63 | 0.146 | 33 | 2 | PASS |
| | 9400 | 1880.0 | 21.56 | 0.143 | | | PASS |
| | 9538 | 1907.6 | 21.61 | 0.145 | | | PASS |
| HSUPA | 9262 | 1852.4 | 21.87 | 0.154 | 33 | 2 | PASS |
| | 9400 | 1880.0 | 21.68 | 0.147 | | | PASS |
| | 9538 | 1907.6 | 21.74 | 0.149 | | | PASS |
| HSPA+ | 9262 | 1852.4 | 21.93 | 0.156 | 33 | 2 | PASS |
| | 9400 | 1880.0 | 21.83 | 0.152 | | | PASS |
| | 9538 | 1907.6 | 21.48 | 0.141 | | | PASS |
| **Note 1:** For the HSDPA and HSUPA mode, all the subtests were tested and just the worst data were recorded in this report. | | | | | | | |

## 2.8. Radiated Out of Band Emissions

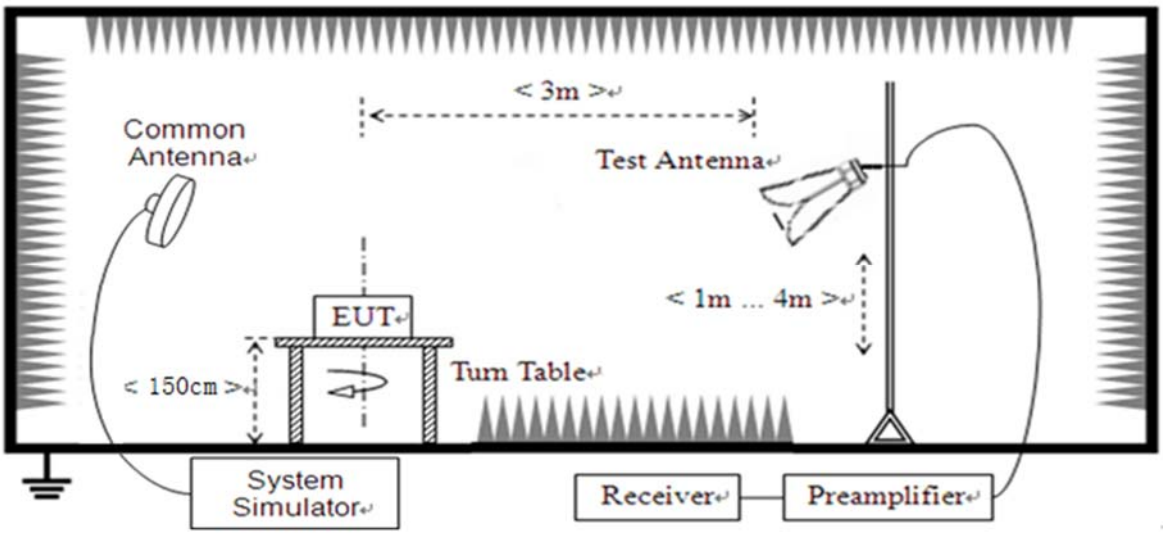
### 2.8.1.Requirement

The 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. This calculated to be -13dBm. The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency.

### 2.8.2.Test Description




(For the test frequency from 30MHz to1GHz)




(For the test frequency above 1GHz)

The EUT is located in a 3m Full-Anechoic Chamber, the cable loss, air loss and so on of the site as factors are pre-calibrated using the "Substitution" method, and calculated to correct the reading.
A call is established between the EUT and the SS via a Common Antenna. The EUT is commanded by the SS to operate at the maximum and minimum output power and only the test result of the maximum output power was recorded.
In the frequency range above 30MHz, Bi-Log Test Antenna (30MHz to 1GHz) and Horn Test Antenna (above 1GHz) are used. Test Antenna is 3m away from the EUT. Test Antenna height is varied from 1m to 4m above the ground and the Turn Table is actuated to turn from 0° to 360°to determine the maximum value of the radiated power. The emission levels at both horizontal and vertical polarizations should be tested. The Filters consists of Notch Filters and High Pass Filter.
**Note:** When doing measurements above 1GHz, the EUT has been within the 3dB cone width of the horn antenna during horizontal antenna.

### 2.8.3.Test Procedure

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements.

For measurements above 1GHz the resolution bandwidth is set to 1MHz, the video band width is set to 3MHz for peak measurements.

### 2.8.4.Test Result

The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The Turn Table is actuated to turn from 0° to 360°, and both horizontal and vertical polarizations of the Test Antenna are used to find the maximum radiated power. The lowest, middle and highest channels are tested to verify the out of band emissions.

The substitution corrections are obtained as described below:

$A_{SUBST} = P_{SUBST_TX} - P_{SUBST_RX} - L_{SUBST_CABLES} + G_{SUBST_TX_ANT}$

$A_{TOT} = L_{CABLES} + A_{SUBST}$

Where $A_{SUBST}$ is the final substitution correction including receive antenna gain.

$P_{SUBST_TX}$ is signal generator level,

$P_{SUBST_RX}$ is receiver level,

$L_{SUBST_CABLES}$ is cable losses including TX cable,

$G_{SUBST_TX_ANT}$ is substitution antenna gain.

$A_{TOT}$ is total correction factor including cable loss and substitution correction

During the test, the data of $A_{TOT}$ was added in the test spectrum analyze, so spectrum analyze reading is the final values which contain the data of $A_{TOT}$.

**Note1:** The power of the EUT transmitting frequency should be ignored.

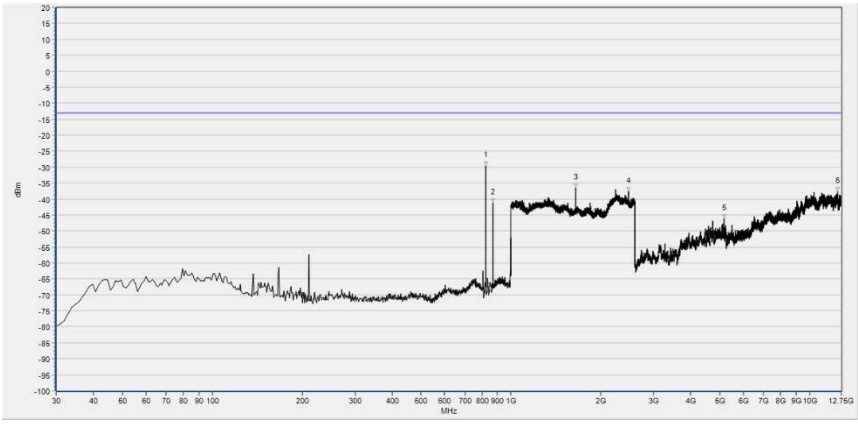
**Note2:** All test mode and condition mentioned were considered and evaluated respectively by performing full test, only the worst data were recorded and reported.

**Note3:** All spurious emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

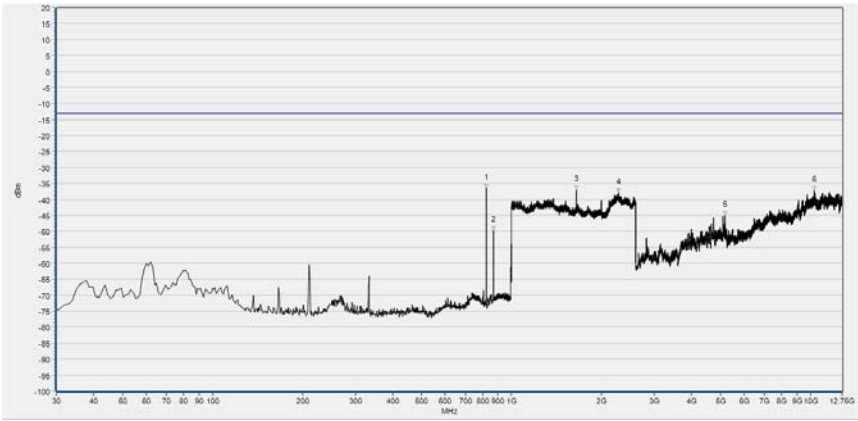
**Note4:** N/A means the frequency is the basic frequency or the base station frequency, they are no need to verdict.

**Top Antenna**

GSM850(GSM), Low Channel

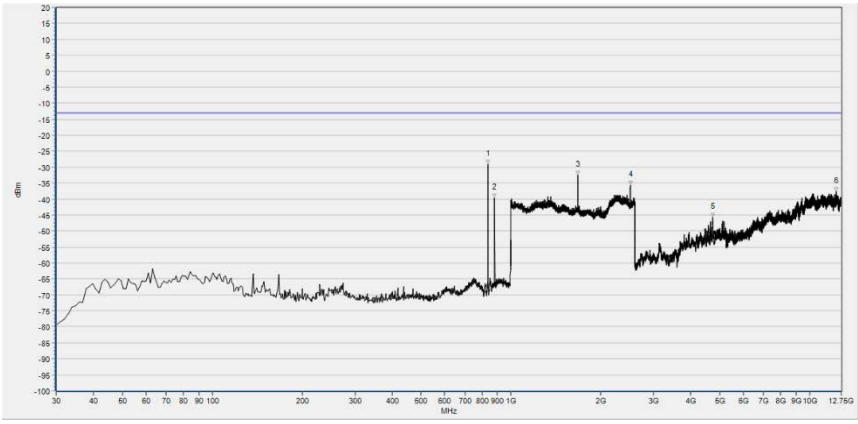


| No. | Fre.(MHz) | PK (dBm) | Limit (dBm) | Antenna | Verdict |
|---|---|---|---|---|---|
| 1 | 824.430 | -29.70 | -13.00 | Horizontal | N/A |
| 2 | 869.050 | -41.17 | -13.00 | Horizontal | N/A |
| 3 | 1648.579 | -36.55 | -13.00 | Horizontal | PASS |
| 4 | 2472.589 | -37.72 | -13.00 | Horizontal | PASS |
| 5 | 5174.877 | -46.18 | -13.00 | Horizontal | PASS |
| 6 | 12380.842 | -37.60 | -13.00 | Horizontal | PASS |

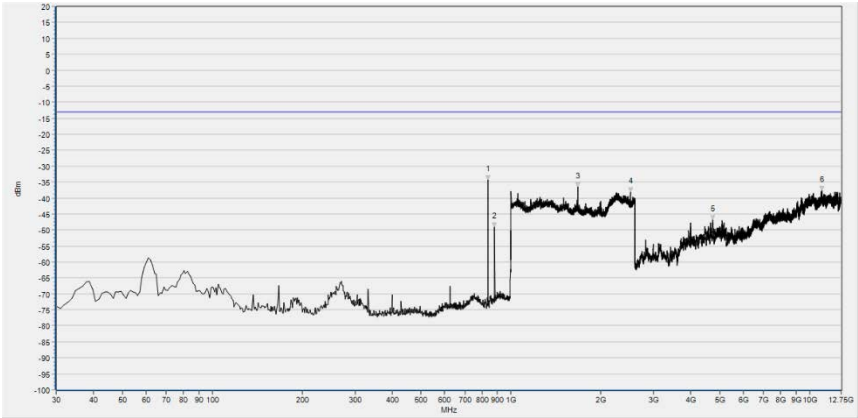


| No. | Fre.(MHz) | PK (dBm) | Limit (dBm) | Antenna | Verdict |
|---|---|---|---|---|---|
| 1 | 824.430 | -36.59 | -13.00 | Vertical | N/A |
| 2 | 869.050 | -49.62 | -13.00 | Vertical | N/A |
| 3 | 1647.939 | -37.04 | -13.00 | Vertical | PASS |
| 4 | 2280.512 | -37.97 | -13.00 | Vertical | PASS |
| 5 | 5176.723 | -44.98 | -13.00 | Vertical | PASS |
| 6 | 10285.870 | -37.16 | -13.00 | Vertical | PASS |

GSM850(GSM), Mid Channel

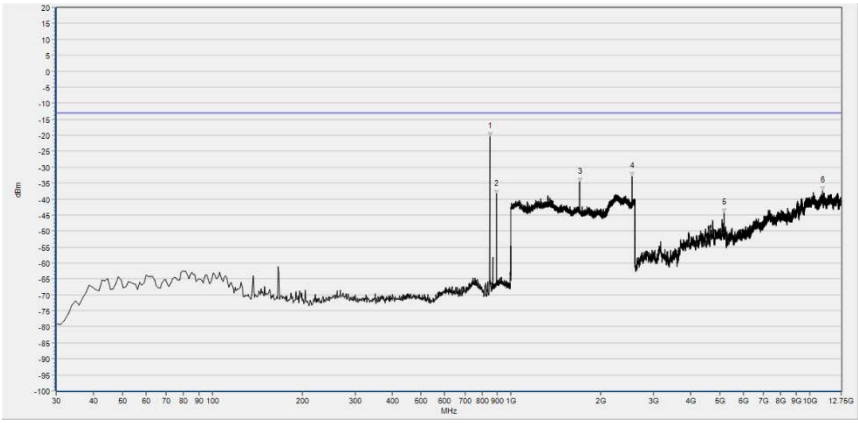


| No. | Fre.(MHz) | PK (dBm) | Limit (dBm) | Antenna | Verdict |
|---|---|---|---|---|---|
| 1 | 836.070 | -29.05 | -13.00 | Horizontal | N/A |
| 2 | 881.660 | -39.64 | -13.00 | Horizontal | N/A |
| 3 | 1672.909 | -32.56 | -13.00 | Horizontal | PASS |
| 4 | 2509.084 | -35.69 | -13.00 | Horizontal | PASS |
| 5 | 4733.733 | -45.78 | -13.00 | Horizontal | PASS |
| 6 | 12292.244 | -37.58 | -13.00 | Horizontal | PASS |

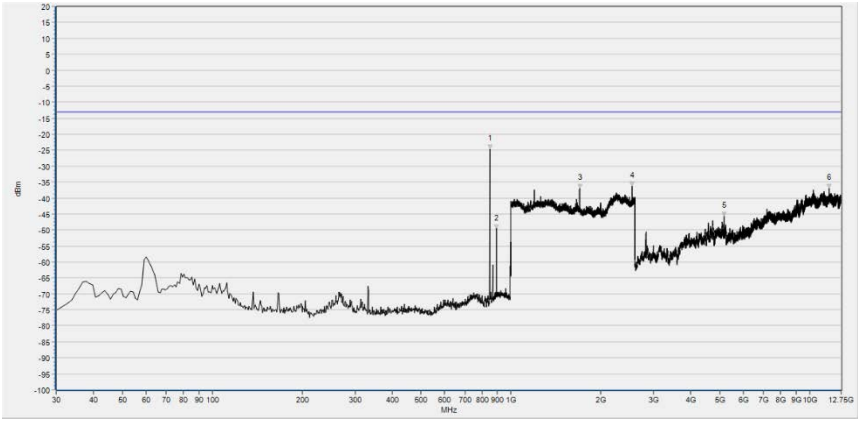


| No. | Fre.(MHz) | PK (dBm) | Limit (dBm) | Antenna | Verdict |
|---|---|---|---|---|---|
| 1 | 836.070 | -34.21 | -13.00 | Vertical | N/A |
| 2 | 881.660 | -49.02 | -13.00 | Vertical | N/A |
| 3 | 1672.909 | -36.44 | -13.00 | Vertical | PASS |
| 4 | 2509.084 | -38.00 | -13.00 | Vertical | PASS |
| 5 | 4741.117 | -46.76 | -13.00 | Vertical | PASS |
| 6 | 10996.499 | -37.61 | -13.00 | Vertical | PASS |

GSM850(GSM), High Channel

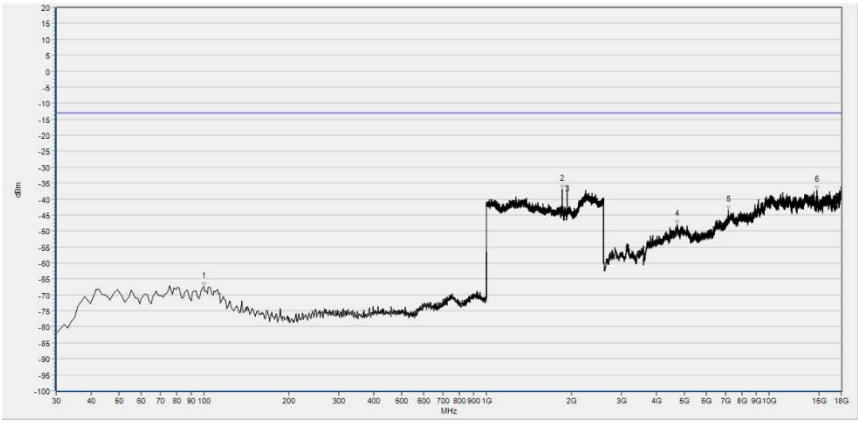


| No. | Fre.(MHz) | PK (dBm) | Limit (dBm) | Antenna | Verdict |
|---|---|---|---|---|---|
| 1 | 848.680 | -20.50 | -13.00 | Horizontal | N/A |
| 2 | 893.300 | -38.57 | -13.00 | Horizontal | N/A |
| 3 | 1697.879 | -34.84 | -13.00 | Horizontal | PASS |
| 4 | 2546.218 | -32.91 | -13.00 | Horizontal | PASS |
| 5 | 5176.723 | -44.31 | -13.00 | Horizontal | PASS |
| 6 | 11057.410 | -37.34 | -13.00 | Horizontal | PASS |

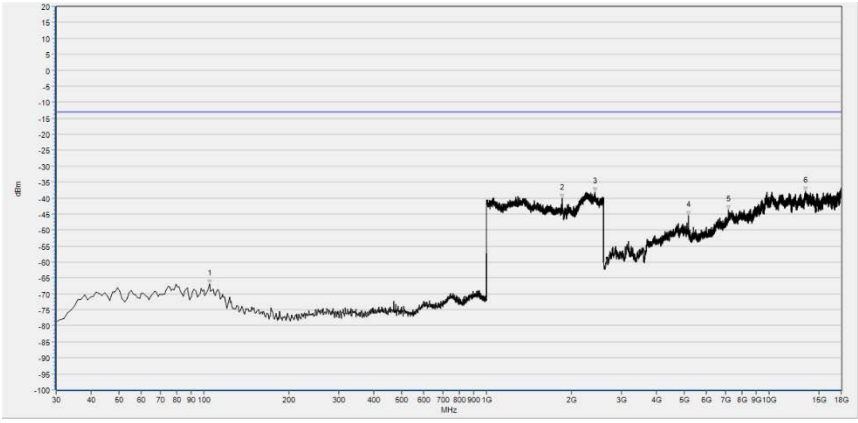


| No. | Fre.(MHz) | PK (dBm) | Limit (dBm) | Antenna | Verdict |
|---|---|---|---|---|---|
| 1 | 848.680 | -24.71 | -13.00 | Vertical | N/A |
| 2 | 893.300 | -49.81 | -13.00 | Vertical | N/A |
| 3 | 1697.879 | -37.03 | -13.00 | Vertical | PASS |
| 4 | 2546.218 | -36.41 | -13.00 | Vertical | PASS |
| 5 | 5174.877 | -45.74 | -13.00 | Vertical | PASS |
| 6 | 11629.605 | -37.09 | -13.00 | Vertical | PASS |

GSM1900(GSM), Low Channel

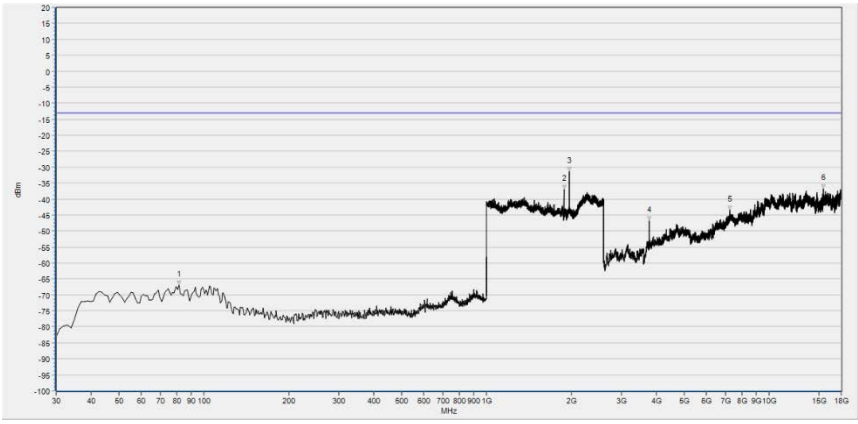


| No. | Fre.(MHz) | PK (dBm) | Limit (dBm) | Antenna | Verdict |
|---|---|---|---|---|---|
| 1 | 99.840 | -67.29 | -13.00 | Horizontal | PASS |
| 2 | 1850.260 | -36.95 | -13.00 | Horizontal | N/A |
| 3 | 1930.292 | -37.01 | -13.00 | Horizontal | N/A |
| 4 | 4736.789 | -47.99 | -13.00 | Horizontal | PASS |
| 5 | 7195.636 | -43.37 | -13.00 | Horizontal | PASS |
| 6 | 14776.614 | -37.26 | -13.00 | Horizontal | PASS |

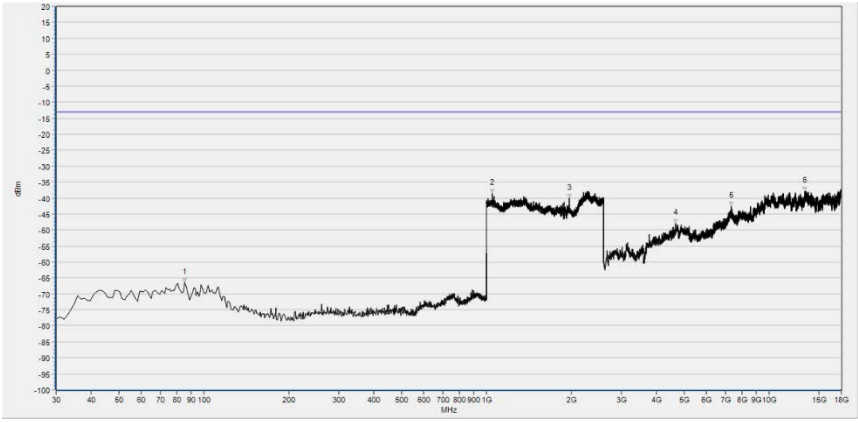


| No. | Fre.(MHz) | PK (dBm) | Limit (dBm) | Antenna | Verdict |
|---|---|---|---|---|---|
| 1 | 104.690 | -66.92 | -13.00 | Vertical | PASS |
| 2 | 1850.260 | -40.16 | -13.00 | Vertical | N/A |
| 3 | 2424.570 | -38.12 | -13.00 | Vertical | PASS |
| 4 | 5179.269 | -45.54 | -13.00 | Vertical | PASS |
| 5 | 7164.830 | -43.67 | -13.00 | Vertical | PASS |
| 6 | 13474.377 | -37.81 | -13.00 | Vertical | PASS |

GSM1900(GSM), Mid Channel

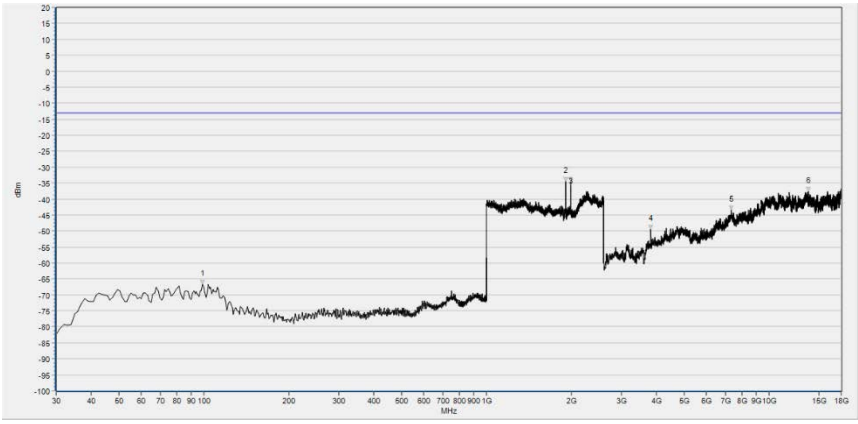


| No. | Fre.(MHz) | PK (dBm) | Limit (dBm) | Antenna | Verdict |
|---|---|---|---|---|---|
| 1 | 81.410 | -67.02 | -13.00 | Horizontal | PASS |
| 2 | 1879.712 | -36.90 | -13.00 | Horizontal | N/A |
| 3 | 1959.744 | -31.51 | -13.00 | Horizontal | N/A |
| 4 | 3759.411 | -46.84 | -13.00 | Horizontal | PASS |
| 5 | 7276.850 | -43.55 | -13.00 | Horizontal | PASS |
| 6 | 15594.363 | -36.75 | -13.00 | Horizontal | PASS |

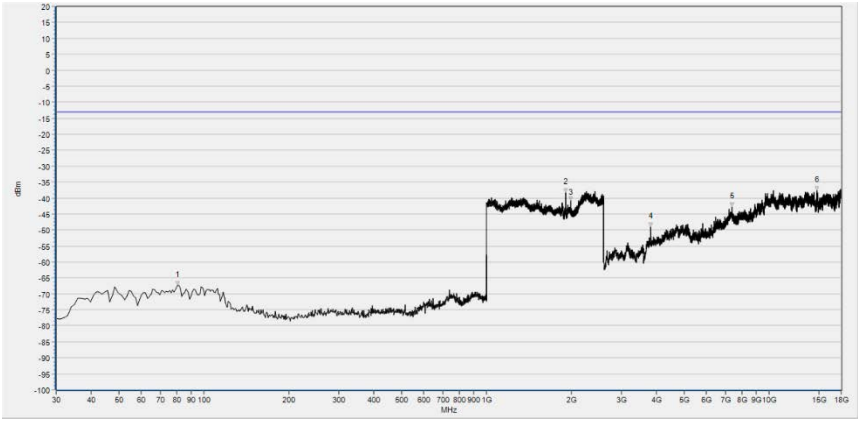


| No. | Fre.(MHz) | PK (dBm) | Limit (dBm) | Antenna | Verdict |
|---|---|---|---|---|---|
| 1 | 85.290 | -66.46 | -13.00 | Vertical | PASS |
| 2 | 1045.458 | -38.62 | -13.00 | Vertical | PASS |
| 3 | 1959.744 | -40.03 | -13.00 | Vertical | N/A |
| 4 | 4666.776 | -47.96 | -13.00 | Vertical | PASS |
| 5 | 7332.861 | -42.56 | -13.00 | Vertical | PASS |
| 6 | 13415.566 | -37.87 | -13.00 | Vertical | PASS |

GSM1900(GSM), High Channel

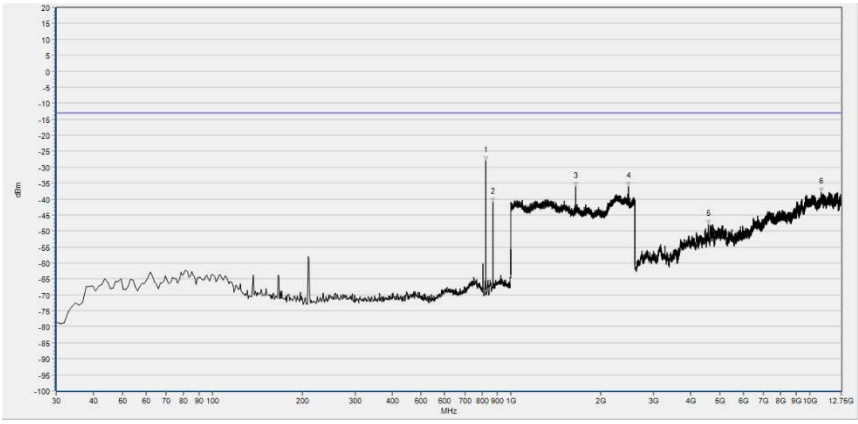


| No. | Fre.(MHz) | PK (dBm) | Limit (dBm) | Antenna | Verdict |
|---|---|---|---|---|---|
| 1 | 98.870 | -66.63 | -13.00 | Horizontal | PASS |
| 2 | 1909.804 | -34.47 | -13.00 | Horizontal | N/A |
| 3 | 1989.836 | -34.63 | -13.00 | Horizontal | N/A |
| 4 | 3818.221 | -49.52 | -13.00 | Horizontal | PASS |
| 5 | 7355.265 | -43.51 | -13.00 | Horizontal | PASS |
| 6 | 13748.827 | -37.74 | -13.00 | Horizontal | PASS |

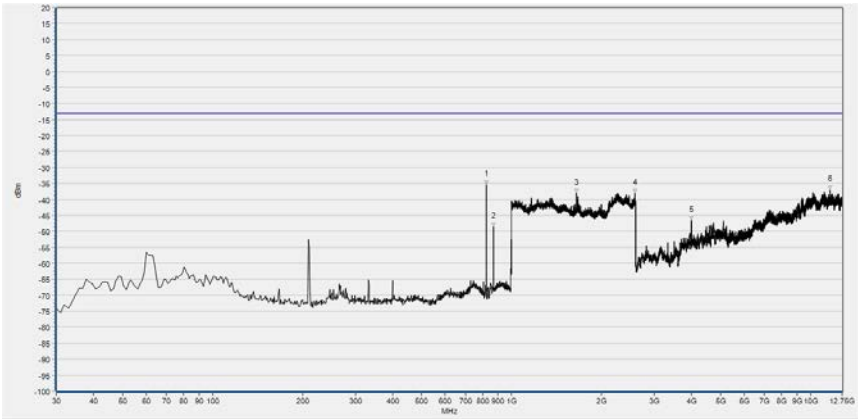


| No. | Fre.(MHz) | PK (dBm) | Limit (dBm) | Antenna | Verdict |
|---|---|---|---|---|---|
| 1 | 80.440 | -67.29 | -13.00 | Vertical | PASS |
| 2 | 1909.804 | -38.36 | -13.00 | Vertical | N/A |
| 3 | 1989.836 | -40.87 | -13.00 | Vertical | N/A |
| 4 | 3818.221 | -49.01 | -13.00 | Vertical | PASS |
| 5 | 7383.270 | -42.82 | -13.00 | Vertical | PASS |
| 6 | 14790.616 | -37.76 | -13.00 | Vertical | PASS |

GSM850(EDGE), Low Channel

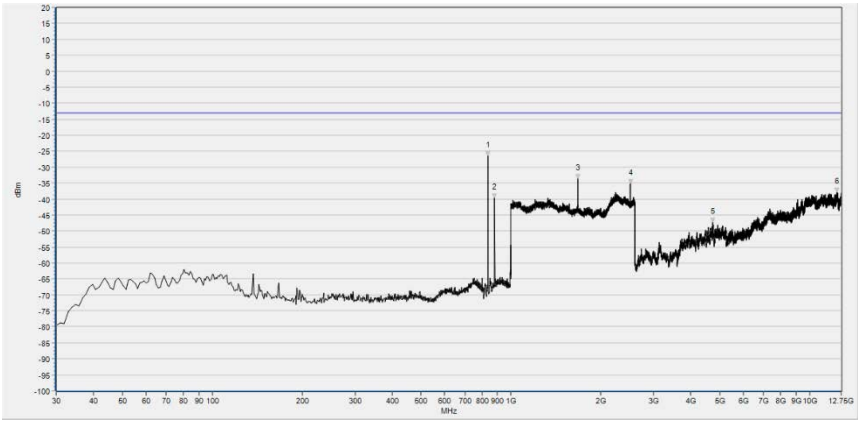


| No. | Fre.(MHz) | PK (dBm) | Limit (dBm) | Antenna | Verdict |
|---|---|---|---|---|---|
| 1 | 824.430 | -28.07 | -13.00 | Horizontal | N/A |
| 2 | 869.050 | -40.99 | -13.00 | Horizontal | N/A |
| 3 | 1647.939 | -36.13 | -13.00 | Horizontal | PASS |
| 4 | 2471.949 | -36.15 | -13.00 | Horizontal | PASS |
| 5 | 4574.995 | -47.89 | -13.00 | Horizontal | PASS |
| 6 | 10950.355 | -37.79 | -13.00 | Horizontal | PASS |

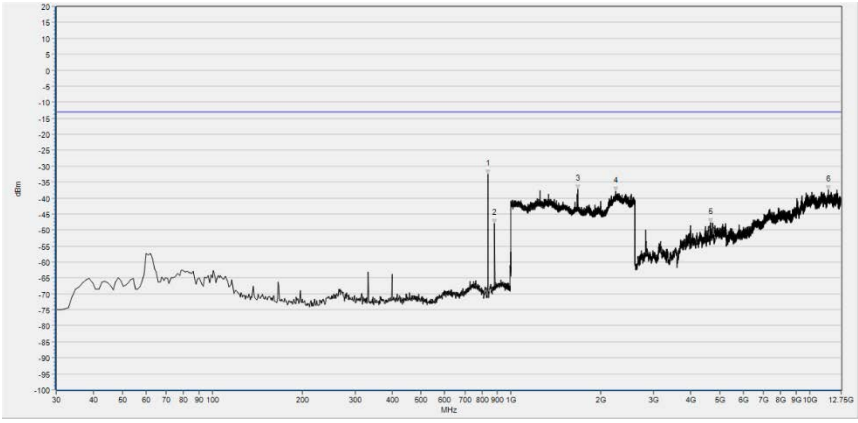


| No. | Fre.(MHz) | PK (dBm) | Limit (dBm) | Antenna | Verdict |
|---|---|---|---|---|---|
| 1 | 824.430 | -35.33 | -13.00 | Vertical | N/A |
| 2 | 869.050 | -48.54 | -13.00 | Vertical | N/A |
| 3 | 1647.939 | -38.00 | -13.00 | Vertical | PASS |
| 4 | 2582.073 | -38.21 | -13.00 | Vertical | PASS |
| 5 | 3986.188 | -46.56 | -13.00 | Vertical | PASS |
| 6 | 11629.605 | -37.03 | -13.00 | Vertical | PASS |

GSM850(EDGE), Mid Channel

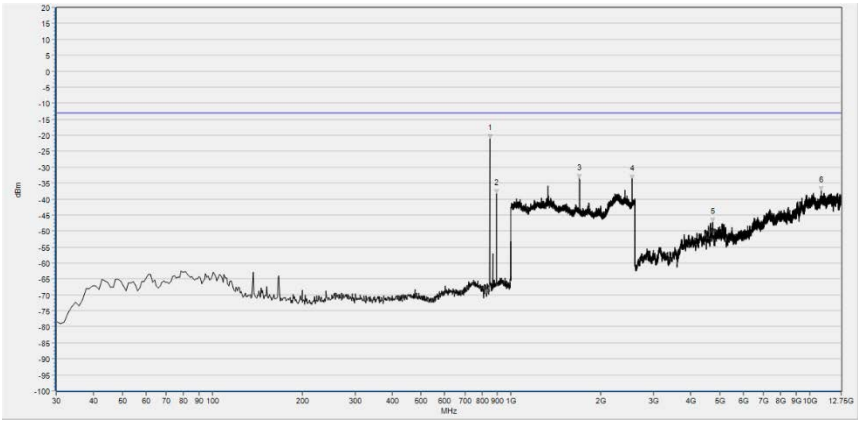


| No. | Fre.(MHz) | PK (dBm) | Limit (dBm) | Antenna | Verdict |
|---|---|---|---|---|---|
| 1 | 836.070 | -26.56 | -13.00 | Horizontal | N/A |
| 2 | 881.660 | -39.75 | -13.00 | Horizontal | N/A |
| 3 | 1672.909 | -33.64 | -13.00 | Horizontal | PASS |
| 4 | 2509.084 | -35.11 | -13.00 | Horizontal | PASS |
| 5 | 4741.117 | -47.32 | -13.00 | Horizontal | PASS |
| 6 | 12360.538 | -37.82 | -13.00 | Horizontal | PASS |

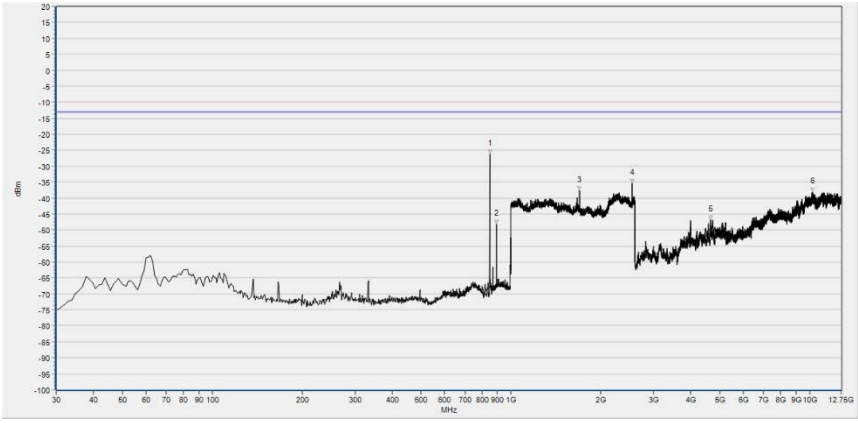


| No. | Fre.(MHz) | PK (dBm) | Limit (dBm) | Antenna | Verdict |
|---|---|---|---|---|---|
| 1 | 836.070 | -32.58 | -13.00 | Vertical | N/A |
| 2 | 881.660 | -47.90 | -13.00 | Vertical | N/A |
| 3 | 1672.909 | -37.16 | -13.00 | Vertical | PASS |
| 4 | 2246.579 | -37.85 | -13.00 | Vertical | PASS |
| 5 | 4650.673 | -47.79 | -13.00 | Vertical | PASS |
| 6 | 11557.620 | -37.49 | -13.00 | Vertical | PASS |

GSM850(EDGE), High Channel

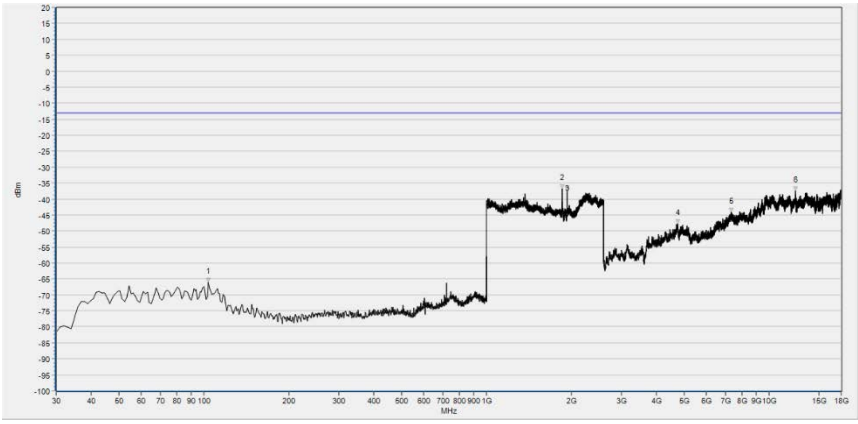


| No. | Fre.(MHz) | PK (dBm) | Limit (dBm) | Antenna | Verdict |
|---|---|---|---|---|---|
| 1 | 848.680 | -21.07 | -13.00 | Horizontal | N/A |
| 2 | 894.270 | -38.39 | -13.00 | Horizontal | N/A |
| 3 | 1697.239 | -33.68 | -13.00 | Horizontal | PASS |
| 4 | 2545.578 | -33.96 | -13.00 | Horizontal | PASS |
| 5 | 4737.425 | -47.36 | -13.00 | Horizontal | PASS |
| 6 | 10907.901 | -37.43 | -13.00 | Horizontal | PASS |

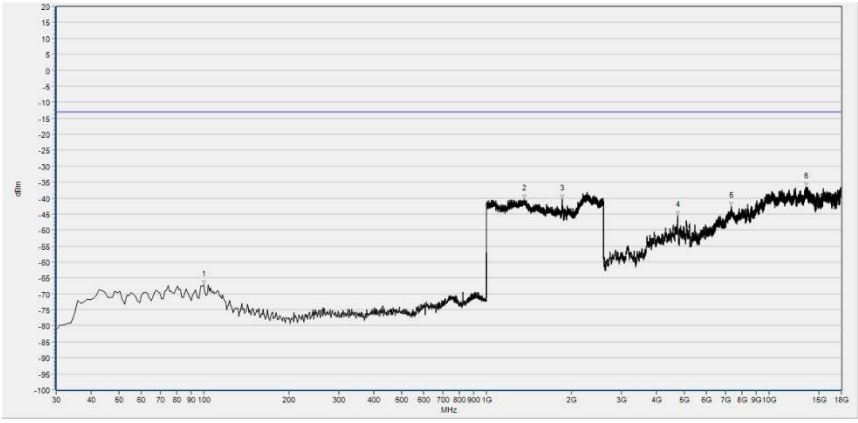


| No. | Fre.(MHz) | PK (dBm) | Limit (dBm) | Antenna | Verdict |
|---|---|---|---|---|---|
| 1 | 848.680 | -26.23 | -13.00 | Vertical | N/A |
| 2 | 894.270 | -48.08 | -13.00 | Vertical | N/A |
| 3 | 1697.239 | -37.70 | -13.00 | Vertical | PASS |
| 4 | 2546.218 | -35.41 | -13.00 | Vertical | PASS |
| 5 | 4650.673 | -46.87 | -13.00 | Vertical | PASS |
| 6 | 10228.651 | -38.10 | -13.00 | Vertical | PASS |

GSM1900(EDGE), Low Channel

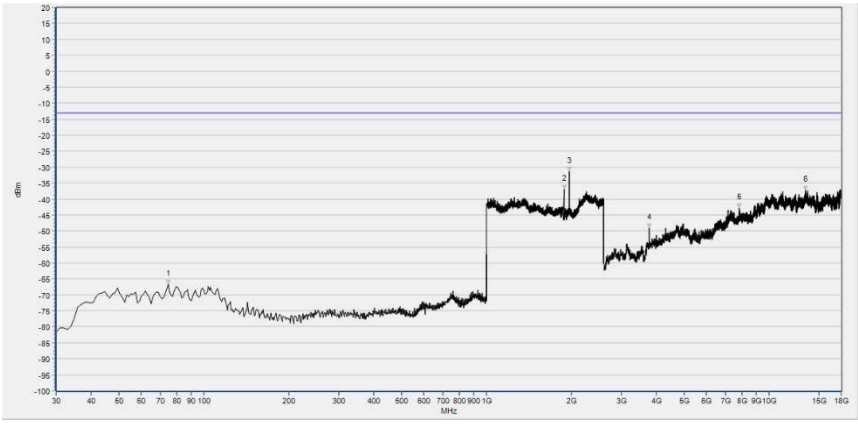


| No. | Fre.(MHz) | PK (dBm) | Limit (dBm) | Antenna | Verdict |
|---|---|---|---|---|---|
| 1 | 103.720 | -65.96 | -13.00 | Horizontal | PASS |
| 2 | 1849.620 | -36.74 | -13.00 | Horizontal | N/A |
| 3 | 1929.652 | -37.52 | -13.00 | Horizontal | N/A |
| 4 | 4742.390 | -47.74 | -13.00 | Horizontal | PASS |
| 5 | 7332.861 | -44.20 | -13.00 | Horizontal | PASS |
| 6 | 12421.386 | -37.38 | -13.00 | Horizontal | PASS |

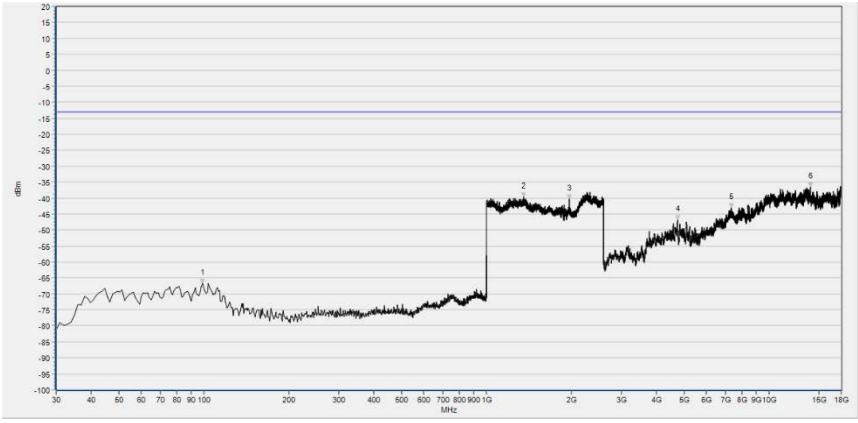


| No. | Fre.(MHz) | PK (dBm) | Limit (dBm) | Antenna | Verdict |
|---|---|---|---|---|---|
| 1 | 99.840 | -67.14 | -13.00 | Vertical | PASS |
| 2 | 1364.306 | -40.38 | -13.00 | Vertical | PASS |
| 3 | 1850.260 | -40.32 | -13.00 | Vertical | N/A |
| 4 | 4742.390 | -45.48 | -13.00 | Vertical | PASS |
| 5 | 7352.464 | -42.51 | -13.00 | Vertical | PASS |
| 6 | 13544.390 | -36.46 | -13.00 | Vertical | PASS |

GSM1900(EDGE), Mid Channel

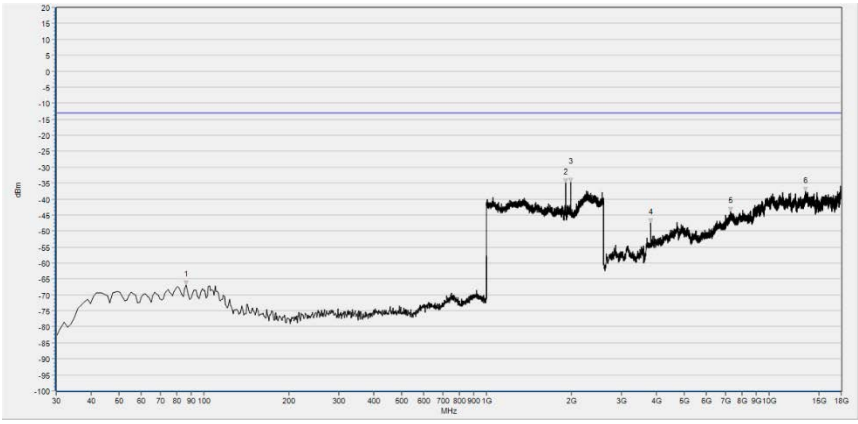


| No. | Fre.(MHz) | PK (dBm) | Limit (dBm) | Antenna | Verdict |
|---|---|---|---|---|---|
| 1 | 74.620 | -66.79 | -13.00 | Horizontal | PASS |
| 2 | 1879.712 | -36.92 | -13.00 | Horizontal | N/A |
| 3 | 1959.744 | -31.47 | -13.00 | Horizontal | N/A |
| 4 | 3759.411 | -48.99 | -13.00 | Horizontal | PASS |
| 5 | 7850.955 | -42.85 | -13.00 | Horizontal | PASS |
| 6 | 13488.380 | -37.19 | -13.00 | Horizontal | PASS |

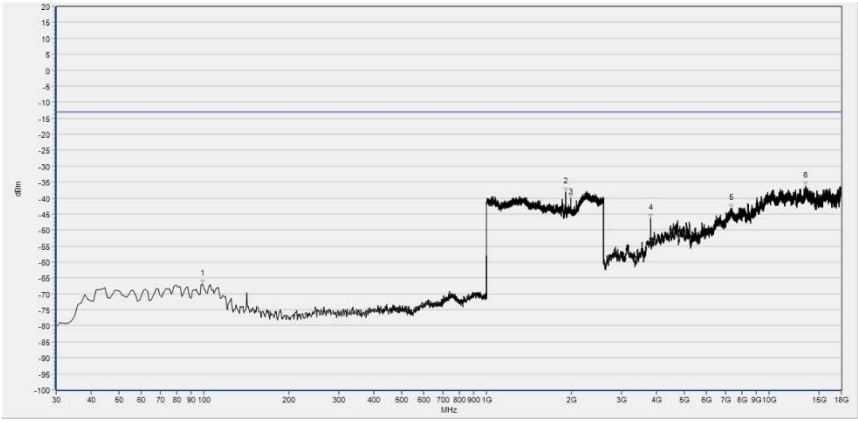


| No. | Fre.(MHz) | PK (dBm) | Limit (dBm) | Antenna | Verdict |
|---|---|---|---|---|---|
| 1 | 98.870 | -66.75 | -13.00 | Vertical | PASS |
| 2 | 1353.421 | -39.72 | -13.00 | Vertical | PASS |
| 3 | 1959.744 | -40.32 | -13.00 | Vertical | N/A |
| 4 | 4742.390 | -46.88 | -13.00 | Vertical | PASS |
| 5 | 7335.661 | -42.94 | -13.00 | Vertical | PASS |
| 6 | 13981.269 | -36.63 | -13.00 | Vertical | PASS |

GSM1900(EDGD), High Channel

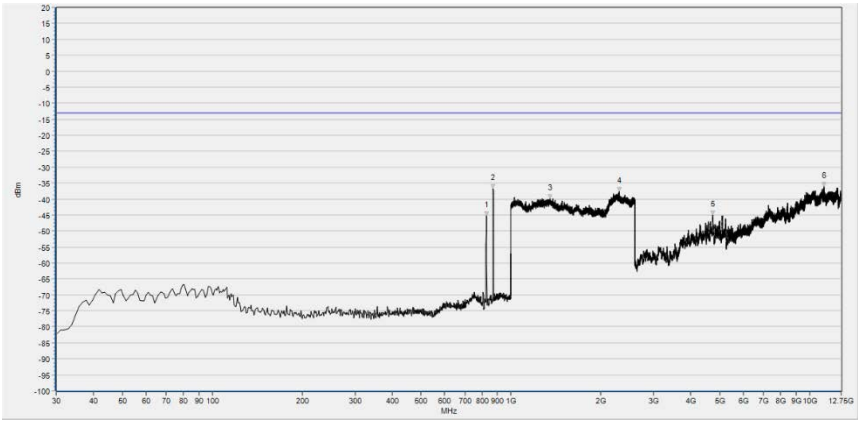


| No. | Fre.(MHz) | PK (dBm) | Limit (dBm) | Antenna | Verdict |
|---|---|---|---|---|---|
| 1 | 86.260 | -66.83 | -13.00 | Horizontal | PASS |
| 2 | 1909.804 | -34.96 | -13.00 | Horizontal | N/A |
| 3 | 1989.836 | -34.68 | -13.00 | Horizontal | N/A |
| 4 | 3818.221 | -47.49 | -13.00 | Horizontal | PASS |
| 5 | 7324.459 | -43.87 | -13.00 | Horizontal | PASS |
| 6 | 13463.175 | -37.60 | -13.00 | Horizontal | PASS |

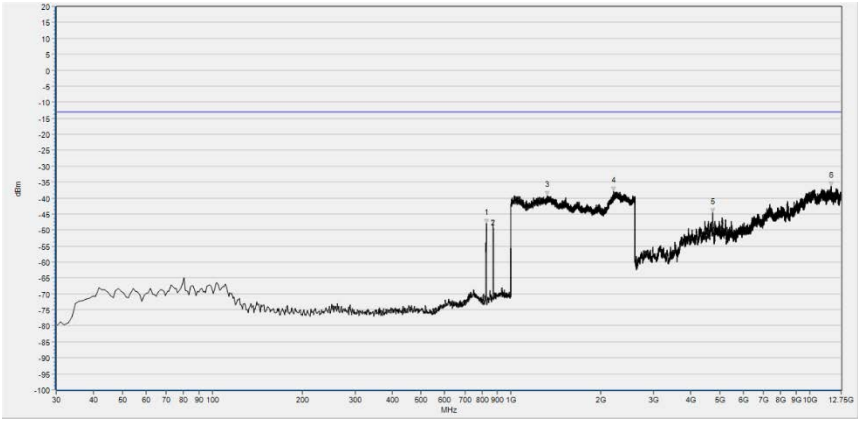


| No. | Fre.(MHz) | PK (dBm) | Limit (dBm) | Antenna | Verdict |
|---|---|---|---|---|---|
| 1 | 98.870 | -67.02 | -13.00 | Vertical | PASS |
| 2 | 1909.804 | -38.15 | -13.00 | Vertical | N/A |
| 3 | 1989.836 | -40.08 | -13.00 | Vertical | N/A |
| 4 | 3818.221 | -46.39 | -13.00 | Vertical | PASS |
| 5 | 7338.462 | -43.28 | -13.00 | Vertical | PASS |
| 6 | 13460.375 | -36.42 | -13.00 | Vertical | PASS |

WCDMA Band V(WCDMA), Low Channel

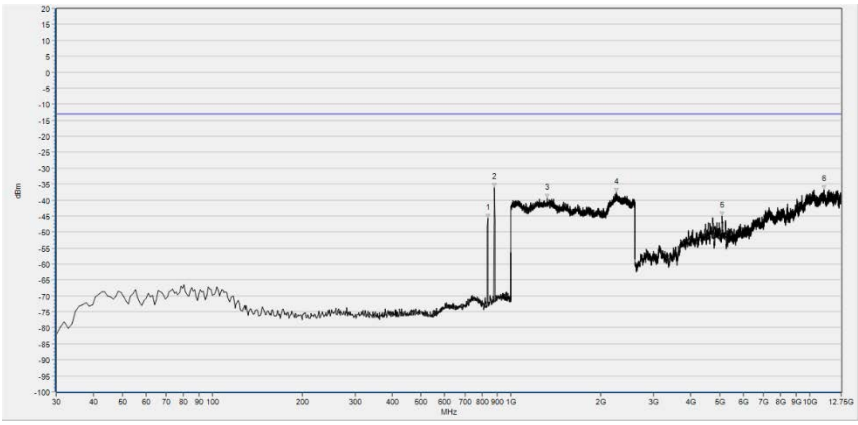


| No. | Fre.(MHz) | PK (dBm) | Limit (dBm) | Antenna | Verdict |
|---|---|---|---|---|---|
| 1 | 827.340 | -45.23 | -13.00 | Horizontal | N/A |
| 2 | 871.960 | -36.66 | -13.00 | Horizontal | N/A |
| 3 | 1350.860 | -39.83 | -13.00 | Horizontal | PASS |
| 4 | 2305.482 | -37.62 | -13.00 | Horizontal | PASS |
| 5 | 4737.425 | -45.01 | -13.00 | Horizontal | PASS |
| 6 | 11151.546 | -36.00 | -13.00 | Horizontal | PASS |

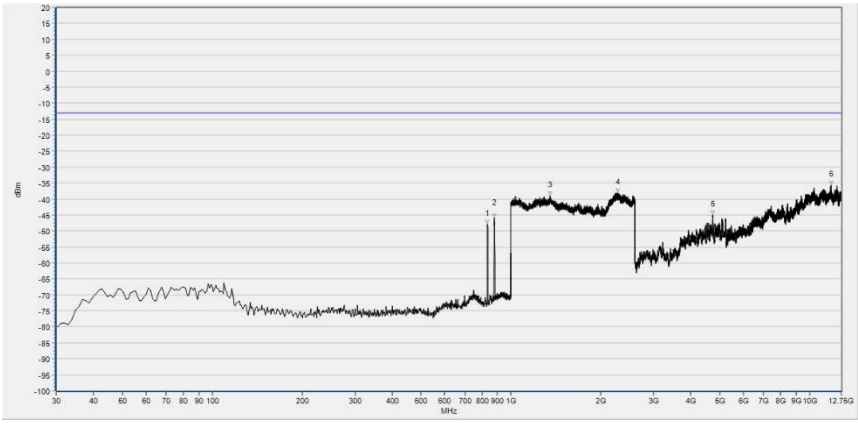


| No. | Fre.(MHz) | PK (dBm) | Limit (dBm) | Antenna | Verdict |
|---|---|---|---|---|---|
| 1 | 828.310 | -47.89 | -13.00 | Vertical | N/A |
| 2 | 870.990 | -48.06 | -13.00 | Vertical | N/A |
| 3 | 1322.689 | -39.16 | -13.00 | Vertical | PASS |
| 4 | 2208.163 | -37.80 | -13.00 | Vertical | PASS |
| 5 | 4739.271 | -44.55 | -13.00 | Vertical | PASS |
| 6 | 11817.876 | -36.23 | -13.00 | Vertical | PASS |

WCDMA Band V(WCDMA), Mid Channel



| No. | Fre.(MHz) | PK (dBm) | Limit (dBm) | Antenna | Verdict |
|---|---|---|---|---|---|
| 1 | 835.100 | -45.79 | -13.00 | Horizontal | N/A |
| 2 | 879.720 | -36.17 | -13.00 | Horizontal | N/A |
| 3 | 1320.768 | -39.35 | -13.00 | Horizontal | PASS |
| 4 | 2250.420 | -37.68 | -13.00 | Horizontal | PASS |
| 5 | 5099.200 | -45.07 | -13.00 | Horizontal | PASS |
| 6 | 11188.462 | -36.81 | -13.00 | Horizontal | PASS |



| No. | Fre.(MHz) | PK (dBm) | Limit (dBm) | Antenna | Verdict |
|---|---|---|---|---|---|
| 1 | 834.130 | -48.01 | -13.00 | Vertical | N/A |
| 2 | 879.720 | -45.96 | -13.00 | Vertical | N/A |
| 3 | 1351.501 | -38.98 | -13.00 | Vertical | PASS |
| 4 | 2277.311 | -38.18 | -13.00 | Vertical | PASS |
| 5 | 4741.117 | -45.12 | -13.00 | Vertical | PASS |
| 6 | 11793.881 | -35.60 | -13.00 | Vertical | PASS |