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Report No.: 1407RSU01604
Report Version: V05
Issue Date: 08-11-2014

# MEASUREMENT REPORT
## FCC PART 22&24

| | |
|---|---|
| **FCC ID:** | 2ACS2-M1 |
| **APPLICANT:** | MiiTech LLC |
| **Application Type:** | Certification |
| **Product:** | MiiLink |
| **Model No.:** | M1 |
| **FCC Classification:** | PCS Licensed Transmitter Worn to Body (PCT) |
| **FCC Rule Part(s):** | Part2, Part22 Subpart H, Part24 Subpart E |
| **Test Procedure(s):** | ANSI/TIA-603-D-2010, KDB 971168 D01v02r01 |
| **Test Date:** | July 10 ~ July 26, 2014 |

Reviewed By : Robin Wu
( Robin Wu )

Approved By : Marlin Chen
( Marlin Chen )

# Revision History

| Report No. | Version | Description | Issue Date |
|---|---|---|---|
| 1407RSU01604 | Rev. 01 | Initial report | 07-27-2014 |
| 1407RSU01604 | Rev. 02 | Modify the FCC Classification | 07-31-2014 |
| 1407RSU01604 | Rev. 03 | Modify the test procedure rule and some output power | 08-01-2014 |
| 1407RSU01604 | Rev. 04 | Modify the power of EDGE1900 mode | 08-04-2014 |
| 1407RSU01604 | Rev. 05 | Modify the test procedure rule and added some descriptions for band-edge test. | 08-11-2014 |
| | | | |

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## §2.1033 General Information

| | |
|---|---|
| **Applicant:** | MiiTech LLC |
| **Applicant Address:** | 46616 Pinehurst Cir. Northville MI.48168, USA |
| **Manufacturer:** | MiiTech LLC |
| **Manufacturer Address:** | 46616 Pinehurst Cir. Northville MI.48168, USA |
| **Test Site:** | MRT Technology (Suzhou) Co., Ltd |
| **Test Site Address:** | D8 Building, Youxin Industrial Park, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China |
| **MRT Registration No.:** | 809388 |
| **FCC Rule Part(s):** | Part22 Subpart H, Part24 Subpart E |
| **Model No.:** | M1 |
| **FCC ID:** | 2ACS2-M1 |
| **Test Device Serial No.:** | N/A ☐ Production ☒ Pre-Production ☐ Engineering |
| **FCC Classification:** | PCS Licensed Transmitter Worn to Body (PCT) |
| **Date(s) of Test:** | July 10 ~ July 26, 2014 |
| **Test Report S/N:** | 1407RSU01604 |

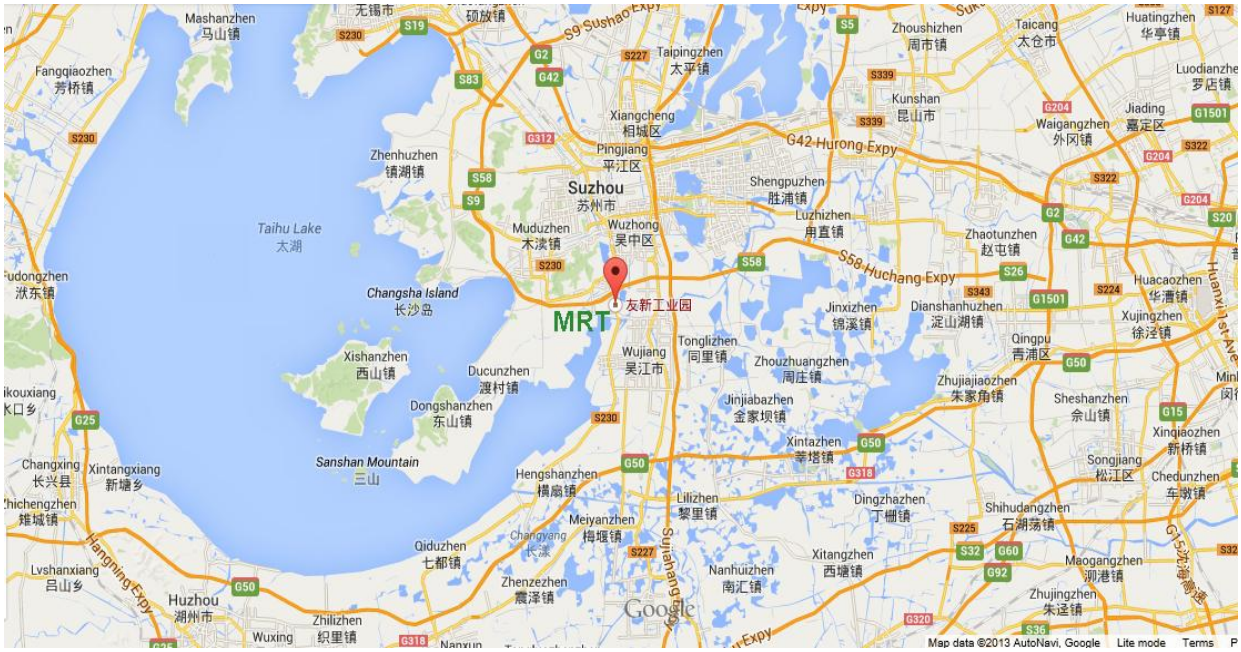
# 1. INTRODUCTION

## 1.1. Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Industry Canada Certification and Engineering Bureau.

## 1.2. MRT Test Location

The map below shows the location of the MRT LABORATORY, its proximity to the Taihu Lake. These measurement tests were conducted at the MRT Technology (Suzhou) Co., Ltd. Facility located at D8 Building, Youxin Industrial Park, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China. The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4-2009 on September 30, 2013.



# 2. PRODUCT INFORMATION

## 2.1. Equipment Description

| | |
|---|---|
| Product Name | MiiLink |
| Model No. | M1 |
| GPS Function | Support |
| Antenna Type | Internal |
| Antenna Gain | GSM850: -1.0dBi<br>PCS1900: 1.2dBi |
| Type of Modulation | GSM / GPRS: GMSK; EDGE: 8PSK |

## 2.2. Device Capabilities

This device contains the following capabilities:
850/1900 GPRS/EDGE, GPS

## 2.3. Test Configuration

The **MiiLink FCC ID: 2ACS2-M1** was tested per the guidance of ANSI/TIA-603-D-2010 and KDB 971168 D01v02r01. See section 3.0 of this report for a description of the radiated and antenna port conducted emissions tests.

## 2.4. EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and no modifications were made during testing.

# 3. DESCRIPTION OF TEST

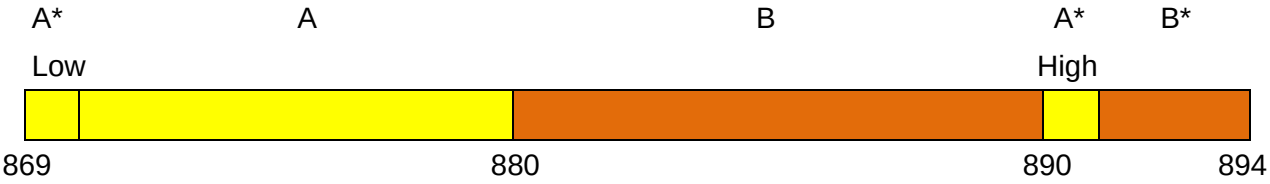
## 3.1. Evaluation Procedure

The measurement procedures described in the “Land Mobile FM or PM – Communications Equipment – Measurements and Performance Standards” (ANSI/TIA-603-D-2010) and “Procedures for Compliance Measurement of the Fundamental Emission Power of Licensed Wideband (> 1 MHz) Digital Transmission Systems” (KDB 971168) were used in the measurement of the **MiiLink FCC ID: 2ACS2-M1.**

**Deviation from measurement procedure…….....None**

## 3.2. Cellular – Base Frequency Blocks

**§22.905**




Block 1: 869 – 880 MHz (A* Low + A)

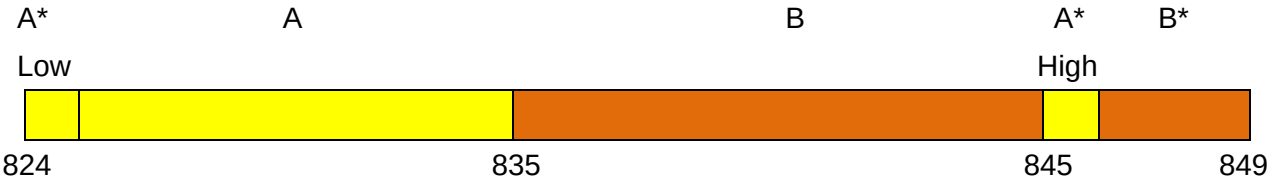
Block 2: 880 – 890 MHz (B)

Block 3: 890 – 891.5 MHz (A* High)

Block 4: 891.5 – 894 MHz (B*)

## 3.3. Cellular – Mobile Frequency Blocks

**§22.905**




Block 1: 824 – 835 MHz (A* Low + A)

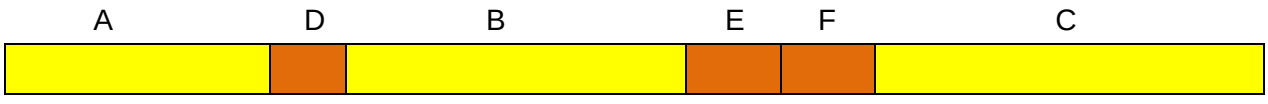
Block 2: 835 – 845 MHz (B)

Block 3: 845 – 846.5 MHz (A* High)

Block 4: 846.5 – 849 MHz (B*)

## 3.4. PCS – Base Frequency Blocks

**§24.229**




Block 1: 1930 – 1945 MHz (A)

Block 2: 1945 – 1950 MHz (D)

Block 3: 1950 – 1965 MHz (B)

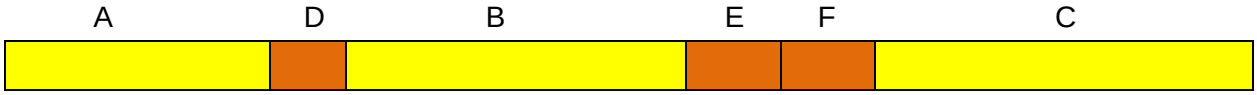
Block 4: 1965 – 1970 MHz (E)

Block 5: 1970 – 1975 MHz (F)

Block 6: 1975 – 1990 MHz (C)

## 3.5. PCS – Mobile Frequency Blocks

**§24.229**




Block 1: 1850 – 1865 MHz (A)
Block 2: 1865 – 1870 MHz (D)
Block 3: 1870 – 1885 MHz (B)
Block 4: 1885 – 1890 MHz (E)
Block 5: 1890 – 1895 MHz (F)
Block 6: 1895 – 1910 MHz (C)

## 3.6. Occupied Bandwidth

**§2.1049**

The occupied bandwidth, that 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 shall be measured. The spectrum analyzers' "occupied bandwidth" measurement function was used to record the occupied bandwidth in accordance with KDB 971168.

## 3.7. Spurious and Harmonic Emissions at Antenna Terminal

**§2.1051 §22.917(a) §24.238(a)**

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 $10^{th}$ harmonic. On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least 43 + 10 log(P) dB. Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for Part 22 and 1 MHz or greater for Part 24. However, 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. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

## 3.8. Radiated Power and Radiated Spurious Emissions

**§2.1053 §22.913(a.2) §22.917(a) §24.232(c) §24.238(a)**

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurement and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. For measurements above 1GHz absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections. For measurements below 1GHz, the absorbers are removed. A MF Model 210SS turntable is used for radiated measurement. It is a continuously rotatable, remote-controlled, metallic turntable and 2 meters (6.56 ft.) in diameter. The turn table is flush with the raised floor of the chamber in order to maintain its function as a ground plane. An 80cm high PVC support structure is placed on top of the turntable.

The equipment under test was transmitting while connected to its integral antenna and is placed on a wooden turntable 80cm above the ground plane and 3 meters from the receive antenna. The receive antenna height is adjusted between 1 and 4 meter height, the turntable is rotated through 360 degrees, and the EUT is manipulated through all orthogonal planes representative of its typical use to achieve the highest reading on the receive spectrum analyzer. Radiated power levels are also investigated with the receive antenna horizontally and vertically polarized. The maximized power level is recorded using the spectrum analyzer “Channel Power” function with the integration band set to the emissions’ occupied bandwidth, a RMS detector, RBW = 100kHz, VBW = 300kHz, and a 1 second sweep time over a minimum of 10 sweeps, per the guidelines of KDB 971168.

Per the guidance of ANSI/TIA-603-D-2010, a half-wave dipole is then substituted in place of the EUT. For emissions above 1GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator with the level of the signal generator being adjusted to obtain the same receive spectrum analyzer level previously recorded from the spurious emission from the EUT. The power of the emission is calculated using the following formula:

$$Pd\ [dBm] = Pg\ [dBm] - \text{cable loss}\ [dB] + \text{antenna gain}\ [dBd/dBi]$$

Where, Pd is the dipole equivalent power, Pg is the generator output into the substitution antenna, and the antenna gain is the gain of the substitute antenna used relative to either a half-wave dipole (dBd) or an isotropic source (dBi). The substitute level is equal to Pg [dBm] – cable loss [dB].

The calculated Pd levels are then compared to the absolute spurious emission limit of -13dBm which is equivalent to the required minimum attenuation of 43 + 10*log10(Power [Watts]) specified

in 22.917(a) and 24.238(a).

## 3.9. Peak-Average Ratio

**§24.232(d)**

A peak to average ratio measurement is performed at the conducted port of the EUT. The spectrum analyzers Complementary Cumulative Distribution Function (CCDF) measurement profile is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth. The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The percent of time the signal spends at or above the level defines the probability for that particular power level.

For pulsed signals, the spectrum analyzer is set to use an internal “RF Burst” trigger that is synced with an incoming pulse and the measurement interval is set to less than the duration of the “on time” of one burst to ensure that energy is only captured during a time in which the transmitter is operating at maximum power. For continuous signals, the trigger is set to “free run” in the CCDF measurement mode.

## 3.10. Frequency Stability / Temperature Variation

**§2.1055 §22.355 §22.863 §22.905 §24.229 §24.235**

Frequency stability testing is performed in accordance with the guidelines of ANSI/TIA-603-D-2010. The frequency stability of the transmitter is measured by:

a.) Temperature: The temperature is varied from -30°C to +50°C in 10°C increments using an environmental chamber.

b.) Primary Supply Voltage: The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

Specification – For Part 22, the frequency stability of the transmitter shall be maintained within ±0.00025% (±2.5 ppm) of the center frequency. For Part 24, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Time Period and Procedure:

1. The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).
2. The equipment is turned on in a “standby” condition for fifteen minutes before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
3. Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

# 4. TEST EQUIPMENT CALIBRATION DATA

Radiated Emission

| Instrument | Manufacturer | Type No. | Serial No. | Cali. Interval | Cal. Date |
|---|---|---|---|---|---|
| Spectrum Analyzer | Agilent | N9010A | MY5144016A | 1 year | 2015/01/04 |
| Radio Communication Tester | R&S | CMU 200 | 117129 | 1 year | 2014/12/14 |
| Preamplifier | MRT | AP01G18 | 1310002 | 1 year | 2014/12/14 |
| Loop Antenna | Schwarzbeck | FMZB1519 | 1519-041 | 1 year | 2014/11/24 |
| TRILOG Antenna | Schwarzbeck | VULB9162 | 9162-047 | 1 year | 2014/11/24 |
| Broad-Band Horn Antenna | Schwarzbeck | BBHA9120D | 9120D-1167 | 1 year | 2014/11/24 |
| Broadband Horn Antenna | Schwarzbeck | BBHA9170 | 9170-549 | 1 year | 2014/12/11 |
| Temperature/Humidity Meter | Anymetre | TH101B | AC1-01 | 1 year | 2014/11/15 |

Conducted Test Equipment

| Instrument | Manufacturer | Type No. | Serial No. | Cali. Interval | Cali. Due Date |
|---|---|---|---|---|---|
| Spectrum Analyzer | Agilent | E4447A | MY45300136 | 1 year | 2014/11/08 |
| Radio Communication Tester | R&S | CMU 200 | 117129 | 1 year | 2014/12/14 |
| DC Power Supply | GWINSTEK | GPS-3030D | EM861052 | 1 year | 2014/11/14 |
| Programmable Temperature & Humidity Chamber | BAOYT | BYH-1500L | 1309W043 | 1 year | 2014/11/20 |
| Temperature/Humidity Meter | Anymetre | TH101B | TR3-01 | 1 year | 2014/11/15 |

# 5. SAMPLE CALCULATIONS

**GSM Emission Designator**

Emission Designator = 250KGXW

GSM BW = 250 kHz

G = Phase Modulation

X = Cases not otherwise covered

W = Combination (Audio/Data)

**EDGE Emission Designator**

Emission Designator = 250KG7W

GSM BW = 250 kHz

G = Phase Modulation

7 = Quantized/Digital Info

W = Combination (Audio/Data)

**Spurious Radiated Emission**

Example: Spurious emission at 3700.40 MHz

The receive spectrum analyzer reading at 3 meters with the EUT on the turntable was –81.0dBm. The gain of the substituted antenna is 8.1dBi. The signal generator connected to the substituted antenna terminals is adjusted to produce a reading of –81.0dBm on the spectrum analyzer. The loss of the cable between the signal generator and the terminals of the substituted antenna is 2.0 dB at 3700.40MHz. So 6.1 dB is added to the signal generator reading of –30.9dBm yielding –24.80dBm. The fundamental EIRP was 25.50dBm so this harmonic was 25.50dBm – (-24.80) = 50.3dBc.

# 6. MEASUREMENT UNCERTAINTY

Where relevant, the following test uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k = 2.

| Radiated Emission Measurement |
| --- |
| Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)):<br>9kHz ~ 1GHz: ± 4.18dB<br>1GHz ~ 40GHz: ± 4.76dB |

# 7. TEST RESULT

## 7.1. Summary

**Company Name:** **MiiTech LLC**
**FCC ID:** **2ACS2-M1**
**FCC Classification:** **PCS Licensed Transmitter Held to Ear (PCE)**
**Mode(s):** **GPRS/EDGE**

| FCC Part Section(s) | Test Description | Test Limit | Test Condition | Test Result | Reference |
|---|---|---|---|---|---|
| **Transmitter Mode(TX)** | | | | | |
| 2.1049 | Occupied bandwidth | N/A | Conducted | Pass | Section 7.2 |
| 2.1051<br>22.917(a)<br>24.238(a) | Band Edge / Conducted Spurious Emissions | > 43 + log10 (P[Watts]) at Band Edge and for all out-of-band emissions | | Pass | Section 7.3 |
| 24.232(d) | Peak-Average Ratio | < 13 dB | | Pass | Section 7.5 |
| 2.1046 | Transmitter Conducted Output Power | N/A | | Pass | RF Exposure Report |
| 22.913(a.2) | Effective Radiated Power | < 7 Watts max. ERP | Radiated | Pass | Section 7.4 |
| 24.232(c) | Equivalent Isotropic Radiated Power | < 2 Watts max. EIRP | | Pass | Section 7.4 |
| 2.1053<br>22.917(a)<br>24.238(a) | Undesirable Emissions | > 43 + log10 (P[Watts]) for all out-of-band emissions | | Pass | Section 7.4 |
| 2.1055<br>22.355<br>24.235 | Frequency Stability | < 2.5 ppm (Part 22)<br>Emission must remain in band (Part 24) | | Pass | Section 7.6 |

**Notes:**

1) All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
2) The analyzer plots shown in Section 4.0 were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables, directional couplers, and attenuators used as part of the system to maintain a link between the call box and the EUT at all frequencies of interest.
3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables, attenuators, and couplers.

## 7.2. Occupied Bandwidth

### 7.2.1. Test Limit

N/A

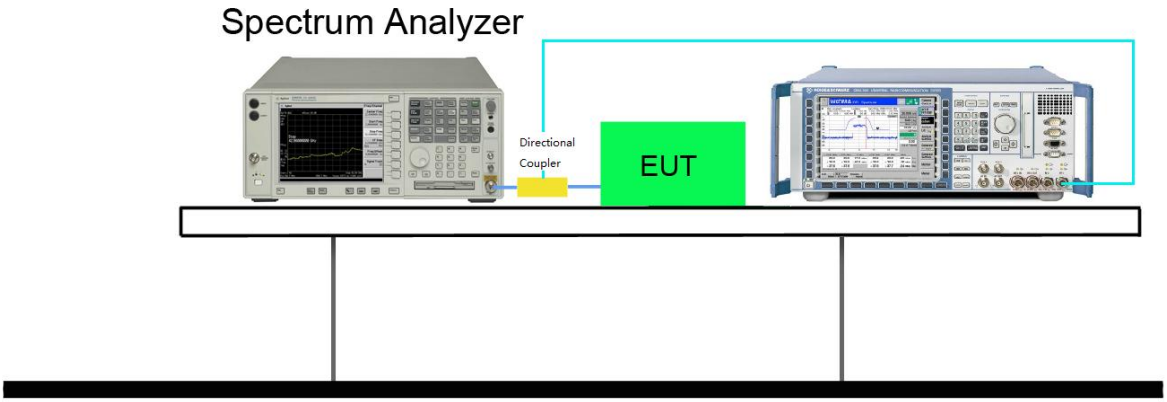
### 7.2.2. Test Procedure used

KDB 971168 D01v02r01 – Section 4.1 & ANSI/TIA-603-D-2010

### 7.2.3. Test Setting

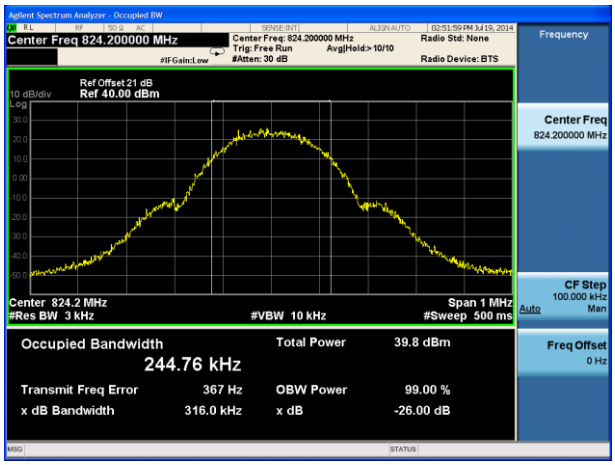
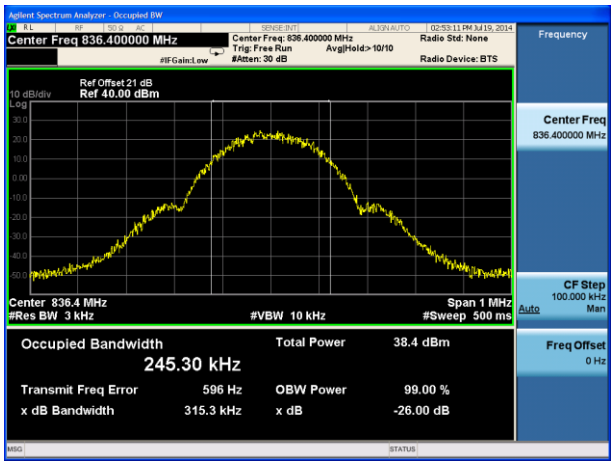
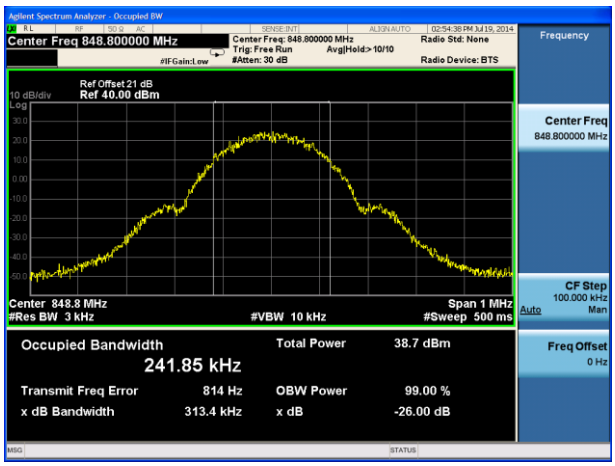
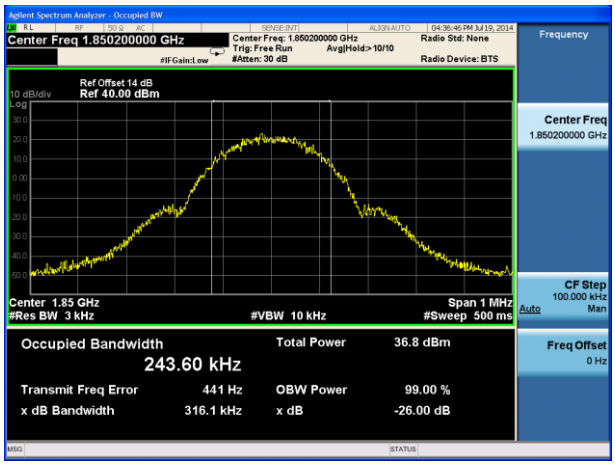
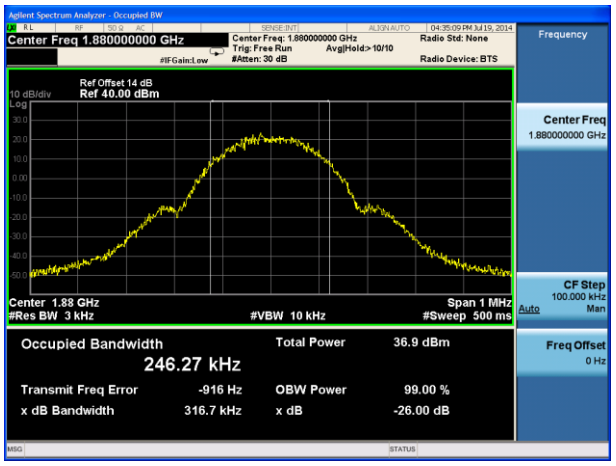
1. The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be between two and five times the anticipated OBW. RBW = approximately 1% of the emission bandwidth.
2. The nominal resolution bandwidth (RBW) shall be in the range of 1 to 5 % of the anticipated OBW, and the VBW shall be at least 3 times the RBW.
3. Set the detection mode to peak, and the trace mode to max hold.
4. Use the 99 % power bandwidth function of the spectrum analyzer (if available) and report the measured bandwidth.

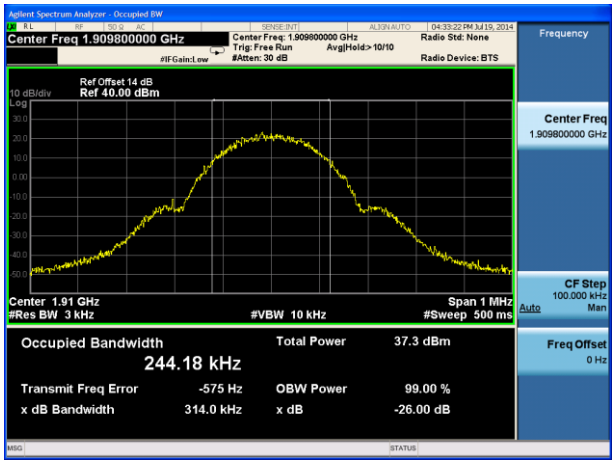
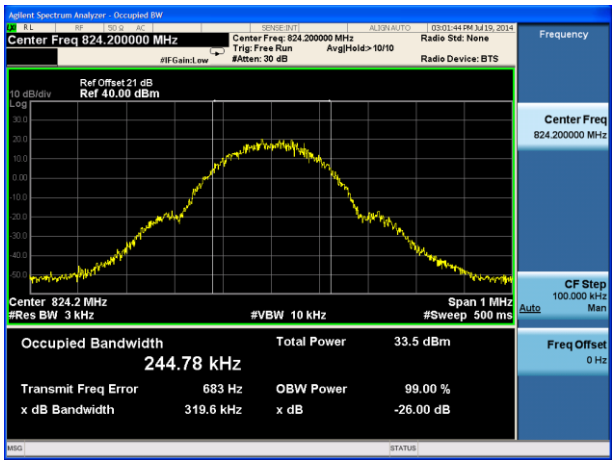
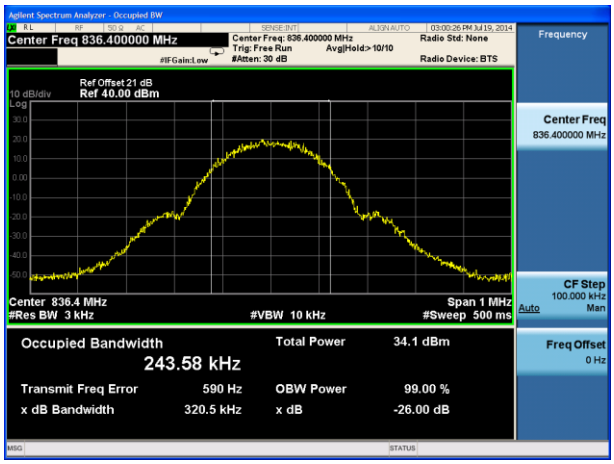
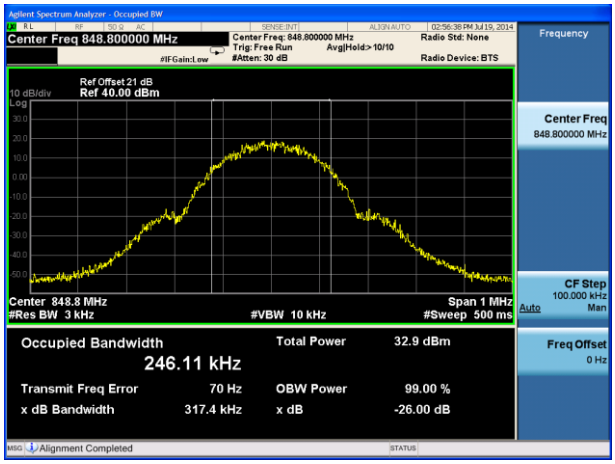
### 7.2.4. Test Setup

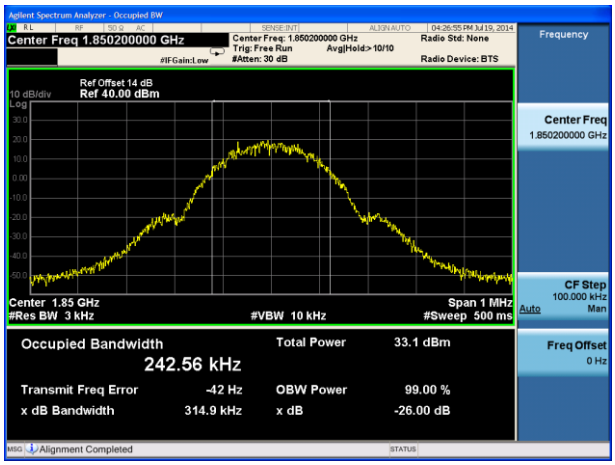
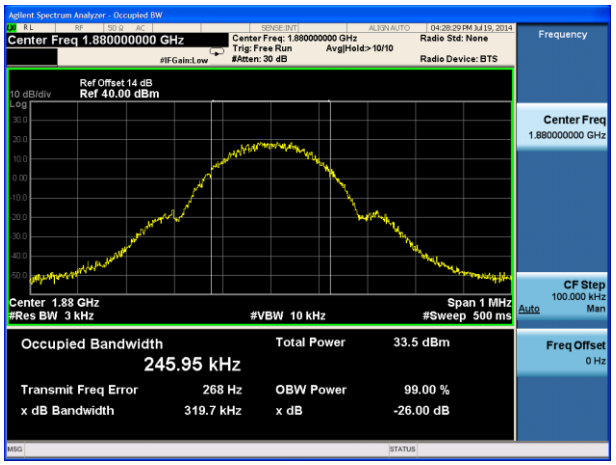
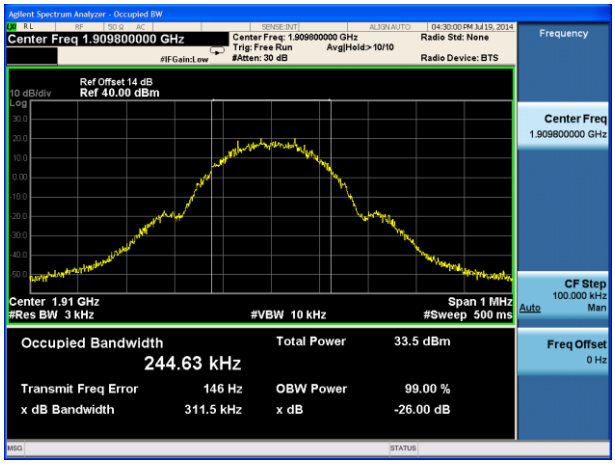


### 7.2.5. Test Result

| Test Mode | Channel No. | Frequency (MHz) | 99% Occupied Bandwidth (kHz) | -26dB Occupied Bandwidth (kHz) | Result |
|---|---|---|---|---|---|
| GSM850 | 128 | 824.2 | 244.76 | 316.00 | Pass |
| | 189 | 836.4 | 245.30 | 315.30 | Pass |
| | 251 | 848.8 | 241.85 | 313.40 | Pass |
| PCS1900 | 512 | 1850.2 | 243.60 | 316.10 | Pass |
| | 661 | 1880.0 | 246.27 | 316.70 | Pass |
| | 810 | 1909.8 | 244.18 | 314.00 | Pass |
| EDGE850 | 128 | 824.2 | 244.78 | 319.60 | Pass |
| | 189 | 836.4 | 243.58 | 320.50 | Pass |
| | 251 | 848.8 | 246.11 | 317.40 | Pass |
| EDGE1900 | 512 | 1850.2 | 242.56 | 314.90 | Pass |
| | 661 | 1880.0 | 245.95 | 319.70 | Pass |
| | 810 | 1909.8 | 244.63 | 311.50 | Pass |

| GSM850 Channel 128 (824.2MHz) | GSM850 Channel 189 (836.4MHz) |
|---|---|
|  |  |
| **GSM850 Channel 251 (848.8MHz)** | |
|  | |
| **PCS1900 Channel 512 (1850.2MHz)** | **PCS1900 Channel 661 (1880.0MHz)** |
|  |  |

| PCS1900 Channel 810 (1909.8MHz) | |
|---|---|
|  | |
| **EDGE850 Channel 128 (824.2MHz)** | **EDGE850 Channel 189 (836.4MHz)** |
|  |  |
| **EDGE850 Channel 251 (848.8MHz)** | |
|  | |

| EDGE1900 Channel 512 (1850.2MHz) | EDGE1900 Channel 661 (1880.0MHz) |
|---|---|
|  |  |
| **EDGE1900 Channel 810 (1909.8MHz)** | |
|  | |

## 7.3. Spurious and Harmonic Emissions at Antenna Terminal

### 7.3.1. Test Limit

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 + 10log(P) dB.

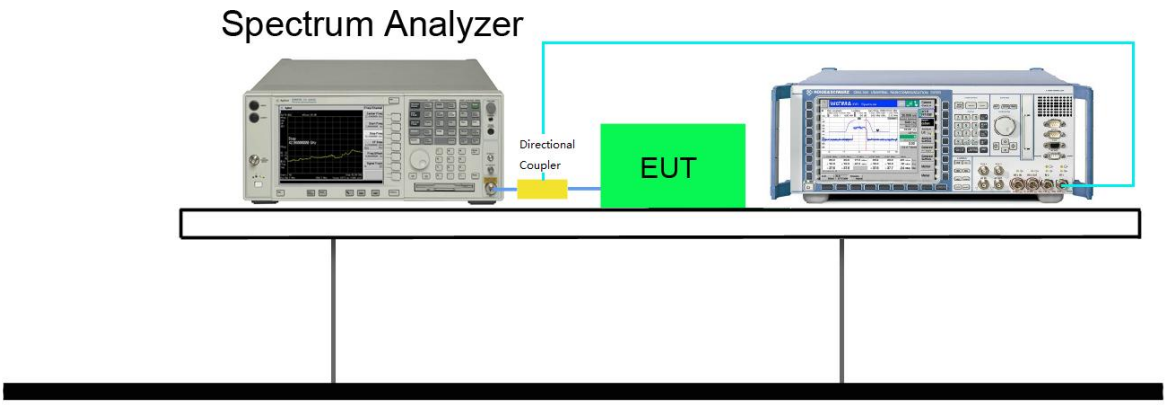
### 7.3.2. Test Procedure Used

KDB 971168 D01v02r01 – Section 6.0 & ANSI/TIA-603-D-2010

### 7.3.3. Test Setting

In the 1MHz 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 to measure the out of band Emissions.

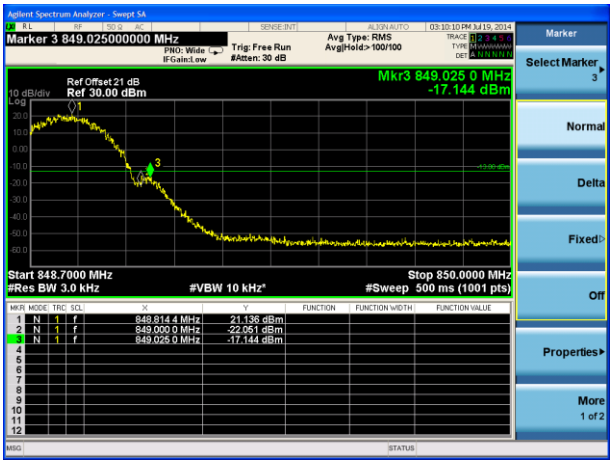
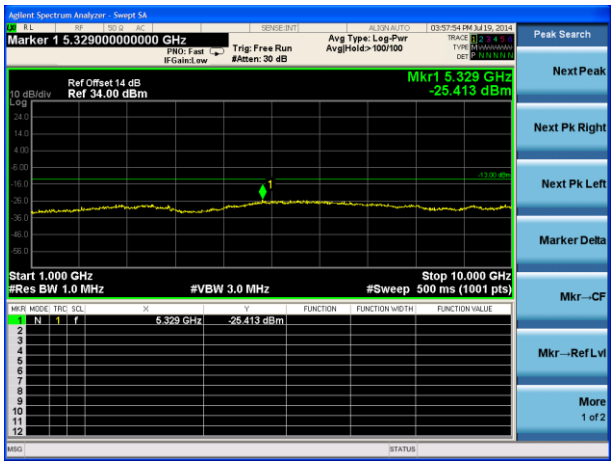
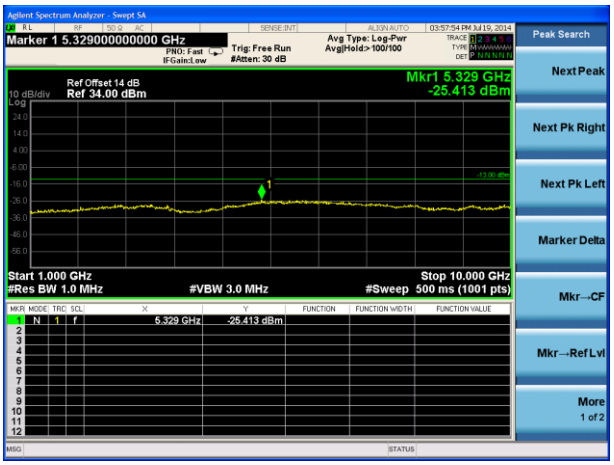
### 7.3.4. Test Setup



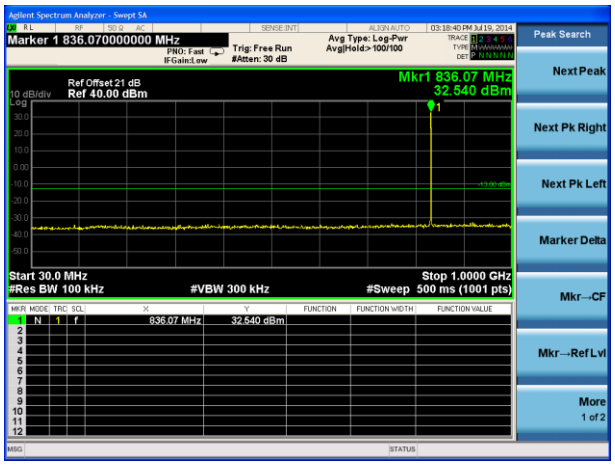
### 7.3.5. Test Result

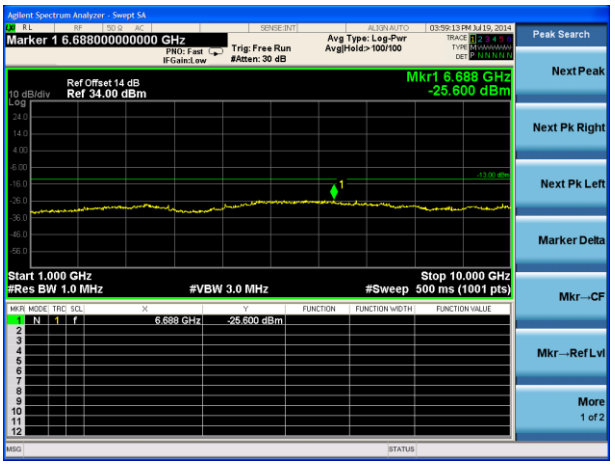
| Mode | Channel No. | Frequency (MHz) | Modulation | Test Result |
|---|---|---|---|---|
| GSM850 | 128 | 824.20 | GMSK | Pass |
| GSM850 | 189 | 836.40 | GMSK | Pass |
| GSM850 | 251 | 848.80 | GMSK | Pass |

Note: Offset = 10*log(3.2kHz/3kHz) = 0.28dB, if the measured level added this offset, the result can pass.

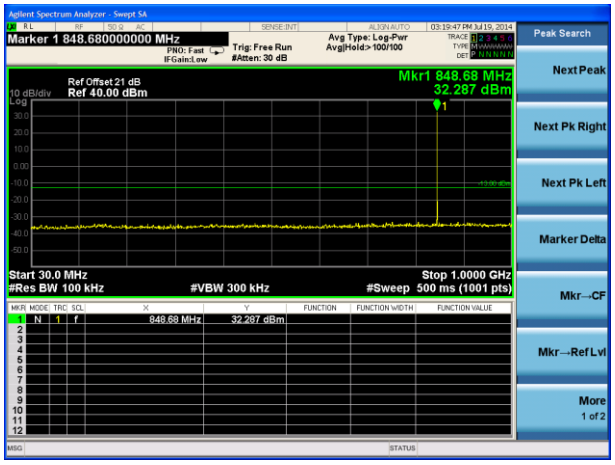
<table>
<tr><th colspan="2">Band Edge</th></tr>
<tr><th>Channel 128 (824.20MHz)</th><th>Channel 251 (848.80MHz)</th></tr>
<tr><td> 
</td><td> 
</td></tr>
<tr><td>-14.33dBm + 0.28dB = -14.05dBm <-13dBm</td><td>-17.14dBm + 0.28dB= -16.86dBm <-13dBm</td></tr>
<tr><th colspan="2">Conducted Spurious Emission</th></tr>
<tr><th colspan="2">Channel 128 (824.20MHz)</th></tr>
<tr><td> 
</td><td> 
</td></tr>
</table>

## Channel 189 (836.40MHz)



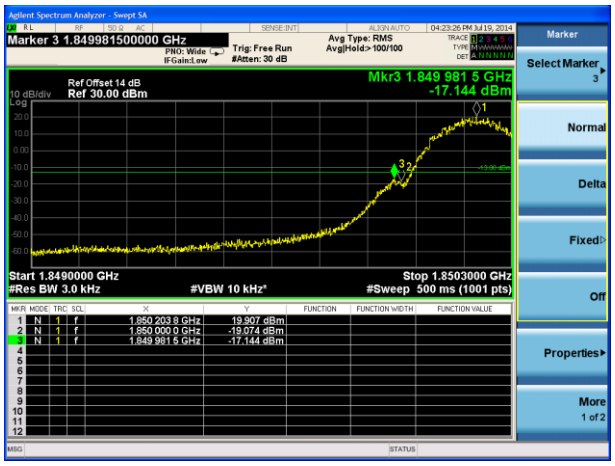
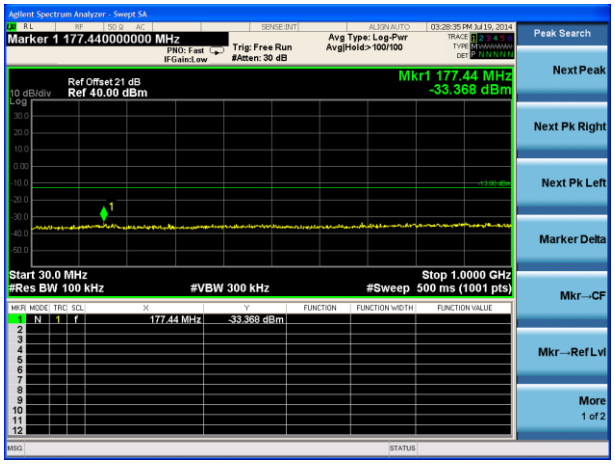




## Channel 251 (848.80MHz)



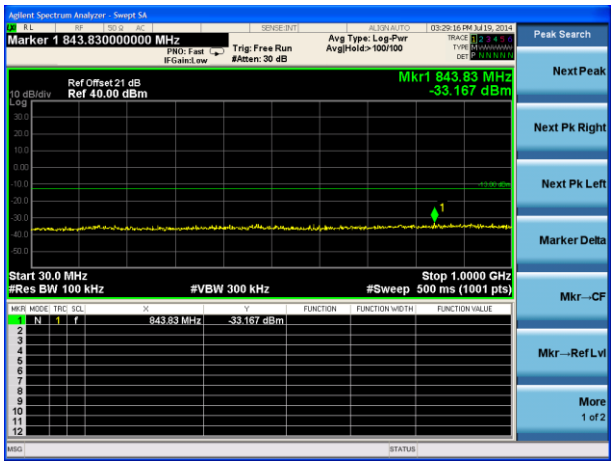

| Mode | Channel No. | Frequency (MHz) | Modulation | Test Result |
|---|---|---|---|---|
| PCS1900 | 512 | 1850.20 | GMSK | Pass |
| PCS1900 | 661 | 1880.00 | GMSK | Pass |
| PCS1900 | 810 | 1909.80 | GMSK | Pass |

Note: Offset = 10*log(3.2kHz/3kHz) = 0.28dB, if the measured level added this offset, the result can pass.

<table>
<tr><th colspan="2">Band Edge</th></tr>
<tr><th>Channel 512 (1850.20MHz)</th><th>Channel 810 (1909.80MHz)</th></tr>
<tr><td> 
</td><td> 
</td></tr>
<tr><td>-17.14dBm + 0.28dB = -16.86dBm <-13dBm</td><td>-18.14dBm + 0.28dB= -17.86dBm <-13dBm</td></tr>
<tr><th colspan="2">Conducted Spurious Emission</th></tr>
<tr><th colspan="2">Channel 512 (1850.20MHz)</th></tr>
<tr><td colspan="2"> 

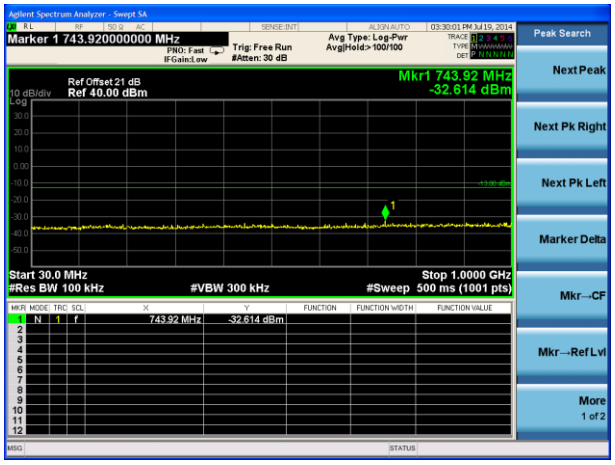

</td></tr>
</table>

## Channel 661 (1880.00MHz)



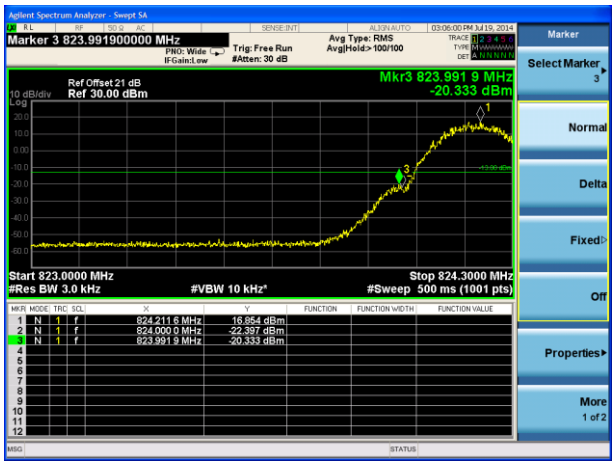
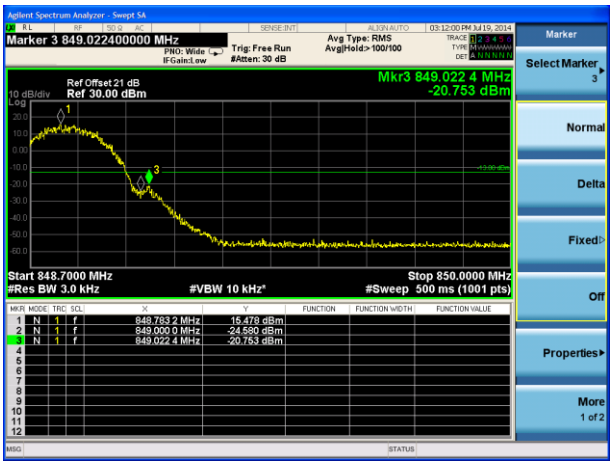
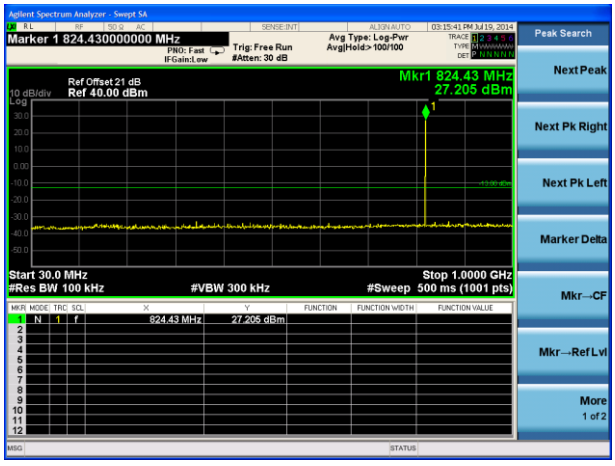
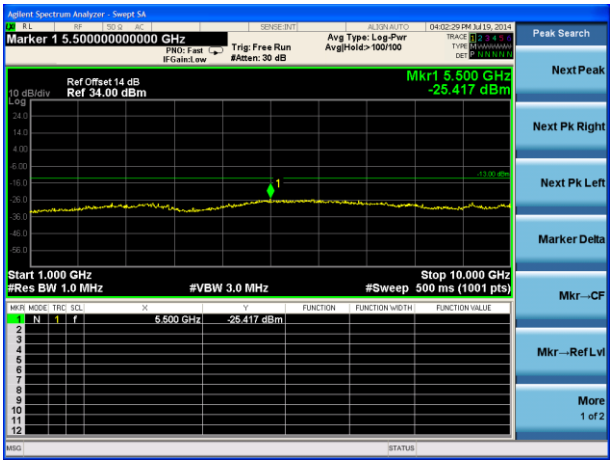


## Channel 810 (1909.80MHz)

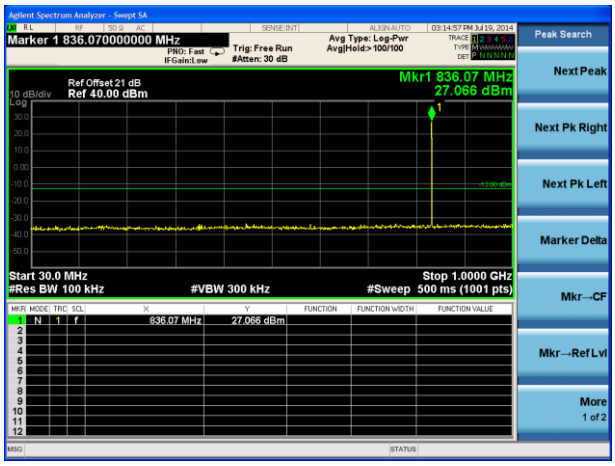


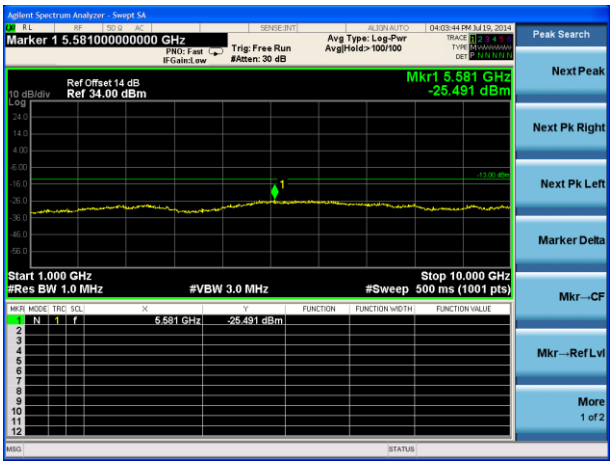

| Mode | Channel No. | Frequency (MHz) | Modulation | Test Result |
|---|---|---|---|---|
| EDGE850 | 128 | 824.20 | 8PSK | Pass |
| EDGE850 | 189 | 836.40 | 8PSK | Pass |
| EDGE850 | 251 | 848.80 | 8PSK | Pass |

Note: Offset = 10*log(3.2kHz/3kHz) = 0.28dB, if the measured level added this offset, the result can pass.

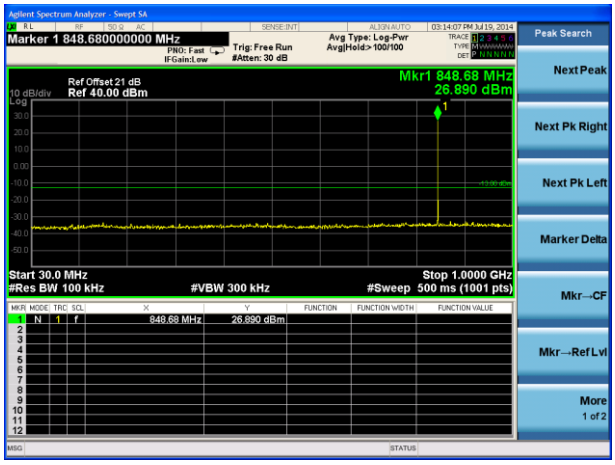
<table>
<tr><th colspan="2">Band Edge</th></tr>
<tr><th>Channel 128 (824.20MHz)</th><th>Channel 251 (848.80MHz)</th></tr>
<tr><td> 
</td><td> 
</td></tr>
<tr><td>-20.33dBm + 0.28dB = -20.05dBm <-13dBm</td><td>-20.75dBm + 0.28dB= -20.47dBm <-13dBm</td></tr>
<tr><th colspan="2">Conducted Spurious Emission</th></tr>
<tr><th colspan="2">Channel 128 (824.20MHz)</th></tr>
<tr><td> 
</td><td> 
</td></tr>
</table>

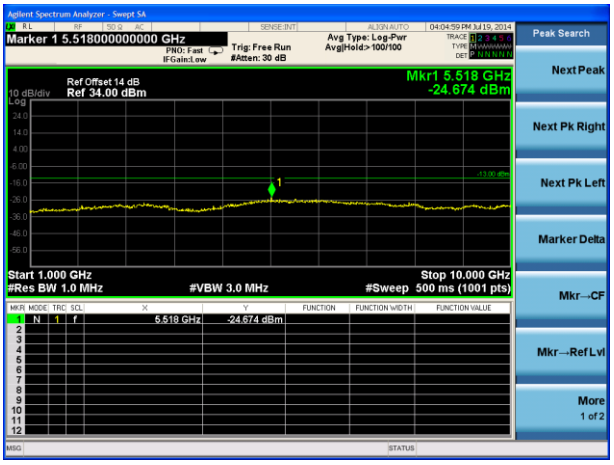
## Channel 189 (836.40MHz)



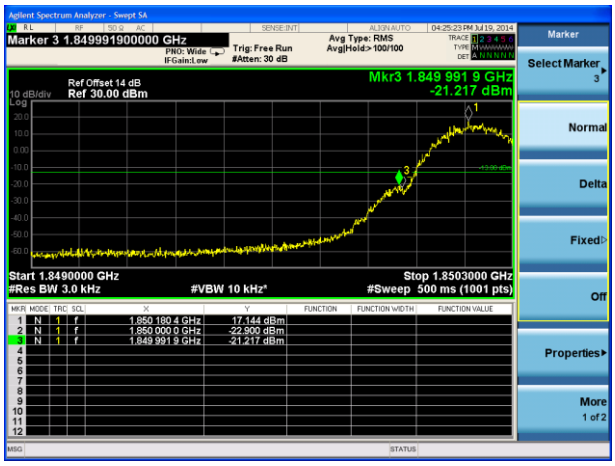
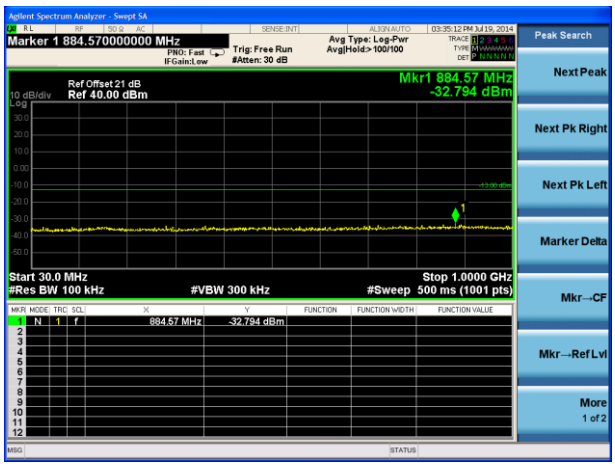
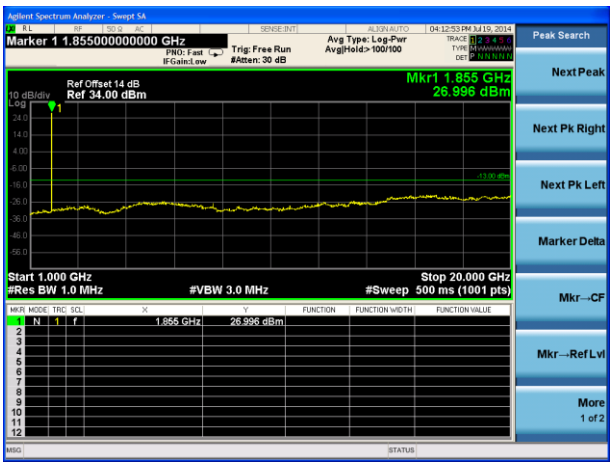

## Channel 251 (848.80MHz)



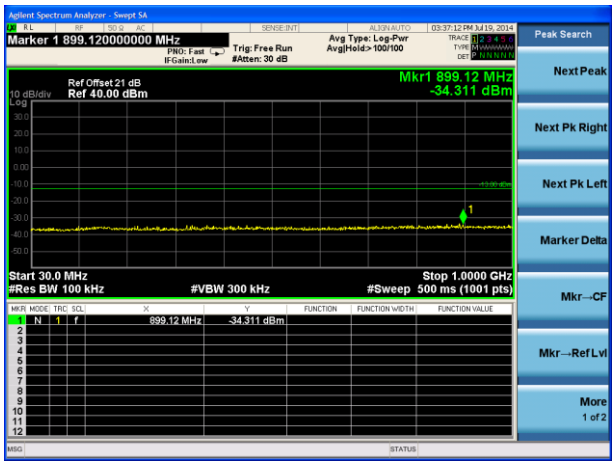



| Mode | Channel No. | Frequency (MHz) | Modulation | Test Result |
|---|---|---|---|---|
| EDGE1900 | 512 | 1850.20 | 8PSK | Pass |
| EDGE1900 | 661 | 1880.00 | 8PSK | Pass |
| EDGE1900 | 810 | 1909.80 | 8PSK | Pass |

Note: Offset = 10*log(3.2kHz/3kHz) = 0.28dB, if the measured level added this offset, the result can pass.

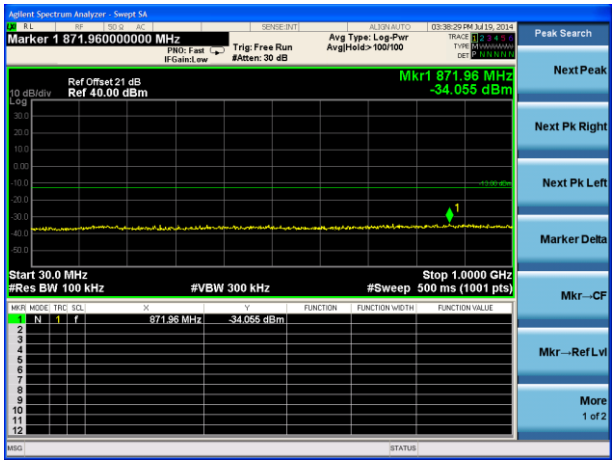
| **Band Edge** | |
|---|---|
| **Channel 512 (1850.20MHz)** | **Channel 810 (1909.80MHz)** |
|  |  |
| -21.22dBm + 0.28dB = -20.94dBm <-13dBm | -19.96dBm + 0.28dB= -19.68dBm <-13dBm |
| **Conducted Spurious Emission** | |
| **Channel 512 (1850.20MHz)** | |
|  |  |

## Channel 661 (1880.00MHz)





## Channel 810 (1909.80MHz)




## 7.4. Conducted & Radiated Power and Radiated Spurious Emissions

### 7.4.1. Test Limit

**Radiated Power**

For FCC Part 22.913(a)(2):

The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

For FCC Part 24.232(b):

The EIRP of mobile transmitters and auxiliary test transmitters must not exceed 2 Watts.

**Radiated Spurious Emissions**

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 + 10log(P) dB.

### 7.4.2. Test Procedure Used

KDB 971168 D01v02r01 - Section 7.0 & ANSI/TIA-603-D-2010

### 7.4.3. Test Setting

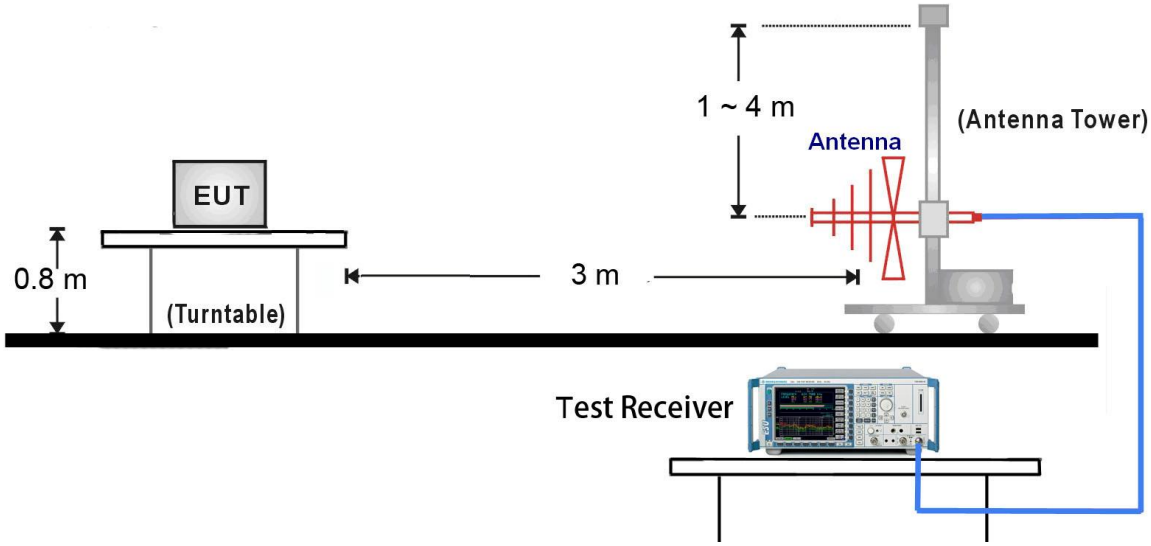
1. The EUT shall be placed at the specified height on a support, and in the position closest to normal use as declared by provider.
2. The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to the frequency of the transmitter
3. The output of the test antenna shall be connected to the measuring receiver.
4. The transmitter shall be switched on and the measuring receiver shall be tuned to the frequency of the transmitter under test.
5. The test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver.
6. The transmitter shall then be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
7. The test antenna shall be raised and lowered again through the specified range of height

until a maximum signal level is detected by the measuring receiver.

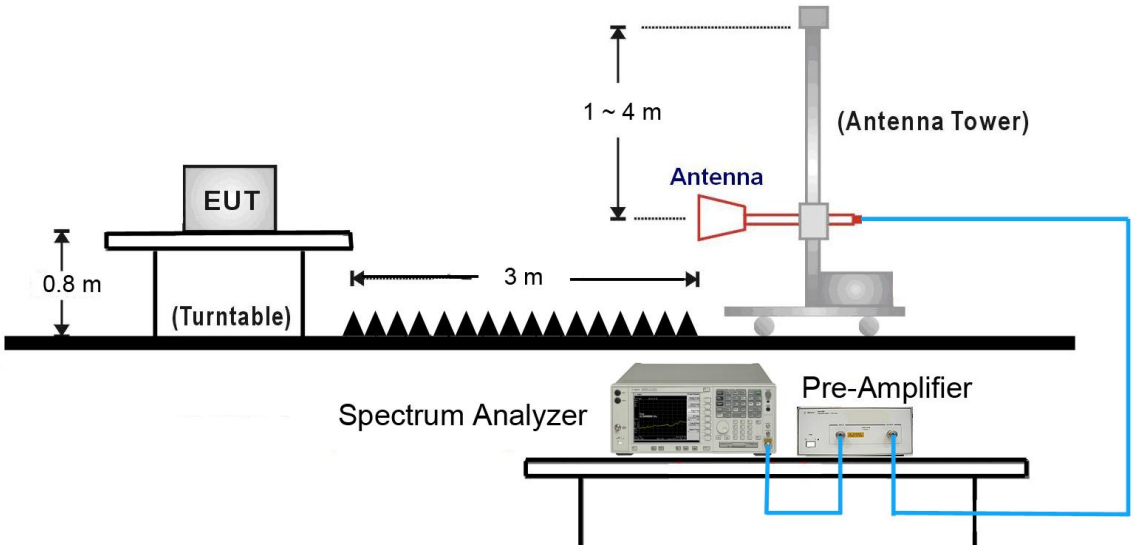
8. The maximum signal level detected by the measuring receiver shall be noted.
9. The transmitter shall be replaced by a substitution antenna.
10. The substitution antenna shall be orientated for vertical polarization and the length of the substitution antenna shall be adjusted to correspond to the frequency of the transmitter.
11. The substitution antenna shall be connected to a calibrated signal generator.
12. If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
13. The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
14. The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuator setting of the measuring receiver.
15. The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarization.
16. The measure of the effective radiated power is the larger of the two levels recorded at the input to the substitution antenna, corrected for gain of the substitution antenna if necessary.
17. Test site anechoic chamber refer to ANSI C63.4: 2009.

### 7.4.4. Test Setup

30MHz ~ 1GHz Test Setup:




1GHz ~ 20GHz Test Setup:



### 7.4.5. Test Result

**Conducted Power**

| Mode | Frequency (MHz) | Avg. Burst Power (dBm) | Duty Cycle Factor (dB) | Scaling Factor |
|---|---|---|---|---|
| GPRS850(1 Slot) | 824.2 | 32.13 | -9 | 1.089 |
| | 836.4 | 32.23 | -9 | 1.064 |
| | 848.8 | 32.27 | -9 | 1.054 |
| GPRS850(2 Slot) | 824.2 | 31.35 | -6 | 1.059 |
| | 836.4 | 31.49 | -6 | 1.026 |
| | 848.8 | 31.58 | -6 | 1.005 |
| GPRS850(3 Slot) | 824.2 | 29.40 | -4.25 | 1.175 |
| | 836.4 | 29.92 | -4.25 | 1.042 |
| | 848.8 | 30.01 | -4.25 | 1.021 |
| GPRS850(4 Slot) | 824.2 | 29.20 | -3 | 1.072 |
| | 836.4 | 29.37 | -3 | 1.030 |
| | 848.8 | 29.46 | -3 | 1.009 |
| EDGE850(1 Slot) | 824.2 | 27.74 | -9 | 1.191 |
| | 836.4 | 28.07 | -9 | 1.104 |
| | 848.8 | 28.27 | -9 | 1.054 |
| EDGE850(2 Slot) | 824.2 | 27.26 | -6 | 1.186 |
| | 836.4 | 27.51 | -6 | 1.119 |
| | 848.8 | 27.79 | -6 | 1.050 |
| EDGE850(3 Slot) | 824.2 | 26.12 | -4.25 | 1.091 |
| | 836.4 | 26.28 | -4.25 | 1.052 |
| | 848.8 | 26.35 | -4.25 | 1.035 |
| EDGE850(4 Slot) | 824.2 | 25.27 | -3 | 1.183 |
| | 836.4 | 25.38 | -3 | 1.153 |
| | 848.8 | 25.52 | -3 | 1.117 |
| GPRS1900(1 Slot) | 1850.2 | 29.79 | -9 | 1.050 |
| | 1880.0 | 29.44 | -9 | 1.138 |
| | 1909.8 | 29.25 | -9 | 1.189 |
| GPRS1900(2 Slot) | 1850.2 | 29.10 | -6 | 1.023 |
| | 1880.0 | 28.91 | -6 | 1.069 |
| | 1909.8 | 28.83 | -6 | 1.089 |
| GPRS1900(3 Slot) | 1850.2 | 27.20 | -4.25 | 1.122 |
| | 1880.0 | 27.44 | -4.25 | 1.062 |

| | | | | |
|---|---|---|---|---|
| | 1909.8 | 27.63 | -4.25 | 1.016 |
| GPRS1900(4 Slot) | 1850.2 | 26.25 | -3 | 1.161 |
| | 1880.0 | 26.59 | -3 | 1.074 |
| | 1909.8 | 26.83 | -3 | 1.016 |
| EDGE1900(1 Slot) | 1850.2 | 25.03 | -9 | 1.089 |
| | 1880.0 | 24.87 | -9 | 1.130 |
| | 1909.8 | 24.55 | -9 | 1.216 |
| EDGE1900(2 Slot) | 1850.2 | 23.44 | -6 | 1.014 |
| | 1880.0 | 23.05 | -6 | 1.109 |
| | 1909.8 | 22.88 | -6 | 1.153 |
| EDGE1900(3 Slot) | 1850.2 | 21.35 | -4.25 | 1.035 |
| | 1880.0 | 21.12 | -4.25 | 1.091 |
| | 1909.8 | 20.91 | -4.25 | 1.146 |
| EDGE1900(4 Slot) | 1850.2 | 19.61 | -3 | 1.094 |
| | 1880.0 | 19.55 | -3 | 1.109 |
| | 1909.8 | 19.37 | -3 | 1.156 |

Note：

1. Scaling Factor = Max Power (mW) / Avg. Burst Power (mW); Max Power is the tune-up power.
2. This device operates using the following maximum and nominal output power specifications. SAR values were scaled to the maximum allowed power to determine compliance per KDB Publication 447498 D01v05.
3. Both burst-averaged and calculated frame-averaged powers are included. Frame-averaged powers were calculated from the measured burst-averaged power by converting the slot powers into linear units and calculating the energy over 8 timeslots.
4. The bolded GPRS modes were selected for SAR testing according to the highest frame-averaged output power table per KDB 941225 D03v01.

**Radiated Power**

GSM850

| Frequency (MHz) | Ant. Pol. (H/V) | SG Reading (dBm) | Cable Loss (dB) | Substitute Antenna Gain (dBd) | ERP (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| Low Channel 128 (824.20MHz) | | | | | | | |
| 824.2 | H | 25.28 | 1.78 | 6.52 | 30.02 | 38.50 | -10.48 |
| 824.2 | V | 16.86 | 1.78 | 6.38 | 21.46 | 38.50 | -18.04 |
| Middle Channel 189 (836.40MHz) | | | | | | | |
| 836.4 | H | 25.84 | 1.80 | 6.63 | 30.67 | 38.50 | -9.83 |
| 836.4 | V | 18.72 | 1.80 | 6.15 | 23.07 | 38.50 | -17.43 |
| High Channel 251 (848.80MHz) | | | | | | | |
| 848.8 | H | 25.82 | 1.82 | 6.80 | 30.80 | 38.50 | -9.70 |
| 848.8 | V | 19.12 | 1.82 | 6.54 | 23.84 | 38.50 | -16.66 |

PCS1900

| Frequency (MHz) | Ant. Pol. (H/V) | SG Reading (dBm) | Cable Loss (dB) | Substitute Antenna Gain (dBi) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| Low Channel 512 (1850.20MHz) | | | | | | | |
| 1850.2 | H | 27.79 | 2.70 | 4.64 | 29.73 | 33.00 | -7.27 |
| 1850.2 | V | 16.43 | 2.70 | 4.64 | 18.37 | 33.00 | -18.63 |
| Middle Channel 661 (1880.00MHz) | | | | | | | |
| 1880.0 | H | 27.27 | 2.72 | 4.59 | 29.14 | 33.00 | -8.86 |
| 1880.0 | V | 15.96 | 2.72 | 4.59 | 17.83 | 33.00 | -19.17 |
| High Channel 810 (1909.80MHz) | | | | | | | |
| 1909.8 | H | 27.70 | 2.75 | 4.54 | 29.49 | 33.00 | -8.51 |
| 1909.8 | V | 17.62 | 2.75 | 4.54 | 19.41 | 33.00 | -18.59 |

EDGE850

| Frequency (MHz) | Ant. Pol. (H/V) | SG Reading (dBm) | Cable Loss (dB) | Substitute Antenna Gain (dBd) | ERP (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| Low Channel 128 (824.20MHz) | | | | | | | |
| 824.2 | H | 20.46 | 1.78 | 6.52 | 25.20 | 38.50 | -14.30 |
| 824.2 | V | 12.86 | 1.78 | 6.38 | 17.46 | 38.50 | -22.04 |
| Middle Channel 189 (836.40MHz) | | | | | | | |
| 836.4 | H | 20.83 | 1.80 | 6.63 | 25.66 | 38.50 | -13.84 |
| 836.4 | V | 13.72 | 1.80 | 6.15 | 18.07 | 38.50 | -21.43 |
| High Channel 251 (848.80MHz) | | | | | | | |
| 848.8 | H | 20.86 | 1.82 | 6.80 | 25.84 | 38.50 | -13.66 |
| 848.8 | V | 14.11 | 1.82 | 6.54 | 18.83 | 38.50 | -20.67 |

EDGE1900

| Frequency (MHz) | Ant. Pol. (H/V) | SG Reading (dBm) | Cable Loss (dB) | Substitute Antenna Gain (dBi) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| Low Channel 512 (1850.20MHz) | | | | | | | |
| 1850.2 | H | 22.83 | 2.70 | 4.64 | 24.77 | 33.00 | -11.23 |
| 1850.2 | V | 11.43 | 2.70 | 4.64 | 13.37 | 33.00 | -22.63 |
| Middle Channel 661 (1880.00MHz) | | | | | | | |
| 1880.0 | H | 22.27 | 2.72 | 4.59 | 24.14 | 33.00 | -11.86 |
| 1880.0 | V | 11.96 | 2.72 | 4.59 | 13.83 | 33.00 | -22.17 |
| High Channel 810 (1909.80MHz) | | | | | | | |
| 1909.8 | H | 21.70 | 2.75 | 4.54 | 23.49 | 33.00 | -11.51 |
| 1909.8 | V | 11.62 | 2.75 | 4.54 | 13.41 | 33.00 | -21.59 |

NOTES:

1. ERP (dBm) / EIRP (dBm)= SG Reading (dBm) - Cable Loss (dB) + Substitute Antenna Gain (dBd)
2. This device was tested under all configurations and the highest power is reported in GSM mode.
3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The “H” positioning is defined with the EUT lying flat on the test surface, the “H2” positioning is defined with the EUT standing up on its side, and the “V” positioning is defined

with the EUT standing upright. The worst case test configuration was found in the EUT in the V positioning. The data reported in the table above was measured in this test setup.

**Radiated Spurious Emission**

GSM850

| Frequency (MHz) | Ant. Pol. (H/V) | SG Reading (dBm) | Cable Loss (dB) | Substitute Antenna Gain (dBd) | ERP (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| Low Channel 128 (824.20MHz) | | | | | | | |
| 1646.0 | V | -45.44 | 2.55 | 5.13 | -42.86 | -13.0 | -29.86 |
| 2470.5 | V | -48.06 | 3.14 | 5.54 | -45.66 | -13.0 | -32.66 |
| 1646.0 | H | -43.14 | 2.55 | 5.13 | -40.56 | -13.0 | -27.56 |
| 2470.5 | H | -47.84 | 3.14 | 5.54 | -45.44 | -13.0 | -32.44 |
| Middle Channel 189 (836.40MHz) | | | | | | | |
| 1671.5 | V | -46.14 | 2.57 | 5.05 | -43.66 | -13.0 | -30.66 |
| 2513.0 | V | -49.74 | 3.18 | 5.64 | -47.28 | -13.0 | -34.28 |
| 1671.5 | H | -48.99 | 2.57 | 5.05 | -46.51 | -13.0 | -33.51 |
| 2513.0 | H | -47.04 | 3.18 | 5.64 | -44.58 | -13.0 | -31.58 |
| High Channel 251 (848.80MHz) | | | | | | | |
| 1697.0 | V | -48.67 | 2.59 | 4.97 | -46.29 | -13.0 | -33.29 |
| 2547.0 | V | -49.19 | 3.20 | 5.73 | -46.66 | -13.0 | -33.66 |
| 1697.0 | H | -52.02 | 2.59 | 4.97 | -49.64 | -13.0 | -36.64 |
| 2547.0 | H | -45.93 | 3.20 | 5.73 | -43.40 | -13.0 | -30.40 |

Note:

1. Spurious emissions within 30-1000MHz were found more than 20dB below limit line.
2. ERP (dBm) = SG Reading (dBm) - Cable Loss (dB) + Substitute Antenna Gain (dBd)

PCS1900

| Frequency (MHz) | Ant. Pol. (H/V) | SG Reading (dBm) | Cable Loss (dB) | Substitute Antenna Gain (dBi) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| Low Channel 512 (1850.20MHz) | | | | | | | |
| 3703.0 | V | -28.06 | 3.90 | 7.88 | -24.08 | -13.0 | -11.08 |
| 5547.5 | V | -44.98 | 4.85 | 10.10 | -39.73 | -13.0 | -26.73 |
| 3703.0 | H | -30.37 | 3.90 | 7.88 | -26.39 | -13.0 | -13.39 |
| 5547.5 | H | -44.40 | 4.85 | 10.10 | -39.15 | -13.0 | -26.15 |
| Middle Channel 661 (1880.00MHz) | | | | | | | |
| 3762.5 | V | -29.68 | 3.94 | 7.93 | -25.69 | -13.0 | -12.69 |
| 5641.0 | V | -46.73 | 4.90 | 10.10 | -41.53 | -13.0 | -28.53 |
| 3762.5 | H | -29.88 | 3.94 | 7.93 | -25.89 | -13.0 | -12.89 |
| 5641.0 | H | -43.63 | 4.90 | 10.10 | -38.43 | -13.0 | -25.43 |
| High Channel 810 (1909.80MHz) | | | | | | | |
| 3822.0 | V | -25.29 | 3.98 | 8.07 | -21.20 | -13.0 | -8.20 |
| 5726.0 | V | -40.07 | 5.00 | 10.10 | -34.97 | -13.0 | -21.97 |
| 3822.0 | H | -27.91 | 3.98 | 8.07 | -23.82 | -13.0 | -10.82 |
| 5726.0 | H | -43.25 | 5.00 | 10.10 | -38.15 | -13.0 | -25.15 |

Note:

1. Spurious emissions within 30-1000MHz were found more than 20dB below limit line.
2. EIRP (dBm) = SG Reading (dBm) - Cable Loss (dB) + Substitute Antenna Gain (dBd)

EDGE850

| Frequency (MHz) | Ant. Pol. (H/V) | SG Reading (dBm) | Cable Loss (dB) | Substitute Antenna Gain (dBd) | ERP (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| Low Channel 128 (824.20MHz) | | | | | | | |
| 1646.0 | V | -48.16 | 2.55 | 5.13 | -45.58 | -13.0 | -32.58 |
| 2470.5 | V | -52.56 | 3.14 | 5.54 | -50.16 | -13.0 | -37.16 |
| 1646.0 | H | -47.73 | 2.55 | 5.13 | -45.15 | -13.0 | -32.15 |
| 2470.5 | H | -51.71 | 3.14 | 5.54 | -49.31 | -13.0 | -36.31 |
| Middle Channel 189 (836.40MHz) | | | | | | | |
| 1671.5 | V | -50.42 | 2.57 | 5.05 | -47.94 | -13.0 | -34.94 |
| 2513.0 | V | -52.22 | 3.18 | 5.64 | -49.76 | -13.0 | -36.76 |
| 1671.5 | H | -51.87 | 2.57 | 5.05 | -49.39 | -13.0 | -36.39 |
| 2513.0 | H | -51.02 | 3.18 | 5.64 | -48.56 | -13.0 | -35.56 |
| High Channel 251 (848.80MHz) | | | | | | | |
| 1697.0 | V | -52.57 | 2.59 | 4.97 | -50.19 | -13.0 | -37.19 |
| 2547.0 | V | -52.65 | 3.20 | 5.73 | -50.12 | -13.0 | -37.12 |
| 1697.0 | H | -53.36 | 2.59 | 4.97 | -50.98 | -13.0 | -37.98 |
| 2547.0 | H | -49.64 | 3.20 | 5.73 | -47.11 | -13.0 | -34.11 |

Note:

1. Spurious emissions within 30-1000MHz were found more than 20dB below limit line.
2. ERP (dBm) = SG Reading (dBm) - Cable Loss (dB) + Substitute Antenna Gain (dBd)

EDGE1900

| Frequency (MHz) | Ant. Pol. (H/V) | SG Reading (dBm) | Cable Loss (dB) | Substitute Antenna Gain (dBi) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| Low Channel 512 (1850.20MHz) | | | | | | | |
| 3703.0 | V | -35.19 | 3.90 | 7.88 | -31.21 | -13.0 | -18.21 |
| 5547.5 | V | -40.97 | 4.85 | 10.10 | -35.72 | -13.0 | -22.72 |
| 3703.0 | H | -40.82 | 3.90 | 7.88 | -36.84 | -13.0 | -23.84 |
| 5547.5 | H | -41.50 | 4.85 | 10.10 | -36.25 | -13.0 | -23.25 |
| Middle Channel 661 (1880.00MHz) | | | | | | | |
| 3762.5 | V | -32.26 | 3.94 | 7.93 | -28.27 | -13.0 | -15.27 |
| 5641.0 | V | -40.24 | 4.90 | 10.10 | -35.04 | -13.0 | -22.04 |
| 3762.5 | H | -35.12 | 3.94 | 7.93 | -31.13 | -13.0 | -18.13 |
| 5641.0 | H | -45.00 | 4.90 | 10.10 | -39.8 | -13.0 | -26.80 |
| High Channel 810 (1909.80MHz) | | | | | | | |
| 3822.0 | V | -33.07 | 3.98 | 8.07 | -28.98 | -13.0 | -15.98 |
| 5726.0 | V | -45.93 | 5.00 | 10.10 | -40.83 | -13.0 | -27.83 |
| 3822.0 | H | -30.58 | 3.98 | 8.07 | -26.49 | -13.0 | -13.49 |
| 5726.0 | H | -43.48 | 5.00 | 10.10 | -38.38 | -13.0 | -25.38 |

Note:

1. Spurious emissions within 30-1000MHz were found more than 20dB below limit line.
2. EIRP (dBm) = SG Reading (dBm) - Cable Loss (dB) + Substitute Antenna Gain (dBd).

## 7.5. Peak-Average Ratio

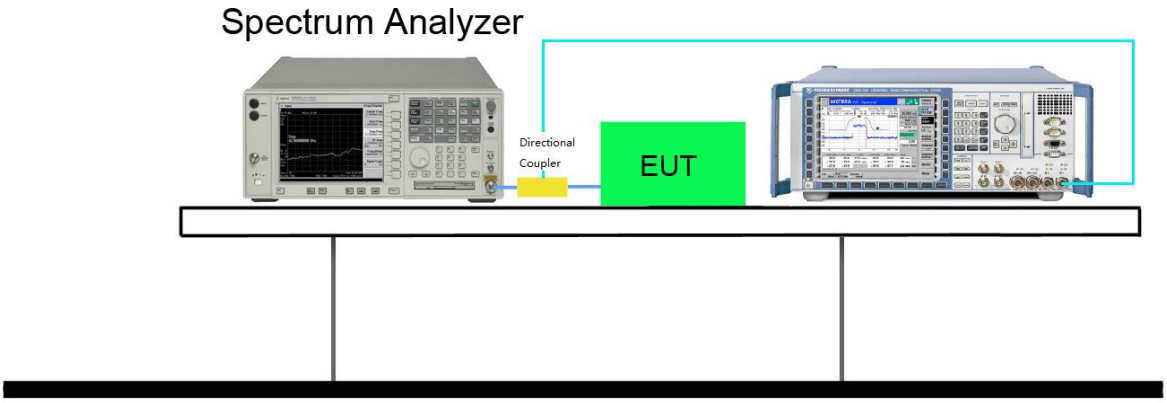
### 7.5.1. Test Limit

The transmitter's peak-to-average power ratio (PAPR) shall not exceed 13 dB for more than 0.1% of the time using a signal corresponding to the highest PAPR during periods of continuous transmission.

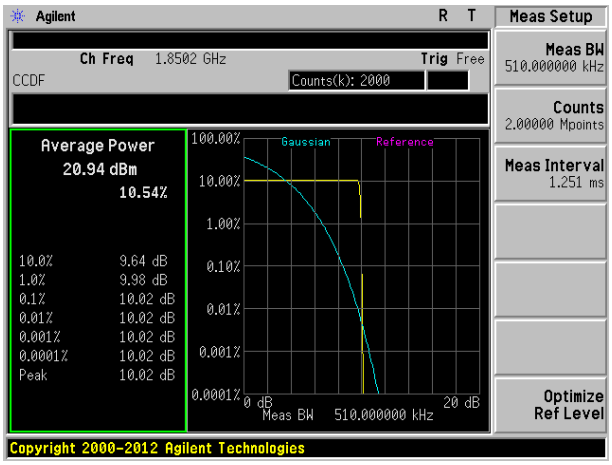
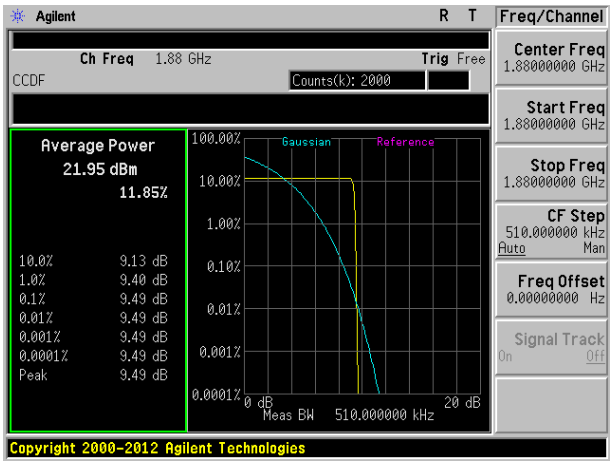
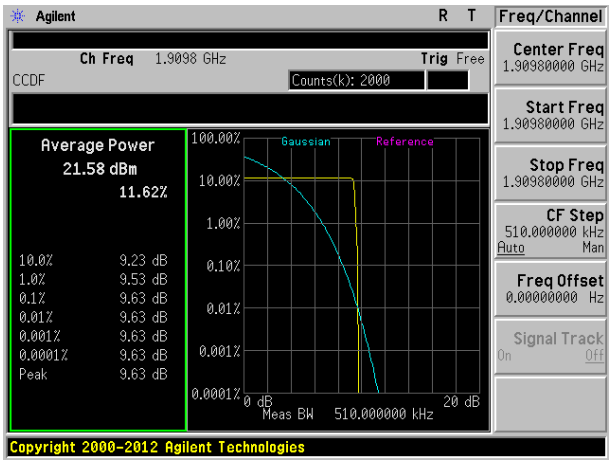
### 7.5.2. Test Procedure

KDB 971168 D01v02r01 - Section 5.7 & ANSI/TIA-603-D-2010

### 7.5.3. Test Setup

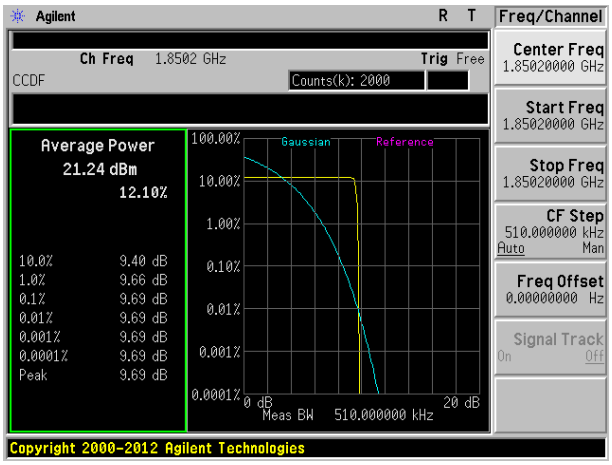


### 7.5.4. Test Result

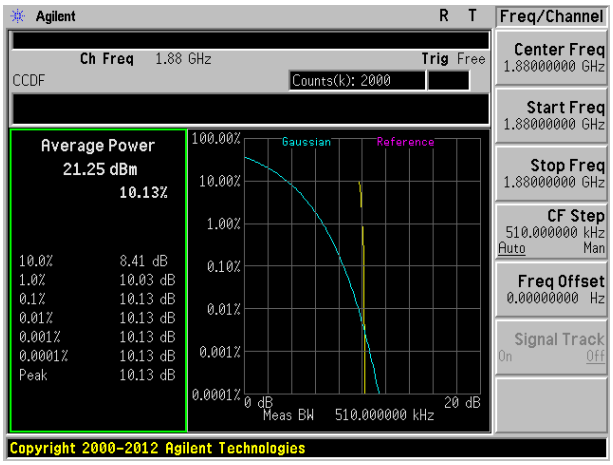
| Peak-Average Ratio | |
|---|---|
| PCS1900 Channel 512 (1850.2MHz) | PCS1900 Channel 661 (1880.0MHz) |
|  |  |
| PCS1900 Channel 810 (1909.8MHz) | |
|  | |

## Peak-Average Ratio

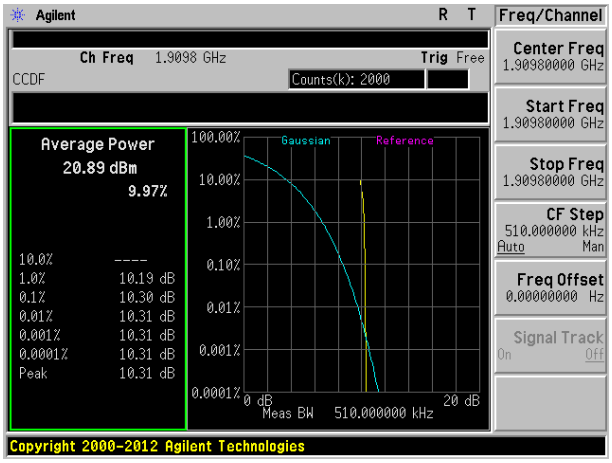
### EDGE1900 Channel 512 (1850.2MHz)




### EDGE1900 Channel 661 (1880.0MHz)




### EDGE1900 Channel 810 (1909.8MHz)



## 7.6. Frequency Stability Under Temperature & Voltage Variations

### 7.6.1. Test Limit

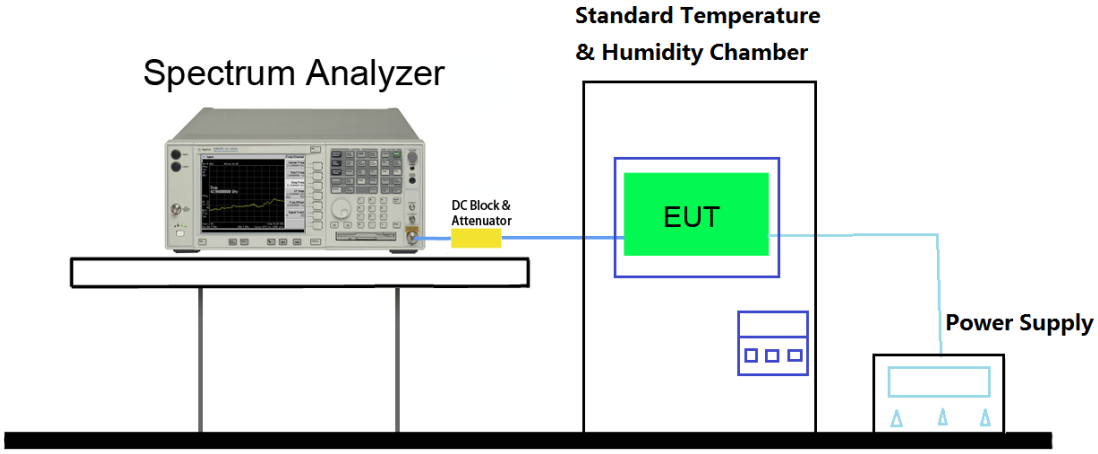
The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

| | |
|---|---|
| Limit | < ± 2.5 ppm |

### 7.6.2. Test Procedure

KDB 971168 D01v02r01 - Section 9.0 & ANSI/TIA-603-D-2010

### 7.6.3. Test Setup



### 7.6.4. Test Result

| | |
|---|---|
| Operating Frequency | 836,400,000 Hz |
| Channel | 189 |
| Test Mode | GPRS850 |
| Reference Voltage | 3.7 VDC |
| Deviation Limit | ±0.00025% or 2.5ppm |

| Voltage (%) | Power (VDC) | TEMP (%) | Frequency (Hz) | Freq. Dev. (Hz) | Deviation (%) |
|---|---|---|---|---|---|
| 100% | 3.7 | +20(Ref) | 836,400,000 | 37 | 0.00000442 |
| 100% | | -30 | 836,400,000 | 29 | 0.00000347 |
| 100% | | -20 | 836,400,000 | -78 | -0.00000933 |
| 100% | | -10 | 836,400,000 | 48 | 0.00000574 |
| 100% | | 0 | 836,400,000 | -40 | -0.00000478 |
| 100% | | +10 | 836,400,000 | 31 | 0.00000368 |
| 100% | | +20 | 836,400,000 | 38 | 0.00000454 |
| 100% | | +30 | 836,400,000 | -40 | -0.00000477 |
| 100% | | +40 | 836,400,000 | 58 | 0.00000693 |
| 100% | | +50 | 836,400,000 | -46 | -0.00000550 |
| 115% | 4.2 | +20 | 836,400,000 | 31 | 0.00000371 |
| BAT.ENDPOINT | 3.6 | +20 | 836,400,000 | -11 | -0.00000132 |

| | |
|---|---|
| Operating Frequency | 1,880,000,000 Hz |
| Channel | 661 |
| Test Mode | GPRS1900 |
| Reference Voltage | 3.7 VDC |
| Deviation Limit | ±0.00025% or 2.5ppm |

| Voltage (%) | Power (VDC) | TEMP (%) | Frequency (Hz) | Freq. Dev. (Hz) | Deviation (%) |
|---|---|---|---|---|---|
| 100% | 3.7 | +20(Ref) | 1,880,000,000 | -27 | -0.00000144 |
| 100% | | -30 | 1,880,000,000 | 66 | 0.00000351 |
| 100% | | -20 | 1,880,000,000 | -66 | -0.00000351 |
| 100% | | -10 | 1,880,000,000 | -54 | -0.00000287 |
| 100% | | 0 | 1,880,000,000 | 33 | 0.00000175 |
| 100% | | +10 | 1,880,000,000 | -47 | -0.00000250 |
| 100% | | +20 | 1,880,000,000 | 63 | 0.00000335 |
| 100% | | +30 | 1,880,000,000 | 54 | 0.00000287 |
| 100% | | +40 | 1,880,000,000 | 34 | 0.00000183 |
| 100% | | +50 | 1,880,000,000 | -34 | -0.00000181 |
| 115% | 4.2 | +20 | 1,880,000,000 | 39 | 0.00000207 |
| BAT.ENDPOINT | 3.6 | +20 | 1,880,000,000 | 67 | 0.00000356 |

| | |
|---|---|
| Operating Frequency | 836,400,000 Hz |
| Channel | 189 |
| Test Mode | EDGE850 |
| Reference Voltage | 3.7 VDC |
| Deviation Limit | ±0.00025% or 2.5ppm |

| Voltage (%) | Power (VDC) | TEMP (%) | Frequency (Hz) | Freq. Dev. (Hz) | Deviation (%) |
|---|---|---|---|---|---|
| 100% | 3.7 | +20(Ref) | 836,400,000 | 39 | 0.00000466 |
| 100% | | -30 | 836,400,000 | 51 | 0.00000610 |
| 100% | | -20 | 836,400,000 | 70 | 0.00000837 |
| 100% | | -10 | 836,400,000 | -34 | -0.00000407 |
| 100% | | 0 | 836,400,000 | 44 | 0.00000526 |
| 100% | | +10 | 836,400,000 | 56 | 0.00000670 |
| 100% | | +20 | 836,400,000 | 38 | 0.00000454 |
| 100% | | +30 | 836,400,000 | 8 | 0.00000096 |
| 100% | | +40 | 836,400,000 | -46 | -0.00000555 |
| 100% | | +50 | 836,400,000 | 52 | 0.00000622 |
| 115% | 4.2 | +20 | 836,400,000 | -43 | -0.00000514 |
| BAT.ENDPOINT | 3.6 | +20 | 836,400,000 | 65 | 0.00000777 |

| | |
|---|---|
| Operating Frequency | 1,880,000,000 Hz |
| Channel | 661 |
| Test Mode | EDGE1900 |
| Reference Voltage | 3.7 VDC |
| Deviation Limit | ±0.00025% or 2.5ppm |

| Voltage (%) | Power (VDC) | TEMP (%) | Frequency (Hz) | Freq. Dev. (Hz) | Deviation (%) |
|---|---|---|---|---|---|
| 100% | 3.7 | +20(Ref) | 1,880,000,000 | 43 | 0.00000229 |
| 100% | | -30 | 1,880,000,000 | 94 | 0.00000500 |
| 100% | | -20 | 1,880,000,000 | -36 | -0.00000191 |
| 100% | | -10 | 1,880,000,000 | -54 | -0.00000287 |
| 100% | | 0 | 1,880,000,000 | 33 | 0.00000176 |
| 100% | | +10 | 1,880,000,000 | 31 | 0.00000165 |
| 100% | | +20 | 1,880,000,000 | -17 | -0.00000090 |
| 100% | | +30 | 1,880,000,000 | 64 | 0.00000340 |
| 100% | | +40 | 1,880,000,000 | 31 | 0.00000165 |
| 100% | | +50 | 1,880,000,000 | -29 | -0.00000154 |
| 115% | 4.2 | +20 | 1,880,000,000 | 43 | 0.00000229 |
| BAT.ENDPOINT | 3.6 | +20 | 1,880,000,000 | 88 | 0.00000468 |

# 8. CONCLUSION

The data collected relate only the item(s) tested and show that the **MiiLink FCC ID: 2ACS2-M1** compliance with all the requirements of Parts 2, 22, 24 of the FCC Rules.

The End