# FCC Test Report

| | | |
|---|---|---|
| **FCC ID** | : | **VQK-F04G** |
| **Equipment** | : | **Mobile Phone** |
| **Model No.** | : | **F-04G** |
| **Brand Name** | : | **FUJITSU** |
| **Applicant** | : | **FUJITSU LIMITED** |
| **Address** | : | **1-1, Kamikodanaka 4-chome, Nakahara-ku, Kawasaki 211-8588, Japan** |
| **Standard** | : | **47 CFR FCC Part 22 Subpart H** |
| **Received Date** | : | **Dec. 17, 2014** |
| **Tested Date** | : | **Feb. 11 ~ Mar. 04, 2015** |

**We, International Certification Corp., would like to declare that the tested sample has been evaluated and in compliance with the requirement of the above standards. The test results contained in this report refer exclusively to the product. It may be duplicated completely for legal use with the approval of the applicant. It shall not be reproduced except in full without the written approval of our laboratory.**

**Approved & Reviewed by:**

**Gary Chang / Manager**

Testing Laboratory
2732

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# Release Record

| Report No. | Version | Description | Issued Date |
|---|---|---|---|
| FG4D1701P22 | Rev. 01 | Initial issue | Apr. 01, 2015 |

# Summary of Test Results

| FCC Rules | Test Items | Measured | Result |
|---|---|---|---|
| 2.1046 / 22.913(a)(2) | Effective Radiated Power | Power[dBm]:<br>GSM: 26.65<br>WCDMA: 18.96 | Pass |
| 2.1053 / 22.917(a) | Radiated Emissions | Meet the requirement of limit | Pass |
| 2.1051 / 22.917(a) | Conducted Emissions | Meet the requirement of limit | Pass |
| 2.1051 / 22.917(a) | Band Edge | Meet the requirement of limit | Pass |
| 2.1049 | Occupied Bandwidth | Meet the requirement of limit | Pass |
| - | Peak to average ratio | Meet the requirement of limit | Pass |
| 2.1055 / 22.355 | Frequency Stability | Meet the requirement of limit | Pass |

# 1 General Description

## 1.1 Information

### 1.1.1 Product Details

| | |
|---|---|
| **Product Name** | Mobile Phone |
| **Brand Name** | FUJITSU |
| **Model Name** | F-04G |
| **IMEI Code** | 357241060025094 / 357241060025250 |
| **H/W Version** | v2.1.0 |
| **S/W Version** | R21.5e |

### 1.1.2 Specification of the Equipment under Test (EUT)

| | |
|---|---|
| **Operating band (MHz)** | GSM: 824.2-848.8<br>WCDMA Band V: 826.4-846.6 |
| **Modulation** | GSM / GPRS: GMSK<br>WCDMA / HSDPA / HSUPA<br>Uplink: QPSK<br>Downlink: QPSK , 16QAM , 64QAM |
| **Multislot Class** | 33 |
| **3GPP Release Version** | R5 / R6 |
| **UE Category** | 10 / 6 |

### 1.1.3 Maximum ERP, Frequency Tolerance and Emission Designator

| System | Modulation | Maximum ERP(W) | Frequency Tolerance (ppm) | Emission Designator |
|---|---|---|---|---|
| GSM 850 | GMSK | 0.462 | 0.022 | 245KGXW |
| WCDMA 850 | QPSK | 0.079 | 0.027 | 4M15F9W |

### 1.1.4 Antenna Details

| Ant. No. | Type | Gain (dBi) | Connector | Remark |
|---|---|---|---|---|
| 1 | λ/4 Monopole | -2.65 | --- | --- |

### 1.1.5 EUT Operational Condition

| | | | |
|---|---|---|---|
| **Supply Voltage** | AC adapter:<br>(normal output rating) 5.0Vdc, 1.8A<br>(quick charge output rating) 9.0Vdc, 1.8A<br>Battery: 3.75Vdc | | |
| **Operational Voltage** | ☒ Vnom (3.9 V) | ☒ Vmax (4.29 V) | ☒ Vmin (3.51 V) |
| **Operational Climatic** | ☒ Tnom (20°C) | ☒ Tmax (55°C) | ☒ Tmin (-30°C) |

### 1.1.6 Accessories

| No. | Equipment | Description |
|---|---|---|
| 1 | Cradle | Brand Name: Fujitsu Limited<br>Model Name: F50<br>Input rating: (quick charge) 9.0Vdc, 1.5A<br>Output rating: (quick charge) 9.0Vdc, 1.5A |
| 2 | Battery<br>(Unremovable) | Brand Name: NTT Docomo<br>Model Name: CA54310-0061<br>Power Rating: 3.75Vdc, 3120mAh, 12Wh |

### 1.1.7 Operating Channel List

| GSM & GPRS | | |
|---|---|---|
| | **Channel** | **Frequency (MHz)** |
| Low | 128 | 824.2 |
| Middle | 189 | 836.4 |
| High | 251 | 848.8 |

| WCDMA | | |
|---|---|---|
| | **Channel** | **Frequency (MHz)** |
| Low | 4132 | 826.4 |
| Middle | 4182 | 836.4 |
| High | 4233 | 846.6 |

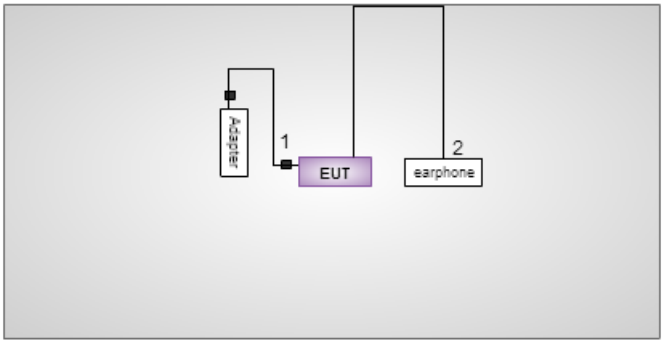
## 1.2 Local Support Equipment List

| Support Equipment List | | | | | | |
|---|---|---|---|---|---|---|
| **No.** | **Equipment** | **Brand** | **Model** | **S/N** | **FCC ID** | **Signal cable / Length (m)** |
| 1 | Adapter | NTT docomo | AC Adaptor 05 | --- | --- | --- |
| 2 | Earphone | APPLE | MD827FE/A | 6 | --- | 1.2m non-shielded w/o core |

Note: Item 1 was provided by client.

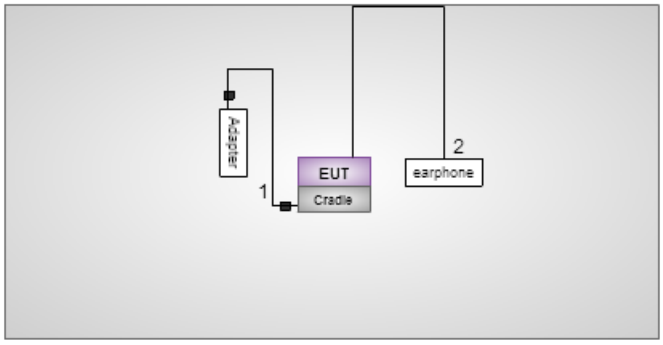
## 1.3 Test Setup Chart

**Test Setup Diagram (Adapter mode)**




1. 1.2m non-shielded with 2 cores
2. 1.2m non-shielded w/o core

**Test Setup Diagram (Cradle mode)**




1. 1.2m non-shielded with 2 cores
2. 1.2m non-shielded w/o core

## 1.4 The Equipment List

| Test Item | RF Conducted | | | | |
|---|---|---|---|---|---|
| Test Site | (TH01-WS) | | | | |
| **Instrument** | **Manufacturer** | **Model No.** | **Serial No.** | **Calibration Date** | **Calibration Until** |
| Spectrum Analyzer | R&S | FSV40 | 101063 | Feb. 03, 2015 | Feb. 02, 2016 |
| TEMP&HUMIDITY CHAMBER | GIANT FORCE | GCT-225-40-SP-SD | MAF1212-002 | Dec. 03, 2014 | Dec. 02, 2015 |
| Power Meter | Anritsu | ML2495A | 1241002 | Sep. 29, 2014 | Sep. 28, 2015 |
| Power Sensor | Anritsu | MA2411B | 1207366 | Sep. 29, 2014 | Sep. 28, 2015 |
| Radio Communication Analyzer | Anritsu | MT8820C | 6201240341 | Mar. 18, 2014 | Mar. 17, 2015 |
| Measurement Software | Sporton | Sporton_1 | 1.3.30 | NA | NA |
| Note: Calibration Interval of instruments listed above is one year. | | | | | |

| Test Item | Radiated Emission | | | | |
|---|---|---|---|---|---|
| Test Site | 966 chamber1 / (03CH01-WS) | | | | |
| **Instrument** | **Manufacturer** | **Model No.** | **Serial No.** | **Calibration Date** | **Calibration Until** |
| Spectrum Analyzer | R&S | FSV40 | 101498 | Dec. 09, 2014 | Dec. 08, 2015 |
| Receiver | R&S | ESR3 | 101658 | Nov. 10, 2014 | Nov. 09, 2015 |
| Bilog Antenna | SCHWARZBECK | VULB9168 | VULB9168-522 | Sep. 05, 2014 | Sep. 04, 2015 |
| Horn Antenna 1G-18G | SCHWARZBECK | BBHA 9120 D | BBHA 9120 D 1096 | Dec. 11, 2014 | Dec. 10, 2015 |
| Horn Antenna 18G-40G | SCHWARZBECK | BBHA 9170 | BBHA 9170517 | Nov. 10, 2014 | Nov. 09, 2015 |
| Loop Antenna | R&S | HFH2-Z2 | 11900 | Nov. 10, 2014 | Nov. 09, 2015 |
| Preamplifier | Burgeon | BPA-530 | SN:100219 | Sep. 09, 2014 | Sep. 08, 2015 |
| Preamplifier | Agilent | 83017A | MY39501308 | Oct. 09, 2014 | Oct. 08, 2015 |
| Preamplifier | EMC | EMC184045B | 980192 | Aug. 26, 2014 | Aug. 25, 2015 |
| RF Cable | HUBER+SUHNER | SUCOFLEX104 | MY16014/4 | Dec. 15, 2014 | Dec. 14, 2015 |
| RF Cable | HUBER+SUHNER | SUCOFLEX104 | MY16019/4 | Dec. 15, 2014 | Dec. 14, 2015 |
| RF Cable | HUBER+SUHNER | SUCOFLEX104 | MY16139/4 | Dec. 15, 2014 | Dec. 14, 2015 |
| LF cable 3M | Woken | CFD400NL-LW | CFD400NL-001 | Dec. 15, 2014 | Dec. 14, 2015 |
| LF cable 10M | Woken | CFD400NL-LW | CFD400NL-002 | Dec. 15, 2014 | Dec. 14, 2015 |
| Radio Communication Analyzer | Anritsu | MT8820C | 6201240341 | Mar. 18, 2014 | Mar. 17, 2015 |
| Measurement Software | AUDIX | e3 | 6.120210g | NA | NA |
| Note: Calibration Interval of instruments listed above is one year. | | | | | |

## 1.5 Test Standards

According to the specification of EUT, the EUT must comply with following standards.

47 CFR FCC Part 22 Subpart H
ANSI C63.4-2003
ANSI / TIA / EIA-603-C -2004
FCC KDB 971168 D01 Power Meas License Digital Systems v02r02
FCC KDB 412172 D01 Determining ERP and EIRP v01

## 1.6 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2).

| Measurement Uncertainty | |
|---|---|
| **Parameters** | **Uncertainty** |
| Bandwidth | ±34.134 Hz |
| Conducted power | ±0.808 dB |
| Frequency error | ±34.134 Hz |
| Conducted emission | ±2.670 dB |
| Radiated emission ≤ 1GHz | ±3.72 dB |
| Radiated emission > 1GHz | ±5.65 dB |
| Temperature | ±0.6 °C |

# 2 Test Configuration

## 2.1 Testing Condition and Location Information

| Test Item | Test Site | Ambient Condition | Tested By |
|---|---|---|---|
| RF conducted | TH01-WS | 22°C / 62% | Felix Sung |
| Radiated Emissions | 03CH01-WS | 20-21°C / 64-65% | Aska Huang |

- FCC site registration No.: 657002
- IC site registration No.: 10807A-1

## 2.2 The Worst Test Modes and Channel Details

| Test item | Mode | Test channel |
|---|---|---|
| Effective Radiated Power | GPRS 8<br>WCDMA | 128, 189, 251<br>4132, 4182, 4233 |
| Radiated Emissions ≤ 1GHz | GPRS 8<br>WCDMA | 128<br>4182 |
| Radiated Emissions > 1GHz | GPRS 8<br>WCDMA | 128, 189, 251<br>4132, 4182, 4233 |
| Conducted Emissions | GPRS 8<br>WCDMA | 128, 189, 251<br>4132, 4182, 4233 |
| Band Edge | GPRS 8<br>WCDMA | 128, 251<br>4132, 4233 |
| Occupied Bandwidth | GPRS 8<br>WCDMA | 128, 189, 251<br>4132, 4182, 4233 |
| Peak to average ratio | GPRS 8<br>WCDMA | 128, 189, 251<br>4132, 4182, 4233 |
| Frequency Stability | GPRS 8<br>WCDMA | 189<br>4182 |

**NOTE:**

1. The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement – X, Y, and Z-plane. The **X-plane** results were found as the worst case and were shown in this report.
2. The EUT had been tested by following test configurations for radiated emission below 1GHz.
   1) Configuration 1 : Adapter mode
   2) Configuration 2 : Cradle mode
3. Adapter and cradle mode had been pretested for radiated emission above 1GHz and found that the adapter mode was the worst case and was selected for final test.

# 3 Test Results

## 3.1 Effective Radiated Power

### 3.1.1 Limit of Effective Radiated Power

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

### 3.1.2 Test Procedures

For E.R.P measurement

For Conducted power measurement

1. The EUT links up with simulator and is set to maximum output power level at low / middel / high channel.
2. Measure the output power of low / middle / high channel of the EUT

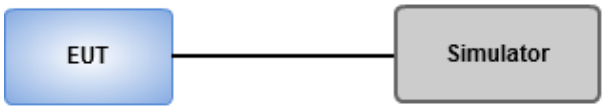
For ERP measurement

EPR can be calculated by below formula from KDB 412172 D01

1. EIRP = $P_T + G_T - L_C$
   $P_T$ = transmitter output power, in dBm
   $G_T$ = gain of the transmitting antenna, in dBi (EIRP)
   $L_C$ = signal attenuation in the connecting cable between the transmitter and antenna, in dB.
2. ERP = EIRP – 2.15 dB.

### 3.1.3 Test Setup

**Conducted Power Measurement**



### 3.1.4 Test Result of Conducted Output Power (dBm)

| Band | | GSM 850 | | |
|---|---|---|---|---|
| Channel | | 128 | 189 | 251 |
| Frequency (MHz) | | 824.2 | 836.4 | 848.8 |
| GSM | | 31.44 | 31.37 | 31.27 |
| GPRS 8 (GMSK, 1 slot) | | **31.45** | 31.38 | 31.34 |
| GPRS 10 (GMSK, 2 slots) | | 28.85 | 28.87 | 28.96 |
| GPRS 11 (GMSK, 3 slots) | | 23.99 | 23.90 | 23.82 |
| GPRS 12 (GMSK, 4 slots) | | 23.97 | 23.88 | 23.81 |
| DTM 5 (2Tx slots) | GSM (GMSK, 1 slot ) | 29.29 | 28.80 | 28.84 |
| | GPRS (GMSK, 1 slot ) | 29.25 | 28.74 | 28.79 |
| DTM 9 (2Tx slots) | GSM (GMSK, 1 slot ) | 29.25 | 28.77 | 28.84 |
| | GPRS (GMSK, 1 slot ) | 29.21 | 28.71 | 28.77 |
| DTM 11 (3Tx slots) | GSM (GMSK, 1 slot ) | 23.93 | 23.83 | 23.74 |
| | GPRS (GMSK, 2 lots ) | 23.85 | 23.74 | 23.64 |

| Band | WCDMA 850 | | |
|---|---|---|---|
| Channel | 4132 | 4182 | 4233 |
| Frequency (MHz) | 826.4 | 836.4 | 846.6 |
| AMR 12.2K | 22.11 | 23.61 | 23.02 |
| RMC 12.2K | 22.25 | **23.76** | 23.11 |
| HSDPA Subtest-1 | 21.28 | 22.69 | 22.06 |
| HSDPA Subtest-2 | 21.27 | 22.61 | 22.06 |
| HSDPA Subtest-3 | 20.74 | 22.24 | 21.62 |
| HSDPA Subtest-4 | 20.69 | 22.18 | 21.66 |
| HSUPA Subtest-1 | 20.65 | 22.09 | 21.55 |
| HSUPA Subtest-2 | 20.31 | 21.67 | 21.24 |
| HSUPA Subtest-3 | 19.62 | 21.22 | 20.86 |
| HSUPA Subtest-4 | 20.56 | 22.15 | 21.78 |
| HSUPA Subtest-5 | 21.05 | 22.53 | 21.96 |

### 3.1.5 Test Result of Effective Radiated Power (dBm)

| Mode | GPRS 8 | | | | | | |
|---|---|---|---|---|---|---|---|
| **Channel** | **Frequency (MHz)** | **Conducted Output Power (dBm)** | **Max Antenna Gain(dBi)** | **EIRP (dBm)** | **ERP (dBm)** | **ERP (W)** | **Limit (W)** |
| 128 | 824.2 | 31.45 | -2.65 | 28.80 | 26.65 | 0.462 | 7 |
| 189 | 836.4 | 31.38 | -2.65 | 28.73 | 26.58 | 0.455 | 7 |
| 251 | 848.8 | 31.34 | -2.65 | 28.69 | 26.54 | 0.451 | 7 |

| Mode | WCDMA | | | | | | |
|---|---|---|---|---|---|---|---|
| **Channel** | **Frequency (MHz)** | **Conducted Output Power (dBm)** | **Max Antenna Gain(dBi)** | **EIRP (dBm)** | **ERP (dBm)** | **ERP (W)** | **Limit (W)** |
| 4132 | 826.4 | 22.25 | -2.65 | 19.60 | 17.45 | 0.056 | 7 |
| 4182 | 836.4 | 23.76 | -2.65 | 21.11 | 18.96 | 0.079 | 7 |
| 4233 | 846.6 | 23.11 | -2.65 | 20.46 | 18.31 | 0.068 | 7 |

## 3.2 Radiated Emissions

### 3.2.1 Limit of Radiated Emissions

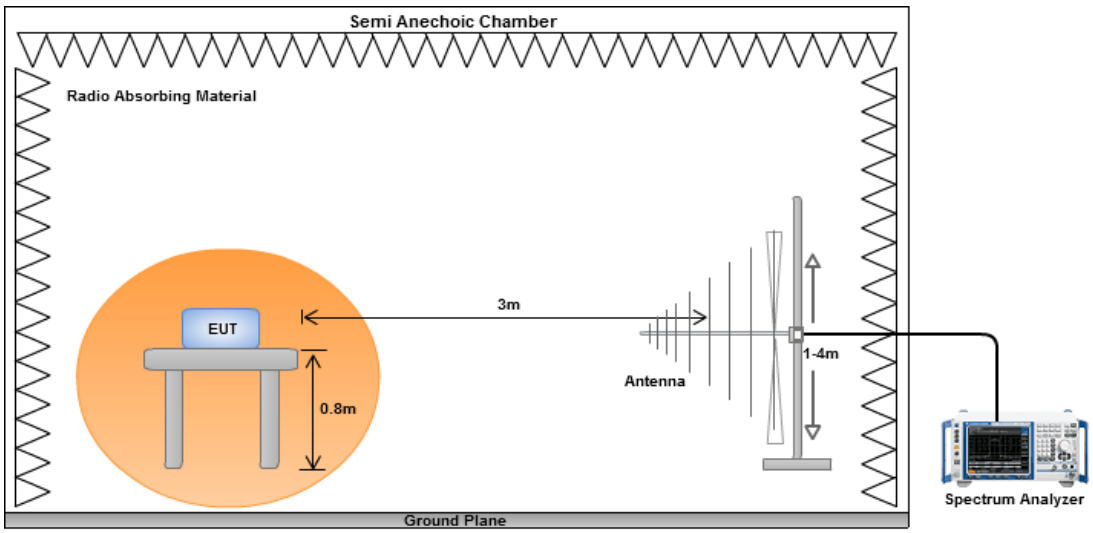
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB equal to -13dBm.

### 3.2.2 Test Procedures

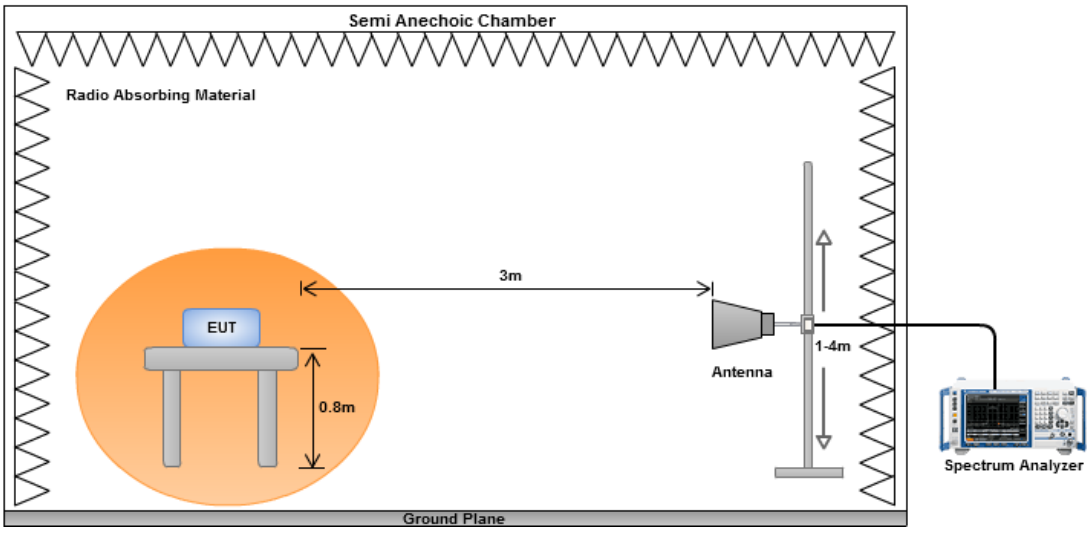
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission frequency. The EUT is placed at a height of 0.8 m test table above the ground plane.
2. Measurement is made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna is varied in height (1m ~ 4m) above the reference ground plane to obtain the maximum signal strength. Distance between EUT and antenna is 3 m.
3. This investigation is performed with the EUT rotated 360°, the antenna height scanned between 1 m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations.
4. After finding the max radiated emission, substitution method will be used for getting effective radiated power. EUT will be removed and substitution antenna will be placed at same position. Signal generator will output CW signal to substitution antenna through a RF cable. Rotate turntable and move antenna to find maximum radiated emission. Adjust output power of signal generator to let the maximum radiated emission is same as step 3. Record the output power level.
5. E.I.R.P = output power of step 4 + gain of substitution antenna – cable loss of RF cable. ERP can be calculated by below formula:
   E.R.P= E.I.R.P – 2.15dB

### 3.2.3 Test Setup

**Radiated Emissions below 1 GHz**




**Radiated Emissions above 1 GHz**



### 3.2.4 Test Result of Radiated Emissions below 1GHz

| Mode | GPRS 8, Channel: 128, adapter mode | | | | | | |
|---|---|---|---|---|---|---|---|
| **Frequency (MHz)** | **Antenna Polarity** | **E.R.P (dBm)** | **Limit (dBm)** | **Margin (dB)** | **S.A Reading (dBm)** | **S.G Power Vaule (dBm)** | **Correction Factor (dB)** |
| 43.58 | H | -53.21 | -13.00 | -40.21 | -49.72 | -39.28 | -11.78 |
| 112.45 | H | -58.63 | -13.00 | -45.63 | -46.37 | -56.14 | -0.34 |
| 150.28 | H | -60.11 | -13.00 | -47.11 | -49.20 | -56.86 | -1.10 |
| 362.71 | H | -62.33 | -13.00 | -49.33 | -53.65 | -64.57 | 4.39 |
| 423.82 | H | -61.65 | -13.00 | -48.65 | -53.96 | -63.69 | 4.19 |
| 452.92 | H | -61.79 | -13.00 | -48.79 | -54.38 | -63.73 | 4.09 |
| 30.00 | V | -50.91 | -13.00 | -37.91 | -39.69 | -34.38 | -14.38 |
| 44.55 | V | -49.25 | -13.00 | -36.25 | -37.98 | -35.46 | -11.64 |
| 75.59 | V | -56.92 | -13.00 | -43.92 | -44.36 | -51.20 | -3.57 |
| 231.76 | V | -58.40 | -13.00 | -45.40 | -49.82 | -60.63 | 4.38 |
| 276.38 | V | -58.22 | -13.00 | -45.22 | -50.13 | -60.35 | 4.28 |
| 342.34 | V | -58.92 | -13.00 | -45.92 | -50.85 | -61.16 | 4.39 |

| Mode | GPRS 8, Channel: 128, cradle mode | | | | | | |
|---|---|---|---|---|---|---|---|
| **Frequency (MHz)** | **Antenna Polarity** | **E.R.P (dBm)** | **Limit (dBm)** | **Margin (dB)** | **S.A Reading (dBm)** | **S.G Power Vaule (dBm)** | **Correction Factor (dB)** |
| 44.55 | H | -53.33 | -13.00 | -40.33 | -49.88 | -39.54 | -11.64 |
| 109.54 | H | -60.77 | -13.00 | -47.77 | -48.52 | -58.42 | -0.20 |
| 149.31 | H | -61.31 | -13.00 | -48.31 | -50.41 | -58.04 | -1.12 |
| 223.03 | H | -64.45 | -13.00 | -51.45 | -50.48 | -66.68 | 4.38 |
| 418.97 | H | -60.42 | -13.00 | -47.42 | -52.69 | -62.48 | 4.21 |
| 450.98 | H | -60.13 | -13.00 | -47.13 | -52.69 | -62.07 | 4.09 |
| 38.73 | V | -46.32 | -13.00 | -33.32 | -33.14 | -31.69 | -12.48 |
| 75.59 | V | -57.90 | -13.00 | -44.90 | -45.34 | -52.18 | -3.57 |
| 84.32 | V | -59.28 | -13.00 | -46.28 | -46.71 | -56.13 | -1.00 |
| 229.82 | V | -57.63 | -13.00 | -44.63 | -48.97 | -59.86 | 4.38 |
| 241.46 | V | -57.76 | -13.00 | -44.76 | -49.57 | -59.98 | 4.37 |
| 521.79 | V | -57.40 | -13.00 | -44.40 | -52.52 | -59.37 | 4.12 |

NOTE: ERP = S.G power value + correction factor - 2.15

| Mode | WCDMA, Channel: 4182, adapter mode | | | | | | |
|---|---|---|---|---|---|---|---|
| **Frequency (MHz)** | **Antenna Polarity** | **E.R.P (dBm)** | **Limit (dBm)** | **Margin (dB)** | **S.A Reading (dBm)** | **S.G Power Vaule (dBm)** | **Correction Factor (dB)** |
| 44.55 | H | -56.47 | -13.00 | -43.47 | -53.02 | -42.68 | -11.64 |
| 106.63 | H | -60.44 | -13.00 | -47.44 | -48.21 | -58.24 | -0.05 |
| 138.64 | H | -65.58 | -13.00 | -52.58 | -54.63 | -62.12 | -1.31 |
| 188.11 | H | -67.40 | -13.00 | -54.40 | -54.08 | -68.29 | 3.04 |
| 267.65 | H | -67.73 | -13.00 | -54.73 | -55.07 | -69.89 | 4.31 |
| 357.86 | H | -66.87 | -13.00 | -53.87 | -58.09 | -69.12 | 4.40 |
| 44.55 | V | -52.10 | -13.00 | -39.10 | -40.83 | -38.31 | -11.64 |
| 99.84 | V | -61.57 | -13.00 | -48.57 | -40.39 | -59.69 | 0.27 |
| 114.39 | V | -61.45 | -13.00 | -48.45 | -50.12 | -58.86 | -0.44 |
| 213.33 | V | -62.78 | -13.00 | -49.78 | -53.46 | -65.01 | 4.38 |
| 239.52 | V | -60.91 | -13.00 | -47.91 | -52.64 | -63.13 | 4.37 |
| 350.10 | V | -64.09 | -13.00 | -51.09 | -56.05 | -66.36 | 4.42 |

| Mode | WCDMA, Channel: 4182, cradle mode | | | | | | |
|---|---|---|---|---|---|---|---|
| **Frequency (MHz)** | **Antenna Polarity** | **E.R.P (dBm)** | **Limit (dBm)** | **Margin (dB)** | **S.A Reading (dBm)** | **S.G Power Vaule (dBm)** | **Correction Factor (dB)** |
| 46.49 | H | -62.81 | -13.00 | -49.81 | -58.22 | -49.28 | -11.38 |
| 84.32 | H | -60.63 | -13.00 | -47.63 | -47.46 | -57.48 | -1.00 |
| 107.60 | H | -65.22 | -13.00 | -52.22 | -52.98 | -62.97 | -0.10 |
| 143.49 | H | -70.09 | -13.00 | -57.09 | -59.22 | -66.68 | -1.26 |
| 172.59 | H | -72.34 | -13.00 | -59.34 | -60.46 | -71.21 | 1.02 |
| 203.63 | H | -68.65 | -13.00 | -55.65 | -54.11 | -70.89 | 4.39 |
| 44.55 | V | -56.95 | -13.00 | -43.95 | -45.68 | -43.16 | -11.64 |
| 84.32 | V | -59.79 | -13.00 | -46.79 | -47.22 | -56.64 | -1.00 |
| 102.75 | V | -67.37 | -13.00 | -54.37 | -56.17 | -65.36 | 0.14 |
| 148.34 | V | -67.39 | -13.00 | -54.39 | -58.69 | -64.09 | -1.15 |
| 224.00 | V | -67.54 | -13.00 | -54.54 | -58.65 | -69.77 | 4.38 |
| 232.73 | V | -66.87 | -13.00 | -53.87 | -58.33 | -69.10 | 4.38 |

NOTE: ERP = S.G power value + correction factor - 2.15

### 3.2.5 Test Result of Radiated Emissions above 1GHz

| Mode | GPRS 8, Channel: 128 | | | | | | |
|---|---|---|---|---|---|---|---|
| **Frequency (MHz)** | **Antenna Polarity** | **E.R.P (dBm)** | **Limit (dBm)** | **Margin (dB)** | **S.A Reading (dBm)** | **S.G Power Vaule (dBm)** | **Correction Factor (dB)** |
| 1648.40 | H | -42.59 | -13.00 | -29.59 | -43.92 | -45.47 | 5.03 |
| 2472.60 | H | -54.30 | -13.00 | -41.30 | -60.47 | -58.23 | 6.08 |
| 3296.80 | H | -54.72 | -13.00 | -41.72 | -63.61 | -58.97 | 6.40 |
| 1648.40 | V | -49.33 | -13.00 | -36.33 | -47.18 | -52.21 | 5.03 |
| 2472.60 | V | -63.70 | -13.00 | -50.70 | -61.55 | -67.63 | 6.08 |
| 3296.80 | V | -65.46 | -13.00 | -52.46 | -63.31 | -69.71 | 6.40 |

| Mode | GPRS 8, Channel: 189 | | | | | | |
|---|---|---|---|---|---|---|---|
| **Frequency (MHz)** | **Antenna Polarity** | **E.R.P (dBm)** | **Limit (dBm)** | **Margin (dB)** | **S.A Reading (dBm)** | **S.G Power Vaule (dBm)** | **Correction Factor (dB)** |
| 1672.80 | H | -37.96 | -13.00 | -24.96 | -39.42 | -40.92 | 5.11 |
| 2509.20 | H | -49.17 | -13.00 | -36.17 | -55.43 | -53.08 | 6.06 |
| 3345.60 | H | -54.00 | -13.00 | -41.00 | -62.63 | -58.31 | 6.46 |
| 1672.80 | V | -42.91 | -13.00 | -29.91 | -43.72 | -45.87 | 5.11 |
| 2509.20 | V | -55.41 | -13.00 | -42.41 | -62.39 | -59.32 | 6.06 |
| 3345.60 | V | -53.52 | -13.00 | -40.52 | -61.97 | -57.83 | 6.46 |

| Mode | GPRS 8, Channel: 251 | | | | | | |
|---|---|---|---|---|---|---|---|
| **Frequency (MHz)** | **Antenna Polarity.** | **E.R.P (dBm)** | **Limit (dBm)** | **Margin (dB)** | **S.A Reading (dBm)** | **S.G Power Vaule (dBm)** | **Correction Factor (dB)** |
| c | H | -40.08 | -13.00 | -27.08 | -41.67 | -43.11 | 5.18 |
| 2546.40 | H | -47.45 | -13.00 | -34.45 | -53.79 | -51.34 | 6.04 |
| 3395.20 | H | -54.26 | -13.00 | -41.26 | -62.64 | -58.64 | 6.53 |
| 1697.60 | V | -42.08 | -13.00 | -29.08 | -42.97 | -45.11 | 5.18 |
| 2546.40 | V | -53.45 | -13.00 | -40.45 | -60.48 | -57.34 | 6.04 |
| 3395.20 | V | -54.96 | -13.00 | -41.96 | -63.38 | -59.34 | 6.53 |

NOTE: ERP = S.G power value + correction factor - 2.15

| Mode | WCDMA , Channel: 4132 | | | | | | |
|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Antenna Polarity | E.R.P (dBm) | Limit (dBm) | Margin (dB) | S.A Reading (dBm) | S.G Power Vaule (dBm) | Correction Factor (dB) |
| 1652.80 | H | -57.97 | -13.00 | -44.97 | -59.33 | -60.86 | 5.04 |
| 2479.20 | H | -67.38 | -13.00 | -54.38 | -73.57 | -71.30 | 6.07 |
| 4958.40 | H | -54.61 | -13.00 | -41.61 | -69.60 | -58.31 | 5.85 |
| 1652.80 | V | -59.47 | -13.00 | -46.47 | -60.21 | -62.36 | 5.04 |
| 2479.20 | V | -67.02 | -13.00 | -54.02 | -73.95 | -70.94 | 6.07 |
| 4958.40 | V | -57.98 | -13.00 | -44.98 | -70.82 | -61.68 | 5.85 |

| Mode | WCDMA , Channel: 4182 | | | | | | |
|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Antenna Polarity | E.R.P (dBm) | Limit (dBm) | Margin (dB) | S.A Reading (dBm) | S.G Power Vaule (dBm) | Correction Factor (dB) |
| 1672.80 | H | -58.47 | -13.00 | -45.47 | -59.93 | -61.43 | 5.11 |
| 2509.20 | H | -67.90 | -13.00 | -54.90 | -74.16 | -71.81 | 6.06 |
| 5018.40 | H | -54.18 | -13.00 | -41.18 | -69.27 | -57.88 | 5.85 |
| 1672.80 | V | -59.03 | -13.00 | -46.03 | -59.84 | -61.99 | 5.11 |
| 2509.20 | V | -67.27 | -13.00 | -54.27 | -74.25 | -71.18 | 6.06 |
| 5018.40 | V | -57.73 | -13.00 | -44.73 | -70.62 | -61.43 | 5.85 |

| Mode | WCDMA , Channel: 4233 | | | | | | |
|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Antenna Polarity. | E.R.P (dBm) | Limit (dBm) | Margin (dB) | S.A Reading (dBm) | S.G Power Vaule (dBm) | Correction Factor (dB) |
| 1693.20 | H | -58.11 | -13.00 | -45.11 | -59.68 | -61.07 | 5.11 |
| 2539.80 | H | -67.39 | -13.00 | -54.39 | -73.72 | -71.30 | 6.06 |
| 5079.60 | H | -54.02 | -13.00 | -41.02 | -69.13 | -57.72 | 5.85 |
| 1693.20 | V | -58.60 | -13.00 | -45.60 | -59.48 | -61.56 | 5.11 |
| 2539.80 | V | -66.91 | -13.00 | -53.91 | -73.93 | -70.82 | 6.06 |
| 5079.60 | V | -57.29 | -13.00 | -44.29 | -70.60 | -60.99 | 5.85 |

NOTE: ERP = S.G power value + correction factor - 2.15

## 3.3 Conducted Emissions

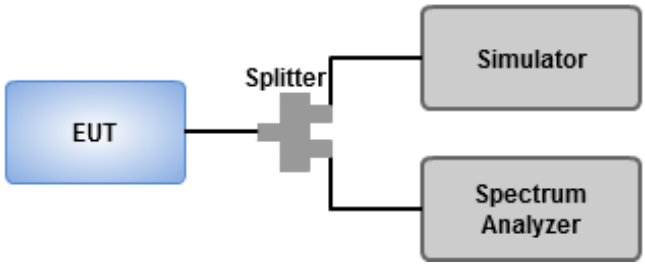
### 3.3.1 Limit of Conducted Emissions

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 + 10 log(P) dB equal to -13dBm.

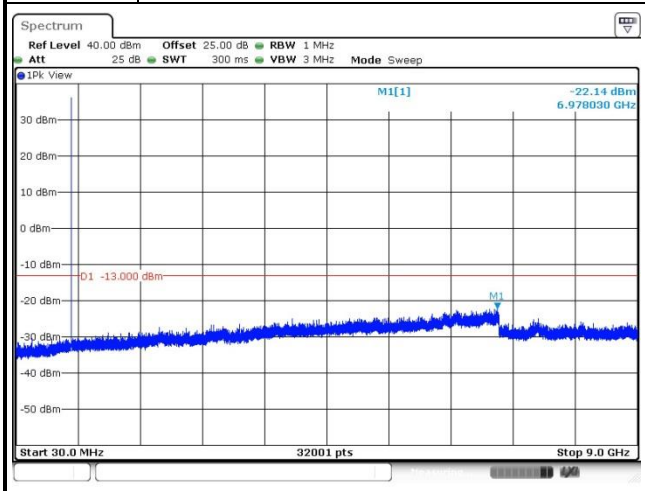
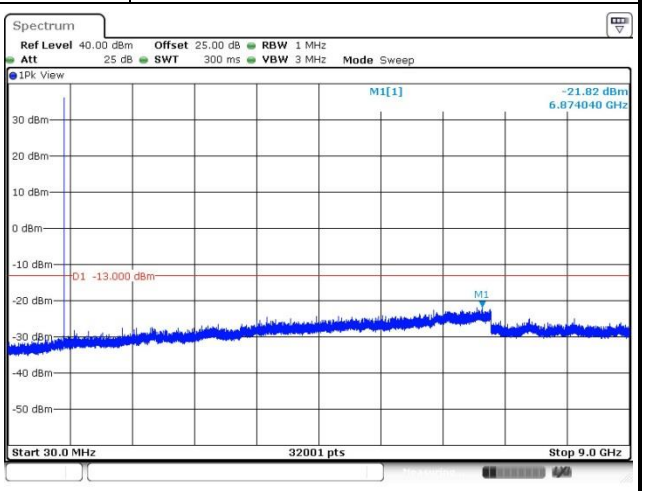
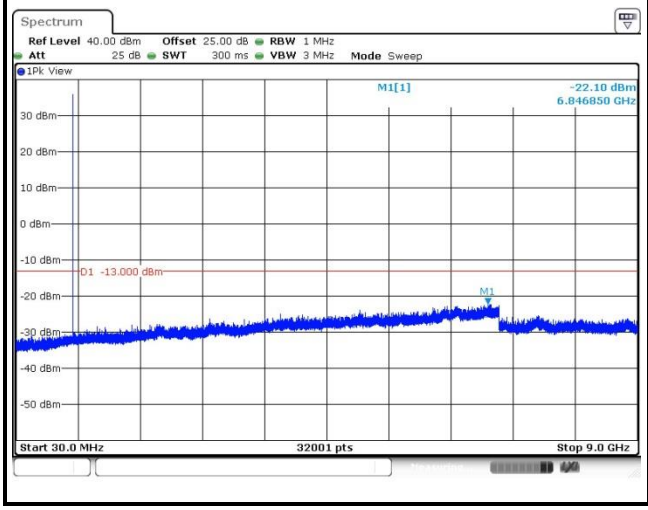
### 3.3.2 Test Procedures

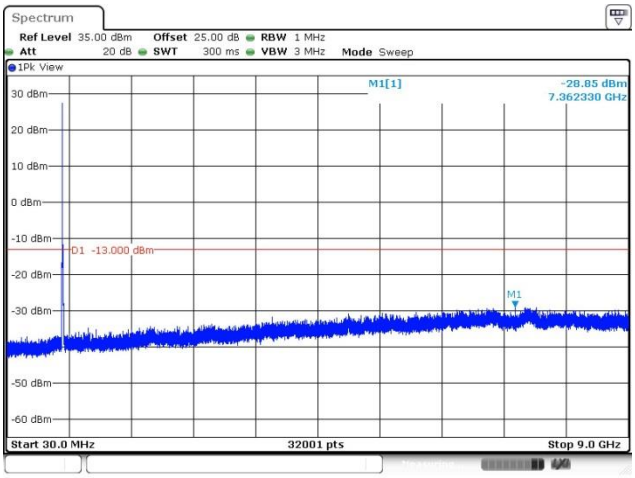
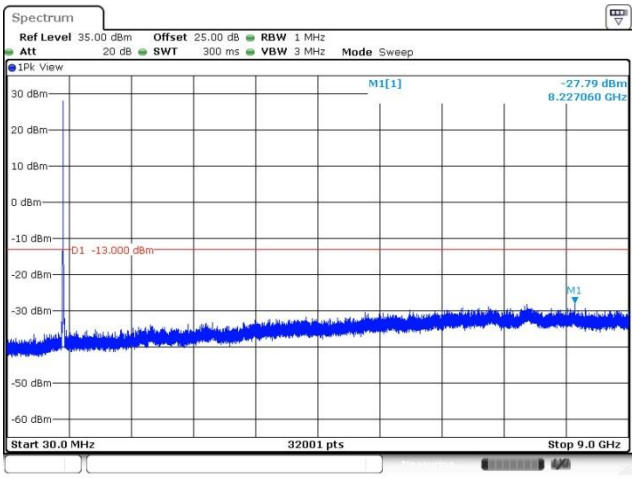
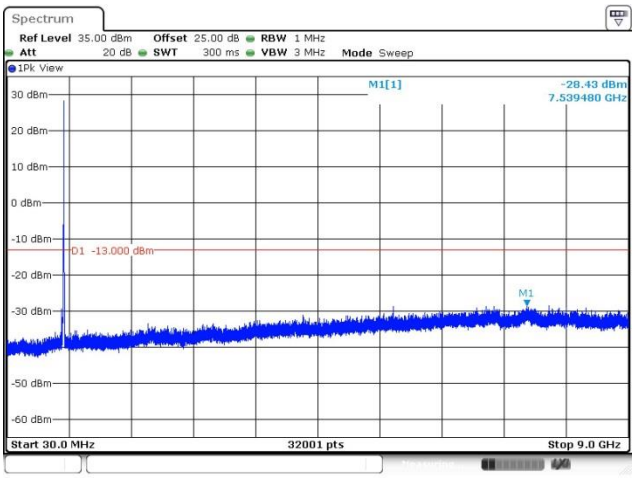
1. Lowest, middle and highest operating channels are tested for this item.
2. Scan frequency range is from 30MHz~9GHz.
3. Set RBW = 1MHz, VBW = 3MHz, detector = RMS, sweep time = auto.
4. Record the max trace value and capture the test plot of each sub frequency band.

### 3.3.3 Test Setup



### 3.3.4 Test Result of Conducted Emissions

<table>
<tr><td>Mode</td><td colspan="3">GPRS 8</td></tr>
<tr><td>Channel</td><td>128</td><td>Channel</td><td>189</td></tr>
<tr><td colspan="2"> 
</td><td colspan="2"> 
</td></tr>
<tr><td>Channel</td><td>251</td><td colspan="2">---</td></tr>
<tr><td colspan="2"> 
</td><td colspan="2">---</td></tr>
</table>

| Mode | WCDMA | | |
|---|---|---|---|
| Channel | 4132 | Channel | 4182 |
|  | |  | |
| Channel | 4233 | | --- |
|  | | --- | |

## 3.4 Band Edge

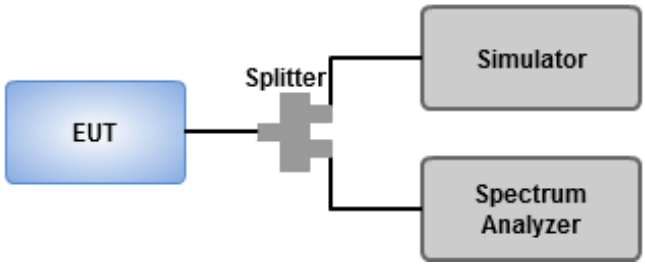
### 3.4.1 Limit of Band Edge

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 equal to -13dBm.

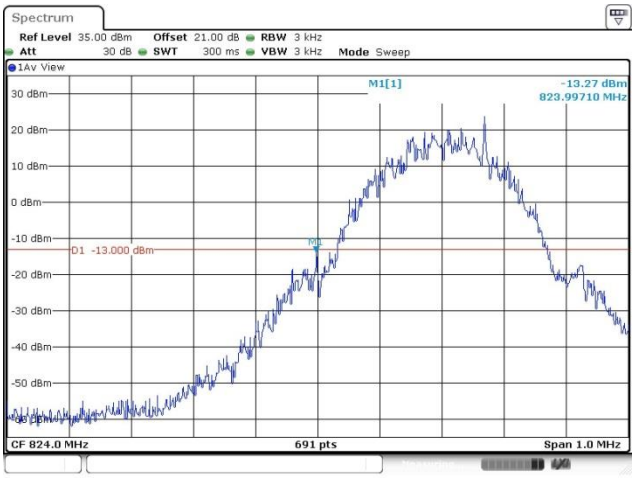
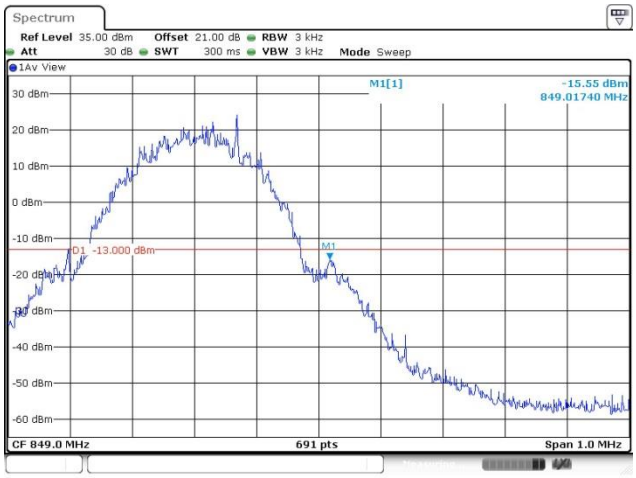
### 3.4.2 Test Procedures

1. Lowest and highest operating channels are tested for this item.
2. The center frequency of spectrum analyzer will be set to 824 and 849 MHz.
3. Set RBW = VBW=3kHz, span = 1 MHz, detector = RMS, sweep time = auto for GSM
   Set RBW = 100kHz, VBW = 300kHz, span = 5 MHz, detector = RMS, sweep time = auto for WCDMA
4. Record the max trace value and capture the test plot.

### 3.4.3 Test Setup

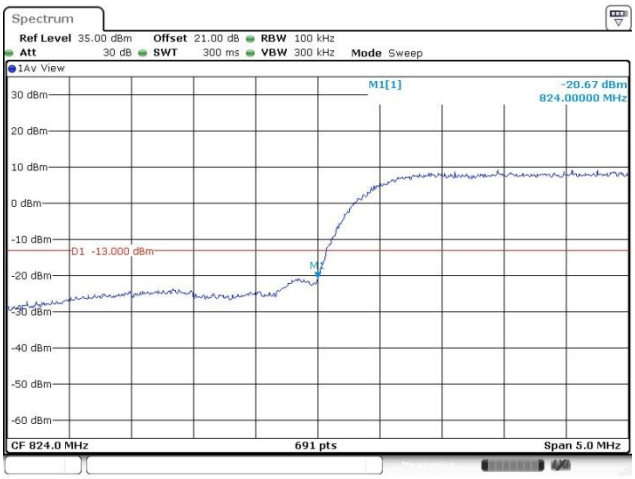
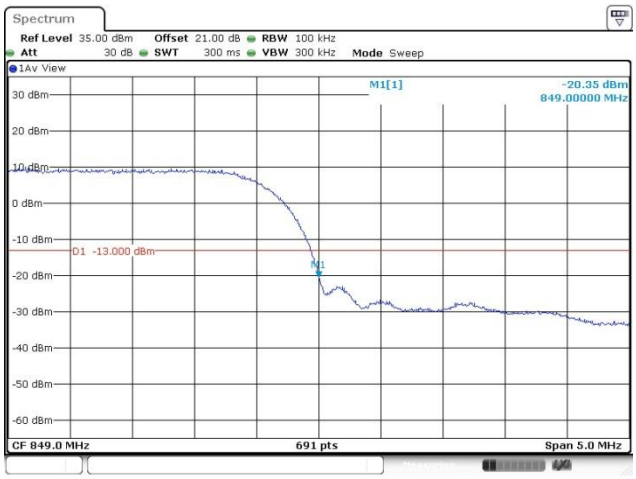


### 3.4.4 Test Result of Band Edge

| Mode | GPRS 8 | | |
|---|---|---|---|
| Channel | 128 | Channel | 251 |
|  | |  | |





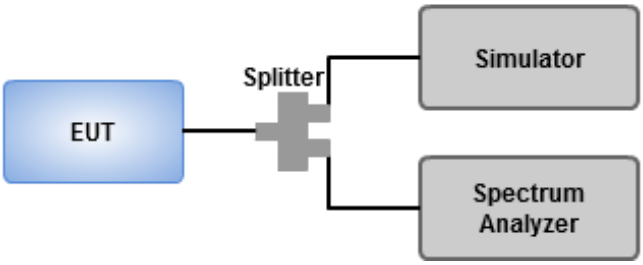
| Mode | WCDMA | | |
|---|---|---|---|
| Channel | 4132 | Channel | 4233 |
|  | |  | |

## 3.5 Occupied Bandwidth

### 3.5.1 Test Procedures

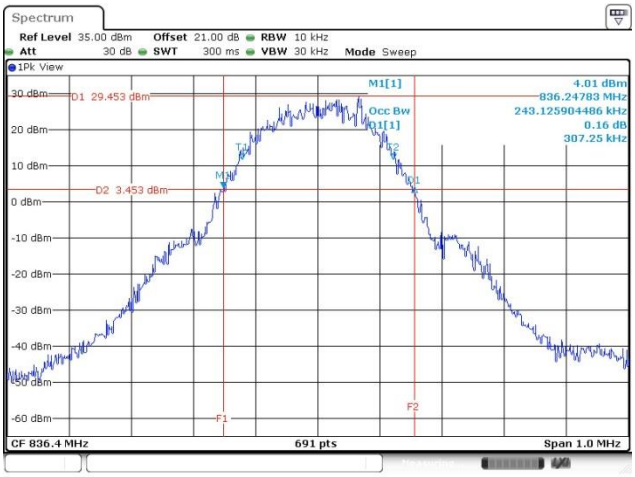
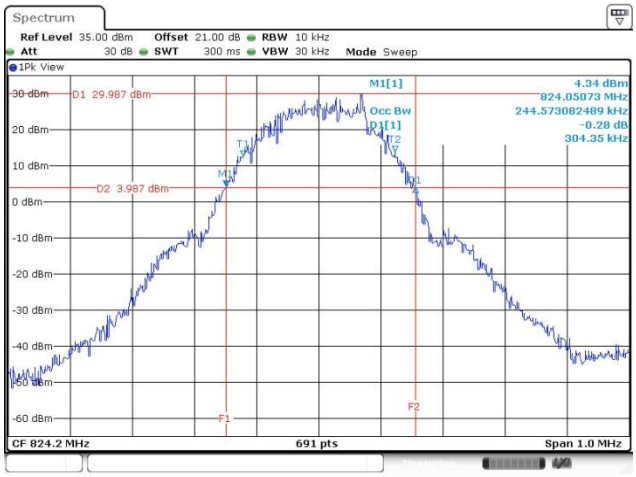
1. Set resolution bandwidth (RBW) = 10 kHz, Video bandwidth = 30 kHz for GSM mode.
   Set resolution bandwidth (RBW) = 100 kHz, Video bandwidth = 300 kHz for WCDMA mode.
2. Detector = Peak, Trace mode = max hold.
3. Sweep = auto couple, Allow the trace to stabilize.
4. Using occupied bandwidth measurement function of spectrum analyzer to measure occupied bandwidth

### 3.5.2 Test Setup

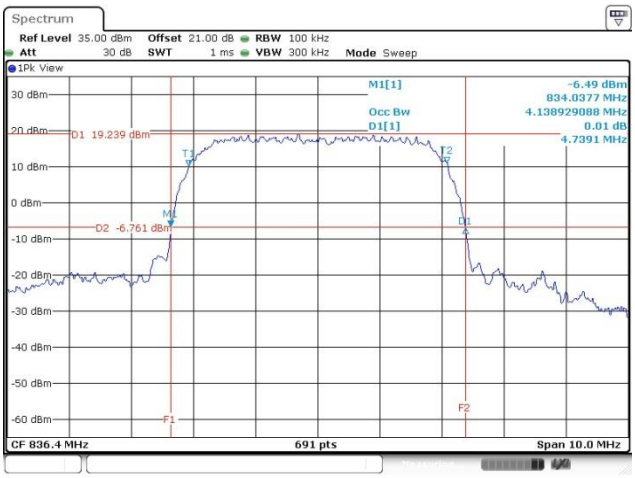
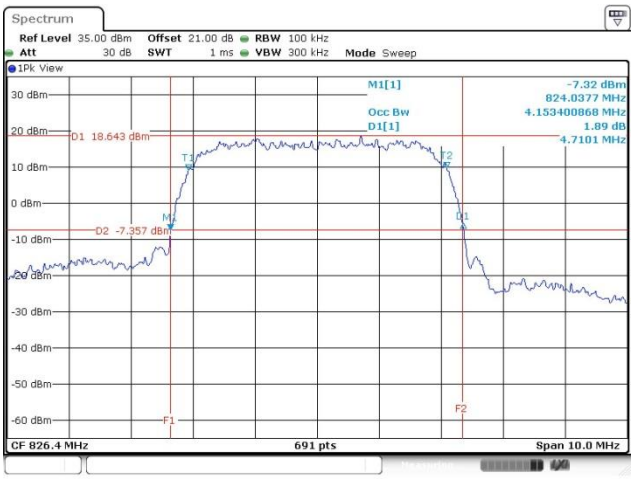


### 3.5.3 Test Result of Occupied Bandwidth

| MODE | Channel | Frequency (MHz) | 26dB BW (kHz) | 99% OBW (kHz) |
|---|---|---|---|---|
| GPRS 8 | 128 | 824.2 | 304.35 | 244.57 |
| GPRS 8 | 189 | 836.4 | 307.25 | 243.13 |
| GPRS 8 | 251 | 848.8 | 305.80 | 244.57 |

| Worst plots | |
|---|---|
| **26dB bandwidth** | **OBW** |
|  |  |

| MODE | Channel | Frequency (MHz) | OBW (MHz) | 26dB BW (MHz) |
|---|---|---|---|---|
| WCDMA | 4132 | 826.4 | 4.7101 | 4.1534 |
| WCDMA | 4182 | 836.4 | 4.7391 | 4.1389 |
| WCDMA | 4133 | 846.6 | 4.7246 | 4.1534 |

| Worst plots | |
|---|---|
| **26dB bandwidth** | **OBW** |
|  |  |

## 3.6 Peak to Average Ratio

### 3.6.1 Limit of Peak to Average Ratio

Peak-to-average ratio (PAR) of the transmission may not exceed 13 dB

### 3.6.2 Test Procedures

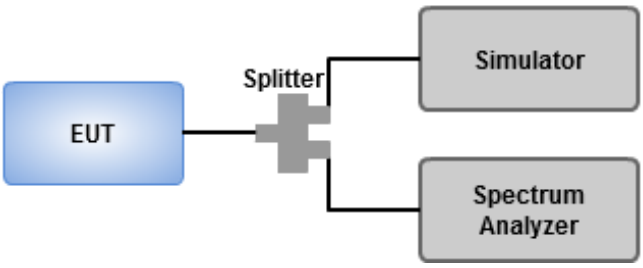
For GSM mode

1. Set RBW=1MHz, RBW=3MHz, Peak detector in Trace 1
2. Set RBW=1MHz, RBW=3MHz, RMs detector in Trace 2
3. Trigger function is enabled for measuring singal at burst on time. Measure the difference between trace1 and trace 2.

For WCDMA mode

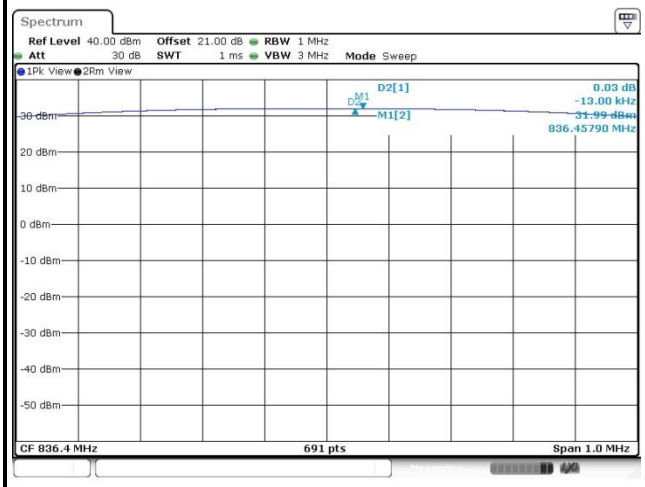
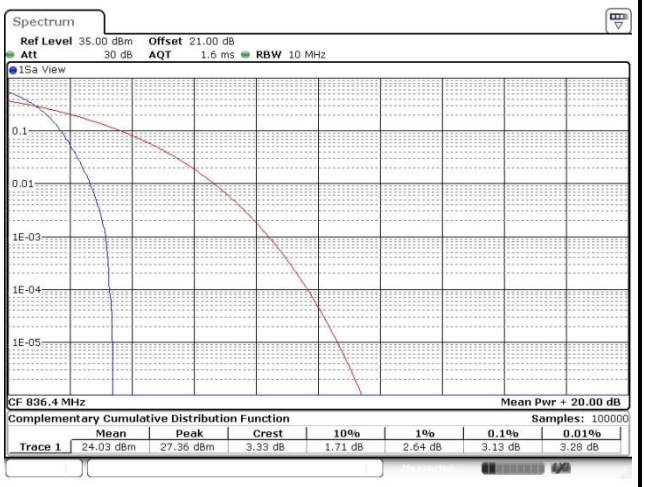
1. Enable CCDF function of spectrum analyzer and set RBW=10MHz
2. Set the number of counts to a value that stabilizes the measured CCDF curve
3. Record the maximum PAPR level associated with a probability of 0.1%.

### 3.6.3 Test Setup



### 3.6.4 Test Result of Peak to Average Ratio

| MODE | Channel | Frequency (MHz) | Peak to Average ratio (dB) |
|---|---|---|---|
| GPRS 8 | 128 | 824.2 | 0.01 |
| GPRS 8 | 189 | 836.4 | 0.03 |
| GPRS 8 | 251 | 848.8 | 0.01 |
| WCDMA | 4132 | 826.4 | 2.90 |
| WCDMA | 4182 | 836.4 | 3.13 |
| WCDMA | 4133 | 846.6 | 2.90 |

| Worst plots | |
|---|---|
| **GPRS 8** | **WCDMA** |
|  |  |

## 3.7 Frequency Stability

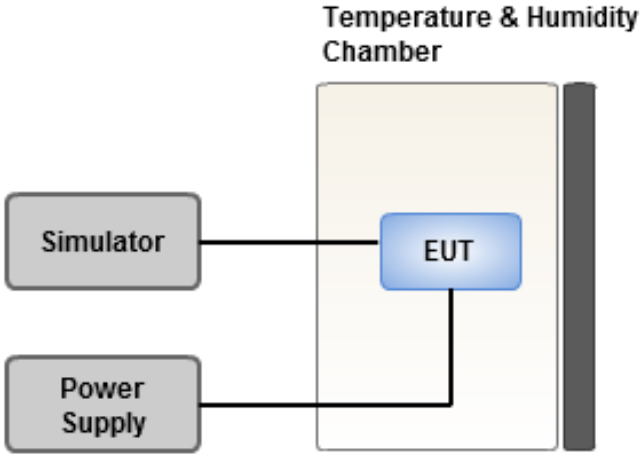
### 3.7.1 Limit of Frequency Stability

The frequency stability shall be less +/- 2.5ppm.

### 3.7.2 Test Procedures

1. EUT was placed at temperature chamber and connected to an external power supply.
2. Temperature and voltage condition shall be tested to confirm frequency stability.
3. Temperature range is from -30~55°C and voltage range is from lowest to highest working voltage.
4. Link up EUT and simulator. Confirm frequency drift value of simulator and record it.

### 3.7.3 Test Setup



### 3.7.4 Test Result of Frequency Stability

| Temperature (°C) | Voltage (dc) | Frequency Drift (ppm) | | Limit (ppm) |
|---|---|---|---|---|
| | | GSM | WCDMA | |
| 55 | 3.9 | 0.019 | 0.026 | 2.5 |
| 50 | 3.9 | 0.016 | 0.022 | 2.5 |
| 40 | 3.9 | 0.013 | 0.019 | 2.5 |
| 30 | 3.9 | 0.014 | 0.018 | 2.5 |
| 20 | 3.9 | 0.012 | 0.016 | 2.5 |
| 10 | 3.9 | 0.011 | 0.011 | 2.5 |
| 0 | 3.9 | 0.008 | 0.010 | 2.5 |
| -10 | 3.9 | 0.006 | 0.007 | 2.5 |
| -20 | 3.9 | 0.004 | 0.006 | 2.5 |
| -30 | 3.9 | 0.005 | 0.004 | 2.5 |
| 20 | 4.29 | 0.022 | 0.027 | 2.5 |
| 20 | 3.51 | 0.018 | 0.025 | 2.5 |

# 4 Test laboratory information

Established in 2012, ICC provides foremost EMC & RF Testing and advisory consultation services by our skilled engineers and technicians. Our services employ a wide variety of advanced edge test equipment and one of the widest certification extents in the business.

International Certification Corp, it is our definitive objective is to institute long term, trust-based associations with our clients. The expectation we set up with our clients is based on outstanding service, practical expertise and devotion to a certified value structure. Our passion is to grant our clients with best EMC / RF services by oriented knowledgeable and accommodating staff.

Our Test sites are located at Linkou District and Kwei Shan Hsiang. Location map can be found on our website http://www.icertifi.com.tw.

| **Linkou** | **Kwei Shan** | **Kwei Shan Site II** |
|---|---|---|
| Tel: 886-2-2601-1640 | Tel: 886-3-271-8666 | Tel: 886-3-271-8640 |
| No. 30-2, Ding Fwu Tsuen, Lin Kou District, New Taipei City, Taiwan, R.O.C. | No. 3-1, Lane 6, Wen San 3rd St., Kwei Shan Hsiang, Tao Yuan Hsien 333, Taiwan, R.O.C. | No. 14-1, Lane 19, Wen San 3rd St., Kwei Shan Hsiang, Tao Yuan Hsien 333, Taiwan, R.O.C. |

If you have any suggestion, please feel free to contact us as below information

Tel: 886-3-271-8666
Fax: 886-3-318-0155
Email: ICC_Service@icertifi.com.tw

**==END==**