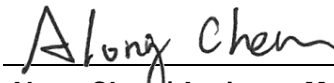


# FCC Test Report

**FCC ID** : 2AQYEFMP176  
**Equipment** : Mobile Phone  
**Model No.** : F-51A  
**Brand Name** : FUJITSU  
**Applicant** : FUJITSU CONNECTED TECHNOLOGIES Ltd.  
**Address** : Chuorinkan 7-10-1 Yamato, Kanagawa  
242-0007, Japan.  
**Standard** : 47 CFR FCC Part 24 Subpart E  
**Received Date** : Mar. 03, 2020  
**Tested Date** : Apr. 08 ~ Apr. 17, 2020

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.

Reviewed by:

  
Along Chen / Assistant Manager

Approved by:

  
Gary Chang / Manager



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## Release Record

| Report No.  | Version | Description   | Issued Date  |
|-------------|---------|---------------|--------------|
| FR011605P24 | Rev. 01 | Initial issue | May 18, 2020 |

## Summary of Test Results

| FCC Rules          | Test Items                              | Measured                      | Result |
|--------------------|---|-------------------------------|--------|
| 2.1046 / 24.232(c) | Equivalent Isotropically Radiated Power | Power[dBm]: 25.95             | Pass   |
| 2.1053 / 24.238(a) | Radiated Emissions                      | Meet the requirement of limit | Pass   |
| 2.1051 / 24.238(a) | Conducted Emissions                     | Meet the requirement of limit | Pass   |
| 2.1051 / 24.238(a) | Band Edge                               | Meet the requirement of limit | Pass   |
| 2.1049             | Occupied Bandwidth                      | Meet the requirement of limit | Pass   |
| 24.232(d)          | Peak to Average Ratio                   | Meet the requirement of limit | Pass   |
| 2.1055 / 24.235    | Frequency Stability                     | Meet the requirement of limit | Pass   |

### Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

### Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

# 1 General Description

## 1.1 Information

### 1.1.1 Product Details

|              |                                   |
|--------------|-----------------------------------|
| Product Name | Mobile Phone                      |
| Brand Name   | FUJITSU                           |
| Model Name   | F-51A                             |
| IMEI Code    | 353704110012010 / 353704110012127 |
| H/W Version  | v2.1.0                            |
| S/W Version  | R047.4                            |

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

|                 |                     |
|-----------------|---------------------|
| Operating Band  | 1850.2 ~ 1909.8 MHz |
| Modulation      | GSM / GPRS: GMSK    |
| Multislot Class | 11 for GPRS         |

### 1.1.3 Antenna Details

| Ant. No. | Type     | Connector | Gain (dBi) | Remark |
|----------|----------|-----------|------------|--------|
| 1        | Monopole | No        | -4.0       | ---    |

### 1.1.4 EUT Operational Condition

|                      |  |   |  |
|----------------------|--|---|--|
| Supply Voltage       | 3.83Vdc from battery:<br>9Vdc,1.5A from adapter (No bundle, support unit only) |   |  |
| Operational Climatic | <input checked="" type="checkbox"/> Tnom (20°C)                                | <input checked="" type="checkbox"/> Tmax (55°C) | <input checked="" type="checkbox"/> Tmin (-10°C) |

### 1.1.5 Accessories

| No. | Equipment           | Description   |
|-----|---------------------|---|
| 1   | Battery             | Brand: FUJITSU CONNECTED TECHNOLOGIES LIMITED<br>Model: CA54310-0079-A1<br>Rated: 4000mAh, 15.4Wh<br>Typ. 4070mAh, 15.6Wh |
| 2   | Type-C <-> Earphone | 9.5cm non-shielded without core   |

### 1.1.6 Maximum EIRP and Emission Designator

| Mode     | Modulation | Maximum EIRP(W) | Emission Designator |
|----------|------------|-----------------|---------------------|
| GSM 1900 | GMSK       | 0.394           | 245KGXW             |

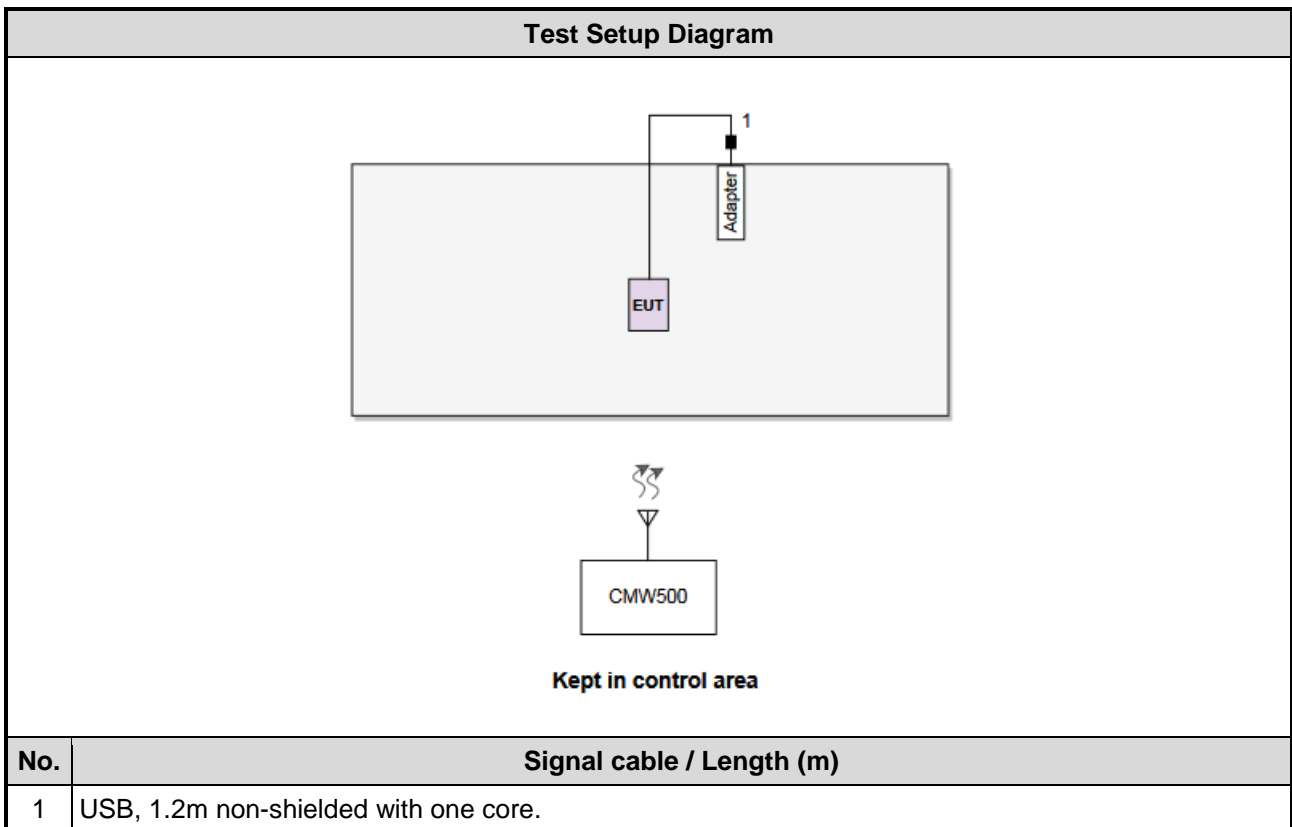
### 1.1.7 Operating Channel List

| GSM & GPRS |         |                 |
|------------|---------|-----------------|
|            | Channel | Frequency (MHz) |
| Low        | 512     | 1850.2          |
| Middle     | 661     | 1880.0          |
| High       | 810     | 1909.8          |

### 1.2 Local Support Equipment List

| Support Equipment List |            |            |               |     |                        |
|------------------------|------------|------------|---------------|-----|------------------------|
| No.                    | Equipment  | Brand      | Model         | S/N | Remarks                |
| 1                      | AC Adapter | NTT docomo | AC Adapter 06 | --- | Provided by applicant. |

### 1.3 Test Setup Chart



## 1.4 The Equipment List

| Test Item                           | Radiated Emission          |                      |                  |                  |                   |
|-------------------------------------|----------------------------|----------------------|------------------|------------------|-------------------|
| Test Site                           | 966 chamber1 / (03CH01-WS) |                      |                  |                  |                   |
| Instrument                          | Manufacturer               | Model No.            | Serial No.       | Calibration Date | Calibration Until |
| Wideband Radio Communication Tester | R&S                        | CMW500               | 106070           | Feb. 06, 2020    | Feb. 05, 2021     |
| Spectrum Analyzer                   | R&S                        | FSV40                | 101498           | Dec. 17, 2019    | Dec. 16, 2020     |
| Receiver                            | R&S                        | ESR3                 | 101657           | Feb. 14, 2020    | Feb. 13, 2021     |
| Bilog Antenna                       | SCHWARZBECK                | VULB9168             | VULB9168-522     | Jul. 12, 2019    | Jul. 11, 2020     |
| Horn Antenna 1G-18G                 | SCHWARZBECK                | BBHA 9120 D          | BBHA 9120 D 1096 | Dec. 12, 2019    | Dec. 11, 2020     |
| Horn Antenna 18G-40G                | SCHWARZBECK                | BBHA 9170            | BBHA 9170517     | Nov. 15, 2019    | Nov. 14, 2020     |
| Loop Antenna                        | R&S                        | HFH2-Z2              | 100330           | Nov. 13, 2019    | Nov. 12, 2020     |
| Loop Antenna Cable                  | KOAX KABEL                 | 101354-BW            | 101354-BW        | Oct. 07, 2019    | Oct. 06, 2020     |
| Preamplifier                        | EMC                        | EMC02325             | 980225           | Jul. 09, 2019    | Jul. 08, 2020     |
| Preamplifier                        | Agilent                    | 83017A               | MY39501308       | Oct. 08, 2019    | Oct. 07, 2020     |
| Preamplifier                        | EMC                        | EMC184045B           | 980192           | Aug. 01, 2019    | Jul. 31, 2020     |
| RF Cable                            | EMC                        | EMC104-SM-SM-8000    | 181106           | Oct. 07, 2019    | Oct. 06, 2020     |
| RF Cable                            | HUBER+SUHNER               | SUCOFLEX104          | MY16019/4        | Oct. 07, 2019    | Oct. 06, 2020     |
| RF Cable                            | HUBER+SUHNER               | SUCOFLEX104          | MY16014/4        | Oct. 07, 2019    | Oct. 06, 2020     |
| LF cable 1M                         | EMC                        | EMCCFD400-NM-NM-1000 | 160502           | Oct. 07, 2019    | Oct. 06, 2020     |
| LF cable 3M                         | Woken                      | CFD400NL-LW          | CFD400NL-001     | Oct. 07, 2019    | Oct. 06, 2020     |
| LF cable 10M                        | Woken                      | CFD400NL-LW          | CFD400NL-002     | Oct. 07, 2019    | Oct. 06, 2020     |
| Measurement Software                | AUDIX                      | e3                   | 6.120210g        | NA               | NA                |

Note: Calibration Interval of instruments listed above is one year.

|                                     |                     |                  |                   |                         |                          |
|-------------------------------------|---------------------|------------------|-------------------|-------------------------|--------------------------|
| <b>Test Item</b>                    | RF Conducted        |                  |                   |                         |                          |
| <b>Test Site</b>                    | (TH01-WS)           |                  |                   |                         |                          |
| <b>Instrument</b>                   | <b>Manufacturer</b> | <b>Model No.</b> | <b>Serial No.</b> | <b>Calibration Date</b> | <b>Calibration Until</b> |
| Spectrum Analyzer                   | R&S                 | FSV40            | 101498            | Dec. 17, 2019           | Dec. 16, 2020            |
| Spectrum Analyzer                   | R&S                 | FSV40            | 101499            | Jan. 09, 2020           | Jan. 08, 2021            |
| TEMP&HUMIDITY CHAMBER               | GIANT FORCE         | GCT-225-40-SP-SD | MAF1212-002       | Dec. 12, 2019           | Dec. 11, 2020            |
| Power Meter                         | Anritsu             | ML2495A          | 1241002           | Oct. 23, 2019           | Oct. 22, 2020            |
| Power Sensor                        | Anritsu             | MA2411B          | 1207366           | Oct. 23, 2019           | Oct. 22, 2020            |
| Wideband Radio Communication Tester | R&S                 | CMW500           | 106070            | Feb. 06, 2020           | Feb. 05, 2021            |
| AC POWER SOURCE                     | APC                 | AFC-500W         | F312060012        | Dec. 02, 2019           | Dec. 01, 2020            |
| Measurement Software                | Sporton             | SENSE-FCC_2G-4G  | V5.10.5           | 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 24 Subpart E

ANSI C63.4-2014

ANSI C63.26-2015

FCC KDB 971168 D01 Power Meas License Digital Systems v03r01

FCC KDB 971168 D02 Misc Rev Approv License Devices v02r01

FCC KDB 412172 D01 Determining ERP and EIRP v01r01

## 1.6 Deviation from Test Standard and Measurement Procedure

None



## 1.7 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                      | $\pm 34.130$ Hz        |
| Conducted power                | $\pm 0.808$ dB         |
| Frequency error                | $\pm 1 \times 10^{-9}$ |
| Conducted emission             | $\pm 2.715$ dB         |
| Radiated emission $\leq 1$ GHz | $\pm 3.41$ dB          |
| Radiated emission $> 1$ GHz    | $\pm 4.59$ dB          |
| Temperature                    | $\pm 0.4$ °C           |

## 2 Test Configuration

### 2.1 Testing Condition and Location Information

| Test Item          | Test Site | Ambient Condition | Tested By              |
|--------------------|-----------|-------------------|------------------------|
| Radiated Emissions | 03CH01-WS | 22-23°C / 65-69%  | Roger Lu<br>Akun Chung |
| RF Conducted       | TH01-WS   | 17-25°C / 60-67%  | Aska Huang             |

- FCC Designation No.: TW2732
- FCC site registration No.: 181692
- ISED#: 10807A
- CAB identifier: TW2732

### 2.2 The Worst Test Modes and Channel Details

| Test item                | Mode           | Test Frequency (MHz)     |
|--------------------------|----------------|--------------------------|
| E.I.R.P                  | GPRS 1 Tx slot | 1850.2 / 1880.0 / 1909.8 |
| Radiated Emission ≤ 1GHz | GPRS 1 Tx slot | 1850.2                   |
| Radiated Emission > 1GHz | GPRS 1 Tx slot | 1850.2 / 1880.0 / 1909.8 |
| Conducted Emissions      | GPRS 1 Tx slot | 1850.2 / 1880.0 / 1909.8 |
| Band Edge                | GPRS 1 Tx slot | 1850.2 / 1909.8          |
| Occupied Bandwidth       | GPRS 1 Tx slot | 1850.2 / 1880.0 / 1909.8 |
| Peak to Average Ratio    | GPRS 1 Tx slot | 1850.2 / 1880.0 / 1909.8 |
| Frequency Stability      | GPRS 1 Tx slot | 1880.0                   |

**NOTE:**

1. The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement – X, Y, and Z-plane. The **Y-plane** results were found as the worst case and were shown in this report.

## 3 Test Results

### 3.1 Equivalent Isotropically Radiated Power

#### 3.1.1 Limit of Equivalent Isotropically Radiated Power

Mobile and portable stations are limited to 2 watts EIRP.

#### 3.1.2 Test Procedures

##### For E.I.R.P measurement

EIPR 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).

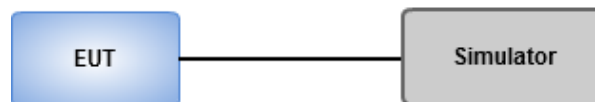
$L_C$  = signal attenuation in the connecting cable between the transmitter and antenna, in dB.

##### 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

#### 3.1.3 Test Setup

##### Conducted Power Measurement



### 3.1.4 Test Result of Conducted power (dBm)

| Band                       |                 | GSM 1900 |        |        |
|----------------------------|-----------------|----------|--------|--------|
| Channel                    |                 | 512      | 661    | 810    |
| Frequency (MHz)            |                 | 1850.2   | 1880.0 | 1909.8 |
| GSM 1 Tx slot              |                 | 29.91    | 29.43  | 29.20  |
| GPRS 1 Tx slot             |                 | 29.95    | 29.47  | 29.21  |
| GPRS 2 Tx slots            |                 | 26.77    | 26.88  | 26.77  |
| GPRS 3 Tx slots            |                 | 25.00    | 24.89  | 24.78  |
| GPRS 4 Tx slots            |                 | 23.61    | 23.61  | 23.65  |
| DTM Multi-slot<br>class 5  | GSM 1 Tx slot   | 26.71    | 26.83  | 26.73  |
|                            | GPRS 1 Tx slot  | 26.72    | 26.81  | 26.72  |
| DTM Multi-slot<br>class 9  | GSM 1 Tx slot   | 26.68    | 26.78  | 26.68  |
|                            | GPRS 1 Tx slot  | 26.65    | 26.73  | 26.65  |
| DTM Multi-slot<br>class 11 | GSM 1 Tx slot   | 24.87    | 24.91  | 24.73  |
|                            | GPRS 2 Tx slots | 24.86    | 24.88  | 24.71  |

### 3.1.5 Test Result of Equivalent Isotropically Radiated Power (dBm)

#### Summary

| Mode                         | Power<br>(dBm) | Power<br>(W) | EIRP<br>(dBm) | EIRP<br>(W) |
|------------------------------|----------------|--------------|---------------|-------------|
| 1900                         | -              | -            | -             | -           |
| GPRS_200kHz_Nss1,Slots 1_1TX | 29.95          | 0.989        | 25.95         | 0.39355     |

#### Result

| Mode                      | Result | DG<br>(dBi) | EIRP<br>(dBm) | EIRP<br>(W) | EIRP<br>Lim.<br>(W) | Power<br>(dBm) | Power<br>(W) | Power<br>Lim.<br>(W) | Port 1<br>(dBm) |
|---------------------------|--------|-------------|---------------|-------------|---------------------|----------------|--------------|----------------------|-----------------|
| 1900_GPRS_200kHz_Nss1_1TX | -      | -           | -             | -           | -                   | -              | -            | -                    | -               |
| 1850.2MHz_Slots 1         | Pass   | -4.00       | 25.95         | 0.39355     | 2                   | 29.95          | 0.989        | Inf                  | 29.95           |
| 1880MHz_Slots 1           | Pass   | -4.00       | 25.47         | 0.35237     | 2                   | 29.47          | 0.885        | Inf                  | 29.47           |
| 1909.8MHz_Slots 1         | Pass   | -4.00       | 25.21         | 0.33189     | 2                   | 29.21          | 0.834        | Inf                  | 29.21           |

DG = Directional Gain; Port n = Port n output power

## 3.2 Radiated Emissions

### 3.2.1 Limit of Radiated Emissions

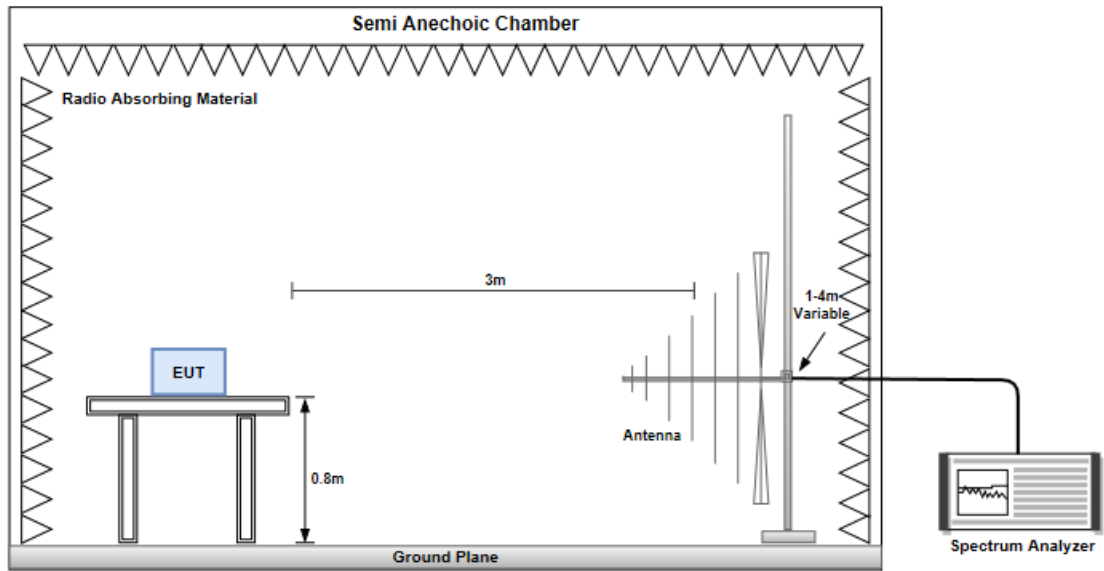
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB equal to -13dBm.

### 3.2.2 Test Procedures

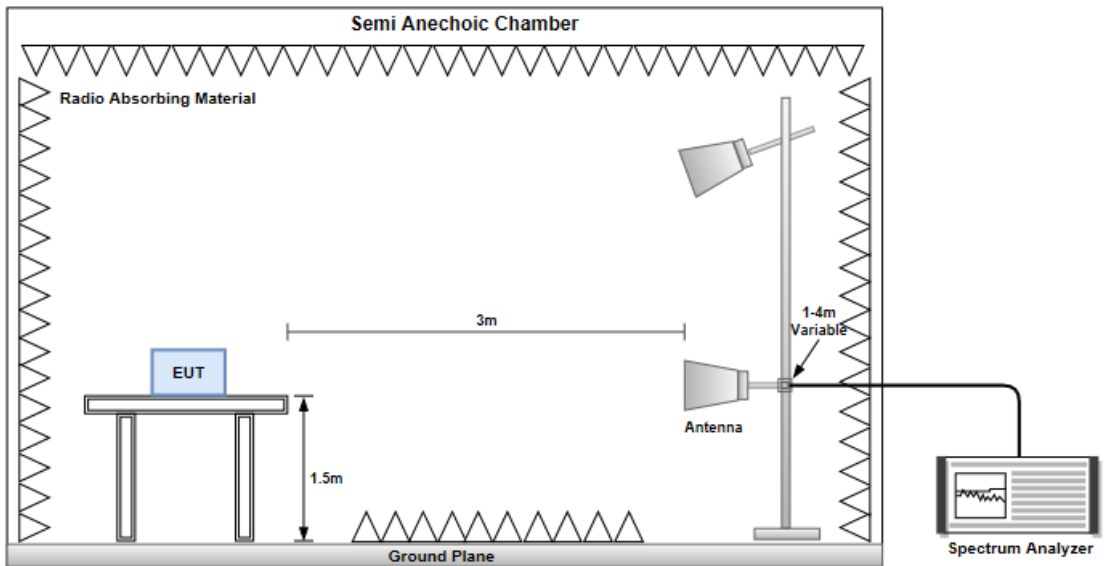
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission frequency. For emissions testing at or below 1 GHz, the table height is 80 cm above the reference ground plane. For emission measurements above 1 GHz, the table height is 1.5 m.
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.

### 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 1Tx slot, Channel : 512 |               |             |             |                   |                       |                        |
|-----------------|------------------------------|---------------|-------------|-------------|-------------------|-----------------------|------------------------|
| Frequency (MHz) | Antenna Polarity             | E.I.R.P (dBm) | Limit (dBm) | Margin (dB) | S.A Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) |
| 39.70           | H                            | -68.92        | -13.00      | -55.92      | -75.57            | -51.28                | -17.64                 |
| 70.74           | H                            | -67.27        | -13.00      | -54.27      | -65.21            | -56.96                | -10.31                 |
| 114.39          | H                            | -71.16        | -13.00      | -58.16      | -68.58            | -65.39                | -5.77                  |
| 155.13          | H                            | -73.21        | -13.00      | -60.21      | -72.45            | -66.82                | -6.39                  |
| 267.65          | H                            | -65.60        | -13.00      | -52.60      | -63.19            | -64.34                | -1.26                  |
| 345.25          | H                            | -68.74        | -13.00      | -55.74      | -70.37            | -67.63                | -1.11                  |
| 39.70           | V                            | -73.01        | -13.00      | -60.01      | -69.14            | -55.37                | -17.64                 |
| 46.49           | V                            | -71.90        | -13.00      | -58.90      | -69.18            | -55.23                | -16.67                 |
| 70.74           | V                            | -55.16        | -13.00      | -42.16      | -52.65            | -44.85                | -10.31                 |
| 90.14           | V                            | -65.81        | -13.00      | -52.81      | -63.49            | -60.90                | -4.91                  |
| 155.14          | V                            | -72.05        | -13.00      | -59.05      | -74.22            | -65.66                | -6.39                  |
| 268.62          | V                            | -65.41        | -13.00      | -52.41      | -67.35            | -64.15                | -1.26                  |

Note: EIRP = S.G Power value + Correction factor

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

| Mode            |                  | GPRS 1Tx slot , Channel : 512 |             |             |                   |                       |                        |
|-----------------|------------------|-------------------------------|-------------|-------------|-------------------|-----------------------|------------------------|
| Frequency (MHz) | Antenna Polarity | E.I.R.P (dBm)                 | Limit (dBm) | Margin (dB) | S.A Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) |
| 3700.40         | H                | -41.88                        | -13.00      | -28.88      | -57.36            | -48.75                | 6.87                   |
| 5550.60         | H                | -38.84                        | -13.00      | -25.84      | -56.25            | -45.47                | 6.63                   |
| 9251.00         | H                | -40.99                        | -13.00      | -27.99      | -63.25            | -42.61                | 1.62                   |
| 3700.40         | V                | -44.20                        | -13.00      | -31.20      | -59.52            | -51.07                | 6.87                   |
| 5550.60         | V                | -38.99                        | -13.00      | -25.99      | -56.58            | -45.62                | 6.63                   |
| 9251.00         | V                | -41.98                        | -13.00      | -28.98      | -62.14            | -43.60                | 1.62                   |

| Mode            |                  | GPRS 1Tx slot , Channel: 661 |             |             |                   |                       |                        |
|-----------------|------------------|------------------------------|-------------|-------------|-------------------|-----------------------|------------------------|
| Frequency (MHz) | Antenna Polarity | E.I.R.P (dBm)                | Limit (dBm) | Margin (dB) | S.A Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) |
| 3760.00         | H                | -42.64                       | -13.00      | -29.64      | -58.27            | -49.56                | 6.92                   |
| 5640.00         | H                | -39.93                       | -13.00      | -26.93      | -57.42            | -46.49                | 6.56                   |
| 9400.00         | H                | -42.31                       | -13.00      | -29.31      | -64.96            | -43.84                | 1.53                   |
| 3760.00         | V                | -44.71                       | -13.00      | -31.71      | -60.18            | -51.63                | 6.92                   |
| 5640.00         | V                | -39.45                       | -13.00      | -26.45      | -57.16            | -46.01                | 6.56                   |
| 9400.00         | V                | -42.54                       | -13.00      | -29.54      | -62.67            | -44.07                | 1.53                   |

| Mode            |                   | GPRS 1Tx slot , Channel: 810 |             |             |                   |                       |                        |
|-----------------|-------------------|------------------------------|-------------|-------------|-------------------|-----------------------|------------------------|
| Frequency (MHz) | Antenna Polarity. | E.I.R.P (dBm)                | Limit (dBm) | Margin (dB) | S.A Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) |
| 3819.60         | H                 | -43.10                       | -13.00      | -30.10      | -58.69            | -50.05                | 6.95                   |
| 5729.40         | H                 | -40.60                       | -13.00      | -27.60      | -57.89            | -47.10                | 6.50                   |
| 9549.00         | H                 | -41.37                       | -13.00      | -28.37      | -64.52            | -42.89                | 1.52                   |
| 3819.60         | V                 | -44.97                       | -13.00      | -31.97      | -60.44            | -51.92                | 6.95                   |
| 5729.40         | V                 | -40.65                       | -13.00      | -27.65      | -58.18            | -47.15                | 6.50                   |
| 9549.00         | V                 | -41.38                       | -13.00      | -28.38      | -62.26            | -42.90                | 1.52                   |

Note: EIRP = S.G Power value + Correction factor



### 3.3 Conducted Emissions & Band Edge

#### 3.3.1 Limit of Conducted Emissions & 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.

#### 3.3.2 Test Procedures

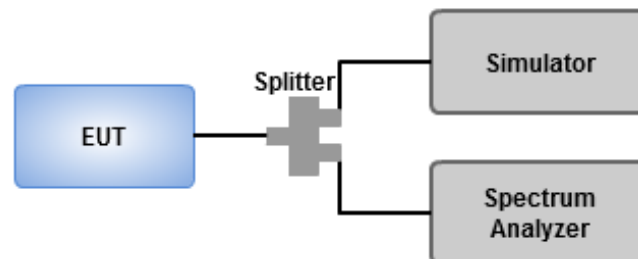
##### Out of band emission

1. Lowest, middle and highest operating channels are tested for this item.
2. Scan frequency range is from 30 MHz ~ 20 GHz.
3. Set RBW = 1 MHz, VBW = 3 MHz, detector = RMS, sweep time = auto.
4. Record the max trace value and capture the test plot of each sub frequency band.

##### Band edge

1. Lowest and highest operating channels are tested for this item.
2. Set RBW = 1% of EBW, VBW = 3 x RBW, detector = RMS, sweep time = auto.
3. 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 & Band Edge

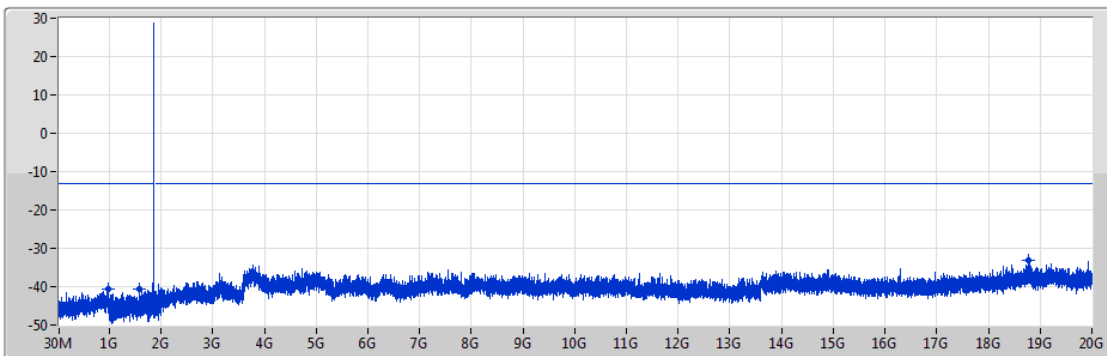
#### Summary

| Mode | Result | F-Start (Hz) | F-Stop (Hz) | RBW (Hz) | VBW (Hz) | Detector | Freq (Hz) | Level (dBm) | Limit (dBm) | Margin (dB) | Port | Remark | Ref.Limit (dB) |
|------|--------|--------------|-------------|----------|----------|----------|-----------|-------------|-------------|-------------|------|--------|----------------|
| 1900 | -      | -            | -           | -        | -        | -        | -         | -           | -           | -           | -    | -      | -              |
| GPRS | Pass   | 2.01G        | 20G         | 1M       | 3M       | Peak     | 18.77758G | -33.27      | -13.00      | -20.27      | 1    | -      | -              |

1900

CSE-TX-Port

1850.2MHz

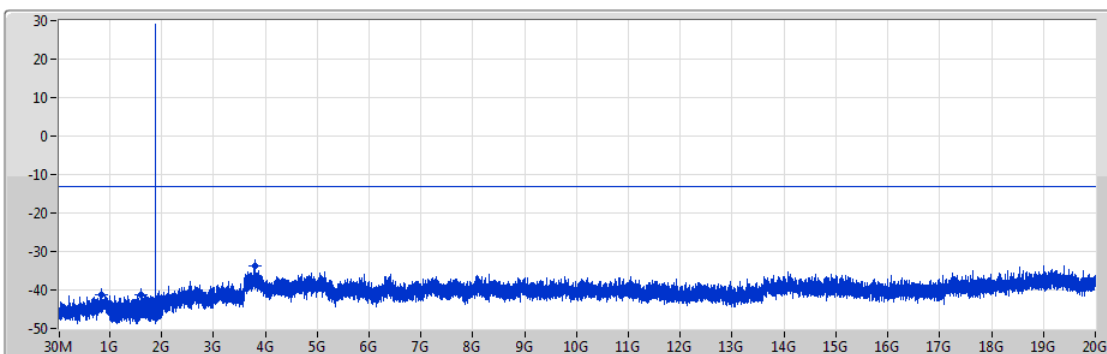


| F-Start(Hz) | F-Stop(Hz) | RBW(Hz) | VBW(Hz) | Detector | Freq(Hz)  | Level(dBm) | Limit(dBm) | Margin(dB) | Port | Remark |
|-------------|------------|---------|---------|----------|-----------|------------|------------|------------|------|--------|
| 30M         | 1G         | 1M      | 3M      | Peak     | 974.78M   | -40.73     | -13.00     | -27.73     | 1    | -      |
| 1G          | 1.75G      | 1M      | 3M      | Peak     | 1.56925G  | -40.58     | -13.00     | -27.58     | 1    | -      |
| 2.01G       | 20G        | 1M      | 3M      | Peak     | 18.77758G | -33.27     | -13.00     | -20.27     | 1    | -      |

1900

CSE-TX-Port

1880MHz

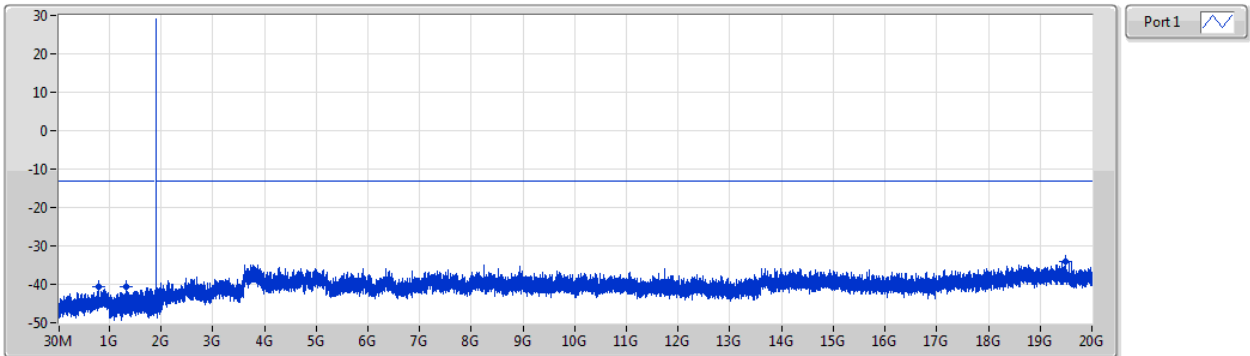


| F-Start(Hz) | F-Stop(Hz) | RBW(Hz) | VBW(Hz) | Detector | Freq(Hz) | Level(dBm) | Limit(dBm) | Margin(dB) | Port | Remark |
|-------------|------------|---------|---------|----------|----------|------------|------------|------------|------|--------|
| 30M         | 1G         | 1M      | 3M      | Peak     | 829.28M  | -41.18     | -13.00     | -28.18     | 1    | -      |
| 1G          | 1.75G      | 1M      | 3M      | Peak     | 1.60825G | -41.16     | -13.00     | -28.16     | 1    | -      |
| 2.01G       | 20G        | 1M      | 3M      | Peak     | 3.79281G | -33.78     | -13.00     | -20.78     | 1    | -      |

1900

CSE-TX-Port

1909.8MHz



| F-Start(Hz) | F-Stop(Hz) | RBW(Hz) | VBW(Hz) | Detector | Freq(Hz)  | Level(dBm) | Limit(dBm) | Margin(dB) | Port | Remark |
|-------------|------------|---------|---------|----------|-----------|------------|------------|------------|------|--------|
| 30M         | 1G         | 1M      | 3M      | Peak     | 797.27M   | -40.55     | -13.00     | -27.55     | 1    | -      |
| 1G          | 1.75G      | 1M      | 3M      | Peak     | 1.33525G  | -40.70     | -13.00     | -27.70     | 1    | -      |
| 2.01G       | 20G        | 1M      | 3M      | Peak     | 19.48369G | -34.18     | -13.00     | -21.18     | 1    | -      |

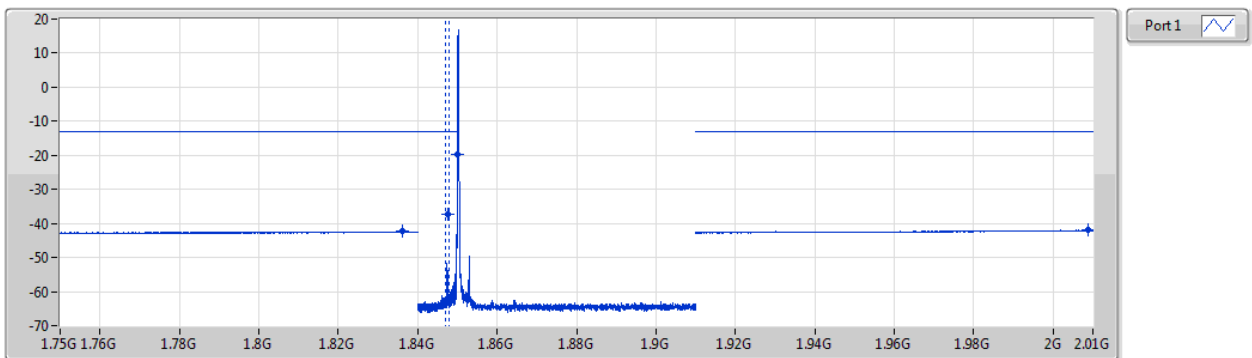
### Summary

| Mode | Result | F-Start (Hz) | F-Stop (Hz) | RBW (Hz) | VBW (Hz) | Detector | Freq (Hz) | Level (dBm) | Limit (dBm) | Margin (dB) | Port | Remark | Ref.Limit (dB) |
|------|--------|--------------|-------------|----------|----------|----------|-----------|-------------|-------------|-------------|------|--------|----------------|
| 1900 | -      | -            | -           | -        | -        | -        | -         | -           | -           | -           | -    | -      | -              |
| GPRS | Pass   | 1.91G        | 1.911G      | 6.2k     | 20k      | RMS      | 1.91002G  | -17.64      | -13.00      | -4.64       | 1    | -      | -              |

1900

CSE-TX-Port

1850.2MHz

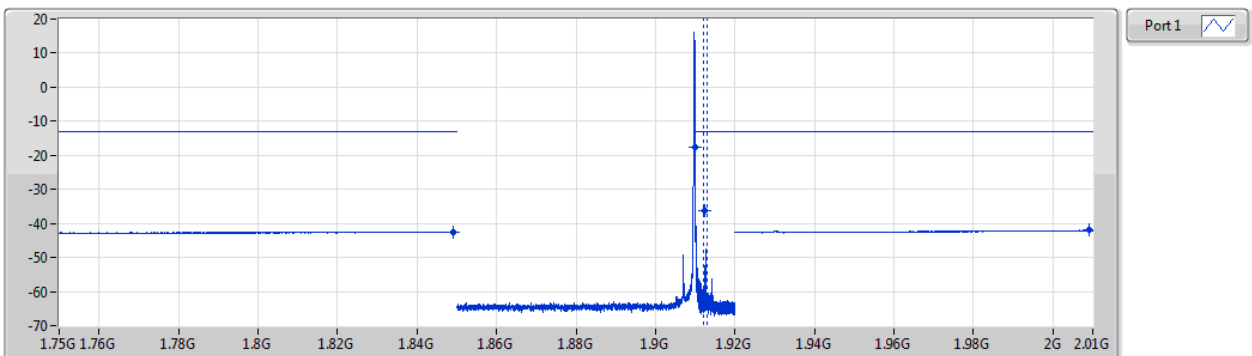


| F-Start(Hz) | F-Stop(Hz) | RBW(Hz) | VBW(Hz) | Detector | Freq(Hz) | Level(dBm) | Limit(dBm) | Margin(dB) | Port | Remark |
|-------------|------------|---------|---------|----------|----------|------------|------------|------------|------|--------|
| 1.75G       | 1.84G      | 1M      | 3M      | RMS      | 1.83622G | -42.10     | -13.00     | -29.10     | 1    | -      |
| 1.84G       | 1.849G     | 6.2k    | 20k     | RMS      | 1.8475G  | -37.41     | -13.00     | -24.41     | 1    | MBW 1M |
| 1.849G      | 1.85G      | 6.2k    | 20k     | RMS      | 1.84998G | -19.64     | -13.00     | -6.64      | 1    | -      |
| 1.91G       | 2.01G      | 1M      | 3M      | RMS      | 2.00865G | -41.98     | -13.00     | -28.98     | 1    | -      |

1900

CSE-TX-Port

1909.8MHz



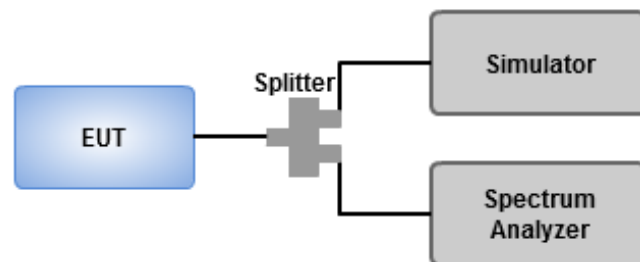
| F-Start(Hz) | F-Stop(Hz) | RBW(Hz) | VBW(Hz) | Detector | Freq(Hz) | Level(dBm) | Limit(dBm) | Margin(dB) | Port | Remark |
|-------------|------------|---------|---------|----------|----------|------------|------------|------------|------|--------|
| 1.75G       | 1.85G      | 1M      | 3M      | RMS      | 1.8492G  | -42.44     | -13.00     | -29.44     | 1    | -      |
| 1.91G       | 1.911G     | 6.2k    | 20k     | RMS      | 1.91002G | -17.64     | -13.00     | -4.64      | 1    | -      |
| 1.911G      | 1.92G      | 6.2k    | 20k     | RMS      | 1.9125G  | -36.09     | -13.00     | -23.09     | 1    | MBW 1M |
| 1.92G       | 2.01G      | 1M      | 3M      | RMS      | 2.00906G | -42.01     | -13.00     | -29.01     | 1    | -      |

## 3.4 Occupied and 26 dB Bandwidth

### 3.4.1 Test Procedures

1. Set resolution bandwidth (RBW) = 1% ~ 5 % of OBW, Video bandwidth = 3 x RBW
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
5. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 26dB relative to the maximum level measured in the fundamental emission.

### 3.4.2 Test Setup



### 3.4.3 Test Result of Occupied and 26 dB Bandwidth

#### Summary

| Mode                 | Max-NdB<br>(Hz) | Max-OBW<br>(Hz) | ITU-Code | Min-NdB<br>(Hz) | Min-OBW<br>(Hz) |
|----------------------|-----------------|-----------------|----------|-----------------|-----------------|
| 1900                 | -               | -               | -        | -               | -               |
| GPRS_200kHz_Nss1_1TX | 318.25k         | 245.021k        | 245KGXW  | 307k            | 243.395k        |

**Max-N dB** = Maximum 26dB down bandwidth; **Max-OBW** = Maximum 99% occupied bandwidth;  
**Min-N dB** = Minimum 26dB down bandwidth; **Min-OBW** = Minimum 99% occupied bandwidth;

#### Result

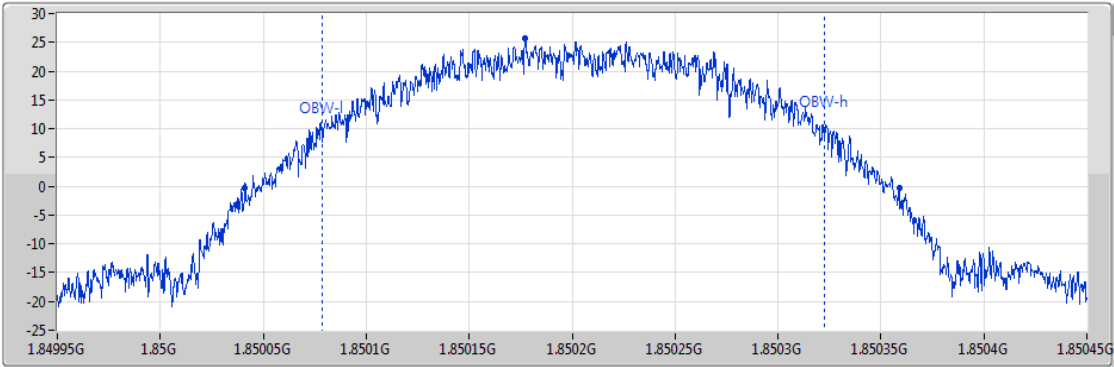
| Mode                      | Result | Limit<br>(Hz) | Port 1-NdB<br>(Hz) | Port 1-OBW<br>(Hz) |
|---------------------------|--------|---------------|--------------------|--------------------|
| 1900_GPRS_200kHz_Nss1_1TX | -      | -             | -                  | -                  |
| 1850.2MHz                 | Pass   | Inf           | 317.75k            | 243.395k           |
| 1880MHz                   | Pass   | Inf           | 307k               | 245.021k           |
| 1909.8MHz                 | Pass   | Inf           | 318.25k            | 244.298k           |


**Port X-N dB** = Port X 26dB down bandwidth; **Port X-OBW** = Port X 99% occupied bandwidth;

**1900\_GPRS\_200kHz\_Nss1\_1TX**

EBW

**1850.2MHz**



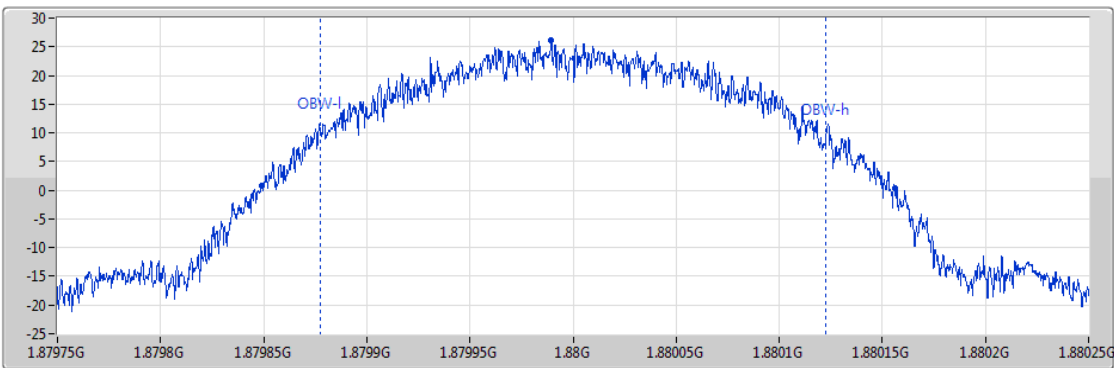
Port1 


| 26dB(Hz) | Fl-26dB(Hz) | Fh-26dB(Hz) | OBW(Hz)  | Fl-OBW(Hz) | Fh-OBW(Hz) | Port | CF(Hz)  | Span(Hz) | RBW(Hz) | VBW(Hz) |
|----------|-------------|-------------|----------|------------|------------|------|---------|----------|---------|---------|
| 317.75k  | 1.850041G   | 1.850359G   | 243.395k | 1.850079G  | 1.850322G  | 1    | 1.8502G | 500k     | 10k     | 30k     |

**1900\_GPRS\_200kHz\_Nss1\_1TX**

EBW

**1880MHz**



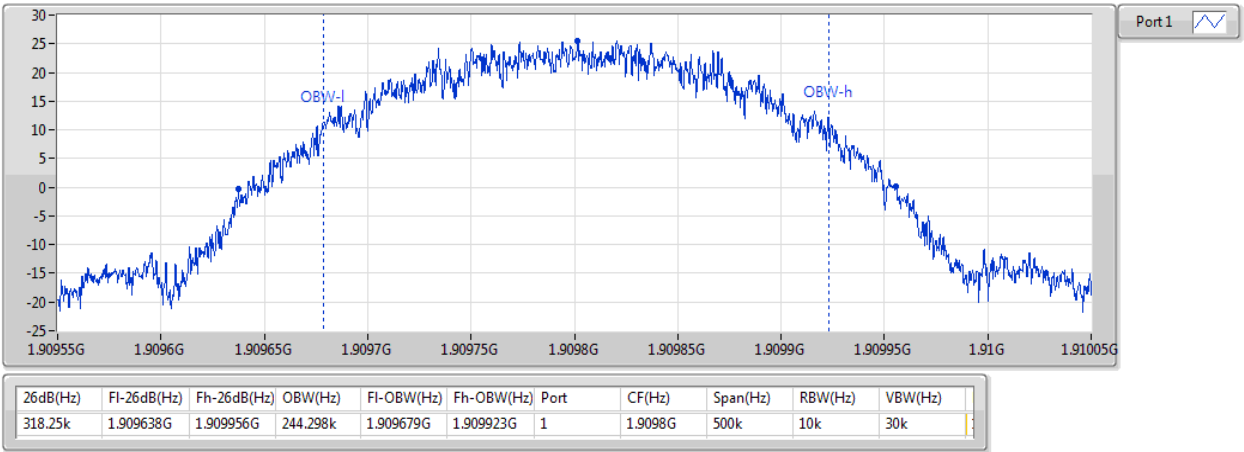
Port1 

| 26dB(Hz) | Fl-26dB(Hz) | Fh-26dB(Hz) | OBW(Hz)  | Fl-OBW(Hz) | Fh-OBW(Hz) | Port | CF(Hz) | Span(Hz) | RBW(Hz) | VBW(Hz) |
|----------|-------------|-------------|----------|------------|------------|------|--------|----------|---------|---------|
| 307k     | 1.879849G   | 1.880156G   | 245.021k | 1.879878G  | 1.880123G  | 1    | 1.88G  | 500k     | 10k     | 30k     |

**1900\_GPRS\_200kHz\_Nss1\_1TX**

EBW

**1909.8MHz**





## 3.5 Peak to Average Ratio

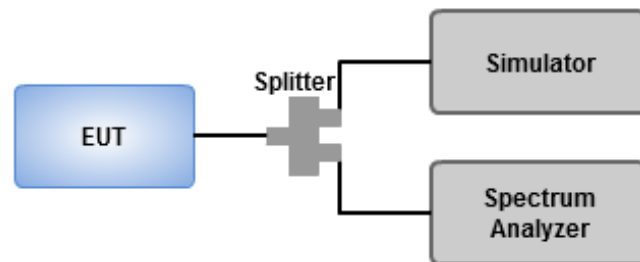
### 3.5.1 Limit of Peak to Average Ratio

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

### 3.5.2 Test Procedures

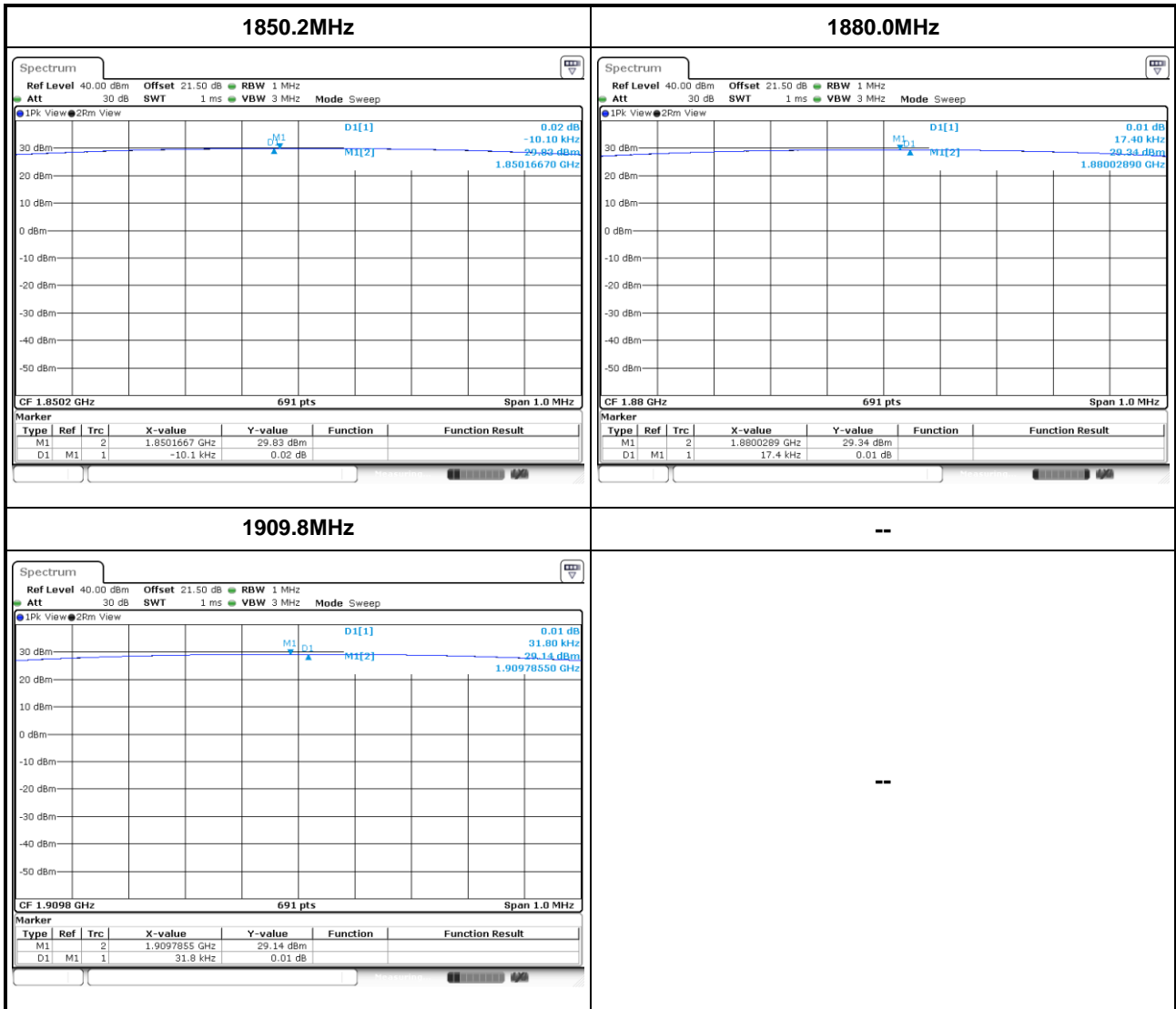
1. Set RBW=1MHz, RBW=3MHz, Peak detector in Trace 1
2. Set RBW=1MHz, RBW=3MHz, RMs detector in Trace 2
3. Trigger function is enabled for measuring signal at burst on time. Measure the difference between trace1 and trace 2.

### 3.5.3 Test Setup



### 3.5.4 Test Result of Peak to Average ratio

| MODE     | Frequency (MHz) | Peak to Average ratio (dB) | Result |
|----------|-----------------|----------------------------|--------|
| 1900_GSM | 1850.2          | 0.02                       | Pass   |
| 1900_GSM | 1880.0          | 0.01                       | Pass   |
| 1900_GSM | 1909.8          | 0.01                       | Pass   |



## 3.6 Frequency Stability

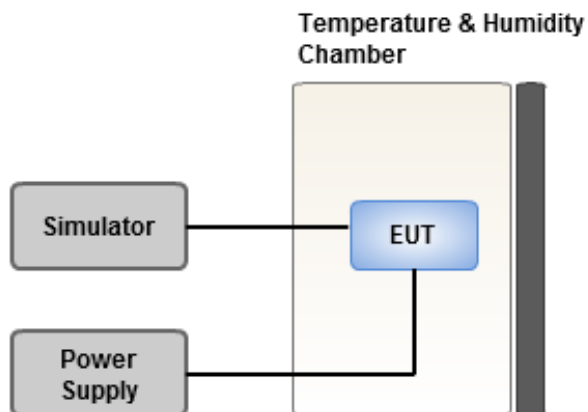
### 3.6.1 Limit of Frequency Stability

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

### 3.6.2 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. The test shall be performed under normal and extreme condition for temperature and voltage.
4. Tem Link up EUT and simulator. Confirm frequency drift value of simulator and record it.

### 3.6.3 Test Setup



### 3.6.4 Test Result of Frequency Stability

| Temperature (°C) | Voltage (dc) | Frequency Drift (ppm) |
|------------------|--------------|-----------------------|
| T20°CVmax        | 4.29         | 0.0015                |
| T20°CVmin        | 3.51         | 0.0015                |
| T55°CVnom        | 3.9          | 0.0022                |
| T50°CVnom        | 3.9          | 0.0021                |
| T40°CVnom        | 3.9          | 0.0021                |
| T30°CVnom        | 3.9          | 0.0018                |
| T20°CVnom        | 3.9          | 0.0016                |
| T10°CVnom        | 3.9          | 0.0018                |
| T0°CVnom         | 3.9          | 0.0017                |
| T-10°CVnom       | 3.9          | 0.0016                |
| T-20°CVnom       | 3.9          | 0.0017                |
| T-30°CVnom       | 3.9          | 0.0016                |

## 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 (EMC and Wireless Communication Laboratory), 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**

Tel: 886-2-2601-1640

No. 30-2, Ding Fwu Tsuen, Lin  
Kou District, New Taipei City,  
Taiwan, R.O.C.

### **Kwei Shan**

Tel: 886-3-271-8666

No. 3-1, Lane 6, Wen San 3rd St.,  
Kwei Shan District, Tao Yuan City  
333, Taiwan, R.O.C.

### **Kwei Shan Site II**

Tel: 886-3-271-8640

No. 14-1, Lane 19, Wen San 3rd  
St., Kwei Shan District, Tao Yuan  
City 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==