

# FCC TEST REPORT

## (PART 22)

**REPORT NO.:** RF130610C19-2

**MODEL NO.:** Picasso, NA9xx (where "x" can be used as "A-Z" or "0-9" or "-" or blank for marketing purposes only)

**FCC ID:** P27NA930ZW2G

**RECEIVED:** Jun. 10, 2013

**TESTED:** Jun. 25 ~ Jul. 02, 2013

**ISSUED:** Jul. 16, 2013

**APPLICANT:** SerComm Corp.

**ADDRESS:** 8F, No.3-1, YuangQu St., NanKang, Taipei 115,  
Taiwan , R.O.C. (NanKang Software Park)

**ISSUED BY:** Bureau Veritas Consumer Products Services  
(H.K.) Ltd., Taoyuan Branch

**LAB ADDRESS:** No. 47, 14th Ling, Chia Pau Vil., Lin Kou Dist., New  
Taipei City, Taiwan, R.O.C.

**TEST LOCATION:** No. 19, Hwa Ya 2nd Rd, Wen Hwa Tsuen, Kwei  
Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.

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## RELEASE CONTROL RECORD

| ISSUE NO.     | REASON FOR CHANGE | DATE ISSUED   |
|---------------|-------------------|---------------|
| RF130610C19-2 | Original release  | Jul. 16, 2013 |



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## 1 CERTIFICATION

**PRODUCT:** Smart Home Gateway

**MODEL:** Picasso, NA9xx (where "x" can be used as "A-Z" or "0-9" or "-" or blank for marketing purposes only)

**BRAND:** Telefonica

**APPLICANT:** SerComm Corp.

**TESTED:** Jun. 25 ~ Jul. 02, 2013

**TEST SAMPLE:** ENGINEERING SAMPLE

**STANDARDS:** FCC PART 22, Subpart H

The above equipment (model: Picasso) has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

**PREPARED BY :** Sun Li , **DATE :** Jul. 16, 2013  
Suntée Liu / Specialist

**APPROVED BY :** Anderson Chiu , **DATE :** Jul. 16, 2013  
Anderson Chiu / Senior Engineer

## 2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

| APPLIED STANDARD: FCC Part 22 & Part 2 |                              |        |                                                                                     |
|----------------------------------------|------------------------------|--------|-------------------------------------------------------------------------------------|
| STANDARD SECTION                       | TEST TYPE                    | RESULT | REMARK                                                                              |
| 2.1046<br>22.913 (a)                   | Effective radiated power     | PASS   | Meet the requirement of limit.                                                      |
| 2.1055<br>22.355                       | Frequency Stability          | PASS   | Meet the requirement of limit.                                                      |
| 2.1049                                 | Occupied Bandwidth           | PASS   | Meet the requirement of limit.                                                      |
| 22.917                                 | Band Edge Measurements       | PASS   | Meet the requirement of limit.                                                      |
| 2.1051<br>22.917                       | Conducted Spurious Emissions | PASS   | Meet the requirement of limit.                                                      |
| 2.1053<br>22.917                       | Radiated Spurious Emissions  | PASS   | Meet the requirement of limit.<br>Minimum passing margin is -15.00dB at 1648.40MHz. |

### 2.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

| MEASUREMENT         | FREQUENCY       | UNCERTAINTY |
|---------------------|-----------------|-------------|
| Conducted emissions | 150kHz~30MHz    | 2.44 dB     |
| Radiated emissions  | 30MHz ~ 200MHz  | 3.34 dB     |
|                     | 200MHz ~1000MHz | 3.35 dB     |
|                     | 1GHz ~ 18GHz    | 2.26 dB     |
|                     | 18GHz ~ 40GHz   | 1.94 dB     |

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

## 2.2 TEST SITE AND INSTRUMENTS

| DESCRIPTION & MANUFACTURER              | MODEL NO.                    | SERIAL NO.       | DATE OF CALIBRATION | DUE DATE OF CALIBRATION |
|-----------------------------------------|------------------------------|------------------|---------------------|-------------------------|
| Test Receiver<br>ROHDE & SCHWARZ        | ESIB7                        | 100212           | Aug. 06, 2012       | Aug. 05, 2013           |
| Spectrum Analyzer<br>ROHDE & SCHWARZ    | FSP40                        | 100039           | Jan. 31, 2013       | Jan. 30, 2014           |
| BILOG Antenna<br>SCHWARZBECK            | VULB9168                     | 9168-160         | Mar. 20, 2013       | Mar. 19, 2014           |
| HORN Antenna<br>SCHWARZBECK             | 9120D                        | 209              | Sep. 03, 2012       | Sep. 02, 2013           |
| HORN Antenna<br>SCHWARZBECK             | BBHA 9170                    | 148              | Jul. 11, 2012       | Jul. 10, 2013           |
| Loop Antenna                            | HFH2-Z2                      | 100070           | Jan. 31, 2012       | Jan. 30, 2014           |
| Preamplifier<br>Agilent                 | 8447D                        | 2944A10633       | Oct. 25, 2012       | Oct. 24, 2013           |
| Preamplifier<br>Agilent                 | 8449B                        | 3008A01964       | Oct. 25, 2012       | Oct. 24, 2013           |
| RF signal cable<br>HUBER+SUHNNER        | SUCOFLEX 104                 | 250723/4         | Aug. 28, 2012       | Aug. 27, 2013           |
| RF signal cable<br>HUBER+SUHNNER        | SUCOFLEX 106                 | 12738/6+309224/4 | Aug. 28, 2012       | Aug. 27, 2013           |
| Software<br>BV ADT                      | ADT_Radiated_<br>V7.6.15.9.3 | NA               | NA                  | NA                      |
| Antenna Tower<br>inn-co GmbH            | MA 4000                      | 013303           | NA                  | NA                      |
| Antenna Tower Controller<br>inn-co GmbH | CO2000                       | 017303           | NA                  | NA                      |
| Turn Table<br>BV ADT                    | TT100                        | TT93021703       | NA                  | NA                      |
| Turn Table Controller<br>BV ADT         | SC100                        | SC93021703       | NA                  | NA                      |
| Mini-Circuits Power Splitter            | ZN2PD-9G                     | NA               | Mar. 22, 2013       | Mar. 21, 2014           |
| JFW 20dB attenuation                    | 50HF-020-SMA                 | NA               | NA                  | NA                      |
| Communications<br>Tester-Wireless       | E5515C                       | MY50266653       | Oct. 08, 2012       | Oct. 09, 2013           |

- NOTE:**
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
  2. The calibration interval of the loop antenna is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
  3. The test was performed in HwaYa Chamber 3.
  4. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
  5. The FCC Site Registration No. is 988962.
  6. The IC Site Registration No. is IC 7450F-3.

### 3 GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

|                            |                                                                                                      |
|----------------------------|------------------------------------------------------------------------------------------------------|
| <b>EUT</b>                 | Smart Home Gateway                                                                                   |
| <b>MODEL NO.</b>           | Picasso, NA9xx (where "x" can be used as "A-Z" or "0-9" or "-" or blank for marketing purposes only) |
| <b>IMEI CODE</b>           | 351732050323867                                                                                      |
| <b>HW VERSION</b>          | 1.0                                                                                                  |
| <b>SW VERSION</b>          | 1.0                                                                                                  |
| <b>POWER SUPPLY</b>        | 12Vdc (adaper)                                                                                       |
| <b>MODULATION TYPE</b>     | GMSK                                                                                                 |
| <b>FREQUENCY RANGE</b>     | 824.2MHz ~ 848.8MHz                                                                                  |
| <b>MAX. ERP POWER</b>      | 1659.59mW (32.20dBm)                                                                                 |
| <b>EMISSION DESIGNATOR</b> | 265KGXW                                                                                              |
| <b>MULTI-SLOTS CLASS</b>   | 4                                                                                                    |
| <b>ANTENNA TYPE</b>        | PIFA antenna with 1dBi gain                                                                          |
| <b>DATA CABLE</b>          | NA                                                                                                   |
| <b>I/O PORTS</b>           | Refer to user's manual                                                                               |
| <b>ACCESSORY DEVICES</b>   | Adapter                                                                                              |

#### NOTE:

1. All models are electrically identical, different model names are for marketing purpose.

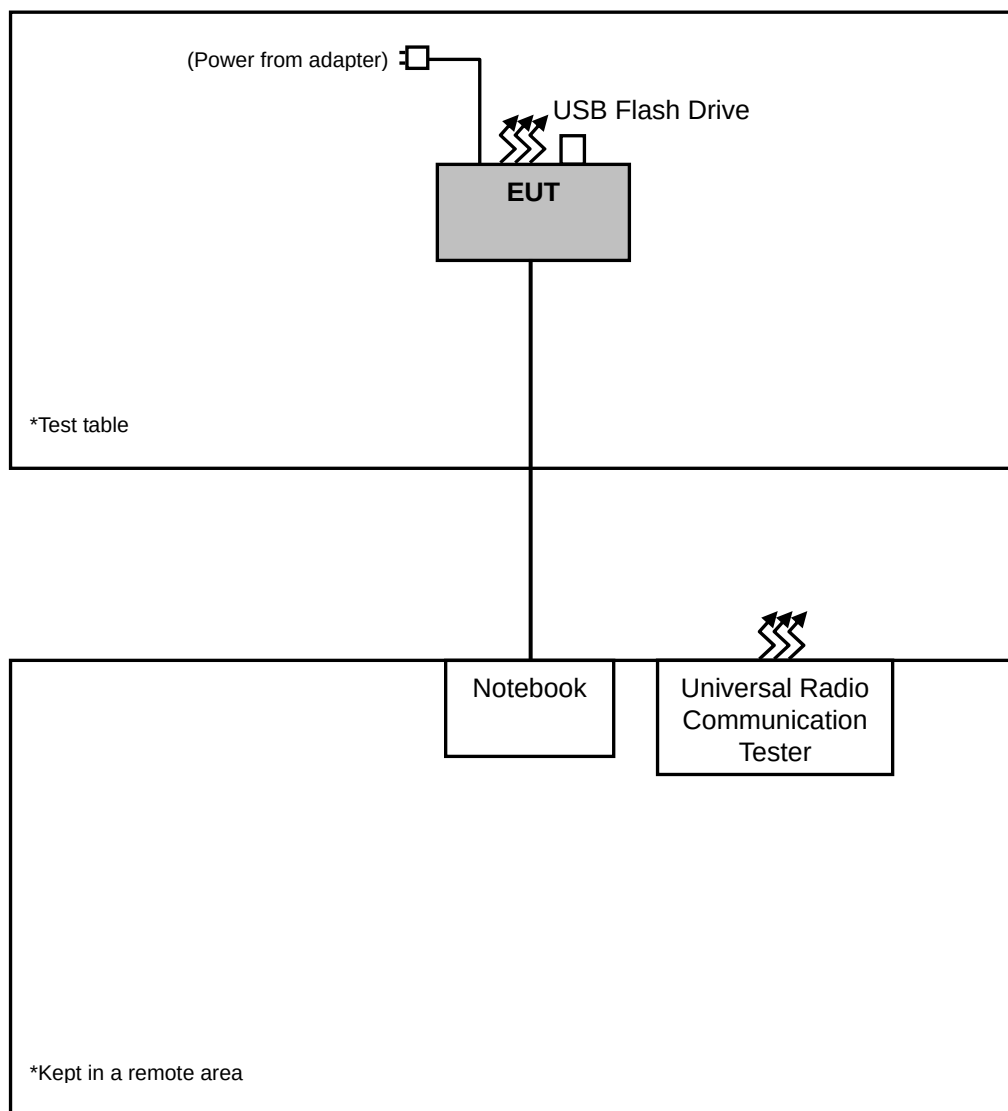
| Brand      | Model   | Remark                                                                              |
|------------|---------|-------------------------------------------------------------------------------------|
| Telefonica | Picasso |                                                                                     |
|            | NA9xx   | where "x" can be used as "A-Z" or "0-9" or "-" or blank for marketing purposes only |

2. The EUT consumes power from following adapter.

|                     |                                             |
|---------------------|---------------------------------------------|
| <b>Brand</b>        | Sunny                                       |
| <b>Model</b>        | SYS1381-1212-W2                             |
| <b>Input Power</b>  | 100-240Vac, 0.5A MAX, 50-60Hz               |
| <b>Output Power</b> | 12Vdc, 1.0A                                 |
| <b>Power Line</b>   | 1.5m cable without core attached on adapter |

3. The above EUT information is declared by the manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

### 3.2 CONFIGURATION OF SYSTEM UNDER TEST



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### 3.3 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

| NO. | PRODUCT                              | BRAND     | MODEL NO. | SERIAL NO.  | FCC ID           |
|-----|--------------------------------------|-----------|-----------|-------------|------------------|
| 1   | USB Flash Drive                      | Transcend | V85       | 538455 4488 | NA               |
| 2   | Notebook                             | DELL      | E5420     | 33MJMQ1     | FCC Doc Approved |
| 3   | Universal Radio Communication Tester | R&S       | CMU200    | 104958      | NA               |

| NO. | SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS |
|-----|-----------------------------------------------------|
| 1   | NA                                                  |
| 2   | 10m RJ45 UTP cable                                  |
| 3   | NA                                                  |

**NOTE:**

1. All power cords of the above support units are non-shielded (1.8m).
2. Items 2-3 acted as communication partners to transfer data.

### 3.4 TEST ITEM AND TEST CONFIGURATION

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports. The worst case was found when positioned on **X-plane**. Following channel(s) was (were) selected for the final test as listed below:

#### GPRS MODE

| EUT CONFIGURE MODE | TEST ITEM                       | AVAILABLE CHANNEL | TESTED CHANNEL | MODE |
|--------------------|---------------------------------|-------------------|----------------|------|
| -                  | ERP                             | 128 to 251        | 128, 189, 251  | GPRS |
| -                  | FREQUENCY STABILITY             | 128 to 251        | 189            | GPRS |
| -                  | OCCUPIED BANDWIDTH              | 128 to 251        | 128, 189, 251  | GPRS |
| -                  | BAND EDGE                       | 128 to 251        | 128, 251       | GPRS |
| -                  | CONDCUDED EMISSION              | 128 to 251        | 128            | GPRS |
| -                  | RADIATED EMISSION<br>Below 1GHz | 128 to 251        | 128            | GPRS |
| -                  | RADIATED EMISSION<br>Above 1GHz | 128 to 251        | 128, 189, 251  | GPRS |

#### TEST CONDITION:

| TEST ITEM                       | ENVIRONMENTAL CONDITIONS | INPUT POWER  | TESTED BY  |
|---------------------------------|--------------------------|--------------|------------|
| ERP                             | 24deg. C, 64%RH          | 120Vac, 60Hz | Alan Wu    |
| FREQUENCY STABILITY             | 24deg. C, 64%RH          | 120Vac, 60Hz | Match Tsui |
| OCCUPIED BANDWIDTH              | 24deg. C, 64%RH          | 120Vac, 60Hz | Match Tsui |
| BAND EDGE                       | 24deg. C, 64%RH          | 120Vac, 60Hz | Match Tsui |
| CONDCUDED EMISSION              | 25deg. C, 65%RH          | 120Vac, 60Hz | Chris Lin  |
| RADIATED EMISSION<br>Below 1GHz | 24deg. C, 64%RH          | 120Vac, 60Hz | Alan Wu    |
| RADIATED EMISSION<br>Above 1GHz | 25deg. C, 69%RH          | 120Vac, 60Hz | Alan Wu    |

### **3.5 EUT OPERATING CONDITIONS**

The EUT makes a call to the communication simulator. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency

### **3.6 GENERAL DESCRIPTION OF APPLIED STANDARDS**

The EUT is a RF product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

**FCC 47 CFR Part 2**

**FCC 47 CFR Part 22**

**ANSI/TIA/EIA-603-C 2004**

**NOTE:** All test items have been performed and recorded as per the above standards.

## 4 TEST TYPES AND RESULTS

### 4.1 OUTPUT POWER MEASUREMENT

#### 4.1.1 LIMITS OF OUTPUT POWER MEASUREMENT

Mobile / Portable station are limited to 7 watts e.r.p.

#### 4.1.2 TEST PROCEDURES

##### **EIRP / ERP MEASUREMENT:**

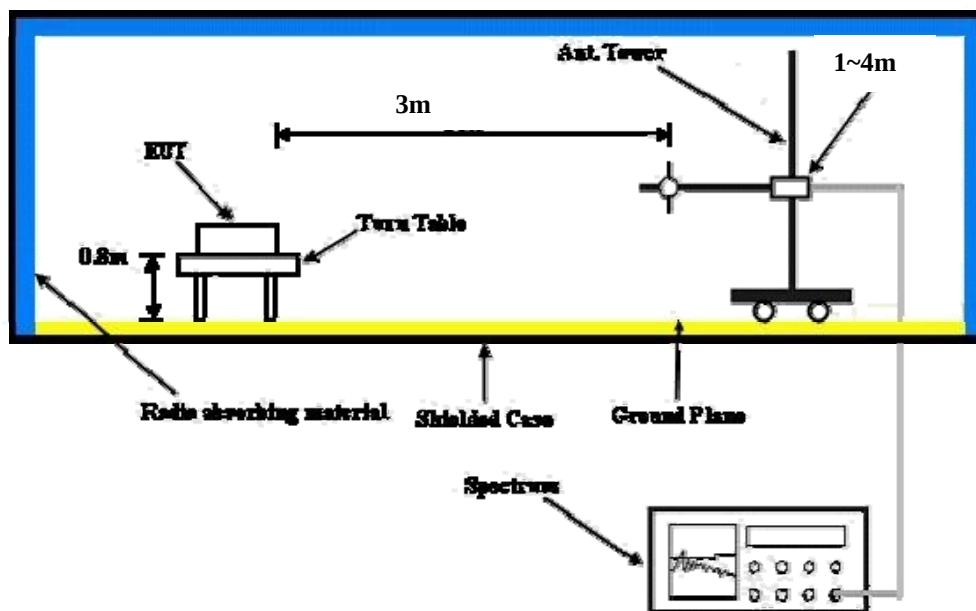
- a. All measurements were done at low, middle and high operational frequency range. RBW and VBW is 1MHz for GPRS mode.
- b. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.
- c. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a tx cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to “Read Value “ of step b. Record the power level of S.G
- d.  $EIRP = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn.}$   
 $E.R.P \text{ power can be calculated form E.I.R.P power by subtracting the gain of dipole, } E.R.P \text{ power} = E.I.P.R \text{ power} - 2.15\text{dBi.}$

##### **CONDUCTED POWER MEASUREMENT:**

The EUT was set up for the maximum power with GPRS link data modulation and link up with simulator. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

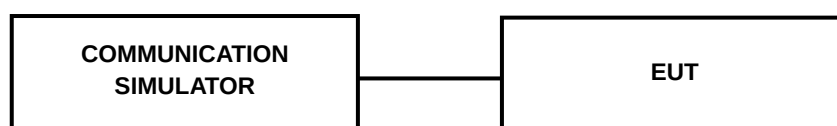
### 4.1.3 TEST SETUP

#### EIRP / ERP MEASUREMENT:



For the actual test configuration, please refer to the attached file (Test Setup Photo).

#### CONDUCTED POWER MEASUREMENT:



For the actual test configuration, please refer to the attached file (Test Setup Photo).

#### 4.1.4 TEST RESULTS

##### CONDUCTED OUTPUT POWER (dBm)

| Band            | GPRS850 |       |       |
|-----------------|---------|-------|-------|
| Channel         | 128     | 189   | 251   |
| Frequency (MHz) | 824.2   | 836.4 | 848.8 |
| GPRS 8          | 32.03   | 32.20 | 32.10 |
| GPRS 10         | 32.00   | 32.09 | 32.07 |

## ERP POWER (dBm)

### GPRS

|                                                     |             |                |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|----------------|-----------------------|------------------------|-----------|-------------|-------------|
| MODE                                                |             | TX channel 128 |                       |                        |           |             |             |
| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |             |                |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)  | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 824.20      | 0.98           | 32.19                 | 0.01                   | 32.20     | 38.45       | -6.25       |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M   |             |                |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)  | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 824.20      | -5.37          | 23.94                 | 0.01                   | 23.95     | 38.45       | -14.50      |

|                                                     |             |                |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|----------------|-----------------------|------------------------|-----------|-------------|-------------|
| MODE                                                |             | TX channel 189 |                       |                        |           |             |             |
| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |             |                |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)  | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 836.40      | 0.80           | 31.10                 | 0.29                   | 31.39     | 38.45       | -7.06       |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M   |             |                |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)  | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 836.40      | -5.71          | 24.12                 | 0.29                   | 24.41     | 38.45       | -14.04      |

|                                                     |             |                |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|----------------|-----------------------|------------------------|-----------|-------------|-------------|
| MODE                                                |             | TX channel 251 |                       |                        |           |             |             |
| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |             |                |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)  | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 848.80      | 0.63           | 30.83                 | 0.51                   | 31.34     | 38.45       | -7.11       |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M   |             |                |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm)  | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 848.80      | -6.70          | 24.06                 | 0.51                   | 24.57     | 38.45       | -13.88      |

**NOTE:** ERP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

## 4.2 FREQUENCY STABILITY MEASUREMENT

### 4.2.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

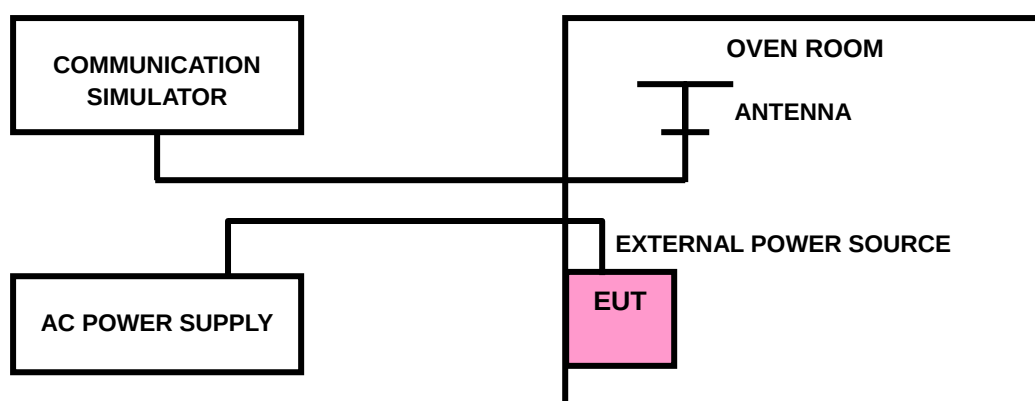
1.5 ppm is for base and fixed station. 2.5 ppm is for mobile station.

### 4.2.2 TEST PROCEDURE

- Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.
- EUT is connected the external power supply to control the AC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.
- The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the  $\pm 0.5^{\circ}\text{C}$  during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

**NOTE:** The frequency error was recorded frequency error from the communication simulator.

### 4.2.3 TEST SETUP



## 4.2.4 TEST RESULTS

### FREQUENCY ERROR VS. VOLTAGE

| VOLTAGE (Volts) | FREQUENCY ERROR (ppm) | LIMIT (ppm) |
|-----------------|-----------------------|-------------|
|                 | GPRS                  |             |
| 132             | -0.027                | 2.5         |
| 120             | -0.017                | 2.5         |
| 108             | -0.023                | 2.5         |

**NOTE:** The applicant defined the normal working voltage of the battery is from 108Vac to 132Vac.

### FREQUENCY ERROR vs. TEMPERATURE

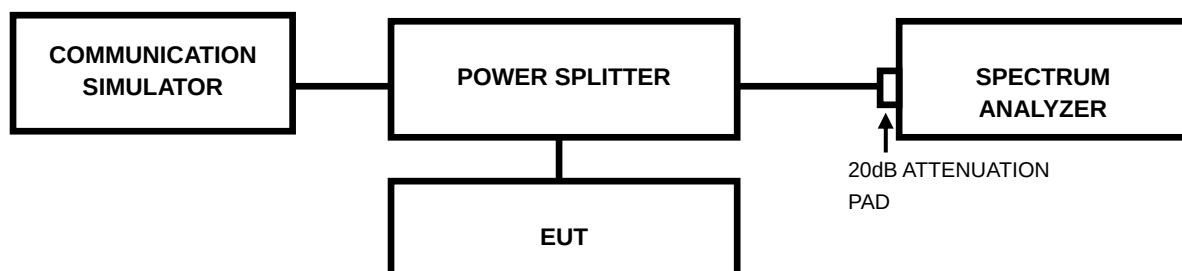
| TEMP. (°C) | FREQUENCY ERROR (ppm) | LIMIT (ppm) |
|------------|-----------------------|-------------|
|            | GPRS                  |             |
| 50         | -0.035                | 2.5         |
| 40         | -0.029                | 2.5         |
| 30         | -0.023                | 2.5         |
| 20         | -0.017                | 2.5         |
| 10         | -0.029                | 2.5         |
| 0          | -0.037                | 2.5         |
| -10        | -0.045                | 2.5         |
| -20        | -0.054                | 2.5         |

## 4.3 OCCUPIED BANDWIDTH MEASUREMENT

### 4.3.1 TEST PROCEDURES

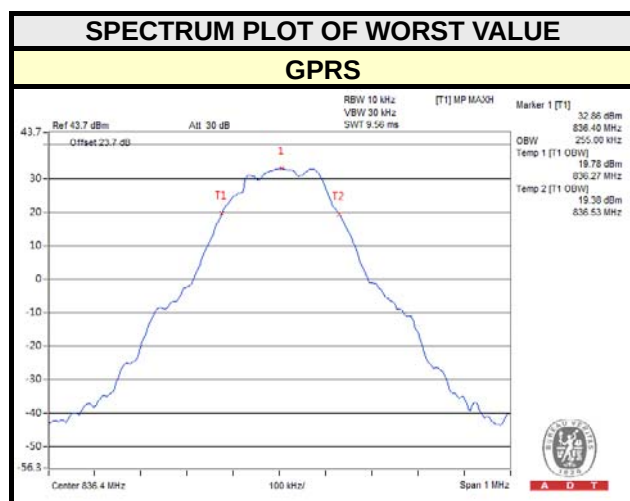
The EUT makes a call to the communication simulator. All measurements were done at low, middle and high operational frequency range. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

### 4.3.2 TEST SETUP



### 4.3.3 TEST RESULTS

| CHANNEL | FREQUENCY (MHz) | 99% OCCUPIED BANDWIDTH (kHz) |
|---------|-----------------|------------------------------|
|         |                 | GPRS                         |
| 128     | 824.2           | 250.00                       |
| 189     | 836.4           | 255.00                       |
| 251     | 848.8           | 255.00                       |

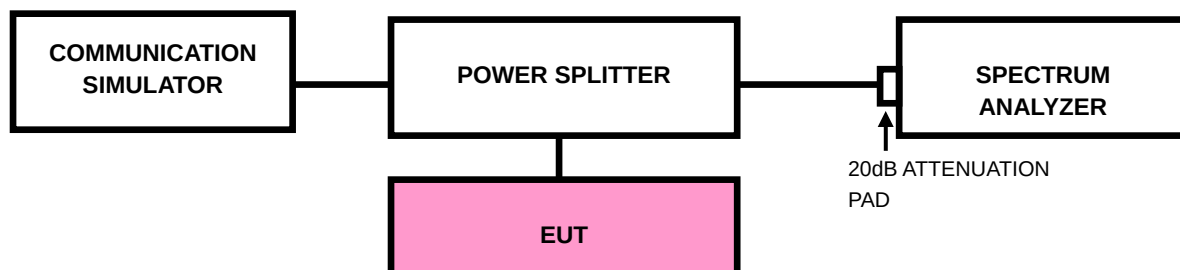


## 4.4 BAND EDGE MEASUREMENT

### 4.4.1 LIMITS OF BAND EDGE MEASUREMENT

Power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

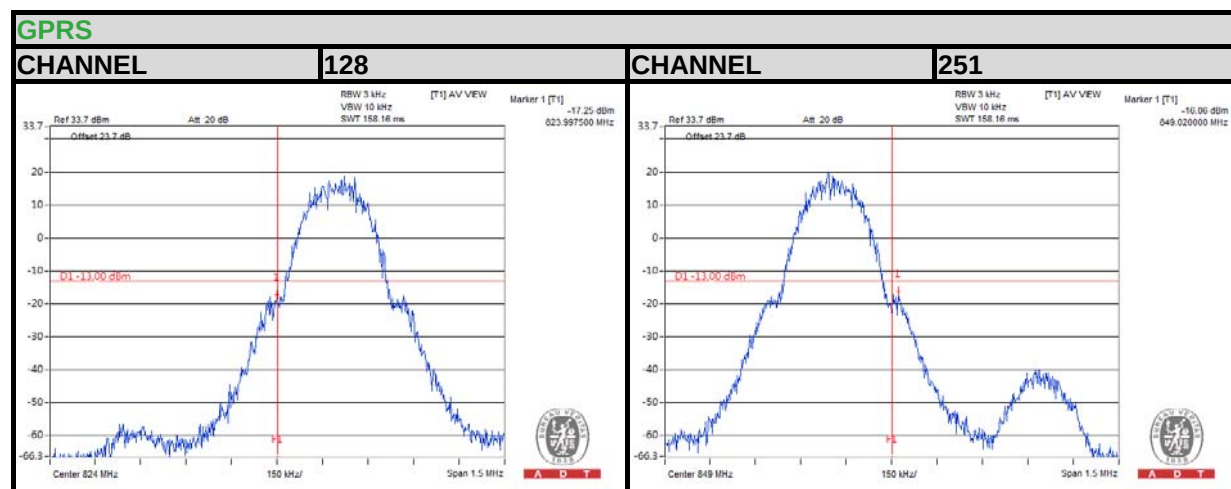
### 4.4.2 TEST SETUP



### 4.4.3 TEST PROCEDURES

- All measurements were done at low and high operational frequency range.
- The center frequency of spectrum is the band edge frequency and span is 1.5MHz. RB of the spectrum is 3kHz and VB of the spectrum is 10kHz (GPRS).
- Record the max trace plot into the test report.

## 4.4.4 TEST RESULTS



## 4.5 CONDUCTED SPURIOUS EMISSIONS

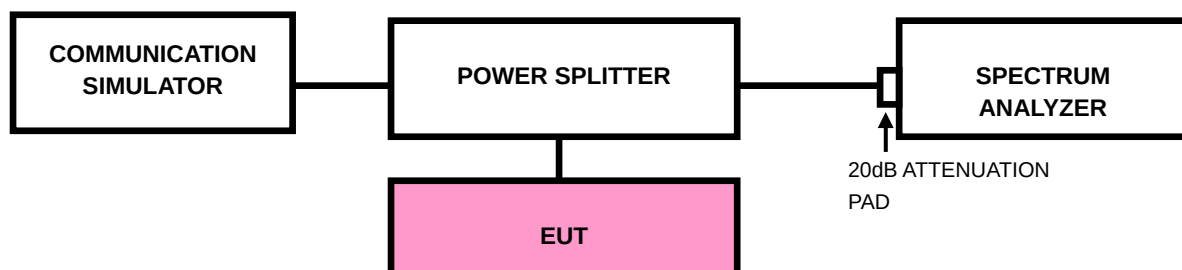
### 4.5.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

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. The emission limit equal to  $-13\text{dBm}$ .

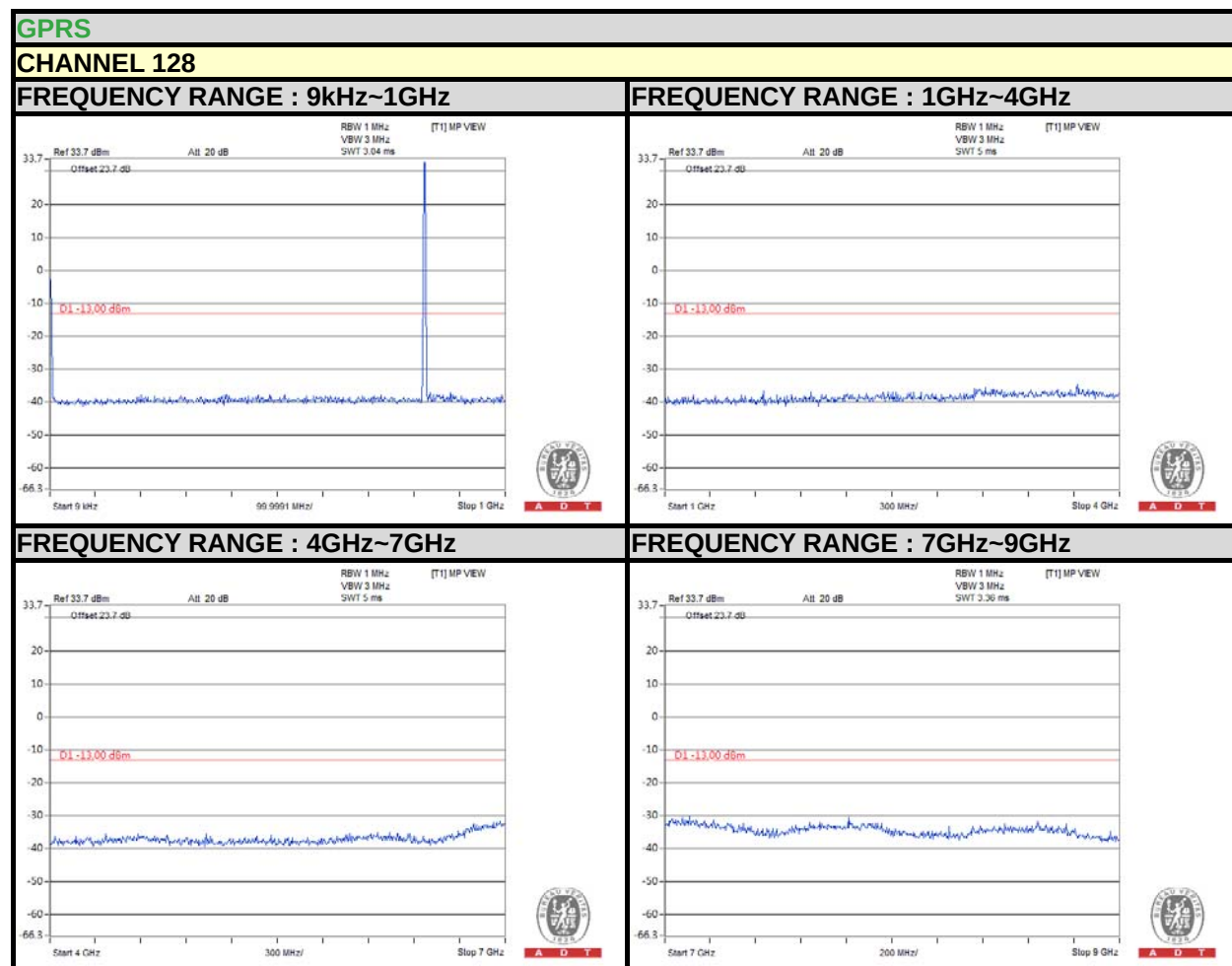
### 4.5.2 TEST PROCEDURE

- The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
- Measuring frequency range is from 9 kHz to 9GHz. 20dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz is used for conducted emission measurement.

### 4.5.3 TEST SETUP



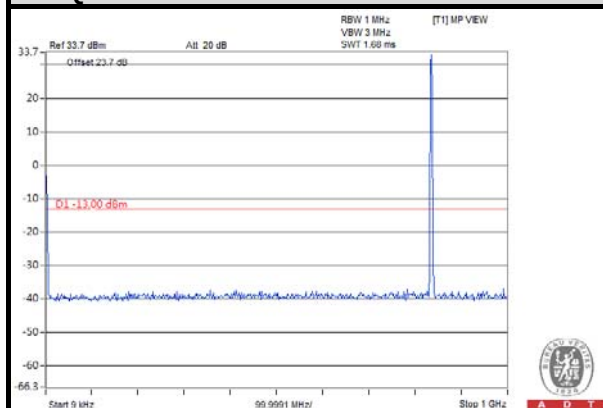
## 4.5.4 TEST RESULTS



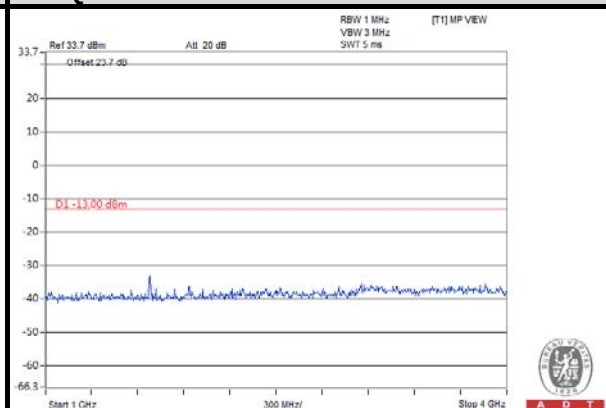
**GPRS**

**CHANNEL 189**

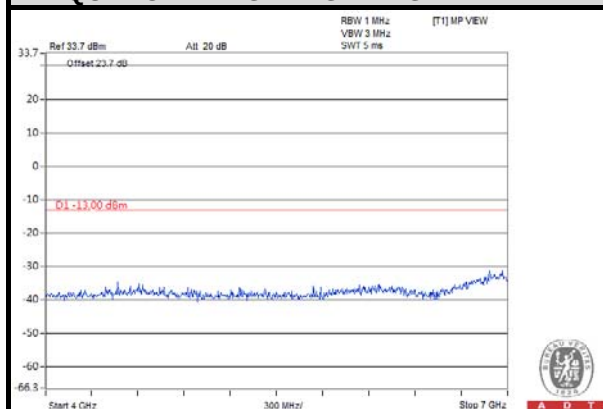
**FREQUENCY RANGE : 9kHz~1GHz**



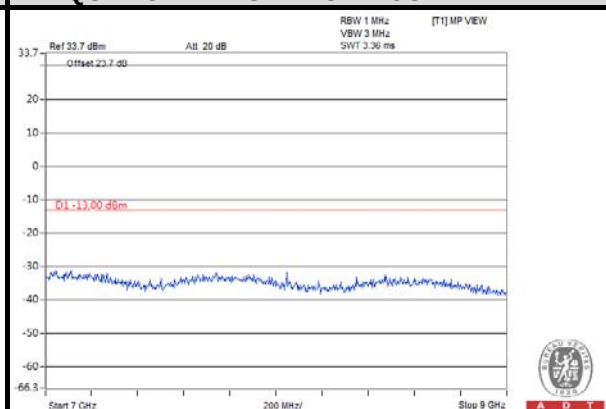
**FREQUENCY RANGE : 1GHz~4GHz**



**FREQUENCY RANGE : 4GHz~7GHz**



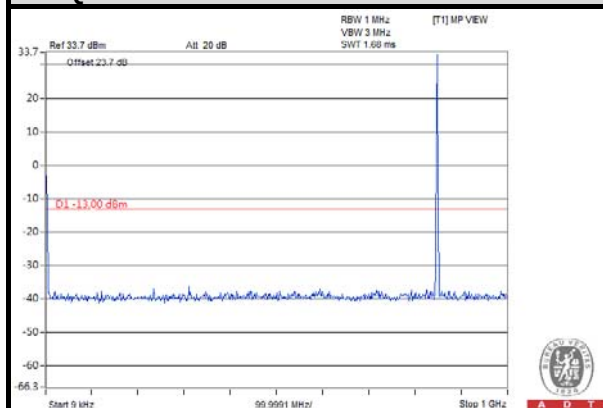
**FREQUENCY RANGE : 7GHz~9GHz**



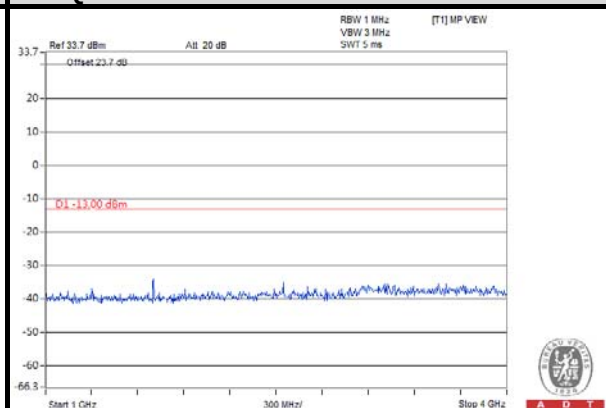
# GPRS

## CHANNEL 251

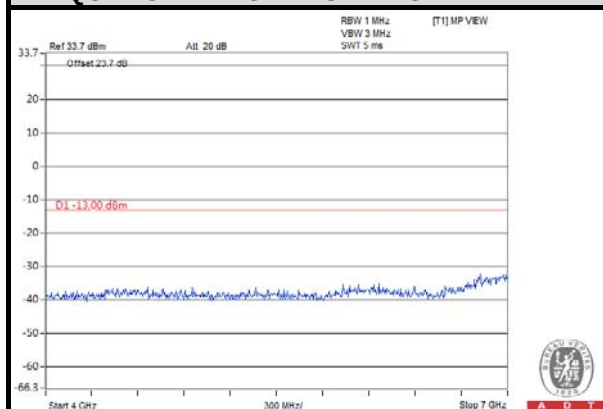
### FREQUENCY RANGE : 9kHz~1GHz



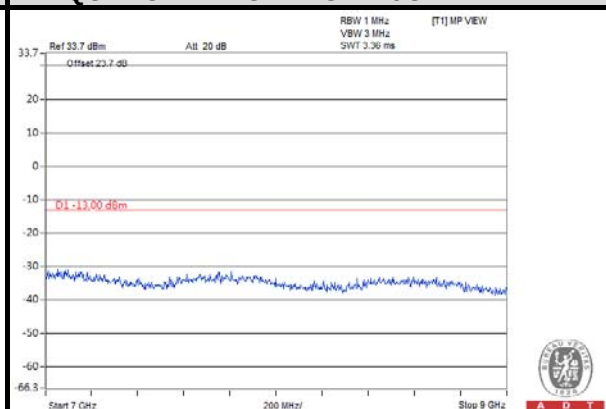
### FREQUENCY RANGE : 1GHz~4GHz



### FREQUENCY RANGE : 4GHz~7GHz



### FREQUENCY RANGE : 7GHz~9GHz



## 4.6 RADIATED EMISSION MEASUREMENT

### 4.6.1 LIMITS OF RADIATED EMISSION MEASUREMENT

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. The emission limit equal to  $-13\text{dBm}$ .

### 4.6.2 TEST PROCEDURES

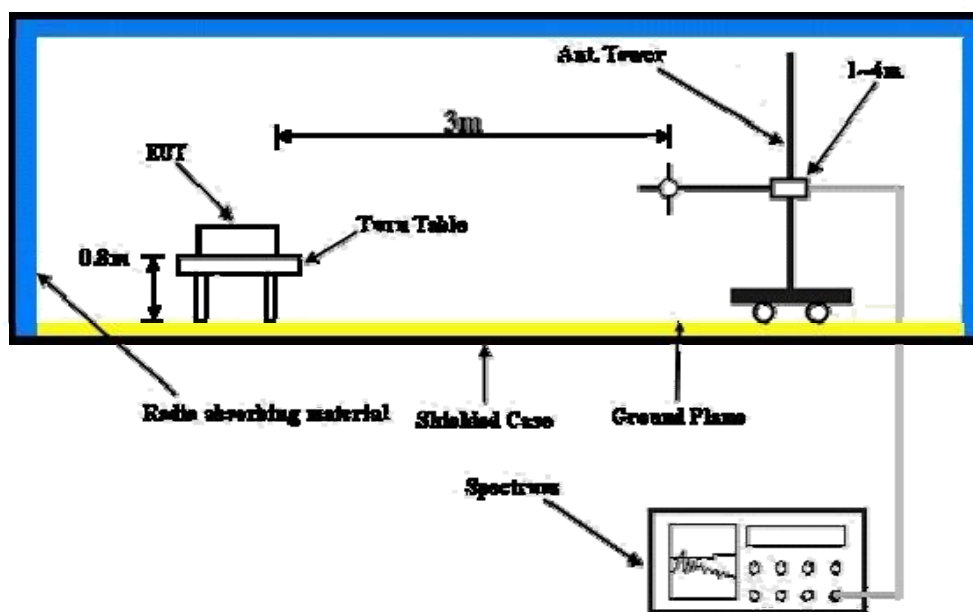
- a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.
- b. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to “Read Value “ of step a. Record the power level of S.G
- c.  $\text{EIRP} = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}$ .
- d. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole,  
 $\text{E.R.P power} = \text{E.I.P.R power} - 2.15\text{dBi}$ .

**NOTE:** The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

### 4.6.3 DEVIATION FROM TEST STANDARD

No deviation.

#### 4.6.4 TEST SETUP



For the actual test configuration, please refer to the attached file (Test Setup Photo).

## 4.6.5 TEST RESULTS

### BELOW 1GHz

#### GPRS

|                          |                 |                 |               |
|--------------------------|-----------------|-----------------|---------------|
| MODE                     | TX channel 128  | FREQUENCY RANGE | Below 1000MHz |
| ENVIRONMENTAL CONDITIONS | 24deg. C, 64%RH | INPUT POWER     | 120Vac, 60Hz  |
| TESTED BY                | Alan Wu         |                 |               |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |             |               |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|---------------|-----------------------|------------------------|-----------|-------------|-------------|
| No.                                                 | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 33.89       | -64.40        | -50.40                | -12.10                 | -62.50    | -13.00      | -49.50      |
| 2                                                   | 72.77       | -56.00        | -61.20                | -4.10                  | -65.30    | -13.00      | -52.30      |
| 3                                                   | 162.18      | -51.80        | -58.60                | 0.70                   | -57.90    | -13.00      | -44.90      |
| 4                                                   | 201.06      | -59.80        | -73.10                | 5.50                   | -67.60    | -13.00      | -54.60      |
| 5                                                   | 339.08      | -65.10        | -75.10                | 5.20                   | -69.90    | -13.00      | -56.90      |
| 6                                                   | 725.91      | -67.10        | -69.60                | 4.90                   | -64.70    | -13.00      | -51.70      |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M   |             |               |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 33.89       | -51.50        | -48.30                | -12.10                 | -60.40    | -13.00      | -47.40      |
| 2                                                   | 82.48       | -54.80        | -60.20                | -0.70                  | -60.90    | -13.00      | -47.90      |
| 3                                                   | 162.18      | -60.50        | -61.60                | 0.70                   | -60.90    | -13.00      | -47.90      |
| 4                                                   | 203.01      | -58.60        | -68.70                | 5.50                   | -63.20    | -13.00      | -50.20      |
| 5                                                   | 309.92      | -64.40        | -72.70                | 5.10                   | -67.60    | -13.00      | -54.60      |
| 6                                                   | 411.00      | -66.90        | -73.10                | 5.20                   | -67.90    | -13.00      | -54.90      |

#### REMARKS:

1.  $ERP(dBm) = S.G \text{ Power Value (dBm)} + \text{Correction Factor (dB)}$ .
2.  $\text{Correction Factor} = \text{gain of substitution antenna} + \text{cable loss}$



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ABOVE 1GHz

GPRS

|                          |                 |                 |               |
|--------------------------|-----------------|-----------------|---------------|
| MODE                     | TX channel 128  | FREQUENCY RANGE | Above 1000MHz |
| ENVIRONMENTAL CONDITIONS | 25deg. C, 69%RH | INPUT POWER     | 120Vac, 60Hz  |
| TESTED BY                | Alan Wu         |                 |               |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |             |               |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|---------------|-----------------------|------------------------|-----------|-------------|-------------|
| No.                                                 | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 1648.40     | -30.75        | -33.48                | 5.48                   | -28.00    | -13.00      | -15.00      |
| 2                                                   | 2472.60     | -44.68        | -44.64                | 6.43                   | -38.21    | -13.00      | -25.21      |
| 3                                                   | 3296.80     | -52.60        | -50.99                | 6.87                   | -44.12    | -13.00      | -31.12      |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M   |             |               |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 1648.40     | -33.91        | -38.58                | 5.48                   | -33.10    | -13.00      | -20.10      |
| 2                                                   | 2472.60     | -48.66        | -48.46                | 6.43                   | -42.03    | -13.00      | -29.03      |
| 3                                                   | 3296.80     | -53.61        | -52.40                | 6.87                   | -45.53    | -13.00      | -32.53      |

**REMARKS:**

1.  $ERP(dBm) = S.G \text{ Power Value (dBm)} + \text{Correction Factor (dB)}$ .
2. Correction Factor = gain of substitution antenna + cable loss



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|                          |                 |                 |               |
|--------------------------|-----------------|-----------------|---------------|
| MODE                     | TX channel 189  | FREQUENCY RANGE | Above 1000MHz |
| ENVIRONMENTAL CONDITIONS | 25deg. C, 69%RH | INPUT POWER     | 120Vac, 60Hz  |
| TESTED BY                | Alan Wu         |                 |               |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |             |               |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|---------------|-----------------------|------------------------|-----------|-------------|-------------|
| No.                                                 | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 1672.80     | -31.12        | -33.95                | 5.54                   | -28.41    | -13.00      | -15.41      |
| 2                                                   | 2509.20     | -44.88        | -44.68                | 6.45                   | -38.23    | -13.00      | -25.23      |
| 3                                                   | 3345.60     | -52.54        | -51.02                | 6.94                   | -44.08    | -13.00      | -31.08      |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M   |             |               |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 1672.80     | -34.16        | -38.79                | 5.54                   | -33.25    | -13.00      | -20.25      |
| 2                                                   | 2509.20     | -48.73        | -48.50                | 6.45                   | -42.05    | -13.00      | -29.05      |
| 3                                                   | 3345.60     | -53.69        | -52.42                | 6.94                   | -45.48    | -13.00      | -32.48      |

**REMARKS:**

1.  $ERP(dBm) = S.G \text{ Power Value (dBm)} + \text{Correction Factor (dB)}$ .
2. Correction Factor = gain of substitution antenna + cable loss



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|                          |                 |                 |               |
|--------------------------|-----------------|-----------------|---------------|
| MODE                     | TX channel 251  | FREQUENCY RANGE | Above 1000MHz |
| ENVIRONMENTAL CONDITIONS | 25deg. C, 69%RH | INPUT POWER     | 120Vac, 60Hz  |
| TESTED BY                | Alan Wu         |                 |               |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |             |               |                       |                        |           |             |             |
|-----------------------------------------------------|-------------|---------------|-----------------------|------------------------|-----------|-------------|-------------|
| No.                                                 | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 1697.60     | -31.23        | -34.16                | 5.59                   | -28.57    | -13.00      | -15.57      |
| 2                                                   | 2546.40     | -45.15        | -44.69                | 6.44                   | -38.25    | -13.00      | -25.25      |
| 3                                                   | 3395.20     | -52.37        | -50.94                | 7.02                   | -43.92    | -13.00      | -30.92      |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M   |             |               |                       |                        |           |             |             |
| No.                                                 | Freq. (MHz) | Reading (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 1                                                   | 1697.60     | -34.32        | -38.91                | 5.59                   | -33.32    | -13.00      | -20.32      |
| 2                                                   | 2546.40     | -48.66        | -48.51                | 6.44                   | -42.07    | -13.00      | -29.07      |
| 3                                                   | 3395.20     | -53.55        | -52.23                | 7.02                   | -45.21    | -13.00      | -32.21      |

**REMARKS:**

1.  $ERP(dBm) = S.G \text{ Power Value (dBm)} + \text{Correction Factor (dB)}$ .
2.  $\text{Correction Factor} = \text{gain of substitution antenna} + \text{cable loss}$



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## 5 PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).

## 6 INFORMATION ON THE TESTING LABORATORIES

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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The address and road map of all our labs can be found in our web site also.



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## **7 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB**

No any modifications are made to the EUT by the lab during the test.

**---END---**