



# FCC TEST REPORT

## (PART 24)

**REPORT NO.:** RF960822L02-2  
**MODEL NO.:** Pegaso P40-2001  
**RECEIVED:** Aug. 22, 2007  
**TESTED:** Aug. 22 ~ Sep. 12, 2007  
**ISSUED:** Sep. 19, 2007

**APPLICANT:** Datalogic Mobile Inc.  
**ADDRESS:** 1505 Westec Dr. Eugene, Oregon 97402 USA

**ISSUED BY:** Advance Data Technology Corporation  
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**TEST LOCATION:** No. 19, Hwa Ya 2<sup>nd</sup> Rd., Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.

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## 1 CERTIFICATION

**PRODUCT:** Portable Data Terminal

**MODEL:** Pegaso P40-2001

**BRAND:** Datalogic

**APPLICANT:** Datalogic Mobile Inc.

**TESTED:** Aug. 22 ~ Sep. 12, 2007

**TEST SAMPLE:** ENGINEERING SAMPLE

**TEST STANDARDS : FCC Part 24, Subpart E**

ANSI C63.4-2003

The above equipment (model: Pegaso P40-2001) has been tested by **Advance Data Technology Corporation**, 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** : Rennie Wang, DATE: Sep. 19, 2007  
Rennie Wang / Senior Specialist

**TECHNICAL  
ACCEPTANCE** : Long Chen, DATE: Sep. 19, 2007  
Responsible for RF Long Chen / Senior Engineer

**APPROVED BY** : Gary Chang, DATE: Sep. 19, 2007  
Gary Chang / Assistant Manager



## 2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

| APPLIED STANDARD: FCC Part 24 & Part 2 / IC RSS-133 |  |        |   |
|---|--|--------|---|
| STANDARD SECTION                                    | TEST TYPE AND LIMIT  | RESULT | REMARK  |
| 2.1046<br>24.232                                    | Maximum Peak Output Power<br>Limit: max. 2 watts e.i.r.p peak power  | PASS   | Meet the requirement of limit.<br>Minimum passing margin is 32.46dBm at 1909.80MHz.   |
| 2.1055<br>24.235                                    | Frequency Stability<br>AFC Freq. Error vs. Voltage<br>AFC Freq. Error vs. Temperature<br>Limit: max. $\pm 2.5$ ppm | PASS   | Meet the requirement of limit.  |
| 2.1049<br>24.238(b)                                 | Occupied Bandwidth   | PASS   | Meet the requirement of limit.  |
| 24.238(b)   | Band Edge Measurements   | PASS   | Meet the requirement of limit.  |
| 2.1051<br>24.238                                    | Conducted Spurious Emissions   | PASS   | Meet the requirement of limit.  |
| 2.1053<br>24.238                                    | Radiated Spurious Emissions  | PASS   | Meet the requirement of limit.<br>Minimum passing margin is $-45.29$ dB at 117.39MHz. |



## 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 | 9kHz ~ 30MHz     | 2.44dB      |
| Radiated emissions  | 30MHz ~ 200MHz   | 3.34dB      |
|                     | 200MHz ~ 1000MHz | 3.35dB      |
|                     | 1GHz ~ 18GHz     | 2.26dB      |
|                     | 18GHz ~ 40GHz    | 1.94dB      |

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



### 3 GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

|   |   |
|---|---|
| <b>PRODUCT</b>                          | Portable Data Terminal  |
| <b>MODEL NO.</b>                        | Pegaso P40-2001   |
| <b>FCC ID</b>                           | U4SPD   |
| <b>POWER SUPPLY</b>                     | 3.7Vdc from rechargeable lithium battery<br>5.0Vdc from power adapter |
| <b>MODULATION TYPE</b>                  | GMSK / 8PSK   |
| <b>FREQUENCY RANGE</b>                  | 1850MHz ~ 1909MHz   |
| <b>NUMBER OF CHANNEL</b>                | 299   |
| <b>MAX. CONDUCTED PEAK OUTPUT POWER</b> | 29.40dBm (0.871W)   |
| <b>MAX. EIRP POWER</b>                  | 32.46dBm (1.762W)   |
| <b>EMISSION DESIGNATOR</b>              | GSM: 314KGXW<br>GPRS: 320KG7W<br>E-GPRS: 316KG7W                      |
| <b>ANTENNA TYPE</b>                     | Monopole antenna with 2.8dBi gain                                     |
| <b>DATA CABLE</b>                       | 1.5m shielded USB cable with charger port without core                |
| <b>I/O PORTS</b>                        | Refer to user's manual  |
| <b>ASSOCIATED DEVICES</b>               | Adapter, lithium battery x2   |
| <b>EUT EXTREME VOL. RANGE</b>           | 3.65Vdc to 4.2Vdc   |

#### NOTE:

1. The EUT is a Portable Data Terminal with wireless LAN, Bluetooth and mobile phone functions. This report is only covered the mobile phone function of PCS1900. For GSM850 mobile phone function is covered in another test report, which standard used is FCC Part 22. The wireless LAN and Bluetooth functions are covered in another test reports, which standard used is FCC Part 15. (Report no.: RF960822L02-1 & RF960822L02-3).
2. The communicated functions of EUT listed as below:

|      |      | GSM850MHz | PCS1900MHz | With<br>802.11b/g &<br>bluetooth |
|------|------|-----------|------------|----------------------------------|
| 2G   | GPRS | √         | √          |                                  |
| EDGE | √    | √         |            |                                  |



3. The EUT have two lithium batteries listed as below:

| BATTERY 1:                     | BATTERY 2:                     |
|--------------------------------|--------------------------------|
| <b>BRAND:</b> ETI              | <b>BRAND:</b> ETI              |
| <b>MODEL:</b> 4006-0337        | <b>MODEL:</b> 4006-0338        |
| <b>RATING:</b> 3.7Vdc, 3300mAh | <b>RATING:</b> 3.7Vdc, 2200mAh |

\*\* After pre-tested both batteries, found battery 1 was the worse, therefore all the test results came out from this.

4. The EUT was operated with following power adapter:

|                    |                                       |
|--------------------|---------------------------------------|
| <b>BRAND:</b>      | PHIHONG                               |
| <b>MODEL:</b>      | PSA15R-050P                           |
| <b>INPUT:</b>      | 100-240Vac, 50-60Hz, 0.5A             |
| <b>OUTPUT:</b>     | 5.0Vdc, 3.0A                          |
| <b>POWER LINE:</b> | 1.8m non-shielded cable with one core |

5. The EUT operates in the 2.4GHz frequency spectrum and complies with 802.11b & 802.11g techniques.

6. Bluetooth technology is used in this EUT.

7. Hardware version: B2.11

8. Software version: B2.11

9. IMEI code: 355634\*\*\*\*\*

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



### 3.2 DESCRIPTION OF TEST MODES

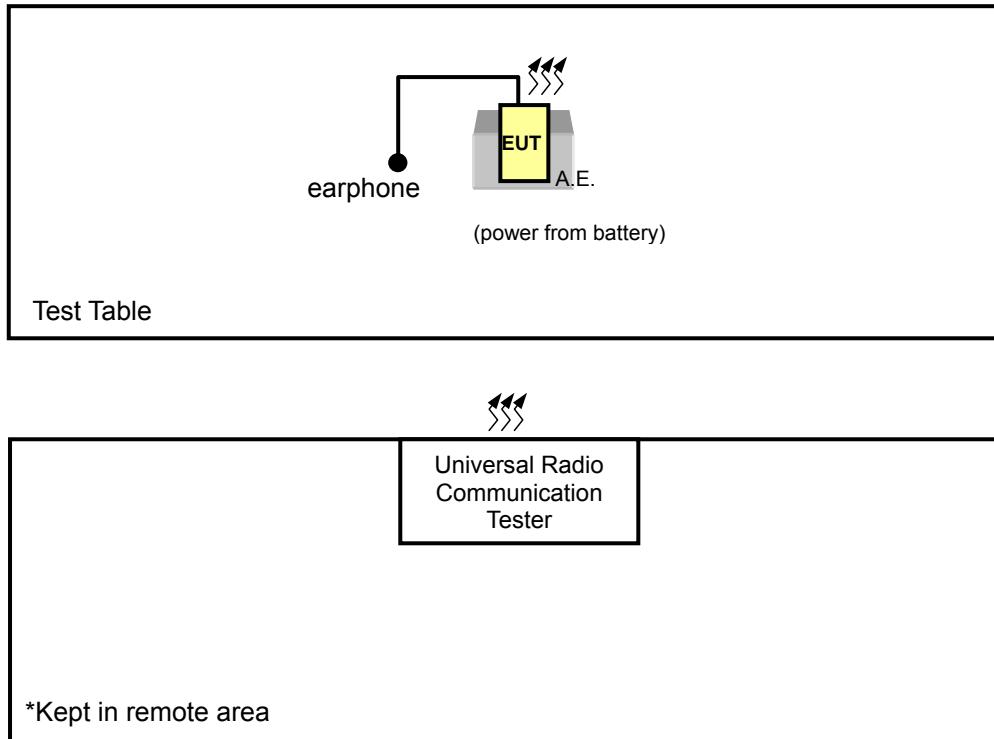
299 channels are provided to this EUT in the PCS1900 band. Therefore, the low, middle and high channels are chosen for testing.

|        | CHANNEL | FREQUENCY | TX MODE           |
|--------|---------|-----------|-------------------|
| LOW    | 512     | 1850.2MHz | GSM, GPRS, E-GPRS |
| MIDDLE | 661     | 1880.0MHz | GSM, GPRS, E-GPRS |
| HIGH   | 810     | 1909.8MHz | GSM, GPRS, E-GPRS |

**NOTE:**

1. Below 1 GHz, the channel 512, 661, and 810 were pre-tested in chamber. The channel 512 was chosen for final test.
2. Above 1 GHz, the channel 512, 661, and 810 were tested individually.
3. When the Power Control Level set 0, the worst case, was chosen for final test.
4. The channel space is 0.2MHz.
5. Since the EUT is considered a portable unit, it was pre-tested on the positioned of each 3 axis. The worst case was found when positioned on Z-plane. Therefore only the test data of this Z-plane was used for radiated emission measurement test.
6. The EUT is a GPRS class 12 device, which provide 4 up-link. The up-link with 1 time slot has been chosen for the worst case to do the final output power, occupied bandwidth, band edge test and recorded.
7. The EUT is an E-GPRS class 12 device, which provide 4 up-link. The up-link with 1 time slot has been chosen for the worst case to do the final output power, occupied bandwidth, band edge test and recorded.
8. For frequency stability and spurious emissions tests, GSM mode has been chosen for the worst case to do the final test and record.

### 3.2.1 CONFIGURATION OF SYSTEM UNDER TEST





### 3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

| EUT<br>CONFIGURE<br>MODE | APPLICABLE TO |    |    |    |    |       |       | DESCRIPTION |
|--------------------------|---------------|----|----|----|----|-------|-------|-------------|
|                          | OP            | FS | OB | BE | CE | RE<1G | RE≥1G |             |
| -                        | √             | √  | √  | √  | √  | √     | √     | -           |

Where **OP**: Output power

**FS**: Frequency stability

**OB**: Occupied bandwidth

**BE**: Band edge

**CE**: Conducted spurious emissions

**RE<1G**: Radiated emission below 1GHz

**RE≥1G**: Radiated emission above 1GHz

#### OUTPUT POWER MEASUREMENT:

- 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 (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

| EUT<br>CONFIGURE<br>MODE | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION<br>TECHNOLOGY | AXIS |
|--------------------------|-------------------|----------------|--------------------------|------|
| -                        | 512 to 810        | 512, 661, 810  | GSM, GPRS, E-GPRS        | Z    |

#### FREQUENCY STABILITY MEASUREMENT:

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

| EUT<br>CONFIGURE<br>MODE | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY |
|--------------------------|-------------------|----------------|-----------------------|
| -                        | 512 to 810        | 661            | GSM                   |



#### **OCCUPIED BANDWIDTH MEASUREMENT:**

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

| EUT<br>CONFIGURE<br>MODE | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY |
|--------------------------|-------------------|----------------|-----------------------|
| -                        | 512 to 810        | 512, 661, 810  | GSM, GPRS, E-GPRS     |

#### **BAND EDGE MEASUREMENT:**

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

| EUT<br>CONFIGURE<br>MODE | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY |
|--------------------------|-------------------|----------------|-----------------------|
| -                        | 512 to 810        | 512, 810       | GSM, GPRS, E-GPRS     |

#### **CONDUCTED SPURIOUS EMISSIONS MEASUREMENT:**

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

| EUT<br>CONFIGURE<br>MODE | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY |
|--------------------------|-------------------|----------------|-----------------------|
| -                        | 512 to 810        | 512, 661, 810  | GSM                   |



#### **RADIATED EMISSION MEASUREMENT (BELOW 1 GHz):**

- 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 (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

| EUT<br>CONFIGURE<br>MODE | AVAILABLE<br>CHANNEL | TESTED CHANNEL | MODULATION<br>TECHNOLOGY | AXIS |
|--------------------------|----------------------|----------------|--------------------------|------|
| -                        | 512 to 810           | 512            | GSM                      | Z    |

#### **RADIATED EMISSION MEASUREMENT (ABOVE 1 GHz):**

- 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 (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

| EUT<br>CONFIGURE<br>MODE | AVAILABLE<br>CHANNEL | TESTED CHANNEL | MODULATION<br>TECHNOLOGY | AXIS |
|--------------------------|----------------------|----------------|--------------------------|------|
| -                        | 512 to 810           | 512, 661, 810  | GSM                      | Z    |



### 3.3 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 24**

**IC RSS-133**

**ANSI C63.4-2003**

**ANSI/TIA/EIA-603-A**

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

### 3.4 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. | CAL. DATE     |
|-----|--------------------------------------|---------|-----------|------------|---------------|
| 1   | UNIVERSAL RADIO COMMUNICATION TESTER | R&S     | CMU200    | 101095     | Apr. 11, 2008 |
| 2   | EARPHONE                             | PHILIPS | SBC HL125 | NA         | NA            |

| NO. | SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS |
|-----|---|
| 1   | NA  |
| 2   | 1.8m non-shielded cable                             |

**NOTE:** All power cords of the above support units are non shielded (1.8m).



## 4 TEST TYPES AND RESULTS

### 4.1 OUTPUT POWER MEASUREMENT

#### 4.1.1 LIMITS OF OUTPUT POWER MEASUREMENT

The radiated peak output power shall be according to the specific rule Part 24.232(b) that “Mobile / Portable station are limited to 2 watts e.i.r.p” and 24.232(c) specific that “Peak transmit power must be measure over any interval of continuous transmission using instrumentation calibration in terms of rms-equivalent voltage.”



#### 4.1.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER              | MODEL NO.         | SERIAL NO.  | CALIBRATED UNTIL |
|---|-------------------|-------------|------------------|
| Test Receiver<br>ROHDE & SCHWARZ        | ESCI              | 100424      | Jul. 27, 2008    |
| Spectrum Analyzer<br>ROHDE & SCHWARZ    | FSP40             | 100025      | Oct. 05, 2007    |
| BILOG Antenna<br>SCHWARZBECK            | VULB9168          | 9168-160    | May 31, 2008     |
| HORN Antenna<br>SCHWARZBECK             | 9120D             | 9120D-209   | Jun. 28, 2008    |
| HORN Antenna<br>SCHWARZBECK             | BBHA 9170         | BBHA9170243 | Dec. 28, 2007    |
| Preamplifier<br>Agilent                 | 8447D             | 2944A10633  | Oct. 26, 2007    |
| Preamplifier<br>Agilent                 | 8449B             | 3008A01964  | Oct. 26, 2007    |
| RF signal cable<br>HUBER+SUHNNER        | SUCOFLEX 104      | 238137/4    | Dec. 11, 2007    |
| RF signal cable<br>HUBER+SUHNNER        | SUCOFLEX 104      | 233233/4    | Nov. 14, 2007    |
| Software<br>ADT.                        | ADT_Radiated_V7.6 | NA          | NA               |
| Antenna Tower<br>inn-co GmbH            | MA 4000           | 013303      | NA               |
| Antenna Tower Controller<br>inn-co GmbH | CO2000            | 017303      | NA               |
| Turn Table<br>ADT.                      | TT100.            | TT93021703  | NA               |
| Turn Table Controller<br>ADT.           | SC100.            | SC93021703  | NA               |

**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 test was performed in HwaYa Chamber 3.
3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The VCCI Site Registration No. is R-237.
5. The IC Site Registration No. is IC3789B-3.

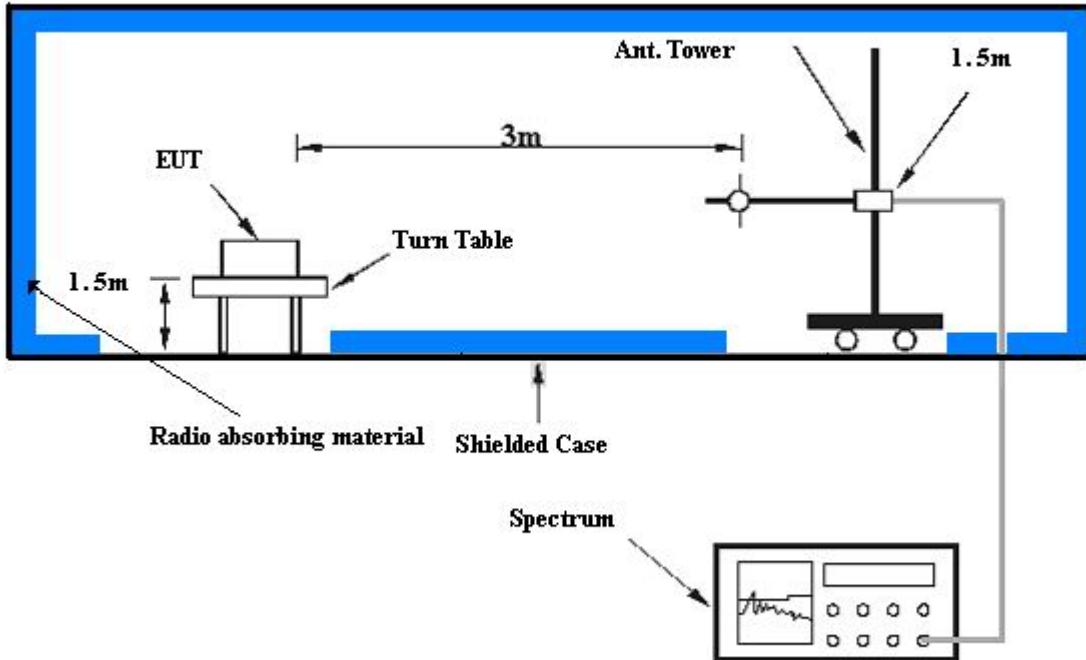


#### 4.1.3 TEST PROCEDURES

- a. The EUT was set up for the maximum peak power with GSM link data modulation. The power was measured with R&S Spectrum Analyzer. All measurements were done at 3 channels: 512, 661 and 810 (low, middle and high operational frequency range).
- b. The conducted peak output power used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer. The path loss included the splitter loss, cable loss and 20dB pad loss. The spectrum set RB=1MHz / VB=3MHz, then read peak power value and record to the test. (All transmitted path loss shall be considered in the test report data.)
- c. E.I.R.P peak power measurement. In the fully anechoic chamber, EUT placed on the 1.5m 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 to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.
- d. The substitution horn antenna is substituted for EUT at the same position and signal generator export the CW signal to the calibration antenna. Rotated the Turn Table to find the maximum radiation power. “Raw” is the spectrum reading value, “SG” is signal generator export power, “TX Gain” is calibration antenna isotropic gain value, “TX cable” is the transmitted cable loss between the calibration antenna and signal generator. The “Factor” means that the transmission path loss is equal to “SG” - “TX cable” + “TX Gain” – “Raw”.
- e. Actually the real E.I.R.P peak power is equal to “Read Value” + “Factor”.

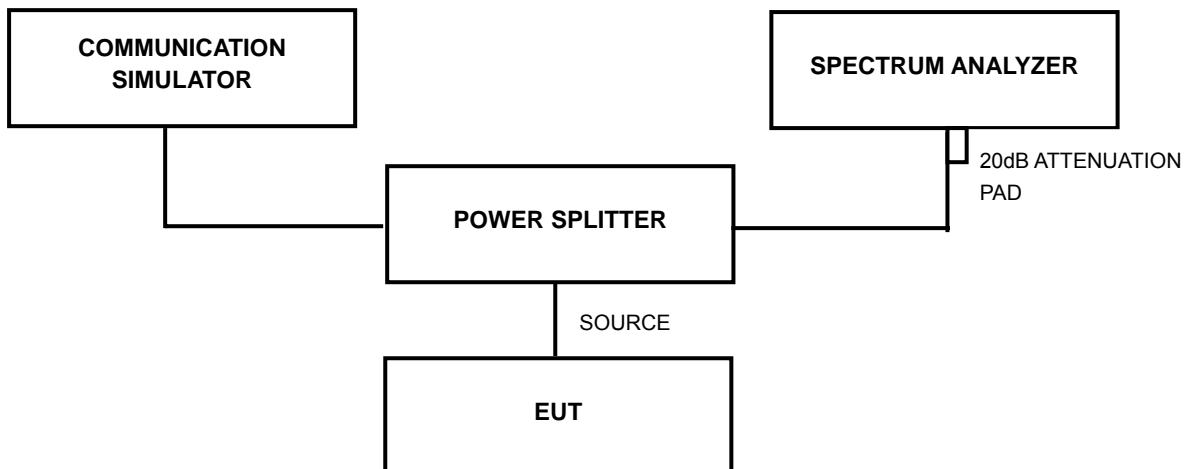
#### 4.1.4 TEST SETUP

##### EIRP POWER MEASUREMENT:



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

##### CONDUCTED POWER MEASUREMENT:



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.



#### 4.1.5 EUT OPERATING CONDITIONS

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



#### 4.1.6 TEST RESULTS

|                      |              |                          |                         |
|----------------------|--------------|--------------------------|-------------------------|
| MODE                 | TX connected | DETECTOR FUNCTION        | Average                 |
| INPUT POWER (SYSTEM) | 120Vac, 60Hz | ENVIRONMENTAL CONDITIONS | 25deg. C, 65%RH, 983hPa |
| TESTED BY            | Brad Wu      |                          |                         |

##### FOR GSM MODE

| CONDUCTED PEAK OUTPUT POWER |                 |                 |                        |                   |              |
|-----------------------------|-----------------|-----------------|------------------------|-------------------|--------------|
| CHANNEL NO.                 | FREQUENCY (MHz) | RAW VALUE (dBm) | CORRECTION FACTOR (dB) | PEAK OUTPUT POWER |              |
|                             |                 |                 |                        | dBm               | Watt         |
| 512                         | 1850.2          | 24.40           | 4.80                   | 29.20             | 0.832        |
| <b>661</b>                  | <b>1880.0</b>   | <b>24.60</b>    | <b>4.80</b>            | <b>29.40</b>      | <b>0.871</b> |
| 810                         | 1909.8          | 24.40           | 4.80                   | 29.20             | 0.832        |

**REMARKS:**

1. Peak Output Power (dBm) = Raw Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Power Splitter Loss (dB) + Cable Loss (dB).
3. The value in bold is the worst.



**FOR GPRS MODE (UP-LINK WITH 1 TIME SLOT)**

| CONDUCTED PEAK OUTPUT POWER |                 |                 |                        |                   |       |
|-----------------------------|-----------------|-----------------|------------------------|-------------------|-------|
| CHANNEL NO.                 | FREQUENCY (MHz) | RAW VALUE (dBm) | CORRECTION FACTOR (dB) | PEAK OUTPUT POWER |       |
|                             |                 |                 |                        | dBm               | Watt  |
| 512                         | 1850.2          | 24.40           | 4.80                   | 29.20             | 0.832 |
| 661                         | 1880.0          | 24.50           | 4.80                   | 29.30             | 0.851 |
| 810                         | 1909.8          | 24.40           | 4.80                   | 29.20             | 0.832 |

**FOR GPRS MODE (UP-LINK WITH 2 TIME SLOT)**

| CONDUCTED PEAK OUTPUT POWER |                 |                 |                        |                   |       |
|-----------------------------|-----------------|-----------------|------------------------|-------------------|-------|
| CHANNEL NO.                 | FREQUENCY (MHz) | RAW VALUE (dBm) | CORRECTION FACTOR (dB) | PEAK OUTPUT POWER |       |
|                             |                 |                 |                        | dBm               | Watt  |
| 512                         | 1850.2          | 22.80           | 4.50                   | 27.30             | 0.537 |
| 661                         | 1880.0          | 22.90           | 4.50                   | 27.40             | 0.550 |
| 810                         | 1909.8          | 22.80           | 4.50                   | 27.30             | 0.537 |

**FOR GPRS MODE (UP-LINK WITH 3 TIME SLOT)**

| CONDUCTED PEAK OUTPUT POWER |                 |                 |                        |                   |       |
|-----------------------------|-----------------|-----------------|------------------------|-------------------|-------|
| CHANNEL NO.                 | FREQUENCY (MHz) | RAW VALUE (dBm) | CORRECTION FACTOR (dB) | PEAK OUTPUT POWER |       |
|                             |                 |                 |                        | dBm               | Watt  |
| 512                         | 1850.2          | 20.90           | 4.50                   | 25.40             | 0.347 |
| 661                         | 1880.0          | 21.00           | 4.50                   | 25.50             | 0.355 |
| 810                         | 1909.8          | 20.90           | 4.50                   | 25.40             | 0.347 |

**FOR GPRS MODE (UP-LINK WITH 4 TIME SLOT)**

| CONDUCTED PEAK OUTPUT POWER |                 |                 |                        |                   |       |
|-----------------------------|-----------------|-----------------|------------------------|-------------------|-------|
| CHANNEL NO.                 | FREQUENCY (MHz) | RAW VALUE (dBm) | CORRECTION FACTOR (dB) | PEAK OUTPUT POWER |       |
|                             |                 |                 |                        | dBm               | Watt  |
| 512                         | 1850.2          | 18.90           | 4.50                   | 23.40             | 0.219 |
| 661                         | 1880.0          | 19.00           | 4.50                   | 23.50             | 0.224 |
| 810                         | 1909.8          | 18.90           | 4.50                   | 23.40             | 0.219 |

**REMARKS:** 1. Peak Output Power (dBm) = Raw Value (dBm) + Correction Factor (dB).

2. Correction Factor (dB) = Power Splitter Loss (dB) + Cable Loss (dB).



**FOR E-GPRS MODE (UP-LINK WITH 1 TIME SLOT)**

| CONDUCTED PEAK OUTPUT POWER |                 |                 |                        |                   |       |
|-----------------------------|-----------------|-----------------|------------------------|-------------------|-------|
| CHANNEL NO.                 | FREQUENCY (MHz) | RAW VALUE (dBm) | CORRECTION FACTOR (dB) | PEAK OUTPUT POWER |       |
|                             |                 |                 |                        | dBm               | Watt  |
| 512                         | 1850.2          | 21.20           | 4.80                   | 26.00             | 0.398 |
| 661                         | 1880.0          | 19.90           | 4.80                   | 24.70             | 0.295 |
| 810                         | 1909.8          | 20.80           | 4.80                   | 25.60             | 0.363 |

**FOR E-GPRS MODE (UP-LINK WITH 2 TIME SLOT)**

| CONDUCTED PEAK OUTPUT POWER |                 |                 |                        |                   |       |
|-----------------------------|-----------------|-----------------|------------------------|-------------------|-------|
| CHANNEL NO.                 | FREQUENCY (MHz) | RAW VALUE (dBm) | CORRECTION FACTOR (dB) | PEAK OUTPUT POWER |       |
|                             |                 |                 |                        | dBm               | Watt  |
| 512                         | 1850.2          | 19.30           | 4.50                   | 23.80             | 0.240 |
| 661                         | 1880.0          | 19.20           | 4.50                   | 23.70             | 0.234 |
| 810                         | 1909.8          | 19.10           | 4.50                   | 23.60             | 0.229 |

**FOR E-GPRS MODE (UP-LINK WITH 3 TIME SLOT)**

| CONDUCTED PEAK OUTPUT POWER |                 |                 |                        |                   |       |
|-----------------------------|-----------------|-----------------|------------------------|-------------------|-------|
| CHANNEL NO.                 | FREQUENCY (MHz) | RAW VALUE (dBm) | CORRECTION FACTOR (dB) | PEAK OUTPUT POWER |       |
|                             |                 |                 |                        | dBm               | Watt  |
| 512                         | 1850.2          | 17.20           | 4.50                   | 21.70             | 0.148 |
| 661                         | 1880.0          | 17.20           | 4.50                   | 21.70             | 0.148 |
| 810                         | 1909.8          | 17.10           | 4.50                   | 21.60             | 0.145 |

**FOR E-GPRS MODE (UP-LINK WITH 4 TIME SLOT)**

| CONDUCTED PEAK OUTPUT POWER |                 |                 |                        |                   |       |
|-----------------------------|-----------------|-----------------|------------------------|-------------------|-------|
| CHANNEL NO.                 | FREQUENCY (MHz) | RAW VALUE (dBm) | CORRECTION FACTOR (dB) | PEAK OUTPUT POWER |       |
|                             |                 |                 |                        | dBm               | Watt  |
| 512                         | 1850.2          | 15.20           | 4.50                   | 19.70             | 0.093 |
| 661                         | 1880.0          | 15.20           | 4.50                   | 19.70             | 0.093 |
| 810                         | 1909.8          | 15.10           | 4.50                   | 19.60             | 0.091 |

**REMARKS:** 1. Peak Output Power (dBm) = Raw Value (dBm) + Correction Factor (dB).

2. Correction Factor (dB) = Power Splitter Loss (dB) + Cable Loss (dB).



|                      |              |                          |                         |
|----------------------|--------------|--------------------------|-------------------------|
| MODE                 | TX connected | DETECTOR FUNCTION        | Average                 |
| INPUT POWER (SYSTEM) | 120Vac, 60Hz | ENVIRONMENTAL CONDITIONS | 25deg. C, 65%RH, 983hPa |
| TESTED BY            | Brad Wu      |                          |                         |

#### FOR GSM MODE

| EIRP POWER  |                 |                 |                        |                   |              |
|-------------|-----------------|-----------------|------------------------|-------------------|--------------|
| CHANNEL NO. | FREQUENCY (MHz) | RAW VALUE (dBm) | CORRECTION FACTOR (dB) | PEAK OUTPUT POWER |              |
|             |                 |                 |                        | dBm               | Watt         |
| 512         | 1850.2          | -7.97           | 40.03                  | 32.06             | 1.607        |
| 661         | 1880.0          | -8.12           | 40.32                  | 32.20             | 1.660        |
| <b>810</b>  | <b>1909.8</b>   | <b>-8.16</b>    | <b>40.62</b>           | <b>32.46</b>      | <b>1.762</b> |

#### FOR GPRS MODE (UP-LINK WITH 1 TIME SLOT)

| EIRP POWER  |                 |                 |                        |                   |       |
|-------------|-----------------|-----------------|------------------------|-------------------|-------|
| CHANNEL NO. | FREQUENCY (MHz) | RAW VALUE (dBm) | CORRECTION FACTOR (dB) | PEAK OUTPUT POWER |       |
|             |                 |                 |                        | dBm               | Watt  |
| 512         | 1850.2          | -8.21           | 40.03                  | 31.82             | 1.521 |
| 661         | 1880.0          | -8.46           | 40.32                  | 31.86             | 1.535 |
| 810         | 1909.8          | -8.77           | 40.62                  | 31.85             | 1.531 |

#### FOR E-GPRS MODE (UP-LINK WITH 1 TIME SLOT)

| EIRP POWER  |                 |                 |                        |                   |       |
|-------------|-----------------|-----------------|------------------------|-------------------|-------|
| CHANNEL NO. | FREQUENCY (MHz) | RAW VALUE (dBm) | CORRECTION FACTOR (dB) | PEAK OUTPUT POWER |       |
|             |                 |                 |                        | dBm               | Watt  |
| 512         | 1850.2          | -11.04          | 40.03                  | 28.99             | 0.793 |
| 661         | 1880.0          | -11.56          | 40.32                  | 28.76             | 0.752 |
| 810         | 1909.8          | -12.20          | 40.62                  | 28.42             | 0.695 |

**REMARKS:**

1. Peak Output Power (dBm) = Raw Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Receiver Antenna Gain (dBi) + Cable Loss (dB) + Free Space Loss (dB).
3. The value in bold is the worst.



## 4.2 FREQUENCY STABILITY MEASUREMENT

### 4.2.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

According to the FCC part 2.4235 shall be tested the frequency stability. The rule is defined that "The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block." The frequency error rate is according to the JTC standard that the frequency error rate shall be accurate to within 2.5ppm of the received frequency from the base station. The test extreme voltage is according to the 2.1055(d)(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment and the extreme temperature rule is comply with the 2.1055(a)(1) -30°C ~ 50°C.

### 4.2.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER                          | MODEL NO.   | SERIAL NO. | CALIBRATED UNTIL |
|---|-------------|------------|------------------|
| * Hewlett Packard RF cable                          | 8120-6192   | 01428251   | NA               |
| * Suhner RF cable                                   | Sucoflex104 | 204850/4   | NA               |
| * WIT<br>Standard Temperature & Humidity<br>Chamber | TH-4S-C     | W981030    | Jun. 28, 2008    |

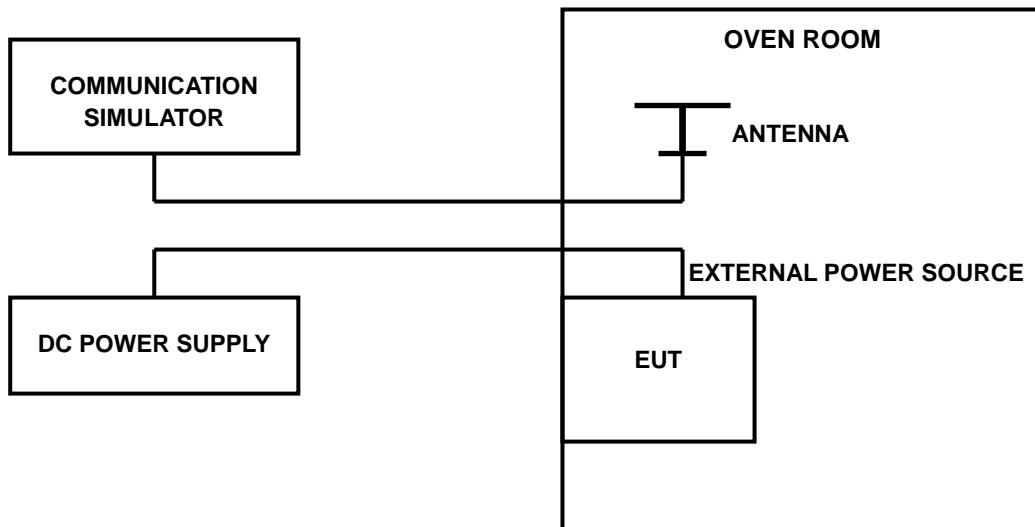
**NOTE:** 1. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.  
2. “\*” = These equipments are used for the final measurement.  
3. The test was performed in ADT RF OVEN room.

#### 4.2.3 TEST PROCEDURE

- a. Because of the measure the carrier frequency under the condition of the AFC lock, it shall be used the mobile station in the GSM link mode. This is accomplished with the use of the communication simulator station. The oven room could control the temperatures and humidity. The GSM link channel is the 661.
- b. Power must be removed when changing from one temperature to another or one voltage to another voltage. Power warm up is at least 15 min and power applied should perform before recording frequency error.
- c. EUT is connected the external power supply to control the DC input power. The various Volts from the minimum 3.65 Volts to 4.2 Volts. Each step shall be record the frequency error rate.
- d. 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.
- e. 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 GSM simulator.

#### 4.2.4 TEST SETUP





#### 4.2.5 TEST RESULTS

|                      |              |                          |                        |
|----------------------|--------------|--------------------------|------------------------|
| MODE                 | Channel 661  | ENVIRONMENTAL CONDITIONS | 25deg°C, 65%RH, 991hPa |
| INPUT POWER (SYSTEM) | 120Vac, 60Hz | TESTED BY                | Brad Wu                |

| AFC FREQUENCY ERROR VS. VOLTAGE |                      |                       |             |
|---------------------------------|----------------------|-----------------------|-------------|
| VOLTAGE (Volts)                 | FREQUENCY ERROR (Hz) | FREQUENCY ERROR (ppm) | LIMIT (ppm) |
| 3.65                            | -6                   | -0.0031914894         | 2.5         |
| 3.70                            | 2                    | 0.0010638298          | 2.5         |
| 4.20                            | 9                    | 0.0047872340          | 2.5         |

**NOTE:** The applicant defined the normal working voltage of the battery is from 3.65Vdc to 4.20Vdc.

| AFC FREQUENCY ERROR VS. TEMP. |                      |                       |             |
|-------------------------------|----------------------|-----------------------|-------------|
| TEMP. (°C)                    | FREQUENCY ERROR (Hz) | FREQUENCY ERROR (ppm) | LIMIT (ppm) |
| 50                            | 31                   | 0.0164893617          | 2.5         |
| 40                            | 29                   | 0.0154255319          | 2.5         |
| 30                            | 23                   | 0.0122340426          | 2.5         |
| 20                            | 18                   | 0.0095744681          | 2.5         |
| 10                            | 13                   | 0.0069148936          | 2.5         |
| 0                             | 9                    | 0.0047872340          | 2.5         |
| -10                           | 5                    | 0.0026595745          | 2.5         |
| -20                           | 2                    | 0.0010638298          | 2.5         |



## 4.3 OCCUPIED BANDWIDTH MEASUREMENT

### 4.3.1 LIMITS OF OCCUPIED BANDWIDTH MEASUREMENT

According to FCC 24.238(b) specified that emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26dB below the transmitter power.

### 4.3.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER          | MODEL NO.    | SERIAL NO. | CALIBRATED UNTIL |
|-------------------------------------|--------------|------------|------------------|
| * ROHDE & SCHWARZ Spectrum Analyzer | FSP40        | 100035     | Mar. 25, 2008    |
| * Mini-Circuits Power Splitter      | ZAPD-4       | 400005     | NA               |
| * Hewlett Packard RF cable          | 8120-6192    | 01428251   | NA               |
| * JFW 20dB attenuation              | 50HF-020-SMA | NA         | NA               |
| * Suhner RF cable                   | Sucoflex104  | 204850/4   | NA               |

**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. “\*” = These equipments are used for the final measurement.

### 4.3.3 TEST SETUP

Same as Item 4.2.4 (Conducted Power Setup)



#### 4.3.4 TEST PROCEDURES

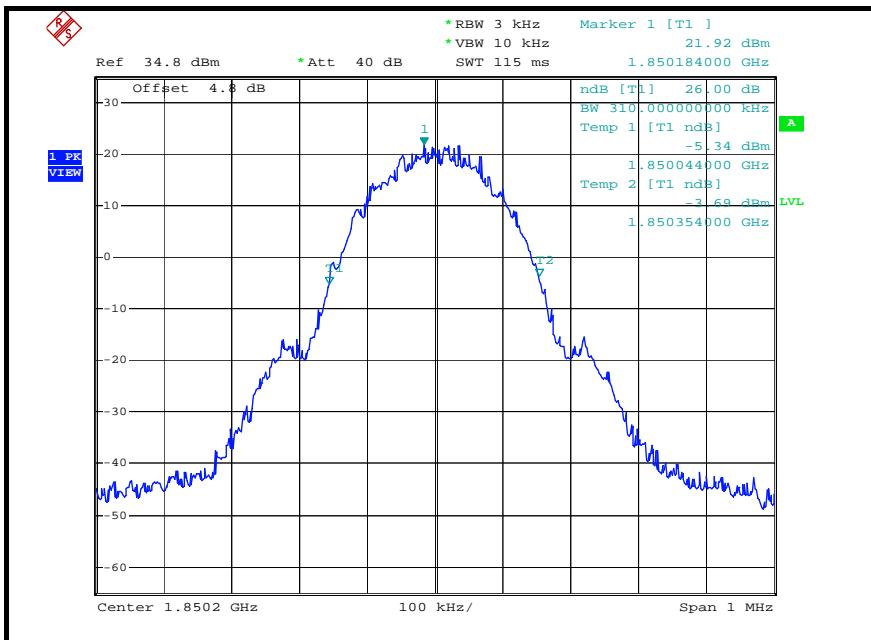
- a. The EUT makes a phone call to the communication simulator. The power was measured with R&S Spectrum Analyzer. All measurements were done at 3 channels: 512, 661 and 810 (low, middle and high operational frequency range).
- b. The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer. This splitter, attenuator, and cable loss are the worst loss 4.8dB in the transmitted path track.
- c. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. FCC 24.238(b) required a measurement bandwidth is the fundamental emission below 26dB bandwidth.

### 4.3.5 TEST RESULTS

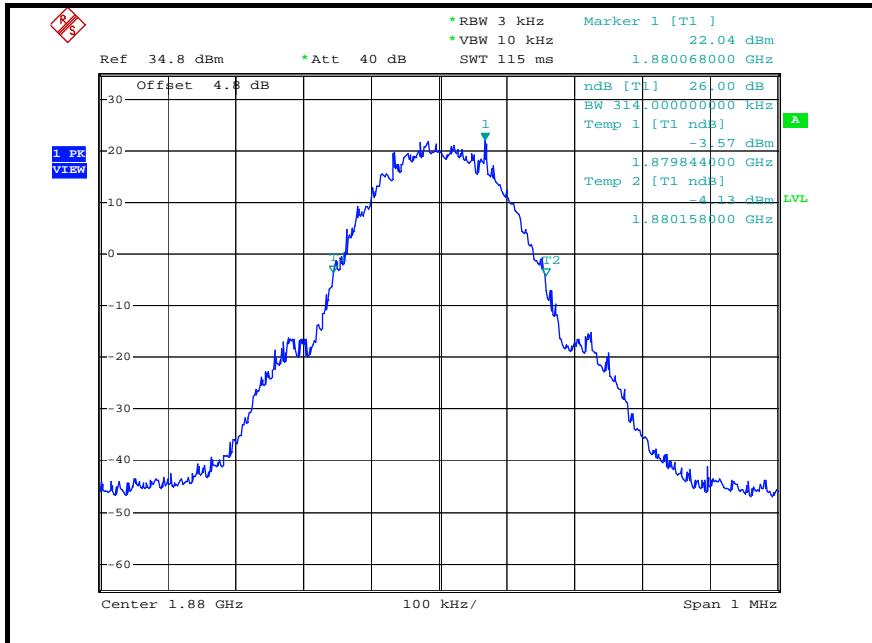
#### FOR GSM MODE

| FREQUENCY (MHz) | MAX. OUTPUT POWER -26 dBc<br>BANDWIDTH (kHz) |
|-----------------|--|
| 1850.2          | 310  |
| 1880.0          | 314  |
| 1909.8          | 310  |

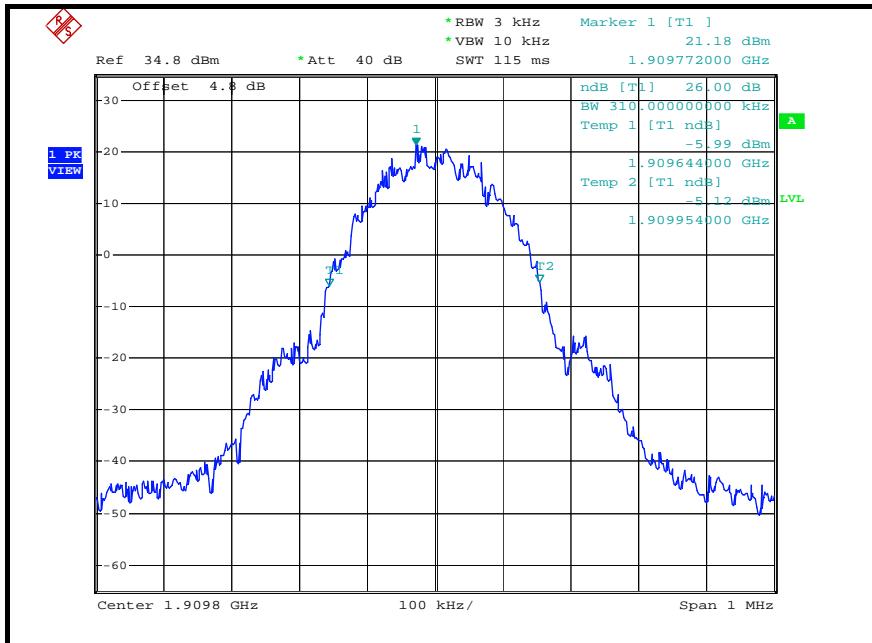
#### CH 512 MAX. POWER



## CH 661 MAX. POWER



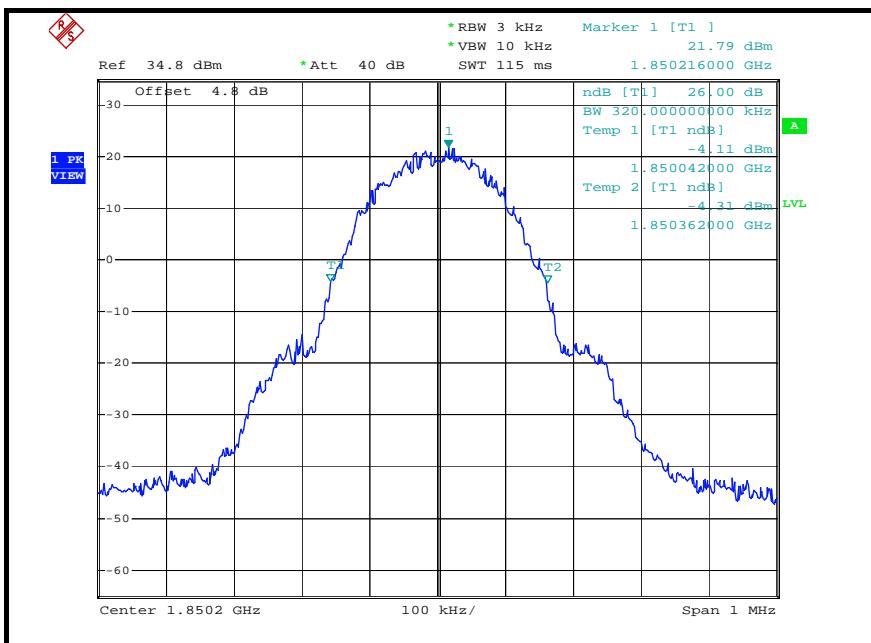
## CH 810 MAX. POWER



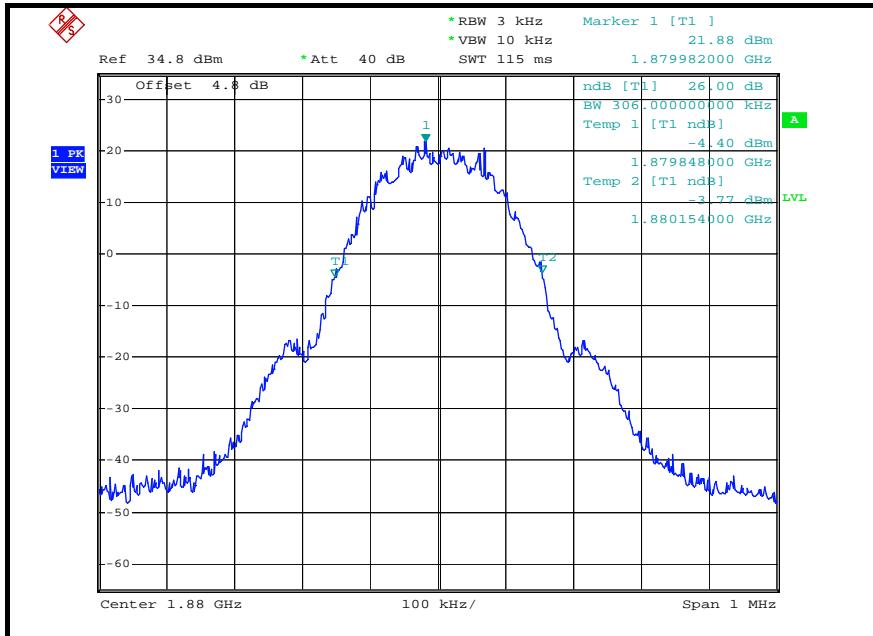
**FOR GPRS MODE (UP-LINK WITH 1 TIME SLOT)**

| FREQUENCY (MHz) | MAX. OUTPUT POWER -26 dBc<br>BANDWIDTH (kHz) |
|-----------------|--|
| 1850.2          | 320  |
| 1880.0          | 306  |
| 1909.8          | 308  |

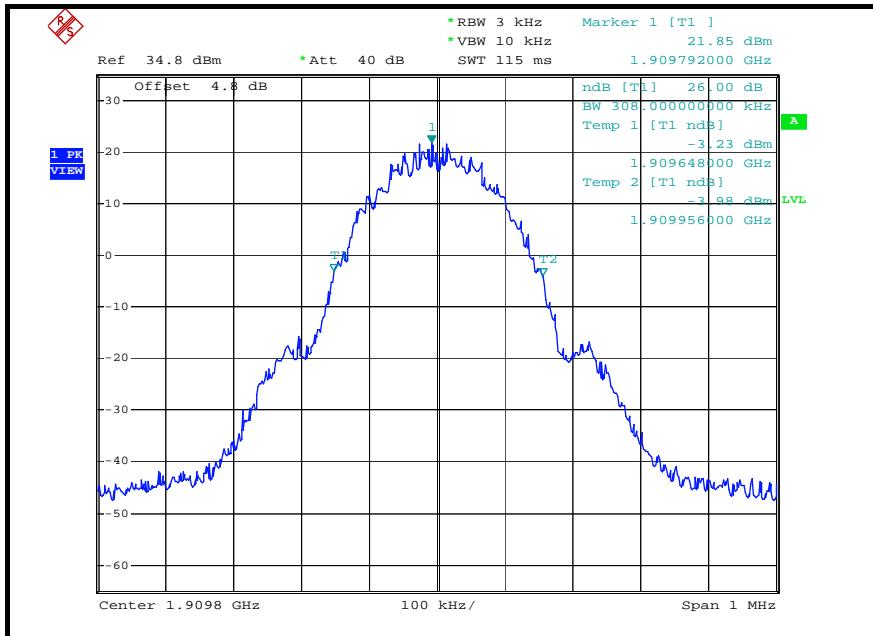
**CH 512 MAX. POWER**



## CH 661 MAX. POWER



## CH 810 MAX. POWER

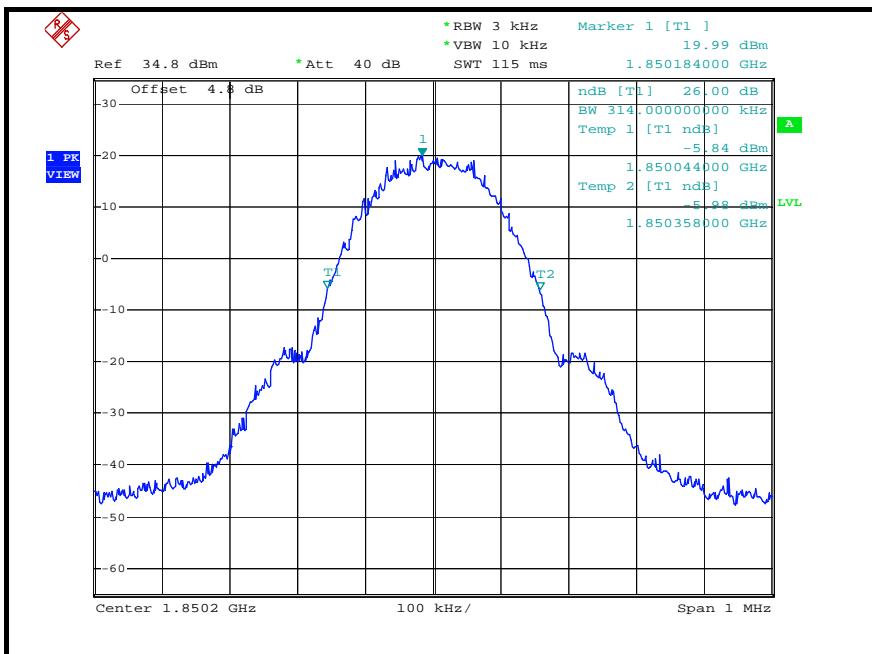




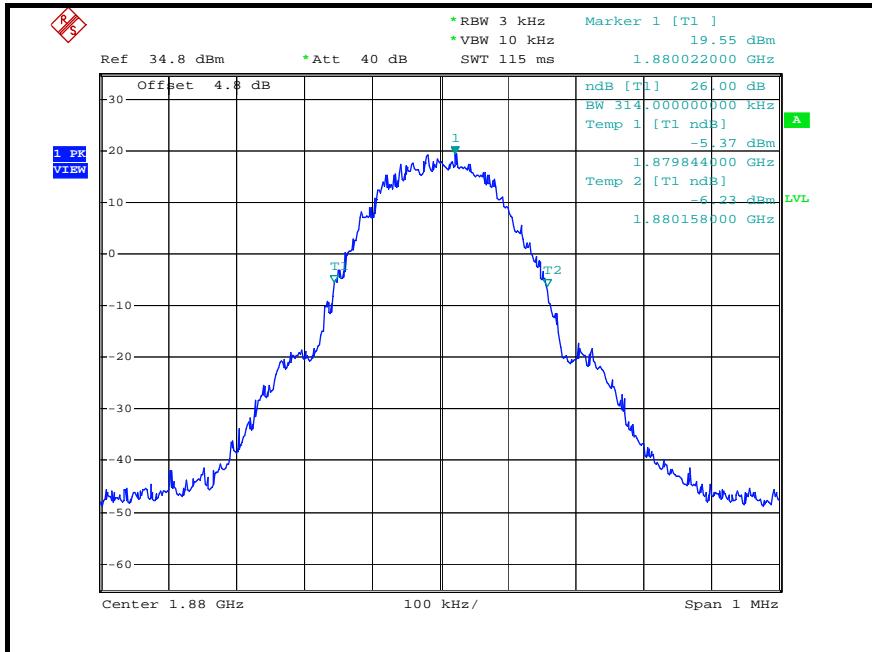
### FOR E-GPRS MODE (UP-LINK WITH 1 TIME SLOT)

| FREQUENCY (MHz) | MAX. OUTPUT POWER -26 dBc<br>BANDWIDTH (kHz) |
|-----------------|--|
| 1850.2          | 314  |
| 1880.0          | 314  |
| 1909.8          | 316  |

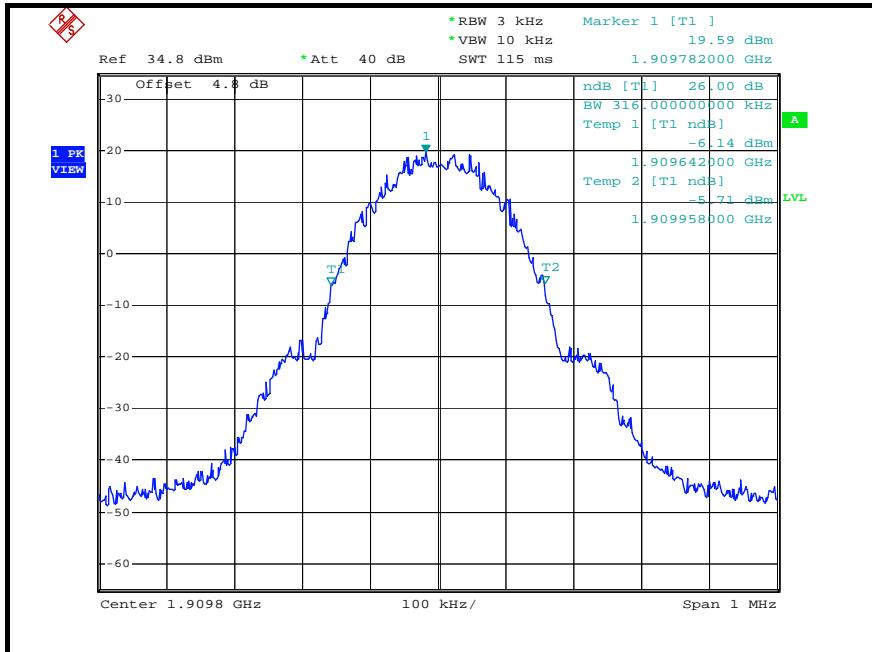
### CH 512 MAX. POWER



## CH 661 MAX. POWER



## CH 810 MAX. POWER





## 4.4 BAND EDGE MEASUREMENT

### 4.4.1 LIMITS OF BAND EDGE MEASUREMENT

The PCS frequency bands refer to the FCC 24.229 rule. According to FCC 24.238(a) specified that 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 1MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

### 4.4.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER          | MODEL NO.    | SERIAL NO. | CALIBRATED UNTIL |
|-------------------------------------|--------------|------------|------------------|
| * ROHDE & SCHWARZ Spectrum Analyzer | E4446A       | MY44360128 | Dec. 03, 2007    |
| * Mini-Circuits Power Splitter      | ZAPD-4       | 400005     | NA               |
| * Hewlett Packard RF cable          | 8120-6192    | 01428251   | NA               |
| * JFW 20dB attenuation              | 50HF-020-SMA | NA         | NA               |
| * Suhner RF cable                   | Sucoflex104  | 204850/4   | NA               |

**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. “\*” = These equipments are used for the final measurement.

### 4.4.3 TEST SETUP

Same as Item 4.2.4 (Conducted Power Setup)



#### 4.4.4 TEST PROCEDURES

- a. The EUT was set up for the maximum peak power with GSM link data modulation. The power was measured with R&S Spectrum Analyzer. All measurements were done at 2 channels: 512 and 810 (low and high operational frequency range).
- b. The band edge measurement used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer. This splitter, attenuator, and cable loss are the worst loss 4.8dB in the transmitted path track.
- c. The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 3kHz and VB of the spectrum is 10kHz.
- d. Record the max trace plot into the test report.

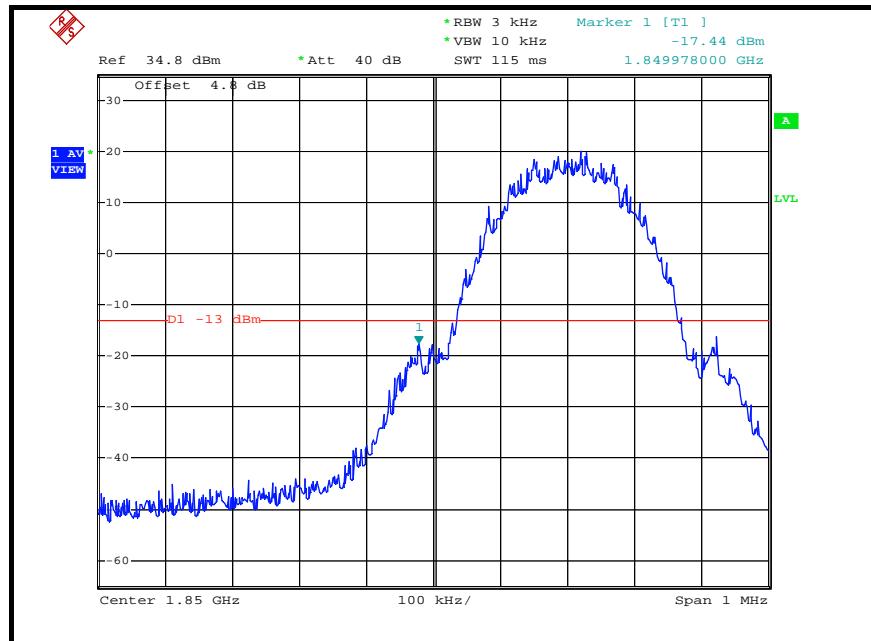
#### 4.4.5 EUT OPERATING CONDITION

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

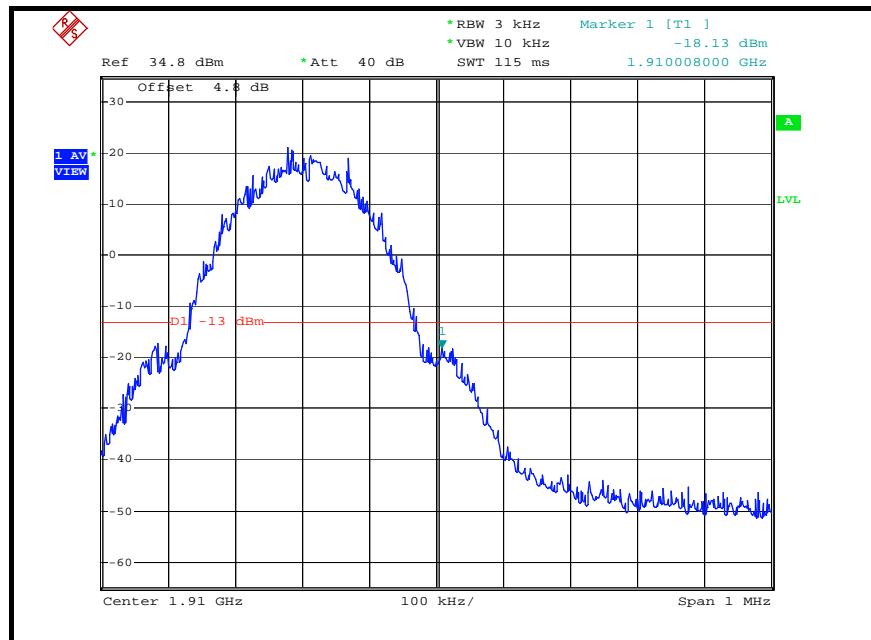
## 4.4.6 TEST RESULTS

### FOR GSM MODE

#### LOWER BAND EDGE

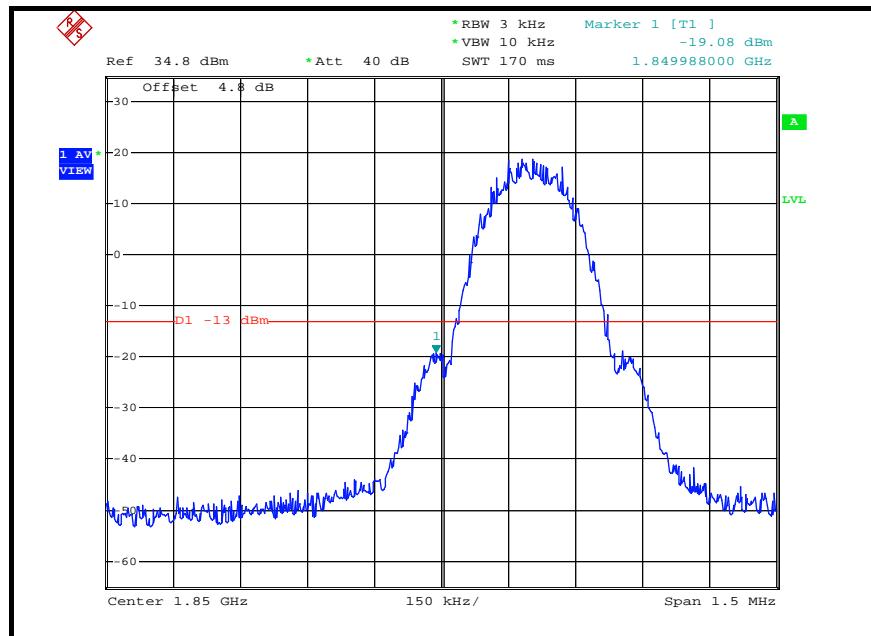


#### HIGHER BAND EDGE

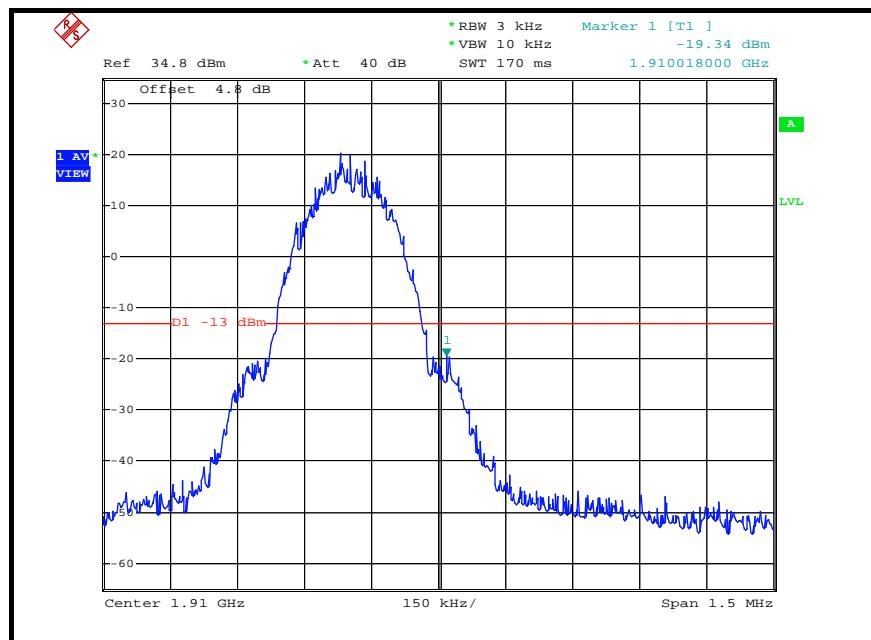


FOR GPRS MODE (UP-LINK WITH 1 TIME SLOT)

LOWER BAND EDGE

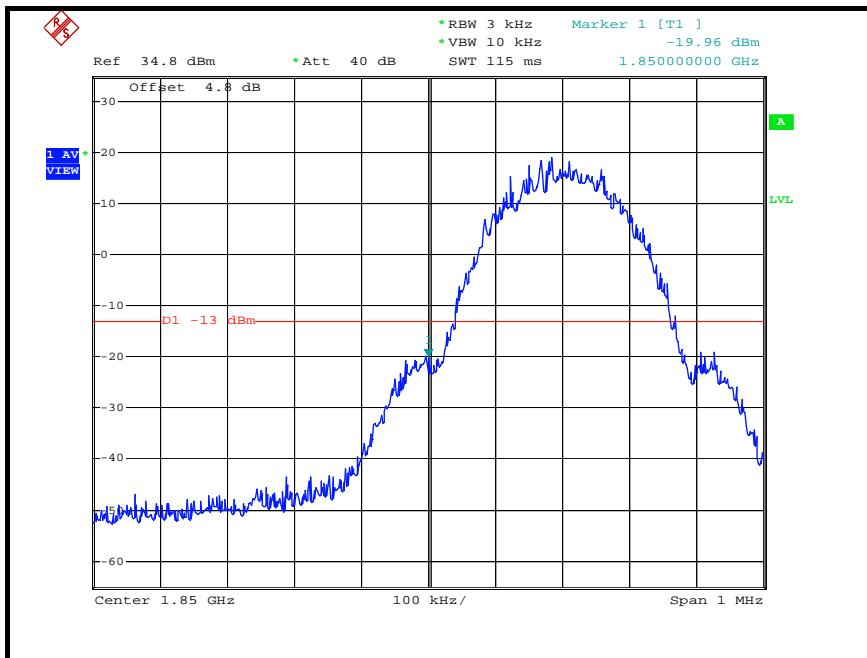


HIGHER BAND EDGE

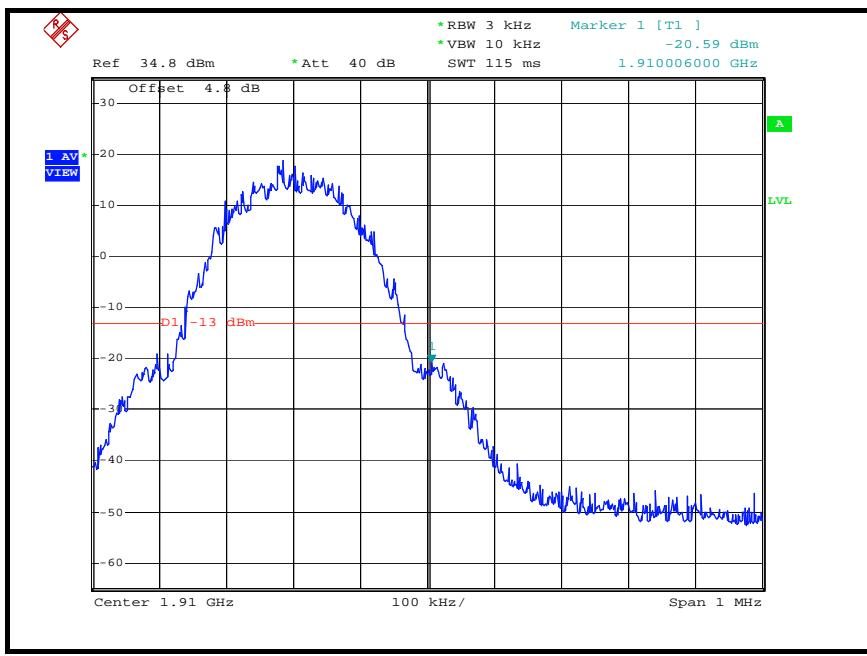


## FOR E-GPRS MODE (UP-LINK WITH 1 TIME SLOT)

### LOWER BAND EDGE



### HIGHER BAND EDGE





## 4.5 CONDUCTED SPURIOUS EMISSIONS

### 4.5.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

In the FCC 24.238(a), On any frequency outside a licensee's frequency block within USPCS spectrum, the power of any emission shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log (P)$  dB. The specified minimum attenuation becomes 43dB and the limit of emission equal to  $-13$  dBm.

### 4.5.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER                  | MODEL NO.                       | SERIAL NO. | CALIBRATED UNTIL |
|---|---------------------------------|------------|------------------|
| * ROHDE & SCHWARZ Spectrum Analyzer         | FSP40                           | 100035     | Mar. 25, 2008    |
| * Wainwright Instruments Band Reject Filter | WRCG 1850/1910-1830/1930-60/9SS | SN1        | NA               |
| * Wainwright Instruments High Pass Filter   | WHK3.1/18G-10SS                 | ZZ-010091  | NA               |
| * Mini-Circuits Power Splitter              | ZAPD-4                          | 400005     | NA               |
| * Hewlett Packard RF cable                  | 8120-6192                       | 01428251   | NA               |
| * JFW 20dB attenuation                      | 50HF-020-SMA                    | NA         | NA               |
| * Suhner RF cable                           | Sucoflex104                     | 204850/4   | NA               |

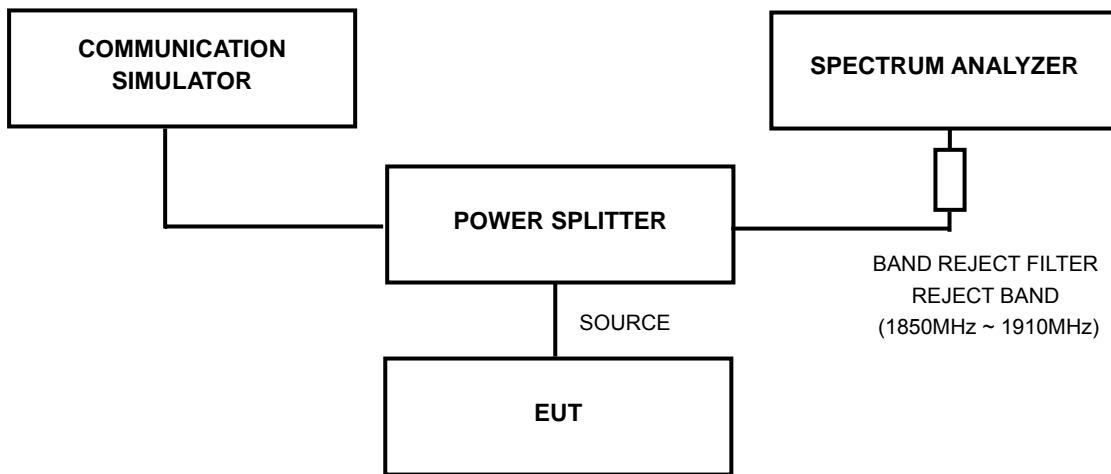
**NOTE:** 1. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.

2. \*\* = These equipments are used for the final measurement.

#### 4.5.3 TEST PROCEDURE

- a. The EUT was set up for the maximum peak power with GSM link data modulation. The power was measured with R&S Spectrum Analyzer. All measurements were done at 3 channels: 512, 661 and 810 (low, middle and high operational frequency range).
- b. The conducted spurious emission used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer. This splitter loss and cable loss are the worst loss 4.8dB in the transmitted path track.
- c. When the spectrum scanned from 9kHz to 3GHz, it shall be connected to the band reject filter attenuated the carried frequency. The spectrum set RB=1MHz, VB=3MHz.
- d. When the spectrum scanned from 3GHz to 20GHz, it shall be connected to the high pass filter attenuated the carried frequency. The spectrum set RB=1MHz, VB=3MHz.

#### 4.5.4 TEST SETUP

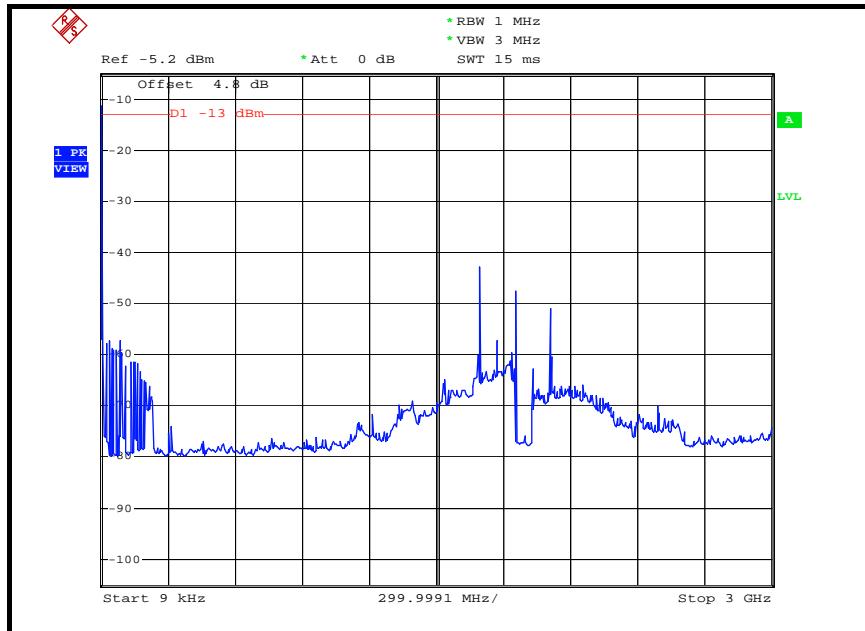


#### 4.5.5 EUT OPERATING CONDITIONS

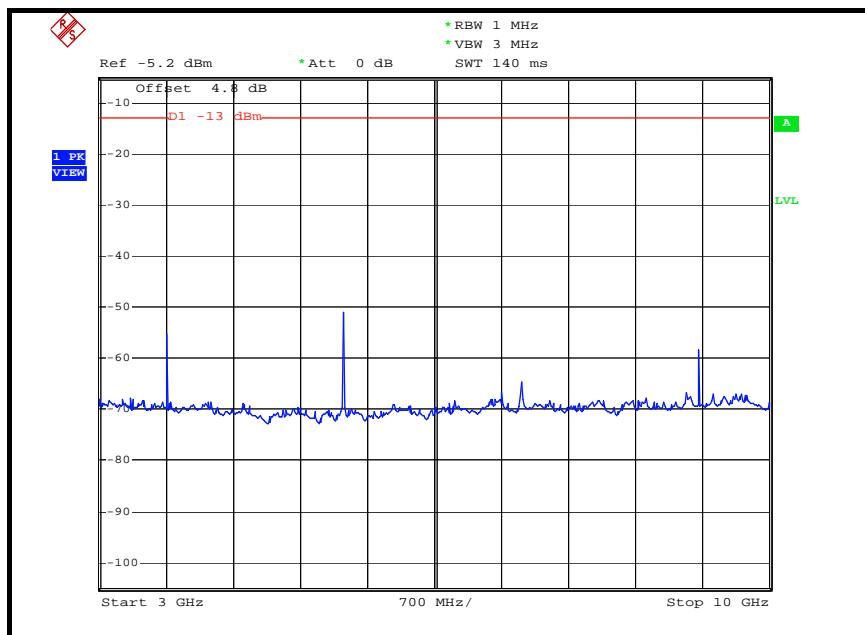
- a. The EUT makes a phone call to the communication simulator.
- b. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency.

## 4.5.6 TEST RESULTS

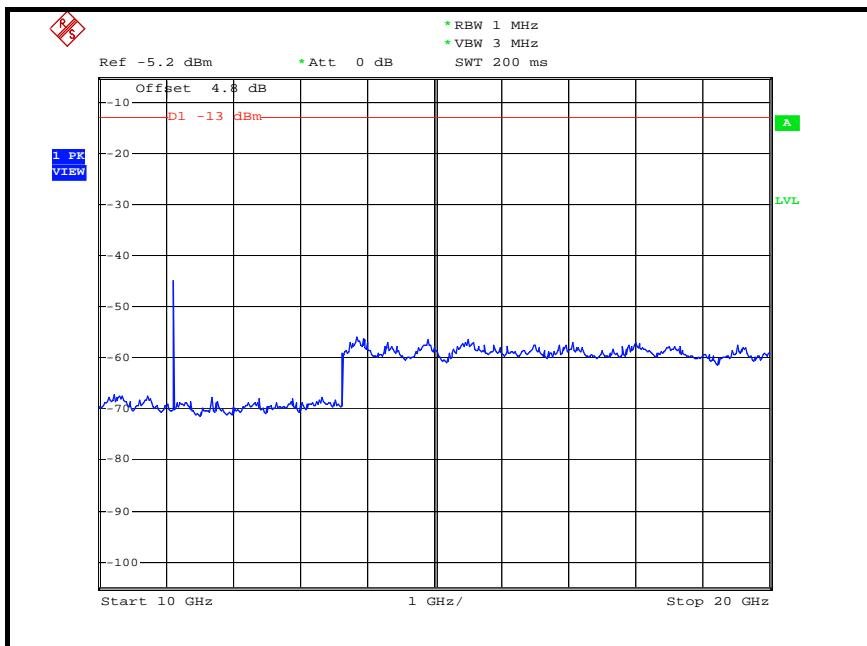
### CH 512: 9kHz ~ 3GHz



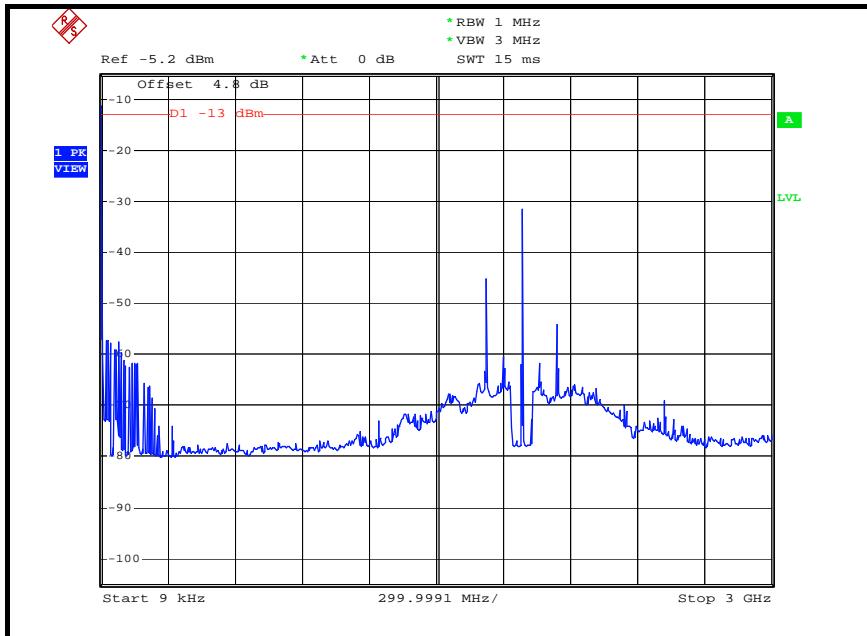
### 3GHz ~ 10GHz



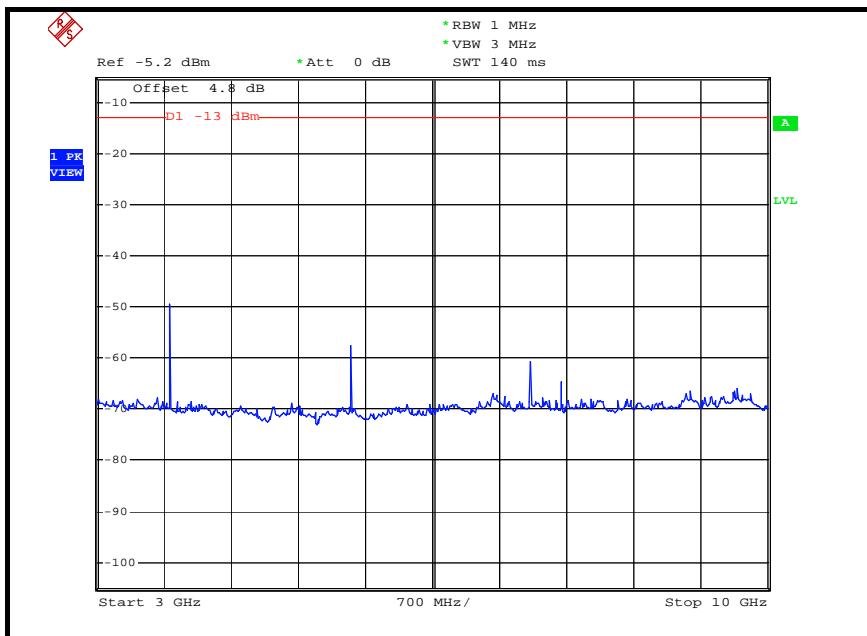
10GHz ~ 20GHz



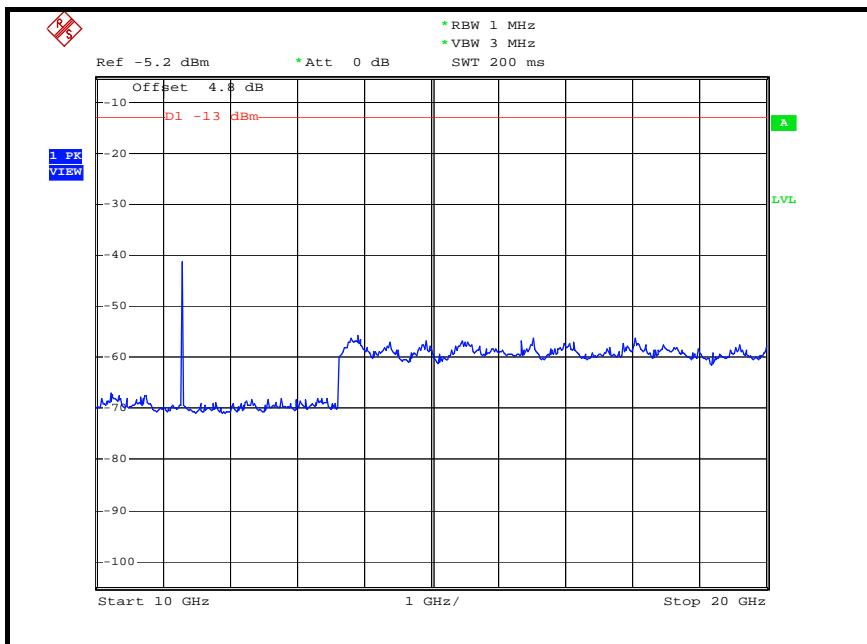
### CH 661: 9kHz ~ 3GHz



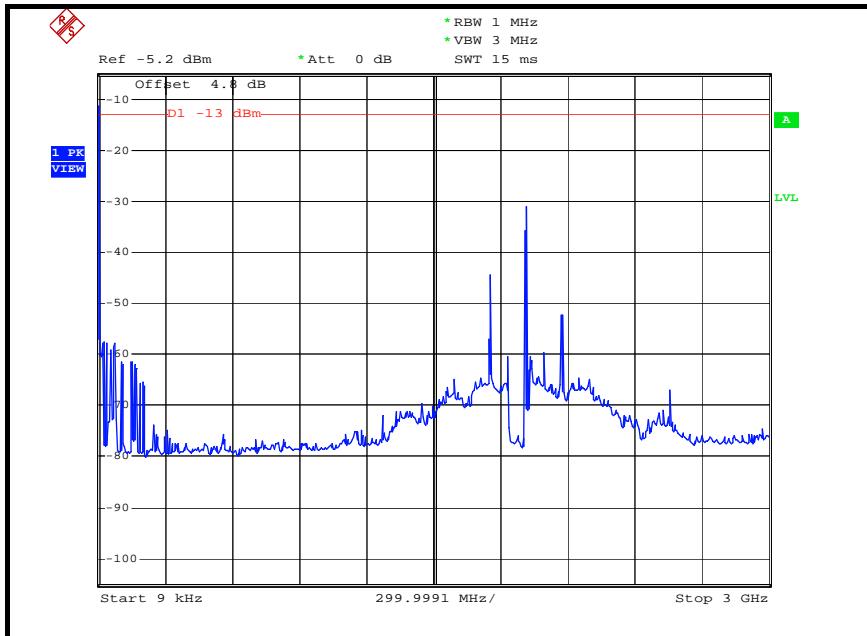
### 3GHz ~ 10GHz



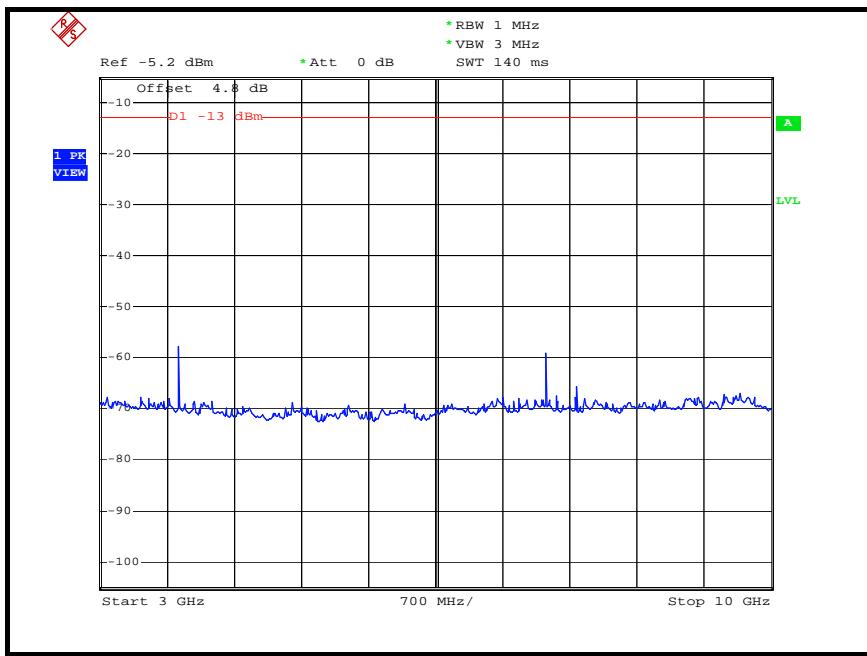
10GHz ~ 20GHz



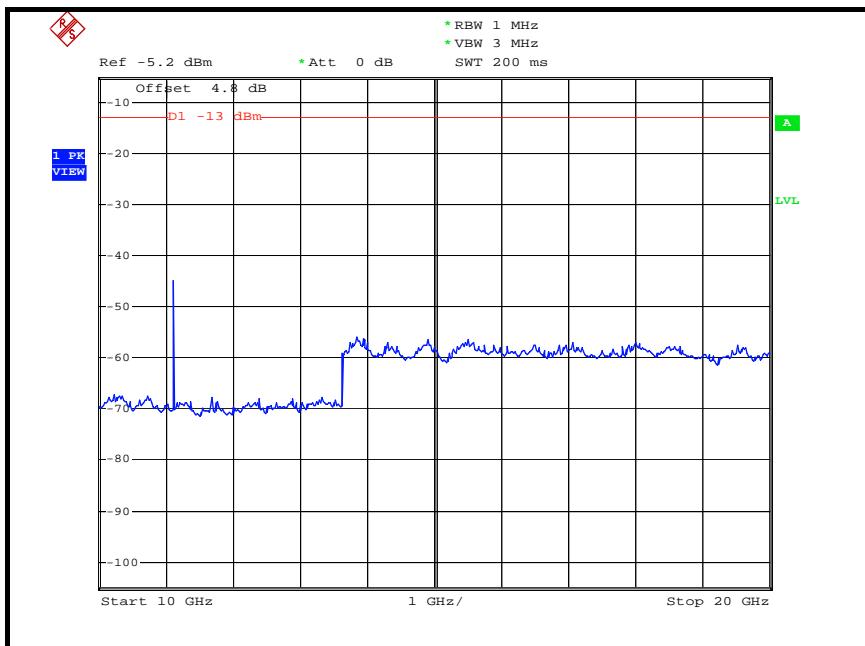
### CH 810: 9kHz ~ 3GHz



### 3GHz ~ 10GHz



10GHz ~ 20GHz





## 4.6 RADIATED EMISSION MEASUREMENT (BELOW 1GHz)

### 4.6.1 LIMITS OF RADIATED EMISSION MEASUREMENT

In the FCC 24.238(a), On any frequency outside a licensee's frequency block within USPCS spectrum, the power of any emission shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log (P)$  dB. The specified minimum attenuation becomes 43dB and the limit of emission equal to  $-13$  dBm. So the limit of emission is the same absolute specified line.

| LIMIT (dBm) | EQUIVALENT FIELD STRENGTH AT 3m (dBuV/m) (NOTE) |
|-------------|---|
| -13         | 82.22   |

**NOTE:** The following formula is used to convert the equipment radiated power to field strength.

$$E = [1000000 \sqrt{30P}] / 3 \text{ uV/m, where P is Watts.}$$



#### 4.6.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER              | MODEL NO.         | SERIAL NO.  | CALIBRATED UNTIL |
|---|-------------------|-------------|------------------|
| Test Receiver<br>ROHDE & SCHWARZ        | ESCI              | 100424      | Jul. 27, 2008    |
| Spectrum Analyzer<br>ROHDE & SCHWARZ    | FSP40             | 100025      | Oct. 05, 2007    |
| BILOG Antenna<br>SCHWARZBECK            | VULB9168          | 9168-160    | May 31, 2008     |
| HORN Antenna<br>SCHWARZBECK             | 9120D             | 9120D-209   | Jun. 28, 2008    |
| HORN Antenna<br>SCHWARZBECK             | BBHA 9170         | BBHA9170243 | Dec. 28, 2007    |
| Preamplifier<br>Agilent                 | 8447D             | 2944A10633  | Oct. 26, 2007    |
| Preamplifier<br>Agilent                 | 8449B             | 3008A01964  | Oct. 26, 2007    |
| RF signal cable<br>HUBER+SUHNNER        | SUCOFLEX 104      | 238137/4    | Dec. 11, 2007    |
| RF signal cable<br>HUBER+SUHNNER        | SUCOFLEX 104      | 233233/4    | Nov. 14, 2007    |
| Software<br>ADT.                        | ADT_Radiated_V7.6 | NA          | NA               |
| Antenna Tower<br>inn-co GmbH            | MA 4000           | 013303      | NA               |
| Antenna Tower Controller<br>inn-co GmbH | CO2000            | 017303      | NA               |
| Turn Table<br>ADT.                      | TT100.            | TT93021703  | NA               |
| Turn Table Controller<br>ADT.           | SC100.            | SC93021703  | NA               |

**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 test was performed in HwaYa Chamber 3.
3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The VCCI Site Registration No. is R-237.
5. The IC Site Registration No. is IC3789B-3.



#### 4.6.3 TEST PROCEDURES

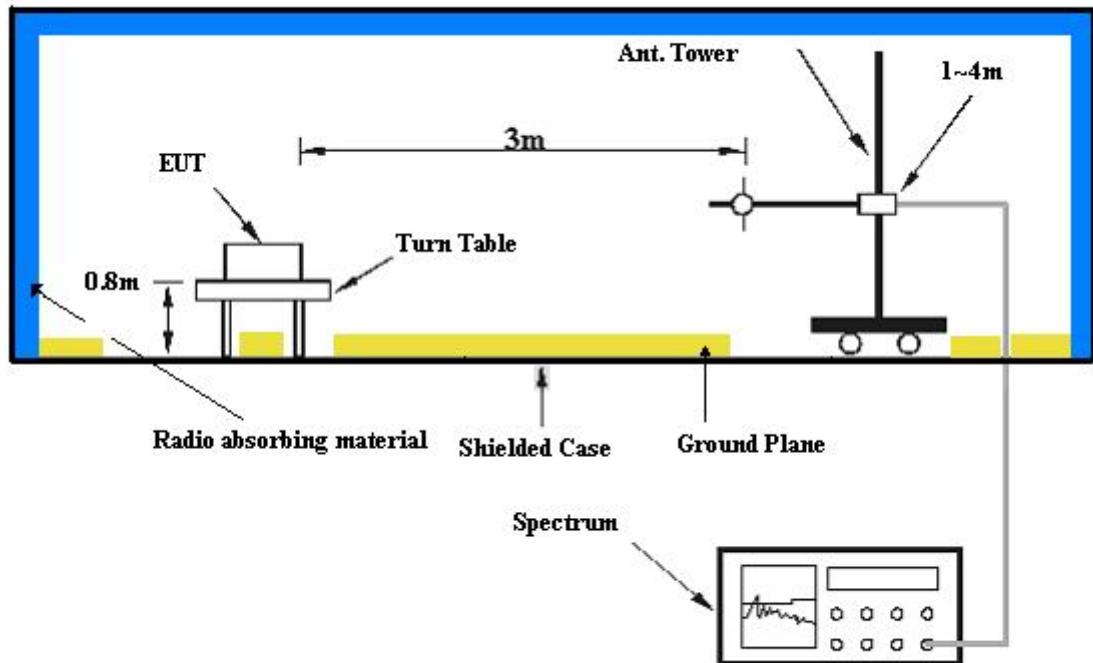
- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the receiving antenna, which was mounted on antenna tower and its position at 0.8m above the ground.
- c. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading and recorded the value.
- d. Repeat step a ~ c for horizontal polarization.

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

#### 4.6.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.6.5 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

#### 4.6.6 EUT OPERATING CONDITIONS

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



#### 4.6.7 TEST RESULTS

|                          |                        |                      |              |
|--------------------------|------------------------|----------------------|--------------|
| MODE                     | Channel 512            | DETECTOR FUNCTION    | Quasi-Peak   |
| FREQUENCY RANGE          | Below 1000MHz          | INPUT POWER (SYSTEM) | 120Vac, 60Hz |
| ENVIRONMENTAL CONDITIONS | 23deg°C, 70%RH, 991hPa | TESTED BY            | Dean Wang    |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3m |             |                         |                |             |                    |                      |                  |                          |
|--|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| NO.  | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1  | 117.39      | 36.93 QP                | 82.22          | -45.29      | 1.50 H             | 184.00               | 24.61            | 12.32                    |
| 2  | 129.06      | 33.03 QP                | 82.22          | -49.19      | 2.00 H             | 94.00                | 19.89            | 13.14                    |
| 3  | 169.89      | 33.30 QP                | 82.22          | -48.92      | 1.50 H             | 277.00               | 19.54            | 13.76                    |
| 4  | 197.11      | 31.71 QP                | 82.22          | -50.51      | 1.50 H             | 67.00                | 20.20            | 11.51                    |
| 5  | 249.60      | 36.22 QP                | 82.22          | -46.00      | 1.00 H             | 61.00                | 22.74            | 13.47                    |
| 6  | 368.21      | 34.18 QP                | 82.22          | -48.04      | 1.00 H             | 184.00               | 17.28            | 16.90                    |
| 7  | 467.36      | 32.74 QP                | 82.22          | -49.48      | 1.50 H             | 70.00                | 13.03            | 19.71                    |
| 8  | 862.06      | 35.30 QP                | 82.22          | -46.92      | 1.50 H             | 100.00               | 8.19             | 27.11                    |

| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3m |             |                         |                |             |                    |                      |                  |                          |
|--|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| NO.  | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1  | 37.68       | 28.49 QP                | 82.22          | -53.73      | 1.00 V             | 88.00                | 14.19            | 14.30                    |
| 2  | 74.62       | 27.27 QP                | 82.22          | -54.95      | 1.50 V             | 352.00               | 15.56            | 11.71                    |
| 3  | 117.39      | 28.33 QP                | 82.22          | -53.89      | 1.00 V             | 145.00               | 16.01            | 12.32                    |
| 4  | 132.95      | 28.85 QP                | 82.22          | -53.37      | 1.00 V             | 10.00                | 15.49            | 13.36                    |
| 5  | 171.83      | 30.20 QP                | 82.22          | -52.02      | 1.50 V             | 208.00               | 16.58            | 13.62                    |
| 6  | 467.36      | 34.62 QP                | 82.22          | -47.60      | 1.00 V             | 73.00                | 14.91            | 19.71                    |
| 7  | 733.73      | 30.53 QP                | 82.22          | -51.69      | 1.50 V             | 145.00               | 5.35             | 25.18                    |
| 8  | 865.94      | 34.88 QP                | 82.22          | -47.34      | 1.00 V             | 67.00                | 7.72             | 27.16                    |
| 9  | 906.77      | 30.29 QP                | 82.22          | -51.93      | 1.00 V             | 43.00                | 2.59             | 27.70                    |

##### NOTE:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. This is valid for all 3 channels.



## 4.7 RADIATED EMISSION MEASUREMENT (ABOVE 1GHz)

### 4.7.1 LIMITS OF RADIATED EMISSION MEASUREMENT

In the FCC 24.238(a), On any frequency outside a licensee's frequency block within USPCS spectrum, the power of any emission shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log (P)$  dB. The specified minimum attenuation becomes 43dB and the limit of emission equal to -13dBm.



#### 4.7.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER              | MODEL NO.         | SERIAL NO.  | CALIBRATED UNTIL |
|---|-------------------|-------------|------------------|
| Test Receiver<br>ROHDE & SCHWARZ        | ESCI              | 100424      | Jul. 27, 2008    |
| Spectrum Analyzer<br>ROHDE & SCHWARZ    | FSP40             | 100025      | Oct. 05, 2007    |
| BILOG Antenna<br>SCHWARZBECK            | VULB9168          | 9168-160    | May 31, 2008     |
| HORN Antenna<br>SCHWARZBECK             | 9120D             | 9120D-209   | Jun. 28, 2008    |
| HORN Antenna<br>SCHWARZBECK             | BBHA 9170         | BBHA9170243 | Dec. 28, 2007    |
| Preamplifier<br>Agilent                 | 8447D             | 2944A10633  | Oct. 26, 2007    |
| Preamplifier<br>Agilent                 | 8449B             | 3008A01964  | Oct. 26, 2007    |
| RF signal cable<br>HUBER+SUHNNER        | SUCOFLEX 104      | 238137/4    | Dec. 11, 2007    |
| RF signal cable<br>HUBER+SUHNNER        | SUCOFLEX 104      | 233233/4    | Nov. 14, 2007    |
| Software<br>ADT.                        | ADT_Radiated_V7.6 | NA          | NA               |
| Antenna Tower<br>inn-co GmbH            | MA 4000           | 013303      | NA               |
| Antenna Tower Controller<br>inn-co GmbH | CO2000            | 017303      | NA               |
| Turn Table<br>ADT.                      | TT100.            | TT93021703  | NA               |
| Turn Table Controller<br>ADT.           | SC100.            | SC93021703  | NA               |
| Signal Generator<br>Agilent             | E8257C            | MY43320668  | Dec. 28, 2007    |

**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 test was performed in HwaYa Chamber 3.
3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The VCCI Site Registration No. is R-237.
5. The IC Site Registration No. is IC3789B-3.



#### 4.7.3 TEST PROCEDURES

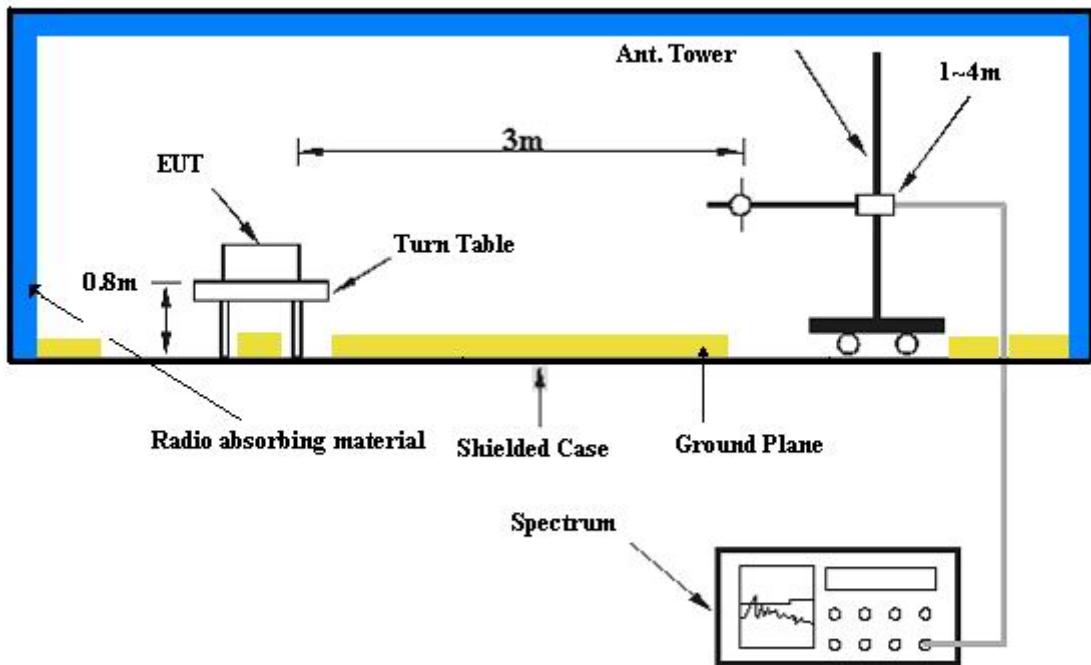
- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the receiving antenna, which was mounted on antenna tower and its position at 0.8 m above the ground.
- c. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading and recorded the value.
- d. The EUT is replaced by a horn antenna connected to a signal generator tuned to the frequency of emission.
- e. The signal generator level has to be adjusted to have the same emission nature.
- f. The radiated power can be calculated via the factor and antenna gain.
- g. Repeat step a ~ f for horizontal polarization.

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

#### 4.7.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.7.5 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

#### 4.7.6 EUT OPERATING CONDITIONS

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



#### 4.7.7 TEST RESULTS

|                      |              |                          |                        |
|----------------------|--------------|--------------------------|------------------------|
| MODE                 | Channel 512  | FREQUENCY RANGE          | Above 1000MHz          |
| INPUT POWER (SYSTEM) | 120Vac, 60Hz | ENVIRONMENTAL CONDITIONS | 25deg°C, 65%RH, 991hPa |
| TESTED BY            | Dean Wang    |                          |                        |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3m |             |                       |             |                       |                        |                   |
|--|-------------|-----------------------|-------------|-----------------------|------------------------|-------------------|
| NO.  | FREQ. (MHz) | EMISSION LEVEL (dBuV) | LIMIT (dBm) | S.G POWER VALUE (dBm) | CORRECTION FACTOR (dB) | POWER VALUE (dBm) |
| 1  | 3700.40     | 57.97                 | -13.00      | -47.38                | 10.12                  | -37.26            |
| 2  | 5550.60     | 55.91                 | -13.00      | -50.81                | 11.49                  | -39.32            |

| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3m |             |                       |             |                       |                        |                   |
|--|-------------|-----------------------|-------------|-----------------------|------------------------|-------------------|
| NO.  | FREQ. (MHz) | EMISSION LEVEL (dBuV) | LIMIT (dBm) | S.G POWER VALUE (dBm) | CORRECTION FACTOR (dB) | POWER VALUE (dBm) |
| 1  | 3700.40     | 54.87                 | -13.00      | -50.48                | 10.12                  | -40.36            |
| 2  | 5550.60     | 52.89                 | -13.00      | -53.83                | 11.49                  | -42.34            |

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



|                      |              |                          |                        |
|----------------------|--------------|--------------------------|------------------------|
| MODE                 | Channel 661  | FREQUENCY RANGE          | Above 1000MHz          |
| INPUT POWER (SYSTEM) | 120Vac, 60Hz | ENVIRONMENTAL CONDITIONS | 25deg°C, 65%RH, 991hPa |
| TESTED BY            | Dean Wang    |                          |                        |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3m |             |                       |             |                       |                        |                   |
|--|-------------|-----------------------|-------------|-----------------------|------------------------|-------------------|
| NO.  | FREQ. (MHz) | EMISSION LEVEL (dBuV) | LIMIT (dBm) | S.G POWER VALUE (dBm) | CORRECTION FACTOR (dB) | POWER VALUE (dBm) |
| 1  | 3760.00     | 58.21                 | -13.00      | -47.14                | 10.12                  | -37.02            |
| 2  | 5640.00     | 56.40                 | -13.00      | -50.32                | 11.49                  | -38.83            |

| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3m |             |                       |             |                       |                        |                   |
|--|-------------|-----------------------|-------------|-----------------------|------------------------|-------------------|
| NO.  | FREQ. (MHz) | EMISSION LEVEL (dBuV) | LIMIT (dBm) | S.G POWER VALUE (dBm) | CORRECTION FACTOR (dB) | POWER VALUE (dBm) |
| 1  | 3760.00     | 55.64                 | -13.00      | -49.71                | 10.12                  | -39.59            |
| 2  | 5640.00     | 53.24                 | -13.00      | -53.48                | 11.49                  | -41.99            |

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



|                      |              |                          |                        |
|----------------------|--------------|--------------------------|------------------------|
| MODE                 | Channel 810  | FREQUENCY RANGE          | Above 1000MHz          |
| INPUT POWER (SYSTEM) | 120Vac, 60Hz | ENVIRONMENTAL CONDITIONS | 25deg°C, 65%RH, 991hPa |
| TESTED BY            | Dean Wang    |                          |                        |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3m |             |                       |             |                       |                        |                   |
|--|-------------|-----------------------|-------------|-----------------------|------------------------|-------------------|
| NO.  | FREQ. (MHz) | EMISSION LEVEL (dBuV) | LIMIT (dBm) | S.G POWER VALUE (dBm) | CORRECTION FACTOR (dB) | POWER VALUE (dBm) |
| 1  | 3819.60     | 61.58                 | -13.00      | -43.77                | 10.12                  | -33.65            |
| 2  | 5729.40     | 59.58                 | -13.00      | -47.14                | 11.49                  | -35.65            |

| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3m |             |                       |             |                       |                        |                   |
|--|-------------|-----------------------|-------------|-----------------------|------------------------|-------------------|
| NO.  | FREQ. (MHz) | EMISSION LEVEL (dBuV) | LIMIT (dBm) | S.G POWER VALUE (dBm) | CORRECTION FACTOR (dB) | POWER VALUE (dBm) |
| 1  | 3819.60     | 58.56                 | -13.00      | -46.79                | 10.12                  | -36.67            |
| 2  | 5729.40     | 56.19                 | -13.00      | -50.53                | 11.49                  | -39.04            |

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



## 5 PHOTOGRAPHS OF THE TEST CONFIGURATION

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



## 6 INFORMATION ON THE TESTING LABORATORIES

We, ADT Corp., were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

|                    |                       |
|--------------------|-----------------------|
| <b>USA</b>         | FCC, UL, A2LA         |
| <b>GERMANY</b>     | TUV Rheinland         |
| <b>JAPAN</b>       | VCCI                  |
| <b>NORWAY</b>      | NEMKO                 |
| <b>CANADA</b>      | INDUSTRY CANADA , CSA |
| <b>R.O.C.</b>      | TAF, BSMI, NCC        |
| <b>NETHERLANDS</b> | Telefication          |
| <b>SINGAPORE</b>   | GOST-ASIA (MOU)       |
| <b>RUSSIA</b>      | CERTIS (MOU)          |

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site: [www.adt.com.tw/index.5/phtml](http://www.adt.com.tw/index.5/phtml). If you have any comments, please feel free to contact us at the following:

**Linko EMC/RF Lab:**

Tel: 886-2-26052180  
Fax: 886-2-26051924

**Hsin Chu EMC/RF Lab:**

Tel: 886-3-5935343  
Fax: 886-3-5935342

**Hwa Ya EMC/RF/Safety/Telecom Lab:**

Tel: 886-3-3183232  
Fax: 886-3-3185050

**Web Site:** [www.adt.com.tw](http://www.adt.com.tw)

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



## 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.