

## FCC TEST REPORT

for

47 CFR Part 24E

Equipment : GSM Mobile Phone  
Trade Name : Arima  
Model No. : 2710  
FCC ID : PJO2710  
Tx Frequency Range : 1850.2~1909.8MHz  
Max. RF Output Power : 0.743W  
Emission Designator : 300 KGXW  
Applicant : Arima Communication Corporation  
No.16, Lane 658, Ying Tao Road, Yingko Taipei  
Hsien, Taiwan

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- The data shown in this test report were carried out on Dec. 06, 2004 at Sporton International Inc. LAB.

*Daniel Lee 12/8/2004*

Dr. Daniel Lee  
EMC/SAR Manager

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**SPORTON International Inc.**

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### History of this test report

Original Report Issue Date: Dec. 07, 2004

☒ No additional attachment.

☐ Additional attachment were issued as following record:

| Attachment No. | Issue Date | Description |
|----------------|------------|-------------|
|                |            |             |
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## **1. General Information**

### **1.1. Applicant**

**Arima Communication Corporation**

No.16, Lane 658, Ying Tao Road, Yingko Taipei Hsien, Taiwan

### **1.2 Manufacturer**

**Arima Communication Corporation**

No. 16, Lane 658, Ying Tao Road, Yingko Taipei Hsien, Taiwan

### **1.3 Basic Description of Equipment under Test**

|            |                        |
|------------|------------------------|
| Equipment  | : GSM Mobile Phone     |
| Trade Name | : Arima                |
| Model No.  | : 2710                 |
| FCC ID     | : PJO2710              |
| Earpiece   | : CH1032NLSE(AM)       |
| Adaptor    | : LEI, MU03-5053055-A1 |

**1.4 Feature of Equipment under Test**

|                                      |                       |
|--------------------------------------|-----------------------|
| <b>DUT Type :</b>                    | GSM Mobile Phone      |
| <b>Trade Name :</b>                  | Arima                 |
| <b>Model Name :</b>                  | 2710                  |
| <b>FCC ID :</b>                      | PJO2710               |
| <b>Tx Frequency :</b>                | 1850.2-1909.8MHz      |
| <b>Rx Frequency :</b>                | 1930.2-1989.8MHz      |
| <b>Antenna Type :</b>                | Fixed Internal        |
| <b>Maximum Output Power :</b>        | 0.851 W (29.3 dBm)    |
| <b>Maximum EIRP</b>                  | 0.743 W ( 28.710 dBm) |
| <b>HW Version :</b>                  | P1E                   |
| <b>SW Version :</b>                  | P4D                   |
| <b>Digital Modulation Emission :</b> | GMSK                  |
| <b>Type of Emission :</b>            | 300 KGXW              |
| <b>DUT Stage :</b>                   | Identical Prototype   |

**1.5 Report Date**

EUT Received : Nov. 18, 2004

Report Date : Dec. 07, 2004



## **2 Test Configuration of Equipment under Test**

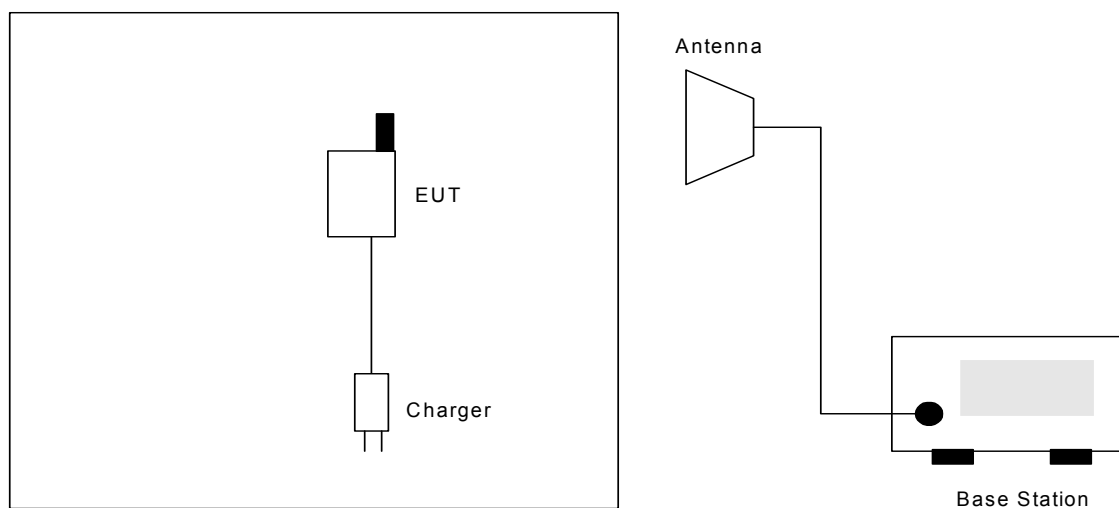
### **2.1 Test Manner**

- a. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range.
- b. During all testings, EUT is in link mode with base station emulator at maximum power level. (PCL=0 for PCS 1900)
- c. Frequency range investigated: radiated emission 30 MHz to 19000MHz.

### **2.2 Test Mode**

| <b>Application</b>    | <b>PCS 1900</b>                                    |
|-----------------------|----------------------------------------------------|
| Radiated Emission     | <input checked="" type="checkbox"/> Mode 1: CH 661 |
| Conducted Measurement | <input checked="" type="checkbox"/> Mode 1: CH 661 |

## 2.3 Connection Diagram of Test System



## 2.4 Ancillary Equipment List

| Item | Equipment    | Model No. | Serial No. |
|------|--------------|-----------|------------|
| 1.   | Base Station | CMU200    | 105934     |
| 2.   | Base Station | E5515C    | GB43460754 |



### **3. General Information of Test Site**

Test Site Location : No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park,  
Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.  
TEL : 886-3-327-3456  
FAX : 886-3-318-0055

Test Site No : 03CH06-HY

The chamber meets the characteristics of ANSI C63.4-2003. This site is on file with the FCC. The Industry Canada file number for this site is IC 4088.

#### **3.1 Test Voltage**

110V/ 60Hz

#### **3.2 Test in Compliance with**

47 CFR Part 24E and Part 2.

#### **3.3 Frequency Range Investigated**

a. Radiation: from 30 MHz to 19000 MHz for PCS 1900

#### **3.4 Test Distance**

The test distance of radiated emission from antenna to EUT is 3 m.



## 4. Test Data and Test Result

### 4.1 List of Measurements and Examinations

| FCC Rule               | IC RULE      | DESCRIPTION OF TEST                           | Result | Section |
|------------------------|--------------|-----------------------------------------------|--------|---------|
| §2.1046                | RSS-133 §6.2 | RF Output Power                               | Passed | 4.2     |
| §24.232                | RSS-133 §6.2 | EIRP                                          | Passed | 4.3     |
| §2.1049,<br>§24.238(b) | RSS-133 §6.3 | Occupied Bandwidth & Band Edge<br>Measurement | Passed | 4.4     |
| §2.1051                | RSS-133 §6.3 | Conducted Emission                            | Passed | 4.5     |
| §2.1053                | RSS-133 §6.3 | Field Strength of Spurious Radiation          | Passed | 4.6     |
| §2.1055,<br>§24.235    | RSS-133 §7   | Frequency Stability vs. Temperature           | Passed | 4.7     |
| §2.1055,<br>§24.235    | RSS-133 §7   | Frequency Stability vs. Voltage               | Passed | 4.8     |

## 4.2 RF Output Power

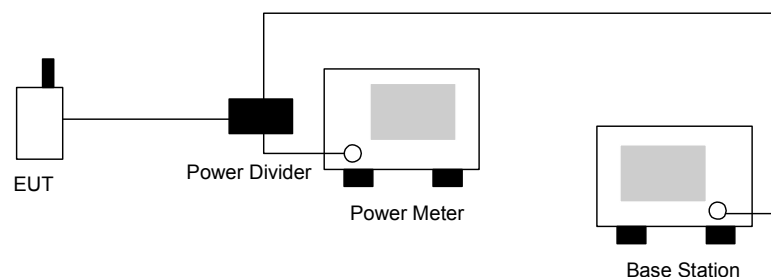
### 4.2.1 Measurement Instruments :

As described in chapter 5 of this test report.

### 4.2.2 Test Procedure :

1. The transmitter output was connected to power meter and base station through power divider.
2. Set EUT at PCL=0 for PCS 1900 through base station.
3. Select lowest, middle, and highest channels for each band.

### 4.2.3 Test Setup Layout :



### 4.2.4 Test Result :

| Bands    | Channel | Frequency (MHz) | Conducted Power (dBm) | Conducted Power (Watts) |
|----------|---------|-----------------|-----------------------|-------------------------|
| GSM 1900 | 512     | 1850.2 (Low)    | 29.3                  | 0.851                   |
|          | 661     | 1880.0 (Mid)    | 29.2                  | 0.832                   |
|          | 810     | 1909.8 (High)   | 29.3                  | 0.851                   |



### **4.3 ERP / EIRP Measurement**

Equivalent isotropic radiated power measurements by substitution method according to ANSI/TIA/EIA-603-A.

#### **4.3.1 Measurement Instruments**

As described in chapter 5 of this test report.

#### **4.3.2 Test Procedure**

1. The EUT was placed on a rotatable wooden table with 1.5 meter about ground.
2. The EUT was set 3 meters from the receiving antenna which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiated power.
4. The height of the receiving antenna is varied between one meter and four meters to reach the maximum radiated power for both horizontal and vertical polarizations.
5. Taking the record of maximum ERP/EIRP.
6. A Horn antenna was substituted in place of the EUT and was driven by a signal generator.
7. The conducted power at the terminal of the Horn antenna is measured.
8. Repeat step 3 to step 5 to get the maximum ERP/EIRP of the substitution antenna.
9.  $ERP/EIRP = P_s + E_t - E_s + G_s = P_s + R_t - R_s + G_s$

$P_s$  (dBm): Input power to substitution antenna.

$G_s$  (dBi): Substitution antenna Gain.

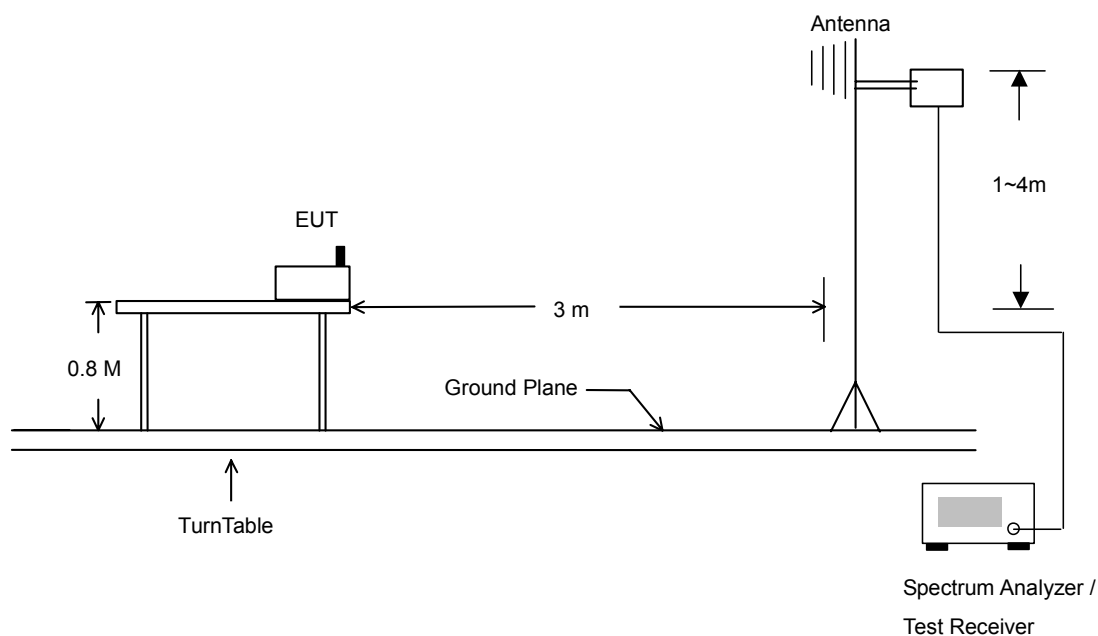
$E_t = R_t + AF$

$E_s + R_s + AF$

$AF$  (dB/m): Receive antenna factor

$R_t$ : the highest received signal in Spectrum Analyzer for EUT.

### 4.3.3 Test Setup Layout of ERP/EIRP



### 4.3.4 Test Result

| PCS1900 Radiated Power EIRP |               |                 |                    |               |                 |
|-----------------------------|---------------|-----------------|--------------------|---------------|-----------------|
| H Polarization              |               |                 | V Polarization     |               |                 |
| Frequency<br>(MHz)          | EIRP<br>(dBm) | EIRP<br>(Watts) | Frequency<br>(MHz) | EIRP<br>(dBm) | EIRP<br>(Watts) |
| 1850.270                    | 26.670        | 0.46            | 1850.190           | 28.710        | 0.743           |
| 1879.940                    | 26.400        | 0.44            | 1879.990           | 27.990        | 0.63            |
| 1909.770                    | 23.520        | 0.22            | 1909.840           | 25.140        | 0.33            |

## 4.4 Occupied Bandwidth and Band Edge Measurement

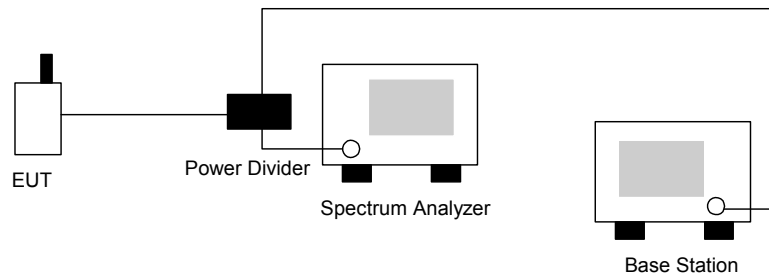
### 4.4.1 Measurement Instruments

As described in chapter 5 of this test report.

### 4.4.2 Test Procedure

1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. The occupied bandwidth of middle channel for the highest and lowest RF powers were measured.
3. The bandedge of low and high channels for the highest RF powers within the transmitting frequency band were measured. Setting RBW as roughly  $BW/10$ .

### 4.4.3 Test Setup Layout



#### 4.4.4 Test Result

- Test Mode : PCS 1900 CH661 Lower Band Edge
- Power State : High

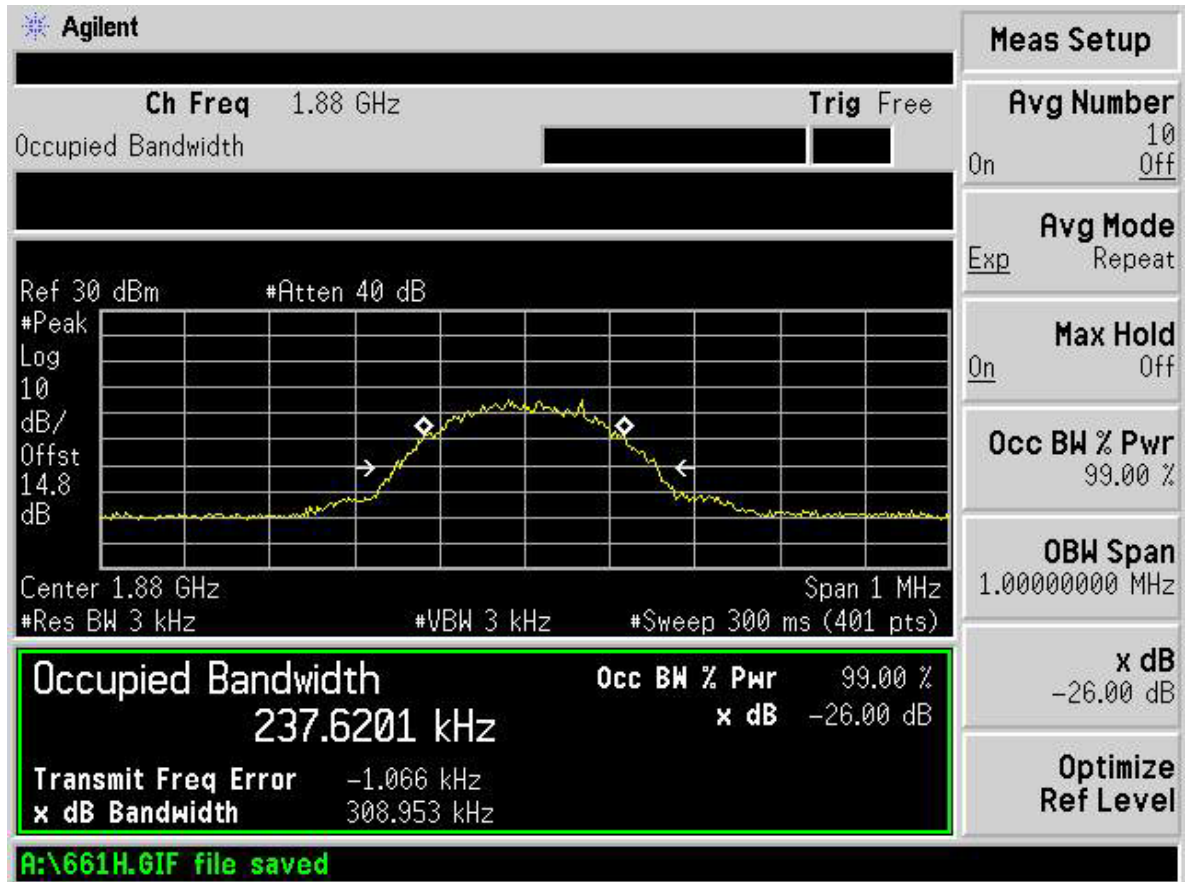




## FCC TEST REPORT

Report No. : FG4N1005-01

- Test Mode : PCS 1900 CH661 99% Occupied Bandwidth
- Power State : Low





## FCC TEST REPORT

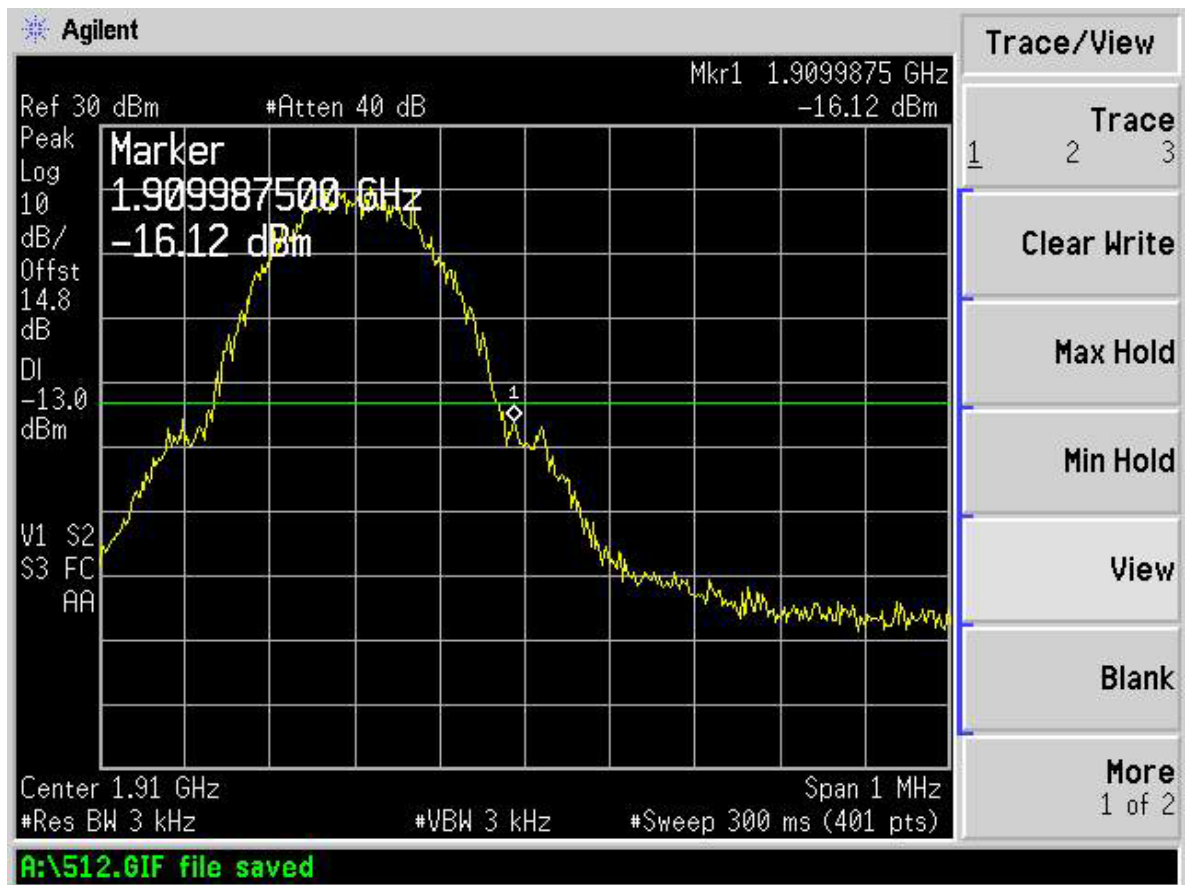
Report No. : FG4N1005-01

- Test Mode : PCS 1900 CH661 99% Occupied Bandwidth
- Power State : High





- Test Mode : PCS 1900 CH661 99% Occupied Band Edge
- Power State : High



## 4.5 Conducted Emission

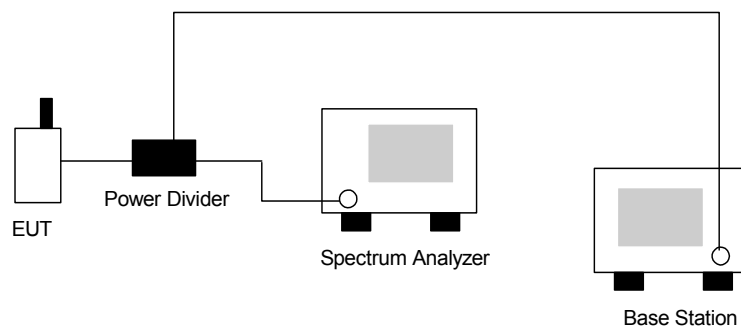
### 4.5.1 Measurement Instruments

As described in chapter 5 of this test report.

### 4.5.2 Test Procedure

1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. The middle channel for the highest RF power within the transmitting frequency was measured.
3. The conducted spurious emission for the whole frequency range was taken.

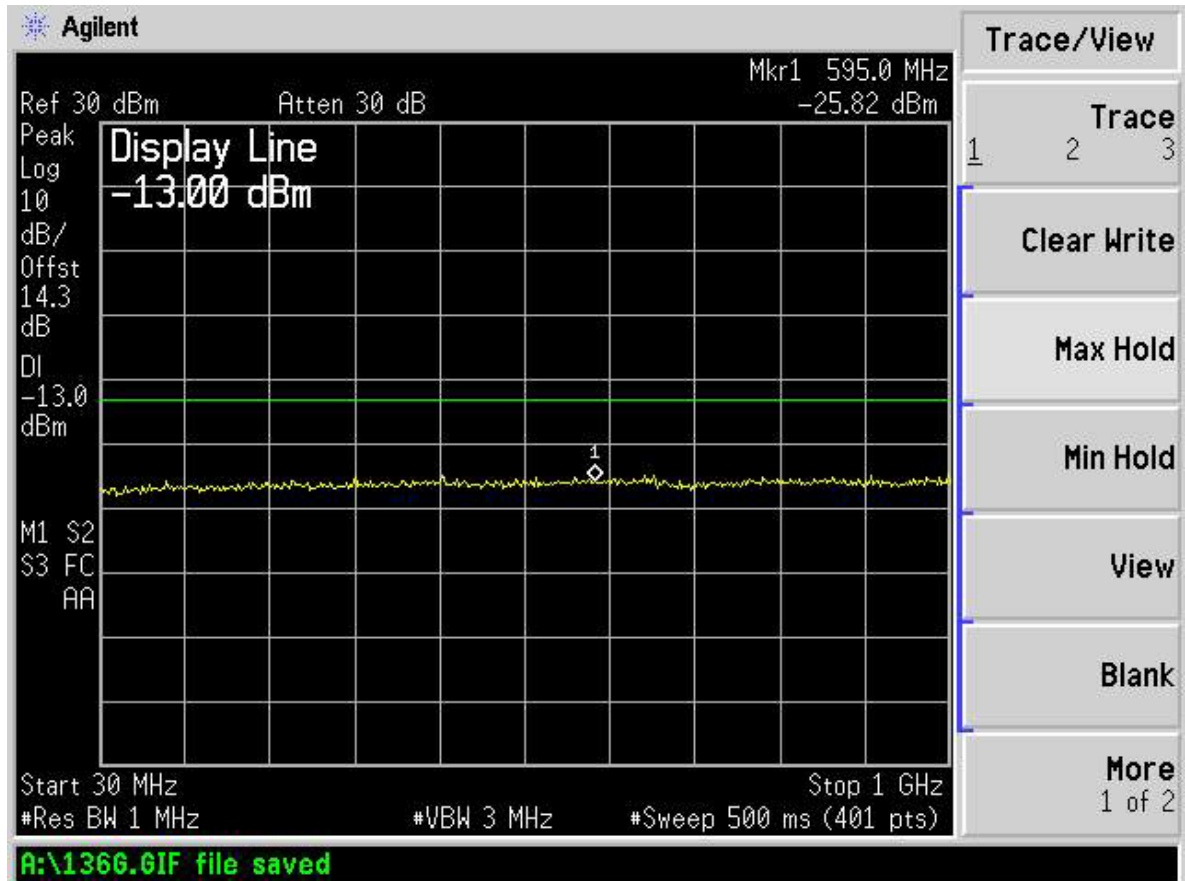
### 4.5.3 Test Setup Layout





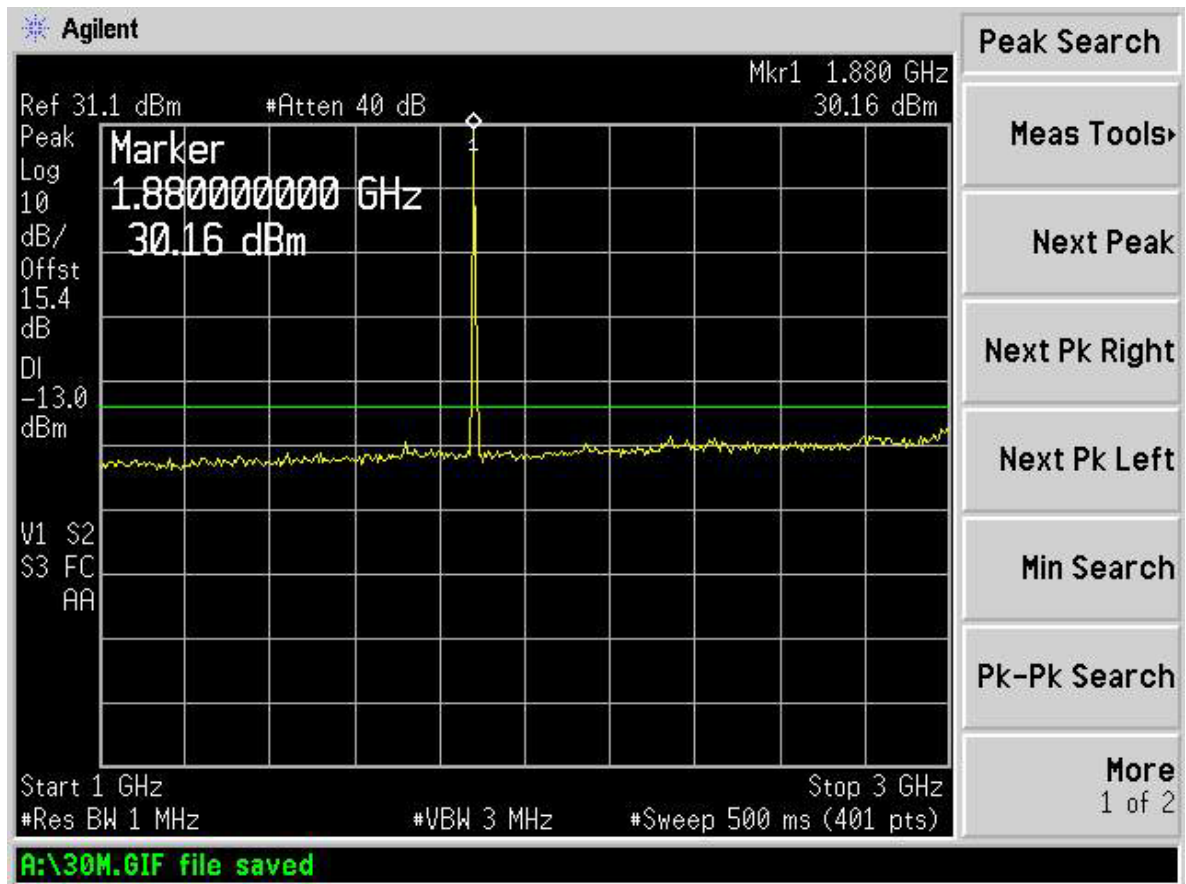
**4.5.4 Test Result**

- Test Mode : PCS 1900 CH661
- Frequency Range : 30M-1G



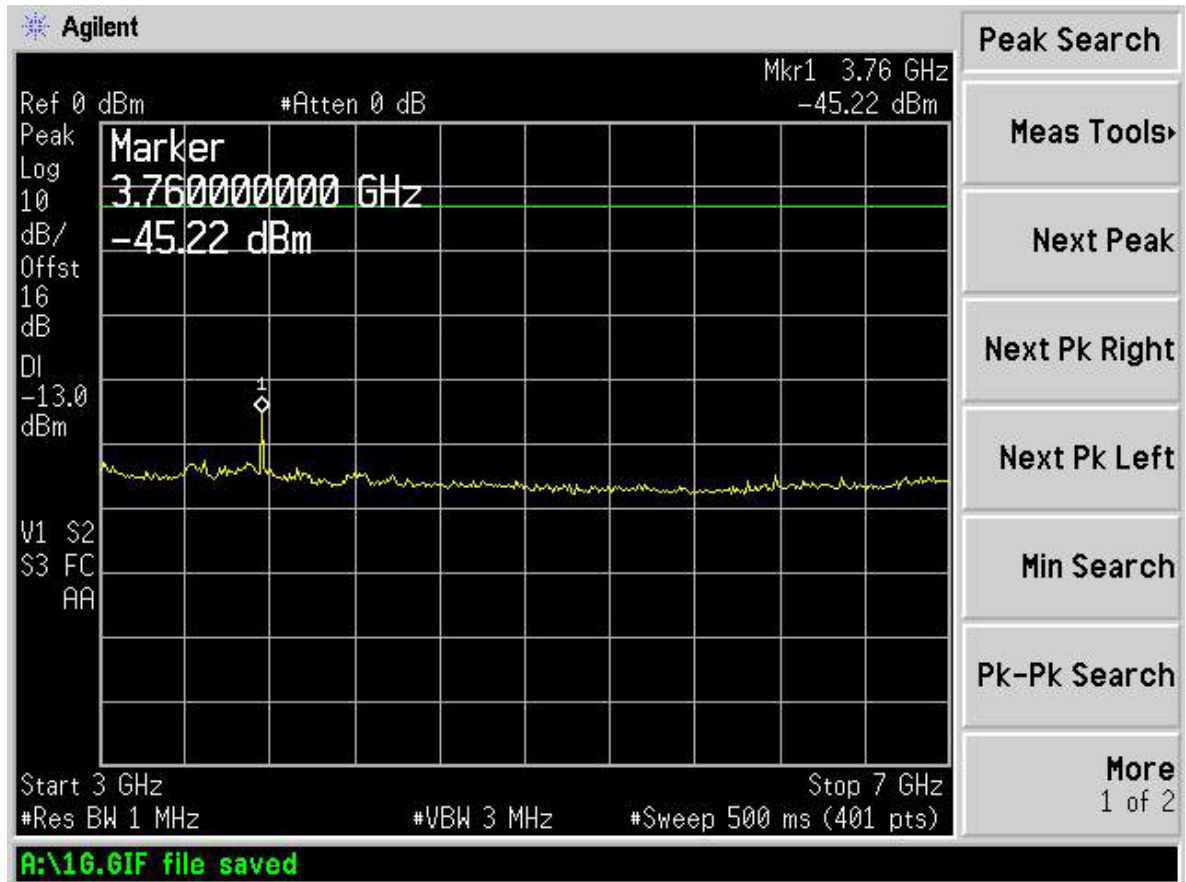


- Test Mode : PCS 1900 CH661
- Frequency Range : 1G-3G



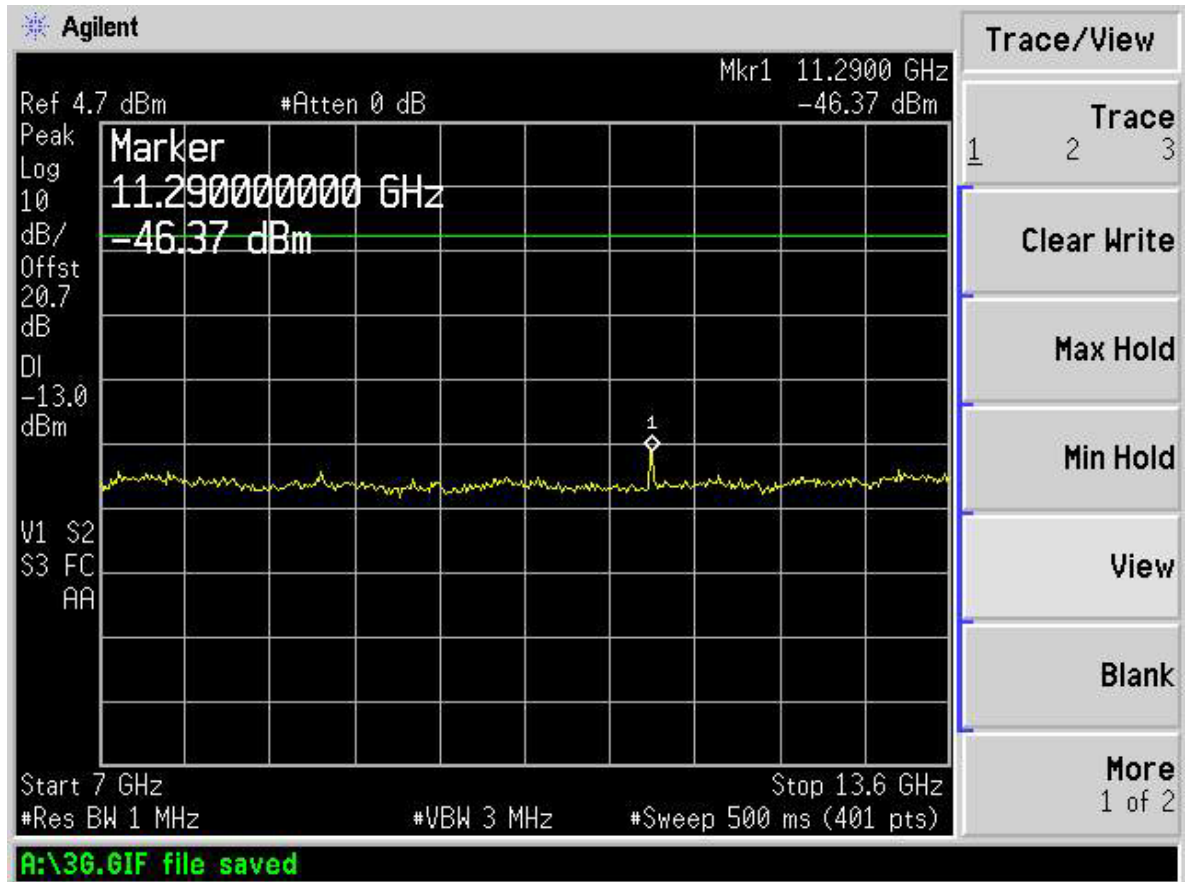


- Test Mode : PCS 1900 CH661
- Frequency Range : 3G-7G



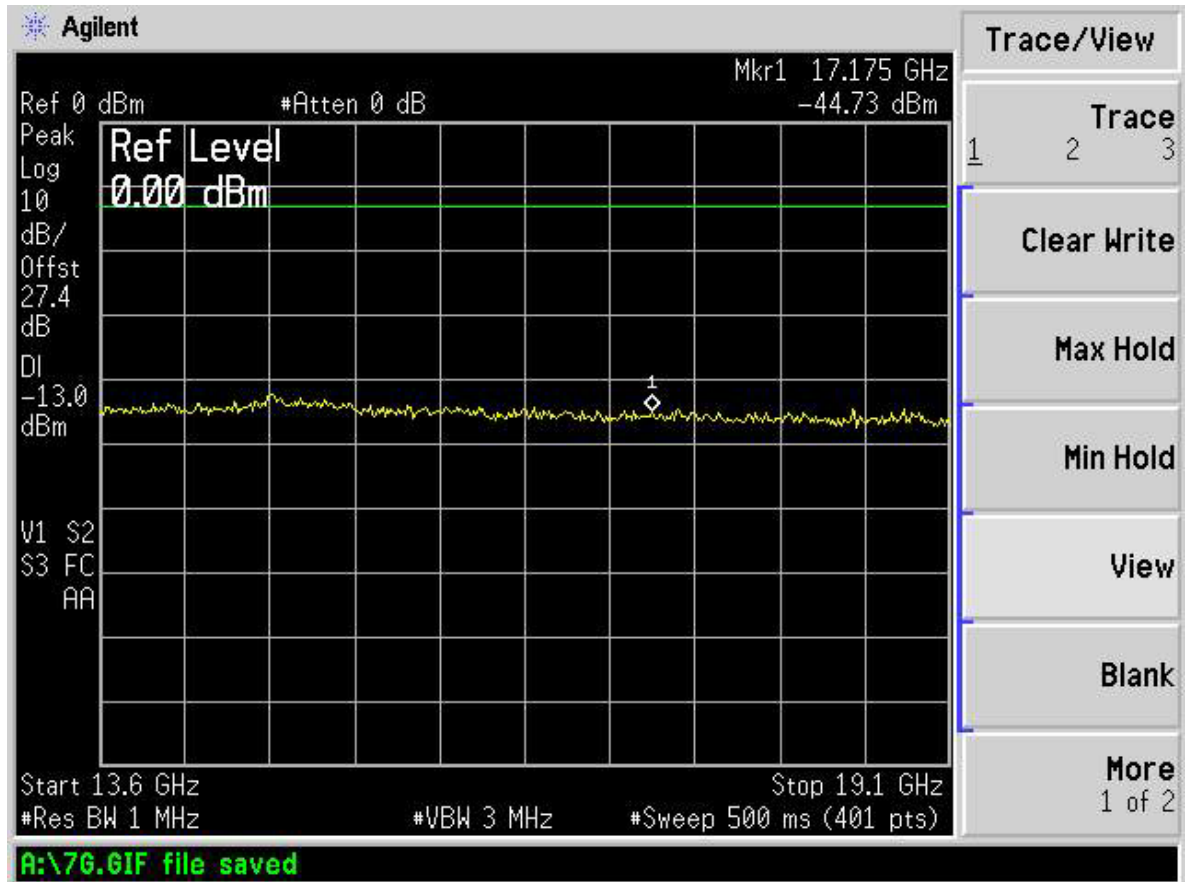


- Test Mode : PCS 1900 CH661
- Frequency Range : 7G-13.6G





- Test Mode : PCS 1900 CH661
- Frequency Range : 13.6G-19.1G



## 4.6 Field Strength of Spurious Radiation

Equivalent isotropic radiated Power Measurements by substitution method according to ANSI/TIA/EIA-603-A.

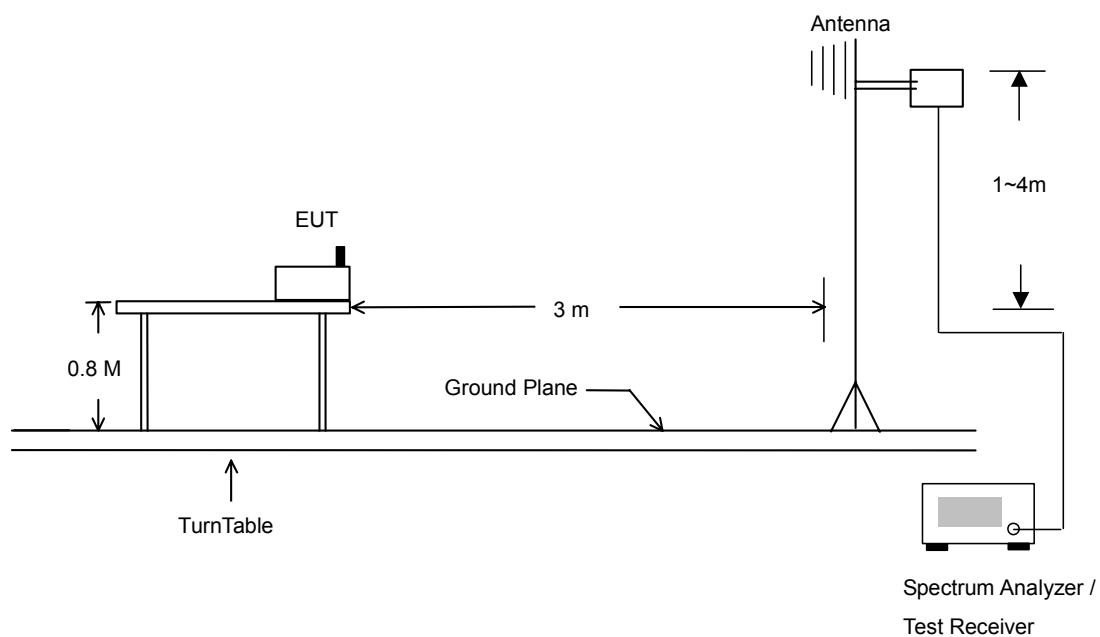
### 4.6.1 Measurement Instruments

As described in chapter 5 of this test report.

### 4.6.2 Test Procedure

1. The EUT was placed on a rotatable wooden table with 0.8 meter about ground.
2. The EUT was set 3 meters from the receiving antenna which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between one meter and four meters to reach the maximum spurious emission for both horizontal and vertical polarizations.
5. Taking the record of maximum spurious emission.
6. A Horn antenna was substituted in place of the EUT and was driven by a signal generator.
7. The conducted power at the terminal of the Horn antenna is measured.
8. Repeat step 3 to step 5.

### 4.6.3 Test Setup Layout



**4.6.4 Test Result**

- Test Mode : PCS 1900 CH 661

| <b>PCS1900 Radiated Spurious EIRP</b> |            |                |                |                    |            |                |                |
|---------------------------------------|------------|----------------|----------------|--------------------|------------|----------------|----------------|
| H Polarization                        |            |                |                | V Polarization     |            |                |                |
| Frequency<br>(MHz)                    | EIRP (dBm) | Limit<br>(dBm) | Margin<br>(dB) | Frequency<br>(MHz) | EIRP (dBm) | Limit<br>(dBm) | Margin<br>(dB) |
| 54.030                                | -64.420    | -13            | -51.42         | 45.390             | -58.180    | -13            | -45.18         |
| 62.130                                | -70.500    | -13            | -57.50         | 54.030             | -53.430    | -13            | -40.43         |
| 210.630                               | -69.080    | -13            | -56.08         | 64.830             | -60.560    | -13            | -47.56         |
| 346.900                               | -70.150    | -13            | -57.15         | 334.300            | -68.560    | -13            | -55.56         |
| 437.900                               | -71.230    | -13            | -58.23         | 351.800            | -69.140    | -13            | -56.14         |
| 448.400                               | -71.160    | -13            | -58.16         | 455.400            | -70.930    | -13            | -57.93         |
| 3758.000                              | -34.880    | -13            | -21.88         | 3758.000           | -37.61     | -13            | -24.61         |
| 5638.000                              | -42.440    | -13            | -29.44         | 5638.000           | -44.240    | -13            | -31.24         |
| 9398.000                              | -36.260    | -13            | -23.26         | 9398.000           | -36.910    | -13            | -23.91         |
|                                       |            |                |                |                    |            |                |                |
|                                       |            |                |                |                    |            |                |                |
|                                       |            |                |                |                    |            |                |                |
|                                       |            |                |                |                    |            |                |                |



## 4.6.5 Test Data

## Horizontal Polarization

|     | Freq   | Level  | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Preamp Factor | Cable Loss | Remark | Ant Pos | Table Pos |
|-----|--------|--------|------------|------------|-------------------|----------------|---------------|------------|--------|---------|-----------|
|     | MHz    | dBm    | dB         | dBm        | dBm               | dB             | dB            | dB         |        | cm      | deg       |
| 1 @ | 54.03  | -64.42 | -51.42     | -13.00     | -52.01            | -12.42         | 0.00          | 0.00       | Peak   | ---     | ---       |
| 2 @ | 62.13  | -70.50 | -57.50     | -13.00     | -58.11            | -12.39         | 0.00          | 0.00       | Peak   | ---     | ---       |
| 3 @ | 210.63 | -69.08 | -56.08     | -13.00     | -56.06            | -13.02         | 0.00          | 0.00       | Peak   | ---     | ---       |

|     | Freq   | Level  | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Preamp Factor | Cable Loss | Remark | Ant Pos | Table Pos |
|-----|--------|--------|------------|------------|-------------------|----------------|---------------|------------|--------|---------|-----------|
|     | MHz    | dBm    | dB         | dBm        | dBm               | dB             | dB            | dB         |        | cm      | deg       |
| 1 @ | 346.90 | -70.15 | -57.15     | -13.00     | -61.85            | -8.31          | 0.00          | 0.00       | Peak   | ---     | ---       |
| 2 @ | 437.90 | -71.23 | -58.23     | -13.00     | -65.26            | -5.97          | 0.00          | 0.00       | Peak   | ---     | ---       |
| 3 @ | 448.40 | -71.16 | -58.16     | -13.00     | -65.33            | -5.83          | 0.00          | 0.00       | Peak   | ---     | ---       |

|     | Freq    | Level  | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Preamp Factor | Cable Loss | Remark | Ant Pos | Table Pos |
|-----|---------|--------|------------|------------|-------------------|----------------|---------------|------------|--------|---------|-----------|
|     | MHz     | dBm    | dB         | dBm        | dBm               | dB             | dB            | dB         |        | cm      | deg       |
| 1 @ | 1884.00 | -42.46 | -29.46     | -13.00     | -41.78            | -0.68          | 0.00          | 0.00       | Peak   | ---     | ---       |
| 2 @ | 1958.00 | -42.84 | -29.84     | -13.00     | -41.73            | -1.11          | 0.00          | 0.00       | Peak   | ---     | ---       |

|     | Freq    | Level  | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Preamp Factor | Cable Loss | Remark | Ant Pos | Table Pos |
|-----|---------|--------|------------|------------|-------------------|----------------|---------------|------------|--------|---------|-----------|
|     | MHz     | dBm    | dB         | dBm        | dBm               | dB             | dB            | dB         |        | cm      | deg       |
| 1 @ | 3758.00 | -34.88 | -21.88     | -13.00     | -42.80            | 7.92           | 0.00          | 0.00       | Peak   | ---     | ---       |

|     | Freq    | Level  | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Preamp Factor | Cable Loss | Remark | Ant Pos | Table Pos |
|-----|---------|--------|------------|------------|-------------------|----------------|---------------|------------|--------|---------|-----------|
|     | MHz     | dBm    | dB         | dBm        | dBm               | dB             | dB            | dB         |        | cm      | deg       |
| 1 @ | 5638.00 | -42.44 | -29.44     | -13.00     | -52.40            | 9.97           | 0.00          | 0.00       | Peak   | ---     | ---       |

|     | Freq    | Level  | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Preamp Factor | Cable Loss | Remark | Ant Pos | Table Pos |
|-----|---------|--------|------------|------------|-------------------|----------------|---------------|------------|--------|---------|-----------|
|     | MHz     | dBm    | dB         | dBm        | dBm               | dB             | dB            | dB         |        | cm      | deg       |
| 1 @ | 9398.00 | -36.26 | -23.26     | -13.00     | -54.48            | 18.22          | 0.00          | 0.00       | Peak   | ---     | ---       |



## Vertical Polarization

|     | Freq  | Level  | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Preamp Factor | Cable Loss | Remark | Ant Pos | Table Pos |
|-----|-------|--------|------------|------------|-------------------|----------------|---------------|------------|--------|---------|-----------|
|     | MHz   | dBm    | dB         | dBm        | dBm               | dB             | dB            | dB         |        | cm      | deg       |
| 1 @ | 45.39 | -58.18 | -45.18     | -13.00     | -44.73            | -13.45         | 0.00          | 0.00       | Peak   | ---     | ---       |
| 2 @ | 54.03 | -53.43 | -40.43     | -13.00     | -39.17            | -14.26         | 0.00          | 0.00       | Peak   | ---     | ---       |
| 3 @ | 64.83 | -60.56 | -47.56     | -13.00     | -47.83            | -12.72         | 0.00          | 0.00       | Peak   | ---     | ---       |

|     | Freq   | Level  | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Preamp Factor | Cable Loss | Remark | Ant Pos | Table Pos |
|-----|--------|--------|------------|------------|-------------------|----------------|---------------|------------|--------|---------|-----------|
|     | MHz    | dBm    | dB         | dBm        | dBm               | dB             | dB            | dB         |        | cm      | deg       |
| 1 @ | 334.30 | -68.56 | -55.56     | -13.00     | -62.84            | -5.72          | 0.00          | 0.00       | Peak   | ---     | ---       |
| 2 @ | 351.80 | -69.14 | -56.14     | -13.00     | -63.79            | -5.34          | 0.00          | 0.00       | Peak   | ---     | ---       |
| 3 @ | 455.40 | -70.93 | -57.93     | -13.00     | -67.27            | -3.66          | 0.00          | 0.00       | Peak   | ---     | ---       |

|     | Freq    | Level  | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Preamp Factor | Cable Loss | Remark | Ant Pos | Table Pos |
|-----|---------|--------|------------|------------|-------------------|----------------|---------------|------------|--------|---------|-----------|
|     | MHz     | dBm    | dB         | dBm        | dBm               | dB             | dB            | dB         |        | cm      | deg       |
| 1 @ | 1874.00 | -39.11 | -26.11     | -13.00     | -38.71            | -0.40          | 0.00          | 0.00       | Peak   | ---     | ---       |
| 2 @ | 1958.00 | -43.77 | -30.77     | -13.00     | -43.17            | -0.60          | 0.00          | 0.00       | Peak   | ---     | ---       |

|     | Freq    | Level  | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Preamp Factor | Cable Loss | Remark | Ant Pos | Table Pos |
|-----|---------|--------|------------|------------|-------------------|----------------|---------------|------------|--------|---------|-----------|
|     | MHz     | dBm    | dB         | dBm        | dBm               | dB             | dB            | dB         |        | cm      | deg       |
| 1 @ | 3758.00 | -37.61 | -24.61     | -13.00     | -44.25            | 6.64           | 0.00          | 0.00       | Peak   | ---     | ---       |

|     | Freq    | Level  | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Preamp Factor | Cable Loss | Remark | Ant Pos | Table Pos |
|-----|---------|--------|------------|------------|-------------------|----------------|---------------|------------|--------|---------|-----------|
|     | MHz     | dBm    | dB         | dBm        | dBm               | dB             | dB            | dB         |        | cm      | deg       |
| 1 @ | 5638.00 | -44.24 | -31.24     | -13.00     | -52.89            | 8.65           | 0.00          | 0.00       | Peak   | ---     | ---       |

|     | Freq    | Level  | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Preamp Factor | Cable Loss | Remark | Ant Pos | Table Pos |
|-----|---------|--------|------------|------------|-------------------|----------------|---------------|------------|--------|---------|-----------|
|     | MHz     | dBm    | dB         | dBm        | dBm               | dB             | dB            | dB         |        | cm      | deg       |
| 1 @ | 9398.00 | -36.91 | -23.91     | -13.00     | -54.11            | 17.20          | 0.00          | 0.00       | Peak   | ---     | ---       |

## 4.7 Frequency Stability (Temperature Variation)

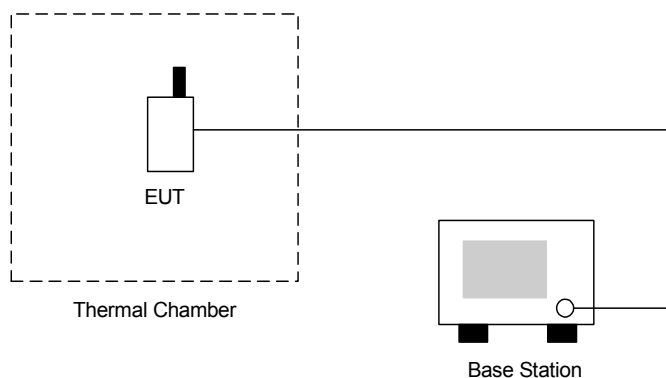
### 4.7.1 Measurement Instrument

As described in chapter 5 of this test report.

### 4.7.2 Test Procedure

1. The EUT and test equipment were set up as shown on the following section.
2. With all power removed, the temperature was decreased to -30°C and permitted to stabilize for three hours. Power was applied and the maximum change in frequency was noted within one minute.
3. With power OFF, the temperature was raised in 10°C steps. The sample was permitted to stabilize at each step for at least one-half hour. Power was applied and the maximum frequency change was noted within one minute.
4. The temperature tests were performed for the worst case.
5. Test data was recorded.

### 4.7.3 Test Setup Layout



### 4.7.4 Test Result

- Test Mode : PCS 1900 CH661

| Temperature(°C) | Change (Hz) | Change (ppm) | Limit (ppm) | Result |
|-----------------|-------------|--------------|-------------|--------|
| -30             | -73         | -0.04        | 2.5         | Passed |
| -20             | -110        | -0.06        |             |        |
| -10             | -118        | -0.06        |             |        |
| 0               | -75         | -0.04        |             |        |
| 10              | -97         | -0.05        |             |        |
| 20              | -167        | -0.09        |             |        |
| 30              | -133        | -0.07        |             |        |
| 40              | -107        | -0.06        |             |        |
| 50              | -129        | -0.07        |             |        |

## 4.8 Frequency Stability (Voltage Variation)

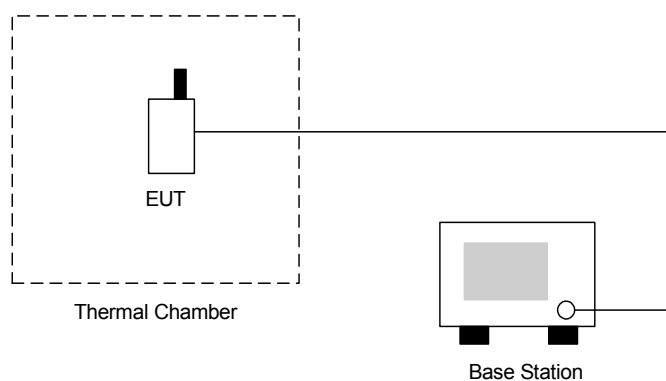
### 4.8.1 Measurement Instrument

As described in chapter 5 of this test report.

### 4.8.2 Test Procedure

1. The EUT was placed in a temperature chamber at  $25 \pm 5^{\circ}\text{C}$  and connected as the following section.
2. The power supply voltage to the EUT was varied from BEP to 115% of the nominal value measured at the input to the EUT.
3. The variation in frequency was measured for the worst case.

### 4.8.3 Test Setup Layout



### 4.8.4 Test Result

- Test Mode : PCS 1900 CH661

| Voltage(Volt) | Change (Hz) | Change (ppm) | Limit (ppm) | Result |
|---------------|-------------|--------------|-------------|--------|
| 3.7           | -167        | -0.09        | 2.5         | Passed |
| BEP           | -162        | -0.09        |             |        |
| 4.3           | -156        | -0.08        |             |        |

Remark:

1. Normal Voltage=3.7V
2. Battery End Point (BEP)=3.3V

**5. List of Measurement Equipments**

| Instrument        | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Due Date      | Remark                |
|-------------------|--------------|-----------|------------|-----------------|------------------|---------------|-----------------------|
| Spectrum analyzer | R&S          | FSP40     | 100057     | 9KHz-40GHz      | Feb. 26, 2004    | Feb. 26, 2005 | Radiation (03CH06-HY) |
| Bilog Antenna     | SCHAFFNER    | CBL6112B  | 2885       | 30MHz -2GHz     | Dec. 18, 2003    | Dec. 18, 2004 | Radiation (03CH06-HY) |
| Horn Antenna      | Com-Power    | AH118     | 071025     | 1G-18G          | Feb. 11, 2004    | Feb. 11, 2005 | Radiation (03CH06-HY) |
| PreAmplifier      | Com-Power    | PA-103    | 161055     | 1MHz - 1000MHz  | Apr. 26, 2004    | Apr. 26, 2005 | Radiation (03CH06-HY) |
| HF Amplifier      | MITEQ        | AFS44     | 973248     | 0.1G - 26.5G    | May. 20, 2004    | May. 20, 2005 | Radiation (03CH06-HY) |
| Base Station      | Agilent      | E5515C    | GB43460754 | N/A             | Jan. 12, 2004    | Jan. 12, 2005 | Base Station          |
| Radio             | R&S          | CMU200    | 105934     | N/A             | Aug. 24, 2004    | Aug. 24, 2005 | Base Station          |
| Thermal Chamber   | Ten Billion  | TTH-D35P  | N/A        | N/A             | NCR              | NCR           | EMS Chamber           |

## 6. Uncertainty Evaluation

### Uncertainty of Conducted Emission Evaluation (30kHz ~ 1000MHz)

| Contribution                                                                                                                 | Uncertainty of $x_i$ |                          | $u(x_i)$ |
|------------------------------------------------------------------------------------------------------------------------------|----------------------|--------------------------|----------|
|                                                                                                                              | dB                   | Probability Distribution |          |
| Receiver reading                                                                                                             | 0.41                 | Normal(k=2)              | 0.21     |
| Antenna factor calibration                                                                                                   | 0.83                 | Normal(k=2)              | 0.42     |
| Cable loss calibration                                                                                                       | 0.25                 | Normal(k=2)              | 0.13     |
| Pre Amplifier Gain calibration                                                                                               | 0.27                 | Normal(k=2)              | 0.14     |
| RCV/SPA specification                                                                                                        | 2.50                 | Rectangular              | 0.72     |
| Antenna Factor Interpolation for Frequency                                                                                   | 1.00                 | Rectangular              | 0.29     |
| Site imperfection                                                                                                            | 1.43                 | Rectangular              | 0.83     |
| Mismatch<br>Receiver VSWR $\Gamma_1 = 0.20$<br>Antenna VSWR $\Gamma_2 = 0.23$<br>Uncertainty = $20\log(1-\Gamma_1*\Gamma_2)$ | +0.39/-0.41          | U-shaped                 | 0.28     |
| <b>combined standard uncertainty <math>U_c(y)</math></b>                                                                     | <b>1.27</b>          |                          |          |
| <b>Measuring uncertainty for a level of confidence of 95% <math>U=2U_c(y)</math></b>                                         | <b>2.54</b>          |                          |          |

### Uncertainty of Radiated Emission Evaluation (1GHz ~ 40GHz)

| Contribution                                                                                                                            | Uncertainty of $x_i$ |                          | $u(x_i)$ | $C_i$ | $C_i * u(x_i)$ |
|-----------------------------------------------------------------------------------------------------------------------------------------|----------------------|--------------------------|----------|-------|----------------|
|                                                                                                                                         | dB                   | Probability Distribution |          |       |                |
| Receiver reading                                                                                                                        | $\pm 0.10$           | Normal(k=1)              | 0.10     | 1     | 0.10           |
| Antenna factor calibration                                                                                                              | $\pm 1.70$           | Normal(k=2)              | 0.85     | 1     | 0.85           |
| Cable loss calibration                                                                                                                  | $\pm 0.50$           | Normal(k=2)              | 0.25     | 1     | 0.25           |
| Receiver Correction                                                                                                                     | $\pm 2.00$           | Rectangular              | 1.15     | 1     | 1.15           |
| Antenna Factor Directional                                                                                                              | $\pm 1.50$           | Rectangular              | 0.87     | 1     | 0.87           |
| Site imperfection                                                                                                                       | $\pm 2.80$           | Triangular               | 1.14     | 1     | 1.14           |
| Mismatch<br>Receiver VSWR $\Gamma_1 = 0.197$<br>Antenna VSWR $\Gamma_2 = 0.194$<br>Uncertainty = $20\log(1-\Gamma_1*\Gamma_2*\Gamma_3)$ | +0.34/-0.35          | U-shaped                 | 0.244    | 1     | 0.244          |
| <b>Combined standard uncertainty <math>U_c(y)</math></b>                                                                                | <b>2.36</b>          |                          |          |       |                |
| <b>Measuring uncertainty for a level of confidence of 95% <math>U=2U_c(y)</math></b>                                                    | <b>4.72</b>          |                          |          |       |                |

$$U = \sqrt{\{(1/2)^2 + (0.3/2)^2 + (2^2 + 0.5^2 + 2^2 + 0.25^2 + 2^2)/3 + (0.54)^2/2\}} = 2.2 \text{ for 10m test distance}$$

$$U = \sqrt{\{(1/2)^2 + (0.3/2)^2 + (2^2 + 3^2 + 2^2 + 0.25^2 + 2^2)/3 + (0.54)^2/2\}} = 2.7 \text{ for 3m test distance}$$

END OF TEST REPORT