# FCC Test Report

| | | |
|---|---|---|
| **EQUIPMENT** | : | **GSM Dual-Band Digital Mobile Phone** |
| **BRAND NAME** | : | **Vodafone** |
| **MODEL NAME** | : | **VDF225FM** |
| **FCC ID** | : | **Q78-VDF225FM** |
| **STANDARD** | : | **47 CFR Part 2, 22(H), 24(E)** |
| **CLASSIFICATION** | : | **PCS Licensed Transmitter Held to Ear (PCE)** |
| **Tx/Rx FREQUENCY RANGE** | : | **GSM850 : 824.2 ~ 848.8 / 869.2 ~ 893.8 MHz**<br>**GSM1900 : 1850.2 ~1909.8 / 1930.2 ~ 1989.8 MHz** |
| **MAX. ERP/EIRP POWER** | : | **GSM850(GSM) : 0.94 W**<br>**GSM1900(GSM) : 1.43 W** |
| **EMISSION DESIGNATOR** | : | **300KGXW** |
| **APPLICANT** | : | **ZTE CORPORATION**<br>ZTE Plaza, Keji Road South, Hi-Tech Industrial Park,Nanshan District,Shenzhen, Guangdong, 518057, P.R.China |

**The product sample received on Sep. 03, 2008 and completely tested on Sep. 12, 2008. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.4-2003 and shown compliance with the applicable technical standards.**

**The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.**

Testing Laboratory 1190

**Reviewed by: Roy Wu / Manager**

***SPORTON INTERNATIONAL (KUNSHAN) INC.***
***No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C.***

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# SUMMARY OF TEST RESULT

| Report Section | FCC Rule | IC Rule | Description | Limit | Result |
|---|---|---|---|---|---|
| 3.1 | §2.1046 | N/A | Conducted Output Power | N/A | PASS |
| 3.2 | §22.913(a)(2) | RSS-132(4.4)<br>SRSP-503(5.1.3) | Effective Radiated Power | < 7 Watts for FCC<br>(<6.3 Watts for IC) | PASS |
| 3.2 | §24.232(c) | RSS-133 (6.4)<br>SRSP-510(5.1.2) | Equivalent Isotropic Radiated Power | < 2 Watts | PASS |
| 3.3 | §2.1049<br>§22.917(a)<br>§24.238(a) | N/A | Occupied Bandwidth | N/A | PASS |
| 3.3 | §2.1051<br>§22.917(a)<br>§24.238(a) | RSS-132 (4.5.1)<br>RSS-133 (6.5.1) | Band Edge Measurement | < $43+10\log_{10}$(P[Watts]) | PASS |
| 3.4 | §2.1051<br>§22.917(a)<br>§24.238(a) | RSS-132 (4.5.1)<br>RSS-133 (6.5.1) | Conducted Emission | < $43+10\log_{10}$(P[Watts]) | PASS |
| 3.5 | §2.1053<br>§22.917(a)<br>§24.238(a) | RSS-132 (4.5.1)<br>RSS-133 (6.5.1) | Field Strength of Spurious Radiation | < $43+10\log_{10}$(P[Watts]) | PASS |
| 3.6 | §2.1055<br>§22.355<br>§24.235 | RSS-132(4.3)<br>RSS-133(6.3) | Frequency Stability for Temperature & Voltage | < 2.5 ppm | PASS |

# REVISION HISTORY

| REPORT NO. | VERSION | DESCRIPTION | ISSUED DATE |
|---|---|---|---|
| FG890310 | Rev. 01 | Initial Release | Oct. 02, 2008 |
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# 1 General Description

## 1.1 Applicant

**ZTE CORPORATION**

ZTE Plaza, Keji Road South, Hi-Tech Industrial Park,Nanshan District,Shenzhen, Guangdong, 518057, P.R.China

## 1.2 Manufacturer

**ZTE CORPORATION**

ZTE Plaza, Keji Road South, Hi-Tech Industrial Park,Nanshan District,Shenzhen, Guangdong, 518057, P.R.China

## 1.3 Feature of Equipment Under Test

| Product Feature & Specification | |
|---|---|
| **Equipment** | GSM Dual-Band Digital Mobile Phone |
| **Brand Name** | Vodafone |
| **Model Name** | VDF225FM |
| **Tx Frequency** | GSM850 : 824 MHz ~ 849 MHz<br>GSM1900 : 1850 MHz ~ 1910 MHz |
| **Rx Frequency** | GSM850 : 869 MHz ~ 894 MHz<br>GSM1900 : 1930 MHz ~ 1990 MHz |
| **Maximum Output Power to Antenna** | GSM850 : 31.12 dBm<br>GSM1900 : 28.75 dBm |
| **Maximum ERP/EIRP** | GSM850(GSM: 0.94 W ( 29.72 dBm )<br>GSM1900(GSM) : 1.43 W ( 31.54 dBm ) |
| **Antenna Type** | Fixed Internal Antenna with gain 1.31 dBi |
| **HW Version** | g3dB |
| **SW Version** | SFR-P108A2FM(U)B01-FrEsPtIt-FR01\\ng3dBV2.0 |
| **Type of Modulation** | GMSK |
| **Type of Emission** | 300KGXW |
| **EUT Stage** | Production Unit |

**2nd component Source List**

| Component Model | | |
|---|---|---|
| **AC Adapter** | **Brand Name** | ZTE CORPORATION |
| | **Model Name** | STC-A22O50U8-C |
| | **Power Rating** | I/P: 100-240Vac, 50-60Hz, 200mA;<br>O/P: 5Vdc, 700mA |
| | **AC Power Cord Type** | 1.2 meter non-shielded cable without ferrite core |
| **Battery** | **Brand Name** | ZTE CORPORATION |
| | **Model Name** | Li3706T42P3h383857 |
| | **Power Rating** | 3.7Vdc, 670mmAh |
| | **Type** | Li-ion |
| **Earphone** | **Brand Name** | ZTE CORPORATION |
| | **Model Name** | TMD-600U//SF-880KM-1//DEM-1//GS-354M |
| **LCD Panel** | **Brand Name** | LEAD COMMUNICATIONS LTD |
| | **Model Name** | CMC-GG1P0087DTSW-W-E//P106B6F//TM128128-CKFWG48-9 |

Remark:

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. For accessories equipped with this EUT, please refer to the appendix of the external photo.

## 1.4 Testing Site

| | | |
|---|---|---|
| **Test Site** | Sporton International (Kunshan) Inc. | |
| **Test Site Location** | No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C.<br>TEL: 86-0512-5790-0158<br>FAX: 86-0512-5790-0958 | |
| **Test Site No.** | **Sporton Site No.** | |
| | TH01-KS | 03CH01-KS |

## 1.5 Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- Preliminary Guidance for Receiving Applications for Certification of 3G Device. May 9, 2006.
- 47 CFR Part 2, 22(H), 24(E)
- ANSI C63.4-2003
- ANSI / TIA / EIA-603-C-2004
- IC RSS-132, RSS-133

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B (DoC), recorded in a separate test report.

## 1.6 Ancillary Equipment List

| Item | Equipment | Trade Name | Model No. | FCC ID | Data Cable | Power Code |
|---|---|---|---|---|---|---|
| 1. | GSM Base Station | R&S | CMU200 | N/A | N/A | Unshielded, 1.8m |

# 2 Test Configuration of Equipment Under Test

## 2.1 Test Mode

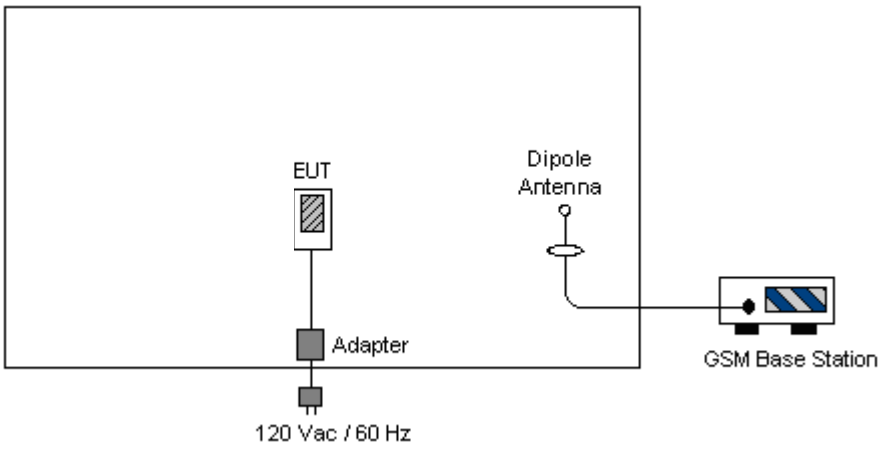
During all testing, EUT is in link mode with base station emulator at maximum power level. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range, and EUT is rotated on three test planes to find out the worst emission.

Frequency range investigated for radiated emission is as follows:

1. 30 MHz to 9000 MHz for GSM850 and WCDMA Band V
2. 30MHz to 19000 MHz for GSM1900 and WCDMA Band II.

| Test Modes | | |
|---|---|---|
| **Band** | **Radiated TCs** | **Conducted TCs** |
| **GSM 850** | ■ GSM Link | ■ GSM Link |
| **GSM 1900** | ■ GSM Link | ■ GSM Link |

## 2.2 Connection Diagram of Test System



# 3 Test Result

## 3.1 Conducted Output Power Measurement

### 3.1.1 Description of the Conducted Output Power Measurement

A base station simulator was used to establish communication with the EUT. Its parameters were set to transmit the maximum power on the EUT. The measured power in the radio frequency on the transmitter output terminals shall be reported.

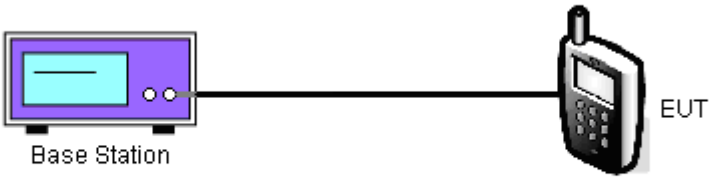
### 3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.1.3 Test Procedures

1. The transmitter output port was connected to base station.
2. Set EUT at maximum power through base station.
3. Select lowest, middle, and highest channels for each band and different modulation.

### 3.1.4 Test Setup



### 3.1.5 Test Result of Conducted Output Power

| Cellular | | | | |
|---|---|---|---|---|
| Modes | Channel | Frequency (MHz) | Conducted Power | |
| | | | (dBm) | (Watts) |
| GSM | 128 (Low) | 824.2 | 31.01 | 1.26 |
| | 189 (Mid) | 836.4 | 31.12 | 1.29 |
| | 251 (High) | 848.8 | 30.93 | 1.24 |

| PCS | | | | |
|---|---|---|---|---|
| Modes | Channel | Frequency (MHz) | Conducted Power | |
| | | | (dBm) | (Watts) |
| GSM | 512 (Low) | 1850.2 | 28.75 | 0.75 |
| | 661 (Mid) | 1880.0 | 28.53 | 0.71 |
| | 810 (High) | 1909.8 | 28.24 | 0.67 |

# 3.2 Effective Radiated Power and Effective Isotropic Radiated Power Measurement

## 3.2.1 Description of the ERP/EIRP Measurement

ERP/EIRP is measured by substitution method according to
ANSI / TIA / EIA-603-C-2004. The ERP of mobile transmitters must not exceed 7 Watts and the EIRP of mobile transmitters are limited to 2 Watts.

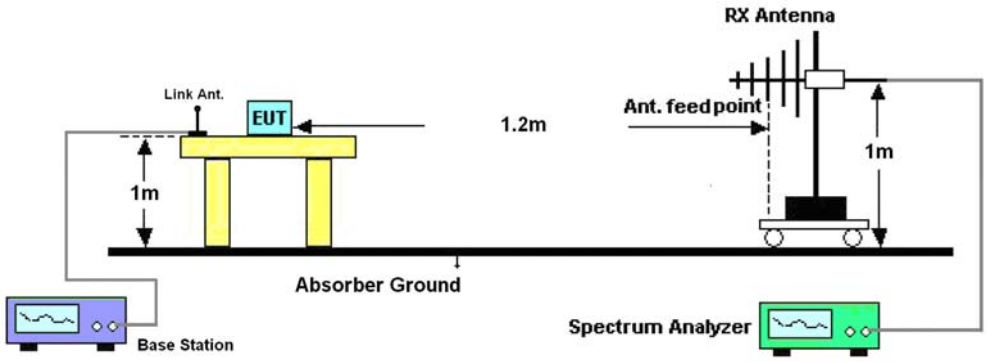
## 3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

## 3.2.3 Test Procedures

1. The EUT was placed on a tutntable with 1.0 meter height in a fully anechoic chamber.
2. The EUT was set at 1.2 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 adjusted to look for the maximum ERP/EIRP.
5. Taking the record of maximum ERP/EIRP.
6. A dipole antenna was substituted in place of the EUT and was driven by a signal generator.
7. The conducted power at the terminal of the dipole antenna is measured.
8. Repeat step 3 to step 5 to get the maximum ERP/EIRP of the substitution antenna.
9. ERP/EIRP = Ps + Et – Es + Gs = Ps + Rt – Rs + Gs
   Ps (dBm)：Input power to substitution antenna.
   Gs (dBi or dBd)：Substitution antenna Gain.
   Et = Rt + AF
   Es = Rs + AF
   AF (dB/m)：Receive antenna factor
   Rt：The highest received signal in spectrum analyzer for EUT.
   Rs：The highest received signal in spectrum analyzer for substitution antenna.

## 3.2.4 Test Setup



### 3.2.5 Test Result of ERP

| GSM850 (GSM) Radiated Power ERP | | | | | | |
|---|---|---|---|---|---|---|
| Horizontal Polarization | | | | | | |
| **Frequency (MHz)** | **Rt (dBm)** | **Rs (dBm)** | **Ps (dBm)** | **Gs (dBd)** | **ERP (dBm)** | **ERP (W)** |
| 824.20 | -37.37 | -48.12 | 0.00 | -1.08 | 9.67 | 0.01 |
| 836.40 | -38.40 | -48.28 | 0.00 | -0.93 | 8.95 | 0.01 |
| 848.80 | -37.91 | -48.35 | 0.00 | -0.76 | 9.68 | 0.01 |
| Vertical Polarization | | | | | | |
| **Frequency (MHz)** | **Rt (dBm)** | **Rs (dBm)** | **Ps (dBm)** | **Gs (dBd)** | **ERP (dBm)** | **ERP (W)** |
| 824.20 | -17.17 | -47.97 | 0.00 | -1.08 | 29.72 | 0.94 |
| 836.40 | -17.49 | -48.01 | 0.00 | -0.93 | 29.59 | 0.91 |
| 848.80 | -17.71 | -48.05 | 0.00 | -0.76 | 29.58 | 0.91 |

### 3.2.6 Test Result of EIRP

| GSM1900 (GSM) Radiated Power EIRP | | | | | | |
|---|---|---|---|---|---|---|
| Horizontal Polarization | | | | | | |
| **Frequency (MHz)** | **Rt (dBm)** | **Rs (dBm)** | **Ps (dBm)** | **Gs (dBi)** | **EIRP (dBm)** | **EIRP (W)** |
| 1850.20 | -22.44 | -51.88 | 0.00 | 1.96 | 31.40 | 1.38 |
| 1880.00 | -24.25 | -52.99 | 0.00 | 2.00 | 30.74 | 1.19 |
| 1909.80 | -27.25 | -54.28 | 0.00 | 1.98 | 29.01 | 0.80 |
| Vertical Polarization | | | | | | |
| **Frequency (MHz)** | **Rt (dBm)** | **Rs (dBm)** | **Ps (dBm)** | **Gs (dBi)** | **EIRP (dBm)** | **EIRP (W)** |
| 1850.20 | -22.55 | -52.13 | 0.00 | 1.96 | 31.54 | 1.43 |
| 1880.00 | -24.13 | -53.17 | 0.00 | 2.00 | 31.04 | 1.27 |
| 1909.80 | -26.45 | -54.13 | 0.00 | 1.98 | 29.66 | 0.92 |

## 3.3 Occupied Bandwidth and Band Edge Measurement

### 3.3.1 Description of Occupied Bandwidth and Band Edge Measurement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least 43 + 10 log (P) dB.

The emission bandwidth is defined as the width of the signal between two points, located at the 2 sides of the carrier frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

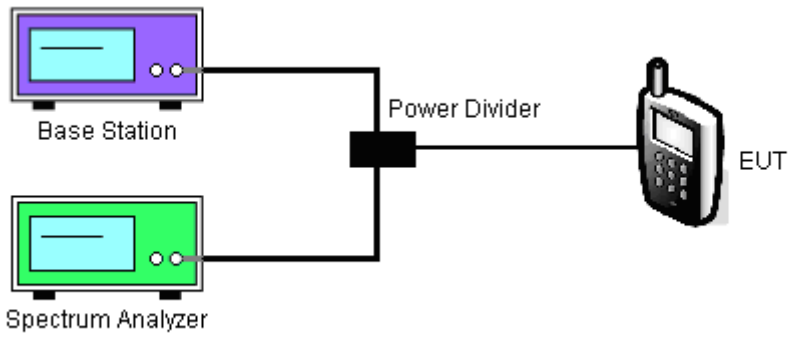
### 3.3.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.3.3 Test Procedures

1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. The 99% and 26 dB occupied bandwidth (BW) of the low, middle and high channels for the highest RF powers were measured.
3. The band edges of low and high channels for the highest RF powers were measured. Setting RBW as roughly BW/100.
4. The RBW was replaced by 10 kHz, due to the spectrum analyzer IF-Filter including an excess of the limit. A worst case correction factor of 10 log (1% BW/measurement RBW) was implemented.

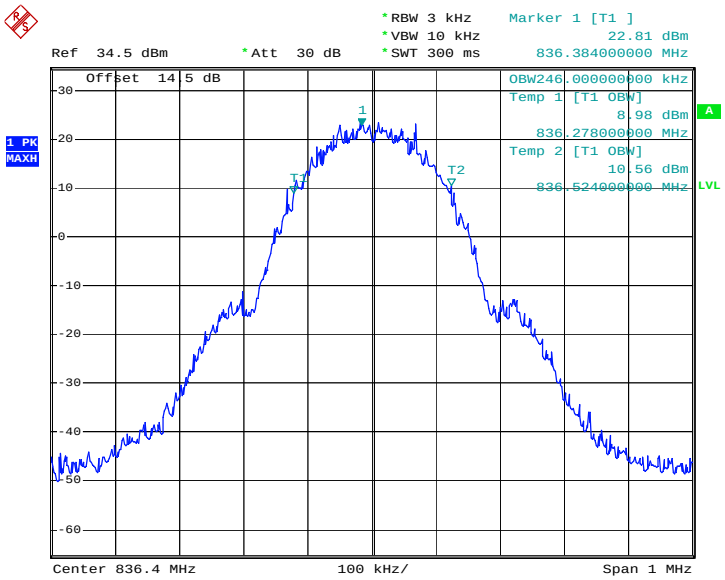
### 3.3.4 Test Setup



## 3.3.5 Test Result (Plots) of Occupied Bandwidth

| Band : | GSM 850 | Power Stage : | High |
|---|---|---|---|
| Test Mode : | GSM Link | | |

### 99% Occupied Bandwidth Plot on Channel 189

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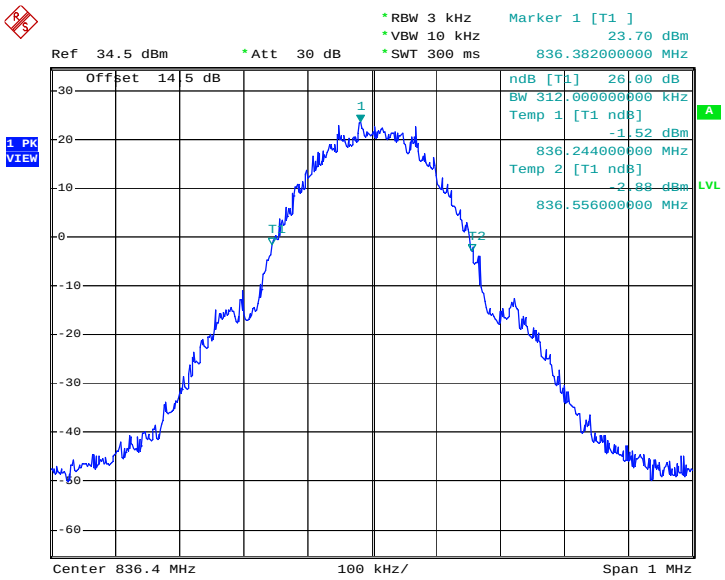
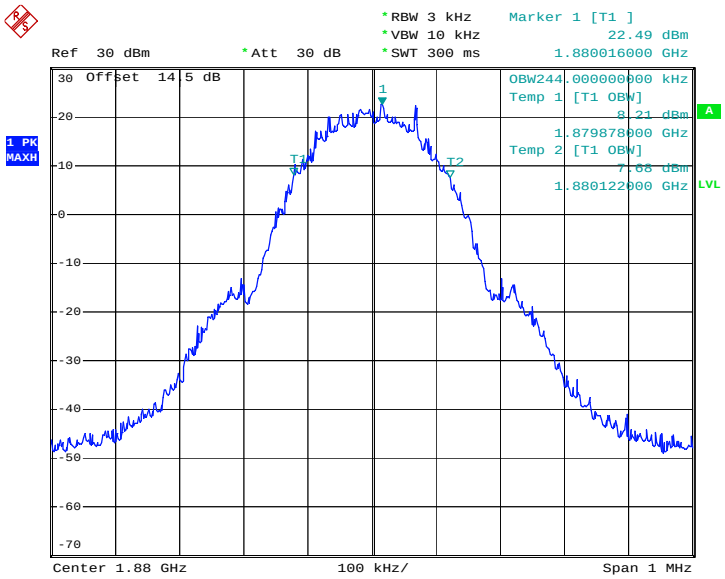
### 26dB Bandwidth Plot on Channel 189




Date: 12.SEP.2008 12:59:35

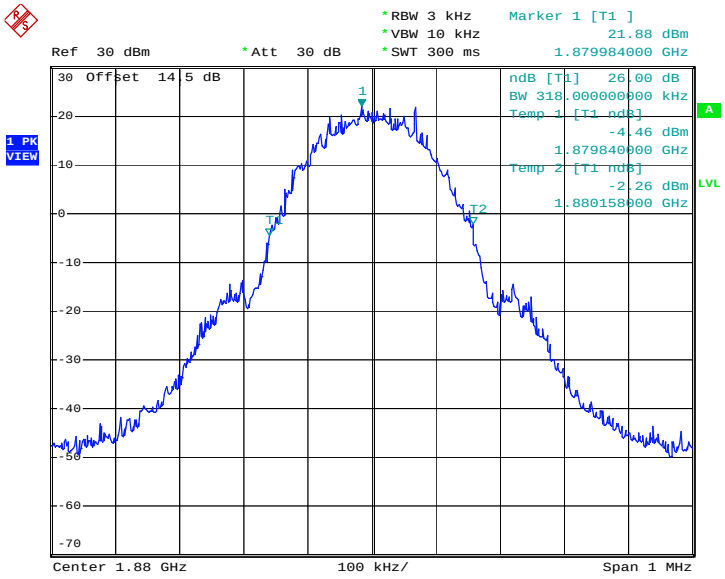
| Band : | GSM 1900 | Power Stage : | High |
|---|---|---|---|
| Test Mode : | GSM Link | | |

### 99% Occupied Bandwidth Plot on Channel 661




Date: 12.SEP.2008 09:01:38

### 26dB Bandwidth Plot on Channel 661

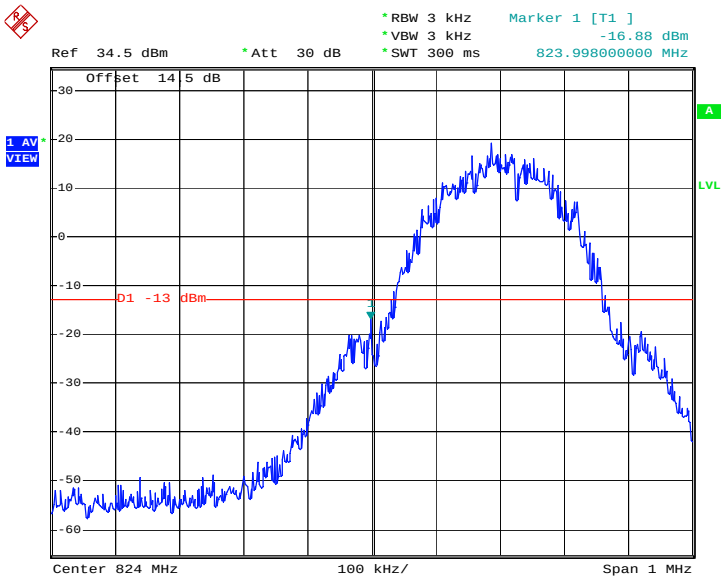



Date: 12.SEP.2008 08:44:17

## 3.3.6 Test Result (Plots) of Conducted Band Edges

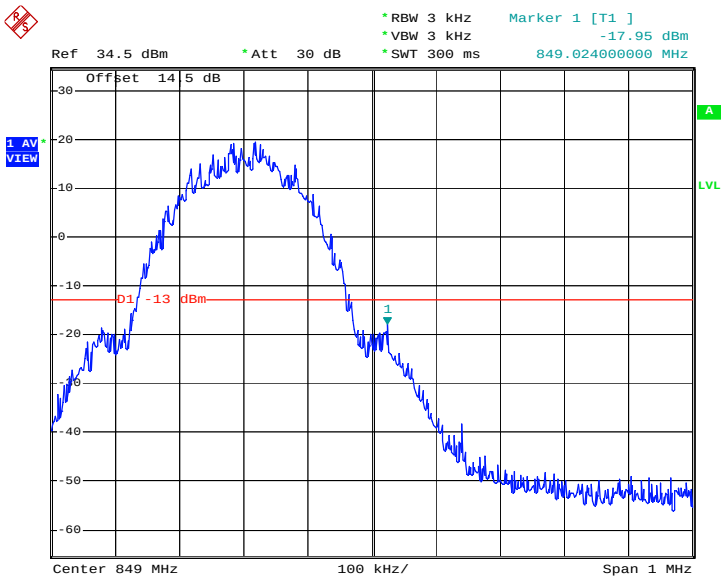
| Band : | GSM850 | Power Stage : | High |
|---|---|---|---|
| Test Mode : | GSM Link | | |

### Lower Band Edge Plot on Channel 128




Date: 12.SEP.2008 13:01:51

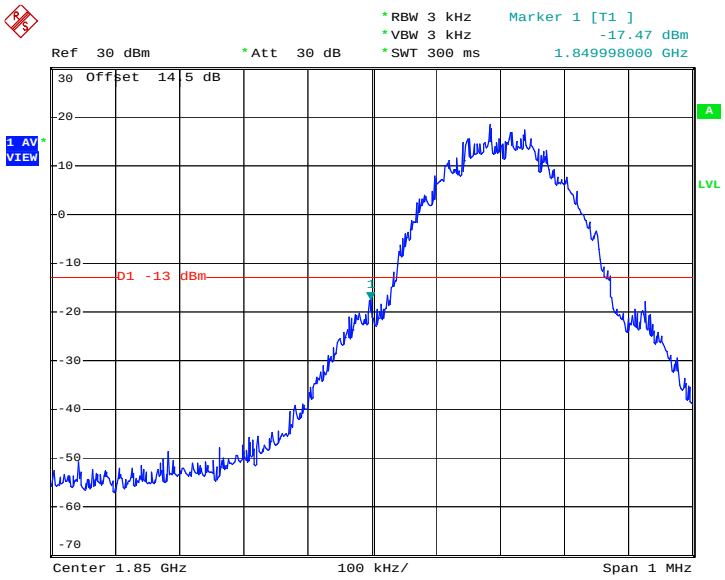
### Higher Band Edge Plot on Channel 251




Date: 12.SEP.2008 13:02:43

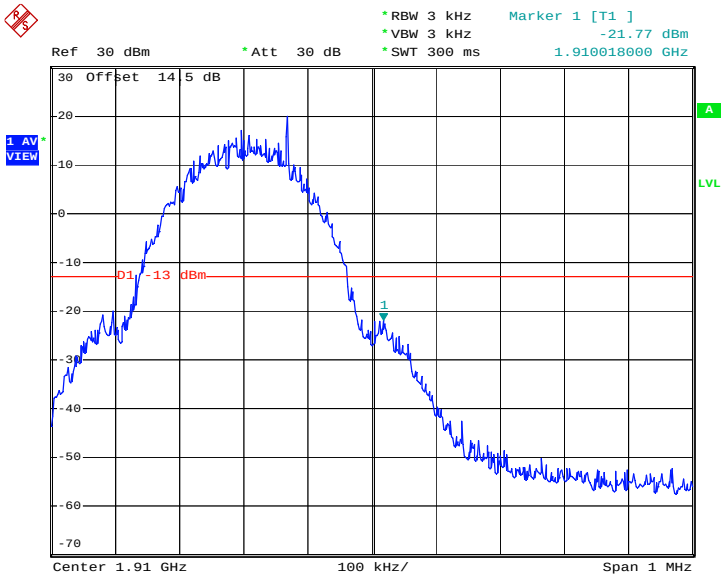
| Band : | GSM1900 | Power Stage : | High |
|---|---|---|---|
| Test Mode : | GSM Link | | |

## Lower Band Edge Plot on Channel 512




Date: 12.SEP.2008 08:50:37

## Higher Band Edge Plot on Channel 810




Date: 12.SEP.2008 08:56:44

# 3.4 Conducted Emission Measurement

## 3.4.1 Description of Conducted Emission Measurement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least 43 + 10 log (P) dB.

It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10$^{th}$ harmonic.

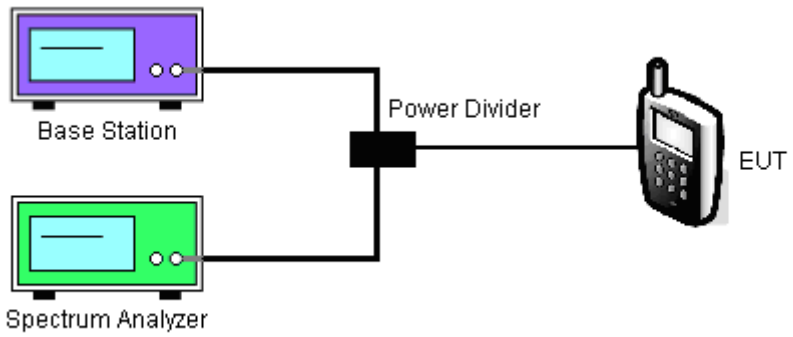
## 3.4.2 Measuring Instruments

See list of measuring instruments of this test report.

## 3.4.3 Test Procedures

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.

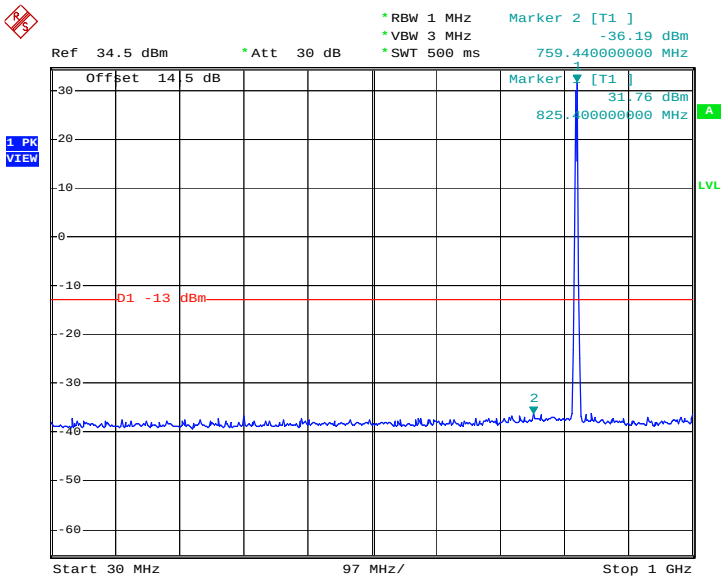
## 3.4.4 Test Setup



## 3.4.5 Test Result of Conducted Emission

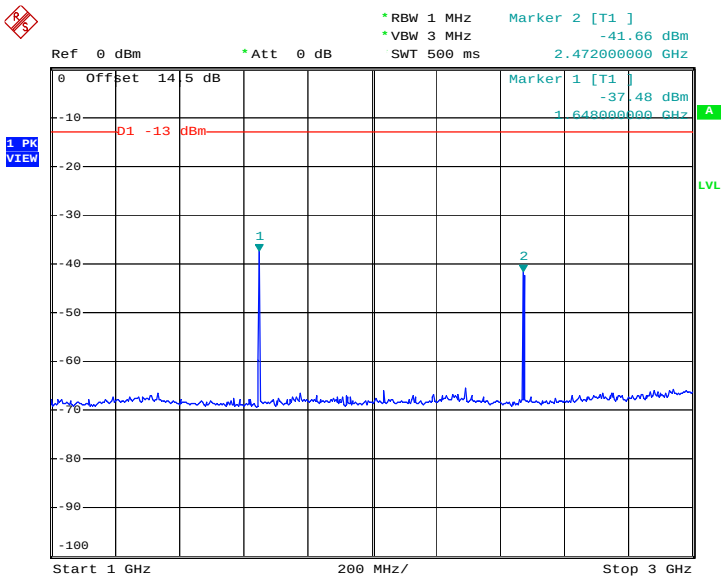
| Band : | GSM850 | Channel : | CH189 |
|---|---|---|---|
| Test Mode : | GSM Link | | |

### Conducted Emission Plot between 30M-1G



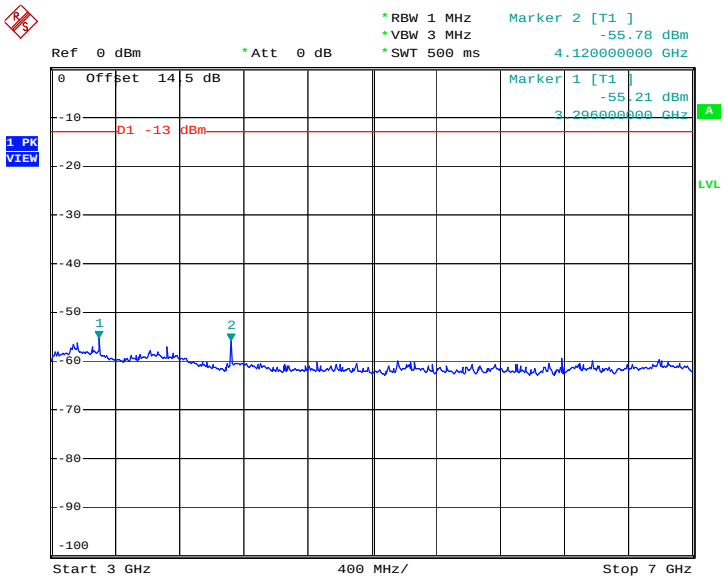

Date: 12.SEP.2008 12:43:10

### Conducted Emission Plot between 1GHz ~ 3GHz



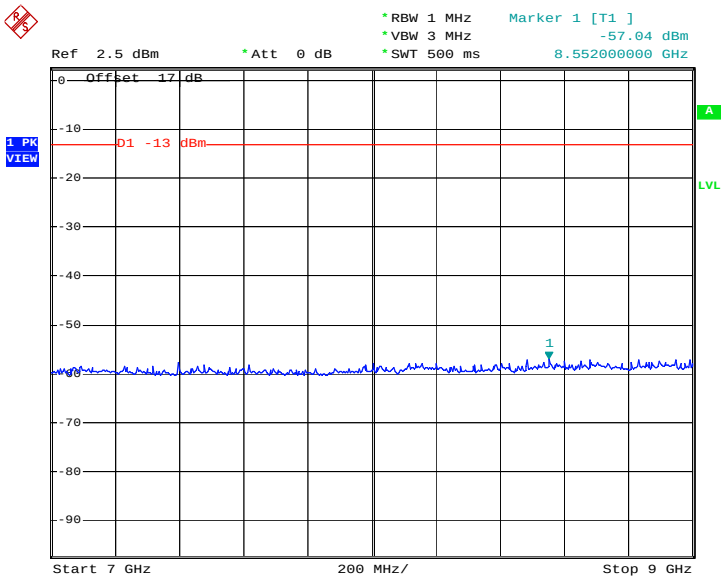

Date: 12.SEP.2008 12:45:10

## Conducted Emission Plot between 3GHz ~ 7GHz




Date: 12.SEP.2008 12:46:30

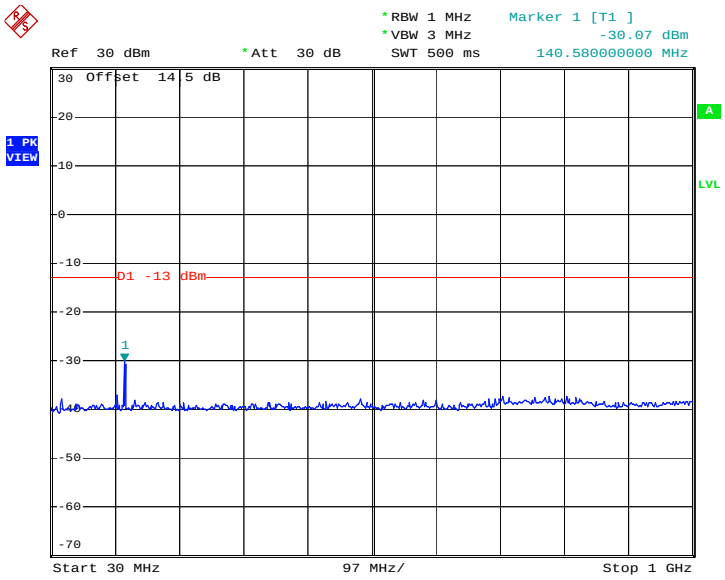
## Conducted Emission Plot between 7GHz ~ 9GHz




Date: 12.SEP.2008 12:47:33

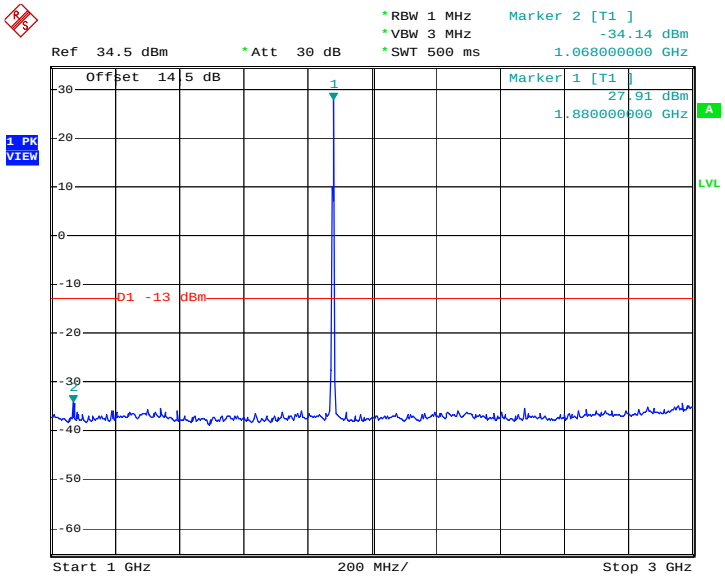
| Band : | GSM1900 | Channel : | CH661 |
|---|---|---|---|
| Test Mode : | GSM Link | | |

## Conducted Emission Plot between 30M-1G



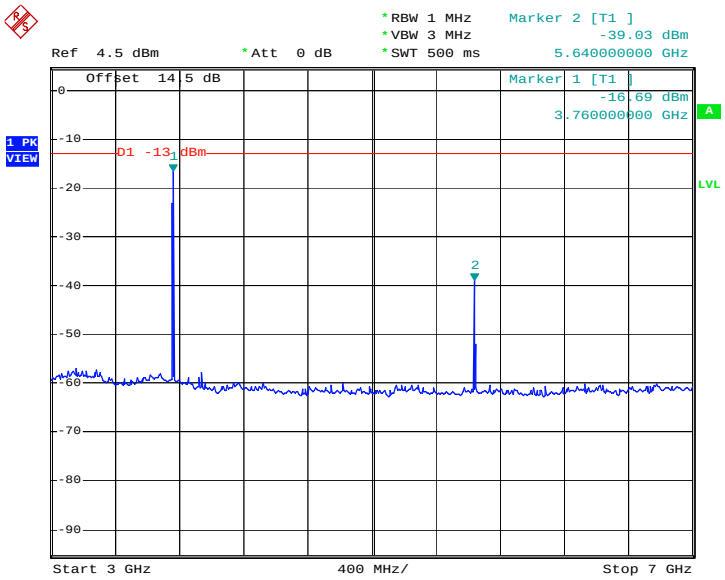

Date: 12.SEP.2008 10:48:02

## Conducted Emission Plot between 1GHz ~ 3GHz



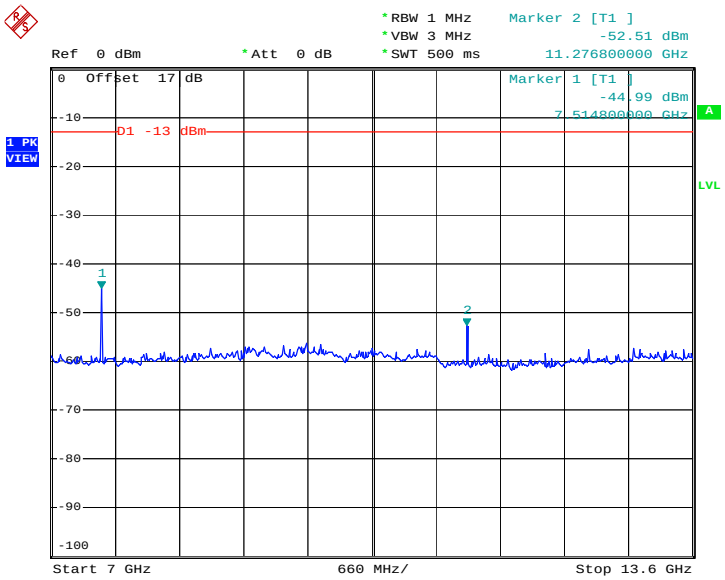

Date: 12.SEP.2008 10:44:45

## Conducted Emission Plot between 3G-7G



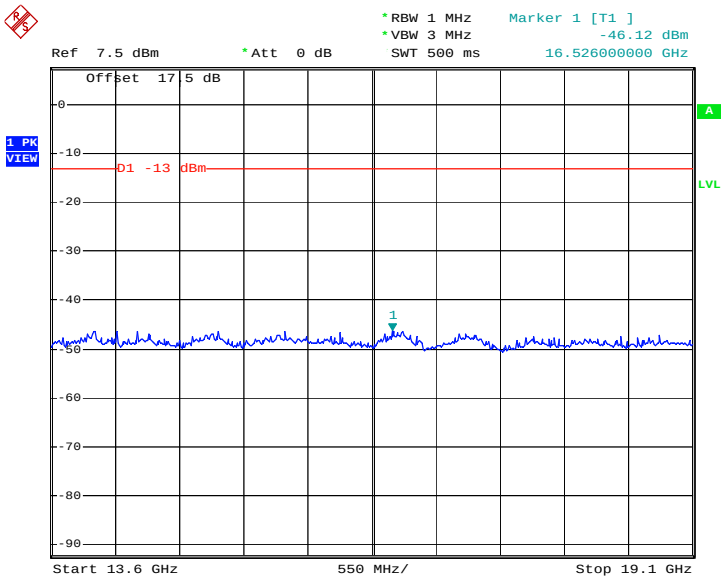

Date: 12.SEP.2008 10:43:22

## Conducted Emission Plot between 7G-13.6G




Date: 12.SEP.2008 10:42:18

## Conducted Emission Plot between 13.6G-19.1G




Date: 12.SEP.2008 10:46:28

# 3.5 Field Strength of Spurious Radiation Measurement

## 3.5.1 Description of Field Strength of Spurious Radiated Measurement

The radiated spurious emission was measured by substitution method according to ANSI / TIA / EIA-603-C-2004. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least 43 + 10 log (P) dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

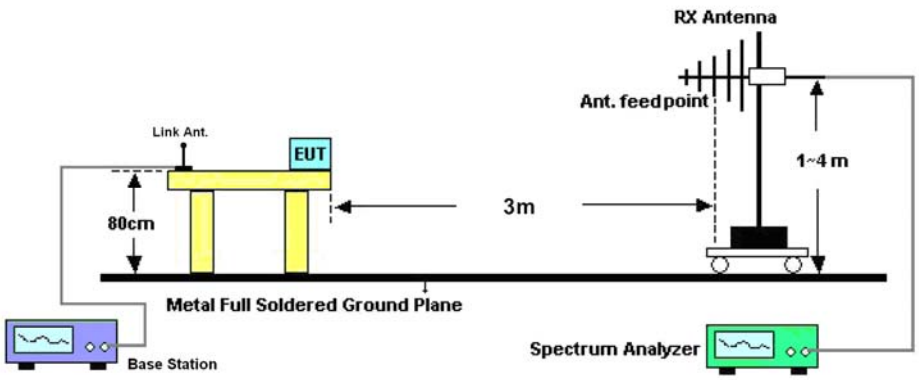
## 3.5.2 Measuring Instruments

See list of measuring instruments of this test report.

## 3.5.3 Test Procedures

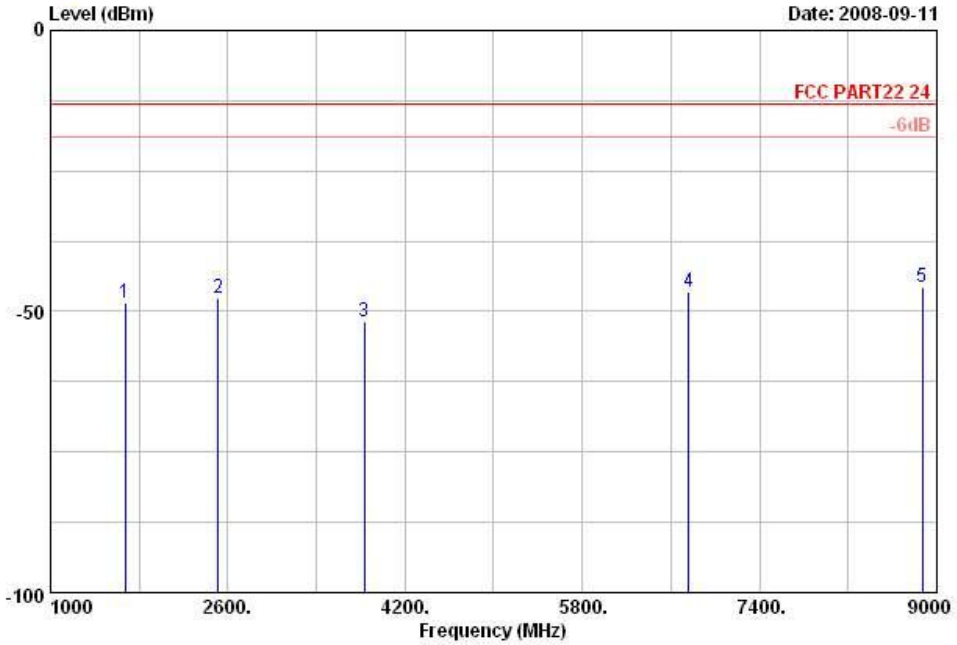
1. The EUT was placed on a rotatable wooden table with 0.8 meter about ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between one meter and four meters to search 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. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
8. Taking the record of output power at antenna port.
9. Repeat step 7 to step 8 for another polarization.
10. Emission level (dBm) = output power + substitution Gain.

## 3.5.4 Test Setup



### 3.5.5 Test Result of Field Strength of Spurious Radiated

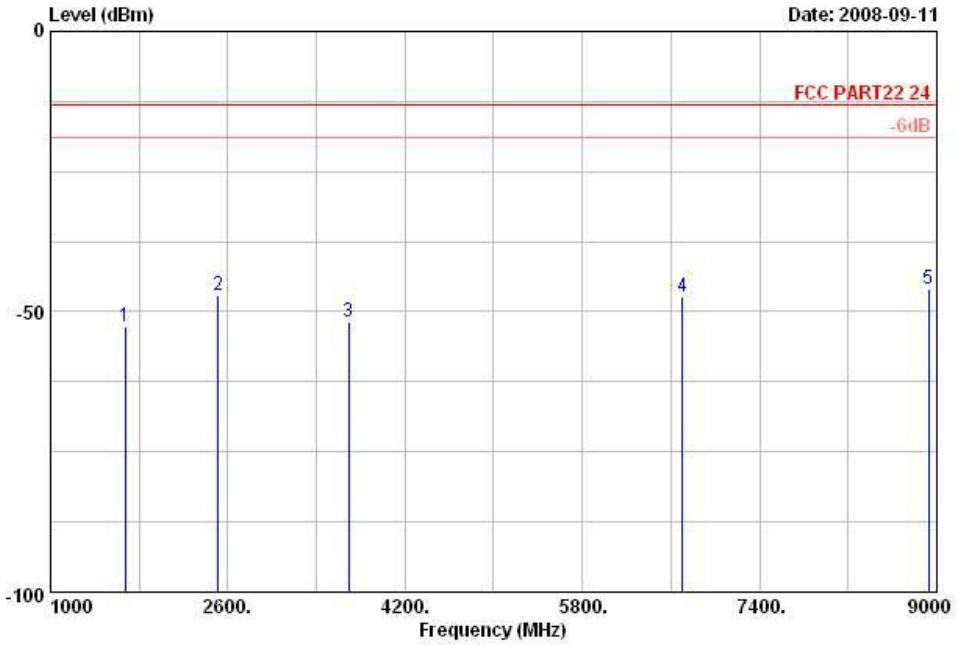
| | | | |
|---|---|---|---|
| **Band :** | GSM850 | **Temperature :** | 25~26°C |
| **Test Mode :** | GSM Link + Adapter | **Relative Humidity :** | 40~41% |
| **Test Engineer :** | James Huang | **Polarization :** | Horizontal |
| **Remark :** | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. | | |




Site : 03CH01-KS
Condition: FCC PART22 24 HF EIRP FACTOR-07091 HORIZONTAL
Model : FG 890201
Memo : Mode 1

| Frequency ( MHz ) | ERP ( dBm ) | Limit ( dBm ) | Over Limit ( dB ) | SPA Reading (dBm) | S.G. Power ( dBm ) | TX Cable loss ( dB ) | TX Antenna Gain (dBi) | Polarization (H/V) | Result |
|---|---|---|---|---|---|---|---|---|---|
| 1674.00 | -50.48 | -13 | -37.48 | -52.8 | -54.59 | 2.68 | 8.94 | H | Pass |
| 2512.00 | -49.83 | -13 | -36.83 | -58.11 | -60.30 | -2.32 | 10.30 | H | Pass |
| 3834.00 | -53.93 | -13 | -40.93 | -63.71 | -66.52 | -4.16 | 10.58 | H | Pass |
| 6762.00 | -48.66 | -13 | -35.66 | -64.6 | -68.48 | -9.83 | 12.14 | H | Pass |
| 8868.00 | -47.71 | -13 | -34.71 | -64.87 | -69.17 | -10.76 | 12.85 | H | Pass |

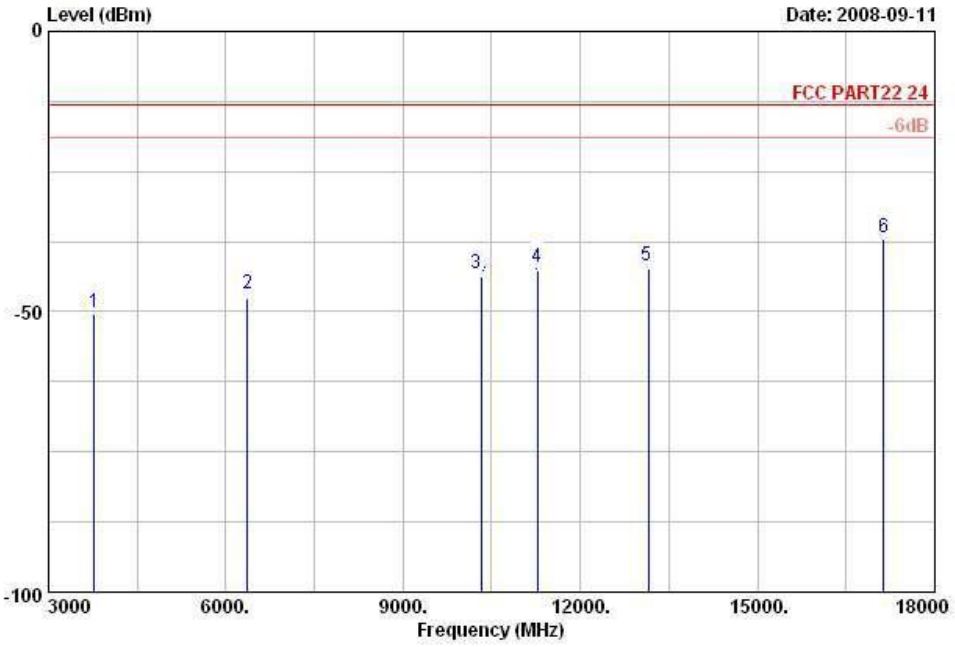
| Band : | GSM850 | Temperature : | 25~26°C |
|---|---|---|---|
| Test Mode : | GSM Link + Adapter | Relative Humidity : | 40~41% |
| Test Engineer : | James Huang | Polarization : | Vertical |
| Remark : | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. | | |




Site : 03CH01-KS
Condition: FCC PART22 24 HF EIRP FACTOR-07091 VERTICAL
Model : FG 890201
Memo : Mode 1

| Frequency ( MHz ) | ERP ( dBm ) | Limit ( dBm ) | Over Limit ( dB ) | SPA Reading (dBm) | S.G. Power ( dBm ) | TX Cable loss ( dB ) | TX Antenna Gain (dBi) | Polarization (H/V) | Result |
|---|---|---|---|---|---|---|---|---|---|
| 1674.00 | -54.93 | -13 | -41.93 | -57.25 | -59.04 | 2.68 | 8.94 | V | Pass |
| 2512.00 | -49.35 | -13 | -36.35 | -57.63 | -59.82 | -2.32 | 10.30 | V | Pass |
| 3690.00 | -54.00 | -13 | -41.00 | -63.17 | -65.83 | -3.60 | 10.38 | V | Pass |
| 6706.00 | -49.50 | -13 | -36.50 | -65.43 | -69.27 | -9.74 | 12.18 | V | Pass |
| 8928.00 | -48.03 | -13 | -35.03 | -65.3 | -69.62 | -10.87 | 12.87 | V | Pass |

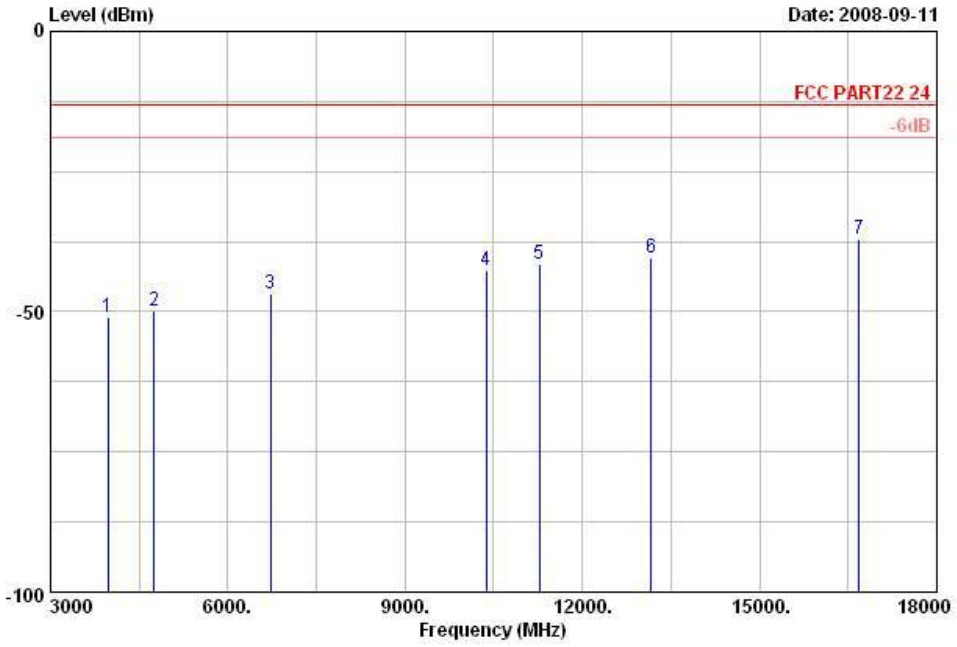
| Band : | GSM1900 | Temperature : | 25~26°C |
|---|---|---|---|
| Test Mode : | GSM Link + Adapter | Relative Humidity : | 40~41% |
| Test Engineer : | James Huang | Polarization : | Horizontal |
| Remark : | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. | | |




Site : 03CH01-KS
Condition: FCC PART22 24 HF EIRP FACTOR-07091 HORIZONTAL
Model : FG 890201
Memo : Mode 1

| Frequency ( MHz ) | EIRP ( dBm ) | Limit ( dBm ) | Over Limit ( dB ) | SPA Reading (dBm) | S.G. Power ( dBm ) | TX Cable loss ( dB ) | TX Antenna Gain (dBi) | Polarization (H/V) | Result |
|---|---|---|---|---|---|---|---|---|---|
| 3760.00 | -50.50 | -13 | -37.50 | -62.09 | -62.66 | -3.84 | 10.47 | H | Pass |
| 6359.00 | -47.53 | -13 | -34.53 | -65.36 | -66.87 | -9.35 | 12.14 | H | Pass |
| 10334.00 | -43.59 | -13 | -30.59 | -65.62 | -67.83 | -12.94 | 13.45 | H | Pass |
| 11279.00 | -42.72 | -13 | -29.72 | -65.52 | -68.79 | -14.52 | 13.70 | H | Pass |
| 13163.00 | -42.28 | -13 | -29.28 | -65.64 | -69.52 | -16.01 | 13.38 | H | Pass |
| 17128.00 | -36.91 | -12 | -24.91 | -61.81 | -65.18 | -16.86 | 13.56 | H | Pass |

| Band : | GSM1900 | Temperature : | 25~26°C |
|---|---|---|---|
| Test Mode : | GSM Link + Adapter | Relative Humidity : | 40~41% |
| Test Engineer : | James Huang | Polarization : | Vertical |
| Remark : | Spurious emissions within 30-1000MHz were found more than 20dB below limit line. | | |




Site : 03CH01-KS
Condition: FCC PART22 24 HF EIRP FACTOR-07091 VERTICAL
Model : FG 890201
Memo : Mode 1

| Frequency ( MHz ) | EIRP ( dBm ) | Limit ( dBm ) | Over Limit ( dB ) | SPA Reading (dBm) | S.G. Power ( dBm ) | TX Cable loss ( dB ) | TX Antenna Gain (dBi) | Polarization (H/V) | Result |
|---|---|---|---|---|---|---|---|---|---|
| 3970.00 | -51.06 | -13 | -38.06 | -63.51 | -72.61 | -4.55 | 19.15 | V | Pass |
| 4756.00 | -49.76 | -13 | -36.76 | -63.67 | -73.57 | -5.81 | 20.15 | V | Pass |
| 6719.00 | -46.79 | -13 | -33.79 | -64.87 | -75.53 | -9.74 | 21.15 | V | Pass |
| 10379.00 | -42.71 | -13 | -29.71 | -64.83 | -75.71 | -13.00 | 22.15 | V | Pass |
| 11279.00 | -41.51 | -13 | -28.51 | -64.31 | -77.03 | -14.52 | 23.15 | V | Pass |
| 13160.00 | -40.52 | -12 | -28.52 | -63.88 | -78.53 | -16.01 | 24.15 | V | Pass |
| 16684.00 | -37.16 | -11 | -26.16 | -61.42 | -75.83 | -15.67 | 25.15 | V | Pass |

# 3.6 Frequency Stability Measurement

## 3.6.1 Description of Frequency Stability Measurement

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within ±0.00025% (±2.5ppm) of the center frequency.

## 3.6.2 Measuring Instruments

See list of measuring instruments of this test report.

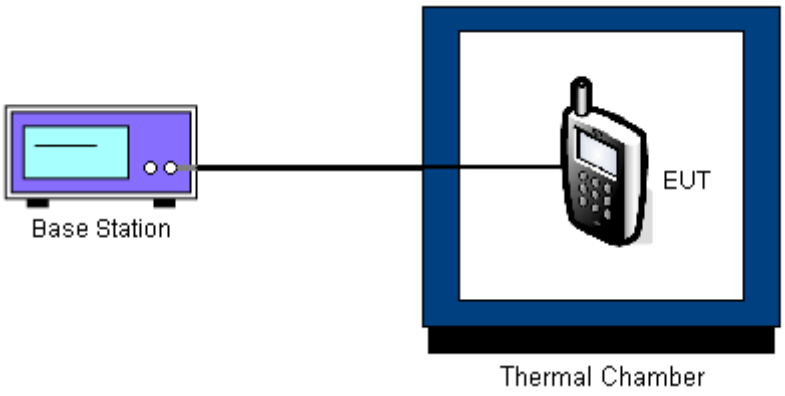
## 3.6.3 Test Procedures for Temperature Variation

1. The EUT was set up in the thermal chamber and connected with the base station.
2. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized for three hours. Power was applied and the maximum change in frequency was recorded within one minute.
3. With power OFF, the temperature was raised in 10°C step up to 50°C. The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.
4. If the EUT can not be turned on at -30°C, the testing lowest temperature will be raised in 10°C step until the EUT can be turned on.

## 3.6.4 Test Procedures for Voltage Variation

1. The EUT was placed in a temperature chamber at 25±5° C and connected with the base station.
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.

## 3.6.5 Test Setup



### 3.6.6 Test Result of Temperature Variation

| Band : | GSM 850 | Channel : | 189 |
|---|---|---|---|
| Limit (ppm) : | 2.5 | | |

| Temperature (°C) | GSM | | Result |
|---|---|---|---|
| | Freq. Dev. (Hz) | Deviation (ppm) | |
| -30 | n/a | n/a | |
| -20 | -19 | -0.02 | |
| -10 | -16 | -0.02 | |
| 0 | 13 | 0.02 | |
| 10 | 10 | 0.01 | |
| 20 | 9 | 0.01 | |
| 30 | -10 | -0.01 | |
| 40 | -17 | -0.02 | |
| 50 | -18 | -0.02 | |

Note: The EUT can not operated in -30**°C.**

| Band : | GSM 1900 | Channel : | 661 |
|---|---|---|---|
| Limit (ppm) : | 2.5 | | |

| Temperature (°C) | GSM | | Result |
|---|---|---|---|
| | Freq. Dev. (Hz) | Deviation (ppm) | |
| -30 | n/a | n/a | |
| -20 | 37 | 0.02 | |
| -10 | 59 | 0.03 | |
| 0 | 37 | 0.02 | |
| 10 | 31 | 0.02 | |
| 20 | 34 | 0.02 | |
| 30 | 29 | 0.02 | |
| 40 | 30 | 0.02 | |
| 50 | -21 | -0.01 | |

Note: The EUT can not operated in -30**°C.**

### 3.6.7 Test Result of Voltage Variation

| Band & Channel | Mode | Voltage (Volt) | Freq. Dev. (Hz) | Deviation (ppm) | Limit (ppm) | Result |
|---|---|---|---|---|---|---|
| GSM 850 CH189 | GSM | 3.7 | 17.0 | 0.02 | 2.5 | PASS |
| | | BEP | -27.0 | -0.03 | | |
| | | 4.2 | 23.0 | 0.03 | | |
| GSM 1900 CH661 | GSM | 3.7 | 29.0 | 0.02 | | |
| | | BEP | 24.0 | 0.01 | | |
| | | 4.2 | 32.0 | 0.02 | | |

Remark:

1. Normal Voltage = 3.7V.
2. Battery End Point (BEP) = 3.4 V.

# 4 List of Measuring Equipments

| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Due Date | Remark |
|---|---|---|---|---|---|---|---|
| Spectrum Analyzer | R&S | FSP40 | 100319 | 9K~40GHz | Mar. 13, 2008 | Mar. 12, 2009 | Radiation (03CH01-KS) |
| EMI Test Receiver | R&S | ESCI | 100724 | 9KHz~2.75GHz | Feb. 06, 2008 | Feb. 05, 2009 | Radiation (03CH01-KS) |
| Bilog Antenna | Schaffner | CBL6112D | 23182 | 25MHz~2000MHz | May 21, 2008 | May 20, 2009 | Radiation (03CH01-KS) |
| AC Power Source | APC | AFC-11001G | N/A | N/A | N/A | N/A | Radiation (03CH01-KS) |
| Preamplifier | Agilent | 8449B | 3008A02370 | 1G~26.5GHz | Jun. 03, 2008 | Jun. 02, 2009 | Radiation (03CH01-KS) |
| Preamplifier | Wireless | FPA6592G | 60006 | 30M~2000MHz | Jul. 23, 2008 | Jul. 22, 2009 | Radiation (03CH01-KS) |
| DRG Horn(Medium) | EMCO | 3117 | 75959 | 1GHz ~ 18GHz | Apr. 17, 2007 | Aug. 16, 2009 | Radiation (03CH01-KS) |
| Power Meter | Agilent | E4416A | MY45101555 | N/A | Jun. 18, 2007 | Jun. 17, 2009 | Conducted (TH01-KS) |
| Power Sensor | Agilent | E9327A | MY44421198 | 50MHz~18GHz | Jun. 12, 2007 | Jun. 11, 2009 | Conducted (TH01-KS) |
| Thermal Chamber | Rten Billion | TTC-B3S | TBN-960502 | -40~150C | Jun. 27, 2007 | Jun. 26, 2009 | Conducted (TH01-KS) |
| POWER DIVIDER | ARRA | A3200-2 | N/A | DC~18GHz | Sep. 01, 2007 | Aug. 31, 2009 | Conducted (TH01-KS) |
| DC Power Supply | Topward | 3306D | N/A | 30V6A | N/A | N/A | Conducted (TH01-KS) |
| DC Block | Mini-Circuits | BLK-18-S+ | N/A | DC-18GHz | N/A | N/A | Conducted (TH01-KS) |
| Terminator | Mini-Circuits | ANNE-50+ | N/A | DC~18000MHz | N/A | N/A | Conducted (TH01-KS) |

# 5 Uncertainty of Evaluation

**Uncertainty of Conducted Emission Measurement (150 KHz ~ 30 MHz)**

| Contribution | Uncertainty of $x_i$ | | $u(x_i)$ |
|---|---|---|---|
| | dB | Probability Distribution | |
| Receiver reading | 0.10 | Normal(k=2) | 0.05 |
| Cable loss | 0.10 | Normal(k=2) | 0.05 |
| AMN insertion loss | 2.50 | Rectangular | 0.63 |
| Receiver Spec | 1.50 | Rectangular | 0.43 |
| Site imperfection | 1.39 | Rectangular | 0.80 |
| Mismatch | +0.34/-0.35 | U-shape | 0.24 |
| **Combined standard uncertainty Uc(y)** | **1.13** | | |
| **Measuring uncertainty for a level of confidence of 95% U=2Uc(y)** | **2.26** | | |

**Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)**

| 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 | +0.39/-0.41 | U-shaped | 0.28 |
| **Combined standard uncertainty Uc(y)** | **1.27** | | |
| **Measuring uncertainty for a level of confidence of 95% U=2Uc(y)** | **2.54** | | |

**Uncertainty of Radiated Emission Measurement (1 GHz ~ 40 GHz)**

| Contribution | Uncertainty of $x_i$ | | $u(x_i)$ | $Ci$ | $Ci*u(x_i)$ |
|---|---|---|---|---|---|
| | dB | Probability Distribution | | | |
| Receiver reading | ±0.10 | Normal(k=1) | 0.10 | 1 | 0.10 |
| Antenna factor calibration | ±1.70 | Normal(k=2) | 0.85 | 1 | 0.85 |
| Cable loss calibration | ±0.50 | Normal(k=2) | 0.25 | 1 | 0.25 |
| Receiver Correction | ±2.00 | Rectangular | 1.15 | 1 | 1.15 |
| Antenna Factor Directional | ±1.50 | Rectangular | 0.87 | 1 | 0.87 |
| Site imperfection | ±2.80 | Triangular | 1.14 | 1 | 1.14 |
| Mismatch<br>Receiver VSWR Γ1= 0.197<br>Antenna VSWR Γ2= 0.194<br>Uncertainty=20log(1-Γ1*Γ2) | +0.34/-0.35 | U-shaped | 0.244 | 1 | 0.244 |
| **Combined standard uncertainty Uc(y)** | **2.36** | | | | |
| **Measuring uncertainty for a level of confidence of 95% U=2Uc(y)** | **4.72** | | | | |

# 6 Certification of TAF Accreditation

Certificate No. : L1190-070110

財團法人全國認證基金會
Taiwan Accreditation Foundation

## Certificate of Accreditation

This is to certify that

**Sporton International Inc.**
**EMC & Wireless Communications Laboratory**
No.52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.

**is accredited in respect of laboratory**

| | | |
|---|---|---|
| **Accreditation Criteria** | : | ISO/IEC 17025:2005 |
| **Accreditation Number** | : | 1190 |
| **Originally Accredited** | : | December 15, 2003 |
| **Effective Period** | : | January 10, 2007 to January 09, 2010 |
| **Accredited Scope** | : | Testing Field, see described in the Appendix |
| **Specific Accreditation Program** | : | Accreditation Program for Designated Testing Laboratory for Commodities Inspection<br>Accreditation Program for Telecommunication Equipment Testing Laboratory |

Jay-San Chen
President, Taiwan Accreditation Foundation
Date : January 10, 2007

P1, total 9 pages

The Appendix forms an integral part of this Certificate, which shall be invalid when used without the Appendix.

# Appendix A. Photographs of EUT

Please refer to Sporton report number EP890310 as below.

## 1. External Photographs of EUT

**Model Name: VDF225FM**

**Model Name: VDF225FM**

**Model Name: VDF225FM**

**Model Name: VDF225FM**

## 2. Photographs of Accessories

**Model Name: VDF225FM**

**Model Name: VDF225FM**

**Model Name: VDF225FM**

**Model Name: VDF225FM**

**Model Name: VDF225FM**

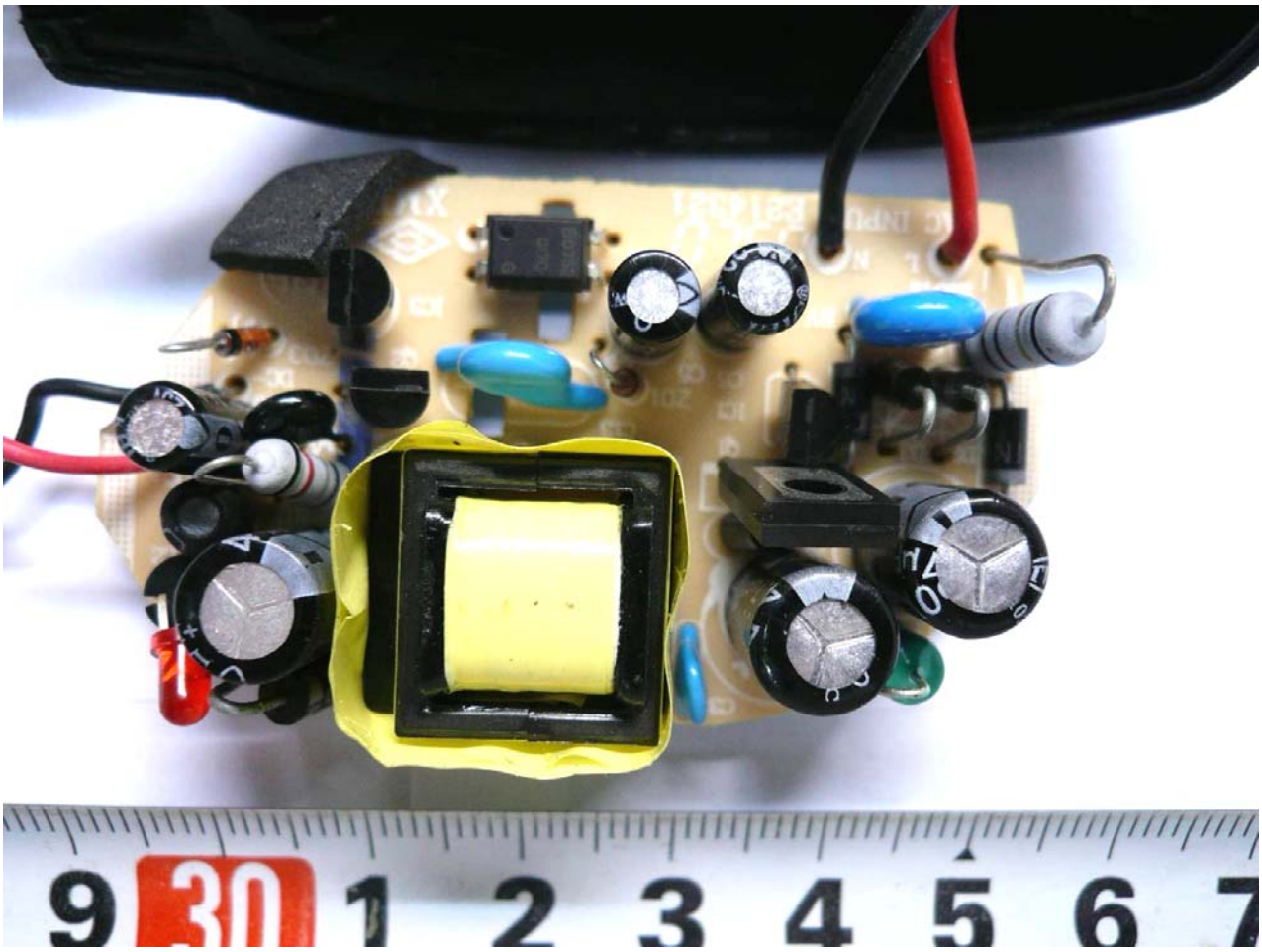
**Model Name: VDF225FM**

**Model Name: VDF225FM**

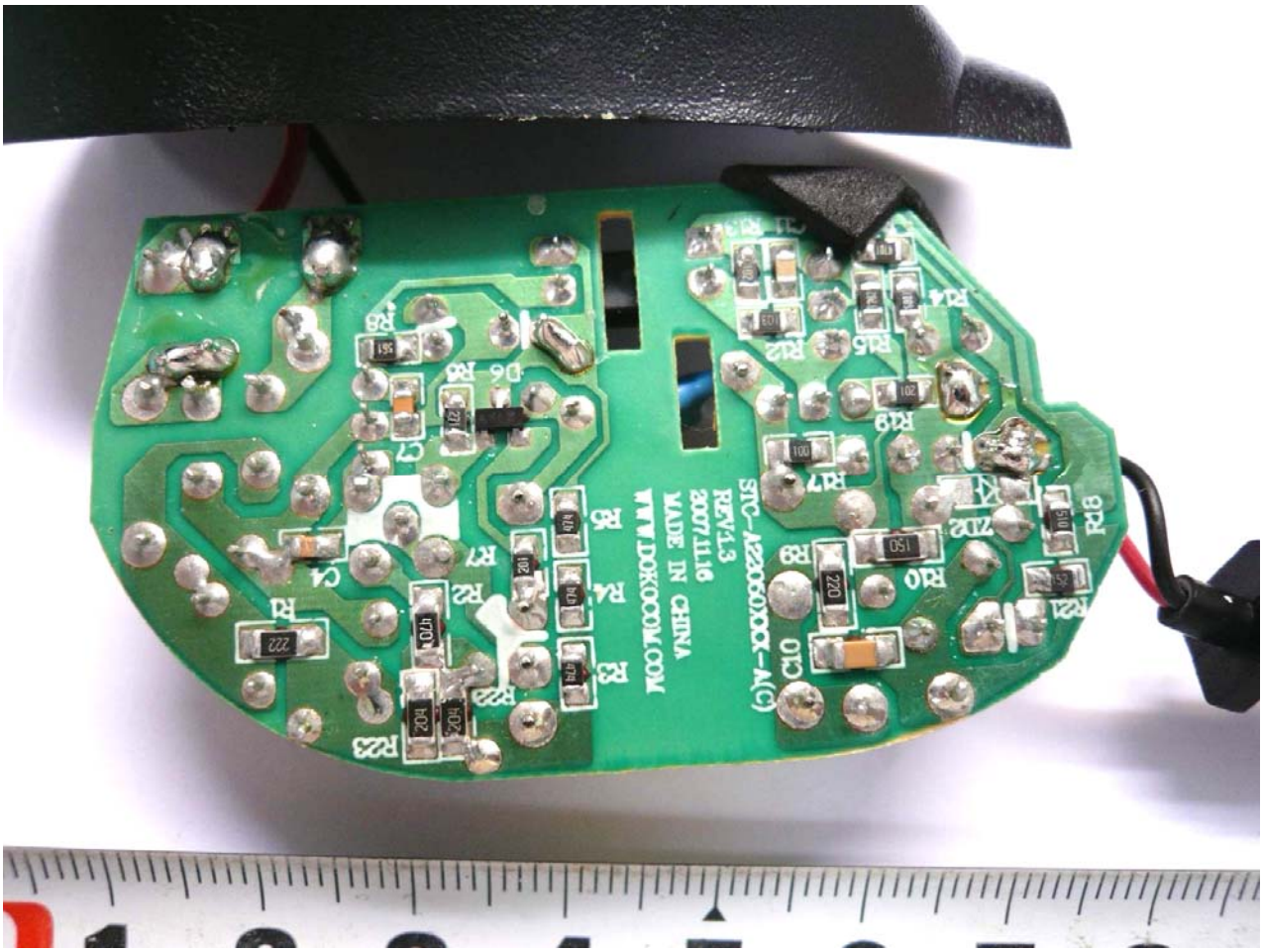
**Model Name: VDF225FM**

**Model Name: VDF225FM**

**Model Name: VDF225FM**



**Model Name: VDF225FM**



## 3. Internal Photographs of EUT

**Model Name: VDF225FM**

**Model Name: VDF225FM**

**Model Name: VDF225FM**

**Model Name: VDF225FM**

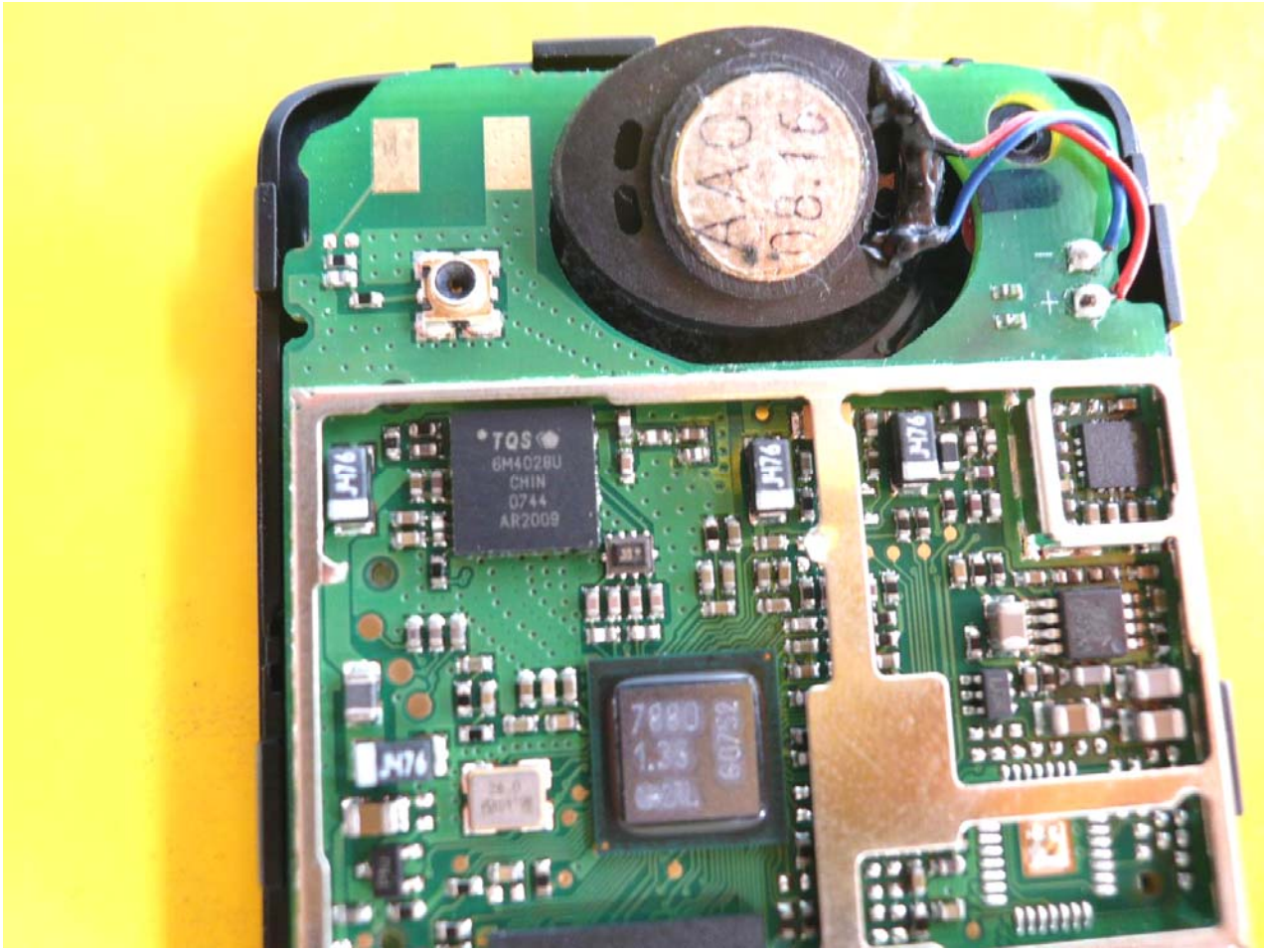
**Model Name: VDF225FM**

**Model Name: VDF225FM**

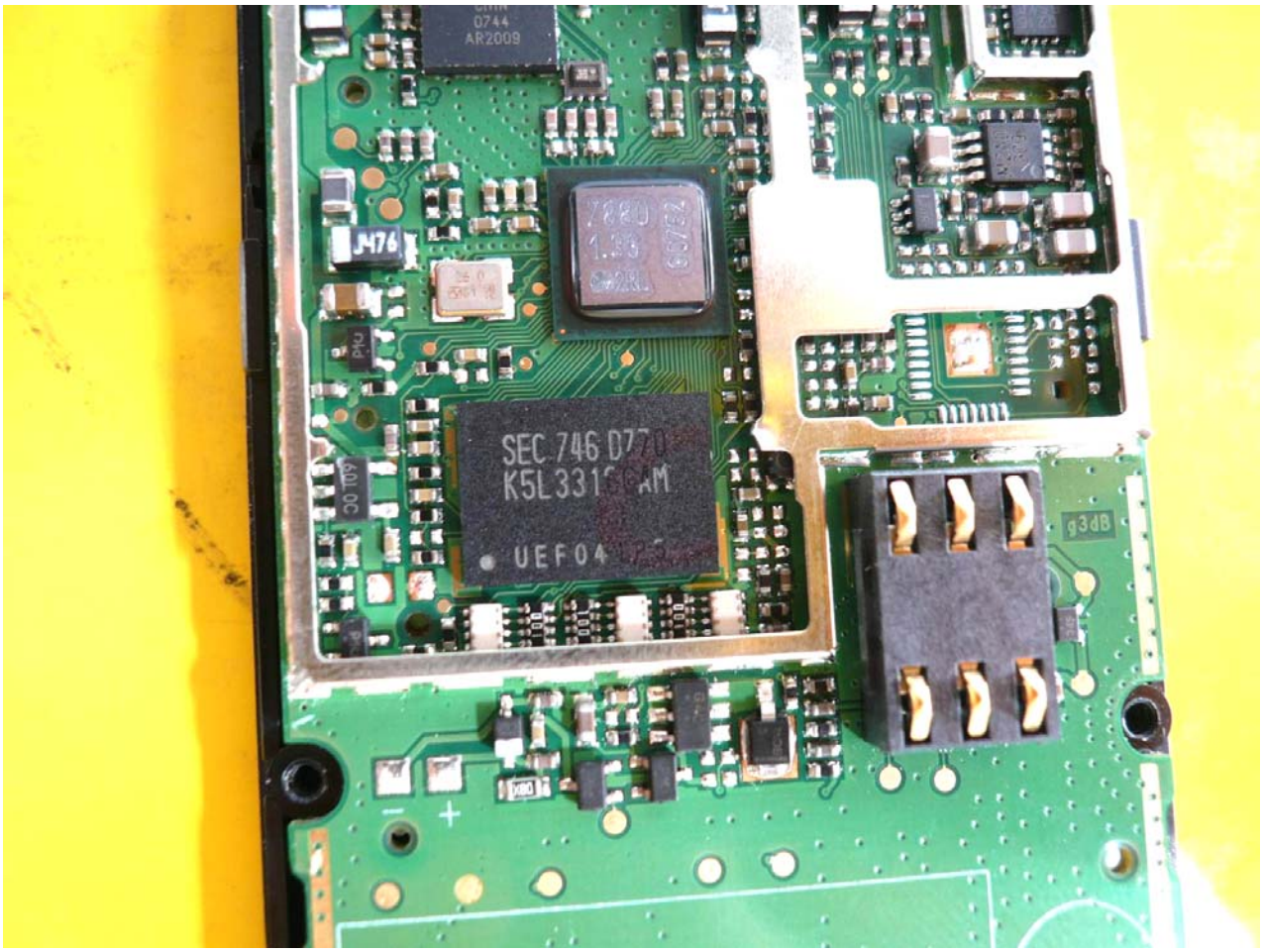
**Model Name: VDF225FM**

**Model Name: VDF225FM**

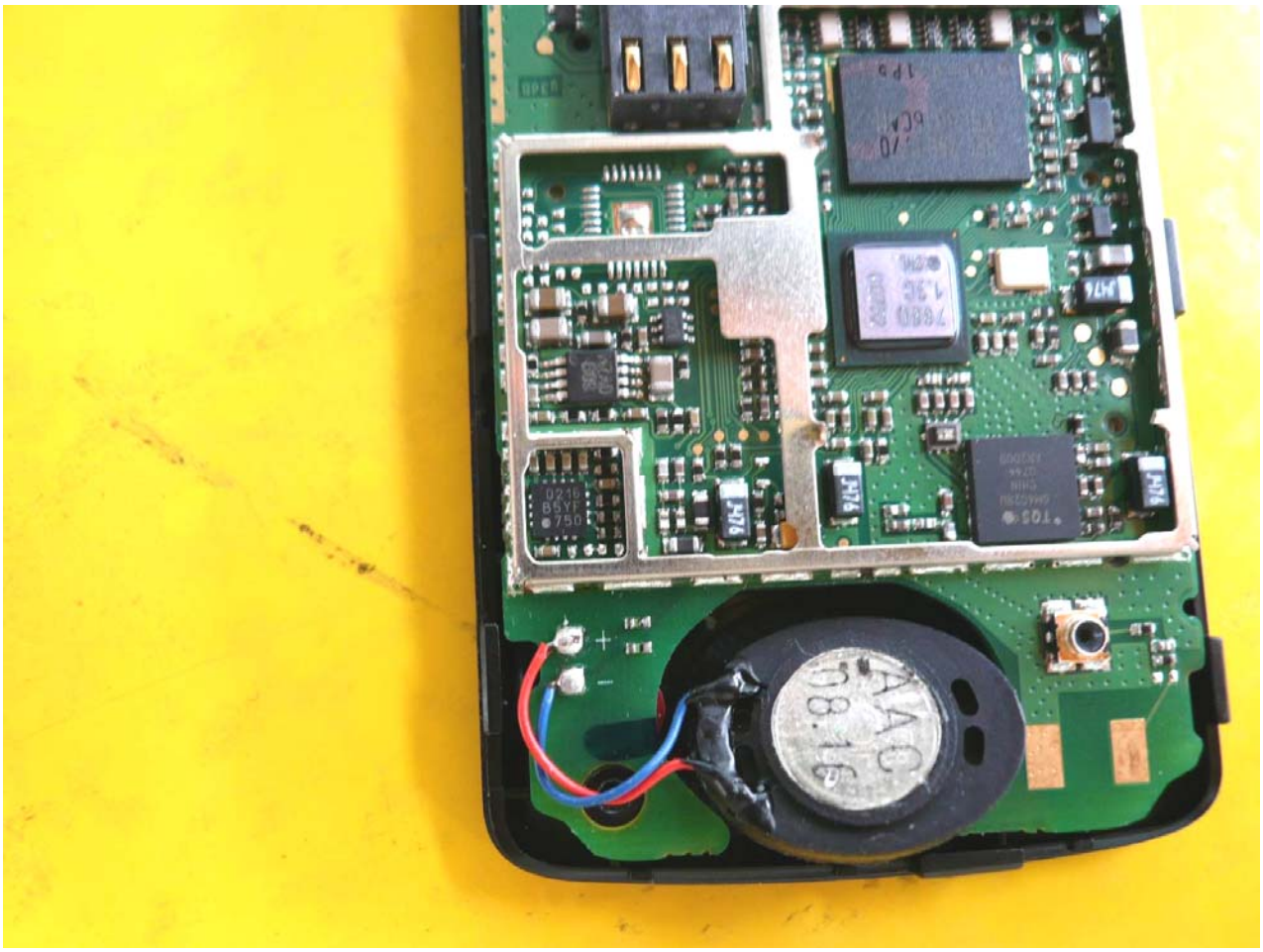
**Model Name: VDF225FM**



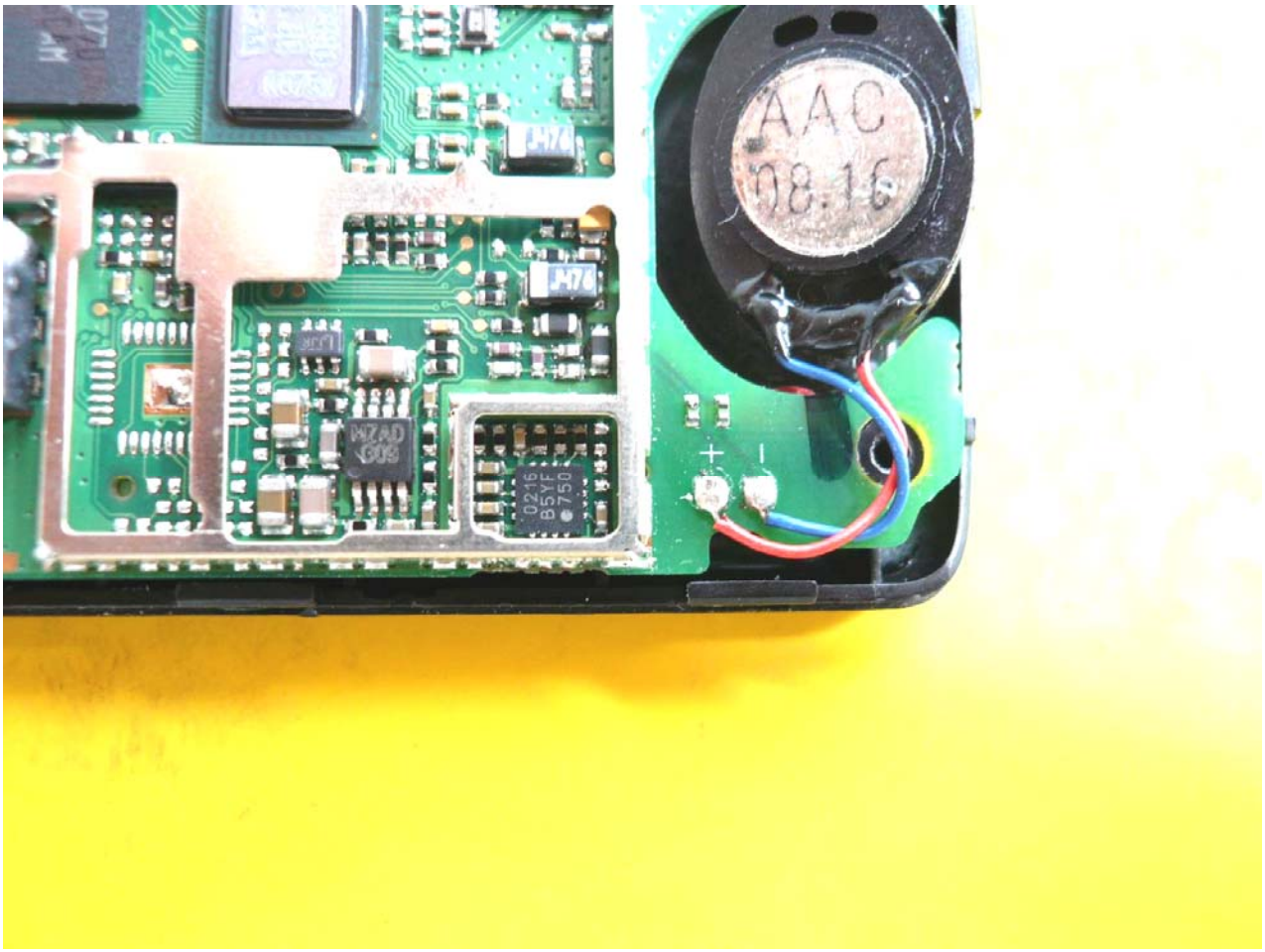
**Model Name: VDF225FM**



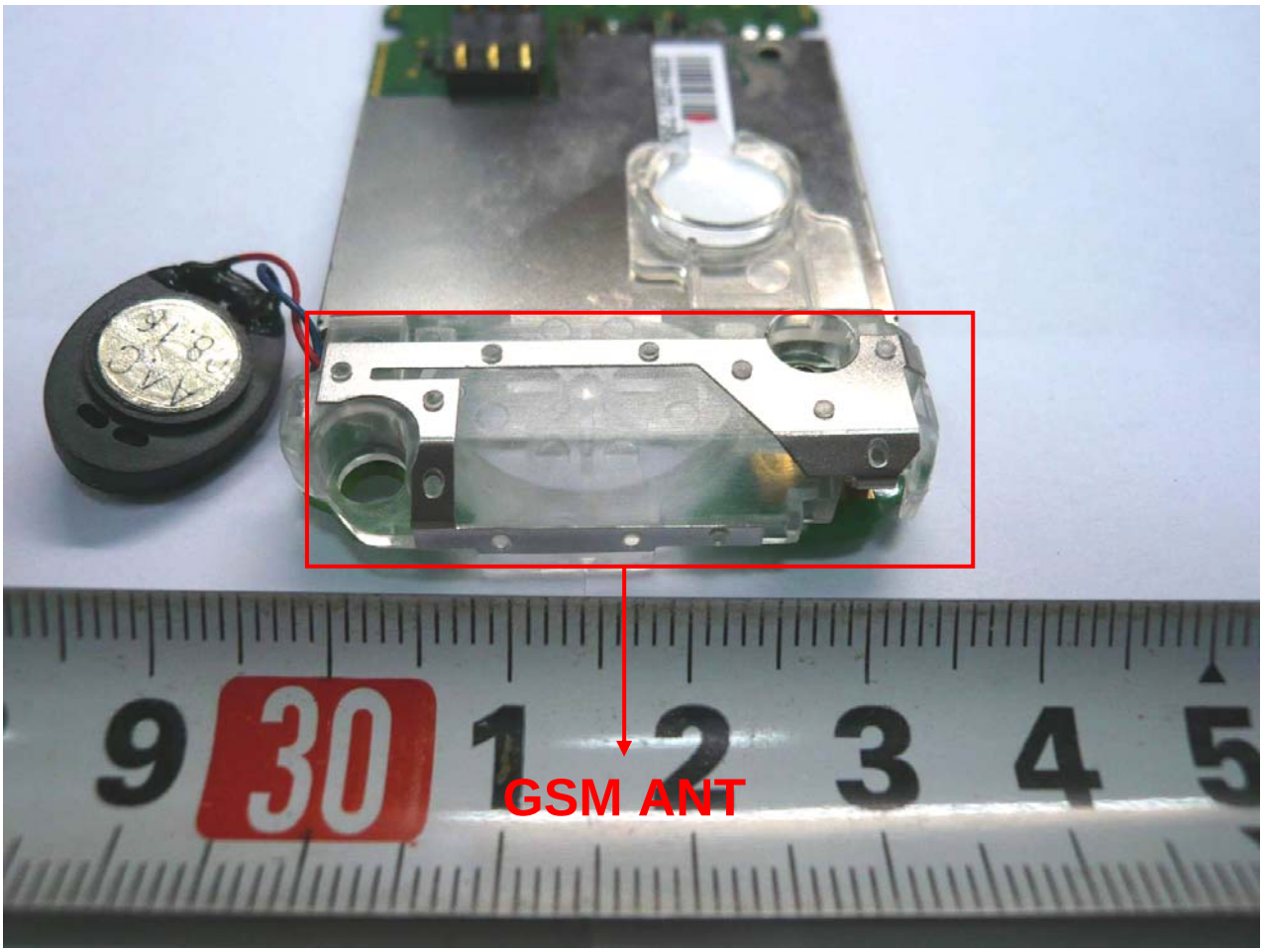
**Model Name: VDF225FM**



**Model Name: VDF225FM**



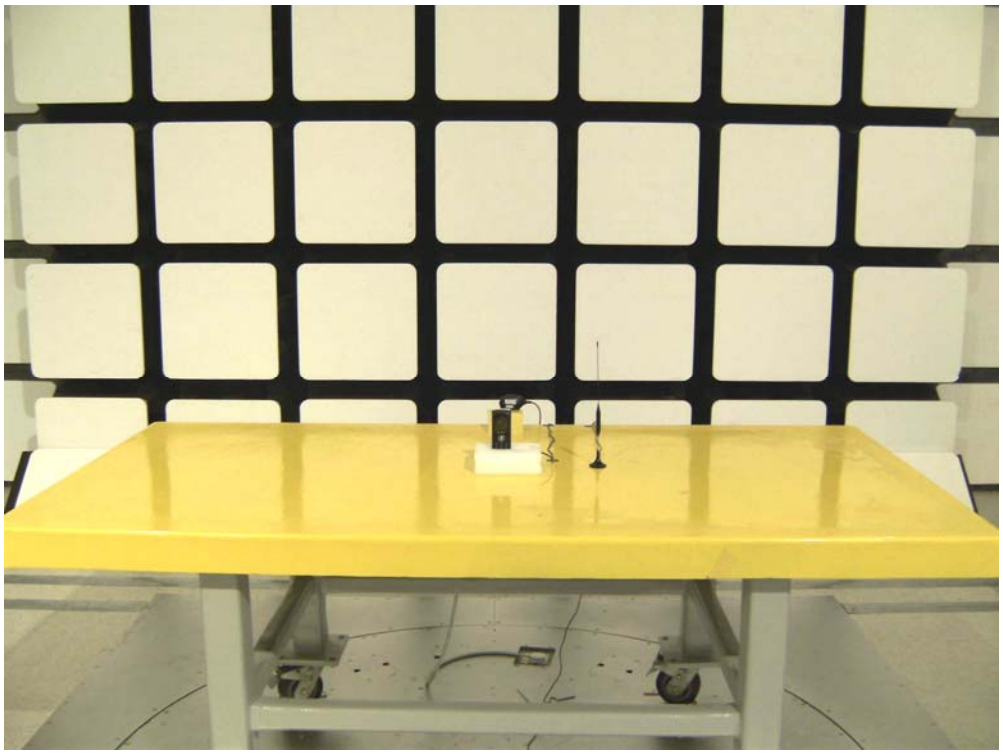
**Model Name: VDF225FM**



# Appendix B. Setup Photographs

## <Radiated Emission>

Front View



Rear View