



FCC Test Report

for

47 CFR Part 22H, 24E

Equipment : GSM/GPRS with Bluetooth Cellular Phone
Trade Name : GPLUS
Model No. : GP810
FCC ID : VPV-GP810
Tx Frequency Range : GSM850 : 824.2 ~ 848.8MHz
PCS1900 : 1850.2 ~1909.8 MHz
Max. ERP/EIRP Power : GGSM850(GSM) : 0.20 W
PCS1900(GSM) : 0.43 W
Emission Designator : GSM : 300KGXW
Applicant : TOTAL LIGHT ENTERPRISE CO., LTD.
5F., No. 62, Zhouzi St., Neihu District, Taipei City 114,
Taiwan (R.O.C.)

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- **Certificate or Test Report must not be used by the applicant to claim the product in this test report endorsement by NVLAP or any agency of U.S. government.**
- The data shown in this test report were carried out on Oct. 29, 2007 at **Sporton International Inc. LAB.**
- Report No.: FG751505-03, Report Version: Rev. 01.

Jones Tsai
Manager

SPORTON International Inc.

6F, No.106, Sec. 1, Hsin Tai Wu Rd., Hsi Chih, Taipei Hsien, Taiwan, R.O.C.



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History of this test report

Report Issue Date: Oct. 29, 2007

| Report No. | Description |
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1. General Information

1.2 Applicant

TOTAL LIGHT ENTERPRISE CO., LTD.

5F., No. 62, Zhouzi St., Neihu District, Taipei City 114, Taiwan (R.O.C.)

1.3 Manufacturer

GPLUS TELCOM CO., LTD.

4F, POLARIS I BLDG., 15-3, JEONGJA-DONG BUNDANG-GU, SEONGNAM-SI, GYEONGGI-DO, KOREA 463-811

1.4 Basic Description of Equipment under Test

| | | |
|-------------------|---------------------------|--|
| Equipment | | GSM/GPRS with Bluetooth Cellular Phone |
| Trade Name | | GPLUS |
| Model Name | | GP810 |
| FCC ID | | VPV-GP810 |
| AC Adapter | Brand Name | GPLUS |
| | Model Name | GT-TA-005-A3 |
| | Power Rating | I/P: 100-240Vac, 50-60Hz, 0.2A; O/P: 5.2Vdc, 600mA |
| | AC Power Cord Type | 1.55 meter non-shielded cable without ferrite non-core |
| Battery | Brand Name | GPLUS |
| | Model Name | GP800/810 |
| | Rating | 4.2V, 270mA |
| | Type | Li-ion |
| Earphone | Brand Name | GPLUS |
| | Model Name | GP800 |
| | Signal line Type | 1.65 meter non-shielded cable without ferrite non-core |
| USB Cable | Brand Name | GPLUS |
| | Model Name | GP800 |
| | Signal line Type | 1.5 meter non-shielded cable without ferrite non-core |

Remark: Above EUT's information was declared by manufacturer. Please refer to the specifications of manufacturer or User's Manual for more detailed features description.

**1.5 Feature of Equipment under Test**

| | |
|---|--|
| DUT Type : | GSM/GPRS with Bluetooth Cellular Phone |
| Trade Name : | GPLUS |
| Model Name : | GP810 |
| FCC ID : | VPV-GP810 |
| Tx Frequency : | GSM850 : 824 ~ 849 MHz PCS1900 : 1850 ~ 1910 MHz Bluetooth : 2400 ~ 2483.5 MHz |
| Rx Frequency : | GSM850 : 869 ~ 894 MHz PCS1900 : 1930 ~ 1990 MHz Bluetooth : 2400 ~ 2483.5 MHz |
| Maximum Output Power to Antenna : | GSM850 : 31.82 dBm (GSM) PCS1900 : 29.30 dBm (GSM) Bluetooth : -1.62 dBm (1Mbps) |
| Maximum ERP/EIRP : | GSM850(GSM) : 0.20 W (23.00 dBm) PCS1900(GSM) : 0.43 W (26.35 dBm) |
| Antenna Type : | Chip Antenna |
| Type of Antenna Connector | N/A |
| Power Rating (DC/AC , Voltage and Current of RF element or PA) : | 4.2Vdc / 270mA |
| GPRS / EGPRS Multislot class : | 10 |
| Digital Modulation Emission : | GSM : GMSK Bluetooth : GFSK |
| Type of Emission : | GSM : 300KGXW |
| DUT Stage : | Production Unit |



1.6 Report Date

EUT Received : Oct. 18, 2007

Report Date : Oct. 29, 2007



2. Test Configuration of Equipment under Test

2.1 Test Manner

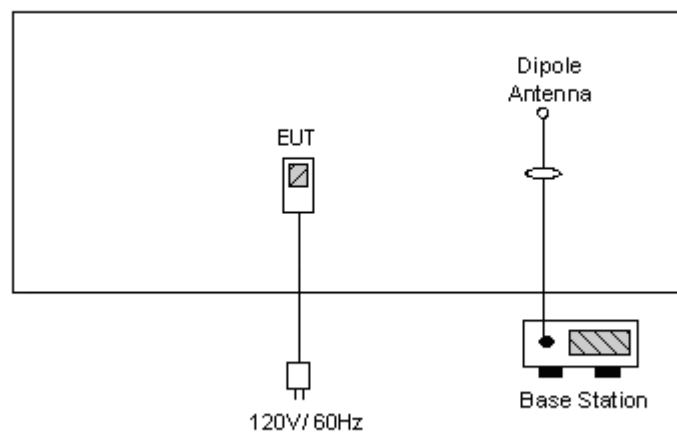
1. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range.
2. During all testings, EUT is in link mode with base station emulator at maximum power level.
3. Frequency range investigated: radiated emission 30 MHz to 9000 MHz for GSM850 and 30MHz to 19000 MHz for PCS1900.

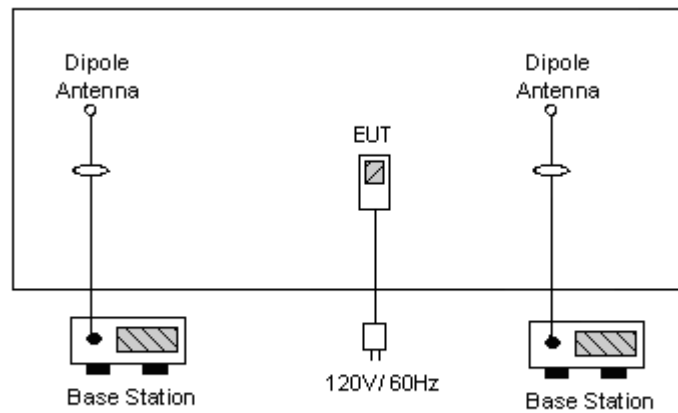
2.2 Test Mode

| Application | GSM850 | PCS1900 |
|-----------------------|--|--|
| Radiated Emission | <input checked="" type="checkbox"/> Mode 1: GSM Link | <input checked="" type="checkbox"/> Mode 2: GSM Link |
| | <input checked="" type="checkbox"/> Mode 3: GSM Link + BT Link | |
| Conducted Measurement | <input checked="" type="checkbox"/> Mode 1: GSM Link | <input checked="" type="checkbox"/> Mode 2: GSM Link |

2.3 Connection Diagram of Test System

<GSM Link Mode>



<GSM with Bluetooth Link Mode>

2.4 Ancillary Equipment List

| Item | Equipment | Trade Name | Model No. | FCC ID | Cable Cord / Power Code |
|------|-----------------|------------|-----------|--------|-------------------------|
| 1. | Base Station | R&S | CMU200 | N/A | Unshielded, 1.8m |
| 2. | BT Base Station | Anritus | 8852A | N/A | Unshielded, 1.8m |



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.

3.1 Test Voltage

AC 120V / 60Hz

3.2 Test Compliance

47 CFR Part 22H, 24E, Part 2

3.3 Frequency Range

- a. Radiation: from 30MHz to 9000MHz for GSM850.
- b. Radiation: from 30 MHz to 19000 MHz for PCS1900.

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 | Description of Test | Result | Section |
|--------------------------------------|--|--------|---------|
| §2.1046 | RF Output Power | Passed | 4.2 |
| § 22.913 §24.232 | ERP / EIRP | Passed | 4.3 |
| §2.1049, § 22.917, § 24.238(b) | Occupied Bandwidth & Band Edge Measurement | Passed | 4.4 |
| §2.1051 | Conducted Emission | Passed | 4.5 |
| §2.1053 | Field Strength of Spurious Radiation | Passed | 4.6 |
| §2.1055, § 22.355, §24.235 | Frequency Stability vs. Temperature | Passed | 4.7 |
| §2.1055, §22.355, §24.235 | Frequency Stability vs. Voltage | Passed | 4.8 |

In order to compliance with FCC rule, EMC test was performed according worst case scenario.

4.2 RF Output Power

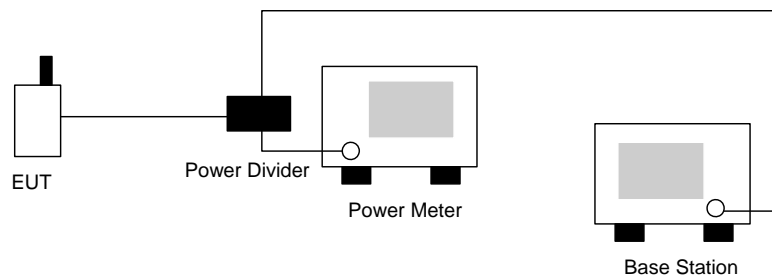
4.2.1 Measurement Instruments :

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=5 for GSM850 and/or PCL=0 for PCS1900 maximum power 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) |
|------------------|----------------|------------------------|------------------------------|--------------------------------|
| GSM850 (GSM) | 128 | 824.2 (Low) | 31.68 | 1.472 |
| | 189 | 836.4 (Mid) | 31.82 | 1.521 |
| | 251 | 848.8 (High) | 31.80 | 1.514 |
| PCS1900 (GSM) | 512 | 1850.2 (Low) | 29.30 | 0.851 |
| | 661 | 1880.0 (Mid) | 29.17 | 0.826 |
| | 810 | 1909.8 (High) | 29.17 | 0.826 |



4.3 ERP / EIRP Measurement

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

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 table with 1.0 meter height in an fully anechoic chamber.
2. The EUT was set 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 also kept at 1.0M height.
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. $ERP/EIRP = P_s + E_t - E_s + G_s = P_s + R_t - R_s + G_s$

P_s (dBm) : Input power to substitution antenna.

G_s (dBi or dBd) : Substitution antenna Gain.

$E_t = R_t + AF$

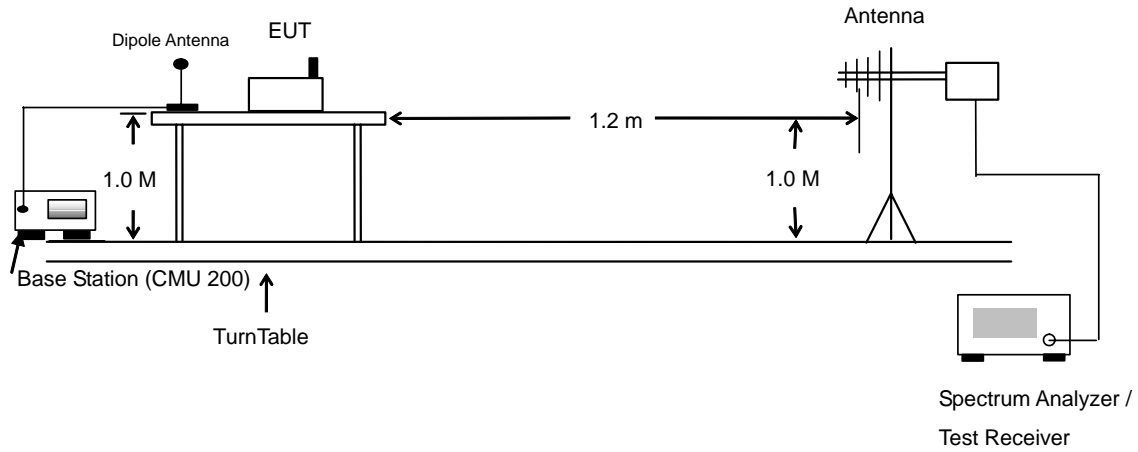
$E_s = R_s + AF$

AF (dB/m) : Receive antenna factor

R_t : The highest received signal in Spectrum Analyzer for EUT.

R_s : The highest received signal in spectrum analyzer for substitution antenna.

4.3.3 Test Setup Layout of ERP/EIRP



**4.3.4 Test Result**

| GSM850 (GSM) Radiated Power ERP | | | | | | |
|--|-------------|-------------|-------------|-------------|--------------|------------|
| Horizontal Polarization | | | | | | |
| Frequency (MHz) | Rt (dBm) | Rs (dBm) | Ps (dBm) | Gs (dBd) | ERP (dBm) | ERP (W) |
| 824.20 | -24.04 | -48.12 | 0.00 | -1.08 | 23.00 | 0.20 |
| 836.40 | -24.86 | -48.28 | 0.00 | -0.93 | 22.49 | 0.18 |
| 848.80 | -26.13 | -48.35 | 0.00 | -0.76 | 21.46 | 0.14 |
| Vertical Polarization | | | | | | |
| Frequency (MHz) | Rt (dBm) | Rs (dBm) | Ps (dBm) | Gs (dBd) | ERP (dBm) | ERP (W) |
| 824.20 | -33.64 | -47.97 | 0.00 | -1.08 | 13.25 | 0.02 |
| 836.40 | -33.72 | -48.01 | 0.00 | -0.93 | 13.36 | 0.02 |
| 848.80 | -34.31 | -48.05 | 0.00 | -0.76 | 12.98 | 0.02 |

| PCS1900 (GSM) Radiated Power EIRP | | | | | | |
|--|-------------|-------------|-------------|-------------|---------------|-------------|
| Horizontal Polarization | | | | | | |
| Frequency (MHz) | Rt (dBm) | Rs (dBm) | Ps (dBm) | Gs (dBi) | EIRP (dBm) | EIRP (W) |
| 1850.20 | -27.55 | -51.88 | 0.00 | 1.96 | 26.29 | 0.43 |
| 1880.00 | -28.64 | -52.99 | 0.00 | 2.00 | 26.35 | 0.43 |
| 1909.80 | -30.46 | -54.28 | 0.00 | 1.98 | 25.80 | 0.38 |
| Vertical Polarization | | | | | | |
| Frequency (MHz) | Rt (dBm) | Rs (dBm) | Ps (dBm) | Gs (dBi) | EIRP (dBm) | EIRP (W) |
| 1850.20 | -29.71 | -52.13 | 0.00 | 1.96 | 24.38 | 0.27 |
| 1880.00 | -30.36 | -53.17 | 0.00 | 2.00 | 24.81 | 0.30 |
| 1909.80 | -31.34 | -54.13 | 0.00 | 1.98 | 24.77 | 0.30 |

4.4 Occupied Bandwidth and Band Edge Measurement

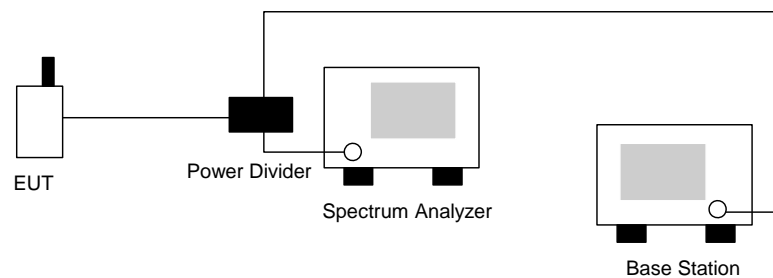
4.4.1 Measurement Instruments

As described in chapter 5 of this test report.

4.4.2 Test Procedure

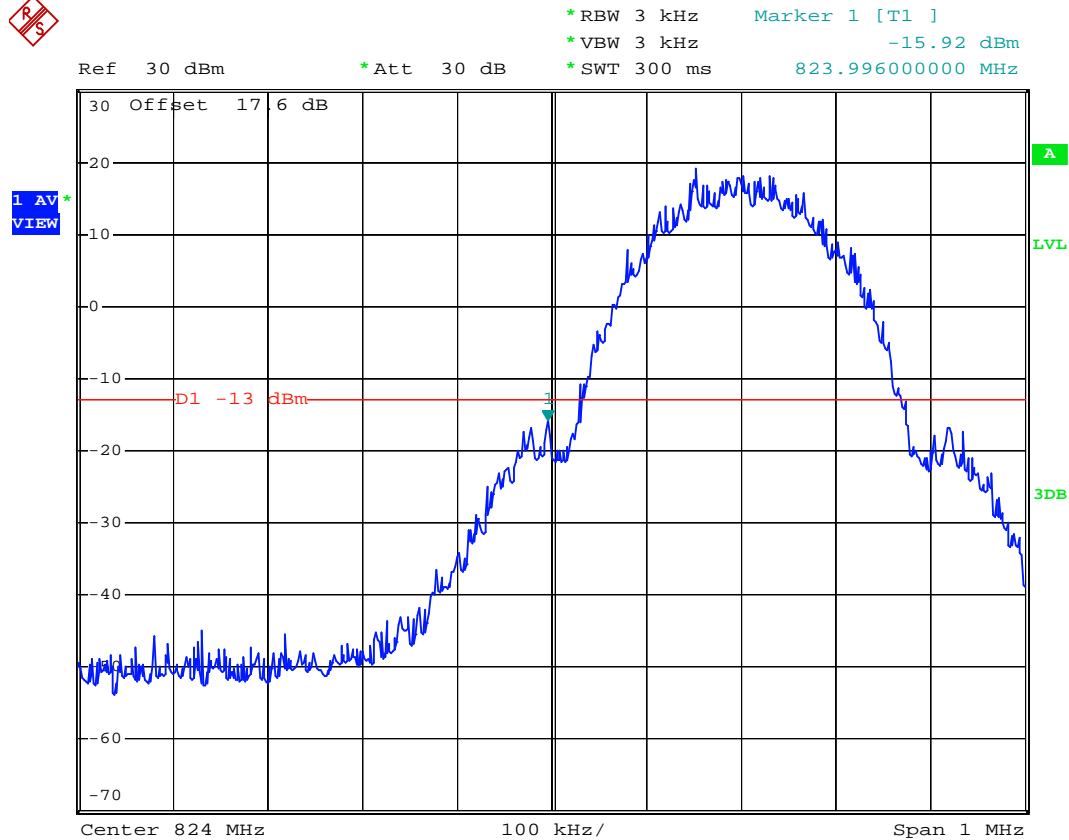
1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. The 99% occupied bandwidth of middle channel for the highest and lowest RF powers were measured.
3. The bandedge of low and high channels for the highest RF powers within the transmitting frequency band were measured. Setting RBW as roughly BW/100.

4.4.3 Test Setup Layout



**4.4.4 Test Result**

- Mode 1
- Test Mode : GSM850 (GSM) CH128 Lower Band Edge
- Power State : High



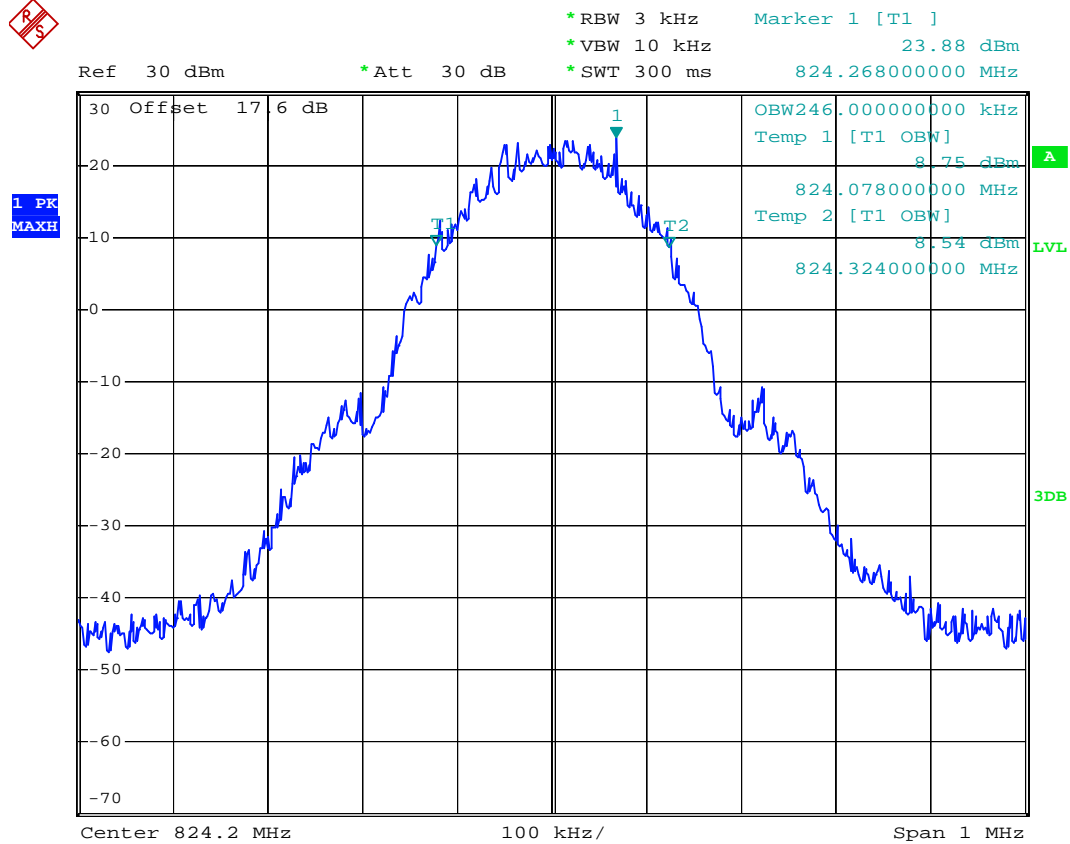
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FCC TEST REPORT

Report No. : FG751505-03

- Test Mode : GSM850 (GSM) CH128 99% Occupied Bandwidth
- Power State : High



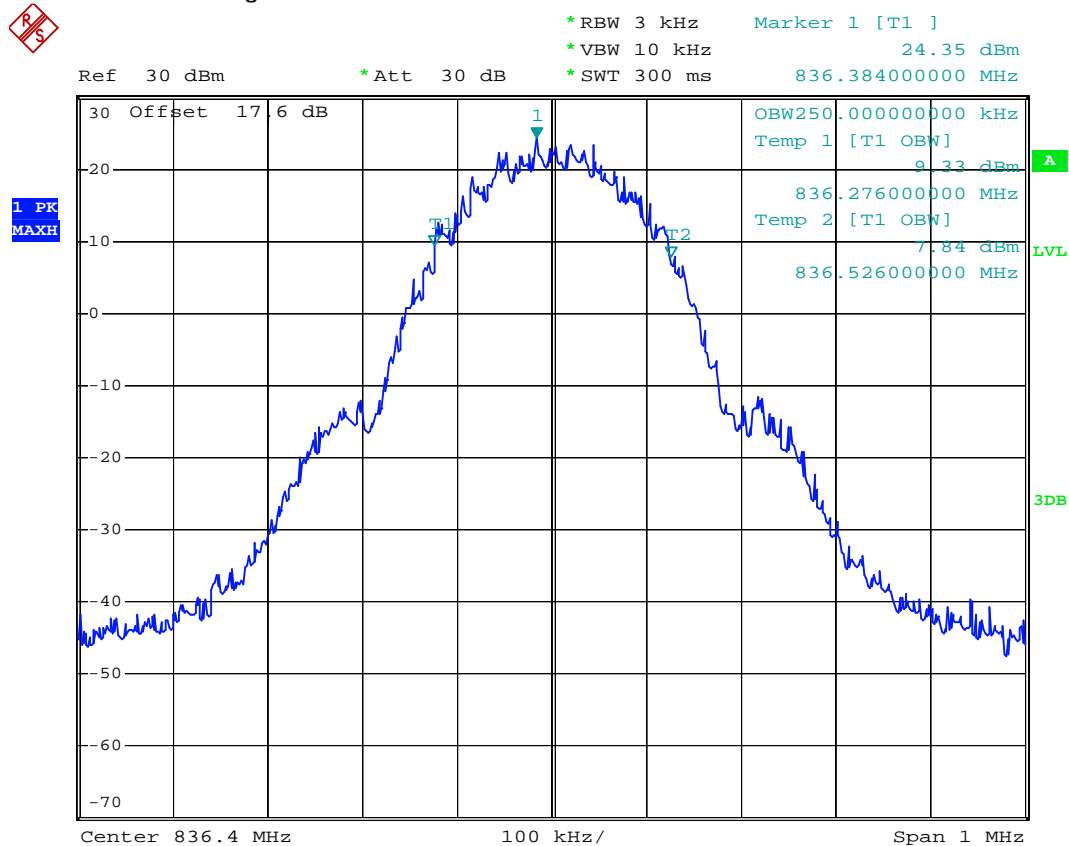
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FCC TEST REPORT

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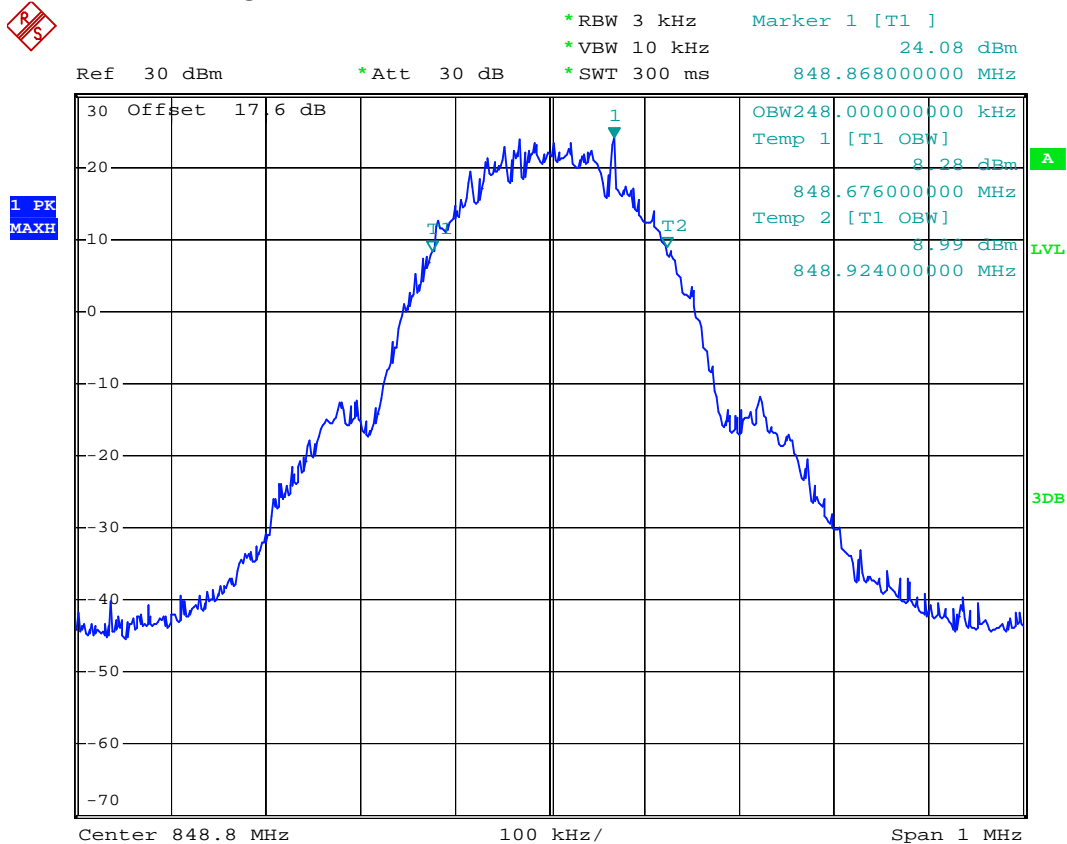
- Test Mode : GSM850 (GSM) CH189 99% Occupied Bandwidth
- Power State : High



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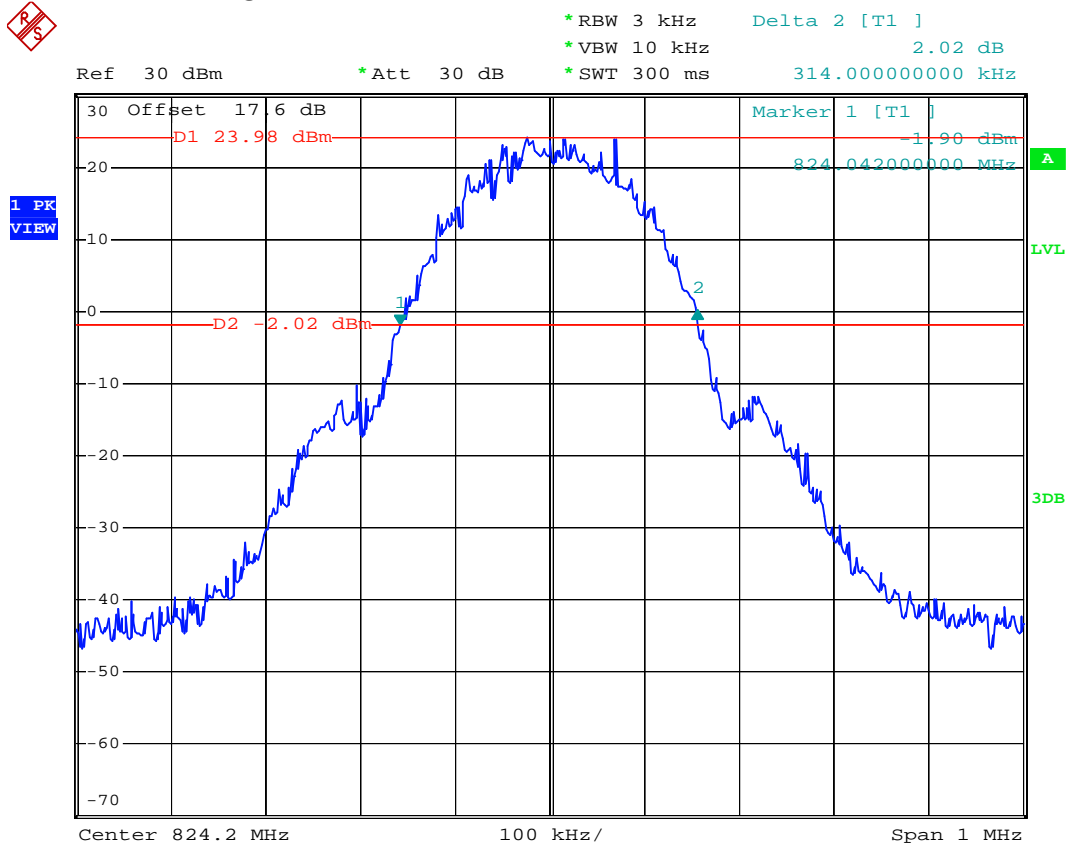
- Test Mode : GSM850 (GSM) CH 251 99% Occupied Bandwidth
- Power State : High



Date: 15.OCT.2007 21:00:51



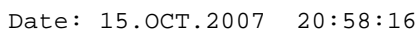
- Test Mode : GSM850 (GSM) CH128 26dB Bandwidth
- Power State : High



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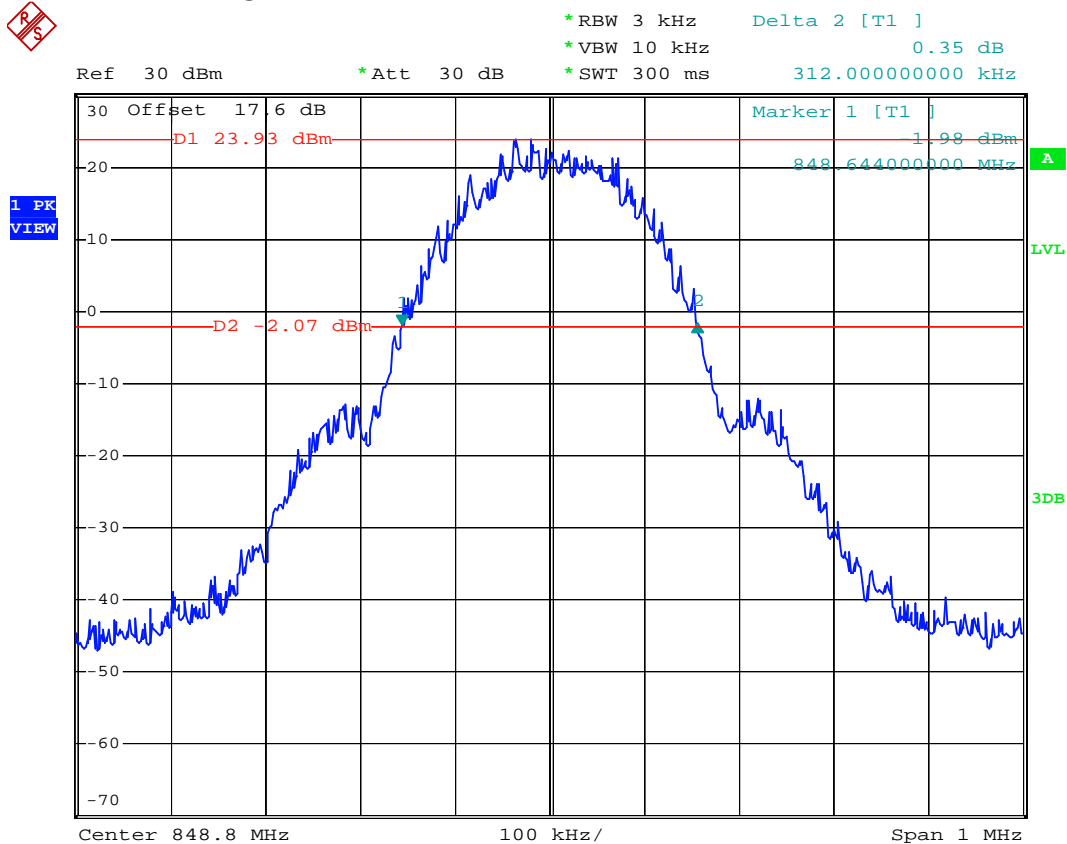


- Test Mode : GSM850 (GSM) CH189 26dB Bandwidth
- Power State : High





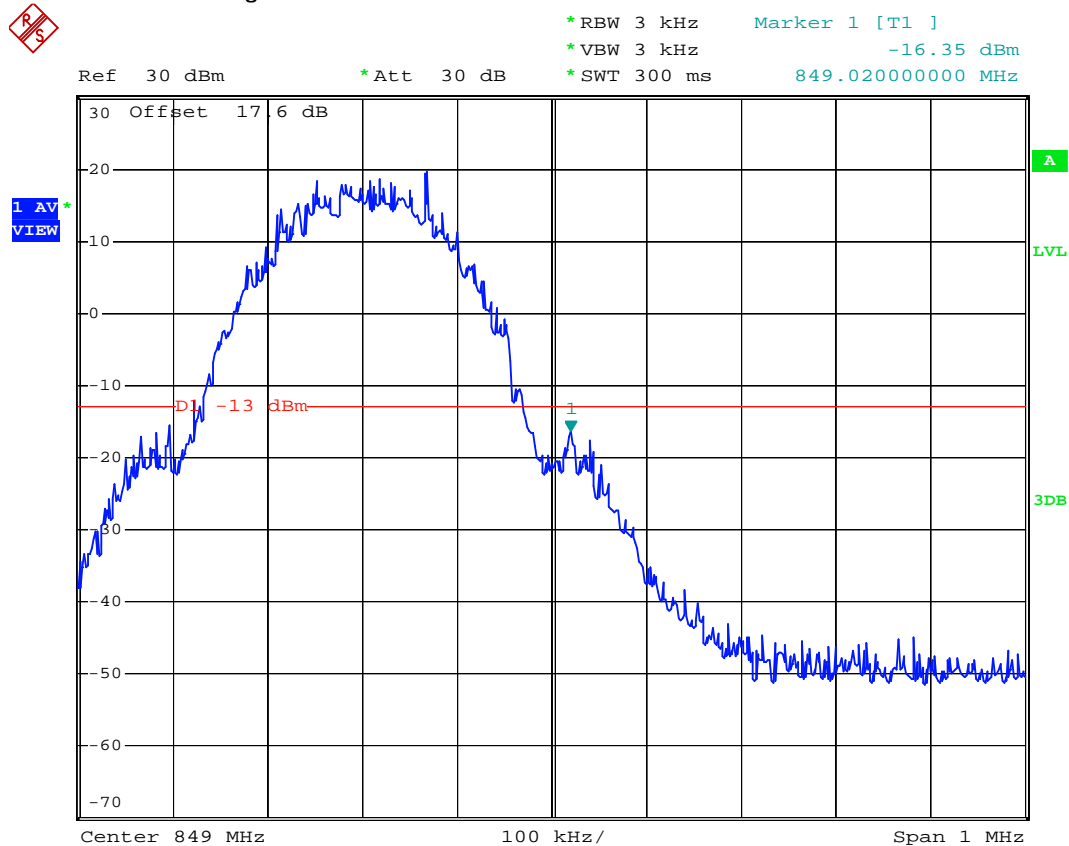
- Test Mode : GSM850 (GSM) CH 251 26dB Bandwidth
- Power State : High



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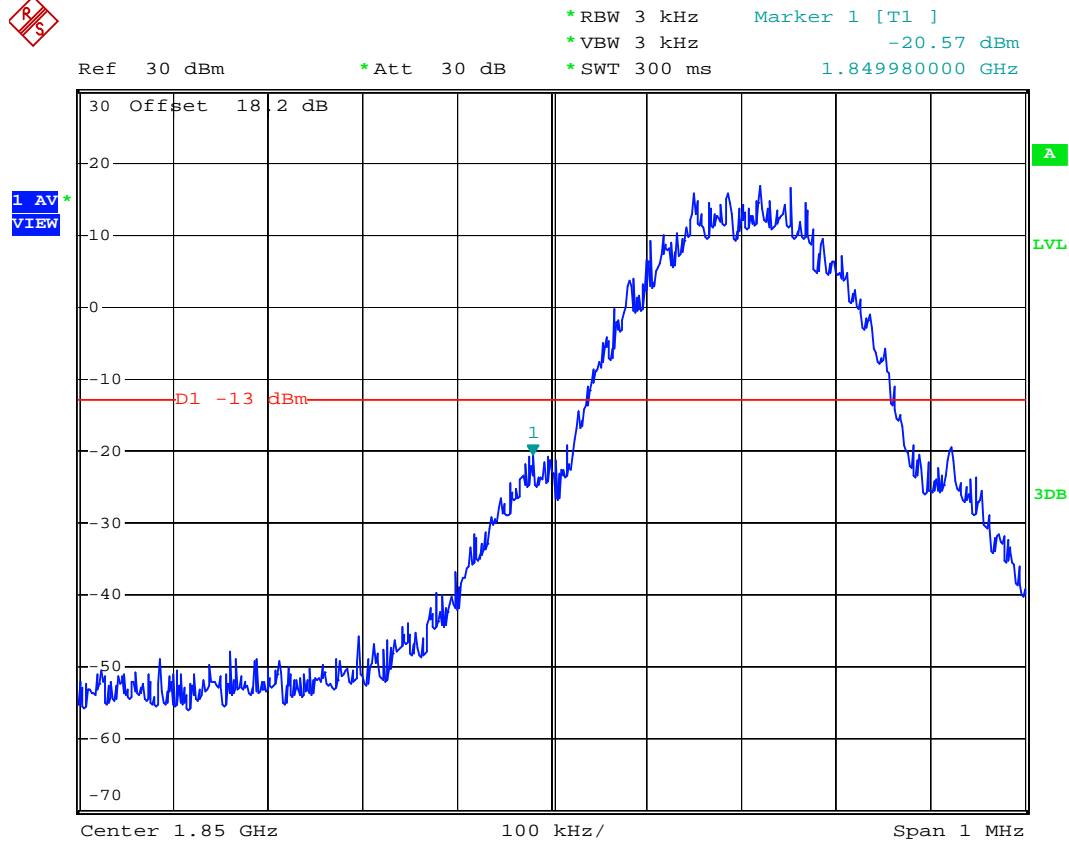
- Test Mode : GSM850 (GSM) CH251 Higher Band Edge
- Power State : High



Date: 15.OCT.2007 21:09:41



- Mode 2
- Test Mode : PCS1900 (GSM) CH512 Lower Band Edge
- Power State : High



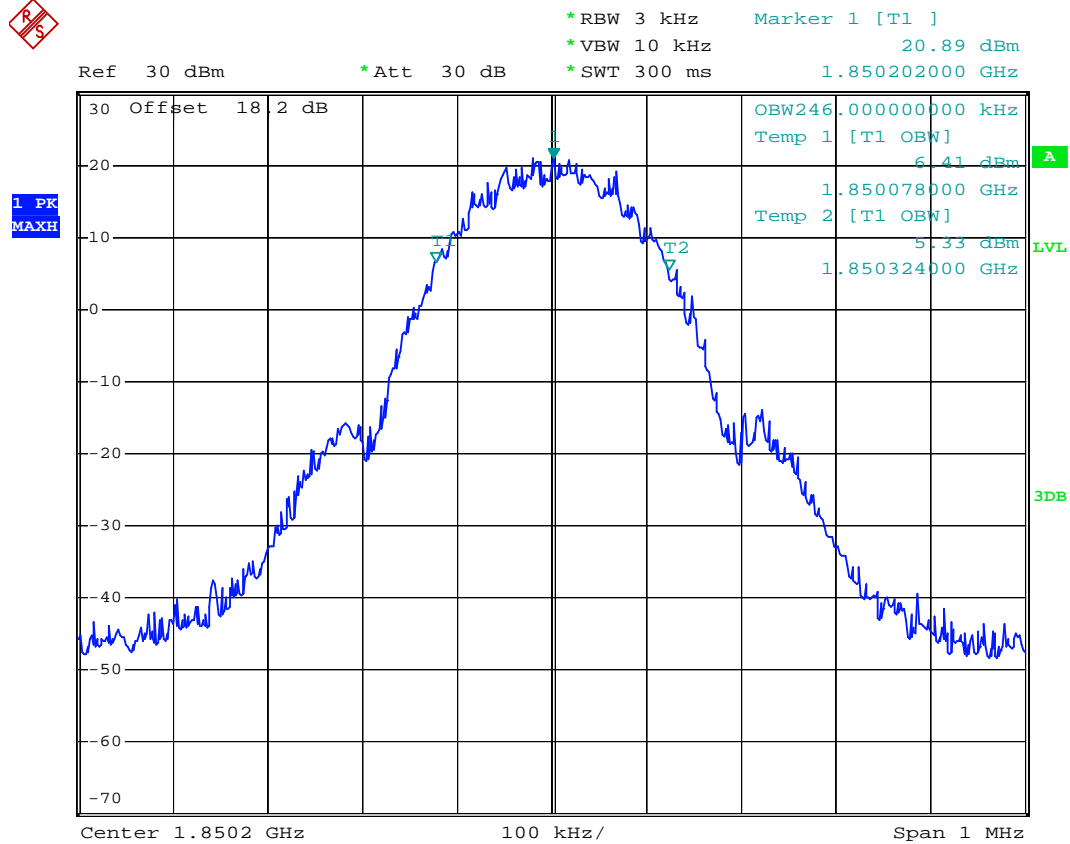
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FCC TEST REPORT

Report No. : FG751505-03

- Test Mode : PCS1900 (GSM) CH512 99% Occupied Bandwidth
- Power State : High



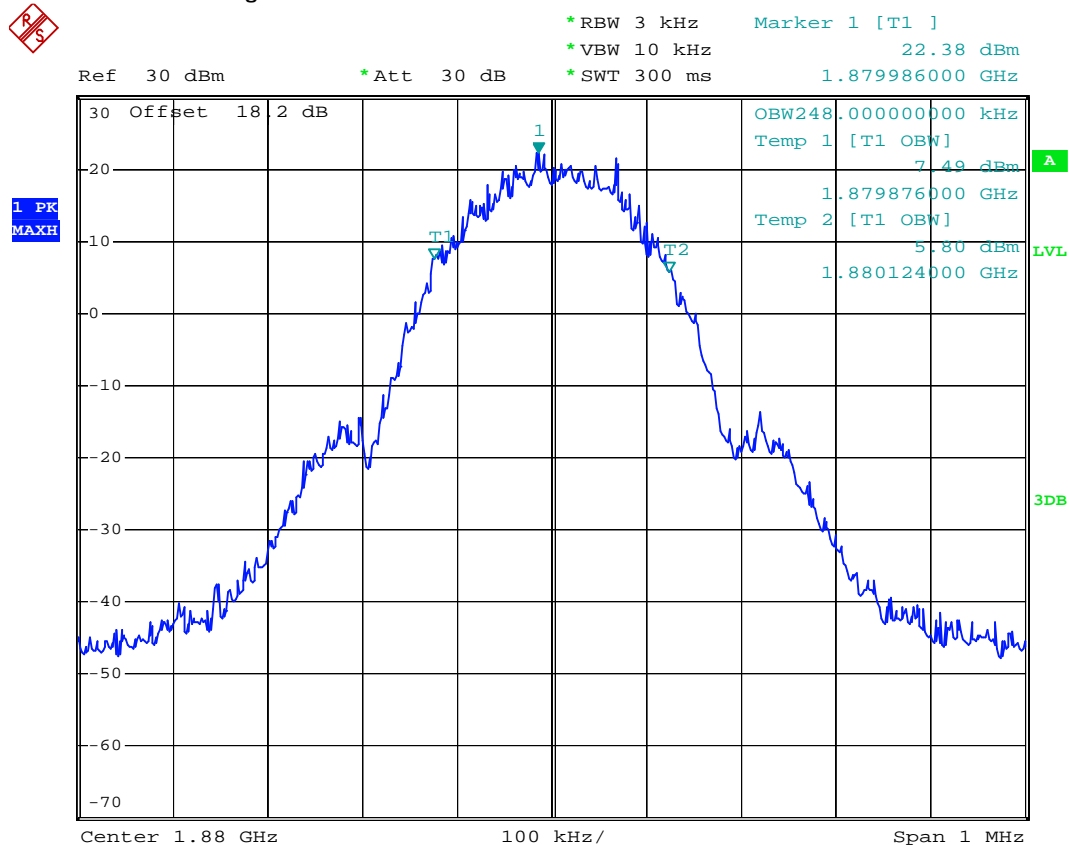
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FCC TEST REPORT

Report No. : FG751505-03

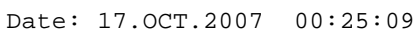
- Test Mode : PCS1900 (GSM) CH661 99% Occupied Bandwidth
- Power State : High



Date: 17.OCT.2007 00:24:20



- Test Mode : PCS1900 (GSM) CH810 99% Occupied Bandwidth
- Power State : High

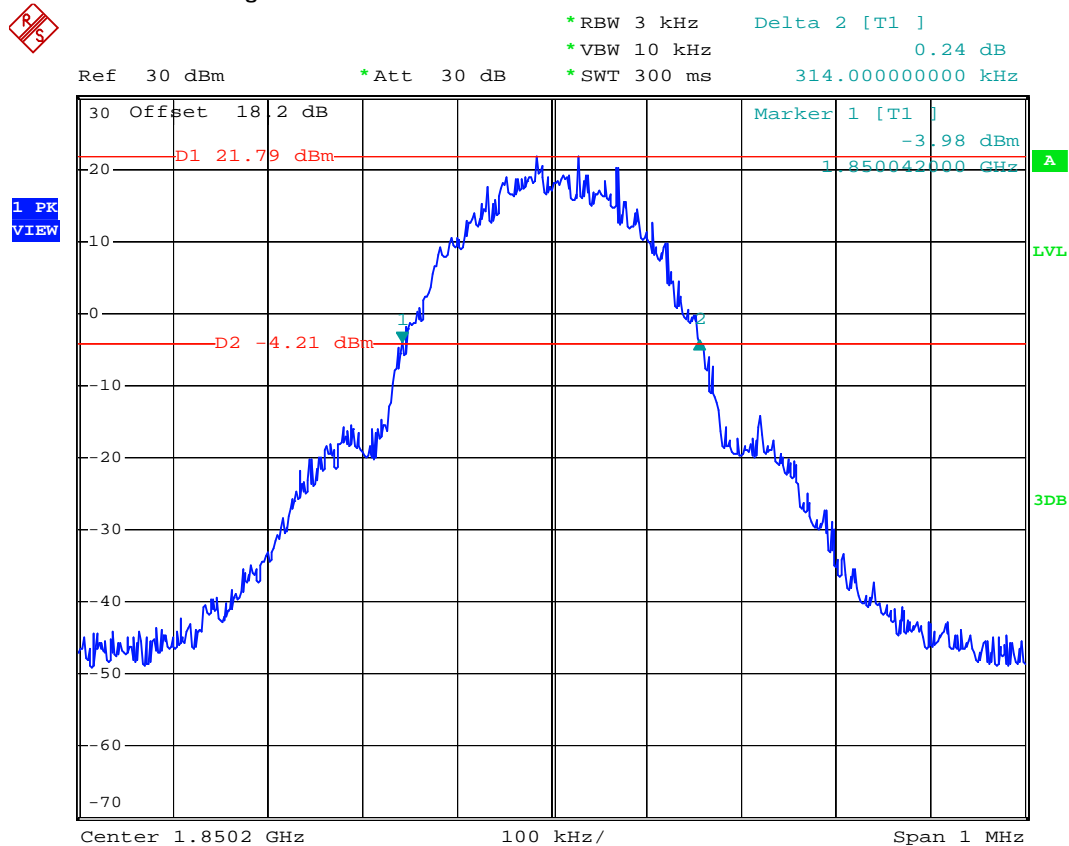




FCC TEST REPORT

Report No. : FG751505-03

- Test Mode : PCS1900 (GSM) CH512 26dB Bandwidth
- Power State : High



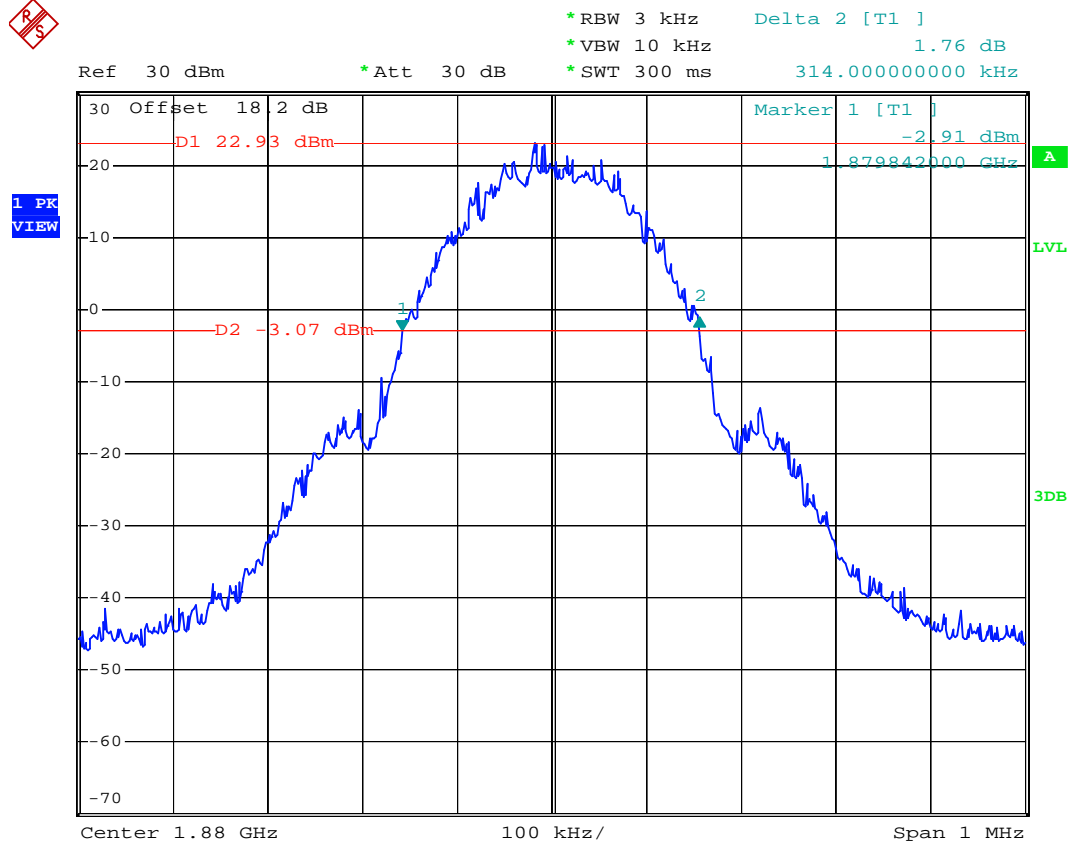
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FCC TEST REPORT

Report No. : FG751505-03

- Test Mode : PCS1900 (GSM) CH661 26dB Bandwidth
- Power State : High



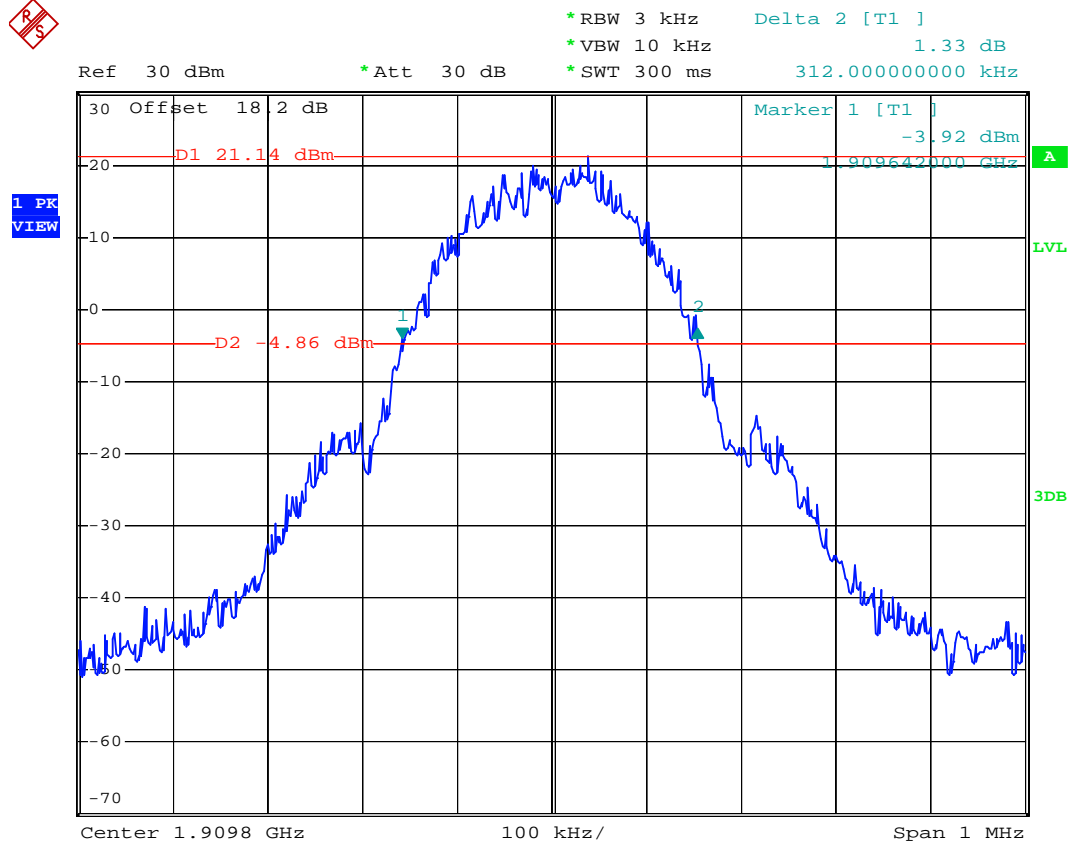
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FCC TEST REPORT

Report No. : FG751505-03

- Test Mode : PCS1900 (GSM) CH810 26dB Bandwidth
- Power State : High



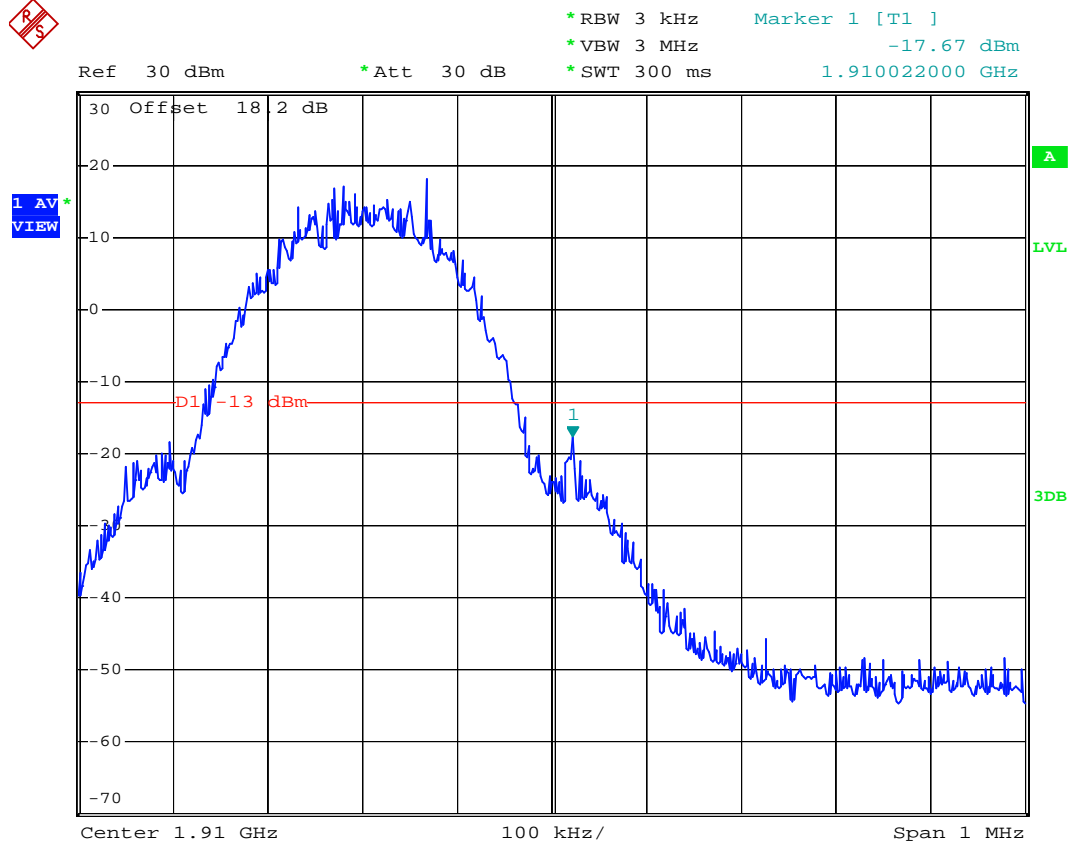
Date: 17.OCT.2007 00:18:27



FCC TEST REPORT

Report No. : FG751505-03

- Test Mode : PCS1900 (GSM) CH810 Higher Band Edge
- Power State : High



Date: 17.OCT.2007 00:31:32

4.5 Conducted Emission

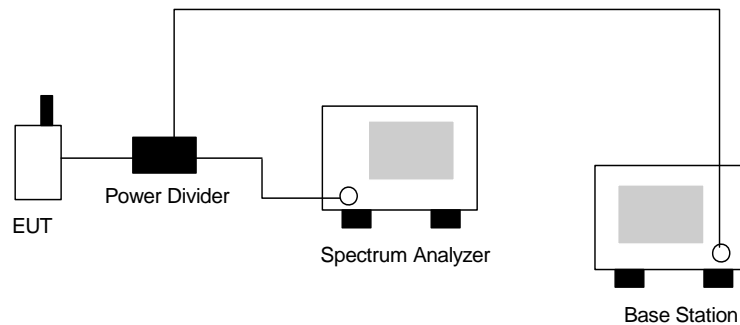
4.5.1 Measurement Instruments

As described in chapter 5 of this test report.

4.5.2 Test Procedure

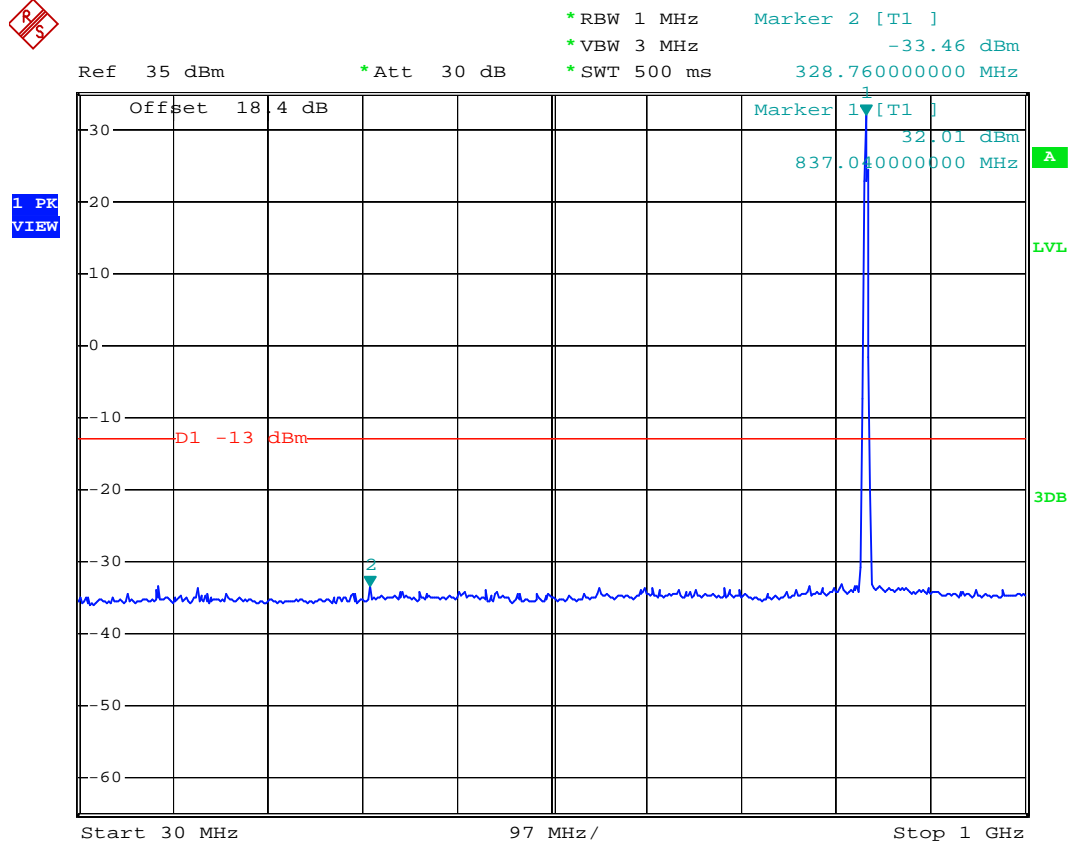
1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. The middle channel for the highest RF power within the transmitting frequency was measured.
3. The conducted spurious emission for the whole frequency range was taken.

4.5.3 Test Setup Layout



**4.5.4 Test Result**

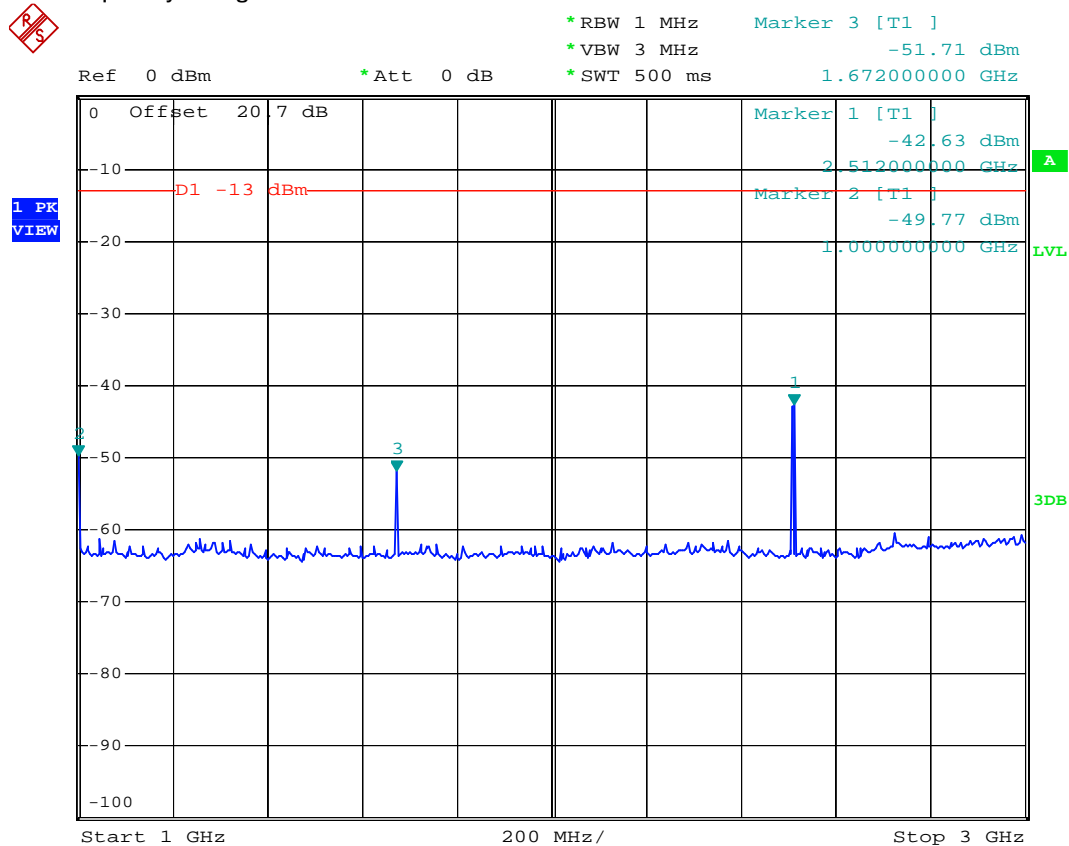
- Mode 1
- Test Mode : GSM850 (GSM) CH189
- Frequency Range : 30M-1G



Date: 17.OCT.2007 00:44:44



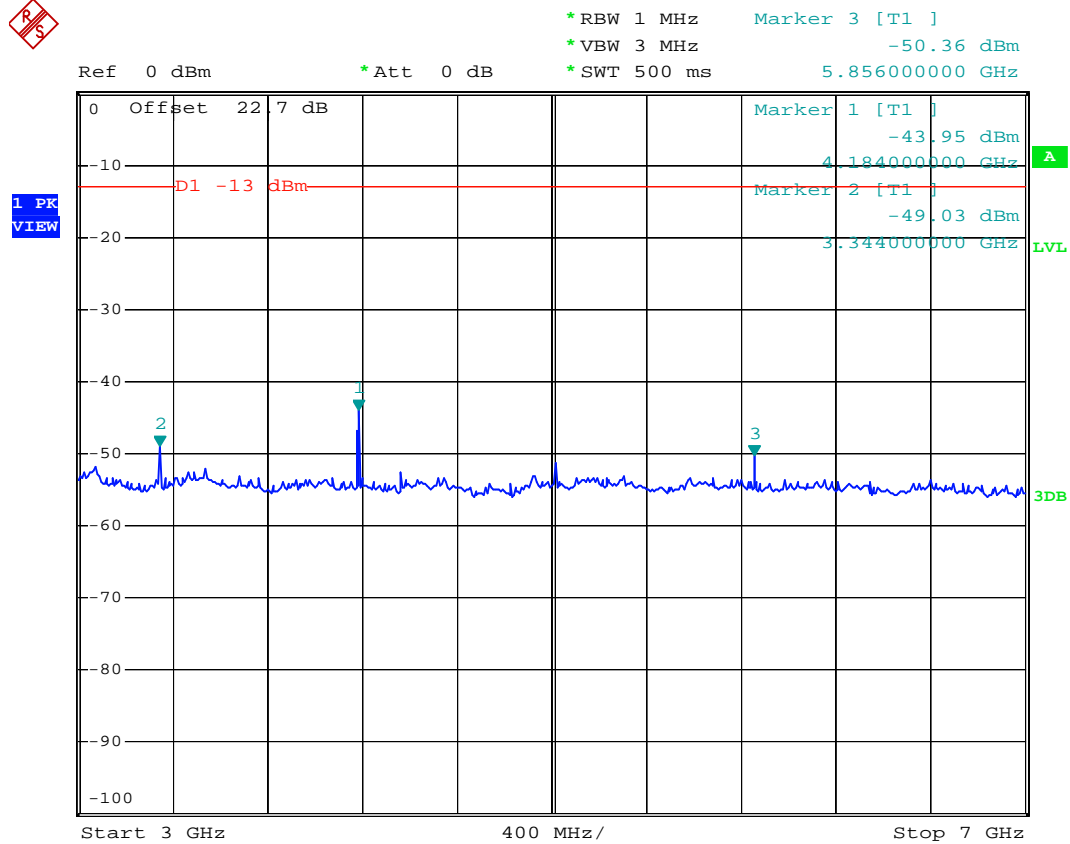
- Test Mode : GSM850 (GSM) CH189
- Frequency Range : 1G-3G



Date: 17.OCT.2007 01:23:39



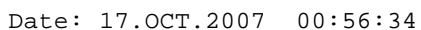
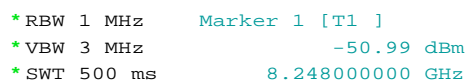
- Test Mode : GSM850 (GSM) CH189
- Frequency Range : 3G-7G



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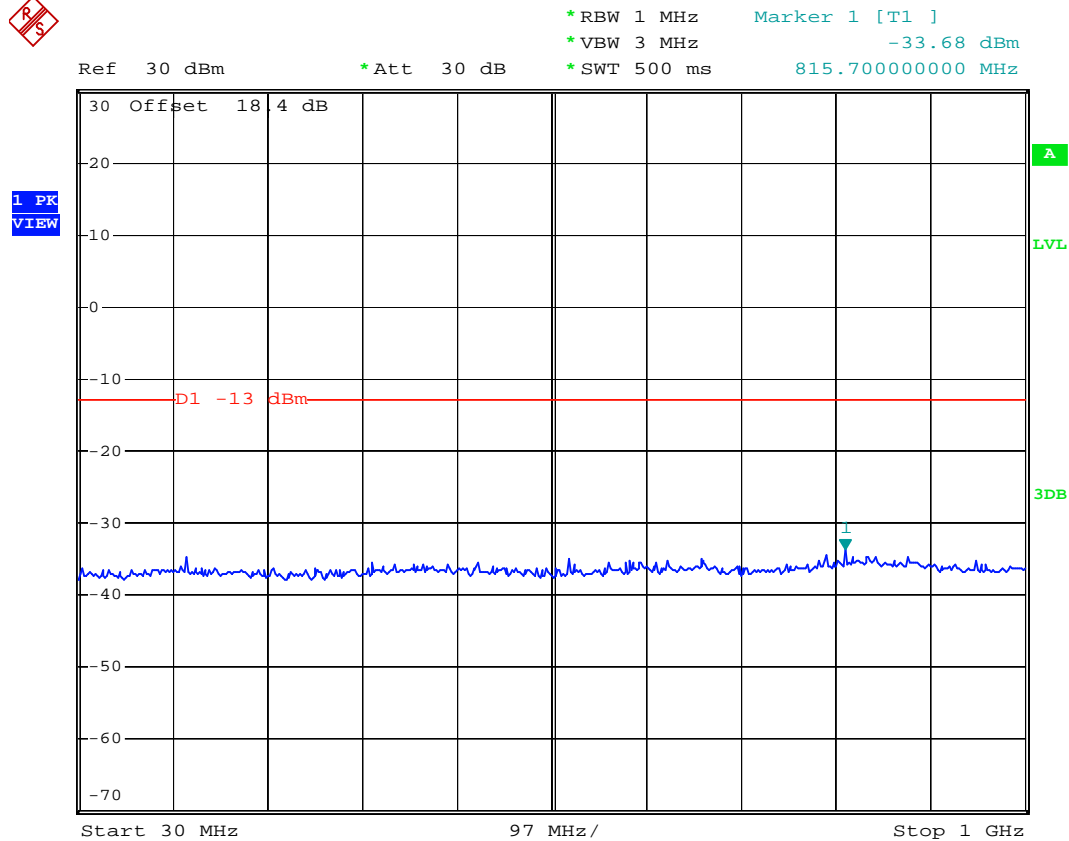


- Test Mode : GSM850 (GSM) CH189
- Frequency Range : 7G-9G





- Mode 2
- Test Mode : PCS1900 (GSM) CH661
- Frequency Range : 30M-1G



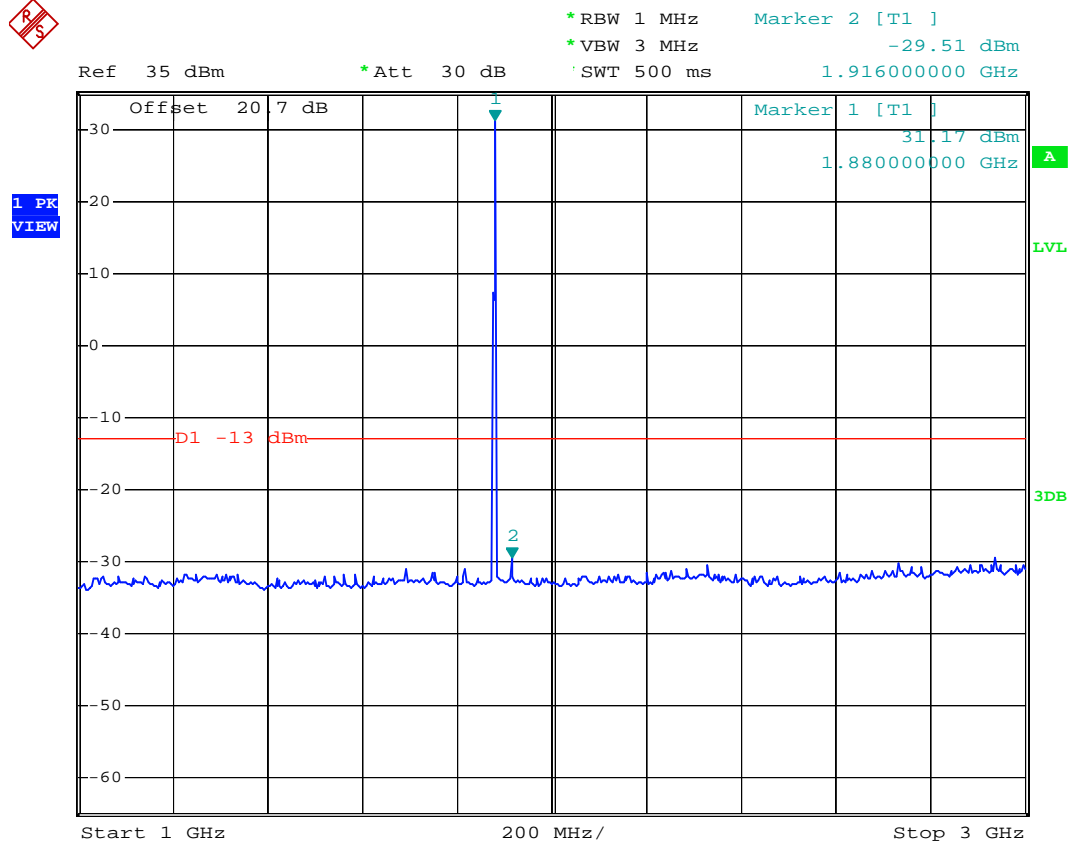
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FCC TEST REPORT

Report No. : FG751505-03

- Test Mode : PCS1900 (GSM) CH661
- Frequency Range : 1G-3G



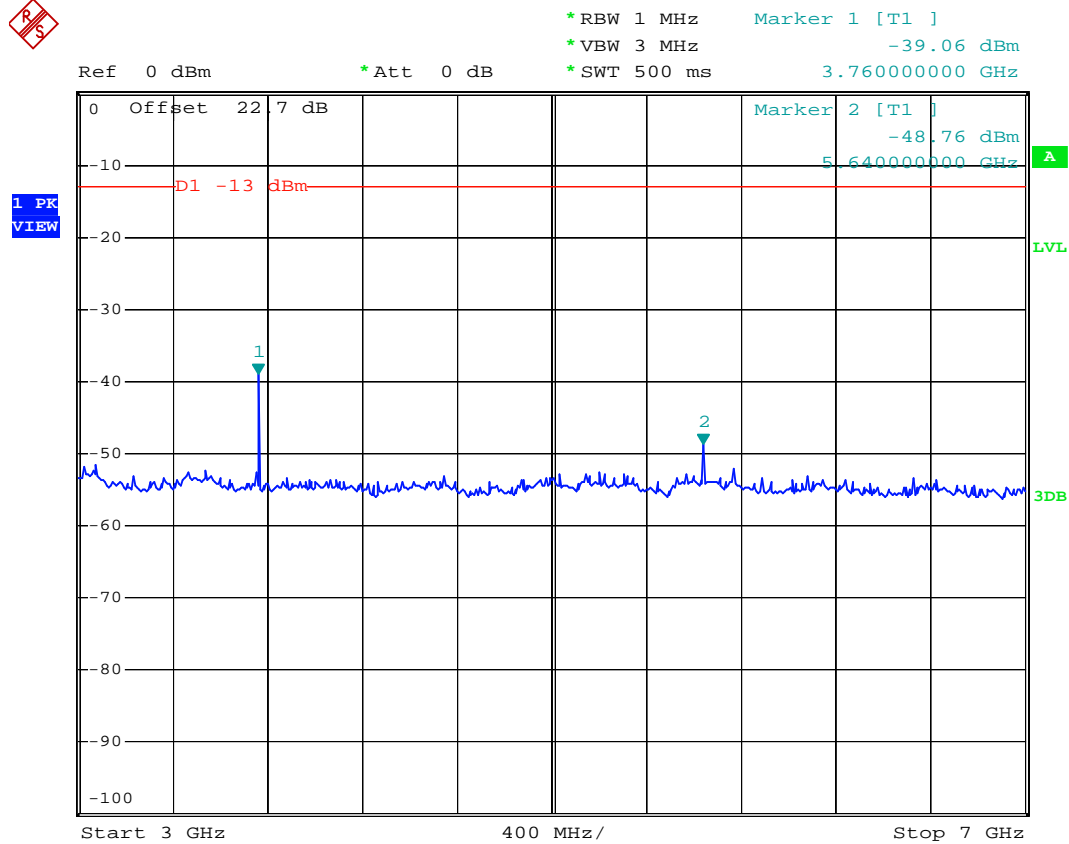
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FCC TEST REPORT

Report No. : FG751505-03

- Test Mode : PCS1900 (GSM) CH661
- Frequency Range : 3G-7G



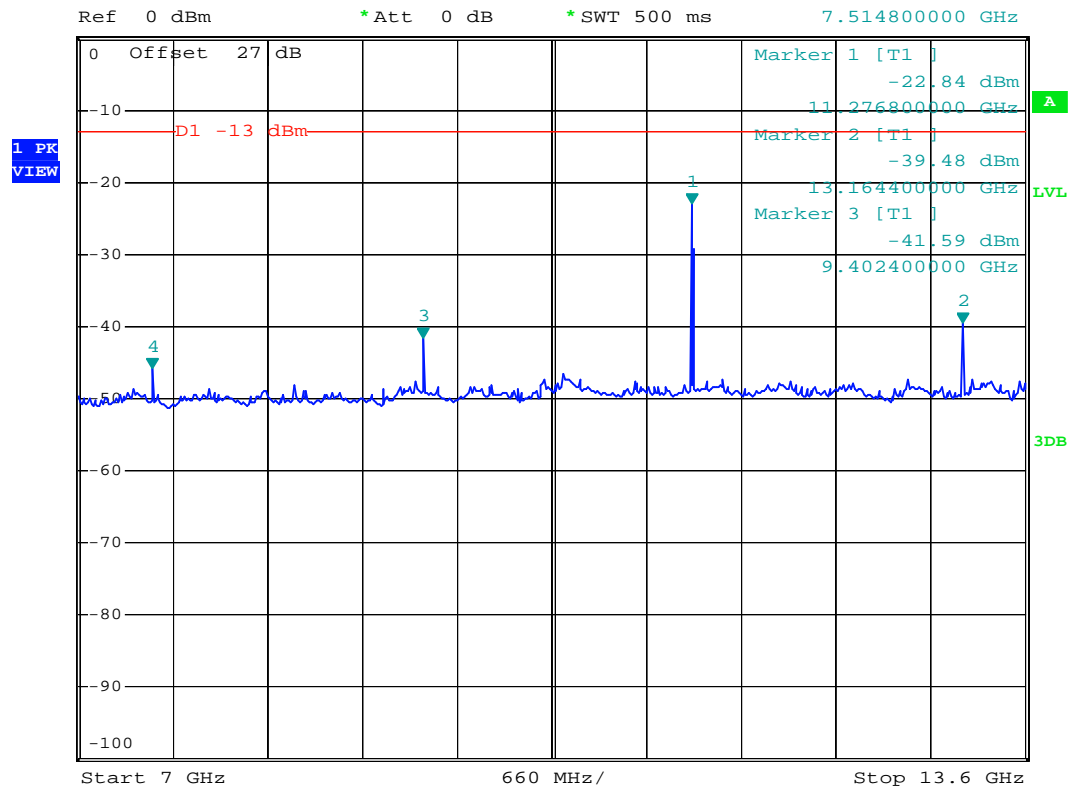
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- Test Mode : PCS1900 (GSM) CH661
- Frequency Range : 7G-13.6G



*RBW 1 MHz Marker 4 [T1]
*VBW 3 MHz -45.78 dBm
*SWT 500 ms 7.514800000 GHz



Date: 17.OCT.2007 01:00:19



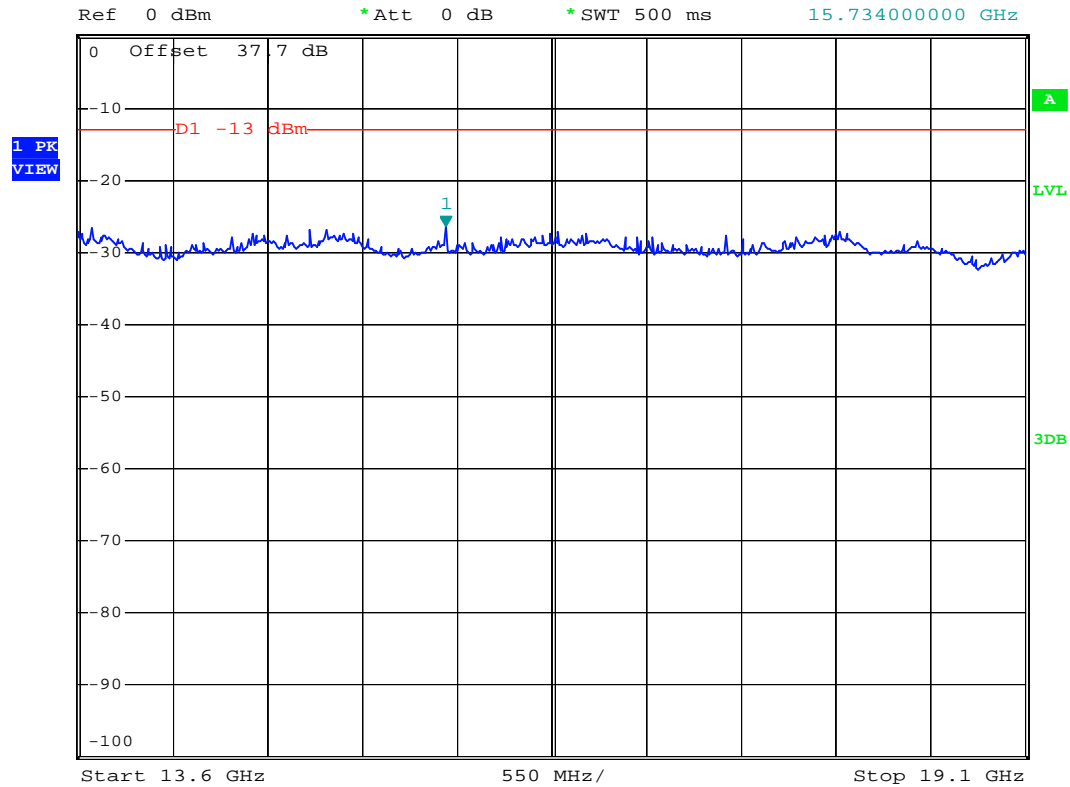
FCC TEST REPORT

Report No. : FG751505-03

- Test Mode : PCS1900 (GSM) CH661
- Frequency Range : 13.6G-19.1G



*RBW 1 MHz Marker 1 [T1]
*VBW 3 MHz -26.31 dBm
*SWT 500 ms 15.734000000 GHz



Date: 17.OCT.2007 01:01:04

4.6 Field Strength of Spurious Radiation

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

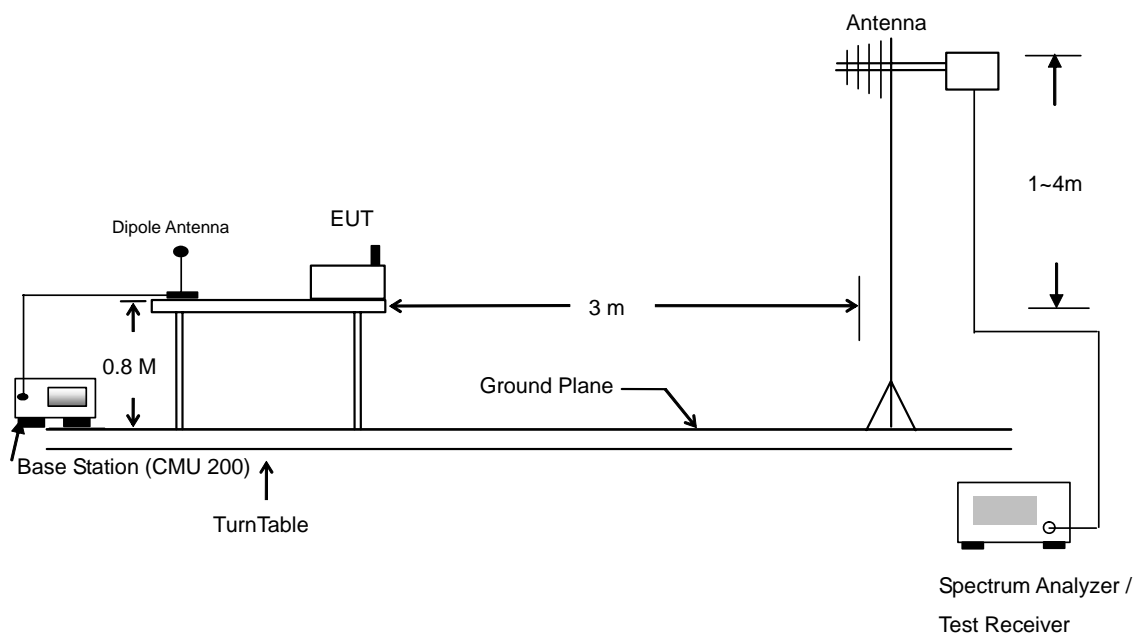
4.6.1 Measurement Instruments

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. 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.

4.6.3 Test Setup Layout



**4.6.4 Test Result**

▪ Test Mode : Mode 1

| GSM850 (GSM) Radiated Spurious ERP | | | | | | | |
|---|----------------------|------------------------|------------------------|----------------------------|----------------------|------------------------|------------------------|
| H Polarization | | | | V Polarization | | | |
| Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 192.540 | -70.220 | -13 | -57.22 | 42.690 | -65.690 | -13 | -52.69 |
| 212.790 | -71.030 | -13 | -58.03 | 211.980 | -66.010 | -13 | -53.01 |
| 223.590 | -69.640 | -13 | -56.64 | 243.840 | -63.070 | -13 | -50.07 |
| 990.900 | -66.430 | -13 | -53.43 | 995.800 | -64.140 | -13 | -51.14 |
| 1674.000 | -39.440 | -13 | -26.44 | 1674.000 | -38.100 | -13 | -25.10 |
| 2508.000 | -36.480 | -13 | -23.48 | 2508.000 | -34.350 | -13 | -21.35 |
| 3344.000 | -38.310 | -13 | -25.31 | 3344.000 | -50.020 | -13 | -37.02 |
| 4178.000 | -34.990 | -13 | -21.99 | 4178.000 | -47.270 | -13 | -34.27 |
| 5018.000 | -41.990 | -13 | -28.99 | 5018.000 | -46.830 | -13 | -33.83 |
| 8364.000 | -30.560 | -13 | -17.56 | 8364.000 | -40.000 | -13 | -27.00 |



▪ Test Mode : Mode 2

| PCS1900 (GSM) Radiated Spurious EIRP | | | | | | | |
|--------------------------------------|------------|-------------|-------------|-----------------|------------|-------------|-------------|
| H Polarization | | | | V Polarization | | | |
| Frequency (MHz) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Frequency (MHz) | EIRP (dBm) | Limit (dBm) | Margin (dB) |
| 31.080 | -60.590 | -13 | -47.59 | 61.590 | -61.450 | -13 | -48.45 |
| 79.140 | -56.590 | -13 | -43.59 | 77.790 | -57.220 | -13 | -44.22 |
| 140.430 | -65.160 | -13 | -52.16 | 214.680 | -59.070 | -13 | -46.07 |
| 306.300 | -69.120 | -13 | -56.12 | 777.400 | -63.810 | -13 | -50.81 |
| 868.400 | -64.930 | -13 | -51.93 | 875.400 | -62.770 | -13 | -49.77 |
| 974.800 | -64.440 | -13 | -51.44 | 995.800 | -61.880 | -13 | -48.88 |
| 1594.000 | -54.470 | -13 | -41.47 | 1688.000 | -51.760 | -13 | -38.76 |
| 1688.000 | -49.030 | -13 | -36.03 | 2068.000 | -47.790 | -13 | -34.79 |
| 2068.000 | -50.900 | -13 | -37.90 | 3758.000 | -34.680 | -13 | -21.68 |
| 3758.000 | -32.510 | -13 | -19.51 | 11278.000 | -30.720 | -13 | -17.72 |
| 9398.000 | -29.710 | -13 | -16.71 | 13158.000 | -31.110 | -13 | -18.11 |
| 11278.000 | -23.150 | -13 | -10.15 | 15036.000 | -29.060 | -13 | -16.06 |
| 13158.000 | -32.610 | -13 | -19.61 | | | | |
| 15036.000 | -28.170 | -13 | -15.17 | | | | |



▪ Test Mode : Mode 3

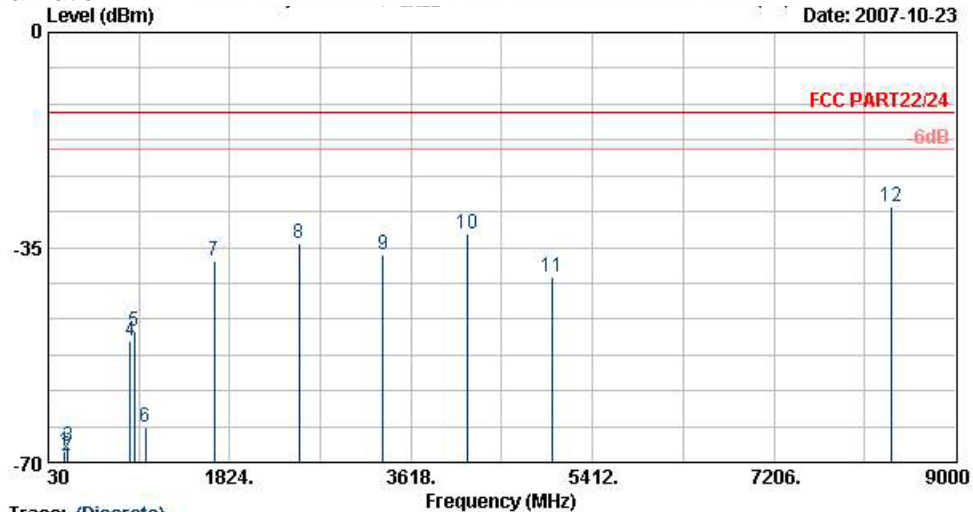
| GSM850 (GSM) with Bluetooth Co-location Radiated Spurious ERP | | | | | | | |
|--|--------------|----------------|----------------|--------------------|--------------|----------------|----------------|
| H Polarization | | | | V Polarization | | | |
| Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Margin (dB) |
| 64.830 | -70.150 | -13 | -57.15 | 52.140 | -61.010 | -13 | -48.01 |
| 95.340 | -67.850 | -13 | -54.85 | 95.340 | -62.430 | -13 | -49.43 |
| 125.580 | -70.040 | -13 | -57.04 | 191.730 | -58.700 | -13 | -45.70 |
| 399.400 | -62.400 | -13 | -49.40 | 397.300 | -57.160 | -13 | -44.16 |
| 1674.000 | -37.450 | -13 | -24.45 | 1674.000 | -36.200 | -13 | -23.20 |
| 2508.000 | -37.550 | -13 | -24.55 | 2508.000 | -40.650 | -13 | -27.65 |
| 4184.000 | -47.310 | -13 | -34.31 | 4178.000 | -50.340 | -13 | -37.34 |
| 8364.000 | -38.640 | -13 | -25.64 | | | | |



4.6.5 Test Data

4.6.5.1 Mode 1

Horizontal Polarization



Site : 03CH06-HY
 Condition : FCC PART22/24 HF-SPURIOUS-060929 HORIZONTAL
 EUT : GSM/GPRS(CLASS 12) 850/1900 With BT
 Mobile Phone
 Power : 120Vac/60Hz
 Model : FG 751505-03
 Mome : GSM 850 Link;Ch189 + Adaptor
 Plane : E1

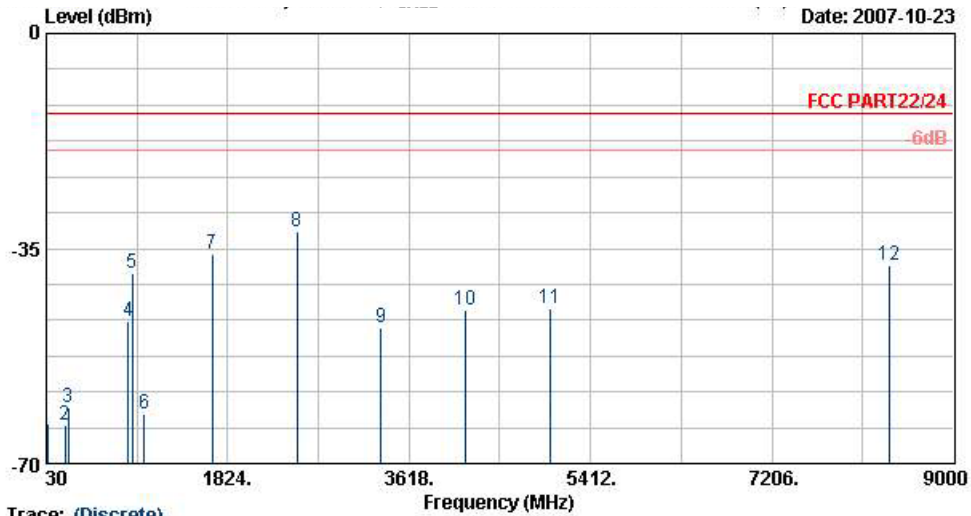
| | Freq | Level | Over | Limit | Read | | |
|------|---------|--------|--------|--------|--------|--------|--------|
| | MHz | dBm | Limit | Line | Level | Factor | Remark |
| | | | dB | dBm | dBm | dB | |
| 1 | 192.54 | -68.07 | -55.07 | -13.00 | -54.76 | -13.31 | Peak |
| 2 | 212.79 | -68.88 | -55.88 | -13.00 | -55.93 | -12.96 | Peak |
| 3 | 223.59 | -67.49 | -54.49 | -13.00 | -54.94 | -12.55 | Peak |
| 4 | 836.90 | -50.26 | | | -48.92 | -1.33 | Peak |
| 5 | 880.30 | -48.75 | | | -47.83 | -0.91 | Peak |
| 6 | 990.90 | -64.28 | -51.28 | -13.00 | -64.44 | 0.16 | Peak |
| 7 | 1674.00 | -37.29 | -24.29 | -13.00 | -39.65 | 2.36 | Peak |
| 8 | 2508.00 | -34.33 | -21.33 | -13.00 | -41.01 | 6.69 | Peak |
| 9 | 3344.00 | -36.16 | -23.16 | -13.00 | -45.55 | 9.40 | Peak |
| 10 | 4178.00 | -32.84 | -19.84 | -13.00 | -44.82 | 11.98 | Peak |
| 11 | 5018.00 | -39.84 | -26.84 | -13.00 | -55.91 | 16.07 | Peak |
| 12 @ | 8364.00 | -28.41 | -15.41 | -13.00 | -52.38 | 23.97 | Peak |

Remark:

- #4: MS Signal
- #5: BS Signal



Vertical Polarization



Site : 03CH06-HY
 Condition : FCC PART22/24 HF-SPURIOUS-060920 VERTICAL
 EUT : GSM/GPRS(CLASS 12) 850/1900 With BT
 : Mobile Phone
 Power : 120Vac/60Hz
 Model : FG 751505-03
 Name : GSM 850 Link;Ch189 + Adaptor
 Plane : EI

| | Freq | Level | Over | Limit | Read | | |
|----|---------|--------|--------|--------|--------|--------|--------|
| | MHz | dBm | Limit | Line | Level | Factor | Remark |
| | | | dB | dBm | dBm | dB | |
| 1 | 42.69 | -63.54 | -50.54 | -13.00 | -50.91 | -12.63 | Peak |
| 2 | 211.98 | -63.86 | -50.86 | -13.00 | -55.54 | -8.32 | Peak |
| 3 | 243.84 | -60.92 | -47.92 | -13.00 | -53.26 | -7.66 | Peak |
| 4 | 836.90 | -46.95 | | | -48.31 | 1.36 | Peak |
| 5 | 880.30 | -39.05 | | | -40.76 | 1.71 | Peak |
| 6 | 995.80 | -61.99 | -48.99 | -13.00 | -64.62 | 2.63 | Peak |
| 7 | 1674.00 | -35.95 | -22.95 | -13.00 | -38.10 | 2.16 | Peak |
| 8 | 2508.00 | -32.20 | -19.20 | -13.00 | -39.38 | 7.18 | Peak |
| 9 | 3344.00 | -47.87 | -34.87 | -13.00 | -56.42 | 8.55 | Peak |
| 10 | 4178.00 | -45.12 | -32.12 | -13.00 | -56.48 | 11.36 | Peak |
| 11 | 5018.00 | -44.68 | -31.68 | -13.00 | -59.41 | 14.74 | Peak |
| 12 | 8364.00 | -37.85 | -24.85 | -13.00 | -60.60 | 22.75 | Peak |

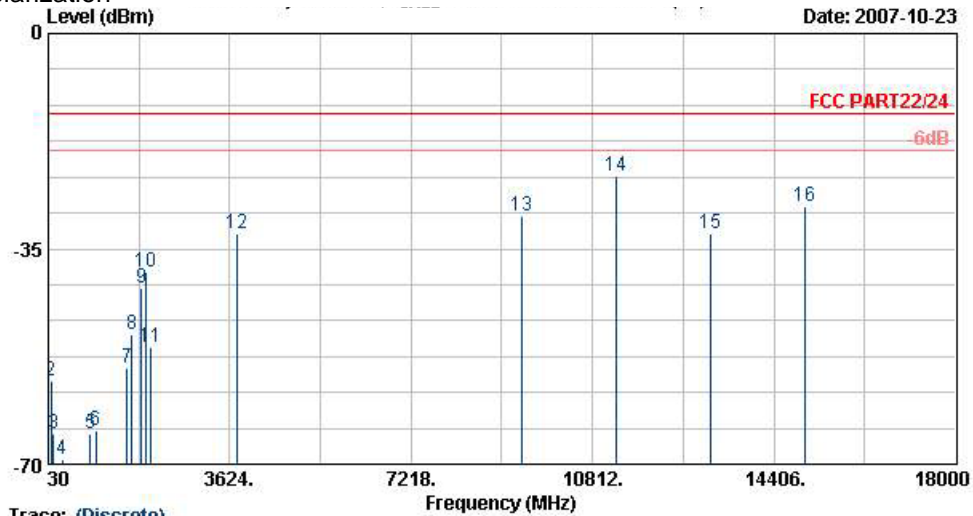
Remark:

- #4: MS Signal
- #5: BS Signal
- There is no more obvious emission except the listings above.



4.6.5.2 Mode 2

Horizontal Polarization



Trace: (Discrete)
 Site : 03CH06-HV
 Condition : FCC PART22/24 HF-SPURIOUS-060929 HORIZONTAL
 EUT : GSM/GPRS(CLASS 12) 850/1900 With BT
 Mobile Phone
 Power : 120Vac/60Hz
 Model : FG 751505-03
 Name : PCS 1900 Link;Ch661 + Adaptor
 Plane : E1

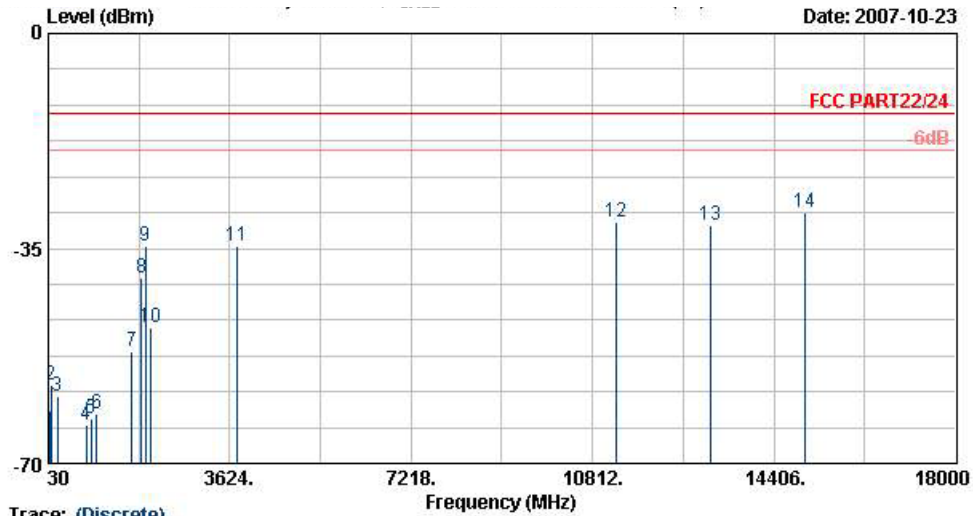
| | Freq | Level | Over | Limit | Read | | |
|------|----------|--------|--------|--------|--------|--------|--------|
| | MHz | dBm | Limit | Line | Level | Factor | Remark |
| | | | dB | dBm | dBm | dB | |
| 1 | 31.08 | -60.59 | -47.59 | -13.00 | -60.34 | -0.25 | Peak |
| 2 | 79.14 | -56.59 | -43.59 | -13.00 | -44.27 | -12.32 | Peak |
| 3 | 140.43 | -65.16 | -52.16 | -13.00 | -52.45 | -12.71 | Peak |
| 4 | 306.30 | -69.12 | -56.12 | -13.00 | -59.41 | -9.71 | Peak |
| 5 | 868.40 | -64.93 | -51.93 | -13.00 | -63.90 | -1.03 | Peak |
| 6 | 974.80 | -64.44 | -51.44 | -13.00 | -64.44 | 0.00 | Peak |
| 7 | 1594.00 | -54.47 | -41.47 | -13.00 | -56.18 | 1.71 | Peak |
| 8 | 1688.00 | -49.03 | -36.03 | -13.00 | -51.39 | 2.36 | Peak |
| 9 | 1878.00 | -41.38 | | | -45.28 | 3.90 | Peak |
| 10 | 1958.00 | -38.86 | | | -43.27 | 4.41 | Peak |
| 11 | 2068.00 | -50.90 | -37.90 | -13.00 | -55.95 | 5.05 | Peak |
| 12 | 3758.00 | -32.51 | -19.51 | -13.00 | -42.92 | 10.41 | Peak |
| 13 | 9398.00 | -29.71 | -16.71 | -13.00 | -51.11 | 21.40 | Peak |
| 14 @ | 11278.00 | -23.15 | -10.15 | -13.00 | -47.88 | 24.72 | Peak |
| 15 | 13158.00 | -32.61 | -19.61 | -13.00 | -60.37 | 27.76 | Peak |
| 16 | 15036.00 | -28.17 | -15.17 | -13.00 | -56.34 | 28.17 | Peak |

Remark:

- #9: MS Signal
- #10: BS Signal



Vertical Polarization



Site : 03CH06-HY
 Condition : FCC PART 22/24 HF-SPURIOUS-060920 VERTICAL
 EUT : GSM/GPRS(CLASS 12) 850/1900 With BT
 : Mobile Phone
 Power : 120Vac/60Hz
 Model : FG 751505-03
 Name : PCS 1900 Link;Ch661 + Adaptor
 Plane : EI

| | Freq | Level | Over | Limit | Read | | |
|----|----------|--------|--------|--------|--------|--------|--------|
| | MHz | dBm | Limit | Line | Level | Factor | Remark |
| | | | dB | dBm | dBm | dB | |
| 1 | 61.59 | -61.45 | -48.45 | -13.00 | -48.31 | -13.14 | Peak |
| 2 | 77.79 | -57.22 | -44.22 | -13.00 | -46.32 | -10.91 | Peak |
| 3 | 214.68 | -59.07 | -46.07 | -13.00 | -50.79 | -8.28 | Peak |
| 4 | 777.40 | -63.81 | -50.81 | -13.00 | -64.55 | 0.74 | Peak |
| 5 | 875.40 | -62.77 | -49.77 | -13.00 | -64.45 | 1.67 | Peak |
| 6 | 995.80 | -61.88 | -48.88 | -13.00 | -64.51 | 2.63 | Peak |
| 7 | 1688.00 | -51.76 | -38.76 | -13.00 | -53.92 | 2.16 | Peak |
| 8 | 1878.00 | -39.94 | | | -44.24 | 4.29 | Peak |
| 9 | 1958.00 | -34.64 | | | -39.65 | 5.01 | Peak |
| 10 | 2068.00 | -47.79 | -34.79 | -13.00 | -53.55 | 5.76 | Peak |
| 11 | 3758.00 | -34.68 | -21.68 | -13.00 | -44.57 | 9.89 | Peak |
| 12 | 11278.00 | -30.72 | -17.72 | -13.00 | -54.16 | 23.44 | Peak |
| 13 | 13158.00 | -31.11 | -18.11 | -13.00 | -57.57 | 26.46 | Peak |
| 14 | 15036.00 | -29.06 | -16.06 | -13.00 | -56.25 | 27.19 | Peak |

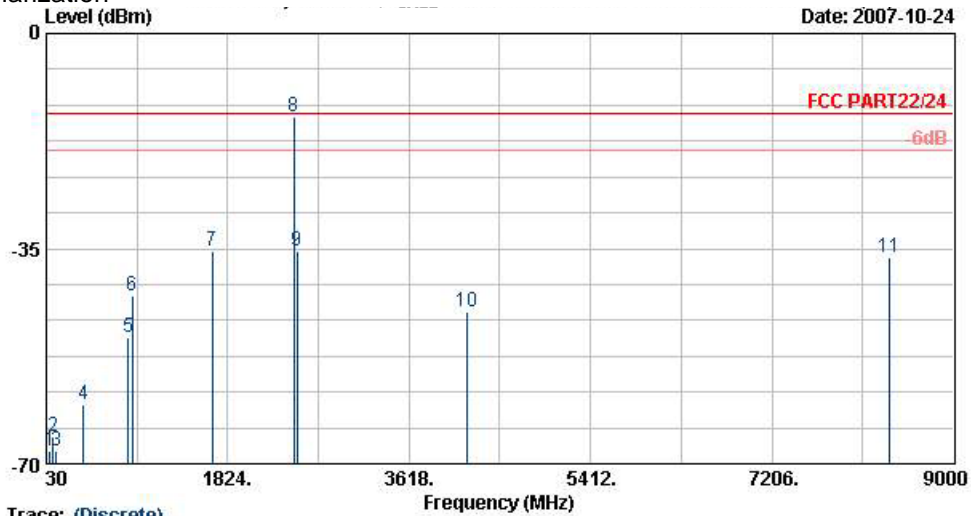
Remark:

1. #8: MS Signal
2. #9: BS Signal
3. There is no more obvious emission except the listings above.



4.6.5.3 Mode 3

Horizontal Polarization



Trace: (Discrete)

Site : 03CH06-HV
 Condition : FCC PART22/24 HF-SPURIOUS-060929 HORIZONTAL
 EUT : GSM/GPRS(CLASS 12) 850/1900 With BT
 Mobile Phone
 Power : 120Vac/60Hz
 Model : FG 751505-03
 Name : GSM 850 Link;Ch189 + BT Tx_Ch76 +Adaptor
 Plane : E1

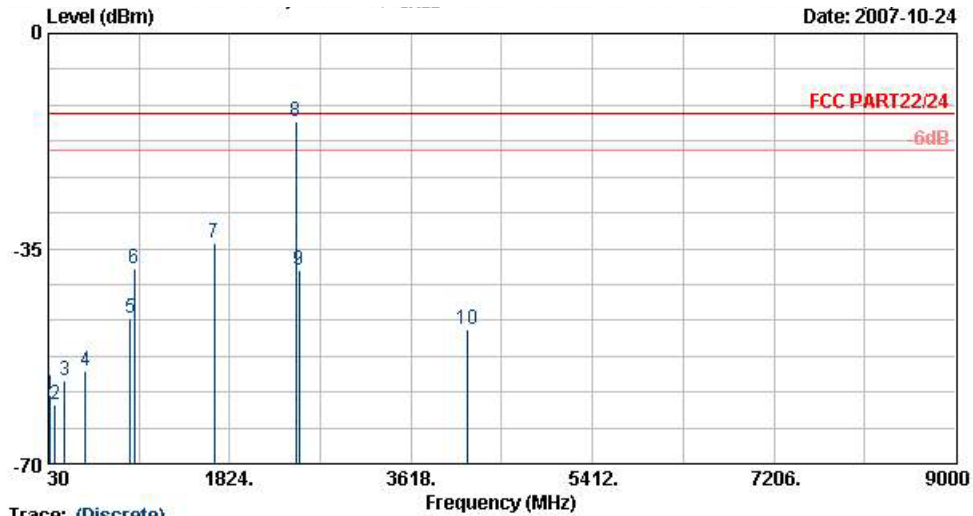
| | Freq | Level | Over | Limit | Read | | |
|-----|---------|--------|--------|--------|--------|--------|--------|
| | MHz | dBm | Limit | Line | Level | Factor | Remark |
| | | | dB | dBm | dBm | dB | |
| 1 | 64.83 | -68.00 | -55.00 | -13.00 | -55.63 | -12.37 | Peak |
| 2 | 95.34 | -65.70 | -52.70 | -13.00 | -53.44 | -12.26 | Peak |
| 3 | 125.58 | -67.89 | -54.89 | -13.00 | -55.34 | -12.54 | Peak |
| 4 | 399.40 | -60.25 | -47.25 | -13.00 | -53.75 | -6.50 | Peak |
| 5 | 836.90 | -49.57 | | | -48.24 | -1.33 | Peak |
| 6 | 880.30 | -42.74 | | | -41.83 | -0.91 | Peak |
| 7 | 1674.00 | -35.30 | -22.30 | -13.00 | -37.65 | 2.36 | Peak |
| 8 @ | 2478.00 | -13.66 | | | -20.22 | 6.57 | Peak |
| 9 | 2508.00 | -35.40 | -22.40 | -13.00 | -42.08 | 6.69 | Peak |
| 10 | 4184.00 | -45.16 | -32.16 | -13.00 | -57.14 | 11.98 | Peak |
| 11 | 8364.00 | -36.49 | -23.49 | -13.00 | -60.46 | 23.97 | Peak |

Remark:

- #5: MS Signal
- #6: BS Signal
- #8: BT Signal



Vertical Polarization



Site : 03CH06-HY
 Condition : FCC PART22/24 HF-SPURIOUS-060920 VERTICAL
 EUT : GSM/GPRS(CLASS 12) 850/1900 With BT
 : Mobile Phone
 Power : 120Vac/60Hz
 Model : FG 751505-03
 Name : GSM 850 Link;Ch189 + BT Tx_Ch76 +Adaptor
 Plane : EI

| | Freq | Level | Over | Limit | Read | | |
|-----|---------|--------|--------|--------|--------|--------|--------|
| | MHz | dBm | Limit | Line | Level | Factor | Remark |
| | | | dB | dBm | dBm | dB | |
| 1 | 52.14 | -58.86 | -45.86 | -13.00 | -44.32 | -14.54 | Peak |
| 2 | 95.34 | -60.28 | -47.28 | -13.00 | -51.89 | -8.39 | Peak |
| 3 | 191.73 | -56.55 | -43.55 | -13.00 | -48.03 | -8.52 | Peak |
| 4 | 397.30 | -55.01 | -42.01 | -13.00 | -50.64 | -4.37 | Peak |
| 5 | 836.90 | -46.39 | | | -47.76 | 1.36 | Peak |
| 6 | 880.30 | -38.15 | | | -39.86 | 1.71 | Peak |
| 7 | 1674.00 | -34.05 | -21.05 | -13.00 | -36.21 | 2.16 | Peak |
| 8 ! | 2478.00 | -14.35 | | | -21.46 | 7.11 | Peak |
| 9 | 2508.00 | -38.50 | -25.50 | -13.00 | -45.69 | 7.18 | Peak |
| 10 | 4178.00 | -48.19 | -35.19 | -13.00 | -59.55 | 11.36 | Peak |

Remark:

- #5: MS Signal
- #6: BS Signal
- #8: BT Signal
- There is no more obvious emission except the listings above.

4.7 Frequency Stability (Temperature Variation)

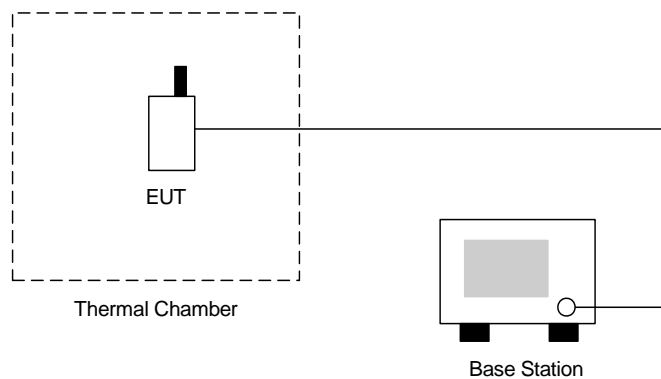
4.7.1 Measurement Instrument

As deccribed 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 note 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 ws 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 : GSM850 (GSM) CH189

| Temperature(°C) | Change (Hz) | Change (ppm) | Limit (ppm) | Result |
|-----------------|-------------|--------------|-------------|--------|
| -30 | 44 | 0.02 | 2.5 | Passed |
| -20 | -25 | -0.03 | | |
| -10 | -21 | -0.02 | | |
| 0 | -18 | -0.02 | | |
| 10 | -15 | -0.02 | | |
| 20 | -14 | -0.02 | | |
| 30 | -16 | -0.02 | | |
| 40 | -15 | -0.02 | | |
| 50 | -11 | -0.01 | | |
| | | | | |

- Test Mode : PCS1900 (GSM) CH661

| Temperature(°C) | Change (Hz) | Change (ppm) | Limit (ppm) | Result |
|-----------------|-------------|--------------|-------------|--------|
| -30 | -31 | -0.02 | 2.5 | Passed |
| -20 | -57 | -0.03 | | |
| -10 | -36 | -0.02 | | |
| 0 | -34 | -0.02 | | |
| 10 | -33 | -0.02 | | |
| 20 | -31 | -0.02 | | |
| 30 | -28 | -0.01 | | |
| 40 | -29 | -0.02 | | |
| 50 | -34 | -0.02 | | |
| | | | | |

4.8 Frequency Stability (Voltage Variation)

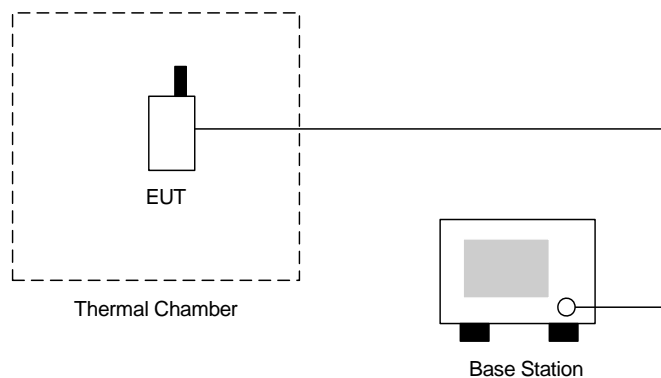
4.8.1 Measurement Instrument

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 : GSM850 (GSM) CH189

| Voltage(Volt) | Change (Hz) | Change (ppm) | Limit (ppm) | Result |
|---------------|-------------|--------------|-------------|--------|
| 3.7 | -24.0 | -0.03 | 2.5 | Passed |
| BEP | 27.0 | 0.03 | | |
| 4.2 | -17.0 | -0.02 | | |

- Test Mode : PCS1900 (GSM) CH661

| Voltage(Volt) | Change (Hz) | Change (ppm) | Limit (ppm) | Result |
|---------------|-------------|--------------|-------------|--------|
| 3.7 | -23.0 | -0.01 | 2.5 | Passed |
| BEP | -24.0 | -0.01 | | |
| 4.2 | -23.0 | -0.01 | | |

Remark:

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



5. List of Measurement Equipment

| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Due Date | Remark |
|---------------------------|------------------|-----------|------------|-----------------|------------------|---------------|-----------------------|
| Spectrum Analyzer | Agilent | E4408B | MY44211028 | 9KHz-26.5GHz | Oct. 17, 2007 | Oct. 16, 2008 | Radiation (03CH06-HY) |
| EMI Test Receiver | R&S | ESCS30 | 100356 | 9KHz-2.75GHz | Jul. 26, 2007 | Jul. 25, 2008 | Radiation (03CH06-HY) |
| Bilog Antenna | SCHAFFNER | CBL6112B | 2885 | 30MHz -2GHz | Nov. 20, 2006 | Nov. 19, 2007 | Radiation (03CH06-HY) |
| Double Ridge Horn Antenna | Com-Power | AH118 | 071025 | 1G~18G | Jun. 04, 2007 | Jun. 03, 2008 | Radiation (03CH06-HY) |
| SHF-EHF Horn | SCHWARZBECK | BBHA 9170 | 9170-249 | 14G - 40G | Nov. 20, 2006 | Nov. 19, 2008 | Radiation (03CH06-HY) |
| Pre Amplifier | Agilent | 8449B | 3008A01917 | 1G - 26.5G | Nov. 15, 2006 | Nov. 14, 2007 | Radiation (03CH06-HY) |
| Pre Amplifier | Mini Circuits | ZKL-2 | D092004-1 | 10~2500MHz | Nov. 15, 2006 | Nov. 14, 2007 | Radiation (03CH06-HY) |
| Base Station Simulator | R & S | CMU200 | 106656 | WCDMA | Nov. 20, 2006 | Nov. 19, 2007 | Radiation (03CH06-HY) |
| Thermal Chamber | Tenyi technology | TTH-D35P | TBN-930701 | N/A | Aug. 02, 2007 | Aug. 01, 2008 | Conduction (TH02-HY) |
| Spectrum | R&S | FSP40 | 100055 | 9KHz~40GHz | Jun. 25, 2007 | Jun. 24, 2008 | Conduction (TH02-HY) |
| Bluetooth Test | ANRITSU | MT8852A | 6K00003939 | N/A | N/A | N/A | Conduction (TH02-HY) |
| Power Divider | ARRA | 5200-1 | 3871 | N/A | Oct. 01, 2007 | Sep. 30, 2008 | Conduction (TH02-HY) |
| DC Power Supply | TOPWARD | 3303D | 740889 | N/A | May 25, 2005 | May 24, 2009 | Conduction (TH02-HY) |
| Power Meter | Agilent | E4416A | GB41292344 | N/A | Feb. 08, 2007 | Feb. 07, 2008 | Conduction (TH02-HY) |
| Power Sensor | Agilent | E9327A | US40441548 | N/A | Feb. 08, 2007 | Feb. 07, 2008 | Conduction (TH02-HY) |

6. Uncertainty Evaluation

Uncertainty of Radiated Emission Measurement (30MHz ~ 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 | +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 (1GHz ~ 40GHz)

| Contribution | Uncertainty of x_i | | $u(x_i)$ | C_i | $C_i * u(x_i)$ |
|--|----------------------|--------------------------|----------|-------|----------------|
| | 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 Receiver VSWR $\Gamma_1 = 0.197$ Antenna VSWR $\Gamma_2 = 0.194$ Uncertainty = $20 \log(1 - \Gamma_1 * \Gamma_2 * \Gamma_3)$ | +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 | | | | |

END OF TEST REPORT