FCC TEST REPORT

for

47 CFR Part 22H, 24E

Equipment	:	**PDA Phone**
Trade Name	:	**Opticon**
Model No.	:	**H-16A, H-16B**
FCC ID	:	**DGIBC0129AAA190**
Tx Frequency Range	:	**GSM850 : 824~849 MHz** **PCS1900 : 1850~1910 MHz**
Max. ERP/EIRP Power	:	**GSM850(GSM) : 1.49 W** **GSM850(EDGE) : 0.39 W** **PCS1900(GSM) : 0.33 W** **PCS1900(EDGE) : 0.08 W**
Emission Designator	:	**GSM : 300KGXW** **EDGE : 300KG7W**
Applicant	:	**Inventec Corporation** Inventec Building, 66 Hou-Kang Street, Shih-Lin District, Taipei 11170, Taiwan

- The test result refers exclusively to the test presented test model / sample.
- Without written approval of SPORTON International Inc., the test report shall not be reproduced except in full.
- **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 Dec. 23, 2006 at **Sporton International Inc. LAB.**
- Report No.: FG6N2811, Report Version: Rev. 01.

Roy Wu
Deputy Manager

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

Table of Contents

History of this test report ..... **ii**
1. General Information **1**
1.1. Applicant 1
1.2 Manufacturer 1
1.3 Basic Description of Equipment under Test 1
1.4 Feature of Equipment under Test 2
1.5 Report Date 2
2 Test Configuration of Equipment under Test **3**
2.1 Test Manner 3
2.2 Test Mode 3
2.3 Connection Diagram of Test System 3
2.4 Ancillary Equipment List 3
3. General Information of Test Site **4**
3.1 Test Voltage 4
3.2 Test in Compliance with 4
3.3 Frequency Range Investigated 4
3.4 Test Distance 4
4. Test Data and Test Result **5**
4.1 List of Measurements and Examinations 5
4.2 RF Output Power 6
4.3 ERP / EIRP Measurement 7
4.4 Occupied Bandwidth and Band Edge Measurement 11
4.5 Conducted Emission 26
4.6 Field Strength of Spurious Radiation 45
4.7 Frequency Stability (Temperature Variation) 89
4.8 Frequency Stability (Voltage Variation) 92
5 List of Measurement Equipments **94**
6 Uncertainty Evaluation **95**

Appendix A - Setup Photographs

History of this test report

Report Issue Date: Jan. 09, 2007

Report No.	Description

1. General Information

1.1. Applicant

Inventec Corporation
Inventec Building, 66 Hou-Kang Street, Shih-Lin District, Taipei 11170, Taiwan

1.2 Manufacturer

Inventec Corporation
Inventec Building, 66 Hou-Kang Street, Shih-Lin District, Taipei 11170, Taiwan

1.3 Basic Description of Equipment under Test

Equipment	: PDA Phone
Trade Name	: Opticon
Model No.	: H-16A, H-16B
FCC ID	: DGIBC0129AAA190
Power Supply Type	: Switching, From Battery 4.2V
Adapter	: PI Electronics, AD7112B 03LF
Battery	: OPTICON, H-16
Earphone	: TECHWIN Communication Co. Ltd., EE-624A-8EN
Scanner 1	: OPTOELECTRONICS, MDI-1000
Scanner 2	: OPTOELECTRONICS, MDL-2000

1.4 Feature of Equipment under Test

DUT Type :	PDA Phone
Trade Name :	Opticon
Model Name :	H-16A, H-16B
FCC ID :	DGIBC0129AAA190
Tx Frequency :	GSM850 : 824 ~ 849 MHz PCS1900 : 1850 ~1910 MHz
Rx Frequency :	GSM850 : 869 ~ 894 MHz PCS1900 : 1930 ~ 1990 MHz
Maximum Output Power to Antenna :	GSM : 32.13 dBm(GSM) ; 32.06 dBm(GPRS8) ; 30.29 dBm(GPRS10) ; 26.7 dBm(GPRS12) ; 26 dBm(EDGE8) ; 23.8 dBm(EDGE10) ; 19.5 dBm(EDGE12) DCS : 29.26 dBm(GSM) ; 29.25 dBm(GPRS8) ; 27.39 dBm(GPRS10) ; 23.8 dBm(GPRS12) ; 25.5 dBm(EDGE8) ; 23.4 dBm(EDGE10) ; 19.3 dBm(EDGE12)
Maximum ERP/EIRP :	GSM850(GSM) : 1.49 W (31.73 dBm) GSM850(EDGE8) : 0.39 W (25.94 dBm) PCS1900(GSM) : 0.33 W (25.17 dBm) PCS1900(EDGE8) : 0.08 W (19.22 dBm)
Antenna Type :	GSM/DCS: Fixed Internal Bluetooth: Chip Antenna WLAN: PIFA Antenna
HW Version :	0.1
SW Version :	0.1
Power Rating (DC/AC , Voltage and Current of RF element or PA) :	DC 4.2V / 1440mA
Digital Modulation Emission :	GMSK
Type of Emission :	GSM : 300KGXW EDGE : 300KG7W
Device Power Class :	GSM850 : 4 PCS1900 : 1
DUT Stage :	Identical Prototype

1.5 Report Date

EUT Received : Nov. 28, 2006

Report Date : Jan. 09, 2007

2 Test Configuration of Equipment under Test

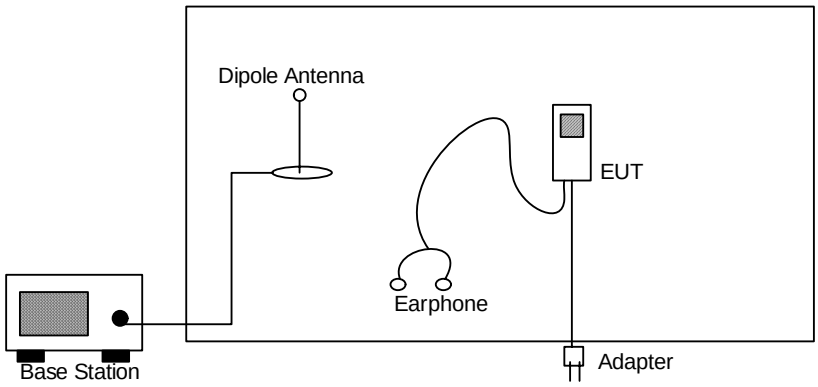
2.1 Test Manner

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.
c. Frequency range investigated: radiated emission 30 MHz to 9000 MHz for GSM850; 30MHz to 19000 MHz for PCS.

2.2 Test Mode

Application	GSM850	PCS1900
Radiated Emission	☒ Mode 1: GSM Link_CH 189 ☒ Mode 2: EDGE Link_CH 189 ☒ Mode 5: GSM Link with Bluetooth Link	☒ Mode 3: GSM Link_CH 661 ☒ Mode 4: EDGE Link_CH 661
Conducted Measurement	☒ Mode 1: GSM_CH 189 ☒ Mode 2: EDGE_CH 189	☒ Mode 3: GSM_CH 661 ☒ Mode 4: EDGE_CH 661

2.3 Connection Diagram of Test System



2.4 Ancillary Equipment List

Item	Equipment	Model No.	Serial No.
1.	Base Station(R&S)	CMU200	106656

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

120V/ 60Hz

3.2 Test in Compliance with

47 CFR Part 22H, 24E, Part 2.

3.3 Frequency Range Investigated

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

4.2 RF Output Power

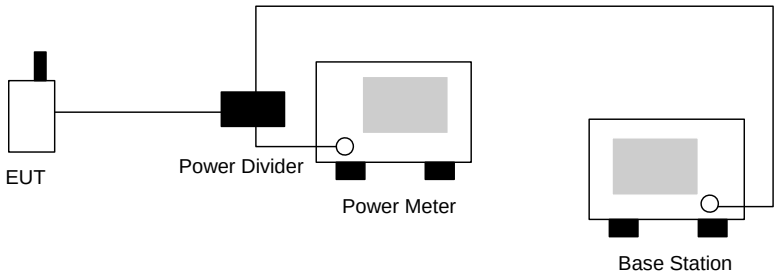
4.2.1 Measurement Instruments：

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)	32.13	1.633
	189	836.4 (Mid)	32.09	1.618
	251	848.8 (High)	32.07	1.611
GSM850 (EDGE8)	128	824.2 (Low)	26.00	0.398
	189	836.4 (Mid)	25.90	0.389
	251	848.8 (High)	25.90	0.389
PCS1900 (GSM)	512	1850.2 (Low)	29.26	0.843
	661	1880.0 (Mid)	29.23	0.838
	810	1909.8 (High)	29.08	0.809
PCS1900 (EDGE8)	512	1850.2 (Low)	25.50	0.355
	661	1880.0 (Mid)	25.40	0.347
	810	1909.8 (High)	25.30	0.339

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 rotatable 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 = 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

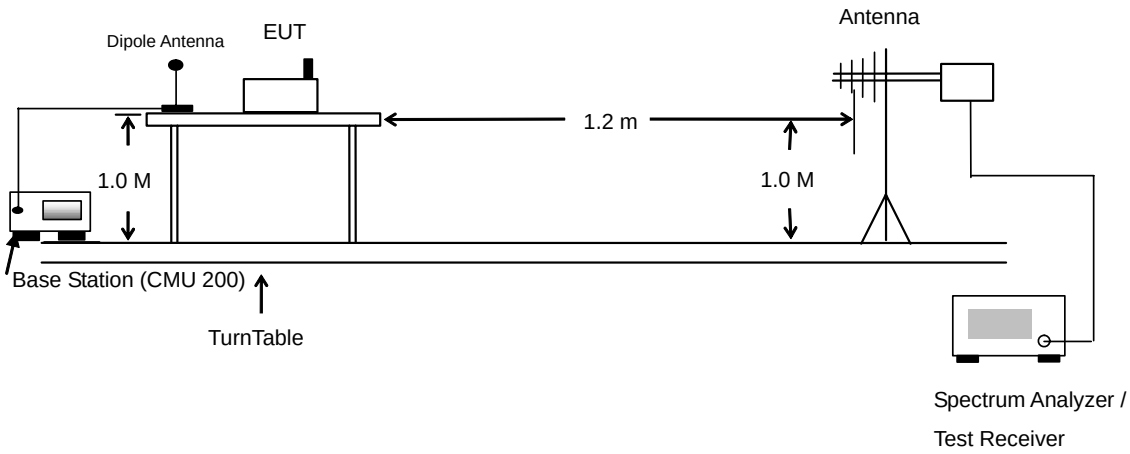
   Es = Rs + AF

   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.

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	-18.07	-48.12	0.00	-1.08	28.97	0.79
836.40	-16.70	-48.28	0.00	-0.93	30.65	1.16
848.80	**-15.86**	**-48.35**	**0.00**	**-0.76**	**31.73**	**1.49**
Vertical Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBd)	ERP (dBm)	ERP (W)
824.20	-33.58	-47.97	0.00	-1.08	13.31	0.02
836.40	-32.34	-48.01	0.00	-0.93	14.74	0.03
848.80	-31.45	-48.05	0.00	-0.76	15.84	0.04

GSM850 (EDGE8) Radiated Power ERP						
Horizontal Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBd)	ERP (dBm)	ERP (W)
824.20	-23.72	-48.12	0.00	-1.08	23.32	0.21
836.40	-22.47	-48.28	0.00	-0.93	24.88	0.31
848.80	**-21.65**	**-48.35**	**0.00**	**-0.76**	**25.94**	**0.39**
Vertical Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBd)	ERP (dBm)	ERP (W)
824.20	-39.31	-47.97	0.00	-1.08	7.58	0.01
836.40	-38.08	-48.01	0.00	-0.93	9.00	0.01
848.80	-37.19	-48.05	0.00	-0.76	10.10	0.01

PCS1900 (GSM) Radiated Power EIRP						
Horizontal Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBi)	EIRP (dBm)	EIRP (W)
1850.20	-30.73	-51.88	0.00	1.96	23.11	0.20
1880.00	-33.34	-52.99	0.00	2.00	21.65	0.15
1909.80	-35.83	-54.28	0.00	1.98	20.43	0.11
Vertical Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBi)	EIRP (dBm)	EIRP (W)
1850.20	**-28.92**	**-52.13**	**0.00**	**1.96**	**25.17**	**0.33**
1880.00	-31.12	-53.17	0.00	2.00	24.05	0.25
1909.80	-32.79	-54.13	0.00	1.98	23.32	0.21

PCS1900 (EDGE8) Radiated Power EIRP						
Horizontal Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBi)	EIRP (dBm)	EIRP (W)
1850.20	-36.71	-51.88	0.00	1.96	17.13	0.05
1880.00	-39.13	-52.99	0.00	2.00	15.86	0.04
1909.80	-41.50	-54.28	0.00	1.98	14.76	0.03
Vertical Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBi)	EIRP (dBm)	EIRP (W)
1850.20	**-34.87**	**-52.13**	**0.00**	**1.96**	**19.22**	**0.08**
1880.00	-36.91	-53.17	0.00	2.00	18.26	0.07
1909.80	-38.45	-54.13	0.00	1.98	17.66	0.06

4.4 Occupied Bandwidth and Band Edge Measurement

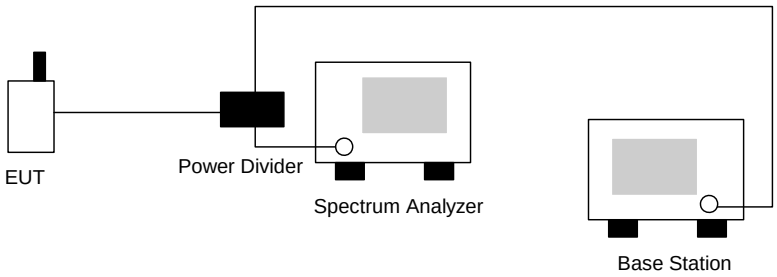
4.4.1 Measurement Instruments

As described in chapter 5 of this test report.

4.4.2 Test Procedure

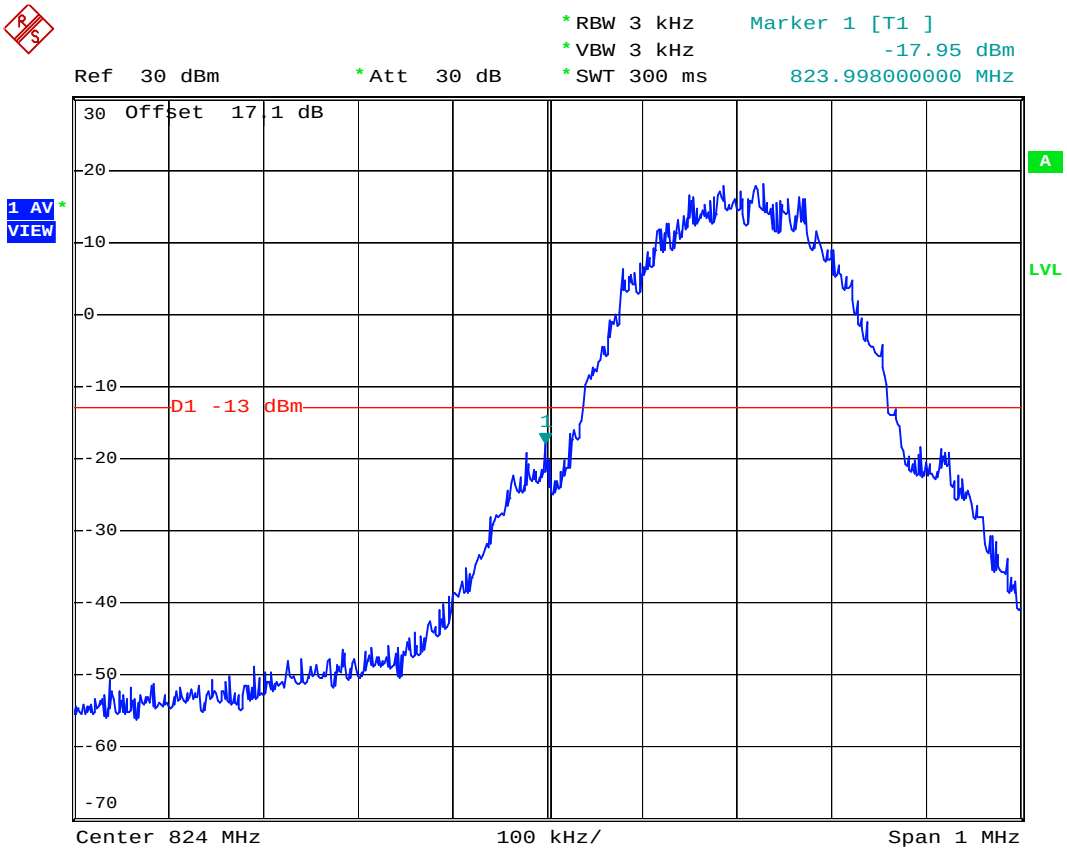
1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. The 99% occupied bandwidth of middle channel for the highest and lowest RF powers were measured.
3. The bandedge of low and high channels for the highest RF powers within the transmitting frequency band were measured.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

4.4.3 Test Setup Layout



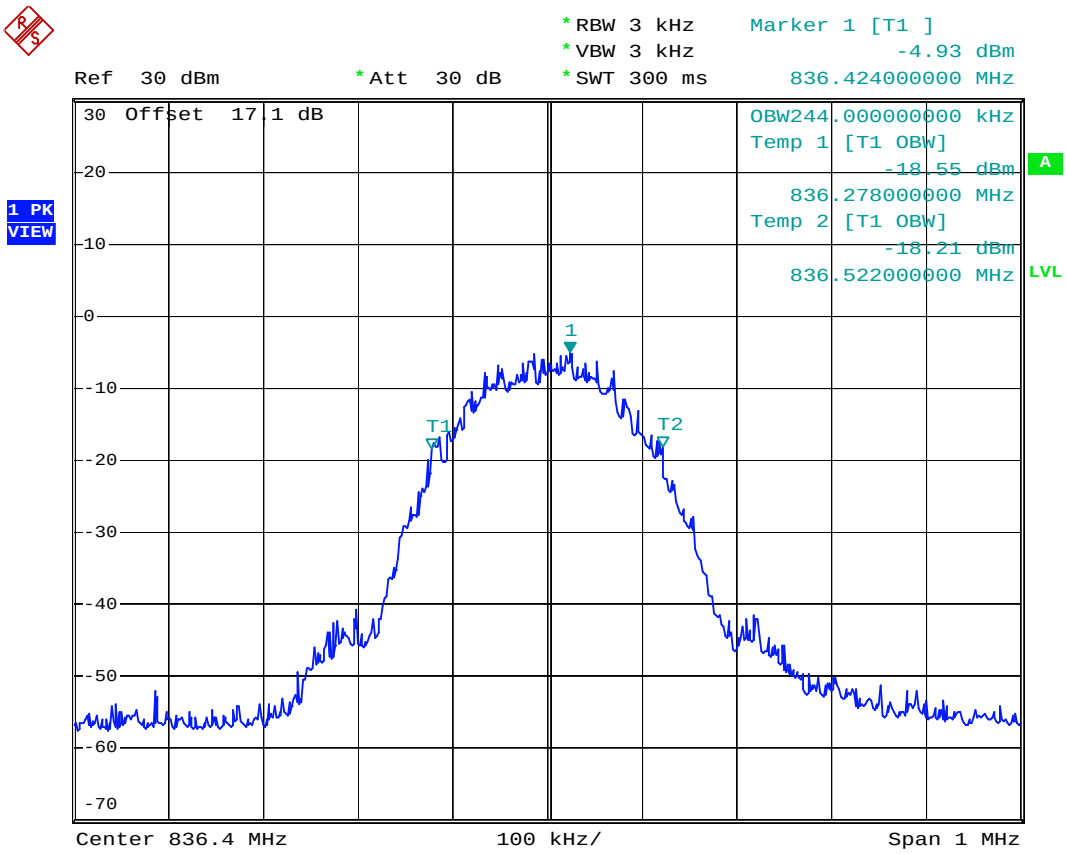
4.4.4 Test Result

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



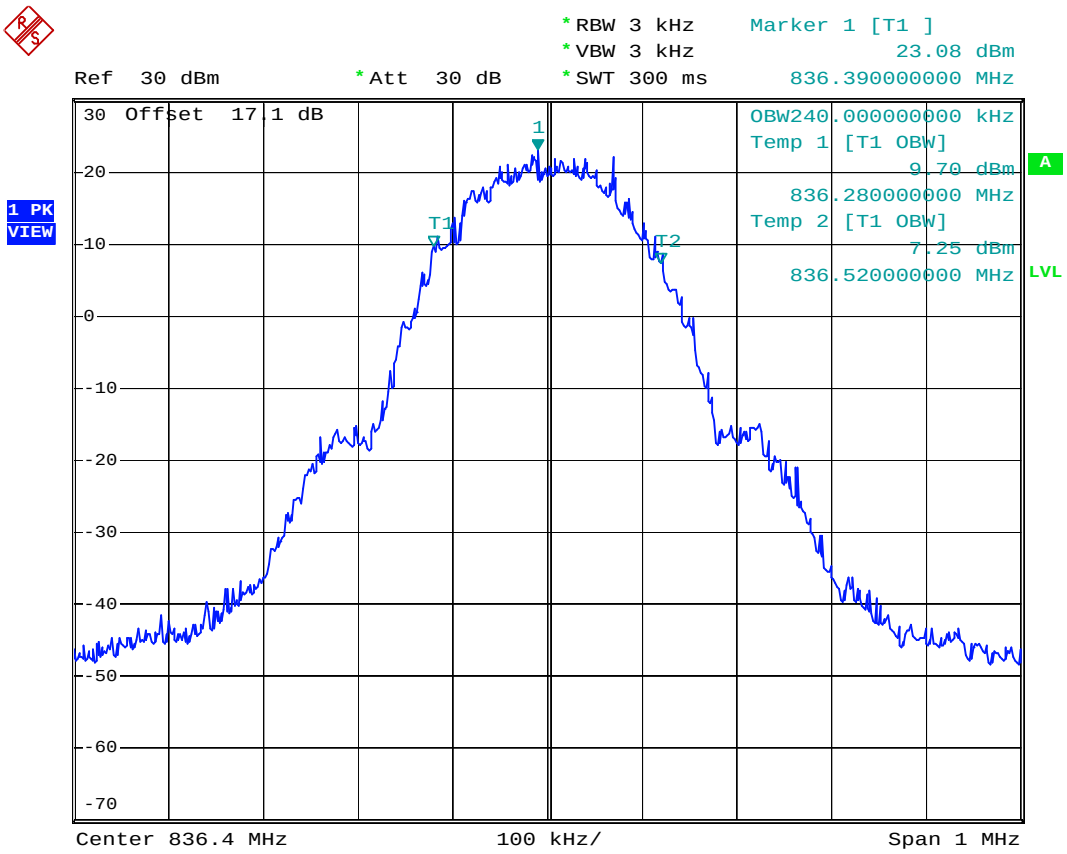
Date: 5.DEC.2006 16:30:53

- Test Mode : GSM850 (GSM) CH189 99% Occupid Bandwidth
- Power State : Low



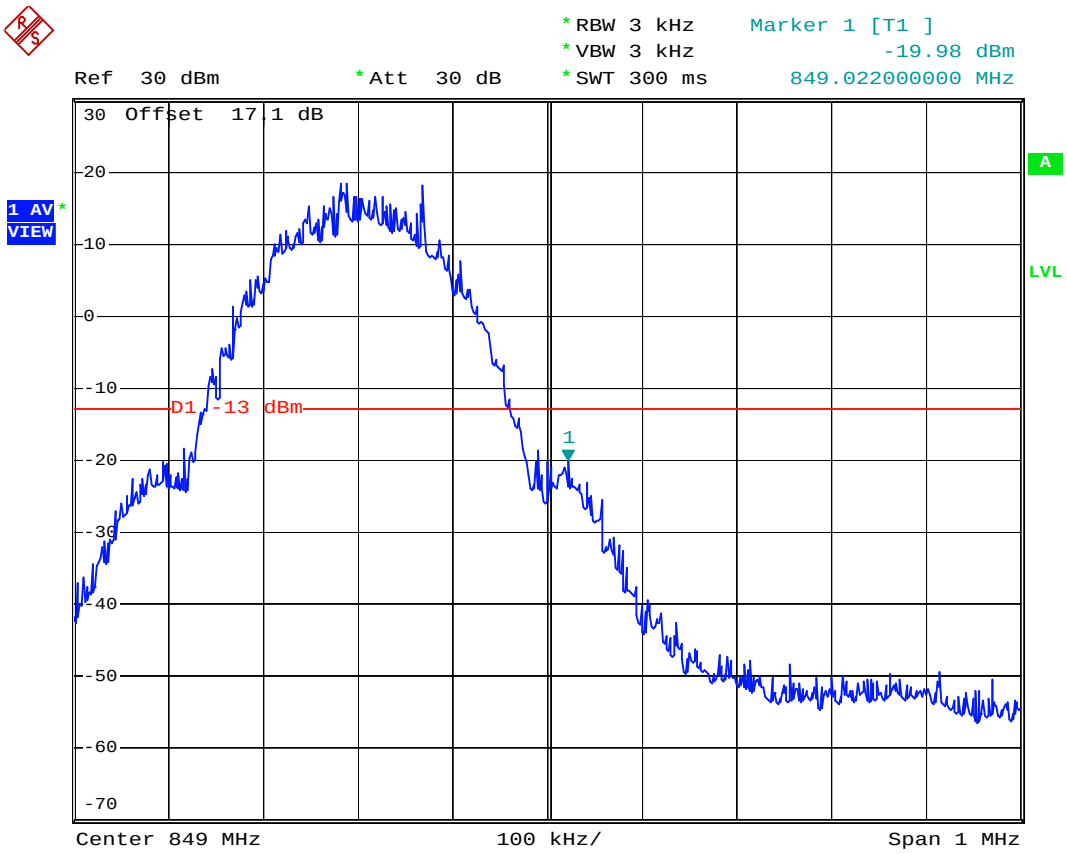
Date: 5.DEC.2006 16:27:01

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



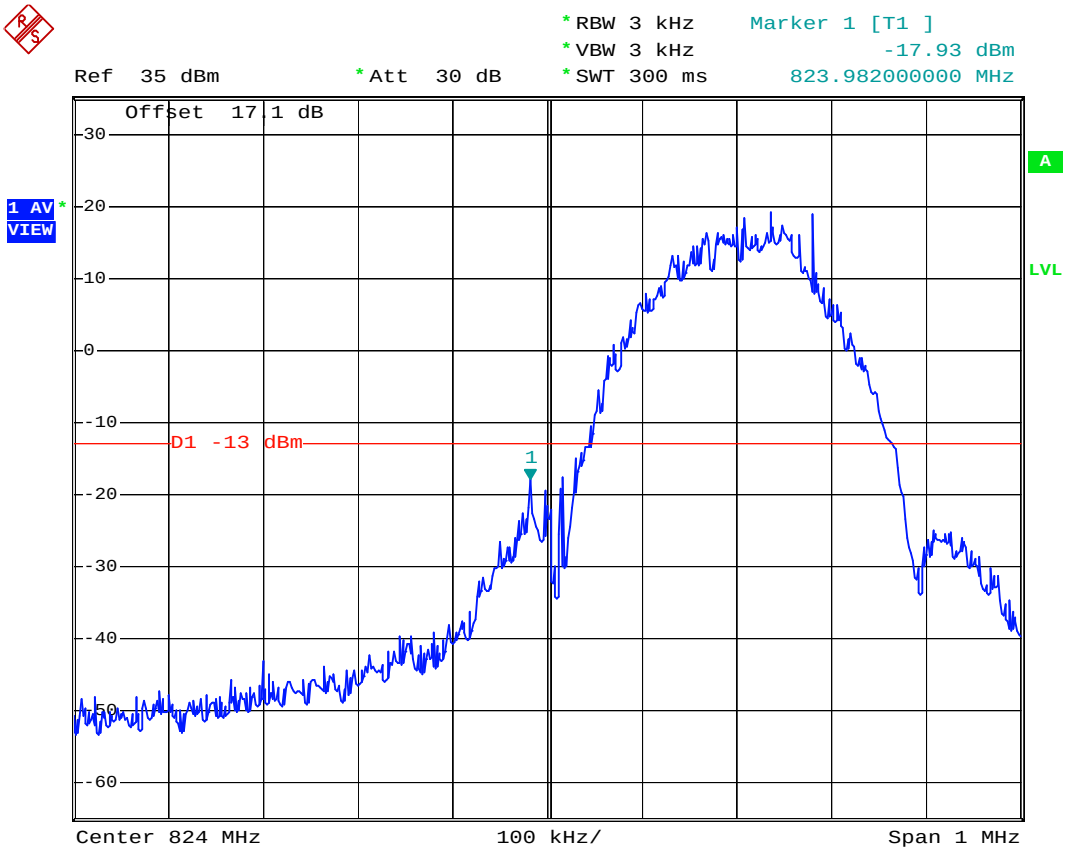
Date: 5.DEC.2006 16:25:53

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



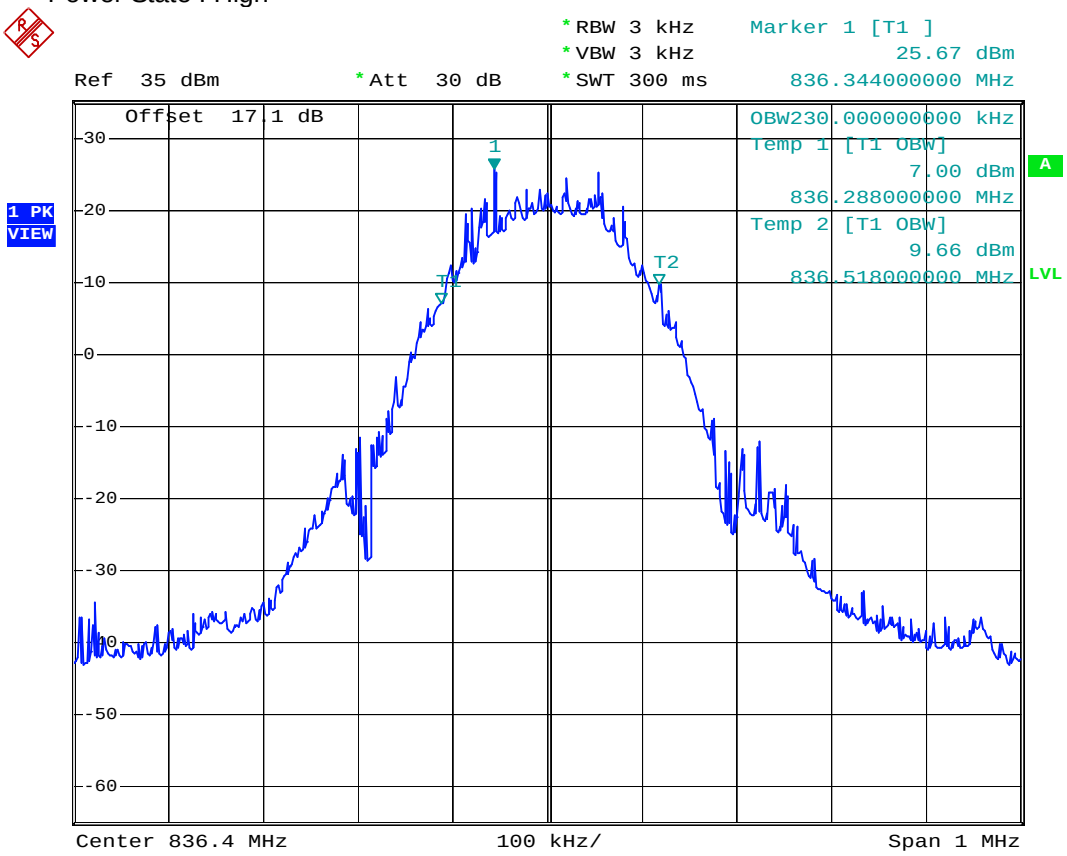
Date: 5.DEC.2006 16:32:03

- Mode 2
- Test Mode : GSM850 (EDGE8) CH128 Lower Band Edge
- Power State : High



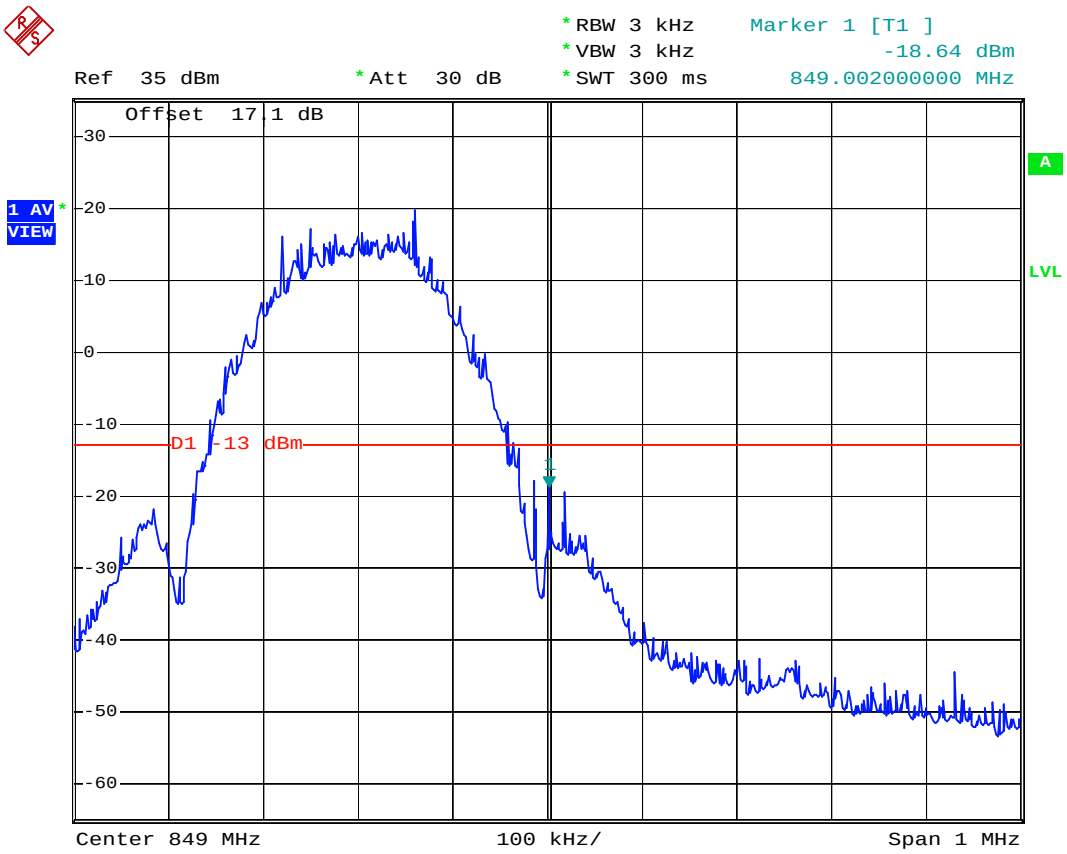
Date: 6.DEC.2006 11:33:24

- Test Mode : GSM850 (EDGE8) CH189 99% Occupid Bandwidth
- Power State : High



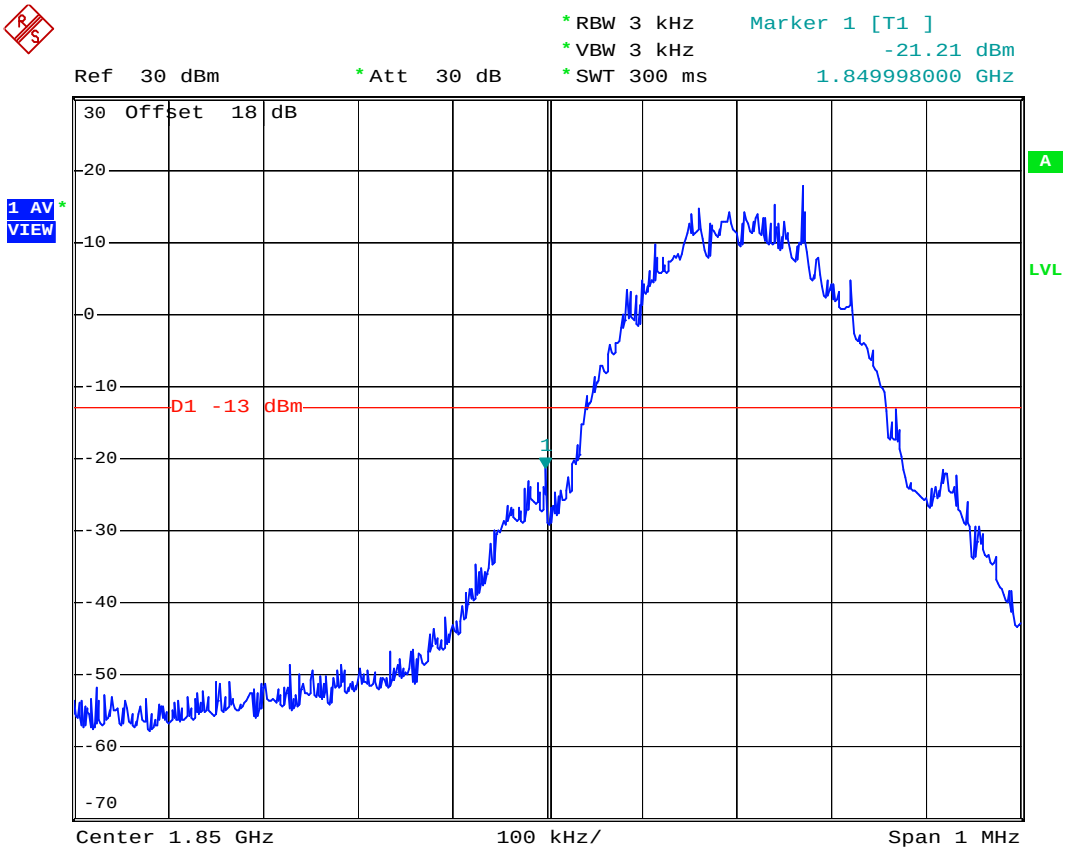
Date: 6.DEC.2006 11:28:03

- Test Mode : GSM850 (EDGE8) CH251 Higher Band Edge
- Power State : High



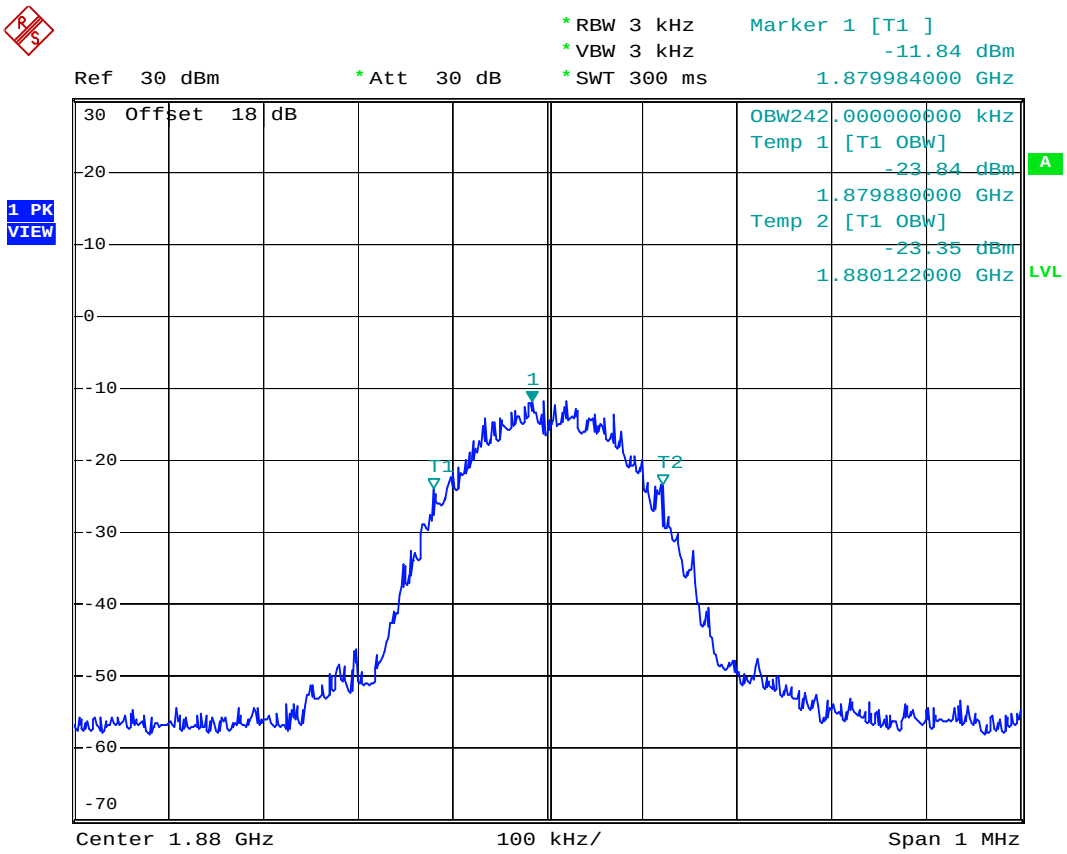
Date: 6.DEC.2006 11:34:14

- Mode 3
- Test Mode : PCS1900 (GSM) CH512 Lower Band Edge
- Power State : High



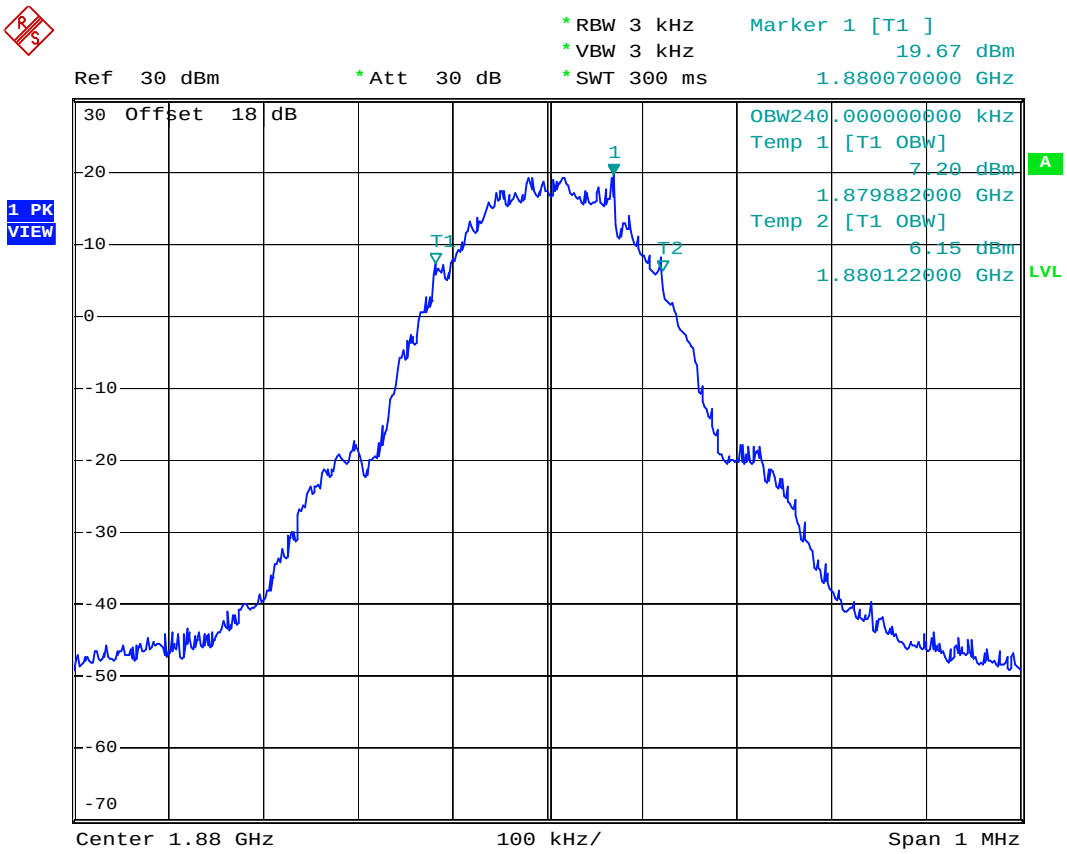
Date: 5.DEC.2006 17:22:11

- Test Mode : PCS1900 (GSM) CH661 99% Occupid Bandwidth
- Power State : Low



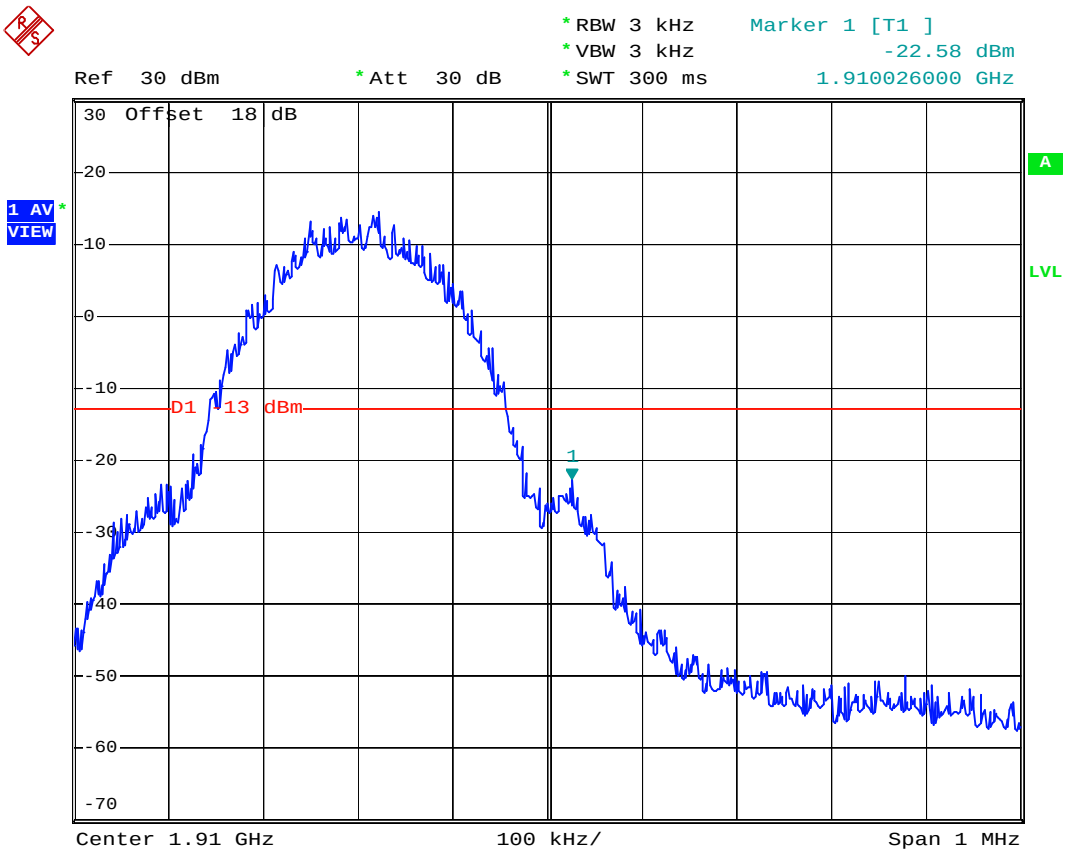
Date: 5.DEC.2006 17:18:09

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



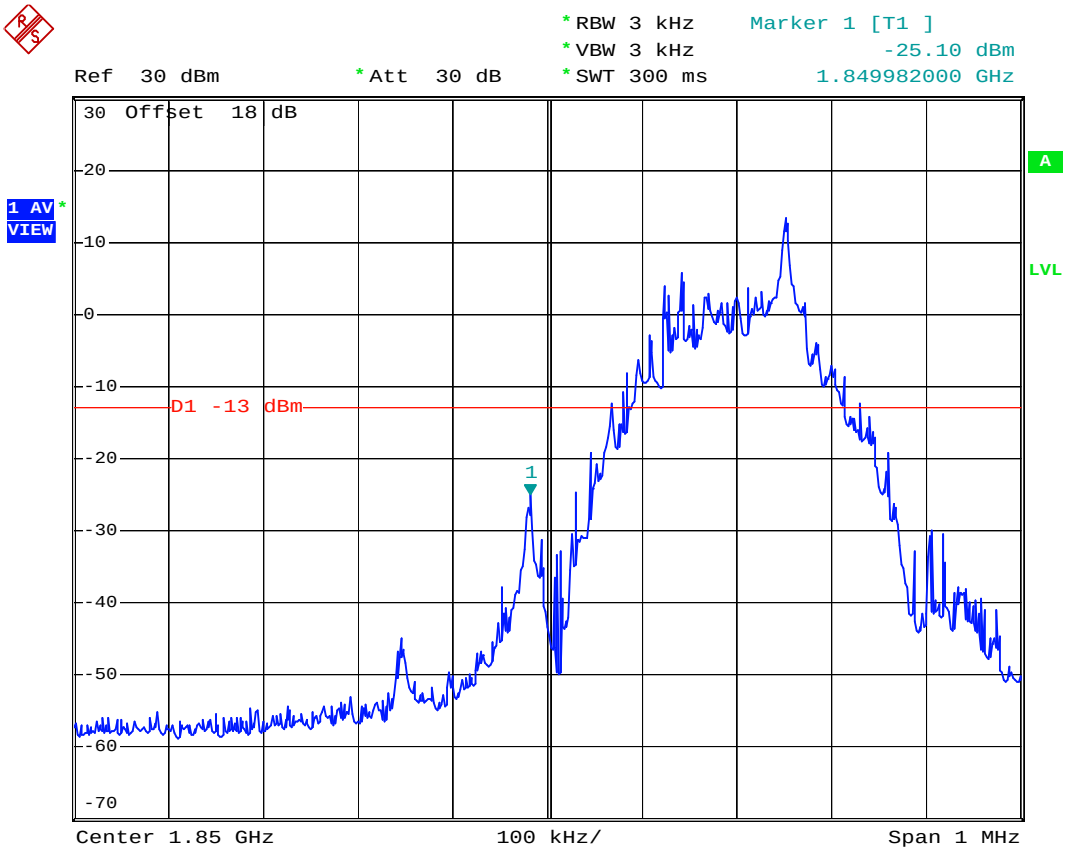
Date: 5.DEC.2006 17:17:26

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



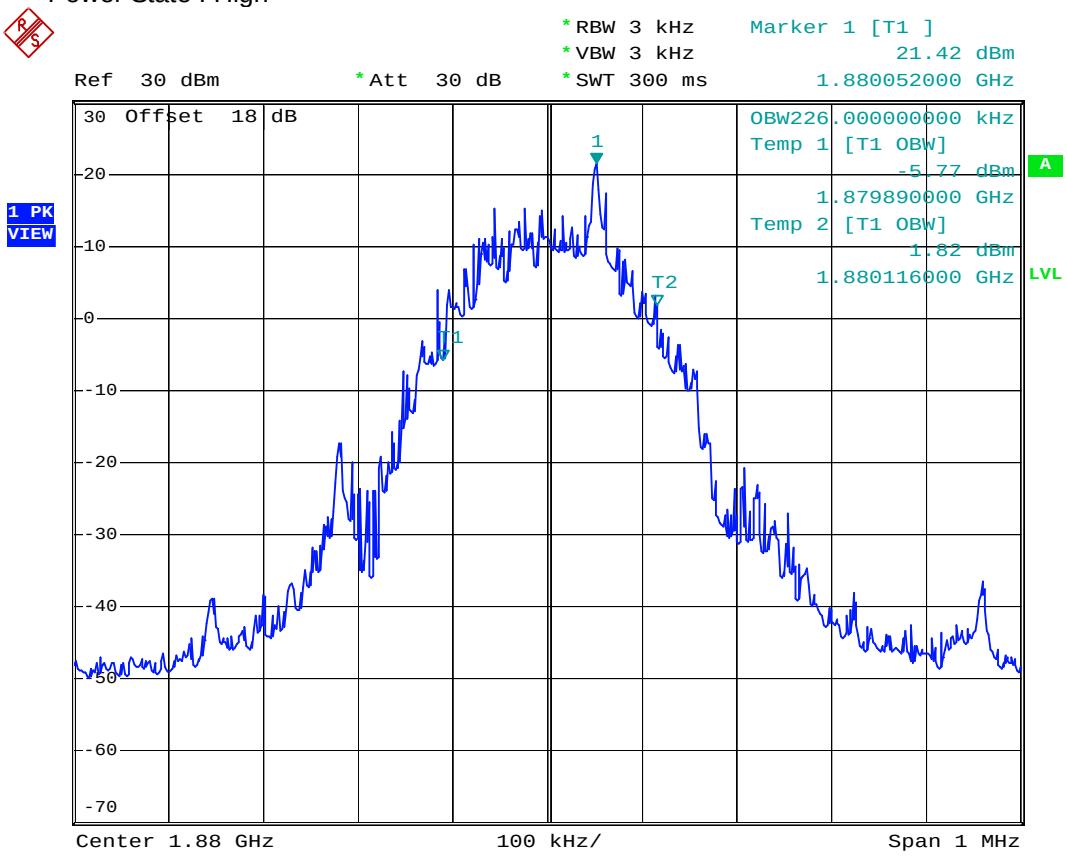
Date: 5.DEC.2006 17:22:58

- Mode 4
- Test Mode : PCS1900 (EDGE8) CH512 Lower Band Edge
- Power State : High



Date: 6.DEC.2006 14:09:58

- Test Mode : PCS1900(EDGE8) CH661 99% Occupid Bandwidth
- Power State : High



- Test Mode : PCS1900(EDGE8) CH810 Higher Band Edge
- Power State : High

Date: 6.DEC.2006 14:11:00

4.5 Conducted Emission

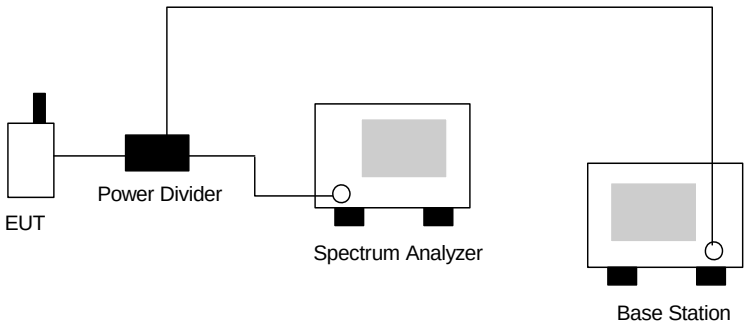
4.5.1 Measurement Instruments

As described in chapter 5 of this test report.

4.5.2 Test Procedure

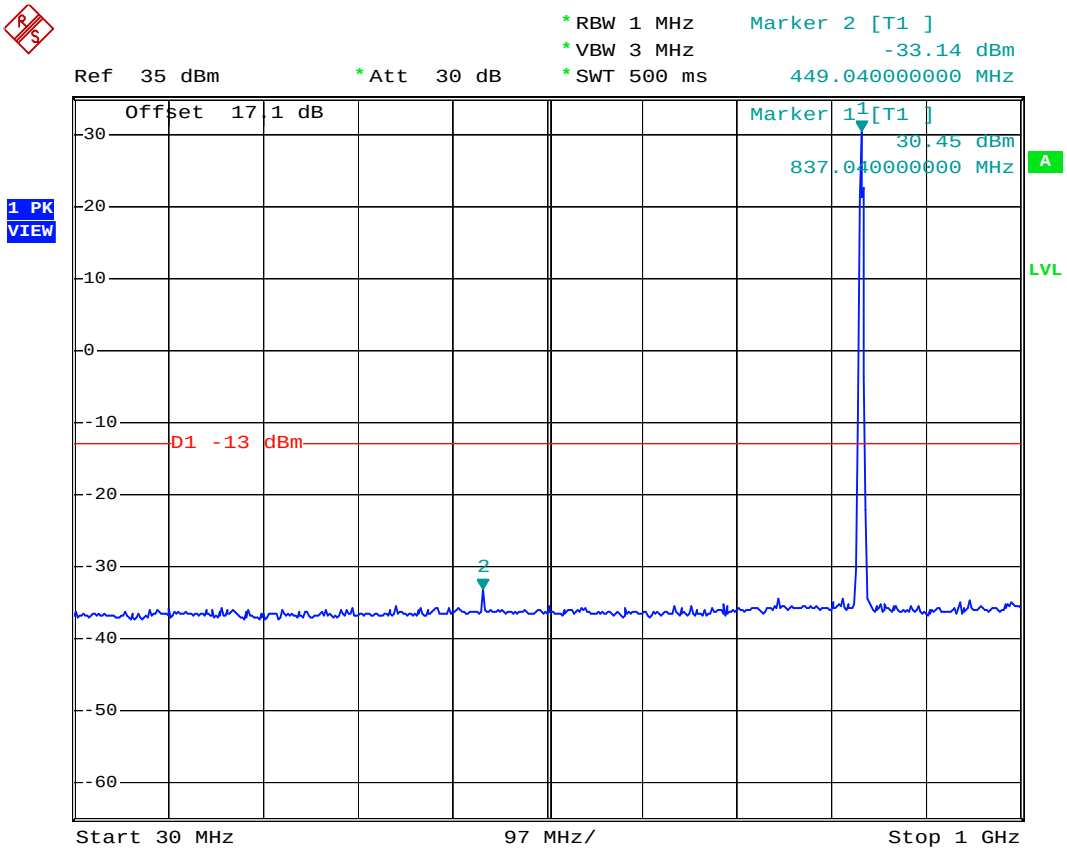
1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. The middle channel for the highest RF power within the transmitting frequency was measured.
3. The conducted spurious emission for the whole frequency range was taken.

4.5.3 Test Setup Layout



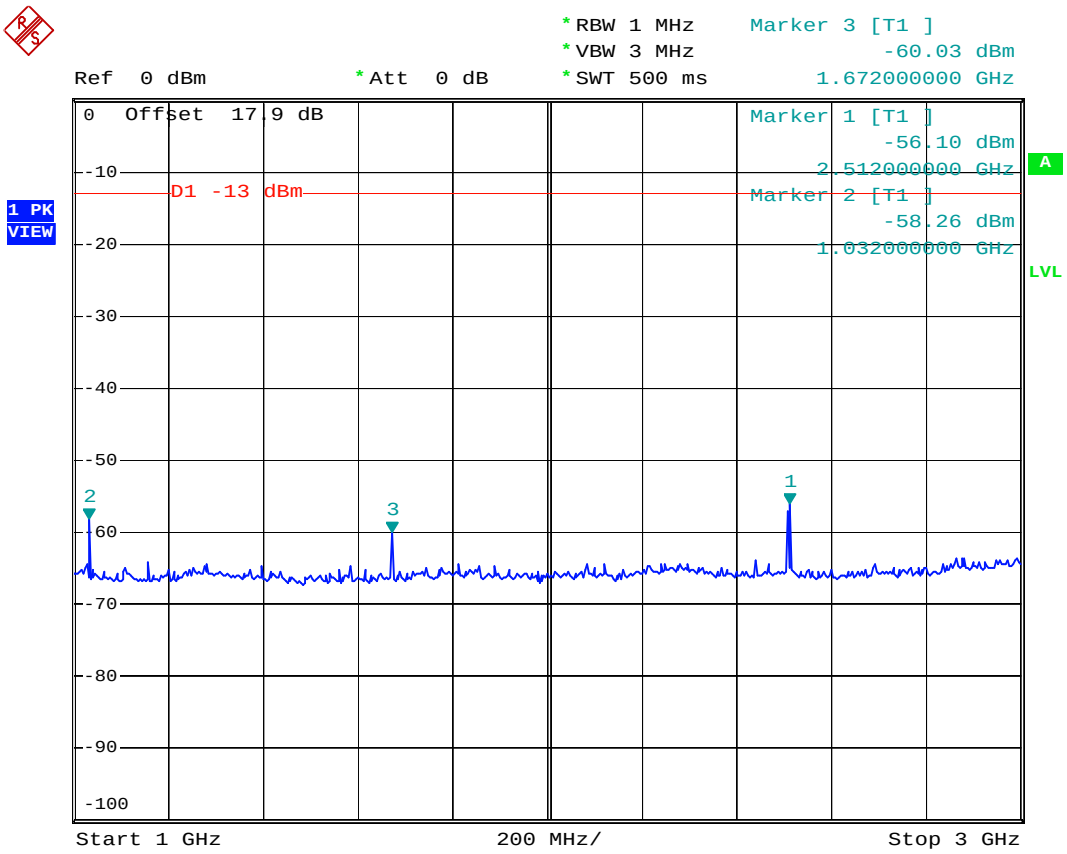
4.5.4 Test Result

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



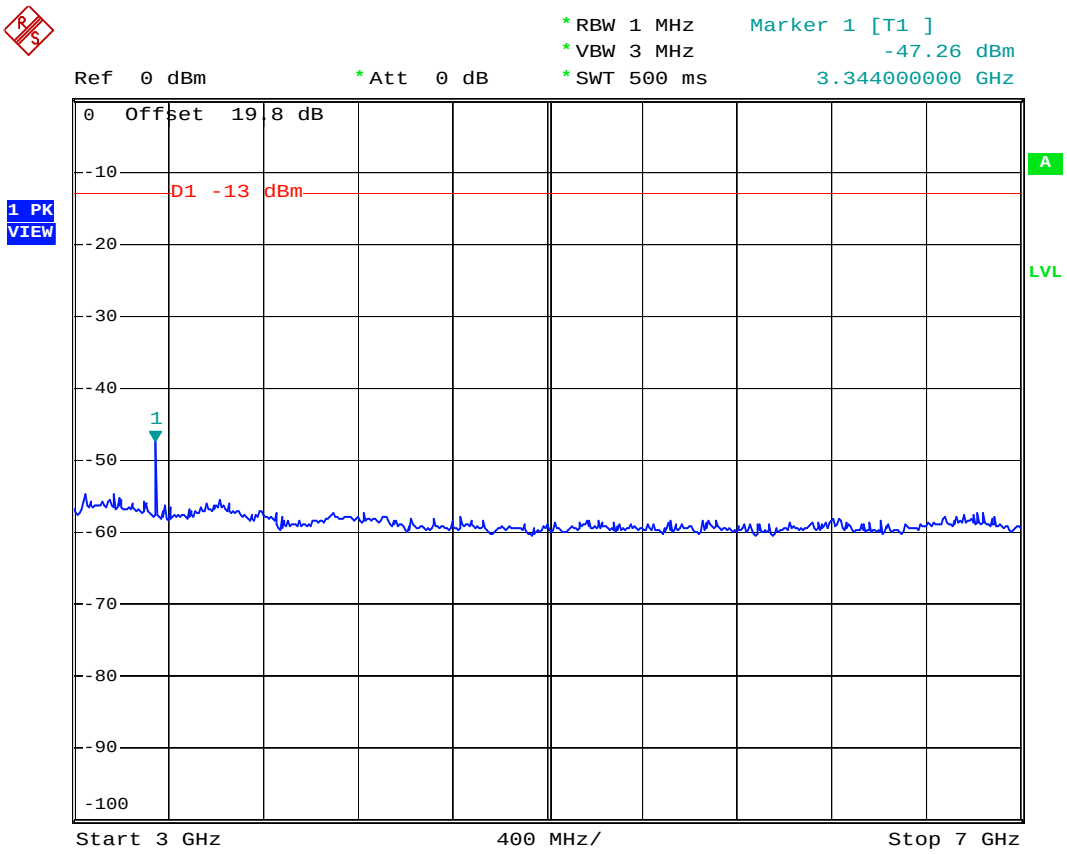
Date: 5.DEC.2006 16:37:10

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



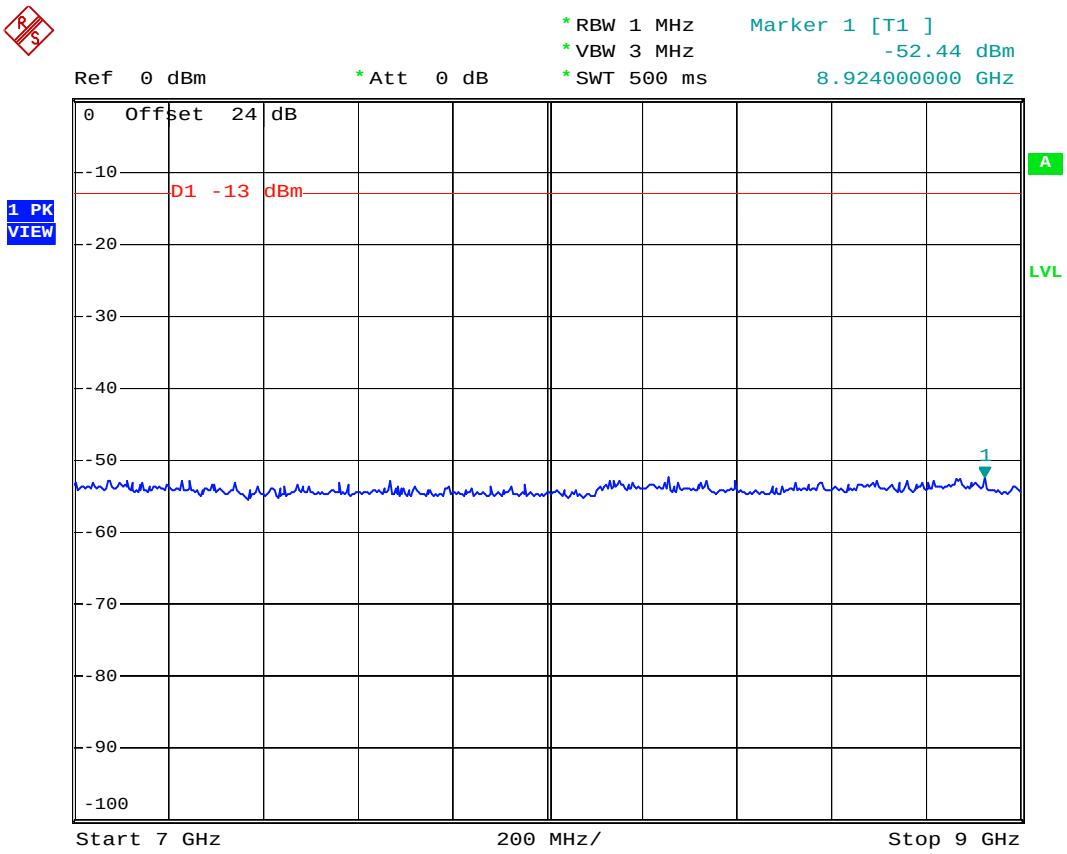
Date: 5.DEC.2006 16:47:35

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



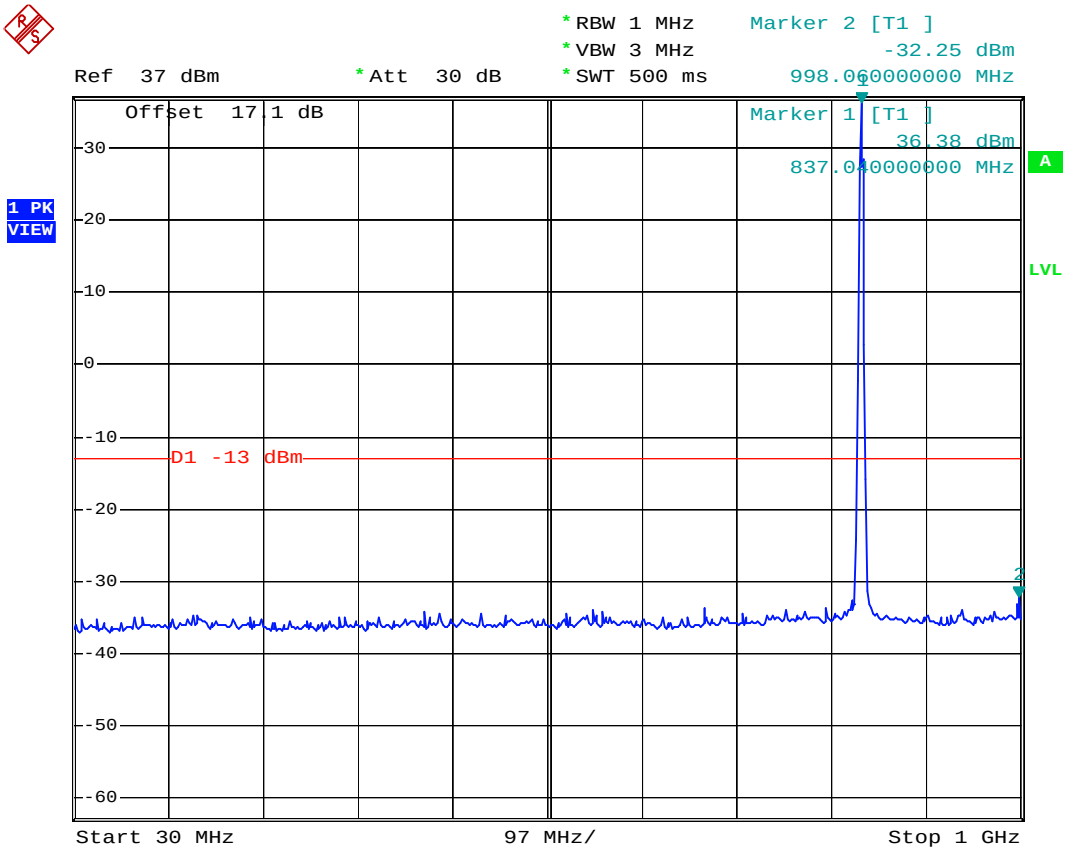
Date: 5.DEC.2006 16:48:33

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



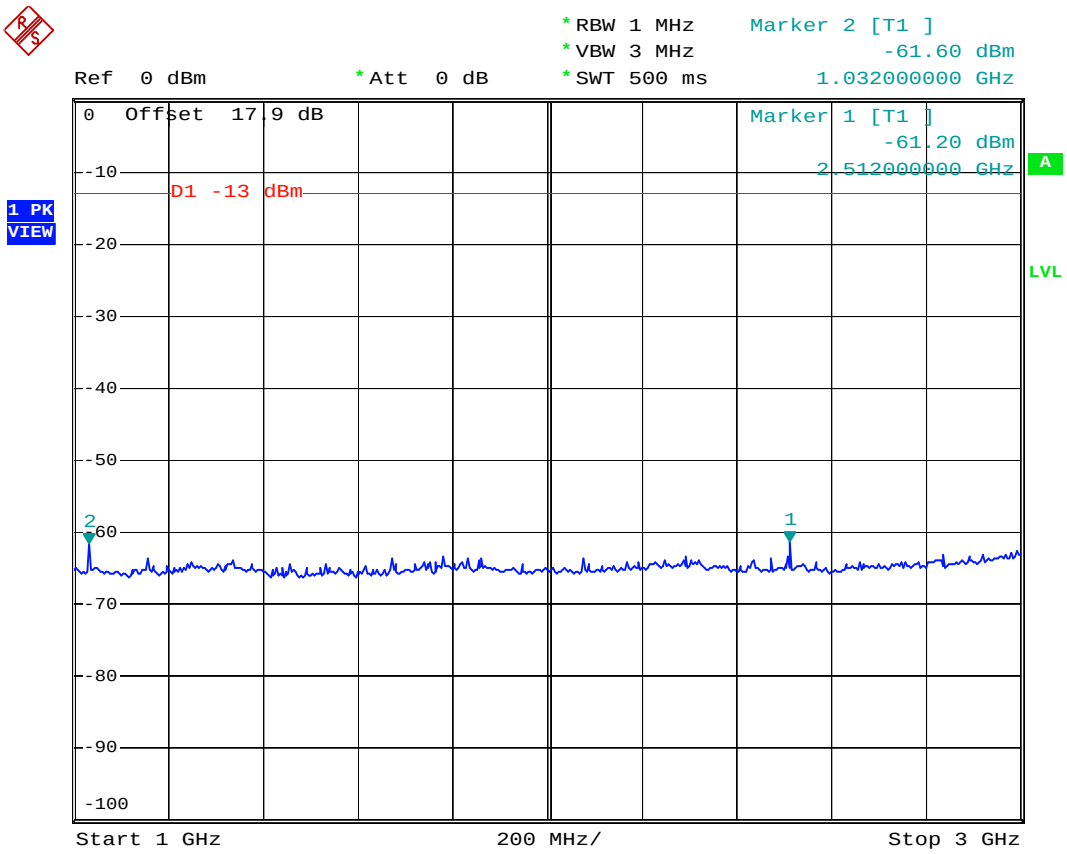
Date: 5.DEC.2006 16:49:51

- Mode 2
- Test Mode : GSM850 (EDGE8) CH189
- Frequency Range : 30M-1G



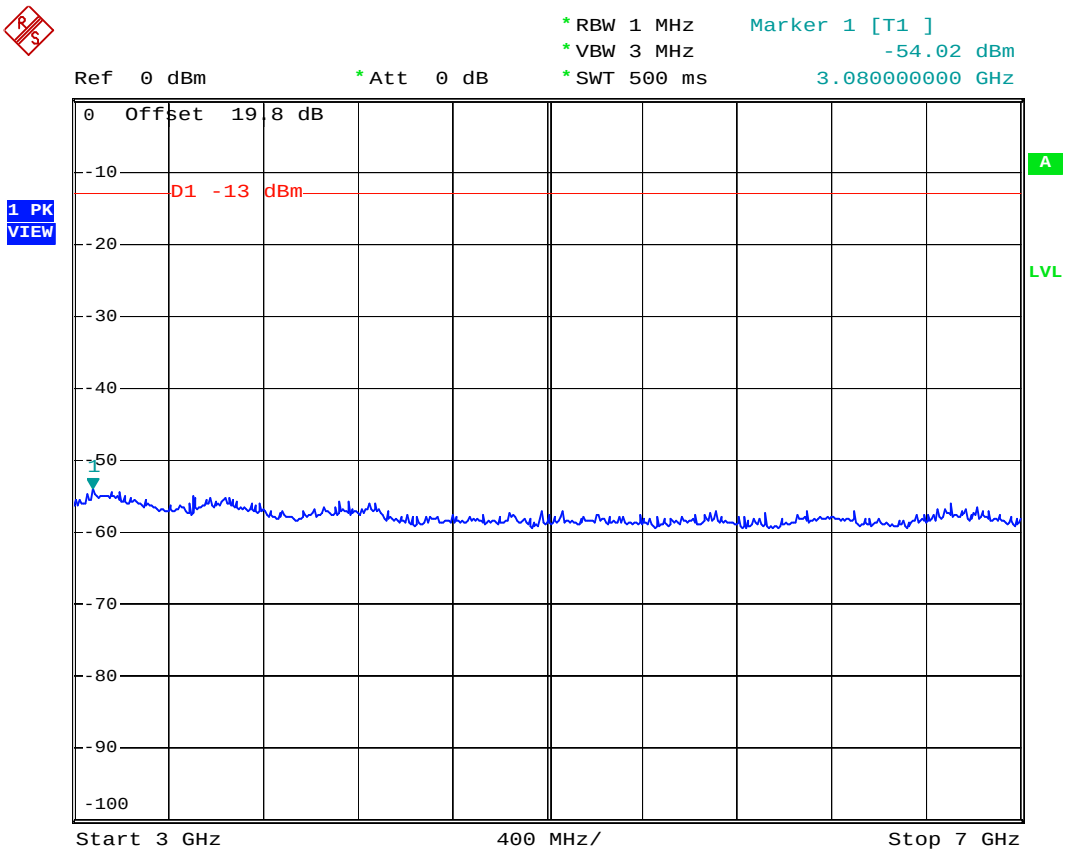
Date: 6.DEC.2006 11:37:15

- Test Mode : GSM850 (EDGE8) CH189
- Frequency Range : 1G-3G



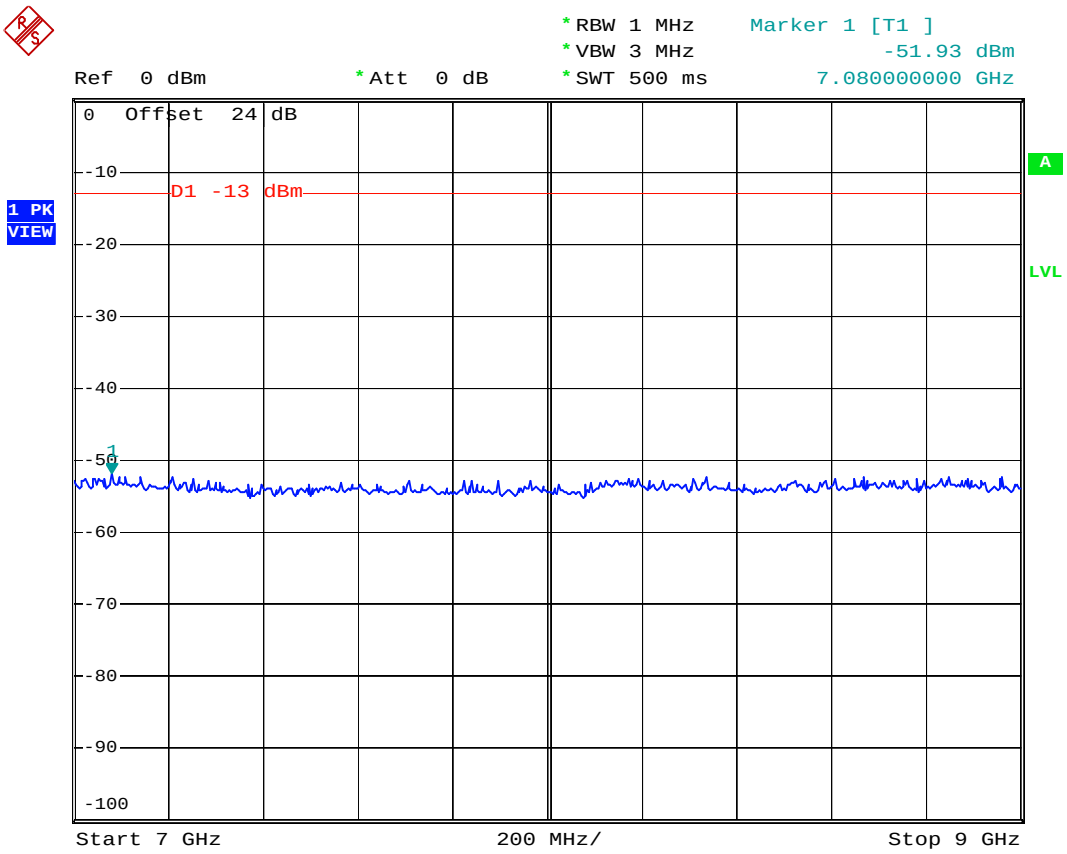
Date: 6.DEC.2006 13:36:01

- Test Mode : GSM850 (EDGE8) CH189
- Frequency Range : 3G-7G



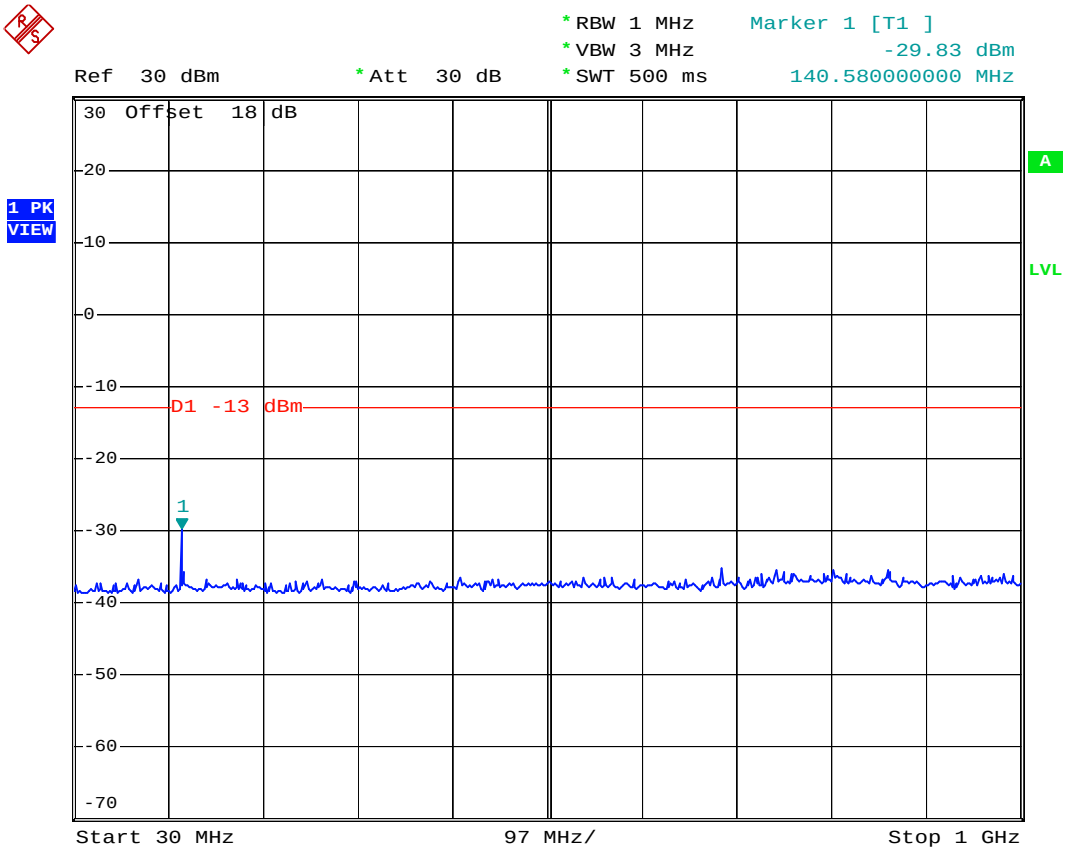
Date: 6.DEC.2006 13:36:50

- Test Mode : GSM850 (EDGE8) CH189
- Frequency Range : 7G-9G



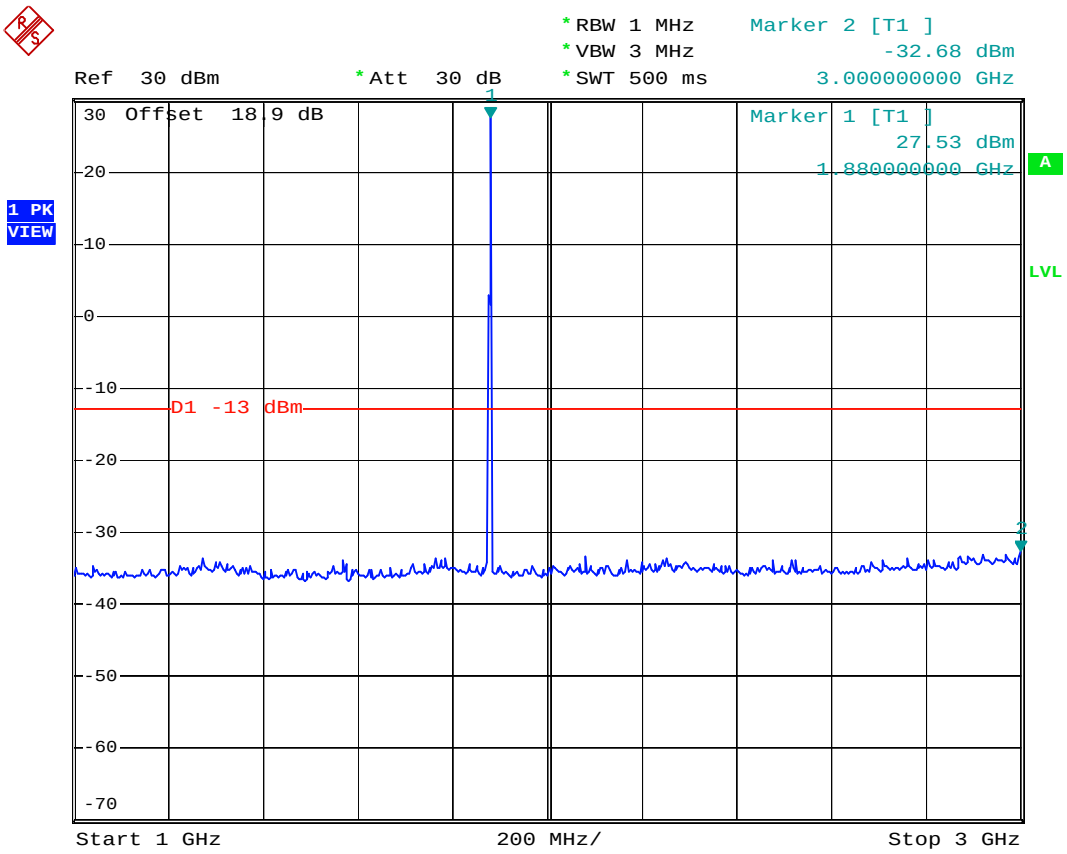
Date: 6.DEC.2006 13:37:38

- Mode 3
- Test Mode : PCS1900 (GSM) CH661
- Frequency Range : 30M-1G



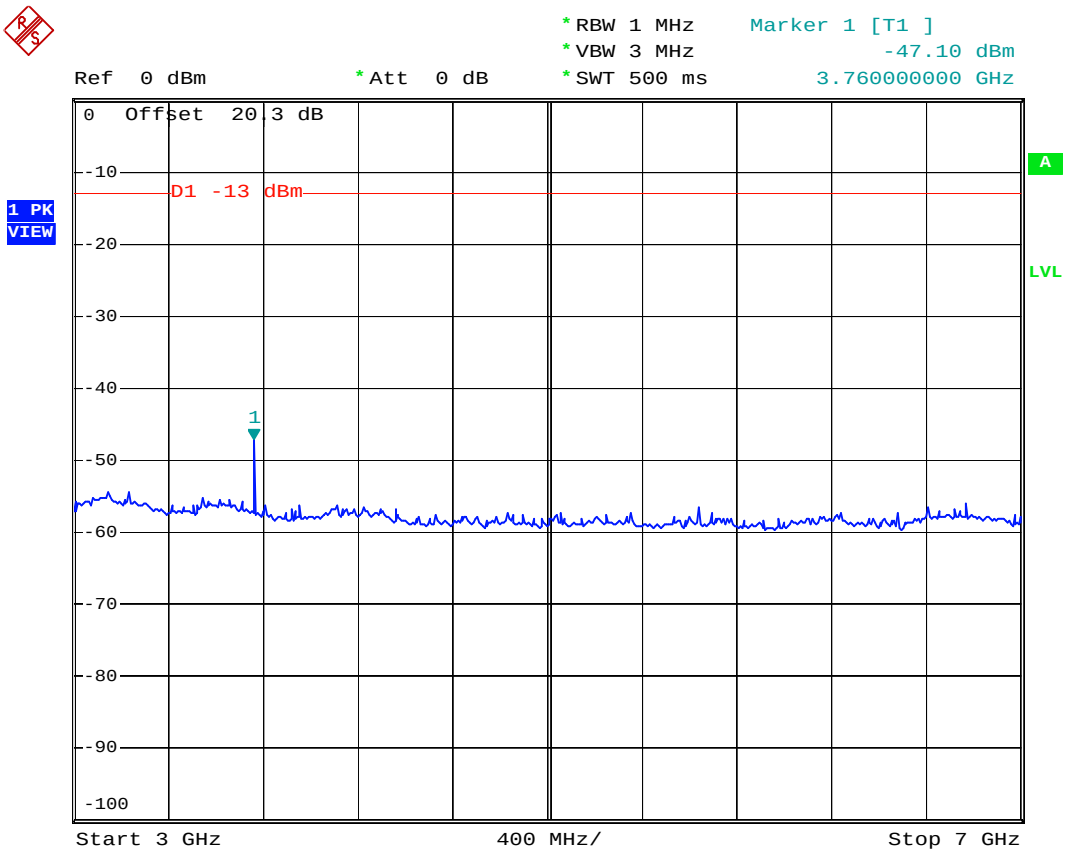
Date: 5.DEC.2006 17:24:13

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



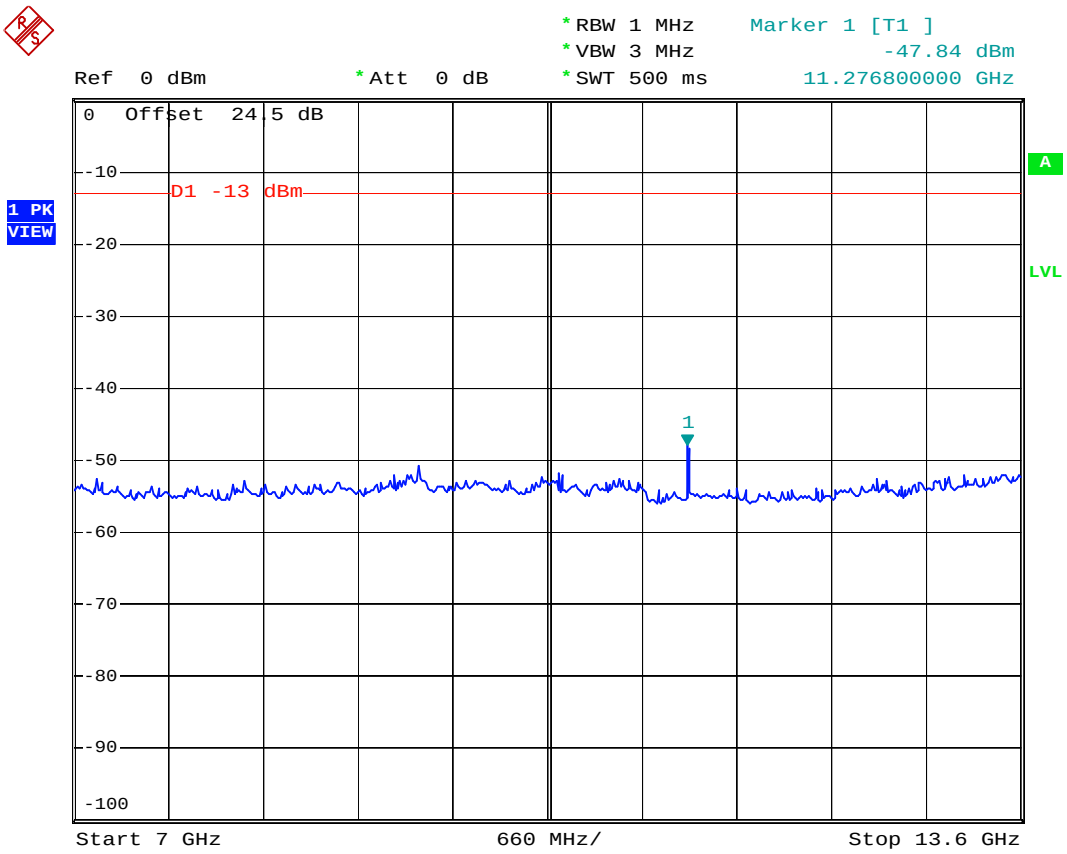
Date: 5.DEC.2006 17:25:43

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



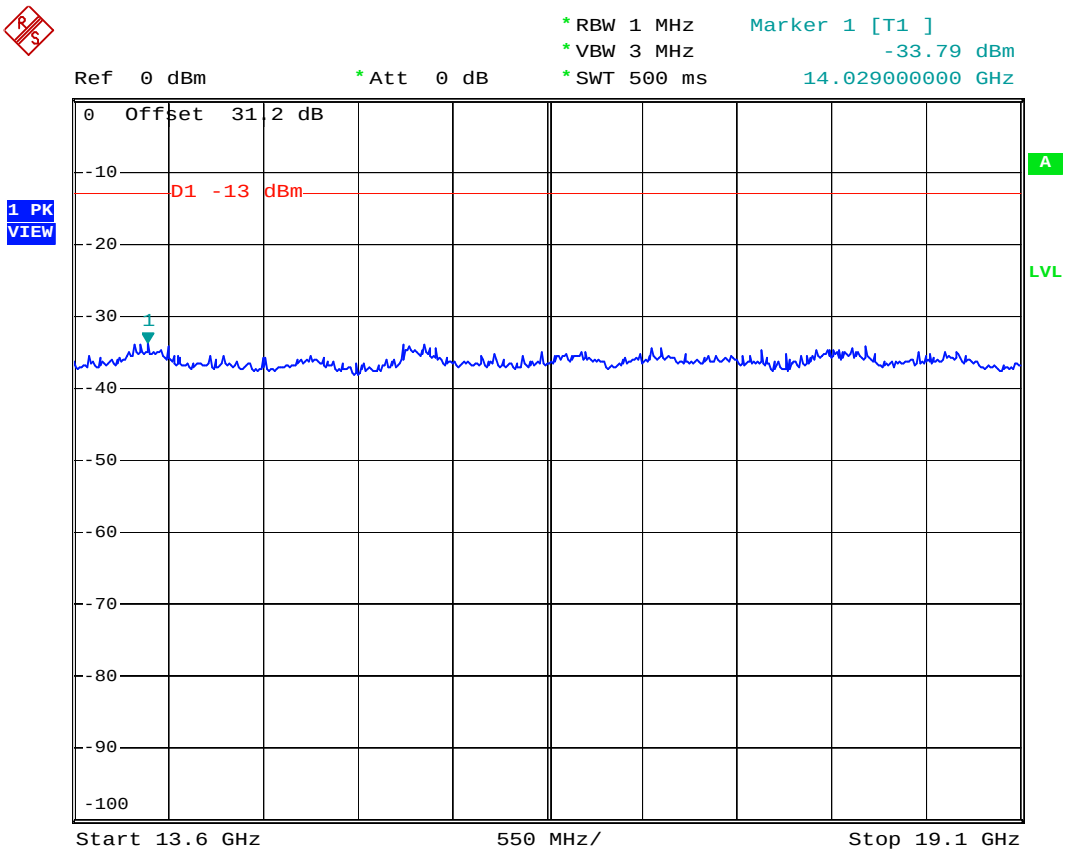
Date: 5.DEC.2006 17:27:09

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



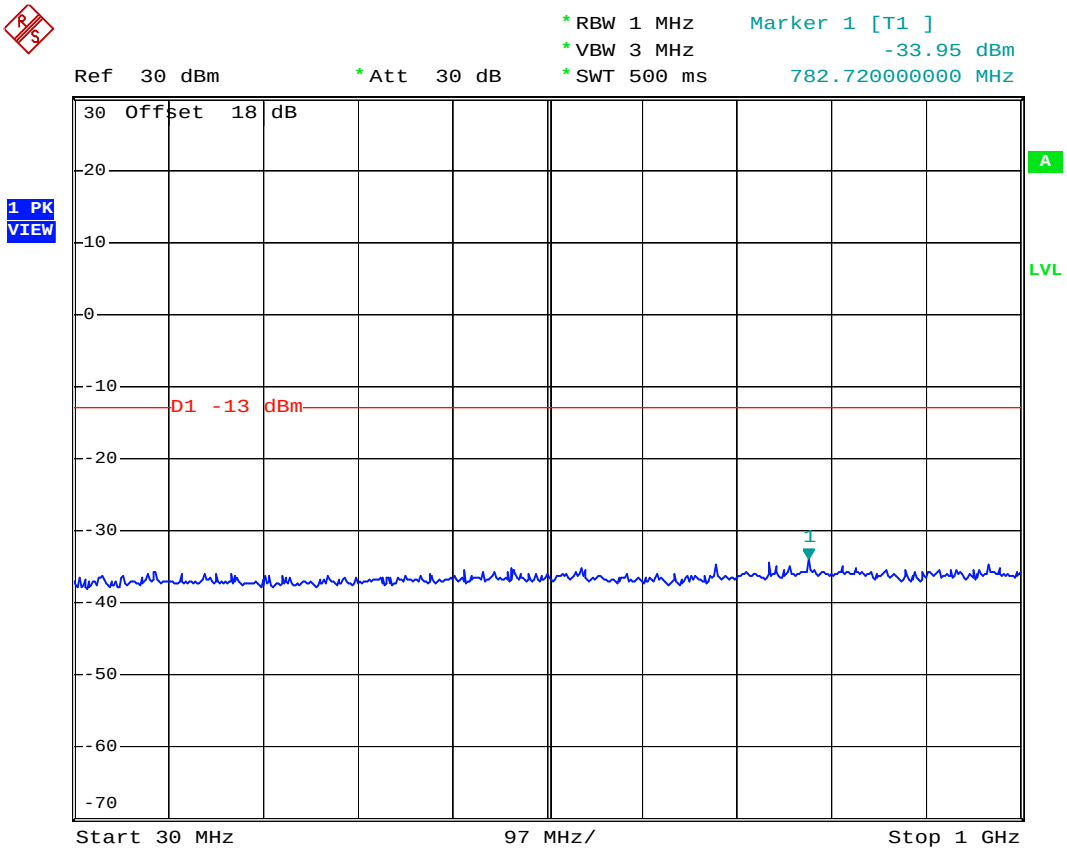
Date: 5.DEC.2006 17:28:27

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



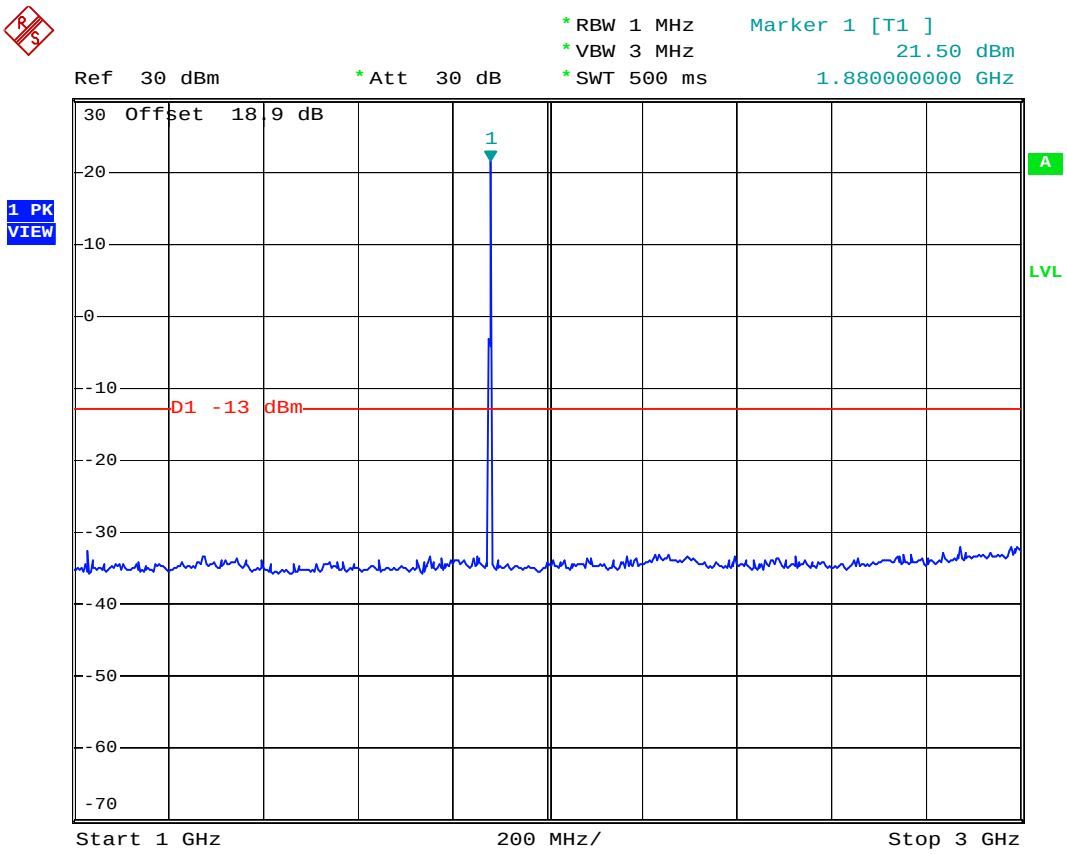
Date: 5.DEC.2006 17:29:26

- Mode 4
- Test Mode : PCS1900 (EDGE8) CH661
- Frequency Range : 30M-1G



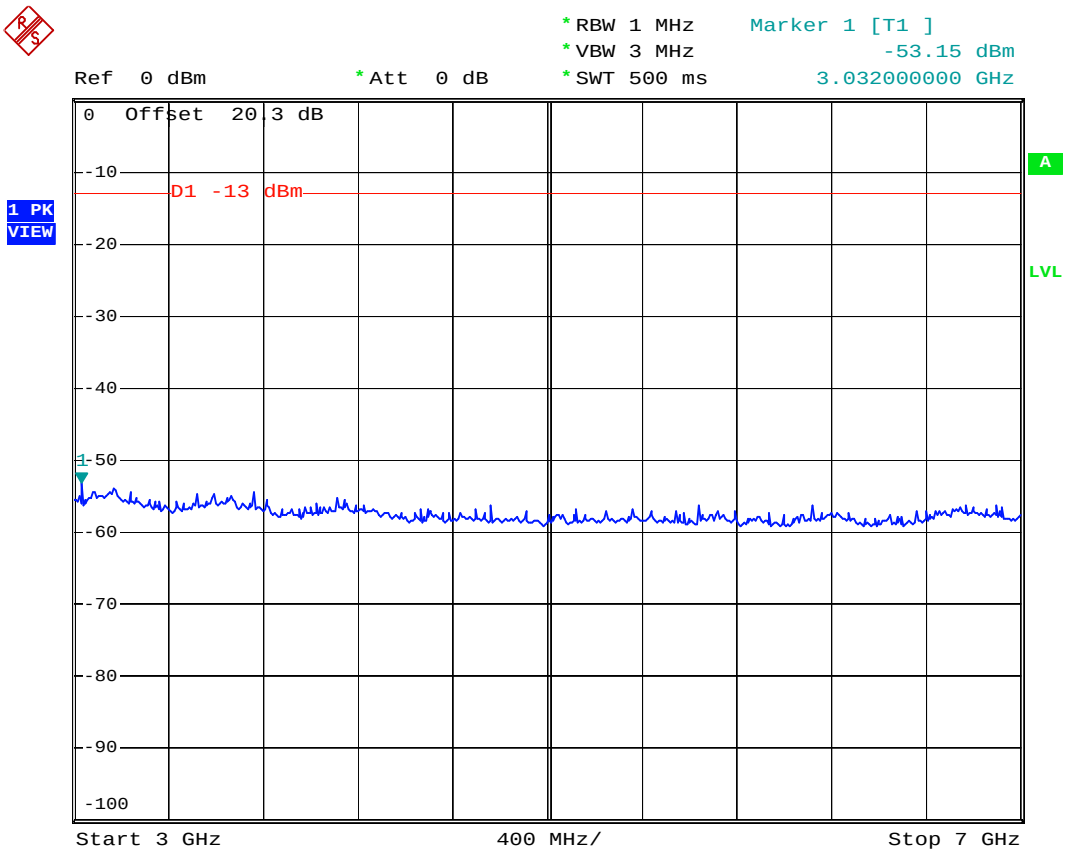
Date: 6.DEC.2006 14:13:04

- Test Mode : PCS1900 (EDGE8) CH661
- Frequency Range : 1G-3G



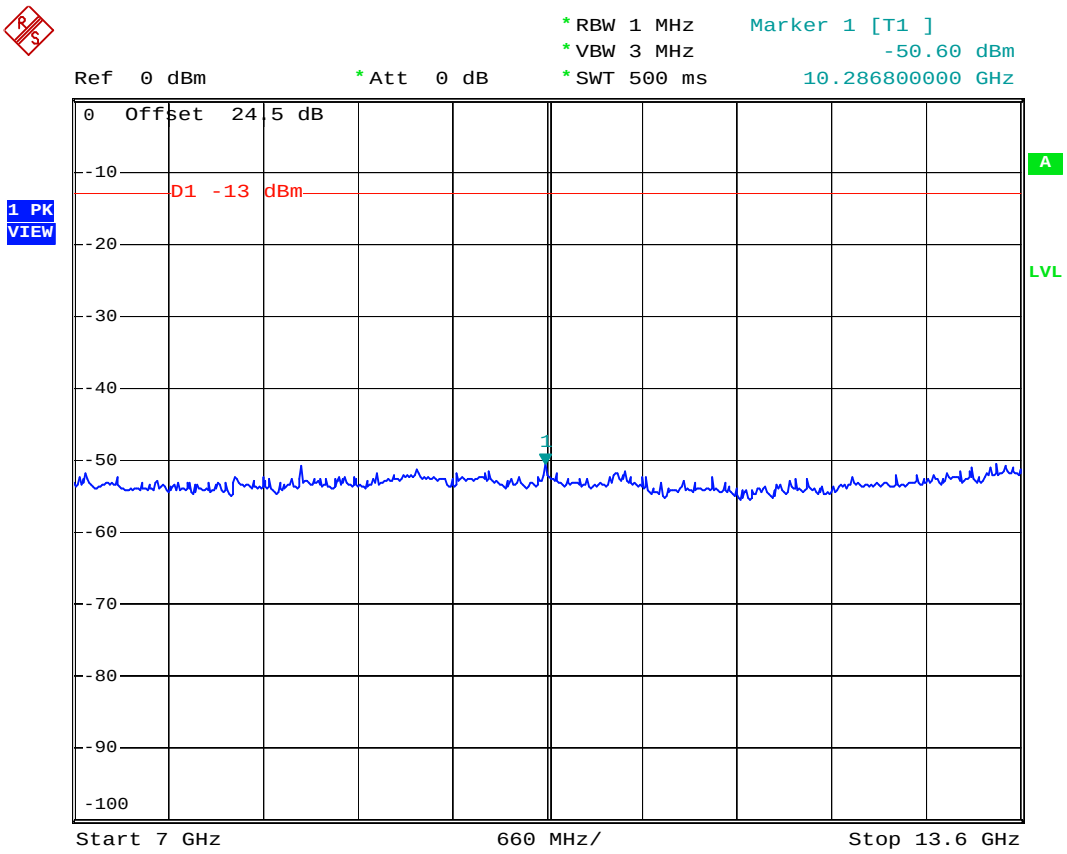
Date: 6.DEC.2006 14:14:05

- Test Mode : PCS1900 (EDGE8) CH661
- Frequency Range : 3G-7G



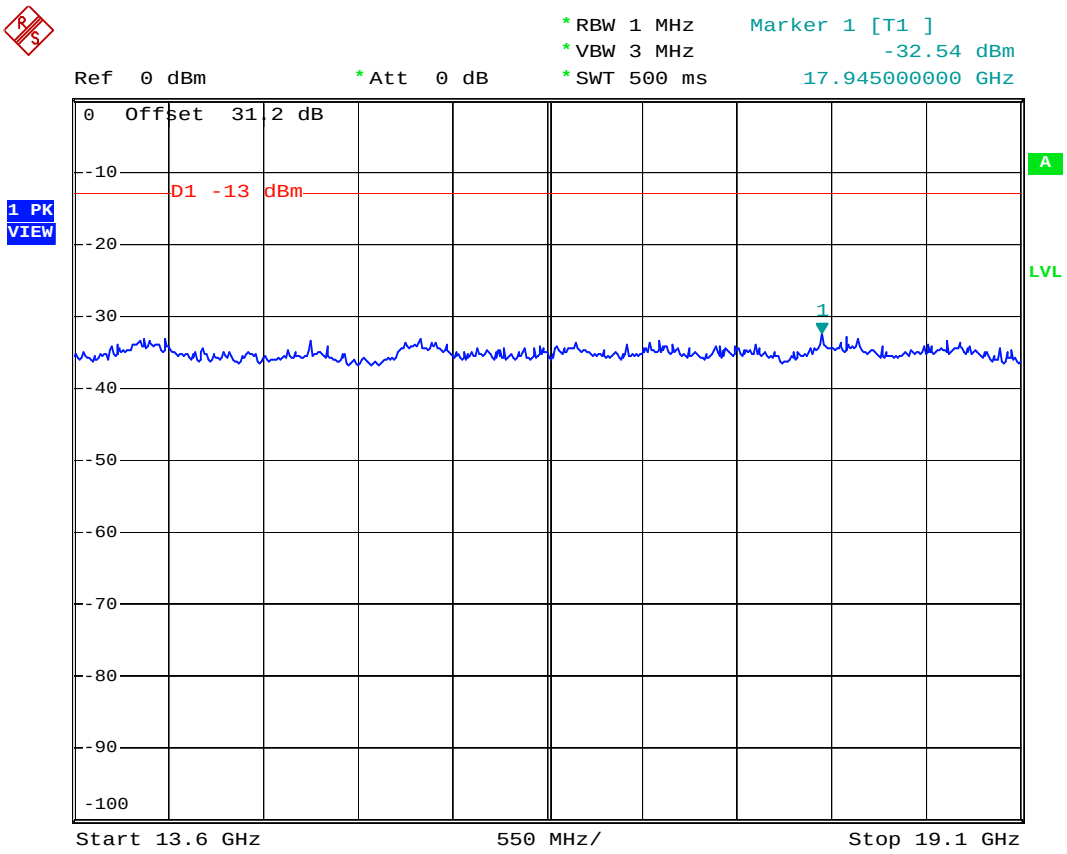
Date: 6.DEC.2006 14:14:47

- Test Mode : PCS1900 (EDGE8) CH661
- Frequency Range : 7G-13.6G



Date: 6.DEC.2006 14:15:28

- Test Mode : PCS1900 (EDGE8) CH661
- Frequency Range : 13.6G-19.1G



Date: 6.DEC.2006 14:16:18