FCC / IC TEST REPORT

For

47 CFR Part 22H, 24E, RSS-132, and RSS-133

Equipment	:	**PDA Phone w/BT & WLAN**
Model No.	:	**ELF0101**
FCC ID	:	**NM8EFN**
IC ID	:	**4115B-EFN**
Tx Frequency Range	:	**GSM850 : 824.2~848.8 MHz** **PCS1900 : 1850.2~1909.8 MHz**
Max. ERP/EIRP Power	:	**GSM850(GSM) : 0.66 W** **GSM850(EDGE) : 0.18 W** **PCS1900(GSM) : 1.32 W** **PCS1900(EDGE) : 0.39 W**
Emission Designator	:	**GSM : 300KGXW** **EDGE : 300KG7W**
Applicant	:	**High Tech Computer Corp.** 23 Xinghua Rd., Taoyuan 330, 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 Sep. 15, 2007 at **Sporton International Inc. LAB.**
- Report No.: FG780314, 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.

Table of Contents

History of this test report

Report Issue Date: Sep. 17, 2007

Report No.	Description

1. General Information

1.2 Applicant

High Tech Computer Corp.
23 Xinghua Rd., Taoyuan 330, Taiwan

1.3 Manufacturer

High Tech Computer Corp.
23 Xinghua Rd., Taoyuan 330, Taiwan

1.4 Basic Description of Equipment under Test

Equipment		PDA Phone w/BT & WLAN
Model No.		ELF0101
PDA Phone A		PDA Phone with LCD Panel 1
PDA Phone B		PDA Phone with LCD Panel 2
AC Adapter 1	**Brand Name**	Delta
	Model Name	ADP-5FH B
	Power Rating	I/P:100-240Vac,50-60Hz,0.2A; O/P:5Vdc
	AC Power Cord Type	1.8 meter shielded cable without ferrite core
AC Adapter 2	**Brand Name**	Phihong
	Model Name	PSAA05A-050
	Power Rating	I/P:100-240V-200mA,50-60Hz,13-20VA; O/P:5Vdc,1A
	AC Power Cord Type	1.8 meter shielded cable without ferrite core
Battery 1	**Brand Name**	Samsung
	Model Name	ELF0160
	Rating	3.7Vdc, 1100mAh
	Type	Li-ion
Battery 2	**Brand Name**	Tws
	Model Name	ELF0160
	Rating	3.7Vdc, 1100mAh
	Type	Li-ion
Earphone 1	**Brand Name**	Cotron
	Model Name	CHM-311STV08001
	Signal line Type	1.6 meter shielded cable without ferrite core
Earphone 2	**Brand Name**	MEC
	Model Name	60-4269-500
	Signal line Type	1.5 meter shielded cable without ferrite core
Earphone 3	**Brand Name**	Cotron
	Model Name	CHM-311STV08002
	Signal line Type	1.6 meter shielded cable without ferrite core

Holster	**Brand Name**	NEWTECH
	Model Name	HTC597-11
USB Cable	**Brand Name**	High Tech
	Signal line Type	1.2 meter shielded cable without ferrite core
LCD Panel 1	**Brand Name**	Samsung
	Model Name	LMS283GF01
LCD Panel 2	**Brand Name**	Toppoly
	Model Name	TD028THED1
Camera 1	**Brand Name**	LITEON
	Model Name	07PE01
Camera 2	**Brand Name**	PRIMAX
	Model Name	50-70422HTT8

1.5 Feature of Equipment under Test

DUT Type :	PDA Phone w/BT & WLAN
Model Name :	ELF0101
FCC ID :	NM8EFN
Tx Frequency :	GSM850 : 824 ~ 849 MHz PCS1900 : 1850 ~1910 MHz WLAN / Bluetooth : 2400 ~ 2483.5 MHz
Rx Frequency :	GSM850 : 869 ~ 894 MHz PCS1900 : 1930 ~ 1990 MHz WLAN / Bluetooth : 2400 ~ 2483.5 MHz
Maximum Output Power to Antenna :	GSM850 : 32.21 dBm (GSM) ; 26.80 dBm (EDGE) PCS1900 : 29.90 dBm (GSM) ; 24.62 dBm (EDGE) WLAN : 19.66 dBm (802.11b) ; 17.60 dBm (802.11g) Bluetooth : 1.40 dBm
Maximum ERP/EIRP :	GSM850(GSM) : 0.66 W (28.19 dBm) GSM850(EDGE) : 0.18 W (22.44 dBm) PCS1900(GSM) : 1.32 W (31.22 dBm) PCS1900(EDGE) : 0.39 W (25.96 dBm)
Antenna Type :	GSM850 / PCS1900 : Fixed Internal Bluetooth : Chip Antenna WLAN : PIFA Antenna
Type of Antenna Connector	N/A
Power Rating (DC/AC , Voltage and Current of RF element or PA) :	3.7Vdc / 1100mA
Digital Modulation Emission :	GSM : GMSK EDGE : 8PSK WLAN : DSSS / OFDM Bluetooth : GFSK
Type of Emission :	GSM : 300KGXW EDGE : 300KG7W
Device Power Class :	GSM850 : 4 PCS1900 : 1
DUT Stage :	Production Unit

1.6 Report Date

EUT Received : Aug. 03, 2007

Report Date : Sep. 17, 2007

2 Test Configuration of Equipment under Test

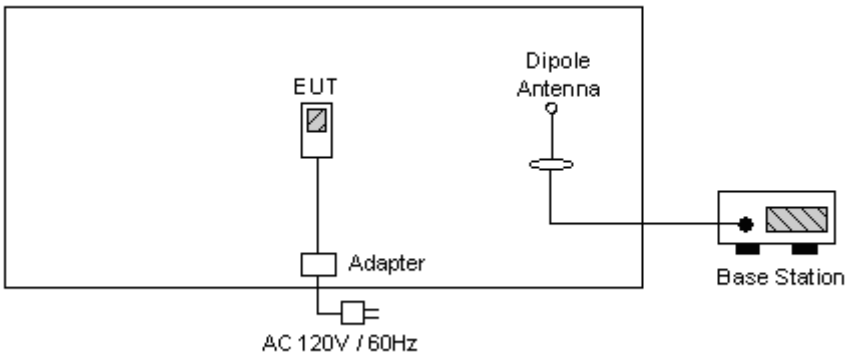
2.1 Test Manner

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 ten times of highest channel frequency for GSM850 ; 30MHz to ten times of highest channel frequency for PCS1900.

2.2 Test Mode

Application	GSM850	PCS1900
Radiated Emission	☒ Mode 1: GSM850 Link	☒ Mode 3: PCS1900 Link
	☒ Mode 2: EDGE Link	☒ Mode 4: EDGE Link
	☒ Mode 5: GSM850 Link + WLAN Link	
Conducted Measurement	☒ Mode 1: GSM850 Link	☒ Mode 3: PCS1900 Link
	☒ Mode 2: EDGE Link	☒ Mode 4: EDGE Link

2.3 Connection Diagram of Test System



2.4 Ancillary Equipment List

Item	Equipment	Trade Name	Model No.	FCC ID	Serial No.
1.	Base Station	R&S	CMU200	N/A	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

AC 120V / 60Hz

3.2 Test Compliance

47 CFR Part 22H, 24E, Part 2, IC RSS-132 Issued 2 and RSS-133 Issued 3

3.3 Frequency Range

a. Radiation: from 30MHz to ten times of highest channel frequency for GSM850.
b. Radiation: from 30 MHz to ten times of highest channel frequency 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	IC Rule	Description of Test	Result	Section
§2.1046	RSS-132 §4.4 RSS-133 §6.4	RF Output Power	Pass	4.2
§22.913 §24.232	RSS-132 §4.4 RSS-133 §6.4	ERP / EIRP	Pass	4.3
§2.1049, §22.917, §24.238(b)	RSS-132 §4.5 RSS-133 §6.5	Occupied Bandwidth & Band Edge Measurement	Pass	4.4
§2.1051	RSS-132 §4.5 RSS-133 §6.5	Conducted Emission	Pass	4.5
§2.1053	RSS-132 §4.5 RSS-133 §6.5	Field Strength of Spurious Radiation	Pass	4.6
§2.1055, §22.355, §24.235	RSS-132 §4.3 RSS-133 §6.3	Frequency Stability vs. Temperature	Pass	4.7
§2.1055, §22.355, §24.235	RSS-132 §4.3 RSS-133 §6.3	Frequency Stability vs. Voltage	Pass	4.8

4.2 RF Output Power

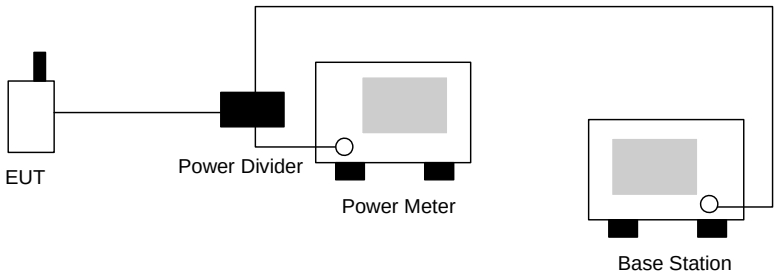
4.2.1 Measurement Instruments：

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)	32.21	1.663
	189	836.4 (Mid)	32.14	1.637
	251	848.8 (High)	32.02	1.592
GSM850 (EDGE)	128	824.2 (Low)	26.63	0.460
	189	836.4 (Mid)	26.76	0.474
	251	848.8 (High)	26.80	0.479
PCS1900 (GSM)	512	1850.2 (Low)	29.90	0.977
	661	1880.0 (Mid)	29.79	0.953
	810	1909.8 (High)	29.64	0.920
PCS1900 (EDGE)	512	1850.2 (Low)	24.62	0.290
	661	1880.0 (Mid)	24.60	0.288
	810	1909.8 (High)	24.41	0.276

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 tutntable 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 1.0meter 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

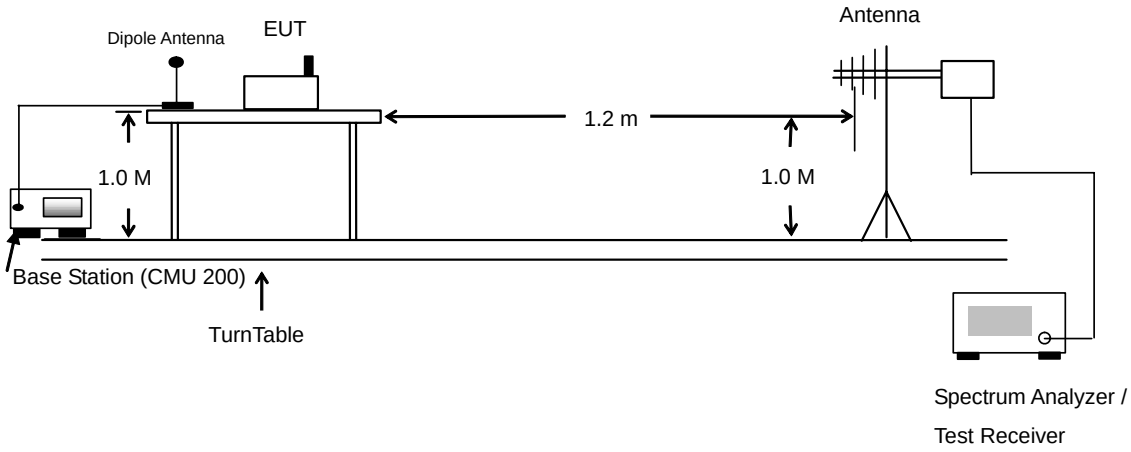
Es = Rs + AF

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	-30.06	-48.12	0.00	-1.08	16.98	0.05
836.40	-29.32	-48.28	0.00	-0.93	18.03	0.06
848.80	-30.25	-48.35	0.00	-0.76	17.34	0.05
Vertical Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBd)	ERP (dBm)	ERP (W)
824.20	-20.00	-47.97	0.00	-1.08	26.89	0.49
836.40	-18.89	-48.01	0.00	-0.93	28.19	0.66
848.80	-19.47	-48.05	0.00	-0.76	27.82	0.61

GSM850 (EDGE) Radiated Power ERP						
Horizontal Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBd)	ERP (dBm)	ERP (W)
824.20	-36.11	-48.12	0.00	-1.08	10.93	0.01
836.40	-34.89	-48.28	0.00	-0.93	12.46	0.02
848.80	-34.10	-48.35	0.00	-0.76	13.49	0.02
Vertical Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBd)	ERP (dBm)	ERP (W)
824.20	-27.41	-47.97	0.00	-1.08	19.48	0.09
836.40	-25.83	-48.01	0.00	-0.93	21.25	0.13
848.80	-24.85	-48.05	0.00	-0.76	22.44	0.18

PCS1900 (GSM) Radiated Power EIRP						
Horizontal Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBi)	EIRP (dBm)	EIRP (W)
1850.20	-23.65	-51.88	0.00	1.96	30.19	1.04
1880.00	-24.84	-52.99	0.00	2.00	30.15	1.04
1909.80	-27.31	-54.28	0.00	1.98	28.95	0.79
Vertical Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBi)	EIRP (dBm)	EIRP (W)
1850.20	-22.87	-52.13	0.00	1.96	31.22	1.32
1880.00	-24.05	-53.17	0.00	2.00	31.12	1.29
1909.80	-26.19	-54.13	0.00	1.98	29.92	0.98

PCS1900 (EDGE) Radiated Power EIRP						
Horizontal Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBi)	EIRP (dBm)	EIRP (W)
1850.20	-29.40	-51.88	0.00	1.96	24.44	0.28
1880.00	-31.66	-52.99	0.00	2.00	23.33	0.22
1909.80	-34.06	-54.28	0.00	1.98	22.20	0.17
Vertical Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBi)	EIRP (dBm)	EIRP (W)
1850.20	-28.13	-52.13	0.00	1.96	25.96	0.39
1880.00	-30.34	-53.17	0.00	2.00	24.83	0.30
1909.80	-32.40	-54.13	0.00	1.98	23.71	0.23

4.4 Occupied Bandwidth and Band Edge Measurement

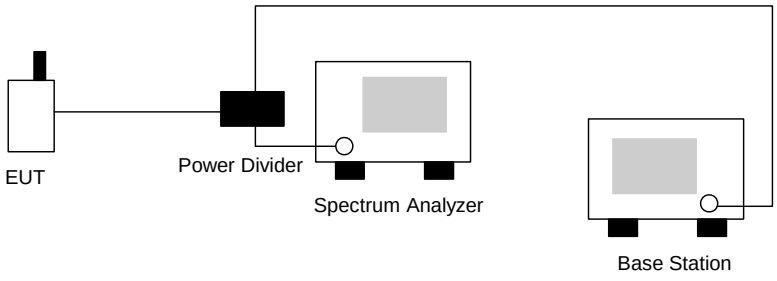
4.4.1 Measurement Instruments

As described in chapter 5 of this test report.

4.4.2 Test Procedure

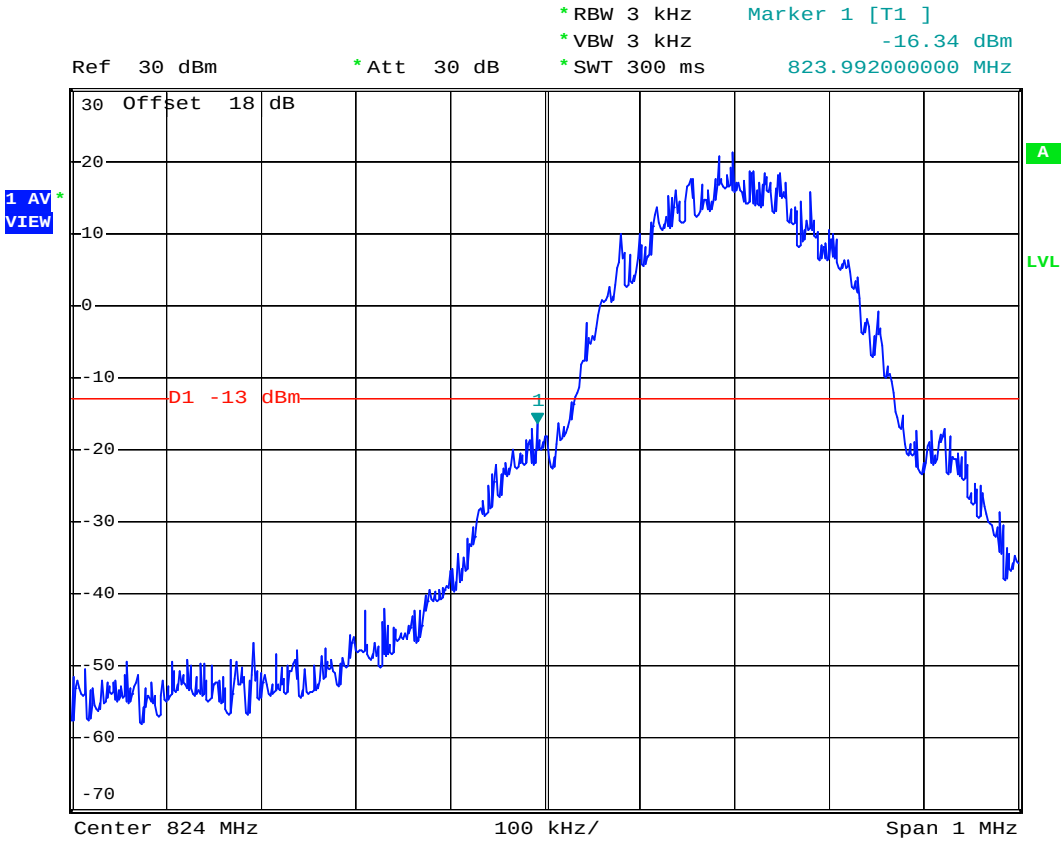
1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. The 99% occupied bandwidth of middle channel for the highest and lowest RF powers were measured.
3. The bandedge of low and high channels for the highest RF powers within the transmitting frequency band were measured.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

4.4.3 Test Setup Layout

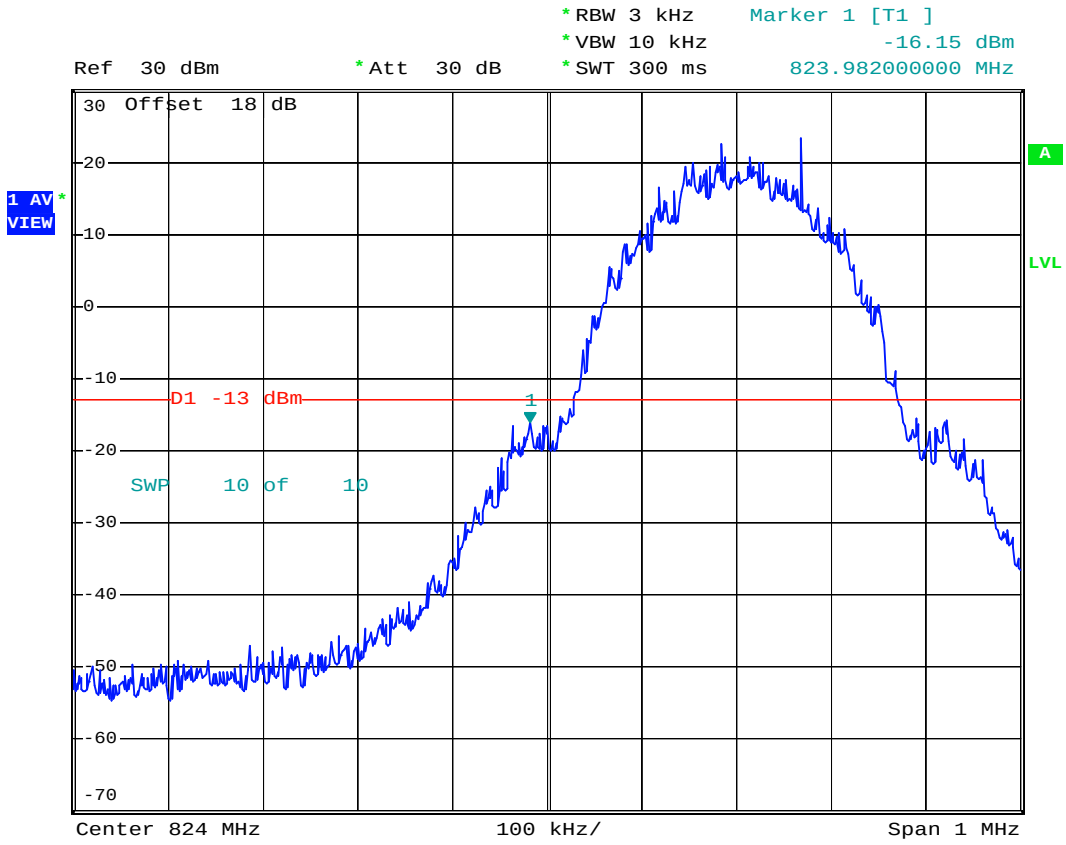


4.4.4 Test Result

- Mode 1
- Test Mode : GSM850 (GSM) CH128 Lower Band Edge (VBW 3kHz)
- Power State : High

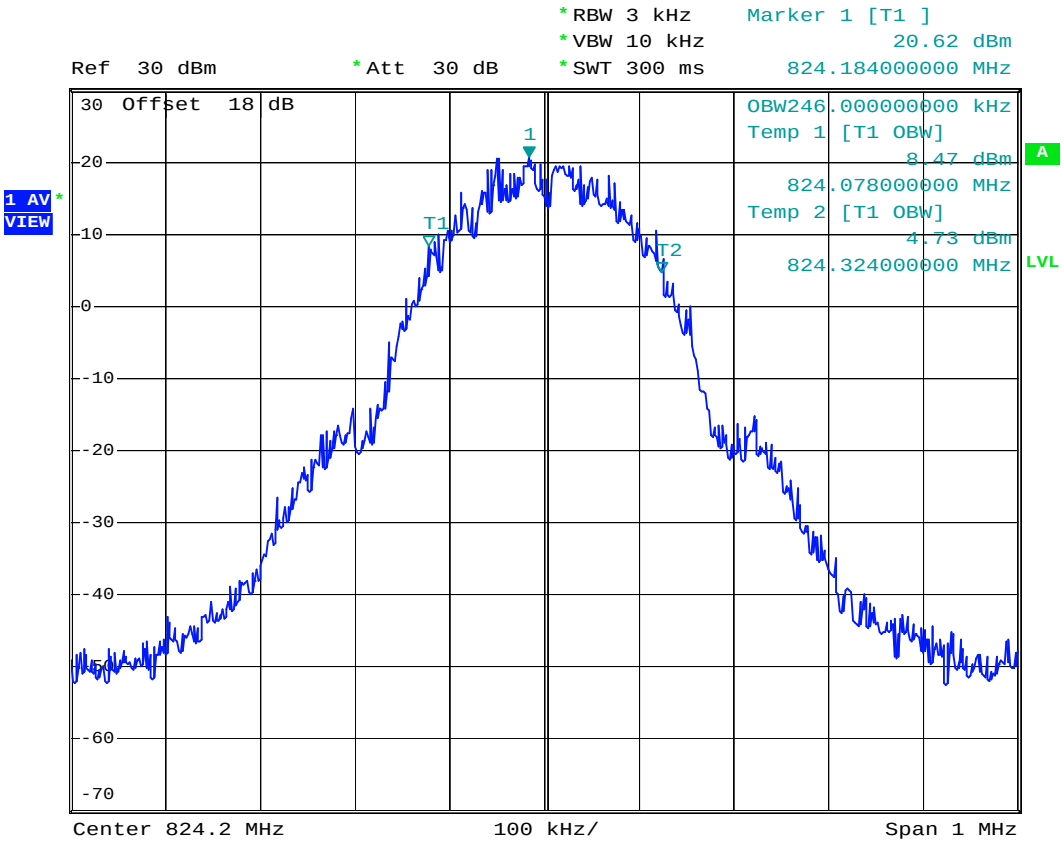


- Test Mode : GSM850 (GSM) CH128 Lower Band Edge (VBW 10kHz)
- Power State : High



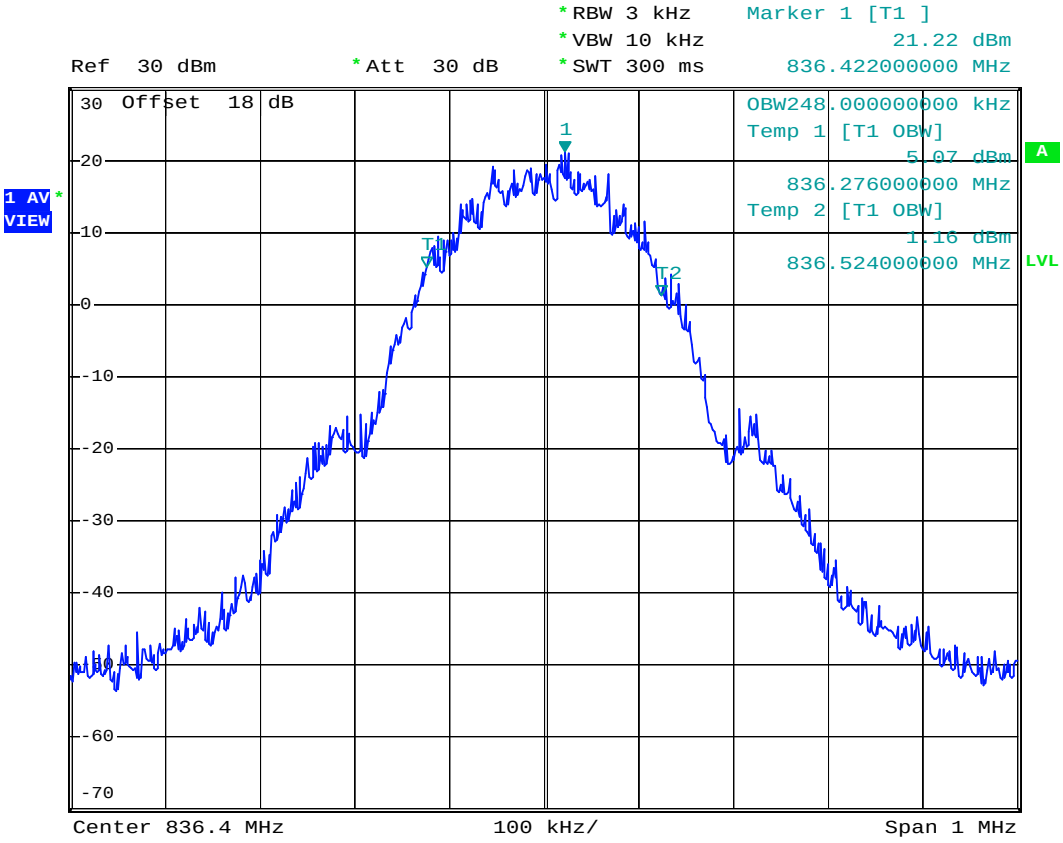
Date: 14.AUG.2007 20:55:38

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



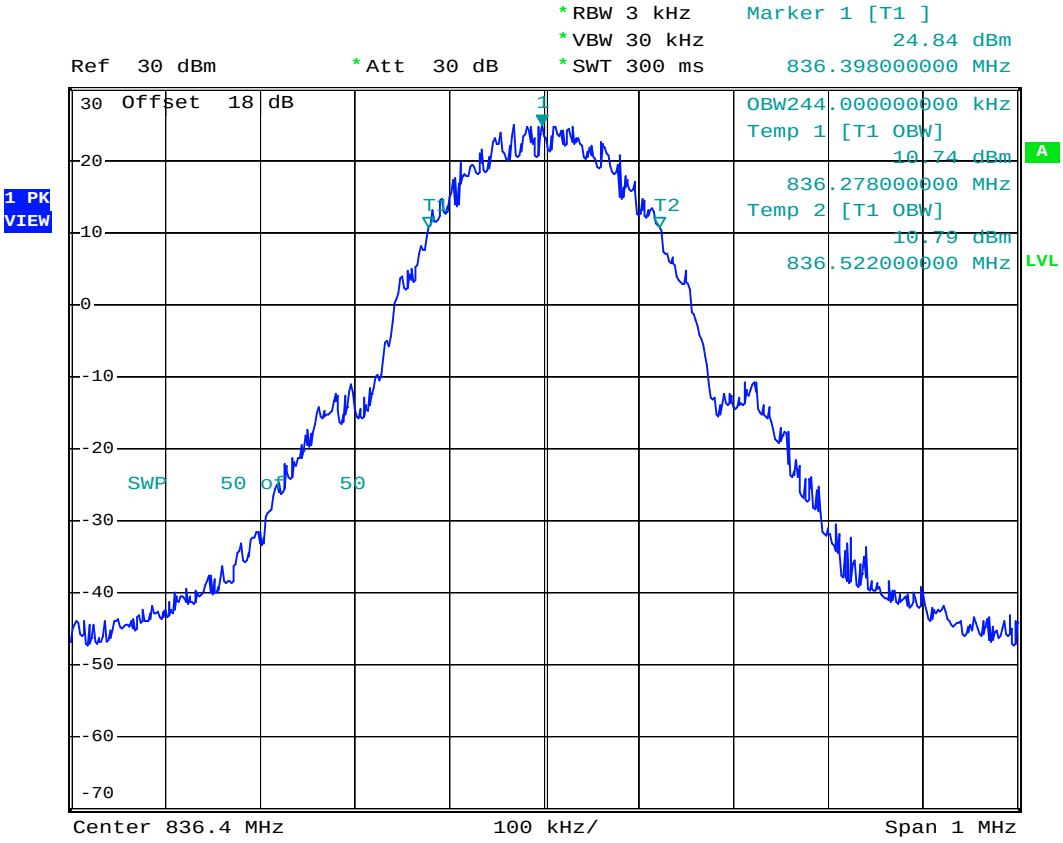
Date: 14.AUG.2007 21:11:33

- Test Mode : GSM850 (GSM) CH189 99% Occupid Bandwidth(VBW 10kHz)
- Power State : High



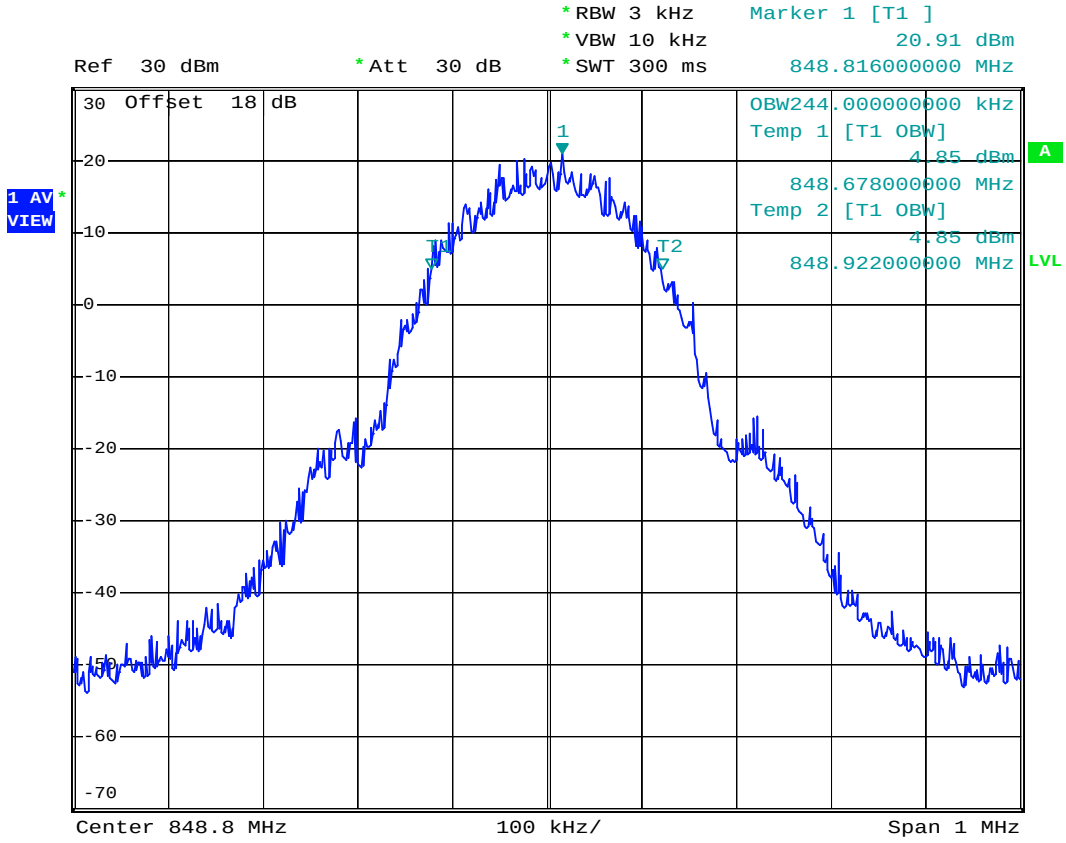
Date: 14.AUG.2007 21:13:20

- Test Mode : GSM850 (GSM) CH189 99% Occupid Bandwidth (VBW 30kHz)
- Power State : High



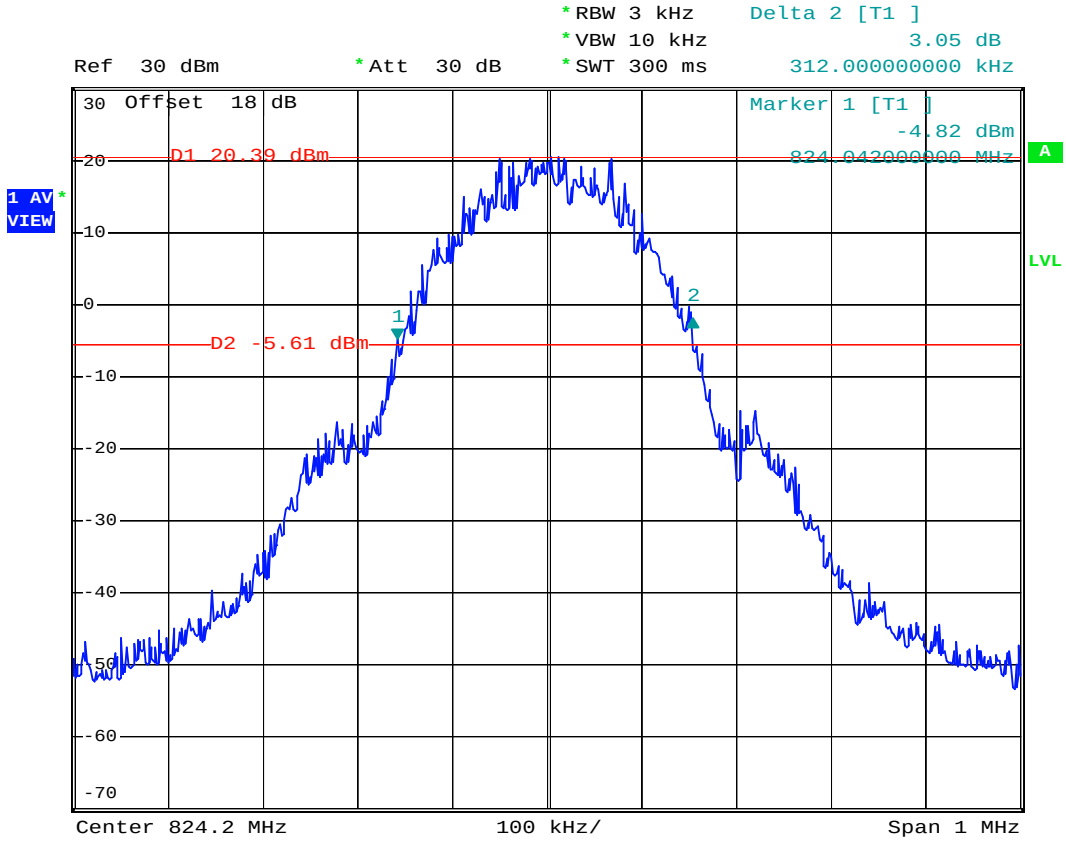
Date: 16.AUG.2007 00:00:45

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



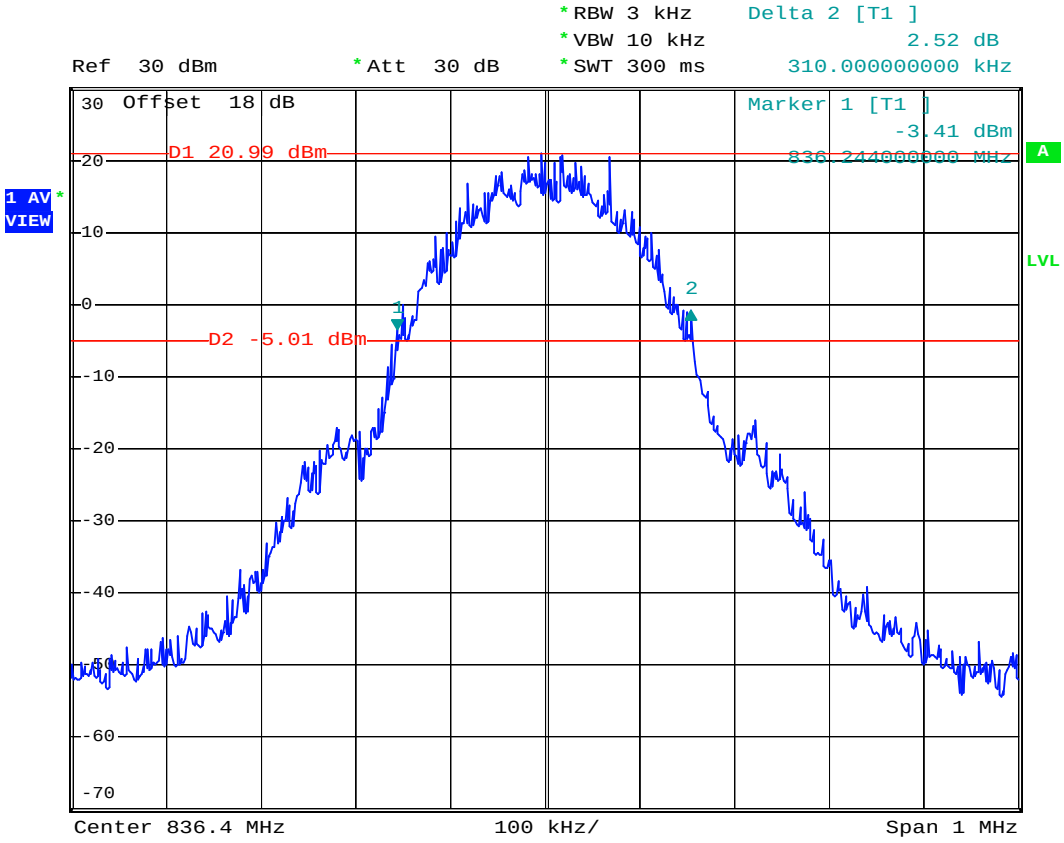
Date: 14.AUG.2007 23:46:15

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



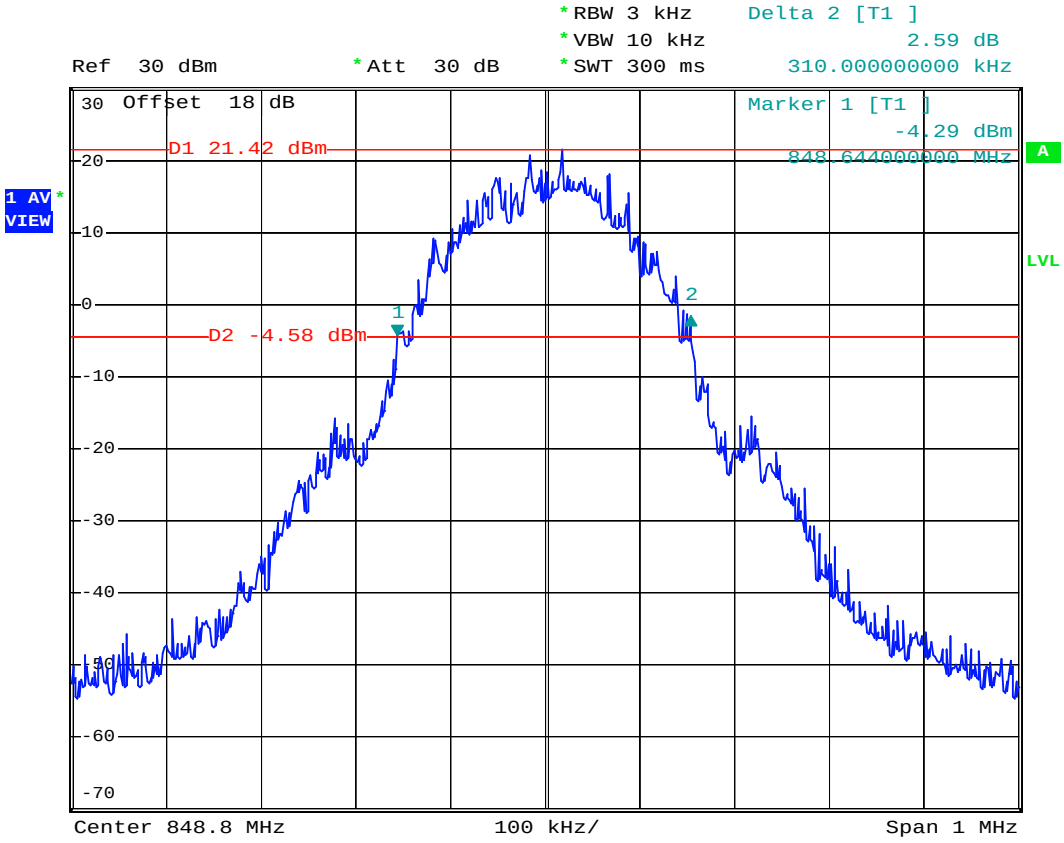
Date: 14.AUG.2007 21:20:56

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



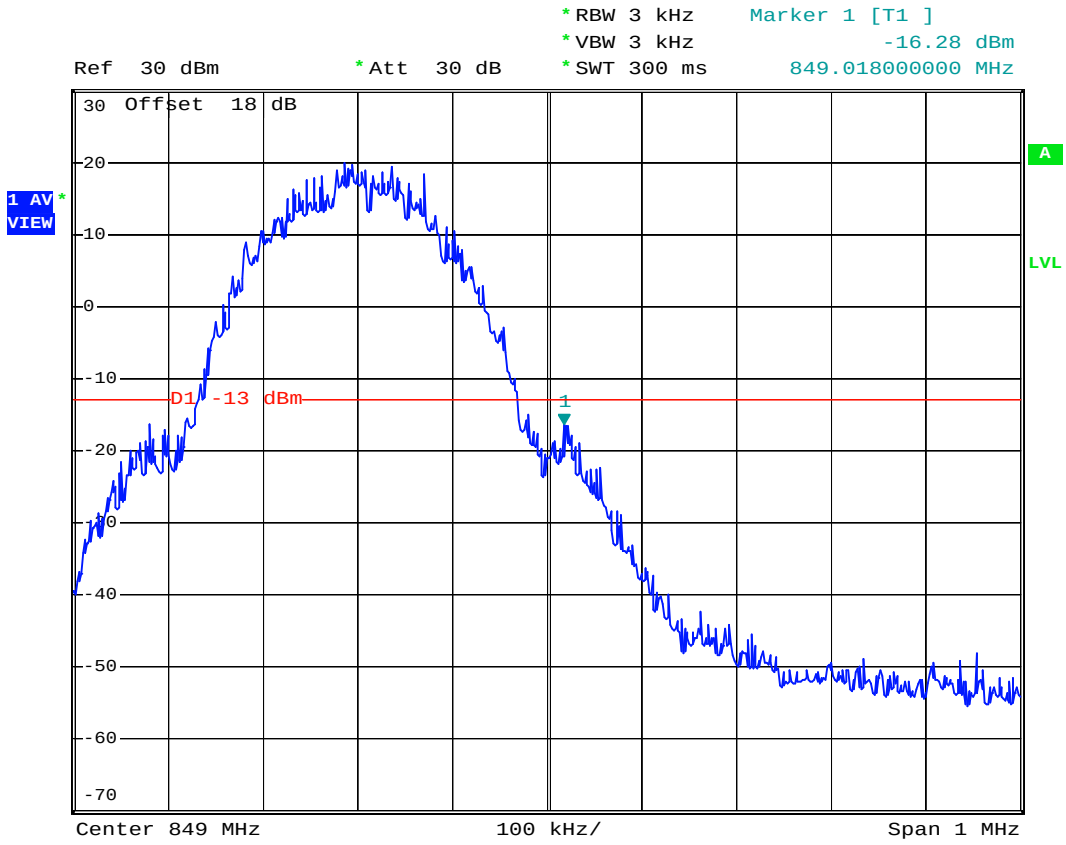
Date: 14.AUG.2007 21:23:17

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



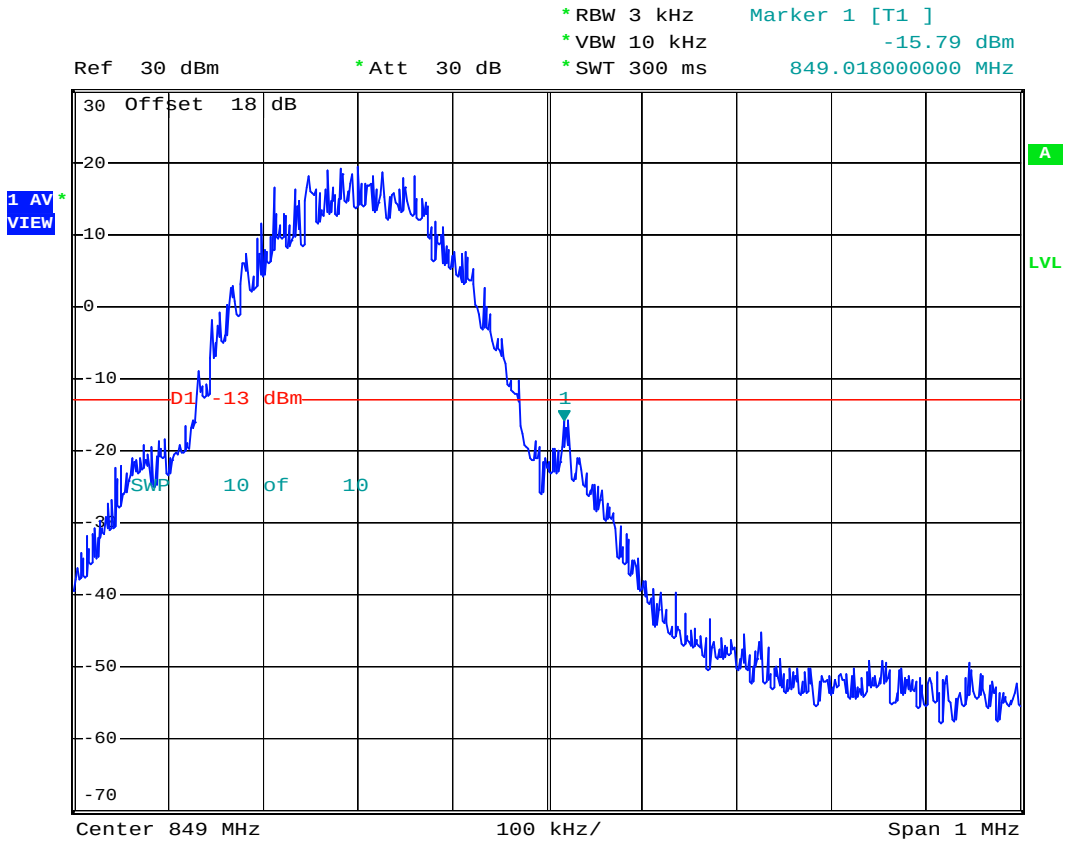
Date: 14.AUG.2007 21:25:39

- Test Mode : GSM850 (GSM) CH251 Higher Band Edge (VBW 3kHz)
- Power State : High



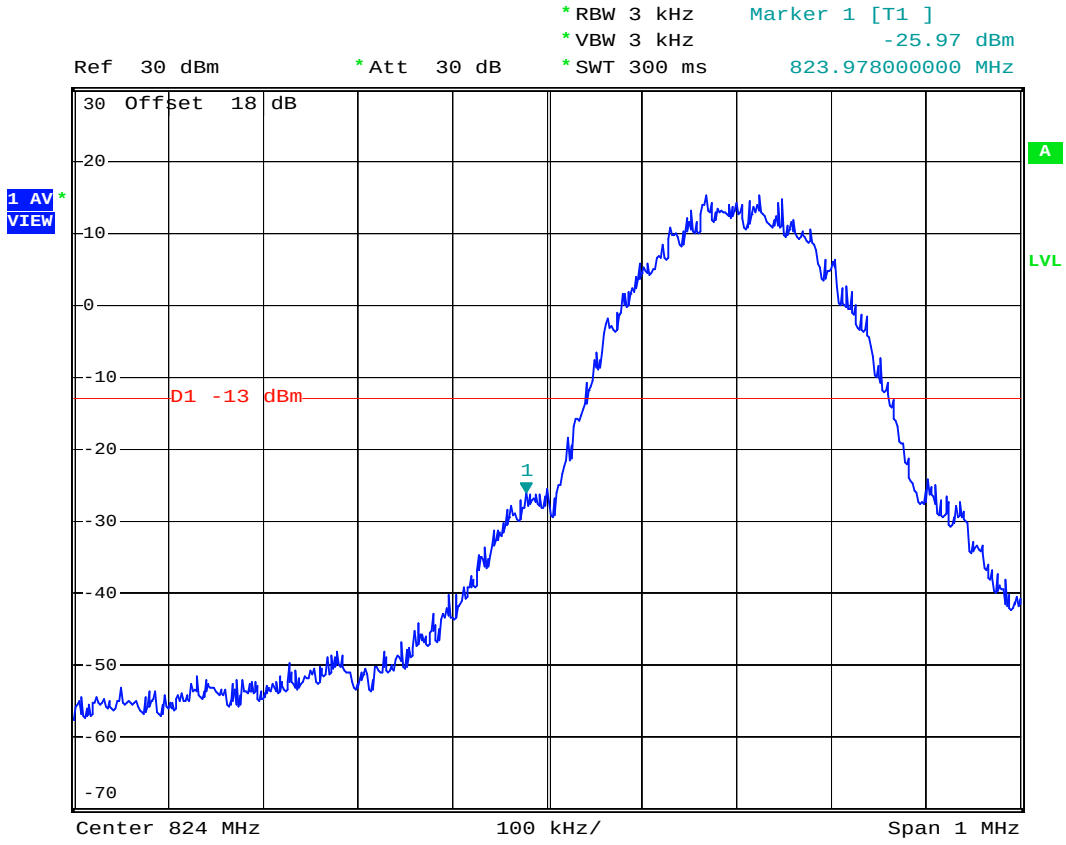
Date: 14.AUG.2007 20:58:39

- Test Mode : GSM850 (GSM) CH251 Higher Band Edge (VBW 10kHz)
- Power State : High



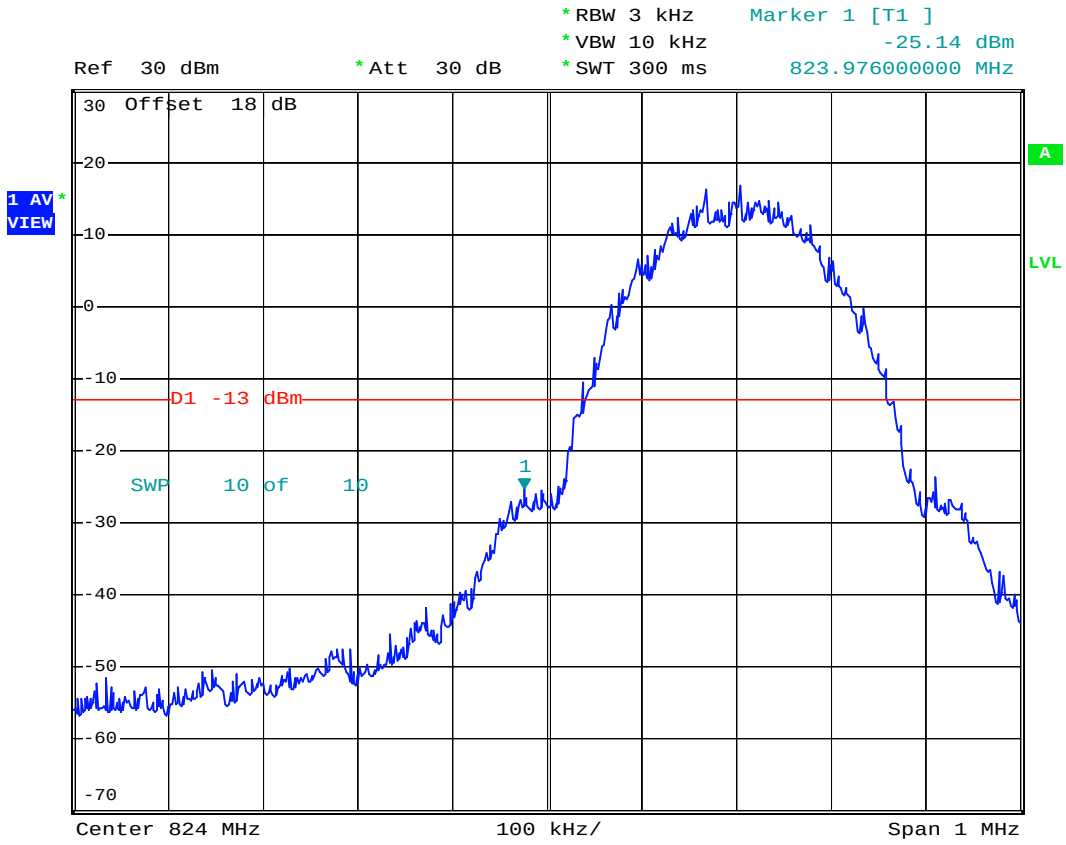
Date: 14.AUG.2007 20:59:55

- Mode 2
- Test Mode : GSM850 (EDGE) CH128 Lower Band Edge (VBW 3kHz)
- Power State : High



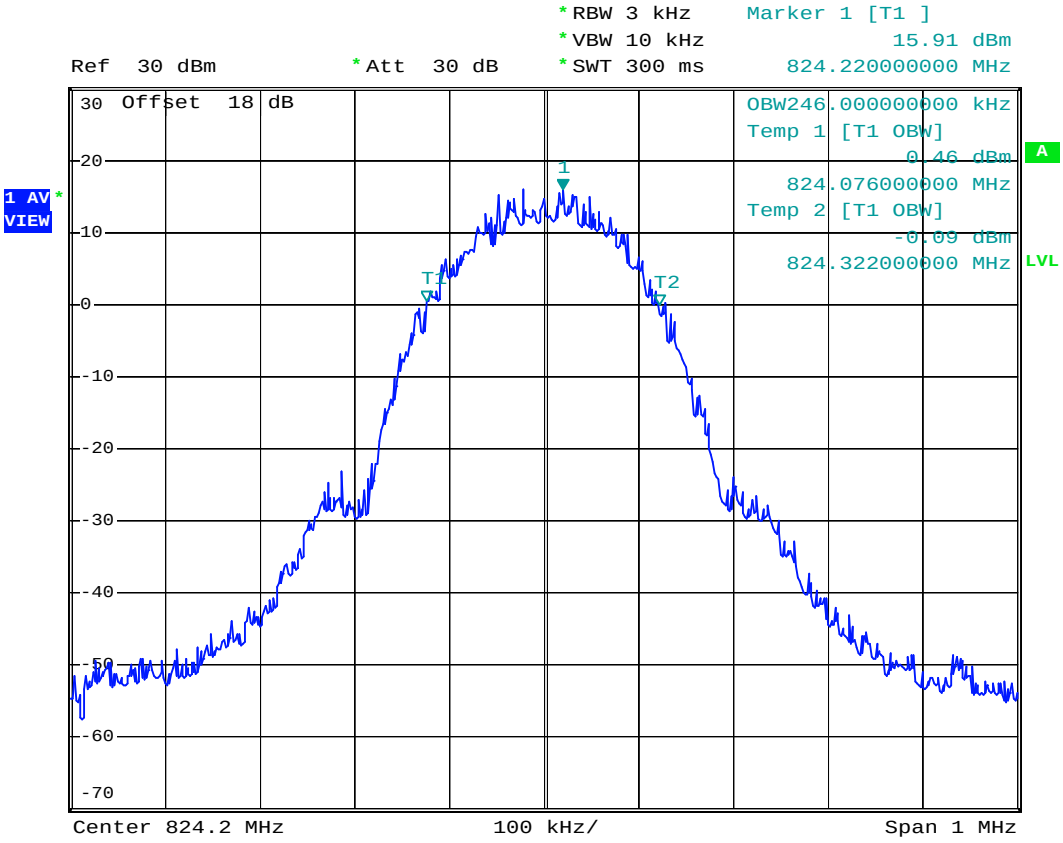
Date: 17.AUG.2007 08:09:42

- Test Mode : GSM850 (EDGE) CH128 Lower Band Edge (VBW 10kHz)
- Power State : High



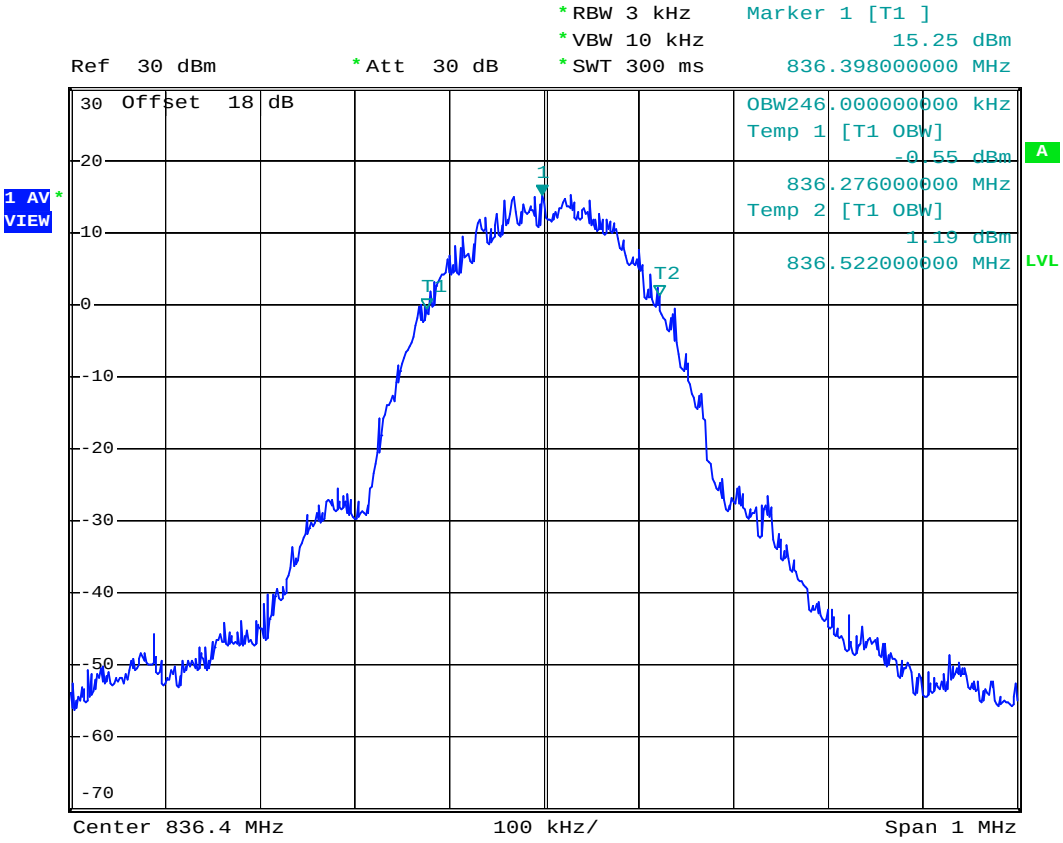
Date: 15.AUG.2007 00:10:17

- Test Mode : GSM850 (EDGE) CH128 99% Occupid Bandwidth
- Power State : High



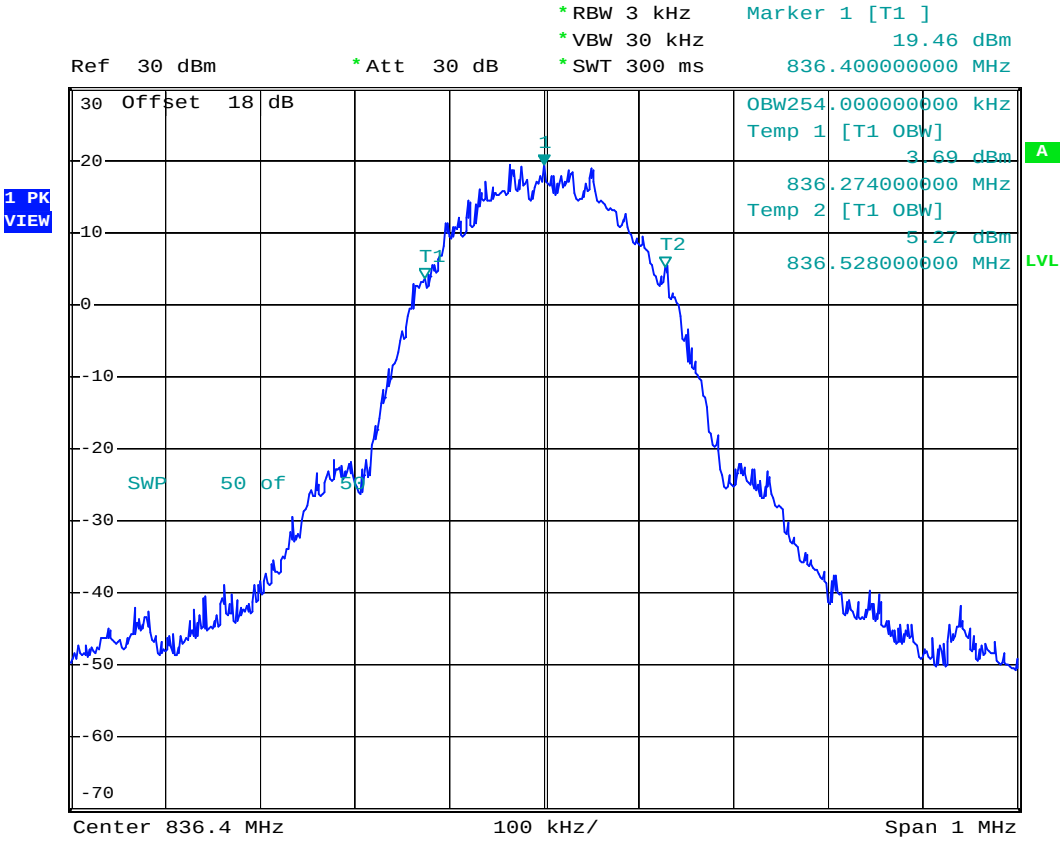
Date: 14.AUG.2007 23:41:52

- Test Mode : GSM850 (EDGE) CH189 99% Occupid Bandwidth (VBW 10kHz)
- Power State : High



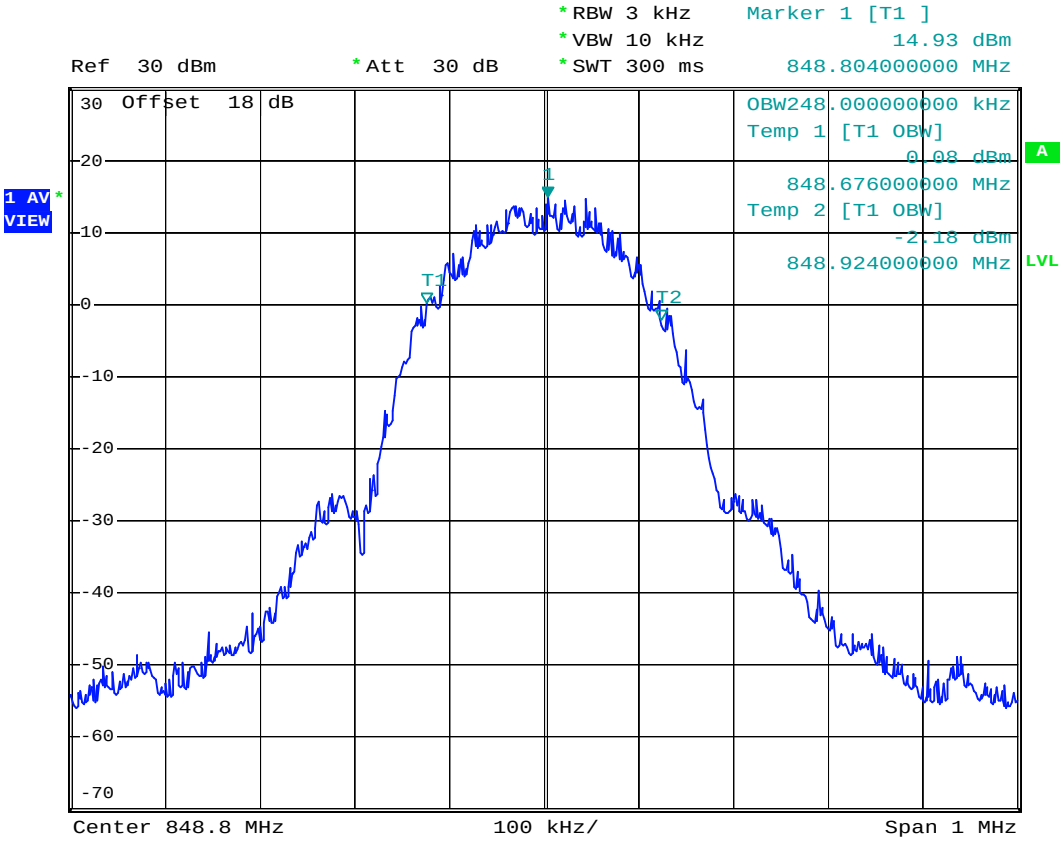
Date: 14.AUG.2007 23:41:09

- Test Mode : GSM850 (EDGE) CH189 99% Occupid Bandwidth (VBW 30kHz)
- Power State : High



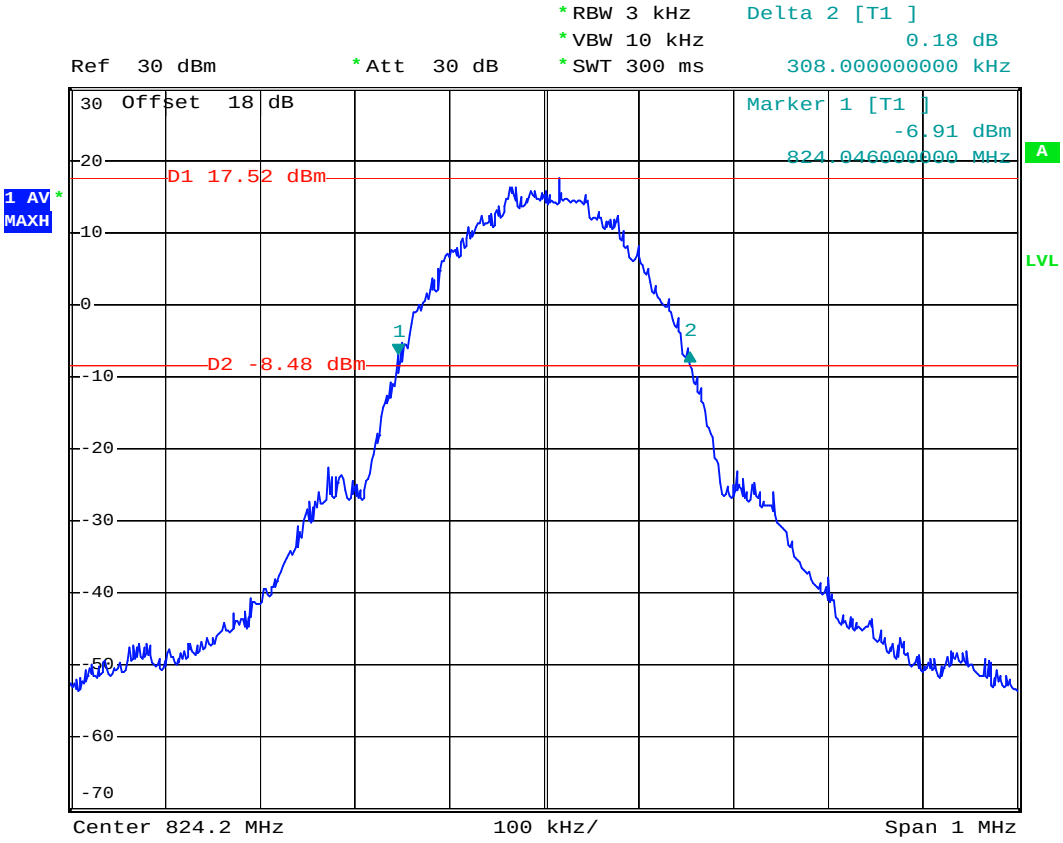
Date: 15.AUG.2007 23:59:54

- Test Mode : GSM850 (EDGE) CH 251 99% Occupid Bandwidth
- Power State : High



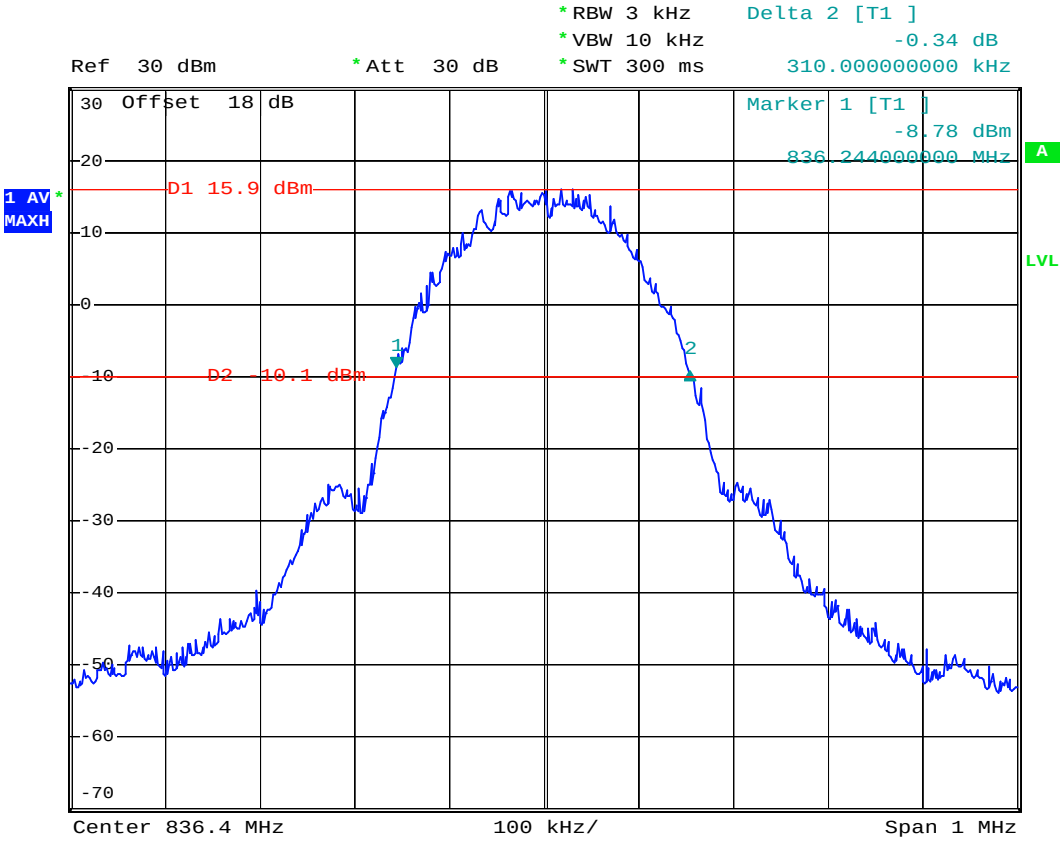
Date: 14.AUG.2007 23:42:36

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



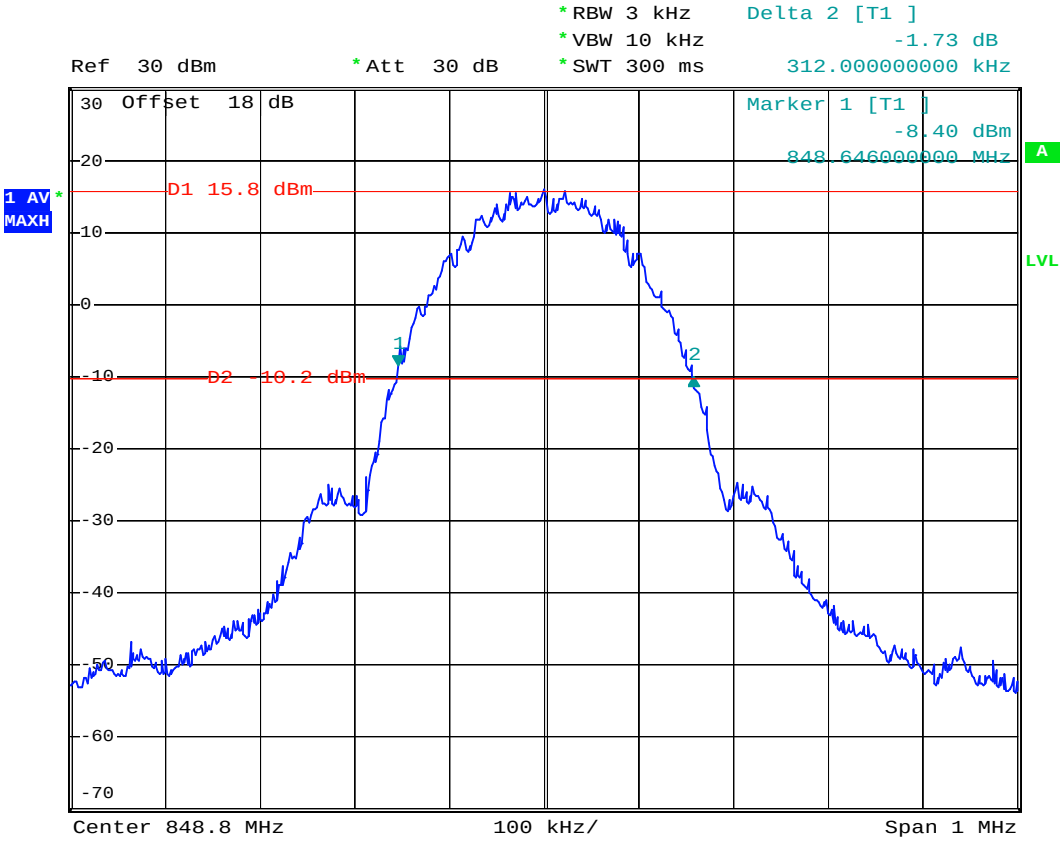
Date: 14.AUG.2007 23:56:32

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



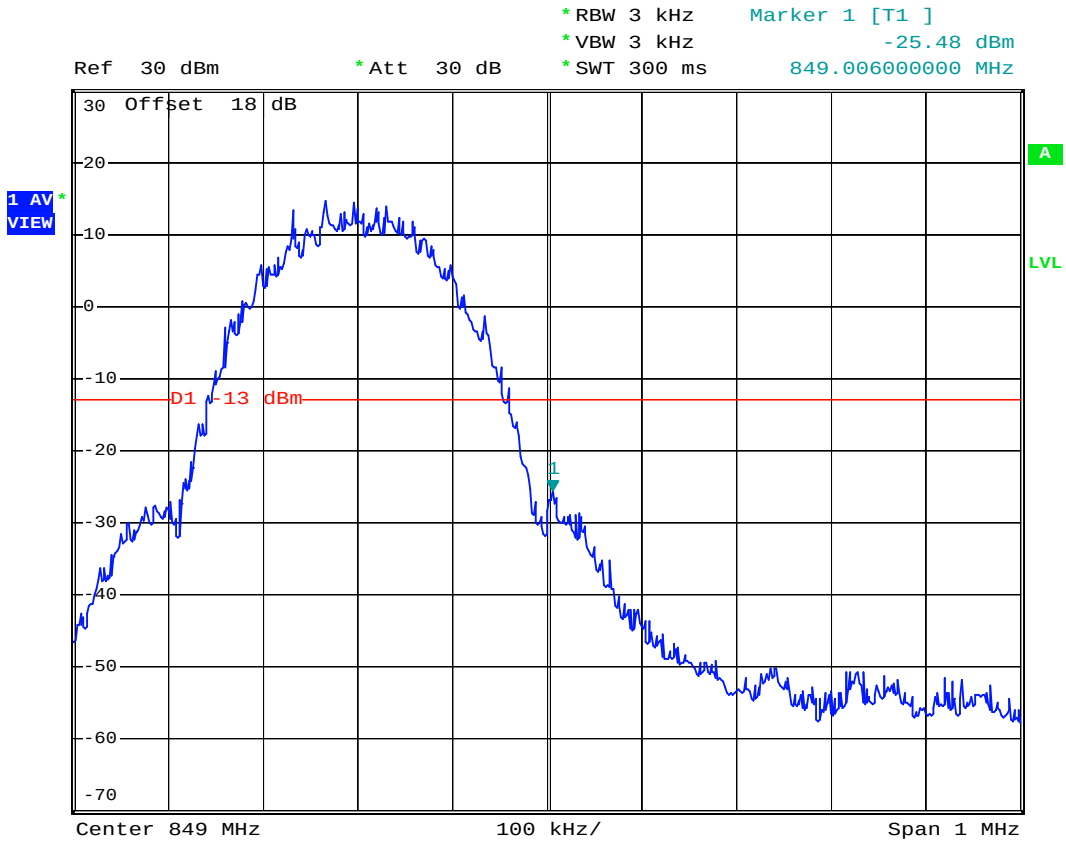
Date: 14.AUG.2007 23:53:46

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



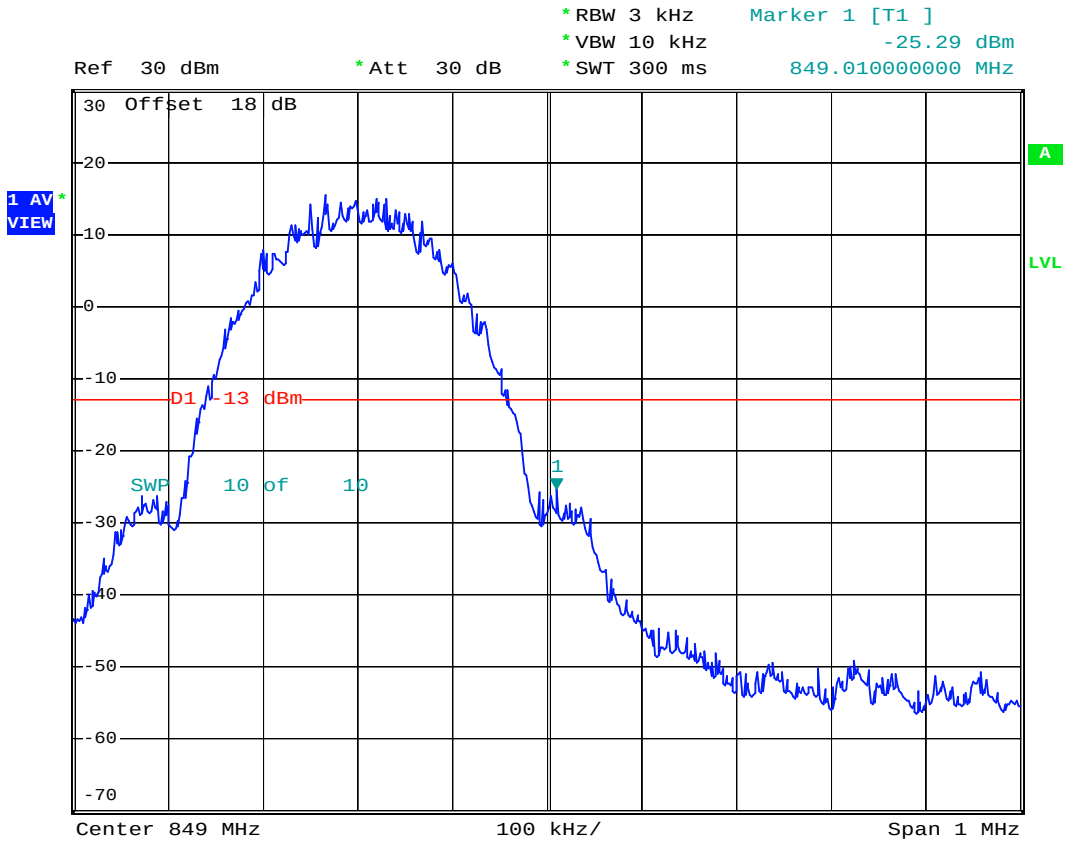
Date: 15.AUG.2007 00:00:53

- Test Mode : GSM850 (EDGE) CH251 Higher Band Edge (VBW 3kHz)
- Power State : High



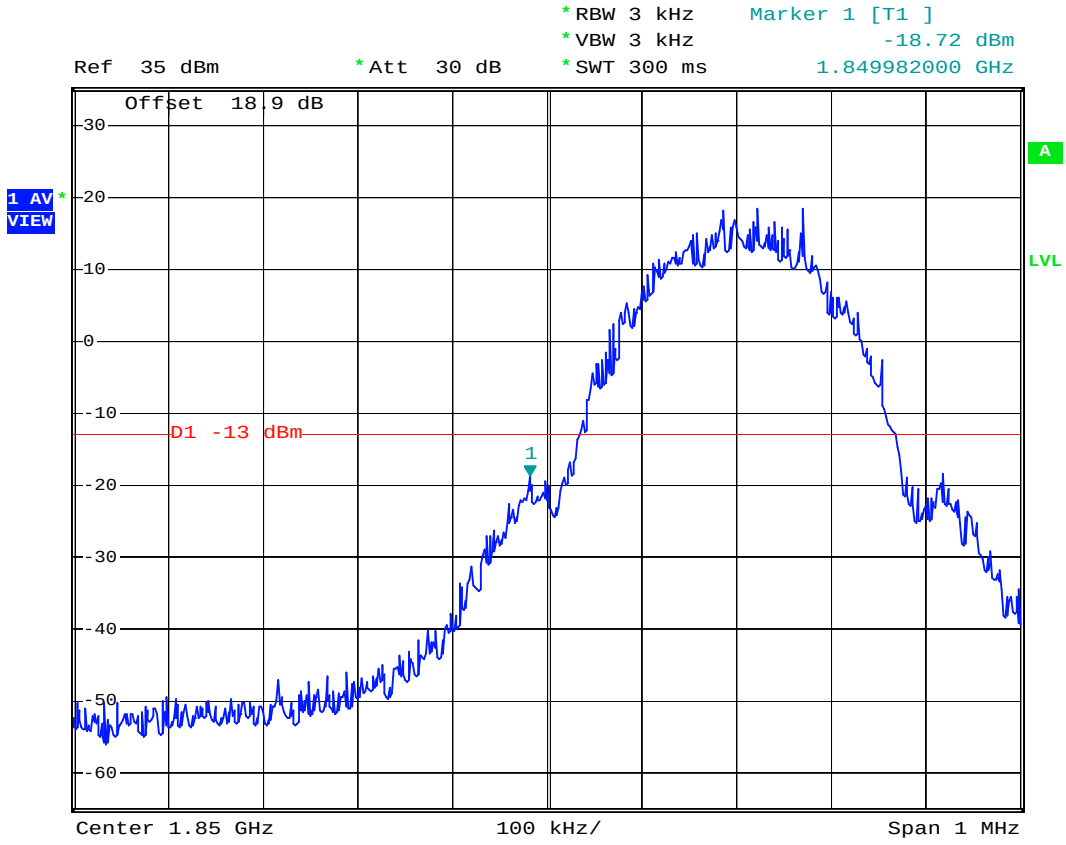
Date: 17.AUG.2007 08:10:31

- Test Mode : GSM850 (EDGE) CH251 Higher Band Edge (VBW 10kHz)
- Power State : High



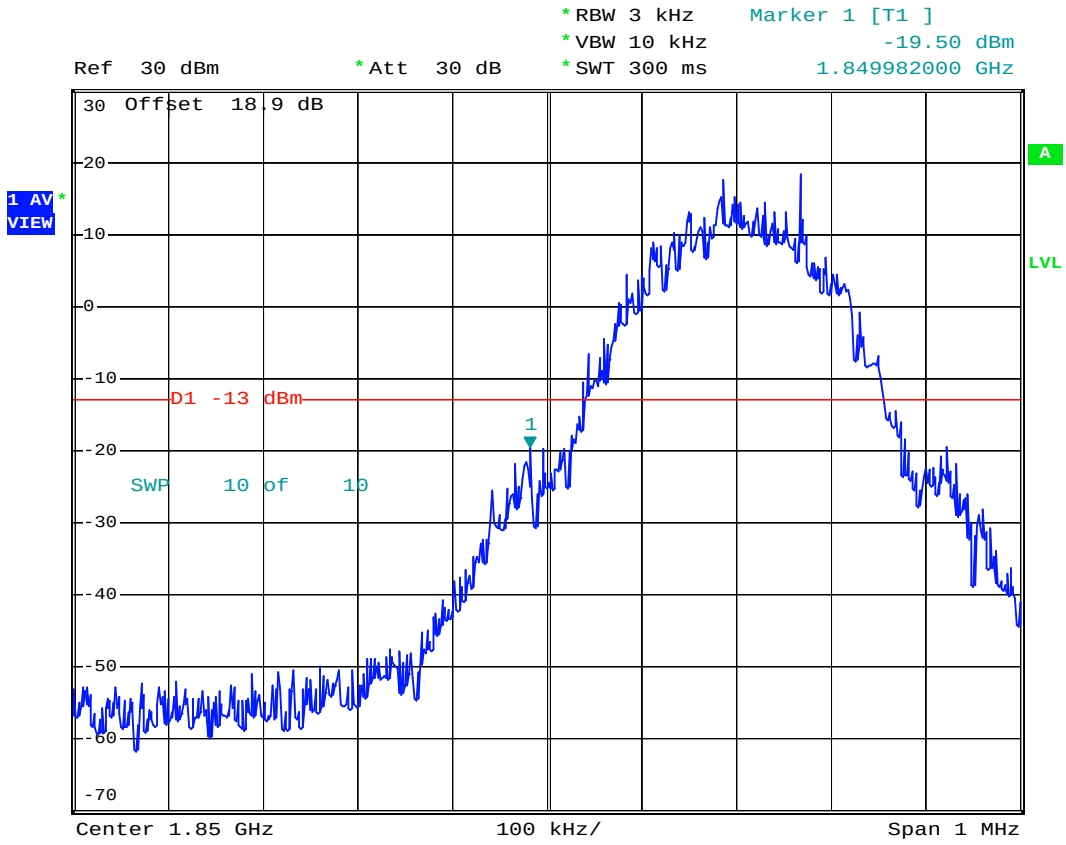
Date: 15.AUG.2007 00:11:51

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



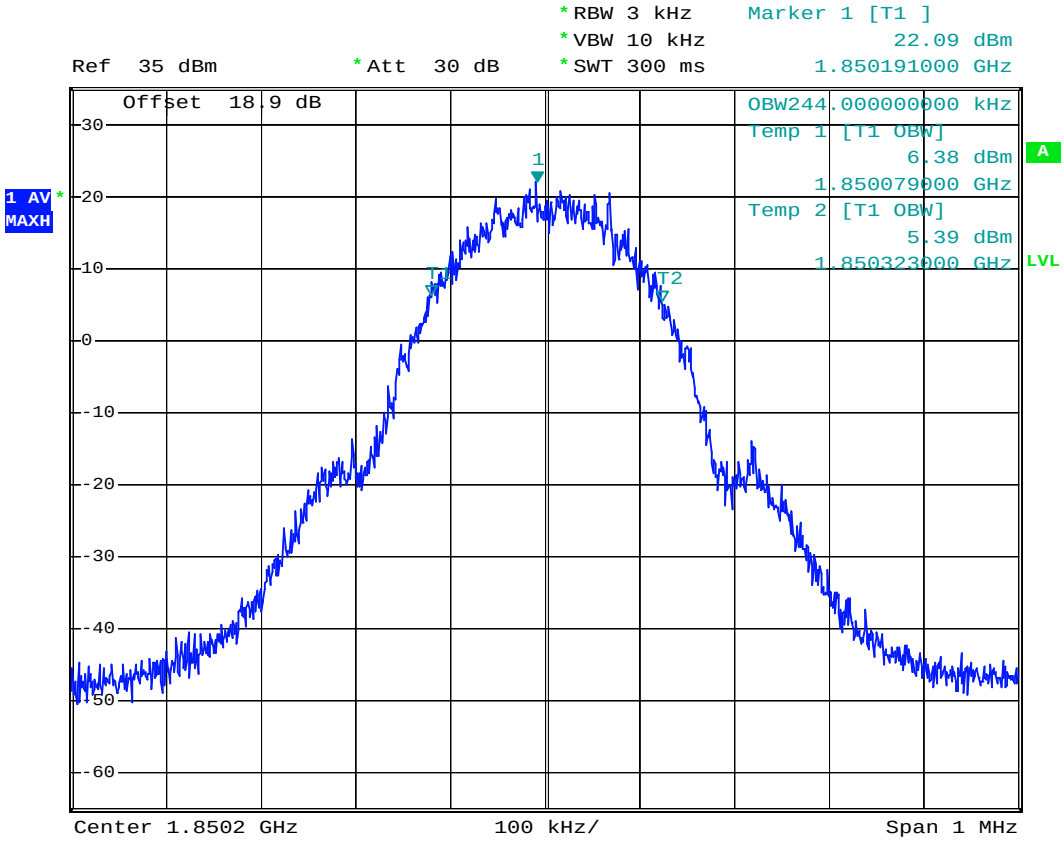
Date: 15.AUG.2007 21:02:09

- Test Mode : PCS1900 (GSM) CH512 Lower Band Edge (VBW 10kHz)
- Power State : High



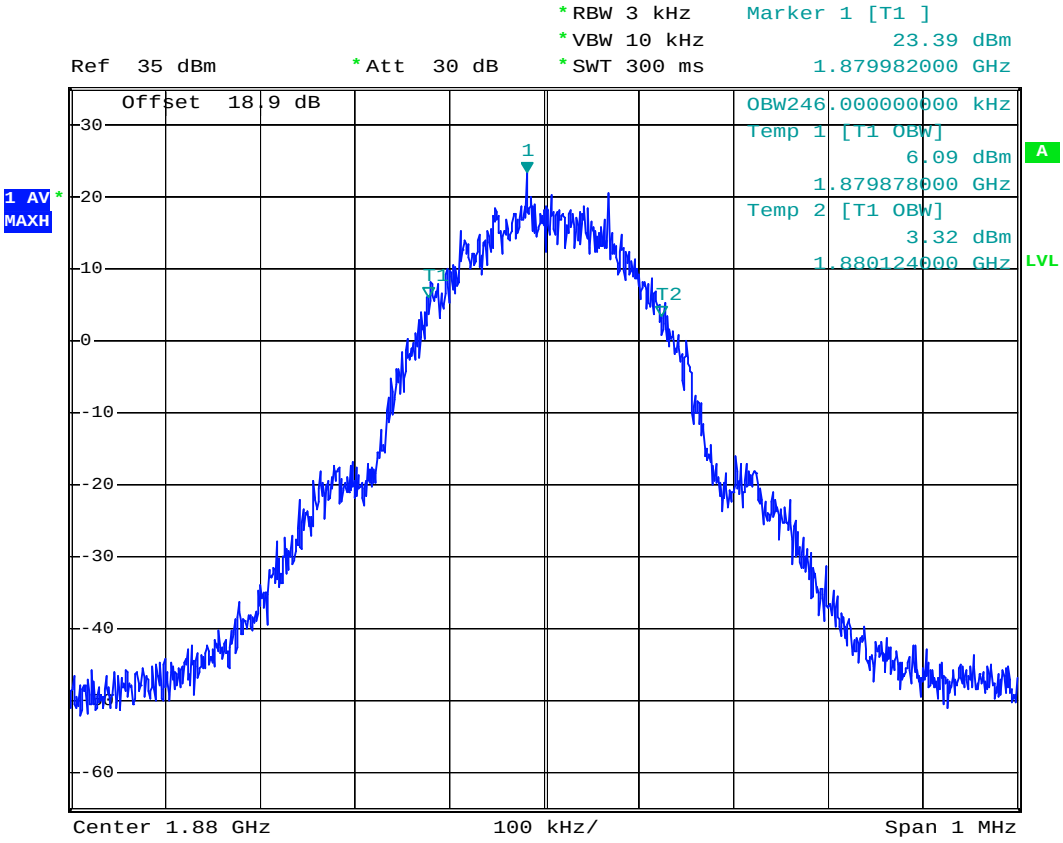
Date: 25.AUG.2007 17:43:33

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



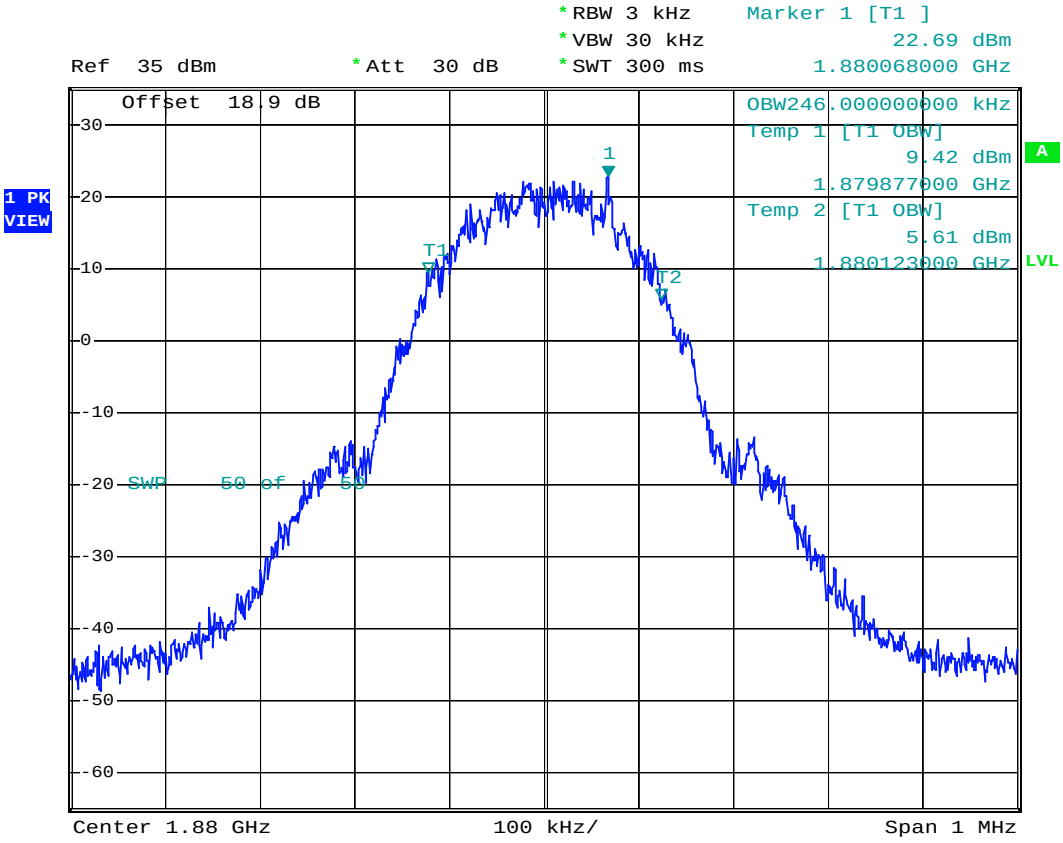
Date: 15.AUG.2007 21:24:35

- Test Mode : PCS1900 (GSM) CH661 99% Occupid Bandwidth (VBW 10kHz)
- Power State : High



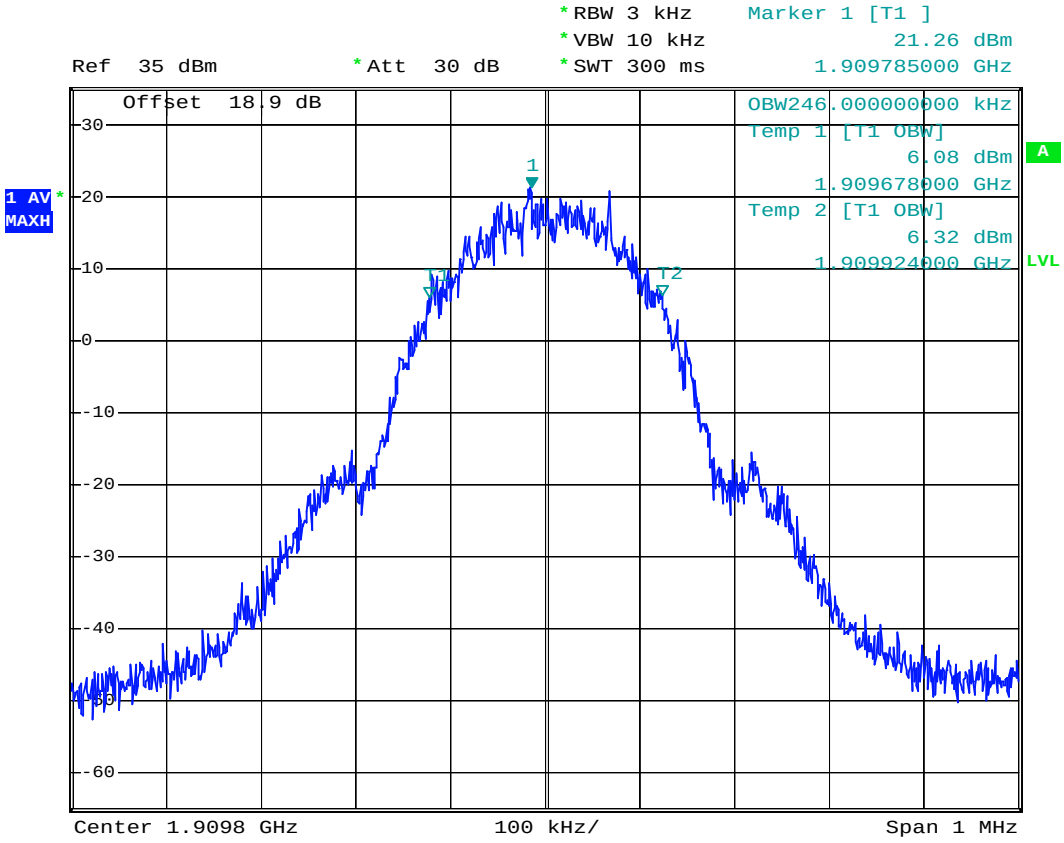
Date: 15.AUG.2007 21:25:24

- Test Mode : PCS1900 (GSM) CH661 99% Occupid Bandwidth (VBW 30kHz)
- Power State : High



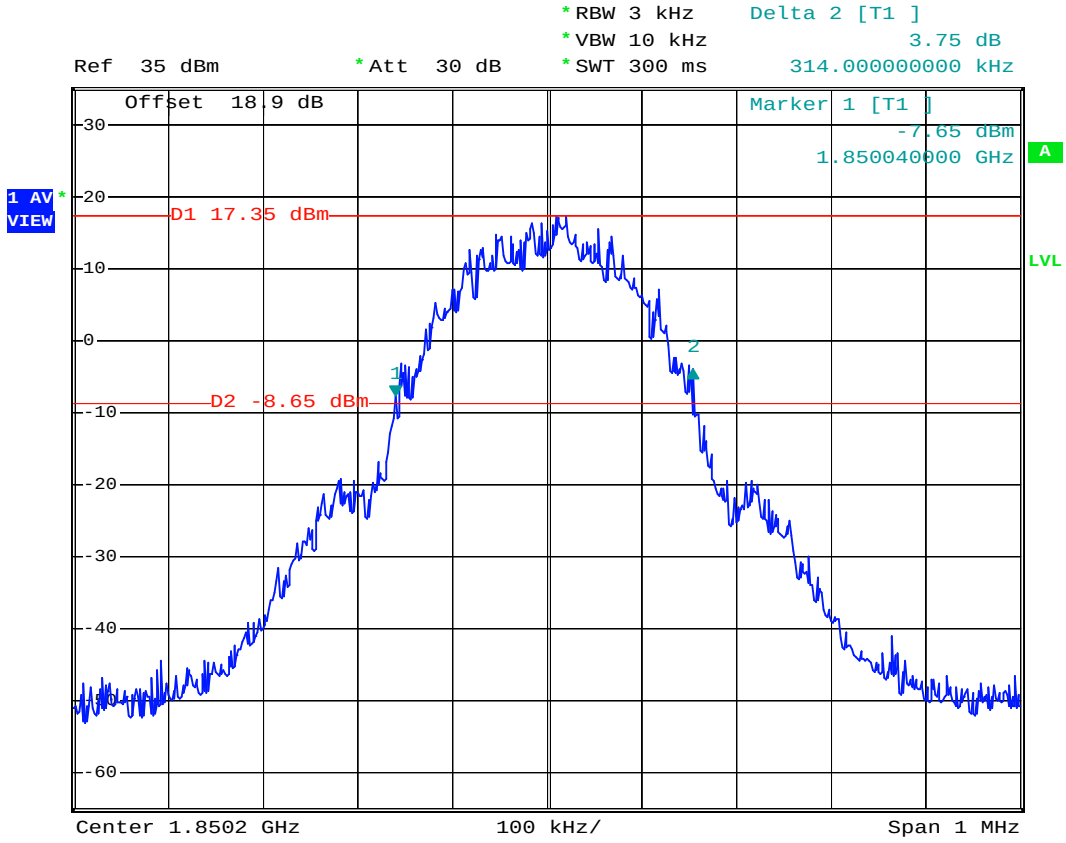
Date: 15.AUG.2007 21:43:59

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



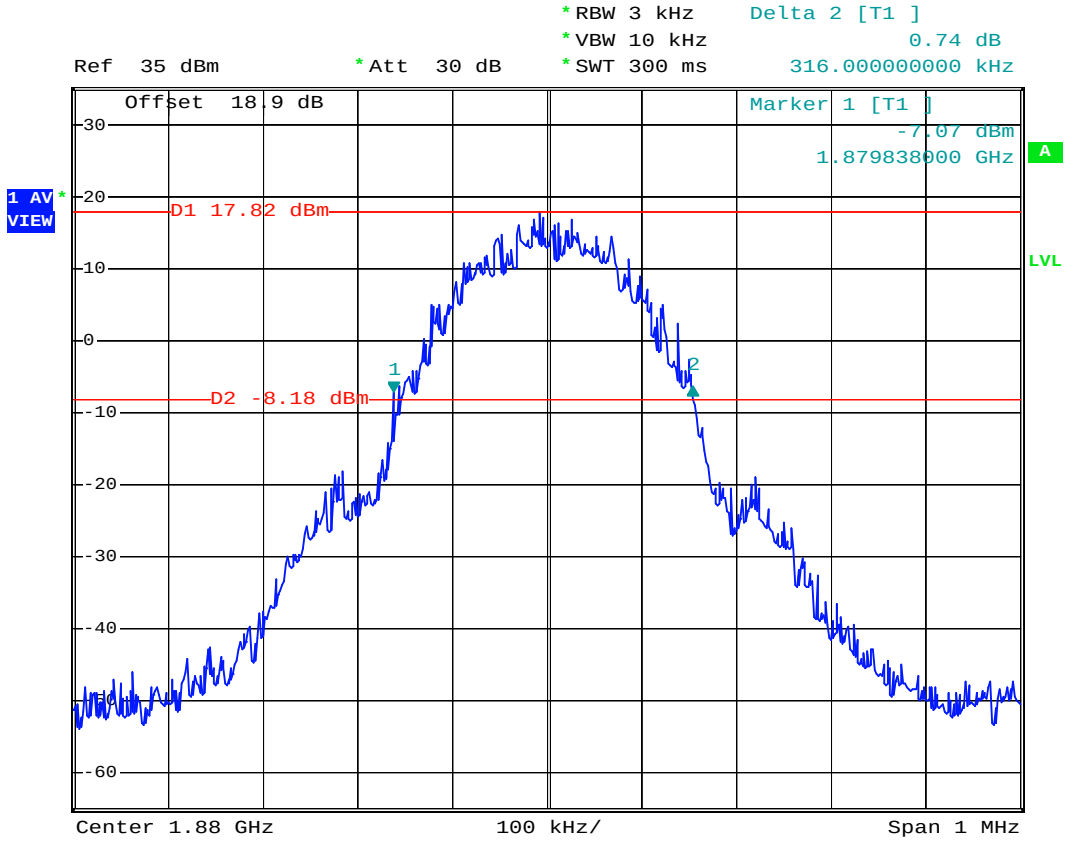
Date: 15.AUG.2007 21:28:09

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



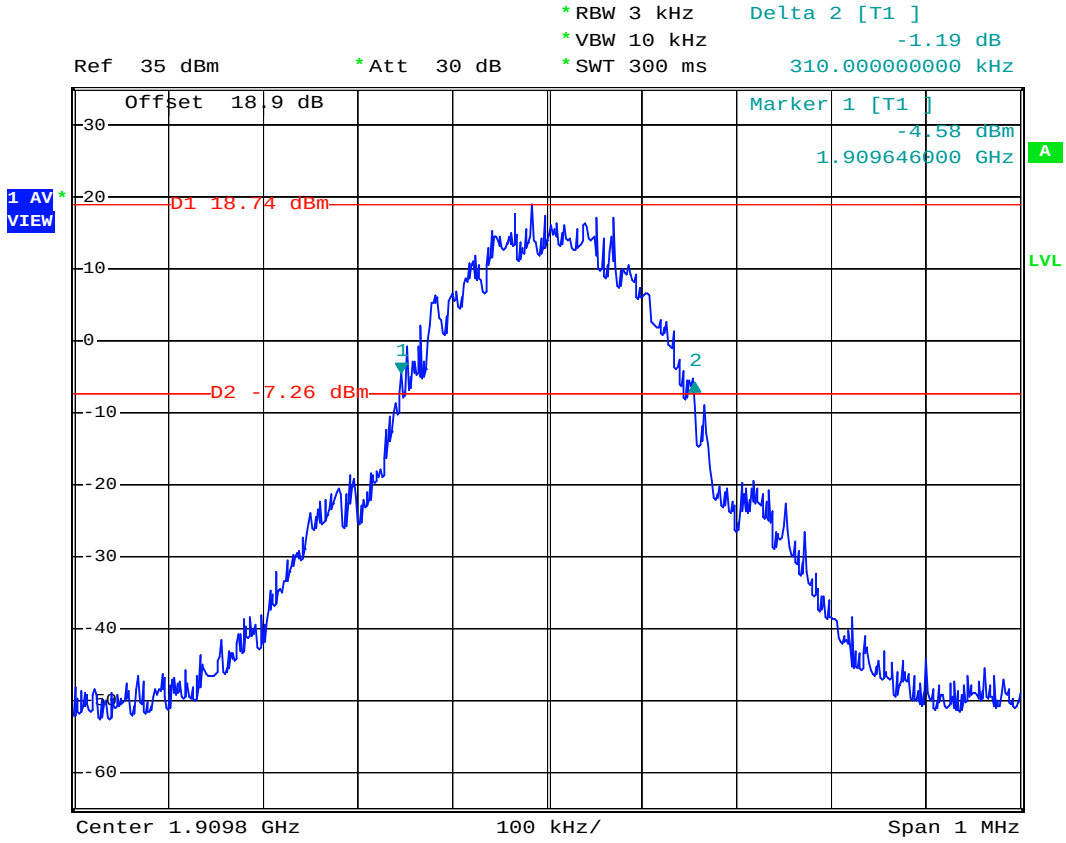
Date: 15.AUG.2007 20:49:22

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



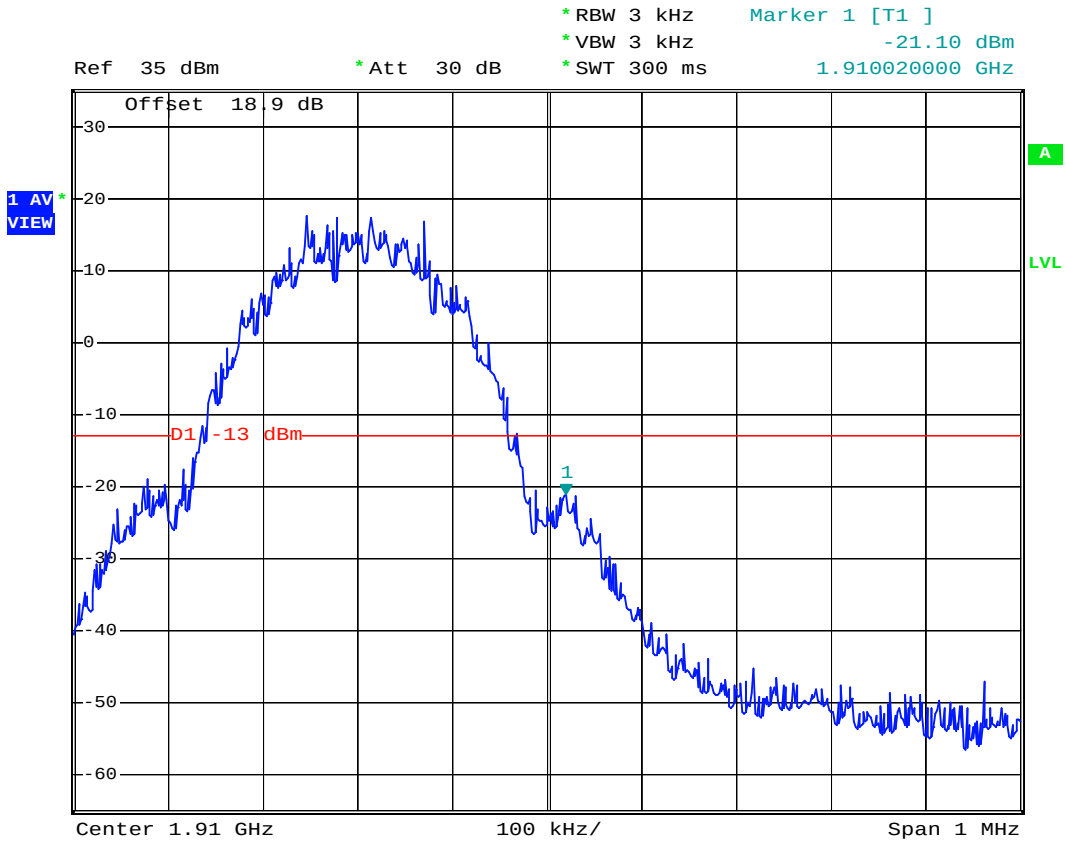
Date: 15.AUG.2007 21:14:06

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



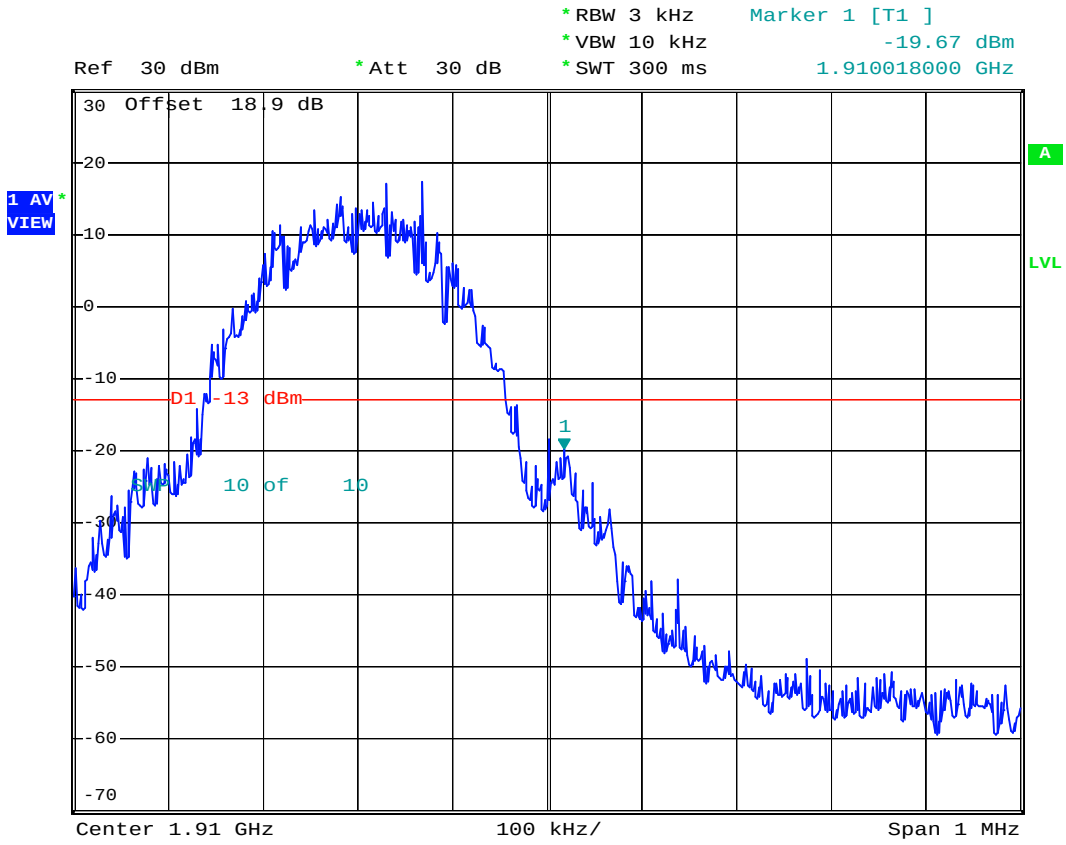
Date: 15.AUG.2007 21:16:04

- Test Mode : PCS1900 (GSM) CH810 Higher Band Edge (VBW 3kHz)
- Power State : High



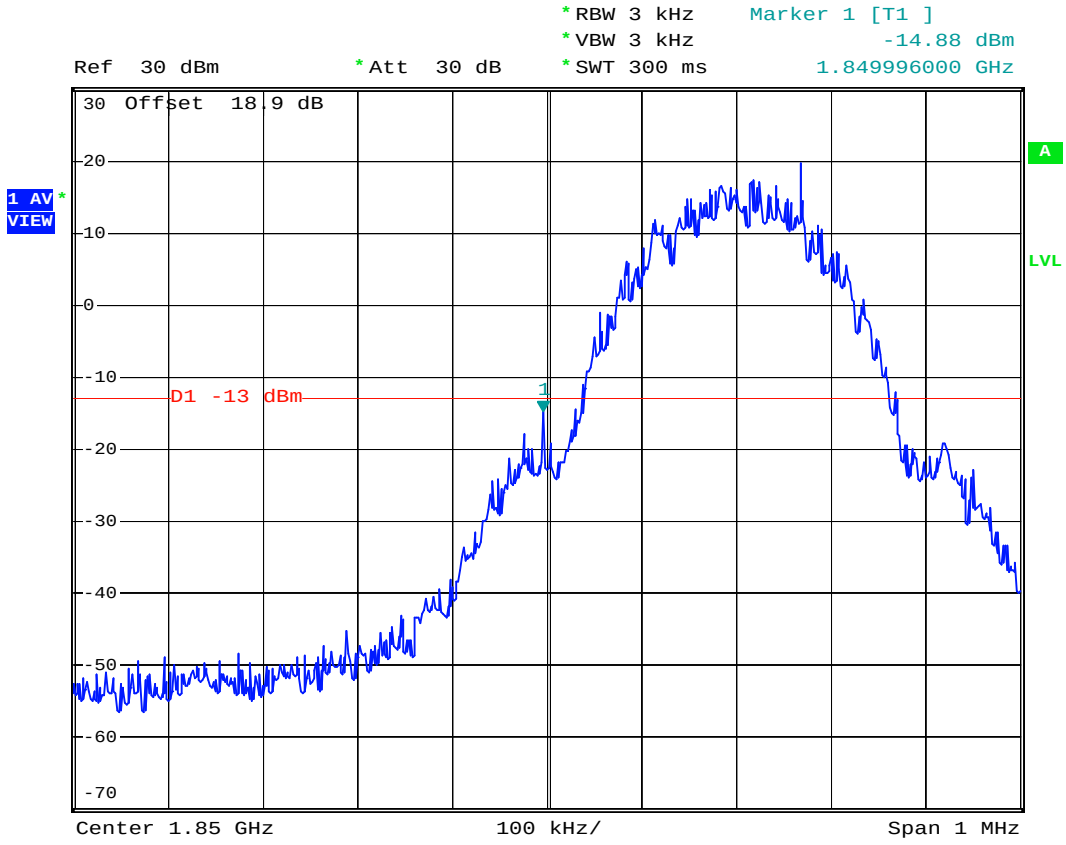
Date: 15.AUG.2007 21:05:38

- Test Mode : PCS1900 (GSM) CH810 Higher Band Edge (VBW 10kHz)
- Power State : High



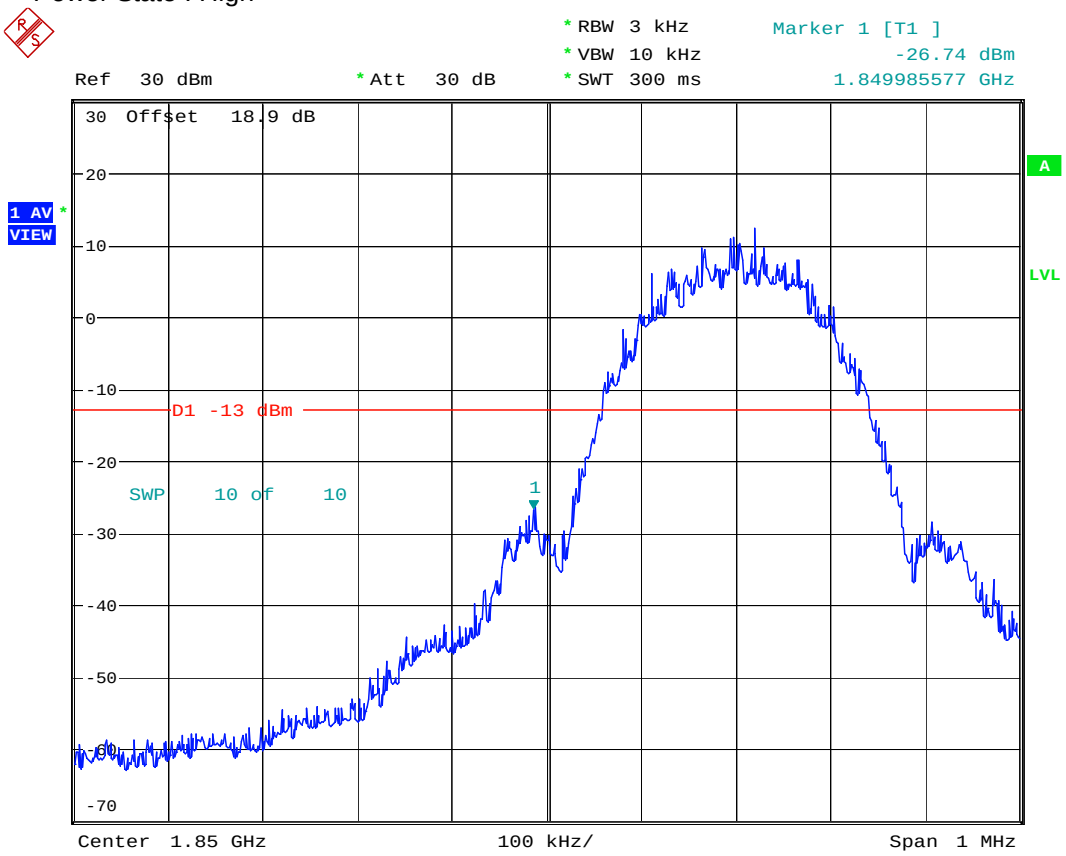
Date: 25.AUG.2007 17:44:05

- Mode 4
- Test Mode : PCS1900 (EDGE) CH512 Lower Band Edge (VBW 3kHz)
- Power State : High



Date: 17.AUG.2007 08:12:31

- Test Mode : PCS1900 (EDGE) CH512 Lower Band Edge (VBW 10kHz)
- Power State : High

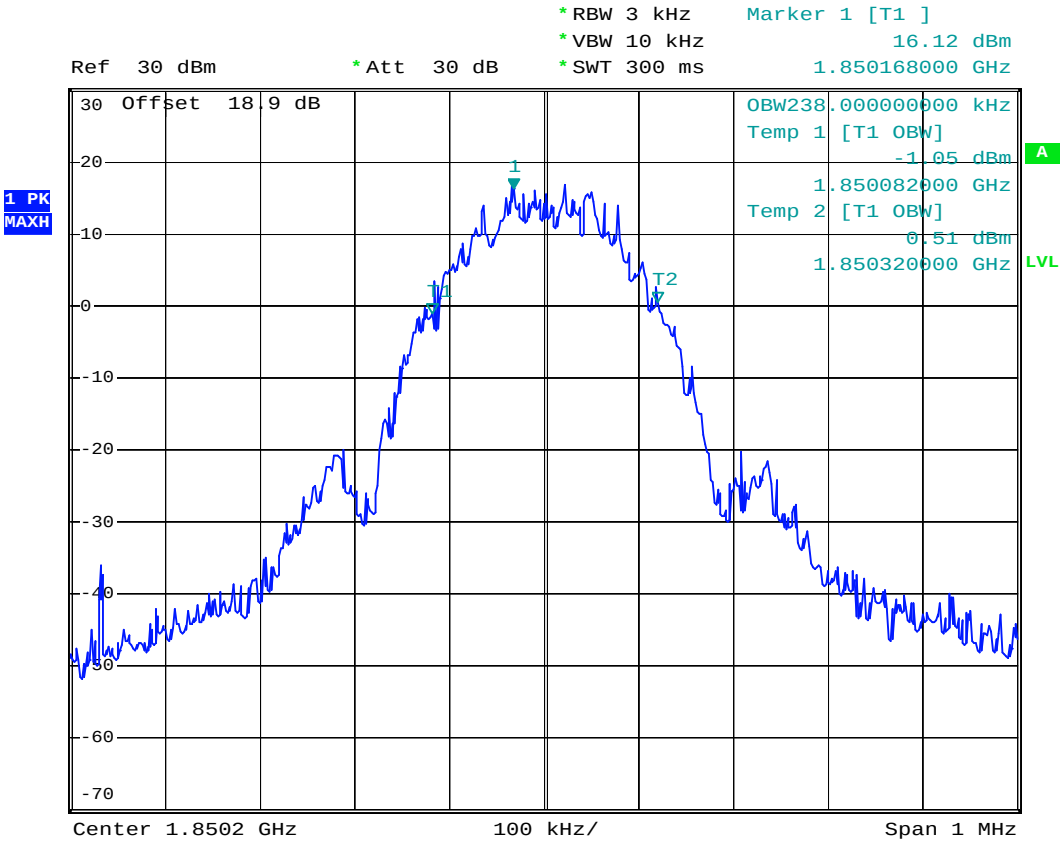


444

Date: 14.SEP.2007 19:17:20

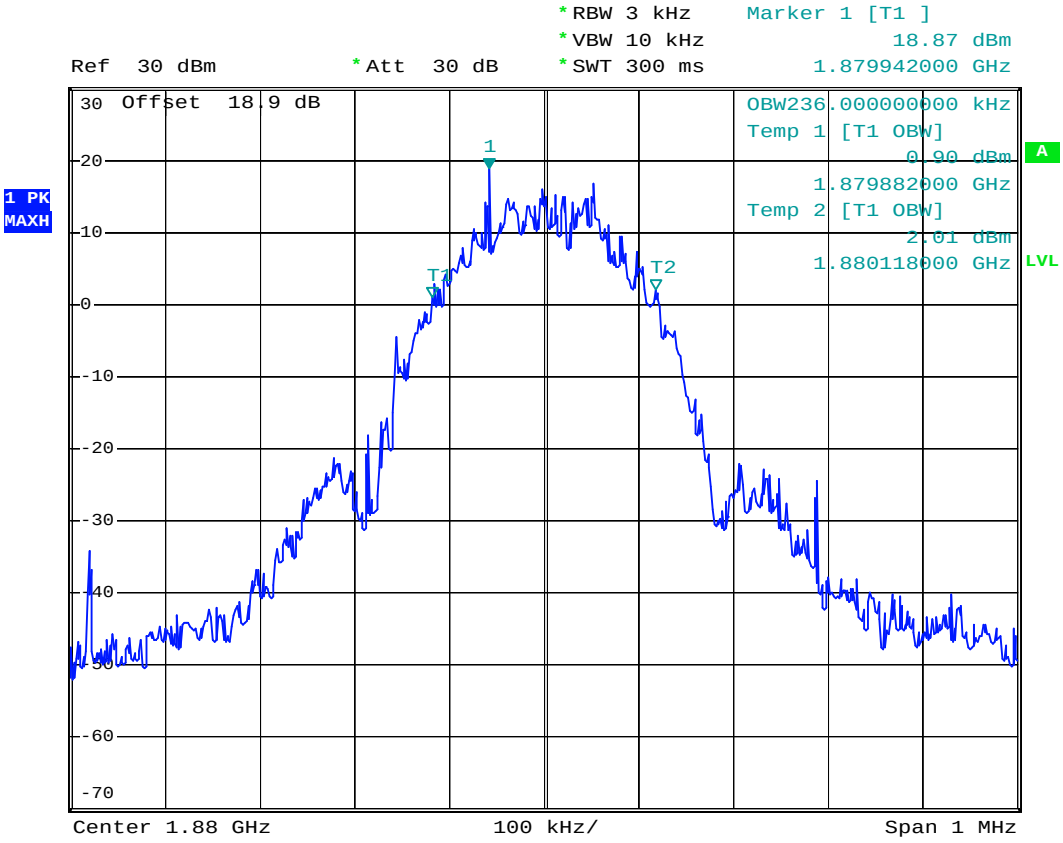
Test Mode : PCS1900 (EDGE) CH512 99% Occupid Bandwidth

- Power State : High



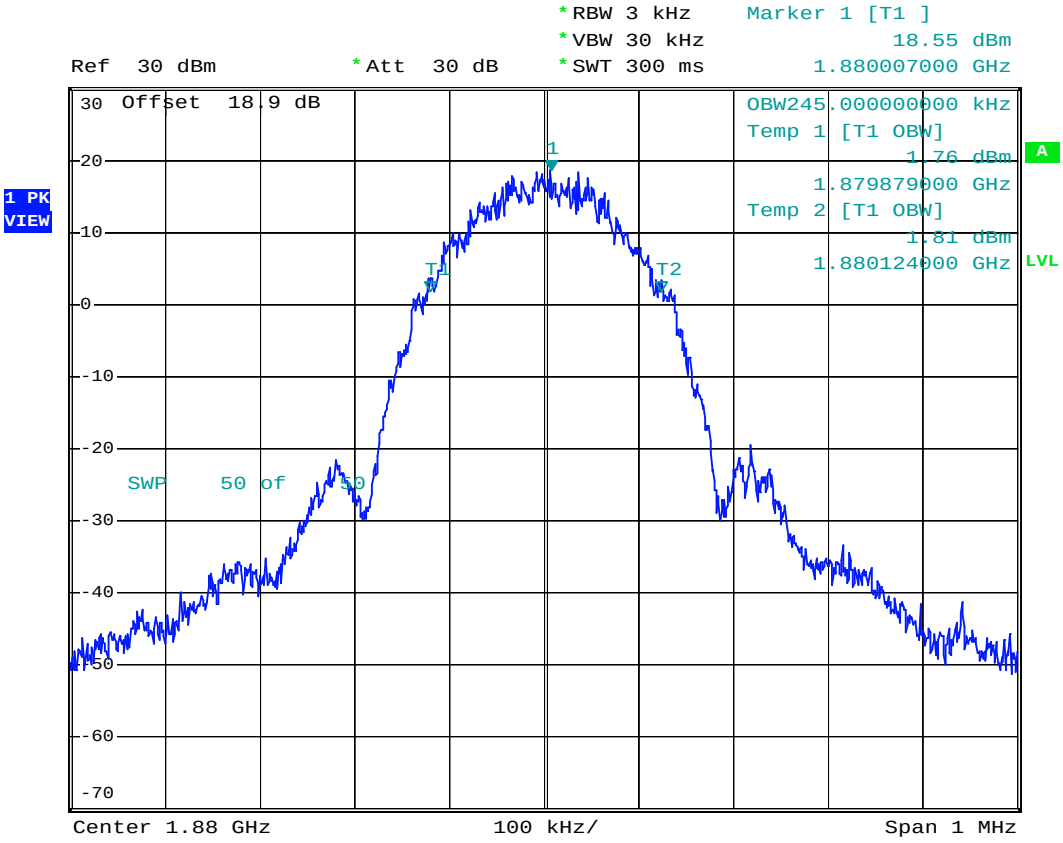
Date: 25.AUG.2007 17:54:20

- Test Mode : PCS1900 (EDGE) CH661 99% Occupid Bandwidth (VBW 10kHz)
- Power State : High



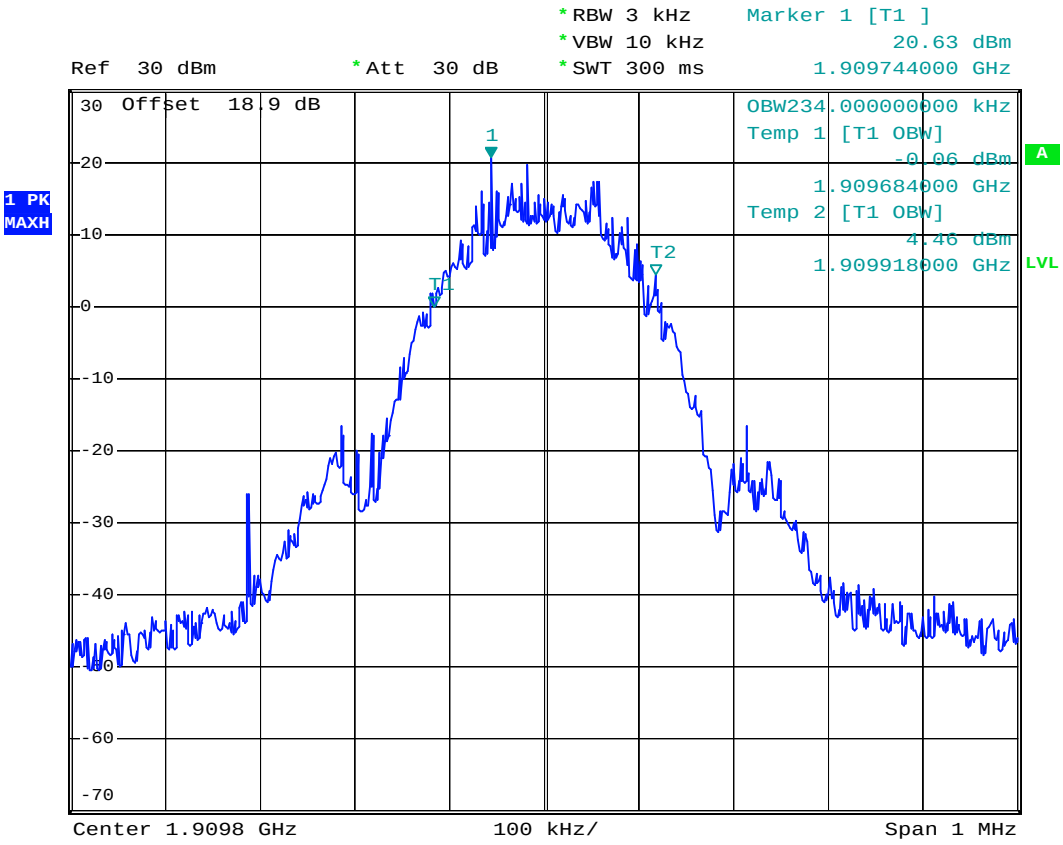
Date: 25.AUG.2007 17:54:43

- Test Mode : PCS1900 (EDGE) CH661 99% Occupid Bandwidth (VBW 30kHz)
- Power State : High



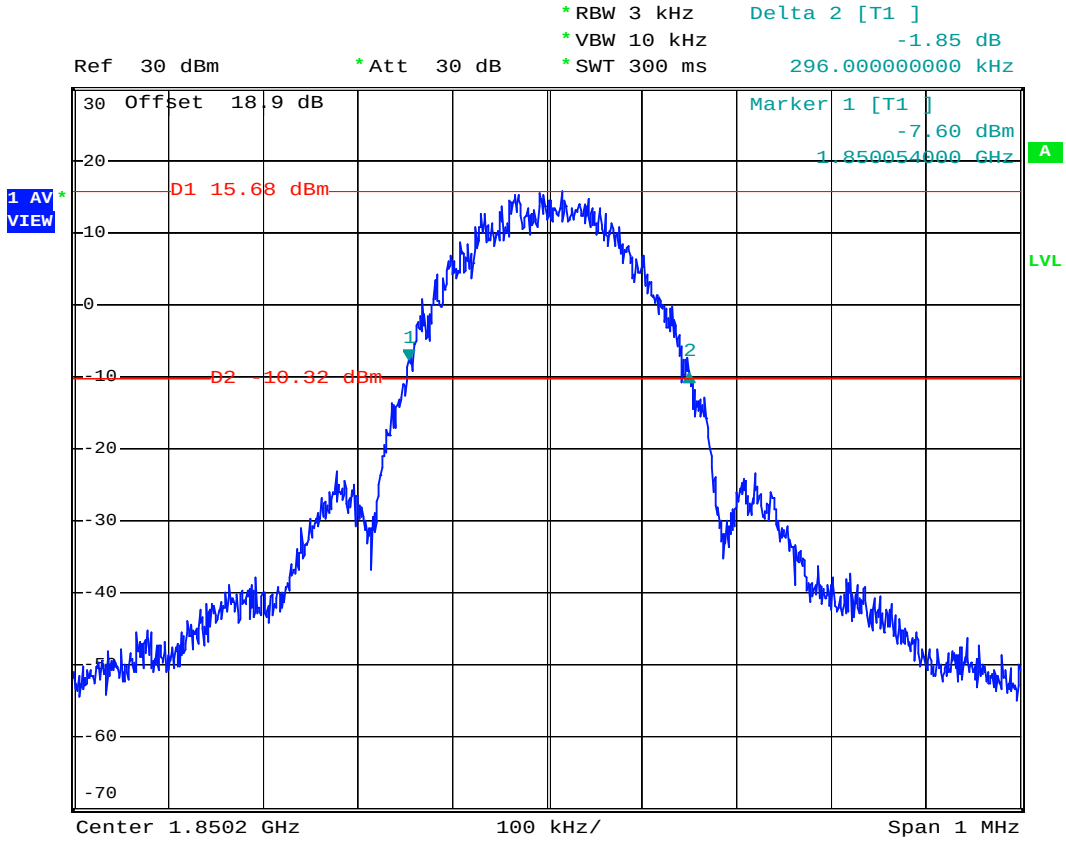
Date: 15.AUG.2007 23:23:13

- Test Mode : PCS1900 (EDGE) CH810 99% Occupid Bandwidth
- Power State : High



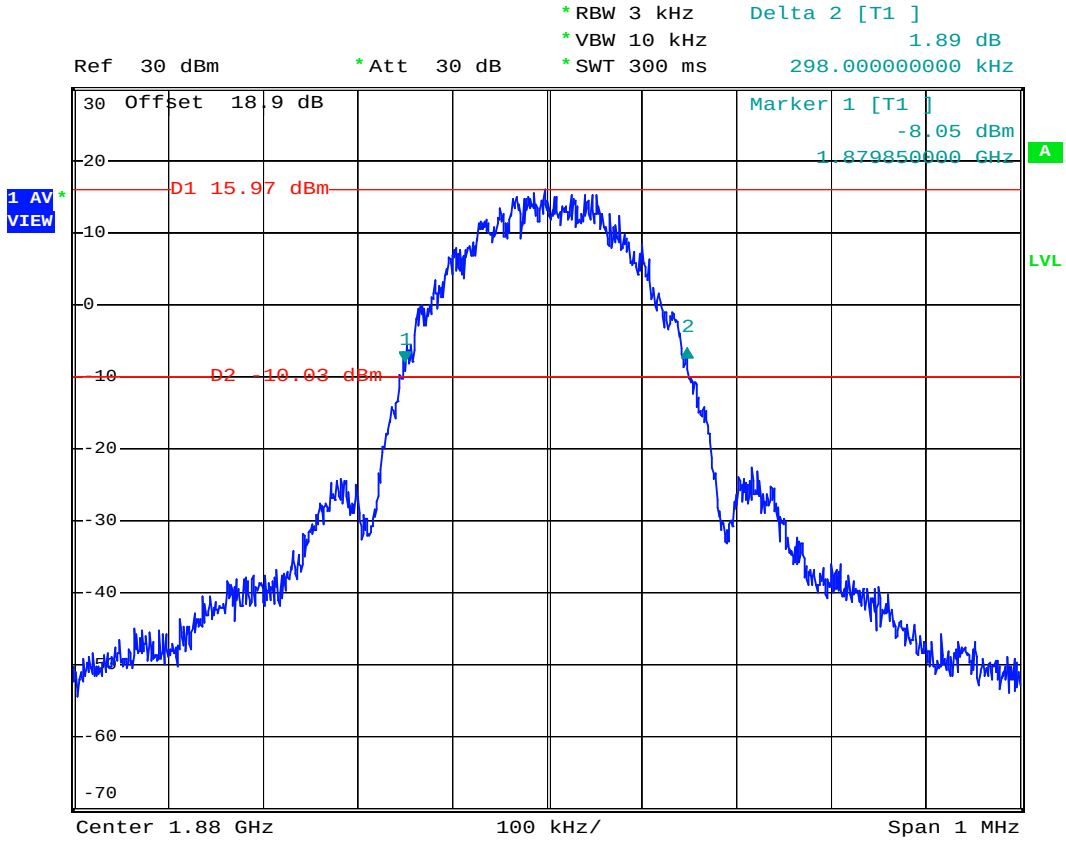
Date: 25.AUG.2007 17:55:10

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



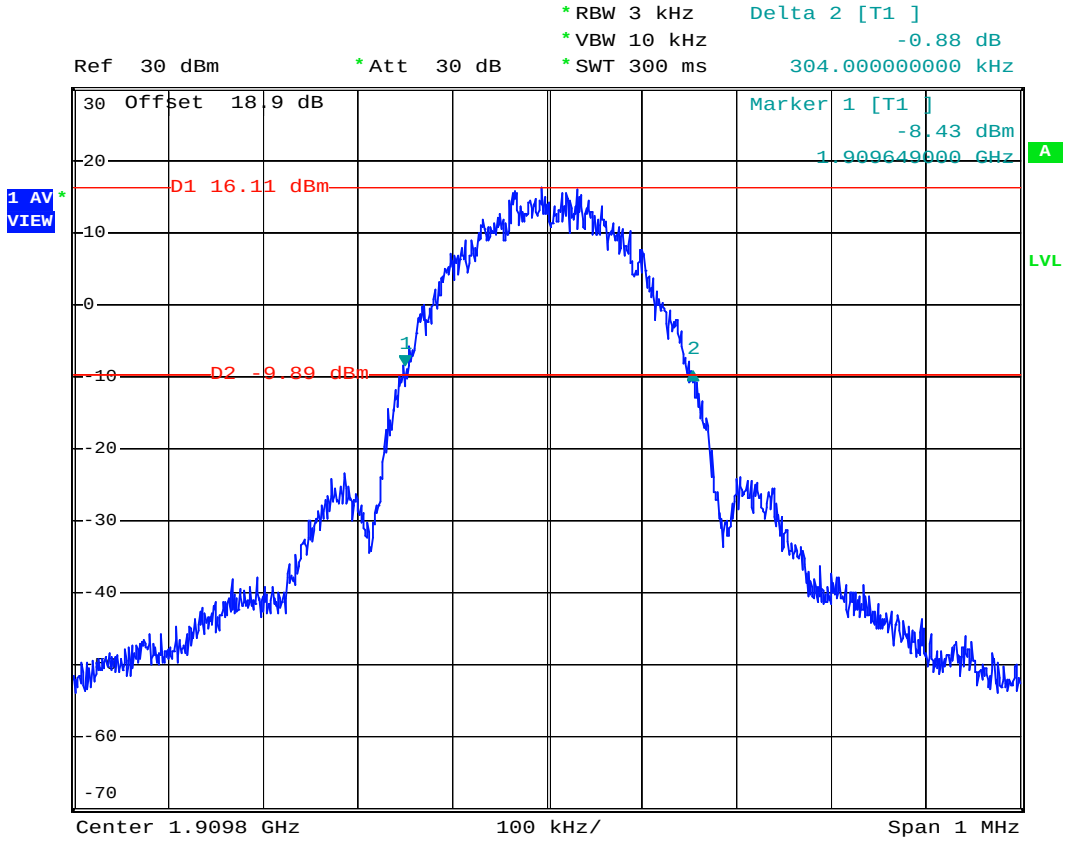
Date: 15.AUG.2007 23:27:27

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



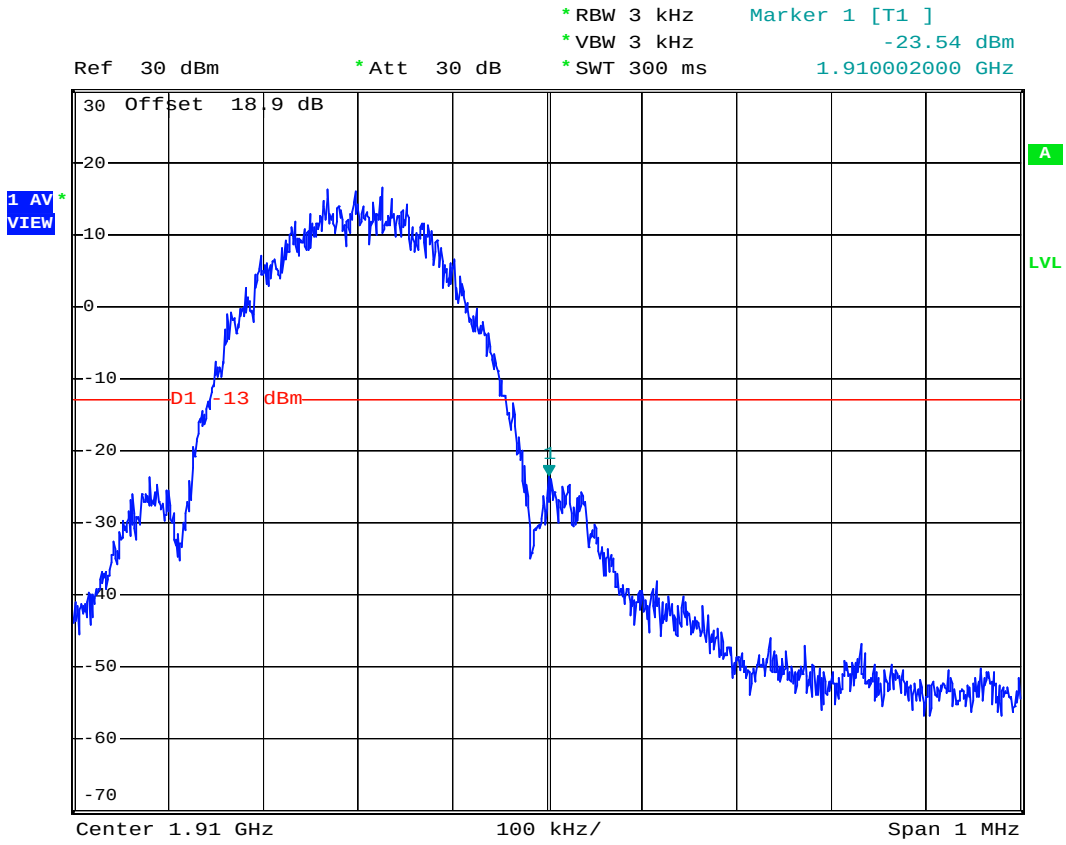
Date: 15.AUG.2007 23:25:22

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



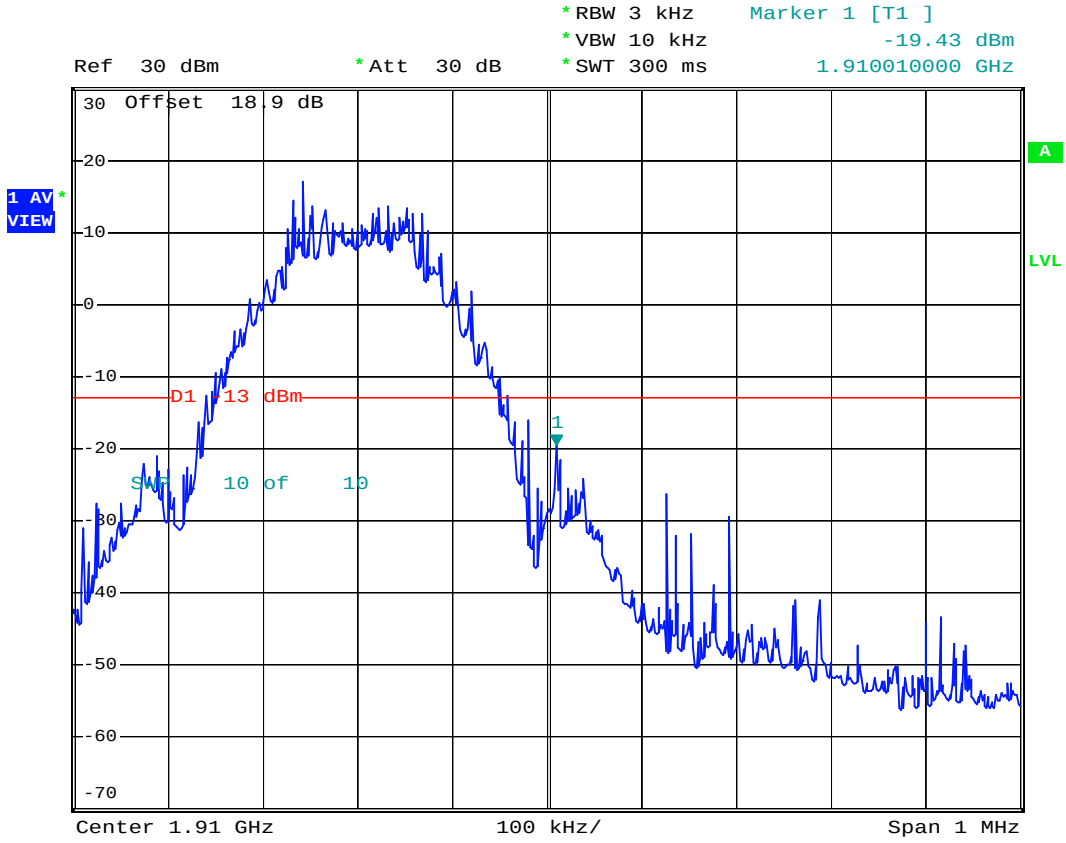
Date: 15.AUG.2007 23:29:12

- Test Mode : PCS1900(EDGE) CH810 Higher Band Edge (VBW 3kHz)
- Power State : High



Date: 15.AUG.2007 23:31:34

- Test Mode : PCS1900(EDGE) CH810 Higher Band Edge (VBW 10kHz)
- Power State : High



Date: 25.AUG.2007 18:00:02

4.5 Conducted Emission

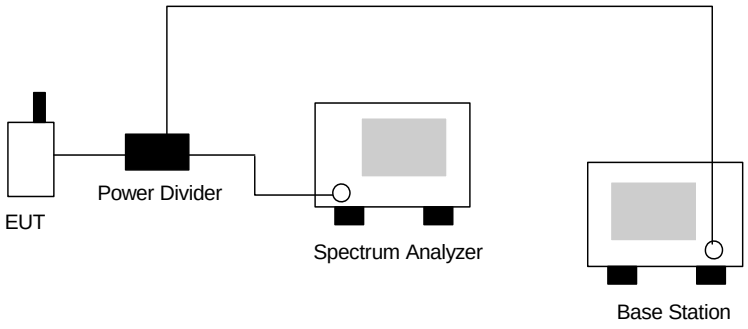
4.5.1 Measurement Instruments

As described in chapter 5 of this test report.

4.5.2 Test Procedure

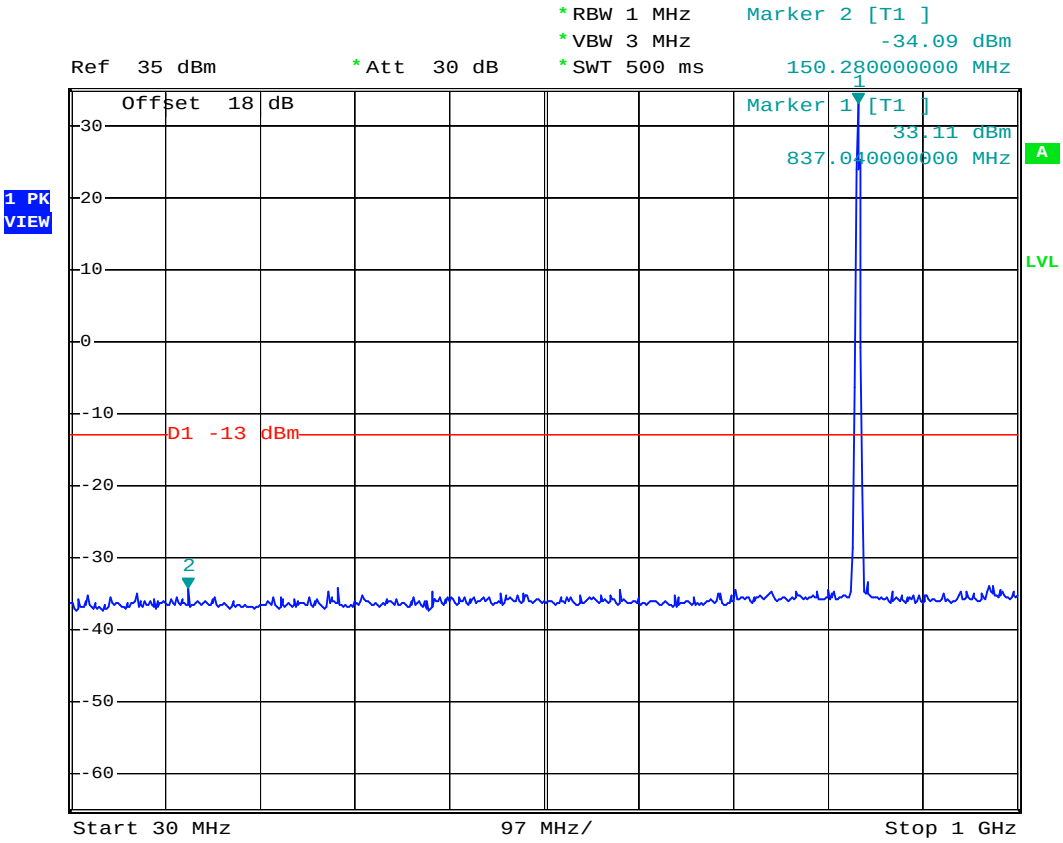
1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. The middle channel for the highest RF power within the transmitting frequency was measured.
3. The conducted spurious emission for the whole frequency range was taken.

4.5.3 Test Setup Layout



4.5.4 Test Result

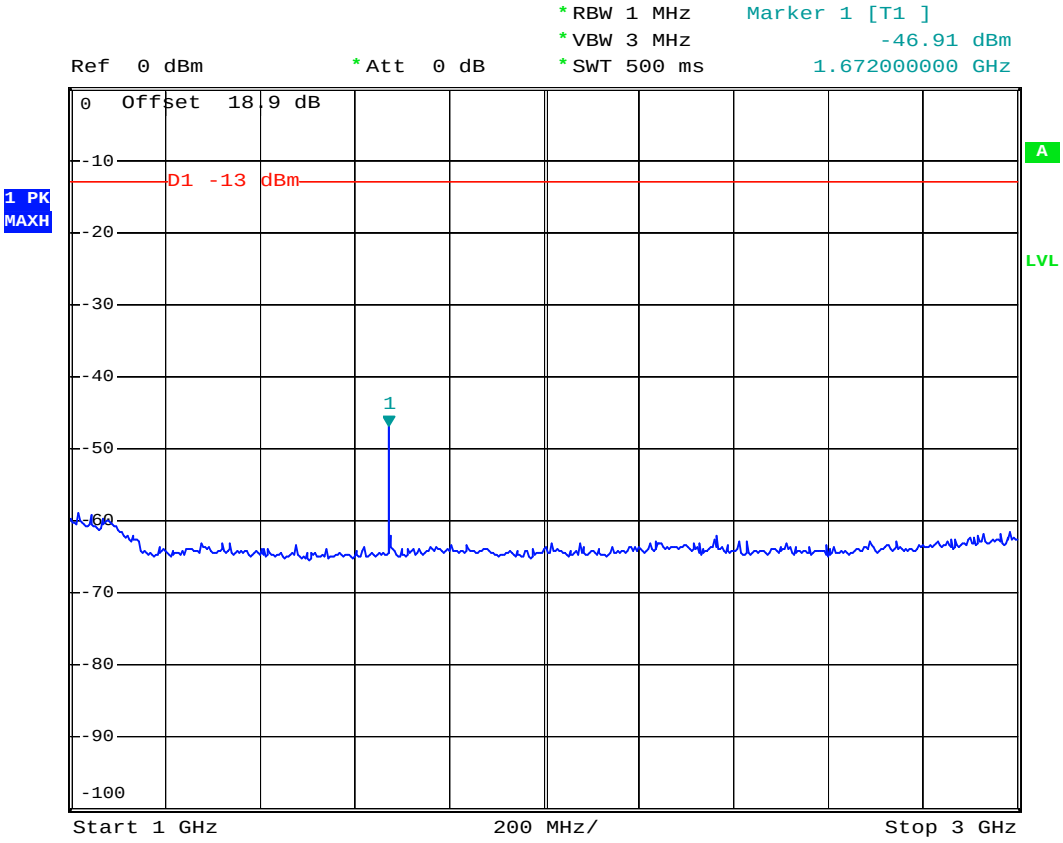
- Mode 1
- Test Mode : GSM850 (GSM) CH189
- Frequency Range : 30M-1G



Date: 25.AUG.2007 17:10:13

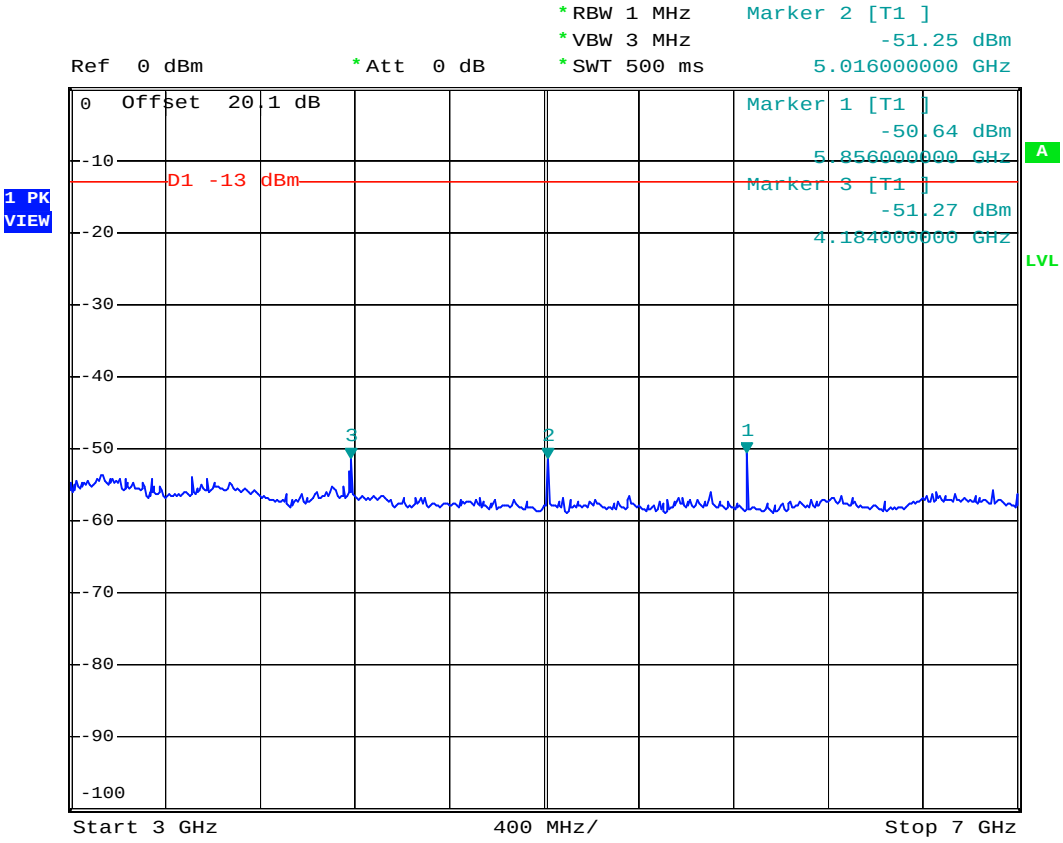
Remark : Mark 1 is fundamental signal.

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



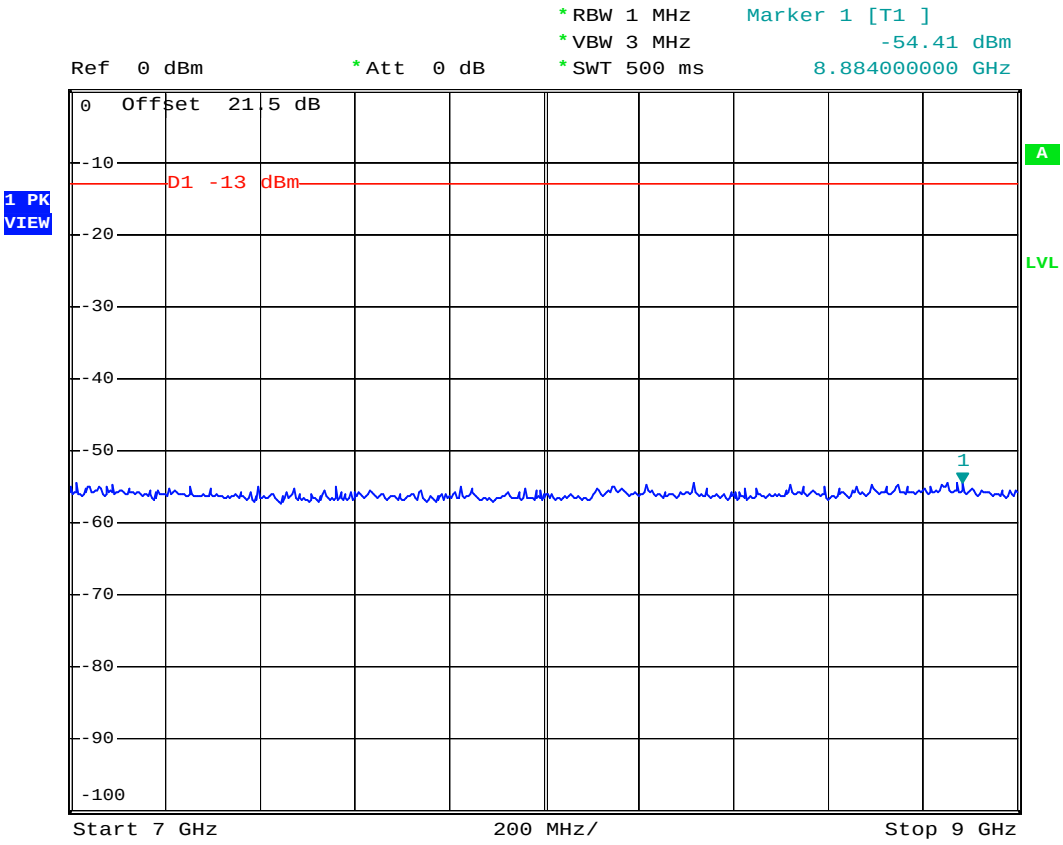
Date: 14.AUG.2007 21:39:30

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



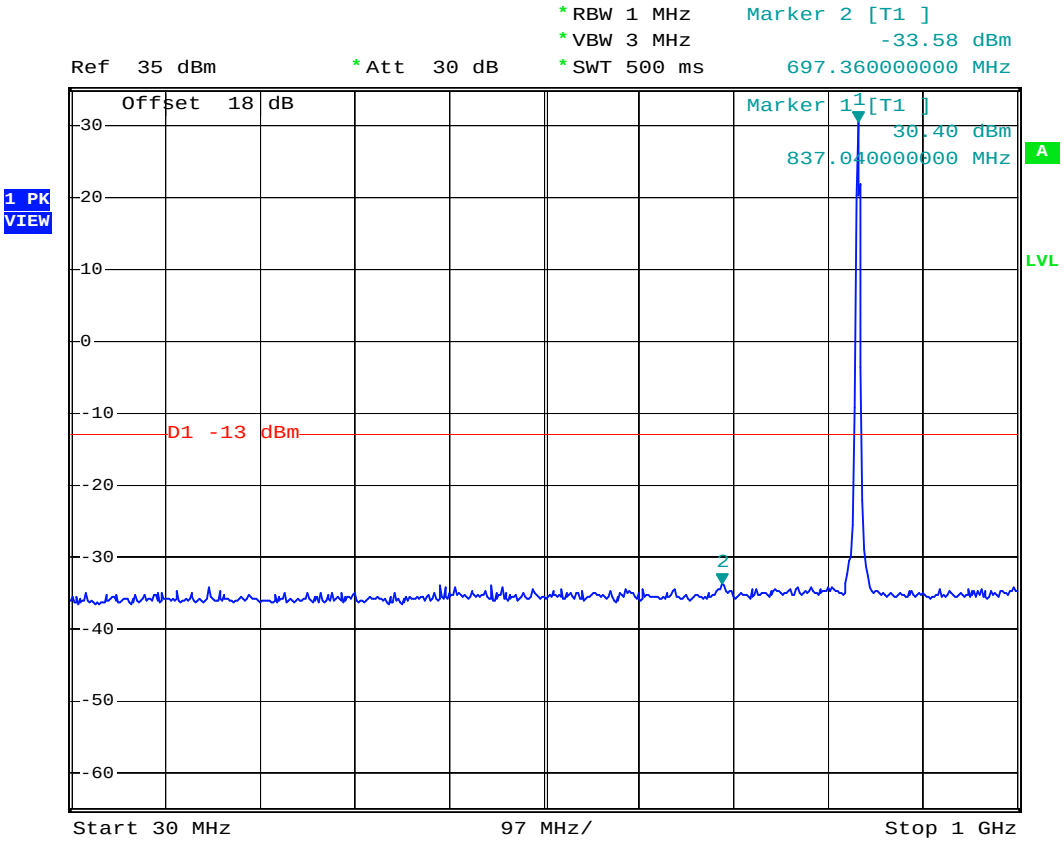
Date: 14.AUG.2007 21:42:07

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



Date: 14.AUG.2007 21:45:04

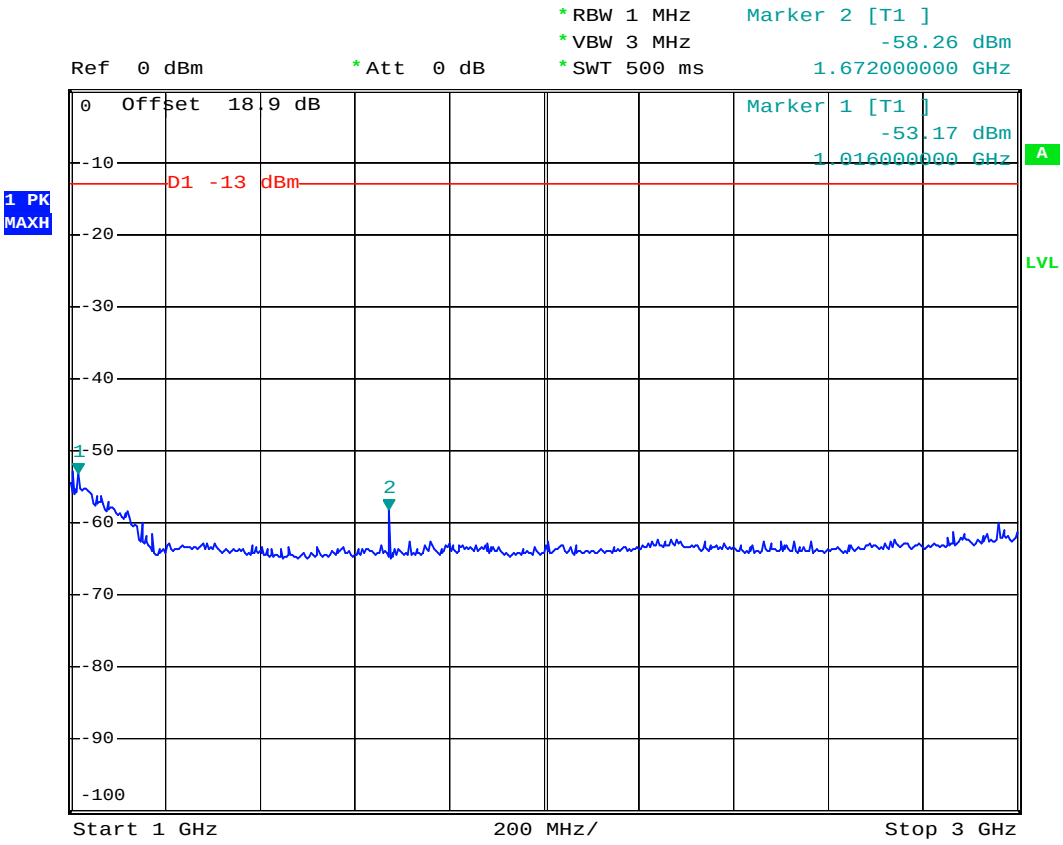
- Mode 2
- Test Mode : GSM850 (EDGE) CH189
- Frequency Range : 30M-1G



Date: 16.AUG.2007 00:07:10

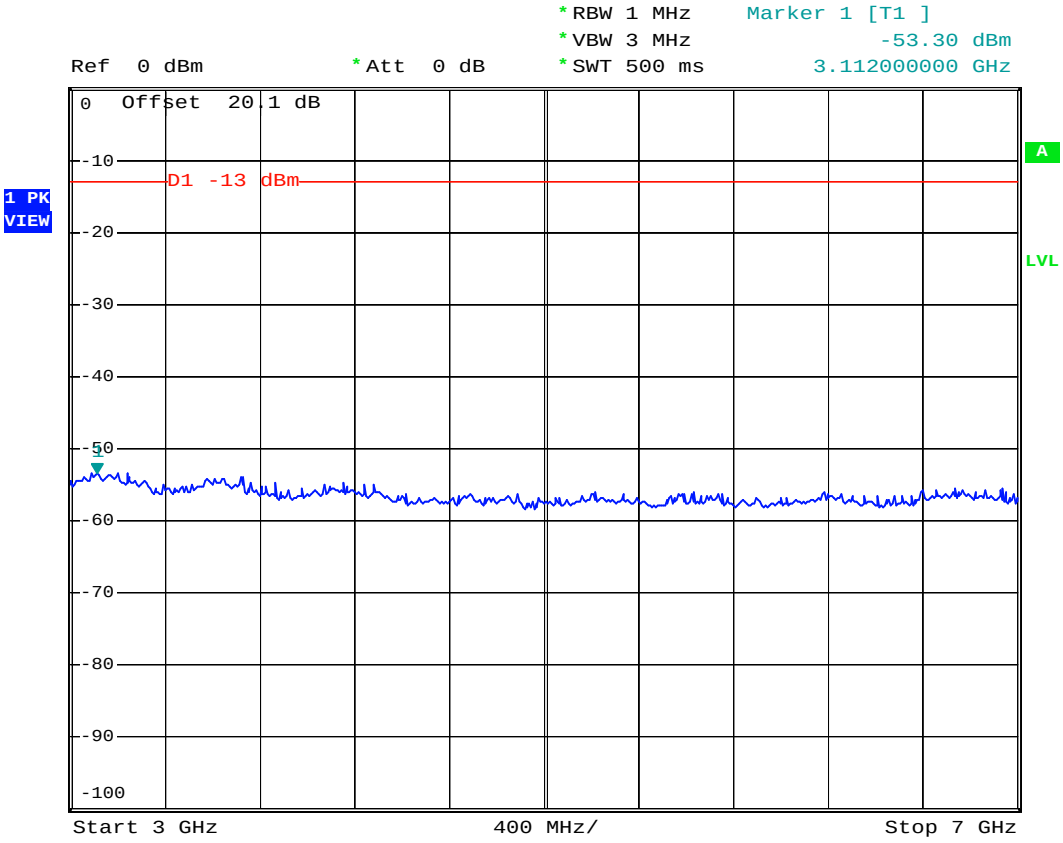
Remark : Mark 1 is fundamental signal.

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



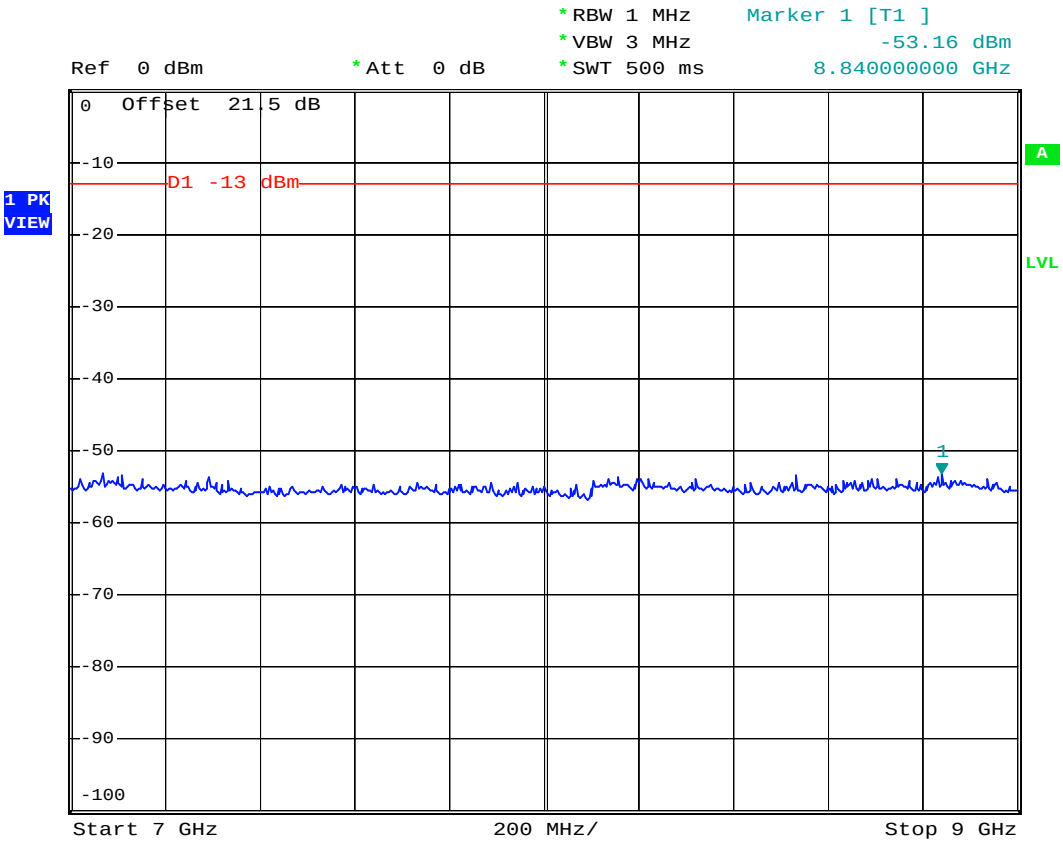
Date: 16.AUG.2007 00:51:08

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



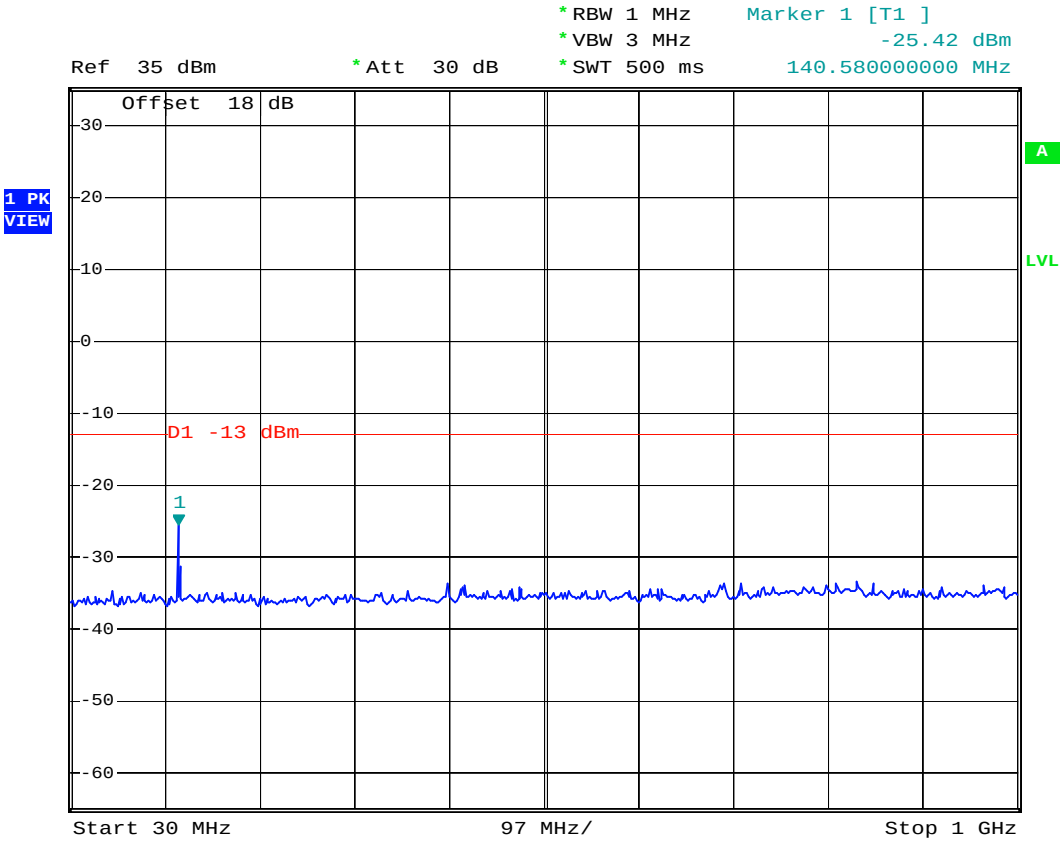
Date: 16.AUG.2007 00:52:37

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



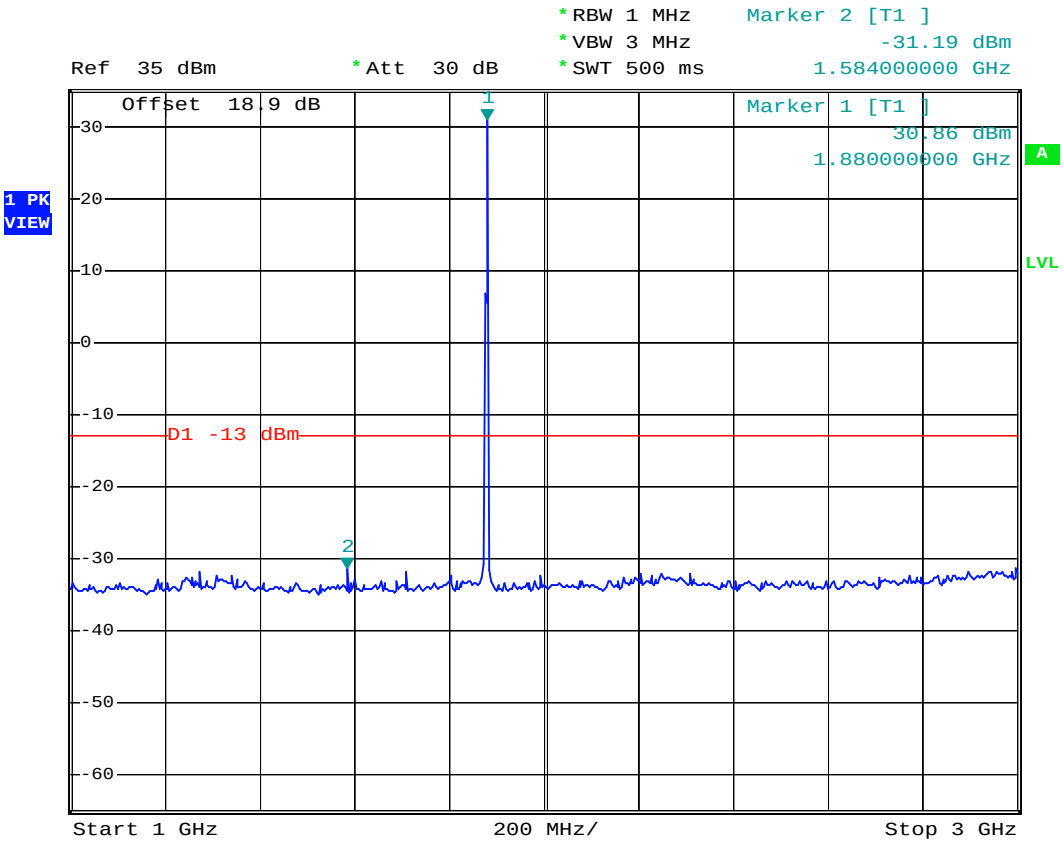
Date: 16.AUG.2007 00:57:00

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



Date: 16.AUG.2007 00:04:34

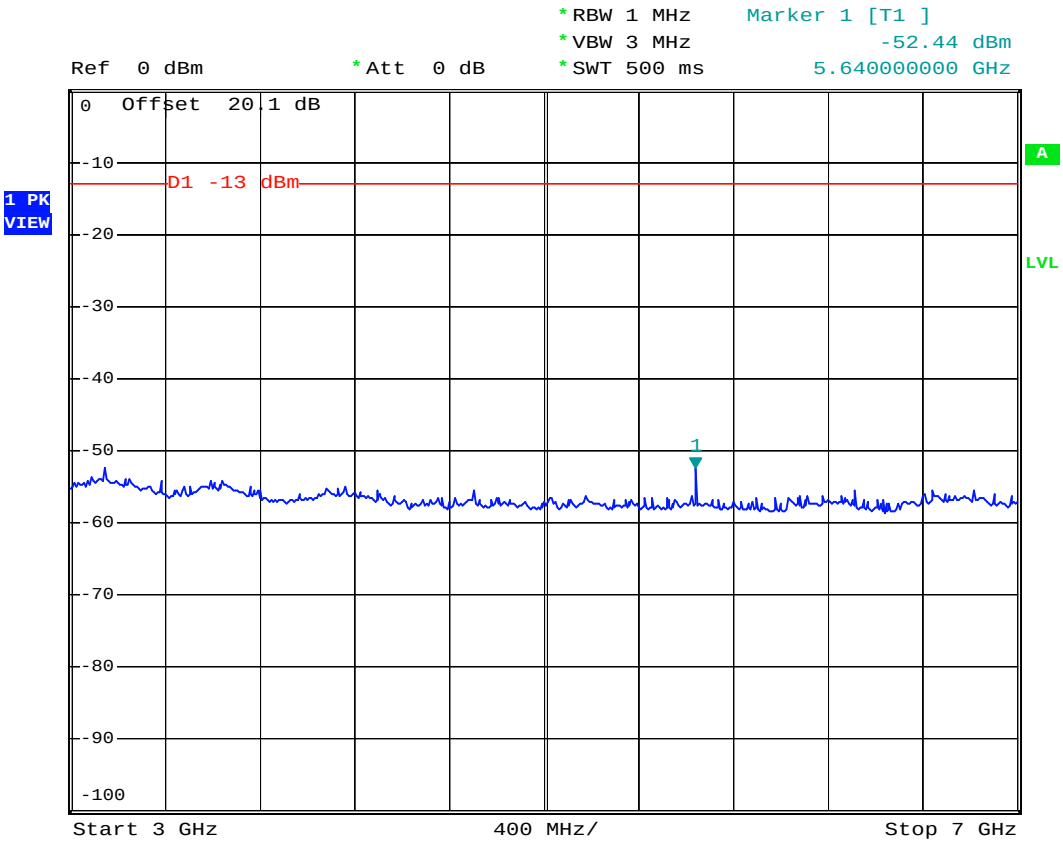
- Test Mode : PCS1900 (GSM) CH661
- Frequency Range : 1G-3G



Date: 16.AUG.2007 00:13:30

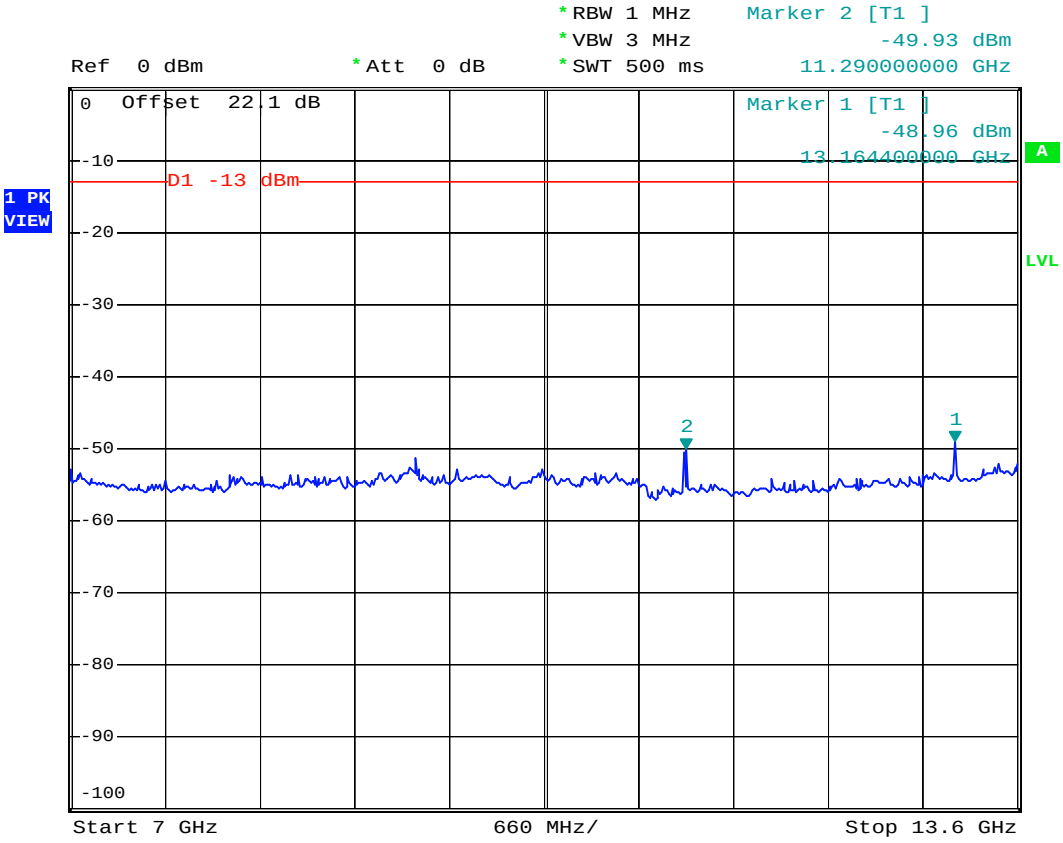
Remark : Mark 1 is fundamental signal.

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



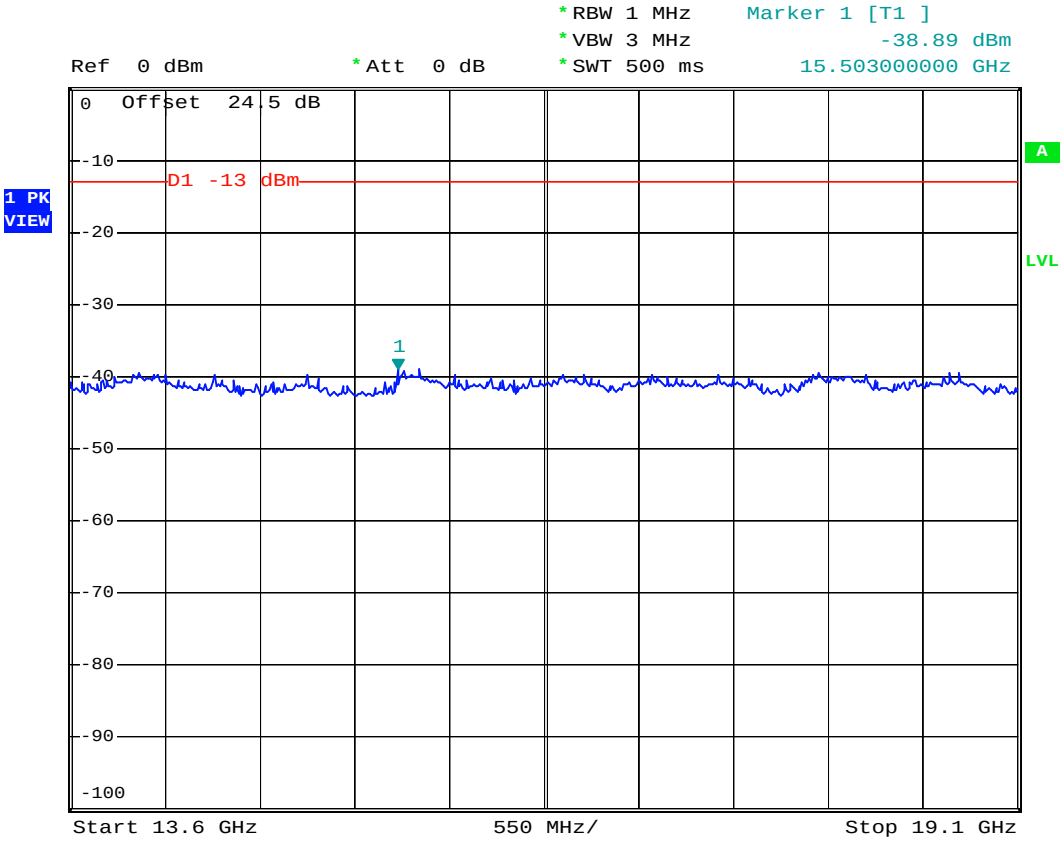
Date: 16.AUG.2007 00:54:18

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



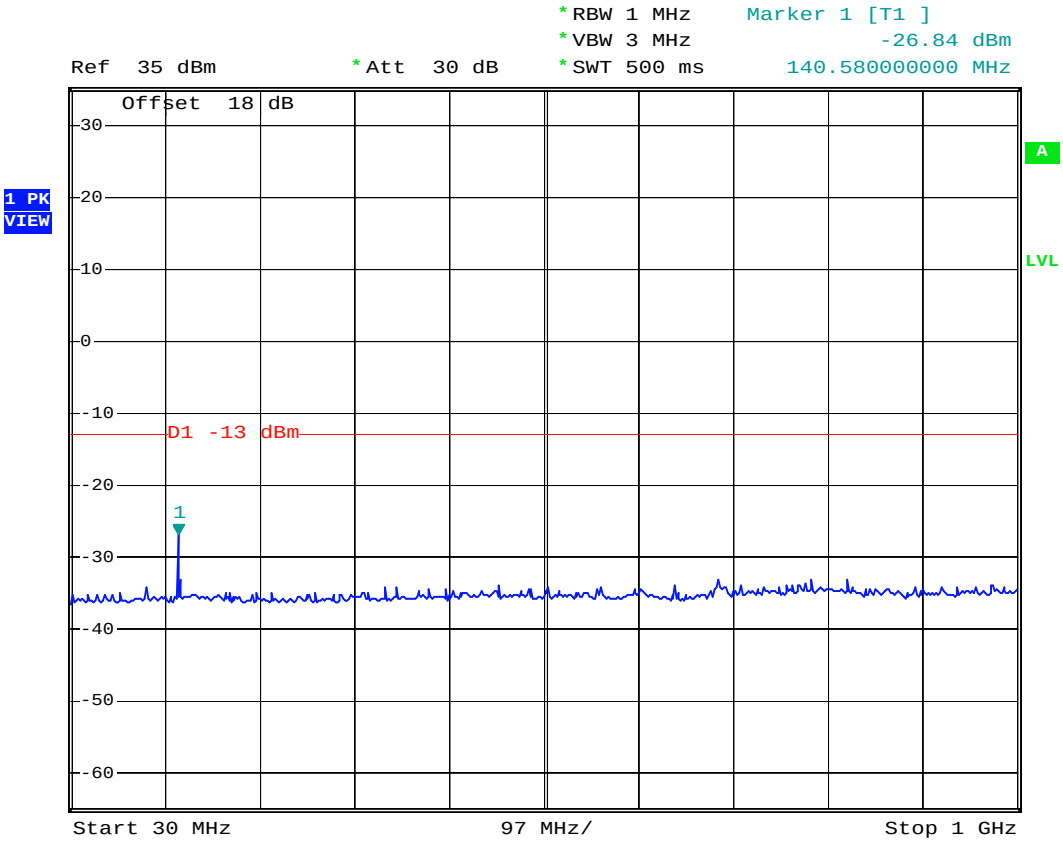
Date: 16.AUG.2007 01:00:16

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



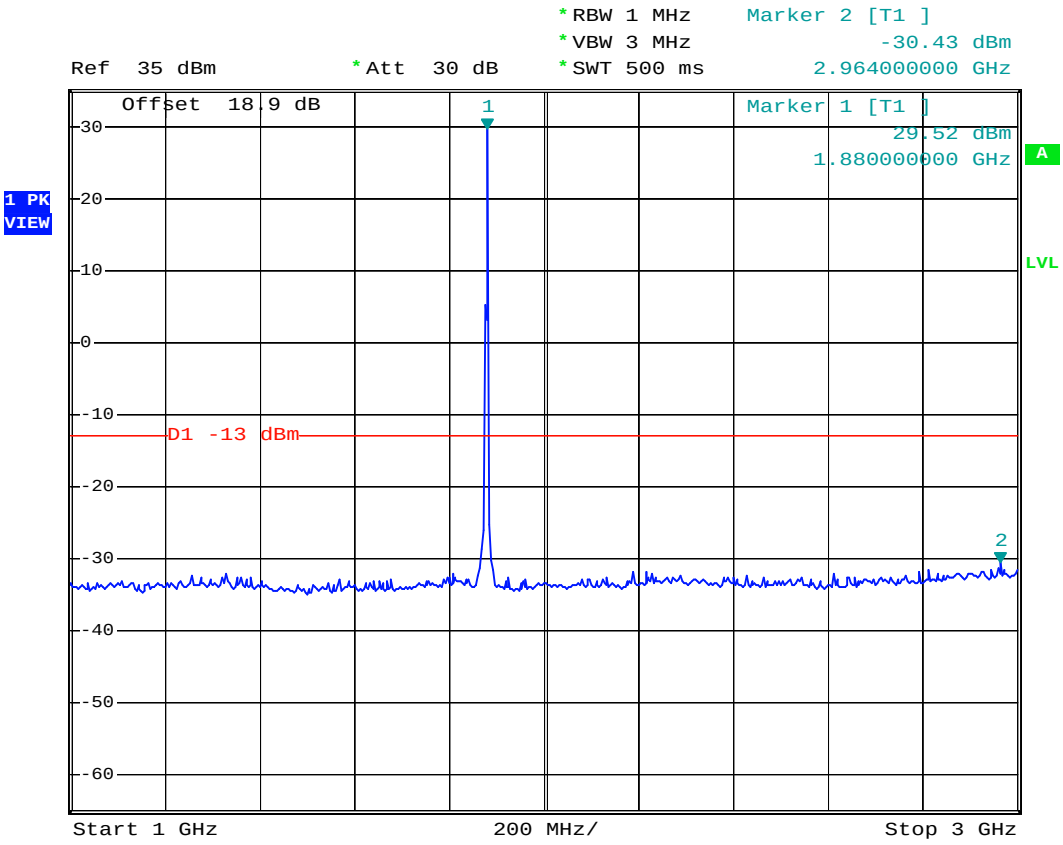
Date: 16.AUG.2007 01:07:05

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



Date: 16.AUG.2007 00:05:39

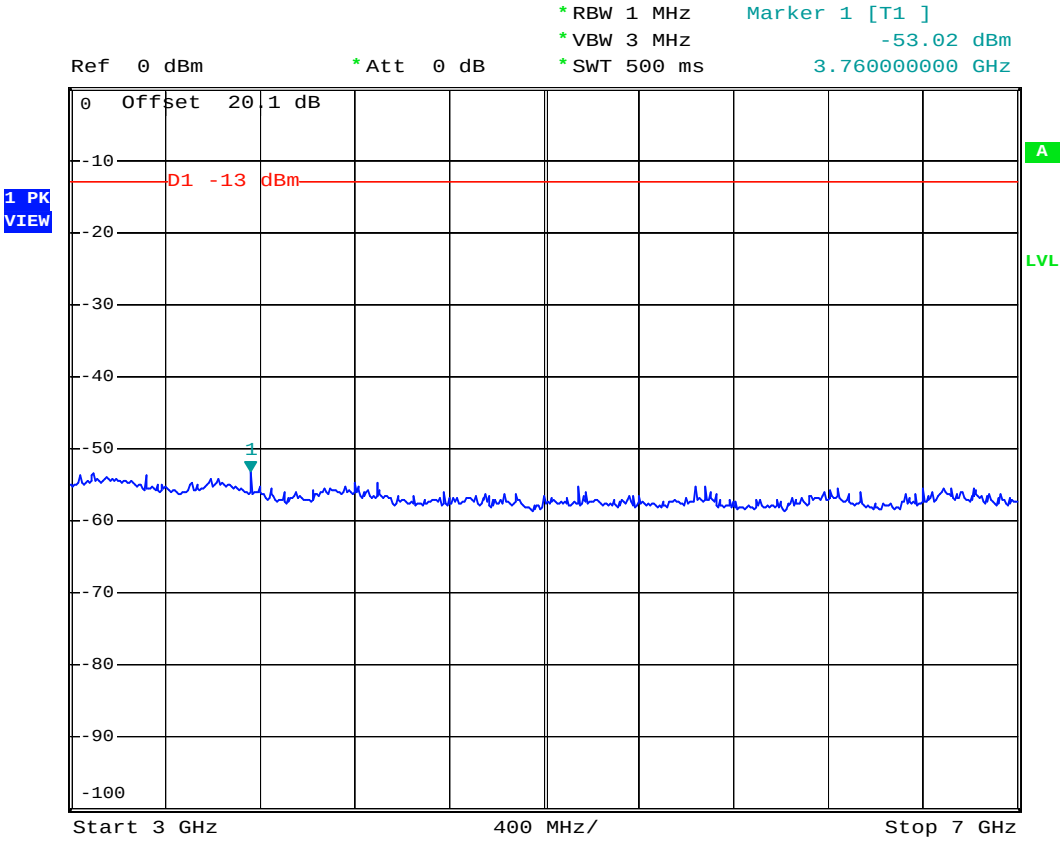
- Test Mode : PCS1900 (EDGE) CH661
- Frequency Range : 1G-3G



Date: 16.AUG.2007 00:14:29

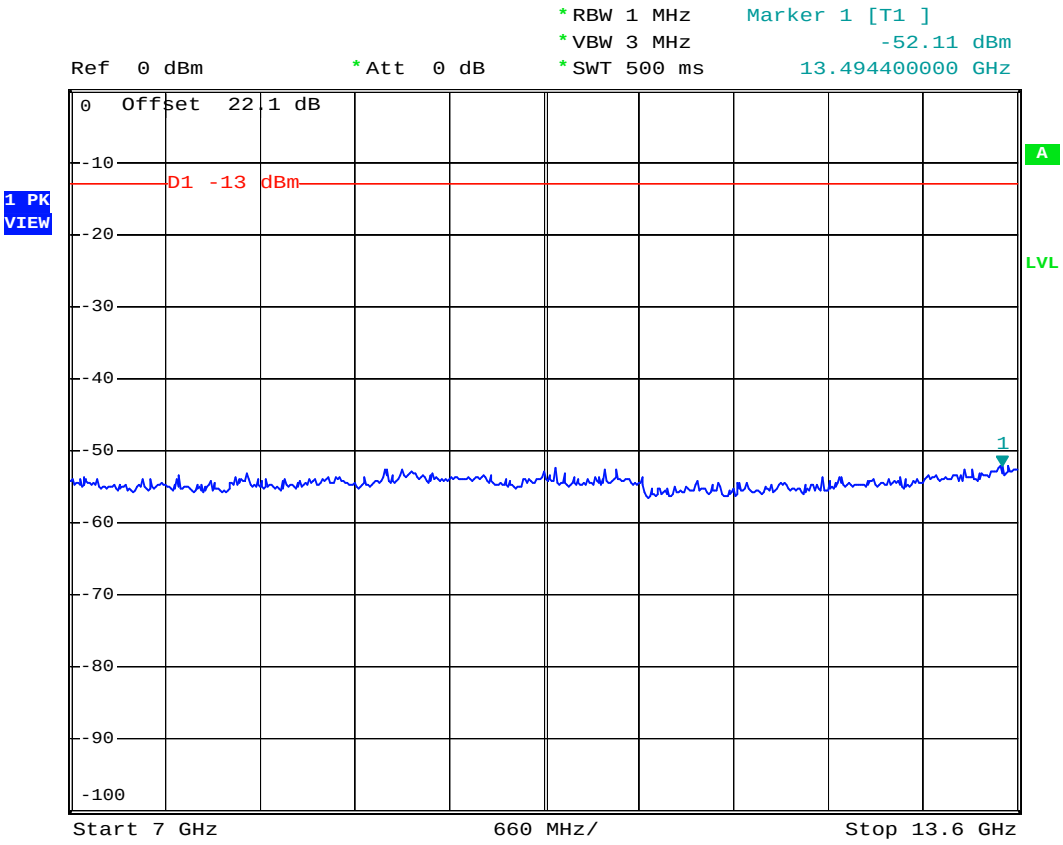
Remark : Mark 1 is fundamental signal.

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



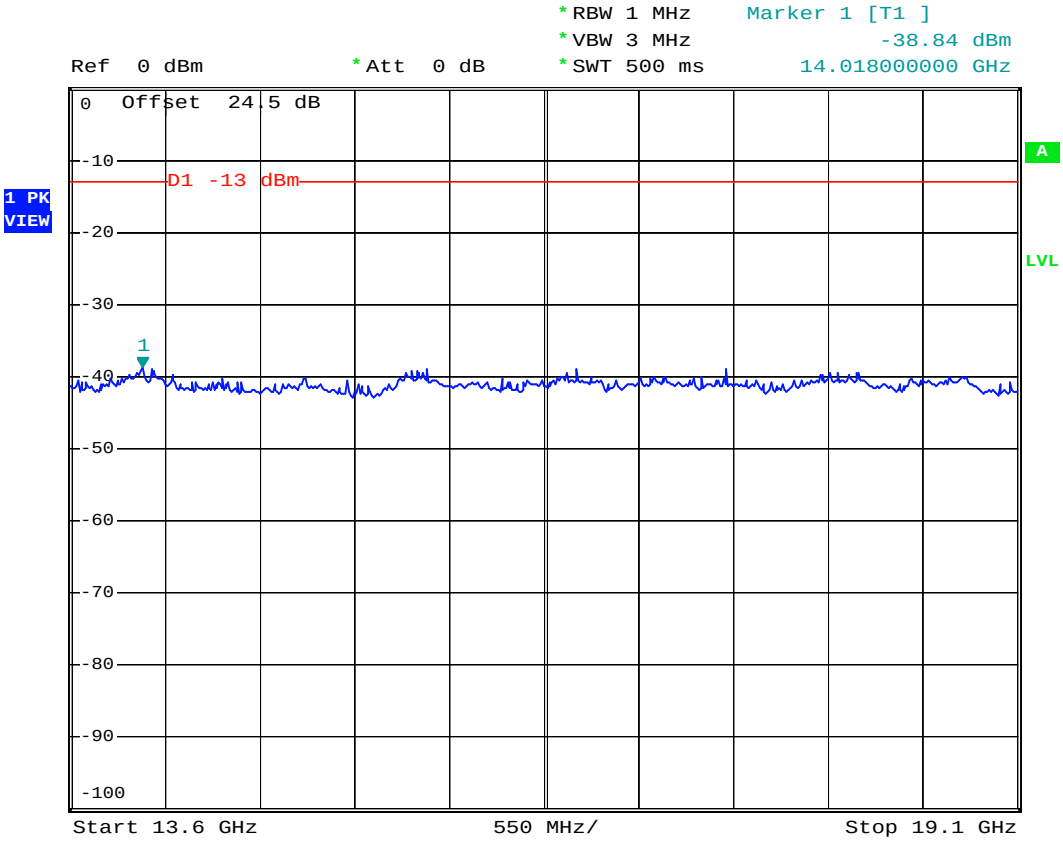
Date: 16.AUG.2007 00:55:13

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



Date: 16.AUG.2007 01:05:02

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



Date: 16.AUG.2007 01:06:18

4.6 Field Strength of Spurious Radiation

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

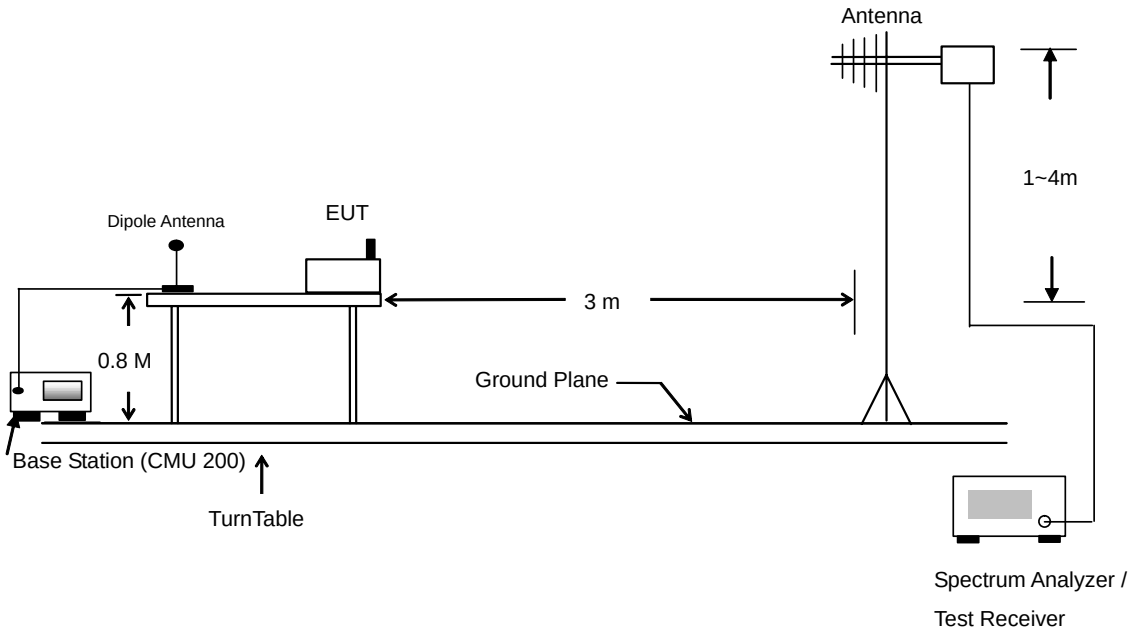
4.6.1 Measurement Instruments

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 recored of output power at antenna port.
9. Repeat step 7 to step 8 for another polariztion.
10. Emission level (dBm) = output power + substitution Gain.

4.6.3 Test Setup Layout


Antenna
1~4m
Dipole Antenna
EUT
3 m
0.8 M
Ground Plane
Base Station (CMU 200)
TurnTable
Spectrum Analyzer /
Test Receiver

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)
30.000	-53.580	-13	-40.58	65.640	-47.390	-13	-34.39
108.030	-56.740	-13	-43.74	99.390	-51.720	-13	-38.72
174.990	-51.280	-13	-38.28	176.880	-50.960	-13	-37.96
862.800	-59.860	-13	-46.86	329.400	-59.340	-13	-46.34
1674.000	-41.350	-13	-28.35	1674.000	-44.200	-13	-31.20
2508.000	-39.350	-13	-26.35	2508.000	-40.640	-13	-27.64
3344.000	-53.100	-13	-40.10	4178.000	-52.880	-13	-39.88
5018.000	-41.900	-13	-28.90	5018.000	-37.520	-13	-24.52
5854.000	-42.860	-13	-29.86	5854.000	-42.070	-13	-29.07
				6688.000	-42.050	-13	-29.05

- Test Mode : Mode 2

GSM850 (EDGE) Radiated Spurious ERP							
H Polarization				V Polarization			
Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)
30.000	-55.780	-13	-42.78	72.930	-58.170	-13	-45.17
108.030	-57.120	-13	-44.12	107.490	-57.000	-13	-44.00
176.880	-53.460	-13	-40.46	175.530	-56.040	-13	-43.04
861.400	-53.880	-13	-40.88	861.400	-53.490	-13	-40.49
1674.000	-43.600	-13	-30.60	1674.000	-45.320	-13	-32.32
2508.000	-42.160	-13	-29.16	2508.000	-45.870	-13	-32.87
5018.000	-40.620	-13	-27.62	5018.000	-37.450	-13	-24.45
5854.000	-42.510	-13	-29.51	5854.000	-43.490	-13	-30.49
6688.000	-40.690	-13	-27.69	6688.000	-41.460	-13	-28.46

- Test Mode : Mode 3

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)
30.000	-57.190	-13	-44.19	72.390	-54.980	-13	-41.98
105.330	-55.840	-13	-42.84	107.490	-54.480	-13	-41.48
179.580	-55.560	-13	-42.56	179.040	-52.900	-13	-39.90
339.900	-67.200	-13	-54.20	301.400	-61.200	-13	-48.20
791.400	-65.400	-13	-52.40	334.300	-61.350	-13	-48.35
985.300	-63.780	-13	-50.78	978.300	-61.600	-13	-48.60
1108.000	-57.250	-13	-44.25	1128.000	-57.650	-13	-44.65
3758.000	-45.410	-13	-32.41	3758.000	-42.260	-13	-29.26
5638.000	-37.250	-13	-24.25	5638.000	-32.190	-13	-19.19
7518.000	-39.640	-13	-26.64	7518.000	-40.650	-13	-27.65
9398.000	-37.850	-13	-24.85	9398.000	-33.600	-13	-20.60
11278.000	-34.610	-13	-21.61	11278.000	-30.350	-13	-17.35

- Test Mode : Mode 4

PCS1900 (EDGE) Radiated Spurious EIRP							
H Polarization				V Polarization			
Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)
30.810	-59.240	-13	-46.24	71.580	-54.720	-13	-41.72
106.140	-55.750	-13	-42.75	106.140	-54.840	-13	-41.84
179.040	-55.600	-13	-42.60	179.040	-51.920	-13	-38.92
339.900	-66.730	-13	-53.73	336.400	-60.320	-13	-47.32
903.400	-65.050	-13	-52.05	903.400	-61.930	-13	-48.93
994.400	-64.600	-13	-51.60	994.400	-62.220	-13	-49.22
3758.000	-44.660	-13	-31.66	1114.000	-57.440	-13	-44.44
5638.000	-36.280	-13	-23.28	3758.000	-44.470	-13	-31.47
7518.000	-39.610	-13	-26.61	5638.000	-32.880	-13	-19.88
9398.000	-34.060	-13	-21.06	7518.000	-35.230	-13	-22.23
11278.000	-32.130	-13	-19.13	9398.000	-32.760	-13	-19.76
				11278.000	-32.370	-13	-19.37

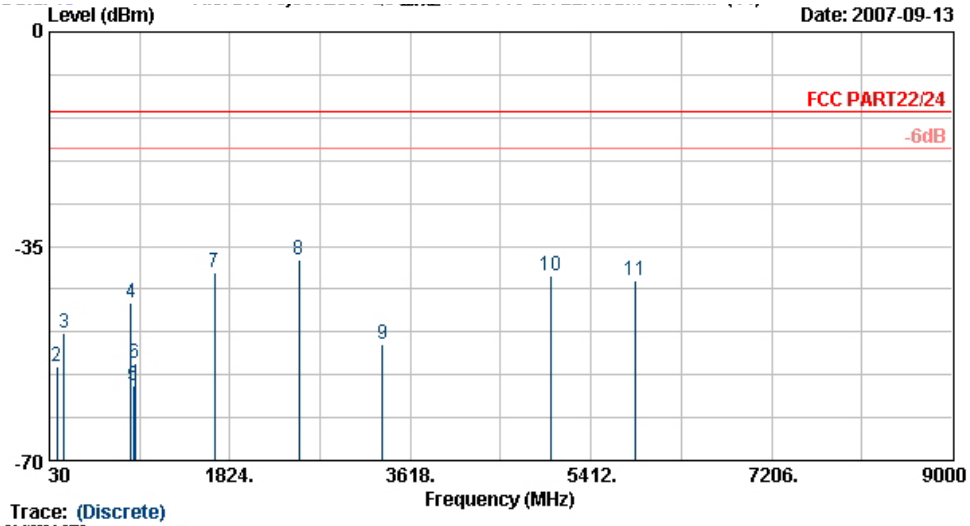
- Test Mode : Mode 5

GSM850 (GSM) with WLAN 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)
34.590	-55.470	-13	-42.47	99.930	-61.010	-13	-48.01
108.840	-62.960	-13	-49.96	139.080	-60.730	-13	-47.73
176.340	-58.950	-13	-45.95	183.630	-56.510	-13	-43.51
861.400	-53.150	-13	-40.15	861.400	-53.610	-13	-40.61
1674.000	-47.590	-13	-34.59	1674.000	-54.860	-13	-41.86
2508.000	-45.280	-13	-32.28	2508.000	-46.300	-13	-33.30
3344.000	-53.690	-13	-40.69	3344.000	-54.620	-13	-41.62
4184.000	-50.670	-13	-37.67	4184.000	-51.240	-13	-38.24
5018.000	-43.670	-13	-30.67	5018.000	-41.200	-13	-28.20
5854.000	-43.300	-13	-30.30	5854.000	-40.030	-13	-27.03
				6688.000	-42.570	-13	-29.57

4.6.5 Test Data

Mode 1

Horizontal Polarization

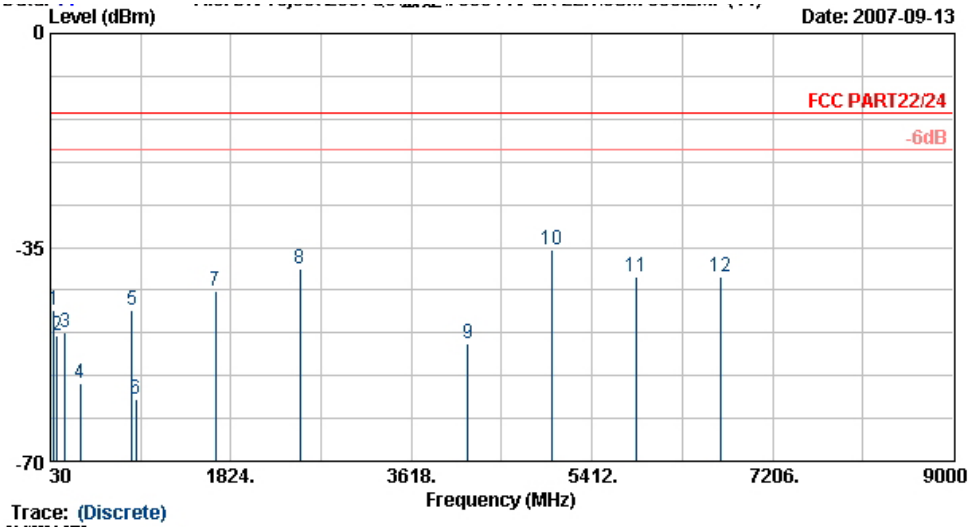


Site : 03CH06-HY
Condition : HF-SPURIOUS-060929 HORIZONTAL
EUT : Pocket PC Phone For FCC
Power : 120Vac/60Hz
Model : FG 780314
Memo : GSM 850 Link Mode;Ch189 + Adaptor 1
Plane : E2
Sample : A

	Freq	Level	Over Limit	Limit Line	Read Level	Factor	Remark
	MHz	dBm	dB	dBm	dBm	dB	
1	30.0	-51.43	-38.43	-13.00	-51.79	0.36	Peak
2	108.0	-54.59	-41.59	-13.00	-42.26	-12.33	Peak
3	175.0	-49.13	-36.13	-13.00	-36.03	-13.10	Peak
4	836.9	-44.13			-42.79	-1.33	Peak
5	862.8	-57.71	-44.71	-13.00	-56.63	-1.08	Peak
6	880.3	-54.11			-53.20	-0.91	Peak
7	1674.0	-39.20	-26.20	-13.00	-41.55	2.36	Peak
8 @	2508.0	-37.20	-24.20	-13.00	-43.88	6.69	Peak
9	3344.0	-50.95	-37.95	-13.00	-60.35	9.40	Peak
10	5018.0	-39.75	-26.75	-13.00	-55.82	16.07	Peak
11	5854.0	-40.71	-27.71	-13.00	-60.56	19.85	Peak

Remark:
1. #4: MS Signal
2. #6: BS Signal

Vertical Polarization



Site : 03CH06-HY
Condition : HF-SPURIOUS-060929 VERTICAL
EUT : Pocket PC Phone For FCC
Power : 120Vac/60Hz
Model : FG 780314
Memo : GSM 850 Link Mode;Ch189 + Adaptor 1
Plane : E2
Sample : A

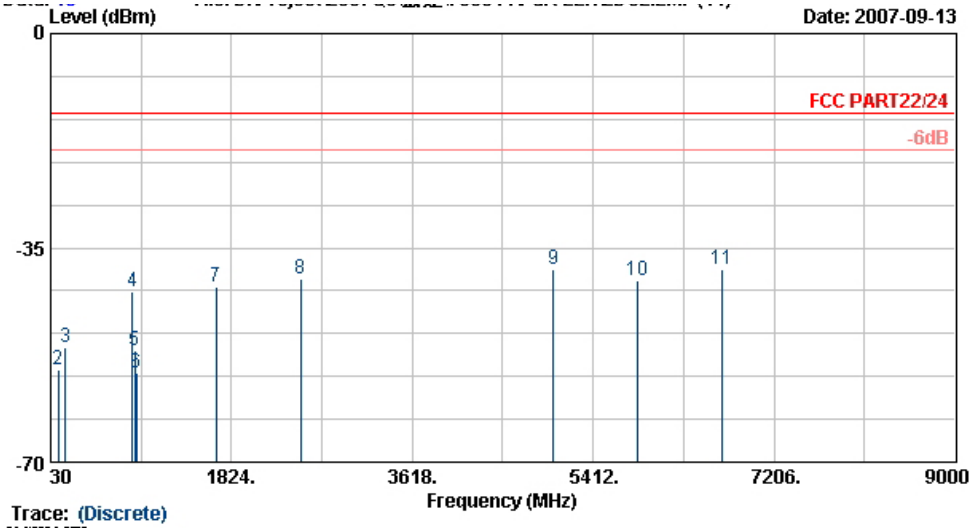
	Freq	Level	Over Limit	Limit Line	Read Level	Factor	Remark
	MHz	dBm	dB	dBm	dBm	dB	
1	65.6	-45.24	-32.24	-13.00	-32.66	-12.58	Peak
2	99.4	-49.57	-36.57	-13.00	-41.88	-7.69	Peak
3	176.9	-48.81	-35.81	-13.00	-40.43	-8.38	Peak
4	329.4	-57.19	-44.19	-13.00	-51.37	-5.82	Peak
5	836.9	-45.32			-46.68	1.36	Peak
6	880.3	-59.75			-61.47	1.71	Peak
7	1674.0	-42.05	-29.05	-13.00	-44.21	2.16	Peak
8	2508.0	-38.49	-25.49	-13.00	-45.67	7.18	Peak
9	4178.0	-50.73	-37.73	-13.00	-62.08	11.36	Peak
10 @	5018.0	-35.37	-22.37	-13.00	-50.11	14.74	Peak
11	5854.0	-39.92	-26.92	-13.00	-58.41	18.49	Peak
12	6688.0	-39.90	-26.90	-13.00	-58.59	18.68	Peak

Remark:

1. #5: MS Signal
2. #6: BS Signal
3. There is no more obvious emission except the listings above.

4.6.6 Mode 2

Horizontal Polarization



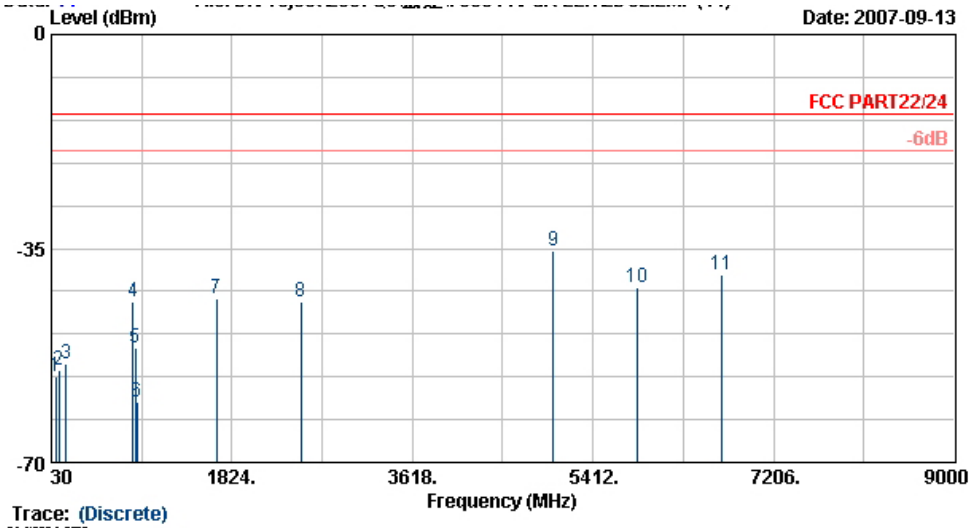
Trace: (Discrete)

Site : 03CH06-HY
Condition : HF-SPURIOUS-060929 HORIZONTAL
EUT : Pocket PC Phone For FCC
Power : 120Vac/60Hz
Model : FG 780314
Memo : EDGE Link Mode;Ch189 + Adaptor 1
Plane : E2
Sample : A

	Freq	Level	Over Limit	Limit Line	Read Level	Factor	Remark
	MHz	dBm	dB	dBm	dBm	dB	
1	30.0	-53.63	-40.63	-13.00	-53.99	0.36	Peak
2	108.0	-54.97	-41.97	-13.00	-42.65	-12.33	Peak
3	176.9	-51.31	-38.31	-13.00	-38.19	-13.12	Peak
4	836.9	-42.27			-40.93	-1.33	Peak
5	861.4	-51.73	-38.73	-13.00	-50.63	-1.10	Peak
6	880.3	-55.52			-54.61	-0.91	Peak
7	1674.0	-41.45	-28.45	-13.00	-43.81	2.36	Peak
8	2508.0	-40.01	-27.01	-13.00	-46.69	6.69	Peak
9 @	5018.0	-38.47	-25.47	-13.00	-54.54	16.07	Peak
10	5854.0	-40.36	-27.36	-13.00	-60.21	19.85	Peak
11	6688.0	-38.54	-25.54	-13.00	-58.73	20.19	Peak

Remark:
1. #4: MS Signal
2. #6: BS Signal

Vertical Polarization



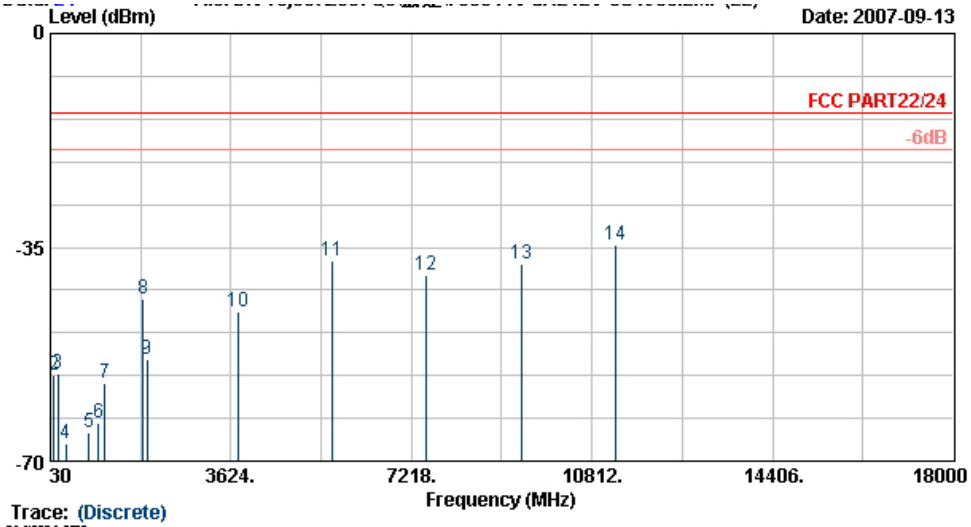
Site : 03CH06-HY
Condition : HF-SPURIOUS-060929 VERTICAL
EUT : Pocket PC Phone For FCC
Power : 120Vac/60Hz
Model : FG 780314
Memo : EDGE Link Mode;Ch189 + Adaptor 1
Plane : E2
Sample : A

		Freq	Level	Over Limit	Limit Line	Read Level	Factor	Remark
		MHz	dBm	dB	dBm	dBm	dB	
1		72.9	-56.02	-43.02	-13.00	-44.42	-11.60	Peak
2		107.5	-54.85	-41.85	-13.00	-47.09	-7.76	Peak
3		175.5	-53.89	-40.89	-13.00	-45.52	-8.37	Peak
4		836.9	-43.74			-45.11	1.36	Peak
5		861.4	-51.34	-38.34	-13.00	-52.89	1.56	Peak
6		880.3	-60.04			-61.75	1.71	Peak
7		1674.0	-43.17	-30.17	-13.00	-45.33	2.16	Peak
8		2508.0	-43.72	-30.72	-13.00	-50.90	7.18	Peak
9	@	5018.0	-35.30	-22.30	-13.00	-50.03	14.74	Peak
10		5854.0	-41.34	-28.34	-13.00	-59.83	18.49	Peak
11		6688.0	-39.31	-26.31	-13.00	-58.00	18.68	Peak

Remark:
1. #4: MS Signal
2. #6: BS Signal
3. There is no more obvious emission except the listings above.

4.6.7 Mode 3

Horizontal Polarization

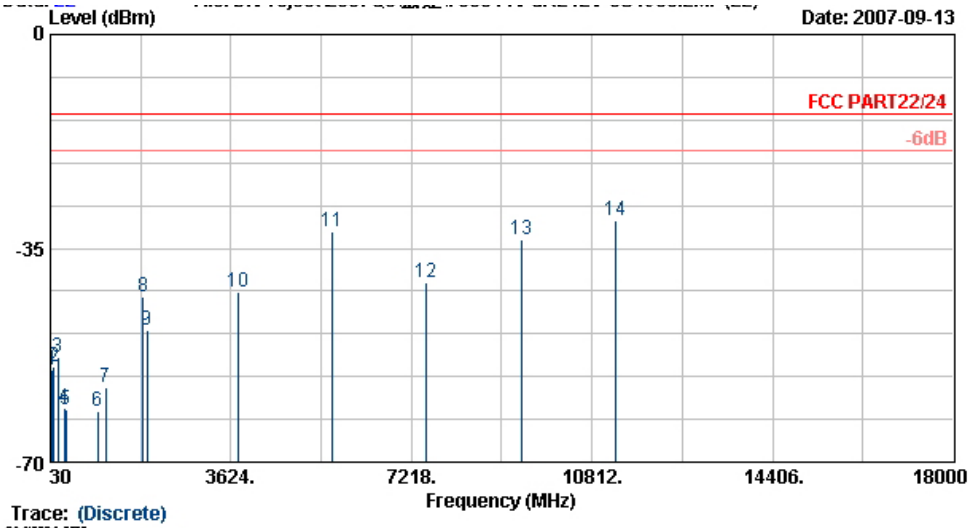


Site : 03CH06-HY
Condition : HF-SPURIOUS-060929 HORIZONTAL
EUT : Pocket PC Phone For FCC
Power : 120Vac/60Hz
Model : FG 780314
Memo : PCS 1900 Link Mode;Ch661 + Adaptor 1
Plane : E2
Sample : A

	Freq	Level	Over Limit	Limit Line	Read Level	Factor	Remark
	MHz	dBm	dB	dBm	dBm	dB	
1	30.0	-57.19	-44.19	-13.00	-57.55	0.36	Peak
2	105.3	-55.84	-42.84	-13.00	-43.53	-12.31	Peak
3	179.6	-55.56	-42.56	-13.00	-42.41	-13.16	Peak
4	339.9	-67.20	-54.20	-13.00	-58.62	-8.57	Peak
5	791.4	-65.40	-52.40	-13.00	-63.62	-1.78	Peak
6	985.3	-63.78	-50.78	-13.00	-63.88	0.10	Peak
7	1108.0	-57.25	-44.25	-13.00	-55.27	-1.99	Peak
8	1878.0	-43.53			-47.43	3.90	Peak
9	1958.0	-53.28			-57.69	4.41	Peak
10	3758.0	-45.41	-32.41	-13.00	-55.82	10.41	Peak
11	5638.0	-37.25	-24.25	-13.00	-55.69	18.45	Peak
12	7518.0	-39.64	-26.64	-13.00	-60.89	21.25	Peak
13	9398.0	-37.85	-24.85	-13.00	-59.26	21.40	Peak
14 @	11278.0	-34.61	-21.61	-13.00	-59.33	24.72	Peak

Remark:
1. #8: MS Signal
2. #9: BS Signal

Vertical Polarization



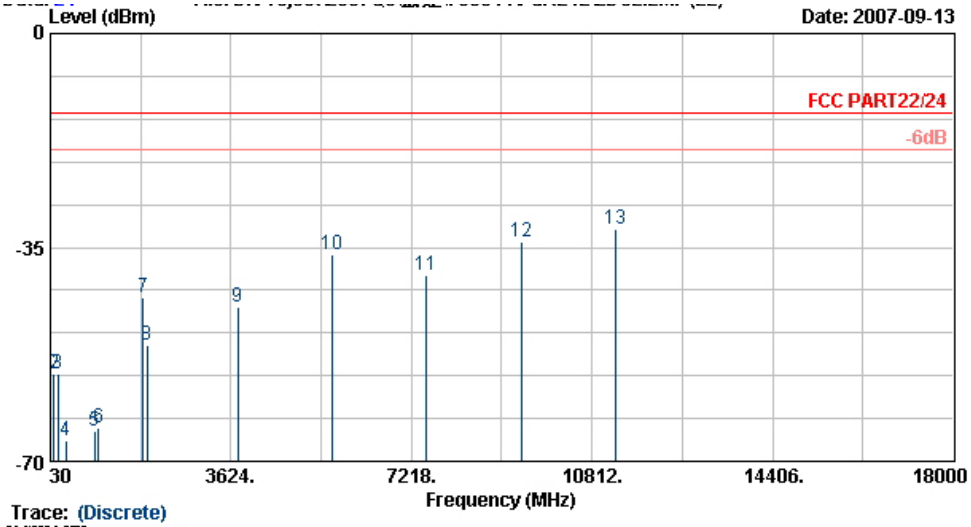
Site : 03CH06-HY
Condition : HF-SPURIOUS-060929 VERTICAL
EUT : Pocket PC Phone For FCC
Power : 120Vac/60Hz
Model : FG 780314
Memo : PCS 1900 Link Mode;Ch661 + Adaptor 1
Plane : E2
Sample : A

		Freq	Level	Over Limit	Limit Line	Read Level	Factor	Remark
		MHz	dBm	dB	dBm	dBm	dB	
1		72.4	-54.98	-41.98	-13.00	-43.37	-11.60	Peak
2		107.5	-54.48	-41.48	-13.00	-46.72	-7.76	Peak
3		179.0	-52.90	-39.90	-13.00	-44.49	-8.41	Peak
4		301.4	-61.20	-48.20	-13.00	-54.78	-6.42	Peak
5		334.3	-61.35	-48.35	-13.00	-55.63	-5.72	Peak
6		978.3	-61.60	-48.60	-13.00	-64.09	2.49	Peak
7		1128.0	-57.65	-44.65	-13.00	-54.78	-2.88	Peak
8		1878.0	-42.98			-47.27	4.29	Peak
9		1958.0	-48.46			-53.46	5.01	Peak
10		3758.0	-42.26	-29.26	-13.00	-52.15	9.89	Peak
11	@	5638.0	-32.19	-19.19	-13.00	-49.17	16.97	Peak
12		7518.0	-40.65	-27.65	-13.00	-60.09	19.44	Peak
13	@	9398.0	-33.60	-20.60	-13.00	-53.49	19.89	Peak
14	@	11278.0	-30.35	-17.35	-13.00	-53.78	23.44	Peak

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

4.6.8 Mode 4

Horizontal Polarization

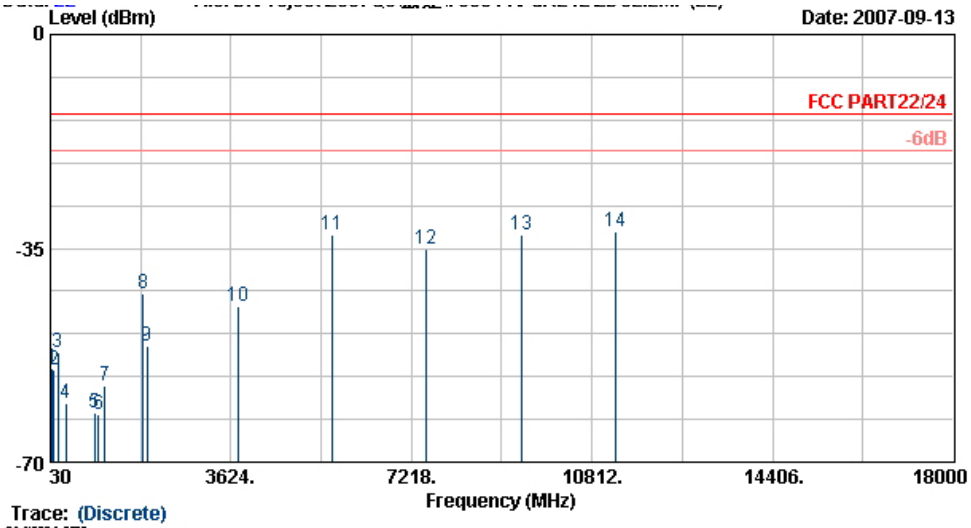


Site : 03CH06-HY
Condition : HF-SPURIOUS-060929 HORIZONTAL
EUT : Pocket PC Phone For FCC
Power : 120Vac/60Hz
Model : FG 780314
Memo : EDGE Link Mode;Ch661 + Adaptor 1
Plane : E2
Sample : A

	Freq	Level	Over Limit	Limit Line	Read Level	Factor	Remark
	MHz	dBm	dB	dBm	dBm	dB	
1	30.8	-59.24	-46.24	-13.00	-58.99	-0.25	Peak
2	106.1	-55.75	-42.75	-13.00	-43.44	-12.31	Peak
3	179.0	-55.60	-42.60	-13.00	-42.45	-13.16	Peak
4	339.9	-66.73	-53.73	-13.00	-58.16	-8.57	Peak
5	903.4	-65.05	-52.05	-13.00	-64.36	-0.70	Peak
6	994.4	-64.60	-51.60	-13.00	-64.78	0.18	Peak
7	1878.0	-43.13			-47.03	3.90	Peak
8	1958.0	-50.95			-55.36	4.41	Peak
9	3758.0	-44.66	-31.66	-13.00	-55.07	10.41	Peak
10	5638.0	-36.28	-23.28	-13.00	-54.73	18.45	Peak
11	7518.0	-39.61	-26.61	-13.00	-60.86	21.25	Peak
12	9398.0	-34.06	-21.06	-13.00	-55.47	21.40	Peak
13 @	11278.0	-32.13	-19.13	-13.00	-56.86	24.72	Peak

Remark:
1. #7: MS Signal
2. #8: BS Signal

Vertical Polarization



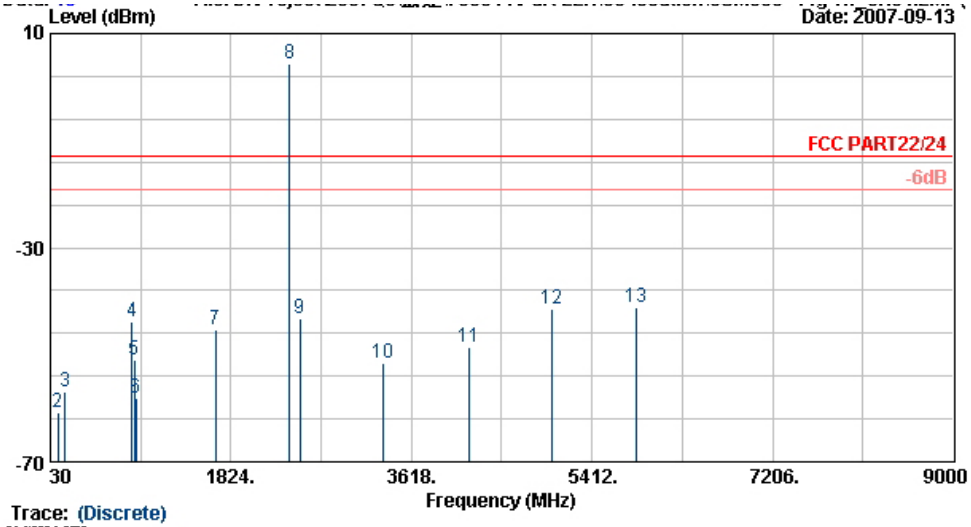
Site : 03CH06-HY
Condition : HF-SPURIOUS-060929 VERTICAL
EUT : Pocket PC Phone For FCC
Power : 120Vac/60Hz
Model : FG 780314
Memo : EDGE Link Mode;Ch661 + Adaptor 1
Plane : E2
Sample : A

	Freq	Level	Over Limit	Limit Line	Read Level	Factor	Remark
	MHz	dBm	dB	dBm	dBm	dB	
1	71.6	-54.72	-41.72	-13.00	-42.98	-11.74	Peak
2	106.1	-54.84	-41.84	-13.00	-47.09	-7.74	Peak
3	179.0	-51.92	-38.92	-13.00	-43.52	-8.41	Peak
4	336.4	-60.32	-47.32	-13.00	-54.65	-5.67	Peak
5	903.4	-61.93	-48.93	-13.00	-63.82	1.89	Peak
6	994.4	-62.22	-49.22	-13.00	-64.84	2.61	Peak
7	1114.0	-57.44	-44.44	-13.00	-54.41	-3.02	Peak
8	1878.0	-42.29			-46.58	4.29	Peak
9	1958.0	-50.96			-55.97	5.01	Peak
10	3758.0	-44.47	-31.47	-13.00	-54.36	9.89	Peak
11	5638.0	-32.88	-19.88	-13.00	-49.85	16.97	Peak
12	7518.0	-35.23	-22.23	-13.00	-54.67	19.44	Peak
13	9398.0	-32.76	-19.76	-13.00	-52.65	19.89	Peak
14	11278.0	-32.37	-19.37	-13.00	-55.81	23.44	Peak

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

4.6.9 Mode 5

Horizontal Polarization



Trace: (Discrete)

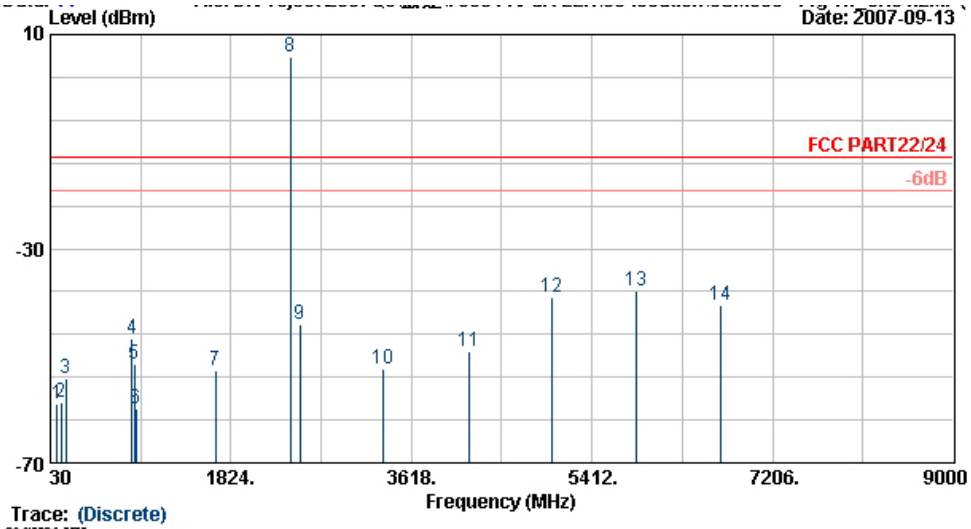
Site : 03CH06-HY
Condition : HF-SPURIOUS-060929 HORIZONTAL
EUT : Pocket PC Phone For FCC
Power : 120Vac/60Hz
Model : FG 780314
Memo : GSM 850 Link;Ch189 + 11g Tx_Ch01;2412MHz
: + Adaptor 1
Plane : E2
Sample : A

		Freq	Level	Over Limit	Limit Line	Read Level	Factor	Remark
		MHz	dBm	dB	dBm	dBm	dB	
1		34.6	-53.32	-40.32	-13.00	-50.63	-2.69	Peak
2		108.8	-60.81	-47.81	-13.00	-48.47	-12.34	Peak
3		176.3	-56.80	-43.80	-13.00	-43.68	-13.12	Peak
4		836.9	-43.79			-42.45	-1.33	Peak
5		861.4	-51.00	-38.00	-13.00	-49.90	-1.10	Peak
6		882.4	-58.13			-57.24	-0.89	Peak
7		1674.0	-45.44	-32.44	-13.00	-47.80	2.36	Peak
8	@	2408.0	4.21			-2.11	6.31	Peak
9		2508.0	-43.13	-30.13	-13.00	-49.82	6.69	Peak
10		3344.0	-51.54	-38.54	-13.00	-60.93	9.40	Peak
11		4184.0	-48.52	-35.52	-13.00	-60.50	11.98	Peak
12		5018.0	-41.52	-28.52	-13.00	-57.59	16.07	Peak
13		5854.0	-41.15	-28.15	-13.00	-61.01	19.85	Peak

Remark:

1. #4: MS Signal
2. #6: BS Signal
3. #8: WLAN Signal

Vertical Polarization



Site : 03CH06-HY
Condition : HF-SPURIOUS-060929 VERTICAL
EUT : Pocket PC Phone For FCC
Power : 120Vac/60Hz
Model : FG 780314
Memo : GSM 850 Link;Ch189 + 11g Tx_Ch01;2412MHz
: + Adaptor 1
Plane : E2
Sample : A

		Freq	Level	Over Limit	Limit Line	Read Level	Factor	Remark
		MHz	dBm	dB	dBm	dBm	dB	
1		99.9	-58.86	-45.86	-13.00	-51.17	-7.69	Peak
2		139.1	-58.58	-45.58	-13.00	-50.54	-8.04	Peak
3		183.6	-54.36	-41.36	-13.00	-45.92	-8.44	Peak
4		836.9	-46.67			-48.03	1.36	Peak
5		861.4	-51.46	-38.46	-13.00	-53.02	1.56	Peak
6		880.3	-60.03			-61.74	1.71	Peak
7		1674.0	-52.71	-39.71	-13.00	-54.86	2.16	Peak
8	@	2414.0	5.75	-----	-----	-1.14	6.89	Peak
9		2508.0	-44.15	-31.15	-13.00	-51.33	7.18	Peak
10		3344.0	-52.47	-39.47	-13.00	-61.02	8.55	Peak
11		4184.0	-49.09	-36.09	-13.00	-60.44	11.36	Peak
12		5018.0	-39.05	-26.05	-13.00	-53.79	14.74	Peak
13		5854.0	-37.88	-24.88	-13.00	-56.37	18.49	Peak
14		6688.0	-40.42	-27.42	-13.00	-59.11	18.68	Peak

Remark:
1. #4: MS Signal
2. #6: BS Signal
3. #8: WLAN Signal
4. There is no more obvious emission except the listings above.

4.7 Frequency Stability (Temperature Variation)

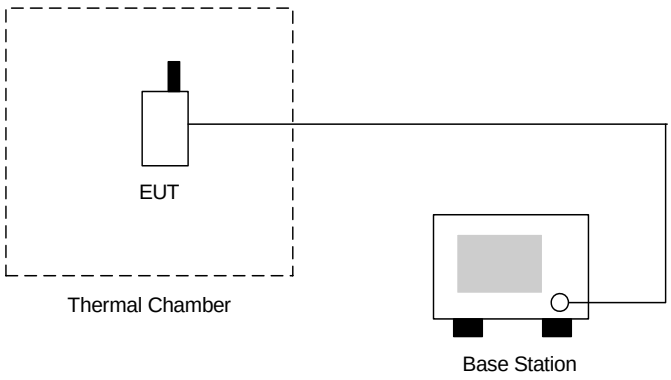
4.7.1 Measurement Instrument

As decribed 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(℃)	Change (Hz)	Change (ppm)	Limit (ppm)	Result
-30	N/A	N/A	2.5	Pass
-20	-35	-0.04		
-10	32	0.04		
0	28	0.03		
10	-22	-0.03		
20	25	0.03		
30	-16	-0.02		
40	-18	-0.02		
50	-23	-0.03		

Remark : EUT could not be turned on at temperature -30℃

- Test Mode : GSM850 (EDGE) CH189

Temperature(℃)	Change (Hz)	Change (ppm)	Limit (ppm)	Result
-30	N/A	N/A	2.5	Pass
-20	-45	-0.05		
-10	-33	-0.04		
0	-24	-0.03		
10	-25	-0.03		
20	23	0.03		
30	-21	-0.02		
40	24	0.03		
50	28	0.03		

Remark : EUT could not be turned on at temperature -30℃

- Test Mode : PCS1900 (GSM) CH661

Temperature(℃)	Change (Hz)	Change (ppm)	Limit (ppm)	Result
-30	N/A	N/A	2.5	Pass
-20	-47	-0.02		
-10	-33	-0.02		
0	28	0.01		
10	34	0.02		
20	22	0.01		
30	-34	-0.02		
40	-44	-0.02		
50	-41	-0.02		

Remark : EUT could not be turned on at temperature -30℃

- Test Mode : PCS1900 (EDGE) CH661

Temperature(℃)	Change (Hz)	Change (ppm)	Limit (ppm)	Result
-30	N/A	N/A	2.5	Pass
-20	43	0.02		
-10	38	0.02		
0	22	0.01		
10	-40	-0.02		
20	-29	-0.02		
30	-37	-0.02		
40	34	0.02		
50	33	0.02		

Remark : EUT could not be turned on at temperature -30℃

4.8 Frequency Stability (Voltage Variation)

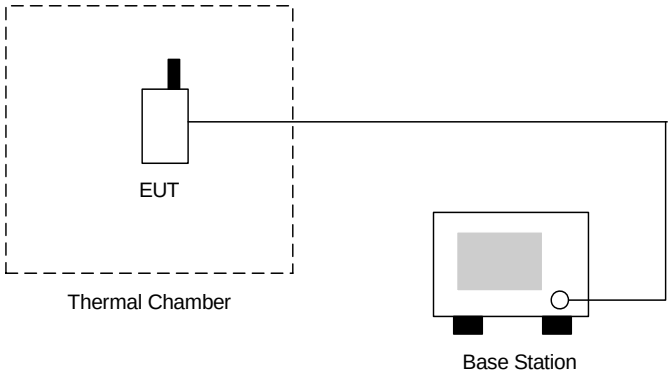
4.8.1 Measurement Instrument

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±5 °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	22.0	0.03	2.5	**Pass**
BEP	-32.0	-0.04		
4.2	-28.0	-0.03		

- Test Mode : GSM850 (EDGE) CH189

Voltage(Volt)	Change (Hz)	Change (ppm)	Limit (ppm)	Result
3.7	28.0	0.03	2.5	**Pass**
BEP	23.0	0.03		
4.2	13.0	0.02		

- Test Mode : PCS1900 (GSM) CH661

Voltage(Volt)	Change (Hz)	Change (ppm)	Limit (ppm)	Result
3.7	-25.0	-0.01	2.5	**Pass**
BEP	-28.0	-0.01		
4.2	-24.0	-0.01		

- Test Mode : PCS1900 (EDGE) CH661

Voltage(Volt)	Change (Hz)	Change (ppm)	Limit (ppm)	Result
3.7	35.0	0.02	2.5	**Pass**
BEP	39.0	0.02		
4.2	36.0	0.02		

Remark:
1. Normal Voltage=3.7V.
2. Battery End Point (BEP)= 3.1 V.

5. List of Measurement Equipments

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Due Date	Remark
Spectrum Analyzer	Agilent	E4408B	MY44211030	9KHz-26.5GHz	Oct. 05, 2006	Oct. 04, 2007	Radiation (03CH06-HY)
EMI Test Receiver	R&S	ESCS30	100356	9KHz-2.75GHz	Jul. 26, 200	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. 07, 2006	Oct. 06, 2007	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		$u(x_i)$	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 Receiver VSWR Γ1= 0.197 Antenna VSWR Γ2= 0.194 Uncertainty=20log(1-Γ1*Γ2*Γ3)	+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