



FCC / IC Test Report

for

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

Equipment : Quad Band Module
Trade Name : Wistron
Model No. : EM100
FCC ID : PU5-EM100
IC ID : 4128A-EM100
Tx Frequency Range : GSM850 : 824.2 ~ 848.8MHz
PCS1900 : 1850.2 ~1909.8 MHz
Max. ERP/EIRP Power : GGSM850(GSM) : 0.66 W
GSM850(EDGE) : 0.26 W
PCS1900(GSM) : 1.22 W
PCS1900(EDGE) : 0.63 W
Emission Designator : GSM : 300KGXW
EDGE : 300KG7W
Applicant : Wistron Corporation
21F, 88, Sec. 1, Hsin Tai Wu Rd., Hsichih, Taipei Hsien
221, Taiwan, R.O.C.

- The test result refers exclusively to the test presented test model / sample.
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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 Nov. 12, 2007 at **Sporton International Inc. Lab.**
- Report No.: FG7O3002, 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	ii
1. General Information.....	1
1.2 Applicant.....	1
1.3 Manufacturer	1
1.4 Basic Description of Equipment under Test.....	1
1.5 Feature of Equipment under Test.....	1
1.6 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 Compliance	4
3.3 Frequency Range.....	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.....	56
4.6 Field Strength of Spurious Radiation	75
4.7 Frequency Stability (Temperature Variation)	86
4.8 Frequency Stability (Voltage Variation)	89
5. List of Measurement Equipment	91
6. Uncertainty Evaluation	92

Appendix A – Photographs of EUT

Appendix B - Setup Photographs



History of this test report

Report Issue Date: Nov. 14, 2007

Report No.	Description



1. General Information

1.2 Applicant

Wistron Corporation

21F, 88, Sec. 1, Hsin Tai Wu Rd., Hsichih, Taipei Hsien 221, Taiwan, R.O.C.

1.3 Manufacturer

Wistron Corporation

21F, 88, Sec. 1, Hsin Tai Wu Rd., Hsichih, Taipei Hsien 221, Taiwan, R.O.C.

1.4 Basic Description of Equipment under Test

Equipment	Quad Band Module
Trade Name	Wistron
Model Name	EM100
FCC ID	PU5-EM100
IC ID	4128A-EM100

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 :	Quad Band Module
Trade Name	Wistron
Model Name :	EM100
FCC ID :	PU5-EM100
IC ID	4128A-EM100
Tx Frequency :	GSM850 : 824 ~ 849 MHz PCS1900 : 1850 ~1910 MHz
Rx Frequency :	GSM850 : 869 ~ 894 MHz PCS1900 : 1930 ~ 1990 MHz
Maximum ERP/EIRP :	GSM850(GSM) : 0.66 W (28.21 dBm) GSM850(EDGE) : 0.26 W (24.16 dBm) PCS1900(GSM) : 1.22 W (30.86 dBm) PCS1900(EDGE) : 0.63 W (27.99 dBm)
Maximum Output Power to Antenna :	GSM850 : 31.99 dBm (GSM) / 27.14 dBm (EDGE) PCS1900 : 29.41 dBm (GSM) / 26.47 dBm (EDGE)
Antenna Type :	Fixed External
Type of Antenna Connector	Coaxial Connector
Power Rating (DC/AC , Voltage and Current of RF element or PA) :	DC 3.2V to 4.3V
HW Version :	SE
SW Version :	EM100 0.3.7
Digital Modulation Emission :	GSM : GMSK EDGE : 8PSK
Type of Emission :	GSM : 300KGXW EDGE : 300KG7W



1.6 Report Date

EUT Received : Oct. 30, 2007

Report Date : Nov. 14, 2007

2. Test Configuration of Equipment under Test

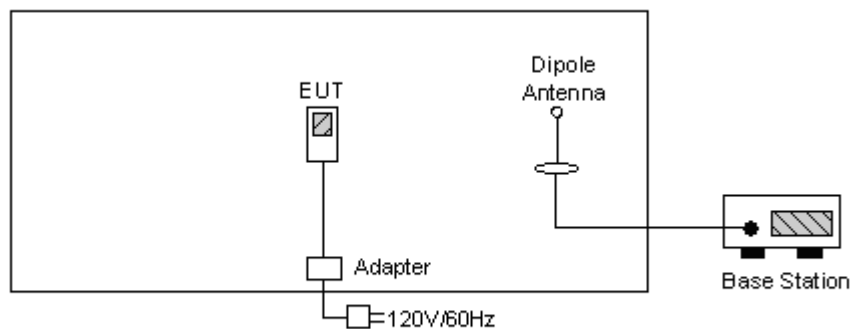
2.1 Test Manner

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; 30MHz to 19000 MHz for PCS1900.

2.2 Test Mode

Application	GSM850	PCS1900
Radiated Emission	☒ Mode 1: GSM Link	☒ Mode 3: GSM Link
	☒ Mode 2: EDGE Link	☒ Mode 4: EDGE Link
Conducted Measurement	☒ Mode 1: GSM Link	☒ Mode 3: GSM 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	Cable Cord / Power Code
1.	Base Station	R&S	CMU200	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 : 886-3-328-4978
Test Site No : 03CH06-HY, TH02-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 and IC RSS-132 Issued 2, and RSS-133 Issued 3

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

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

4.2 RF Output Power

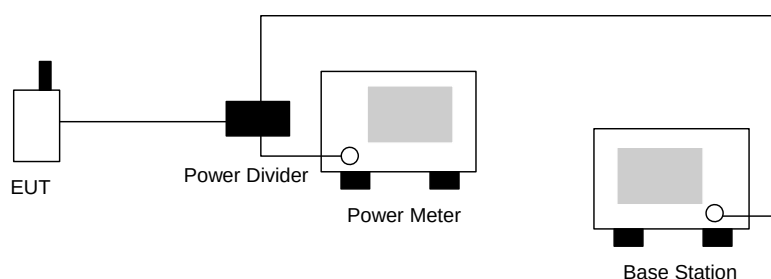
4.2.1 Measurement Instruments :

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)	31.97	1.574
	189	836.4 (Mid)	31.84	1.528
	251	848.8 (High)	31.99	1.581
GSM850 (EDGE)	128	824.2 (Low)	26.70	0.468
	189	836.4 (Mid)	27.14	0.518
	251	848.8 (High)	26.97	0.498
PCS1900 (GSM)	512	1850.2 (Low)	28.89	0.774
	661	1880.0 (Mid)	29.14	0.820
	810	1909.8 (High)	29.41	0.873
PCS1900 (EDGE)	512	1850.2 (Low)	26.31	0.428
	661	1880.0 (Mid)	26.37	0.434
	810	1909.8 (High)	26.47	0.444



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.

$E_t = R_t + AF$

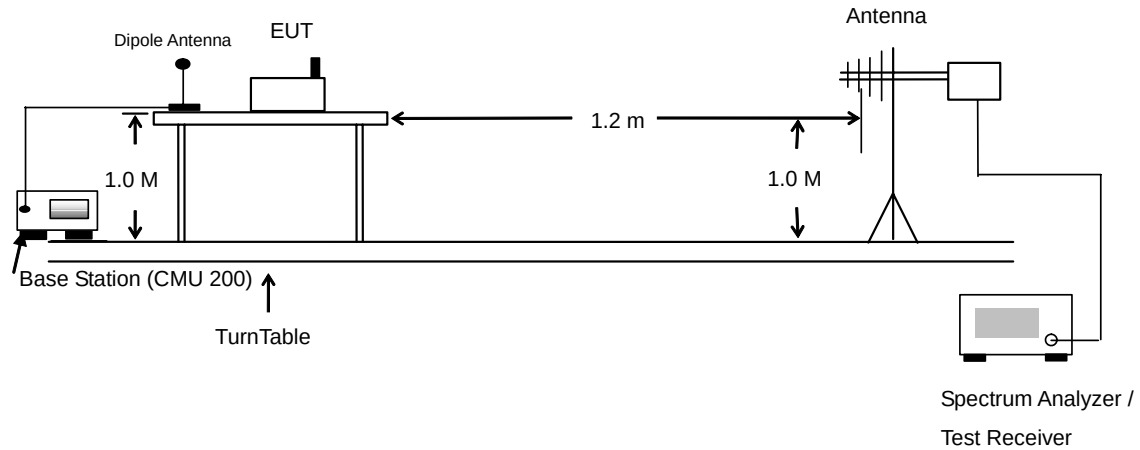
$E_s = R_s + AF$

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	-20.93	-48.12	0.00	-1.08	26.11	0.41
836.40	-22.02	-48.28	0.00	-0.93	25.33	0.34
848.80	-22.37	-48.35	0.00	-0.76	25.22	0.33
Vertical Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBd)	ERP (dBm)	ERP (W)
824.20	-18.68	-47.97	0.00	-1.08	28.21	0.66
836.40	-19.71	-48.01	0.00	-0.93	27.37	0.55
848.80	-20.10	-48.05	0.00	-0.76	27.19	0.52

GSM850 (EDGE) Radiated Power ERP						
Horizontal Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBd)	ERP (dBm)	ERP (W)
824.20	-26.28	-48.12	0.00	-1.08	20.76	0.12
836.40	-26.82	-48.28	0.00	-0.93	20.53	0.11
848.80	-27.84	-48.35	0.00	-0.76	19.75	0.09
Vertical Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBd)	ERP (dBm)	ERP (W)
824.20	-22.73	-47.97	0.00	-1.08	24.16	0.26
836.40	-23.04	-48.01	0.00	-0.93	24.04	0.25
848.80	-23.95	-48.05	0.00	-0.76	23.34	0.22



PCS1900 (GSM) Radiated Power EIRP						
Horizontal Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBi)	EIRP (dBm)	EIRP (W)
1850.20	-28.10	-51.88	0.00	1.96	25.74	0.37
1880.00	-30.10	-52.99	0.00	2.00	24.89	0.31
1909.80	-32.33	-54.28	0.00	1.98	23.93	0.25
Vertical Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBi)	EIRP (dBm)	EIRP (W)
1850.20	-23.23	-52.13	0.00	1.96	30.86	1.22
1880.00	-25.65	-53.17	0.00	2.00	29.52	0.90
1909.80	-27.05	-54.13	0.00	1.98	29.06	0.81

PCS1900 (EDGE) Radiated Power EIRP						
Horizontal Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBi)	EIRP (dBm)	EIRP (W)
1850.20	-31.25	-51.88	0.00	1.96	22.59	0.18
1880.00	-33.17	-52.99	0.00	2.00	21.82	0.15
1909.80	-33.89	-54.28	0.00	1.98	22.37	0.17
Vertical Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBi)	EIRP (dBm)	EIRP (W)
1850.20	-26.10	-52.13	0.00	1.96	27.99	0.63
1880.00	-28.32	-53.17	0.00	2.00	26.85	0.48
1909.80	-28.63	-54.13	0.00	1.98	27.48	0.56

4.4 Occupied Bandwidth and Band Edge Measurement

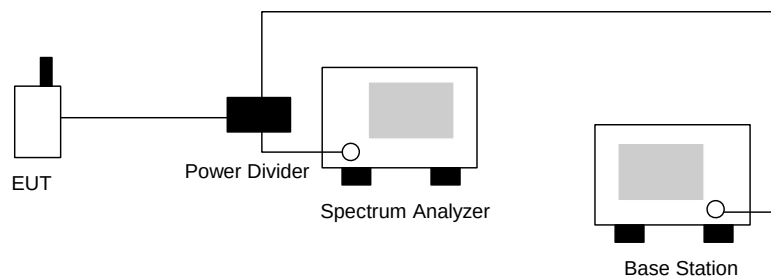
4.4.1 Measurement Instruments

As described in chapter 5 of this test report.

4.4.2 Test Procedure

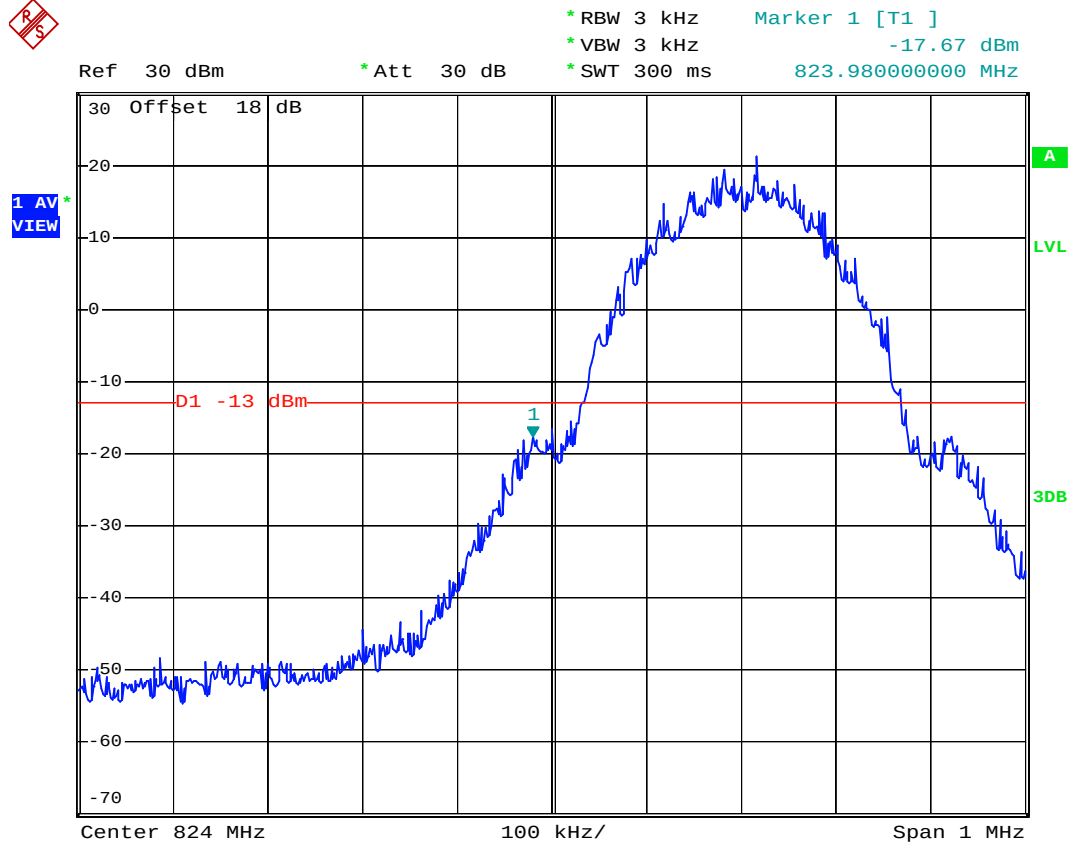
1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. The 99% occupied bandwidth of middle channel for the highest and lowest RF powers were measured.
3. The bandedge of low and high channels for the highest RF powers within the transmitting frequency band were measured.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

4.4.3 Test Setup Layout

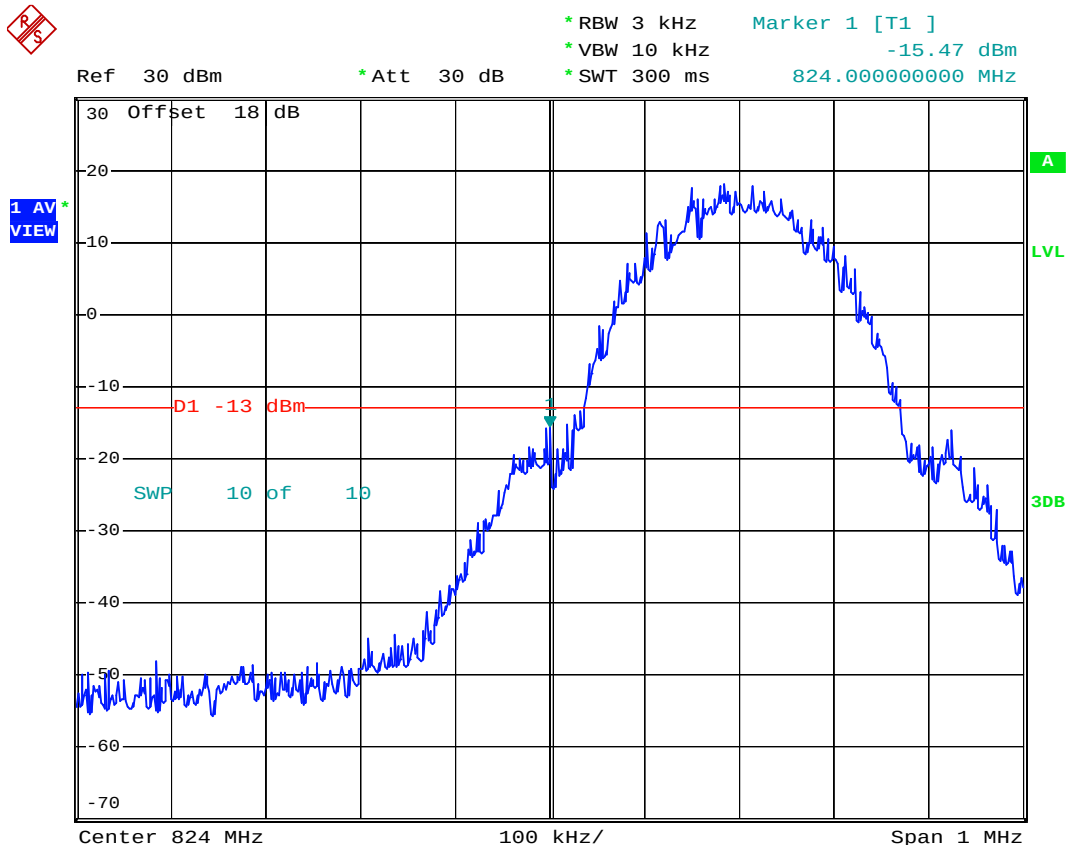


**4.4.4 Test Result**

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



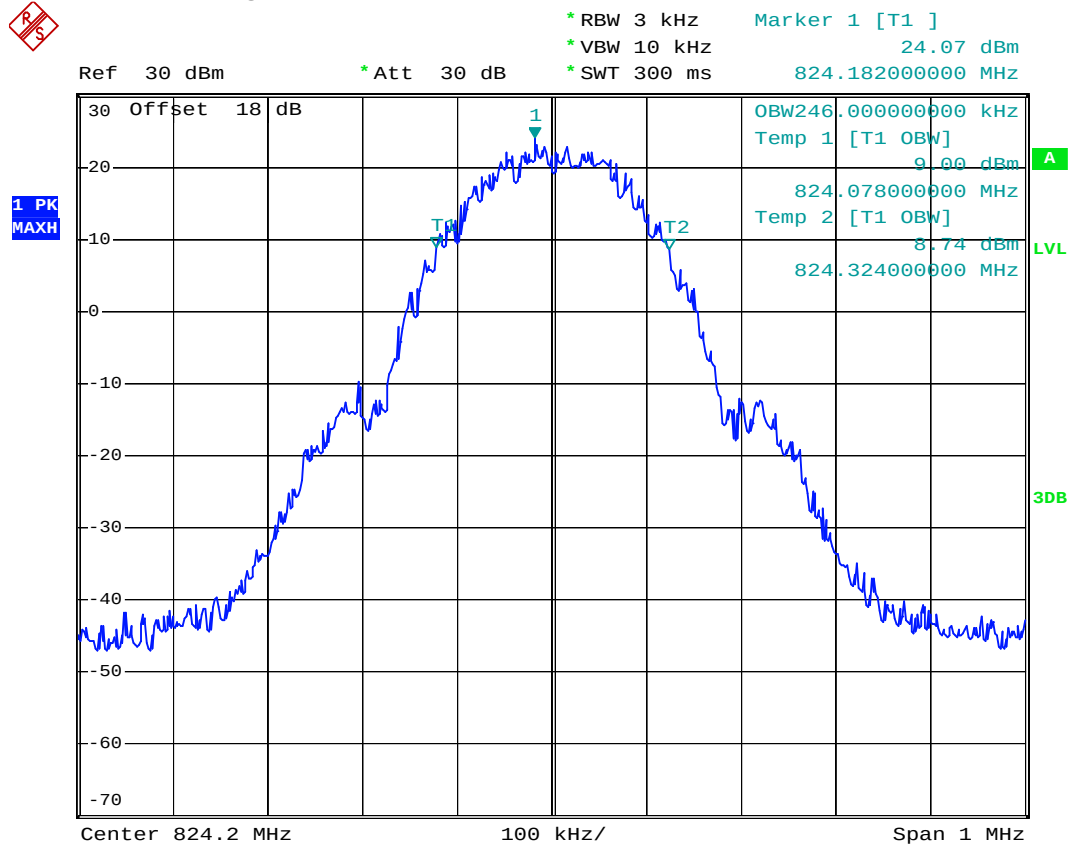
Date: 6.NOV.2007 22:42:51



Date: 6.NOV.2007 22:44:15



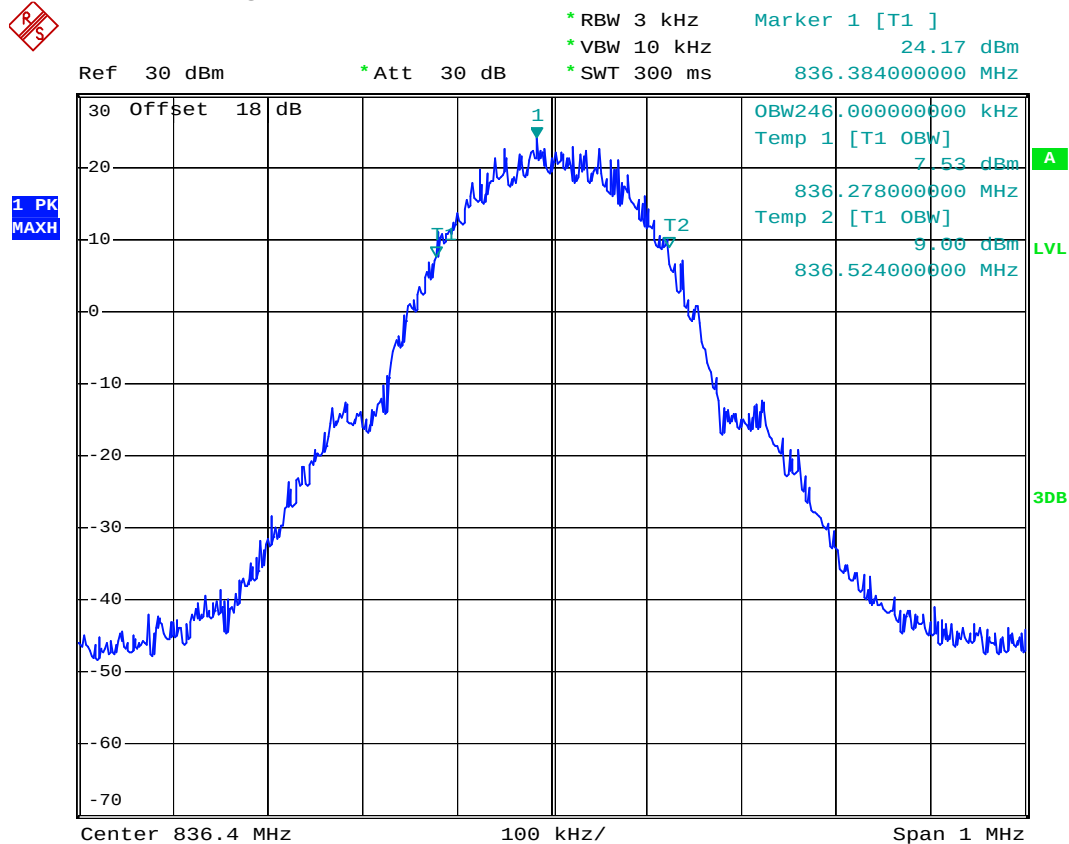
- Test Mode : GSM850 (GSM) CH128 99% Occupied Bandwidth
- Power State : High



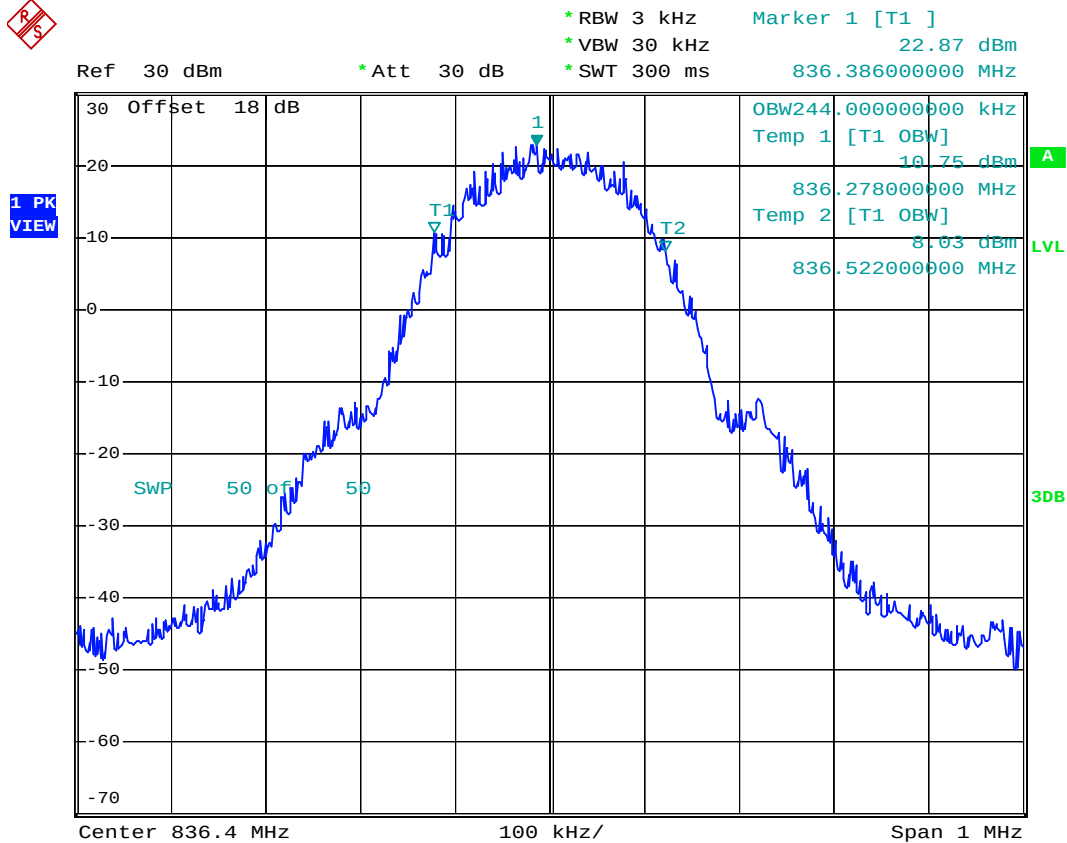
Date: 6.NOV.2007 22:36:50



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



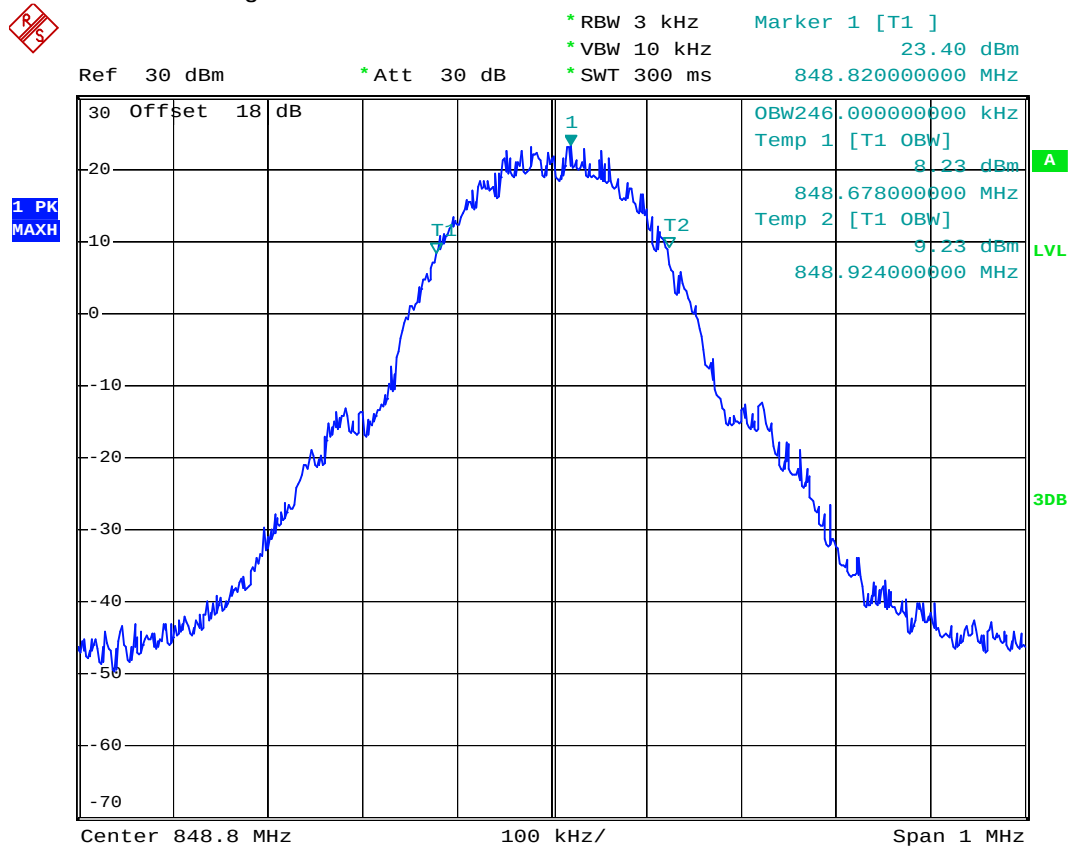
Date: 6.NOV.2007 22:37:25



Date: 6.NOV.2007 22:41:00



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



Date: 6.NOV.2007 22:38:08

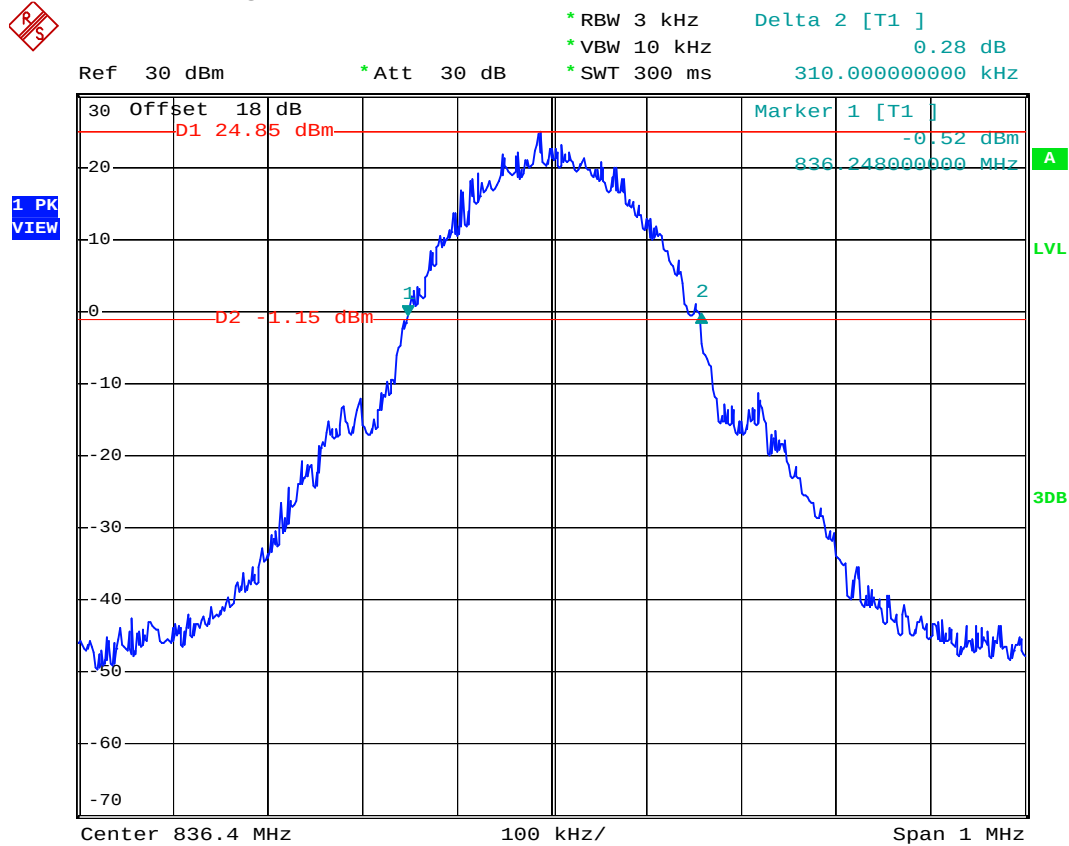


- Test Mode : GSM850 (GSM) CH128 26dB Bandwidth
- Power State : High





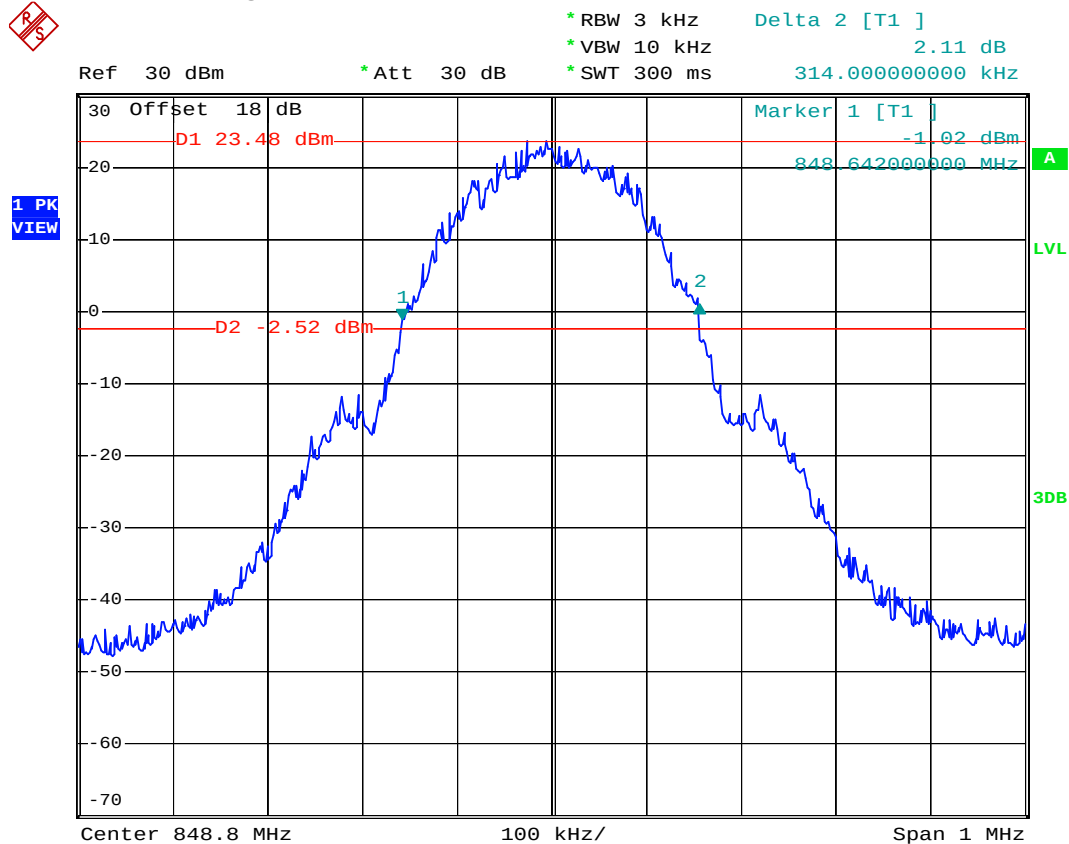
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- Power State : High



Date: 6.NOV.2007 21:53:44



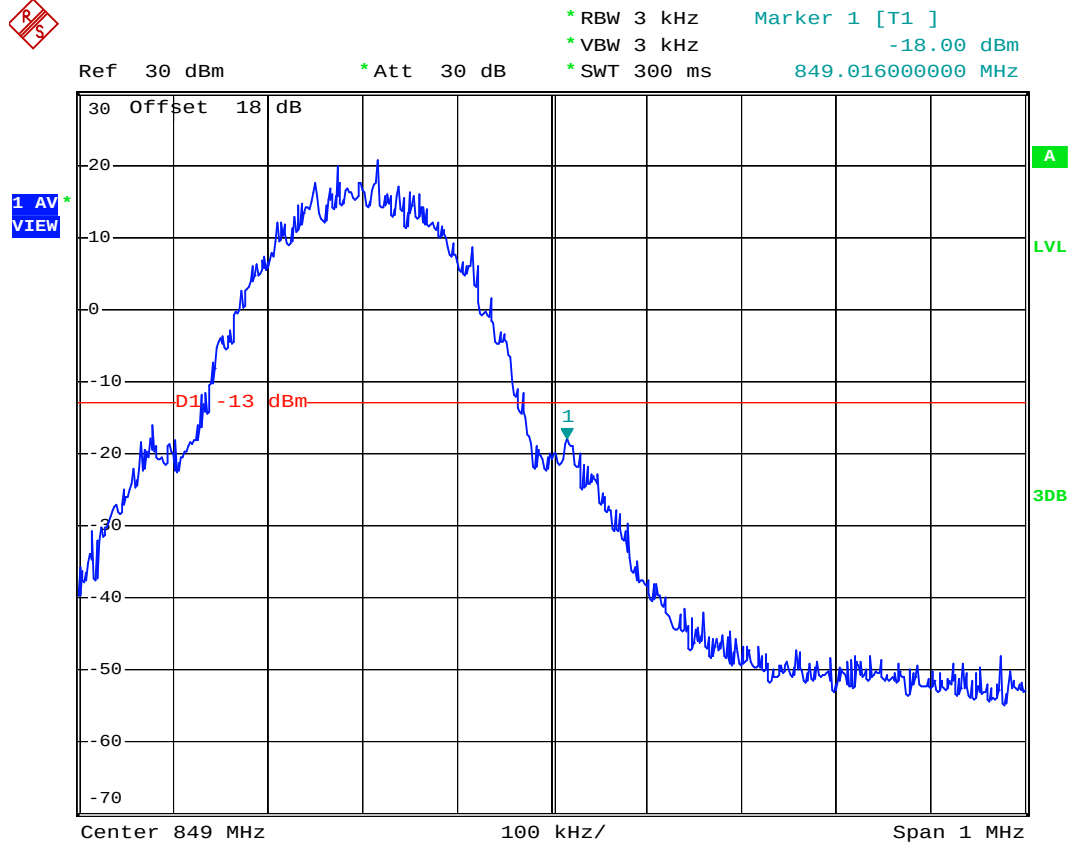
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- Power State : High



Date: 6.NOV.2007 21:55:31



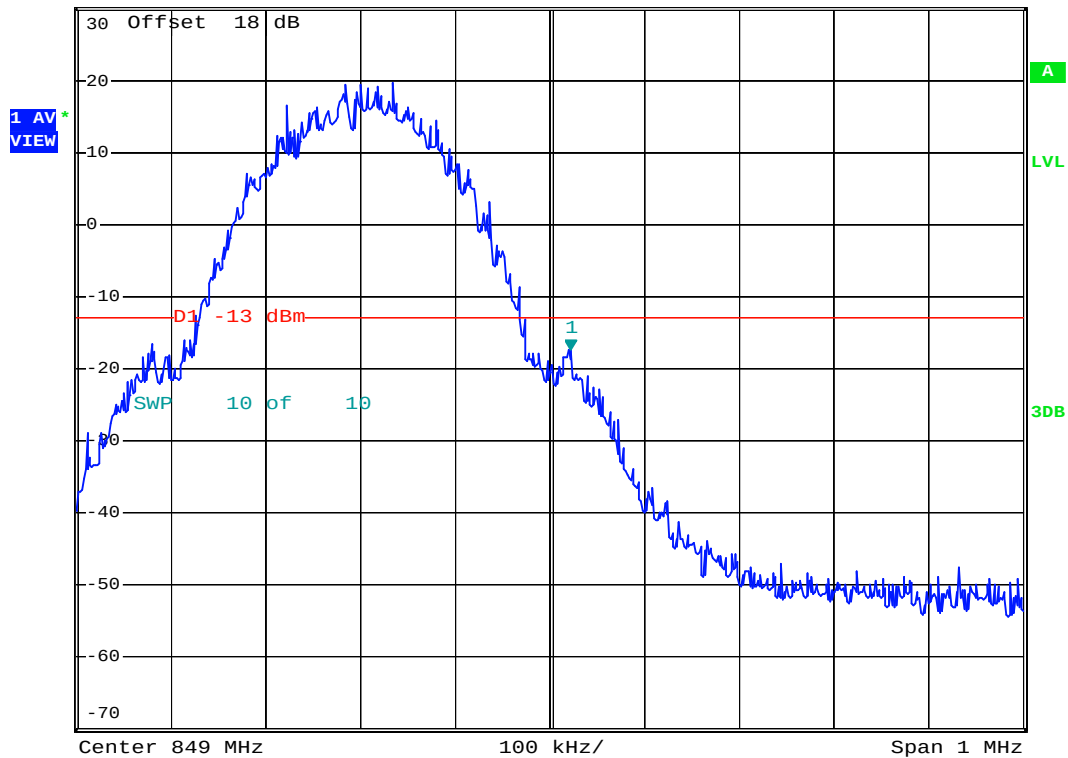
- Test Mode : GSM850 (GSM) CH251 Higher Band Edge
- Power State : High



Date: 6.NOV.2007 22:47:15



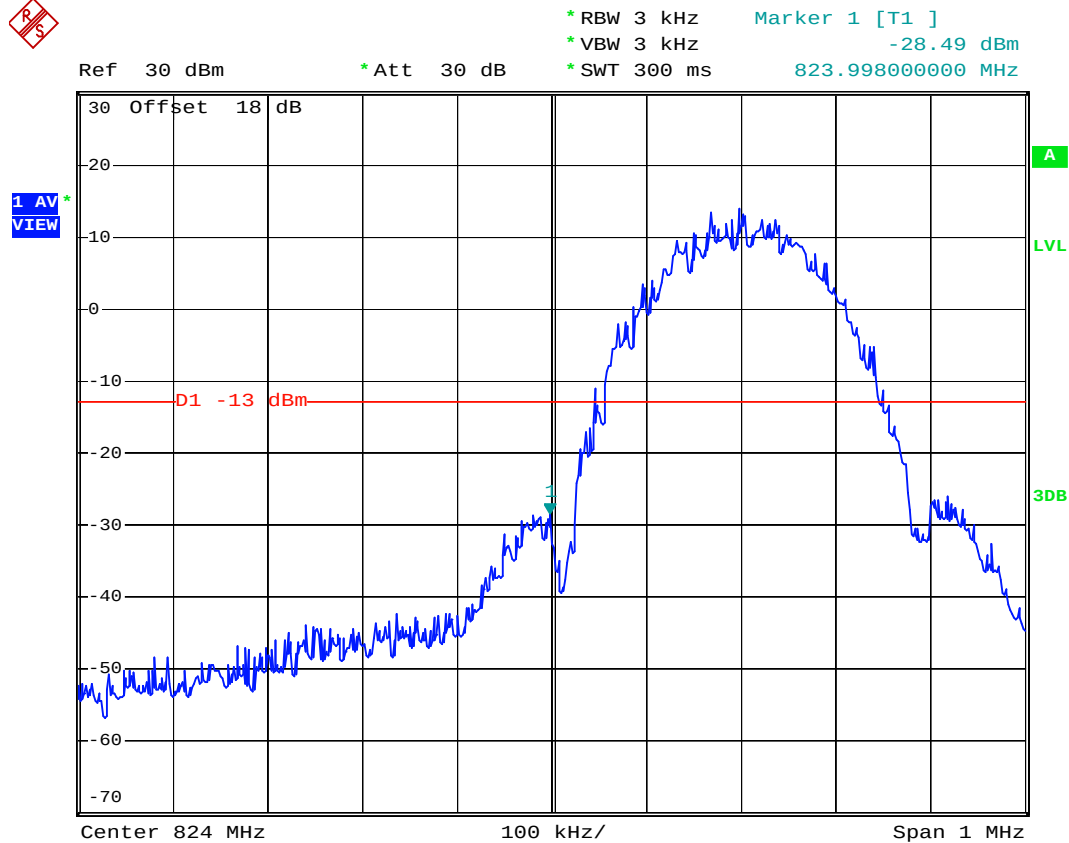
Ref 30 dBm *Att 30 dB *RBW 3 kHz Marker 1 [T1]
*VBW 10 kHz -17.40 dBm
*SWT 300 ms 849.022000000 MHz



Date: 6.NOV.2007 22:51:39



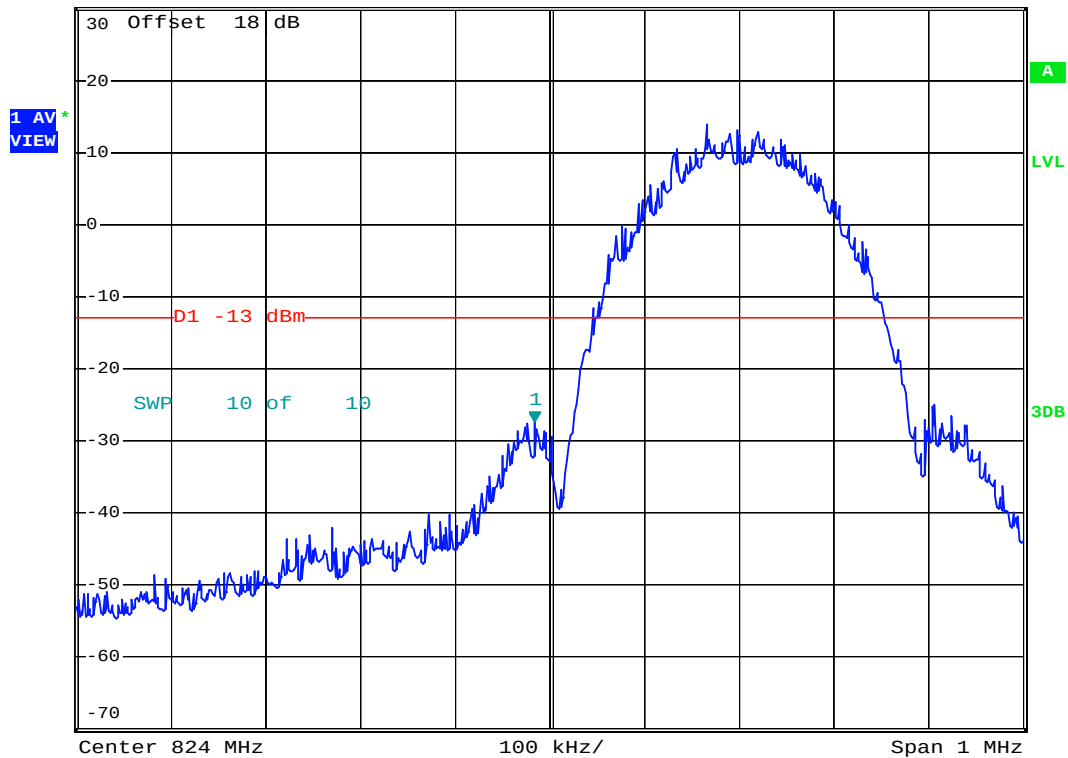
- Mode 2
- Test Mode : GSM850 (EDGE) CH128 Lower Band Edge
- Power State : High



Date: 8.NOV.2007 03:34:04



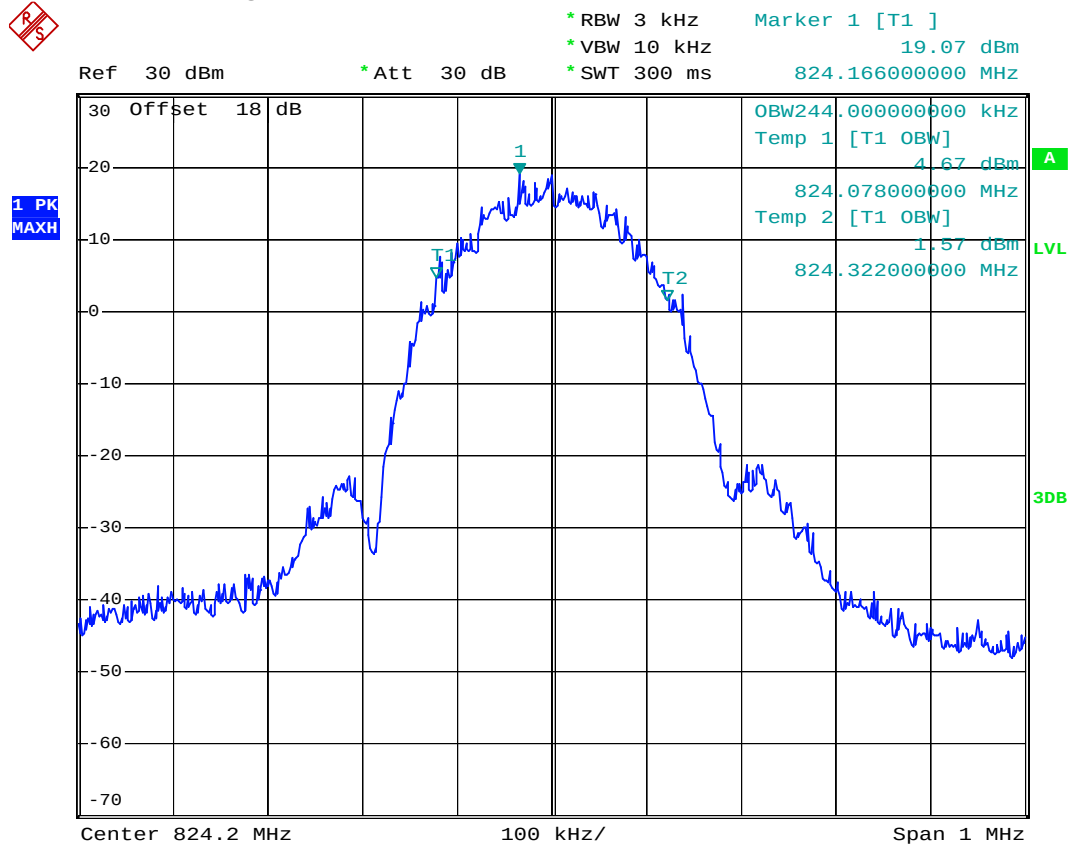
Ref 30 dBm *Att 30 dB *RBW 3 kHz Marker 1 [T1]
*VBW 10 kHz -27.39 dBm
*SWT 300 ms 823.984000000 MHz



Date: 8.NOV.2007 03:35:08



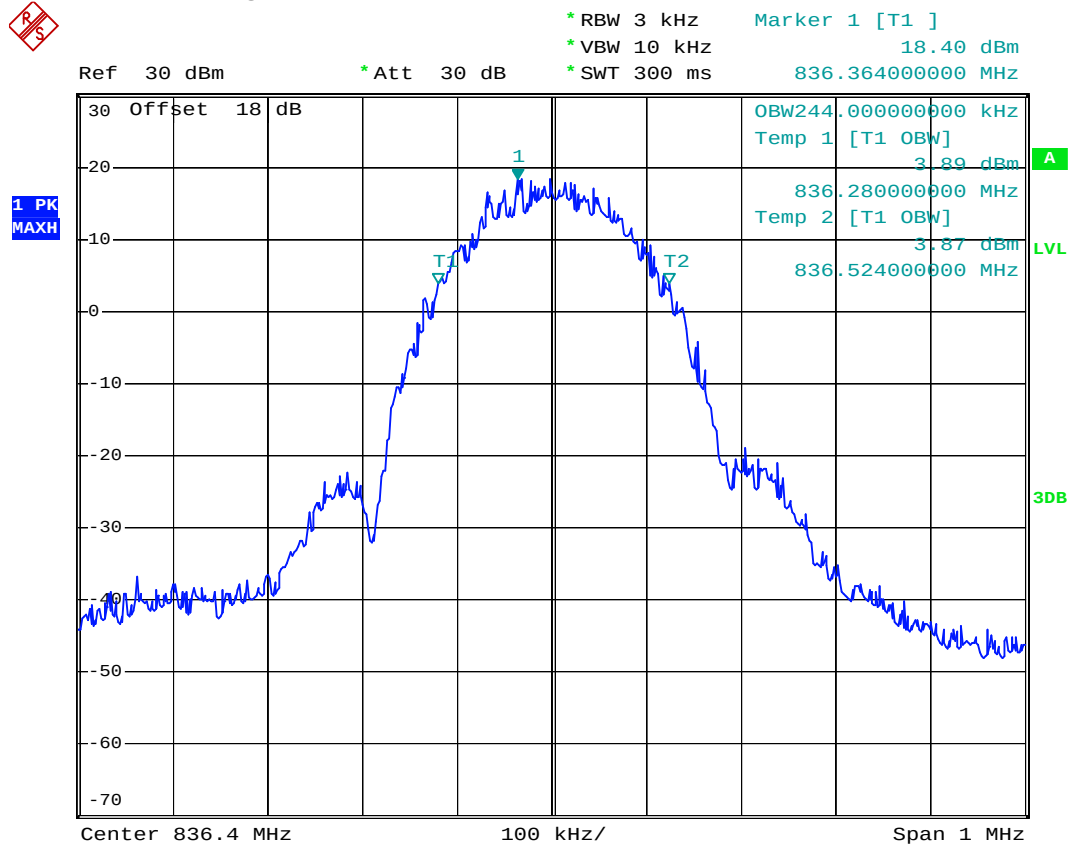
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- Power State : High



Date: 8.NOV.2007 03:30:40



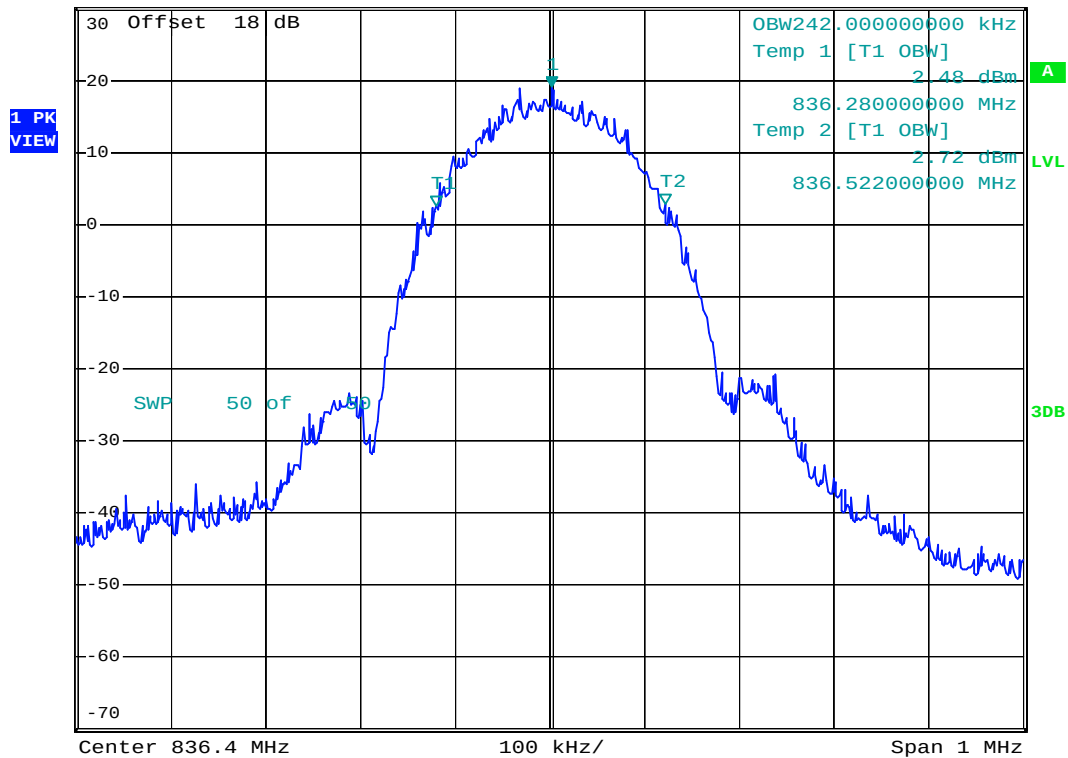
- Test Mode : GSM850 (EDGE) CH189 99% Occupied Bandwidth
- Power State : High



Date: 8.NOV.2007 03:29:59



Ref 30 dBm *Att 30 dB *RBW 3 kHz *VBW 30 kHz *SWT 300 ms Marker 1 [T1] 19.19 dBm 836.402000000 MHz

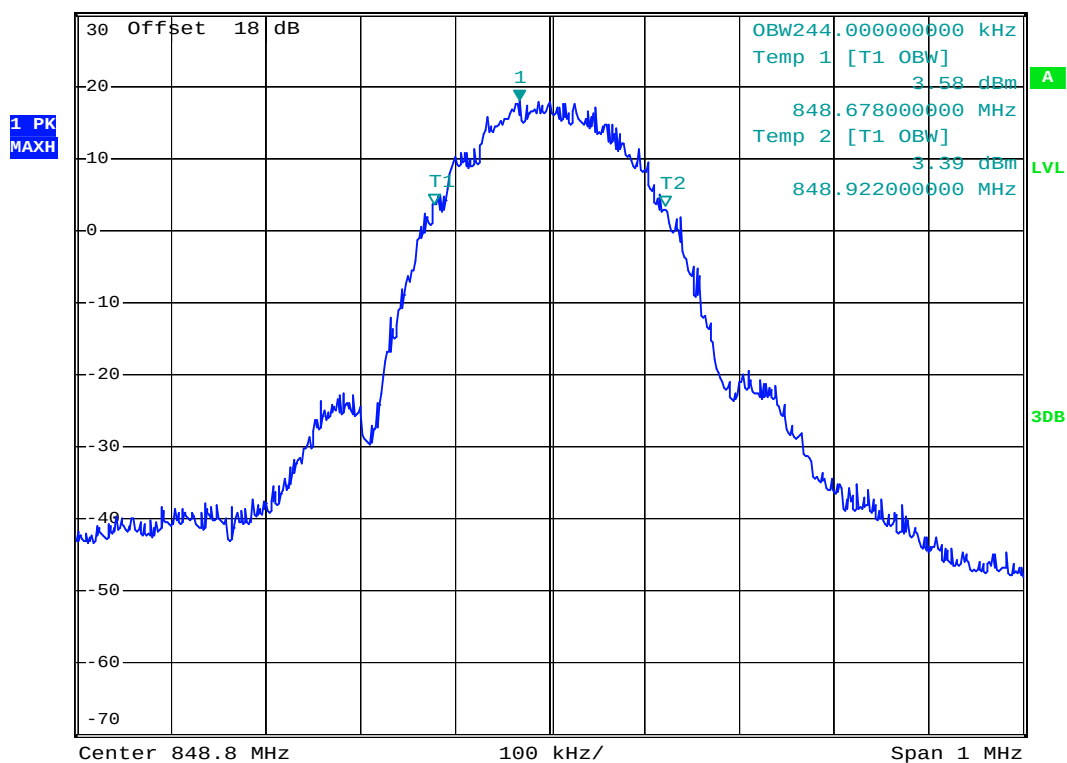


Date: 8.NOV.2007 03:31:53



Report No. : FG7O3002

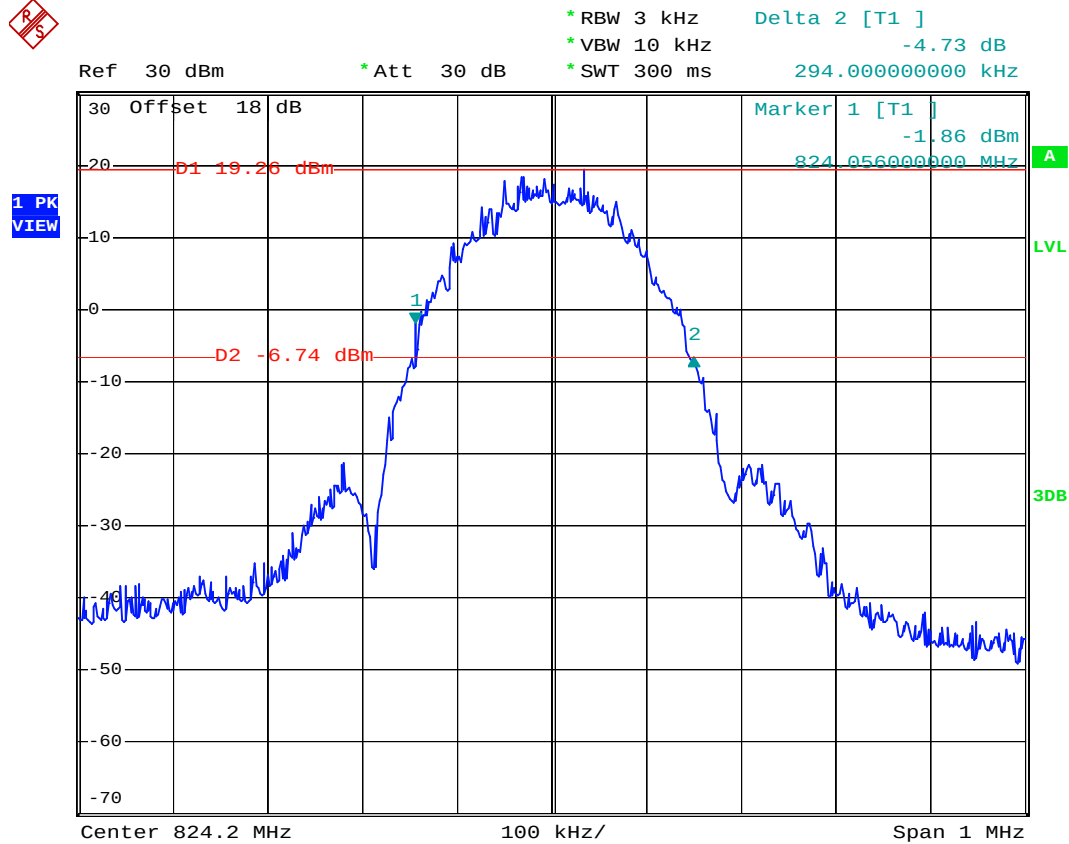
- Test Mode : GSM850 (EDGE) CH 251 99% Occupied Bandwidth
- Power State : High



Date: 8.NOV.2007 06:21:40



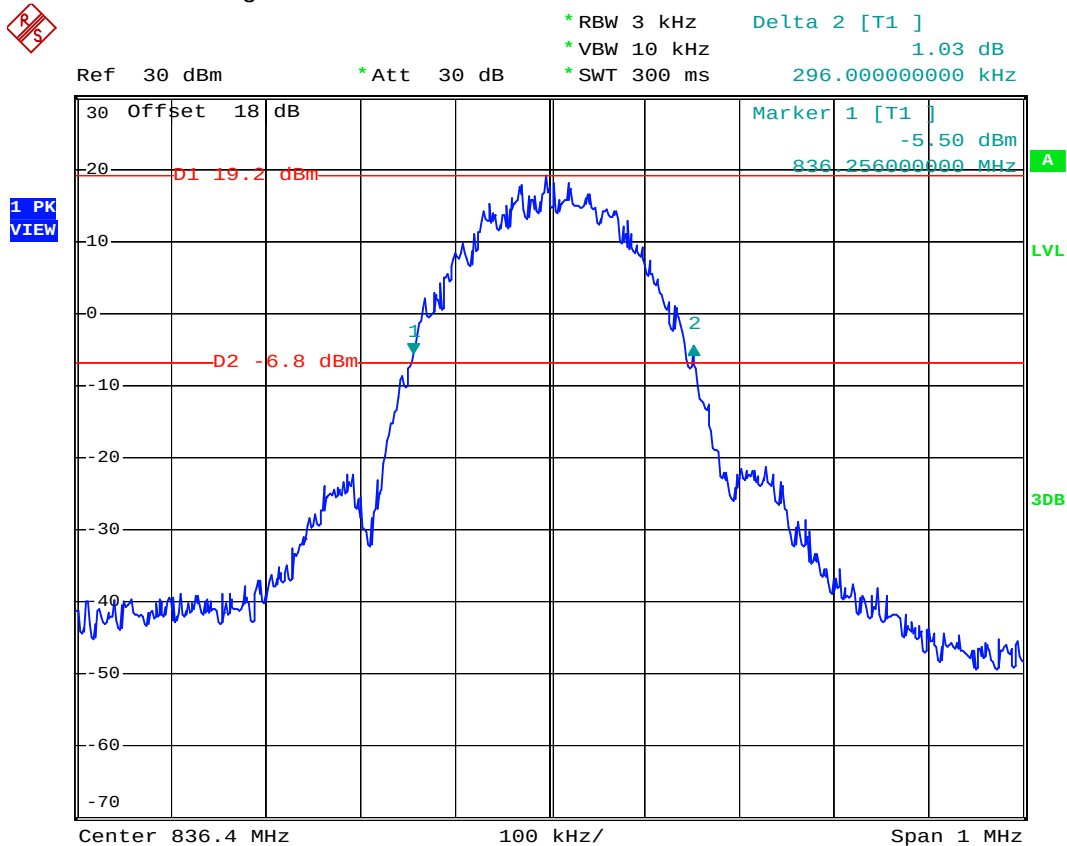
- Test Mode : GSM850 (EDGE) CH128 26dB Bandwidth
- Power State : High



Date: 8.NOV.2007 03:25:08



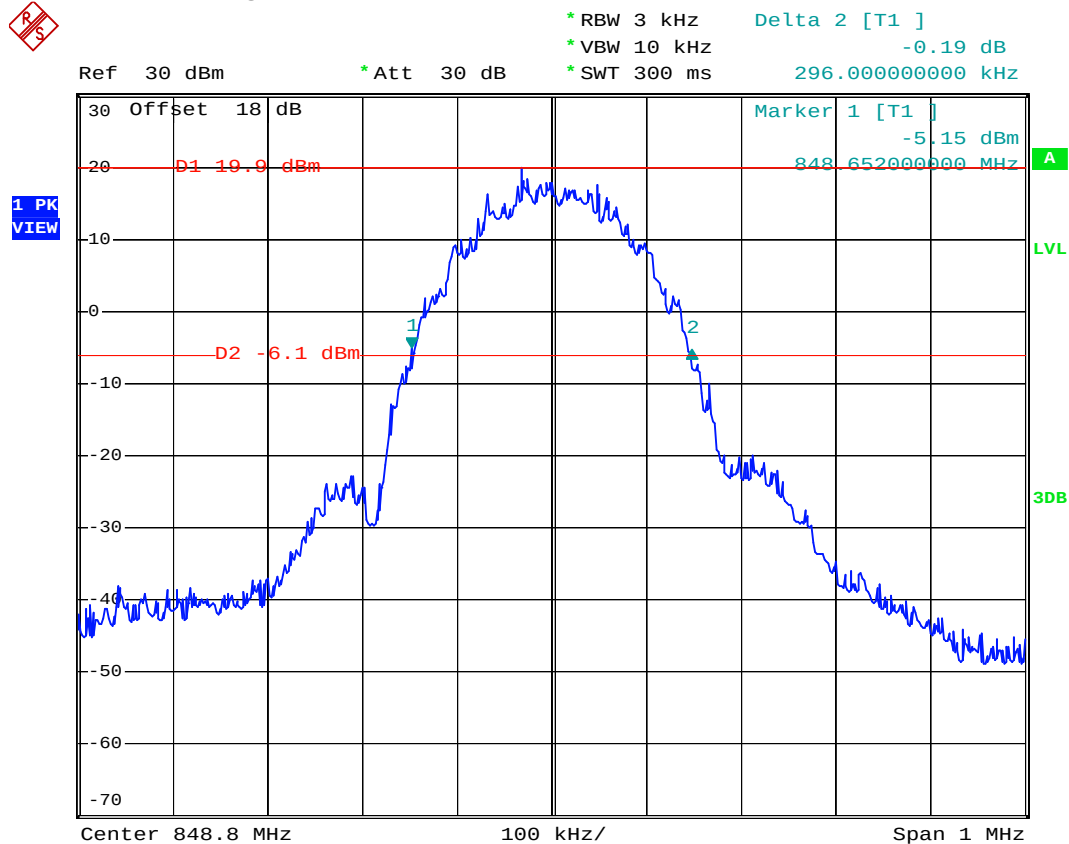
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- Power State : High



Date: 8.NOV.2007 03:26:13



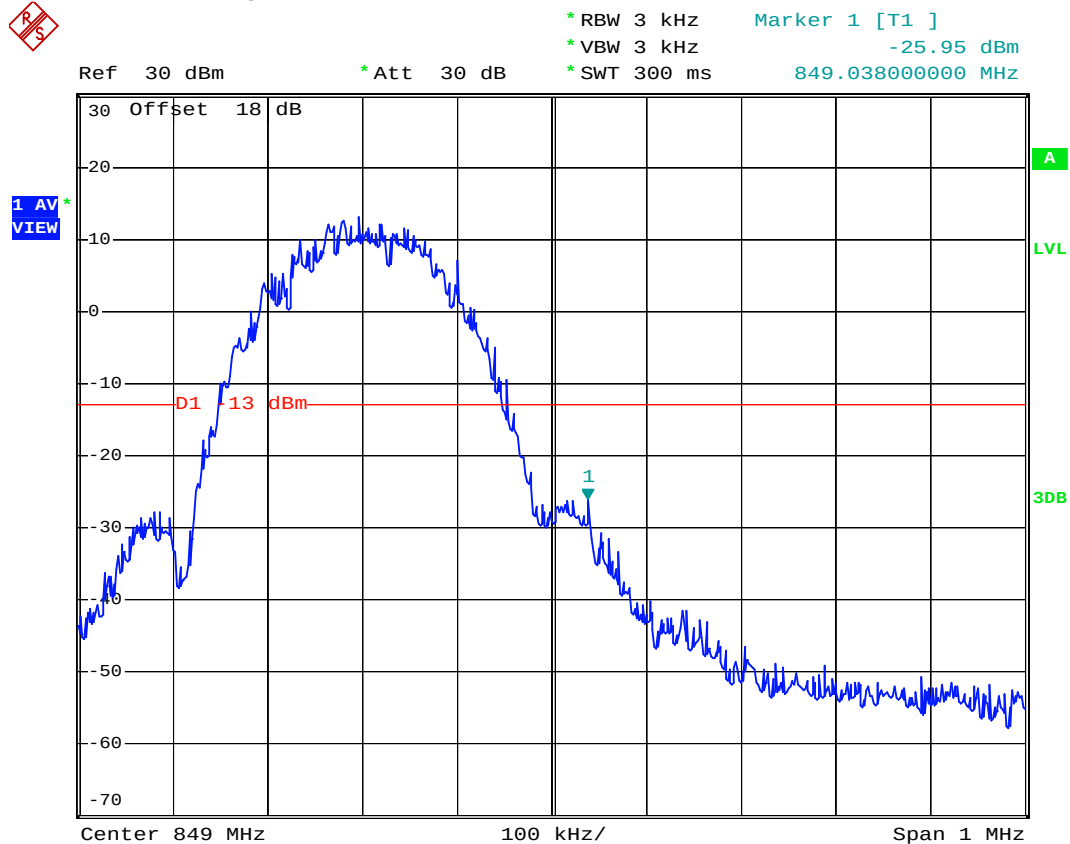
- Test Mode : GSM850 (EDGE) CH 251 26dB Bandwidth
- Power State : High



Date: 8.NOV.2007 03:27:22



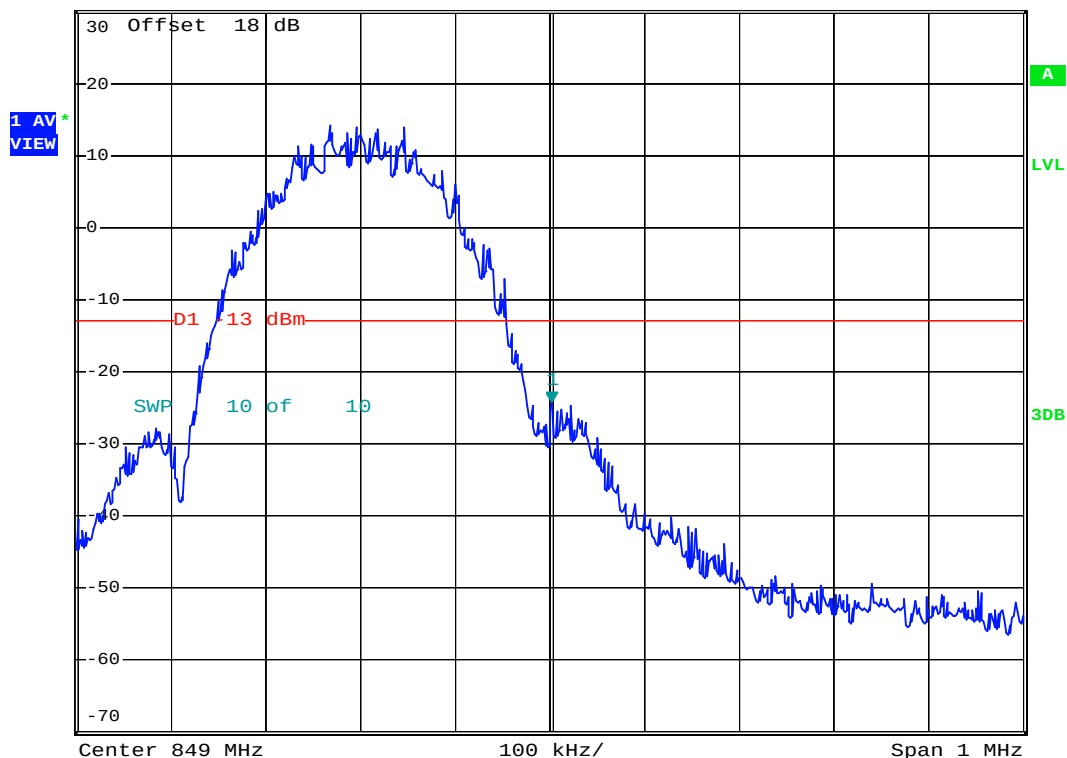
- Test Mode : GSM850 (EDGE) CH251 Higher Band Edge
- Power State : High



Date: 8.NOV.2007 03:37:26



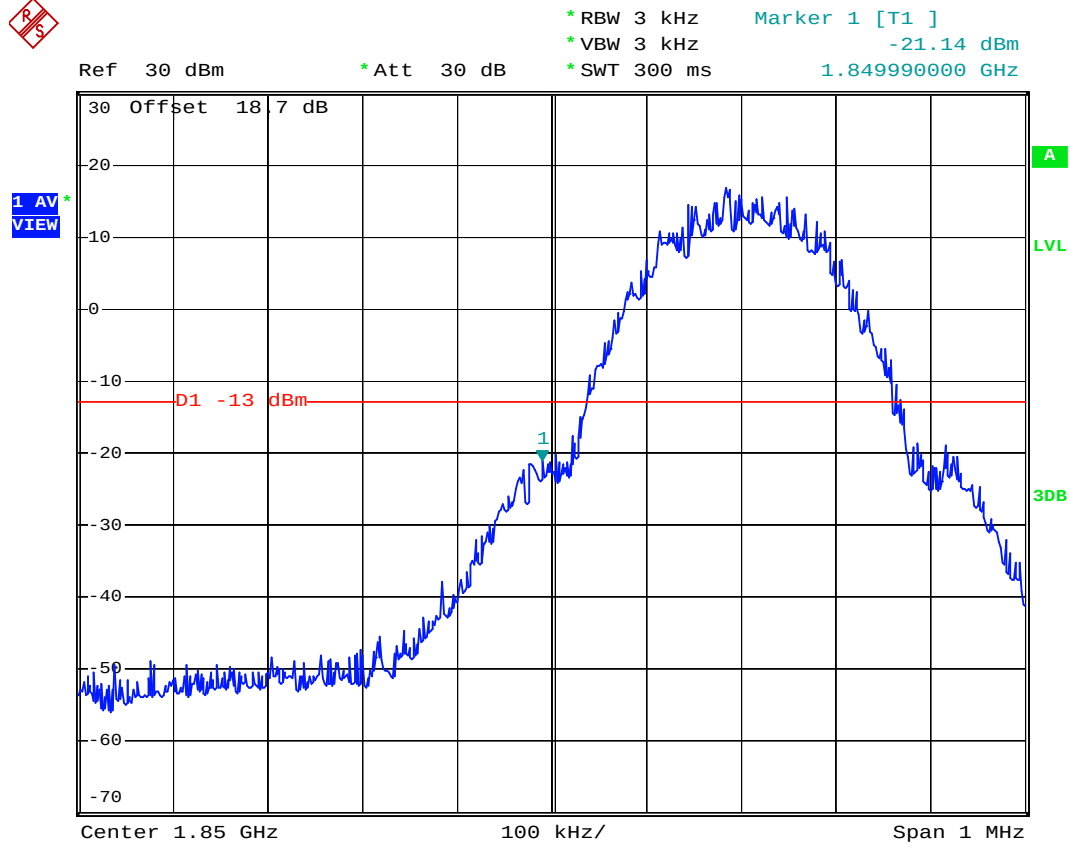
Ref 30 dBm *Att 30 dB *RBW 3 kHz Marker 1 [T1]
*VBW 10 kHz -24.23 dBm
*SWT 300 ms 849.002000000 MHz



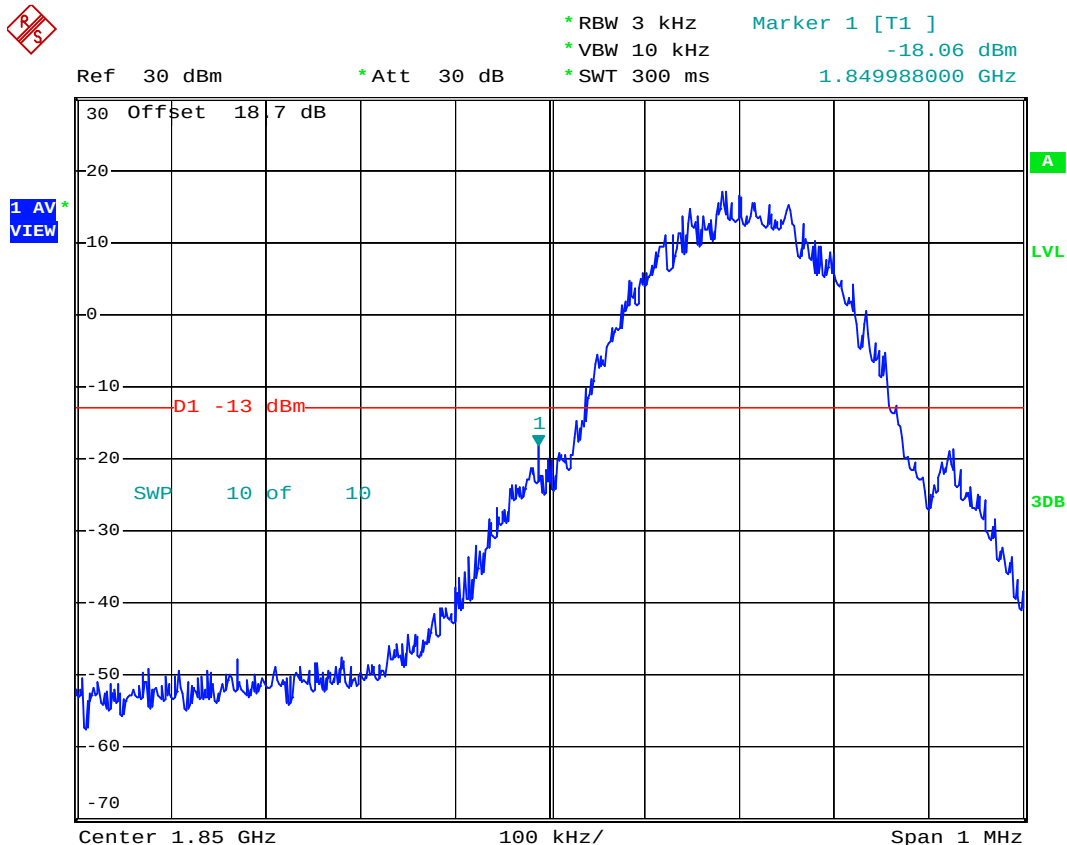
Date: 8.NOV.2007 03:36:32



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



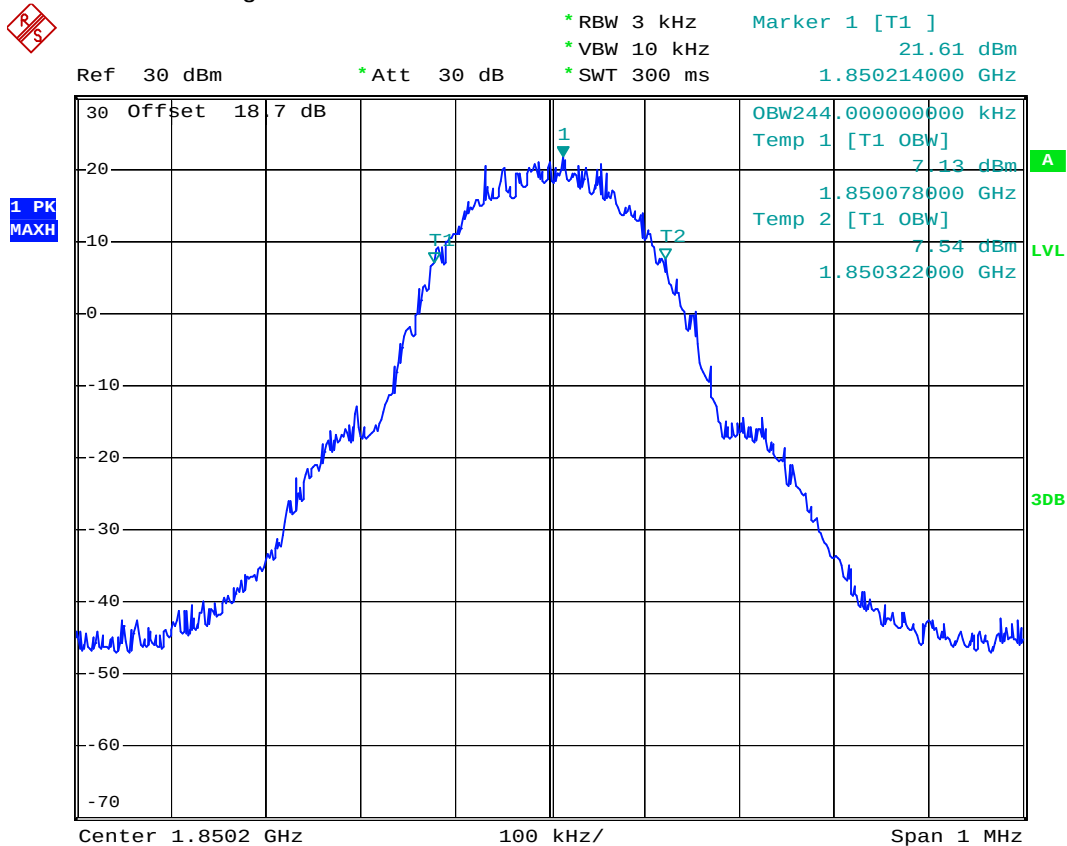
Date: 6.NOV.2007 23:21:46



Date: 6.NOV.2007 23:23:02



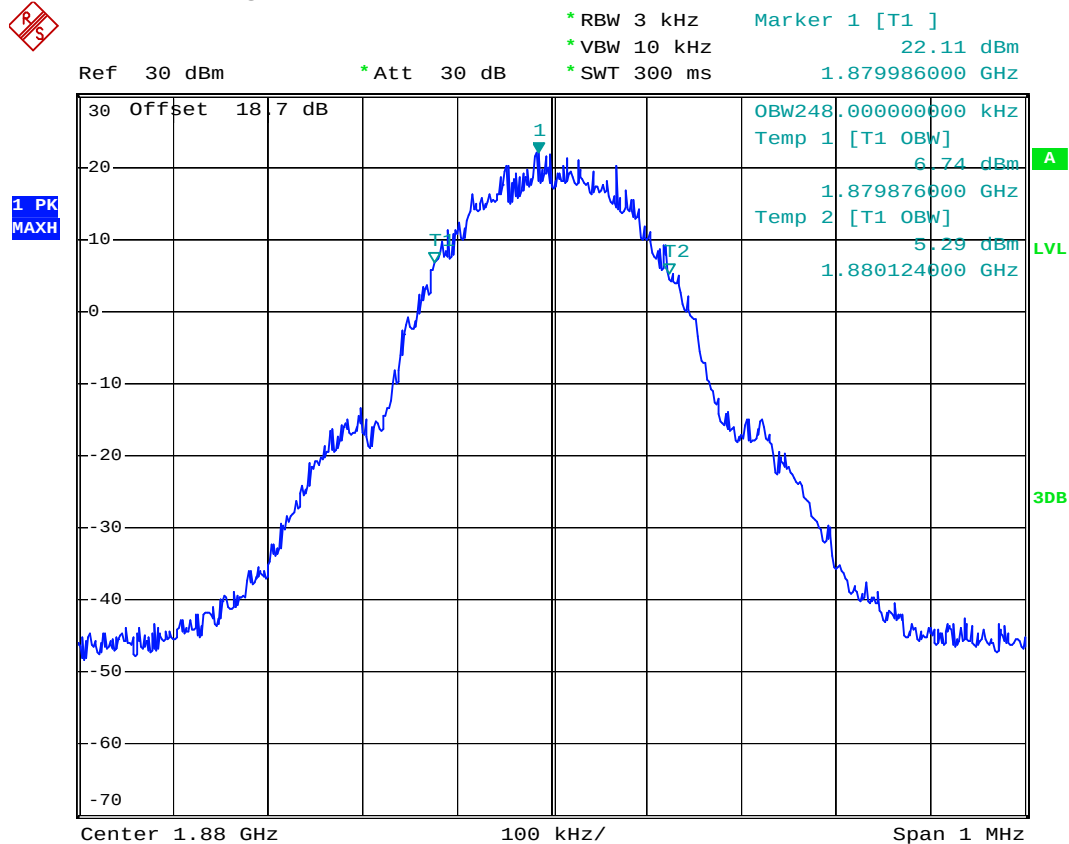
- Test Mode : PCS1900 (GSM) CH512 99% Occupied Bandwidth
- Power State : High



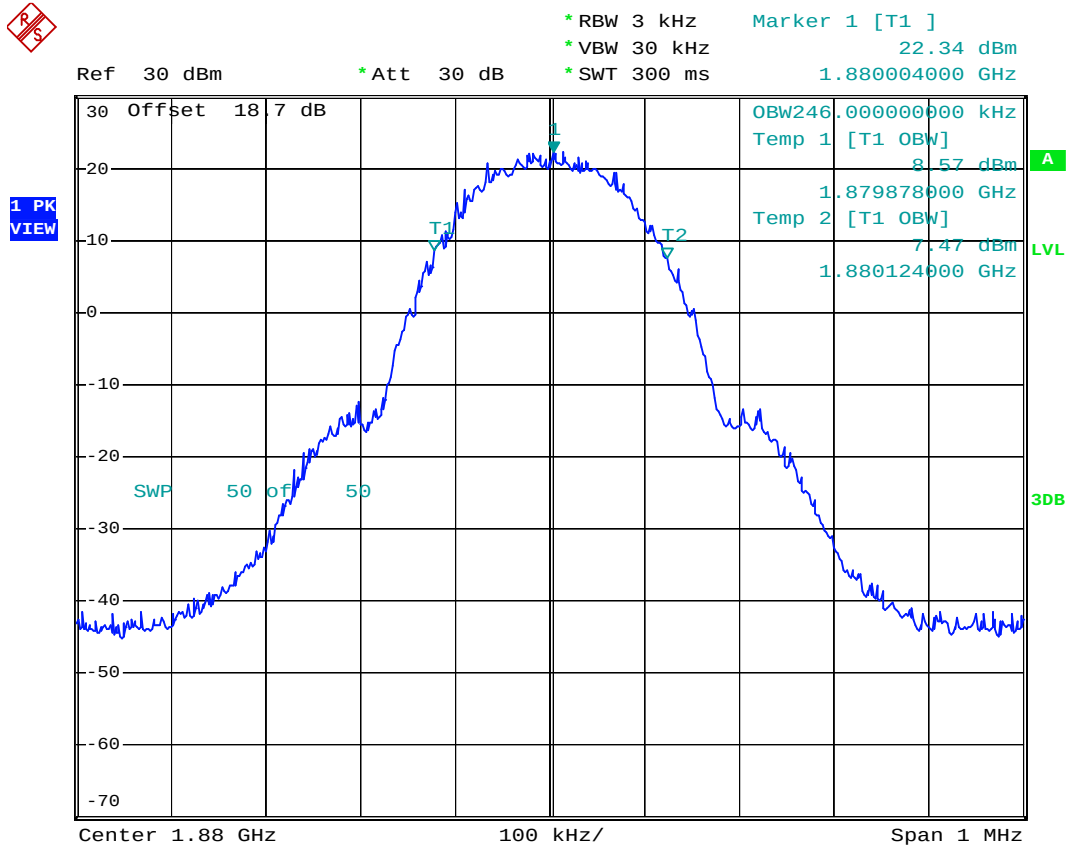
Date: 6.NOV.2007 22:20:55



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



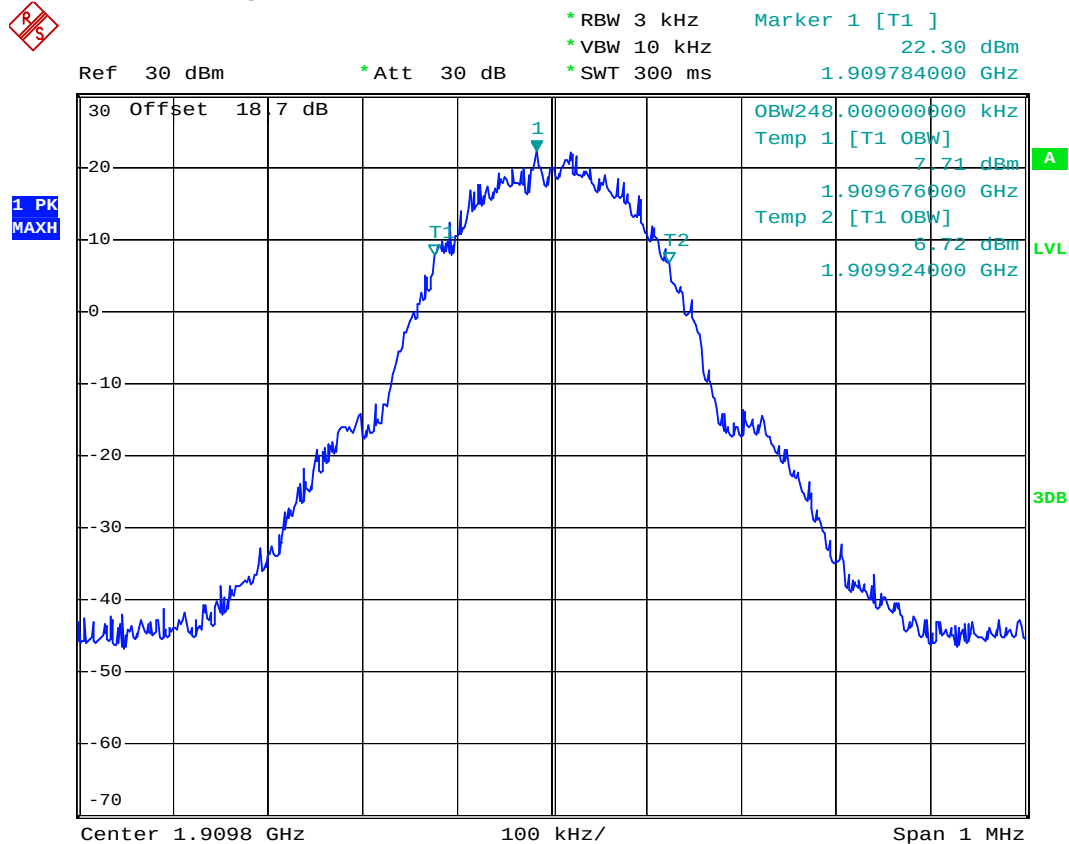
Date: 6.NOV.2007 22:21:39



Date: 6.NOV.2007 23:19:36



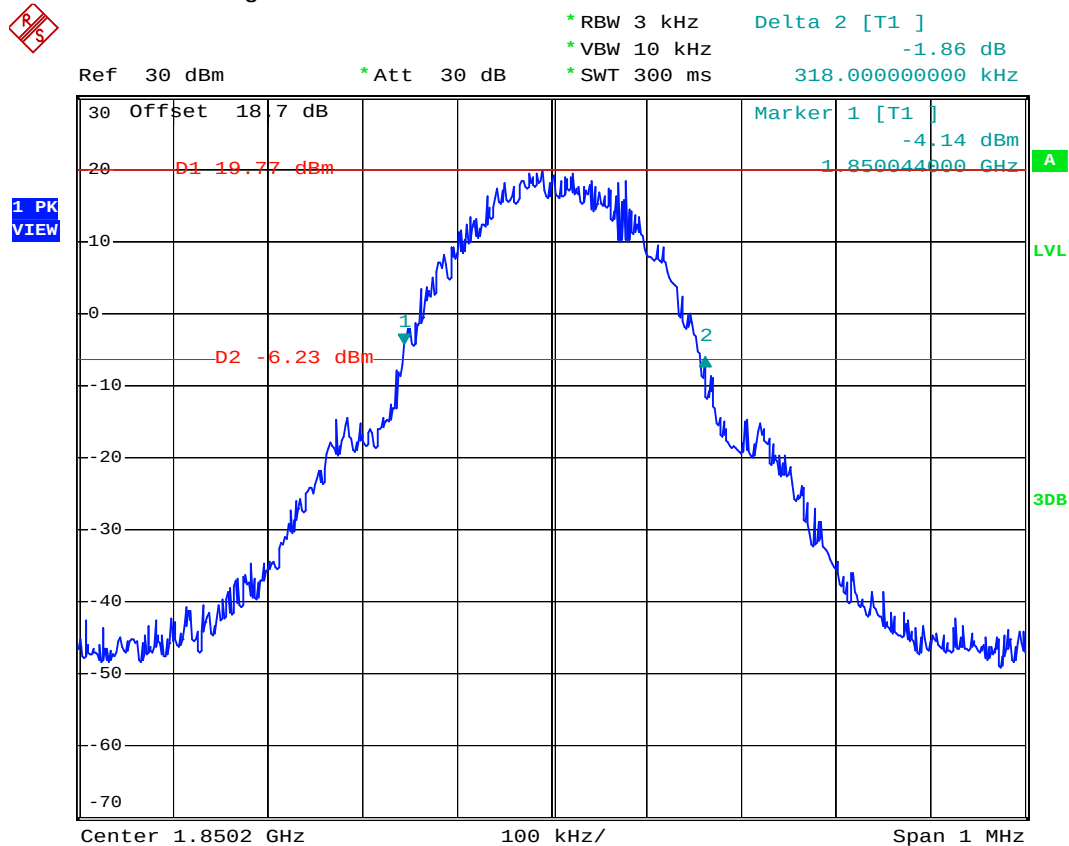
- Test Mode : PCS1900 (GSM) CH810 99% Occupied Bandwidth
- Power State : High



Date: 6.NOV.2007 22:22:49



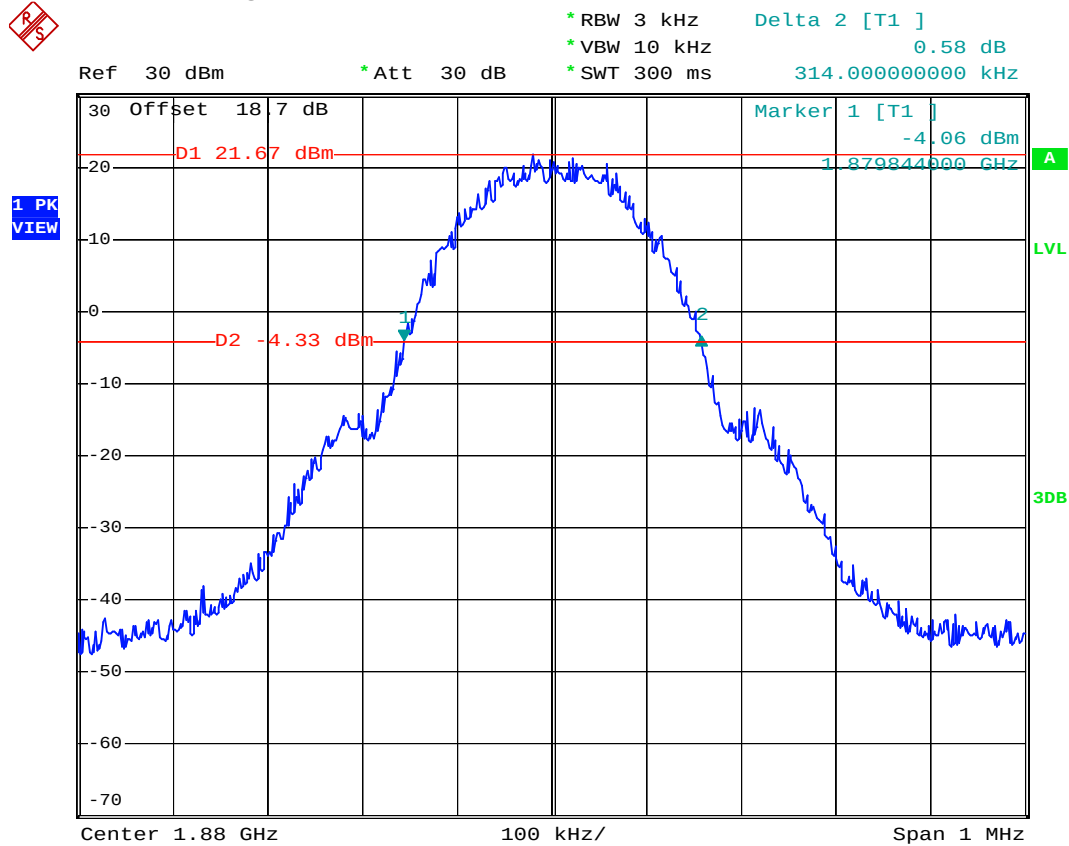
- Test Mode : PCS1900 (GSM) CH512 26dB Bandwidth
- Power State : High



Date: 6.NOV.2007 22:01:05



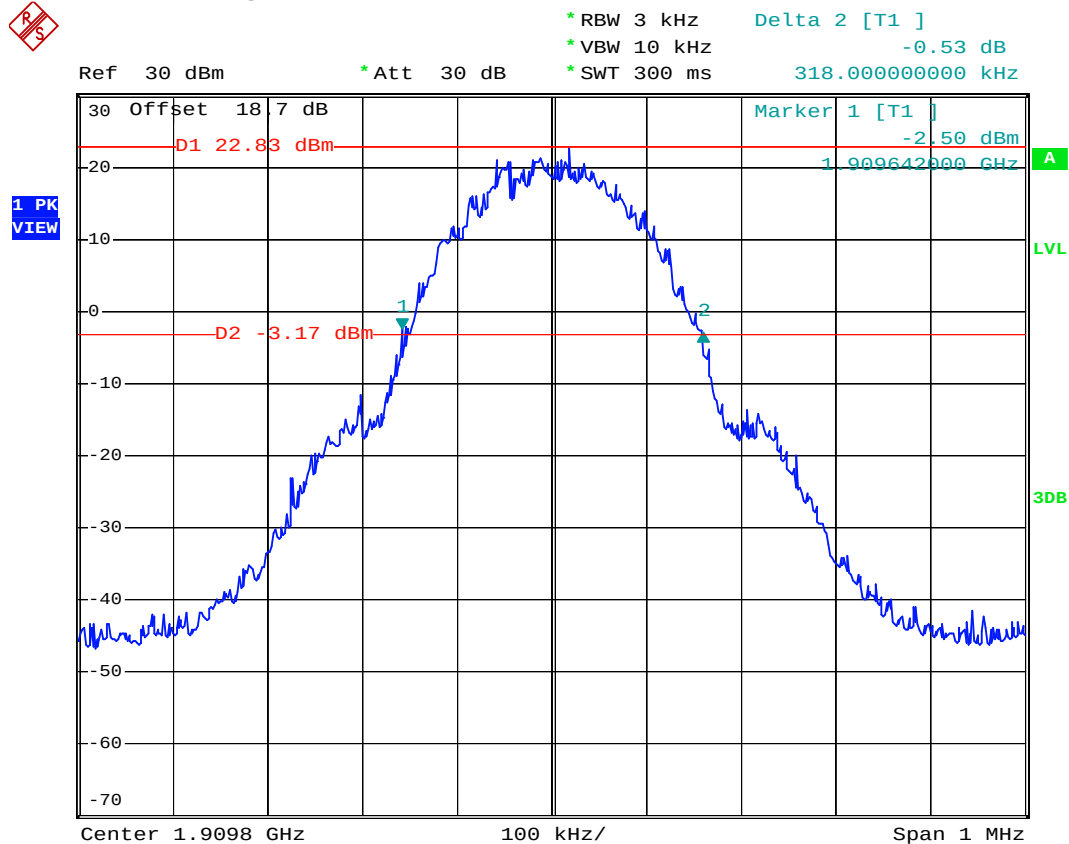
- Test Mode : PCS1900 (GSM) CH661 26dB Bandwidth
- Power State : High



Date: 6.NOV.2007 22:02:45



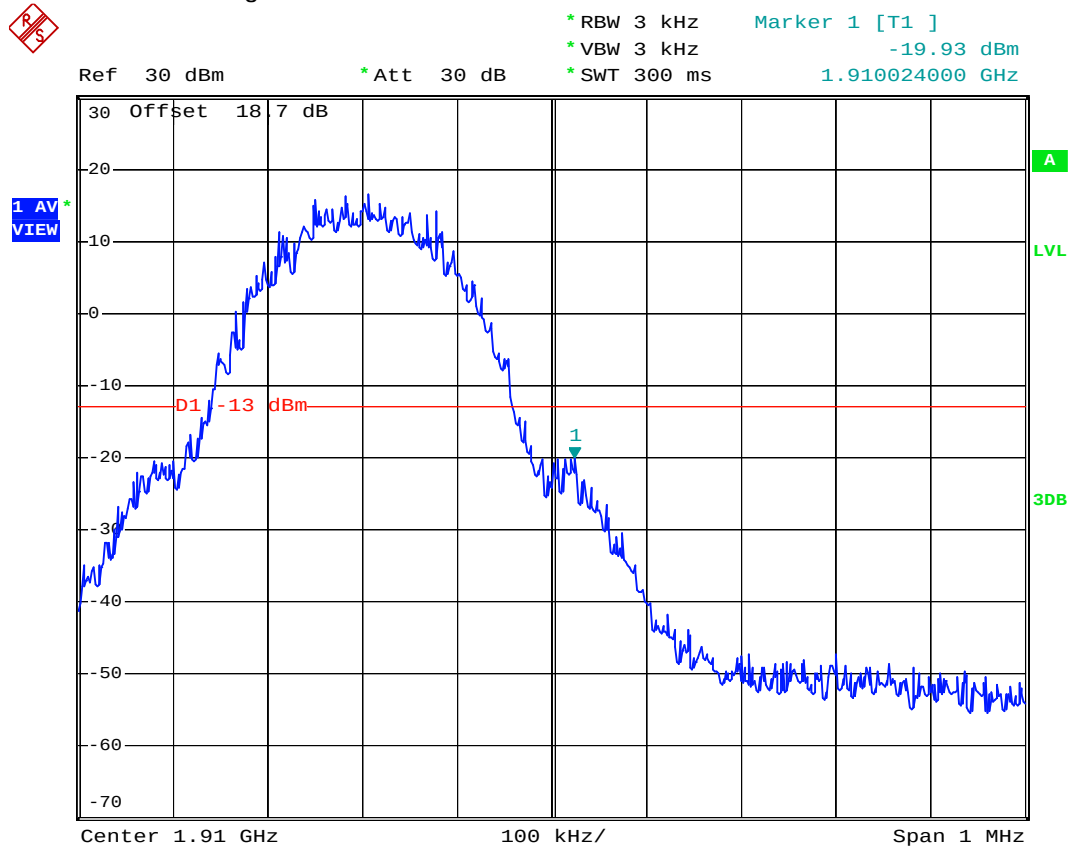
- Test Mode : PCS1900 (GSM) CH810 26dB Bandwidth
- Power State : High



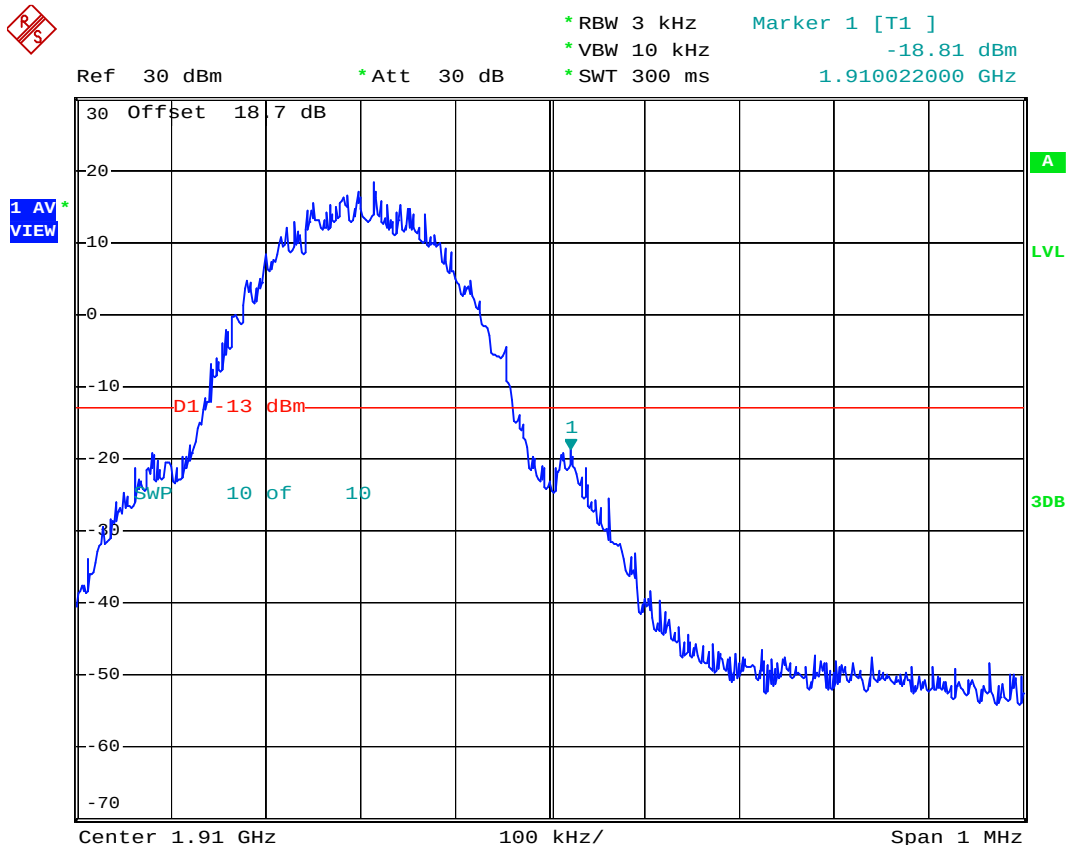
Date: 6.NOV.2007 22:05:45



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



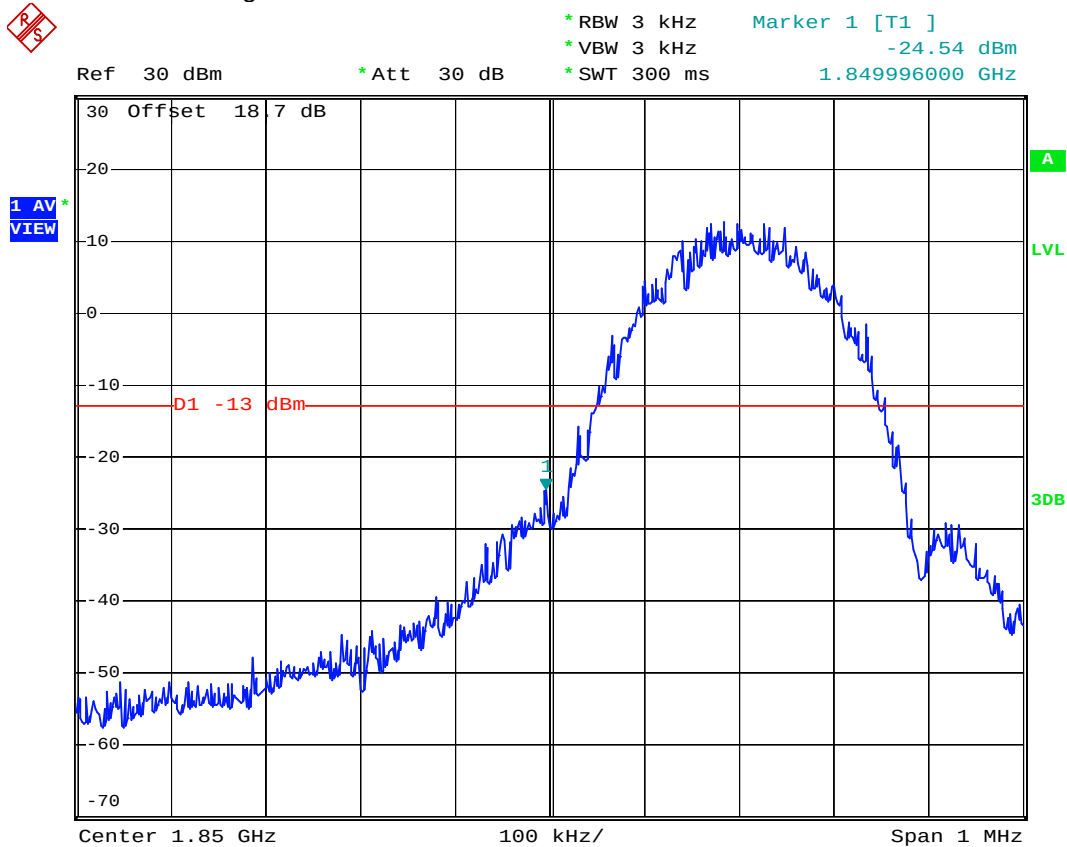
Date: 6.NOV.2007 23:26:14



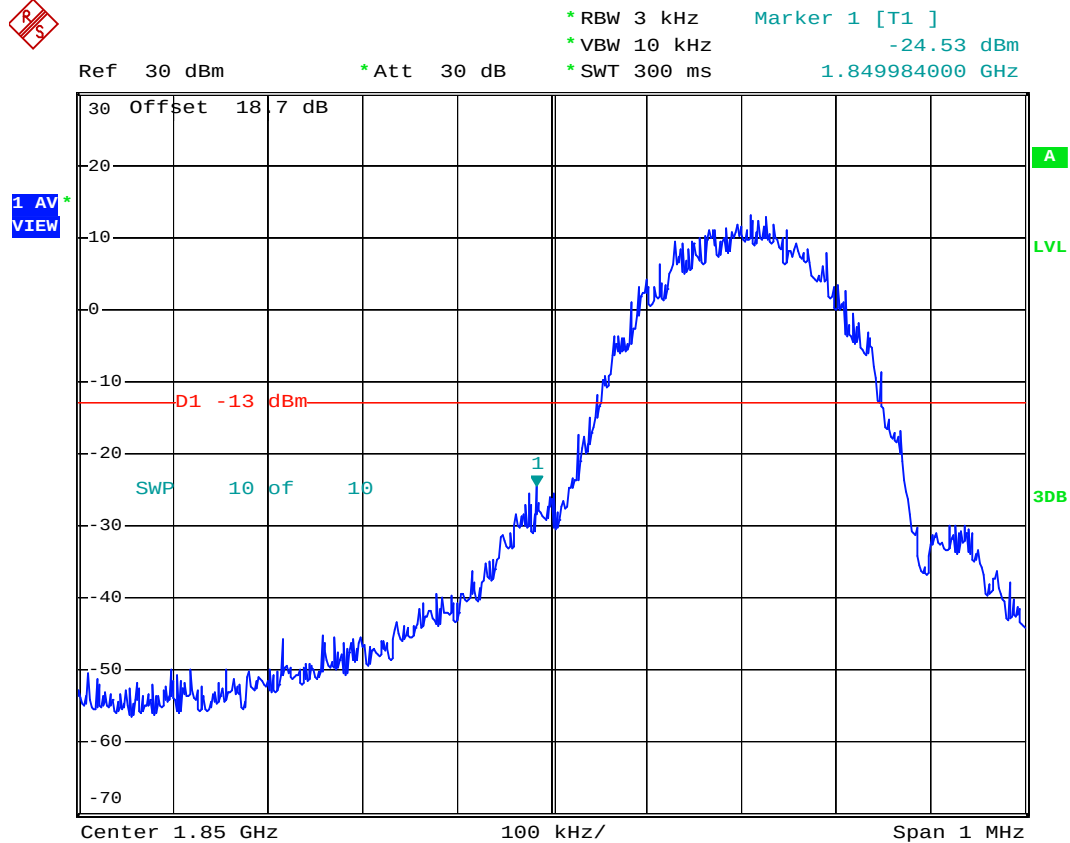
Date: 6.NOV.2007 23:24:52



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



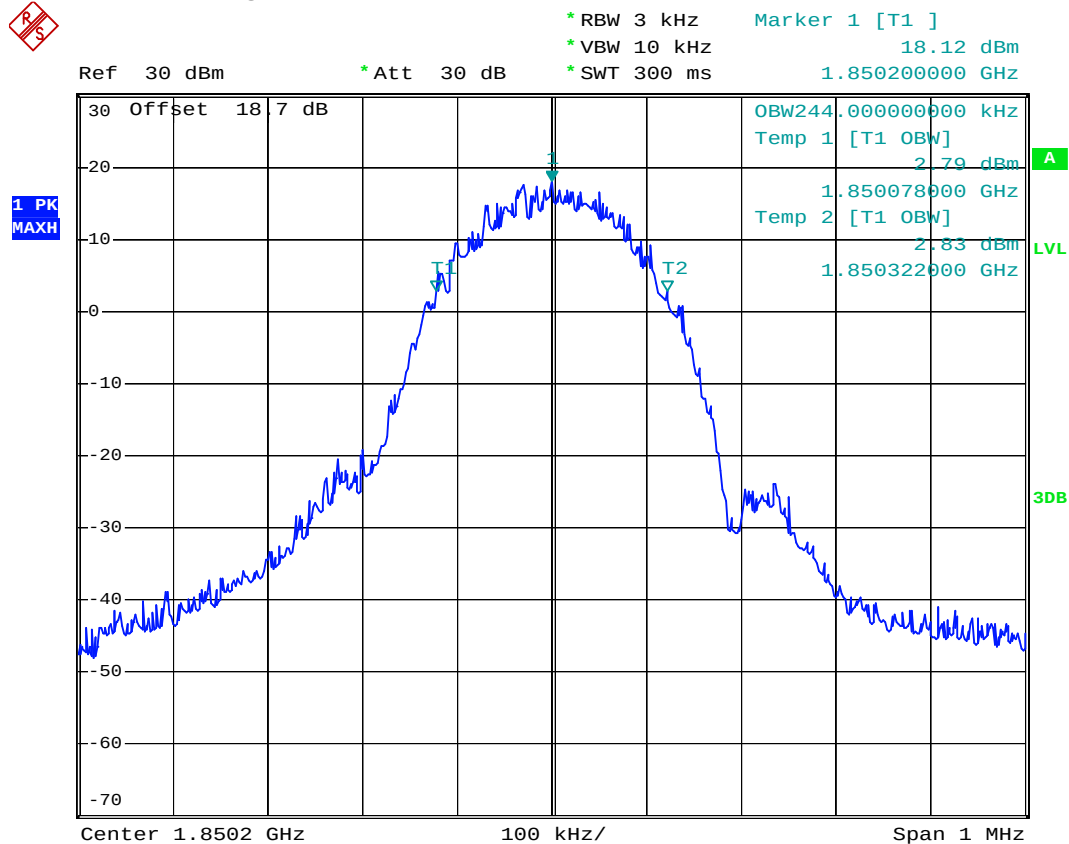
Date: 8.NOV.2007 04:41:16



Date: 8.NOV.2007 04:42:19



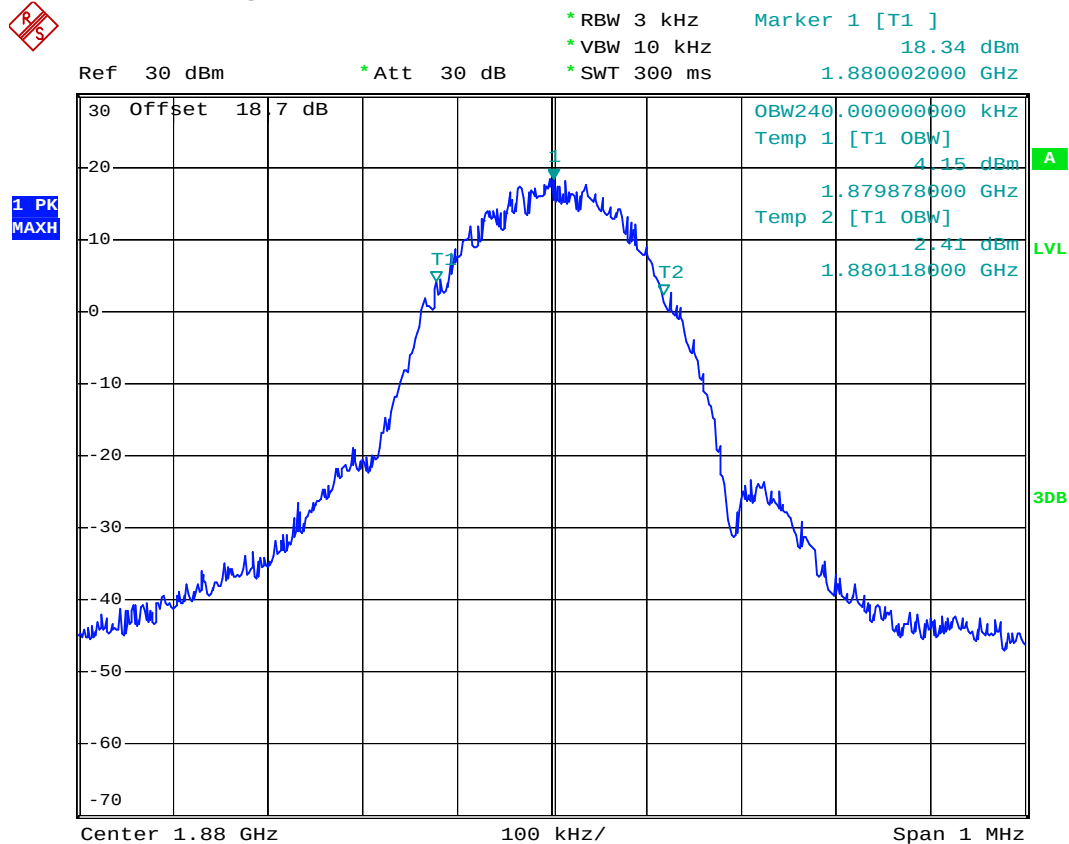
- Test Mode : PCS1900 (EDGE) CH512 99% Occupied Bandwidth
- Power State : High



Date: 8.NOV.2007 04:38:02



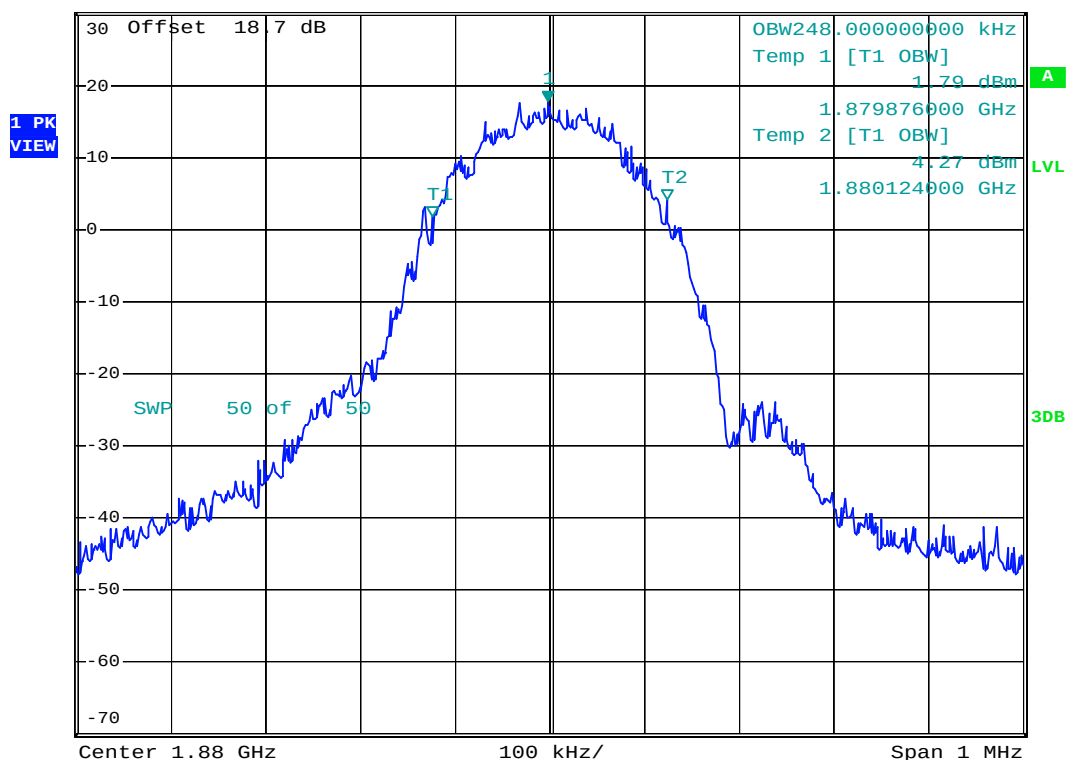
- Test Mode : PCS1900 (EDGE) CH661 99% Occupied Bandwidth
- Power State : High



Date: 8.NOV.2007 04:38:59



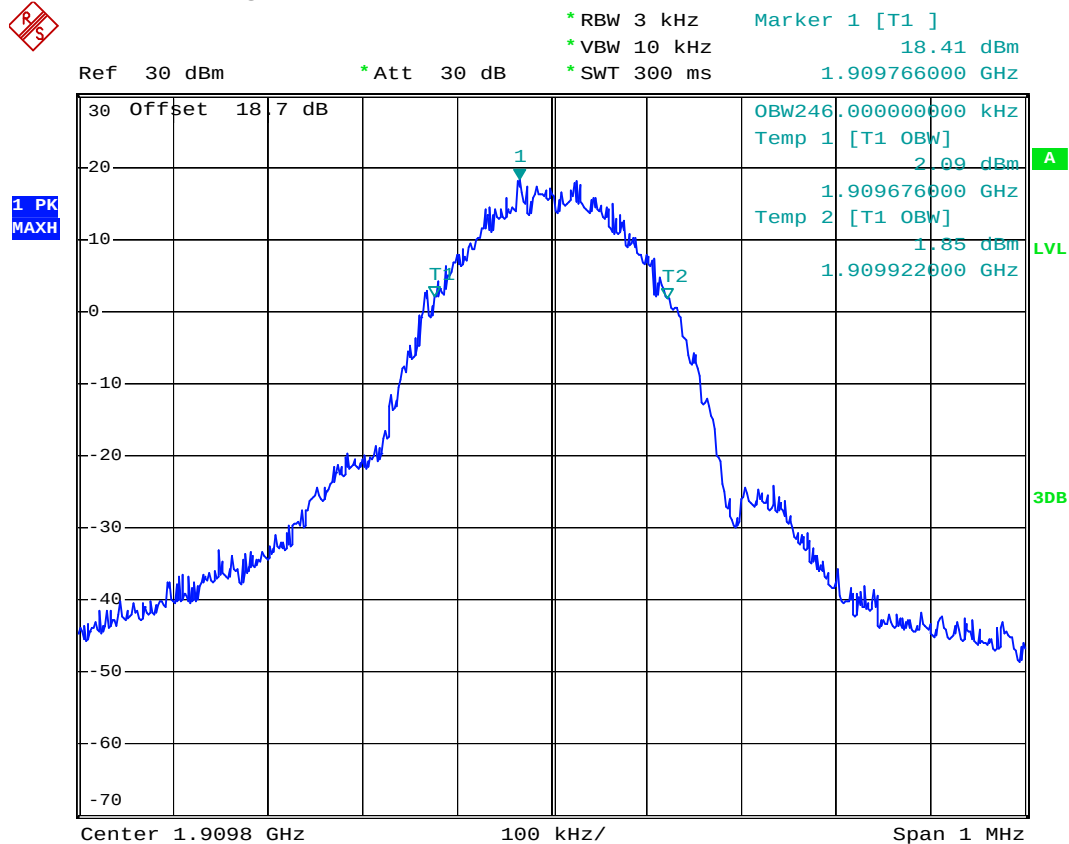
Ref 30 dBm *Att 30 dB *RBW 3 kHz *VBW 30 kHz *SWT 300 ms Marker 1 [T1] 17.80 dBm 1.879998000 GHz



Date: 8.NOV.2007 04:39:56



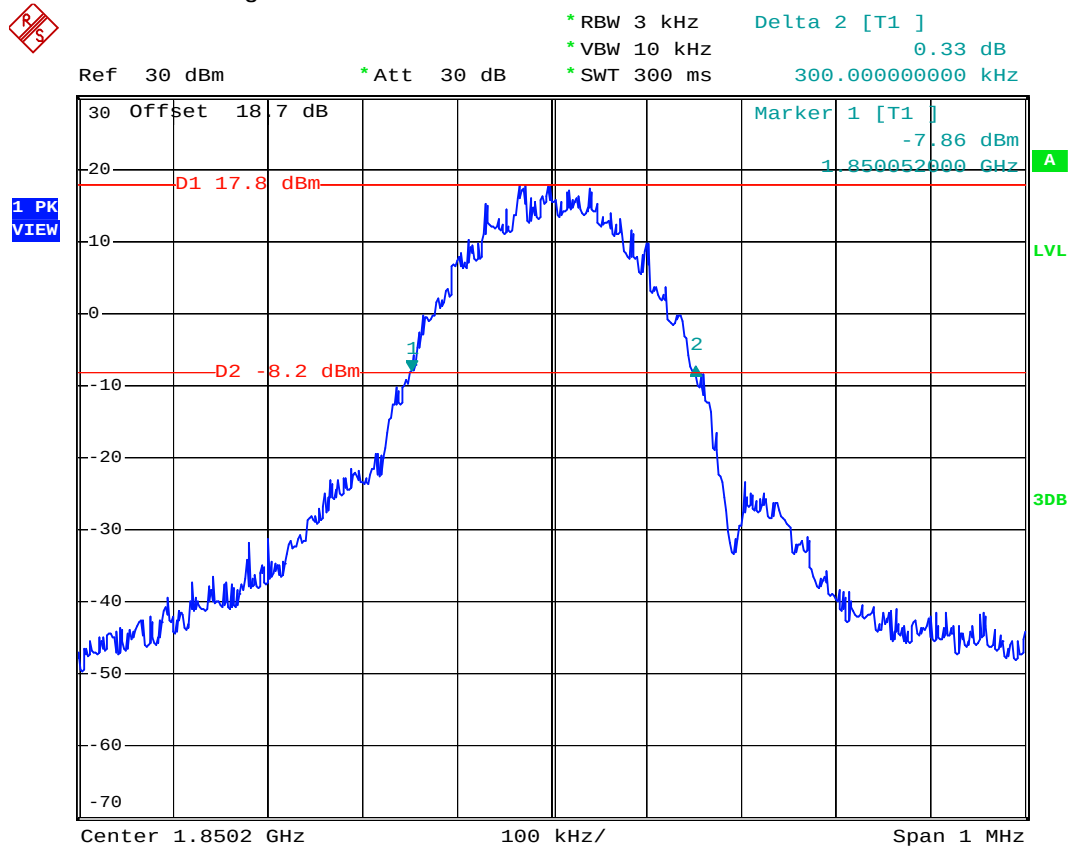
- Test Mode : PCS1900 (EDGE) CH810 99% Occupied Bandwidth
- Power State : High



Date: 8.NOV.2007 04:37:05



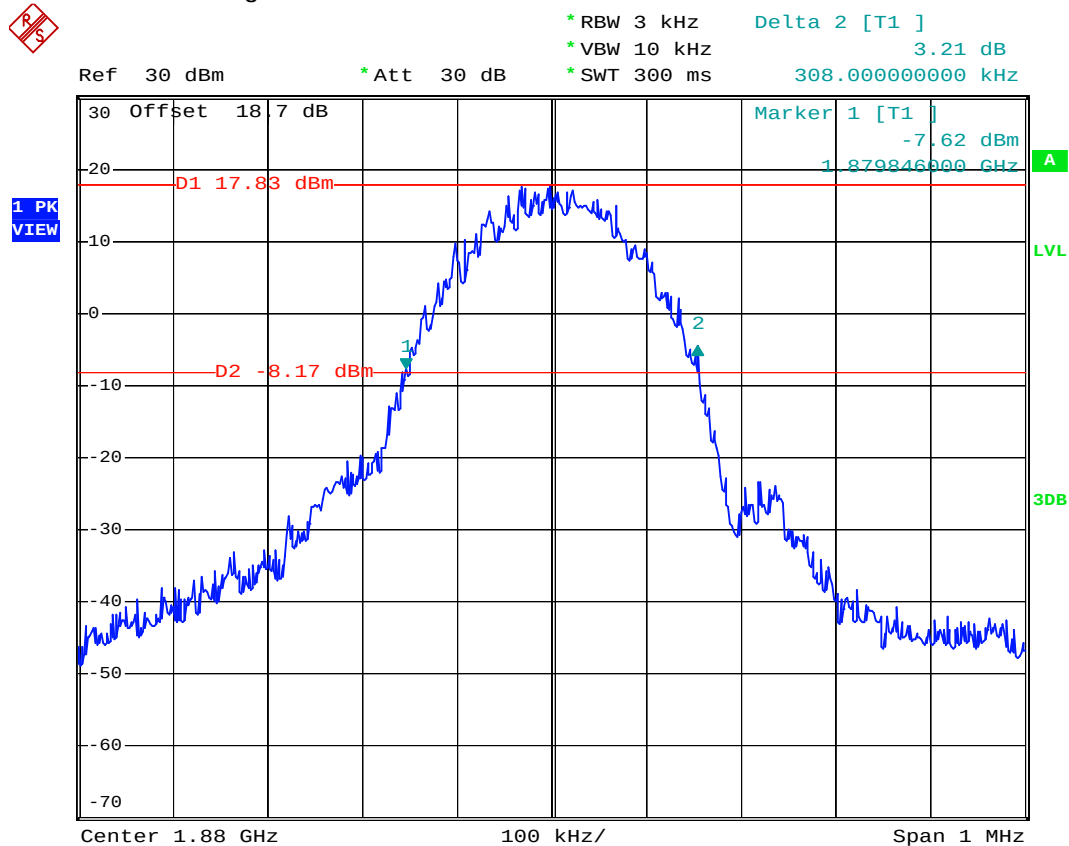
- Test Mode : PCS1900 (EDGE) CH512 26dB Bandwidth
- Power State : High



Date: 8.NOV.2007 04:34:12



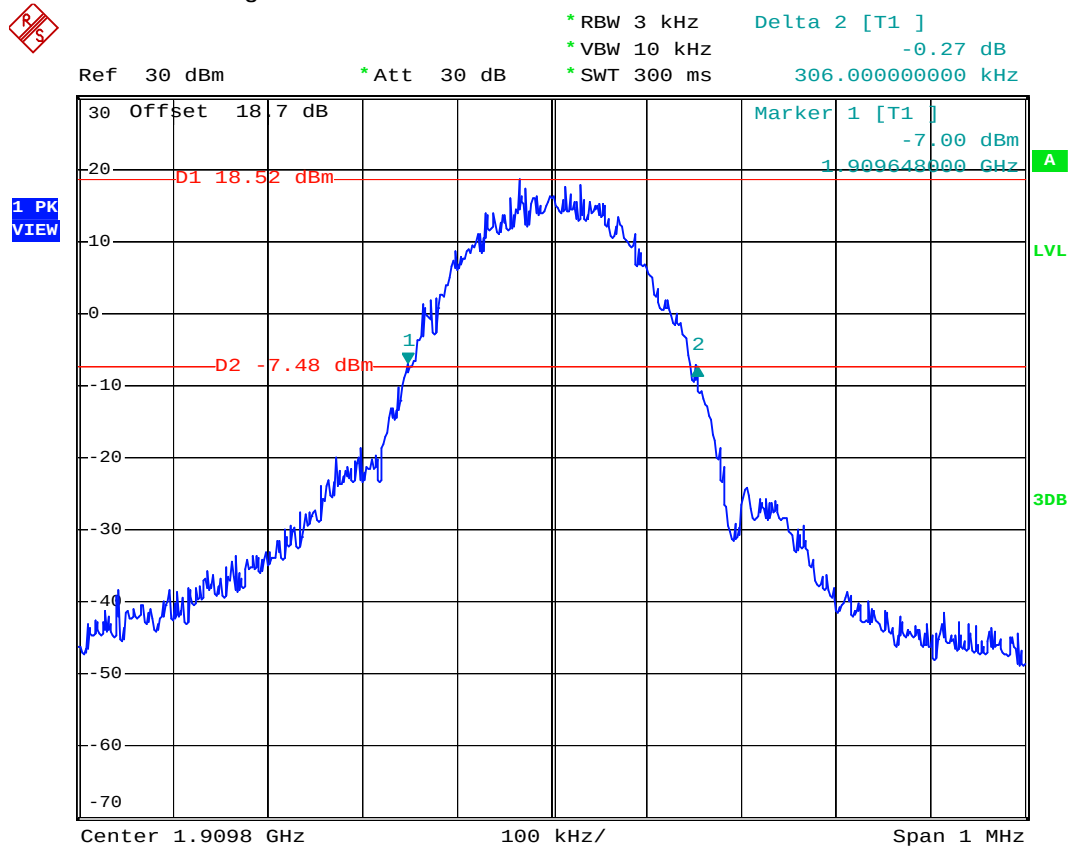
- Test Mode : PCS1900 (EDGE) CH661 26dB Bandwidth
- Power State : High



Date: 8.NOV.2007 04:35:20



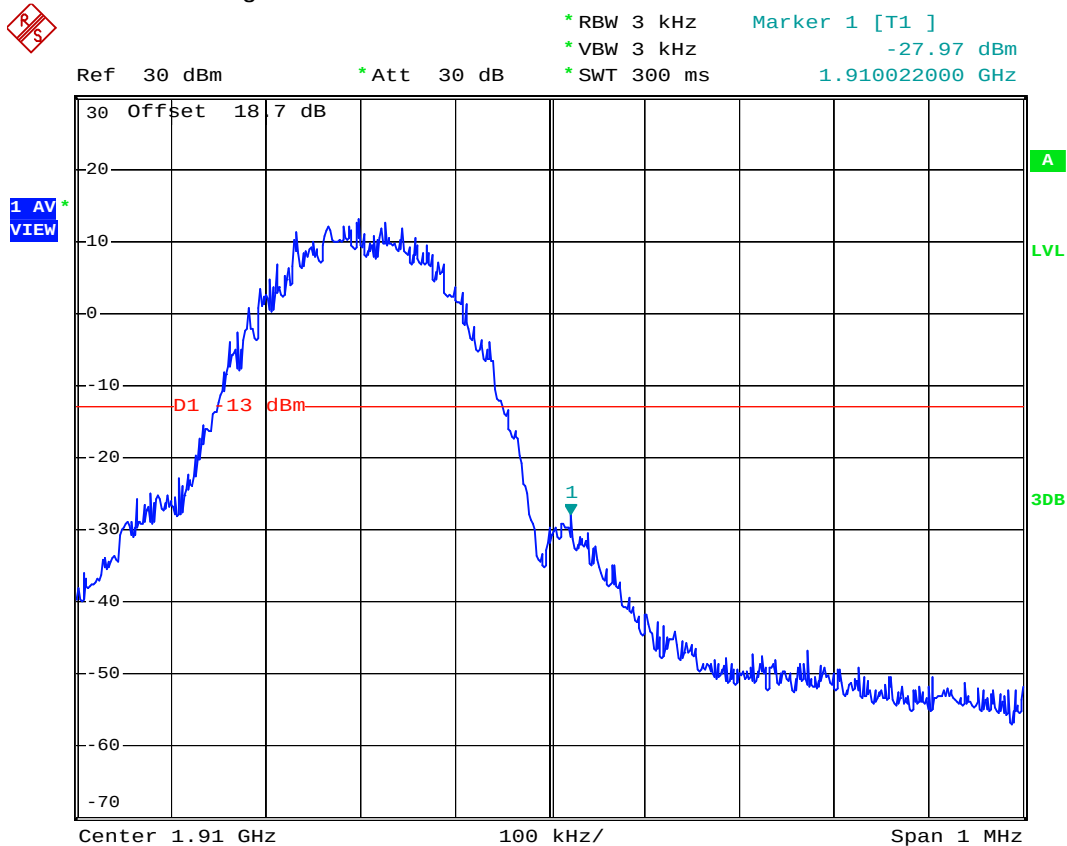
- Test Mode : PCS1900 (EDGE) CH810 26dB Bandwidth
- Power State : High



Date: 8.NOV.2007 04:36:11



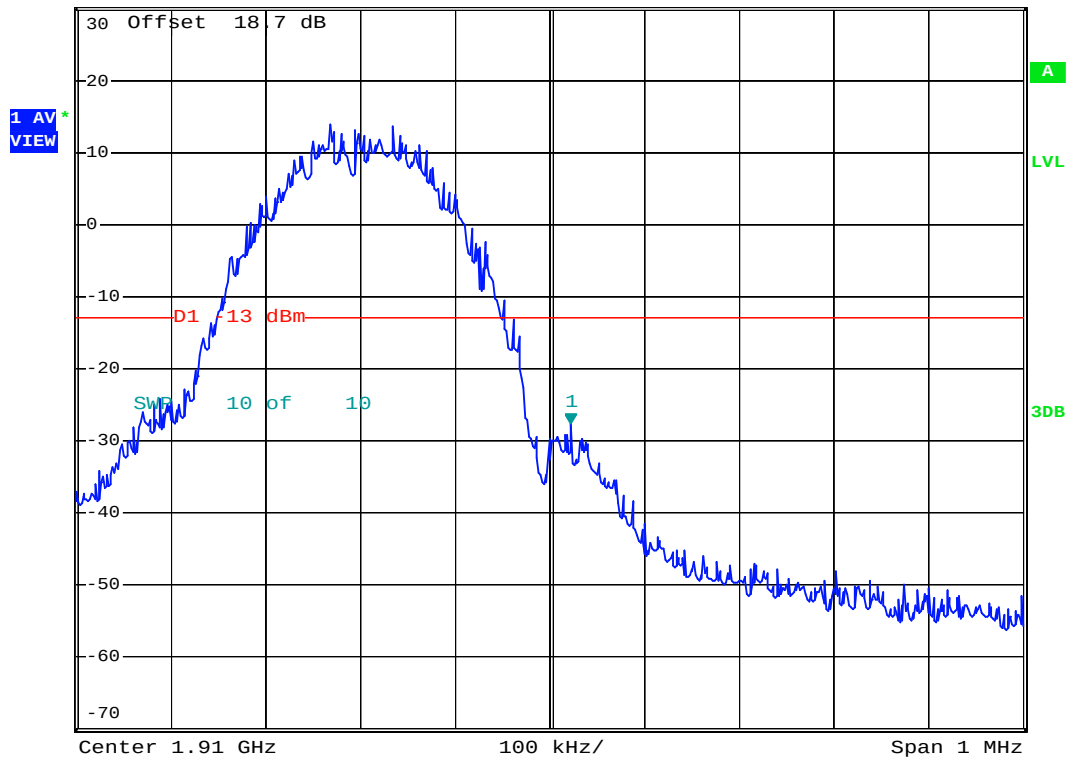
- Test Mode : PCS1900(EDGE) CH810 Higher Band Edge
- Power State : High



Date: 8.NOV.2007 04:49:08



Ref 30 dBm *Att 30 dB *RBW 3 kHz Marker 1 [T1]
*VBW 10 kHz -27.66 dBm
*SWT 300 ms 1.910022000 GHz



Date: 8.NOV.2007 04:43:54

4.5 Conducted Emission

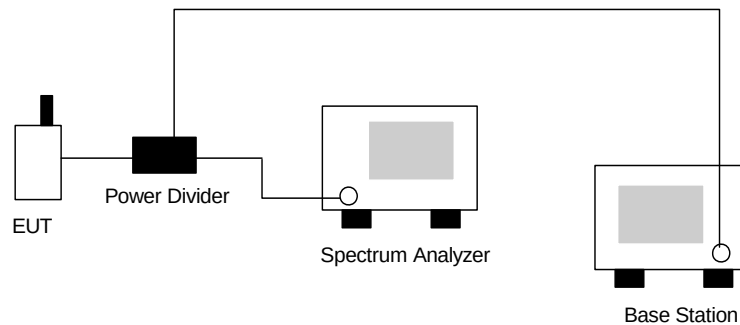
4.5.1 Measurement Instruments

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.

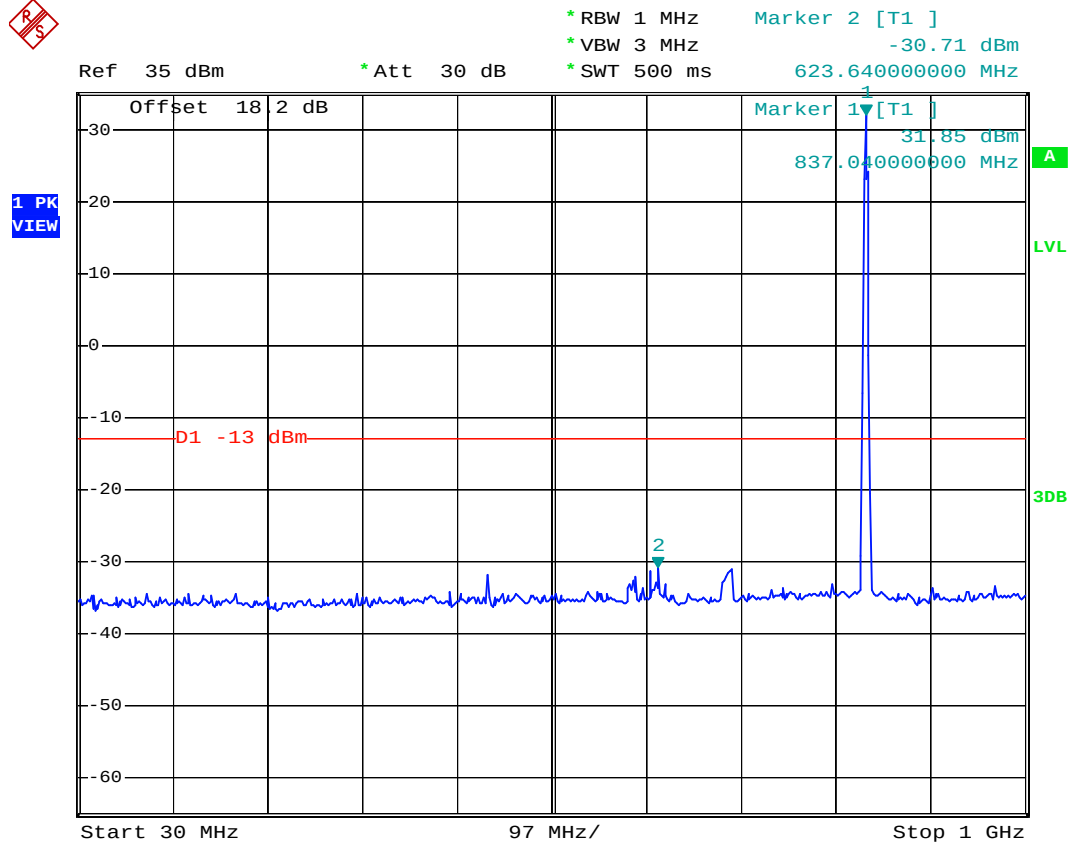
4.5.3 Test Setup Layout





4.5.4 Test Result

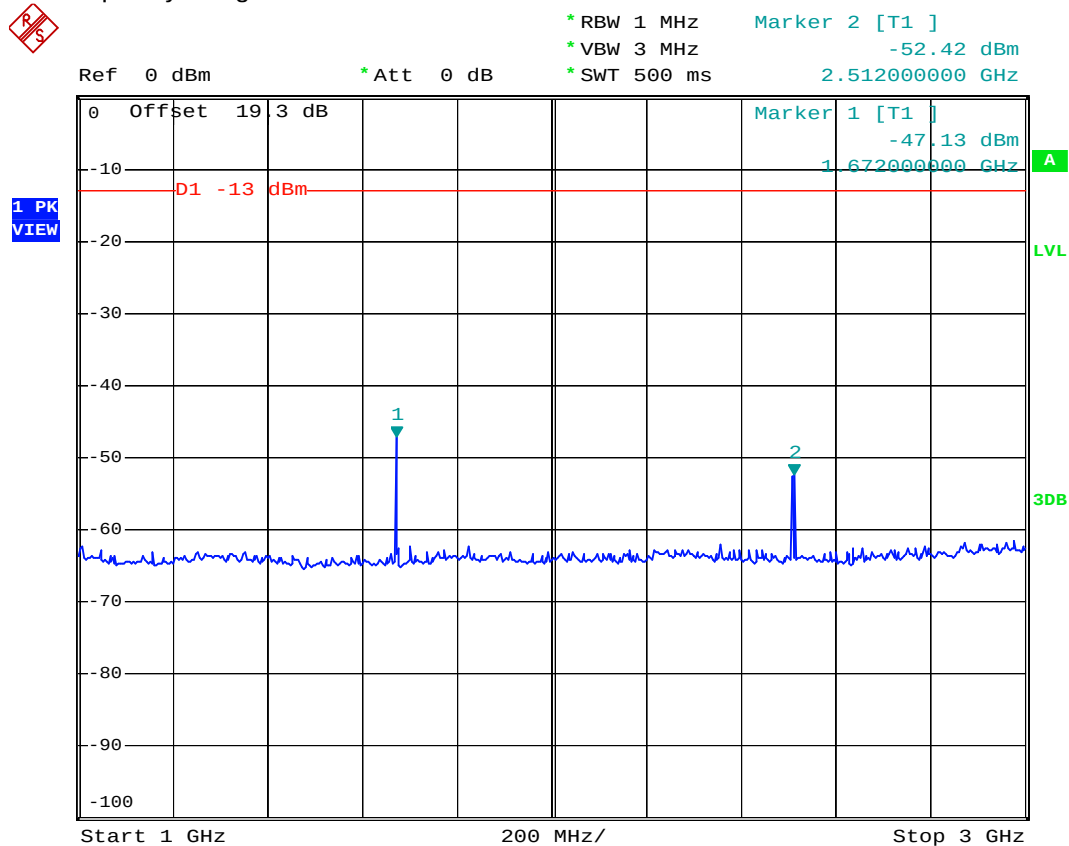
- Mode 1
- Test Mode : GSM850 (GSM) CH189
- Frequency Range : 30M-1G



Date: 8.NOV.2007 04:57:58



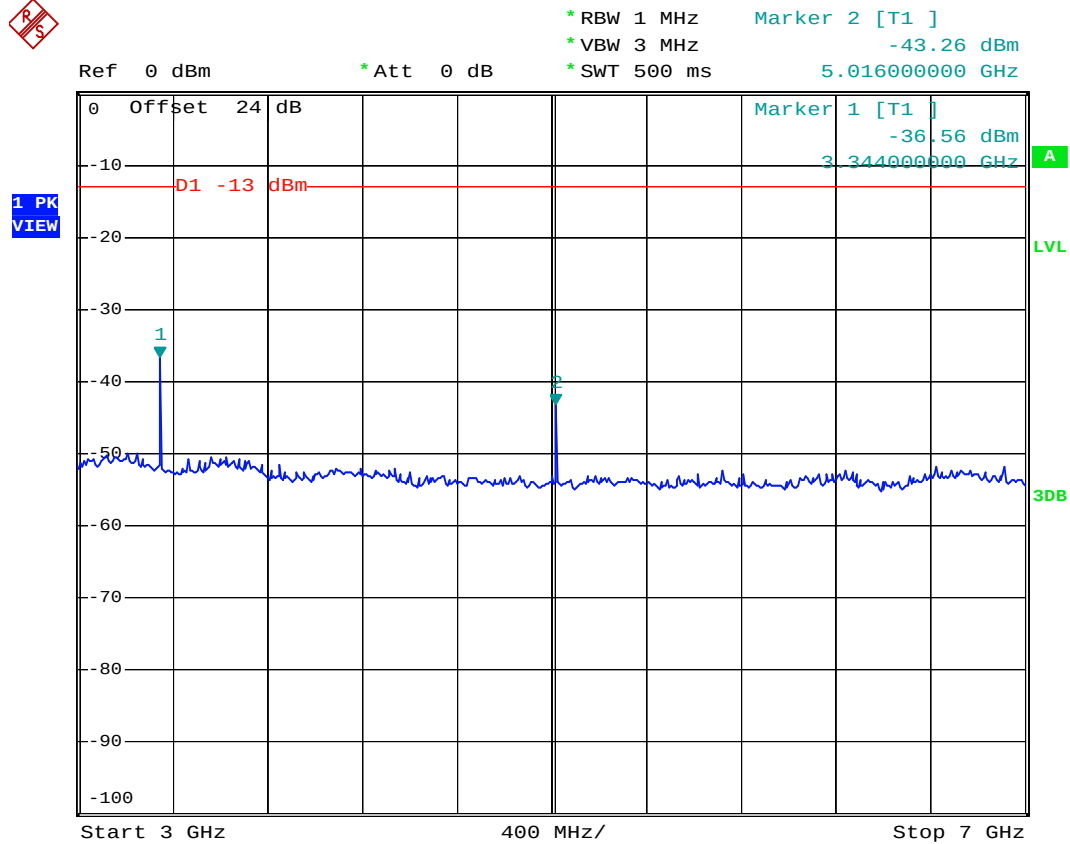
- Test Mode : GSM850 (GSM) CH189
- Frequency Range : 1G-3G



Date: 8.NOV.2007 05:27:37



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



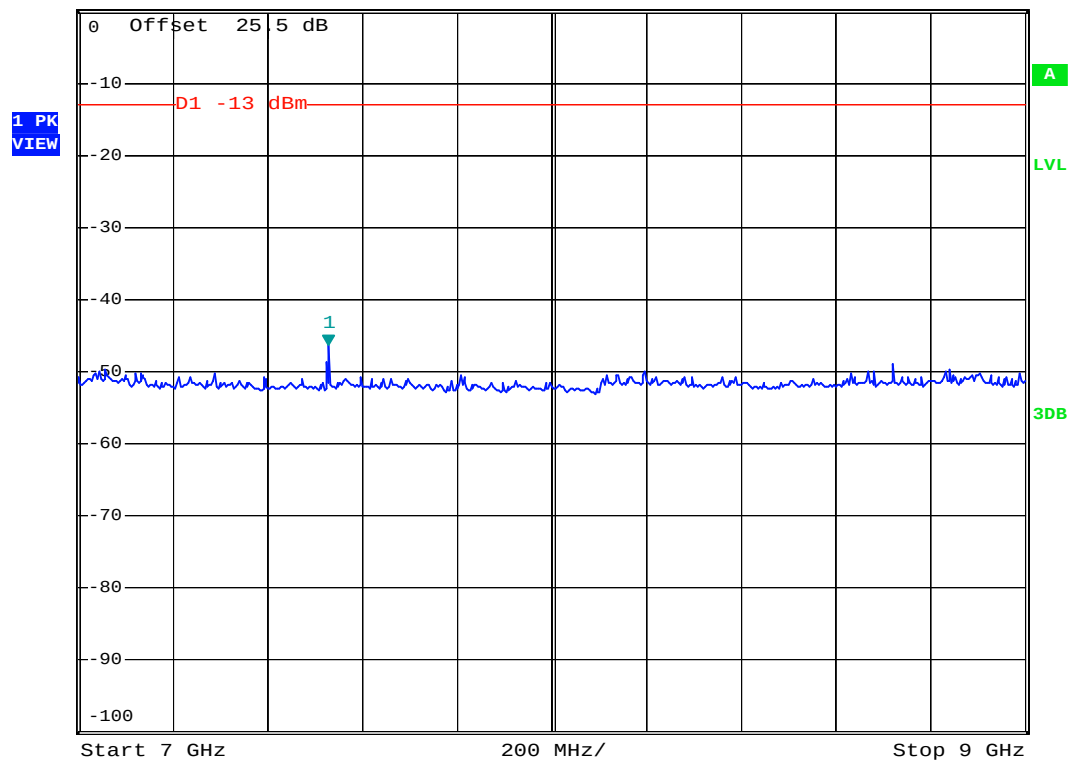
Date: 8.NOV.2007 05:43:23



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



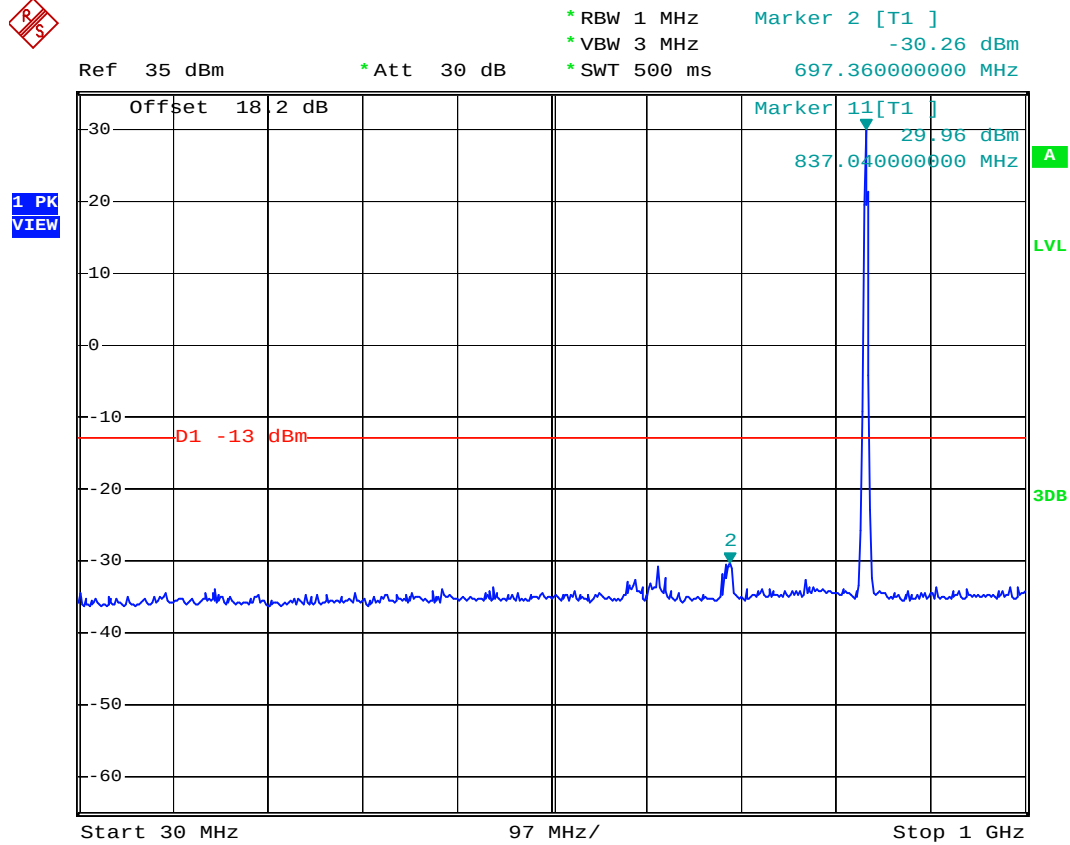
Ref 0 dBm * Att 0 dB * RBW 1 MHz Marker 1 [T1]
* VBW 3 MHz -46.40 dBm
* SWT 500 ms 7.528000000 GHz



Date: 8.NOV.2007 05:44:26



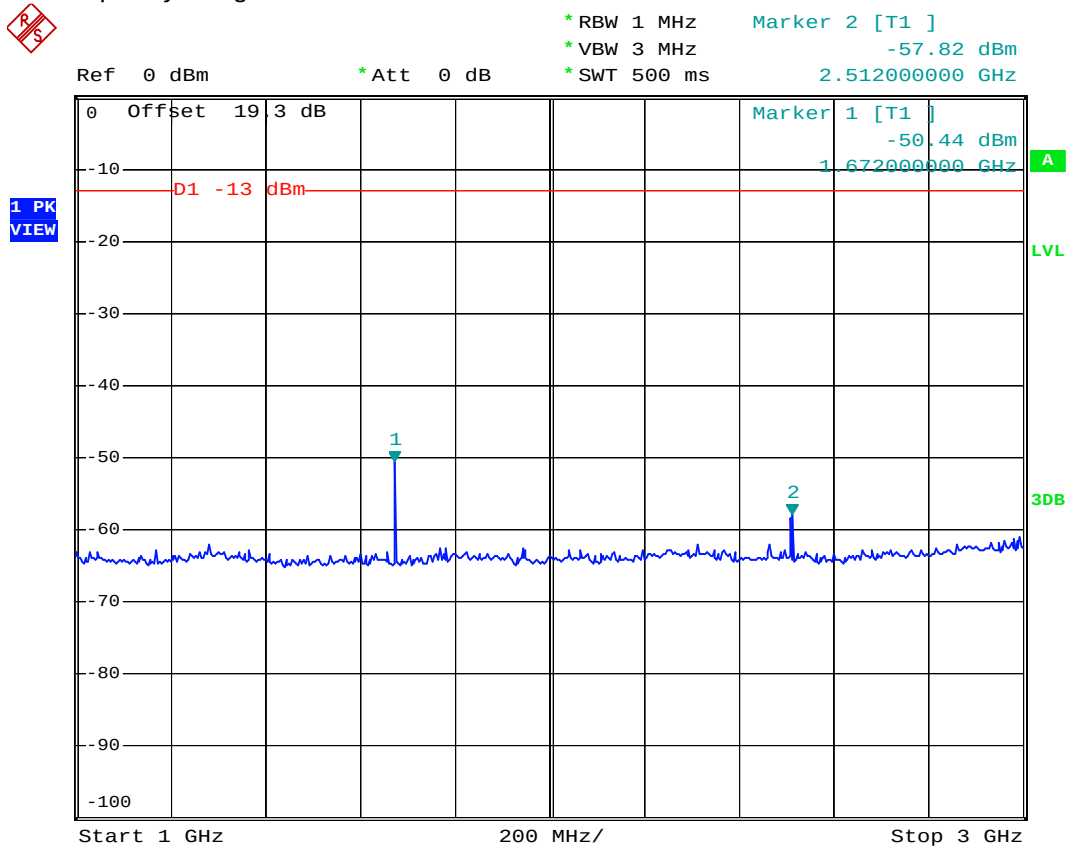
- Mode 2
- Test Mode : GSM850 (EDGE) CH189
- Frequency Range : 30M-1G



Date: 8.NOV.2007 05:02:37



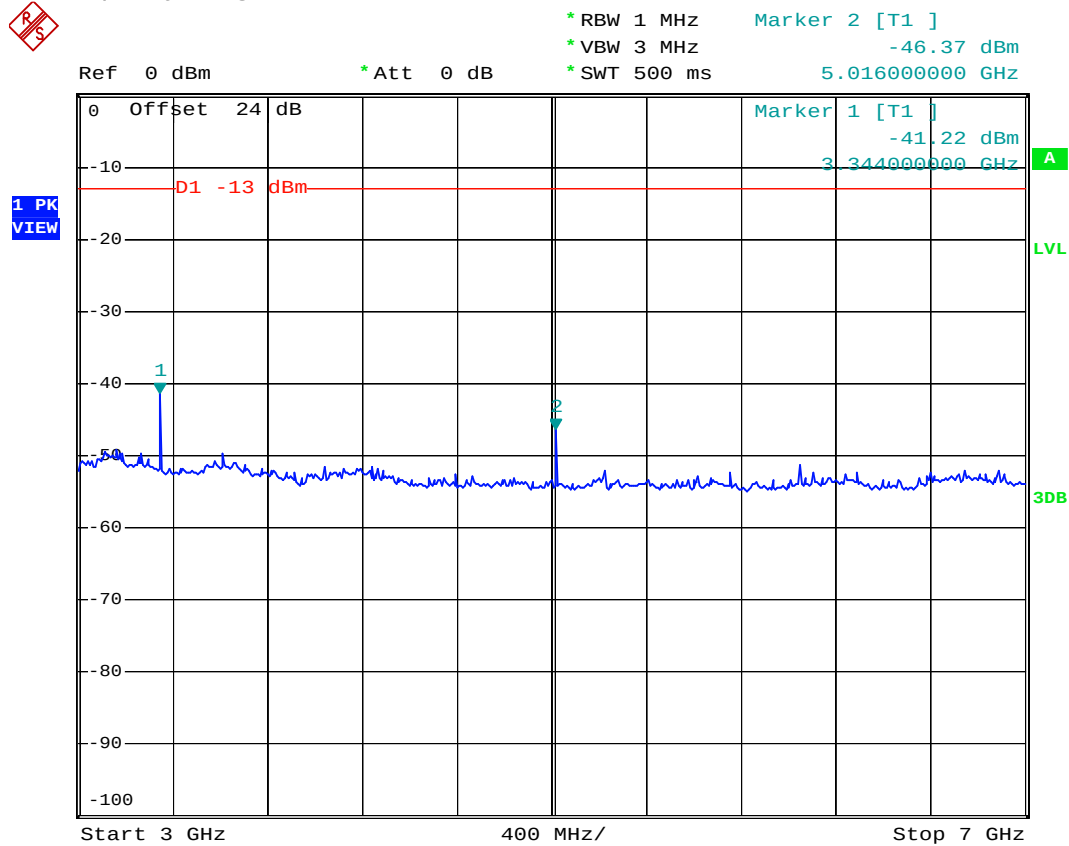
- Test Mode : GSM850 (EDGE) CH189
- Frequency Range : 1G-3G



Date: 8.NOV.2007 05:26:28



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



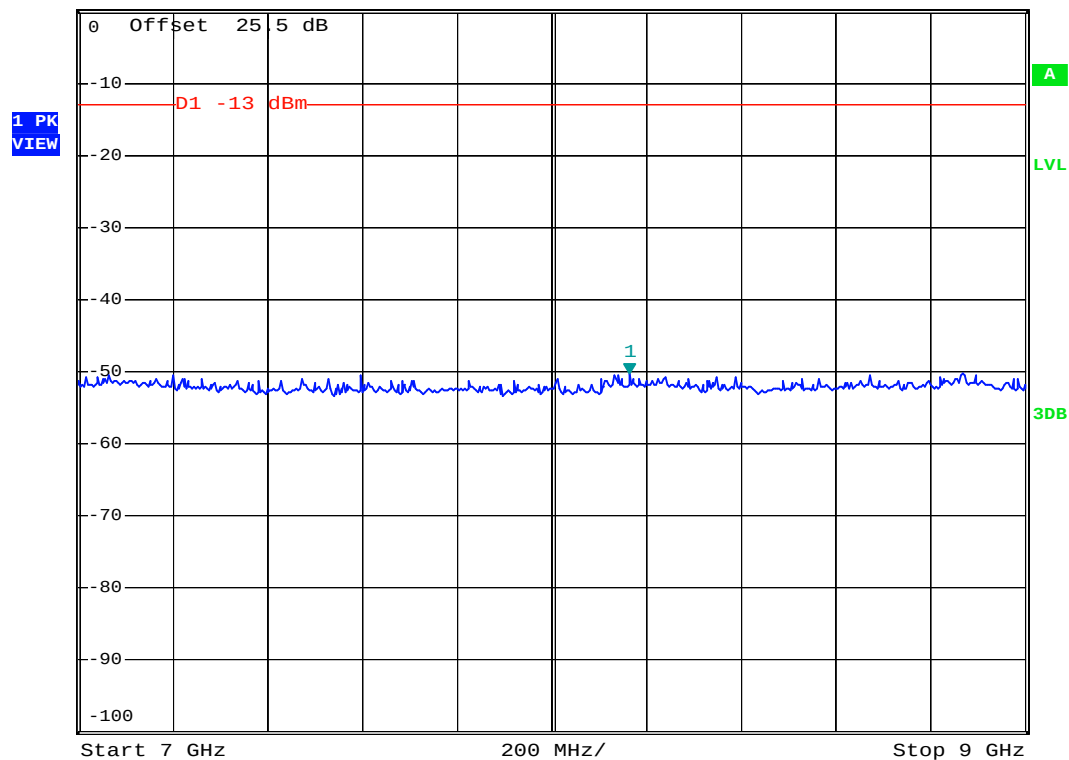
Date: 8.NOV.2007 06:08:19



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



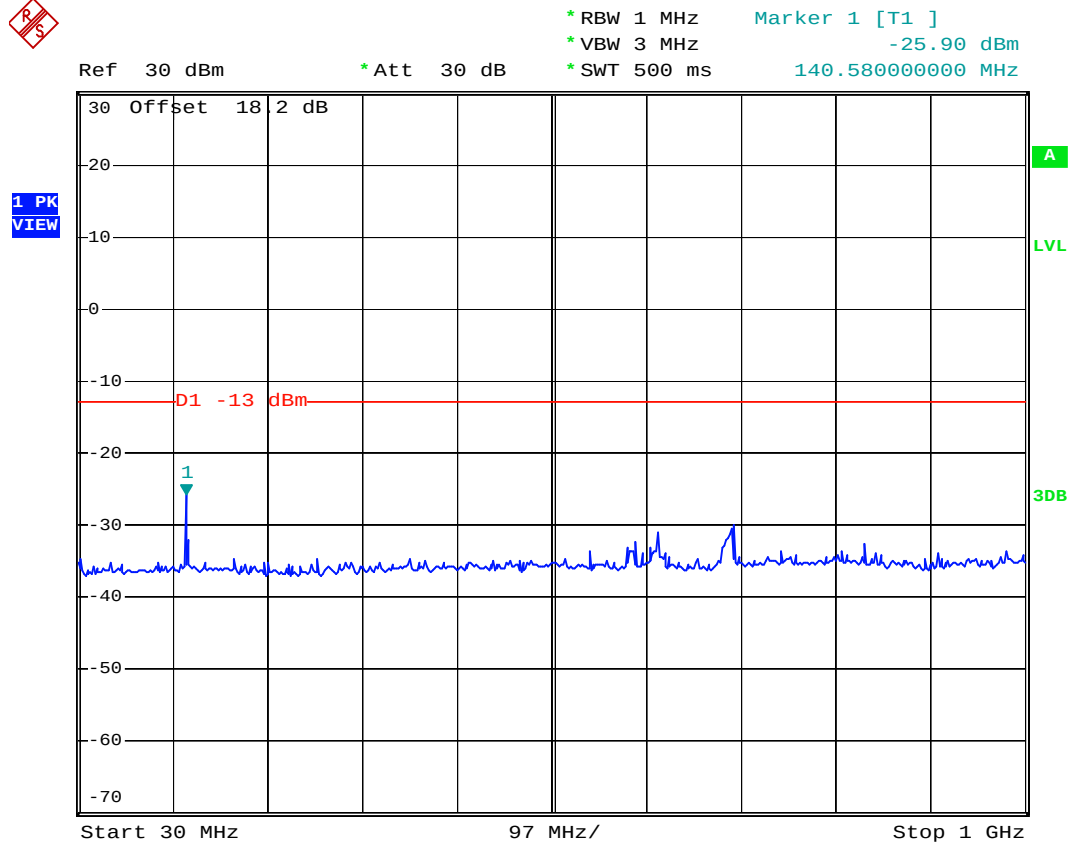
Ref 0 dBm * Att 0 dB * RBW 1 MHz Marker 1 [T1] -50.31 dBm
* VBW 3 MHz * SWT 500 ms 8.164000000 GHz



Date: 8.NOV.2007 05:45:57



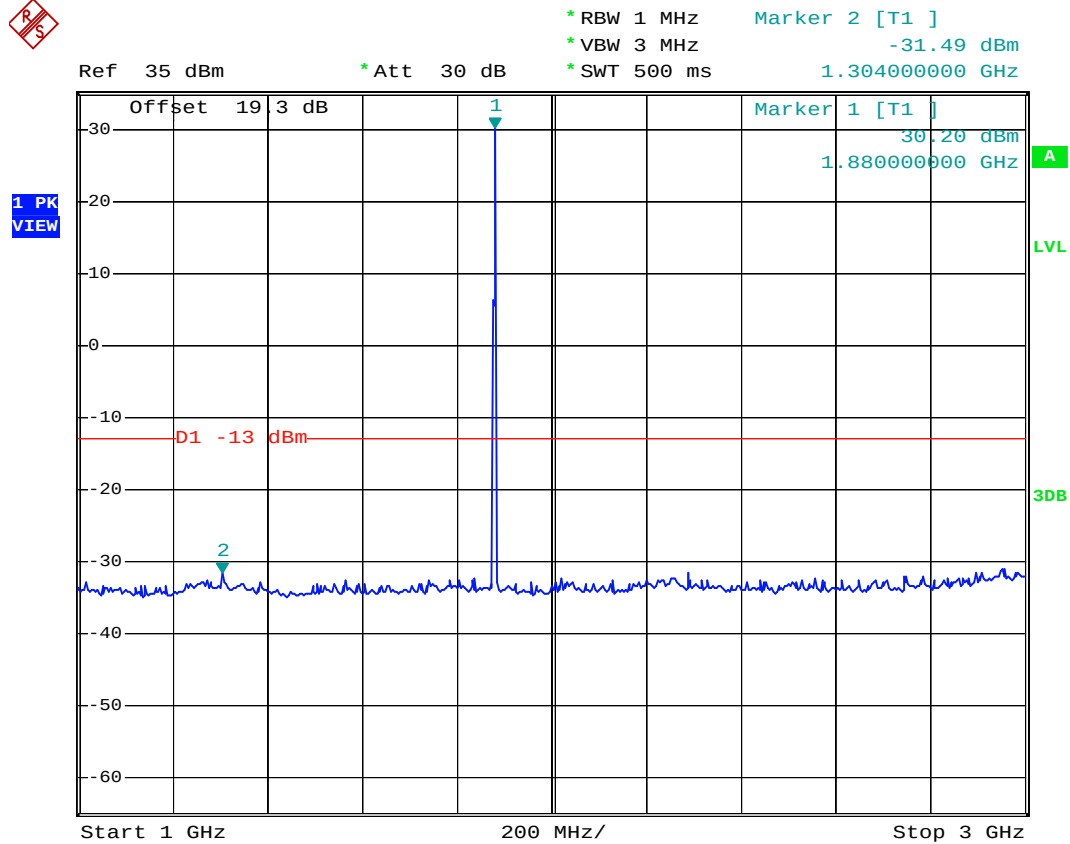
- Mode 3
- Test Mode : PCS1900 (GSM) CH661
- Frequency Range : 30M-1G



Date: 8.NOV.2007 04:55:21



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



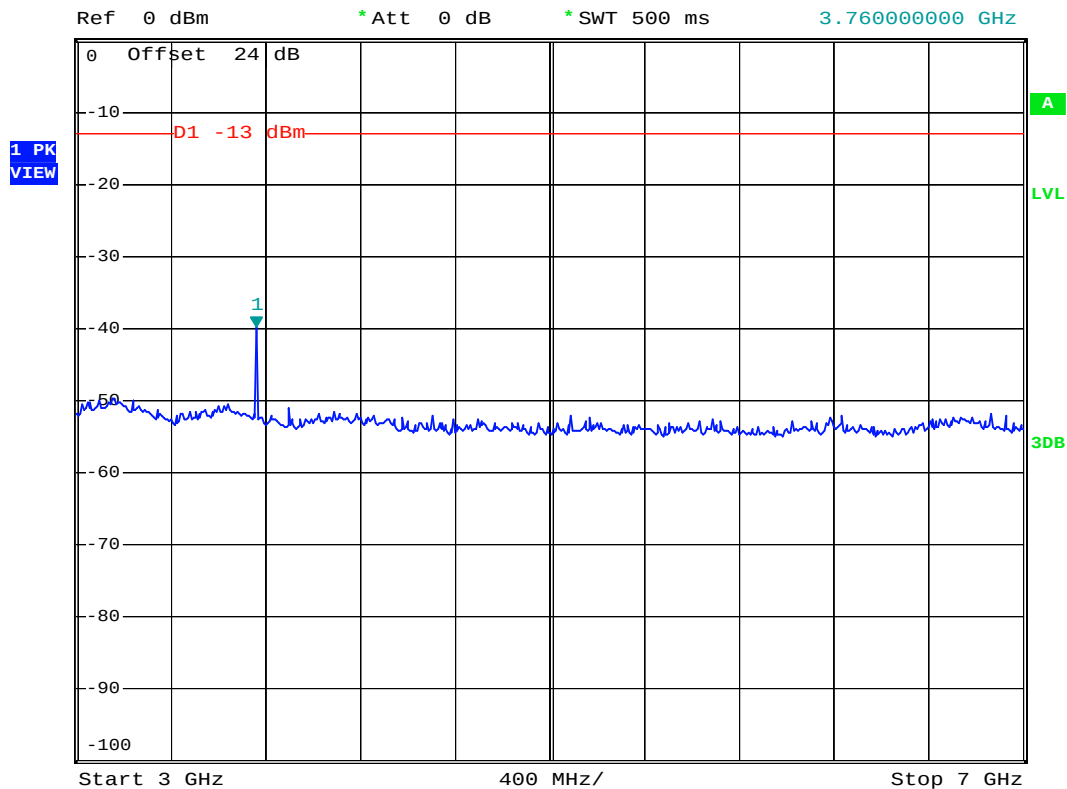
Date: 8.NOV.2007 05:08:35



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



* RBW 1 MHz Marker 1 [T1]
* VBW 3 MHz -39.66 dBm
* SWT 500 ms 3.760000000 GHz



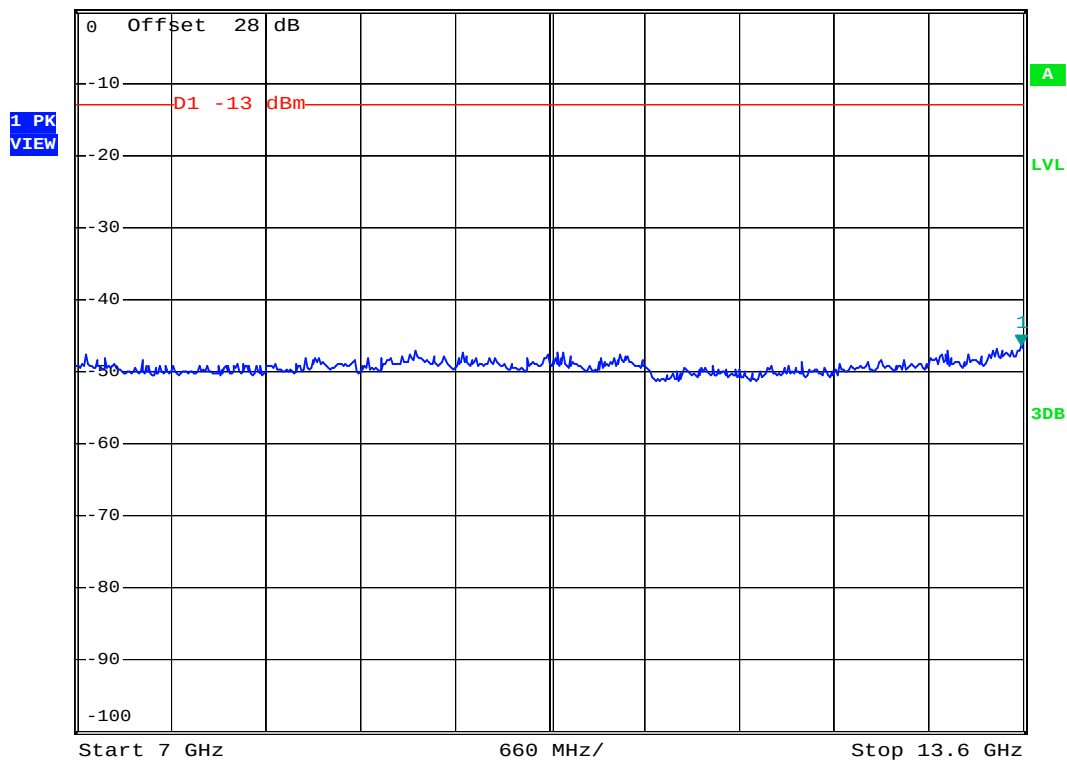
Date: 8.NOV.2007 05:35:35



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



Ref 0 dBm * Att 0 dB * RBW 1 MHz Marker 1 [T1] -46.23 dBm
* VBW 3 MHz * SWT 500 ms 13.586800000 GHz



Date: 8.NOV.2007 05:51:37

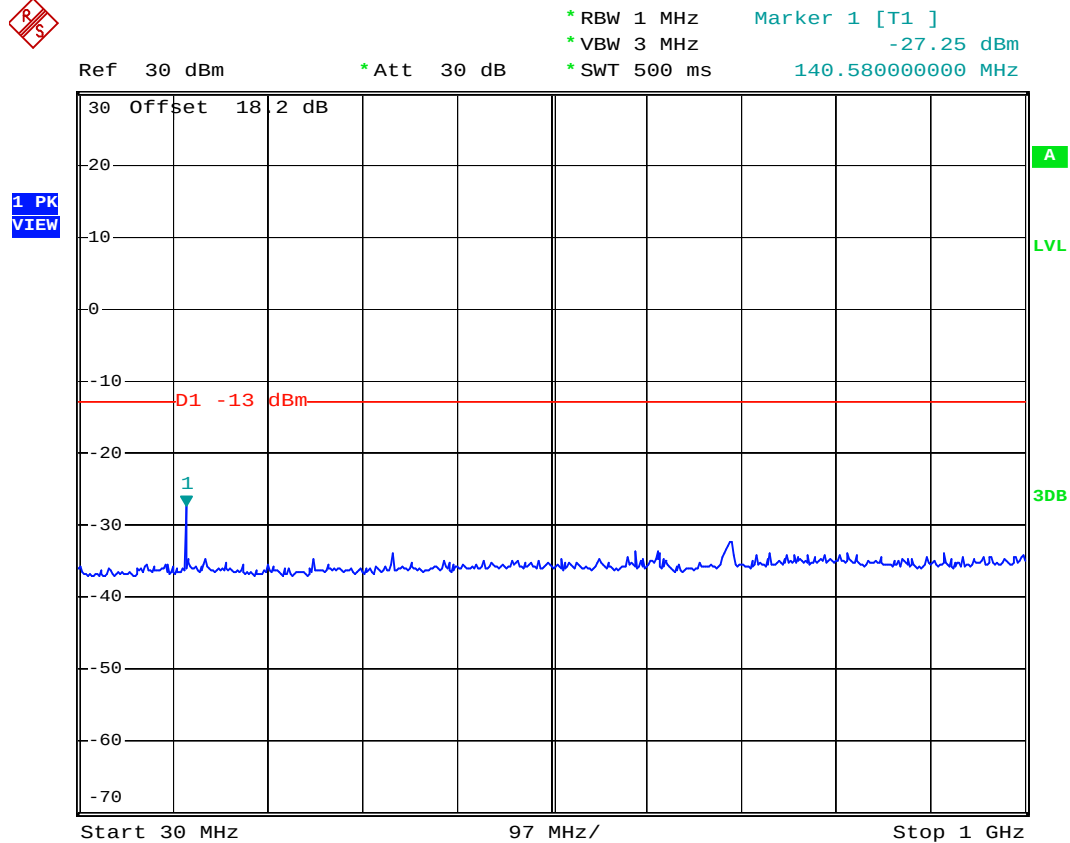


- Test Mode : PCS1900 (GSM) CH661
- Frequency Range : 13.6G-19.1G





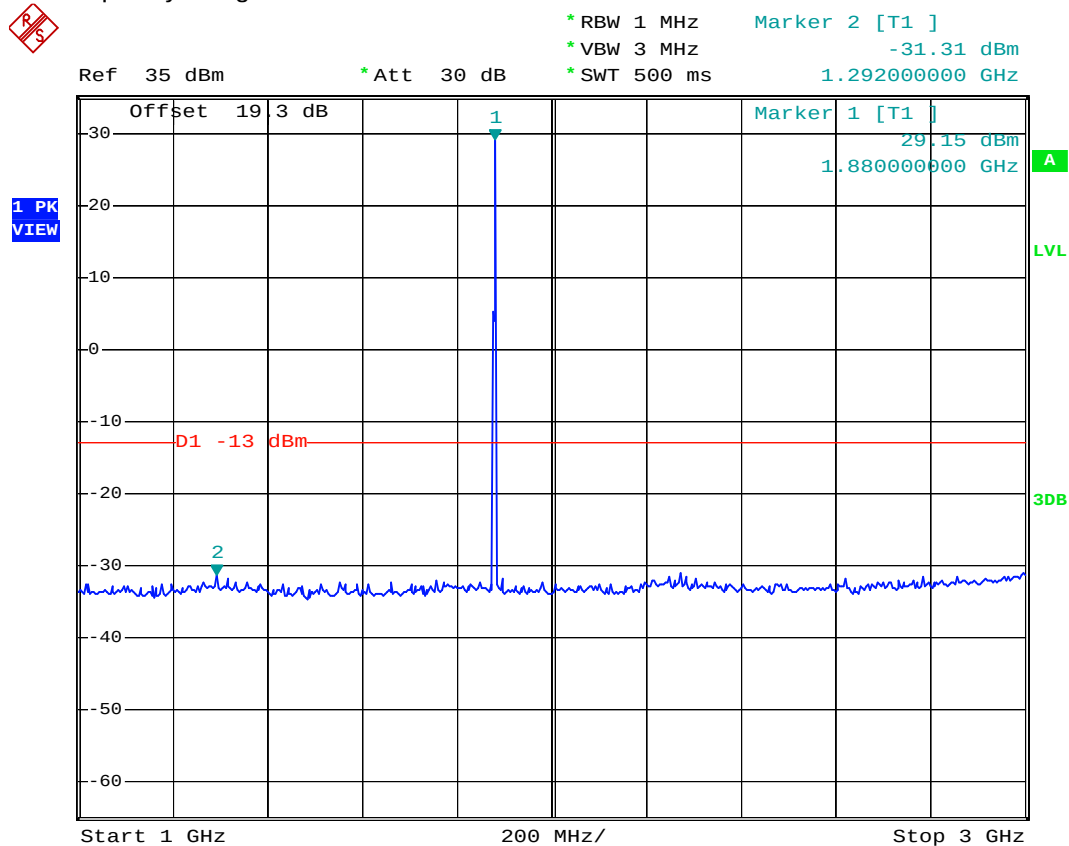
- Mode 4
- Test Mode : PCS1900 (EDGE) CH661
- Frequency Range : 30M-1G



Date: 8.NOV.2007 04:52:32



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



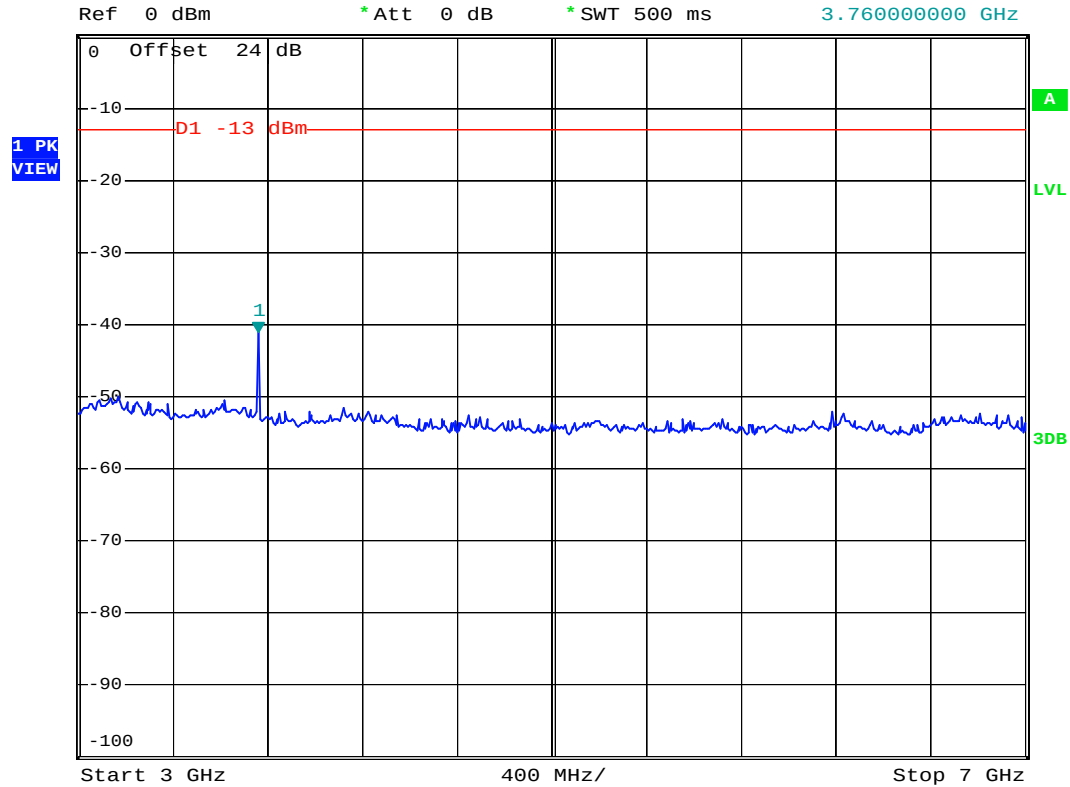
Date: 8.NOV.2007 05:07:35



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



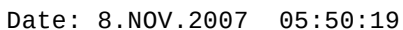
* RBW 1 MHz Marker 1 [T1]
* VBW 3 MHz -41.14 dBm
* SWT 500 ms 3.760000000 GHz



Date: 8.NOV.2007 05:37:54



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





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



4.6 Field Strength of Spurious Radiation

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

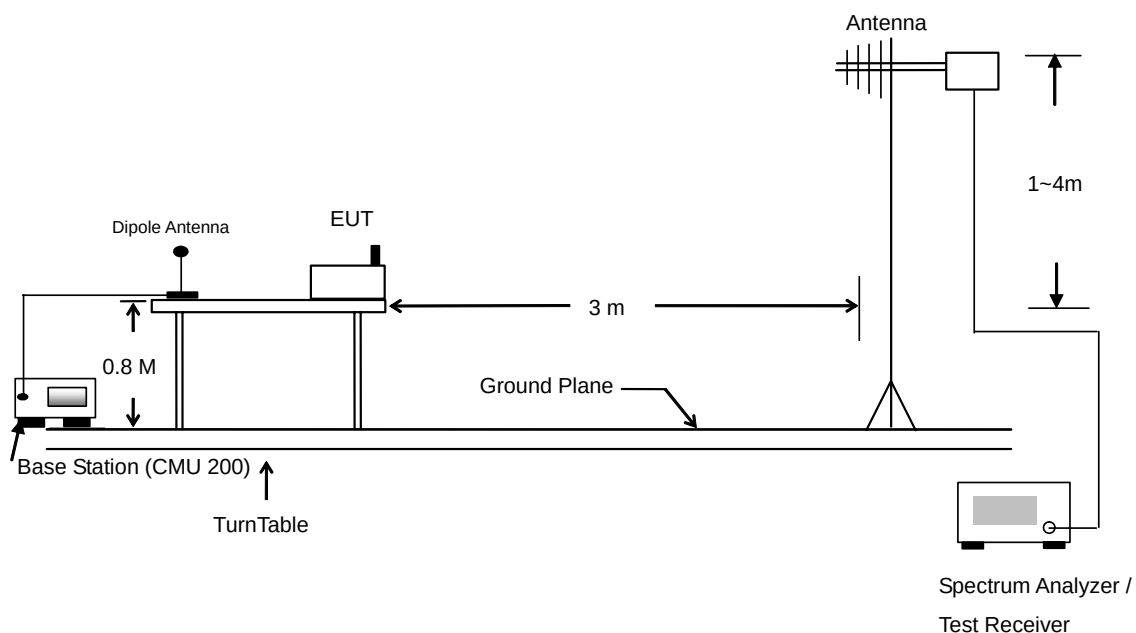
4.6.1 Measurement Instruments

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								
Frequency (MHz)	ERP (dBm)	Limit (dBm)	SPA. Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
1672	-31.65	-13	-34.63	-30.8	5.05	6.35	H	PASS
2506	-44.89	-13	-48.79	-44.94	5.93	8.13	H	PASS
3346	-49.73	-13	-55.7	-50.6	6.88	9.9	H	PASS
1672	-44.35	-13	-46.87	-43.5	5.05	6.35	V	PASS
2506	-46.05	-13	-53.13	-46.1	5.93	8.13	V	PASS
3346	-47.83	-13	-53.15	-48.7	6.88	9.9	V	PASS

• **Test Mode : Mode 2**

GSM850 (EDGE) Radiated Spurious ERP								
Frequency (MHz)	ERP (dBm)	Limit (dBm)	SPA. Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
1672	-29.75	-13	-32.9	-28.9	5.05	6.35	H	PASS
2506	-40.25	-13	-47.8	-40.3	5.93	8.13	H	PASS
3346	-49.33	-13	-54.43	-50.2	6.88	9.9	H	PASS
1672	-43.05	-13	-45.71	-42.2	5.05	6.35	V	PASS
2506	-43.15	-13	-51.46	-43.2	5.93	8.13	V	PASS
3346	-47.73	-13	-53.99	-48.6	6.88	9.9	V	PASS



▪ Test Mode : Mode 3

PCS1900 (GSM) Radiated Spurious EIRP								
Frequency (MHz)	EIRP (dBm)	Limit (dBm)	SPA. Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
3756	-52.77	-13	-58.72	-56.7	7.17	11.1	H	PASS
5636	-51.81	-13	-60.1	-53.6	8.77	10.56	H	PASS
3756	-46.07	-13	-57.12	-50	7.17	11.1	V	PASS
5636	-50.01	-13	-59.32	-51.8	8.77	10.56	V	PASS

▪ Test Mode : Mode 4

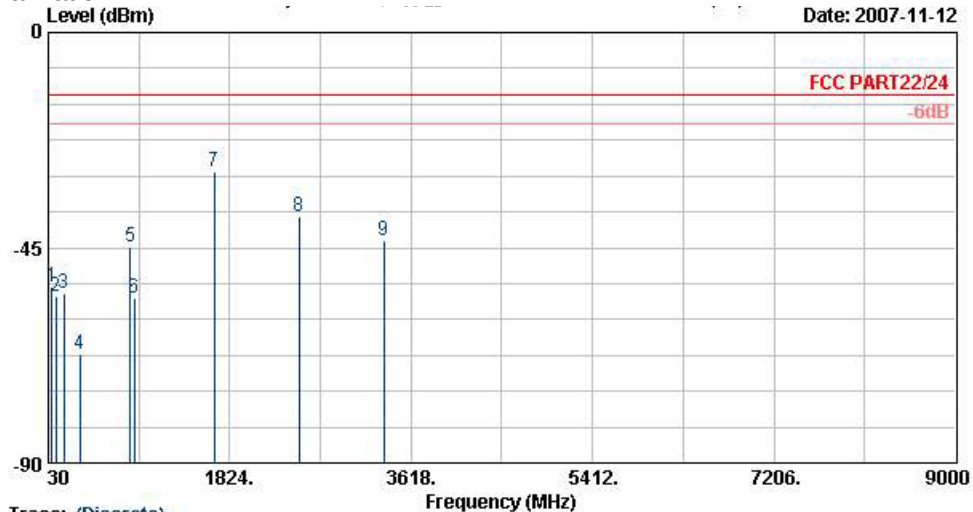
PCS1900 (EDGE) Radiated Spurious EIRP								
Frequency (MHz)	EIRP (dBm)	Limit (dBm)	SPA. Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
5636	-52.31	-13	-60.46	-54.1	8.77	10.56	H	PASS
3756	-48.87	-13	-57.4	-52.8	7.17	11.1	V	PASS
5636	-51.81	-13	-60.05	-53.6	8.77	10.56	V	PASS



4.6.5 Test Data

4.6.5.1 Mode 1

Horizontal Polarization



Site : 03CH06-HV
 Condition : FCC PART22/24 EIRP-071107 HORIZONTAL
 EUT : Quad Band Module
 Power : 120Vac/60Hz
 Model : FG 703002
 Mode : GSM850 Link+Adaptor

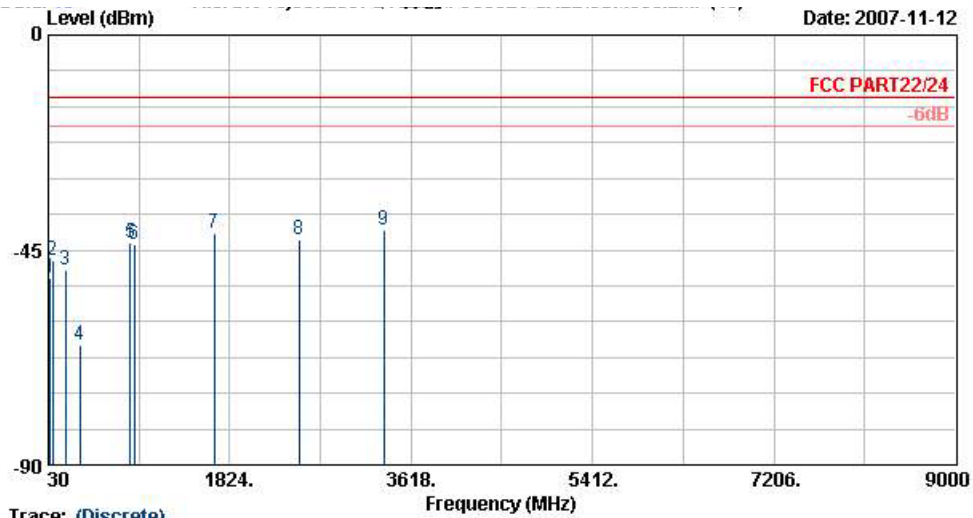
	Freq	Level	Over	Limit	Read		
	MHz	dBm	Limit	Line	Level	Factor	Remark
			dB	dBm	dBm	dB	
1	67.53	-53.26	-40.26	-13.00	-40.90	-12.36	Peak
2	105.33	-55.08	-42.08	-13.00	-42.77	-12.31	Peak
3	182.28	-54.40	-41.40	-13.00	-41.21	-13.19	Peak
4	339.90	-67.15	-54.15	-13.00	-58.57	-8.57	Peak
5	836.90	-44.77			-43.44	-1.33	Peak
6	880.30	-55.43			-54.52	-0.91	Peak
7 @	1672.00	-29.20	-16.20	-13.00	-34.63	5.43	Peak
8 @	2506.00	-38.56	-25.56	-13.00	-48.79	10.23	Peak
9	3346.00	-43.51	-30.51	-13.00	-55.70	12.19	Peak

Remark:

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



Vertical Polarization



Trace: (Discrete)

Site : 03CH06-HY
 Condition : FCC PART22/24 EIRP-071107 VERTICAL
 EUT : Quad Band Module
 Power : 120Vac/60Hz
 Model : FG 703002
 Mode : GSM850 Link+Adaptor

	Freq	Level	Over	Limit	Read		
	MHz	dBm	Limit	Line	Level	Factor	Remark
	MHz	dBm	dB	dBm	dBm	dB	
1	49.98	-50.71	-37.71	-13.00	-35.89	-14.82	Peak
2	70.23	-47.06	-34.06	-13.00	-35.04	-12.02	Peak
3	203.88	-49.09	-36.09	-13.00	-40.58	-8.51	Peak
4	343.40	-64.85	-51.85	-13.00	-59.32	-5.53	Peak
5	836.90	-43.60			-44.97	1.36	Peak
6	880.30	-43.98			-45.69	1.71	Peak
7	1672.00	-41.43	-28.43	-13.00	-46.87	5.43	Peak
8	2506.00	-42.90	-29.90	-13.00	-53.13	10.23	Peak
9 @	3346.00	-40.96	-27.96	-13.00	-53.15	12.19	Peak

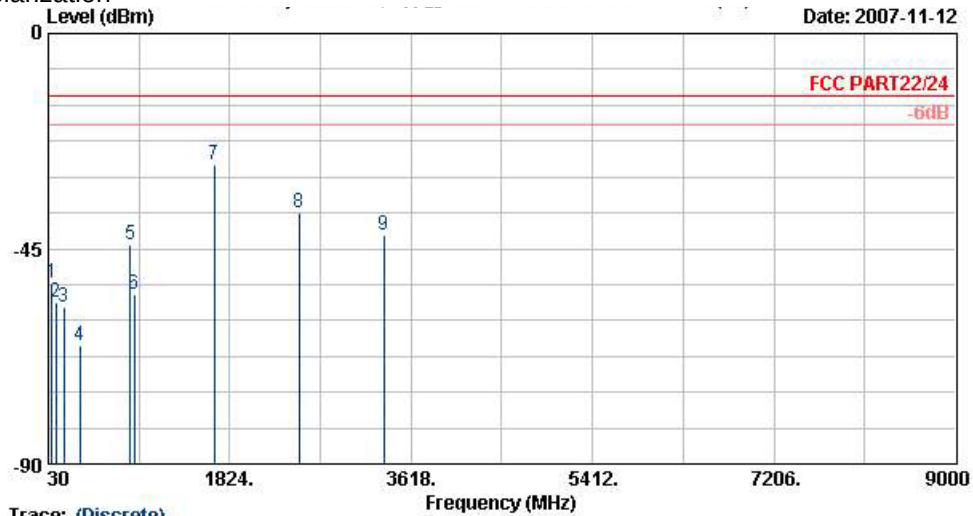
Remark:

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



4.6.5.2 Mode 2

Horizontal Polarization

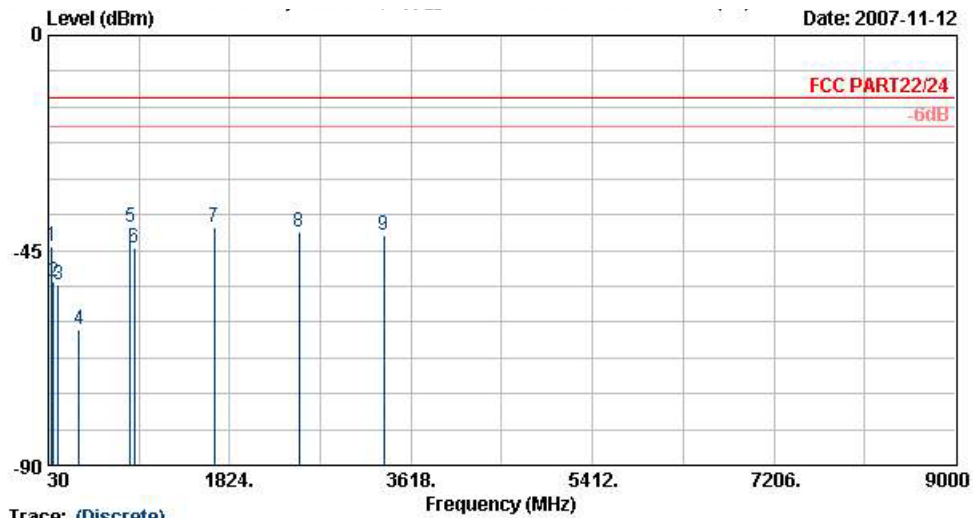


Site : 03CH06-HY
Condition : FCC PART22/24 EIRP-071107 HORIZONTAL
EUT : Quad Band Module
Power : 120Vac/60Hz
Model : FG 703002
Mode : EDGE650 Link+Adaptor

	Freq	Level	Over	Limit	Read		
	MHz	dBm	Limit	Line	Level	Factor	Remark
			dB	dBm	dBm	dB	
1	68.34	-52.16	-39.16	-13.00	-39.80	-12.36	Peak
2	105.33	-56.04	-43.04	-13.00	-43.74	-12.31	Peak
3	182.28	-57.05	-44.05	-13.00	-43.86	-13.19	Peak
4	339.90	-65.18	-52.18	-13.00	-56.60	-8.57	Peak
5	836.90	-44.26			-42.93	-1.33	Peak
6	880.30	-54.57			-53.66	-0.91	Peak
7	1672.00	-27.46	-14.46	-13.00	-32.90	5.43	Peak
8	2506.00	-37.57	-24.57	-13.00	-47.80	10.23	Peak
9	3346.00	-42.24	-29.24	-13.00	-54.43	12.19	Peak

Remark:

1. #5: MS Signal
2. #6: BS Signal

**Vertical Polarization****Trace: (Discrete)**

Site : 03CH06-HY
Condition : FCC PART22/24 ETRP-071107 VERTICAL
EUT : Quad Band Module
Power : 120Vac/60Hz
Model : FG 703002
Mode : EDGE850 Link+Adaptor

	Freq	Level	Over	Limit	Read		
	MHz	dBm	Limit	Line	Level	Factor	Remark
	MHz	dBm	dB	dBm	dBm	dB	
1	67.53	-44.30	-31.30	-13.00	-32.00	-12.30	Peak
2	80.49	-51.37	-38.37	-13.00	-40.89	-10.49	Peak
3	125.04	-52.27	-39.27	-13.00	-44.35	-7.92	Peak
4	337.80	-61.62	-48.62	-13.00	-55.97	-5.65	Peak
5	836.90	-40.04			-41.40	1.36	Peak
6	880.30	-44.50			-46.21	1.71	Peak
7	1672.00	-40.27	-27.27	-13.00	-45.71	5.43	Peak
8	2506.00	-41.23	-28.23	-13.00	-51.46	10.23	Peak
9	3346.00	-41.80	-28.80	-13.00	-53.99	12.19	Peak

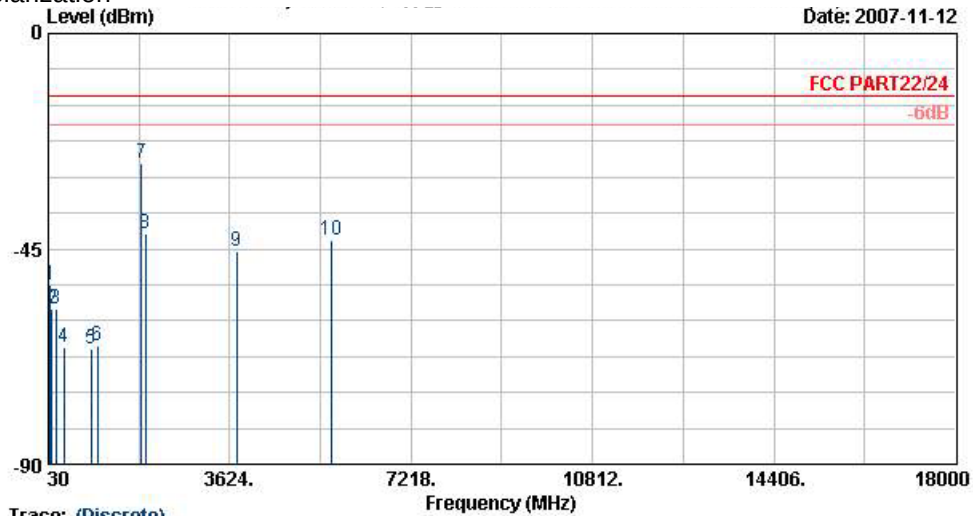
Remark:

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



4.6.5.3 Mode 3

Horizontal Polarization



Site : 03CH06-HV
 Condition : FCC PART22/24 EIRP-071107 HORIZONTAL
 EUT : Quad Band Module
 Power : 120Vac/60Hz
 Model : FG 703002
 Mode : PCS1900 Link+Adaptor

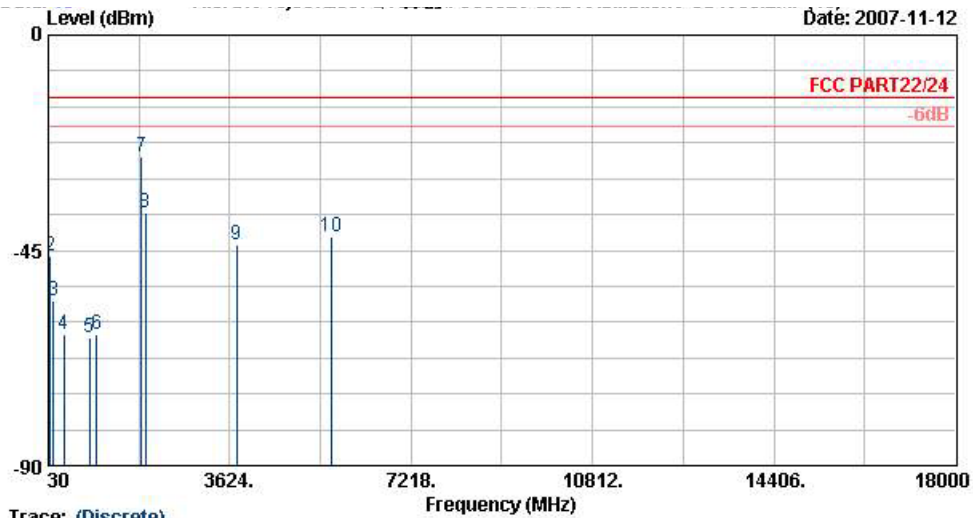
	Freq	Level	Over	Limit	Read		
	MHz	dBm	Limit	Line	Level	Factor	Remark
			dB	dBm	dBm	dB	
1	68.34	-52.64	-39.64	-13.00	-40.28	-12.36	Peak
2	103.44	-57.44	-44.44	-13.00	-45.16	-12.28	Peak
3	183.09	-57.71	-44.71	-13.00	-44.51	-13.20	Peak
4	339.90	-65.53	-52.53	-13.00	-56.95	-8.57	Peak
5	873.30	-66.03	-53.03	-13.00	-65.04	-0.99	Peak
6	997.90	-65.08	-52.08	-13.00	-65.30	0.22	Peak
7 @	1878.00	-27.26			-34.27	7.01	Peak
8	1958.00	-41.80			-49.33	7.54	Peak
9	3756.00	-45.40	-32.40	-13.00	-58.72	13.32	Peak
10	5636.00	-43.06	-30.06	-13.00	-60.10	17.03	Peak

Remark:

- #7: MS Signal
- #8: BS Signal



Vertical Polarization



Trace: (Discrete)

Site : 03CH06-HY
 Condition : FCC PART22/24 ETRP-071107 VERTICAL
 EUT : Quad Band Module
 Power : 120Vac/60Hz
 Model : FG 703002
 Mode : PCS1900 Link+Adaptor

	Freq	Level	Over	Limit	Read		
	MHz	dBm	Limit	Line	Level	Factor	Remark
	MHz	dBm	dB	dBm	dBm	dB	
1	52.14	-54.35	-41.35	-13.00	-39.81	-14.54	Peak
2	68.34	-46.02	-33.02	-13.00	-33.85	-12.16	Peak
3	139.08	-55.54	-42.54	-13.00	-47.50	-8.04	Peak
4	337.80	-62.56	-49.56	-13.00	-56.91	-5.65	Peak
5	852.30	-63.09	-50.09	-13.00	-64.58	1.49	Peak
6	992.30	-62.70	-49.70	-13.00	-65.30	2.60	Peak
7 @	1878.00	-25.42			-32.43	7.01	Peak
8	1958.00	-37.28			-44.81	7.54	Peak
9	3756.00	-43.80	-30.80	-13.00	-57.12	13.32	Peak
10	5636.00	-42.28	-29.28	-13.00	-59.32	17.03	Peak

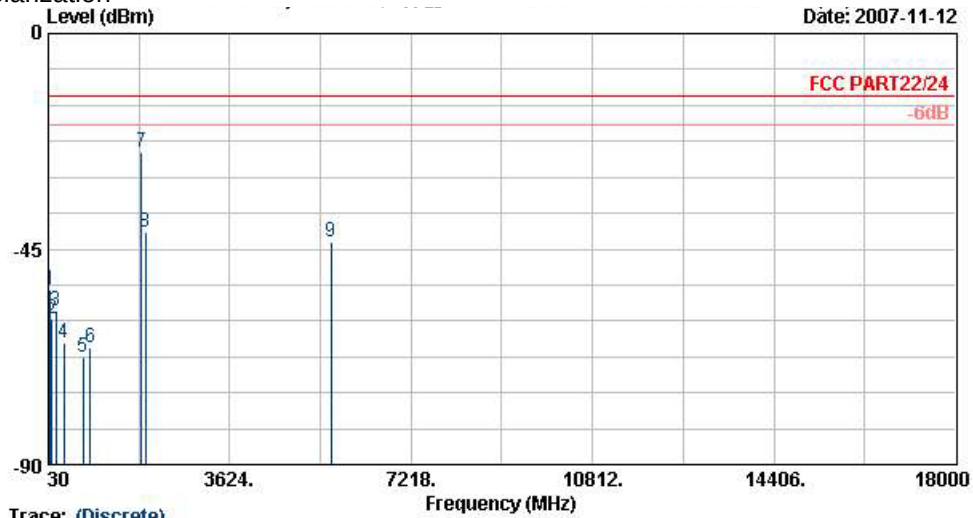
Remark:

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



4.6.5.4 Mode 4

Horizontal Polarization

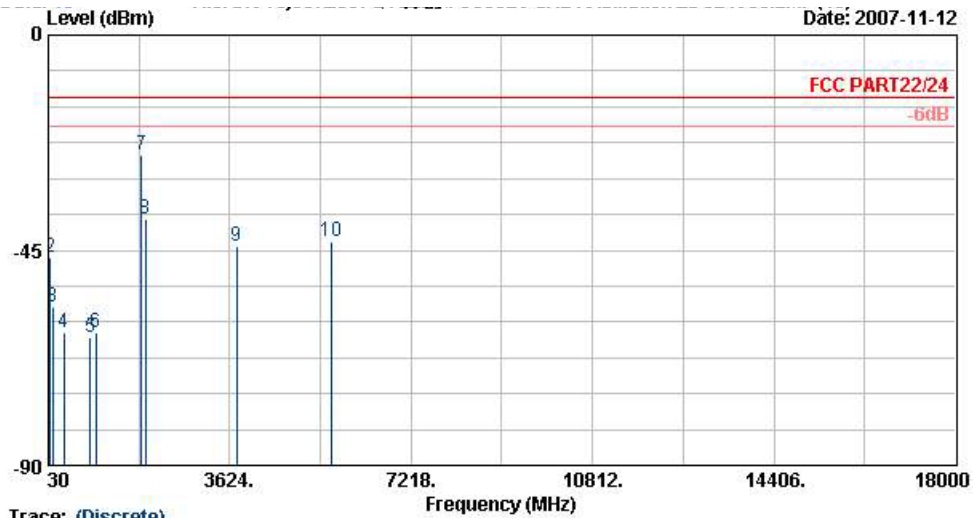


Remark:

- #7: MS Signal
- #8: BS Signal



Vertical Polarization



Trace: (Discrete)

Site : 03CH06-HY
 Condition : FCC PART22/24 EIRP-071107 VERTICAL
 EUT : Quad Band Module
 Power : 120Vac/60Hz
 Model : FG 703002
 Mode : EDGE1900 Link+Adaptor

	Freq	Level	Over	Limit	Read		
	MHz	dBm	Limit	Line	Level	Factor	Remark
			dB	dBm	dBm	dB	
1	48.63	-50.66	-37.66	-13.00	-36.38	-14.27	Peak
2	68.34	-46.51	-33.51	-13.00	-34.35	-12.16	Peak
3	120.99	-56.96	-43.96	-13.00	-49.08	-7.88	Peak
4	339.90	-62.28	-49.28	-13.00	-56.67	-5.61	Peak
5	855.80	-63.29	-50.29	-13.00	-64.80	1.51	Peak
6	978.30	-62.30	-49.30	-13.00	-64.79	2.49	Peak
7 @	1878.00	-25.10			-32.11	7.01	Peak
8	1958.00	-38.48			-46.02	7.54	Peak
9	3756.00	-44.08	-31.08	-13.00	-57.40	13.32	Peak
10	5636.00	-43.01	-30.01	-13.00	-60.05	17.03	Peak

Remark:

1. #7: MS Signal
2. #8: BS Signal
3. There is no more obvious emission except the listings above.

4.7 Frequency Stability (Temperature Variation)

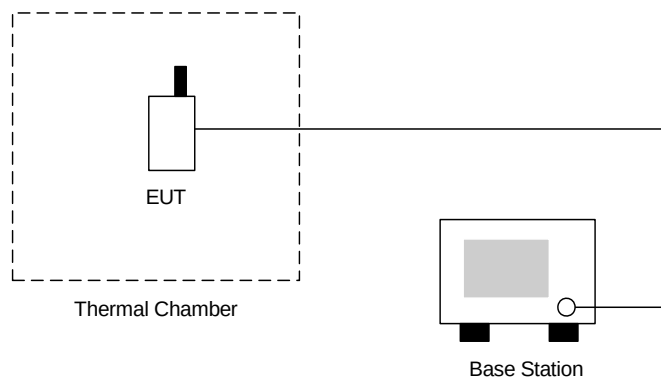
4.7.1 Measurement Instrument

As described in chapter 5 of this test report.

4.7.2 Test Procedure

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

4.7.3 Test Setup Layout



**4.7.4 Test Result**

▪ Test Mode : GSM850 (GSM) CH189

Temperature(°C)	Change (Hz)	Change (ppm)	Limit (ppm)	Result
-30	22	0.01	2.5	Passed
-20	-20	-0.02		
-10	-19	-0.02		
0	-13	-0.02		
10	26	0.03		
20	-20	-0.02		
30	-32	-0.04		
40	-25	-0.03		
50	-11	-0.01		

▪ Test Mode : GSM850 (EDGE) CH189

Temperature(°C)	Change (Hz)	Change (ppm)	Limit (ppm)	Result
-30	18	0.01	2.5	Passed
-20	25	0.03		
-10	15	0.02		
0	-10	-0.01		
10	22	0.03		
20	27	0.03		
30	-29	-0.03		
40	-36	-0.04		
50	21	0.02		



▪ Test Mode : PCS1900 (GSM) CH661

Temperature(°C)	Change (Hz)	Change (ppm)	Limit (ppm)	Result
-30	34	0.02	2.5	Passed
-20	50	0.03		
-10	45	0.02		
0	31	0.02		
10	28	0.01		
20	38	0.02		
30	-29	-0.02		
40	24	0.01		
50	19	0.01		

▪ Test Mode : PCS1900 (EDGE) CH661

Temperature(°C)	Change (Hz)	Change (ppm)	Limit (ppm)	Result
-30	-22	-0.01	2.5	Passed
-20	38	0.02		
-10	35	0.02		
0	21	0.01		
10	-23	-0.01		
20	34	0.02		
30	21	0.01		
40	19	0.01		
50	31	0.02		

4.8 Frequency Stability (Voltage Variation)

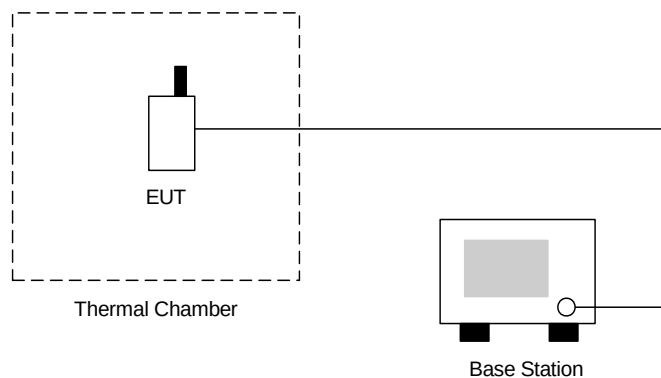
4.8.1 Measurement Instrument

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
120	23.0	0.03	2.5	Passed
BEP	-28.0	-0.03		
138	26.0	0.03		

- Test Mode : GSM850 (EDGE) CH189

Voltage(Volt)	Change (Hz)	Change (ppm)	Limit (ppm)	Result
120	25.0	0.03	2.5	Passed
BEP	29.0	0.03		
138	-30.0	-0.04		



- Test Mode : PCS1900 (GSM) CH661

Voltage(Volt)	Change (Hz)	Change (ppm)	Limit (ppm)	Result
120	33.0	0.02	2.5	Passed
BEP	26.0	0.01		
138	28.0	0.01		

- Test Mode : PCS1900 (EDGE) CH661

Voltage(Volt)	Change (Hz)	Change (ppm)	Limit (ppm)	Result
120	31.0	0.02	2.5	Passed
BEP	35.0	0.02		
138	-32.0	-0.02		

Remark:

- Normal Voltage=120V.
- Battery End Point (BEP)= 102 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	SCHWARZBEC K	BBHA 9170	9170-249	14G - 40G	Nov. 20, 2006	Nov. 19, 2008	Radiation (03CH06-HY)
Base Station Simulator	R & S	CMU200	106656	WCDMA	Nov. 20, 2006	Nov. 19, 2007	Radiation (03CH06-HY)
Thermal	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	TOPWARD	3303D	740889	N/A	May 25, 2007	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 = $20 \log(1 - \Gamma_1 \Gamma_2)$	+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