



FCC Test Report

for

47 CFR Part 22H, 24E

Equipment : Trailer Tracking System
Model No. : TLU-100N
FCC ID : TBQTLU-100N
Tx Frequency Range : GSM850 : 824.2 ~ 848.8MHz
PCS1900 : 1850.2 ~1909.8 MHz
Max. ERP/EIRP Power : GGSM850(GSM) : 0.73 W
PCS1900(GSM) : 0.50 W
Emission Designator : GSM : 300KGXW
Applicant : **PORTMAN ELECTRONICS (SHENZHEN) CO., LTD.**
The Ninth Building, Tong-fuyu Industrial District, LongHua Town,
Bao'an, Shenzhen, China

- 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 Oct. 05, 2007 at **Sporton International Inc. LAB.**
- Report No.: FG771706, 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 reportii

1. General Information.....1

 1.2 Applicant.....1

 1.3 Manufacturer1

 1.4 Basic Description of Equipment under Test.....1

 1.5 Feature of Equipment under Test.....2

 1.6 Report Date.....2

2 Test Configuration of Equipment under Test.....3

 2.1 Test Manner3

 2.2 Test Mode3

 2.3 Connection Diagram of Test System.....3

 2.4 Ancillary Equipment List3

3. General Information of Test Site4

 3.1 Test Voltage4

 3.2 Test Compliance4

 3.3 Frequency Range.....4

 3.4 Test Distance4

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.....8

 4.4 Occupied Bandwidth and Band Edge Measurement11

 4.5 Conducted Emission.....28

 4.6 Field Strength of Spurious Radiation.....38

 4.7 Frequency Stability (Temperature Variation)45

 4.8 Frequency Stability (Voltage Variation)47

5. List of Measurement Equipments48

6. Uncertainty Evaluation.....49

Appendix A - External Photographs

Appendix B - Internal Photographs

Appendix C - Setup Photographs



1. General Information

1.2 Applicant

PORTMAN ELECTRONICS (SHENZHEN) CO., LTD.

The Ninth Building, Tong-fuyu Industrial District, LongHua Town, Bao'an, Shenzhen, China

1.3 Manufacturer

PORTMAN ELECTRONICS (SHENZHEN) CO., LTD.

The Ninth Building, Tong-fuyu Industrial District, LongHua Town, Bao'an, Shenzhen, China

1.4 Basic Description of Equipment under Test

Equipment		Trailer Tracking System
Model Name		TLU-100N
FCC ID		TBQTLU-100N
Battery	Brand Name	WF
	Model Name	CR123A
	Rating	3Vdc
	Type	Li-ion

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 :	Trailer Tracking System
Model Name :	TLU-100N
FCC ID :	TBQTLU-100N
Tx Frequency :	GSM850 : 824 ~ 849 MHz PCS1900 : 1850 ~ 1910 MHz
Rx Frequency :	GSM850 : 869 ~ 894 MHz PCS1900 : 1930 ~ 1990 MHz
Maximum Output Power to Antenna :	GSM850 : 32.57 dBm (GSM) PCS1900 : 30.39 dBm (GSM)
Maximum ERP/EIRP :	GSM850(GSM) : 0.73 W (28.63 dBm) PCS1900(GSM) : 0.50 W (26.95 dBm)
Antenna Type :	Combo Antenna
Type of Antenna Connector	MCX
Power Rating (DC/AC , Voltage and Current of RF element or PA) :	4.5Vdc
Hardware Version :	TLU200 C2
Software Version :	TLU100N V1.16
Digital Modulation Emission :	GSM : GMSK
Type of Emission :	GSM : 300KGXW
DUT Stage :	Identical Prototype

1.6 Report Date

EUT Received : Jul. 17, 2007

Report Date : Oct. 23, 2007

2 Test Configuration of Equipment under Test

2.1 Test Manner

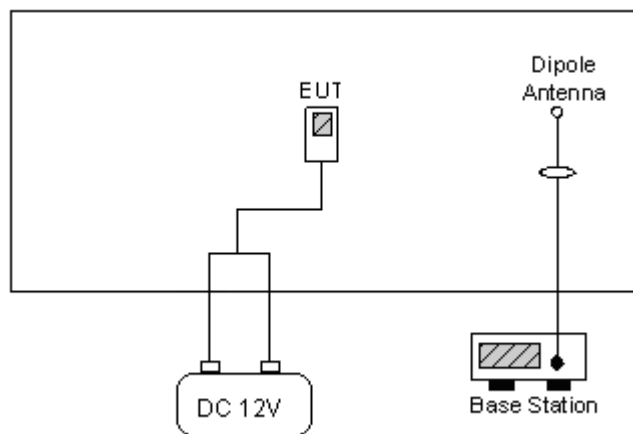
1. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range.
2. During all testings, EUT is in link mode with base station emulator at maximum power level.
3. Frequency range investigated: radiated emission 30 MHz to 9000 MHz for GSM850; 30MHz to 19000 MHz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

2.2 Test Mode

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

2.3 Connection Diagram of Test System

Phone with Link Mode



2.4 Ancillary Equipment List

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



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

Preliminary Guidance for Receiving Applications for Certification of 3G Device. May 9, 2006.

3.3 Frequency Range

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

3.4 Test Distance

The test distance of radiated emission from antenna to EUT is 3 m.



4. Test Data and Test Result

4.1 List of Measurements and Examinations

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

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

4.2 RF Output Power

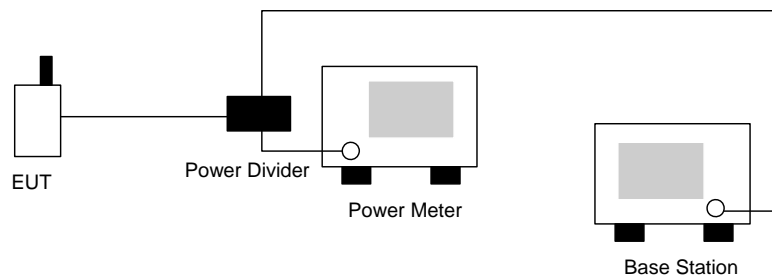
4.2.1 Measurement Instruments :

As described in chapter 5 of this test report.

4.2.2 Test Procedure :

1. The transmitter output was connected to power meter and base station through power divider.
2. Set EUT at PCL=5 for GSM850 and/or PCL=0 for PCS1900 maximum power through base station.
3. Select lowest, middle, and highest channels for each band.

4.2.3 Test Setup Layout :





4.2.4 Test Result :

Bands	Channel	Frequency (MHz)	Conducted Power (dBm)	Conducted Power (Watts)
GSM850 (GSM)	128	824.2 (Low)	32.37	1.726
	189	836.4 (Mid)	32.52	1.786
	251	848.8 (High)	32.57	1.807
PCS1900 (GSM)	512	1850.2 (Low)	30.04	1.009
	661	1880.0 (Mid)	30.15	1.035
	810	1909.8 (High)	30.39	1.094



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.

$E_t = R_t + AF$

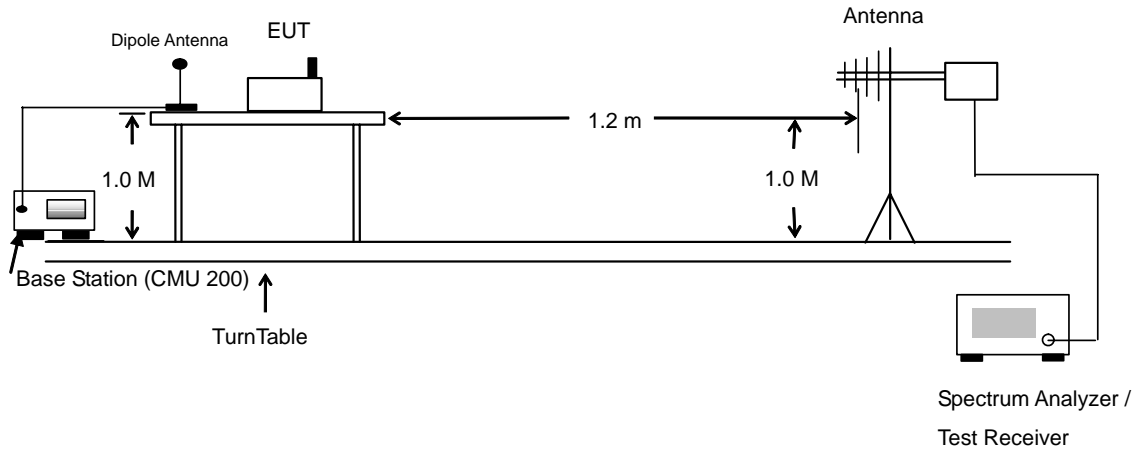
$E_s = R_s + AF$

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	-18.41	-48.12	0.00	-1.08	28.63	0.73
836.40	-18.92	-48.28	0.00	-0.93	28.43	0.70
848.80	-21.48	-48.35	0.00	-0.76	26.11	0.41
Vertical Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBd)	ERP (dBm)	ERP (W)
824.20	-19.32	-47.97	0.00	-1.08	27.57	0.57
836.40	-20.94	-48.01	0.00	-0.93	26.14	0.41
848.80	-21.89	-48.05	0.00	-0.76	25.40	0.35

PCS1900 (GSM) Radiated Power EIRP						
Horizontal Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBi)	EIRP (dBm)	EIRP (W)
1850.20	-28.60	-51.88	0.00	1.96	25.24	0.33
1880.00	-29.51	-52.99	0.00	2.00	25.48	0.35
1909.80	-29.31	-54.28	0.00	1.98	26.95	0.50
Vertical Polarization						
Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBi)	EIRP (dBm)	EIRP (W)
1850.20	-30.19	-52.13	0.00	1.96	23.90	0.25
1880.00	-30.08	-53.17	0.00	2.00	25.09	0.32
1909.80	-31.10	-54.13	0.00	1.98	25.01	0.32

4.4 Occupied Bandwidth and Band Edge Measurement

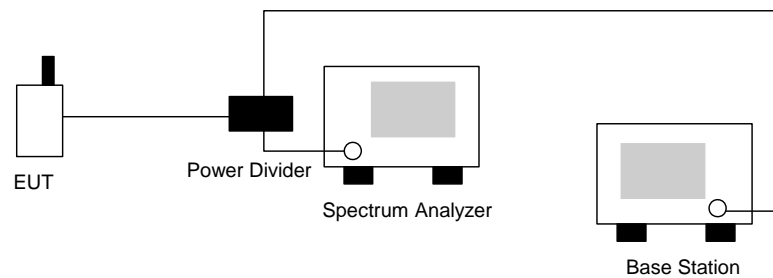
4.4.1 Measurement Instruments

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 $BW/100$.

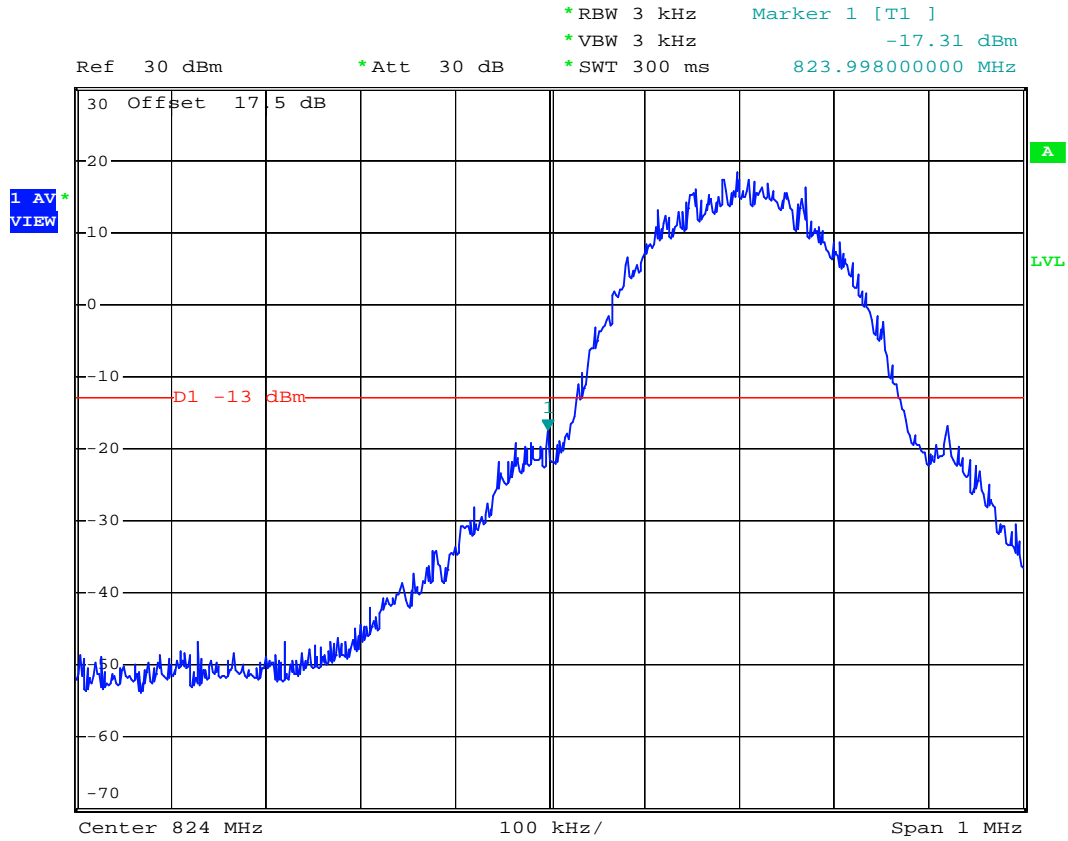
4.4.3 Test Setup Layout





4.4.4 Test Result

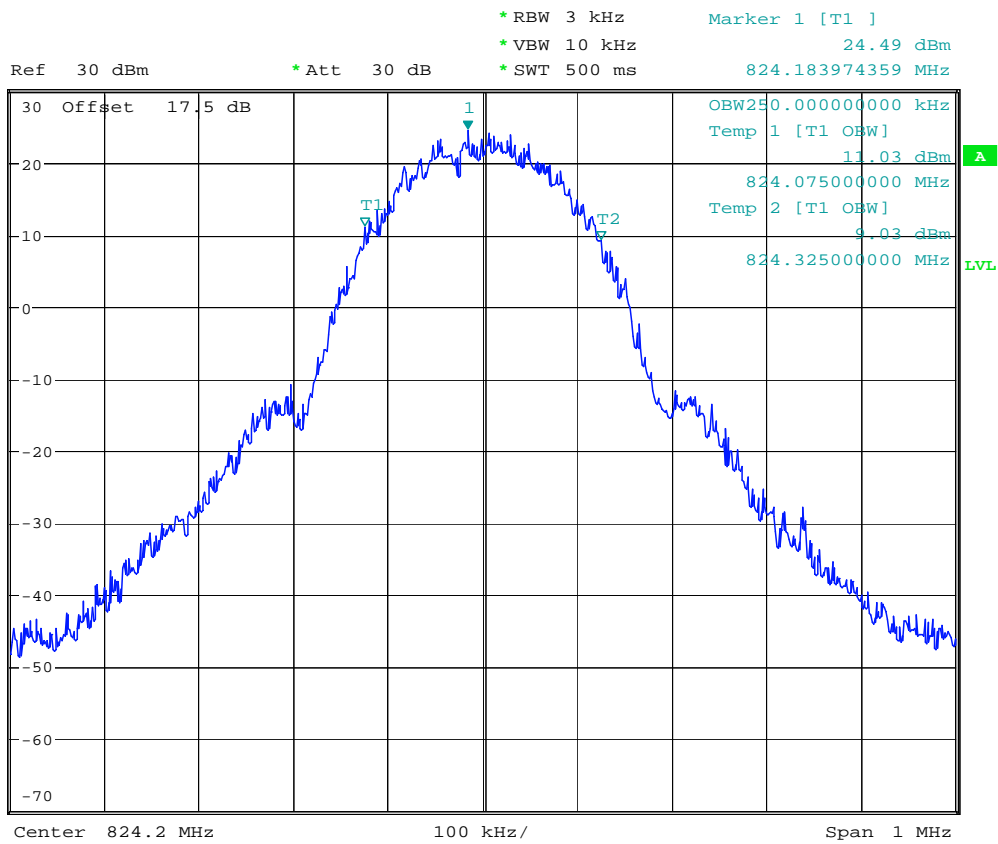
- Mode 1
- Test Mode : GSM850 (GSM) CH128 Lower Band Edge
- Power State : High



Date: 25.AUG.2007 03:52:10



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

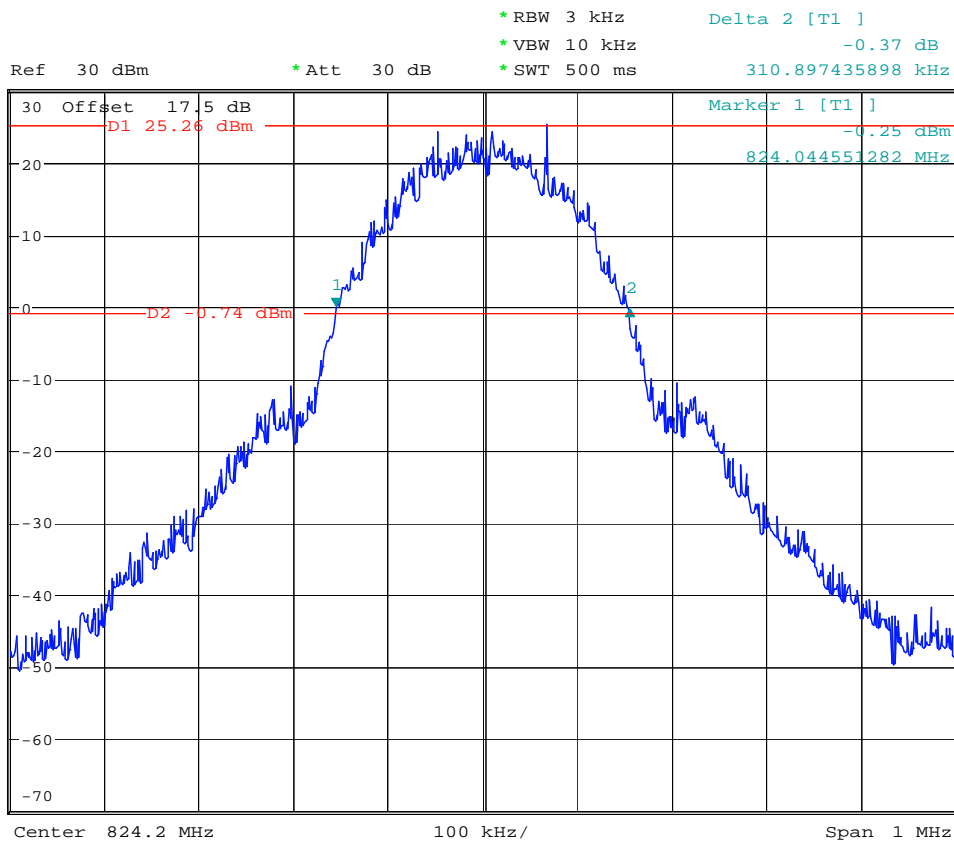


444

Date: 2.OCT.2007 22:14:16



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

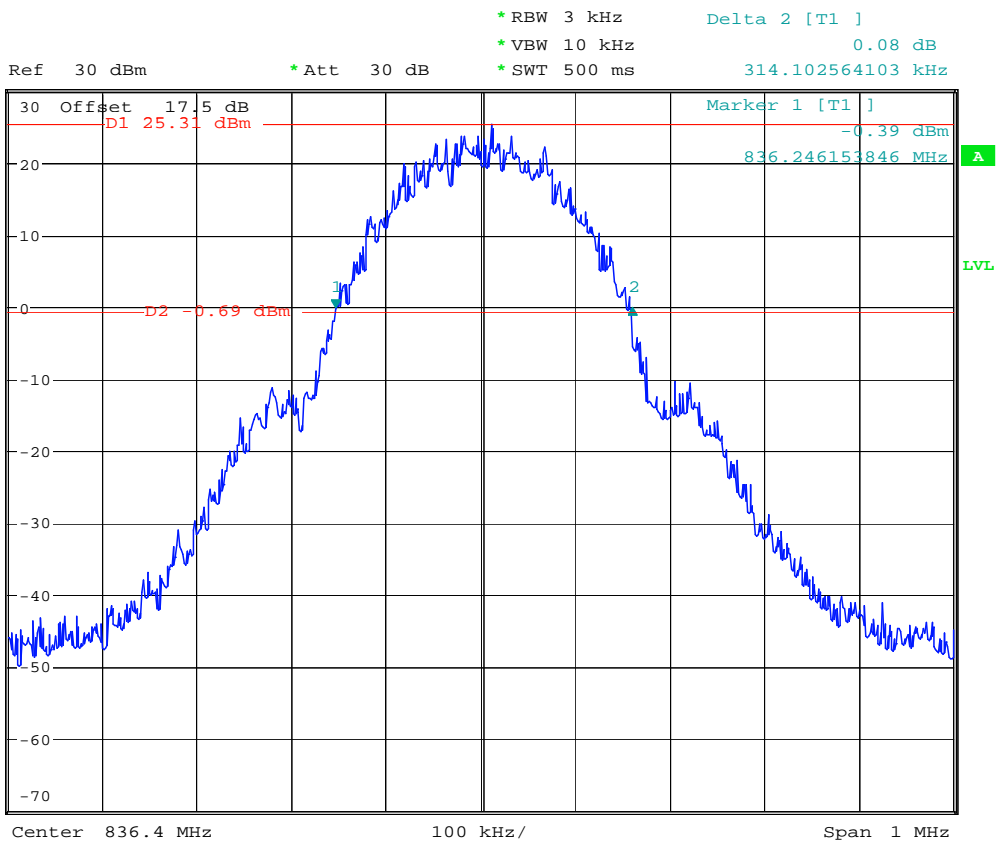


444

Date: 2.OCT.2007 22:09:03



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



444

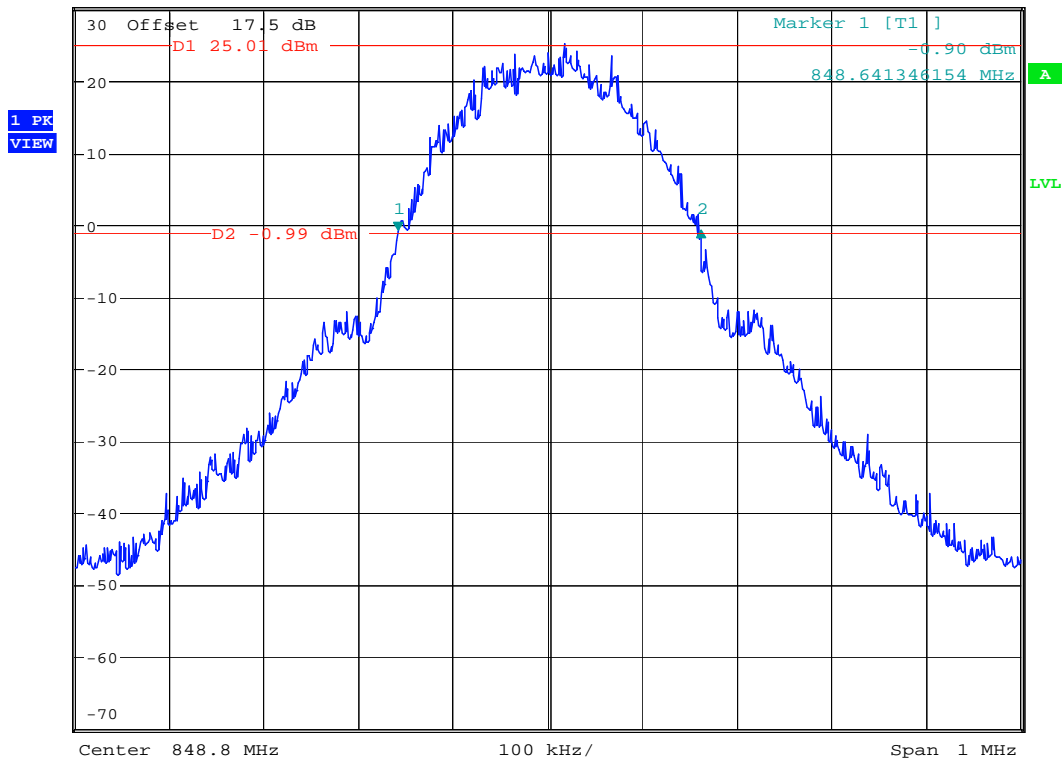
Date: 2.OCT.2007 22:10:22



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



Ref 30 dBm * Att 30 dB * RBW 3 kHz Delta 2 [T1] -0.17 dB
 * VBW 10 kHz 320.512820513 kHz
 * SWT 500 ms

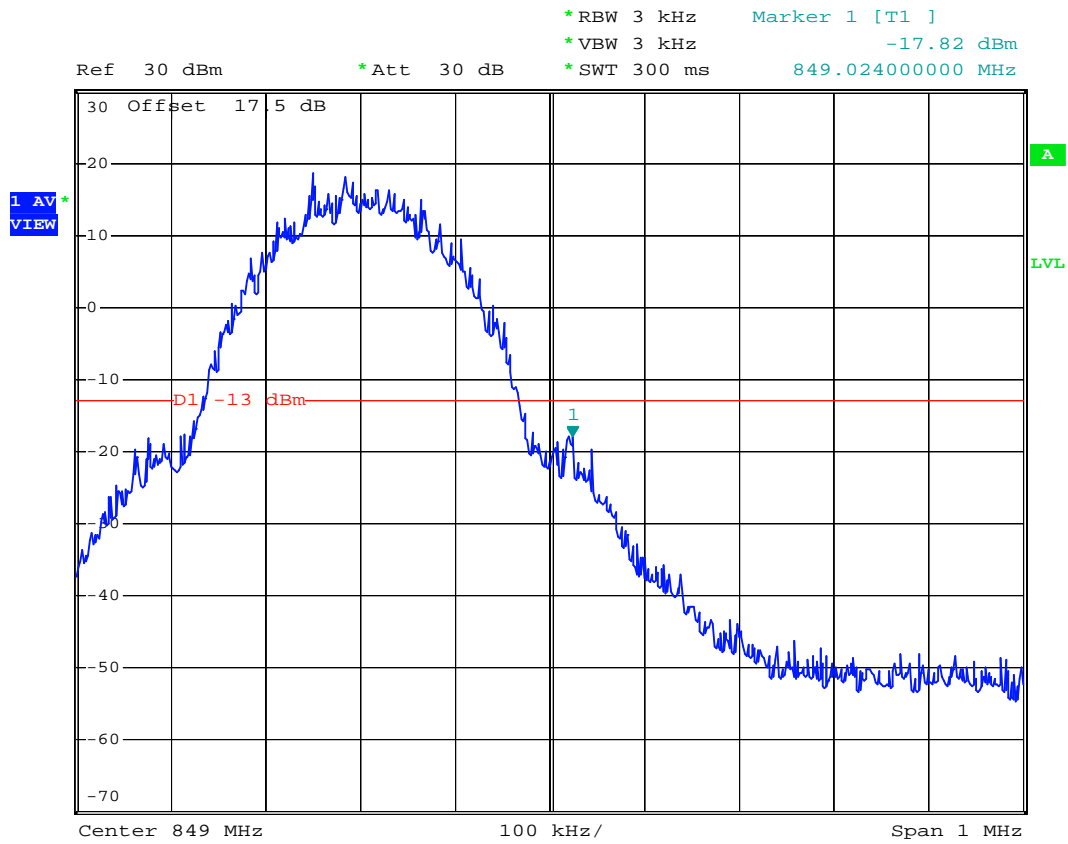


444

Date: 2.OCT.2007 22:11:46



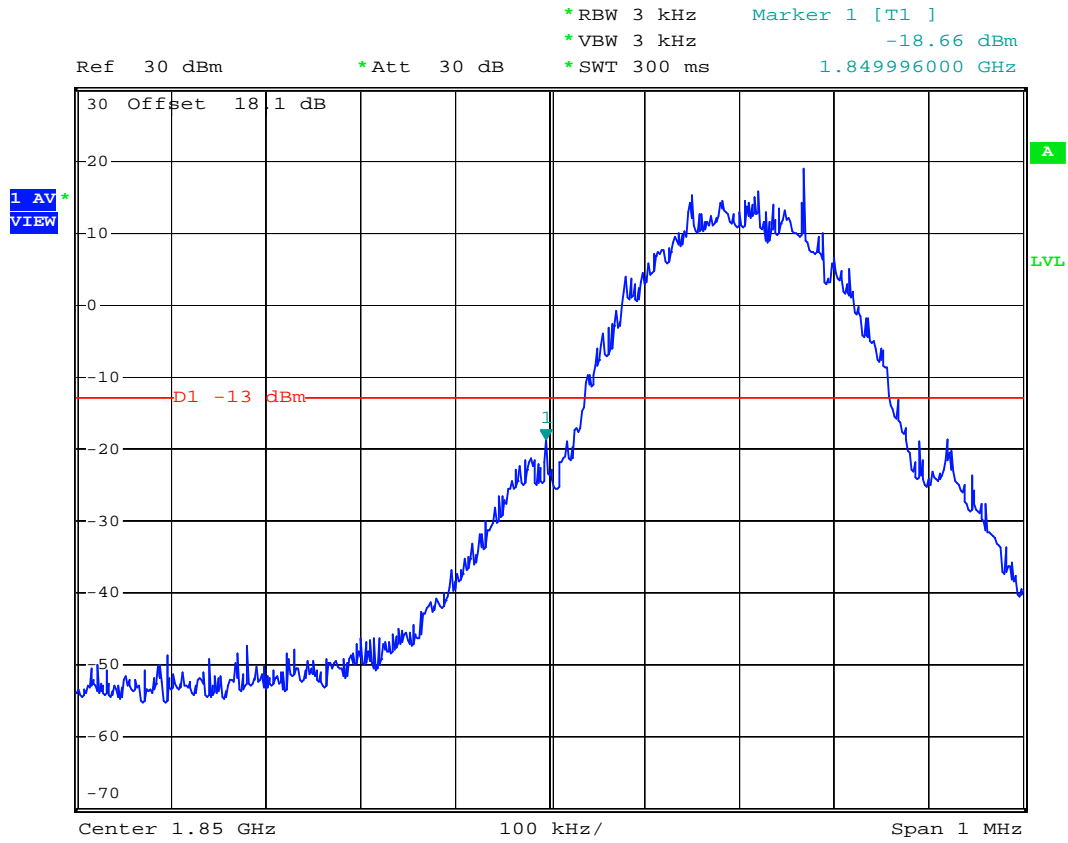
- Test Mode : GSM850 (GSM) CH251 Higher Band Edge
- Power State : High



Date: 25.AUG.2007 03:53:29



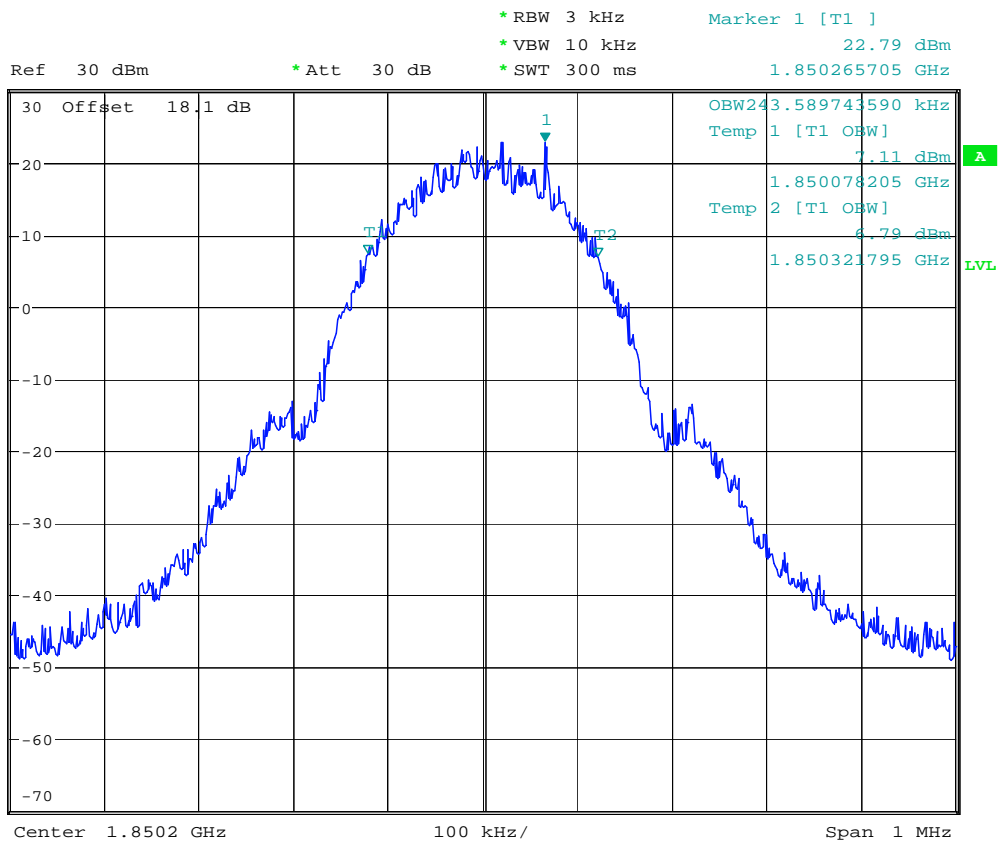
- Mode 2
- Test Mode : PCS1900 (GSM) CH512 Lower Band Edge
- Power State : High



Date: 25.AUG.2007 04:05:35



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



444

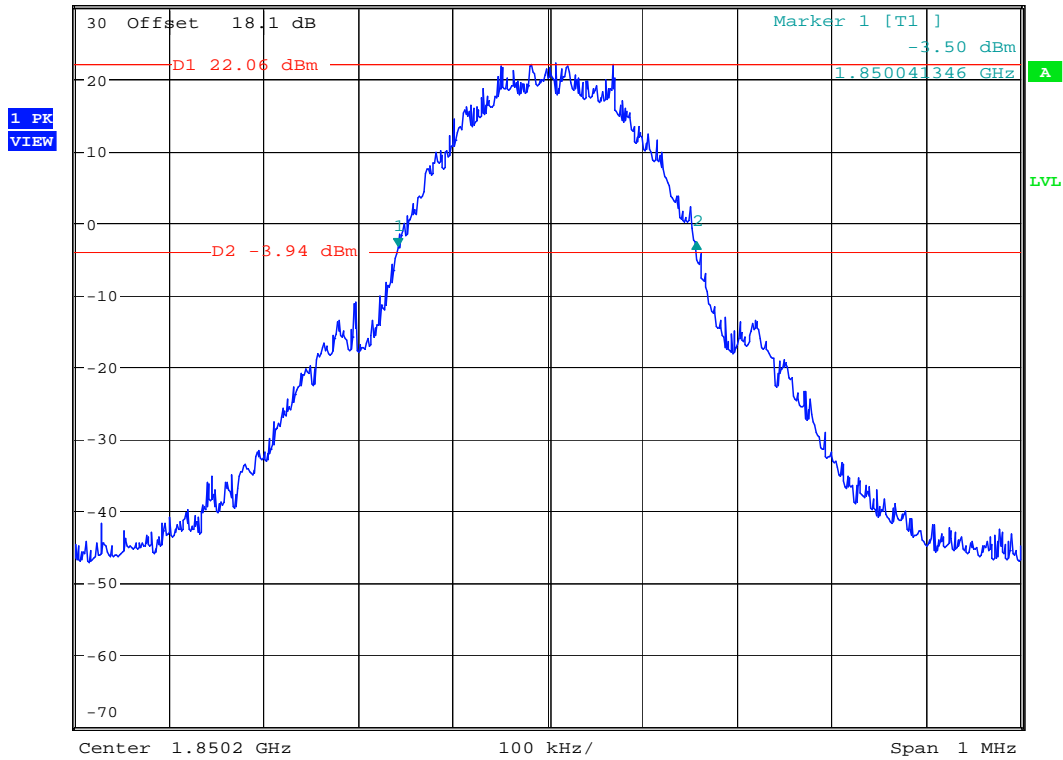
Date: 2.OCT.2007 22:32:06



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



Ref 30 dBm * Att 30 dB * RBW 3 kHz Delta 2 [T1] 0.63 dB
 * VBW 10 kHz 315.705128205 kHz
 * SWT 300 ms



444

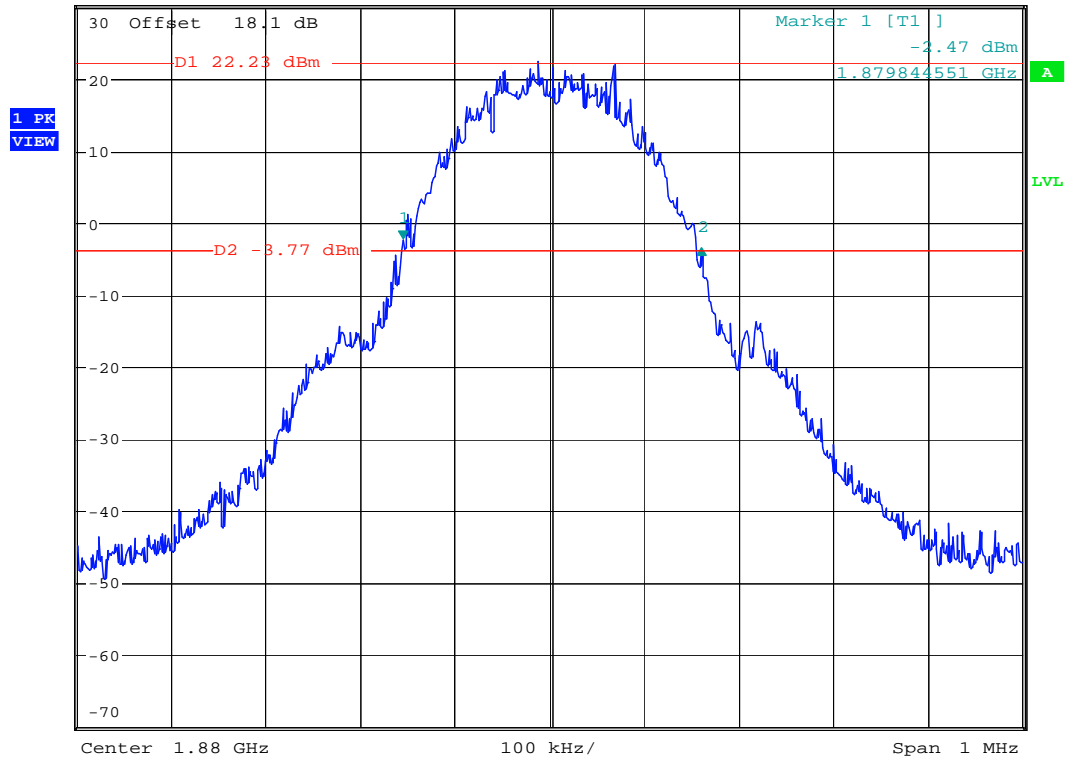
Date: 2.OCT.2007 22:27:01



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



Ref 30 dBm * Att 30 dB * RBW 3 kHz Delta 2 [T1] -1.22 dB
 * VBW 10 kHz 315.705128206 kHz
 * SWT 300 ms



444

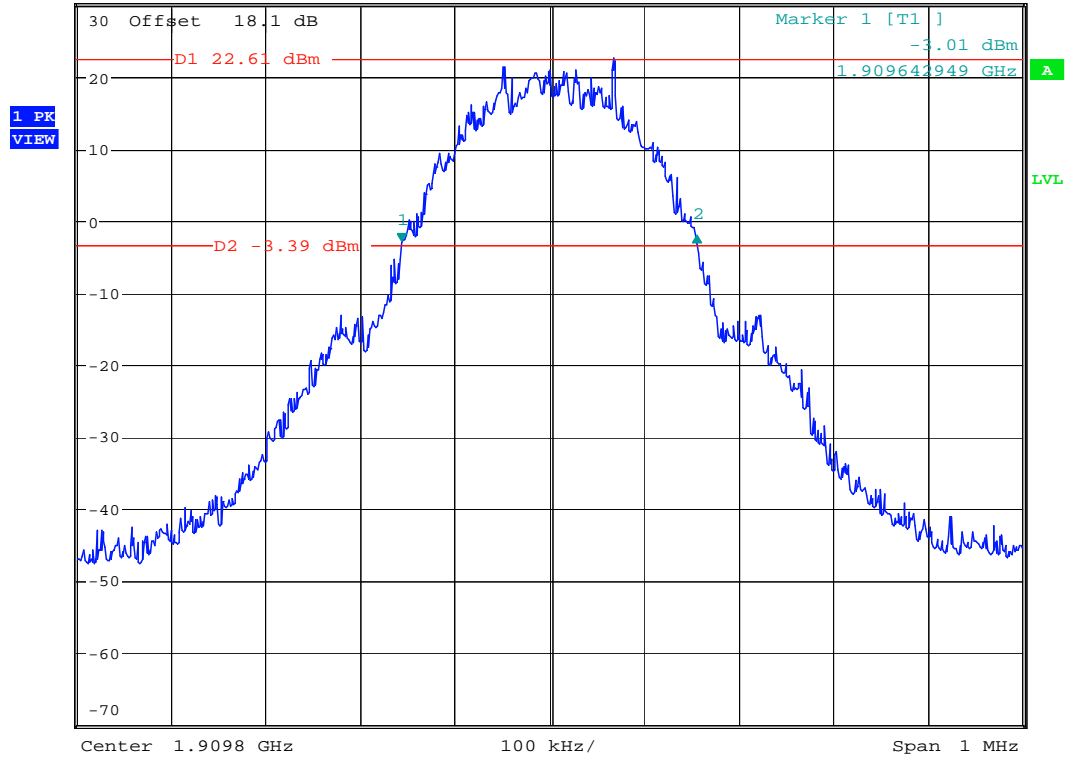
Date: 2.OCT.2007 22:28:35



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



Ref 30 dBm * Att 30 dB * RBW 3 kHz Delta 2 [T1] 0.84 dB
 * VBW 10 kHz 312.50000001 kHz
 * SWT 300 ms

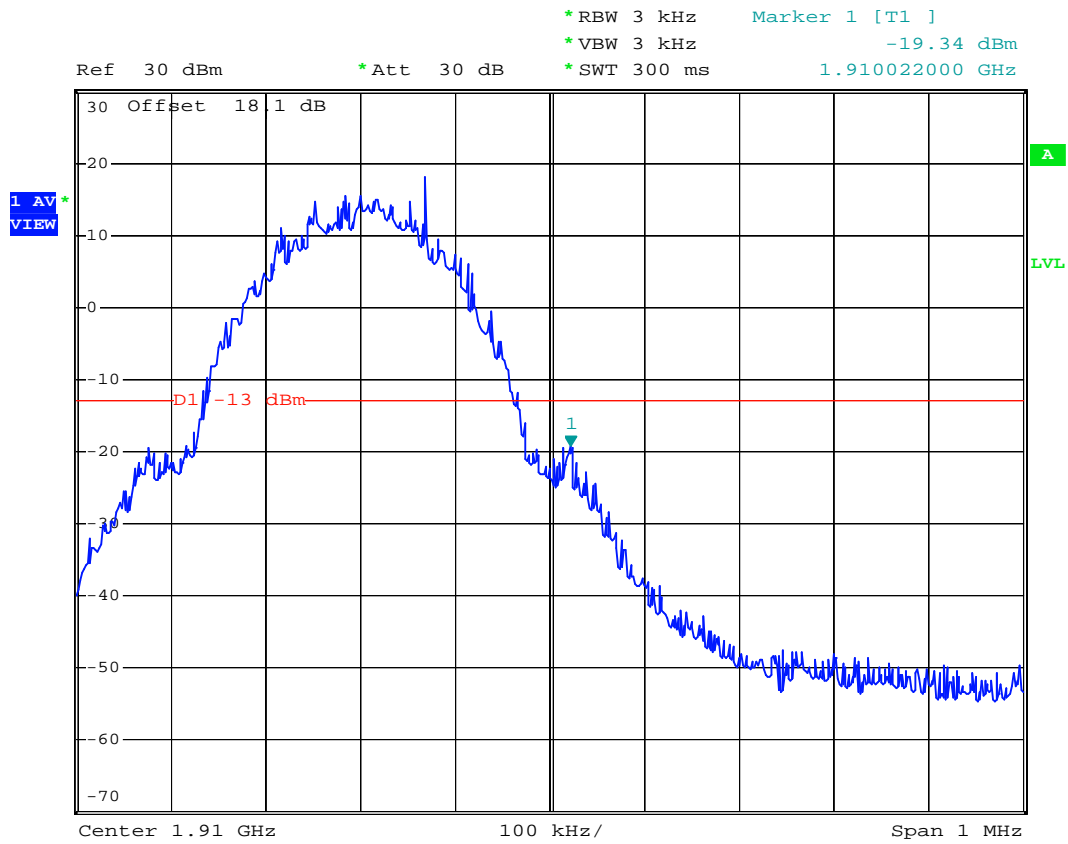


444

Date: 2.OCT.2007 22:30:12



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



Date: 25.AUG.2007 04:03:46

4.5 Conducted Emission

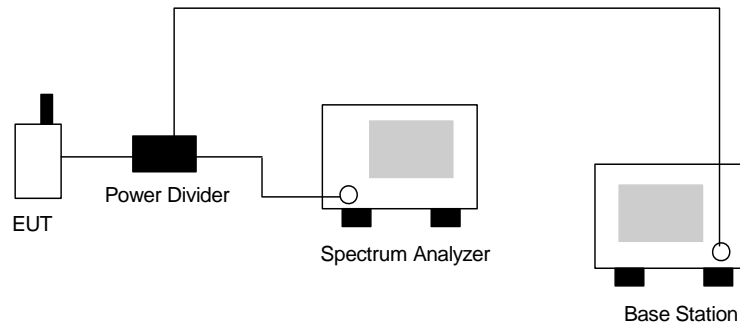
4.5.1 Measurement Instruments

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.

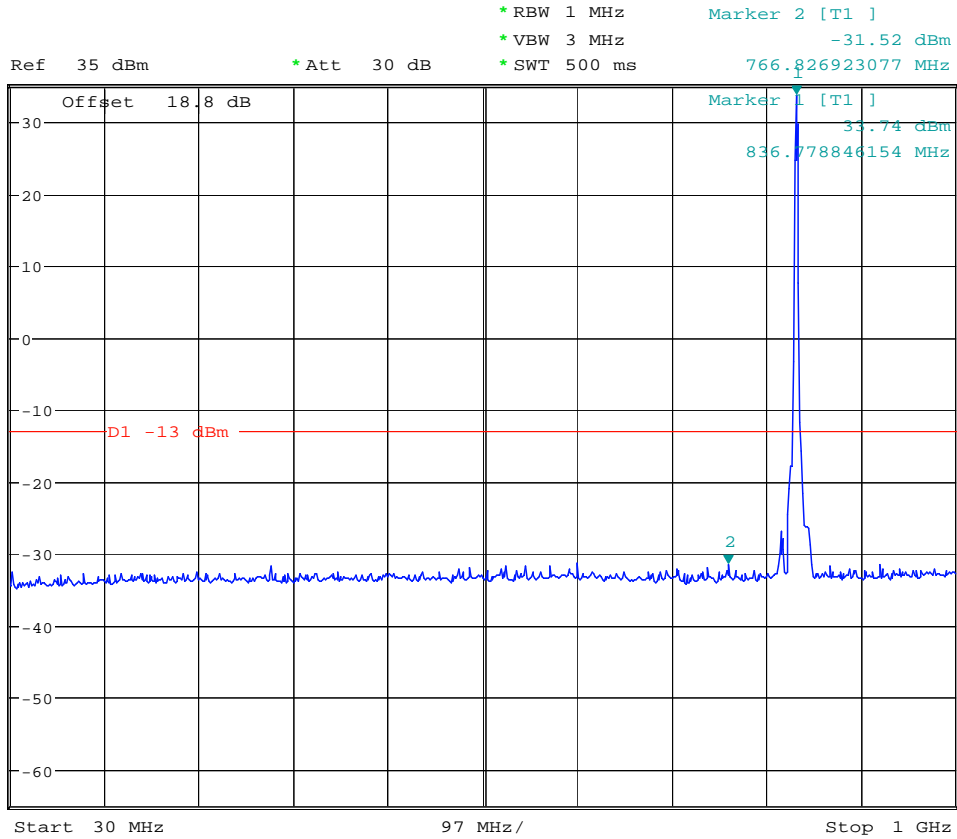
4.5.3 Test Setup Layout





4.5.4 Test Result

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

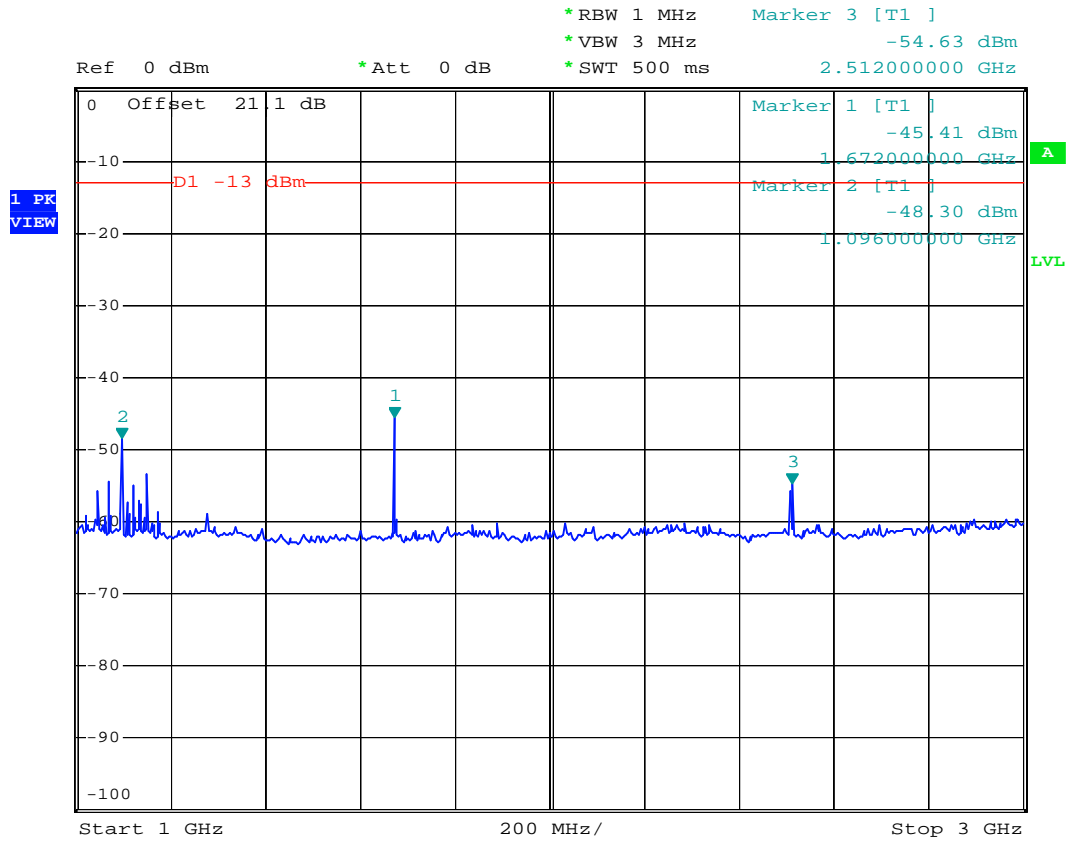


444

Date: 2.OCT.2007 22:20:18



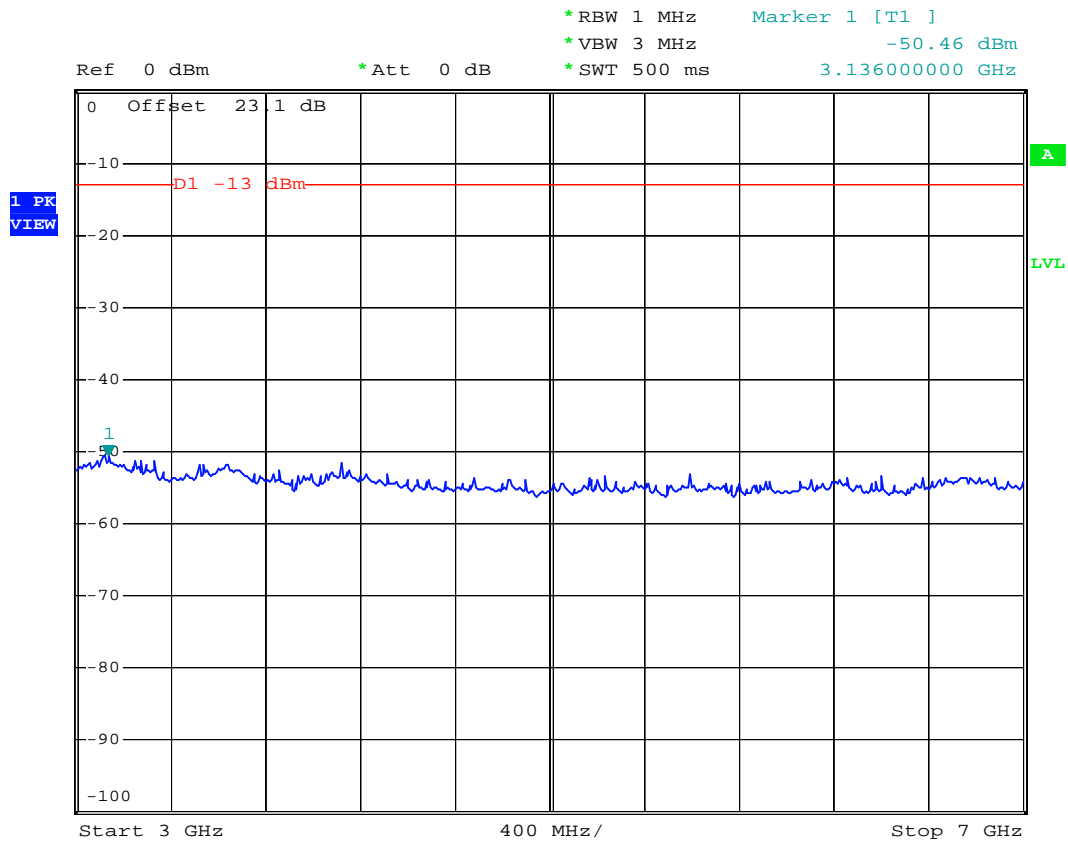
- Test Mode : GSM850 (GSM) CH189
- Frequency Range : 1G-3G



Date: 25.AUG.2007 05:09:16



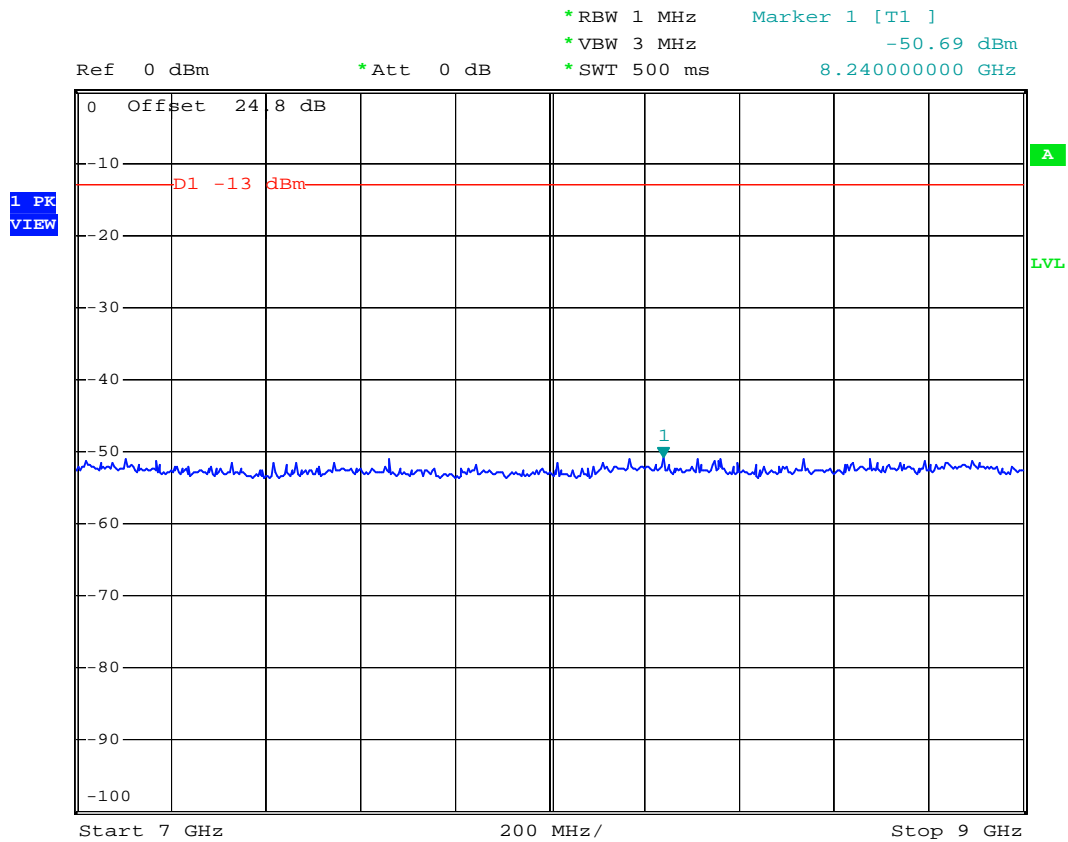
- Test Mode : GSM850 (GSM) CH189
- Frequency Range : 3G-7G



Date: 25.AUG.2007 05:12:30



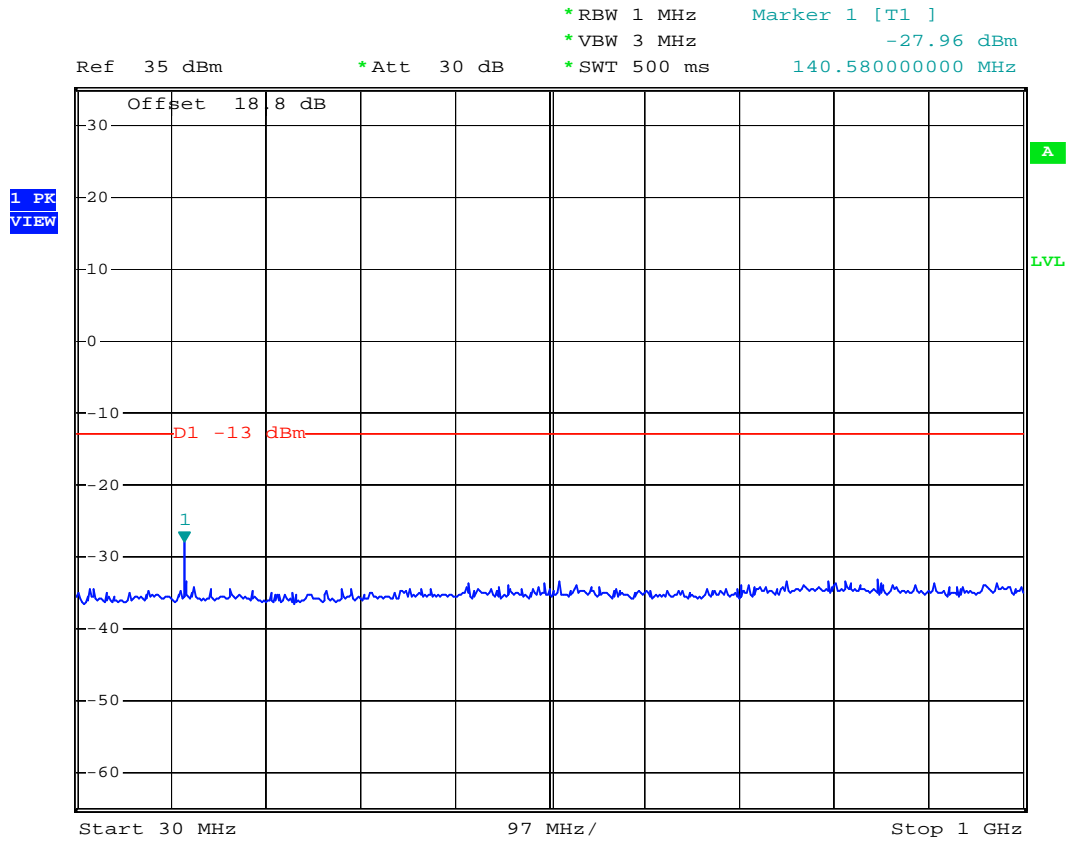
- Test Mode : GSM850 (GSM) CH189
- Frequency Range : 7G-9G



Date: 25.AUG.2007 05:15:05



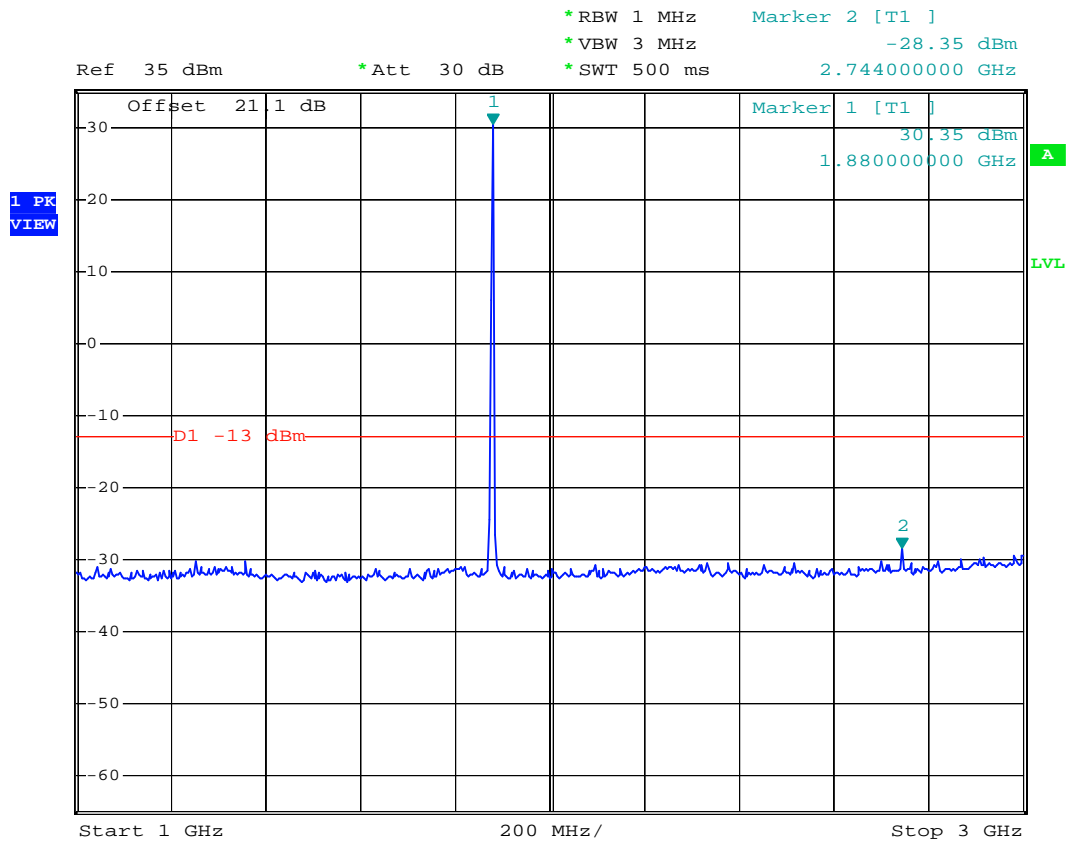
- Mode 2
- Test Mode : PCS1900 (GSM) CH661
- Frequency Range : 30M-1G



Date: 25.AUG.2007 05:05:34



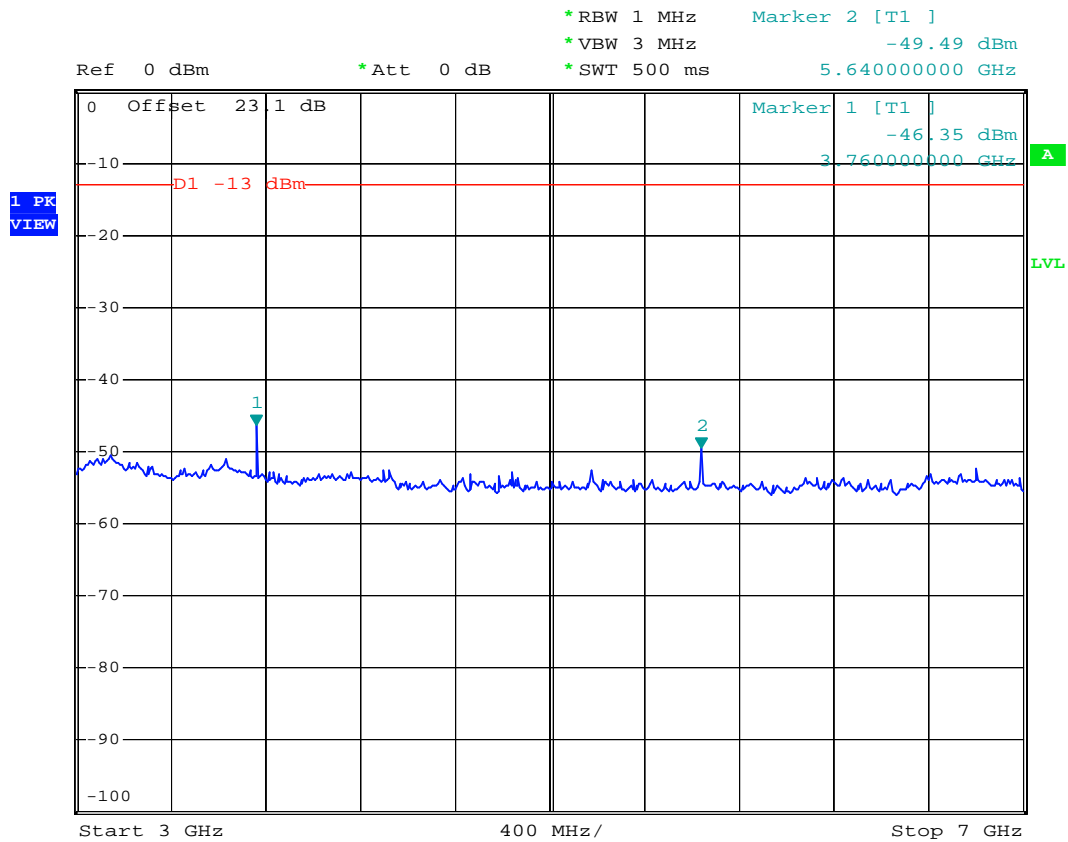
- Test Mode : PCS1900 (GSM) CH661
- Frequency Range : 1G-3G



Date: 25.AUG.2007 05:07:10



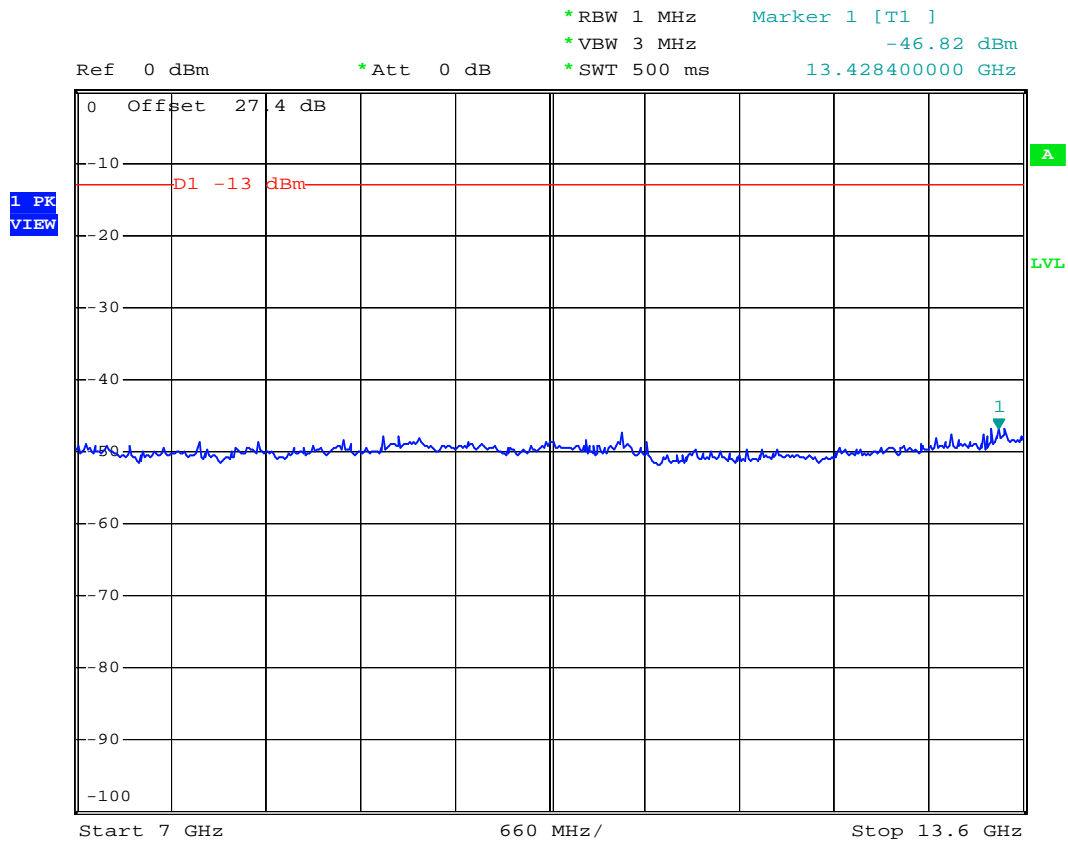
- Test Mode : PCS1900 (GSM) CH661
- Frequency Range : 3G-7G



Date: 25.AUG.2007 05:13:35



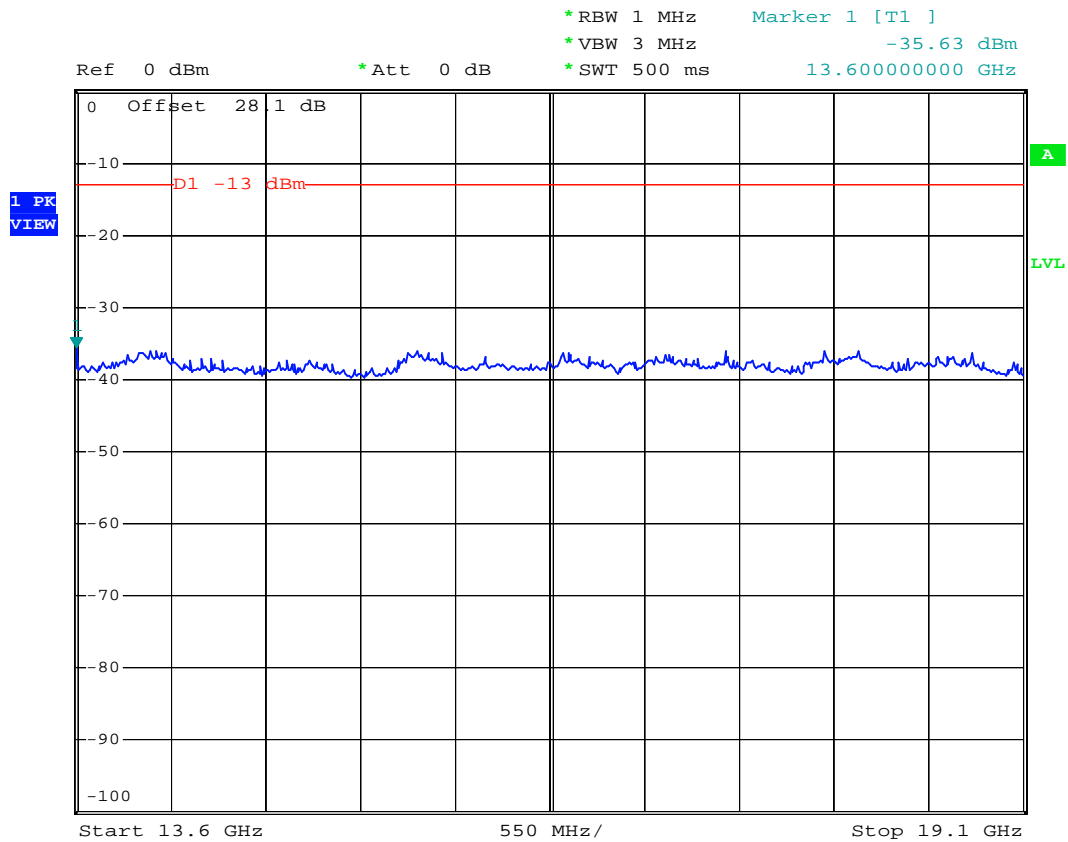
- Test Mode : PCS1900 (GSM) CH661
- Frequency Range : 7G-13.6G



Date: 25.AUG.2007 05:16:30



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



Date: 25.AUG.2007 05:17:42

4.6 Field Strength of Spurious Radiation

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

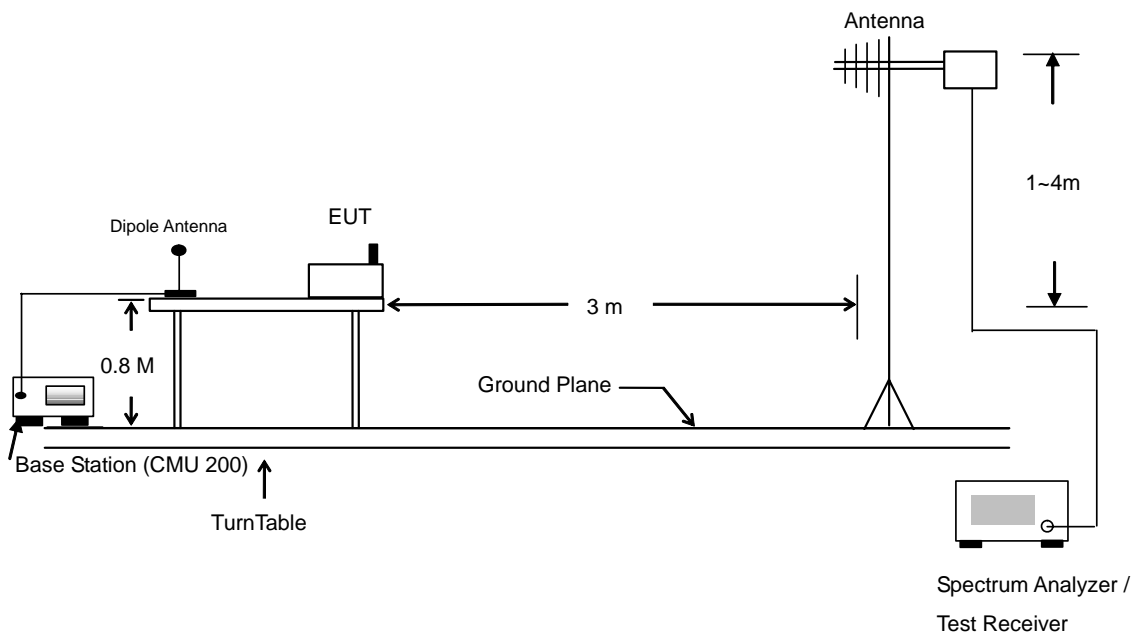
4.6.1 Measurement Instruments

As described in chapter 5 of this test report.

4.6.2 Test Procedure

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

4.6.3 Test Setup Layout





4.6.4 Test Result

• Test Mode : Mode 1

GSM850 (GSM) Radiated Spurious ERP							
H Polarization				V Polarization			
Frequency	ERP (dBm)	Limit	Margin	Frequency	ERP (dBm)	Limit	Margin
(MHz)		(dBm)	(dB)	(MHz)		(dBm)	(dB)
31.080	-55.870	-13	-42.87	62.130	-52.930	-13	-39.93
75.630	-55.480	-13	-42.48	74.280	-57.690	-13	-44.69
175.530	-54.790	-13	-41.79	176.340	-56.430	-13	-43.43
434.400	-21.490	-13	-8.49	434.400	-26.310	-13	-13.31
1298.000	-57.360	-13	-44.36	1298.000	-54.350	-13	-41.35
1674.000	-24.290	-13	-11.29	1674.000	-23.600	-13	-10.60
2508.000	-51.860	-13	-38.86	2508.000	-49.560	-13	-36.56
3344.000	-43.510	-13	-30.51	3344.000	-41.470	-13	-28.47
4178.000	-48.290	-13	-35.29	4178.000	-42.870	-13	-29.87
5018.000	-42.000	-13	-29.00	5018.000	-34.480	-13	-21.48
5854.000	-38.570	-13	-25.57	5854.000	-39.040	-13	-26.04
6688.000	-41.930	-13	-28.93	6688.000	-42.150	-13	-29.15
7528.000	-38.090	-13	-25.09	7528.000	-36.920	-13	-23.92



• Test Mode : Mode 2

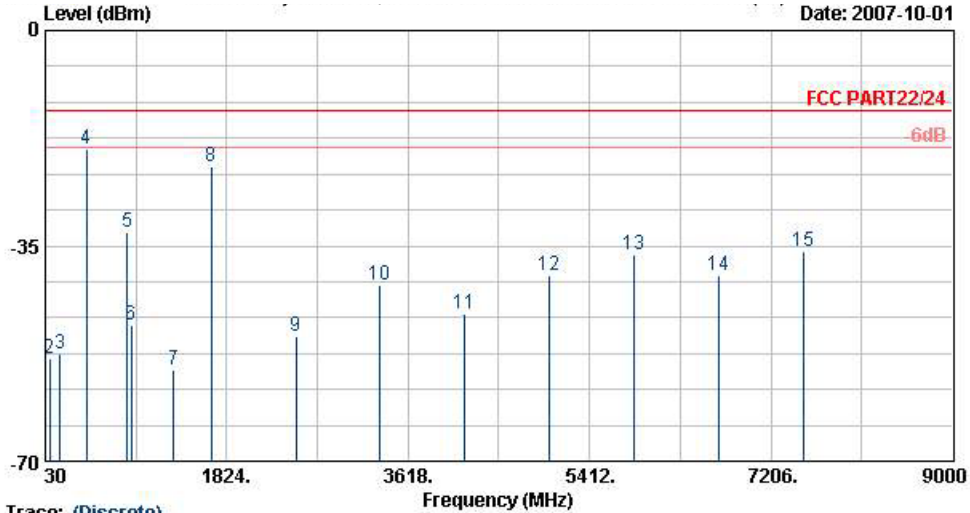
PCS1900 (GSM) Radiated Spurious EIRP							
H Polarization				V Polarization			
Frequency	ERP (dBm)	Limit	Margin	Frequency	ERP (dBm)	Limit	Margin
(MHz)		(dBm)	(dB)	(MHz)		(dBm)	(dB)
31.080	-53.250	-13	-40.25	62.130	-53.080	-13	-40.08
75.630	-53.550	-13	-40.55	75.630	-55.470	-13	-42.47
179.040	-52.090	-13	-39.09	179.040	-52.320	-13	-39.32
329.400	-57.940	-13	-44.94	329.400	-63.320	-13	-50.32
434.400	-21.310	-13	-8.31	434.400	-23.900	-13	-10.90
868.400	-62.180	-13	-49.18	866.300	-60.260	-13	-47.26
1298.000	-56.050	-13	-43.05	1298.000	-52.610	-13	-39.61
3758.000	-48.730	-13	-35.73	3758.000	-27.240	-13	-14.24
5638.000	-28.970	-13	-15.97	5638.000	-20.830	-13	-7.83
7518.000	-33.190	-13	-20.19	7518.000	-31.450	-13	-18.45
9398.000	-39.620	-13	-26.62	9398.000	-35.300	-13	-22.30



Test Data

4.6.4.1 Mode 1

Horizontal Polarization



Trace: (Discrete)

Site : D3CH06-HY
 Condition : FCC PART22/24 HF-SPURIOUS-060929 HORIZONTAL
 EUT : GPS GPS TRACKING AND ALARM SYSTEM
 Power : From Battery 12Vdc
 Model : FC 771706
 Mode : GSM850 Link

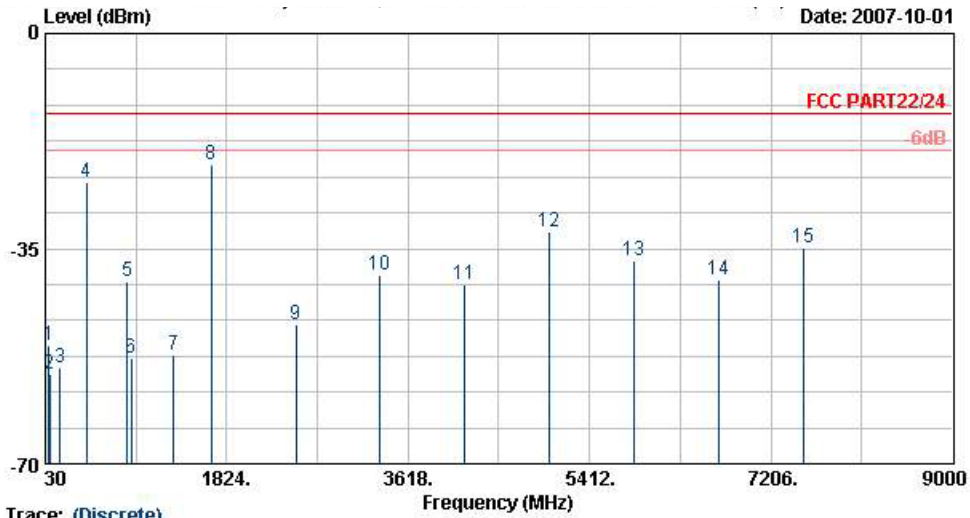
	Freq	Level	Over	Limit	Read	Factor	Remark
	MHz	dBm	Limit	Line	Level	dB	
			dB	dBm	dBm		
1	31.08	-53.72	-40.72	-13.00	-53.47	-0.25	Peak
2	75.63	-53.33	-40.33	-13.00	-41.00	-12.33	Peak
3	175.53	-52.64	-39.64	-13.00	-39.53	-13.11	Peak
4 @	434.40	-19.34	-6.34	-13.00	-13.32	-6.02	Peak
5	840.40	-32.77			-31.47	-1.31	Peak
6	880.30	-47.94			-47.03	-0.91	Peak
7	1298.00	-55.21	-42.21	-13.00	-54.75	-0.46	Peak
8	1674.00	-22.14	-9.14	-13.00	-24.50	2.36	Peak
9	2508.00	-49.71	-36.71	-13.00	-56.39	6.69	Peak
10	3344.00	-41.36	-28.36	-13.00	-50.76	9.40	Peak
11	4178.00	-46.14	-33.14	-13.00	-58.12	11.98	Peak
12	5018.00	-39.85	-26.85	-13.00	-55.92	16.07	Peak
13	5854.00	-36.42	-23.42	-13.00	-56.28	19.85	Peak
14	6688.00	-39.78	-26.78	-13.00	-59.96	20.19	Peak
15	7528.00	-35.94	-22.94	-13.00	-57.26	21.31	Peak

Remark:

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



Vertical Polarization



Trace: (Discrete)

Site : 08CH06-HY
 Condition : FCC PART22/24 HF-SPURIOUS-060020 VERTICAL
 EUT : GPS CPBS TRACKING AND ALARM SYSTEM
 Power : From Battery 12Vdc
 Model : FG 771706
 Mode : GSM850 Link

	Freq	Level	Over	Limit	Read		Remark
	MHz	dBm	Limit	Line	Level	Factor	
			dB	dBm	dBm	dB	
1	62.13	-50.78	-37.78	-13.00	-37.64	-13.14	Peak
2	74.28	-55.54	-42.54	-13.00	-44.22	-11.32	Peak
3	176.34	-54.28	-41.28	-13.00	-45.90	-8.38	Peak
4	434.40	-24.16	-11.16	-13.00	-20.25	-3.91	Peak
5	840.40	-40.33			-41.72	1.39	Peak
6	880.30	-52.70			-54.41	1.71	Peak
7	1298.00	-52.20	-39.20	-13.00	-50.79	-1.41	Peak
8 @	1674.00	-21.45	-8.45	-13.00	-23.60	2.16	Peak
9	2508.00	-47.41	-34.41	-13.00	-54.59	7.18	Peak
10	3344.00	-39.32	-26.32	-13.00	-47.87	8.55	Peak
11	4178.00	-40.72	-27.72	-13.00	-52.08	11.36	Peak
12	5018.00	-32.33	-19.33	-13.00	-47.07	14.74	Peak
13	5854.00	-36.89	-23.89	-13.00	-55.37	18.49	Peak
14	6688.00	-40.00	-27.00	-13.00	-58.68	18.68	Peak
15	7528.00	-34.77	-21.77	-13.00	-54.28	19.51	Peak

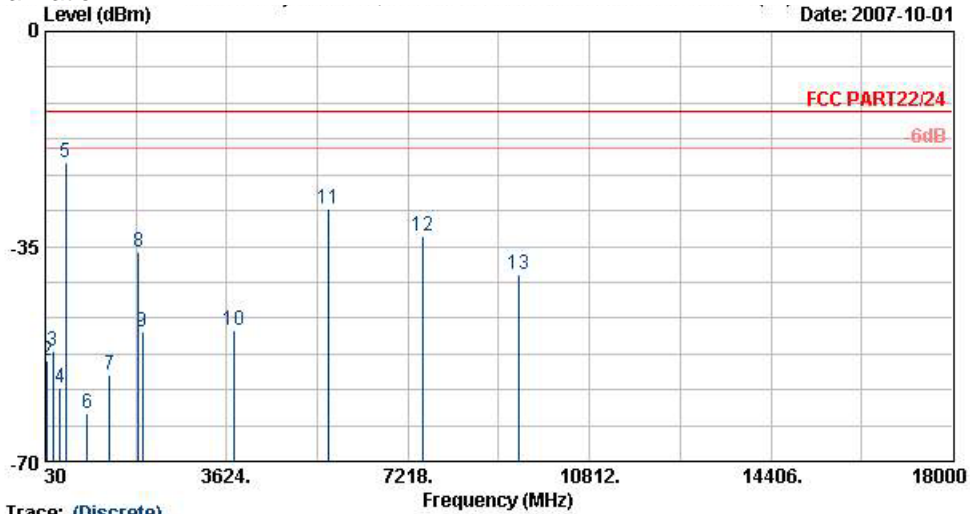
Remark:

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



4.6.4.2 Mode 2

Horizontal Polarization



Trace: (Discrete)
 Site : D3CH06-HY
 Condition : FCC PART22/24 HF-SPURIOUS-060929 HORIZONTAL
 EUT : GPS GPRS TRACKING AND ALARM SYSTEM
 Power : From Battery 12Vdc
 Model : FC 771706
 Mode : PCS1900 Link

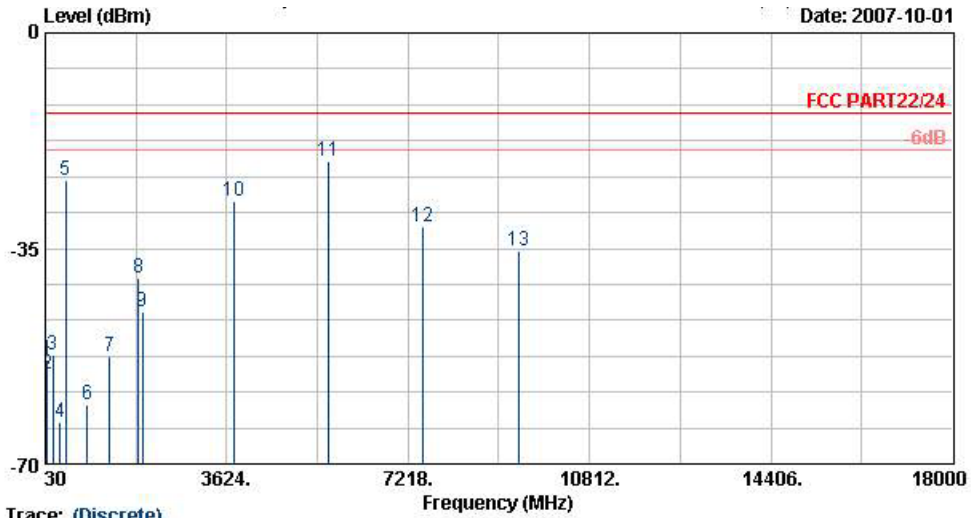
	Freq	Level	Over	Limit	Read		Remark
	MHz	dBm	Limit	Line	Level	Factor	
			dB	dBm	dBm	dB	
1	31.08	-53.25	-40.25	-13.00	-53.01	-0.25	Peak
2	75.63	-53.55	-40.55	-13.00	-41.21	-12.33	Peak
3	179.04	-52.09	-39.09	-13.00	-38.94	-13.16	Peak
4	329.40	-57.94	-44.94	-13.00	-49.03	-8.91	Peak
5	434.40	-21.31	-8.31	-13.00	-15.29	-6.02	Peak
6	868.40	-62.18	-49.18	-13.00	-61.15	-1.03	Peak
7	1298.00	-56.05	-43.05	-13.00	-55.59	-0.46	Peak
8	1884.00	-35.89			-39.79	3.90	Peak
9	1958.00	-49.02			-53.44	4.41	Peak
10	3758.00	-48.73	-35.73	-13.00	-59.14	10.41	Peak
11	5638.00	-28.97	-15.97	-13.00	-47.41	18.45	Peak
12	7518.00	-33.19	-20.19	-13.00	-54.44	21.25	Peak
13	9398.00	-39.62	-26.62	-13.00	-61.02	21.40	Peak

Remark:

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



Vertical Polarization



Date: 2007-10-01

Trace: (Discrete)

Site : 03CH06-HY
 Condition : FCC PART22/24 HF-SPURIOUS-060020 VERTICAL
 EUT : GPS CPBS TRACKING AND ALARM SYSTEM
 Power : From Battery 12Vdc
 Model : FG 771706
 Mode : PCS1900 Link

	Freq	Level	Over	Limit	Read		Remark
	MHz	dBm	dB	dBm	dBm	dB	
1	62.13	-53.08	-40.08	-13.00	-39.94	-13.14	Peak
2	75.63	-55.47	-42.47	-13.00	-44.29	-11.19	Peak
3	179.04	-52.32	-39.32	-13.00	-43.92	-8.41	Peak
4	329.40	-63.32	-50.32	-13.00	-57.50	-5.82	Peak
5	434.40	-23.90	-10.90	-13.00	-19.99	-3.91	Peak
6	866.30	-60.26	-47.26	-13.00	-61.85	1.59	Peak
7	1298.00	-52.61	-39.61	-13.00	-51.20	-1.41	Peak
8	1884.00	-39.90			-44.20	4.29	Peak
9	1958.00	-45.38			-50.39	5.01	Peak
10	3758.00	-27.24	-14.24	-13.00	-37.13	9.89	Peak
11 @	5638.00	-20.83	-7.83	-13.00	-37.80	16.97	Peak
12	7518.00	-31.45	-18.45	-13.00	-50.90	19.44	Peak
13	9398.00	-35.30	-22.30	-13.00	-55.19	19.89	Peak

Remark:

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

4.7 Frequency Stability (Temperature Variation)

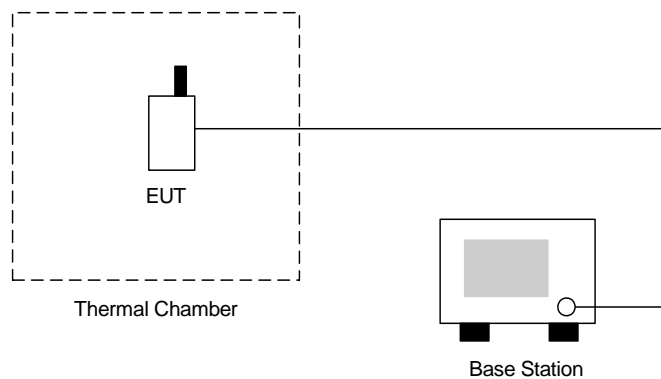
4.7.1 Measurement Instrument

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	59	0.03	2.5	Passed
-20	53	0.06		
-10	28	0.03		
0	37	0.04		
10	44	0.05		
20	46	0.05		
30	-48	-0.06		
40	-43	-0.05		
50	55	0.06		

• Test Mode : PCS1900 (GSM) CH661

Temperature(°C)	Change (Hz)	Change (ppm)	Limit (ppm)	Result
-30	-47	-0.02	2.5	Passed
-20	-50	-0.03		
-10	50	0.03		
0	-44	-0.02		
10	-47	-0.02		
20	38	0.02		
30	40	0.02		
40	-33	-0.02		
50	47	0.02		

4.8 Frequency Stability (Voltage Variation)

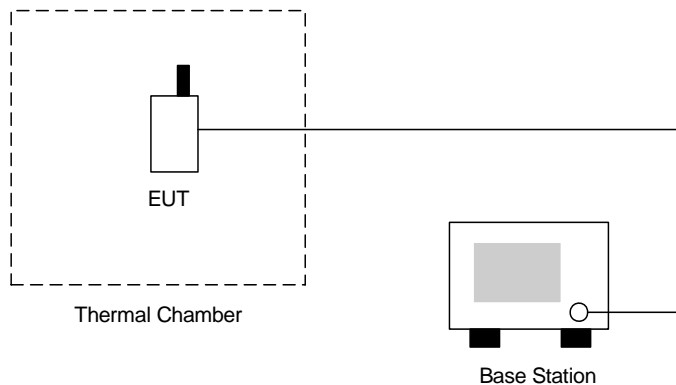
4.8.1 Measurement Instrument

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 ± 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
14.0	55.0	0.06	2.5	Passed
BEP	53.0	0.06		
16.1	58.0	0.07		

- Test Mode : PCS1900 (GSM) CH661

Voltage(Volt)	Change (Hz)	Change (ppm)	Limit (ppm)	Result
14.0	-54.0	-0.03	2.5	Passed
BEP	-44.0	-0.02		
16.1	-51.0	-0.03		

Remark:

1. Normal Voltage=14.0V.
2. Battery End Point (BEP)= 11.9 V.



5. List of Measurement Equipments

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)
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	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	Nov. 01, 2007	Conduction (TH02-HY)
DC Power	TOPWARD	3303D	740889	N/A	May 25, 2005	May 24, 2009	Conduction (TH02-HY)
Power Meter	Agilent	E4416A	GB41292344	N/A	Feb. 08, 2007	Feb. 07, 2008	Conduction (TH02-HY)
Power Sensor	Agilent	E9327A	US40441548	N/A	Feb. 08, 2007	Feb. 07, 2008	Conduction (TH02-HY)



6. Uncertainty Evaluation

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

Contribution	Uncertainty of x_i		$u(x_i)$
	dB	Probability Distribution	
Receiver reading	0.41	Normal(k=2)	0.21
Antenna factor calibration	0.83	Normal(k=2)	0.42
Cable loss calibration	0.25	Normal(k=2)	0.13
Pre Amplifier Gain calibration	0.27	Normal(k=2)	0.14
Rcv/SPA specification	2.50	Rectangular	0.72
Antenna Factor Interpolation for Frequency	1.00	Rectangular	0.29
Site imperfection	1.43	Rectangular	0.83
Mismatch	+0.39/-0.41	U-shaped	0.28
Combined standard uncertainty Uc(y)	1.27		
Measuring uncertainty for a level of Confidence of 95% U=2Uc(y)	2.54		

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

Contribution	Uncertainty of x_i		$u(x_i)$	C_i	$C_i * u(x_i)$
	dB	Probability Distribution			
Receiver reading	±0.10	Normal(k=1)	0.10	1	0.10
Antenna factor calibration	±1.70	Normal(k=2)	0.85	1	0.85
Cable loss calibration	±0.50	Normal(k=2)	0.25	1	0.25
Receiver Correction	±2.00	Rectangular	1.15	1	1.15
Antenna Factor Directional	±1.50	Rectangular	0.87	1	0.87
Site imperfection	±2.80	Triangular	1.14	1	1.14
Mismatch Receiver VSWR $\Gamma_1 = 0.197$ Antenna VSWR $\Gamma_2 = 0.194$ Uncertainty = $20 \log(1 - \Gamma_1 * \Gamma_2 * \Gamma_3)$	+0.34/-0.35	U-shaped	0.244	1	0.244
Combined standard uncertainty Uc(y)	2.36				
Measuring uncertainty for a level of Confidence of 95% U=2Uc(y)	4.72				

END OF TEST REPORT