



Certification Test Report

Test Report: 2005 060392-FCC
FCC ID: APVGX820

Equipment Under Test: GSM/GPRS Modem Module
Model: GX820
Antenna Model: Tuf Duck EXE-821-SM

Applicant: CalAmp Corporation
2236 Rutherford Road, Suite 103
Carlsbad, CA 92008-8836
760.268.5876

In Accordance With: FCC Part 22, Subpart H
Industry Canada RSS-129, Issue 2
Industry Canada RSS-132, Issue 2

AND

In Accordance With: FCC Part 24, Subpart E
Industry Canada RSS-133.Issue 3

Tested By: Nemko USA Inc.
11696 Sorrento Valley Road
San Diego, CA 92121-1024

Date: June 7, 2005

Total Number of Pages: 69



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Section 1. Summary of Test Results

General:

All measurements are traceable to national standards.

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 22, Subpart H and FCC Part 24, Subpart E.

DOCUMENT HISTORY

REVISION	DATE	COMMENTS
-	June 7, 2005	Prepared By: A. Laudani
-	June 7, 2005	Initial Release: Chip Fleury

NOTE: Nemko USA, Inc. hereby makes the following statements so as to conform to Chapter 10 (Test Reports) Requirements of ANSI C63.4 (2003) "Methods and Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz":

- o The unit described in this report was received at Nemko USA, Inc.'s facilities on June 1, 2005 . Testing was performed on the unit described in this report on June 1, 2005 to June 5, 2005 .
- o The Test Results reported herein apply only to the Unit actually tested, and to substantially identical Units.
- o This report does not imply the endorsement of the Federal Communications Commission (FCC), NVLAP or any other government agency.

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CERTIFICATION

Nemko USA, Inc., an independent Electromagnetic Compatibility (EMC) Test Laboratory, produced this Test Report and performed the Radio Frequency Interference (RFI) testing and data evaluation contained herein.

Nemko USA, Inc.'s measurement facility is currently registered with the United States Federal Communications Commission (FCC) in accordance with the provisions of 47 United States Code (CFR) Part 2, Subpart I, Section 2.948(a). A current description of Nemko USA, Inc.'s measurement facility is on file with the FCC. Nemko USA Inc. has additionally satisfied the FCC that it complies with the requirements set forth in 47 CFR Part 2, Subpart I, Section 2.948(d) regarding the accreditation of EMC laboratories. As a result, the FCC has placed Nemko USA Inc. on its list of EMC laboratories approved to perform Declaration of Conformity (DOC) procedure testing.

The RFI testing, test data collection and test data evaluation were accomplished in accordance with the ANSI C63.4-2003 Standard, and in accordance with the applicable sections of the FCC rules (47 CFR Parts 2 and 18)." digital devices. The testing was also accomplished in accordance with Industry Canada's ICES-003 standard for unintentional radiating device per EMCAB-3, Issue 3 (May 1998). The administrative summary of this test report provides a description of the test sample

I hereby certify that the test data, test data evaluation, and equipment configurations used to compile this test report are a true and accurate representation of the test sample's radio frequency interference characteristics as of the test date(s), and, for the design of the test sample.

Test Supervisor: Chip Fleury
Chip Fleury
Manager Nemko USA, Inc.



Summary Of Test Data

Name Of Test	Para. No.	Result
RF Power Output	2.1046	Complies
Audio Frequency Response	2.1047	NA ¹
Audio Low Pass Filter Response	2.1047	NA ¹
Modulation Limiting	2.1047	NA ¹
Occupied Bandwidth (WB Data)	2.1049	Complies
Spurious Emissions at Antenna Terminals	2.1051	Complies
Field Strength of Spurious Emissions	2.1053	Complies
Frequency Stability	2.1055	Complies

Footnotes For N/A's: ¹ Digital Modulation



Section 2. General Equipment Specification

Manufacturer:	CalAmp
Model No.:	GX820 GSM/GPRS Modem Module
Serial No.:	63
Antenna Model:	Tuf Duck EXE-821-SM 3 dBi Gain
Date Received In Laboratory:	June 1, 2005
Nemko Identification No.:	25-392-SKYR1
Frequency Ranges:	824.04 – 849.97 MHz 824.20 – 849.80 MHz 1850.2 to 1909.8 MHz
RF Output (Limit):	Part 22: 7 W Part 24: 2 W
RF Output (Measured):	Part 22: 1.64 W Part 24: 1.34W
Emission Designators:	40K01F1D, 40K0F8W, 1M25F9W
FCC Identifier:	APVGX820



2.1 SYSTEM CONFIGURATION

System Components and Power Cables

The **GX820** is a **GSM/GPRS Modem Module**. Its function is to transmit data using GSM and AMPS cellular telephone frequencies 824.04 to 849.97 MHz and 1850.2 to 1909.8 MHz. The EUT was exercised by putting it into a call with a Wireless Communications Test Set.

Device Interconnection and I/O Cables

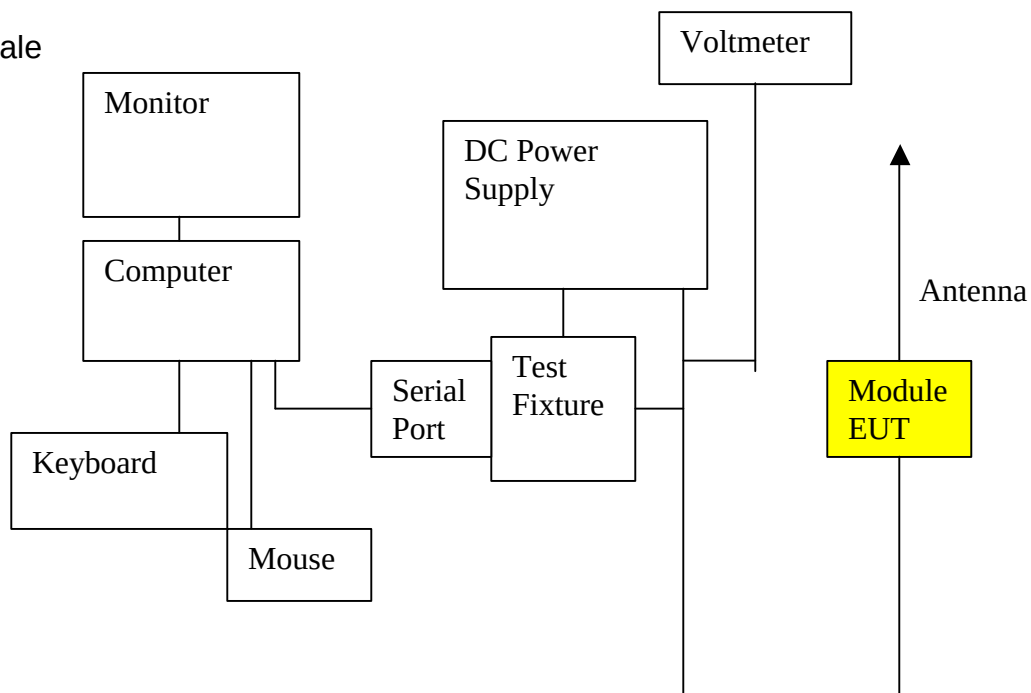
DEVICE	MANUFACTURER MODEL # SERIAL #	POWER CABLE
EUT - GSM/GPRS Modem Module	MFG: CalAmp GSM/GPRS Modem Module Serial #: 63	4.0 Volt DC wires from Power supply
EUT Test Fixture	CalAmp Model #: Serial #	12.0 Volt DC wires from Power supply
Wireless Communications Test Set	Agilent Model #: 8960 Serial #: US40300218	120 Vac 60 Hz
Power Supply	Electro Precision Model#: XP580 SN Serial #: NA	120 Vac 60 Hz
Computer	Gateway Model #:E4200 Serial #: 0018239842	120 Vac 60 Hz
Monitor	ADC Model #:LM-700 Serial #: T7AF21AA06613	120 Vac 60 Hz
Keyboard	Propellor Plot Model #: K280W Serial #: FKD46AK280	
Mouse	Logitek Model #: M-S48 Serial #: LZ93550747	

CONNECTION	I/O CABLE
RF cable	From Test Fixture to Wireless Comm. Test Set – Coax
Serial Cable	From Computer to Test Fixture



General Test Setup:

--not to scale





Design Modifications for Compliance

Device: GSM/GPRS Modem Module

Model: GX820

The following design modifications were made to the EUT during testing.

No design modifications were made to the EUT during testing.



Section 3. RF Power Output

Para. No.: 2.1046

Test Performed By: Alan Laudani	Date of Test: 6-3-05
--	-----------------------------

Minimum Standard: 22.913(a). The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts. & Para.24.232, the EIRP must not exceed 2 Watts.

Test Results: Complies, see tables below.

Measurement Data:

Conductive Measurement

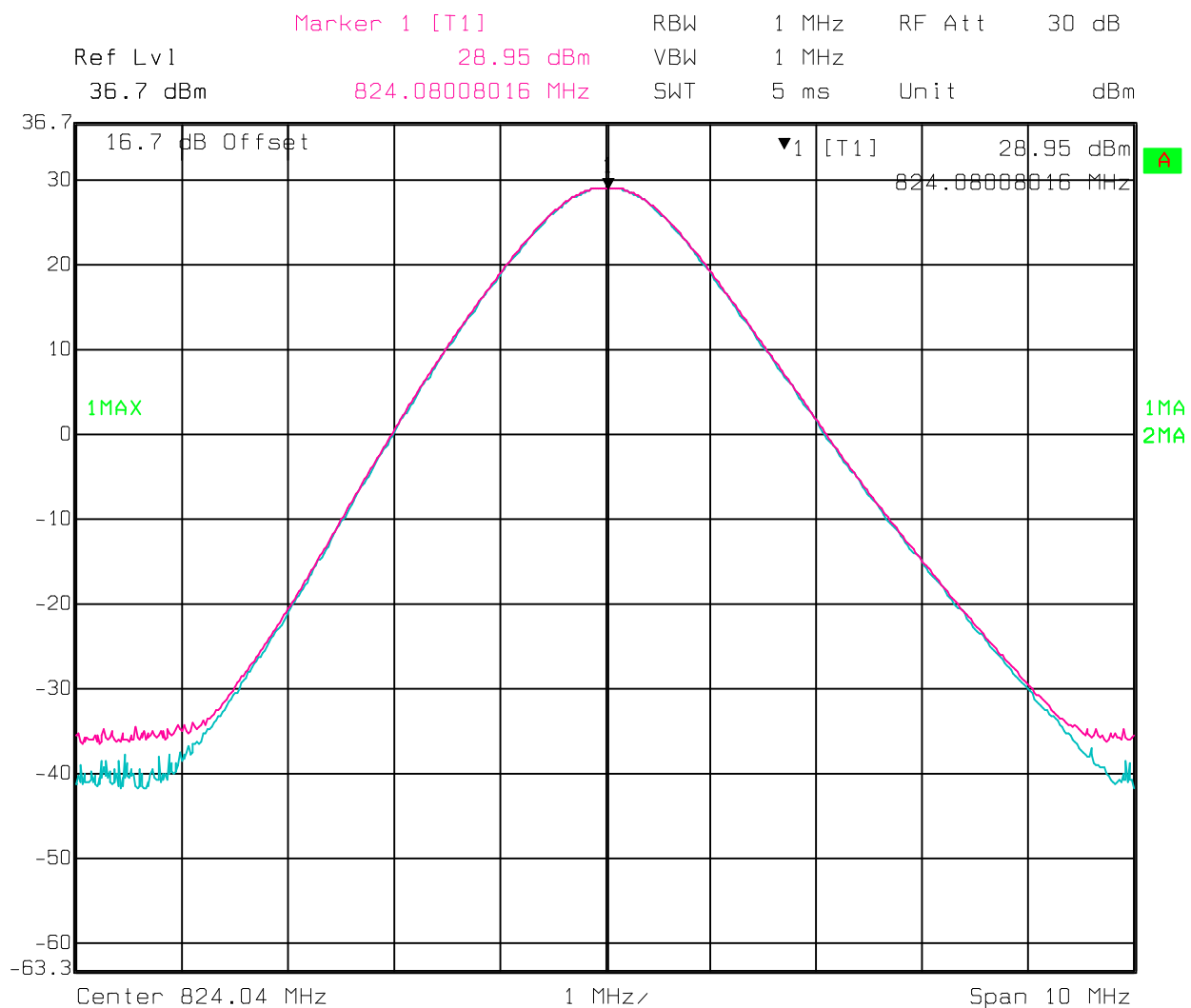
Modulation	Frequency (MHz)	Measured (dBm)	Antenna Gain (dBi)	ERP/EIRP (dBm)	ERP/EIRP Watts
AMPS	824.04	28.95	3	31.95	1.57
	836.49	29.17	3	32.14	1.64
	848.97	26.04	3	29.04	0.80
GSM	824.20	28.07	3	31.07	1.28
	836.40	27.79	3	30.79	1.20
	848.80	28.76	3	31.76	1.50
PCS GSM	1850.02	28.28	3	31.28	1.34
	1880.00	27.34	3	30.34	1.08
	1909.80	26.60	3	29.60	0.91

Radiated Measurement

Modulation	Frequency (MHz)	Measured (dBm)	Substituted Result (dBm)	Substituted Result Watts
AMPS	824.04	30.4	22.8	0.19
	836.49	31.0	23.4	0.22
	848.97	32.0	24.2	0.26
GSM	824.20	30.4	22.8	0.19
	836.40	32.1	24.5	0.28
	848.80	32.8	25.0	0.32
PCS GSM	1850.02	33.2	26.8	0.48
	1880.00	31.6	25.0	0.32
	1909.80	31.5	25.0	0.32



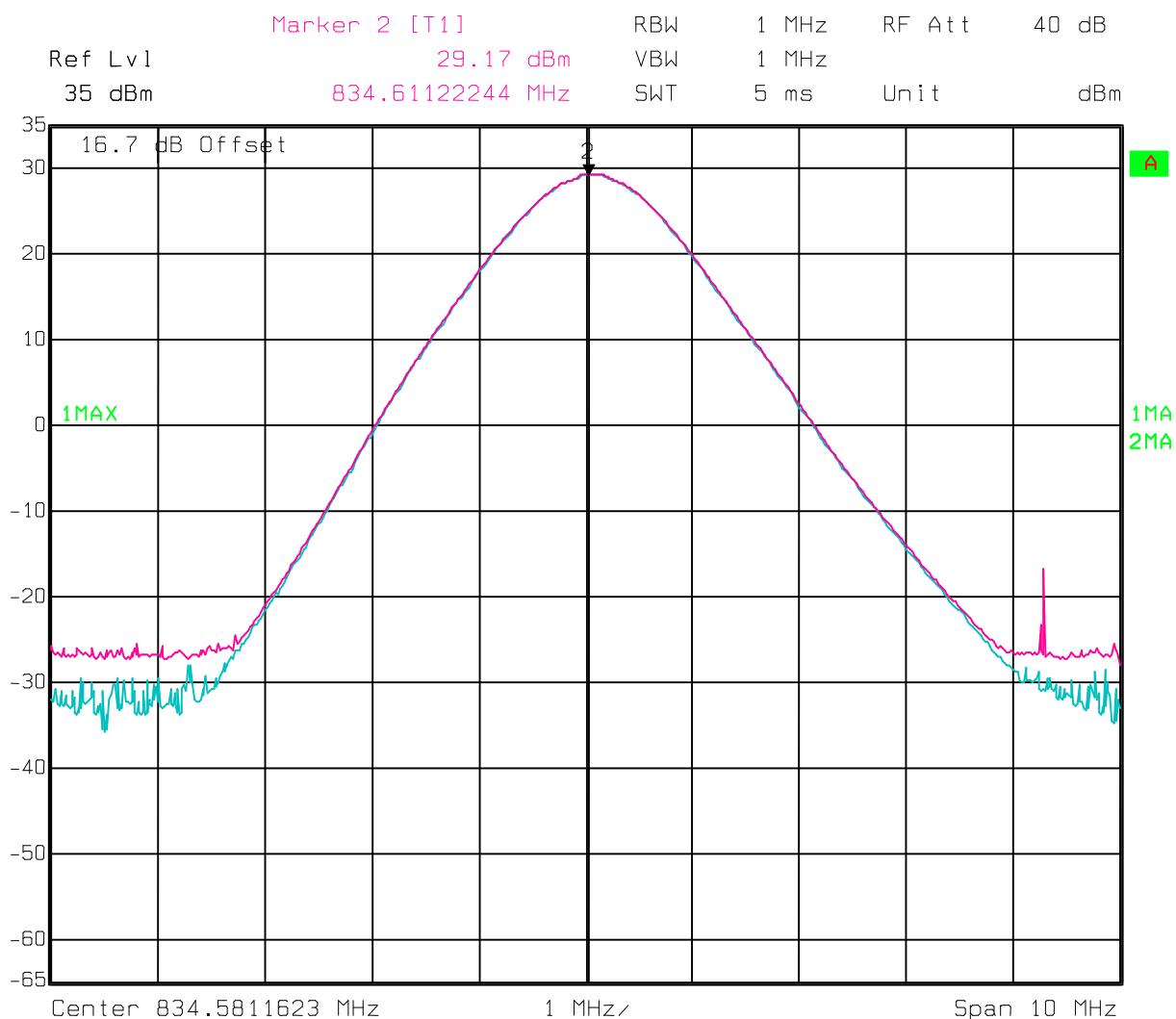
AMPS LOWEST CHANNEL



Date: 01.JUN.2005 16:20:28



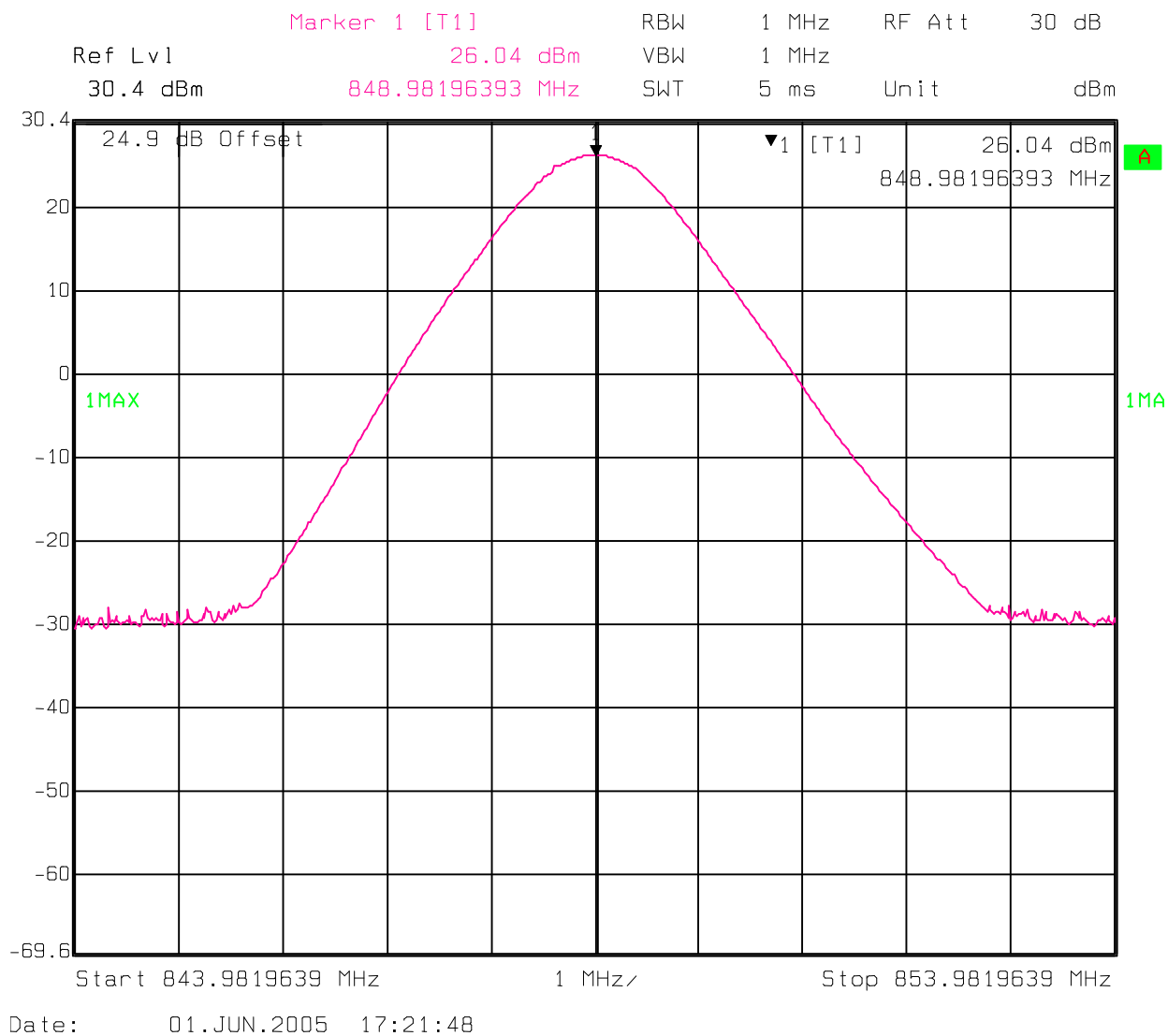
MID CHANNEL



Date: 01.JUN.2005 15:28:31

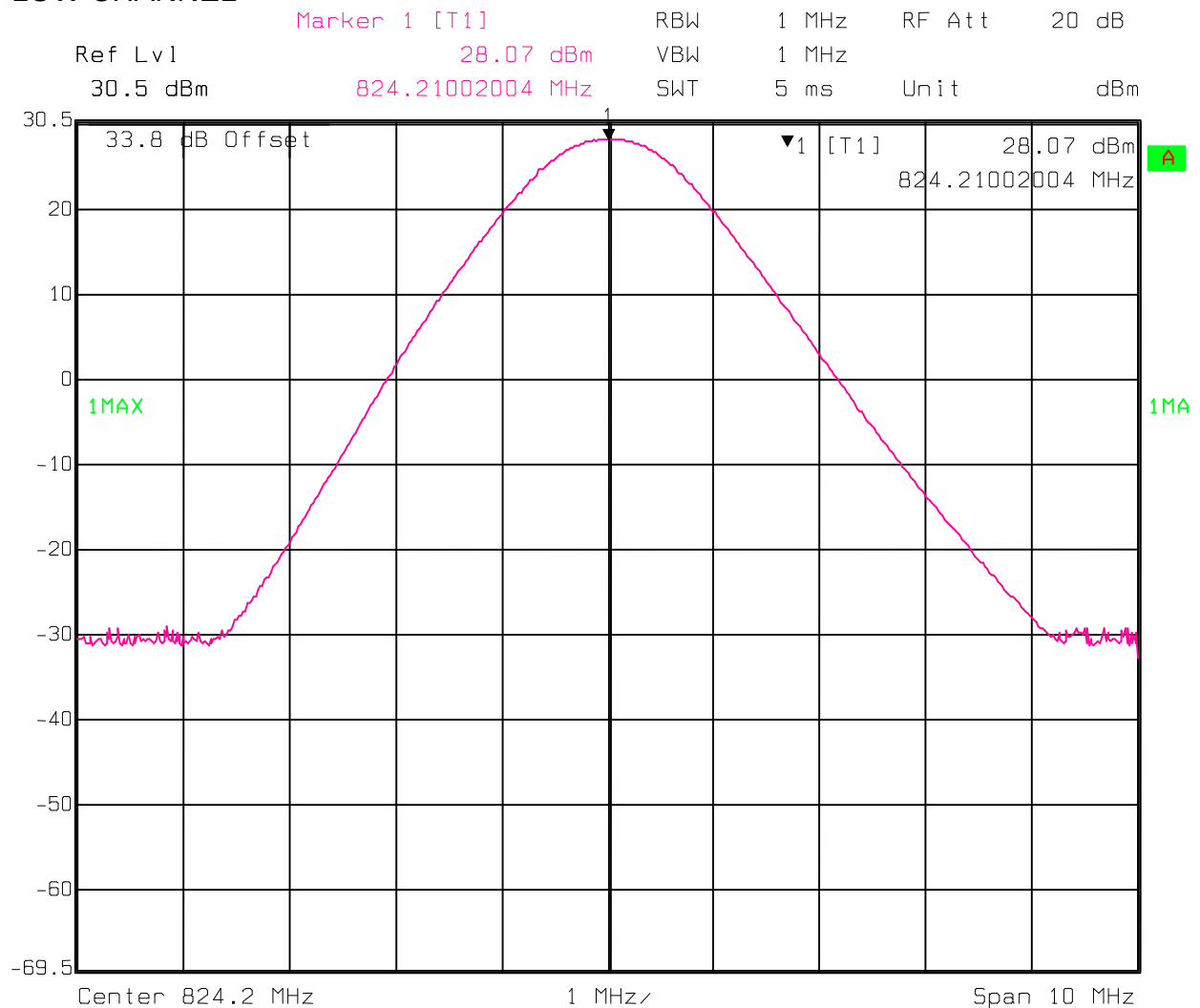


HIGHEST CHANNEL





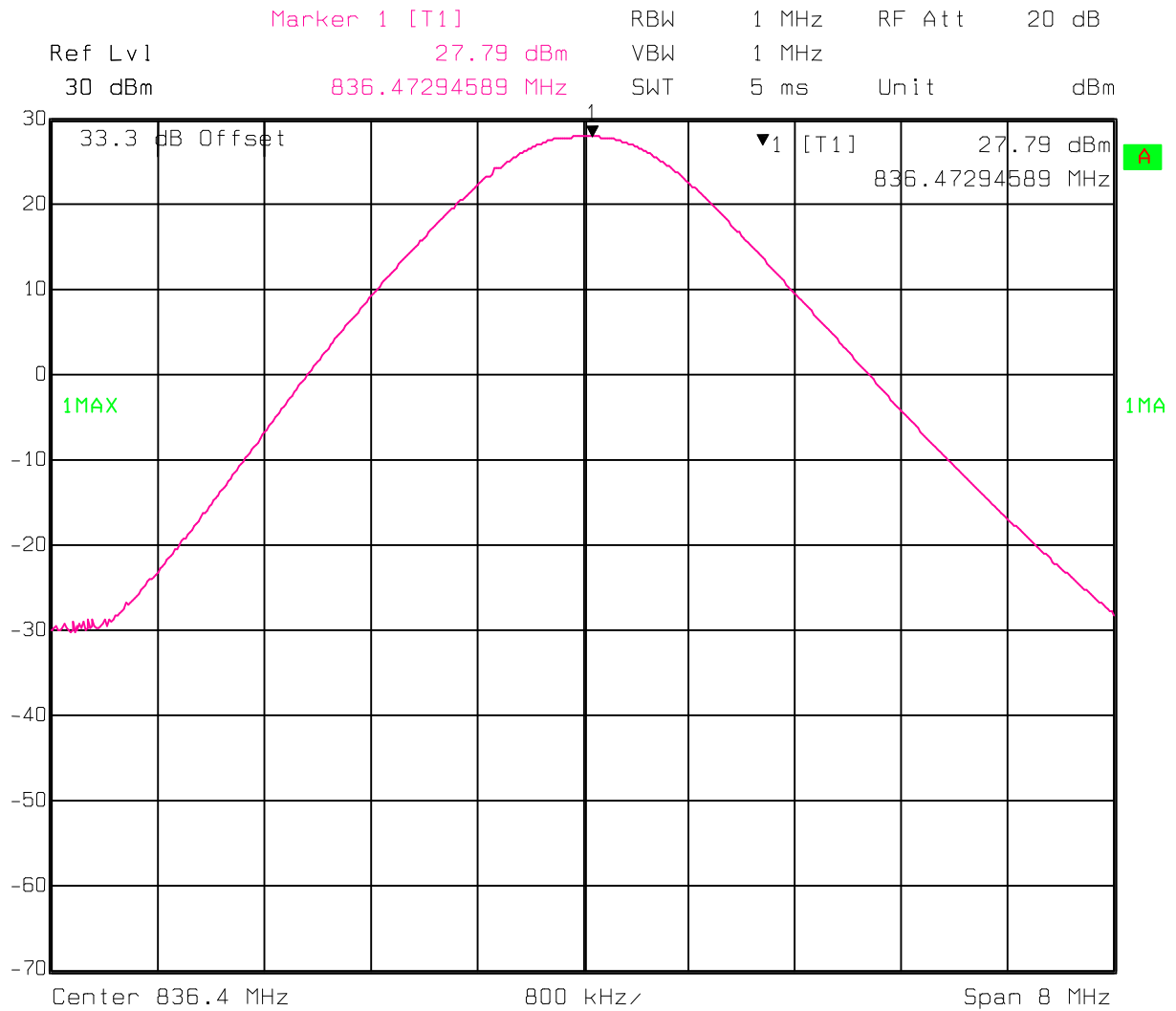
GSM Part 22
LOW CHANNEL



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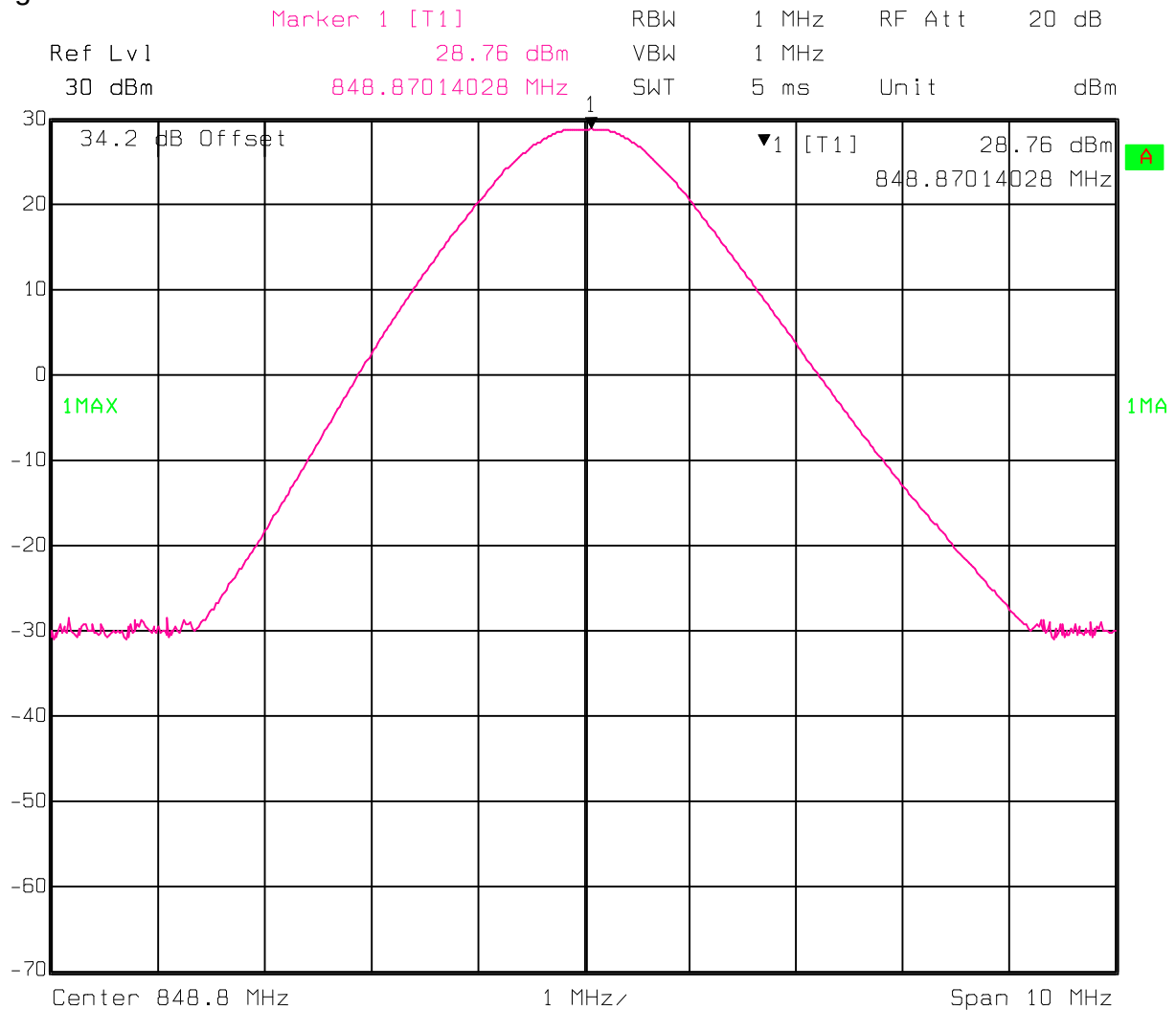
Mid Channel



Date: 02.JUN.2005 15:02:59



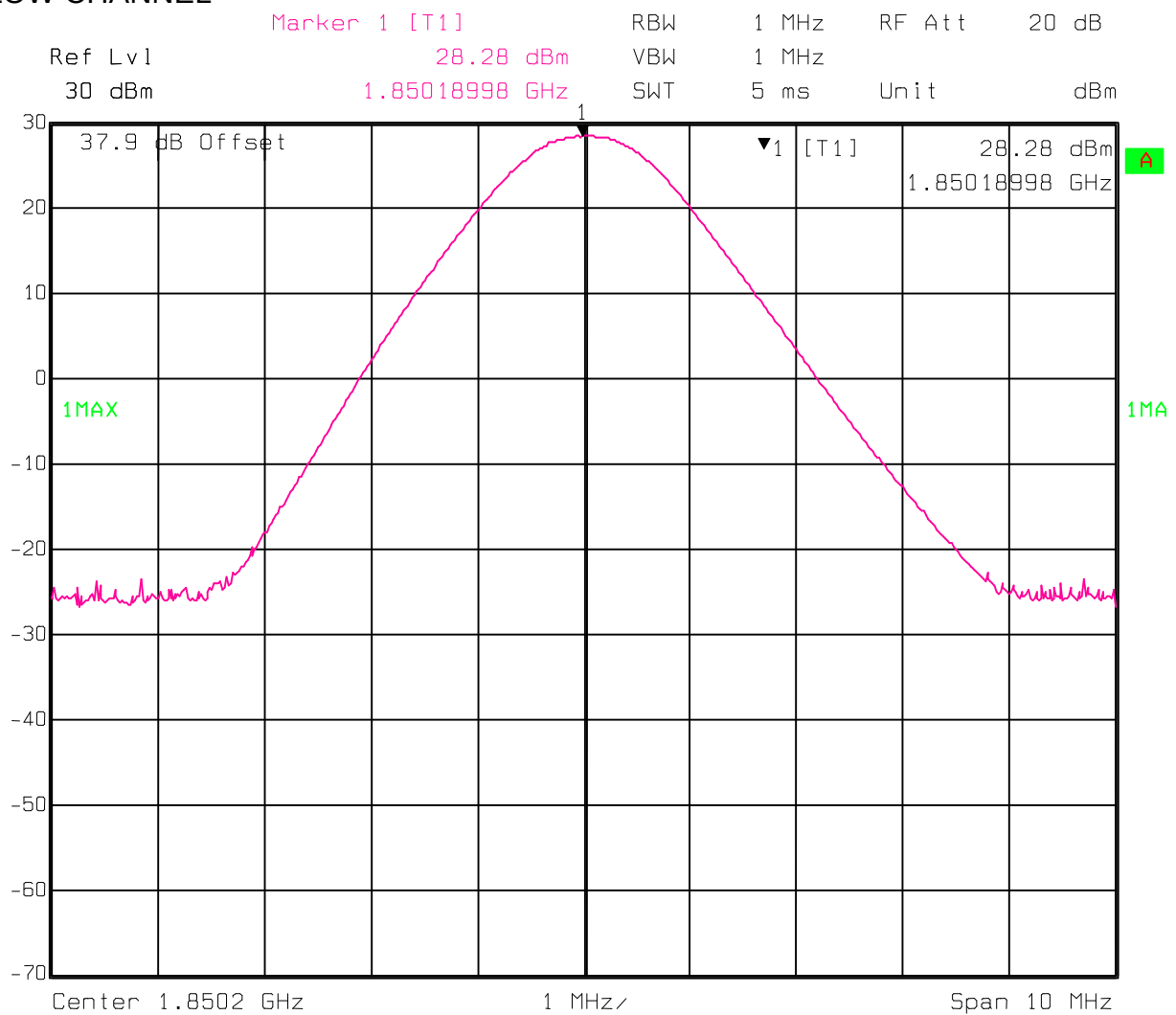
High Channel



Date: 02.JUN.2005 15:25:46



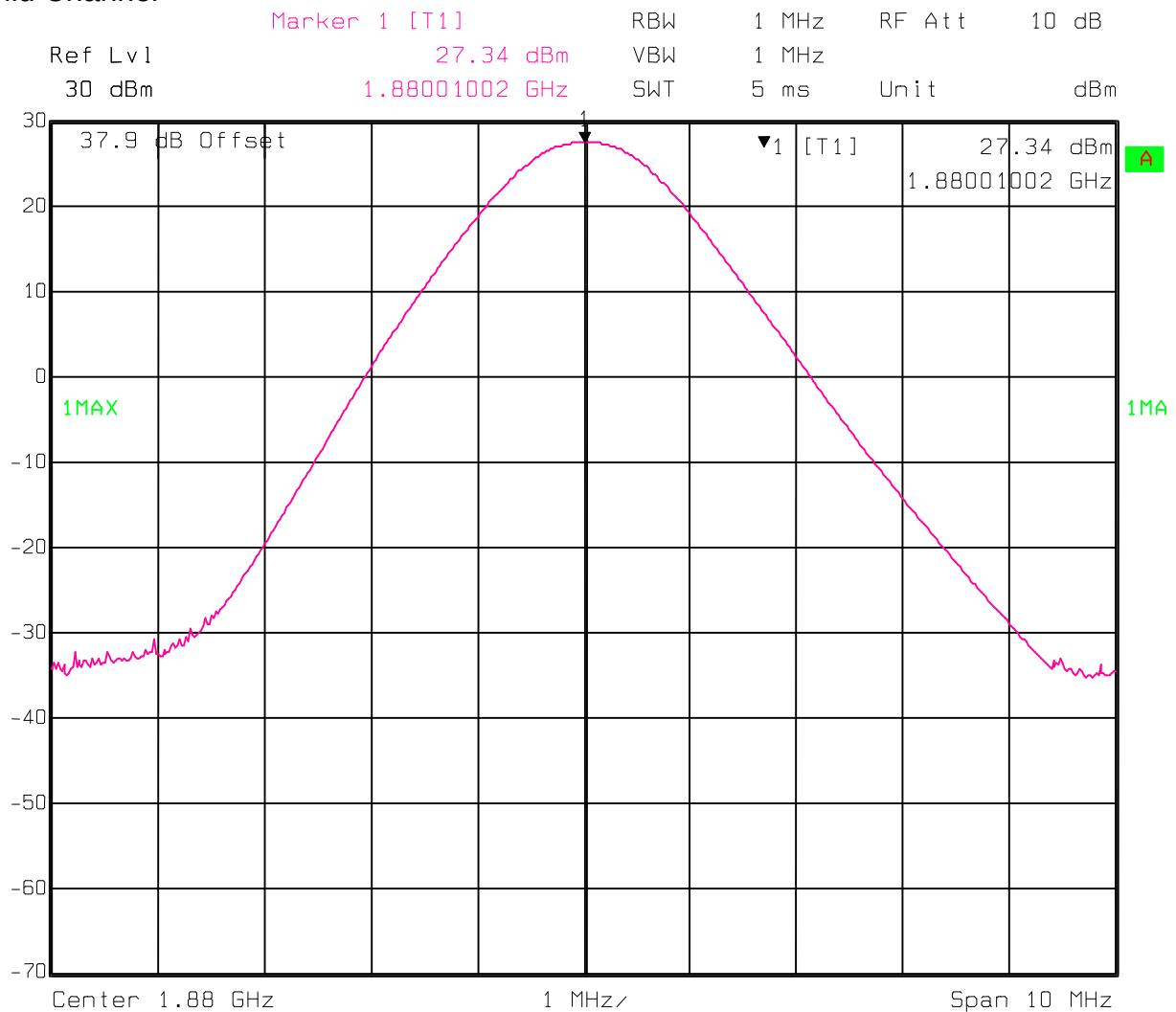
GSM Part 24
LOW CHANNEL



Date: 02.JUN.2005 15:37:10



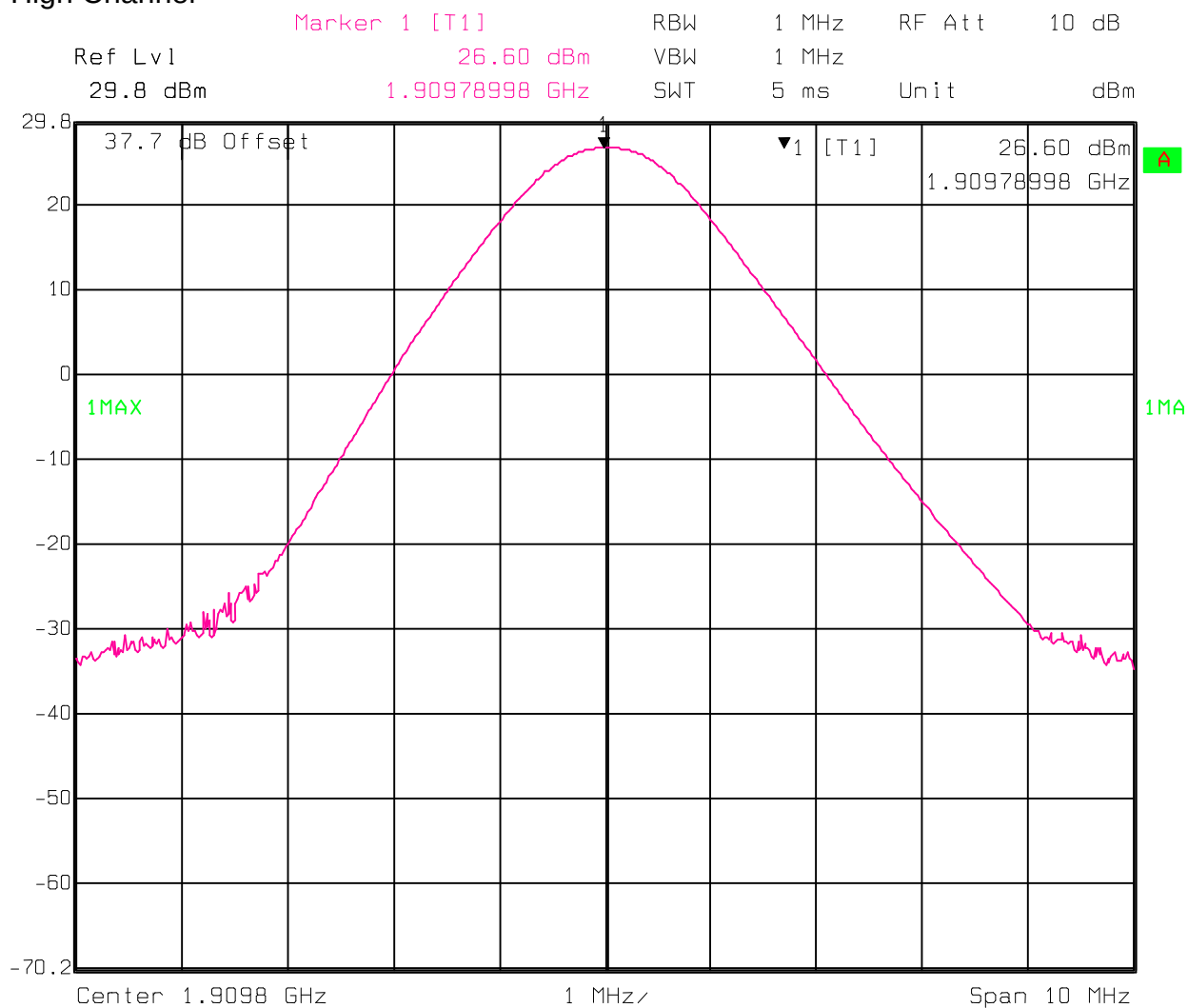
Mid Channel



Date: 02.JUN.2005 15:51:25



High Channel



Date: 02.JUN.2005 16:02:16



Radiated Measurements

Radiated Emissions Data

Job #: 25-392-SKYR1 Test #: 1
Page 1 of 1

Client Name : Calamp Corporation
 EUT Name : GSM/GPRS Modem Module
 EUT Model #: GX820
 EUT Part # :
 EUT Serial #: 63
 EUT Config.: AMPS Tx Harmonics

Specification : FCC Part 22
 Rod. Ant. #: NA Temp. (°C) : 16
 Bicon Ant. #: NA Humidity (%) : 77
 Log Ant. #: 112 EUT Voltage : 4 Vdc
 DRG Ant. #: 529 EUT Frequency : NA
 Dipole Ant. #: NA Phase: NA
 Cable#: soats Location: RN# 90579
 Preamp#: 317 Distance: 3m
 Spec An. #: 835 ERP conversion factor : 7
 QP #: NA
 PreSelect#: NA

Reference :
 Date : 06/06/05
 Time :
 Staff : A. Laudani
 Peak Bandwidth: 1 MHz
 Video Bandwidth 1 MHz

Meas. Freq. (MHz)	Vertical (dBuV) pk	Horizontal (dBuV) pk	CF (db)	Max Level (dBm) pk	Spec. Limit (ERP) (dBm) pk	Margin dB pk	EUT Rotation	Ant. Height	Pass Fail Unc.	Comment
824.02	97.0	89.0	30.7	30.4	33.0	-2.6	60.0	1.5	Pass	
1648.04	58.9	55.0	7.7	-30.7	-13.0	-17.7	60.0	1.2	Pass	
2472.06	59.2	50.4	10.2	-27.9	-13.0	-14.9	60.0	1.0	Pass	
3296.08	48.1	49.5	13.6	-34.2	-13.0	-21.2	60.0	1.0	Pass	
4120.10			16.1		-13.0					no signal, noise floor
4944.12			15.7		-13.0					no signal, noise floor
5768.14			17.6		-13.0					no signal, noise floor
6592.16			19.2		-13.0					no signal, noise floor
7416.18			21.2		-13.0					no signal, noise floor
8240.20			23.9		-13.0					no signal, noise floor
834.60	97.5	89.6	30.8	31.0	33.0	-2.0	60.0	1.5	Pass	
1669.20	59.8	58.3	7.7	-29.8	-13.0	-16.8	60.0	1.2	Pass	
2503.80	60.2	50.6	11.1	-26.0	-13.0	-13.0	60.0	1.1	Pass	
3338.40	52.6	49.6	13.6	-31.1	-13.0	-18.1	60.0	1.0	Pass	
4173.00			16.1		-13.0					no signal, noise floor
5007.60			16.8		-13.0					no signal, noise floor
5842.20			17.6		-13.0					no signal, noise floor
6676.80			19.2		-13.0					no signal, noise floor
7511.40			22.4		-13.0					no signal, noise floor
8346.00			23.9		-13.0					no signal, noise floor
848.97	98.4	89.8	30.9	32.0	33.0	-1.0	60.0	1.6	Pass	
1697.94	55.1	55.9	7.7	-33.7	-13.0	-20.7	60.0	1.2	Pass	
2546.91	54.4	49.7	11.1	-31.8	-13.0	-18.8	60.0	1.0	Pass	
3395.88	49.0	47.6	13.6	-34.7	-13.0	-21.7	60.0	1.0	Pass	
4244.85			16.1		-13.0					no signal, noise floor
5093.82			16.8		-13.0					no signal, noise floor
5942.79			17.6		-13.0					no signal, noise floor
6791.76			19.2		-13.0					no signal, noise floor
7640.73			22.4		-13.0					no signal, noise floor
8489.70			23.9		-13.0					no signal, noise floor

Radiated Emissions Data

Job #: 25-392-SKYR1 Test #: 3
Page 1 of 1

Client Name :	Calamp Corporation
EUT Name :	GSM/GPRS Modem Module
EUT Model # :	GX820
EUT Part # :	
EUT Serial # :	63
EUT Config. :	PCS GSM Tx

Specification :		FCC Part 24		Reference :	
Log Ant.#:	112	Temp. (°C) :	19	Date :	6/6/05
Dipole Ant.#:	759	Humidity (%) :	62	Time :	
DRG Ant. #	529	EUT Voltage :	4 Vdc	Staff :	A. Laudani
Cable#:	rx 20ft	EUT Frequency :	NA	Photo ID:	
Cable#:	tx 20ft	Phase:	NA	Peak Bandwidth:	1 MHz
Preamp#:	317	Location:	RN# 90579	Video Bandwidth:	1 MHz
Spec An.#:	835	Distance:	3m		
QP #:	NA	EIRP conversion factor	5.5		
PreSelect#:	NA				

[illegible]



Radiated Emissions Data

Job # : 25-392-SKYR1 Test # : 2
Page 1 of 1

Client Name : Calamp Corporation
EUT Name : GSM/GPRS Modem Module
EUT Model # : GX820
EUT Part # :
EUT Serial # : 63
EUT Config. : CDMA Tx Harmonics

Specification : FCC Part 22 Reference :
Temp. (°C) : 17 Date : 06/06/05
Humidity (%) : 72 Time :
EUT Voltage : 4 Vdc Staff : A. Laudani
EUT Frequency : NA
Phase : NA
Location : RN# 90579 Peak Bandwidth: 1 MHz
Distance : 3m Video Bandwidth 1 MHz
ERP conversion factor : 7

Log Ant.#: 112
DRG Ant. # 529
Dipole Ant.#: NA
Cable#: soats
Preamp#: 317
Spec An.#: 835
QP #: NA
PreSelect#: NA

Meas. Freq. (MHz)	Vertical (dBuV) pk	Horizontal (dBuV) pk	CF (db)	Max Level (dBm) pk	Spec. Limit (ERP) (dBm) pk	Margin dB pk	EUT Rotation	Ant. Height	Pass Fail Unc.	Comment
824.20	97.0	87.0	30.7	30.4	33.0	-2.6	60.0	1.5	Pass	
1648.40	56.7	52.1	7.7	-32.9	-13.0	-19.9	60.0	1.2	Pass	
2472.60	51.8	54.1	10.2	-33.0	-13.0	-20.0	60.0	1.1	Pass	
3296.80	48.2	50.2	13.6	-33.5	-13.0	-20.5	60.0	1.0	Pass	
4121.00			16.1		-13.0					no signal, noise floor
4945.20			15.7		-13.0					no signal, noise floor
5769.40			17.6		-13.0					no signal, noise floor
6593.60			19.2		-13.0					no signal, noise floor
7417.80			21.2		-13.0					no signal, noise floor
8242.00			23.9		-13.0					no signal, noise floor
834.40	98.6	89.1	30.8	32.1	33.0	-0.9	60.0	1.5	Pass	
1668.80	56.9	51.2	7.7	-32.7	-13.0	-19.7	60.0	1.2	Pass	
2503.20	51.1	51.3	11.1	-34.9	-13.0	-21.9	60.0	1.1	Pass	
3337.60	46.6	50.5	13.6	-33.2	-13.0	-20.2	60.0	1.0	Pass	
4172.00	48.2	48.6	16.1	-32.6	-13.0	-19.6	60.0	1.0	Pass	
5006.40			16.8		-13.0					no signal, noise floor
5840.80			17.6		-13.0					no signal, noise floor
6675.20			19.2		-13.0					no signal, noise floor
7509.60			22.4		-13.0					no signal, noise floor
8344.00			23.9		-13.0					no signal, noise floor
848.80	99.2	90.5	30.9	32.8	33.0	-0.2	60.0	1.6	Pass	
1697.60	54.3	50.6	7.7	-35.3	-13.0	-22.3	60.0	1.2	Pass	
2546.40	51.0	51.1	11.1	-35.1	-13.0	-22.1	60.0	1.1	Pass	
3395.20	48.6	54.6	13.6	-29.1	-13.0	-16.1	60.0	1.0	Pass	
4244.00	49.3	45.6	16.1	-31.9	-13.0	-18.9	60.0	1.0	Pass	
5092.80			16.8		-13.0					no signal, noise floor
5941.60			17.6		-13.0					no signal, noise floor
6790.40			19.2		-13.0					no signal, noise floor
7639.20			22.4		-13.0					no signal, noise floor
8488.00			23.9		-13.0					no signal, noise floor



Substitution Method For Radiated Emissions

Complete Preliminary	Yes	Job # :	25-392-SKYR1	Test # :	4
			Page 1	of	1
Client Name :	Calamp Corporation				
EUT Name :	GSM/GPRS Modem Module				
EUT Model # :	GX820				
EUT Serial # :	63				
Specification :	Part 22, Part 24 FCC		Reference :		
Rod. Ant. #:	NA	Temp. (deg. C) :	20	Date :	6/6/2005
Bicon Ant. #:	NA	Humidity (%) :	58	Time :	
Log Ant. #:	112	EUT Voltage :	na	Staff :	A. Laudani
DRG Ant. #	513	EUT Frequency :	na	Photo ID:	
Dipole Ant. #:	NA	Phase:	na	Peak Bandwidth:	RBW-1MHz, VBW-1MHz
Cable#:	20ft	Location:	SOATS		
Preamp#:	40db	Distance:	3m		
Spec An. #:	835				

target Frequency mHz	level dBuV/m	dipole Gain dBi	cable loss dB	Signal Generator dBm	Total (EIRP) dBm	Spec dBm	Margin dBm
AMPS							
824.02	97.0	0	2.79	25.6	22.8	33.0	-10.2
836.60	97.5	0	2.82	26.3	23.4	33.0	-9.6
848.97	98.4	0	2.88	27.1	24.2	33.0	-8.8
target Frequency mHz	level dBuV/m	Horn Gain dBi	cable loss dB	Signal Generator dBm	Total (EIRP) dBm	Spec dBm	Margin dBm
1648.04	58.9	5.37	4.17	-38.7	-37.5	-13.0	-24.5
1669.20	59.80	5.45	4.12	-37.6	-36.3	-13.0	-23.3
2472.06	59.20	6.84	4.17	-33.2	-30.5	-13.0	-17.5
2503.80	50.20	6.91	4.17	-32.0	-29.3	-13.0	-16.3
2546.91	54.40	6.98	4.17	-37.3	-34.5	-13.0	-21.5
3338.40	52.60	7.87	4.17	-36.2	-32.5	-13.0	-19.5
GSM							
target Frequency mHz	level dBuV/m	dipole Gain dBi	cable loss dB	Signal Generator dBm	Total (EIRP) dBm	Spec dBm	Margin dBm
824.2	97.0	0	2.79	25.6	22.8	33.0	-10.2
834.4	98.6	0	2.82	27.4	24.5	33.0	-8.5
848.9	99.2	0	2.88	27.9	25.0	33.0	-8.0
target Frequency mHz	level dBuV/m	Horn Gain dBi	cable loss dB	Signal Generator dBm	Total (EIRP) dBm	Spec dBm	Margin dBm
1648.4	56.7	5.37	4.17	-40.9	-39.7	-13.0	-26.7
1668.8	56.9	5.44	4.12	-40.5	-39.2	-13.0	-26.2
3395.2	54.6	7.88	6.26	-35.0	-33.4	-13.0	-20.4
4172.0	48.2	8.19	7.07	-39.3	-38.2	-13.0	-25.2
4244.0	49.3	8.27	7.10	-37.5	-36.3	-13.0	-23.3
target Frequency mHz	level dBuV/m	Horn Gain dBi	cable loss dB	Signal Generator dBm	Total (EIRP) dBm	Spec dBm	Margin dBm
1850.0	94.8	5.73	4.27	25.3	26.8	33.0	-6.2
1880.0	93.2	5.78	4.36	23.6	25.0	33.0	-8.0
1909.8	93.1	5.84	4.39	23.5	25.0	33.0	-8.1
3700.4	60.1	7.94	6.50	-35.8	-34.3	-13.0	-21.3
3760.0	59.5	7.95	6.77	-36.1	-34.9	-13.0	-21.9
3819.6	63.0	7.96	6.66	-33.2	-31.9	-13.0	-18.9
5550.6	50.3	9.27	8.08	-40.1	-38.9	-13.0	-25.9
5640.0	48.6	9.29	8.20	-41.0	-39.9	-13.0	-26.9
5729.4	49.2	9.32	8.63	-39.6	-38.9	-13.0	-25.9



Section 4. Audio Frequency Response

Para. No.: 2.1047

Test Performed By:	Date of Test:
---------------------------	----------------------

Minimum Standard: Para. No. 15-19-B.

Test Results: Not Applicable, digital modulation

Measurement Data:



Section 5. Audio Low-Pass Filter Response

Para. No.: 2.1047

Test Performed By:	Date of Test:
---------------------------	----------------------

Minimum Standard: 22.915 (d).

Test Results: Not Applicable, digital modulation

Measurement Data:

- d) Audio filter characteristics. Except as provided in Sec. 22.917, radiotelephony signals applied to the modulator from the modulation limiter must be attenuated as a function of frequency as specified in this paragraph.
- (1) For mobile stations, these signals must be attenuated, relative to the level at 1 kHz, as follows:
- (i) In the frequency ranges of 3.0 to 5.9 kHz and 6.1 to 15.0 kHz, signals must be attenuated by at least $40 \log (f/3)$ dB, where f is the frequency of the signal in kHz.
 - (ii) In the frequency range of 5.9 to 6.1 kHz, signals must be attenuated at least 35 dB.
 - (iii) In the frequency range above 15 kHz, signals must be attenuated at least 28 dB.



Section 6. Modulation Limiting

Para. No.: 2.1047

Test Performed By:	Date of Test:
---------------------------	----------------------

Minimum Standard: 22.915(b)

Test Results: Not Applicable, digital modulation

Measurement Data:

SAT Deviation:
WB Data Deviation:
ST Deviation:



Section 7. Occupied Bandwidth

Para. No.: 2.1049

Test Performed By: A. Laudani

Date of Test: 6-3-05

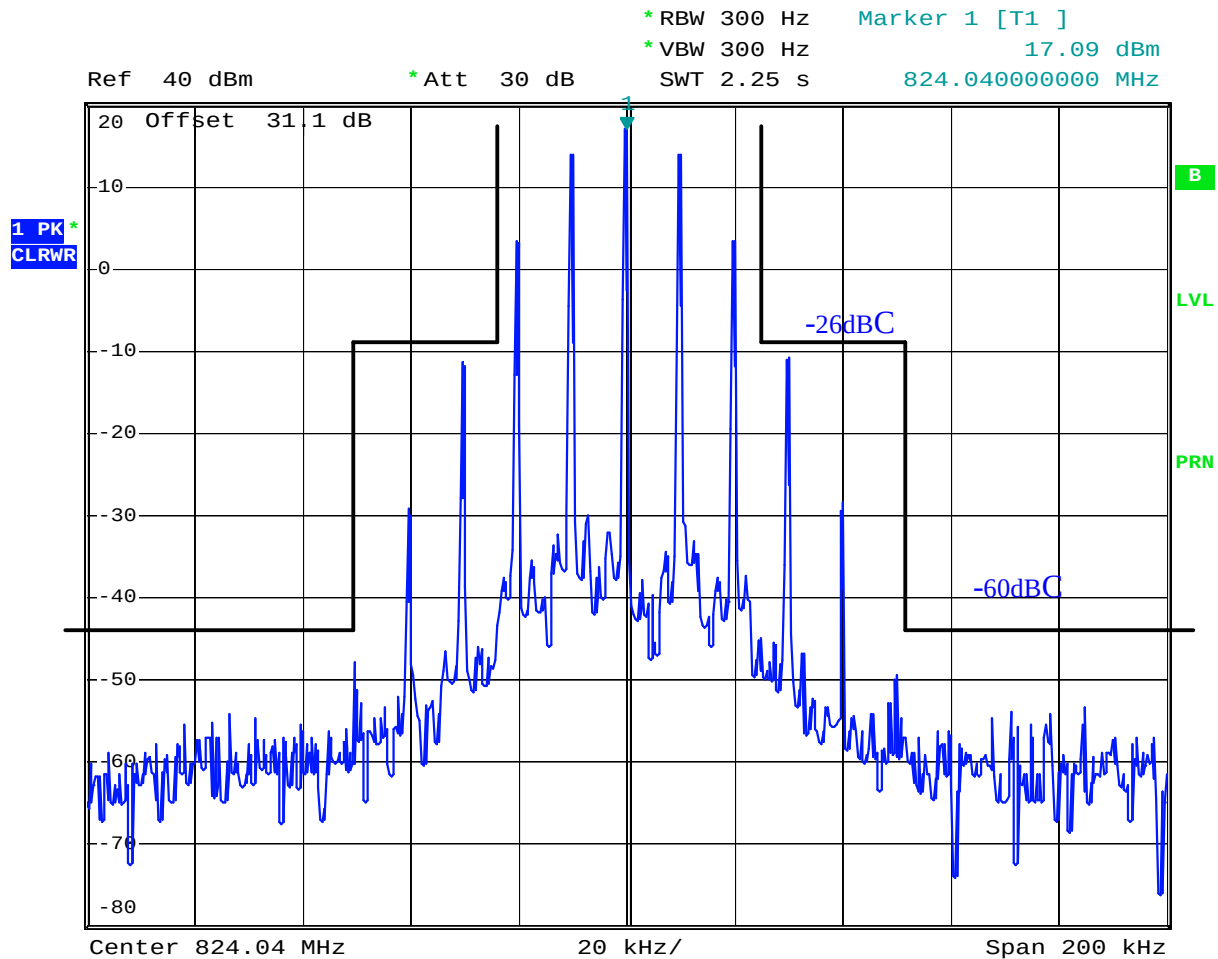
Minimum Standard: 22.917(d); Para. No.: 24.238.

Test Results: Modes: ST, SAT, Digital Data and ST with SAT

Test Data: **See Plots below**



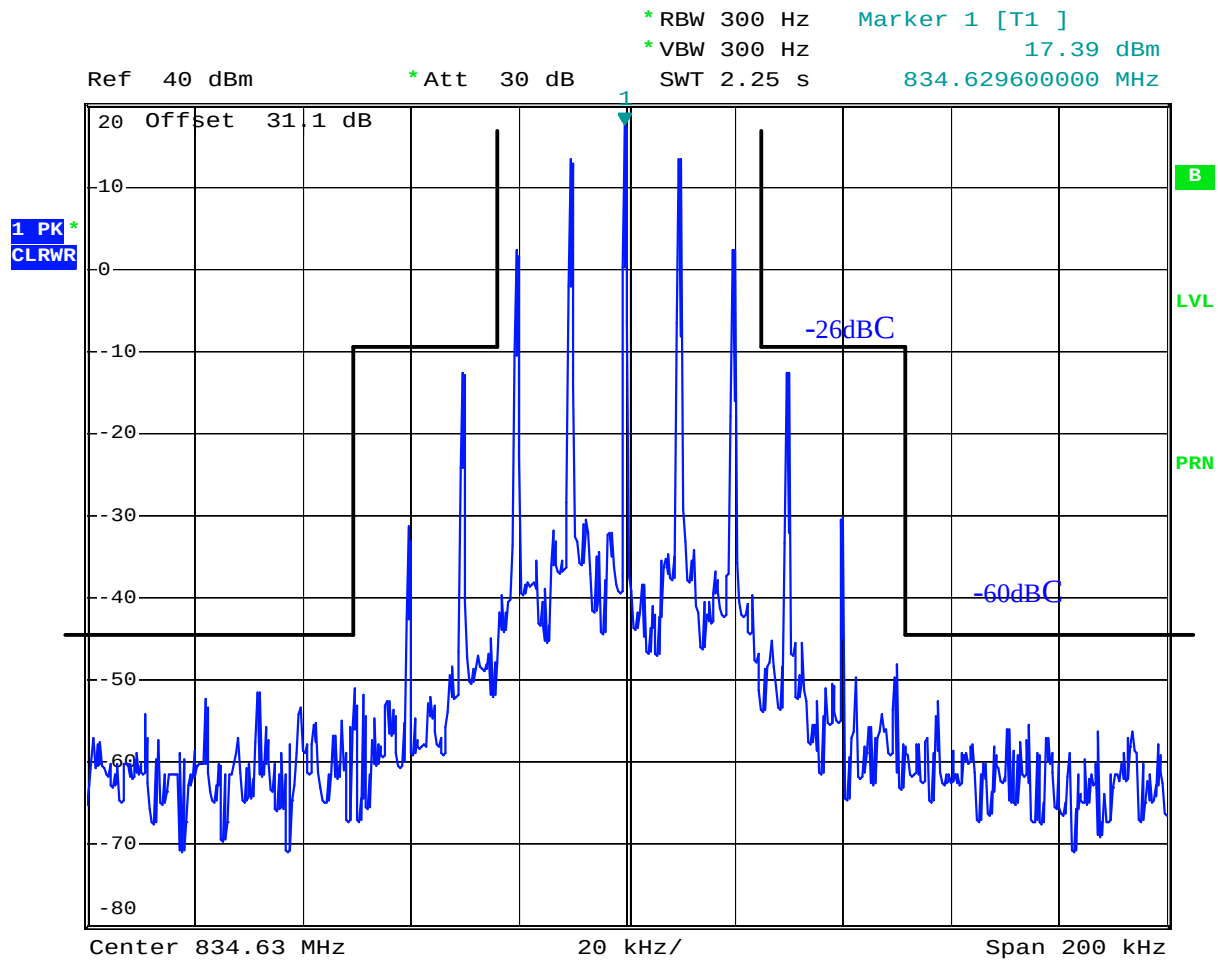
Amps Lowest Channel, ST



Date: 8.JUN.2005 14:53:58



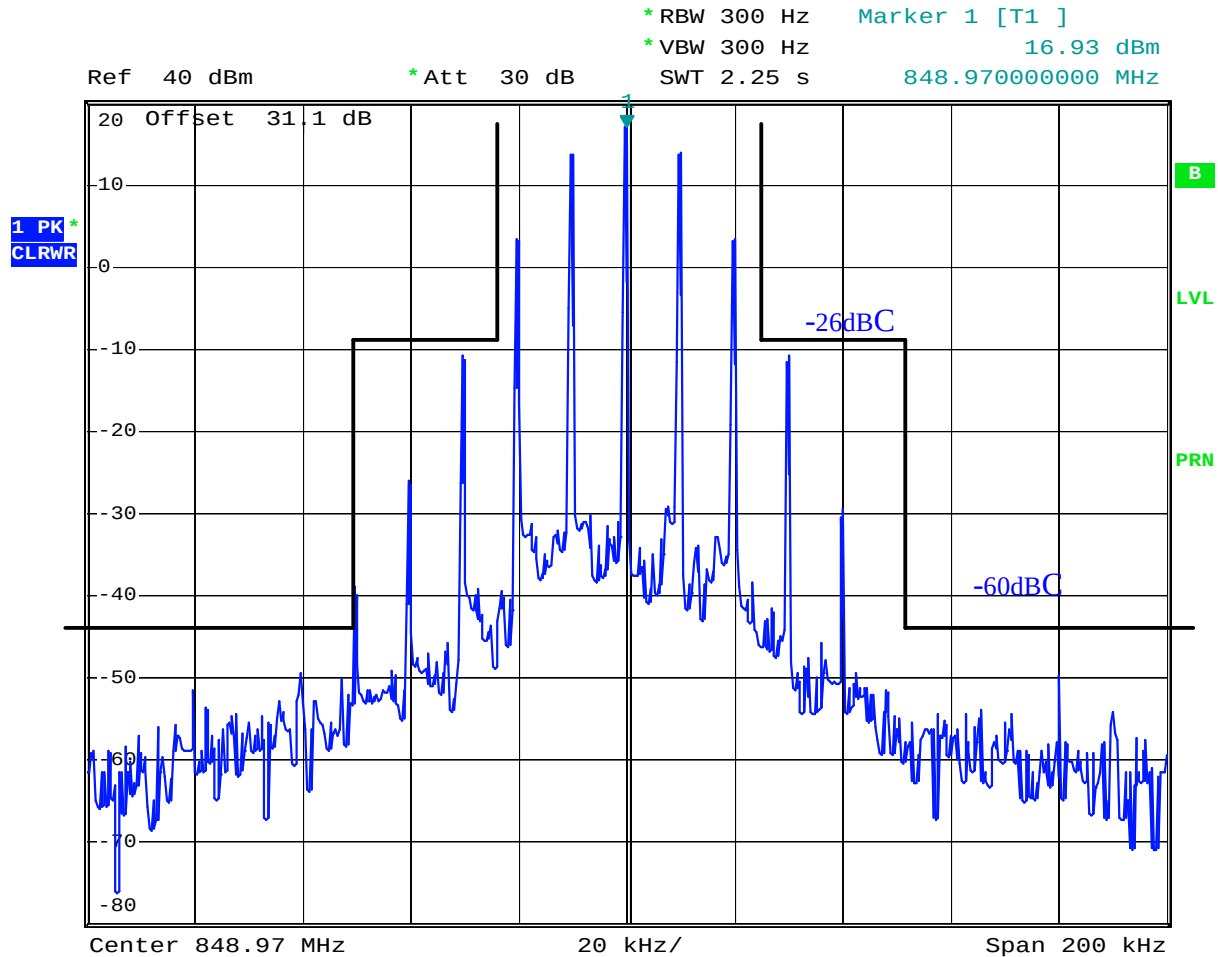
Amps Mid Channel ST



Date: 8.JUN.2005 14:45:33



Amps High Channel ST



Date: 8.JUN.2005 14:56:49



FCC Part 22, Part 24
25-352-SKYR1
FCC ID#: APVGX820

Ref 50 dBm *Att 30 dB *RBW 300 Hz Marker 1 [T1] 27.08 dBm
 *VBW 300 Hz 824.039600000 MHz

30 Offset 31.1 dB

1 PK *

CLRWR

-26dB

-60dB

B

LVL

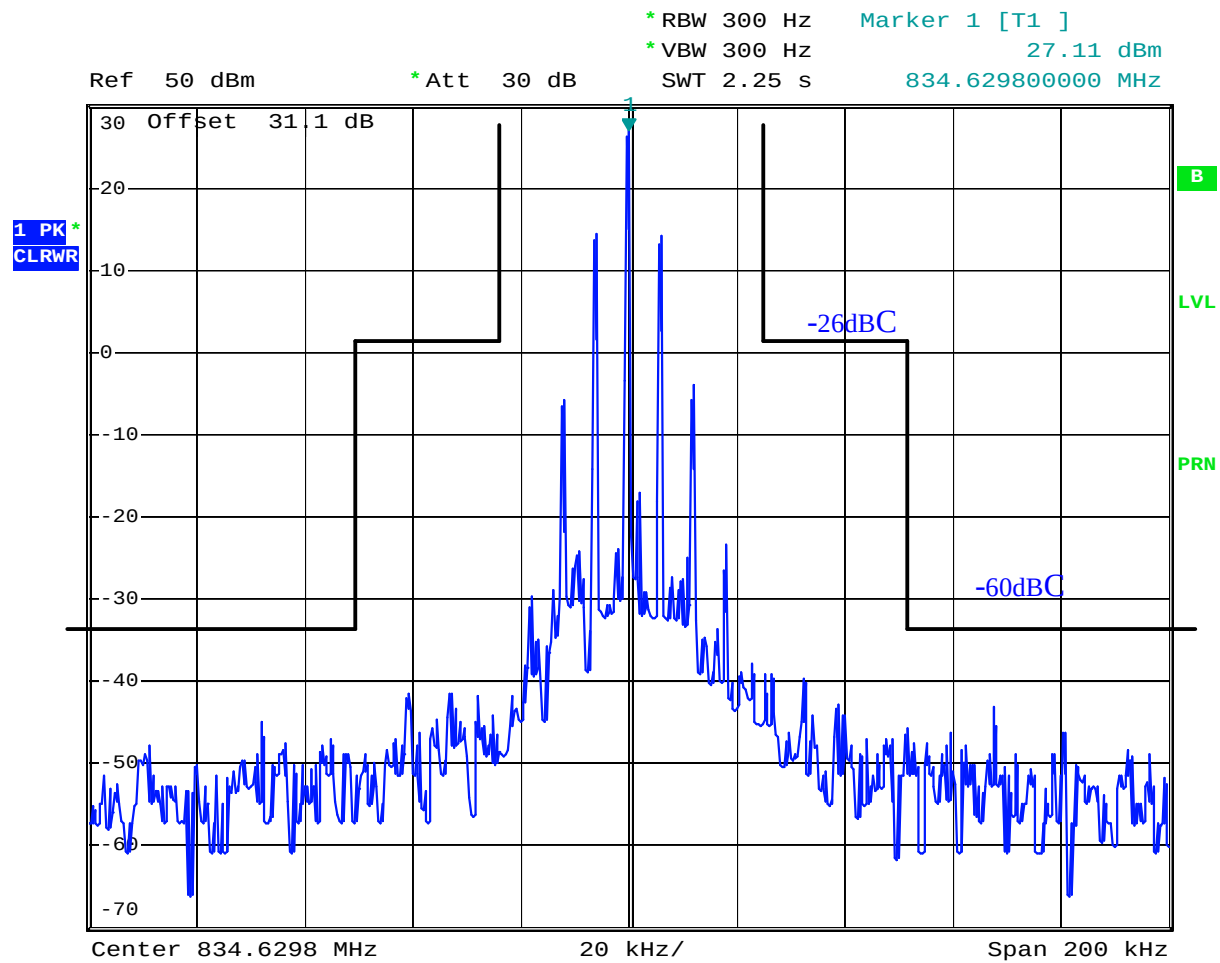
PRN

Center 824.04 MHz 20 kHz/ Span 200 kHz

Date: 8.JUN.2005 15:02:41



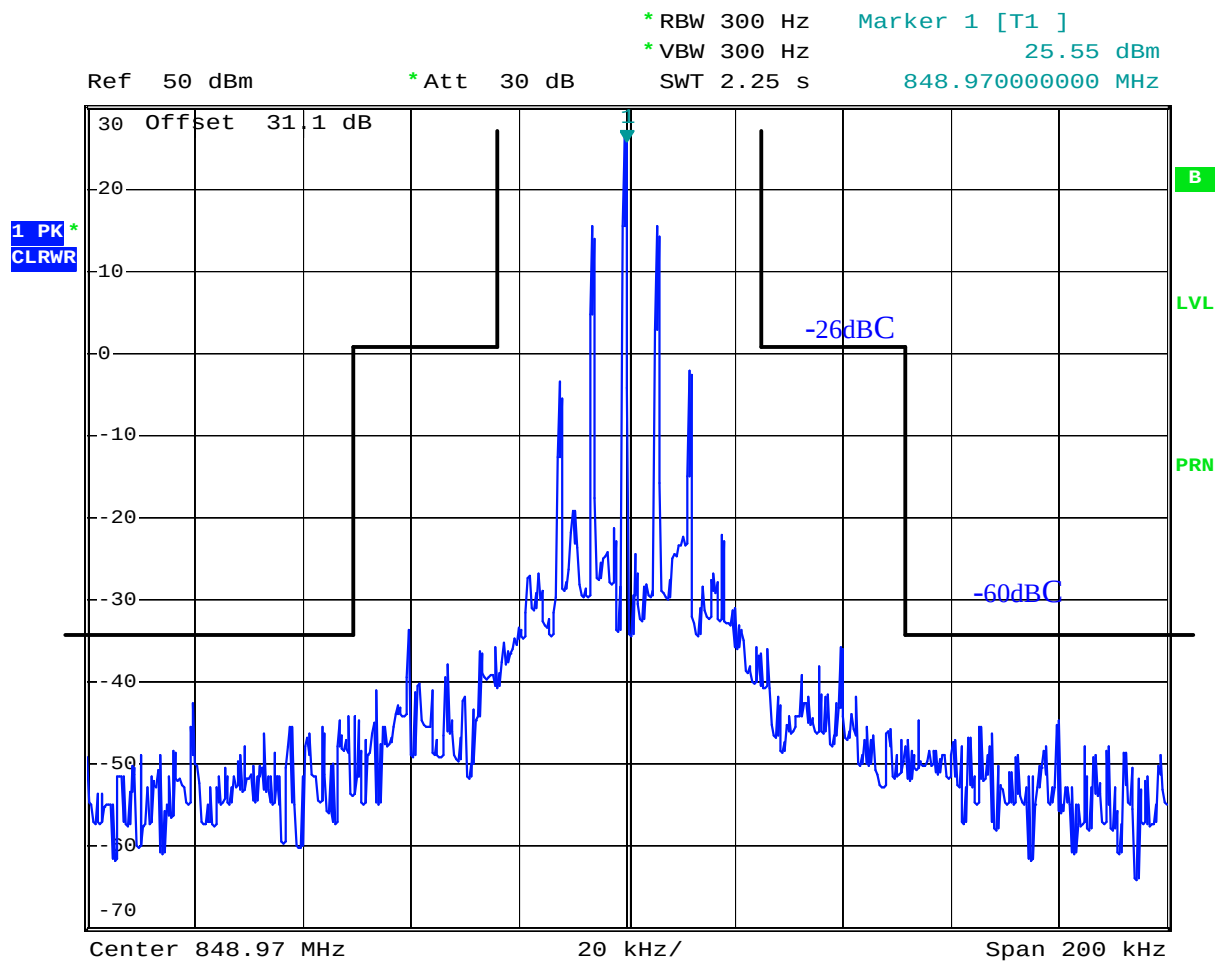
Amps Mid Channel SAT



Date: 8.JUN.2005 15:01:44



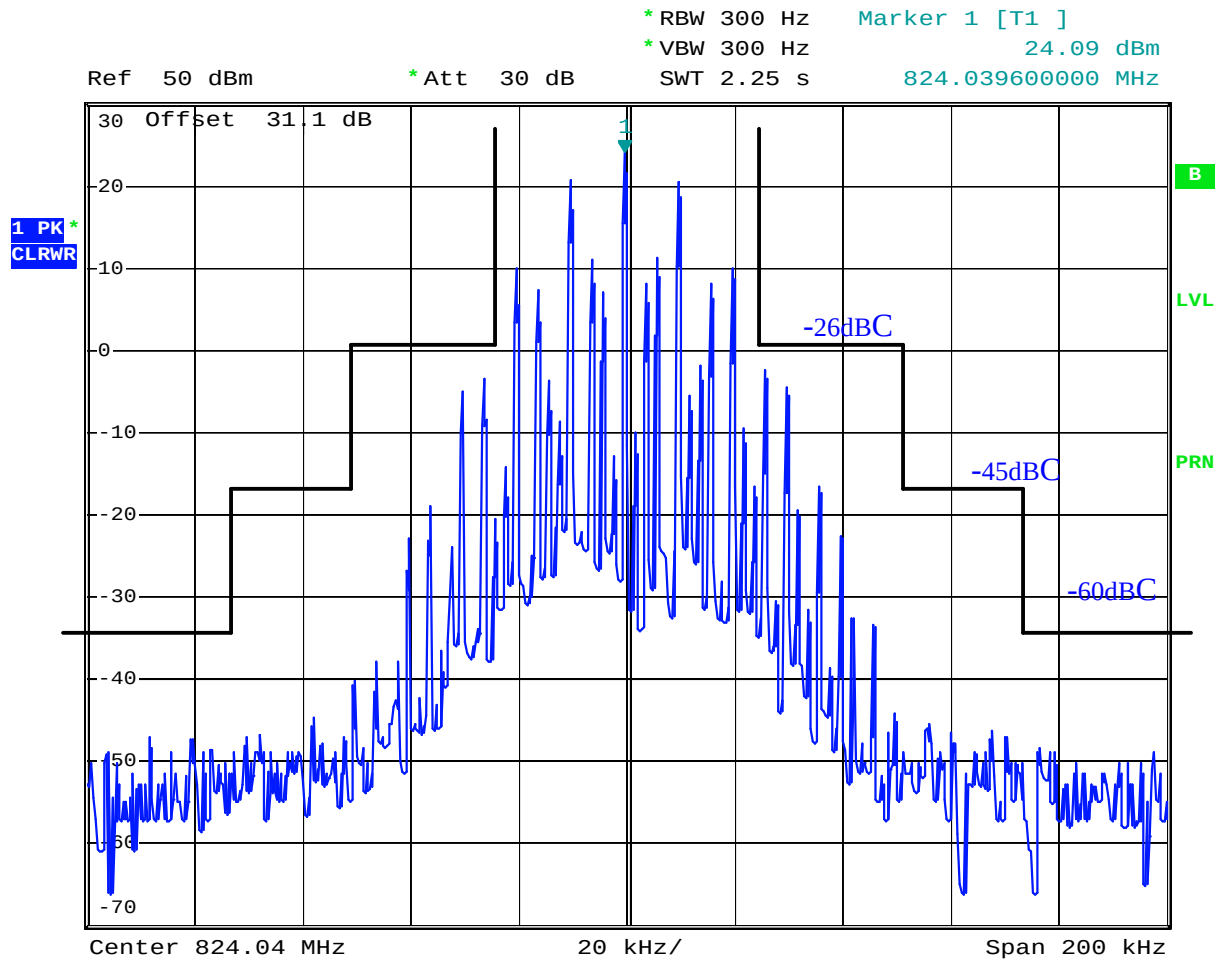
Amps High Channel SAT



Date: 8.JUN.2005 15:00:26



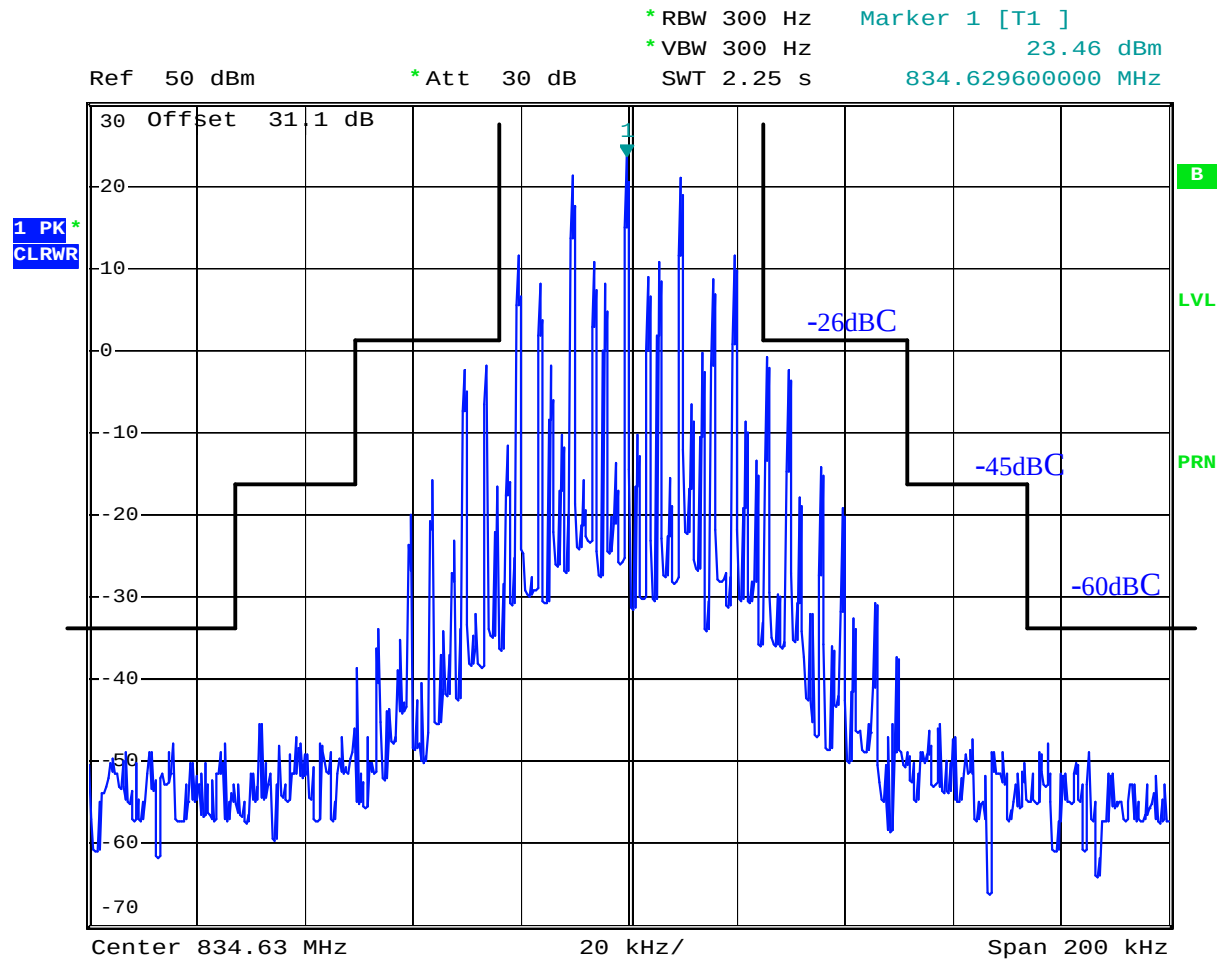
Amps Low Channel SAT & ST



Date: 8.JUN.2005 15:08:23



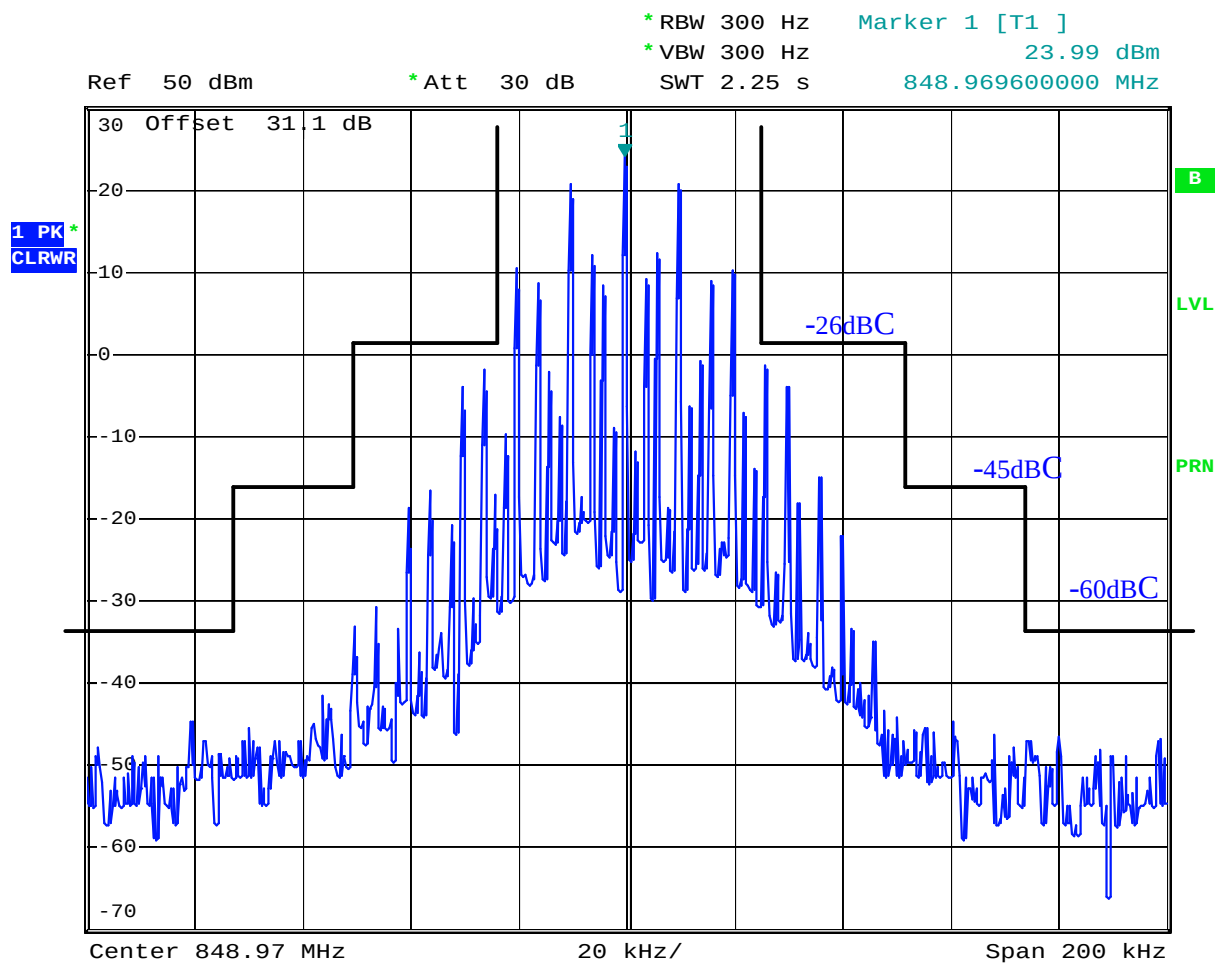
Amps Mid Channel SAT & ST



Date: 8.JUN.2005 15:09:37



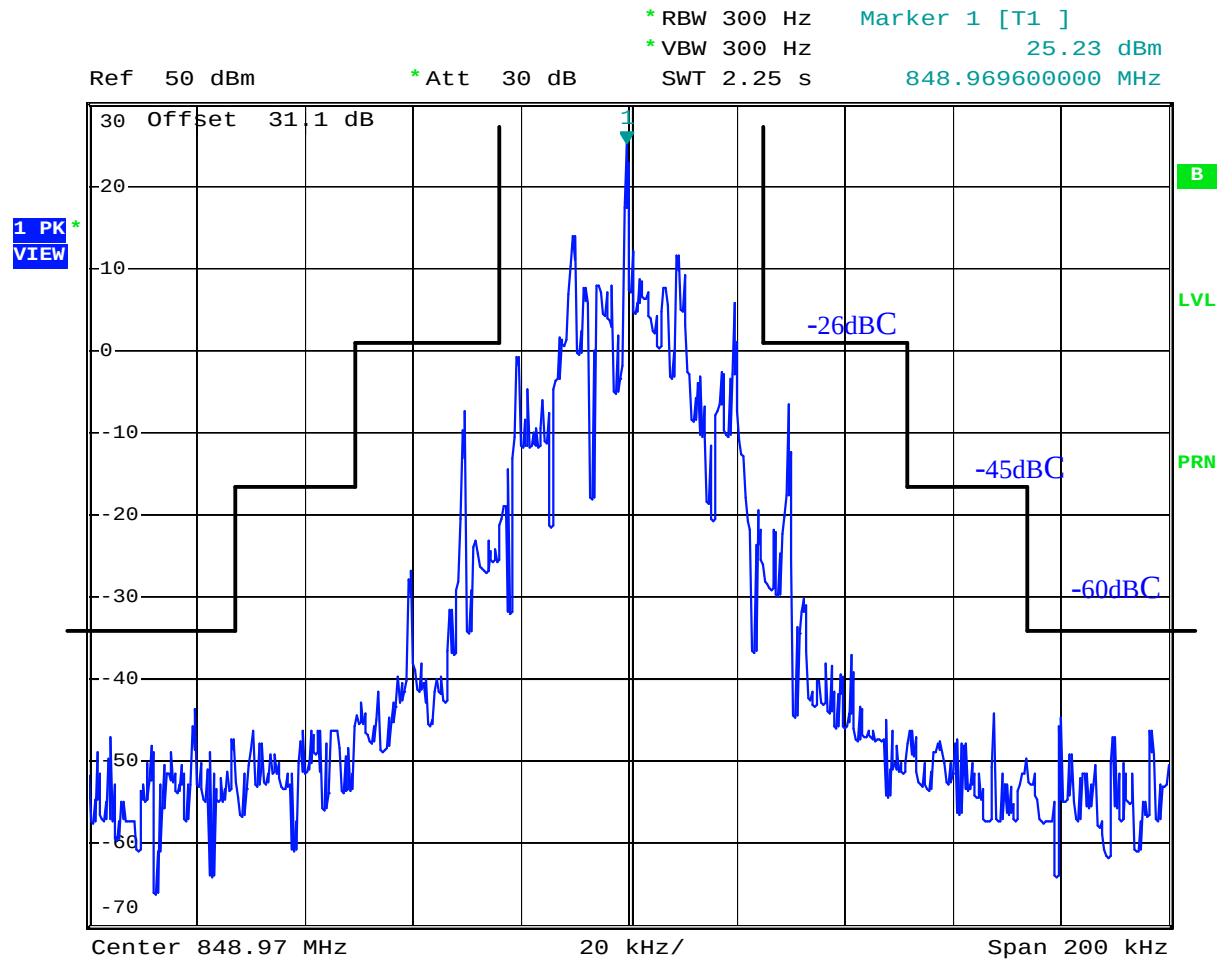
Amps High Channel SAT & ST



Date: 8.JUN.2005 15:17:31



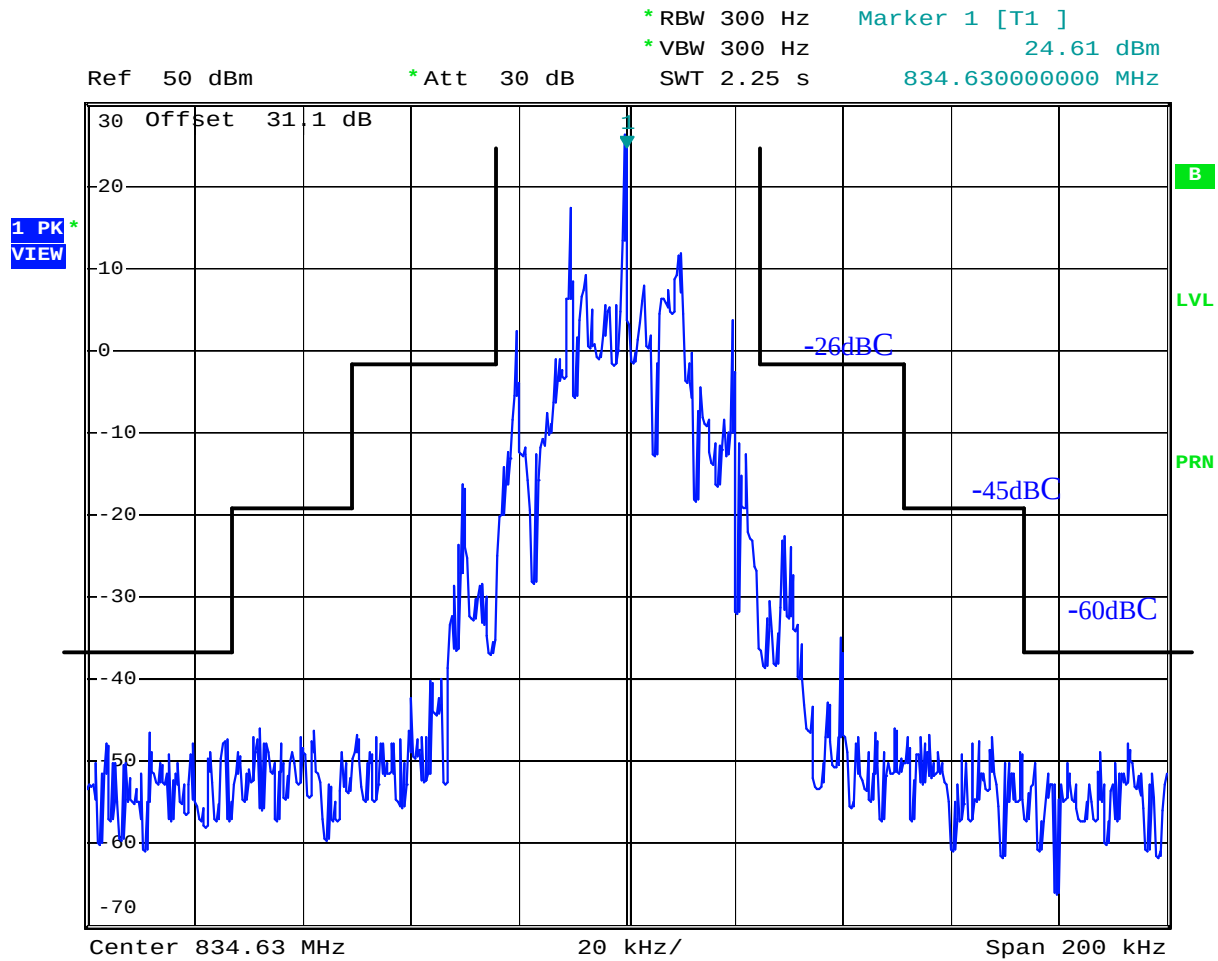
AMPS Low Channel –Data



Date: 8.JUN.2005 15:20:25



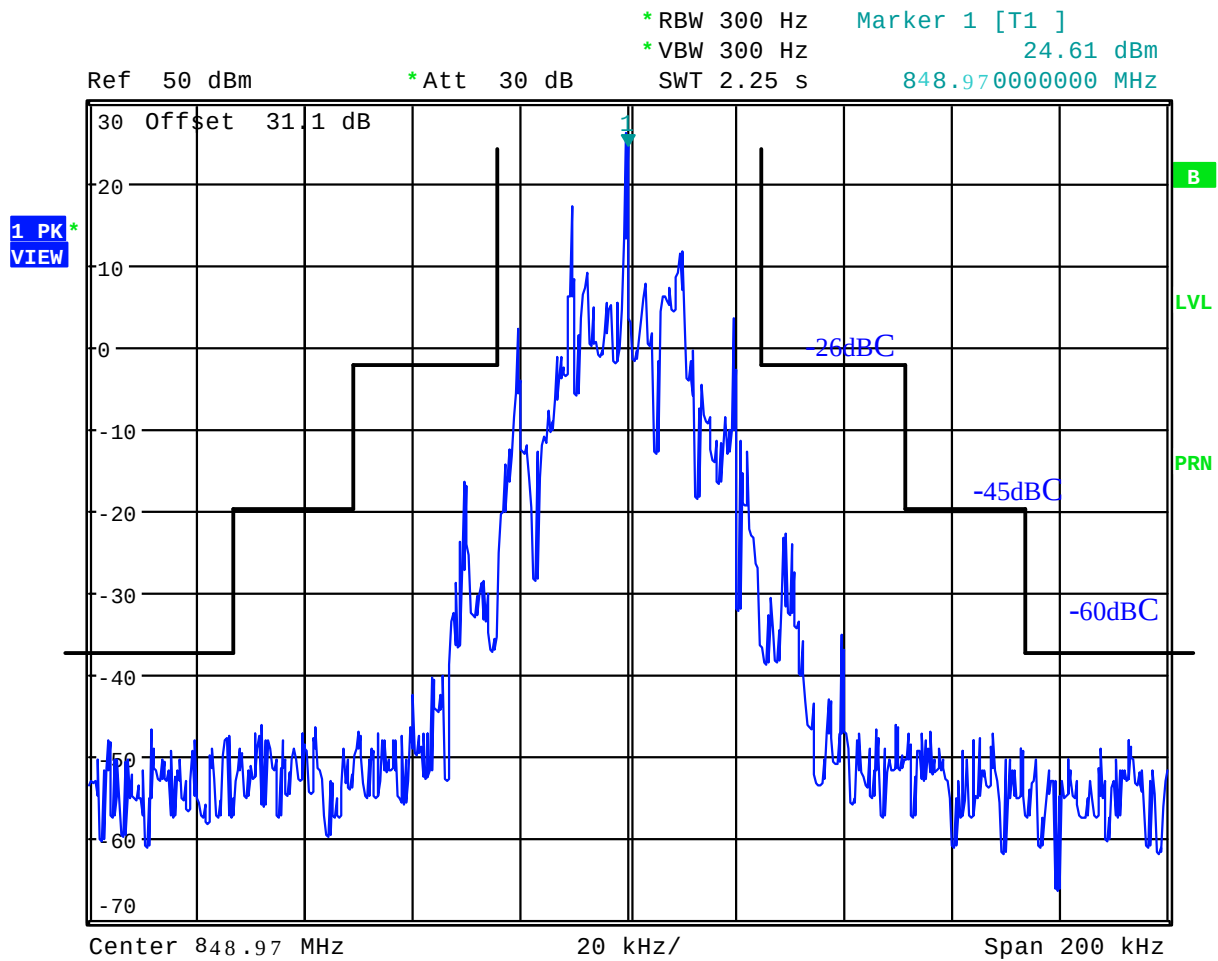
AMPS Mid Channel -Data



Date: 8.JUN.2005 15:22:18



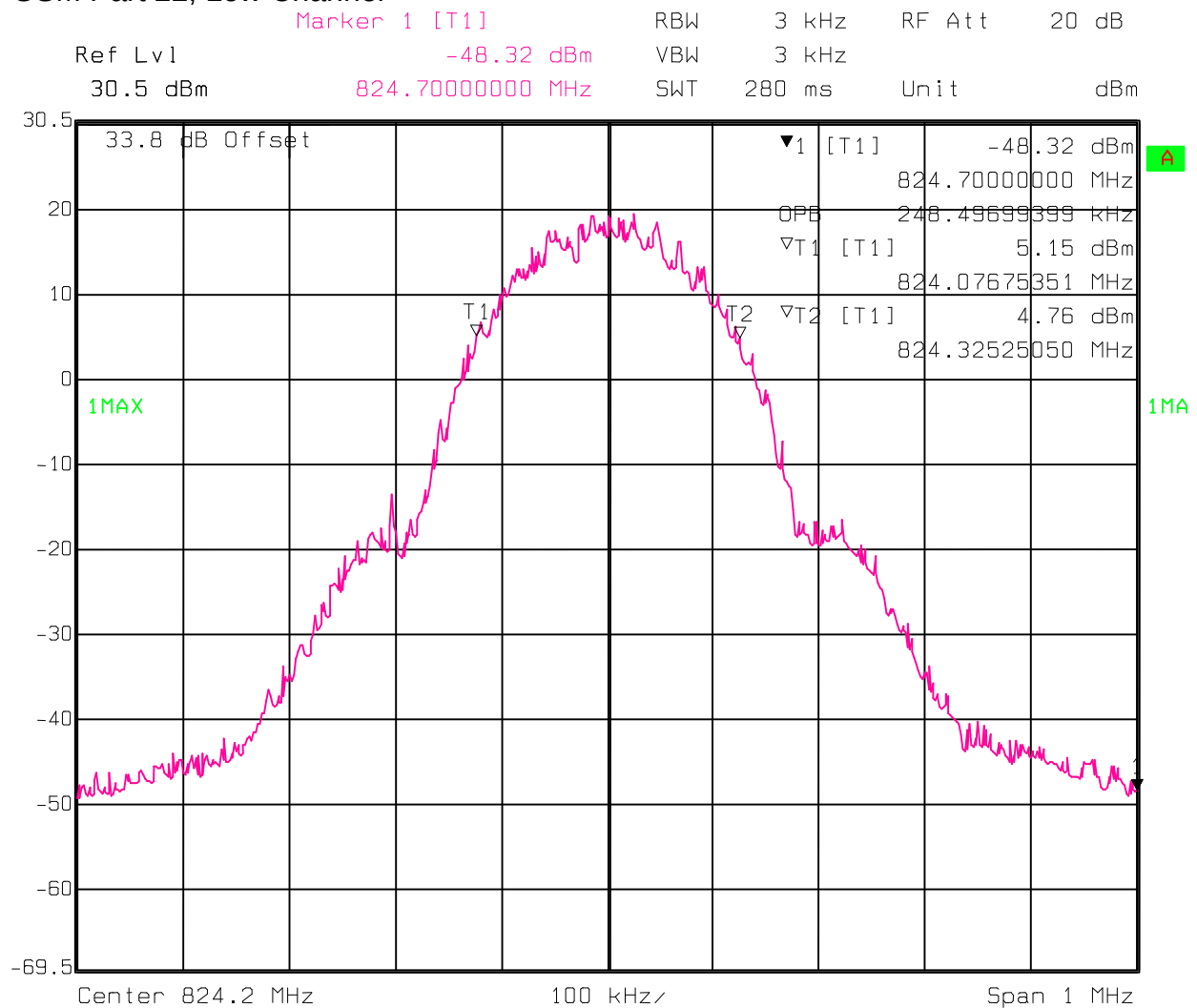
AMPS High Channel—Data



Date: 8.JUN.2005 15:22:18



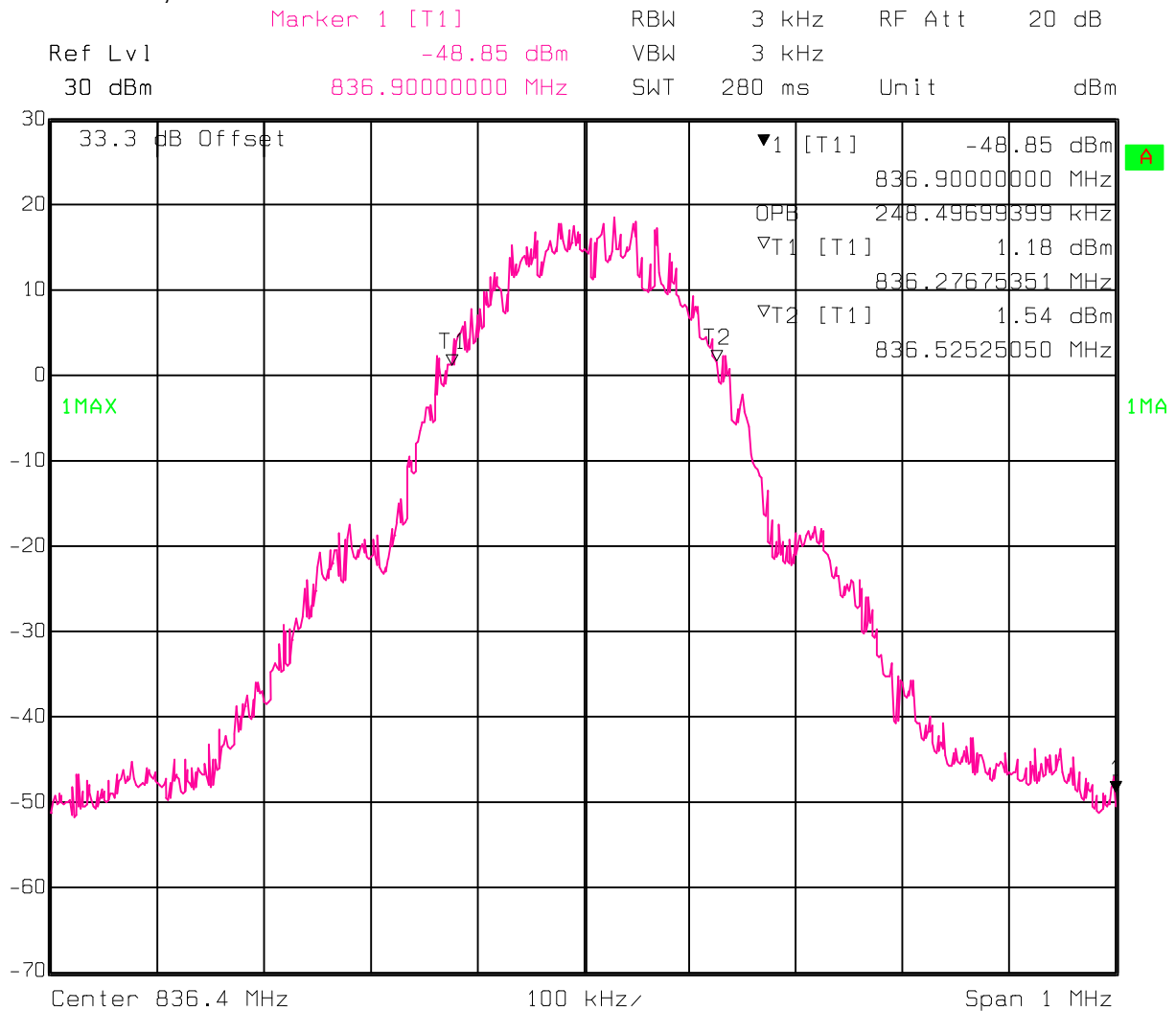
GSM Part 22, Low Channel



Date: 02.JUN.2005 15:09:02



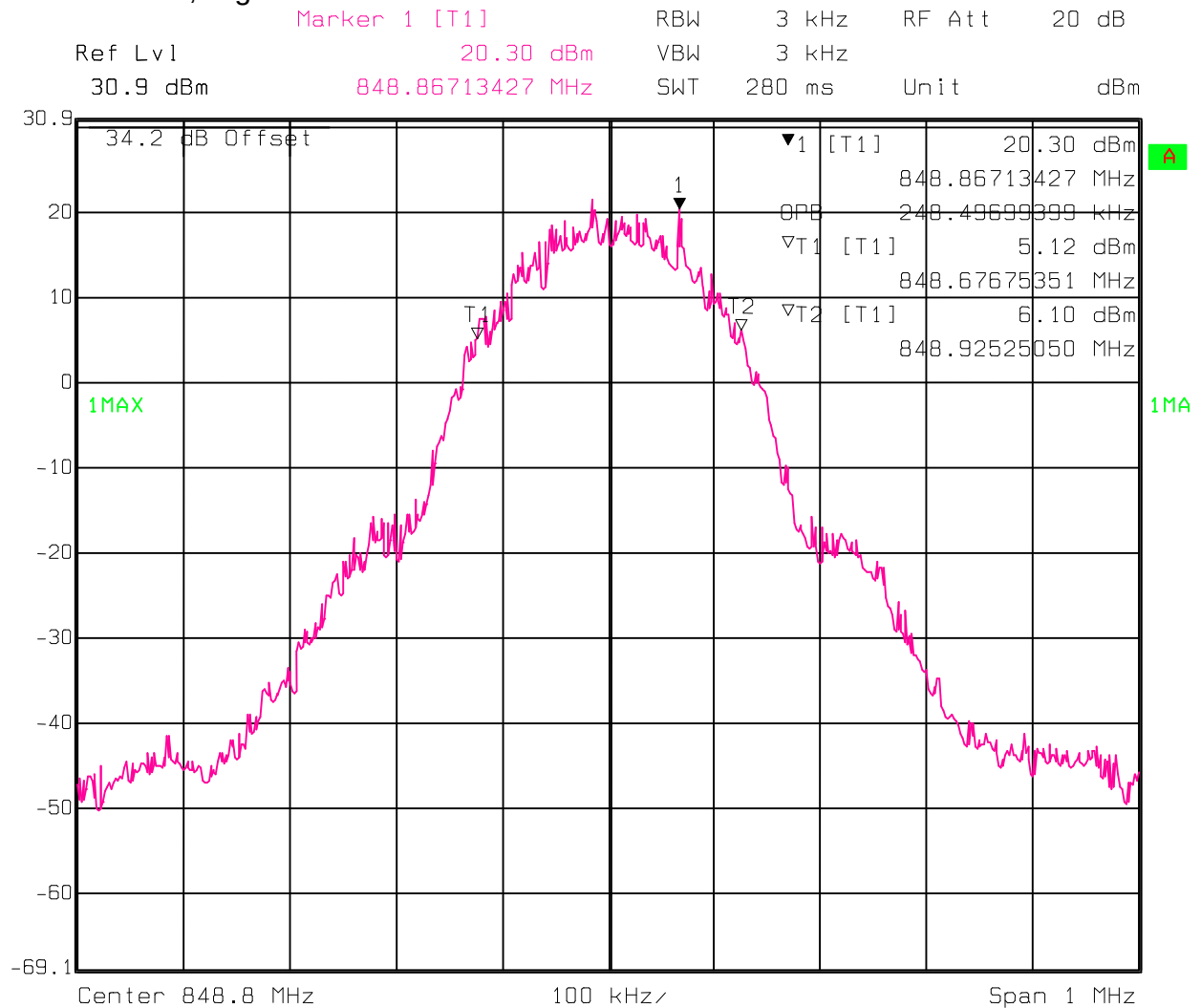
GSM Part 22, Mid Channel



Date: 02.JUN.2005 15:07:23



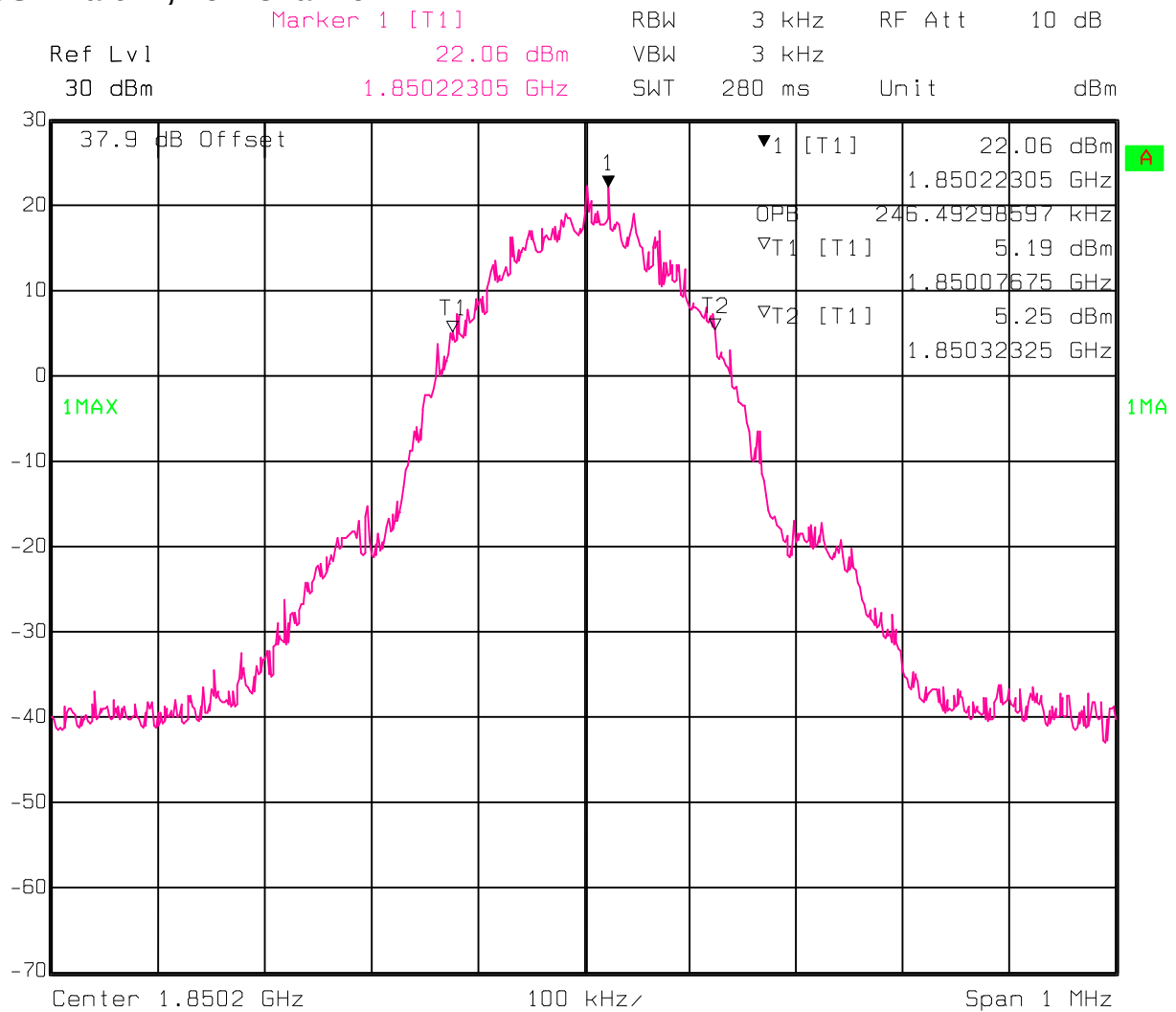
GSM Part 22, High Channel



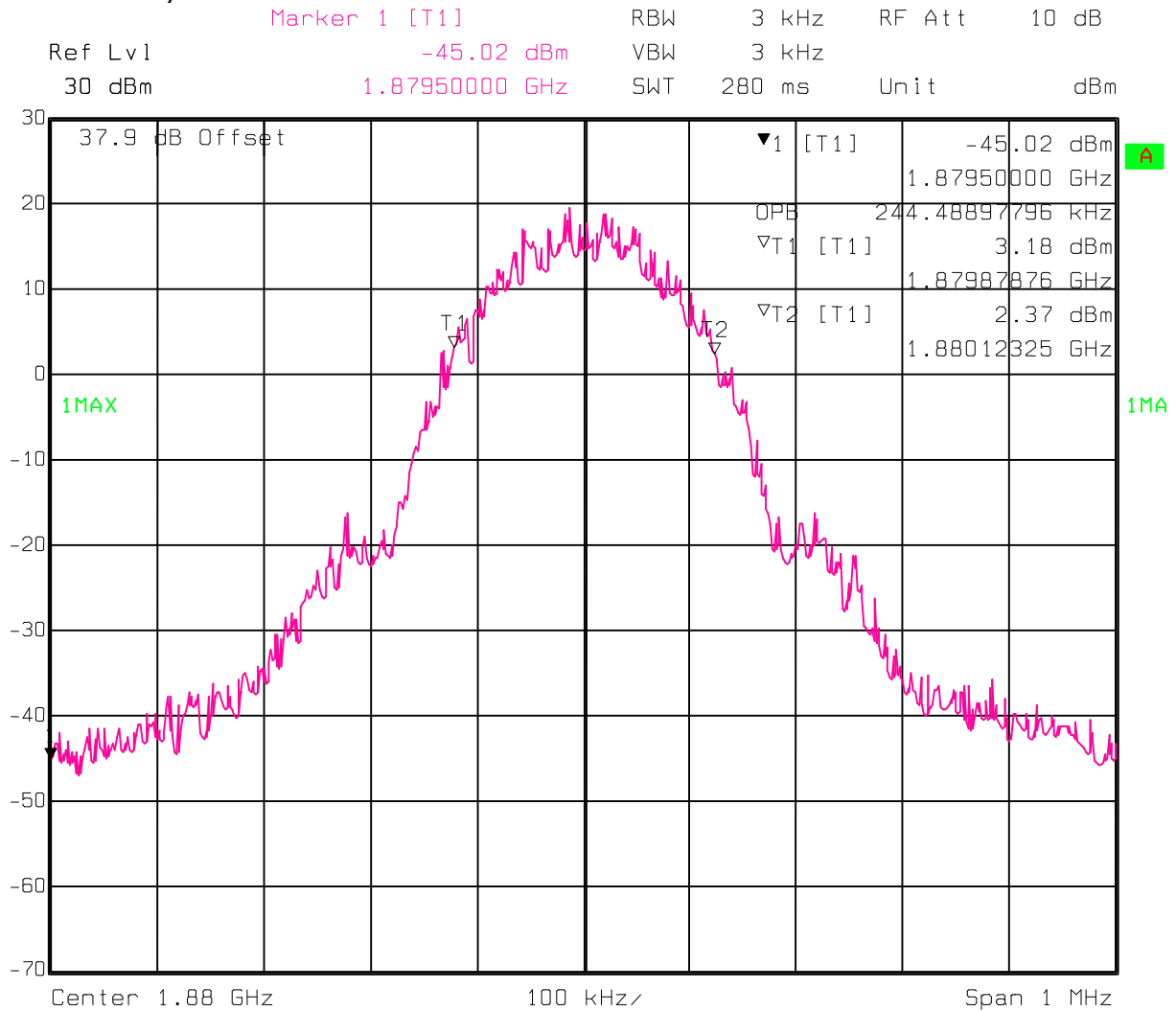
Date: 02.JUN.2005 15:24:41



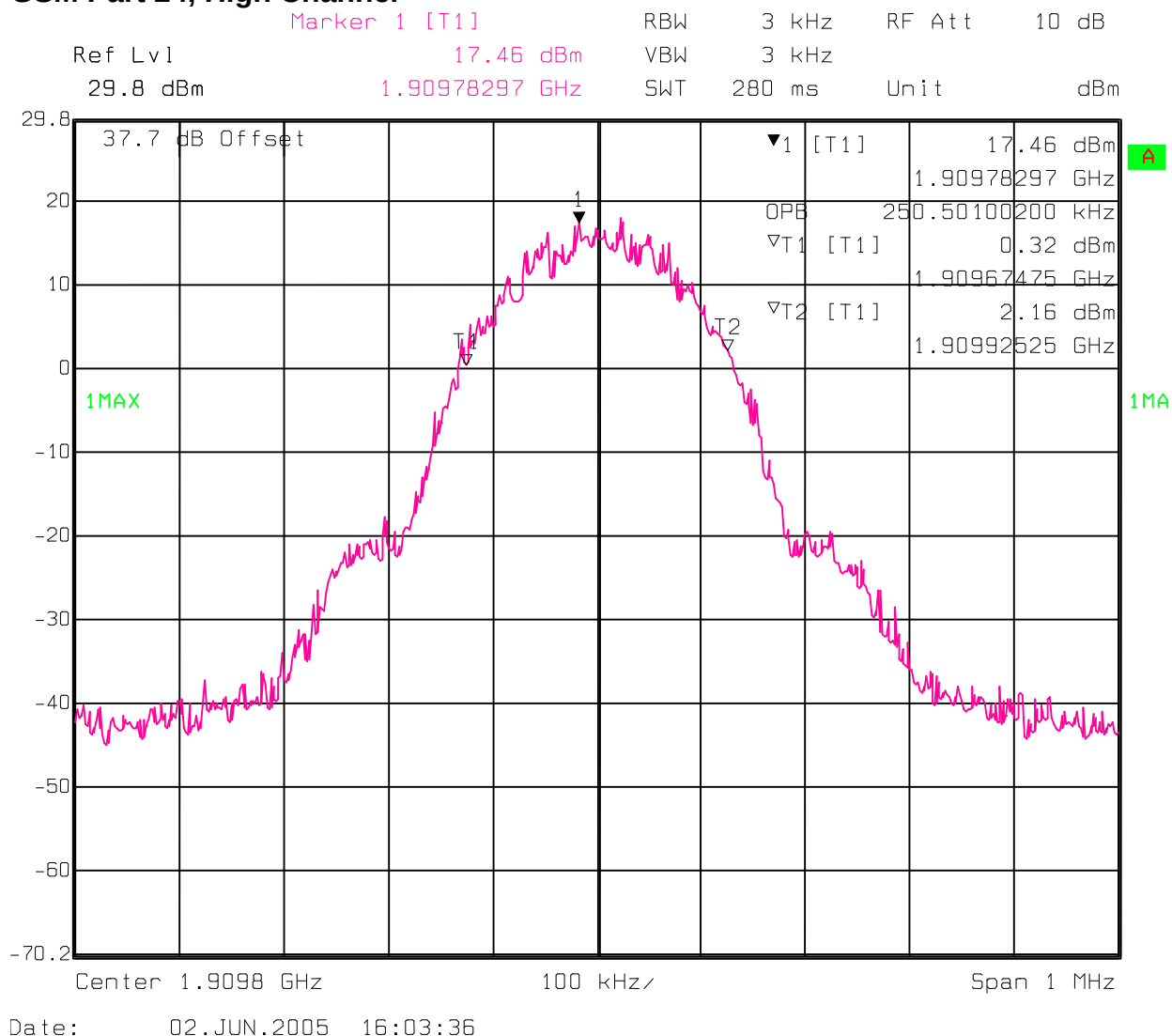
GSM Part 24, Low Channel



Date: 02.JUN.2005 15:47:30

**GSM Part 24, Mid Channel**

Date: 02.JUN.2005 15:48:22

**GSM Part 24, High Channel**



Section 8. Spurious Emissions At Antenna Terminals

Para. No.: 2.1051

Test Performed By: A. Laudani	Date of Test: 6-3-05
-------------------------------	----------------------

Minimum Standard: 22.917(b), 24.238.

Test Results:

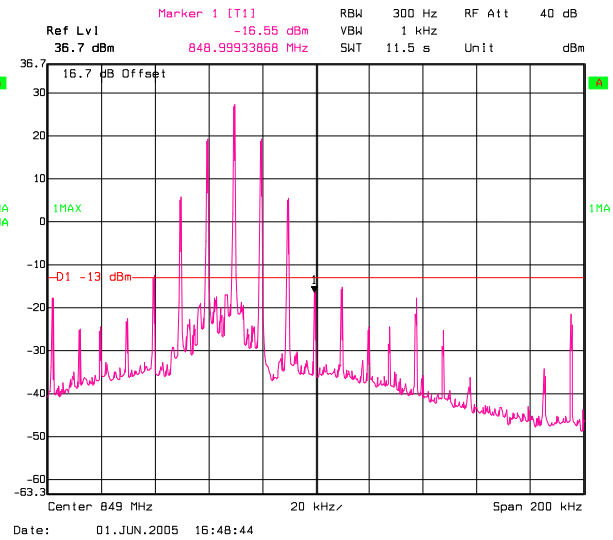
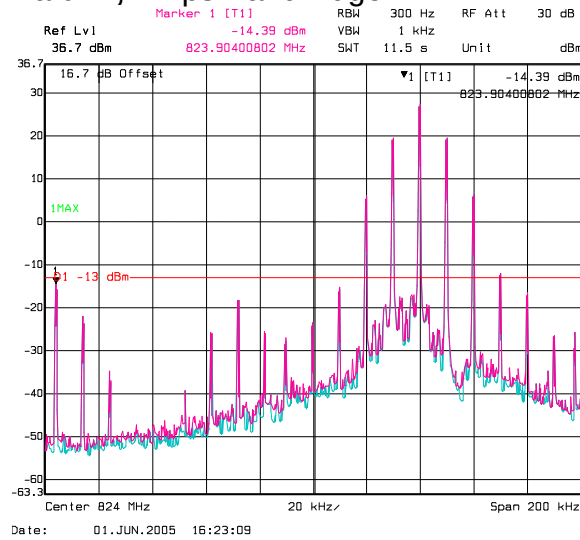
Summary of plots below, worst case.

Mode	Frequency	Level	Limit	Comment
AMPS low Channel	1006 MHz	-14.10 dBm	-13 dBm	Complies
AMPS Mid Channel	1017 MHz	-14.74 dBm	-13 dBm	Complies
AMPS High Channel	1035 MHz	-14.92 dBm	-13 dBm	Complies
GSM Low Channel	643.7 MHz	-14.87 dBm	-13 dBm	Complies
GSM Mid Channel	655.7 MHz	-16.03 dBm	-13 dBm	Complies
GSM High Channel	664.4 MHz	-16.89 dBm	-13 dBm	Complies
PCS/GSM Low Channel	1.669 GHz	-17.32 dBm	-13 dBm	Complies
PCS/GSM Mid Channel	1.697 GHz	-14.80 dBm	-13 dBm	Complies
PCS/GSM High Channel	1.720 GHz	-15.01 dBm	-13 dBm	Complies

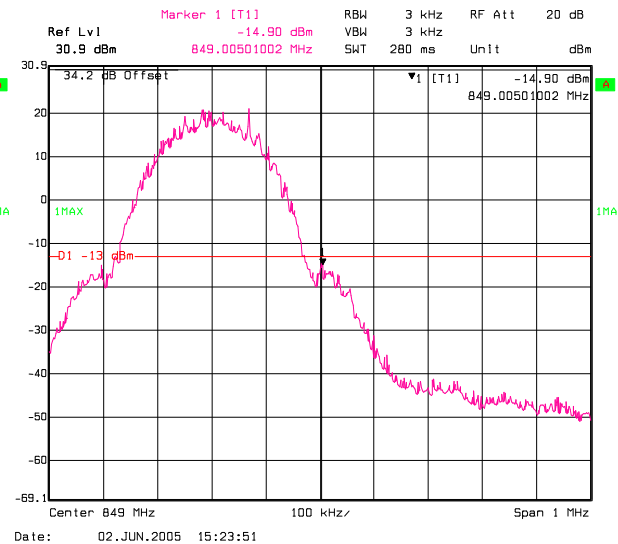
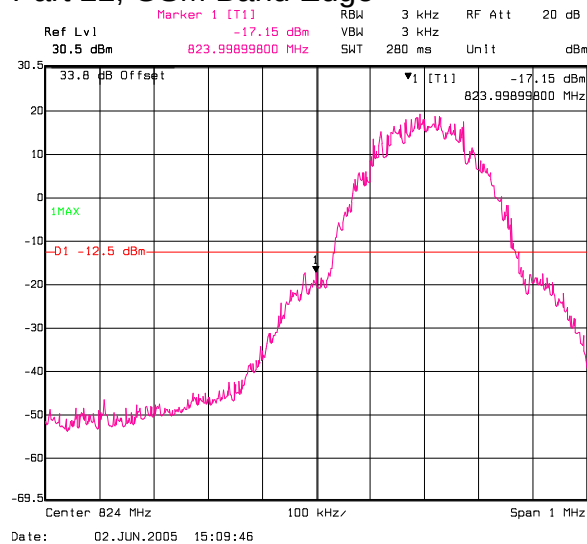
Test Data: See plots below



Part 22, Amps Band Edge

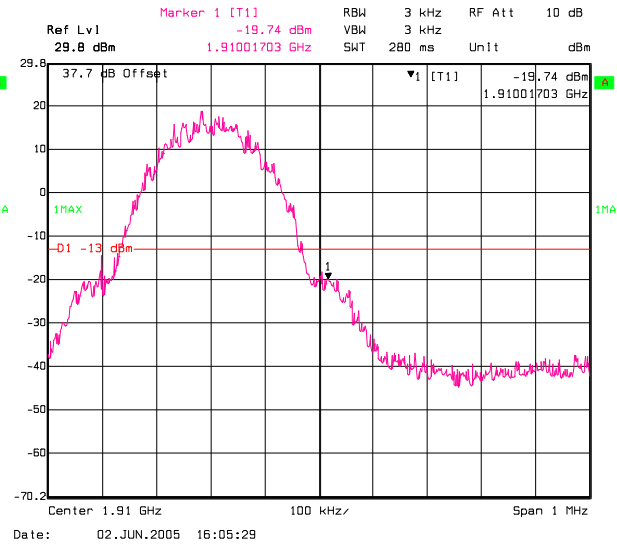
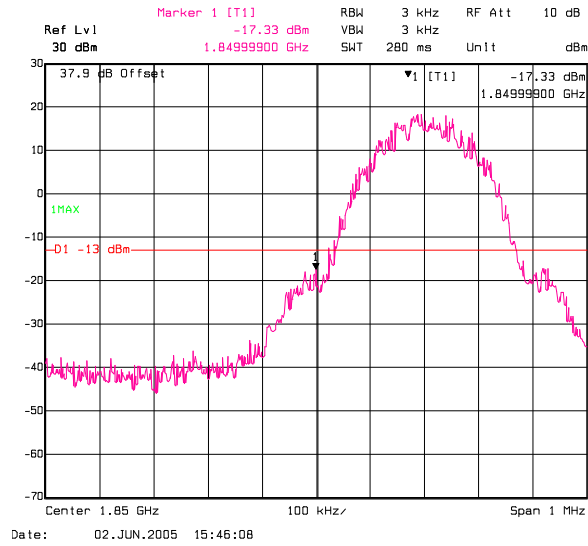


Part 22, GSM Band Edge



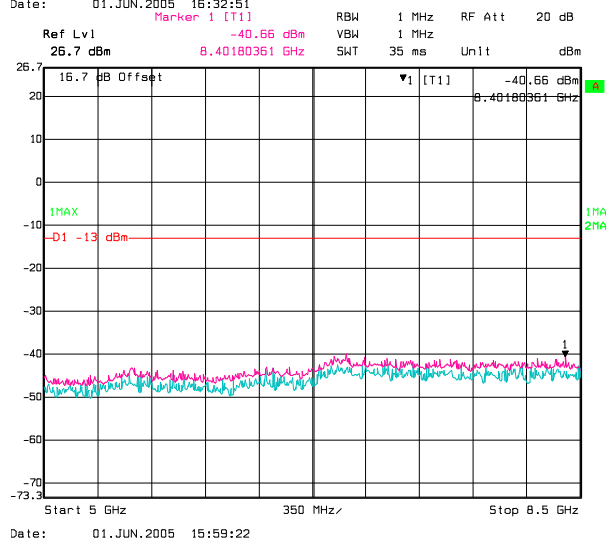
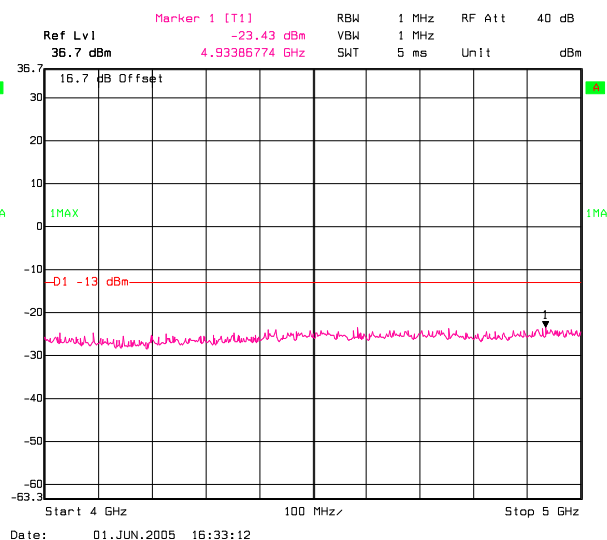
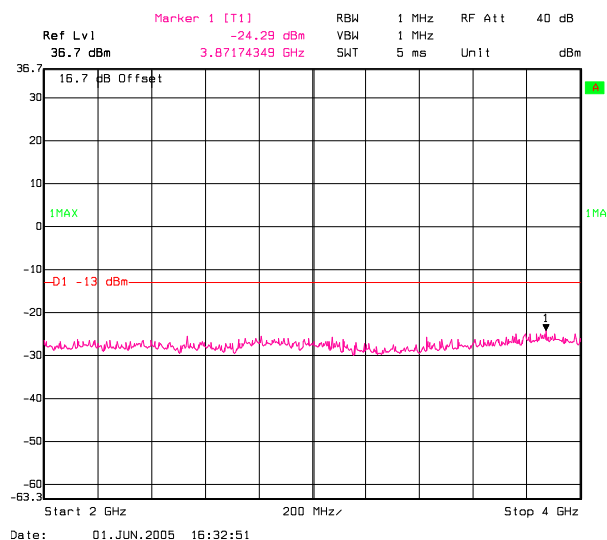
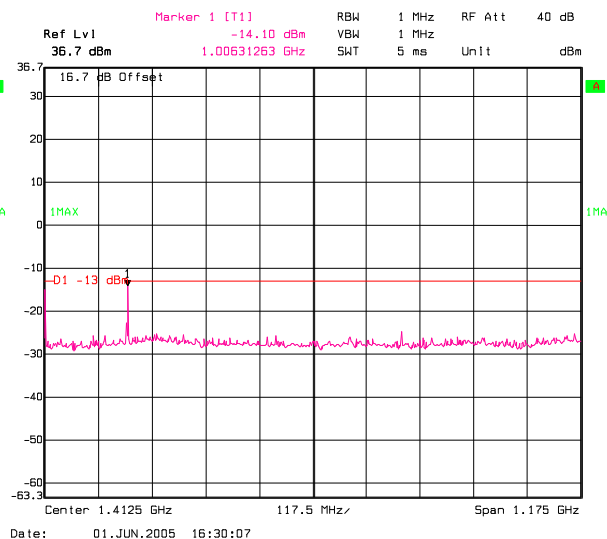
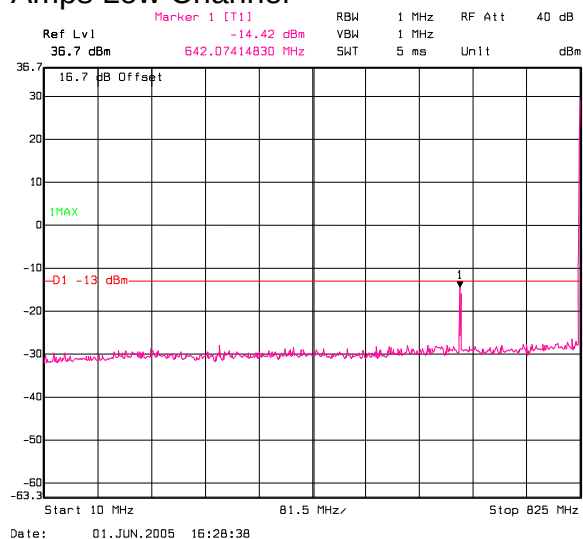


Part 24, GSM Band Edge



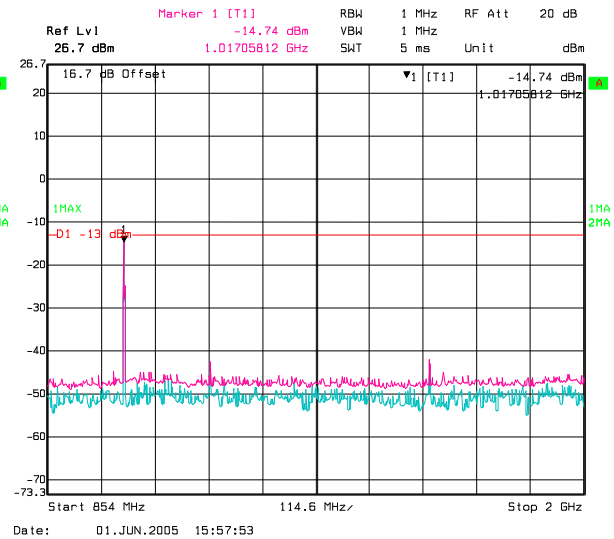
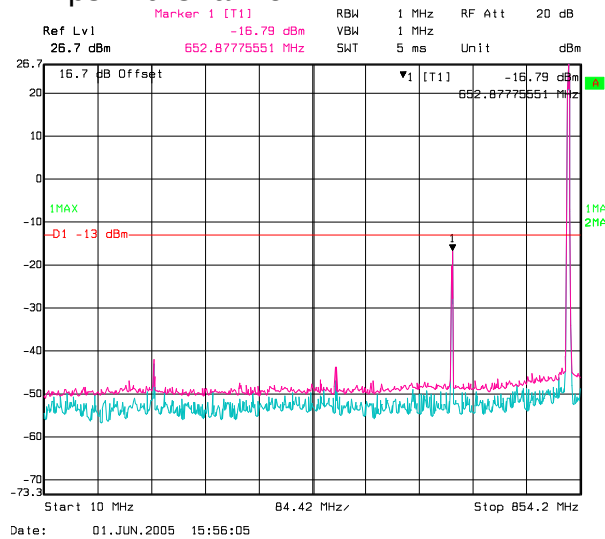


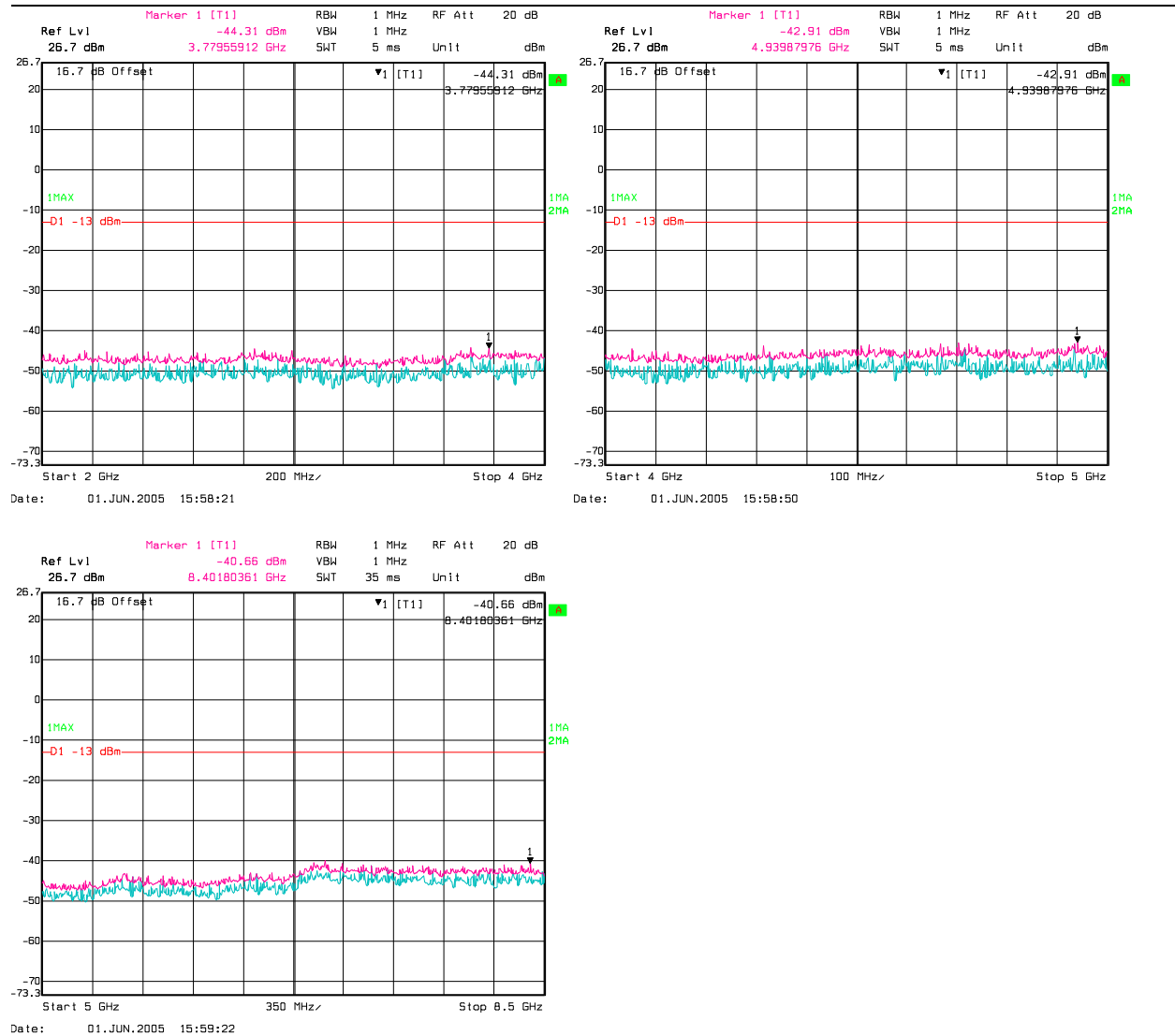
Amps Low Channel





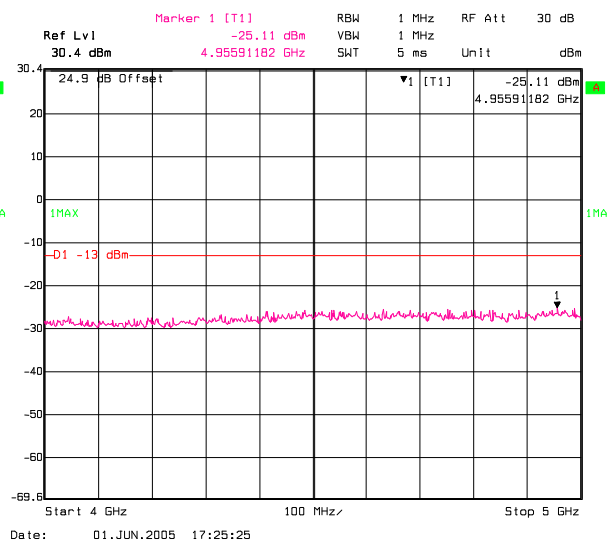
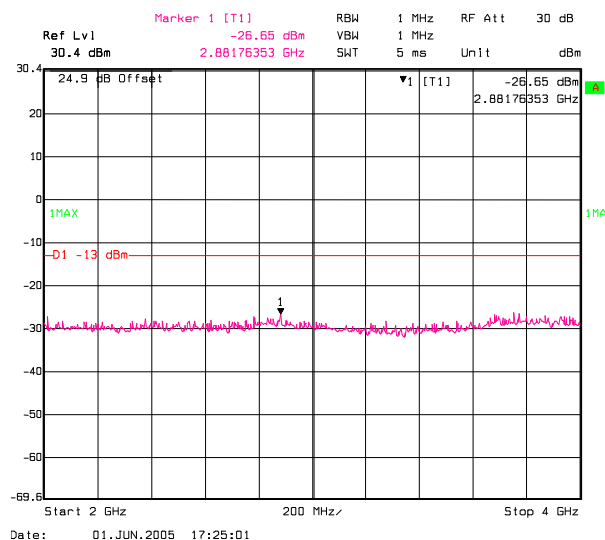
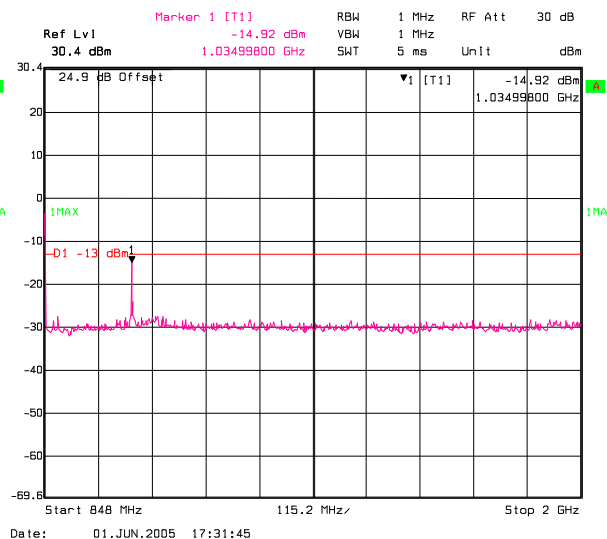
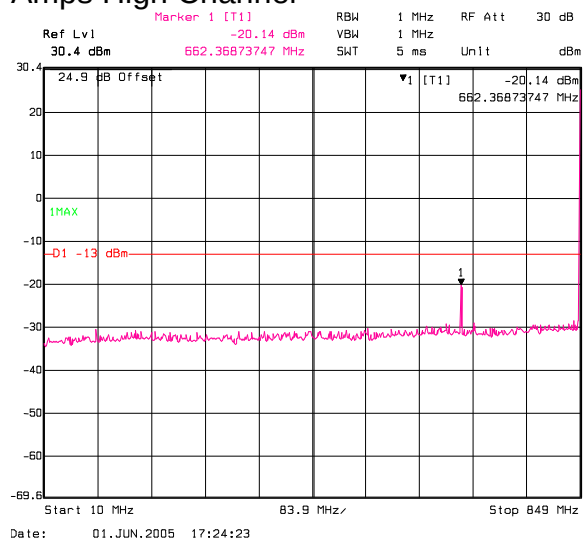
Amps Mid Channel

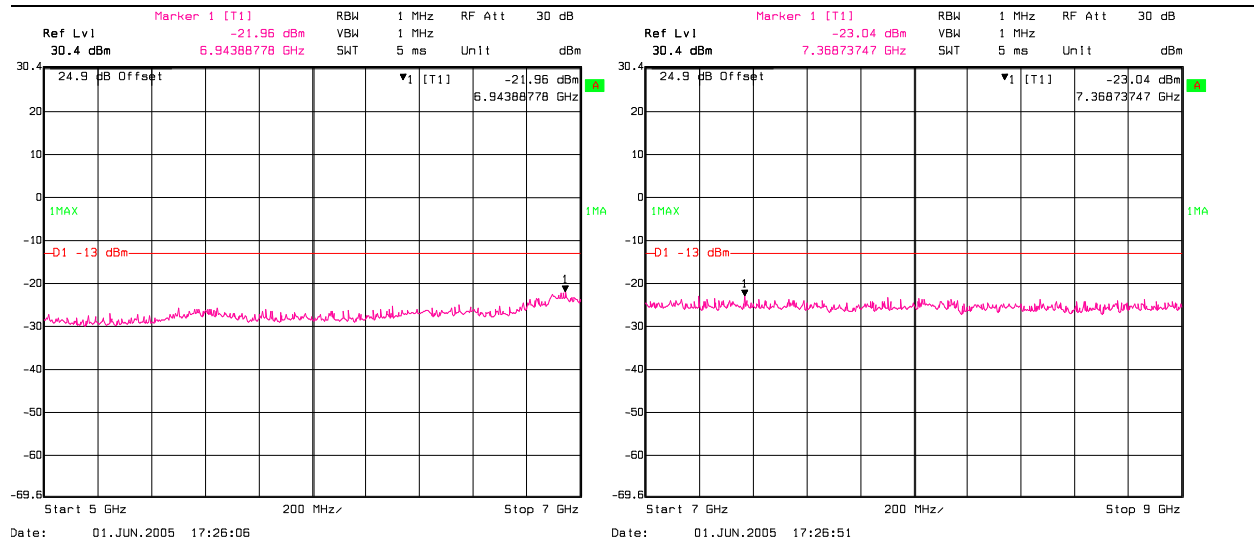






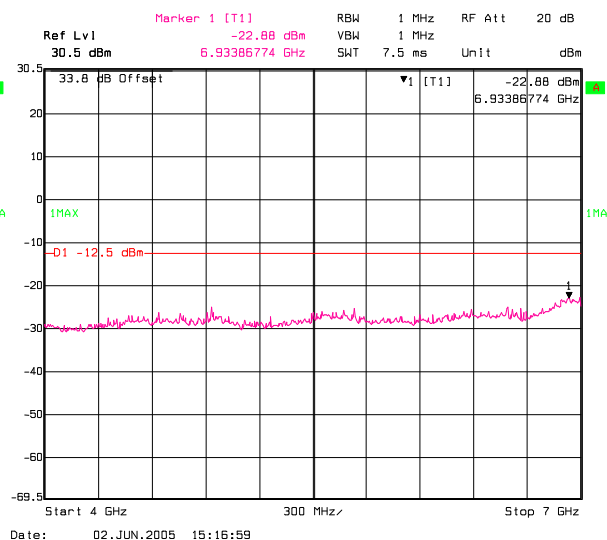
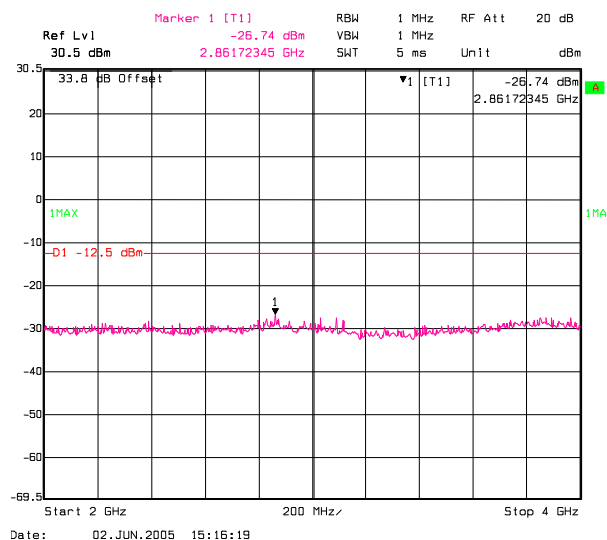
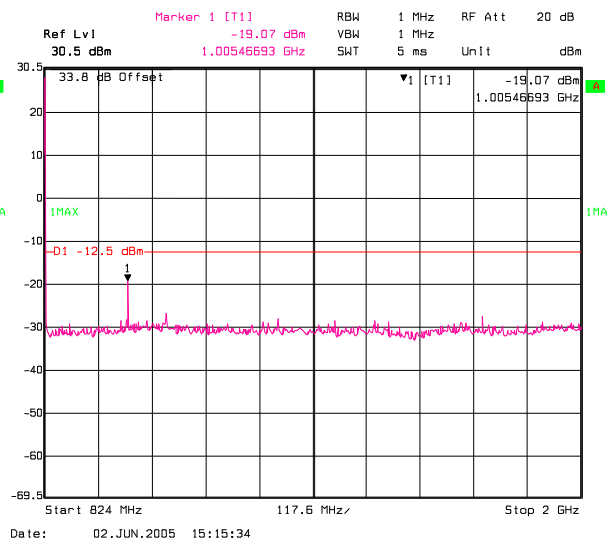
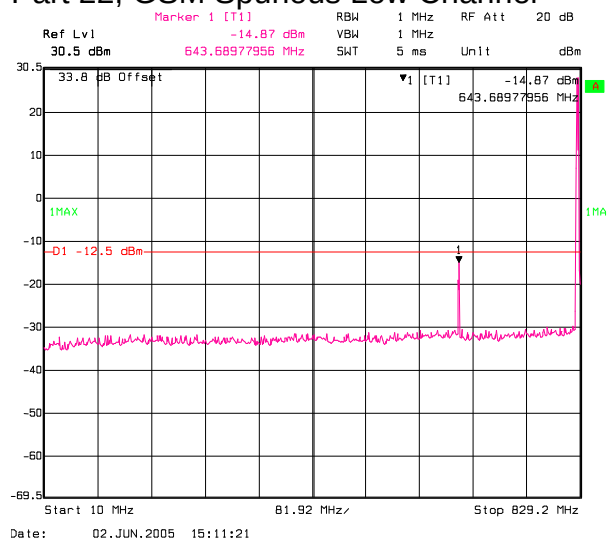
Amps High Channel

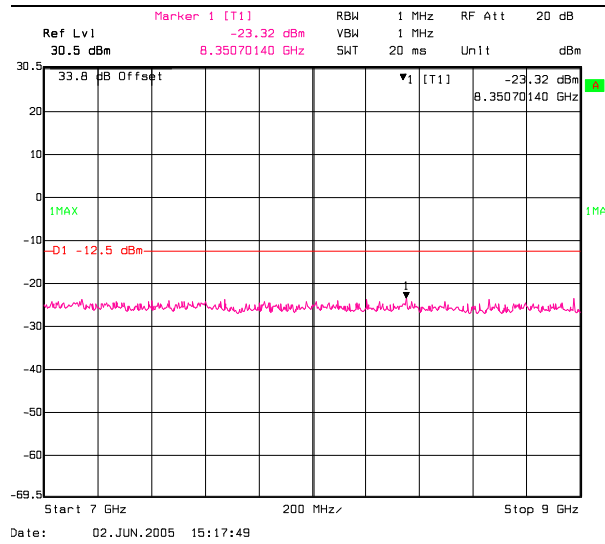






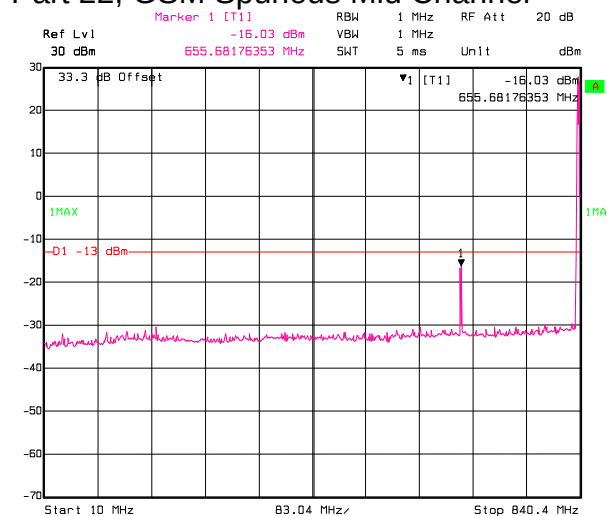
Part 22, GSM Spurious Low Channel



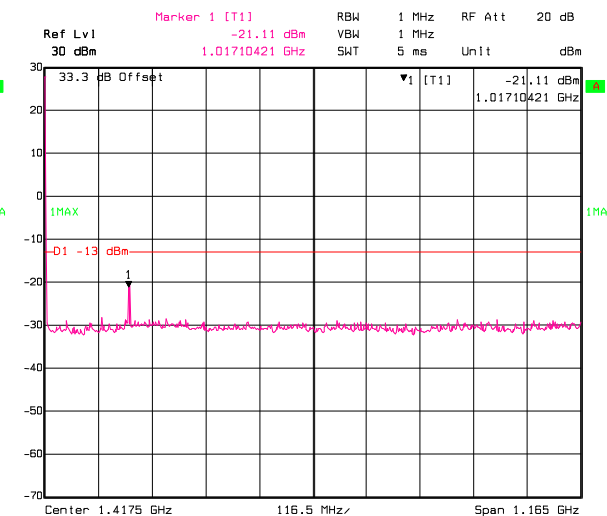




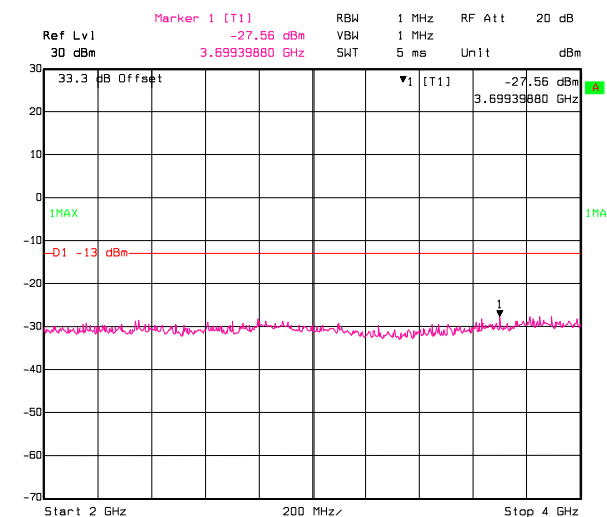
Part 22, GSM Spurious Mid Channel



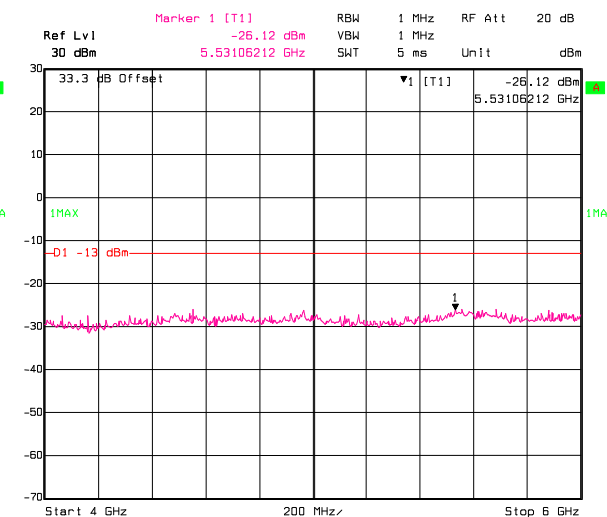
Date: 02.JUN.2005 15:03:41



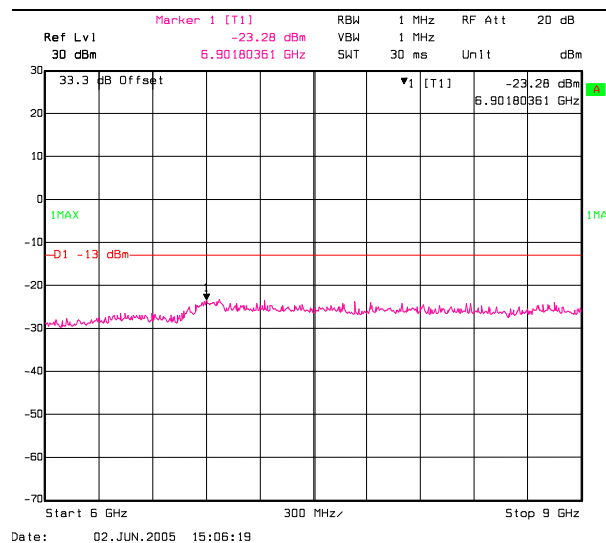
Date: 02.JUN.2005 15:05:03



Date: 02.JUN.2005 15:05:28

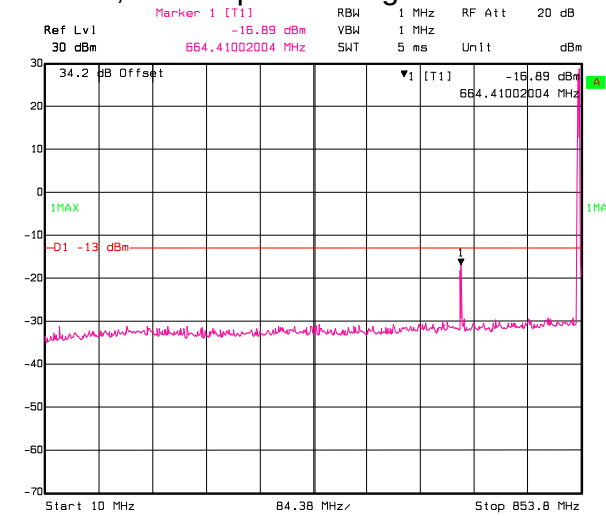


Date: 02.JUN.2005 15:05:53

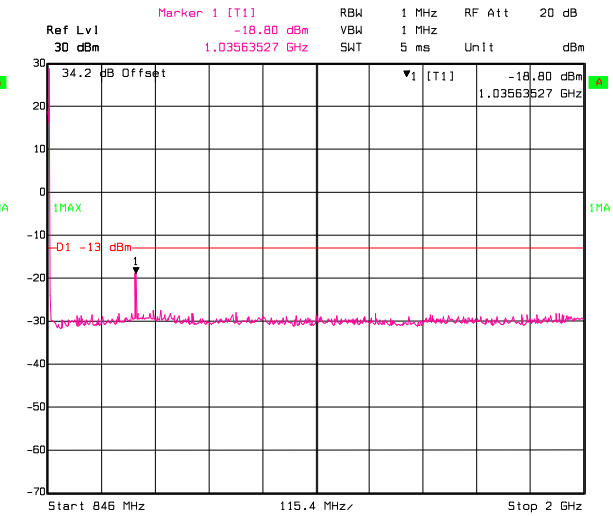




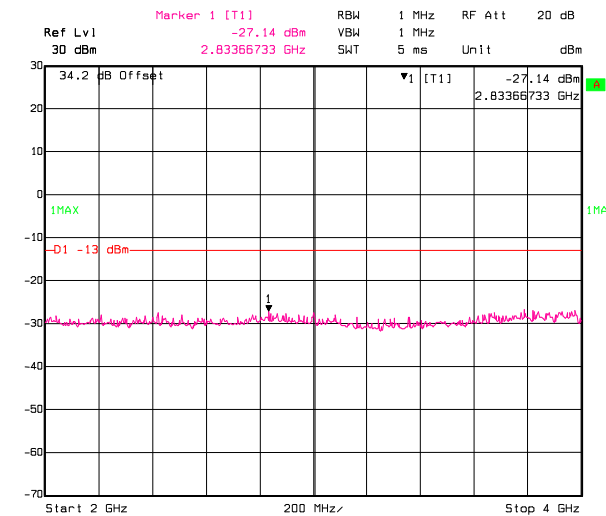
Part 22, GSM Spurious High Channel



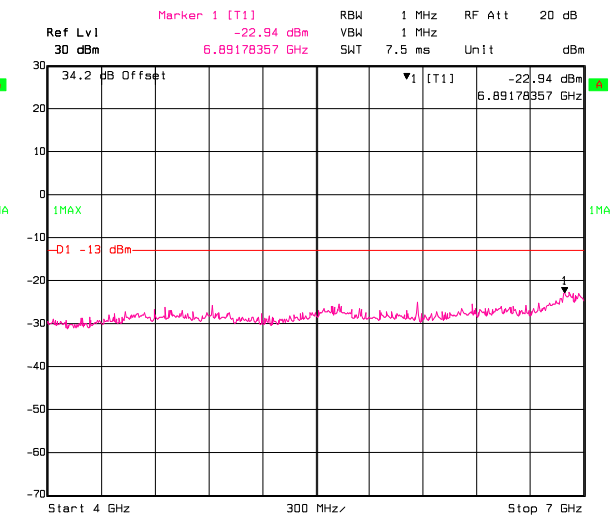
Date: 02.JUN.2005 15:26:16



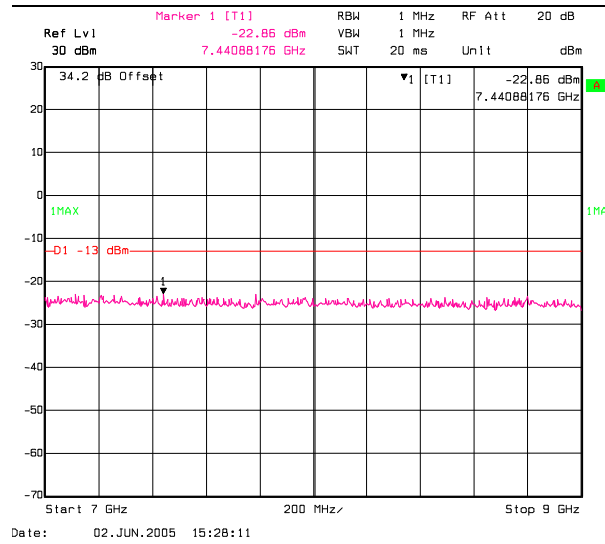
Date: 02.JUN.2005 15:26:45



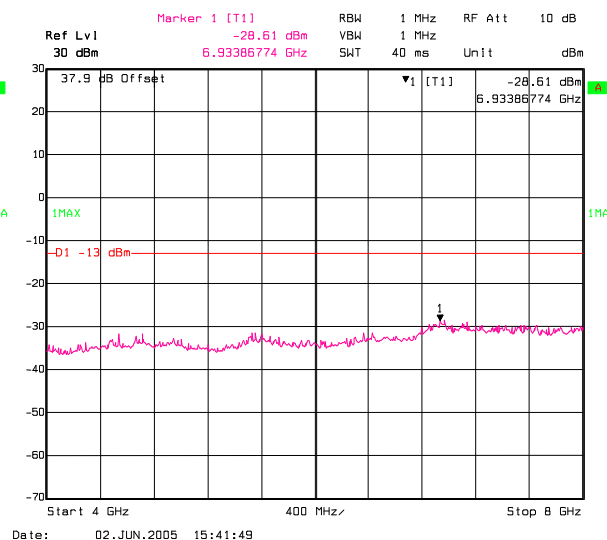
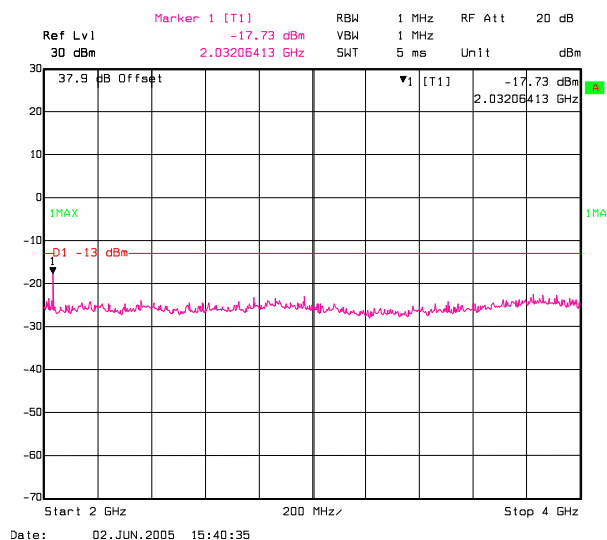
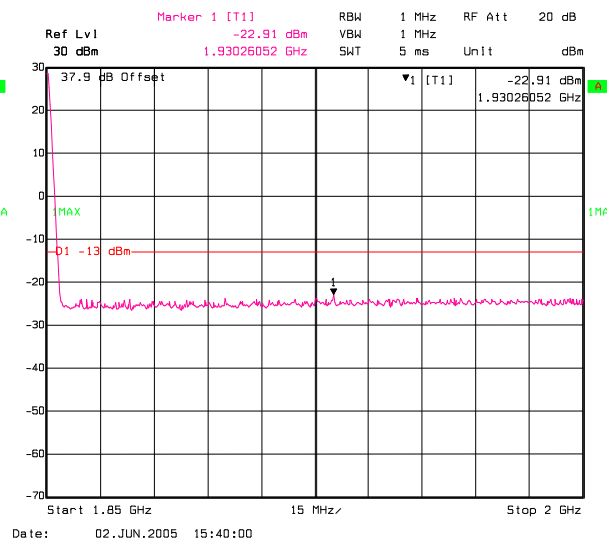
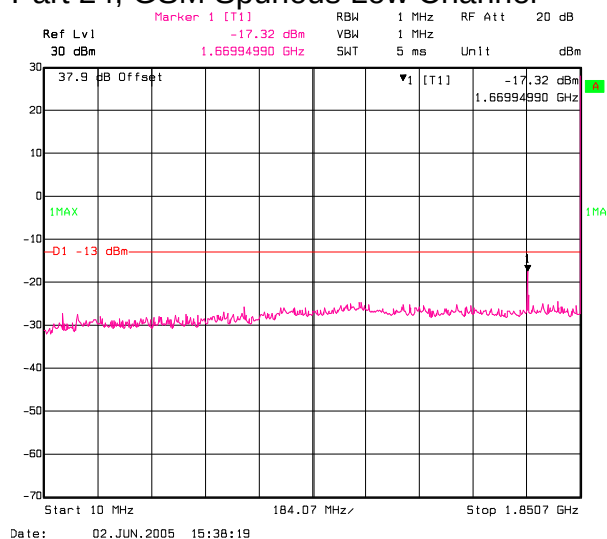
Date: 02.JUN.2005 15:27:15

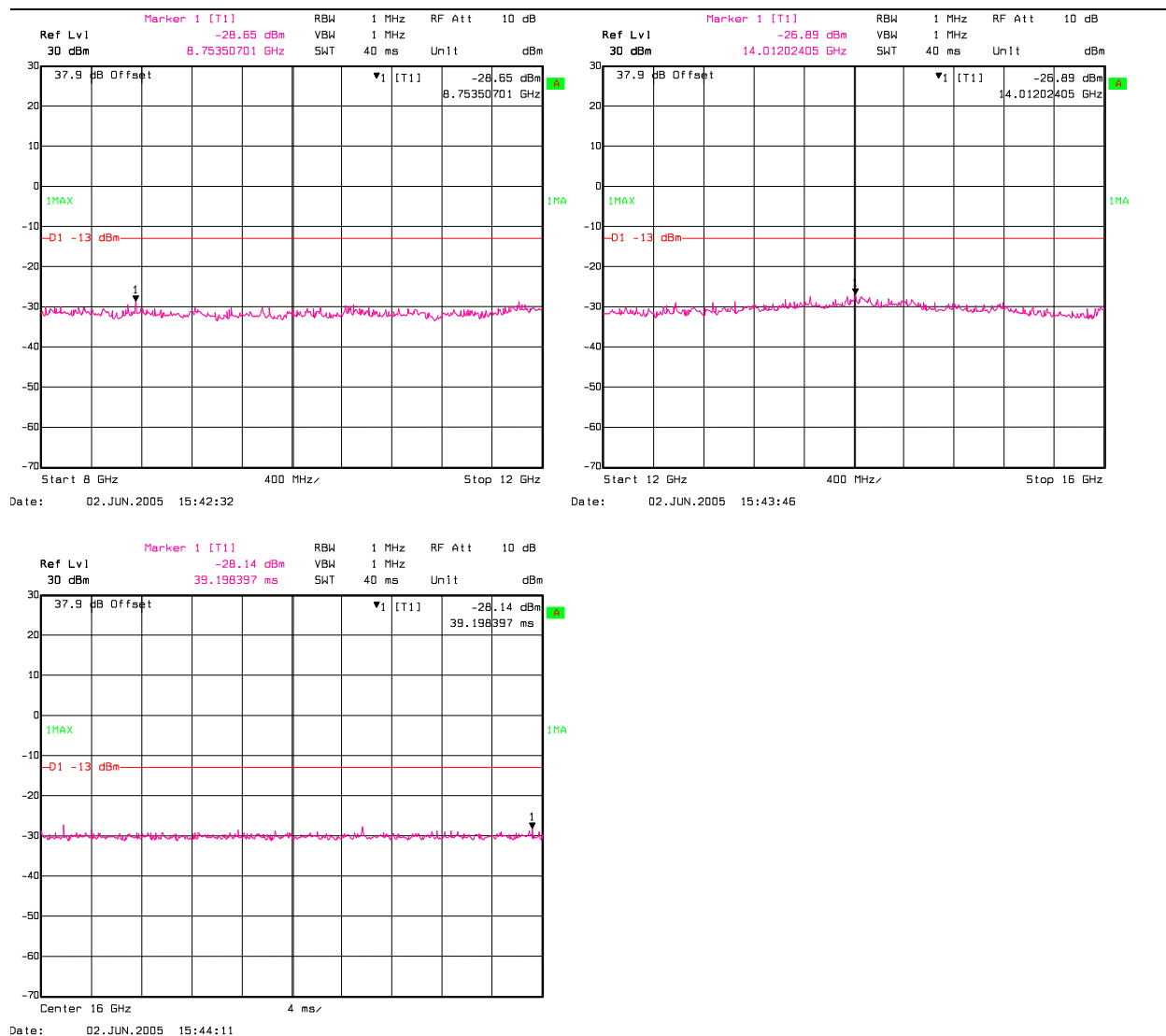


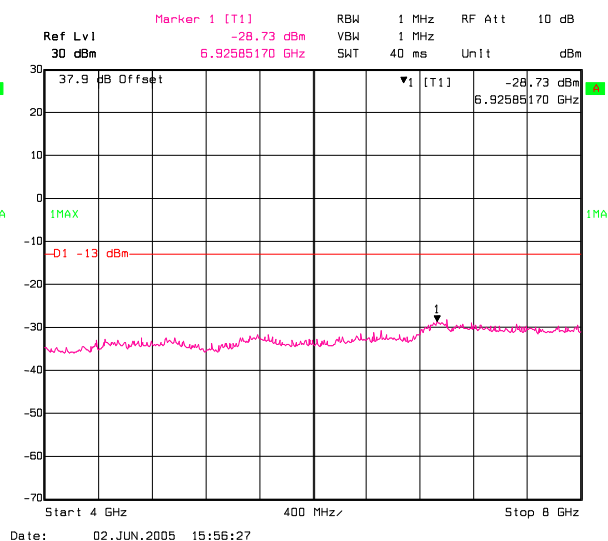
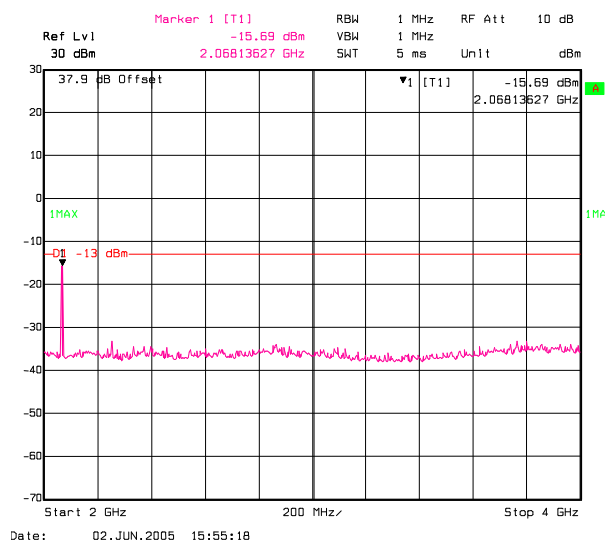
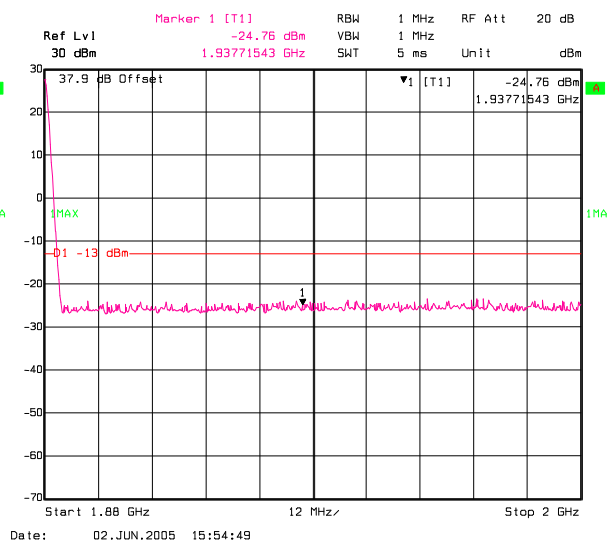
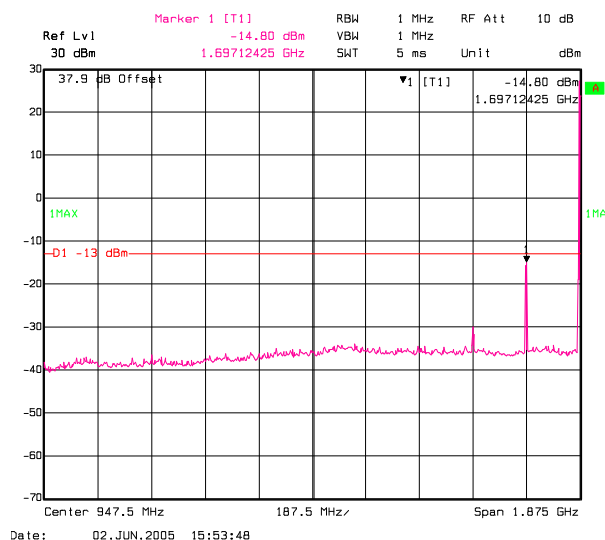
Date: 02.JUN.2005 15:27:40

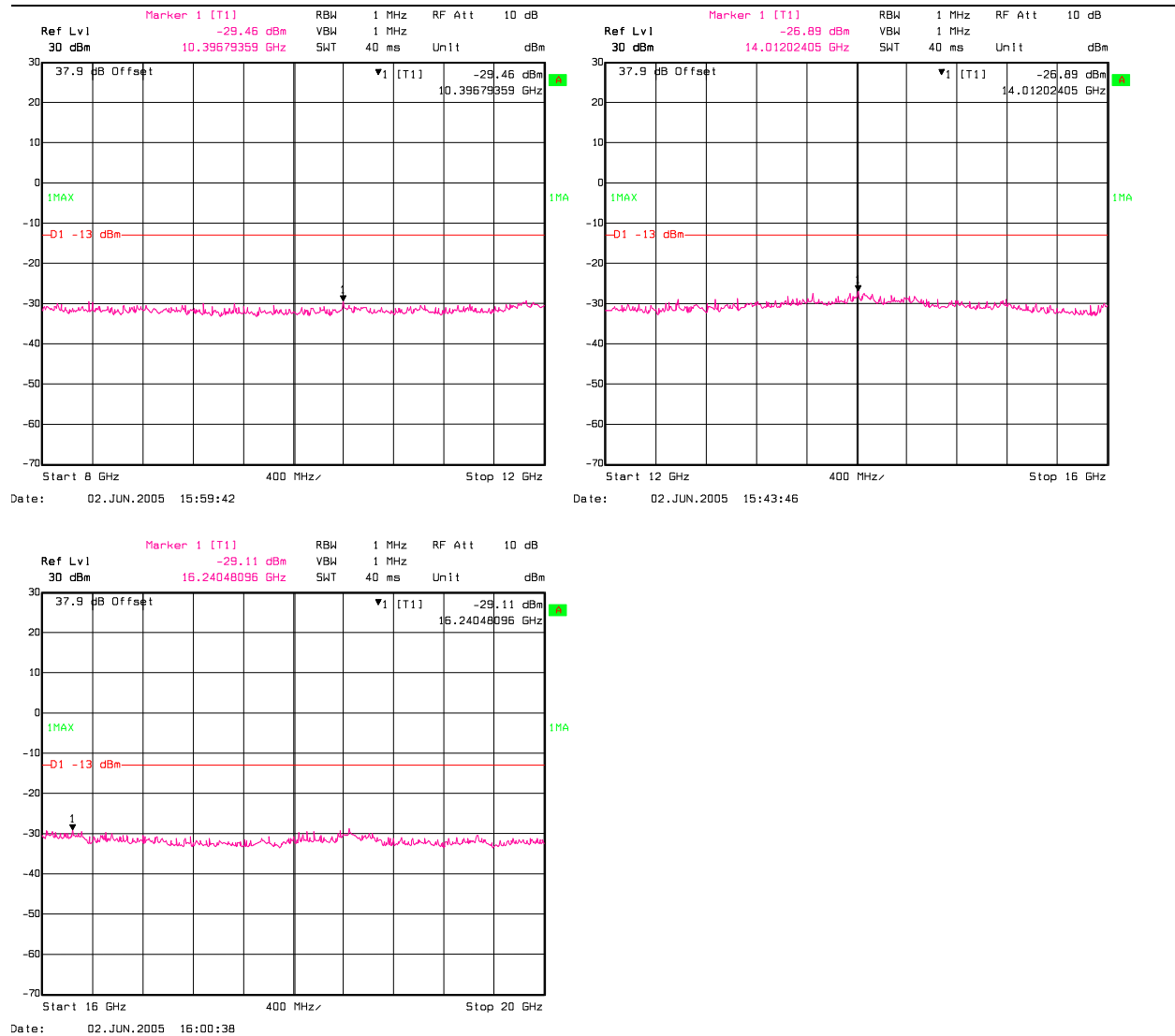


Part 24, GSM Spurious Low Channel



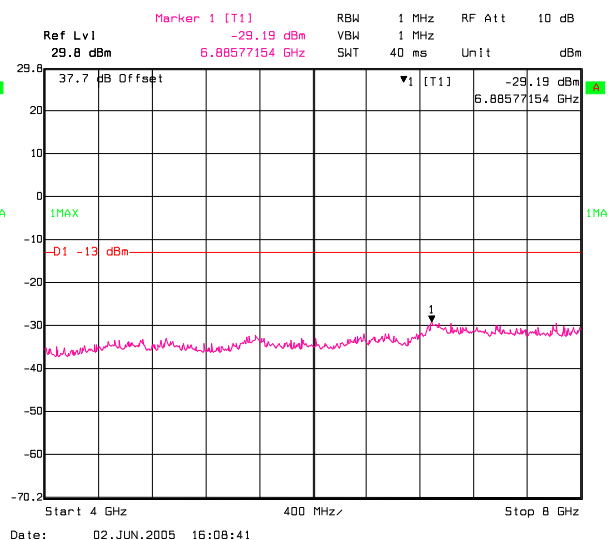
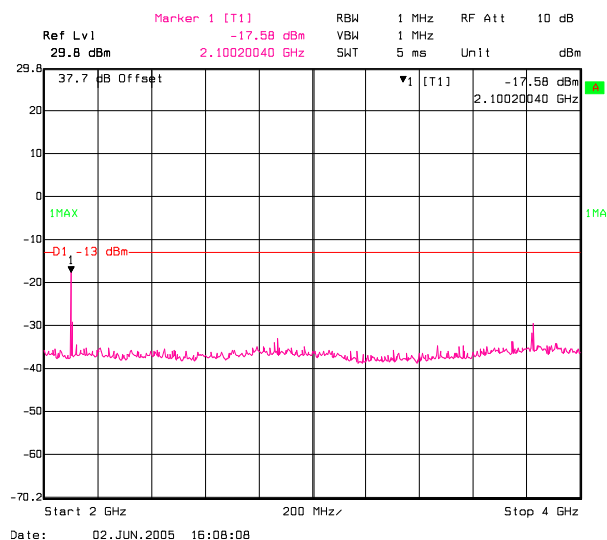
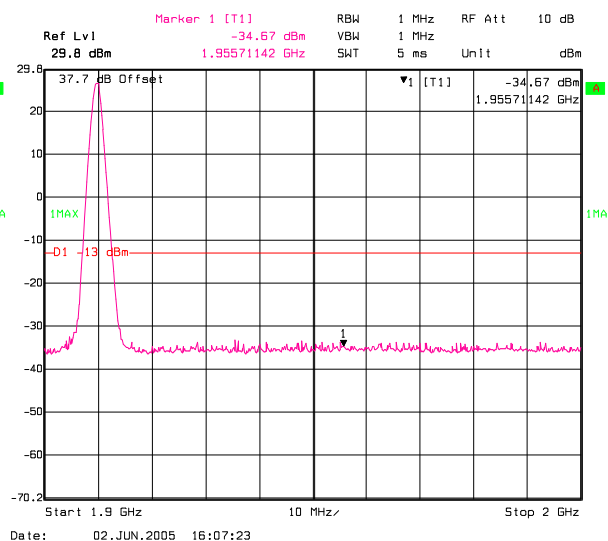
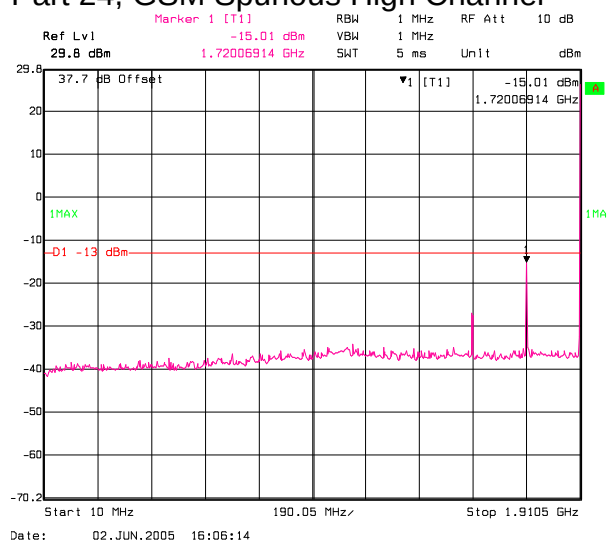


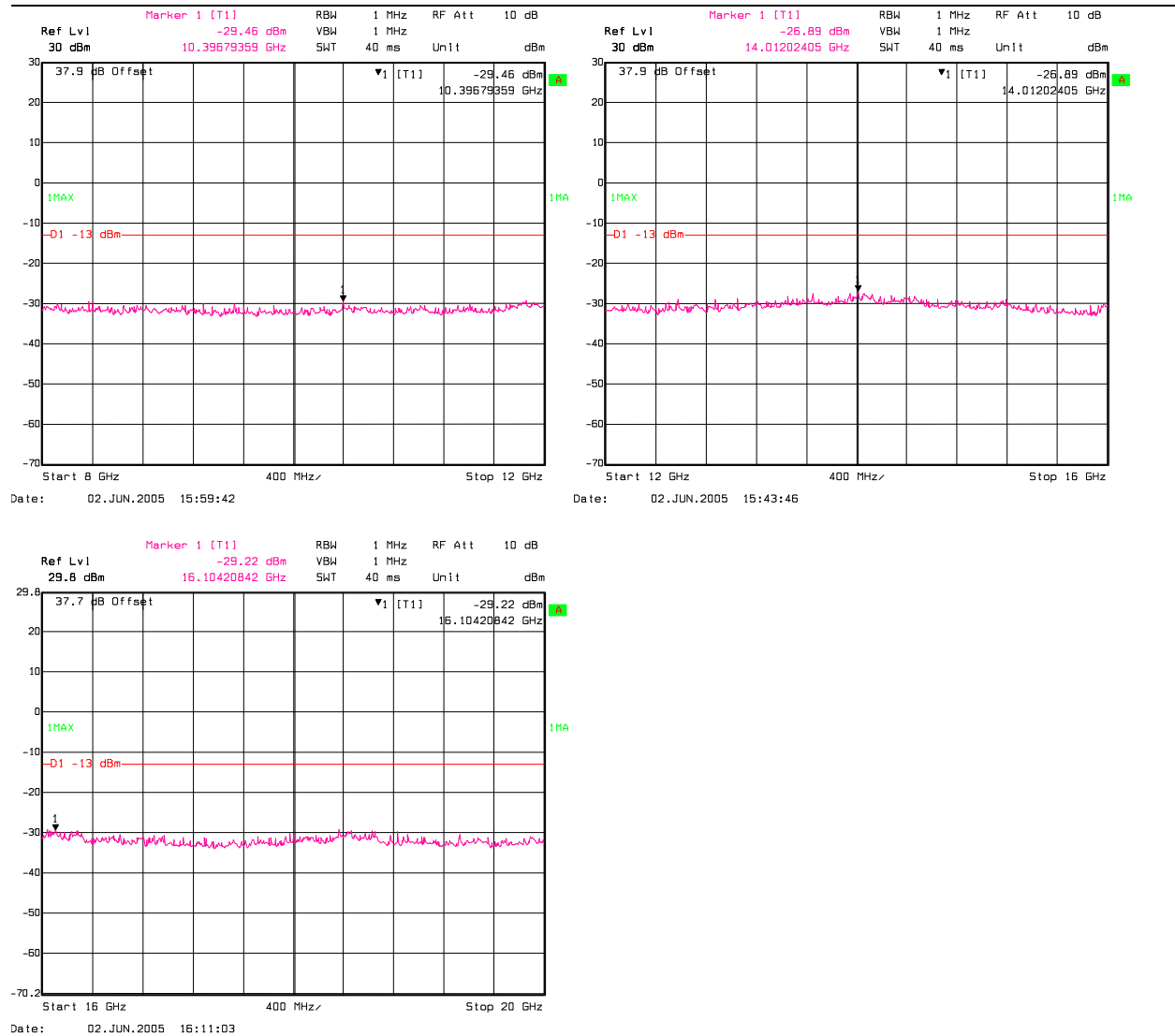
Part 24, GSM Spurious Mid Channel






Part 24, GSM Spurious High Channel







Section 9. Field Strength of Spurious

Para. No.: 2.1053

Test Performed By: A. Laudani

Date of Test: 6-3-05

Minimum Standard: 22.917(b); 24.238.

Test Results:

Radiated spurious was investigated from 1000 MHz to 10x the Transmit Frequency or 1000 MHz to 19100 MHz. Emissions within 20 dB of the limit were substituted by a signal generator and matching antenna and were shown to comply.

The maximum spurious field strength in AMPS mode is 13.0 dB below the limit @ 2503.8 MHz.

The maximum spurious field strength in GSM mode is 16.1 dB below the limit @ 3395.2 MHz.

The maximum spurious field strength in PCS GSM mode is 4.3 dB below the limit @ 3819.6 MHz.

Test Data: See tables pages 20 to 23.



Section 10. Frequency Variation

Para. No.: 2.1055

Test Performed By: A. Laudani	Date of Test: 6-3-05
--------------------------------------	-----------------------------

Minimum Standard: Para. No. 22.355, 24.235.

Test Results: Limit = 2.5 ppm of Frequency 1850.02 MHz

Worst Case 0.039 ppm variation -- Complies, see tables below.
Ambient Temperature 22°C, Relative Humidity 40%

Equipment List:

Agilent Wireless communication Test Set Model 8960 Series 10 E5515C sn GB44051091
Cal. Date due 5-19-07
N149 Cincinnati SubZero Environmental Chamber Model Z+32 sn ZP0552665
Cal. Date due 5/13/06

Measurement Data:

Frequency Stability over Voltage Range

Voltage	Output Power	Frequency Error	Frequency Error
Volt	dBm	HZ	(PPM)
4.6	28.12	-51	-0.028
4.0	28.08	-60	-0.032
3.6	27.75	-73	-0.039
3.5	27.64	-62	-0.034
3.4	27.58	-33	-0.018
3.3	27.58	-47	-0.025
3.25	RF turns off		

4.0 Volts is power supply level as specified by Calamp Corp.

3.6 Volts is power supply minimum level as specified by Calamp Corp.

4.6 Volts is specified power supply level x 1.15%.

Ambient 21°C RH 55%



Frequency Stability vs. Temperature

Frequency stability measurements were made over the temperature range of -30°C to +50°C. The frequency error was measured with the Agilent 8960 Test Set. Climate control was accomplished using a temperature chamber. The unit remained in the chamber during temperature transitions while turned off and during the measurement process, it was turned on and the error was scanned after one minute and recorded the maximum error over the next minute.

	Power Supply					
	3.6 Volts		4.0 Volts		4.6 Volts	
Temperature	Frequency Error	Frequency Error	Frequency Error	Frequency Error	Frequency Error	Frequency Error
°C	HZ	(PPM)	HZ	(PPM)	HZ	(PPM)
19.9	-54	-0.029	-52	-0.028	-47	-0.025
30.0	-56	-0.030	-51	-0.028	54	0.029
40.0	-73	-0.039	-55	-0.030	-62	-0.034
50.1	-61	-0.033	-60	-0.032	-62	-0.034
-30.7	-37	-0.020	-22	-0.012	-33	-0.018
-20.0	-29	-0.016	19	0.010	15	0.008
-10.0	-67	-0.036	-59	-0.032	-63	-0.034
0.2	-14	-0.008	16	0.009	-19	-0.010
10.1	-16	-0.009	12	0.006	-11	-0.006

4.0 Volts is power supply level as specified by Calamp Corp.

3.6 Volts is power supply minimum level as specified by Calamp Corp.

4.6 Volts is specified power supply level x 1.15%.

**Section 11. Test Equipment List**

Asset Number	Description	Model Number	Serial Number	Last Cal	Cal Due
836	Signal Generator, Agilent	E8254A	US41140229	12/30/04	12/30/05
835	Spectrum Analyzer, Rhode & Schwartz	RHDFSEK	829058/005	12/30/04	12/30/05
317	Preamplifier, HP	8449A	2749A00167	1/6/05	1/6/06
752	Antenna, DRWG, EMCO	3115	4943	12/29/04	12/29/05
529	Antenna, DRWG, EMCO	3115	2505	4/13/05	4/13/06
112	Antenna, LPA, EMCO	3146	9101-2988	10/28/04	10/28/05
759	Antenna Set, Dipole, EMCO	3121C	1214	1/28/05	1/28/06
810	Multimeter, Fluke	111	77820242	1/6/05	1/6/06
223	DC Power Supply	XP-580	None	NCR	NCR