



**Test Report:** 2005 110898-FCC2

**Applicant:** Sendum Wireless Corporation  
4500 Beedie Street  
Burnaby, BC Canada V5J 5L2  
Phone: 604 438 6451  
Fax: 604 437 5726

**Apparatus:** OM200

**FCC ID:** TS5-6050M-OM200

**In Accordance With:** FCC Part 22, Subpart H  
Public Mobile Services  
RSS-129, Issue 2  
800MHz Dual-Mode CDMA Cellular Telephones

FCC Part 24, Subpart E  
RSS-133, Issue 2, Rev.1  
2GHz Personal Communications Services

**Tested By:** Nemko USA

**Project Number:** 25-898-SEN

**Date:** Nov. 17, 2005

**Total Number of Pages:** 50

### Report Summary

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 22. Conducted measurements were performed in accordance with ANSI TIA-603-B-2002. Radiated tests were conducted in accordance with ANSI C63.4-2003. Radiated emissions are made on an open area test site. A description of the test facility is on file with the FCC.

The assessment summary is as follows:

- Apparatus Assessed:** OM200
- Specification:** FCC Part 22 Public Mobile Services  
FCC Part 24, Subpart E  
RSS-129, Issue 2  
RSS-133, Issue 2
- Compliance Status:** Complies
- Exclusions:** None
- Non-compliances:** None

### Report Release History:

REVISION	DATE	COMMENTS
-	11-10-05	Prepared By: <b>A. Laudani</b>
-		Initial Release: <b>Chip Fleury</b>

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.

This test report has been completed in accordance with the requirements of ISO/IEC 17025.

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**1.2 Samples Submitted for Assessment**

The following samples of the apparatus have been submitted for type assessment:

<b>Sample No.</b>	<b>Description</b>	<b>Serial No.</b>
001	PT200* modified with pigtail for conducted measurements	NA
002	OM200 with charger for Radiated Measurements Charger keeps battery fully charged for test	NA

\* PT200 contains the same radio circuitry as the DS500

OM200 PS/CHARGER  
SPS-0441000-NA  
100-240 Vac 50/60 HZ 180 mA → 4.4 Vdc 1A

The first samples were received on: 10 November 2005

**1.3 Theory of Operation**

The device uses GPS technology to encode its location, which is transmitted via CDMA or PCS wireless telephony to keep track of the internee it is strapped to.

### **1.4 Technical Specifications of the EUT**

<b>Manufacturer:</b>	Sendum Wireless
<b>Operating Frequency:</b>	836.51 to 848.97 MHz, 1851.25 to 1908.75 MHz
<b>Emission Designator:</b>	1M28F9W
<b>Rated Power:</b>	24.0 dBm
<b>Measured Power:</b>	23.7 dBm
<b>Modulation:</b>	CDMA Cellular, CDMA PCS
<b>Power Source:</b>	4.6 V lithium battery
<b>Antenna Gain:</b>	Internal Integral Circuit.

### **1.5 Block Diagram of the EUT**

See Block diagram exhibit

## Section 2: Test Conditions

### 2.1 Specifications

The apparatus was assessed against the following specifications:

FCC Part 22, Subpart H Public Mobile Services  
 RSS-129, Issue 2 800MHz Dual-Mode CDMA Cellular Telephones  
 FCC Part 24, Subpart E Personal Communications Services  
 RSS-133, Issue 2, Rev.1 2GHz Personal Communications Services

### 2.2 Deviations From Laboratory Test Procedures

No deviations were made from laboratory test procedures.

### 2.3 Test Environment

All tests were performed under the following environmental conditions:

Temperature range : 15 – 30 °C  
 Humidity range : 20 - 75 %  
 Pressure range : 86 - 106 kPa  
 Power supply range : +/- 5% of rated voltages

### 2.4 Test Equipment

Asset Number	Description	Model Number	Serial Number	Last Cal	Cal Due
101L	Signal Generator, Gigatronics	900	317101	10/5/05	10/5/06
835	Spectrum Analyzer, Rhode & Schwartz	RHDFSEK	829058/005	12/30/04	12/30/05
842	Preamp	Nemko	na	verified	10/8/05
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
529	Antenna, DRWG, EMCO	3115	2505	4/13/05	4/13/06
836	Signal Generator, Agilent	E8254A	US41140229	12/30/04	12/30/05
759	Antenna Dipole, Part of Set 760	3121C-DB4	9609-1214	12/30/04	12/30/05
149	Cincinnati Environmental Chamber	Plus 32	AP0552665	5/13/05	5/13/06

## **Section 3: Observations**

### **3.1 Modifications Performed During Assessment**

No modifications were performed during assessment.

### **3.2 Record Of Technical Judgements**

Conductive measurements were performed on the model PT200 which contains the same Rf circuitry as the OM200. A coax, sma pigtail was soldered into the circuitry between the final RF stage and the integral antenna.

### **3.3 EUT Parameters Affecting Compliance**

The user of the apparatus could not alter parameters that would affect compliance.

### **3.4 Test Deleted**

No Tests were deleted from this assessment.

### **3.5 Additional Observations**

There were no additional observations made during this assessment.



## Section 4: Results Summary

This section contains the following:

The results contained in this section are representative of the operation of the apparatus as originally submitted.

FCC Part 22: Test Results

Clause	Test Method	Test Description	Required	Result
22.355	2.1055	Frequency stability		PASS
22.913	2.1046	Output power		PASS
22.917	2.1051	Conducted spurious emissions		PASS
22.917	2.1053	Radiated spurious emissions		PASS
22.905	2.1049	Occupied bandwidth		PASS

Part 24: Test Results

Clause	Test Method	Test Description	Required	Result
24.235	2.1055	Frequency stability		PASS
24.232	2.1046	Output power		PASS
24.238	2.1051	Conducted spurious emissions		PASS
24.236	2.1053	Radiated spurious emissions		PASS
24.238	2.1049	Occupied bandwidth		PASS

Notes:

## Appendix A: Test Results

### Frequency Stability

22.355

Except as otherwise provided in this part, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table C-1 of this section.

Table C-1. - Frequency Tolerance for Transmitters in the Public Mobile Services

Frequency range (MHz)	Base, fixed (ppm)	Mobile	
		>3 watts (ppm)	<=3 watts (ppm)
25 to 50		20.0	20.0
50 to 450	5.0	5.0	50.0
450 to 512	2.5	5.0	5.0
<b>821 to 896</b>	<b>1.5</b>	<b>2.5</b>	<b>2.5</b>
928 to 929	5.0	n/a	n/a
929 to 960	1.5	n/a	n/a
2110 to 2220	10.0	n/a	n/a

**Sec. 24.235 Frequency stability.** The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

The fundamental frequency emissions did not stray outside the designated band 1850 to 1909 MHz during all testing within this report.

The fundamental frequency emissions did not stray outside the designated band 1850 to 1909 MHz during all testing within this report. See Appendix B for bandedged plots from -30 °C to + 50 °C step 10°.

### Test Conditions:

<b>Sample Number:</b>	001	<b>Temperature:</b>	24 °C
<b>Date:</b>	11-8-05	<b>Humidity:</b>	31 %
<b>Modification State:</b>	CW	<b>Tester:</b>	A. Laudani
		<b>Laboratory:</b>	Nemko

**Test Results:** See Attached Table.

### Testing procedure for 22.355:

Frequency stability measurements were made over the temperature range of -30°C to +50°C. Climatic control was accomplished using a temperature chamber. The temperature was first increased from 20C to 50C in 10C increments and then lowered to -50C and incremented back to 20C. The unit remained in the chamber during temperature transitions and during the measurement process.

Voltage Nominal 4.3 V

Temperature(°C)	Frequency center	Freq.difference
20	836.519839	0
30	836.519839	0
40	836.519839	0
50	836.520160	-321
-30	836.520751	-912
-20	836.520751	-912
-10	836.520751	-912
0	836.520160	-321
10	836.520160	-321

836.52 MHz  
2.5 ppm  
2091.3 Hz -- Limit

Voltage 85% 3.66 V

Temperature(°C)	Frequency center	Freq.difference
20	836.519839	0
30	836.519839	0
40	836.519839	0
50	836.520160	-321
-30	836.520751	-912
-20	836.520751	-912
-10	836.520751	-912
0	836.520160	-321
10	836.520160	-321

Voltage 1.15% 4.94 V

Temperature(°C)	Frequency center	Freq.difference
20	836.519839	0
30	836.519839	0
40	836.519839	0
50	836.520160	-321
-30	836.520751	-912
-20	836.520751	-912
-10	836.520751	-912
0	836.520160	-321
10	836.520160	-321

Volts	Frequency center	Freq.difference	Output power dBm
4.6	836.520160	0	22.3
4.4	836.520160	0	22.2
4.2	836.520160	0	22.1
4.1	836.520160	0	21.7
4.0	836.520160	0	20.9
3.9	836.520160	0	22.4
3.7	836.520160	0	20.4
3.6	off		off

**Output Power**

Clause 22.913

Para. No. 22.913(a). The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts

Clause 24.232

Para. No.: 24.232. (b) Mobile/portable stations are limited to 2 watts E.I.R.P. peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications.

**Test Summary:  
Radiated**

<b>Modulation</b>	<b>Frequency (MHz)</b>	<b>ERP/EIRP Measured (dBm)</b>	<b>Substituted (dBm)</b>	<b>Result Watts</b>
CDMA	824.70	26.9	23.7	0.23
	836.52	25.8	23.2	0.21
	848.31	26.5	23.6	0.23
PCS	1851.25	23.2	21.7	0.15
	1880.00	24.7	23.1	0.20
	1908.75	24.0	21.8	0.15

Tables below.

**Radiated Emissions Data**

Complete	<u>YES</u>	Job # :	<u>25-898-SEN</u>	Test # :	<u>2</u>
Preliminary	<u>          </u>	Page	<u>1</u>	of	<u>1</u>
Client Name :	<u>Sendum Wireless Corporation</u>				
EUT Name :	<u>OM200</u>				
EUT Model # :	<u>OM200</u>				
EUT Part # :	<u>          </u>				
EUT Serial # :	<u>          </u>				
EUT Config. :	<u>Transmit CW</u>				
Specification :	<u>FCC Part 24</u>				
Bicon Ant.#:	<u>NA</u>	Temp. (°C) :	<u>19</u>	Date :	<u>11/9/2005</u>
Log Ant.#:	<u>110</u>	Humidity (%) :	<u>61</u>	Time :	<u>          </u>
DRG Ant. #	<u>529</u>	EUT Voltage :	<u>120 Vac</u>	Staff :	<u>AL</u>
Dipole Ant.#:	<u>NA</u>	EUT Frequency :	<u>60 Hz</u>	Photo ID:	<u>          </u>
Cable#:	<u>40ft</u>	Phase:	<u>1</u>	Peak Bandwidth:	<u>1 MHz</u>
Preamp#:	<u>842</u>	Location:	<u>SOATS</u>	Video Bandwidth	<u>1 MHz</u>
Spec An.#:	<u>835</u>	Distance:	<u>3M</u>		
QP #:	<u>NA</u>				
PreSelect#:	<u>NA</u>				

Meas. Freq. (MHz)	Vertical (dBuV) pk	Horizontal (dBuV) pk	CF (db)	Max Level (dBm) pk	Spec. Limit (dBm) pk	Margin dB pk	EUT Rotation	Ant. Height	Pass Fail Unc.	Commen
1851.25	84.9	83.3	35.7	23.2	33.0	-15.4	20	1.0	Pass	
1880.00	86.4	84.2	35.7	24.7	33.0	-13.8	20	1.0	Pass	
1908.75	85.7	83.5	35.7	24.0	33.0	-13.6	20	1.0	Pass	





**Conducted Output Power:****Test Conditions:**

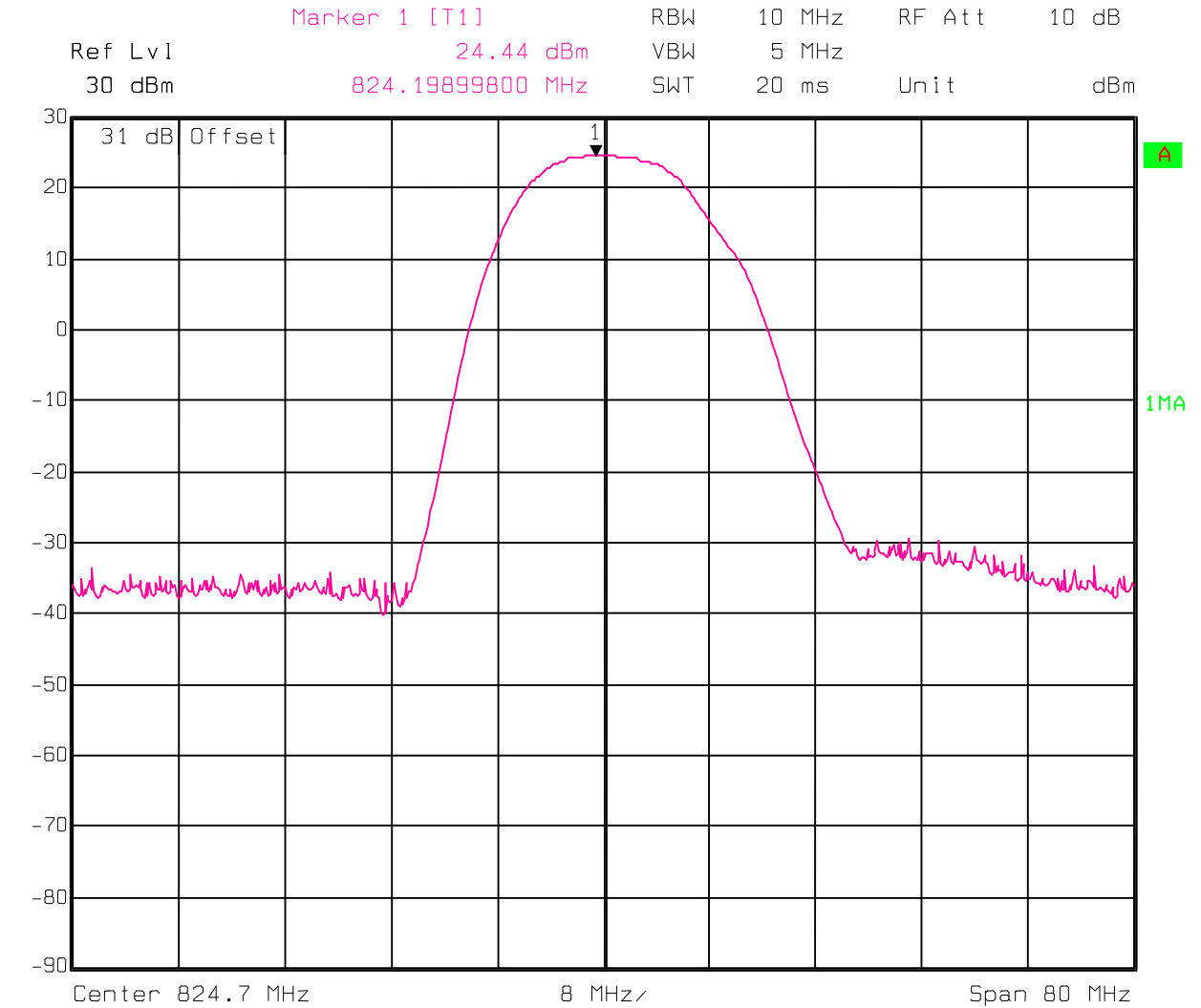
<b>Sample Number:</b>	001	<b>Temperature:</b>	22°C
<b>Date:</b>	12-5-05	<b>Humidity:</b>	29%
<b>Modification State:</b>	CW	<b>Tester:</b>	A. Laudani
		<b>Laboratory:</b>	Nemko SOATS

**Equipment: Spectrum Analyzer 835, with 30 dB Attenuator.**

<b>Modulation</b>	<b>Frequency (MHz)</b>	<b>Measured (dBm)</b>	<b>Ant. Gain</b>	<b>Total ERP/EIRP</b>	<b>Result Watts</b>
CDMA	824.70	24.4	-1.0	23.4	0.22
	836.52	24.0	-1.0	23.0	0.20
	848.31	24.3	-1.0	23.3	0.21
PCS	1851.25	24.2	-0.5	23.7	0.23
	1878	24.0	-0.5	23.5	0.22
	1908.75	24.3	-0.5	23.8	0.24



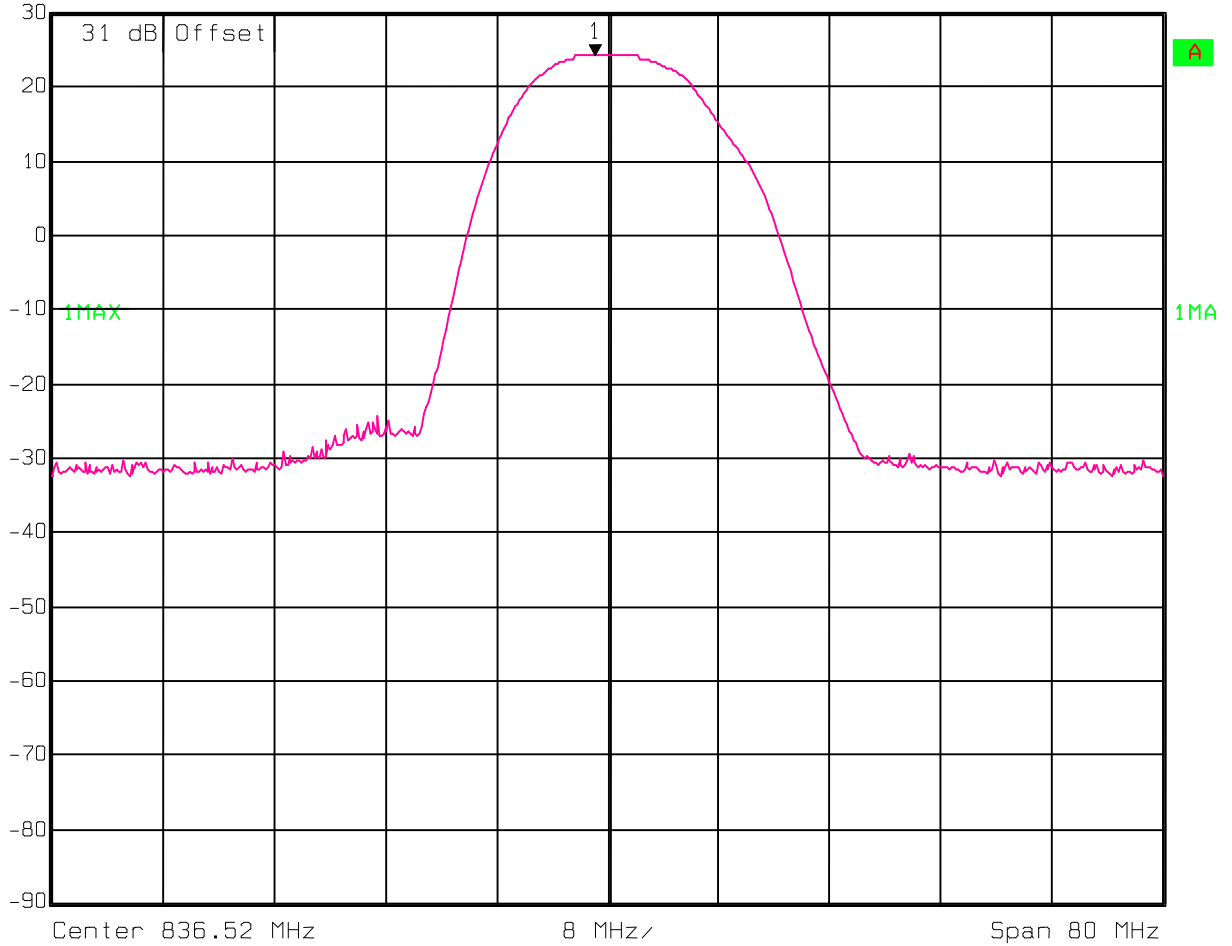
Part 22 Low Frequency Output Power



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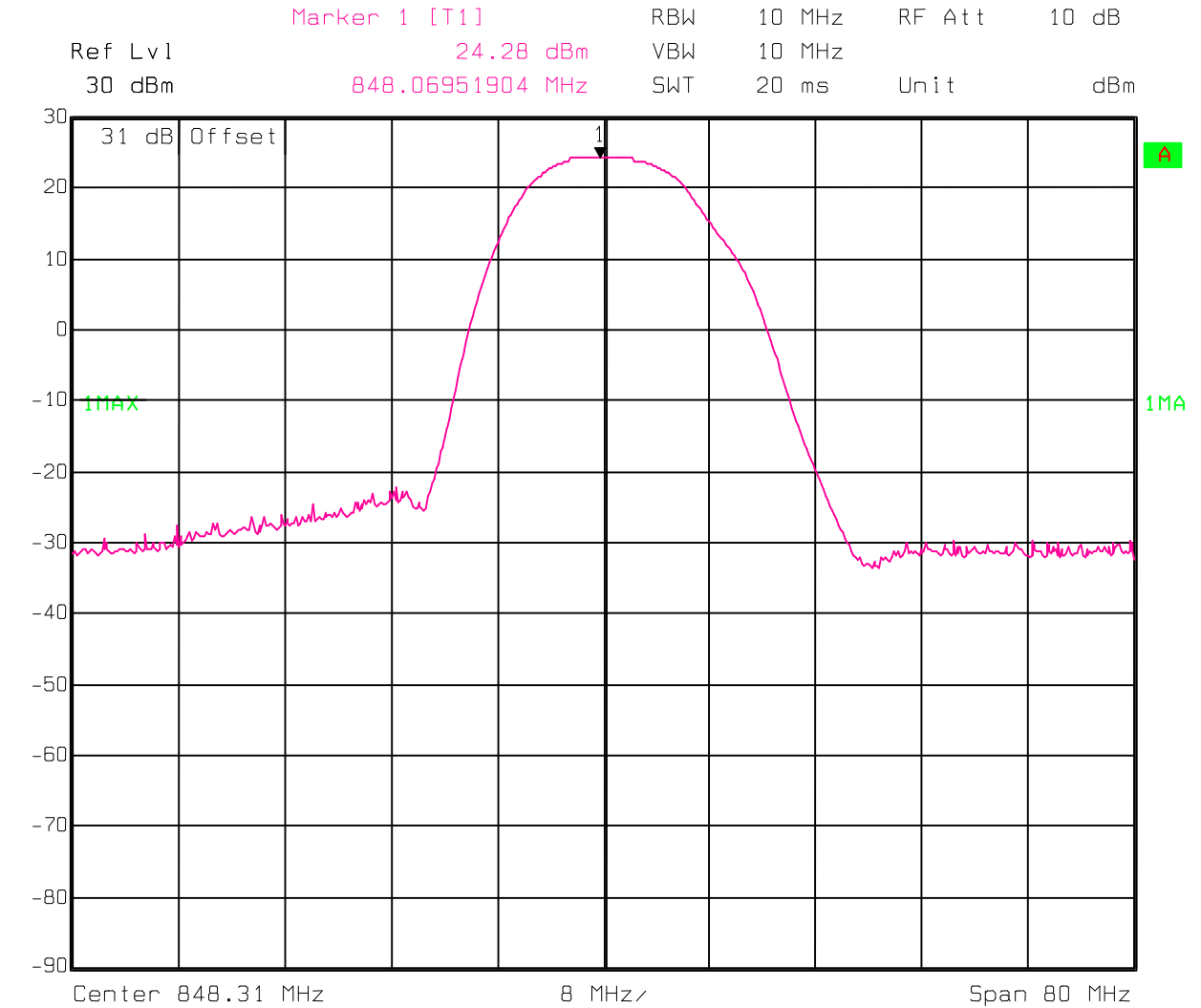
Mid Frequency Output Power

Ref Lvl	30 dBm	Marker 1 [T1]	24.03 dBm	RBW	10 MHz	RF Att	10 dB
			835.63823647 MHz	VBW	10 MHz	Unit	dBm
				SWT	20 ms		



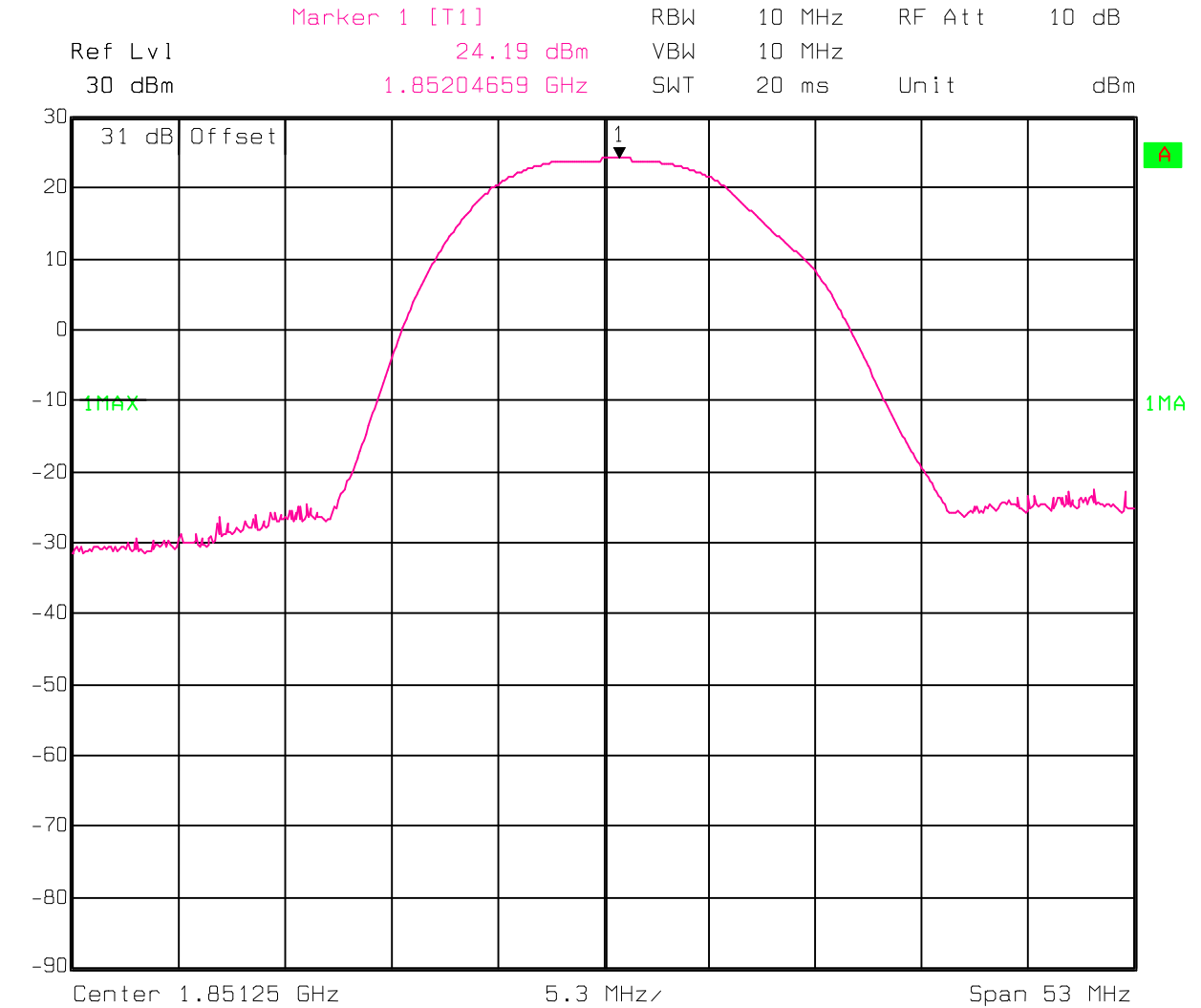
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High Frequency Output Power



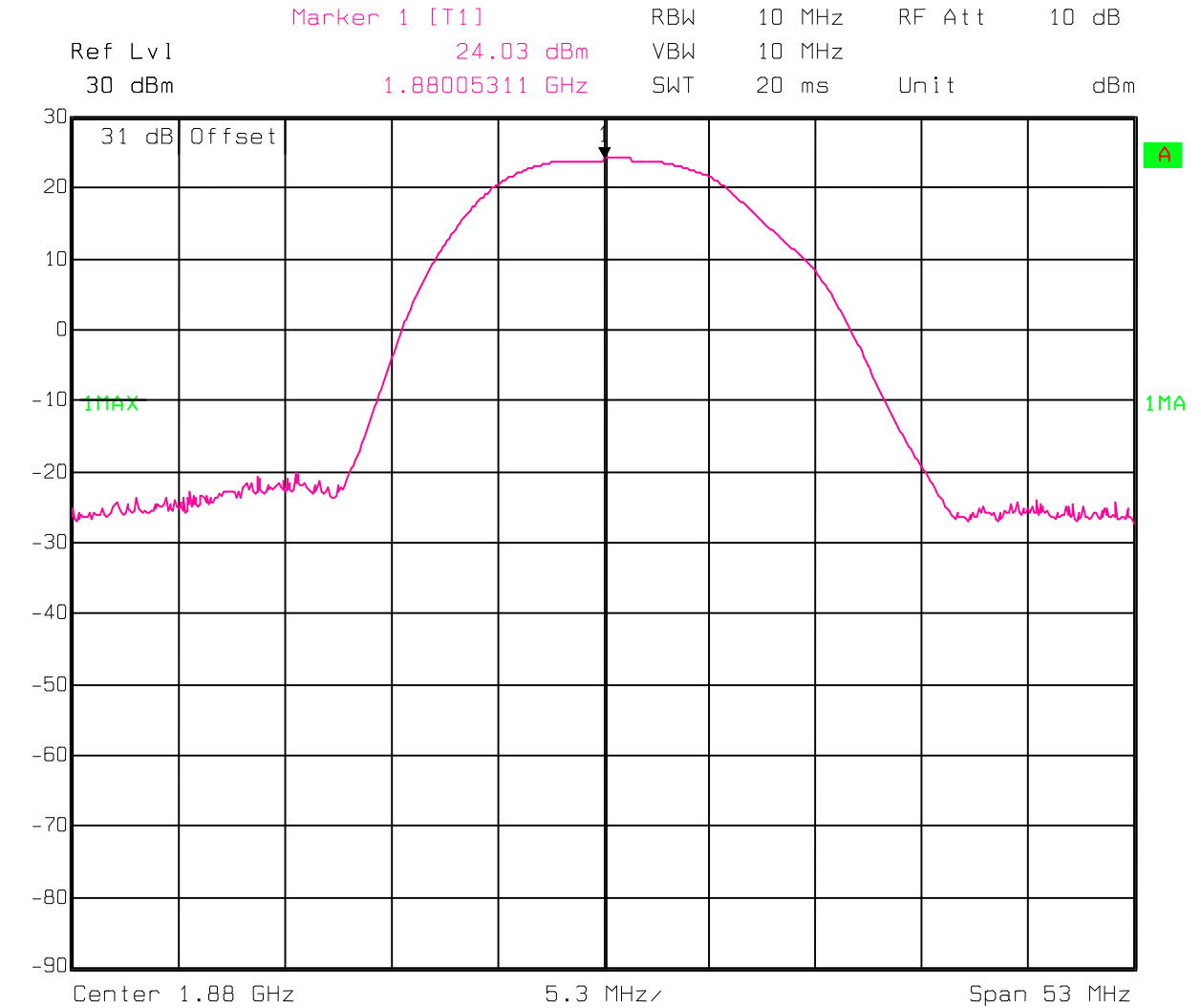
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Part 24 Low Frequency Output Power



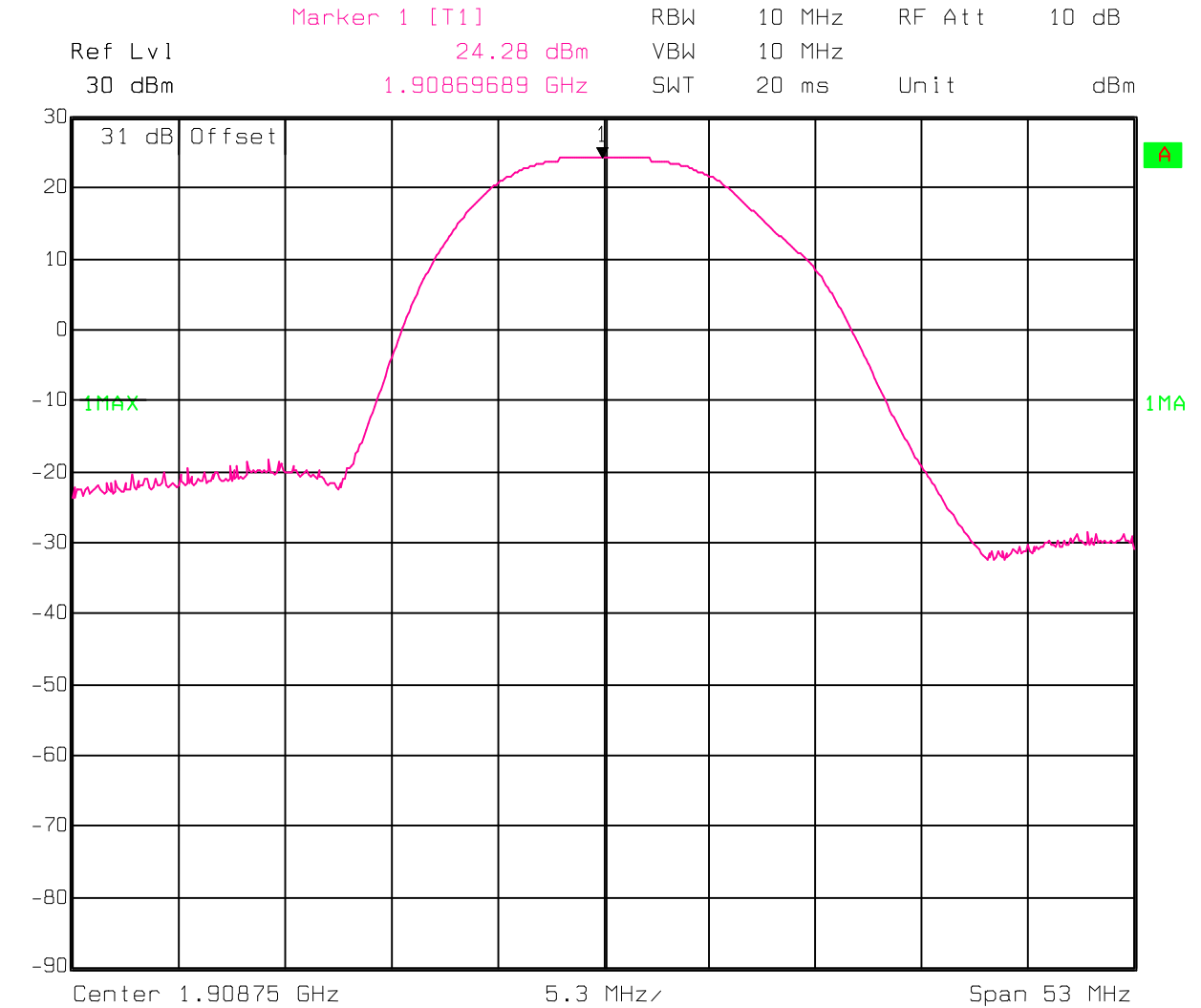
Date: 05.DEC.2005 14:59:18

Mid Frequency Output Power



Date: 05.DEC.2005 15:01:26

High Frequency Output Power



Date: 05.DEC.2005 15:05:36

**Conducted Spurious Emissions**

22.917 a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.
--

**Test Conditions:**

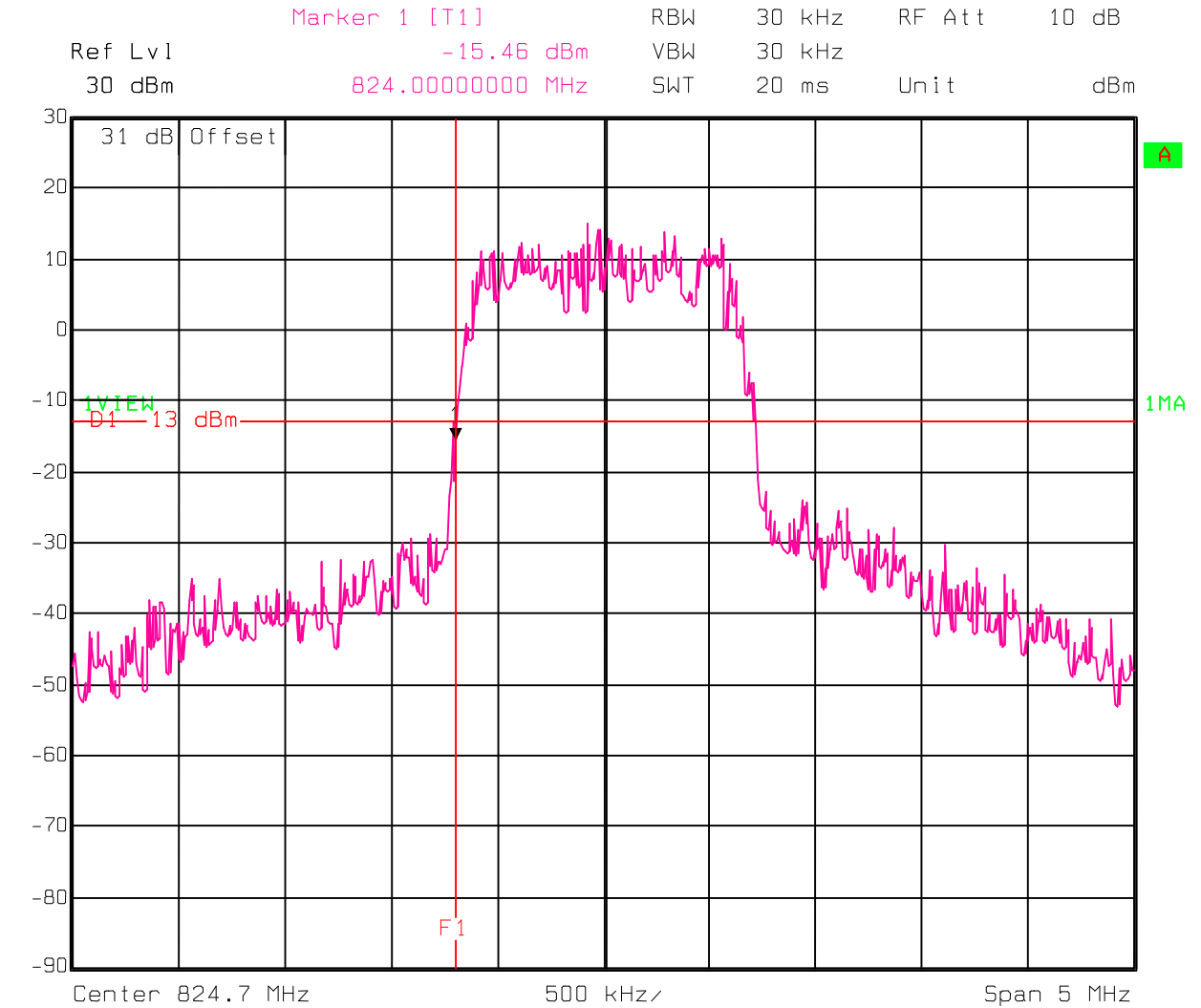
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<b>Date:</b>	11-8-05	<b>Humidity:</b>	31 %
<b>Modification State:</b>	CW	<b>Tester:</b>	A. Laudani
		<b>Laboratory:</b>	Nemko

**Test Results:**

See Attached Plots.

**Additional Observations:**

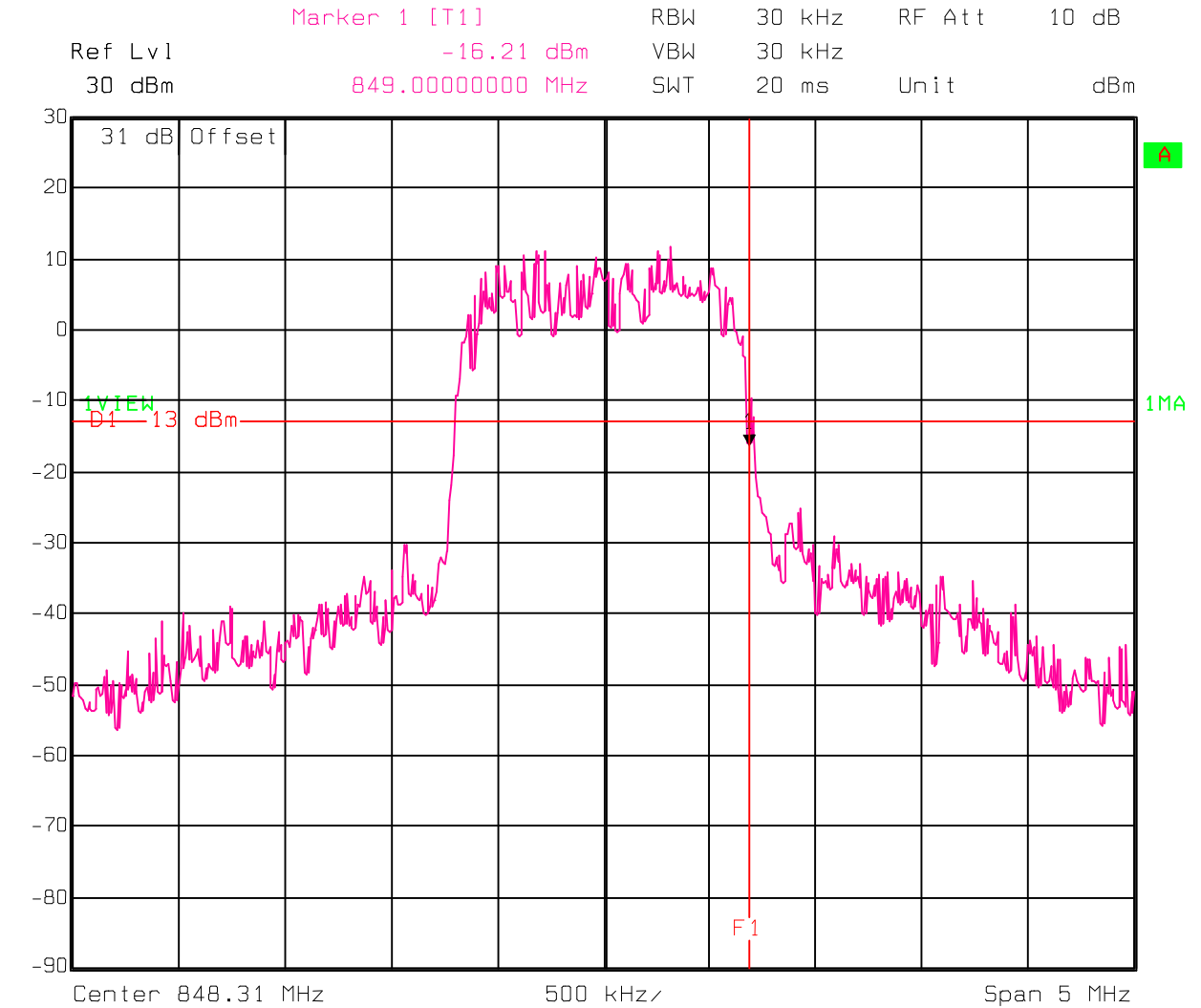
Part 22, Lower Band Edge.



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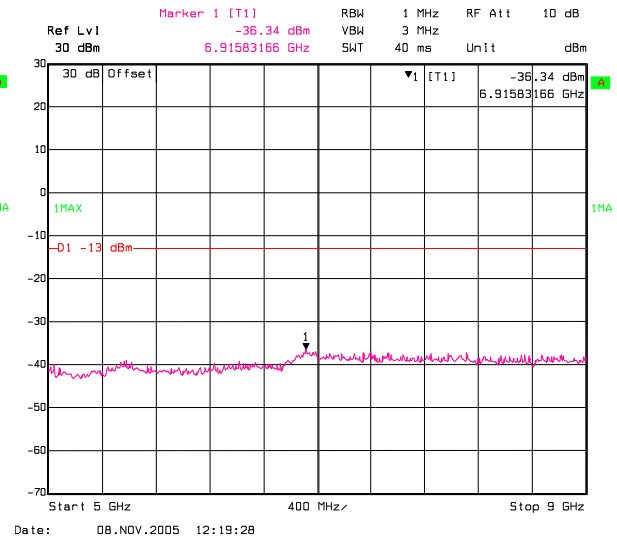
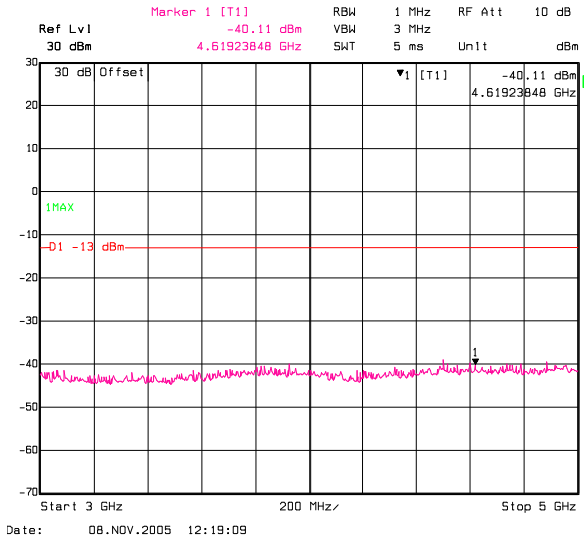
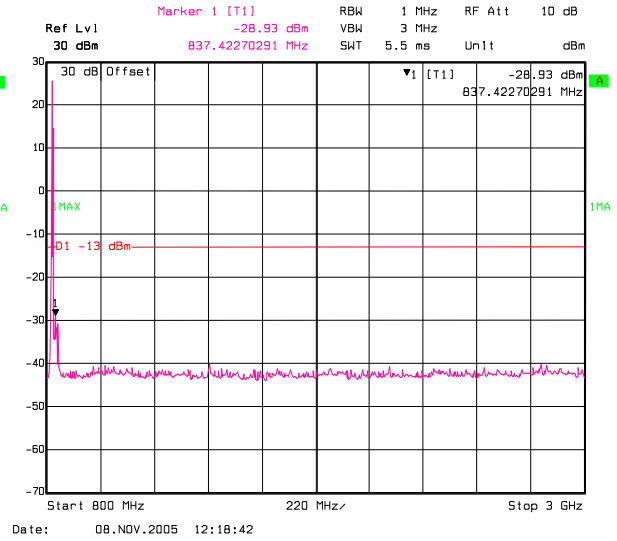
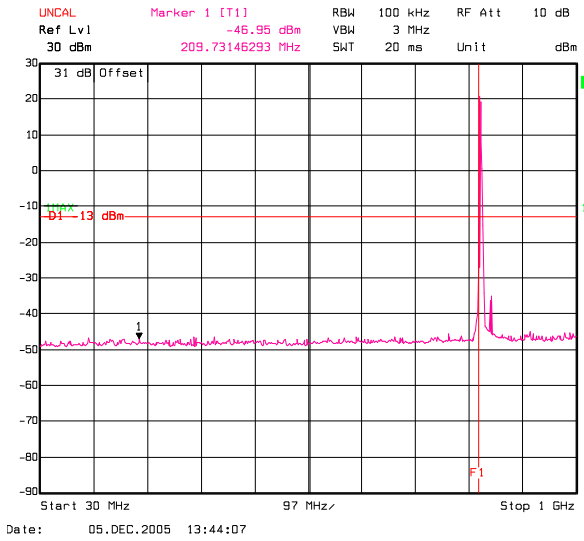


Part 22, Upper Band Edge

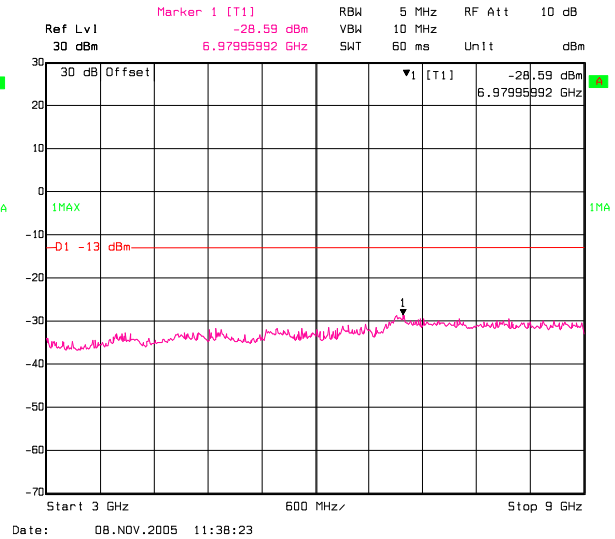
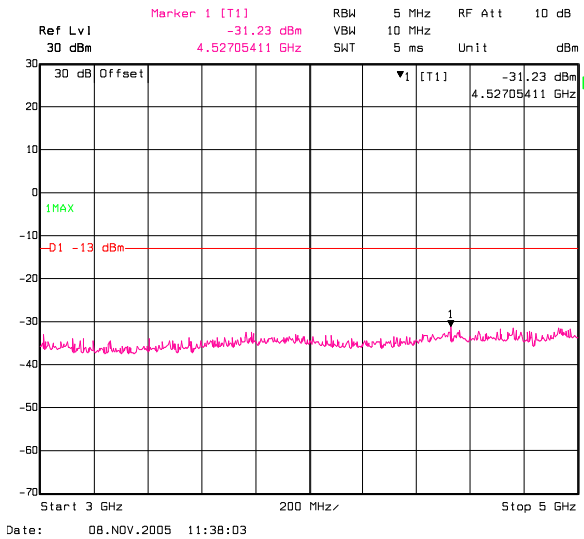
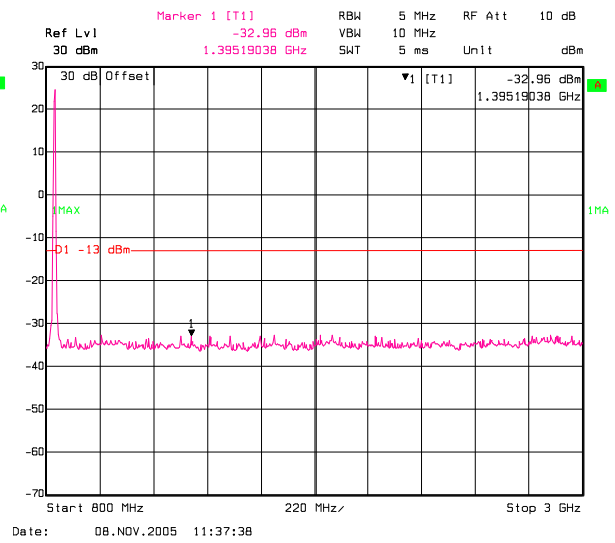
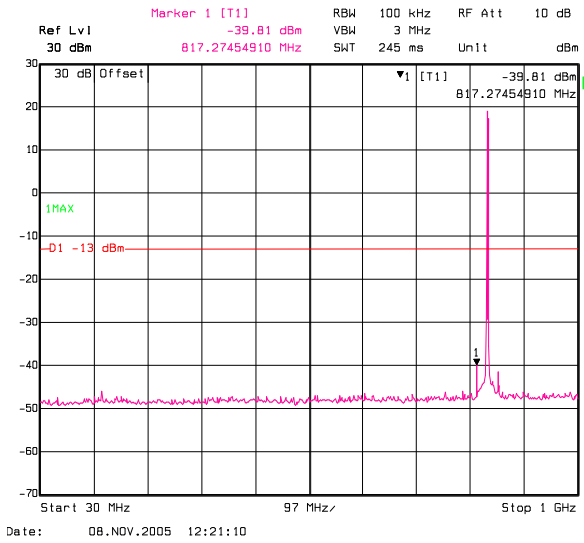


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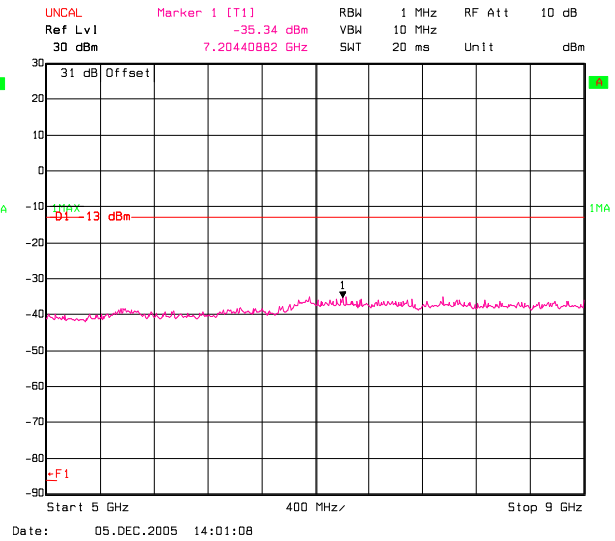
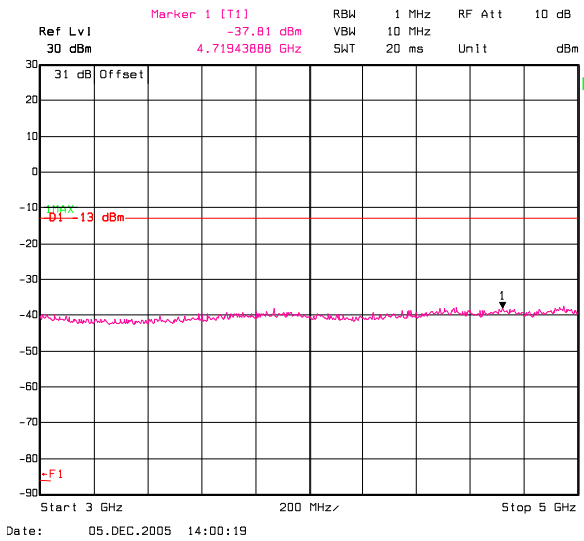
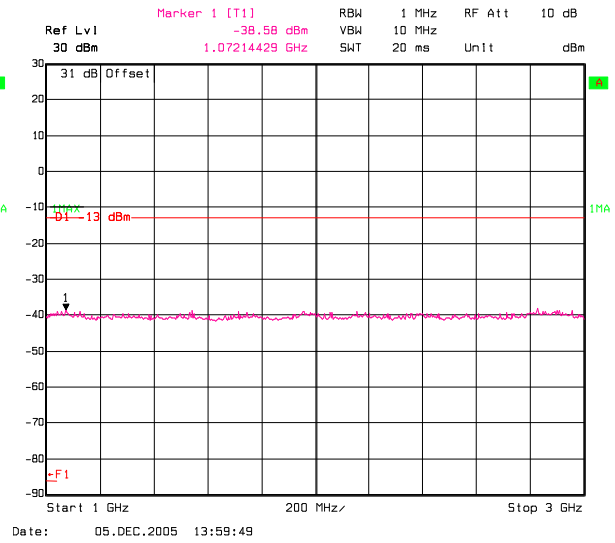
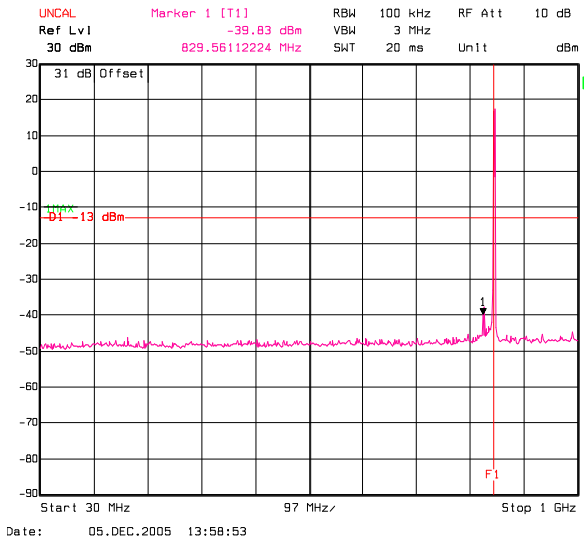
Low frequency Part 22



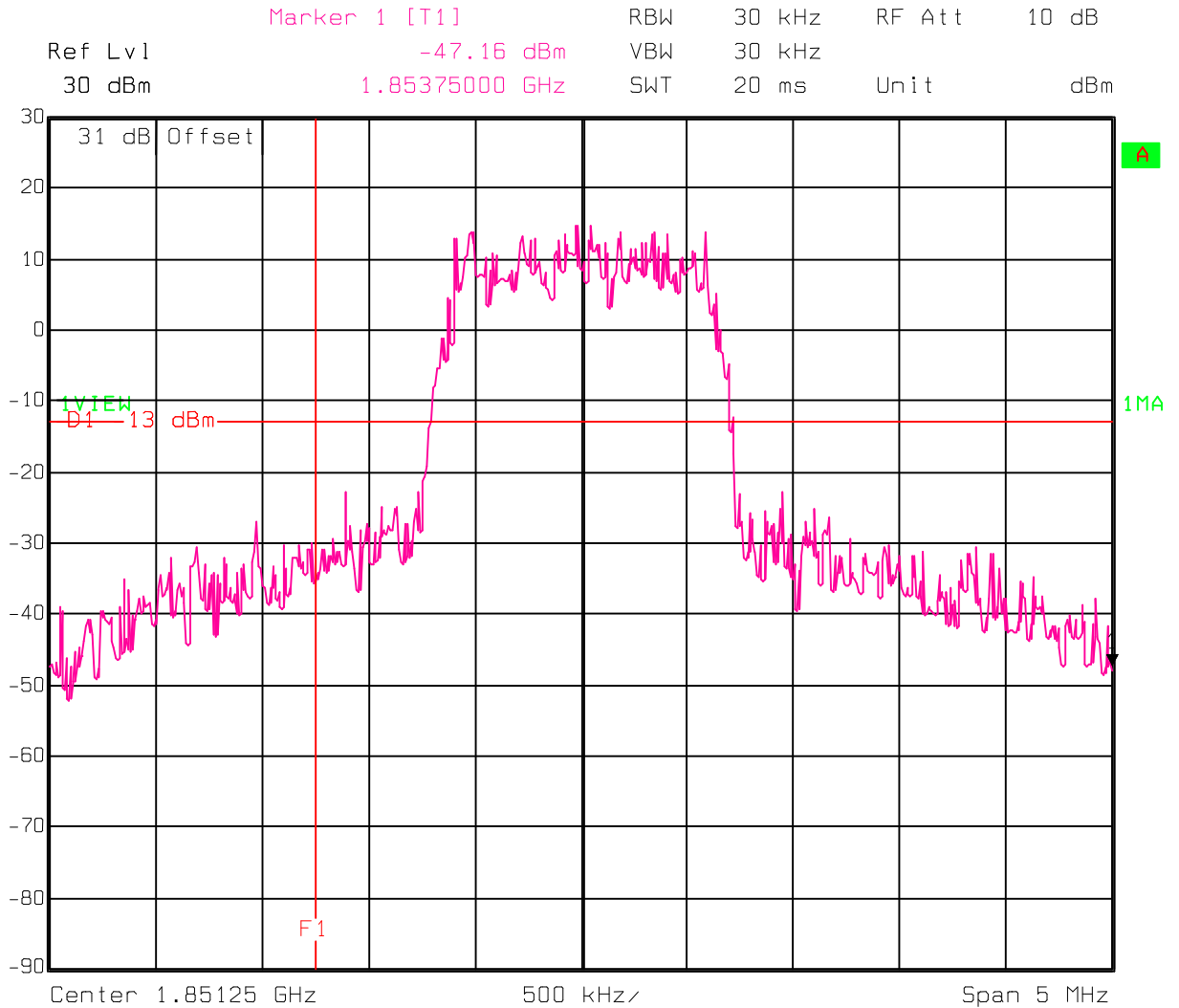
Mid frequency Part 22



High frequency Part 22

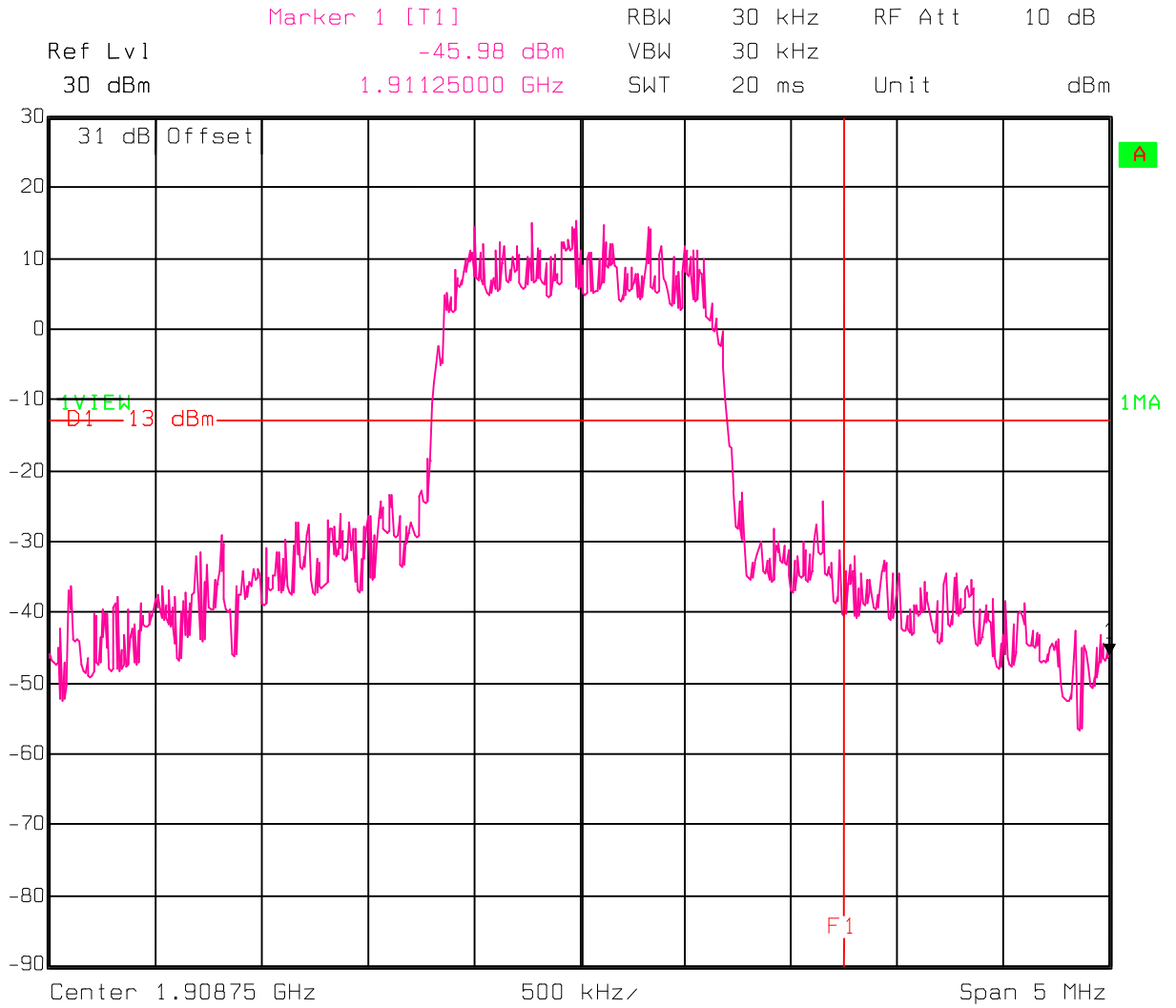


Part 24, Lower Band Edge



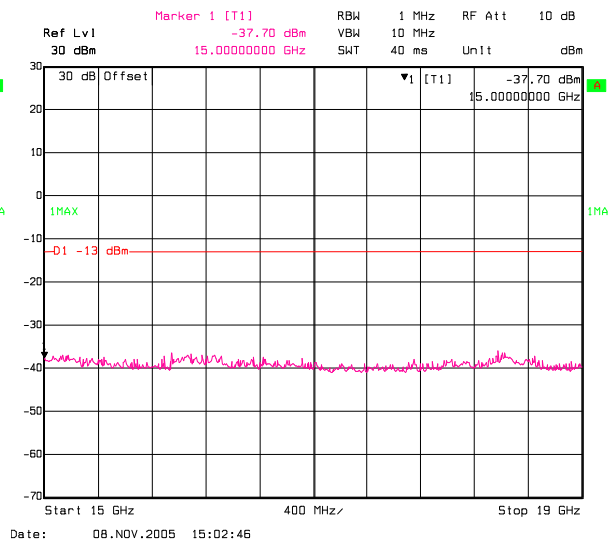
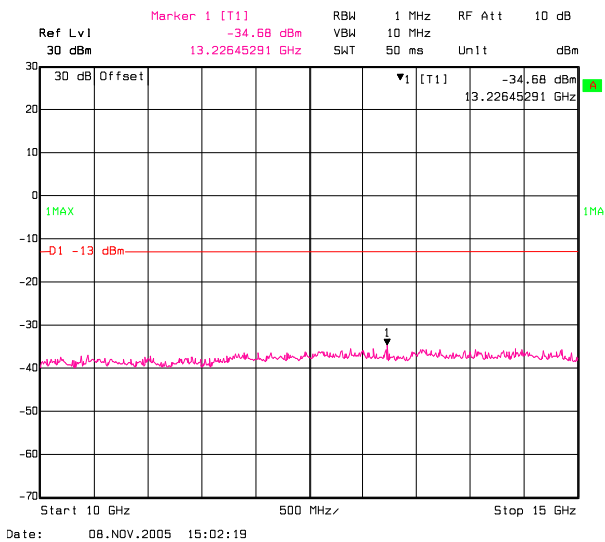
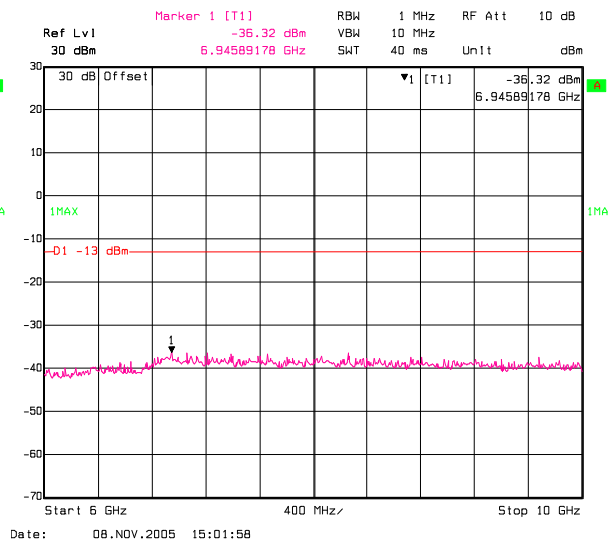
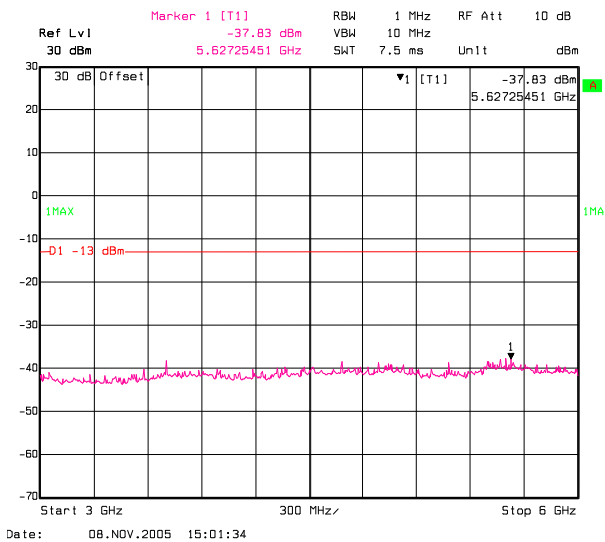
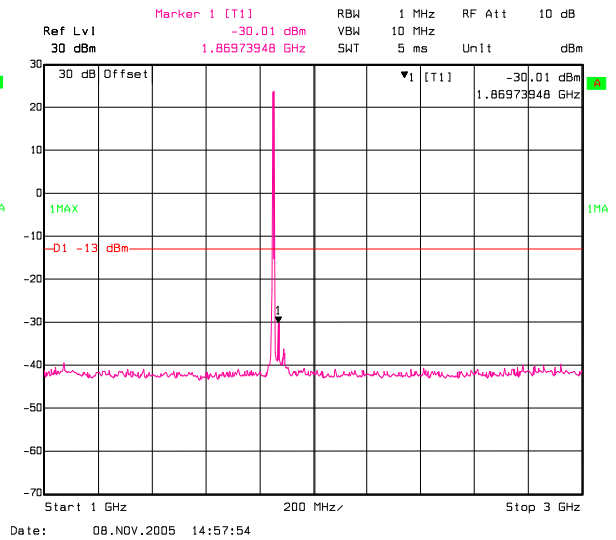
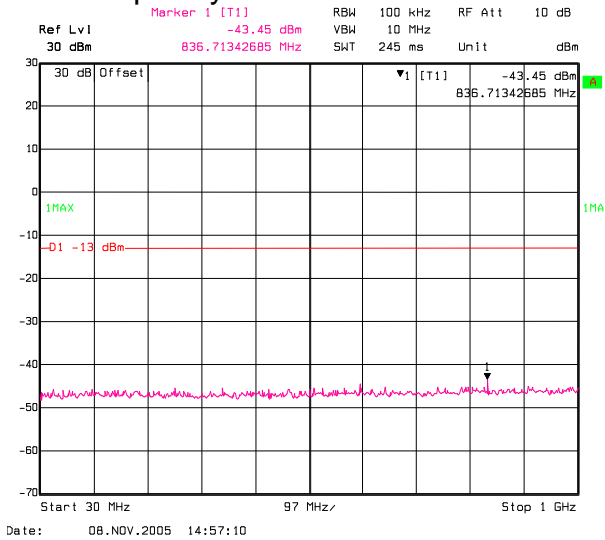
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Part 24, Upper Band Edge

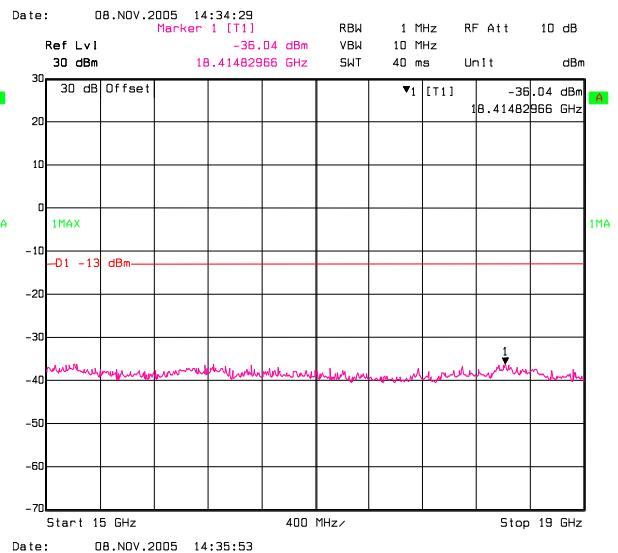
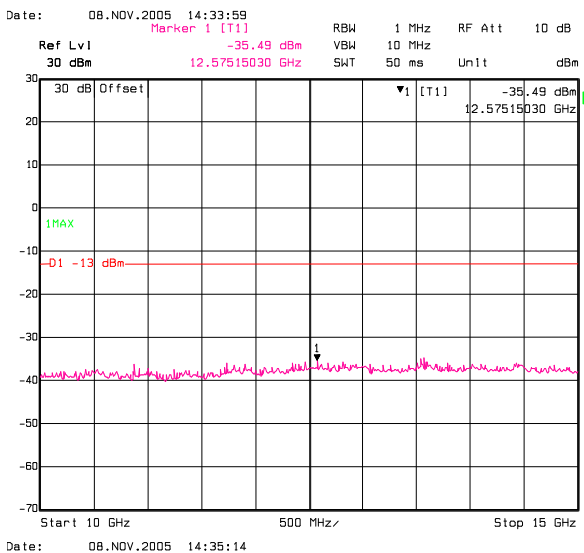
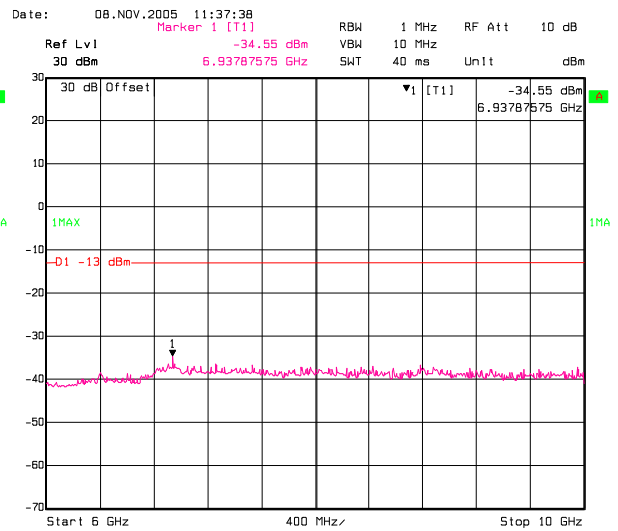
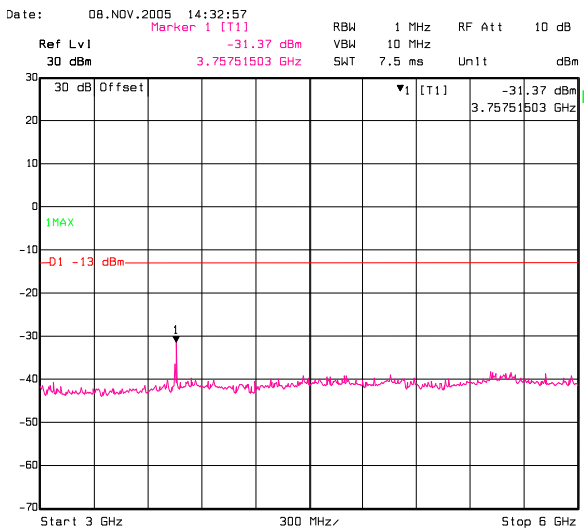
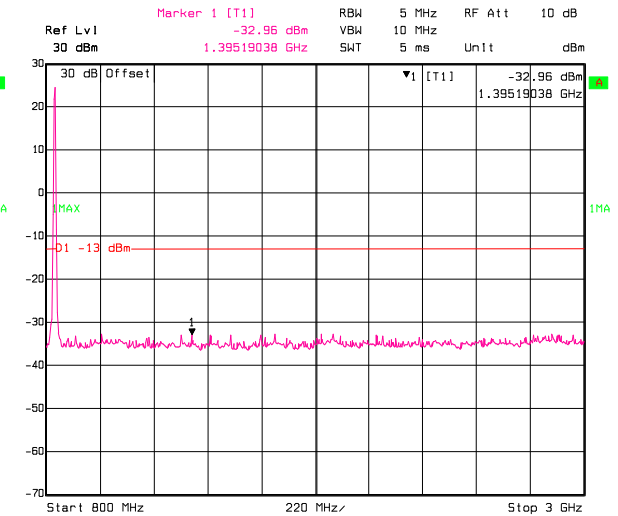
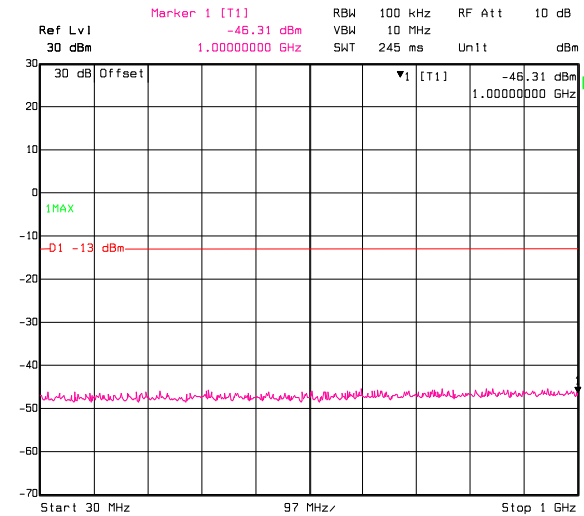


Date: 05.DEC.2005 15:13:24

Low Frequency Part 24

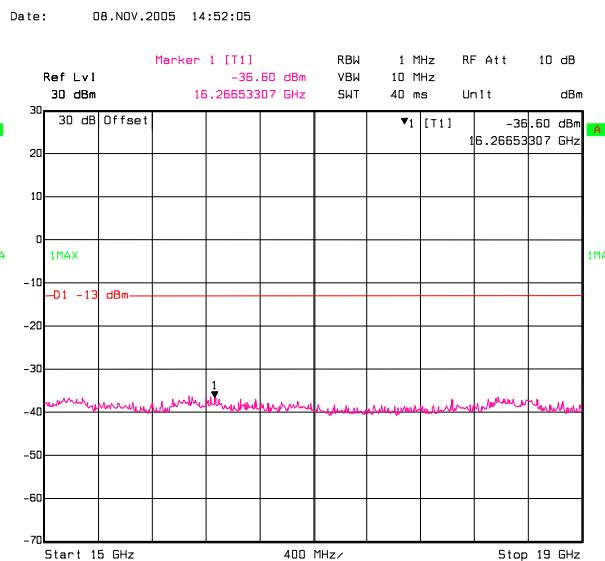
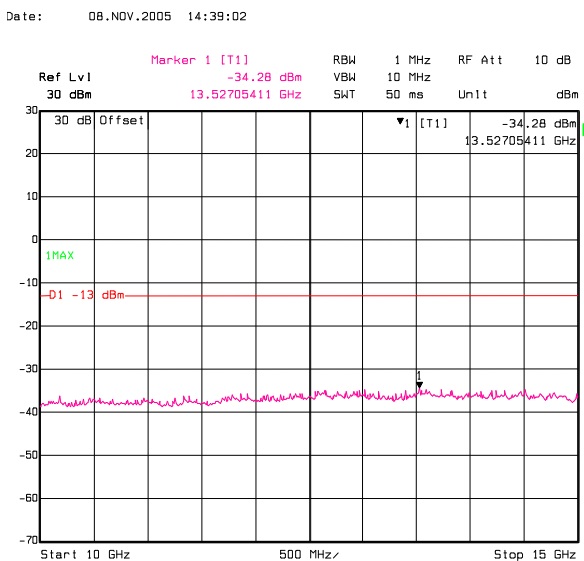
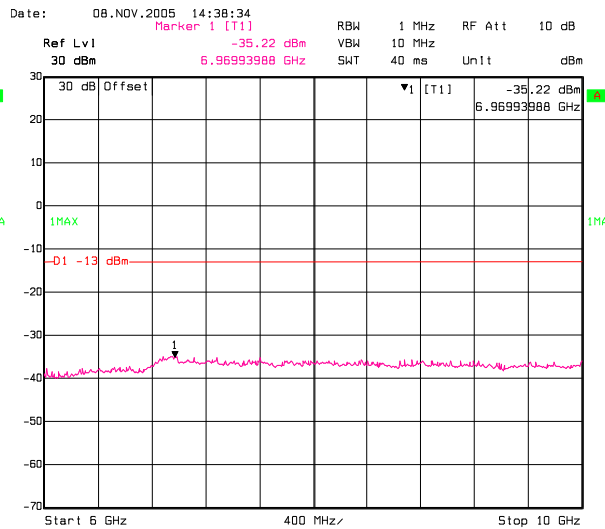
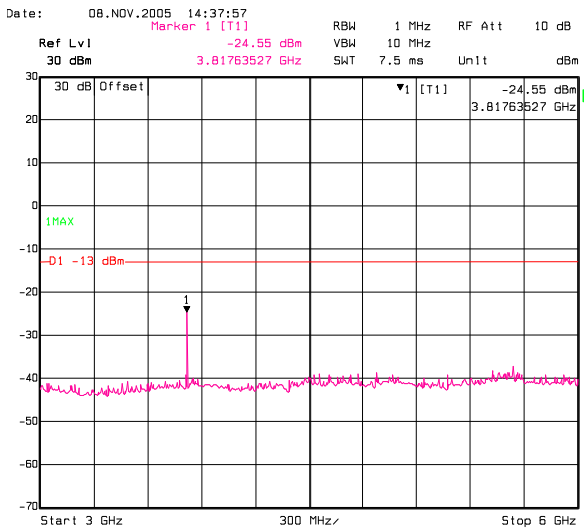
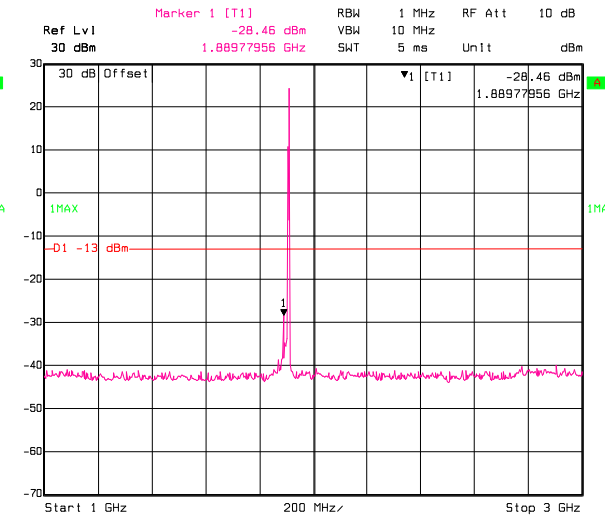
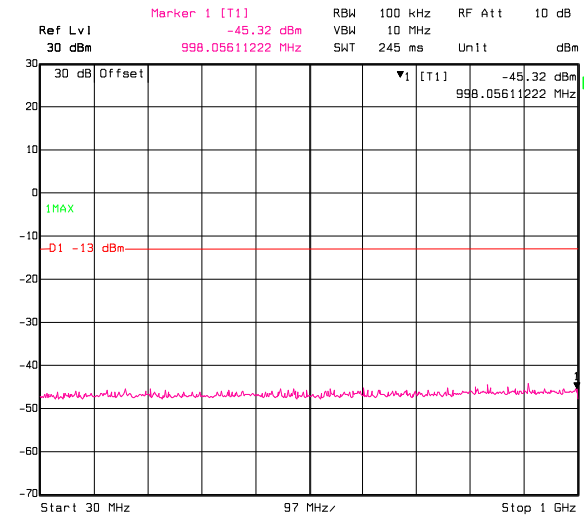


Mid Frequency Part 24





High Frequency Part 24



**Radiated Spurious Emissions**

22.917; 24.238 Emission limits.

a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.

**Test Results:**

See Attached Table for Results

**Additional Observations:**

The Spectrum was searched from 30MHz to the 10<sup>th</sup> Harmonic.

The EUT was measured on three orthogonal axis, worst case presented.

All measurements were performed using a Peak Detector with a 1MHz RBW above 1GHz at a distance of 3 meters.

Substitution was performed on emissions at a level greater than 20 dB below the limit.







**Occupied Bandwidth**

Using an RBW of 300Hz or 1% of the emission bandwidth, The spectral shape of the output should look similar to the input for all modulations.

**Sec. 24.238 Emission limits**

(b) Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

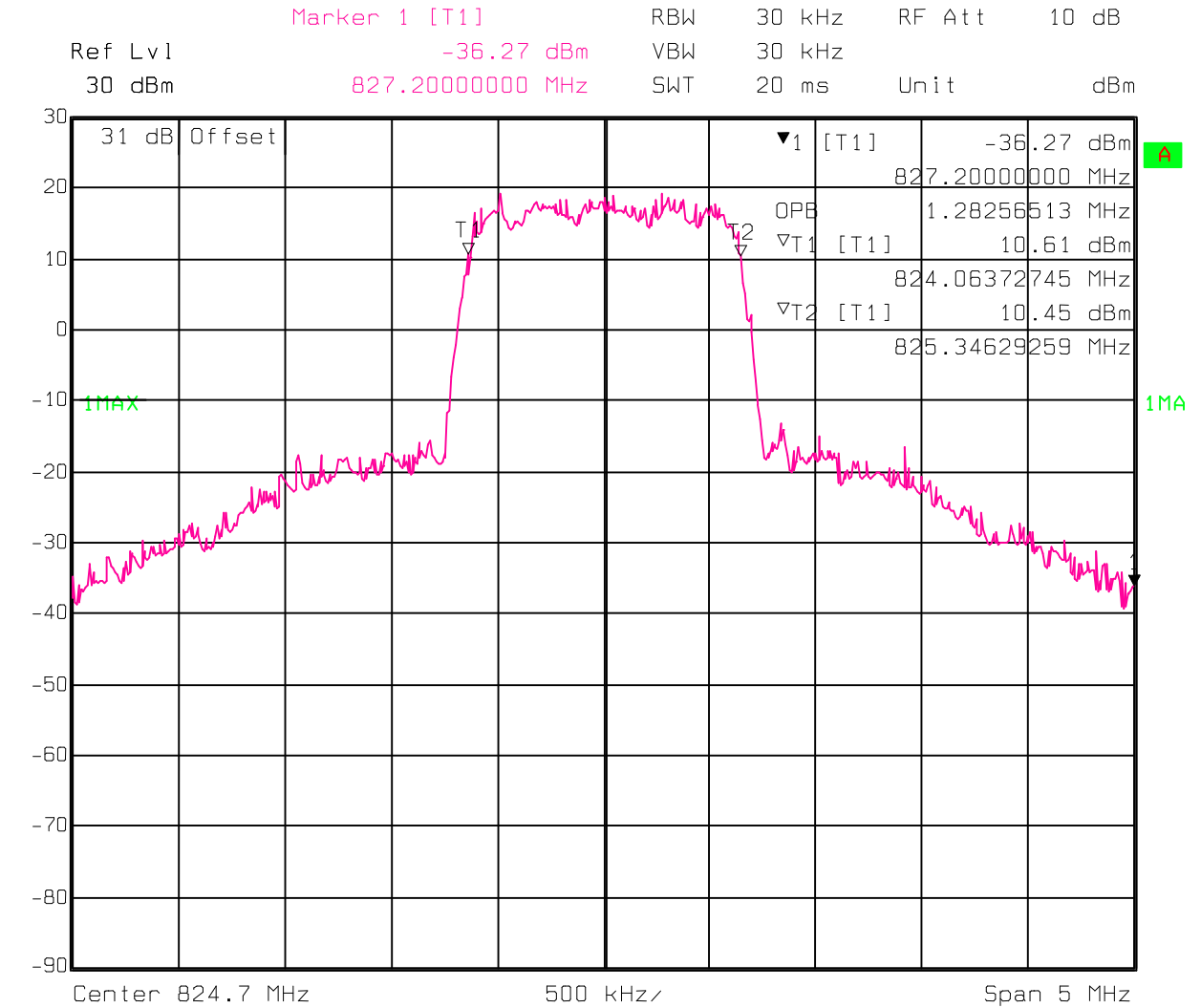
**Test Conditions:**

<b>Sample Number:</b>	001	<b>Temperature:</b>	22 °C
<b>Date:</b>	12-05-05	<b>Humidity:</b>	29 %
<b>Modification State:</b>	CW	<b>Tester:</b>	A. Laudani
		<b>Laboratory:</b>	Nemko AL

**Test Results:**

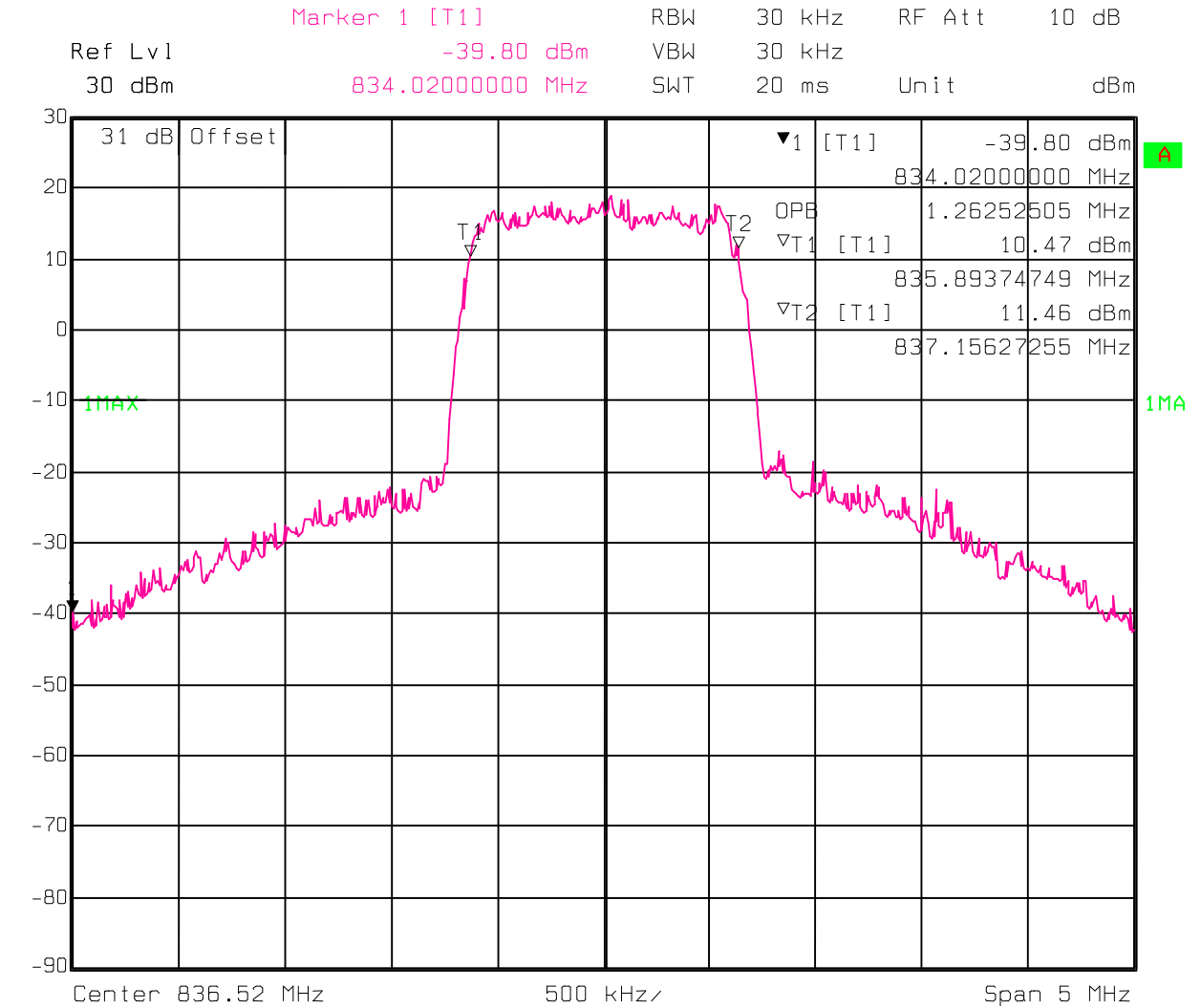
See Attached Plots.

**Part 22 Low Frequency Bandwidth**



Date: 05.DEC.2005 15:27:10

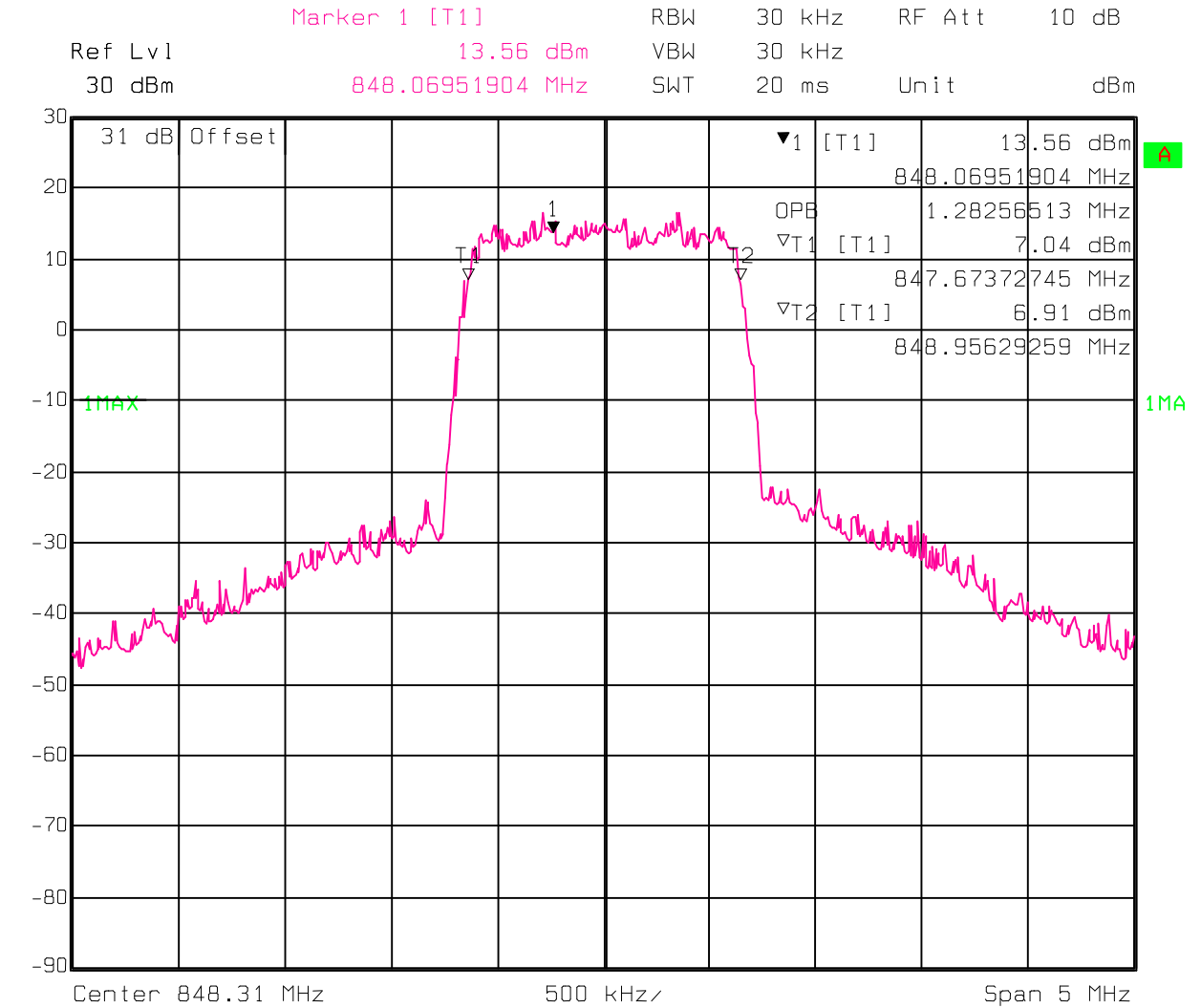
**Part 22 Mid Frequency Bandwidth**



Date: 05.DEC.2005 15:27:54

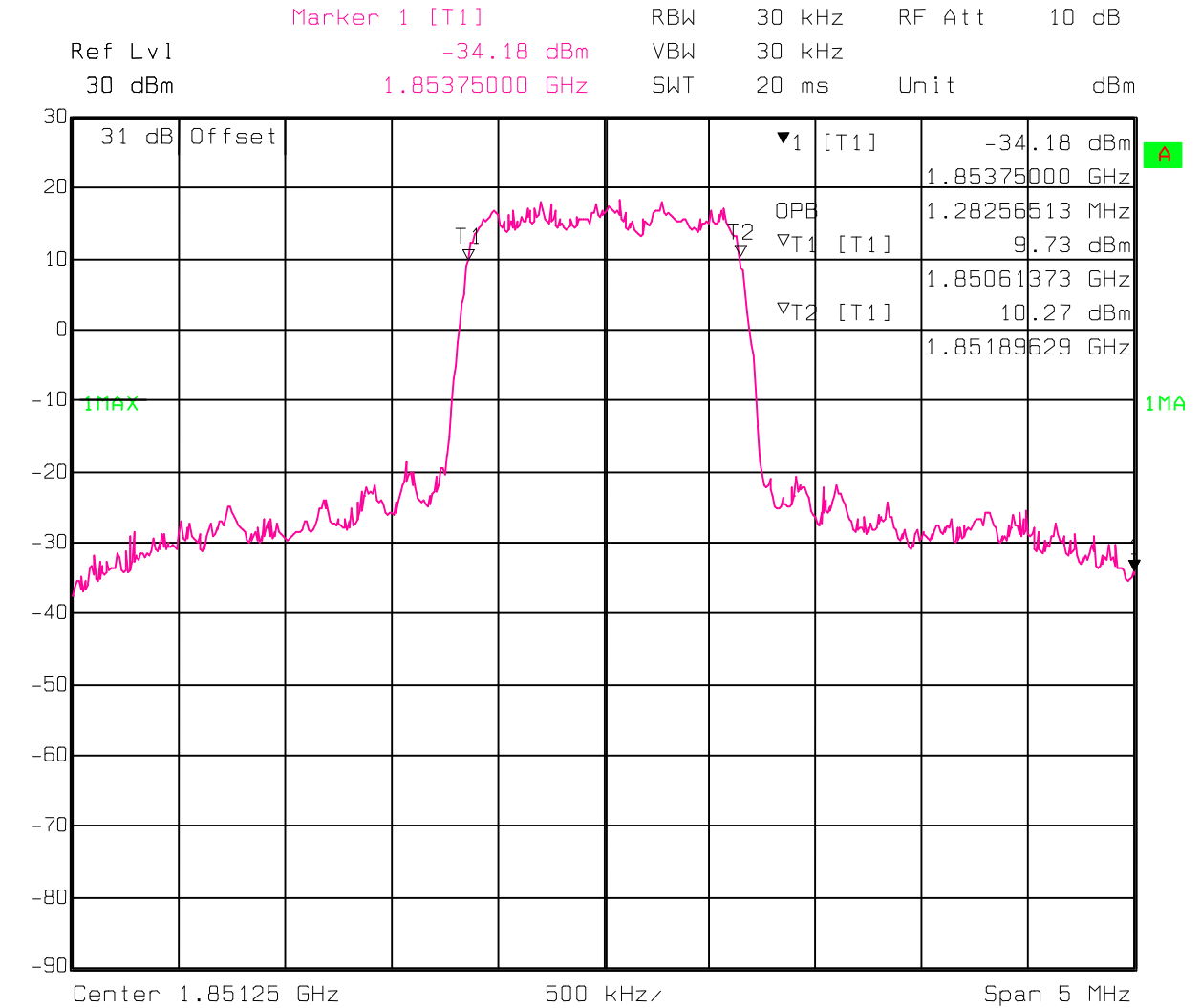


**Part 22 High Frequency Bandwidth**



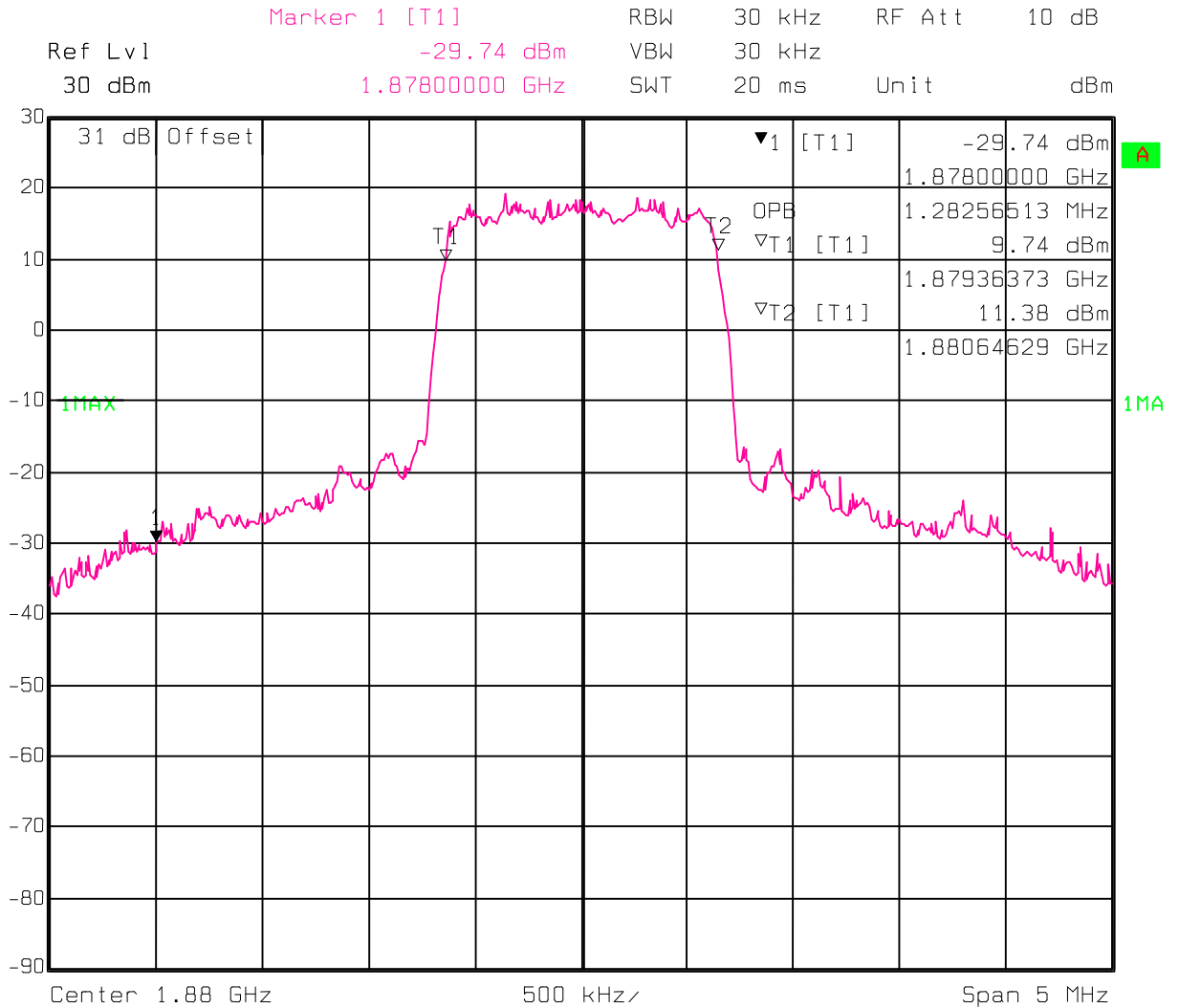
Date: 05.DEC.2005 15:32:34

Part 24 Low Frequency Bandwidth



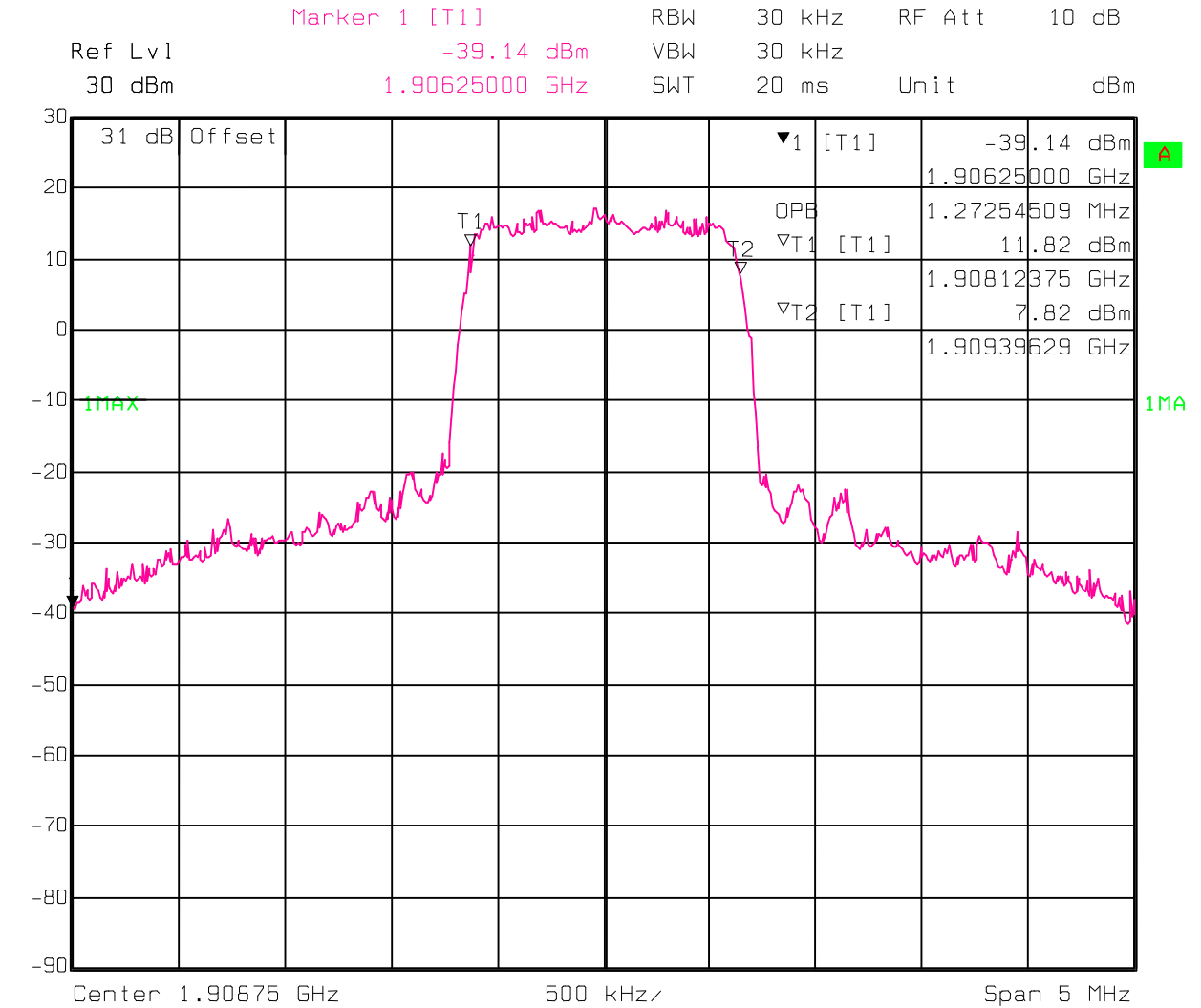
Date: 05.DEC.2005 15:23:19

Part 24 Mid Frequency Bandwidth



Date: 05.DEC.2005 15:24:47

**Part 24 High Frequency Bandwidth**

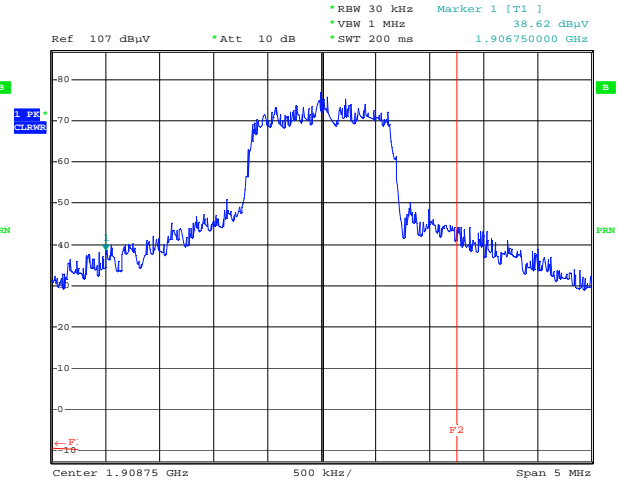
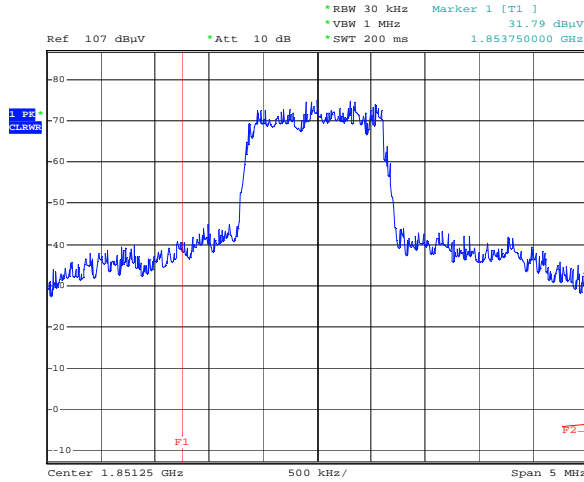


Date: 05.DEC.2005 15:25:54

### Appendix B: PCS Frequency Stability

Bandedge plots from -30 °C to + 50 °C step 10°:

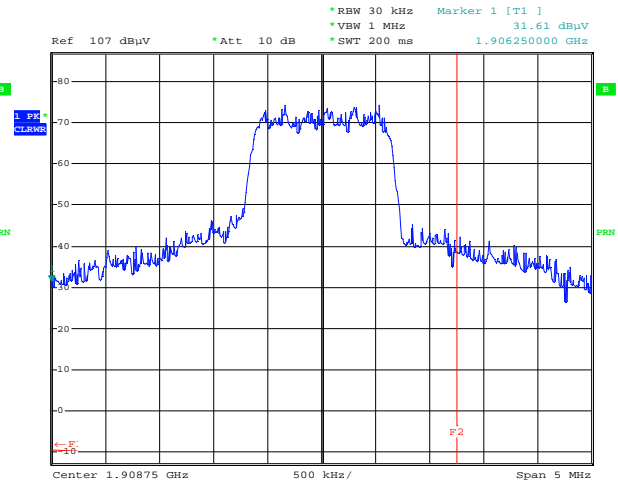
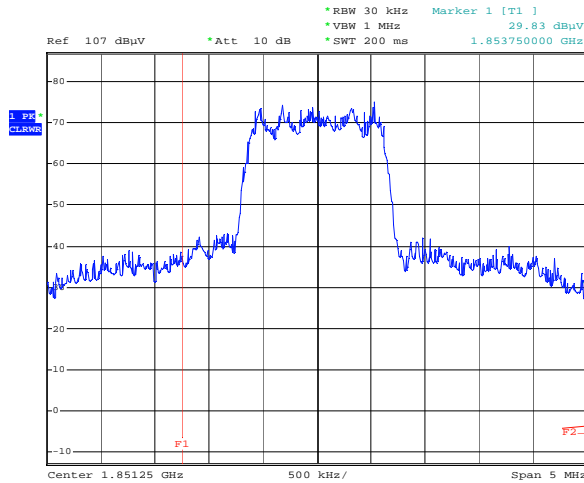
-30°C



Date: 23.FEB.2006 14:22:08

Date: 23.FEB.2006 14:21:31

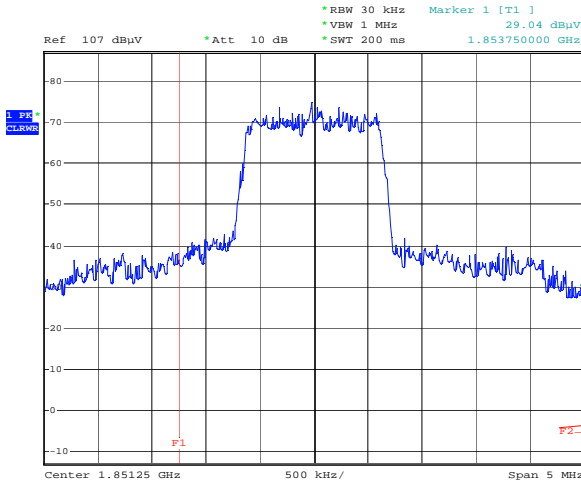
-20°C



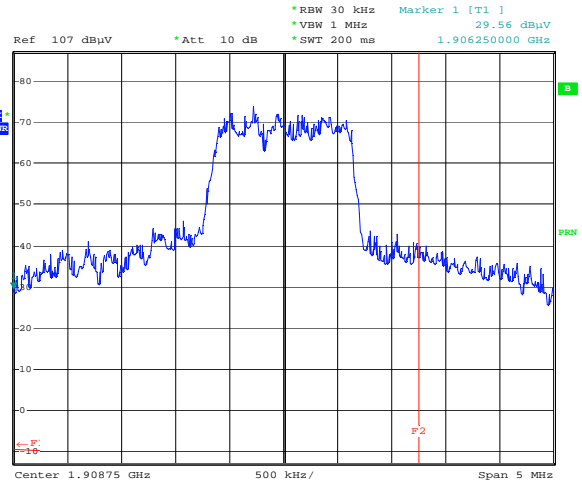
Date: 23.FEB.2006 14:34:12

Date: 23.FEB.2006 14:34:41

-10°C

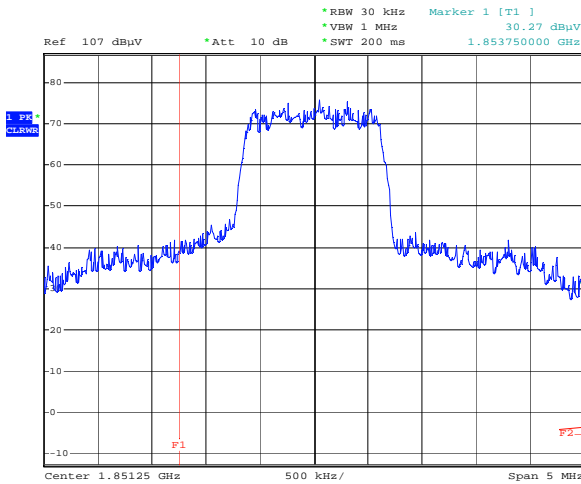


Date: 23.FEB.2006 14:49:55

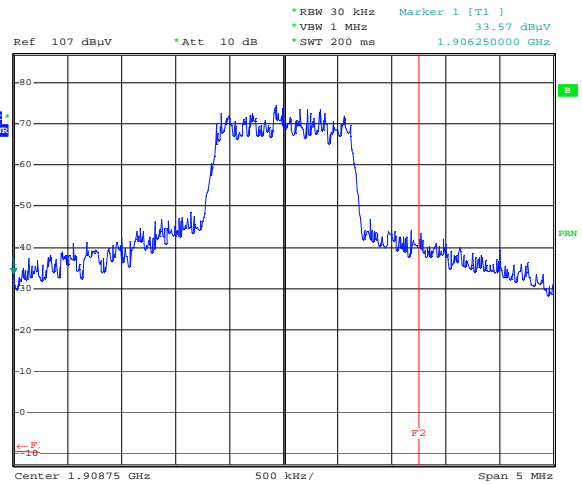


Date: 23.FEB.2006 14:49:28

0°C

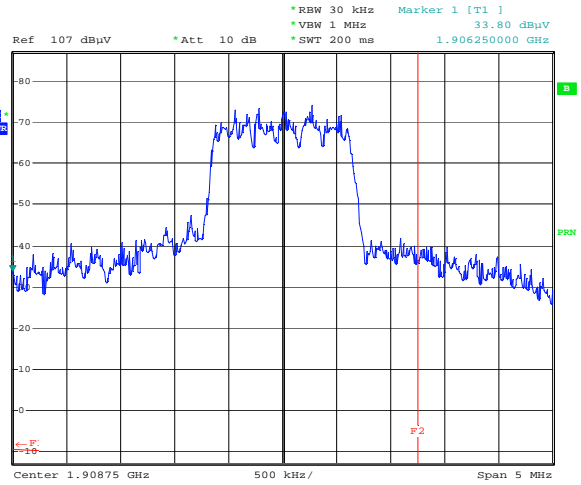
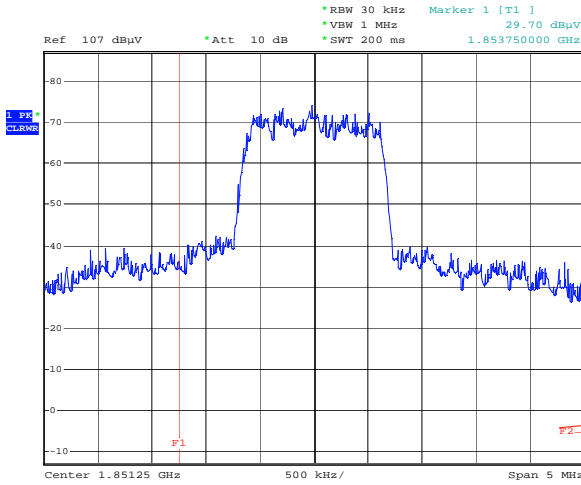


Date: 23.FEB.2006 15:00:05



Date: 23.FEB.2006 15:00:39

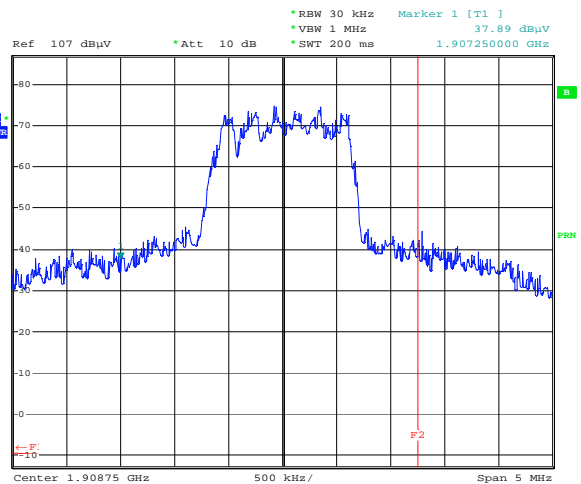
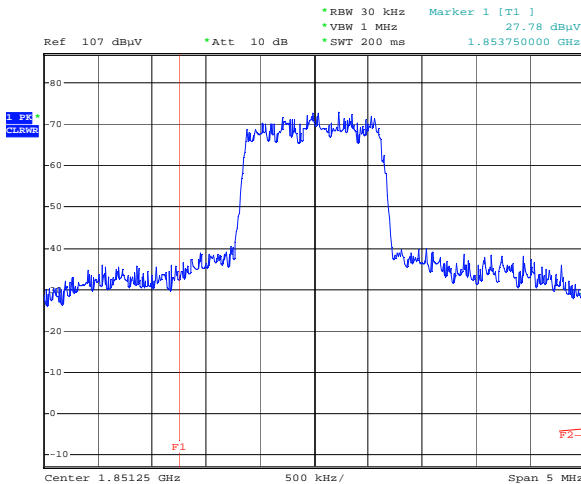
10°C



Date: 23.FEB.2006 15:42:00

Date: 23.FEB.2006 15:41:26

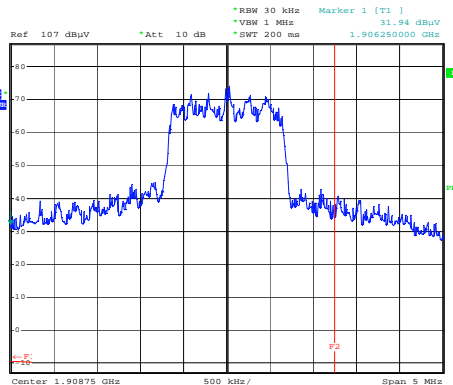
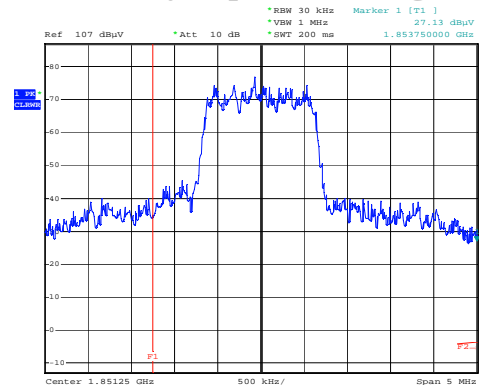
20°C Nominal Voltage



Date: 23.FEB.2006 13:08:54

Date: 23.FEB.2006 13:08:16

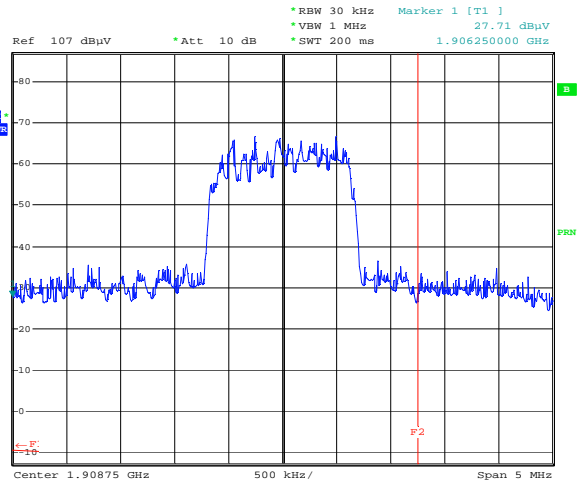
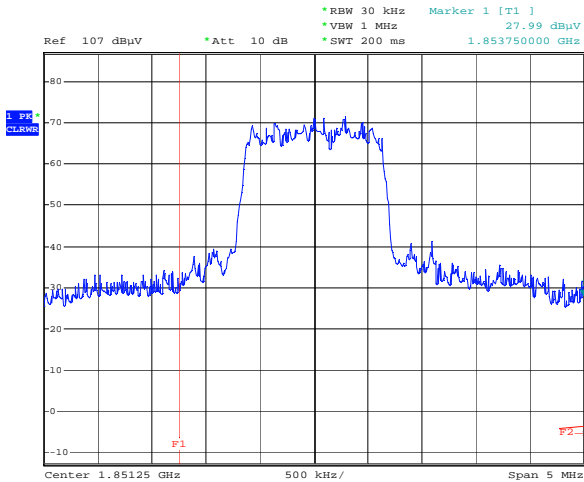
20°C Battery Expended Voltage (3.66Vdc)



Date: 23.FEB.2006 15:55:39

Date: 23.FEB.2006 15:56:13

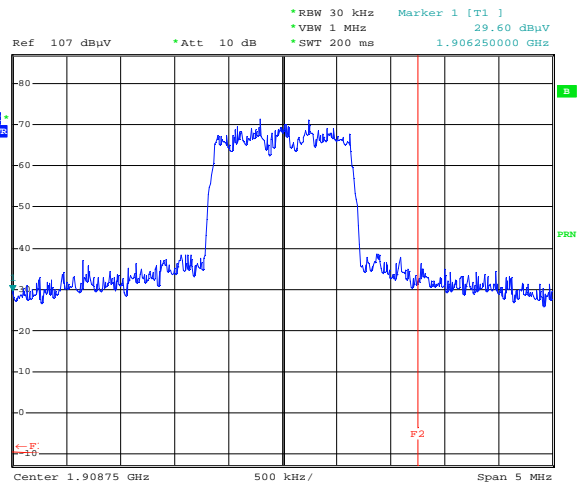
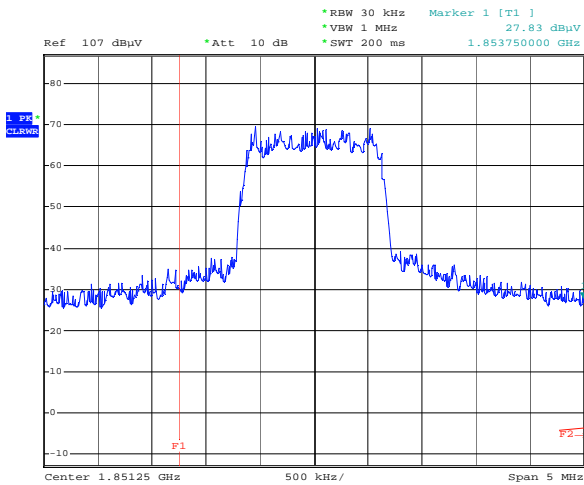
30°C



Date: 23.FEB.2006 13:16:13

Date: 23.FEB.2006 13:17:48

40°C

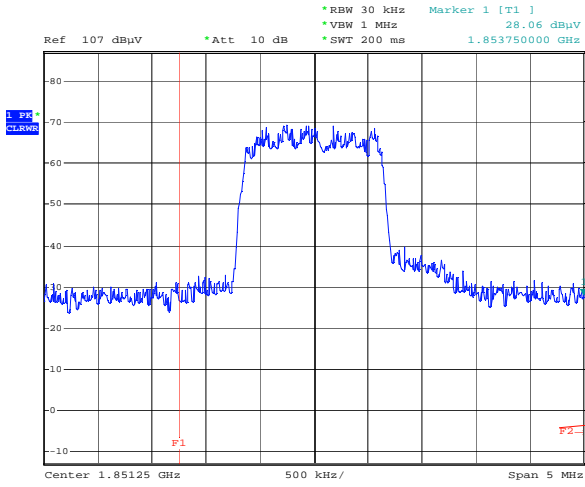


Date: 23.FEB.2006 13:29:56

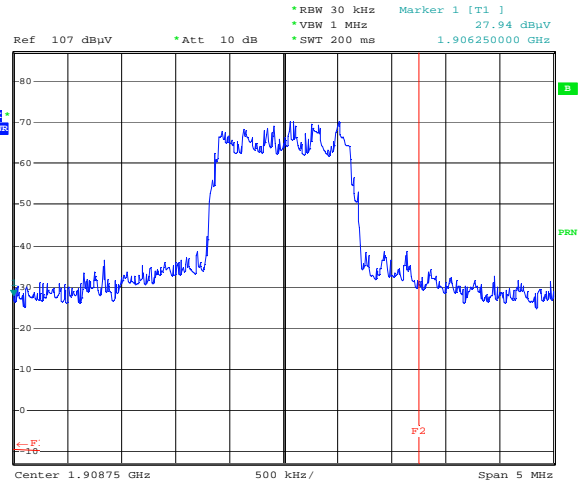
Date: 23.FEB.2006 13:29:24



50°C



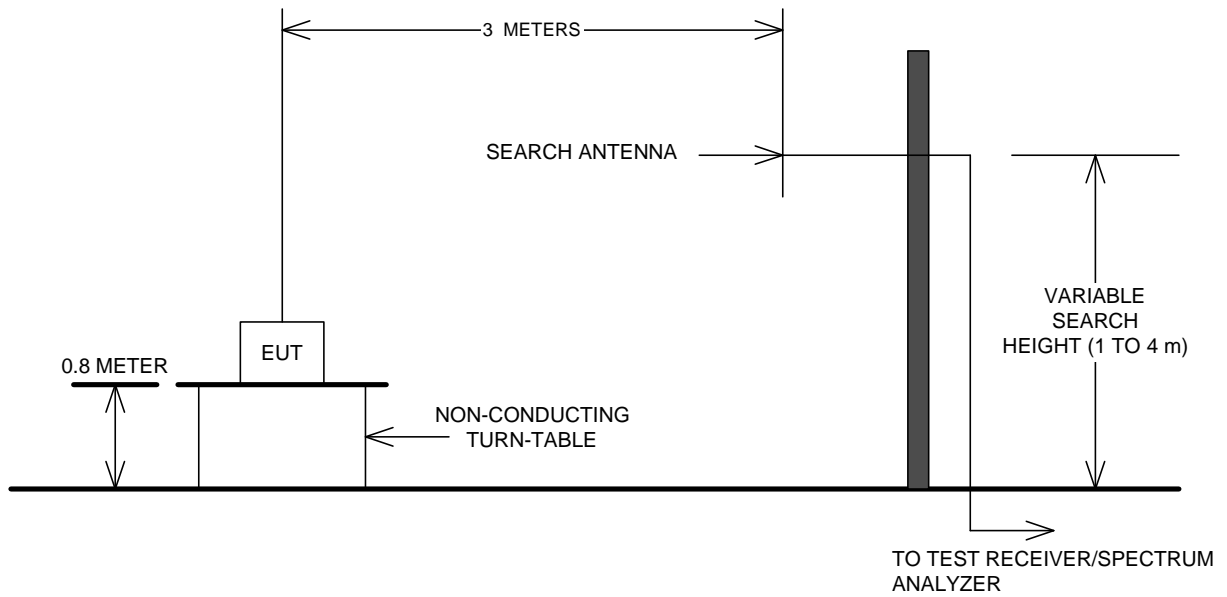
Date: 23.FEB.2006 13:47:06



Date: 23.FEB.2006 13:47:40

### Appendix C : Block Diagram of Test Setups

#### Test Site For Radiated Emissions



#### Conducted Spurious Emissions, Output power, Occupied Bandwidth, Frequency Stability (EUT in environmental chamber)

