



# FCC Test Report

## FCC Part 22,24 / RSS 132,133

FOR:

Quad-Band GPRS/EDGE/UMTS module

MODEL #: XU870

Novatel Wireless  
9645 Scranton Rd., Suite 205  
San Diego, CA 92121  
USA

FCC ID: NBZNRM-XU870  
IC-ID: 3229A-XU870

TEST REPORT #: EMC\_NOVAT\_010\_06002\_FCC22\_24  
DATE: 2006-08-21



Certificate # 2135.01



TTI-P-G 081/94-A0  
Accredited according to  
ISO/IEC 17025



Bluetooth™  
Bluetooth  
Qualification Test  
Facility  
(BQTF)



FCC listed#  
101450  
IC recognized #  
3925

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Board of Directors: Dr. Harald Ansorge, Dr. Klaus Matkey, Hans Peter May

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## **1 Assessment**

**The following is in compliance with the applicable criteria specified in FCC rules Parts 2, 22 and 24 of Title 47 of the Code of Federal Regulations and in compliance with the applicable criteria specified in Industry Canada rules RSS132 and RSS133.**

Company	Description	Model #
<b>NOVATEL WIRELESS</b>	<b>Quad-Band GPRS/EDGE/UMTS module</b>	<b>XU870</b>



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2006-08-21

Michael Grings  
Deputy Testlab Manager

The test results of this test report relate exclusively to the test item specified in Identification of the Equipment under Test. The CETECOM Inc. USA does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the CETECOM Inc USA.

## **2 Administrative Data**

### **2.1 Identification of the Testing Laboratory Issuing the EMC Test Report**

Company Name:	<b>CETECOM Inc.</b>
Department:	<b>EMC</b>
Address:	<b>411 Dixon Landing Road Milpitas, CA 95035 U.S.A.</b>
Telephone:	<b>+1 (408) 586 6200</b>
Fax:	<b>+1 (408) 586 6299</b>
Responsible Test Lab Manager:	<b>Lothar Schmidt</b>
Responsible Project Leader:	<b>Michael Grings</b>
Date of test:	<b>2006-07-10 to 2006-08-21</b>

### **2.2 Identification of the Client**

Applicant's Name:	<b>Novatel Wireless</b>
Street Address:	<b>9645 Scranton Rd., Suite 205</b>
City/Zip Code	<b>San Diego, CA 92121</b>
Country	<b>USA</b>
Contact Person:	<b>Mohammad Toossi</b>
Phone No.	<b>858-349-3641</b>
Fax:	<b>858-812-3402</b>
e-mail:	<b>mtoossi@nvtl.com</b>

### **2.3 Identification of the Manufacturer**

Manufacturer's Name:	<b>Novatel Wireless</b>
Manufacturers Address:	<b>9645 Scranton Rd., Suite 205</b>
City/Zip Code	<b>San Diego, CA 92121</b>
Country	<b>USA</b>

### **3 Equipment under Test (EUT)**

#### **3.1 Identification of the Equipment under Test**

Marketing Name:	<b>Merlin XU870</b>
Description:	<b>Quad-Band GPRS/EDGE/UMTS PC Card</b>
Model No:	<b>XU870</b>
FCC ID:	<b>NBZNRM-XU870</b>
IC ID:	<b>3229A-XU870</b>
Frequency Range:	<b>824.2MHz – 848.8MHz for GSM 850 826.4MHz – 846.6MHz for FDD5 1850.2MHz – 1909.8MHz for PCS 1900 1852.4MHz – 1907.6MHz for FDD2</b>
Type(s) of Modulation:	<b>GMSK, 8-PSK, QPSK</b>
Number of Channels:	<b>124 for GSM-850, 299 for PCS-1900, 300 for WCDMA</b>
Antenna Type:	<b>Patch Antenna</b>
Max. Output Power:	<b>Conducted : see page 9, please Radiated : see page 29, please</b>

#### **3.2 Identification of Accessory equipment**

<b>AE #</b>	<b>TYPE</b>	<b>MANF.</b>	<b>MODEL</b>	<b>SERIAL #</b>
1	Laptop	SONY	VAIO	3790DVt1 110013
2	AC-Adapter	SONY	VGP-AC19V12	1479231210205858
3	Laptop	DELL	LATITUDE 1201	34BB00
4	AC-Adapter	DELL	PA-1600-06D2	CN OTD231 71615 58N 01DA

#### **4 Subject of Investigation**

All testing was performed on the EUT listed in Section 3. The EUT was maximized in the X,Y, Z positions , all data in this report shows the worst case between horizontal and vertical polarization for above 1GHz. The dual band antenna used has 2dBi only and is provided with a 3m cable.

The objective of the measurements done by Cetecom Inc. was to measure the performance of the EUT as specified by requirements listed in FCC rules Parts 2, 22 and 24 of Title 47 of the Code of Federal Regulations and Industry Canada rules RSS132 and RSS133.

## 5 Measurements

### 5.1 RF Power Output

#### 5.1.1 FCC 2.1046 Measurements required: RF power output.

Power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on circuit elements as specified. The electrical characteristics of the radio frequency load attached to the output terminals when this test is made shall be stated.

#### 5.1.2 Limits:

##### 5.1.2.1 **FCC 22.913 (a) Effective radiated power limits.**

The effective radiated power (ERP) of mobile transmitters must not exceed 7 Watts.

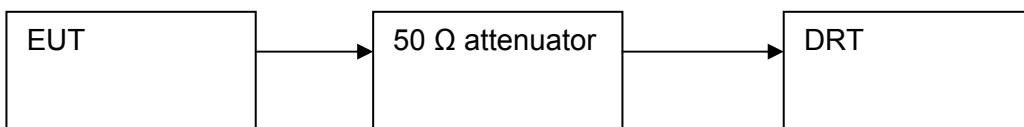
##### 5.1.2.2 **FCC 24.232 (b)(c) Power limits.**

(b) Mobile/portable stations are limited to 2 Watts effective isotropic radiated power (EIRP).  
(c) Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms equivalent voltage. The measurement results shall be properly adjusted for any limitations, such as detector response times, limited resolution bandwidth capability when compared to the emission bandwidth, sensitivity, etc., so as to obtain a true peak measurement over the full bandwidth of the channel.

#### 5.1.3 Conducted Output Power Measurement procedure:

Based on TIA-603C 2004

##### 2.2.1 Conducted Carrier Output Power Rating



1. Connect the equipment as shown in the above diagram. A Digital Radiocommunication Tester (DRT) is used to enable the EUT to transmit and to measure the output power.
2. Adjust the settings of the DRT to set the EUT to its maximum power at the required channel.
3. Record the output power level measured by the DRT.
4. Correct the measured level for all losses in the RF path.
5. Measurements are to be performed with the EUT set to the low, middle and high channel of each frequency band.

#### 5.1.4 Results 850 MHz band(conducted):

Frequency (MHz)	Conducted Output Power (dBm)	
	GPRS	EGPRS
824.2	32.29	30.24
836.6	32.29	30.24
848.8	32.37	30.39

#### 5.1.5 Results 1900 MHz band(conducted):

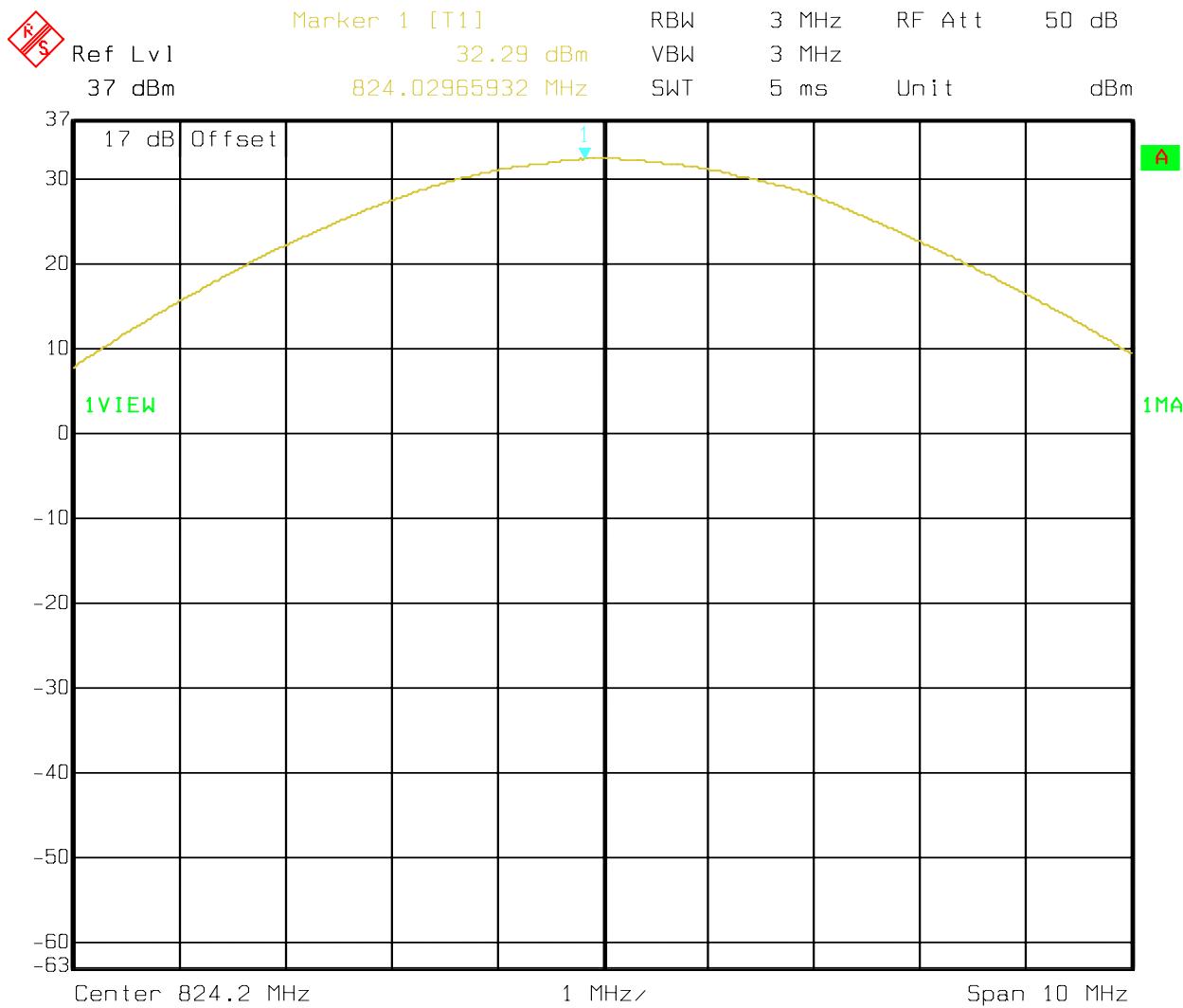
Frequency (MHz)	Conducted Output Power (dBm)	
	GPRS	EGPRS
1850.2	28.58	25.83
1880.0	28.96	26.16
1909.8	29.72	26.03

#### 5.1.6 Results 850 MHz band FDD5 (conducted):

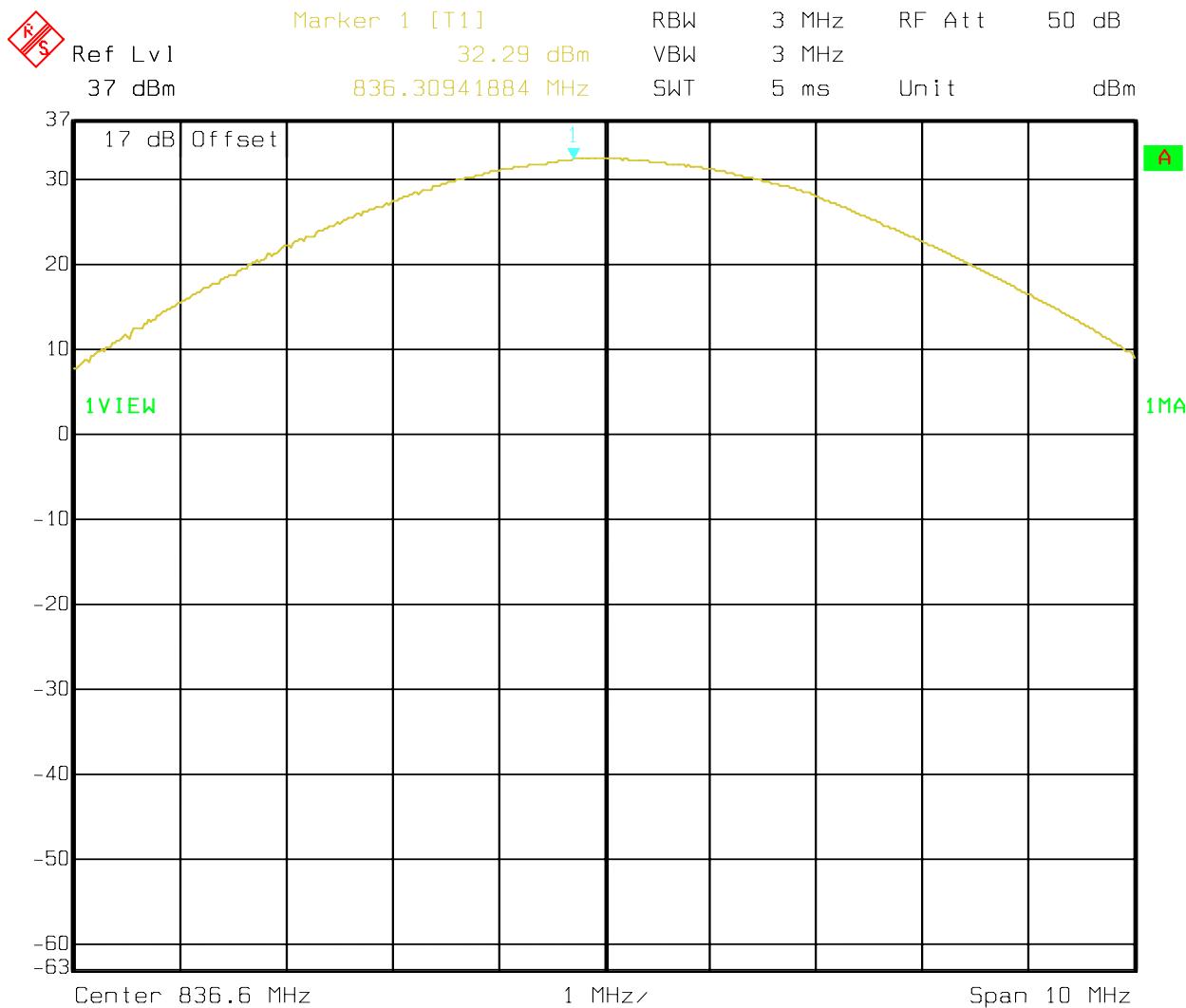
Frequency (MHz)	Conducted Output Power (dBm)
826.4	25.48
836.6	25.44
846.6	25.56

#### 5.1.7 Results 1900 MHz band FDD2 (conducted):

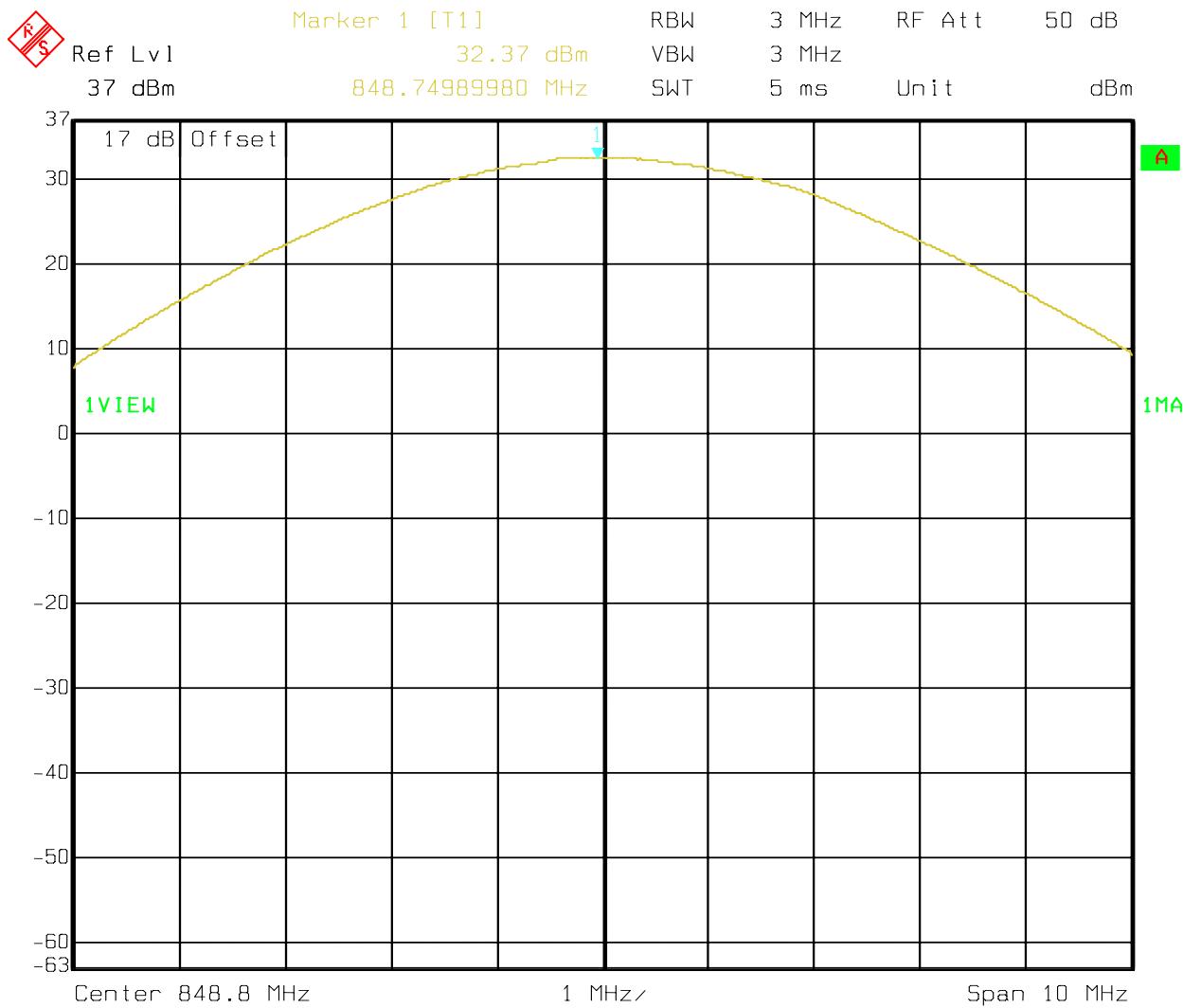
Frequency (MHz)	Conducted Output Power (dBm)
1850.2	26.14
1880.0	26.36
1907.6	25.79

**RF OUTPUT POWER (GSM-850)  
CHANNEL 128 GPRS**

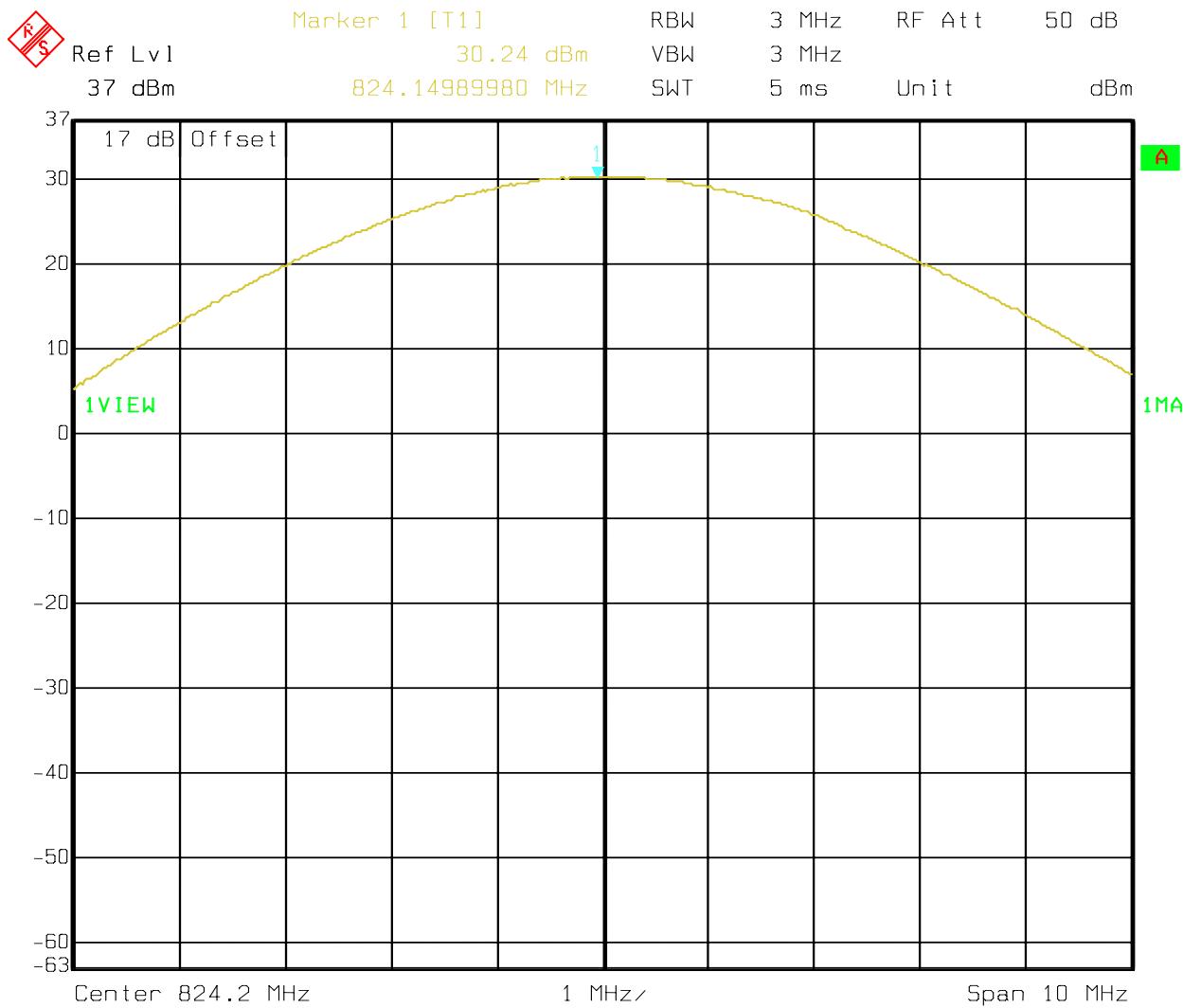
Date: 11.JUL.2006 10:16:48

**RF OUTPUT POWER (GSM-850)  
CHANNEL 190 GPRS**

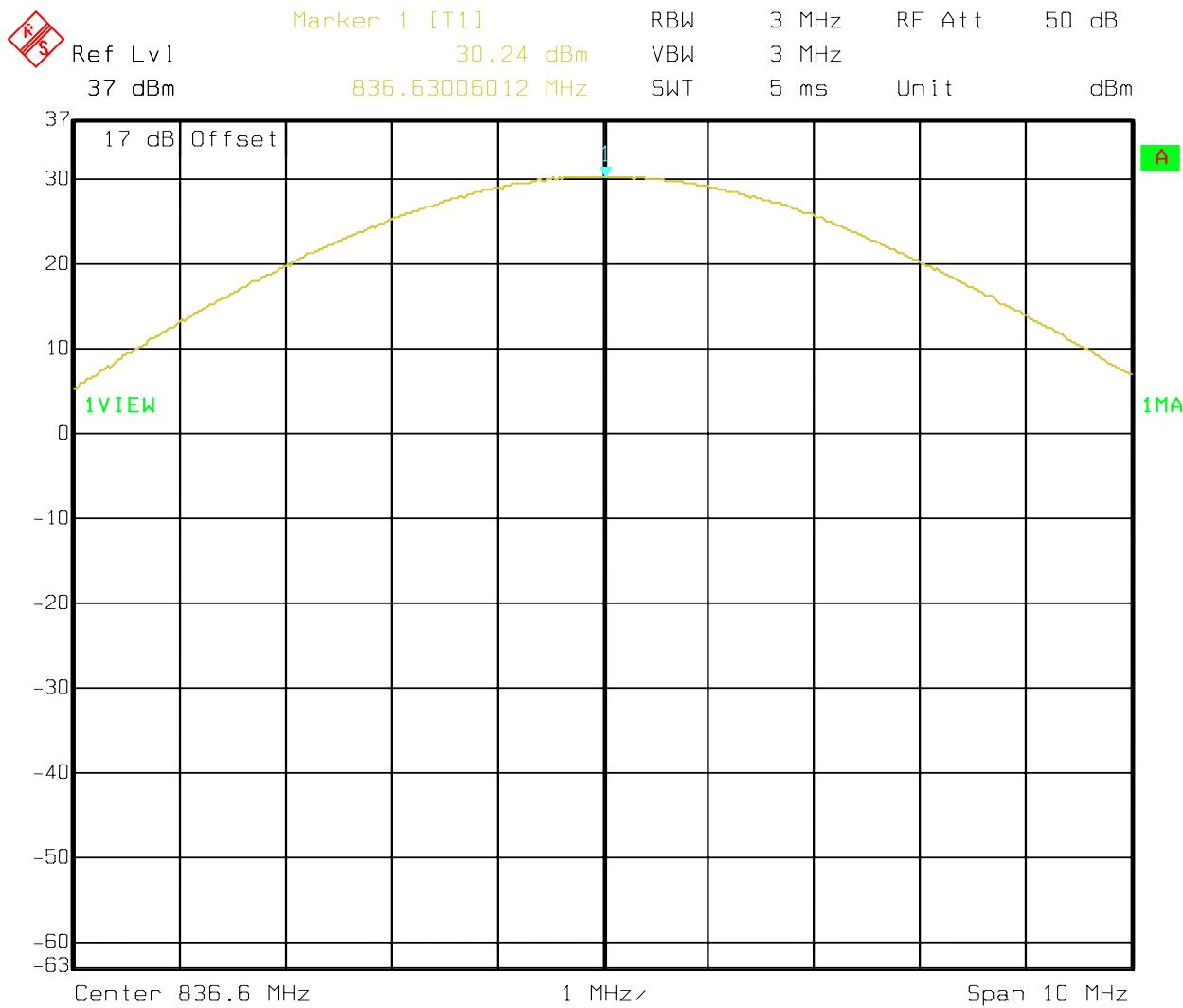
Date: 11.JUL.2006 10:18:06

**RF OUTPUT POWER (GSM-850)  
CHANNEL 251 GPRS**

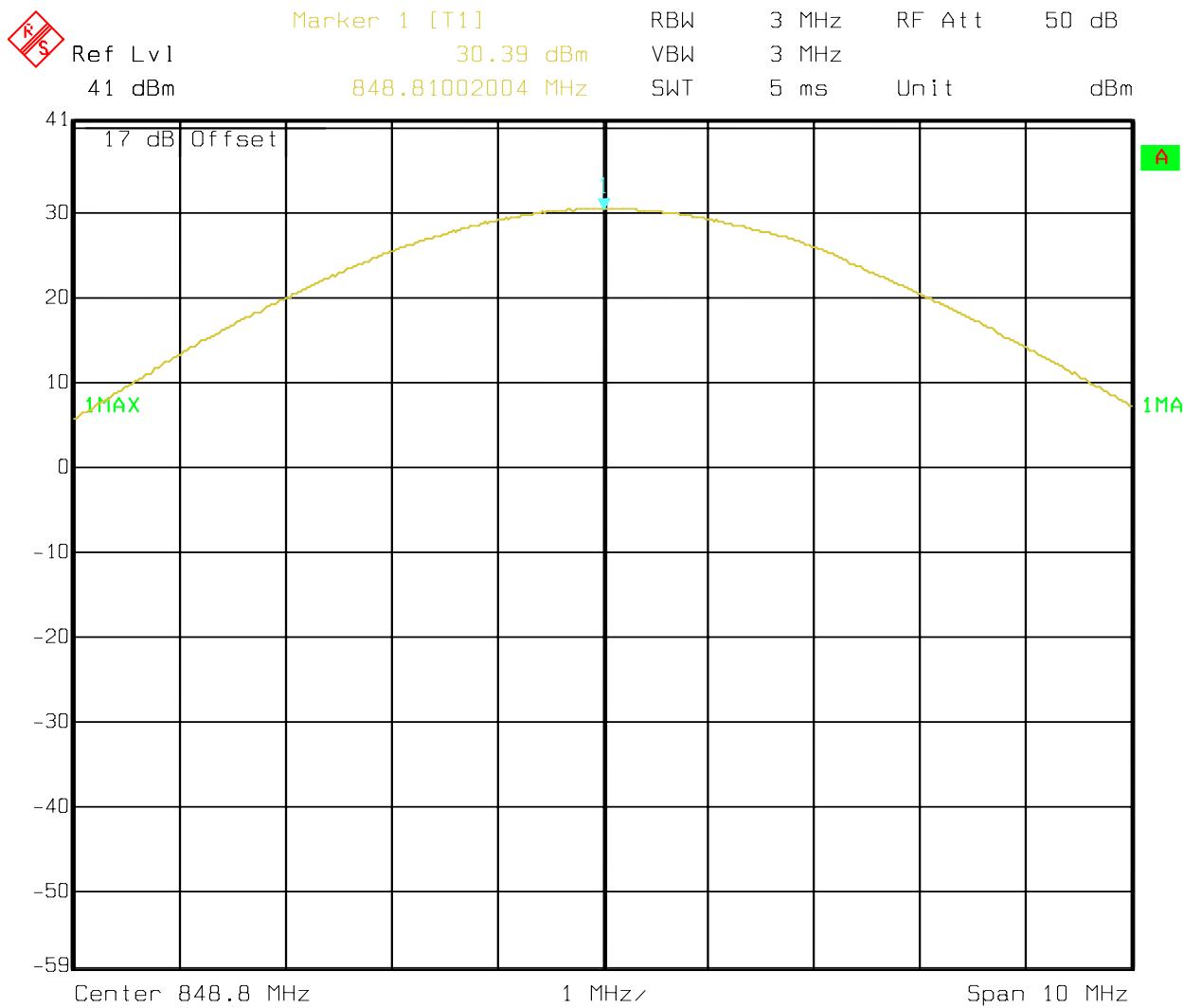
Date: 11.JUL.2006 10:19:34

**RF OUTPUT POWER (GSM-850)  
CHANNEL 128 EGPRS**

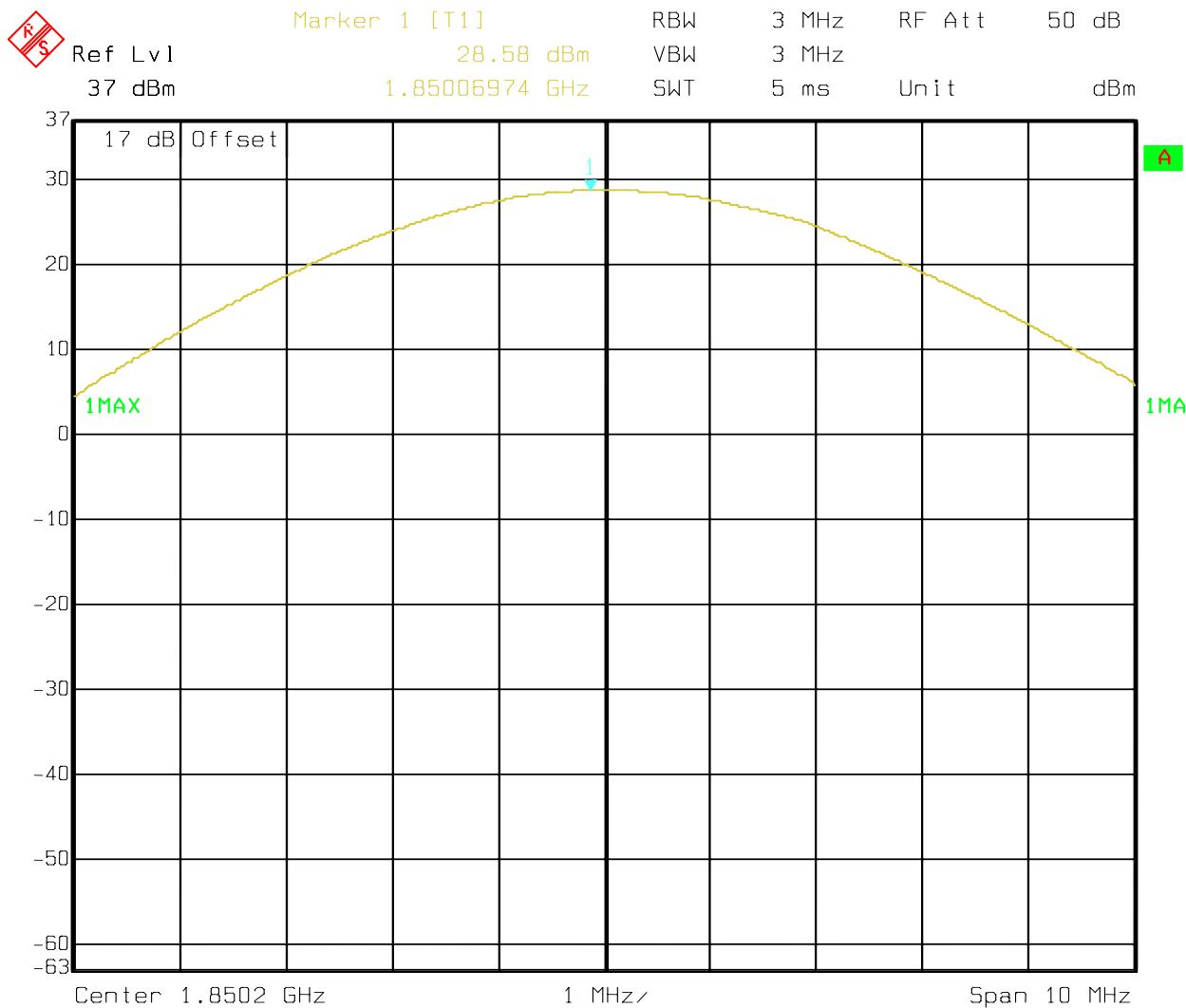
Date: 11.JUL.2006 10:29:24

**RF OUTPUT POWER (GSM-850)  
CHANNEL 190 EGPRS**

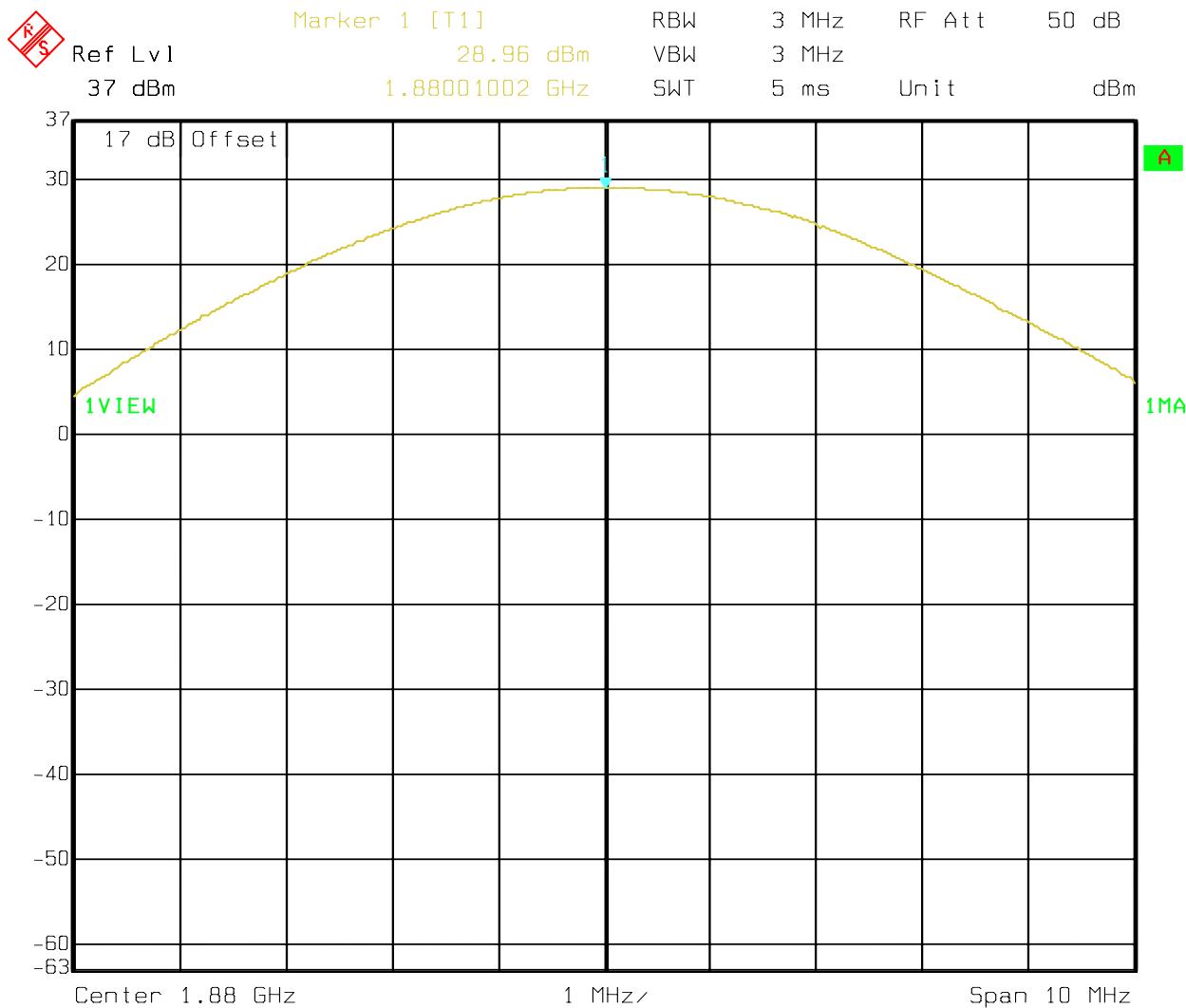
Date: 11.JUL.2006 10:33:48

**RF OUTPUT POWER (GSM-850)  
CHANNEL 251 EGPRS**

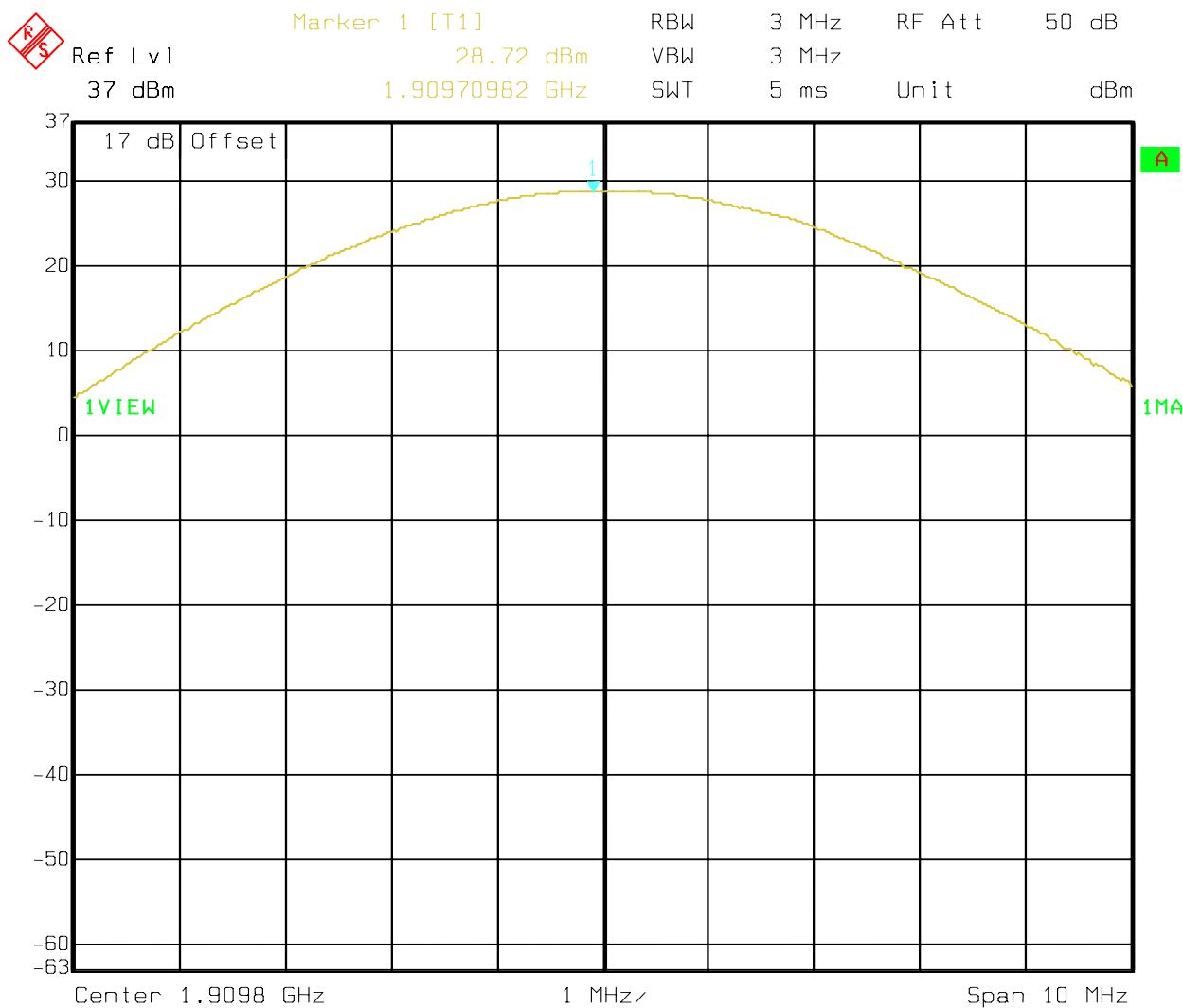
Date: 11.JUL.2006 10:40:42

**RF OUTPUT POWER (PCS-1900)  
CHANNEL 512 GPRS**

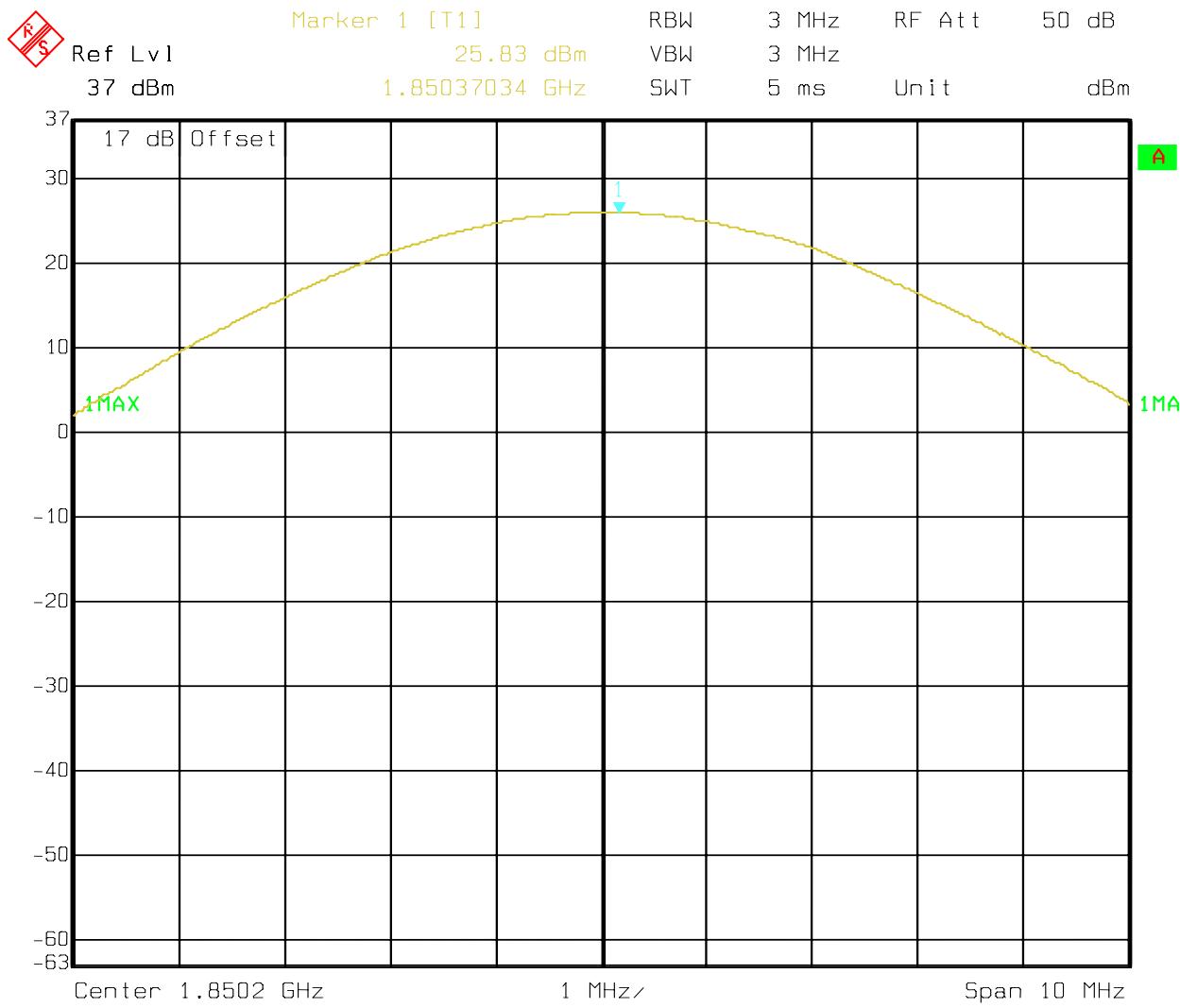
Date: 11.JUL.2006 13:44:08

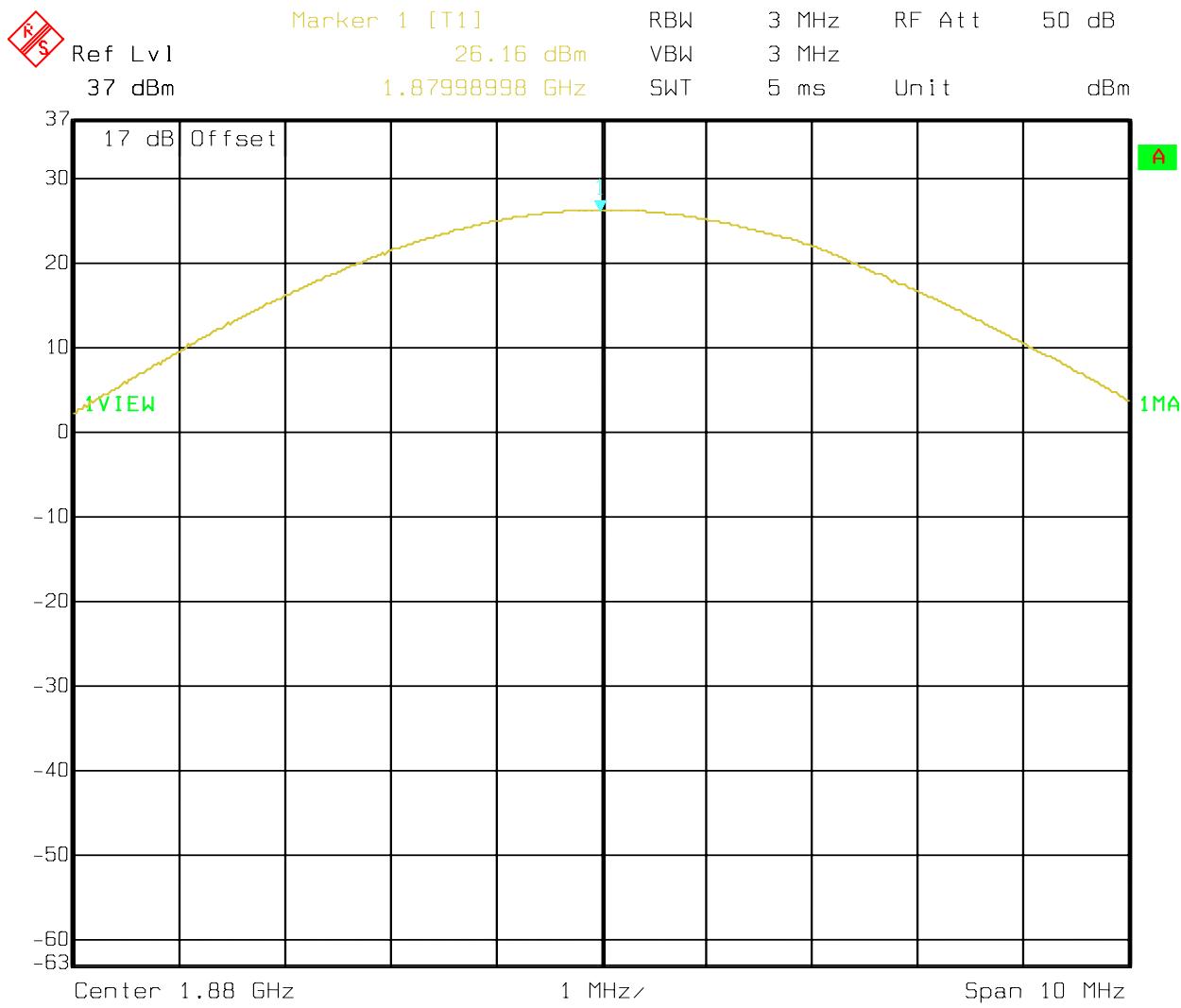
**RF OUTPUT POWER (PCS-1900)**  
**CHANNEL 661 GPRS**


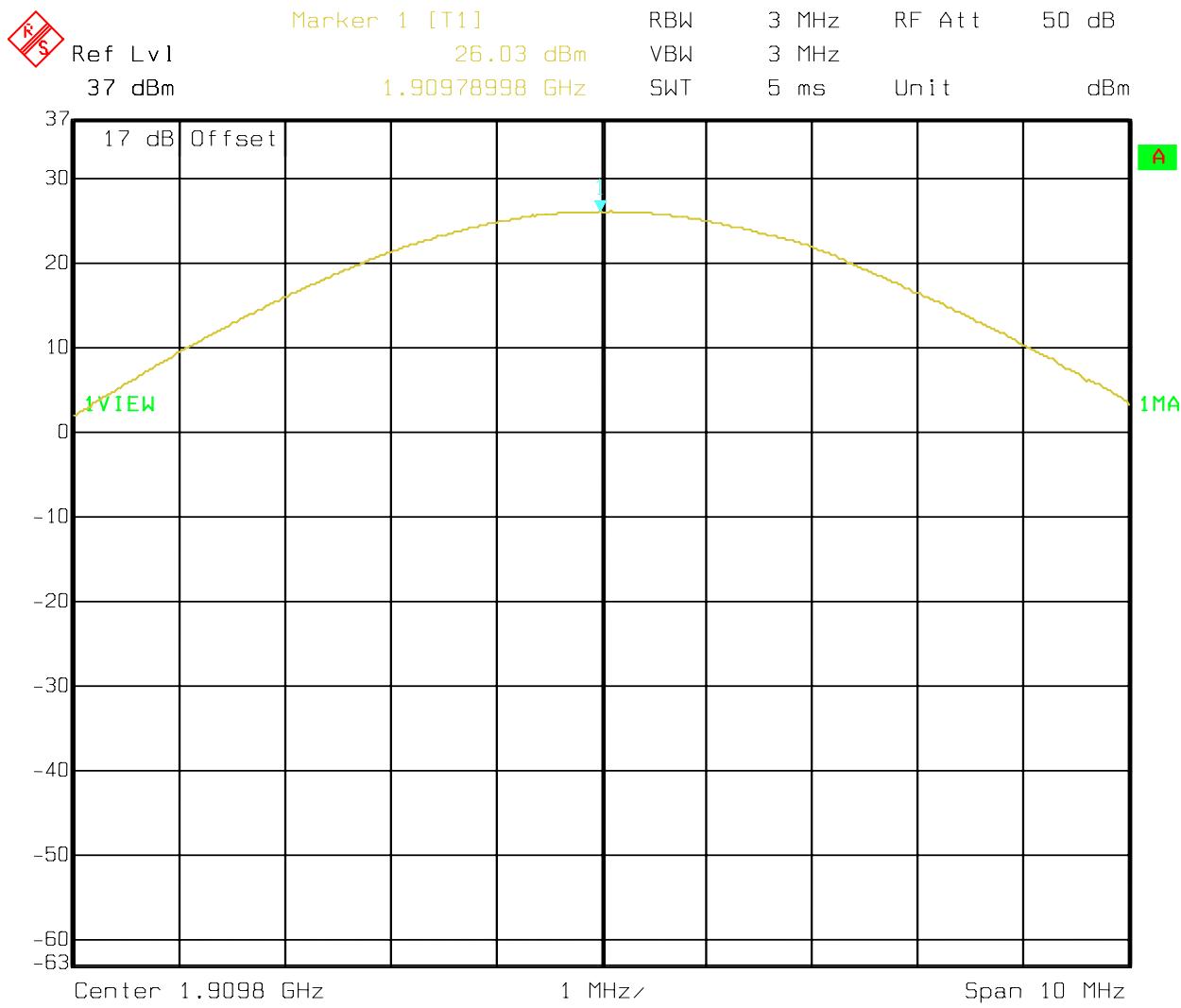
Date: 11.JUL.2006 13:53:33

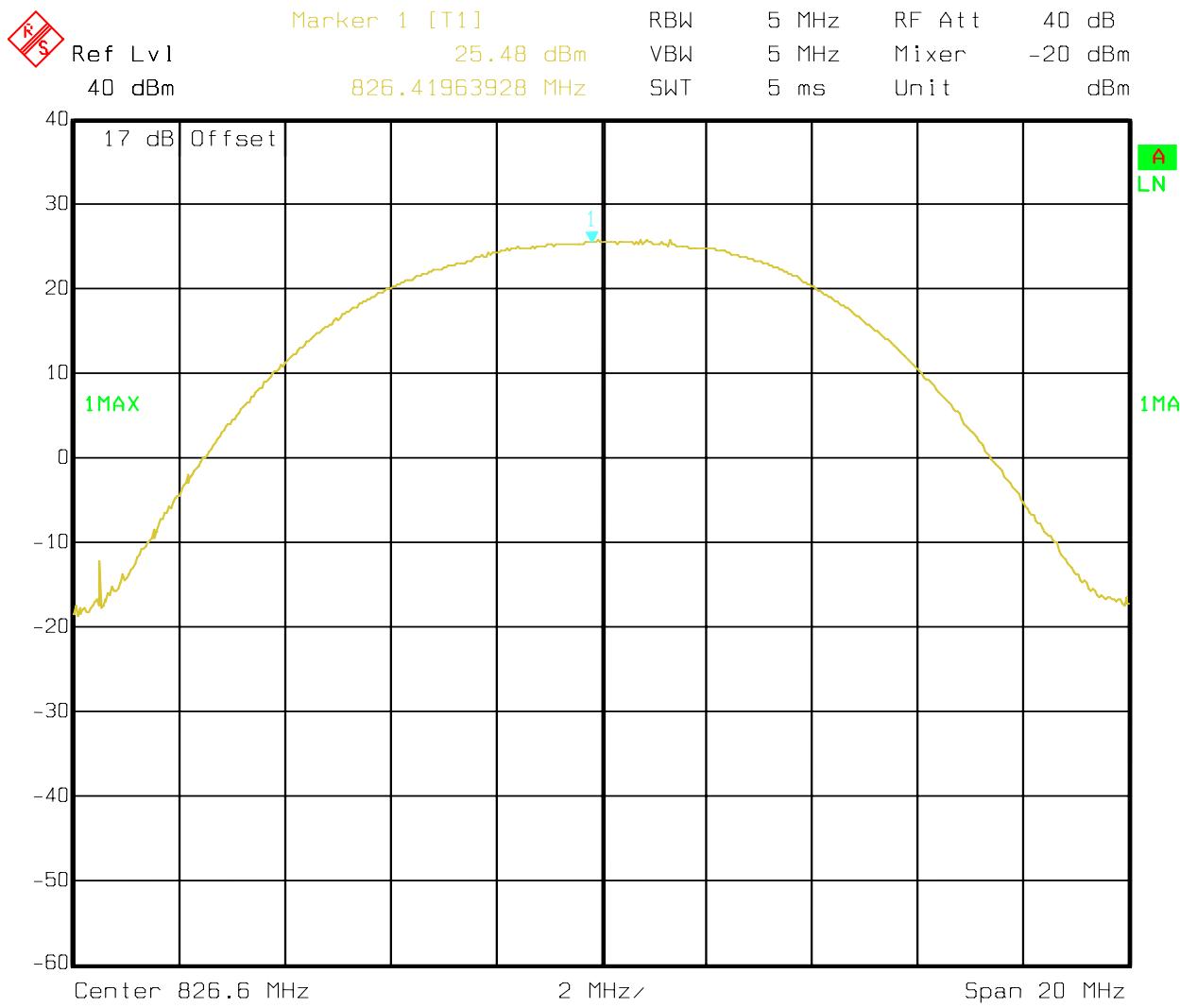
**RF OUTPUT POWER (PCS-1900)**  
**CHANNEL 810 GPRS**


Date: 11.JUL.2006 13:56:27

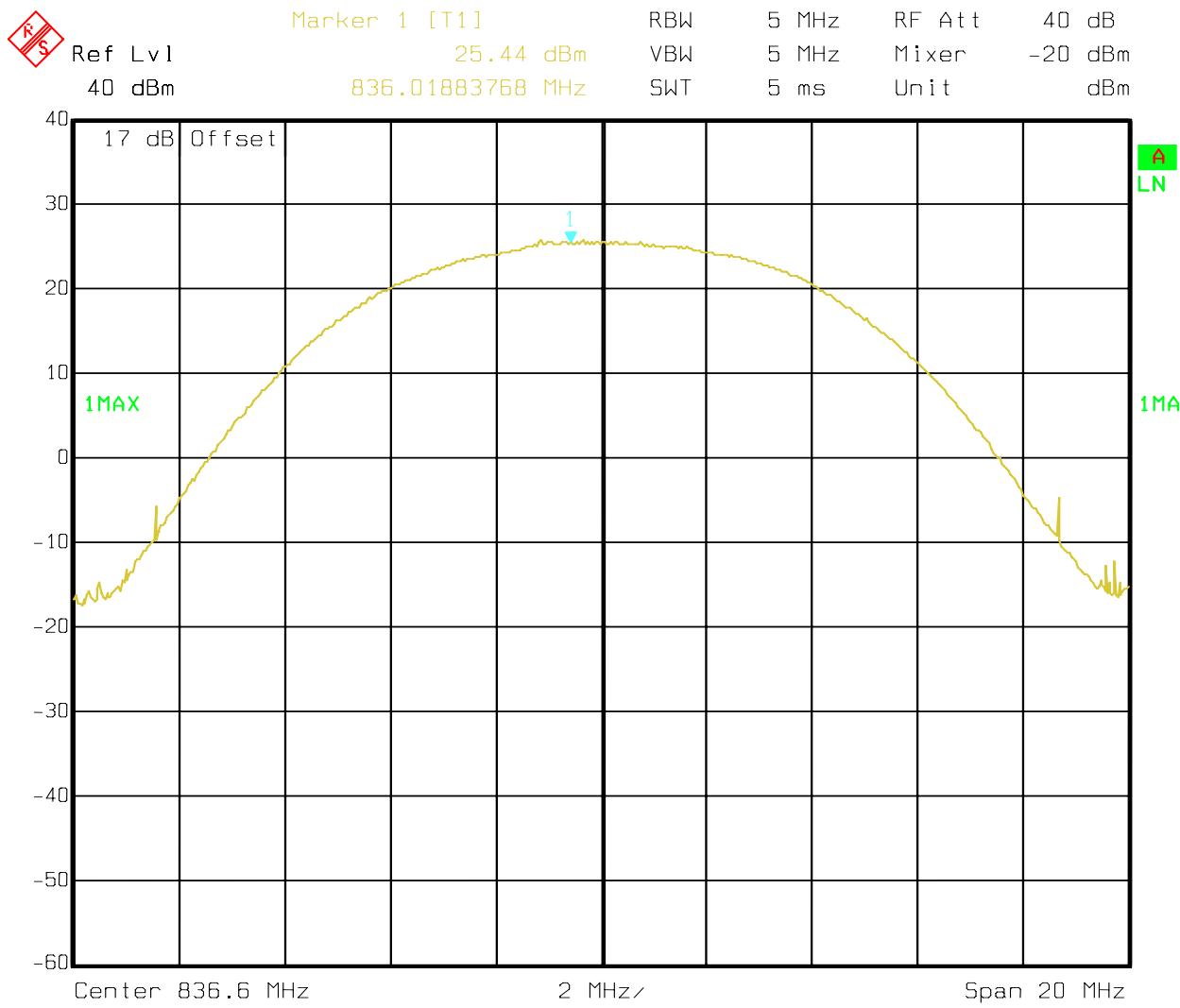
**RF OUTPUT POWER (PCS-1900)**  
**CHANNEL 512 EGPRS**

**RF OUTPUT POWER (PCS-1900)**  
**CHANNEL 661 EGPRS**

**RF OUTPUT POWER (PCS-1900)  
CHANNEL 810 EGPRS**

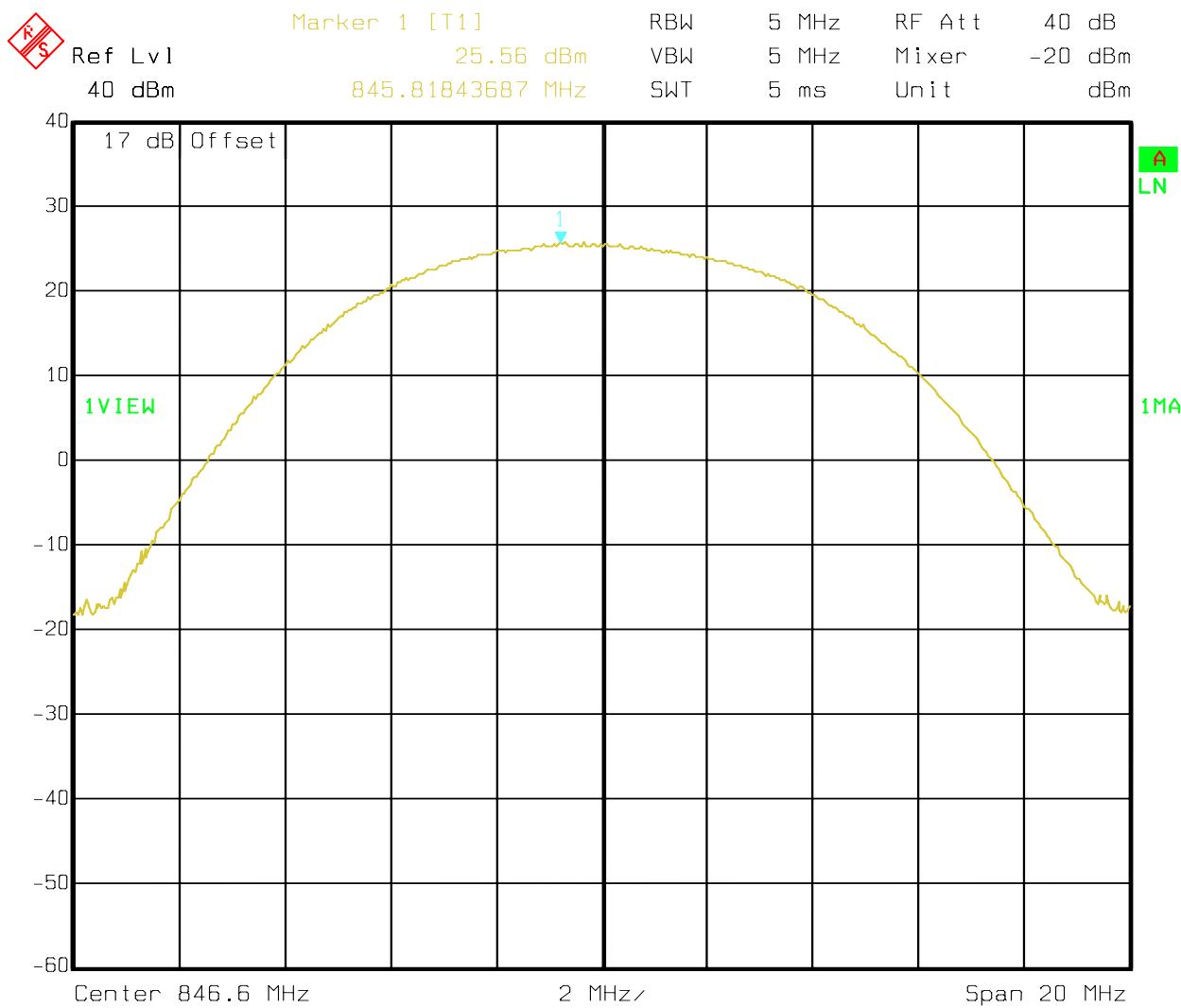
**RF OUTPUT POWER (GSM-850)**  
**CHANNEL 4132 GPRS FDD5**


Date: 26.JUL.2006 10:06:46

**RF OUTPUT POWER (GSM-850)**  
**CHANNEL 4183 GPRS FDD5**


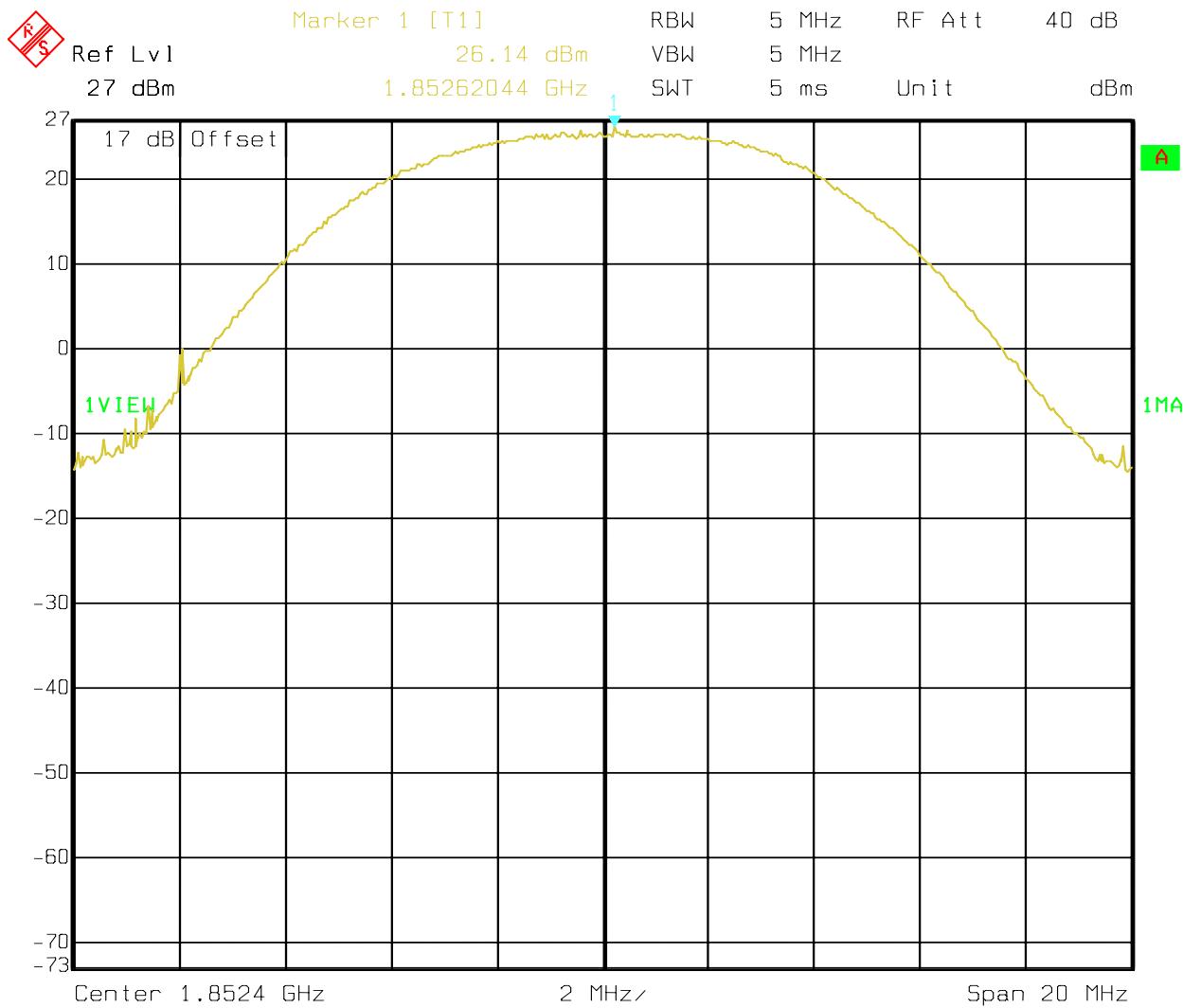
Date: 26.JUL.2006 10:05:15

**RF OUTPUT POWER (GSM-850)**  
**CHANNEL 4233 GPRS FDD5**



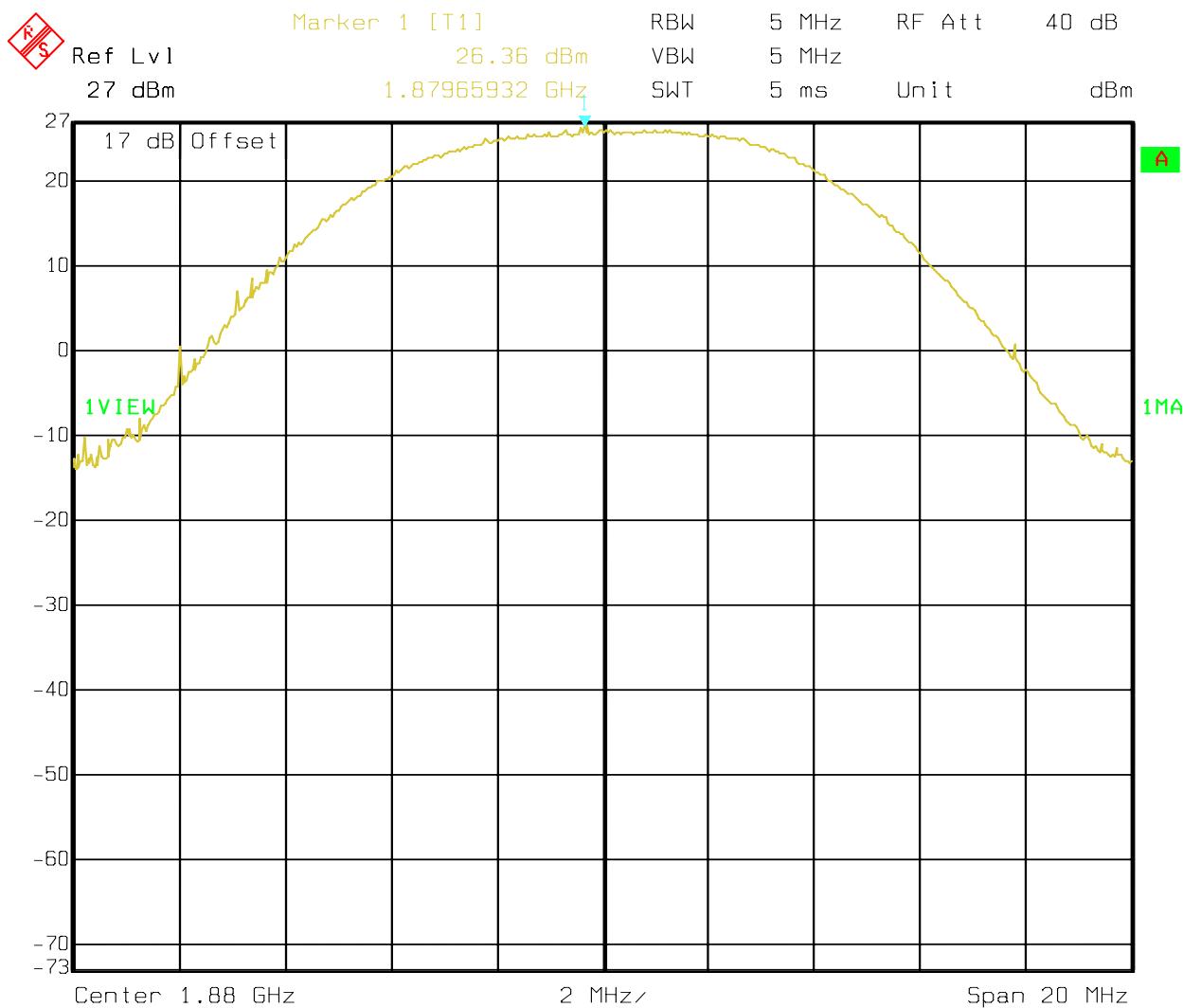
Date: 26.JUL.2006 10:03:06

**RF OUTPUT POWER (PCS-1900)**  
**CHANNEL 9262 GPRS FDD2**

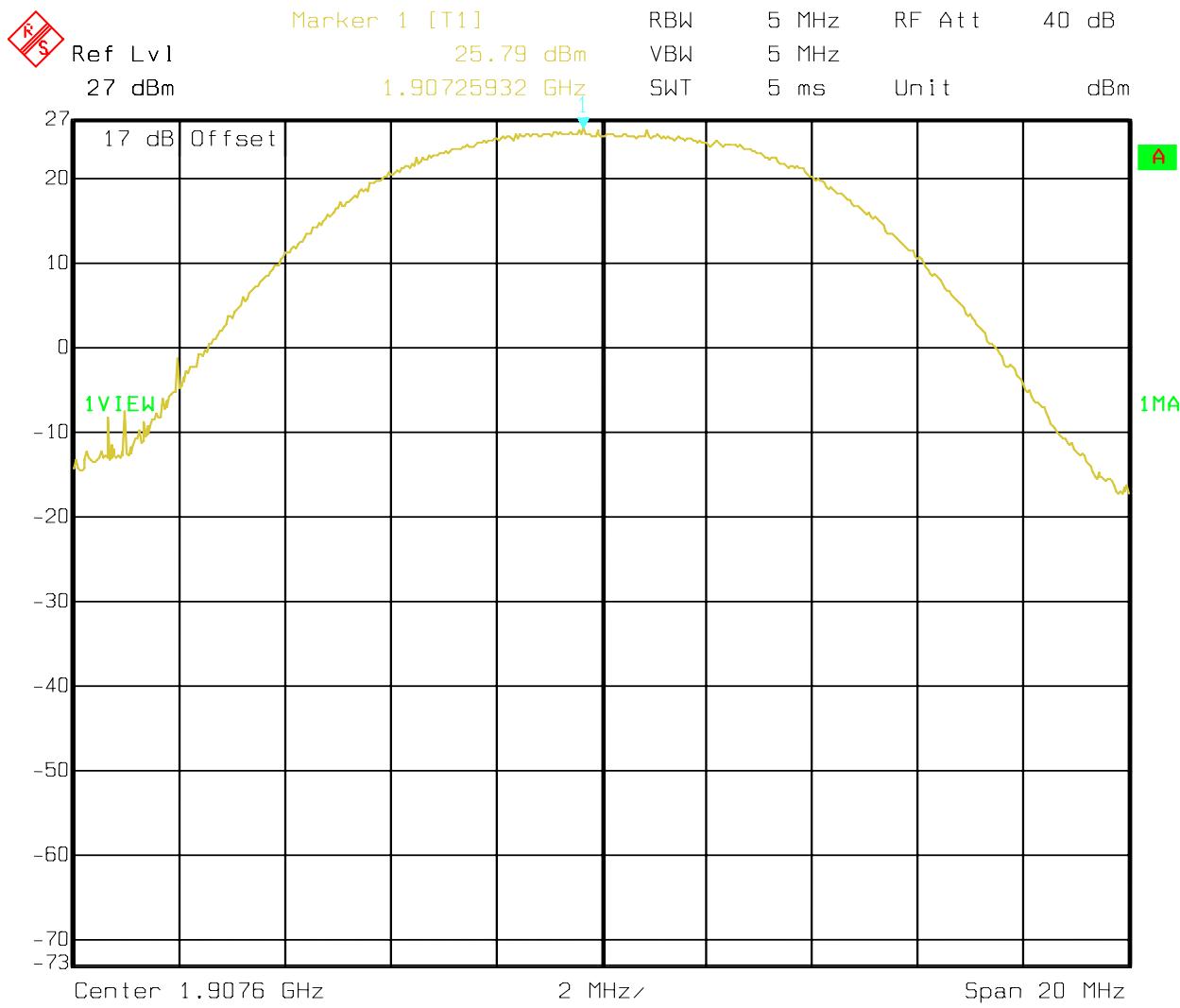


Date: 26.JUL.2006 14:15:18

**RF OUTPUT POWER (PCS-1900)**  
**CHANNEL 9400 GPRS FDD2**



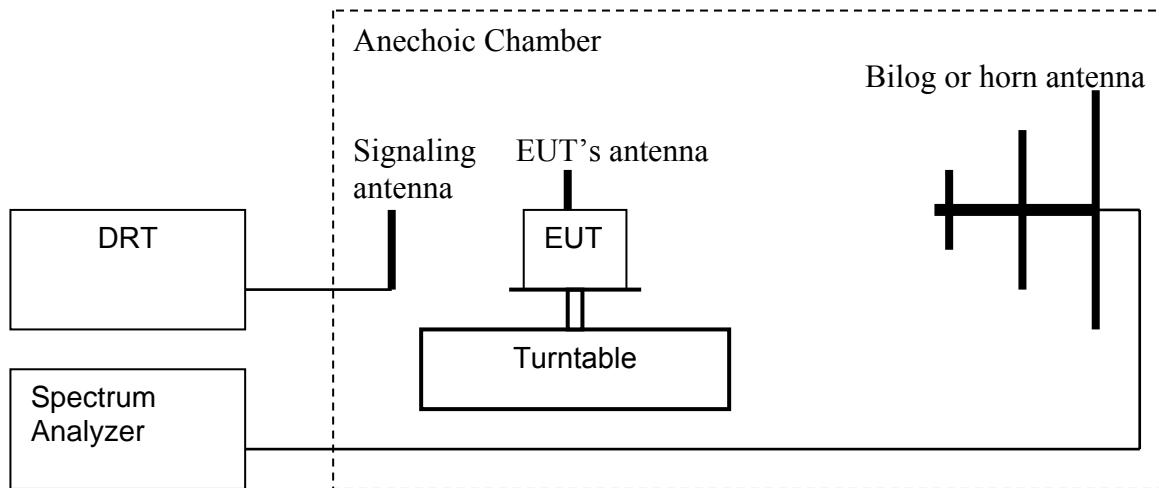
Date: 26.JUL.2006 14:19:48

**RF OUTPUT POWER (PCS-1900)**  
**CHANNEL 810 GPRS FDD2**


Date: 26.JUL.2006 14:19:08

**5.1.8 Radiated Output Power Measurement procedure:**

Based on TIA-603C 2004

**2.2.17.2 Effective Radiated Power (ERP) or Effective Isotropic Radiated Power (EIRP)**

1. Connect the equipment as shown in the above diagram with the EUT's antenna in a vertical orientation.
2. Adjust the settings of the Digital Radiocommunication Tester (DRT) to set the EUT to its maximum power at the required channel.
3. Set the spectrum analyzer to the channel frequency. Set the analyzer to measure peak hold with the required settings.
4. Rotate the EUT 360°. Record the peak level in dBm (**LVL**).
5. Replace the EUT with a vertically polarized half wave dipole or known gain antenna. The center of the antenna should be at the same location as the center of the EUT's antenna.
6. Connect the antenna to a signal generator with known output power and record the path loss in dB (**LOSS**). **LOSS** = Generator Output Power (dBm) – Analyzer reading (dBm).
7. Determine the ERP using the following equation:  

$$\text{ERP (dBm)} = \text{LVL (dBm)} + \text{LOSS (dB)}$$
8. Determine the EIRP using the following equation:  

$$\text{EIRP (dBm)} = \text{ERP (dBm)} + 2.14 \text{ (dB)}$$
9. Measurements are to be performed with the EUT set to the low, middle and high channel of each frequency band. **Spectrum analyzer settings = rbw=vbw=3MHz**

**(note:** Steps 5 and 6 above are performed prior to testing and **LOSS** is recorded by test software. Steps 3, 4, 7 and 8 above are performed with test software.)

**5.1.9 ERP Results 850 MHz band:**

Power Control Level	Burst Peak ERP	
5	$\leq 38.45\text{dBm}$ (7W)	

Frequency (MHz)	Effective Radiated Power (dBm)	
	GPRS	EGPRS
824.2	28.51	26.96
836.6	29.37	27.52
848.8	29.74	27.83

**5.1.10 EIRP Results 1900 MHz band:**

Power Control Level	Burst Peak EIRP	
0	$\leq 33\text{dBm}$ (2W)	

Frequency (MHz)	Effective Isotropic Radiated Power (dBm)	
	GPRS	EGPRS
1850.2	27.39	25.8
1880.0	29.05	27.85
1909.8	27.37	27.04

**5.1.11 ERP Results 850 MHz band FDD5:**

Power Control Level	Burst Peak ERP	
5	$\leq 38.45\text{dBm}$ (7W)	

Frequency (MHz)	Effective Radiated Power (dBm)	
826.4	21.99	
836.6	21.46	
846.6	21.4	

**5.1.12 EIRP Results 1900 MHz band FDD2:**

Power Control Level	Burst Peak EIRP	
0	$\leq 33\text{dBm}$ (2W)	

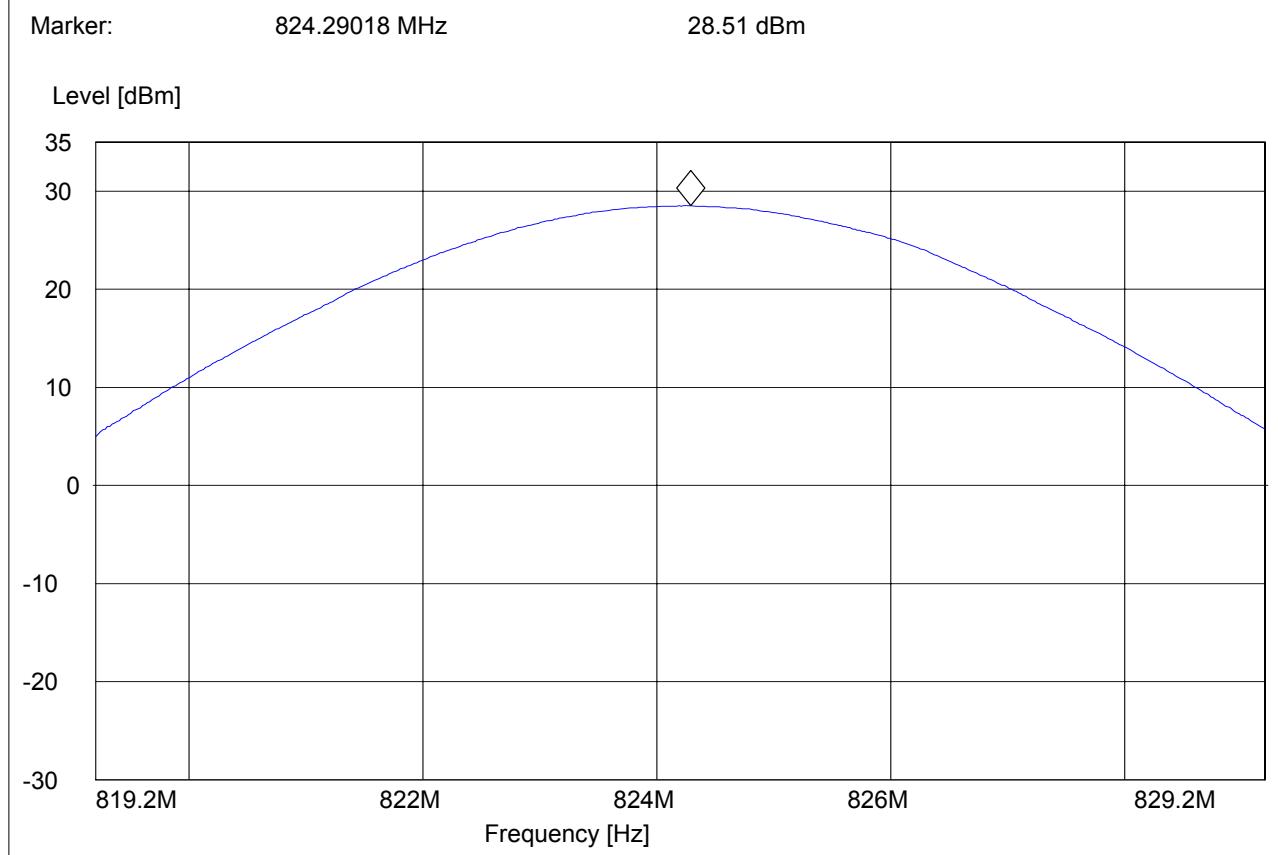
Frequency (MHz)	Effective Isotropic Radiated Power (dBm)	
1852.4	25.02	
1880.0	25.27	
1907.6	26.47	

**EIRP (GSM 850)  
CHANNEL 128 GPRS****§22.913(a)****CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: NOVAT\_010\_06002\_XU870\_EXPRESS  
 Customer: NOVATEL  
 Operating Mode: 850 GPRS; TABLE 90°  
 Antenna: H  
 EUT: V  
 Test Engineer: SATYA  
 Voltage: AC Adapter  
 Sweep: EIRP 850 CH 128 H

***SWEEP TABLE: "EIRP 850 CH 128 H"***

Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
819.2 MHz	829.2 MHz	MaxPeak	Coupled	3 MHz	DUMMY-DBM
			MaxPeak		

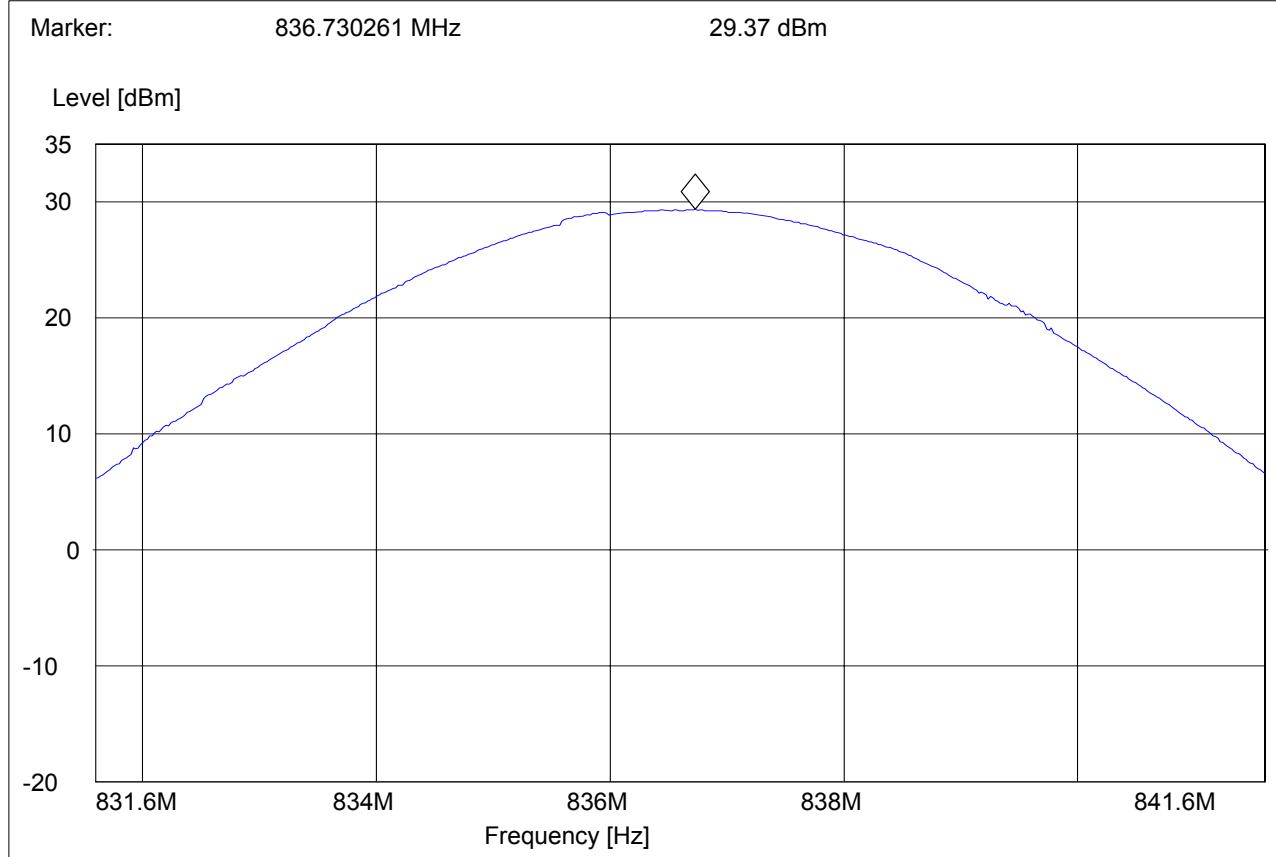


**EIRP (GSM 850)  
CHANNEL 190 GPRS****§22.913(a)****CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: NOVAT\_010\_06002\_XU870\_EXPRESS  
 Customer: NOVATEL  
 Operating Mode: 850 GPRS; TABLE 90°  
 Antenna: H  
 EUT: V  
 Test Engineer: SATYA  
 Voltage: AC Adapter  
 Sweep: EIRP 850 CH 190 H

***SWEET TABLE: "EIRP 850 CH 190 H"***

Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
831.6 MHz	841.6 MHz	MaxPeak	Coupled	3 MHz	DUMMY-DBM
		MaxPeak			

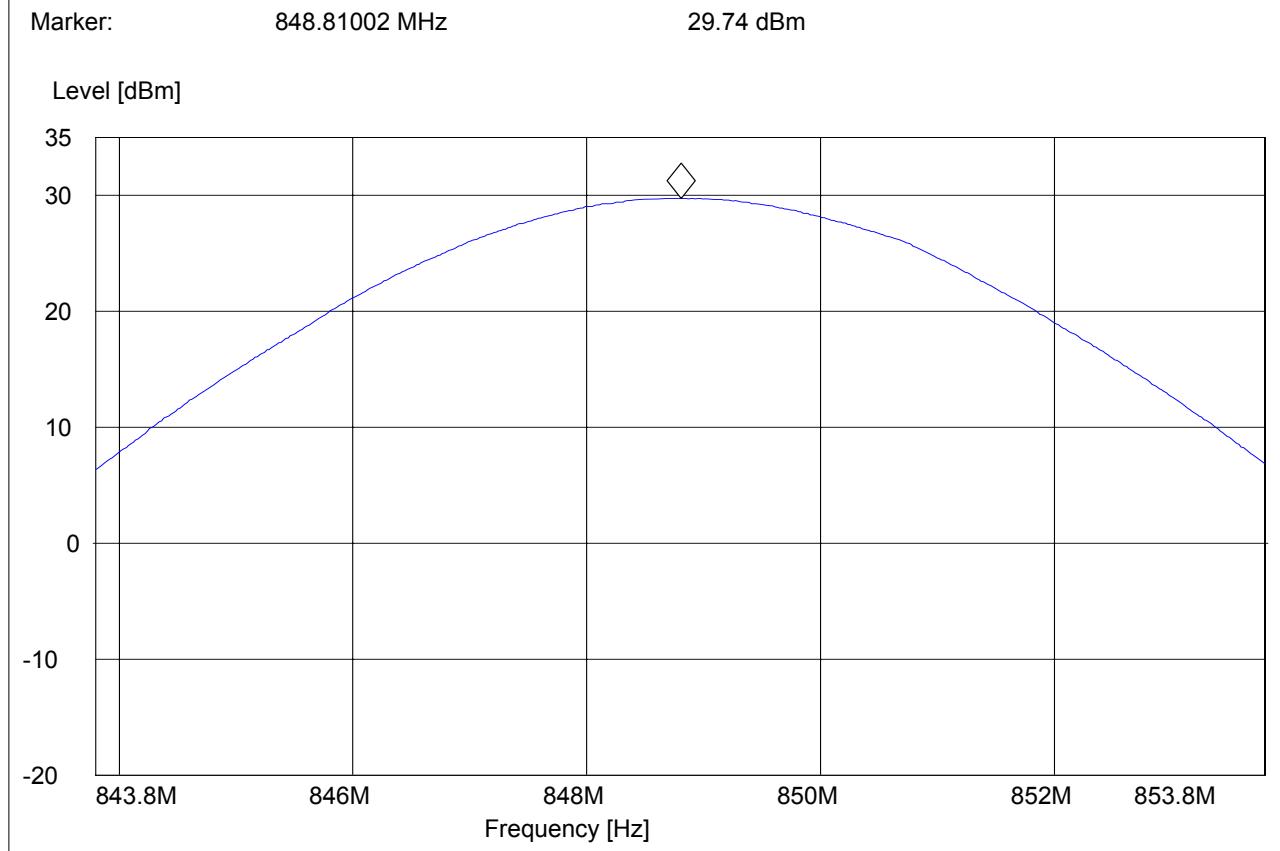


**EIRP (GSM 850)  
CHANNEL 251 GPRS****§22.913(a)****CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: NOVAT\_010\_06002\_XU870\_EXPRESS  
 Customer: NOVATEL  
 Operating Mode: 850 GPRS; TABLE 104°  
 Antenna: H  
 EUT: V  
 Test Engineer: SATYA  
 Voltage: AC Adapter  
 Sweep: EIRP 850 CH 251 H

***SWEEP TABLE: "EIRP 850 CH 251 H"***

Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
843.8 MHz	853.8 MHz	MaxPeak	Time Coupled	Bandw. 3 MHz	DUMMY-DBM

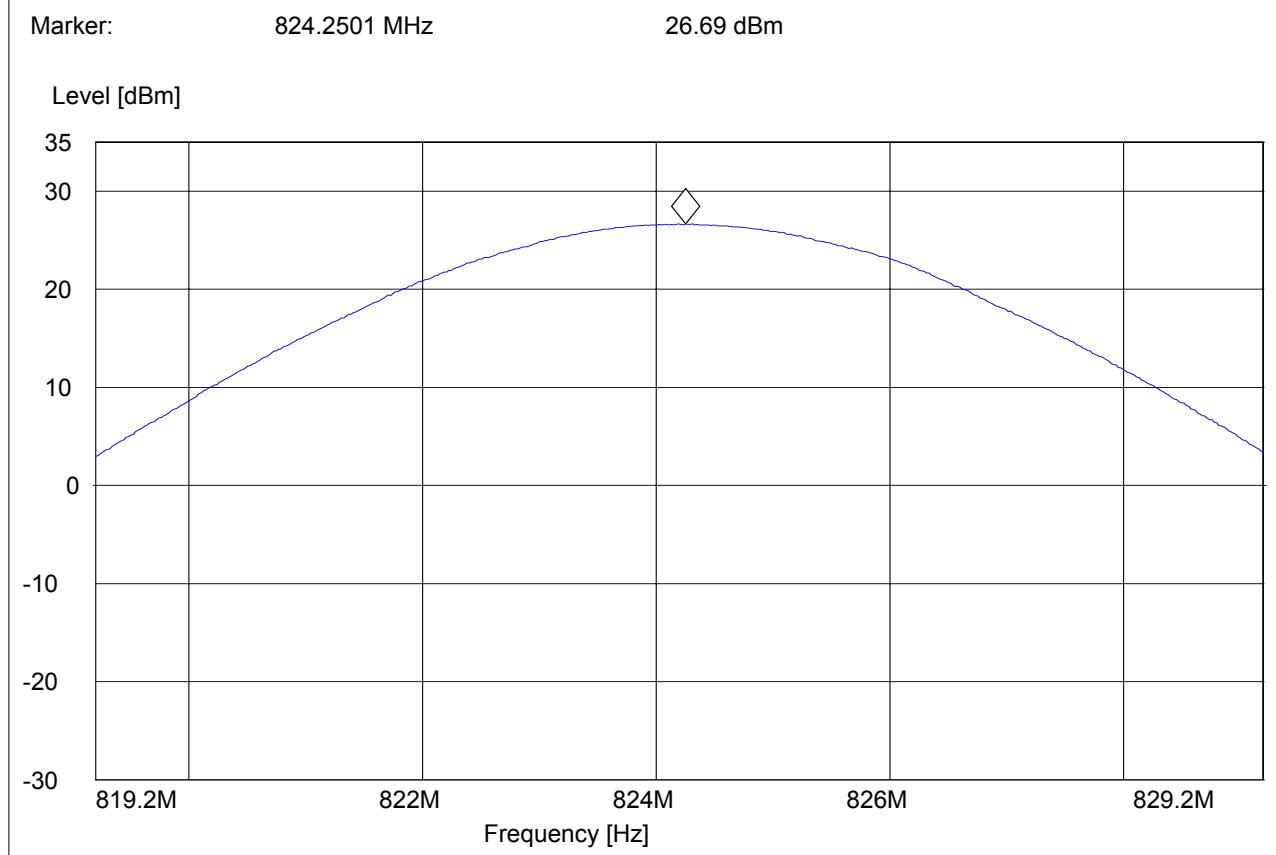


**EIRP (GSM 850)  
CHANNEL 128 EGPRS****§22.913(a)****CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: NOVAT\_010\_06002\_XU870\_EXPRESS  
 Customer: NOVATEL  
 Operating Mode: 850 EGPRS; TABLE 104°  
 Antenna: H  
 EUT: V  
 Test Engineer: SATYA  
 Voltage: AC Adapter  
 Sweep: EIRP 850 CH 128 H

***SWEEP TABLE: "EIRP 850 CH 128 V"***

Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
819.2 MHz	829.2 MHz	MaxPeak	Coupled	3 MHz	DUMMY-DBM
		MaxPeak			

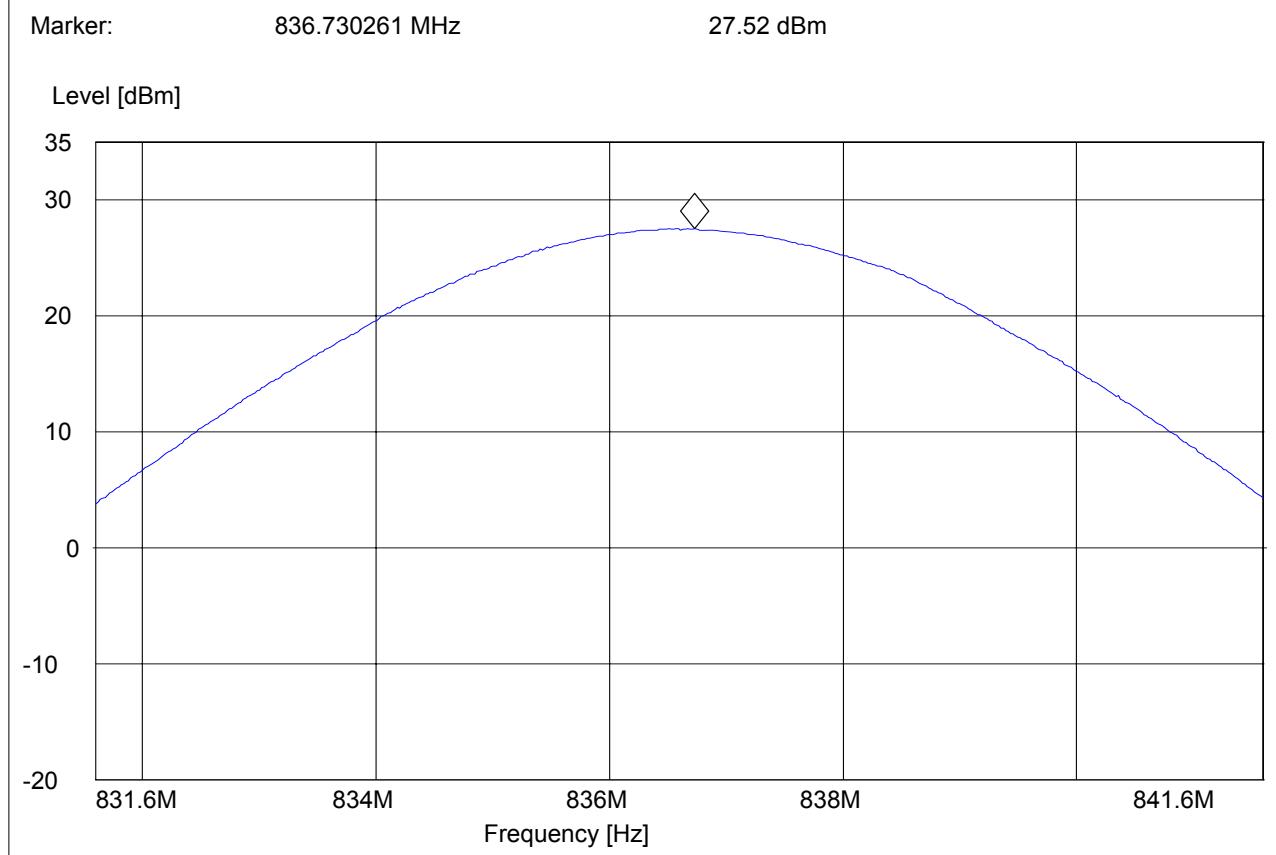


**EIRP (GSM 850)  
CHANNEL 190 EGPRS****§22.913(a)****CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: NOVAT\_010\_06002\_XU870\_EXPRESS  
 Customer: NOVATEL  
 Operating Mode: 850 EGPRS; TABLE 104°  
 Antenna: H  
 EUT: V  
 Test Engineer: SATYA  
 Voltage: AC Adapter  
 Sweep: EIRP 850 CH 190 H

***SWEEP TABLE: "EIRP 850 CH 190 V"***

Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
831.6 MHz	841.6 MHz	MaxPeak	Coupled	3 MHz	DUMMY-DBM
			MaxPeak		

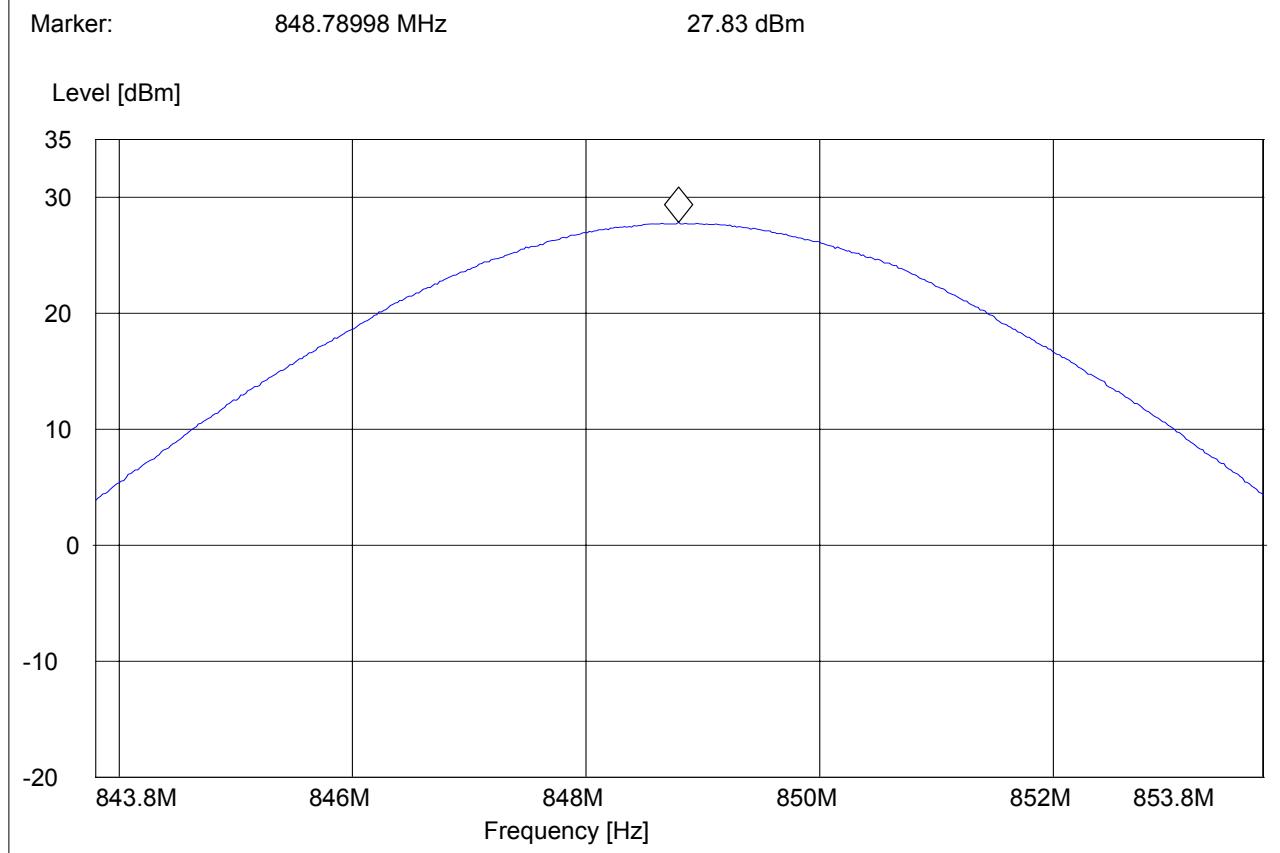


**EIRP (GSM 850)  
CHANNEL 251 EGPRS****§22.913(a)****CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: NOVAT\_010\_06002\_XU870\_EXPRESS  
 Customer: NOVATEL  
 Operating Mode: 850 EGPRS; TABLE 104°  
 Antenna: H  
 EUT: V  
 Test Engineer: SATYA  
 Voltage: AC Adapter  
 Sweep: EIRP 850 CH 251 H

***SWEEP TABLE: "EIRP 850 CH 251 V"***

Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
843.8 MHz	853.8 MHz	MaxPeak	Coupled	3 MHz	DUMMY-DBM



**EIRP (PCS-1900)  
CHANNEL 512 GPRS****§24.232(b)****CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

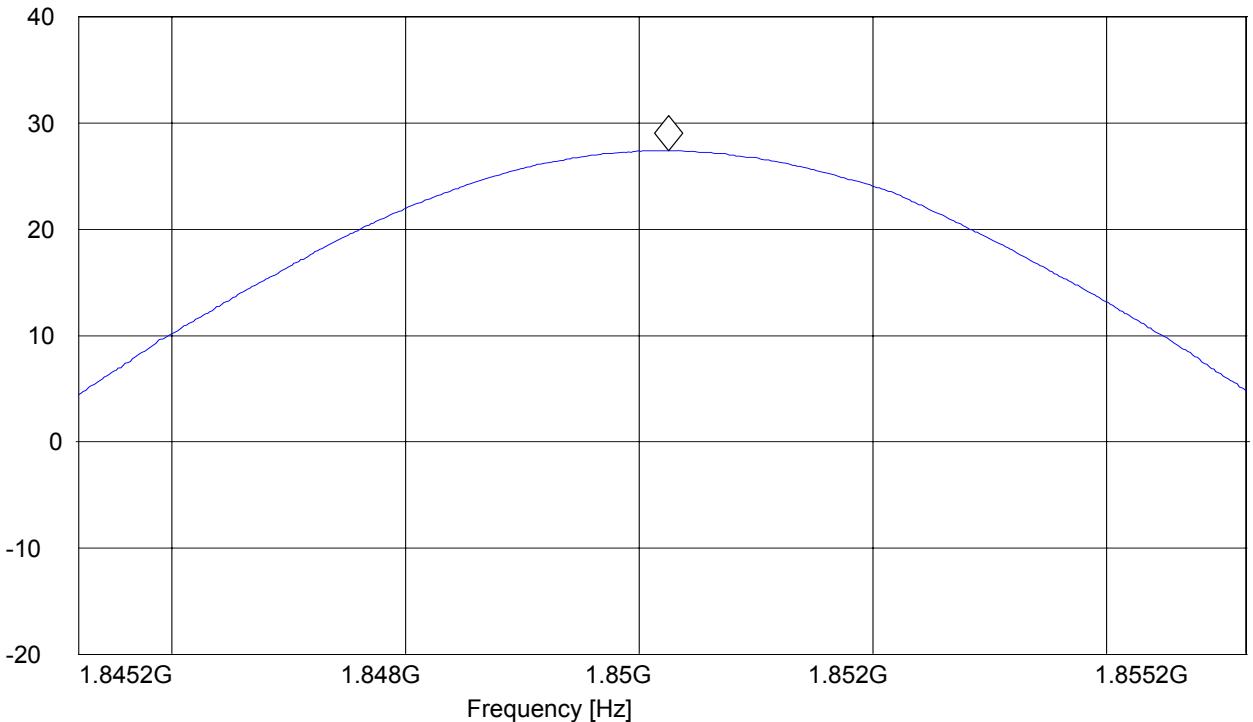
EUT / Description: NOVAT\_010\_06002\_XU870\_EXPRESS  
 Customer: NOVATEL  
 Operating Mode: FDD24, 1900 GPRS, TABLE 184°  
 Antenna: H  
 EUT: V  
 Test Engineer: PETER  
 Voltage: AC Adapter  
 Sweep: EIRP 1900 CH512

***SWEEP TABLE: "EIRP 1900 CH512"***

Short Description: EIRP PCS 1900 for channel-512  
 Start Stop Detector Meas. IF Transducer  
 Frequency Frequency Time Bandw.  
 1.8 GHz 1.9 GHz MaxPeak Coupled 3 MHz DUMMY-DBM

Marker: 1.8502501 GHz 27.39 dBm

Level [dBm]

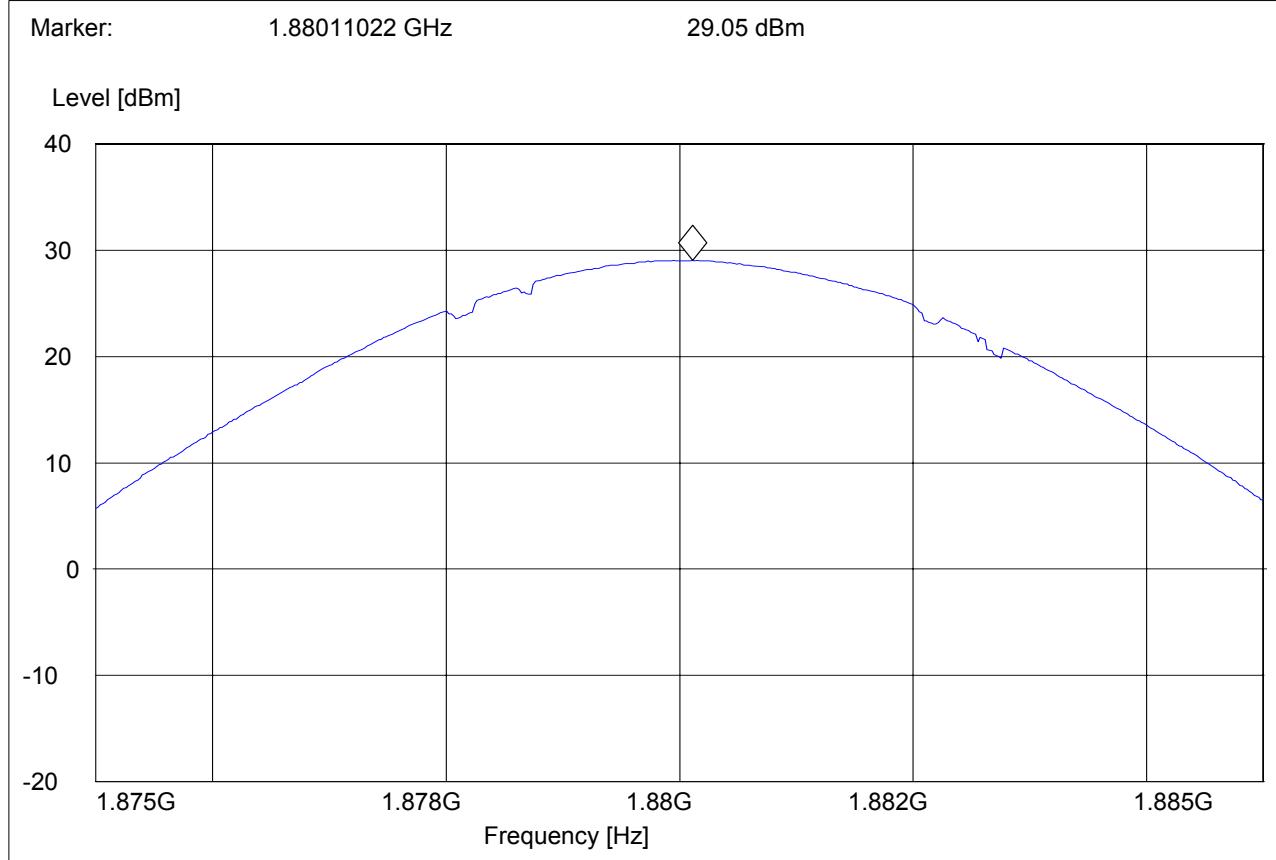


**EIRP (PCS-1900)  
CHANNEL 661 GPRS****§24.232(b)****CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: NOVAT\_010\_06002\_XU870\_EXPRESS  
 Customer: NOVATEL  
 Operating Mode: FDD24, 1900 GPRS, TABLE 30°  
 Antenna: H  
 EUT: V  
 Test Engineer: PETER  
 Voltage: AC Adapter  
 Sweep: EIRP 1900 CH661

***SWEEP TABLE: "EIRP 1900 CH661"***

Short Description: EIRP PCS 1900 for channel-661  
 Start Stop Detector Meas. IF Transducer  
 Frequency Frequency Time Bandw.  
 1.9 GHz 1.9 GHz MaxPeak Coupled 3 MHz DUMMY-DBM  
 MaxPeak



**EIRP (PCS-1900)  
CHANNEL 810 GPRS****§24.232(b)****CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

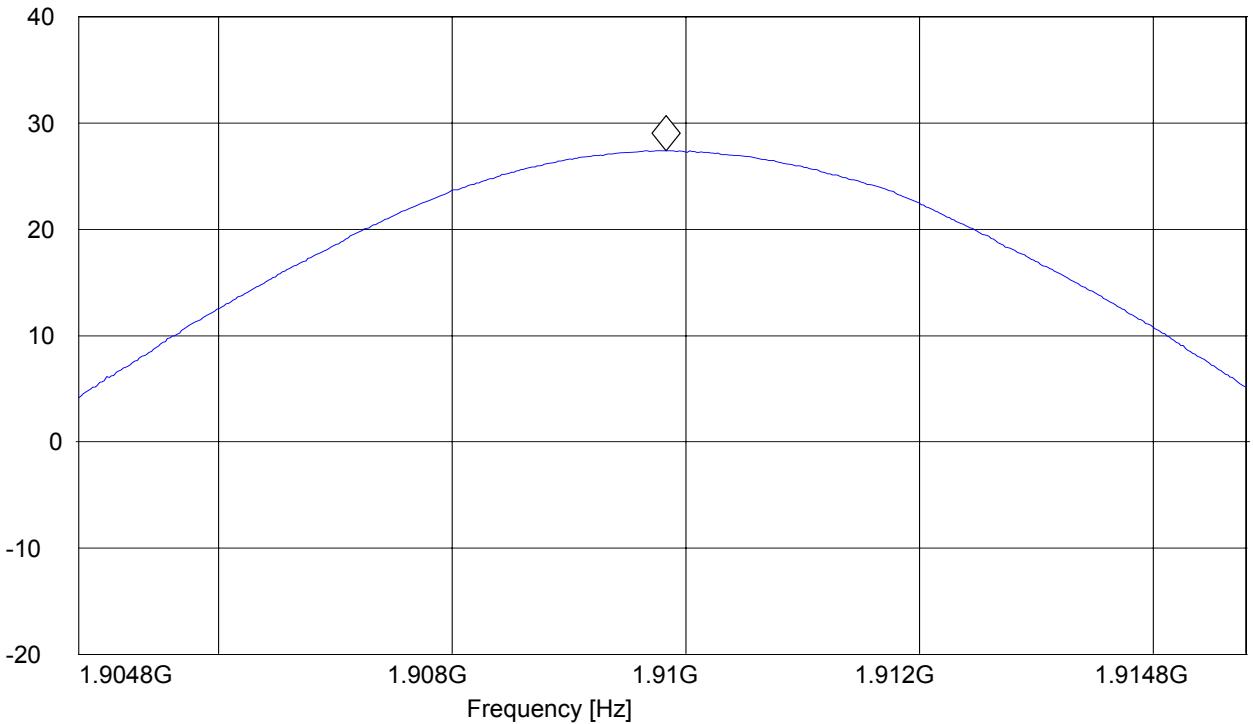
EUT / Description: NOVAT\_010\_06002\_XU870\_EXPRESS  
 Customer: NOVATEL  
 Operating Mode: FDD24, 1900 GPRS, TABLE 184°  
 Antenna: H  
 EUT: V  
 Test Engineer: PETER  
 Voltage: AC Adapter  
 Sweep: EIRP 1900 CH810

***SWEEP TABLE: "EIRP 1900 CH810"***

Short Description: EIRP PCS 1900 for channel-810  
 Start Stop Detector Meas. IF Transducer  
 Frequency Frequency Time Bandw.  
 1.9 GHz 1.9 GHz MaxPeak Coupled 3 MHz DUMMY-DBM

Marker: 1.90983006 GHz 27.37 dBm

Level [dBm]



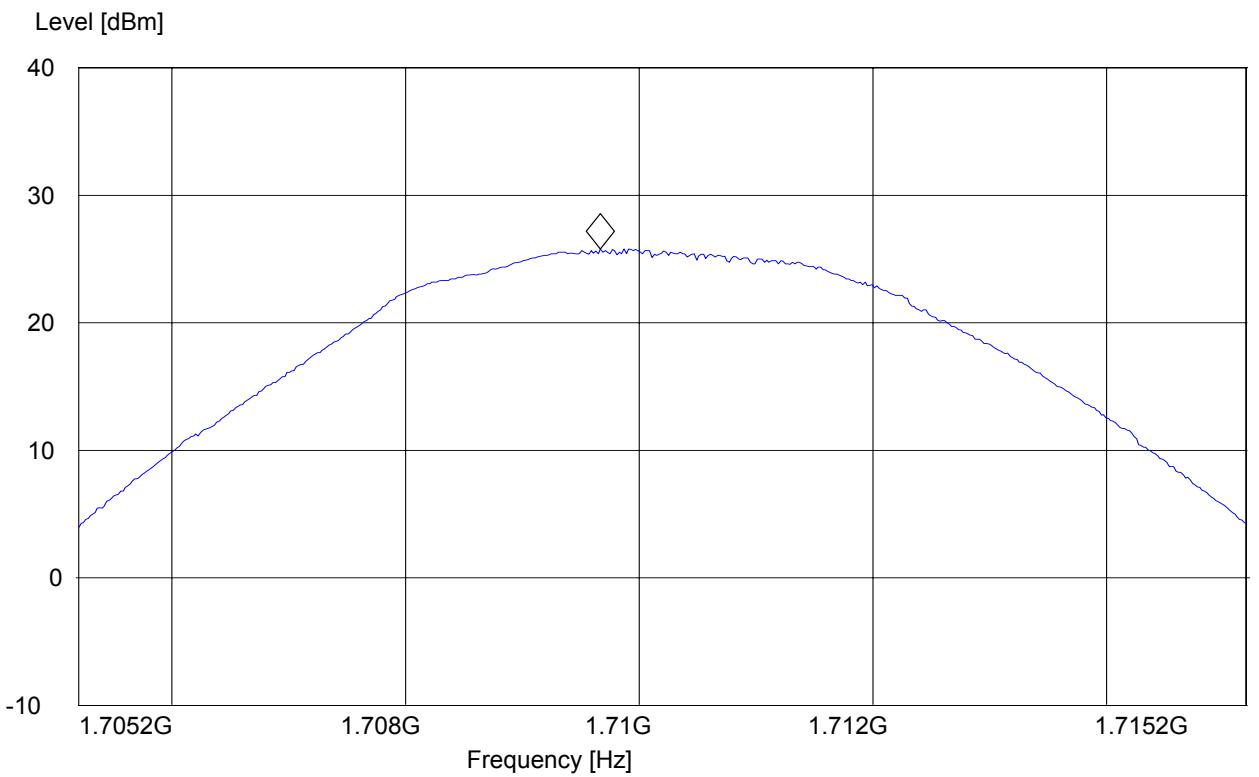
**EIRP (PCS-1900)  
CHANNEL 512 EGPRS****§24.232(b)****CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: XU870  
 Customer: NOVATEL  
 Test mode: FCC24, 1900 EGPRS, TABLE 190°  
 Antenna Polarization: H  
 EUT: V  
 Test Engineer: PETER  
 Voltage: AC ADAPTOR  
 Sweep: EIRP 1900 CH512

***SWEEP TABLE: "EIRP 1900 CH512"***

Short Description: EIRP PCS 1900 for channel-512  
 Start Stop Detector Meas. IF Transducer  
 Frequency Frequency Time Bandw.  
 1.8 GHz 1.9 GHz MaxPeak Coupled 3 MHz DUMMY-DBM

Marker: 1.709668938 GHz 25.8 dBm

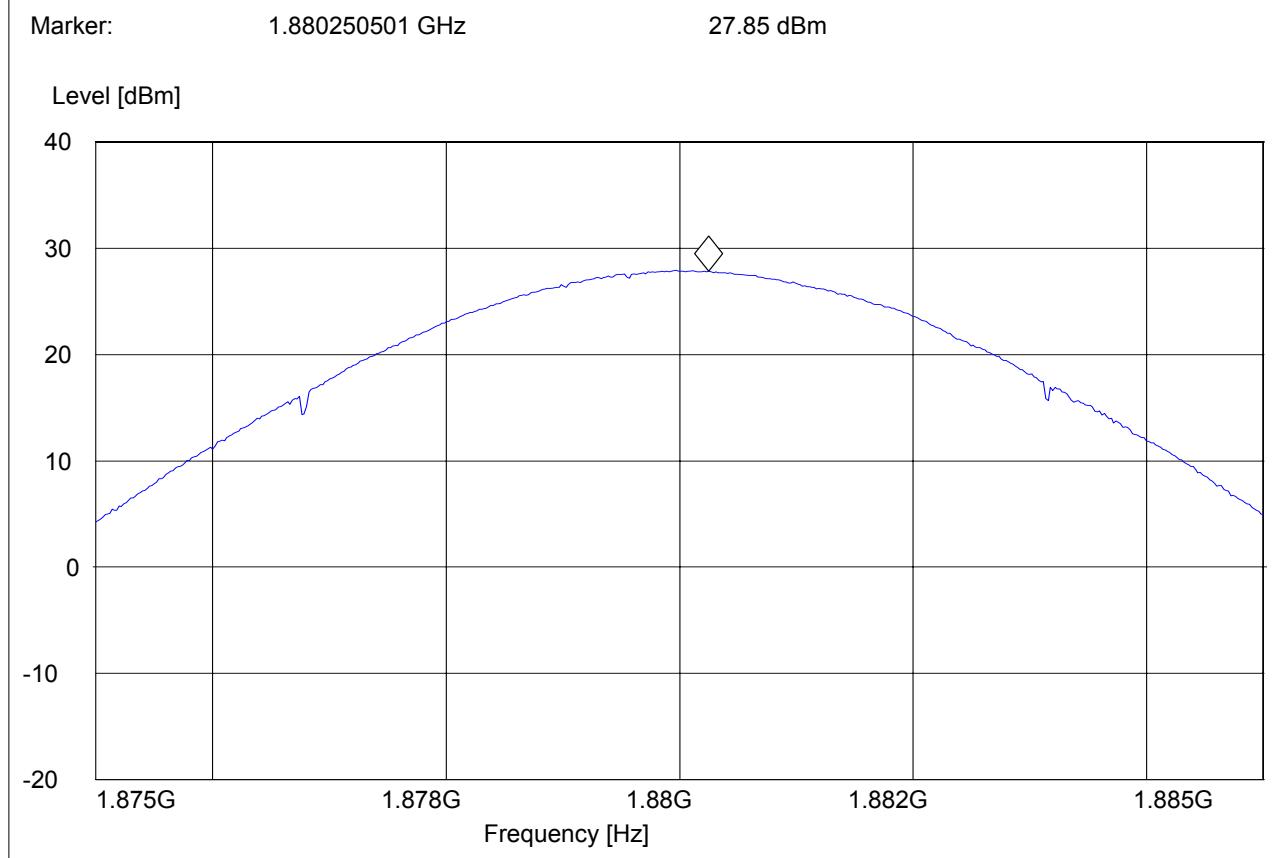


**EIRP (PCS-1900)  
CHANNEL 661 EGPRS****§24.232(b)****CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: NOVAT\_010\_06002\_XU870\_EXPRESS  
 Customer: NOVATEL  
 Operating Mode: FDD24, 1900 EGPRS, TABLE 190°  
 Antenna: H  
 EUT: V  
 Test Engineer: PETER  
 Voltage: AC Adapter  
 Sweep: EIRP 1900 CH661

***SWEEP TABLE: "EIRP 1900 CH661"***

Short Description: EIRP PCS 1900 for channel-661  
 Start Stop Detector Meas. IF Transducer  
 Frequency Frequency Time Bandw.  
 1.9 GHz 1.9 GHz MaxPeak Coupled 3 MHz DUMMY-DBM  
 MaxPeak



**EIRP (PCS-1900)  
CHANNEL 810 EGPRS****§24.232(b)****CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

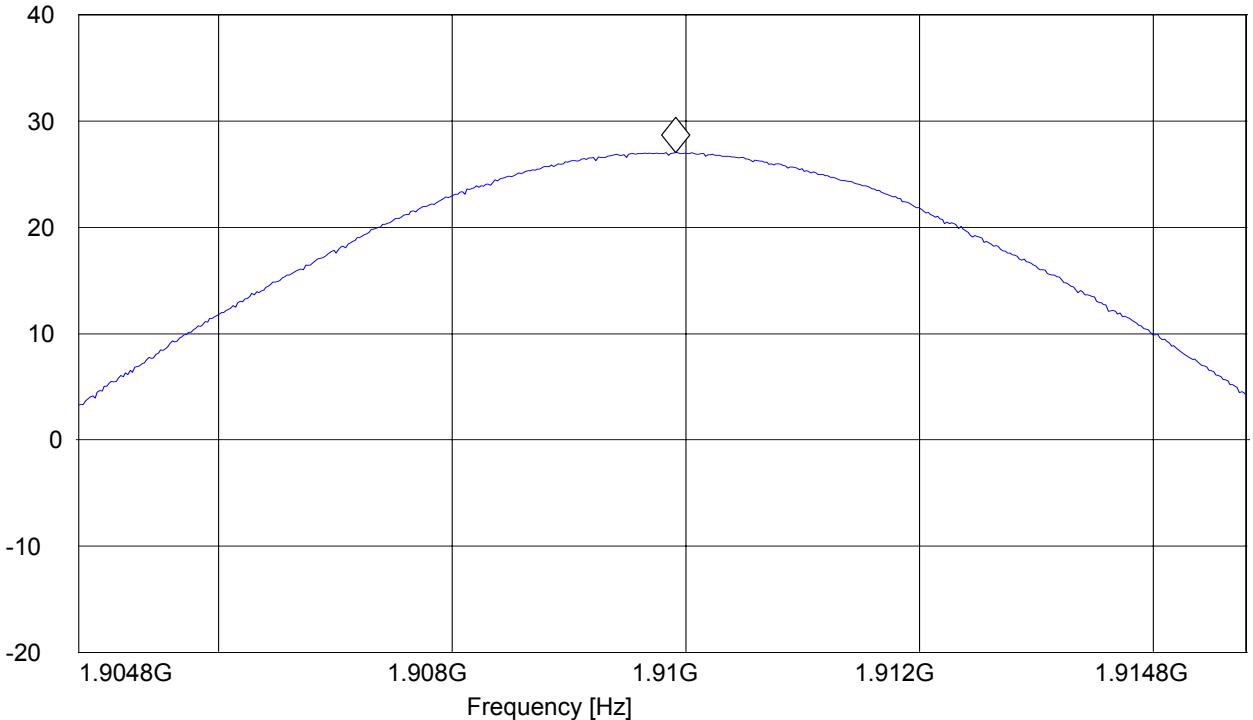
EUT / Description: NOVAT\_010\_06002\_XU870\_EXPRESS  
 Customer: NOVATEL  
 Operating Mode: FDD24, 1900 EGPRS, TABLE 190°  
 Antenna: H  
 EUT: V  
 Test Engineer: PETER  
 Voltage: AC Adapter  
 Sweep: EIRP 1900 CH810

***SWEEP TABLE: "EIRP 1900 CH810"***

Short Description:		EIRP PCS 1900 for channel-810			
Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
1.9 GHz	1.9 GHz	MaxPeak	Coupled	3 MHz	DUMMY-DBM

Marker:	1.90991022 GHz	27.04 dBm
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Level [dBm]

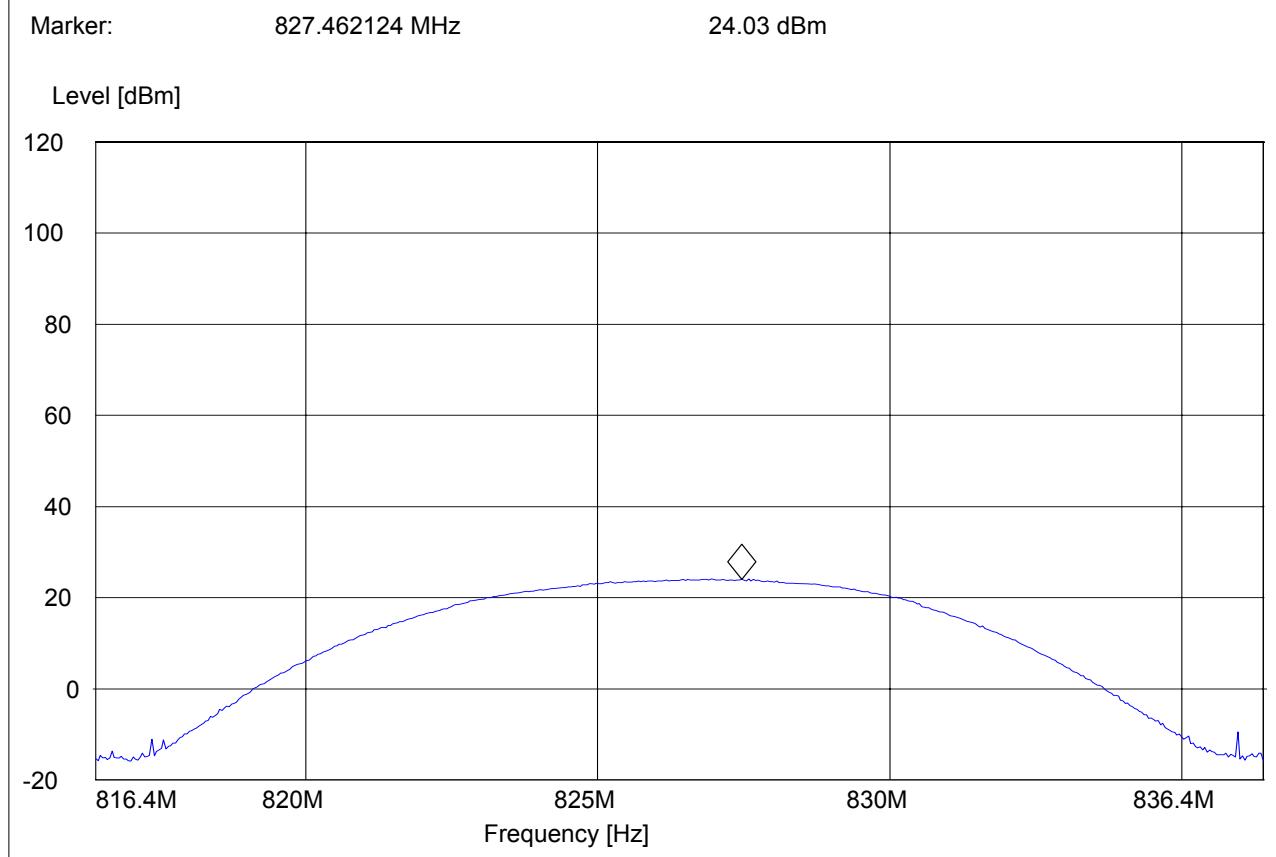


**EIRP (GSM 850)  
CHANNEL 4132 FDD5****§22.913(a)****CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: XU870  
 Customer: Novatel  
 Operating Mode: FDD5 CH4132, TABLE 65°  
 Antenna: V  
 EUT: 30°  
 Test Engineer: Peter  
 Voltage: AC Adaptor  
 Sweep: EIRP 850 CH 4132V

***SWEET TABLE: "EIRP 850 CH 128 V"***

Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
819.2 MHz	829.2 MHz	MaxPeak	Coupled	3 MHz	DUMMY-DBM
			MaxPeak		

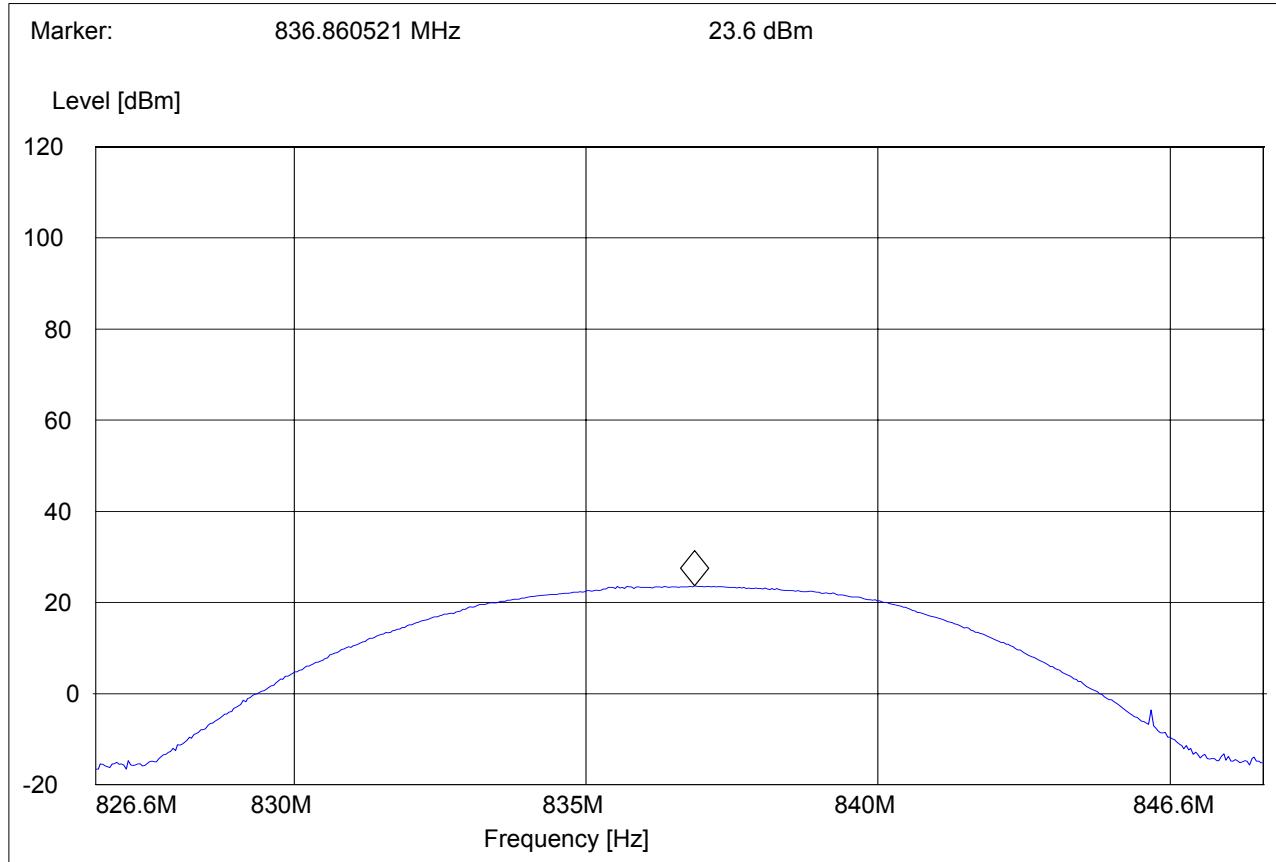


**EIRP (GSM 850)  
CHANNEL 4183 FDD5****§22.913(a)****CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: XU870  
 Customer: Novatel  
 Operating Mode: FDD5 CH4183, TABLE 65°  
 Antenna: V  
 EUT: 30°  
 Test Engineer: Peter  
 Voltage: AC Adaptor  
 Sweep: EIRP 850 CH 4183V

***SWEEP TABLE: "EIRP 850 CH 190 V"***

Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
831.6 MHz	841.6 MHz	MaxPeak	Time Coupled	3 MHz	DUMMY-DBM
			MaxPeak		

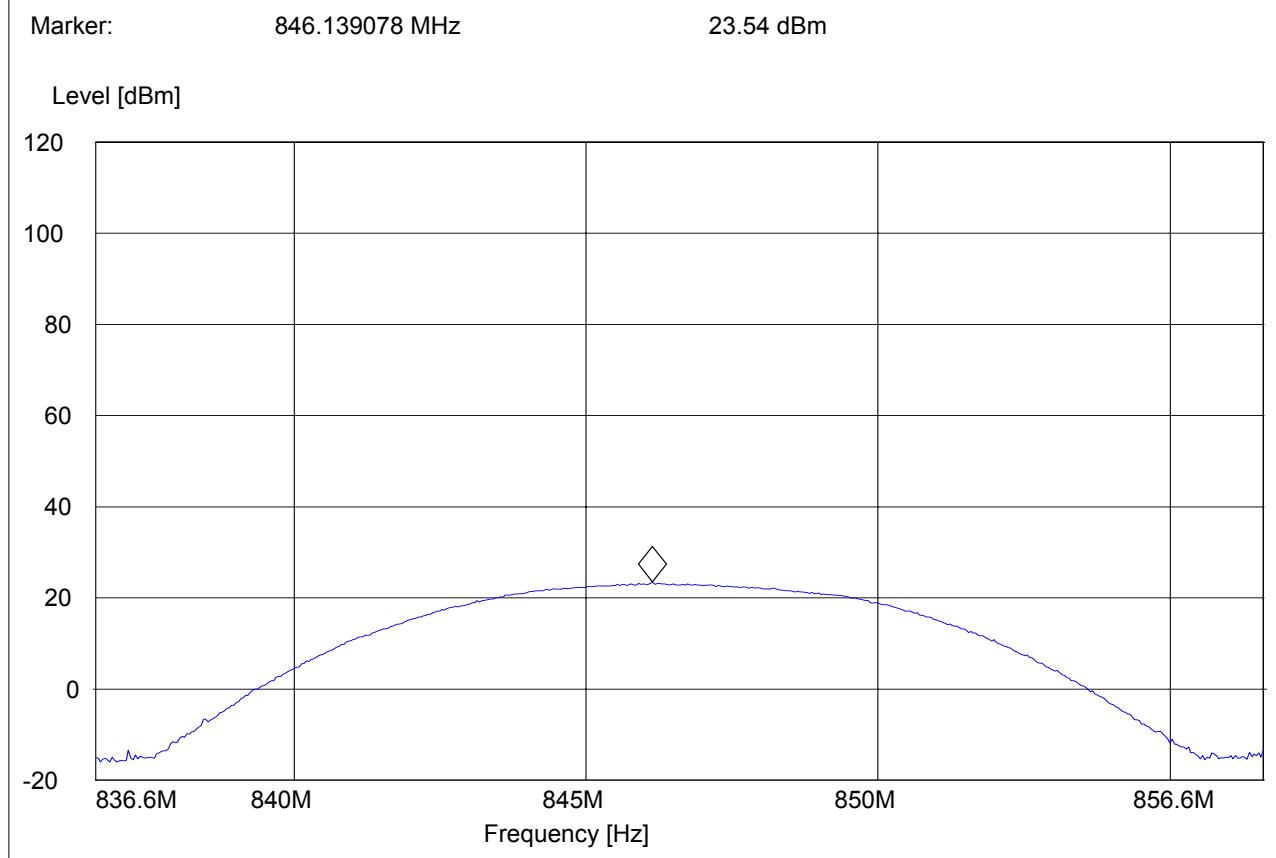


**EIRP (GSM 850)  
CHANNEL 4233 FDD5****§22.913(a)****CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: XU870  
 Customer: Novatel  
 Operating Mode: FDD5 CH4233, TABLE 65°  
 Antenna: V  
 EUT: 30°  
 Test Engineer: Peter  
 Voltage: AC Adaptor  
 Sweep: EIRP 850 CH 4233V

**SWEEP TABLE: "EIRP 850 CH 251 V"**

Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
843.8 MHz	853.8 MHz	MaxPeak	Coupled	3 MHz	DUMMY-DBM

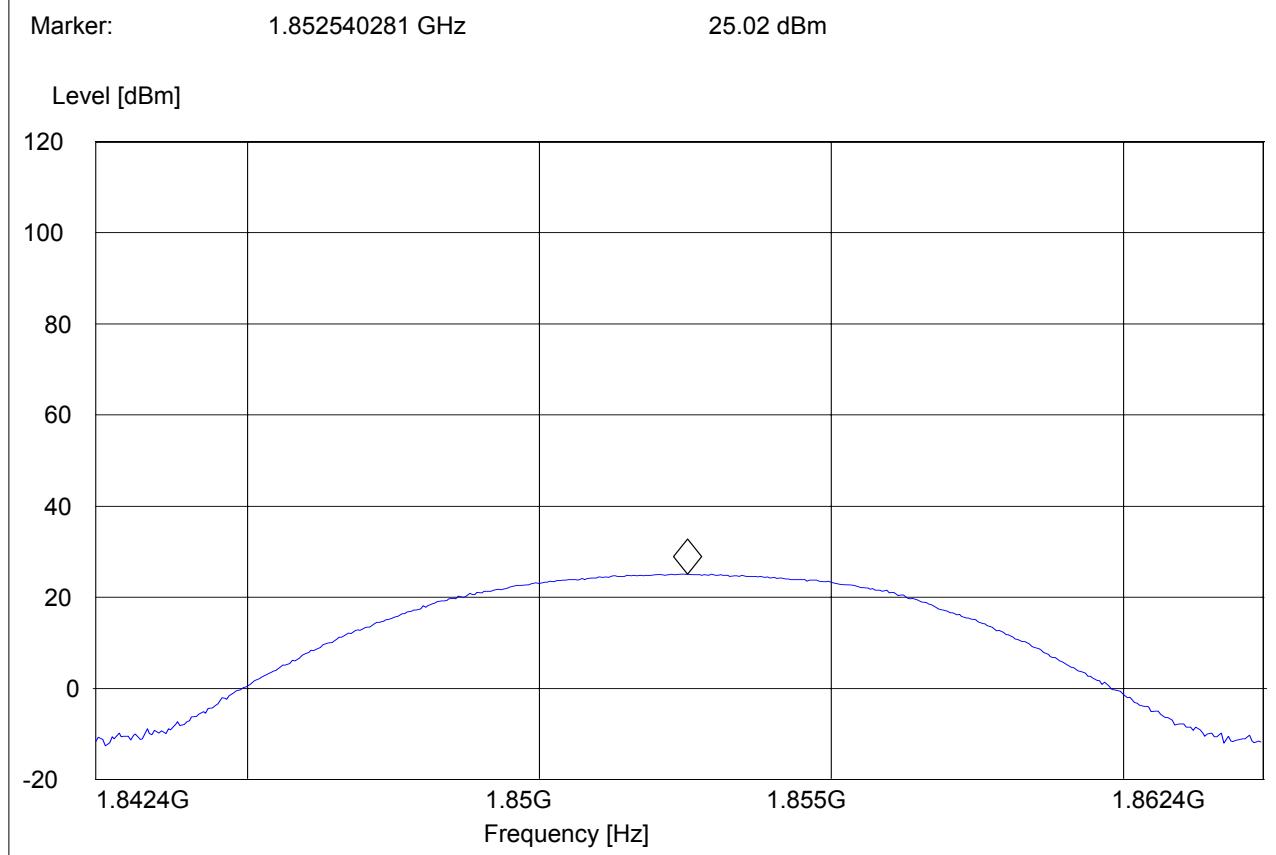


**EIRP (PCS-1900)  
CHANNEL 9262 FDD2****§24.232(b)****CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: XU870  
 Customer: Novatel  
 Operating Mode: FDD2 CH9262, TABLE 198°  
 Antenna: H  
 EUT: 30°  
 Test Engineer: Peter  
 Voltage: AC Adaptor  
 Sweep: EIRP 1900 CH 9262

***SWEEP TABLE: "EIRP 1900 CH512"***

Short Description: EIRP PCS 1900 for channel-512  
 Start Stop Detector Meas. IF Transducer  
 Frequency Frequency Time Bandw.  
 1.8 GHz 1.9 GHz MaxPeak Coupled 3 MHz DUMMY-DBM

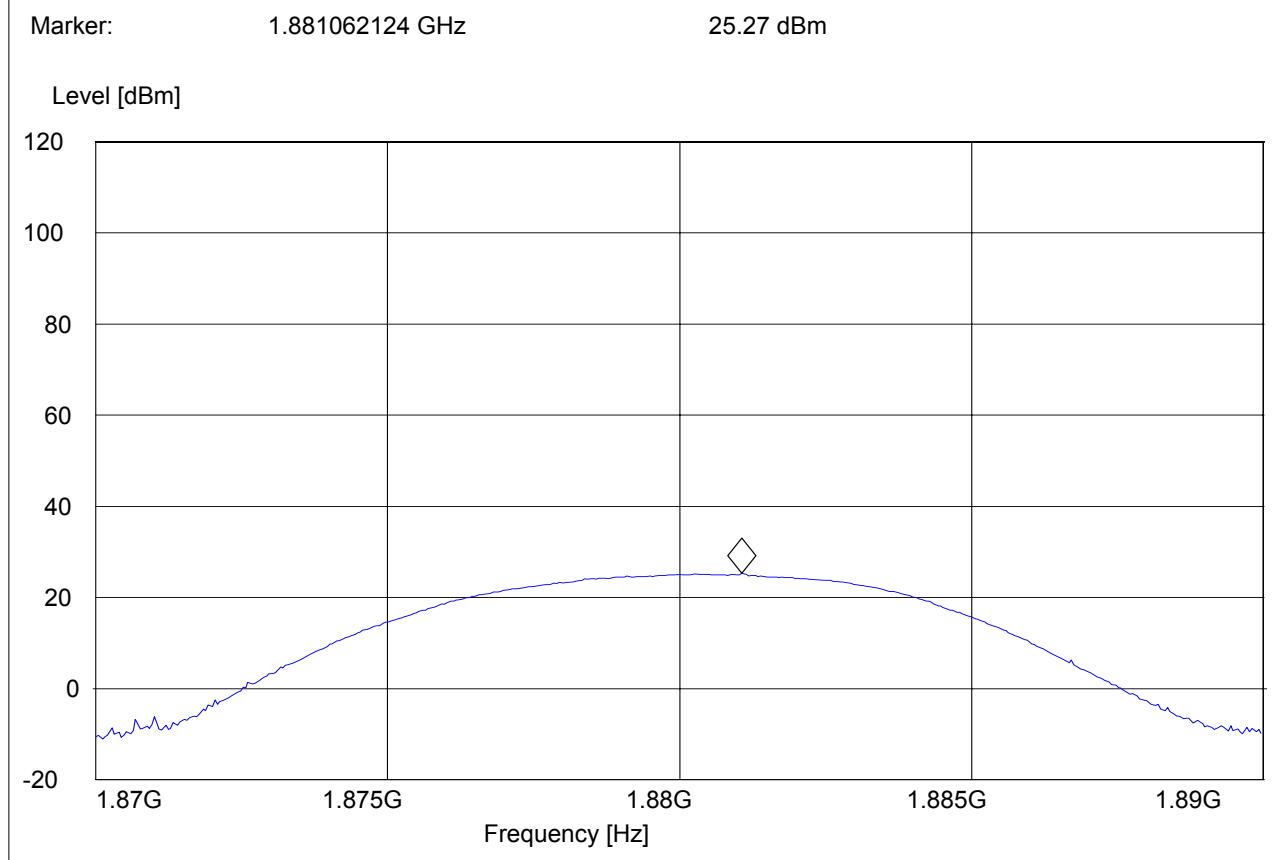


**EIRP (PCS-1900)  
CHANNEL 9400 FDD2****§24.232(b)****CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: XU870  
 Customer: Novatel  
 Operating Mode: FDD2 CH9400, TABLE 198°  
 Antenna: H  
 EUT: 30°  
 Test Engineer: Peter  
 Voltage: AC Adaptor  
 Sweep: EIRP 1900 CH 9400

***SWEEP TABLE: "EIRP 1900 CH9400"***

Short Description: EIRP PCS 1900 for channel-9400  
 Start Stop Detector Meas. IF Transducer  
 Frequency Frequency Time Bandw.  
 1.9 GHz 1.9 GHz MaxPeak Coupled 3 MHz DUMMY-DBM  
 MaxPeak

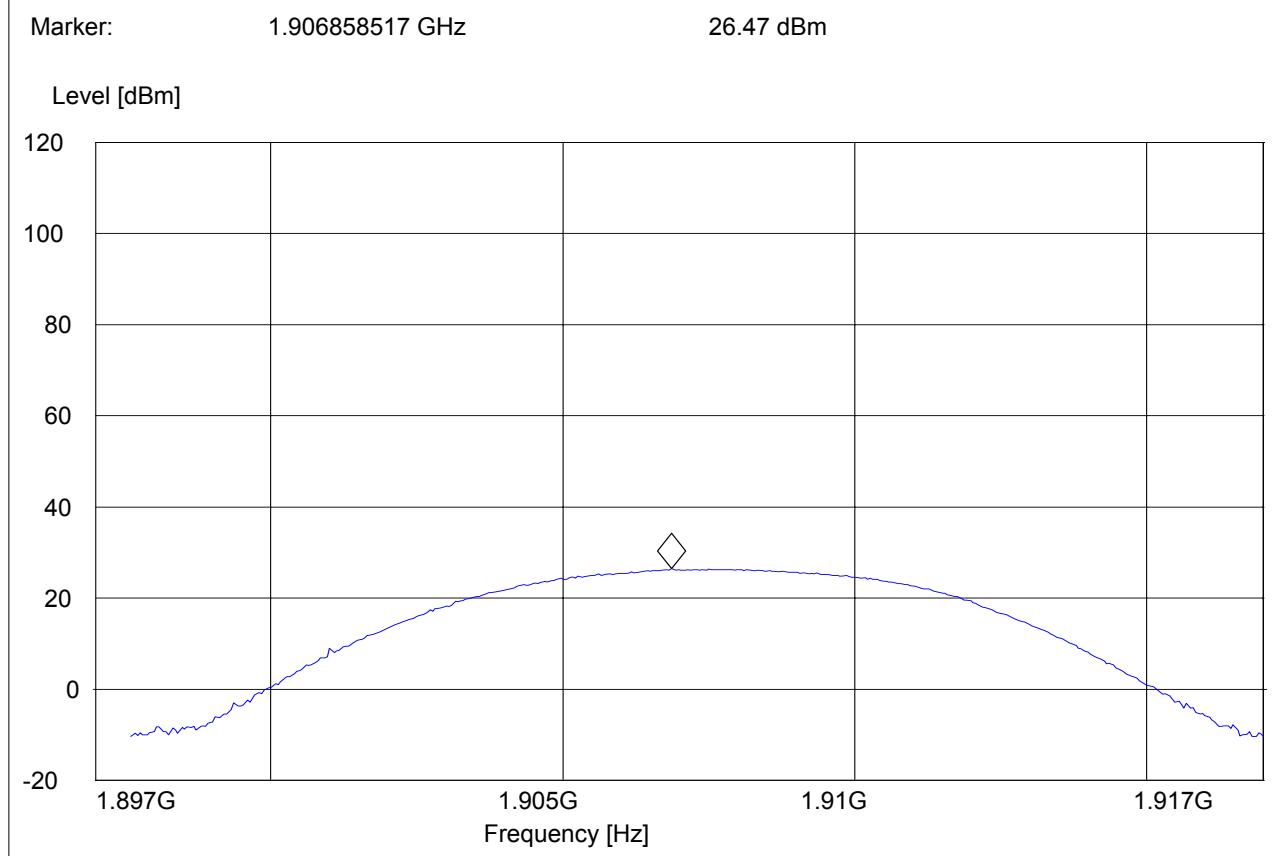


**EIRP (PCS-1900)  
CHANNEL 810 FDD2****§24.232(b)****CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: XU870  
 Customer: Novatel  
 Operating Mode: FDD2 CH9538, TABLE 198°  
 Antenna: H  
 EUT: 30°  
 Test Engineer: Peter  
 Voltage: AC Adaptor  
 Sweep: EIRP 1900 CH 9538

***SWEEP TABLE: "EIRP 1900 CH810"***

Short Description:		EIRP PCS 1900 for channel-810			
Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
1.9 GHz	1.9 GHz	MaxPeak	Coupled	3 MHz	DUMMY-DBM



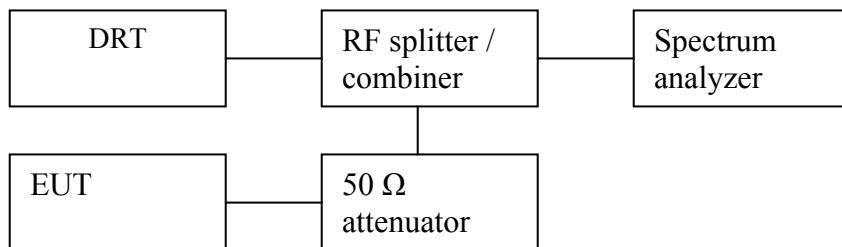
## 5.2 Occupied Bandwidth/Emission Bandwidth

### 5.2.1 FCC 2.1049 Measurements required: Occupied bandwidth

The occupied bandwidth, that is the frequency bandwidth such that below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured under the following conditions as applicable.

(h) Transmitters employing digital modulation techniques-when modulated by an input signal such that its amplitude and symbol rate represent the maximum rated conditions under which the equipment will be operated.

### 5.2.2 Occupied / emission bandwidth measurement procedure:



1. Connect the equipment as shown in the above diagram.
2. Adjust the settings of the Digital Radiocommunication Tester (DRT) to set the EUT to its maximum power at the required channel.
3. Set the spectrum analyzer to measure the 99% (-20 dB) occupied bandwidth. Record the value.
4. Set the spectrum analyzer to measure the 99.5% (-26 dB) emission bandwidth. Record the value.
5. Measurements are to be performed with the EUT set to the low, middle and high channel of each frequency band.

**5.2.3 Occupied / Emission bandwidth results 850 MHz band:**

Frequency (MHz)	Occupied B/W -20 dB (KHz)		Emission B/W -26 dB (KHz)	
	GPRS	E-GPRS	GPRS	E-GPRS
824.2	256.5	240.5	292.6	316.6
836.6	262.5	240.5	302.6	320.6
848.8	278.6	244.5	316.6	310.6

**5.2.4 Occupied / Emission bandwidth results 850 MHz band:FDD 5**

Frequency (MHz)	Occupied B/W -20 dB (KHz)	Emission B/W -26 dB (KHz)
826.4	4569	4669
836.6	4589	4649
846.6	4549	4649

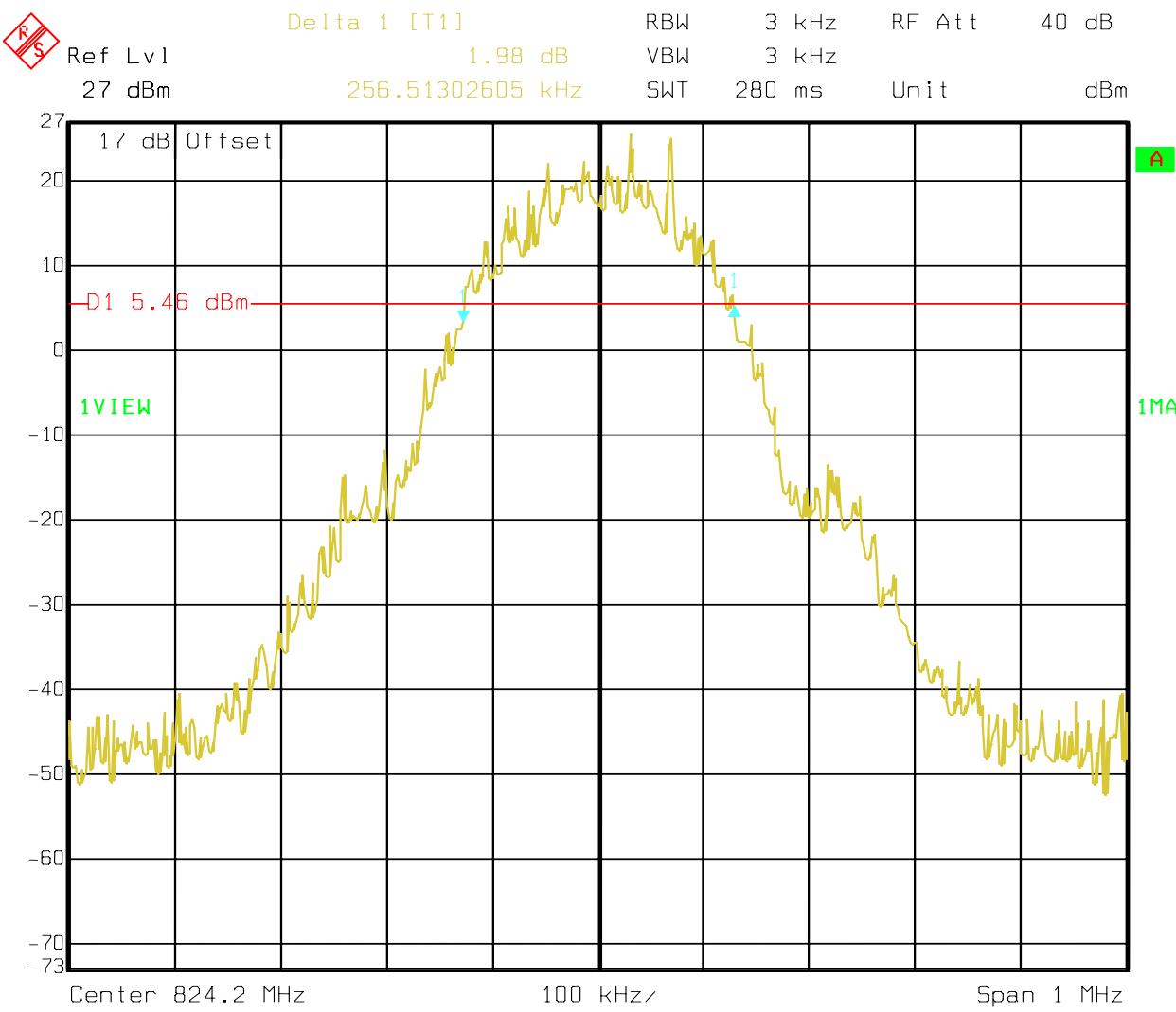
**5.2.5 Occupied / Emission bandwidth results 1900 MHz band:**

Frequency (MHz)	Occupied B/W -20 dB (KHz)		Emission B/W -26 dB (KHz)	
	GPRS	E-GPRS	GPRS	E-GPRS
1850.2	260.5	244.5	314.6	318.6
1880.0	256.5	244.5	316.6	318.6
1909.8	258.5	242.5	318.6	316.6

**5.2.6 Occupied / Emission bandwidth results 1900 MHz band: FDD 2**

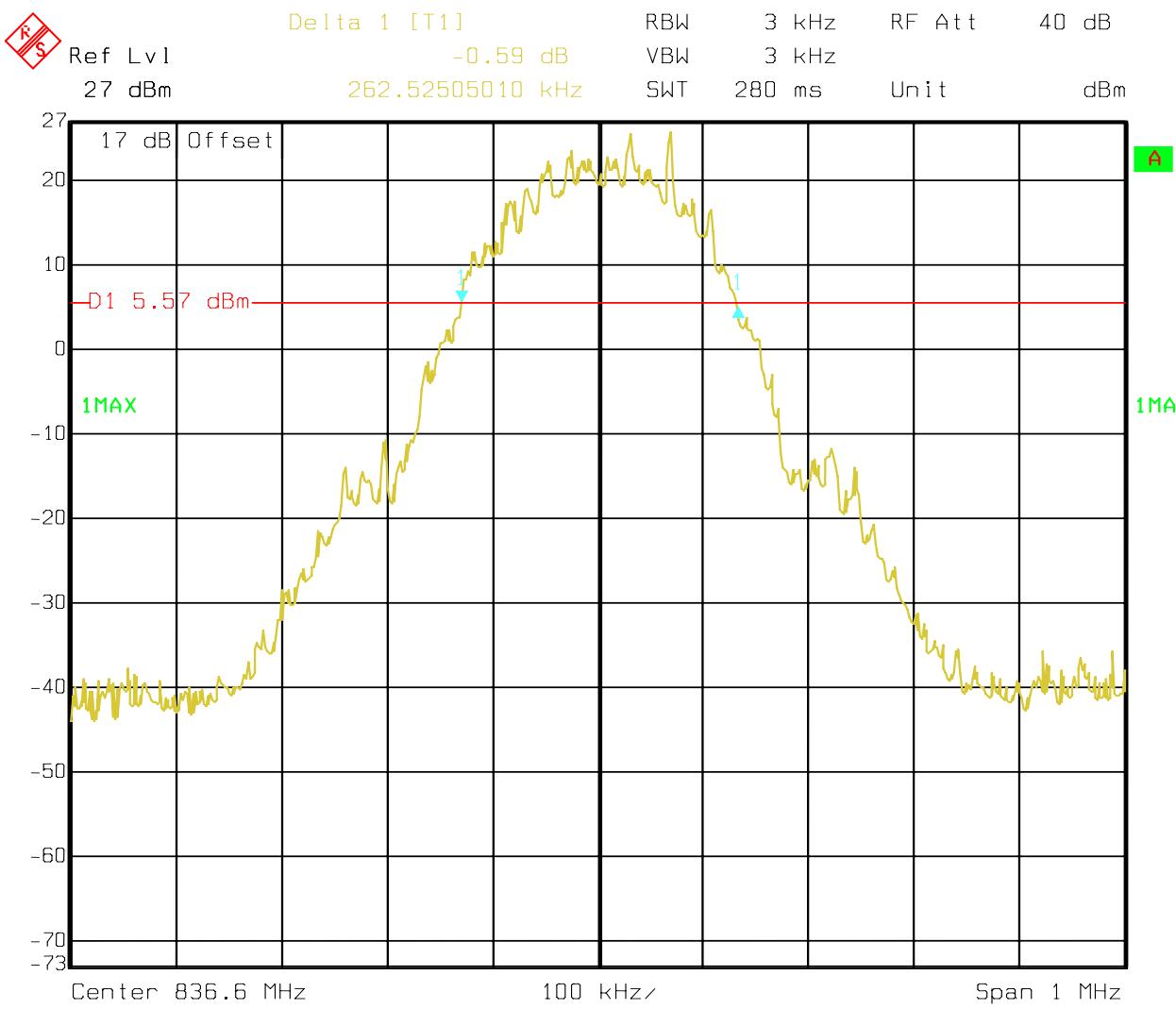
Frequency (MHz)	Occupied B/W -20 dB (KHz)	Emission B/W -26 dB (KHz)
1852.4	4529	4629
1880.0	4529	4629
1907.6	4509	4629

**-20dB (GSM-850)**  
**CHANNEL 128 GPRS**



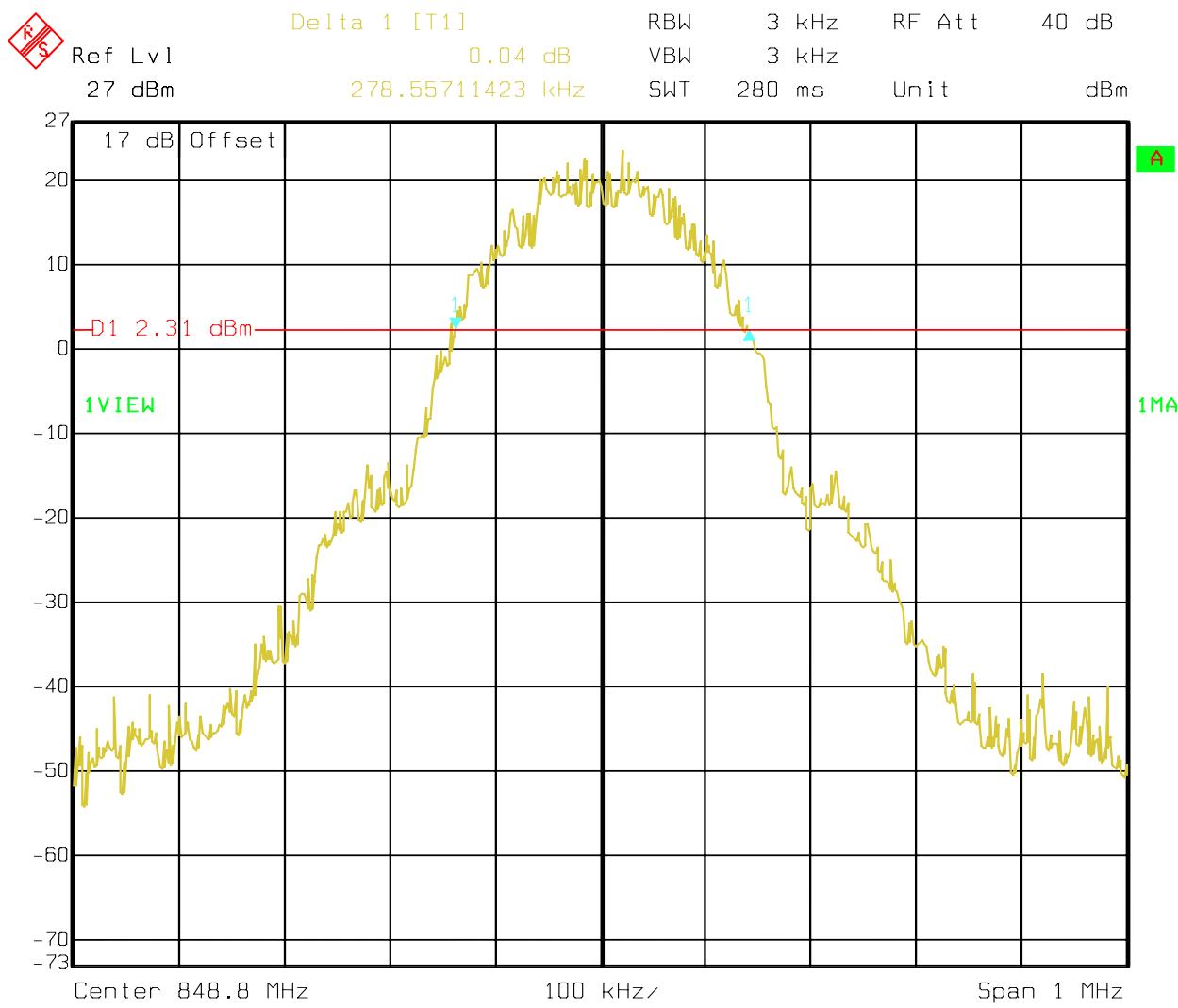
Date: 11.JUL.2006 10:52:57

**-20dB (GSM-850)  
CHANNEL 190 GPRS**



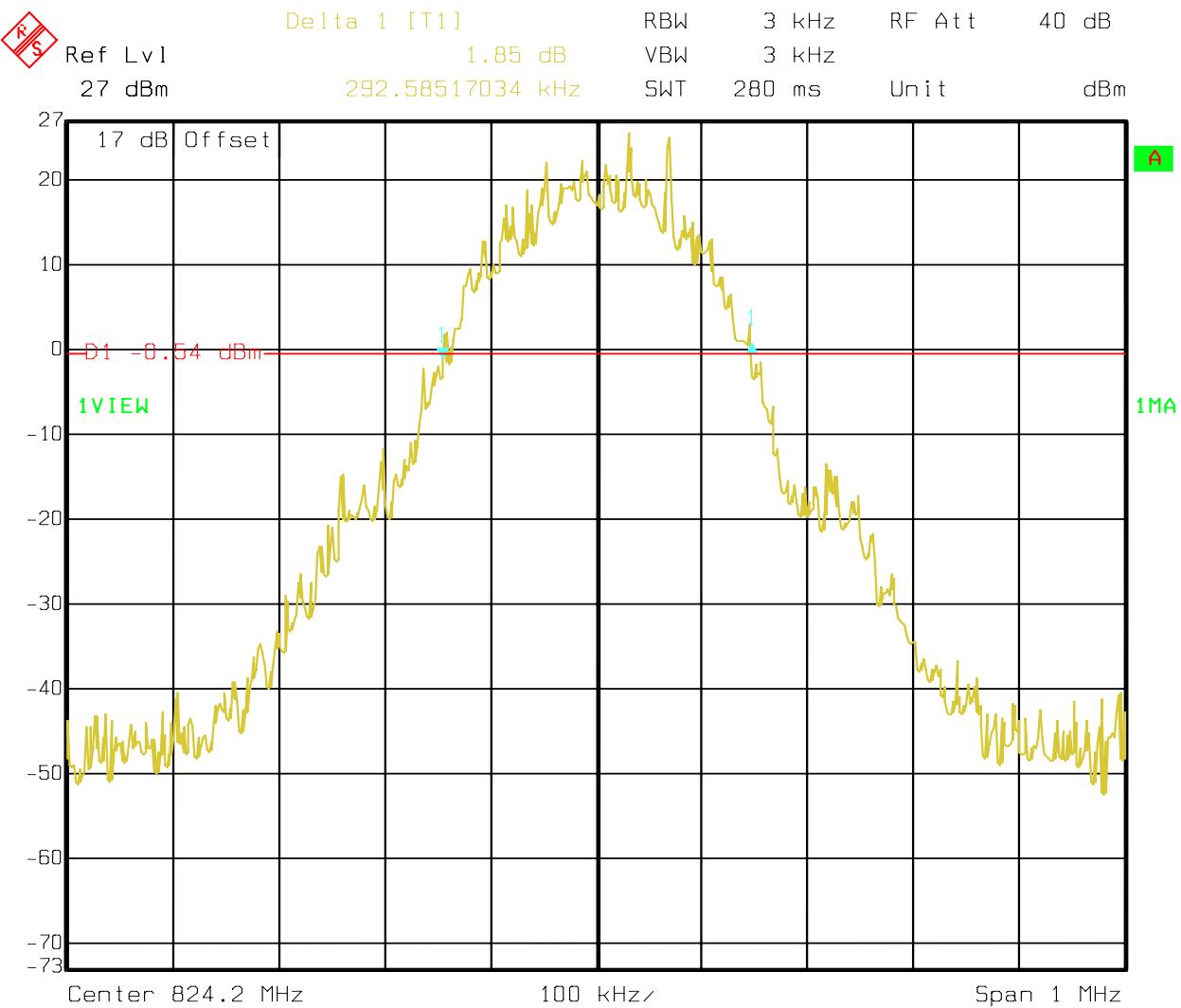
Date: 11.JUL.2006 11:07:12

**-20dB (GSM-850)  
CHANNEL 251 GPRS**



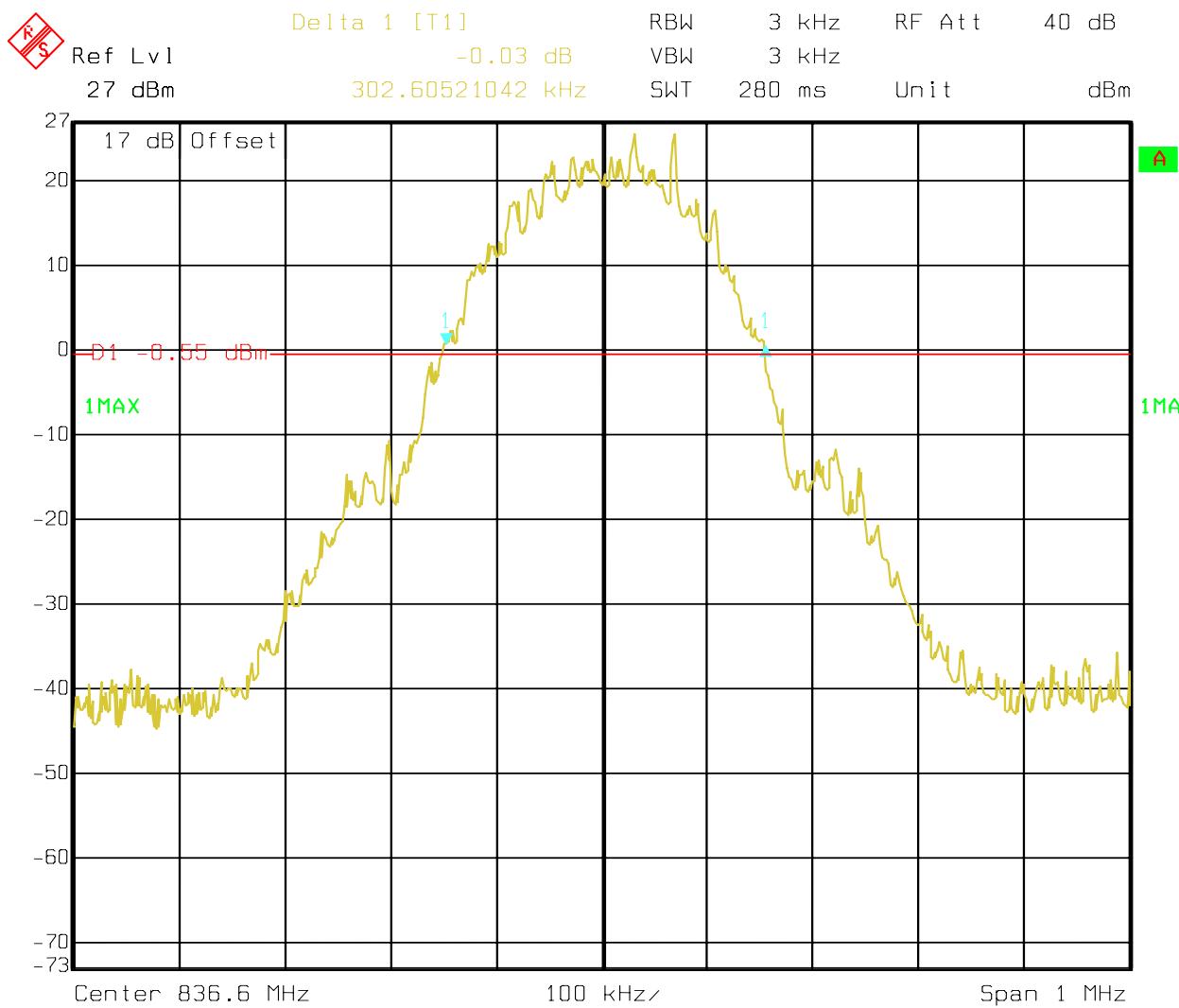
Date: 11.JUL.2006 11:14:42

**-26dB (GSM-850)  
CHANNEL 128 GPRS**



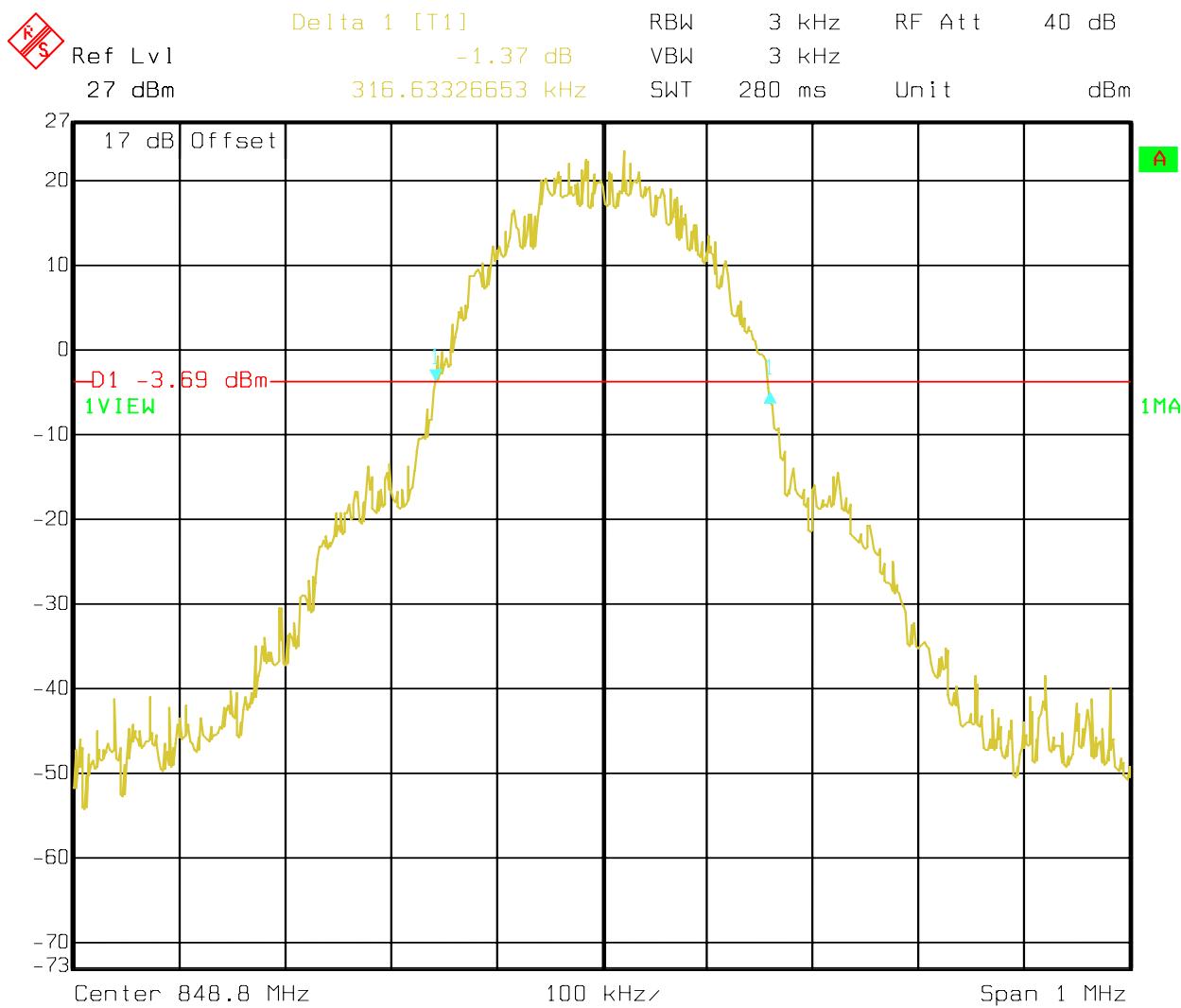
Date: 11.JUL.2006 10:54:34

**-26dB (GSM-850)  
CHANNEL 190 GPRS**



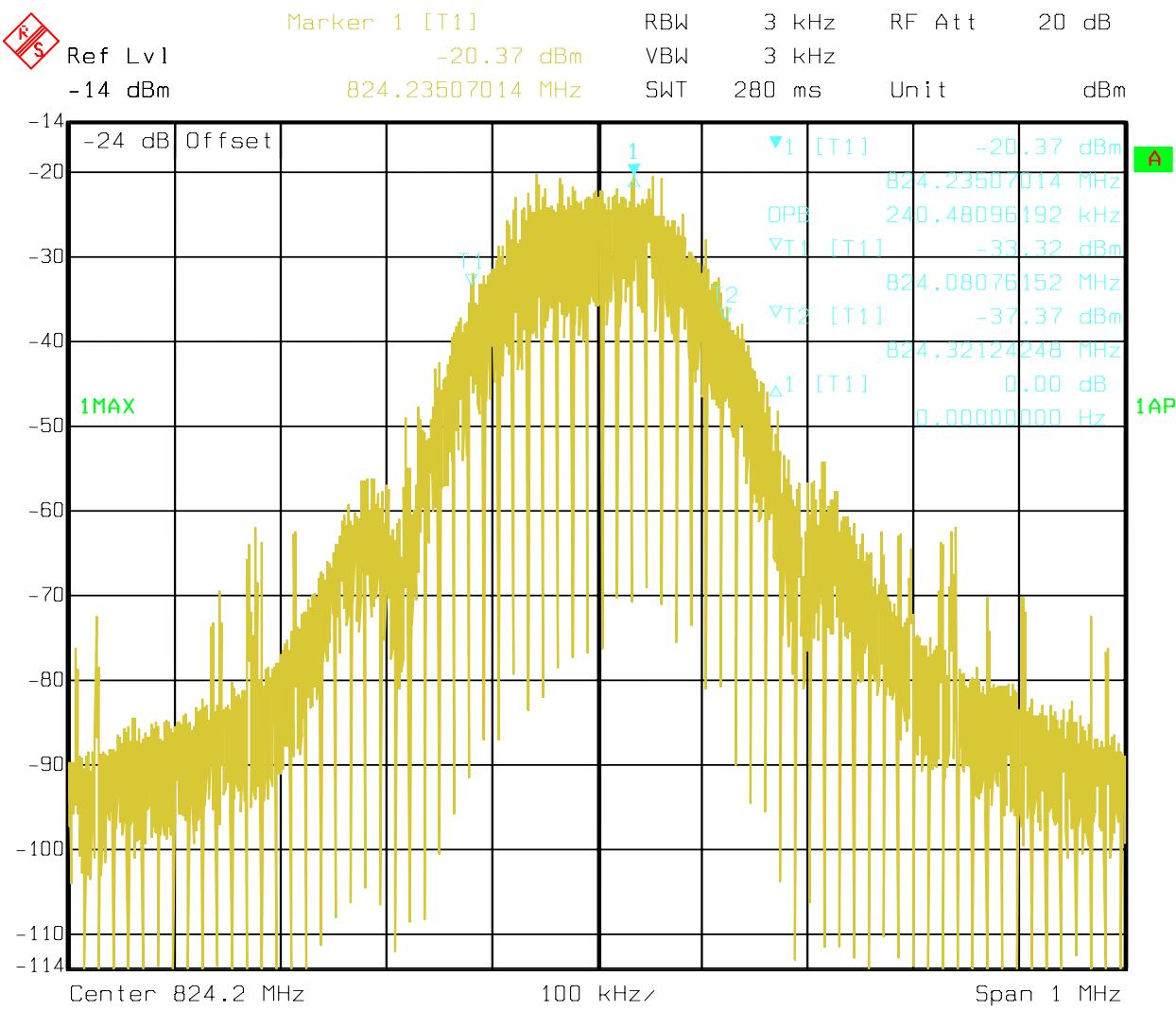
Date: 11.JUL.2006 11:01:32

**-26dB (GSM-850)  
CHANNEL 251 GPRS**



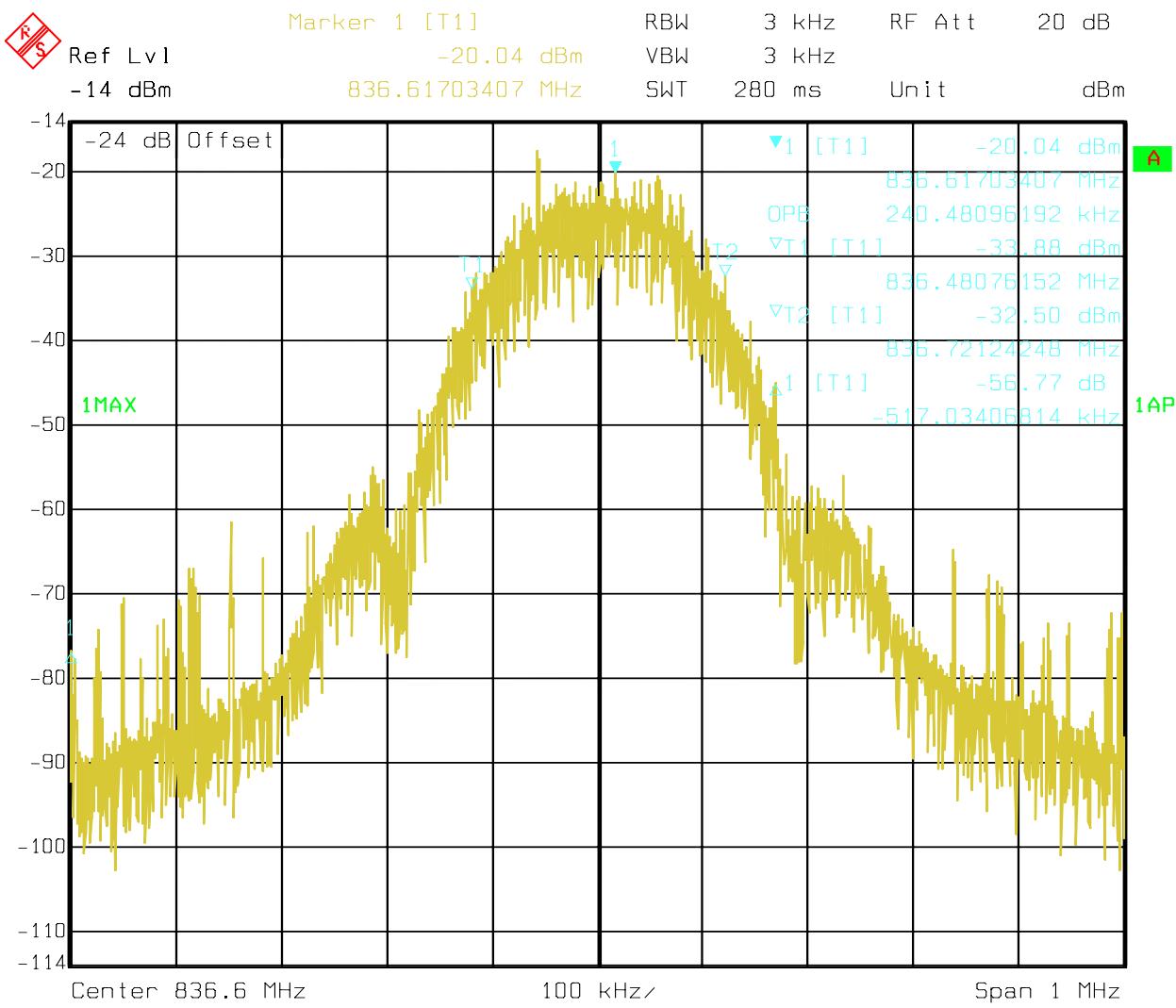
Date: 11.JUL.2006 11:16:40

**-20dB (GSM-850)**  
**CHANNEL 128 EGPRS**



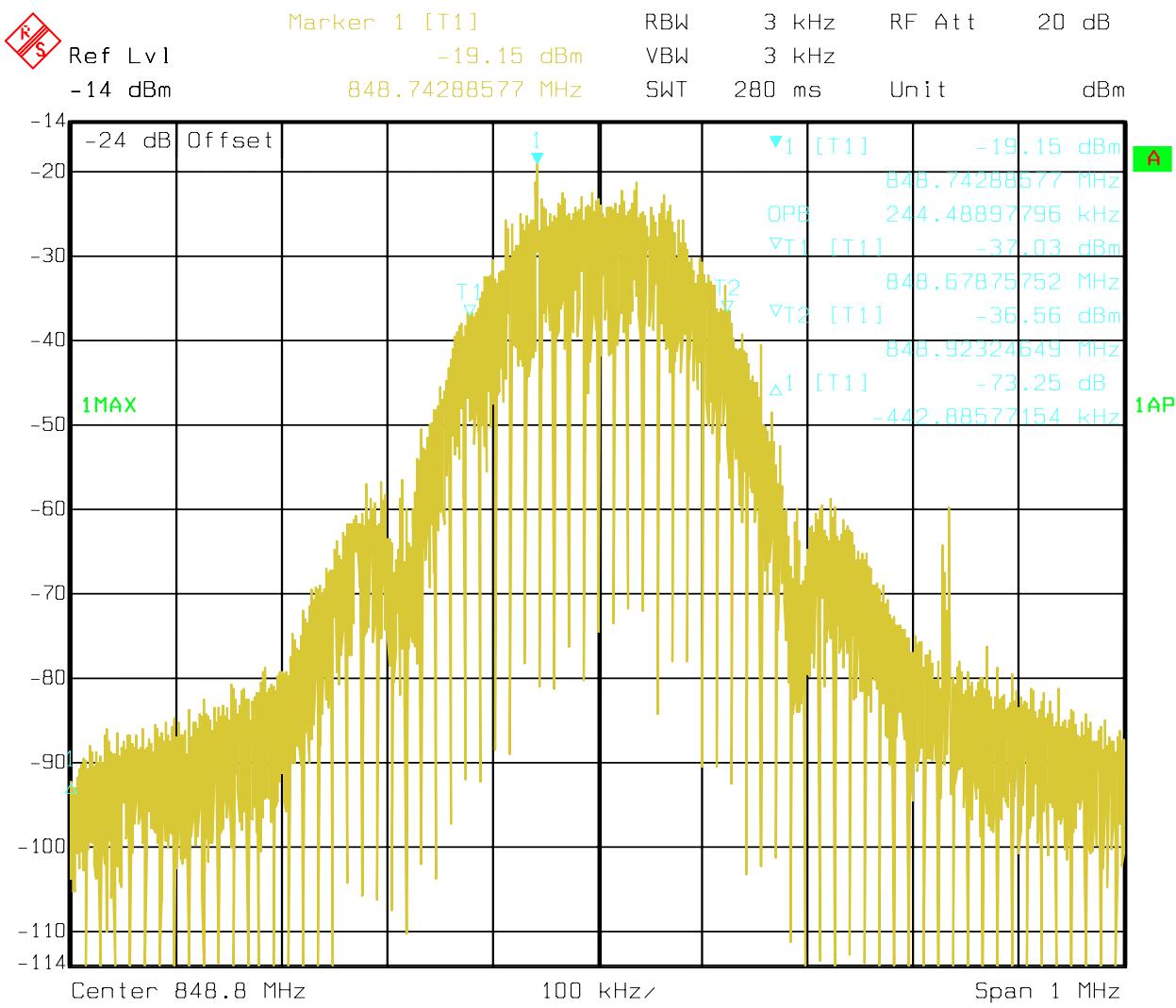
Date: 17.AUG.2006 09:23:10

**-20dB (GSM-850)  
CHANNEL 190 EGPRS**



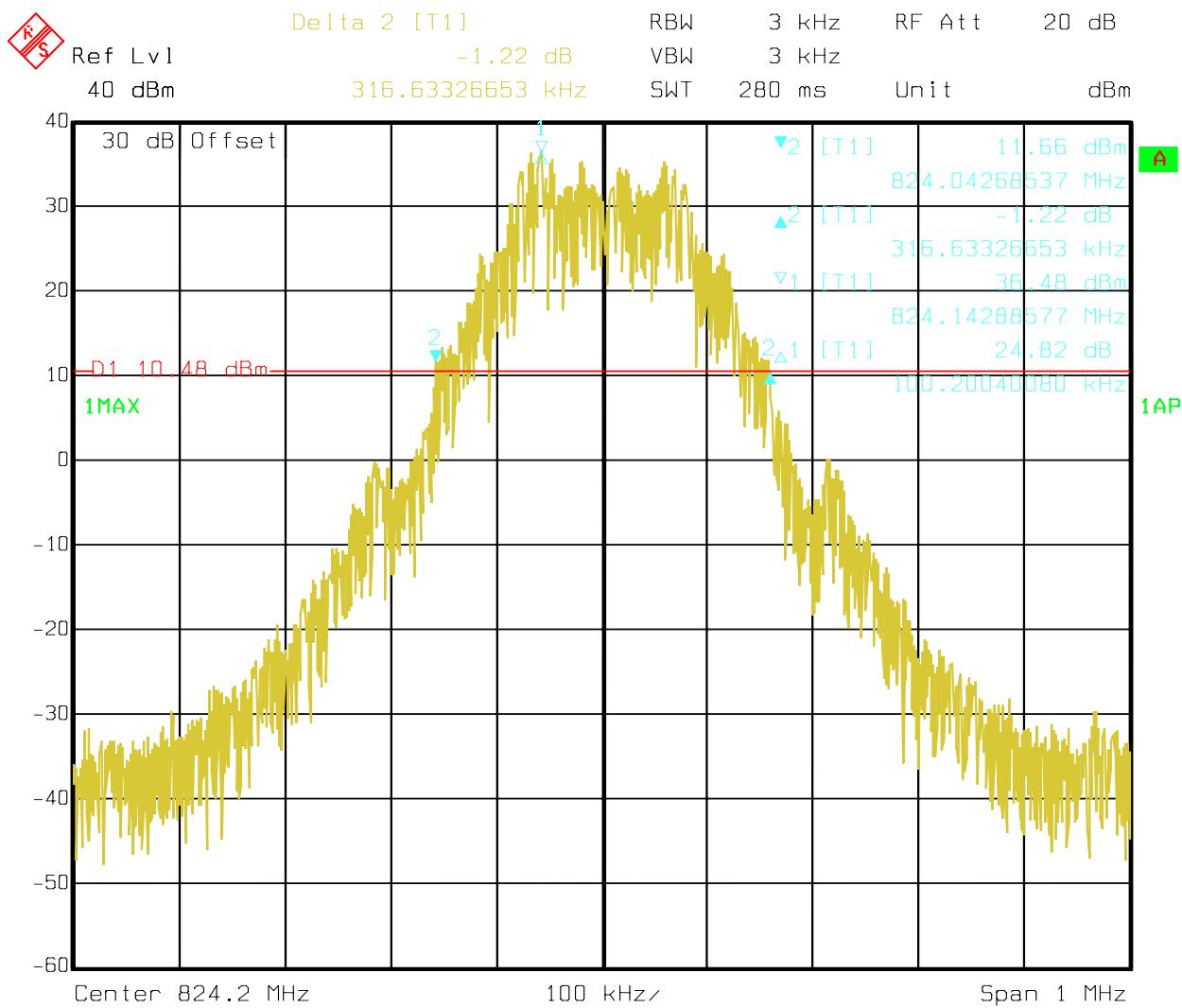
Date: 17.AUG.2006 09:27:25

**-20dB (GSM-850)**  
**CHANNEL 251 EGPRS**



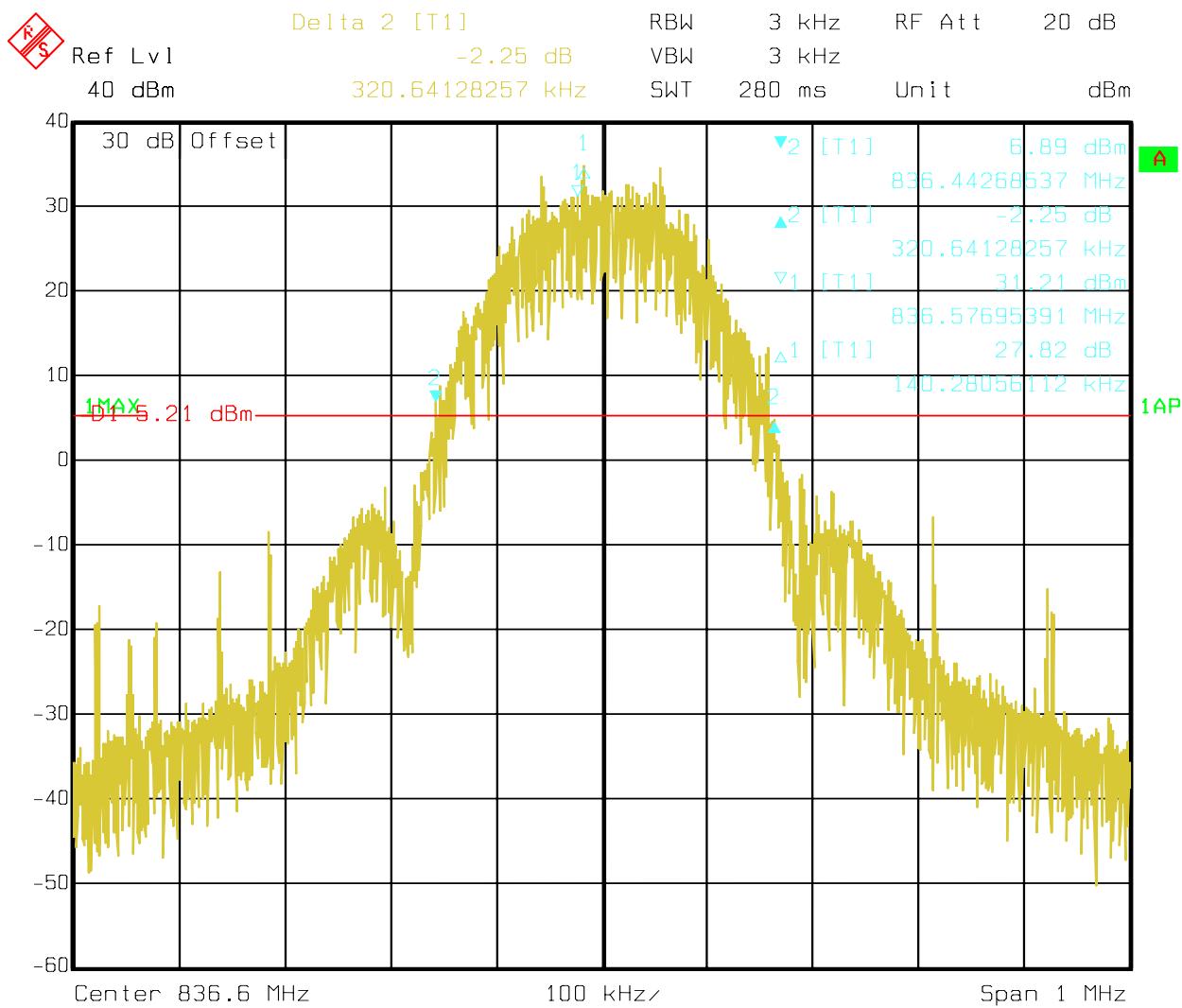
Date: 17.AUG.2006 09:33:15

**-26dB (GSM-850)**  
**CHANNEL 128 EGPRS**



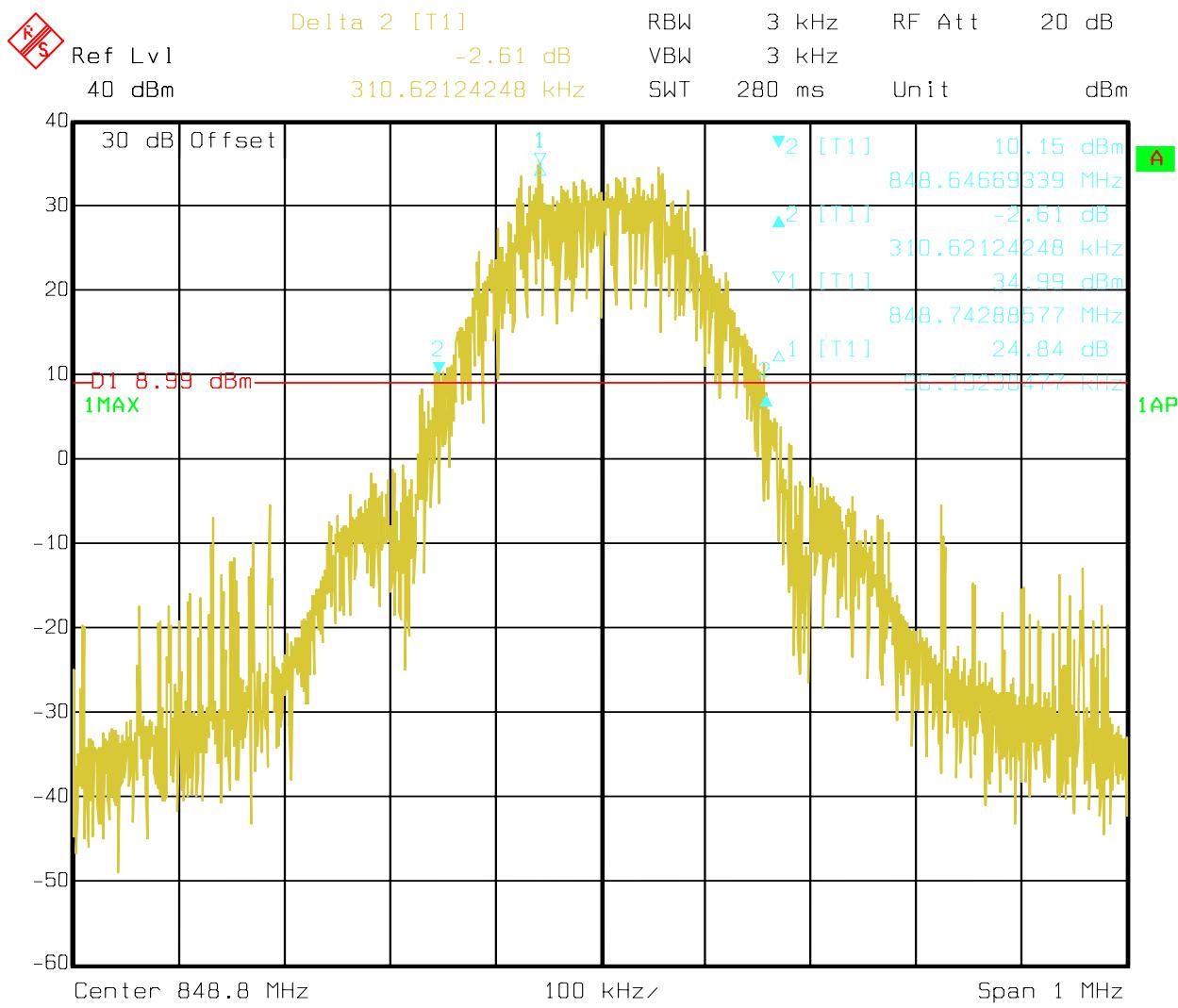
Date: 17.AUG.2006 10:47:10

**-26dB (GSM-850)  
CHANNEL 190 EGPRS**

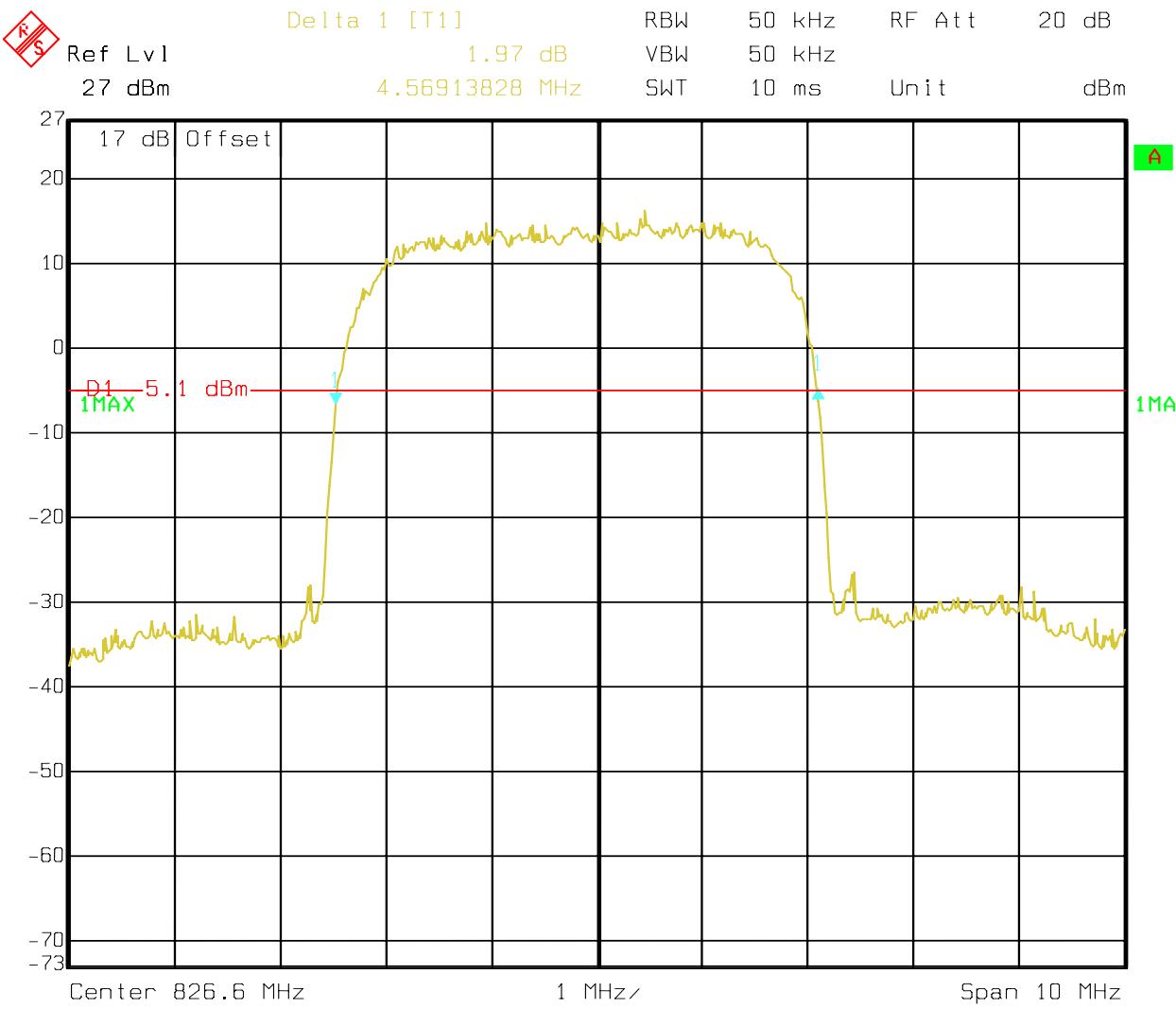


Date: 17.AUG.2006 10:45:09

**-26dB (GSM-850)**  
**CHANNEL 251 EGPRS**

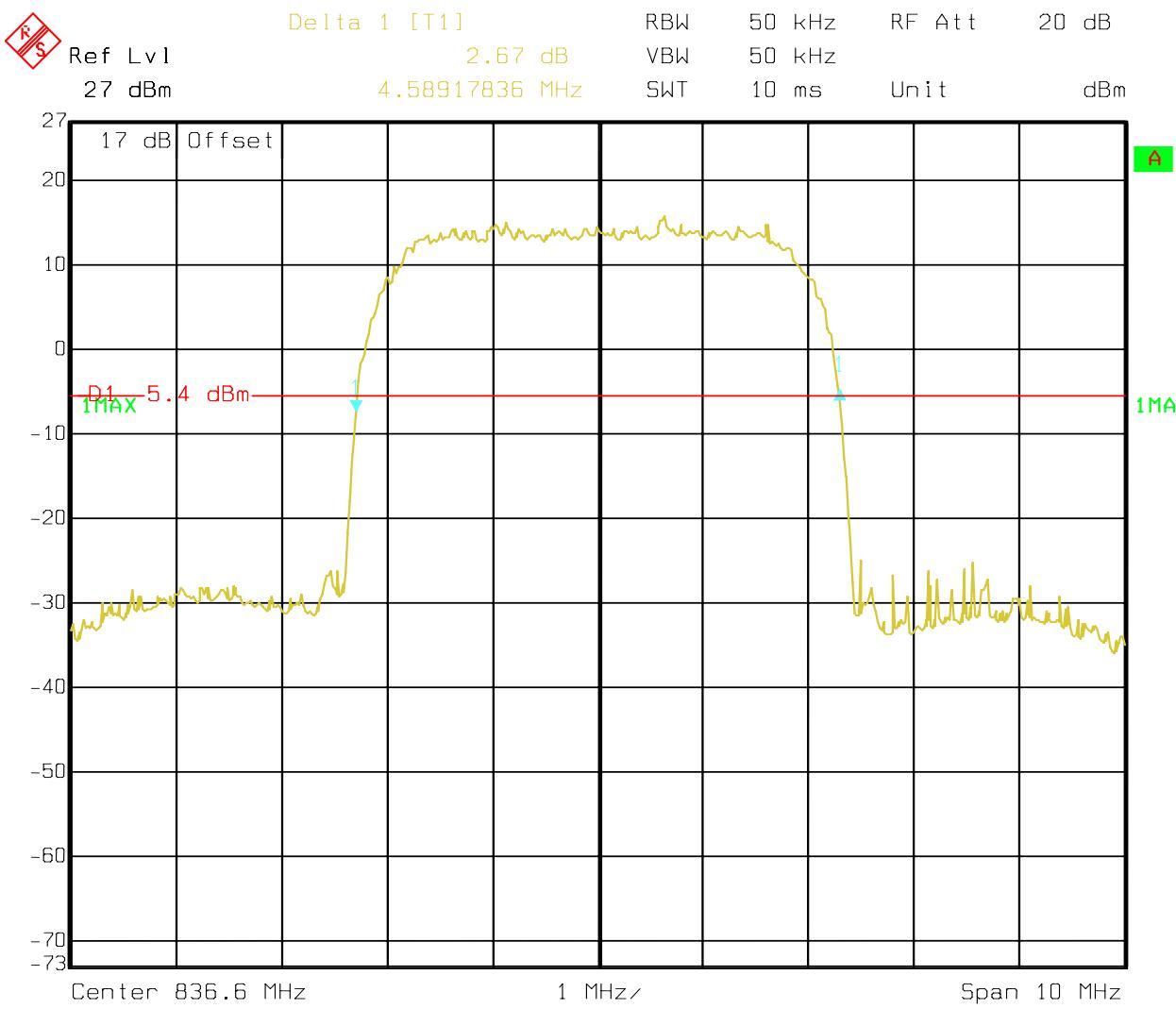


Date: 17.AUG.2006 10:30:23

**-20dB (GSM-850)****CHANNEL 4132 FDD5**

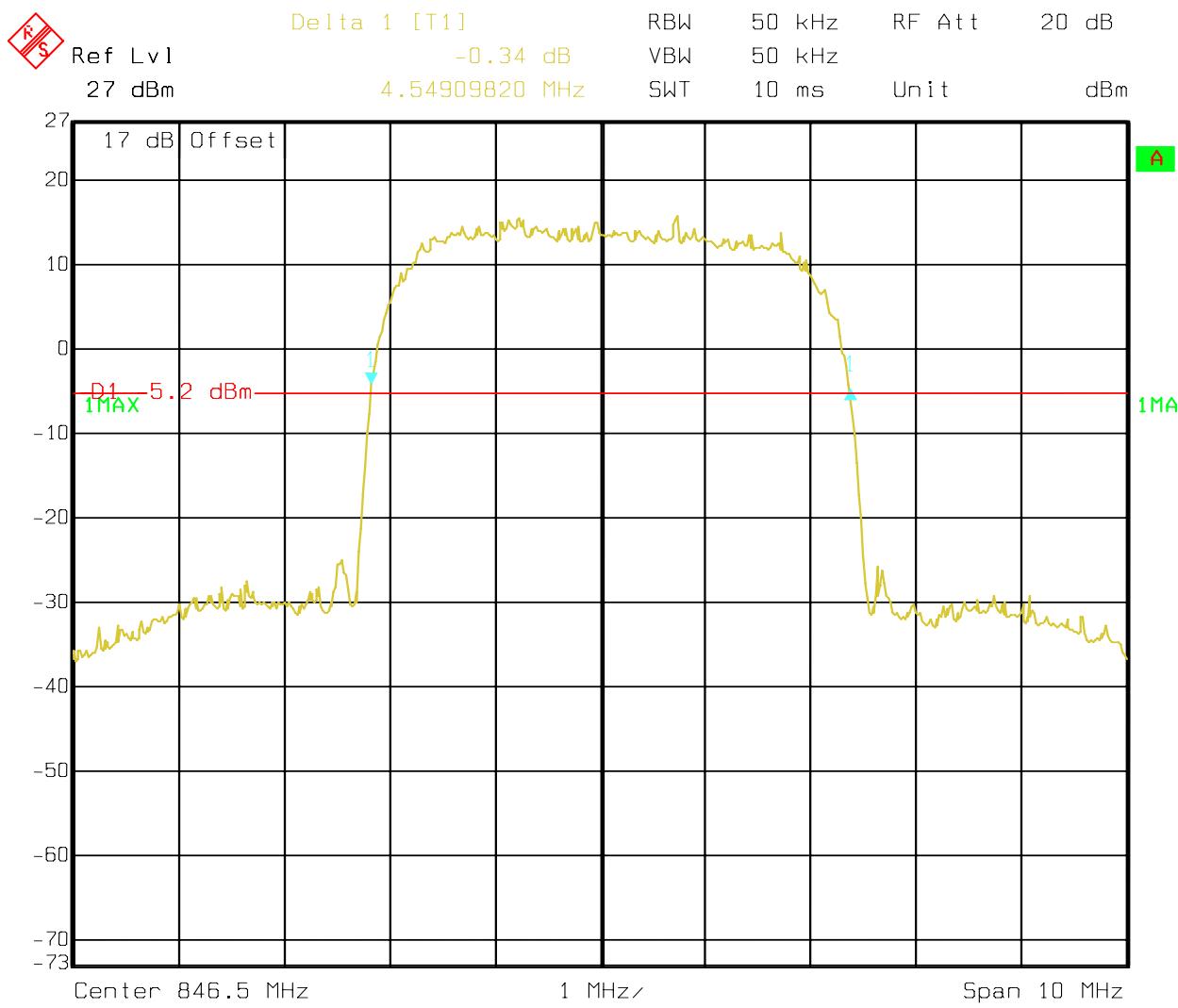
Date: 26.JUL.2006 11:01:38

**-20dB (GSM-850)**  
**CHANNEL 4183 FDD5**



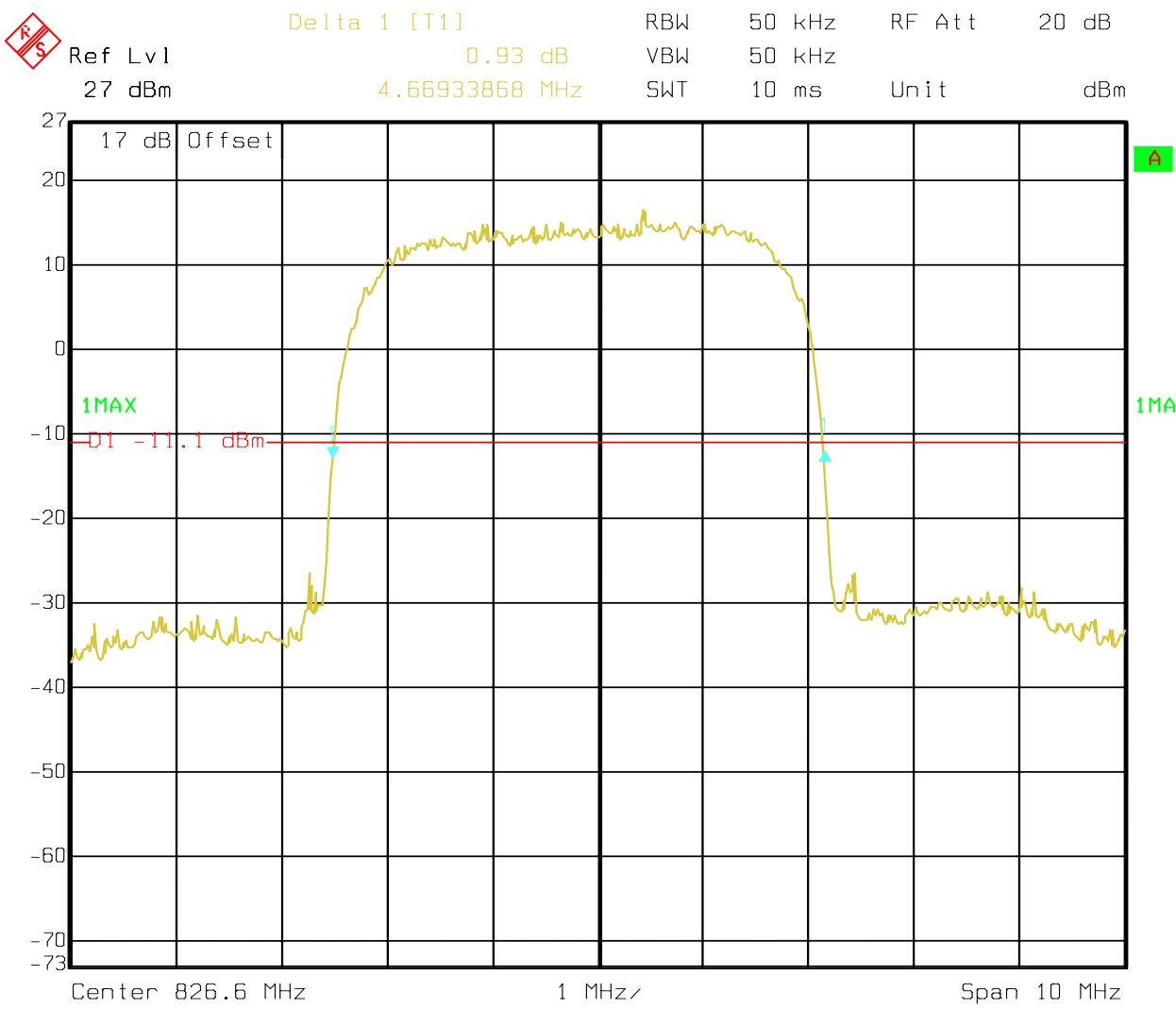
Date: 26.JUL.2006 10:59:05

**-20dB (GSM-850)**  
**CHANNEL 4233 FDD5**



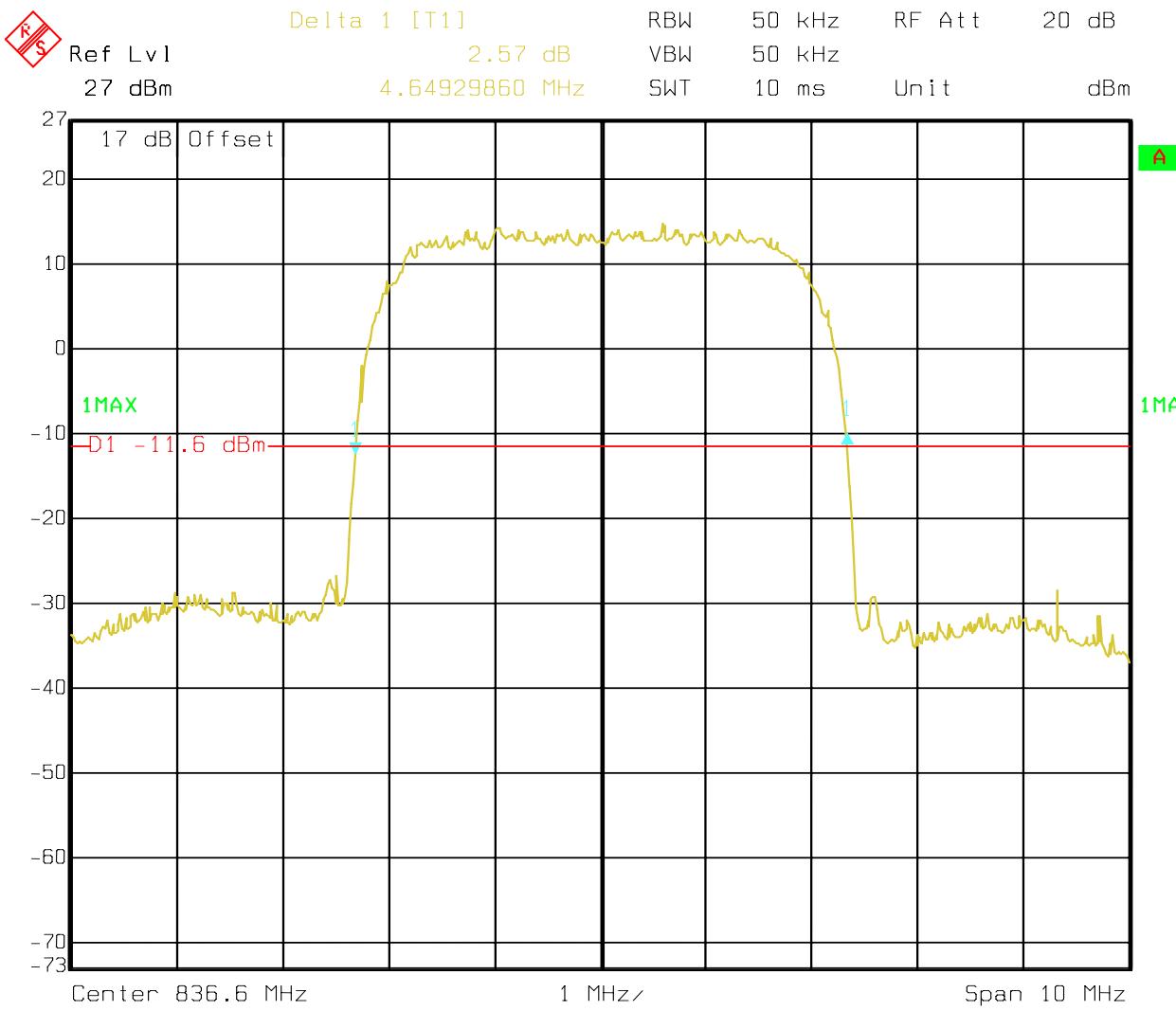
Date: 26.JUL.2006 10:37:18

**-26dB (GSM-850)**  
**CHANNEL 4132 FDD5**



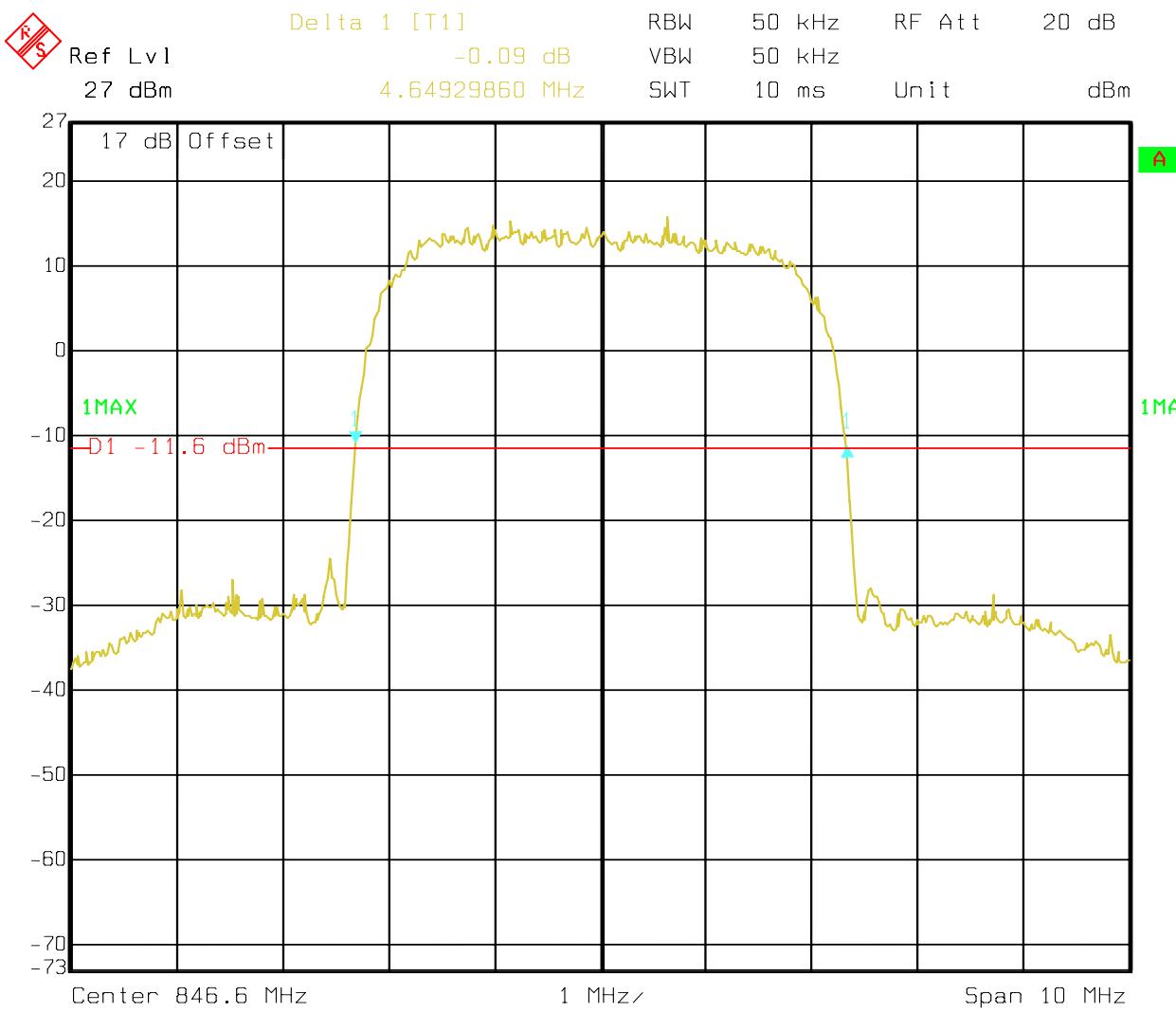
Date: 26.JUL.2006 11:03:16

**-26dB (GSM-850)**  
**CHANNEL 4183 FDD5**



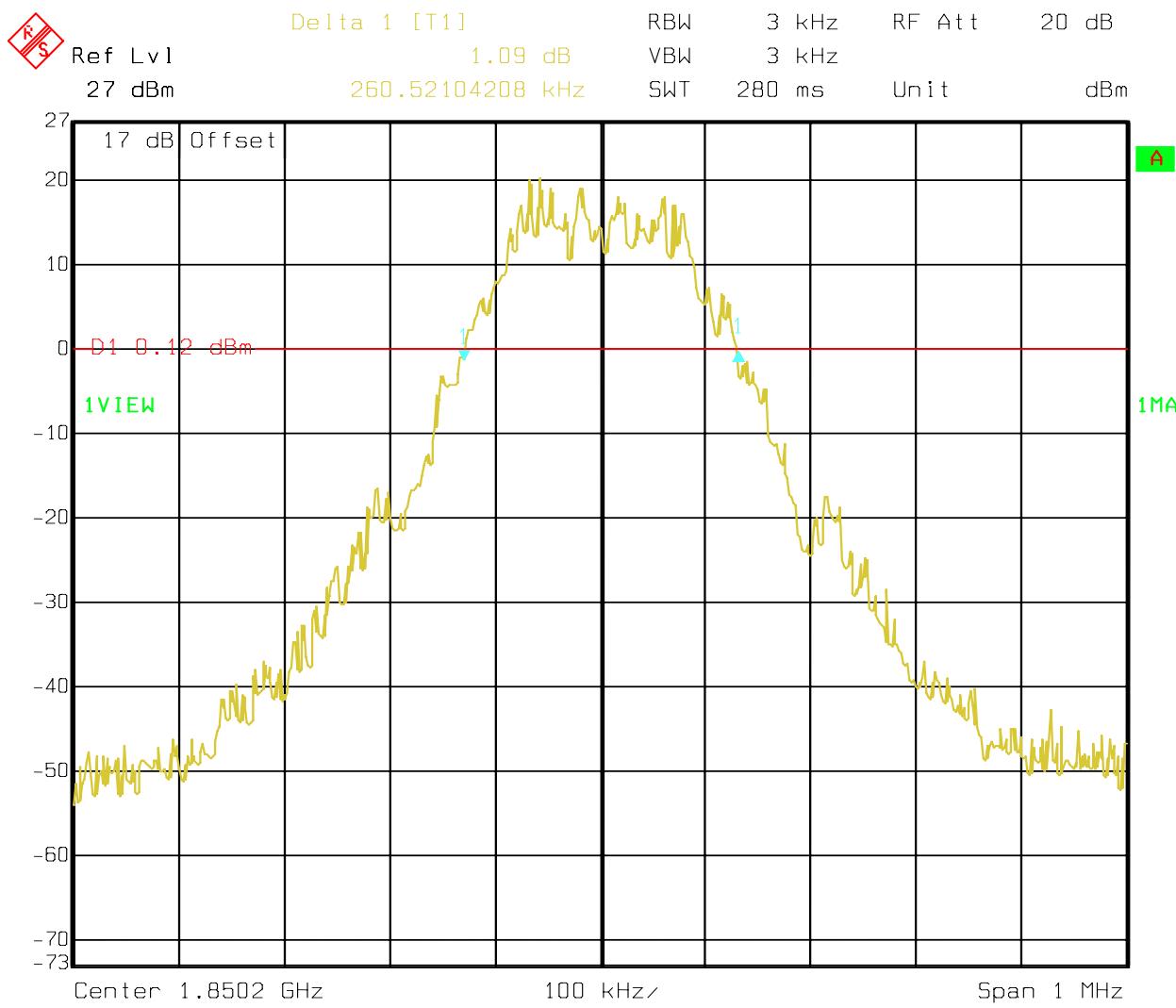
Date: 26.JUL.2006 11:04:57

**-26dB (GSM-850)**  
**CHANNEL 4233 FDD5**



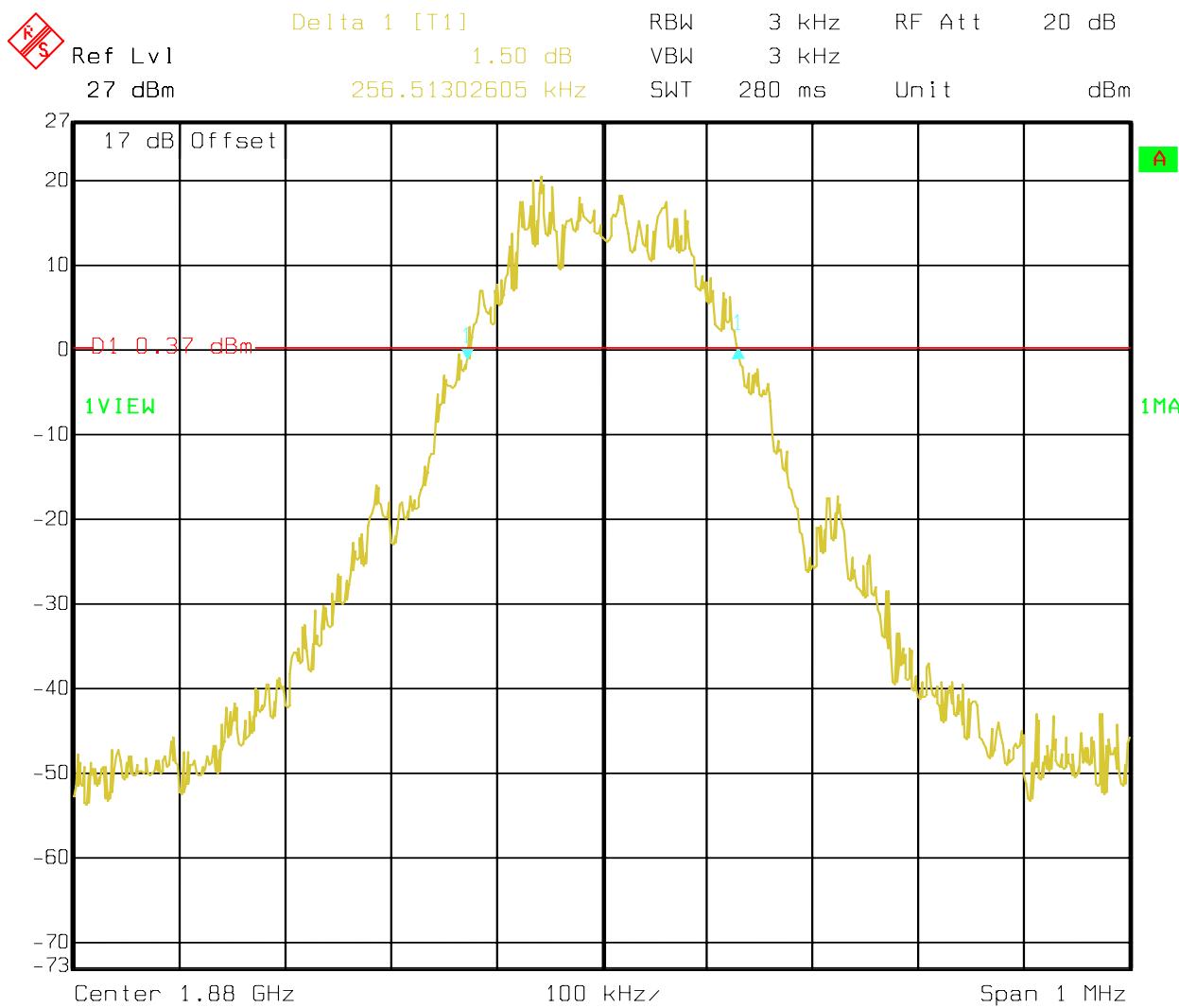
Date: 26.JUL.2006 11:06:33

**-20dB (PCS-1900)  
CHANNEL 512 GPRS**



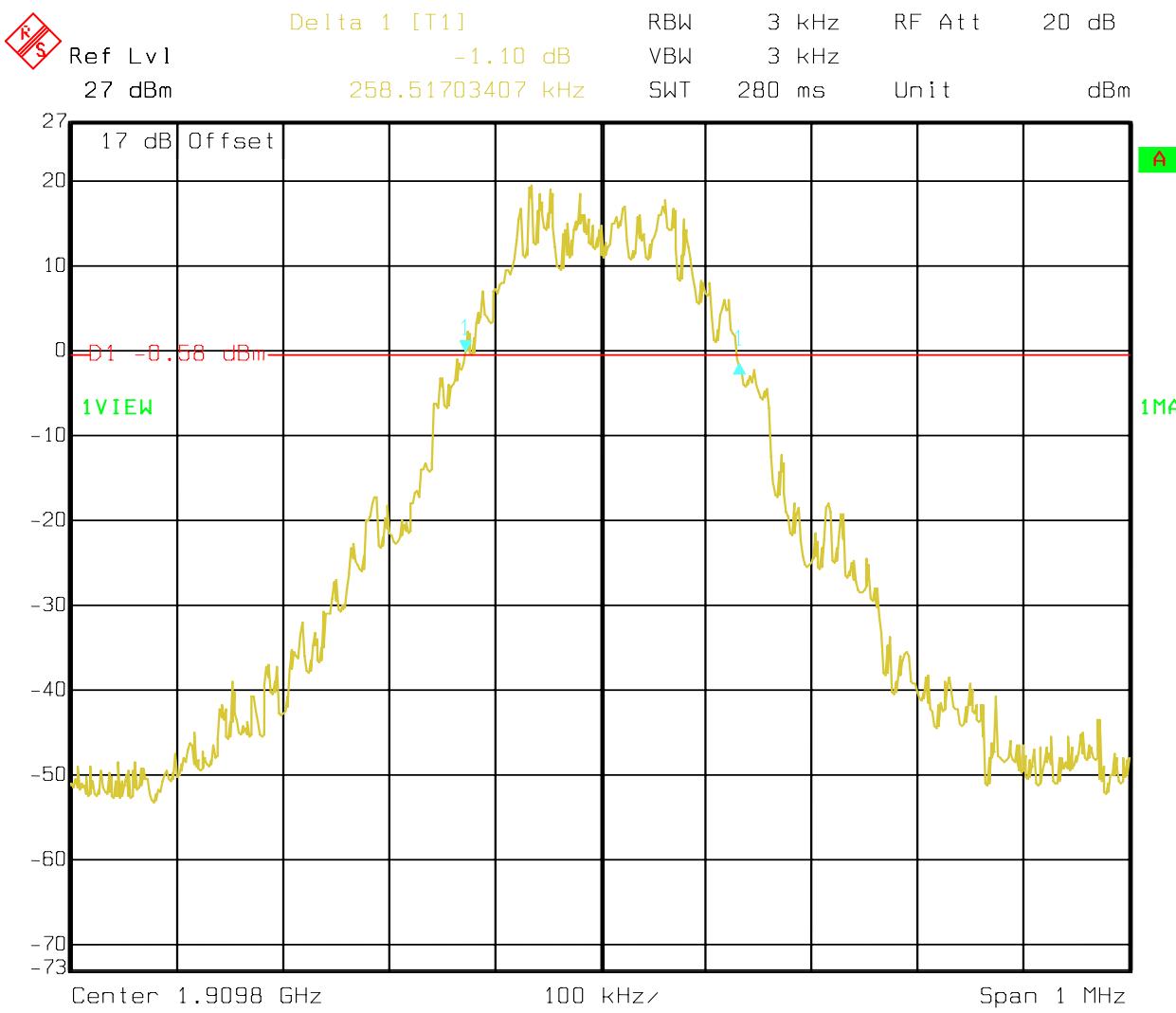
Date: 12.JUL.2006 12:47:26

**-20dB (PCS-1900)  
CHANNEL 661 GPRS**



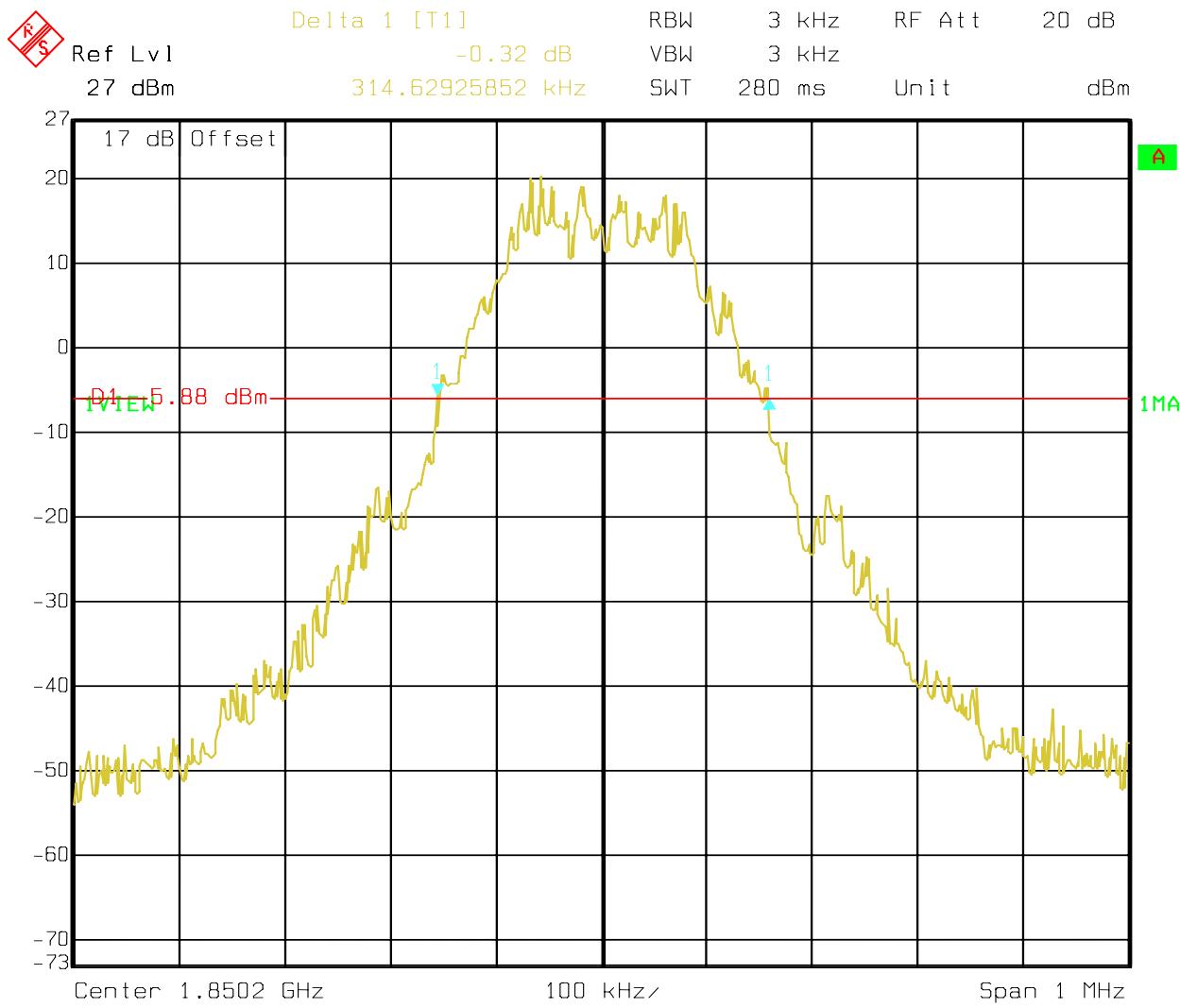
Date: 12.JUL.2006 12:50:34

**-20dB (PCS-1900)  
CHANNEL 810 GPRS**



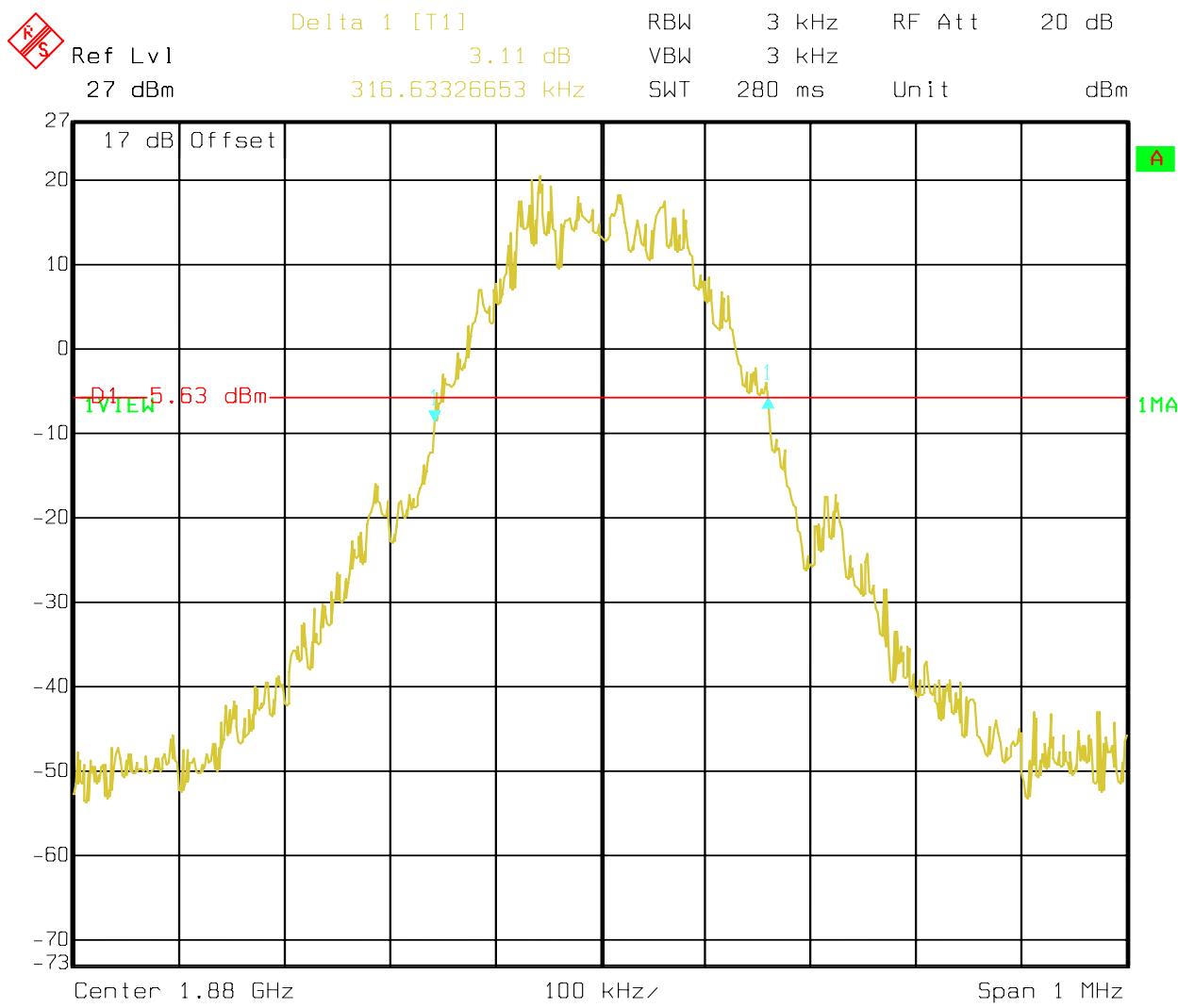
Date: 12.JUL.2006 12:52:31

**-26dB (PCS-1900)  
CHANNEL 512 GPRS**



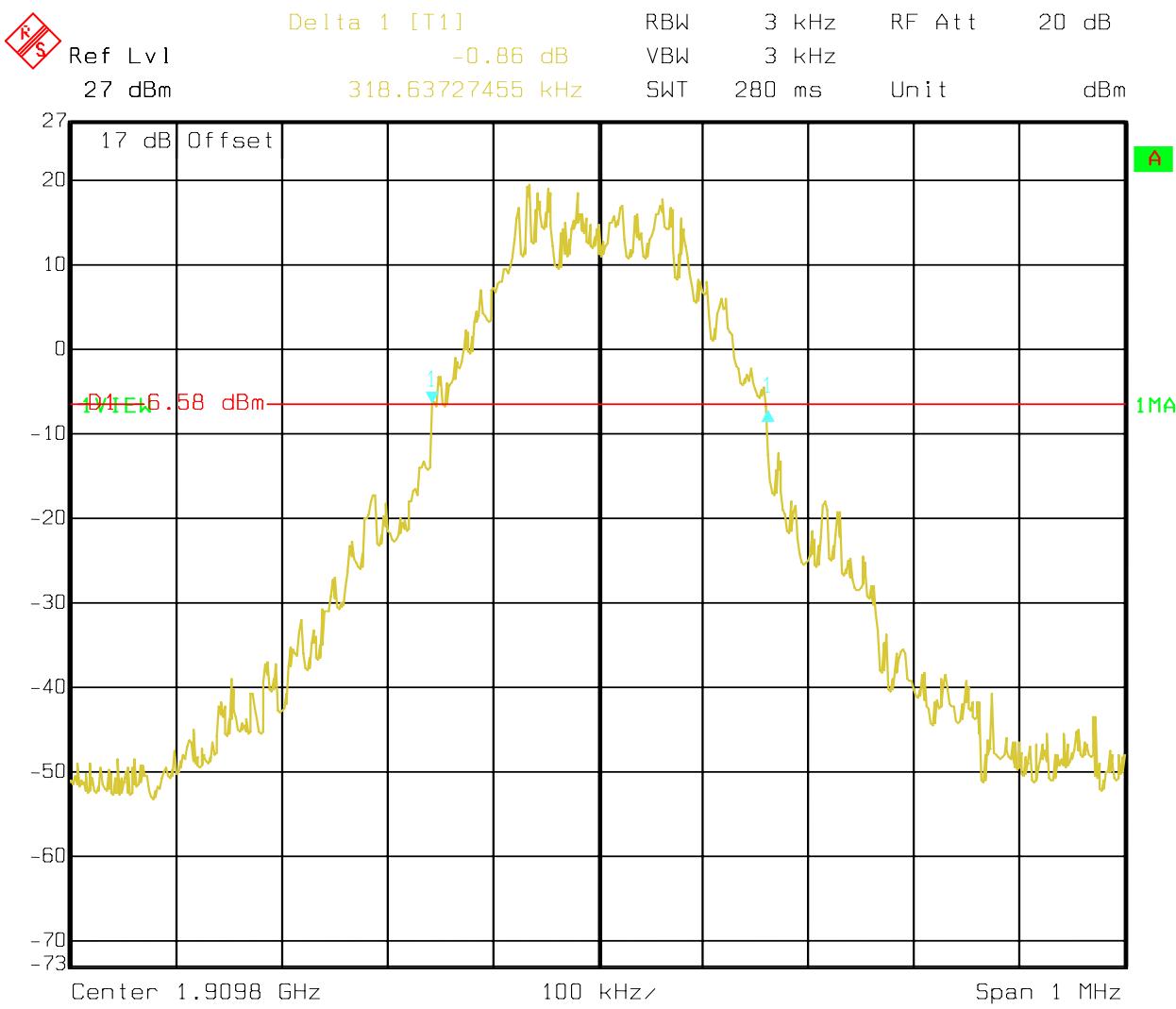
Date: 12.JUL.2006 12:49:06

**-26dB (PCS-1900)  
CHANNEL 661 GPRS**



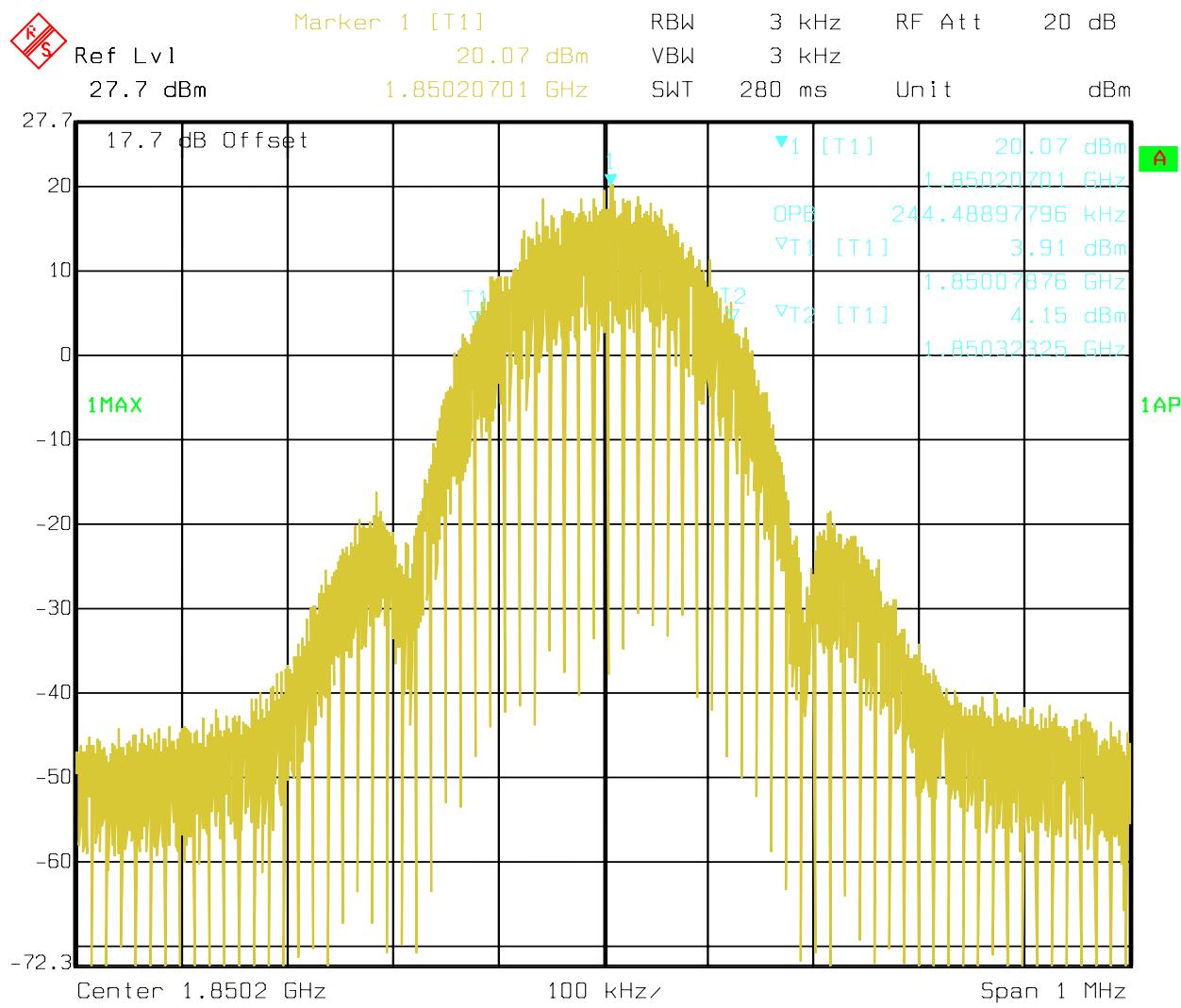
Date: 12.JUL.2006 12:51:20

**-26dB (PCS-1900)  
CHANNEL 810 GPRS**



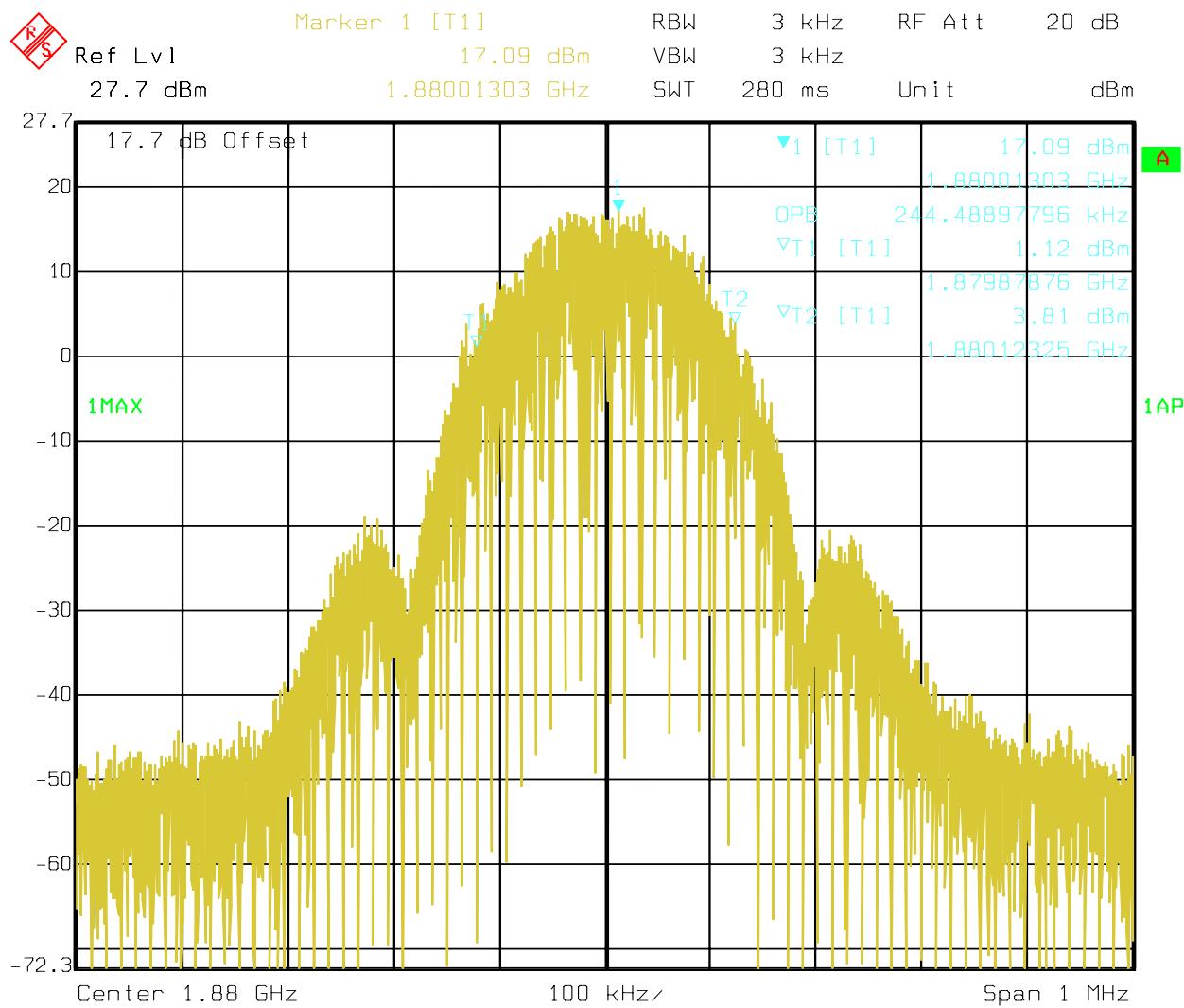
Date: 12.JUL.2006 13:07:18

**-20dB (PCS-1900)**  
**CHANNEL 512 EGPRS**



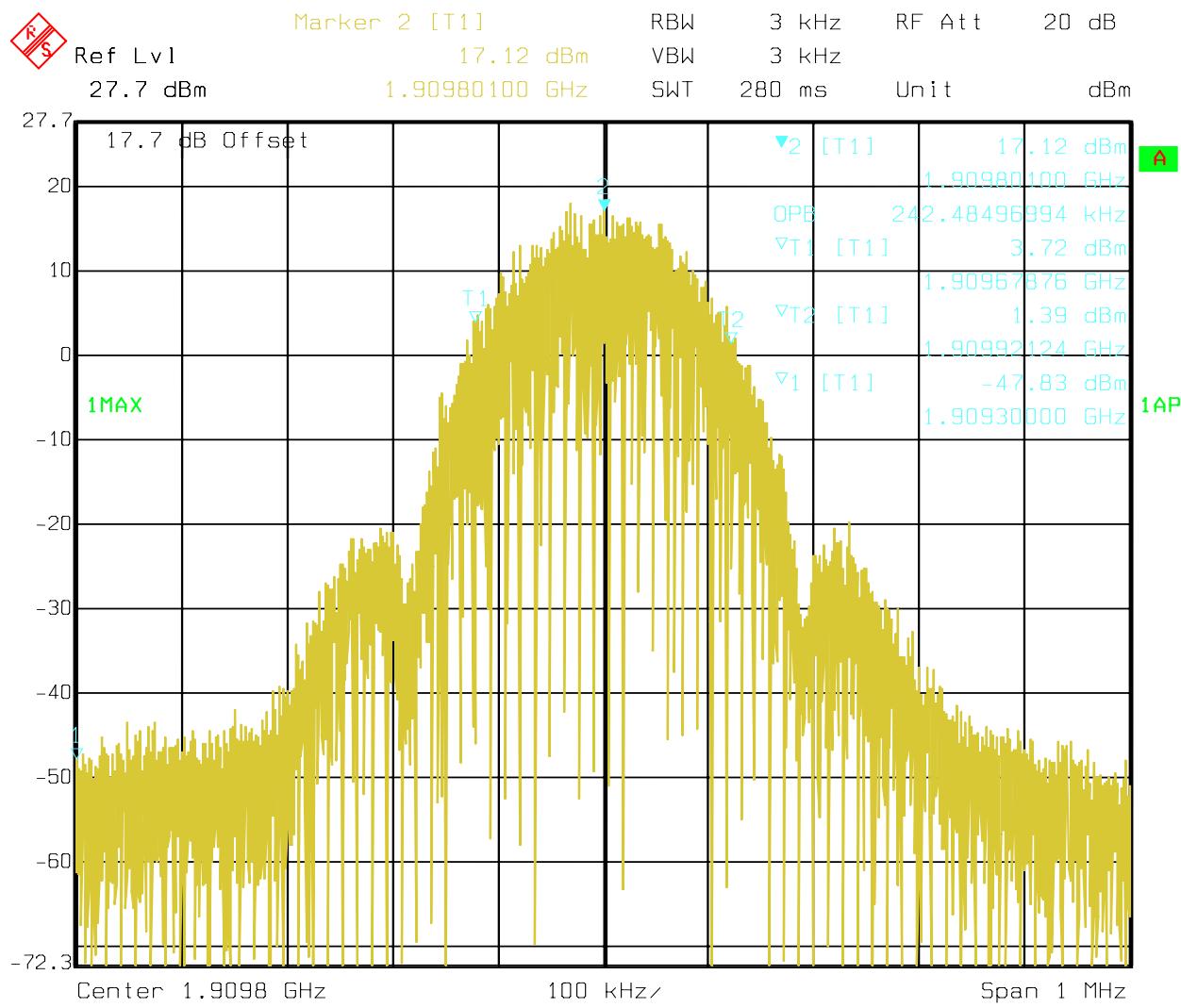
Date: 17.AUG.2006 11:10:19

**-20dB (PCS-1900)**  
**CHANNEL 661 EGPRS**



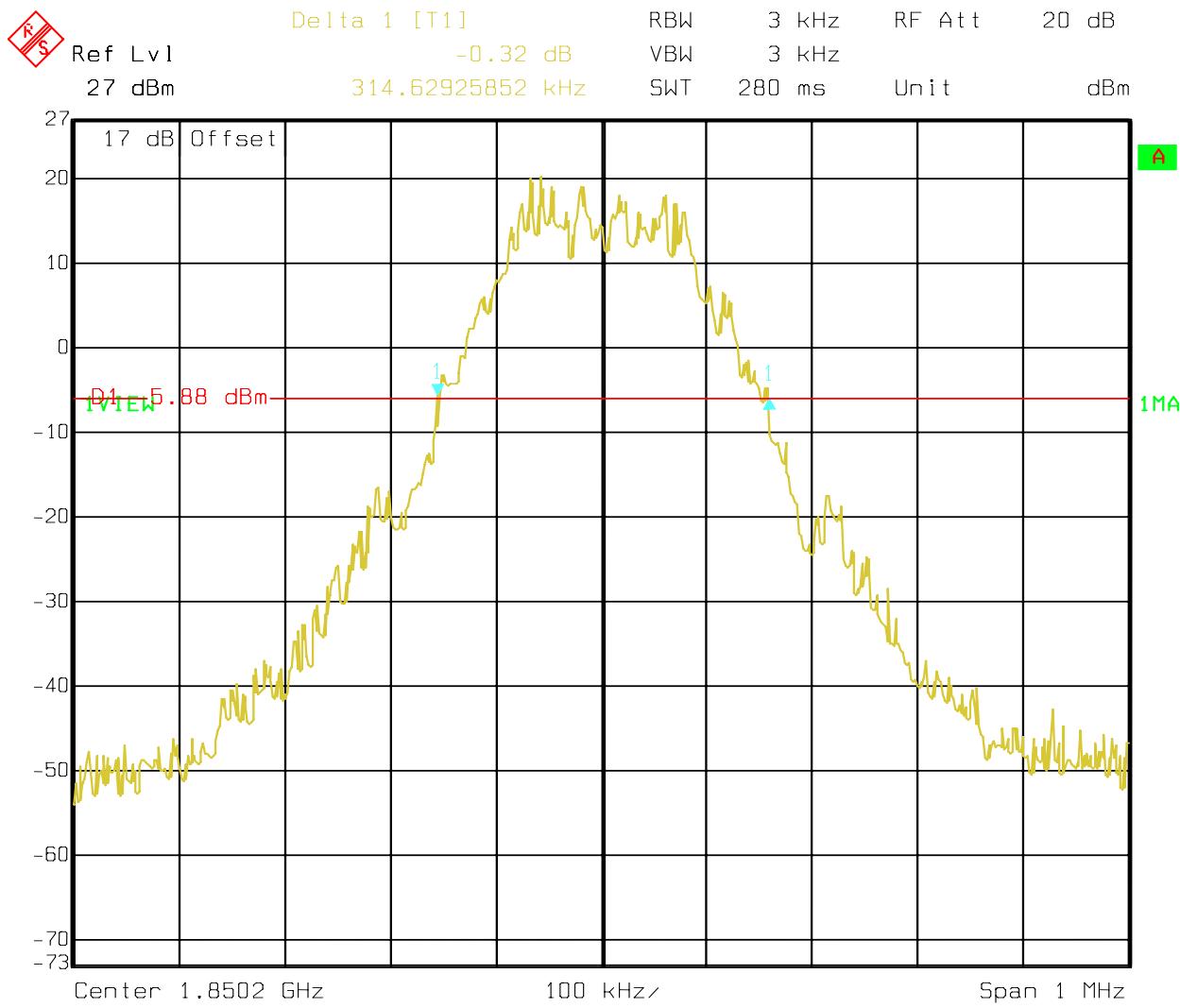
Date: 17.AUG.2006 11:12:13

**-20dB (PCS-1900)**  
**CHANNEL 810 EGPRS**



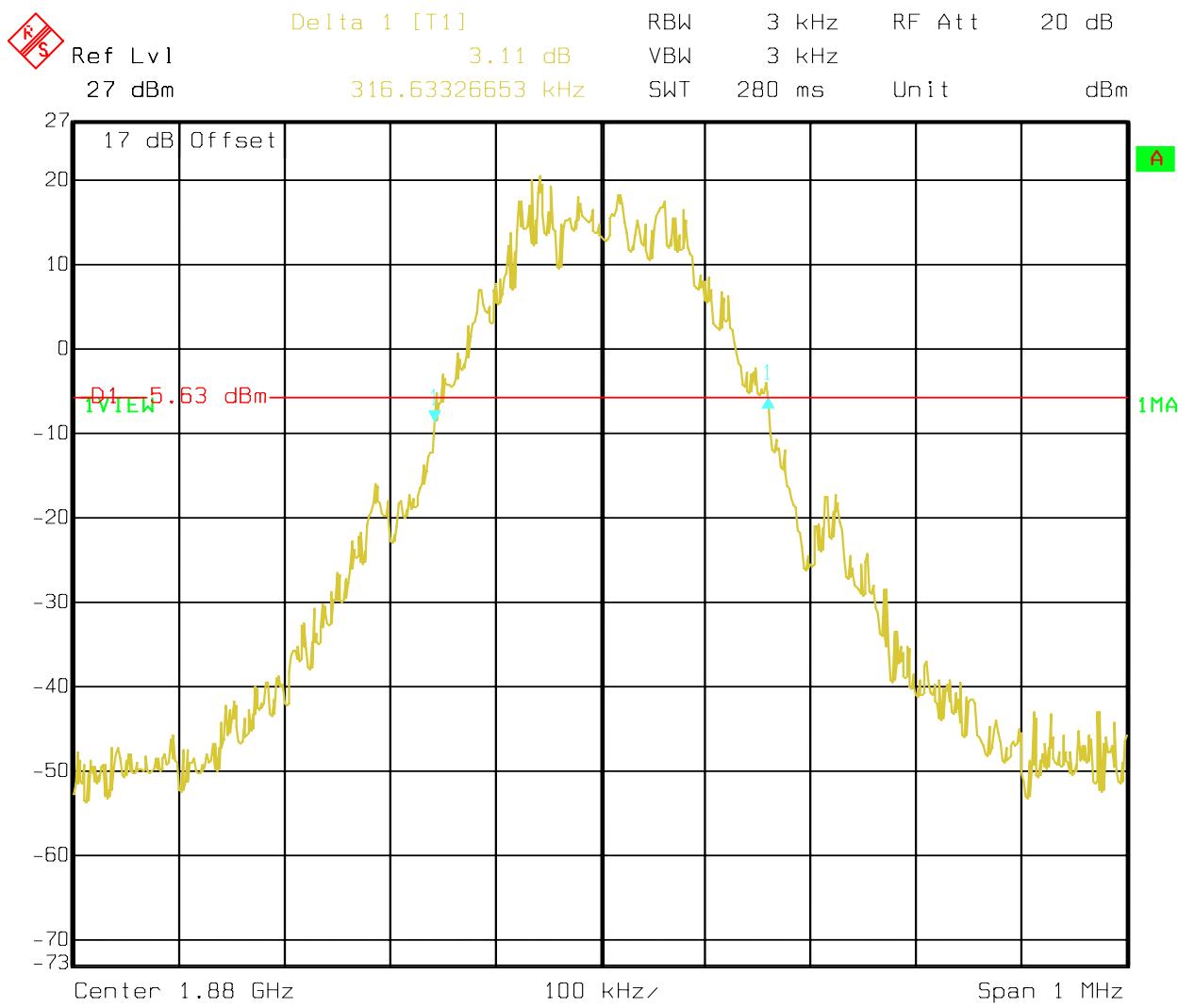
Date: 17.AUG.2006 11:16:30

**-26dB (PCS-1900)  
CHANNEL 512 EGPRS**



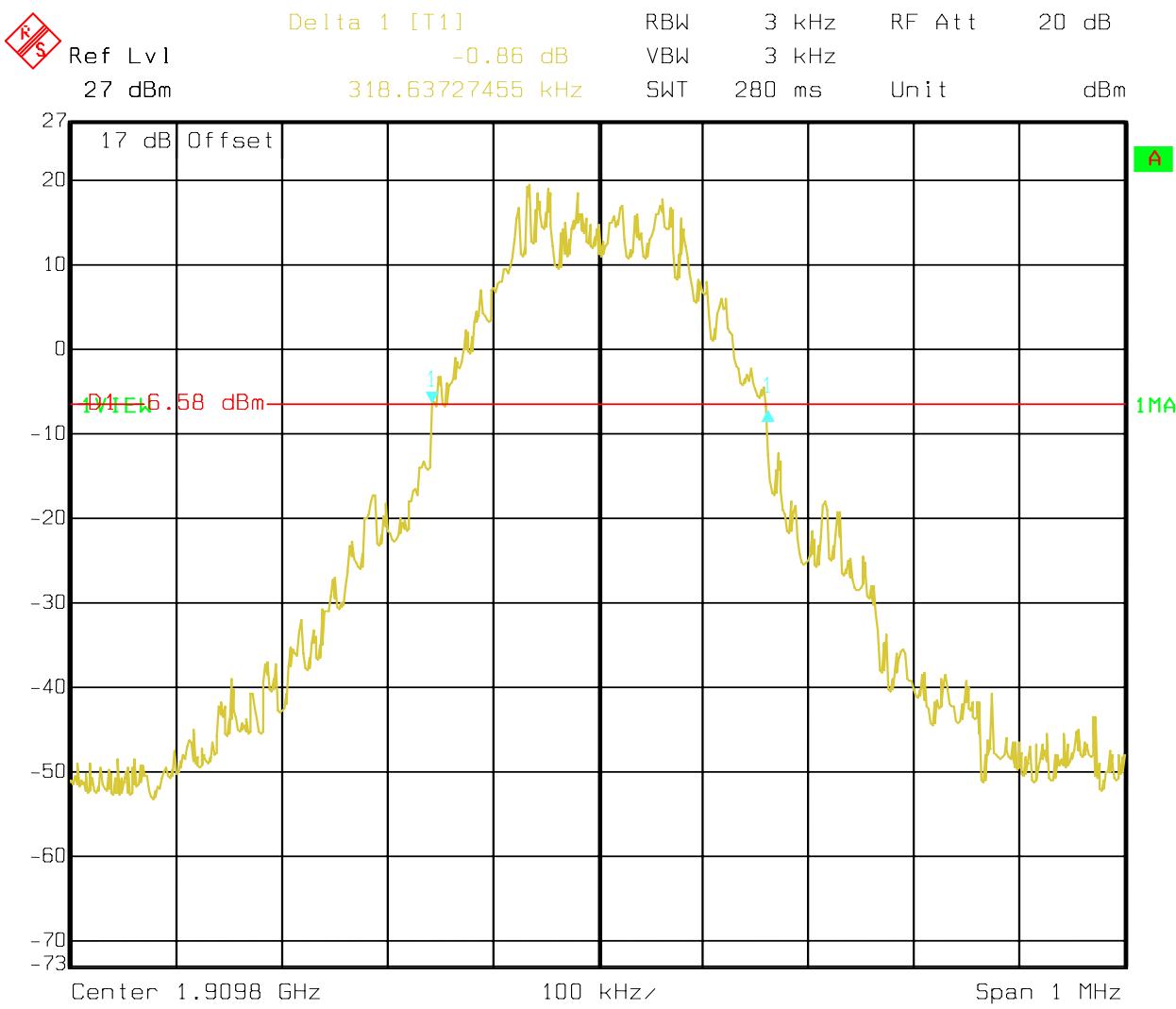
Date: 12.JUL.2006 12:49:06

**-26dB (PCS-1900)  
CHANNEL 661 EGPRS**

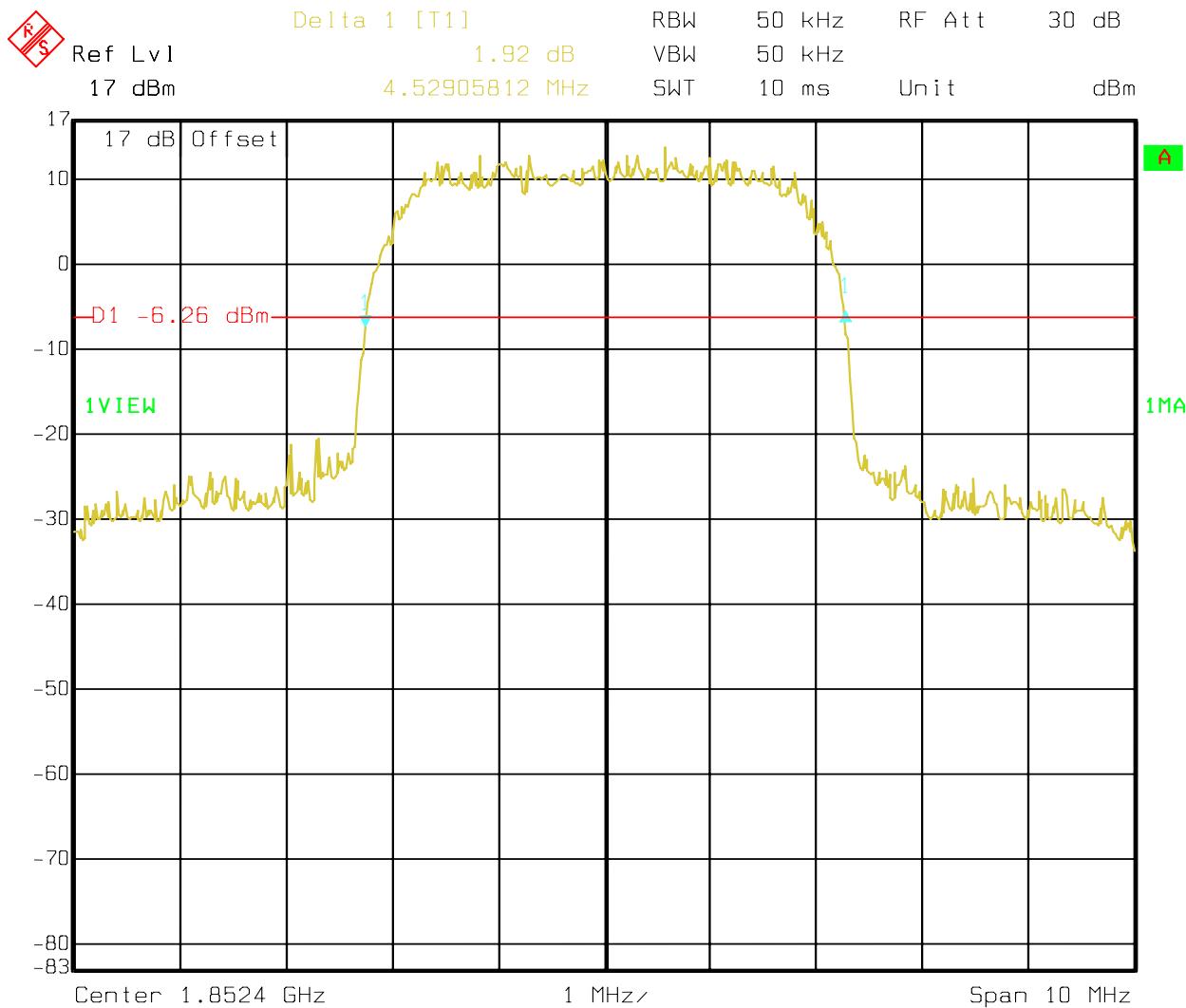


Date: 12.JUL.2006 12:51:20

**-26dB (PCS-1900)  
CHANNEL 810 EGPRS**

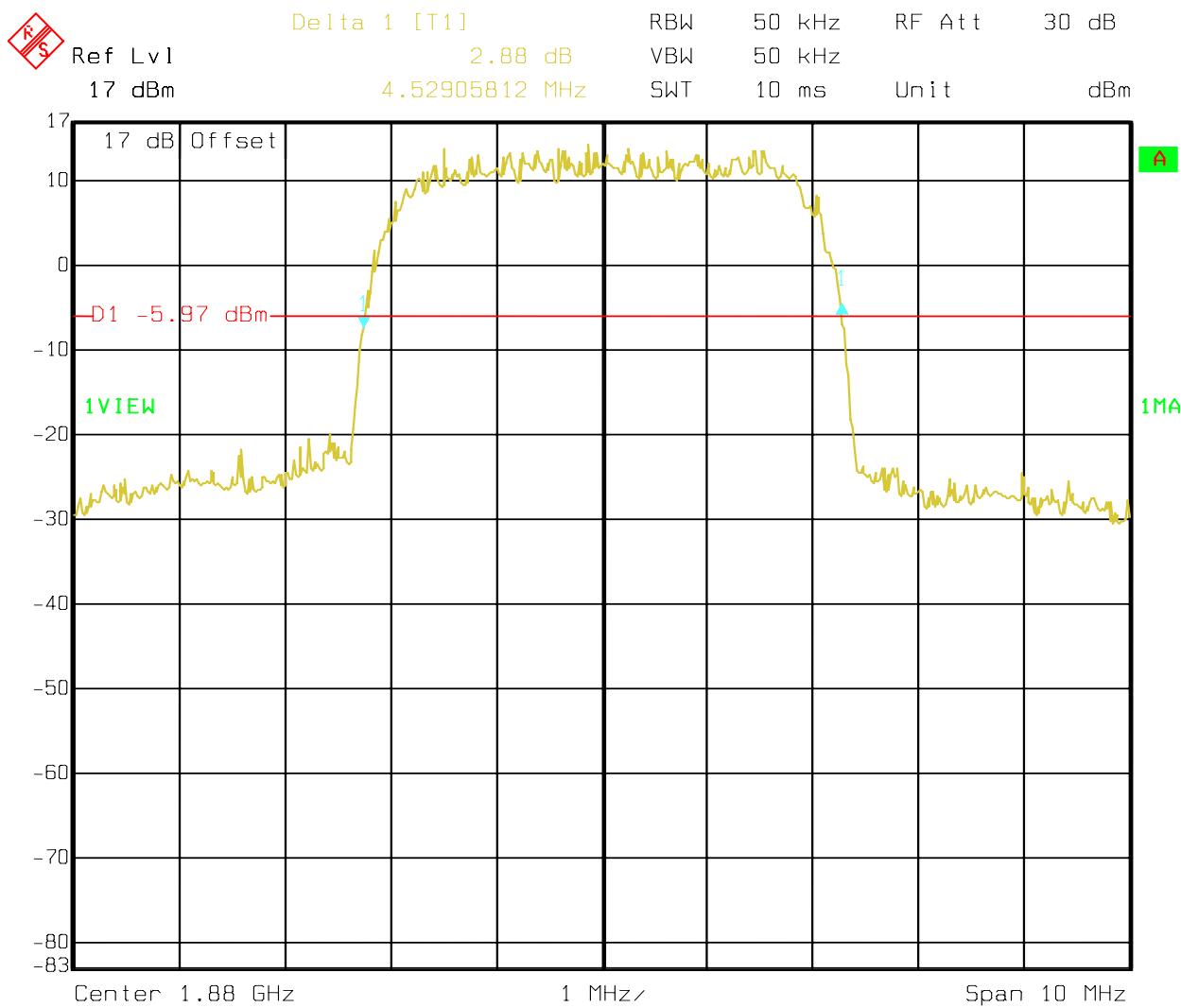


Date: 12.JUL.2006 13:07:18

**-20dB (PCS-1900)  
CHANNEL 9262 FDD2**

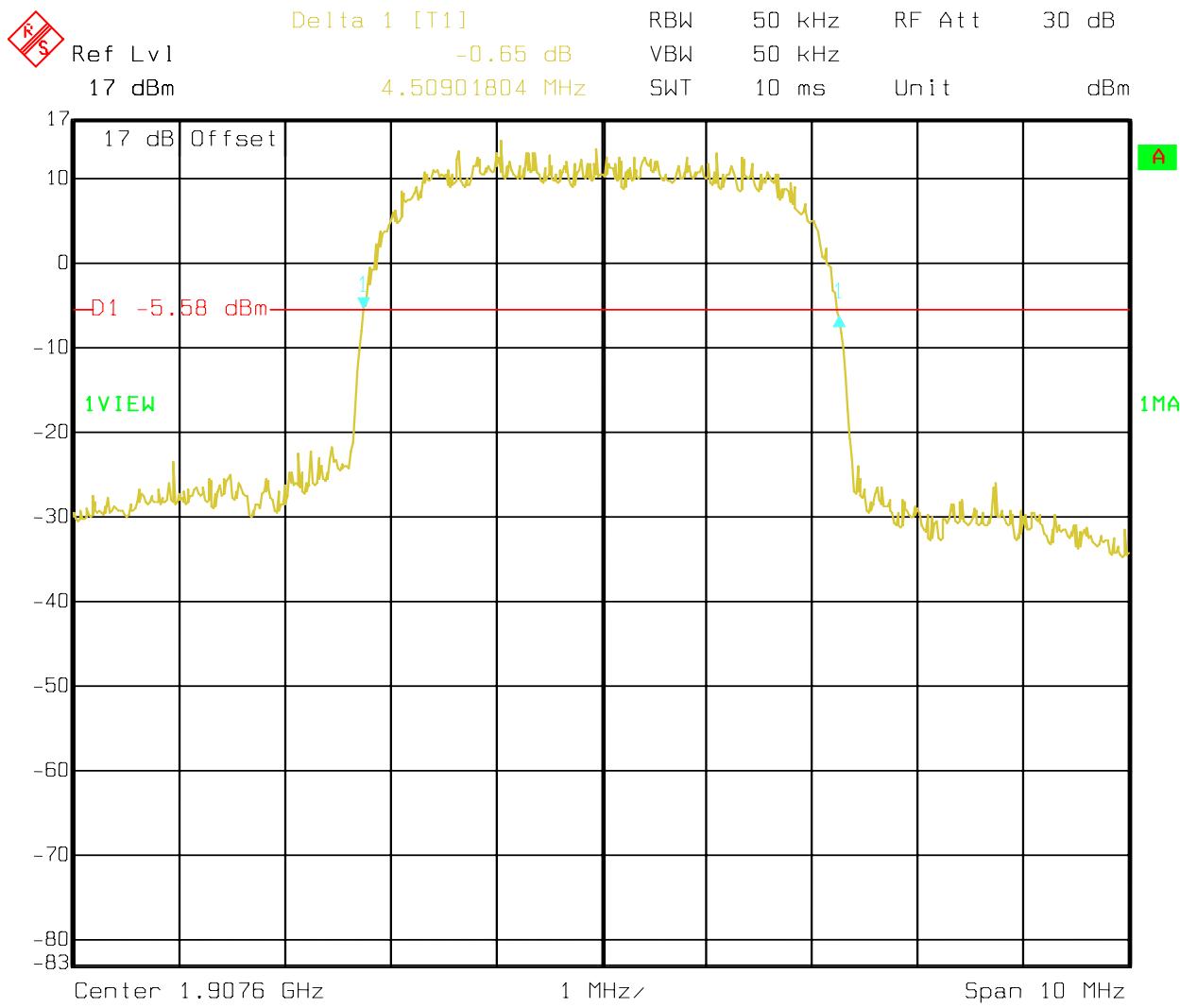
Date: 26.JUL.2006 14:27:53

**-20dB (PCS-1900)  
CHANNEL 9400 FDD2**

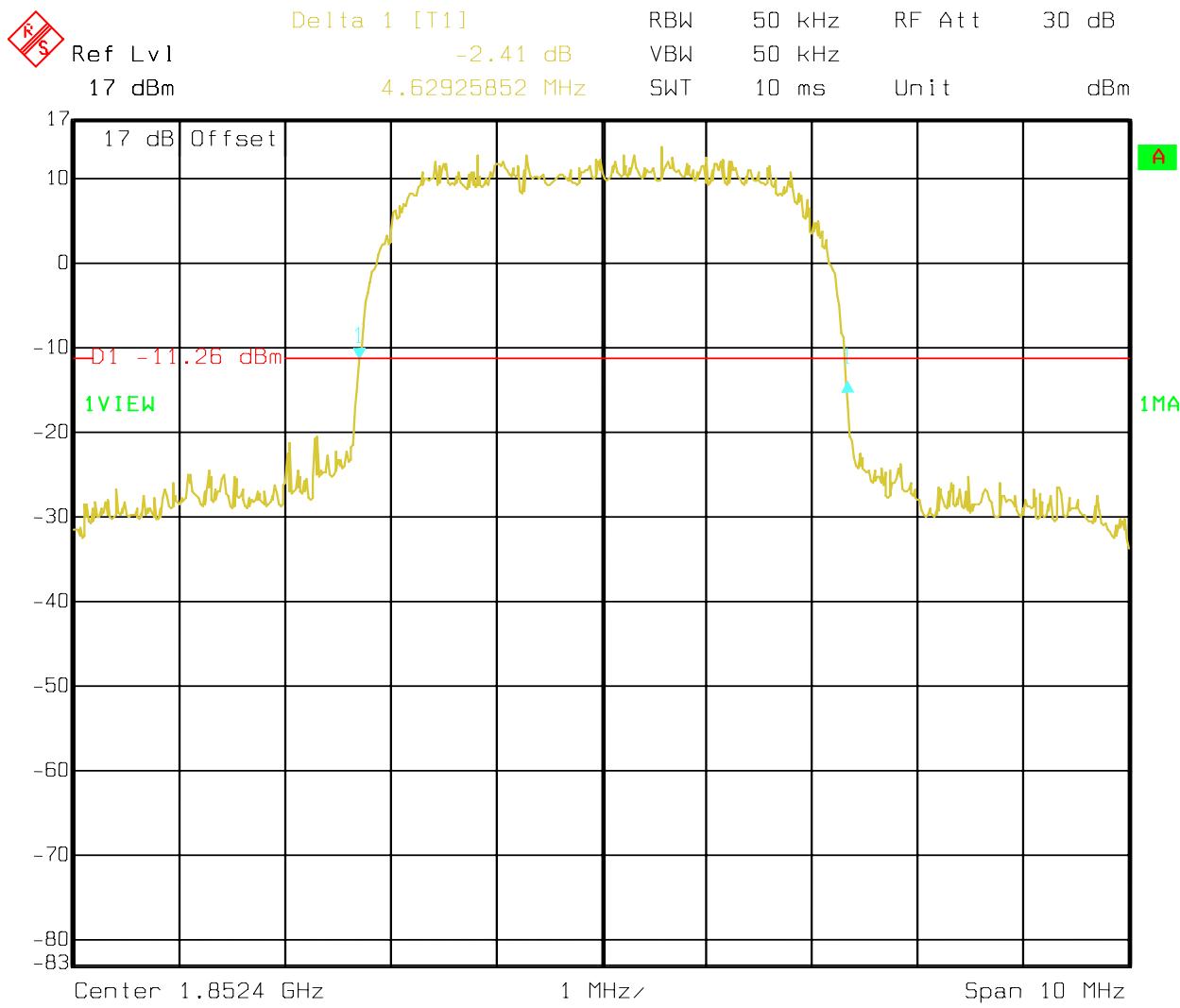


Date: 26.JUL.2006 14:26:10

**-20dB (PCS-1900)  
CHANNEL 810 FDD2**

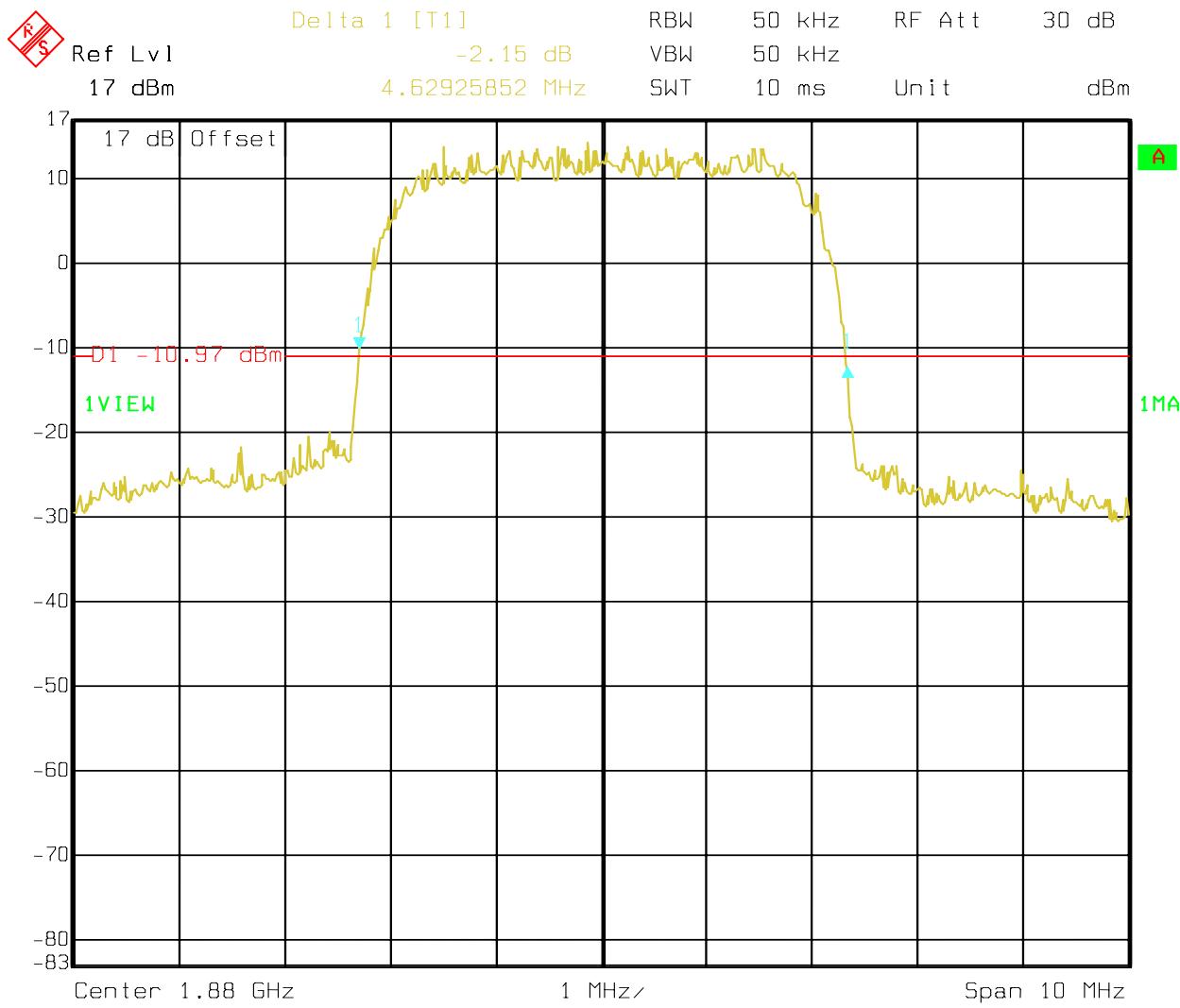


Date: 26.JUL.2006 14:24:33

**-26dB (PCS-1900)  
CHANNEL 9262 FDD2**

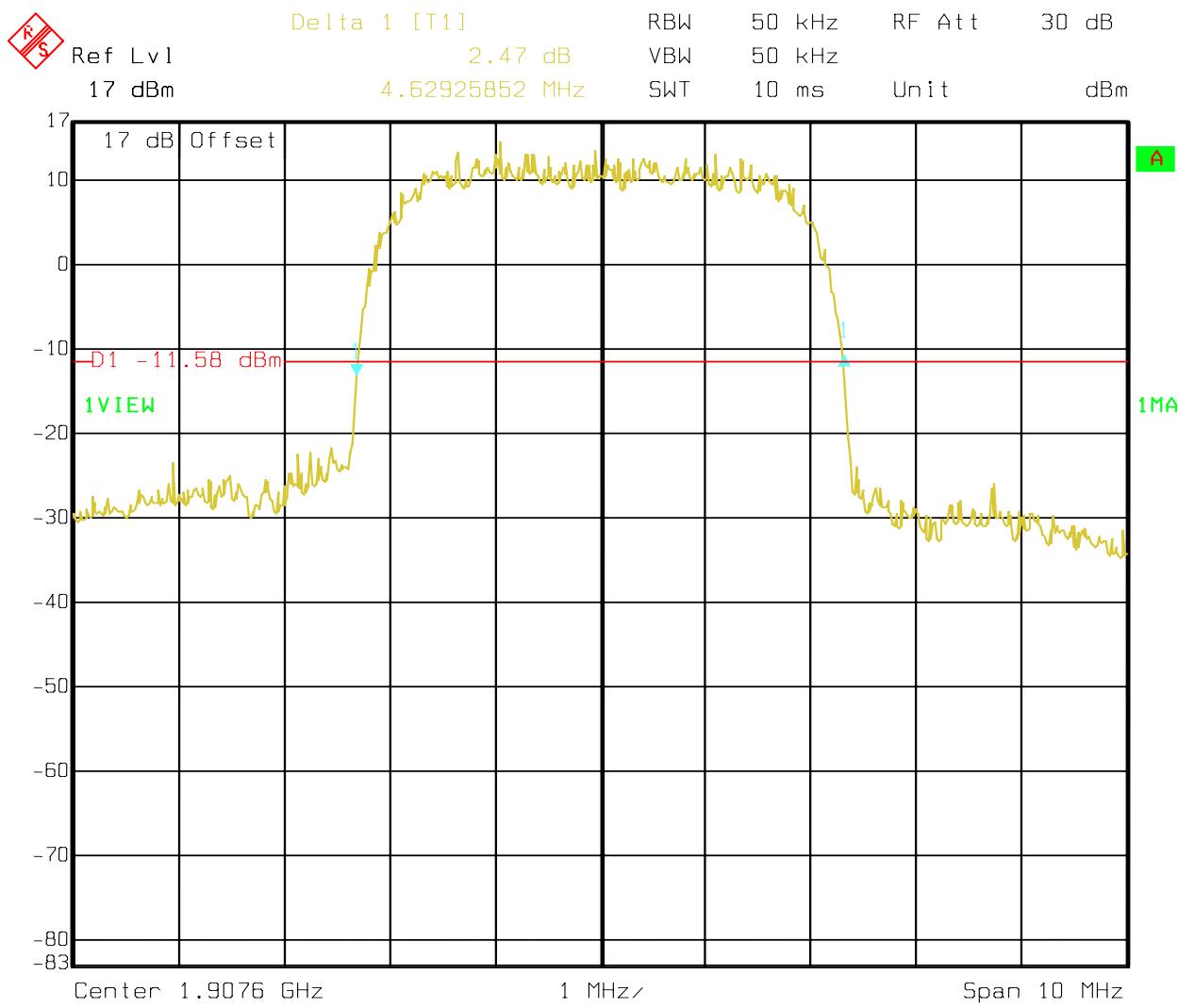
Date: 26.JUL.2006 14:29:10

**-26dB (PCS-1900)  
CHANNEL 9400 FDD2**



Date: 26.JUL.2006 14:26:47

**-26dB (PCS-1900)  
CHANNEL 810 FDD2**



Date: 26.JUL.2006 14:25:12

## 5.3 Frequency Stability

### 5.3.1 Limit

#### **For Hand carried battery powered equipment:**

According to the JTC standard the frequency stability of the carrier shall be accurate to within 0.1 ppm of the received frequency from the base station. This accuracy is sufficient to meet Sec. 24.235, Frequency Stability. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. As this transceiver is considered "Hand carried, battery powered equipment" Section 2.1055(d)(2) applies. This requires that the lower voltage for frequency stability testing be specified by the manufacturer. This transceiver is specified to operate with an input voltage of between 3.2VDC and 4.5VDC, with a nominal voltage of 3.7VDC. Operation above or below these voltage limits is prohibited by transceiver software in order to prevent improper operation as well as to protect components from overstress. These voltages represent a tolerance of -2.7% and +21.62%. For the purposes of measuring frequency stability these voltage limits are to be used.

#### **Method of Measurement:**

In order to measure the carrier frequency under the condition of AFC lock, it is necessary to make measurements with the EUT in a "call mode". This is accomplished with the use of R&S CMU 200 UNIVERSAL RADIO COMMUNICATION TESTER.

1. Measure the carrier frequency at room temperature.
2. Subject the EUT to overnight soak at -30 C.
3. With the EUT, powered via nominal voltage, connected to the CMU 200 and in a simulated call on mid channel (190 for GSM 850 & 4183 for FDD5 & 661 for PCS-1900&9400 for FDD2), measure the carrier frequency. These measurements should be made within 2 minutes of powering up the EUT, to prevent significant self-warming.
4. Repeat the above measurements at 10 C increments from -30 C to +50 C. Allow at least 1 1/2 hours at each temperature, unpowered, before making measurements.
5. Remeasure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1 Volt increments remeasuring carrier frequency at each voltage. Pause at nominal voltage for 1 1/2 hours unpowered, to allow any self-heating to stabilize, before continuing.
6. Subject the EUT to overnight soak at +50 C.
7. With the EUT, powered via nominal voltage, connected to the CMU 200 and in a simulated call on mid channel (190 for GSM 850 & 4183 for FDD5 & 661 for PCS-1900&9400 for FDD2), measure the carrier frequency. These measurements should be made within 2 minutes of powering up the EUT, to prevent significant self-warming.
8. Repeat the above measurements at 10 C increments from +50 C to -30 C. Allow at least 1 1/2 hours at each temperature, unpowered, before making measurements.
9. At all temperature levels hold the temperature to +/- 0.5 C during the measurement procedure.

#### **For equipment powered by primary supply voltage:**

According to the JTC standard the frequency stability of the carrier shall be accurate to within 0.1 ppm of the received frequency from the base station. This accuracy is sufficient to meet Sec. 24.235, Frequency Stability. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

For this EUT section 2.1055(d)(1) applies. This requires to vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

**5.3.2 FREQUENCY STABILITY (GSM-850)**

Channel No. : 190 at 836.6 MHz

**§2.1055 AFC FREQ ERROR VS. VOLTAGE**

NOTE: Freq. Error (ppm) = Freq. Error (Hz) / 836.6

<b>Voltage (VDC)</b>	<b>Frequency Error (Hz)</b>	<b>Frequency Error (ppm)</b>
<b>2.8</b>	<b>23</b>	<b>0.0274</b>
<b>3.8</b>	<b>19</b>	<b>0.0227</b>

**AFC FREQ ERROR vs. TEMPERATURE**

<b>TEMPERATURE (°C)</b>	<b>Frequency Error (Hz)</b>	<b>Frequency Error (ppm)</b>
<b>-30</b>	<b>-22</b>	<b>-0.0239</b>
<b>-20</b>	<b>-22</b>	<b>-0.0239</b>
<b>-10</b>	<b>46</b>	<b>0.0500</b>
<b>0</b>	<b>29</b>	<b>0.0347</b>
<b>+10</b>	<b>37</b>	<b>0.0442</b>
<b>+20</b>	<b>21</b>	<b>0.0251</b>
<b>+30</b>	<b>-9</b>	<b>-0.0108</b>
<b>+40</b>	<b>31</b>	<b>0.0371</b>
<b>+50</b>	<b>26</b>	<b>0.0311</b>

**5.3.3 FREQUENCY STABILITY (PCS-1900)**

Channel No. : 661 at 1880 MHz

**§2.1055 / §24.235 AFC FREQ ERROR vs. VOLTAGE**

NOTE: Freq. Error (ppm) = Freq. Error (Hz) / 1880

Voltage (VDC)	Frequency Error (Hz)	Frequency Error (ppm)
2.8	32	0.0171
3.8	27	0.0144

**AFC FREQ ERROR vs. TEMPERATURE**

TEMPERATURE (°C)	Frequency Error (Hz)	Frequency Error (ppm)
-30	-25	-0.0106
-20	24	0.0128
-10	25	0.0106
0	19	0.0101
+10	33	0.0176
+20	27	0.0144
+30	-22	-0.0177
+40	14	0.0074
+50	25	0.0106

## 5.4 Spurious Emissions Conducted

### 5.4.1 **FCC 2.1051 Measurements required: Spurious emissions at antenna terminals.**

The radio frequency voltage or power generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly loaded with a suitable artificial antenna. Curves or equivalent data shall show the magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated under the conditions specified in FCC 2.1049 as appropriate. The magnitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be specified.

### 5.4.2 Limits:

#### 5.4.2.1 **FCC 22.917 Emission limitations for cellular equipment.**

The rules in this section govern the spectral characteristics of emissions in the Cellular Radiotelephone Service.

(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.

(b) *Measurement procedure.* Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. 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. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (*i.e.* 100 kHz of 1 percent of emission bandwidth, as specified). 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.

#### 5.4.2.2 **FCC 24.238 Emission limitations for Broadband PCS equipment.**

The rules in this section govern the spectral characteristics of emissions in the Broadband Personal Communications Service.

(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.

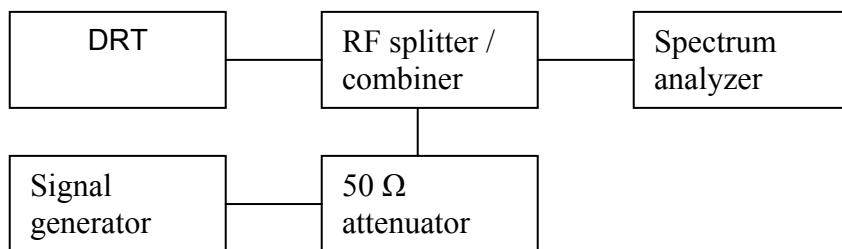
(b) *Measurement procedure.* Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to

improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (*i.e.* 100 kHz of 1 percent of emission bandwidth, as specified). 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.

#### **5.4.3 Conducted out of band emissions measurement procedure:**

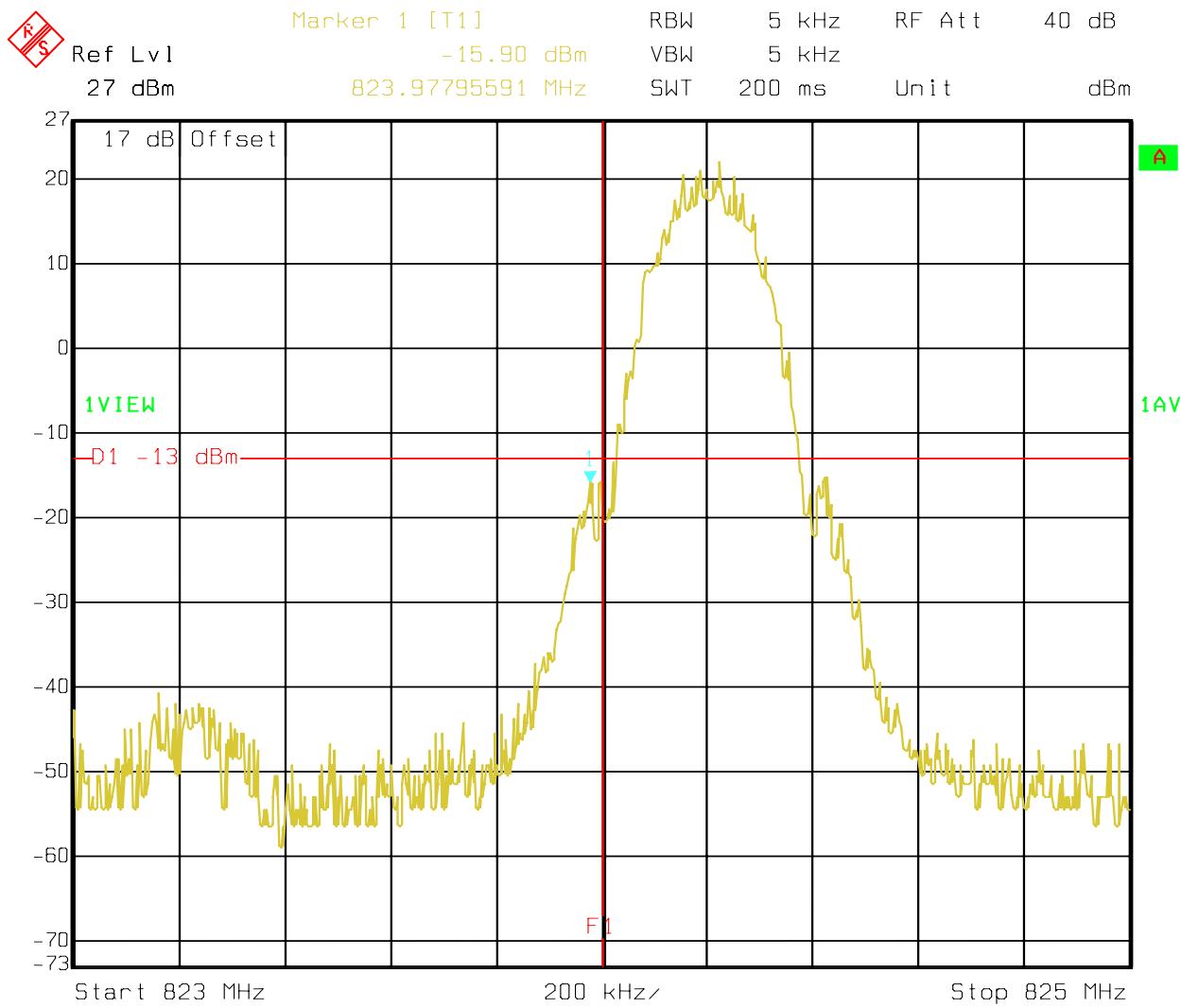
**Based on TIA-603C 2004**

##### **2.2.13 Unwanted Emissions: Conducted Spurious**

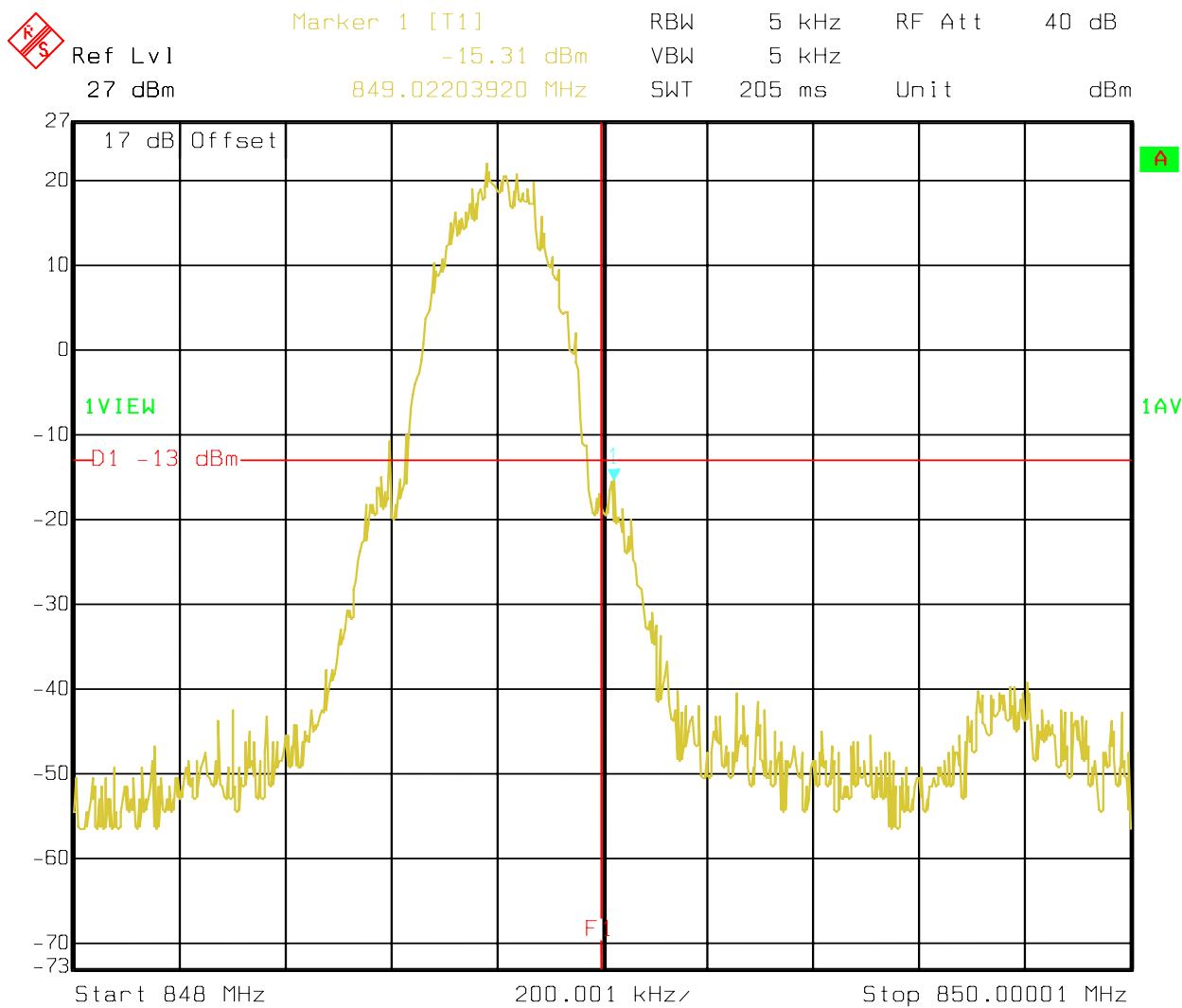


1. Connect the equipment as shown in the above diagram.
2. Set the spectrum analyzer to measure peak hold with the required settings.
3. Set the signal generator to a known output power and record the path loss in dB (**LOSS**) for frequencies up to the tenth harmonic of the EUT's carrier frequency. **LOSS** = Generator Output Power (dBm) – Analyzer reading (dBm).
4. Replace the signal generator with the EUT.
5. Adjust the settings of the Digital Radiocommunication Tester (DRT) to set the EUT to its maximum power at the required channel.
6. Set the spectrum analyzer to measure peak hold with the required settings. Offset the spectrum analyzer reference level by the path loss measured above.
7. Measure and record all spurious emissions up to the tenth harmonic of the carrier frequency.
8. Measurements are to be performed with the EUT set to the low, middle and high channel of each frequency band.
9. If necessary steps 6 and 7 may be performed with the spectrum analyzer set to average detector.

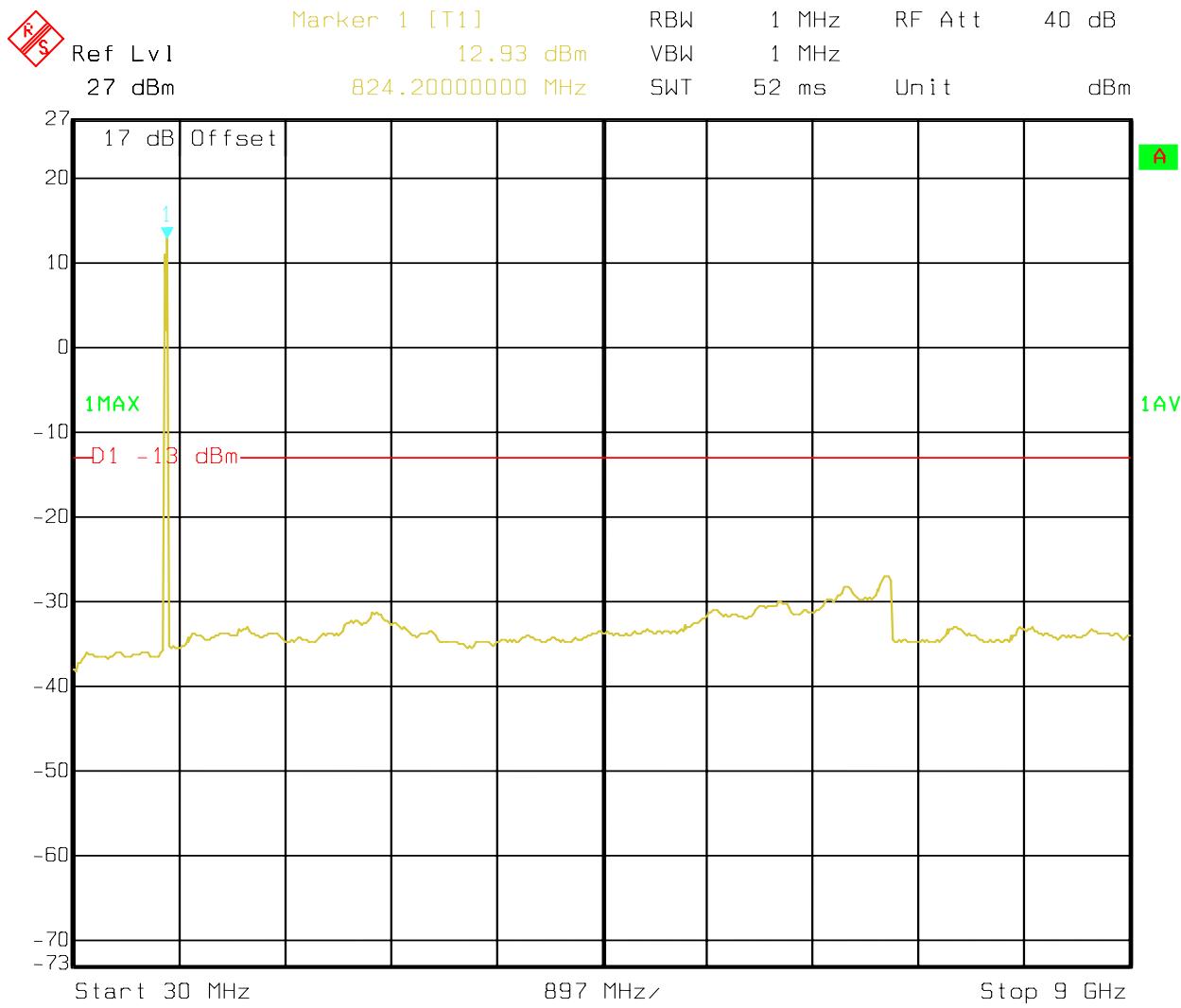
**(note:** Step 3 above is performed prior to testing and **LOSS** is recorded by test software. Steps 2, 6, and 7 above are performed with test software.)

**5.4.4 Band Edge Results GSM-850****GSM-850 Lower Band Edge****CHANNEL 128**

Date: 11.JUL.2006 11:23:41

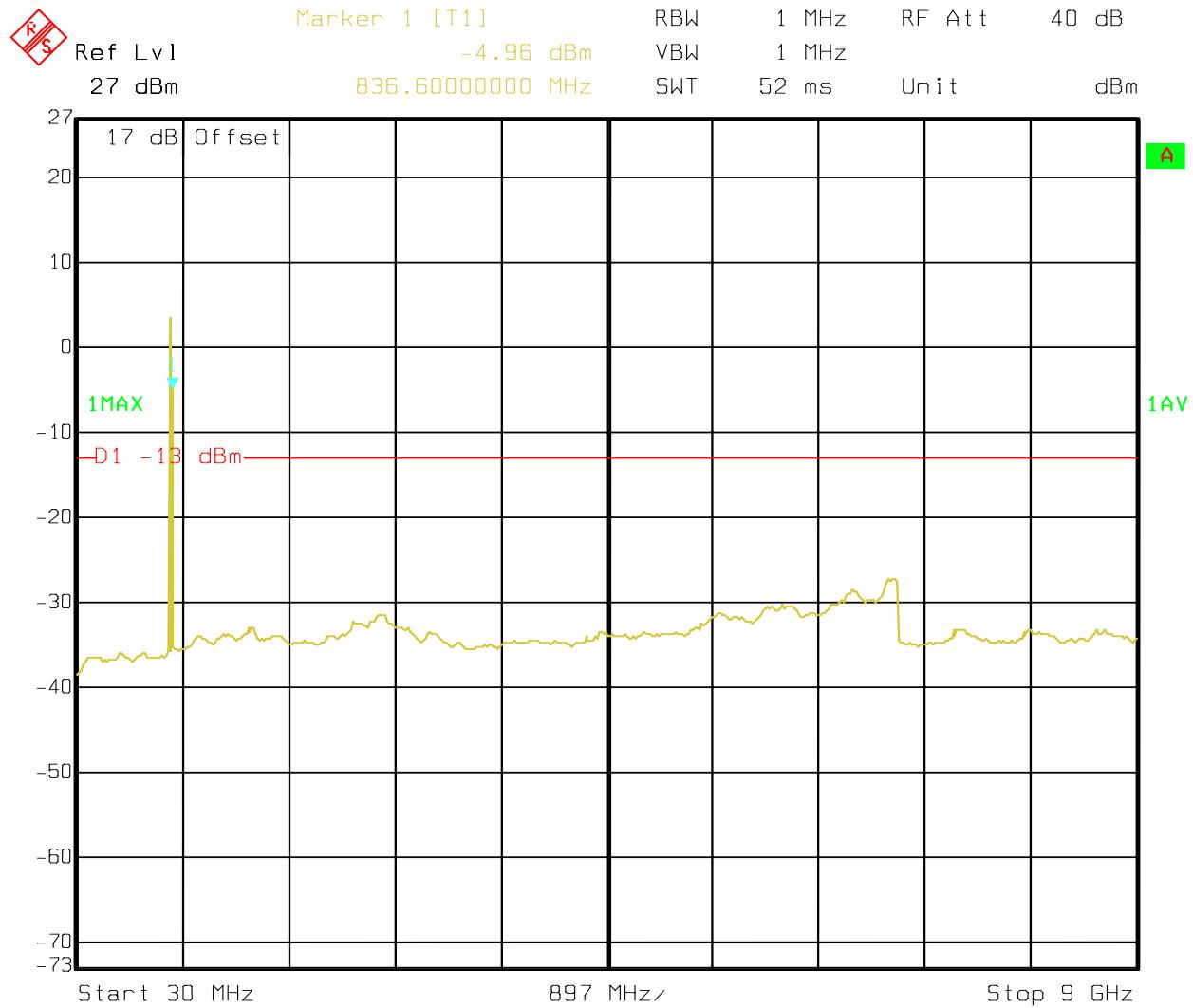
**GSM-850 Higher Band Edge  
CHANNEL 251**

Date: 11.JUL.2006 11:29:07

**5.4.5 Conducted Spurious Results GSM-850****CHANNEL 128 (GSM-850)****30MHz – 9GHz****Note: The peak above the limit line is the carrier freq. at ch-128.**

**CHANNEL 190 (GSM-850)**  
**30MHz – 9GHz**

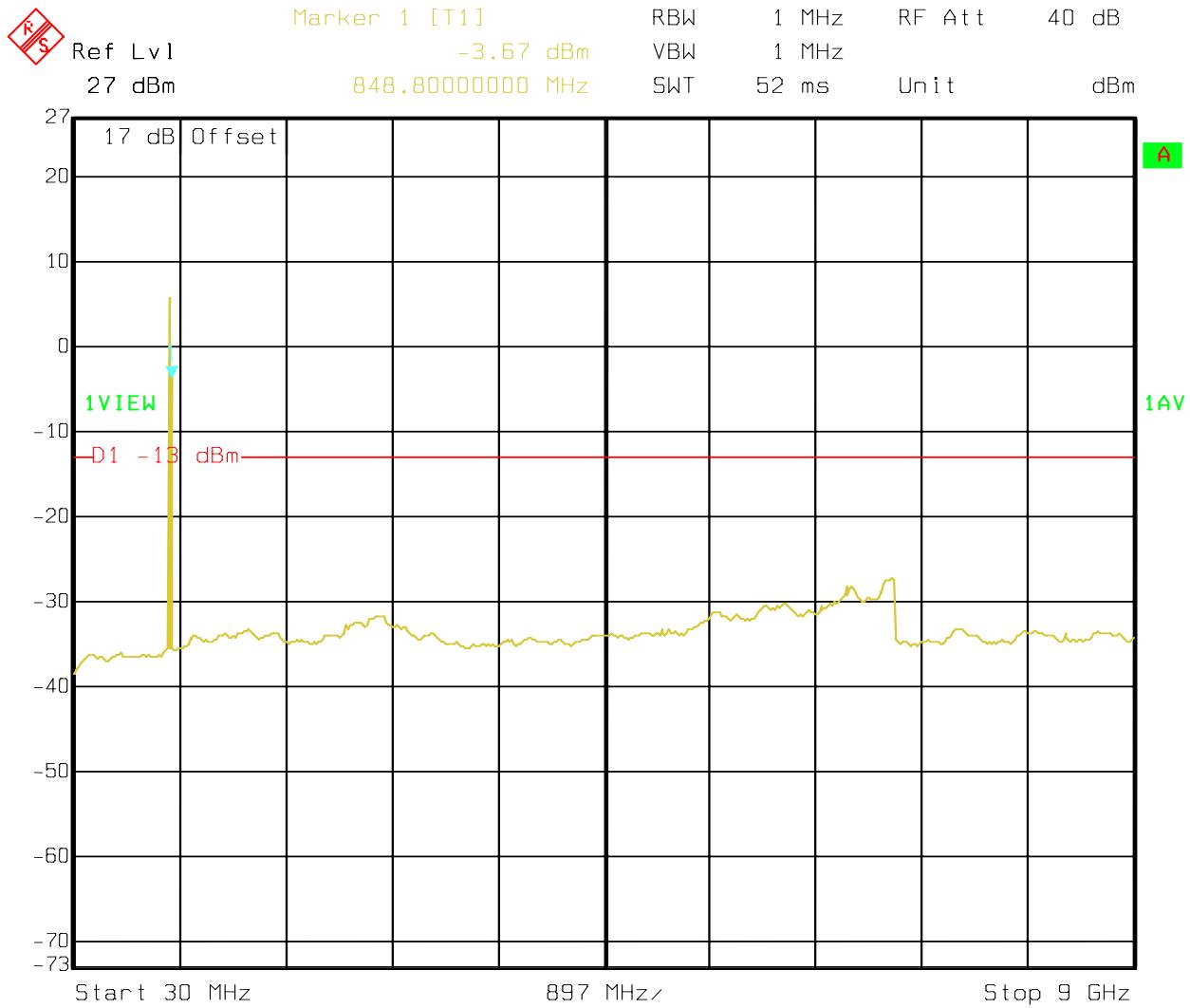
**Note: The peak above the limit line is the carrier freq. at ch-190.**



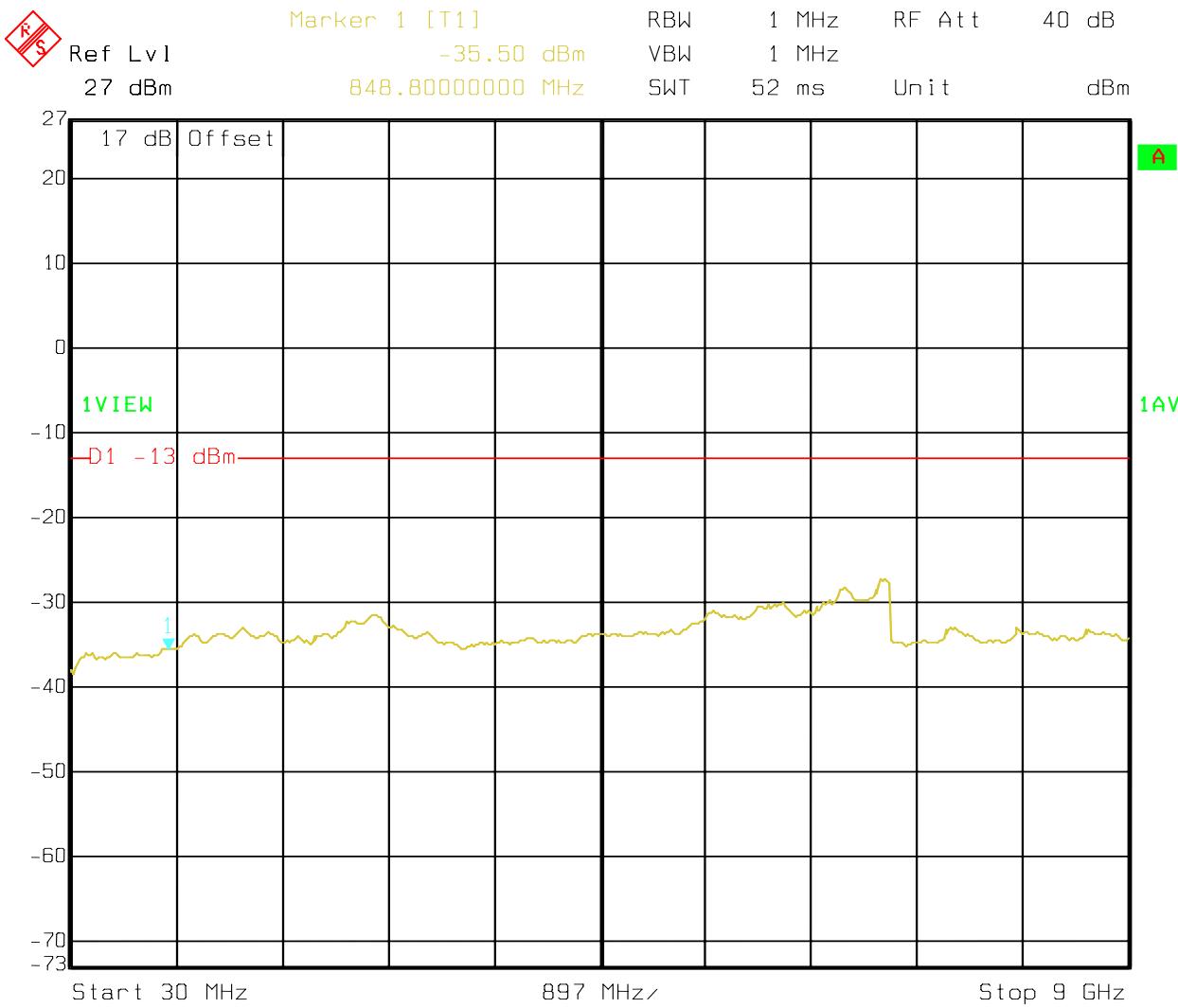
Date: 11.JUL.2006 11:37:10

**CHANNEL 251 (GSM-850)**  
**30MHz – 9GHz**

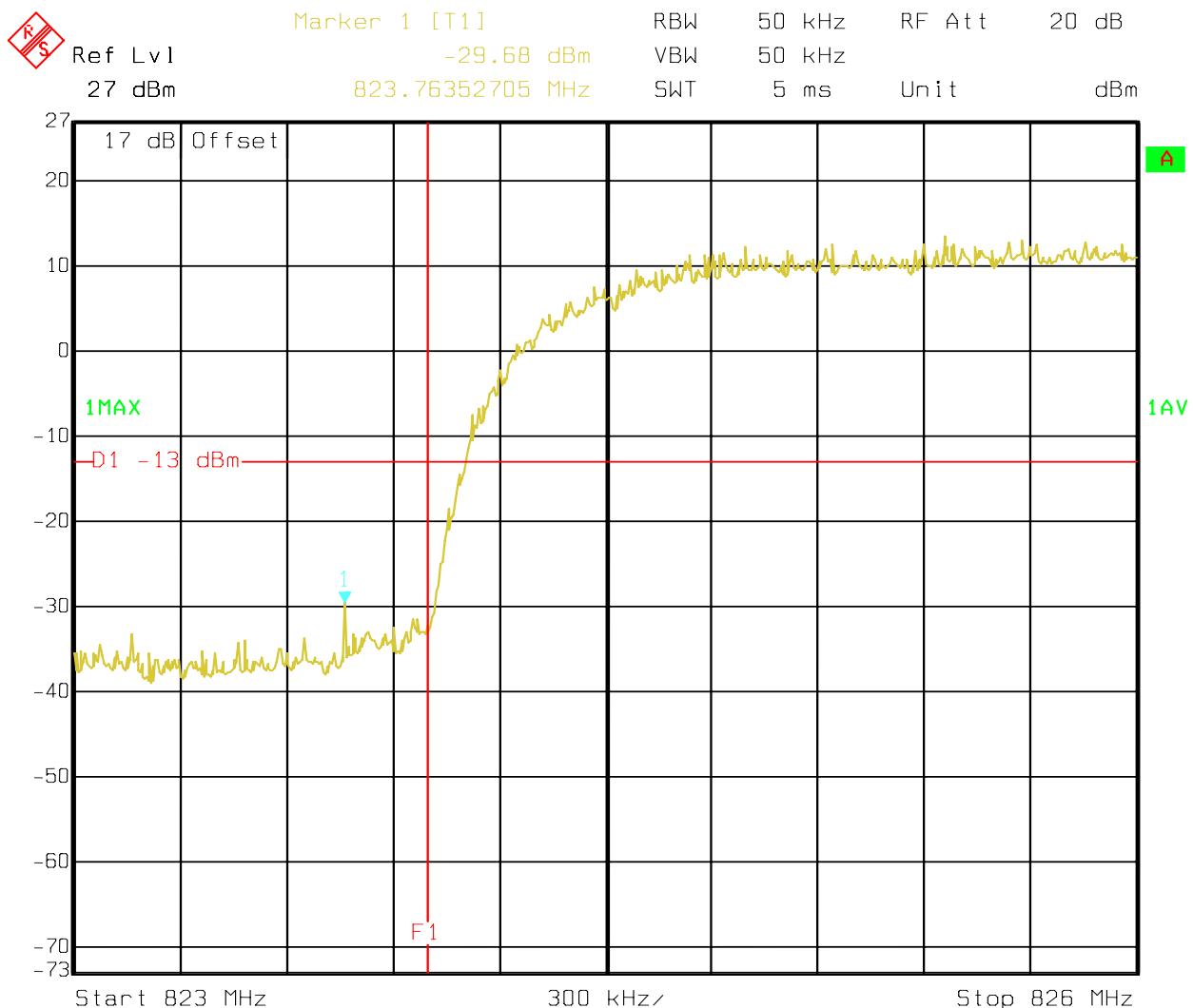
**Note: The peak above the limit line is the carrier freq. at ch-251.**



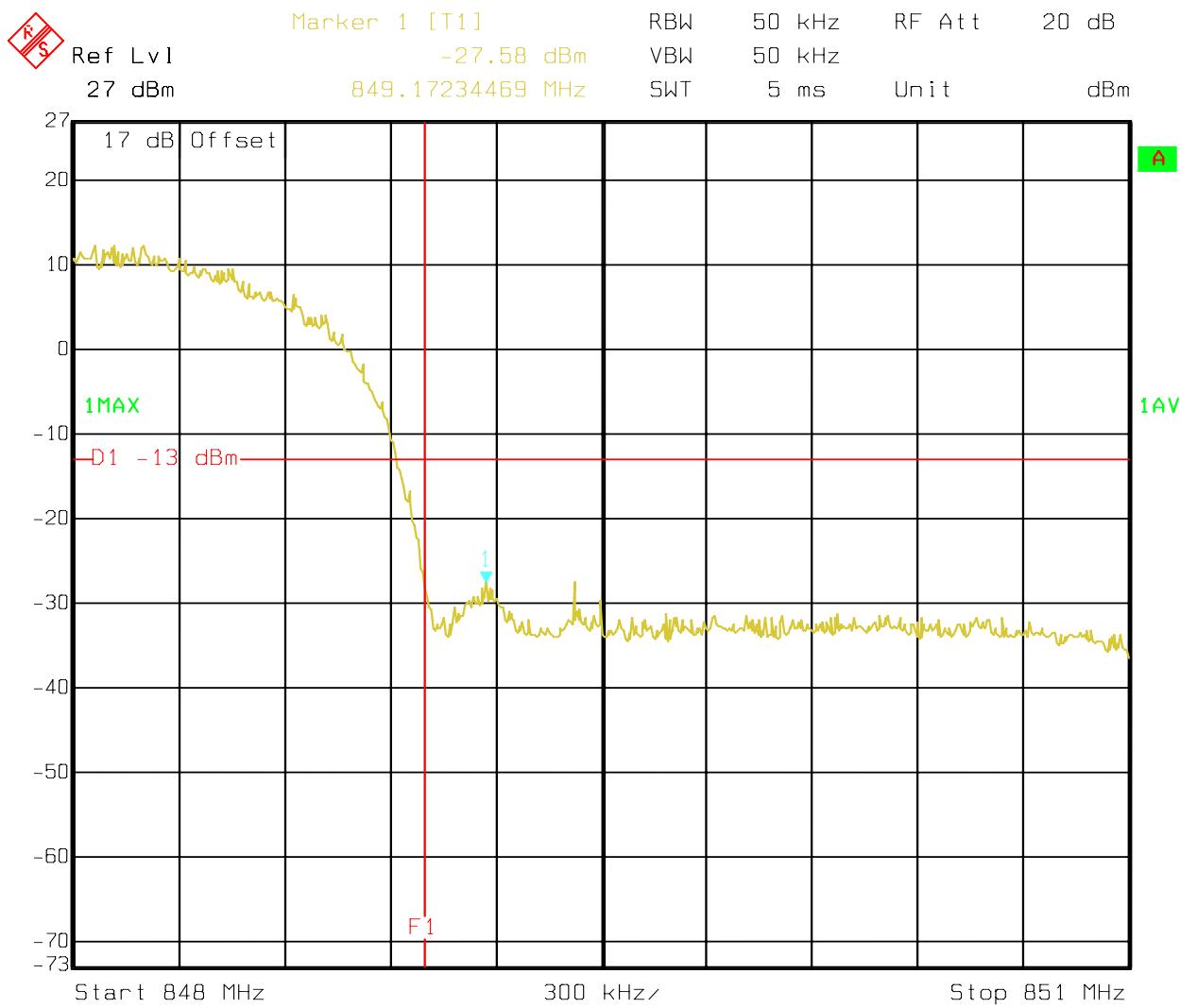
Date: 11.JUL.2006 11:41:00

**IDLE (GSM-850)**  
**30MHz - 9GHz**


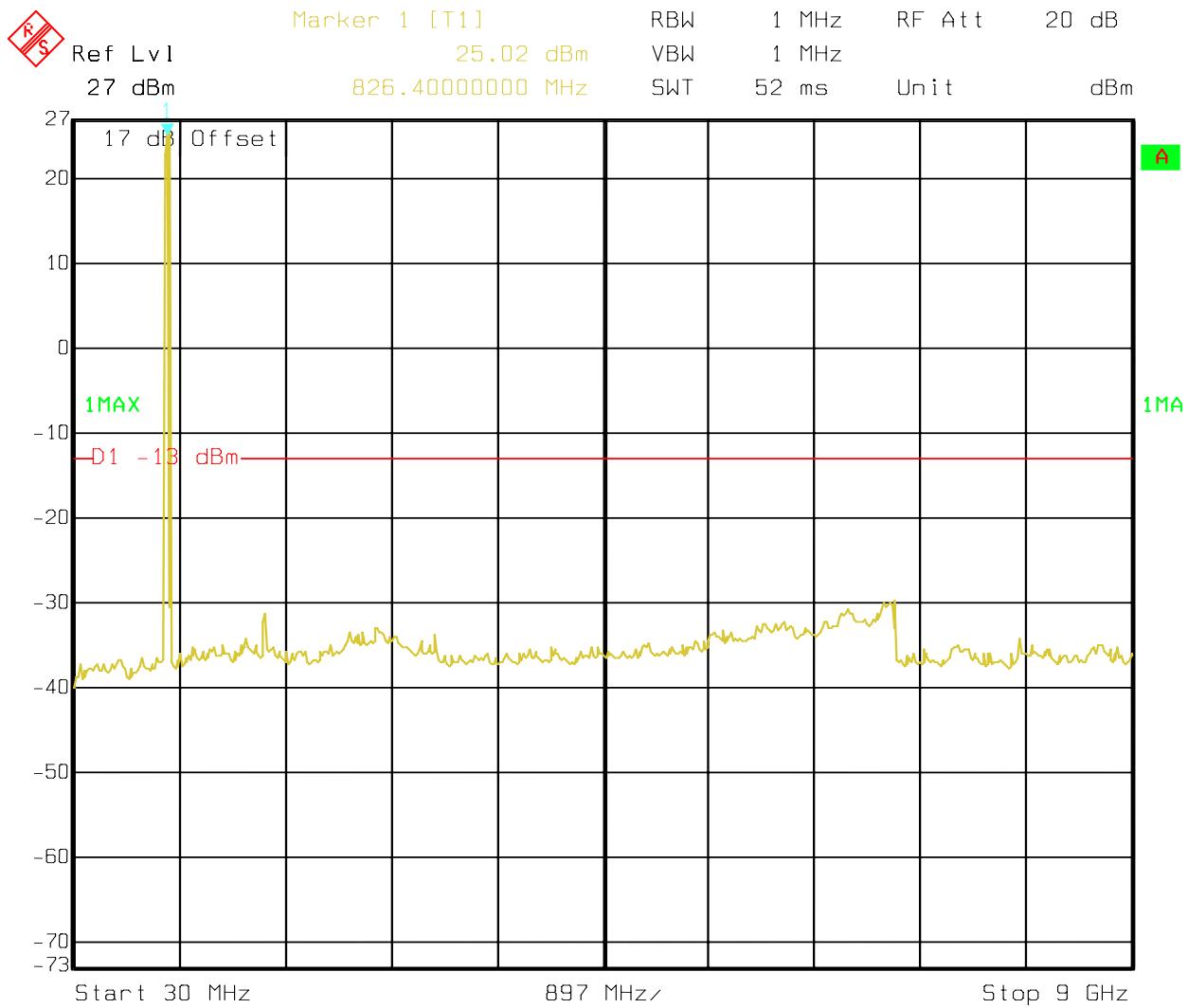
Date: 11.JUL.2006 11:43:39

**5.4.6 Band Edge Results GSM-850 FDD5****GSM-850 Lower Band Edge  
CHANNEL 4132 FDD5**

Date: 26.JUL.2006 11:32:53

**GSM-850 Higher Band Edge**  
**CHANNEL 4233 FDD5**


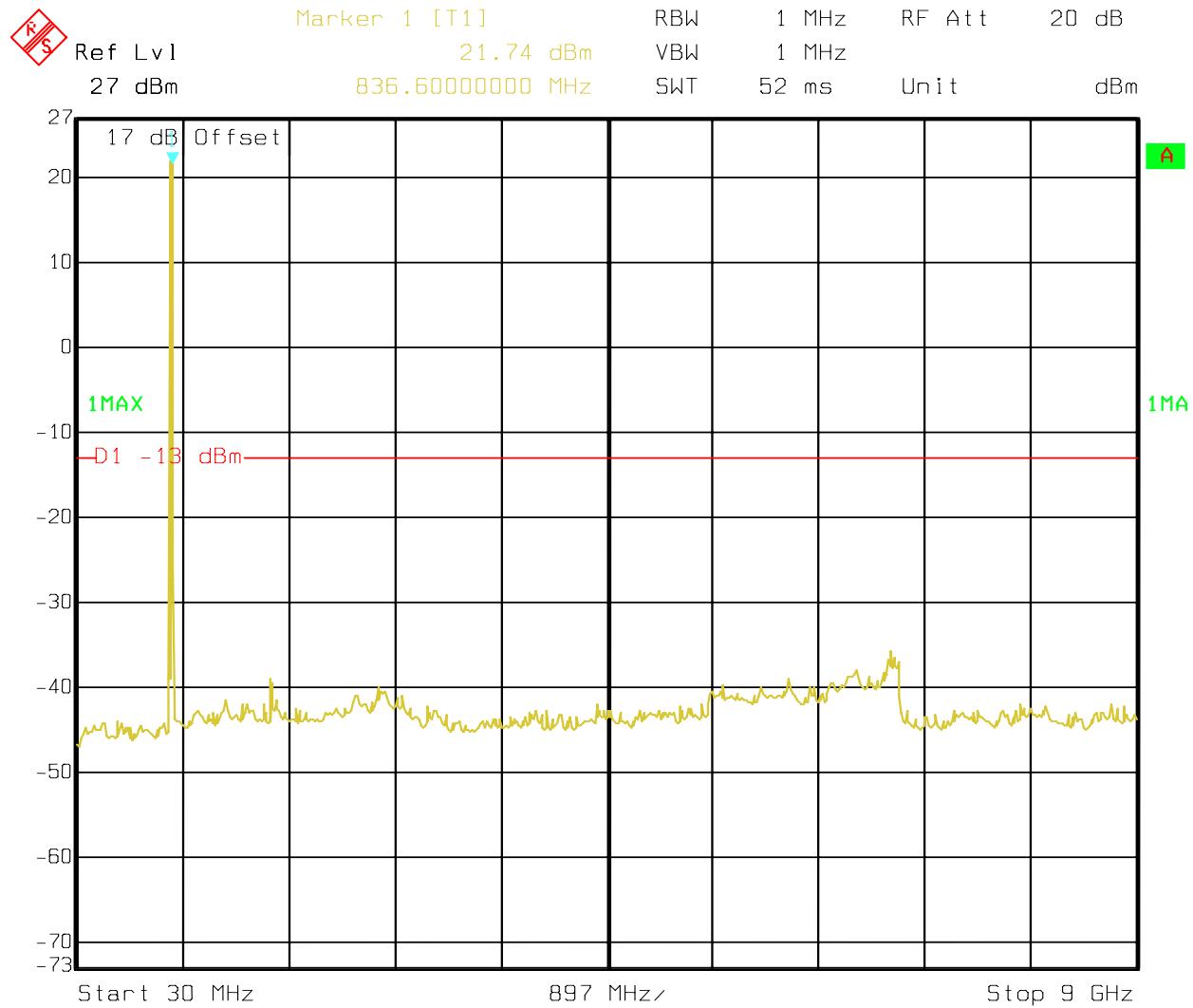
Date: 26.JUL.2006 11:30:29

**5.4.7 Conducted Spurious Results GSM-850 FDD5****CHANNEL 4132 (GSM-850 FDD5)****30MHz – 9GHz****Note: The peak above the limit line is the carrier freq. at ch-4132.**

Date: 26.JUL.2006 10:16:09

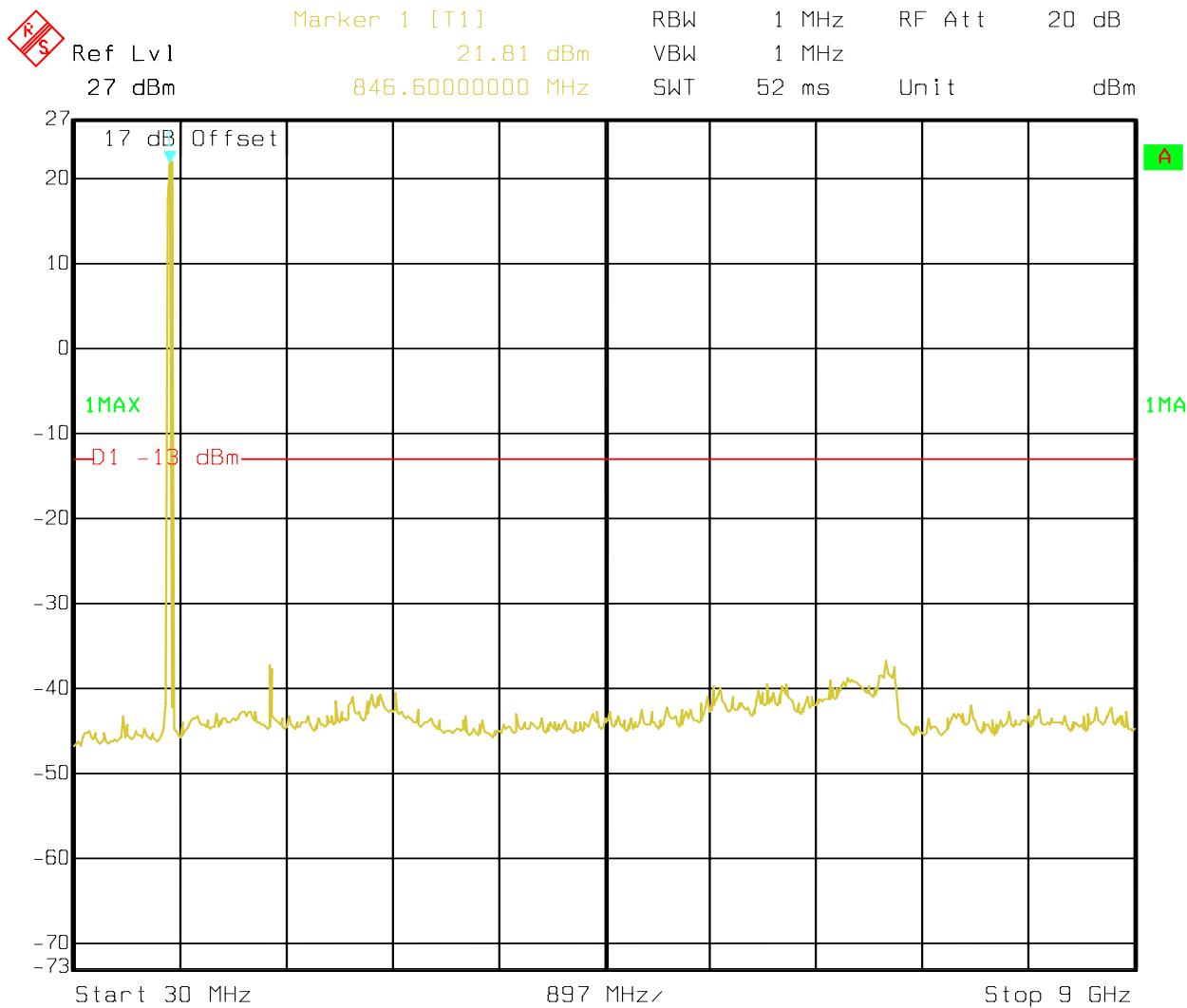
**CHANNEL 4183 (GSM-850 FDD5)**  
**30MHz – 9GHz**

**Note: The peak above the limit line is the carrier freq. at ch-4183.**

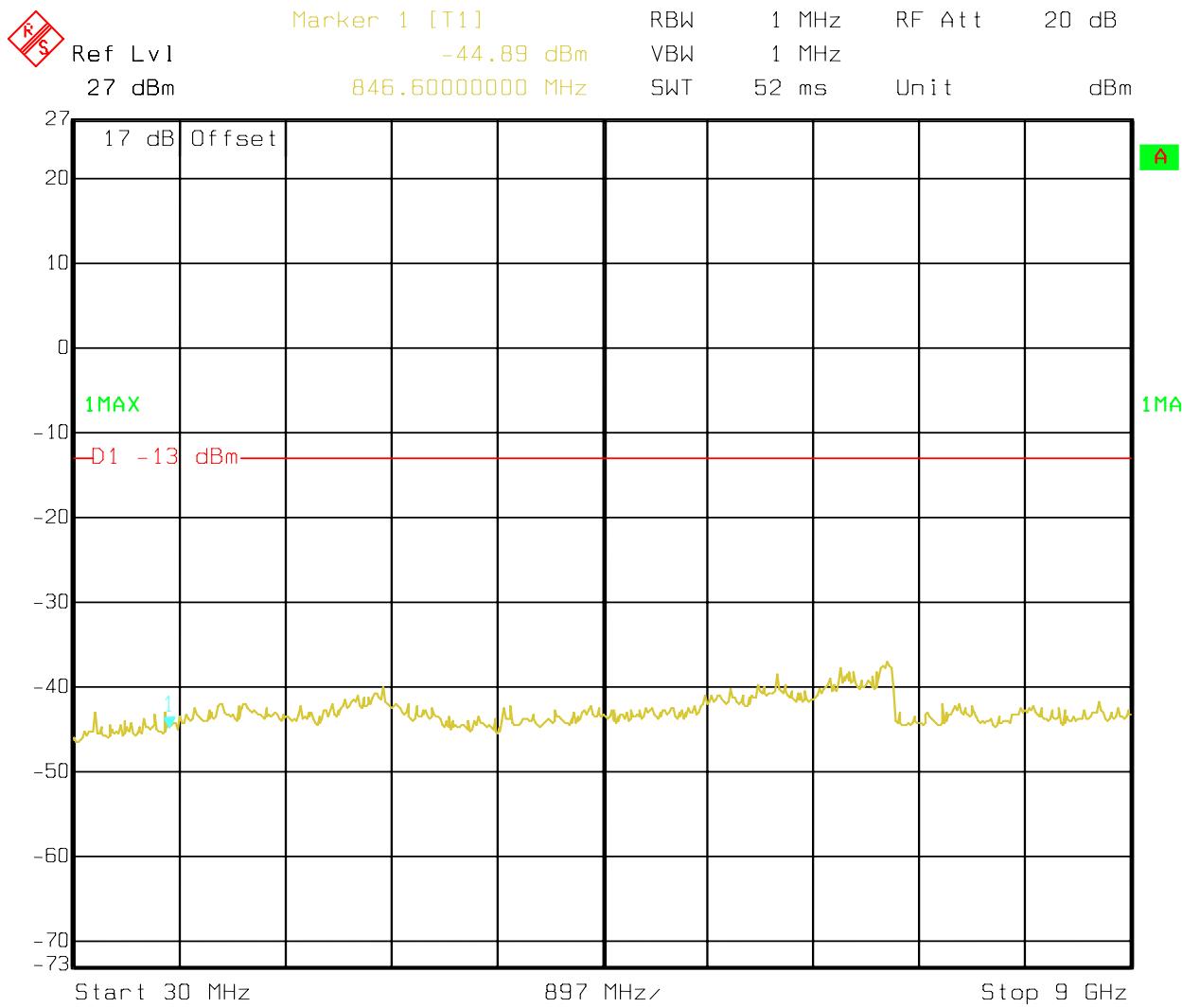


**CHANNEL 4233 (GSM-850 FDD5)  
30MHz – 9GHz**

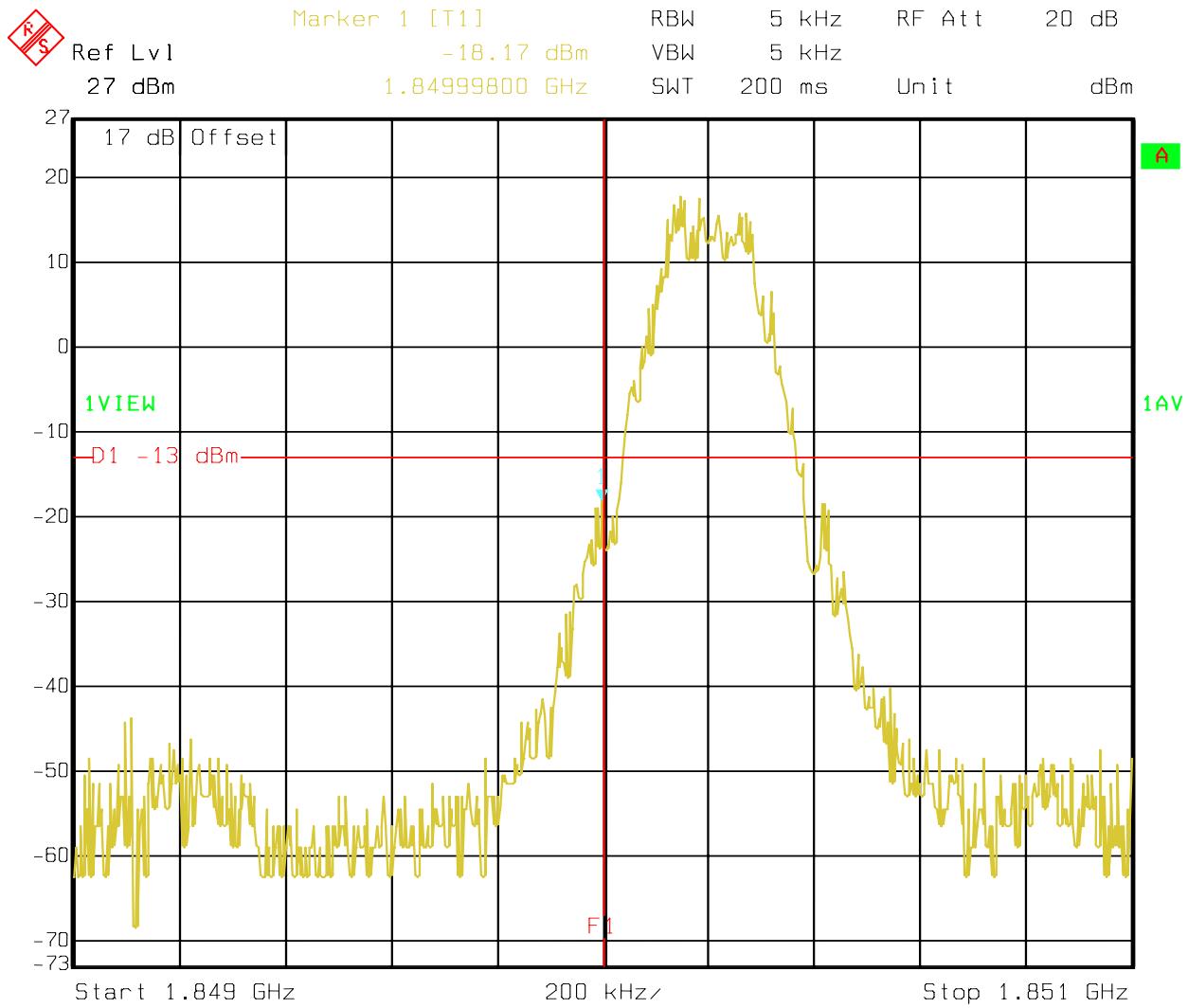
**Note: The peak above the limit line is the carrier freq. at ch-4233.**



Date: 26.JUL.2006 10:18:59

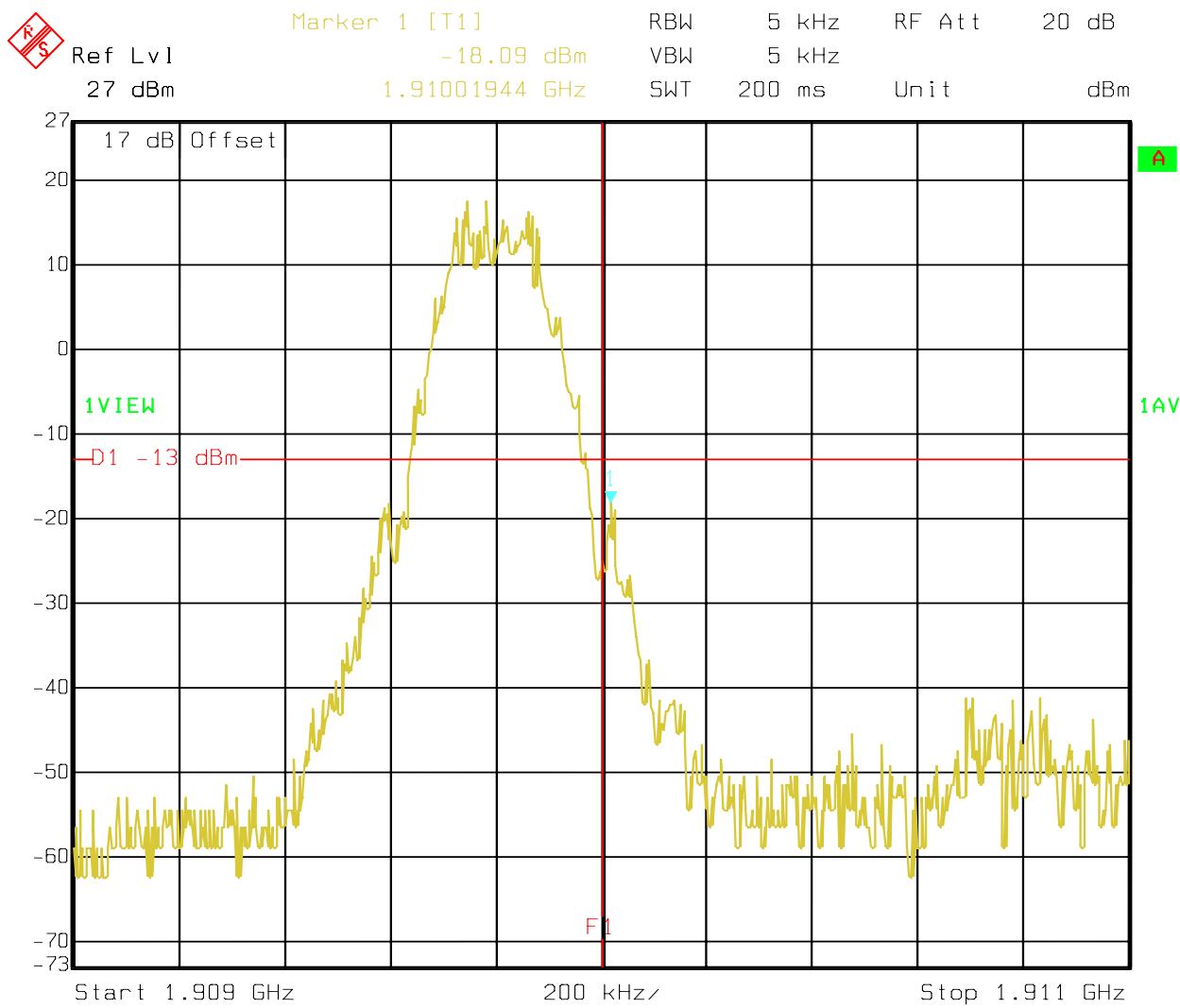
**IDLE (GSM-850 FDD5)**  
**30MHz – 9GHz**


Date: 26.JUL.2006 10:20:03

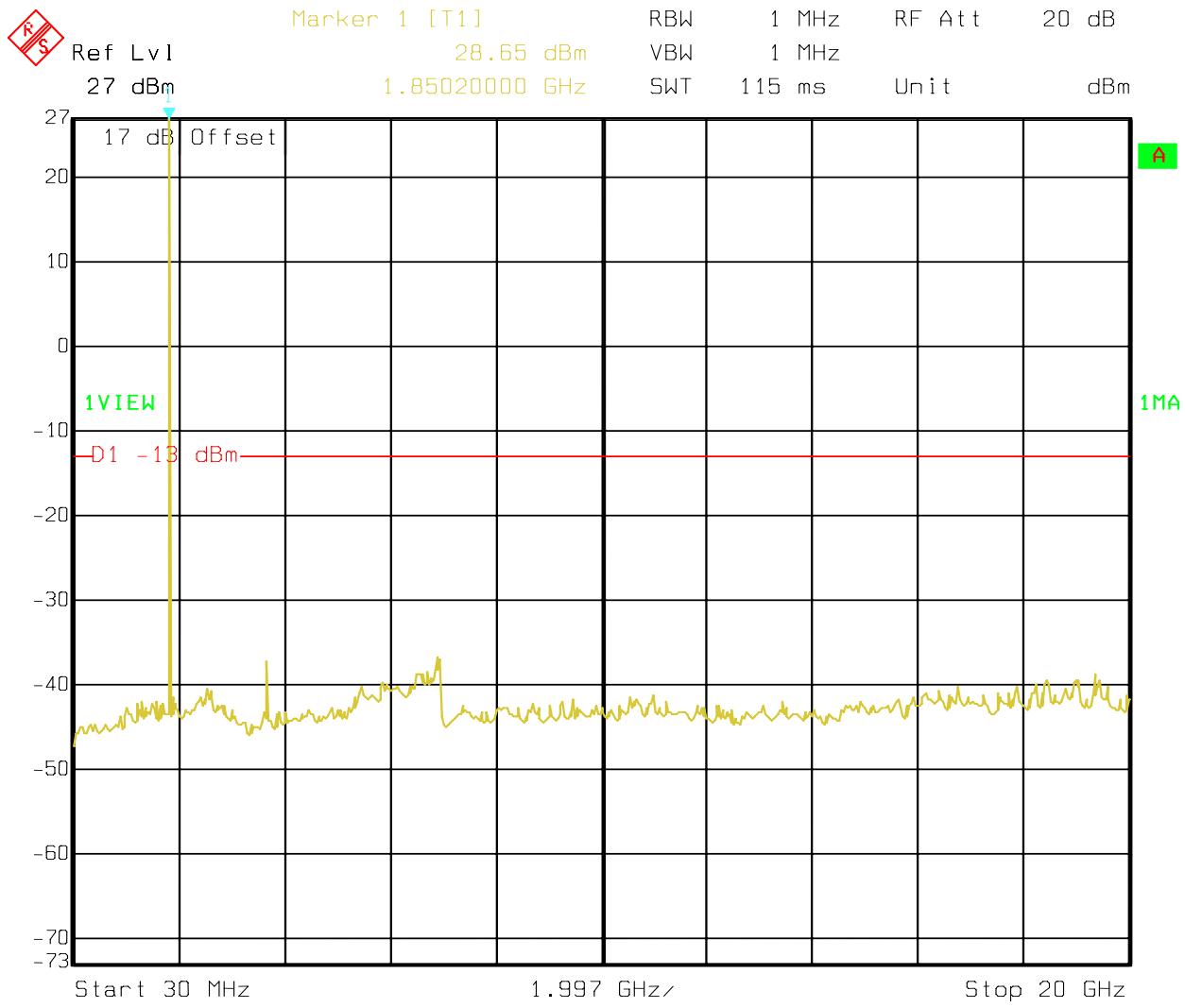
**5.4.8 Band Edge Results PCS-1900****PCS-1900 Lower Band Edge****CHANNEL 512**

Date: 12.JUL.2006 13:10:46

**PCS-1900 Higher Band Edge  
CHANNEL 810**



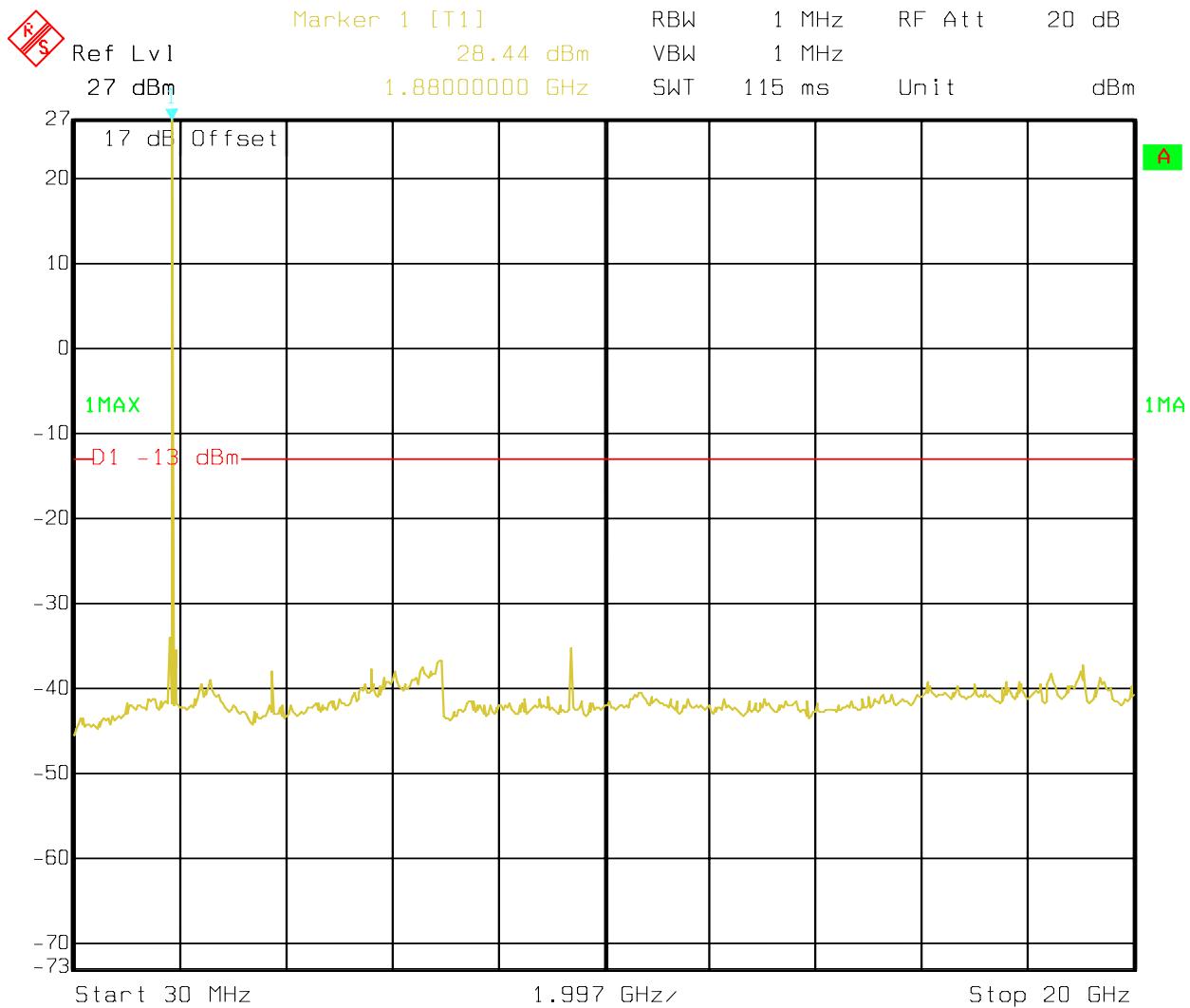
Date: 12.JUL.2006 13:09:03

**5.4.9 Conducted Spurious Results PCS-1900****CHANNEL 512 (PCS-1900)****30MHz – 20GHz****Note: The peak above the limit line is the carrier freq. at ch-512**

Date: 12.JUL.2006 12:44:37

**CHANNEL 661 (PCS-1900)**  
**30MHz – 20GHz**

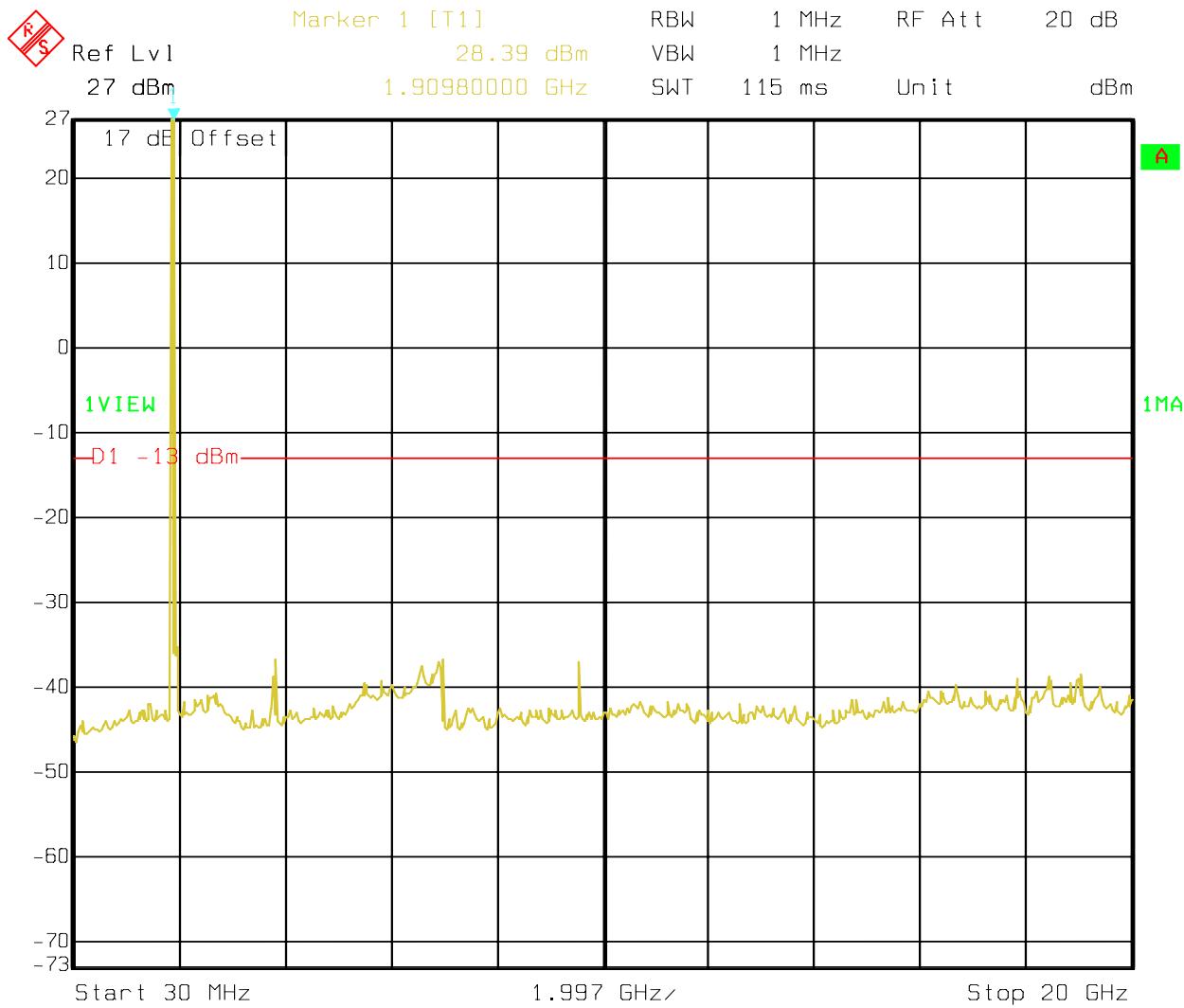
**Note: The peak above the limit line is the carrier freq. at ch-661**



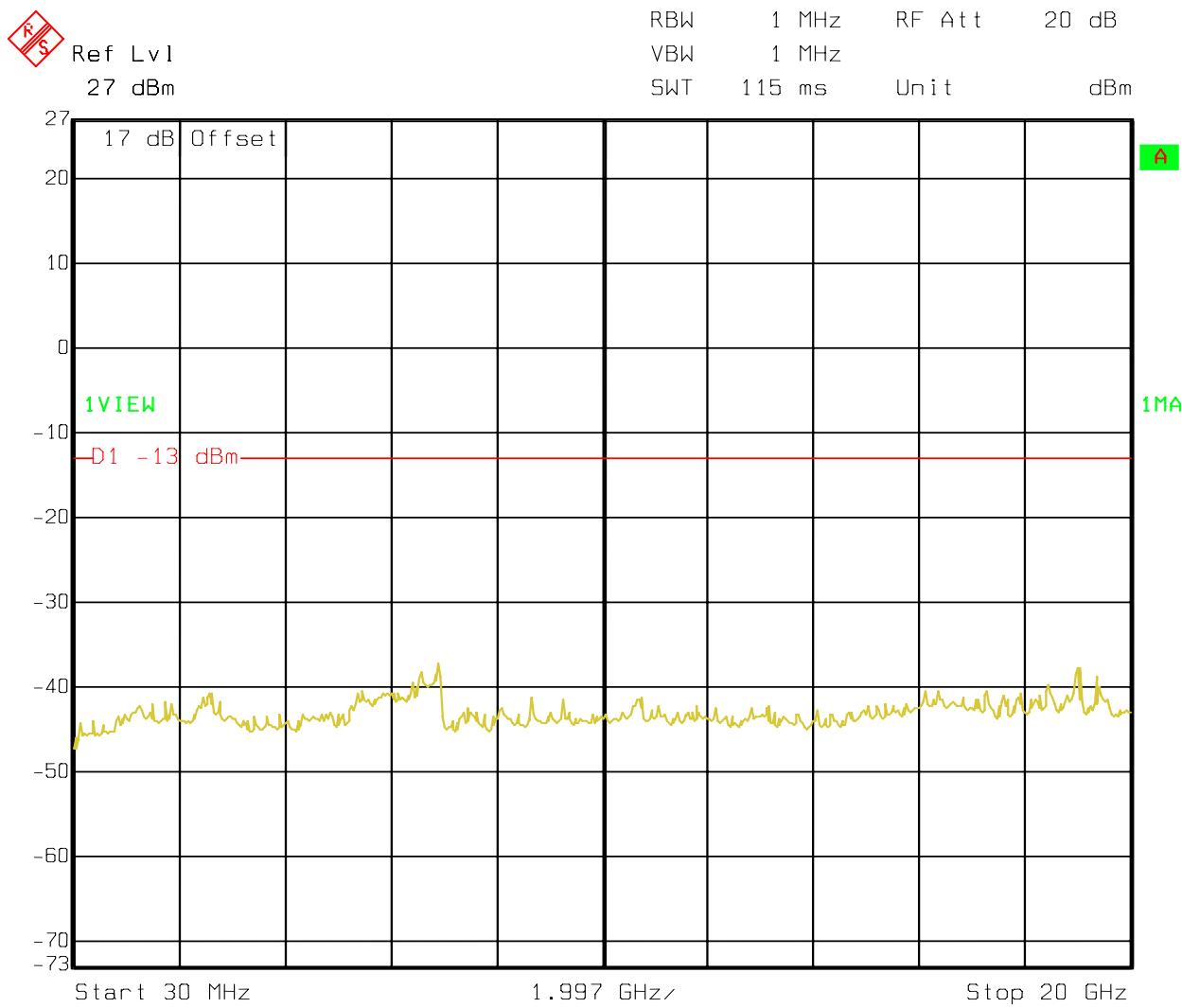
Date: 11.JUL.2006 14:07:26

**CHANNEL 810 (PCS-1900)**  
**30MHz – 20GHz**

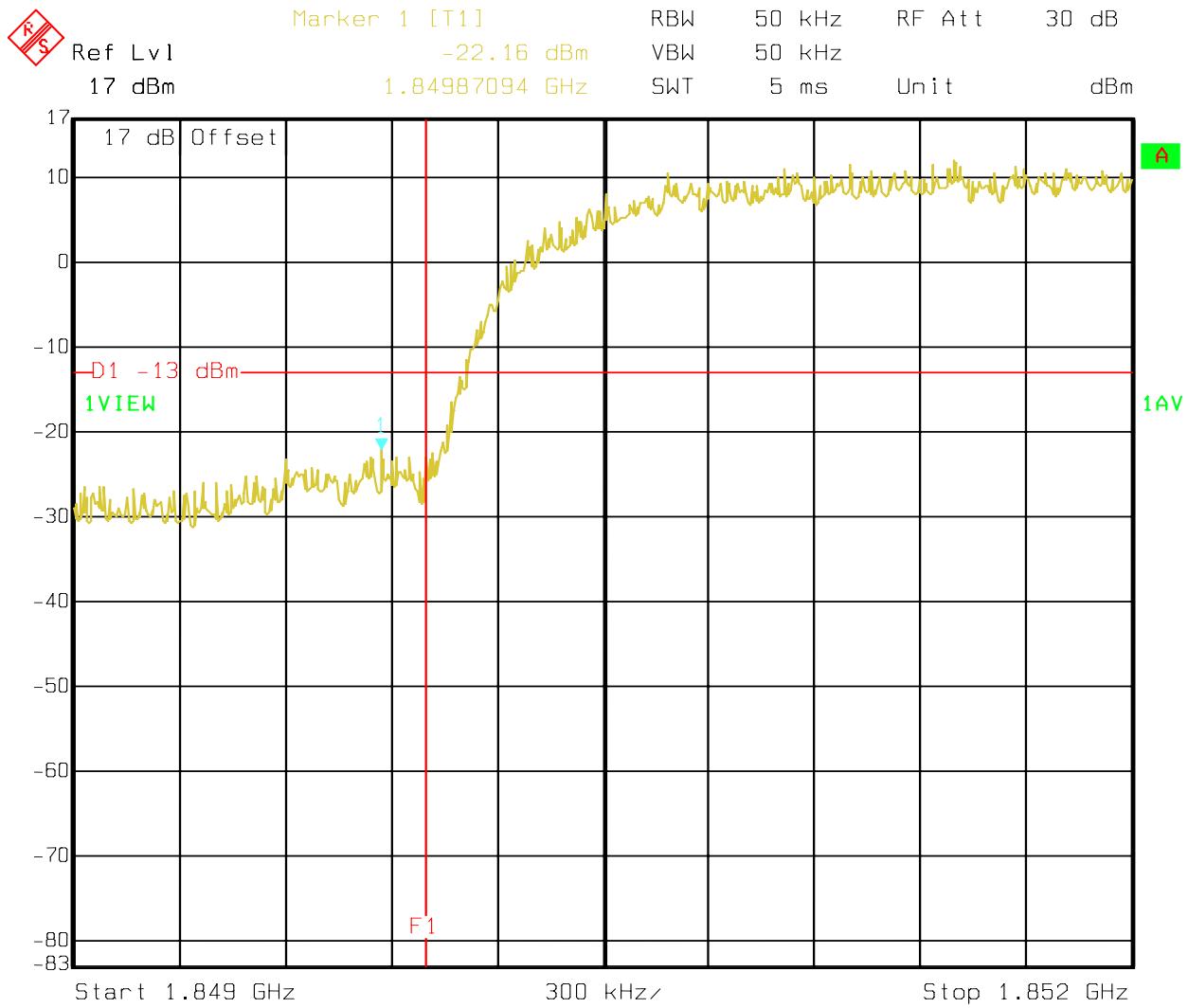
**Note: The peak above the limit line is the carrier freq. at ch-810**



Date: 11.JUL.2006 14:02:03

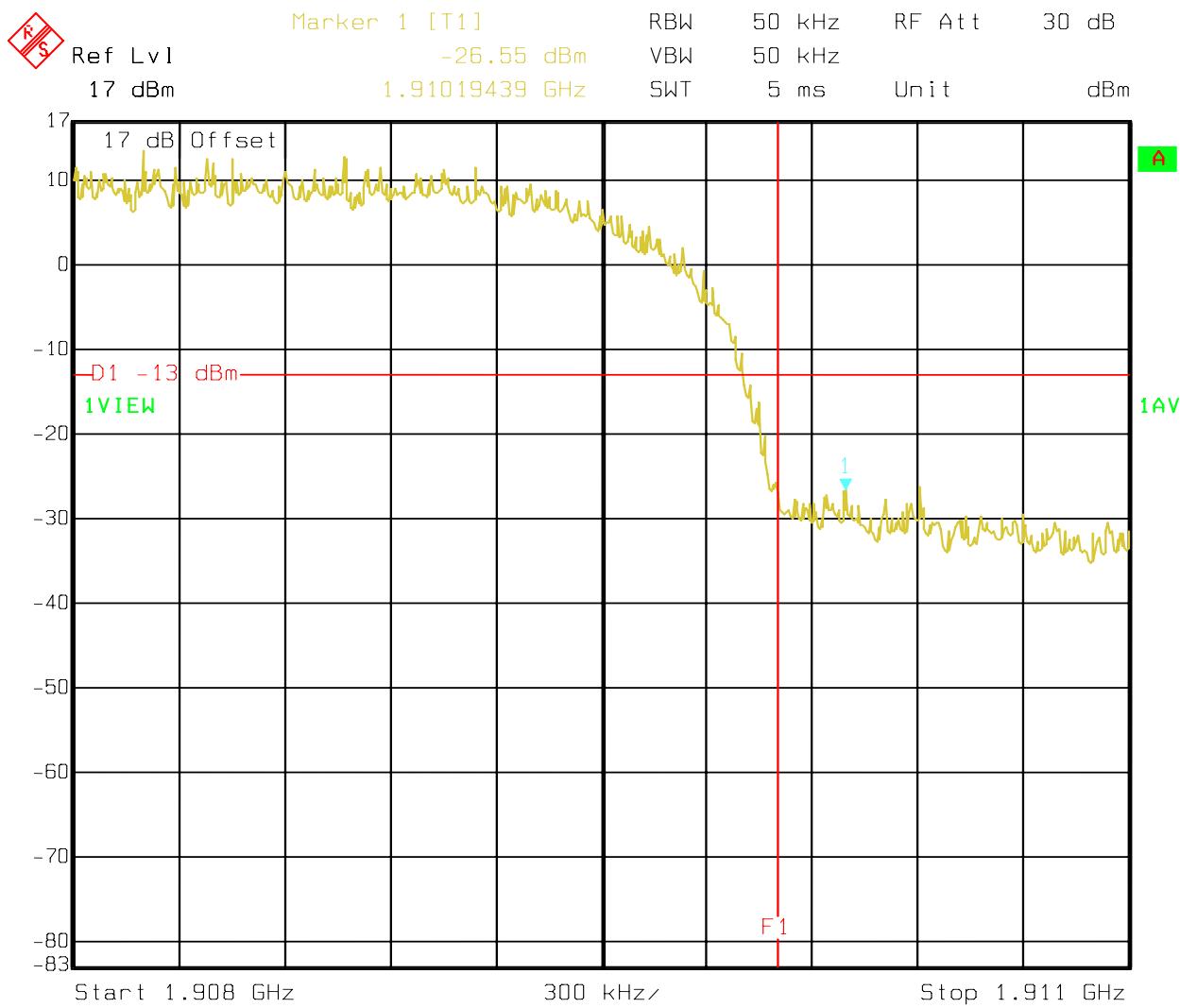
**IDLE (PCS-1900)****30MHz – 20GHz**

Date: 12.JUL.2006 13:12:10

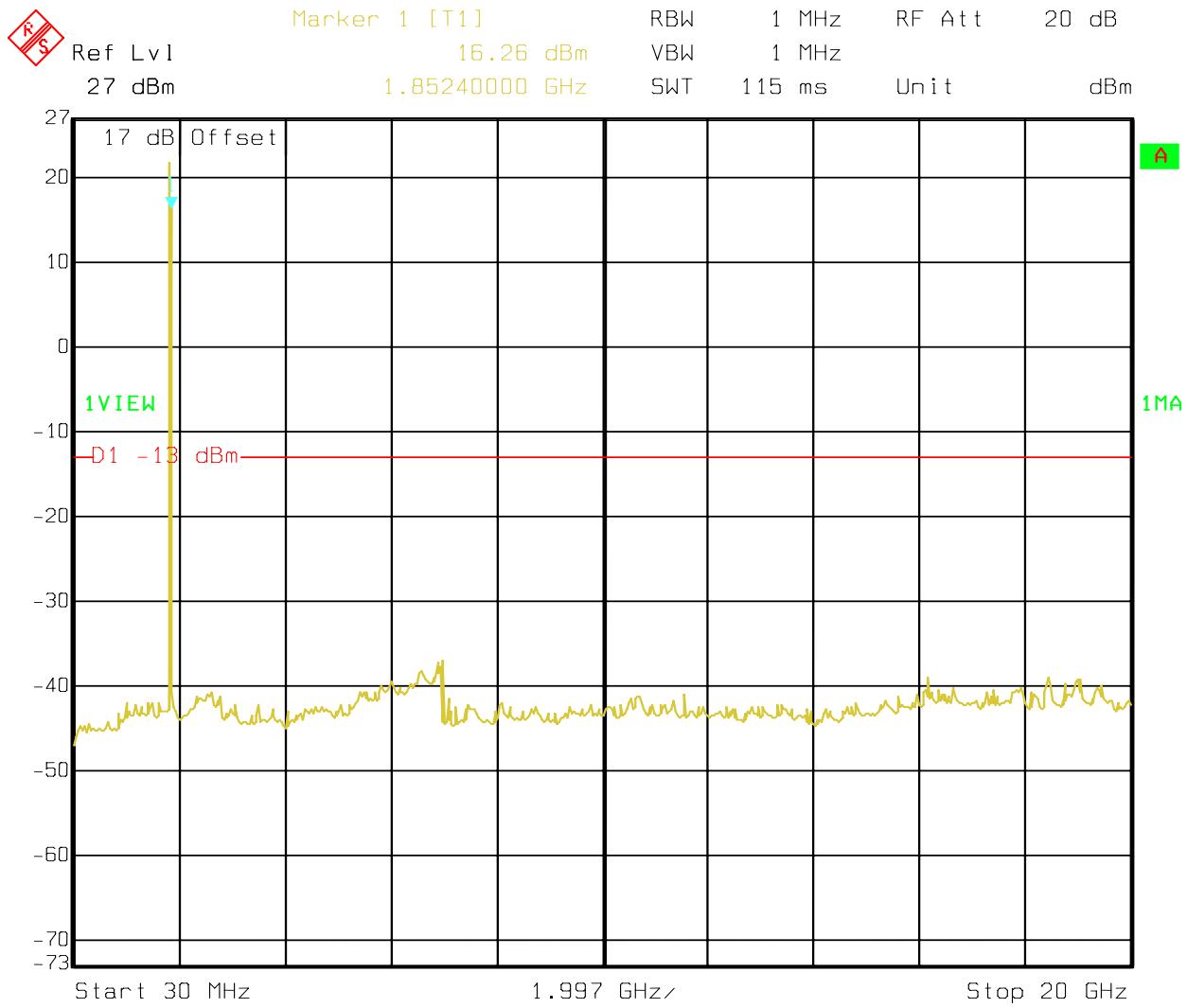
**5.4.10 Band Edge Results PCS-1900 FDD2****PCS-1900 Lower Band Edge  
CHANNEL 9262 FDD2**

Date: 26.JUL.2006 14:31:09

**PCS-1900 Higher Band Edge  
CHANNEL 9538 FDD2**



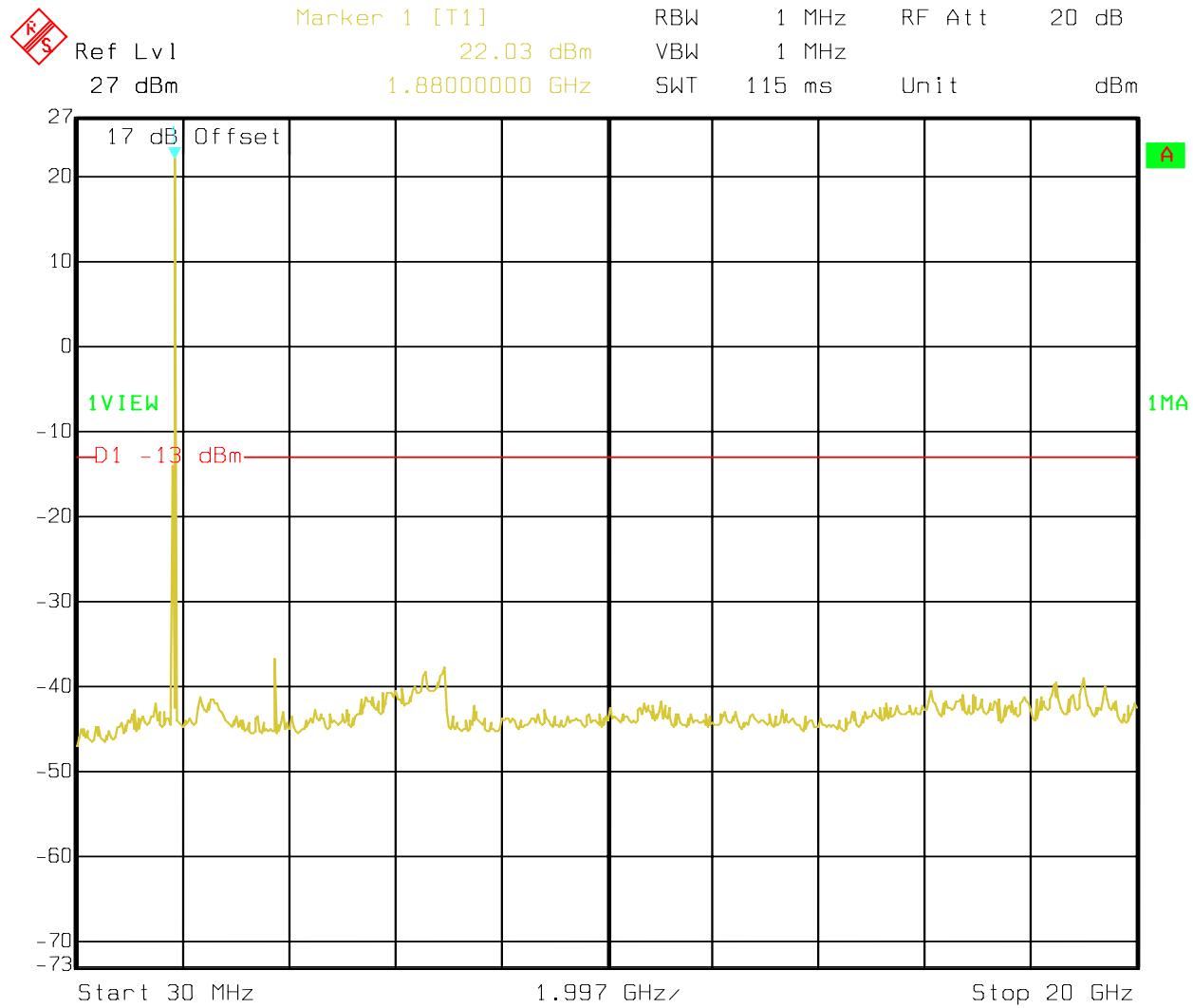
Date: 26.JUL.2006 14:32:46

**5.4.11 Conducted Spurious Results PCS-1900 FDD2****CHANNEL 9262 (PCS-1900 FDD2)****30MHz – 20GHz****Note: The peak above the limit line is the carrier freq. at ch-9262**

Date: 26.JUL.2006 14:21:56

**CHANNEL 9400 (PCS-1900 FDD2)  
30MHz – 20GHz**

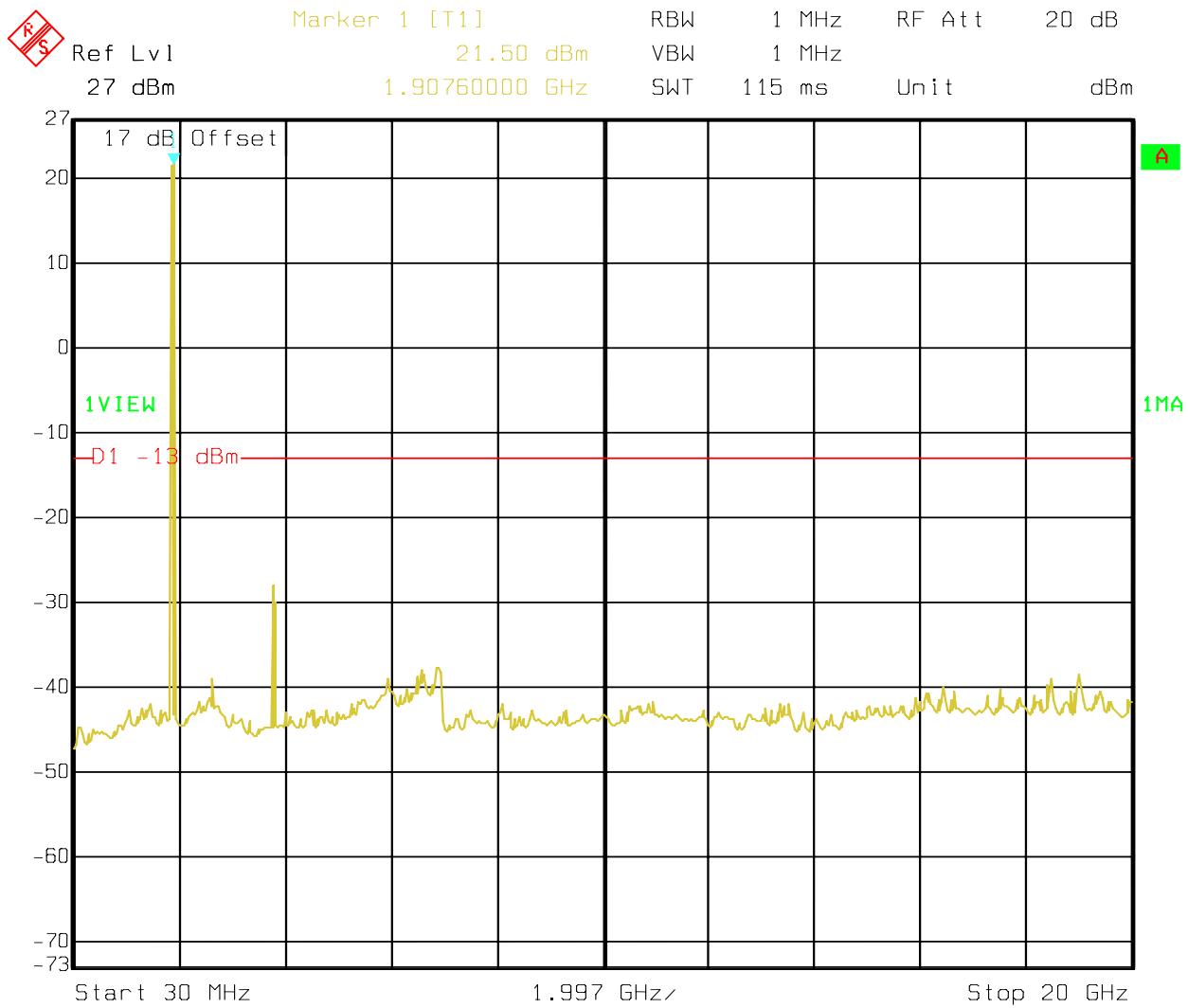
**Note: The peak above the limit line is the carrier freq. at ch-9400**



Date: 26.JUL.2006 14:21:18

**CHANNEL 9538 (PCS-1900 FDD2)  
30MHz – 20GHz**

**Note: The peak above the limit line is the carrier freq. at ch-9538**



Date: 26.JUL.2006 14:22:38

## 5.5 Spurious Emissions Radiated

### 5.5.1 FCC 2.1053 Measurements required: Field strength of spurious radiation.

(a) Measurements shall be made to detect spurious emissions that may be radiated directly from the cabinet, control circuits, power leads or intermediate circuit elements under normal conditions of installation and operation. Curves or equivalent data shall be supplied showing the magnitude of each harmonic and other spurious emission.

### 5.5.2 Limits:

#### 5.5.2.1 FCC 22.917 Emission limitations for cellular equipment.

The rules in this section govern the spectral characteristics of emissions in the Cellular Radiotelephone Service.

(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.

(b) *Measurement procedure.* Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. 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. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (*i.e.* 100 kHz of 1 percent of emission bandwidth, as specified). 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.

#### 5.5.2.2 FCC 24.238 Emission limitations for Broadband PCS equipment.

The rules in this section govern the spectral characteristics of emissions in the Broadband Personal Communications Service.

(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.

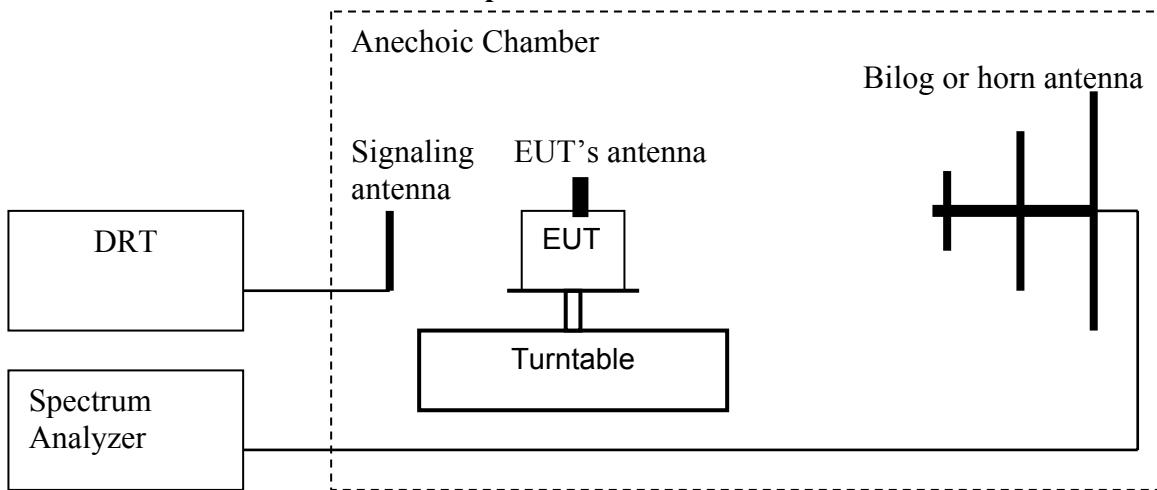
(b) *Measurement procedure.* Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (*i.e.* 100 kHz of 1 percent of emission bandwidth, as specified). 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.

### **5.5.3 Radiated out of band measurement procedure:**

Based on TIA-603C 2004

#### **2.2.12 Unwanted emissions: Radiated Spurious**



1. Connect the equipment as shown in the above diagram with the EUT's antenna in a horizontal orientation.
2. Adjust the settings of the Digital Radiocommunication Tester (DRT) to set the EUT to its maximum power at the required channel.
3. Set the spectrum analyzer to measure peak hold with the required settings.
4. Place the measurement antenna in a horizontal orientation. Rotate the EUT 360°. Raise the measurement antenna up to 4 meters in 0.5 meters increments and rotate the EUT 360° at each height to maximize all emissions. Measure and record all spurious emissions (**LVL**) up to the tenth harmonic of the carrier frequency.
5. Replace the EUT with a horizontally polarized half wave dipole or known gain antenna. The center of the antenna should be at the same location as the center of the EUT's antenna.
6. Connect the antenna to a signal generator with known output power and record the path loss in dB (**LOSS**). **LOSS** = Generator Output Power (dBm) – Analyzer reading (dBm).
7. Determine the level of spurious emissions using the following equation:  

$$\text{Spurious (dBm)} = \text{LVL (dBm)} + \text{LOSS (dB)}$$
8. Repeat steps 4, 5 and 6 with all antennas vertically polarized.
9. Determine the level of spurious emissions using the following equation:  

$$\text{Spurious (dBm)} = \text{LVL (dBm)} + \text{LOSS (dB)}$$
10. Measurements are to be performed with the EUT set to the low, middle and high channel of each frequency band.

(note: Steps 5 and 6 above are performed prior to testing and **LOSS** is recorded by test software. Steps 3, 4 and 7 above are performed with test software.)

**Spectrum analyzer settings:**

Res B/W: 1 MHz

Vid B/W: 1 MHz

**Measurement Survey:**

Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of the GSM-850 & PCS-1900 bands. It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of the GSM-850 & PCS-1900 band into any of the other blocks respectively. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this.

**5.5.4 Radiated out of band emissions results on EUT:****5.5.4.1 RESULTS OF RADIATED TESTS GSM-850:**

Harmonics	Tx ch-128 Freq. (MHz)	Level (dBm)	Tx ch-190 Freq. (MHz)	Level (dBm)	Tx ch-251 Freq. (MHz)	Level (dBm)
2	1648.4	NF	1673.2	NF	1697.6	NF
3	2472.6	NF	2509.8	NF	2546.4	NF
4	3296.8	NF	3346.4	NF	3395.2	NF
5	4121	NF	4183	NF	4244	NF
6	4945.2	NF	5019.6	NF	5092.8	NF
7	5769.4	NF	5856.2	NF	5941.6	NF
8	6593.6	NF	6692.8	NF	6790.4	NF
9	7417.8	NF	7529.4	NF	7639.2	NF
10	8242	NF	8366	NF	8488	NF
NF = NOISE FLOOR						

**5.5.4.2 RADIATED SPURIOUS EMISSIONS (GSM-850)****TX: 30MHz - 1GHz**

Spurious emission limit -13dBm

**Antenna: vertical****Note:**

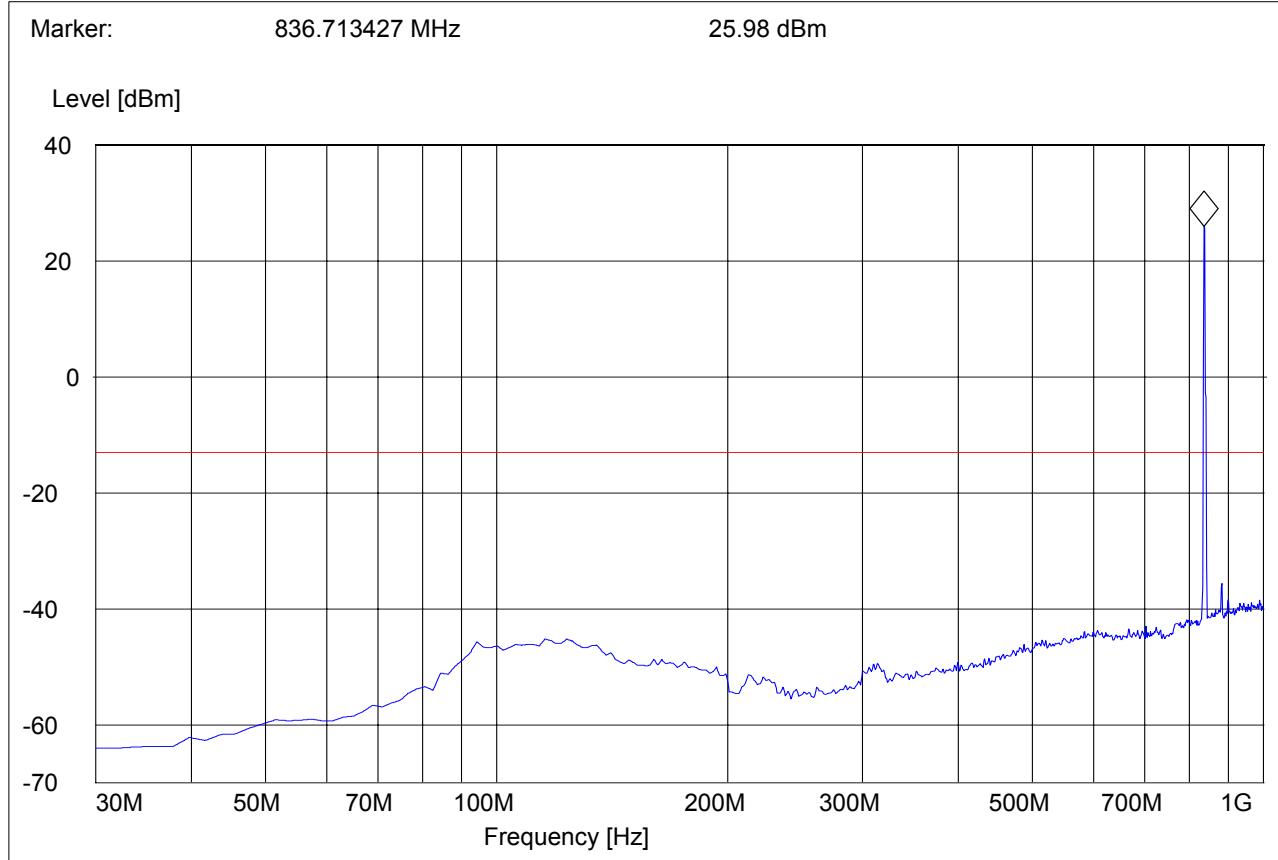
1. The peak above the limit line is the carrier freq.
2. This plot is valid for low, mid & high channels (worst-case plot)

**CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: EUT 34BB00I, C03, LAPTOP KKL-E3-C1, X01-00  
 Customer: NOVATEL  
 Operating Mode: FCC22, RADIATED, TABLE 217 DEGREES  
 Antenna: V  
 EUT: V  
 Test Engineer: SATYA  
 Voltage: AC ADAPTOR  
 Sweep: FCC 24 SPUR 30M-1 G CH 190

***SWEET TABLE: "FCC 24 Spur 30M-1G\_V"***

Short Description: FCC 24 30MHz-1GHz					
Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM



**RADIATED SPURIOUS EMISSIONS (GSM-850)****Tx @ 824.2MHz: 1GHz – 1.58GHz**

Spurious emission limit –13dBm

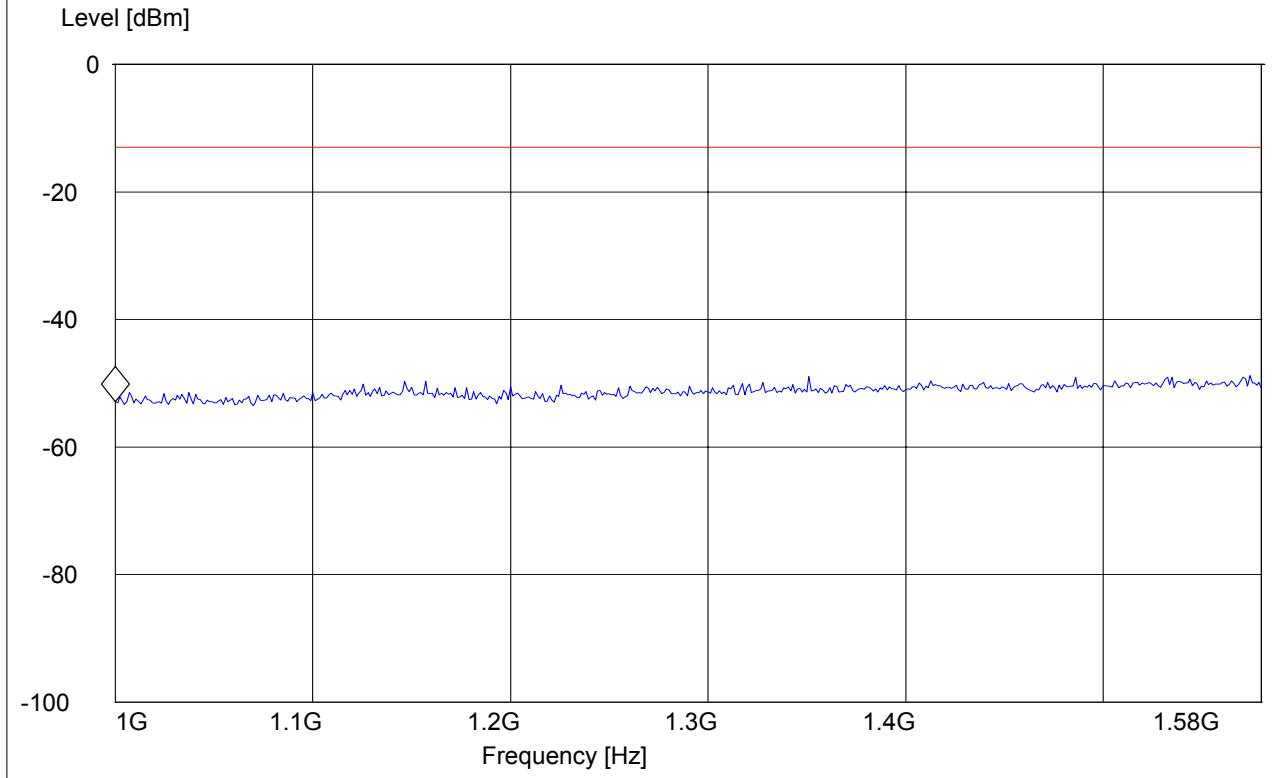
**CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: EUT 34BB00I, C03, LAPTOP KKL-E3-C1, X01-00  
 Customer: NOVATEL  
 Operating Mode: FCC22, RADIATED, TABLE 217 DEGREES  
 Antenna: V  
 EUT: V  
 Test Engineer: SATYA  
 Voltage: AC ADAPTOR  
 Sweep: FCC 22 SPUR 1-1.58 G CH 128 V

***SWEET TABLE: "FCC 22Spuri 1-1.58G"***

Short Description: FCC 24 1GHz-8GHz  
 Start Stop Detector Meas. IF Transducer  
 Frequency Frequency Time Bandw.  
 1.0 GHz 1.6 GHz MaxPeak Coupled 1 MHz DUMMY-DBM

Marker: 1 GHz -52.9 dBm



**RADIATED SPURIOUS EMISSIONS (GSM-850)****Tx @ 824.2MHz: 1.58GHz – 3GHz**

Spurious emission limit –13dBm

**CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

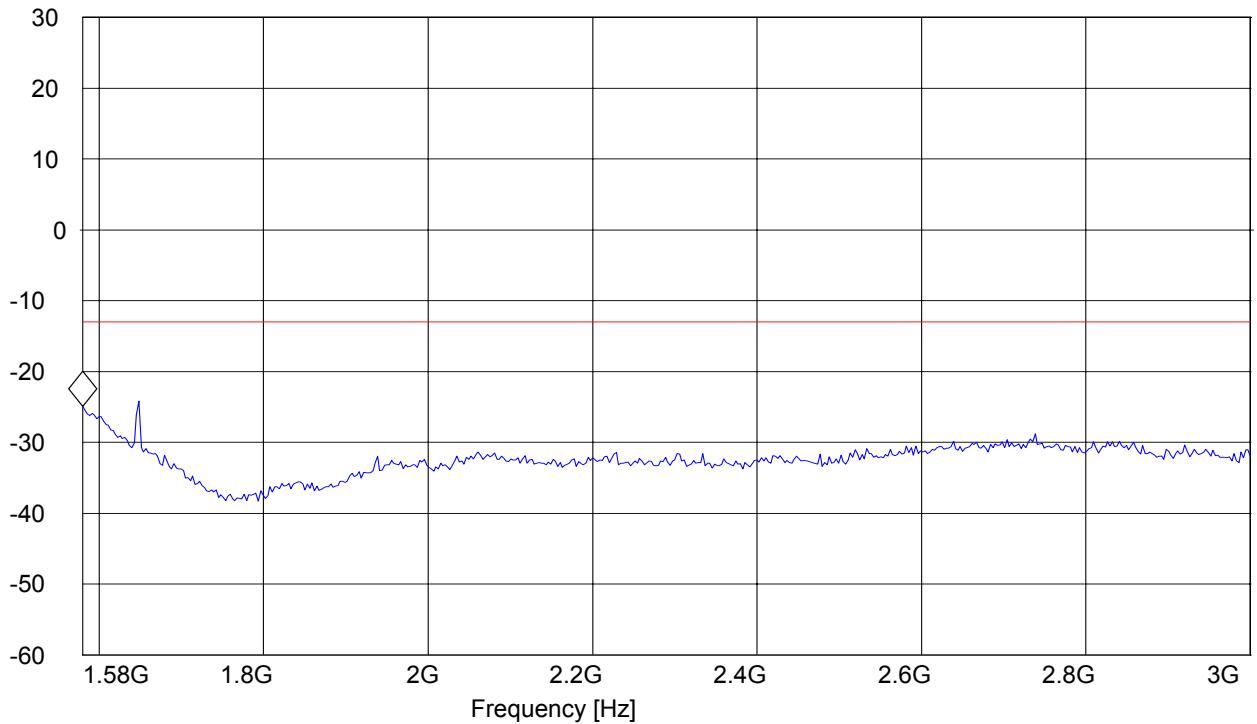
EUT / Description: EUT 34BB00I, C03, LAPTOP KKL-E3-C1, X01-00  
 Customer: NOVATEL  
 Operating Mode: FCC22, RADIATED, TABLE 217 DEGREES  
 Antenna: V  
 EUT: V  
 Test Engineer: SATYA  
 Voltage: AC ADAPTOR  
 Sweep: FCC 22 SPUR 1.58-3 G CH 128

***SWEEP TABLE: "FCC 22Spuri 1.58-3G"***

Short Description:		FCC 24 1GHz-8GHz			
Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
1.6 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM

Marker:	1.58 GHz	-24.95 dBm
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Level [dBm]



**RADIATED SPURIOUS EMISSIONS (GSM-850)****Tx @ 824.2MHz: 3GHz – 9GHz**

Spurious emission limit –13dBm

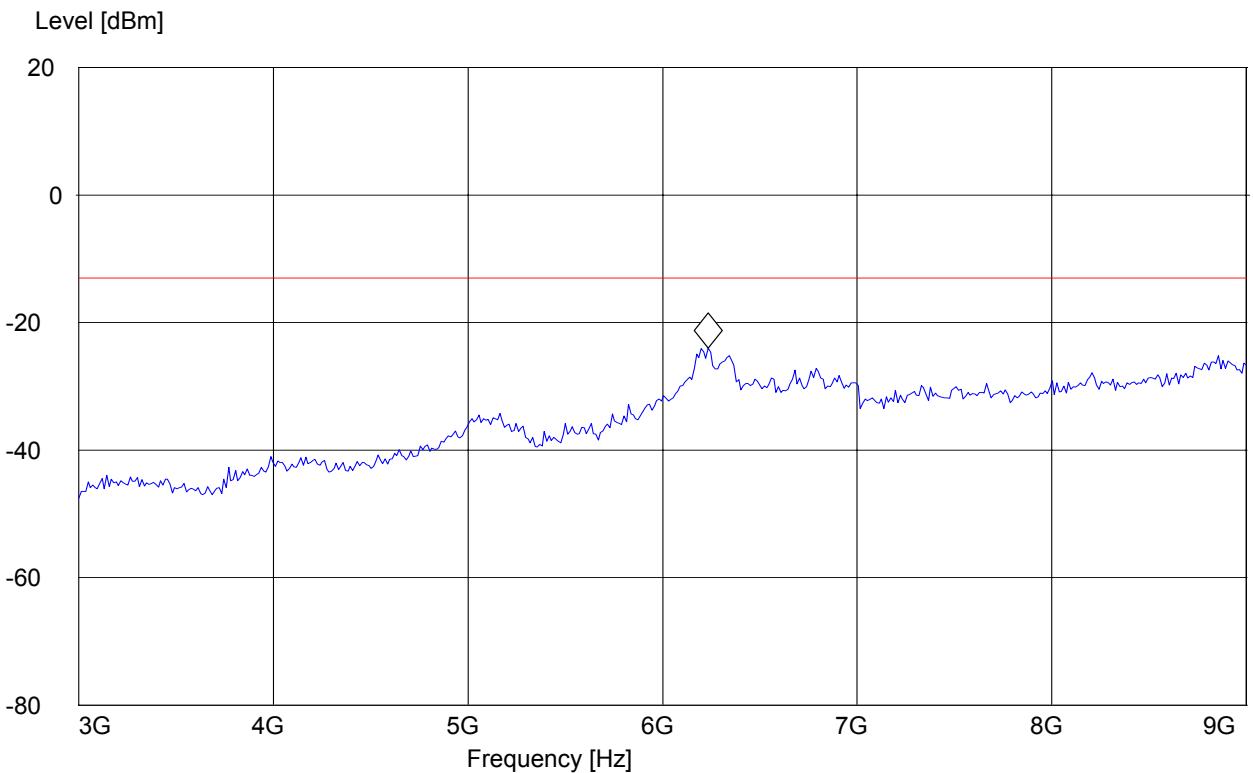
**CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: EUT 34BB00I, C03, LAPTOP KKL-E3-C1, X01-00  
 Customer: NOVATEL  
 Operating Mode: FCC22, RADIATED, TABLE 217 DEGREES  
 Antenna: V  
 EUT: V  
 Test Engineer: SATYA  
 Voltage: AC ADAPTOR  
 Sweep: FCC 22 SPUR 3-9G CH 128

***SWEET TABLE: "FCC 22Spuri 3-9G"***

Short Description:		FCC 24 1GHz-8GHz			
Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
3.0 GHz	9.0 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM

Marker: 6.234468938 GHz -23.97 dBm



**RADIATED SPURIOUS EMISSIONS (GSM-850)****Tx @ 836.6MHz: 1GHz – 1.58GHz**

Spurious emission limit –13dBm

**CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

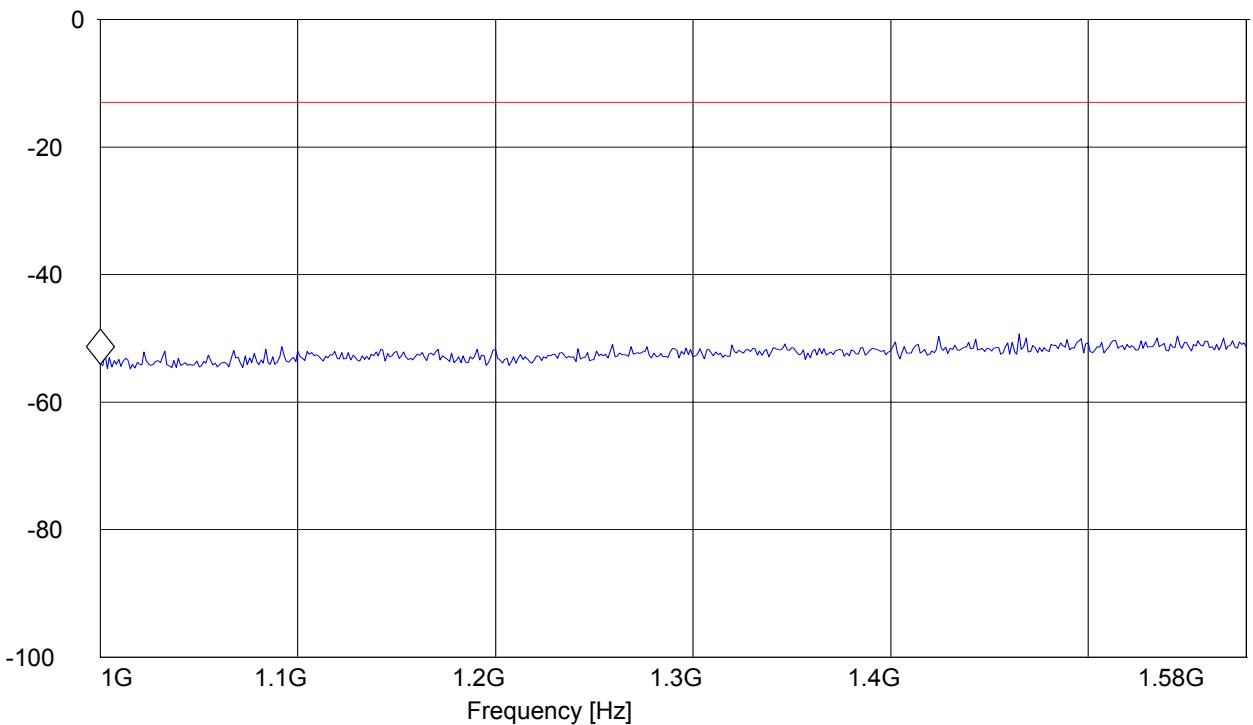
EUT / Description: EUT 34BB00I, C03, LAPTOP KKL-E3-C1, X01-00  
 Customer: NOVATEL  
 Operating Mode: FCC22, RADIATED, TABLE 217 DEGREES  
 Antenna: V  
 EUT: V  
 Test Engineer: SATYA  
 Voltage: AC ADAPTOR  
 Sweep: FCC 22 SPUR 1-1.58 G CH 190

***SWEET TABLE: "FCC 22Spuri 1-1.58G"***

Short Description:		FCC 24 1GHz-8GHz			
Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
1.0 GHz	1.6 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM

Marker: 1 GHz -54.04 dBm

Level [dBm]



**RADIATED SPURIOUS EMISSIONS (GSM-850)****Tx @ 836.6MHz: 1.58GHz – 3GHz**

Spurious emission limit –13dBm

**CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

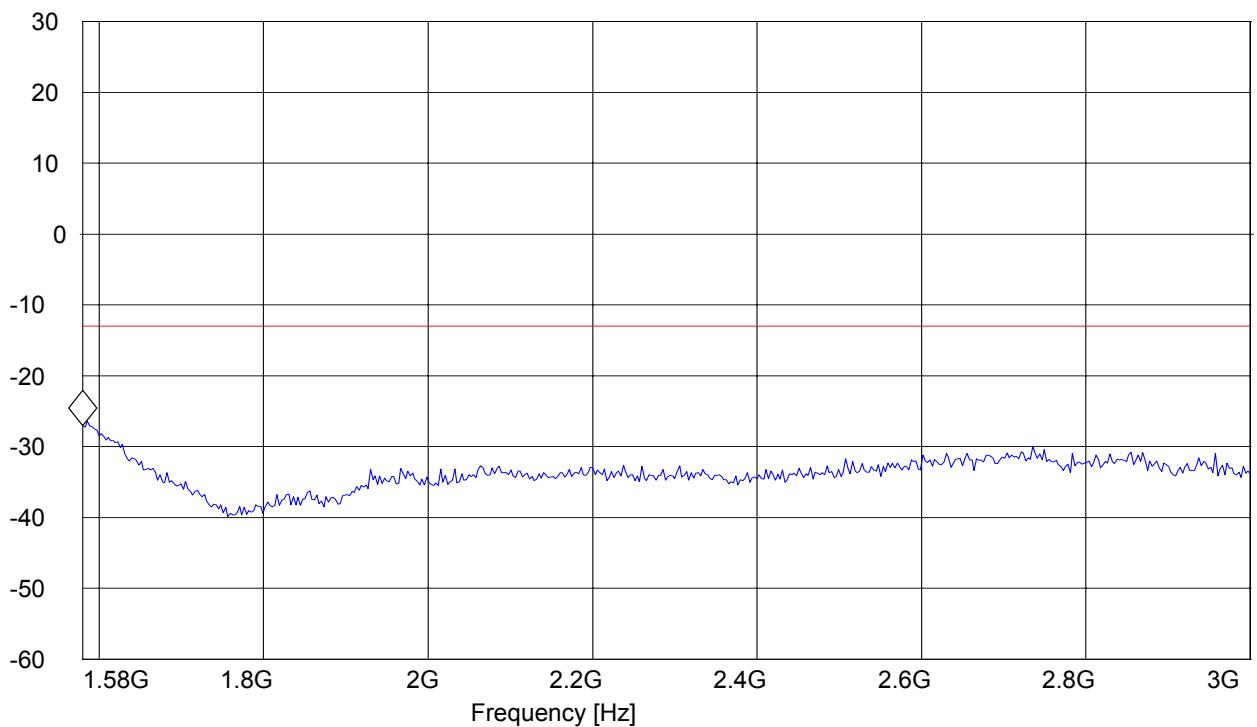
EUT / Description: EUT 34BB00I, C03, LAPTOP KKL-E3-C1, X01-00  
 Customer: NOVATEL  
 Operating Mode: FCC22, RADIATED, TABLE 217 DEGREES  
 Antenna: V  
 EUT: V  
 Test Engineer: SATYA  
 Voltage: AC ADAPTOR  
 Sweep: FCC 22 SPUR 1.58-3 G CH 190

***SWEET TABLE: "FCC 22Spuri 1.58-3G"***

Short Description:		FCC 24 1GHz-8GHz			
Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
1.6 GHz	3.0 GHz	MaxPeak	Time	Bandw.	DUMMY-DBM
			Coupled	1 MHz	

Marker: 1.58 GHz -27 dBm

Level [dBm]



**RADIATED SPURIOUS EMISSIONS (GSM-850)****Tx @ 836.6MHz: 3GHz – 9GHz**

Spurious emission limit –13dBm

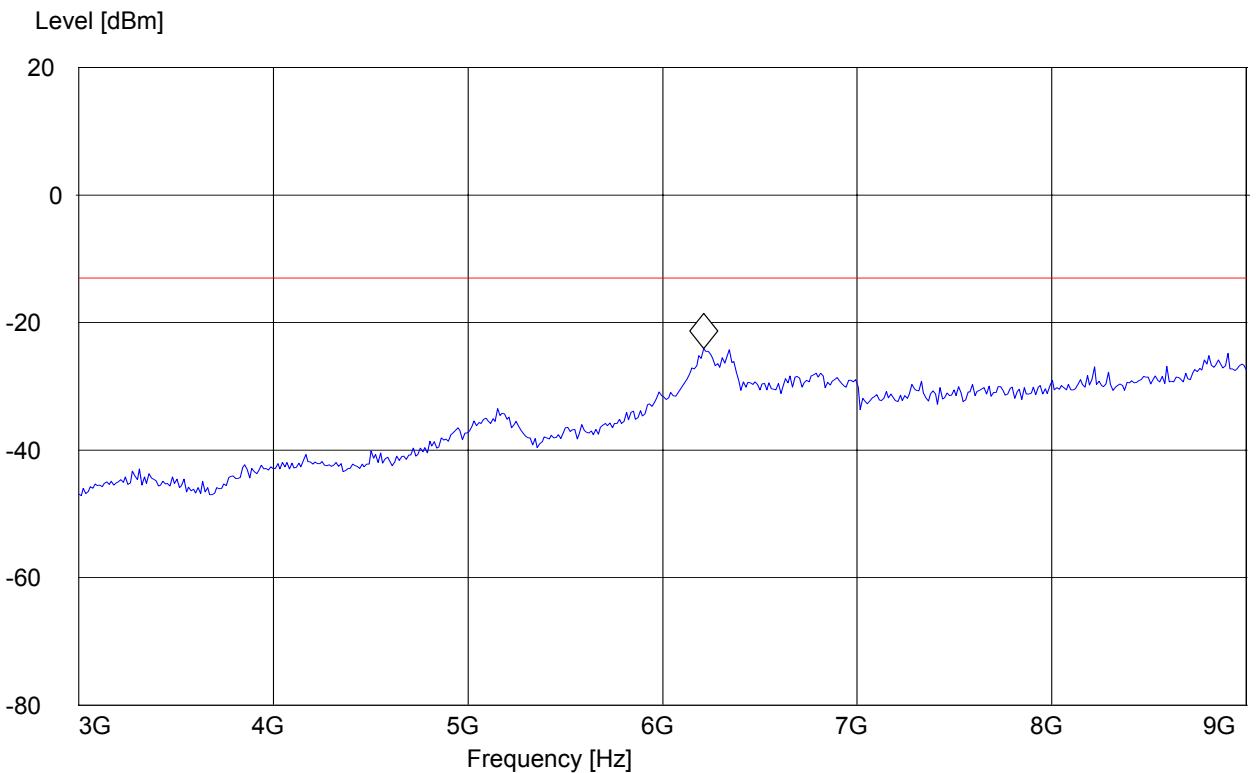
**CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: EUT 34BB00I, C03, LAPTOP KKL-E3-C1, X01-00  
 Customer: NOVATEL  
 Operating Mode: FCC22, RADIATED, TABLE 217 DEGREES  
 Antenna: V  
 EUT: V  
 Test Engineer: SATYA  
 Voltage: AC ADAPTOR  
 Sweep: FCC 22 SPUR 3-9G CH 190

***SWEET TABLE: "FCC 22Spuri 3-9G"***

Short Description:		FCC 24 1GHz-8GHz	IF	Transducer	
Start Frequency	Stop Frequency	Detector	Meas.	Time	Bandw.
3.0 GHz	9.0 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM

Marker: 6.210420842 GHz -24.12 dBm



**RADIATED SPURIOUS EMISSIONS (GSM-850)****Tx @ 848.8MHz: 1GHz – 1.58GHz**

Spurious emission limit –13dBm

**CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

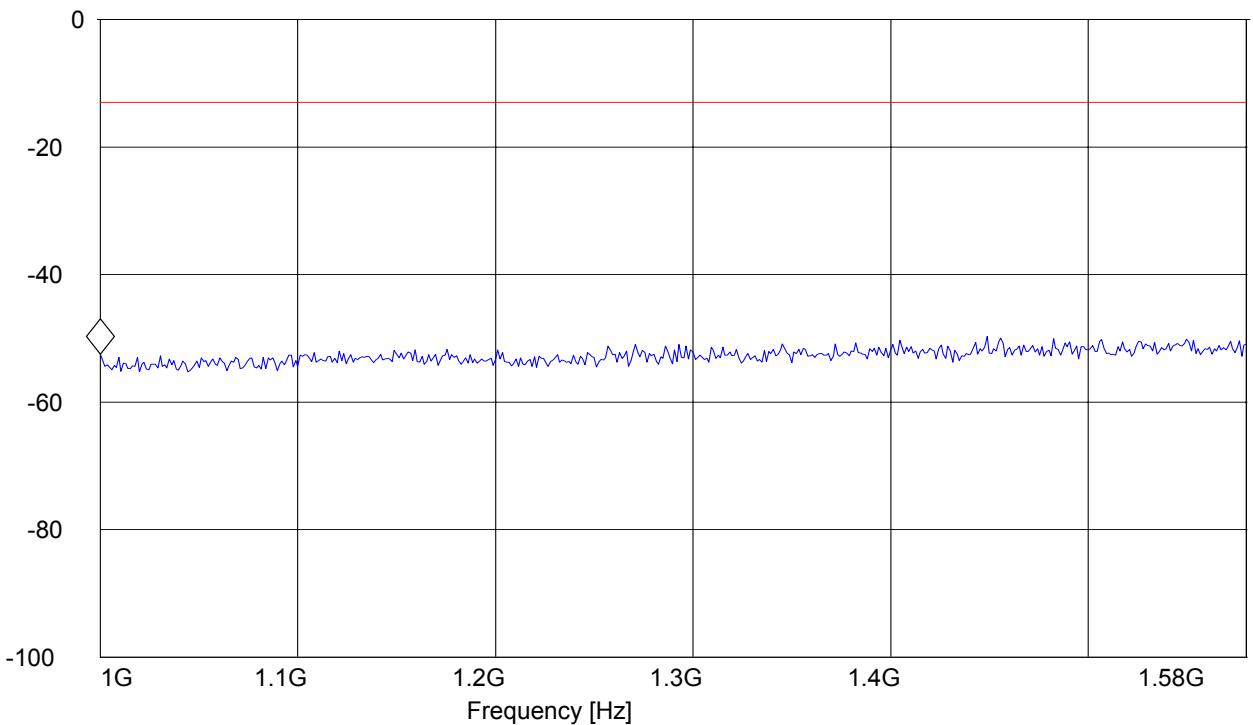
EUT / Description: EUT 34BB00I, C03, LAPTOP KKL-E3-C1, X01-00  
 Customer: NOVATEL  
 Operating Mode: FCC22, RADIATED, TABLE 217 DEGREES  
 Antenna: V  
 EUT: V  
 Test Engineer: SATYA  
 Voltage: AC ADAPTOR  
 Sweep: FCC 22 SPUR 1-1.58 G CH 251

***SWEET TABLE: "FCC 22Spuri 1-1.58G"***

Short Description:		FCC 24 1GHz-8GHz			
Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
1.0 GHz	1.6 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM

Marker:	1 GHz	-52.46 dBm
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Level [dBm]



**RADIATED SPURIOUS EMISSIONS (GSM-850)****Tx @ 848.8MHz: 1.58GHz – 3GHz**

Spurious emission limit –13dBm

**CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

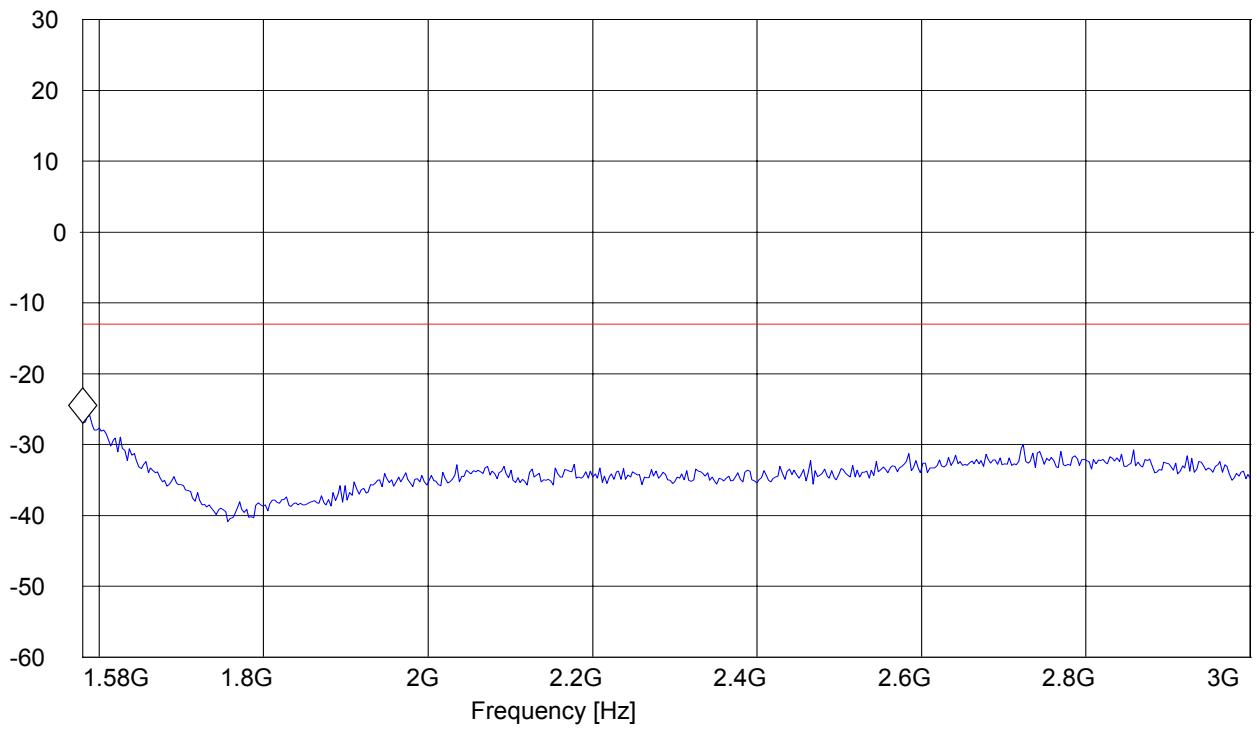
EUT / Description: EUT 34BB00I, C03, LAPTOP KKL-E3-C1, X01-00  
 Customer: NOVATEL  
 Operating Mode: FCC22, RADIATED, TABLE 217 DEGREES  
 Antenna: V  
 EUT: V  
 Test Engineer: SATYA  
 Voltage: AC ADAPTOR  
 Sweep: FCC 22 SPUR 1.58-3 G CH 251

***SWEET TABLE: "FCC 22Spuri 1.58-3G"***

Short Description:		FCC 24 1GHz-8GHz			
Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
1.6 GHz	3.0 GHz	MaxPeak	Time	Bandw.	DUMMY-DBM
			Coupled	1 MHz	

Marker: 1.58 GHz -26.99 dBm

Level [dBm]



**RADIATED SPURIOUS EMISSIONS (GSM-850)****Tx @ 848.8MHz: 3GHz – 9GHz**

Spurious emission limit –13dBm

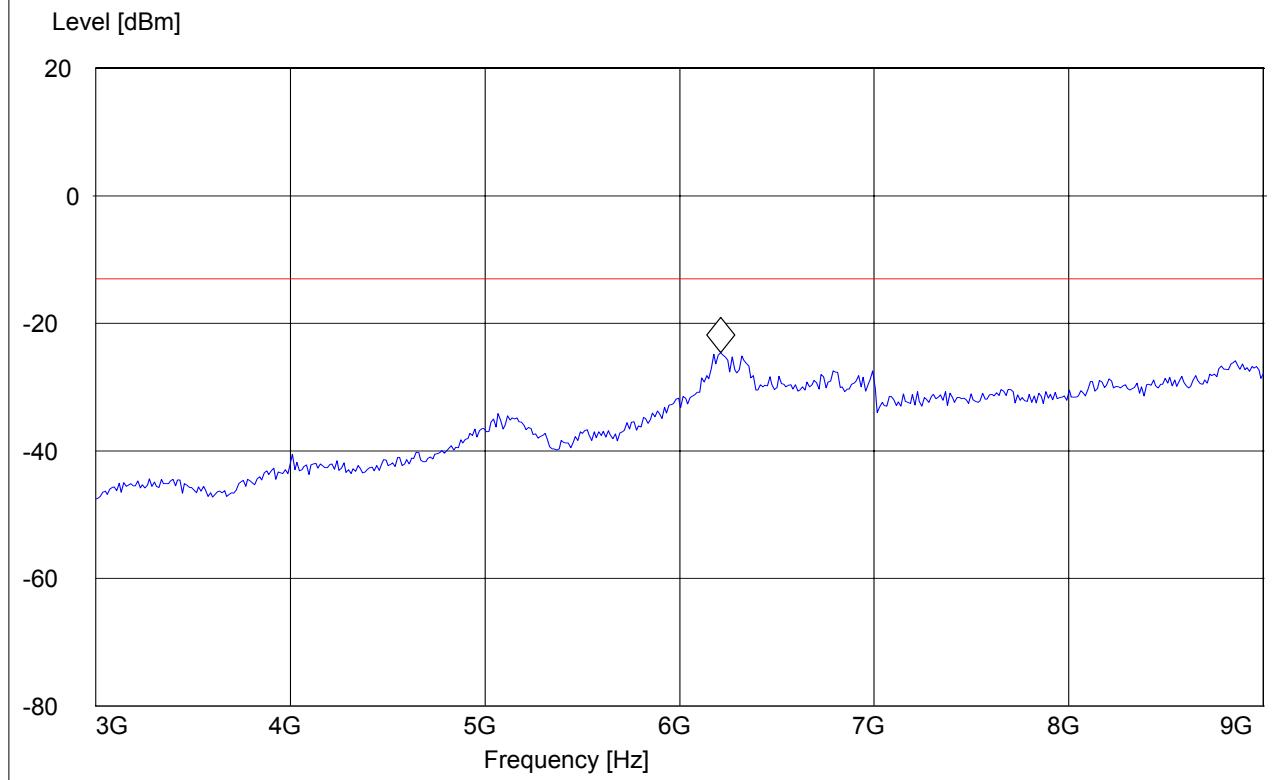
**CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: EUT 34BB00I, C03, LAPTOP KKL-E3-C1, X01-00  
 Customer: NOVATEL  
 Operating Mode: FCC22, RADIATED, TABLE 217 DEGREES  
 Antenna: V  
 EUT: V  
 Test Engineer: SATYA  
 Voltage: AC ADAPTOR  
 Sweep: FCC 22 SPUR 3-9G CH 251

***SWEEP TABLE: "FCC 22Spuri 3-9G"***

Short Description:		FCC 24 1GHz-8GHz			
Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
3.0 GHz	9.0 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM

Marker: 6.210420842 GHz -24.57 dBm



**5.5.4.3 RESULTS OF RADIATED TESTS GSM-850 FDD5:**

Harmonics	Tx ch-4132 Freq. (MHz)	Level (dBm)	Tx ch-4183 Freq. (MHz)	Level (dBm)	Tx ch-4233 Freq. (MHz)	Level (dBm)
2	<b>1648.4</b>	NF	<b>1673.2</b>	NF	<b>1697.6</b>	NF
3	<b>2472.6</b>	NF	<b>2509.8</b>	NF	<b>2546.4</b>	NF
4	<b>3296.8</b>	NF	<b>3346.4</b>	NF	<b>3395.2</b>	NF
5	<b>4121</b>	NF	<b>4183</b>	NF	<b>4244</b>	NF
6	<b>4945.2</b>	NF	<b>5019.6</b>	NF	<b>5092.8</b>	NF
7	<b>5769.4</b>	NF	<b>5856.2</b>	NF	<b>5941.6</b>	NF
8	<b>6593.6</b>	NF	<b>6692.8</b>	NF	<b>6790.4</b>	NF
9	<b>7417.8</b>	NF	<b>7529.4</b>	NF	<b>7639.2</b>	NF
10	<b>8242</b>	NF	<b>8366</b>	NF	<b>8488</b>	NF
NF = NOISE FLOOR						

**5.5.4.4 RADIATED SPURIOUS EMISSIONS (GSM-850 FDD5)****TX: 30MHz - 1GHz**

Spurious emission limit -13dBm

**Antenna: vertical****Note:**

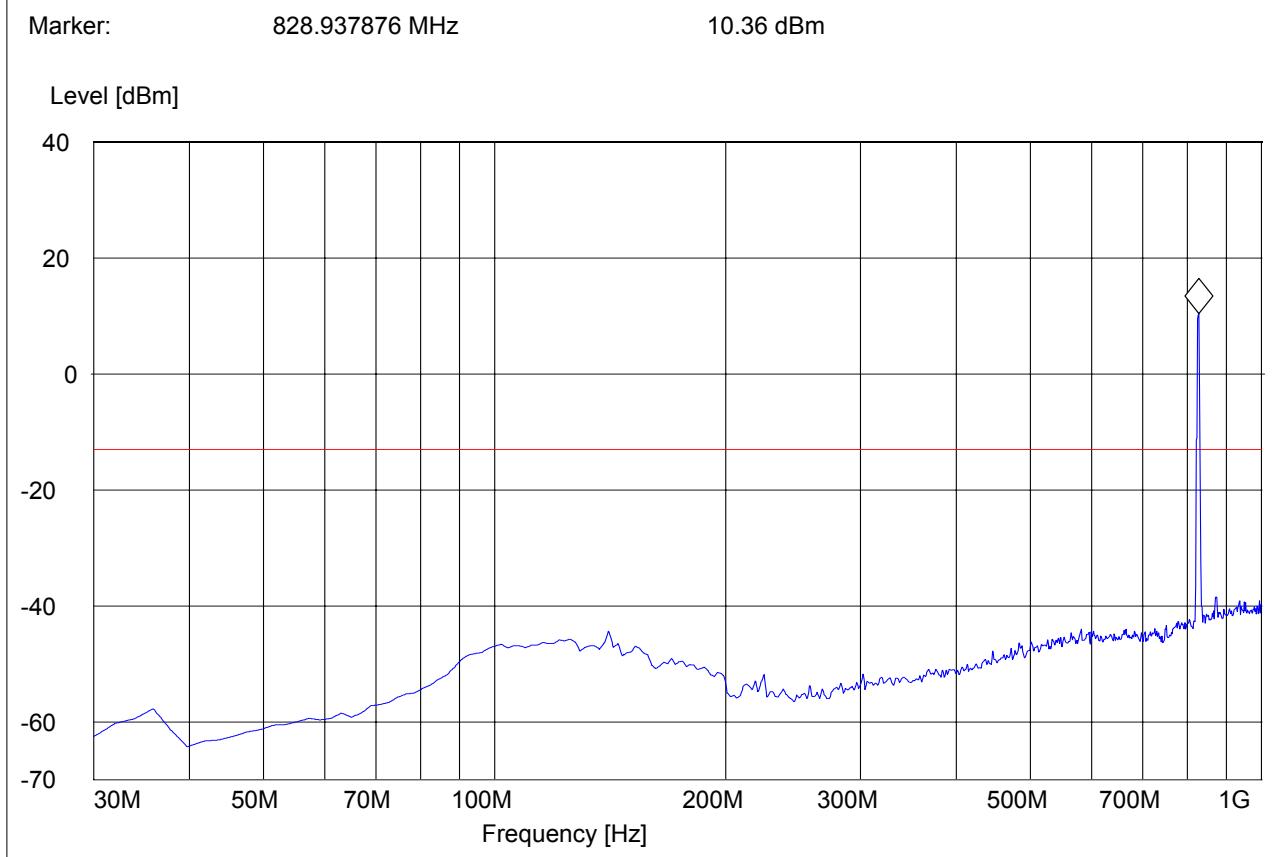
1. The peak above the limit line is the carrier freq.
2. This plot is valid for low, mid & high channels (worst-case plot)

**CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: EUT 34BB00t, C06, LAPTOP KKL-E3-C1, X01-00  
 Customer: Novatel  
 Operating Mode: FDD5  
 Antenna: V  
 EUT: V  
 Test Engineer: Ed  
 Voltage: AC Adapter  
 Sweep: FCC 24 Spur 30M-1G\_V (marker on TCH)

***SWEET TABLE: "FCC 24 Spur 30M-1G\_V"***

Short Description: FCC 24 30MHz-1GHz					
Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM



**RADIATED SPURIOUS EMISSIONS (GSM-850 FDD5)****Tx @ 826.4MHz: 1GHz – 1.58GHz**

Spurious emission limit –13dBm

**CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: EUT 34BB00t, C06, LAPTOP KKL-E3-C1, X01-00

Customer: Novatel

Operating Mode: FDD5, TCH4132

Antenna: V

EUT: V

Test Engineer: Ed

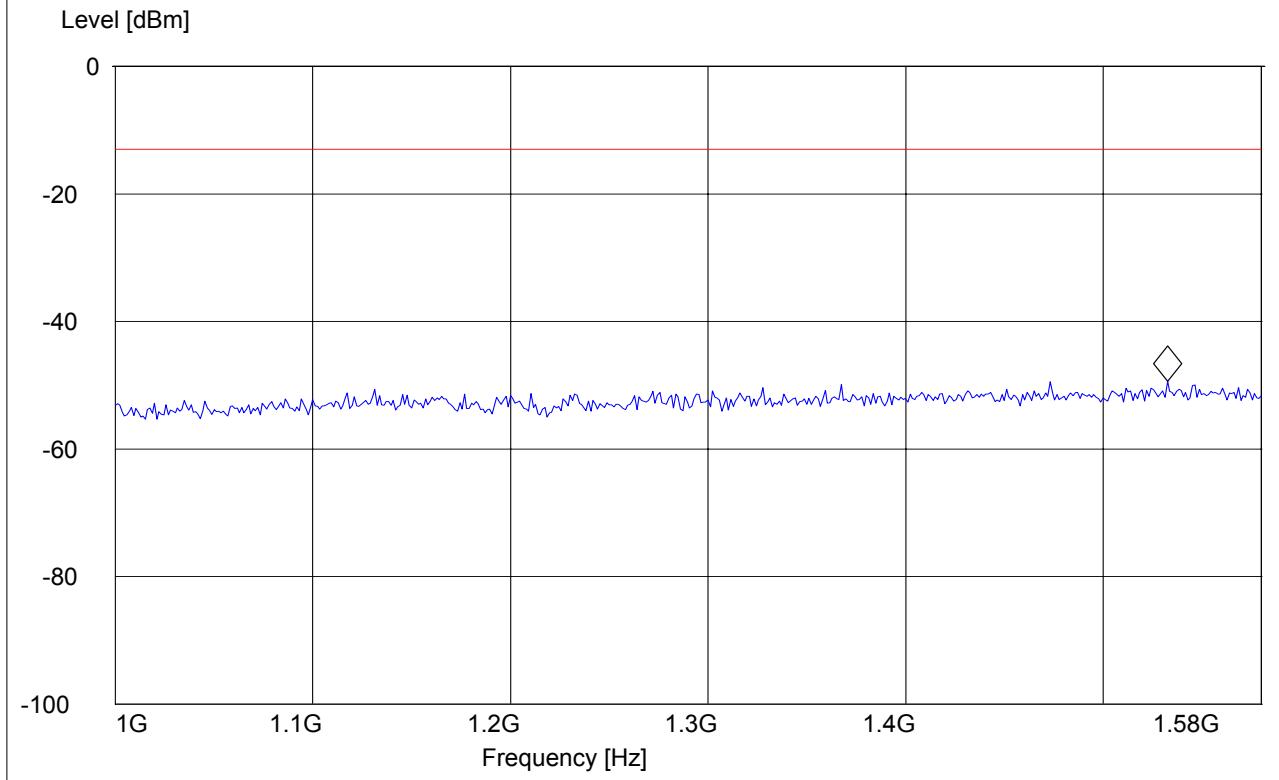
Voltage: AC Adapter

Sweep: FCC 22 Spur 1-1.58G

***SWEET TABLE: "FCC 22Spuri 1-1.58G"***

Short Description:		FCC 24 1GHz-8GHz			
Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
1.0 GHz	1.6 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM

Marker: 1.532344689 GHz -49.36 dBm



**RADIATED SPURIOUS EMISSIONS (GSM-850 FDD5)****Tx @ 826.4MHz: 1.58GHz – 3GHz**

Spurious emission limit –13dBm

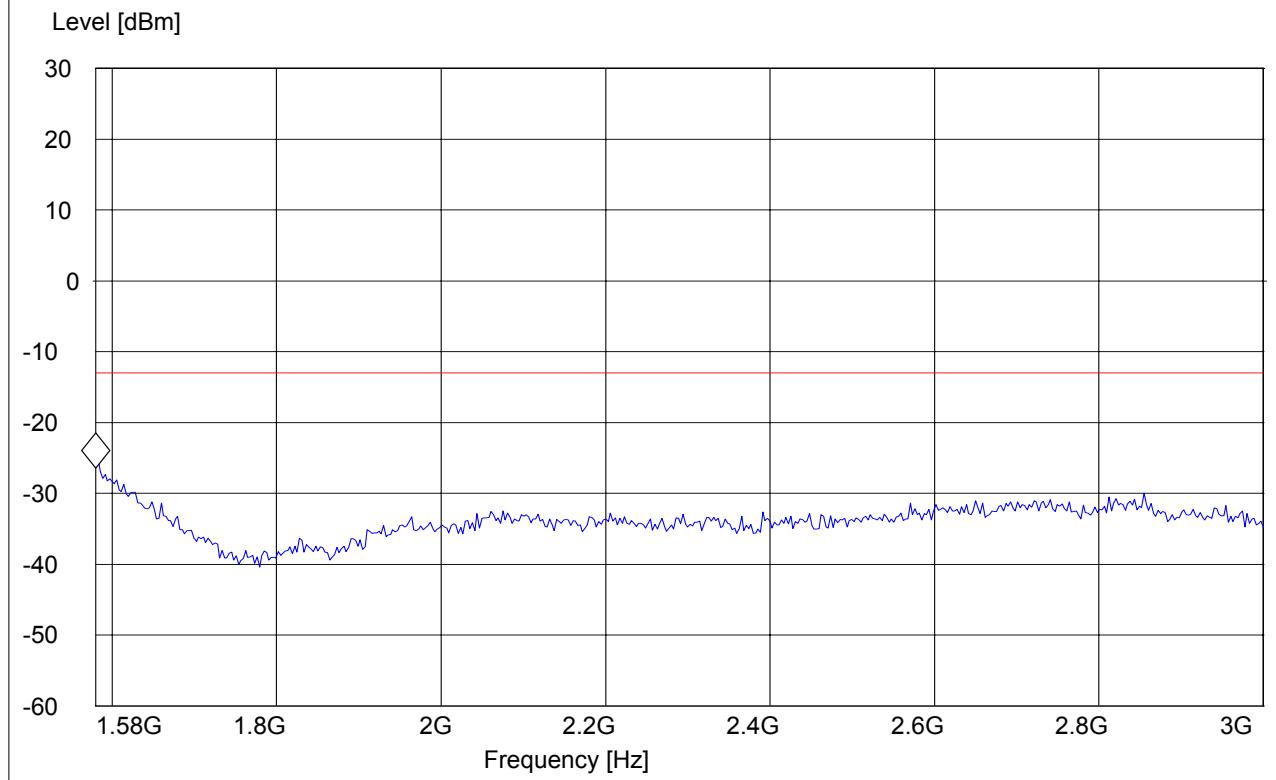
**CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: EUT 34BB00t, C06, LAPTOP KKL-E3-C1, X01-00  
 Customer: Novatel  
 Operating Mode: FDD5, TCH4132  
 Antenna: V  
 EUT: V  
 Test Engineer: Ed  
 Voltage: AC Adapter  
 Sweep: FCC 22 Spur 1.58-3G

***SWEEP TABLE: "FCC 22Spuri 1.58-3G"***

Short Description:		FCC 24 1GHz-8GHz			
Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
1.6 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM

Marker: 1.58 GHz -26.43 dBm



**RADIATED SPURIOUS EMISSIONS (GSM-850 FDD5)****Tx @ 826.4MHz: 3GHz – 9GHz**

Spurious emission limit –13dBm

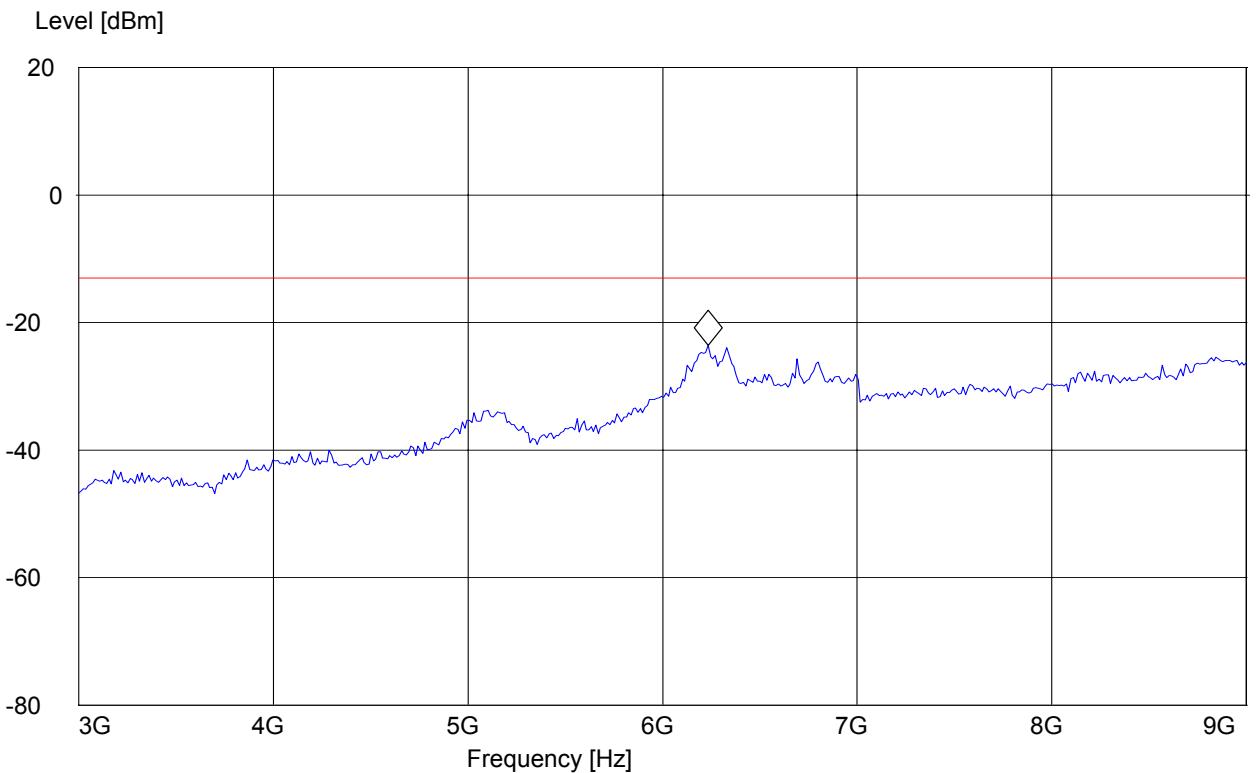
**CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: EUT 34BB00t, C06, LAPTOP KKL-E3-C1, X01-00  
 Customer: Novatel  
 Operating Mode: FDD5, TCH4132  
 Antenna: V  
 EUT: V  
 Test Engineer: Ed  
 Voltage: AC Adapter  
 Sweep: FCC 22 Spur 3-9G

***SWEET TABLE: "FCC 22Spuri 3-9G"***

Short Description:		FCC 24 1GHz-8GHz			
Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
3.0 GHz	9.0 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM

Marker: 6.234468938 GHz -23.55 dBm



**RADIATED SPURIOUS EMISSIONS (GSM-850 FDD5)****Tx @ 836.6MHz: 1GHz – 1.58GHz**

Spurious emission limit –13dBm

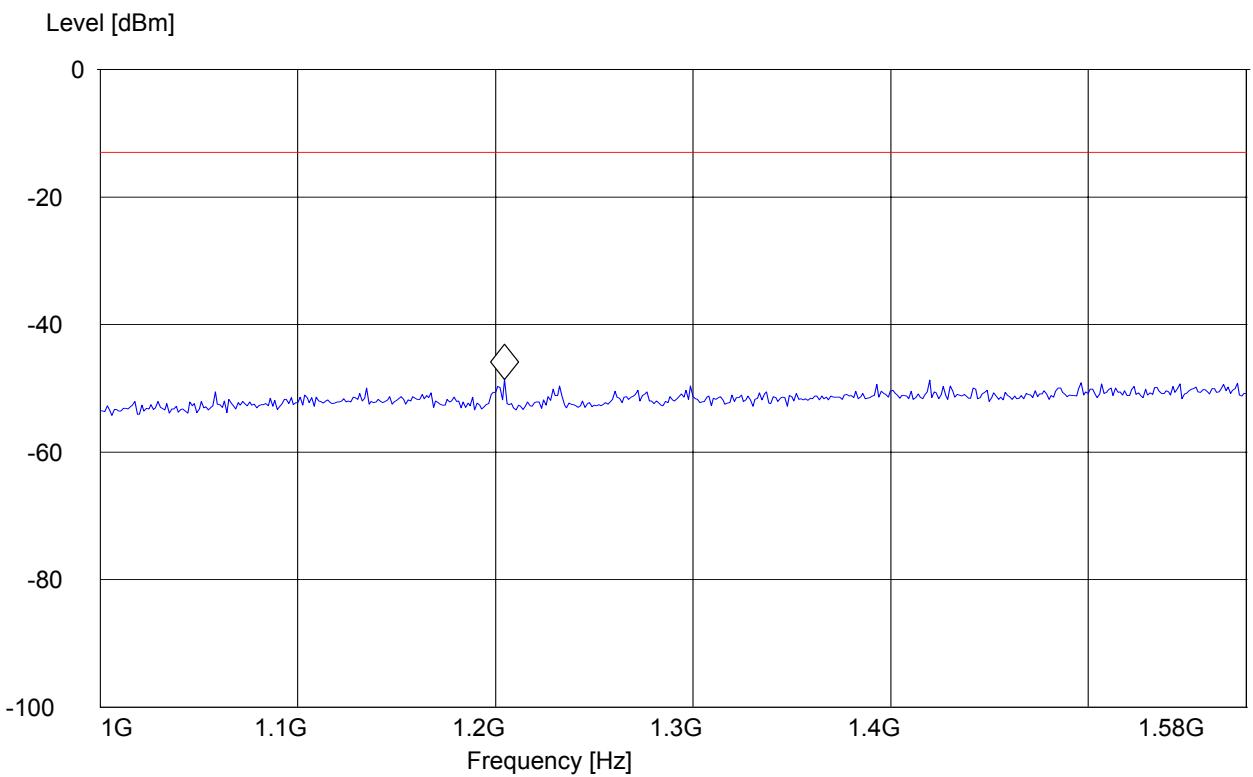
**CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: EUT 34BB00t, C06, LAPTOP KKL-E3-C1, X01-00  
 Customer: Novatel  
 Operating Mode: FDD5, TCH4183  
 Antenna: V  
 EUT: V  
 Test Engineer: Ed  
 Voltage: AC Adapter  
 Sweep: FCC 22 Spur 1-1.58G

***SWEET TABLE: "FCC 22Spuri 1-1.58G"***

Short Description:	FCC 24 1GHz-8GHz				
Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
1.0 GHz	1.6 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM

Marker: 1.204569138 GHz -48.62 dBm



**RADIATED SPURIOUS EMISSIONS (GSM-850 FDD5)****Tx @ 836.6MHz: 1.58GHz – 3GHz**

Spurious emission limit –13dBm

**CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

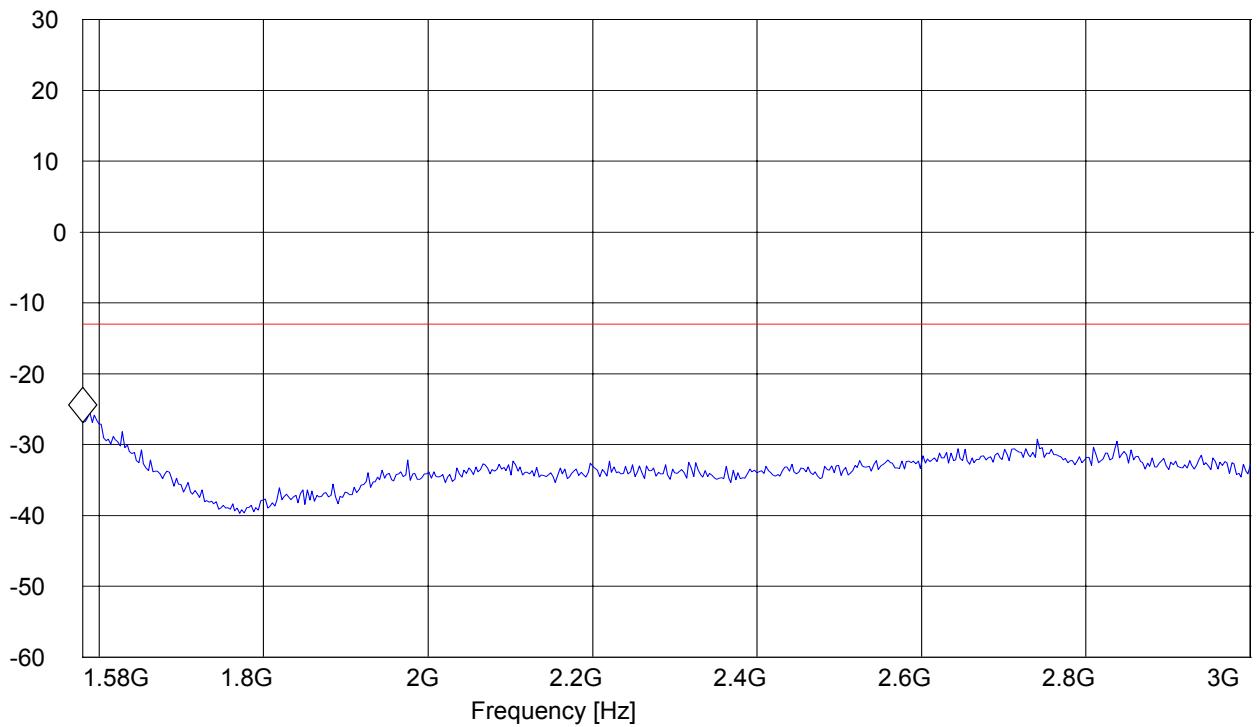
EUT / Description: EUT 34BB00t, C06, LAPTOP KKL-E3-C1, X01-00  
 Customer: Novatel  
 Operating Mode: FDD5, TCH4183  
 Antenna: V  
 EUT: V  
 Test Engineer: Ed  
 Voltage: AC Adapter  
 Sweep: FCC 22 Spur 1.58-3G

***SWEET TABLE: "FCC 22Spuri 1.58-3G"***

Short Description:		FCC 24 1GHz-8GHz			
Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
1.6 GHz	3.0 GHz	MaxPeak	Time	Bandw.	DUMMY-DBM
			Coupled	1 MHz	

Marker: 1.58 GHz -26.86 dBm

Level [dBm]



**RADIATED SPURIOUS EMISSIONS (GSM-850 FDD5)****Tx @ 836.6MHz: 3GHz – 9GHz**

Spurious emission limit –13dBm

**CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

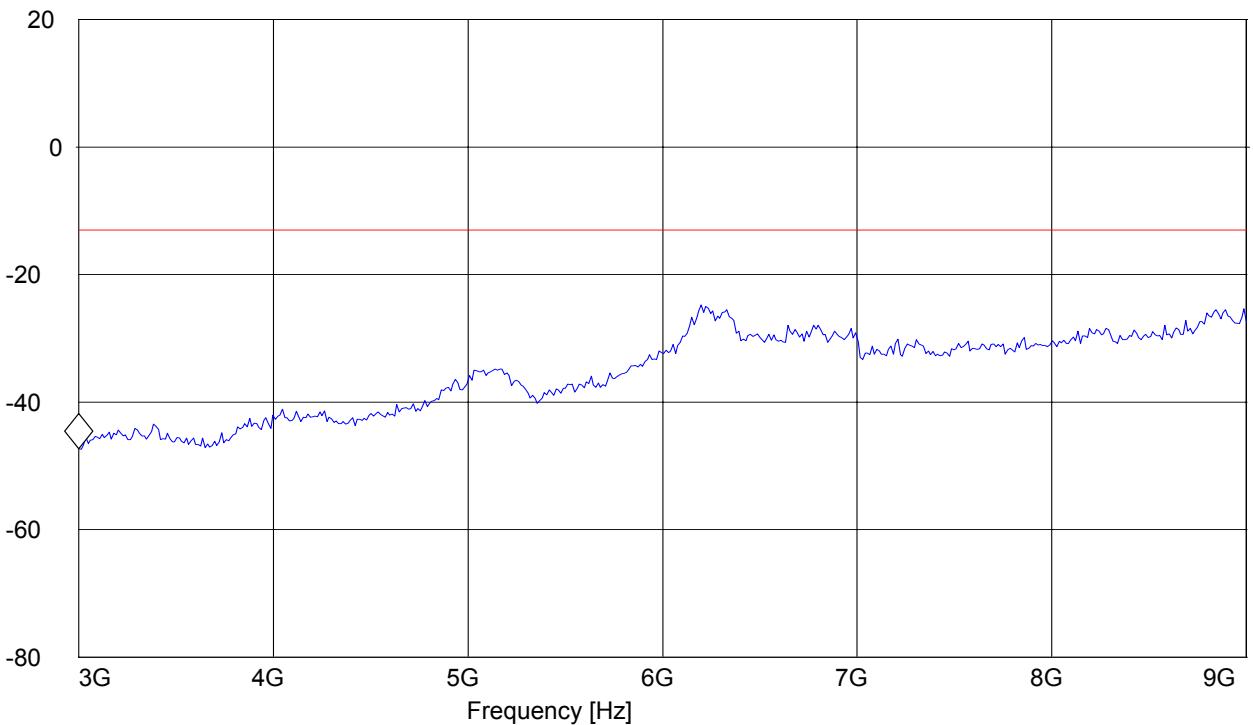
EUT / Description: EUT 34BB00t, C06, LAPTOP KKL-E3-C1, X01-00  
 Customer: Novatel  
 Operating Mode: FDD5, TCH4183  
 Antenna: V  
 EUT: V  
 Test Engineer: Ed  
 Voltage: AC Adapter  
 Sweep: FCC 22 Spur 3-9G

***SWEEP TABLE: "FCC 22Spuri 3-9G"***

Short Description:		FCC 24 1GHz-8GHz			
Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
3.0 GHz	9.0 GHz	MaxPeak	Time	Bandw.	DUMMY-DBM
			Coupled	1 MHz	

Marker: 3 GHz -47.29 dBm

Level [dBm]



**RADIATED SPURIOUS EMISSIONS (GSM-850 FDD5)****Tx @ 846.6MHz: 1GHz – 1.58GHz**

Spurious emission limit –13dBm

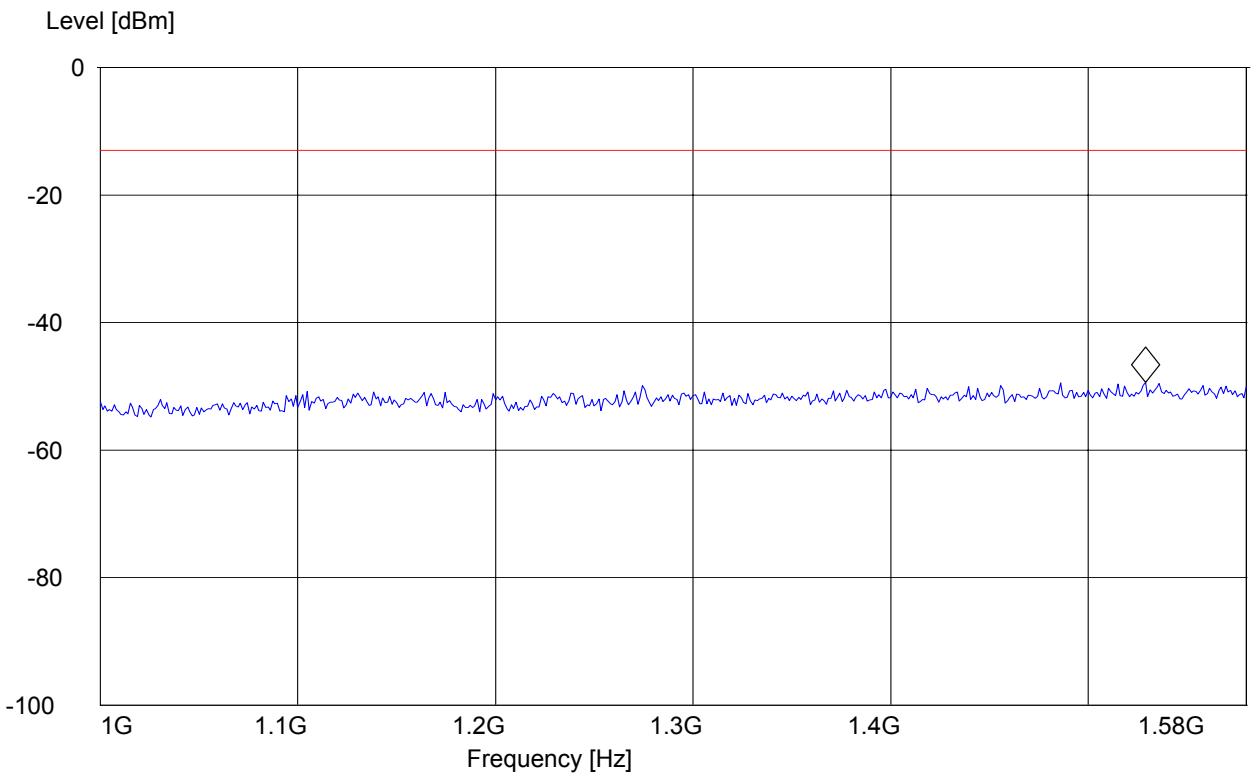
**CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: EUT 34BB00t, C06, LAPTOP KKL-E3-C1, X01-00  
 Customer: Novatel  
 Operating Mode: FDD5, TCH4233  
 Antenna: V  
 EUT: V  
 Test Engineer: Ed  
 Voltage: AC Adapter  
 Sweep: FCC 22 Spur 1-1.58G

***SWEET TABLE: "FCC 22Spuri 1-1.58G"***

Short Description:	FCC 24 1GHz-8GHz				
Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
1.0 GHz	1.6 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM

Marker: 1.528857715 GHz -49.4 dBm



**RADIATED SPURIOUS EMISSIONS (GSM-850 FDD5)****Tx @ 846.6MHz: 1.58GHz – 3GHz**

Spurious emission limit –13dBm

**CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

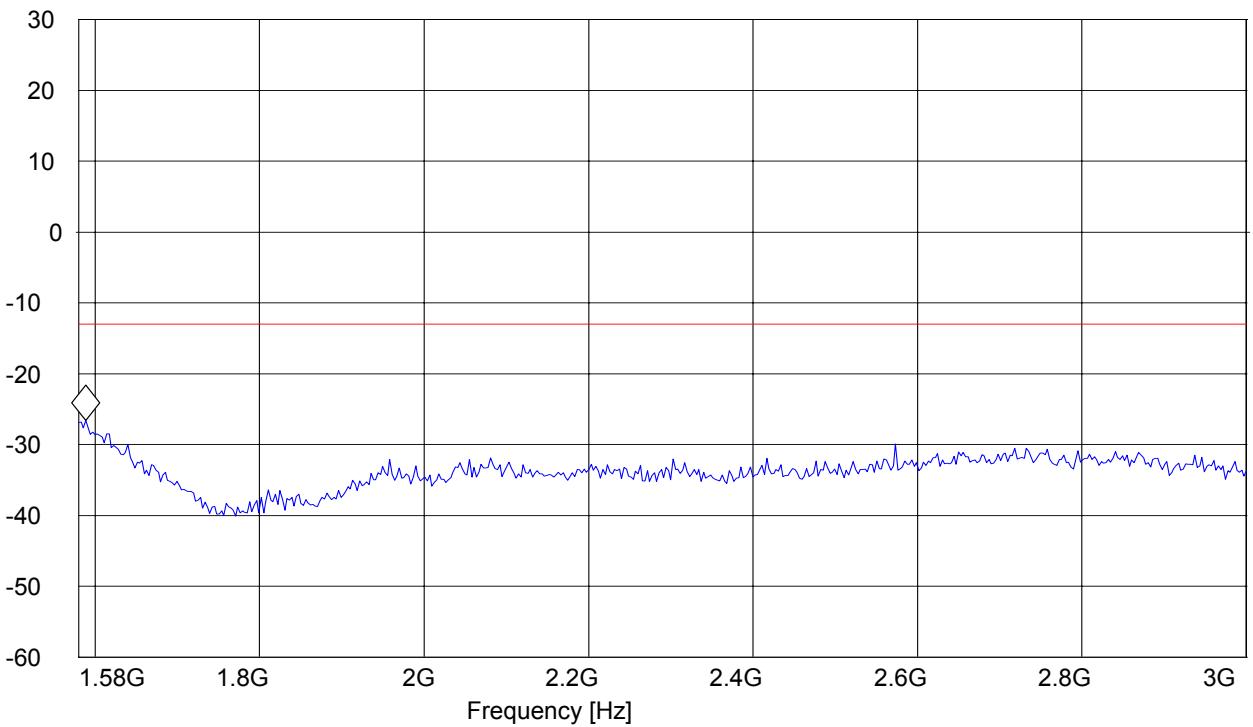
EUT / Description: EUT 34BB00t, C06, LAPTOP KKL-E3-C1, X01-00  
 Customer: Novatel  
 Operating Mode: FDD5, TCH4233  
 Antenna: V  
 EUT: V  
 Test Engineer: Ed  
 Voltage: AC Adapter  
 Sweep: FCC 22 Spur 1.58-3G

***SWEET TABLE: "FCC 22Spuri 1.58-3G"***

Short Description:		FCC 24 1GHz-8GHz			
Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
1.6 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM

Marker: 1.588537074 GHz -26.6 dBm

Level [dBm]



**RADIATED SPURIOUS EMISSIONS (GSM-850 FDD5)****Tx @846.6MHz: 3GHz – 9GHz**

Spurious emission limit –13dBm

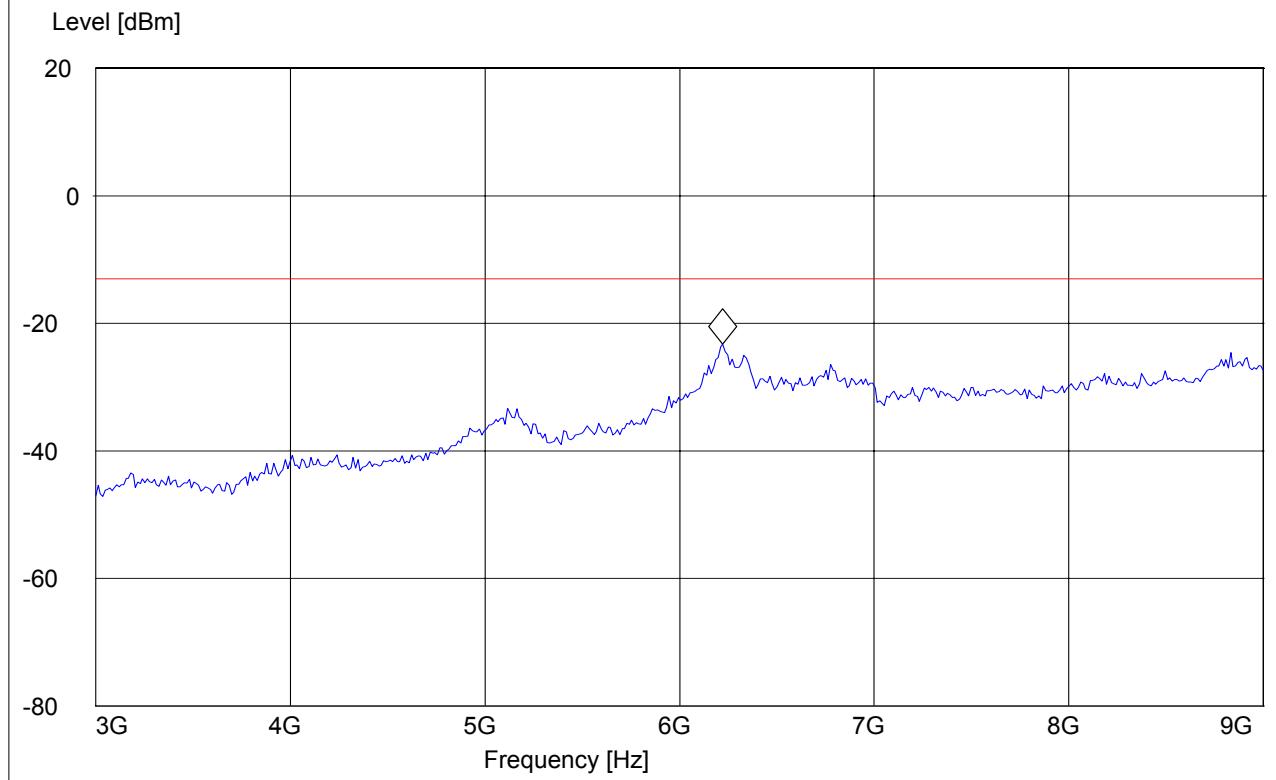
**CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: EUT 34BB00t, C06, LAPTOP KKL-E3-C1, X01-00  
 Customer: Novatel  
 Operating Mode: FDD5, TCH4233  
 Antenna: V  
 EUT: V  
 Test Engineer: Ed  
 Voltage: AC Adapter  
 Sweep: FCC 22 Spur 3-9G

***SWEEP TABLE: "FCC 22Spuri 3-9G"***

Short Description:		FCC 24 1GHz-8GHz			
Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
3.0 GHz	9.0 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM

Marker: 6.22244489 GHz -23.23 dBm



**5.5.4.5 RESULTS OF RADIATED TESTS PCS-1900:**

Harmonic	Tx ch-512 Freq.(MHz)	Level (dBm)	Tx ch-661 Freq. (MHz)	Level (dBm)	Tx ch-810 Freq. (MHz)	Level (dBm)
2	<b>3700.4</b>	NF	<b>3760</b>	NF	<b>3819.6</b>	NF
3	<b>5550.6</b>	NF	<b>5640</b>	NF	<b>5729.4</b>	NF
4	<b>7400.8</b>	NF	<b>7520</b>	NF	<b>7639.2</b>	NF
5	<b>9251</b>	NF	<b>9400</b>	NF	<b>9549</b>	NF
6	<b>11101.2</b>	NF	<b>11280</b>	NF	<b>11458.8</b>	NF
7	<b>12951.4</b>	NF	<b>13160</b>	NF	<b>13368.6</b>	NF
8	<b>14801.6</b>	NF	<b>15040</b>	NF	<b>15278.4</b>	NF
9	<b>16651.8</b>	NF	<b>16920</b>	NF	<b>17188.2</b>	NF
10	<b>18502</b>	NF	<b>18800</b>	NF	<b>19098</b>	NF

NF = NOISE FLOOR

**5.5.4.6 RADIATED SPURIOUS EMISSIONS(PCS 1900)****TX: 30MHz - 1GHz**

Spurious emission limit -13dBm

**Antenna: vertical****Note: This plot is valid for low, mid & high channels (worst-case plot)****CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

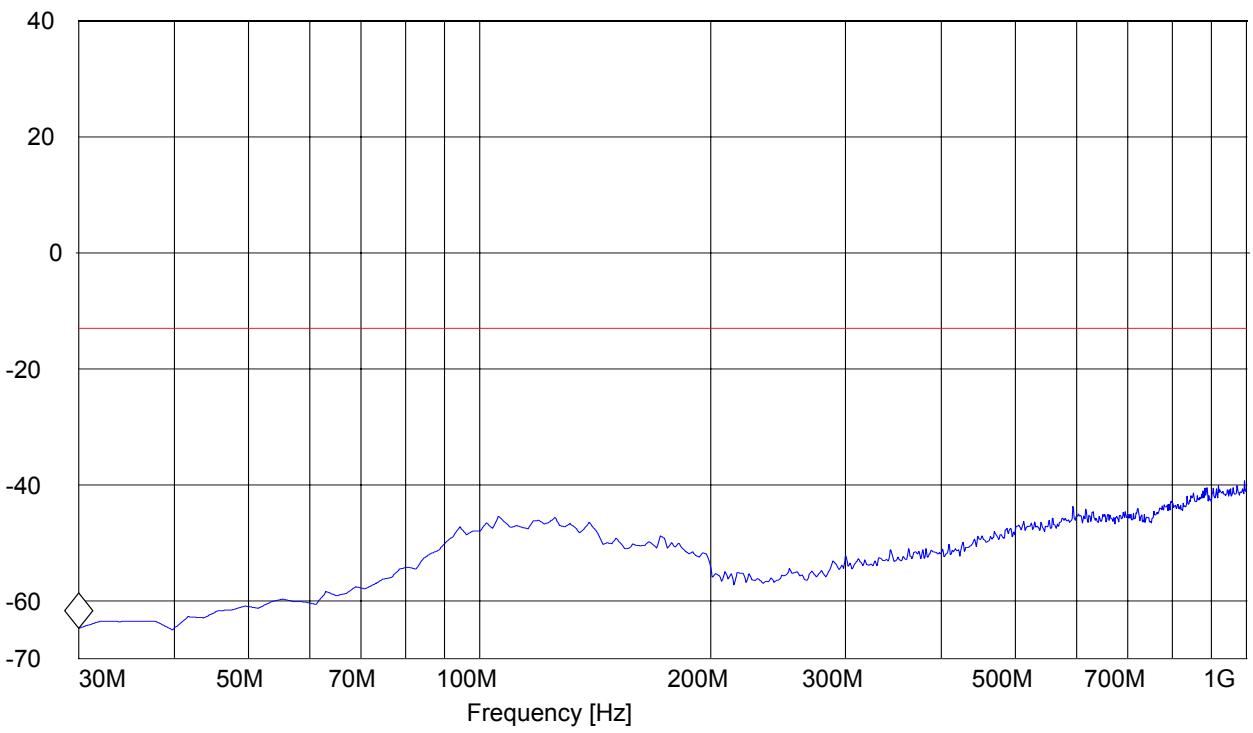
EUT / Description: EUT 34BB00I, C03, LAPTOP KKL-E3-C1, X01-00  
 Customer: NOVATEL  
 Operating Mode: FCC24, RADIATED, TCH 810  
 Antenna: V  
 EUT: V  
 Test Engineer: SATYA  
 Voltage: AC ADAPTOR  
 Sweep: FCC24 SPURI 30M-1G

***SWEET TABLE: "FCC 24 Spur 30M-1G\_V"***

Short Description: FCC 24 30MHz-1GHz					
Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM

Marker: 30 MHz -64.7 dBm

Level [dBm]



**RADIATED SPURIOUS EMISSIONS(PCS 1900)****Tx @ 1850.2MHz: 1GHz – 3GHz**

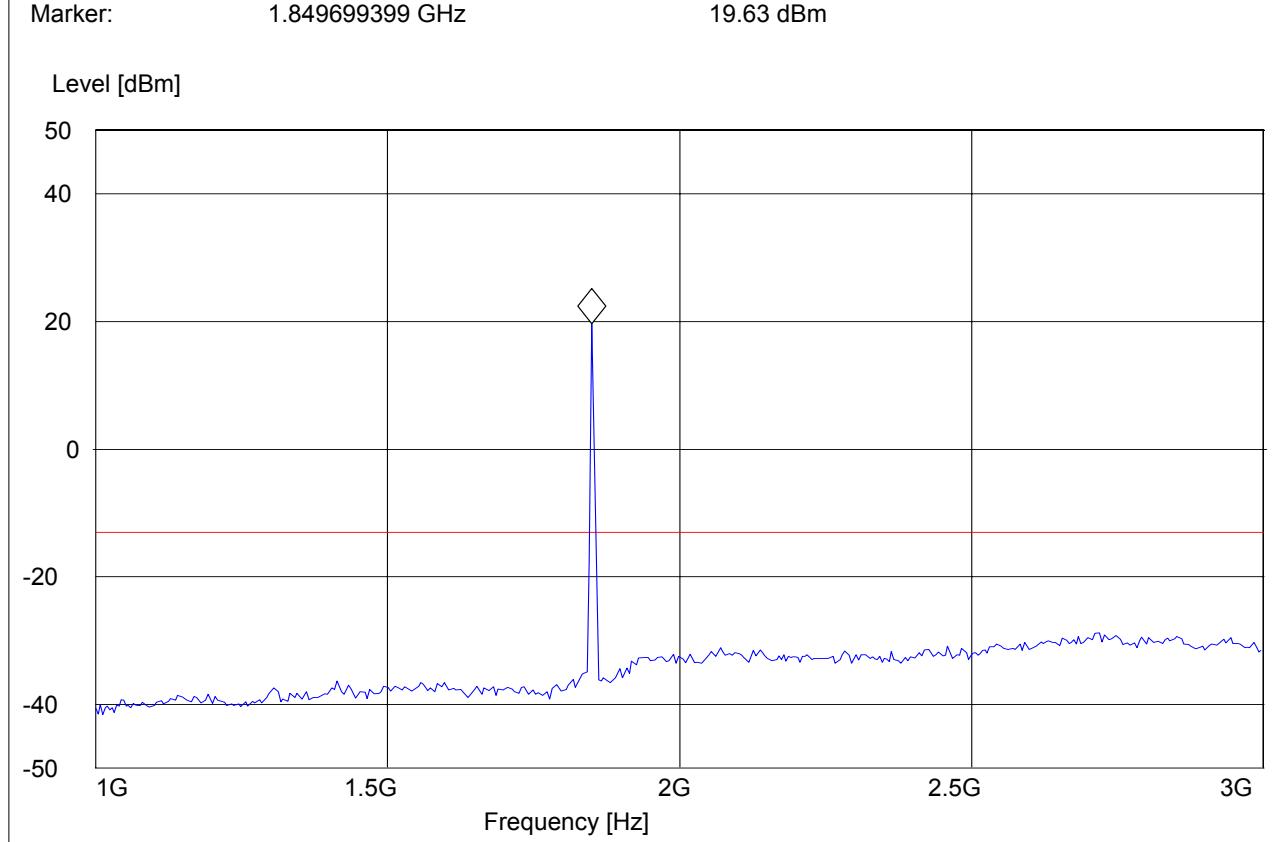
Spurious emission limit -13dBm

**Note: The peak above the limit line is the carrier freq. at ch-512.****CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: EUT 34BB001, C03, LAPTOP KKL-E3-C1, X01-00  
 Customer: NOVATEL  
 Operating Mode: FCC24, RADIATED  
 Antenna: V  
 EUT: V  
 Test Engineer: PETER  
 Voltage: AC ADAPTOR  
 Sweep: FCC24 SPURI 1-3G

***SWEEP TABLE: "FCC 24Spuri 1-3G"***

Short Description:		FCC 24 1GHz-8GHz			
Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
1.0 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM



**RADIATED SPURIOUS EMISSIONS(PCS 1900)****Tx @ 1850.2MHz: 3GHz – 18GHz**

Spurious emission limit -13dBm

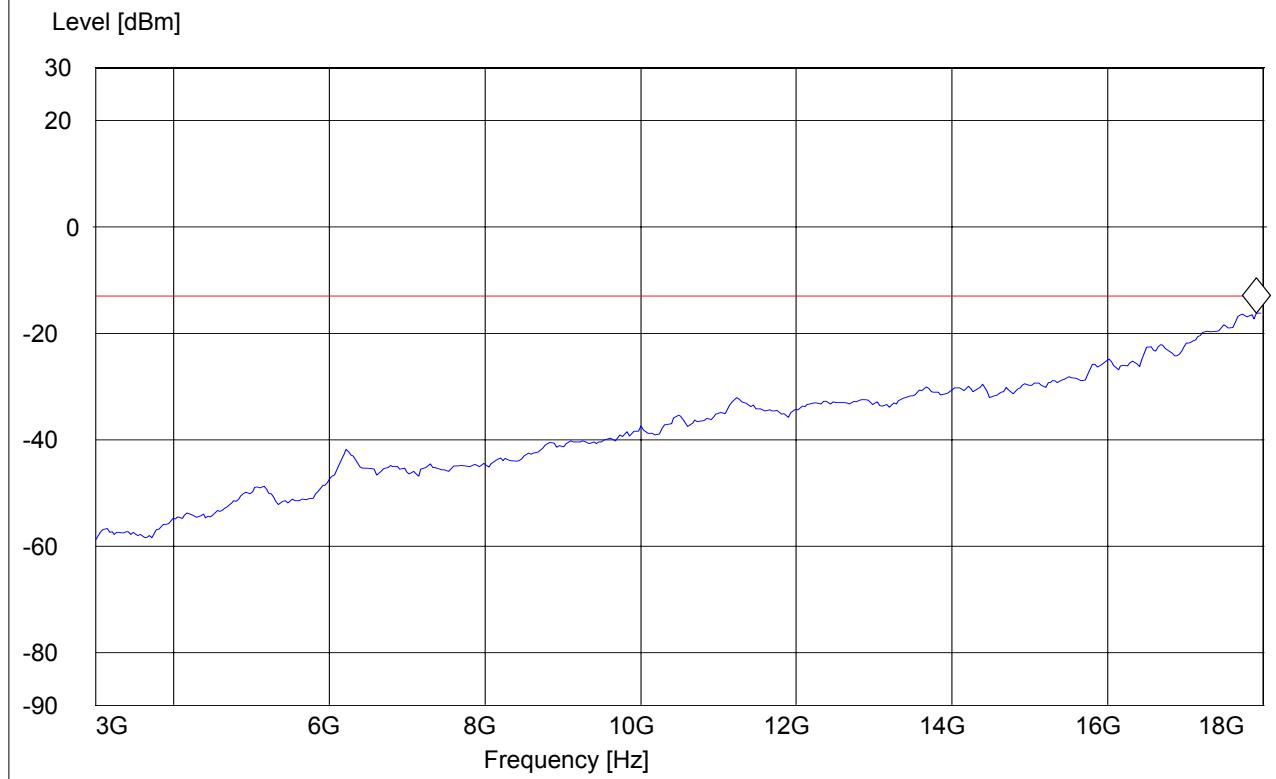
**CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: EUT 34BB00I, C03, LAPTOP KKL-E3-C1, X01-00  
 Customer: NOVATEL  
 Operating Mode: FCC24, RADIATED  
 Antenna: V  
 EUT: V  
 Test Engineer: PETER  
 Voltage: AC ADAPTOR  
 Sweep: FCC24 SPURI 3-18G

***SWEEP TABLE: "FCC 24Spuri 3-18G"***

Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
3.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM

Marker:	17.909819639 GHz	-16.21 dBm
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**RADIATED SPURIOUS EMISSIONS(PCS 1900)****Tx @ 1880.0MHz: 1GHz – 3GHz**

Spurious emission limit –13dBm

**Note: The peak above/close to the limit line is the carrier freq. at ch-661.****CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

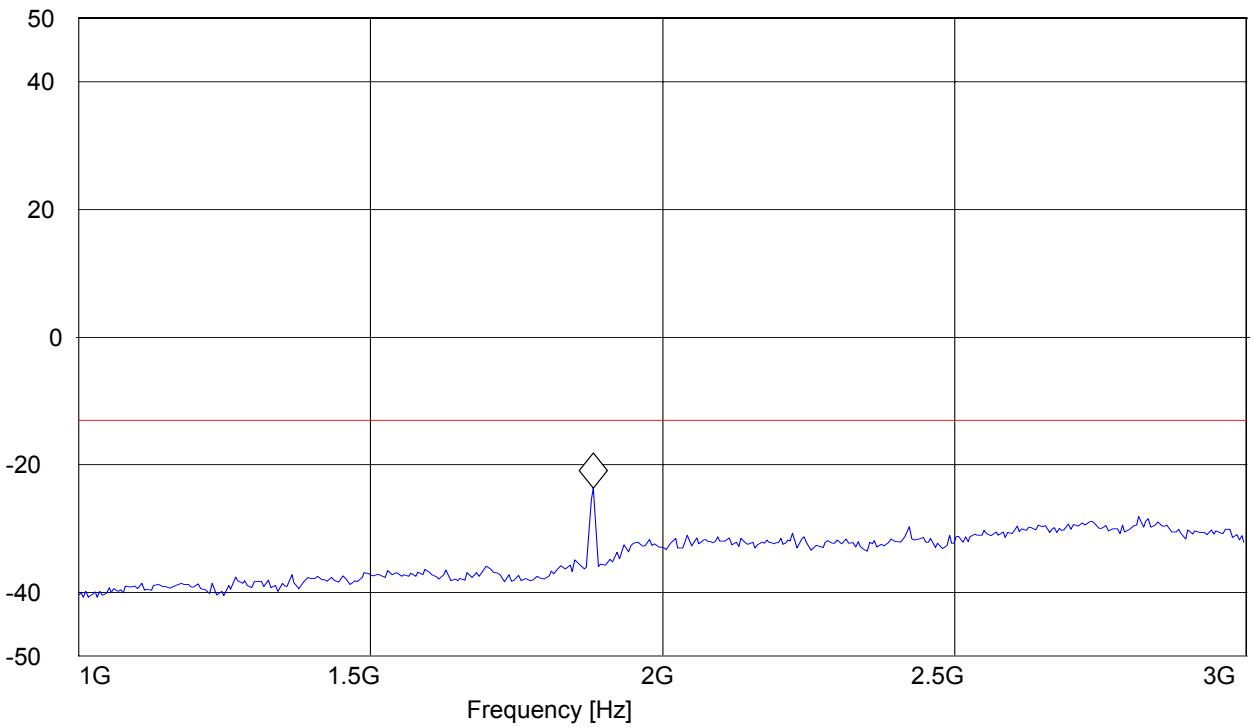
EUT / Description: EUT 34BB00I, C03, LAPTOP KKL-E3-C1, X01-00  
 Customer: NOVATEL  
 Operating Mode: FCC24, RADIATED  
 Antenna: V  
 EUT: V  
 Test Engineer: PETER  
 Voltage: AC ADAPTOR  
 Sweep: FCC24 SPURI 1-3G

***SWEEP TABLE: "FCC 24Spuri 1-3G"***

Short Description:		FCC 24 1GHz-8GHz	IF	Transducer
Start Frequency	Stop Frequency	Detector	Meas.	Bandw.
1.0 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz
				DUMMY-DBM

Marker: 1.881763527 GHz -23.68 dBm

Level [dBm]

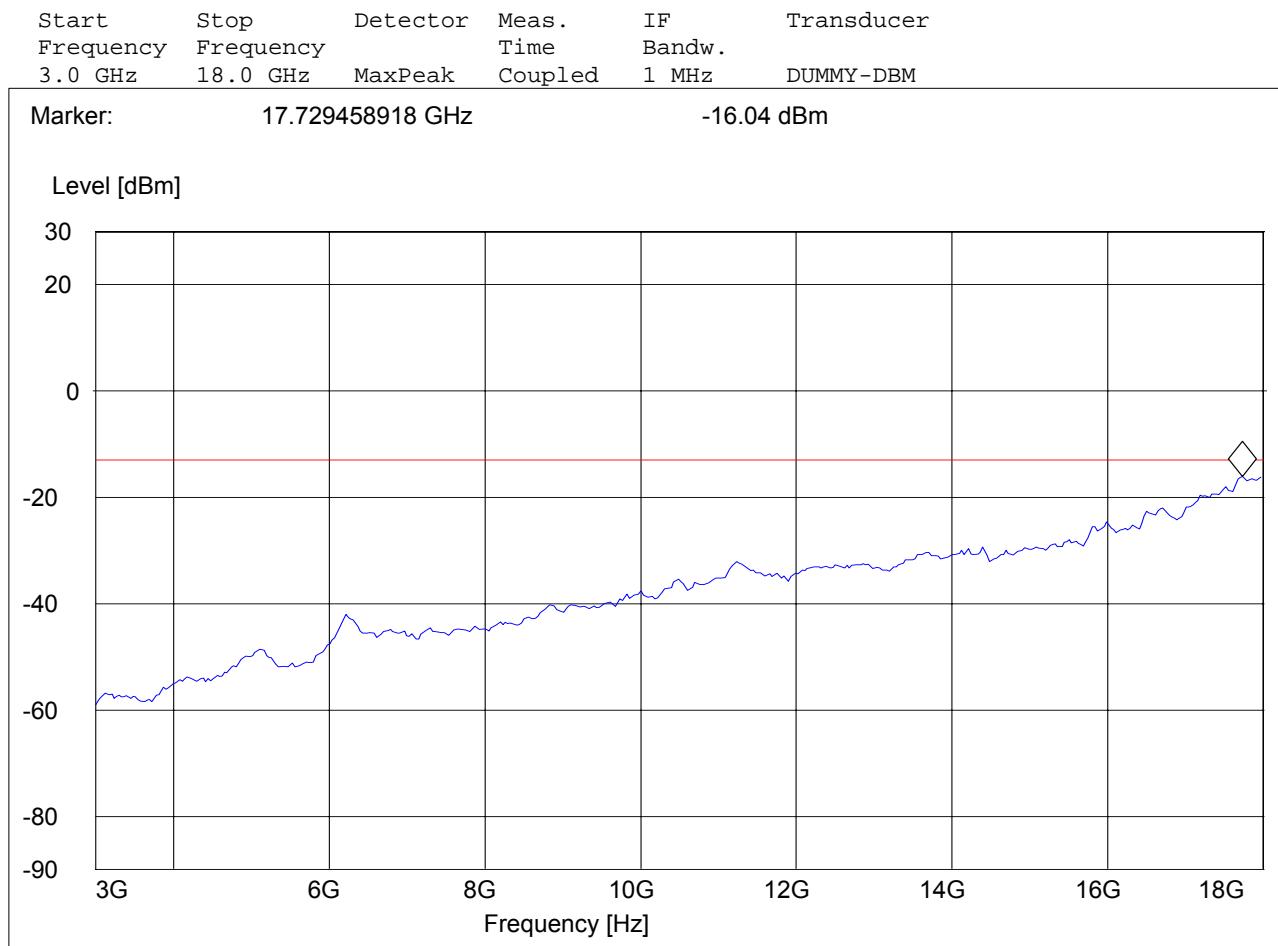


**RADIATED SPURIOUS EMISSIONS(PCS 1900)****Tx @ 1880.0MHz: 3GHz – 18GHz**

Spurious emission limit –13dBm

**CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: EUT 34BB00I, C03, LAPTOP KKL-E3-C1, X01-00  
 Customer: NOVATEL  
 Operating Mode: FCC24, RADIATED  
 Antenna: V  
 EUT: V  
 Test Engineer: PETER  
 Voltage: AC ADAPTOR  
 Sweep: FCC24 SPURI 3-18G

***SWEET TABLE: "FCC 24Spuri 3-18G"***

**RADIATED SPURIOUS EMISSIONS(PCS 1900)****Tx @ 1909.8MHz: 1GHz – 3GHz**

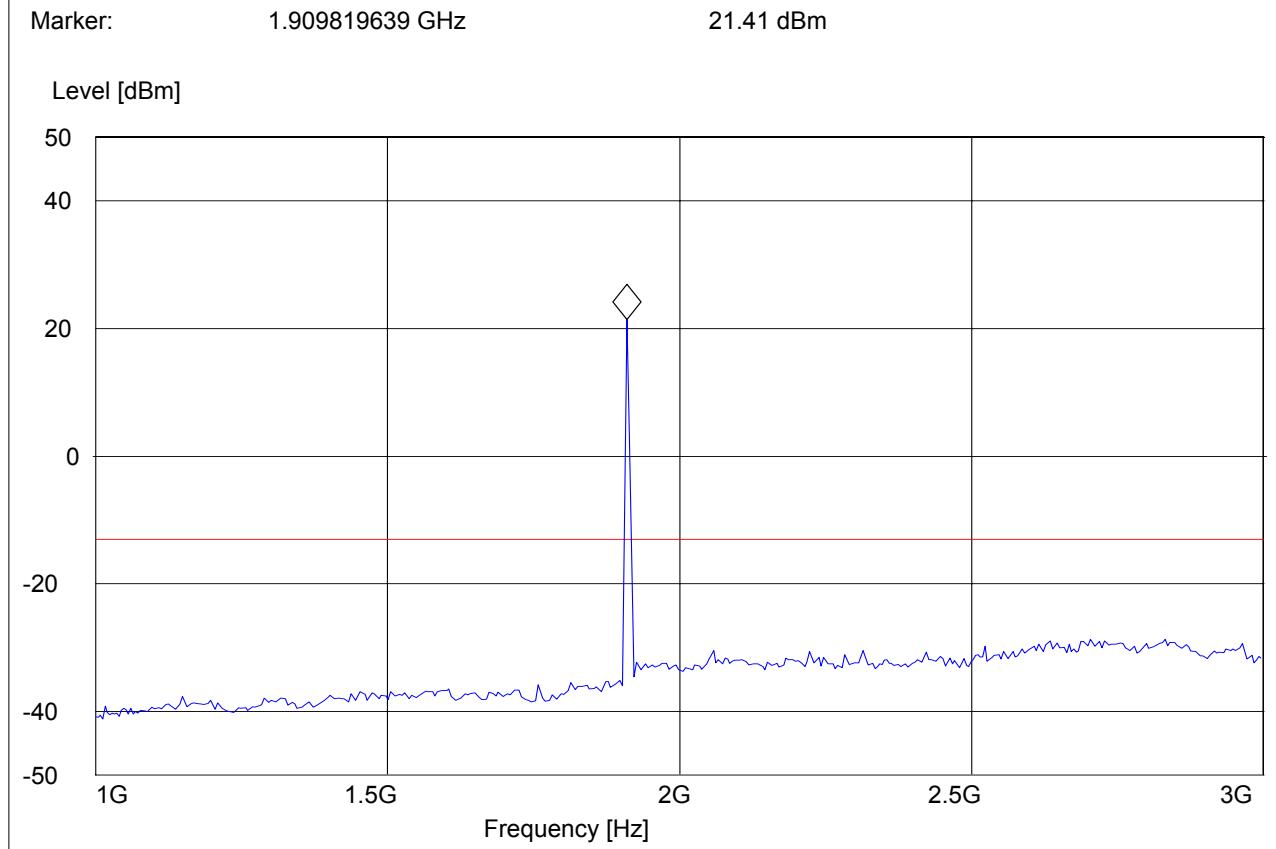
Spurious emission limit –13dBm

**Note: The peak above the limit line is the carrier freq. at ch-810.****CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: EUT 34BB001, C03, LAPTOP KKL-E3-C1, X01-00  
 Customer: NOVATEL  
 Operating Mode: FCC24, RADIATED, TABLE 172°  
 Antenna: V  
 EUT: V  
 Test Engineer: PETER  
 Voltage: AC ADAPTOR  
 Sweep: FCC24 SPURI 1-3G

***SWEEP TABLE: "FCC 24Spuri 1-3G"***

Short Description:		FCC 24 1GHz-8GHz			
Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
1.0 GHz	3.0 GHz	MaxPeak	Time Coupled	1 MHz	DUMMY-DBM



**RADIATED SPURIOUS EMISSIONS(PCS 1900)****Tx @ 1909.8MHz: 3GHz – 18GHz**

Spurious emission limit –13dBm

**CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

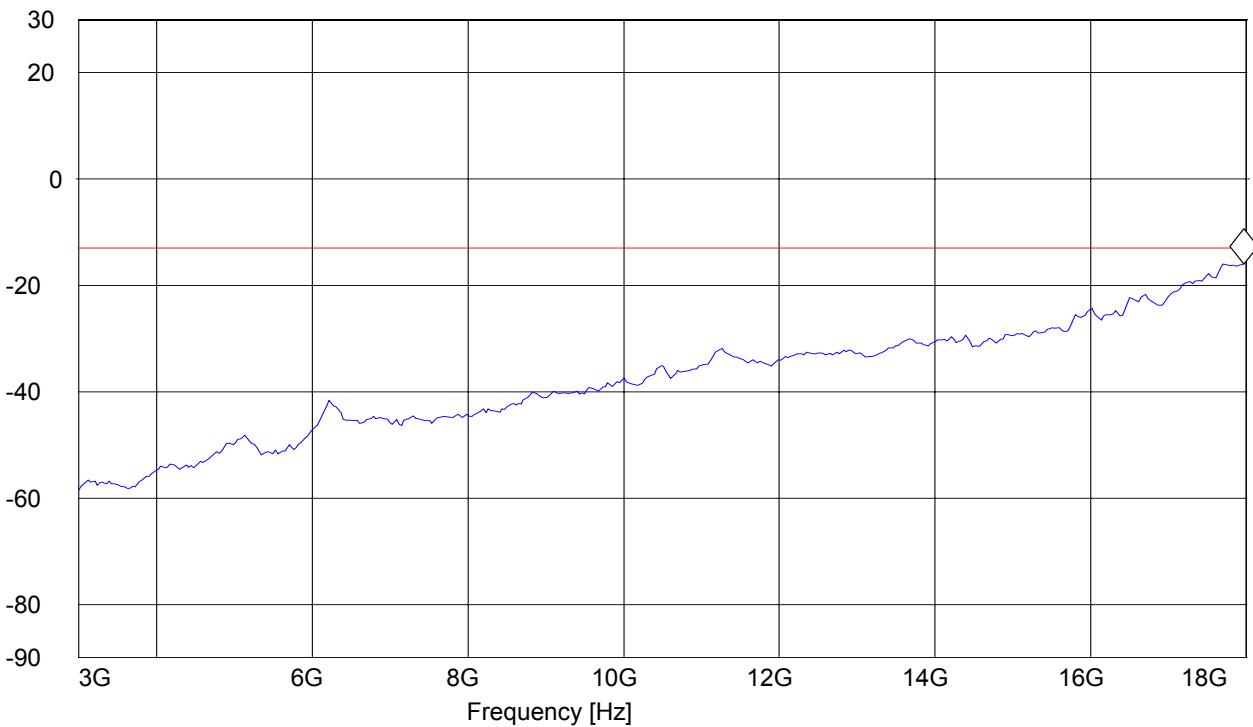
EUT / Description: EUT 34BB00I, C03, LAPTOP KKL-E3-C1, X01-00  
 Customer: NOVATEL  
 Operating Mode: FCC24, RADIATED  
 Antenna: V  
 EUT: V  
 Test Engineer: PETER  
 Voltage: AC ADAPTOR  
 Sweep: FCC24 SPURI 3-18G

***SWEEP TABLE: "FCC 24Spuri 3-18G"***

Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
3.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM

Marker: 17.96993988 GHz -15.93 dBm

Level [dBm]



**RADIATED SPURIOUS EMISSIONS(PCS 1900)****18GHz – 19.1GHz**

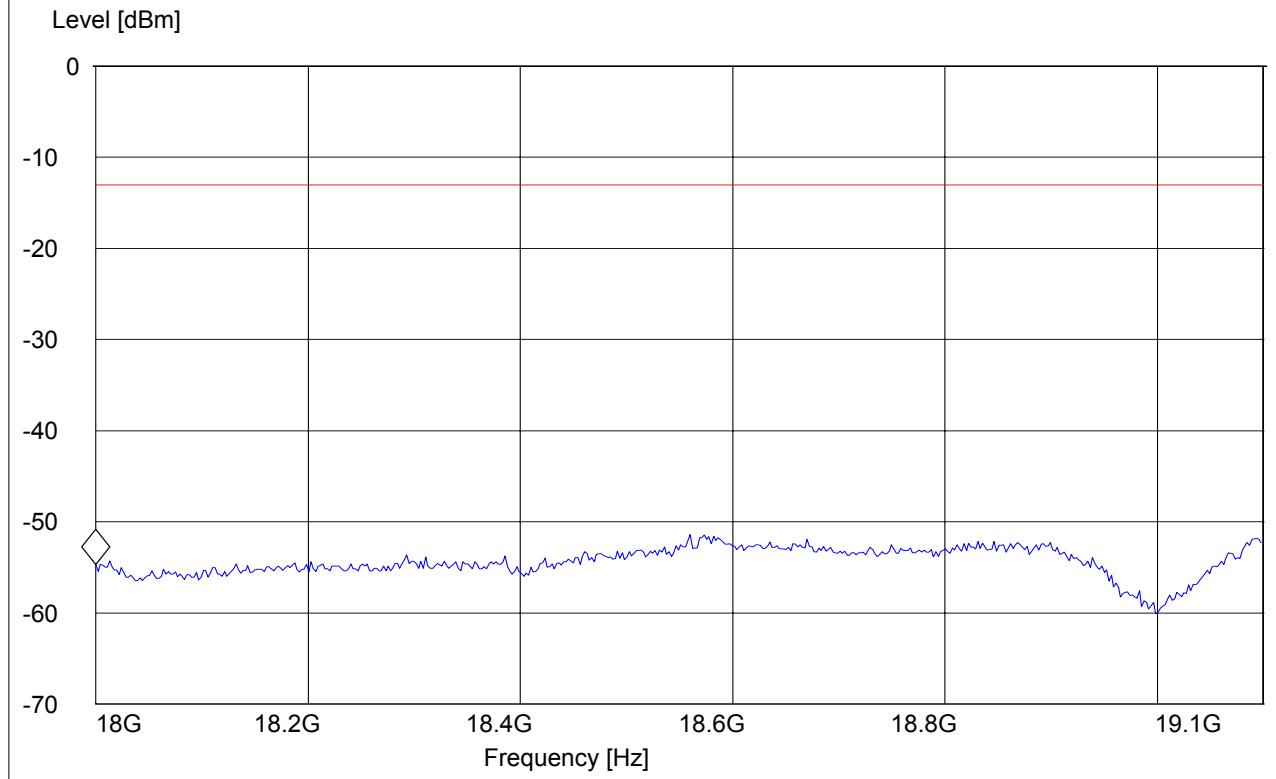
Spurious emission limit –13dBm

**Note: This plot is valid for low, mid & high channels (worst-case plot)****CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: EUT 34BB00I, C03, LAPTOP KKL-E3-C1, X01-00  
 Customer: NOVATEL  
 Operating Mode: FCC24, RADIATED, TCH 810  
 Antenna: V  
 EUT: V  
 Test Engineer: SATYA  
 Voltage: AC ADAPTOR  
 Sweep: FCC24 SPURI 18-19.1G

***SWEEP TABLE: "FCC 24spuri 18-19.1G"***

Short Description: FCC 24 18GHz-19.1GHz					
Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
18.0 GHz	19.1 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM
Marker: 18 GHz -54.69 dBm					



**5.5.4.7 RESULTS OF RADIATED TESTS PCS-1900: FDD2**

Harmonic	Tx ch-9262 Freq.(MHz)	Level (dBm)	Tx ch-9400 Freq. (MHz)	Level (dBm)	Tx ch-9538 Freq. (MHz)	Level (dBm)
2	<b>3700.4</b>	NF	<b>3760</b>	NF	<b>3819.6</b>	NF
3	<b>5550.6</b>	NF	<b>5640</b>	NF	<b>5729.4</b>	NF
4	<b>7400.8</b>	NF	<b>7520</b>	NF	<b>7639.2</b>	NF
5	<b>9251</b>	NF	<b>9400</b>	NF	<b>9549</b>	NF
6	<b>11101.2</b>	NF	<b>11280</b>	NF	<b>11458.8</b>	NF
7	<b>12951.4</b>	NF	<b>13160</b>	NF	<b>13368.6</b>	NF
8	<b>14801.6</b>	NF	<b>15040</b>	NF	<b>15278.4</b>	NF
9	<b>16651.8</b>	NF	<b>16920</b>	NF	<b>17188.2</b>	NF
10	<b>18502</b>	NF	<b>18800</b>	NF	<b>19098</b>	NF

NF = NOISE FLOOR

**5.5.4.8 RADIATED SPURIOUS EMISSIONS(PCS 1900 FDD2)****TX: 30MHz - 1GHz**

Spurious emission limit -13dBm

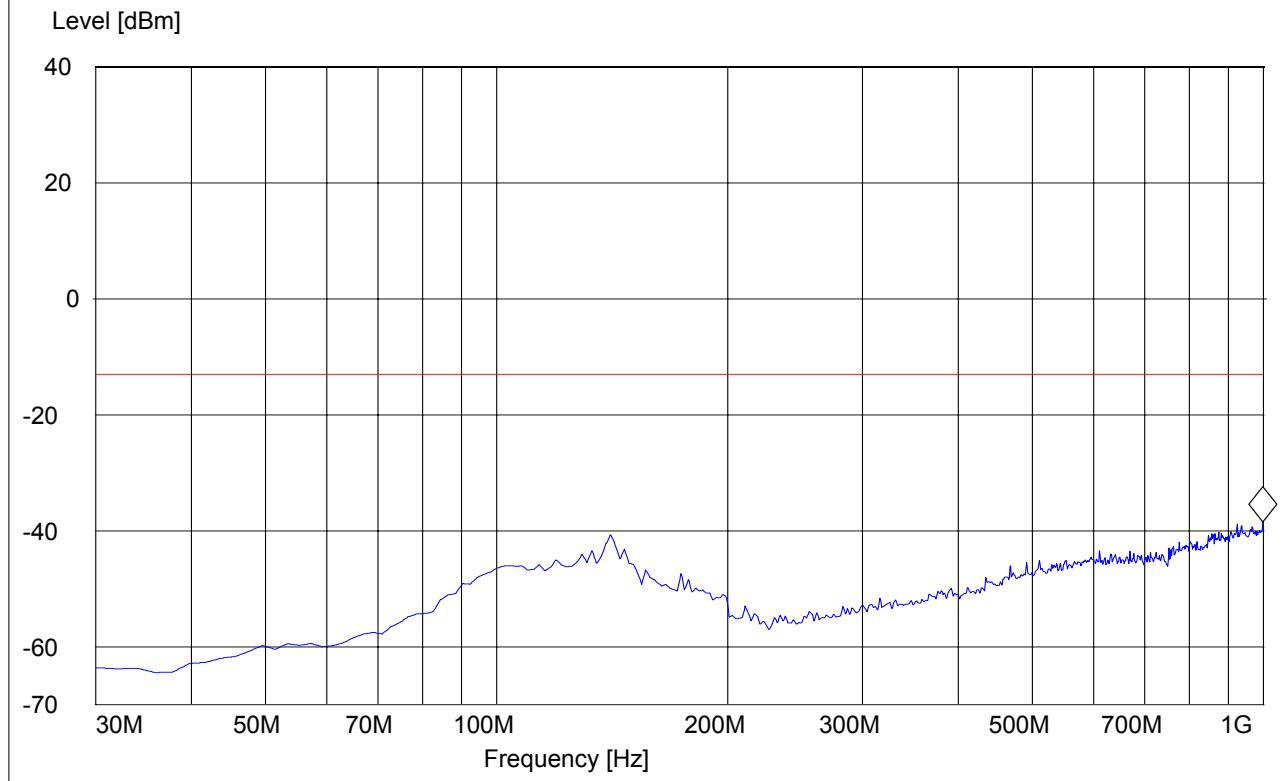
**Antenna: vertical****Note: This plot is valid for low, mid & high channels (worst-case plot)****CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: EUT 34BB00t, C06, LAPTOP KKL-E3-C1, X01-00  
 Customer: Novatel  
 Operating Mode: FDD2, CH9400, 1880MHz  
 Antenna: V  
 EUT: V  
 Test Engineer: PETER  
 Voltage: AC Adapter  
 Sweep: FCC24 SPURI 30-1G\_V

***SWEET TABLE: "FCC 24 Spur 30M-1G\_V"***

Short Description: FCC 24 30MHz-1GHz					
Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM

Marker: 998.056112 MHz -38.44 dBm



**RADIATED SPURIOUS EMISSIONS(PCS 1900 FDD2)****Tx @ 1852.4MHz: 1GHz – 3GHz**

Spurious emission limit -13dBm

**Note: The peak above the limit line is the carrier freq. at ch-512.****CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: EUT 34BB00t, C06, LAPTOP KKL-E3-C1, X01-00

Customer: Novatel

Operating Mode: FDD2, CH9262, 1852.4MHz

Antenna: V

EUT: V

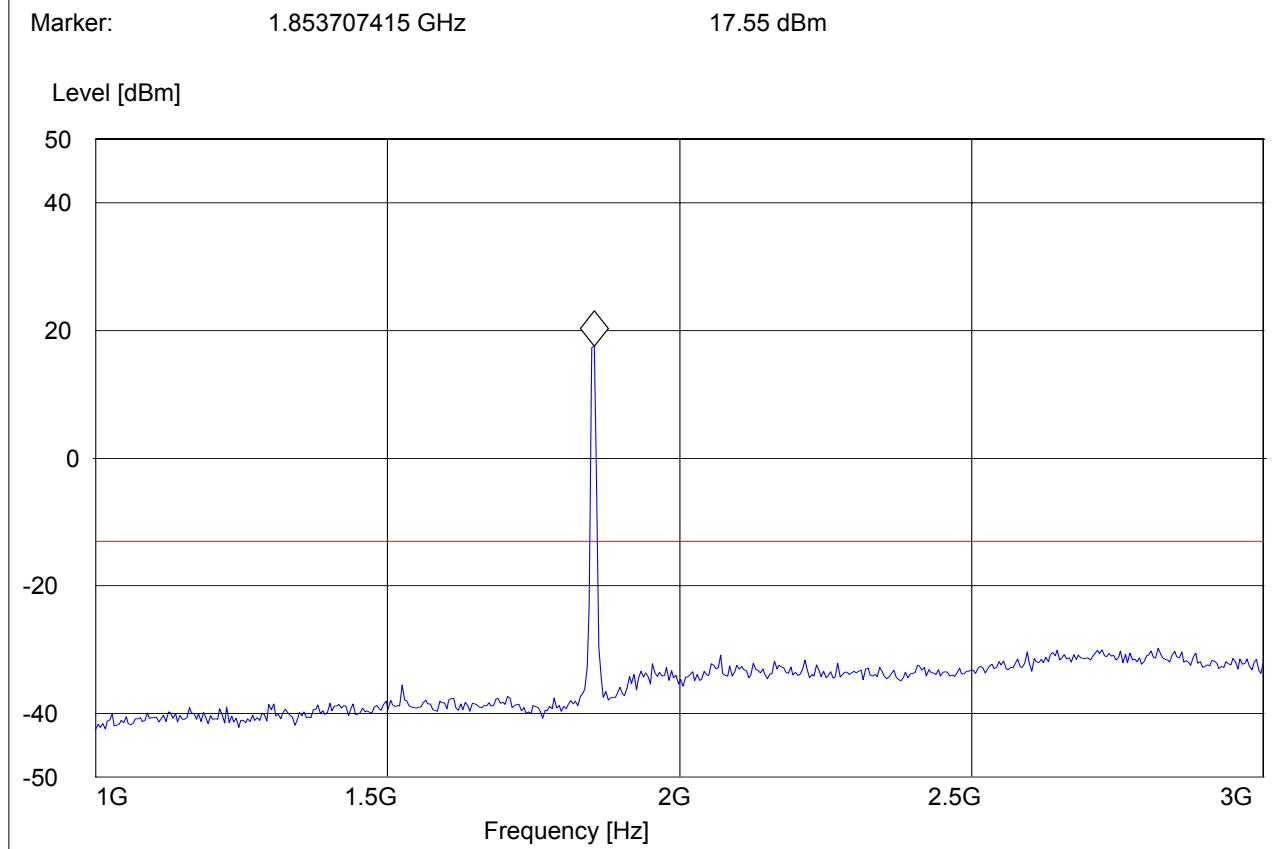
Test Engineer: PETER

Voltage: AC Adapter

Sweep: FCC24 SPURI 1-3G

***SWEEP TABLE: "FCC 24Spuri 1-3G"***

Short Description:		FCC 24 1GHz-8GHz			
Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
1.0 GHz	3.0 GHz	MaxPeak	Time Coupled	1 MHz	DUMMY-DBM

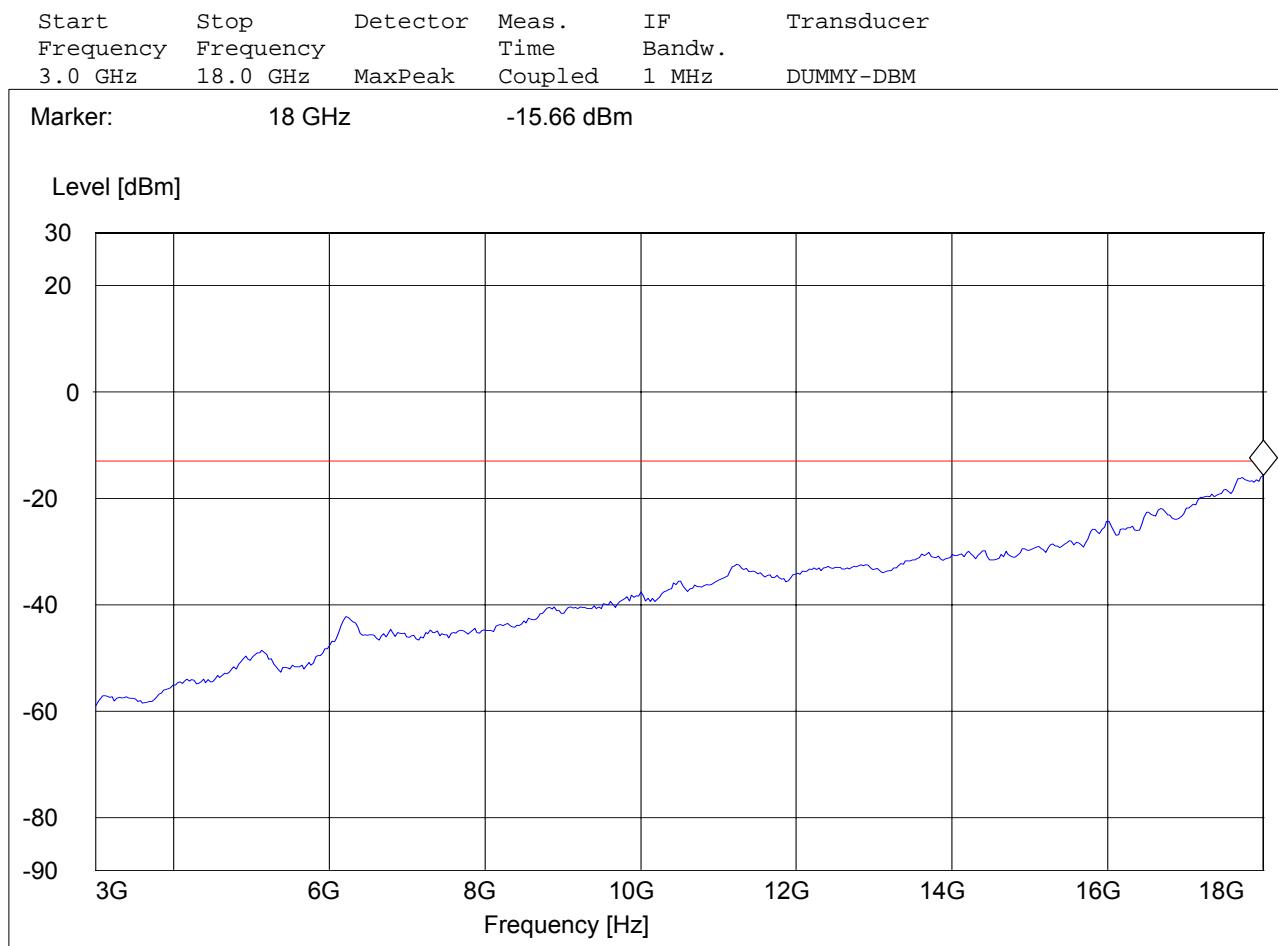


**RADIATED SPURIOUS EMISSIONS(PCS 1900 FDD2)****Tx @ 1852.4MHz: 3GHz – 18GHz**

Spurious emission limit -13dBm

**CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: EUT 34BB00t, C06, LAPTOP KKL-E3-C1, X01-00  
 Customer: Novatel  
 Operating Mode: FDD2, CH9262, 1852.4MHz  
 Antenna: V  
 EUT: V  
 Test Engineer: PETER  
 Voltage: AC Adapter  
 Sweep: FCC24 SPURI 3-18G

***SWEET TABLE: "FCC 24Spuri 3-18G"***

**RADIATED SPURIOUS EMISSIONS(PCS 1900 FDD2)****Tx @ 1880.0MHz: 1GHz – 3GHz**

Spurious emission limit –13dBm

**Note: The peak above/close to the limit line is the carrier freq. at ch-661.****CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

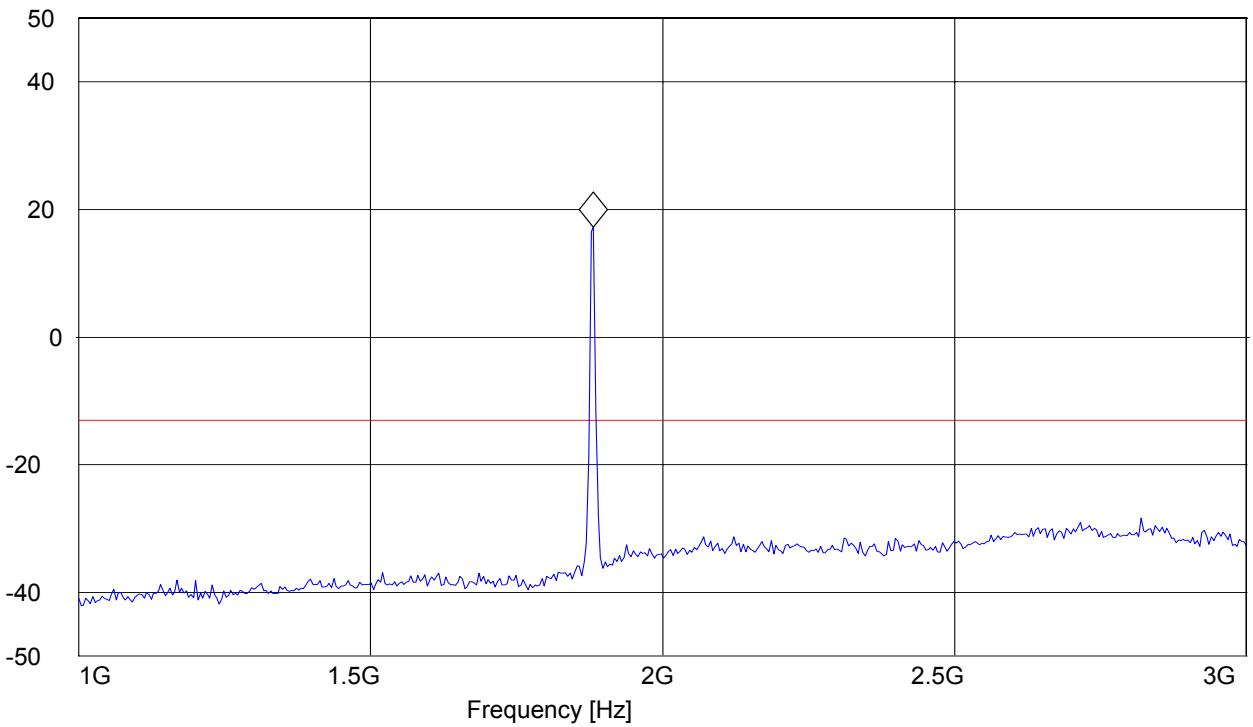
EUT / Description: EUT 34BB00t, C06, LAPTOP KKL-E3-C1, X01-00  
 Customer: Novatel  
 Operating Mode: FDD2, CH9400, 1880MHz  
 Antenna: V  
 EUT: V  
 Test Engineer: PETER  
 Voltage: AC Adapter  
 Sweep: FCC24 SPURI 1-3G

***SWEEP TABLE: "FCC 24Spuri 1-3G"***

Short Description:		FCC 24 1GHz-8GHz			
Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
1.0 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM

Marker:	1.881763527 GHz	17.26 dBm
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Level [dBm]

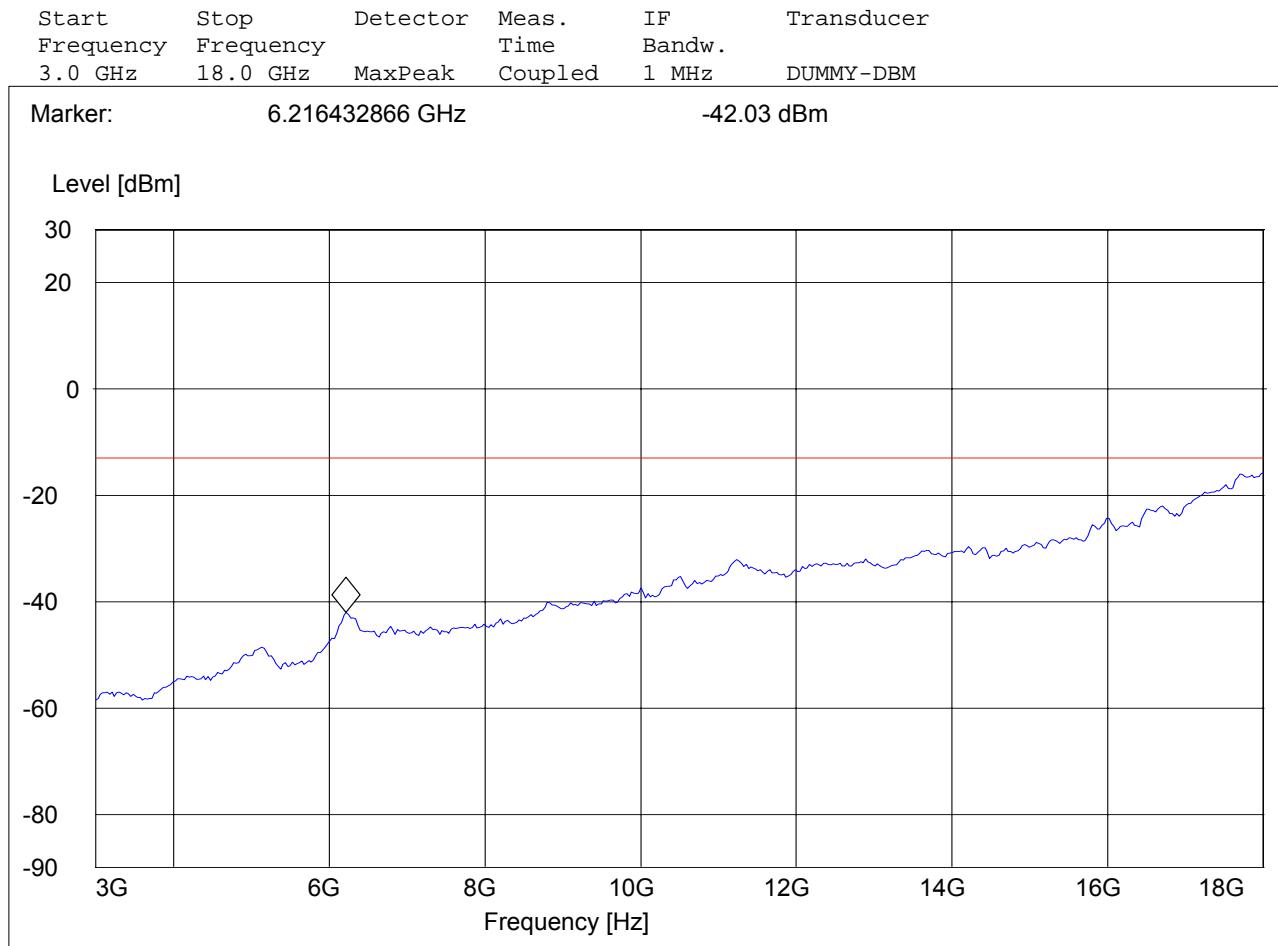


**RADIATED SPURIOUS EMISSIONS(PCS 1900 FDD2)****Tx @ 1880.0MHz: 3GHz – 18GHz**

Spurious emission limit –13dBm

**CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: EUT 34BB00t, C06, LAPTOP KKL-E3-C1, X01-00  
 Customer: Novatel  
 Operating Mode: FDD2, CH9400, 1880MHz  
 Antenna: V  
 EUT: V  
 Test Engineer: PETER  
 Voltage: AC Adapter  
 Sweep: FCC24 SPURI 3-18G

***SWEET TABLE: "FCC 24Spuri 3-18G"***

**RADIATED SPURIOUS EMISSIONS(PCS 1900 FDD2)****Tx @ 1907.6MHz: 1GHz – 3GHz**

Spurious emission limit –13dBm

**Note: The peak above the limit line is the carrier freq. at ch-810.****CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: EUT 34BB00t, C06, LAPTOP KKL-E3-C1, X01-00

Customer: Novatel

Operating Mode: FDD2, CH9538, 1907.6MHz

Antenna: V

EUT: V

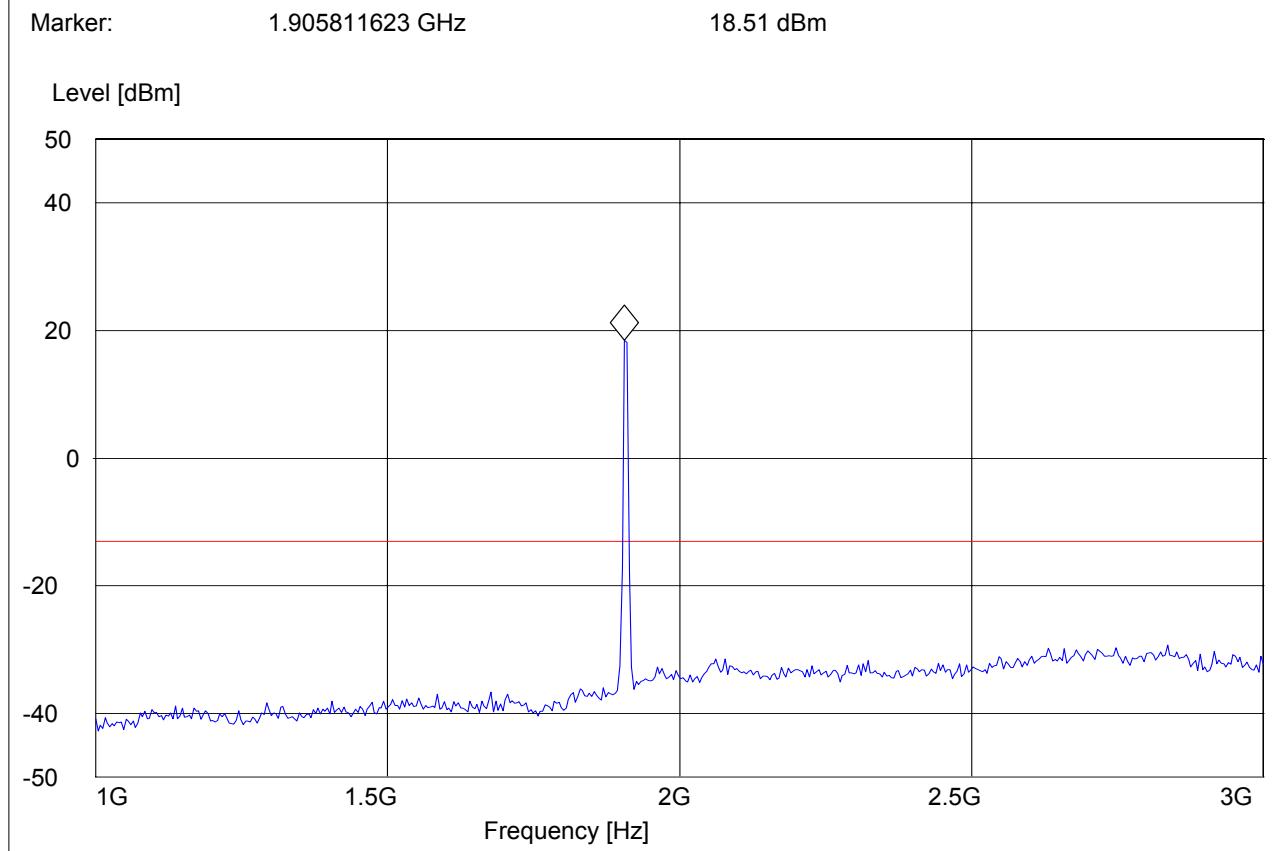
Test Engineer: PETER

Voltage: AC Adapter

Sweep: FCC24 SPURI 1-3G

***SWEEP TABLE: "FCC 24Spuri 1-3G"***

Short Description:		FCC 24 1GHz-8GHz			
Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
1.0 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM



**RADIATED SPURIOUS EMISSIONS(PCS 1900 FDD2)****Tx @ 1907.6MHz: 3GHz – 18GHz**

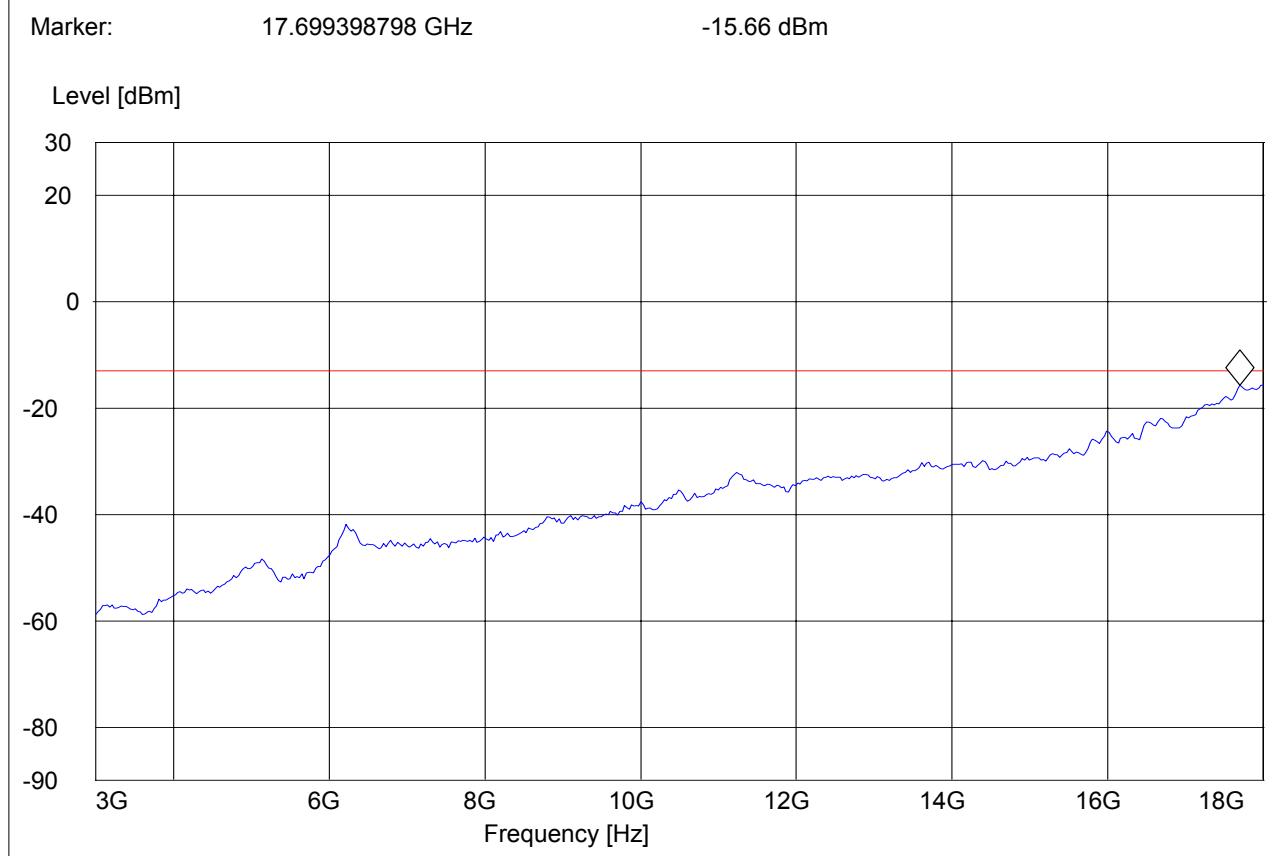
Spurious emission limit –13dBm

**CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: EUT 34BB00t, C06, LAPTOP KKL-E3-C1, X01-00  
 Customer: Novatel  
 Operating Mode: FDD2, CH9538, 1907.6MHz  
 Antenna: V  
 EUT: V  
 Test Engineer: PETER  
 Voltage: AC Adapter  
 Sweep: FCC24 SPURI 3-18G

***SWEEP TABLE: "FCC 24Spuri 3-18G"***

Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
3.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM



**RADIATED SPURIOUS EMISSIONS(PCS 1900 FDD2)****18GHz – 19.1GHz**

Spurious emission limit –13dBm

**Note: This plot is valid for low, mid & high channels (worst-case plot)****CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: EUT 34BB00t, C06, LAPTOP KKL-E3-C1, X01-00

Customer: Novatel

Operating Mode: FDD2, CH9400, 1880MHz

Antenna: V

EUT: V

Test Engineer: PETER

Voltage: AC Adapter

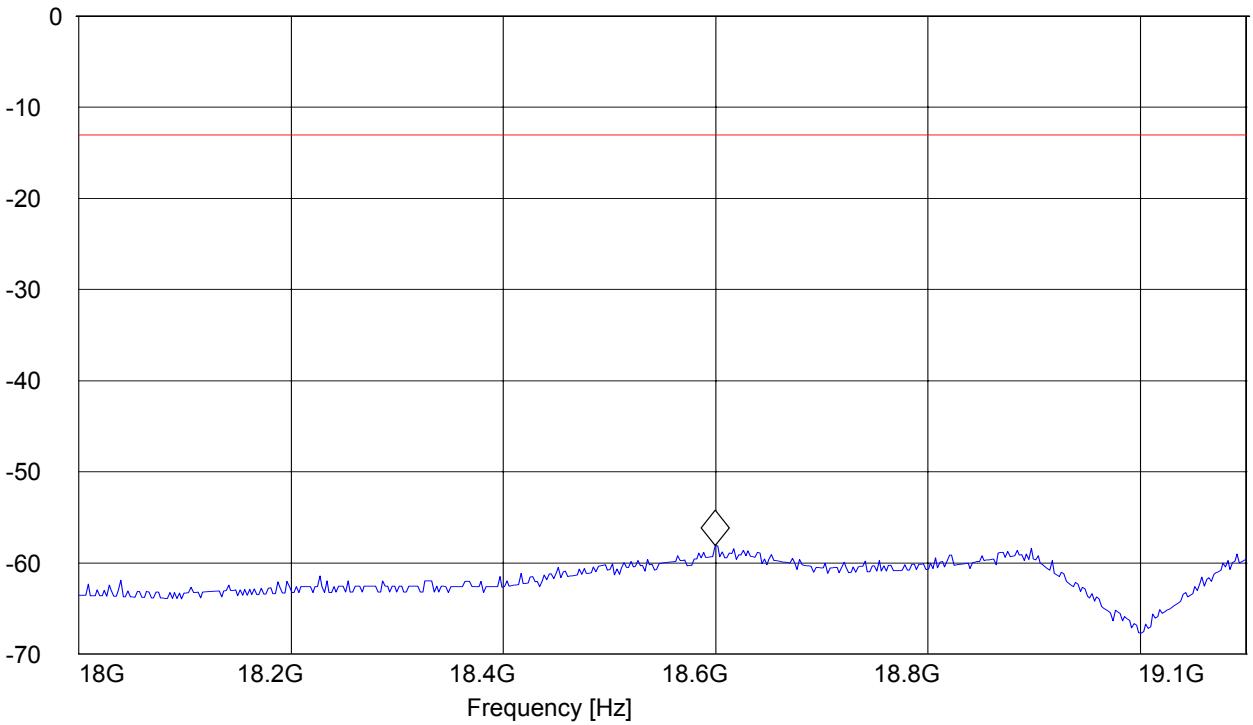
Sweep: FCC24 SPURI 18-19.1G

***SWEEP TABLE: "FCC 24spuri 18-19.1G"***

Short Description: FCC 24 18GHz-19.1GHz					
Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
18.0 GHz	19.1 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM

Marker: 18.599599198 GHz -58.11 dBm

Level [dBm]



**5.6 RECEIVER RADIATED EMISSIONS****§ 2.1053 / RSS-132 & 133****NOTE:**

1. The radiated emissions were done with different settings, using the relevant pre-amplifiers for the relevant frequency ranges. This is the reason that the graphs show different noise levels. In the range between 3GHz and 26.5GHz very short cable connections to the antenna was used to minimize the noise level.

**Limits****SUBCLAUSE § RSS-133**

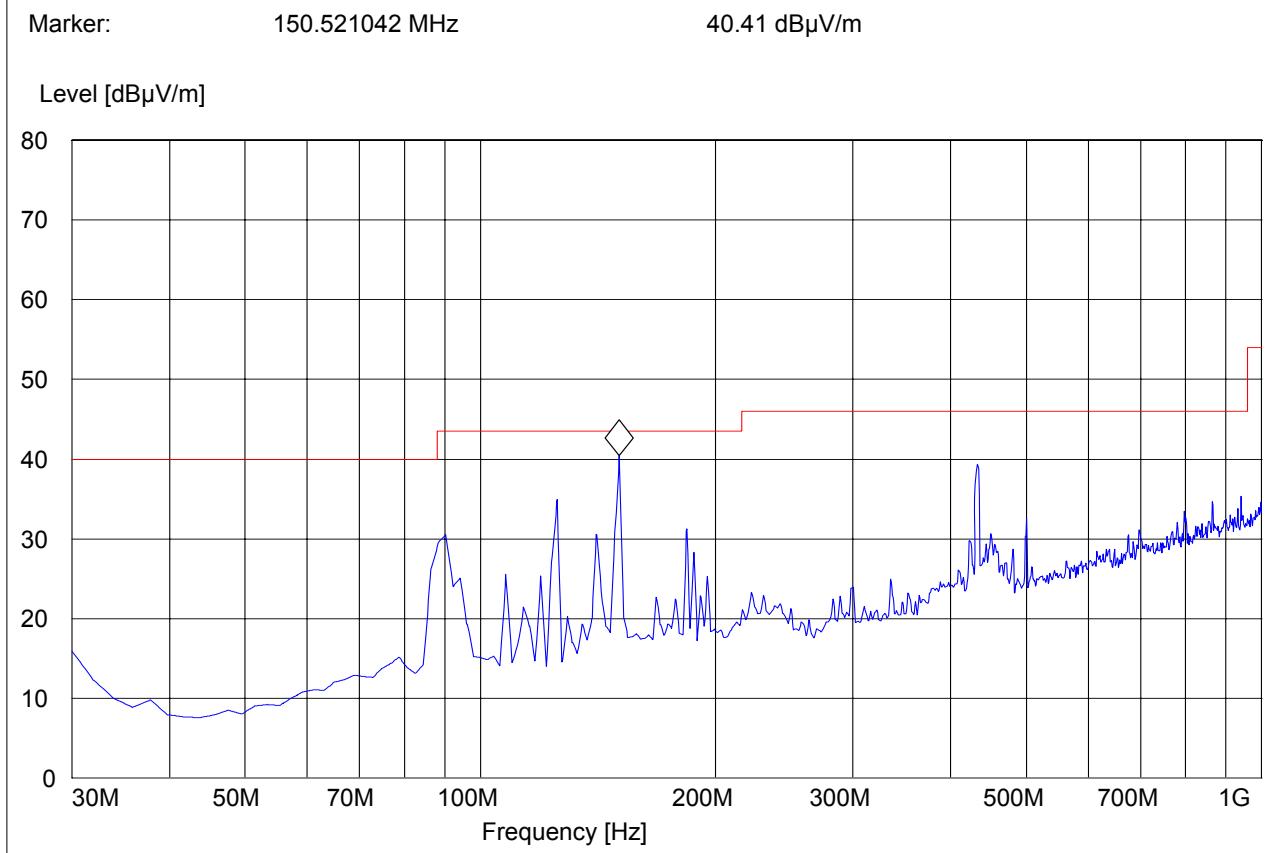
Frequency (MHz)	Field strength ( $\mu$ V/m)	Measurement distance (m)
0.009 - 0.490	2400/F (kHz)	300
0.490 - 1.705	24000/F (kHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

**5.6.1 Receiver Spurious on EUT 850 MHz****RECEIVER RADIATED EMISSIONS****EUT in Idle Mode: 30MHz – 1GHz****Antenna: horizontal****Note: Peak Reading Vs. Quasi-Peak Limit.****CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: EUT 34BB00I, C03, LAPTOP KKL-E3-C1, X01-00  
 Customer: NOVATEL  
 Operating Mode: FCC22, RADIATED, TABLE 0°, IDLE  
 Antenna: H  
 EUT: V  
 Test Engineer: ED  
 Voltage: AC ADAPTOR  
 Sweep: CANADA RE\_30M-1G\_H

***SWEET TABLE: "CANADA RE\_30M-1G\_Hor"***

Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	3141-#1186_Vert



**RECEIVER RADIATED EMISSIONS****EUT in Idle Mode: 1GHz – 3GHz****Note: Peak Reading Vs. Average Limit.****CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: EUT 34BB001, C03, LAPTOP KKL-E3-C1, X01-00

Customer: NOVATEL

Operating Mode: FCC22, RADIATED, TABLE 0°

Antenna: V

EUT: V

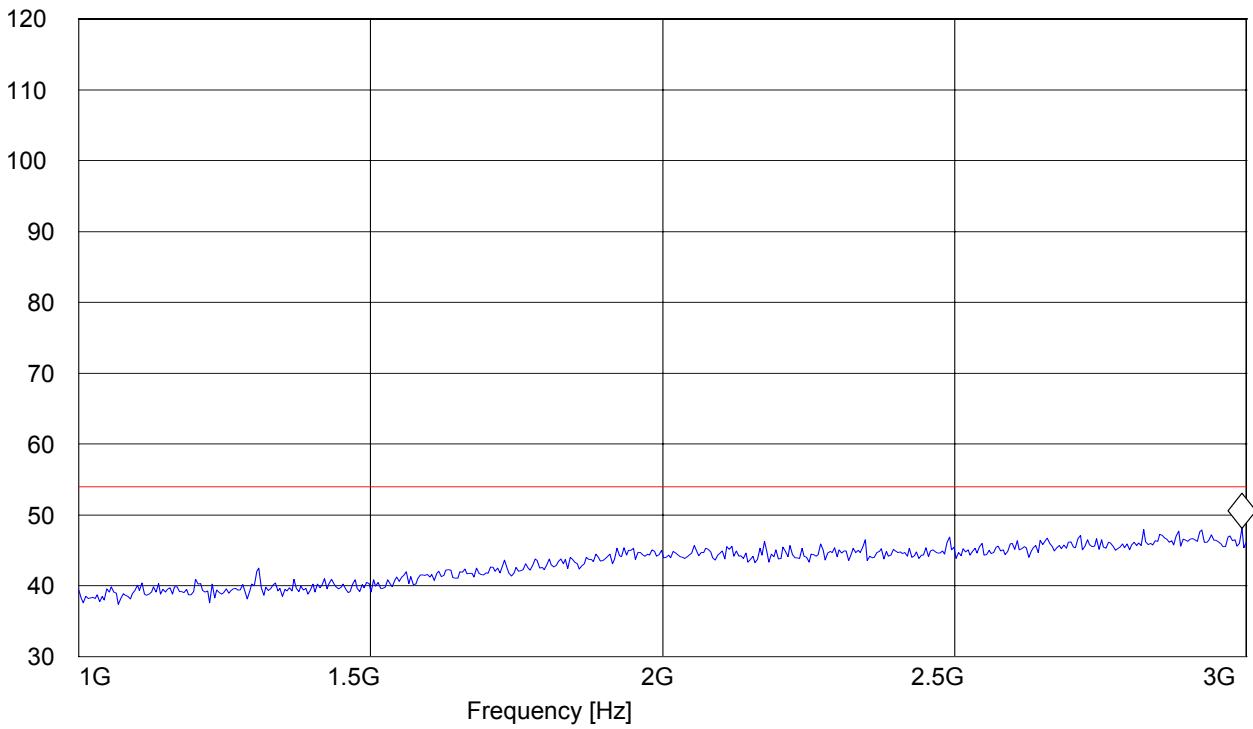
Test Engineer: ED

Voltage: AC ADAPTOR

Sweep: CANADA RE 1-3G

**SWEEP TABLE: "CANADA RE\_1-3G"**

Start Frequency	Stop Frequency	Detector	Meas.	IF Time	Transducer
1.0 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert

Marker: 2.991983968 GHz 48.09 dB $\mu$ V/mLevel [dB $\mu$ V/m]

**RECEIVER RADIATED EMISSIONS**  
**EUT in Idle Mode: 3GHz – 18GHz**

**Note: Peak Reading Vs. Average Limit.**

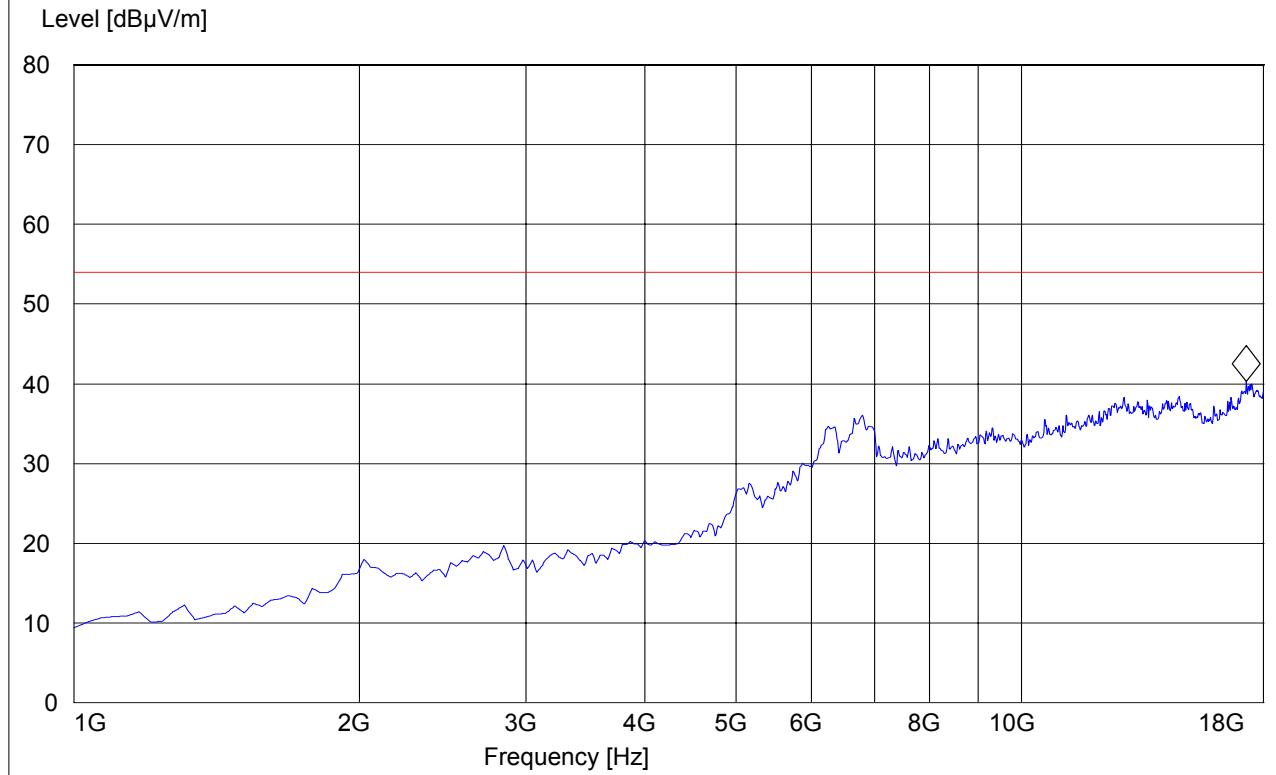
**CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: EUT 34BB00I, C03, LAPTOP KKL-E3-C1, X01-00  
 Customer: NOVATEL  
 Operating Mode: FCC22, RADIATED, TABLE 0°  
 Antenna: V  
 EUT: V  
 Test Engineer: ED  
 Voltage: AC ADAPTOR  
 Sweep: CANADA RE 3-18G

**SWEEP TABLE: "CANADA RE\_3-18G"**

Start Frequency	Stop Frequency	Detector	Meas.	IF Time	Transducer
1.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert

Marker: 17.250501002 GHz 40.31 dB $\mu$ V/m

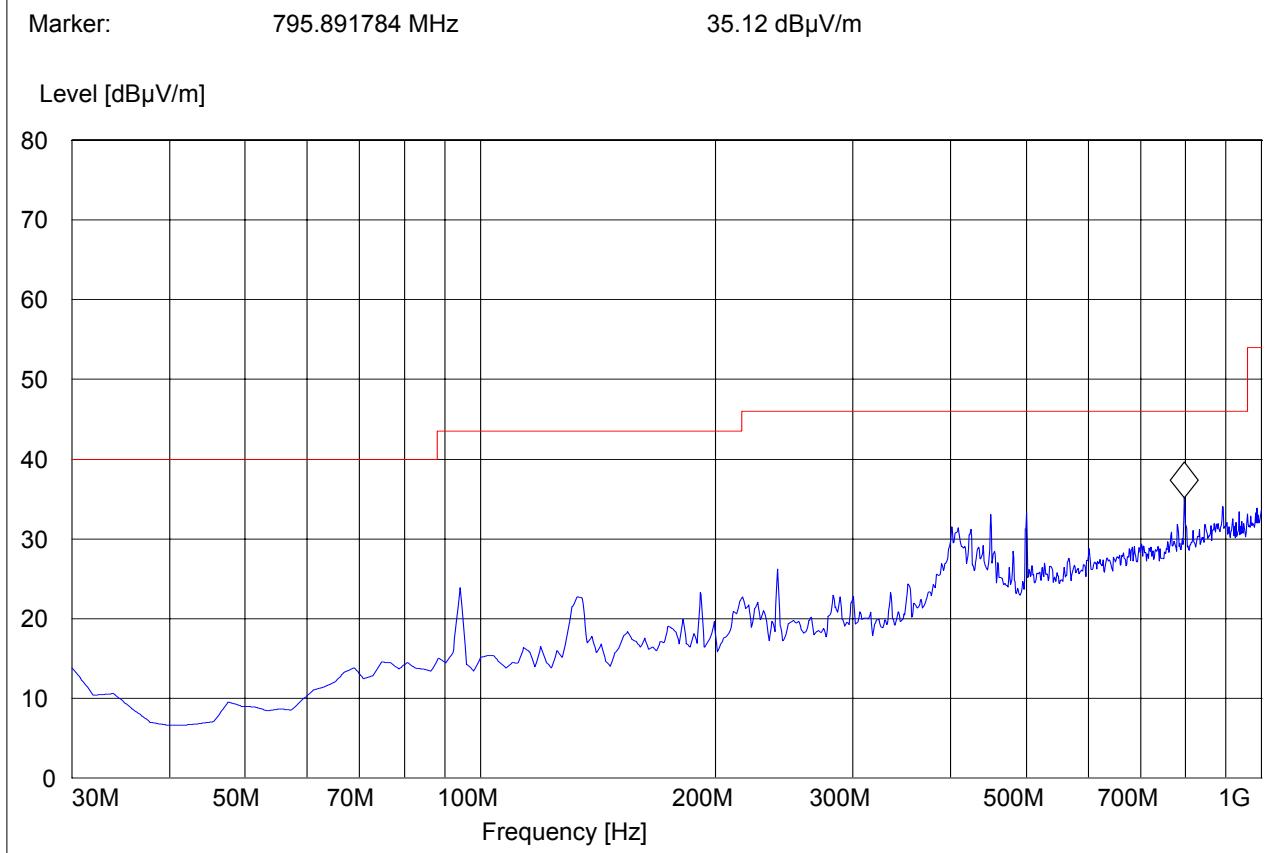


**5.6.2 Receiver Spurious on EUT 850 MHz FDD5****RECEIVER RADIATED EMISSIONS FDD5****EUT in Idle Mode: 30MHz – 1GHz****Antenna: horizontal****Note: Peak Reading Vs. Quasi-Peak Limit.****CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: EUT 34BB00t, C06, LAPTOP KKL-E3-C1, X01-00  
 Customer: Novatel  
 Operating Mode: FDD5, idle mode  
 Antenna: H  
 EUT: V  
 Test Engineer: Ed  
 Voltage: AC Adapter  
 Sweep: Canada RE 30M-1G\_H

***SWEEP TABLE: "CANADA RE\_30M-1G\_Hor"***

Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	3141-#1186_Vert



**RECEIVER RADIATED EMISSIONS FDD5****EUT in Idle Mode: 1GHz – 3GHz****Note: Peak Reading Vs. Average Limit.****CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: EUT 34BB00t, C06, LAPTOP KKL-E3-C1, X01-00

Customer: Novatel

Operating Mode: FDD5, idle mode

Antenna: V

EUT: V

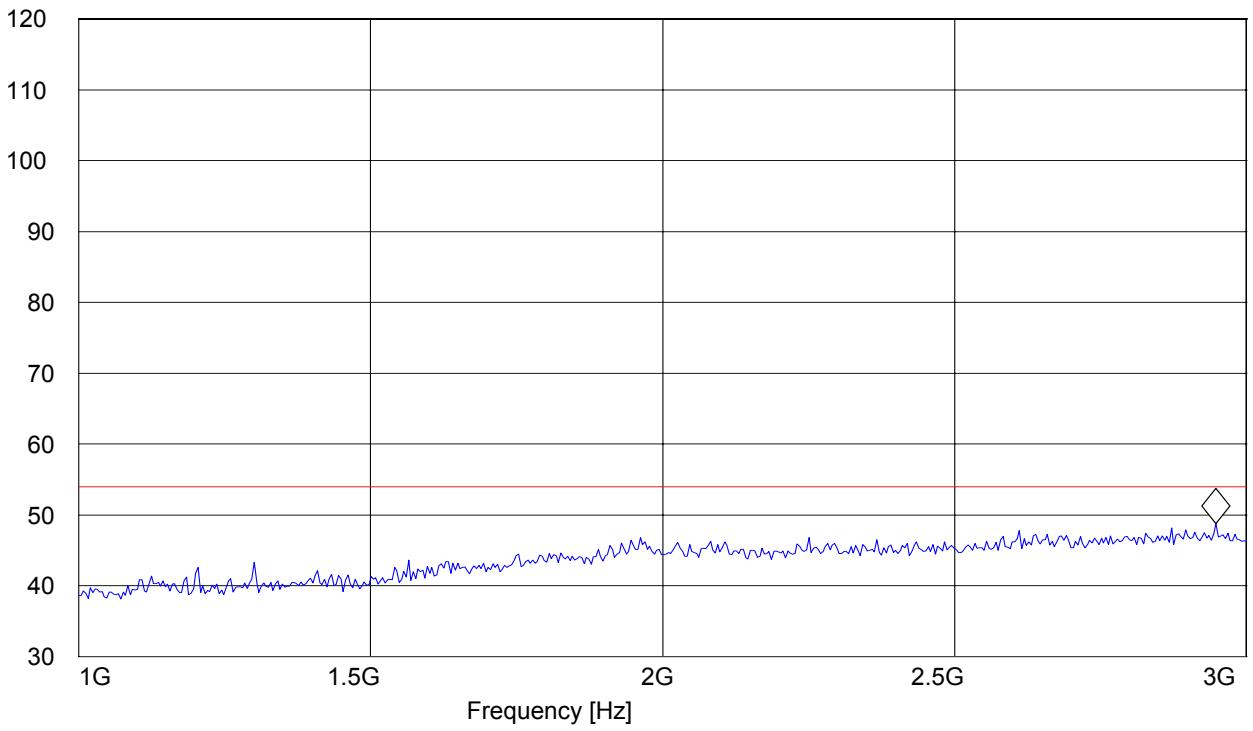
Test Engineer: Ed

Voltage: AC Adapter

Sweep: Canada RE 1-3G

**SWEEP TABLE: "CANADA RE\_1-3G"**

Start Frequency	Stop Frequency	Detector	Meas.	IF Time	Transducer
1.0 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert

Marker: 2.947895792 GHz 48.8 dB $\mu$ V/mLevel [dB $\mu$ V/m]

**RECEIVER RADIATED EMISSIONS FDD5**  
**EUT in Idle Mode: 3GHz – 18GHz**

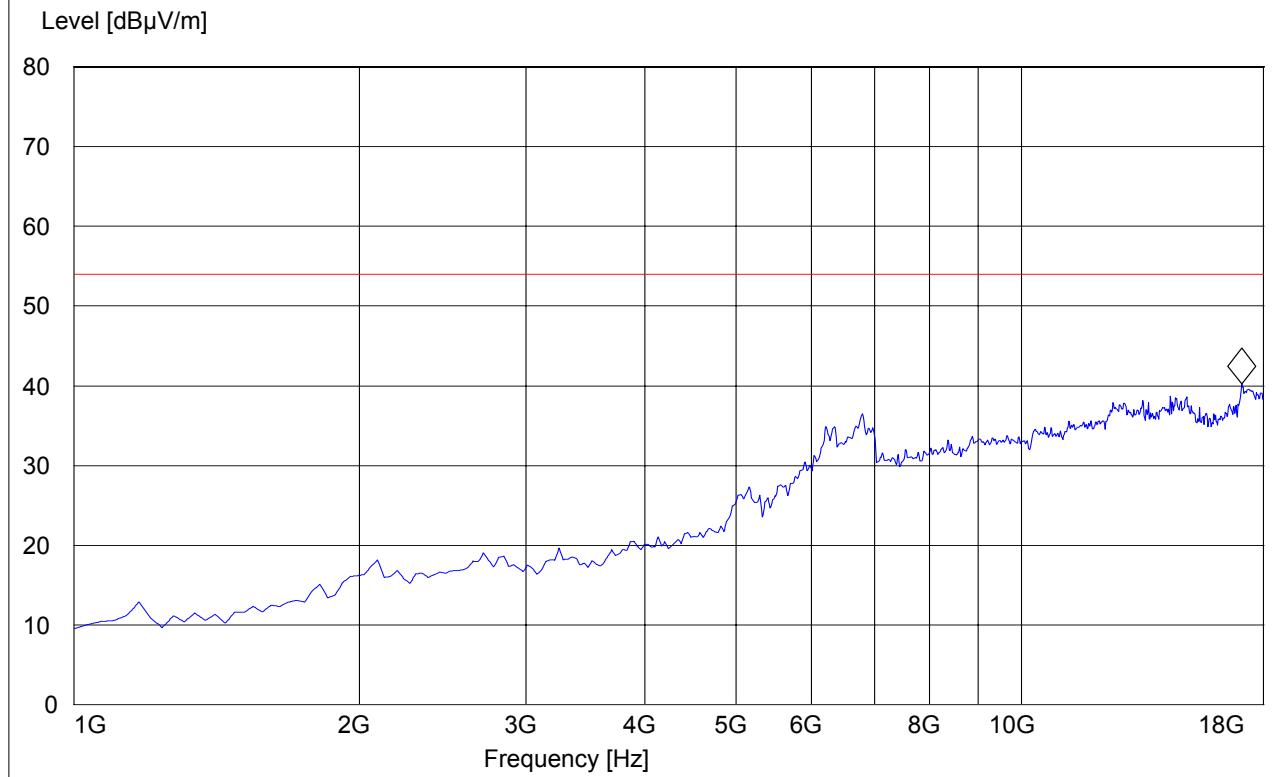
**Note: Peak Reading Vs. Average Limit.**

**CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: EUT 34BB00t, C06, LAPTOP KKL-E3-C1, X01-00  
 Customer: Novatel  
 Operating Mode: FDD5, idle mode  
 Antenna: V  
 EUT: V  
 Test Engineer: Ed  
 Voltage: AC Adapter  
 Sweep: Canada RE3-18G

**SWEEP TABLE: "CANADA RE\_3-18G"**

Start Frequency	Stop Frequency	Detector	Meas.	IF Time	Transducer
1.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert
Marker: 17.080160321 GHz 40.25 dB $\mu$ V/m					

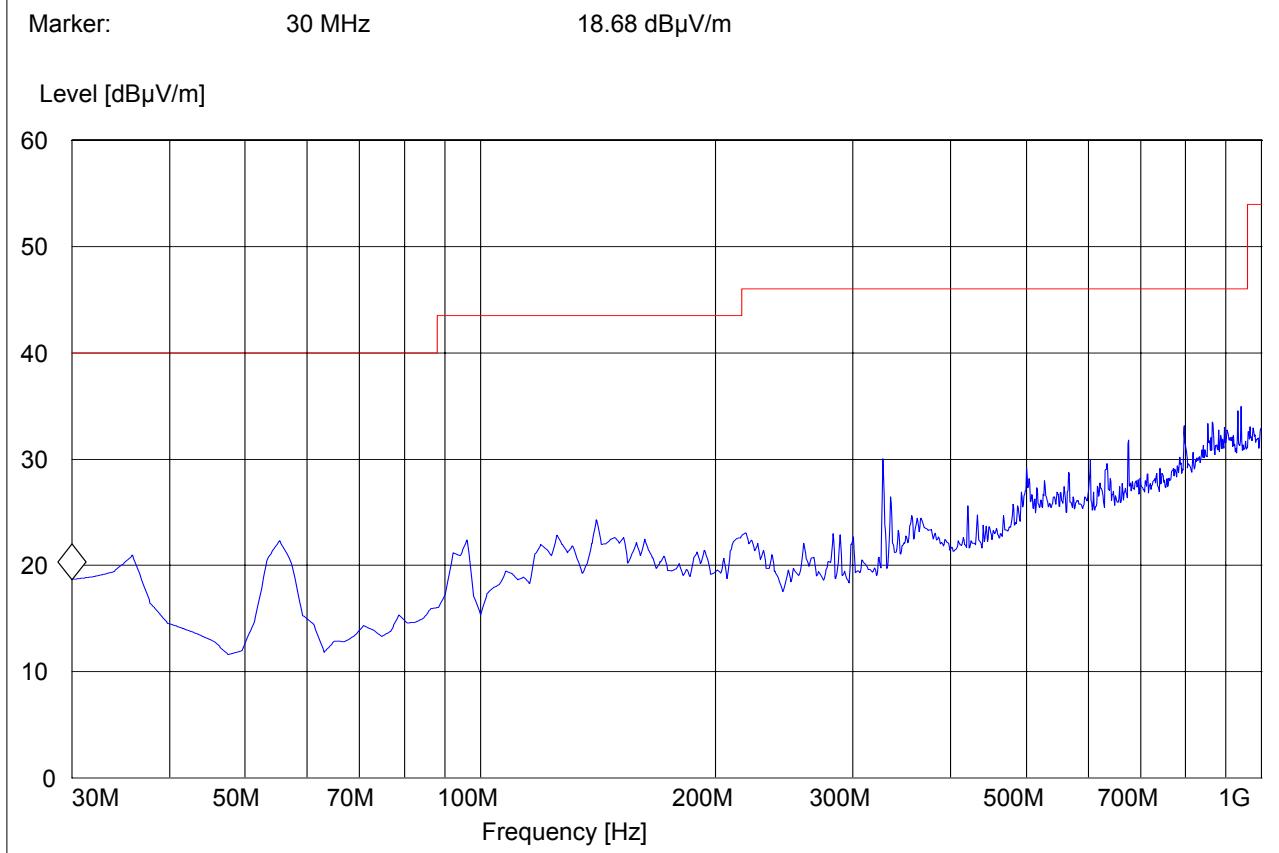


**5.6.3 Receiver Spurious on EUT 1900 MHz****RECEIVER RADIATED EMISSIONS****EUT in Idle Mode: 30MHz – 1GHz****Antenna: vertical****Note: Peak Reading Vs. Quasi-Peak Limit.****CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: EUT 34BB00I, C03, LAPTOP KKL-E3-C1, X01-00  
 Customer: NOVATEL  
 Operating Mode: FCC24, RADIATED, TABLE 92 DEGREES, ANT 136 cm  
 Antenna: V  
 EUT: V  
 Test Engineer: SATYA  
 Voltage: AC ADAPTOR  
 Sweep: CANADA RE 30M-1G V

***SWEEP TABLE: "CANADA RE\_30M-1G\_Ver"***

Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	3141-#1186_Vert



**RECEIVER RADIATED EMISSIONS****EUT in Idle Mode: 1GHz – 3GHz****Note: Peak Reading Vs. Average Limit.****CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: EUT 34BB001, C03, LAPTOP KKL-E3-C1, X01-00

Customer: NOVATEL

Operating Mode: FCC24, RADIATED, TABLE 92 DEGREES

Antenna: V

EUT: V

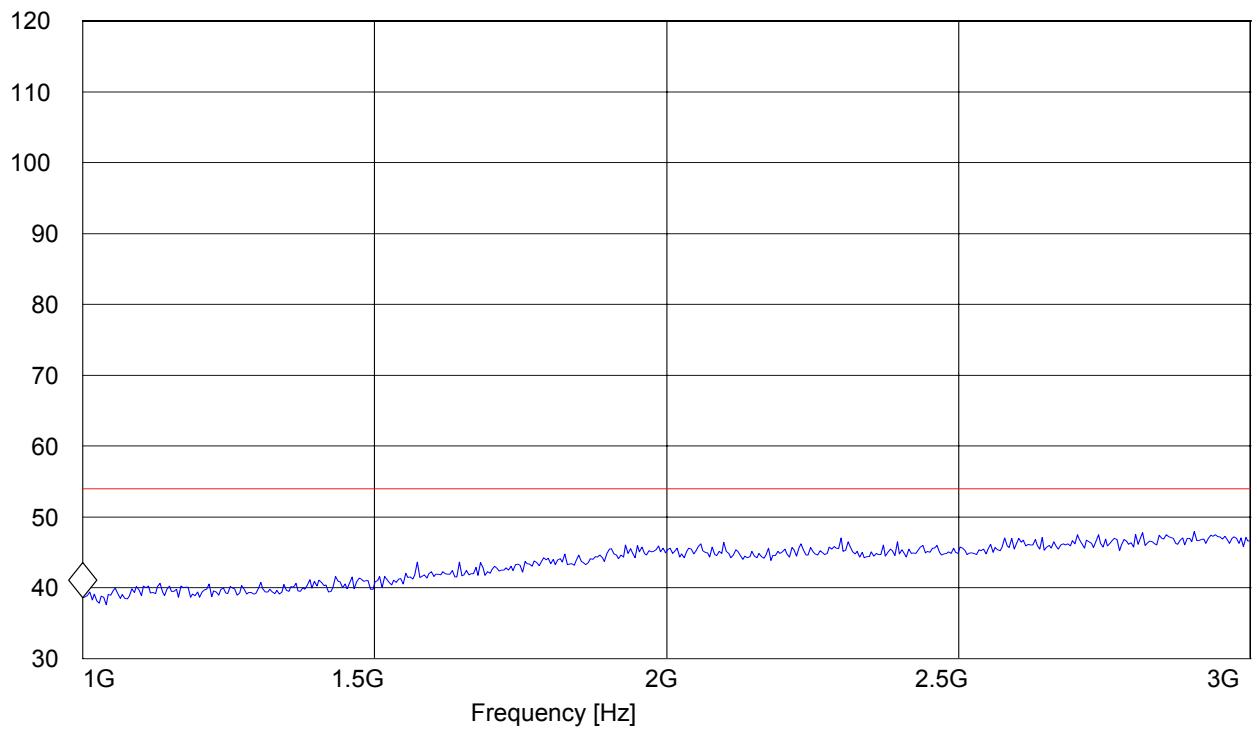
Test Engineer: SATYA

Voltage: AC ADAPTOR

Sweep: CANADA RE 1-3G

**SWEEP TABLE: "CANADA RE\_1-3G"**

Start Frequency	Stop Frequency	Detector	Meas.	IF Time	Transducer
1.0 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert

Marker: 1 GHz 38.64 dB $\mu$ V/mLevel [dB $\mu$ V/m]

**RECEIVER RADIATED EMISSIONS**  
**EUT in Idle Mode: 3GHz – 18GHz**

**Note: Peak Reading Vs. Average Limit.**

**CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

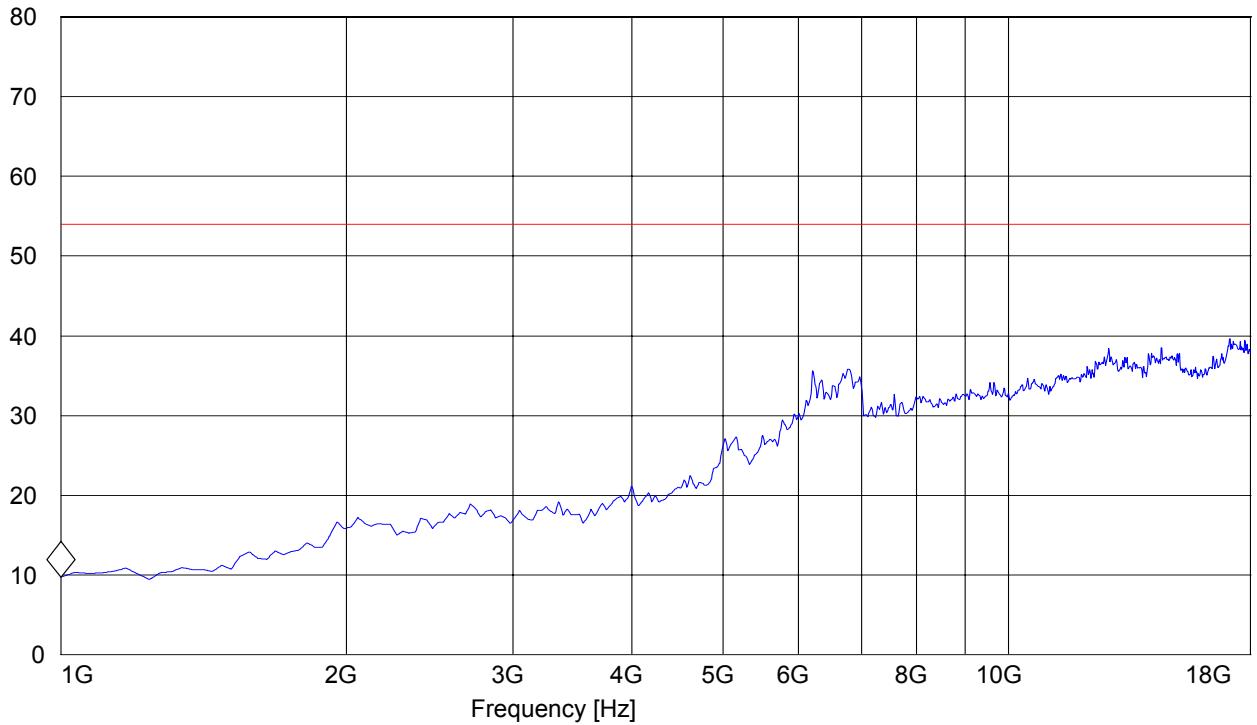
EUT / Description: EUT 34BB00I, C03, LAPTOP KKL-E3-C1, X01-00  
 Customer: NOVATEL  
 Operating Mode: FCC24, RADIATED, TABLE 184 DEGREES  
 Antenna: V  
 EUT: V  
 Test Engineer: SATYA  
 Voltage: AC ADAPTOR  
 Sweep: CANADA RE 3-18G

**SWEEP TABLE: "CANADA RE\_3-18G"**

Start Frequency	Stop Frequency	Detector	Meas.	IF Time	Transducer
1.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert

Marker: 1 GHz 9.75 dB $\mu$ V/m

Level [dB $\mu$ V/m]



**RECEIVER RADIATED EMISSIONS**  
**EUT in Idle Mode: 18GHz – 19.1GHz**

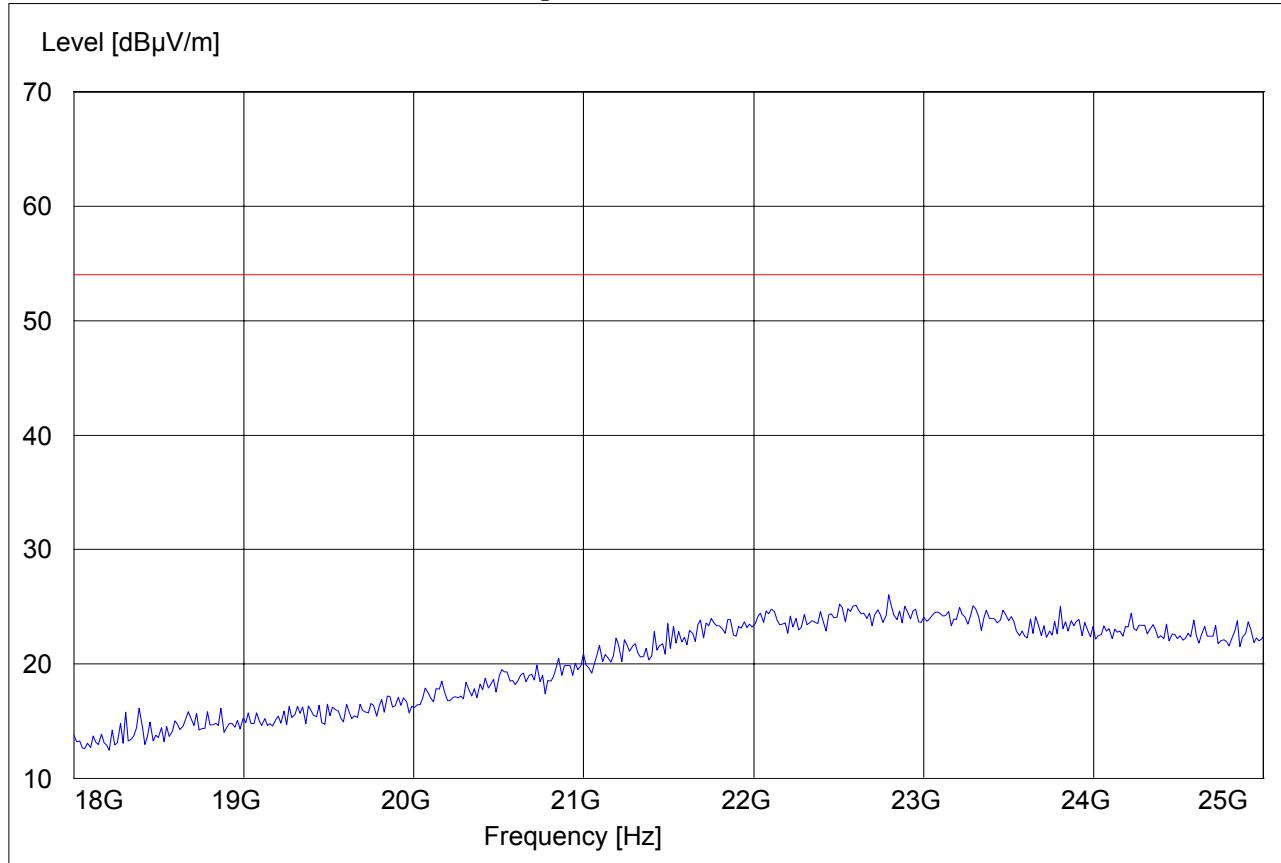
**Note: Peak Reading Vs. Average Limit.**

**CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: EUT 34BB00I, C03, LAPTOP KKL-E3-C1, X01-00  
 Customer: NOVATEL  
 Operating Mode: FCC24, RADIATED, TABLE 184 DEGREES  
 Antenna: V  
 EUT: V  
 Test Engineer: SATYA  
 Voltage: AC ADAPTOR  
 Sweep: CANADA RE 18-26.5G

**SWEEP TABLE: "CANADA RE\_18-26.5G"**

Start Frequency	Stop Frequency	Detector	Meas.	IF Time	Transducer
18.0 GHz	26.5 GHz	MaxPeak	Coupled	1 MHz	3160 Horn 18-26.5G

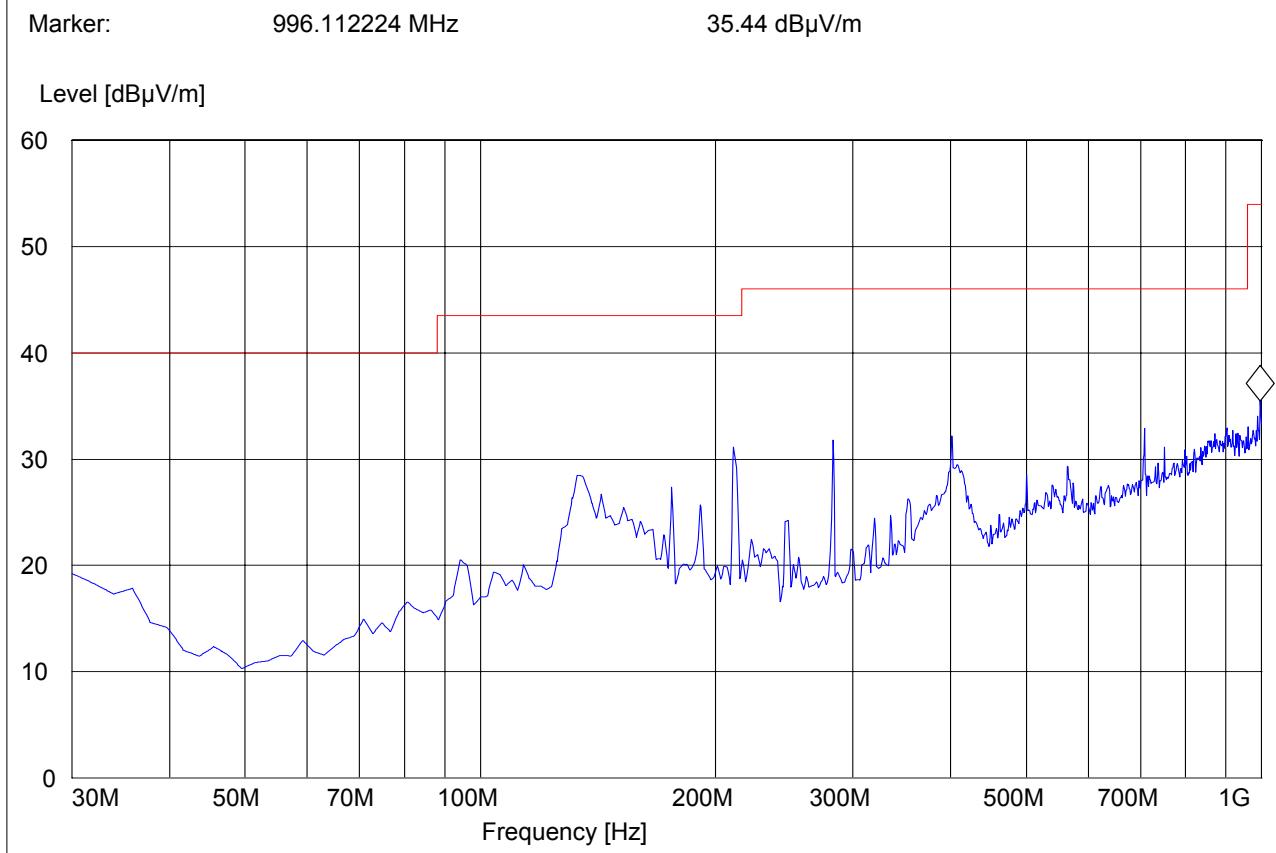


**5.6.4 Receiver Spurious on EUT 1900 MHz FDD2****RECEIVER RADIATED EMISSIONS FDD2****EUT in Idle Mode: 30MHz – 1GHz****Antenna: vertical****Note: Peak Reading Vs. Quasi-Peak Limit.****CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: EUT 34BB00t, C06, LAPTOP KKL-E3-C1, X01-00  
 Customer: Novatel  
 Operating Mode: FDD2, idle mode  
 Antenna: V  
 EUT: V  
 Test Engineer: Ed  
 Voltage: AC Adapter  
 Sweep: Canada RE 30M-1G\_V

***SWEEP TABLE: "CANADA RE\_30M-1G\_Ver"***

Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	3141-#1186_Vert



**RECEIVER RADIATED EMISSIONS FDD2****EUT in Idle Mode: 1GHz – 3GHz****Note: Peak Reading Vs. Average Limit.****CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: EUT 34BB00t, C06, LAPTOP KKL-E3-C1, X01-00

Customer: Novatel

Operating Mode: FDD2, idle mode

Antenna: V

EUT: V

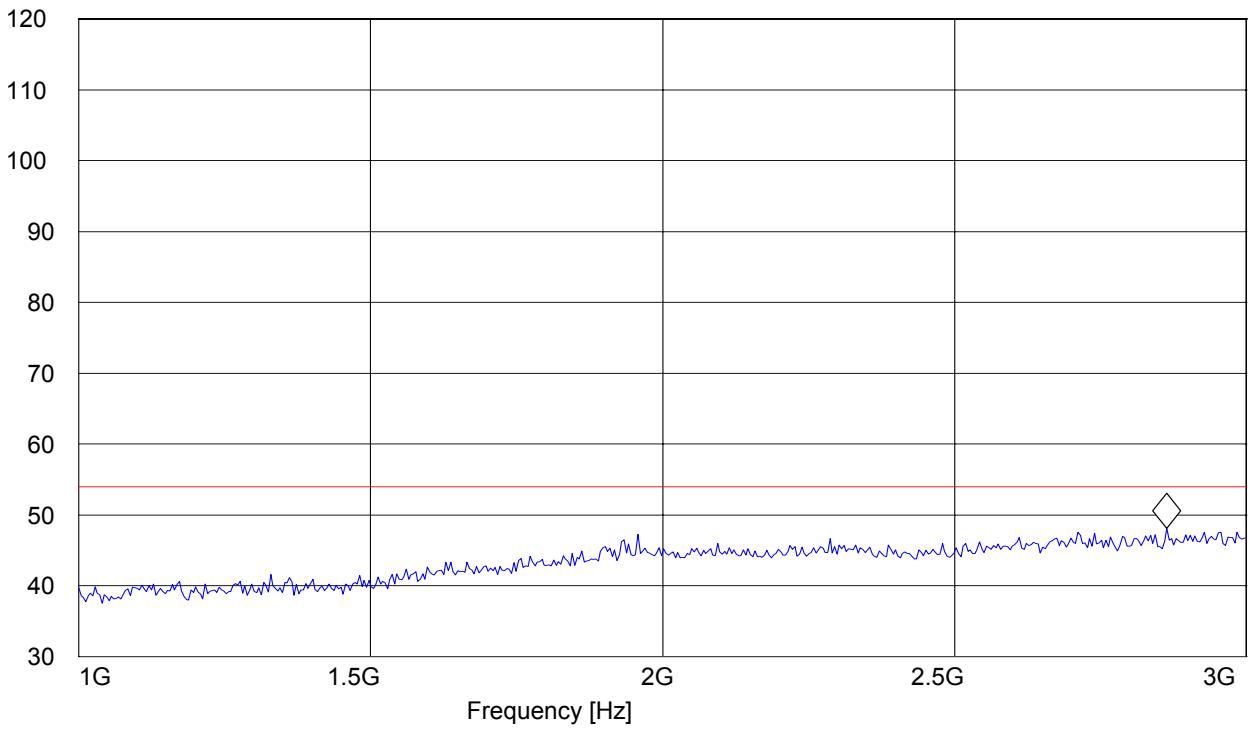
Test Engineer: Ed

Voltage: AC Adapter

Sweep: Canada RE 1-3G

**SWEEP TABLE: "CANADA RE\_1-3G"**

Start Frequency	Stop Frequency	Detector	Meas.	IF Time	Transducer
1.0 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert

Marker: 2.863727455 GHz 48.1 dB $\mu$ V/mLevel [dB $\mu$ V/m]

**RECEIVER RADIATED EMISSIONS FDD2**  
**EUT in Idle Mode: 3GHz – 18GHz**

**Note: Peak Reading Vs. Average Limit.**

**CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

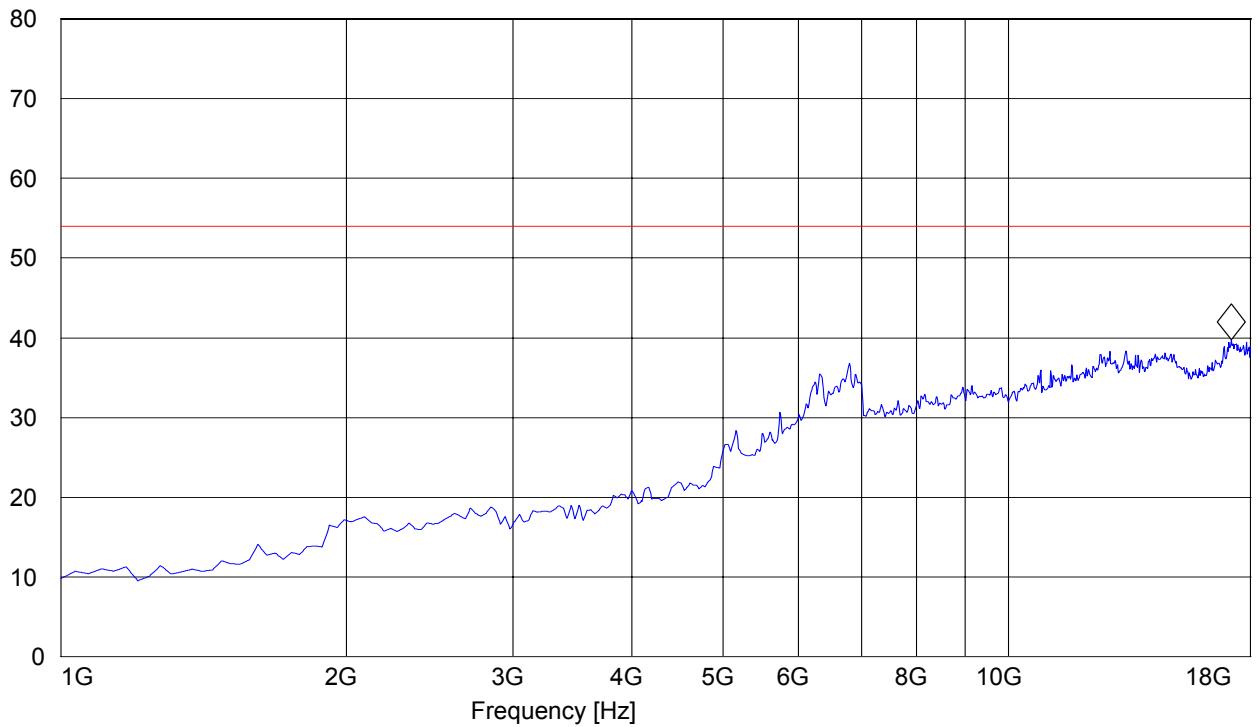
EUT / Description: EUT 34BB00t, C06, LAPTOP KKL-E3-C1, X01-00  
 Customer: Novatel  
 Operating Mode: FDD2, idle mode  
 Antenna: V  
 EUT: V  
 Test Engineer: Ed  
 Voltage: AC Adapter  
 Sweep: Canada RE 3-18G

**SWEEP TABLE: "CANADA RE\_3-18G"**

Start Frequency	Stop Frequency	Detector	Meas.	IF Time	Transducer
1.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert

Marker: 17.182364729 GHz 39.77 dB $\mu$ V/m

Level [dB $\mu$ V/m]



**RECEIVER RADIATED EMISSIONS FDD2**  
**EUT in Idle Mode: 18GHz – 19.1GHz**

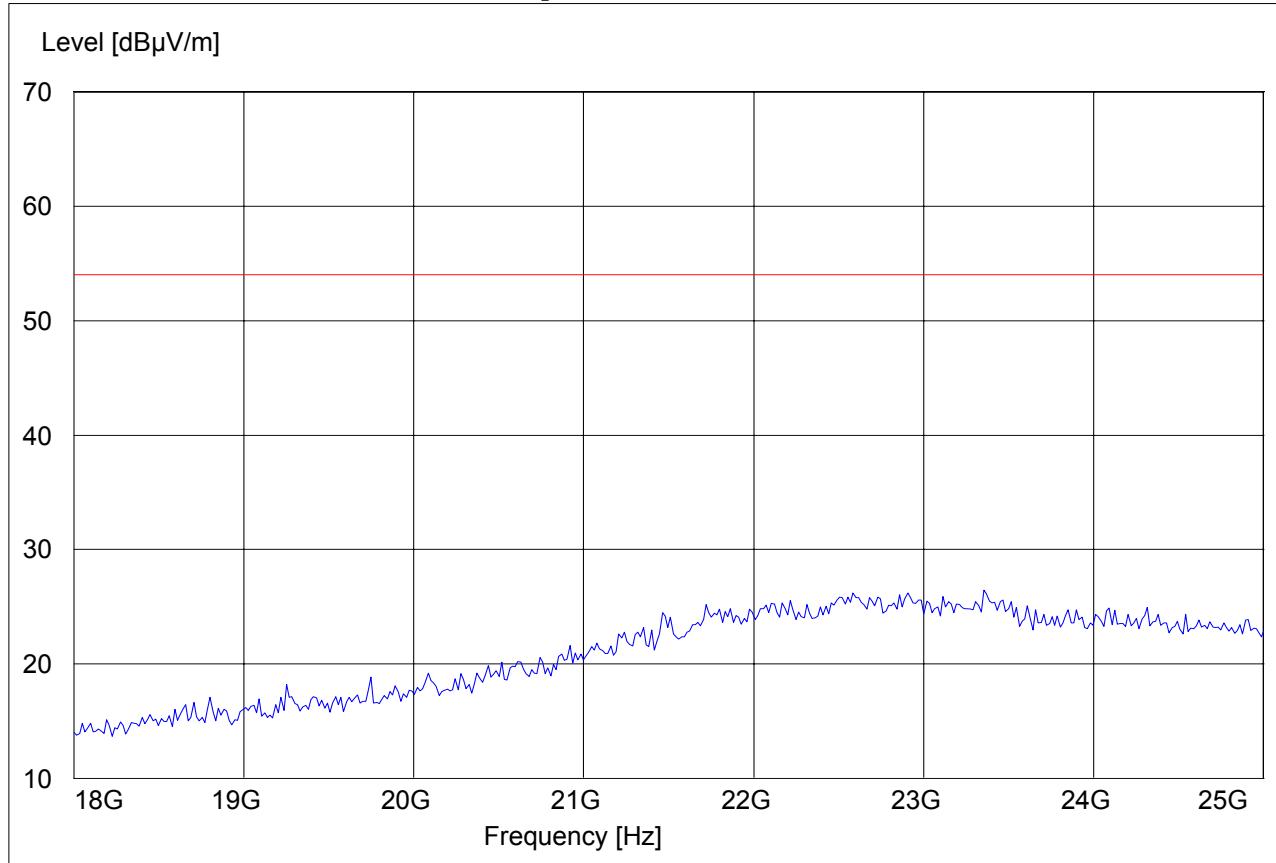
**Note: Peak Reading Vs. Average Limit.**

**CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: EUT 34BB00t, C06, LAPTOP KKL-E3-C1, X01-00  
 Customer: Novatel  
 Operating Mode: FDD2, idle mode  
 Antenna: V  
 EUT: V  
 Test Engineer: Ed  
 Voltage: AC Adapter  
 Sweep: Canada RE 18-26.5G

**SWEEP TABLE: "CANADA RE\_18-26.5G"**

Start Frequency	Stop Frequency	Detector	Meas.	IF Time	Transducer
18.0 GHz	26.5 GHz	MaxPeak	Coupled	1 MHz	3160 Horn 18-26.5G



**6 TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS**

No	Instrument/Ancillary	Type	Manufacturer	Serial No.	Cal Due	Interval
<b>01</b>	Spectrum Analyzer	ESIB 40	Rohde & Schwarz	100107	May 2007	1 year
<b>02</b>	Spectrum Analyzer	FSEM 30	Rohde & Schwarz	100017	August 2007	1 year
<b>03</b>	Signal Generator	SMY02	Rohde & Schwarz	836878/011	May 2007	1 year
<b>04</b>	Power-Meter	NRVD	Rohde & Schwarz	0857.8008.02	May 2007	1 year
<b>05</b>	Biconilog Antenna	3141	EMCO	0005-1186	June 2007	1 year
<b>06</b>	Horn Antenna (1-18GHz)	SAS-200/571	AH Systems	325	June 2007	1 year
<b>07</b>	Horn Antenna (18-26.5GHz)	3160-09	EMCO	1240	June 2007	1 year
<b>08</b>	Power Splitter	11667B	Hewlett Packard	645348	n/a	n/a
<b>09</b>	Climatic Chamber	VT4004	Voltsch	G1115	May 2007	1 year
<b>10</b>	High Pass Filter	5HC2700	Trilithic Inc.	9926013	n/a	n/a
<b>11</b>	High Pass Filter	4HC1600	Trilithic Inc.	9922307	n/a	n/a
<b>12</b>	Pre-Amplifier	JS4-00102600	Miteq	00616	May 2007	1 year
<b>13</b>	Power Sensor	URV5-Z2	Rohde & Schwarz	DE30807	May 2007	1 year
<b>14</b>	Digital Radio Comm. Tester	CMD-55	Rohde & Schwarz	847958/008	May 2007	1 year
<b>15</b>	Universal Radio Comm. Tester	CMU 200	Rohde & Schwarz	832221/06	May 2007	1 year
<b>16</b>	LISN	ESH3-Z5	Rohde & Schwarz	836679/003	May 2007	1 year
<b>17</b>	Loop Antenna	6512	EMCO	00049838	July 2007	2 years

## **7 References**

Title 47—Telecommunication, CHAPTER I--FEDERAL COMMUNICATIONS COMMISSION,  
PART 2--FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS October 1, 2001.

Title 47—Telecommunication, CHAPTER I--FEDERAL COMMUNICATIONS COMMISSION,  
PART 22 PUBLIC MOBILE SERVICES October 1, 1998.

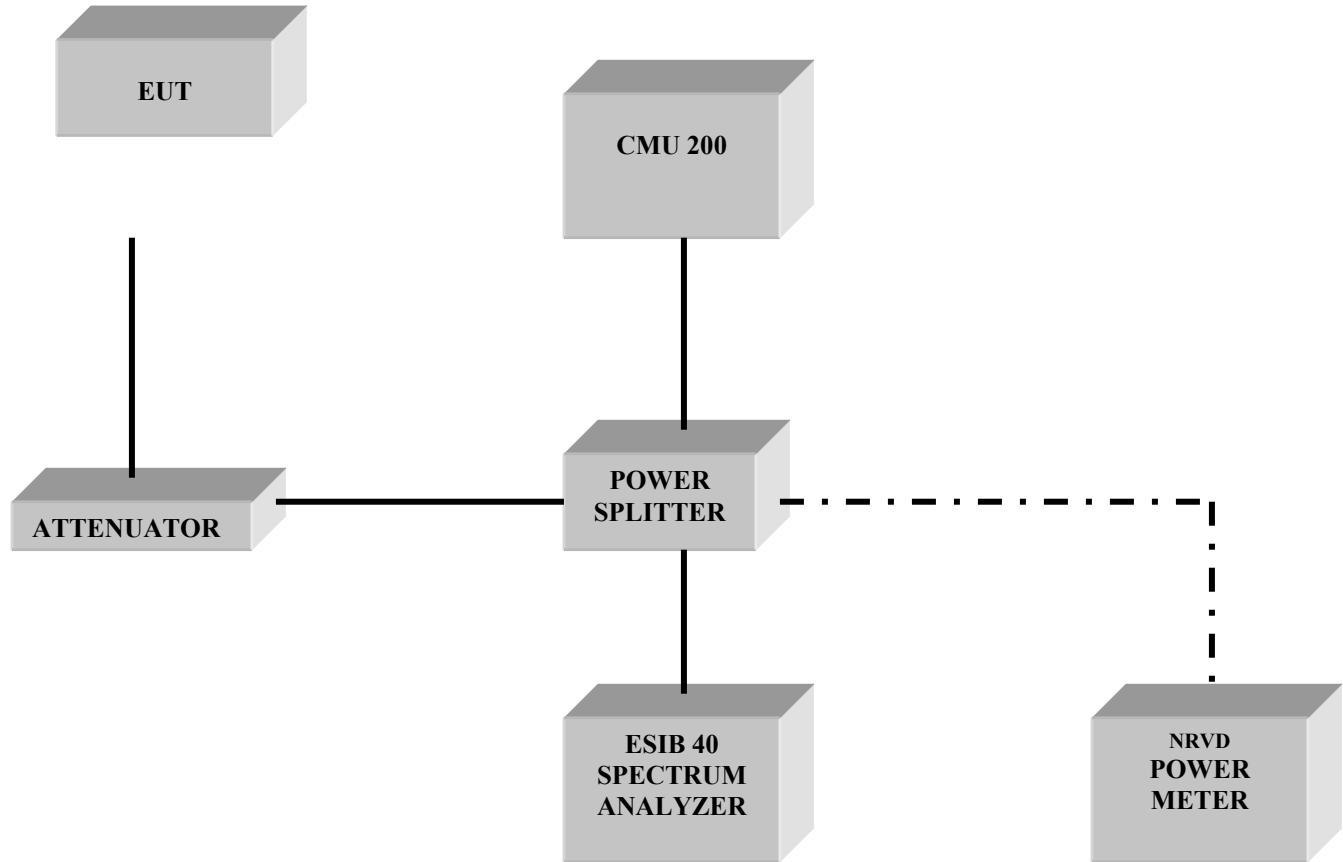
FCC Report and order 02-229 September 24, 2002.

Title 47—Telecommunication, CHAPTER I--FEDERAL COMMUNICATIONS COMMISSION,  
PART 24 PERSONAL COMMUNICATIONS SERVICES October 1, 1998.

ANSI / TIA-603-C-2004 Land Mobile FM or PM Communications Equipment Measurement and Performance Standard November 7, 2002.

## 8 BLOCK DIAGRAMS

Conducted Testing



**Radiated Testing****ANECHOIC CHAMBER**