



1)

# FCC Test Report

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

FOR:

Quad-Band GPRS/EGPRS PC Card

MODEL #: GC86

Sony Ericsson Mobile Communications Int. AB  
1 Lakeside Road, Aerospace Centre,  
Farnborough, Hants. GU14 6XP,  
UK

FCC ID: PY7FF051012  
IC ID: 4170B-FF051012

TEST REPORT #: SONYU-003-06001\_GC86\_FCC22-24  
DATE: 8/03/2006



FCC listed#  
101450  
IC recognized #  
3925

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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 #
Sony Ericsson Mobile Communications Int. AB	Quad-Band GPRS/EGPRS PC Card	GC 86

A handwritten signature in blue ink, appearing to read "Lothar Schmidt", written over a horizontal line.

2006-08-03

Lothar Schmidt

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>2006-07-31</b>

### 2.2 Identification of the Client

Applicant's Name:	<b>Sony Ericsson Mobile Communications Int. AB</b>
Street Address:	<b>1 Lakeside Road, Aerospace Centre,</b>
City/Zip Code	<b>Farnborough, Hants. GU14 6XP</b>
Country	<b>UK</b>
Contact Person:	<b>Billy Manning : Michael Bower</b>
Phone No.	<b>+1 919 389 1809 : +44 1252 551631</b>
Fax:	<b>--</b>
e-mail:	<b><a href="mailto:Billy.manning@sonyericsson.com">Billy.manning@sonyericsson.com</a> <a href="mailto:Michael.Bower@sonyericsson.com">Michael.Bower@sonyericsson.com</a></b>

### 2.3 Identification of the Manufacturer

Manufacturer's Name:	<b>Sony Ericsson Mobile Communications AB</b>
Manufacturers Address:	<b>Nya Vattentorget,</b>
City/Zip Code	<b>SE-221 88 Lund,</b>
Country	<b>Sweden</b>

### 3 Equipment under Test (EUT)

#### 3.1 Identification of the Equipment under Test

Marketing Name:	<b>GC 86</b>			
Description:	<b>Quad-Band GPRS/EGPRS PC Card</b>			
Model No:	<b>GC 86</b>			
FCC ID:	<b>PY7FF051012</b>			
IC ID:	<b>4170B- FF051012</b>			
Frequency Range:	<b>824.2MHz – 848.8MHz for GSM 850, 1850.2MHz – 1909.8MHz for PCS 1900</b>			
Type(s) of Modulation:	<b>GMSK, 8-PSK</b>			
Number of Channels:	<b>124 for GSM-850, 299 for PCS-1900</b>			
Antenna Type:	<b>INTERNAL and EXTERNAL</b>			
Max. Output Power:	<b>FCC 22: <u>ERP@848.8MHz</u></b>		<b>FCC 24 EIRP@1880MHz</b>	
	<b>GPRS</b>	<b>EGPRS</b>	<b>GPRS</b>	<b>EGPRS</b>
	<b>29.74dBm</b>	<b>25.25dBm</b>	<b>28.41dBm</b>	<b>27.99dBm</b>
	<b>942mW</b>	<b>325mW</b>	<b>647mW</b>	<b>630mW</b>

#### 3.2 Identification of Accessory equipment

<b>TYPE</b>	<b>MANF.</b>	<b>MODEL</b>	<b>FCC ID</b>
EXTERNAL ANTENNA	SEMC	KRE 101 1365	--
AC ADAPTER	CUI INC.	3A-161WP05	--
TEST BOARD	SONY ERICSSON	10-BA102346	--

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

All testing was performed on the GC 86 Quad-Band GPRS/EGPRS PC Card referred to as EUT. 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 quarter-wave monopole antenna used has a max. gain of 2.6dBi and plugs in directly (without 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.

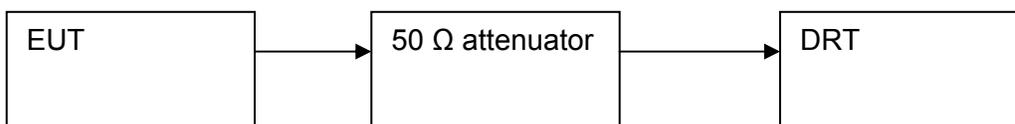
(b) Mobile/portable stations are limited to 2 Watts effective isotropic radiated power (EIRP).

(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	E-GPRS
824.2	32.5	29.3
836.6	32.9	29.9
848.8	32.8	29.8

Note: The Values are measured in peak mode with R&S CMU200

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

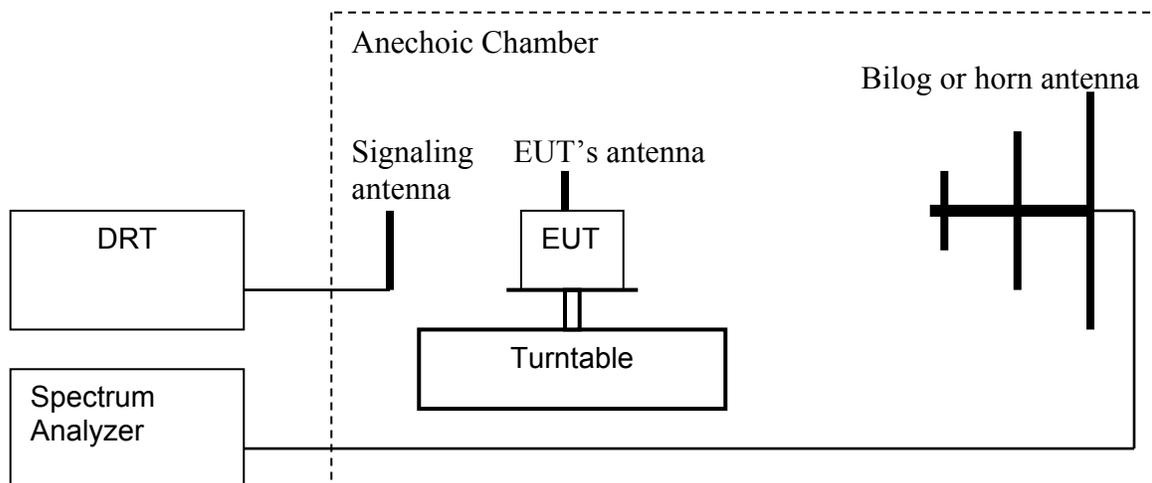
Frequency (MHz)	Conducted Output Power (dBm)	
	GPRS	E-GPRS
1850.2	29.0	28.5
1880.0	29.3	28.4
1909.8	29.3	28.0

Note: The Values are measured in peak mode with R&S CMU200

### 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:  

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

$$\mathbf{EIRP\ (dBm) = ERP\ (dBm) + 2.14\ (dB)}$$
  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.)

**5.1.6 ERP Results 850 MHz band:**

Power Control Level	Burst Peak ERP
5	≤38.45dBm (7W)

Frequency (MHz)	Effective Radiated Power (dBm)			
	Internal Antenna		External Antenna	
	GPRS	E-GPRS	GPRS	E-GPRS
824.2	25.67	22.28	26.46	24.48
836.6	27.52	23.25	28.49	25.02
848.8	29.54	24.32	29.74	25.15

**5.1.7 EIRP Results 1900 MHz band:**

Power Control Level	Burst Peak EIRP
0	≤33dBm (2W)

Frequency (MHz)	Effective Isotropic Radiated Power (dBm)			
	Internal Antenna		External Antenna	
	GPRS	E-GPRS	GPRS	E-GPRS
1850.2	27.82	25.58	28.32	27.82
1880.0	28.04	26.09	28.41	27.99
1909.8	27.28	25.61	28.11	27.24

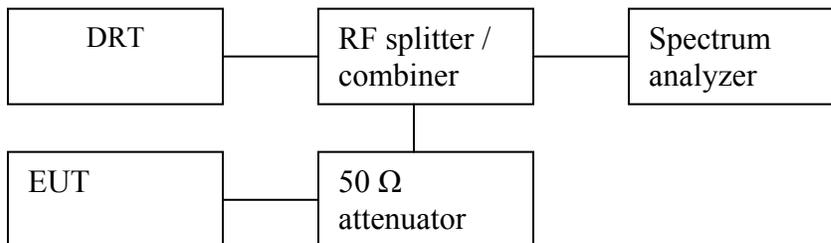
## 5.2 Occupied Bandwidth/Emission Bandwidth

### 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:



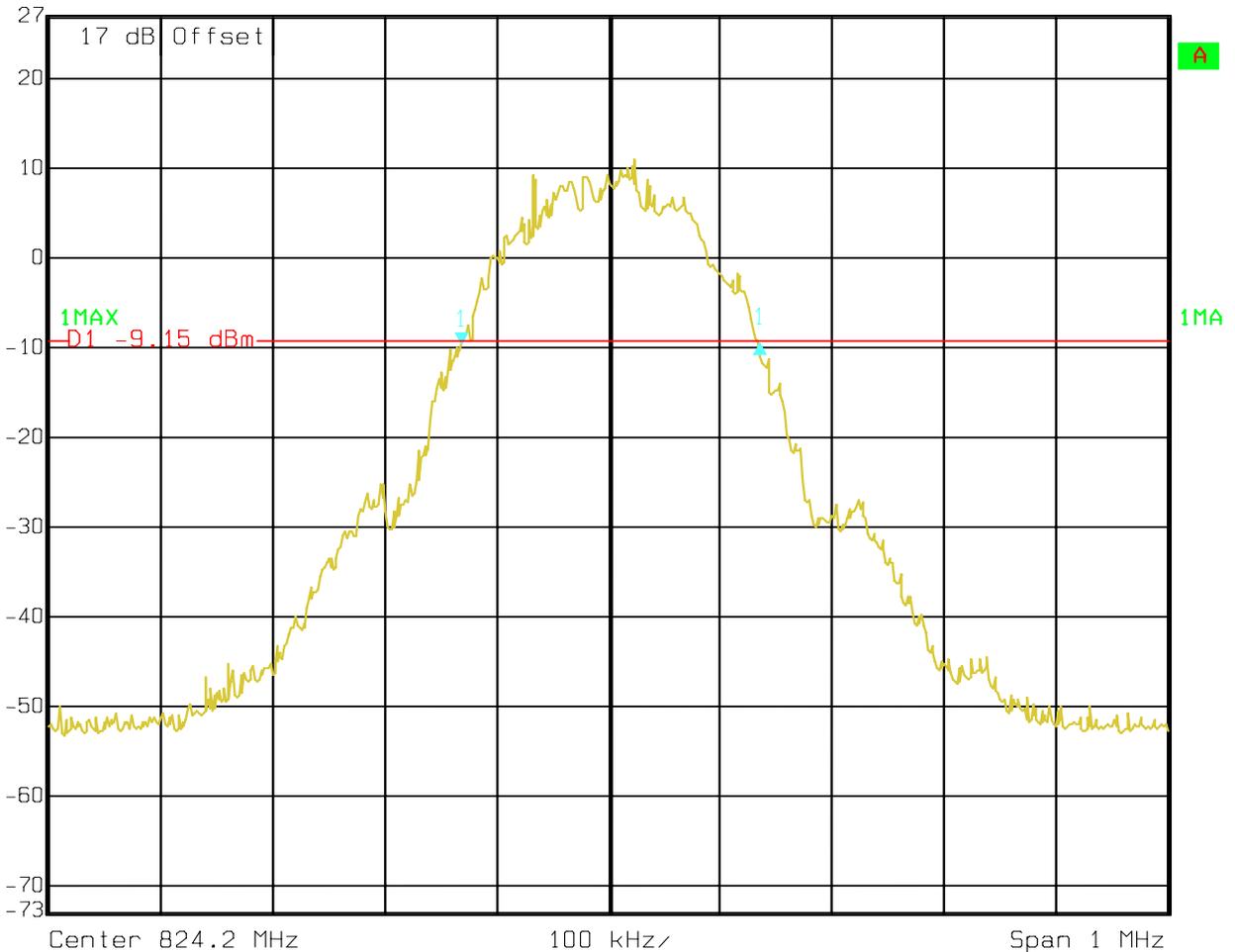
1. Connect the equipment as shown in the above diagram.
2. Adjust the settings of the Digital Radiocommunication Tester (DRT) to set the EUT to its maximum power at the required channel.
3. Set the spectrum analyzer to measure the 99% (-20 dB) occupied bandwidth. Record the value.
4. Set the spectrum 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
824.2	266.5	286.6	310.6
836.6	268.5	278.6	316.6
848.8	270.5	282.6	312.6

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

Delta 1 [T1]
RBW 3 kHz
RF Att 40 dB  
Ref Lvl 27 dBm
0.17 dB
VBW 3 kHz  
266.53306613 kHz
SWT 280 ms
Unit dBm



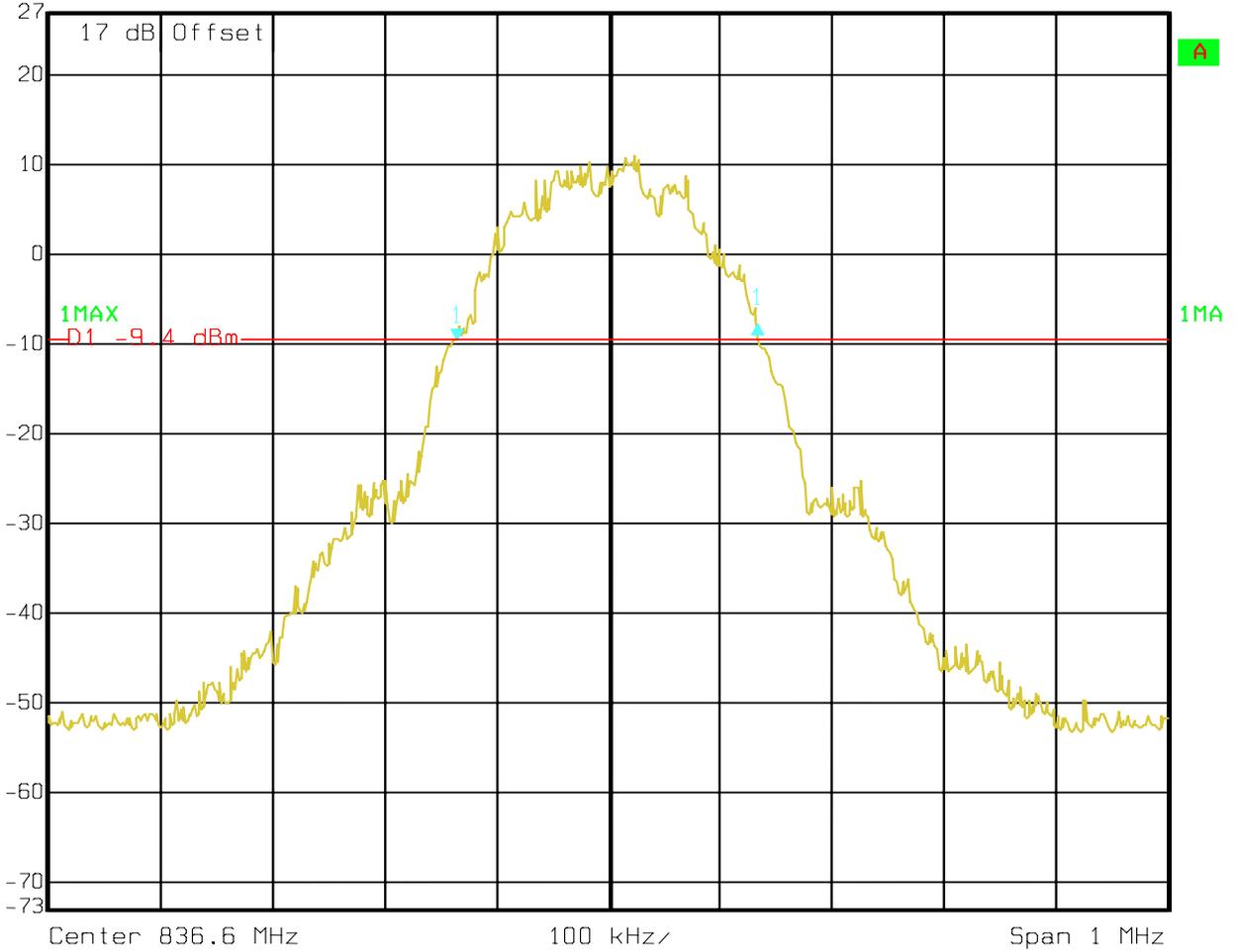
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**-20dB (GSM-850) GPRS  
CHANNEL 190**



Ref Lvl	Delta 1 [T1]	RBW	3 kHz	RF Att	40 dB
27 dBm	2.17 dB	VBW	3 kHz	Unit	dBm
	268.53707415 kHz	SWT	280 ms		



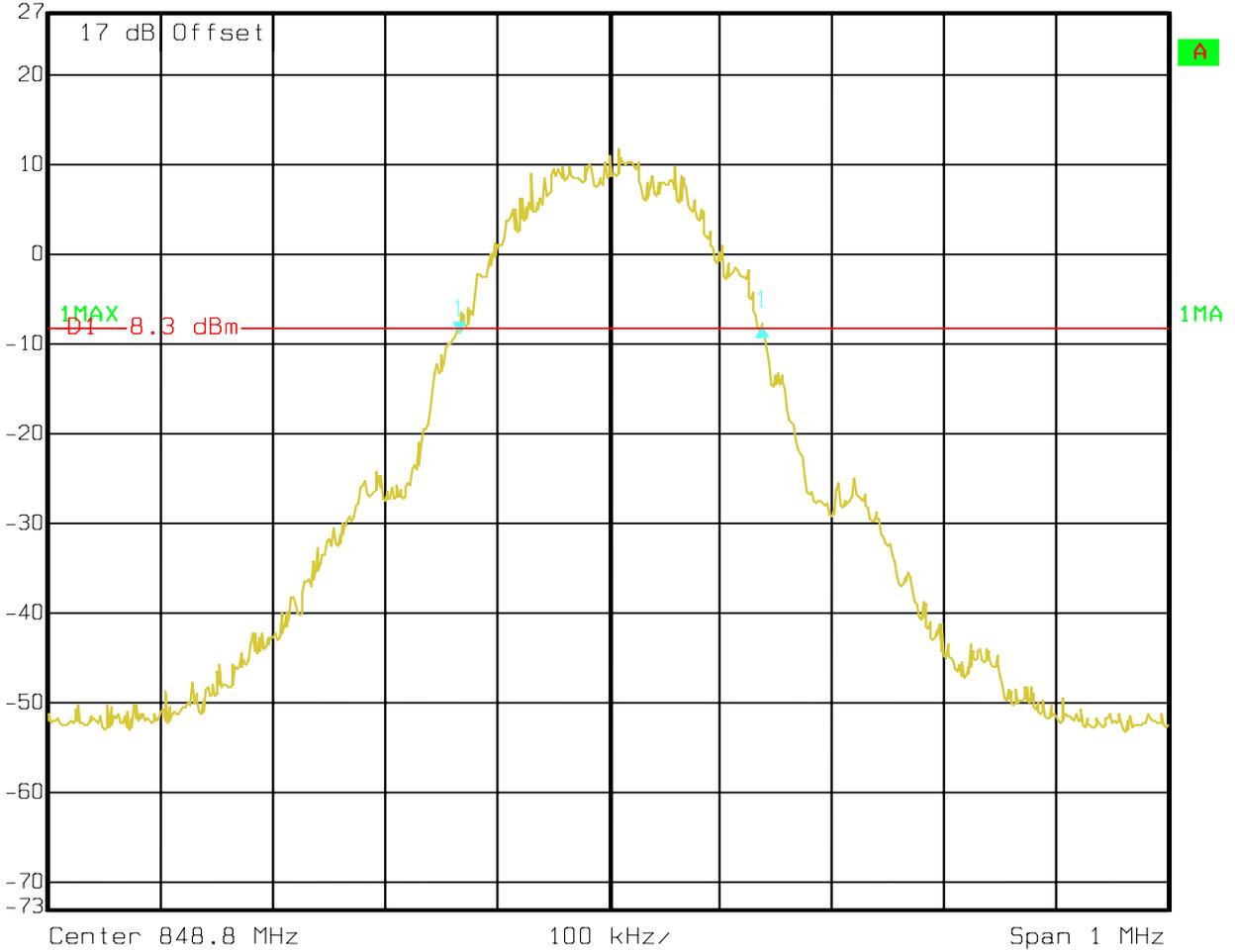
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**-20dB (GSM-850) GPRS  
CHANNEL 251**



Ref Lvl	Delta 1 [T1]	RBW	3 kHz	RF Att	40 dB
27 dBm	1.09 dB	VBW	3 kHz	Unit	dBm
	270.54108216 kHz	SWT	280 ms		



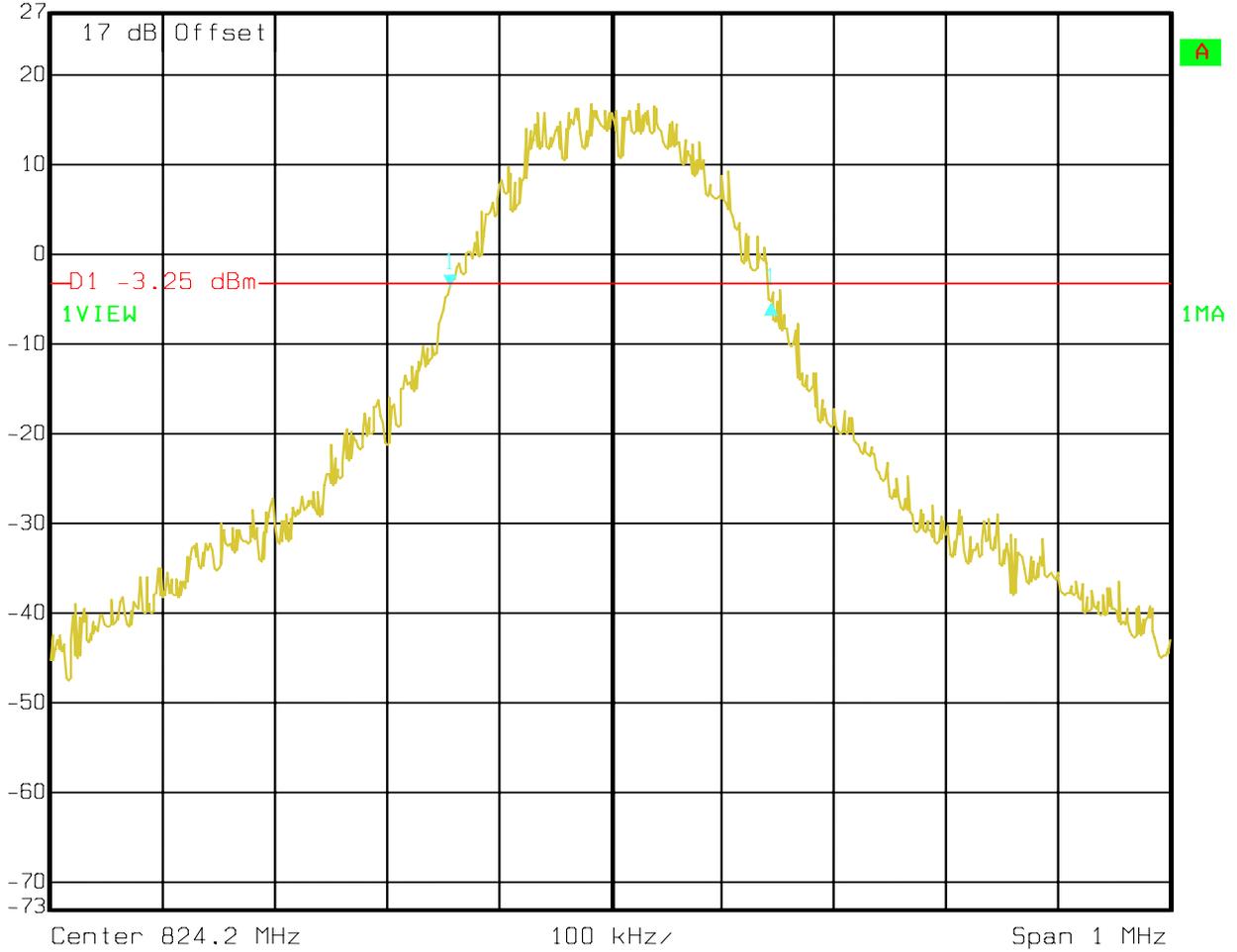
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**-20dB (GSM-850) E-GPRS  
CHANNEL 128**



Ref Lvl	Delta 1 [T1]	RBW	3 kHz	RF Att	20 dB
27 dBm	-1.71 dB	VBW	3 kHz	Unit	dBm
	286.57314629 kHz	SWT	280 ms		



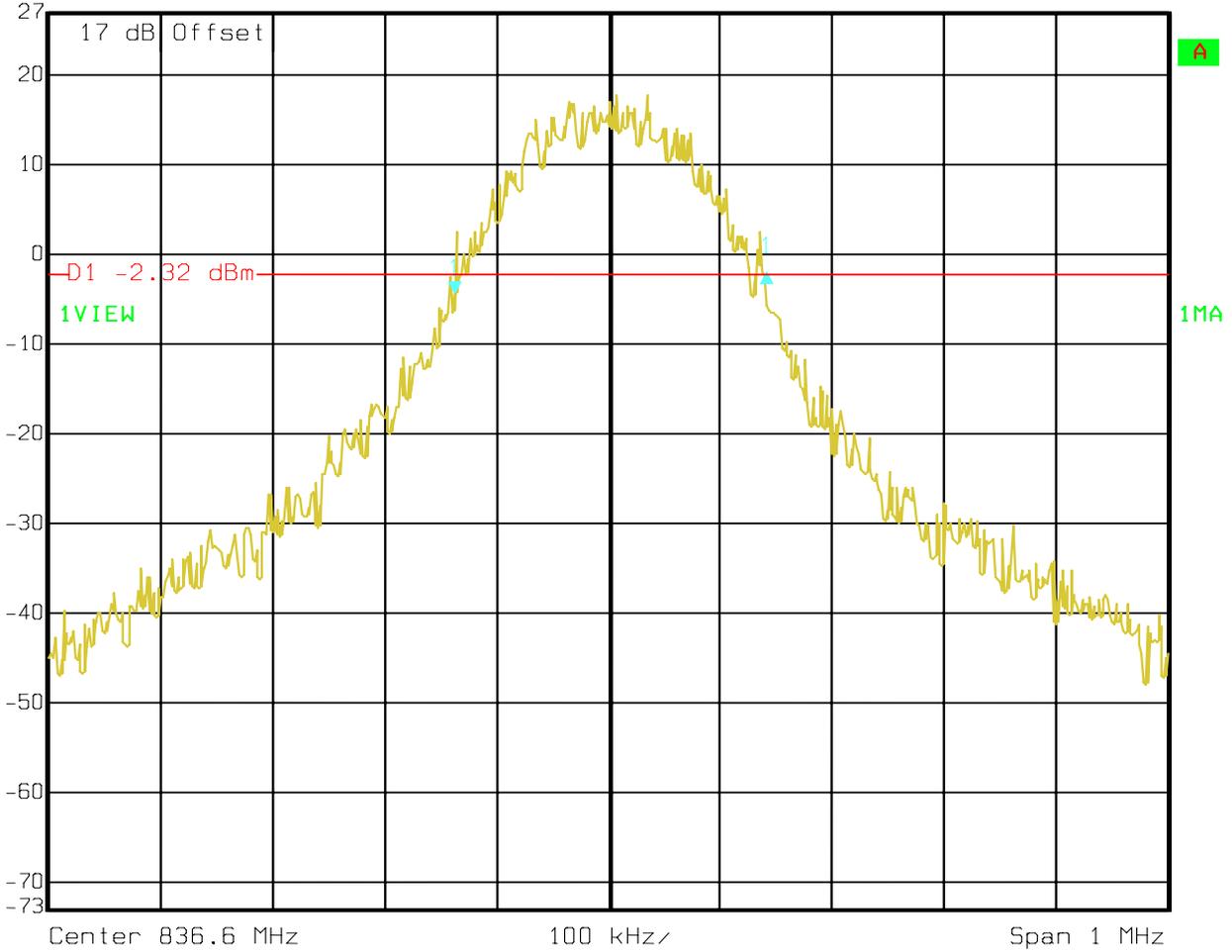
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**-20dB (GSM-850) E-GPRS  
CHANNEL 190**



Ref Lvl	Delta 1 [T1]	RBW	3 kHz	RF Att	20 dB
27 dBm	2.44 dB	VBW	3 kHz	Unit	dBm
	278.55711423 kHz	SWT	280 ms		

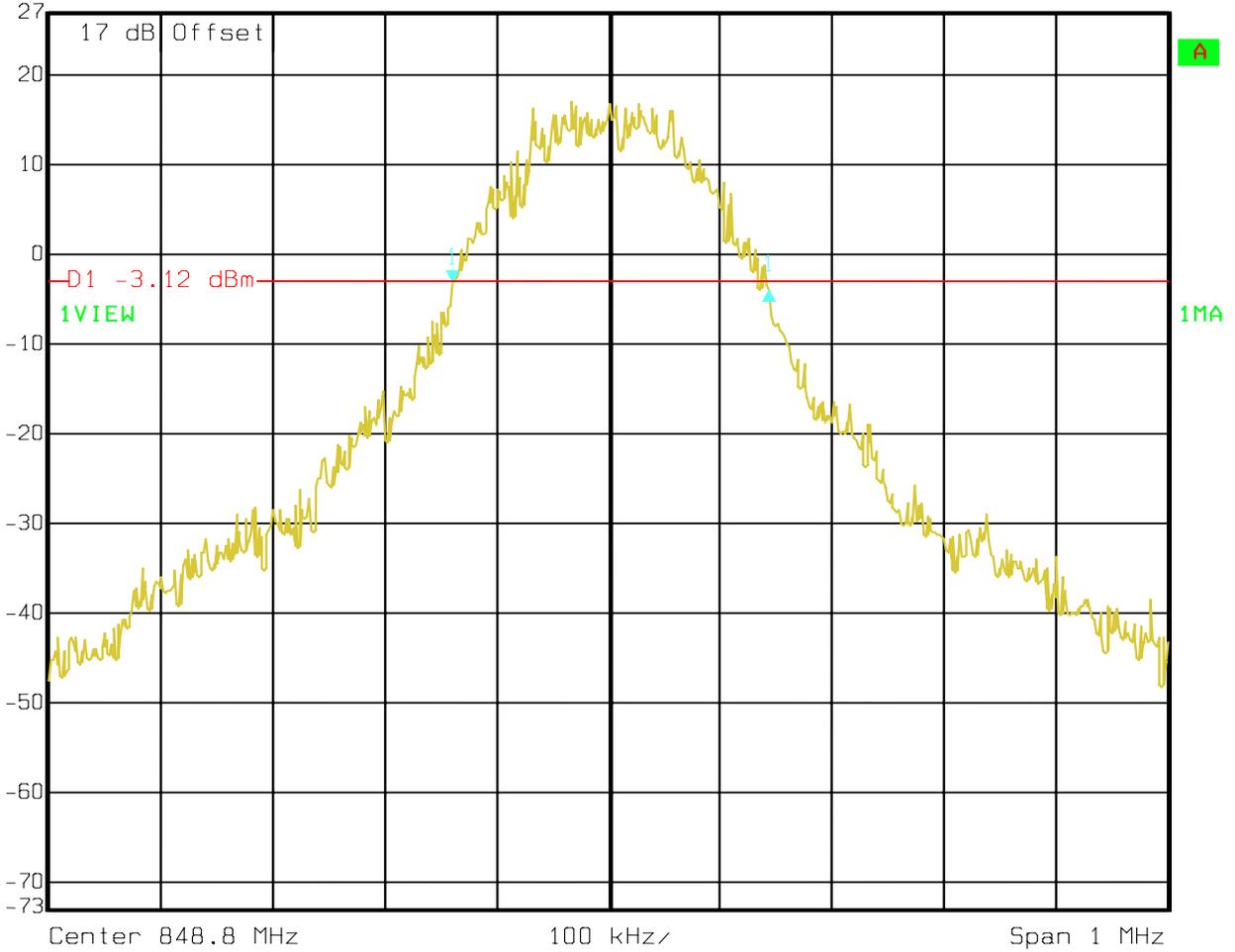


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**-20dB (GSM-850) E-GPRS  
CHANNEL 251**



Ref Lvl	Delta 1 [T1]	RBW	3 kHz	RF Att	20 dB
27 dBm	-0.85 dB	VBW	3 kHz	Unit	dBm
	282.56513026 kHz	SWT	280 ms		



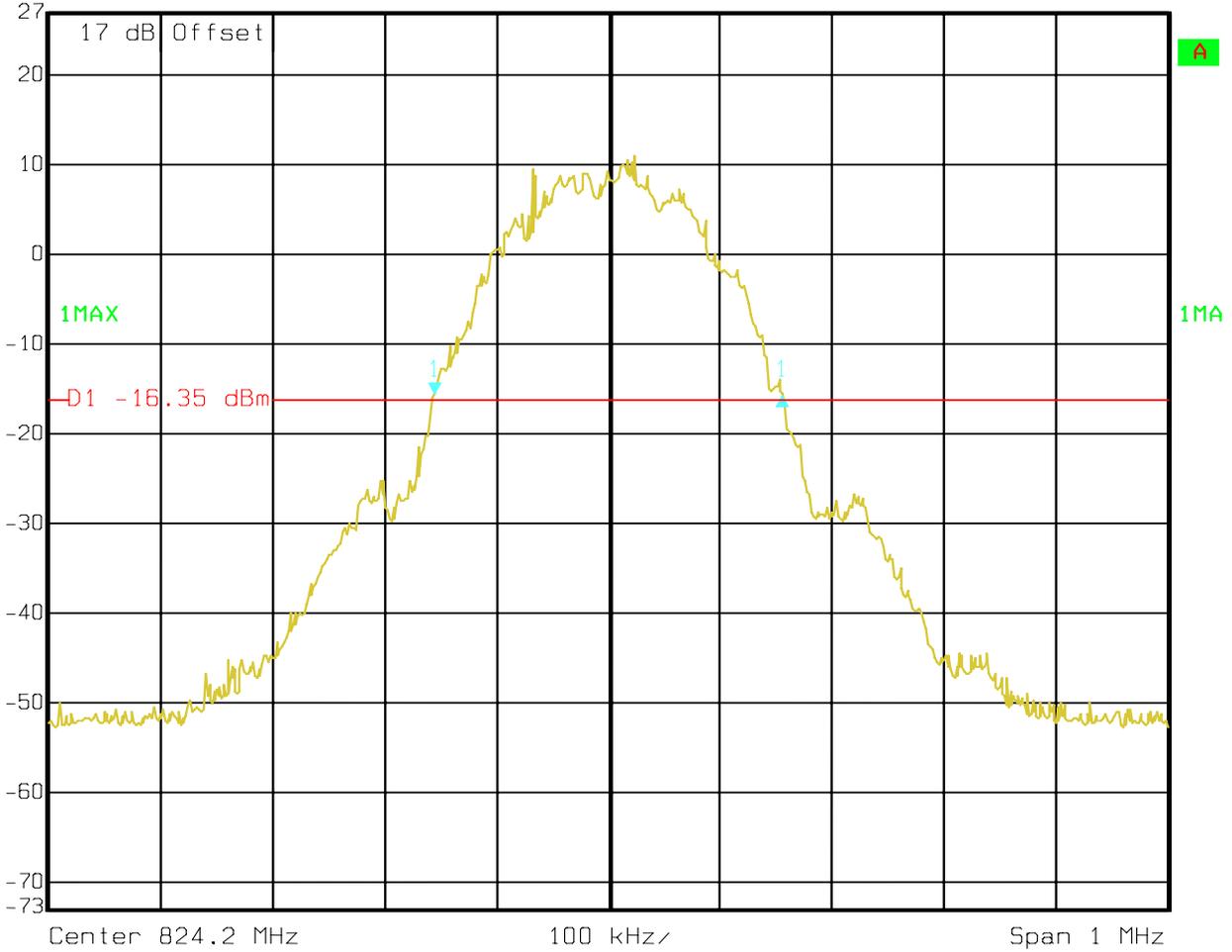
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**-26dB (GSM-850) GPRS  
CHANNEL 128**



Ref Lvl	Delta 1 [T1]	RBW	3 kHz	RF Att	40 dB
27 dBm	0.16 dB	VBW	3 kHz	Unit	dBm
	310.62124248 kHz	SWT	280 ms		



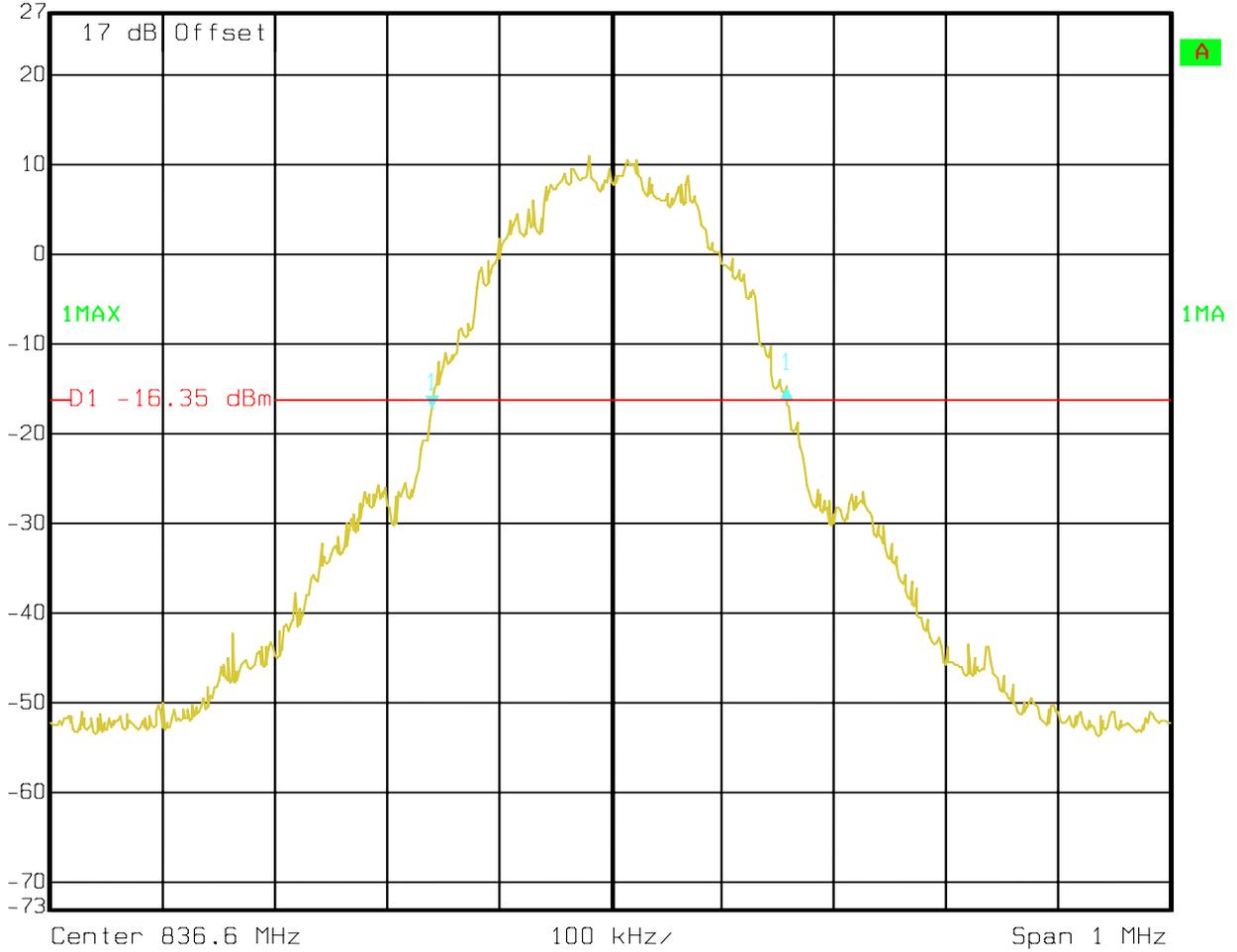
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**-26dB (GSM-850) GPRS  
CHANNEL 190**



Ref Lvl	Delta 1 [T1]	RBW	3 kHz	RF Att	40 dB
27 dBm	2.26 dB	VBW	3 kHz	Unit	dBm
	316.63326653 kHz	SWT	280 ms		



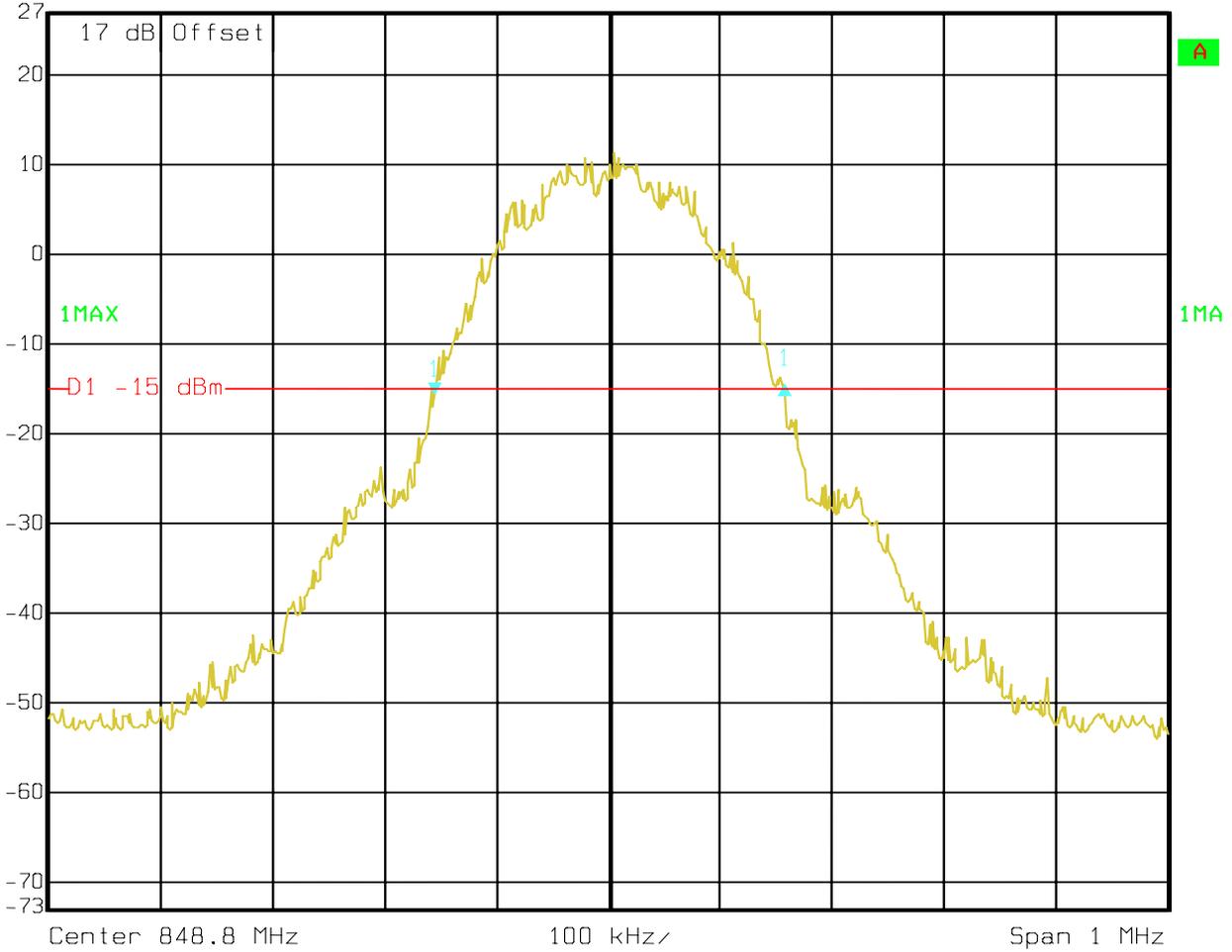
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**-26dB (GSM-850) GPRS  
CHANNEL 251**



Ref Lvl	Delta 1 [T1]	RBW	3 kHz	RF Att	40 dB
27 dBm	1.43 dB	VBW	3 kHz	Unit	dBm
	312.62525050 kHz	SWT	280 ms		



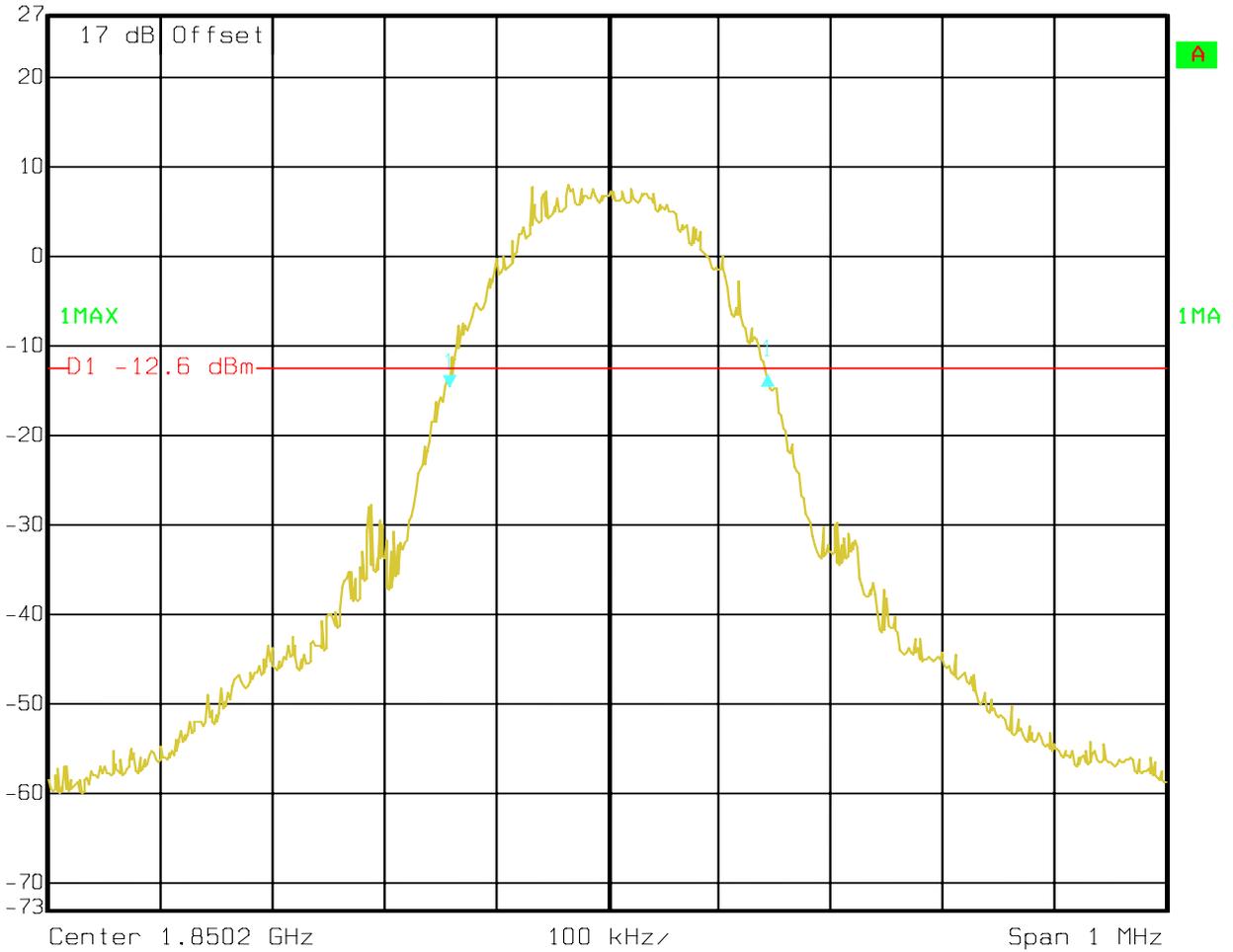
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**5.2.4 Occupied / Emission bandwidth results 1900 MHz band:**

Frequency (MHz)	Occupied B/W -20 dB (KHz)		Emission B/W -26 dB (KHz)
	GPRS	E-GPRS	GPRS
1850.2	284.6	280.6	314.6
1880.0	282.6	282.6	312.6
1909.8	280.6	280.6	308.6

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

Delta 1 [T1]
RBW 3 kHz
RF Att 20 dB  
Ref Lvl 27 dBm
1.27 dB
VBW 3 kHz
Unit dBm  
27 dBm
284.56913828 kHz
SWT 280 ms



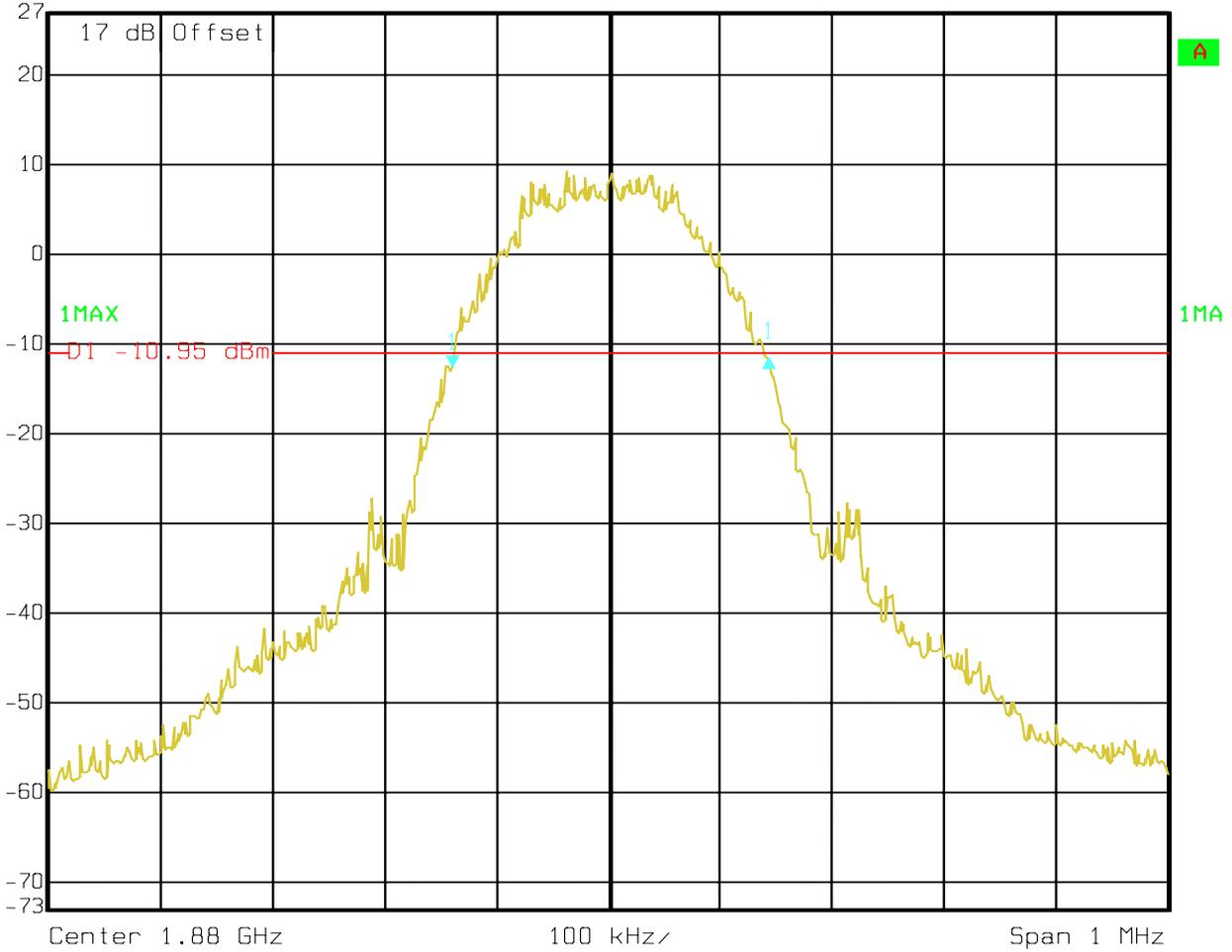
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**-20dB (PCS-1900) GPRS  
CHANNEL 661**



Ref Lvl	Delta 1 [T1]	RBW	3 kHz	RF Att	20 dB
27 dBm	1.11 dB	VBW	3 kHz	Unit	dBm
	282.56513026 kHz	SWT	280 ms		



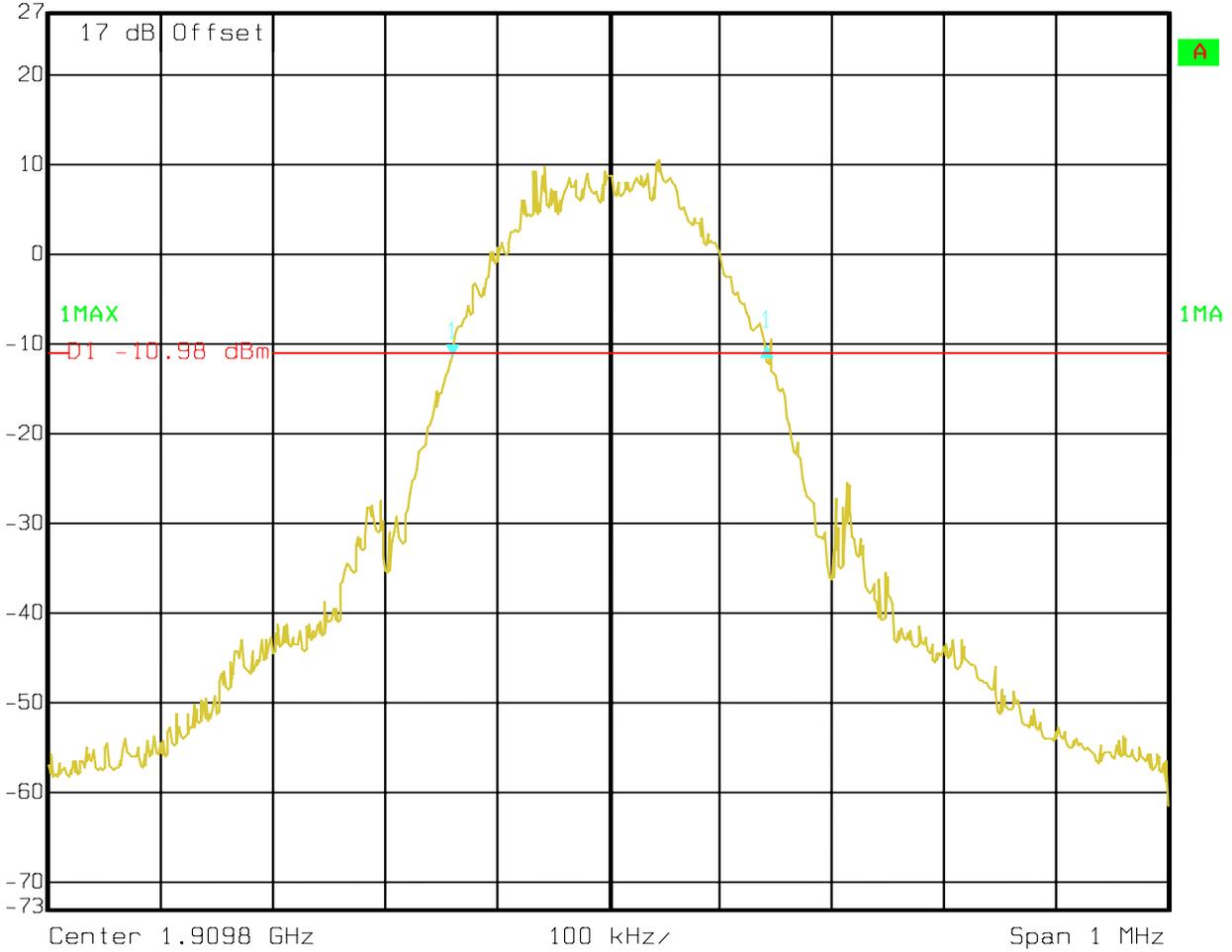
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**-20dB (PCS-1900) GPRS  
CHANNEL 810**



Ref Lvl	Delta 1 [T1]	RBW	3 kHz	RF Att	20 dB
27 dBm	1.11 dB	VBW	3 kHz	Unit	dBm
	280.56112224 kHz	SWT	280 ms		

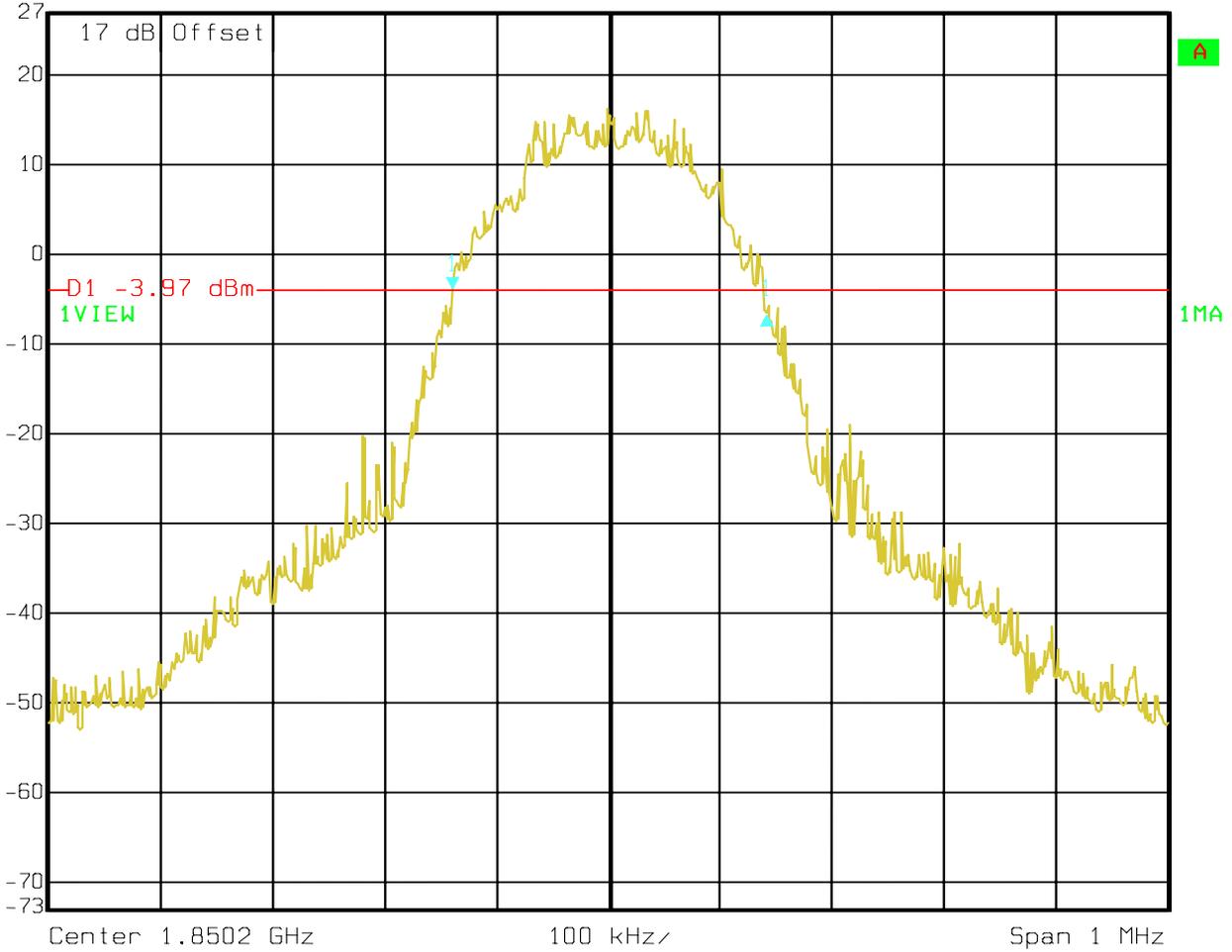


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**-20dB (PCS-1900) E-GPRS  
CHANNEL 512**



Ref Lvl	Delta 1 [T1]	RBW	3 kHz	RF Att	20 dB
27 dBm	-2.95 dB	VBW	3 kHz	Unit	dBm
	280.56112224 kHz	SWT	280 ms		



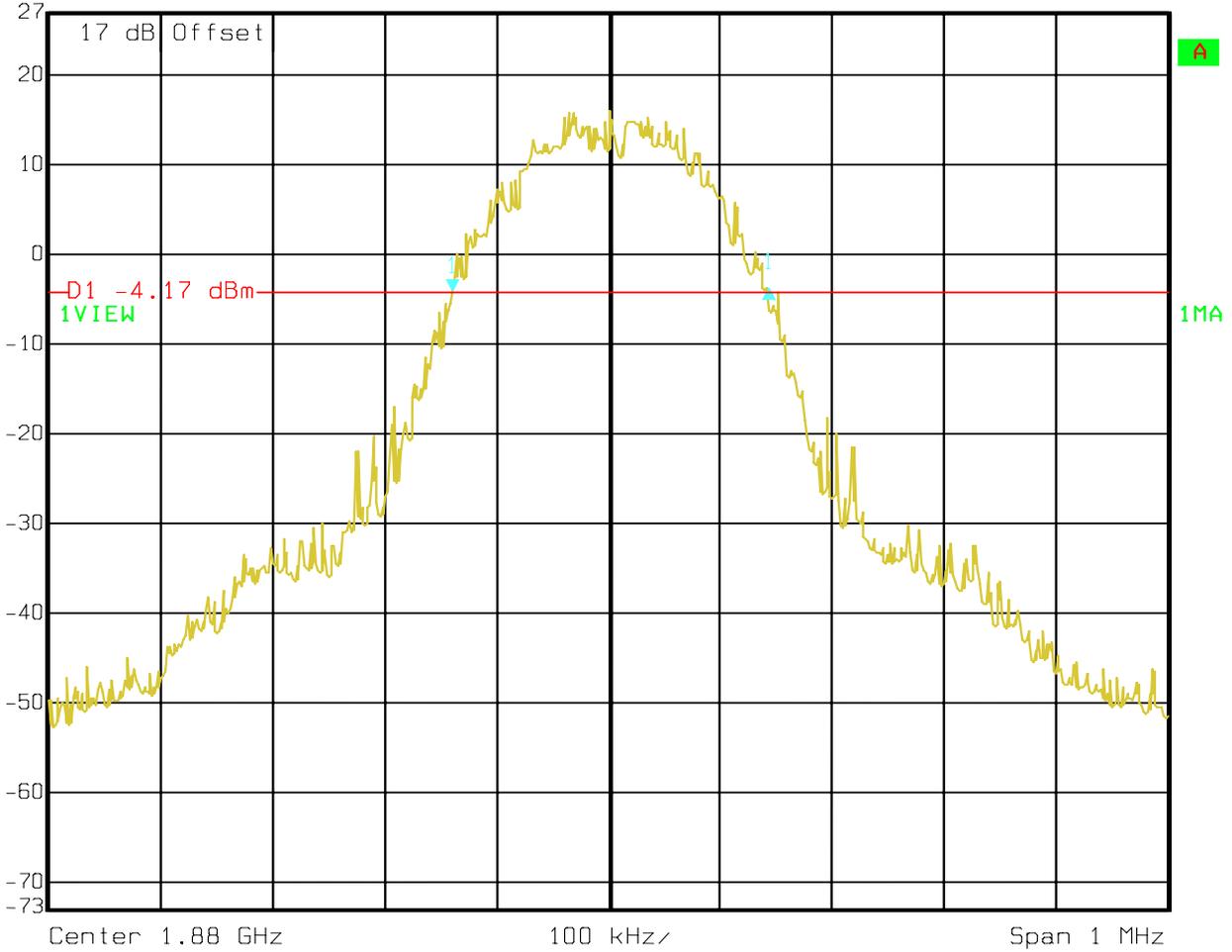
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**-20dB (PCS-1900) E-GPRS  
CHANNEL 661**



Ref Lvl	Delta 1 [T1]	RBW	3 kHz	RF Att	20 dB
27 dBm	0.50 dB	VBW	3 kHz	Unit	dBm
	282.56513026 kHz	SWT	280 ms		



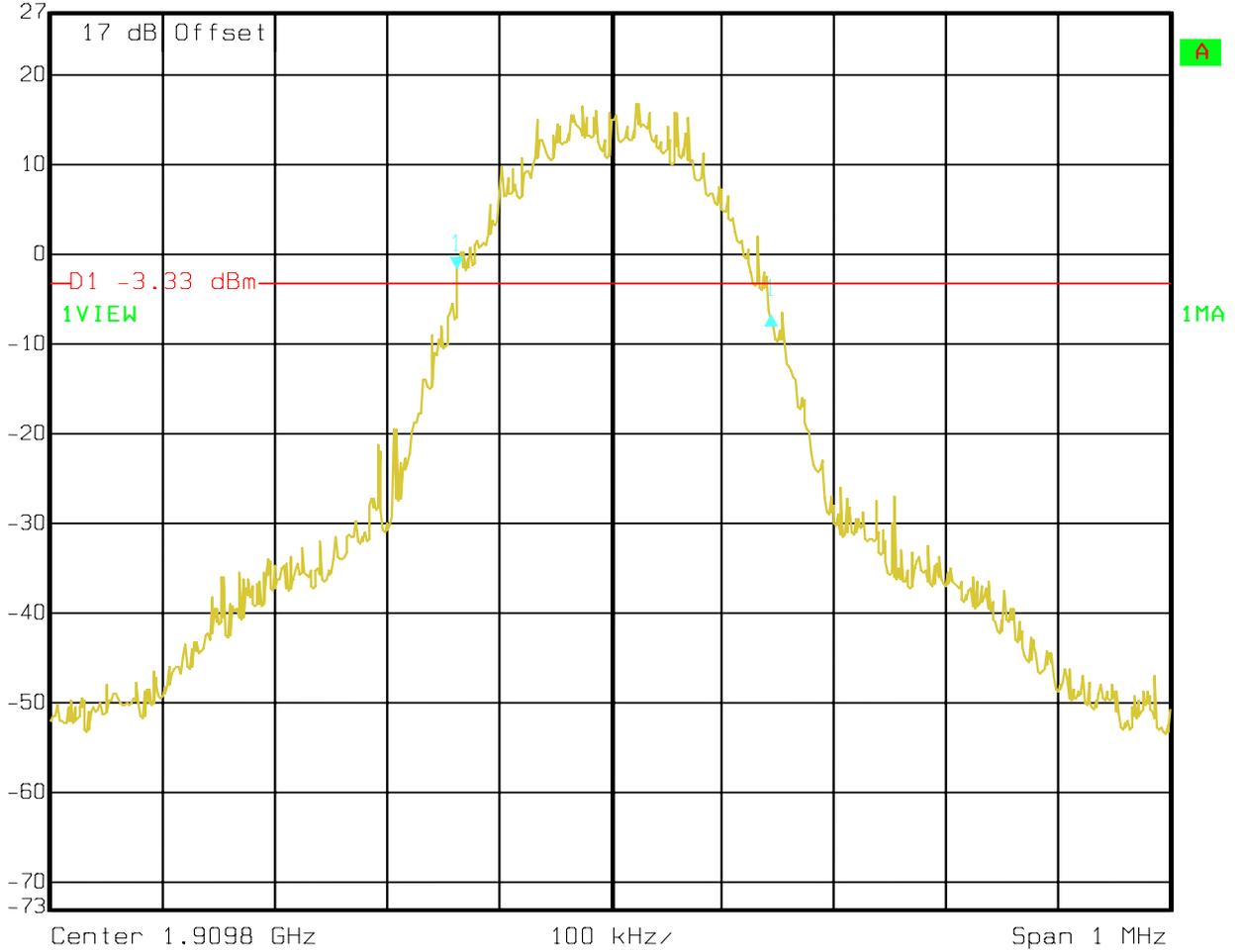
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**-20dB (PCS-1900) E-GPRS  
CHANNEL 810**



Delta 1 [T1] RBW 3 kHz RF Att 20 dB  
Ref Lvl -4.87 dB VBW 3 kHz  
27 dBm 280.56112224 kHz SWT 280 ms Unit dBm



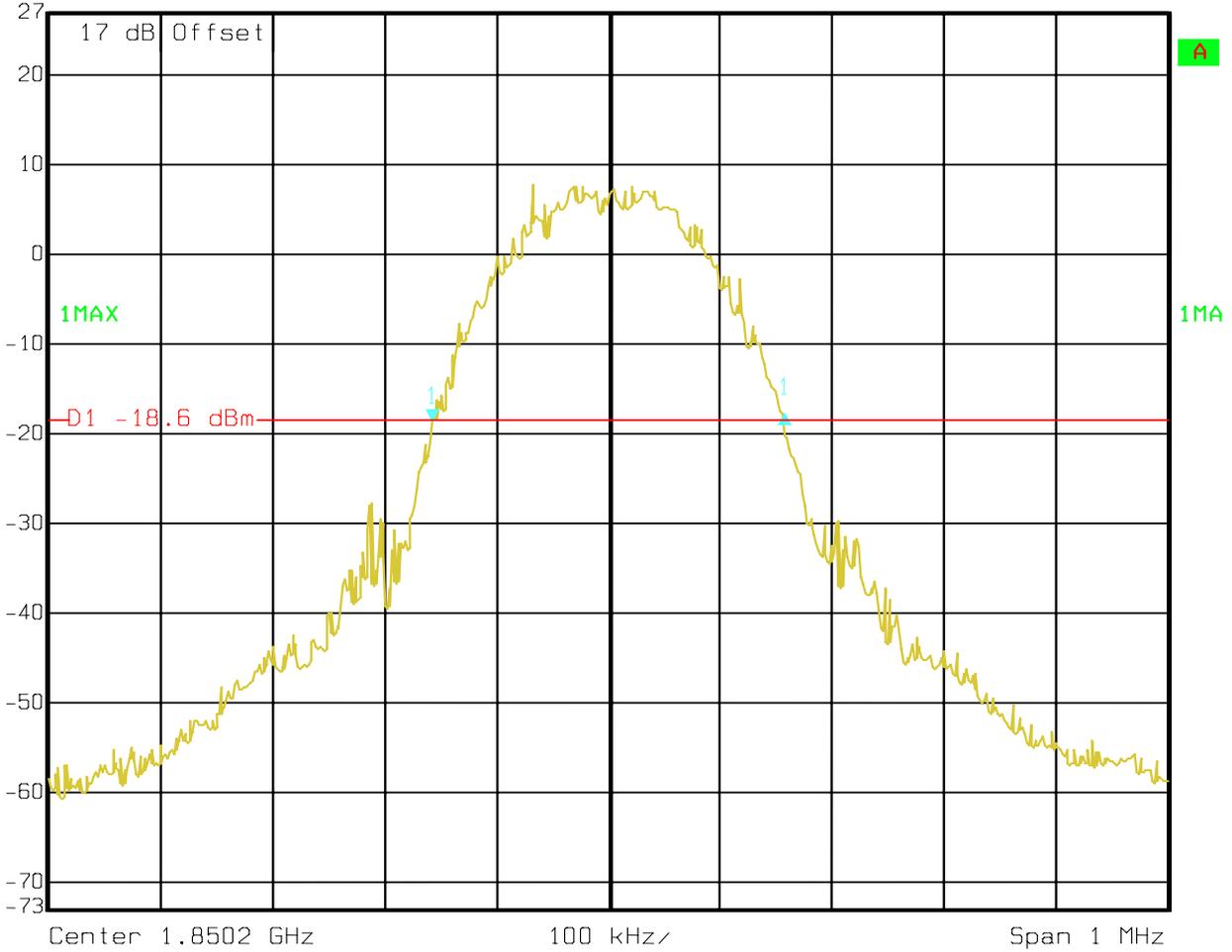
Date: 04.AUG.2006 14:27:14



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



Ref Lvl	Delta 1 [T1]	RBW	3 kHz	RF Att	20 dB
27 dBm	1.05 dB	VBW	3 kHz	Unit	dBm
	314.62925852 kHz	SWT	280 ms		



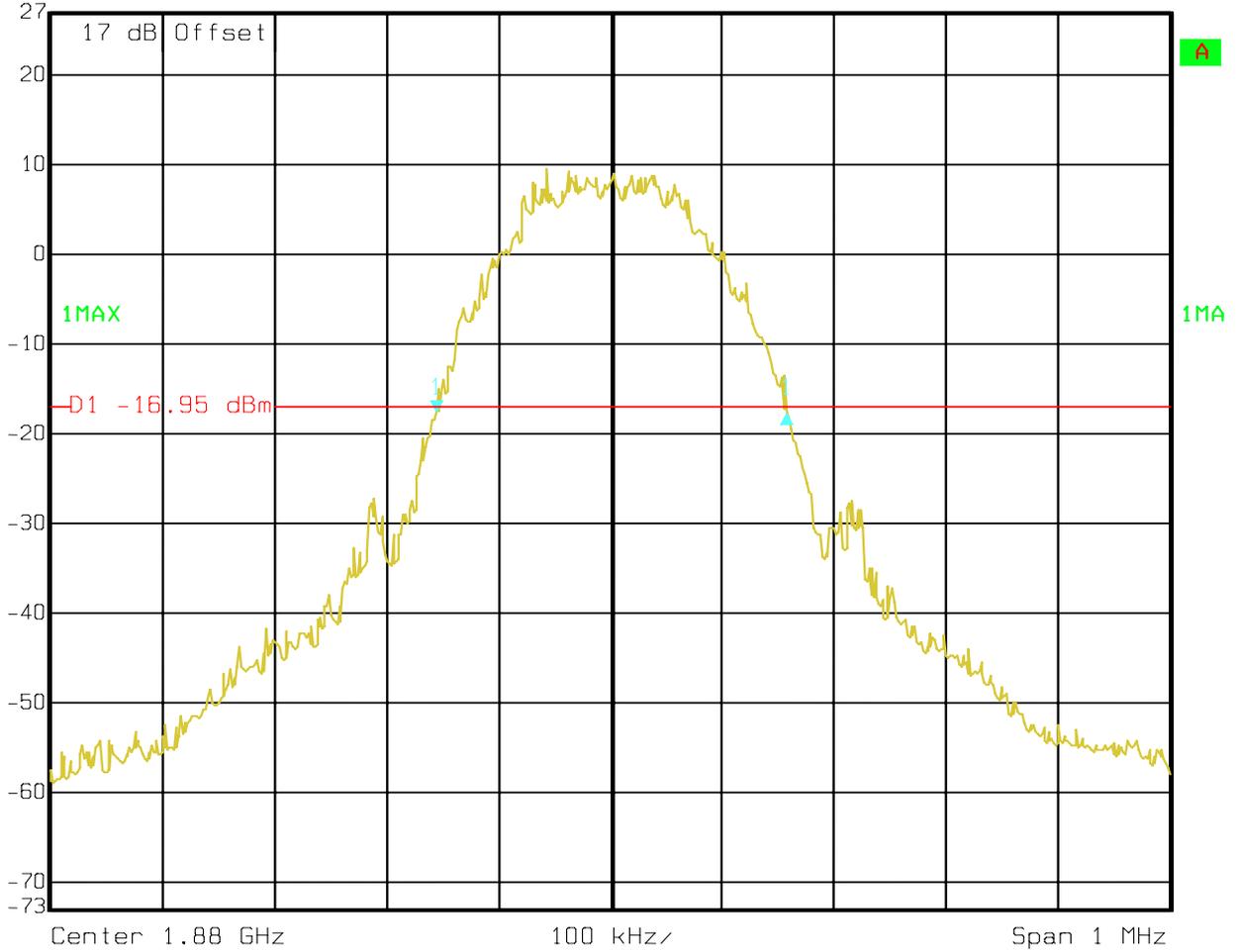
Date: 31.JUL.2006 15:46:27



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



Ref Lvl	Delta 1 [T1]	RBW	3 kHz	RF Att	20 dB
27 dBm	-0.04 dB	VBW	3 kHz	Unit	dBm
	312.62525050 kHz	SWT	280 ms		



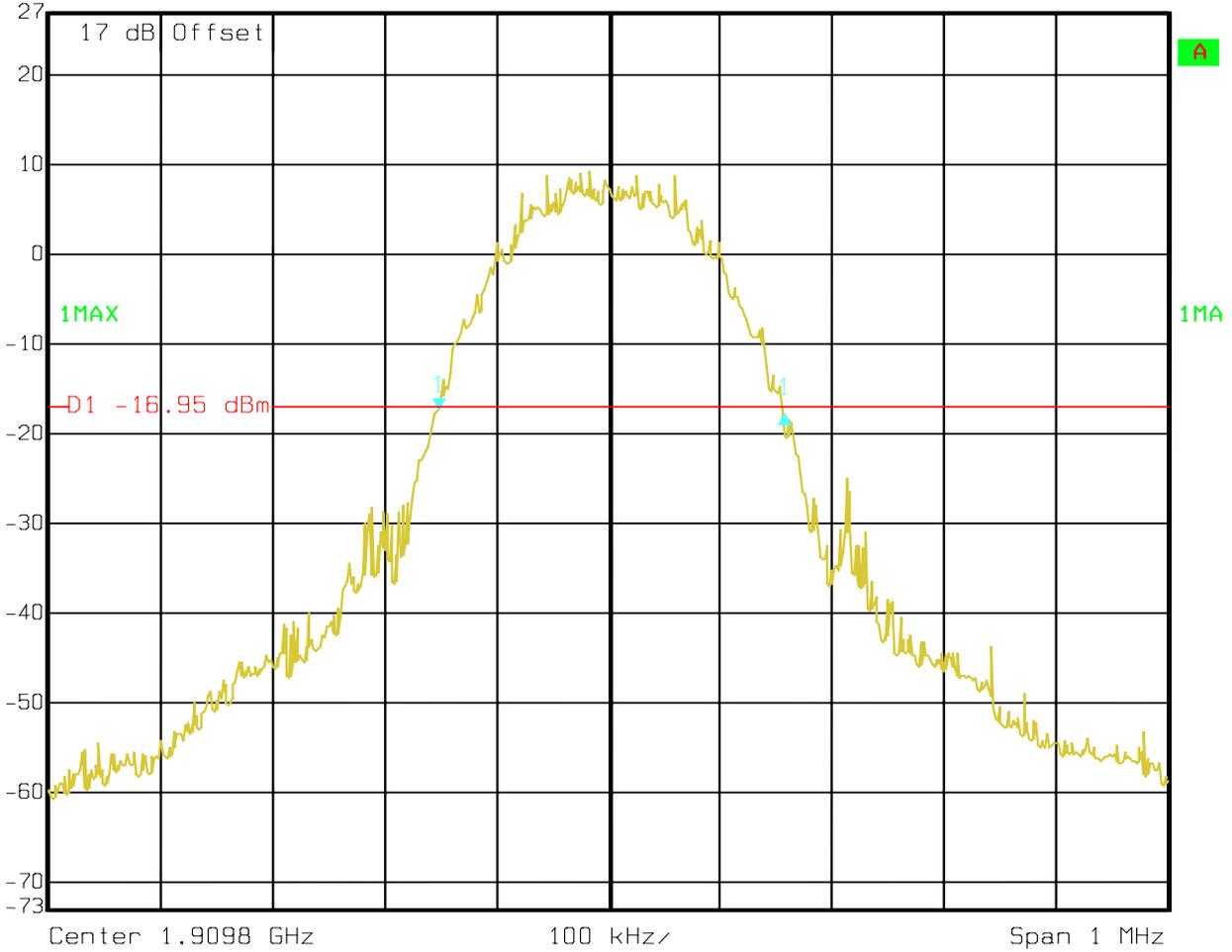
Date: 31.JUL.2006 15:41:57



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



Ref Lvl	Delta 1 [T1]	RBW	3 kHz	RF Att	20 dB
27 dBm	-0.21 dB	VBW	3 kHz	Unit	dBm
	308.61723447 kHz	SWT	280 ms		



Date: 31.JUL.2006 15:43:52

## 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.

#### **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.

#### **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 & 661 for PCS-1900), 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 & 661 for PCS-1900), 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.

### 5.3.2 FREQUENCY STABILITY : Test Results

The following Frequency Stability Tests have been conducted in the SONY Ericsson Communications Test Lab with the Equipment :

Instrument	Manufacturer	Model	Serial Number	Calibration Due Data
Radio Communication Tester	Rohde and Schwarz	CMU200	107735	3/25/2007
Temperature Chamber	ESPEC	SH-241	92002873	3/21/2007

Since this device is a dc powered PC Card, voltage variations are not required as per FCC §24.135 (b).

#### 5.3.2.1 FREQUENCY STABILITY (GSM-850)

##### AFC FREQ ERROR vs. TEMPERATURE

TEMPERATURE (°C)	Uplink Freq. (MHz)	Frequency Error (Hz)	Frequency Error (ppm)
-10	824.2	-29.25	-0.03496
	836.6	-23.70	-0.02833
	848.8	-29.57	-0.03535
+55	824.2	-30.41	-0.03635
	836.6	-29.57	-0.03535
	848.8	-31.64	-0.03782

#### 5.3.2.2 FREQUENCY STABILITY (PCS-1900)

##### AFC FREQ ERROR vs. TEMPERATURE

TEMPERATURE (°C)	Uplink Freq. (MHz)	Frequency Error (Hz)	Frequency Error (ppm)
-10	1850.2	-39.13	-0.02081
	1880.0	-46.62	-0.0248
	1909.8	-32.74	-0.01741
+55	1850.2	-37.58	-0.01999
	1880.0	-33.19	-0.01765
	1909.8	-32.09	-0.01707

## 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.

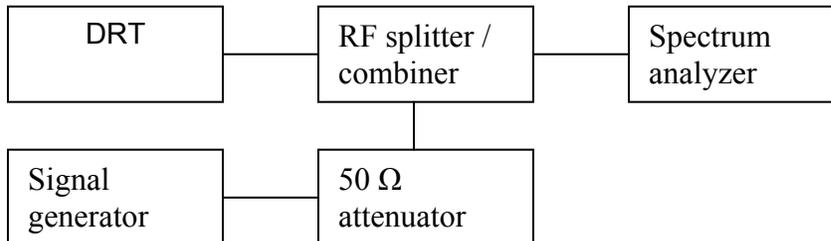
(b) *Measurement procedure.* Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of 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**



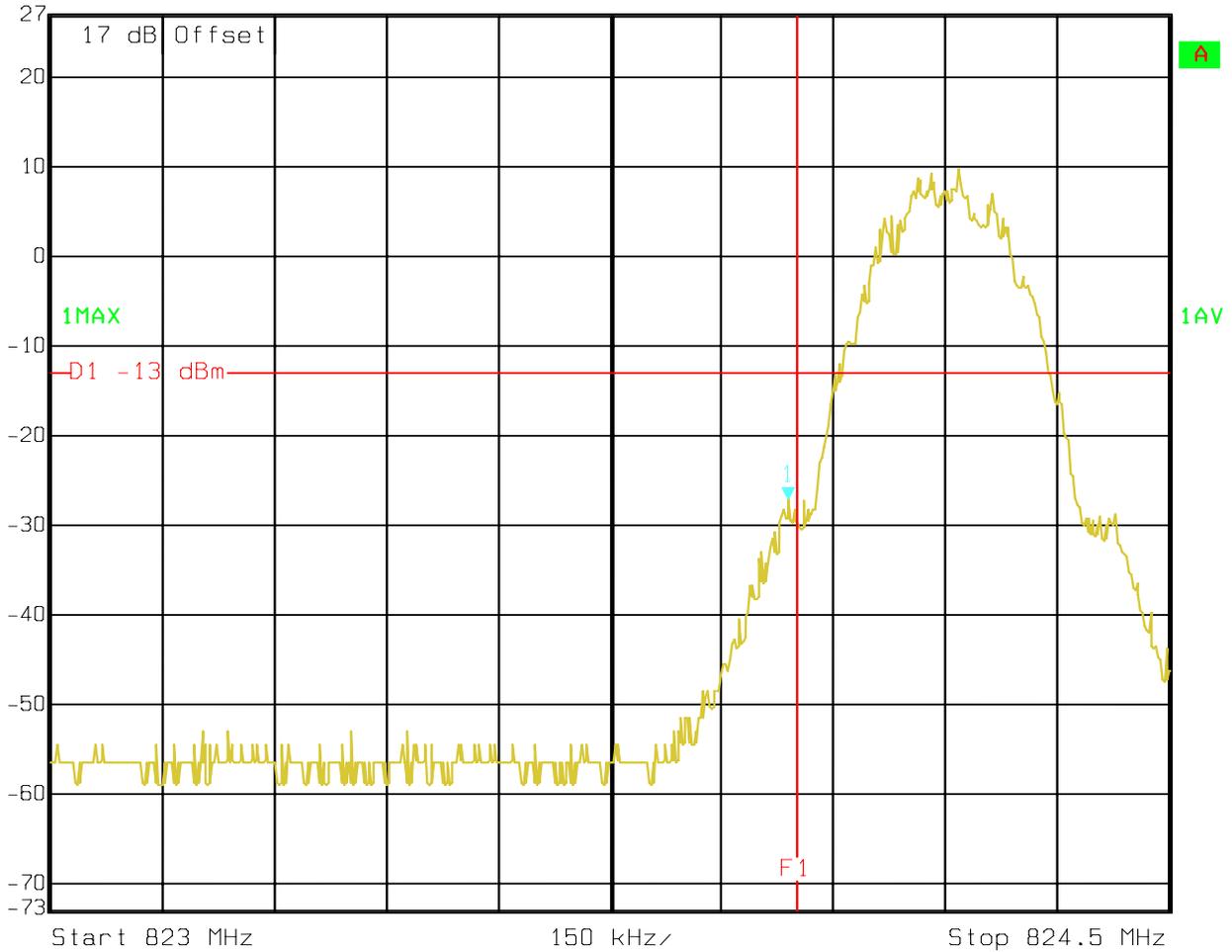
1. Connect the equipment as shown in the above diagram.
2. Set the spectrum analyzer to measure peak hold with the required settings.
3. Set the signal generator to a known output power and record the path loss in dB (**LOSS**) for frequencies up to the tenth harmonic of the EUT's carrier frequency. **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 Bandedge Results GSM-850

#### GSM-850 (Channel 128)

 Ref Lvl 27 dBm      Marker 1 [T1] 823.98897796 MHz      RBW 5 kHz      RF Att 40 dB  
-27.20 dBm      VBW 5 kHz      Unit dBm  
SWT 150 ms



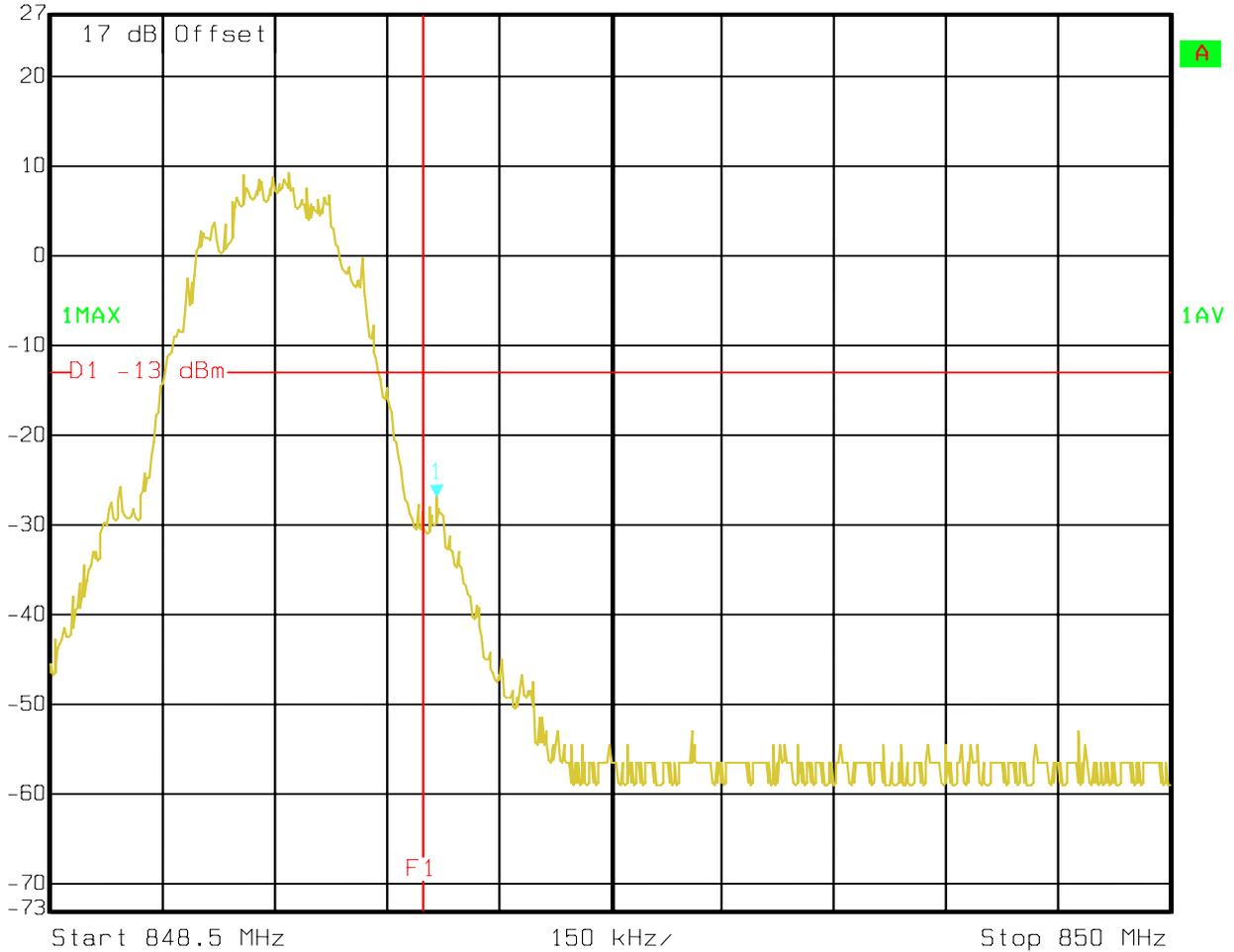
Date: 31.JUL.2006 12:29:11



### GSM-850 (Channel 251)



Ref Lvl 27 dBm  
Marker 1 [T1] 849.01703407 MHz  
RBW 5 kHz  
RF Att 40 dB  
VBW 5 kHz  
SWT 150 ms  
Unit dBm

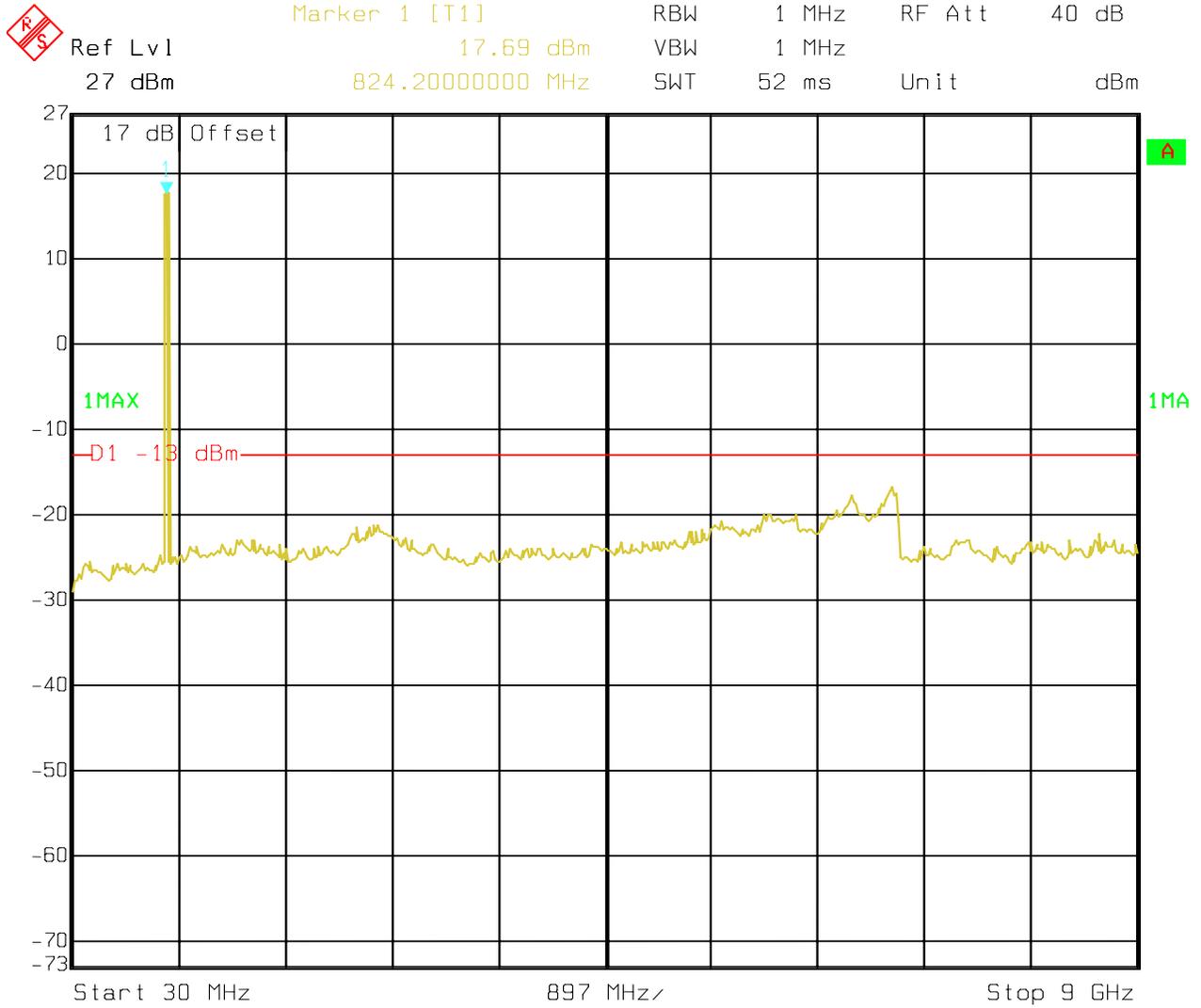


Date: 31.JUL.2006 12:30:38

### 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.**

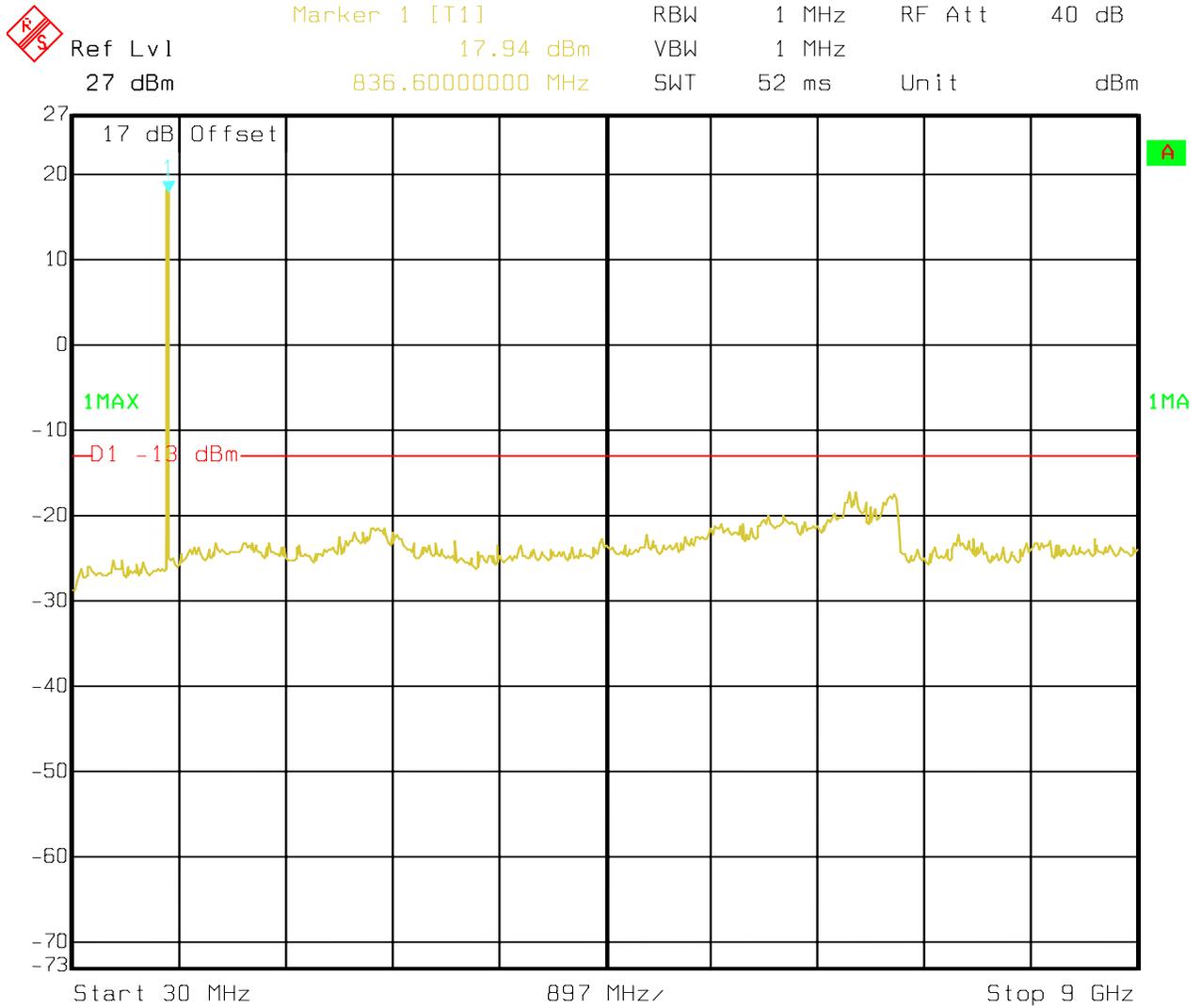


Date: 31.JUL.2006 12:35:07



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

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

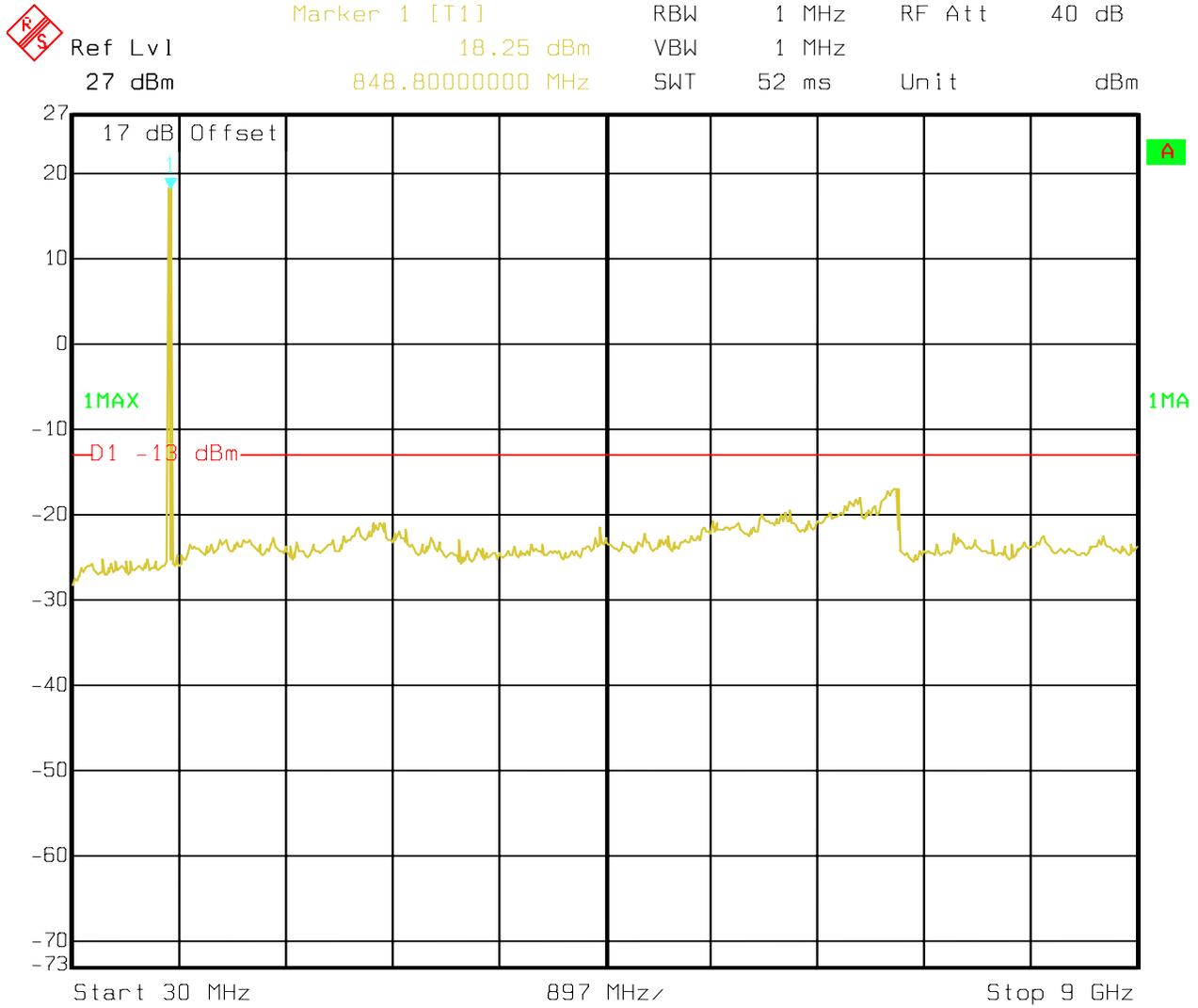


Date: 31.JUL.2006 12:33:55



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

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

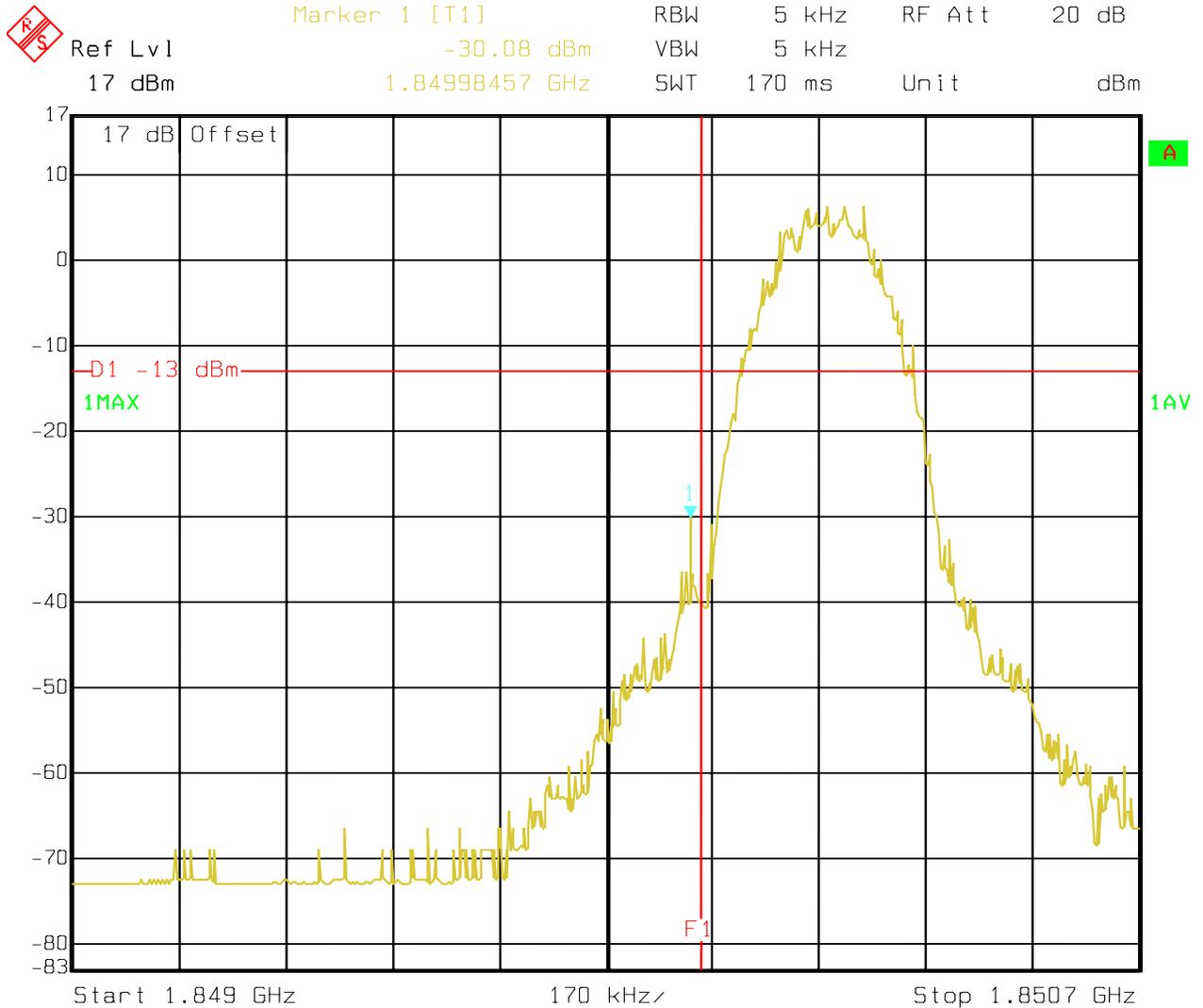


Date: 31.JUL.2006 12:33:07



### 5.4.6 Bandedge Results PCS-1900

#### PCS-1900 (Channel 512)



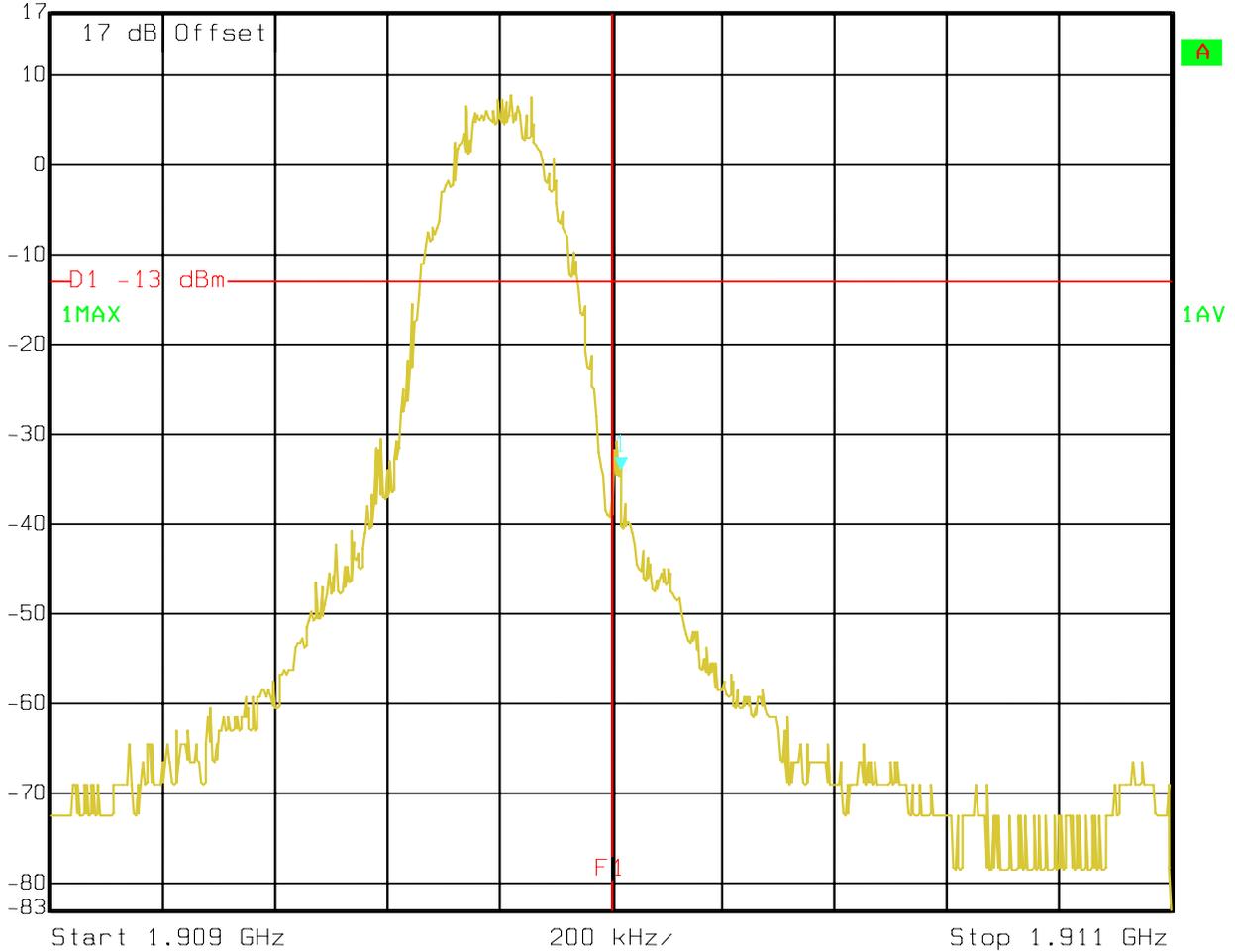
Date: 31.JUL.2006 15:50:35



PCS-1900 (Channel 810)



Marker 1 [T1] RBW 5 kHz RF Att 20 dB  
Ref Lvl -33.91 dBm VBW 5 kHz  
17 dBm 1.91001804 GHz SWT 200 ms Unit dBm

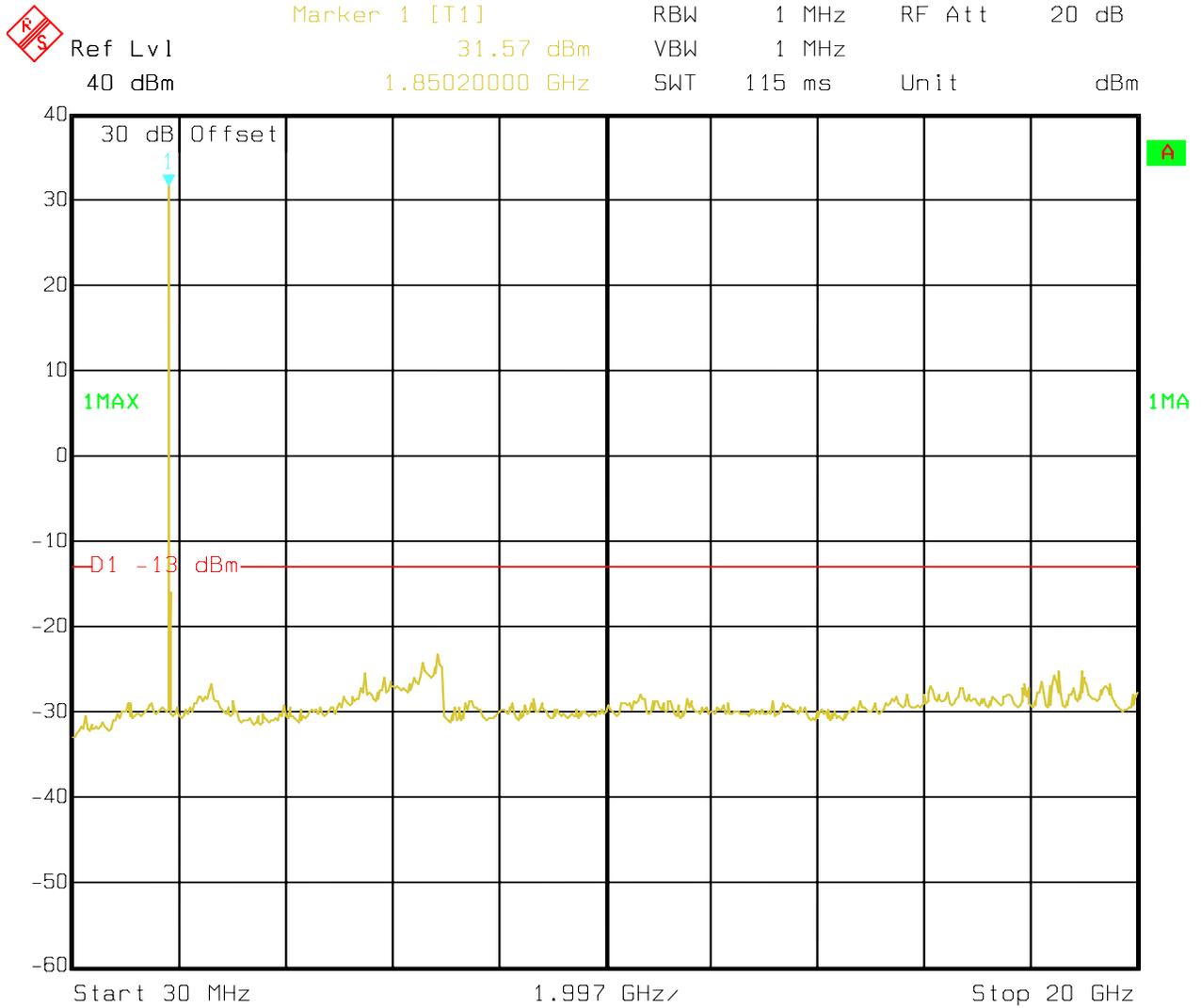


Date: 31.JUL.2006 15:52:52

**5.4.7 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**

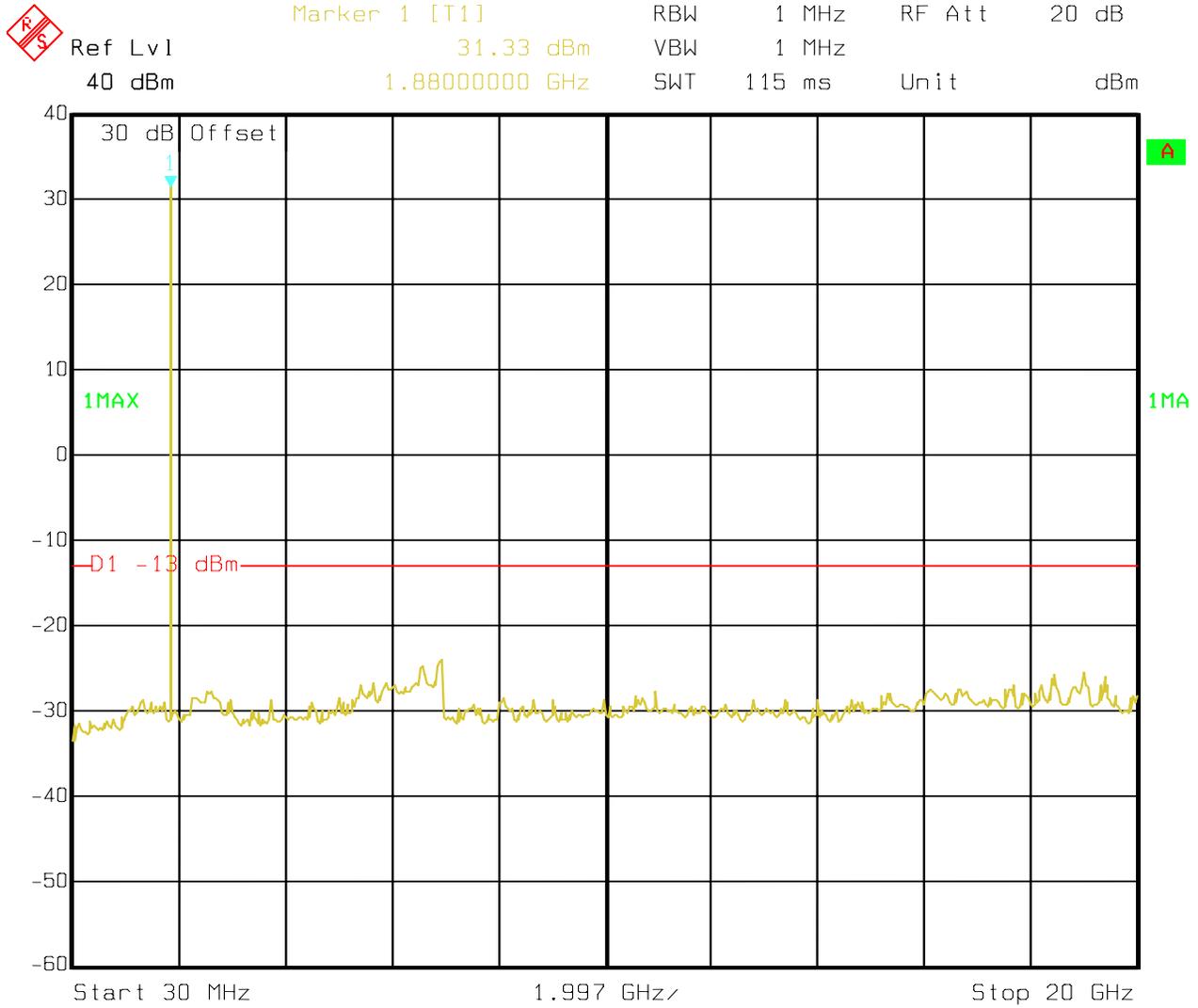


Date: 31.JUL.2006 15:29:03



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

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

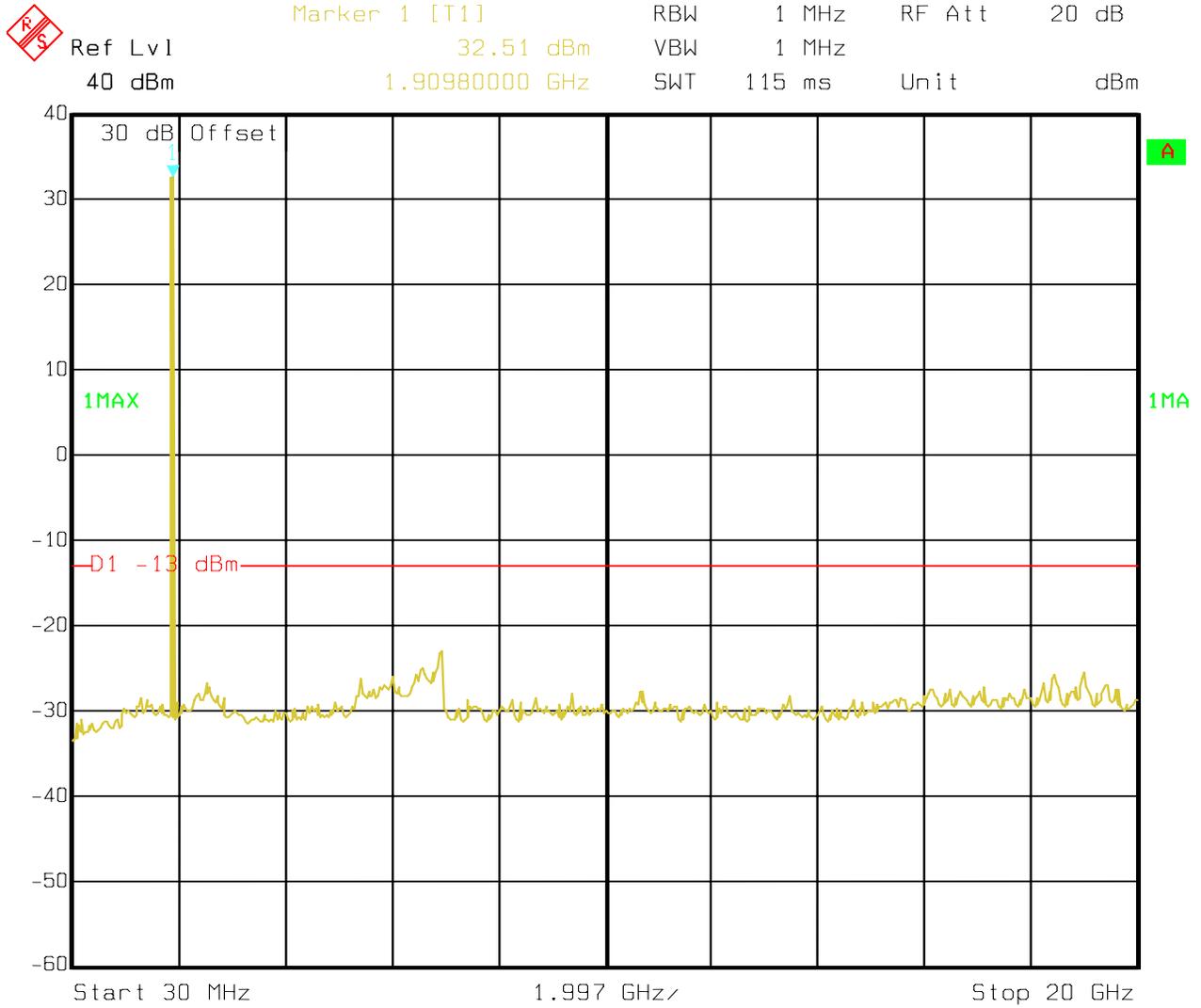


Date: 31.JUL.2006 15:29:54



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

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

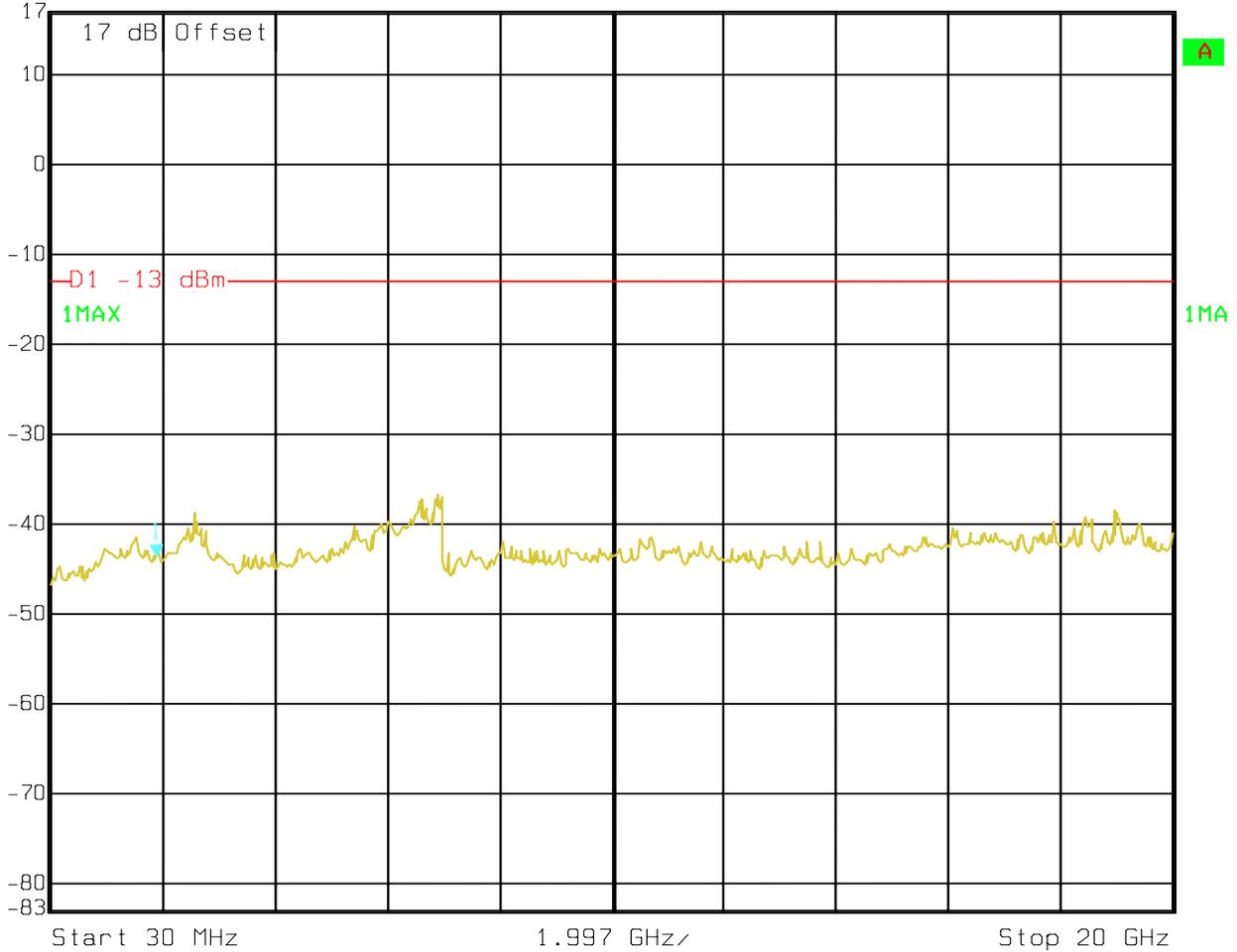


Date: 31.JUL.2006 15:30:36



**IDLE (PCS-1900)**  
**30MHz – 20GHz**

 Ref Lvl 17 dBm      Marker 1 [T1] -43.64 dBm      RBW 1 MHz      RF Att 20 dB  
17 dBm      1.91001804 GHz      VBW 1 MHz  
SWT 115 ms      Unit dBm



Date: 31.JUL.2006 15:54:48

## 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.

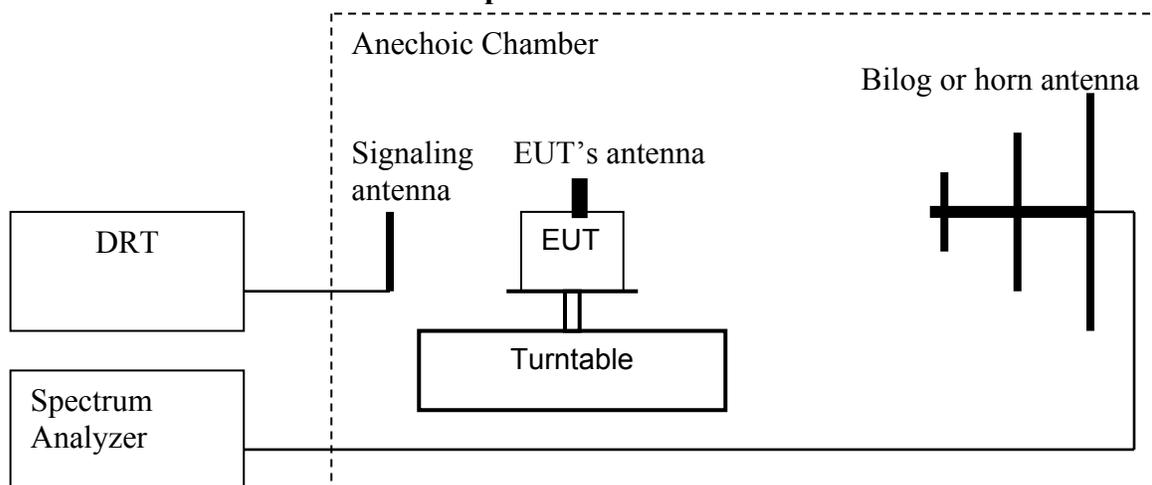
(b) *Measurement procedure.* Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of 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:  
**Spurious** (dBm) = **LVL** (dBm) + **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:  
**Spurious** (dBm) = **LVL** (dBm) + **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:

#### 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						



**RADIATED SPURIOUS EMISSIONS (GSM-850)**

**Tx: 30MHz - 1GHz**

Spurious emission limit -13dBm

**Antenna: vertical**

**Note:**

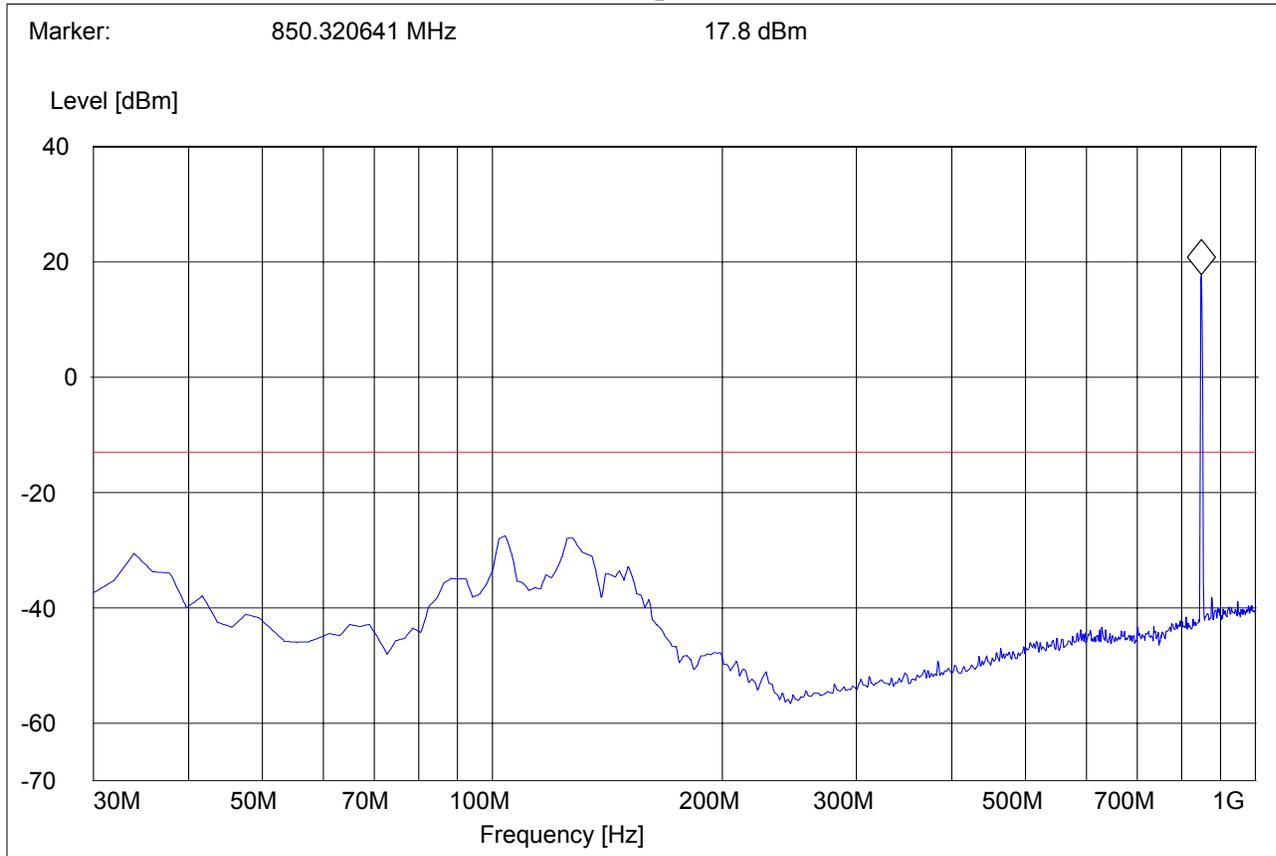
1. The peak above the limit line is the carrier freq.
2. This plot is valid for low, mid & high channels horizontal and vertical polarities (worst-case plot).

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

EUT / Description: GC86, S/N: BL3029603  
 Customer: Sony Ericsson  
 Operating Mode: GPRS850, CH251, PEAK IS TX, TABLE 120°  
 Antenna: V  
 EUT: H  
 Test Engineer: PETER  
 Voltage: AC ADAPTOR  
 Sweep: FCC24 SPURI 30-1G\_H

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

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





**RADIATED SPURIOUS EMISSIONS (GSM-850)**

**Tx @ 824.2MHz: 1GHz – 1.58GHz**

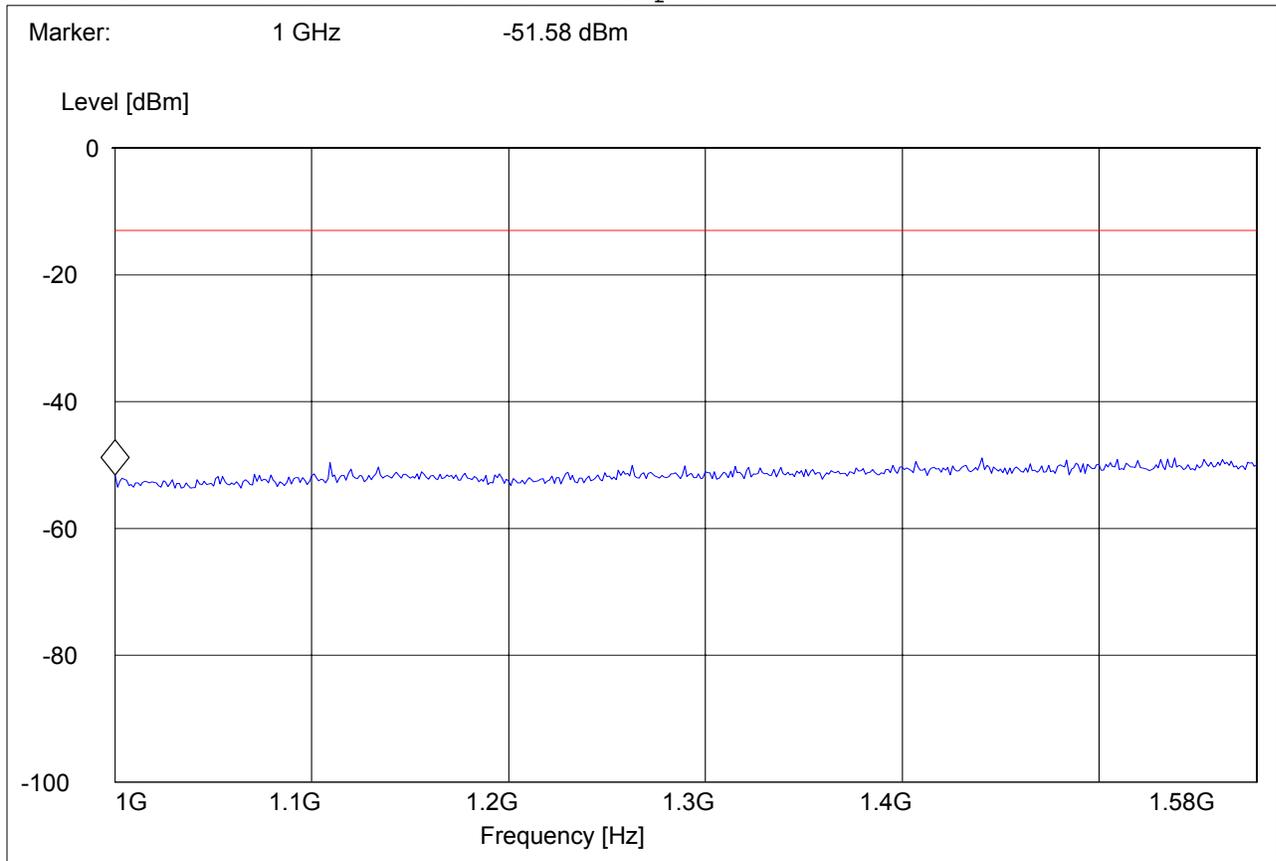
Spurious emission limit -13dBm

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

EUT / Description: GC86, S/N: BL3029603  
 Customer: Sony Ericsson  
 Operating Mode: GPRS850, CH128 , TABLE 96° ,TCH  
 Antenna: H  
 EUT: H, EXTERNAL ANTENNA INCLUDED  
 Test Engineer: SATYA  
 Voltage: AC ADAPTOR  
 Sweep: FCC 22Spuri 1-1.58G

***SWEEP 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





**RADIATED SPURIOUS EMISSIONS (GSM-850)**

**Tx @ 824.2MHz: 1.58GHz – 3GHz**

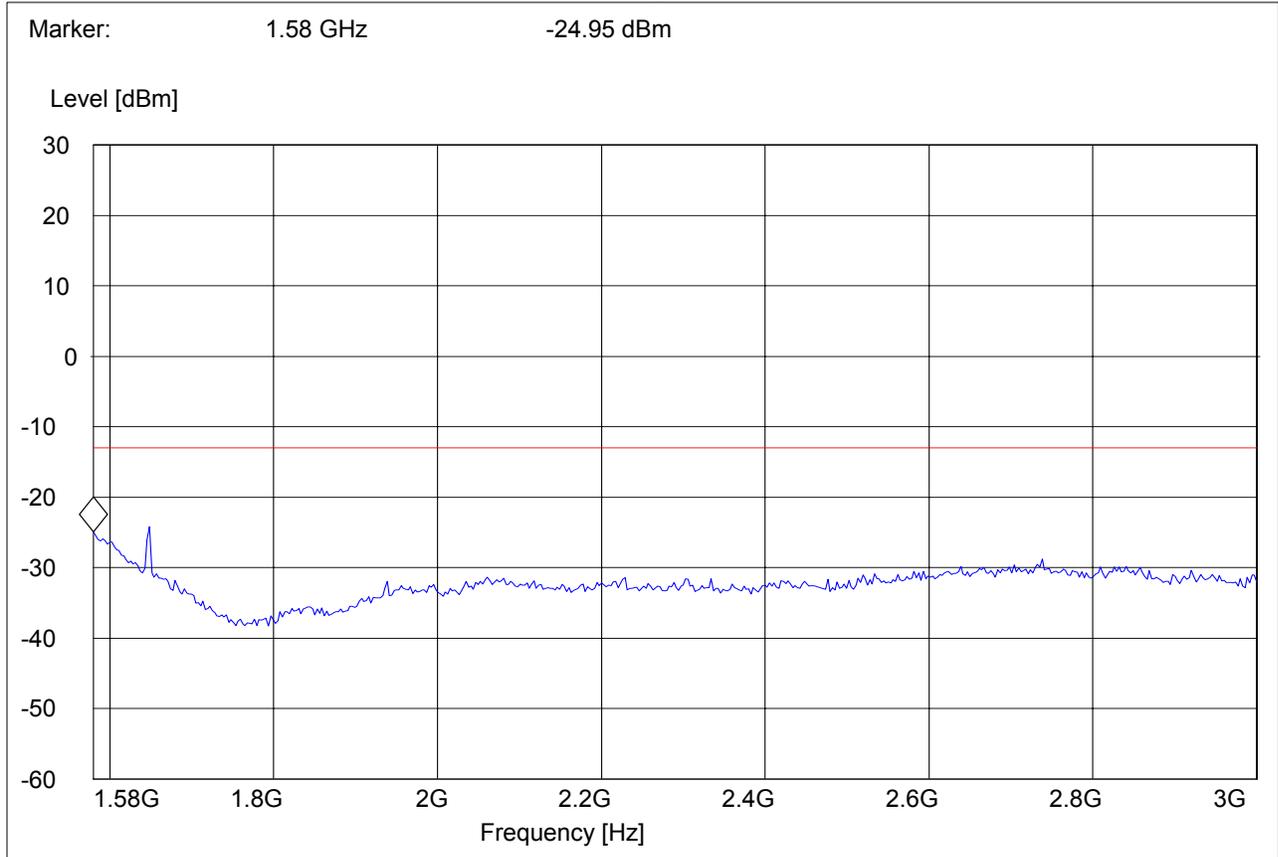
Spurious emission limit -13dBm

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

EUT / Description: GC86, S/N: BL3029603  
 Customer: Sony Ericsson  
 Operating Mode: GPRS850, CH128, TABLE 96°, TCH  
 Antenna: H  
 EUT: H, EXTERNAL ANTENNA INCLUDED  
 Test Engineer: SATYA  
 Voltage: AC ADAPTOR  
 Sweep: FCC 22Spuri 1.58-3G

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

Short Description:	FCC 22 1GHz-8GHz				
Start	Stop	Detector	Meas.	IF	Transducer
Frequency	Frequency		Time	Bandw.	
1.0 GHz	1.6 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM





**RADIATED SPURIOUS EMISSIONS (GSM-850)**

**Tx @ 824.2MHz: 3GHz – 9GHz**

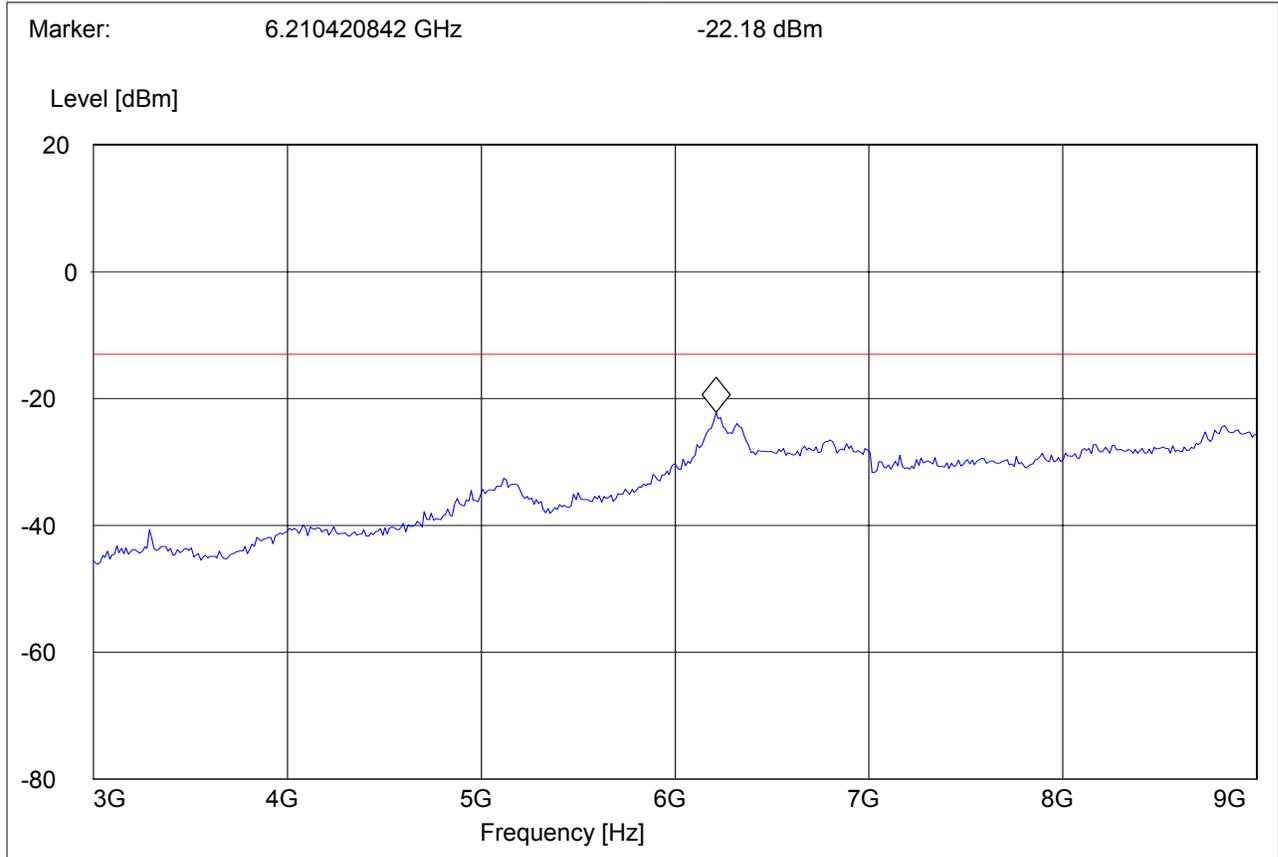
Spurious emission limit -13dBm

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

EUT / Description: GC86, S/N: BL3029603  
 Customer: Sony Ericsson  
 Operating Mode: GPRS850, CH128, TABLE 96°, TCH  
 Antenna: H  
 EUT: H, EXTERNAL ANTENNA INCLUDED  
 Test Engineer: SATYA  
 Voltage: AC ADAPTOR  
 Sweep: FCC 22Spuri 3-9G

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

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





**RADIATED SPURIOUS EMISSIONS (GSM-850)**

**Tx @ 836.6MHz: 1GHz – 1.58GHz**

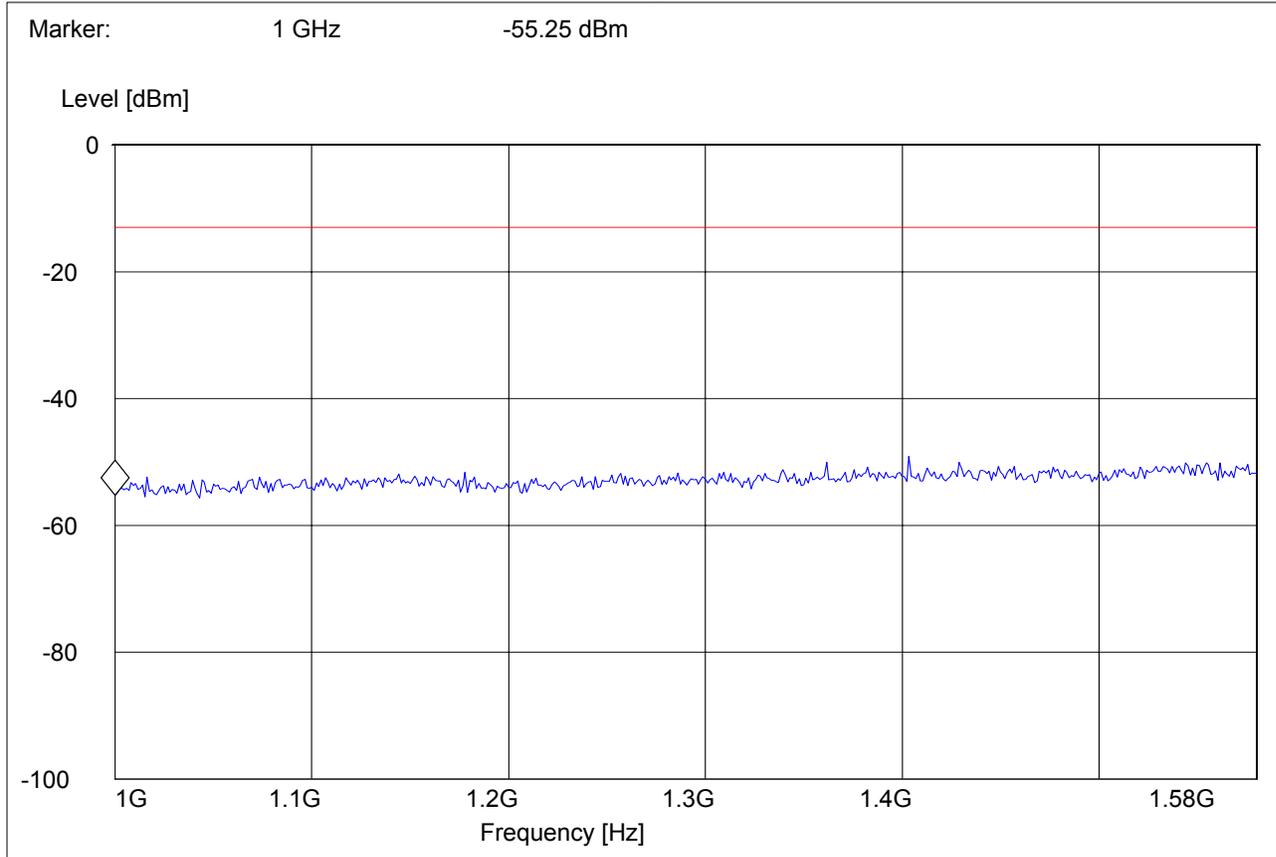
Spurious emission limit -13dBm

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

EUT / Description: GC86, S/N: BL3029603  
 Customer: Sony Ericsson  
 Operating Mode: GPRS850, CH190 , TABLE 96° ,TCH  
 Antenna: H  
 EUT: H, EXTERNAL ANTENNA INCLUDED  
 Test Engineer: SATYA  
 Voltage: AC ADAPTOR  
 Sweep: FCC 22Spuri 1-1.58G

**SWEEP 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





**RADIATED SPURIOUS EMISSIONS (GSM-850)**

**Tx @ 836.6MHz: 1.58GHz – 3GHz**

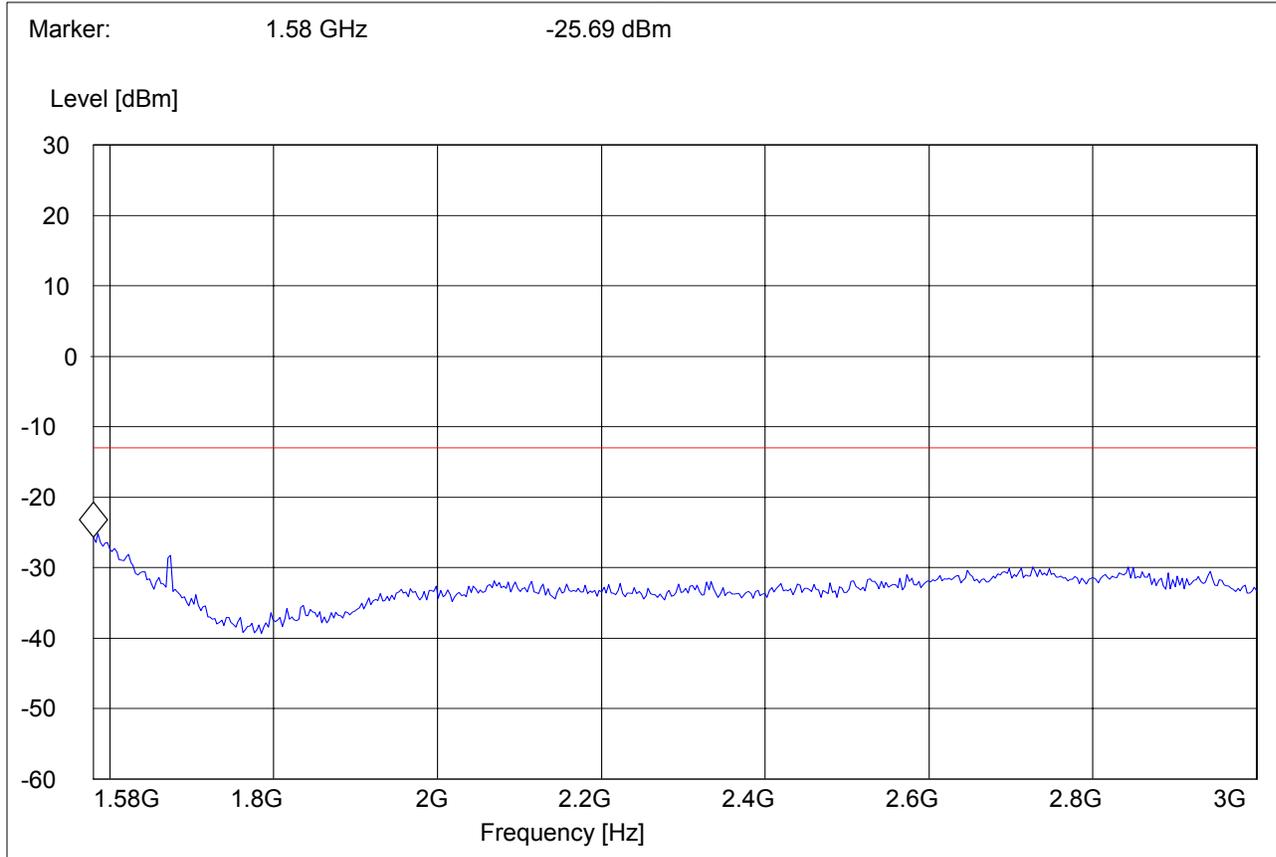
Spurious emission limit -13dBm

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

EUT / Description: GC86, S/N: BL3029603  
 Customer: Sony Ericsson  
 Operating Mode: GPRS850, CH190 , TABLE 96° ,TCH  
 Antenna: H  
 EUT: H, EXTERNAL ANTENNA INCLUDED  
 Test Engineer: SATYA  
 Voltage: AC ADAPTOR  
 Sweep: FCC 22Spuri 1.58-3G

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

Short Description:		FCC 22 1GHz-8GHz			
Start	Stop	Detector	Meas.	IF	Transducer
Frequency	Frequency		Time	Bandw.	
1.6 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM





**RADIATED SPURIOUS EMISSIONS (GSM-850)**

**Tx @ 836.6MHz: 3GHz – 9GHz**

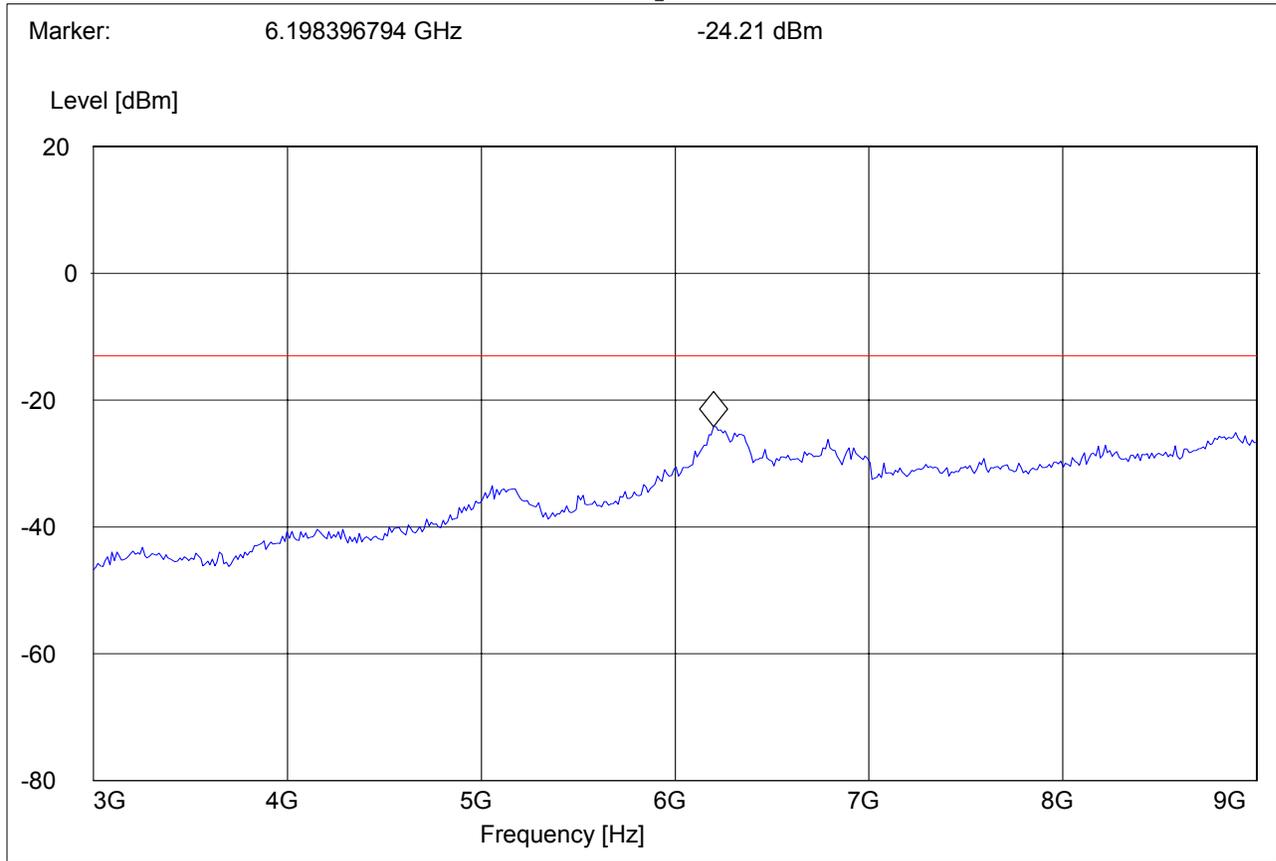
Spurious emission limit -13dBm

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

EUT / Description: GC86, S/N: BL3029603  
 Customer: Sony Ericsson  
 Operating Mode: GPRS850, CH190 , TABLE 96°,TCH  
 Antenna: H  
 EUT: H, EXTERNAL ANTENNA INCLUDED  
 Test Engineer: SATYA  
 Voltage: AC ADAPTOR  
 Sweep: FCC 22Spuri 3-9G

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

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





**RADIATED SPURIOUS EMISSIONS (GSM-850)**

**Tx @ 848.8MHz: 1GHz – 1.58GHz**

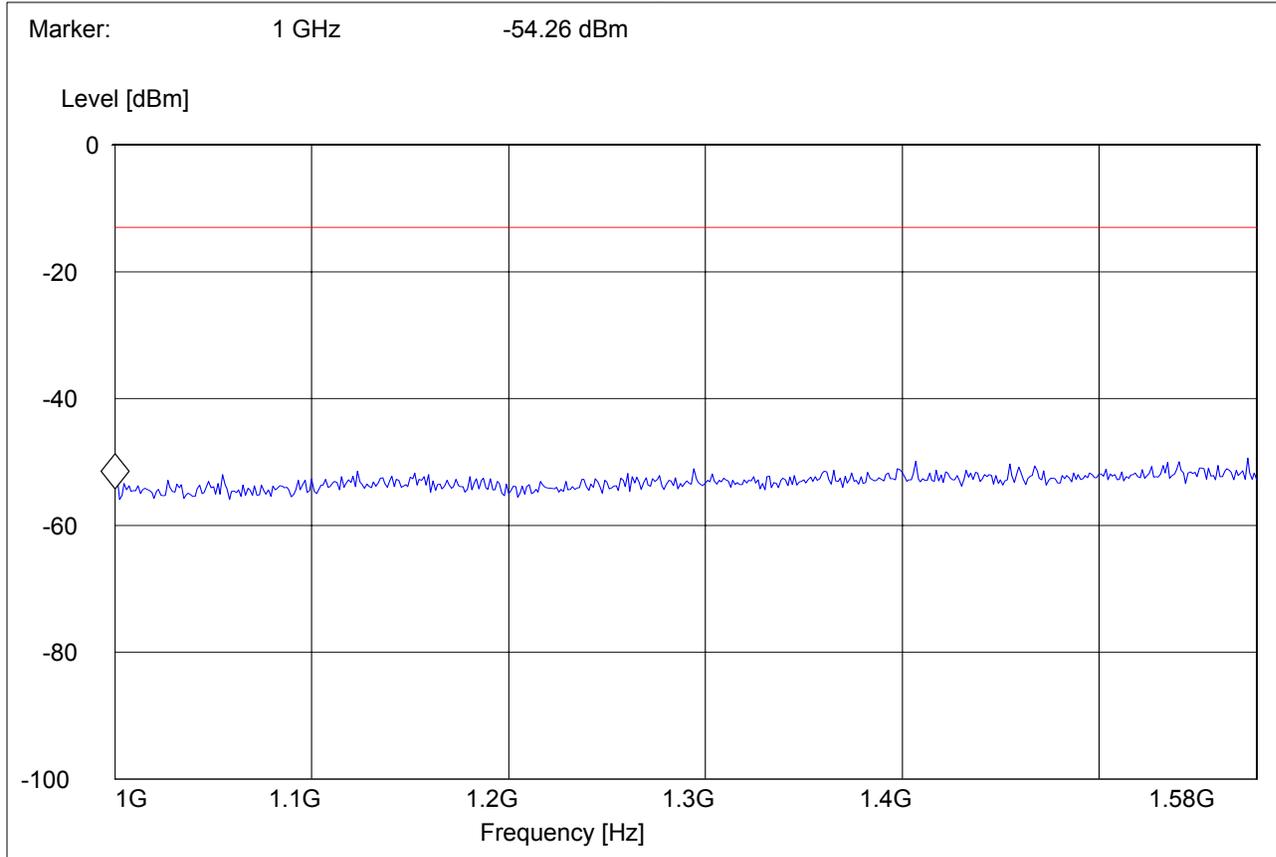
Spurious emission limit -13dBm

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

EUT / Description: GC86, S/N: BL3029603  
 Customer: Sony Ericsson  
 Operating Mode: GPRS850, CH251, TABLE 96°, TCH  
 Antenna: H  
 EUT: H, EXTERNAL ANTENNA INCLUDED  
 Test Engineer: SATYA  
 Voltage: AC ADAPTOR  
 Sweep: FCC 22Spuri 1-1.58G

**SWEEP 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





**RADIATED SPURIOUS EMISSIONS (GSM-850)**

**Tx @ 848.8MHz: 1.58GHz – 3GHz**

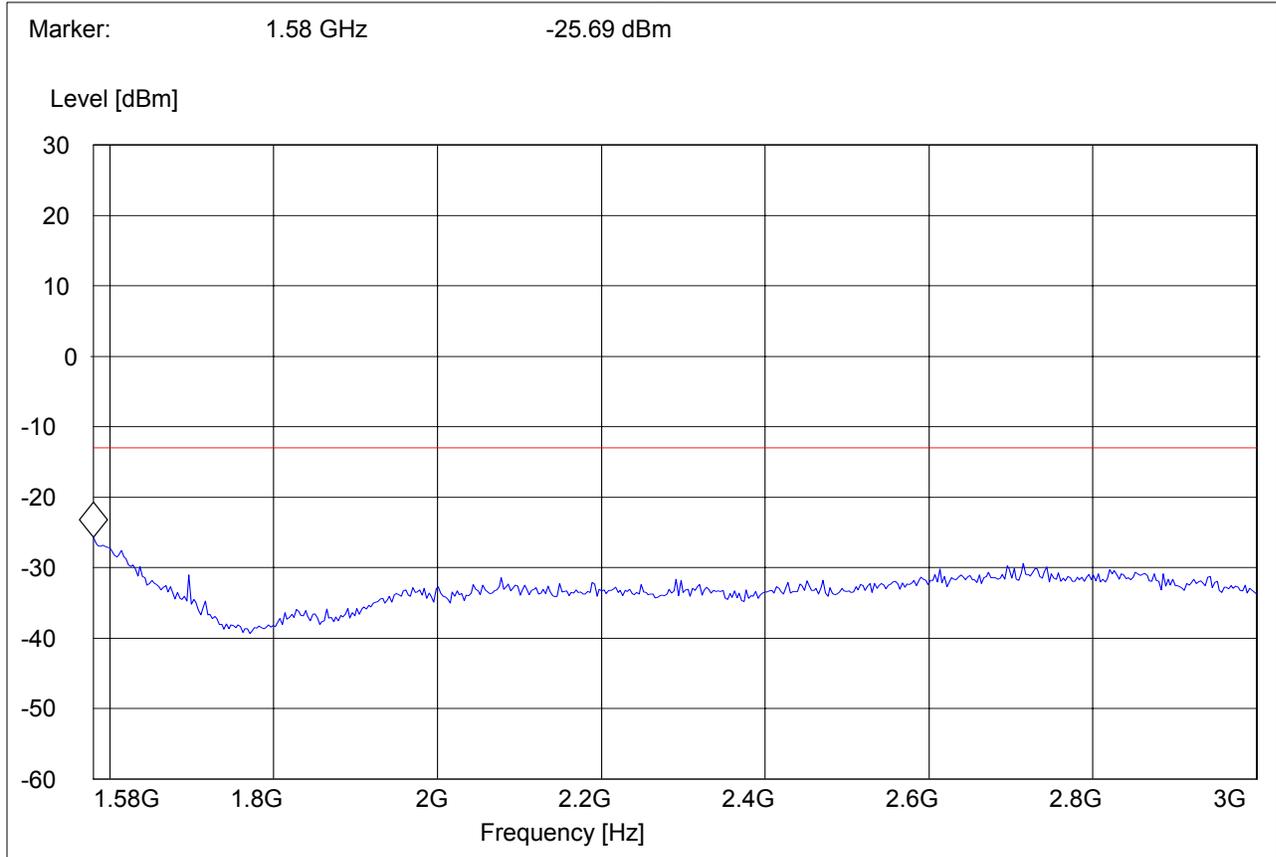
Spurious emission limit -13dBm

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

EUT / Description: GC86, S/N: BL3029603  
 Customer: Sony Ericsson  
 Operating Mode: GPRS850, CH251 , TABLE 96°, TCH  
 Antenna: H  
 EUT: H, EXTERNAL ANTENNA INCLUDED  
 Test Engineer: SATYA  
 Voltage: AC ADAPTOR  
 Sweep: FCC 22Spuri 1.58-3G

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

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





**RADIATED SPURIOUS EMISSIONS (GSM-850)**

**Tx @ 848.8MHz: 3GHz – 9GHz**

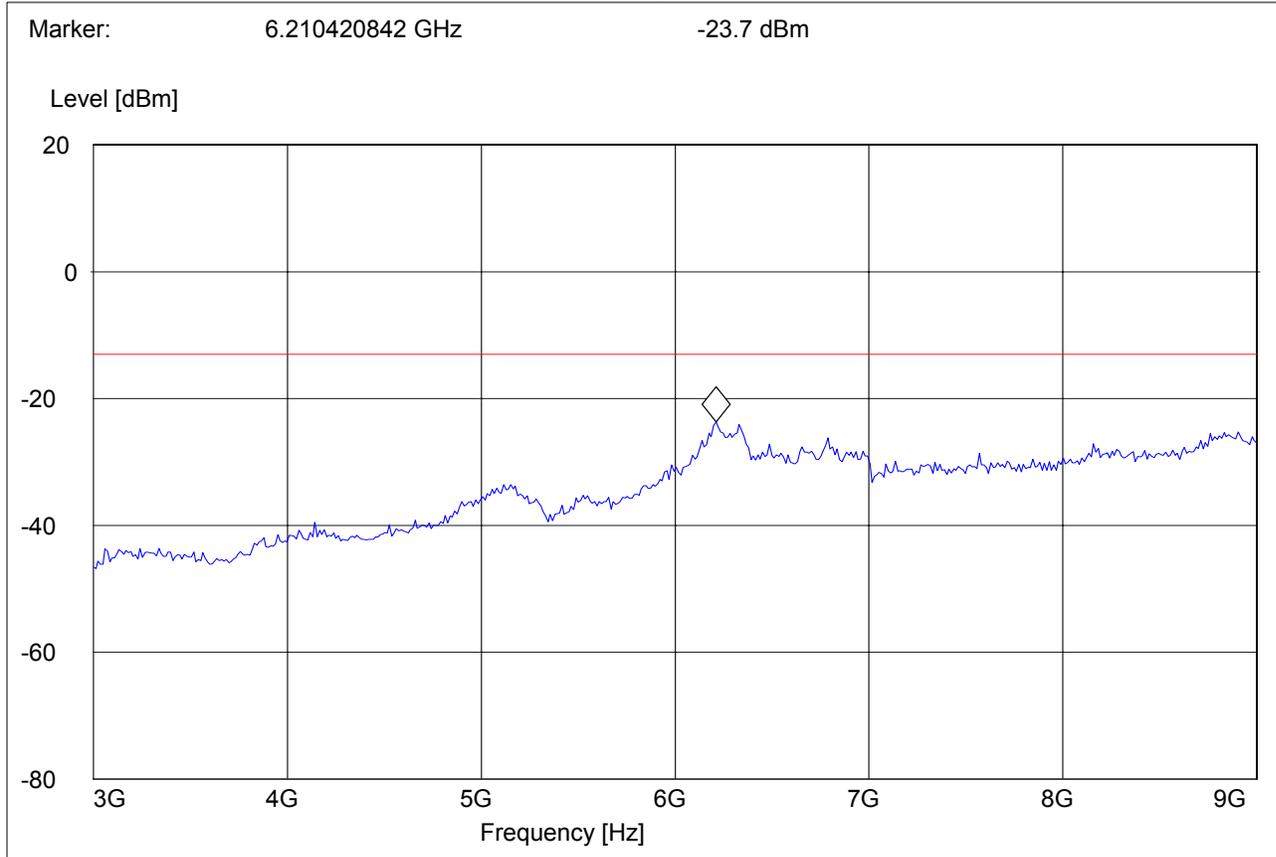
Spurious emission limit -13dBm

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

EUT / Description: GC86, S/N: BL3029603  
 Customer: Sony Ericsson  
 Operating Mode: GPRS850, CH251, TABLE 96°, TCH  
 Antenna: H  
 EUT: H, EXTERNAL ANTENNA INCLUDED  
 Test Engineer: SATYA  
 Voltage: AC ADAPTOR  
 Sweep: FCC 22Spuri 3-9G

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

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



**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	3700.4	NF	3760	NF	3819.6	NF
3	5550.6	NF	5640	NF	5729.4	NF
4	7400.8	NF	7520	NF	7639.2	NF
5	9251	NF	9400	NF	9549	NF
6	11101.2	NF	11280	NF	11458.8	NF
7	12951.4	NF	13160	NF	13368.6	NF
8	14801.6	NF	15040	NF	15278.4	NF
9	16651.8	NF	16920	NF	17188.2	NF
10	18502	NF	18800	NF	19098	NF
NF = NOISE FLOOR						



**RADIATED SPURIOUS EMISSIONS(PCS 1900)**

**TX: 30MHz - 1GHz**

Spurious emission limit -13dBm

**Antenna: vertical**

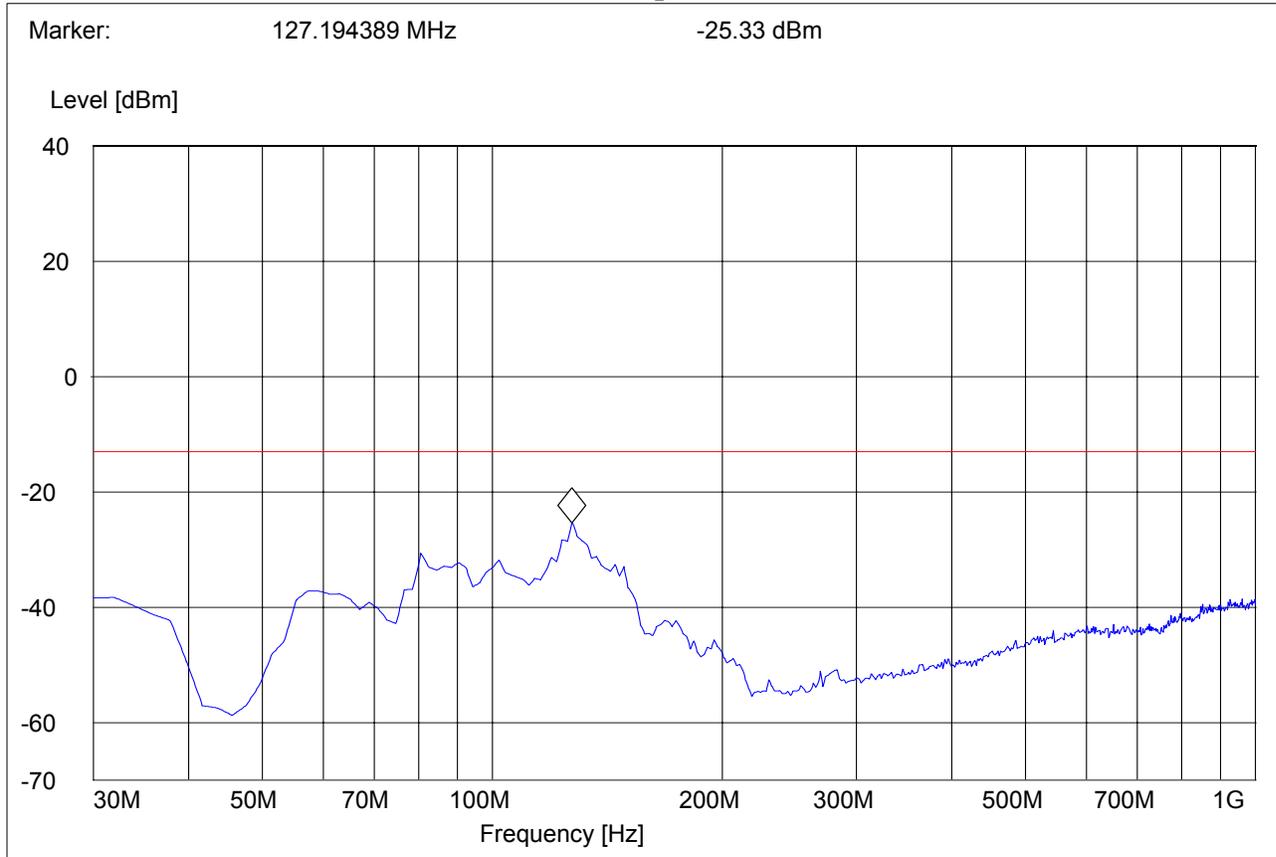
**Note: This plot is valid for low, mid & high channels horizontal and vertical polarities (worst-case plot).**

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

EUT / Description: GC86, S/N: BL3029603  
 Customer: Sony Ericsson  
 Operating Mode: GSM1900, CH 661 ,TABLE 360° ROTATE  
 Antenna: V  
 EUT: H, WITH EXTERNAL ANTENNA  
 Test Engineer: SATYA  
 Voltage: AC ADAPTOR  
 Sweep: FCC 24Spuri 30M-1G\_V

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

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





**RADIATED SPURIOUS EMISSIONS(PCS 1900)**

**Tx @ 1850.2MHz: 1GHz – 3GHz**

Spurious emission limit -13dBm

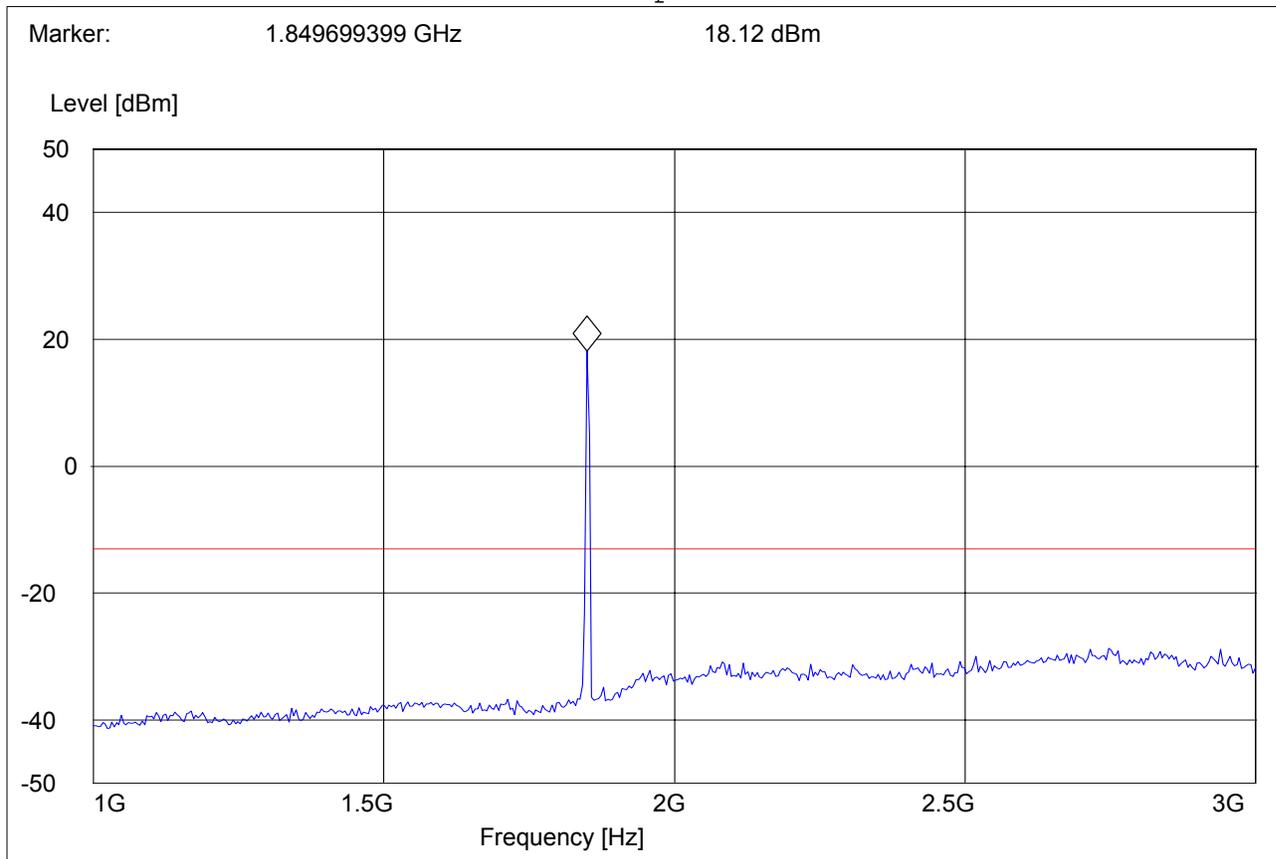
**Note: The peak above the limit line is the carrier freq. at ch-512.**

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

EUT / Description: GC86, S/N: BL3029603  
 Customer: Sony Ericsson  
 Operating Mode: GSM1900, CH 512 , TABLE 113° ROTATE  
 Antenna: V  
 EUT: H, WITH EXTERNAL ANTENNA , PEAK MARKED IS BASE STATION  
 Test Engineer: SATYA  
 Voltage: AC ADAPTOR  
 Sweep: FCC 24Spuri 1-3G

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

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





**RADIATED SPURIOUS EMISSIONS(PCS 1900)**

**Tx @ 1850.2MHz: 3GHz – 18GHz**

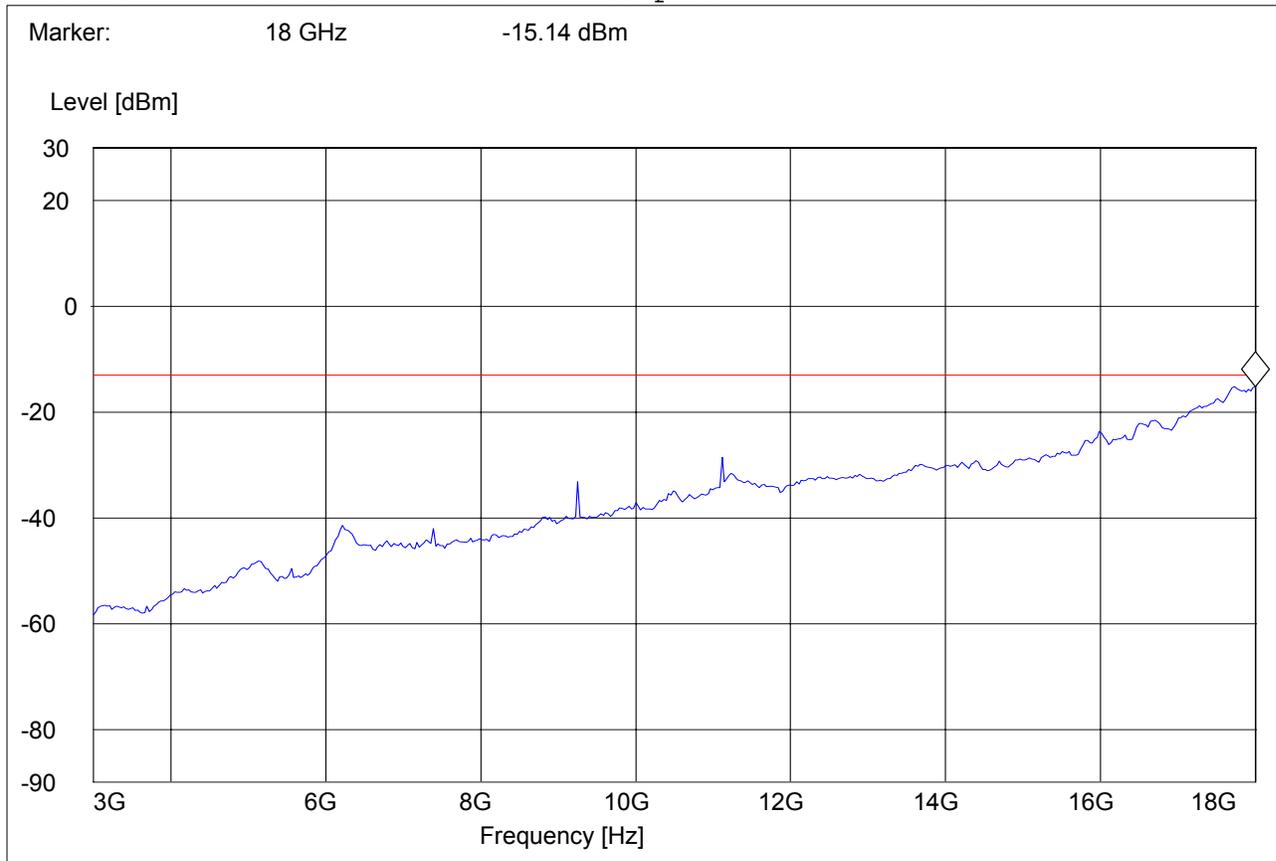
Spurious emission limit -13dBm

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

EUT / Description: GC86, S/N: BL3029603  
 Customer: Sony Ericsson  
 Operating Mode: GSM1900, CH 512 , TABLE 360° ROTATE  
 Antenna: V  
 EUT: H, WITH, EXTERNAL ANTENNA  
 Test Engineer: SATYA  
 Voltage: AC ADAPTOR  
 Sweep: FCC 24Spuri 3-18G

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

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





**RADIATED SPURIOUS EMISSIONS(PCS 1900)**

**Tx @ 1880.0MHz: 1GHz – 3GHz**

Spurious emission limit -13dBm

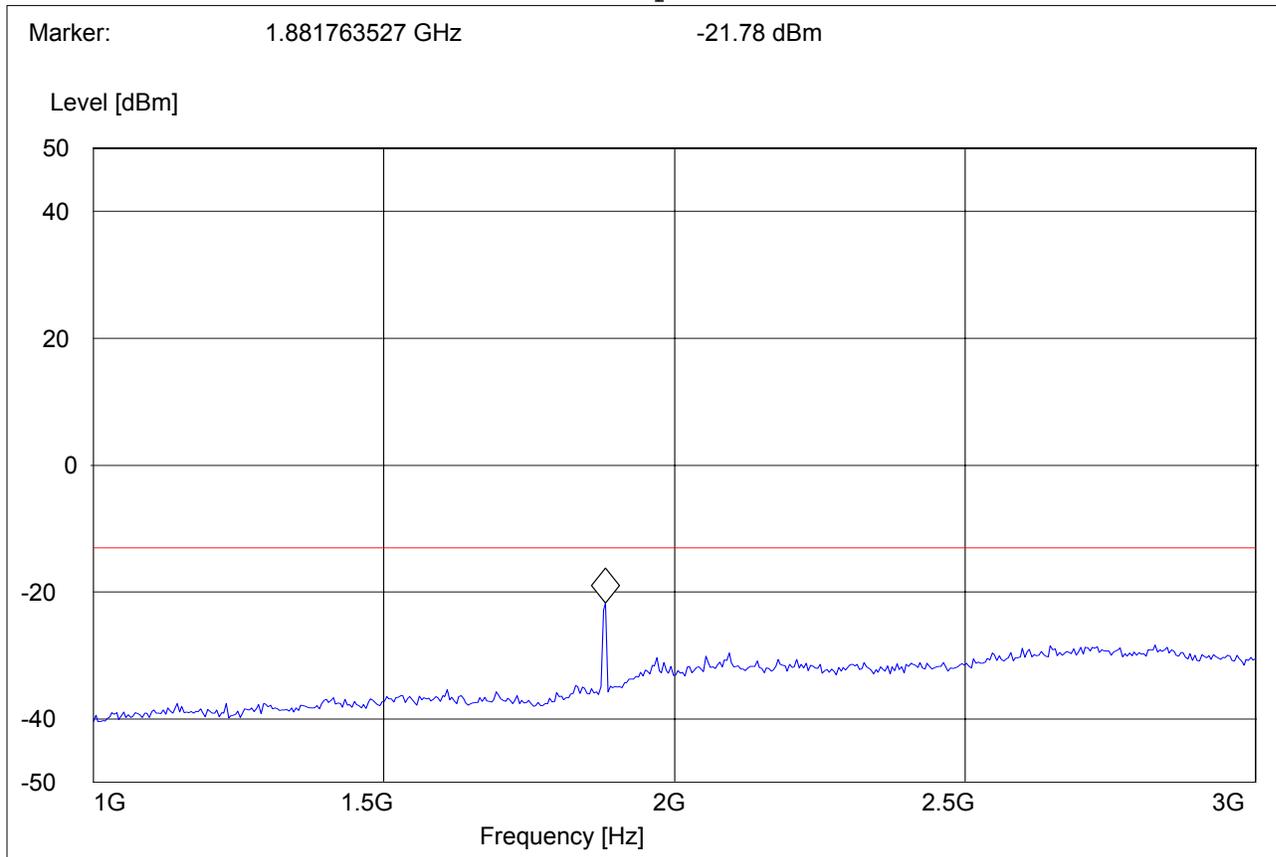
**Note: The peak is the carrier freq. at ch-661.**

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

EUT / Description: GC86, S/N: BL3029603  
 Customer: Sony Ericsson  
 Operating Mode: GSM1900, CH 661, TABLE 360° ROTATE  
 Antenna: V  
 EUT: H, WITH EXTERNAL ANTENNA  
 Test Engineer: SATYA  
 Voltage: AC ADAPTOR  
 Sweep: FCC 24Spuri 1-3G

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

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





**RADIATED SPURIOUS EMISSIONS(PCS 1900)**

**Tx @ 1880.0MHz: 3GHz – 18GHz**

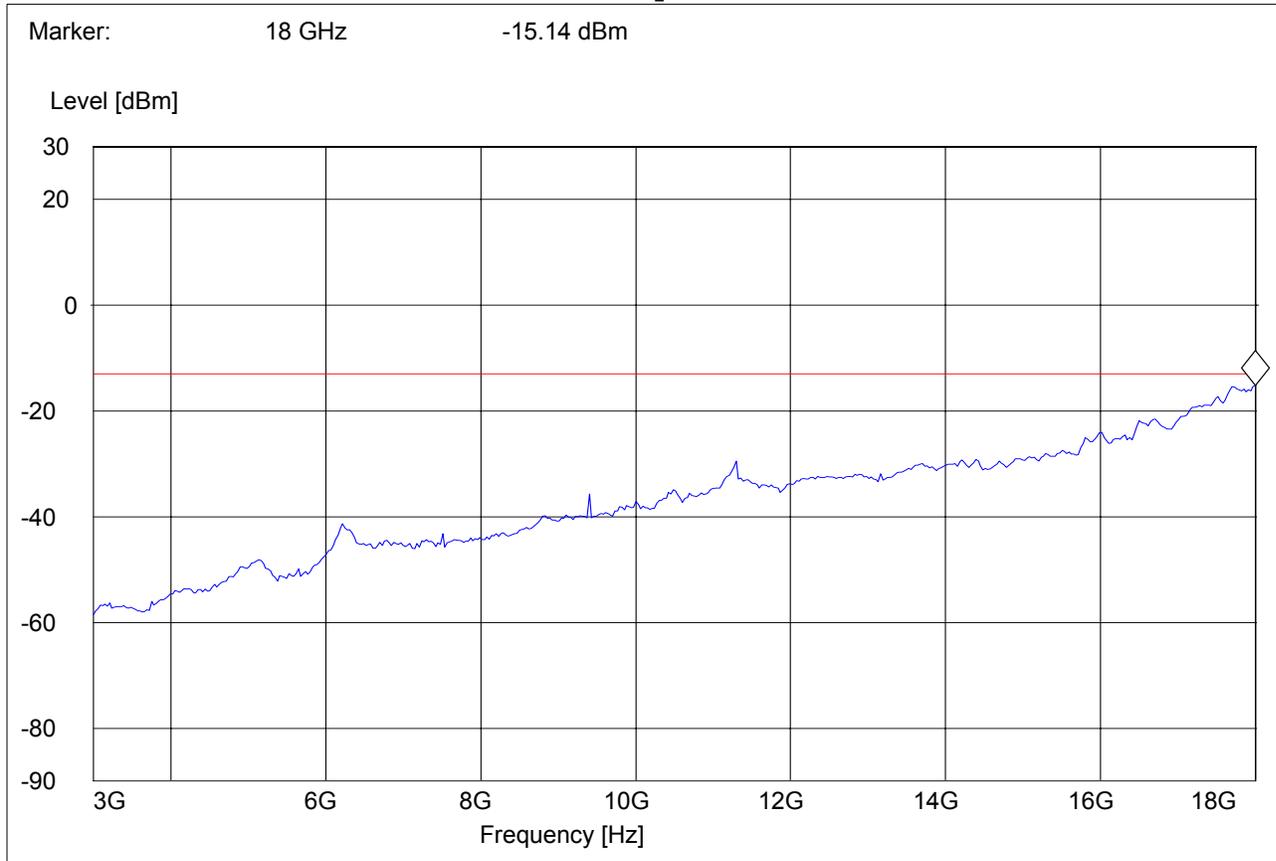
Spurious emission limit -13dBm

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

EUT / Description: GC86, S/N: BL3029603  
 Customer: Sony Ericsson  
 Operating Mode: GSM1900, CH 661 , TABLE 360° ROTATE  
 Antenna: H  
 EUT: H, WITH EXTERNAL ANTENNA  
 Test Engineer: SATYA  
 Voltage: AC ADAPTOR  
 Sweep: FCC 24Spuri 3-18G

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

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





**RADIATED SPURIOUS EMISSIONS(PCS 1900)**

**Tx @ 1909.8MHz: 1GHz – 3GHz**

Spurious emission limit -13dBm

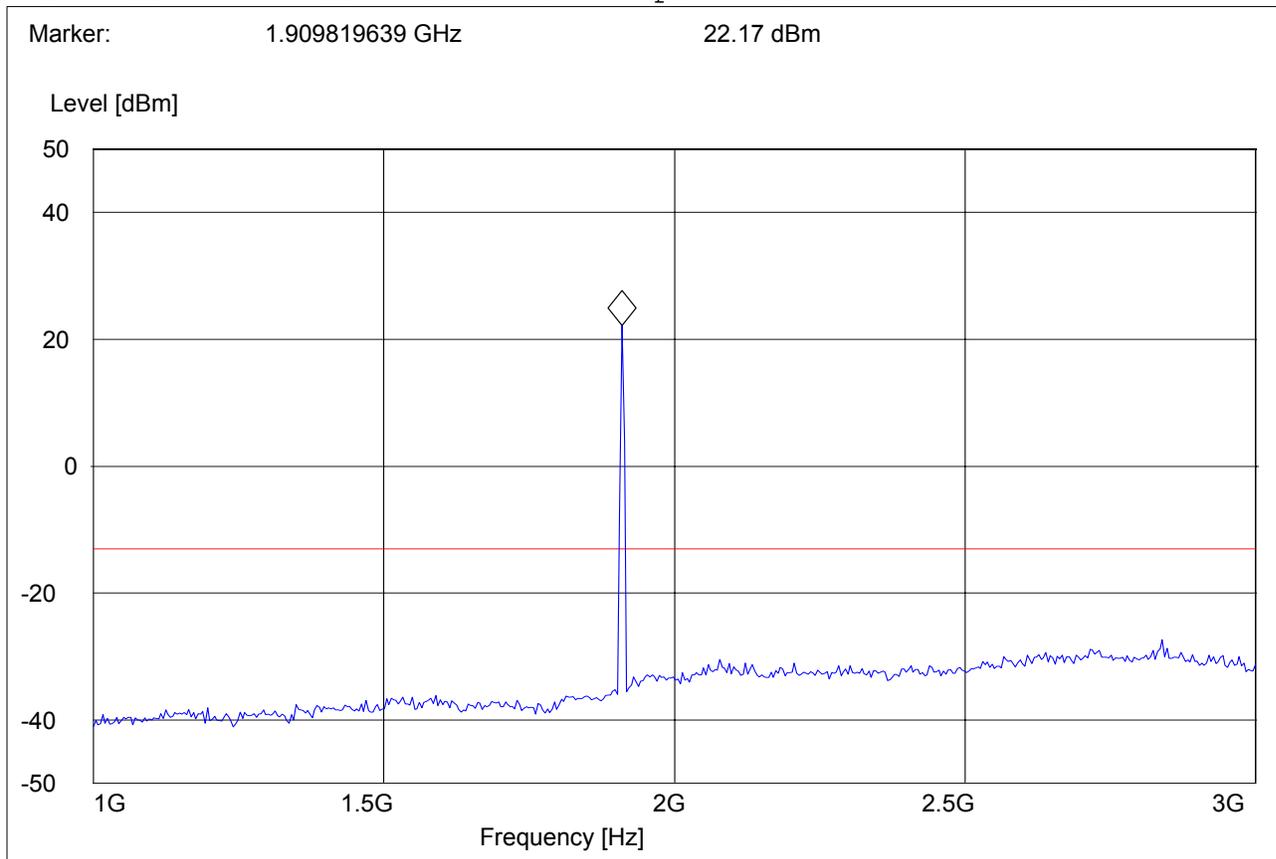
**Note: The peak above the limit line is the carrier freq. at ch-810.**

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

EUT / Description: GC86, S/N: BL3029603  
 Customer: Sony Ericsson  
 Operating Mode: GSM1900, CH 810 ,TABLE 360° ROTATE, PEAK MARKED IS BASE STATION  
 Antenna: V  
 EUT: H, WITH EXTERNAL ANTENNA  
 Test Engineer: SATYA  
 Voltage: AC ADAPTOR  
 Sweep: FCC 24Spuri 1-3G

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

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





**RADIATED SPURIOUS EMISSIONS(PCS 1900)**

**Tx @ 1909.8MHz: 3GHz – 18GHz**

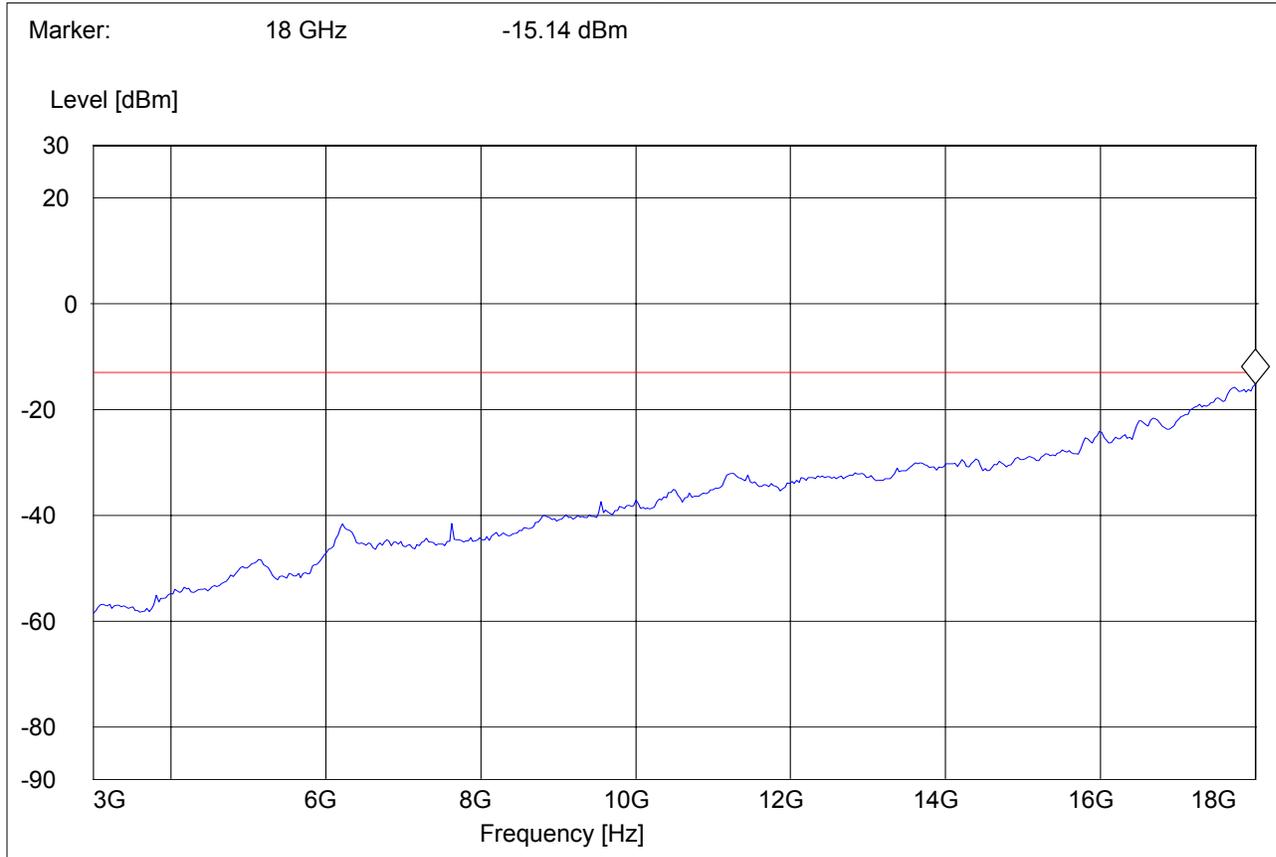
Spurious emission limit -13dBm

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

EUT / Description: GC86, S/N: BL3029603  
 Customer: Sony Ericsson  
 Operating Mode: GSM1900, CH 810 , TABLE 360° ROTATE  
 Antenna: V  
 EUT: H, WITH EXTERNAL ANTENNA  
 Test Engineer: SATYA  
 Voltage: AC ADAPTOR  
 Sweep: FCC 24Spuri 3-18G

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

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





**RADIATED SPURIOUS EMISSIONS(PCS 1900)**

**18GHz – 19.1GHz**

Spurious emission limit -13dBm

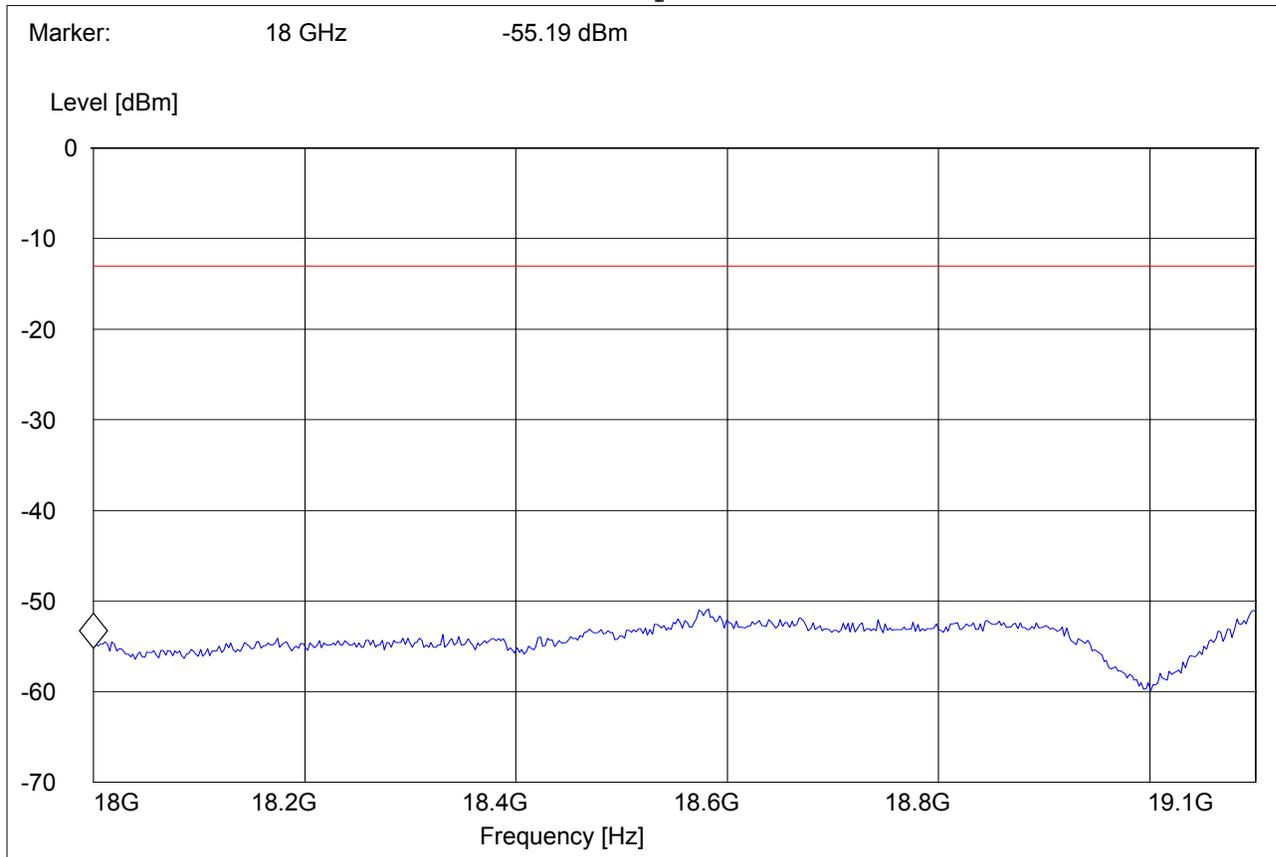
**Note: This plot is valid for low, mid & high channels (worst-case plot)**

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

EUT / Description: GC86, S/N: BL3029603  
 Customer: Sony Ericsson  
 Operating Mode: GSM1900, CH 661 ,TABLE 360° ROTATE  
 Antenna: V  
 EUT: H, WITH EXTERNAL ANTENNA  
 Test Engineer: SATYA  
 Voltage: AC ADAPTOR  
 Sweep: FCC 24Spuri 18-19.1G

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

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





**5.6 RECEIVER RADIATED EMISSIONS**

**§ 2.1053 / RSS-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.
  
2. Receiver radiated emissions were done on both 850/1900 bands, but only worst-case plots are submitted in the test reports.

**Limits**

**SUBCLAUSE § RSS-133**

Frequency (MHz)	Field strength (µV/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**

**RECEIVER RADIATED EMISSIONS**

**EUT in Idle Mode: 30MHz – 1GHz**

**Antenna: vertical**

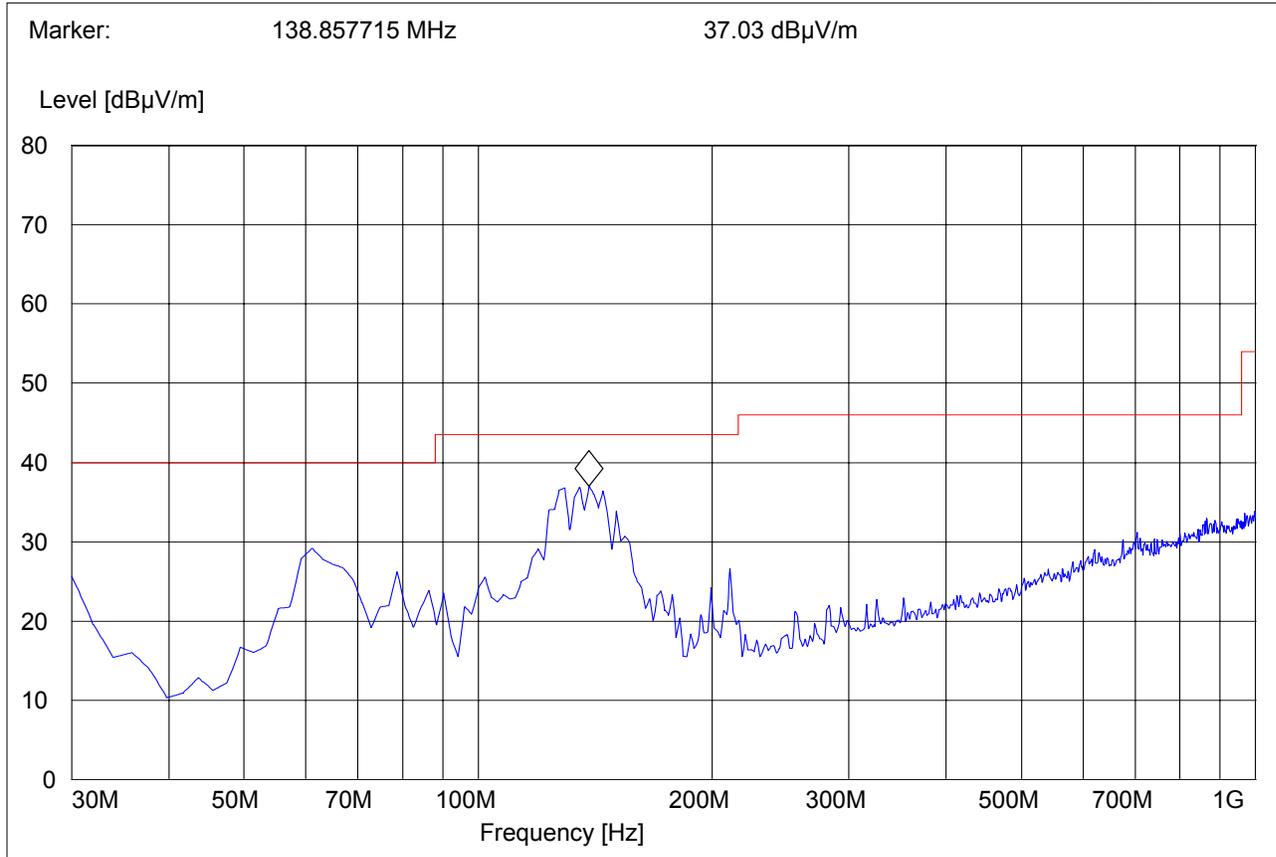
**Note: This plot is valid for horizontal and vertical polarization (worst-case plot)**

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

EUT / Description: GC86, S/N: BL3029603  
 Customer: Sony Ericsson  
 Operating Mode: GSM1900, IDLE MODE ,TABLE 360° ROTATE  
 Antenna: H  
 EUT: H, WITH EXTERNAL ANTENNA  
 Test Engineer: ED  
 Voltage: AC ADAPTOR  
 Sweep: CANADA RE\_30M-1G\_H

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

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





**RECEIVER RADIATED EMISSIONS**

**EUT in Idle Mode: 1GHz – 3GHz**

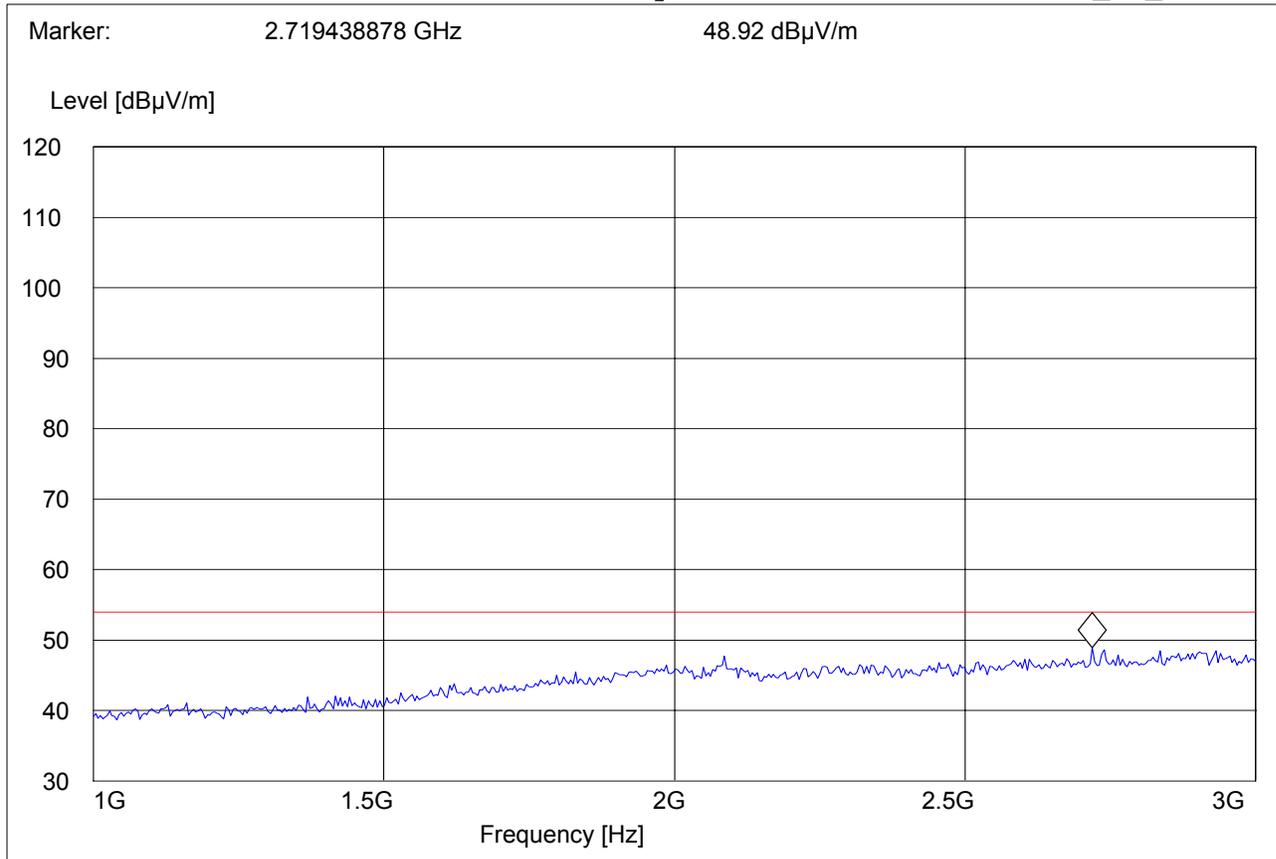
**Note: marked peak is downlink from the base station**

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

EUT / Description: GC86, S/N: BL3029603  
 Customer: Sony Ericsson  
 Operating Mode: GSM1900, IDLE MODE ,TABLE 360° ROTATE  
 Antenna: V  
 EUT: H, WITH EXTERNAL ANTENNA  
 Test Engineer: ED  
 Voltage: AC ADAPTOR  
 Sweep: CANADA RE\_1-3G

***SWEEP TABLE: "CANADA RE 1-3G"***

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





**RECEIVER RADIATED EMISSIONS**

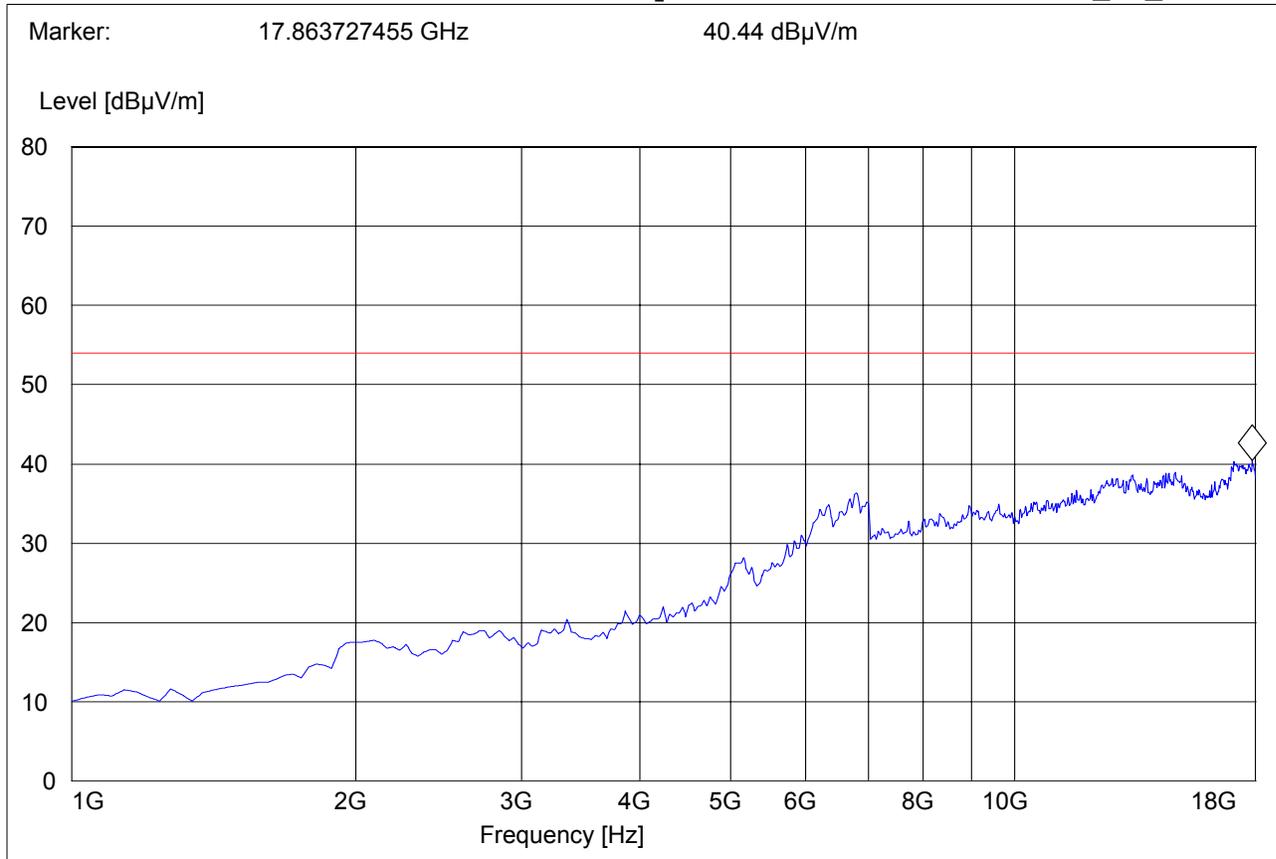
**EUT in Idle Mode: 3GHz – 18GHz**

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

EUT / Description: GC86, S/N: BL3029603  
 Customer: Sony Ericsson  
 Operating Mode: GSM1900, IDLE MODE ,TABLE 360° ROTATE  
 Antenna: V  
 EUT: H, WITH EXTERNAL ANTENNA  
 Test Engineer: ED  
 Voltage: AC ADAPTOR  
 Sweep: CANADA RE\_3-18G

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

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





**RECEIVER RADIATED EMISSIONS**

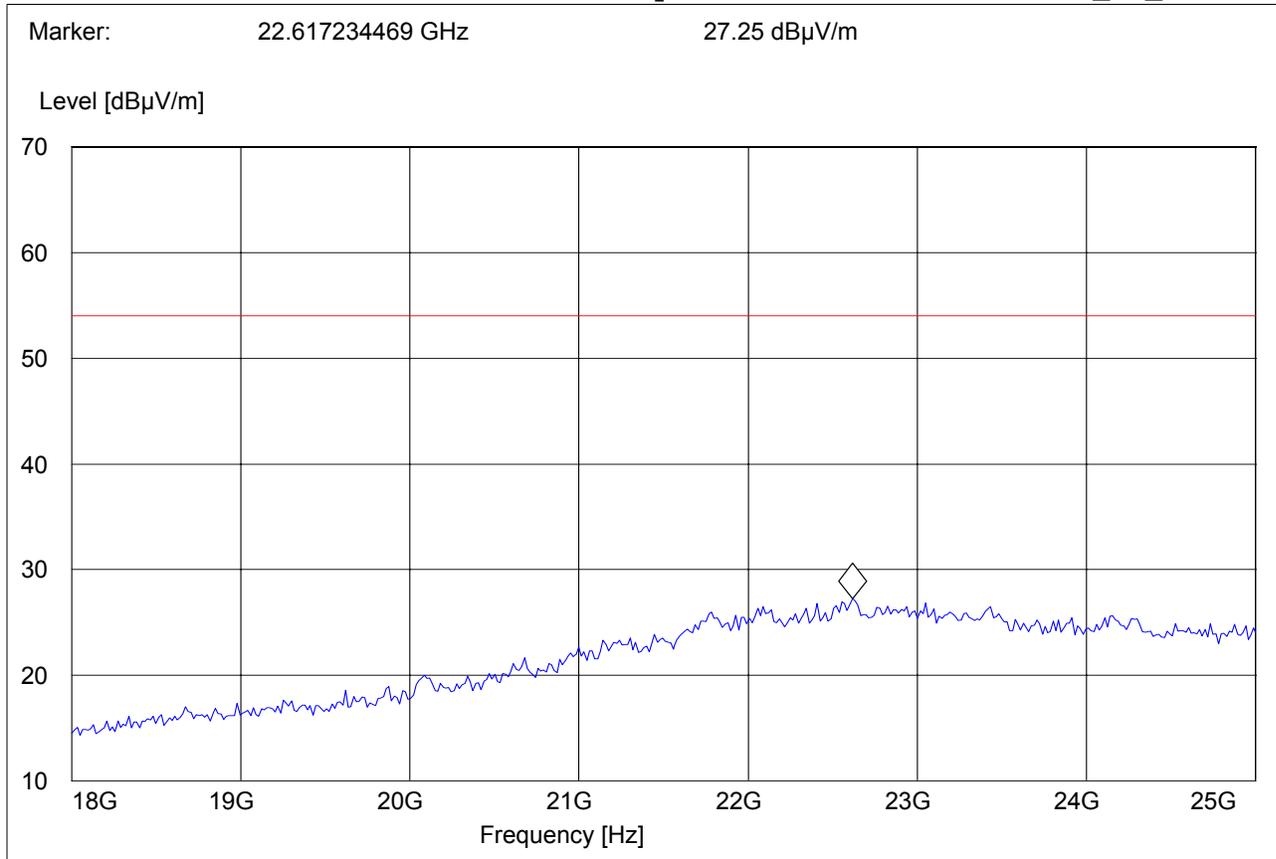
**EUT in Idle Mode: 18GHz – 19.1GHz**

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

EUT / Description: GC86, S/N: BL3029603  
 Customer: Sony Ericsson  
 Operating Mode: GSM1900, IDLE MODE ,TABLE 360° ROTATE  
 Antenna: V  
 EUT: H, WITH EXTERNAL ANTENNA  
 Test Engineer: ED  
 Voltage: AC ADAPTOR  
 Sweep: CANADA RE\_18-26.5G

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

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



**5.7 AC POWERLINE CONDUCTED EMISSIONS****§ 15.107/207****Technical specification: 15.107 / 15.207 (Revised as of August 20, 2002)****Limit**

Frequency of Emission (MHz)	Conducted Limit (dB $\mu$ V)	
	Quasi-Peak	Average
0.15 – 0.5	66 to 56*	56 to 46*
0.5 – 5	56	46
5 – 30	60	50

\* Decreases with logarithm of the frequency

**ANALYZER SETTINGS: RBW = 10KHz VBW = 10KHz**

Prescans were performed on both 850/1900 bands, full testing on the worst-case band is submitted in the test report.



**5.7.1 Results EUT**

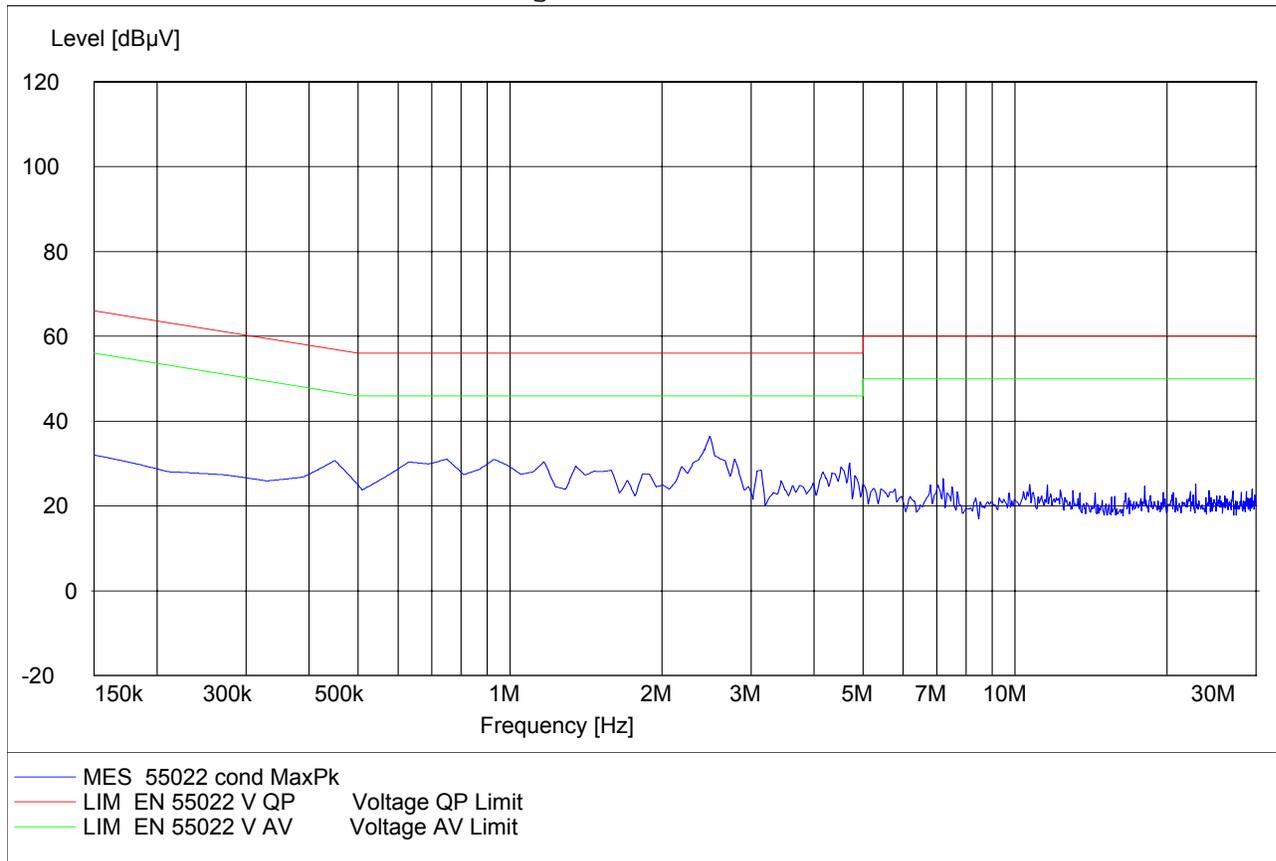
**LISN**

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

EUT / Description: GC86, S/N: BL3029603  
 Manufacturer: Sony Ericsson  
 Test mode: EGPRS1900, CH 512 , TABLE 113° ROTATE  
 EUT: H  
 Antenna: H  
 Test Engineer: SATYA  
 Comment: 55022

**SWEEP TABLE: "EN 55022 Voltage"**

Short Description:		EN 55022 Voltage			
Start	Stop	Detector	Meas. Time	IF Bandw.	Transducer
150.0 kHz	30.0 MHz	MaxPeak Average	Coupled	9 kHz	None



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

<b>No</b>	<b>Instrument/Ancillary</b>	<b>Type</b>	<b>Manufacturer</b>	<b>Serial No.</b>	<b>Cal Due</b>	<b>Interval</b>
01	Spectrum Analyzer	ESIB 40	Rohde & Schwarz	100107	May 2007	1 year
02	Spectrum Analyzer	FSEM 30	Rohde & Schwarz	100017	August 2007	1 year
03	Signal Generator	SMY02	Rohde & Schwarz	836878/011	May 2007	1 year
04	Power-Meter	NRVD	Rohde & Schwarz	0857.8008.02	May 2007	1 year
05	Biconilog Antenna	3141	EMCO	0005-1186	June 2006	1 year
06	Horn Antenna (1-18GHz)	SAS-200/571	AH Systems	325	June 2006	1 year
07	Horn Antenna (18-26.5GHz)	3160-09	EMCO	1240	June 2006	1 year
08	Power Splitter	11667B	Hewlett Packard	645348	n/a	n/a
09	Climatic Chamber	VT4004	Voltsch	G1115	May 2007	1 year
10	High Pass Filter	5HC2700	Trilithic Inc.	9926013	n/a	n/a
11	High Pass Filter	4HC1600	Trilithic Inc.	9922307	n/a	n/a
12	Pre-Amplifier	JS4-00102600	Miteq	00616	May 2007	1 year
13	Power Sensor	URV5-Z2	Rohde & Schwarz	DE30807	May 2007	1 year
14	Digital Radio Comm. Tester	CMD-55	Rohde & Schwarz	847958/008	May 2007	1 year
15	Universal Radio Comm. Tester	CMU 200	Rohde & Schwarz	832221/06	May 2007	1 year
16	LISN	ESH3-Z5	Rohde & Schwarz	836679/003	May 2007	1 year
17	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.

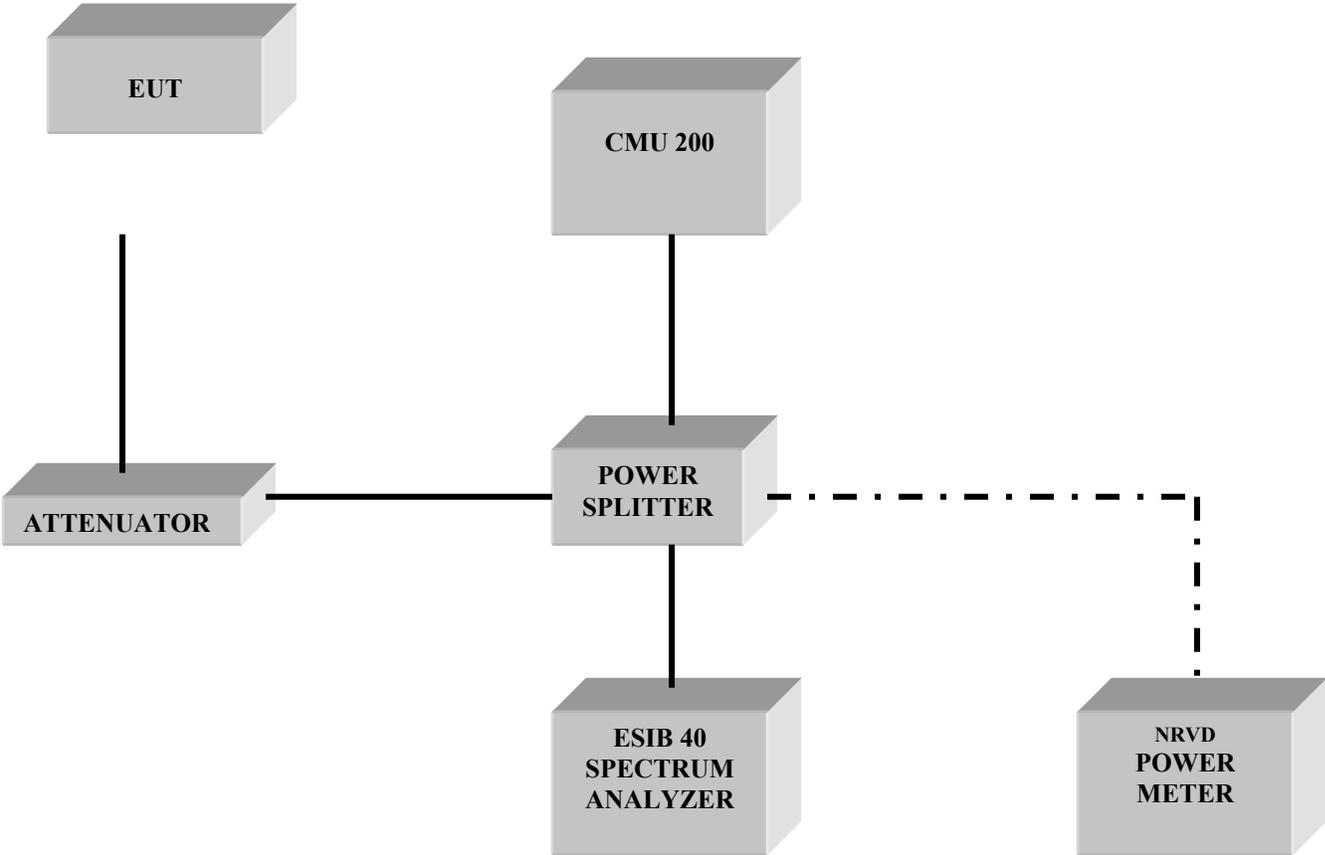
Title 47—Telecommunication, CHAPTER I--FEDERAL COMMUNICATIONS COMMISSION, PART 24 PERSONAL COMMUNICATIONS SERVICES October 1, 1998.

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**

