

Test Report

Report Number: 3154295MPK-001

Project Number: 3154295

Report Date: June 30, 2008

**Testing performed on the
Part 24 Repeater
Model Number: SO4YX400-PCS**

FCC ID: SO4YX400-PCS

IC ID: 5544A-YX400PCS

to

FCC Part 24 Subpart E

for

Wireless Extenders, Inc.

Test Performed by:

Intertek Testing Services NA, Inc
1365 Adams Court
Menlo Park, CA 94025

Test Authorized by:

Wireless Extenders, Inc.
One Mecca Way
Norcross, GA 30093

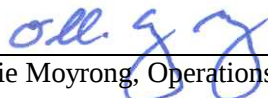
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Date: June 30, 2008

Reviewed by:



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Date: June 30, 2008

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1.0 Introduction

1.1 Product Description

The Equipment Under Test (EUT), model SO4YX400-PCS is a Part 24 Repeater.

Whether quantity (>1) production is planned	Yes
Type	Repeater
Rated RF Output Power	18.8 dBm for CDMA2000 Uplink 18.6 dBm for CDMA2000 DOWNlink 9.5 dBm for WCDMA Uplink 10.9 dBm for WCDMA DOWNlink 17.6 dBm for GSM Uplink 18.1 dBm for GSM DOWNlink 17.7 dBm for EDGE Uplink 18.5 dBm for EDGE DOWNlink
Frequency Ranges, MHz	1930 – 1990 MHz 1850 – 1910 MHz
Type of modulation	CDMA2000, WCDMA, GSM, EDGE
Channel bandwidth	1268 kHz for CDMA2000 4212 kHz for WCDMA 246 kHz for GSM 251 kHz for EDGE
Antenna & Gain	8 dBi
Detachable antenna	No
Operating temperature	-30 ⁰ C to +55 ⁰ C

EUT receive date:	June 11, 2008
EUT receive condition:	The prototype version of the EUT was received in good condition with no apparent damage. As declared by the Applicant it is identical to the production units.
Test start date:	June 11, 2008
Test completion date:	June 18, 2008

1.2 Summary of Test Results

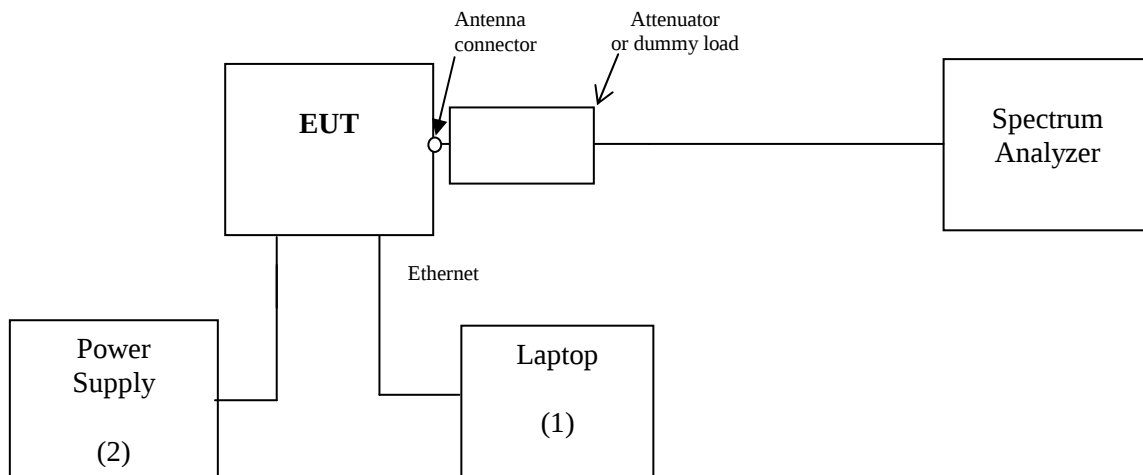
FCC Rule	RSS-133 Rule	Description of Test	Result
2.1046	6.4	RF Power Output	Complies
24.232	6.4	EIRP	Complies
2.1047	-	Modulation characteristics	Not Applicable
2.1049		Occupied Bandwidth	Complies
2.1051, 24.238	6.5	Out of Band Emissions at Antenna Terminals	Complies
2.1053, 24.238	6.5	Transmitter Spurious Radiation	Complies
2.1055, 24.235	6.3	Frequency Stability vs. Temperature and Voltage	Not Applicable
2.1091	RSS-102	RF Exposure evaluation	Complies
15.109	6.7	Receiver Radiated Emissions	Complies

1.3 Test Configuration

1.3.1 Support Equipment

Item #	Description	Model No.
1	Laptop	Compaq nc6220
2	Alpha Technologies Power Supply	APX 6008

1.3.2 Block diagram of Test Setup



S = Shielded U = Unshielded	F = With Ferrite m = Length in Meters
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1.3.3 Mode of operation

During the testing the EUT was setup in the test mode allows to select the frequency, the modulation and the power level. The transmitter was setup to transmit continuously.

1.4 Related Submittal(s) Grants

None

2.0 RF Power Output

FCC 2.1046

2.1 Test Procedure

The EUT RF output was connected as shown on the diagram in sec.1.3.2. The EUT was setup to transmit continuously the maximum power.

The spectrum analyzer was setup with CDMA2000 personality option. The attenuation and cable loss were added to the spectrum analyzed reading by using OFFSET function.

Measurements were performed at three frequencies (low, middle, and high channels).

2.2 Test Equipment

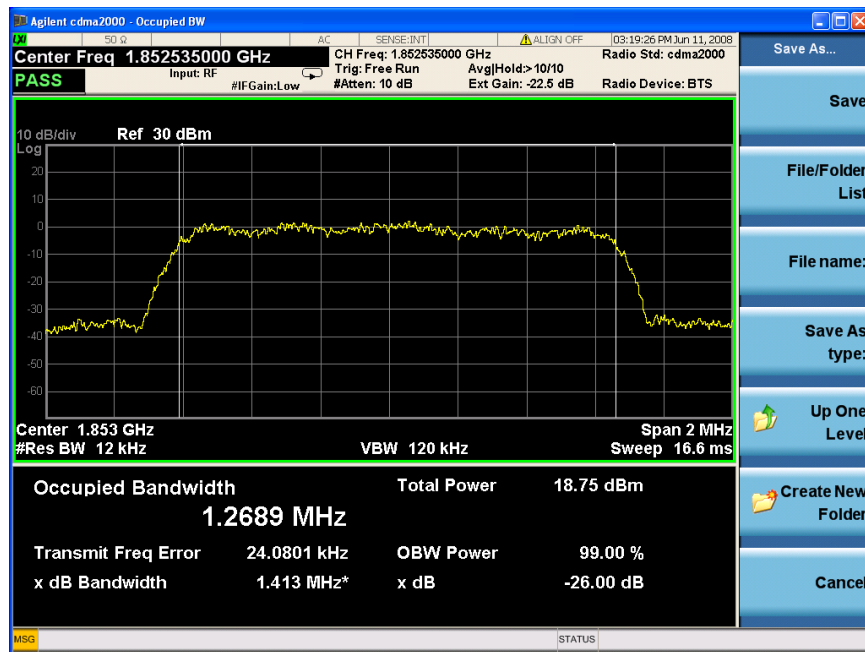
Agilent ESA Spectrum Analyzer

2.3 Test Results

Frequency (MHz)	Measured Maximum Output Power (dBm)			
	CDMA	WCDMA	EDGE	GSM
Uplink				
1852.56	18.8	9.5	17.2	17.6
1877.56	18.6	6.4	17.7	17.5
1907.56	17.5	6.6	17.2	17.6
Downlink				
1932.6	18.6	10.9	18.5	18.1
1957.6	18.3	10.0	17.7	17.3
1987.6	17.2	6.4	16.3	17.6

For more details refer to the attached Graphs.

Graph 2.1



Graph 2.2



Graph 2.3



Graph 2.4



Graph 2.5



Graph 2.6



Graph 2.7



Graph 2.8



Graph 2.9



Graph 2.10



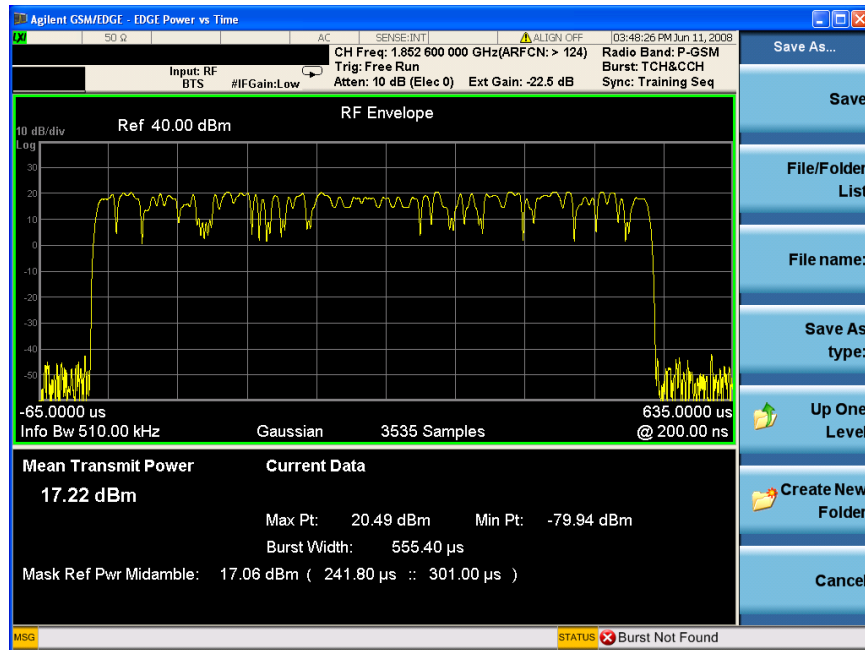
Graph 2.11



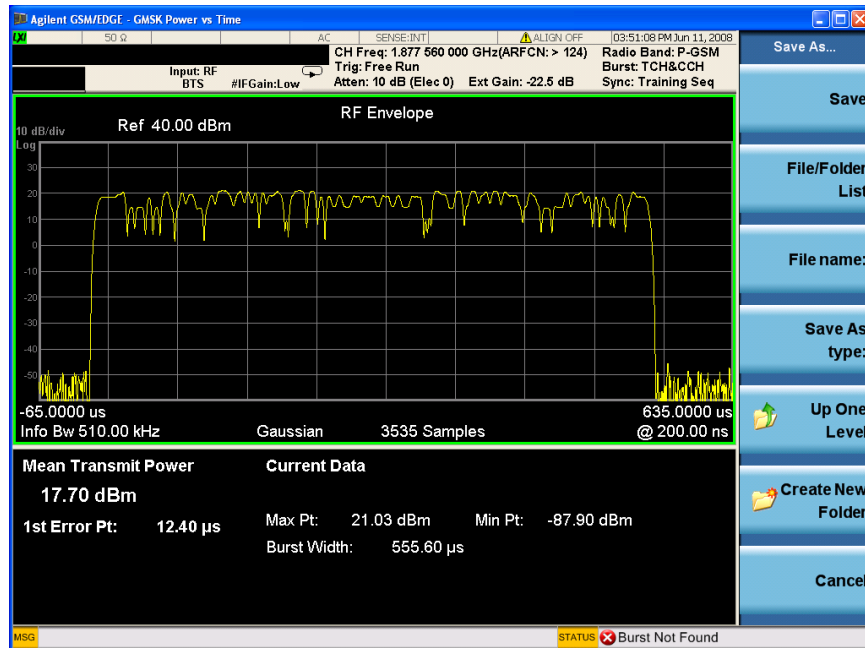
Graph 2.12



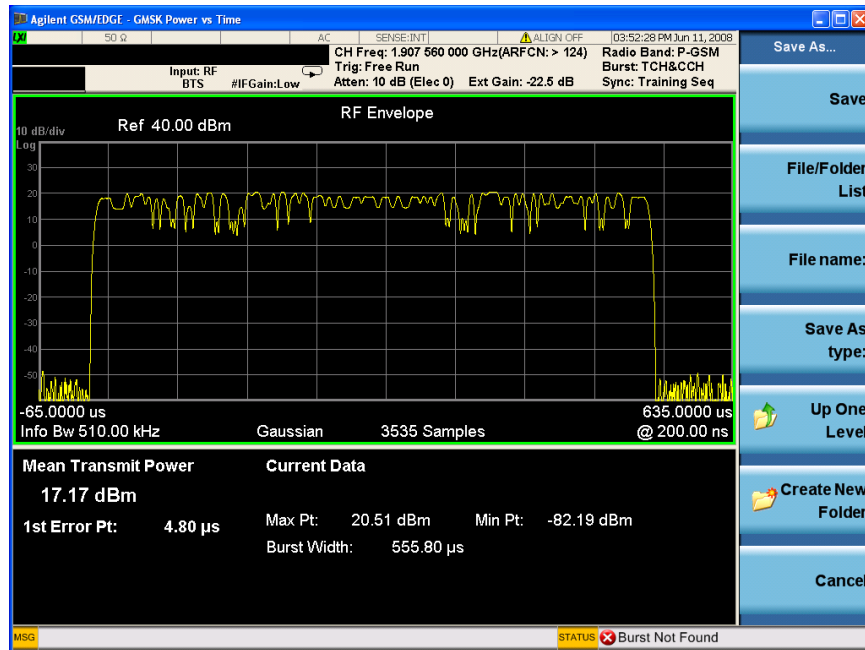
Graph 2.13



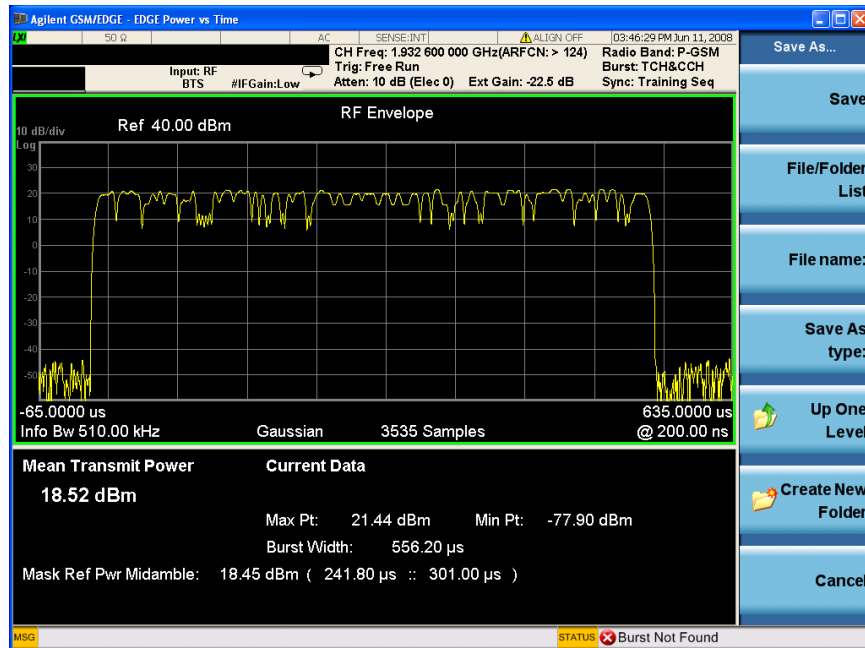
Graph 2.14



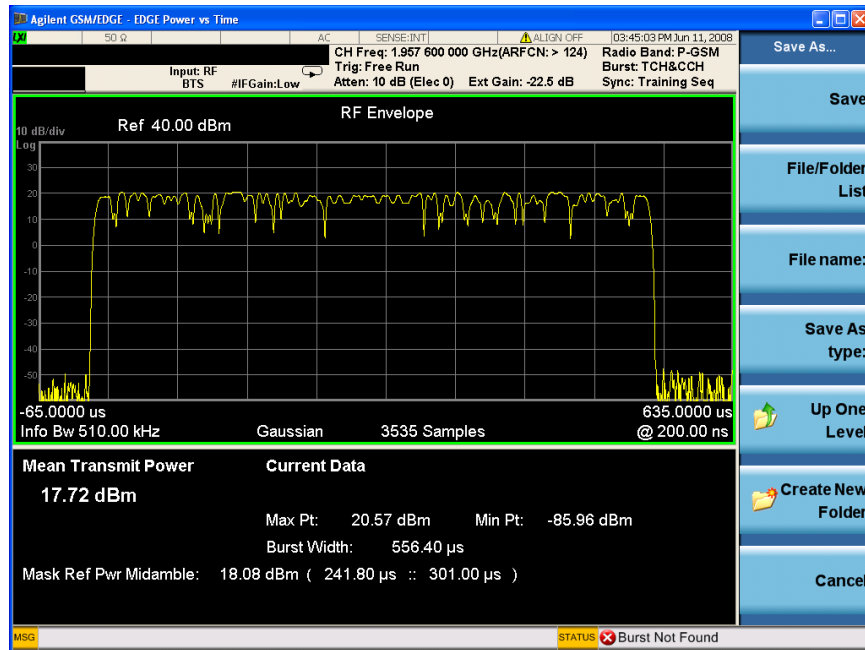
Graph 2.15



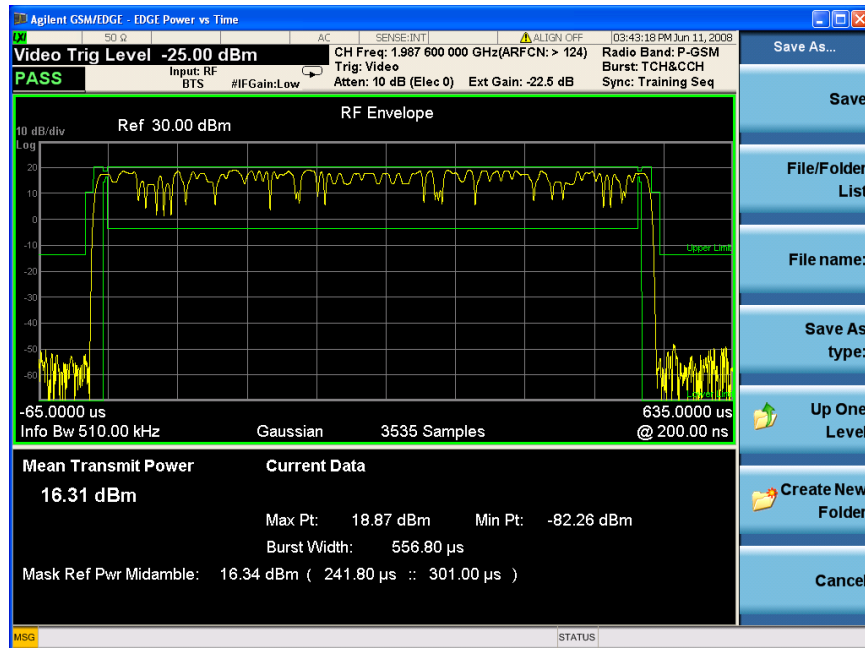
Graph 2.16



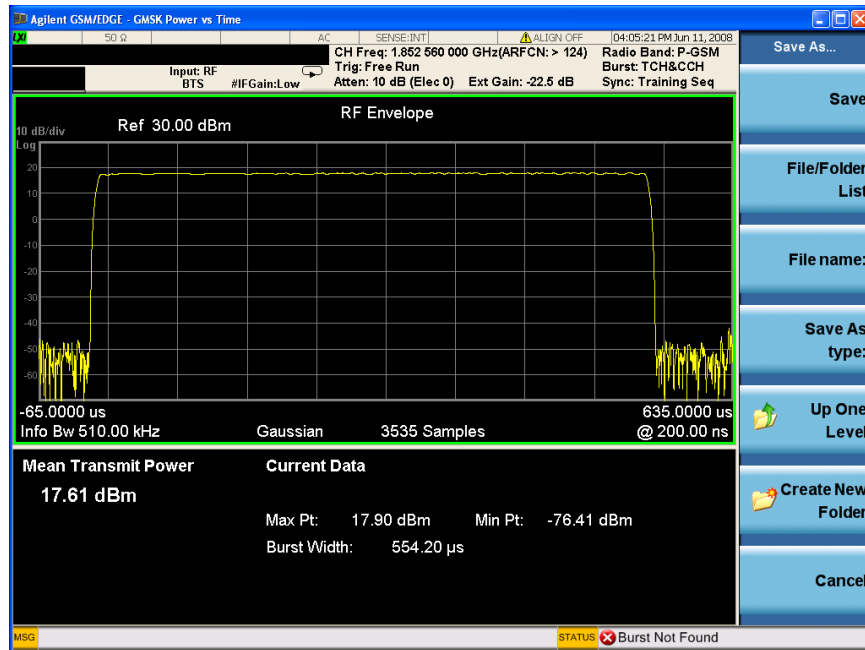
Graph 2.17



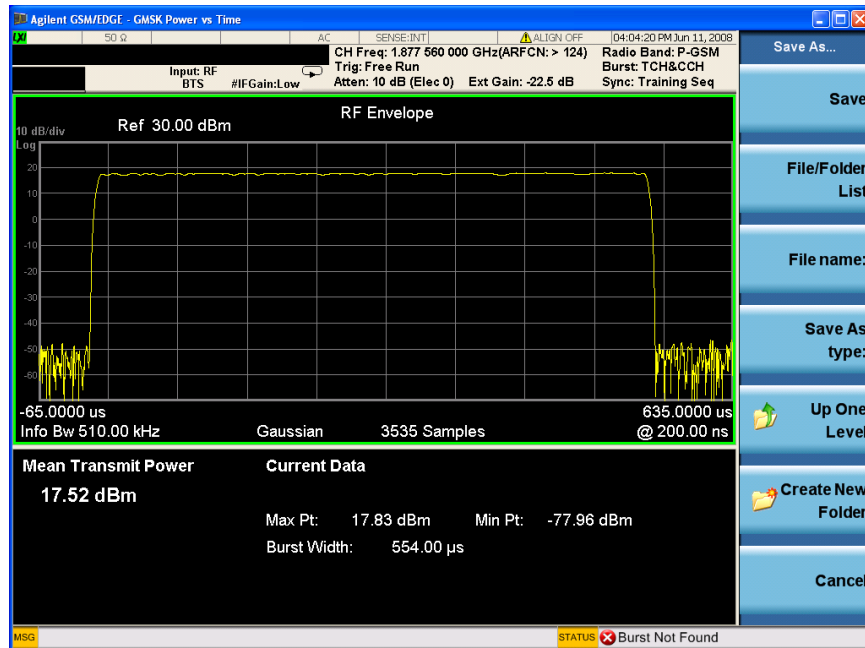
Graph 2.18



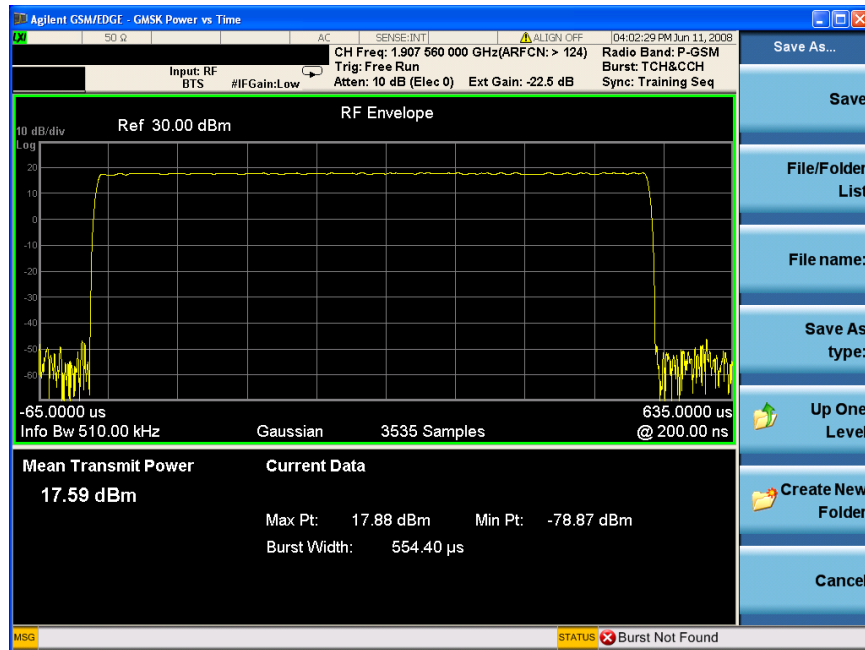
Graph 2.19



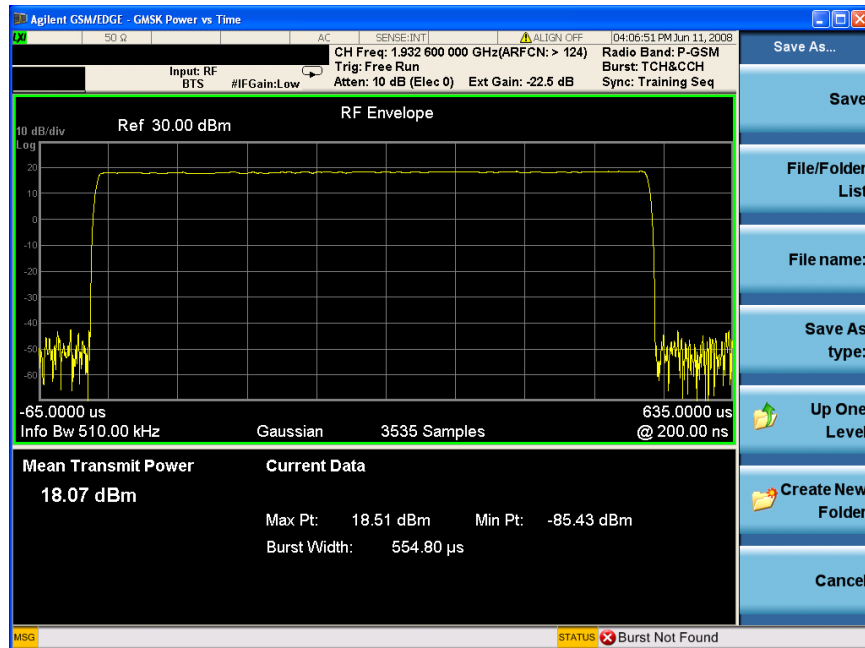
Graph 2.20



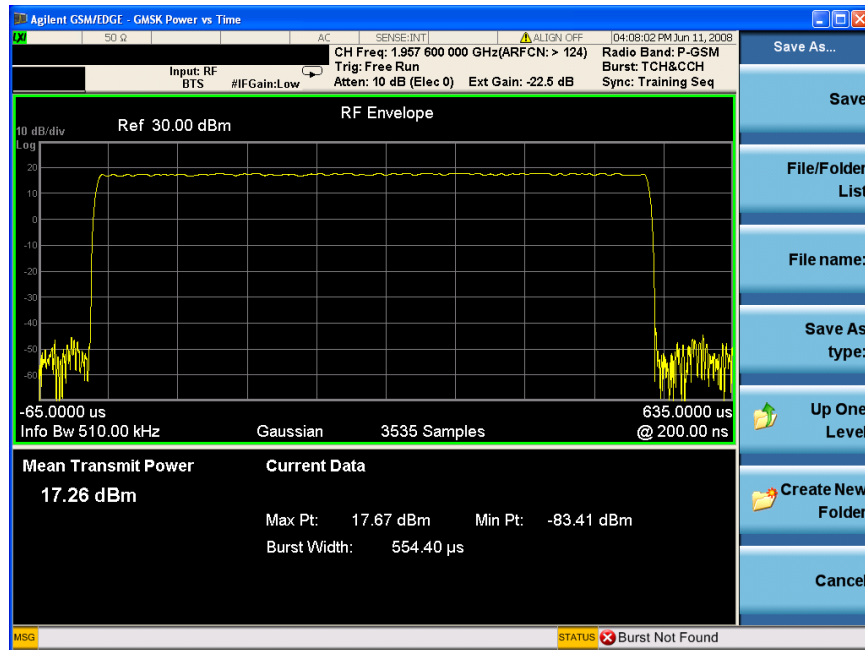
Graph 2.21



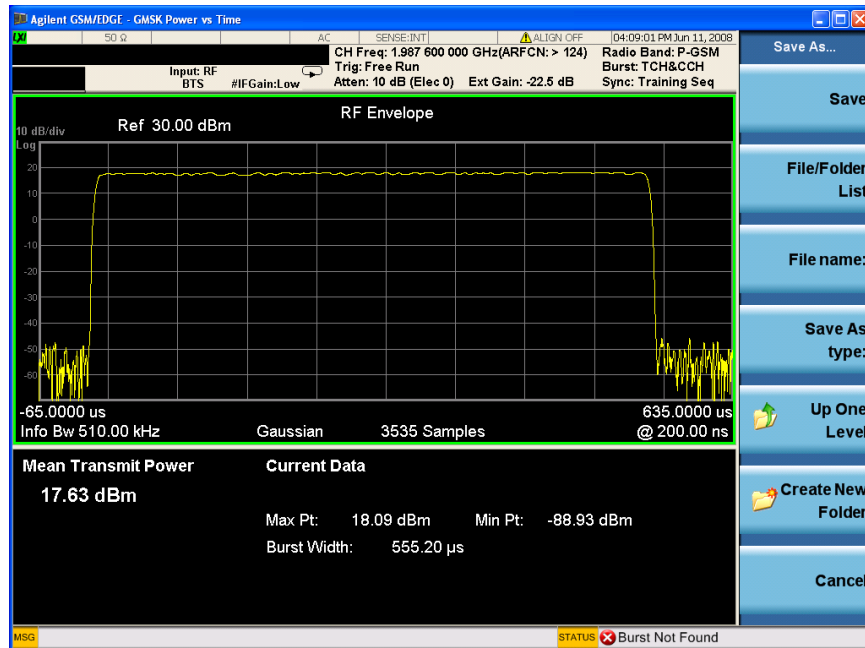
Graph 2.22



Graph 2.23



Graph 2.24



3.0 Radiated Power

FCC 24.232

3.1 Requirement

FCC 24.232(b)

Mobile/portable stations are limited to 2 watts EIRP peak power

3.2 Test Procedure

The EIRP is calculated by adding the antenna gain to the output power in dBm: $EIRP = P_{max} + G_{dBi}$
 As declared by the Applicant, the maximum gain of an antenna, used with the SO4YX400-PCS, is 8 dBi.
 Therefore, the maximum EIRP is as follows:

3.3 Test Results

Frequency (MHz)	Maximum EIRP (dBm)			
	CDMA	WCDMA	EDGE	GSM
Uplink				
1852.56	26.8	17.5	25.2	25.6
1877.56	26.6	14.4	25.7	25.5
1907.56	25.5	14.6	25.2	25.6
Downlink				
1932.6	26.6	18.9	26.5	26.1
1957.6	26.3	18.0	25.7	25.3
1987.6	25.2	14.4	24.3	25.6

For more details refer to Graphs 2.1 – 2.24 located in report section 2.3.

Result	Complies
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4.0 Occupied Bandwidth

FCC 2.1049

4.1 Test Procedure

The EUT RF output was connected as shown on the diagram in sec.1.3.2. The EUT was setup to transmit the maximum power.

The spectrum analyzer was setup to measure the Occupied Bandwidth (defined as the 99% Power Bandwidth). The Occupied Bandwidth was measured at low, middle, and high channels.

4.2 Test Equipment

Rohde & Schwarz FSP40 Spectrum Analyzer

4.3 Test Results

Frequency (MHz)	Occupied Bandwidth, kHz							
	CDMA		WCDMA		EDGE		GSM	
	Input	Output	Input	Output	Input	Output	Input	Output
Uplink								
1877.56	1264	1264	4176	4188	247	244	245	244
Downlink								
1957.6	1268	1264	4212	4176	244	251	245	246

For more details refer to the attached plots.

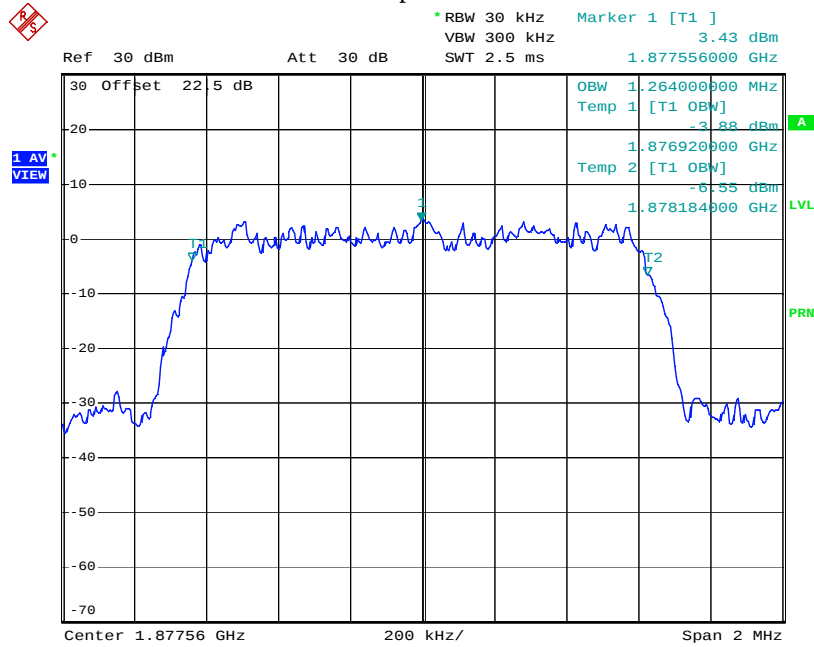
Emission Designator:

GXW – for GSM

G7W – for EDGE

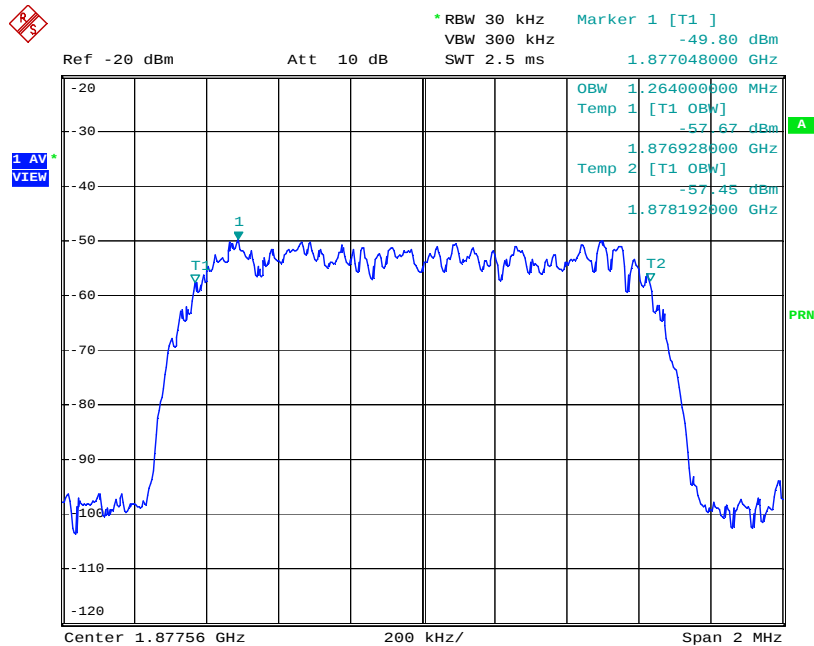
F9W – for CDMA/WCDMA

Graph 4.1



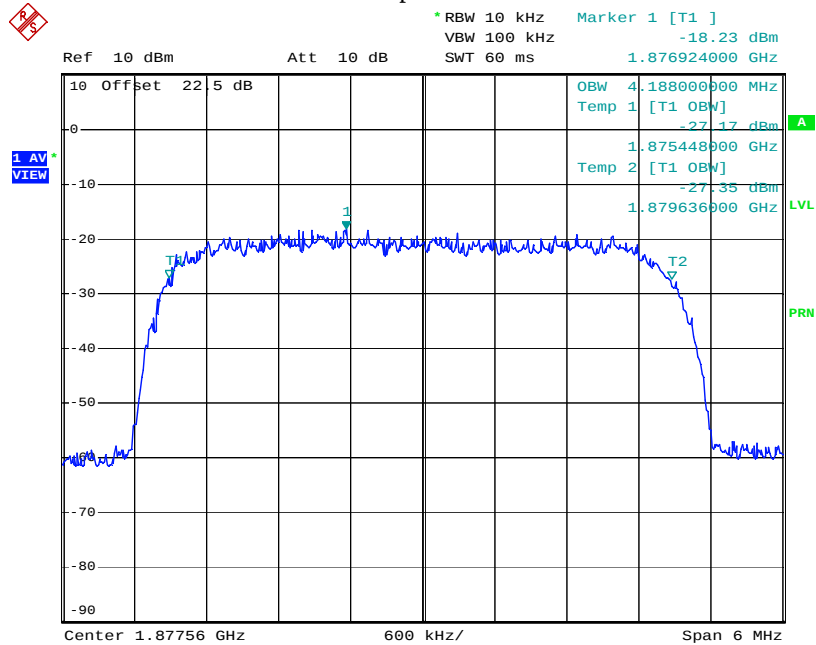
Comment: Occupied bandwidth, Uplink, CDMA, output
Date: 12.JUN.2008 16:35:31

Graph 4.2



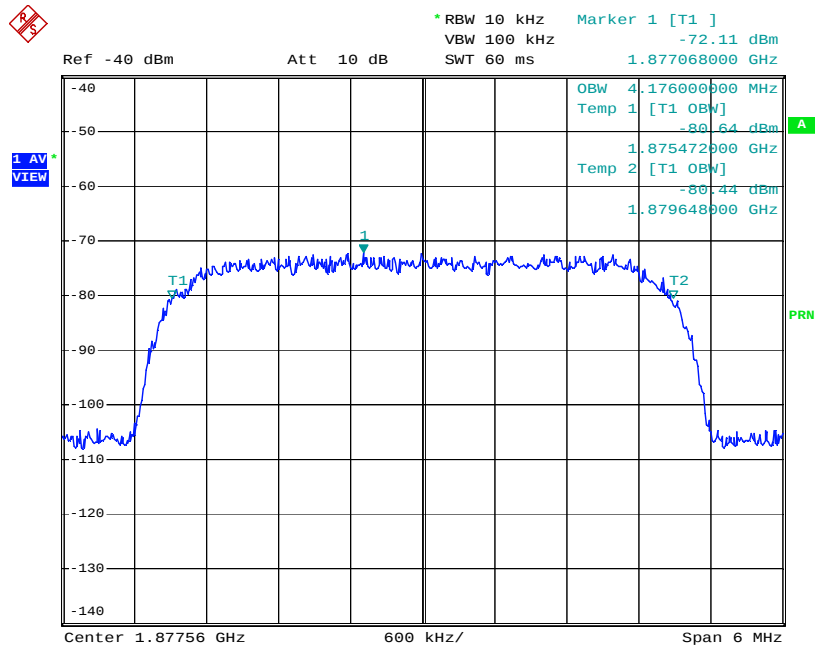
Comment: Occupied bandwidth, Uplink, CDMA, input
Date: 12.JUN.2008 16:38:41

Graph 4.3



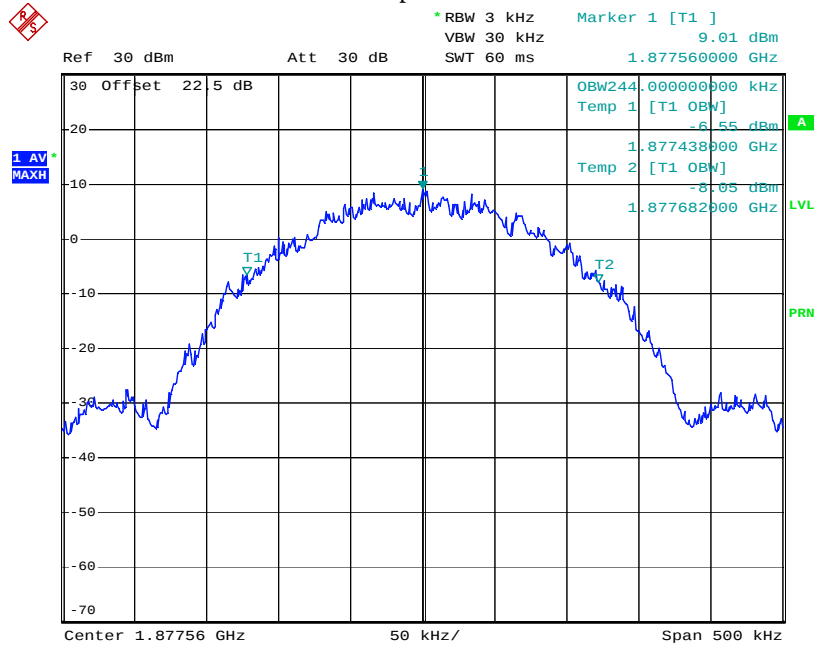
Comment: Occupied bandwidth, UPLink, WCDMA, output
Date: 12.JUN.2008 19:37:54

Graph 4.4



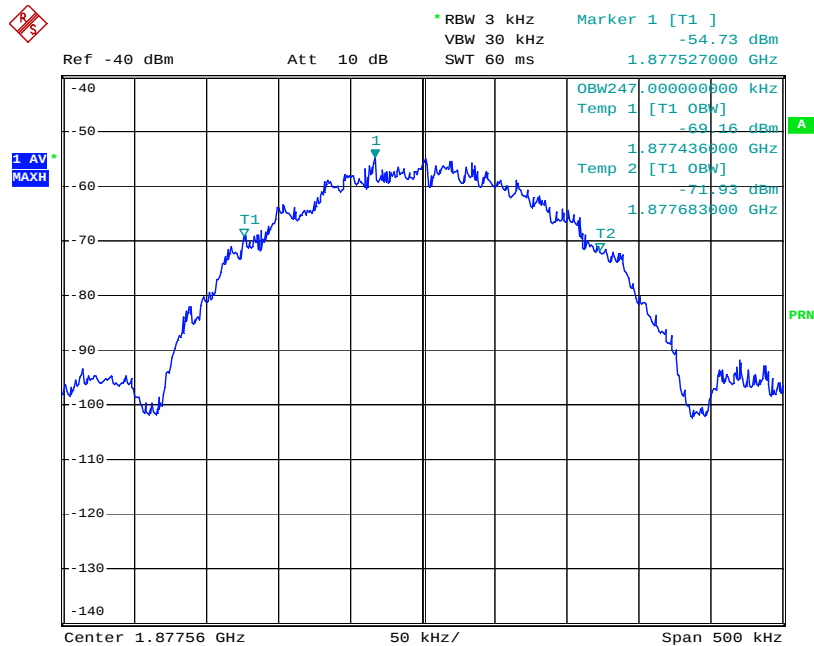
Comment: Occupied bandwidth, UPLink, WCDMA, input
Date: 12.JUN.2008 19:39:50

Graph 4.5



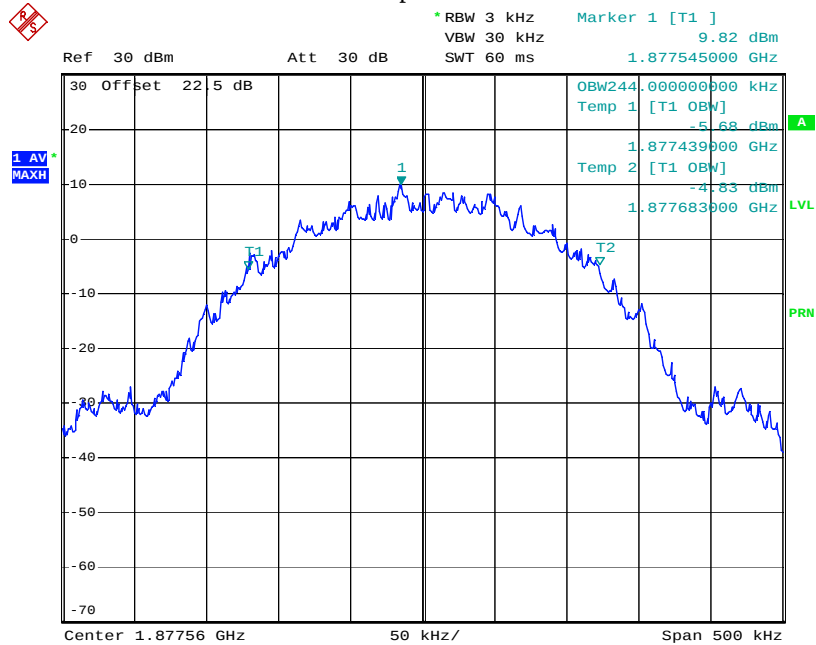
Comment: Occupied bandwidth, UPLink, EDGE, output
Date: 12.JUN.2008 19:45:15

Graph 4.6



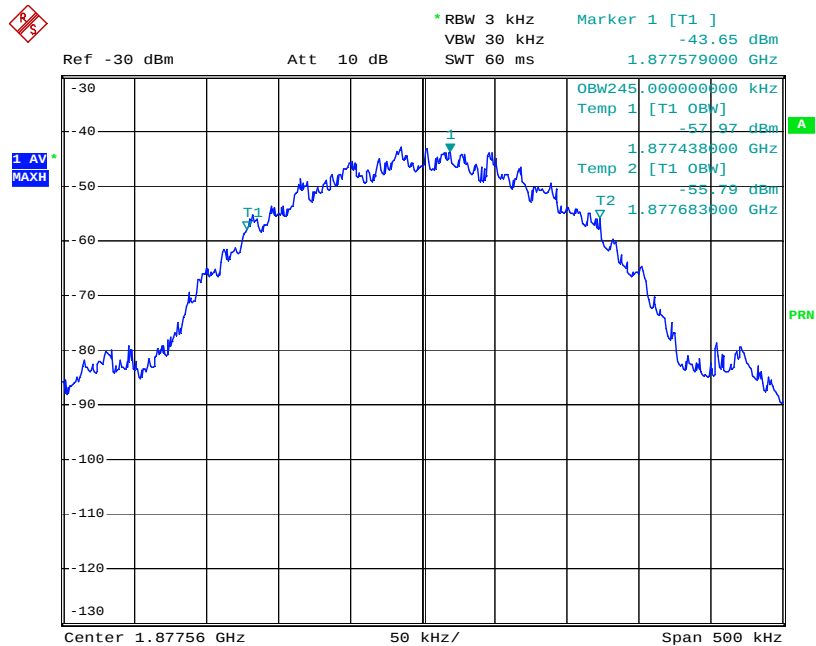
Comment: Occupied bandwidth, UPLink, EDGE, input
Date: 12.JUN.2008 19:42:46

Graph 4.7



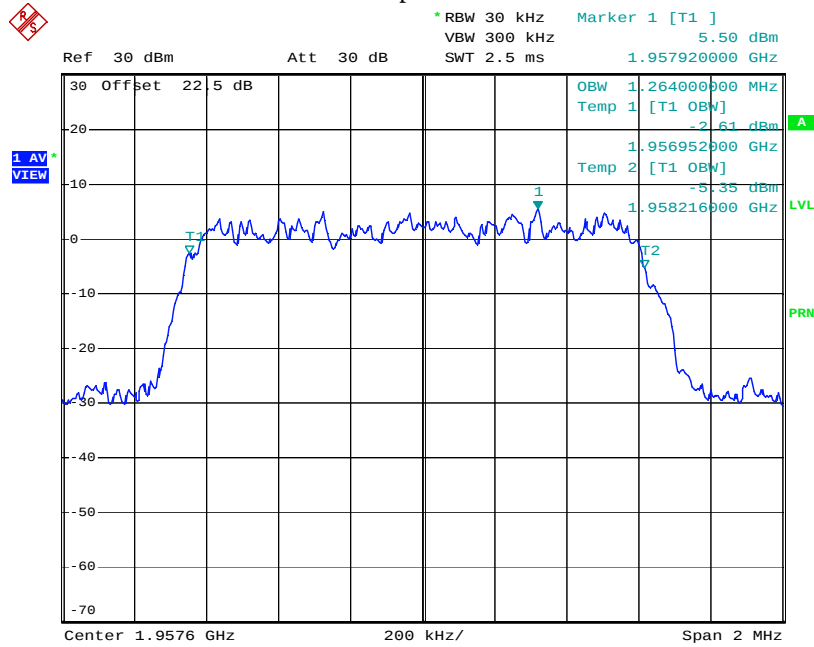
Comment: Occupied bandwidth, UPLink, GSM, output
Date: 12.JUN.2008 19:33:24

Graph 4.8



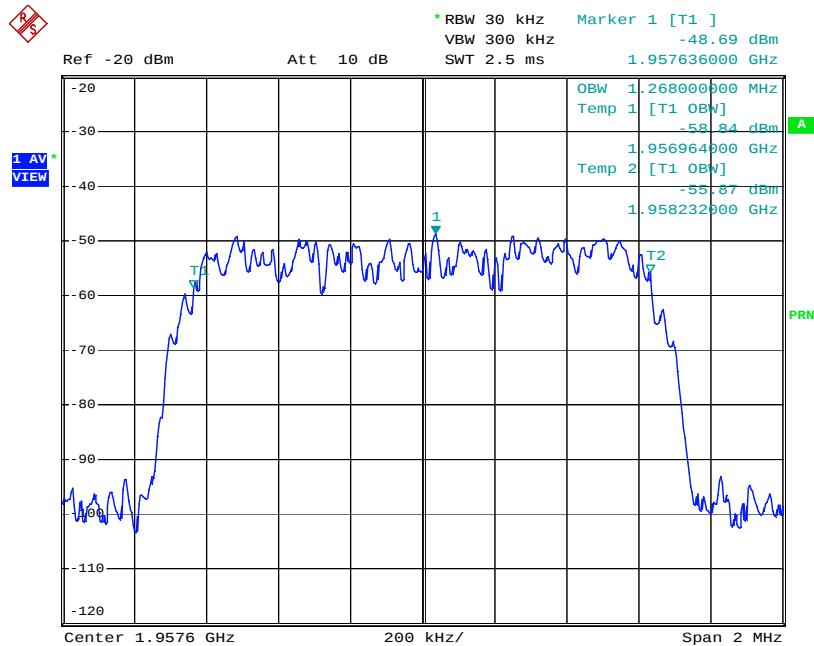
Comment: Occupied bandwidth, UPLink, GSM, input
Date: 12.JUN.2008 19:29:31

Graph 4.9



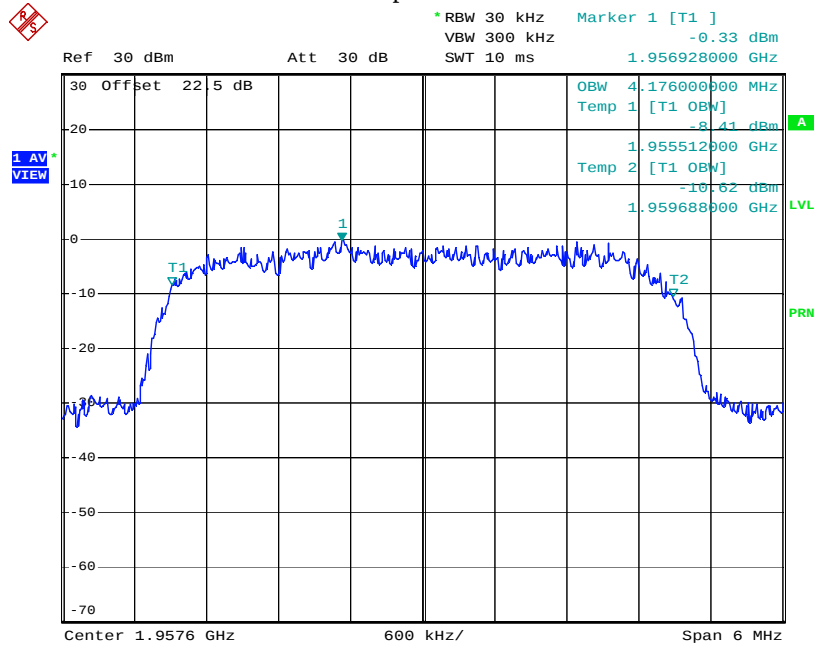
Comment: Occupied bandwidth, Downlink, CDMA, output
Date: 12.JUN.2008 16:58:29

Graph 4.10



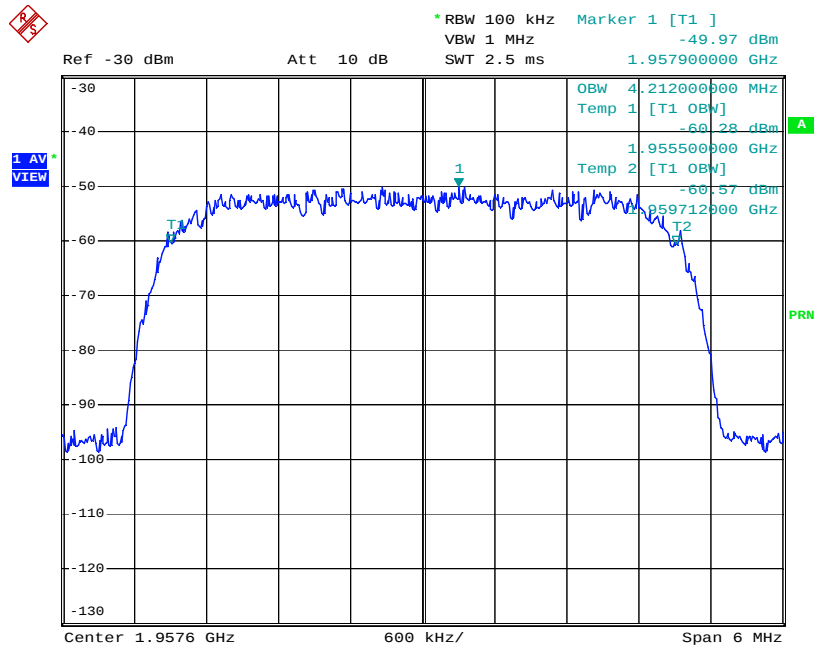
Comment: Occupied bandwidth, Downlink, CDMA, input
Date: 12.JUN.2008 16:40:59

Graph 4.11



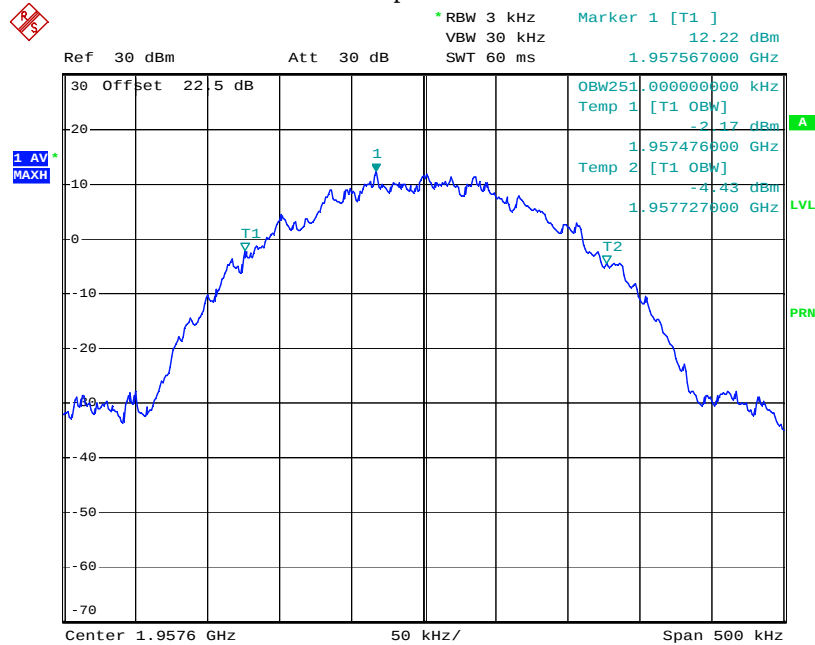
Comment: Occupied bandwidth, Downlink, WCDMA, output
Date: 12.JUN.2008 17:07:12

Graph 4.12



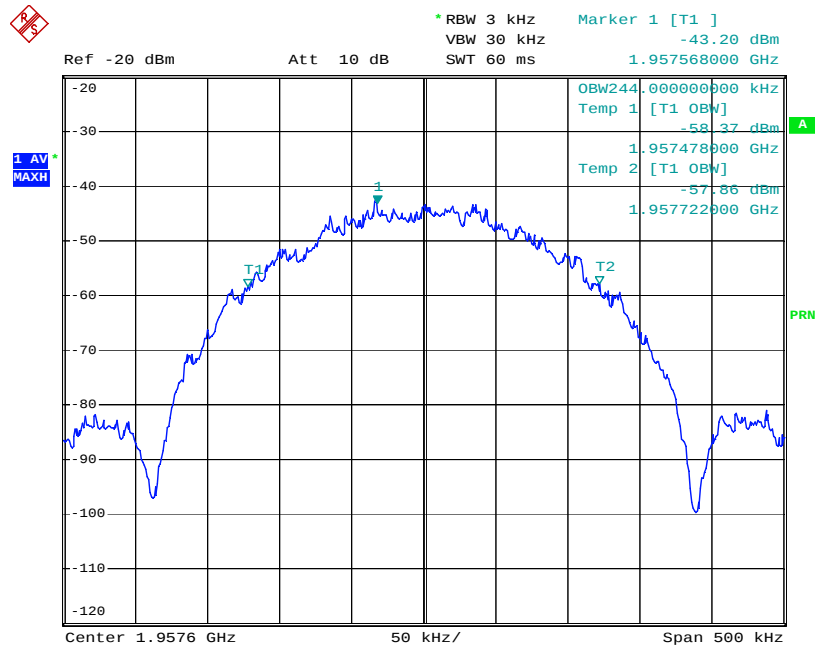
Comment: Occupied bandwidth, Downlink, WCDMA, input
Date: 12.JUN.2008 17:10:28

Graph 4.13



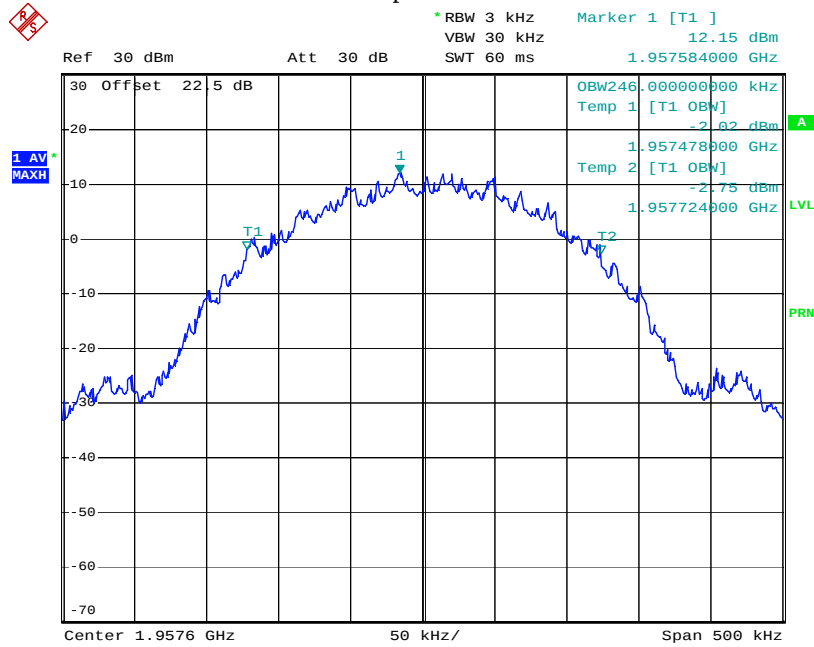
Comment: Occupied bandwidth, Downlink, EDGE, output
Date: 12.JUN.2008 17:44:22

Graph 4.14



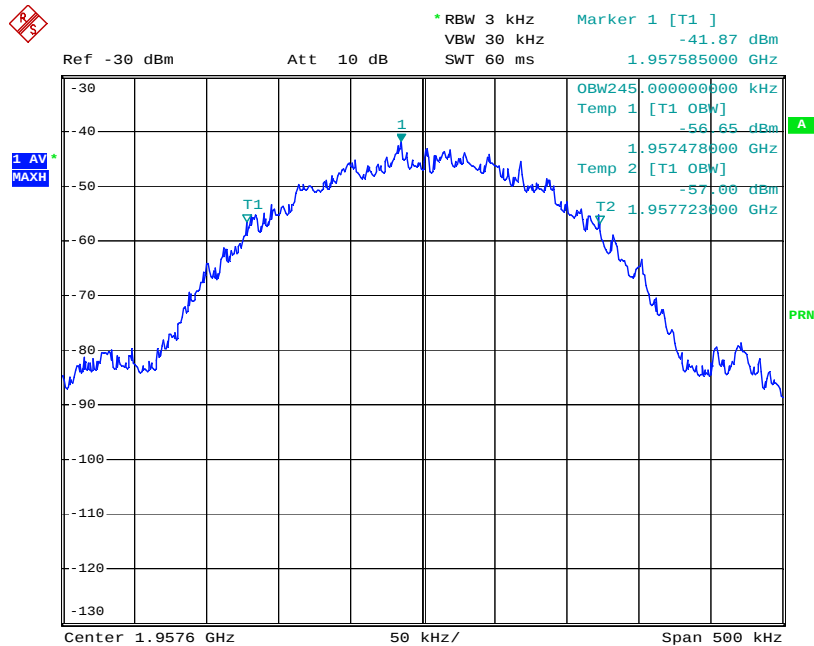
Comment: Occupied bandwidth, Downlink, EDGE, input
Date: 12.JUN.2008 17:19:21

Graph 4.15



Comment: Occupied bandwidth, Downlink, GSM, output
Date: 12.JUN.2008 19:22:00

Graph 4.16



Comment: Occupied bandwidth, Downlink, GSM, input
Date: 12.JUN.2008 19:24:04

5.0 Out-of-Band Emissions at antenna terminal

FCC 2.1051, 24.238

5.1 Requirement

The power of any emissions 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.

Note: That corresponds to the level of -13 dBm for any out-of-band and spurious emissions.

5.2 Test Procedure

The EUT RF output was connected as shown on the diagram in sec.1.3.2. The EUT was setup to transmit the maximum power.

For measurements, the spectrum analyzed resolution bandwidth (BW) was set to 1 MHz. However, in the 1 MHz bands immediately outside and adjacent to the frequency block, the BW was set to 3 kHz. If on frequencies more than 1 MHz away from the frequency block the $BW < 1$ MHz is used, the Bandwidth Correction Factor of $10\log(1_{\text{MHz}}/BW_{\text{MHz}})$ is added to the spectrum analyzed reading (included in the Reference Level OFFSET).

Measurements were performed at three frequencies (low, middle, and high channels).

Sufficient scans were taken to show the out-of-band and spurious emissions up to 10th harmonic.

5.3 Test Equipment

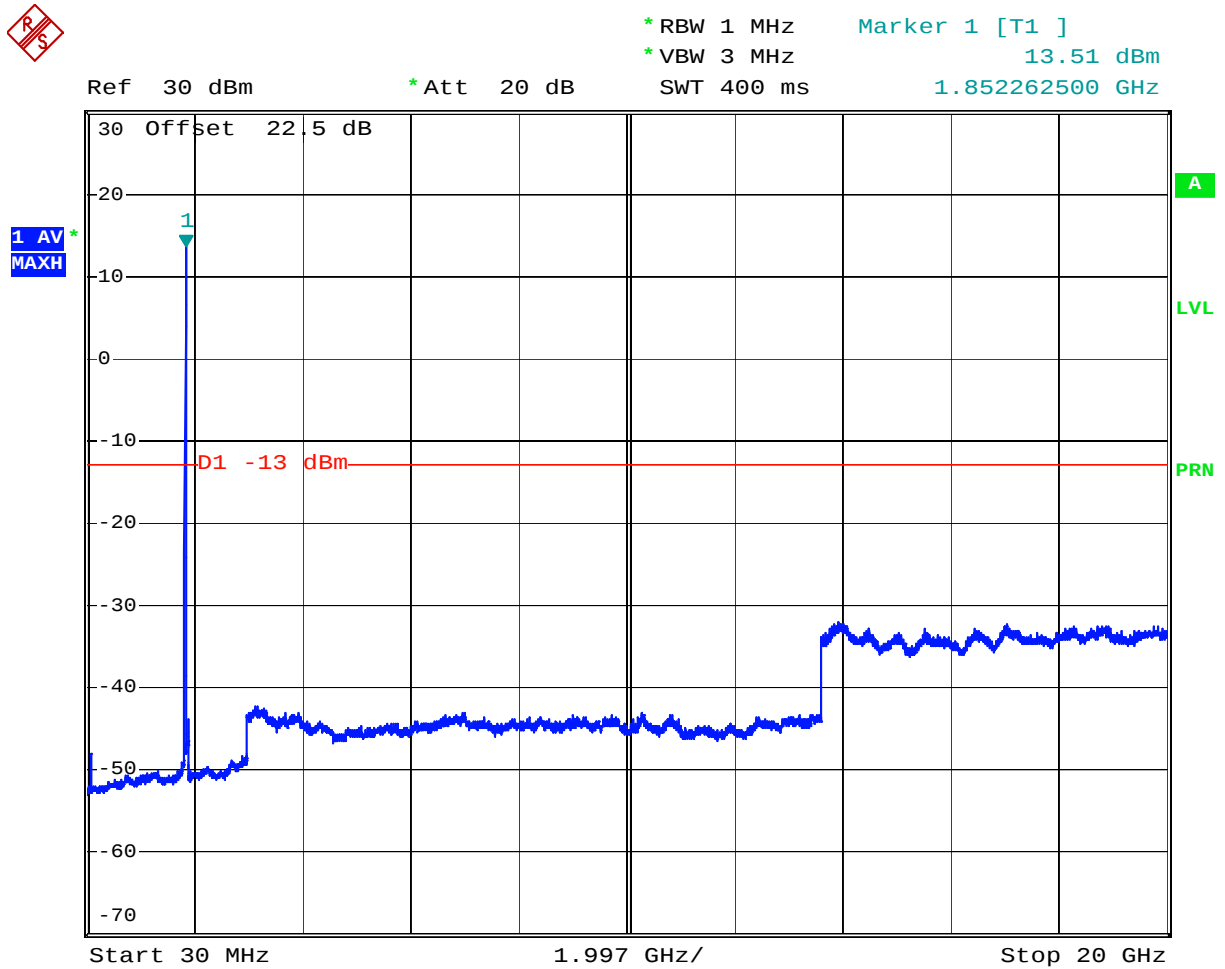
Rohde & Schwarz FSP40 Spectrum Analyzer

5.4 Test Results - Uplink

Result	Complies for CDMA, WCDMA, EDGE, GSM
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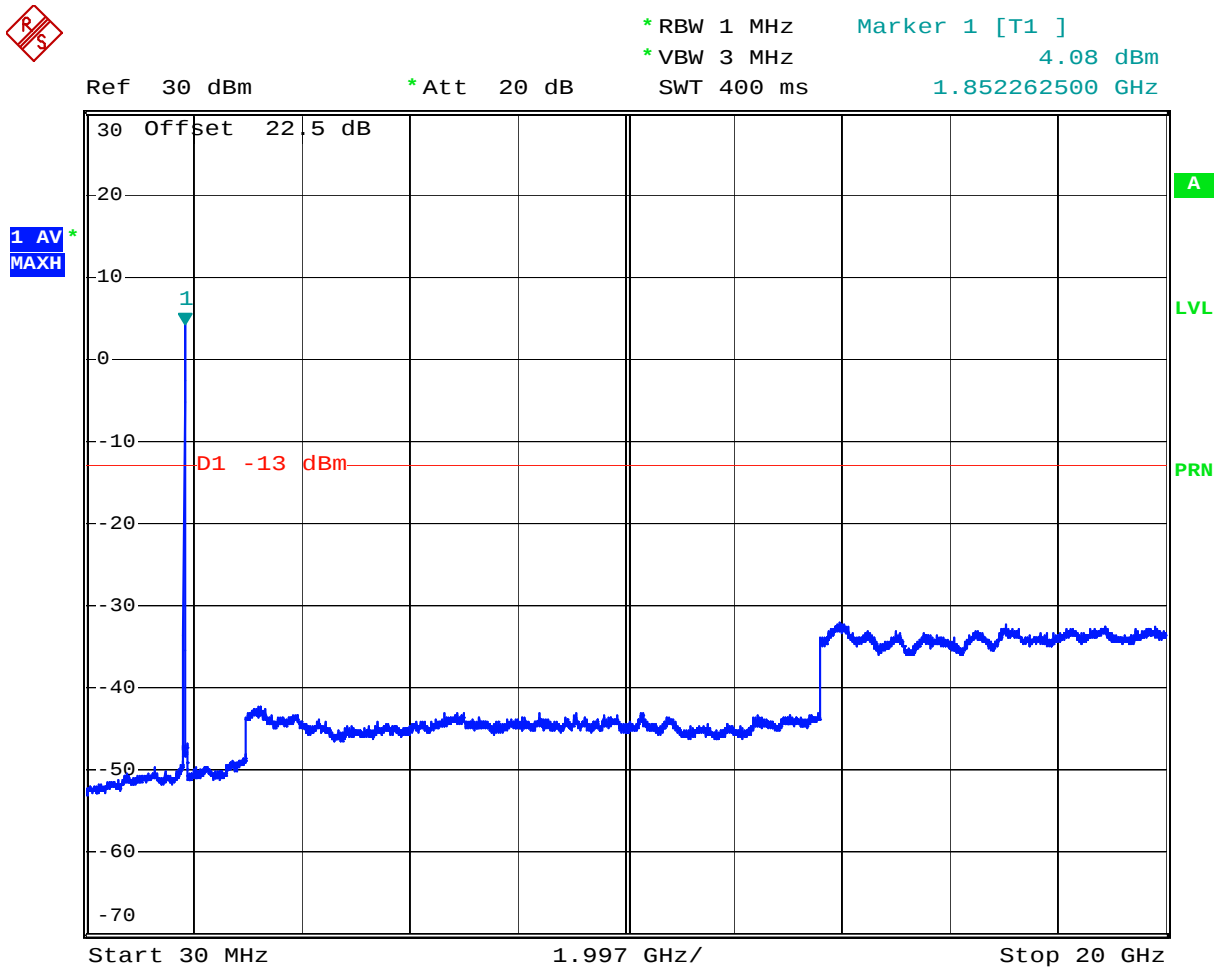
Refer to the following Graphs.

Graph 5.1



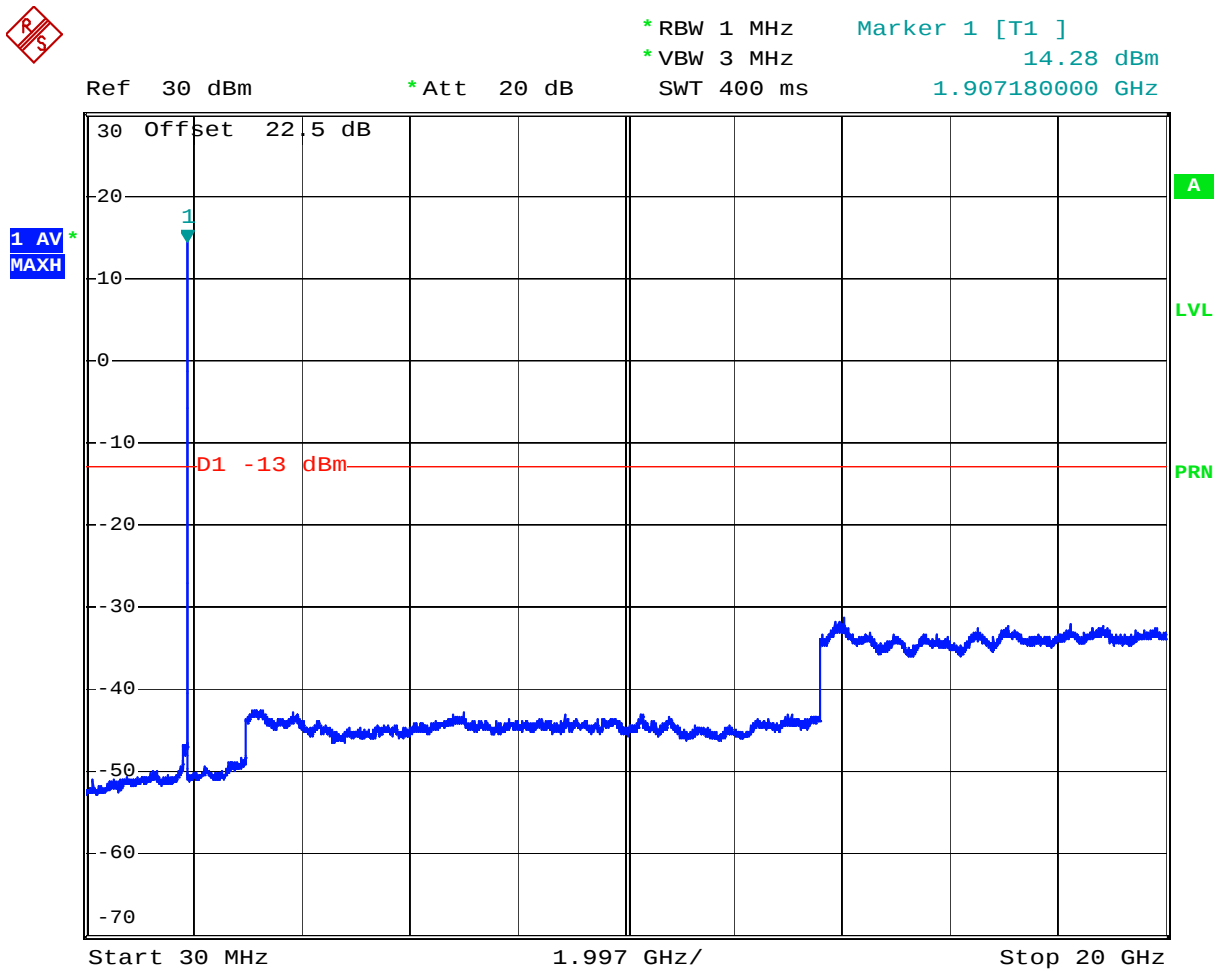
Comment: Spurious emissions, Uplink, 1852.56 MHz, CDMA
Date: 13.JUN.2008 17:12:50

Graph 5.2



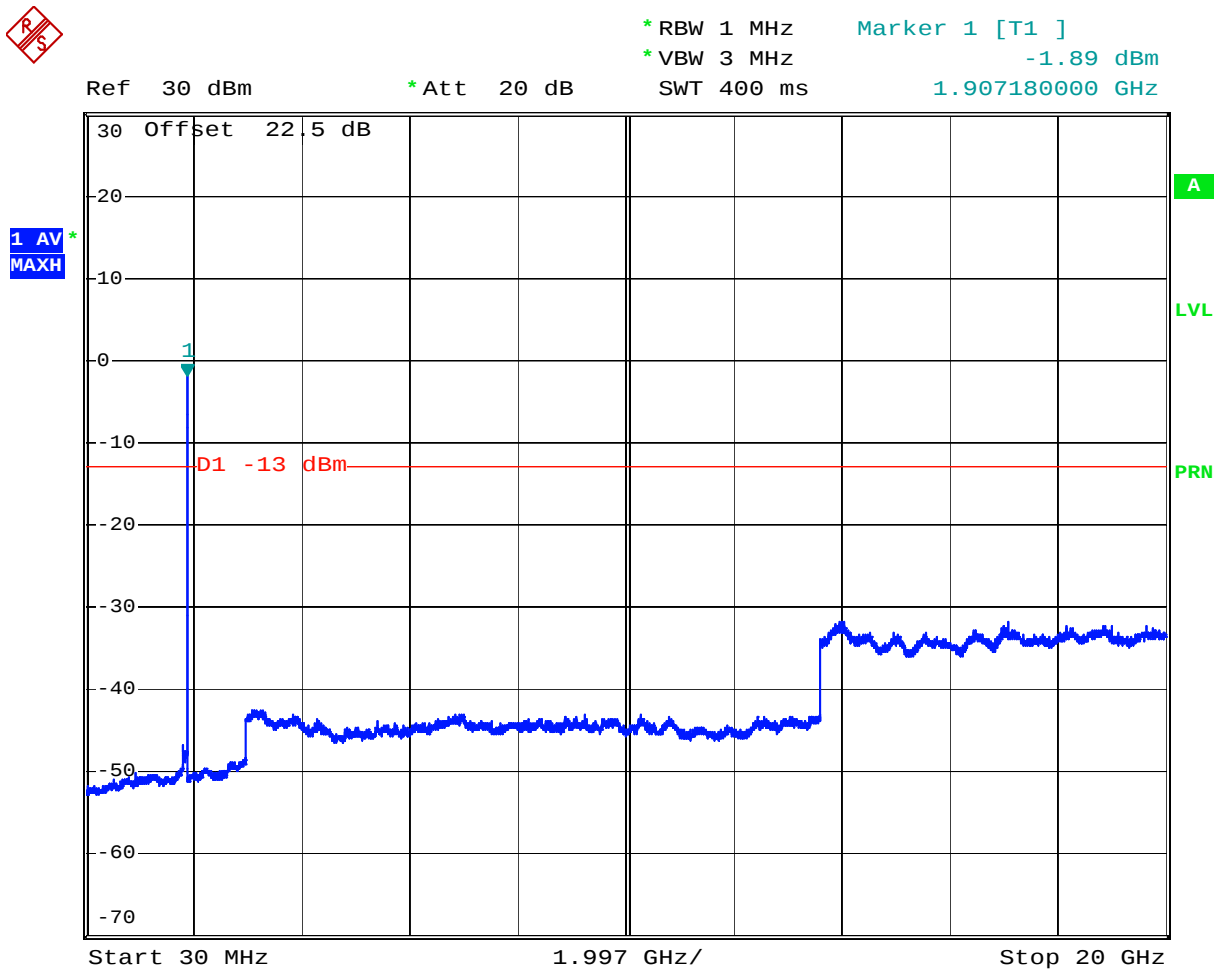
Comment: Spurious emissions, Uplink, 1852.56 MHz, WCDMA
 Date: 13.JUN.2008 17:11:00

Graph 5.3



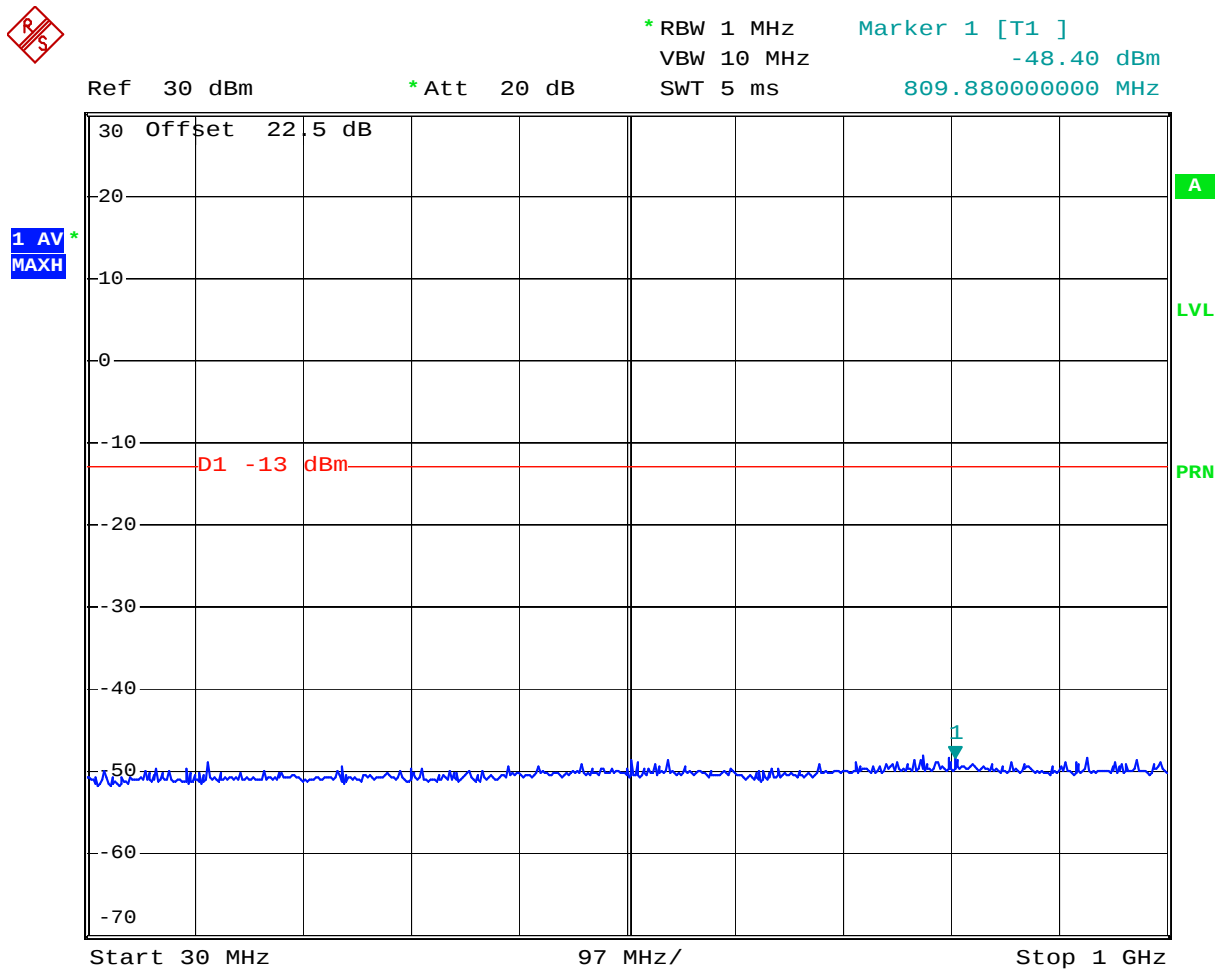
Comment: Spurious emissions, Uplink, 1907.56 MHz, CDMA
Date: 13.JUN.2008 17:19:16

Graph 5.4



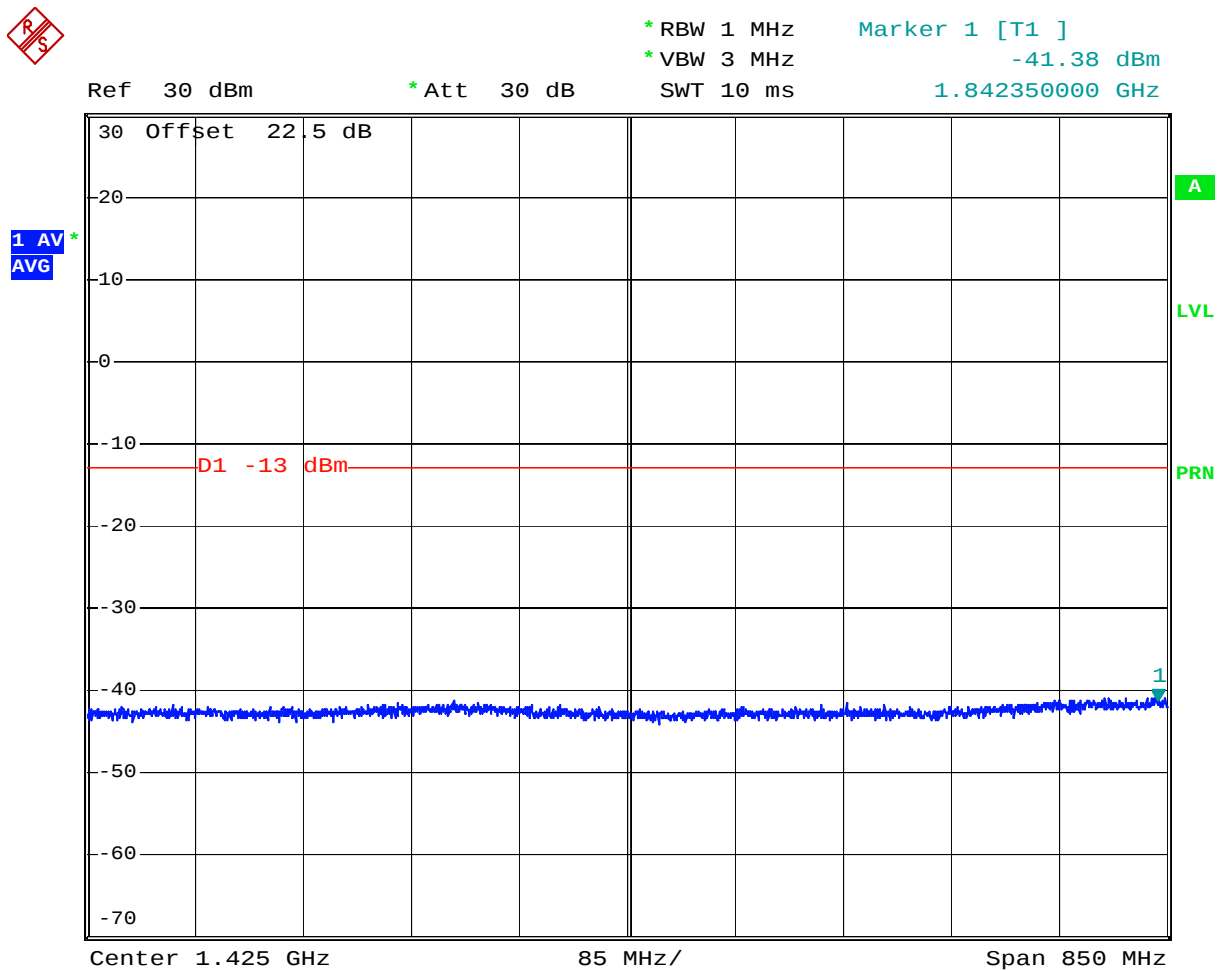
Comment: Spurious emissions, Uplink, 1907.56 MHz, WCDMA
 Date: 13.JUN.2008 17:21:58

Graph 5.5



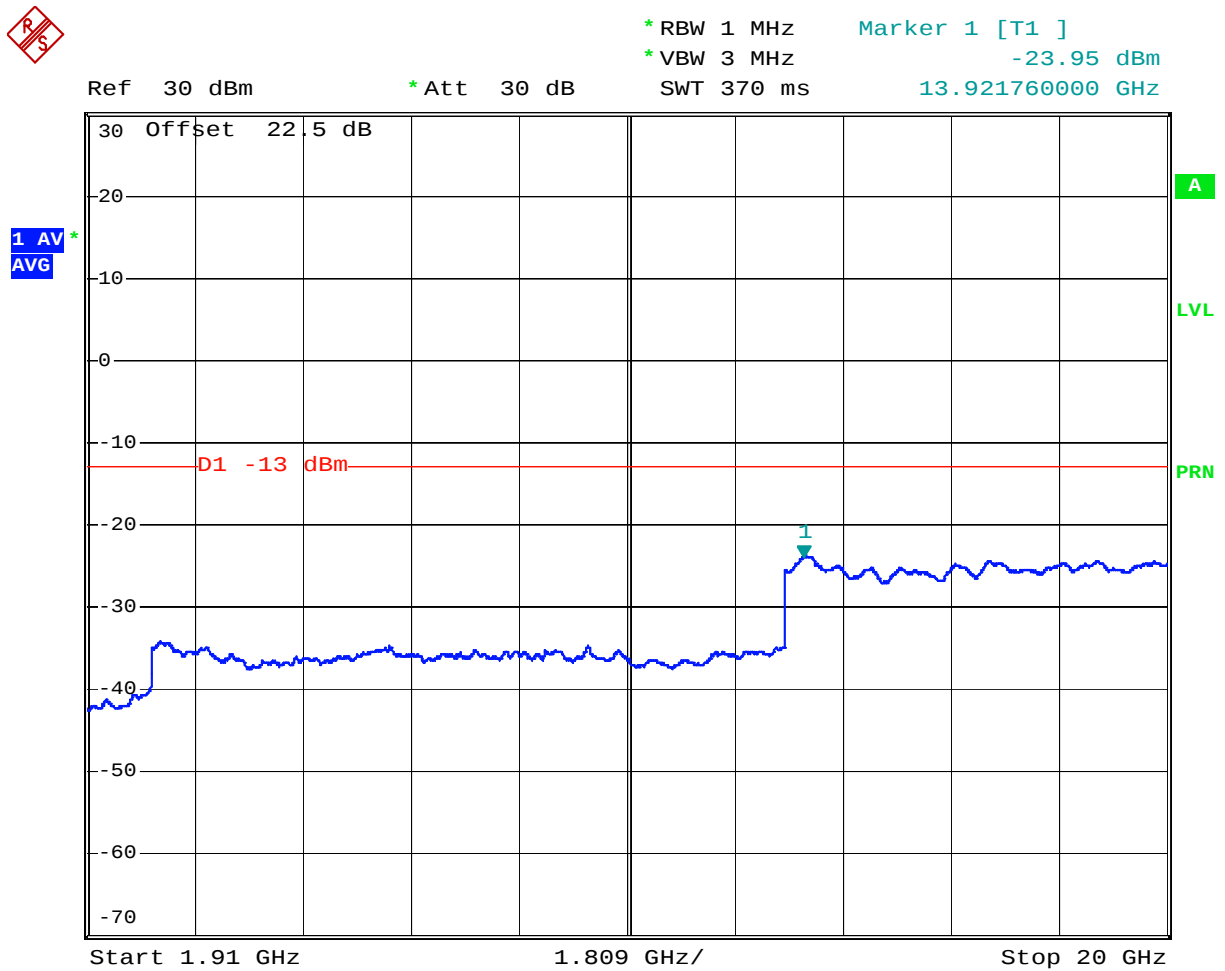
Comment: Spurious emissions, Uplink, 1877.56 MHz, CDMA
 Date: 12.JUN.2008 21:20:58

Graph 5.6



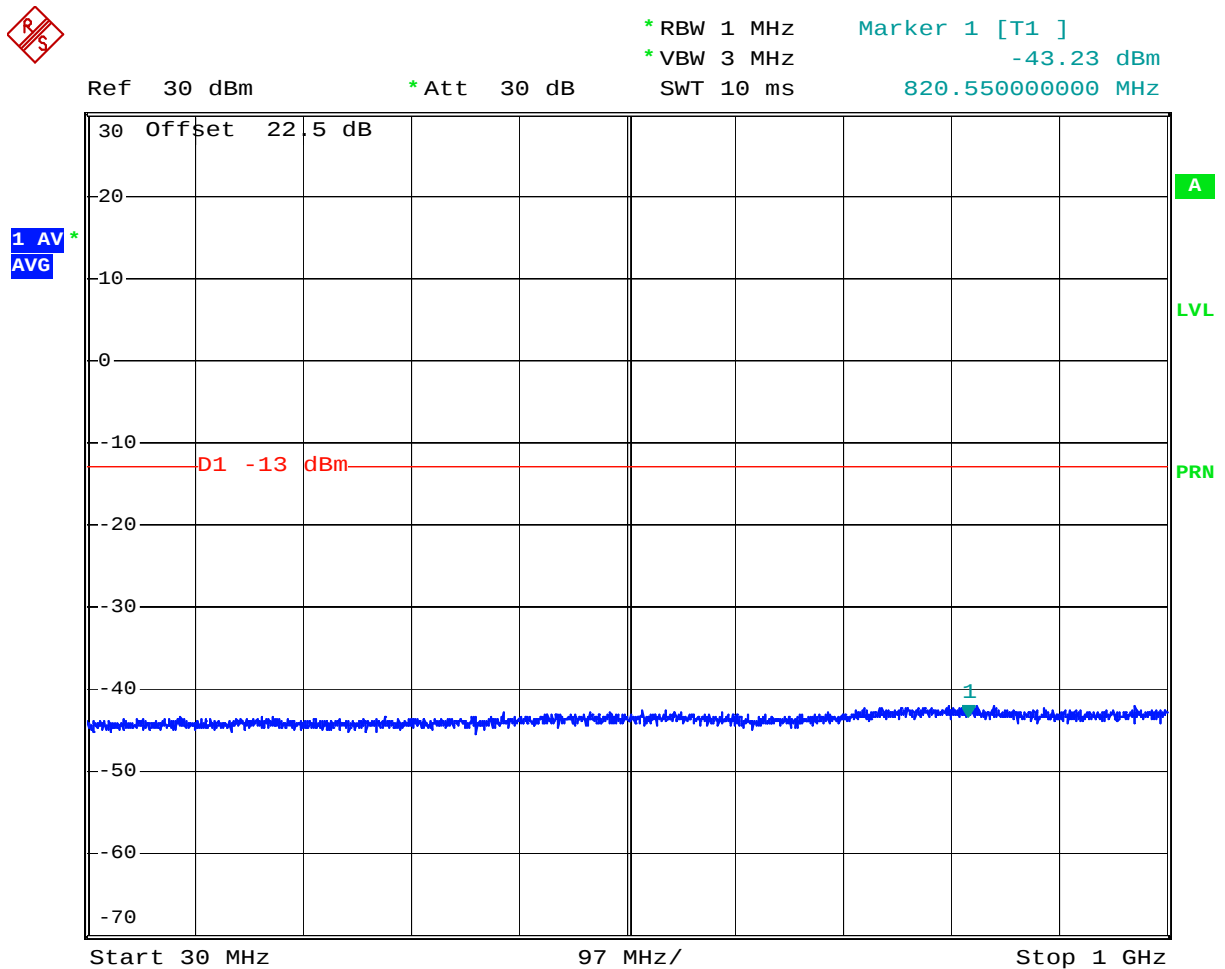
Comment: Spurious emissions, Uplink, 1877.56 MHz, CDMA
 Date: 12.JUN.2008 21:55:39

Graph 5.5



Comment: Spurious emissions, Uplink, 1877.56 MHz, CDMA
 Date: 12.JUN.2008 21:56:41

Graph 5.8



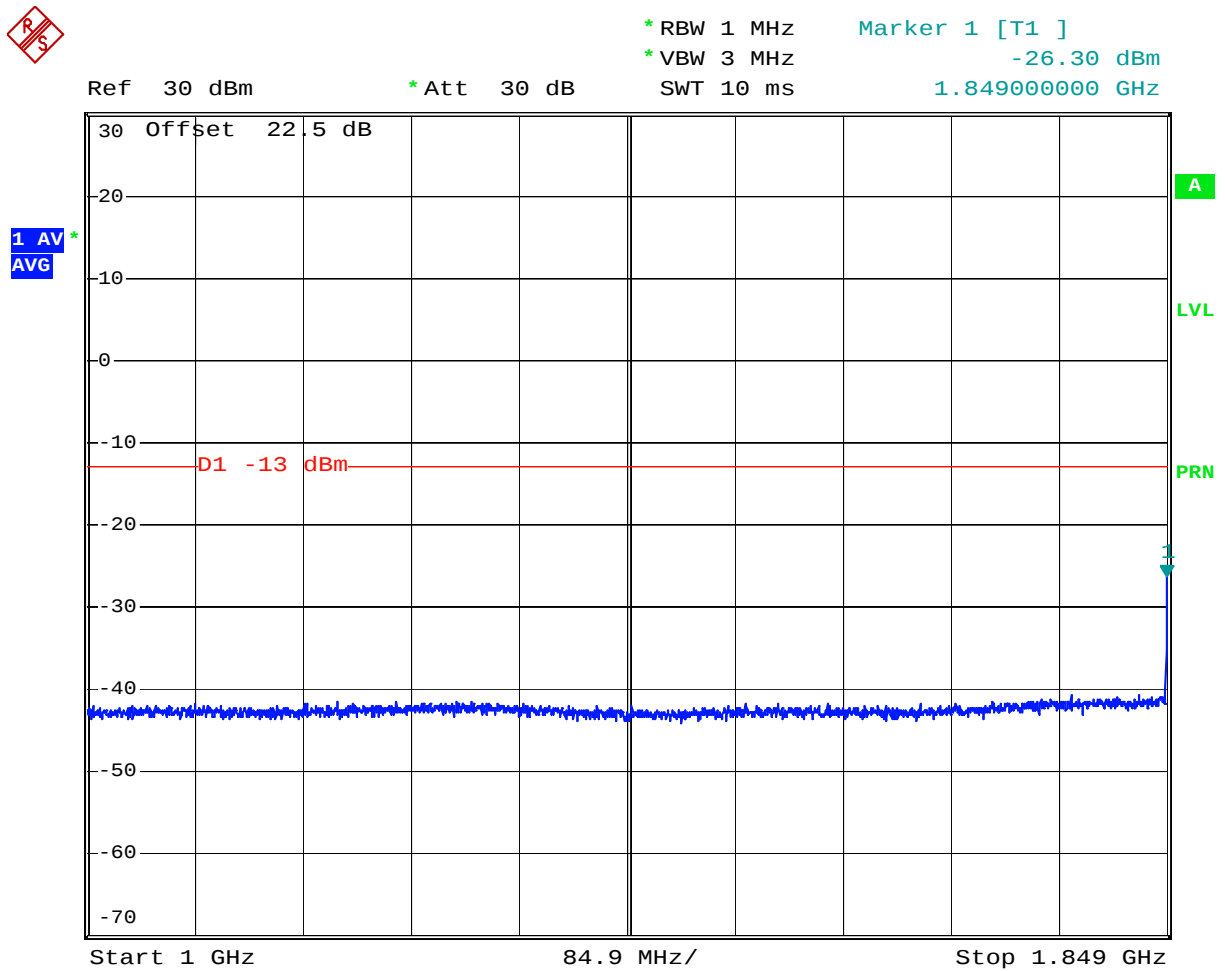
Comment: Spurious emissions, Uplink, 1852.56 MHz, CDMA
 Date: 12.JUN.2008 22:00:32

Graph 5.9



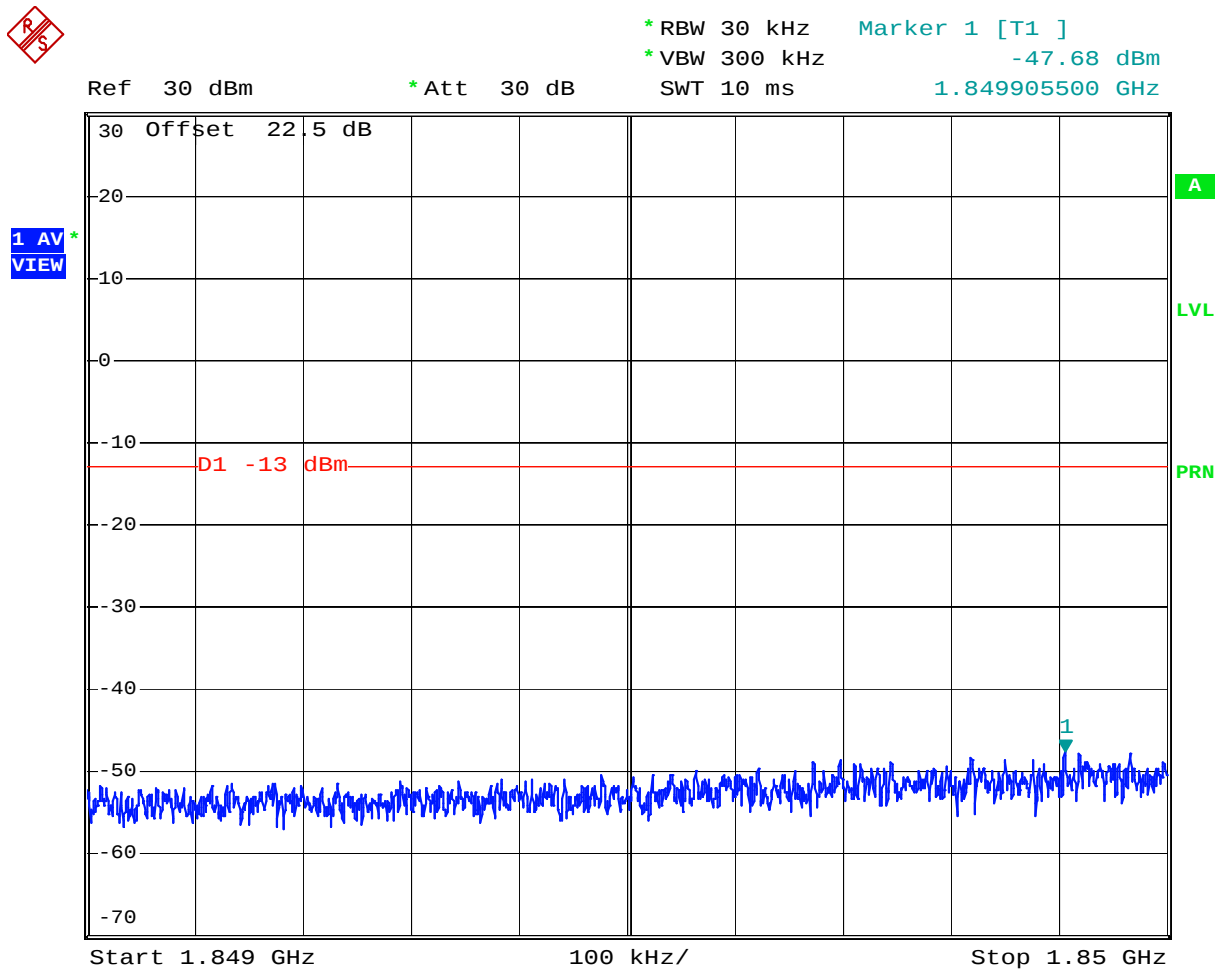
Comment: Spurious emissions, Uplink, 1852.56 MHz, CDMA
 Date: 12.JUN.2008 22:01:16

Graph 5.10



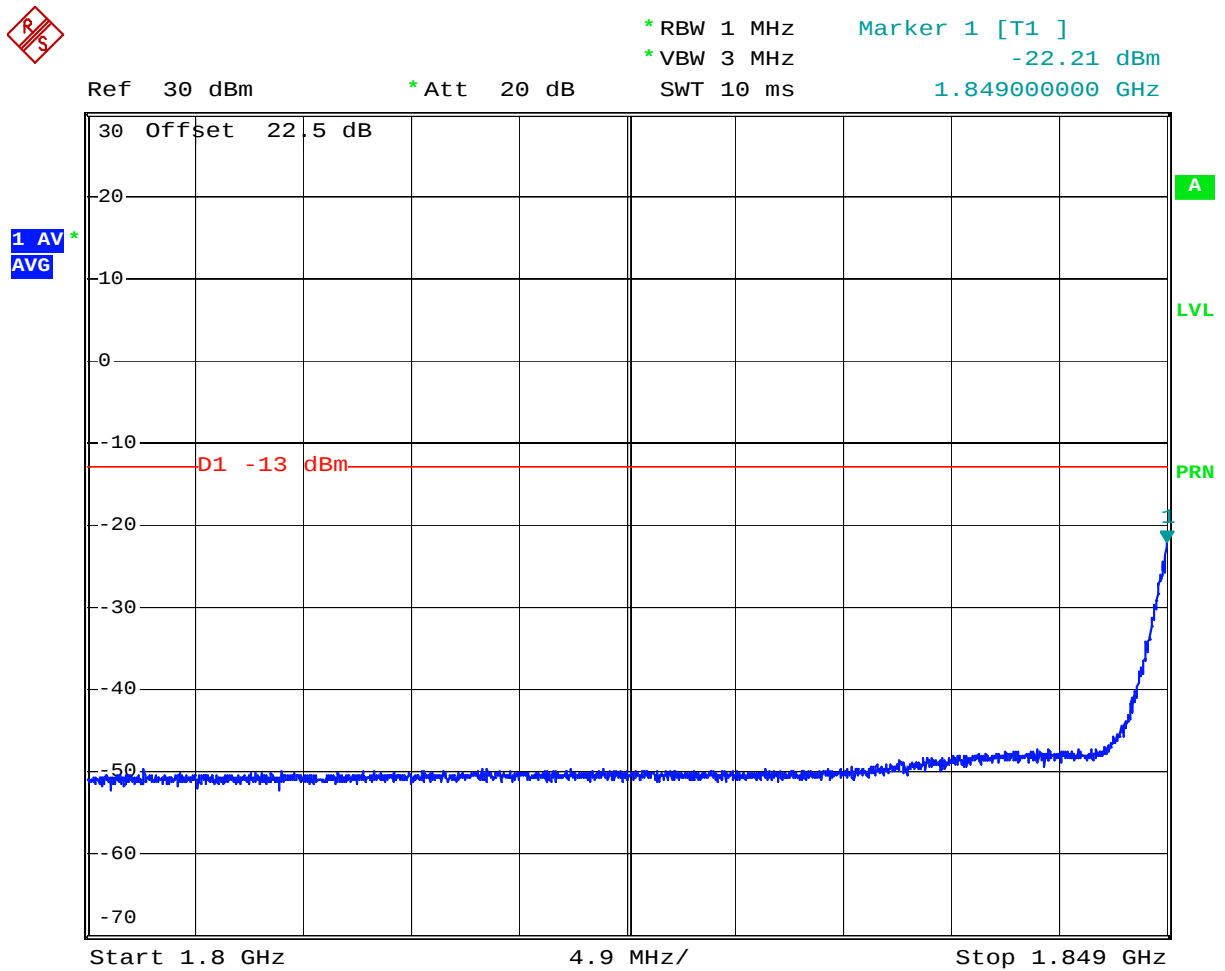
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Date: 12.JUN.2008 22:07:34

Graph 5.11



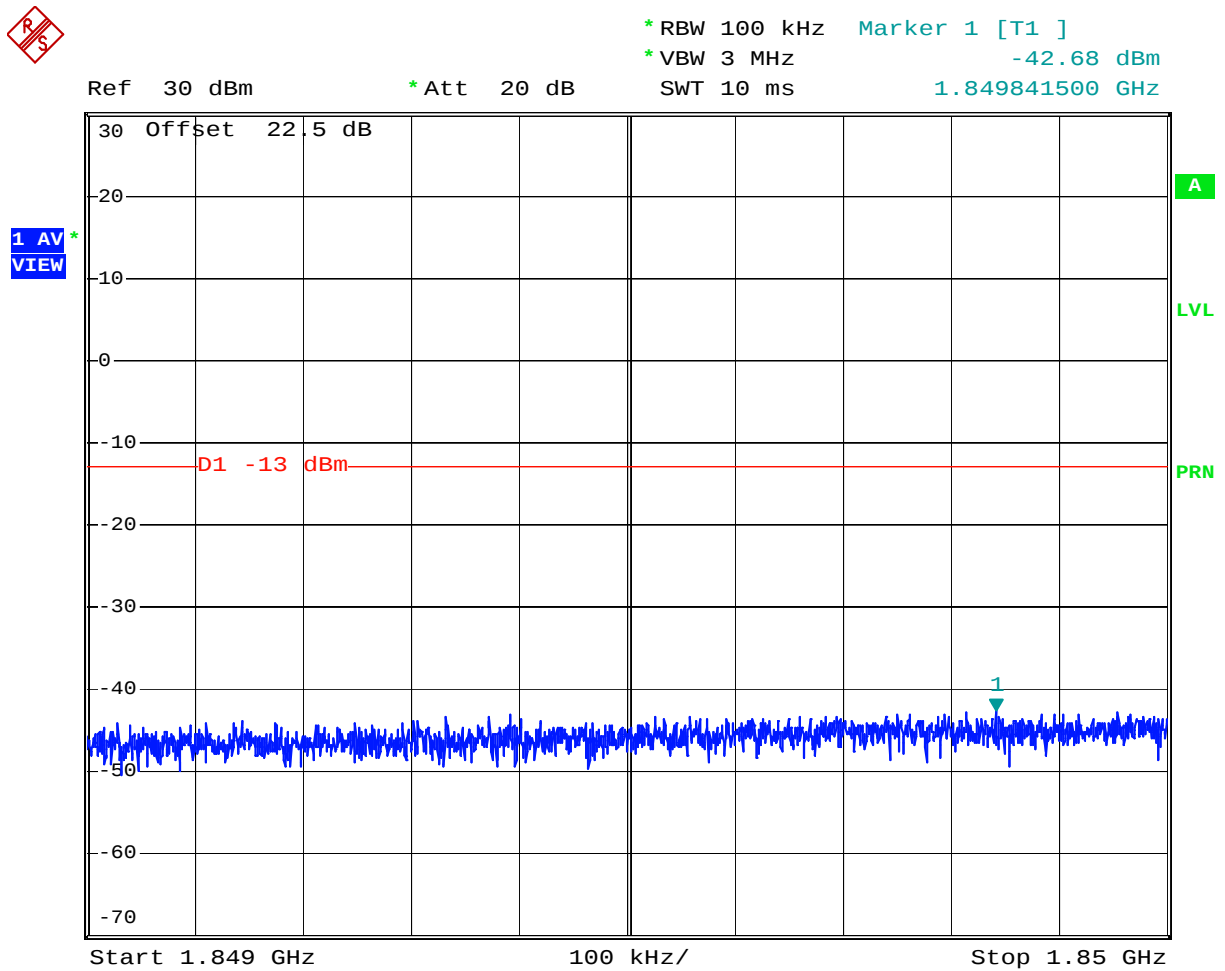
Comment: Spurious emissions, Uplink, 1852.56 MHz, CDMA
Date: 12.JUN.2008 22:10:12

Graph 5.12



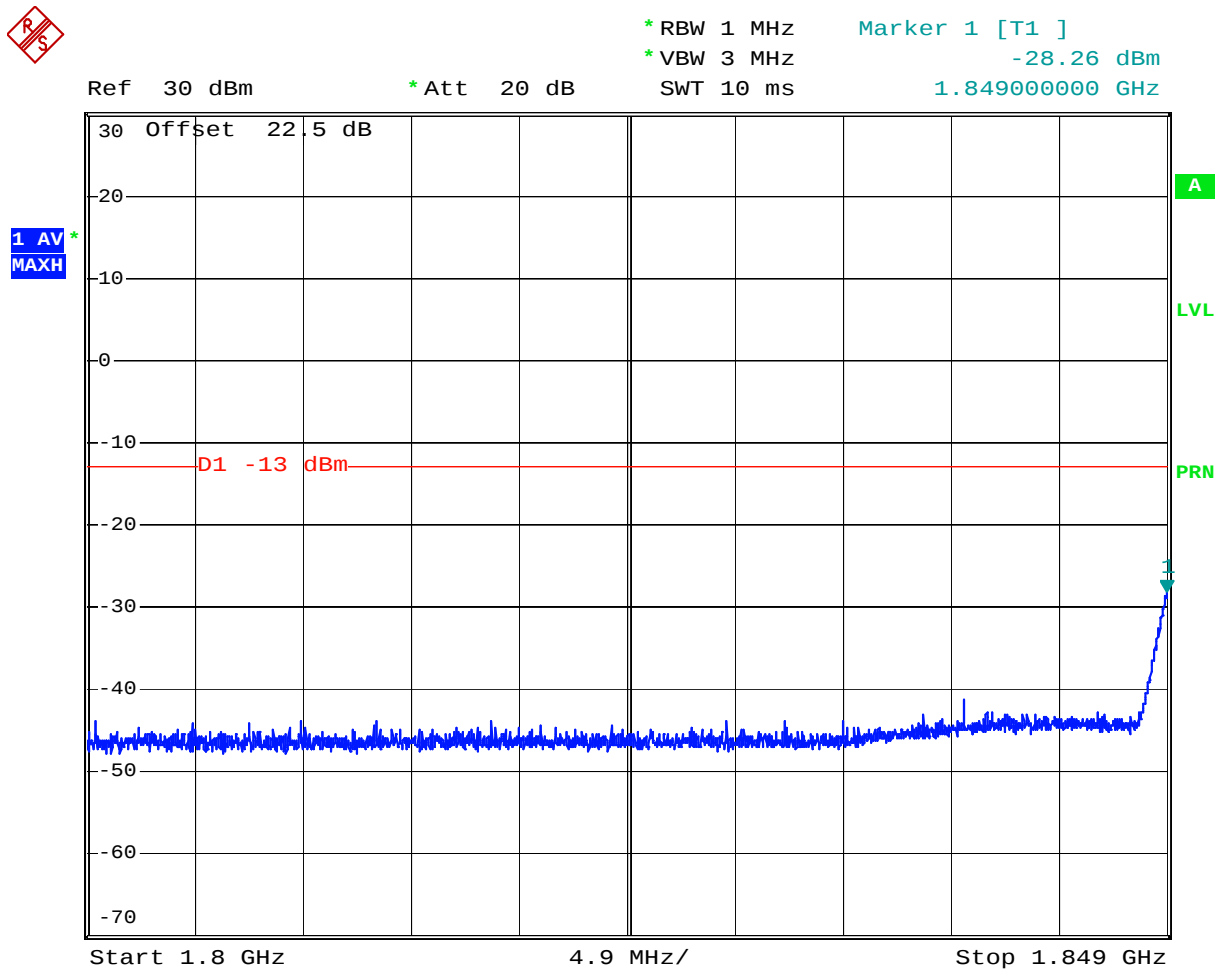
Comment: Spurious emissions, Uplink, 1852.56 MHz, WCDMA
Date: 13.JUN.2008 17:06:47

Graph 5.13



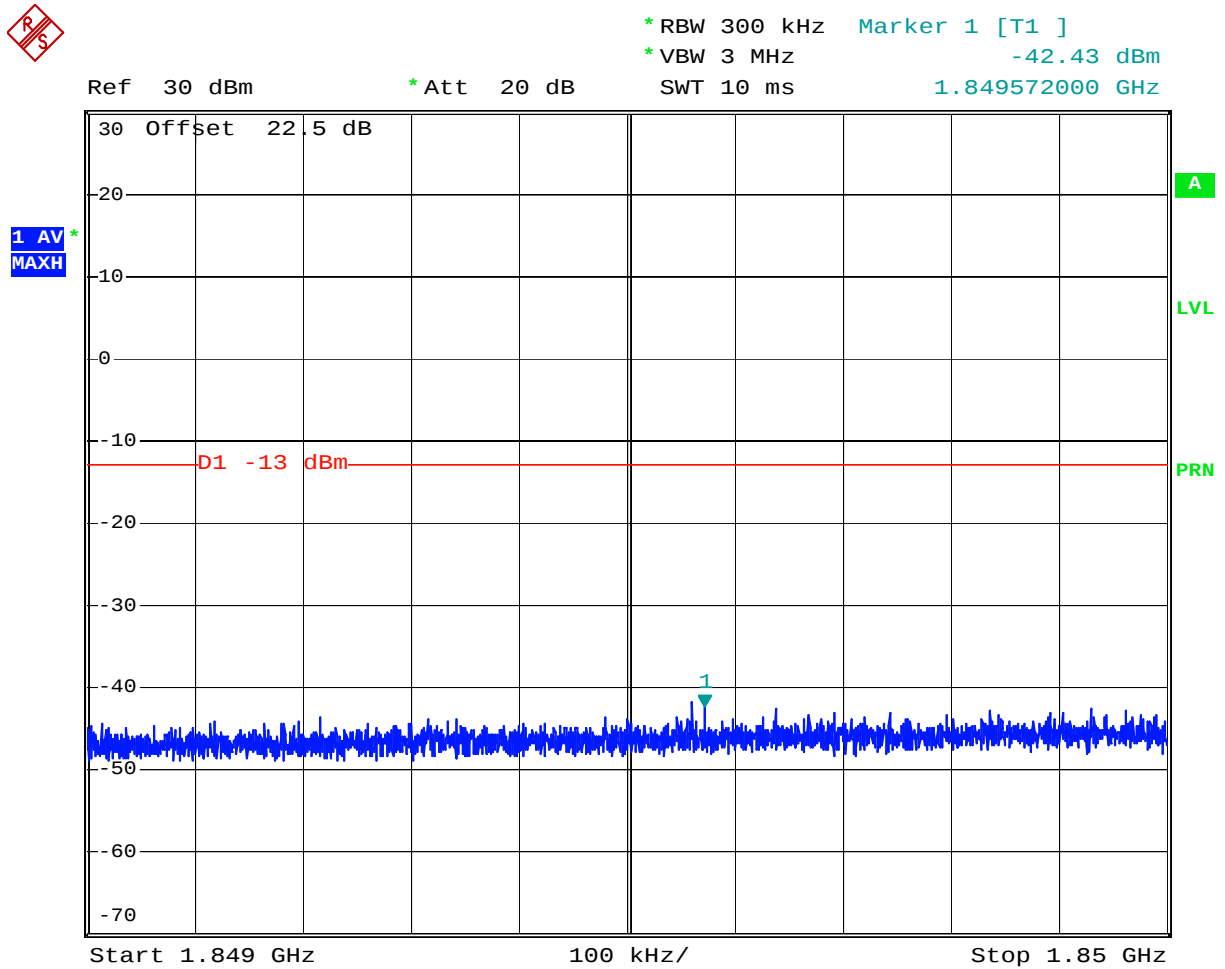
Comment: Spurious emissions, Uplink, 1852.56 MHz, WCDMA
Date: 13.JUN.2008 17:05:48

Graph 5.14



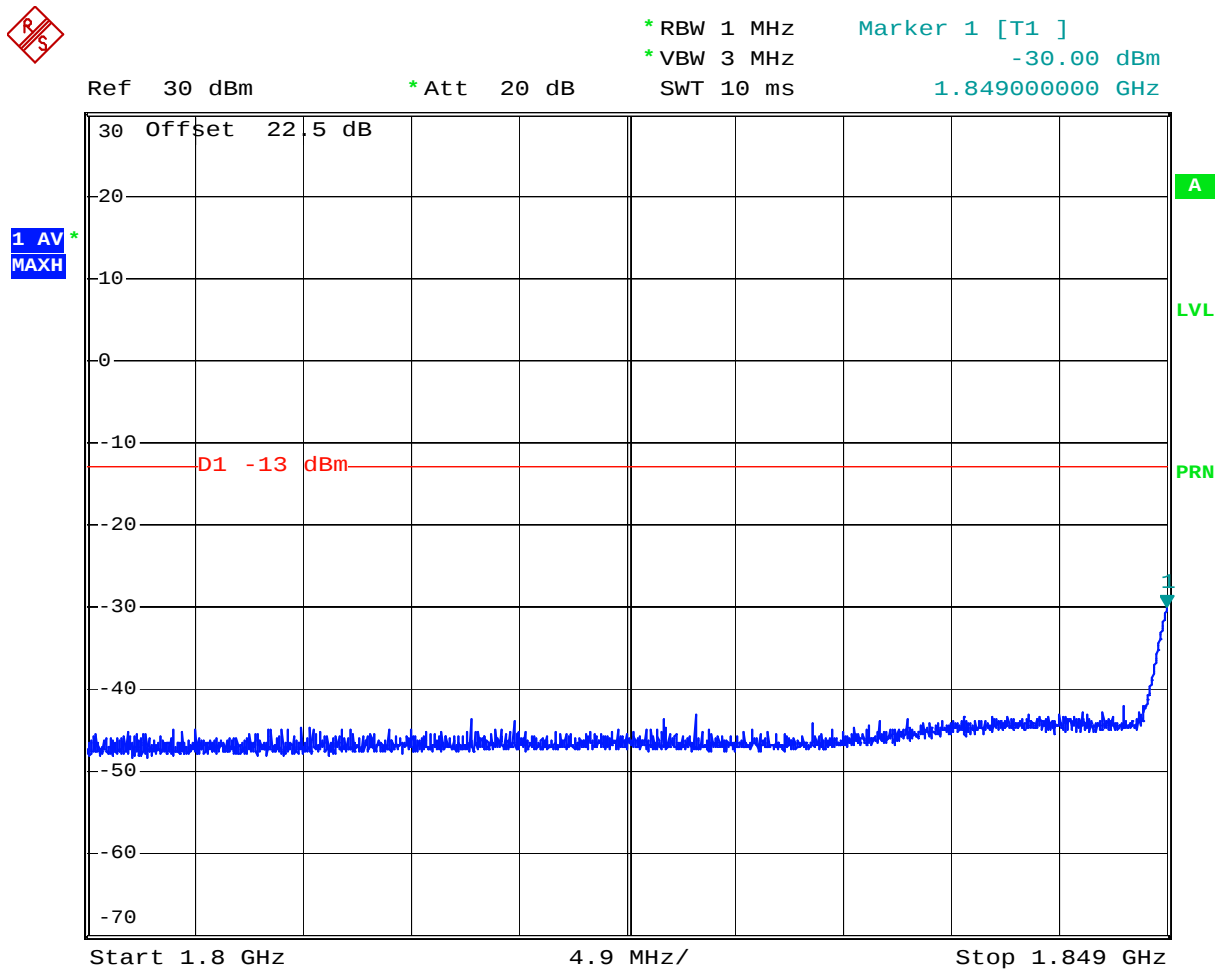
Comment: Spurious emissions, Uplink, 1852.56 MHz, EDGE
 Date: 13.JUN.2008 17:00:20

Graph 5.15



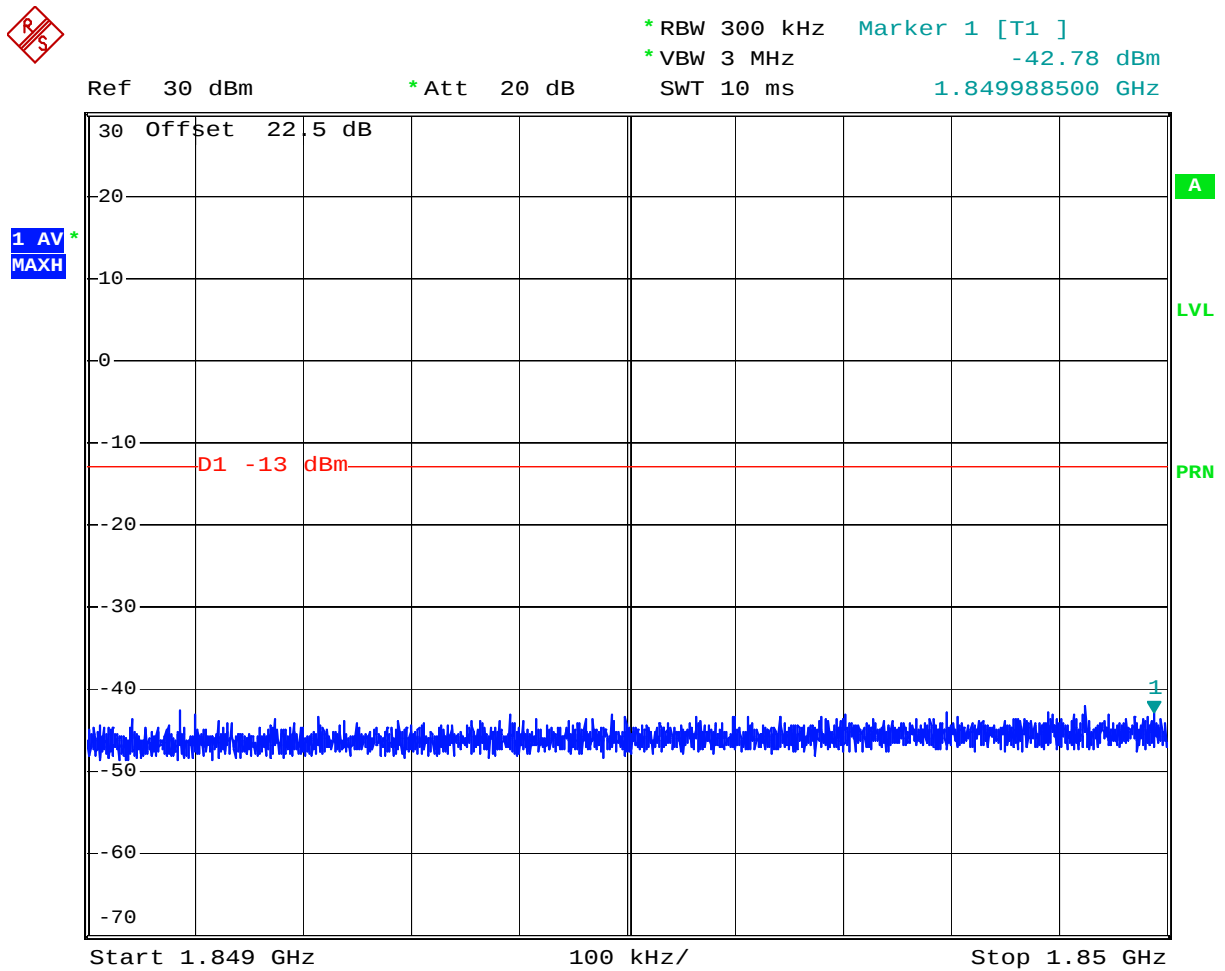
Comment: Spurious emissions, Uplink, 1852.56 MHz, EDGE
 Date: 13.JUN.2008 17:01:10

Graph 5.16



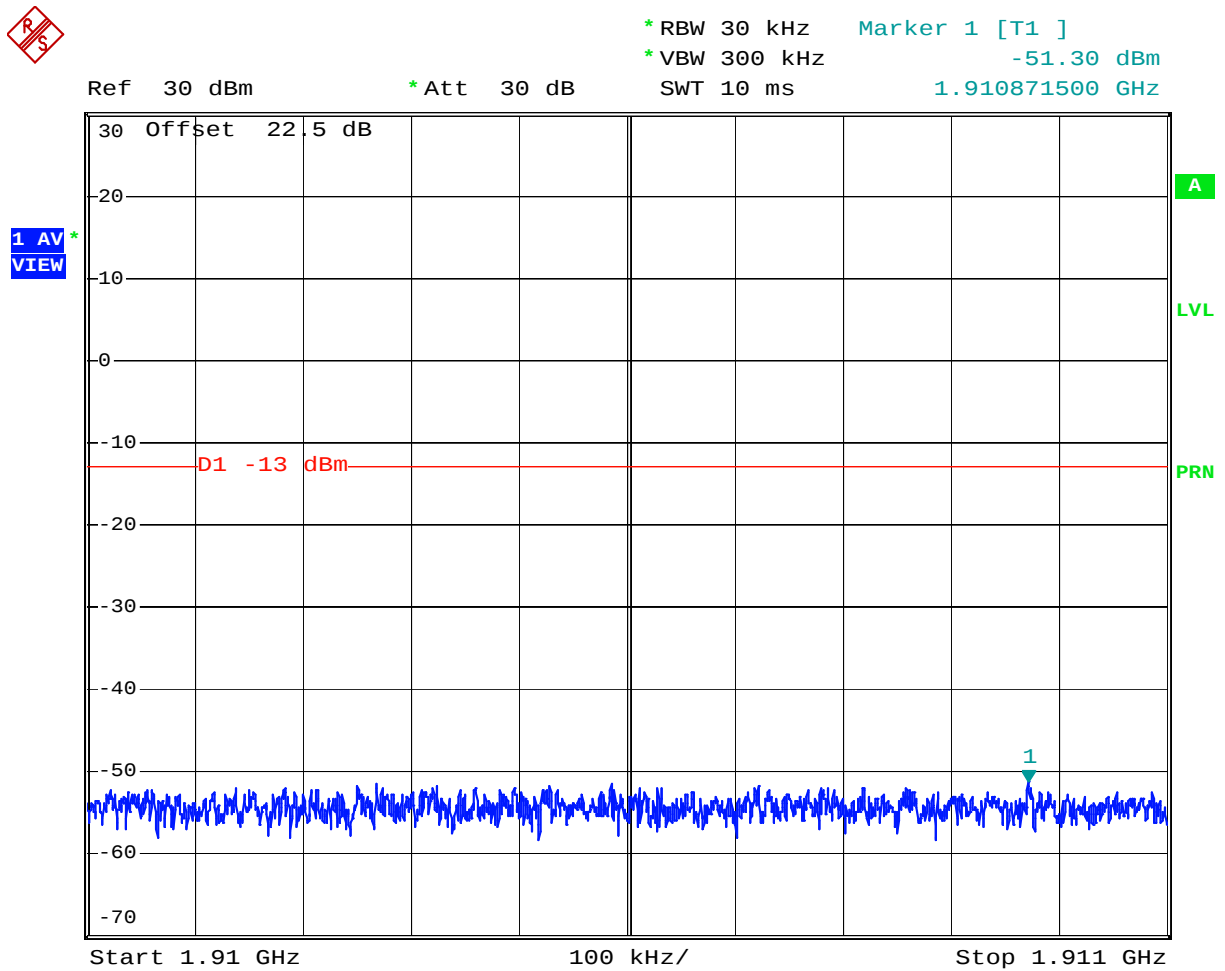
Comment: Spurious emissions, Uplink, 1852.56 MHz, GSM
Date: 13.JUN.2008 16:57:06

Graph 5.17



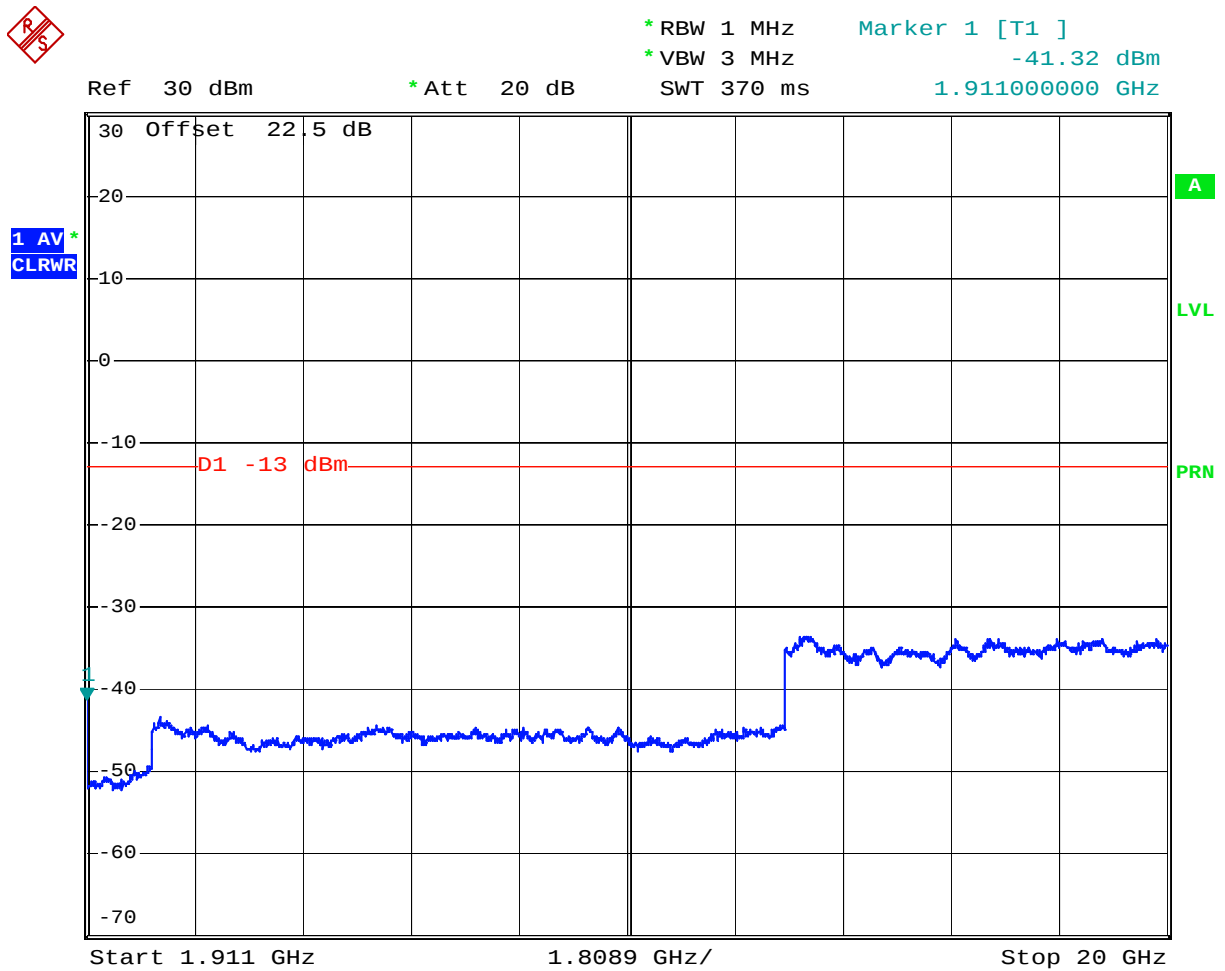
Comment: Spurious emissions, Uplink, 1852.56 MHz, GSM
 Date: 13.JUN.2008 16:55:16

Graph 5.18



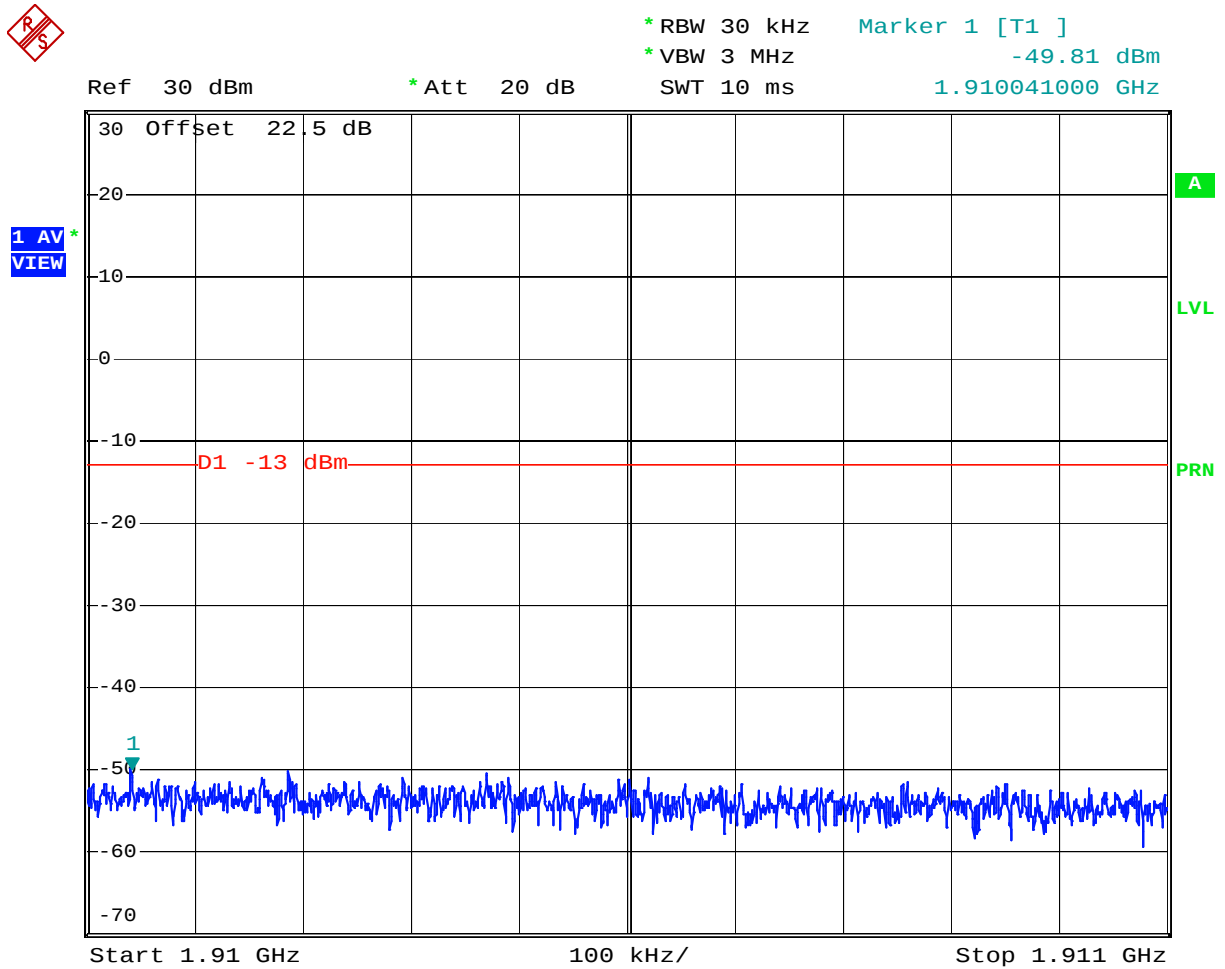
Comment: Spurious emissions, Uplink, 1907.56 MHz, CDMA
 Date: 12.JUN.2008 22:15:26

Graph 5.19



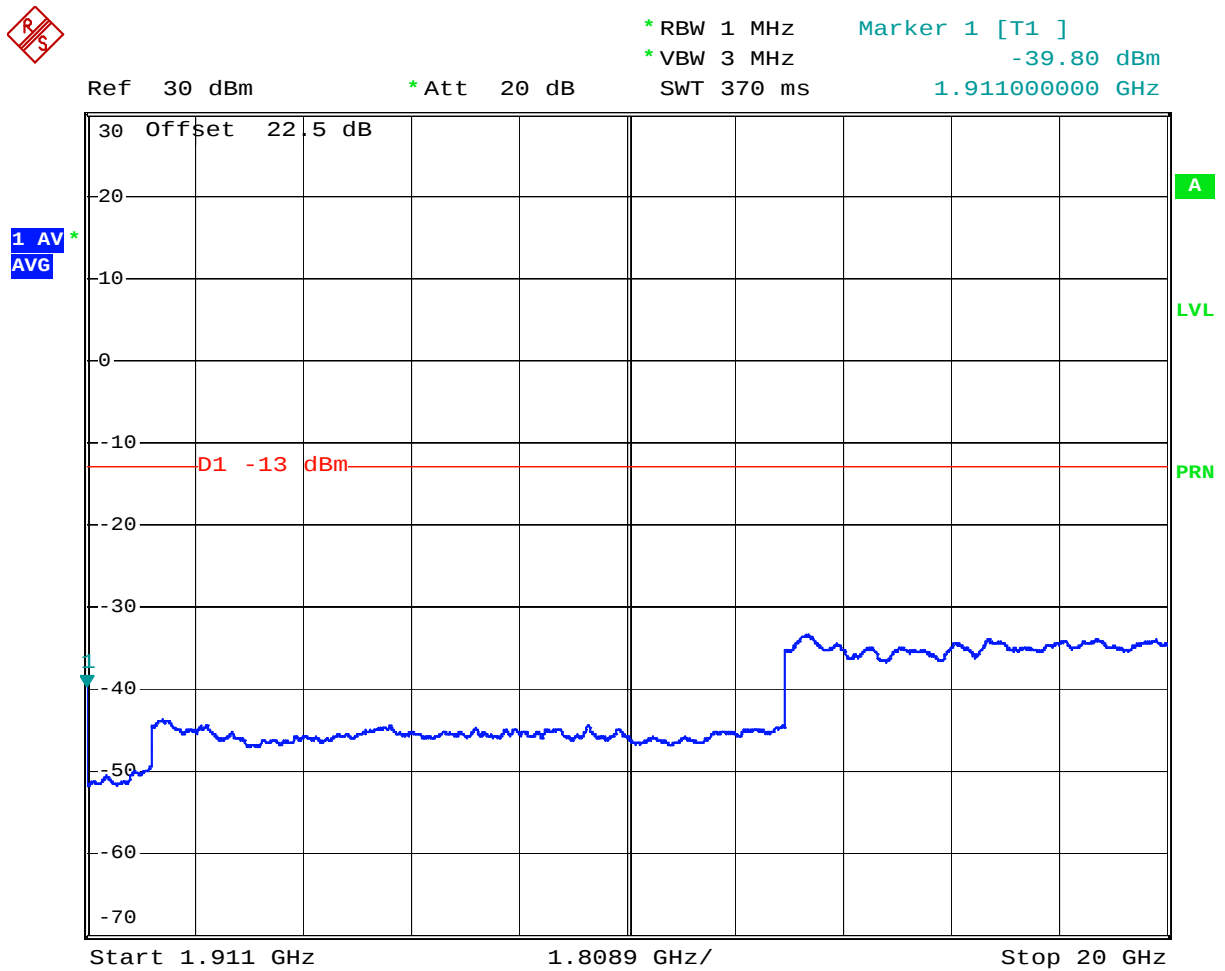
Comment: Spurious emissions, Uplink, 1907.56 MHz, CDMA
Date: 12.JUN.2008 22:17:05

Graph 5.20



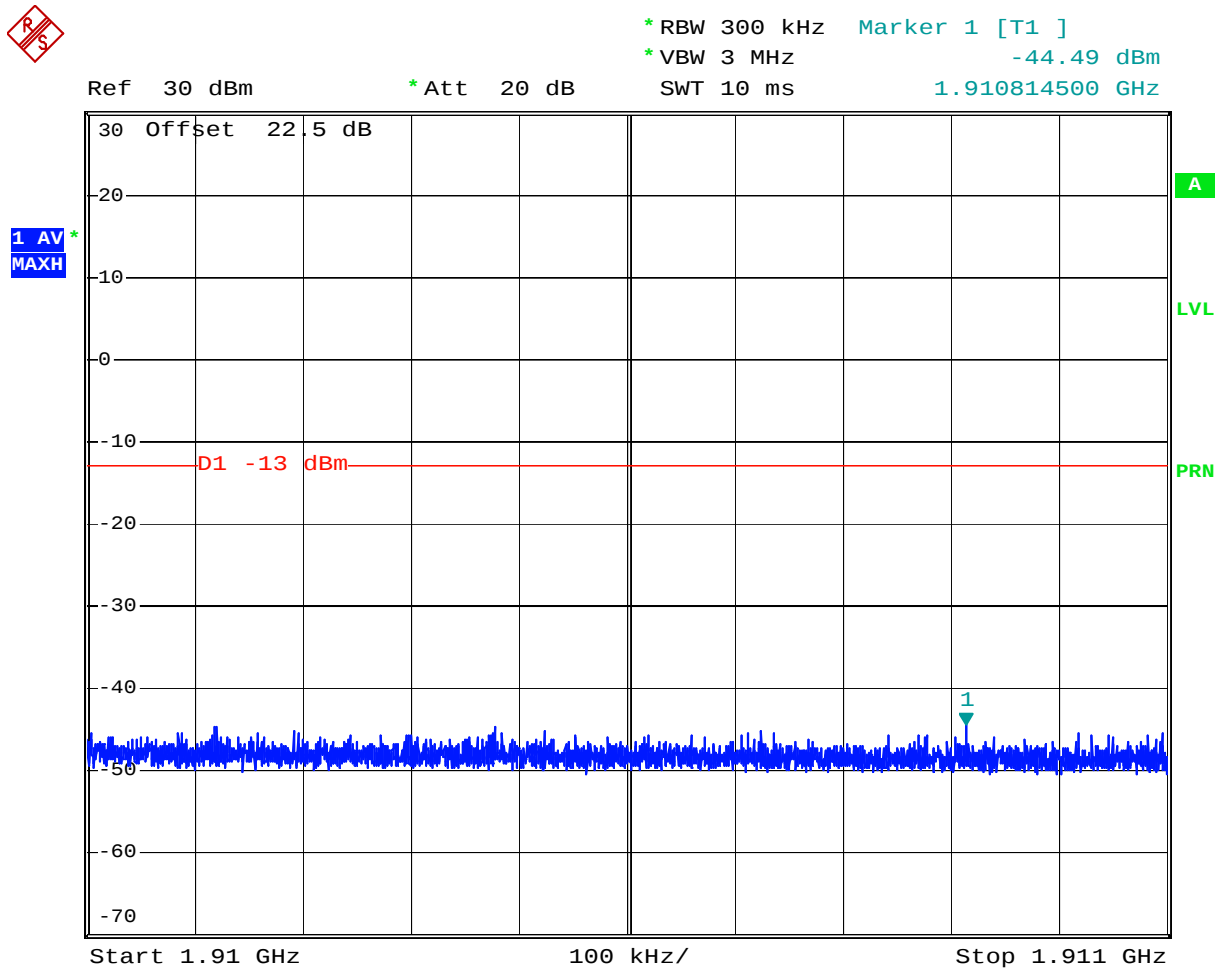
Comment: Spurious emissions, Uplink, 1907.56 MHz, WCDMA
 Date: 13.JUN.2008 14:55:12

Graph 5.21



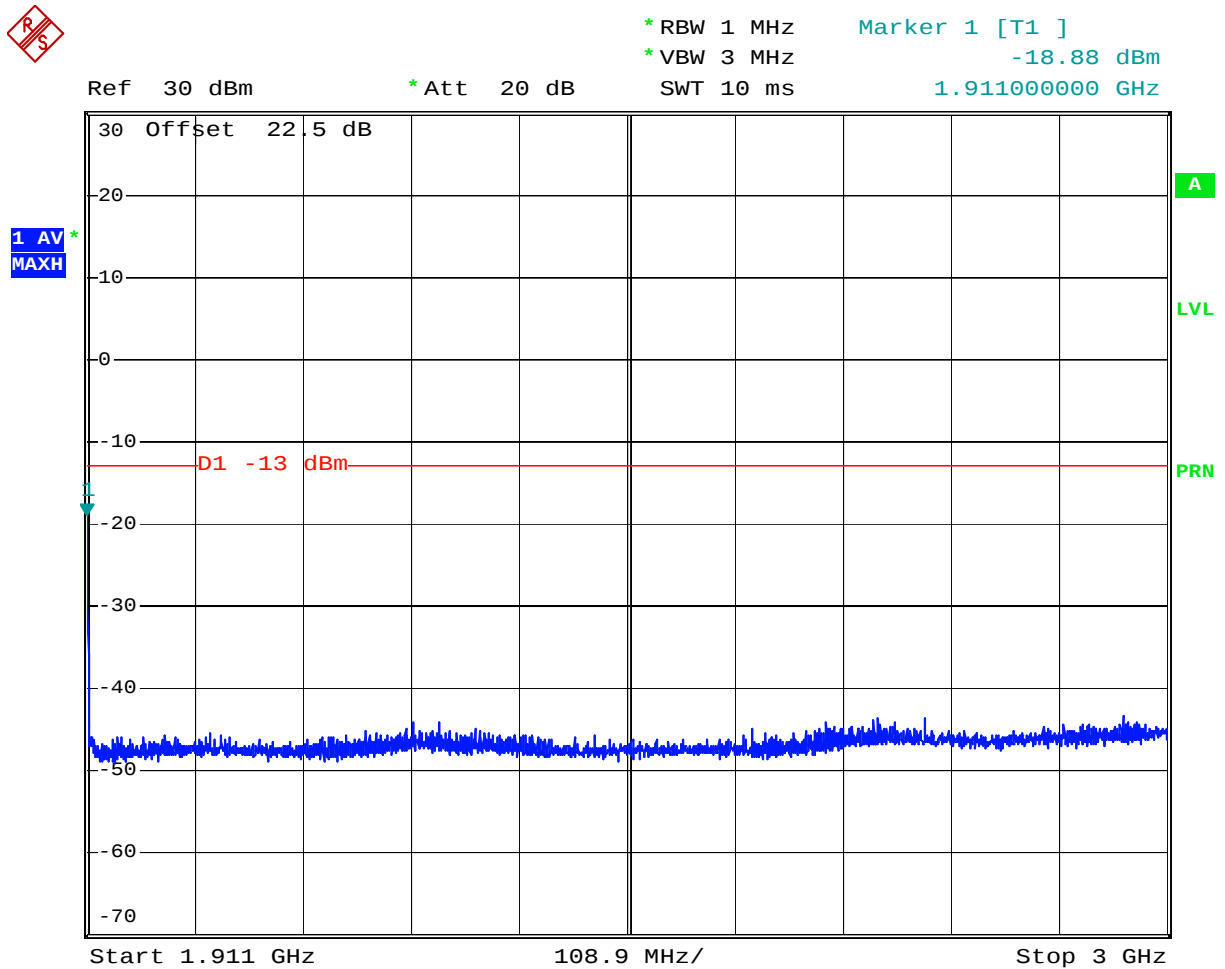
Comment: Spurious emissions, Uplink, 1907.56 MHz, WCDMA
 Date: 13.JUN.2008 14:56:31

Graph 5.22



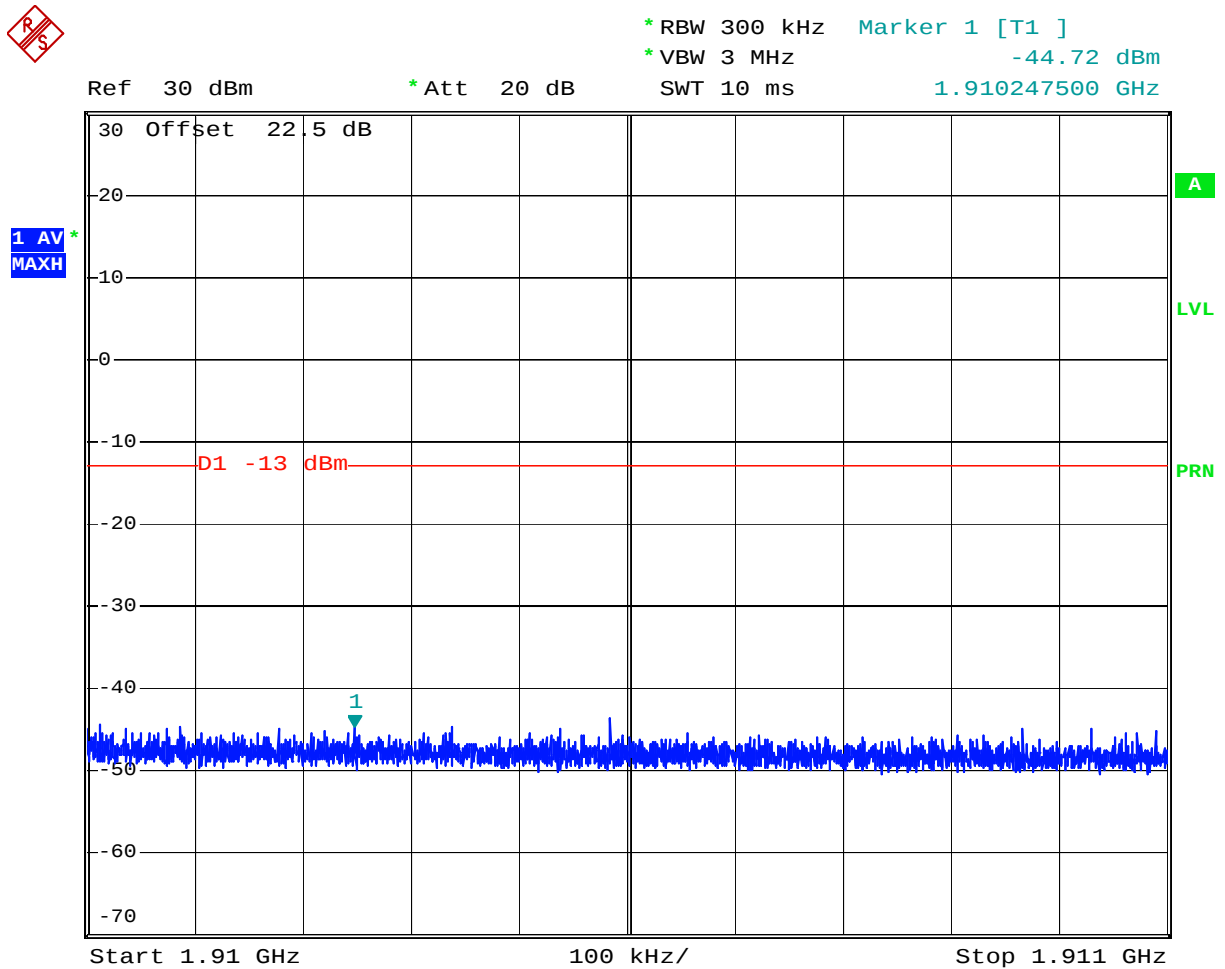
Comment: Spurious emissions, Uplink, 1907.56 MHz, EDGE
 Date: 13.JUN.2008 15:09:08

Graph 5.23



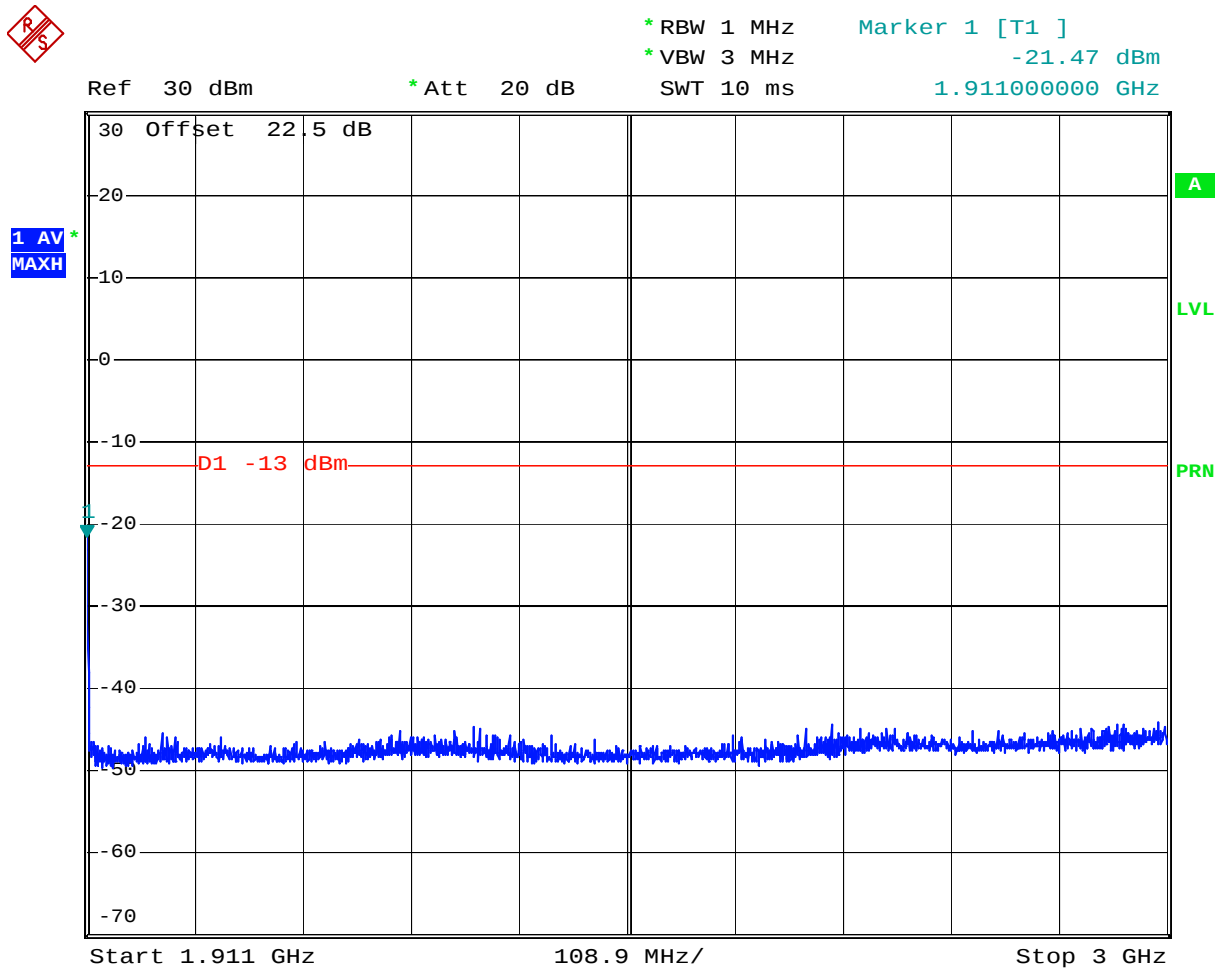
Comment: Spurious emissions, Uplink, 1907.56 MHz, EDGE
Date: 13.JUN.2008 16:34:24

Graph 5.24



Comment: Spurious emissions, Uplink, 1907.56 MHz, GSM
 Date: 13.JUN.2008 16:38:09

Graph 5.25



Comment: Spurious emissions, Uplink, 1907.56 MHz, GSM
 Date: 13.JUN.2008 16:38:54

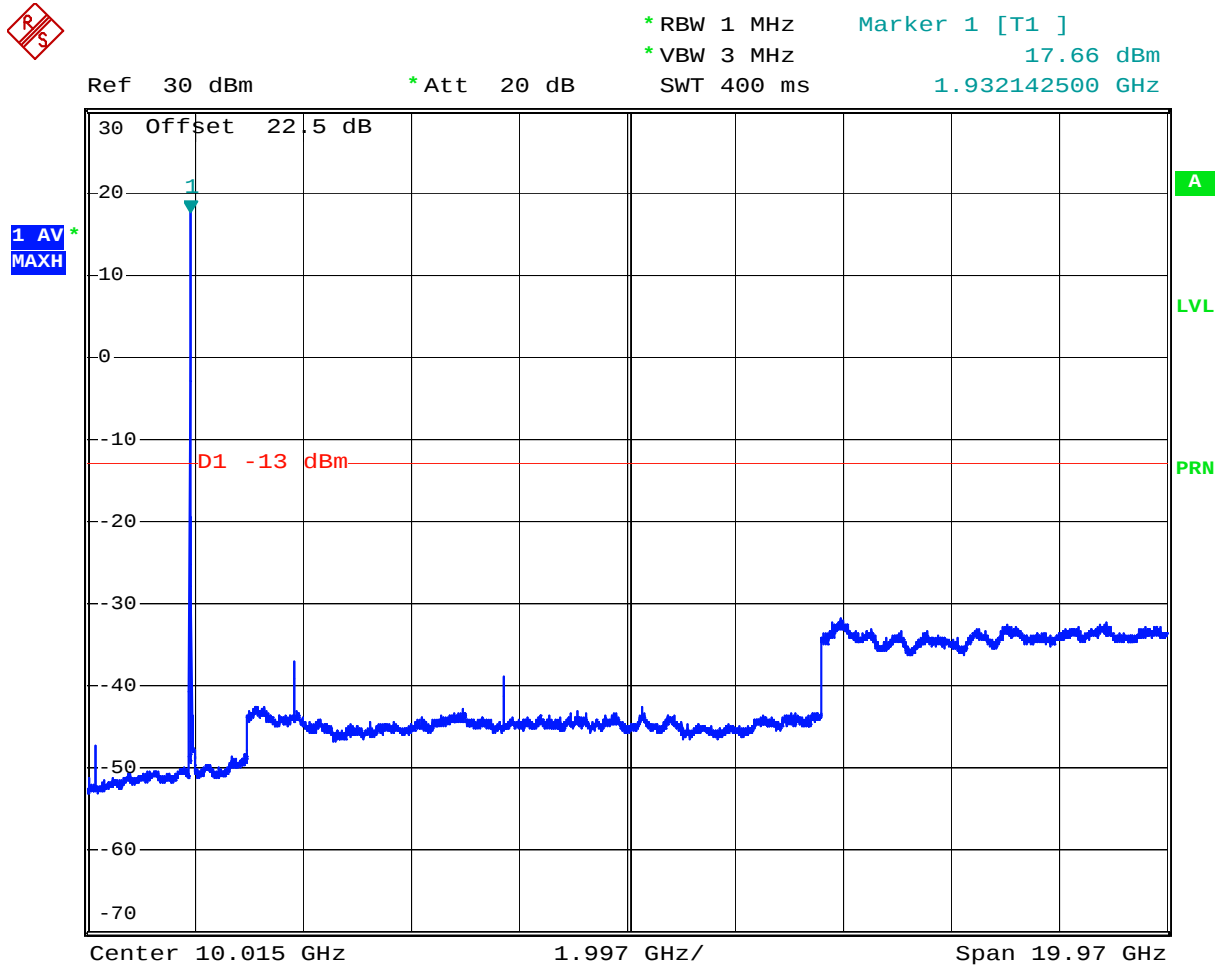


5.5 Test Results - DOWNlink

Result	Complies for CDMA, WCDMA, EDGE, GSM
---------------	-------------------------------------

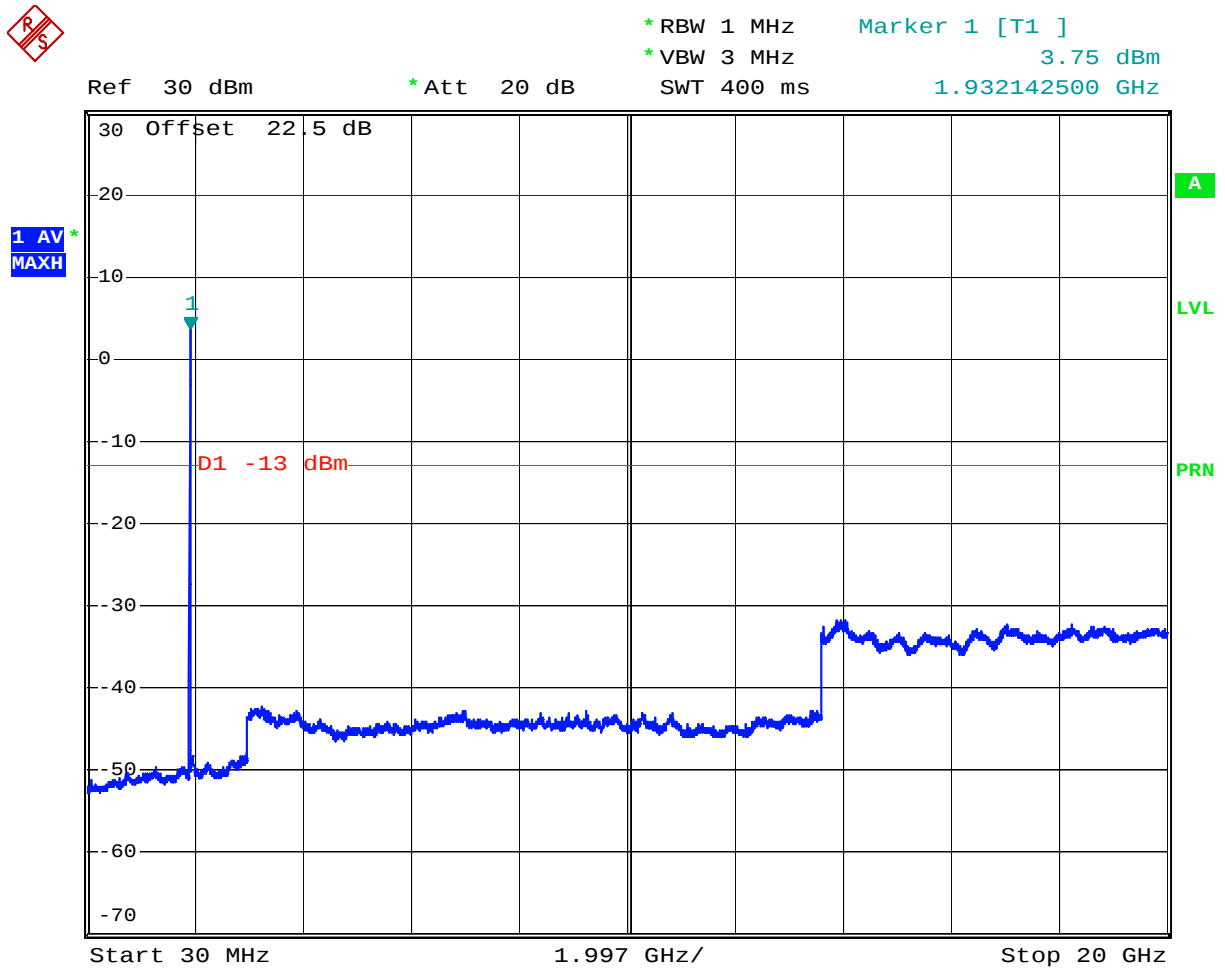
Refer to the following plots.

Graph 5.26



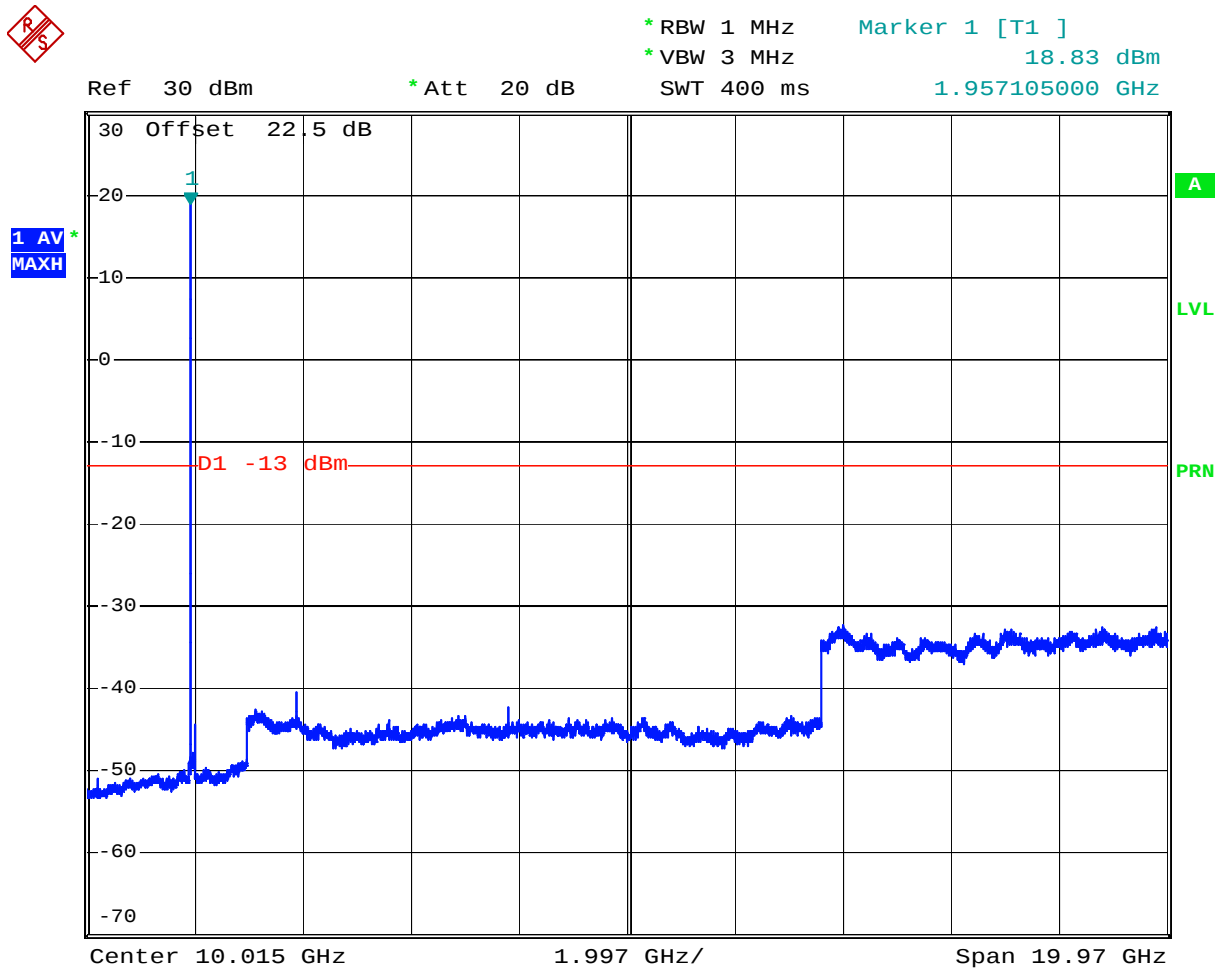
Comment: Spurious emissions, Downlink, 1932.6 MHz, CDMA
 Date: 13.JUN.2008 18:44:13

Graph 5.27



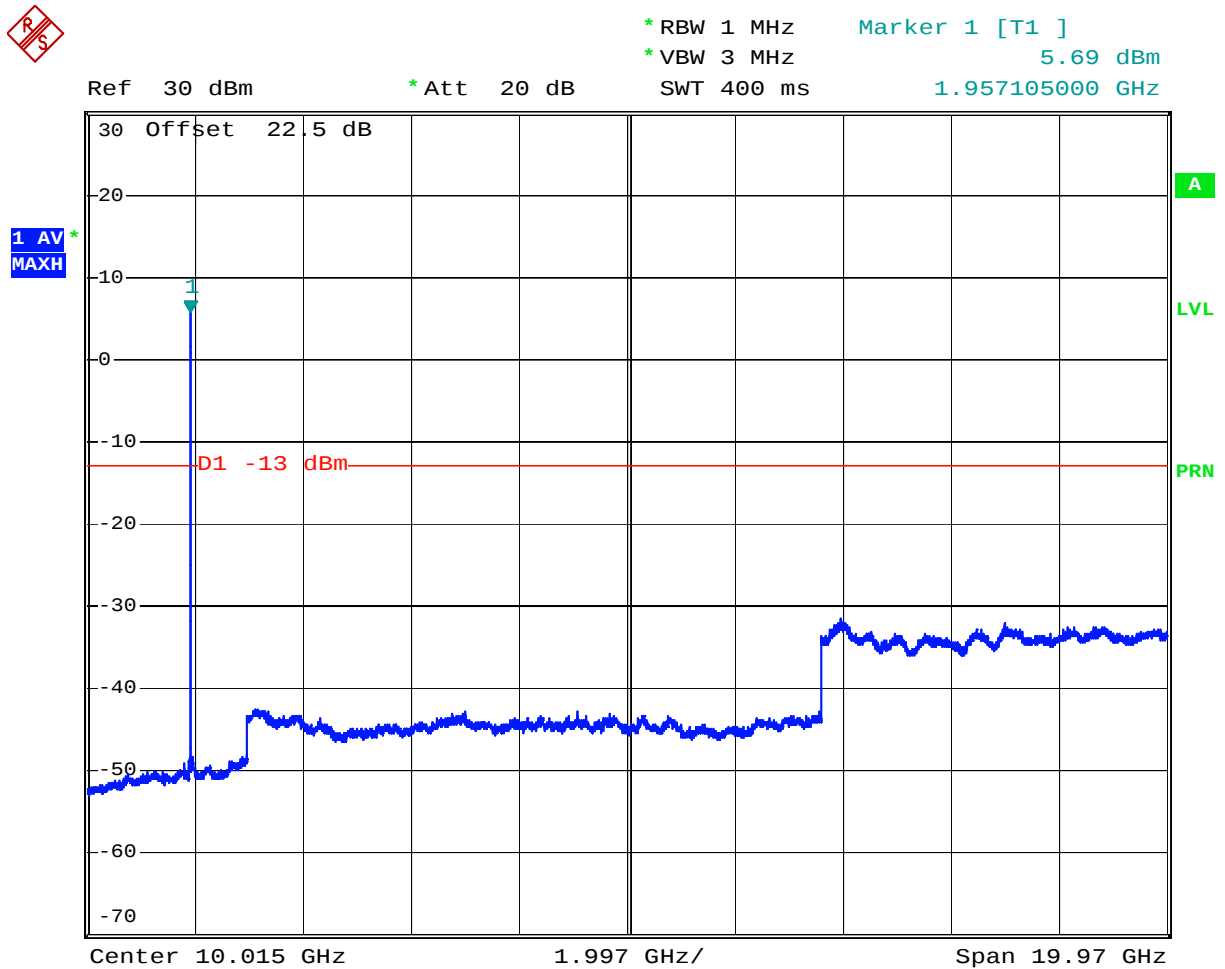
Comment: Spurious emissions, Downlink, 1932.6 MHz, WCDMA
 Date: 13.JUN.2008 18:35:32

Graph 5.28



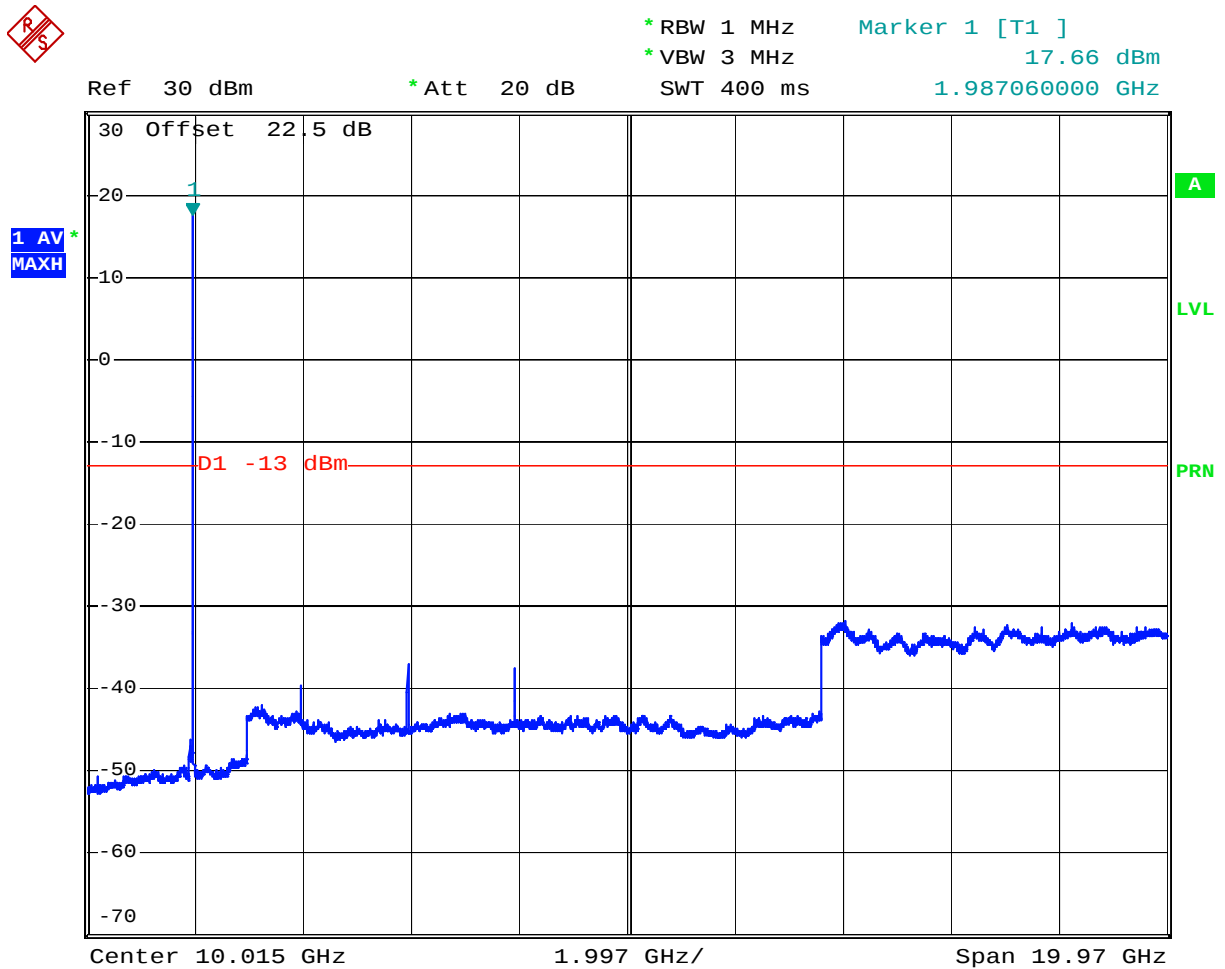
Comment: Spurious emissions, Downlink, 1957.6 MHz, CDMA
 Date: 13.JUN.2008 19:00:51

Graph 5.29



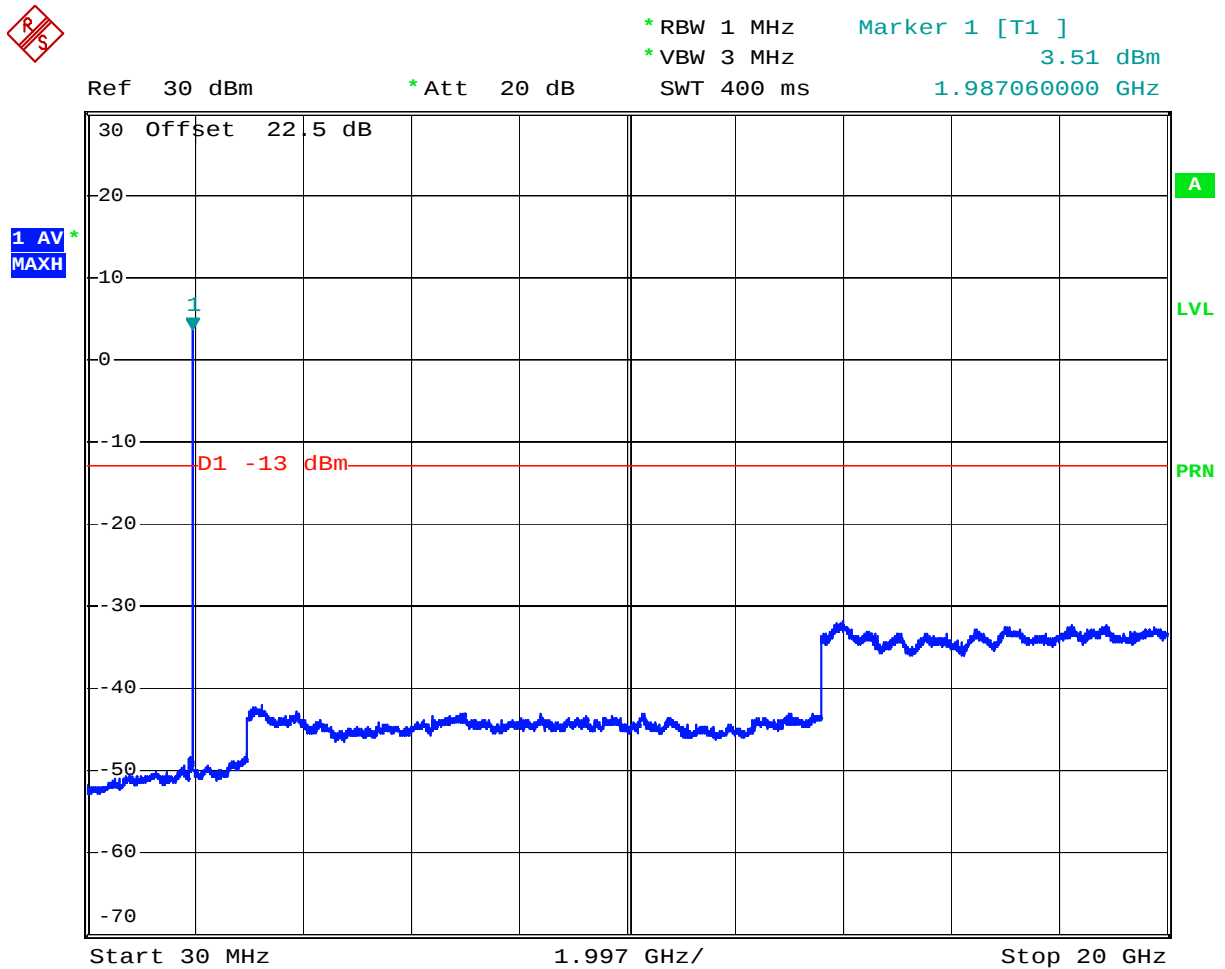
Comment: Spurious emissions, Downlink, 1957.6 MHz, WCDMA
 Date: 13.JUN.2008 18:40:58

Graph 5.30



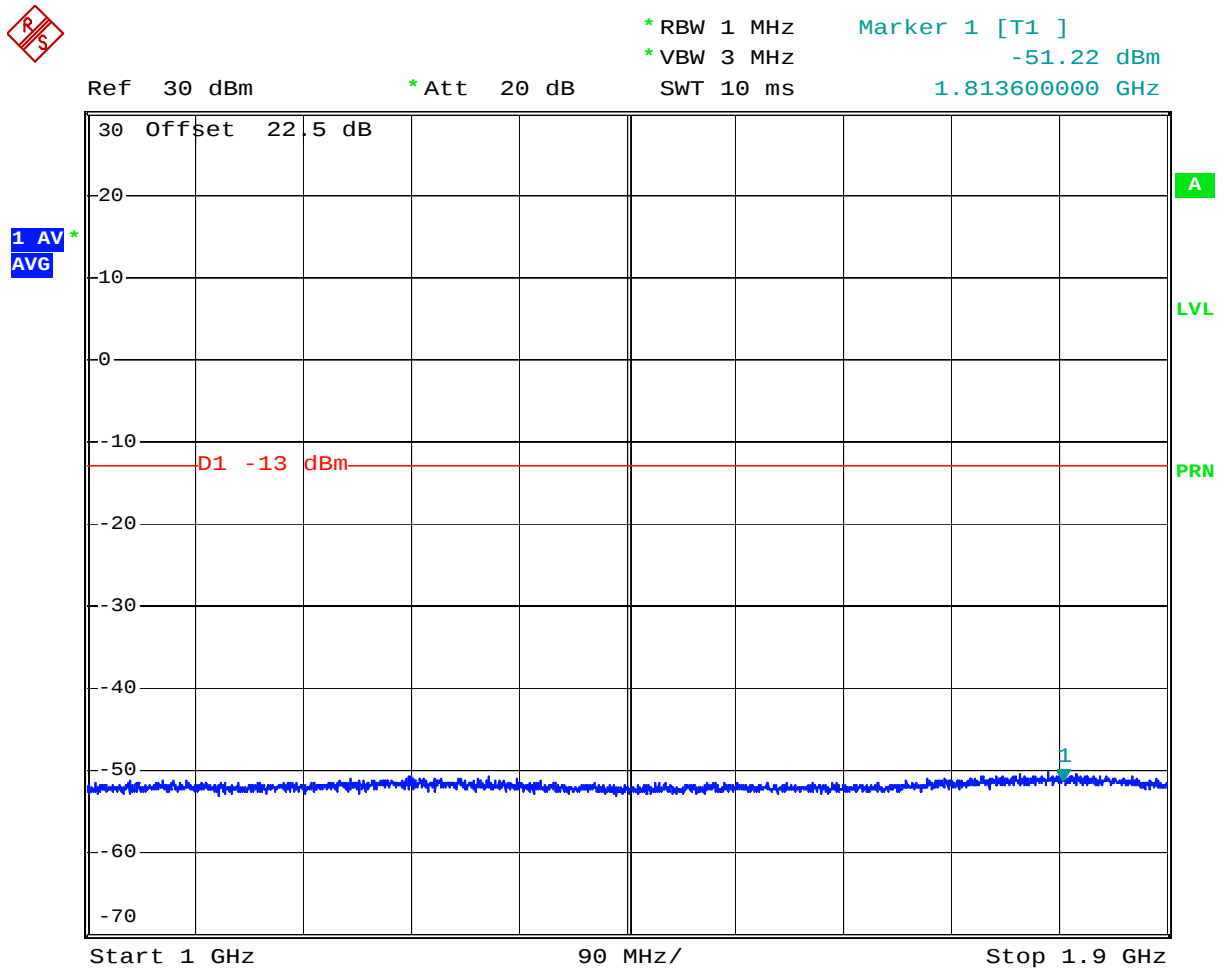
Comment: Spurious emissions, Downlink, 1987.6 MHz, CDMA
 Date: 13.JUN.2008 18:47:40

Graph 5.31



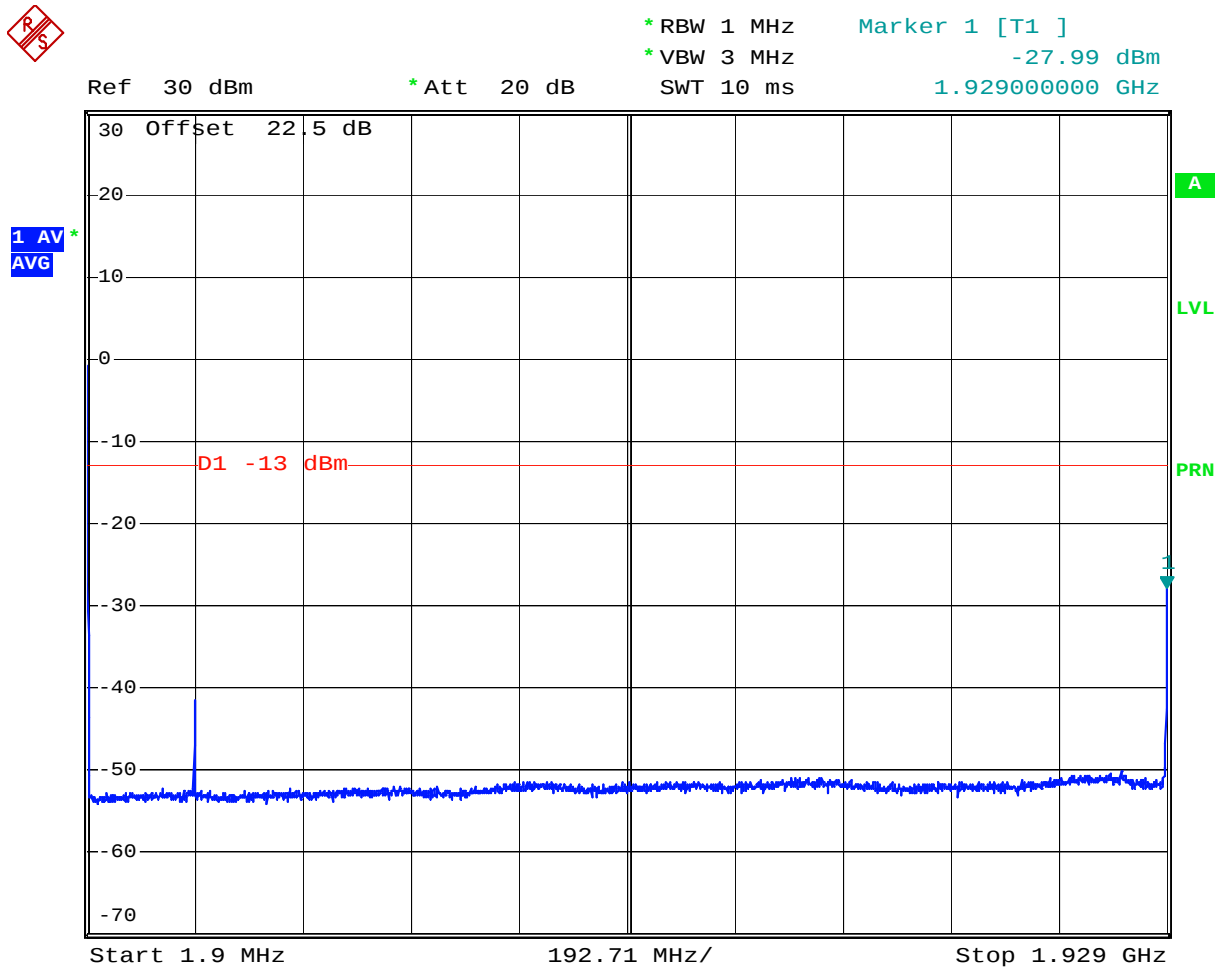
Comment: Spurious emissions, Downlink, 1987.6 MHz, WCDMA
 Date: 13.JUN.2008 18:39:24

Graph 5.32



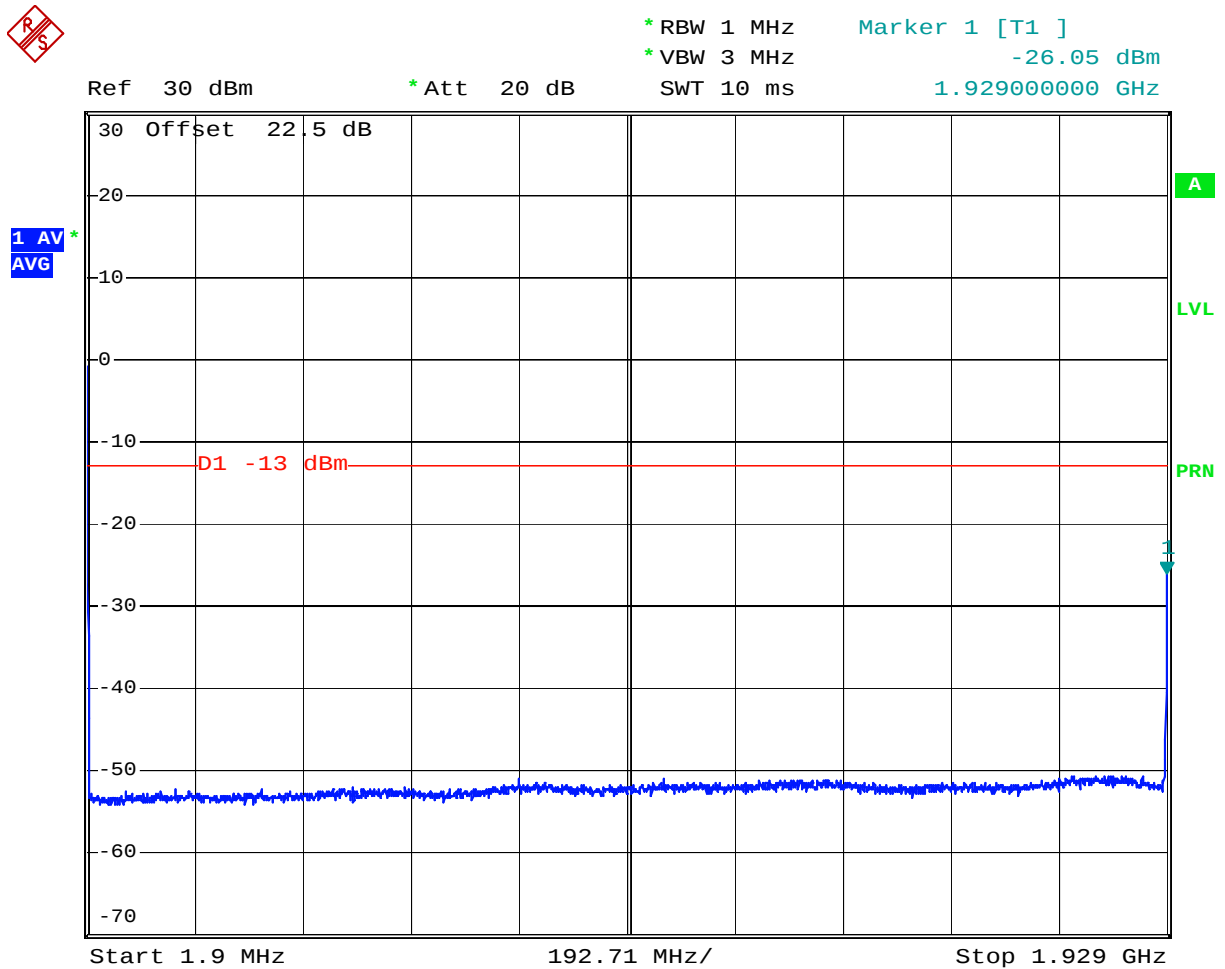
Comment: Spurious emissions, Downlink, 1932.6 MHz, CDMA
 Date: 13.JUN.2008 19:21:40

Graph 5.33



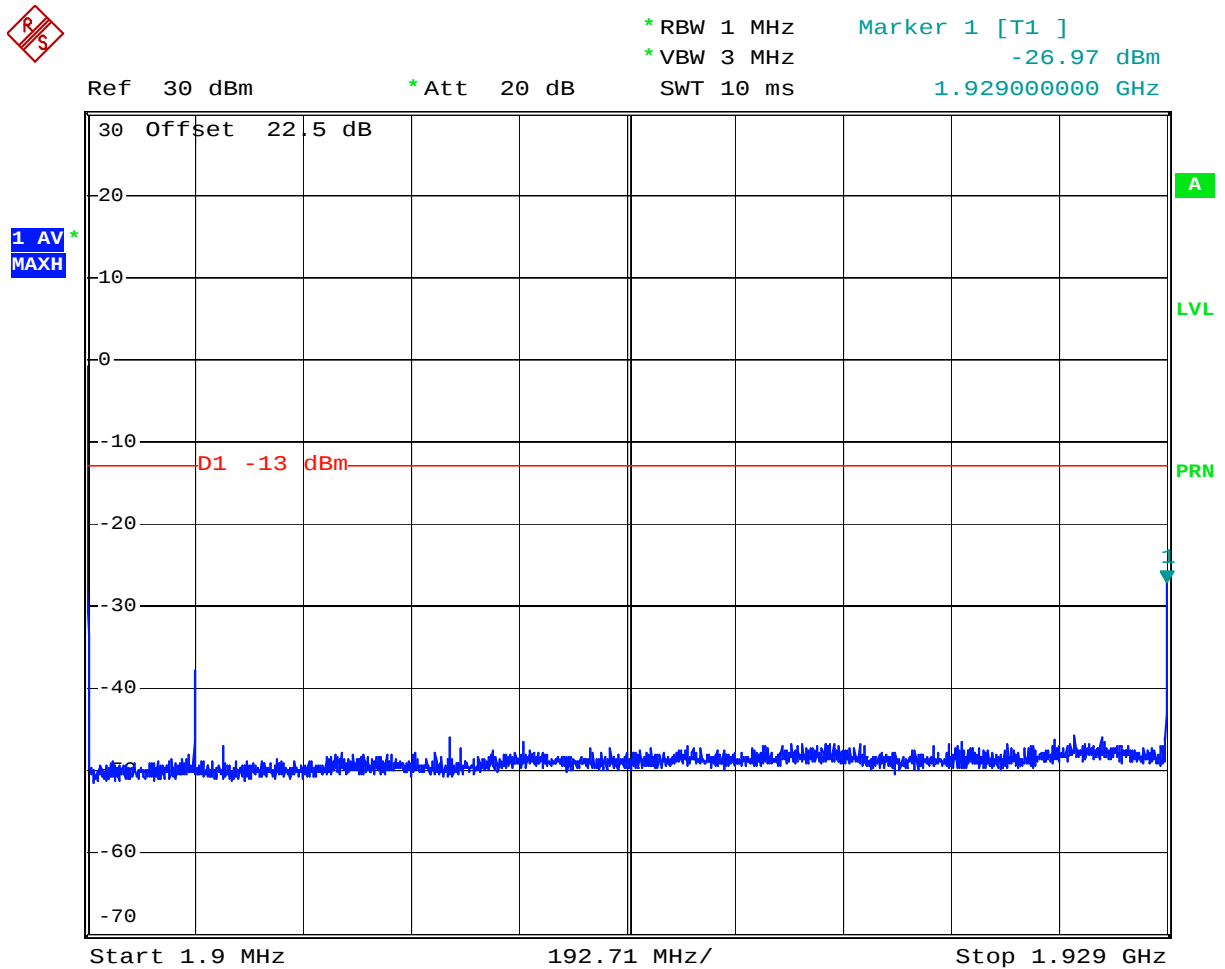
Comment: Spurious emissions, Downlink, 1932.6 MHz, CDMA
 Date: 13.JUN.2008 19:07:24

Graph 5.34



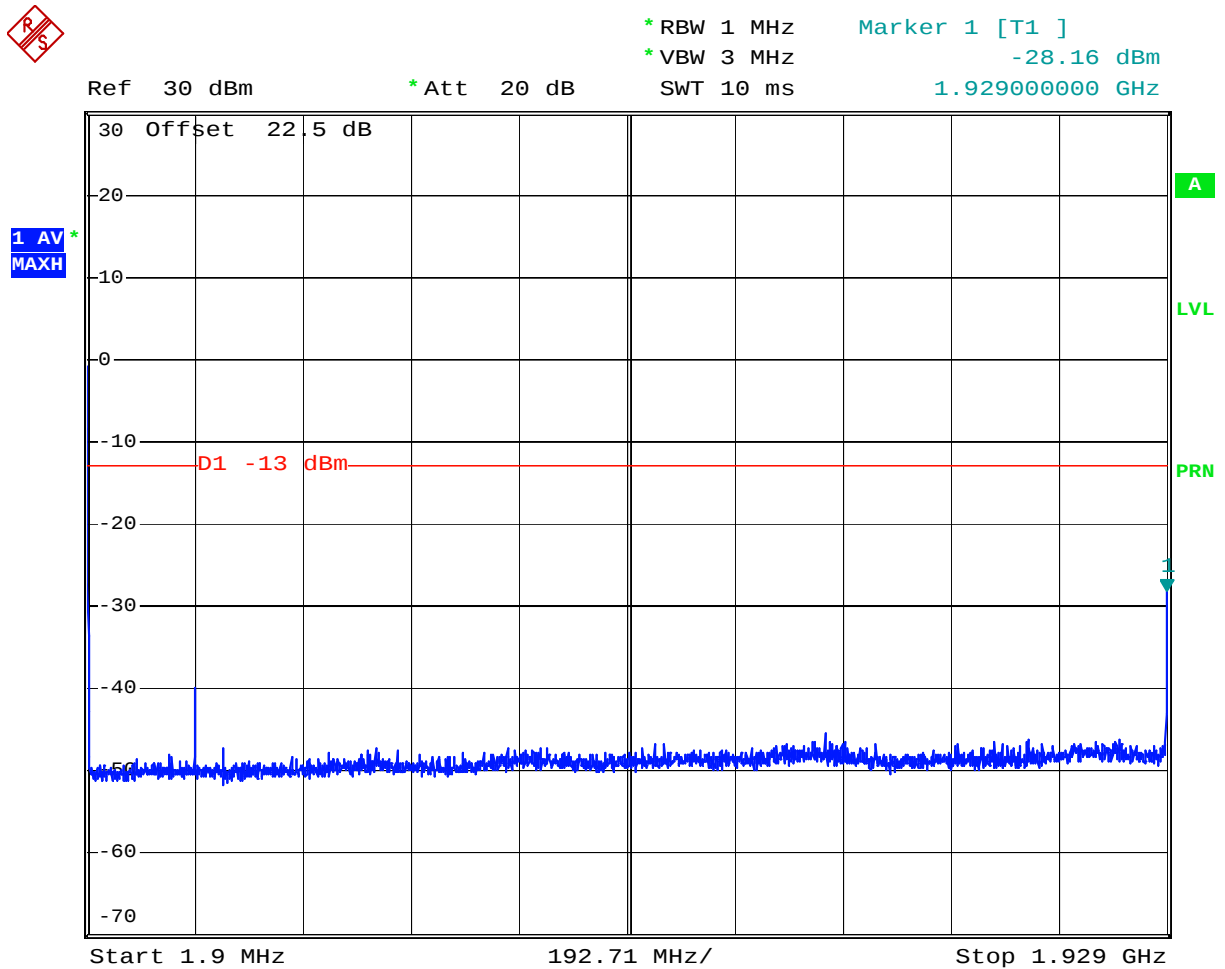
Comment: Spurious emissions, Downlink, 1932.6 MHz, WCDMA
 Date: 13.JUN.2008 19:09:19

Graph 5.35



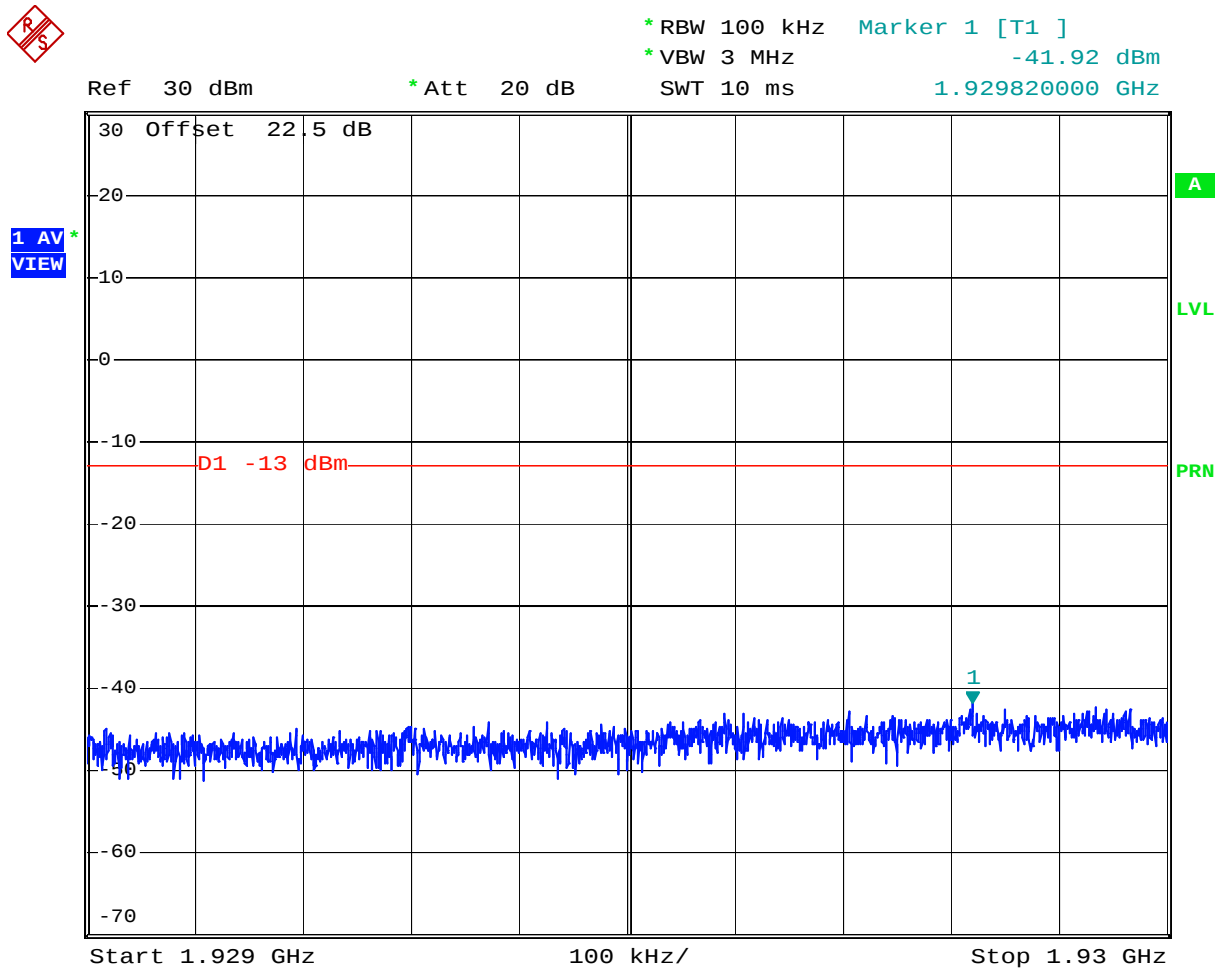
Comment: Spurious emissions, Downlink, 1932.6 MHz, EDGE
 Date: 13.JUN.2008 19:11:39

Graph 5.36



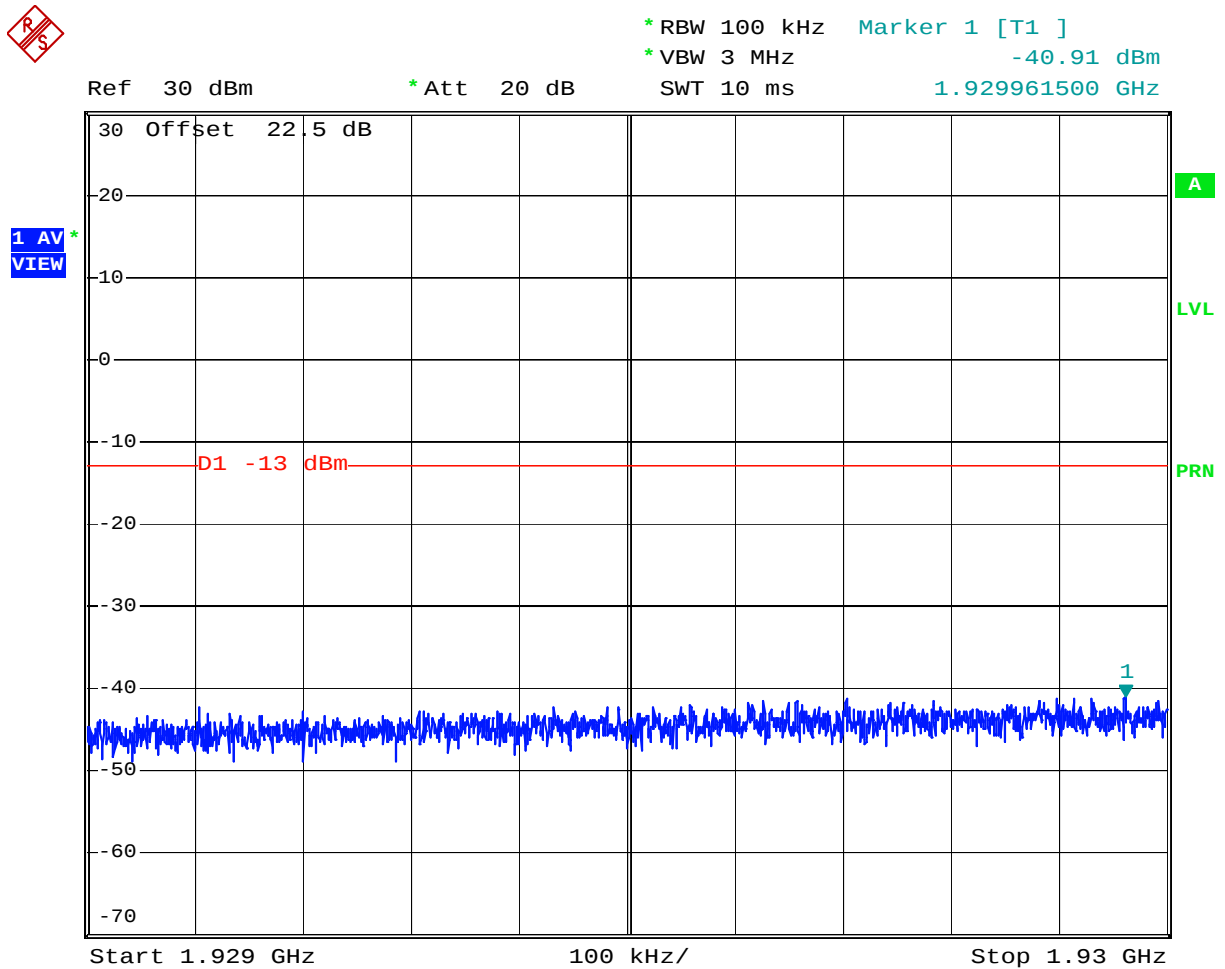
Comment: Spurious emissions, Downlink, 1932.6 MHz, GSM
 Date: 13.JUN.2008 19:13:02

Graph 5.37



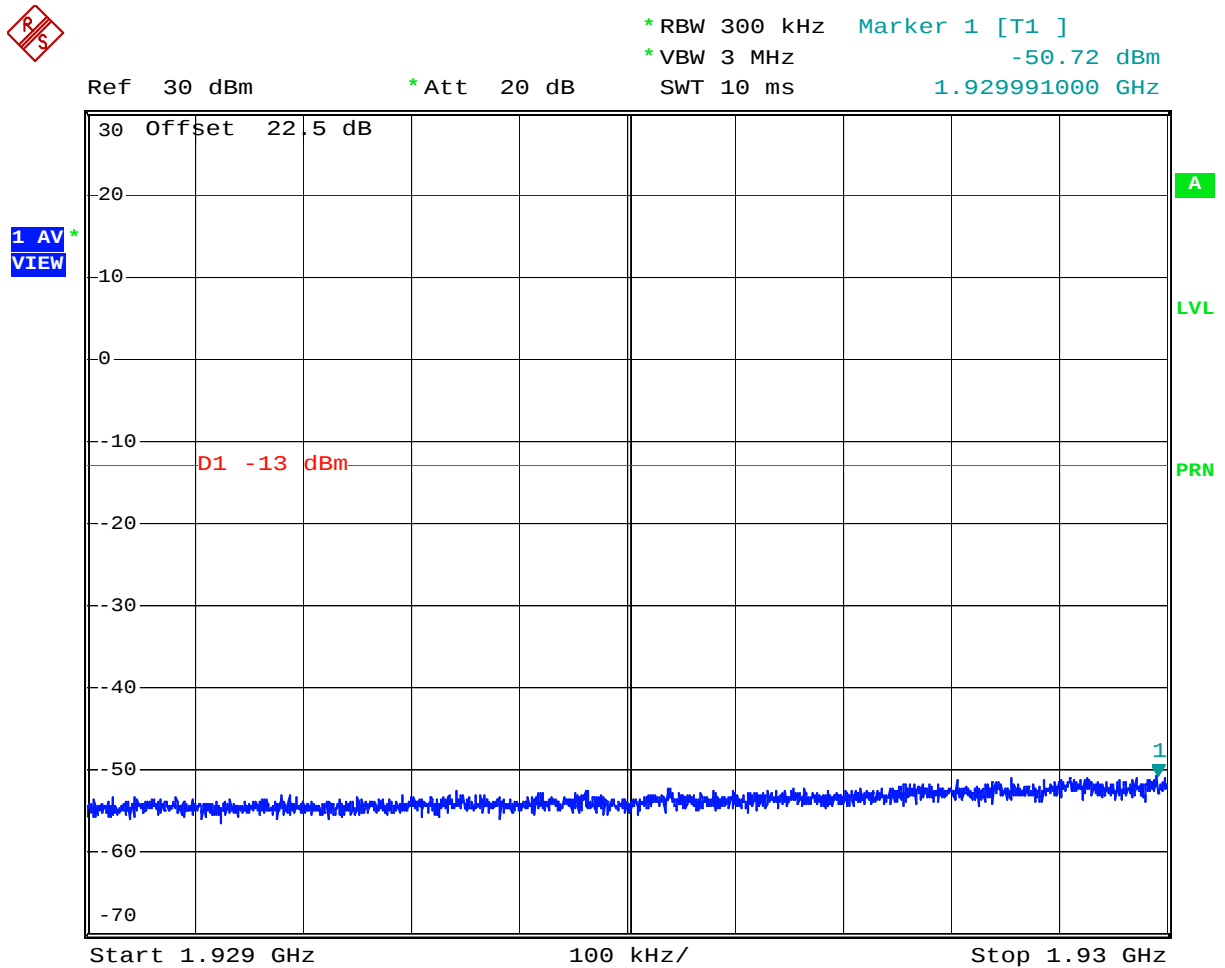
Comment: Spurious emissions, Downlink, 1932.6 MHz, CDMA
 Date: 13.JUN.2008 19:20:34

Graph 5.38



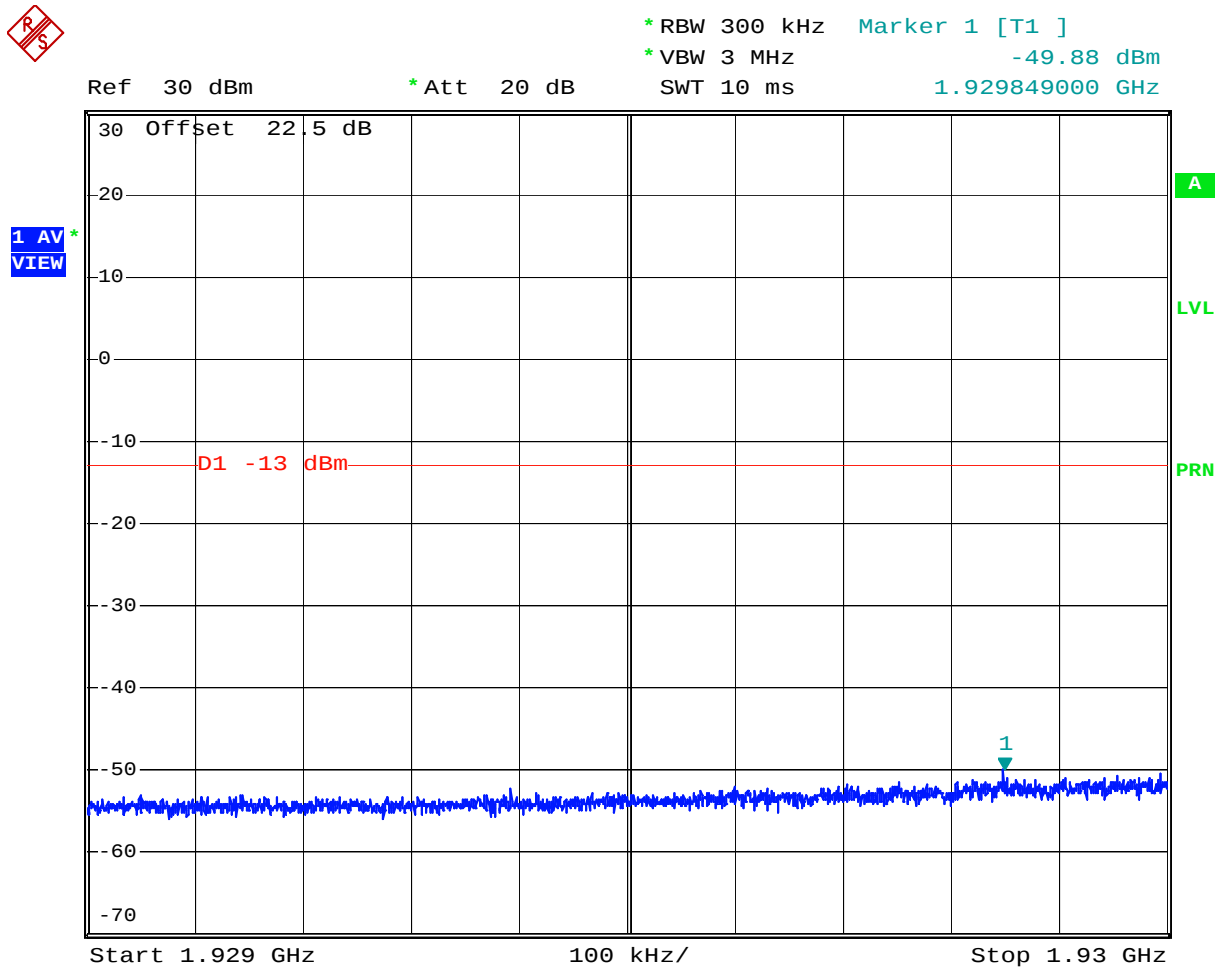
Comment: Spurious emissions, Downlink, 1932.6 MHz, WCDMA
 Date: 13.JUN.2008 19:18:30

Graph 5.39



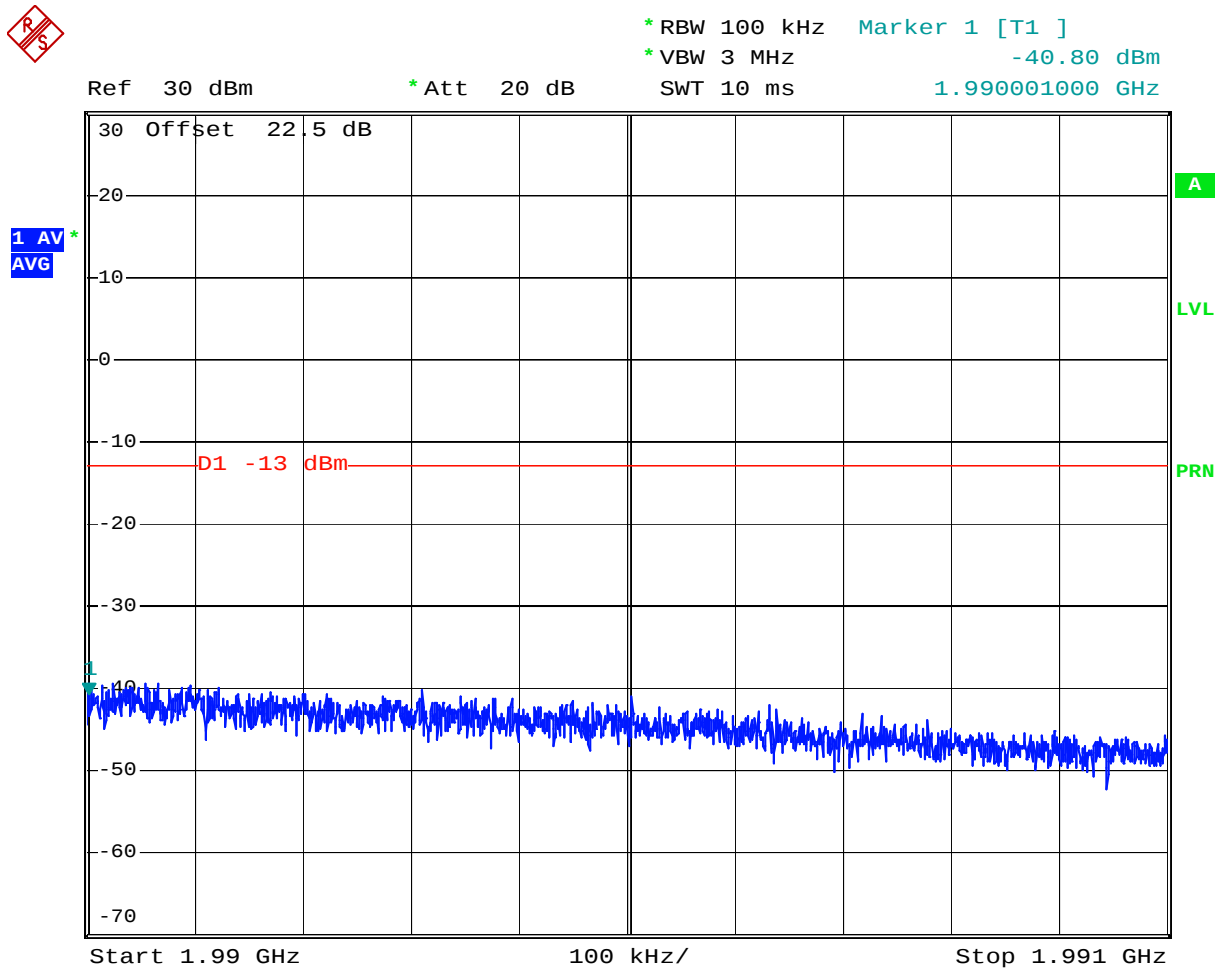
Comment: Spurious emissions, Downlink, 1932.6 MHz, EDGE
 Date: 13.JUN.2008 19:15:59

Graph 5.40



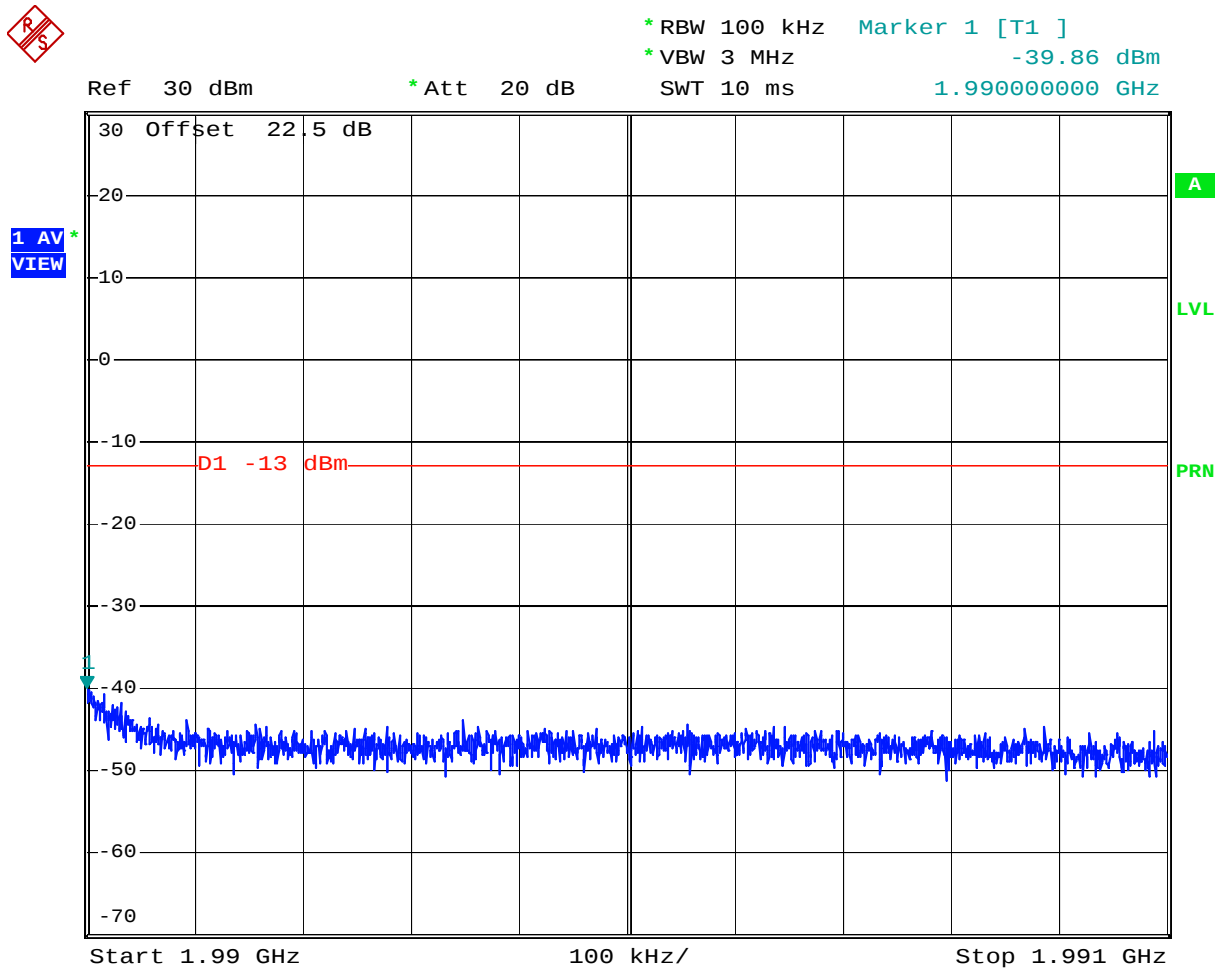
Comment: Spurious emissions, Downlink, 1932.6 MHz, GSM
 Date: 13.JUN.2008 19:14:29

Graph 5.41



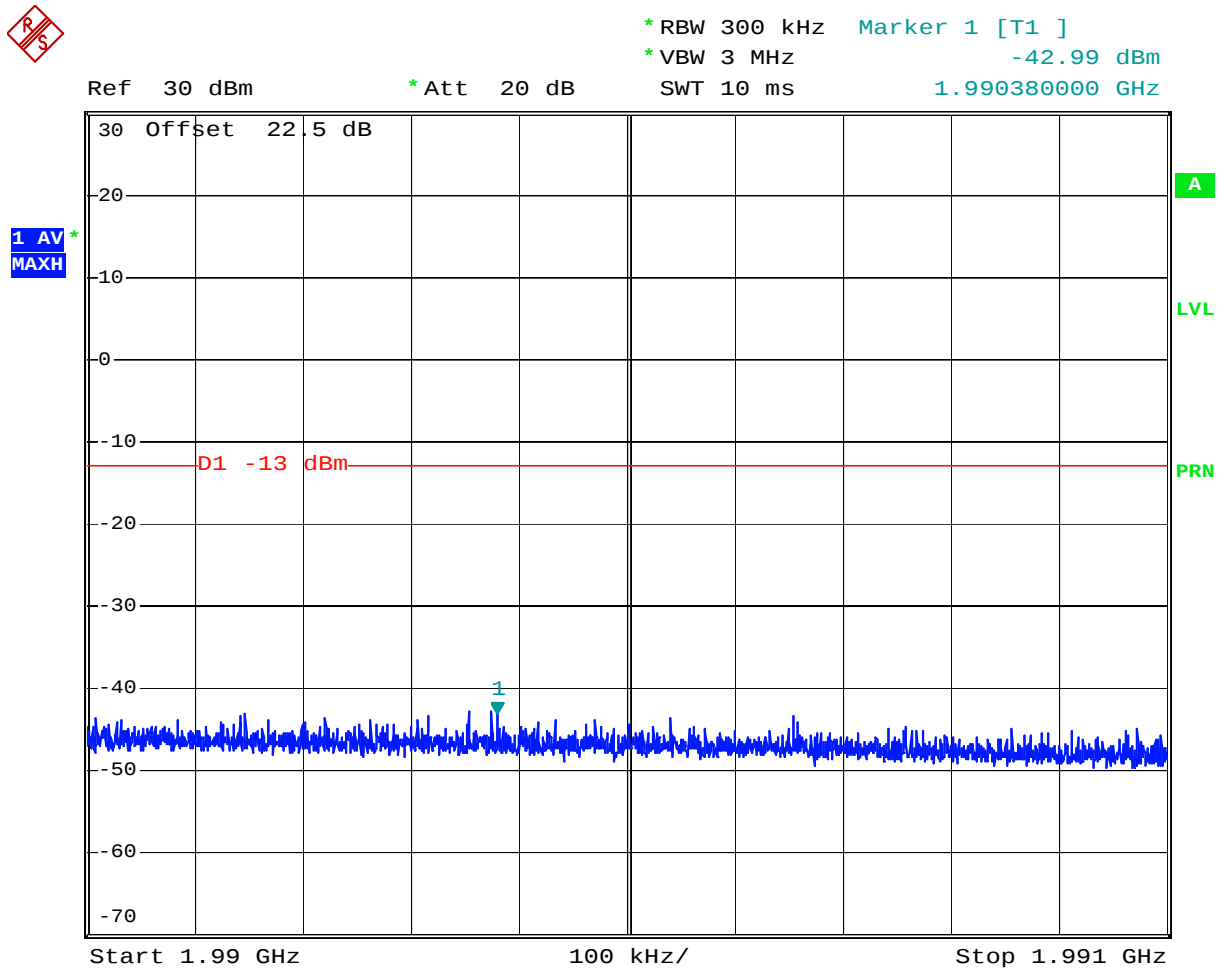
Comment: Spurious emissions, Downlink, 1987.6 MHz, CDMA
Date: 13.JUN.2008 19:31:39

Graph 5.42



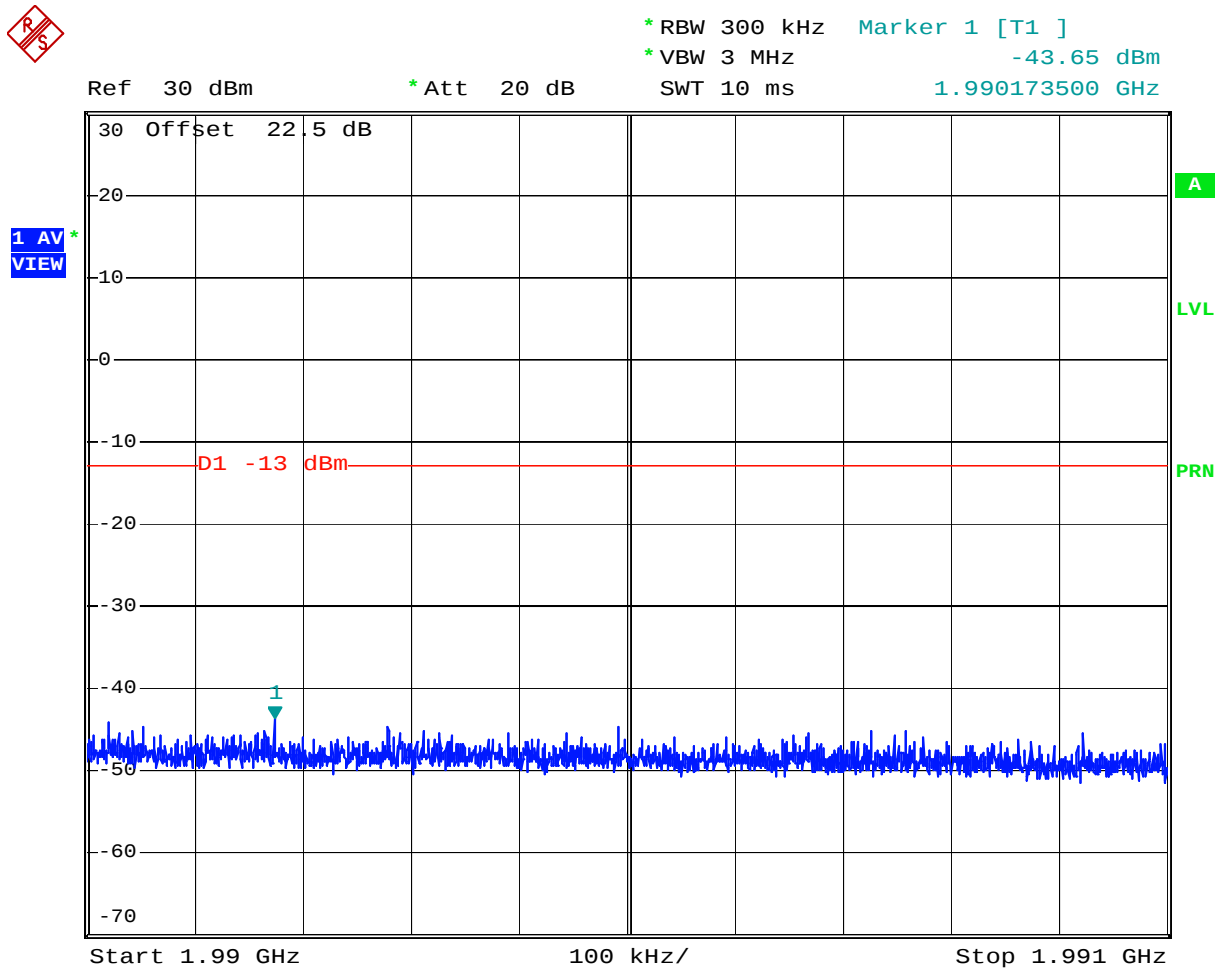
Comment: Spurious emissions, Downlink, 1987.6 MHz, WCDMA
 Date: 13.JUN.2008 19:41:09

Graph 5.43



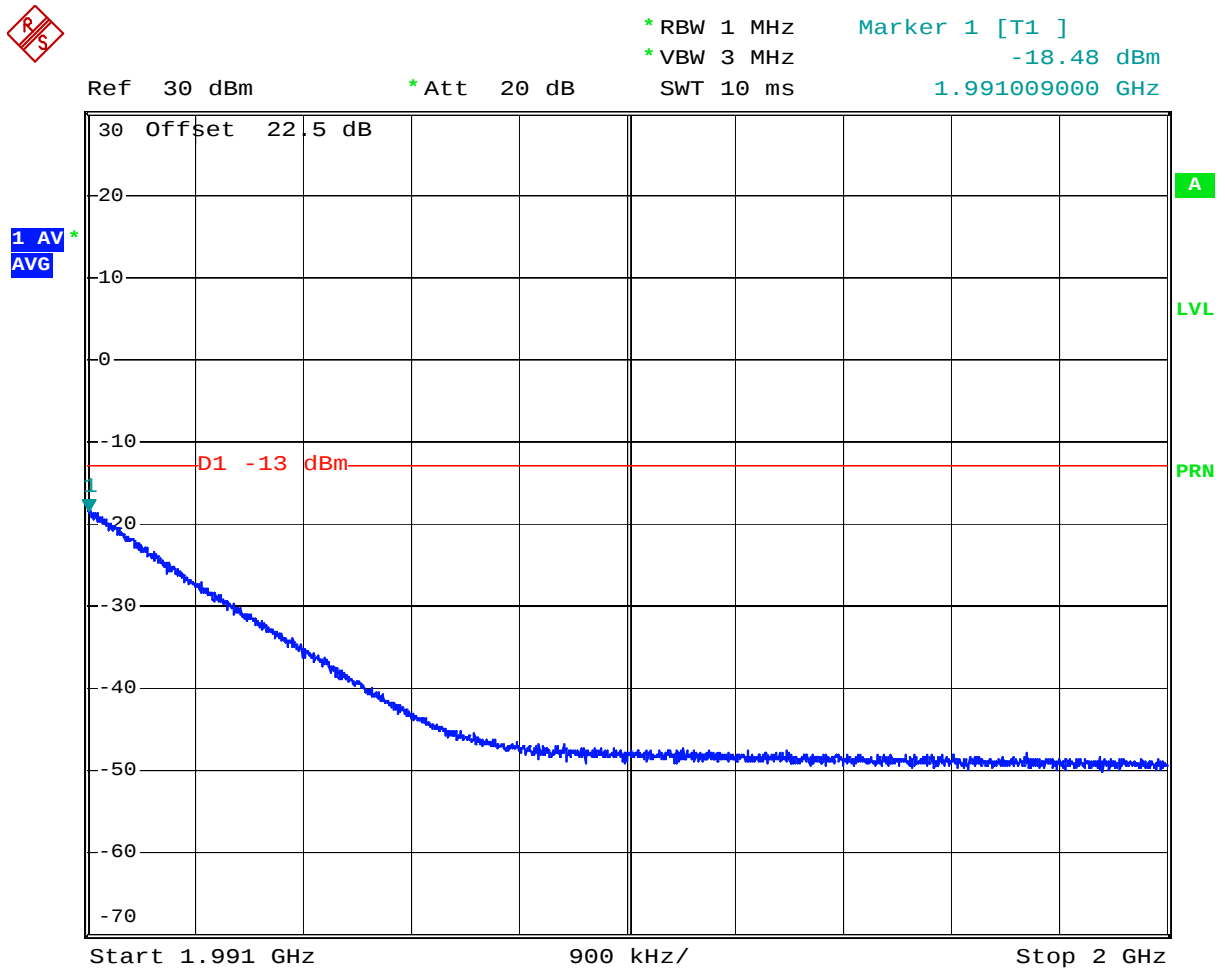
Comment: Spurious emissions, Downlink, 1987.6 MHz, EDGE
 Date: 13.JUN.2008 19:46:29

Graph 5.44



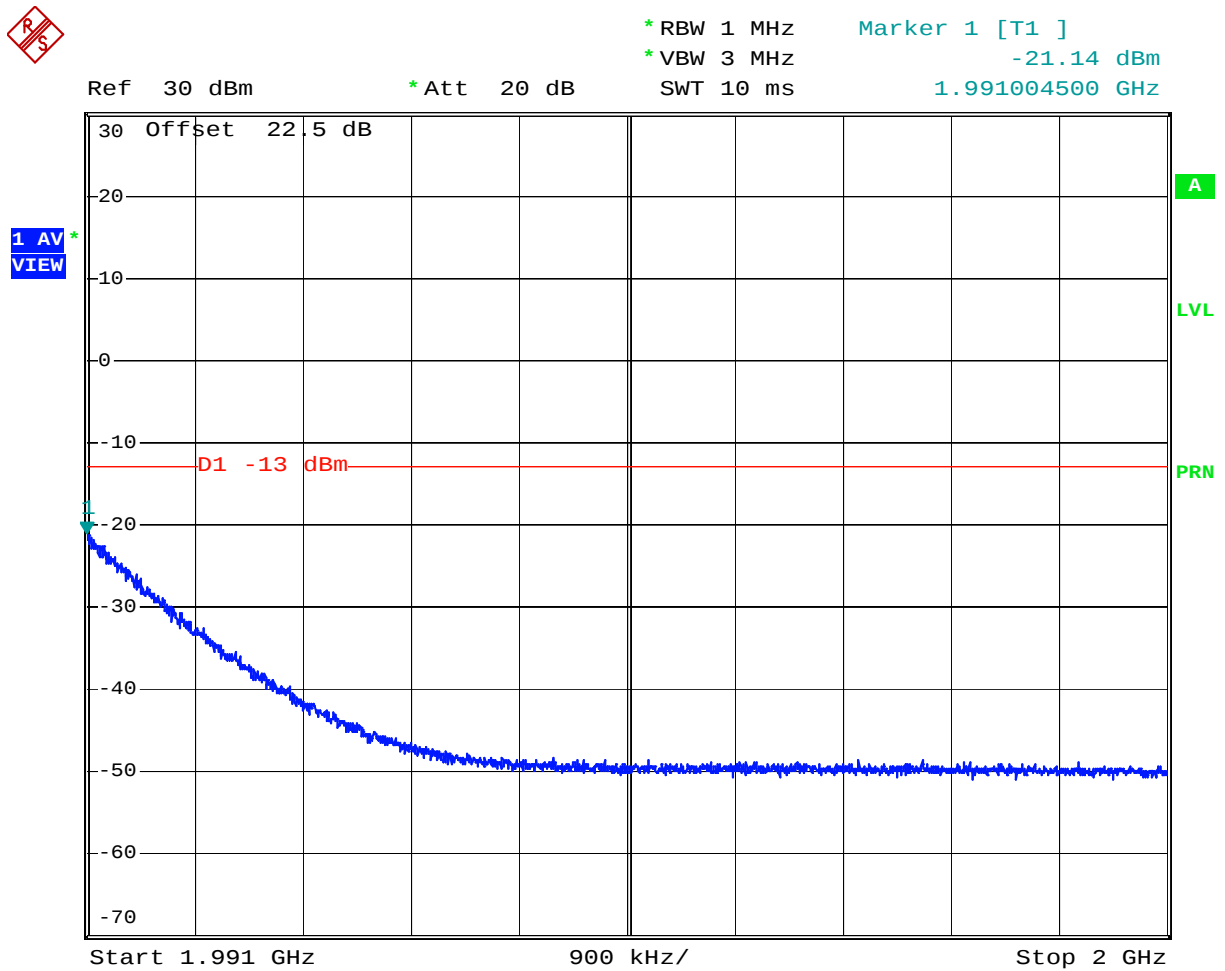
Comment: Spurious emissions, Downlink, 1987.6 MHz, GSM
 Date: 13.JUN.2008 19:50:12

Graph 5.45



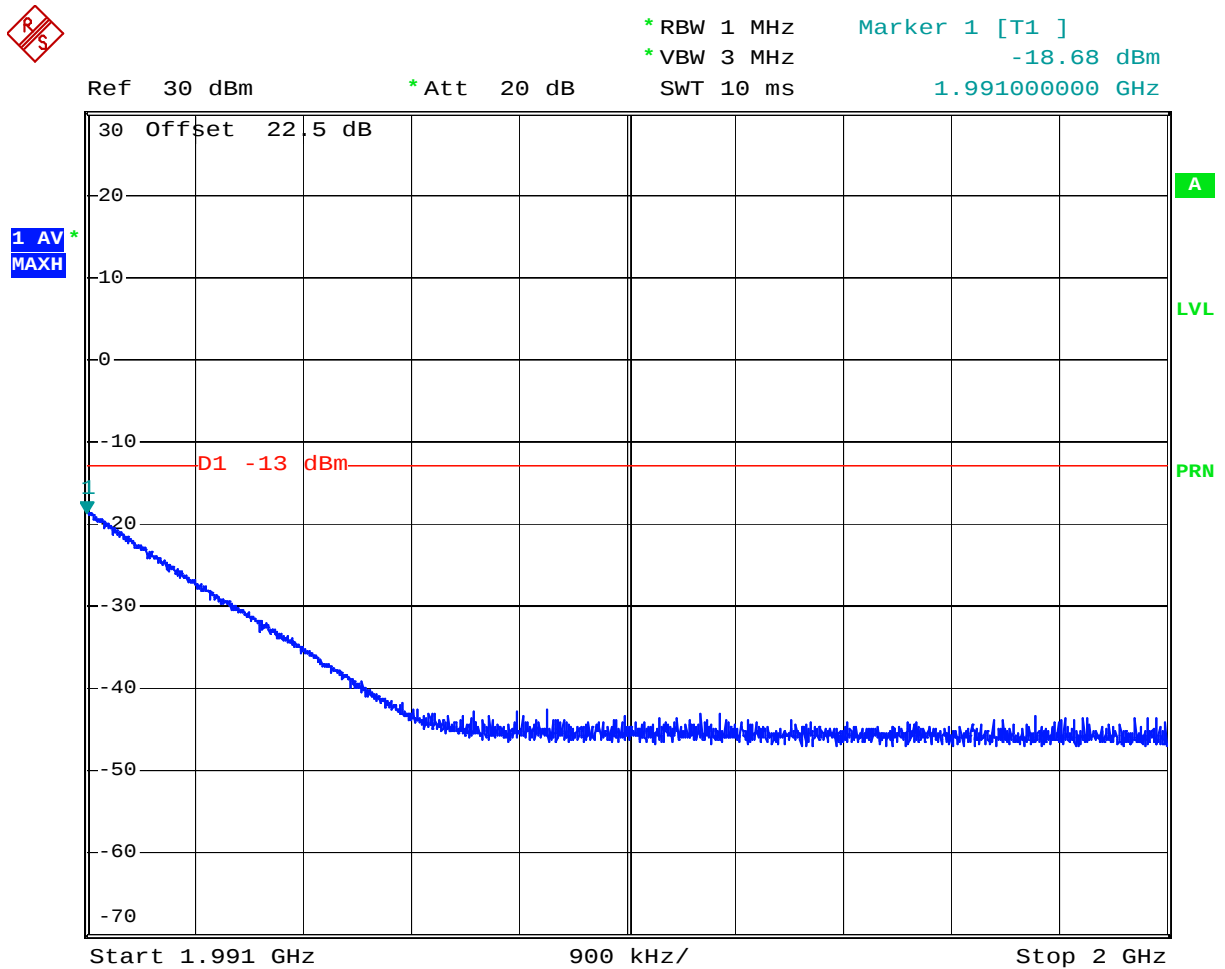
Comment: Spurious emissions, Downlink, 1987.6 MHz, CDMA
 Date: 13.JUN.2008 19:30:16

Graph 5.46



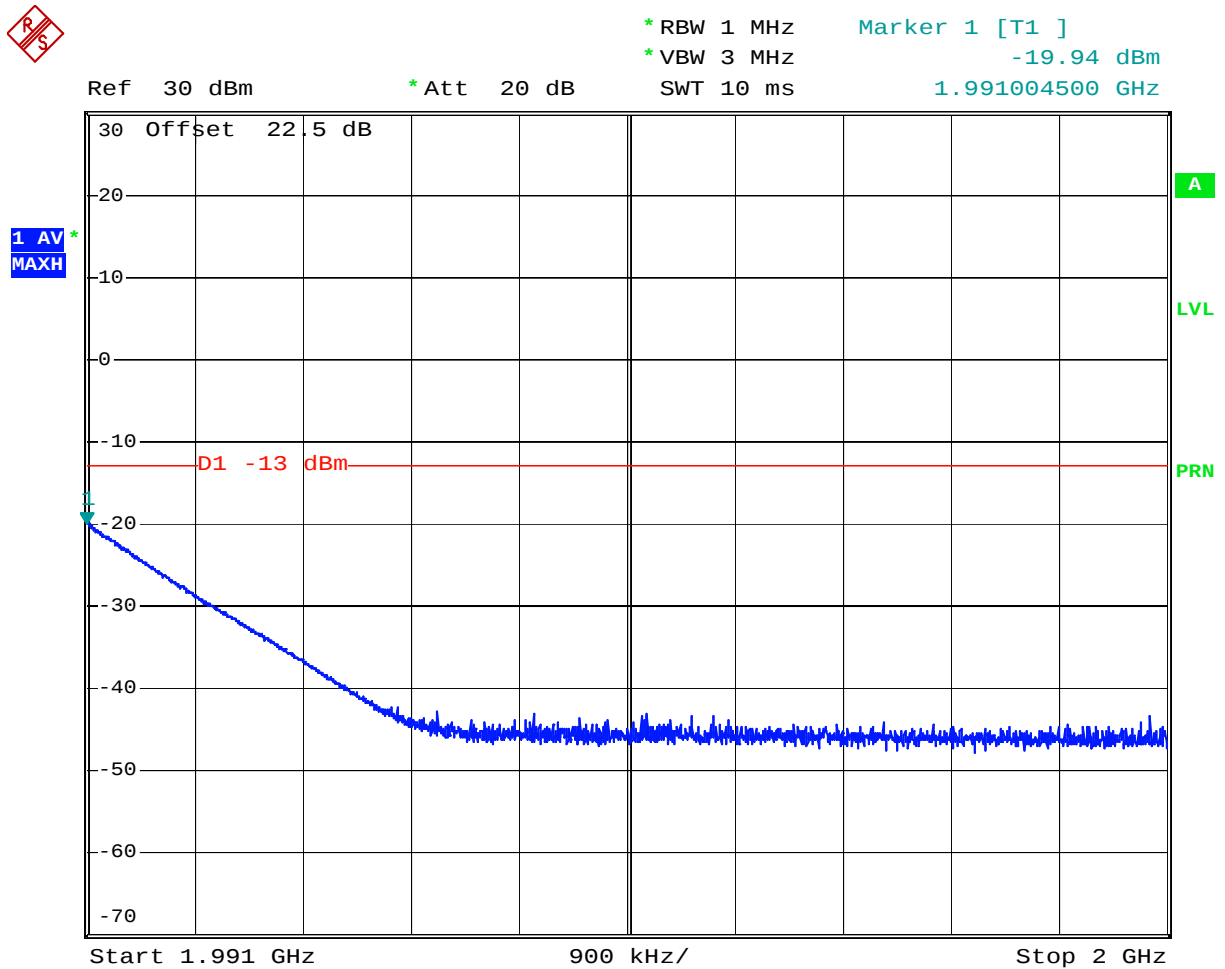
Comment: Spurious emissions, Downlink, 1987.6 MHz, WCDMA
 Date: 13.JUN.2008 19:42:12

Graph 5.47



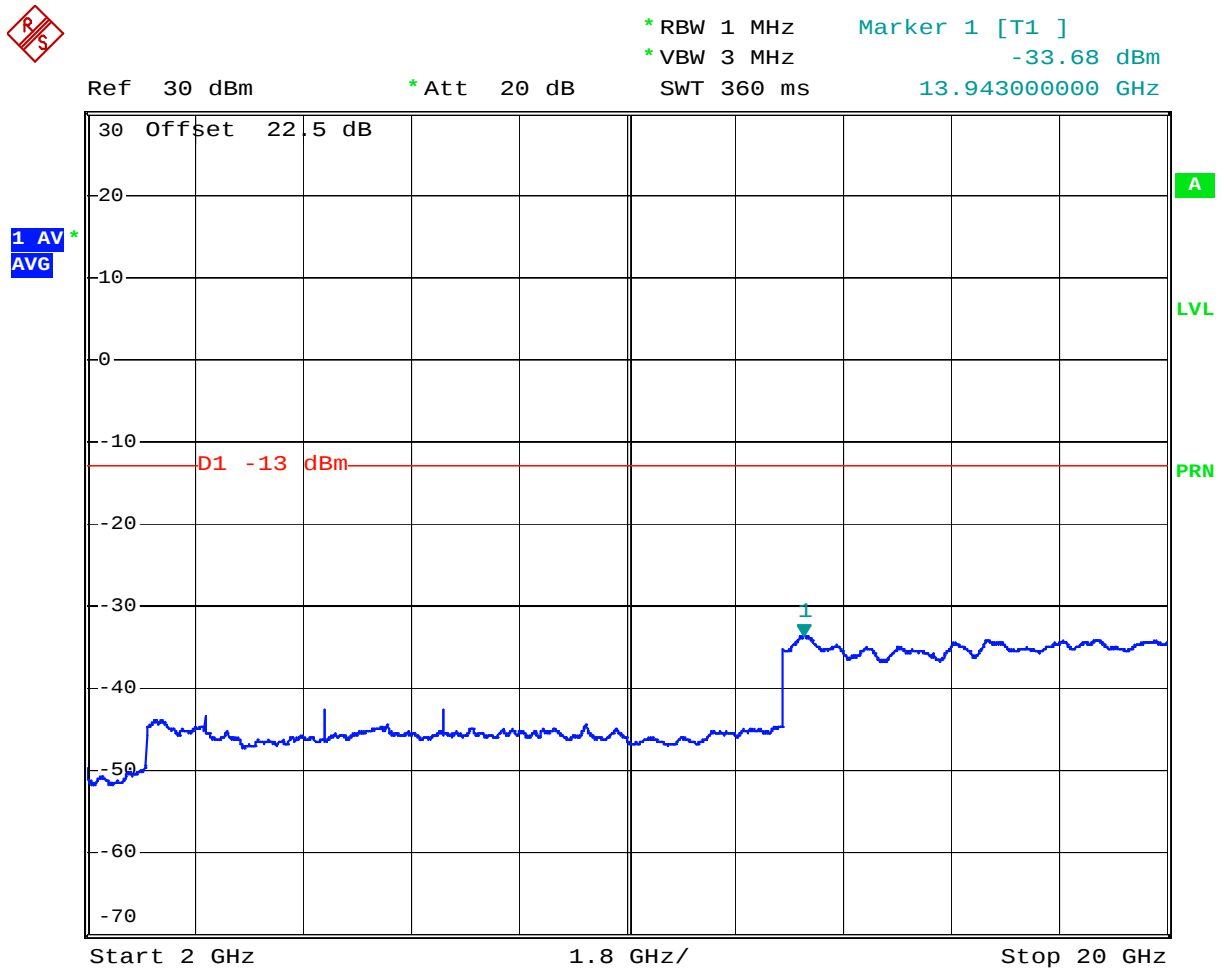
Comment: Spurious emissions, Downlink, 1987.6 MHz, EDGE
 Date: 13.JUN.2008 19:47:30

Graph 5.48



Comment: Spurious emissions, Downlink, 1987.6 MHz, GSM
 Date: 13.JUN.2008 19:51:10

Graph 5.49



Comment: Spurious emissions, Downlink, 1987.6 MHz, CDMA
Date: 13.JUN.2008 19:29:36

6.0 Transmitter Spurious Radiation

FCC 2.1053, 24.238

6.1 Requirement

The power of any emissions 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.

Note: That corresponds to the level of -13 dBm for any radiated out-of-band and spurious emissions.

6.2 Test Procedure

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT.

The frequency range up to 10-th harmonic of each of the three fundamental frequencies (low, middle, and high channels) was investigated. The worst case of emissions was reported.

For spurious emissions attenuation, the substitution method was used. The EUT was substituted by a reference antenna (half-wave dipole - below 1 GHz, or Horn antenna - above 1GHz), connected to a signal generator. The signal generator output level (V_g in dBm) was adjusted to obtain the same reading as from EUT. The EIRP at the spurious emissions frequency was calculated as follows.

$$EIRP_{(dBm)} = V_g + G_{(dBi)}$$

The spurious emissions attenuation is the difference between EIRP at the fundamental frequency (see section 3) and at the spurious emissions frequency.

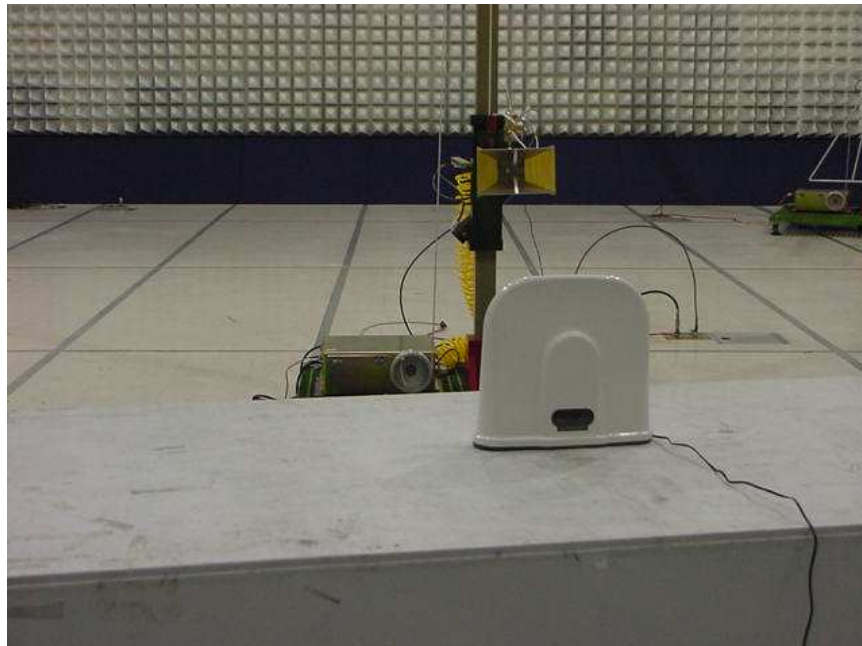
Test was performed with 50 Ω dummy load.

6.3 Test Equipment

Roberts Antenna
EMCO 3115 Horn Antennas
Rohde & Schwarz FSP40 Spectrum Analyzer
Low Pass Filter
Preamplifiers

6.4 Configuration Photographs

Radiated Emission Test Setup



6.5 Test Results

Transmitter Spurious Radiated Emissions

Frequency	SA Reading (from EUT)	Signal Generator Output required to have the same SA Reading as from EUT	EIRP	EIRP Limit	EIRP Margin
MHz	dB(μV)	V _g dBm	dBm	dBm	dB
Uplink, 1852.56 MHz					
3705.1	57.5	-43.6	-34.7	-13.0	-21.7
5557.7	50.1	-46.6	-37.2	-13.0	-24.2
7410.2	50.9	-41.6	-32.0	-13.0	-19.0
9262.8	41.3	-49.5	-40.6	-13.0	-27.6
Uplink, 1877.56 MHz					
3755.1	56.5	-44.7	-35.6	-13.0	-22.6
5632.7	49.5	-46.7	-37.2	-13.0	-24.2
7510.2	51.2	-41.8	-32.1	-13.0	-19.1
9387.8	43.7	-46.5	-37.8	-13.0	-24.8
Uplink, 1907.56 MHz					
3815.1	60.7	-40.3	-31.3	-13.0	-18.3
5722.7	50.3	-45.8	-36.4	-13.0	-23.4
7630.2	52.4	-39.8	-30.3	-13.0	-17.3
9537.8	49.6	-40.3	-31.7	-13.0	-18.7
Downlink, 1932.6 MHz					
3865.2	63.2	-37.6	-28.5	-13.0	-15.5
5797.8	53.1	-42.9	-33.6	-13.0	-20.6
7730.4	44.7	-47.8	-38.2	-13.0	-25.2
9663.0	34.9	-58.4	-49.8	-13.0	-36.8
Downlink, 1957.6 MHz					
3915.2	59.3	-41.4	-32.4	-13.0	-19.4
5872.8	48.9	-46.9	-37.8	-13.0	-24.8
7830.4	40.6	-51.7	-42.2	-13.0	-29.2
9788.0	30.5	-58.8	-50.4	-13.0	-37.4
Downlink, 1987.6 MHz					
3975.2	59.3	-41.0	-32.2	-13.0	-19.2
5962.8	46.1	-49.3	-40.4	-13.0	-27.4
7950.4	40.7	-51.4	-42.1	-13.0	-29.1
9938.0	32.2	-56.6	-48.4	-13.0	-35.4

EIRP is calculated as: $EIRP_{(dBm)} = V_{g(dBm)} + G_{(dBi)}$

All other emissions not reported are more than 10 dB below the limit.

Result	Complies by 15.5 dB
---------------	----------------------------

7.0 Receiver Radiated emissions

FCC 15.109

7.1 Radiated Emission Limits

The following radiated emission limits apply to Class A unintentional radiators:

Radiated Emissions Limits, Section 15.109(b)

<i>Frequency (MHz)</i>	<i>Class A at 10m (μV/m)</i>	<i>Class A at 10m (dBμV/m)</i>
30-88	90	39
88-216	150	43.5
216-960	210	46.4
Above 960	300	49.5

Note: Three sets of units are commonly used for EMI measurement, decibels below one milliwatt (-dBm), decibels above a microvolt (dB μ V), and microvolts (μ V). To convert between them, use the following formulas: $20 \text{ LOG}_{10}(\mu\text{V}) = \text{dB}\mu\text{V}$, $\text{dBm} = \text{dB}\mu\text{V} - 107$.

7.2 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - AG$$

Where FS = Field Strength in dB μ V/m

RA = Receiver Amplitude (including preamplifier) in dB μ V

CF = Cable Attenuation Factor in dB

AF = Antenna Factor in dB

AG = Amplifier Gain in dB

An example for the calculations in the following table is as follows:

Assume a receiver reading of 52.0 dB μ V is obtained. The antennas factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29.0 dB is subtracted, giving field strength of 32 dB μ V/m. This value in dB μ V/m was converted to its corresponding level in μ V/m.

$$RA = 52.0 \text{ dB}\mu\text{V}$$

$$AF = 7.4 \text{ dB}$$

$$CF = 1.6 \text{ dB}$$

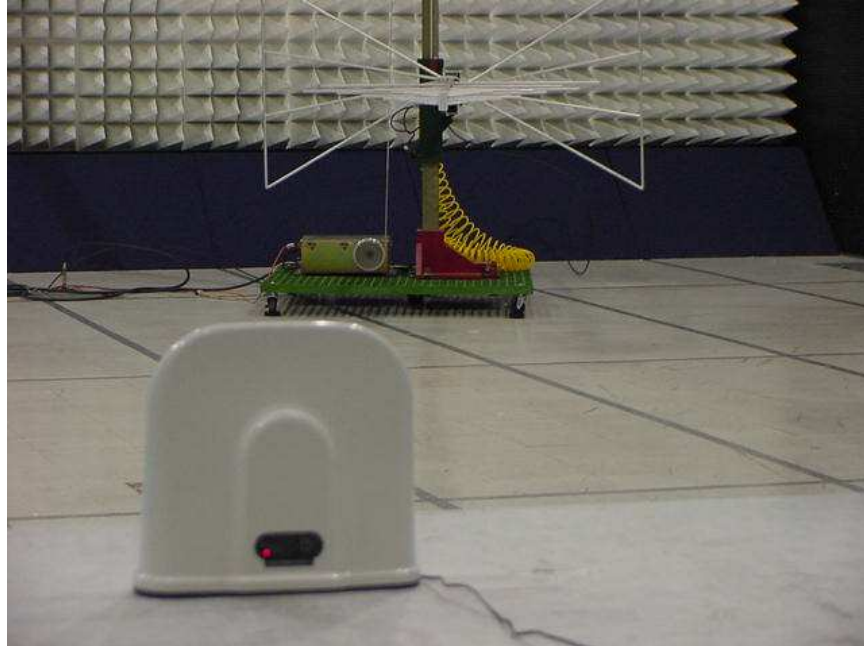
$$AG = 29.0 \text{ dB}$$

$$FS = 52.0 + 7.4 + 1.6 - 29.0 = 32 \text{ dB}\mu\text{V/m}$$

$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm } [(32 \text{ dB}\mu\text{V/m})/20] = 39.8 \mu\text{V/m}$$

7.3 Configuration Photographs

Radiated Emission Test Setup





7.4 Test Results

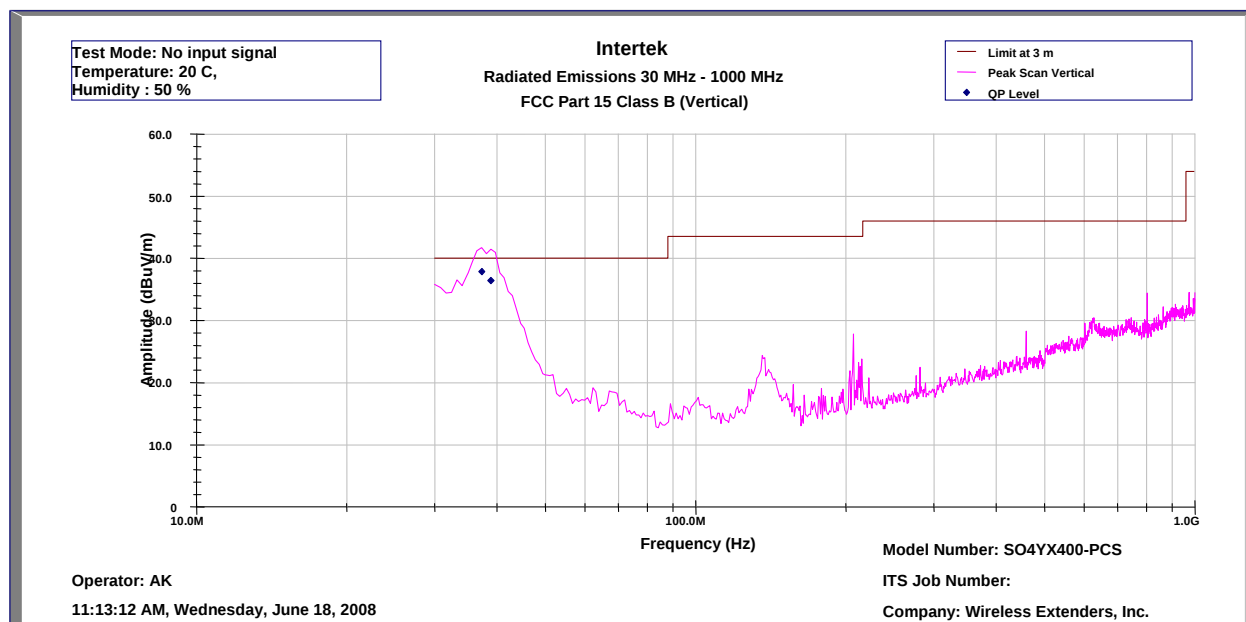
Tested By:	Arkadi Kaplan & David Chernomordik
Test Date:	June 18 & 23, 2008

The results on the following page(s) were obtained when the device was tested in the standby/receiving mode

Note: A complete scan was made from 30 MHz – 20 GHz.
All other emissions, not reported, are at least 10 dB below the limit

Result	Complies by 0.3 dB
---------------	---------------------------

Radiated Emissions below 1 GHz



Intertek Testing Services Radiated Emissions 30 MHz - 1000 MHz FCC Part 15 Class B (QP-Vertical)

Operator: AK
Tested at 10 m

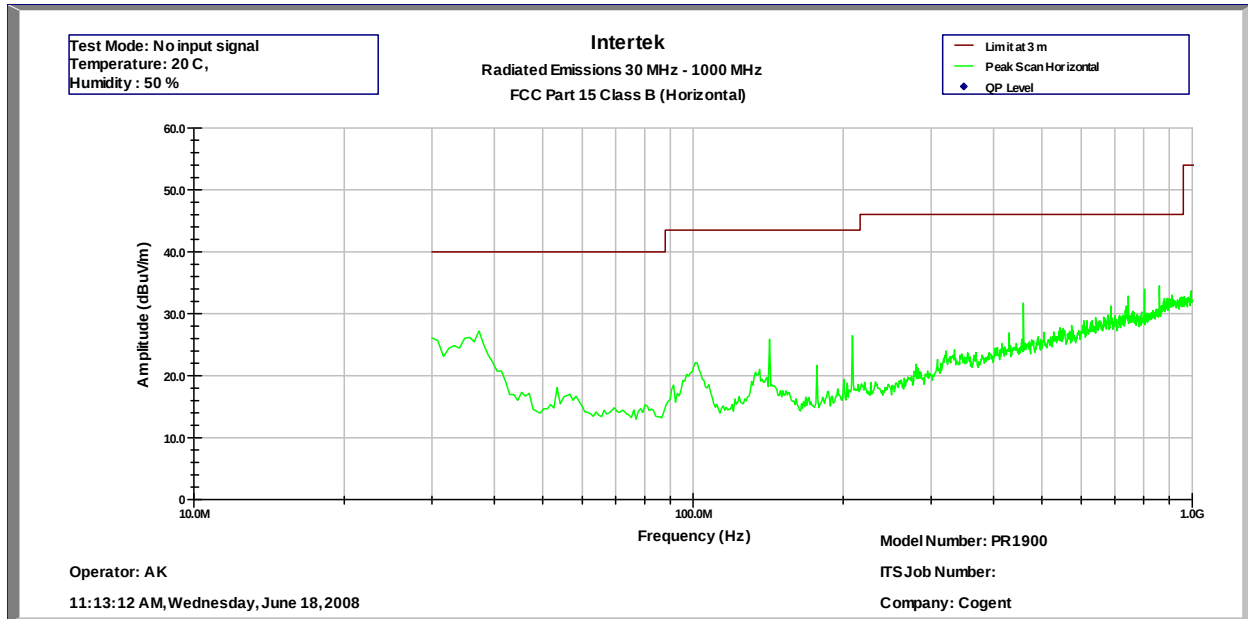
11:13:12 AM, Wednesday, June 18, 2008

Model Number: SO4YX400-PCS

Company: Wireless Extenders, Inc.

Frequency	Quasi-Pk FS	Limit@3m	Margin	RA	CF	AG	DCF	AF
MHz	dB(uV/m)	dB(uV/m)	dB	dB(uV)	dB	dB	dB	dB(1/m)
37.30	37.9	40	-2.1	49.2	0.6	32	10.5	9.6
38.90	36.4	40	-3.6	48.3	0.6	32	10.5	9.0

Radiated Emissions below 1 GHz



Radiated Emissions above 1 GHz

Operator: DA

Model Number: SO4YX400-PCS

Tested at 3 m

07:25:10 PM, Monday, June 23, 2008

Company: Wireless Extenders, Inc.

Frequency	Average FS	Limit@3m	Av Margin	RA	CF	AG	AF
GHz	dB(uV/m)	dB(uV/m)	dB	dB(uV)	dB	dB	dB(1/m)
1.578	39.7	54.0	-14.3	46.6	3.0	35.7	25.8
3.155	51.7	54.0	-2.3	50.6	6.4	35.7	30.4
4.733	52.0	54.0	-2.0	47.0	7.1	35.0	32.9
6.310	53.7	54.0	-0.3	45.0	8.7	34.3	34.3
7.888	48.8	54.0	-5.2	36.4	9.7	34.2	36.9

Test Mode: No input signal

Temperature: 20 C,

Humidity : 50 %

8.0 RF Exposure evaluation

FCC 2.1091, 24.52

The EUT is a wireless device used in a mobile application, at least 20 cm from any body part of the user or nearby persons.

Considering the maximum antenna gain of 8 dBi, the maximum EIRP is 26.8 dBm or 0.48 W.

Using the formula for the Power Density $S = \text{EIRP} / 4\pi D^2$, the distance D, where the Power Density (S) satisfies the FCC 1.1310 Maximum Permissible Exposure (MPE) Limit for General Population/Uncontrolled Exposure, can be calculated as:

$$D \geq \sqrt{(\text{EIRP} / 4\pi S)}$$

The MPE Limit at 1960 MHz is 1.0 mW/cm^2 (or 10 W/m^2), therefore, $D \geq 6 \text{ cm}$

The Statement that a minimum separation distance of 20 cm between the antenna and persons must be maintained is included in the User's Manual.

9.0 List of Test Equipment

Measurement equipment used for compliance testing utilized the equipment on the following list:

Equipment	Manufacturer	Model/Type	Serial #	Cal Int	Cal Due
EMI Receiver	Hewlett Packard	8546A	3710A00373	12	10/02/08
Spectrum Analyzer	R & S	FSP40	036612004	12	10/01/08
BI-Log Antenna	EMCO	3143	9509-1160	12	09/05/08
Horn Antenna	EMCO	3115	8812-3049	12	07/16/08
Horn Antenna	EMCO	3160-09	Not Labeled	#	#
Pre-Amplifier	Sonoma Inst.	310	185634	12	09/26/08
Pre-Amplifier	Miteq	AMF-4D-001180-24-10P	799159	12	07/13/08

No Calibration required



10.0 Document History

Revision/ Job Number	Writer Initials	Date	Change
1.0 / 3154295	DC	June 30, 2008	Original document