Nemko TEST REPORT

Date:	**ESPOO 01.06.2010**	Page:	**1 (54)**
		Appendices	–

Number: **106205A**
No. 1 / 1

Date of handing in: 28.04.2008

Measured by:

Timo Hietala, Test Engineer

Reviewed by:

Timo Leismala, Test Manager

SORT OF EQUIPMENT:	**WCDMA Base Station RF module**
MARKETING NAME:	***Nokia Flexi BTS RF module 2000MHz***
TYPE:	***FRJA***
MANUFACTURER:	***Nokia Siemens Networks Oy***
FCC ID:	**-**
CLIENT:	**Nokia Siemens Networks Oy**
ADDRESS:	**P.O.Box 319, FI-90651 OULU, FINLAND**
TELEPHONE:	**+358 7180 08000**
TEST LABORATORY:	**NSN/Oulu**
FCC REG. NO.	**411251**
REFERENCE:	**FCC Part 25.252**

SUMMARY:

In regard to the performed tests the equipment under test fulfils the requirements defined in the test specifications, see page 4 for details

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Contents

1. EUT and Accessory Information

1.1 EUT description

The EUT is a WCDMA Base station RF module 2000 MHz with 2 power amplifiers.

1.2 EUT and accessories

Manufacturer:	Nokia Siemens Networks Oy
Model:	FRJA, s/n: L9081400690
Other Units:	System module, FSMB External Filter, FEJA Transmission module, FTEB
General:	All measurements are traceable to national standards.

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 25 clause 252

☒	New Submission	☒	Production Unit
☐	Class II Permissive Change	☐	Pre-Production Unit

THIS TEST REPORT RELATES ONLY TO THE ITEM(S) TESTED.

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE. **NONE**

This report applies only to the items tested.

Summary of Test Data

NAME OF TEST	SECTION IN CFR 47	SPEC.	RESULT
RF Power Output	25.252/DA 10-60	32.0 dBW EIRP	**Complies**
RF Power Output	25.252	32.1 dBW/4 MHz EIRP	**Complies**
99% Occupied Bandwidth	2.1049 (i)	Unspecified	**Complies**
Spurious Emissions at Antenna Terminals	25.252 2.1051	-87.6 dBm/4kHz -13 dBm	**Complies**
Field Strength of Spurious Emissions	25.252 2.1053	-70.6 dBm/4kHz EIRP -13 dBm EIRP	**Complies**
Frequency stability	25.252, 2.1055	± 0.05 ppm[1)]	**Complies**

Note [1)] Limit is the manufacturer's specification

Measurement uncertainty is expressed to a confidence level of 95%.

2. General Equipment Specification

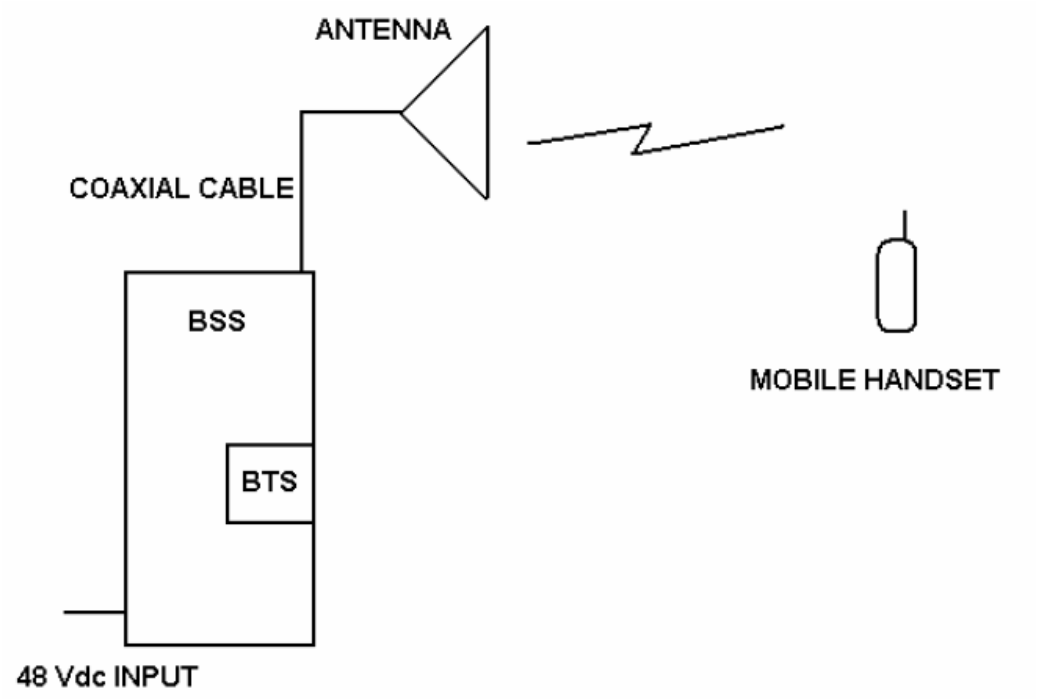
Supply Voltage Input:	48 Vdc
Frequency Bands: TX:	☒ 2180 – 2200 MHz Lowest tunable freq. 2185.000 MHz Middle freq. 2190.000 MHz Highest tunable freq. 2195.000 MHz
Frequency Bands: RX:	☒ 2000 – 2020 MHz
Type of Modulation and Designator:	**W-CDMA (4M00F9W)** ☒ **GSM (200KG7W)** ☐ **NADC 40K0DXW)** ☐
Maximum No. of Carriers:	1
Output Impedance:	50 ohms.
RF Output:	Per channel: 20 W.
Band Selection:	**Software** ☒ **Duplexer** ☐ **Fullband** ☐

System Description

The BTS performs the radio function of the Base Station System (BSS).

Setup for testing single carrier: The transmitter was set up according to 3GPP TS 25.141 Test Model 1 and 5 for all tests. Test model 1: 64 DPCHs at 30 ksps (SF=128) distributed randomly across the code space, at random power levels and random timing offsets, were defined to simulate a realistic operating scenario which may have high PAR (Peak-to-Average Ratio). Test model 5: 30 DPCHs at 30 ksps (SF=128) together with 8 HS-PDSCHs at 240 ksps (SF=16). Each DPCH is modulated by QPSK and each HS-PDCH is modulated by 16QAM modulation.

System Diagram



3. RF Power Output

NAME OF TEST: RF Power Output	PARA.NO.: 25.252 & 2.1046
TESTED BY: Timo Hietala	DATE: 28/04/2008

Requirement: 25.252 (a)(2): 27dBW/1.23MHz EIRP.

Federal Communications Commission DA 10-60 13 January 2010
new limit 32.0 dBW EIRP independent of bandwidth.
Specified antenna gain 18 dBi.

Test Results: Complies.

Measurement Data: Refer to attached plot.

		Measured Output Peak Power		
Modulation Type	**Frequency**	**Power**	**Power**	**Radiated power**
	(MHz)	**(dBm)**	**(W)**	**dBW (EIRP@18dBi antenna gain)**
QPSK	2185.0	**43.66**	**23.23**	**31.66**
QPSK	2190.0	**43.61**	**22.96**	**31.61**
QPSK	2195.0	**43.50**	**22.39**	**31.50**
16QAM	2185.0	**43.66**	**23.23**	**31.66**
16QAM	2190.0	**43.68**	**23.33**	**31.68**
16QAM	2195.0	**43.53**	**22.54**	**31.53**

Equipment used: 1, 2, 4, 8, 9, 14

Measurement Uncertainty: ± 0.7 dB.

Temperature: 23 °C.

Relative Humidity: 35 %.

Test Data – RF Power Output

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Data Plot — RF POWER OUTPUT

Page 1 of 2 — Complete x

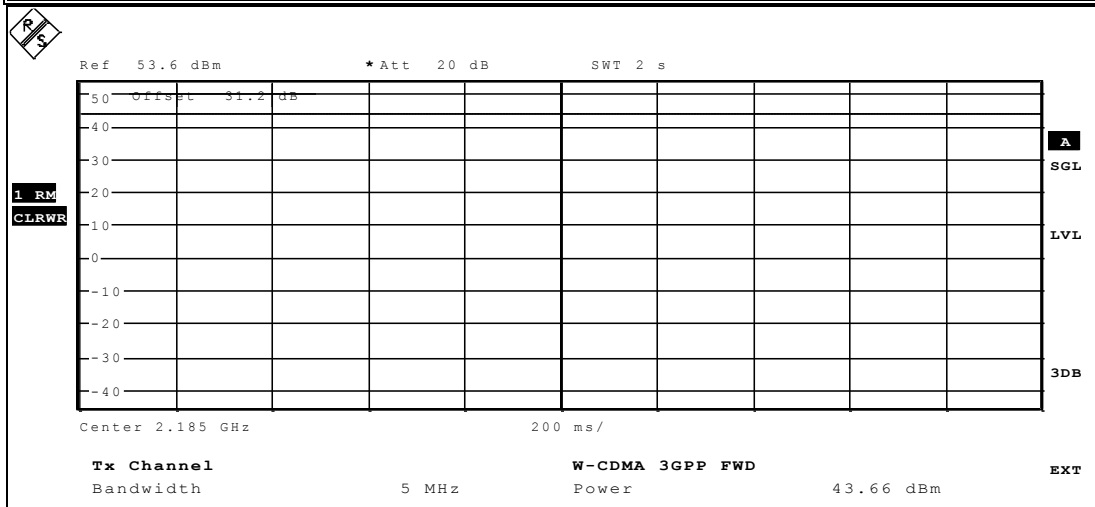
Job No.:	106205	Date:	28/04/2008	Preliminary:	
Specification:	PT25	Temperature (°C):	23		
Tested By:	Timo Hietala	Relative Humidity (%):	35		
E.U.T.:	WCDMA TRANSMITTER				
Configuration:	TX FULL POWER CENTER CHANNEL				
Sample Number:	1				
Location:	NSN Oulu	RBW:	Refer to plots	Measurement	
Detector type:	Rms	VBW:	Refer to plots	Distance:	N/A m

Test Equipment Used

Antenna:		Directional Coupler:	
Pre-Amp:		Cable #1:	
Filter:		Cable #2:	
Receiver:	1	Cable #3:	
Attenuator #1:	14	Cable #4:	
Attenuator #2:		Mixer:	

Additional equipment used:

Measurement Uncertainty: ± 0.7 dB



Date: 28.APR.2008 09:50:45

Notes: QPSK

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Data Plot

RF POWER OUTPUT

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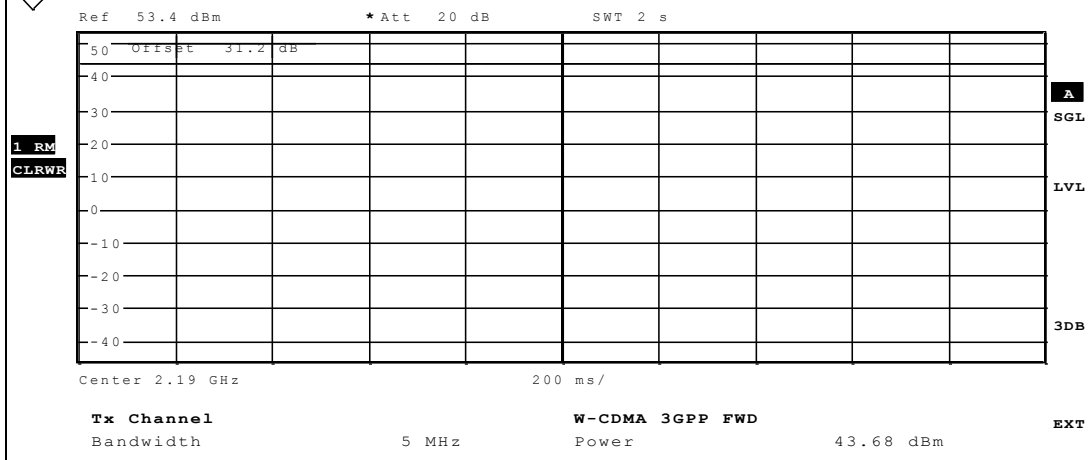
Job No.:	106205	Date:	28/04/2008
Specification:	PT25	Temperature (°C):	23
Tested By:	Timo Hietala	Relative Humidity (%):	35
E.U.T.:	WCDMA TRANSMITTER		
Configuration:	TX FULL POWER CENTER CHANNEL		



Date: 28.APR.2008 10:06:44

Notes: **16QAM**

4. 99% Occupied Bandwidth

NAME OF TEST: Occupied Bandwidth	PARA.NO.: 2.1049(i)
TESTED BY: Timo Hietala	DATE: 28/04/2008

Test Results: Complies.

Test Data: See attached plot(s).

Modulation Type	Frequency (MHz)	Measured 99% Occupied Bandwidth (MHz)
QPSK	2190.0	**3.9487**
16QAM	2190.0	**3.9487**

Equipment used: 1, 2, 4, 8, 9, 14

Measurement Uncertainty: ± 0.7 dB.

Temperature: 23 °C.

Relative Humidity: 35 %.

Test Data – 99% Occupied Bandwidth

Nemko Oy, Finland

Data Plot — 99% Occupied Bandwidth

Page 1 of 2 | Complete x | Preliminary:

Job No.:	106205	Date:	28/04/2008
Specification:	PT25	Temperature (°C):	23
Tested By:	Timo Hietala	Relative Humidity (%):	35
E.U.T.:	WCDMA TRANSMITTER		
Configuration:	TX FULL POWER CENTER CHANNEL		
Sample Number:	1		
Location:	NSN Oulu	RBW:	Refer to plots
Detector type:	Rms	VBW:	Refer to plots

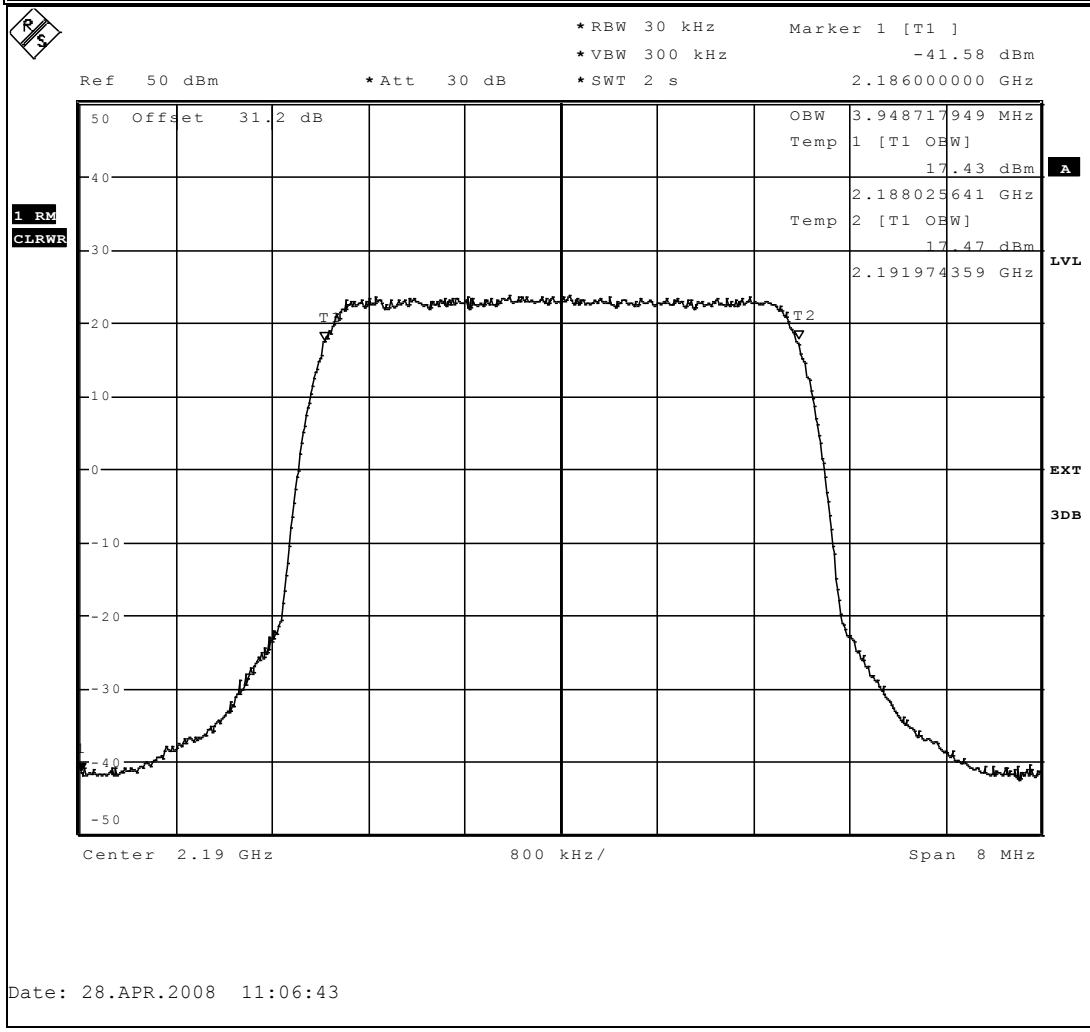
Measurement Distance: N/A m

Test Equipment Used

Antenna:		Directional Coupler:	
Pre-Amp:		Cable #1:	
Filter:		Cable #2:	
Receiver:	1	Cable #3:	
Attenuator #1:	14	Cable #4:	
Attenuator #2:		Mixer:	

Additional equipment used:

Measurement Uncertainty: ± 0.7 dB



Notes: QPSK

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Data Plot — 99% Occupied Bandwidth

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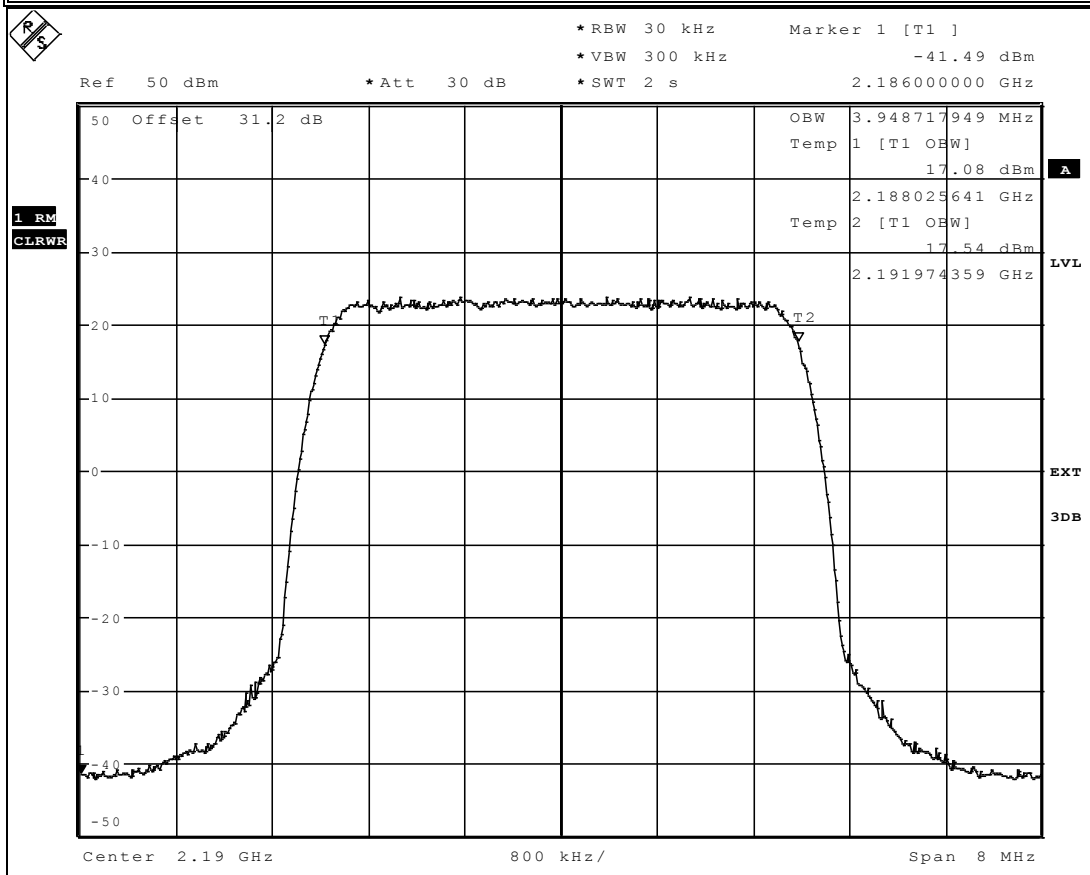
Job No.:	106205	Date:	28/04/2008
Specification:	PT25	Temperature (°C):	23
Tested By:	Timo Hietala	Relative Humidity (%):	35
E.U.T.:	WCDMA TRANSMITTER		
Configuration:	TX FULL POWER CENTER CHANNEL		



Notes: **16QAM**

5. Spurious Emissions at Antenna Terminals

NAME OF TEST: Spurious Emissions @ Antenna Terminals	PARA.NO.: 25.252, 2.1051
TESTED BY: Timo Hietala	DATE: 28-29/04/2008

Test Results: Complies.

Test Data: See attached plots.

Requirement: 43 + 10 log (P) dB

Frequency (MHz)	Modulation	Spurious Emission (dBm) rms det.
All	**QPSK**	**More than 20 dB below limit -13 dBm**
All	**16QAM**	**More than 20 dB below limit -13 dBm**

Requirement: Para 25.252(a)(1) -100.6 dBW / 4kHz EIRP
Measurement band integration 1dB (4kHz to 5kHz) has been used.
Maximum antenna gain 18 dBi: -70.6 dBm + 1 - 18 = -85.6 dBm

Lower Band Edge

Frequency (MHz)	Modulation	Peak Emission Level (dBm) rms det.
2180.0	**QPSK**	**-89.34**
2180.0	**16QAM**	**-90.34**

Upper Band Edge

Frequency (MHz)	Modulation	Peak Emission Level (dBm) rms det.
2200.0	**QPSK**	**-87.81**
2200.0	**16QAM**	**-88.85**

Equipment used: 1, 2, 3, 4, 7, 8, 9, 12, 13, 14

Measurement Uncertainty: ± 0.7 dB.

Temperature: 23 °C.

Relative Humidity: 35 %.

Requirement: Para 25.252(a)(7) -70 dBW / 1MHz EIRP

Maximum antenna gain 18 dBi: -40 dBm - 18 = -58 dBm

1559-1610 MHz Band wideband EIRP

Frequency (MHz)	Modulation	Peak Emission Level (dBm) rms det.
All 1559-1610	**QPSK**	**<-100**
All 1559-1610	**16QAM**	**<-100**

Requirement: Para 25.252(a)(7) -80 dBW / 1kHz EIRP

Maximum antenna gain 18 dBi: -50 dBm - 18 = -68 dBm

1559-1610 MHz Band narrowband EIRP

Frequency (MHz)	Modulation	Peak Emission Level (dBm) rms det.
All 1559-1610	**QPSK**	**<-130**
All 1559-1610	**16QAM**	**<-130**

Equipment used: 1, 2, 3, 4, 7, 8, 9, 12, 13, 14

Measurement Uncertainty: ± 0.7 dB.

Temperature: 23 °C.

Relative Humidity: 35 %.

Test Data – Spurious Emissions

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Data Plot — Spurious Emissions at Antenna Terminals

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Complete x
Preliminary:

Job No.:	106205	Date:	28/04/2008
Specification:	PT25	Temperature (°C):	23
Tested By:	Timo Hietala	Relative Humidity (%):	35
E.U.T.:	WCDMA TRANSMITTER		
Configuration:	TX FULL POWER LOWEST CHANNEL		
Sample Number:	1		
Location:	NSN Oulu	RBW:	Refer to plots
Detector type:	Rms	VBW:	Refer to plots

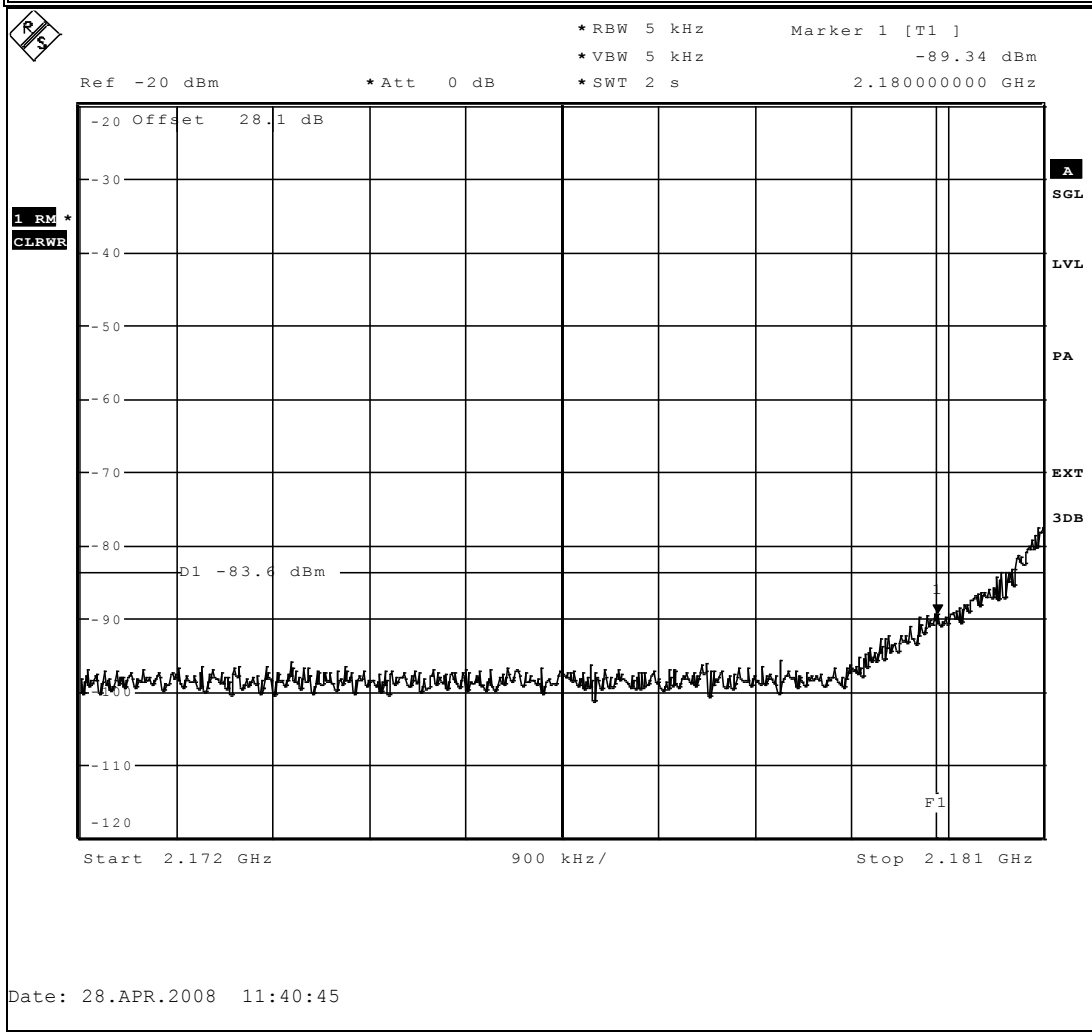
Measurement Distance: N/A m

Test Equipment Used

Antenna:		Directional Coupler:	
Pre-Amp:		Cable #1:	
Filter:	7	Cable #2:	
Receiver:	1	Cable #3:	
Attenuator #1:	7	Cable #4:	
Attenuator #2:		Mixer:	

Additional equipment used:

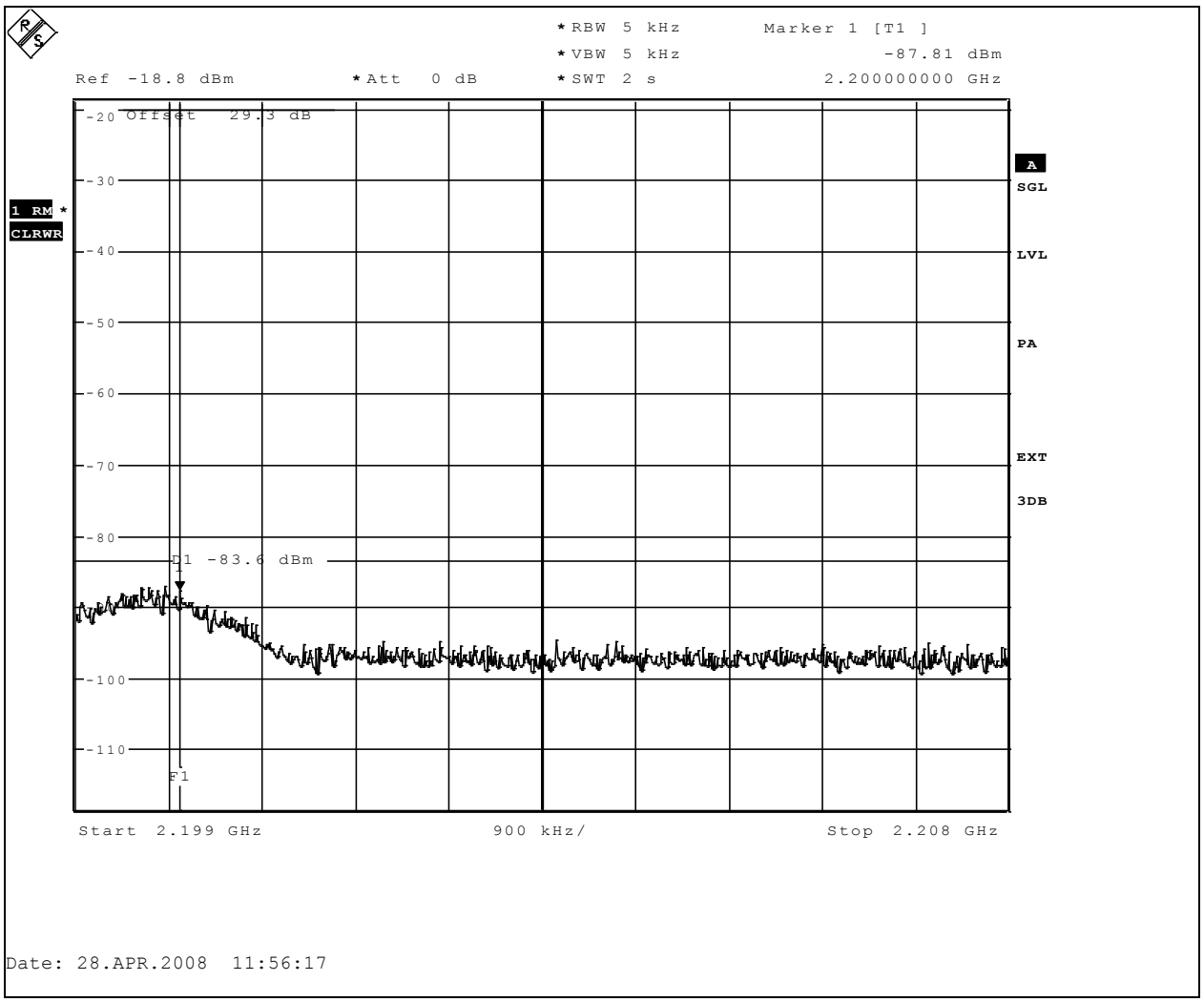
Measurement Uncertainty: ± 0.7 dB



Notes: Tx 2185.0 MHz, QPSK , LOWER BANDEDGE

Measurement band integration 1dB (from 4kHz to 5kHz), SSU bandstop filter RBF2 was used

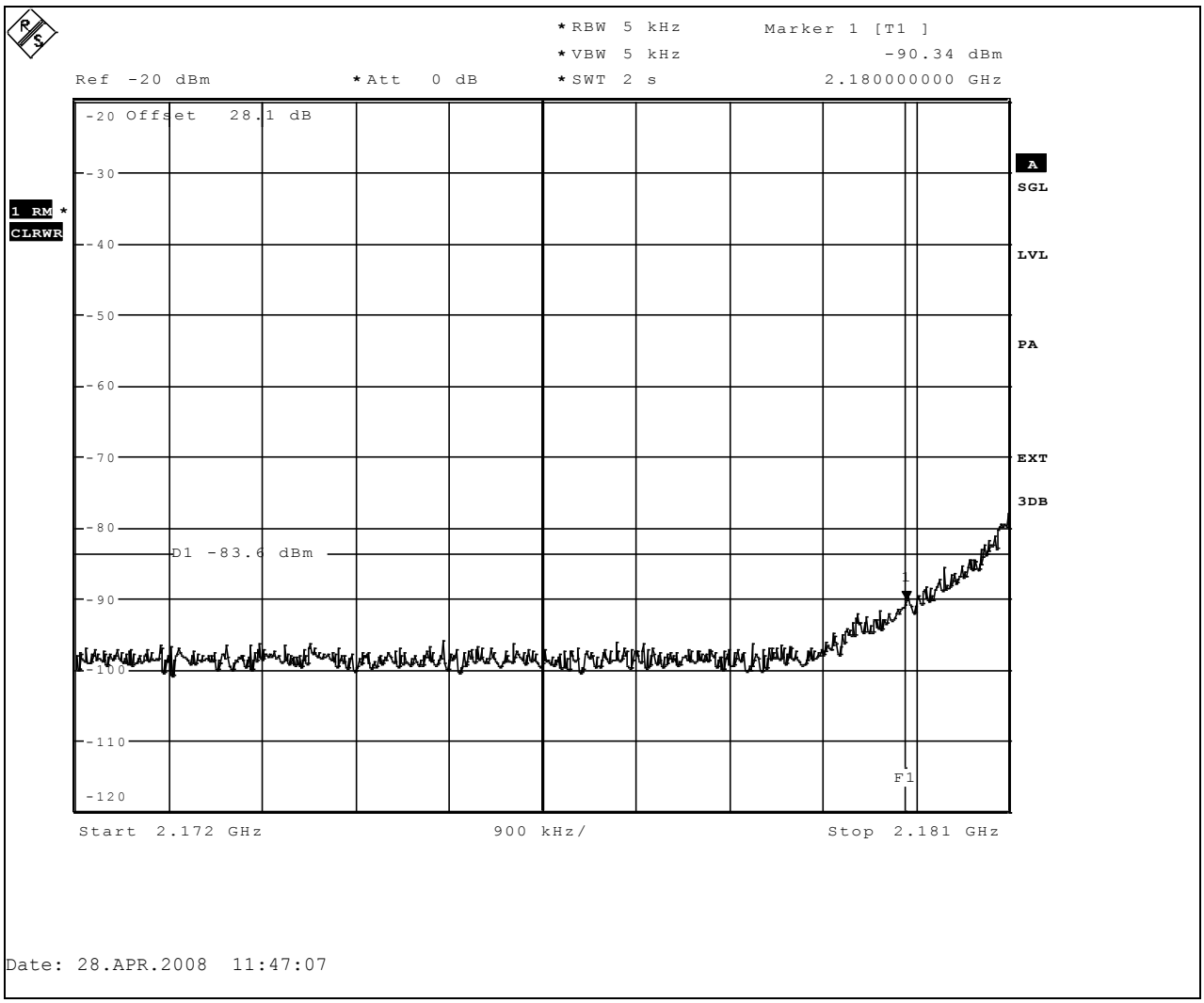
Test Data – Spurious Emissions



Notes: Tx 2195.0 MHz, QPSK, UPPER BANDEDGE

Measurement band integration 1dB (from 4kHz to 5kHz), SSU bandstop filter RBF3 was used

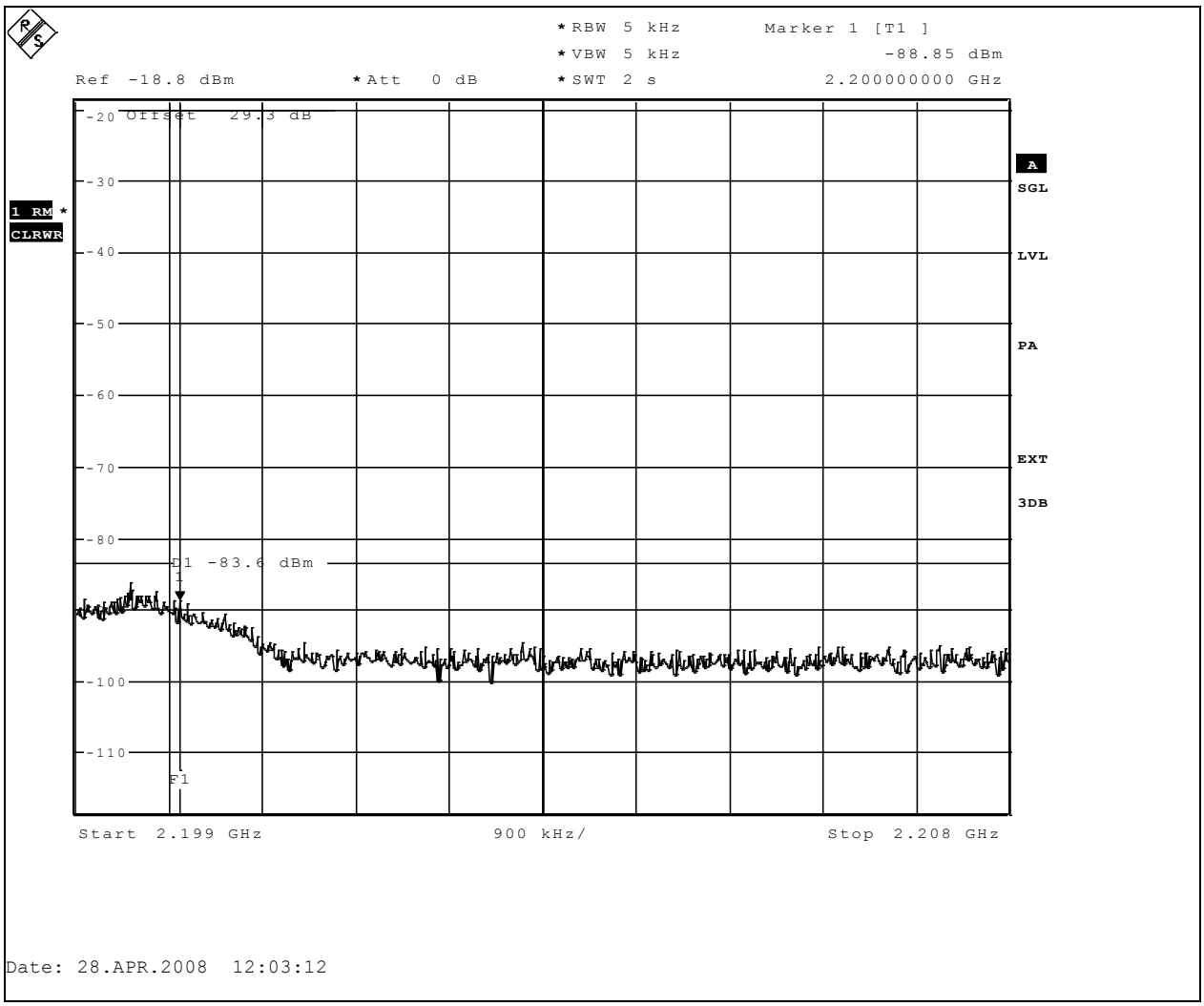
Test Data – Spurious Emissions



Notes: Tx 2185.0 MHz, 16QAM, LOWER BANDEDGE

Measurement band integration 1dB (from 4kHz to 5kHz), SSU bandstop filter RBF2 was used

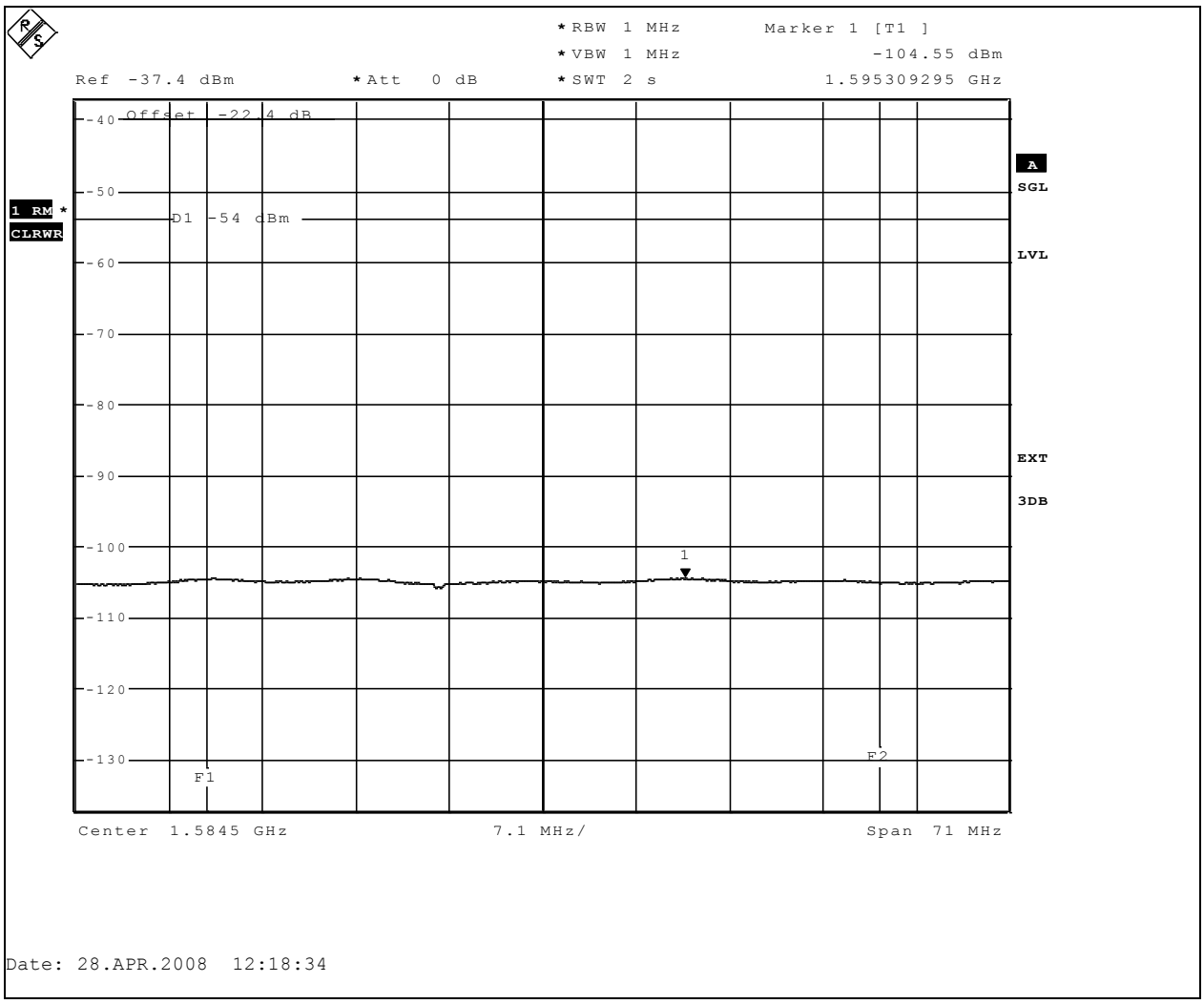
Test Data – Spurious Emissions



Notes: Tx 2195.0 MHz, 16QAM, UPPER BANDEDGE

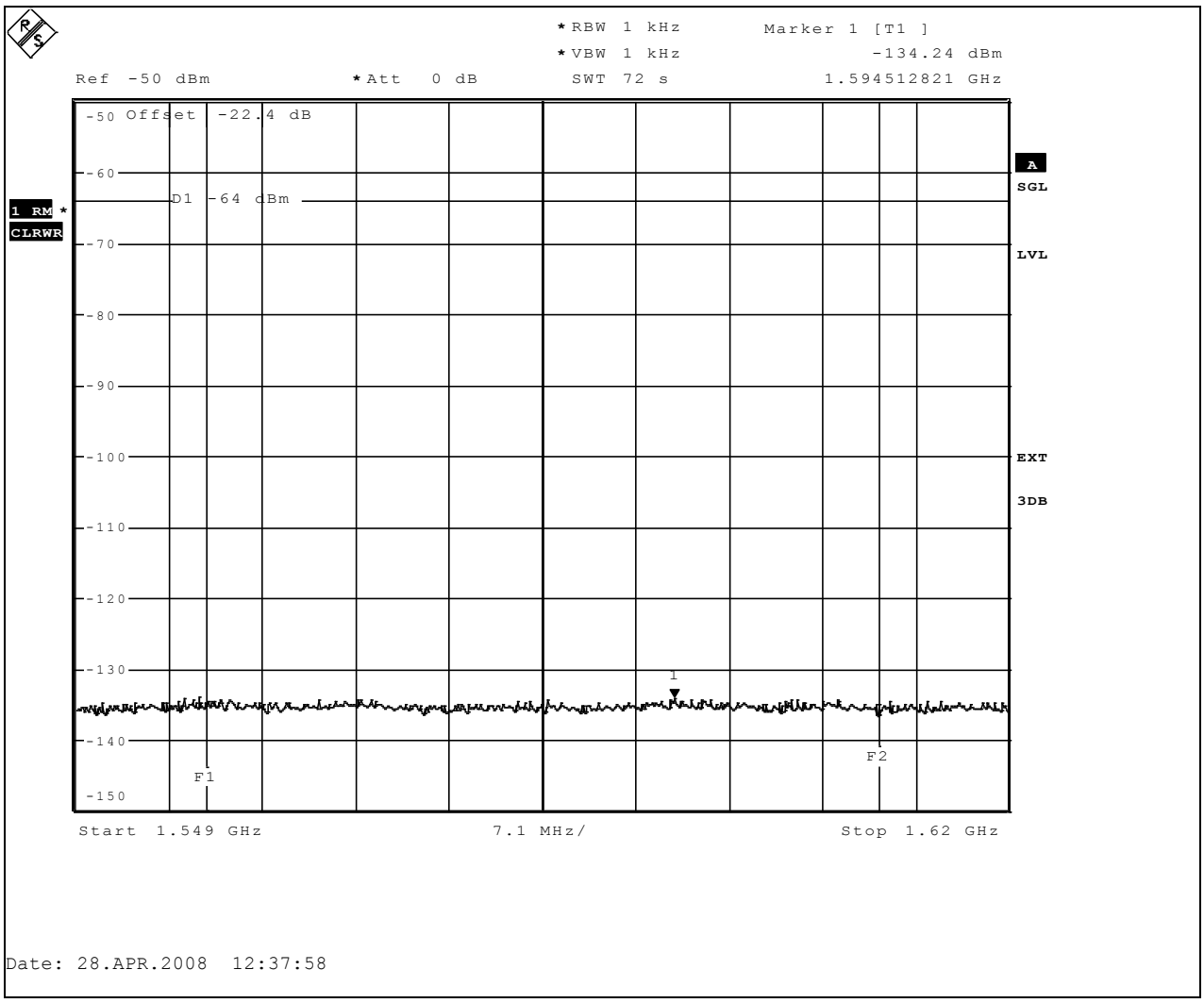
Measurement band integration 1dB (from 4kHz to 5kHz), SSU bandstop filter RBF3 was used

Test Data – Spurious Emissions



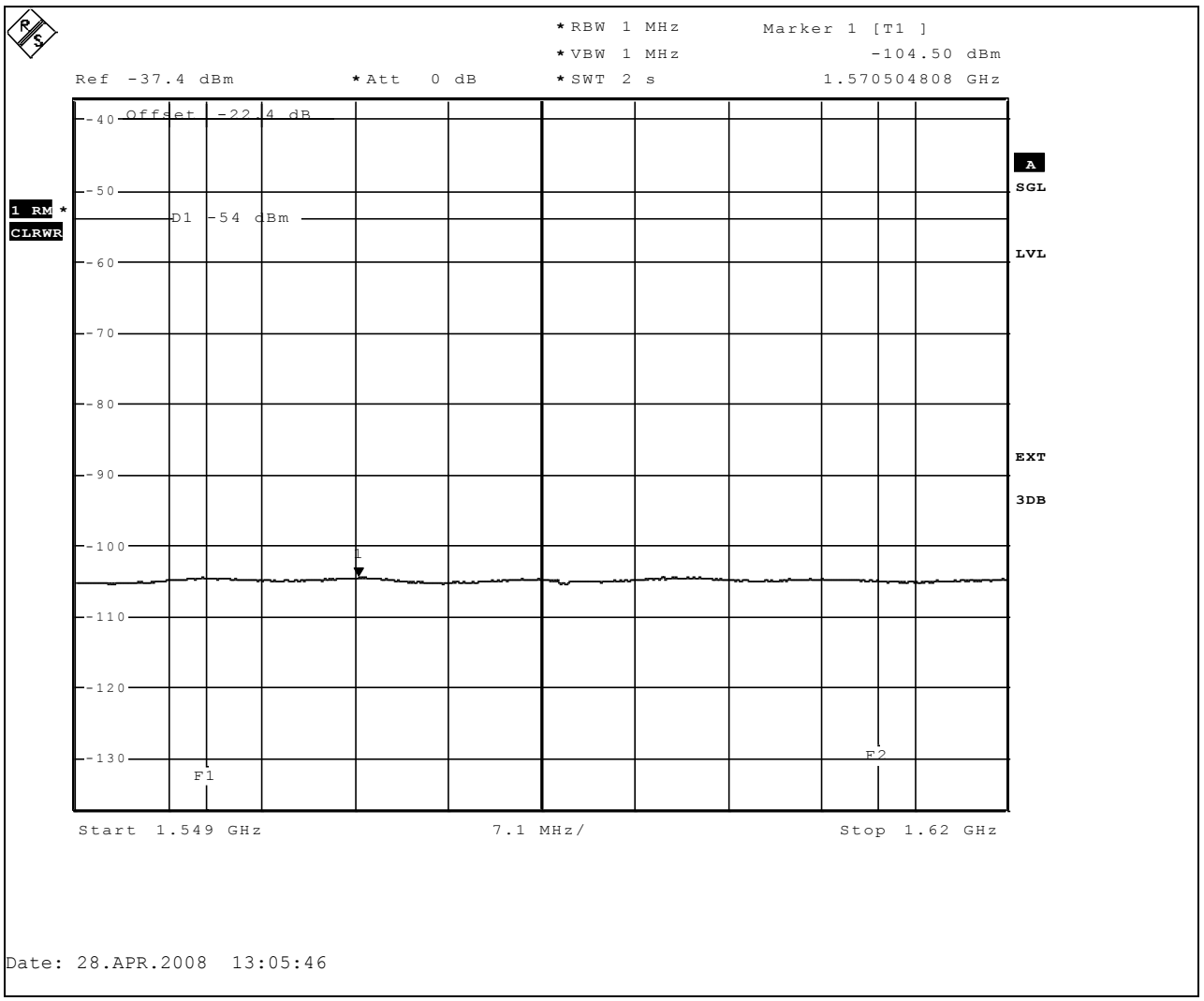
Notes: Tx 2190.0 MHz QPSK, GPS band (1559-1610MHz), 1MHz RBW

Test Data – Spurious Emissions



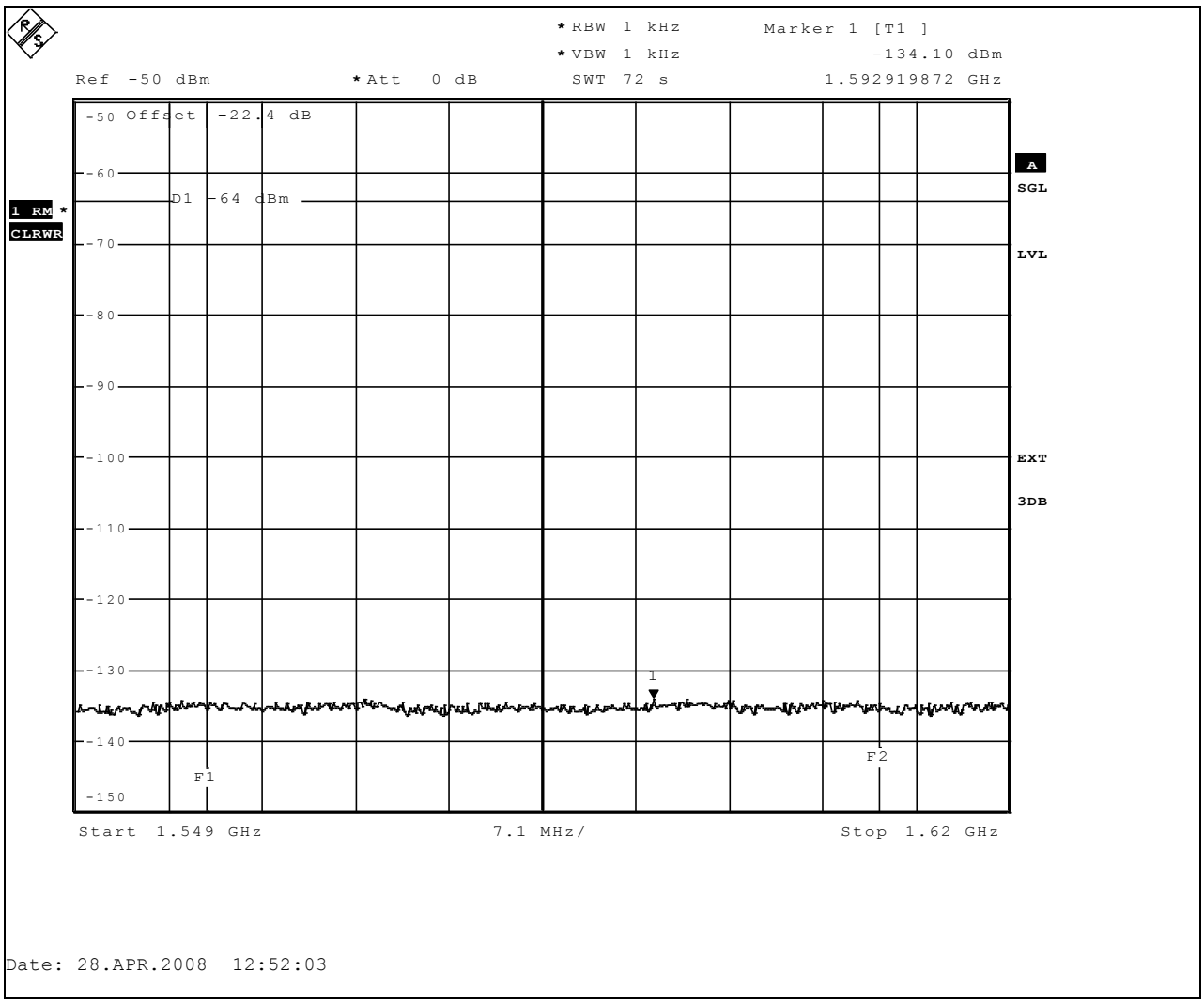
Notes: Tx 2190.0 MHz QPSK, GPS band (1559-1610MHz), 1 kHz RBW

Test Data – Spurious Emissions



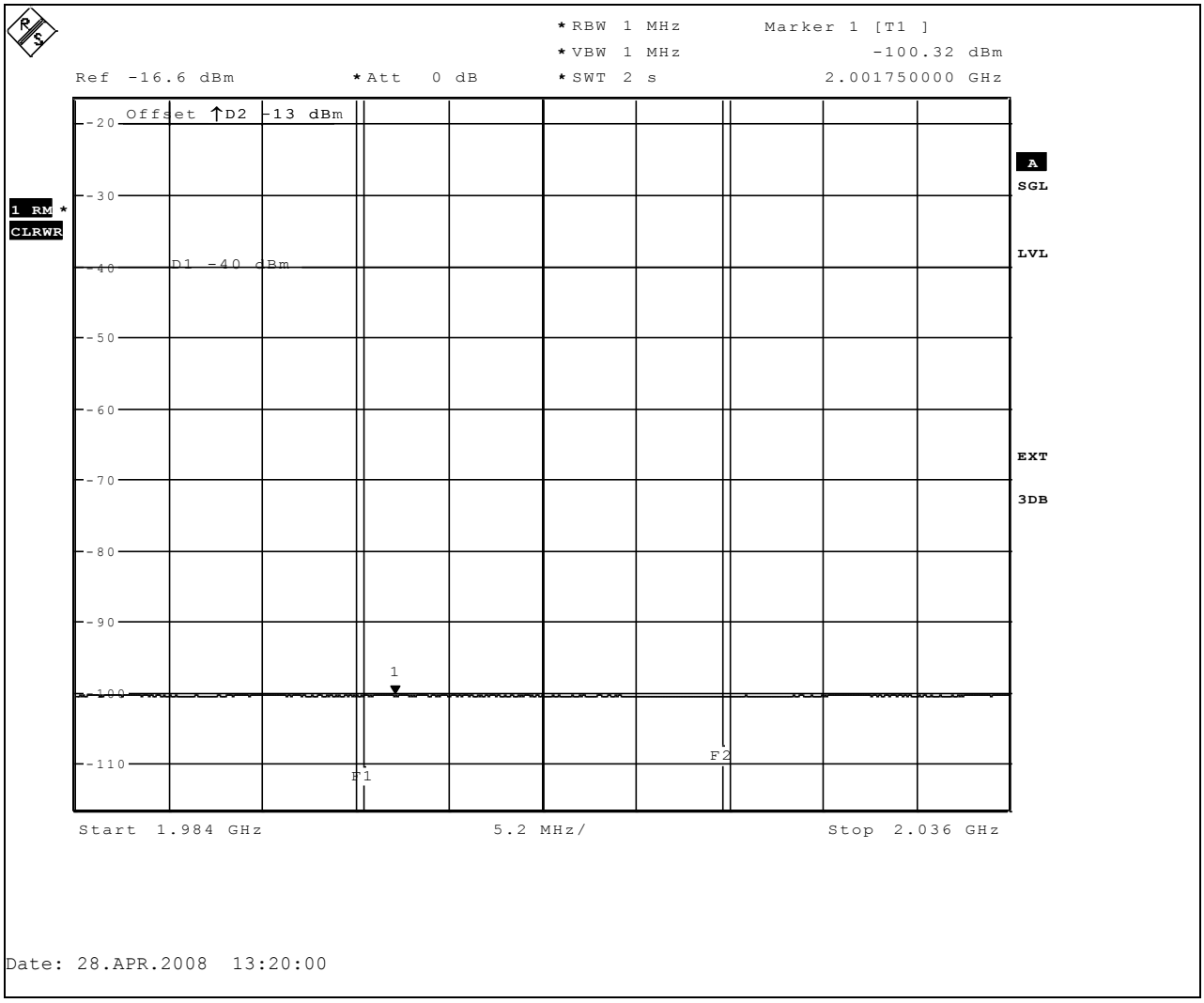
Notes: Tx 2190.0 MHz 16QAM, GPS band (1559-1610MHz), 1 MHz RBW

Test Data – Spurious Emissions



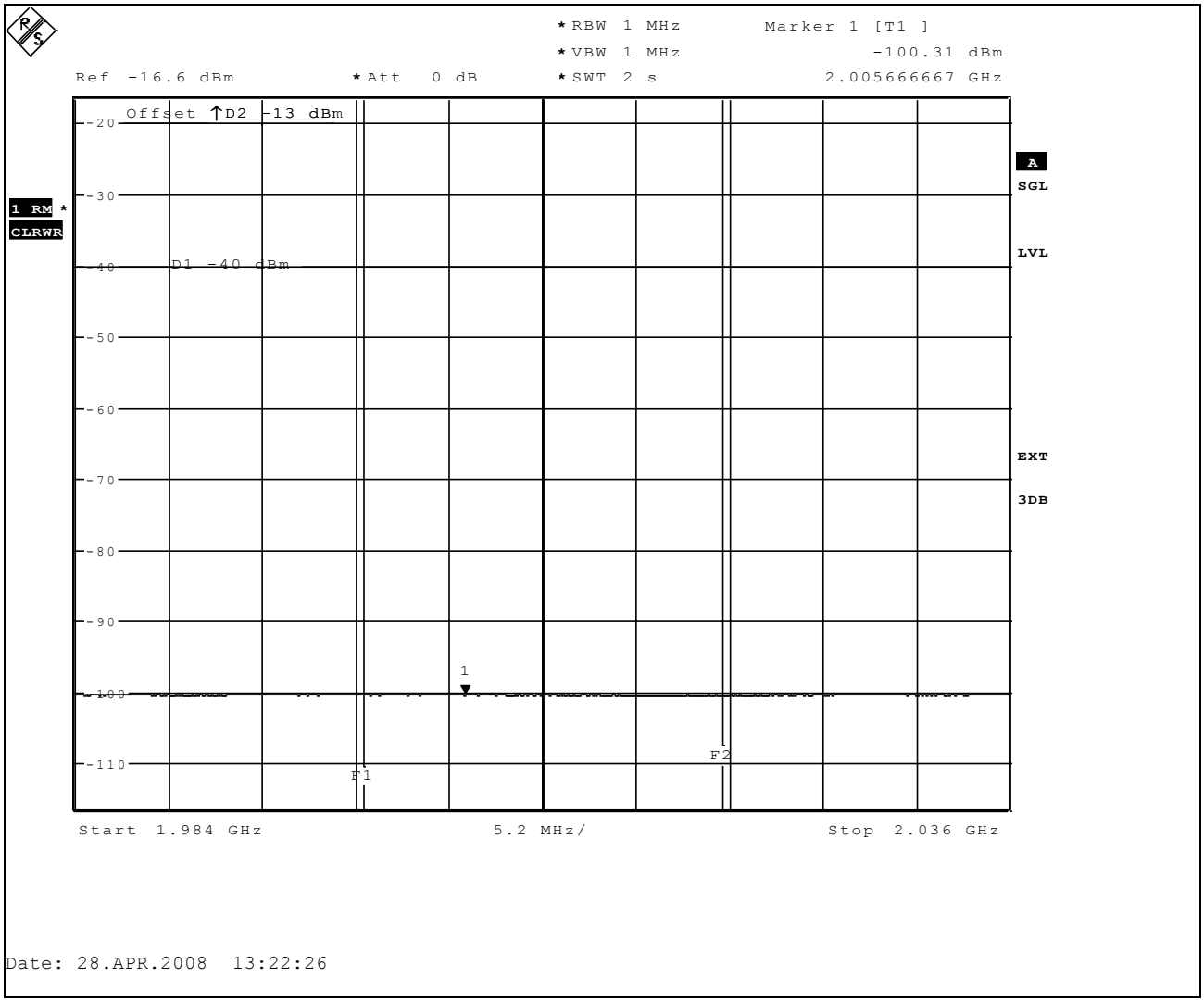
Notes: Tx 2190.0 MHz 16QAM, GPS band (1559-1610MHz), 1 kHz RBW

Test Data – Spurious Emissions



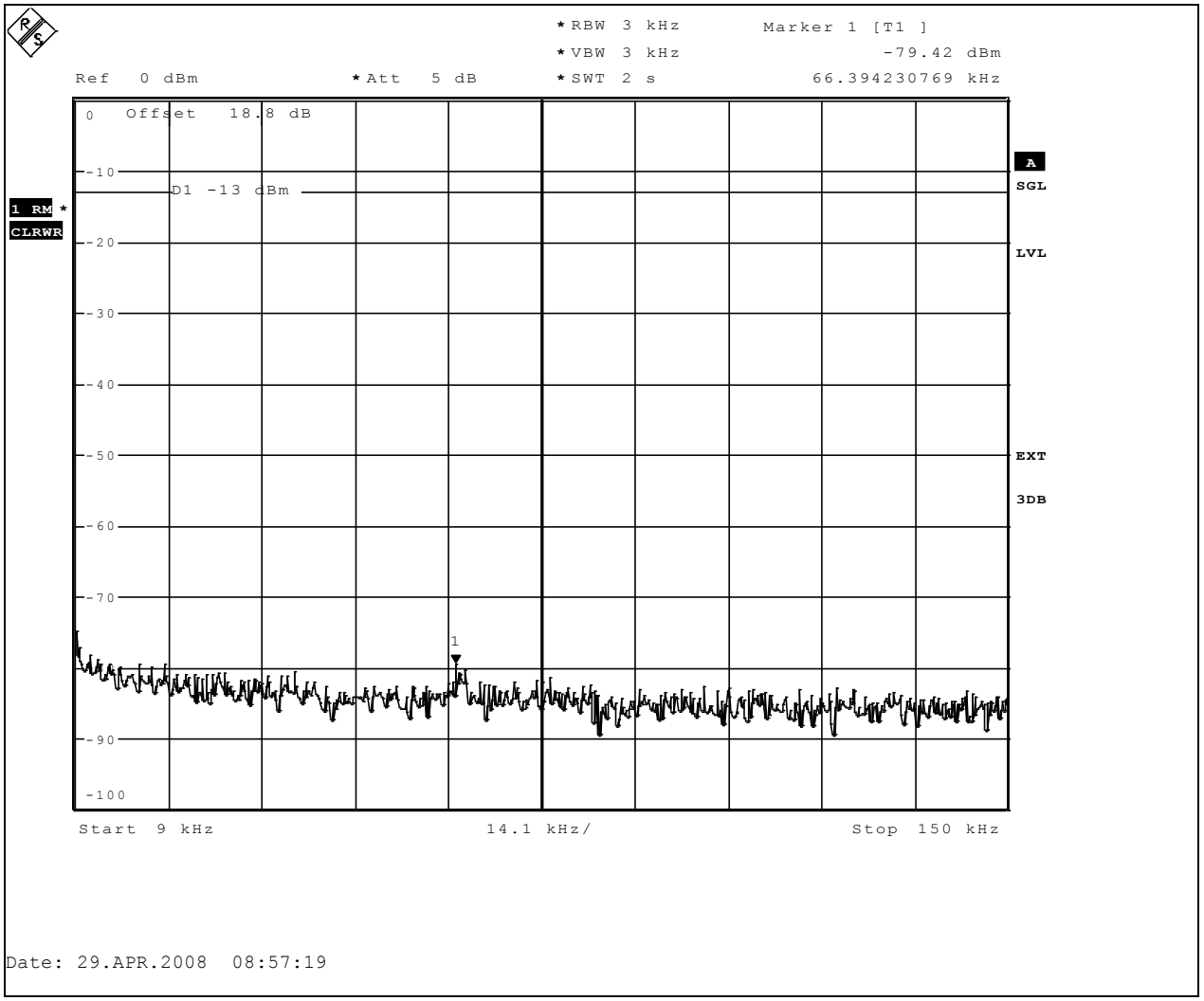
Notes: Tx 2190.0 MHz QPSK, Rx Band 1980-2000MHz

Test Data – Spurious Emissions



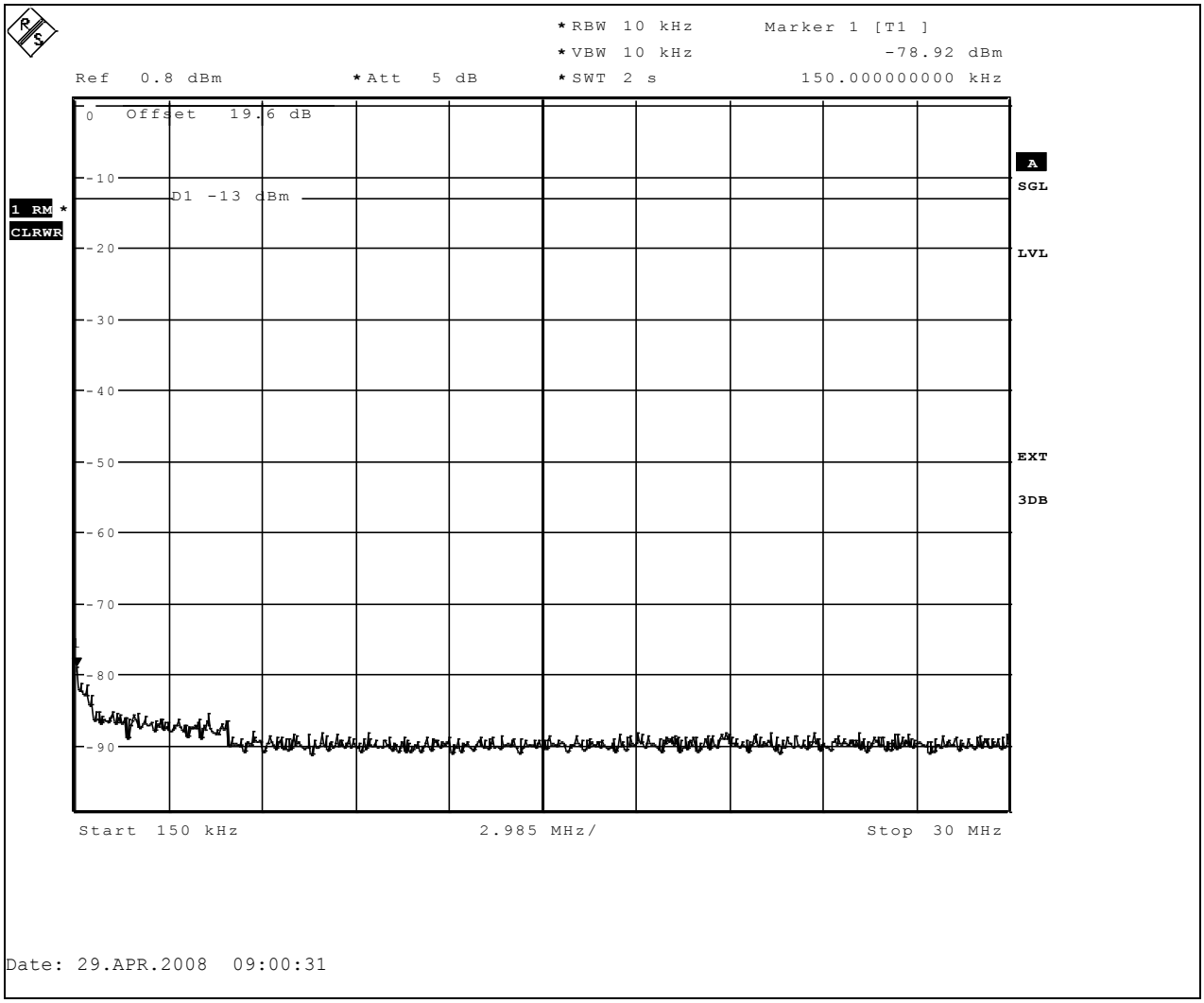
Notes: Tx 2190.0 MHz 16QAM, Rx Band 1980-2000MHz

Test Data – Spurious Emissions



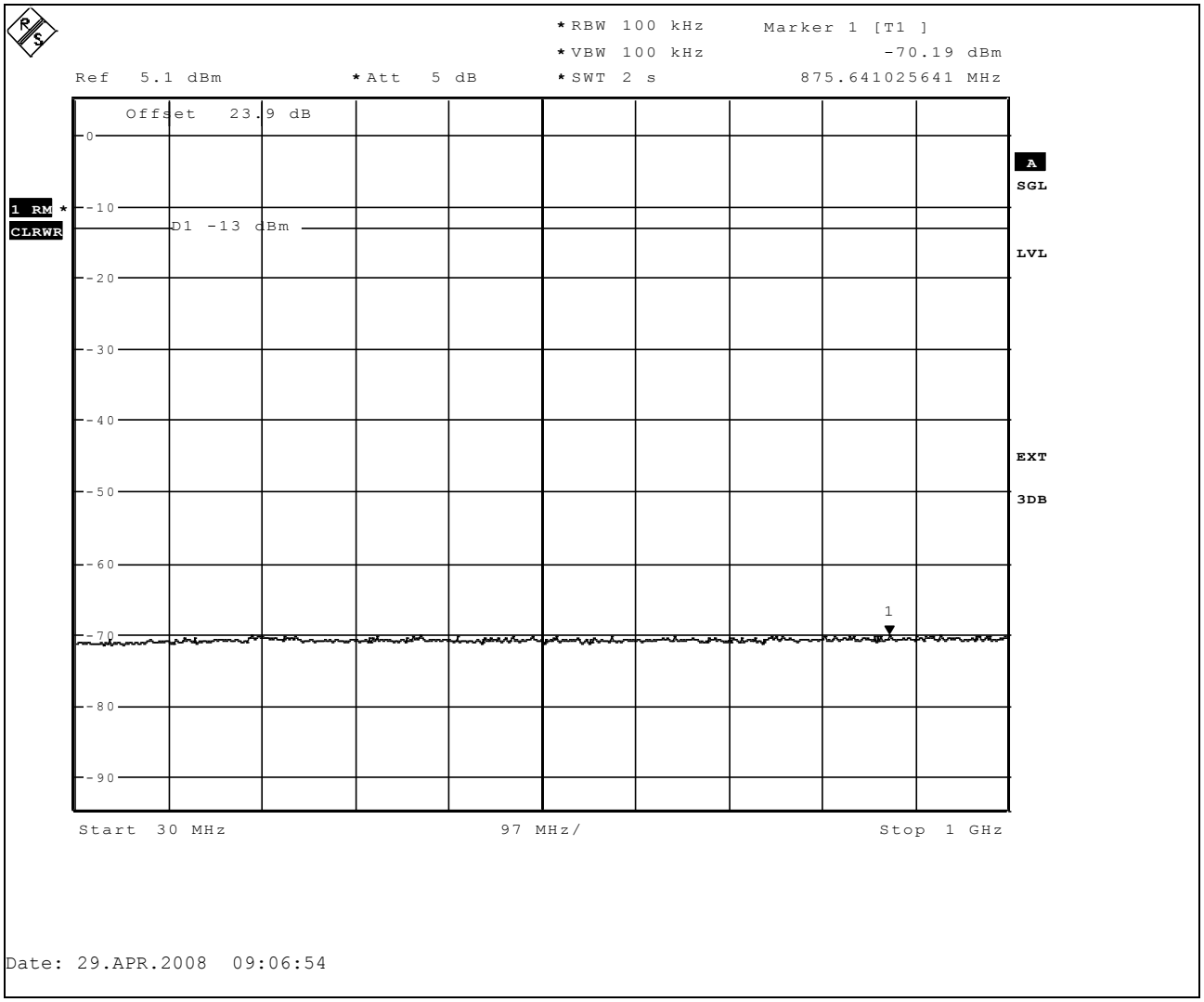
Notes: Tx 2190.0, QPSK , SSU bandstop filter RBF1 was used

Test Data – Spurious Emissions



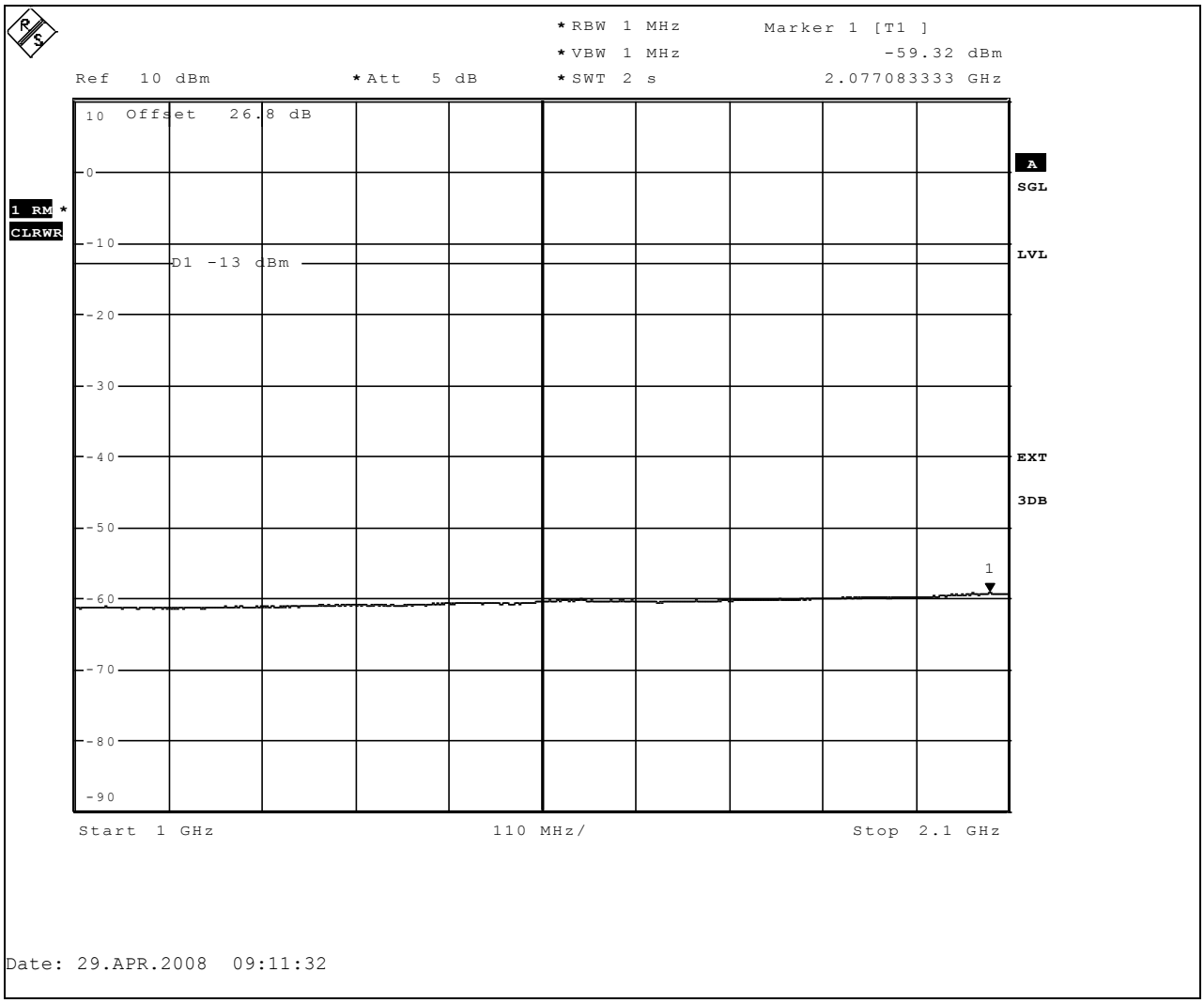
Notes: Tx 2190.0 MHz, QPSK, SSU bandstop filter RBF1 was used

Test Data – Spurious Emissions



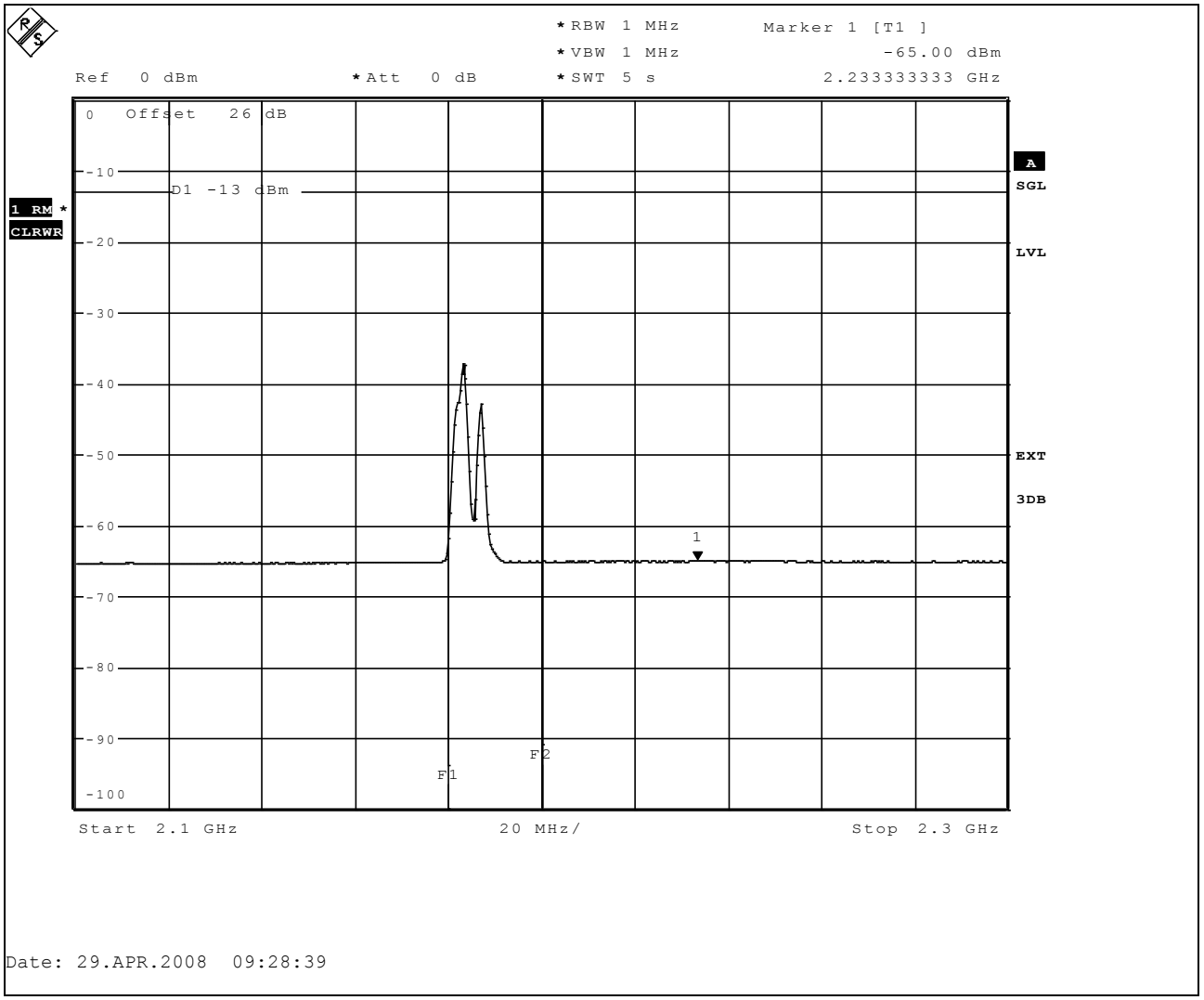
Notes: Tx 2190.0 QPSK, SSU bandstop filter RBF1 was used

Test Data – Spurious Emissions



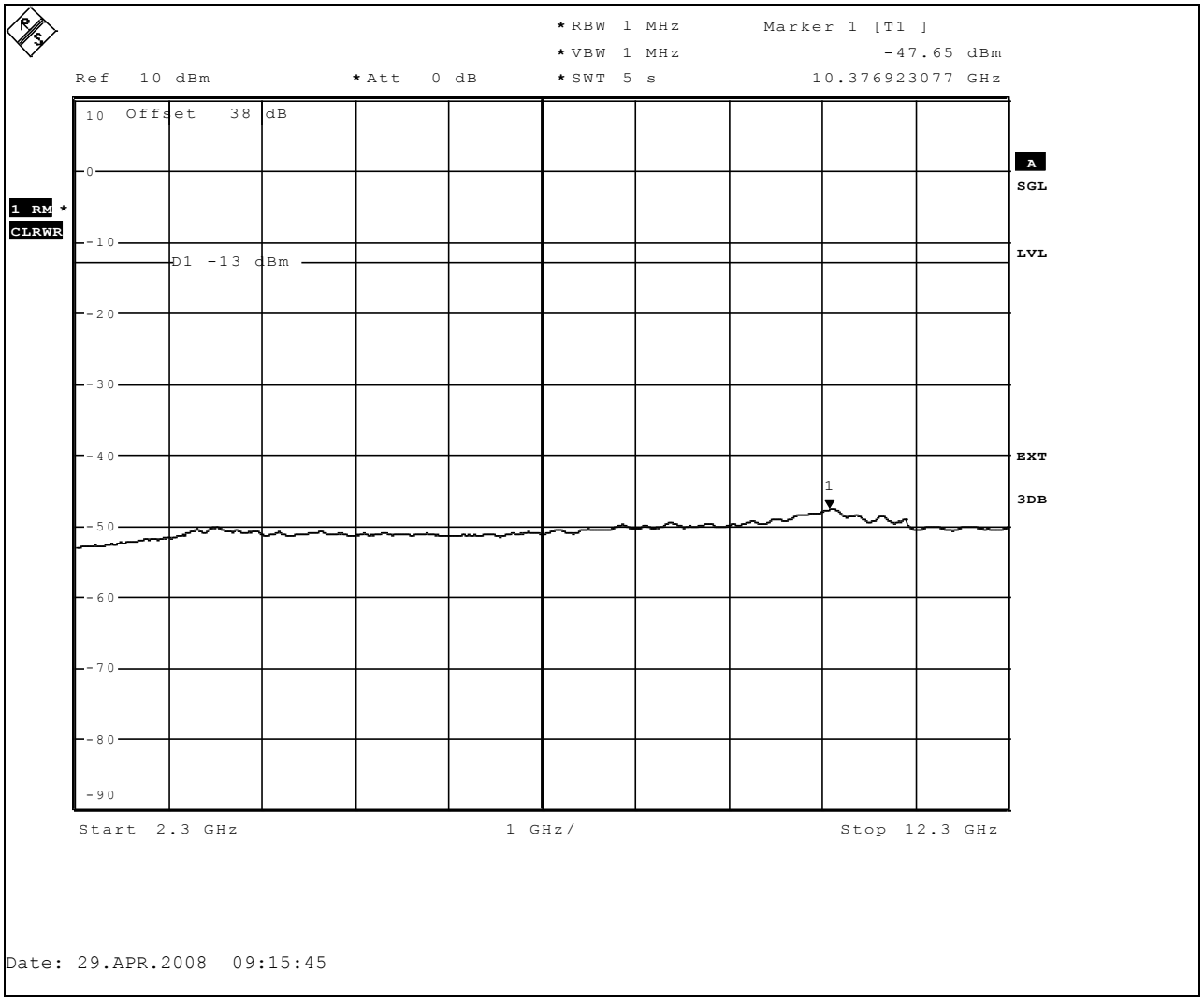
Notes: Tx 2190 MHz, QPSK, SSU bandstop filter RBF1 was used

Test Data – Spurious Emissions



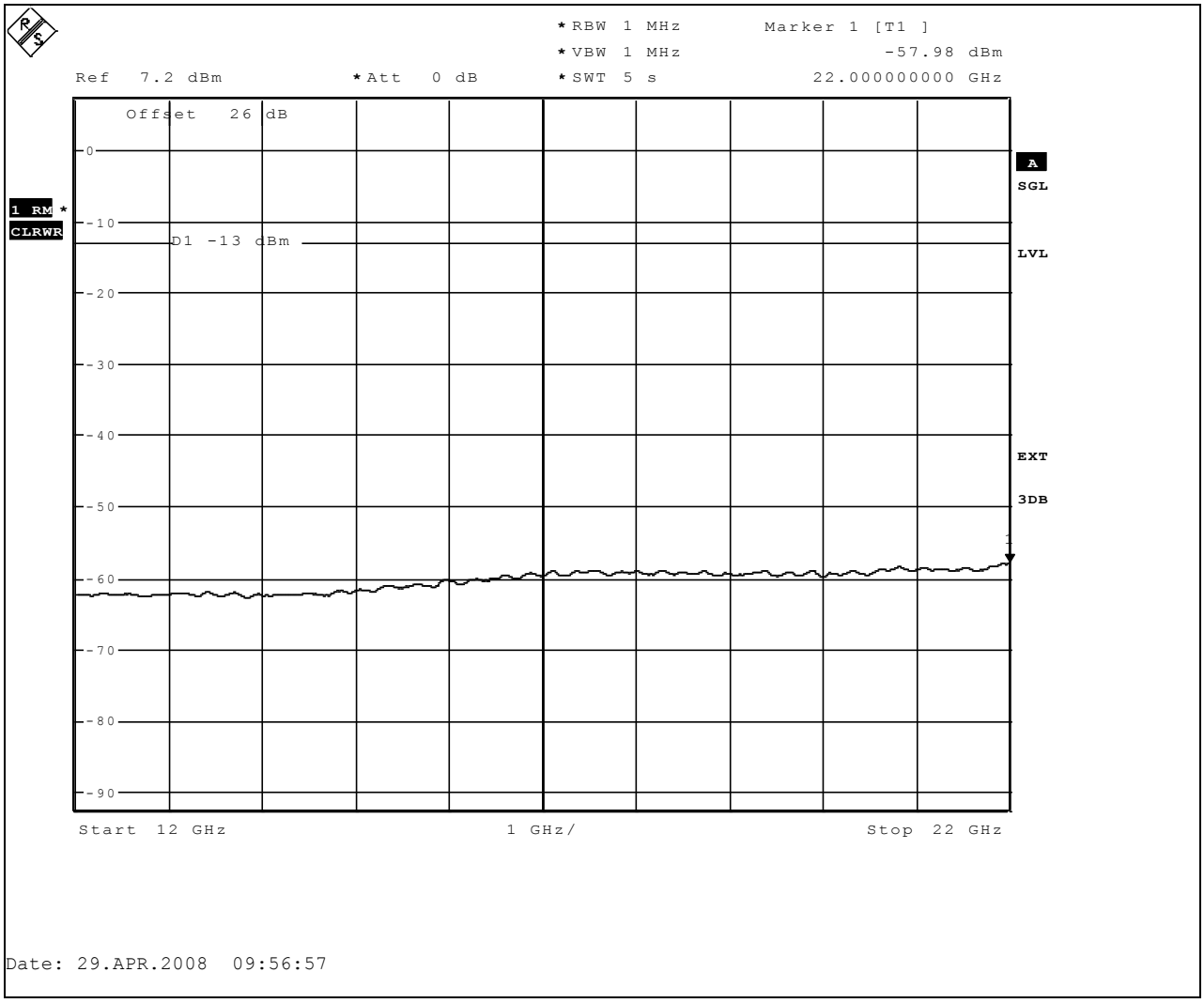
Notes: Tx 2185.0 QPSK, SSU bandstop filter RBF2 was used

Test Data – Spurious Emissions



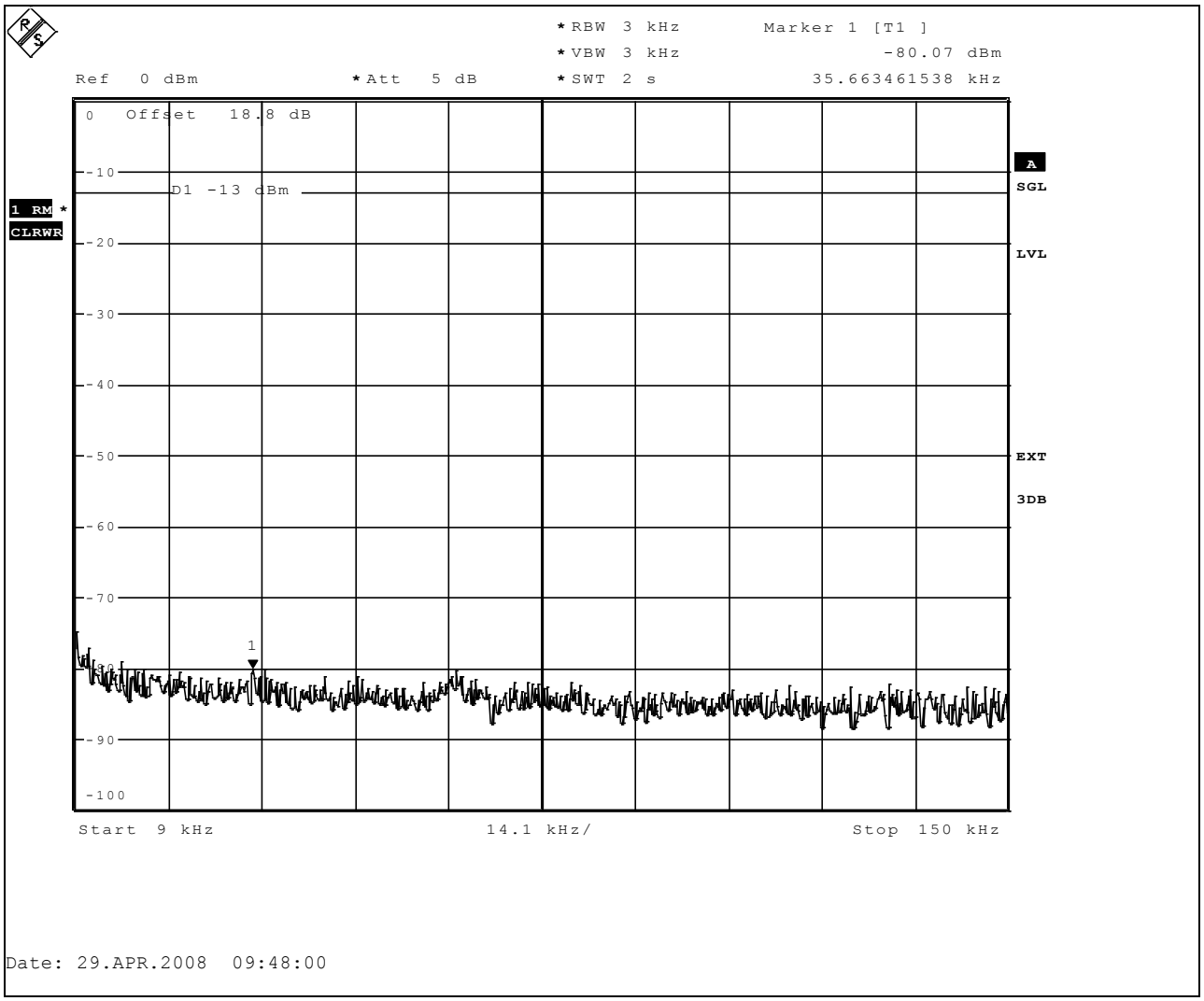
Notes: Tx 2190.0 MHz, QPSK, SSU bandstop filter RBF1 was used

Test Data – Spurious Emissions



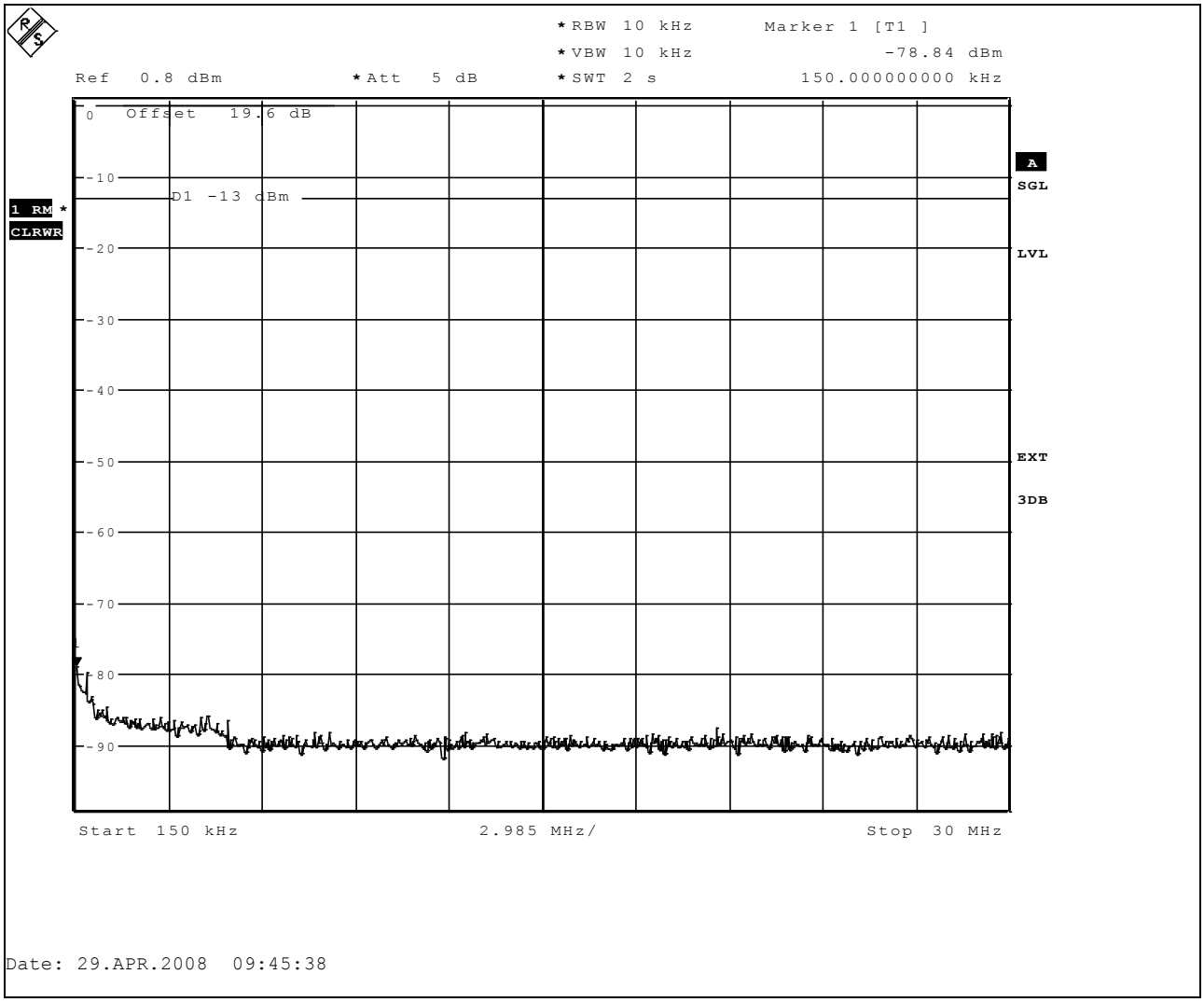
Notes: Tx 2190.0 MHz, QPSK, 6GHz highpass filter was used

Test Data – Spurious Emissions



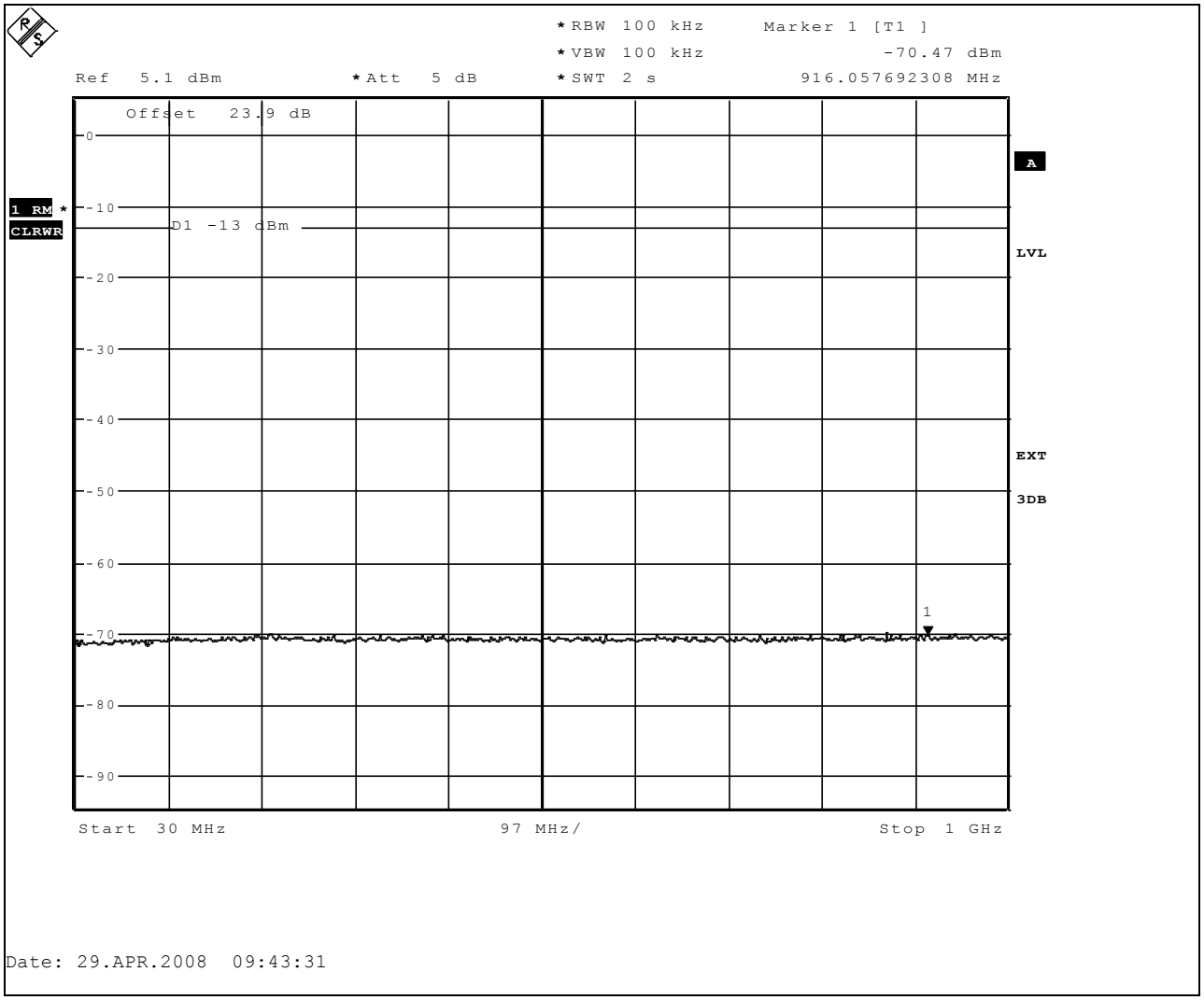
Notes: Tx 2190, 16QAM, SSU bandstop filter RBF1 was used

Test Data – Spurious Emissions



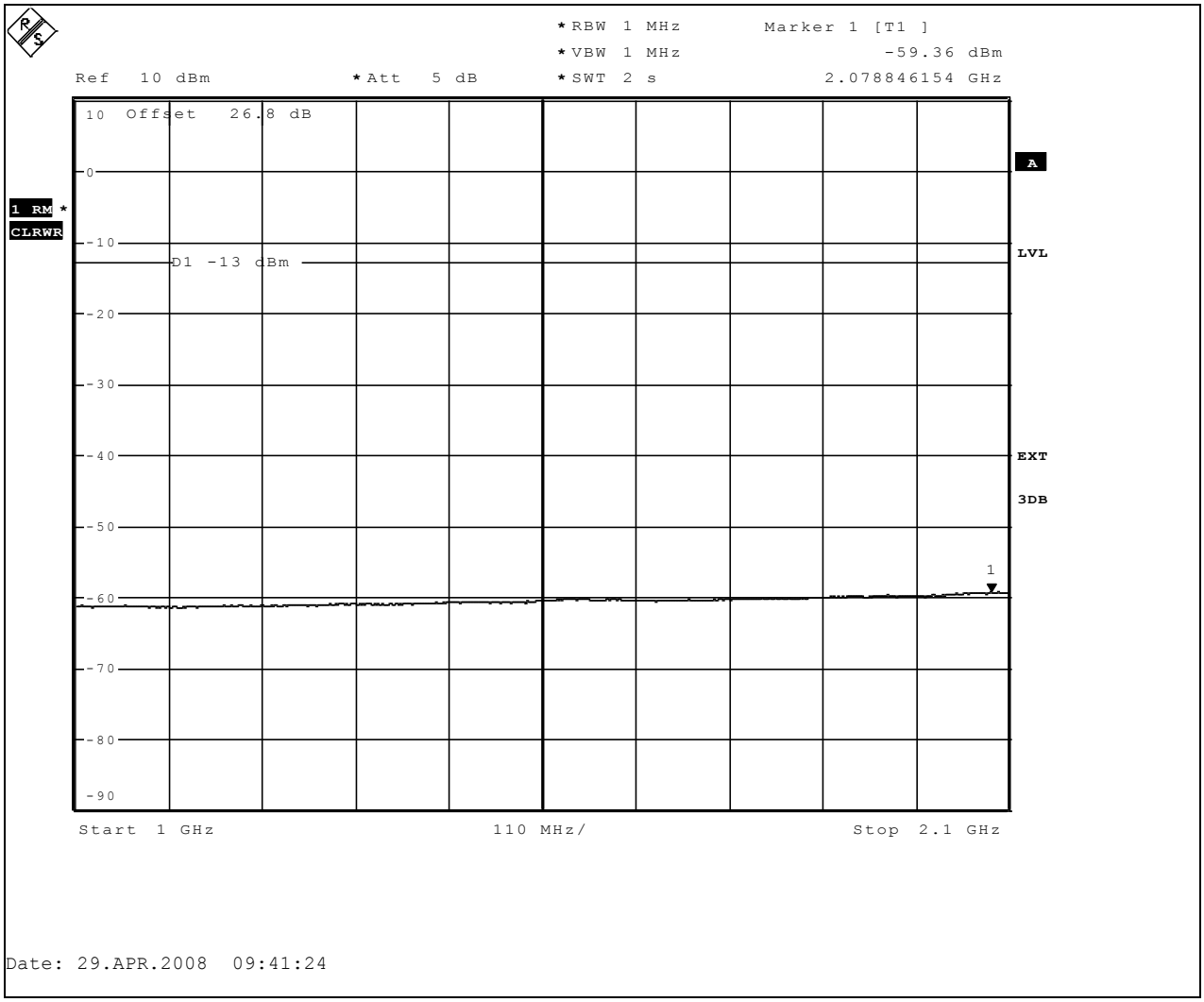
Notes: Tx 2190.0 MHz, 16QAM, SSU bandstop filter RBF1 was used

Test Data – Spurious Emissions



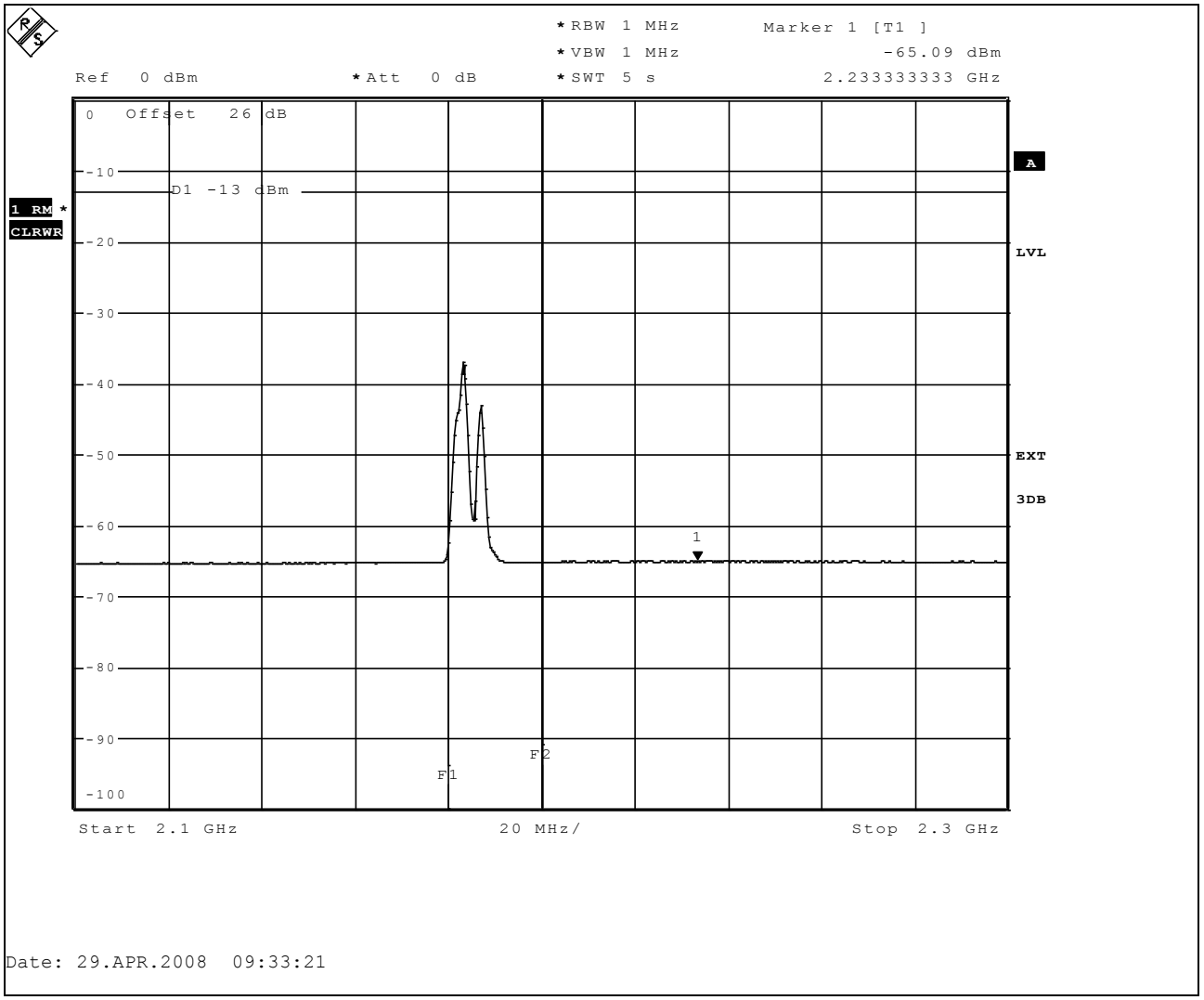
Notes: Tx 2190.0 16QAM, SSU bandstop filter RBF1 was used

Test Data – Spurious Emissions



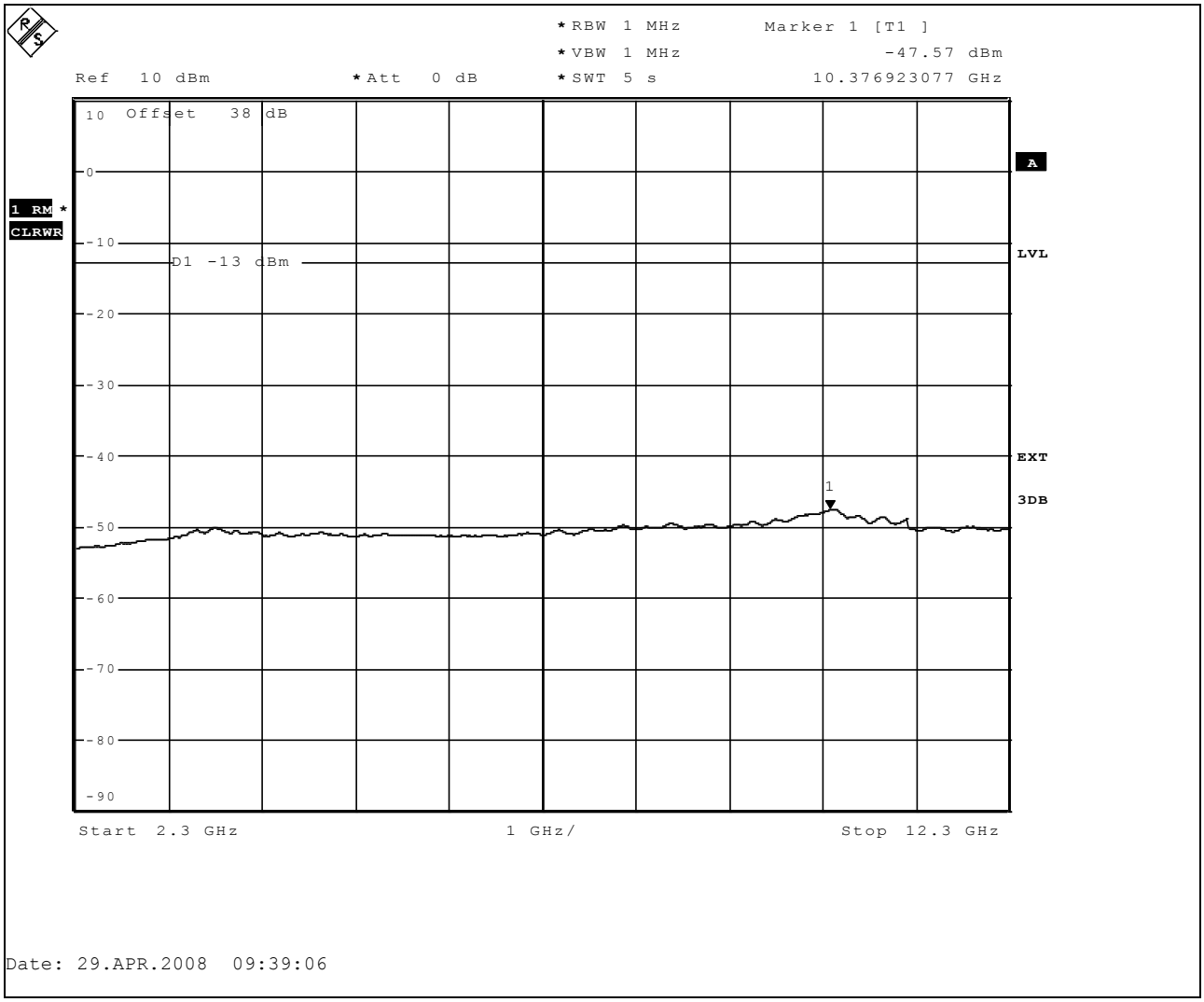
Notes: Tx 2190 MHz, 16QAM, SSU bandstop filter RBF1 was used

Test Data – Spurious Emissions



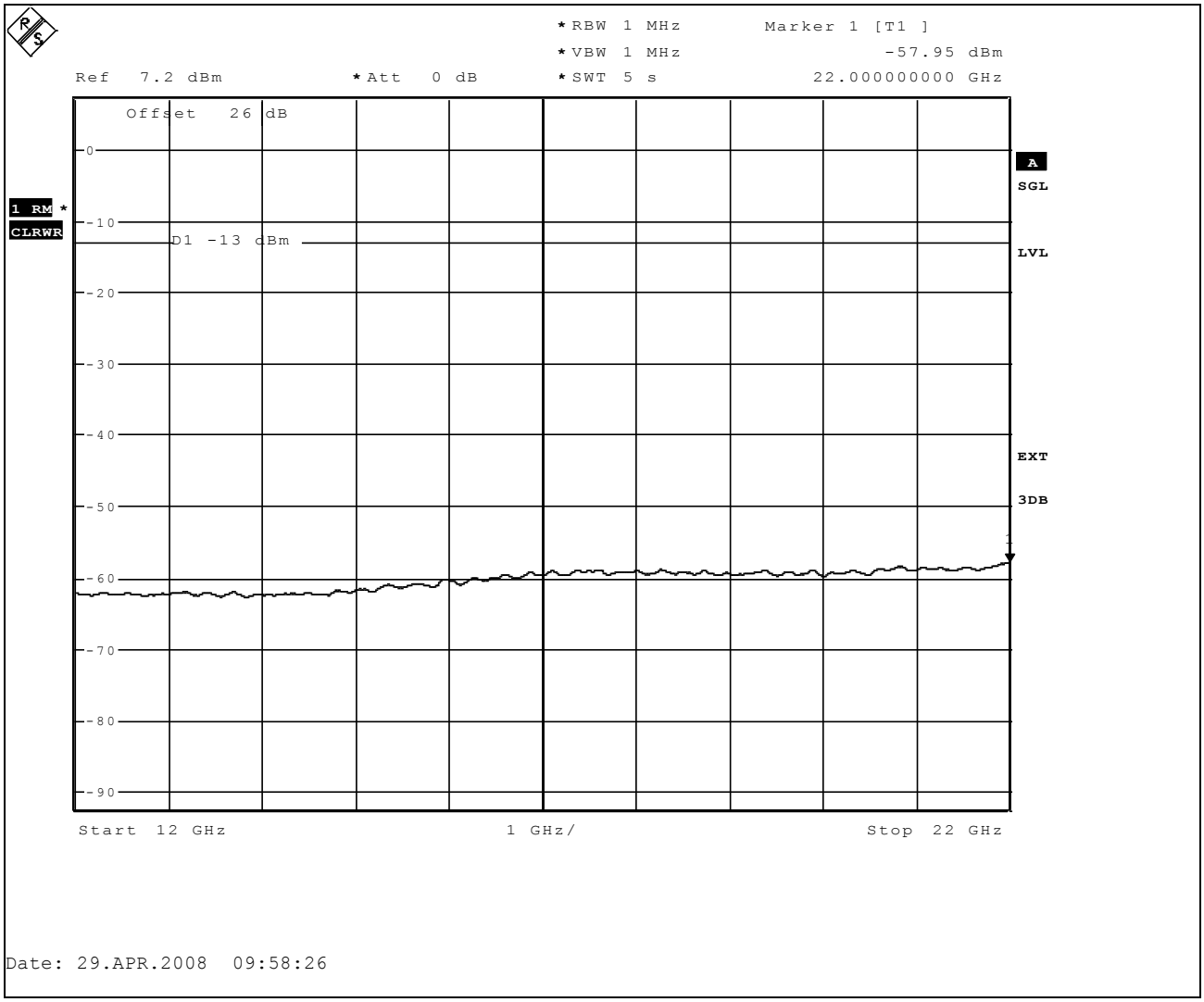
Notes: Tx 2185.0, 16QAM, SSU bandstop filter RBF2 was used

Test Data – Spurious Emissions



Notes: Tx 2190.0 MHz, 16QAM, SSU bandstop filter RBF1 was used

Test Data – Spurious Emissions



Notes: Tx 2190.0 MHz, 16QAM, 6GHz highpass filter was used

6. Field Strength of Spurious

NAME OF TEST: Field Strength of Spurious Emissions	PARA.NO.: 25.252, 2.1053
TESTED BY: Timo Hietala	DATE: 30/04/2008

Test Results: Complies.

Test Data: See attached table.

Frequency (MHz)	Spurious Emission EIRP (dBm) ave
All	More than 20 dB below limit -13 dBm

Equipment used: 15, 16, 17, 18, 19, 23, 24, 25, 26, 30

Measurement Uncertainty: ± 5.2 dB.

Temperature: 23 °C.

Relative Humidity: 35 %.

NOTE:

The spectrum was searched from 30 MHz to the 10th harmonic of the carrier.

Test Data – Radiated Emissions

Nemko Oy, Finland

Data Plot — Radiated Emissions Substitution Method

Page 1 of 1 — Complete: x — Preliminary:

Job No.:	106205	Date:	11-30/04/08		
Specification:	PT25	Temperature (°C):	23		
Tested By:	Timo Hietala	Relative Humidity (%):	35		
E.U.T.:	WCDMA TRANSMITTER				
Configuration:	TX FULL POWER				
Sample Number:	1				
Location:	NSN Oulu	RBW:	1 MHz	Measurement	
Detector type:	Ave	VBW:	1 MHz	Distance:	3 m

Test Equipment Used

Antenna:	17 and 18	Directional Coupler:	
Pre-Amp:	24, 30	Cable #1:	
Filter:		Cable #2:	
Receiver:	16	Cable #3:	
Attenuator #1:	-	Cable #4:	
Attenuator #2:		Mixer:	

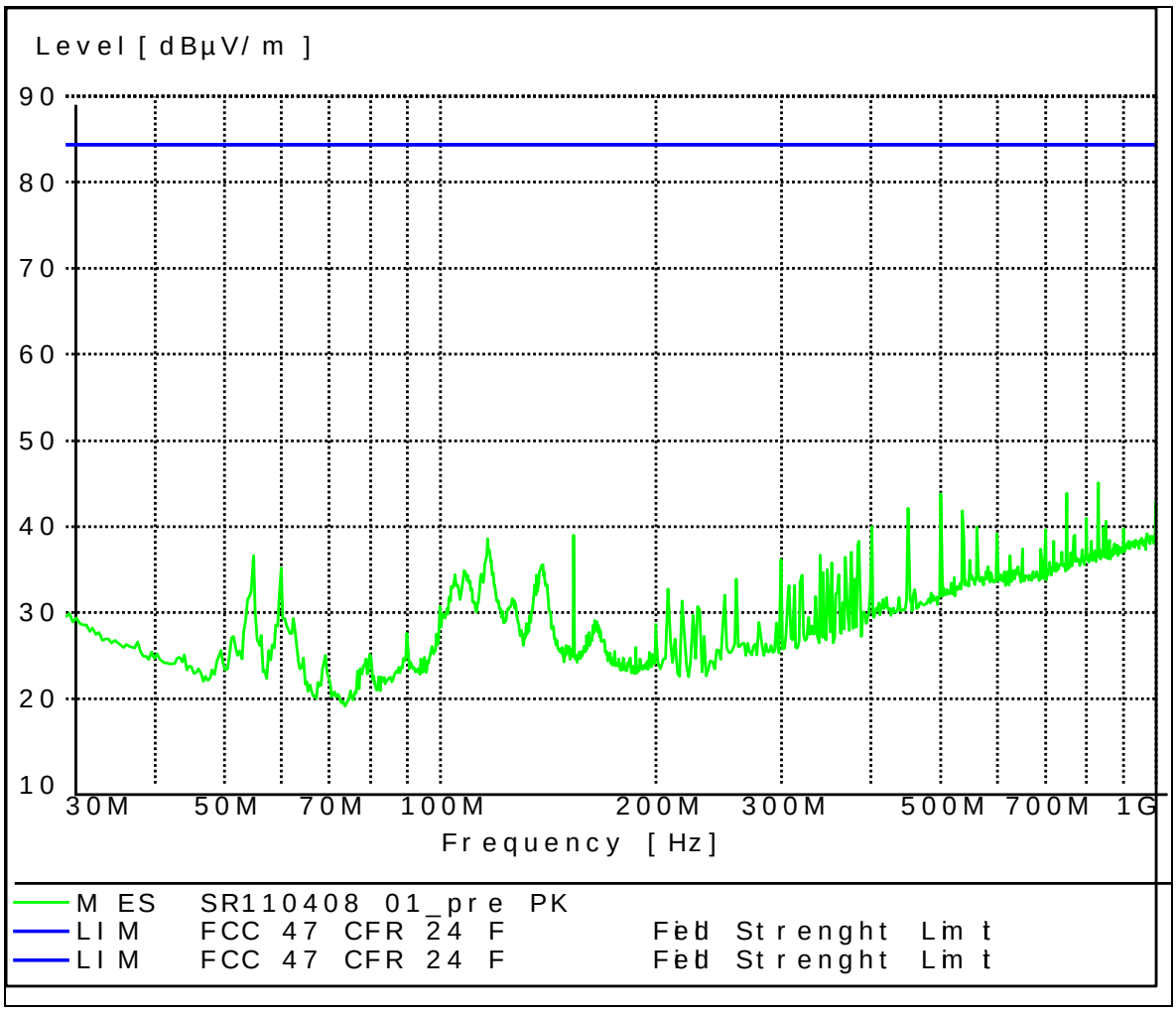
Additional equipment used: 19,23,25 and 26

Measurement Uncertainty: ± 5.2 dB

Frequency (MHz)	Meter Reading (dBm)	Correction Factor (dB)	Gen. Level (dBm)	Substitution Antenna Gain (dBi)	EIRP (dBm)	EIRP (µW)	Polarity	Comments

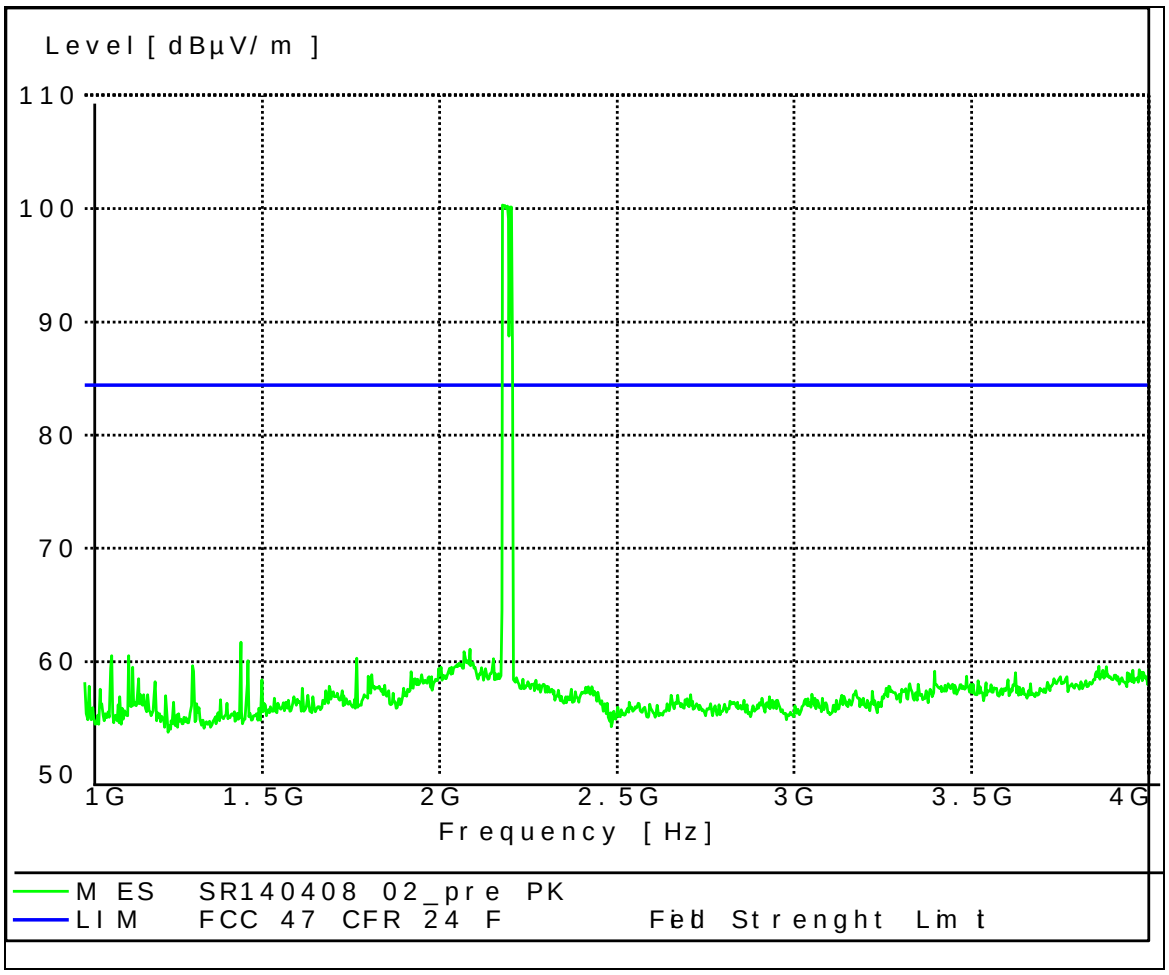
Notes: Pre measurement in stack installation FRJA Tx 2185.0 and 2190.0 MHz together with FRJB Tx 2195.0 MHz, transmitters full power terminated 50Ω

Test Data – Radiated Emissions 30 MHz - 1 GHz



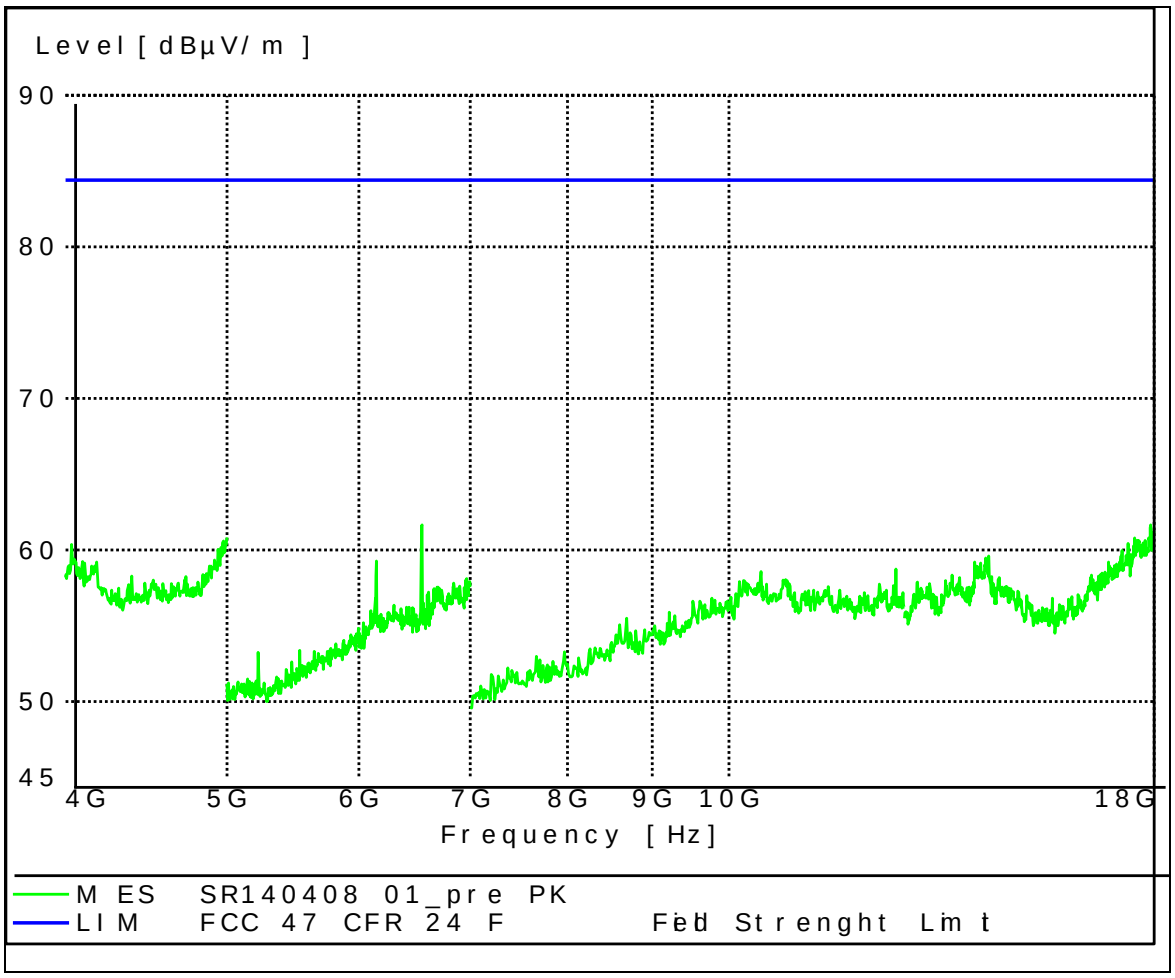
Notes: Limit line (84.4 dBuV/m) is converted from substitution limit (–13 dBm) to unit dBuV/m in 3 meter measurement distance

Test Data – Radiated Emissions 1 GHz – 4 GHz



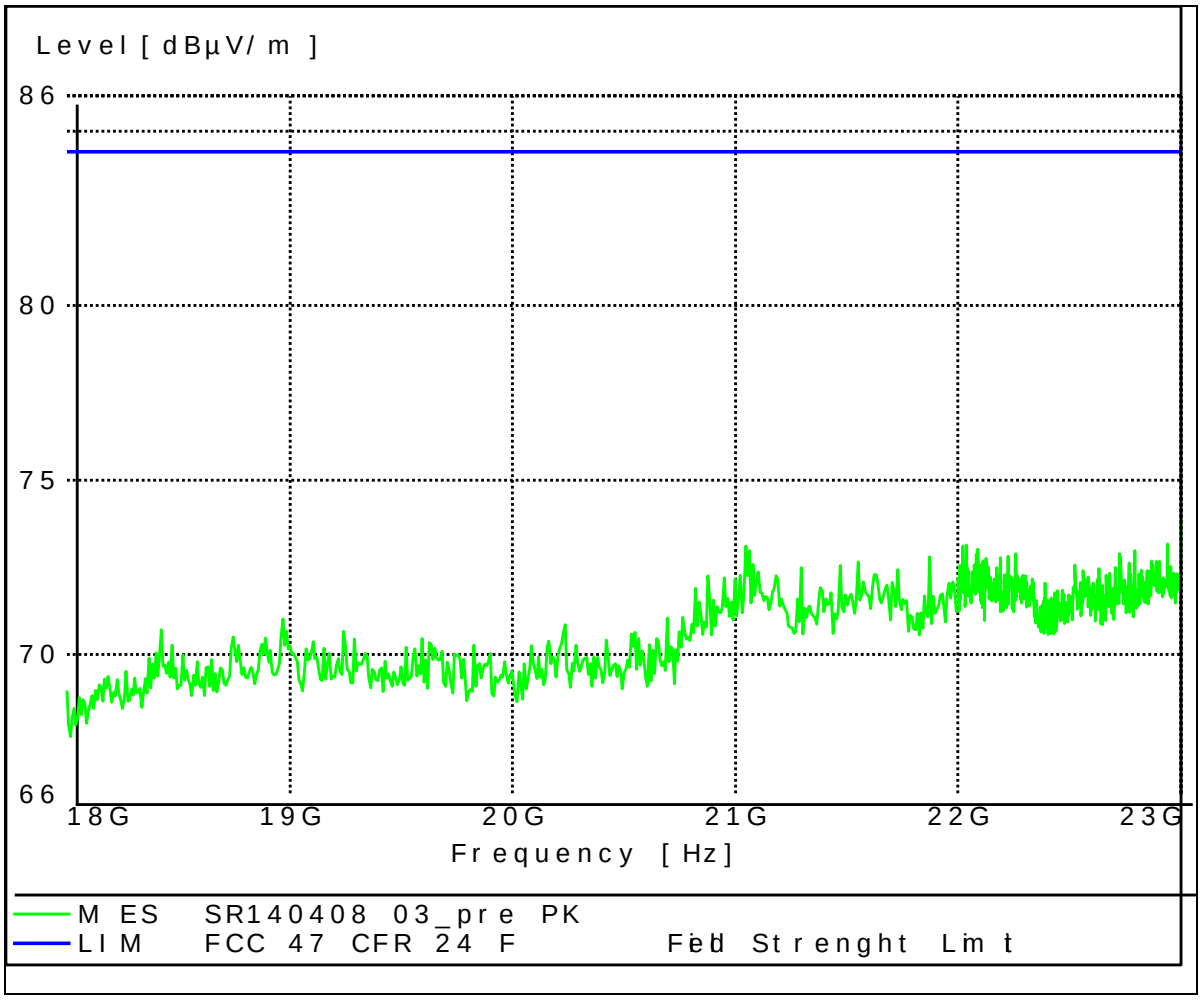
Notes: Limit line (84.4 dBuV/m) is converted from substitution limit (–13 dBm) to unit dBuV/m in 3 meter measurement distance

Test Data – Radiated Emissions 4 GHz – 18 GHz



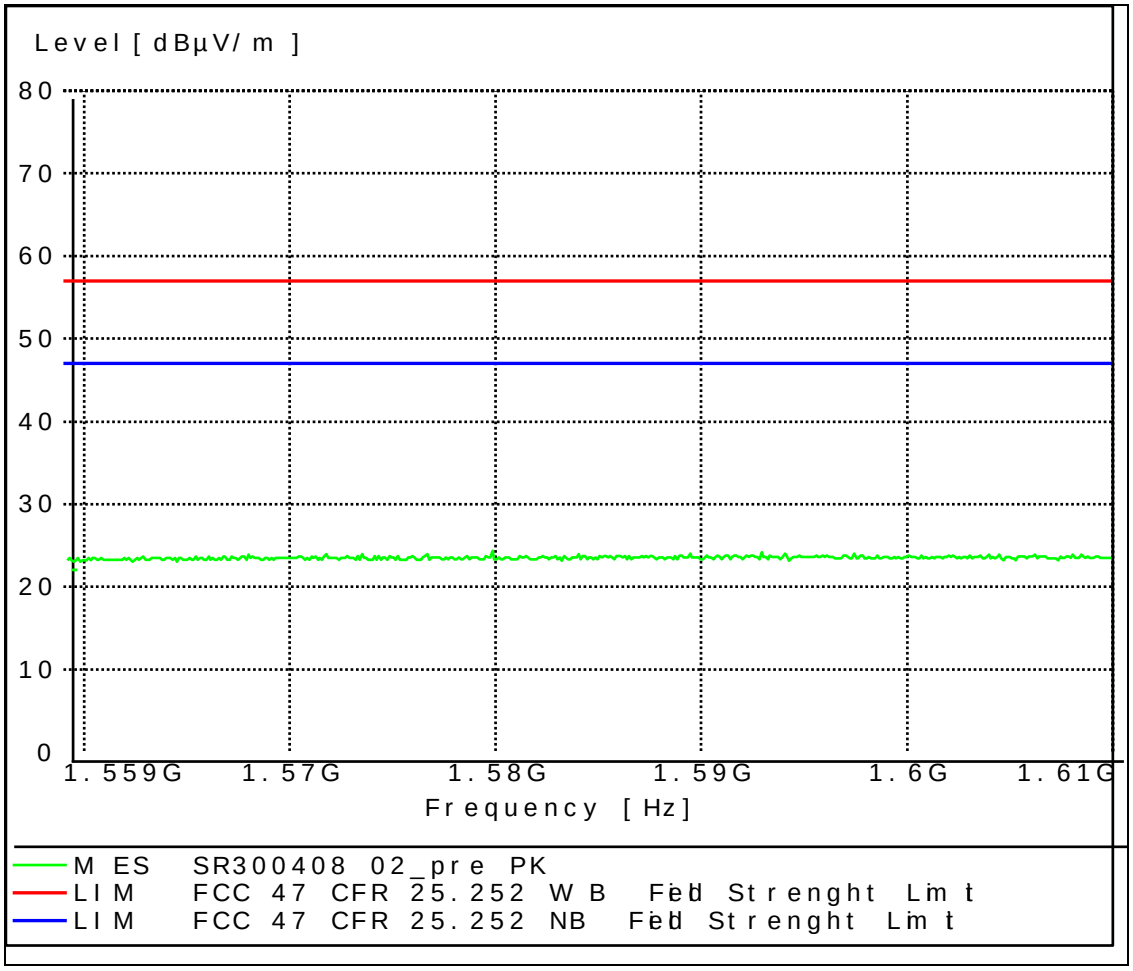
Notes: Limit line (84.4 dBuV/m) is converted from substitution limit (–13 dBm) to unit dBuV/m in 3 meter measurement distance

Test Data – Radiated Emissions 18 – 22 GHz



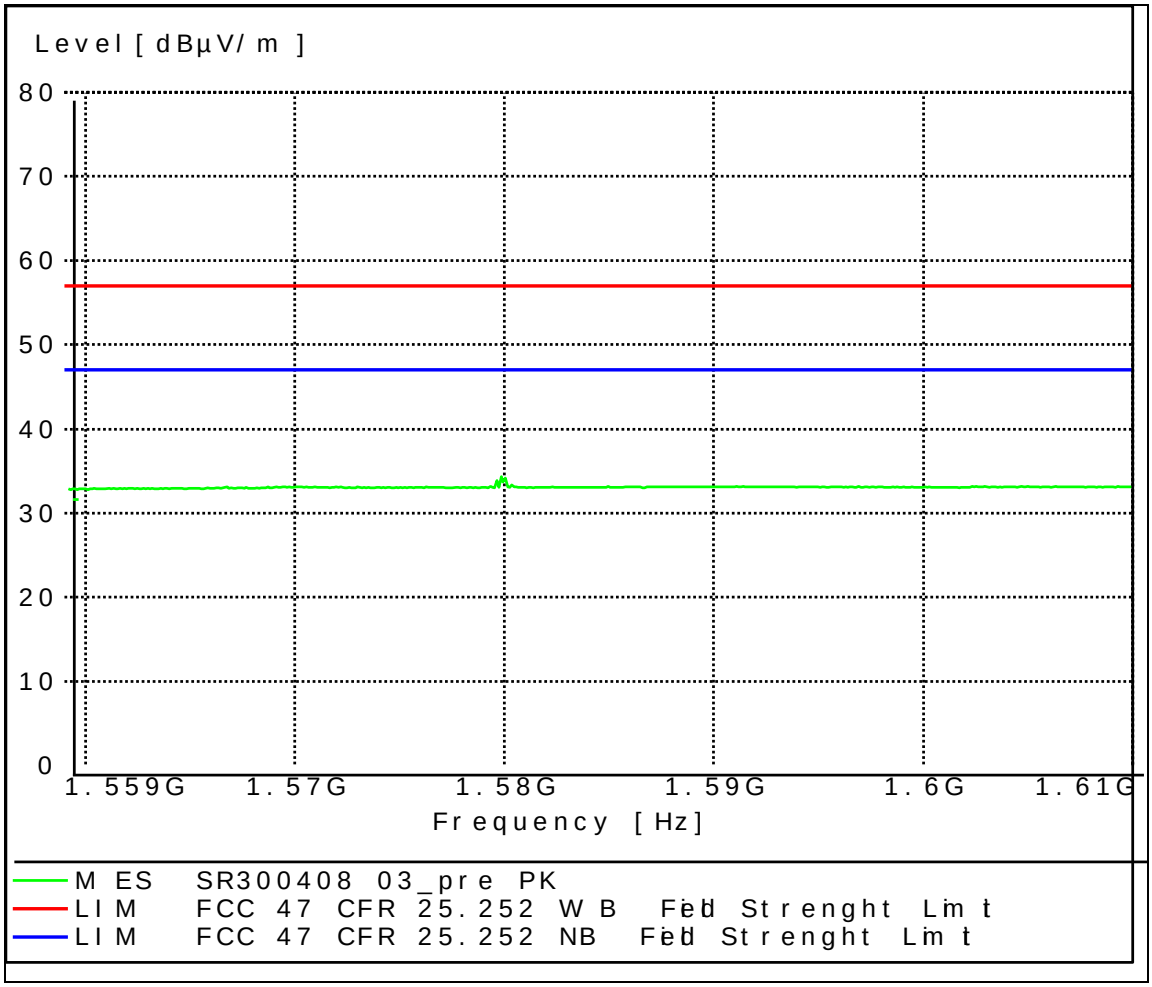
Notes: Limit line (84.4 dBuV/m) is converted from substitution limit (–13 dBm) to unit dBuV/m in 3 meter measurement distance

Test Data – Radiated Emissions 1559 -1610 MHz narrowband



Notes: Limit line (47.4 dBuV/m) is converted from substitution limit (–50 dBm) to unit dBuV/m in 3 meter measurement distance

Test Data – Radiated Emissions 1559 -1610 MHz wideband



Notes: Limit line (57.4 dBuV/m) is converted from substitution limit (–40dBm) to unit dBuV/m in 3 meter measurement distance

7. Frequency stability

NAME OF TEST: Frequency stability	PARA.NO.: 2.1055
TESTED BY: Timo Hietala	DATE: 30/04/2008

Test Results: Complies.

Standard Test Frequency: 2190.0 MHz.

Standard Test Voltage: 48 V DC.

Equipment used: 1, 5, 6, 8, 9, 14

EUT: WCDMA TRANSMITTER.

Configuration: TX FULL POWER MIDDLE CHANNEL.

Measurement Data: **Frequency stability with voltage variation.**

Test Condition			QPSK	QPSK	16QAM	16QAM
Voltage (V DC)	Temp (°C)	Rated (Hz/ppm)	Deviation (Hz)	Deviation (ppm)	Deviation (Hz)	Deviation (ppm)
48.0	20	109. / 0.05	-16.3	-0.0074	-16.2	-0.0074
55.2	20	109 / 0.05	-20.6	-0.0094	-15.2	-0.0069
40.8	20	109 / 0.05	-19.2	-0.0088	-14.8	-0.0068

Measurement Uncertainty: ± 0.001 ppm (± 2.0 Hz).

Relative Humidity: 35 %.

NAME OF TEST: Frequency stability	PARA.NO.: 2.1055
TESTED BY: Timo Hietala	DATE: 29-30/04/2008

Test Results: Complies.

Standard Test Frequency: 2190.0 MHz.

Standard Test Voltage: 48 V DC.

Equipment used: 1, 5, 6, 8, 9, 14

EUT: WCDMA TRANSMITTER.

Configuration: TX FULL POWER MIDDLE CHANNEL.

Measurement Data: **Frequency stability with temperature variation.**

Test Condition			QPSK	QPSK	16QAM	16QAM
Voltage (V DC)	Temp (°C)	Rated (Hz/ppm)	Deviation (Hz)	Deviation (ppm)	Deviation (Hz)	Deviation (ppm)
48.0	50	109. / 0.05	10.2	0.0047	11.2	0.0051
48.0	40	109 / 0.05	-11.5	-0.0052	-10.6	-0.0048
48.0	30	109 / 0.05	-10.0	-0.0046	-11.8	-0.0054
48.0	10	109. / 0.05	-19.5	-0.0089	-19.1	-0.0087
48.0	0	109 / 0.05	-19.1	-0.0087	-16.9	-0.0077
48.0	-10	109 / 0.05	-16.4	-0.0075	-15.9	-0.0072
48.0	-20	109. / 0.05	-16.8	-0.0077	-14.2	-0.0065
48.0	-30	109 / 0.05	-16.3	-0.0075	-8.2	-0.0038

Measurement Uncertainty: ± 0.001 ppm (± 2.0 Hz).

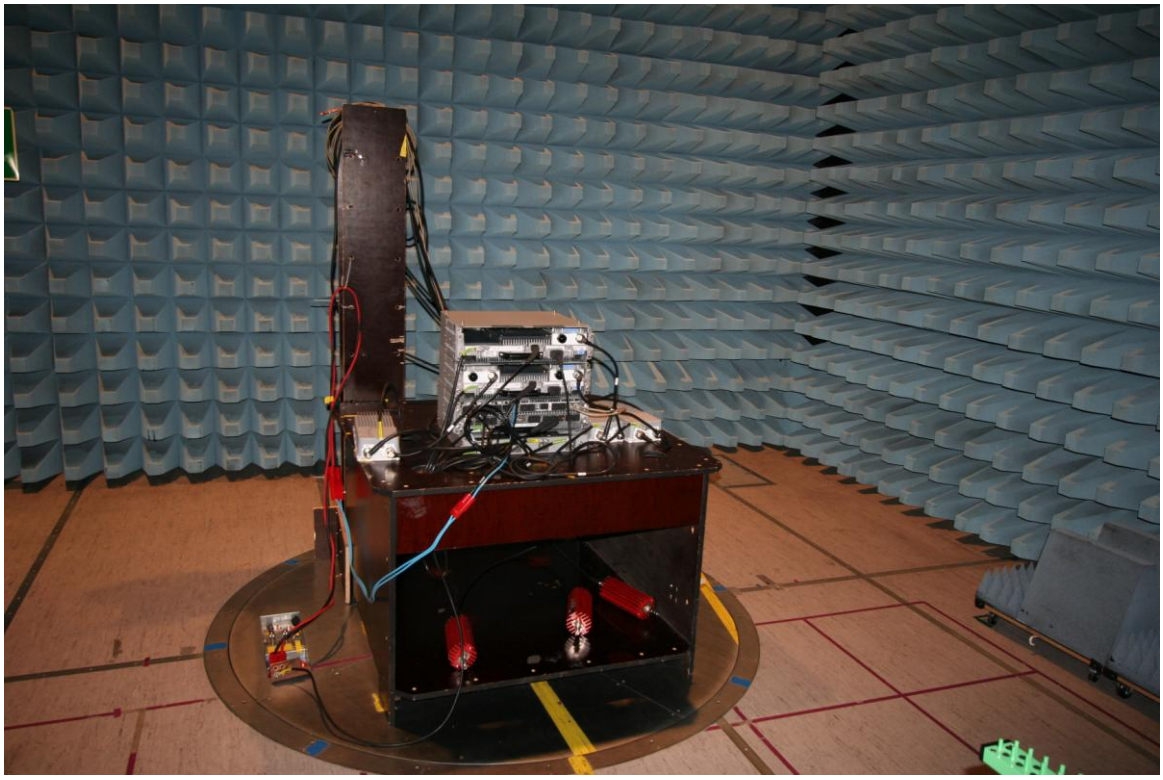
Relative Humidity: 35 %.

8. List of test equipment

Each active test equipment is calibrated annually.

Nr.	Equipment	Name of equipment	Serial number
1	Signal analyzer	Rohde & Schwarz:FSQ26	100364
2	Network analyzer	Hewlett-Packard:HP8753E	US38431868
3	Network analyzer	Hewlett-Packard:HP8720ES	US39172107
4	Calibration kit	Hewlett-Packard:HP85032B	2919A04843
5	Enviromental chamber	Weiss technick	59226012320010
6	Frequency standard	Datum 8040	0023006282
7	Interface Unit	Orbis TX SSU 2200A	SSU-0622-1211
8	DC power	Sörensen	9950C0085
9	Temperature/humidity meter	VAISALA HMI 31	P3730008
10	Signal analyzer	Rohde & Schwarz:FSIQ26	833370/009
11	Frequency standard	Datum 8040	0030007339
12	High Pass filter	MCN-58282/02	1182501
13	Attenuator	MCE/Weinschel 86-20-11	401
14	Attenuator	Narda FSCM 99899	08275
15	Semianechoic chamber	Siemens Matsushita 9m × 5m × 6m (room 0039)	Product No S&M B83317- C6019-T232
16	EMI Test Receiver	R&S ESIB 26	100335
17	Horn Antenna	Emco 3115	00075697
18	Bilog Antenna	Chase CBL6112B	2694
19	Horn Antenna	Emco 3115	0102A06346
20	Biconical Antenna	R&S HK116	836891/009
21	Dipole VHF	Mess-Elektronik VHA9103	
22	Dipole UHF	Mess-Elektronik UHA9105	
23	Signal Generator	R&S SMR 20	1715
24	Amplifier	Miteq AFSX4	791117
25	Antenna Mast	Deisel HD240	2401323194
26	Mast Controller	Deisel HD100	1001331
30	Amplifier	HP 83017A	3123A00444

9. Photographs of Test Setup



10. ANNEX A, TEST DETAILS

NAME OF TEST: RF Power Output	PARA. NO.: 2.1046

Minimum Standard: Para. No. 25.252(a)(2). Base stations are limited to 27 dBW peak E.I.R.P. in 1.23 MHz.
Federal Communications Commission DA 10-60 13 January 2010 new limit 32.0 dBW EIRP independent of bandwidth.

Method Of Measurement:

CDMA Per ANSI/J-STD-014
TDMA Per ANSI/J-STD-010

Detachable Antenna:
The peak power at antenna terminals is measured using an in-line peak power meter or a spectrum analyzer.

NAME OF TEST: Occupied Bandwidth	PARA. NO.: 2.1049

Minimum Standard: Para. No. 2.1049. The 99% occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to 0.5% of the emitted power.

Method Of Measurement:

The 99% occupied bandwidth of the carrier emission is measured using a spectrum analyzer with Resolution Bandwidth set to 1% of the necessary bandwidth of the transmitted carrier.

NAME OF TEST: Spurious Emission at Antenna Terminals	PARA. NO.: 2.1051

Minimum Standard: On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power by at least 43 + 10 log (P) dB.

Method Of Measurement:

Spectrum analyzer settings:
RBW: 1 MHz
VBW: 1 MHz
The EUT is connected to spectrum analyzer through suitable attenuator and filters and spurious emissions closer than 20 dB to the limit are measured with rms detector.

NAME OF TEST: Field Strength of Spurious Radiation	PARA. NO.: 2.1053

Minimum Standard: On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power by at least 43 + 10 log (P) dB.

Test Method:
TIA/EIA-603-C-2004, Section 2.2.12
The test was performed in a semi-anechoic shielded room. The EUT was placed on a non-conductive 0.8 m high table standing on the turntable. During the test in the frequency range 30-22000 MHz the distance from the EUT to the measuring antenna was 3 m. In order to find the maximum levels of the disturbance radiation the angle of the turntable, the height of the measuring antenna were varied during the tests. The test was performed with the measuring antenna being both in horizontal and vertical polarizations.

Vertical and horizontal polarizations in the frequency range 30 – 22000 MHz was first measured by using the peak detector. During the peak detector scan the turntable was rotated from 0° to 360° with 30° step with the antenna heights 1.0 m and 2.5 m.

The limit of -13 dBm has been calculated to correspond 84.4 dB(µV/m).
Spurious emissions closer than 20 dB to the limit was measured with average detector.

The antenna substitution method was used to determine the equivalent radiated power at spurious frequencies. The EUT was replaced with a reference substitution antenna with a known gain referenced to an isotropic radiator $G_{Antenna[dBi]}$. This antenna was fed with a signal at the spurious frequency $P_{Gen[dBm]}$. The level of the signal was adjusted to repeat the previously measured level. The resulting EIRP is the signal level fed to the reference antenna corrected for gain referenced to an isotropic.
The formula below was used to calculate the EIRP of the EUT.

$$P_{EIRP[dbm]} = P_{Gen[dBm]} - L_{Cable[dB]} + G_{Antenna[dBi]}$$

NAME OF TEST: Frequency Stability	PARA. NO.: 2.1055

Minimum Standard: The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Method Of Measurement:
Frequency Stability With Voltage Variation

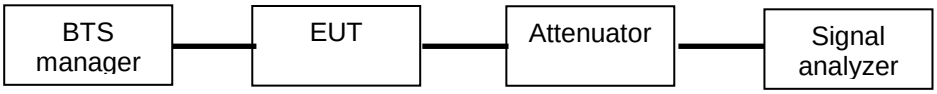
The E.U.T. is placed in an environmental chamber and allowed to stabilize at +20 degrees Celsius for at least 15 minutes. With the voltage input to the E.U.T. set to 85% S.T.V., the frequency error is measure. This procedure is repeated at 100% S.T.V. and 115% S.T.V.

Frequency Stability With Temperature Variation

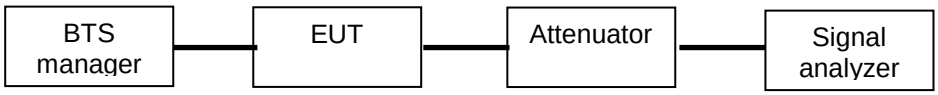
The input voltage to the E.U.T. is set to S.T.V. and the temperature of the environmental chamber is varied in 10 degree steps from -30 degrees C to +50 degrees C. The E.U.T. is allowed to stabilize at each temperature and the frequency error is measured.

11. ANNEX B, TEST DIAGRAMS

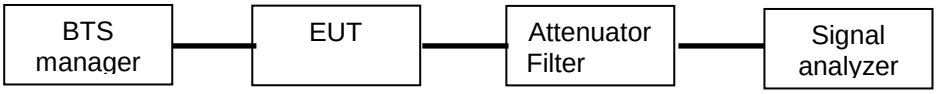
RF Power Output PARA. NO.: 2.1046



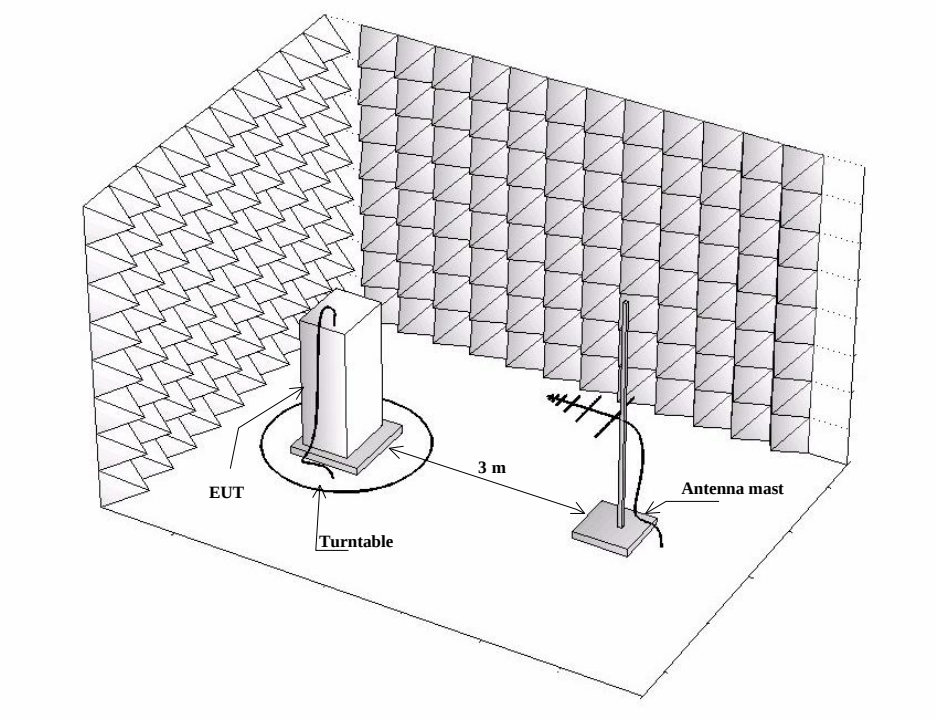
Occupied Bandwidth PARA. NO.: 2.1049



Spurious Emission at Antenna Terminals PARA. NO.: 2.1051

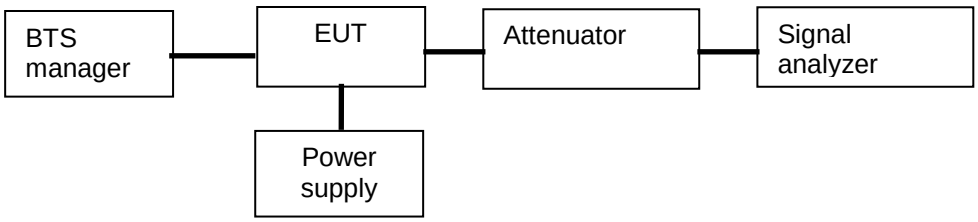


Field Strength of Spurious Radiation PARA. NO.: 2.1053



Frequency Stability PARA. NO.: 2.1055

Frequency Stability With Voltage Variation



Frequency Stability With Temperature Variation