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Plano, Texas 75074
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Certification Test Report

CFR 47 FCC Part 2 and Part 24, Subpart C

Model: MR1903D

FCC ID NO.: BCR-RPT-MR1903D

Project Code: W7127-3

Revision: 1

Prepared for: Andrew Corporation

Author: Tom Tidwell, Manager of Wireless Services

Issued: 10 July, 2007

Report Summary

NTS Plano

Accreditation Numbers: FCC: 101741
IC: 46405-4319 File # IC-4319A

Applicant: Andrew Wireless Innovations Group
100 Rand Park Drive
Garner, NC 27529

Customer Representative: Michael Williamson

EUT Description:

EUT Description	Manufacturer	Model	Revision	Serial Number
The MR1903D is a PCS 1900 MHz band booster	Andrew Corp.	MR1903D	0	001

Test Summary

Appendix	Test/Requirement Description	Deviations from:			Pass / Fail	Applicable Rule Parts
		Base Standard	Test Basis	NTS Procedure		
A	RF Power Output	No	No	No	PASS	CFR 47, Part 2, Para. 2.1046 CFR 47, Part 24, Para.24.232
B	Modulation Characteristics	No	No	No	PASS	CFR 47, Part 2, Para. 2.1047
C	Occupied Bandwidth	No	No	No	PASS	CFR 47, Part 2, Para. 2.1049 CFR 47, Part 24, Para. 24.238
D	Spurious Emissions at Antenna Terminals	No	No	No	PASS	CFR 47, Part 2, Para. 2.1051 CFR 47, Part 24, Para. 24.238
E	Field Strength of Spurious Radiation	No	No	No	PASS	CFR 47, Part 2, Para. 2.1053 CFR 47, Part 24, Para. 24.238
F	Frequency Stability	No	No	No	PASS	CFR 47, Part 2, Para. 2.1055 CFR 47, Part 24, Para. 24.235

Test Result: The product presented for testing complied with test requirements as shown above.

This is to certify that the preceding report is true and correct to the best of my knowledge.

Robert Stevens,
Quality Assurance Manager

Tom Tidwell,
Wireless Test Engineer

Table of Contents

Register of revisions

Revision	Reason for Revision	Release Date
0	Original	1 June, 2007
1	Included input plots for all modulations.	10 July, 2007

INTRODUCTION

1.1 PURPOSE

The purpose of this document is to describe the tests applied by NTS Plano to demonstrate compliance of the MR1903D to FCC Part 24 Subpart C and Subpart H for Cellular Radiotelephone Service in accordance with the certification requirements of CFR 47, Part 2.

2.0 EUT DESCRIPTION

2.1 CONFIGURATION

Description of EUT

	Name	Model	Revision	Serial Number
EUT	Mini Repeater	MR1903D	1	10
RF Exposure Classification	Indoor and Outdoor Fixed. Minimum separation 20 cm.			
Channels/Frequency Range	Uplink: 1850 – 1910 MHz Downlink: 1930 – 1990 MHz			
Power	0.05 watts			
Emission Designator:	F9W – CDMA/WCDMA G7W – GSM/EDGE			
Functional Description	The MR1903D mini repeater is used to enhance the coverage of a licensed PCS band cellular network.			

2.1.1 EUT POWER

Voltage	12 Vdc
Number of Feeds	2 (+ and return)

2.2 EUT CABLES

Quantity	Model/Type	Routing		Shielded / Unshielded	Description	Cable Length (m)
		From	To			
1		EUT	AC power main	Unshielded	Power cord	1.25
1	Gore	IQ Signal Generator	EUT	Shielded (coaxial)	Coaxial cable	1.5
1	Gore	EUT	50 ohm load	Shielded (coaxial)	Coaxial cable	2

2.3 MODE OF OPERATION DURING TESTS

The device was tested in two basic operating modes:

- Downlink, maximum rf output power
- Uplink, maximum rf output power

There are four options of band filtering with this device. Testing was performed on all four to show the response of the various filters.

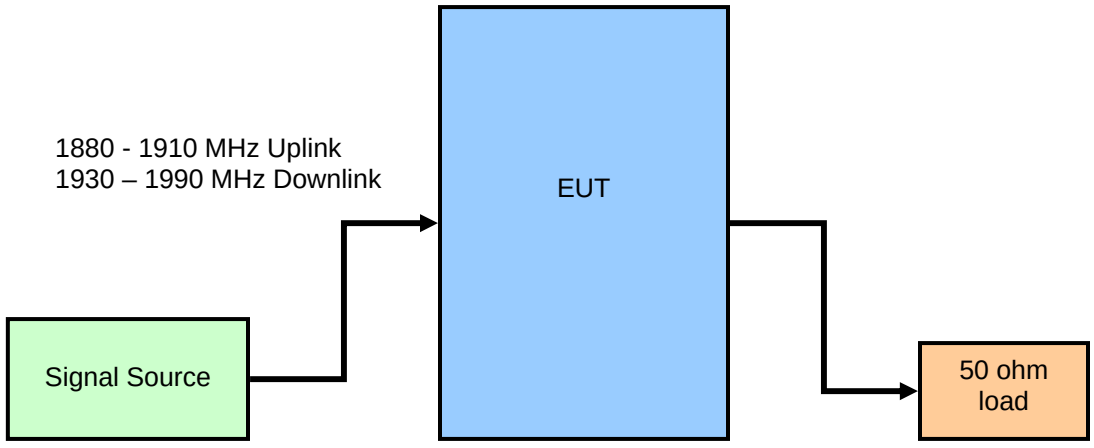
5 MHz filter
10 MHz filter
15 MHz filter
20 MHz filter

3.0 SUPPORT EQUIPMENT

3.1 CONFIGURATION

No support equipment was required to operate the equipment.

3.2 TEST BED/PERIPHERAL CABLES



APPENDICES

APPENDIX A: 2.1046 RF POWER OUTPUT

A.1. Base Standard & Test Basis

Base Standard	FCC PART 2.1046
Test Basis	TIA 603-C, 2004
Test Method	TIA 603-C, 2004

A.2. Specifications

24.232 Power and antenna height limits.

(a) Base stations are limited to 1640 watts peak equivalent isotropically radiated power (EIRP) with an antenna height up to 300 meters HAAT, except as described in paragraph 24.232(b).

(b) Base stations that are located in counties with population densities of 100 persons or fewer per square mile, based upon the most recently available population statistics from the Bureau of the Census, are limited to 3280 watts peak equivalent isotropically radiated power (EIRP) with an antenna height up to 300 meters HAAT.

(c) Mobile/portable stations are limited to 2 watts EIRP peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications.

Applicable RF Power Limit from Above: 1640 watts EIRP

A.3. Deviations

Deviation Number	Time & Date	Description and Justification of Deviation	Deviation Reference			Approval
			Base Standard	Test Basis	NTS Procedure	
None						

A.4. Test Procedure

TIA 603-C, 2004 and 24.232(d)

A.5. Test Results

The EUT is in compliance with the limits as specified above. The maximum rf output power at the antenna terminals is 0.050 watts (downlink) and 0.050 watts (uplink).

A.6. Operating Mode During Test

The transmitter was tested while in a continuous transmit mode. The input signal was tuned to a low, middle, and high channel in both the downlink (base to mobile) and uplink (mobile to base) directions. The rf input level is increased until maximum rf output level is reached and further increase of the input level does not result in an increase in the rf output power.

A.7. Sample Calculation

Rf power(watts) = $10^{(\text{rf power(dBm)}/10)}$ x 1000

A.8. Test Data

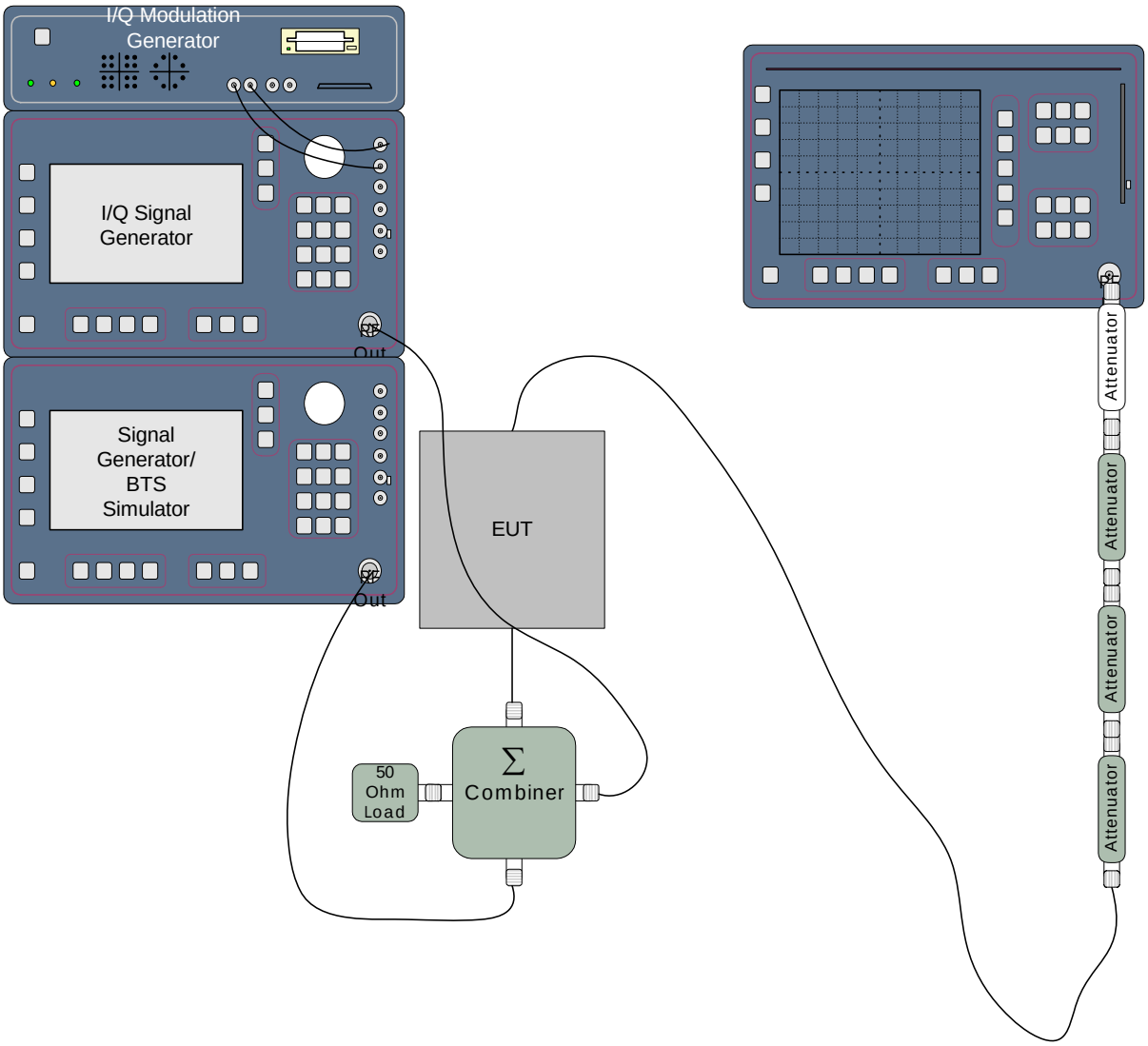
Frequency	Signal Path	Modulation Mode	RF Power Output at Antenna Terminals (dBm)
1931.25	DL	IS-95 CDMA	17.0
1960.00	DL	IS-95 CDMA	17.0
1988.75	DL	IS-95 CDMA	17.0
1932.50	DL	W-CDMA	17.0
1960.00	DL	W-CDMA	17.0
1987.50	DL	W-CDMA	17.0
1930.20	DL	GSM	17.0
1960.00	DL	GSM	17.0
1989.80	DL	GSM	17.0
1930.20	DL	EDGE	17.0
1960.00	DL	EDGE	17.0
1989.80	DL	EDGE	17.0
1851.25	UL	IS-95 CDMA	17.0
1880.00	UL	IS-95 CDMA	17.0
1908.75	UL	IS-95 CDMA	17.0
1852.50	UL	W-CDMA	17.0
1880.00	UL	W-CDMA	17.0
1907.50	UL	W-CDMA	17.0
1850.20	UL	GSM	17.0
1880.00	UL	GSM	17.0
1909.80	UL	GSM	17.0
1850.20	UL	EDGE	17.0
1880.00	UL	EDGE	17.0
1909.80	UL	EDGE	17.0

Note: RF power output was measured using a spectrum analyzer with the following settings:

RBW = 50 MHz
VBW = 30 MHz (maximum)
Detector = RMS
*DL = Downlink (BTS to Mobile) path, UL = Uplink (Mobile to BTS) path

Tested By: Tom Tidwell
Responsibility: Manager of Wireless Services
Test Date: 17 May, 2007

A.9. Test Diagram



A.10. Tested By

Name: Tom Tidwell,
Function: Manager of Wireless Services
Test Date: 17 May, 2007

APPENDIX B: 2.1047 MODULATION CHARACTERISTICS

B.1. Base Standard & Test Basis

Base Standard	FCC 2.1047
Test Basis	FCC 2.1047 Modulation Characteristics
Test Method	TIA 603-C, 2004

B.2. Specifications

2.1047 – Modulation Characteristics

(a) *Voice modulated communication equipment.* A curve or equivalent data showing the frequency response of the audio modulating circuit over a range of 100 to 5000 Hz shall be submitted. For equipment required to have an audio low-pass filter, a curve showing the frequency response of the filter, or of all circuitry installed between the modulation limiter and the modulated stage shall be submitted.
(b) *Equipment which employs modulation limiting.* A curve or family of curves showing the percentage of modulation versus the modulation input voltage shall be supplied. The information submitted shall be sufficient to show modulation limiting capability throughout the range of modulating frequencies and input modulating signal levels employed.
(c) *Single sideband and independent sideband radiotelephone transmitters which employ a device or circuit to limit peak envelope power.* A curve showing the peak envelope power output versus the modulation input voltage shall be supplied. The modulating signals shall be the same in frequency as specified in paragraph (c) of §2.1049 for the occupied bandwidth tests.
(d) *Other types of equipment.* A curve or equivalent data which shows that the equipment will meet the modulation requirements of the rules under which the equipment is to be licensed.

B.3. Deviations

Deviation Number	Time & Date	Description and Justification of Deviation	Deviation Reference			Approval
			Base Standard	Test Basis	NTS Procedure	
none						

B.4. Test Method

This device does not generate any modulation signals but only repeats a modulated rf waveform.

B.5. Test Results

Not applicable – The device does not produce a baseband signal but simply repeats a modulated rf waveform.

Test Data Summary

Emission Designators

F9W – CDMA/WCDMA
G7W – GSM/EDGE

B.6. Test Diagram

N/A

B.7. Tested By

Name: Tom Tidwell
Function: Manager of Wireless Services

APPENDIX C: 2.10.49 OCCUPIED BANDWIDTH

C.1. Base Standard & Test Basis

Base Standard	FCC 2.1049
Test Basis	FCC 2.1049 Occupied Bandwidth
Test Method	TIA 603-C, 2004

C.2. Specifications

24.238 Emission limitations for Broadband PCS equipment

(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 rules 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.* 1 MHz or 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.

C.3. Deviations

Deviation Number	Time & Date	Description and Justification of Deviation	Deviation Reference			Approval
			Base Standard	Test Basis	NTS Procedure	
none						

C.4. Test Method

TIA 603-C, 2004 and 24.238(b)

The modulated rf carrier fed to the device during testing is described below:

IS-95 CDMA carrier:

Downlink

Data source: PRBS (Pseudo-Random Bit Sequence)
Modulation: QPSK 2 b/sym
Symbol Rate: 1.2288 Msym/sec
Filter: IS-95 + Equalizer
Coding: None

Channel Mapping

Chan. No.	Walsh Code	Power (dB)	Data	Chan. No.	Walsh Code	Power (dB)	Data	Chan. No.	Walsh Code	Power (dB)	Data
0	0	-7	0000	**22**	22	-19	PRBS	**44**	44	-19	PRBS
1	1	-19	PRBS	**23**	23	-19	PRBS	**45**	45	-19	PRBS
2	2	-19	PRBS	**24**	24	-19	PRBS	**46**	46	-19	PRBS
3	3	-19	PRBS	**25**	25	-19	PRBS	**47**	47	-19	PRBS
4	4	-19	PRBS	**26**	26	-19	PRBS	**48**	48	-19	PRBS
5	5	-19	PRBS	**27**	27	-19	PRBS	**49**	49	-19	PRBS
6	6	-19	PRBS	**28**	28	-19	PRBS	**50**	50	-19	PRBS
7	7	-19	PRBS	**29**	29	-19	PRBS	**51**	51	-19	PRBS
8	8	-19	PRBS	**30**	30	-19	PRBS	**52**	52	-19	PRBS
9	9	-19	PRBS	**31**	31	-19	PRBS	**53**	53	-19	PRBS
10	10	-19	PRBS	**32**	32	-19	PRBS	**54**	54	-19	PRBS
11	11	-19	PRBS	**33**	33	-19	PRBS	**55**	55	-19	PRBS
12	12	-19	PRBS	**34**	34	-19	PRBS	**56**	56	-19	PRBS
13	13	-19	PRBS	**35**	35	-19	PRBS	**57**	57	-19	PRBS
14	14	-19	PRBS	**36**	36	-19	PRBS	**58**	58	-19	PRBS
15	15	-19	PRBS	**37**	37	-19	PRBS	**59**	59	-19	PRBS
16	16	-19	PRBS	**38**	38	-19	PRBS	**60**	60	-19	PRBS
17	17	-19	PRBS	**39**	39	-19	PRBS	**61**	61	-19	PRBS
18	18	-19	PRBS	**40**	40	-19	PRBS	**62**	62	-19	PRBS
19	19	-19	PRBS	**41**	41	-19	PRBS	**63**	63	-19	PRBS
20	20	-19	PRBS	**42**	42	-19	PRBS				
21	21	-19	PRBS	**43**	43	-19	PRBS				

Uplink

Data source: PRBS (Pseudo-Random Bit Sequence)
Modulation: OQPSK 2 b/sym
Symbol Rate: 1.2288 Msym/sec
Filter: IS-95
Coding: None
Channel Type: Traffic
Data Rate: 14, 400 b/sec
Convolution Encoder: On
Block Interleaver: On
Erasure Bit: 1

W-CDMA carrier: .

Data source: PRBS(Pseudo-Random Bit Sequence)
Modulation: OQPSK

Symbol Rate: 4.096 MHz
Sequence Length: 65536 sym
Filter: Root Cosine
Roll Off: 0.1
Window Function: Hanning

GSM carrier:
Data source: PRBS(Pseudo-Random Bit Sequence)
Modulation: GMSK
Symbol rate: 270 ksps

EDGE carrier:
Data source: PRBS(Pseudo-Random Bit Sequence)
Modulation: 8-PSK
Symbol rate: 270 ksps

C.5. Test Results

Compliant. The rf input and output of the device was plotted to demonstrate that the modulated carrier is not degraded as a result of processing by the device under test.

C.6. Deviations from Normal Operating Mode During Test

None.

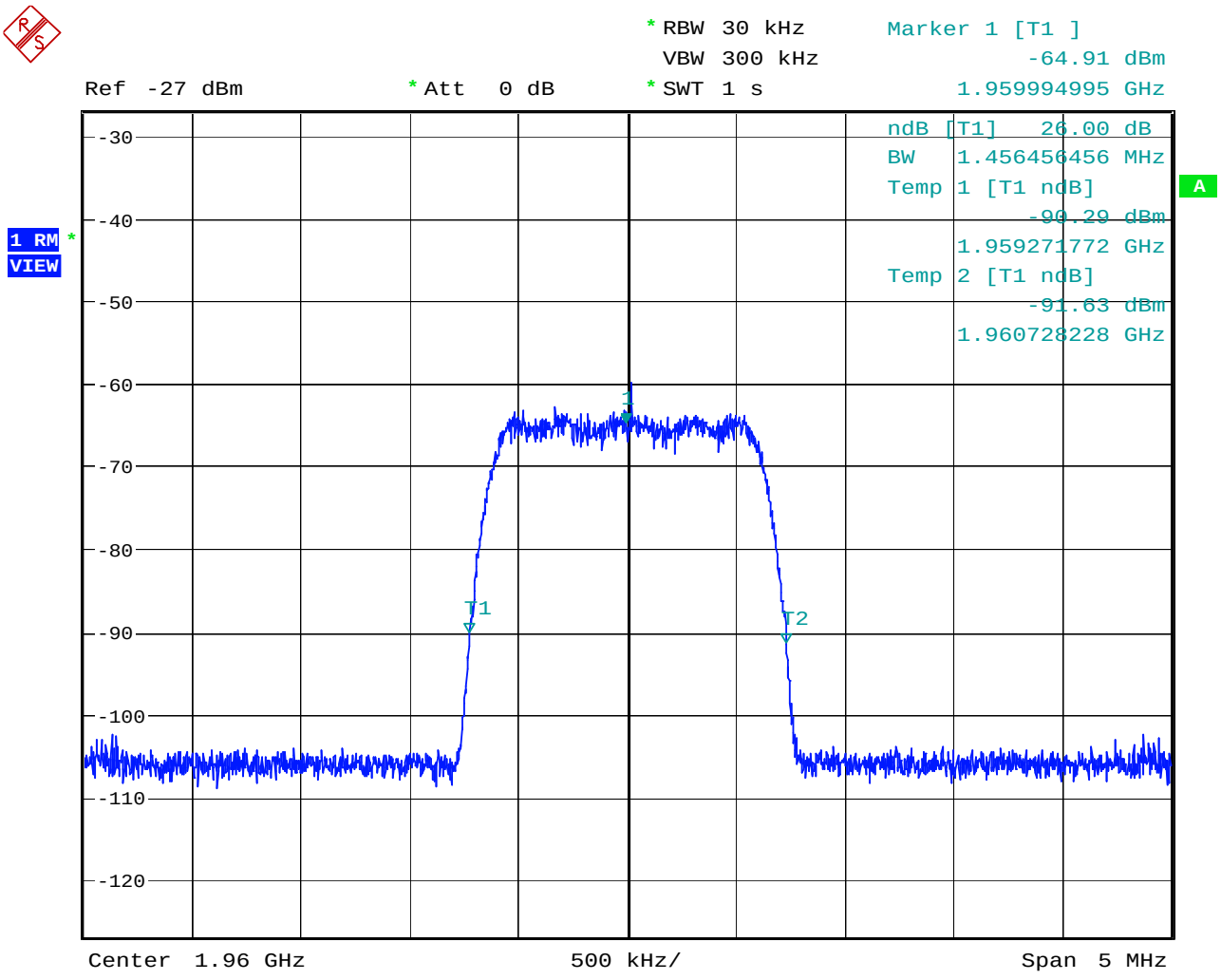
C.7. Sample Calculation

None.

C.8. Test Data

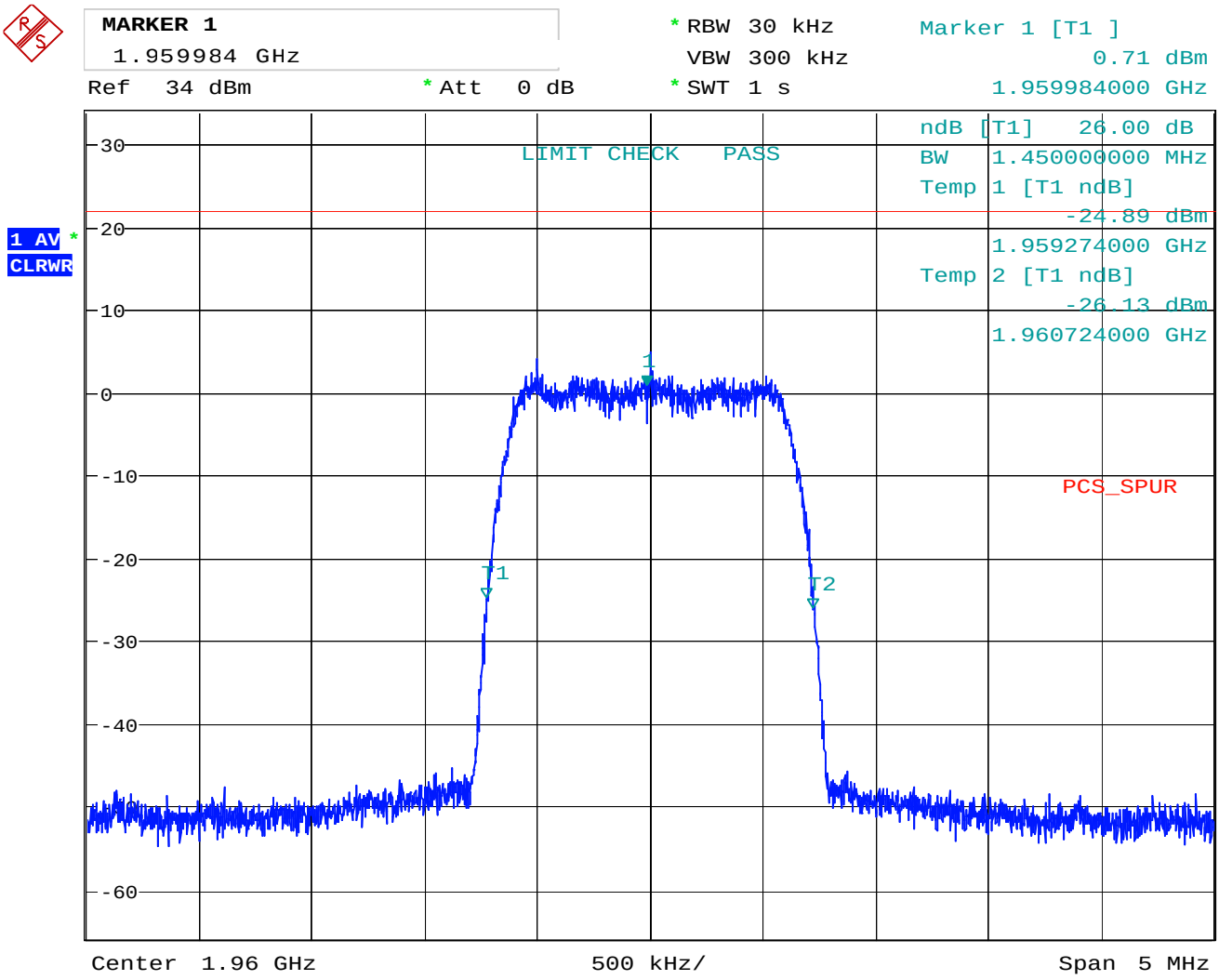
See plots following.

Figure 1 IS-95 CDMA Downlink Channel 600 (1960.0 MHz) - Input



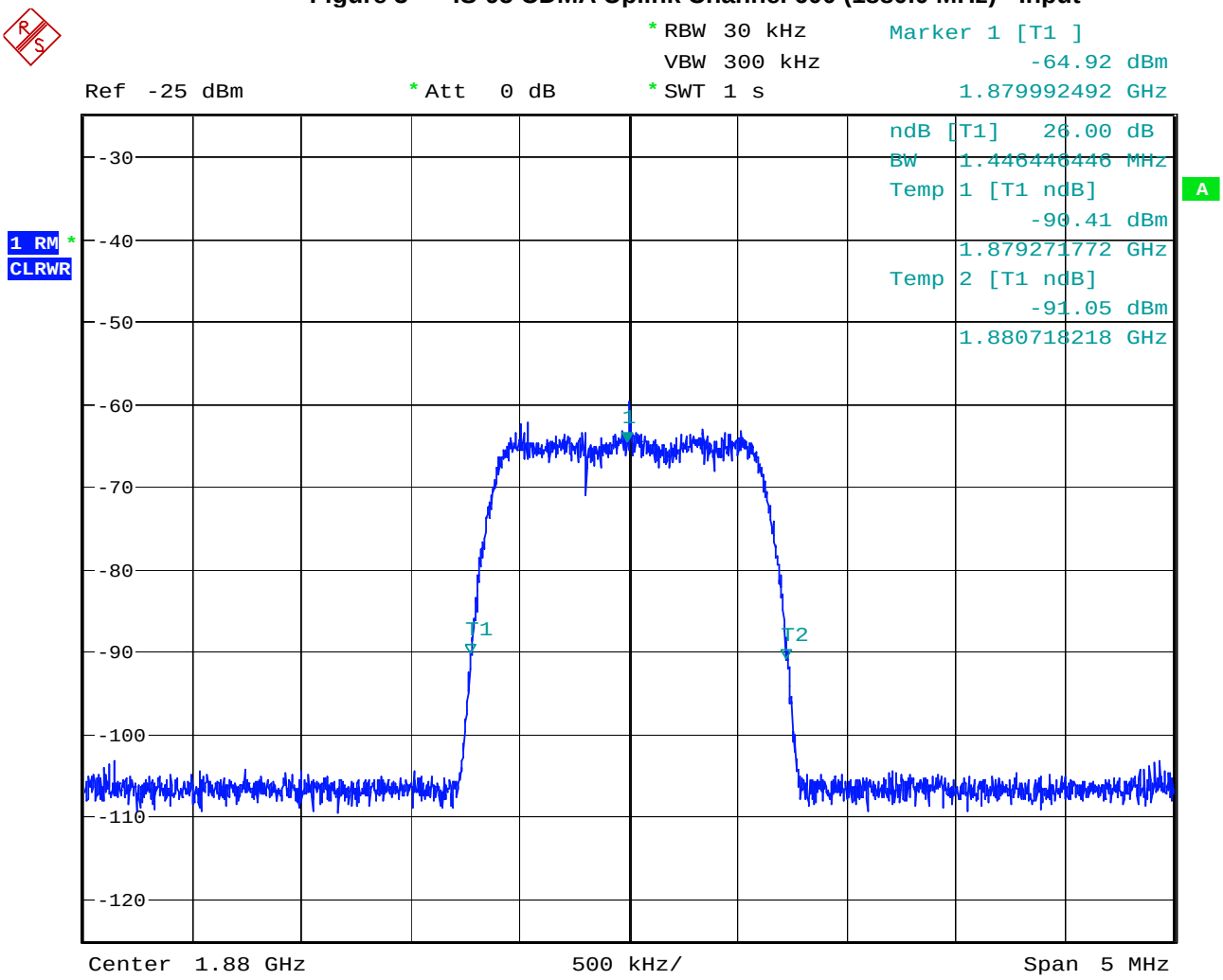
Date: 10.JUL.2007 14:27:22

Figure 2 IS-95 CDMA Downlink Channel 600 (1960.0 MHz) - Output



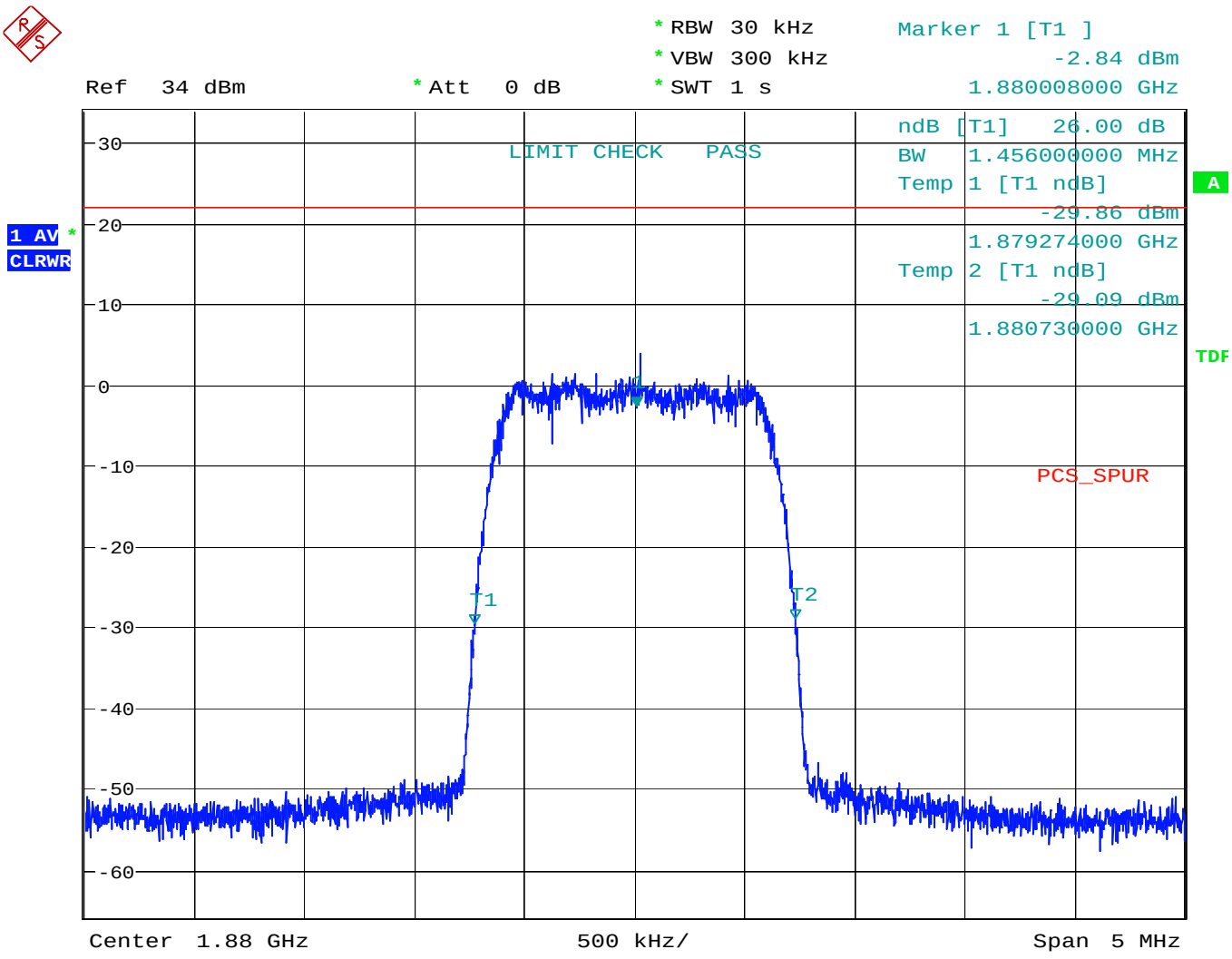
Date: 17.MAY.2007 23:06:27

Figure 3 IS-95 CDMA Uplink Channel 600 (1880.0 MHz) - Input



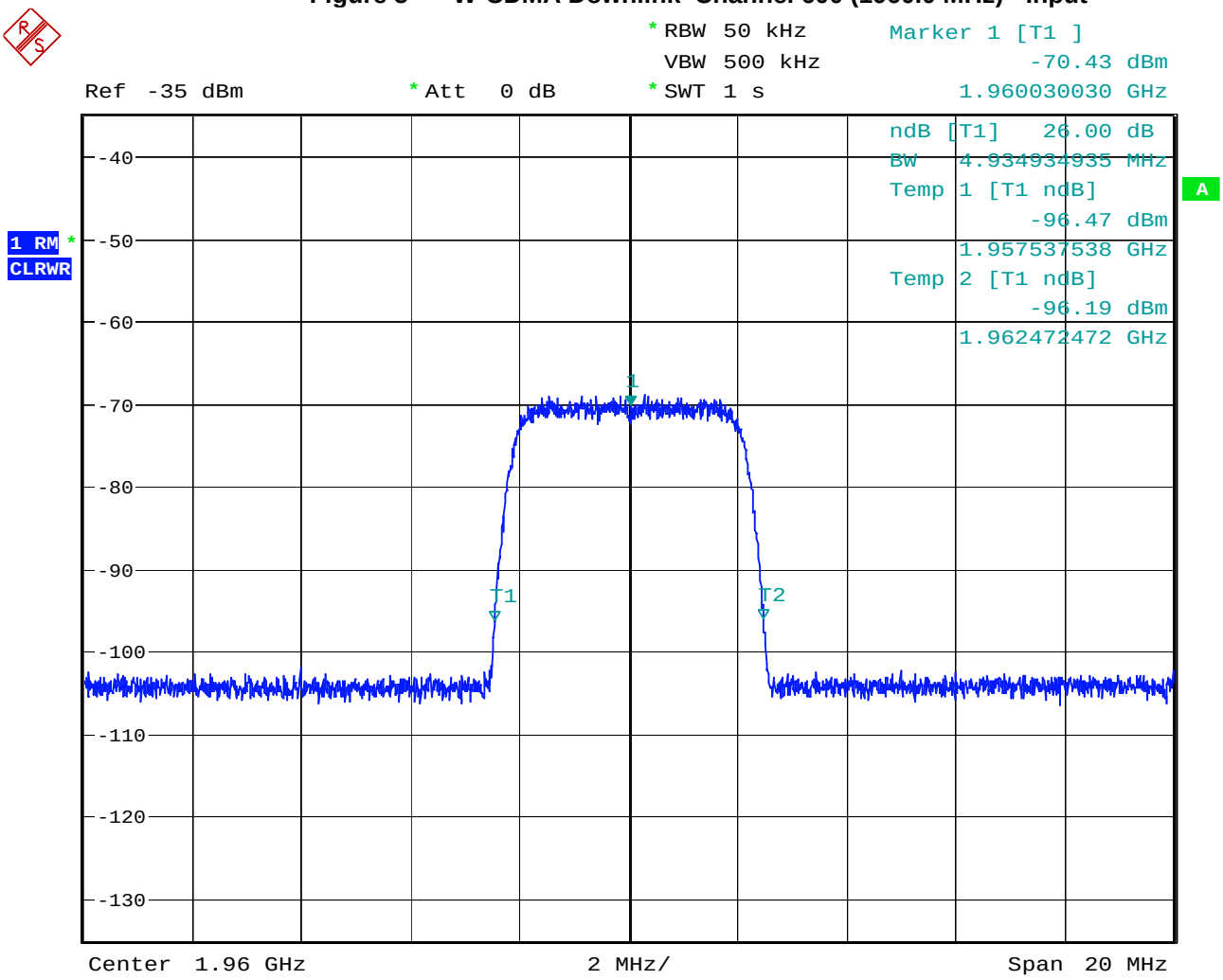
Date: 10.JUL.2007 14:33:35

Figure 4 IS-95 CDMA Uplink Channel 600 (1880.0 MHz) - Output



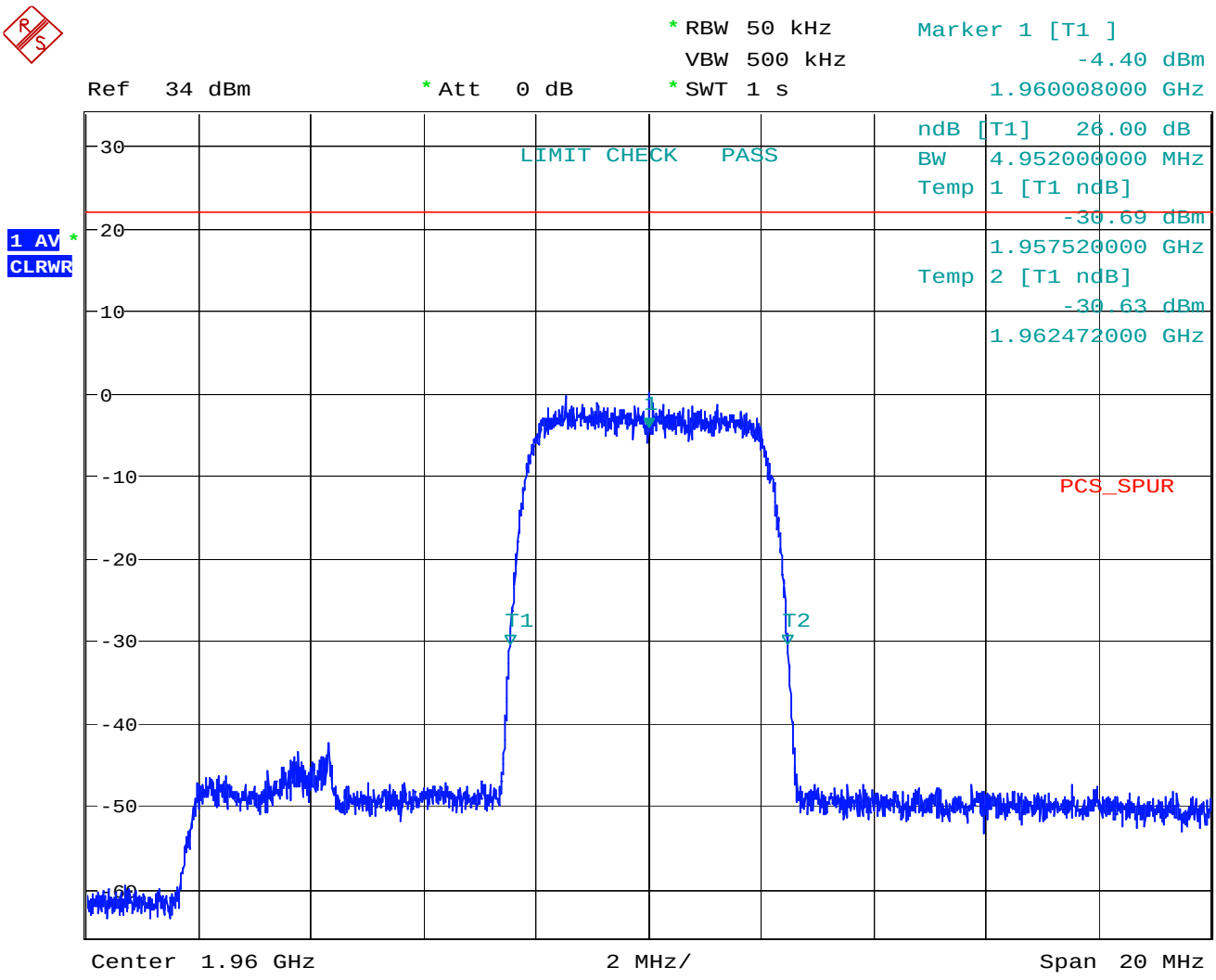
Date: 18.MAY.2007 17:54:28

Figure 5 W-CDMA Downlink Channel 600 (1960.0 MHz) - Input



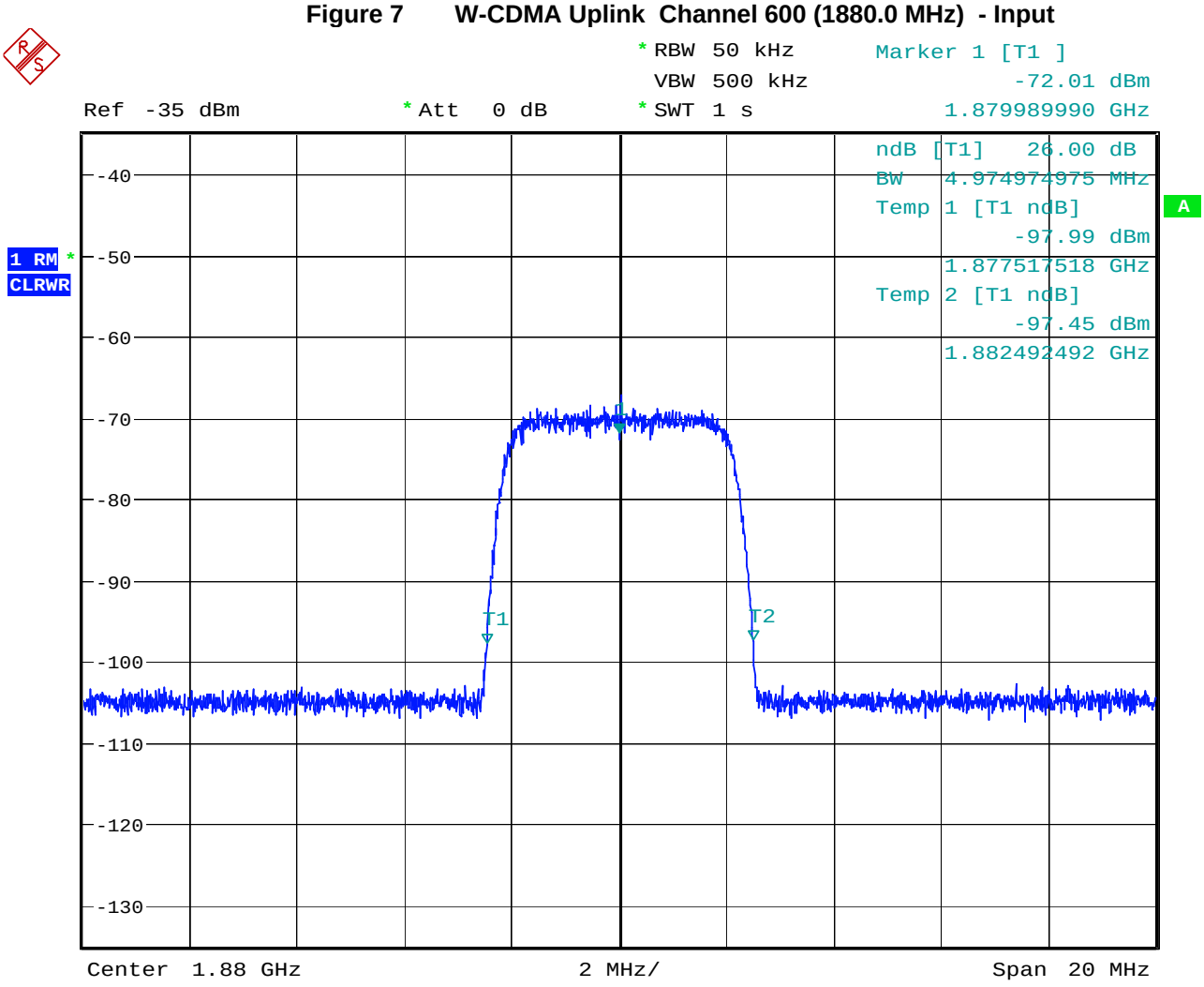
Date: 10.JUL.2007 14:39:17

Figure 6 W-CDMA Downlink Channel 600 (1960.0 MHz) - Output



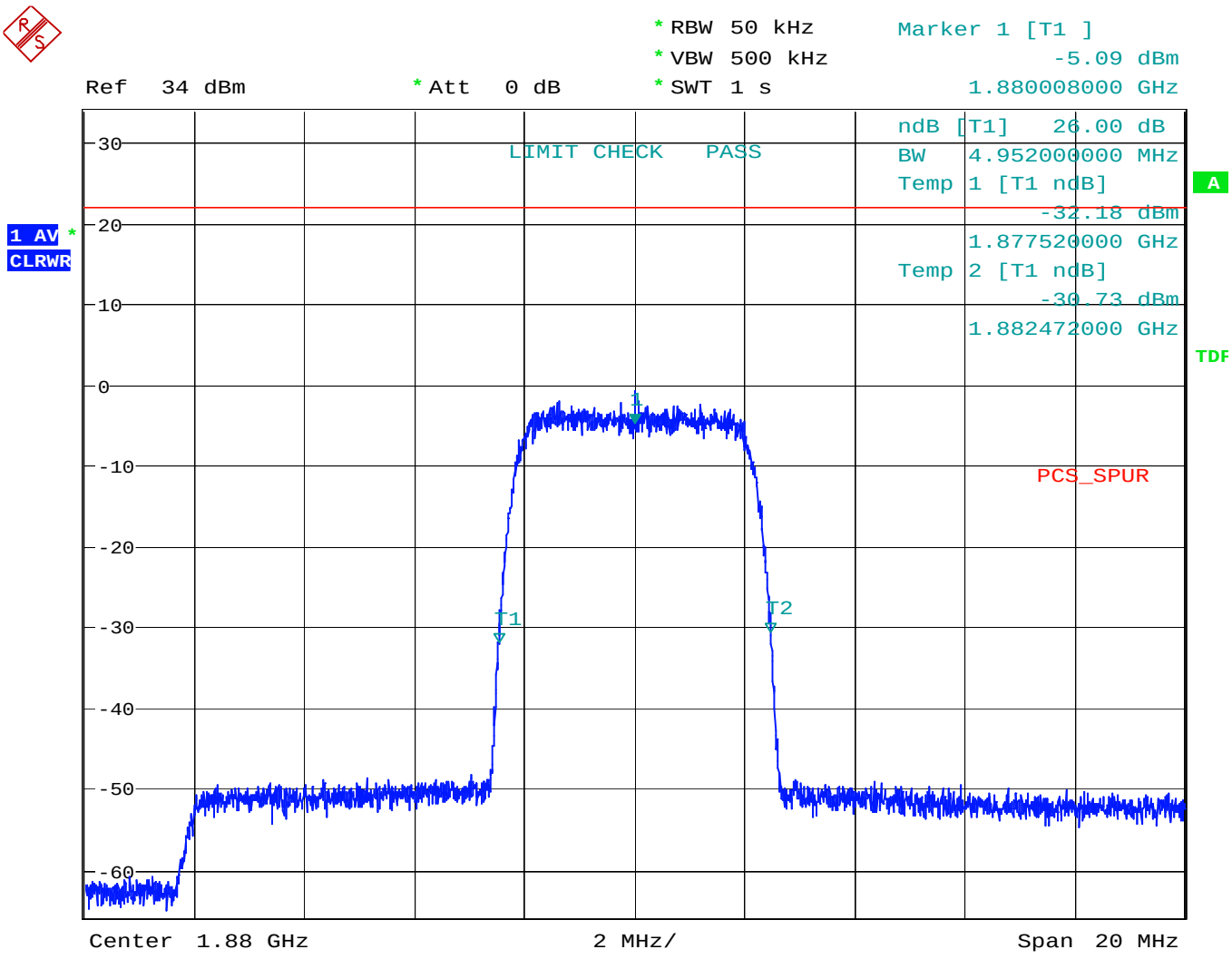
Date: 17.MAY.2007 23:31:02

Figure 7 W-CDMA Uplink Channel 600 (1880.0 MHz) - Input



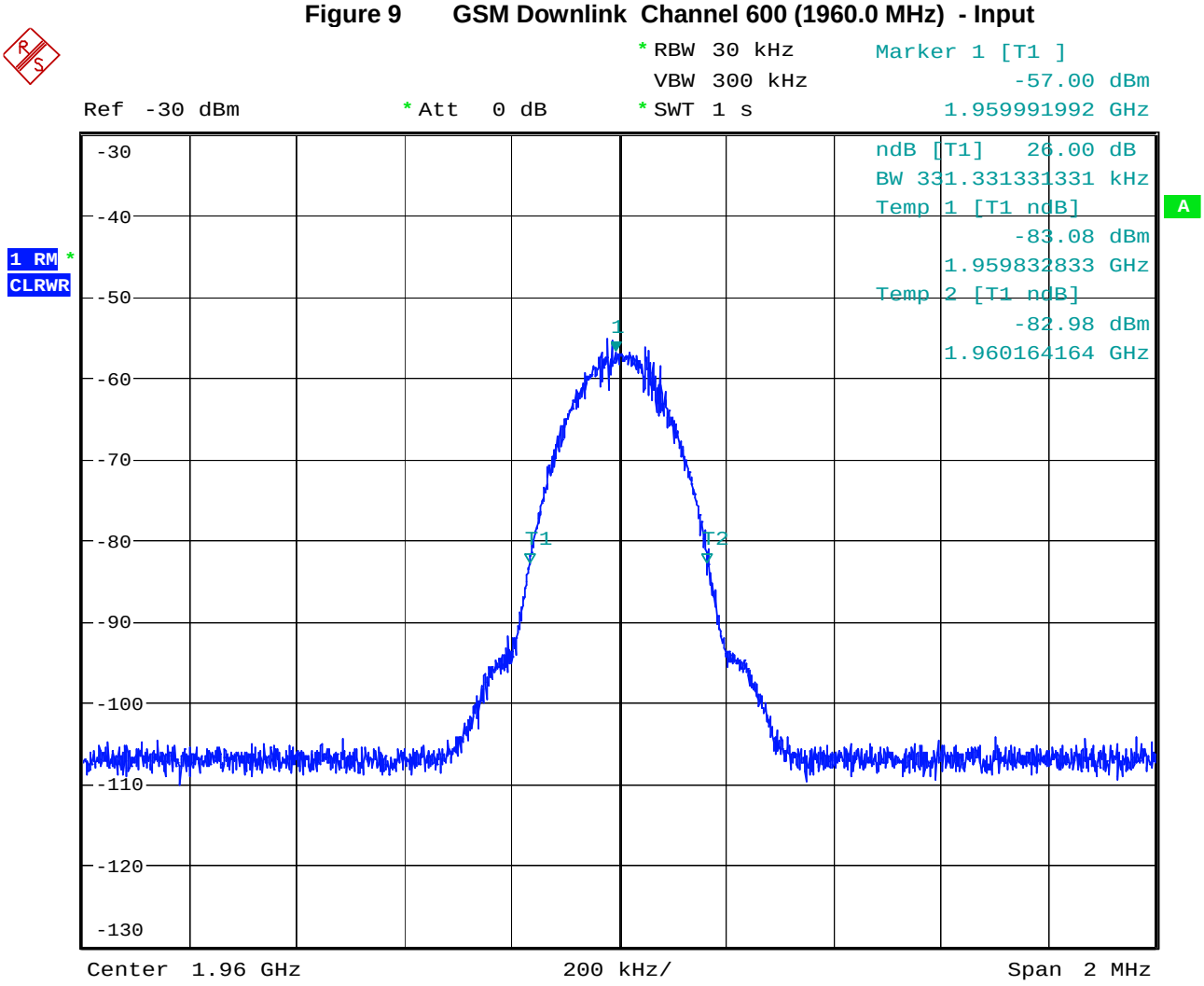
Date: 10.JUL.2007 14:41:07

Figure 8 W-CDMA Uplink Channel 600 (1880.0 MHz) - Output



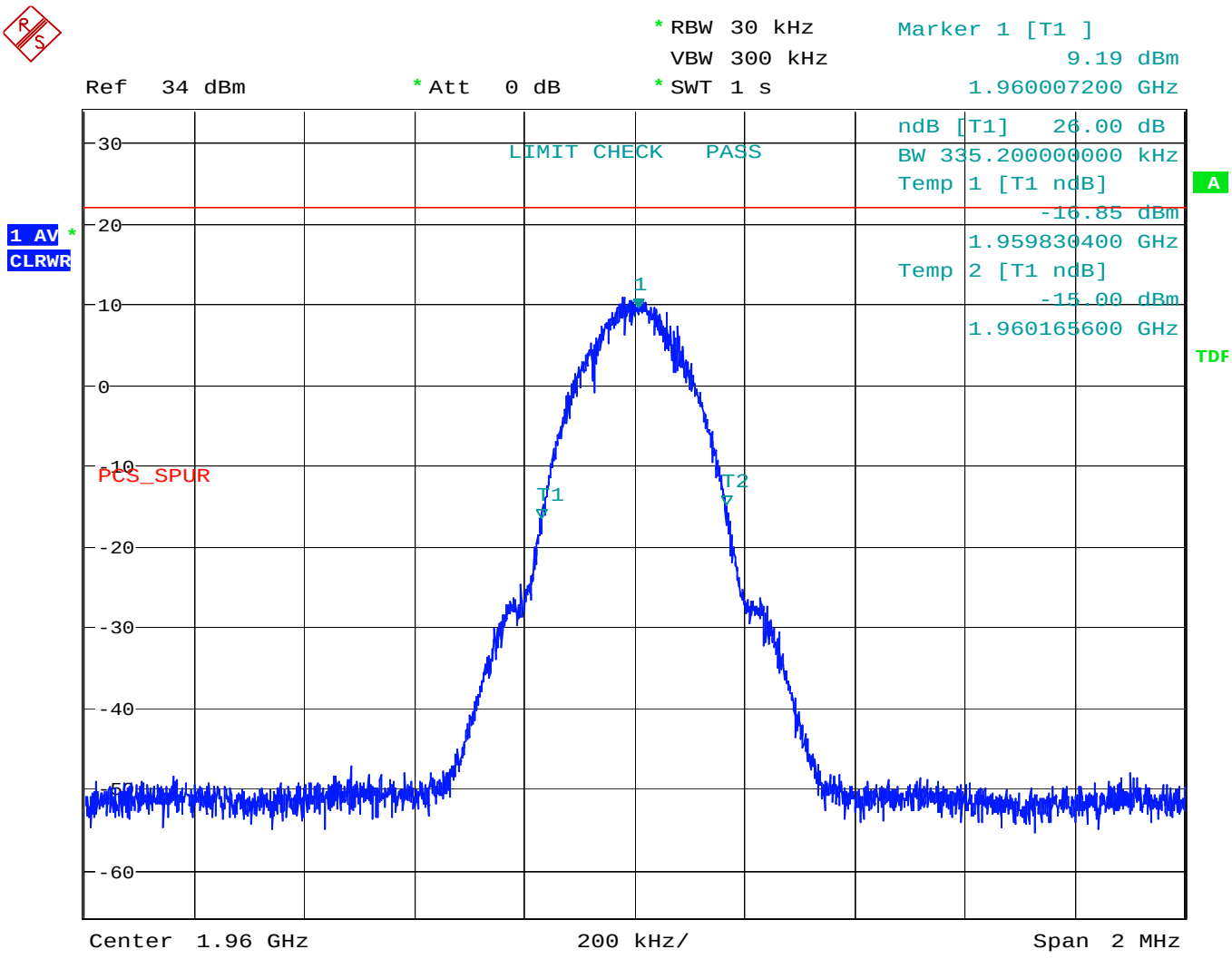
Date: 18.MAY.2007 17:51:28

Figure 9 GSM Downlink Channel 600 (1960.0 MHz) - Input



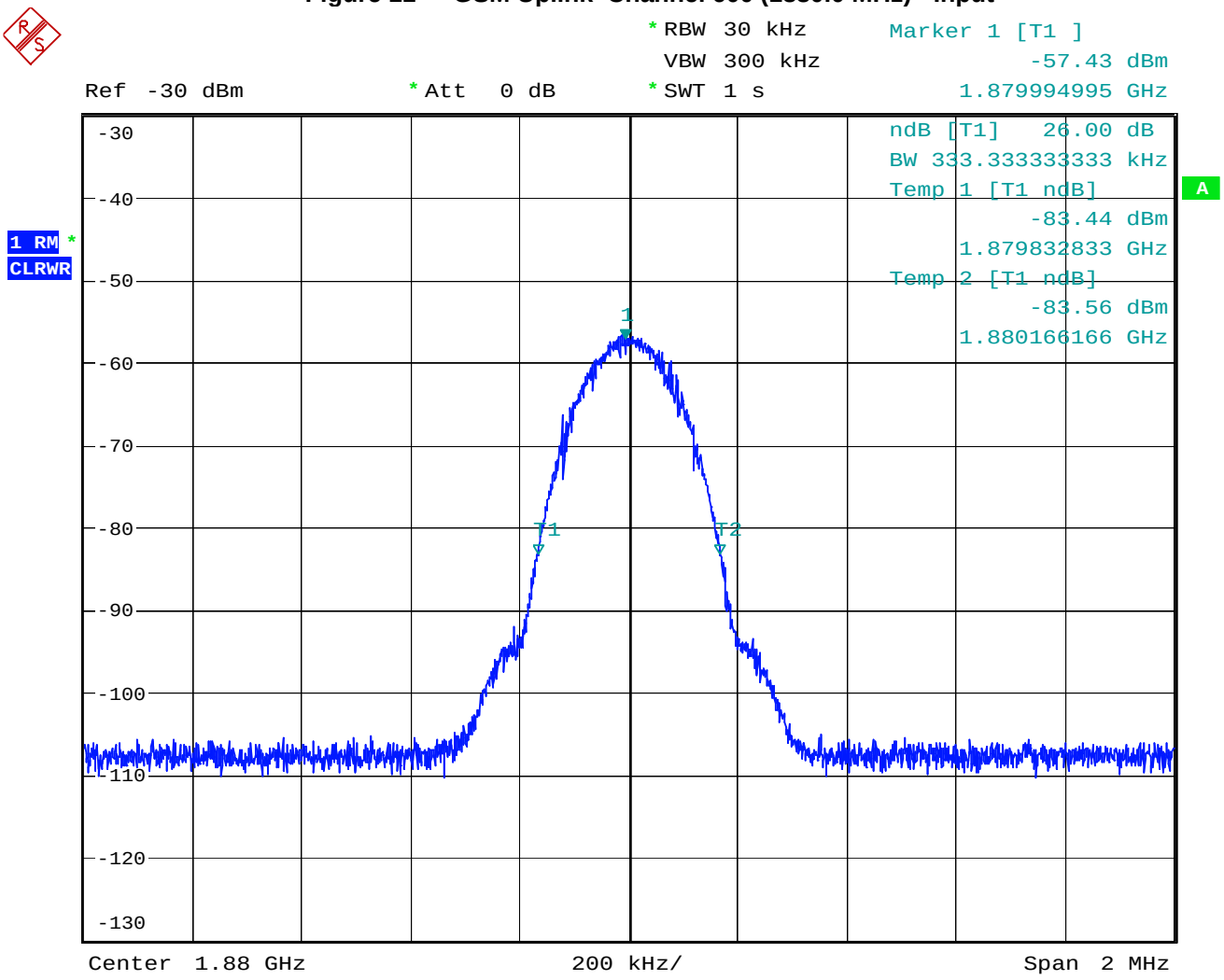
Date: 10.JUL.2007 14:43:12

Figure 10 GSM Downlink Channel 600 (1960.0 MHz) - Output



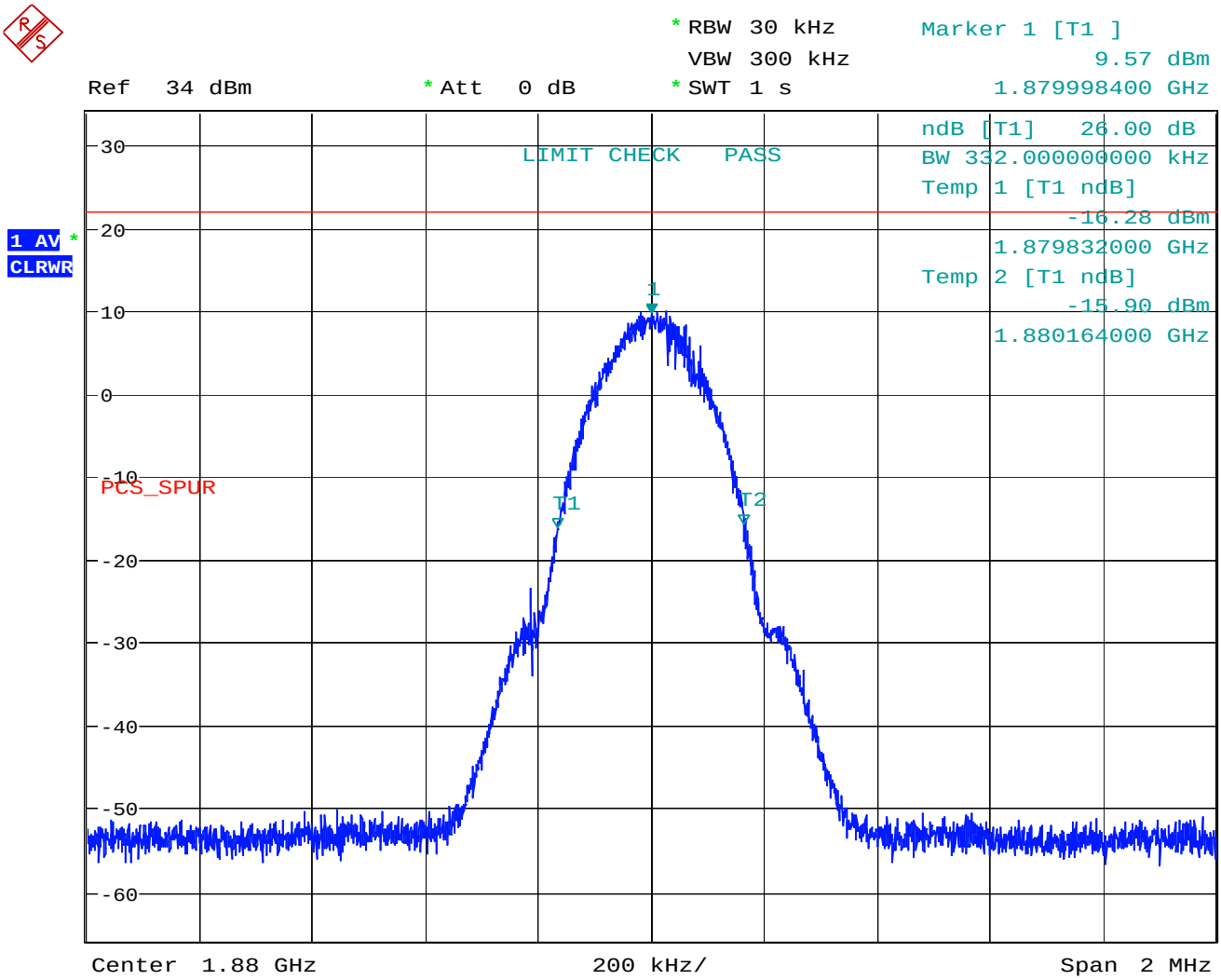
Date: 18.MAY.2007 16:13:11

Figure 11 GSM Uplink Channel 600 (1880.0 MHz) - Input



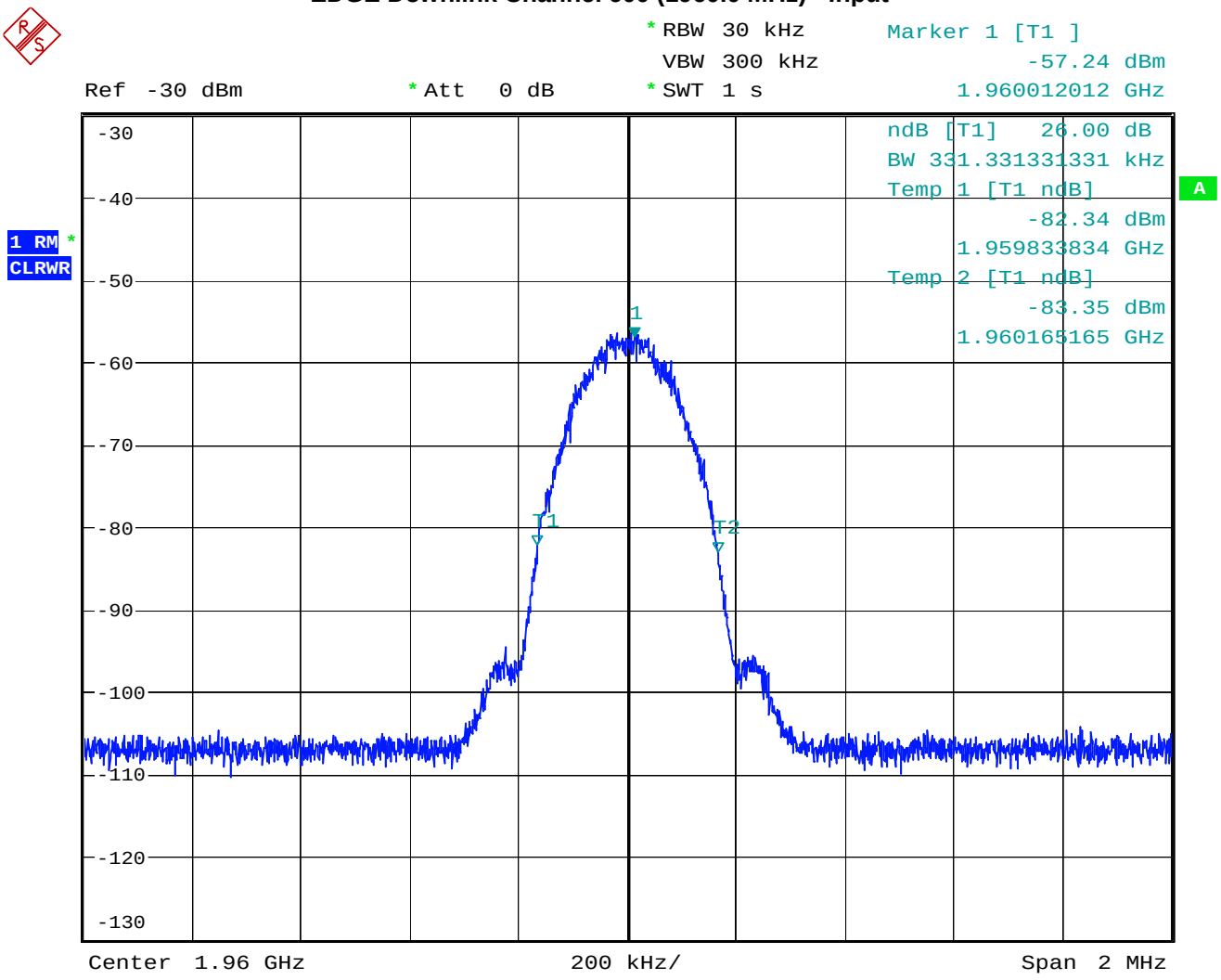
Date: 10.JUL.2007 14:47:21

Figure 12 GSM Uplink Channel 600 (1880.0 MHz) - Output



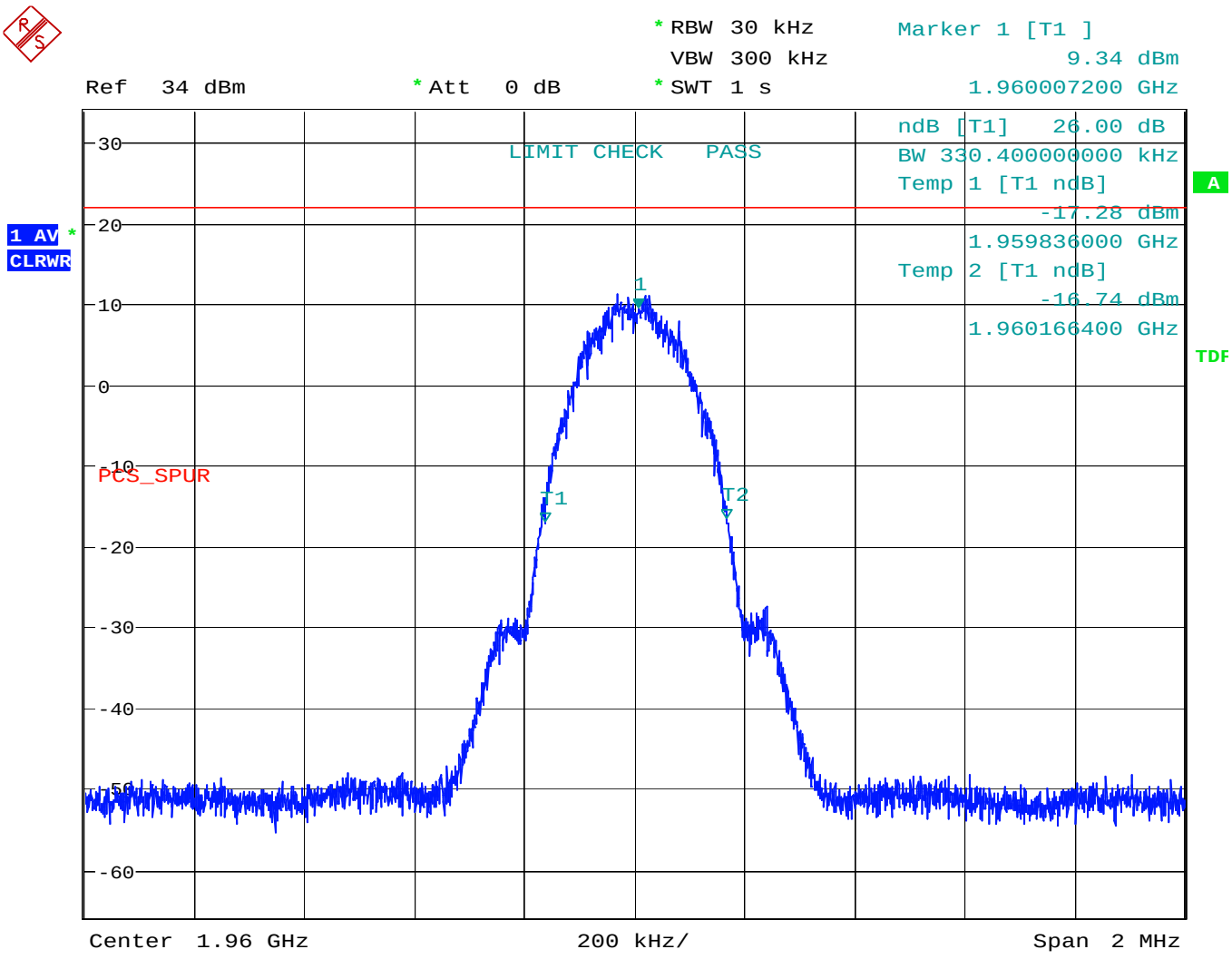
Date: 18.MAY.2007 17:14:07

EDGE Downlink Channel 600 (1960.0 MHz) - Input



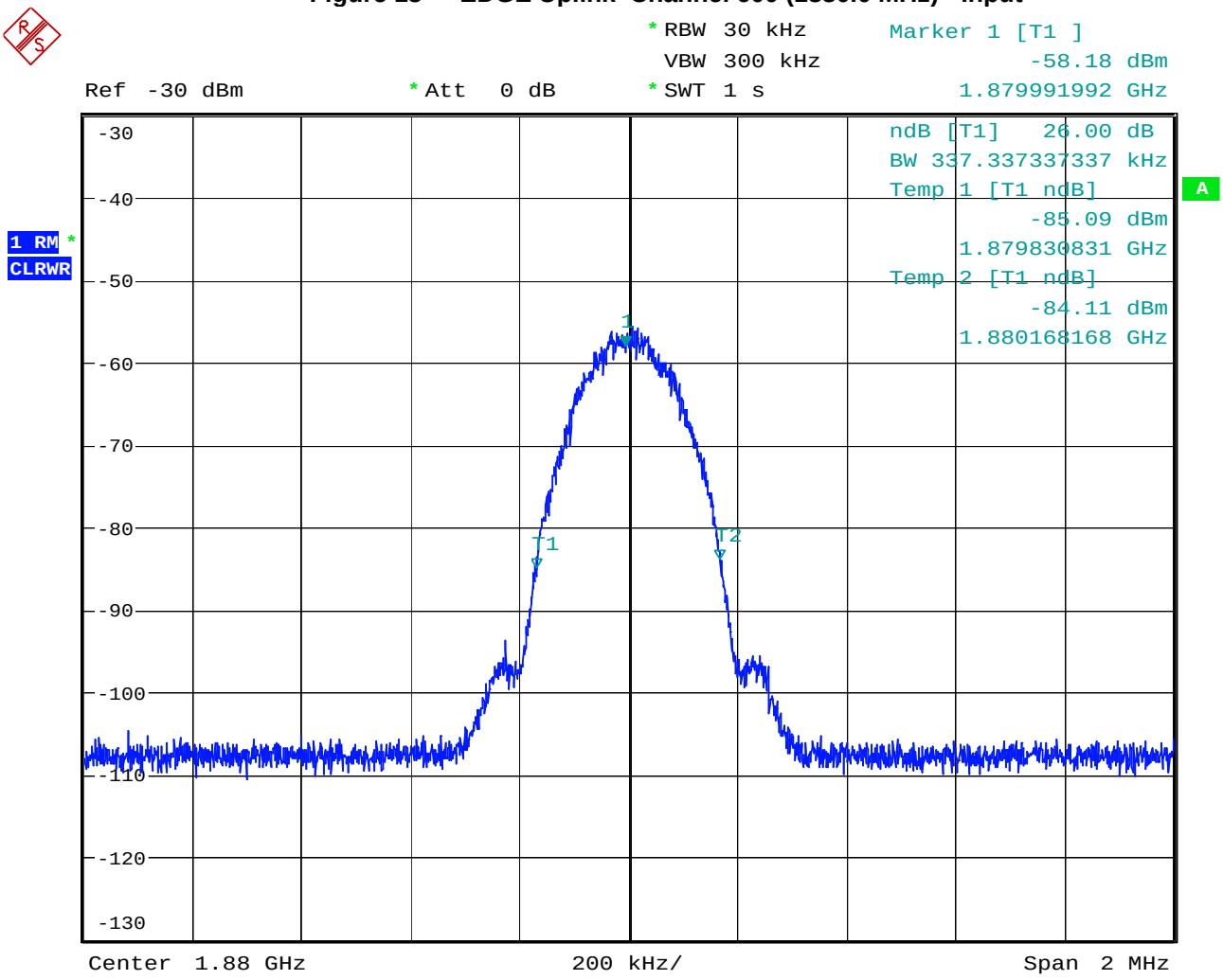
Date: 10.JUL.2007 14:49:06

EDGE Downlink Channel 600 (1960.0 MHz) - Output



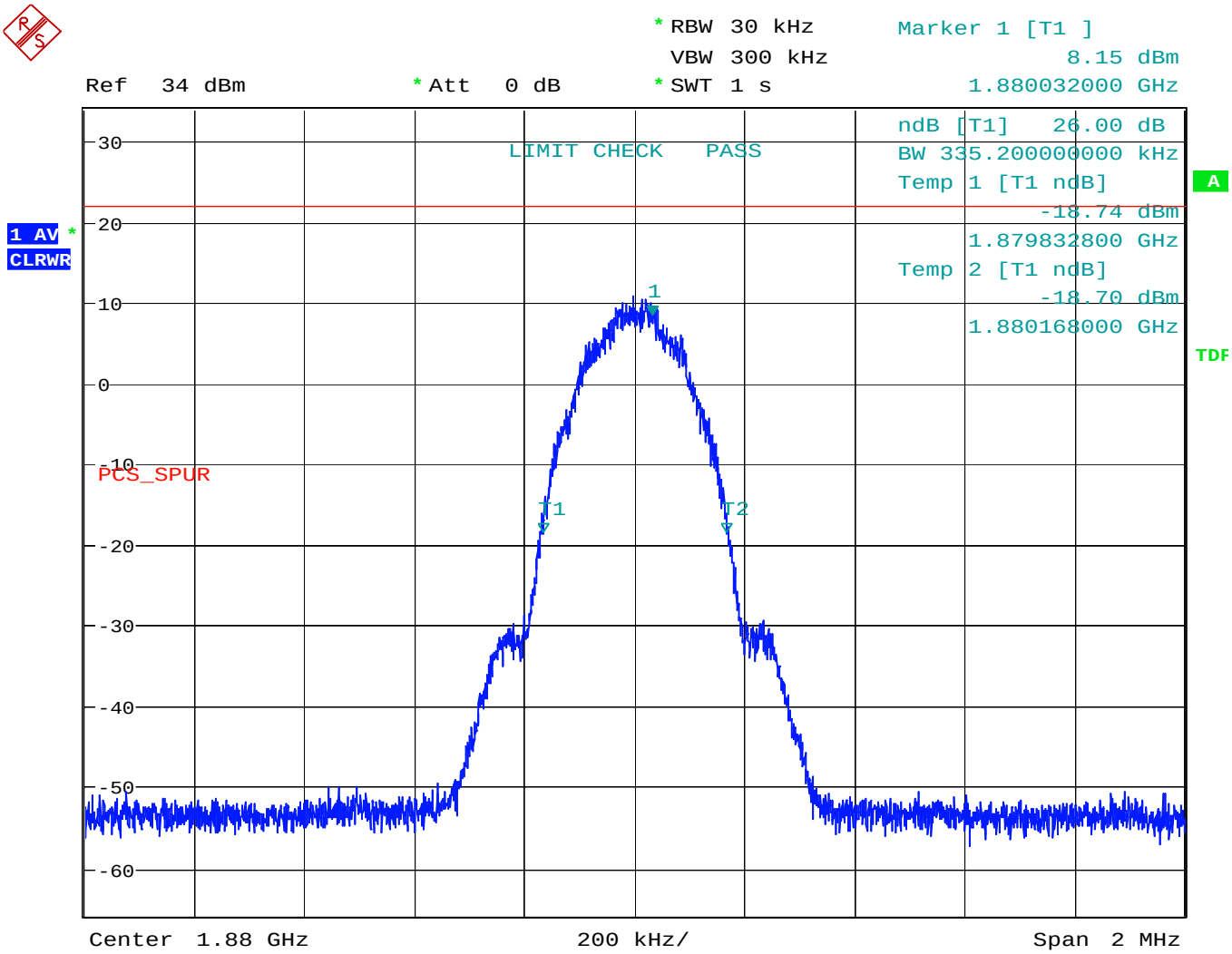
Date: 18.MAY.2007 16:25:39

Figure 13 EDGE Uplink Channel 600 (1880.0 MHz) - Input



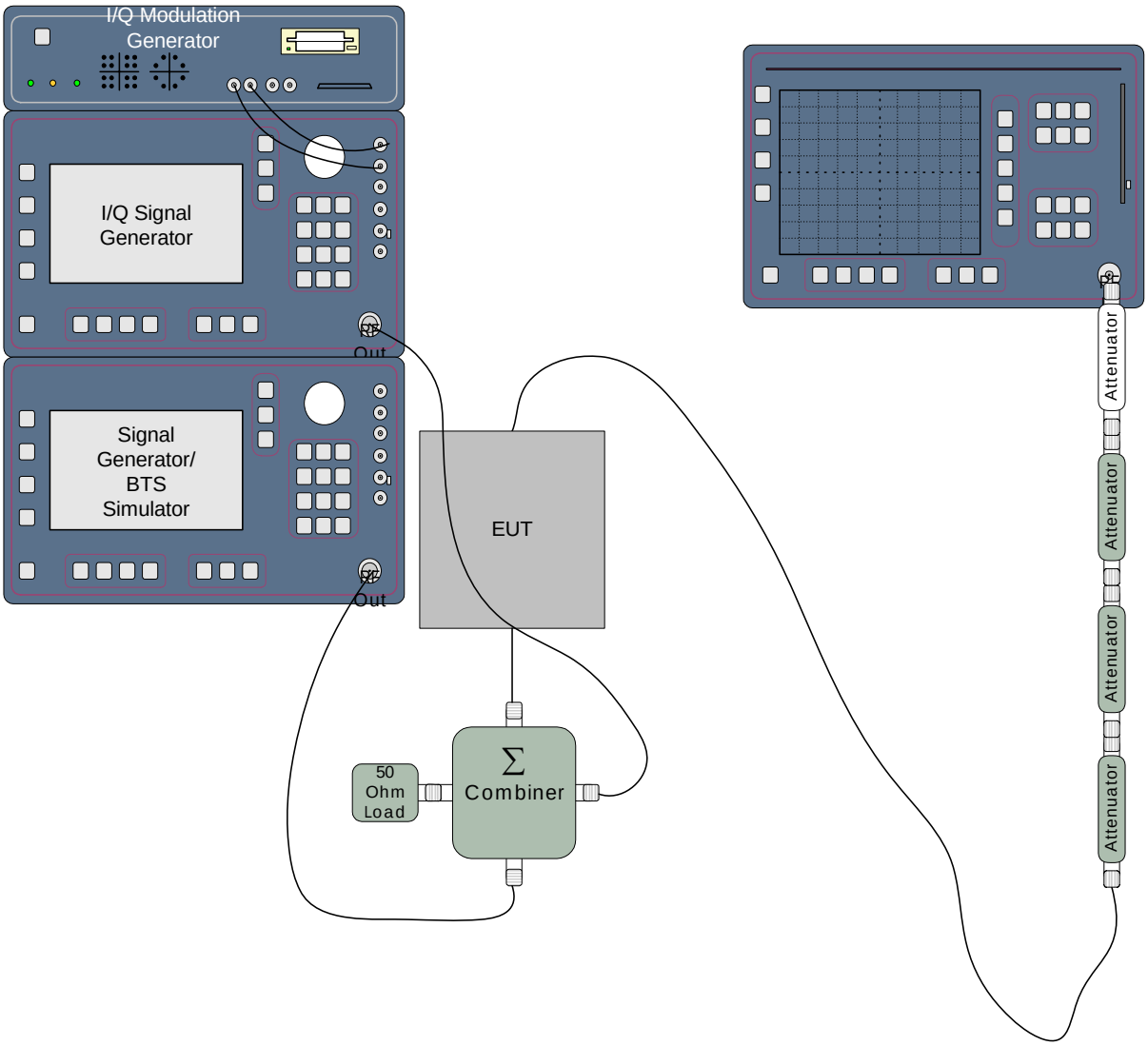
Date: 10.JUL.2007 14:50:27

Figure 14 EDGE Uplink Channel 600 (1880.0 MHz) - Output



Date: 18.MAY.2007 16:56:52

C.9. Test Diagram



C.10. Tested By

Name: Tom Tidwell,
Function: Manager of Wireless Services
Test Date: 17 May, 2007

APPENDIX D: 2.1051 SPURIOUS EMISSIONS AT ANTENNA TERMINALS

D.1. Base Standard & Test Basis

Base Standard	FCC 2.1051
Test Basis	FCC 2.1051 Spurious Emissions at Antenna Terminals
Test Method	TIA 603-C, 2004

D.2. Specifications

24.238 Emission limitations for Broadband PCS equipment

(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.

D.3. Measurement Uncertainty

Expanded Uncertainty (K=2)
+1.11/-1.22

D.4. Deviations

Deviation Number	Time & Date	Description and Justification of Deviation	Deviation Reference			Approval
			Base Standard	Test Basis	NTS Procedure	
none						

D.5. Test Results

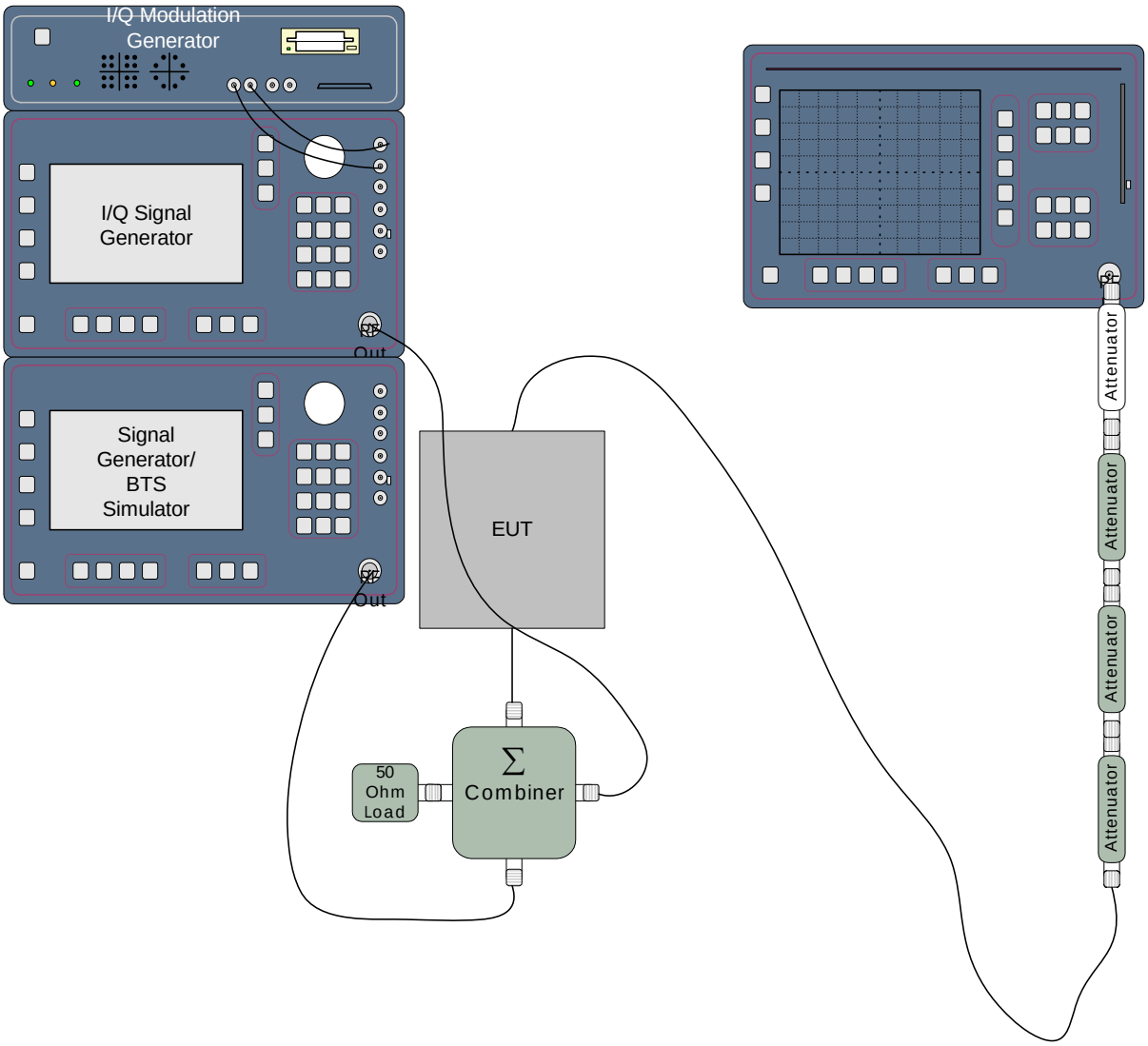
Complies. All emissions meet the out of band limits.

Out-of-Band Emissions limit is 43 + 10 log(P) which relates to -13 dBm absolute power.

Attenuation limit = 43 + 10 log(.05) = 30 dB

+17 dbm – 30 dB = -13 dBm

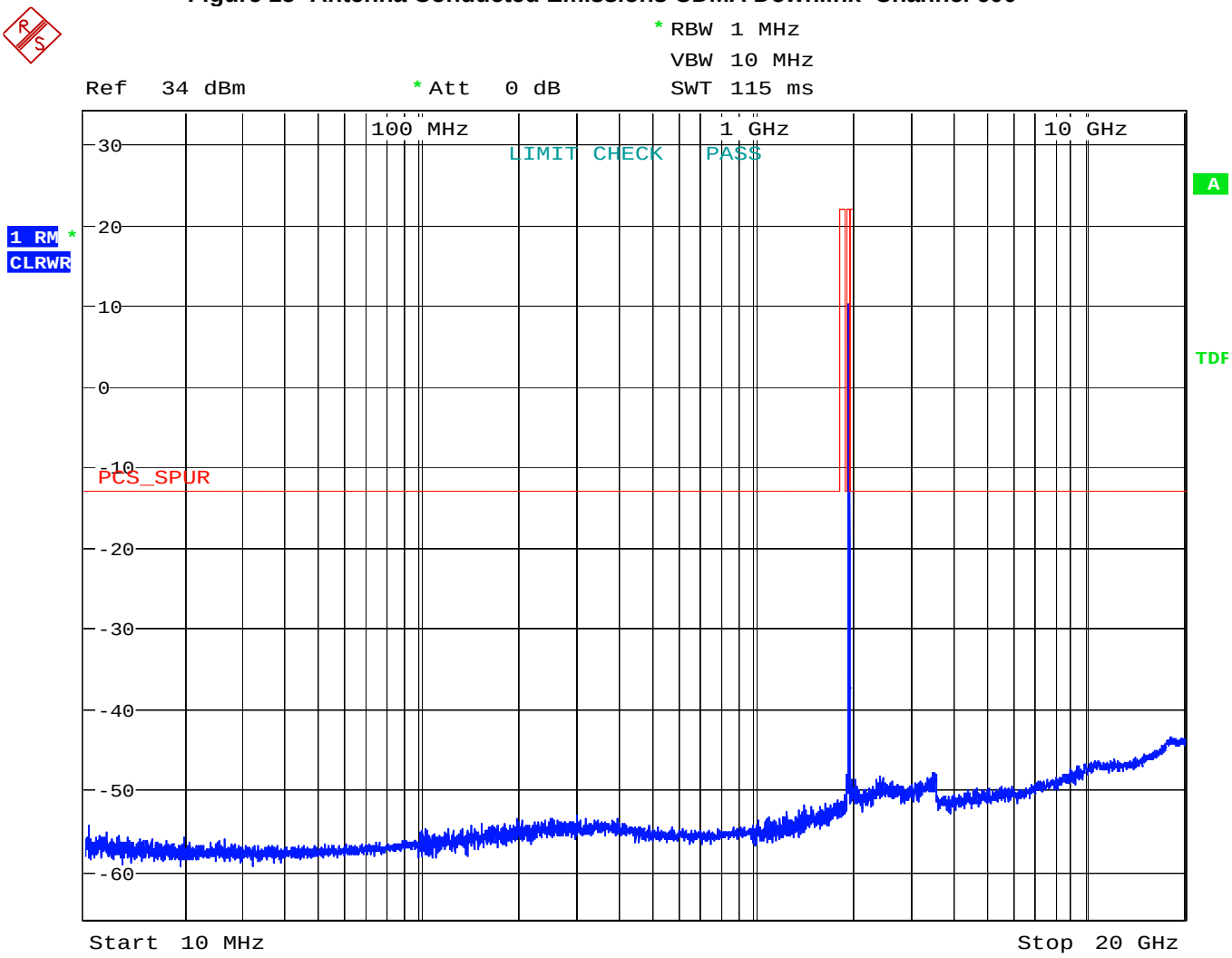
D.6. Test Diagram



D.7. Test Data

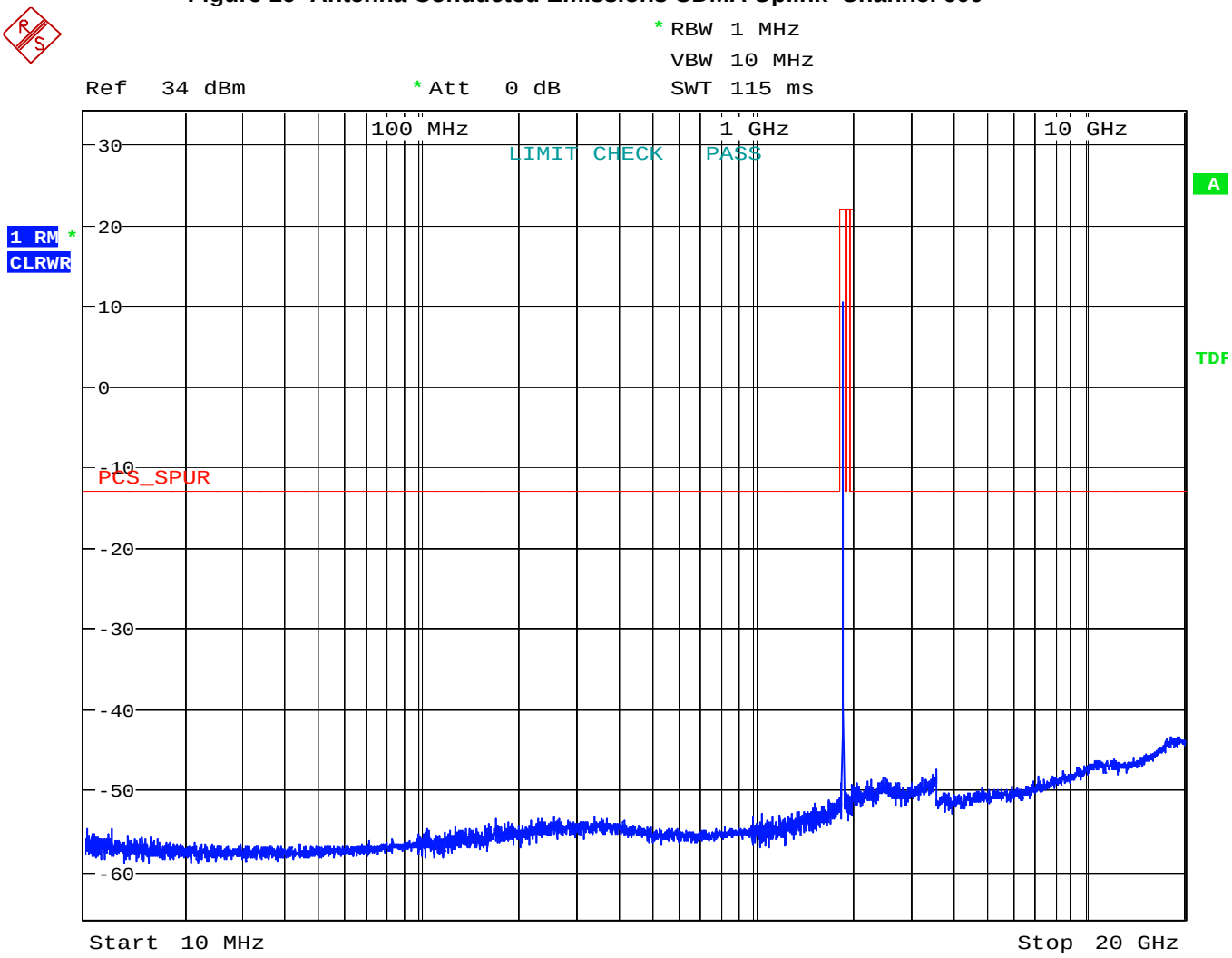
See following pages.

Figure 15 Antenna Conducted Emissions CDMA Downlink Channel 600



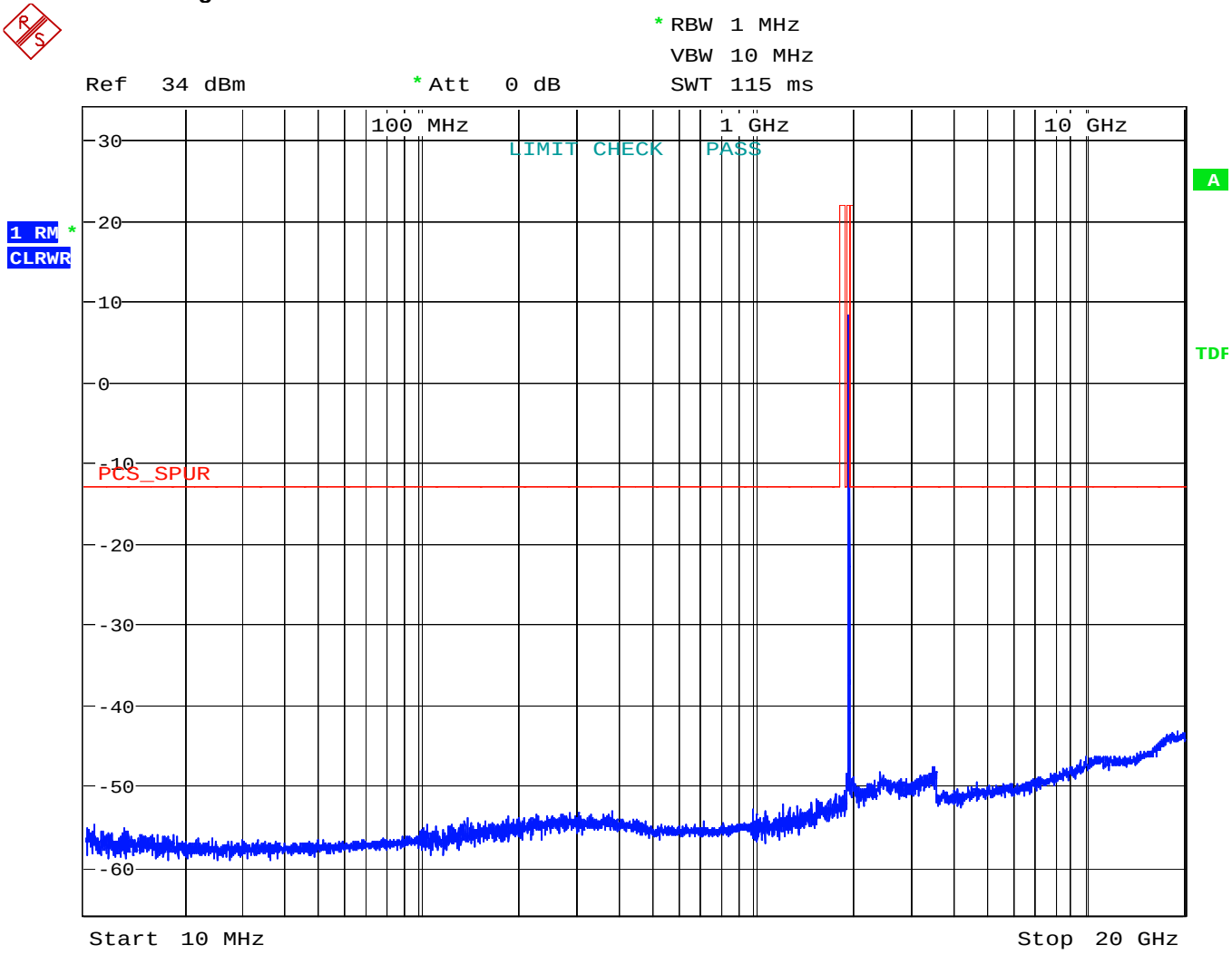
Date: 18.MAY.2007 20:03:35

Figure 16 Antenna Conducted Emissions CDMA Uplink Channel 600



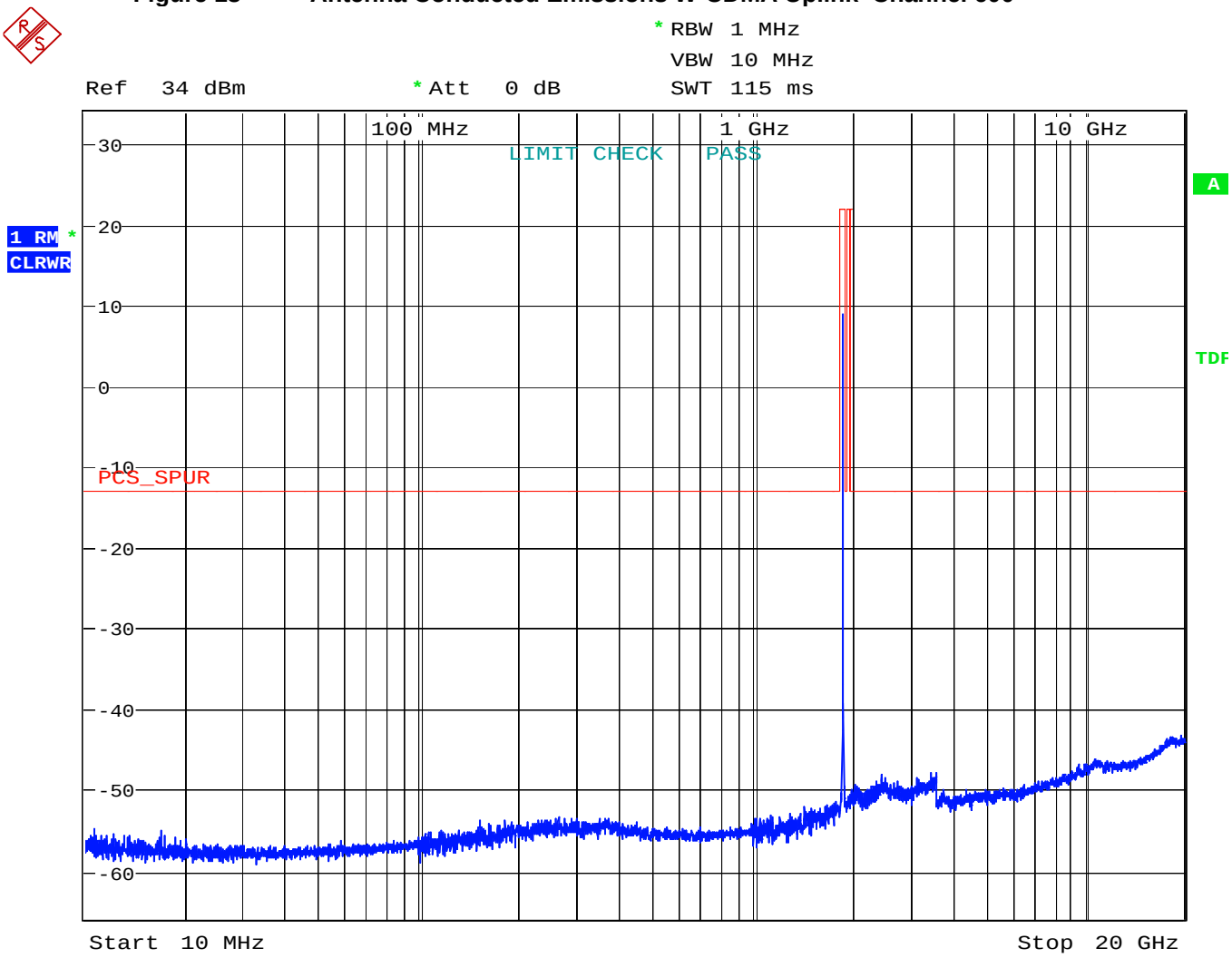
Date: 18.MAY.2007 20:30:04

Figure 17 Antenna Conducted Emissions W-CDMA Downlink Channel 600



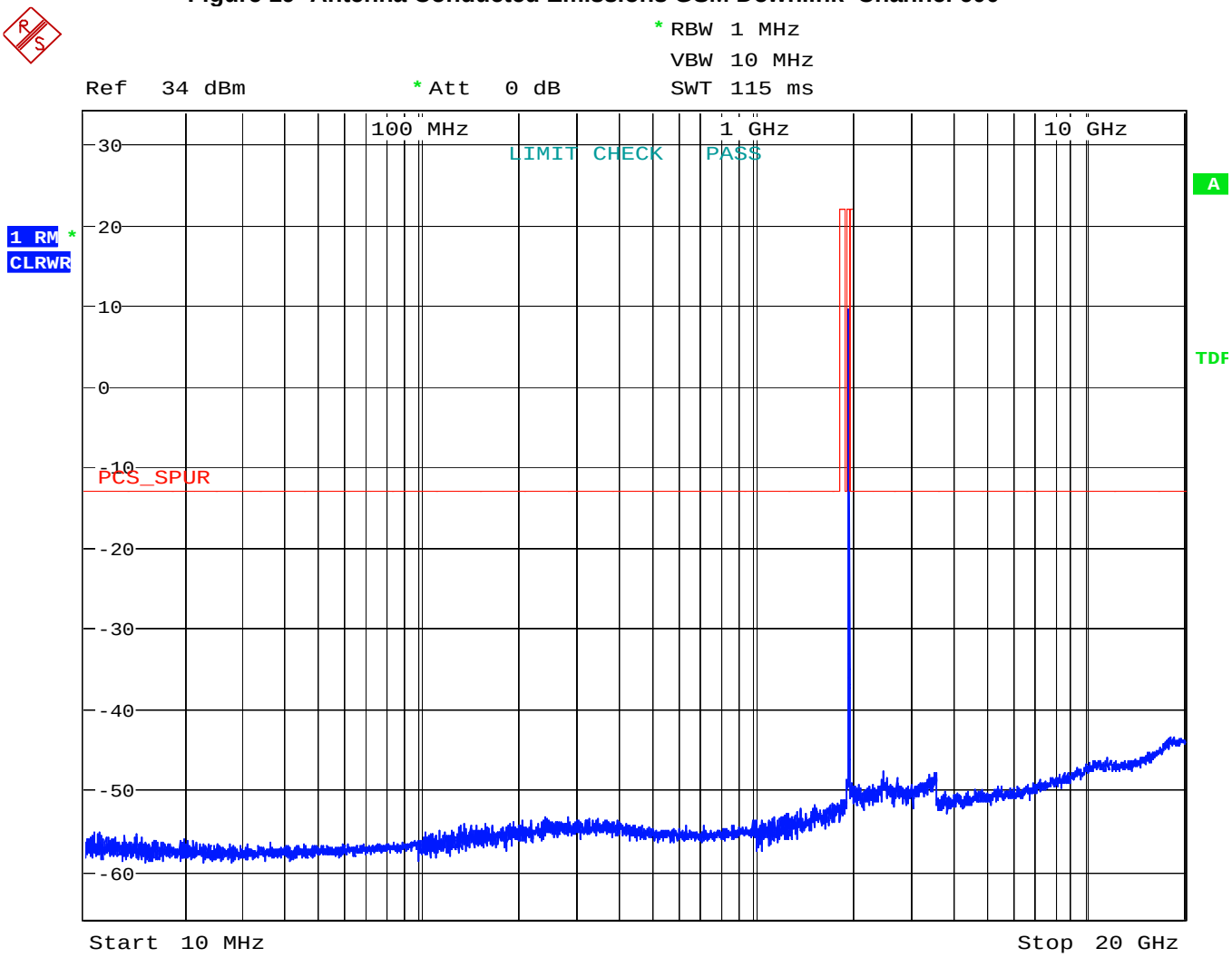
Date: 18.MAY.2007 20:16:21

Figure 18 Antenna Conducted Emissions W-CDMA Uplink Channel 600



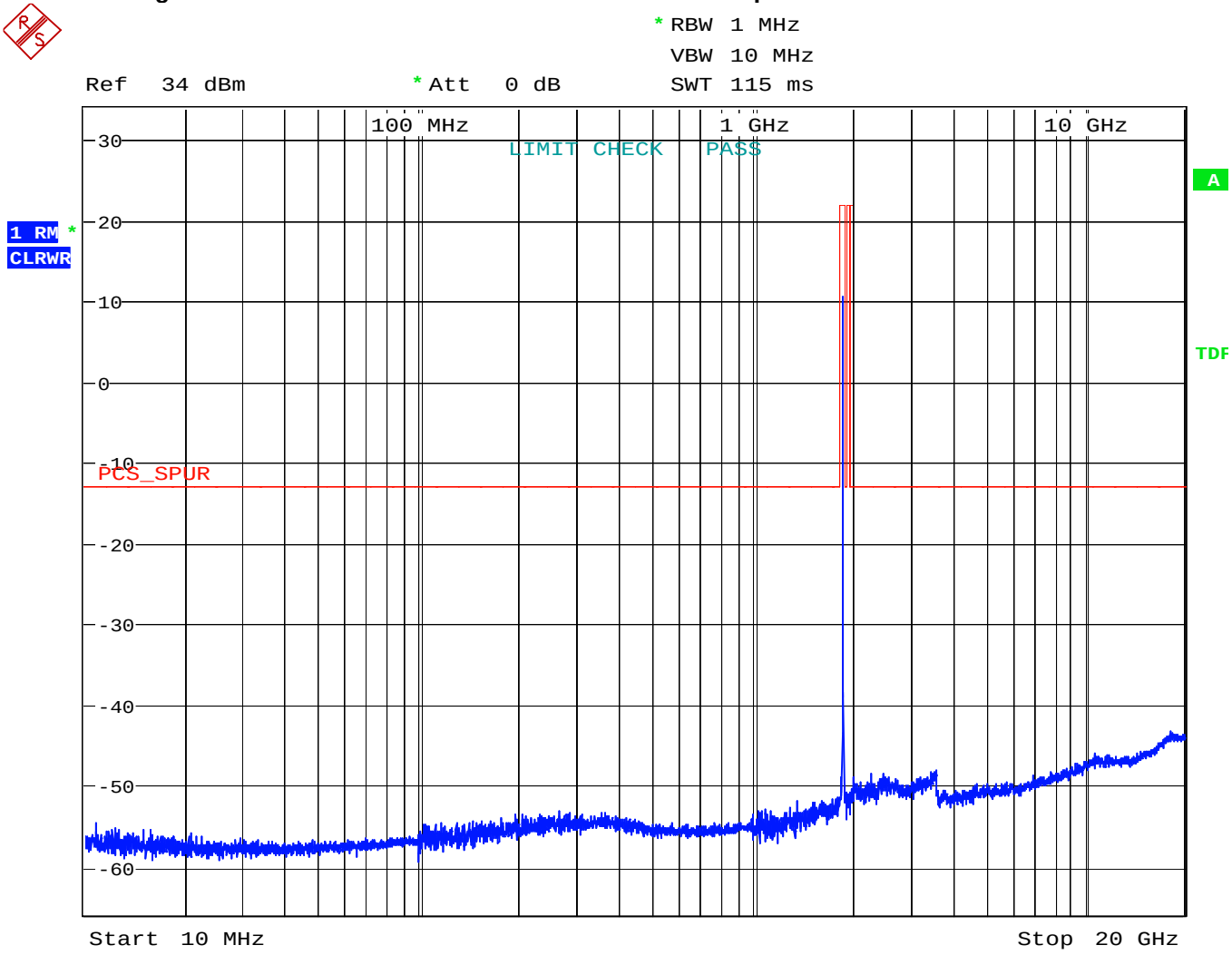
Date: 18.MAY.2007 20:34:24

Figure 19 Antenna Conducted Emissions GSM Downlink Channel 600



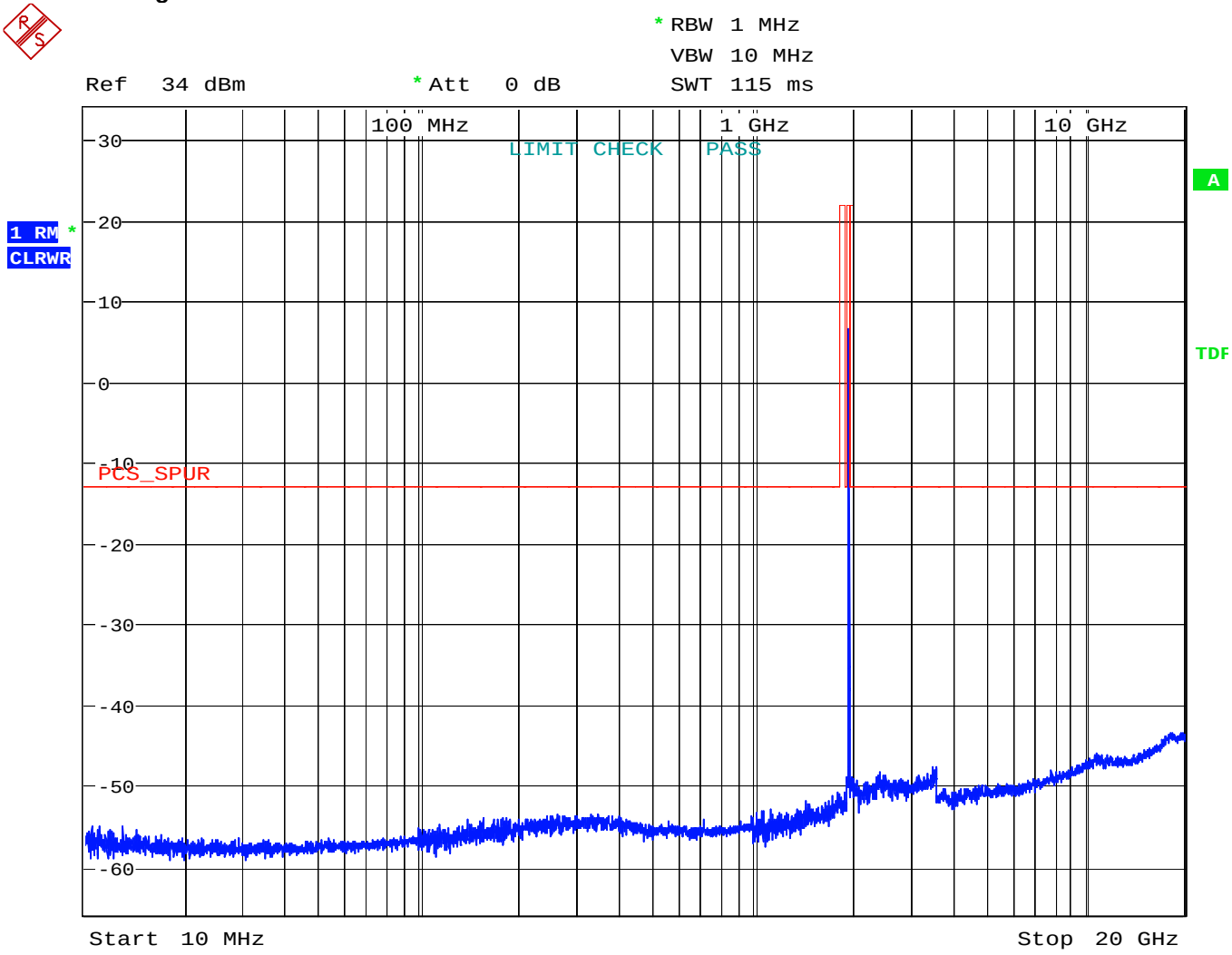
Date: 18.MAY.2007 20:16:44

Figure 20 Antenna Conducted Emissions GSM Uplink Channel 600



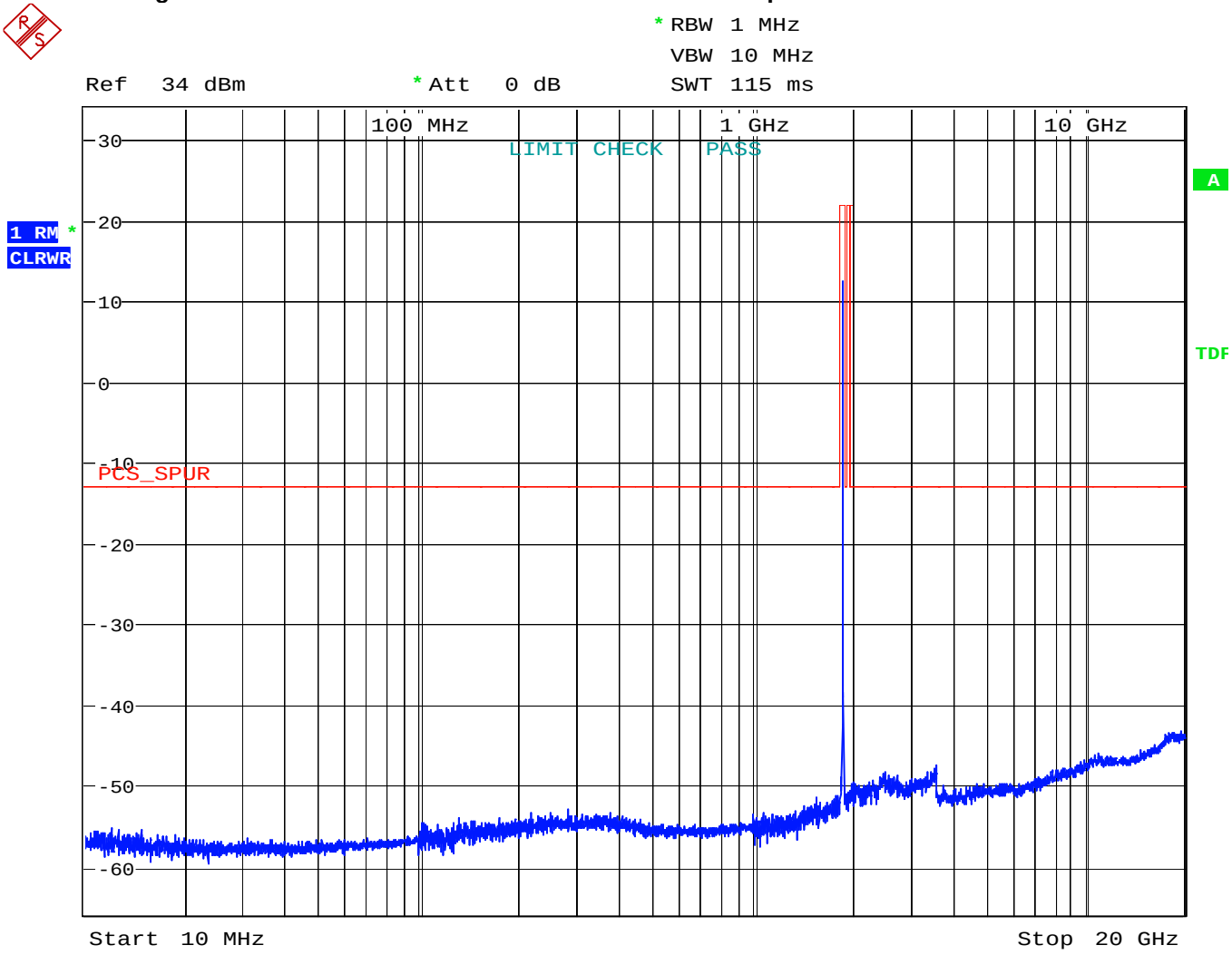
Date: 18.MAY.2007 20:35:13

Figure 21 Antenna Conducted Emissions EDGE Downlink Channel 600



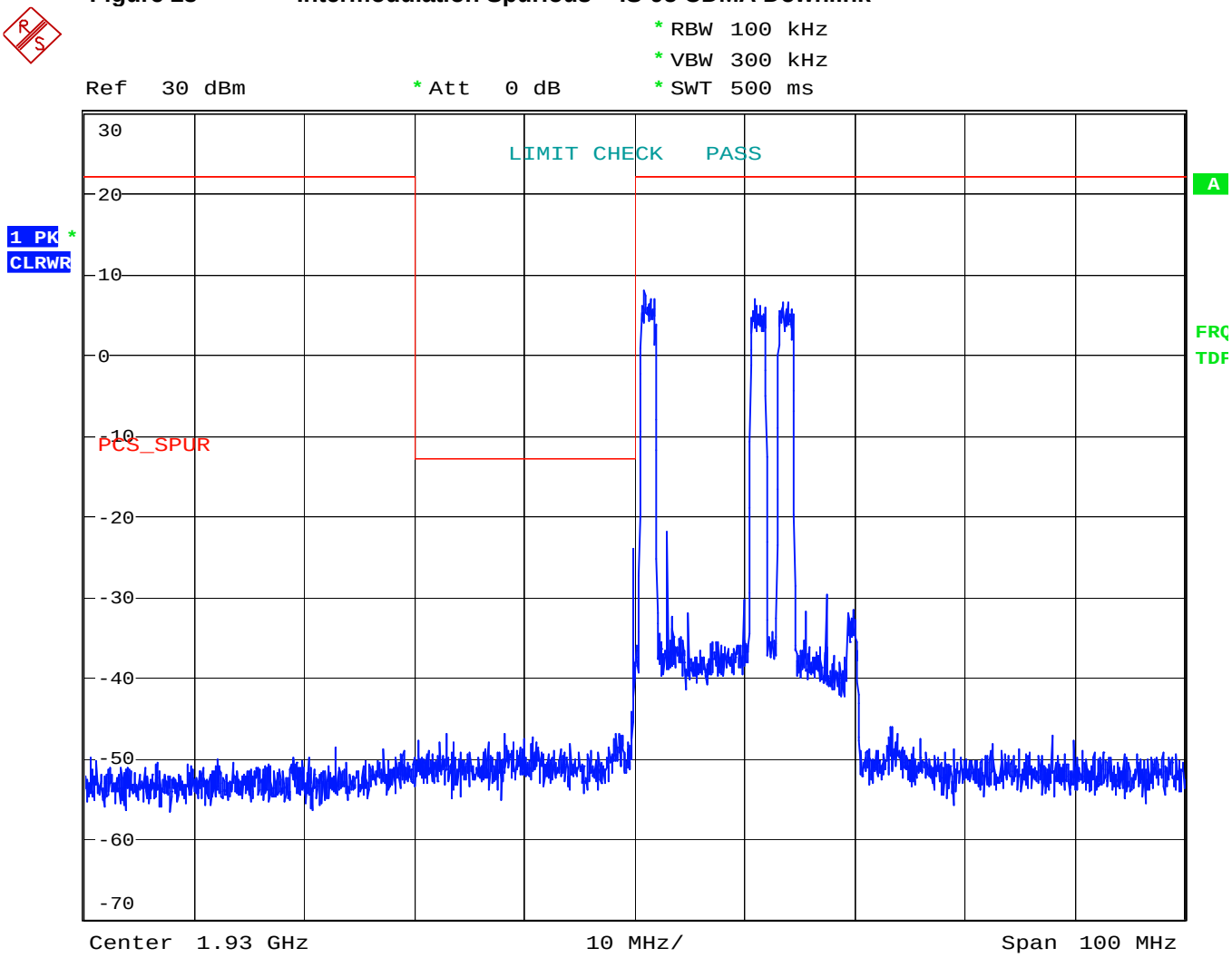
Date: 18.MAY.2007 20:17:12

Figure 22 Antenna Conducted Emissions EDGE Uplink Channel 600



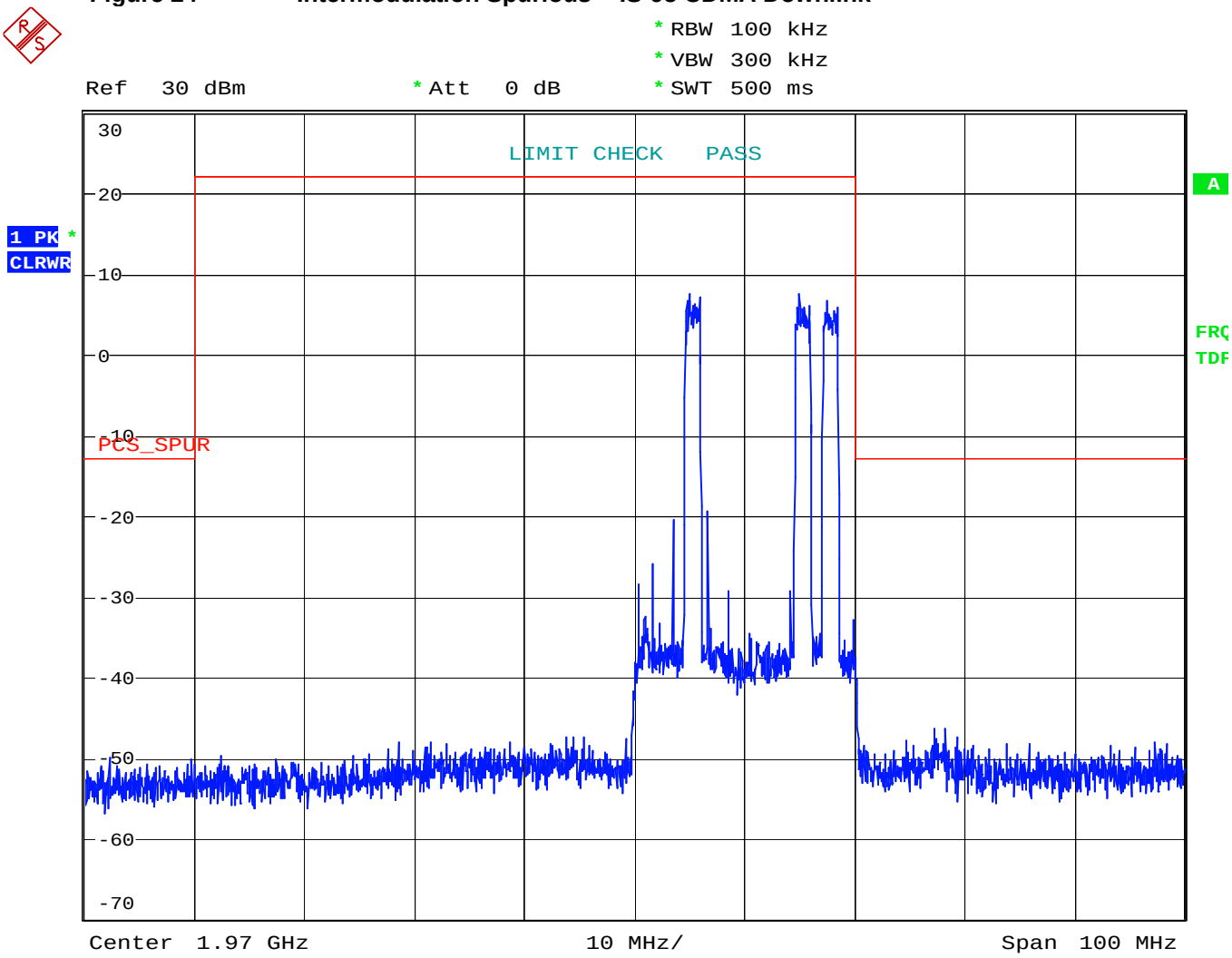
Date: 18.MAY.2007 20:35:51

Figure 23 Intermodulation Spurious - IS-95 CDMA Downlink



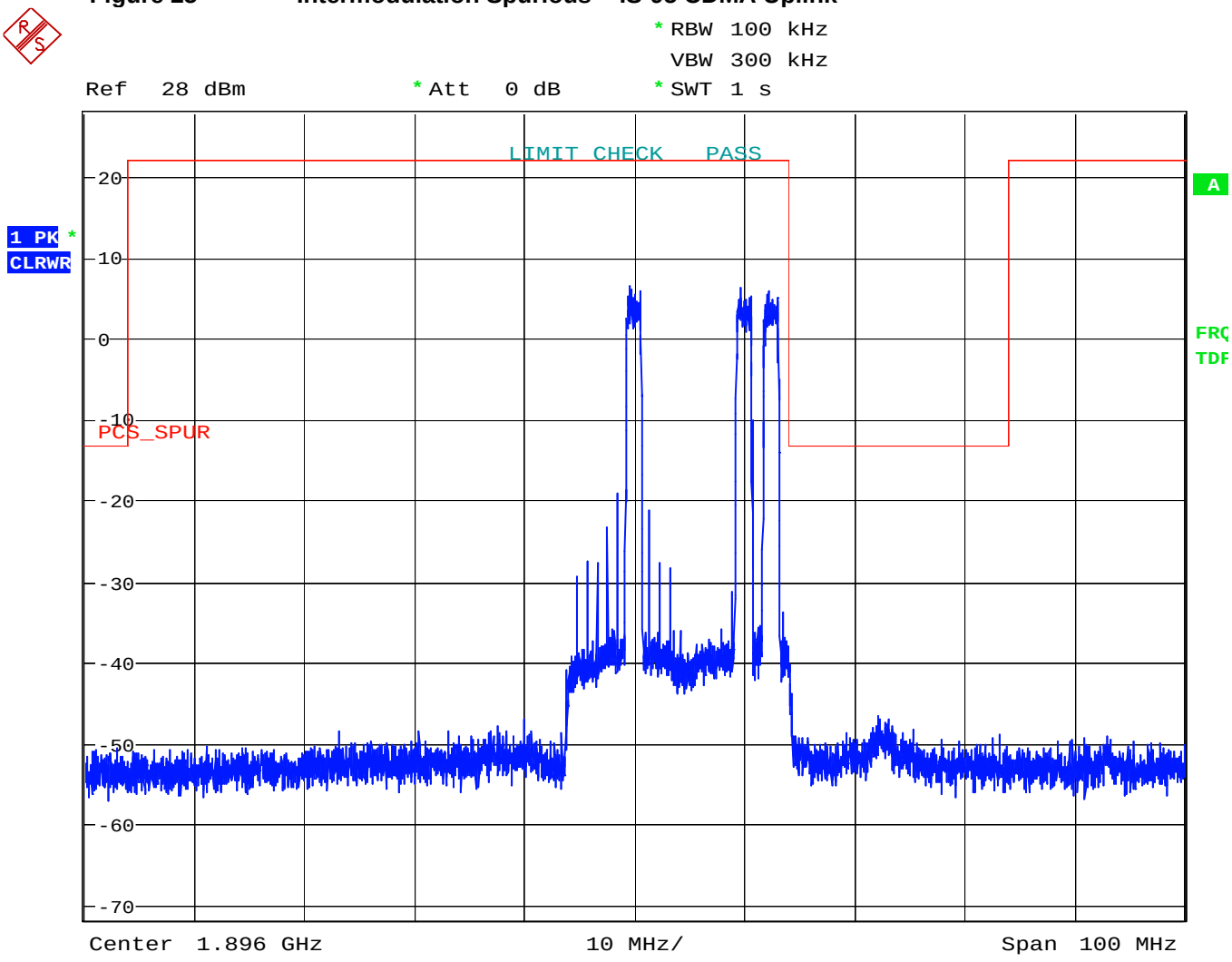
Date: 18.MAY.2007 22:45:20

Figure 24 Intermodulation Spurious - IS-95 CDMA Downlink



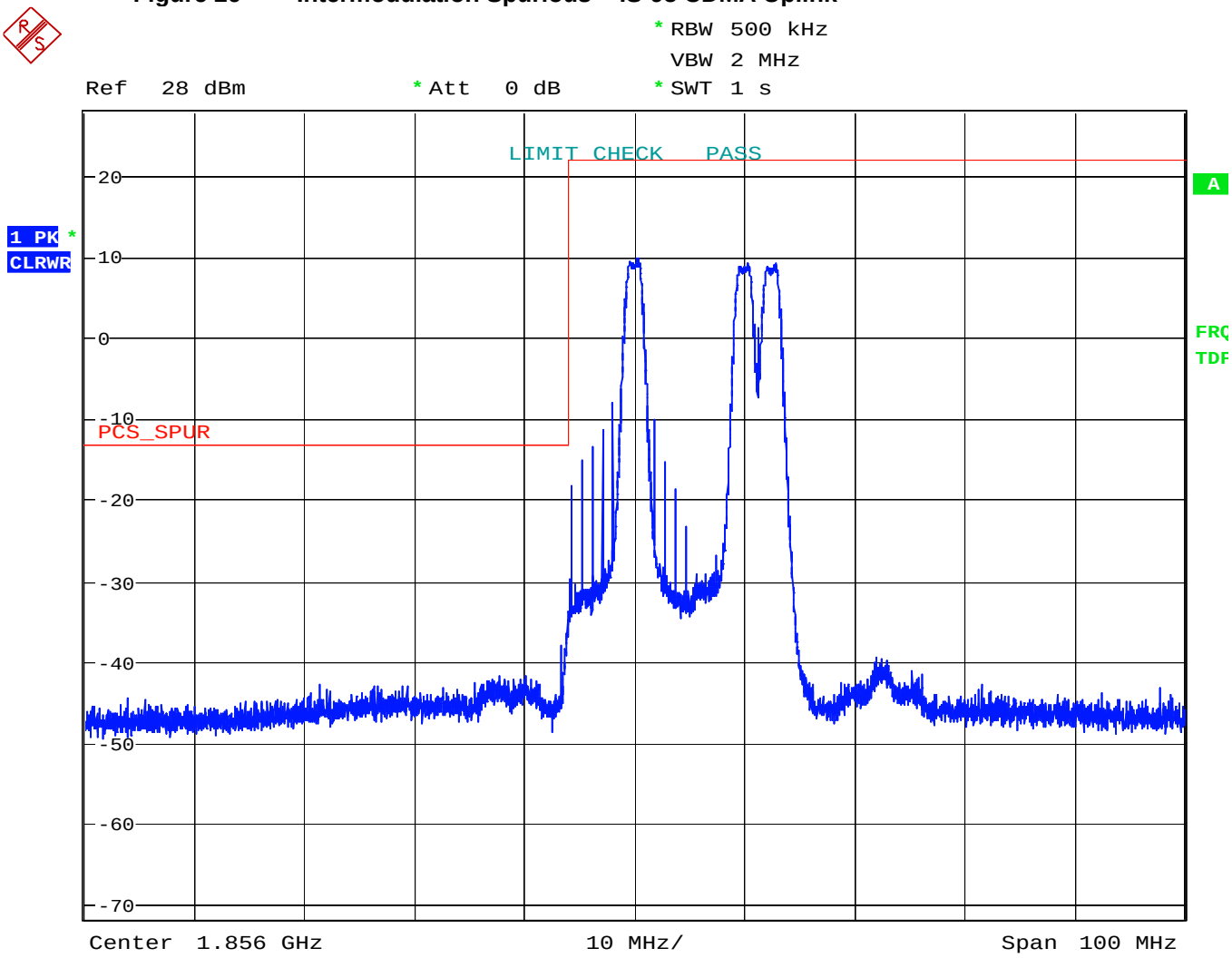
Date: 18.MAY.2007 22:42:24

Figure 25 Intermodulation Spurious - IS-95 CDMA Uplink



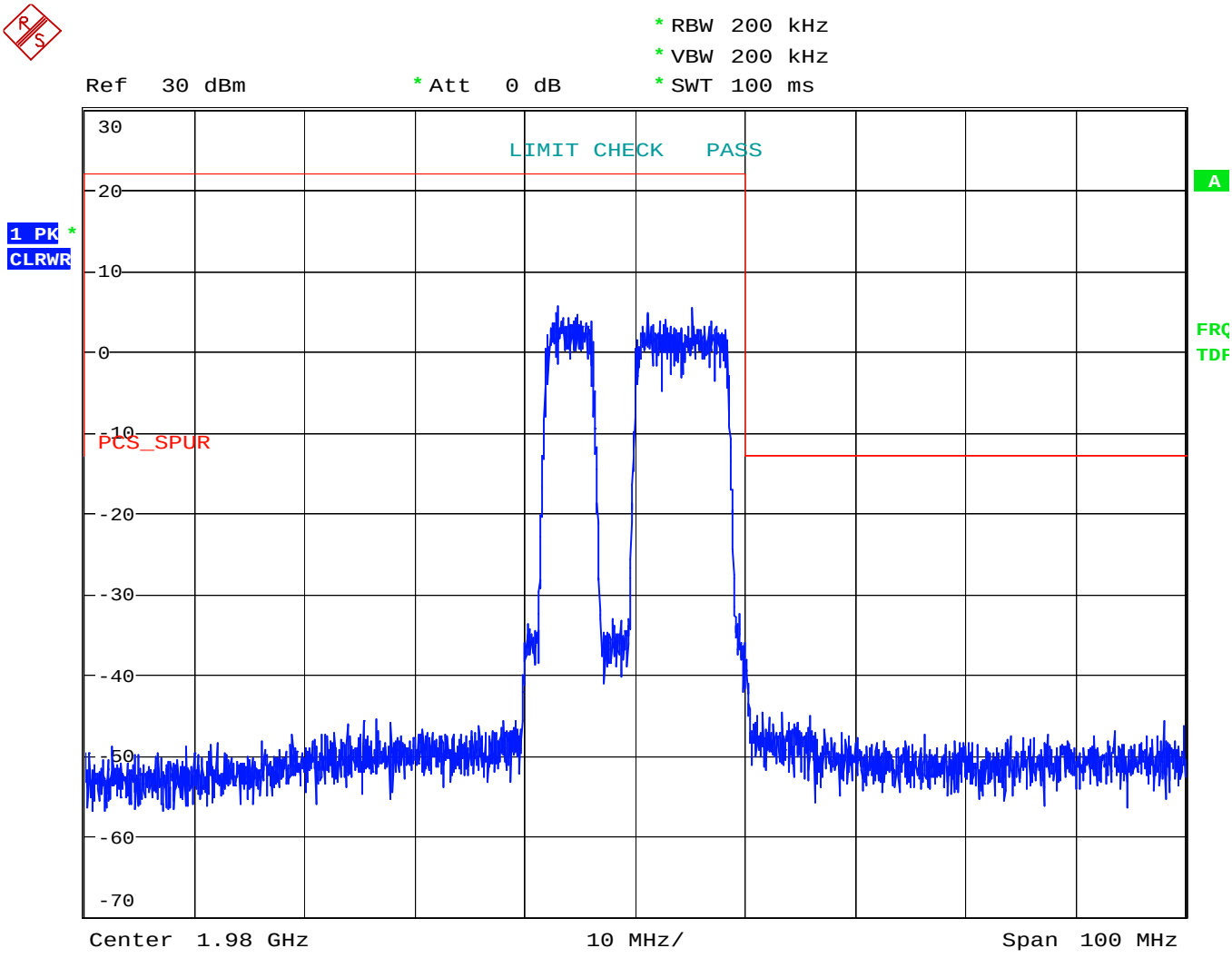
Date: 18.MAY.2007 21:04:41

Figure 26 Intermodulation Spurious - IS-95 CDMA Uplink



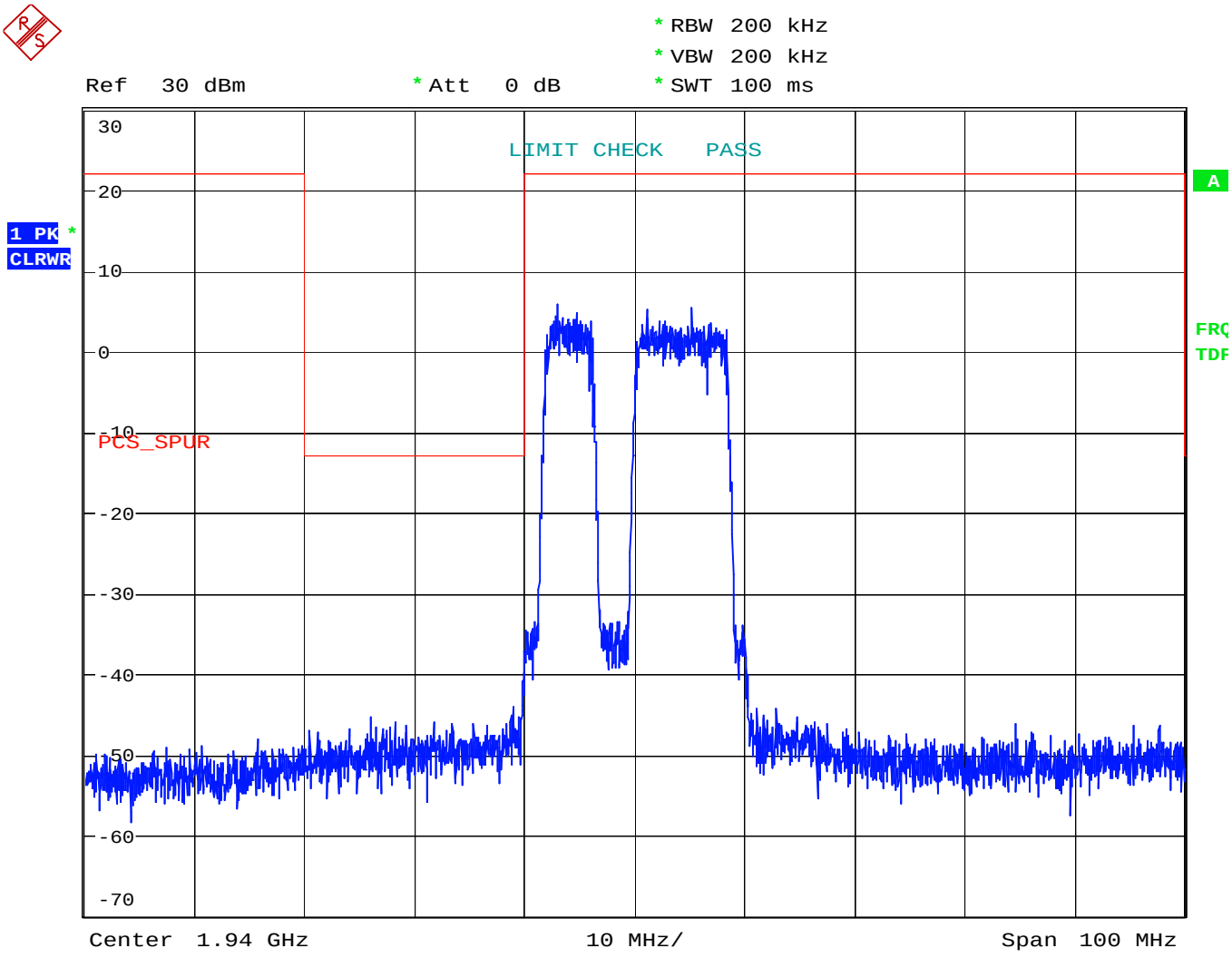
Date: 18.MAY.2007 21:07:17

Figure 27 Intermodulation Spurious - W-CDMA Downlink



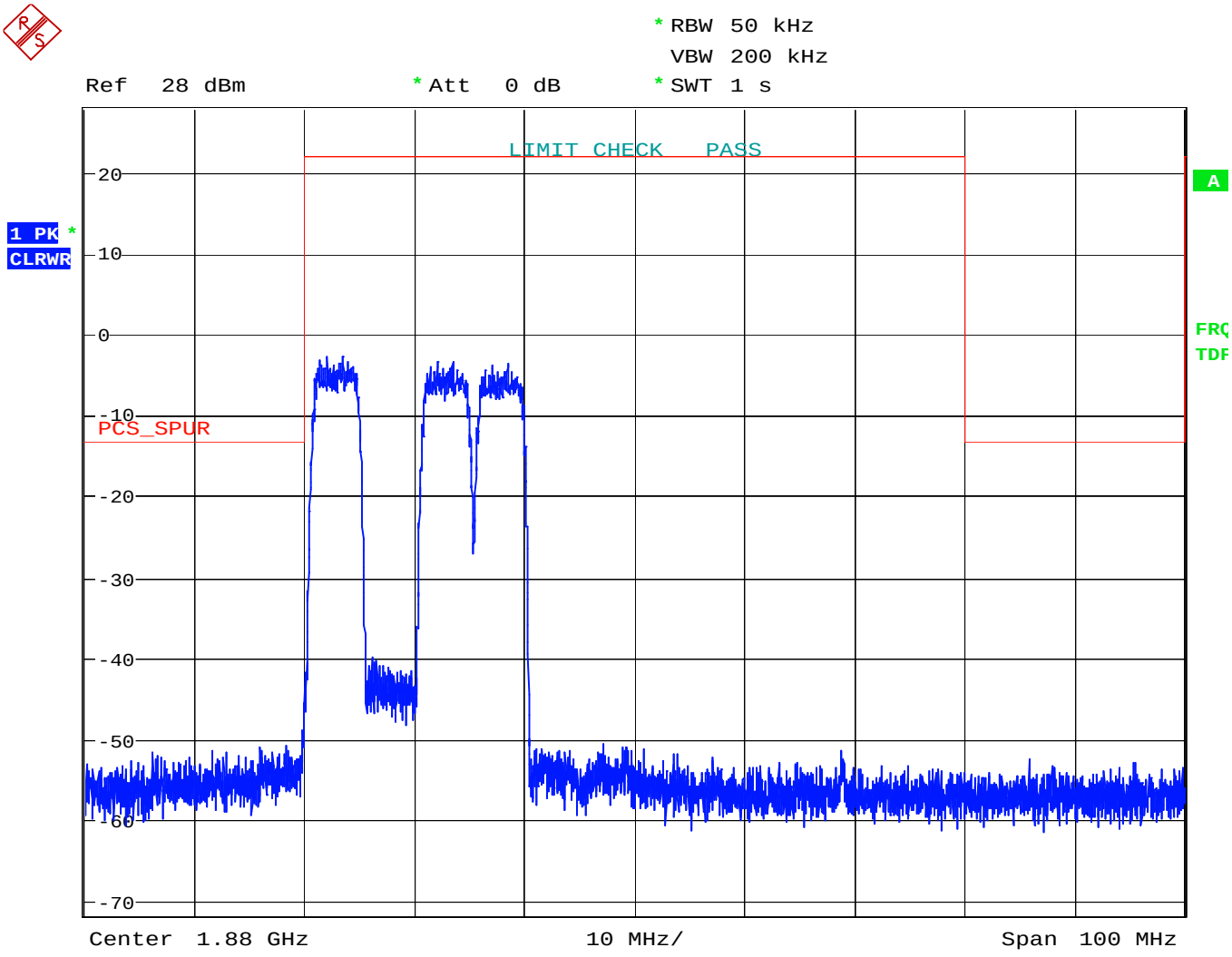
Date: 18.MAY.2007 22:12:04

Figure 28 Intermodulation Spurious - W-CDMA Downlink



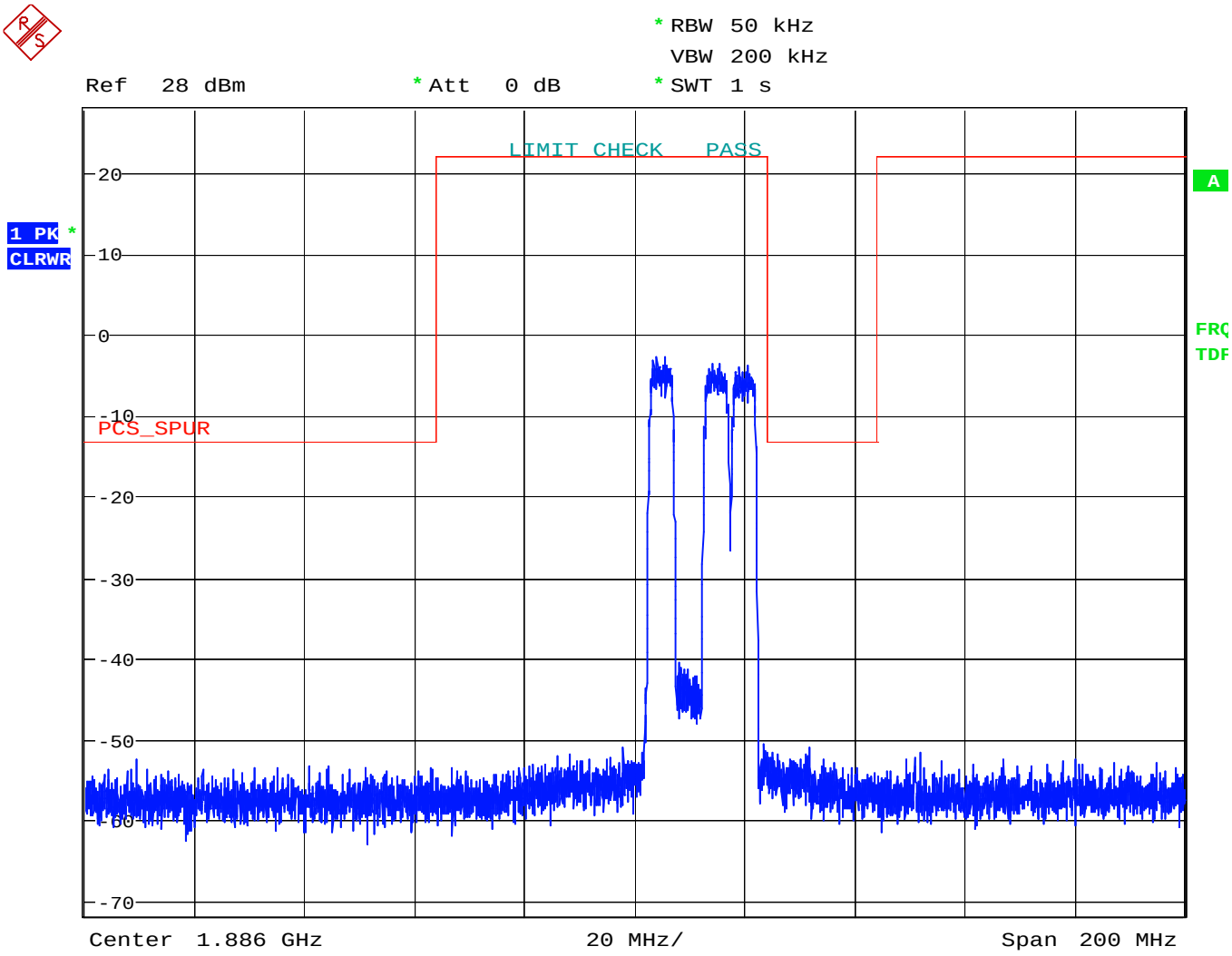
Date: 18.MAY.2007 22:10:49

Figure 29 Intermodulation Spurious - W-CDMA Uplink



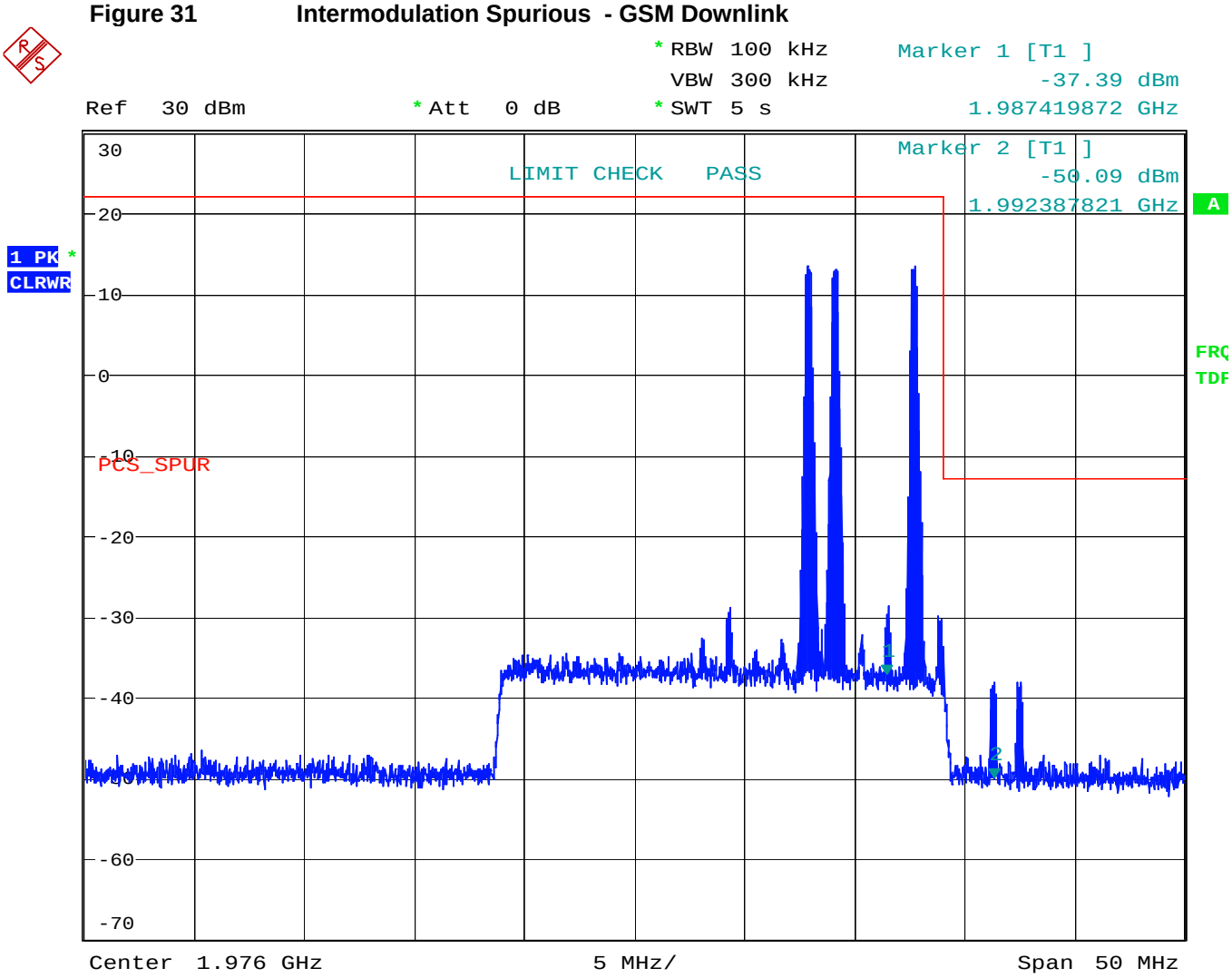
Date: 18.MAY.2007 20:55:01

Figure 30 Intermodulation Spurious - W-CDMA Uplink



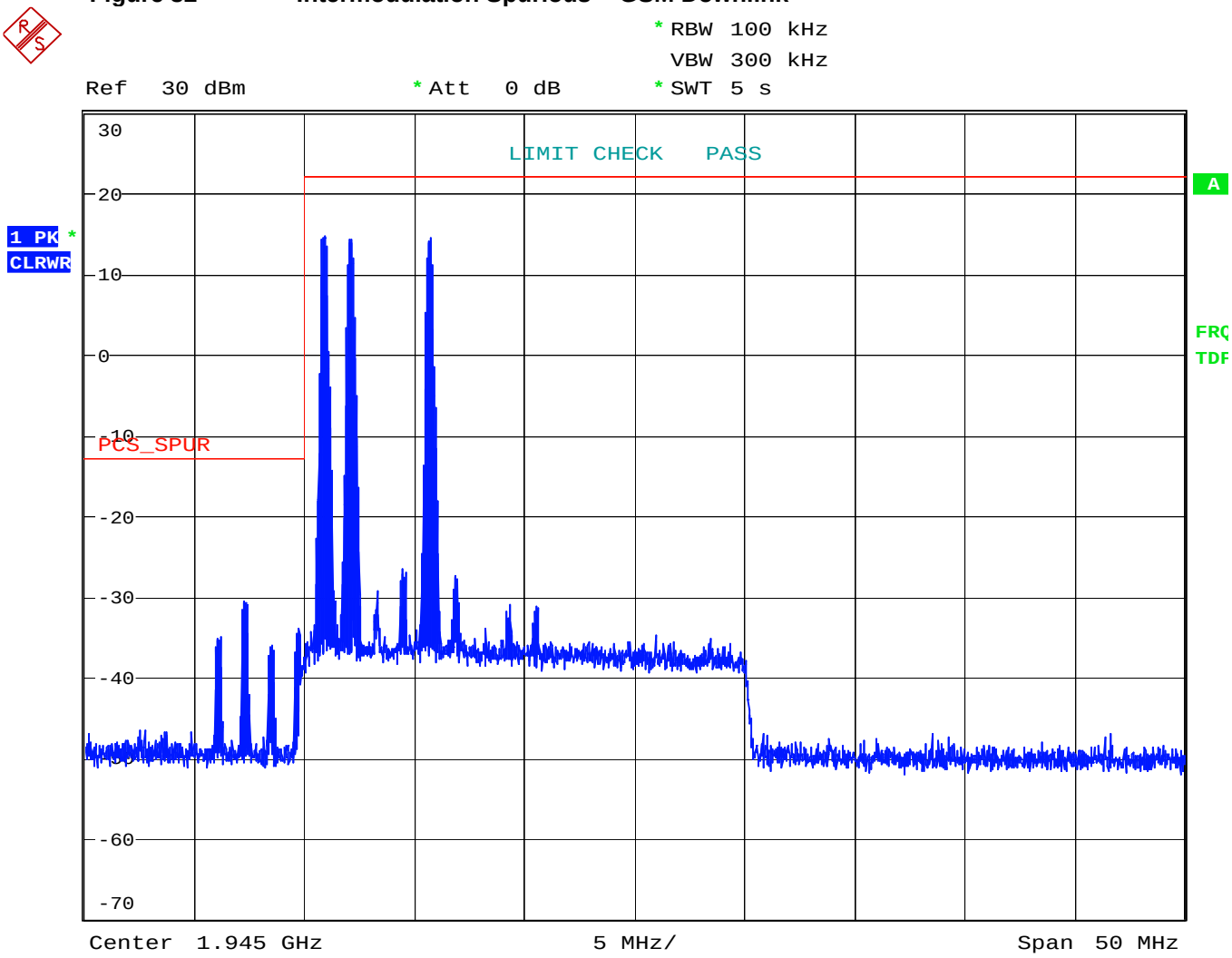
Date: 18.MAY.2007 20:59:24

Figure 31 Intermodulation Spurious - GSM Downlink



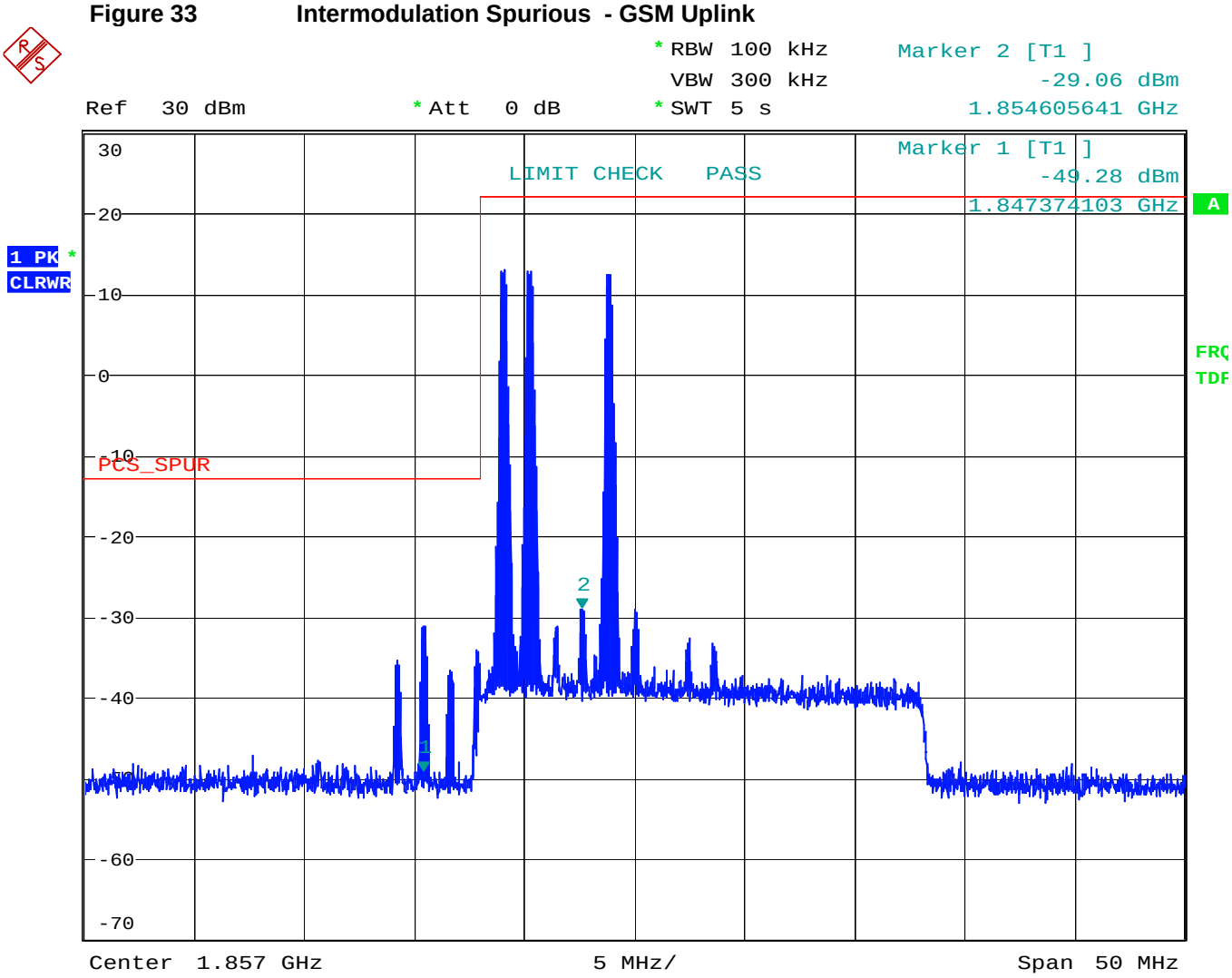
Date: 18.MAY.2007 21:58:06

Figure 32 Intermodulation Spurious - GSM Downlink



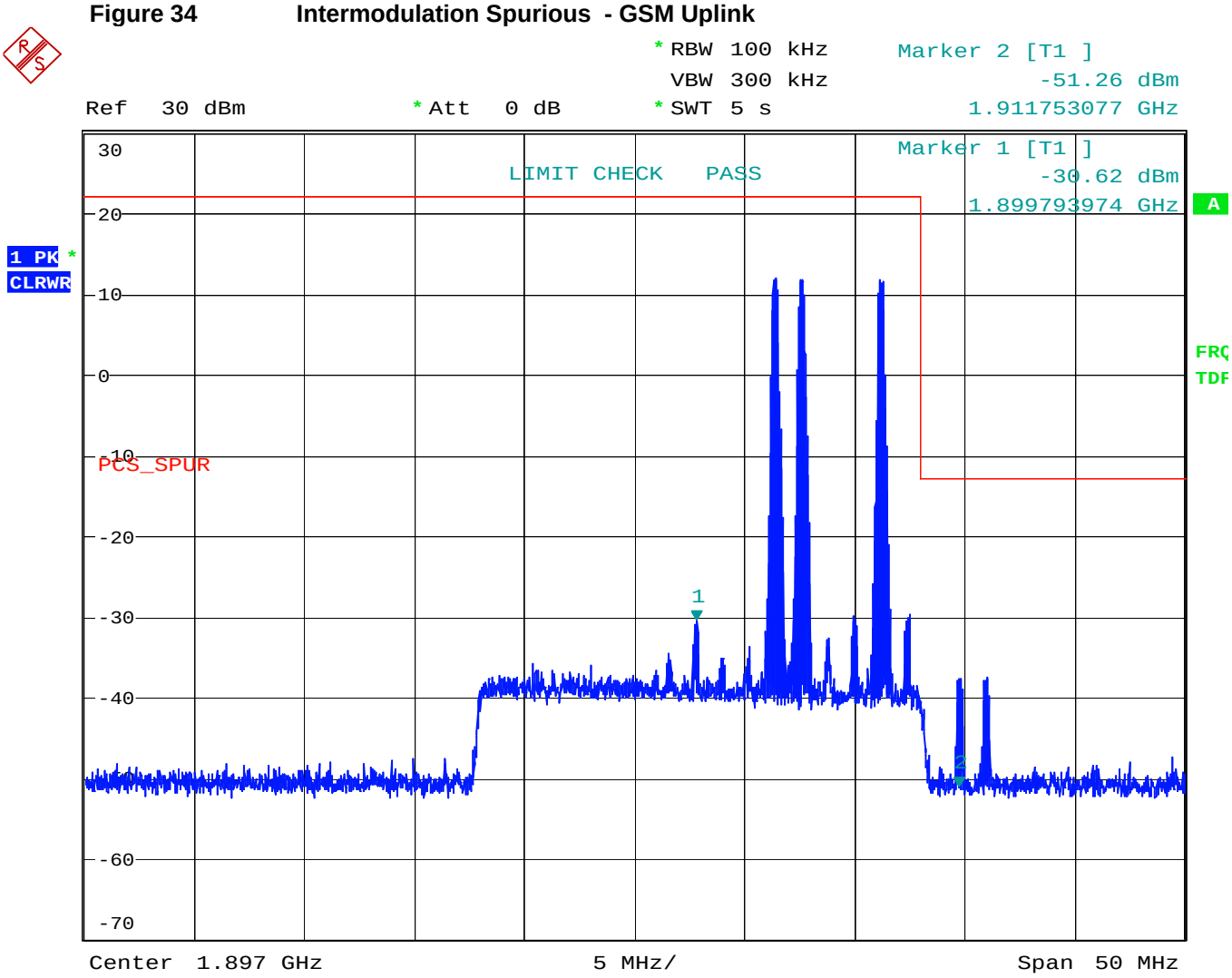
Date: 18.MAY.2007 22:01:09

Figure 33 Intermodulation Spurious - GSM Uplink



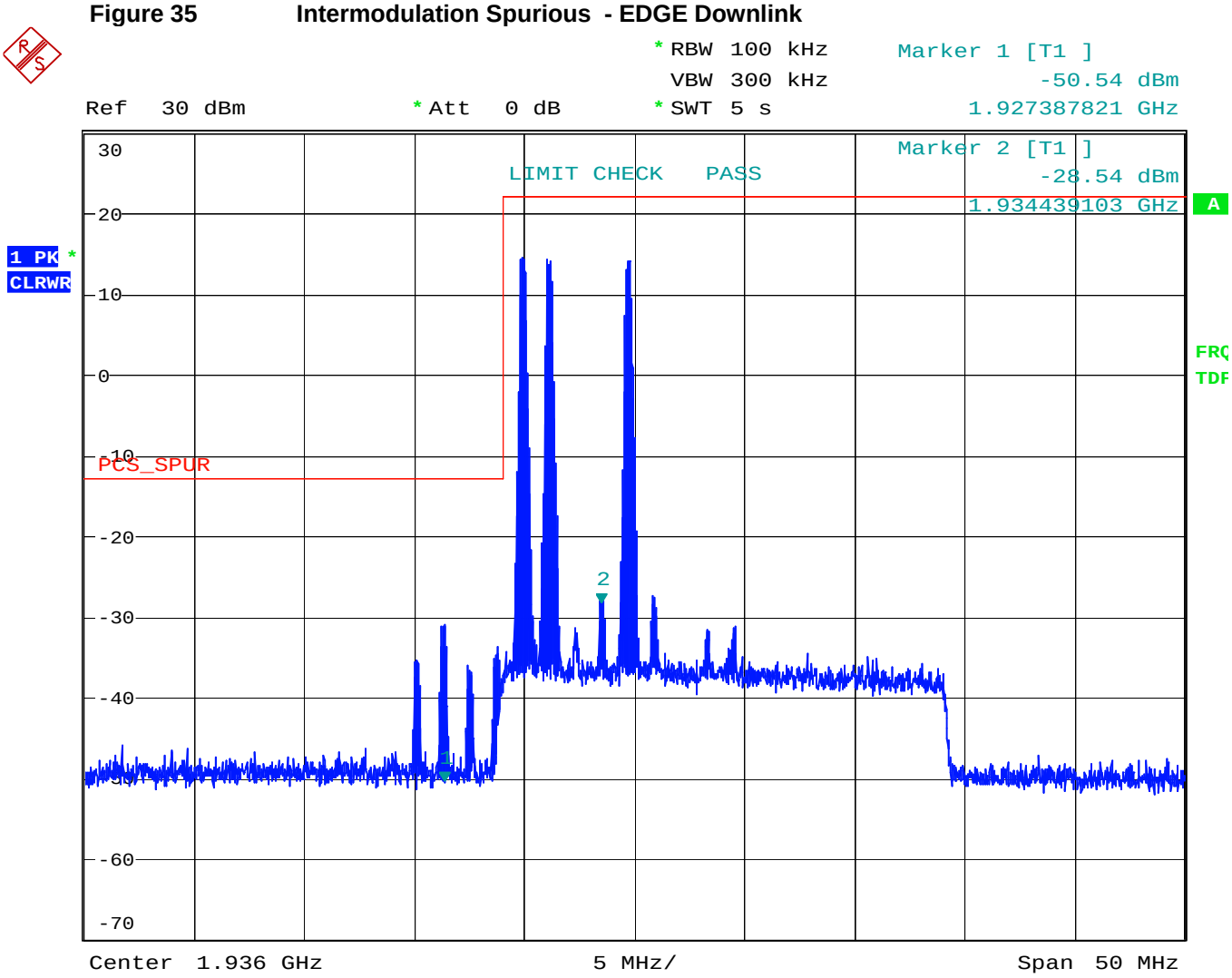
Date: 18.MAY.2007 21:18:35

Figure 34 Intermodulation Spurious - GSM Uplink



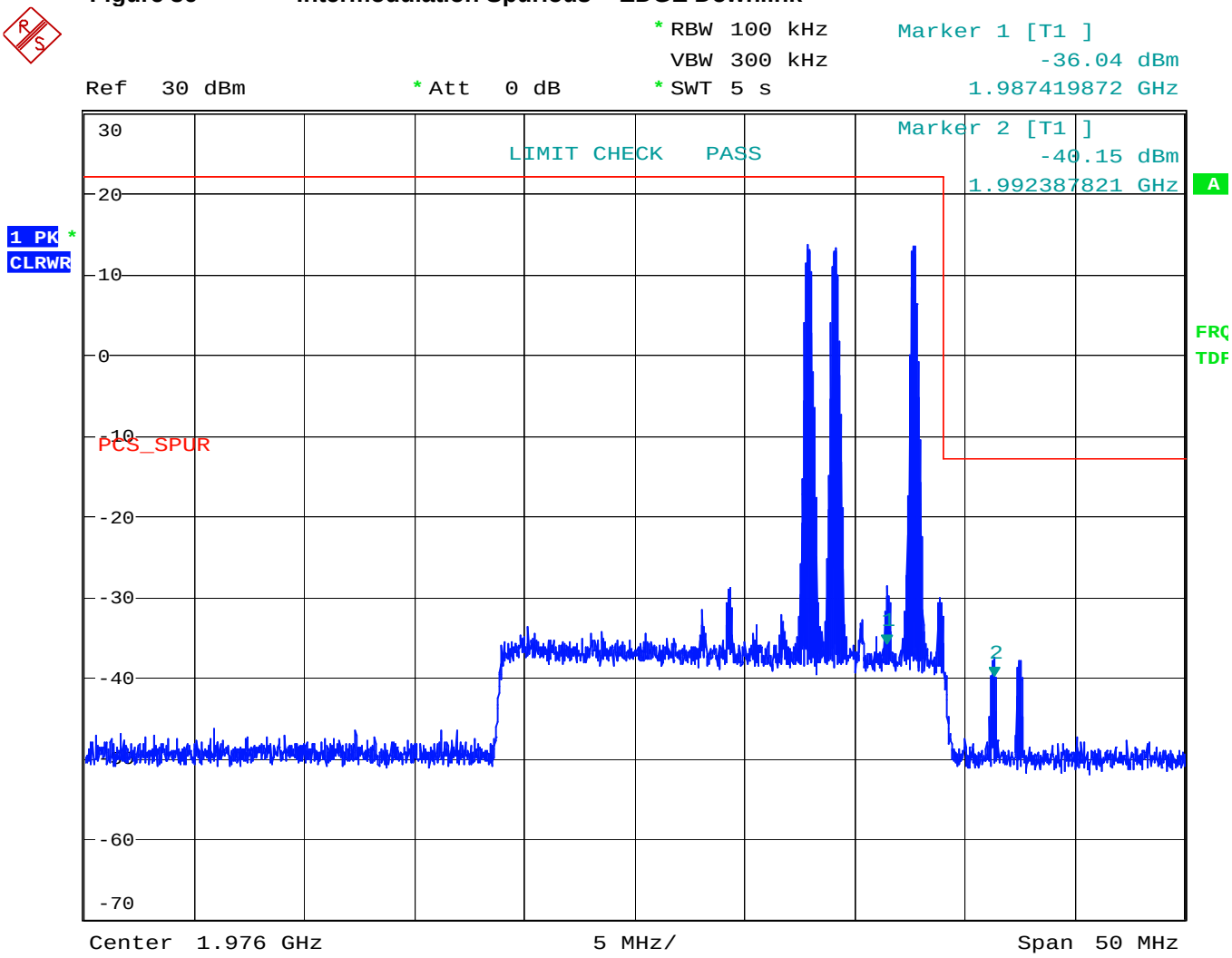
Date: 18.MAY.2007 21:20:36

Figure 35 Intermodulation Spurious - EDGE Downlink



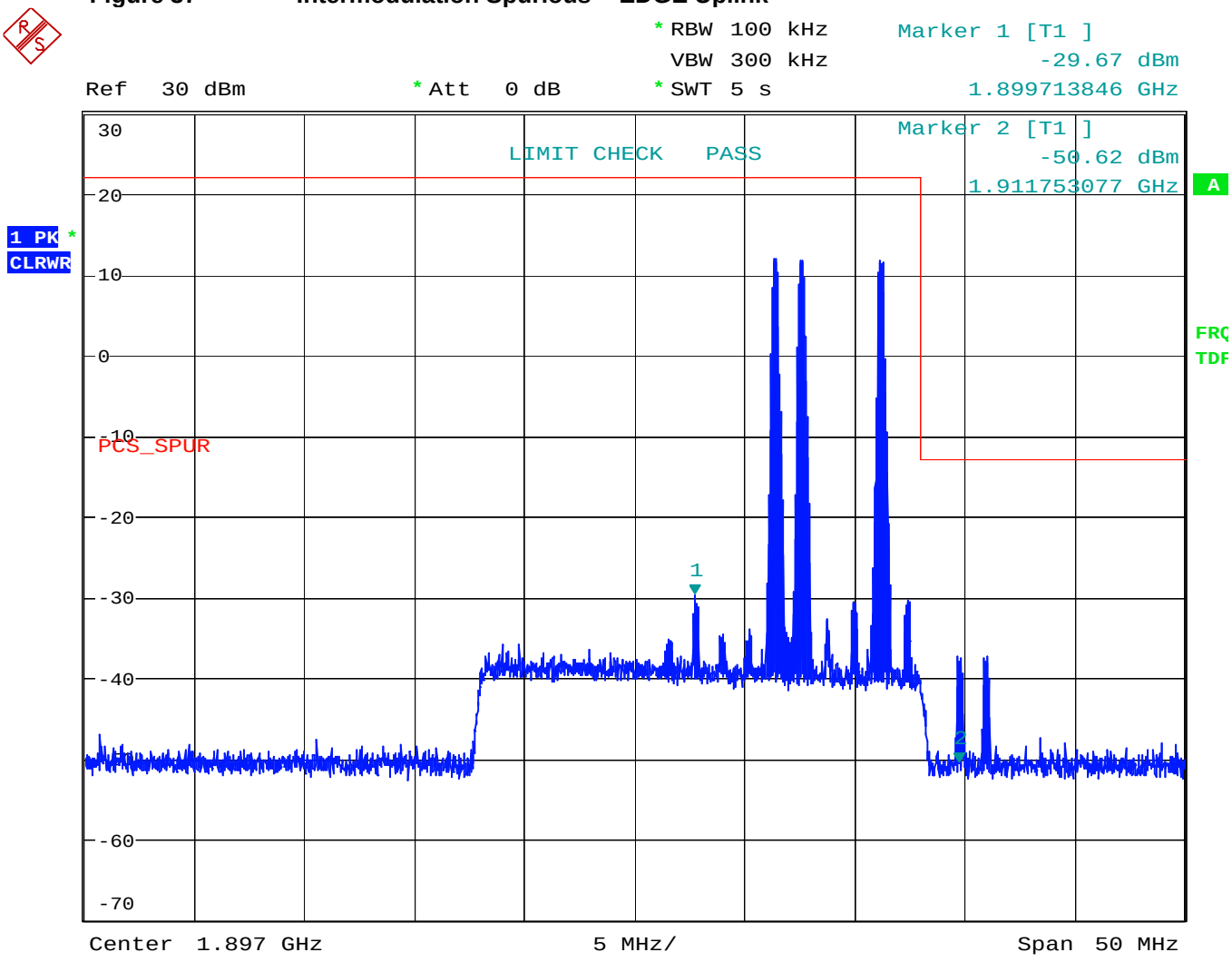
Date: 18.MAY.2007 21:45:47

Figure 36 Intermodulation Spurious - EDGE Downlink



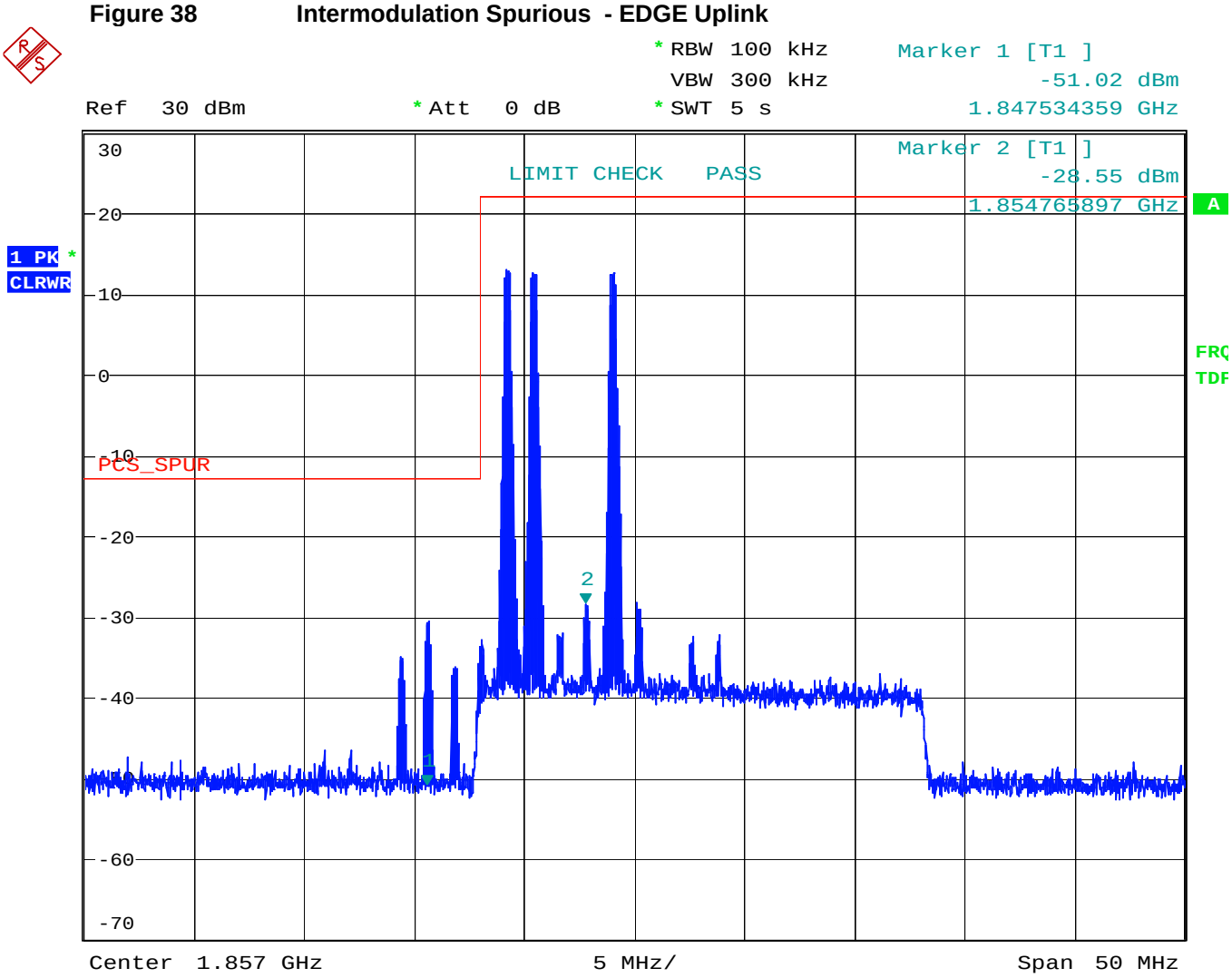
Date: 18.MAY.2007 21:47:56

Figure 37 Intermodulation Spurious - EDGE Uplink



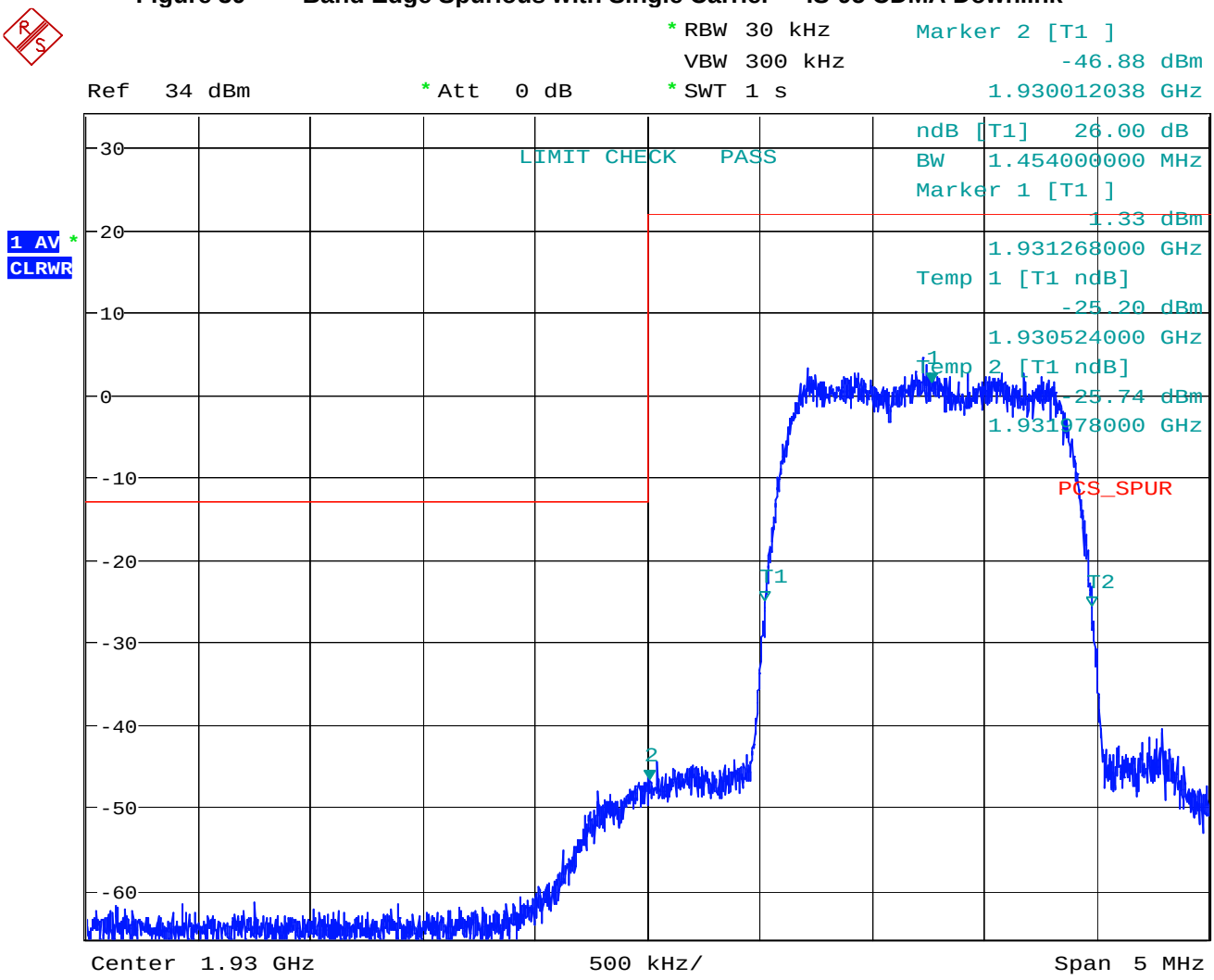
Date: 18.MAY.2007 21:25:34

Figure 38 Intermodulation Spurious - EDGE Uplink



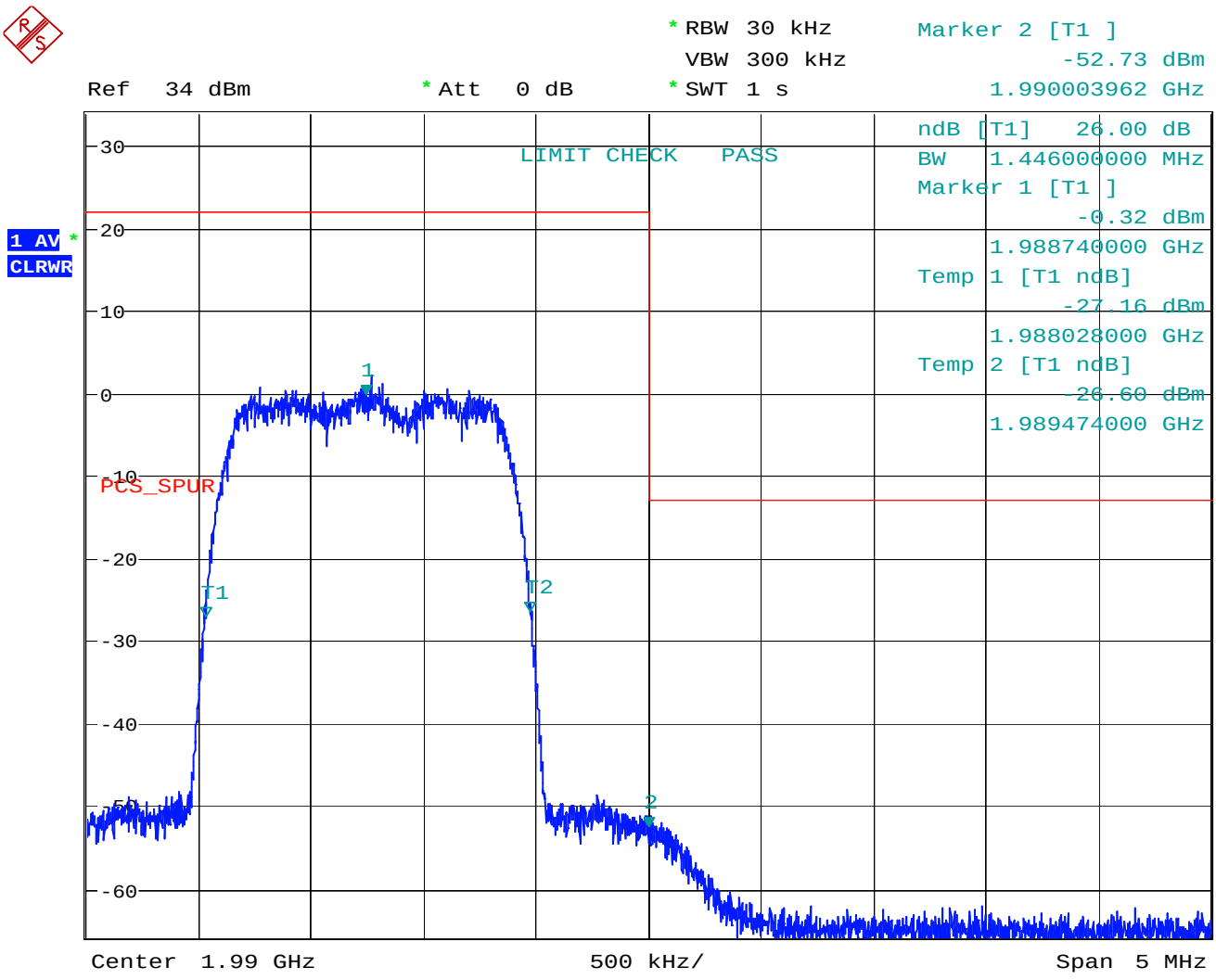
Date: 18.MAY.2007 21:28:06

Figure 39 Band Edge Spurious with Single Carrier - IS-95 CDMA Downlink



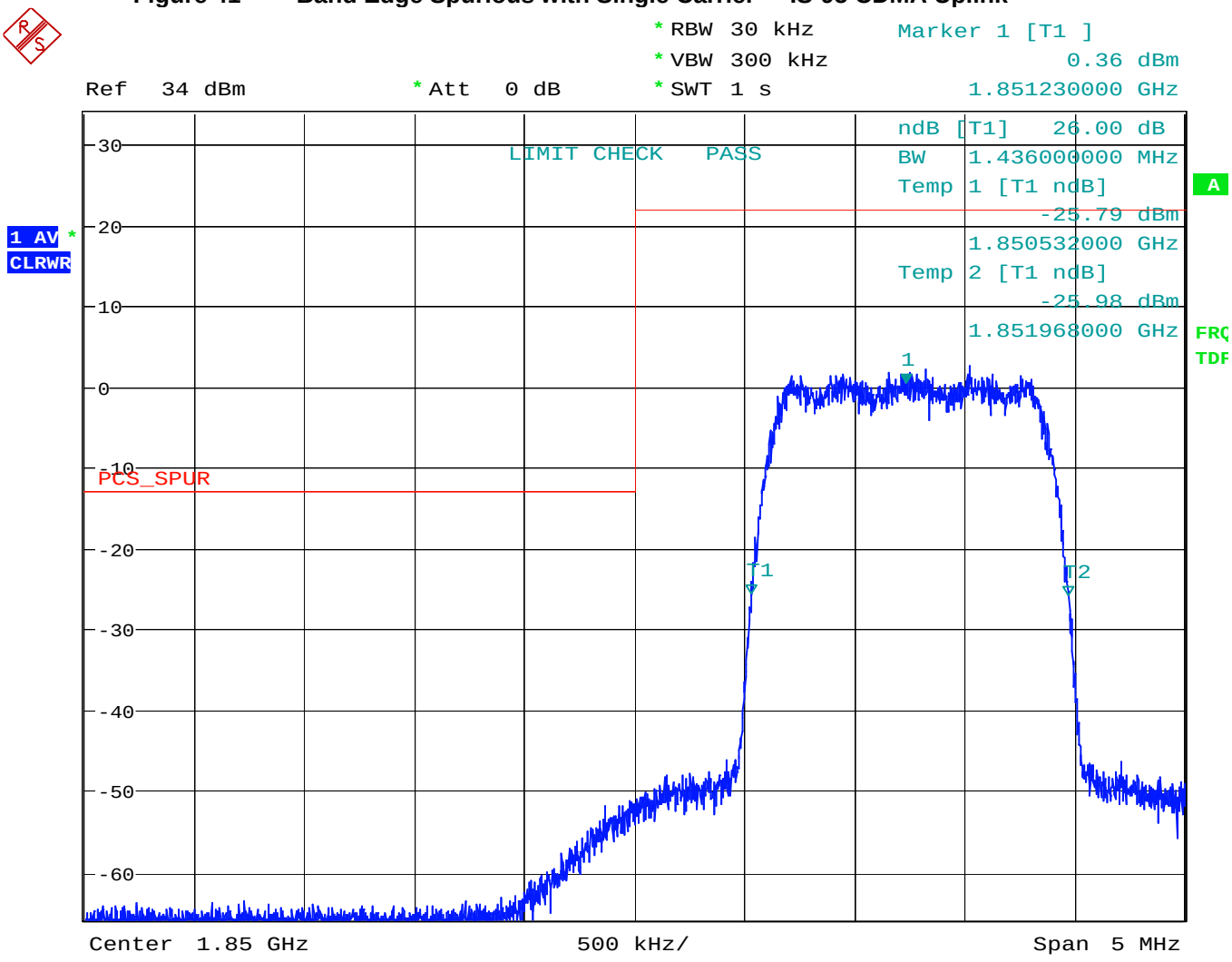
Date: 17.MAY.2007 23:02:31

Figure 40 Band Edge Spurious with Single Carrier - IS-95 CDMA Downlink



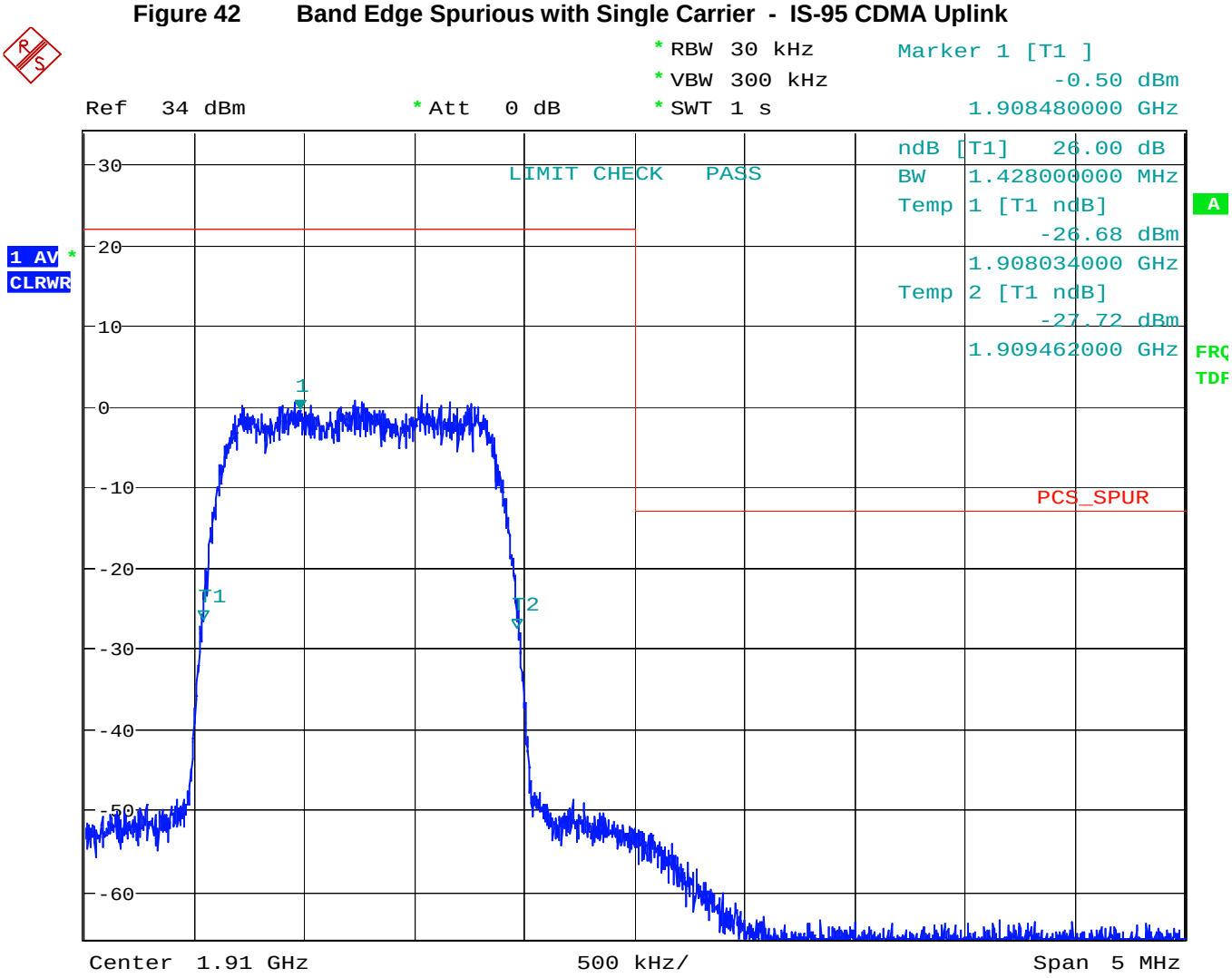
Date: 17.MAY.2007 23:17:53

Figure 41 Band Edge Spurious with Single Carrier - IS-95 CDMA Uplink



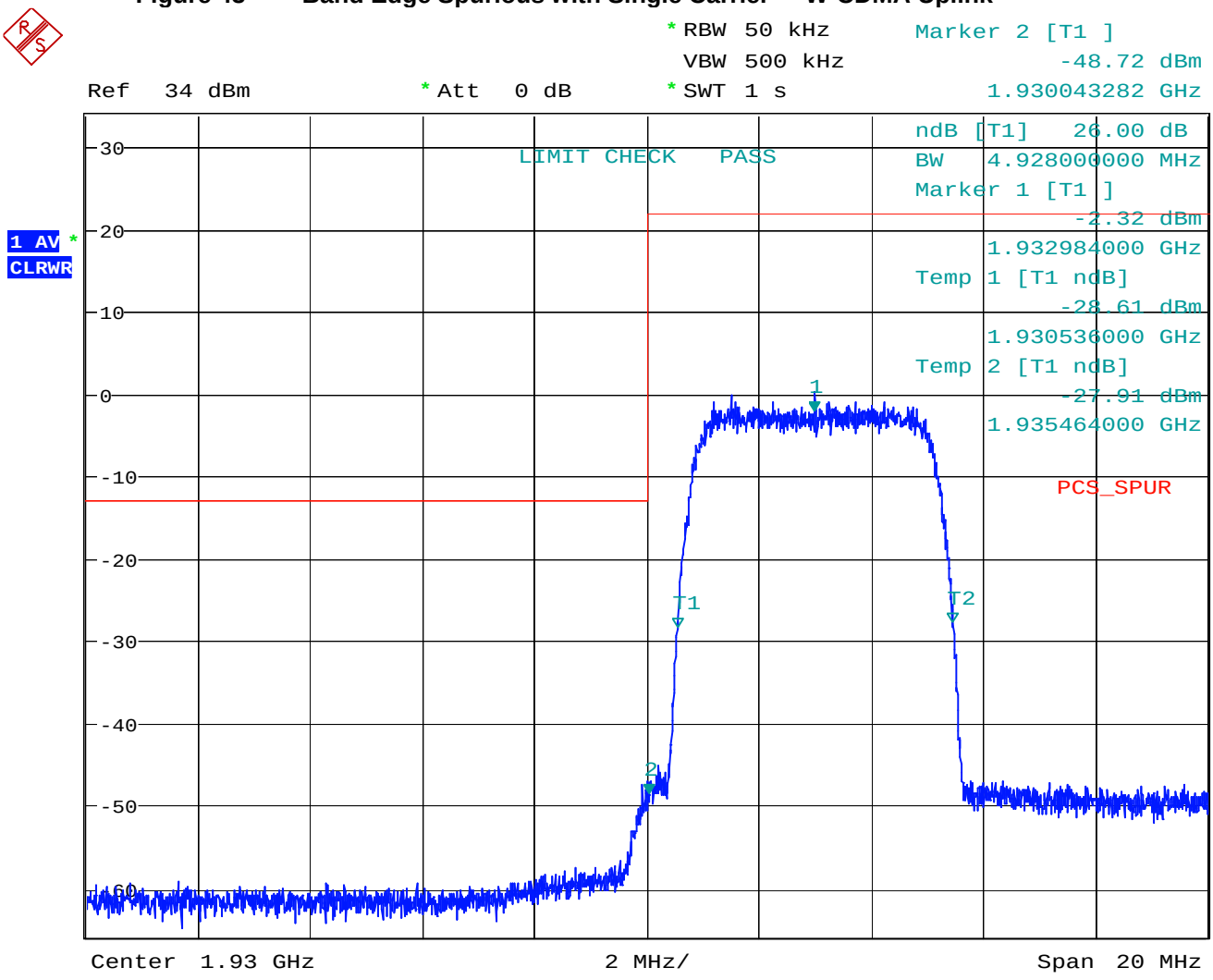
Date: 18.MAY.2007 18:03:08

Figure 42 Band Edge Spurious with Single Carrier - IS-95 CDMA Uplink



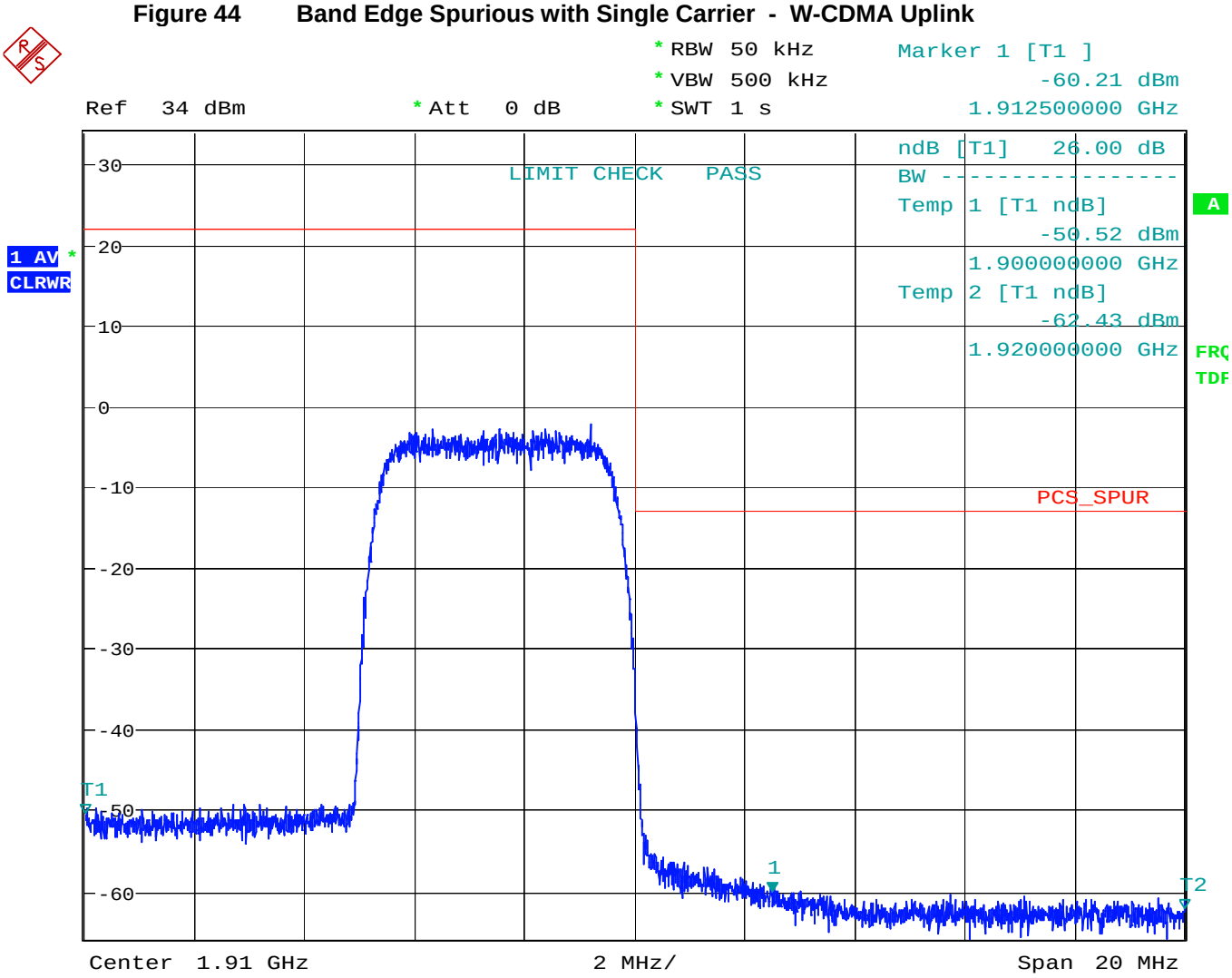
Date: 18.MAY.2007 18:05:14

Figure 43 Band Edge Spurious with Single Carrier - W-CDMA Uplink



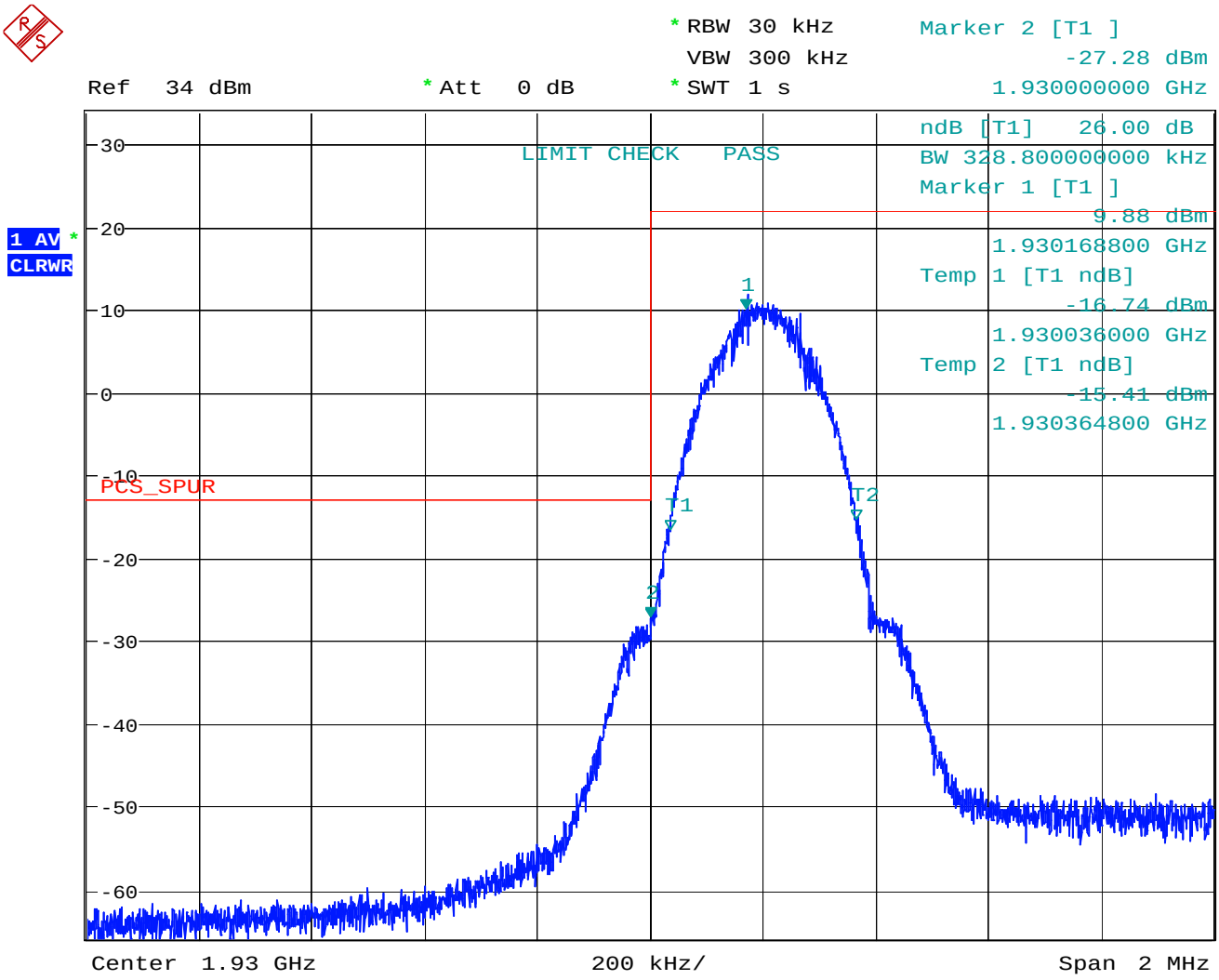
Date: 17.MAY.2007 23:24:47

Figure 44 Band Edge Spurious with Single Carrier - W-CDMA Uplink



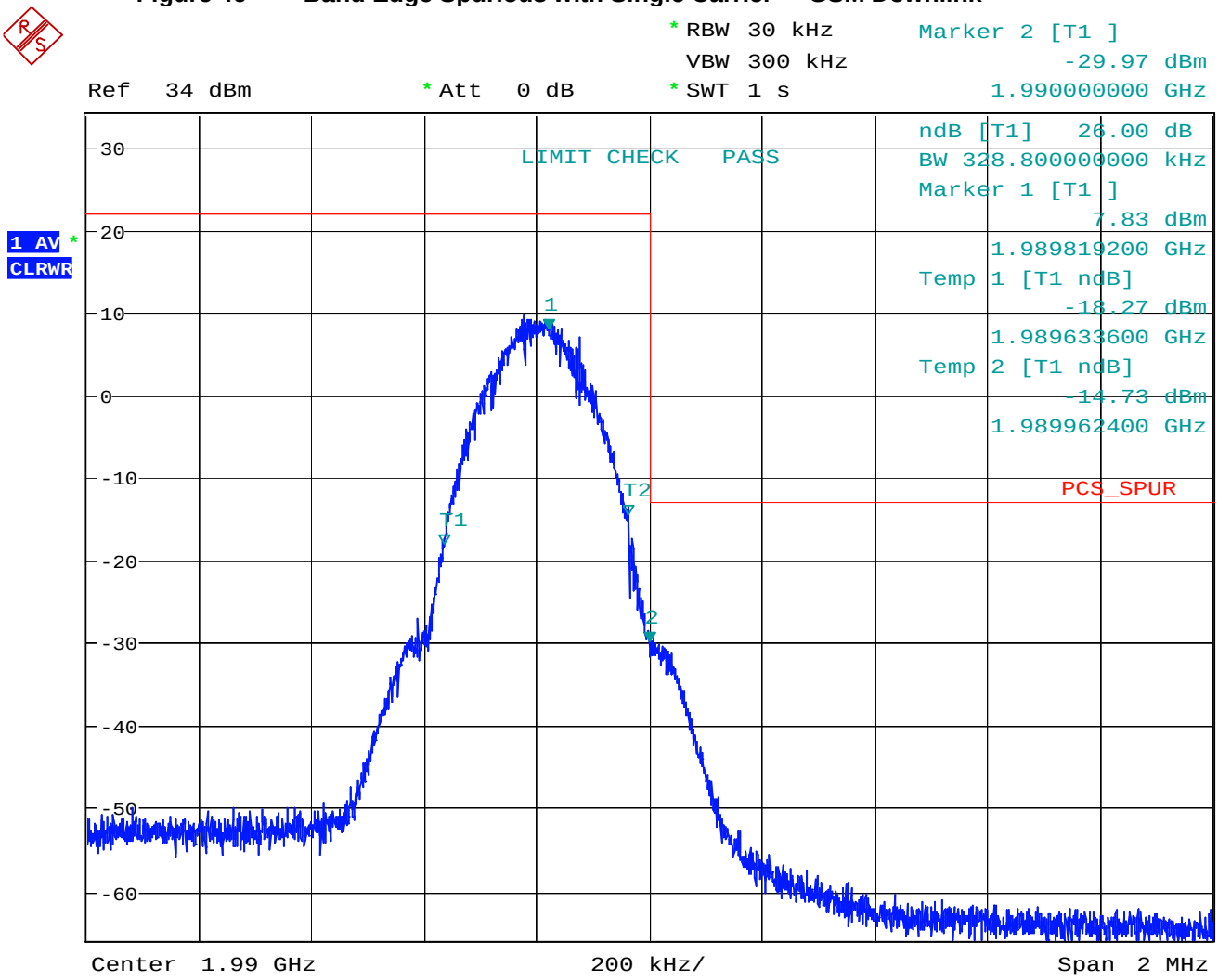
Date: 18.MAY.2007 17:35:09

Figure 45 Band Edge Spurious with Single Carrier - GSM Downlink



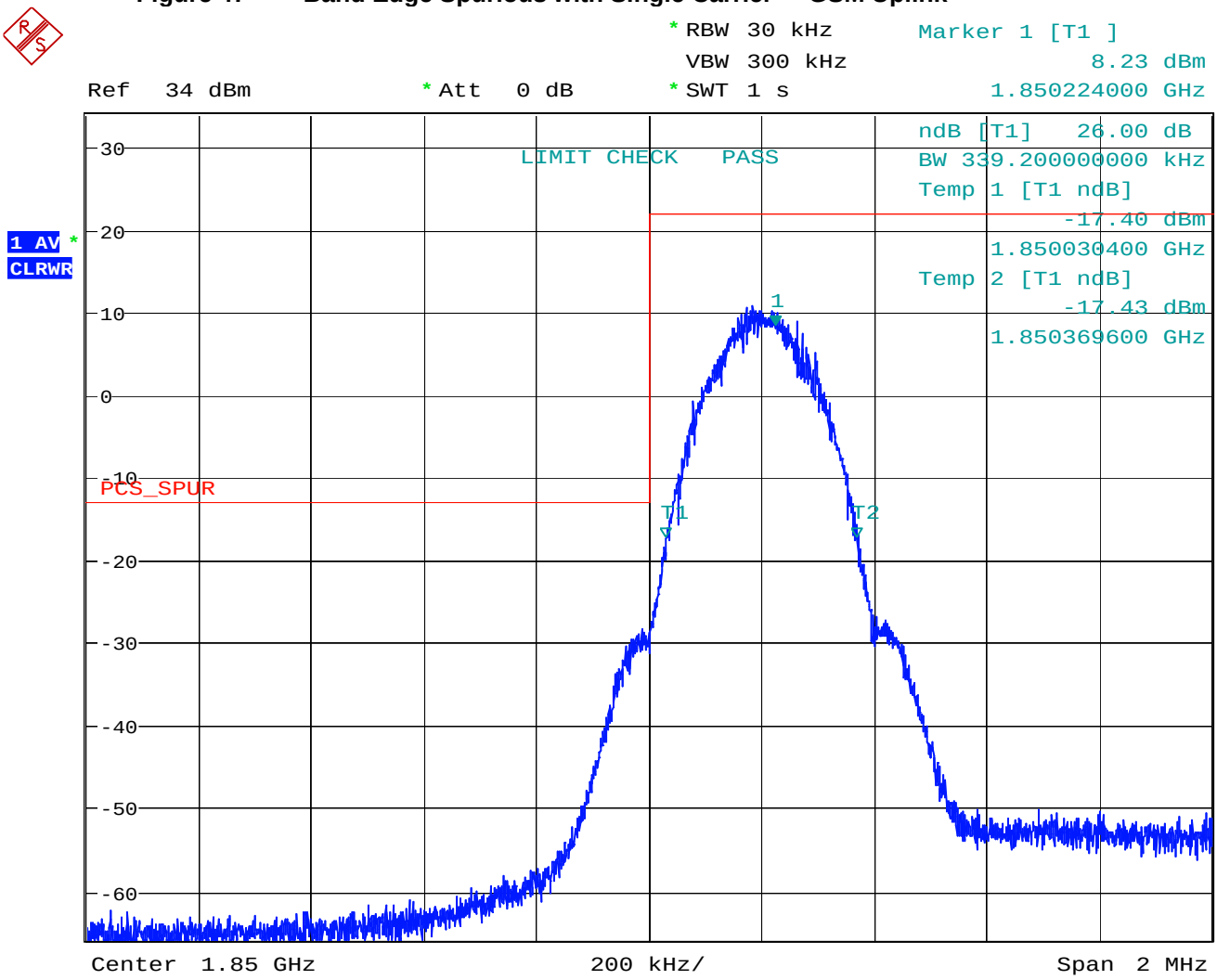
Date: 18.MAY.2007 15:05:14

Figure 46 Band Edge Spurious with Single Carrier - GSM Downlink



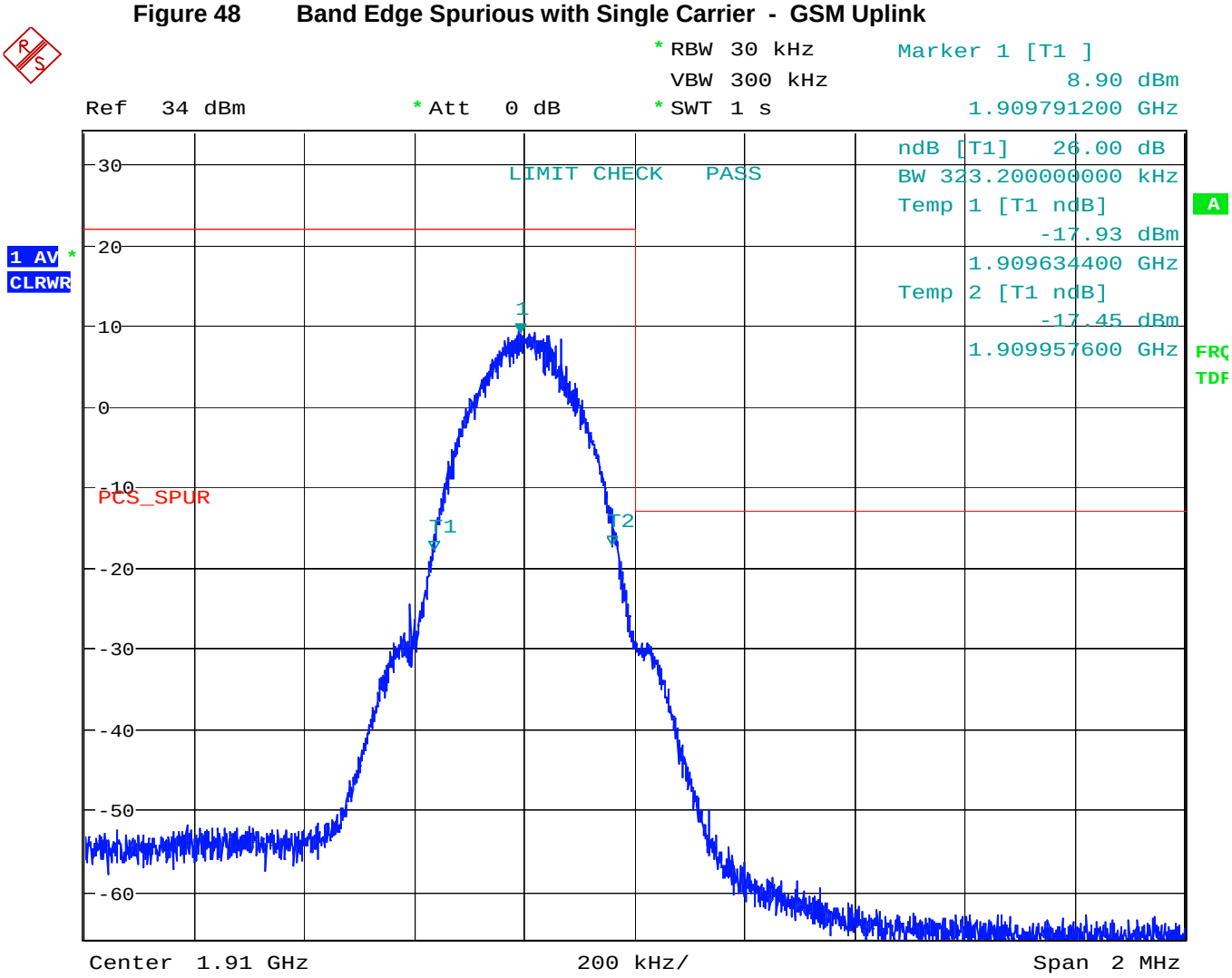
Date: 18.MAY.2007 15:14:41

Figure 47 Band Edge Spurious with Single Carrier - GSM Uplink



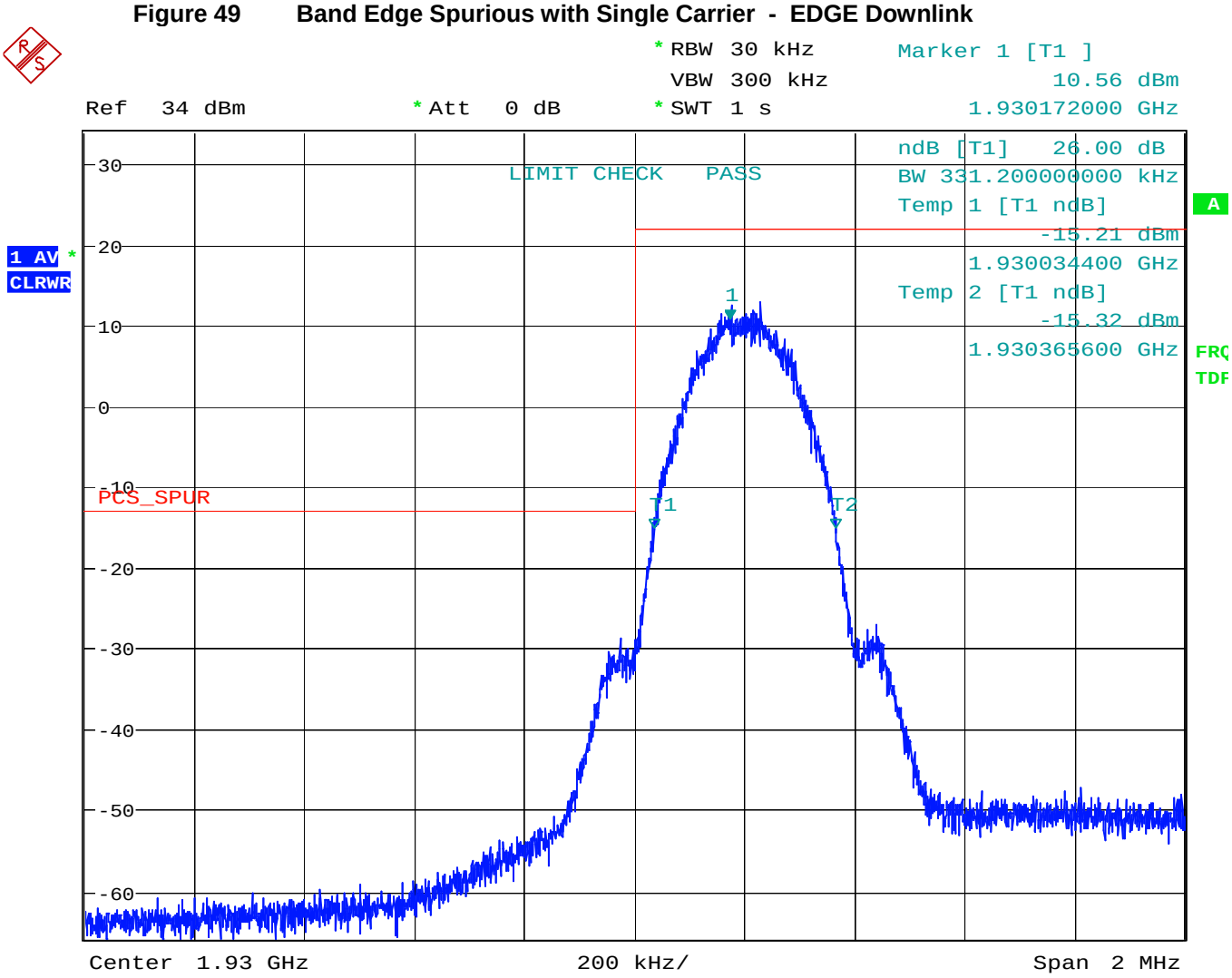
Date: 18.MAY.2007 17:15:04

Figure 48 Band Edge Spurious with Single Carrier - GSM Uplink



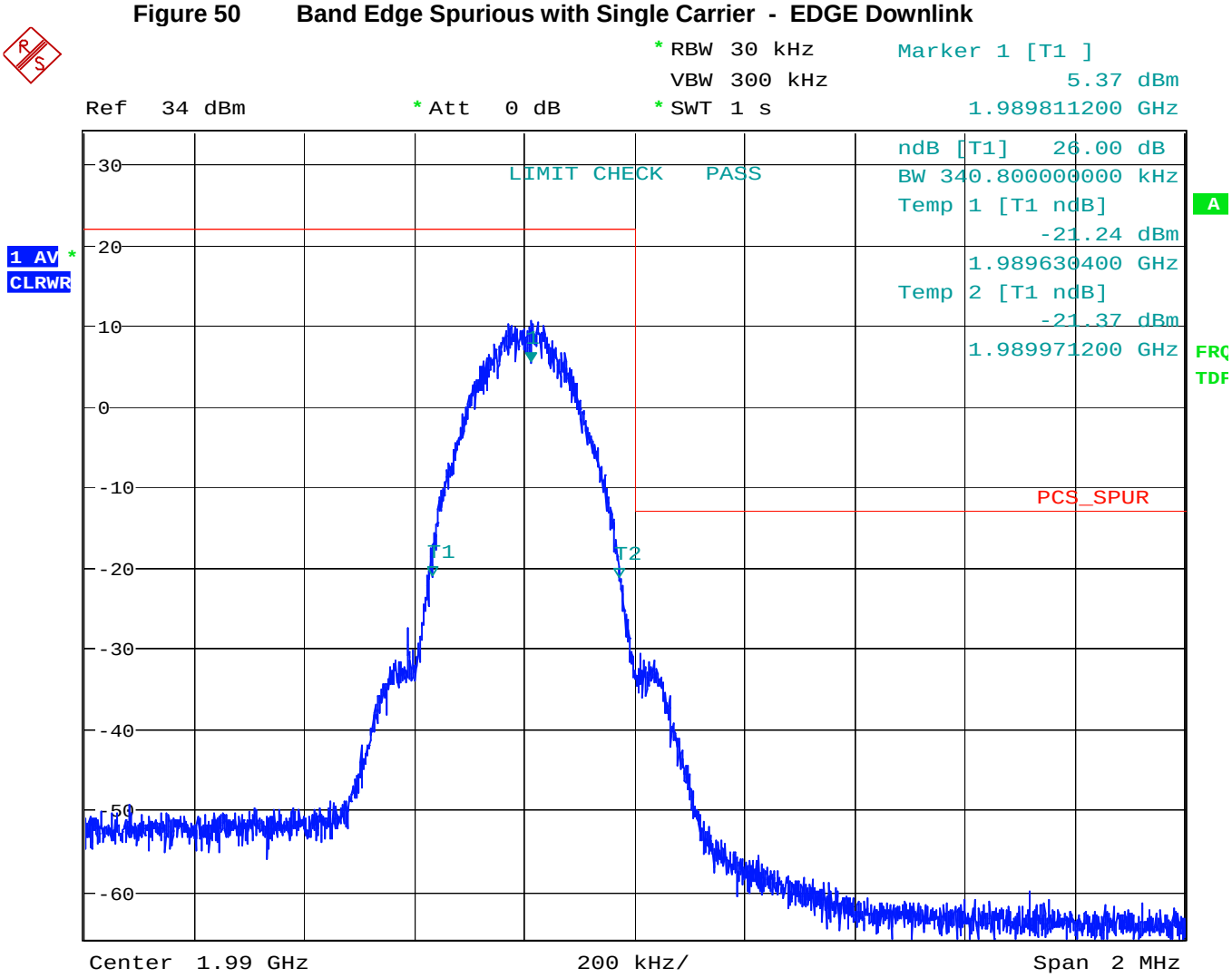
Date: 18.MAY.2007 17:17:11

Figure 49 Band Edge Spurious with Single Carrier - EDGE Downlink



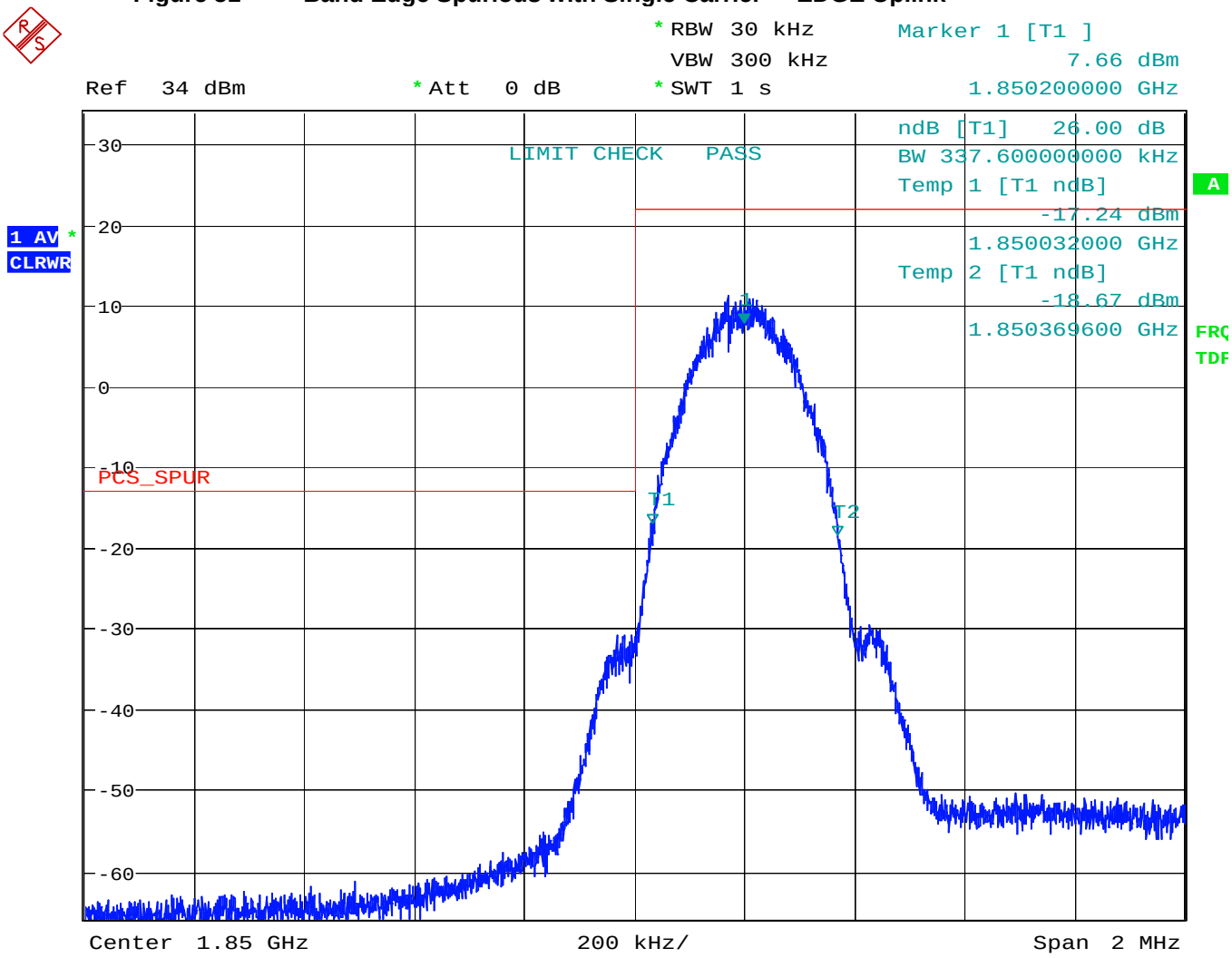
Date: 18.MAY.2007 16:30:24

Figure 50 Band Edge Spurious with Single Carrier - EDGE Downlink



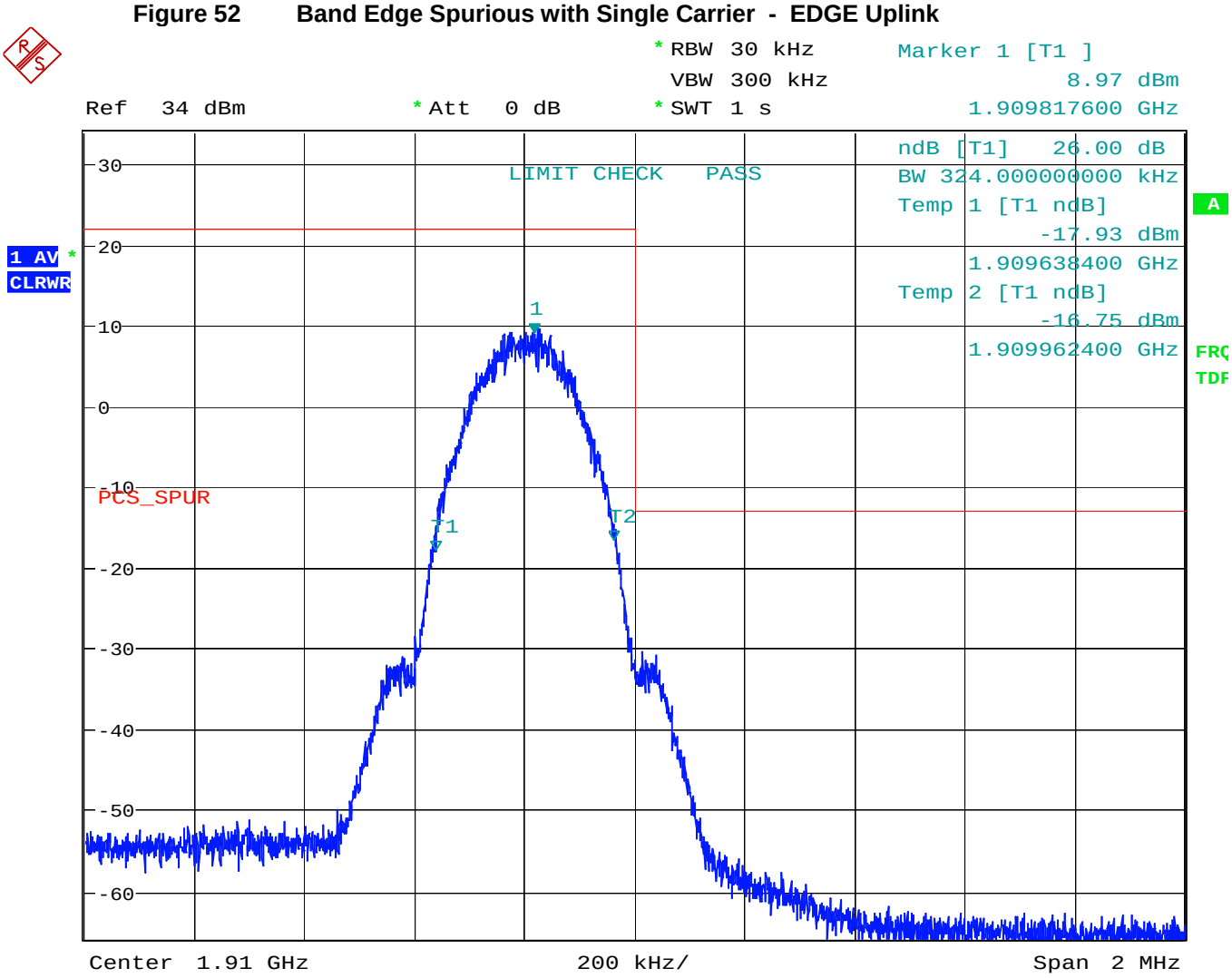
Date: 18.MAY.2007 16:33:19

Figure 51 Band Edge Spurious with Single Carrier - EDGE Uplink



Date: 18.MAY.2007 16:55:07

Figure 52 Band Edge Spurious with Single Carrier - EDGE Uplink



Date: 18.MAY.2007 16:51:53

D.8. Tested By

Name: Tom Tidwell,
Function: Manager of Wireless Services

APPENDIX E: 2.1053 FIELD STRENGTH OF SPURIOUS RADIATION

E.1. Base Standard & Test Basis

Base Standard	FCC 2.1053
Test Basis	FCC 2.1053 Field Strength of Spurious Radiation
Test Method	TIA 603-C, 2004 Substitution Antenna Method

E.2. Limits

24.238 Emission limitations for Broadband PCS equipment

(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.

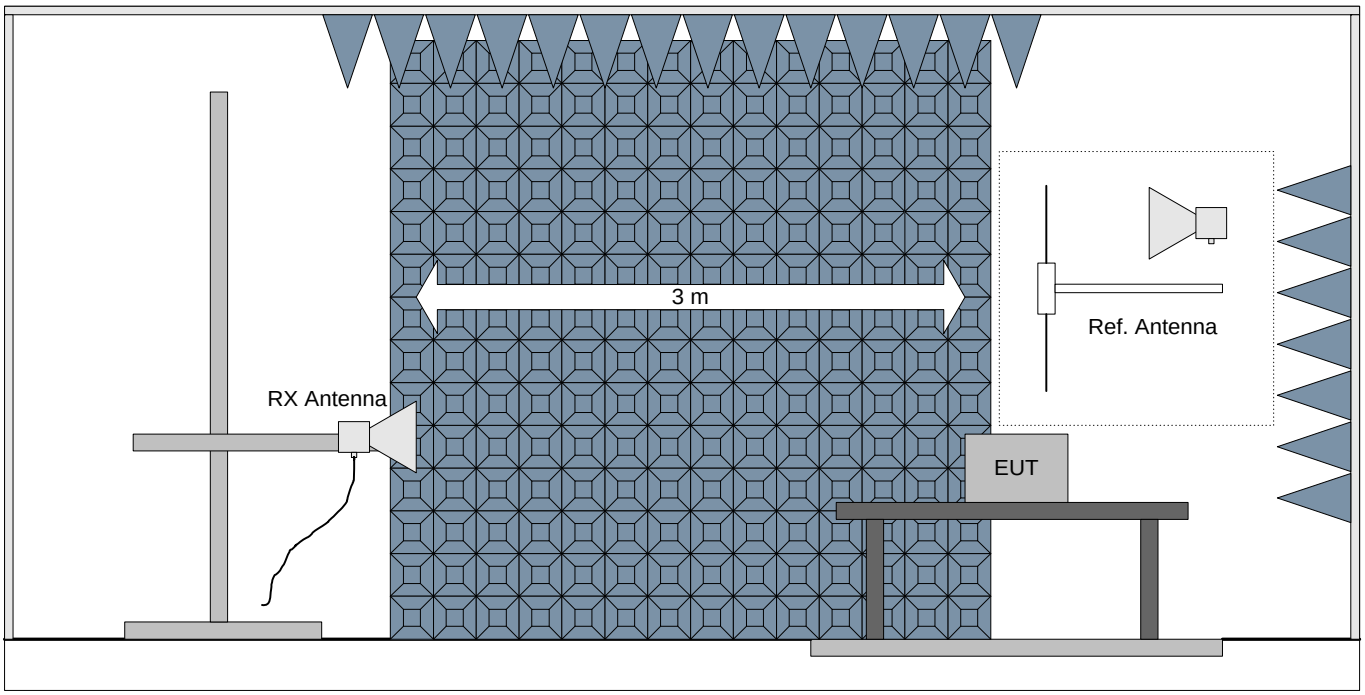
E.3. Test Results

Not tested. This testing was not repeated since the shielding of the device was not modified.

E.4. Deviations from Normal Operating Mode During Test

None.

E.5. Test Diagram



Note: The EUT is set to repeat a signal at maximum rf output power into a coaxial load for this testing.

2.1053 filter plots
These plots demonstrate the filter band pass characteristics of the device.

Figure 53 Downlink – 5 MHz filter

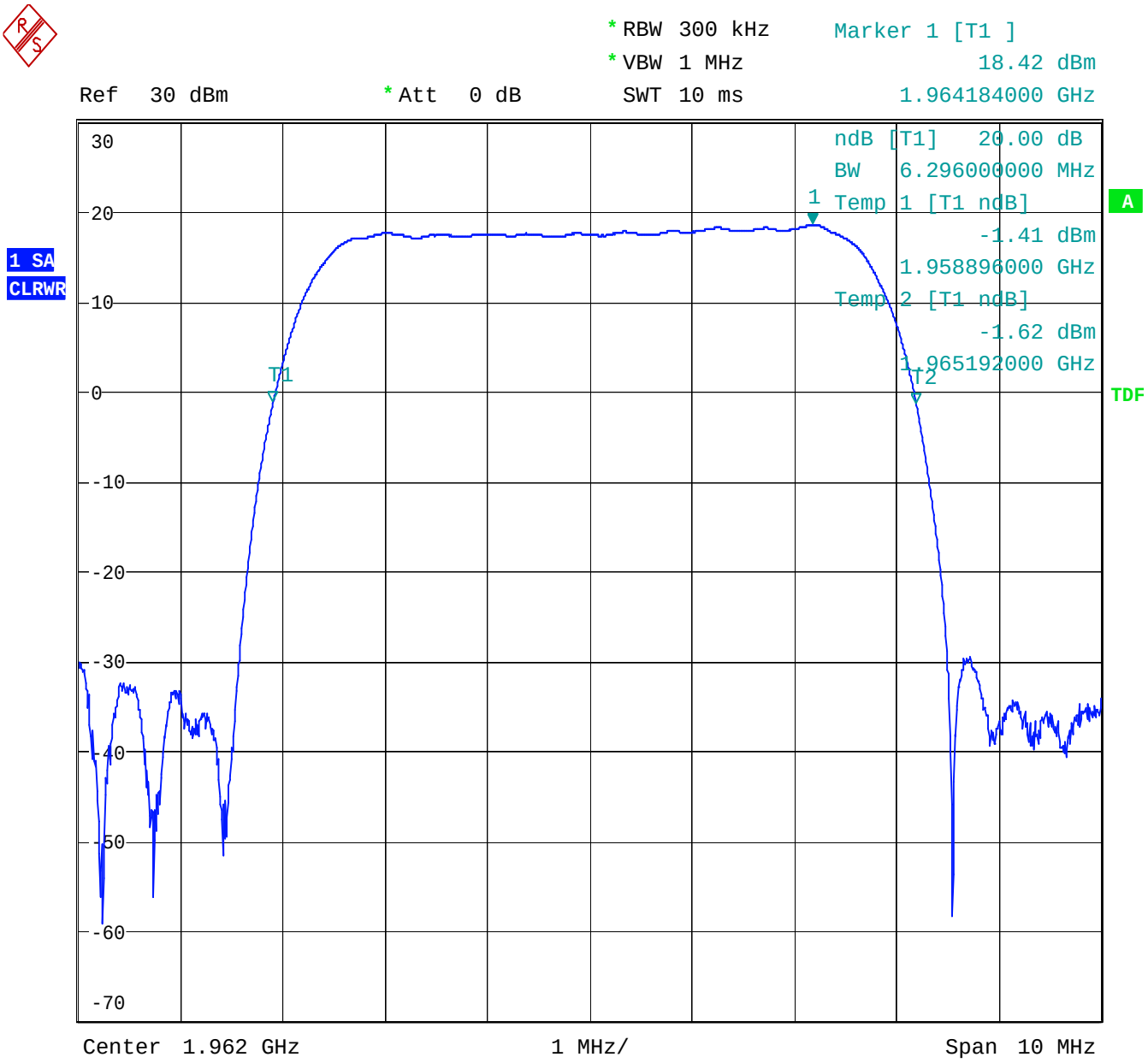


Figure 54 Uplink – 5 MHz filter

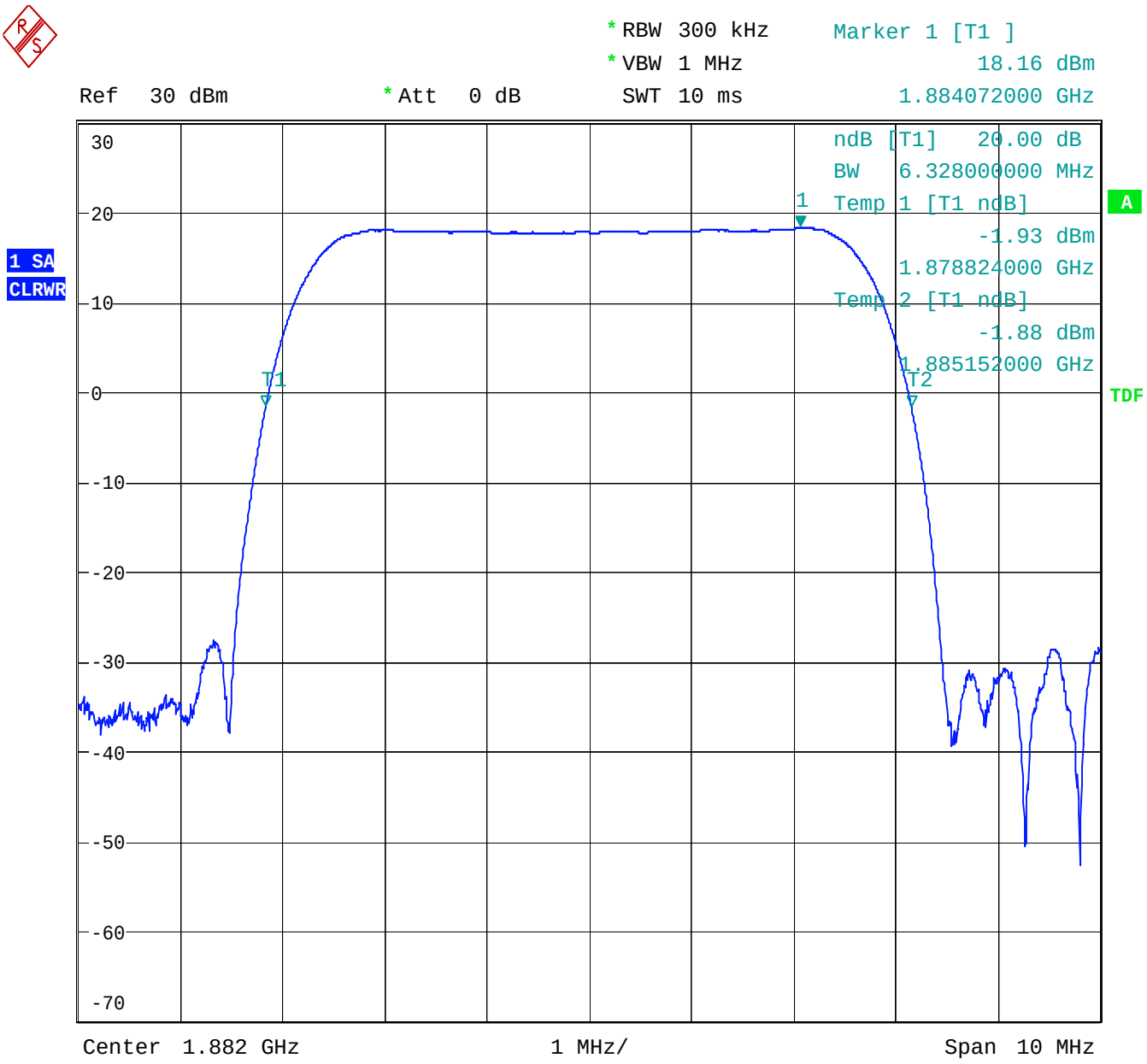
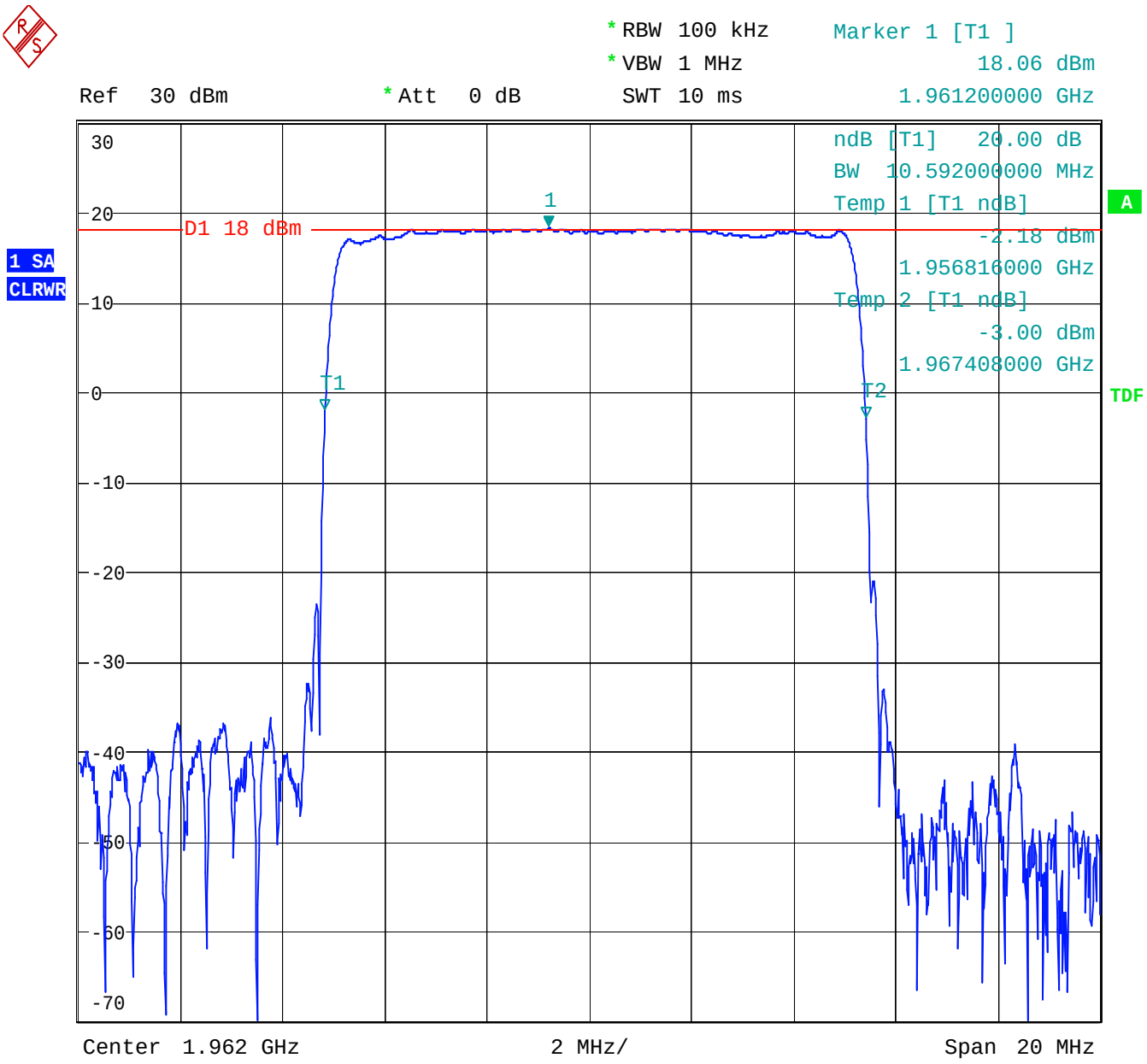
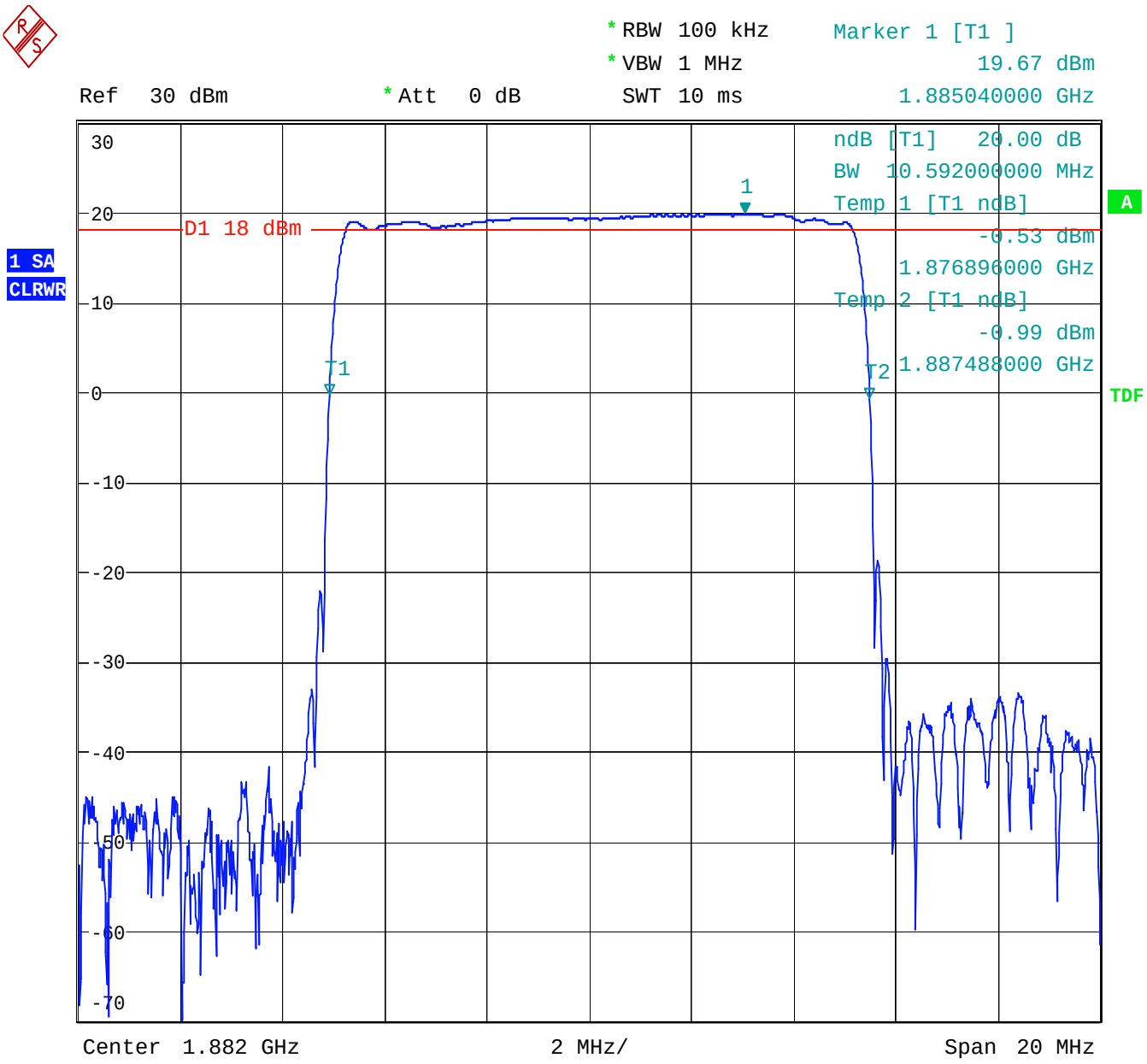


Figure 55 Downlink – 10 MHz filter



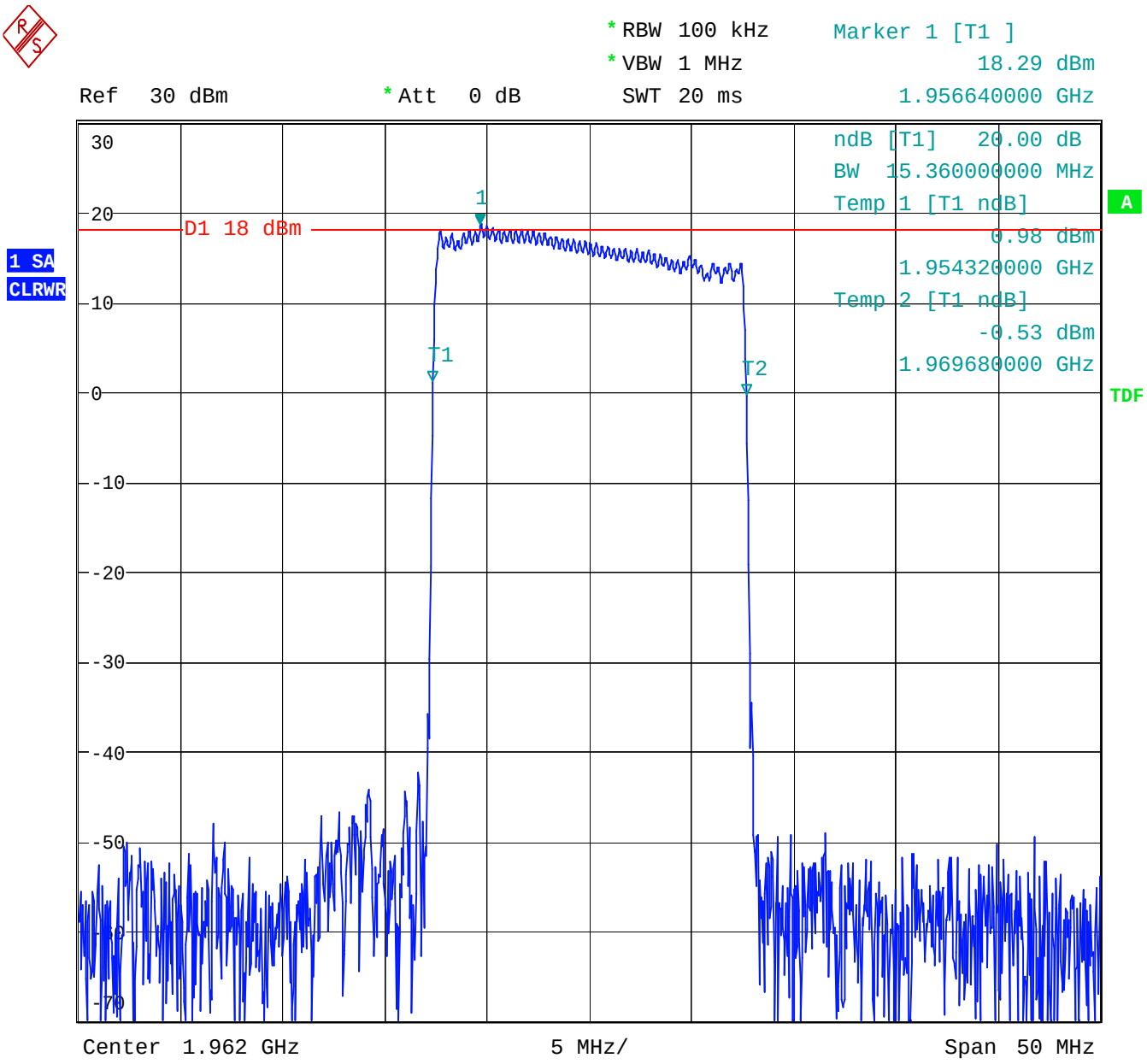
Date: 13.APR.2007 18:06:46

Figure 56 Uplink – 10 MHz filter



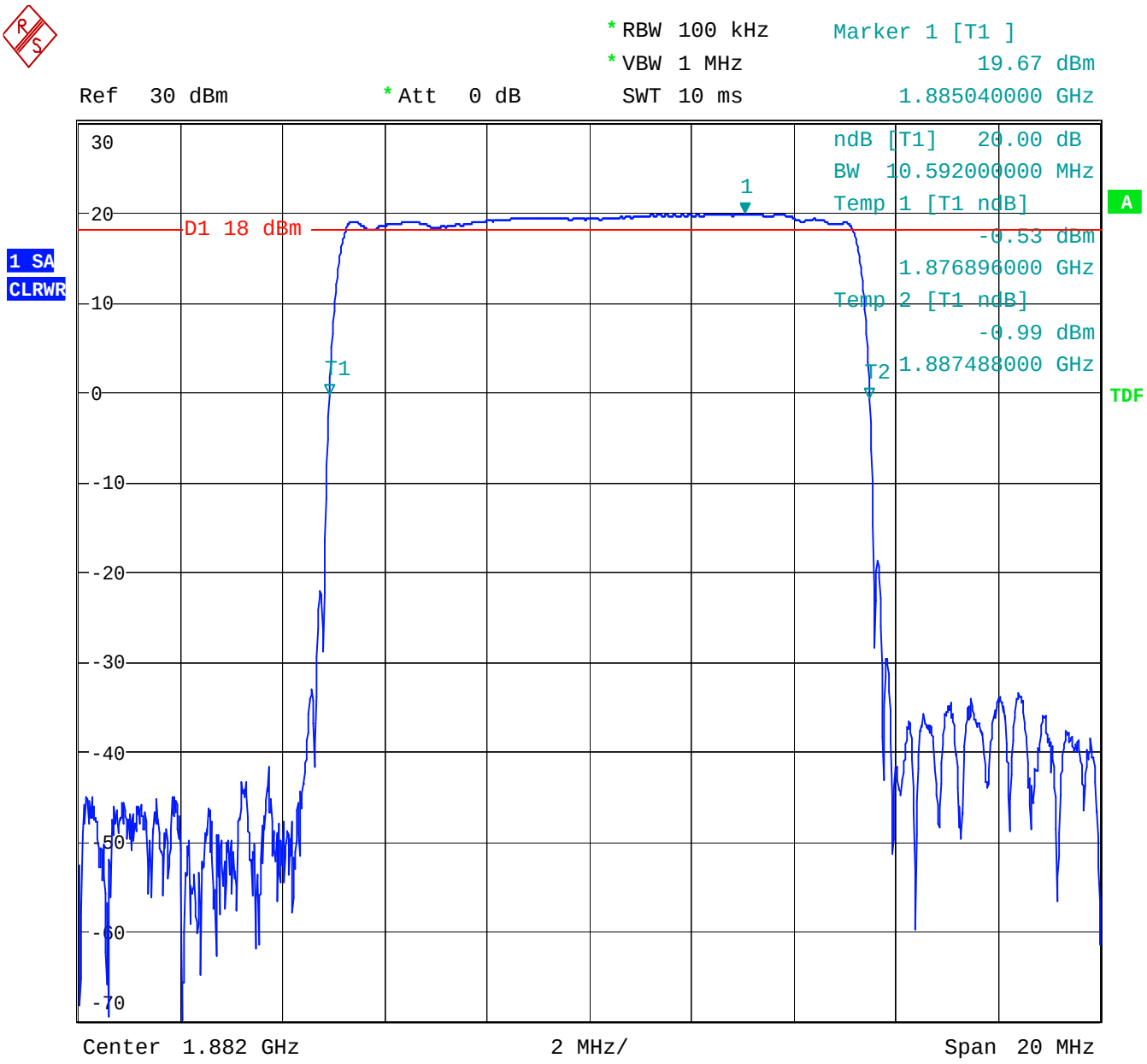
Date: 13.APR.2007 18:10:55

Figure 57 Downlink – 15 MHz filter



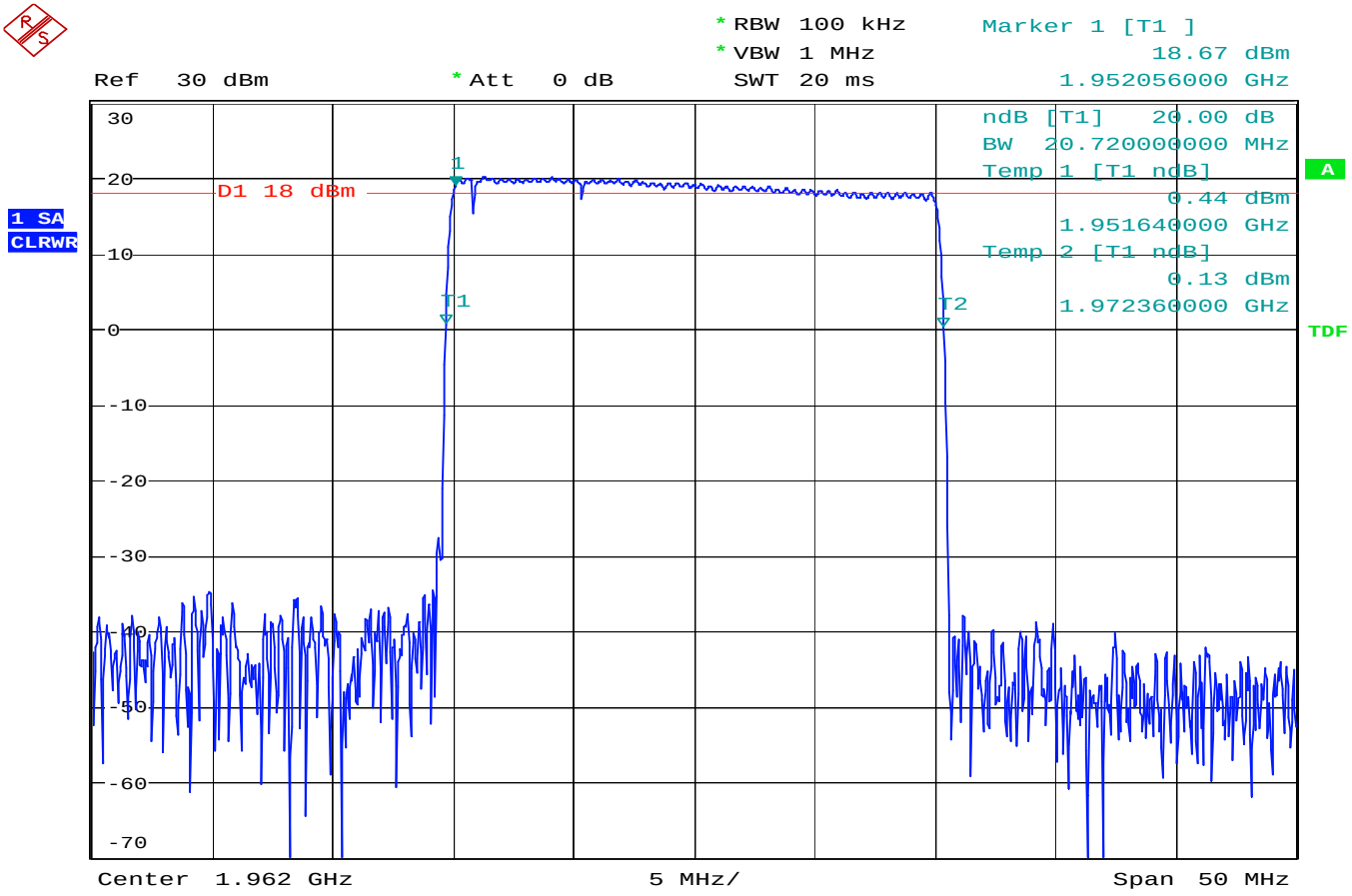
Date: 13.APR.2007 20:20:05

Figure 58 Uplink – 15 MHz filter



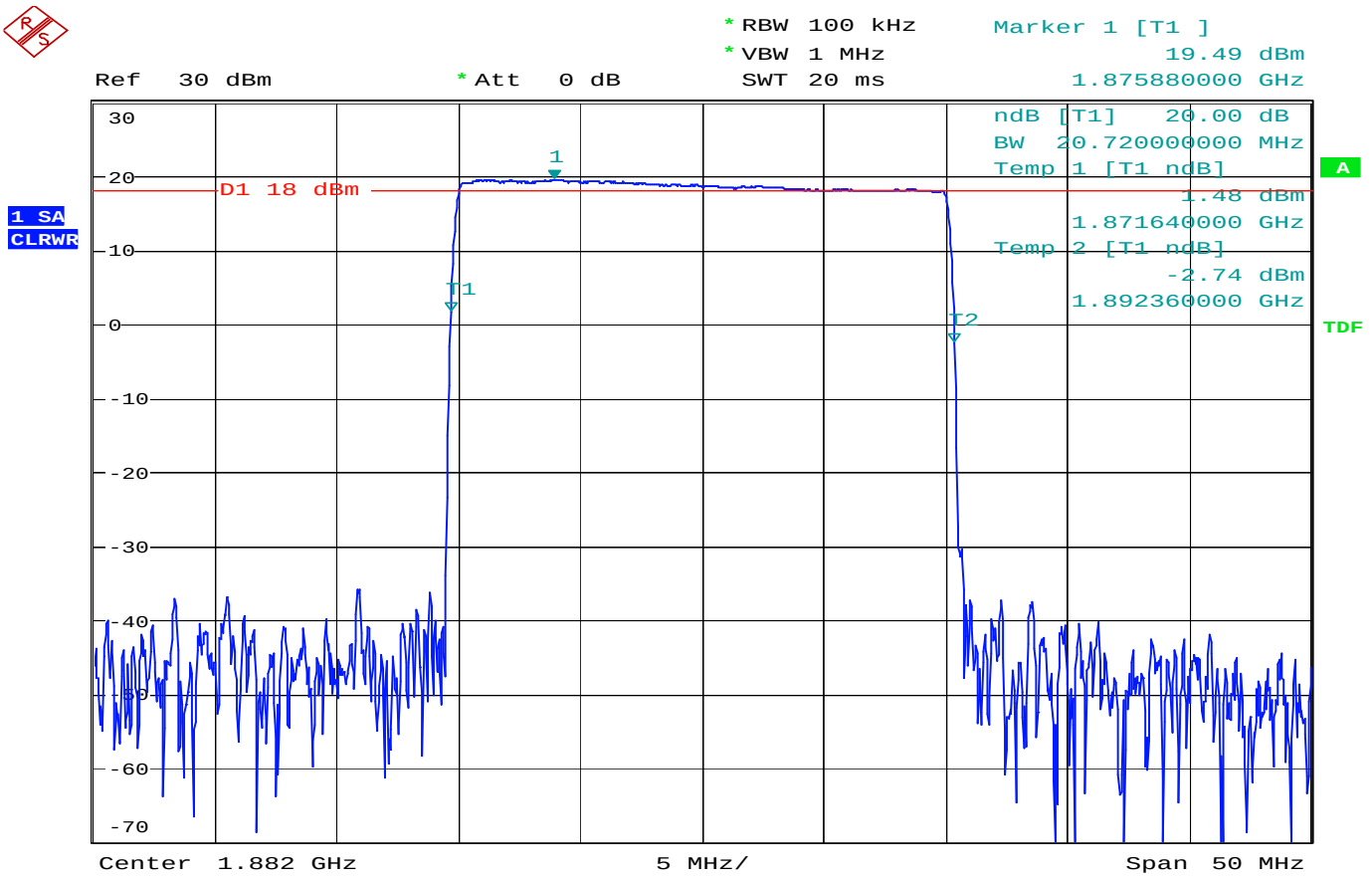
Date: 13.APR.2007 18:10:55

Figure 59 Downlink – 20 MHz filter



Date: 13.APR.2007 22:13:12

Figure 60 Uplink – 20 MHz filter



Date: 13.APR.2007 22:18:31

APPENDIX F: 2.1055 FREQUENCY STABILITY

F.1. Base Standard & Test Basis

Base Standard	FCC 2.1055
Test Method	TIA 603-C, 2004

Specifications

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

F.2. Deviations

Deviation Number	Time & Date	Description and Justification of Deviation	Deviation Reference			Approval
			Base Standard	Test Basis	NTS Procedure	
none						

F.3. Test Results

Not Applicable. This device does not perform frequency translation on the repeated signal..

F.4. Observations

None

F.5. Deviations from Normal Operating Mode During Test

None.

F.6. Sample Calculation

Frequency drift (ppm) = Frequency Drift (Hz)/Authorized frequency (MHz)

F.7. Test Data

None

F.8. Test Diagram

None

F.9. Tested By

Name: Tom Tidwell,
Function: Manager of Wireless Services

APPENDIX G: TEST EQUIPMENT LIST

G.1. Field Strength of Spurious Emissions 30 MHz – 26.5 GHz Measurement Equipment

Description	Manufacturer	Type/Model	Calibration Frequency	Cal Due	NTS Control No.
3m ANECHOIC CHAMBER					
RX Bilog Antenna	ETS	3142C	12 Months	8/17/07	E1288P
Ref. Horn Antenna	ETS	3115	12 Months	11/1/07	E1019P
RX Horn Antenna	ETS	3115	12 Months		E1022P
High Frequency - Cable 1	MegaPhase	TM26-3135-144	12 Months	8/23/07	W1010P
Reference Antenna	ETS	3121 Dipole Set	12 months	8/8/07	S/N. 274
CONTROL ROOM					
Test Receiver	Rohde & Schwarz	FSQ 26	12 Months	9/21/07	W1020P
High Frequency - Cable 2	MegaPhase	NA	12 Months	8/23/07	W1011P
Amplifier	HP	8449B	12 Months	5/4/08	E1010P

G.2. Antenna Conducted Emissions Measurement Equipment

Instrument	Manufacturer	Model	Calibration Frequency	Calibration Due
ANTENNA CONDUCTED EMISSIONS				
Spectrum Analyzer	Rohde & Schwarz	FSQ 26	12 Months	9/21/07
High Frequency - Cable 1	MegaPhase	TM26-3135-144	12 Months	8/23/07
10 dB attenuator	Wiltron	43KC-10	12 Months	8/23/07
20 dB attenuator	Inmet	36AH-20	12 Months	8/23/07
3 dB attenuator	Inmet	36AH-3	12 Months	8/23/07
3 dB attenuator	Inmet	36AH-3	12 Months	8/23/07
50 ohm loads	Amphenol	50R	12 Months	8/28/07
I/Q Signal Generator	Rohde & Schwarz	SMIQ 03	12 Months	8/25/07
I/Q Modulation Generator	Rohde & Schwarz	AMIQ	12 Months	8/28/07
Combiner	Mini-Circuits	ZFSC-2-2500	N/A	N/A*
IS-95 CDMA BTS simulator	Rohde & Schwarz	CMD80	N/A	N/A*

* This device was not used for calibrated measurements.

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