1701 E. Plano Parkway, Suite 150
Plano, Texas 75074
Phone: (972) 509-2566
Fax: (972) 509-0073

Certification Test Report

CFR 47 FCC Part 2 and Part 22, Subpart C

Model: MR853D

FCC ID.: BCR-RPT-MR853D

Project Code: W7127-1

Revision: 1

Prepared for:	Andrew Corporation 108 Rand Park Drive Garner, North Carolina 27529
Author:	Tom Tidwell, Manager of Wireless Services
Issued:	16 May, 2007

Report Summary

NTS Plano

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

Applicant: Andrew Corporation
108 Rand Park Drive
Garner, North Carolina 27529

Customer Representative: Michael Williamson

EUT Description:

EUT Description	Manufacturer	Model	Revision	Serial Number
The EUT is mini repeater system that operates in the North American Mobile Phone System band (824-849 MHz Uplink/869-894 MHz Downlink)	Andrew Wireless Systems Gmbh	MR853D	-	-

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 22, Para. 22.913
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 22, Para. 22.917
D	Spurious Emissions at Antenna Terminals	No	No	No	PASS	CFR 47, Part 2, Para. 2.1051 CFR 47, Part 22, Para. 22.917
E	Field Strength of Spurious Radiation	No	No	No	PASS	CFR 47, Part 2, Para. 2.1053 CFR 47, Part 22, Para. 22.917
F	Frequency Stability	No	No	No	PASS	CFR 47, Part 2, Para. 2.1055 CFR 47, Part 22, Para. 22.355

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	16 May, 2007
1	Added labels to plots pages 31 - 75	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 MR853D to FCC Part 22 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	MR853D	1	1
RF Exposure Classification	Indoor or Outdoor Fixed. Minimum separation is 20 cm.			
Channels/Frequency Range	824 – 849 MHz, 869 – 894 MHz			
Power	**Downlink:** +18 dBm at antenna port **Uplink:** +18 dBm at antenna port.			
Emission Designator:	F8W – Analogue F1D - Analogue F9W – CDMA F9W – W-CDMA GXW - GSM G7W - EDGE DXW - TDMA			
TX antenna details	Determined at time of licensing			
Functional Description	The MR853D is used to enhance coverage of a cellular network within a building.			

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	DC power	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, maximum gain
- Uplink, maximum rf output power, maximum gain

The rf input level was increased until no further increase was noted at the rf output port.

3.0 SUPPORT EQUIPMENT

3.1 CONFIGURATION

The radio was activated using customer-supplied test software. The software allowed the test engineer to change modulation modes and data rates as well as transmit channel.

3.2 TEST BED/PERIPHERAL CABLES

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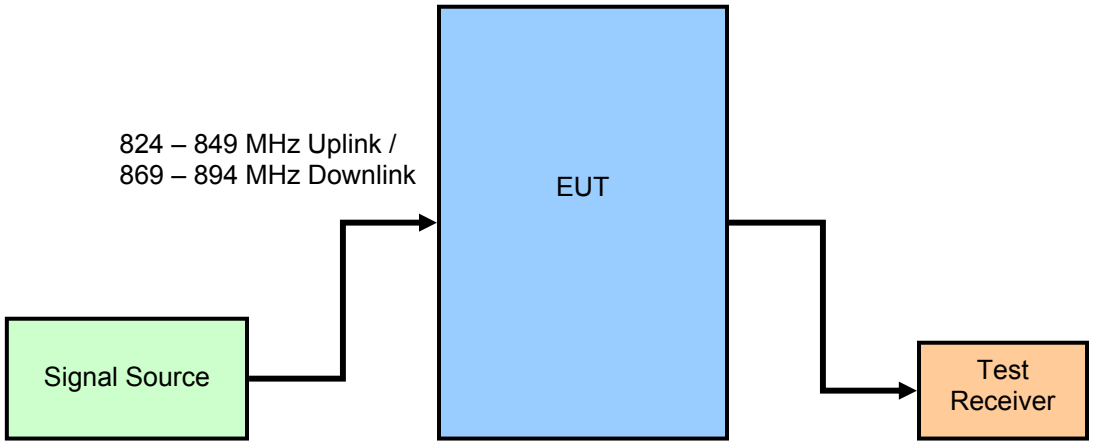


APPENDICES

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

(a) *Maximum ERP*. In general, the effective radiated power (ERP) of base transmitters and cellular repeaters must not exceed 500 Watts. However, for those systems operating in areas more than 72 km (45 miles) from international borders that:

(1) 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; or,

(2) Extend coverage on a secondary basis into cellular unserved areas, as those areas are defined in §22.949, the ERP of base transmitters and cellular repeaters of such systems must not exceed 1000 Watts. The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

Applicable RF Power Limit from Above: 500 watts

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

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 +18 dBm (0.063 watts) (downlink) and +18 dBm (0.063 watts) (uplink).

A.6. Operating Mode During Test

The transmitter was tested while in a continuous transmit mode. The rf input signal was tuned to a low, middle, and high channel in both the downlink (base to mobile) and uplink (mobile to base) directions.

A.7. Sample Calculation

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

A.8. Test Data

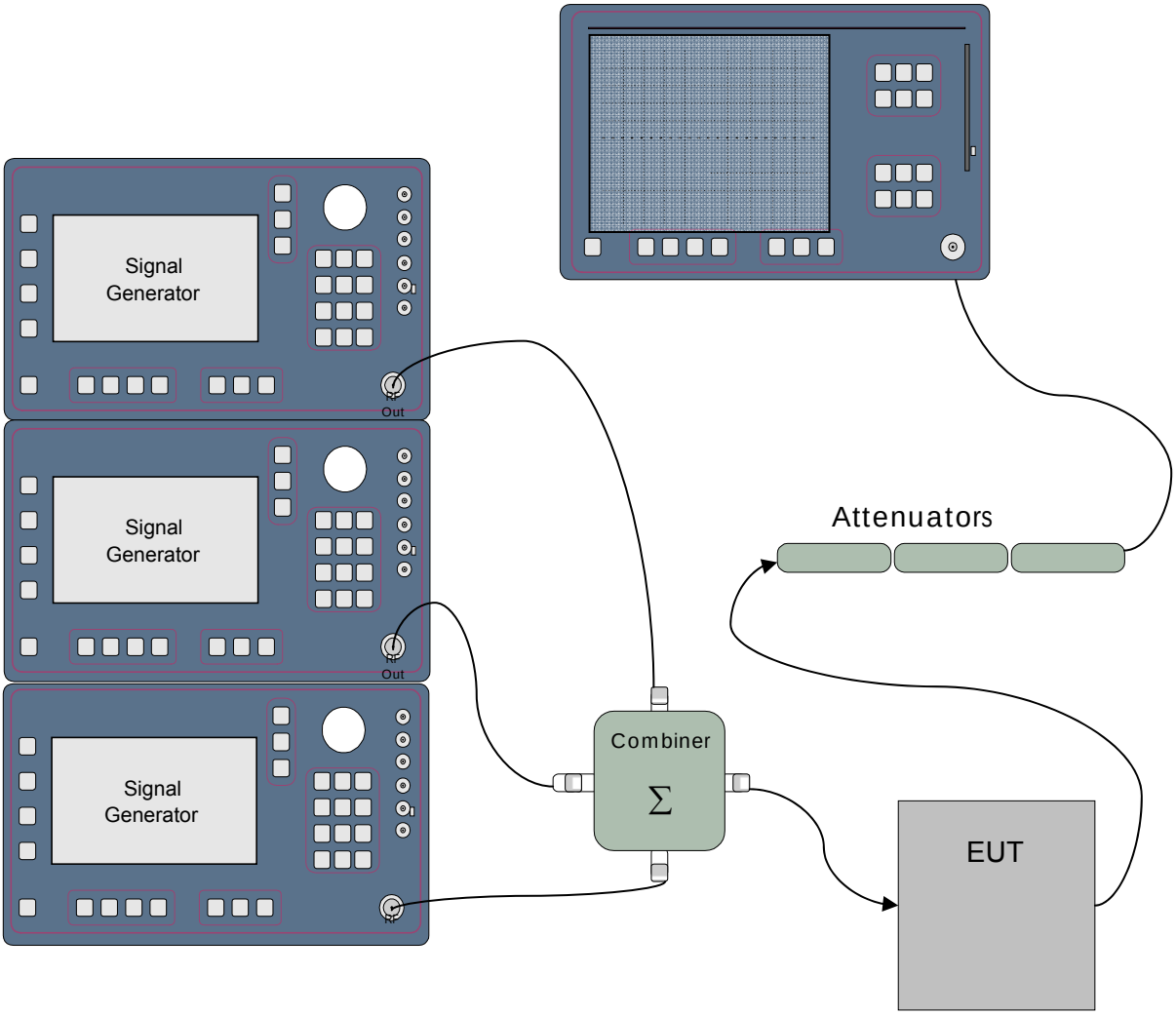
Channel	Signal Path	Modulation Mode	RF Power Output at Antenna Terminals (dBm)
991	DL	F8W (Analogue)	18.0
384	DL	F8W (Analogue)	18.1
799	DL	F8W (Analogue)	17.9
991	DL	F1D (Analogue)	18.0
384	DL	F1D (Analogue)	18.1
799	DL	F1D (Analogue)	17.9
1013	DL	F9W (IS-95 CDMA)	16.0
384	DL	F9W (IS-95 CDMA)	16.0
777	DL	F9W (IS-95 CDMA)	16.0
54	DL	F9W (W-CDMA)	11.0
384	DL	F9W (W-CDMA)	11.0
715	DL	F9W (W-CDMA)	11.0
996	DL	GXW (GSM)	18.0
384	DL	GXW (GSM)	18.0
793	DL	GXW (GSM)	18.0
996	DL	G7W (EDGE)	18.0
384	DL	G7W (EDGE)	18.0
793	DL	G7W (EDGE)	18.0
991	DL	DXW (TDMA/NADC)	18.0
384	DL	DXW (TDMA/NADC)	18.0
799	DL	DXW (TDMA/NADC)	18.0
991	UL	F8W (Analogue)	18.0
384	UL	F8W (Analogue)	18.0
799	UL	F8W (Analogue)	18.0
991	UL	F1D (Analogue)	18.0
384	UL	F1D (Analogue)	18.0
799	UL	F1D (Analogue)	18.0
1013	UL	F9W (IS-95 CDMA)	16.0
384	UL	F9W (IS-95 CDMA)	16.0
777	UL	F9W (IS-95 CDMA)	16.0
54	UL	F9W (W-CDMA)	11.0
384	UL	F9W (W-CDMA)	11.0
715	UL	F9W (W-CDMA)	11.0
996	UL	GXW (GSM)	18.0
384	UL	GXW (GSM)	18.0
793	UL	GXW (GSM)	18.0
996	UL	G7W (EDGE)	18.0
384	UL	G7W (EDGE)	18.0

793	UL	G7W (EDGE)	18.0
991	UL	DXW (TDMA/NADC)	18.0
384	UL	DXW (TDMA/NADC)	18.0
799	UL	DXW (TDMA/NADC)	18.0

Note: RF power output was measured using a spectrum analyzer with detector set to RMS and RBW set to 50 MHz. Video bandwidth was set to maximum (30 MHz). Measurement was made with a single carrier.

*DL = Downlink (BTS to Mobile) path, UL = Uplink (Mobile to BTS) path

A.9. Test Diagram



A.10. Tested By

Name: Tom Tidwell,
Function: Manager of Wireless Services

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

F8W: Analogue
F1D: Analogue Data
F9W: IS-95 CDMA
F9W: W-CDMA
GXW: GSM
G7W: EDGE
DXW: TDMA

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

22.917

(b) 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

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

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 Mbs
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: 270.833 ksps
Filter: Gaussian
Roll Off: 0.30
Window Function: Rectangular

EDGE carrier:

Data source: PRBS(Pseudo-Random Bit Sequence)
Modulation: 8PSK
Symbol Rate: 270.833 ksps
Filter: Gaussian linear
Window Function: Rectangular

TDMA (NADC):

Data source: PRBS(Pseudo-Random Bit Sequence)
Modulation: π/4DQPSK
Symbol Rate: 270.833 ksps
Filter: Gaussian linear
Window Function: Rectangular

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 by the device under test.

C.6. Deviations from Normal Operating Mode During Test

None.

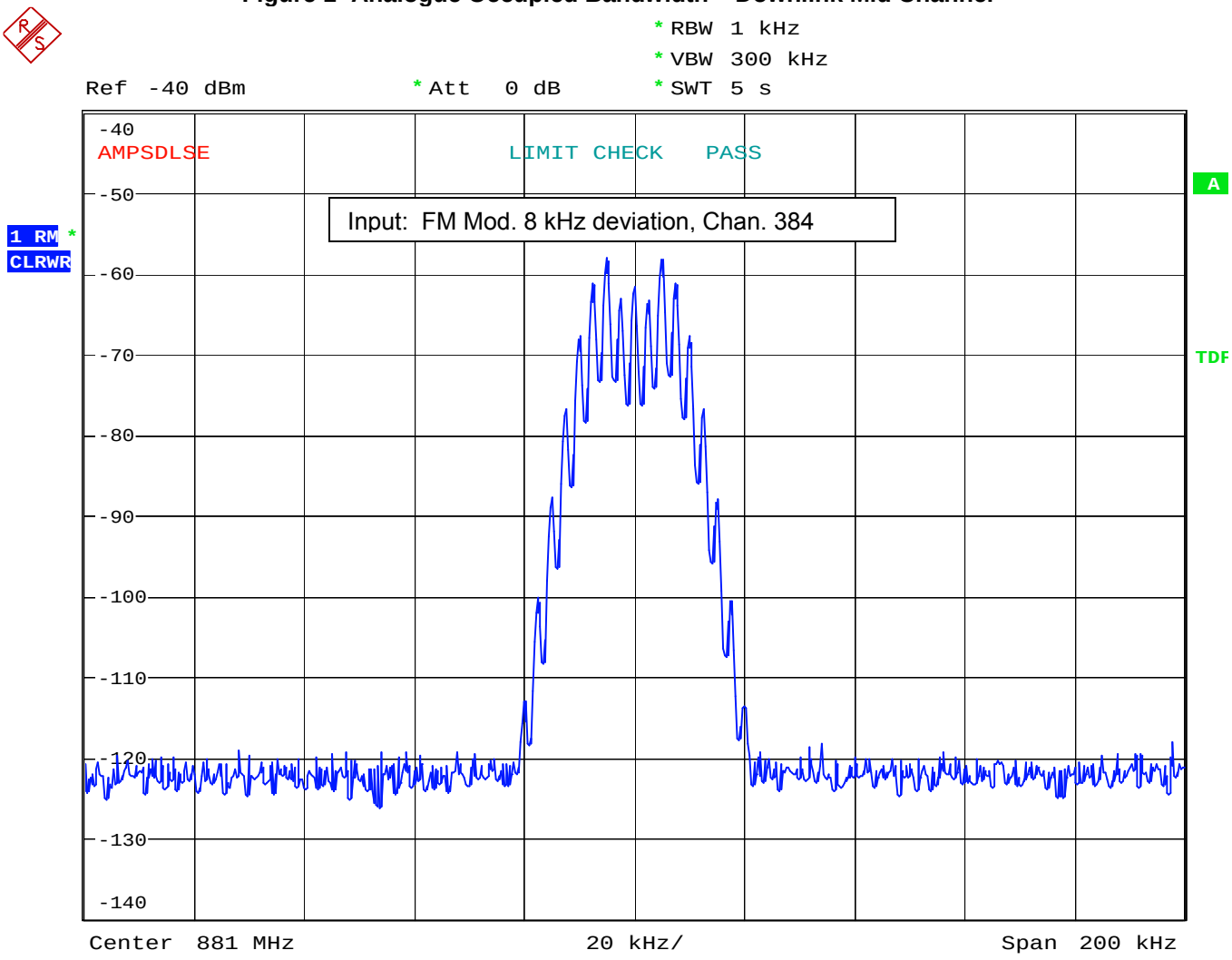
C.7. Sample Calculation

None.

C.8. Test Data

See plots following.

Figure 1 Analogue Occupied Bandwidth – Downlink Mid Channel



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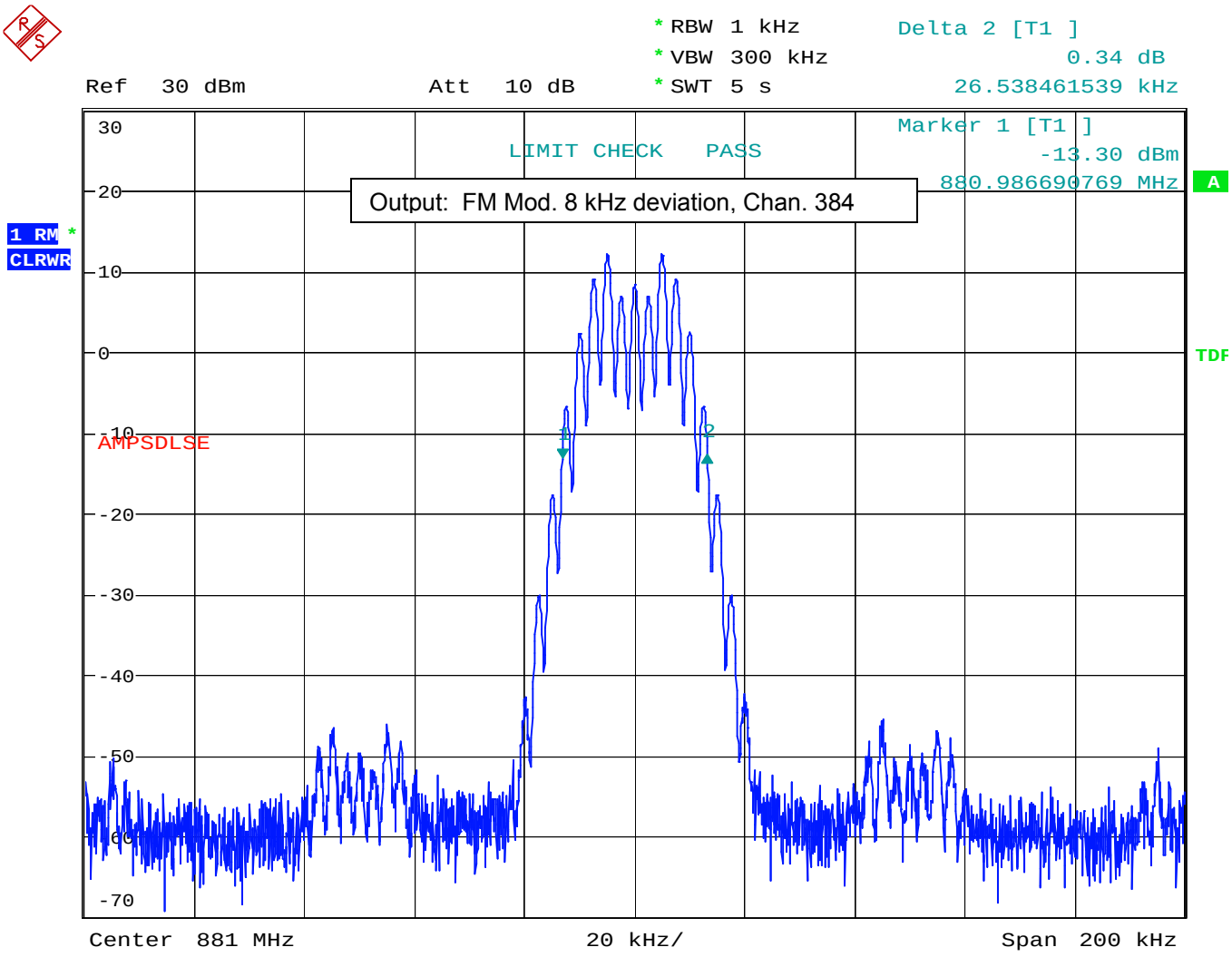

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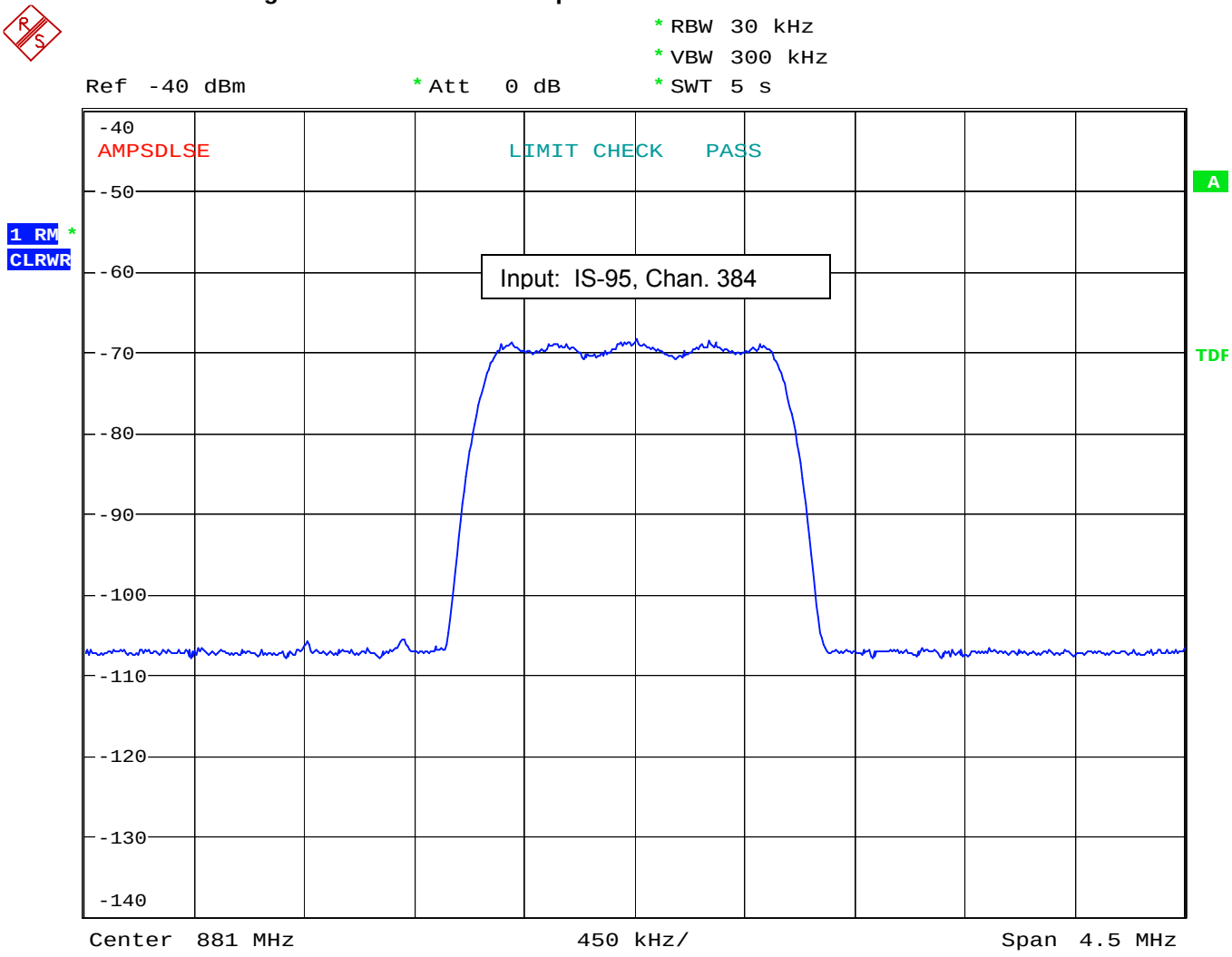
Figure 2 IS-95 CDMA Occupied Bandwidth – Downlink Mid Channel



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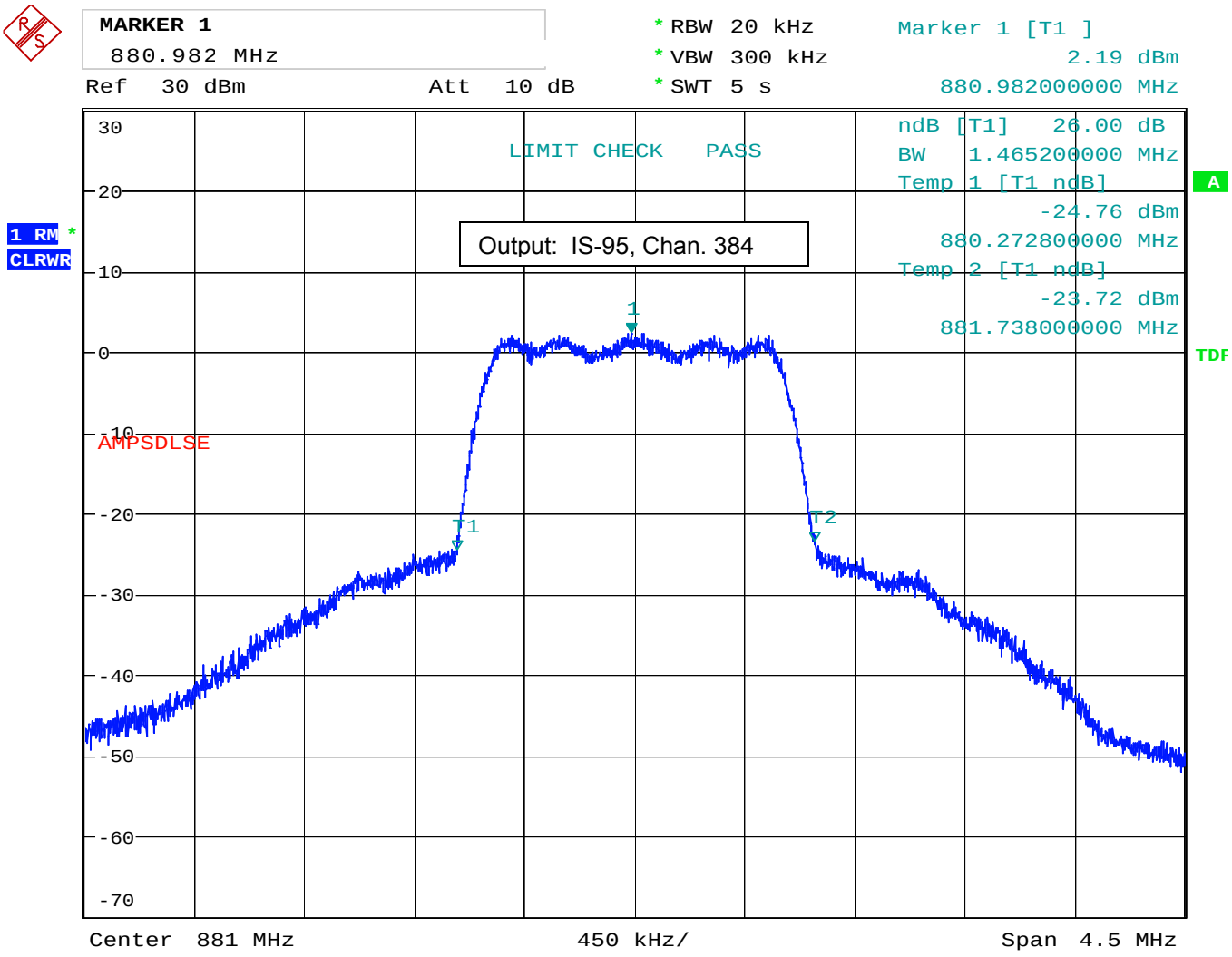

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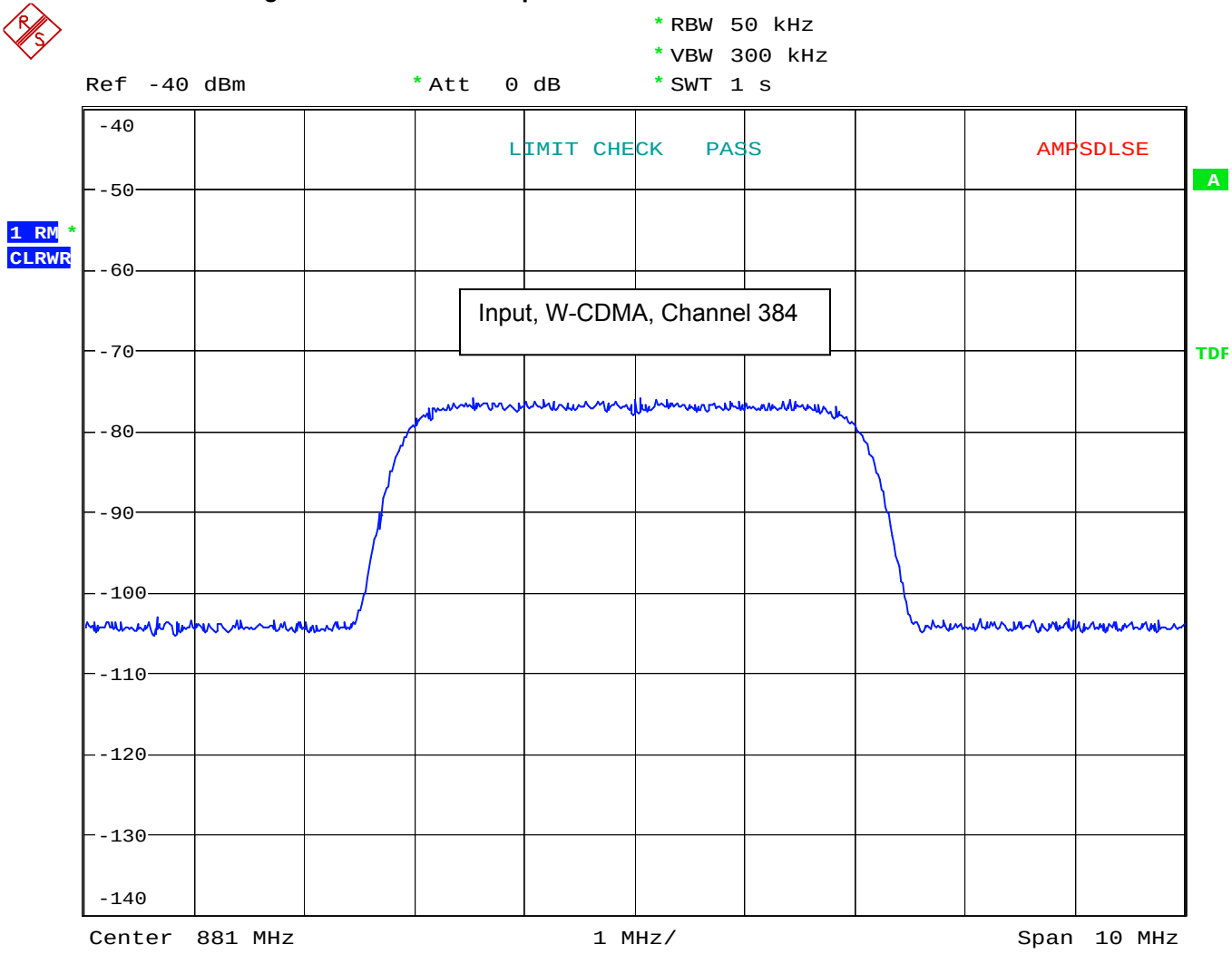
Figure 3 W-CDMA Occupied Bandwidth – Downlink Mid Channel



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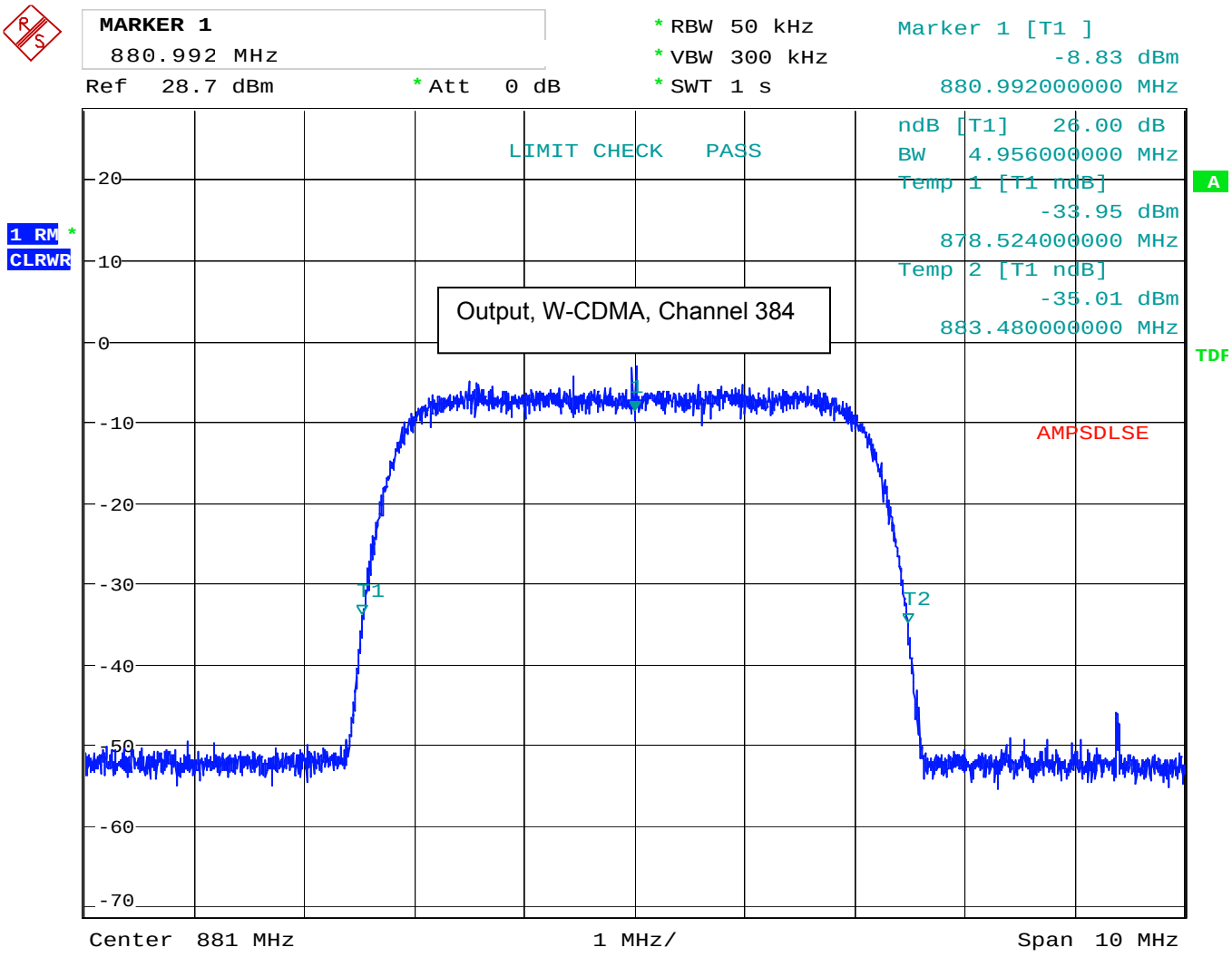

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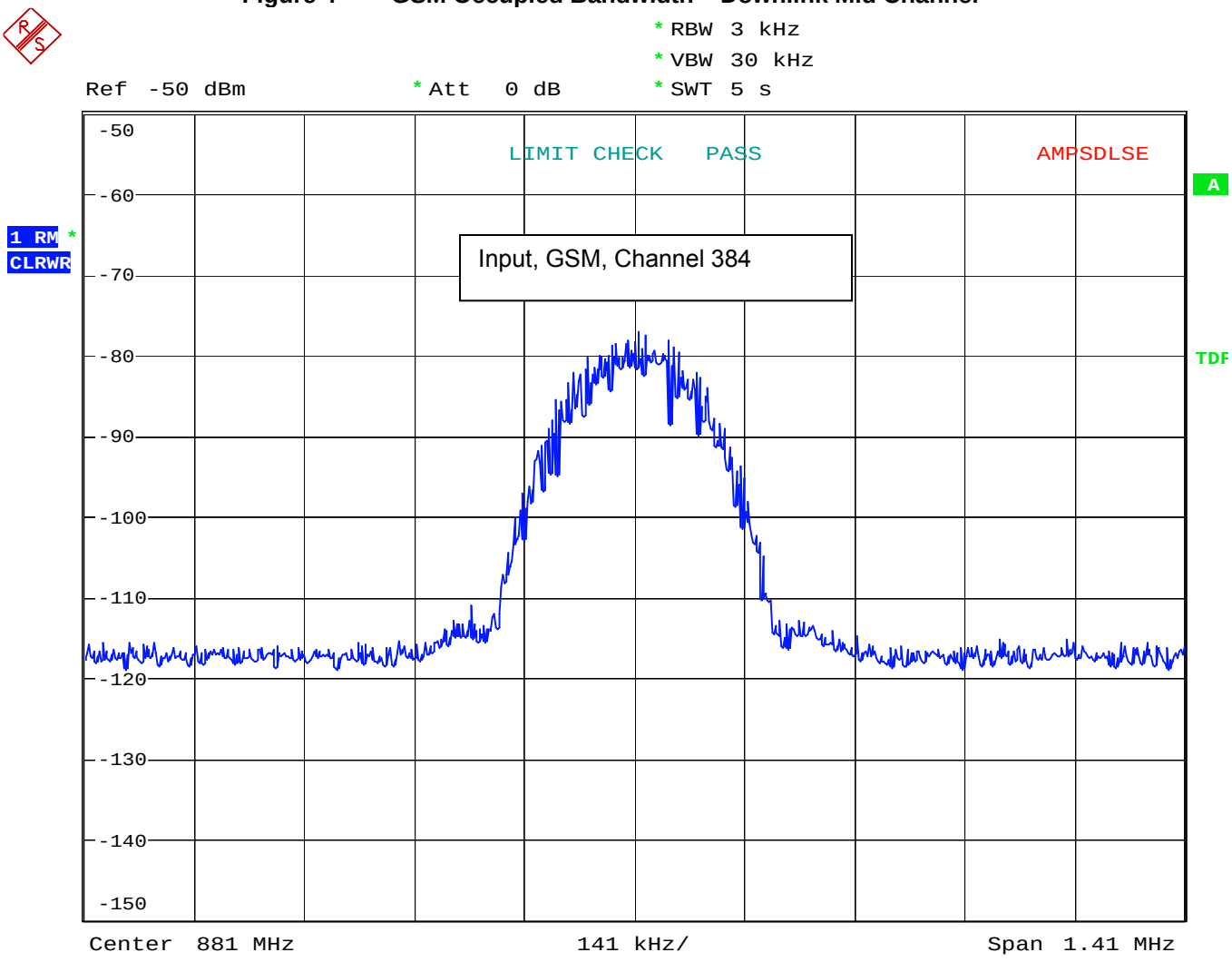
Figure 4 GSM Occupied Bandwidth – Downlink Mid Channel



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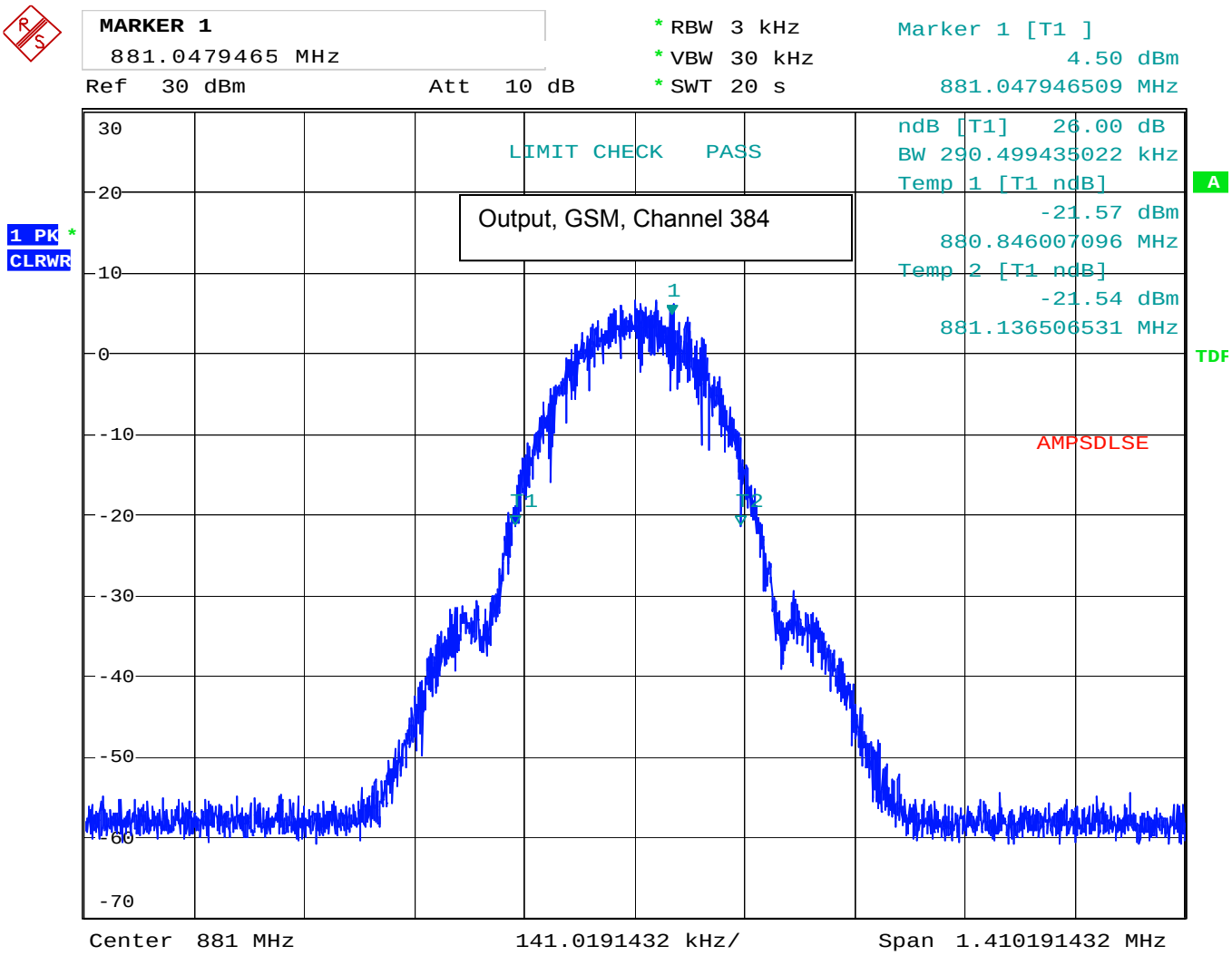

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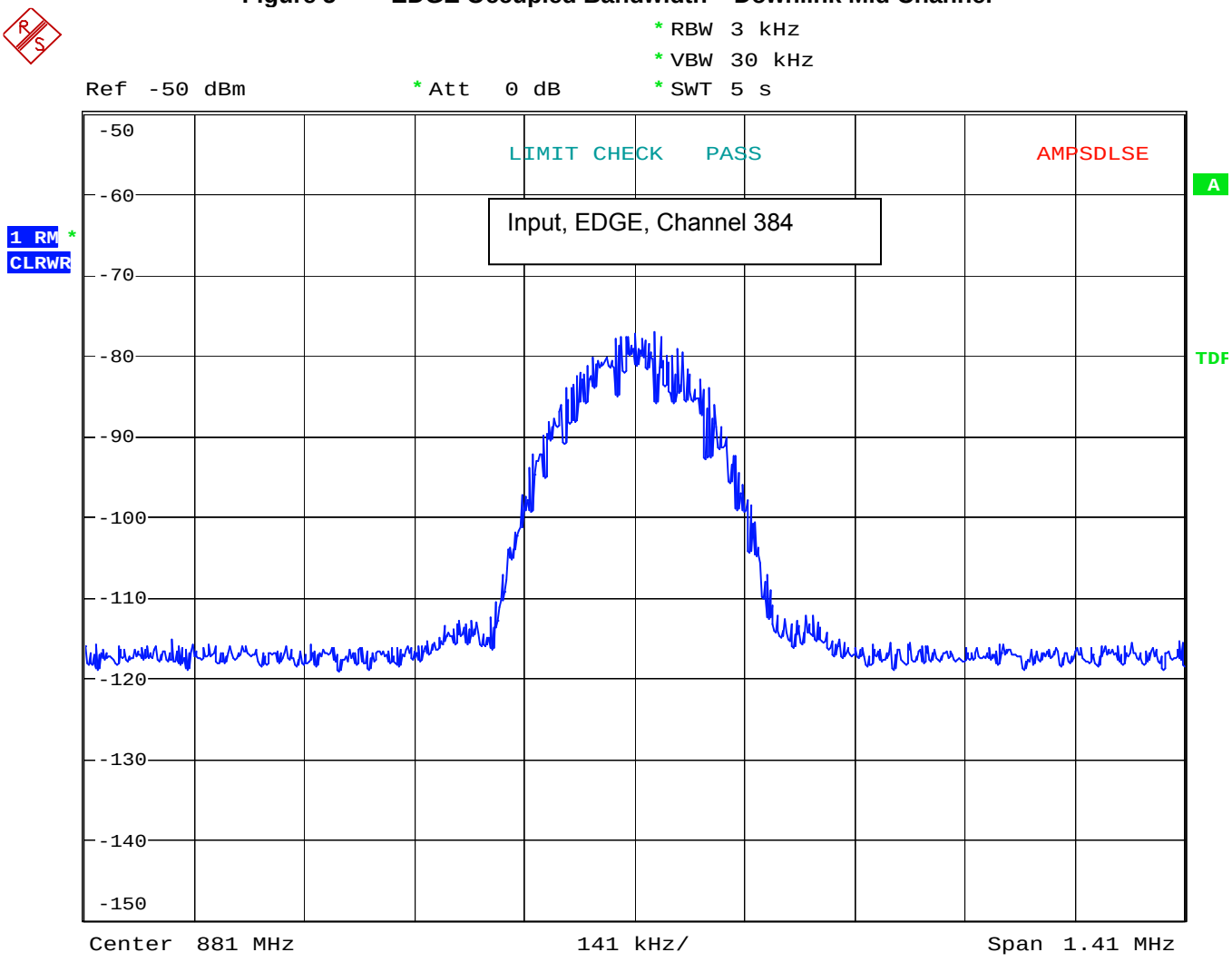
Figure 5 EDGE Occupied Bandwidth – Downlink Mid Channel



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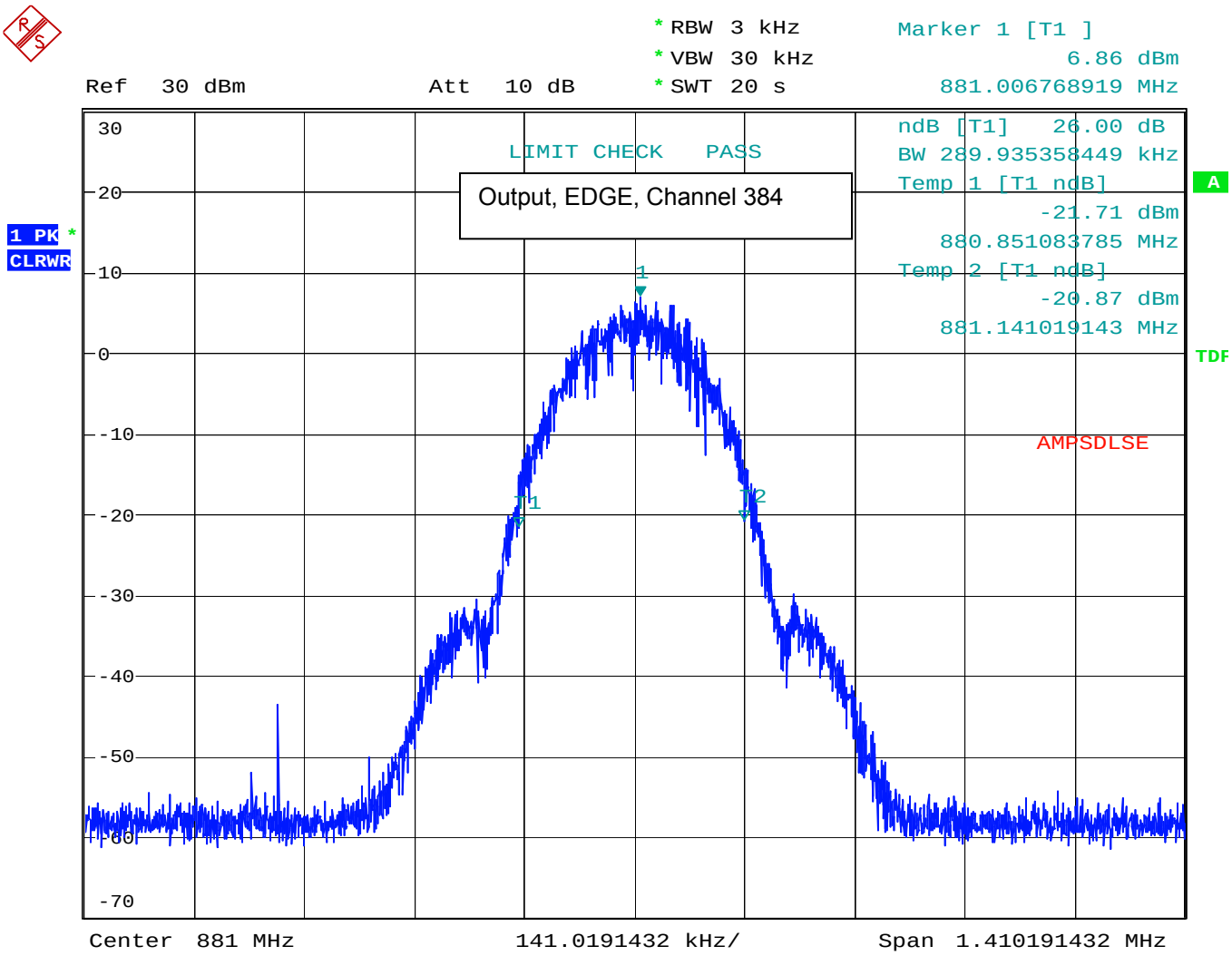
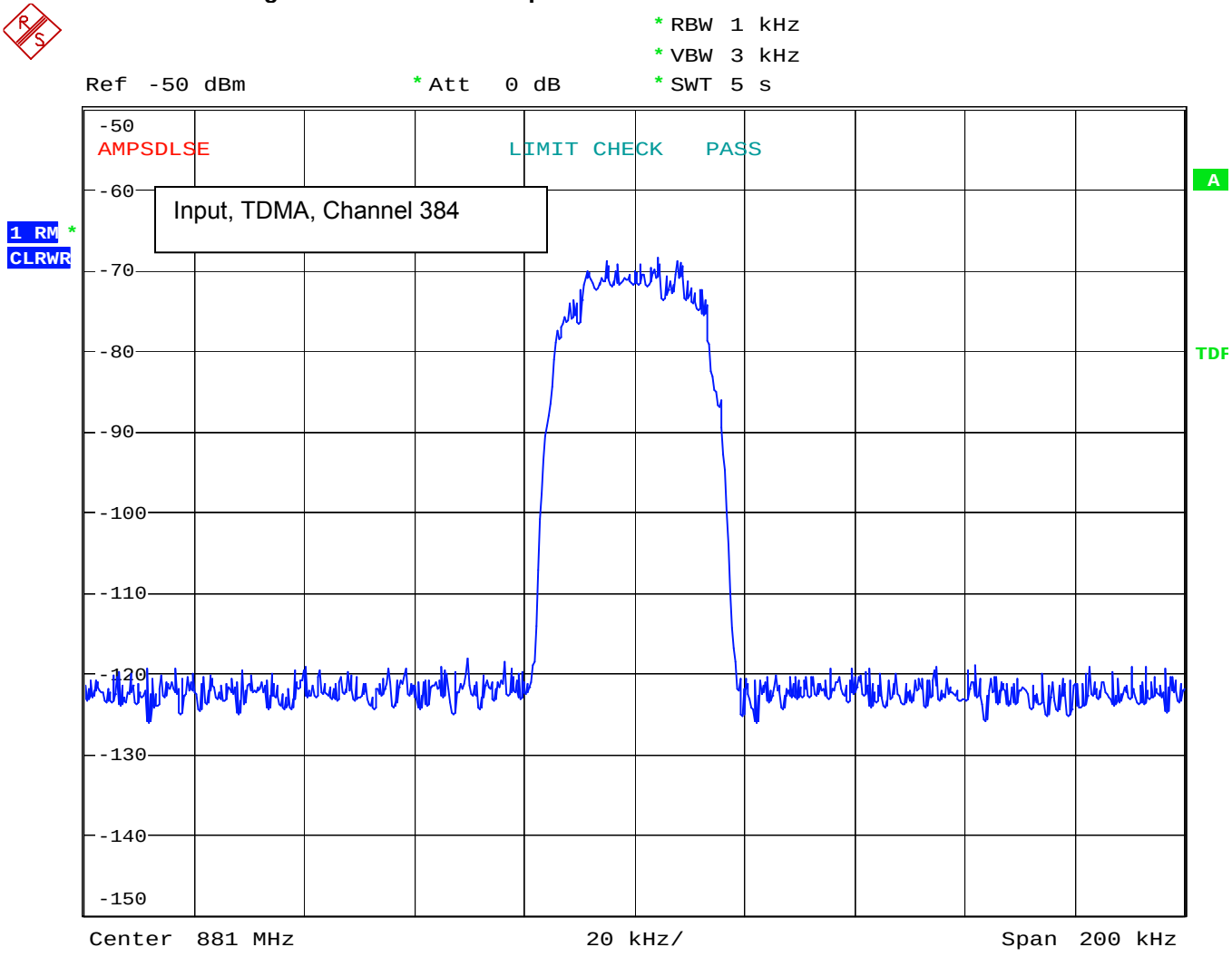


Date: 12.MAY.2007 00:22:51

Figure 6 TDMA Occupied Bandwidth – Downlink Mid Channel



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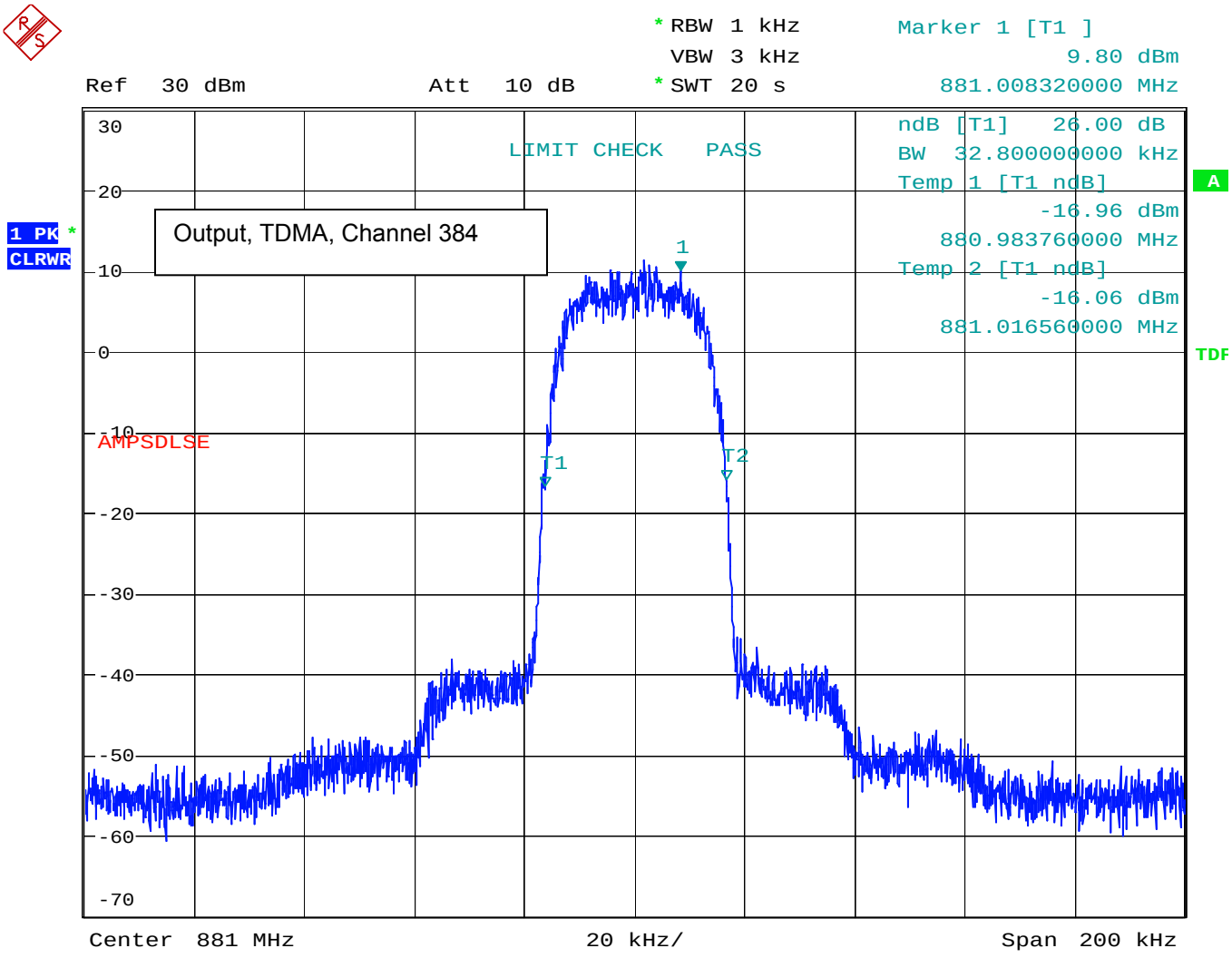

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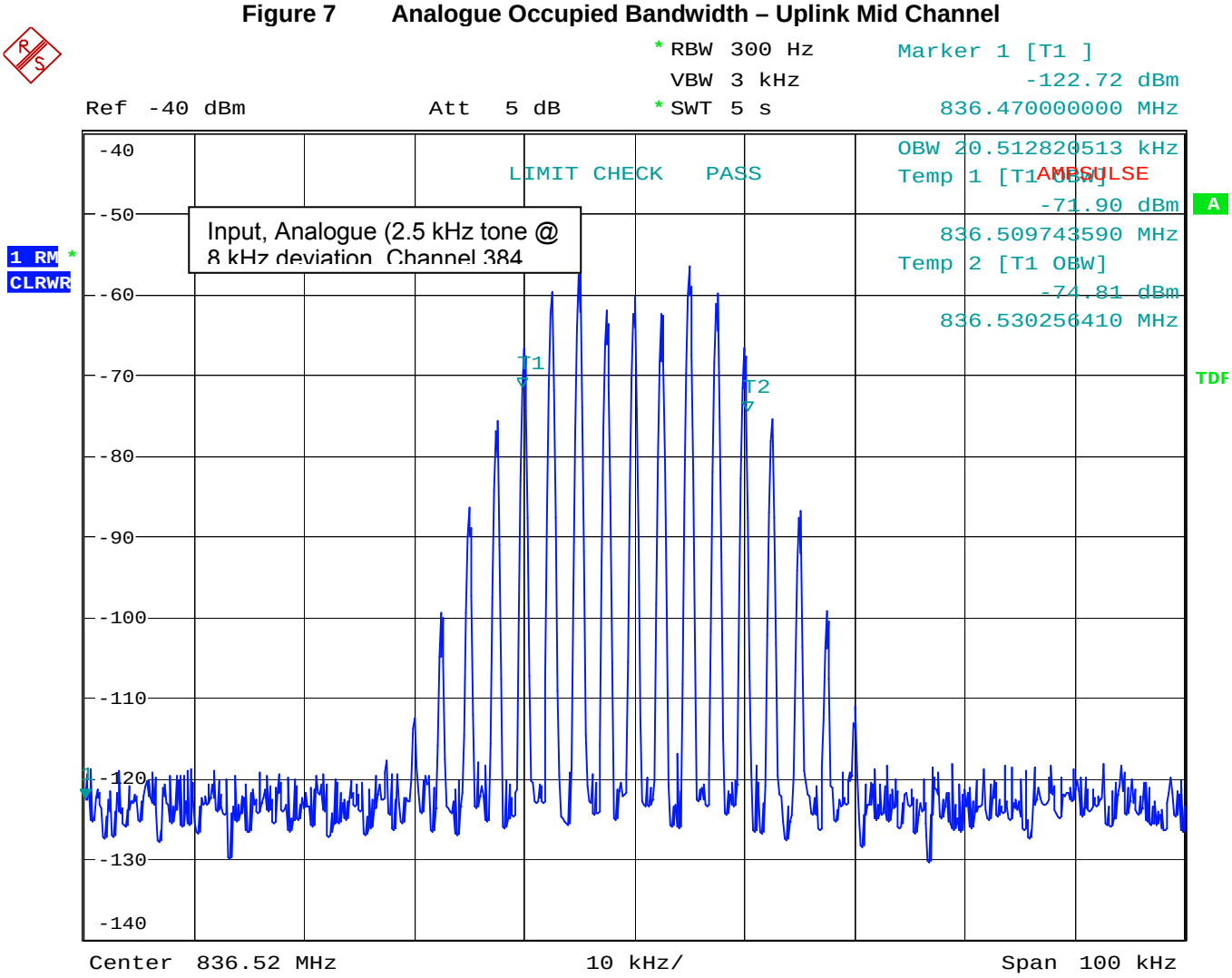
Figure 7 Analogue Occupied Bandwidth – Uplink Mid Channel



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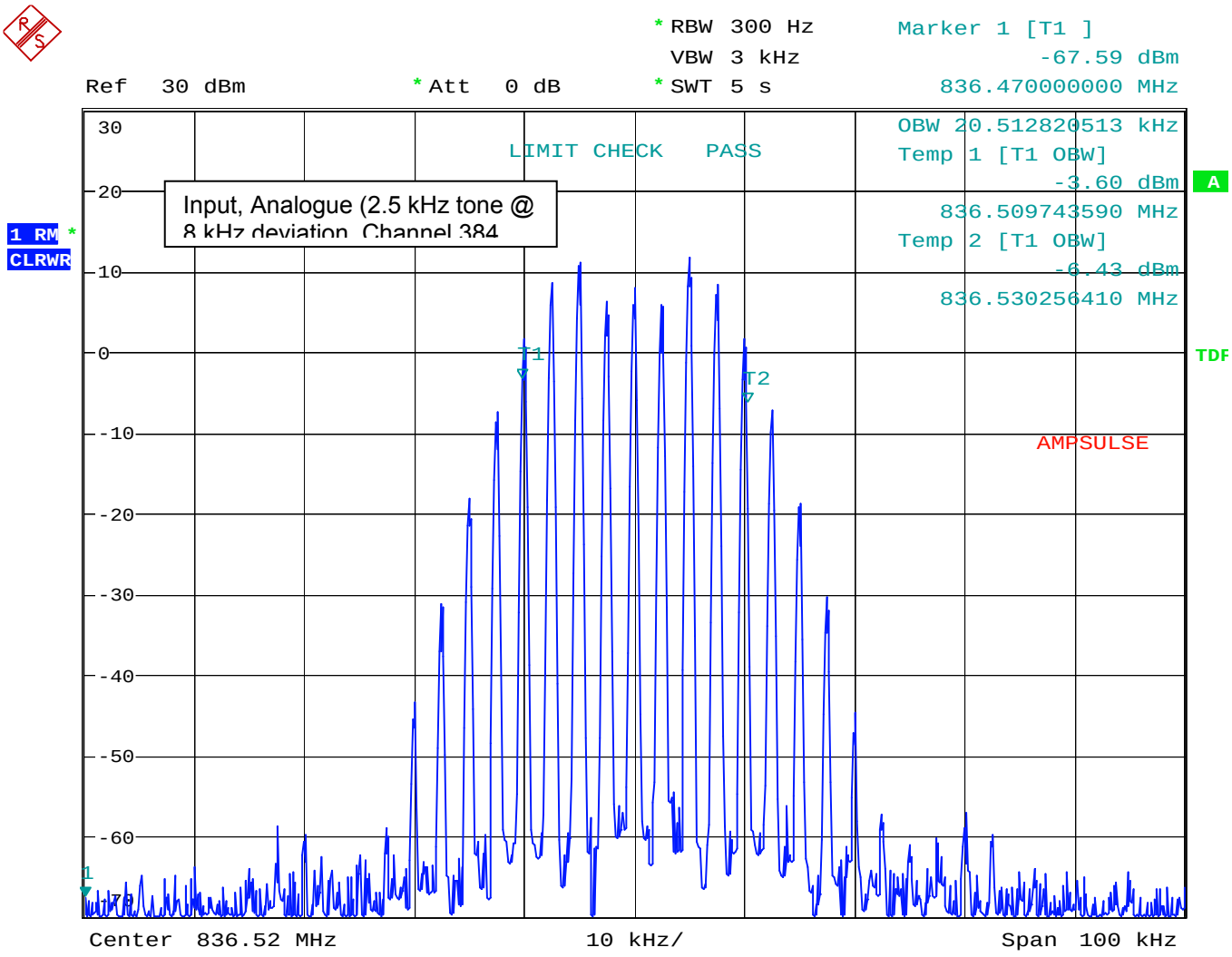

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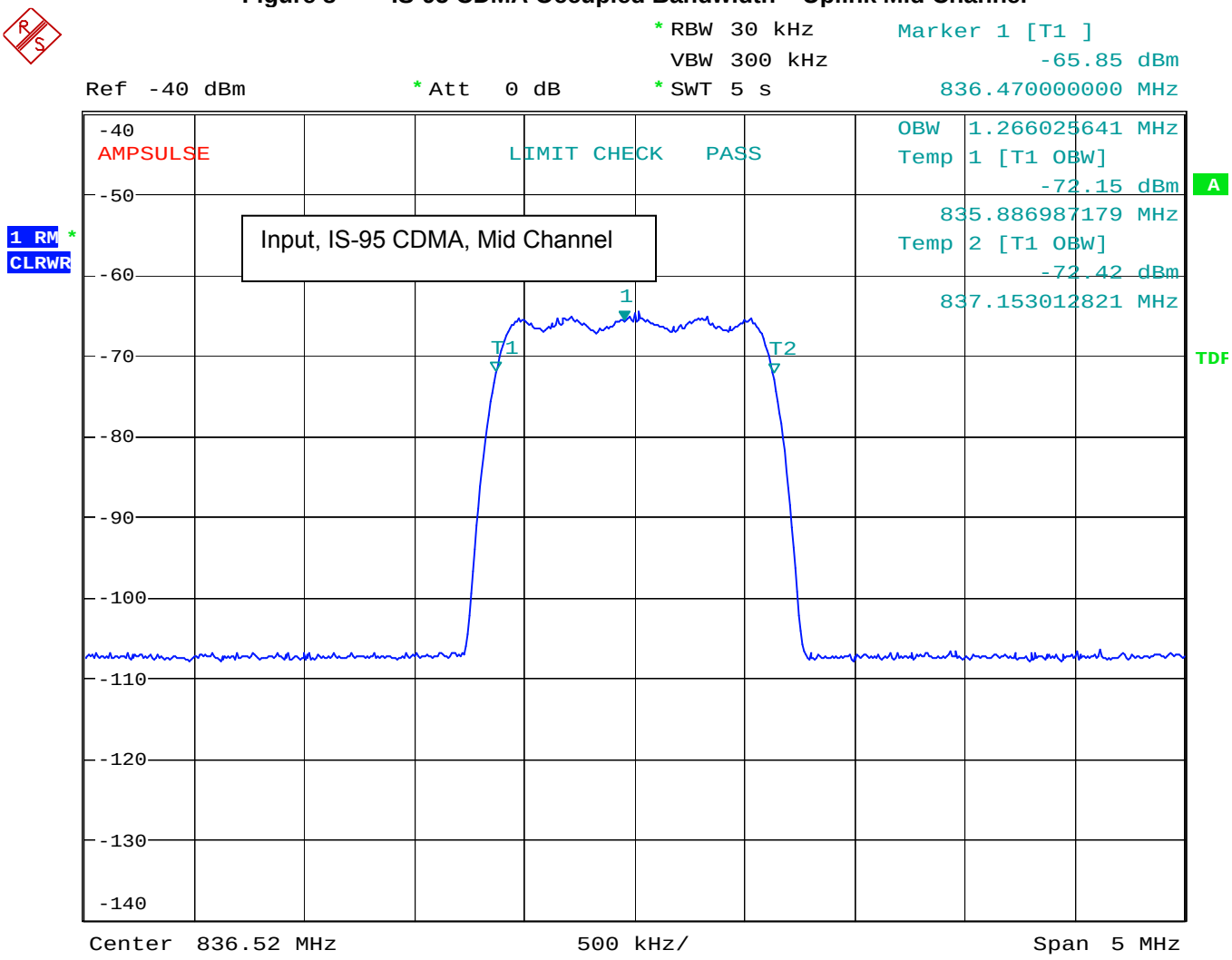
Figure 8 IS-95 CDMA Occupied Bandwidth – Uplink Mid Channel



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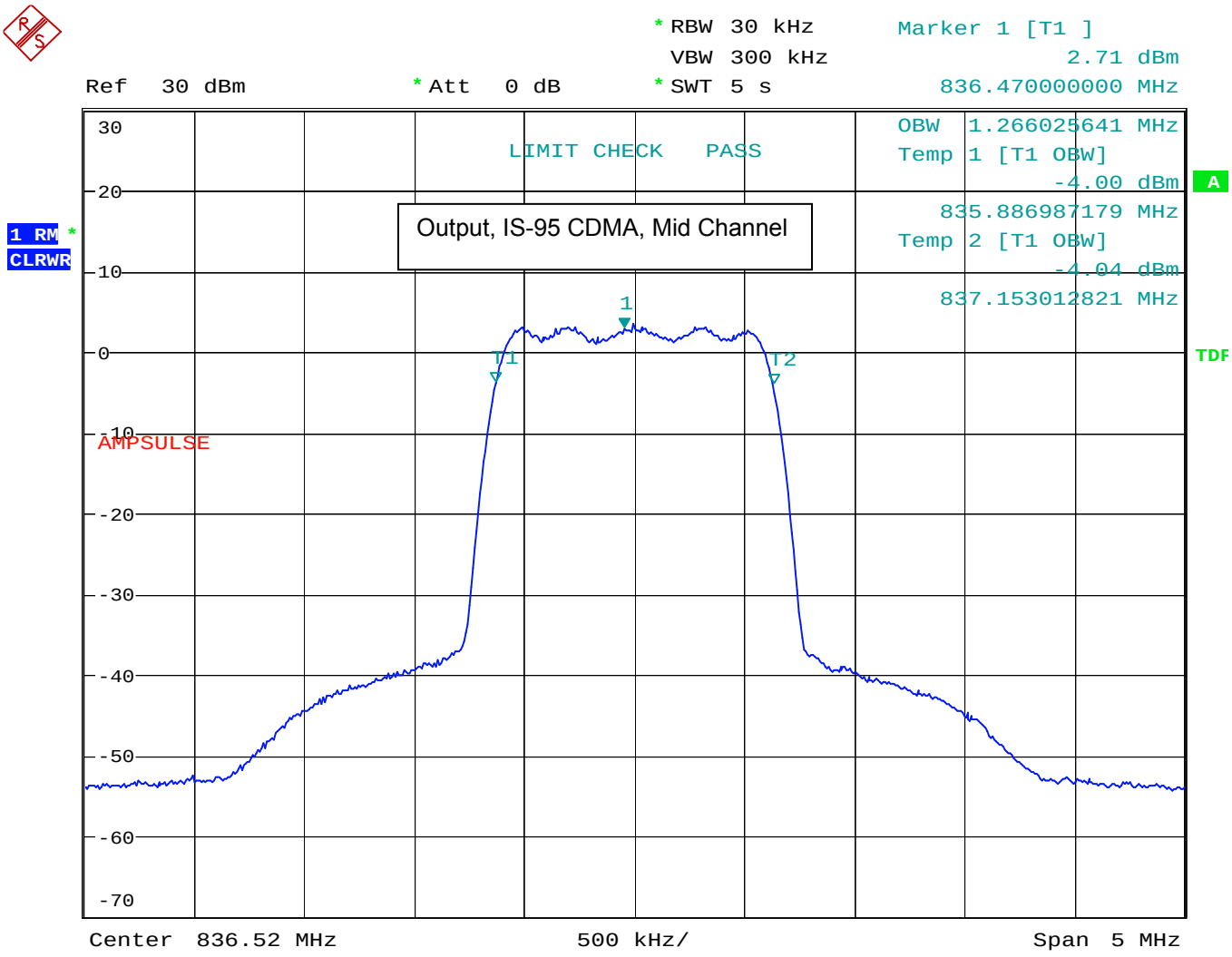

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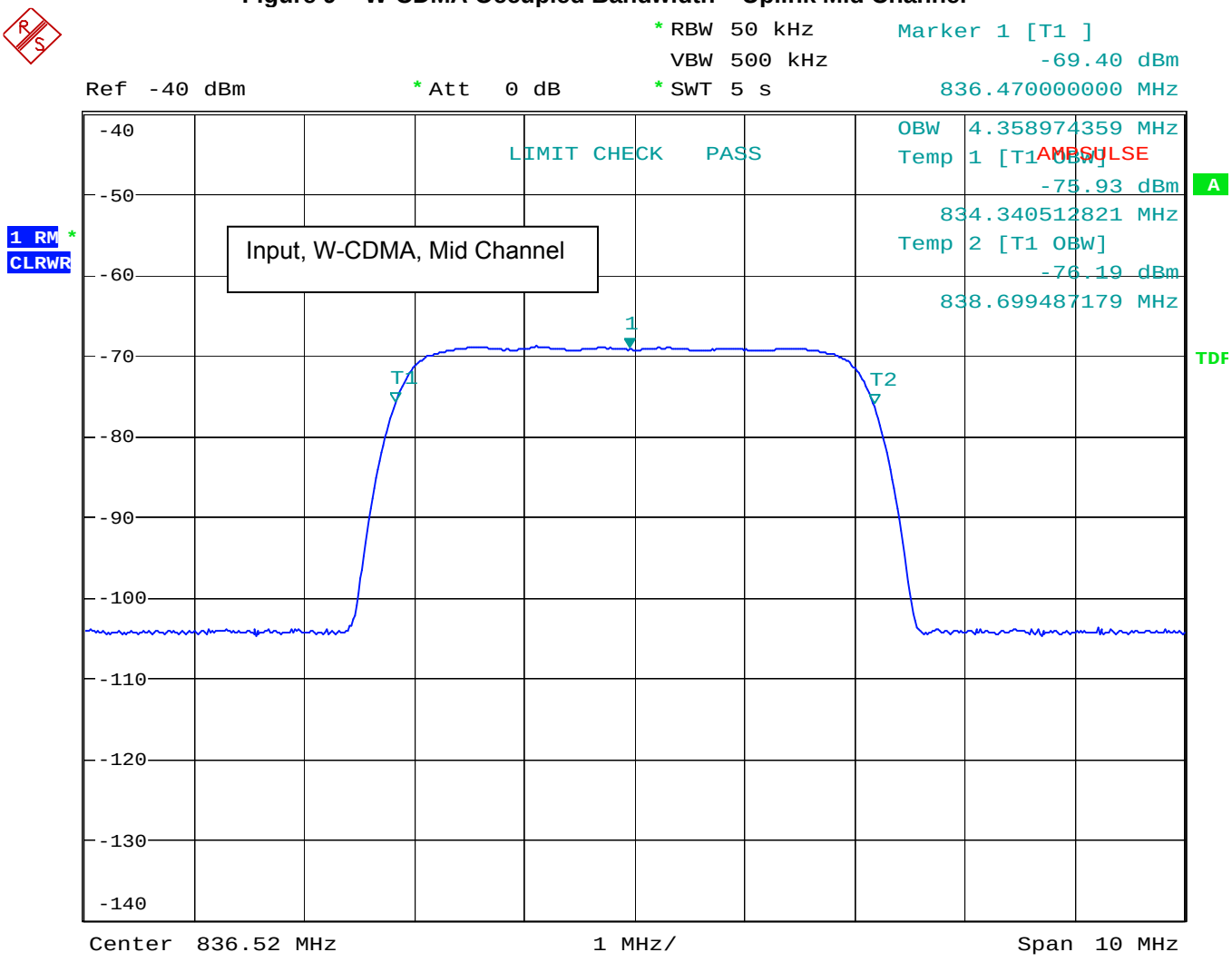
Figure 9 W-CDMA Occupied Bandwidth – Uplink Mid Channel



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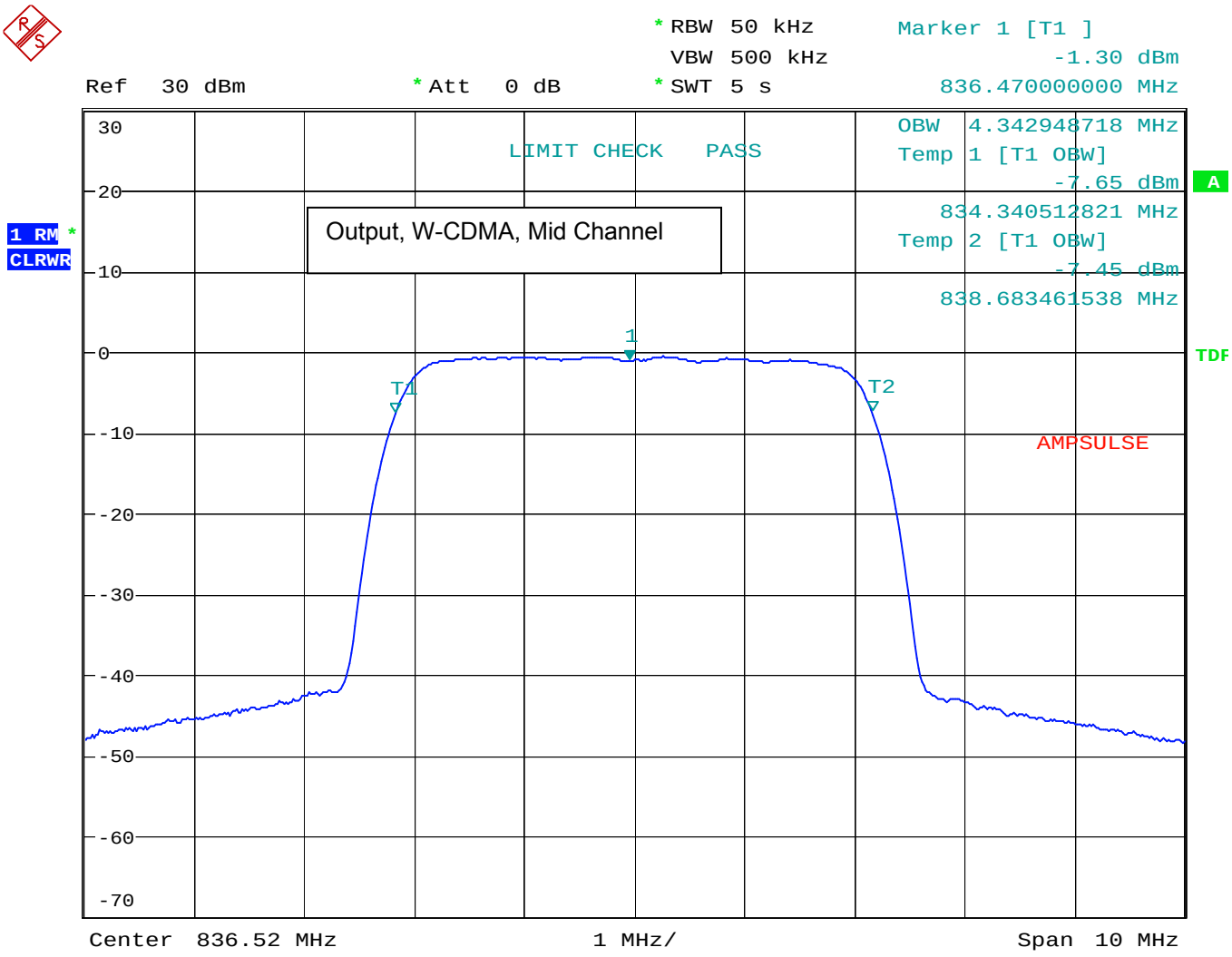

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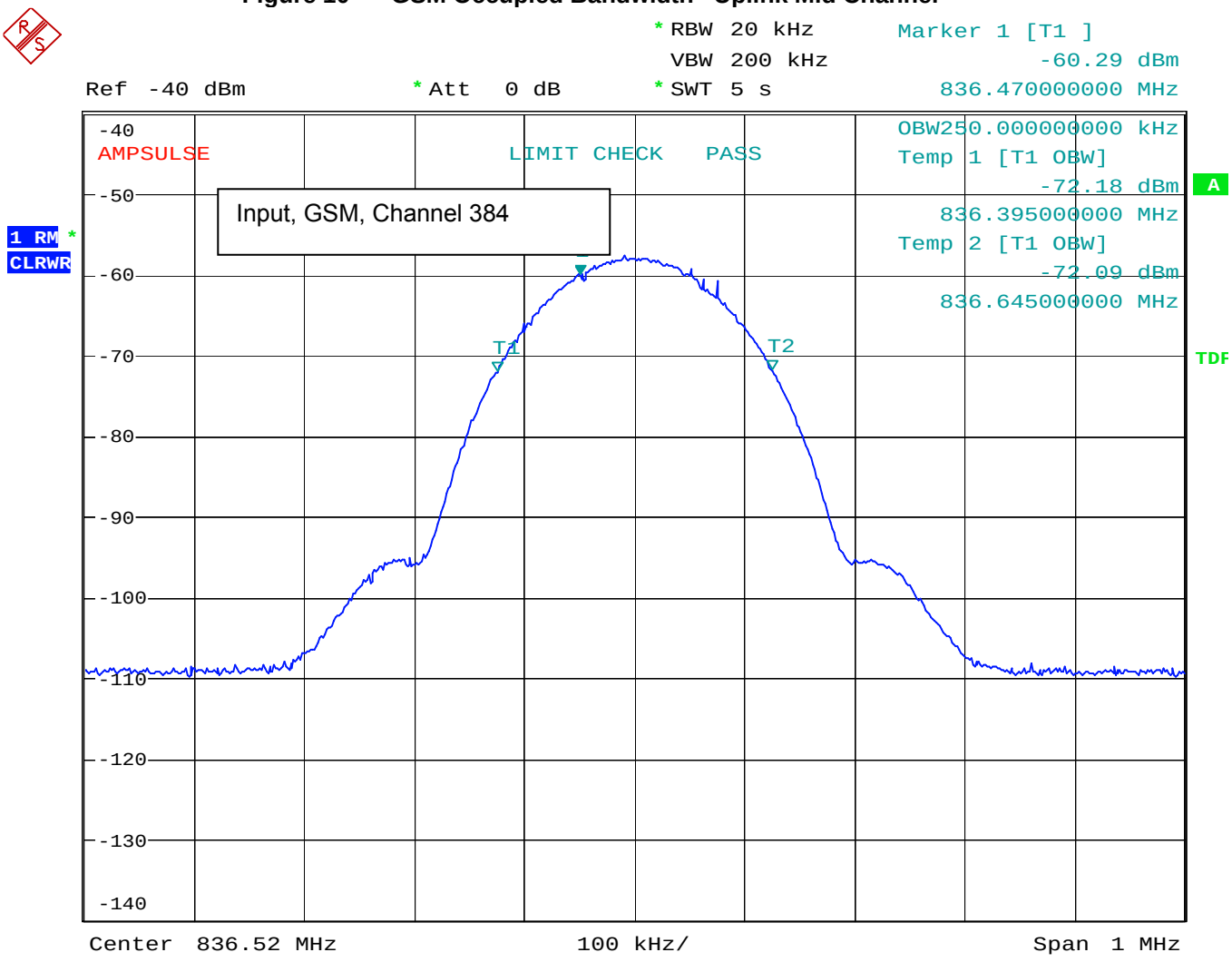
Figure 10 GSM Occupied Bandwidth –Uplink Mid Channel



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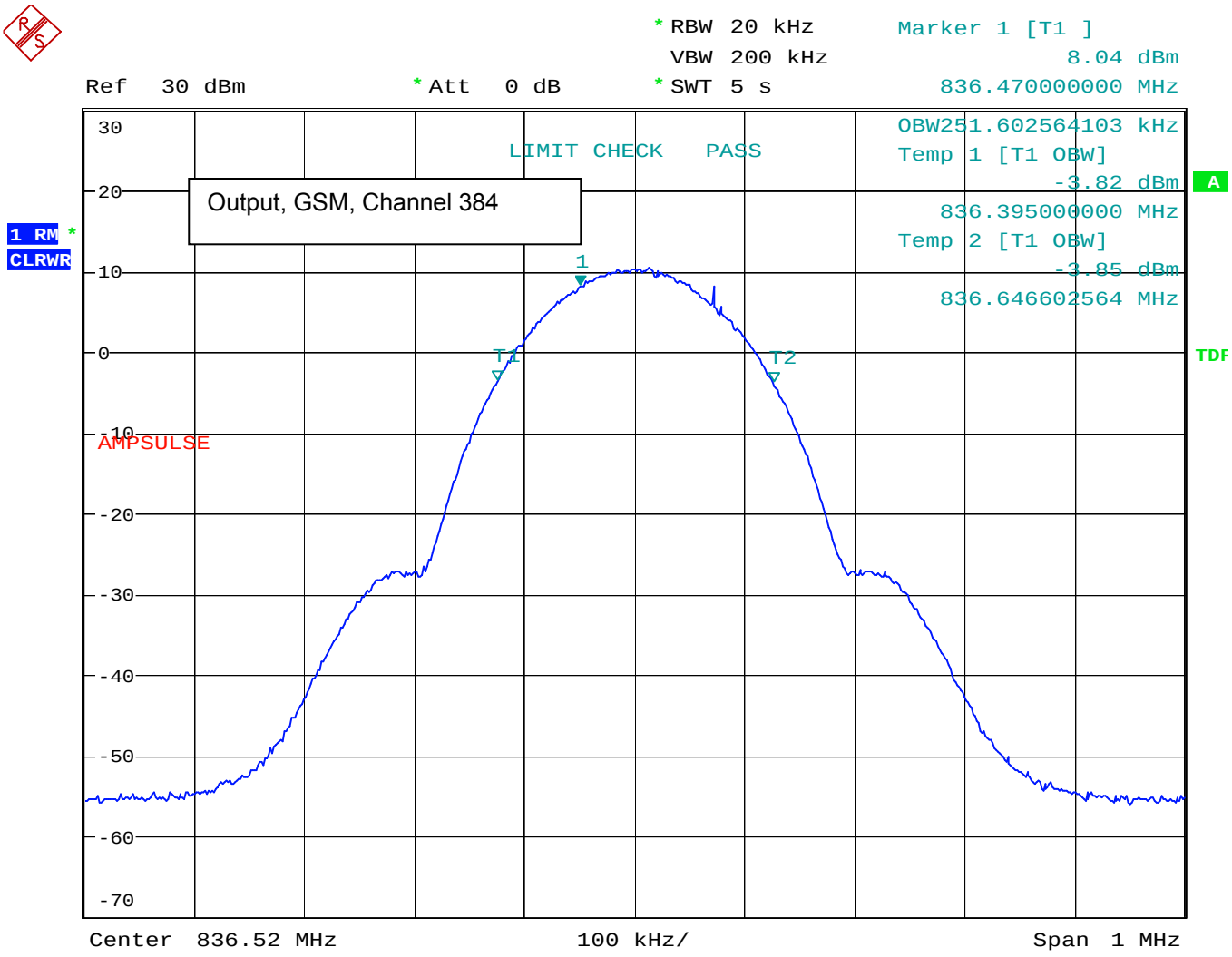

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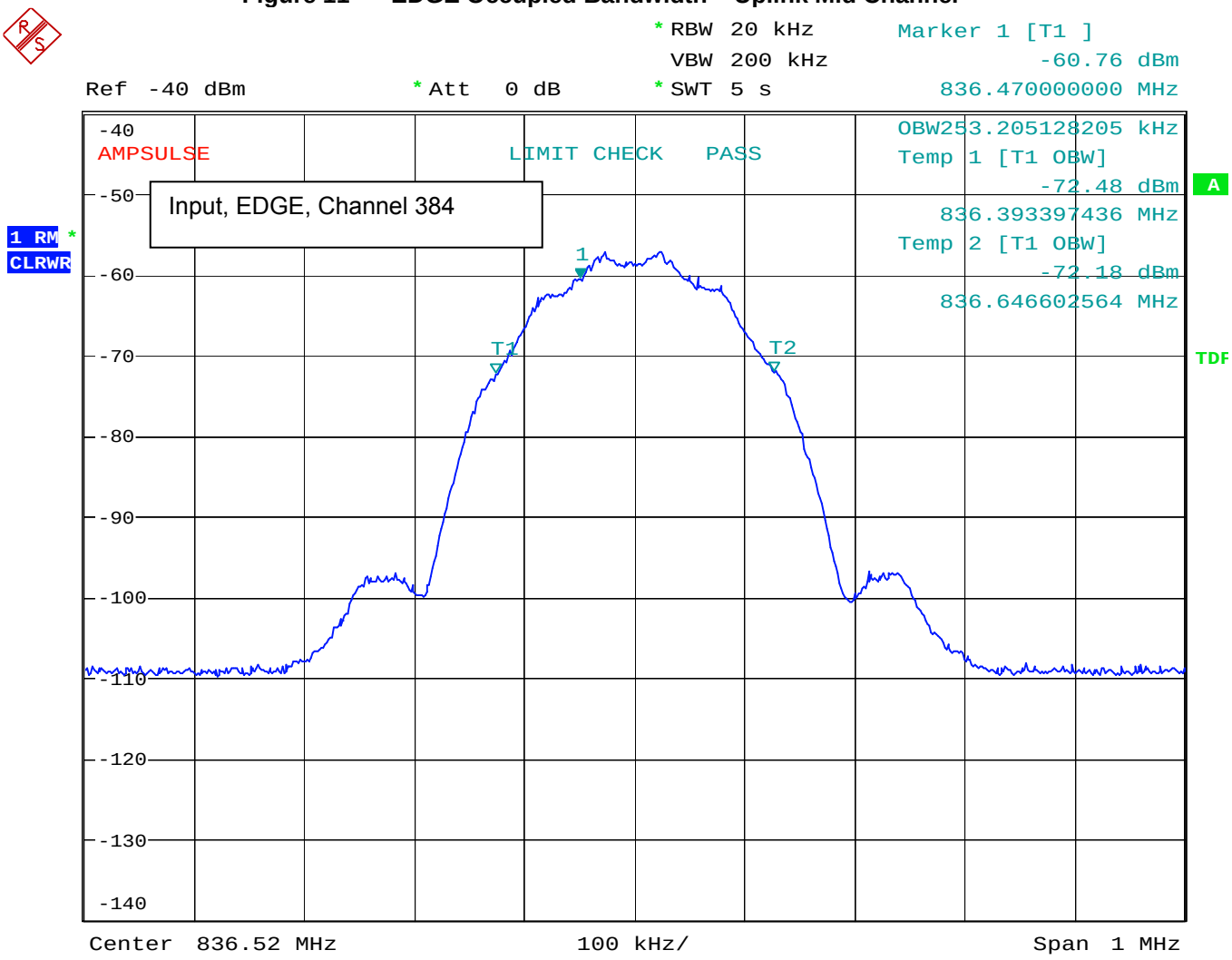
Figure 11 EDGE Occupied Bandwidth – Uplink Mid Channel



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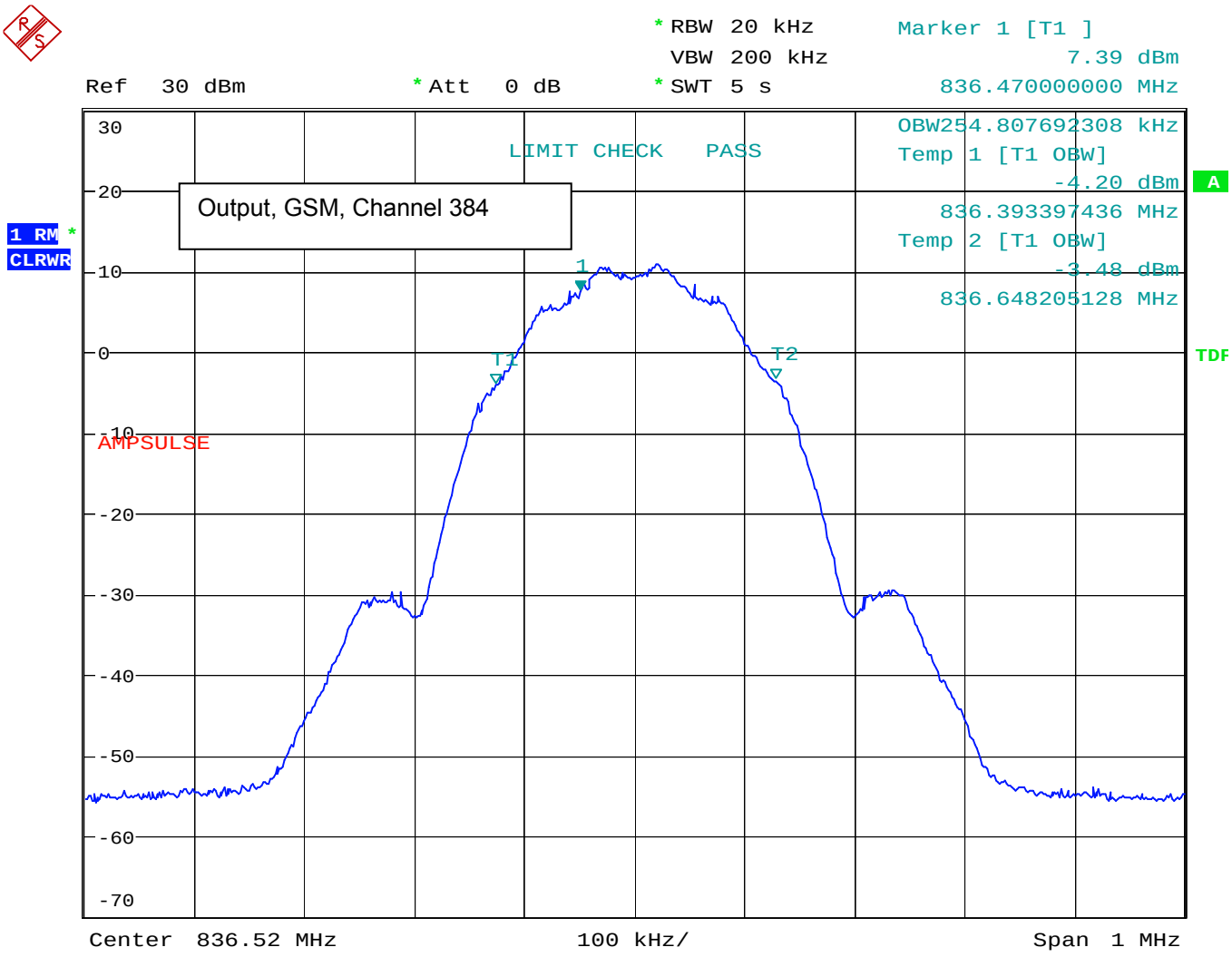

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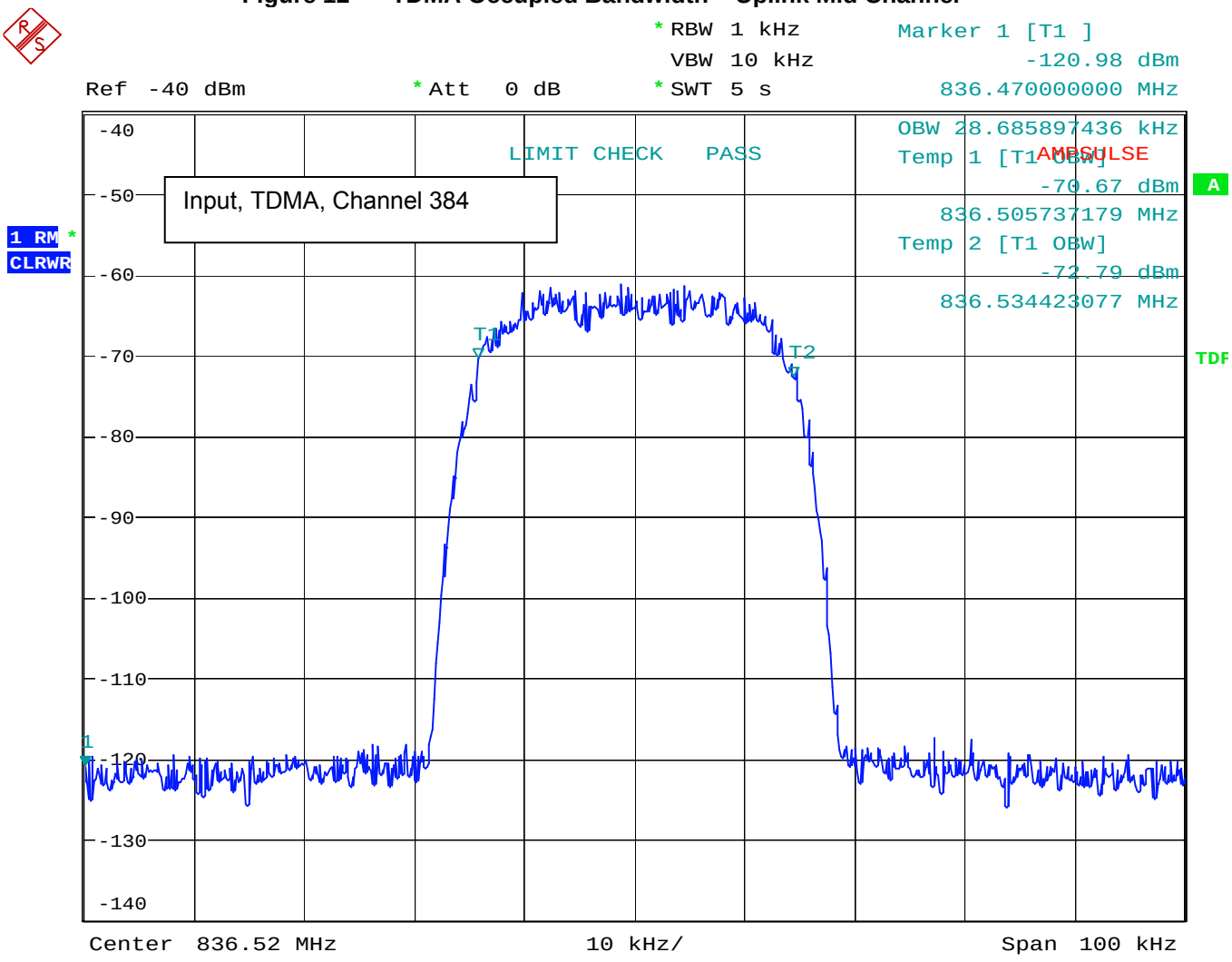
Figure 12 TDMA Occupied Bandwidth – Uplink Mid Channel



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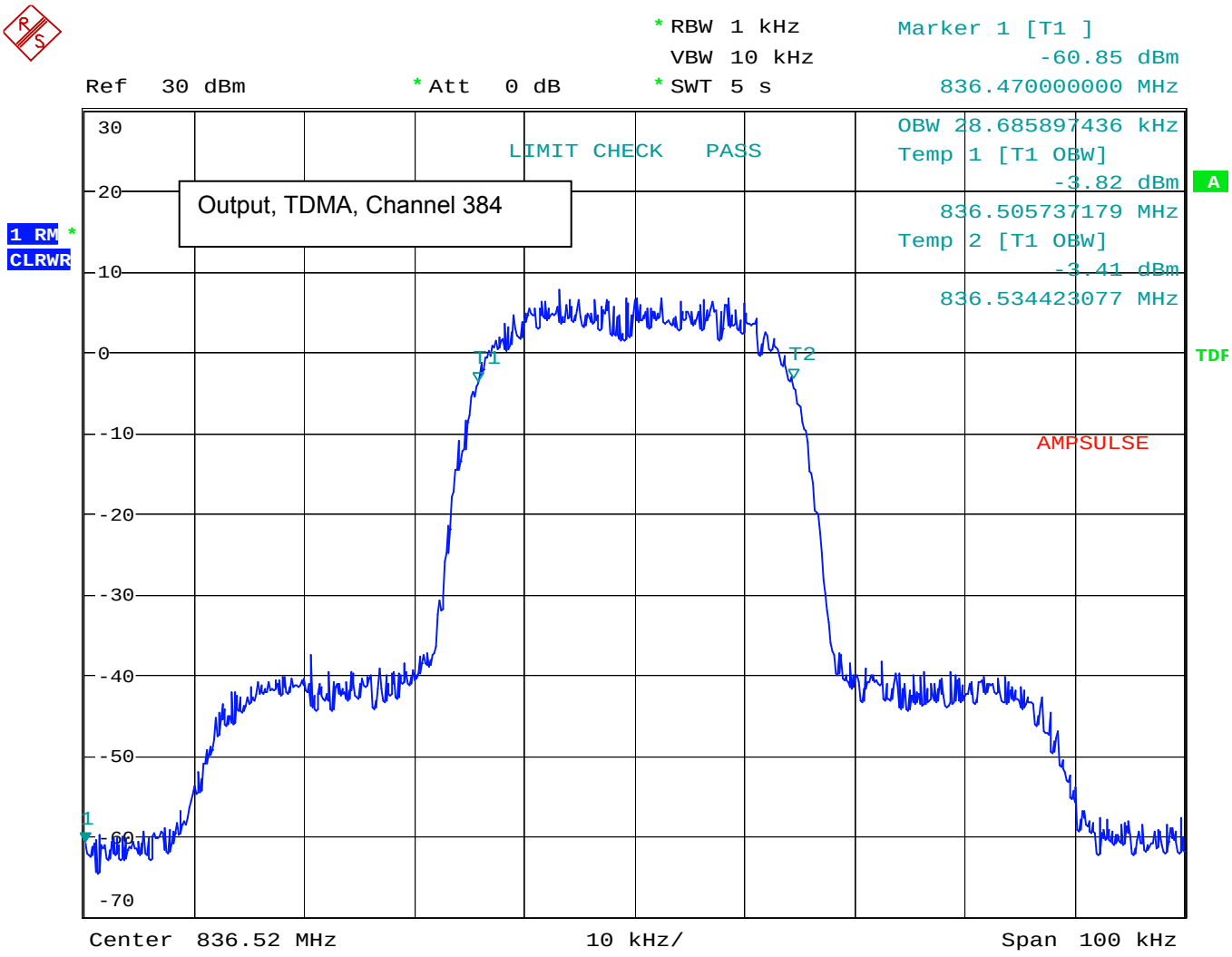

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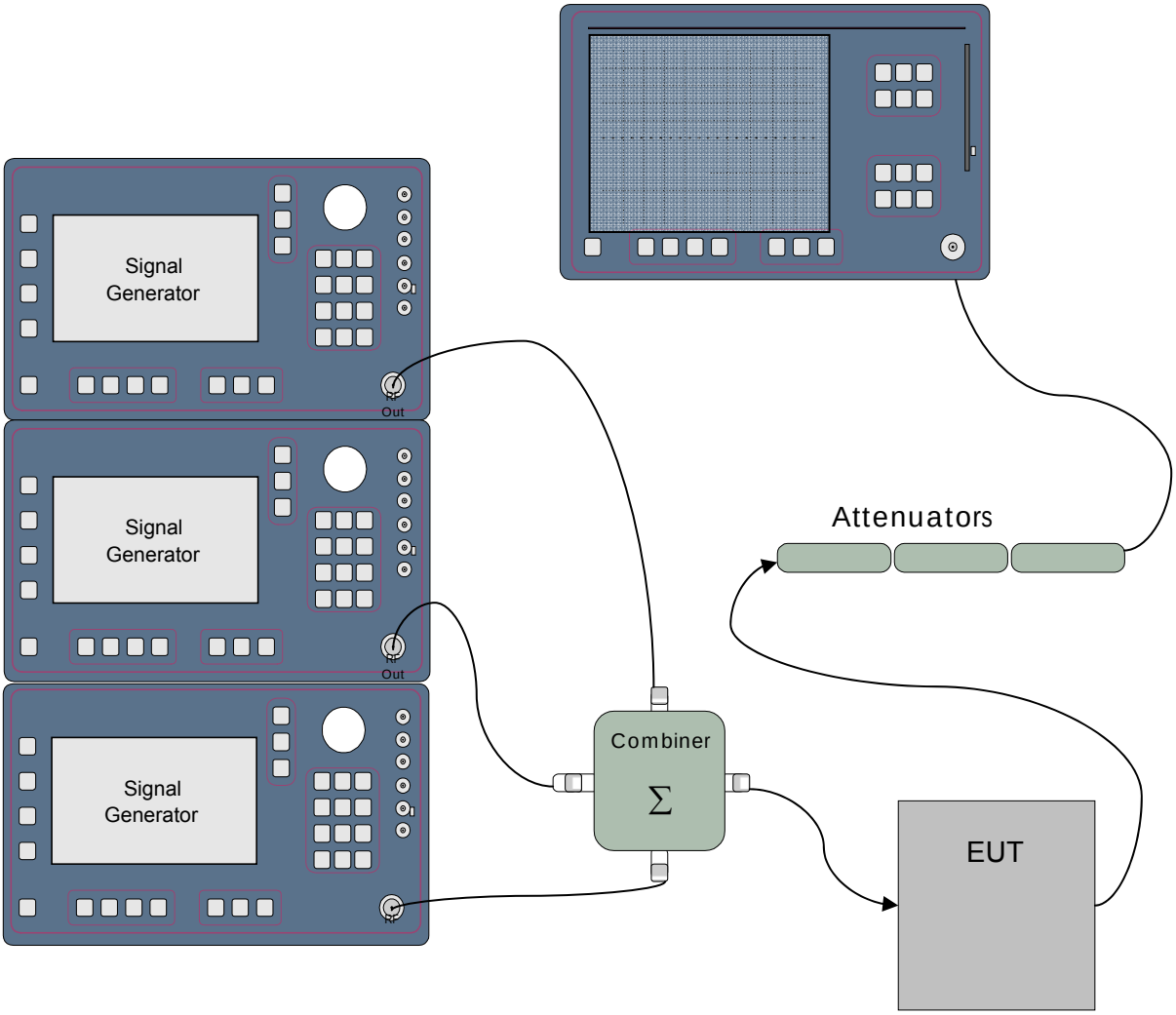
C.9. Test Diagram



C.10. Tested By

Name: Tom Tidwell,
Function: Manager of Wireless Services

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

22.917
(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						

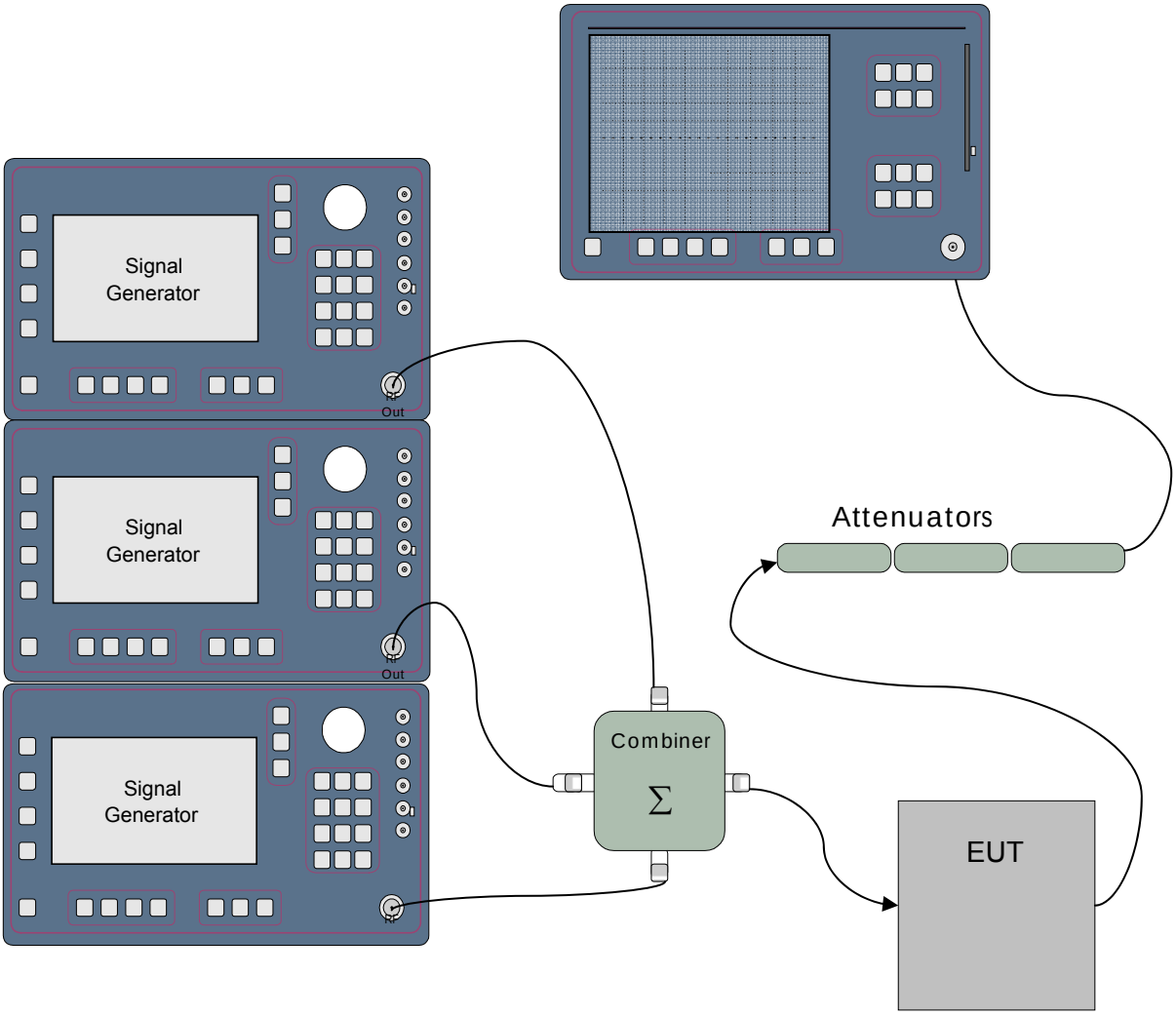
D.5. Test Results

Compliant. 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.

For this testing the rf gain was set to maximum and the rf input was set to the maximum rated input. The resulting composite rf output levels were as reported in A.8 of this report.

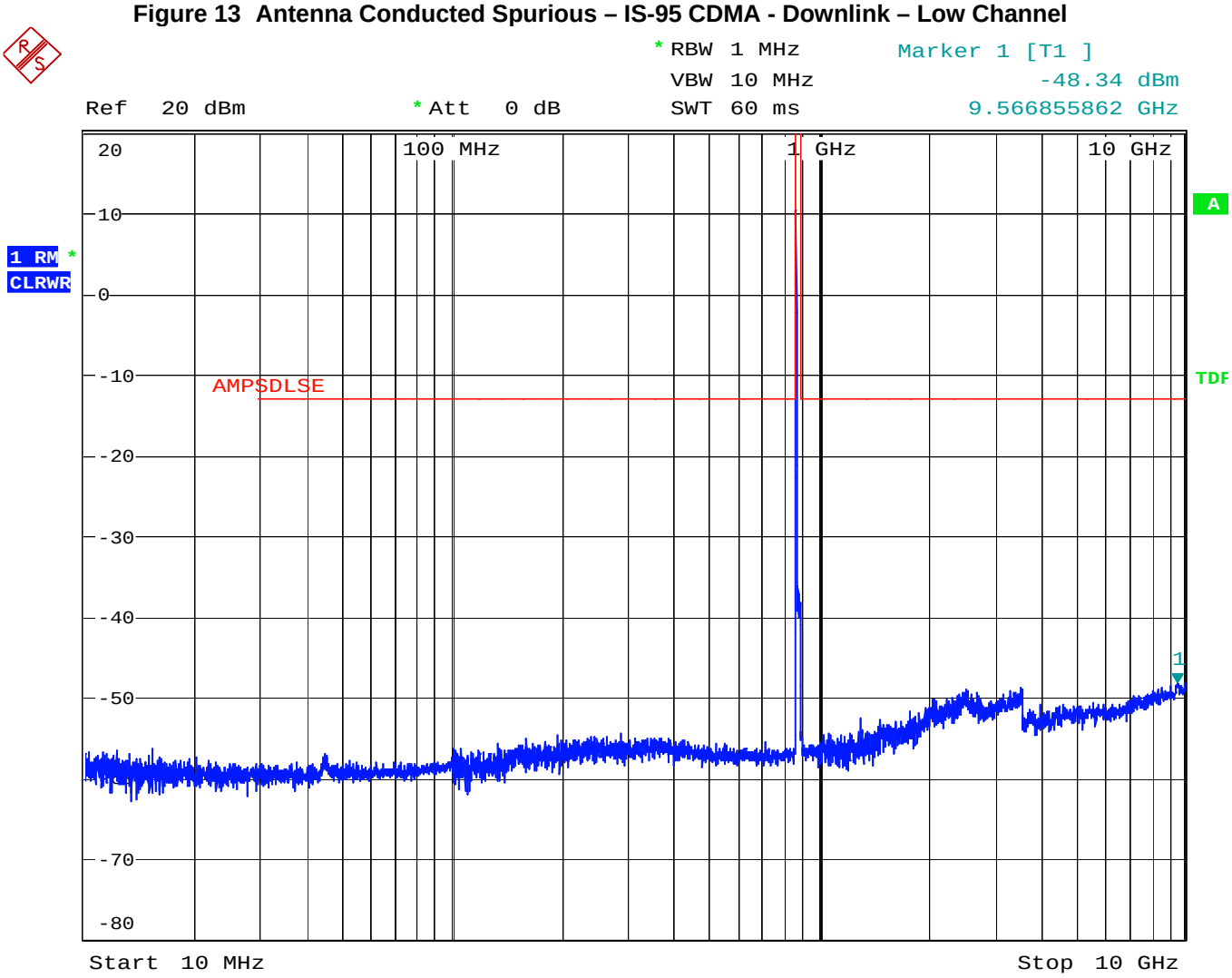
D.6. Test Diagram



D.7. Test Data

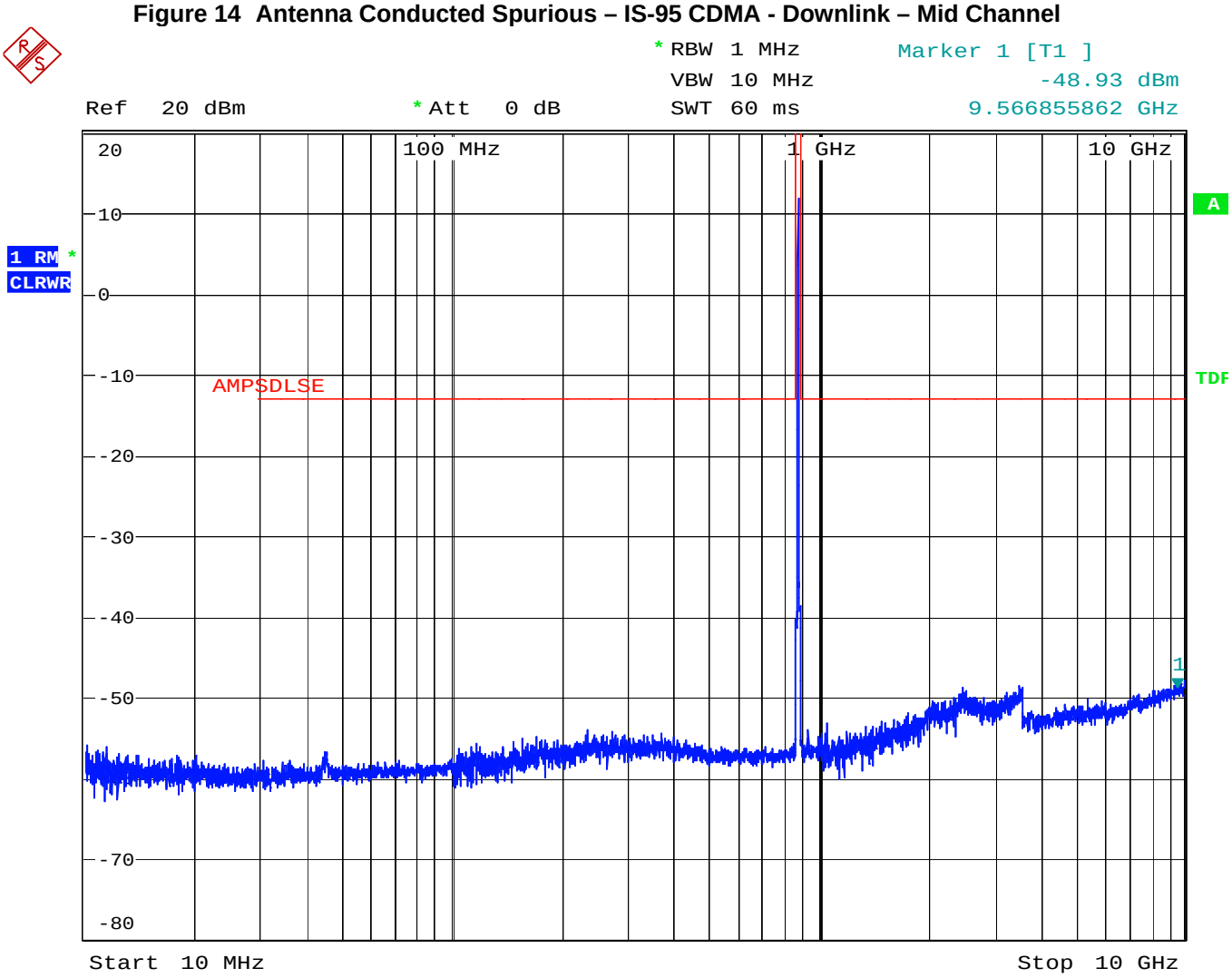
See following pages.

Figure 13 Antenna Conducted Spurious – IS-95 CDMA - Downlink – Low Channel



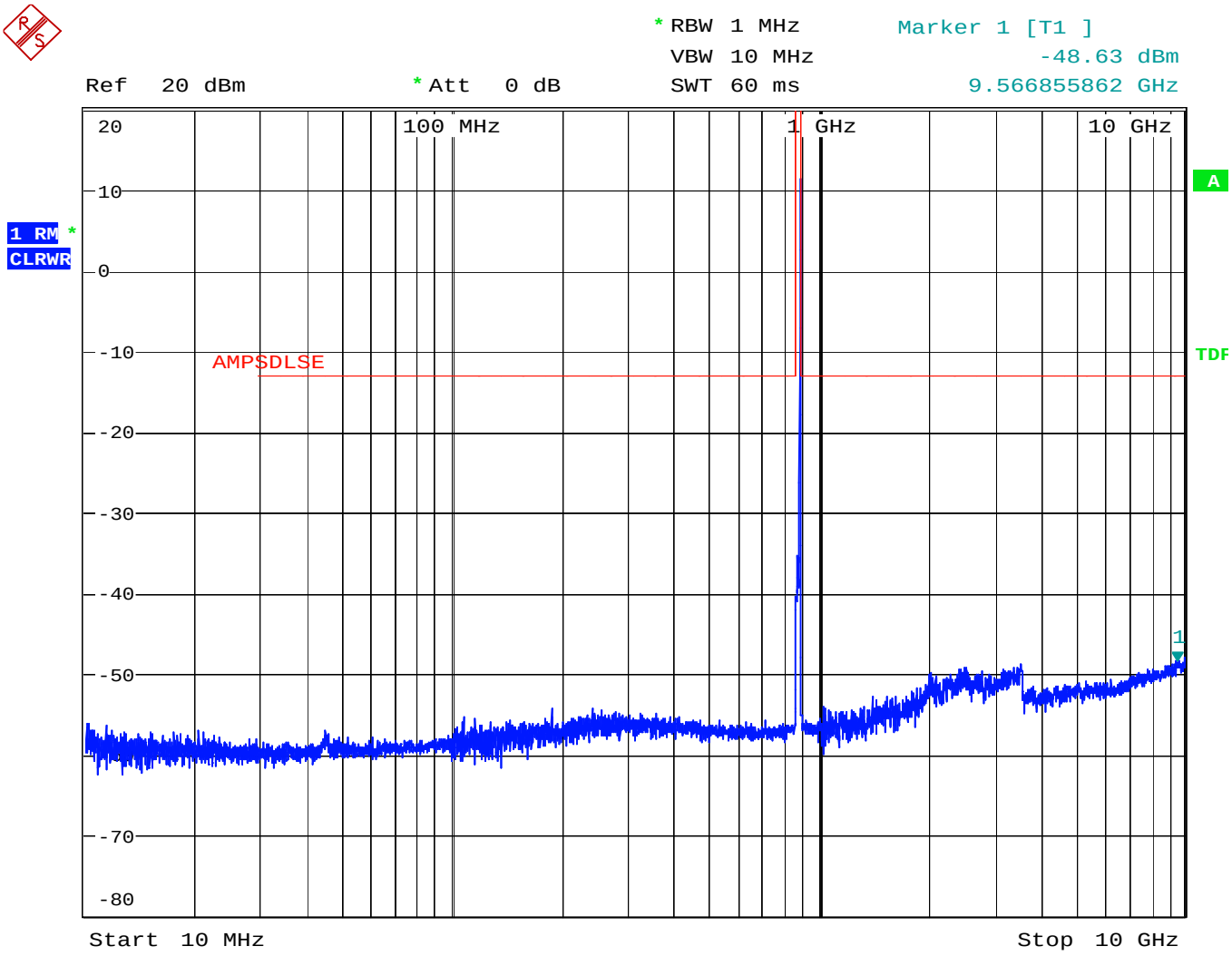
Date: 15.MAY.2007 15:01:44

Figure 14 Antenna Conducted Spurious – IS-95 CDMA - Downlink – Mid Channel



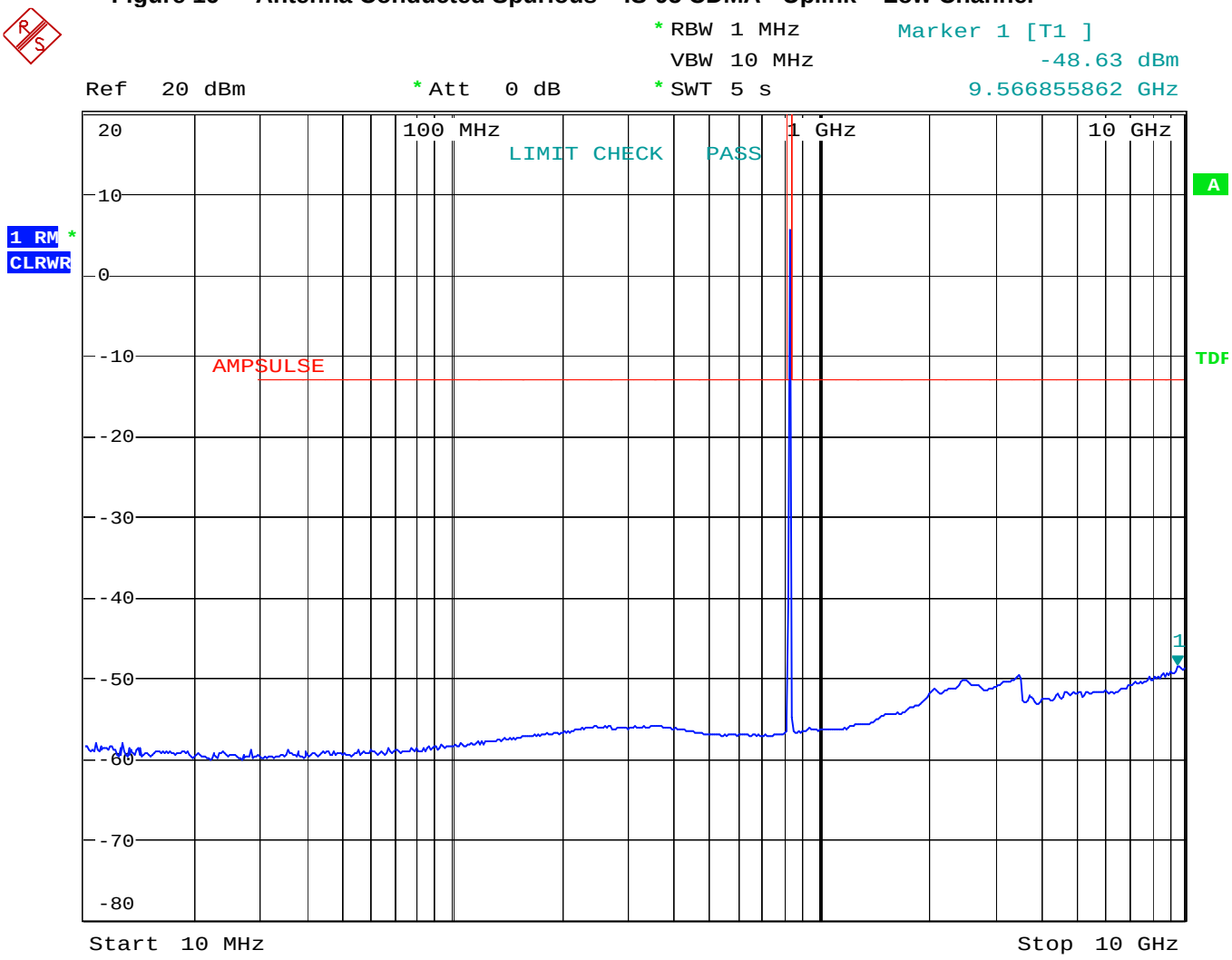
Date: 15.MAY.2007 15:00:06

Figure 15 Antenna Conducted Spurious – IS-95 CDMA - Downlink – High Channel



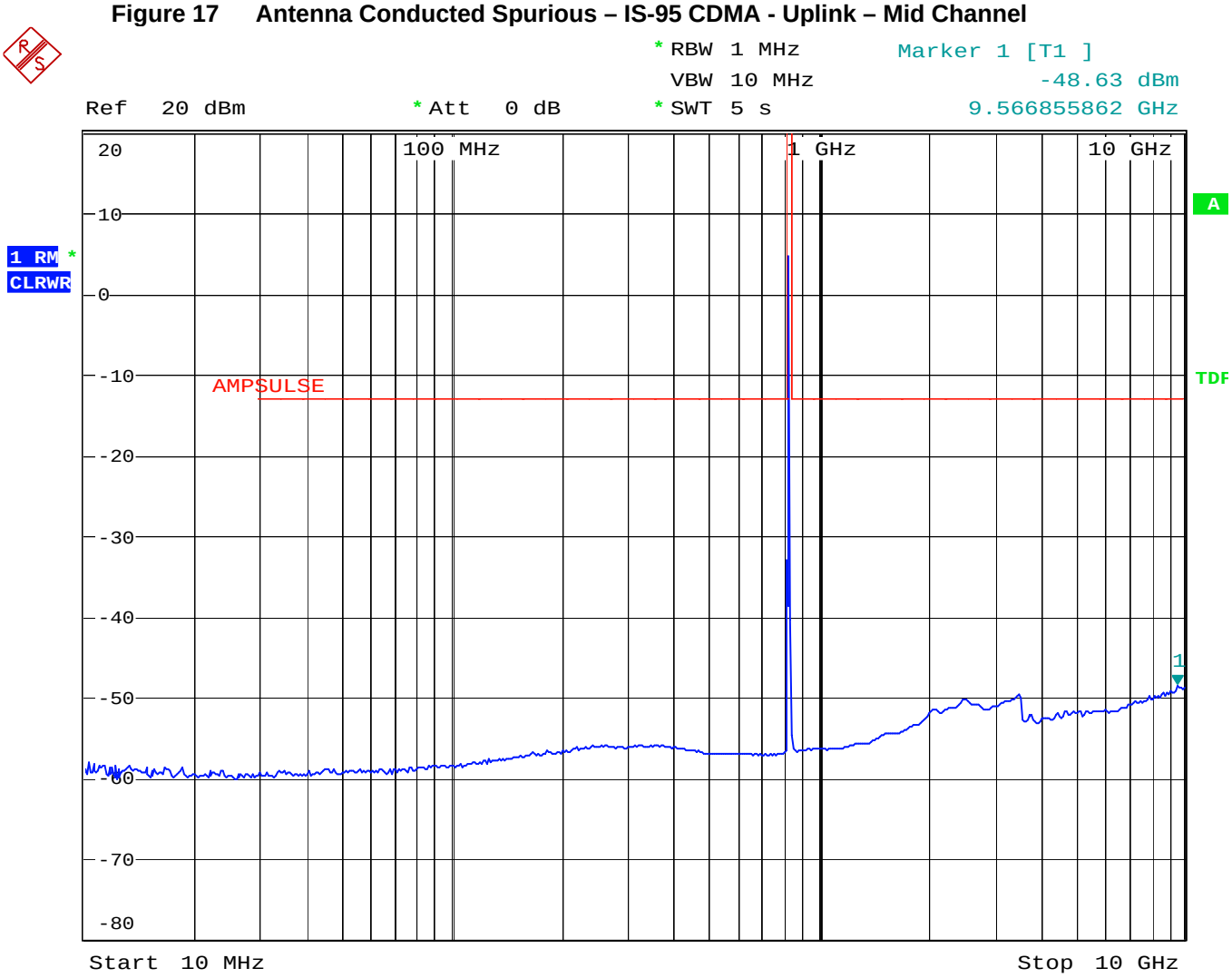
Date: 15.MAY.2007 15:02:25

Figure 16 Antenna Conducted Spurious – IS-95 CDMA - Uplink – Low Channel



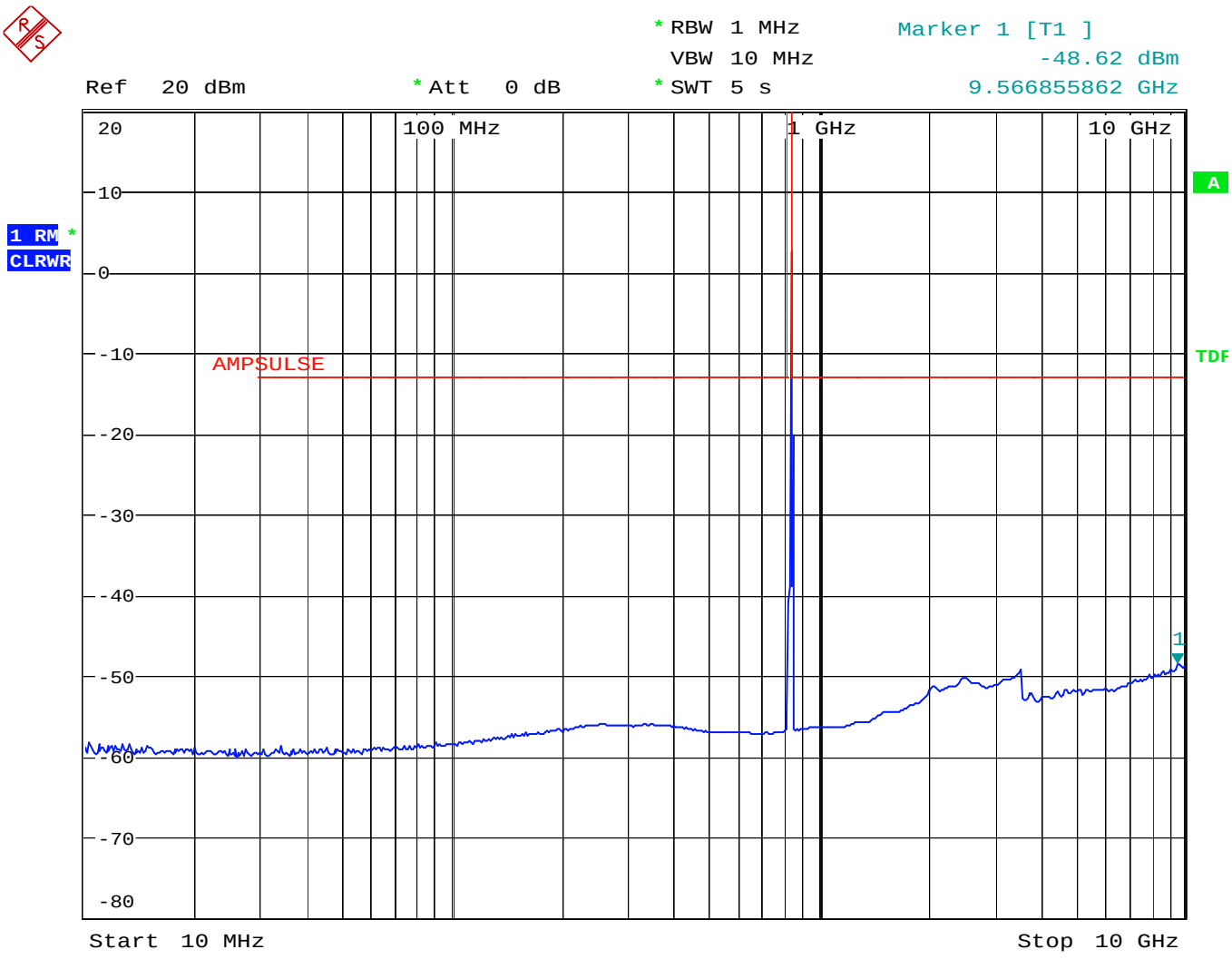
Date: 14.MAY.2007 18:16:20

Figure 17 Antenna Conducted Spurious – IS-95 CDMA - Uplink – Mid Channel



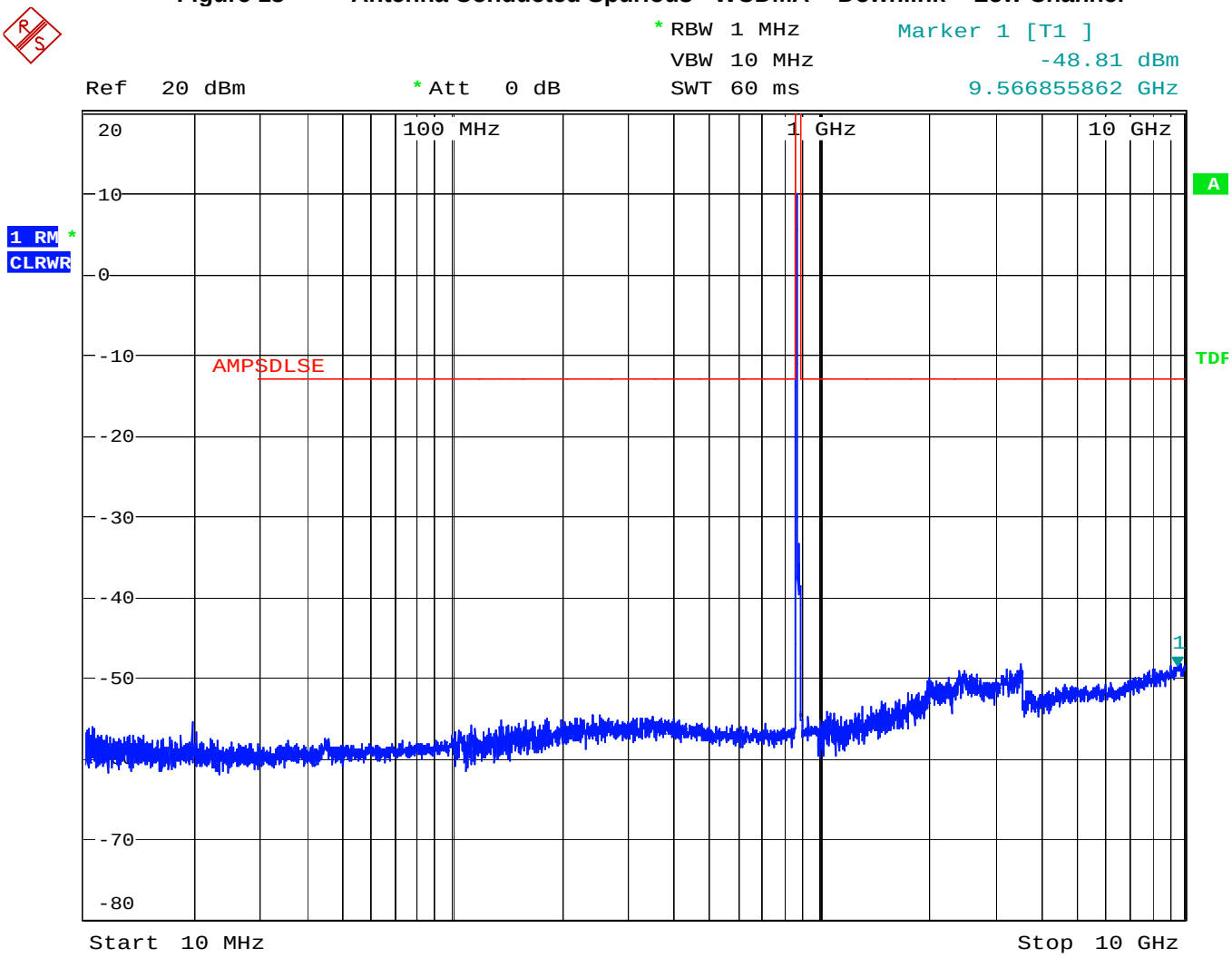
Date: 14.MAY.2007 18:17:58

Antenna Conducted Spurious – IS-95 CDMA - Uplink – High Channel



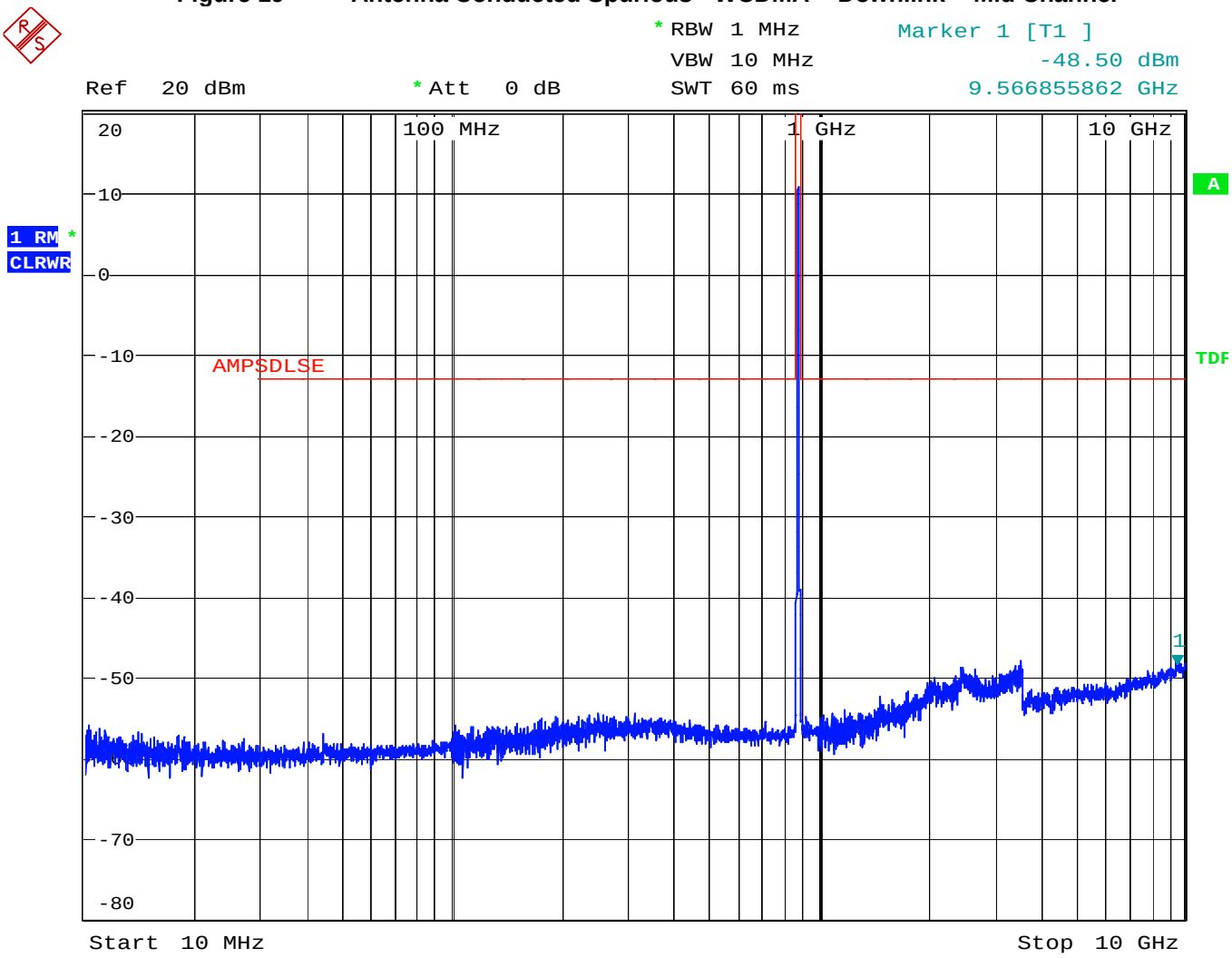
Date: 14.MAY.2007 18:18:51

Figure 18 Antenna Conducted Spurious - WCDMA - Downlink - Low Channel



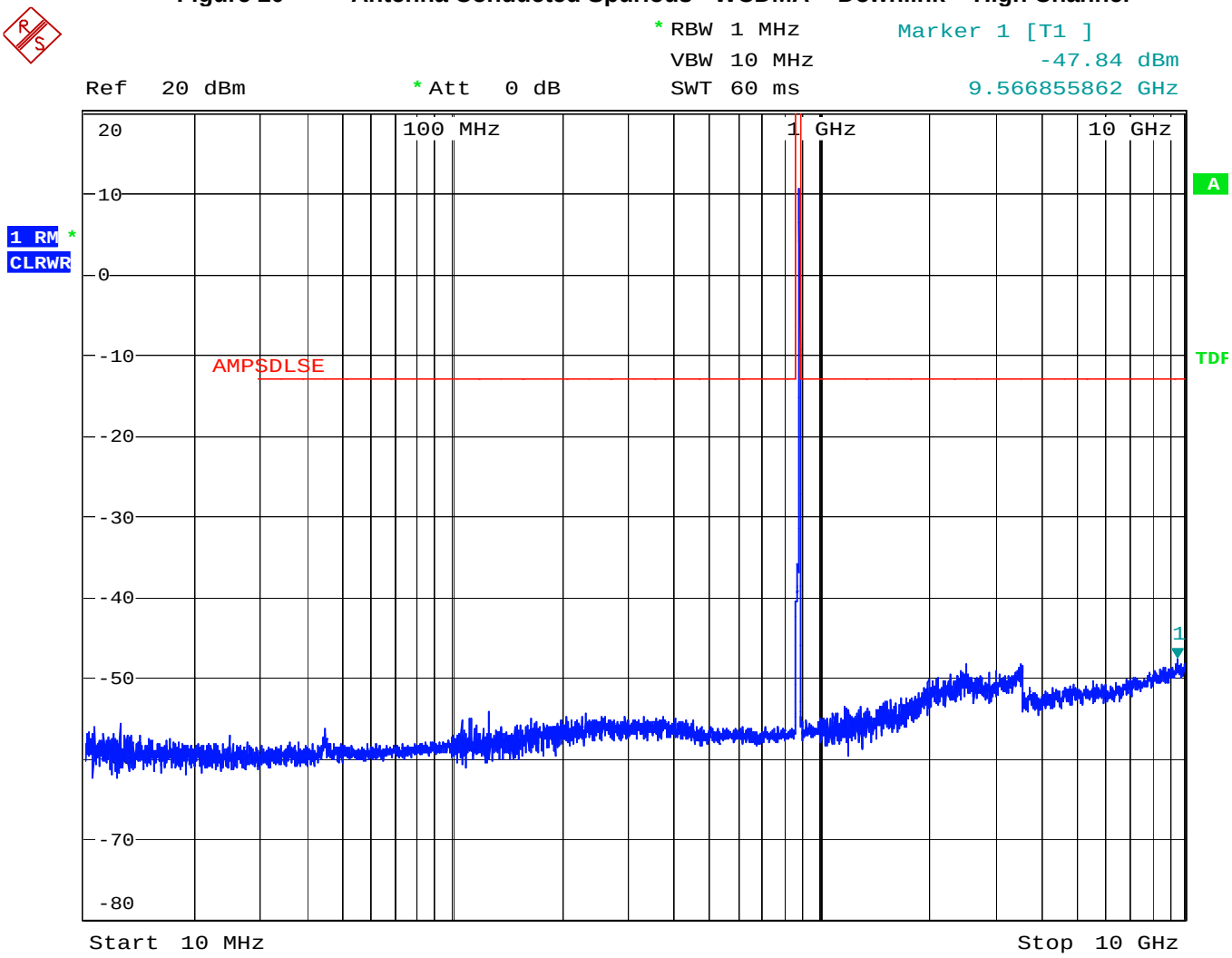
Date: 15.MAY.2007 15:03:28

Figure 19 Antenna Conducted Spurious - WCDMA - Downlink - Mid Channel



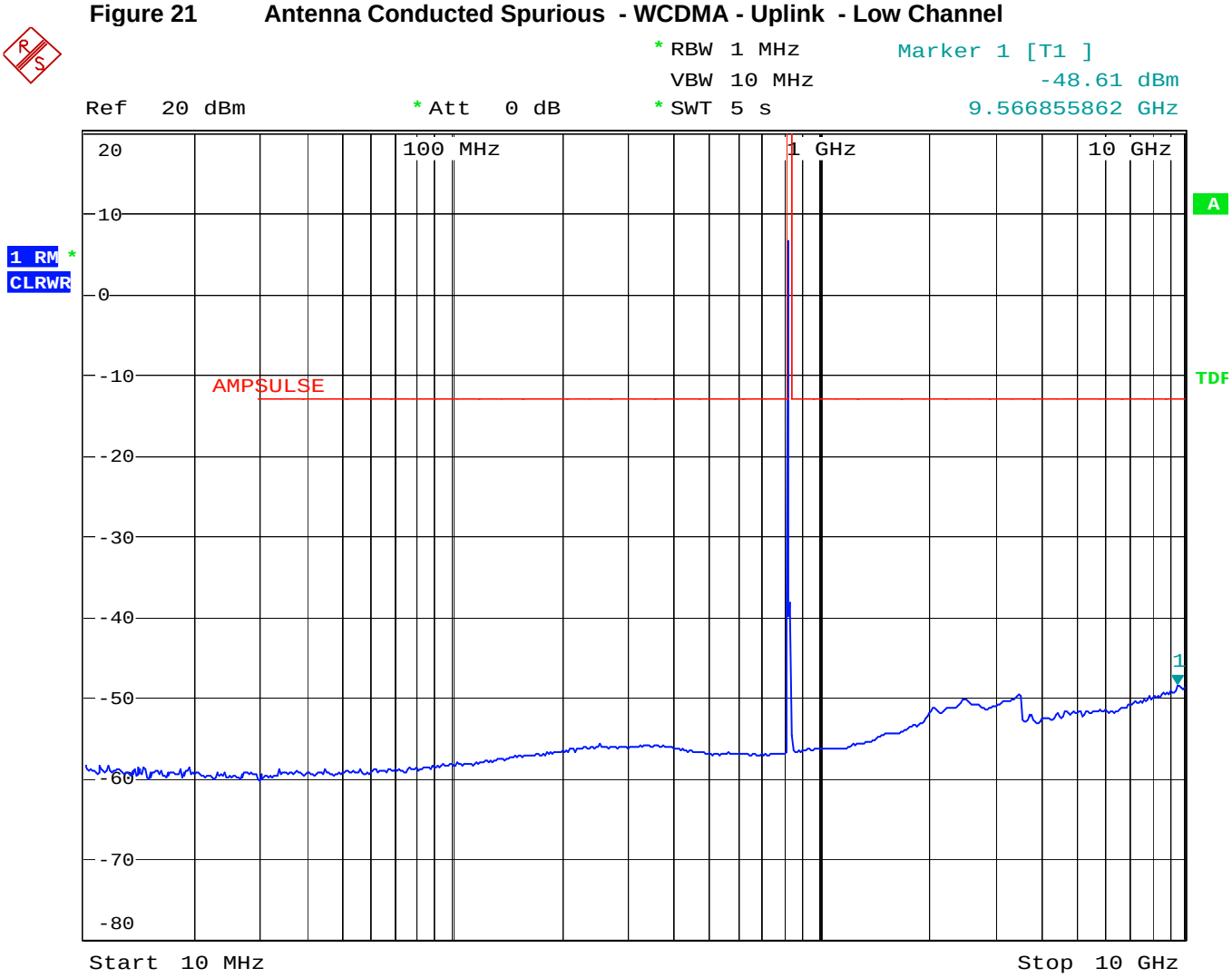
Date: 15.MAY.2007 15:03:58

Figure 20 Antenna Conducted Spurious - WCDMA - Downlink - High Channel



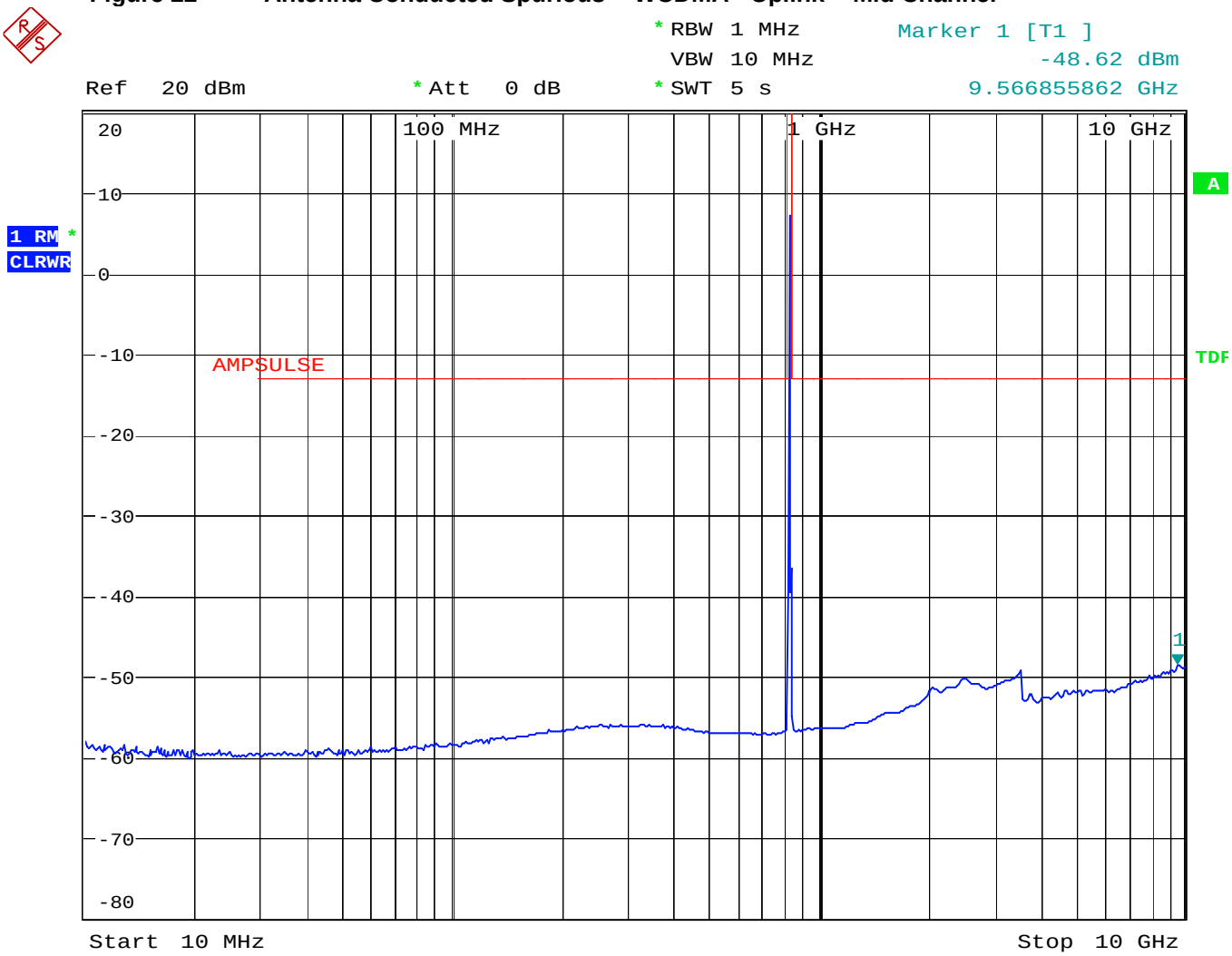
Date: 15.MAY.2007 15:04:25

Figure 21 Antenna Conducted Spurious - WCDMA - Uplink - Low Channel



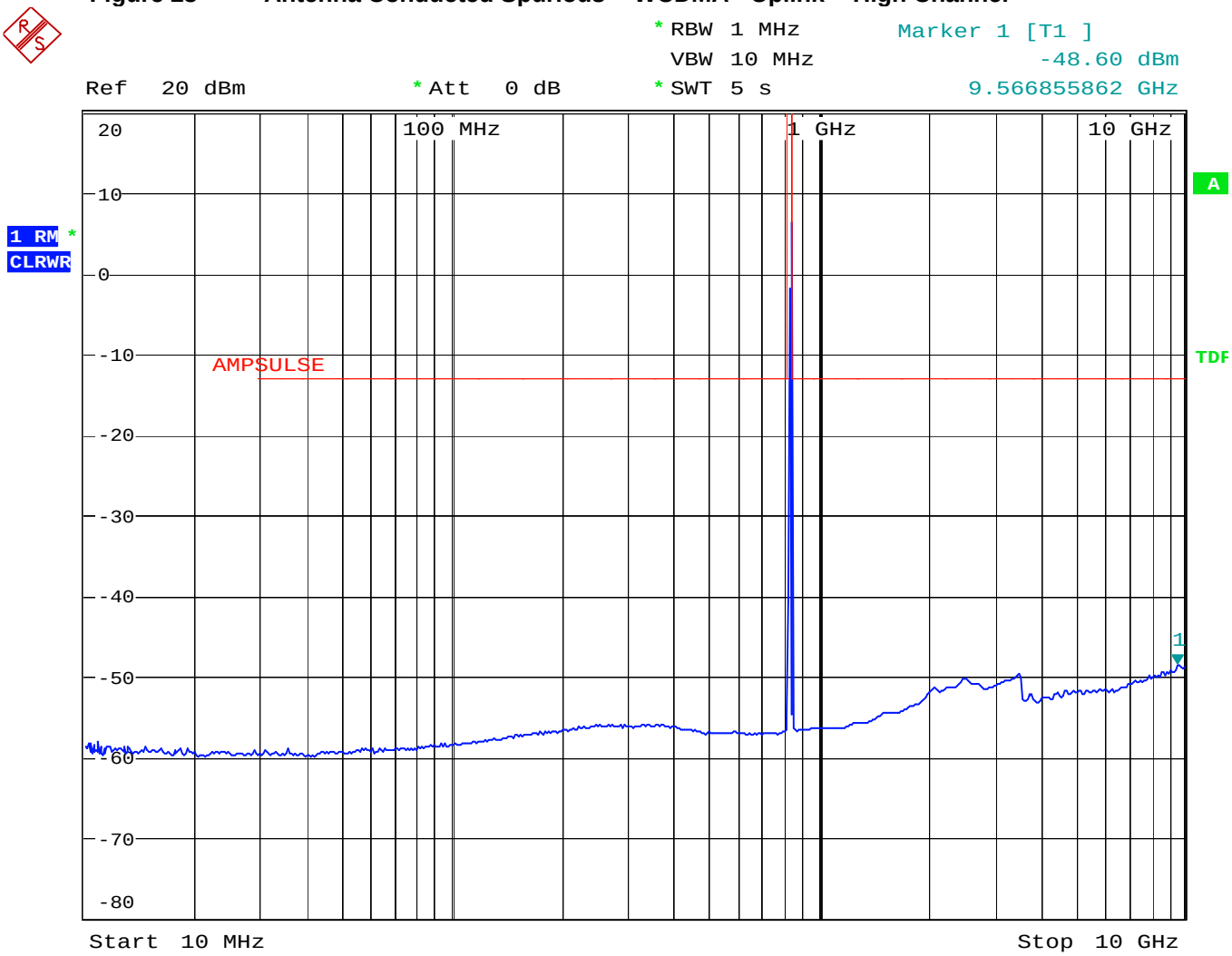
Date: 14.MAY.2007 18:22:45

Figure 22 Antenna Conducted Spurious - WCDMA - Uplink - Mid Channel



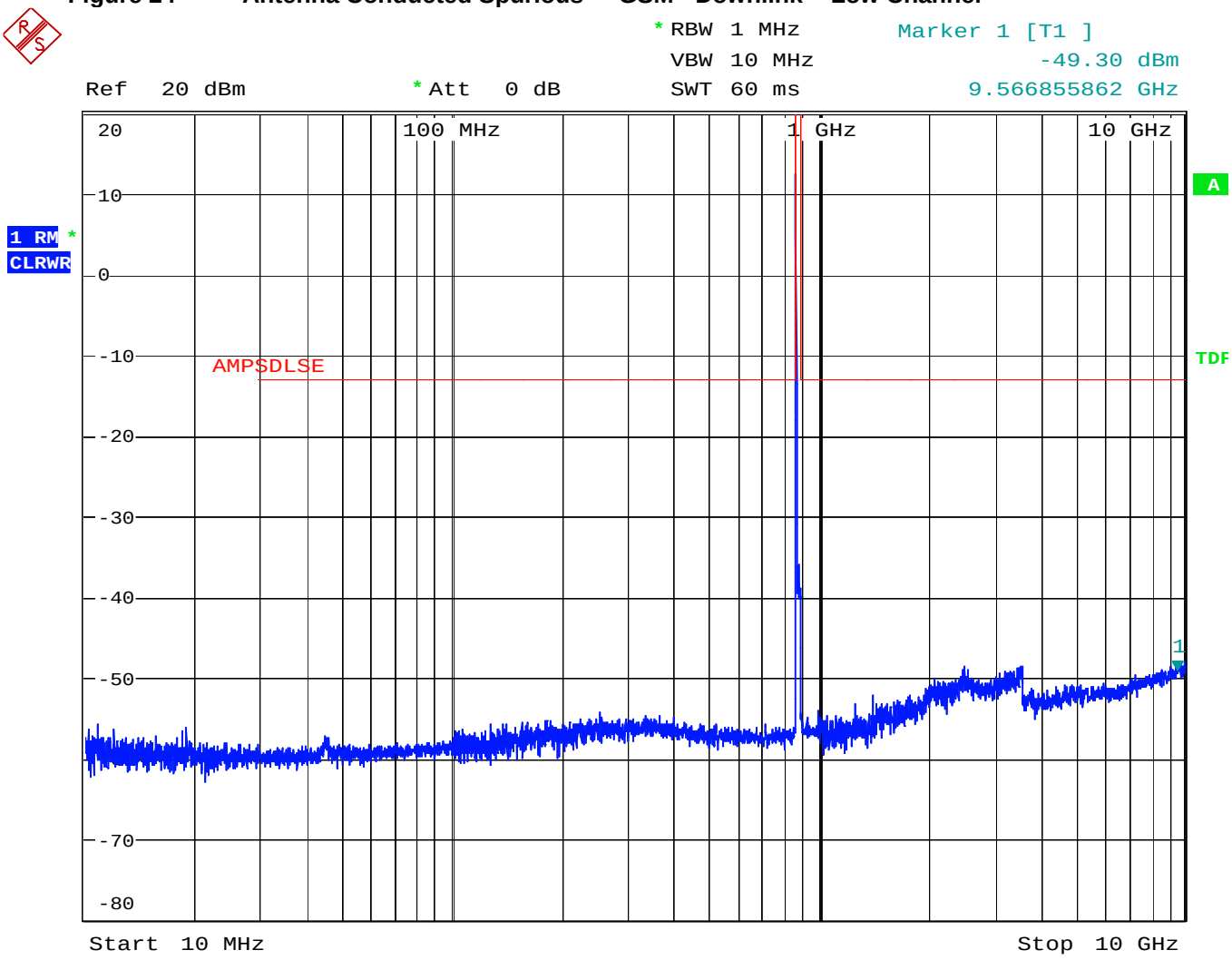
Date: 14.MAY.2007 18:23:39

Figure 23 Antenna Conducted Spurious - WCDMA - Uplink - High Channel



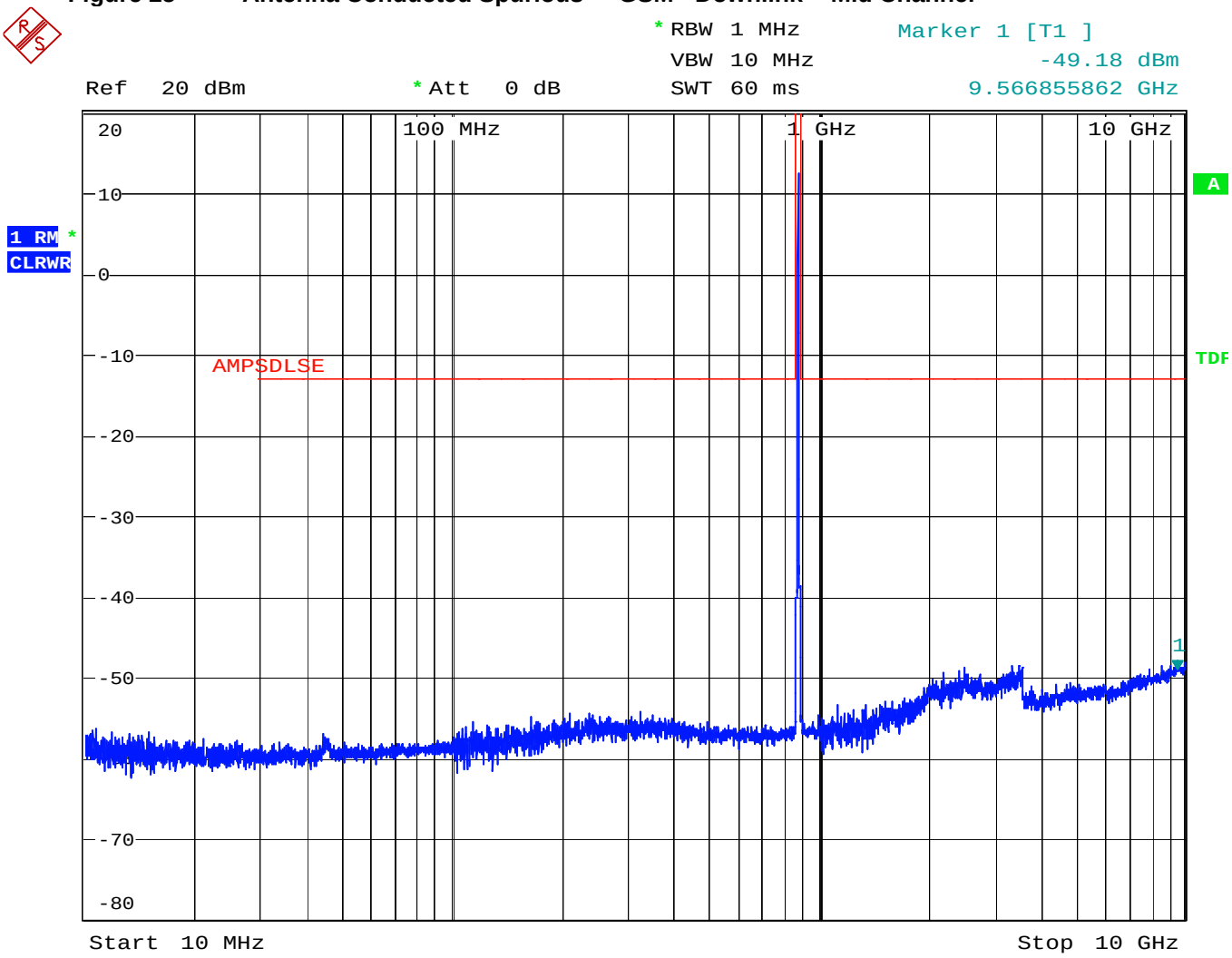
Date: 14.MAY.2007 18:24:32

Figure 24 Antenna Conducted Spurious - GSM - Downlink - Low Channel



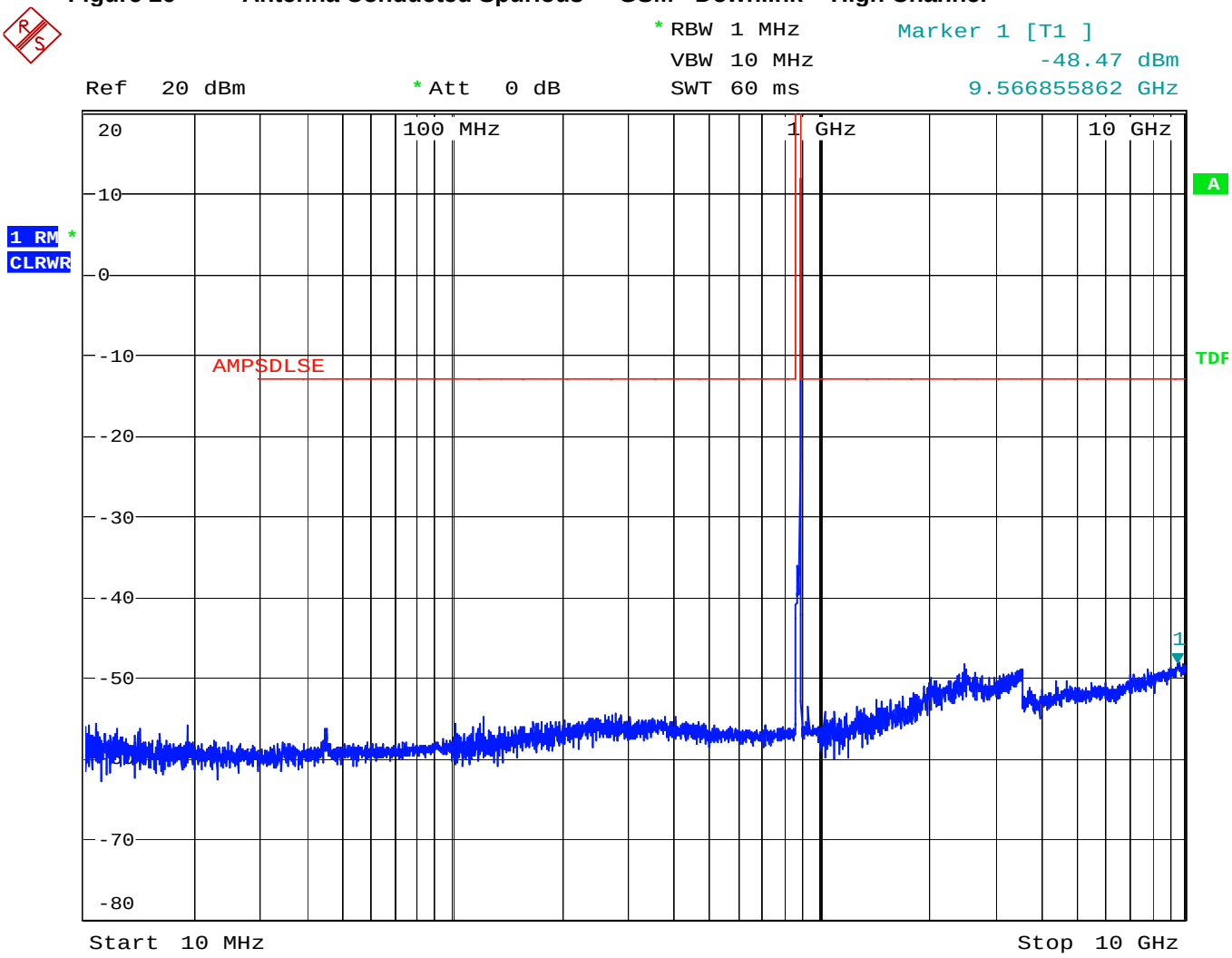
Date: 15.MAY.2007 15:05:42

Figure 25 Antenna Conducted Spurious - GSM - Downlink - Mid Channel



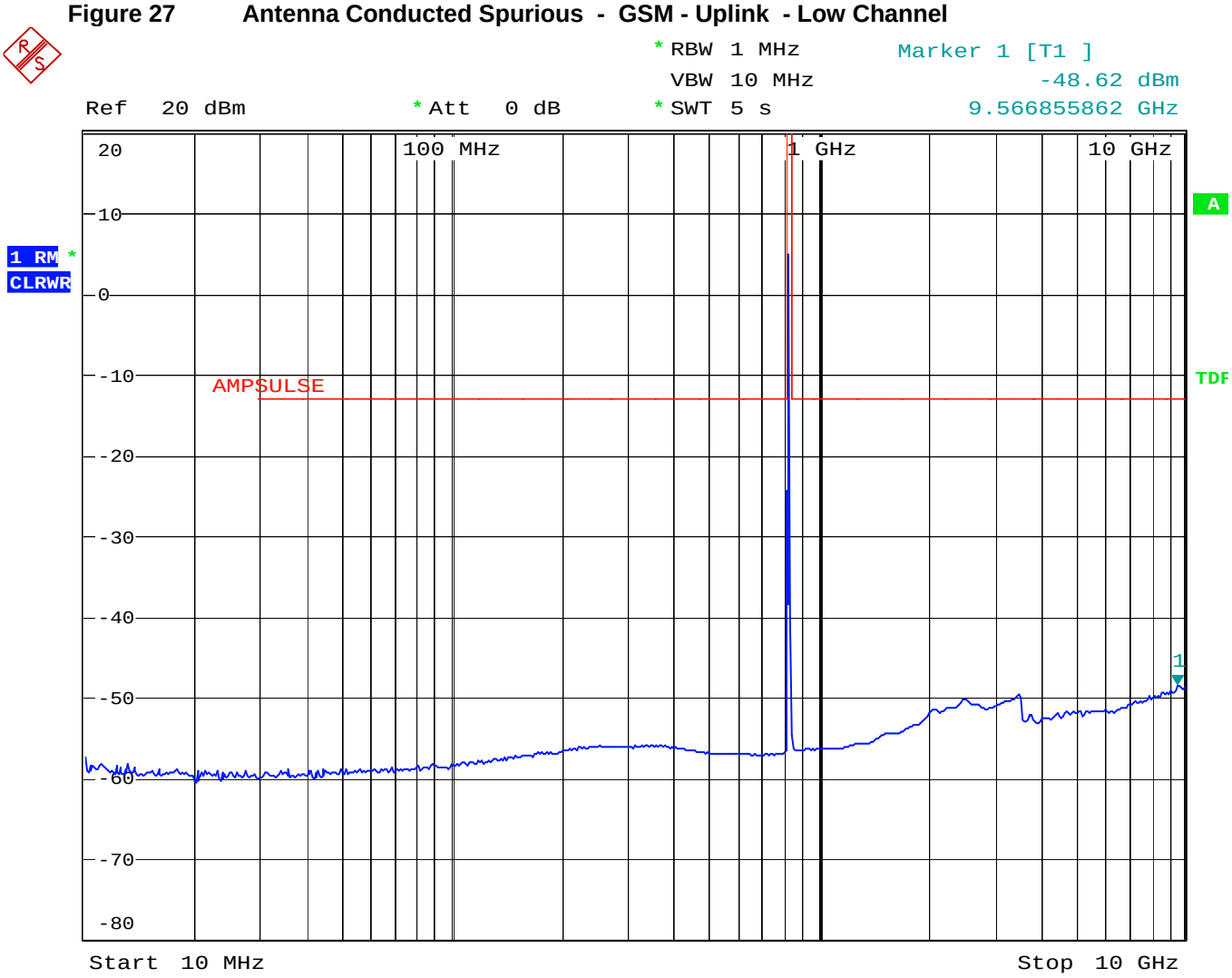
Date: 15.MAY.2007 15:06:13

Figure 26 Antenna Conducted Spurious - GSM - Downlink - High Channel



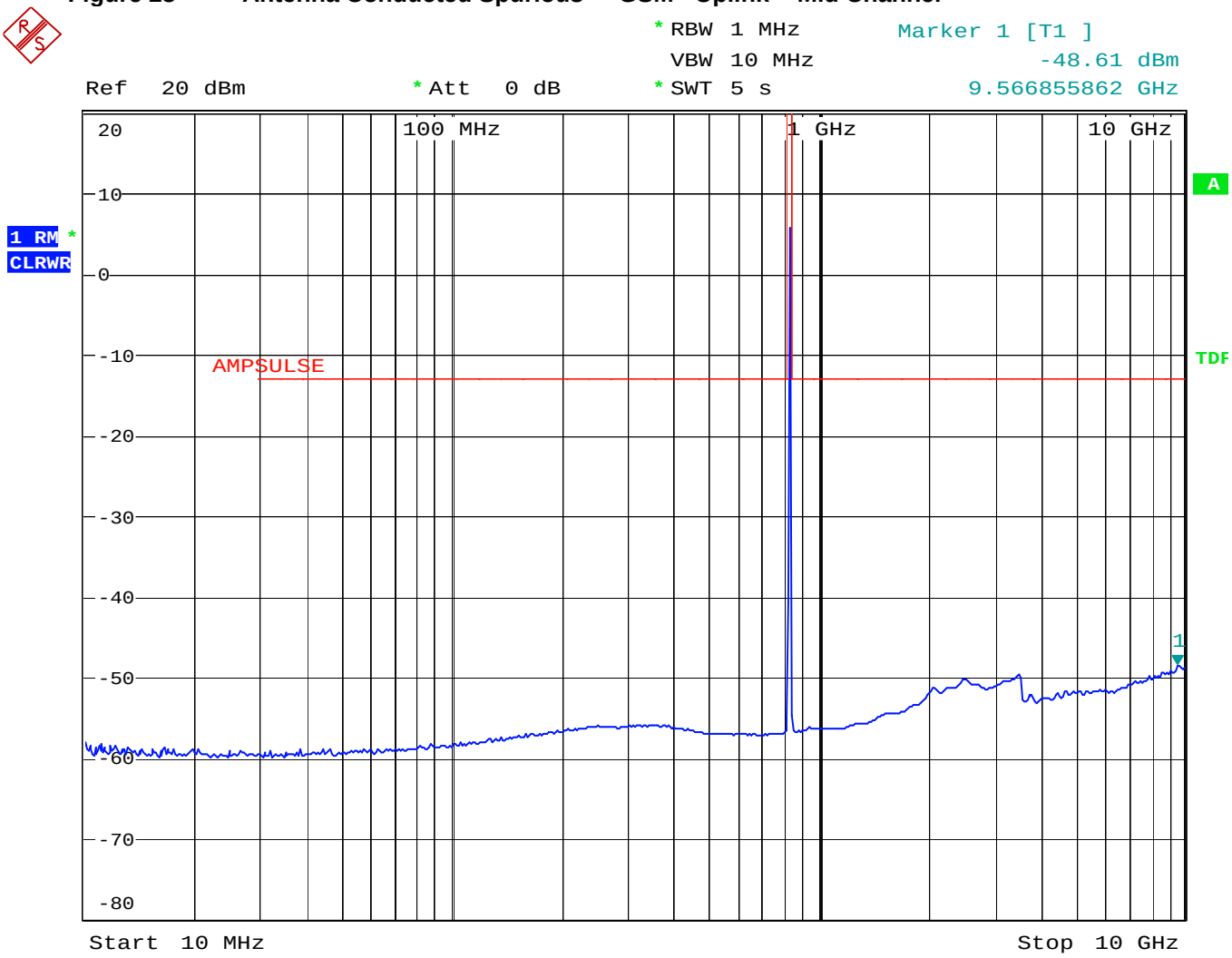
Date: 15.MAY.2007 15:06:45

Figure 27 Antenna Conducted Spurious - GSM - Uplink - Low Channel



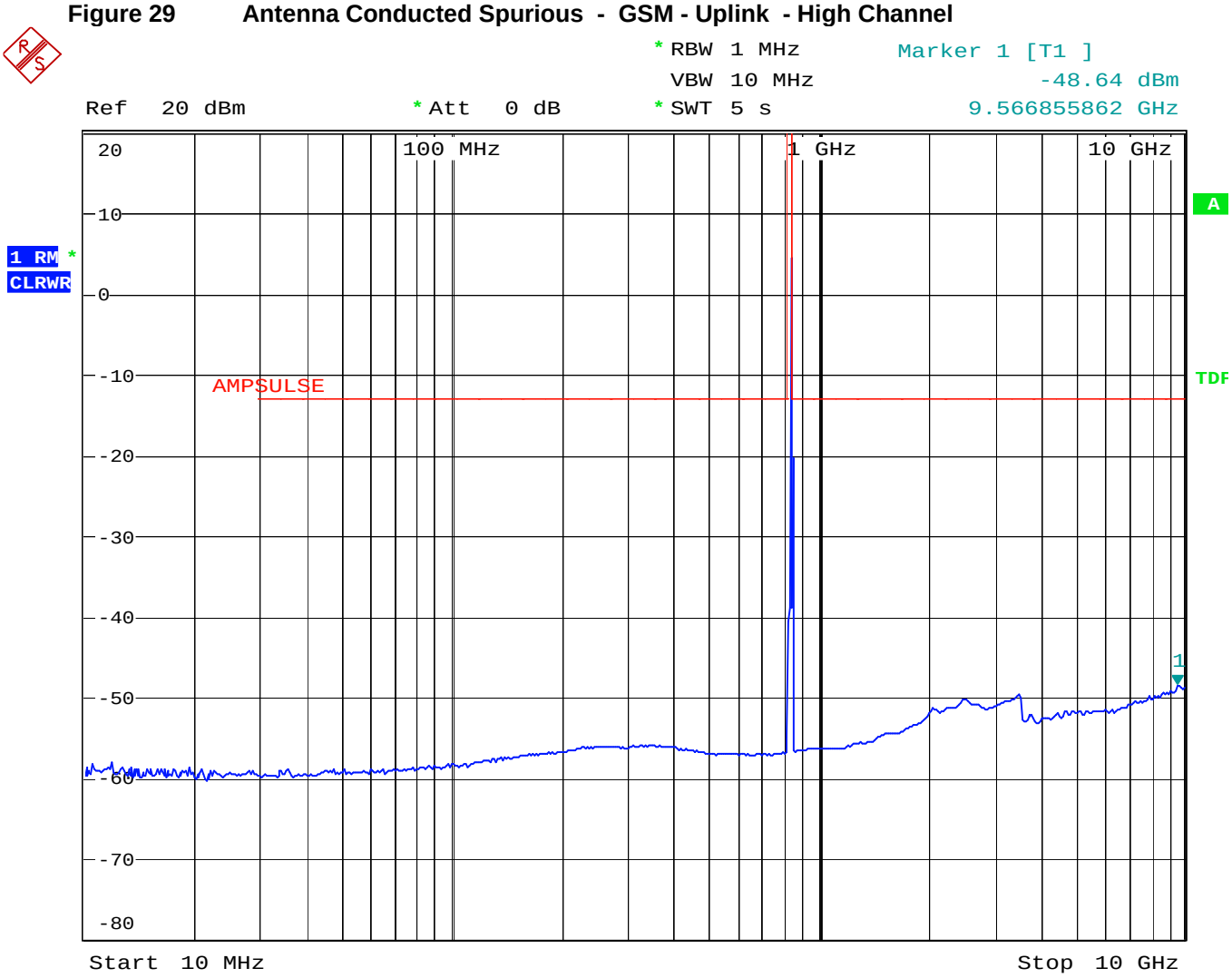
Date: 14.MAY.2007 18:26:02

Figure 28 Antenna Conducted Spurious - GSM - Uplink - Mid Channel



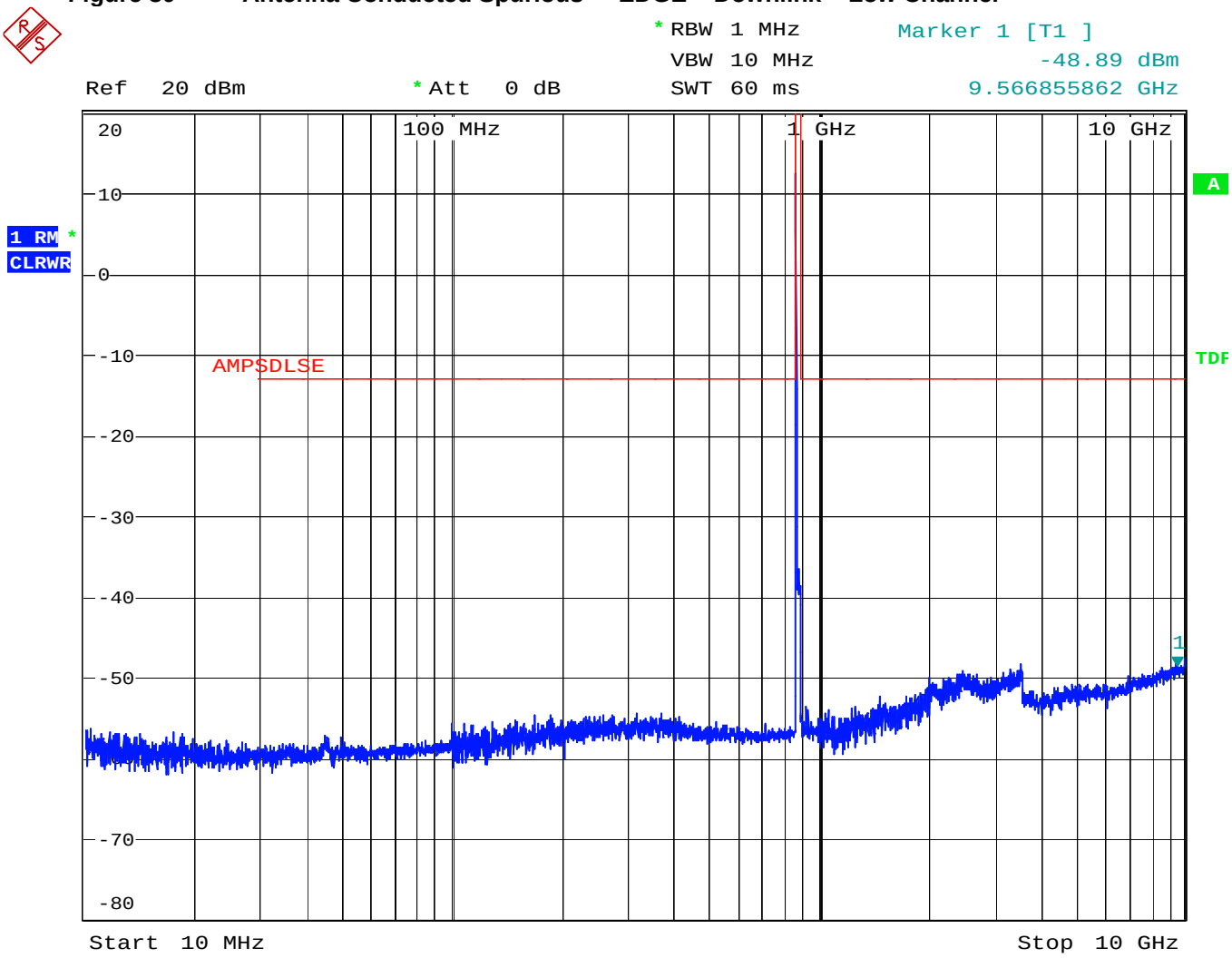
Date: 14.MAY.2007 18:26:21

Figure 29 Antenna Conducted Spurious - GSM - Uplink - High Channel



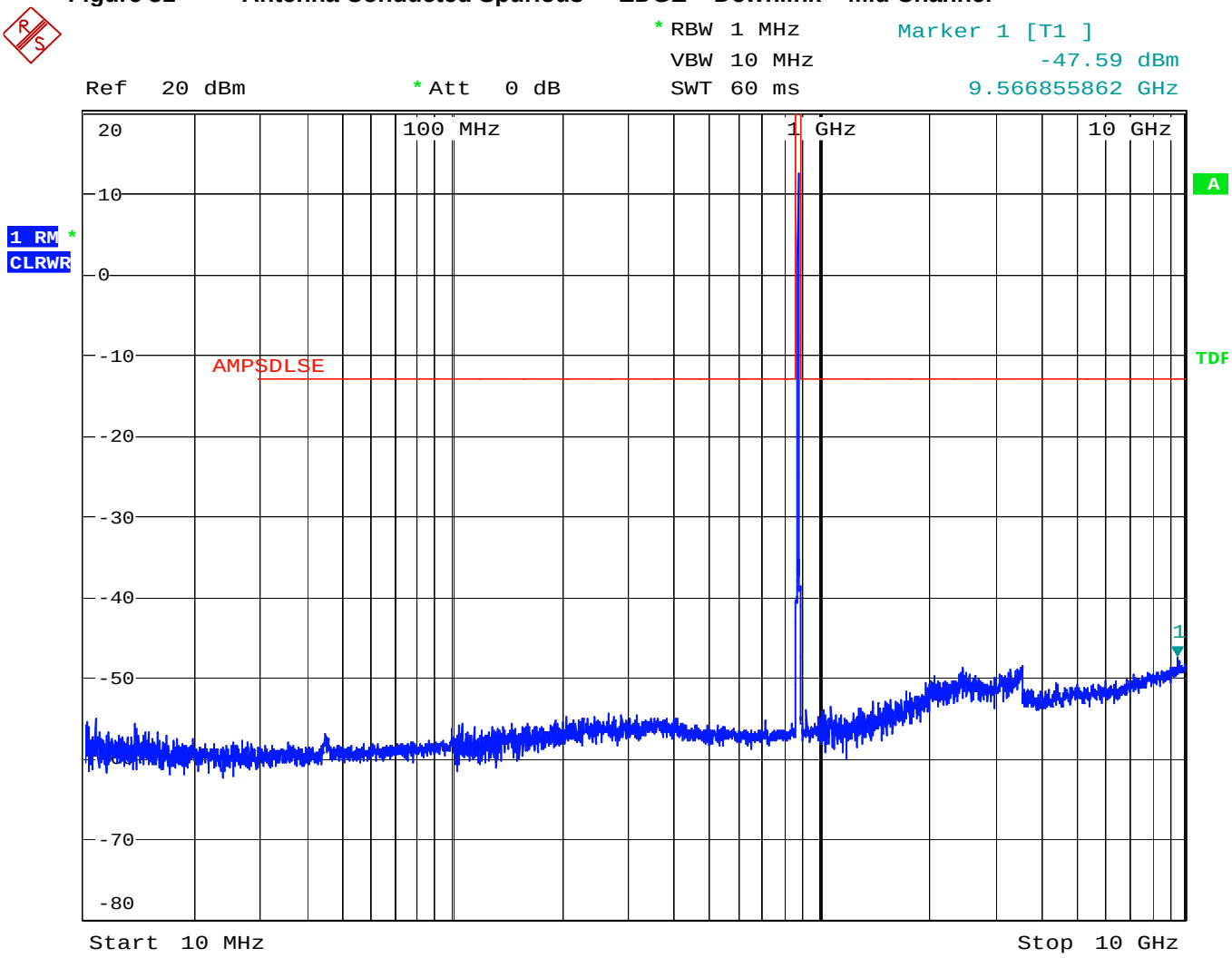
Date: 14.MAY.2007 18:27:01

Figure 30 Antenna Conducted Spurious - EDGE – Downlink – Low Channel



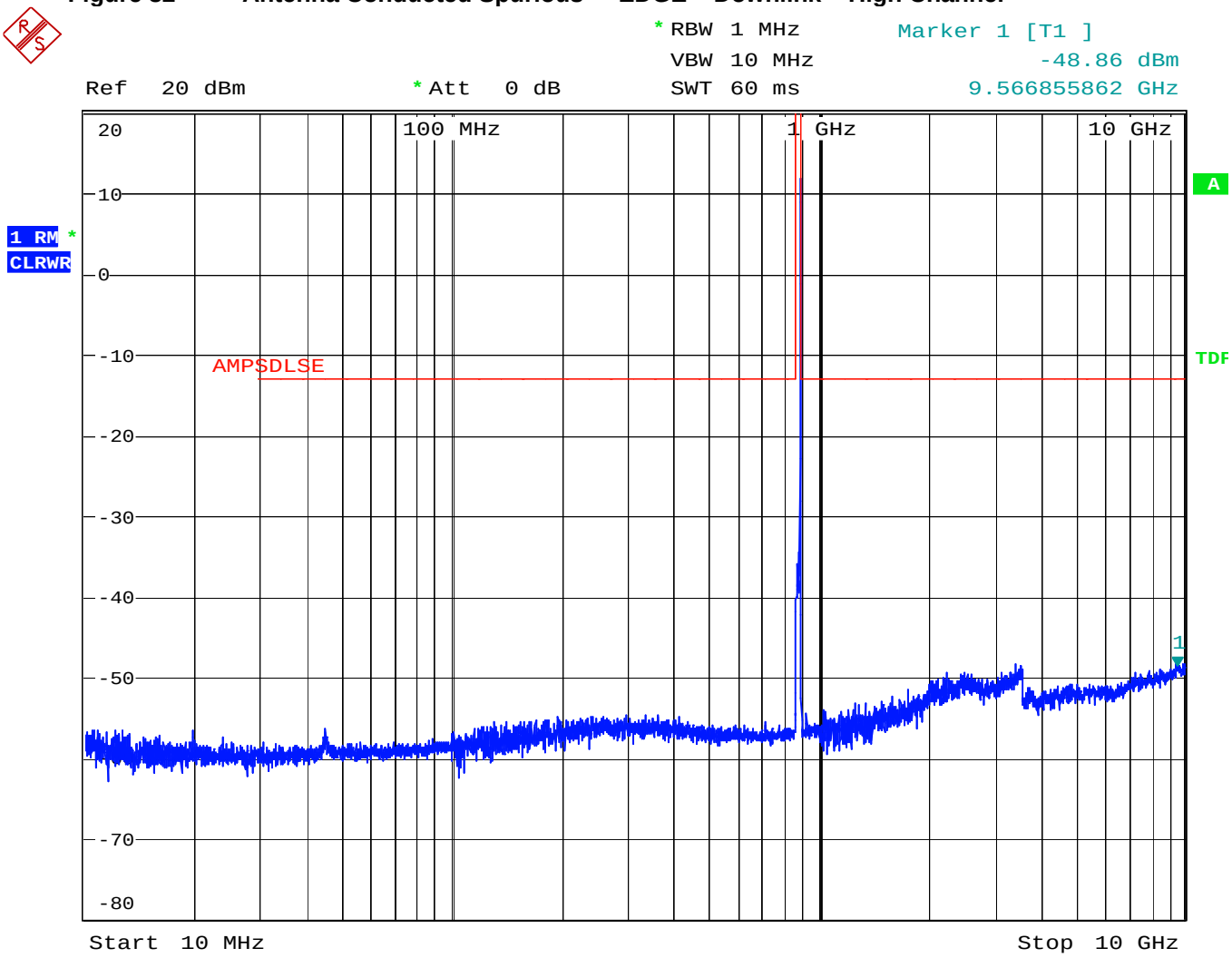
Date: 15.MAY.2007 15:08:02

Figure 31 Antenna Conducted Spurious - EDGE – Downlink – Mid Channel



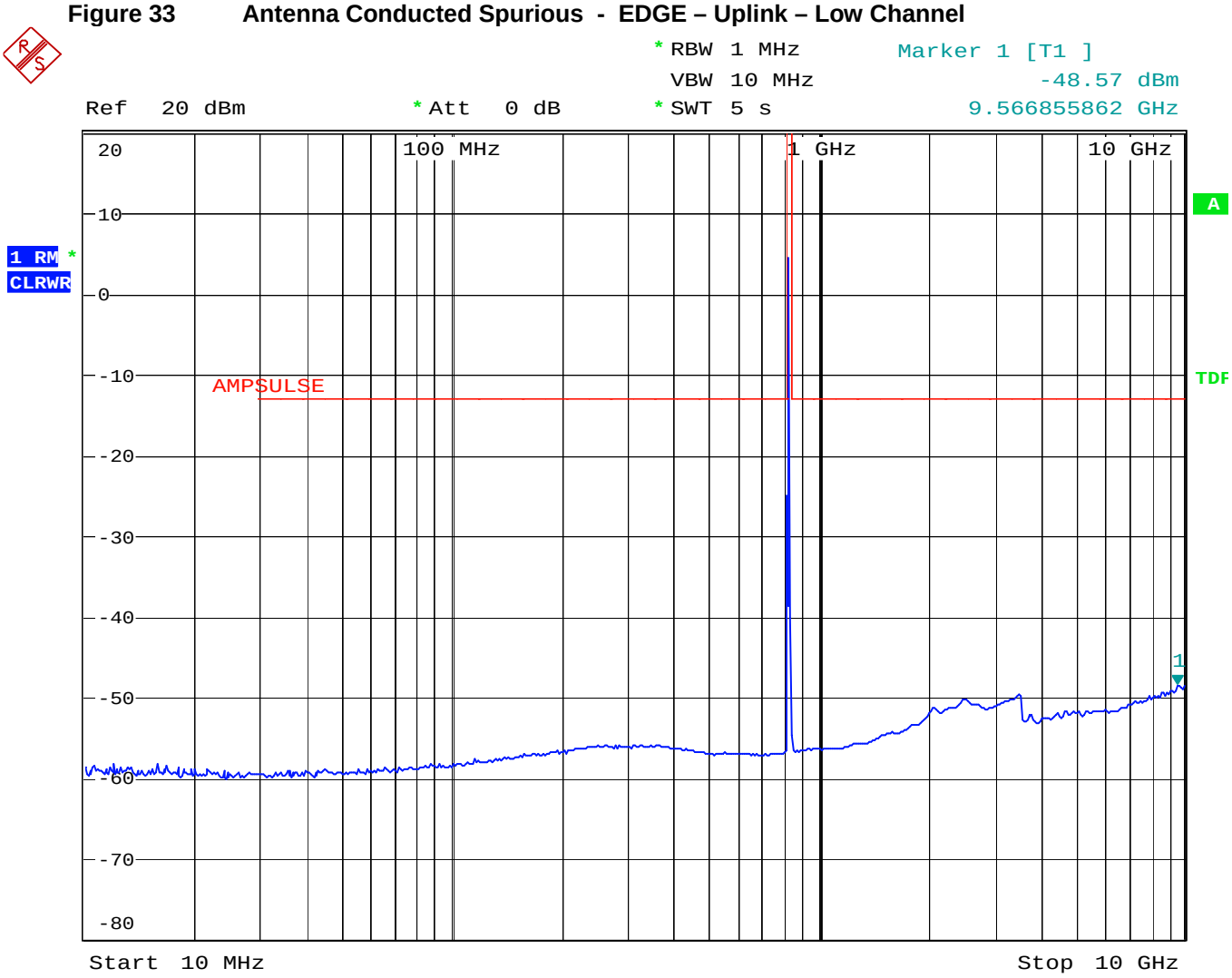
Date: 15.MAY.2007 15:08:25

Figure 32 Antenna Conducted Spurious - EDGE – Downlink – High Channel



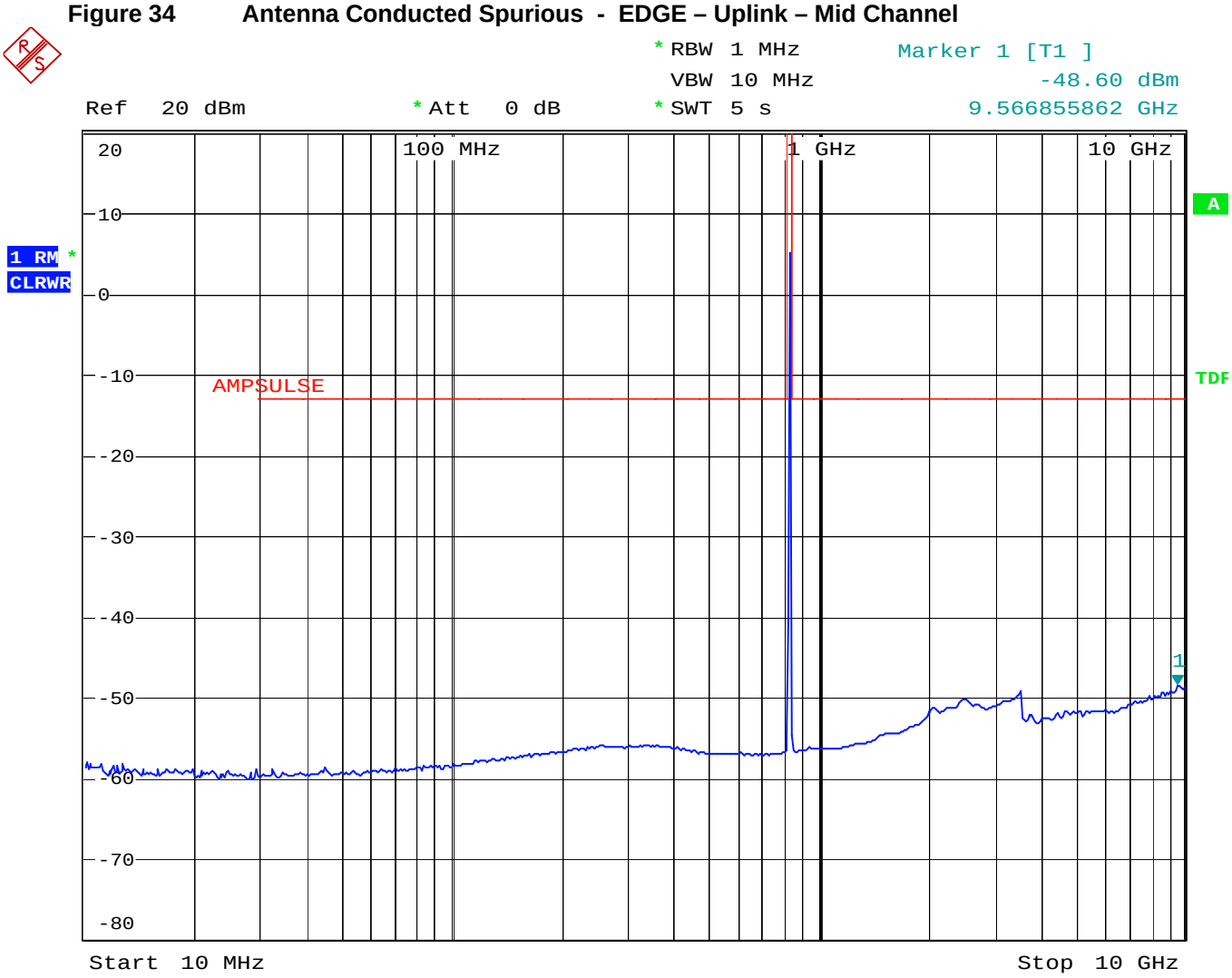
Date: 15.MAY.2007 15:08:55

Figure 33 Antenna Conducted Spurious - EDGE – Uplink – Low Channel



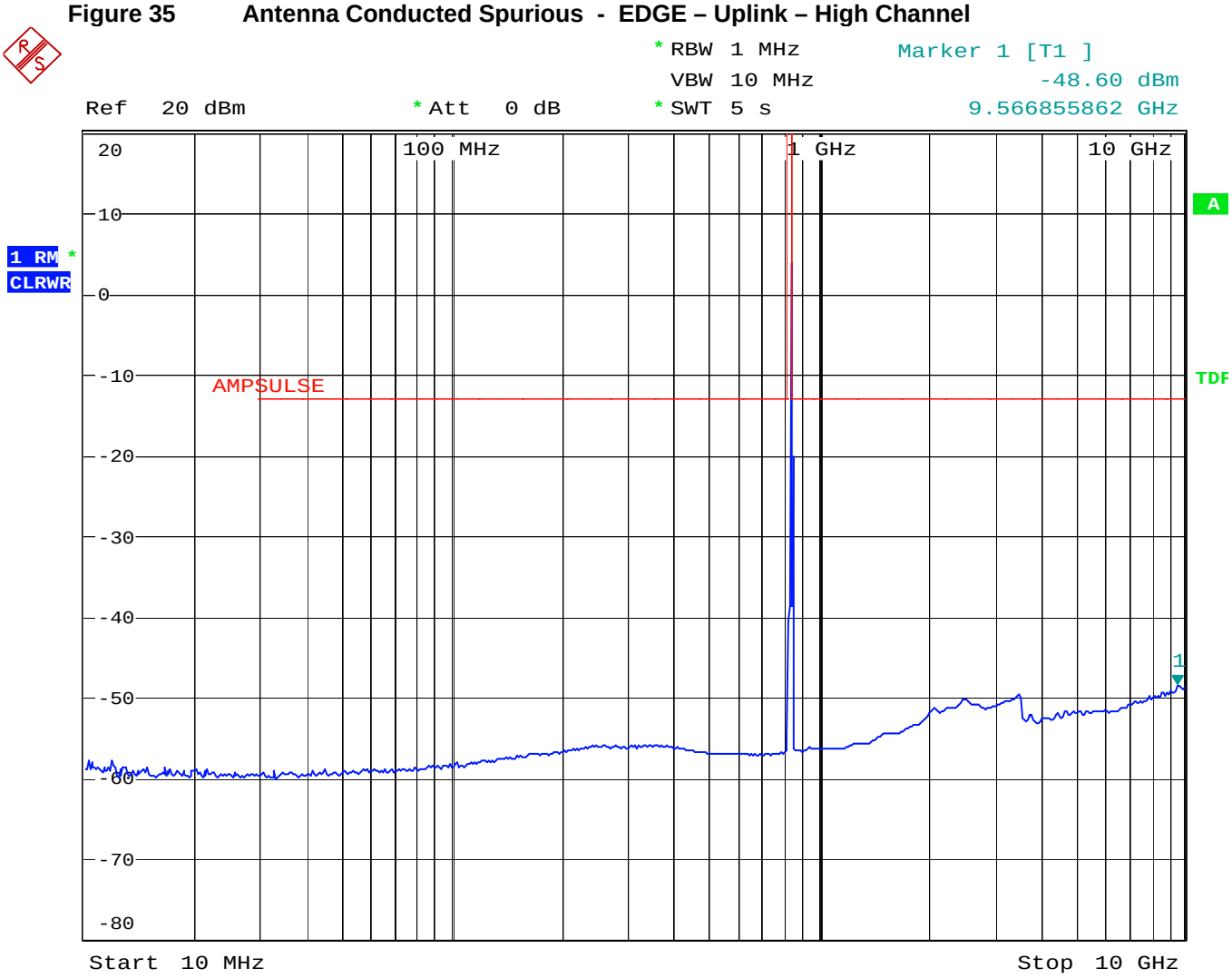
Date: 14.MAY.2007 18:27:52

Figure 34 Antenna Conducted Spurious - EDGE – Uplink – Mid Channel



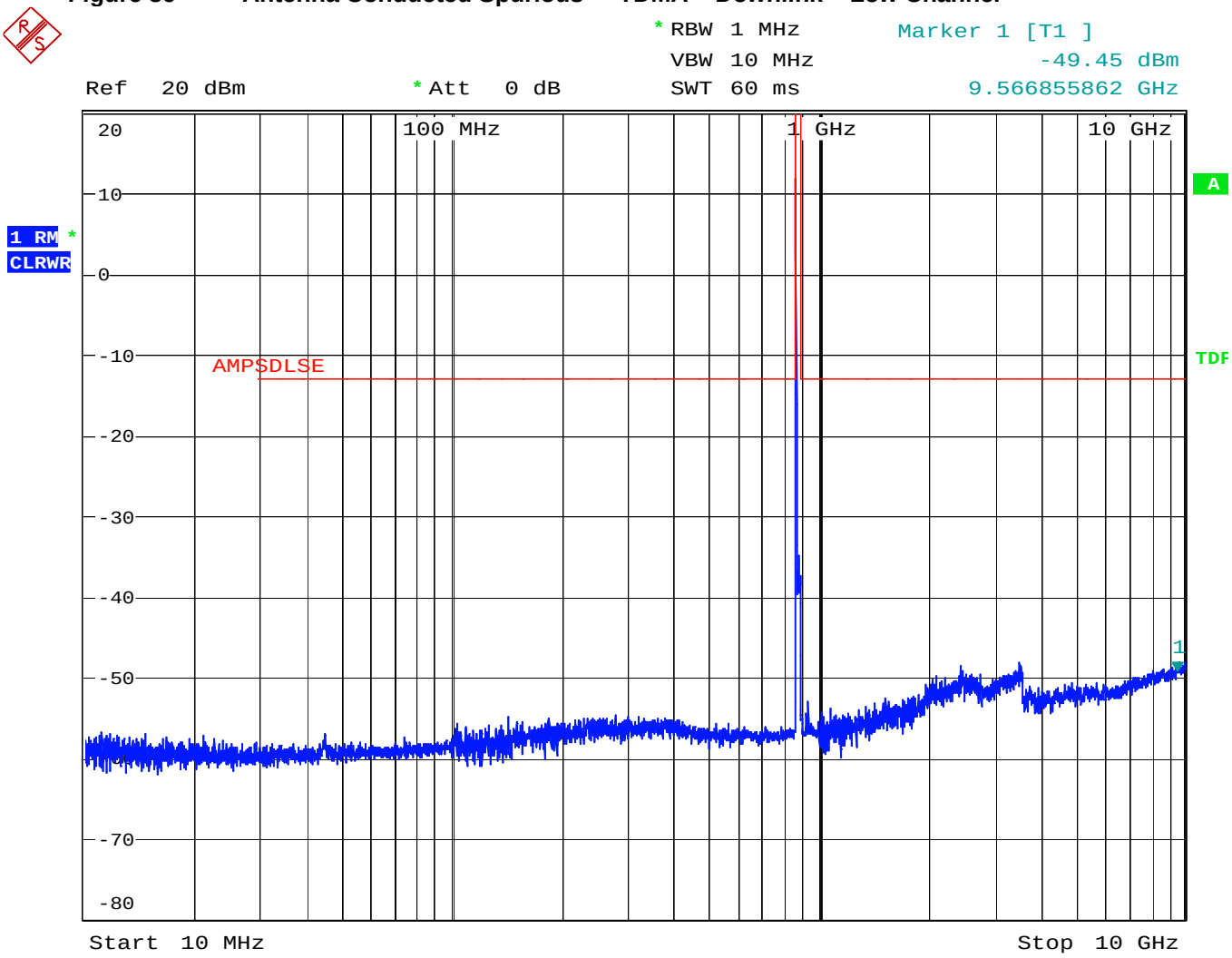
Date: 14.MAY.2007 18:28:10

Figure 35 Antenna Conducted Spurious - EDGE – Uplink – High Channel



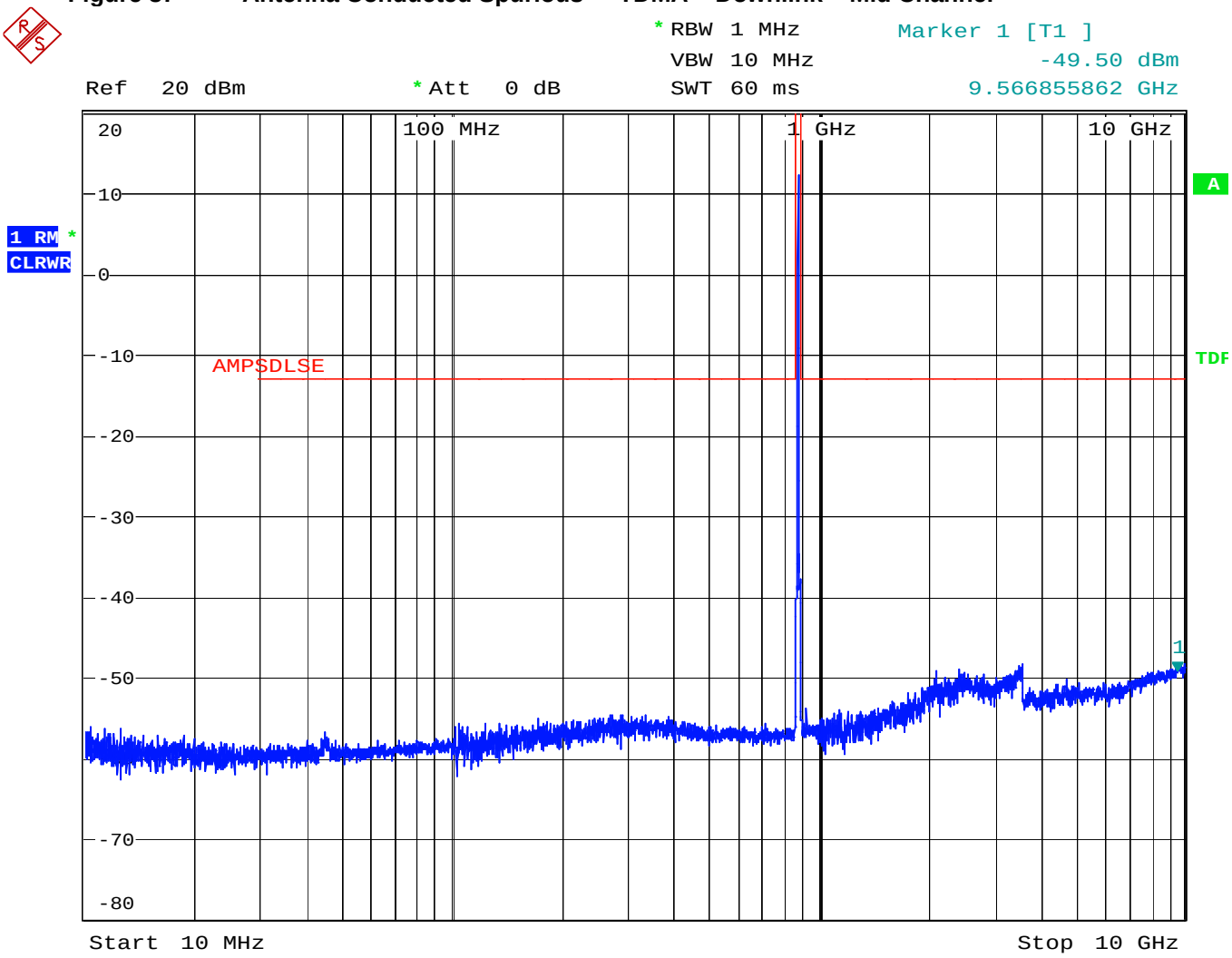
Date: 14.MAY.2007 18:28:35

Figure 36 Antenna Conducted Spurious - TDMA – Downlink – Low Channel



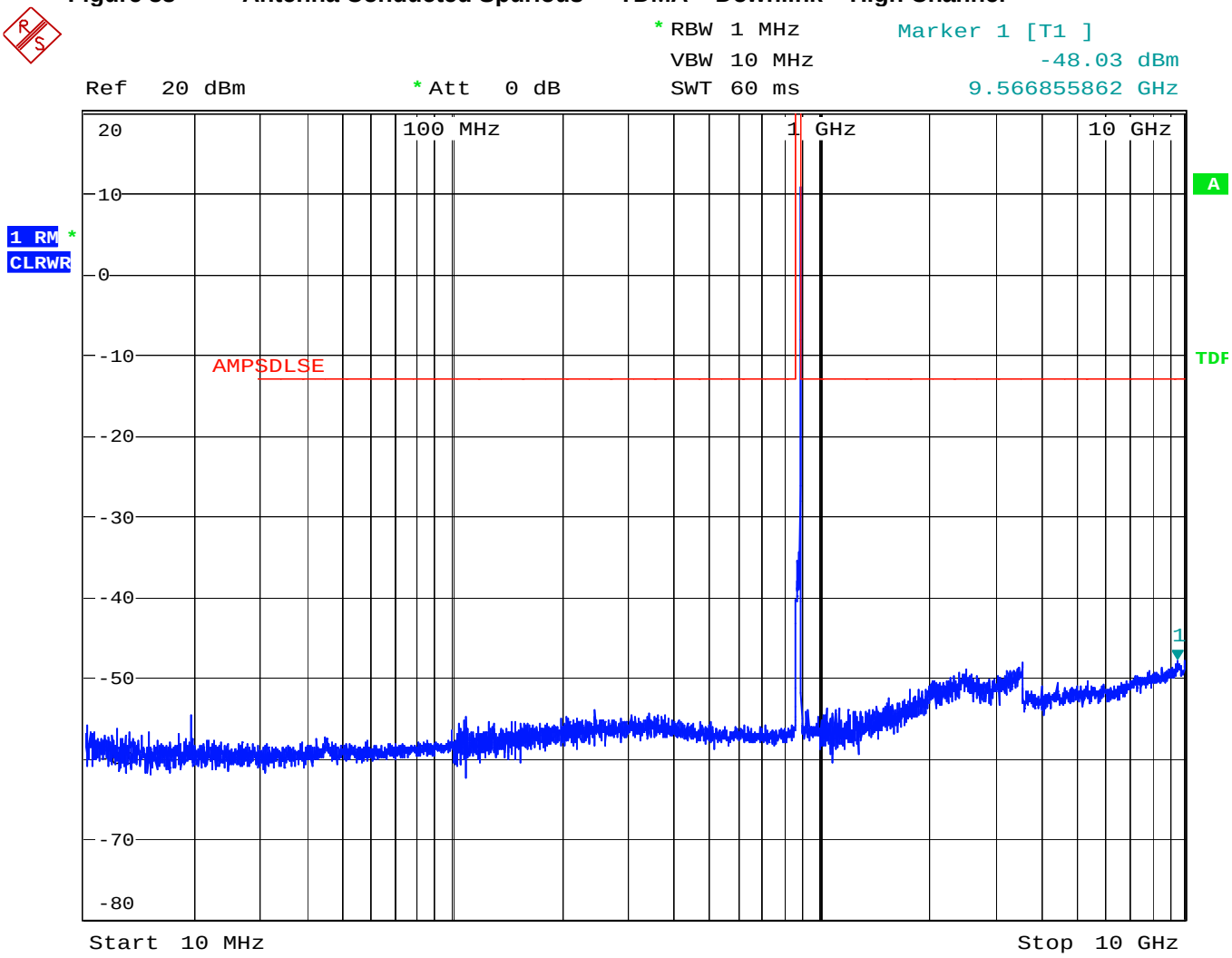
Date: 15.MAY.2007 15:10:06

Figure 37 Antenna Conducted Spurious - TDMA – Downlink – Mid Channel



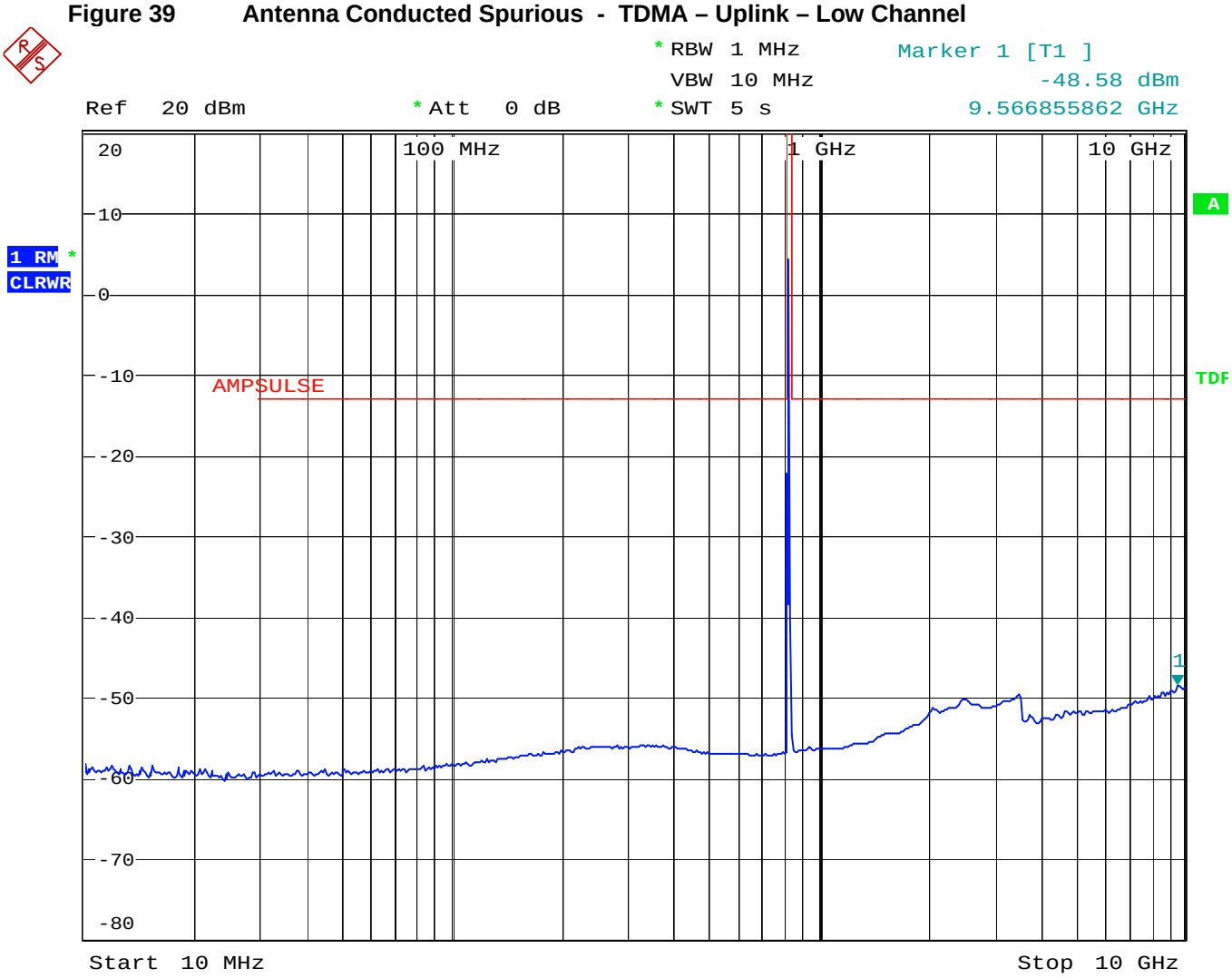
Date: 15.MAY.2007 15:10:26

Figure 38 Antenna Conducted Spurious - TDMA – Downlink – High Channel



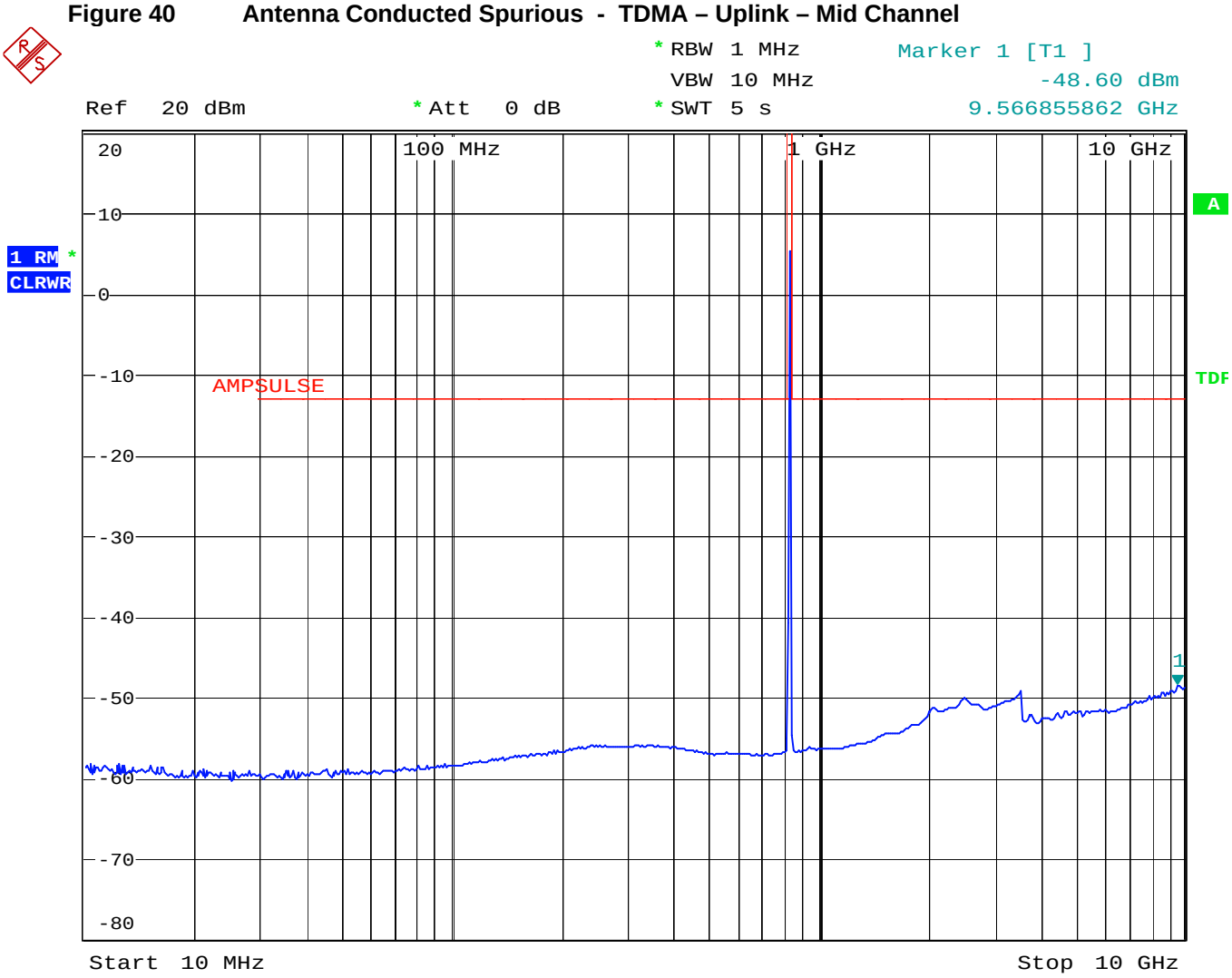
Date: 15.MAY.2007 15:10:51

Figure 39 Antenna Conducted Spurious - TDMA – Uplink – Low Channel



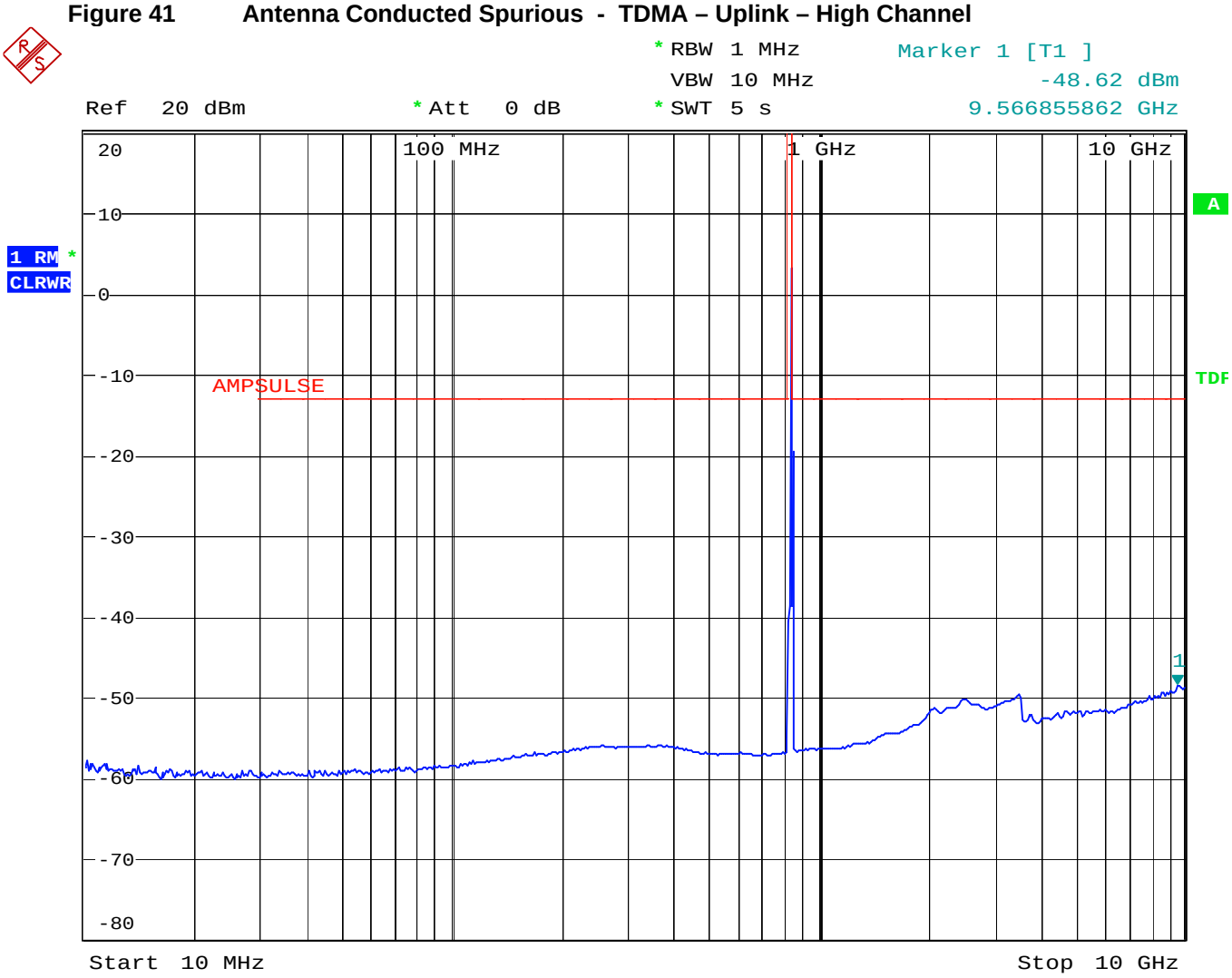
Date: 14.MAY.2007 18:29:50

Figure 40 Antenna Conducted Spurious - TDMA – Uplink – Mid Channel



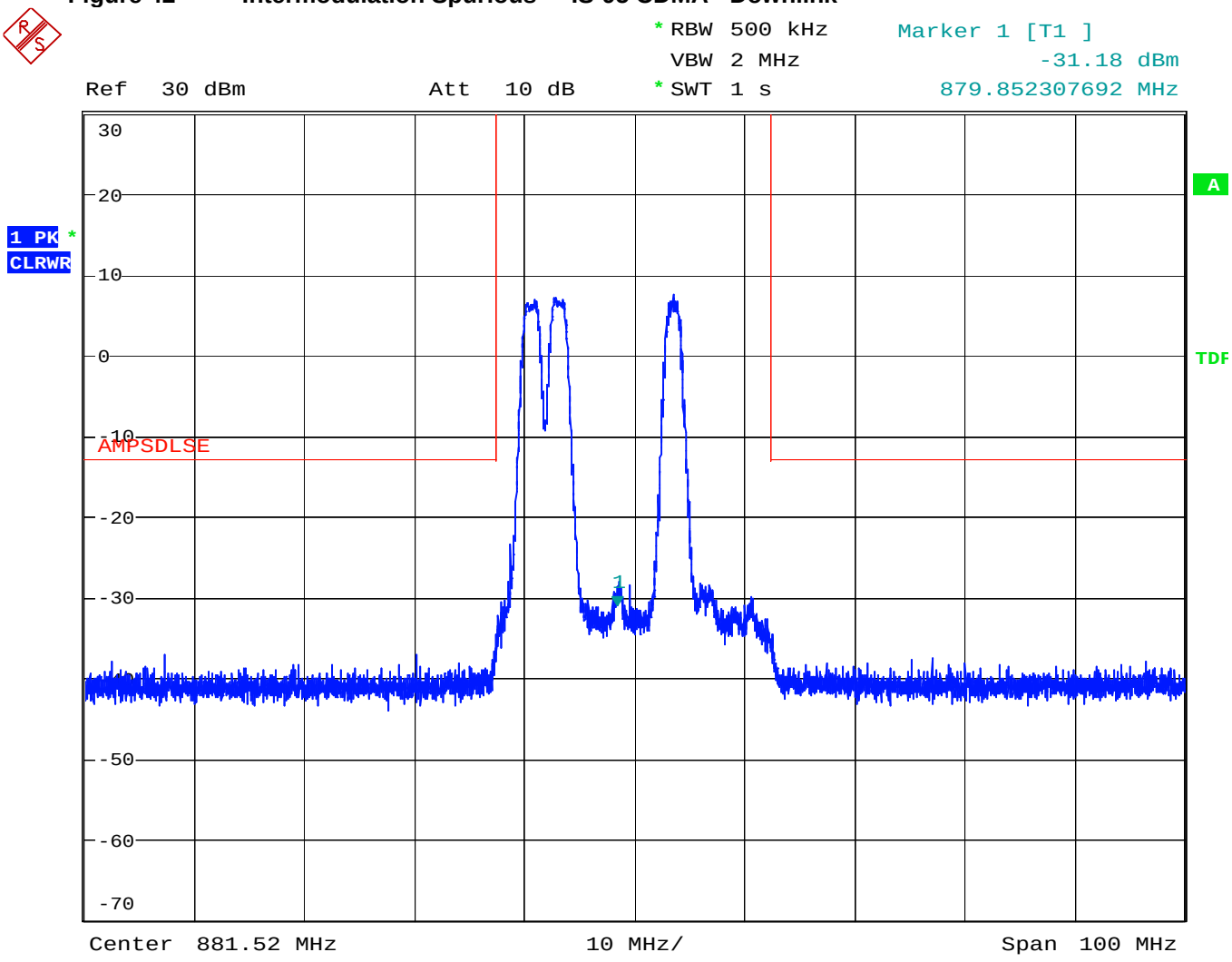
Date: 14.MAY.2007 18:30:18

Figure 41 Antenna Conducted Spurious - TDMA – Uplink – High Channel



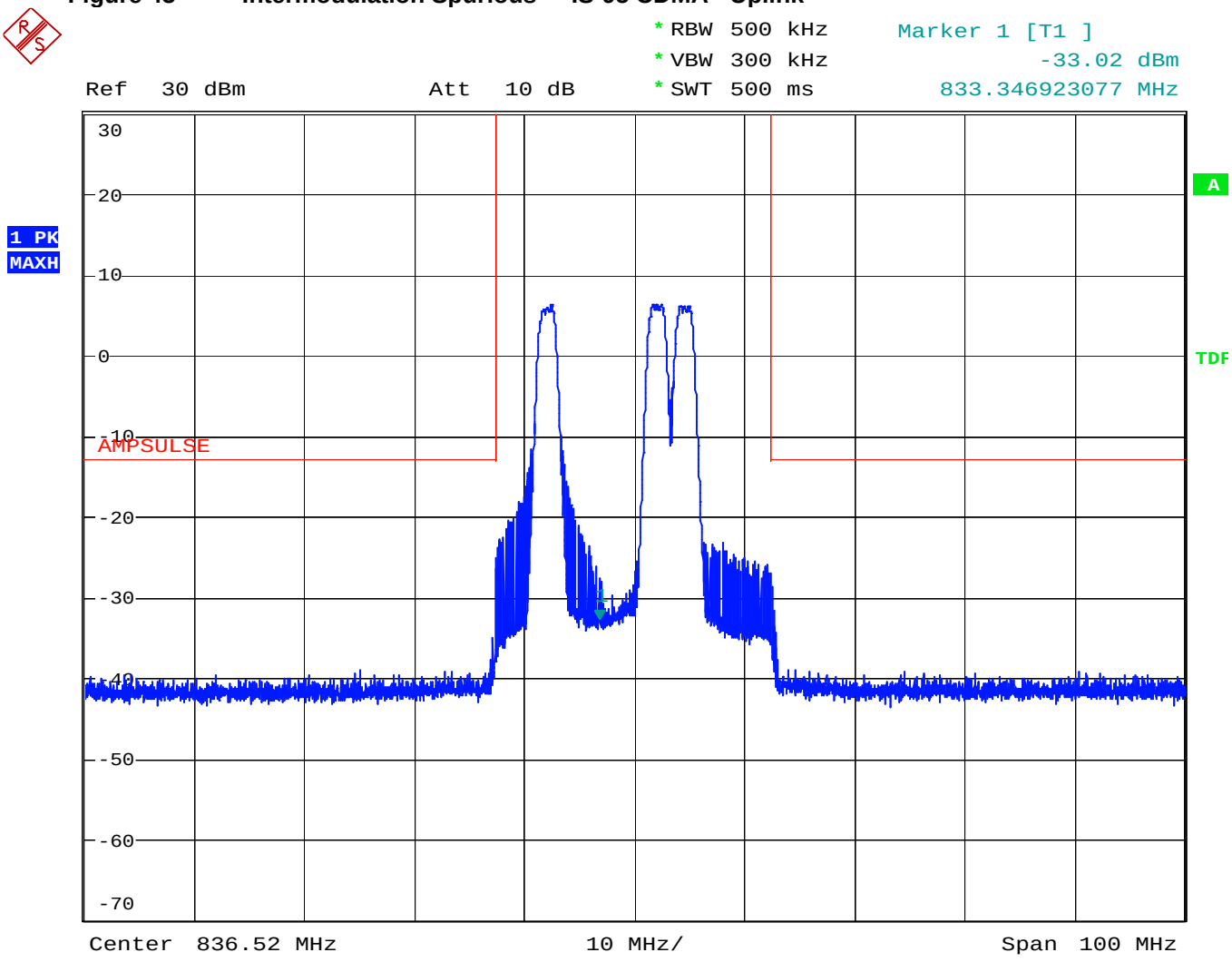
Date: 14.MAY.2007 18:30:44

Figure 42 Intermodulation Spurious - IS-95 CDMA - Downlink



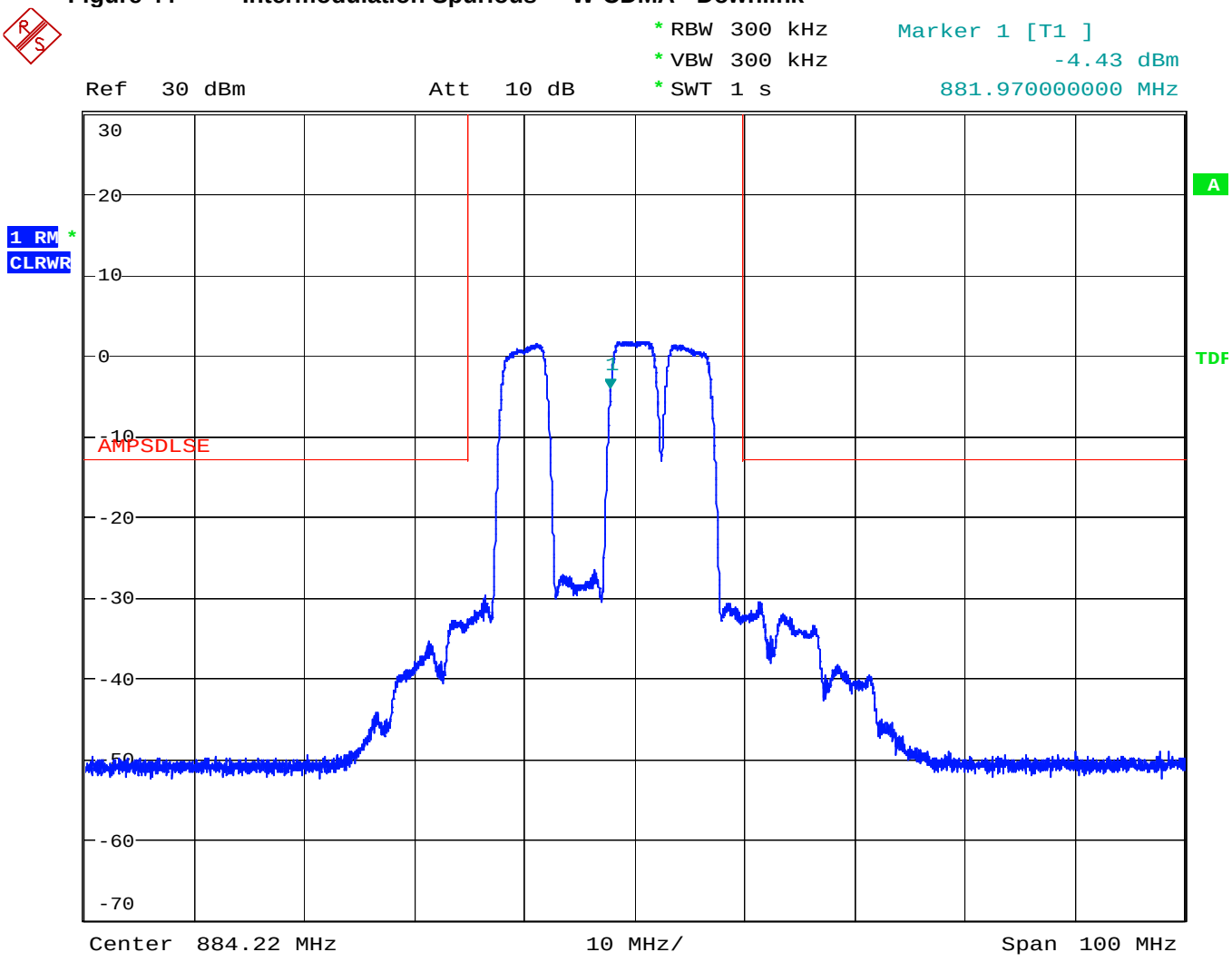
Date: 15.MAY.2007 18:01:02

Figure 43 Intermodulation Spurious - IS-95 CDMA - Uplink



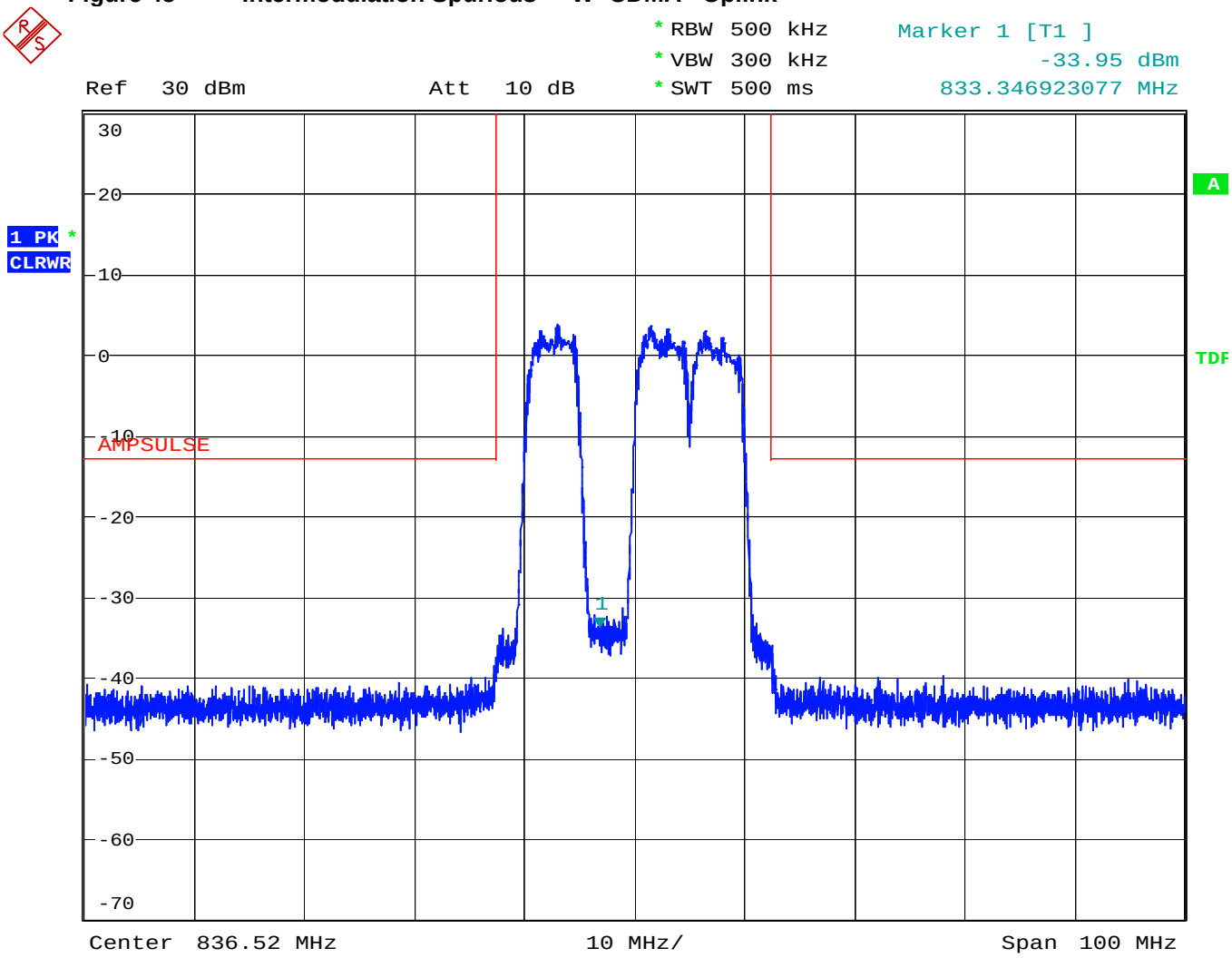
Date: 15.MAY.2007 19:56:47

Figure 44 Intermodulation Spurious - W-CDMA - Downlink



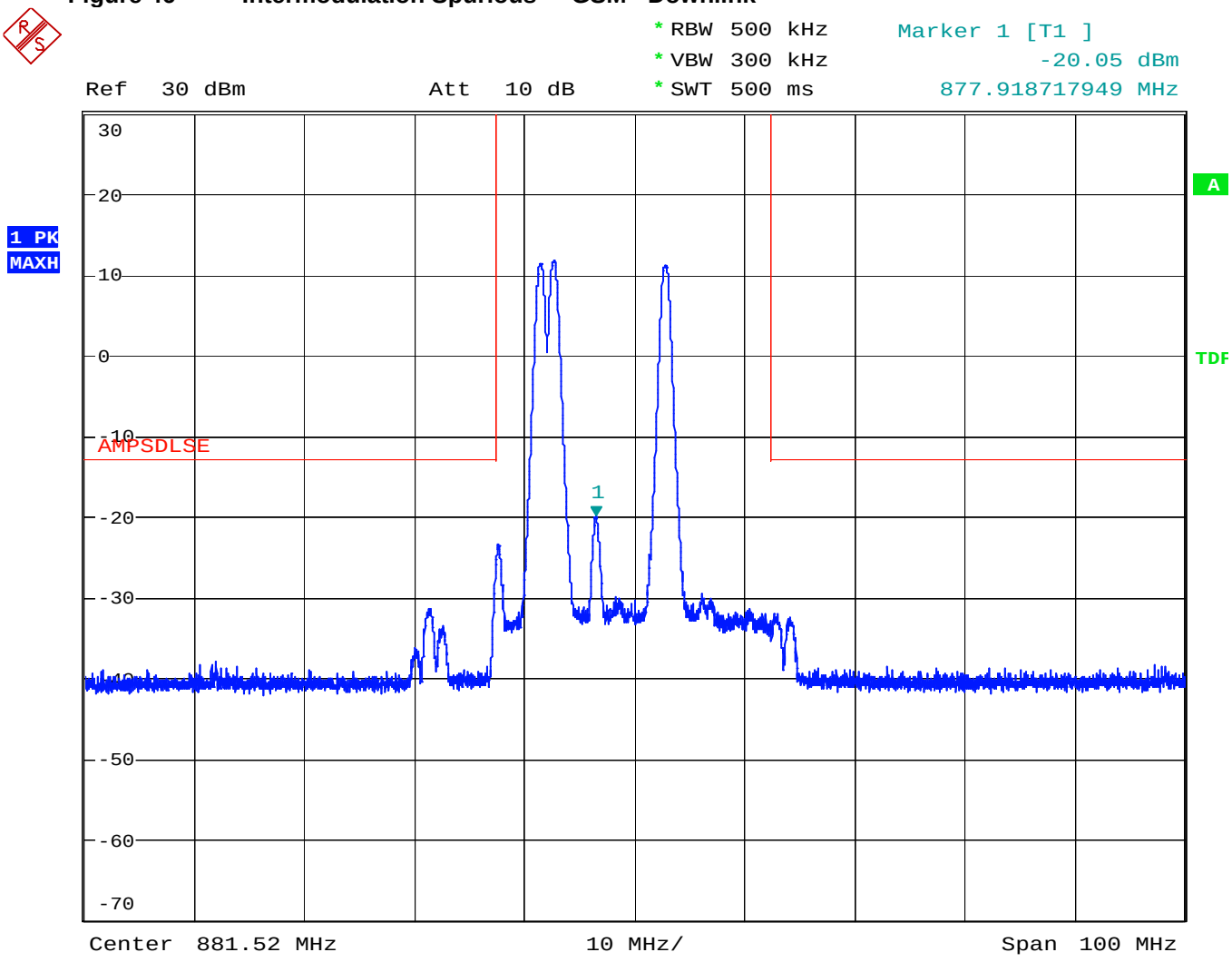
Date: 15.MAY.2007 18:50:17

Figure 45 Intermodulation Spurious - W- CDMA - Uplink



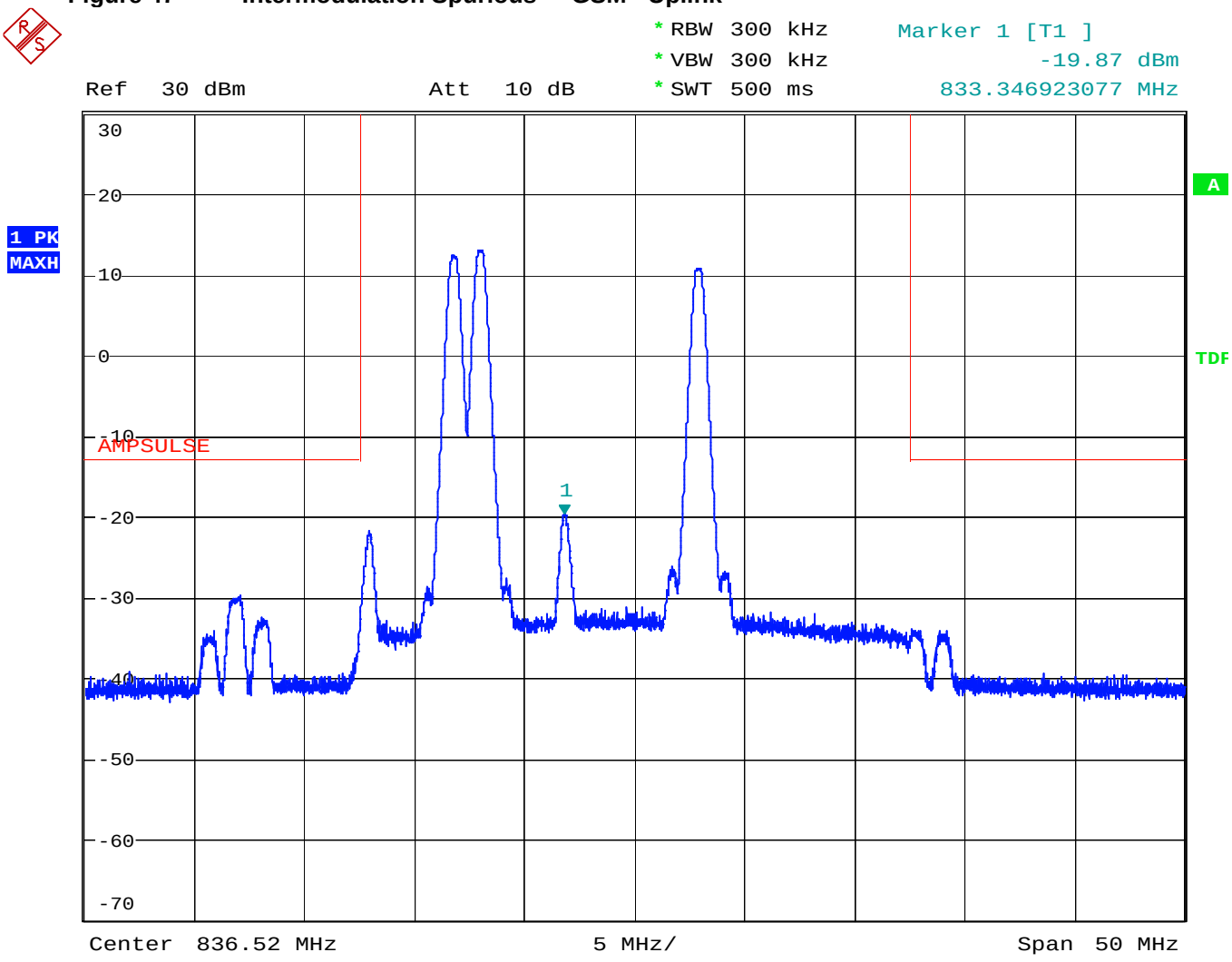
Date: 15.MAY.2007 19:53:52

Figure 46 Intermodulation Spurious - GSM - Downlink



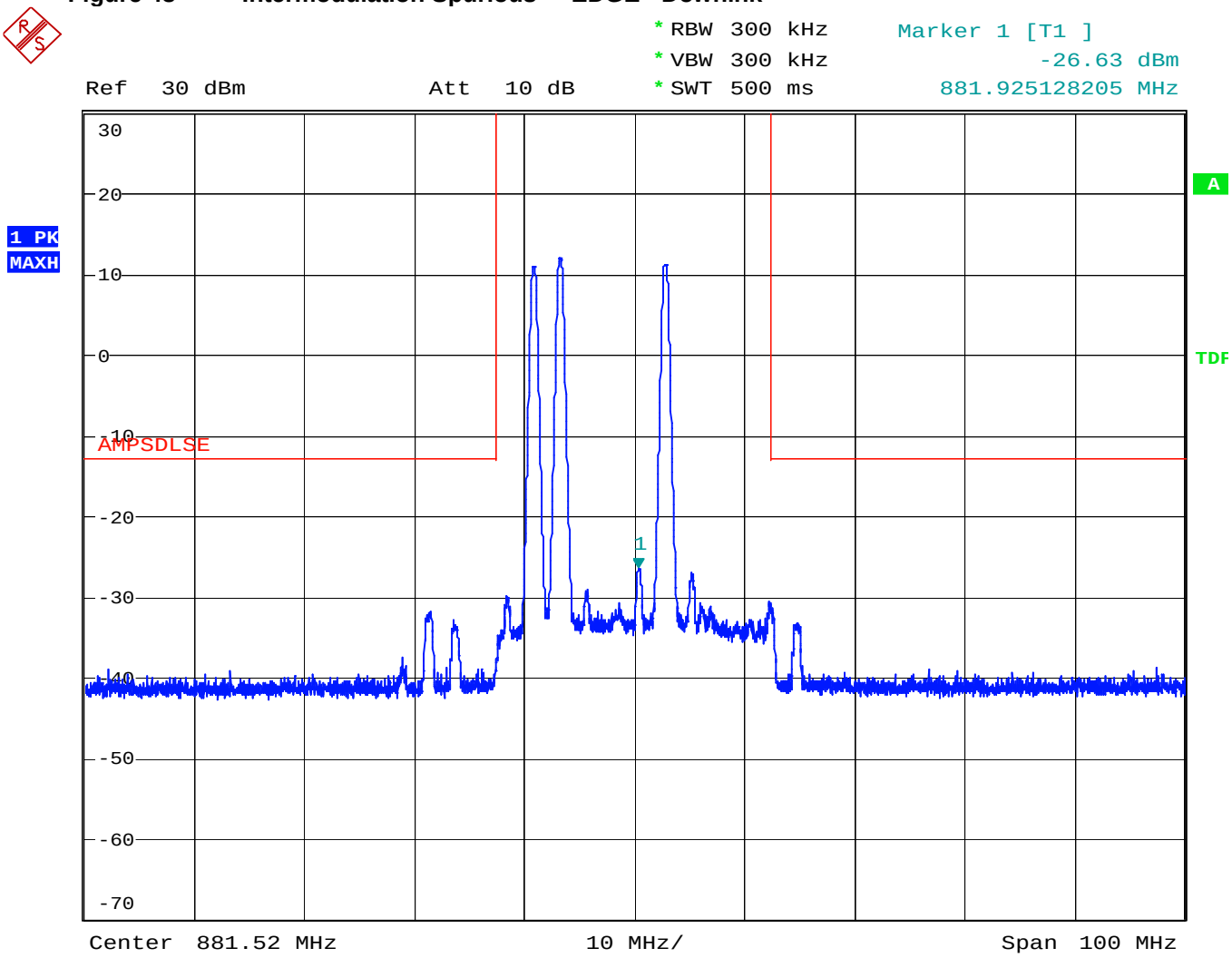
Date: 15.MAY.2007 19:19:23

Figure 47 Intermodulation Spurious - GSM - Uplink



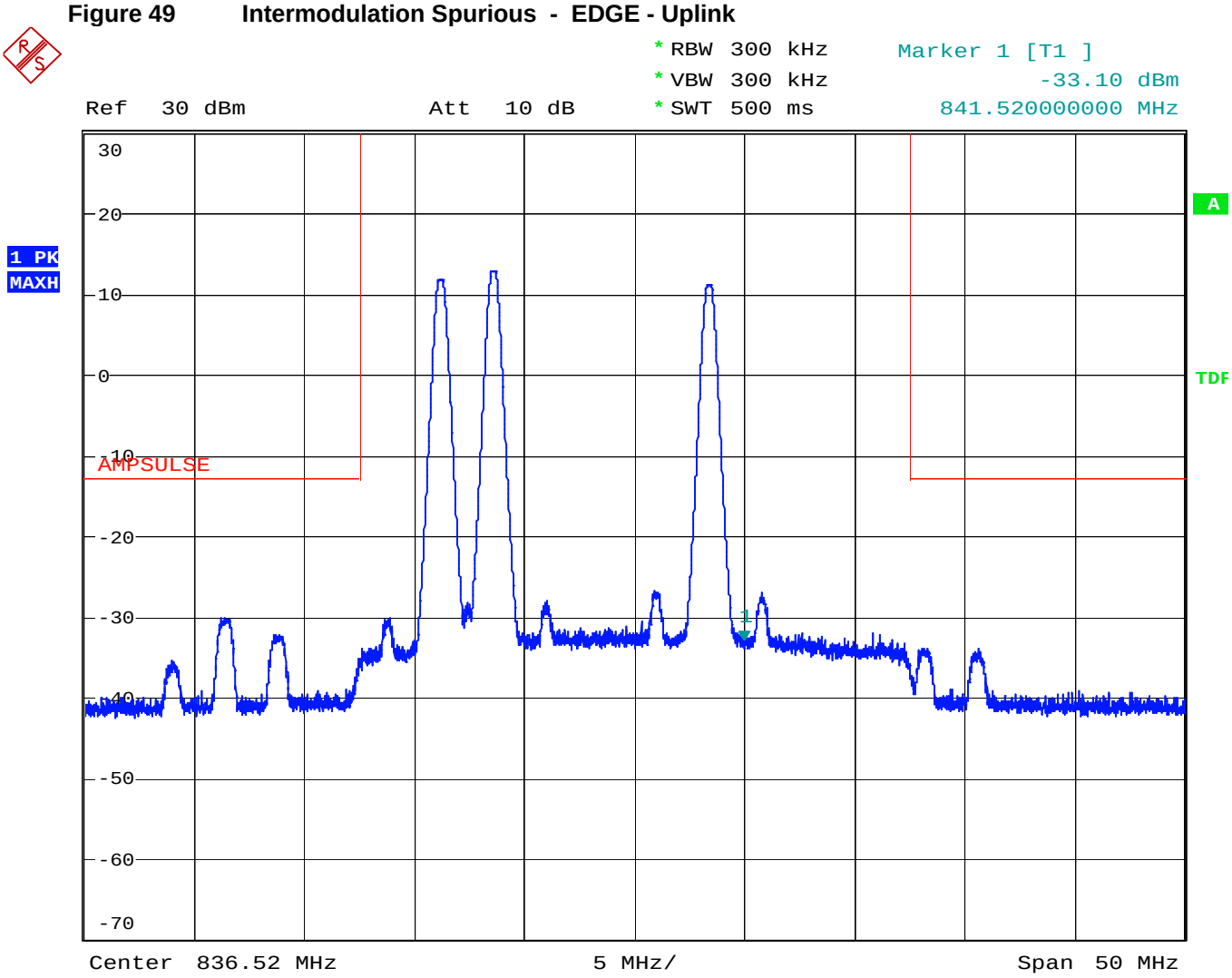
Date: 15.MAY.2007 19:51:37

Figure 48 Intermodulation Spurious - EDGE - Downink



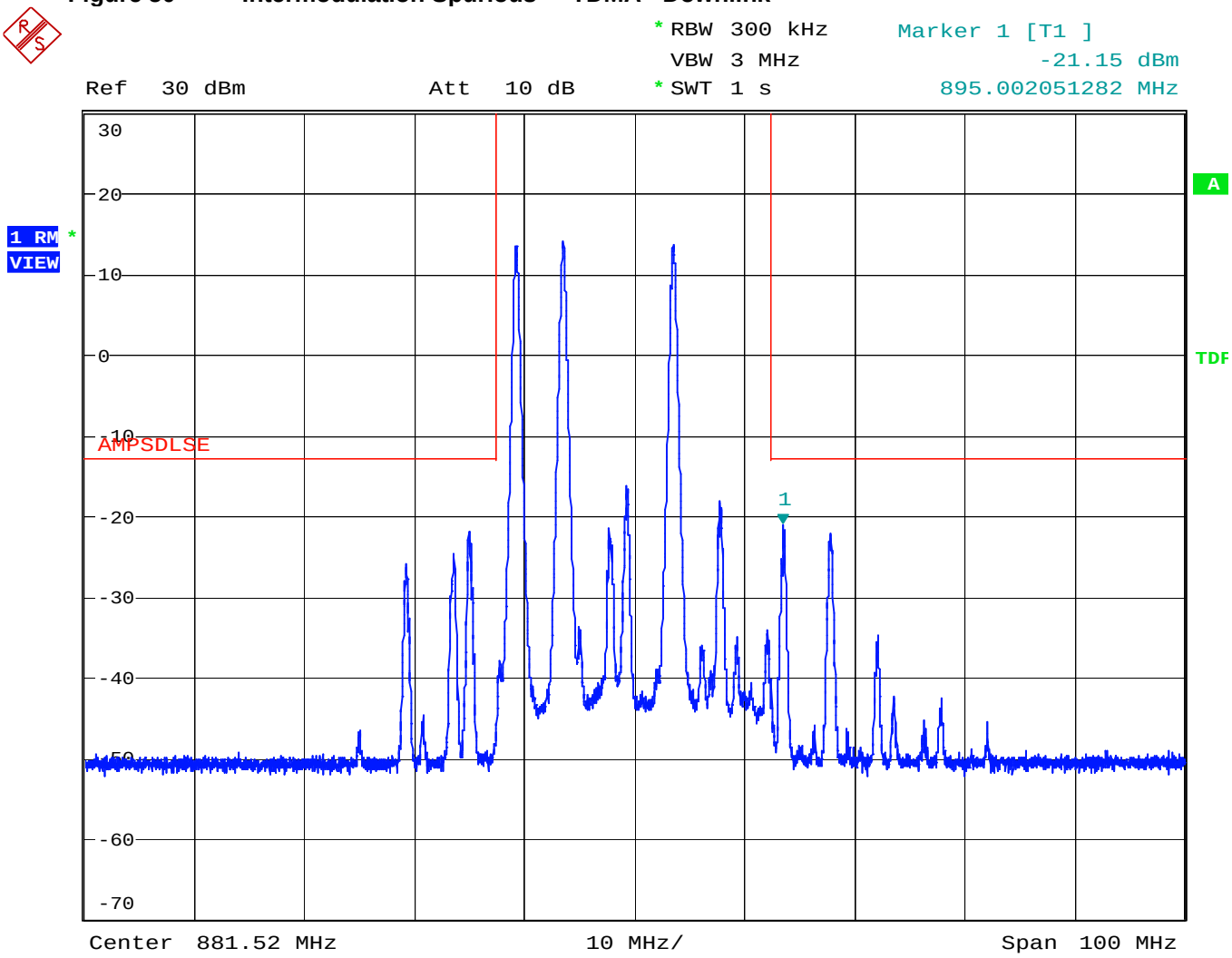
Date: 15.MAY.2007 19:38:28

Figure 49 Intermodulation Spurious - EDGE - Uplink



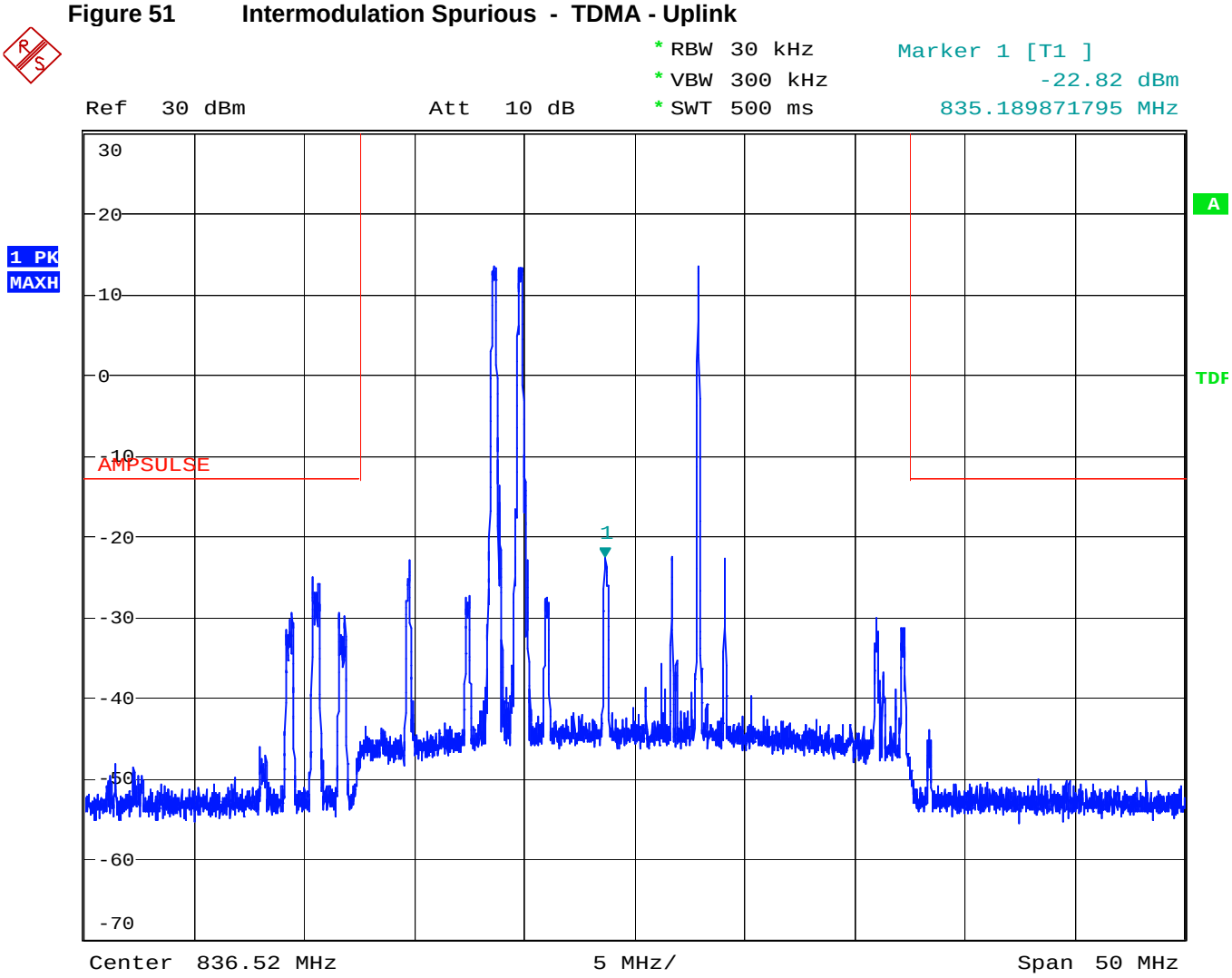
Date: 15.MAY.2007 19:47:27

Figure 50 Intermodulation Spurious - TDMA - Downlink



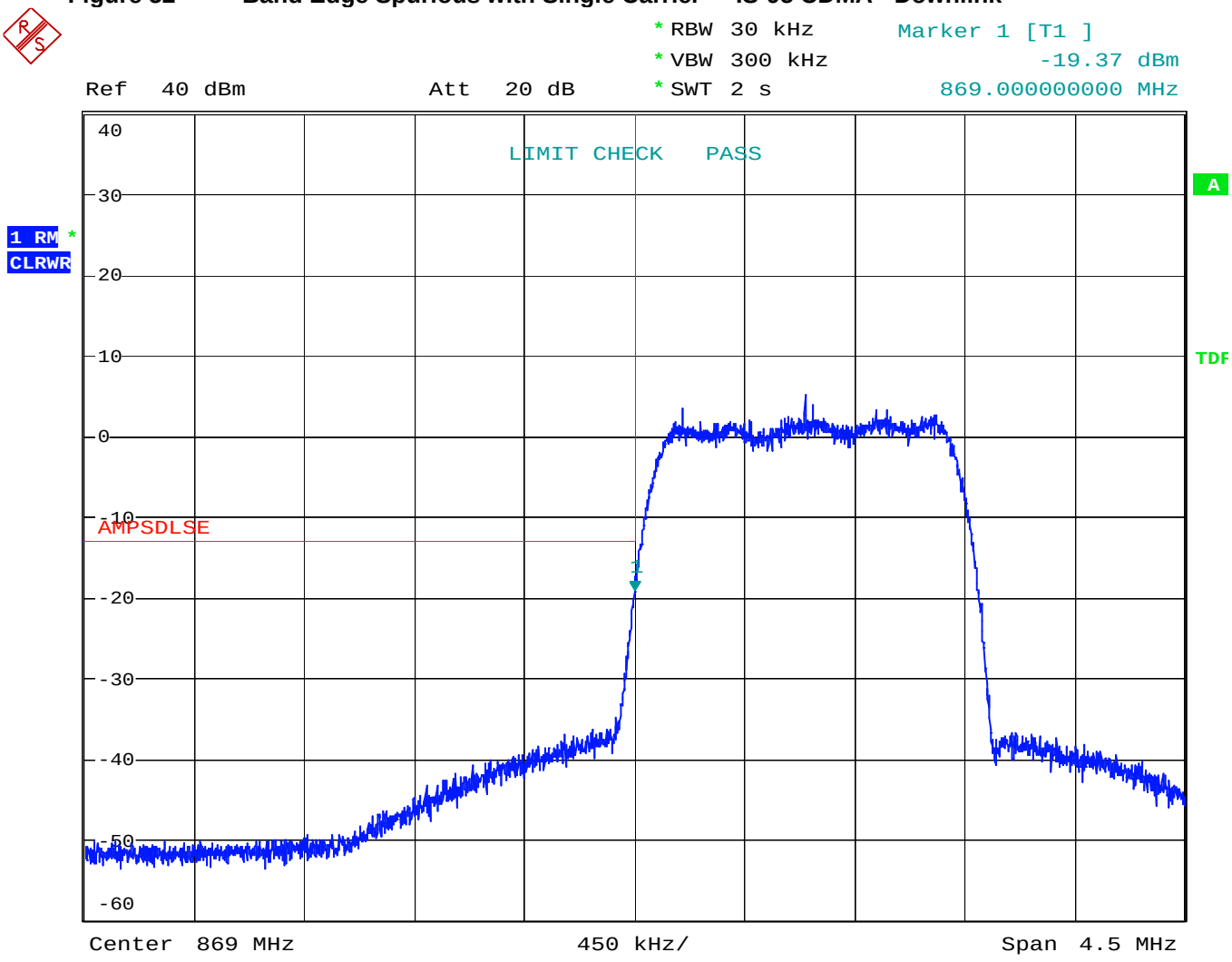
Date: 15.MAY.2007 17:49:41

Figure 51 Intermodulation Spurious - TDMA - Uplink

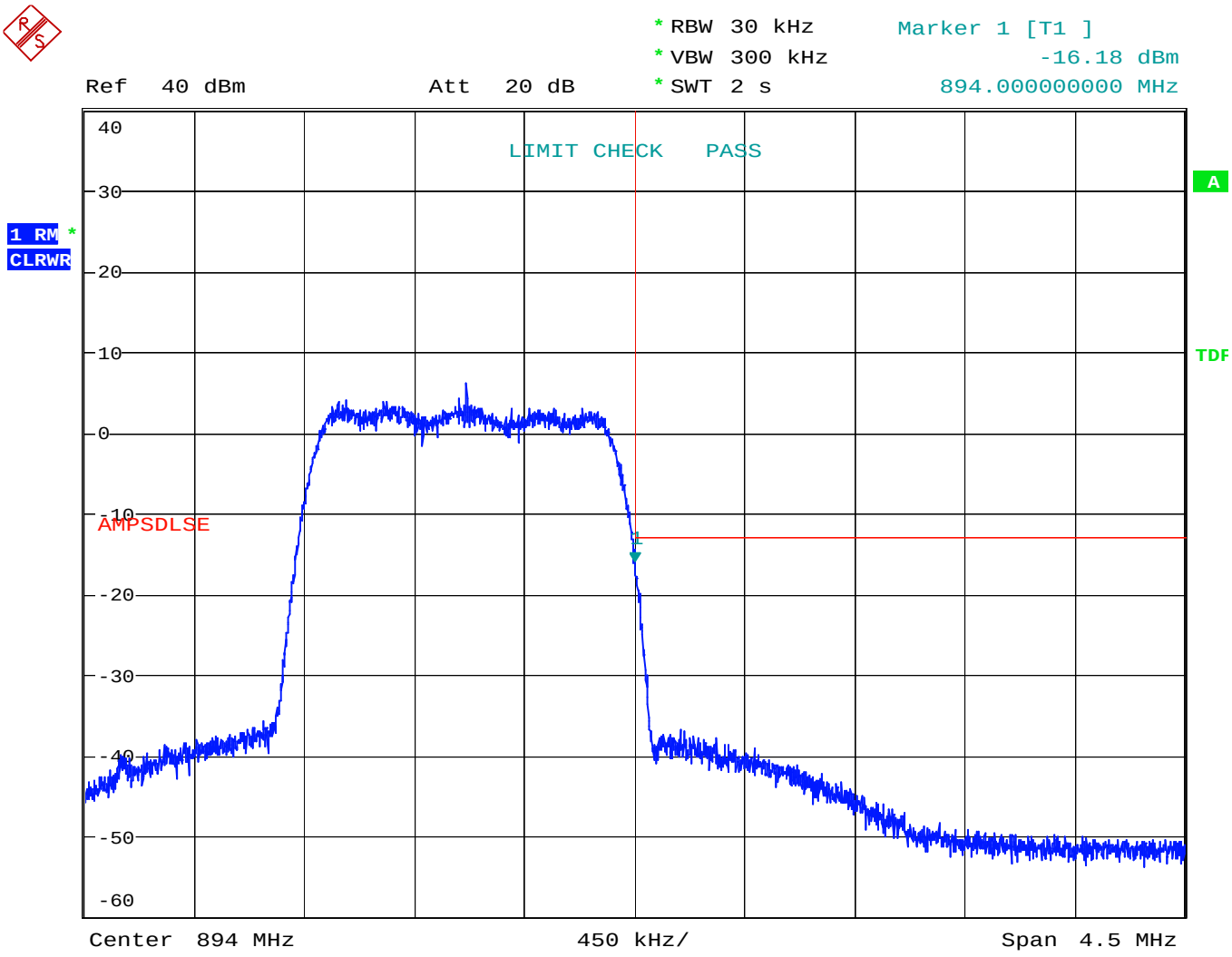


Date: 15.MAY.2007 20:05:13

Figure 52 Band Edge Spurious with Single Carrier - IS-95 CDMA - Downlink

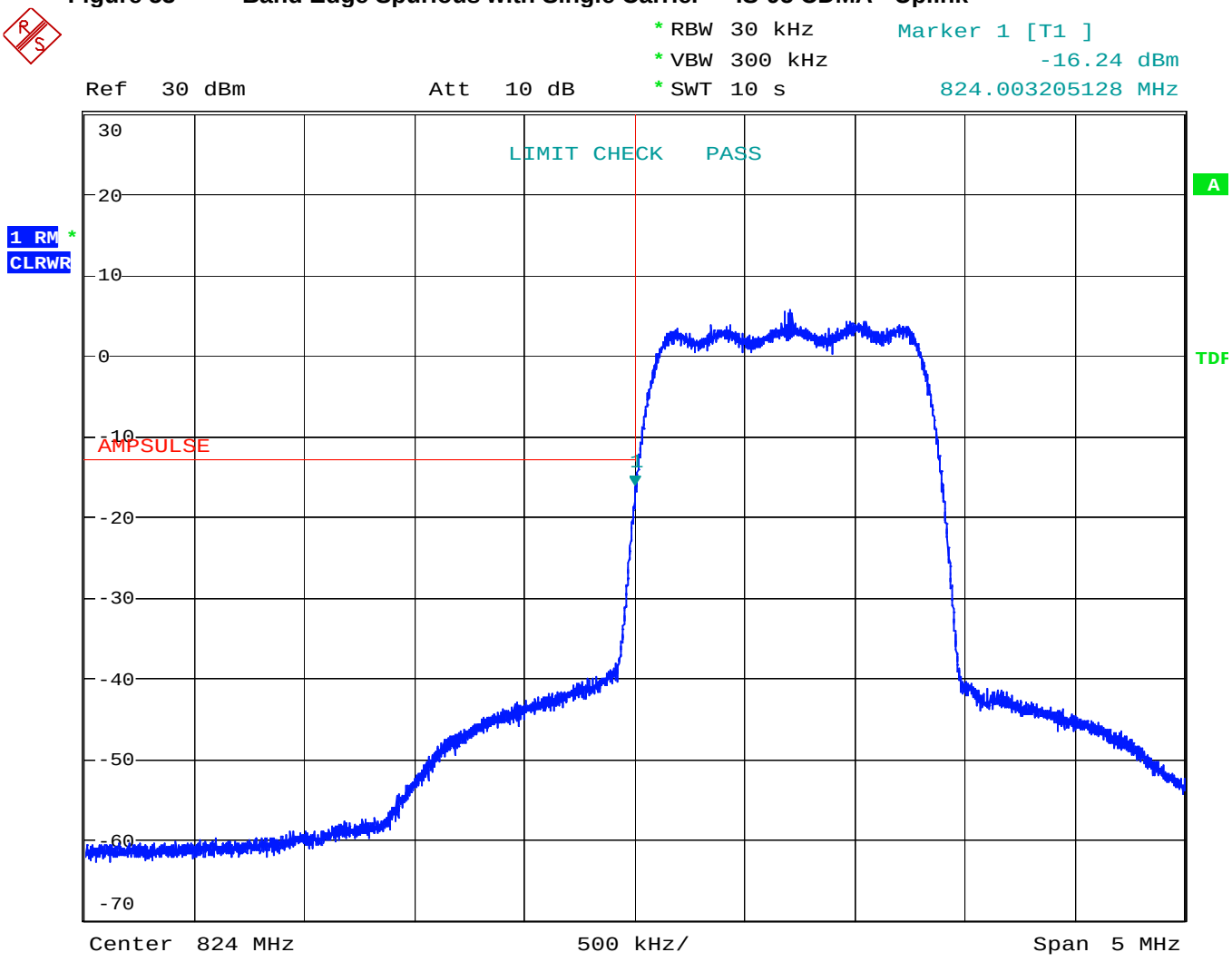


Date: 15.MAY.2007 22:26:27

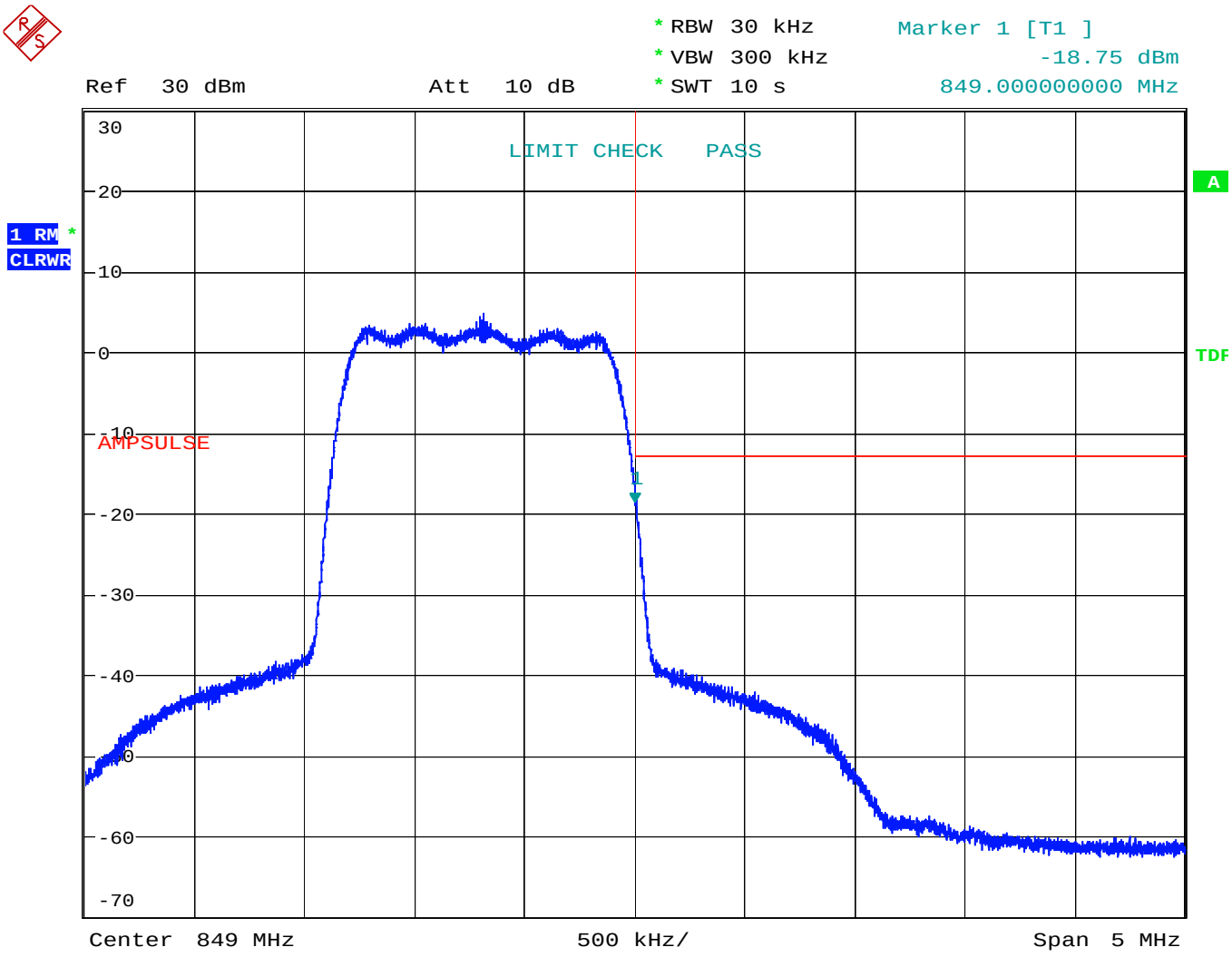


Date: 15.MAY.2007 22:27:27

Figure 53 Band Edge Spurious with Single Carrier - IS-95 CDMA - Uplink

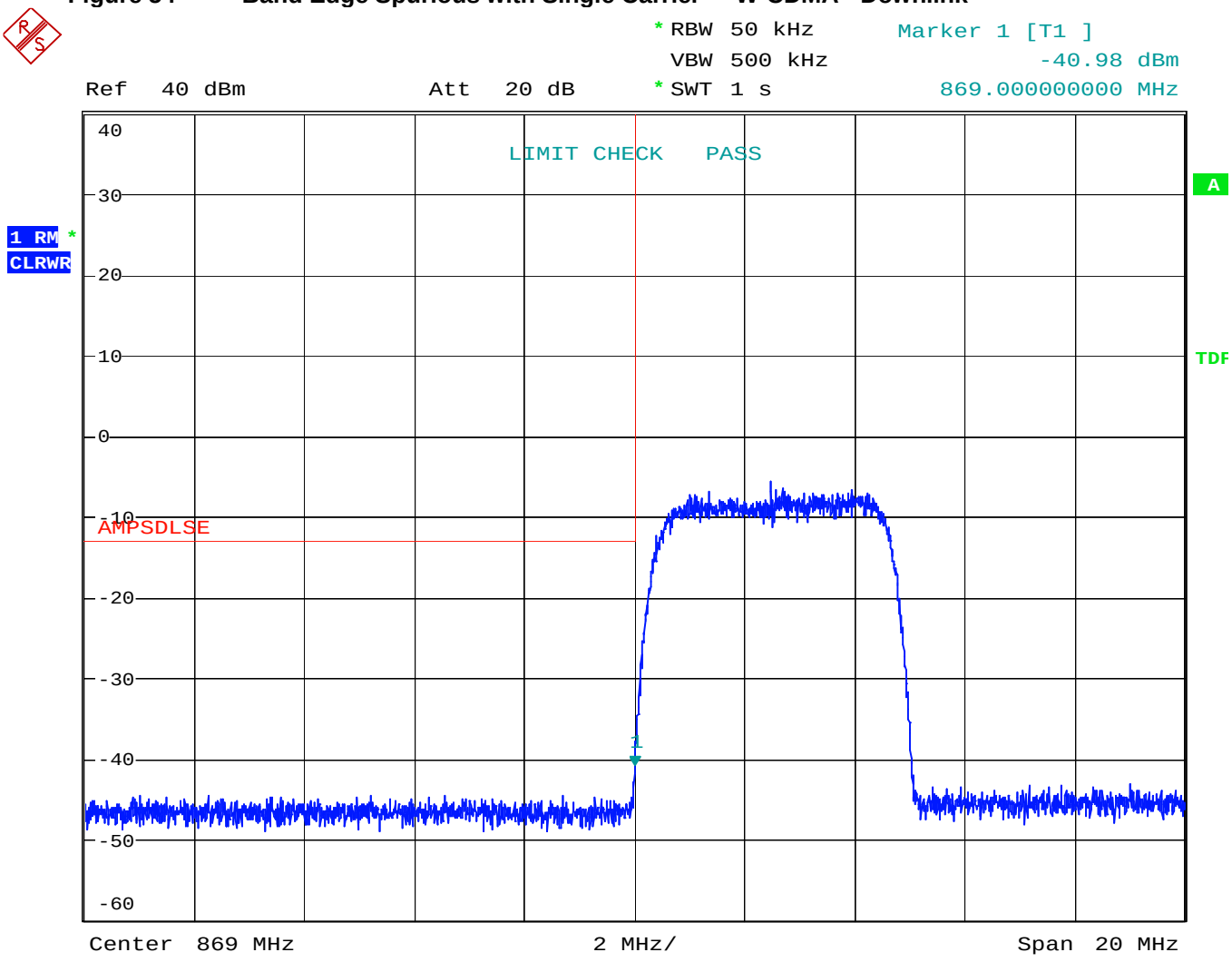


Date: 15.MAY.2007 21:53:13

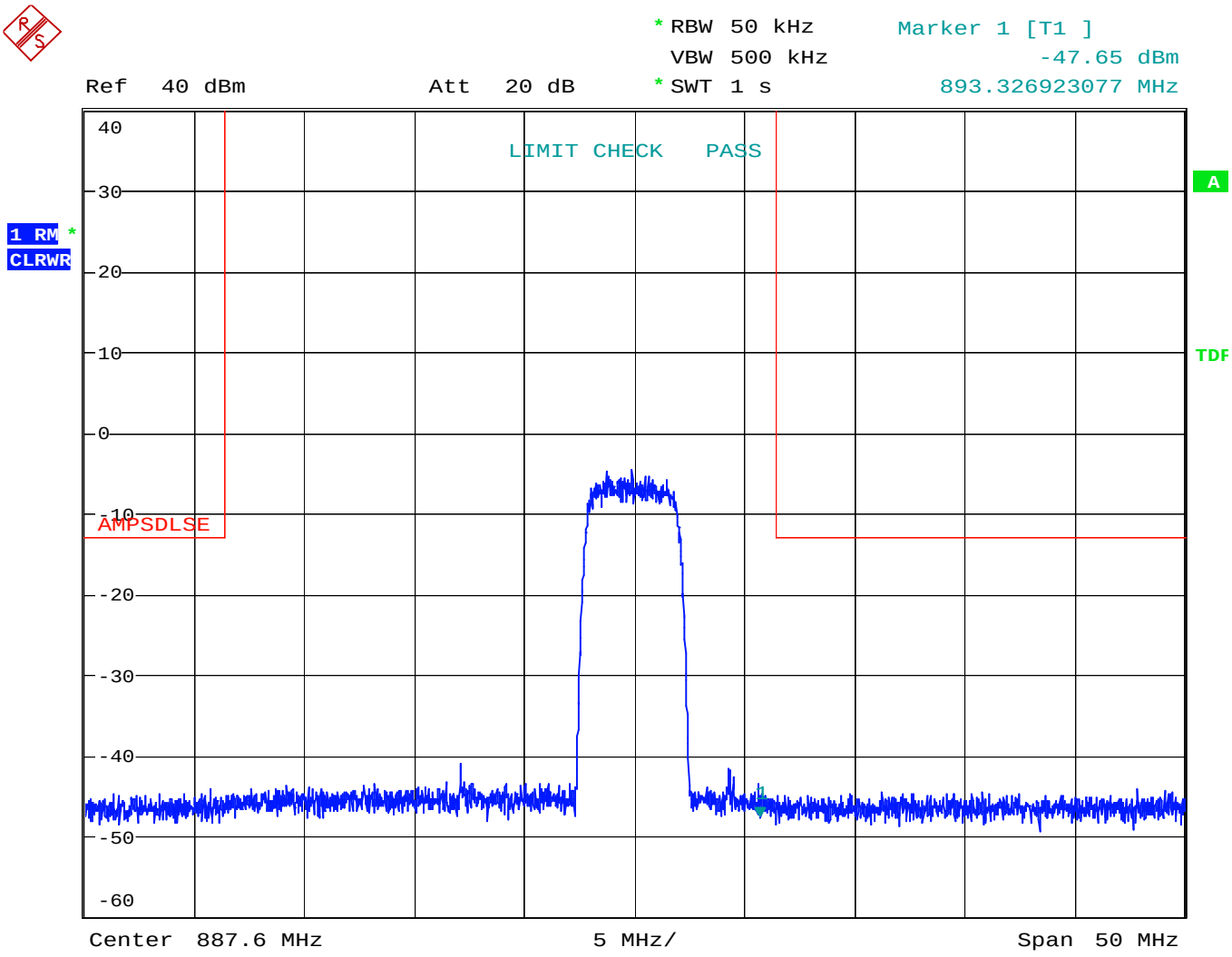


Date: 15.MAY.2007 21:54:24

Figure 54 Band Edge Spurious with Single Carrier - W-CDMA - Downlink

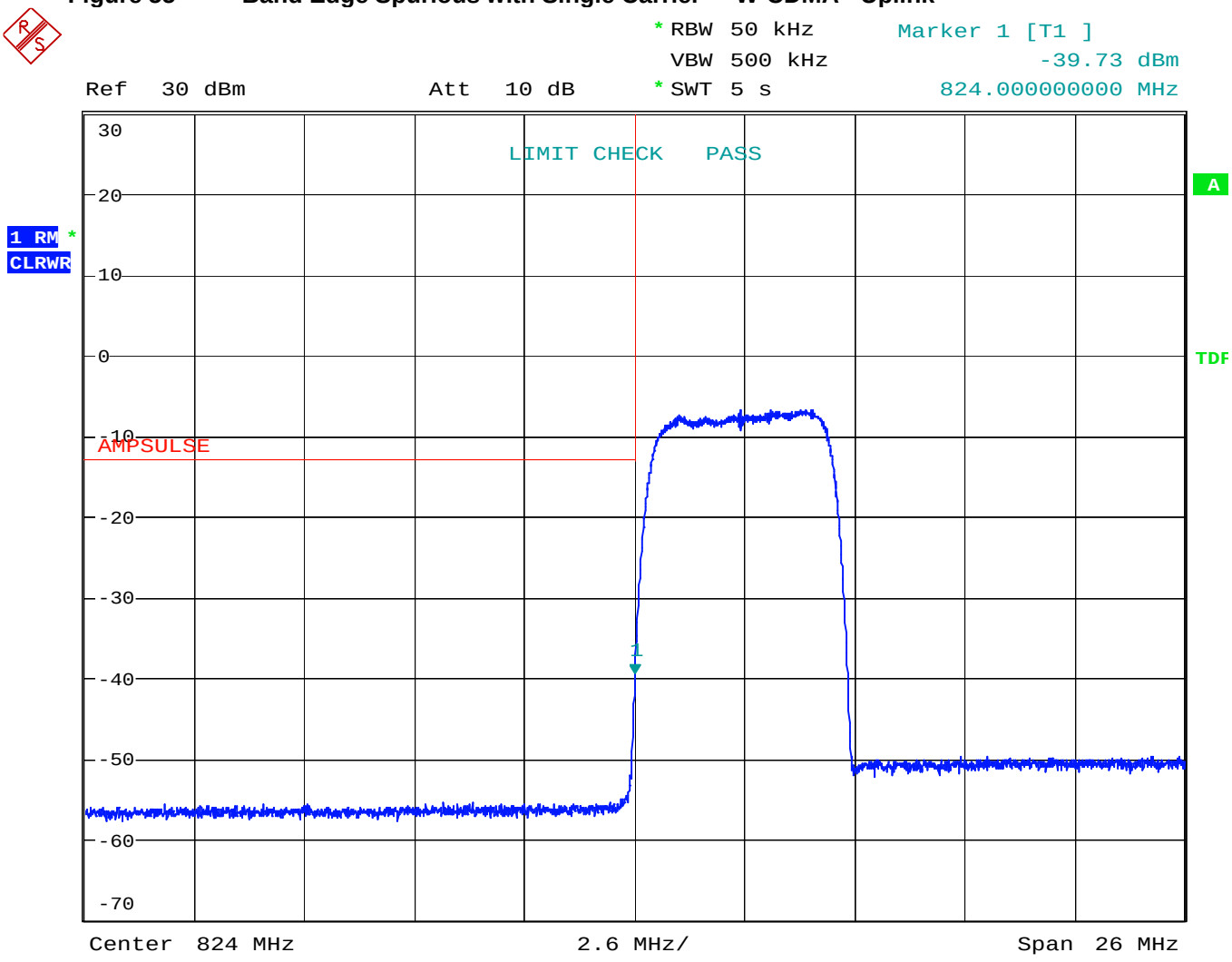


Date: 15.MAY.2007 22:24:28

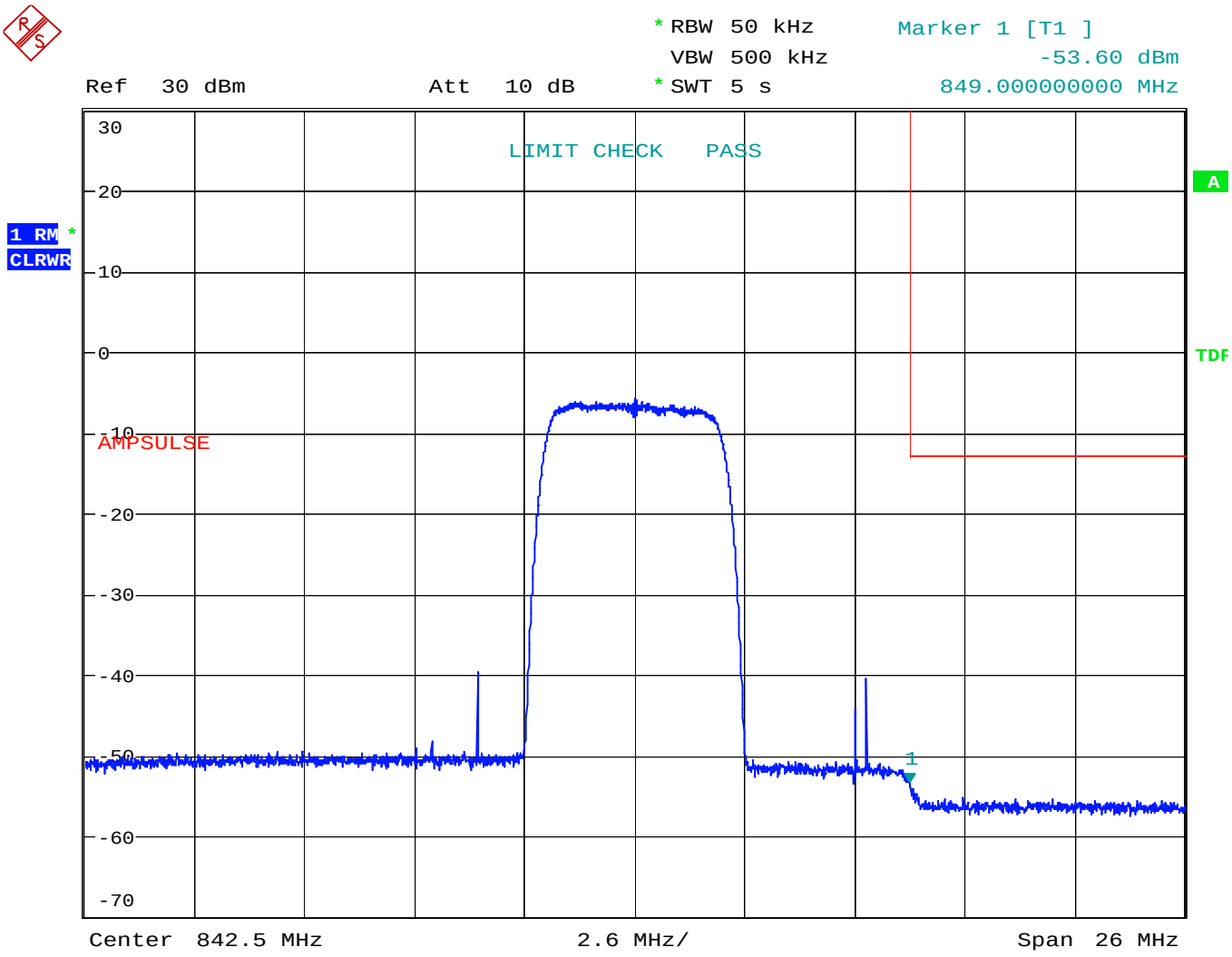


Date: 15.MAY.2007 22:23:29

Figure 55 Band Edge Spurious with Single Carrier - W-CDMA - Uplink

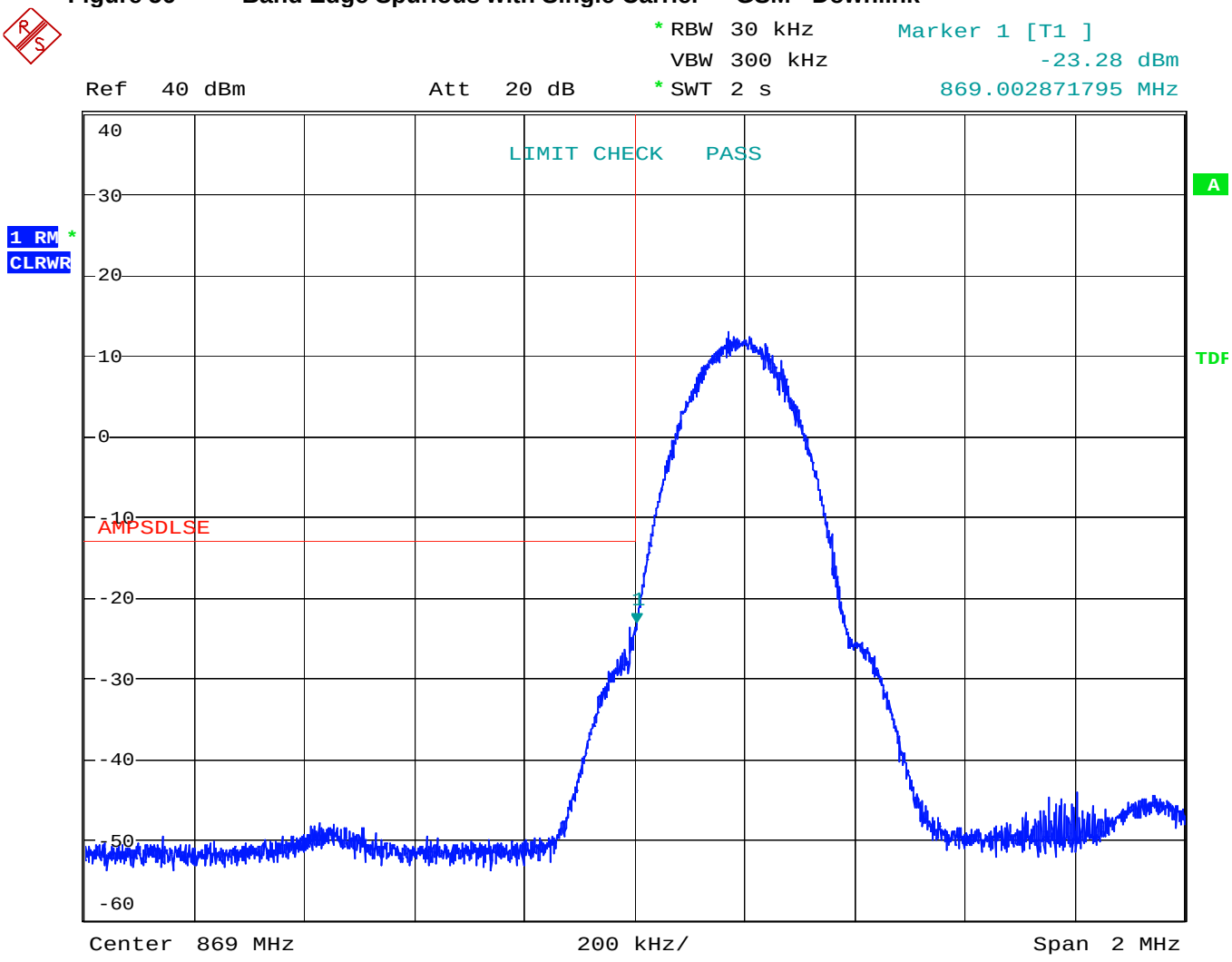


Date: 15.MAY.2007 22:01:47

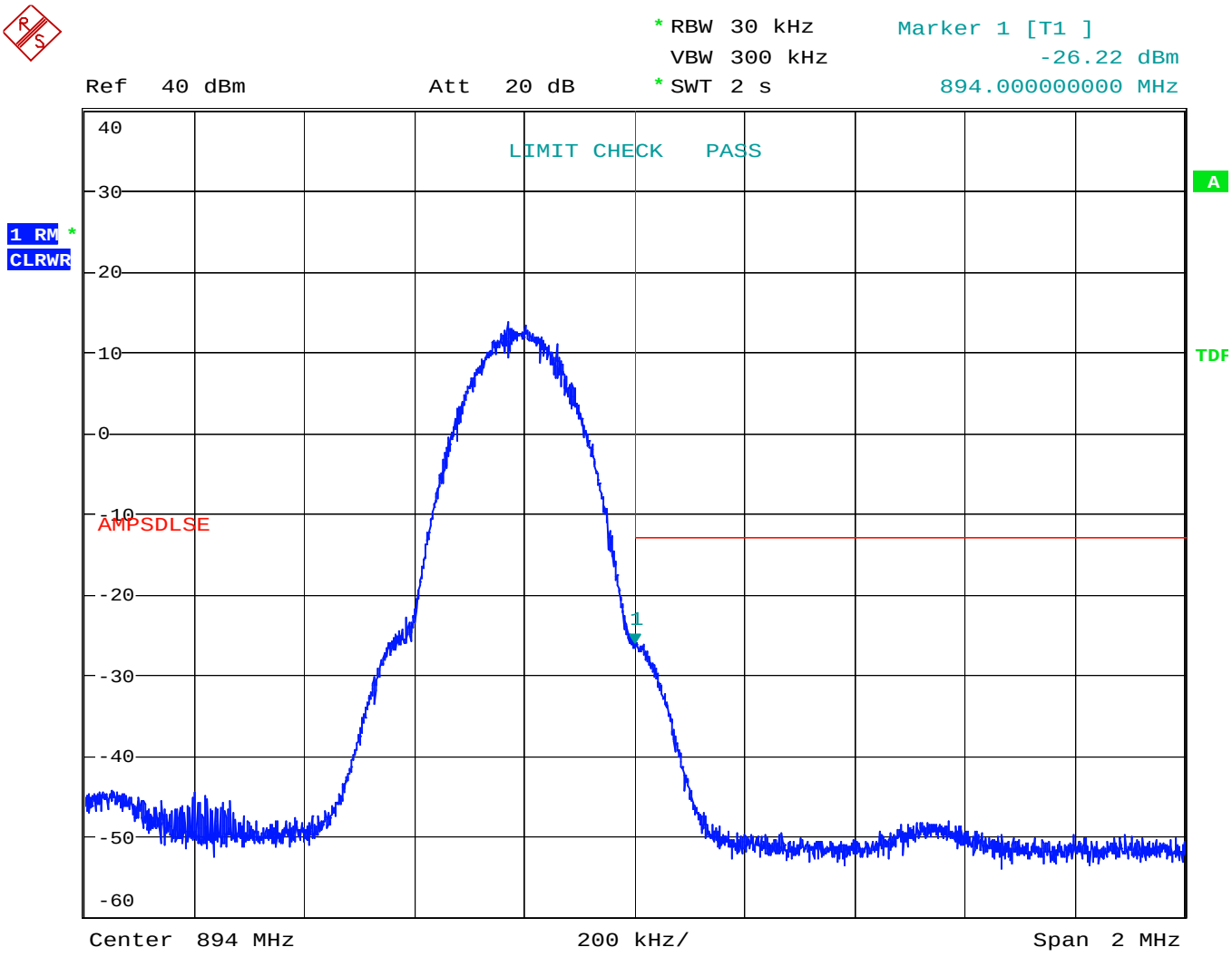


Date: 15.MAY.2007 21:59:58

Figure 56 Band Edge Spurious with Single Carrier - GSM - Downlink

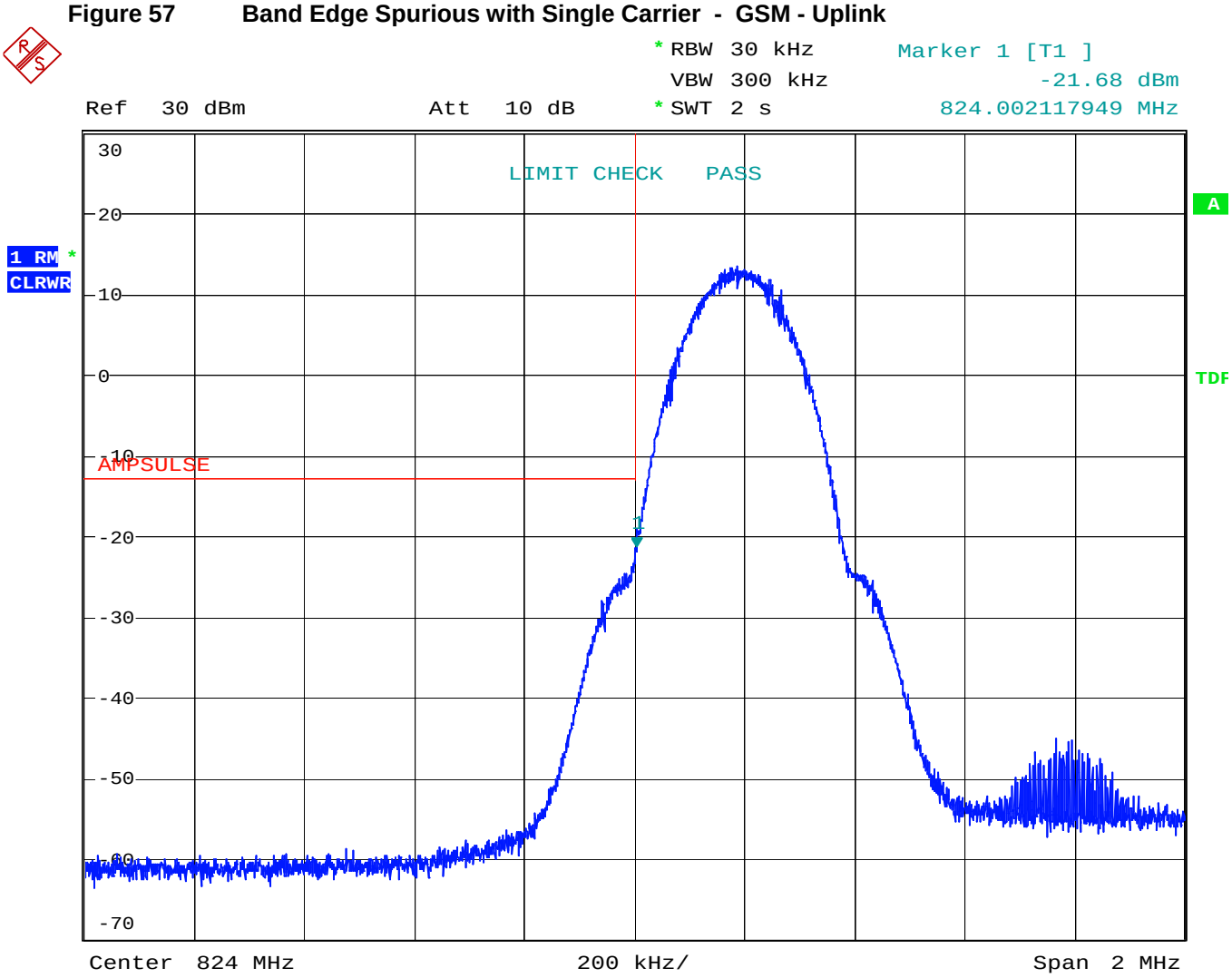


Date: 15.MAY.2007 22:20:50

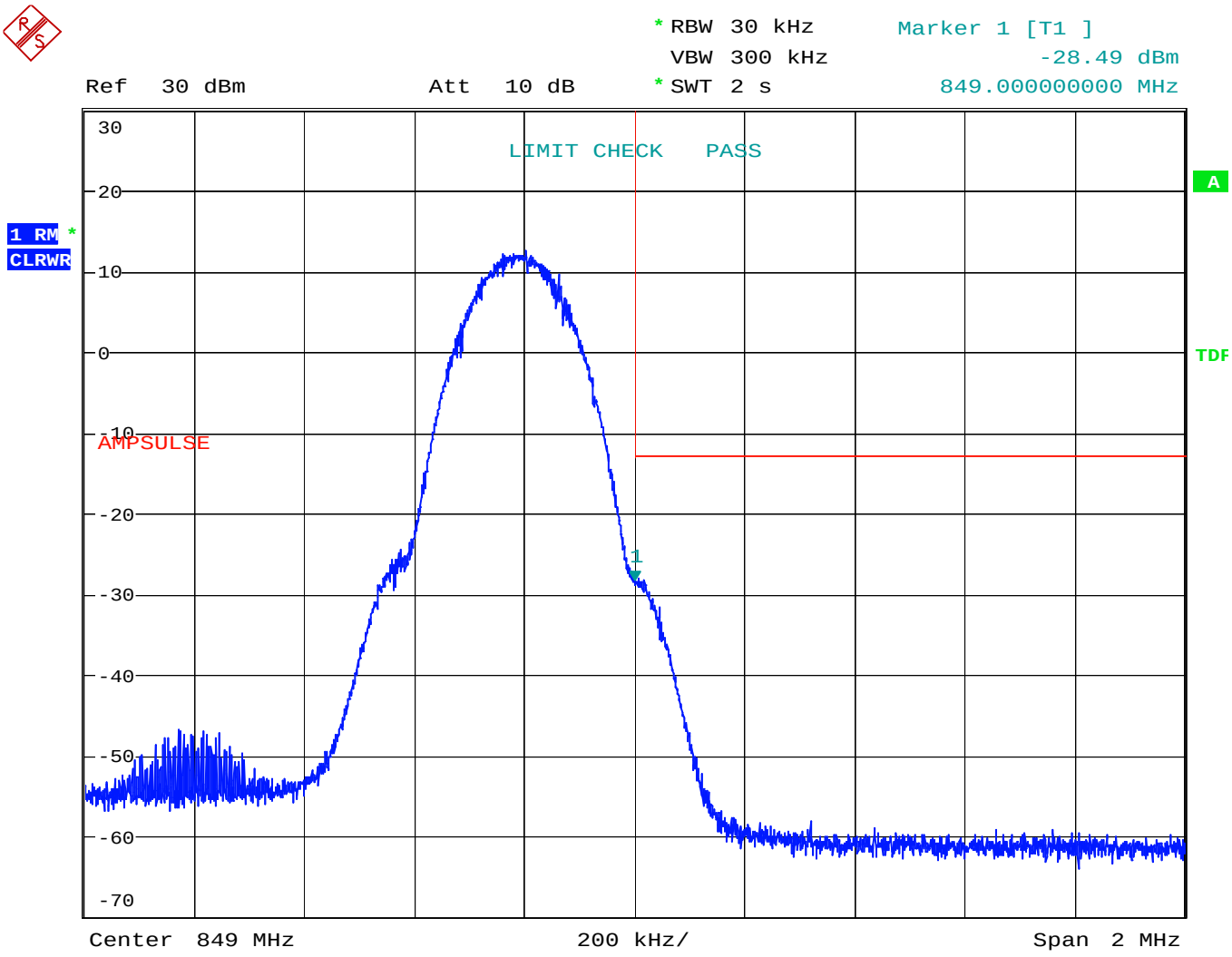


Date: 15.MAY.2007 22:21:32

Figure 57 Band Edge Spurious with Single Carrier - GSM - Uplink

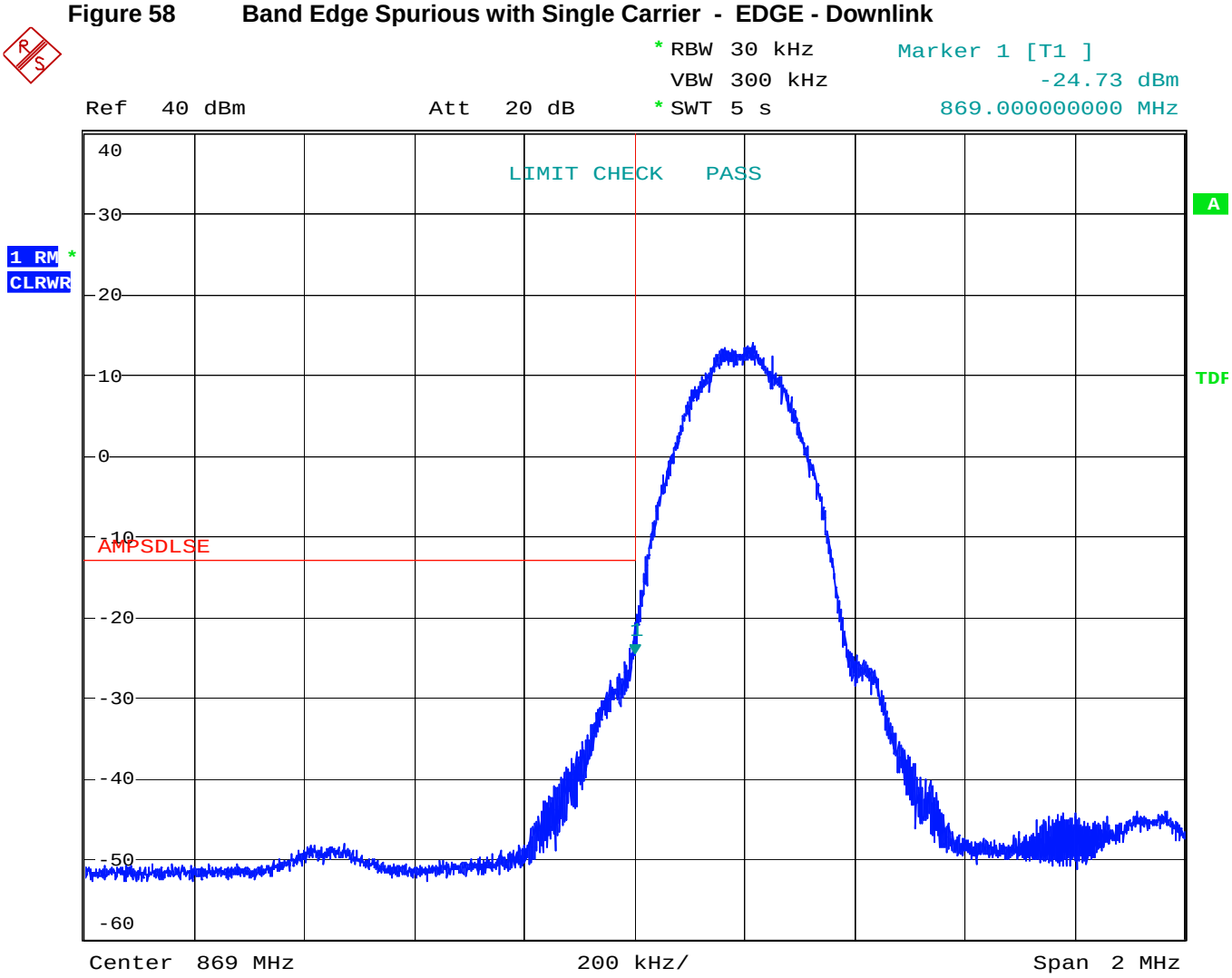


Date: 15.MAY.2007 22:04:11

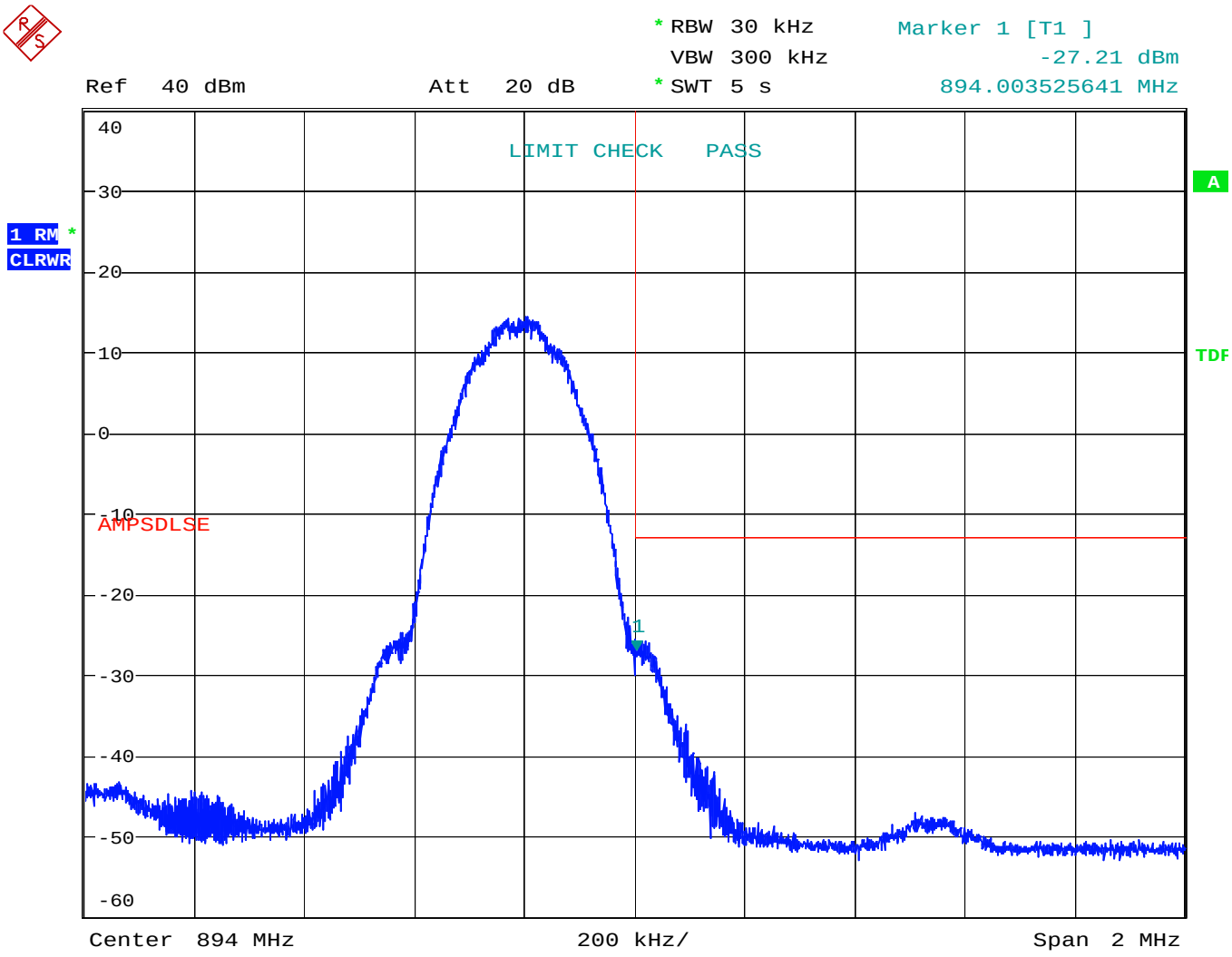


Date: 15.MAY.2007 22:05:49

Figure 58 Band Edge Spurious with Single Carrier - EDGE - Downlink

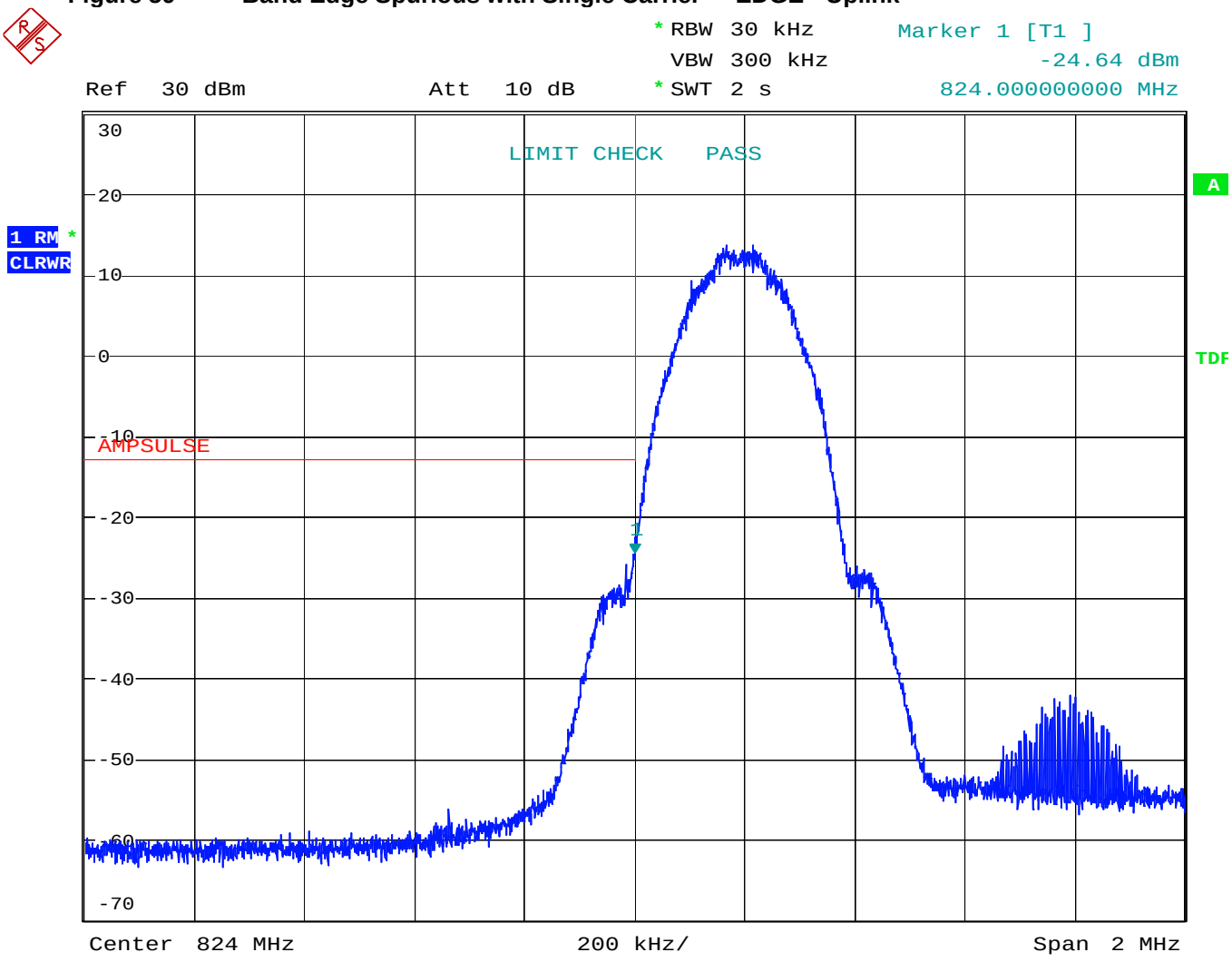


Date: 15.MAY.2007 22:18:55

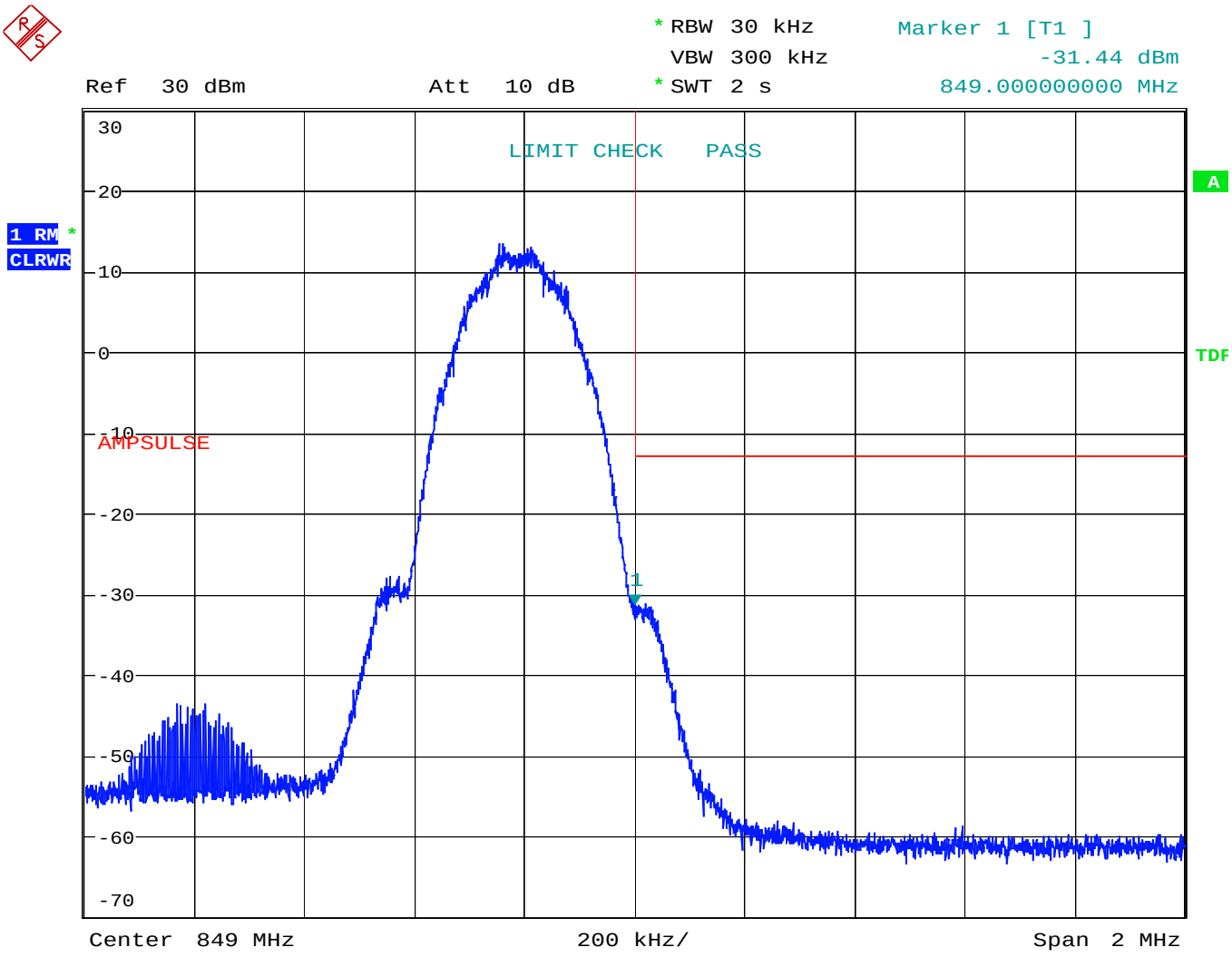


Date: 15.MAY.2007 22:17:43

Figure 59 Band Edge Spurious with Single Carrier - EDGE - Uplink

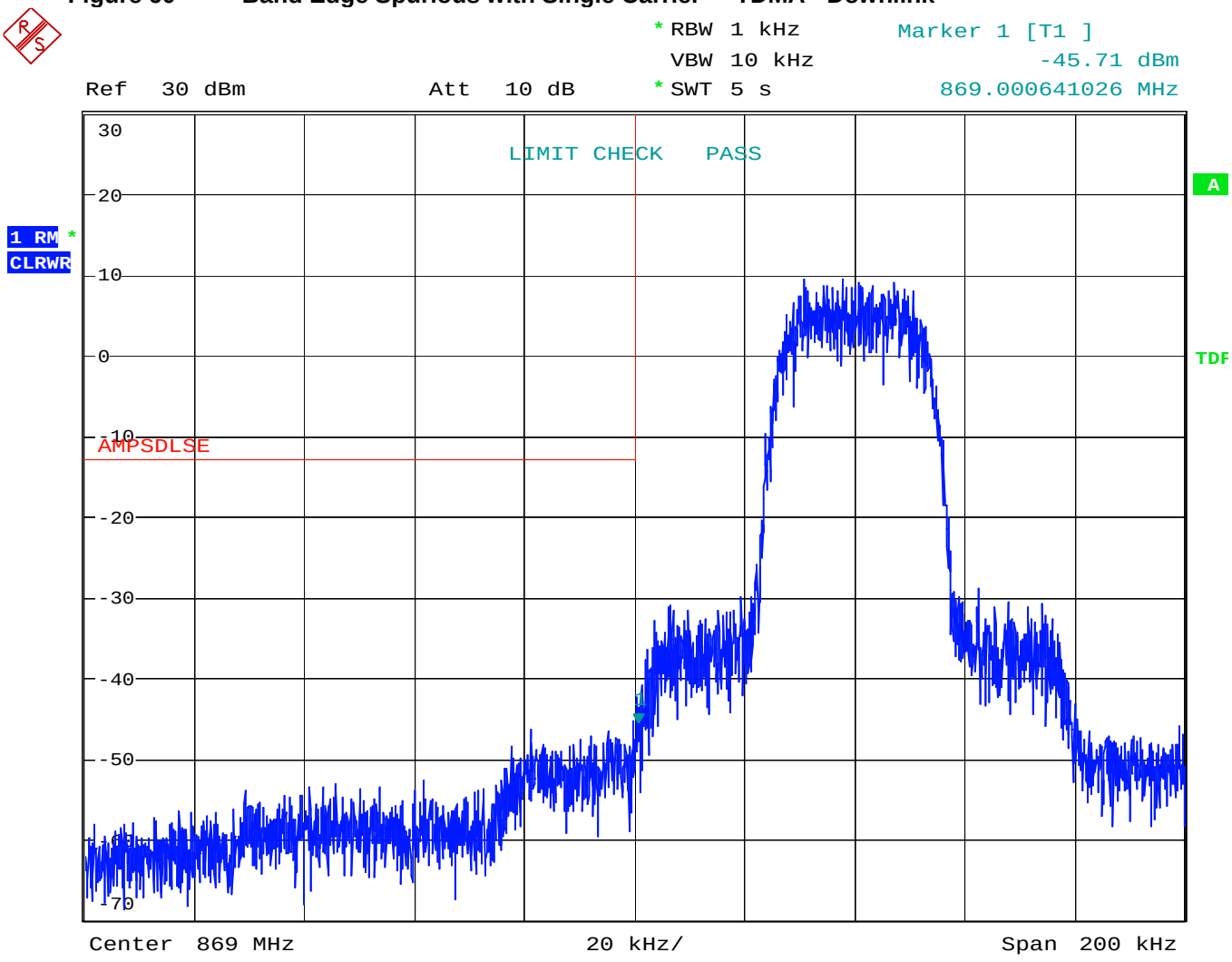


Date: 15.MAY.2007 22:07:29

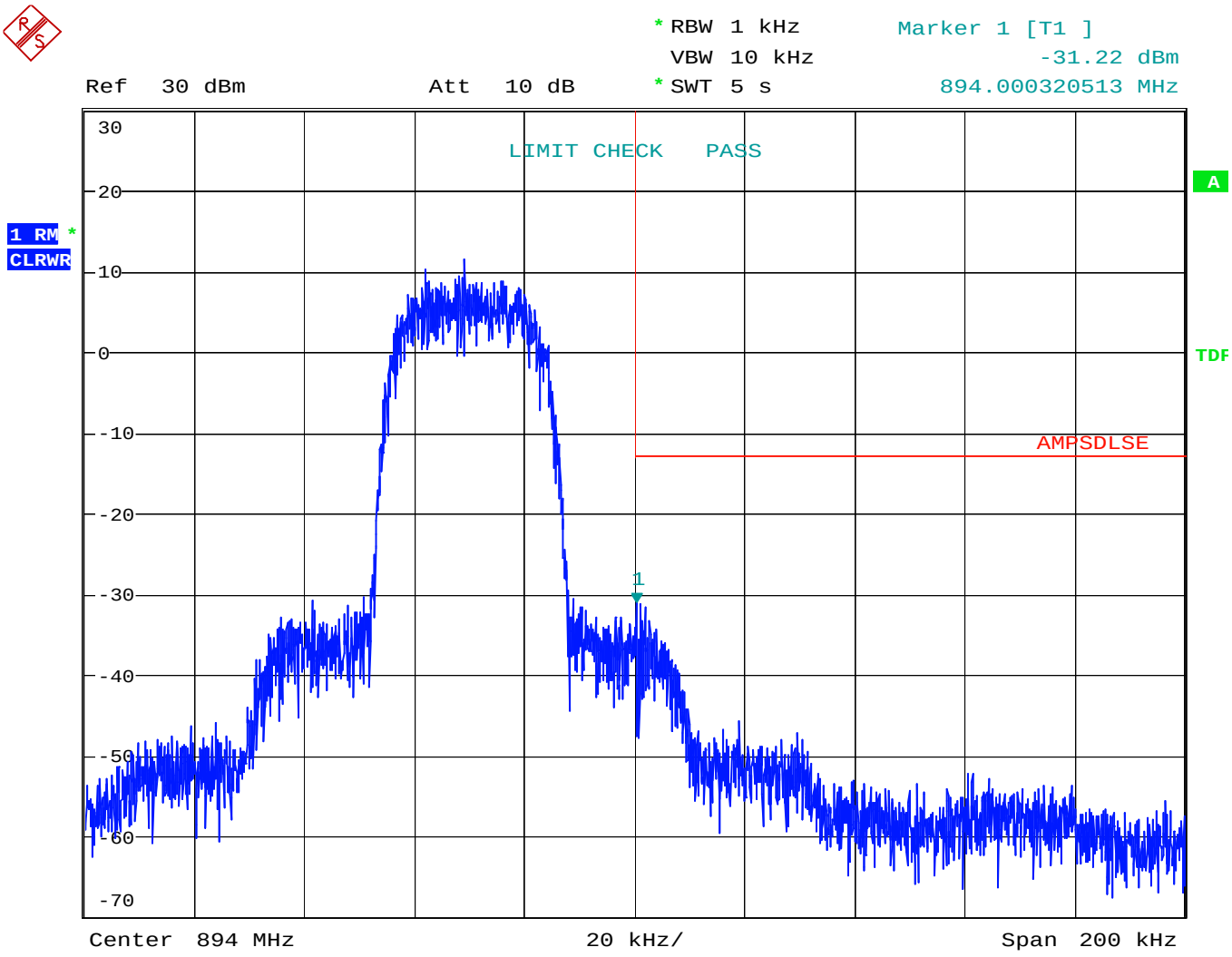


Date: 15.MAY.2007 22:06:26

Figure 60 Band Edge Spurious with Single Carrier - TDMA - Downlink

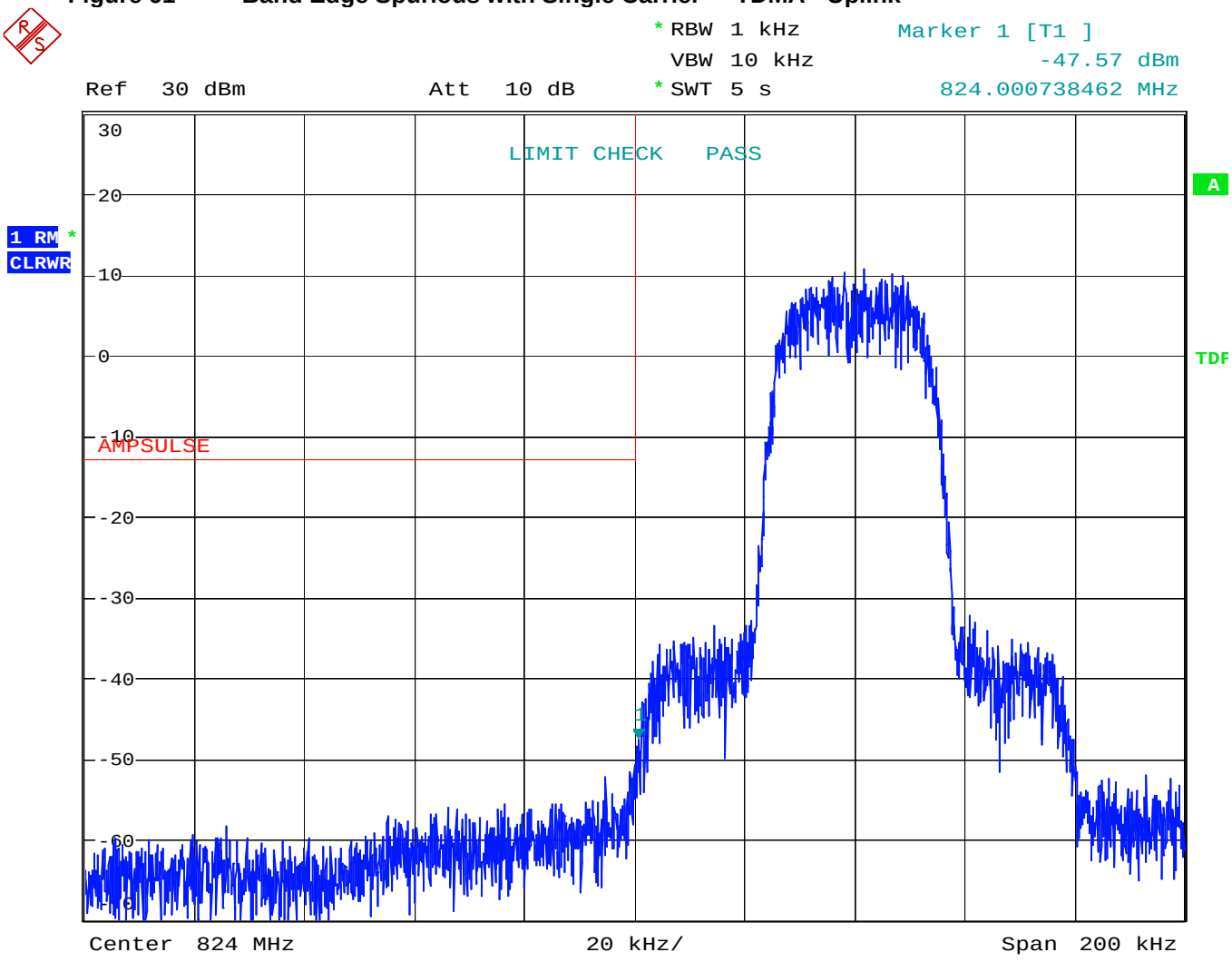


Date: 15.MAY.2007 22:14:05

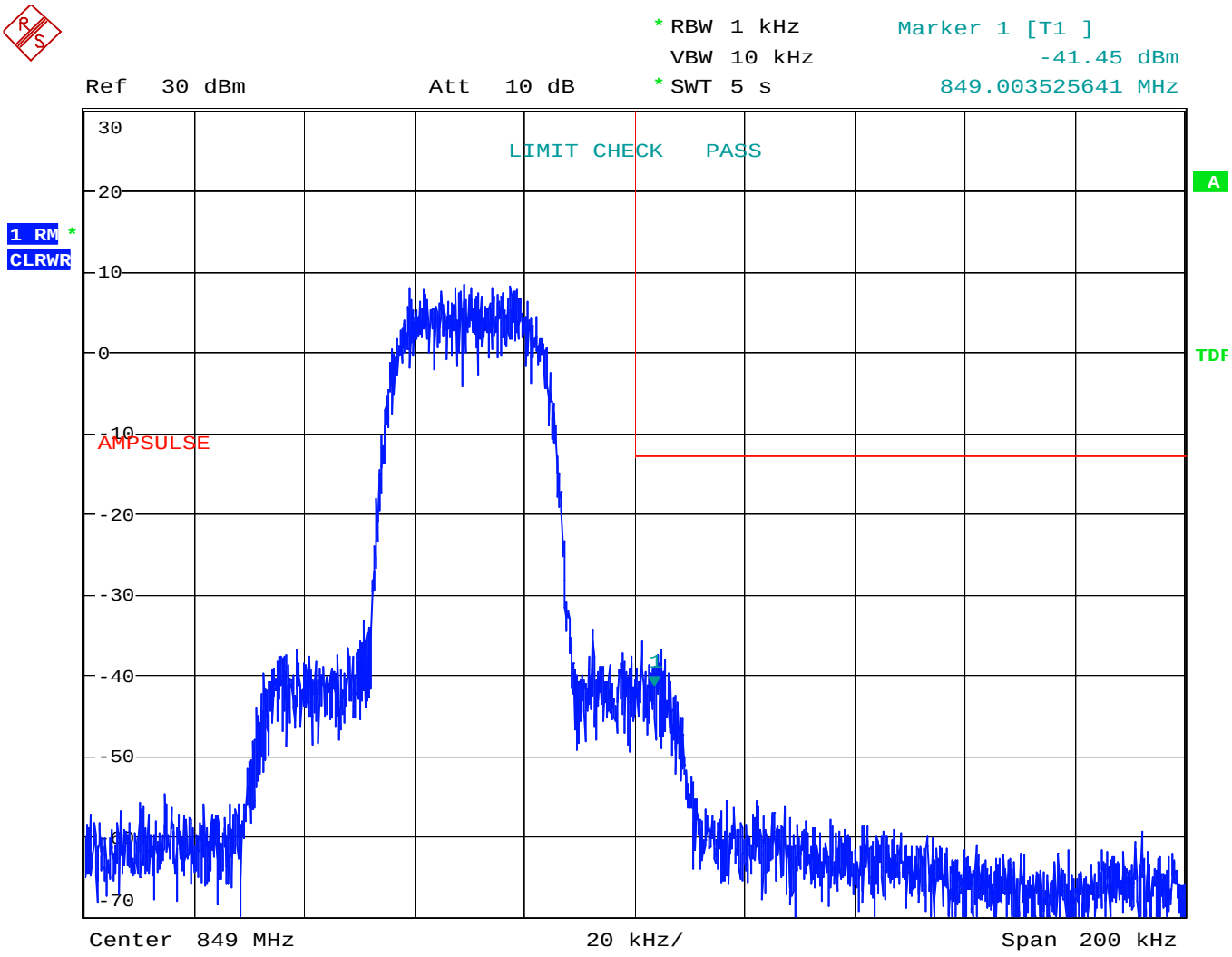


Date: 15.MAY.2007 22:15:00

Figure 61 Band Edge Spurious with Single Carrier - TDMA - Uplink



Date: 15.MAY.2007 22:10:09



Date: 15.MAY.2007 22:11:31

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

22.917
(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. The device shielding has not been modified from the original design.

E.4. Deviations from Normal Operating Mode During Test

None.

E.5. Sample Calculation

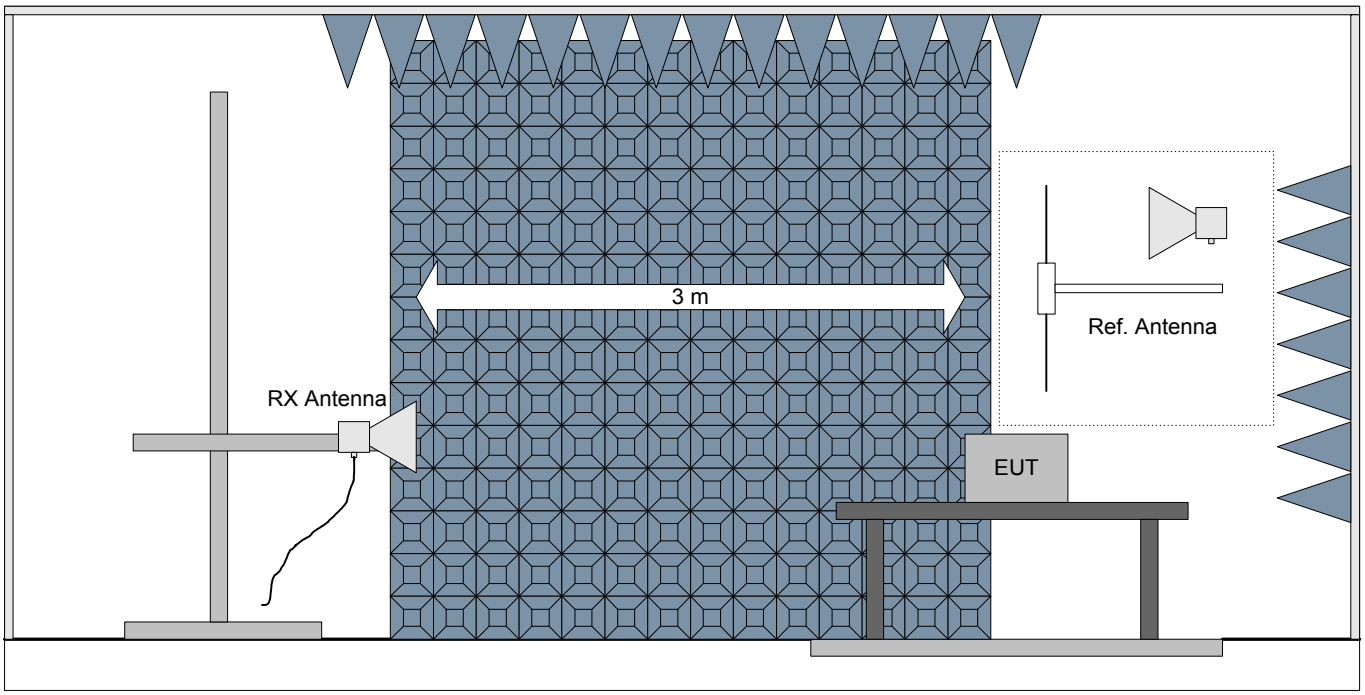
Final measured value (dBm) = Substitution level (dBm) + Antenna Gain (dBd)

Minimum attenuation limit (dB) = 43 + 10 log(P) where P = Peak power of the carrier in watts.

Min. Atten. Limit dB) = 43 + 10 * log(20 watts)
= 43 + 10 * 1.3
= 43 +13
= 56 dB

43 dBm – 56 dB = -13 dBm

E.6. Test Diagram

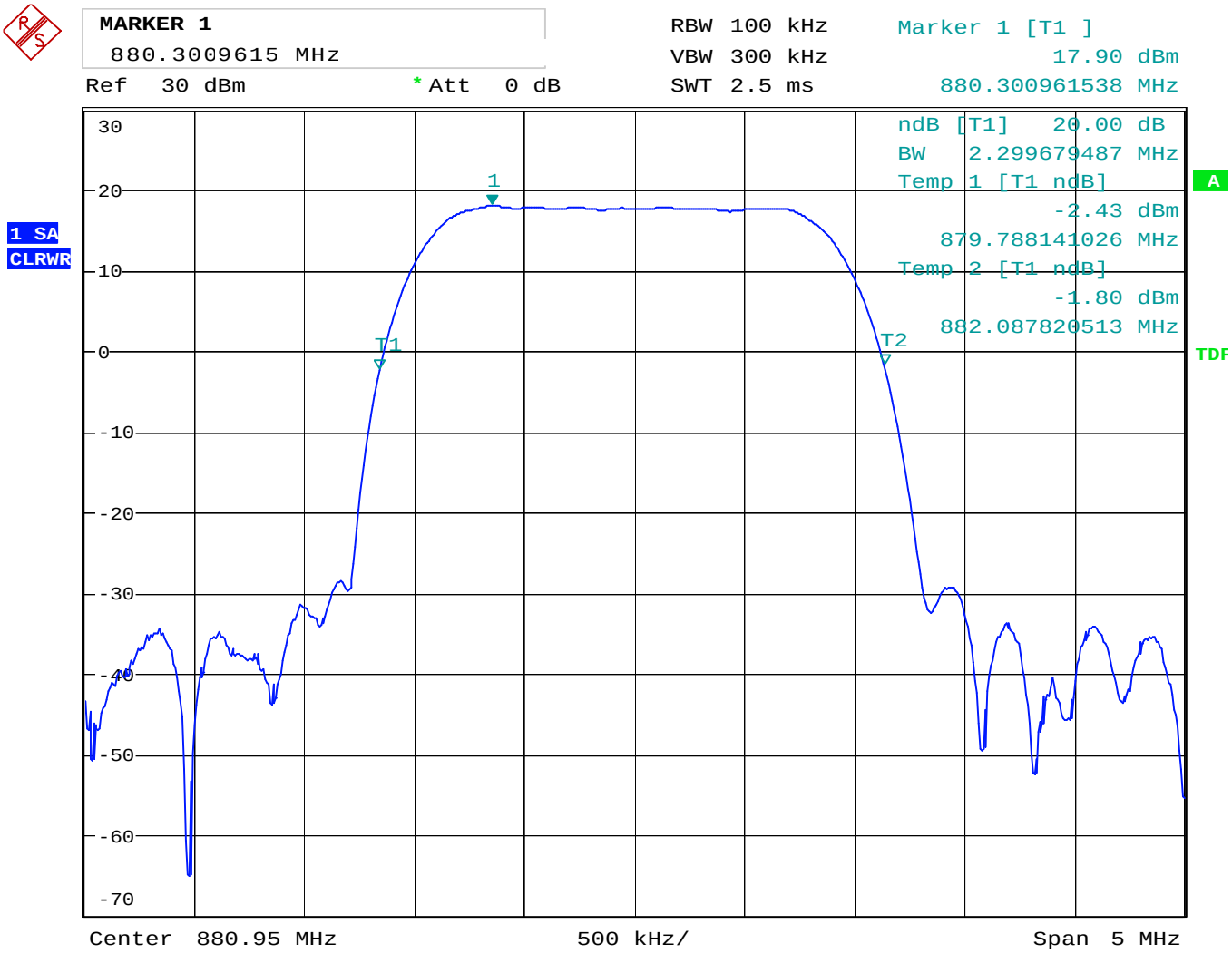


Note: The EUT is set to repeat a signal at maximum rf output power into a coaxial load for this testing.

APPENDIX F: 2.1053 FILTER PLOTS

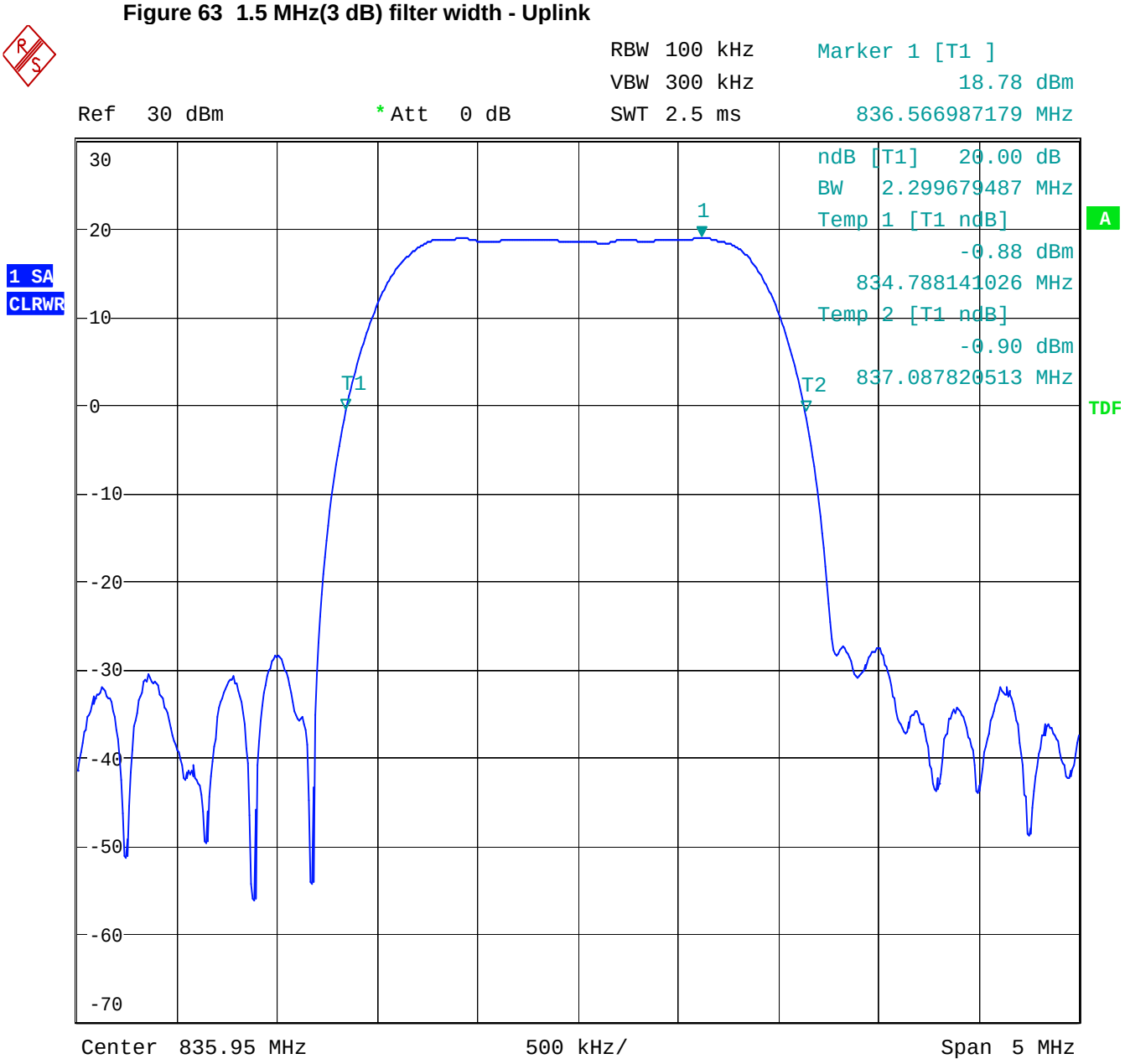
These plots demonstrate the filter band pass characteristics of the device.

Figure 62 1.5 MHz(3 dB) filter width - Downlink



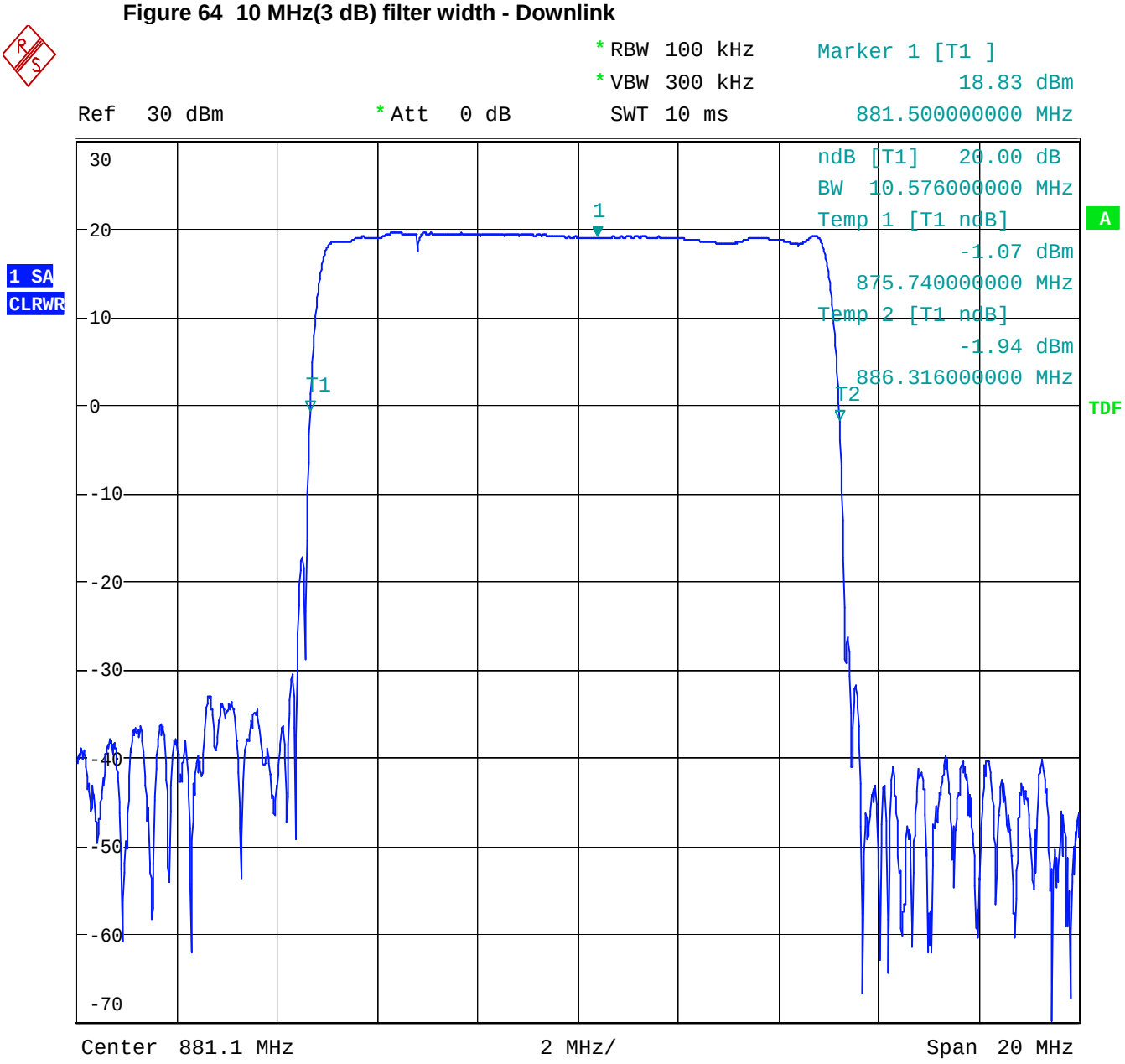
Date: 12.APR.2007 18:28:08

Figure 63 1.5 MHz(3 dB) filter width - Uplink



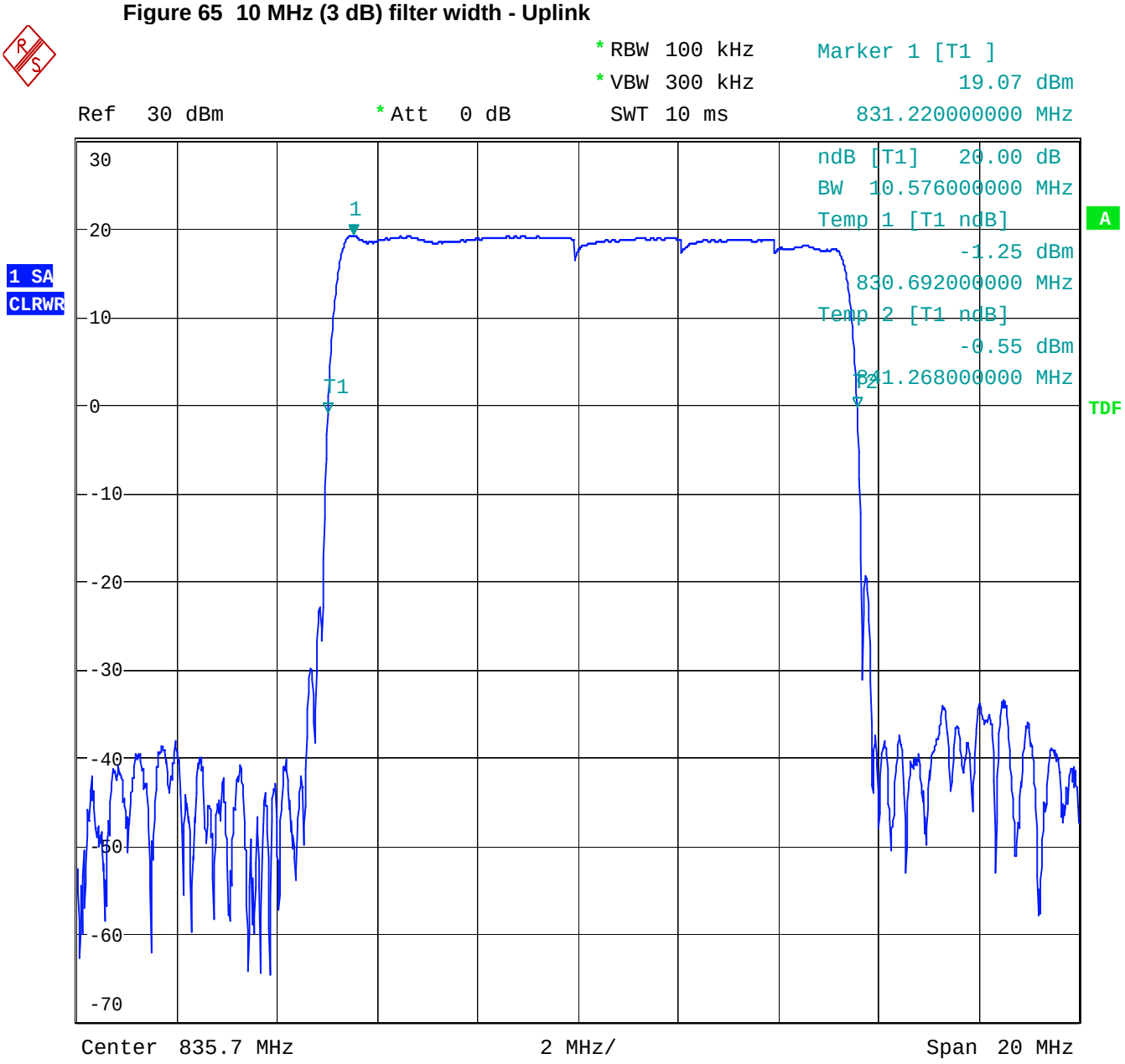
Date: 12.APR.2007 18:37:04

Figure 64 10 MHz(3 dB) filter width - Downlink



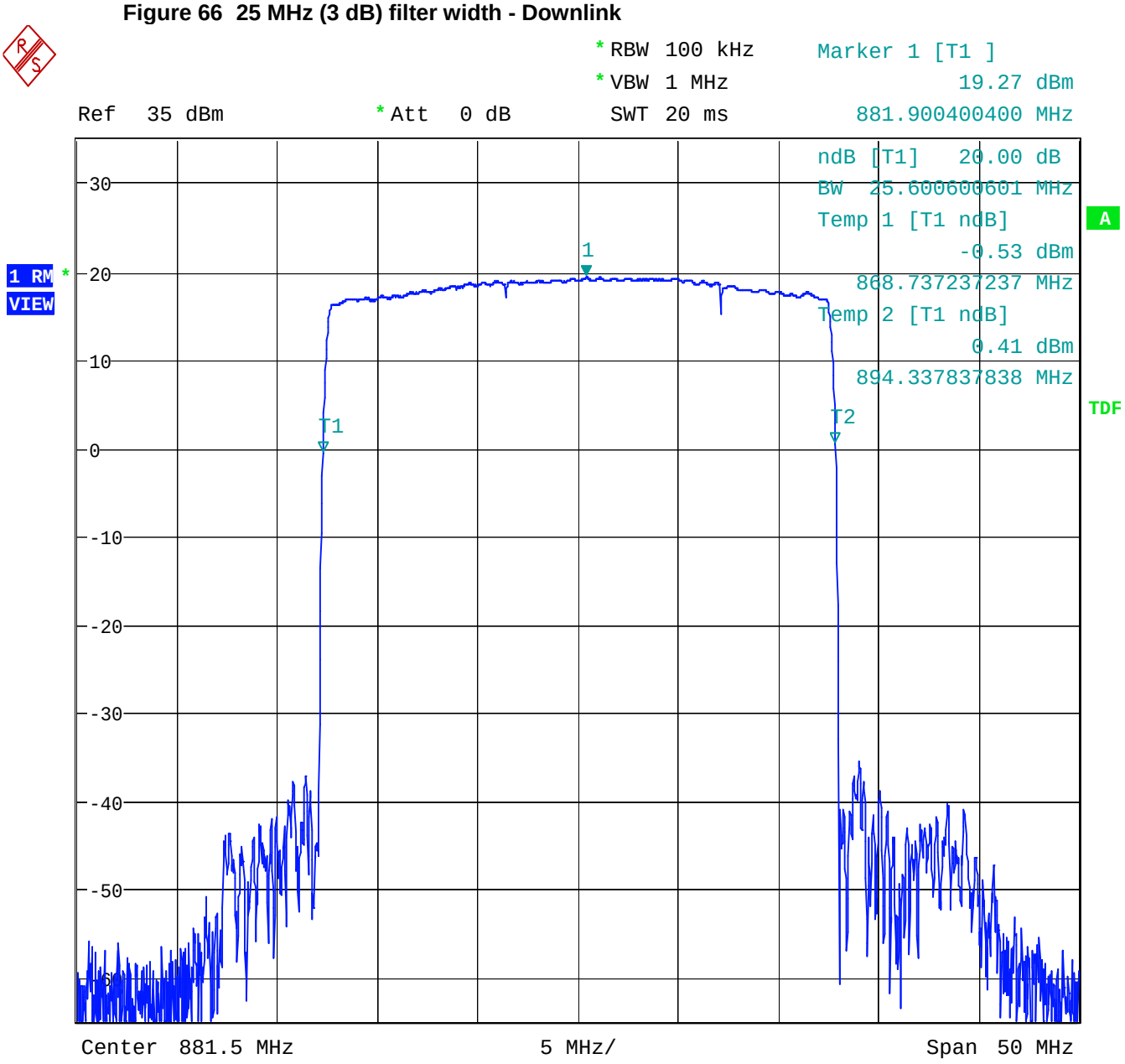
Date: 12.APR.2007 21:28:29

Figure 65 10 MHz (3 dB) filter width - Uplink



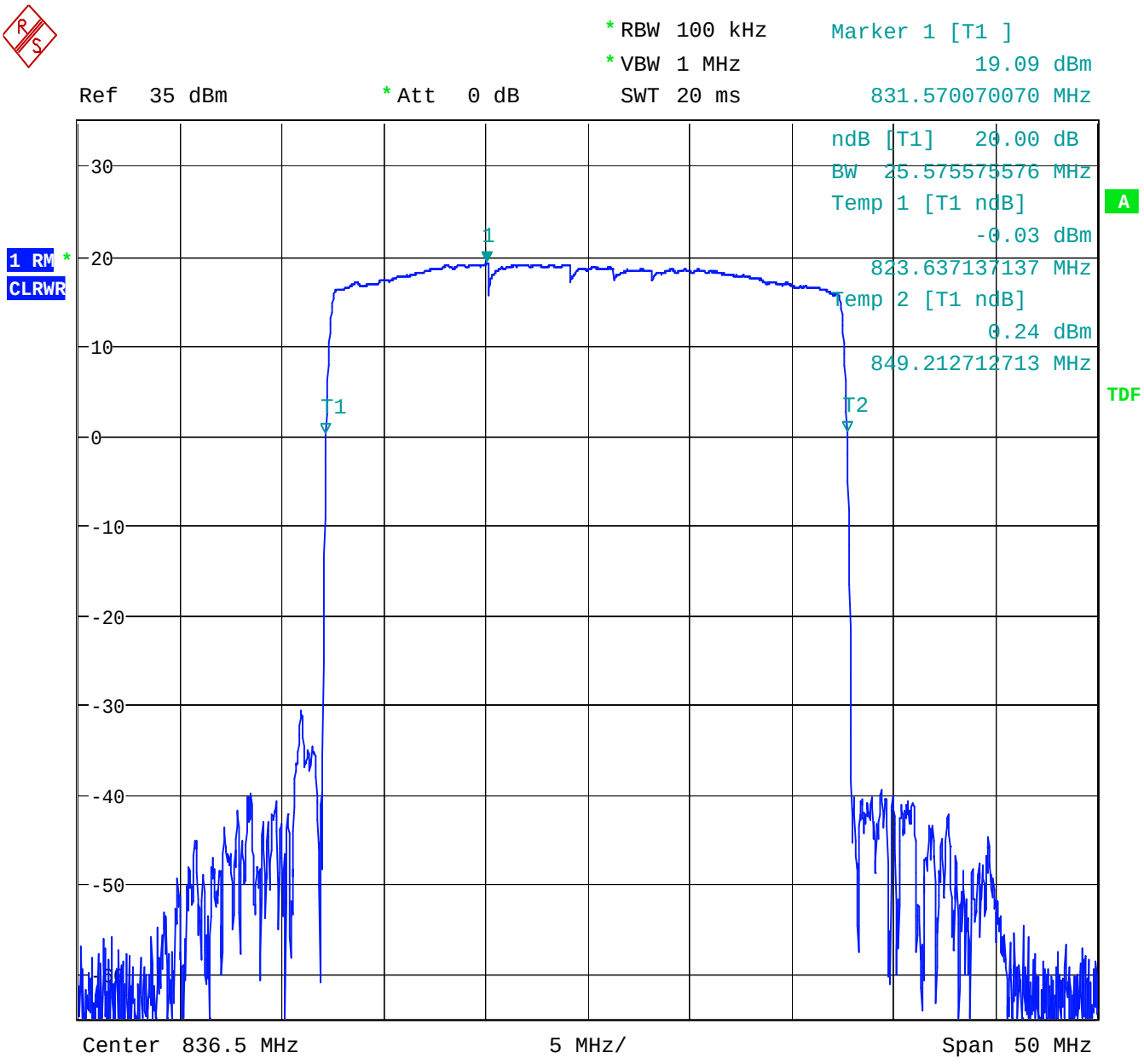
Date: 12.APR.2007 21:33:38

Figure 66 25 MHz (3 dB) filter width - Downlink



Date: 11.APR.2007 15:57:06

Figure 67 25 MHz (3 dB) filter width - Uplink



Date: 11.APR.2007 16:07:33

APPENDIX G: 2.1055 FREQUENCY STABILITY

G.1. Base Standard & Test Basis

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

Specifications

22.355 Except as otherwise provided in this part, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table C–1 of this section.

Frequency range (MHz)	Base, fixed (ppm)	Mobile > 3 watts (ppm)	Mobile < 3 watts (ppm)
25 to 50.....	20.0	20.0	50.0
50 to 450.....	5.0	5.0	50.0
450 to 512.....	2.5	5.0	5.0
821 to 896.....	1.5	2.5	2.5
928 to 929.....	5.0	n/a	n/a
929 to 960.....	1.5	n/a	n/a
2110 to 2220.....	10.0	n/a	n/a

G.2. Deviations

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

G.3. Test Results

Not Applicable. This device uses a common oscillator to down-convert and up-convert the modulated rf carrier so that the output frequency tracks the input frequency. This was determined by inspection of the schematics provided by the client.

G.4. Observations

None

G.5. Deviations from Normal Operating Mode During Test

None.

G.6. Sample Calculation

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

G.7. Test Data

None

G.8. Test Diagram

None

G.9. Tested By

.

Name: Tom Tidwell,
Function: Manager of Wireless Services

APPENDIX H: TEST EQUIPMENT LIST

H.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	11/1/07	E1022P
High Frequency - Cable 1	MegaPhase	TM26-3135-144	12 Months	8/23/07	6070401001
Reference Antenna	ETS	3121 Dipole Set	12 months	8/8/07	S/N. 274
CONTROL ROOM					
Test Receiver	Rohde & Schwarz	FSQ26	12 Months	10/27/07	W1020P
High Frequency - Cable 2	MegaPhase	NA	12 Months	8/23/07	6070401002
Amplifier	HP	8449B	12 Months	5/4/07	E1010P

H.2. Antenna Conducted Emissions Measurement Equipment

Instrument	Manufacturer	Model	Calibration Frequency	Calibration Due	NTS Control No.
ANTENNA CONDUCTED EMISSIONS					
Spectrum Analyzer	Rohde & Schwarz	FSQ26	12 Months	10/27/07	W1020P
High Frequency - Cable 1	MegaPhase	TM26-3135-144	12 Months	8/23/07	W1010P
I/Q Signal Generator	Rohde & Schwarz	SMIQ 03	12 Months	8/25/07	W1005P
I/Q Modulation Generator	Rohde & Schwarz	AMIQ	12 Months	8/28/07	W1004P
3-Way Combiner	Mini Circuits	ZA3PD-1.5	12 Months	N/A*	
Attenuator	Inmet	26A-3	12 Months	8/11/07	W1016P
Attenuator	Inmet	26A-3	12 Months	8/11/07	W1017P
Attenuator	Wiltron	43KC-10	12 Months	9/9/07	W1018P
Attenuator	Inmet	26A-20	12 Months	9/9/07	W1019P
IS-95 CDMA BTS simulator	Rohde & Schwarz	CMD80	N/A	N/A*	W1000P

*This device was not used for calibrated measurements.

END OF DOCUMENT