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Certification Test Report

CFR 47 FCC Part 2 and Part 27, Subpart C

Model: Surfer 1239

FCC ID No.: PL6-2300-MDM90-S1

Project Code: W7245-2

Revision: 2

Prepared for:	Navini Networks 2240 Campbell Creek Blvd. Suite 110 Richardson, TX 75082
Author:	Tom Tidwell, Manager of Wireless Services
Issued:	25 July, 2007

Report Summary

NTS Plano

Accreditation Numbers: FCC: 101741
IC: 46405-4319 File # IC-4319A-1

Applicant: Navini Networks, Inc.
2240 Campbell Creek Blvd.
Suite 110
Richardson, TX 75082

Customer Representative: Larry Zhou

EUT Description:

EUT Description	Manufacturer	Model	Revision	Serial Number
The equipment tested is a point-to-multipoint customer premise transceiver for broadband data transmission.	Navini Networks	Surfer 1239	-	-

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 27, Para. 27.50(a)
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 27, Para. 27.53(a)
D	Spurious Emissions at Antenna Terminals	No	No	No	PASS	CFR 47, Part 2, Para. 2.1051 CFR 47, Part 27, Para. 27.53(a)
E	Field Strength of Spurious Radiation	No	No	No	PASS	CFR 47, Part 2, Para. 2.1053 CFR 47, Part 27, Para. 27.53(a)
F	Frequency Stability	No	No	No	PASS	CFR 47, Part 2, Para. 2.1055 CFR 47, Part 27, Para. 27.54

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	2 July, 2007
1	Remove “2.3 GHz” from cover page.	5 July, 2007
2	Updated emission designator, sample calculation for A.7, bandwidth for A.4, updated RF power	25 July, 2007

INTRODUCTION

1.1 PURPOSE

The purpose of this document is to describe the tests applied by NTS Plano to demonstrate that the 2.3 GHz Surfer transceiver complies with FCC Part 27 Subparts C and M in accordance with the certification requirements of CFR 47, Part 2 following modification as described in the FCC filing.

2.0 EUT DESCRIPTION

2.1 CONFIGURATION

Description of EUT

	Name	Model	Revision	Serial Number
EUT	2.3 GHz Surfer CPE	Surfer 1239		
RF Exposure Classification	Mobile (Operated indoors in a fixed location with separation distance of at least 20 cm.)			
Channels/Frequency Range	2305 – 2315 MHz 2350 – 2360 MHz			
Power	0.355 watts at antenna terminals (avg.)			
Emission Designator:	5M00W7D, 2M50W7D			
TX antenna details	The antenna is integral to the device			
Functional Description	The device tested is used to deliver broadband data services.			

2.1.1 EUT POWER

Voltage	120 Vac, 60 Hz
Number of Feeds	Single phase (L1 and Neutral)

2.2 EUT CABLES

Quantity	Model/Type	Routing		Shielded / Unshielded	Description	Cable Length (m)
		From	To			
1	Coaxial	EUT	Test equipment	Shielded	Coaxial cable	3
1	Ethernet	EUT	Support/configuration PC	unshielded		2

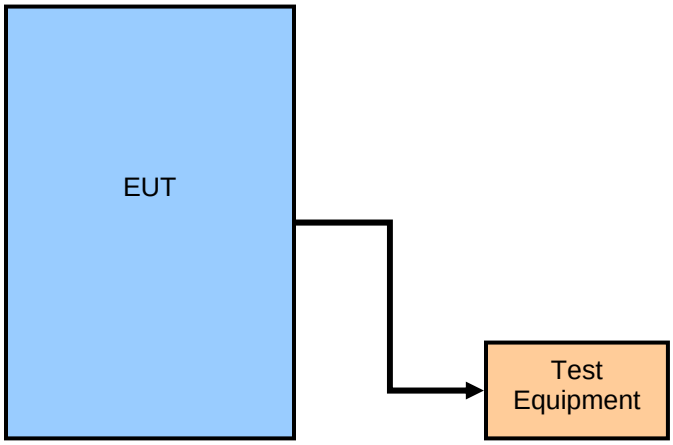
2.3 MODE OF OPERATION DURING TESTS

3.0 SUPPORT EQUIPMENT

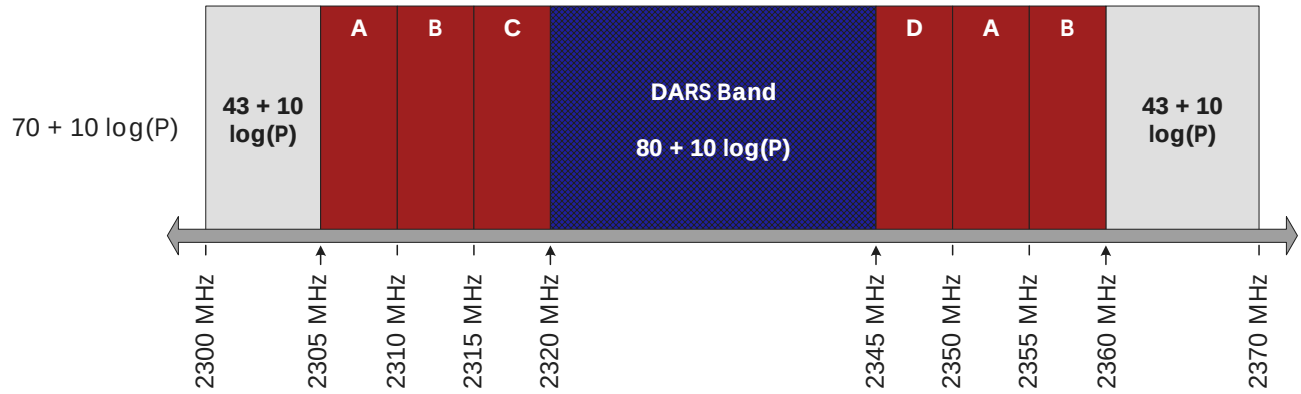
3.1 CONFIGURATION

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

3.2 TEST BED/PERIPHERAL CONFIGURATION



4.0 FREQUENCY SPECTRUM



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

27.50 Power and antenna height requirements
(a) The following power limits apply to the 2305–2320 MHz and 2345–2360 MHz bands:
(1) Fixed, land, and radiolocation land stations transmitting are limited to 2000 watts peak equivalent isotropically radiated power (EIRP).
(2) Mobile and radiolocation mobile stations transmitting are limited to 20 watts EIRP peak power.

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 27.50(h)(2)(i). The resolution bandwidth was set to 50 kHz. Video bandwidth was set to 100 kHz.

A.5. Test Results

Compliant. The peak rf output power is 31.8 dBm at the antenna port.

A.6. Operating Mode During Test

The transmitter was tested while in a modulated, continuous transmit mode.

A.7. Sample Calculation

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

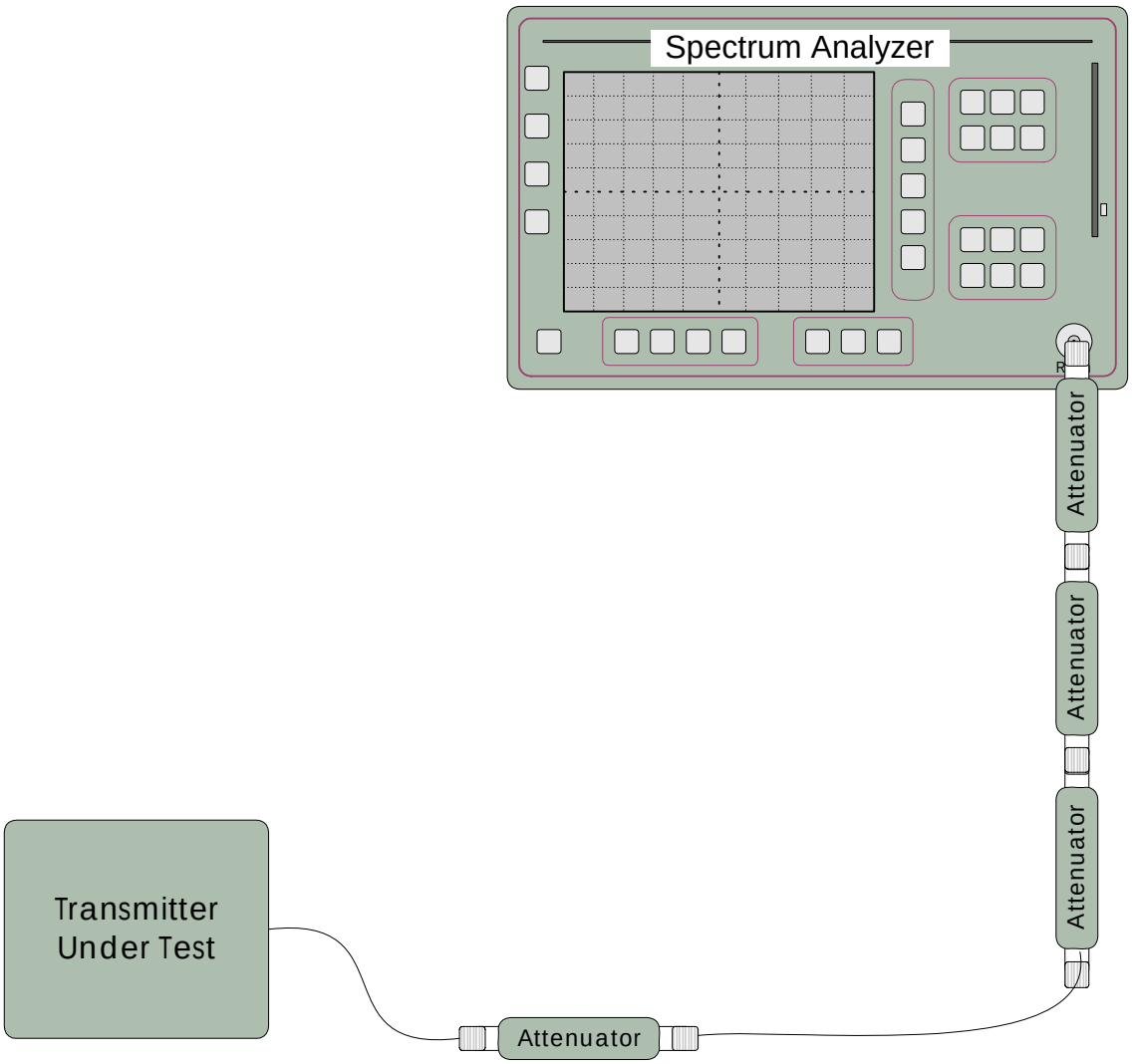
A.8. Test Data

Band/Mode	Frequency	Peak Power (dBm)	Avg. Power (dBm)	Max. Antenna Gain (dBi)	EIRP (dBm)
Low Band A – Full Band	2.3075 GHz	31.7	24.1	9	40.7
Low Band A – ½ Band	2.3075 GHz	31.8	25.5	9	40.8
High Band A – Full Band	2.3525 GHz	30.2	22.2	9	39.2
High Band A – ½ Band	2.3525 GHz	29.8	23.0	9	38.8
Low Band B – Full Band	2.3125 GHz	29.9	21.9	9	38.9
Low Band B – ½ Band	2.3125 GHz	30.1	23.2	9	39.1
High Band B – Full Band	2.3575 GHz	31.6	23.9	9	40.6
High Band B – ½ Band	2.3575 GHz	31.6	25.2	9	40.6

Tested By: Dwaine Hartman
Function: Wireless Test Technician

Test Date: 30 May, 2007

A.9. Test Diagram



The ACP (Adjacent Channel Power) measurement function was used on the spectrum analyzer for this measurement. This function integrates the power within the 5 MHz channel and reports the total channel power. The detector function used was Peak for measuring peak power and RMS for measuring average power.

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 generates a complex digitally modulated waveform.

B.5. Test Results

Not applicable – The device does not produce an analogue modulated waveform.

Test Data Summary

Emission Designators: 5M00W7D OFDMA mode, 2M50W7D

B.6. Test Diagram

N/A

B.7. Tested By

Name: Dwaine Hartman
Function: Wireless Test Technician

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

27.53

(a) For operations in the bands 2305–2320 MHz and 2345–2360 MHz, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by the following amounts:

(1) *For fixed, land, and radiolocation land stations:* By a factor not less than 80 + 10 log (p) dB on all frequencies between 2320 and 2345 MHz;

(2) *For mobile and radiolocation mobile stations:* By a factor not less than 110 + 10 log (p) dB on all frequencies between 2320 and 2345 MHz;

(3) *For fixed, land, mobile, radiolocation land and radiolocation mobile stations:* By a factor not less than 70 + 10 log (p) dB on all frequencies below 2300 MHz and on all frequencies above 2370 MHz; and not less than 43 + 10 log (p) dB on all frequencies between 2300 and 2320 MHz and on all frequencies between 2345 and 2370 MHz that are outside the licensed bands of operation;

(4) Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or less, but at least one percent of the emission bandwidth of the fundamental emission of the transmitter, provided the measured energy is integrated over a 1 MHz bandwidth;

(5) In complying with the requirements in §27.53(a)(1) and §27.53(a)(2), WCS equipment that uses opposite sense circular polarization from that used by Satellite DARS systems in the 2320–2345 MHz band shall be permitted an allowance of 10 dB;

(6) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the edges, both upper and lower, of the licensee's bands of operation as the design permits;

(7) The measurements of emission power can be expressed in peak or average values, provided they are expressed in the same parameters as 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 27.53(a)

C.5. Test Results

Compliant.

C.6. Deviations from Normal Operating Mode During Test

None.

C.7. Sample Calculation

None

C.8. Test Data

Band/Mode	Frequency	26 dB Bandwidth (MHz)
Low Band A – Full Band	2.3075 GHz	4.80
Low Band A – ½ Band	2.3075 GHz	2.45
High Band A – Full Band	2.3525 GHz	4.80
High Band A – ½ Band	2.3525 GHz	2.45
Low Band B – Full Band	2.3125 GHz	4.80
Low Band B – ½ Band	2.3125 GHz	2.45
High Band B – Full Band	2.3575 GHz	4.80
High Band B – ½ Band	2.3575 GHz	2.45

See plots following.

Figure 1 A Band Low 4.736MHz

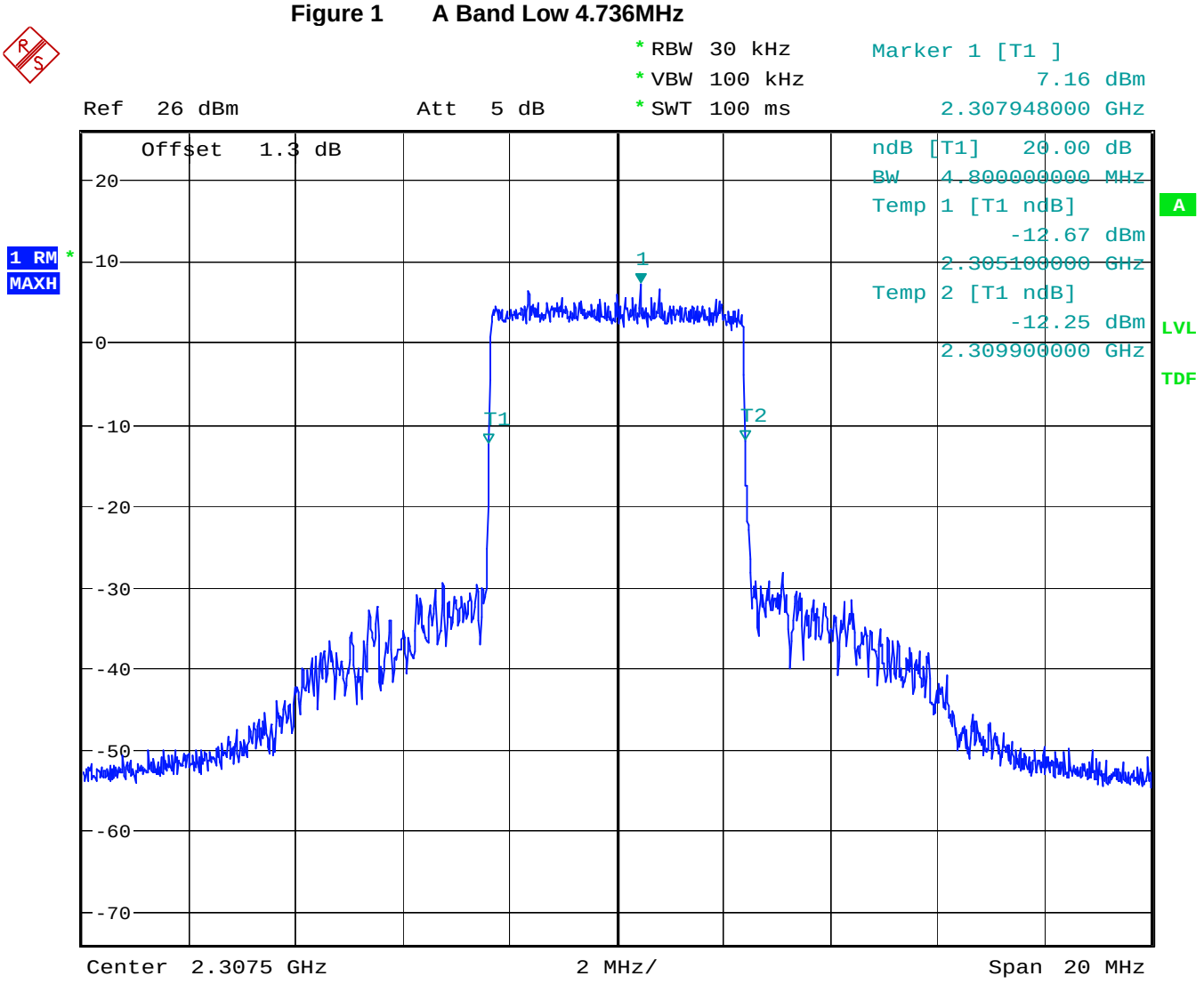


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Figure 2 A Band Low 2.368MHz

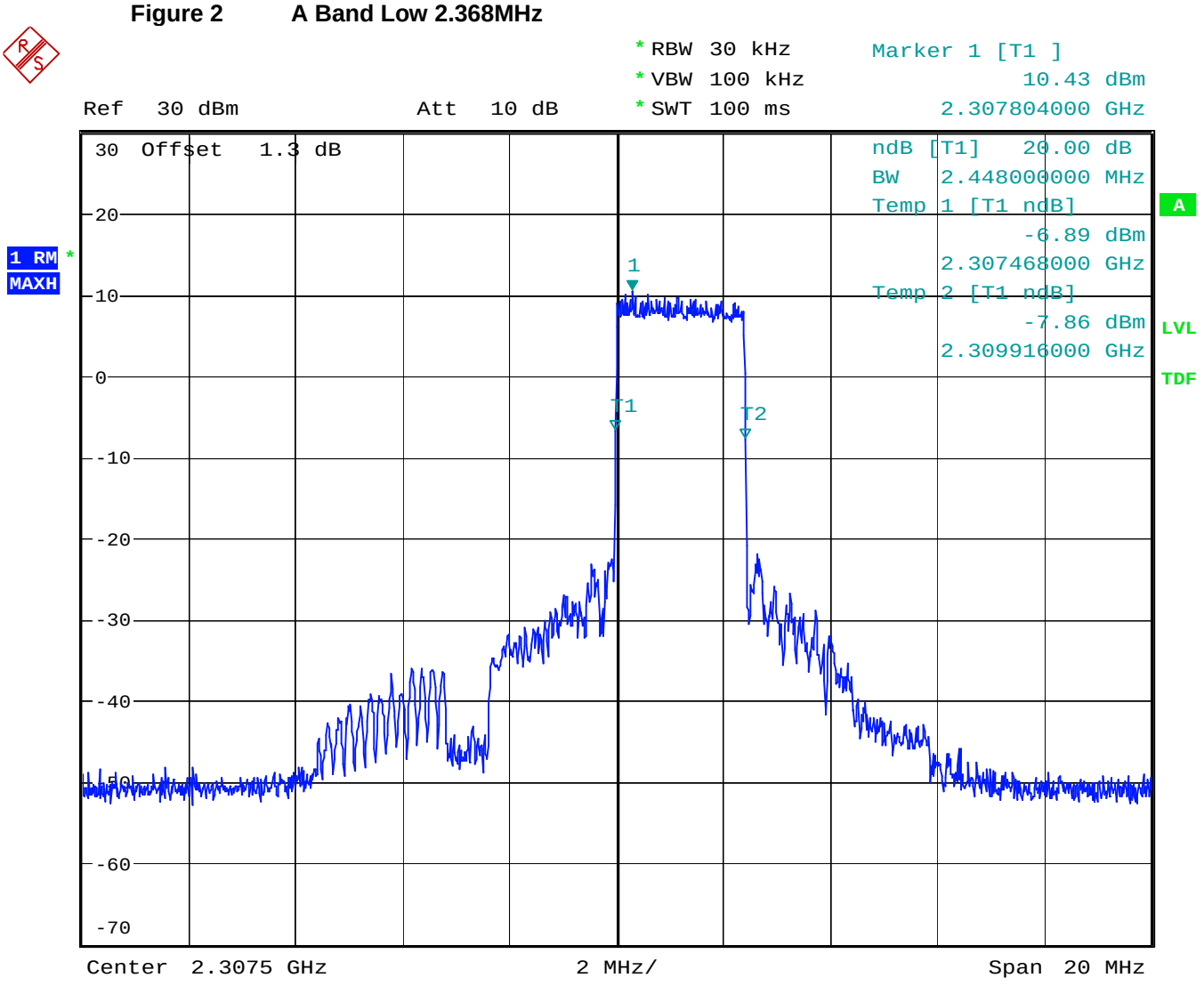

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Figure 3 B Band Low – 4.736 MHz BW

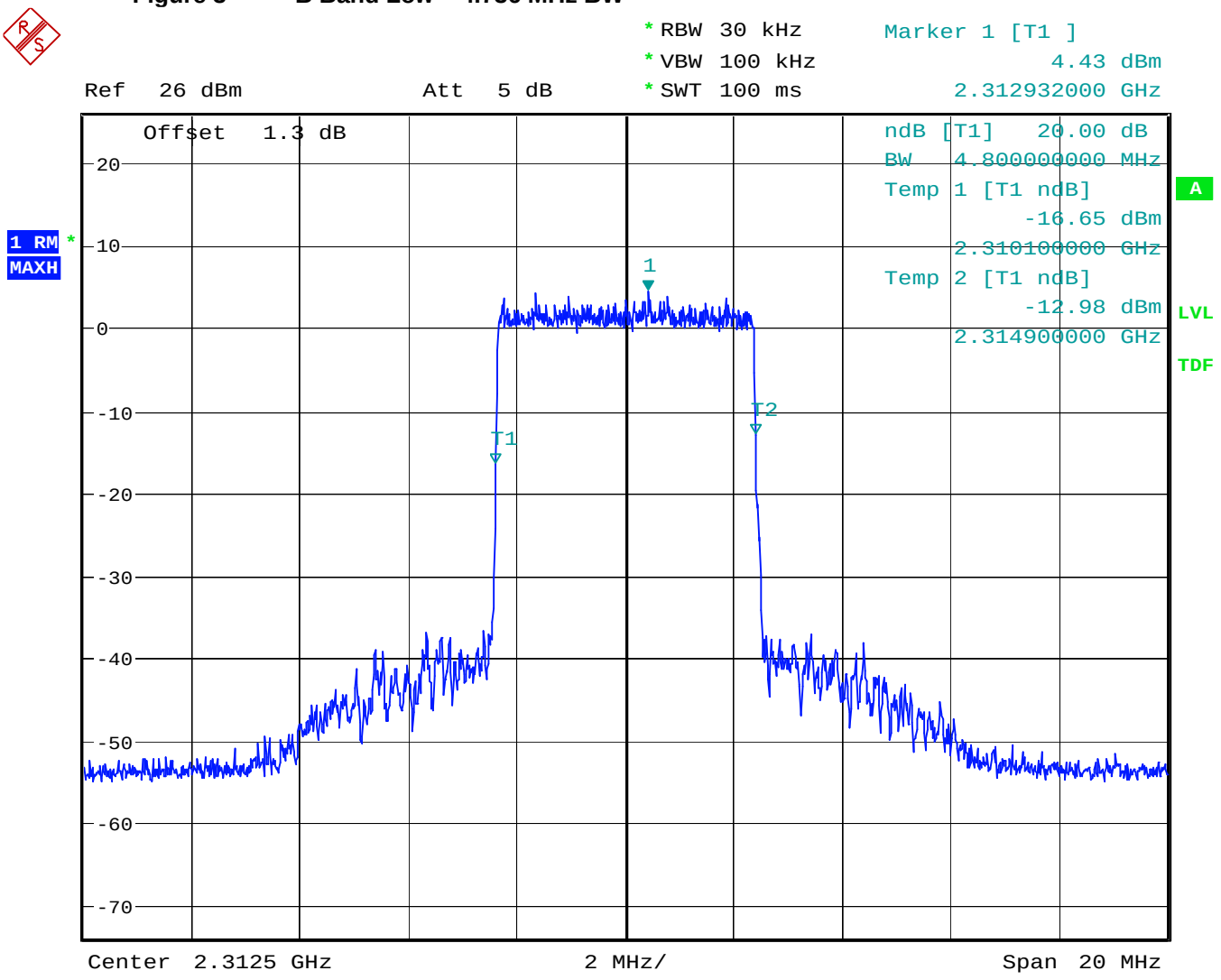

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Figure 4 B Band Low – 2.368 MHz BW

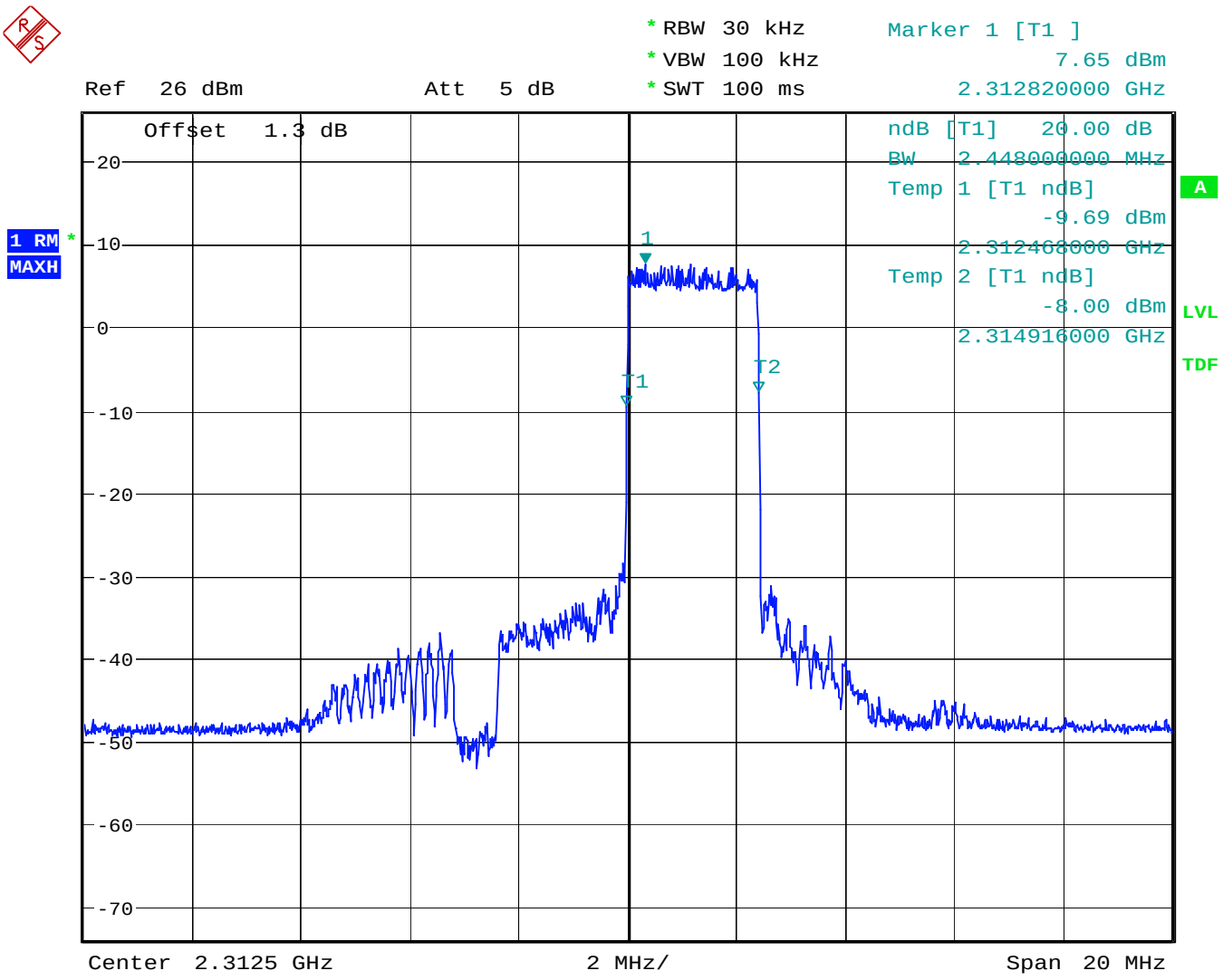

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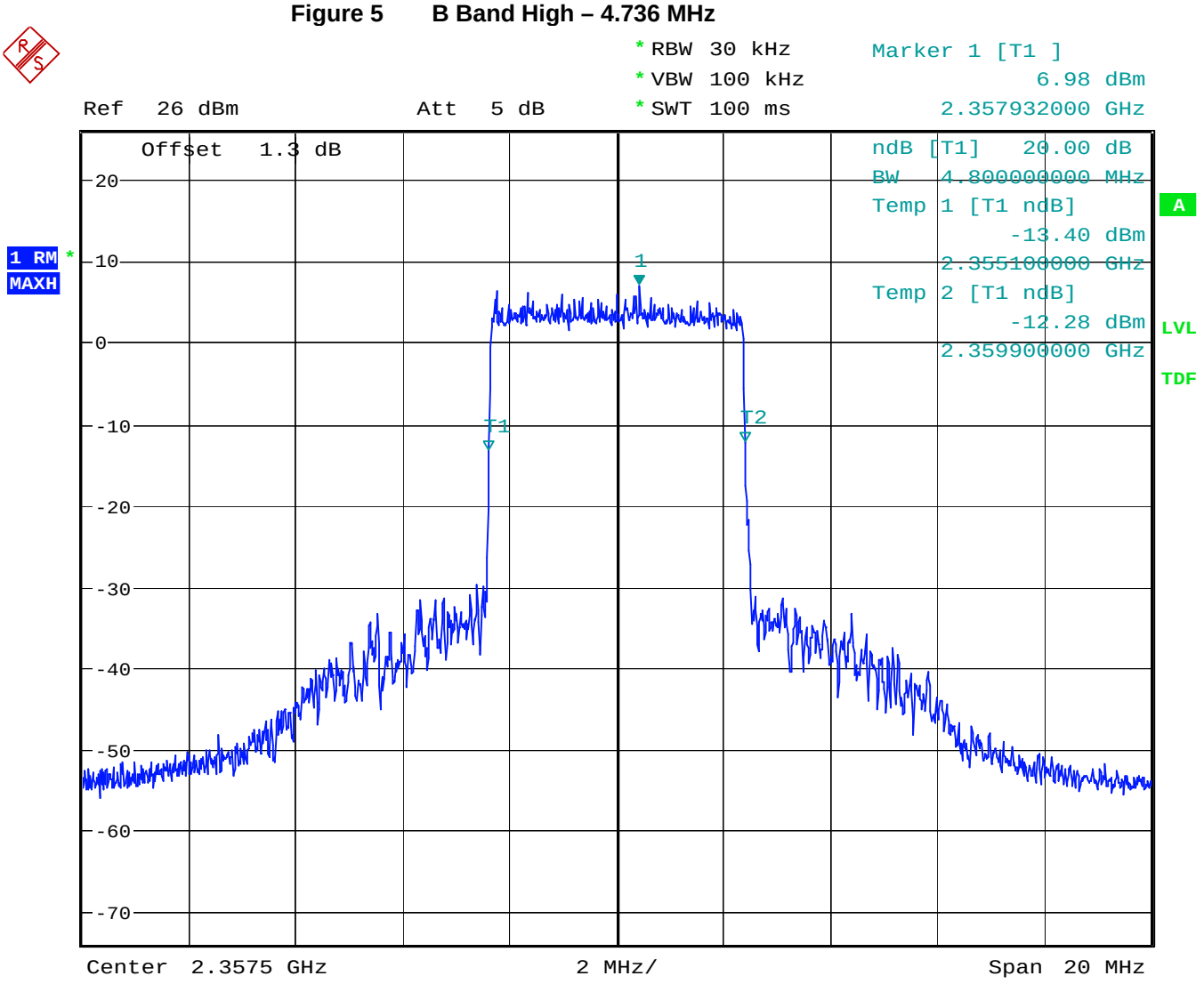
Figure 5 B Band High – 4.736 MHz



Date: 30.MAY.2007 18:41:05

Figure 6 B Band High – 2.368 MHz BW

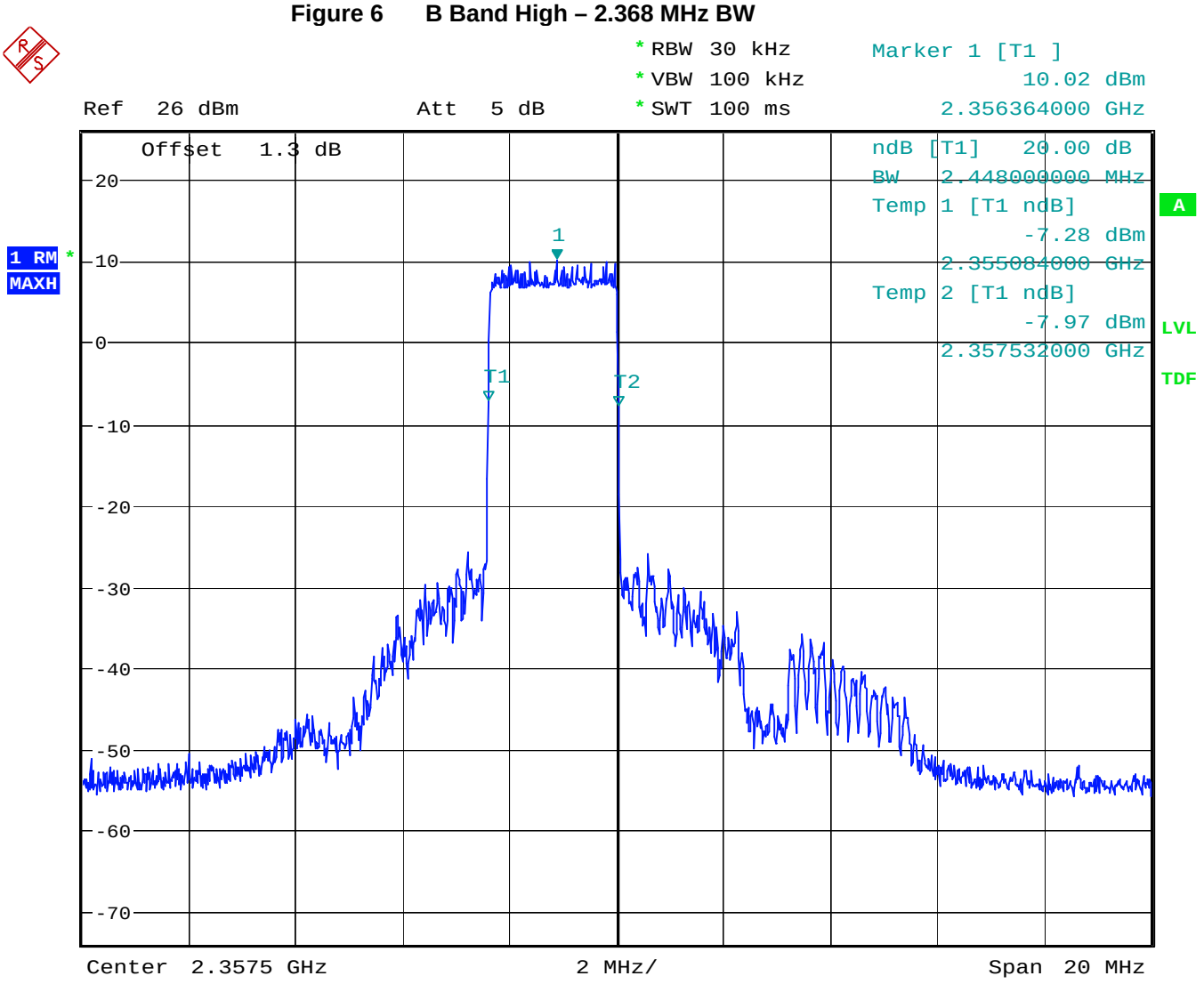


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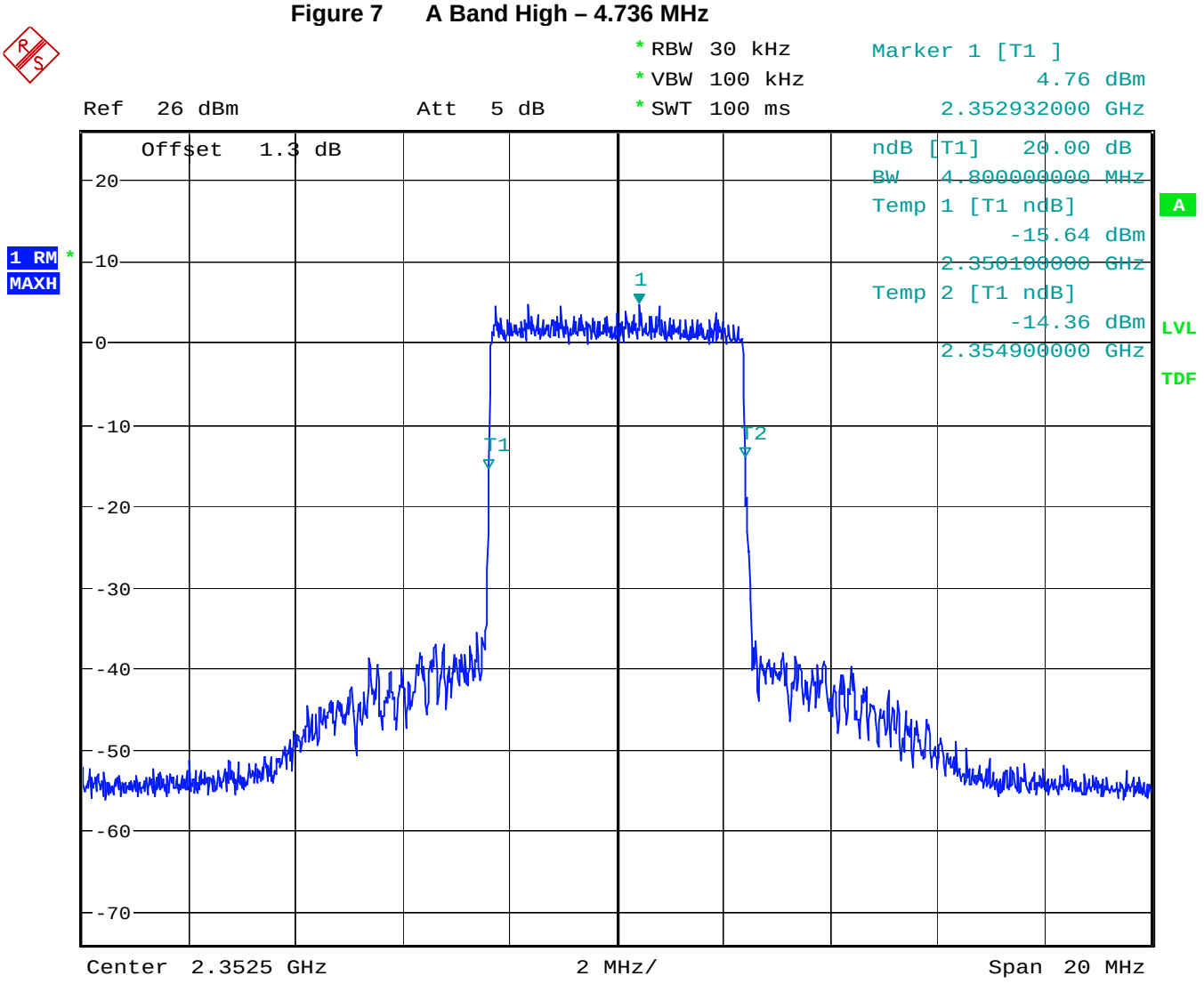
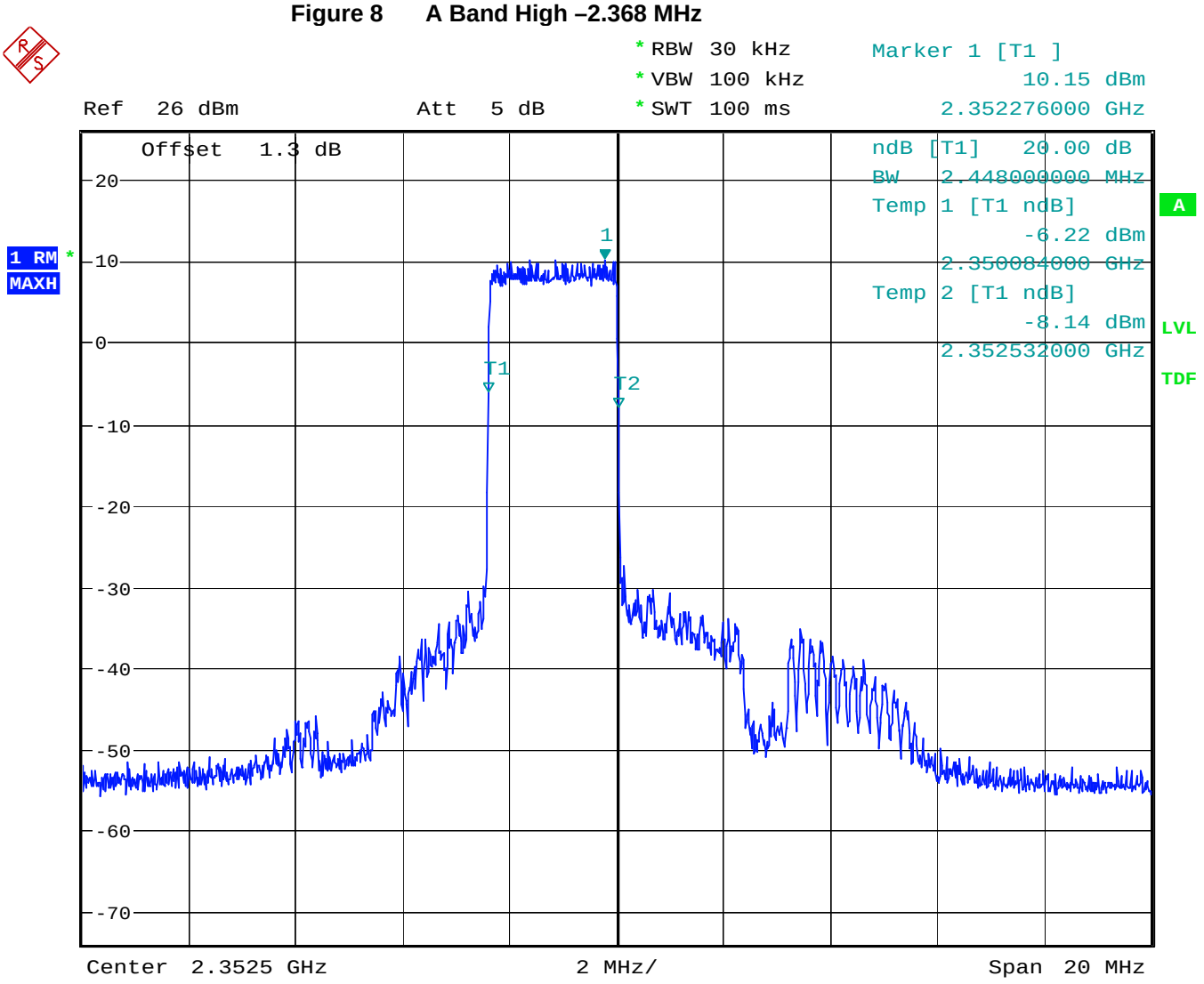
Figure 7 A Band High – 4.736 MHz



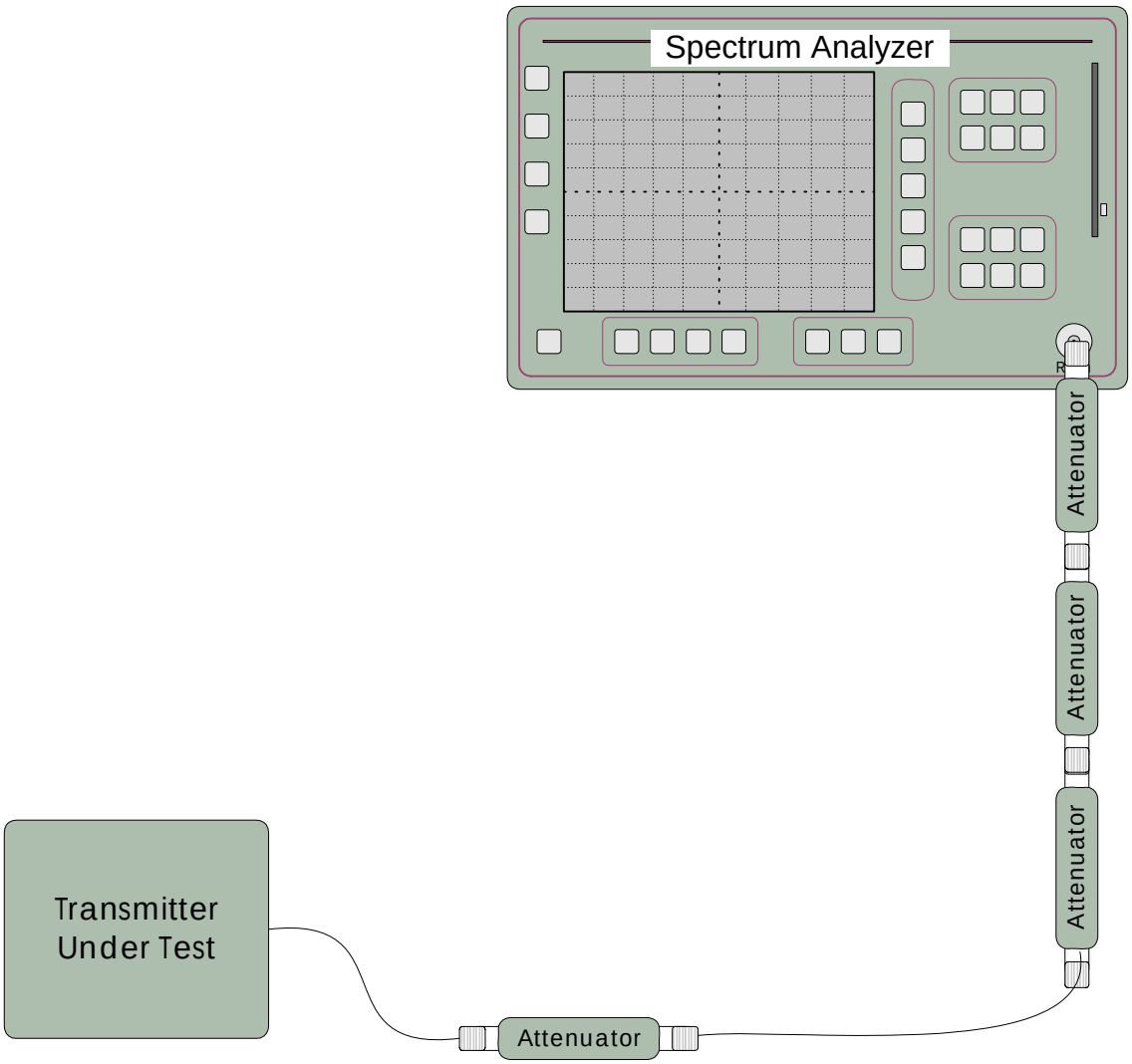
Date: 30.MAY.2007 18:14:05

Figure 8 A Band High –2.368 MHz



Date: 30.MAY.2007 18:32:27

C.9. Test Diagram



C.10. Tested By

Name: Dwaine Hartman
Function: Wireless Test Technician

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

27.53

(a) For operations in the bands 2305–2320 MHz and 2345–2360 MHz, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by the following amounts:

(1) *For fixed, land, and radiolocation land stations:* By a factor not less than 80 + 10 log (p) dB on all frequencies between 2320 and 2345 MHz;

(2) *For mobile and radiolocation mobile stations:* By a factor not less than 110 + 10 log (p) dB on all frequencies between 2320 and 2345 MHz;

(3) *For fixed, land, mobile, radiolocation land and radiolocation mobile stations:* By a factor not less than 70 + 10 log (p) dB on all frequencies below 2300 MHz and on all frequencies above 2370 MHz; and not less than 43 + 10 log (p) dB on all frequencies between 2300 and 2320 MHz and on all frequencies between 2345 and 2370 MHz that are outside the licensed bands of operation;

(4) Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or less, but at least one percent of the emission bandwidth of the fundamental emission of the transmitter, provided the measured energy is integrated over a 1 MHz bandwidth;

(5) In complying with the requirements in §27.53(a)(1) and §27.53(a)(2), WCS equipment that uses opposite sense circular polarization from that used by Satellite DARS systems in the 2320–2345 MHz band shall be permitted an allowance of 10 dB;

(6) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the edges, both upper and lower, of the licensee's bands of operation as the design permits;

(7) The measurements of emission power can be expressed in peak or average values, provided they are expressed in the same parameters as the transmitter power;

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

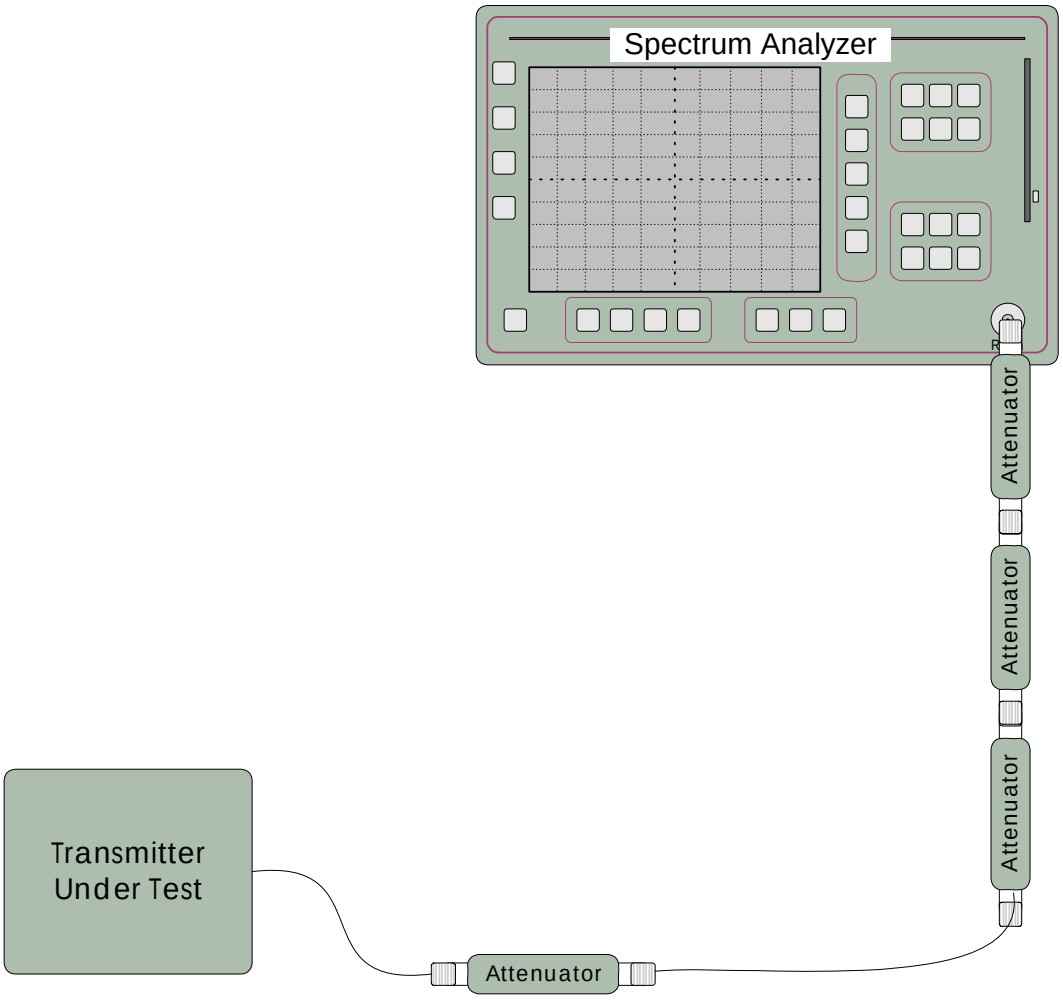
Complies. All emissions meet the out of band limits. A limit line of -40 dBm is displayed on the graphs as the tightest limit (excluding the limits in the DARS band. Compliance in the DARS band is demonstrated in subsequent graphs in this section. It is necessary to filter out the fundamental transmission and reduce the external attenuation by 20 dB in order to measure spurious emissions down to -40 dBm.

Out-of-Band Emissions limit is:

43 + 10 log(P) which relates to -13 dBm absolute power in the bands 2300 – 2305 MHz and 2360 – 2370 MHz.

70 + 10 log(P) which relates to -40 dBm absolute power in the frequency spectrum below 2300 MHz and above 2370 MHz.

D.6. Test Diagram



D.7. Test Data

See following pages.

Figure 9 A Band Low - Mode 4.736 MHz BW

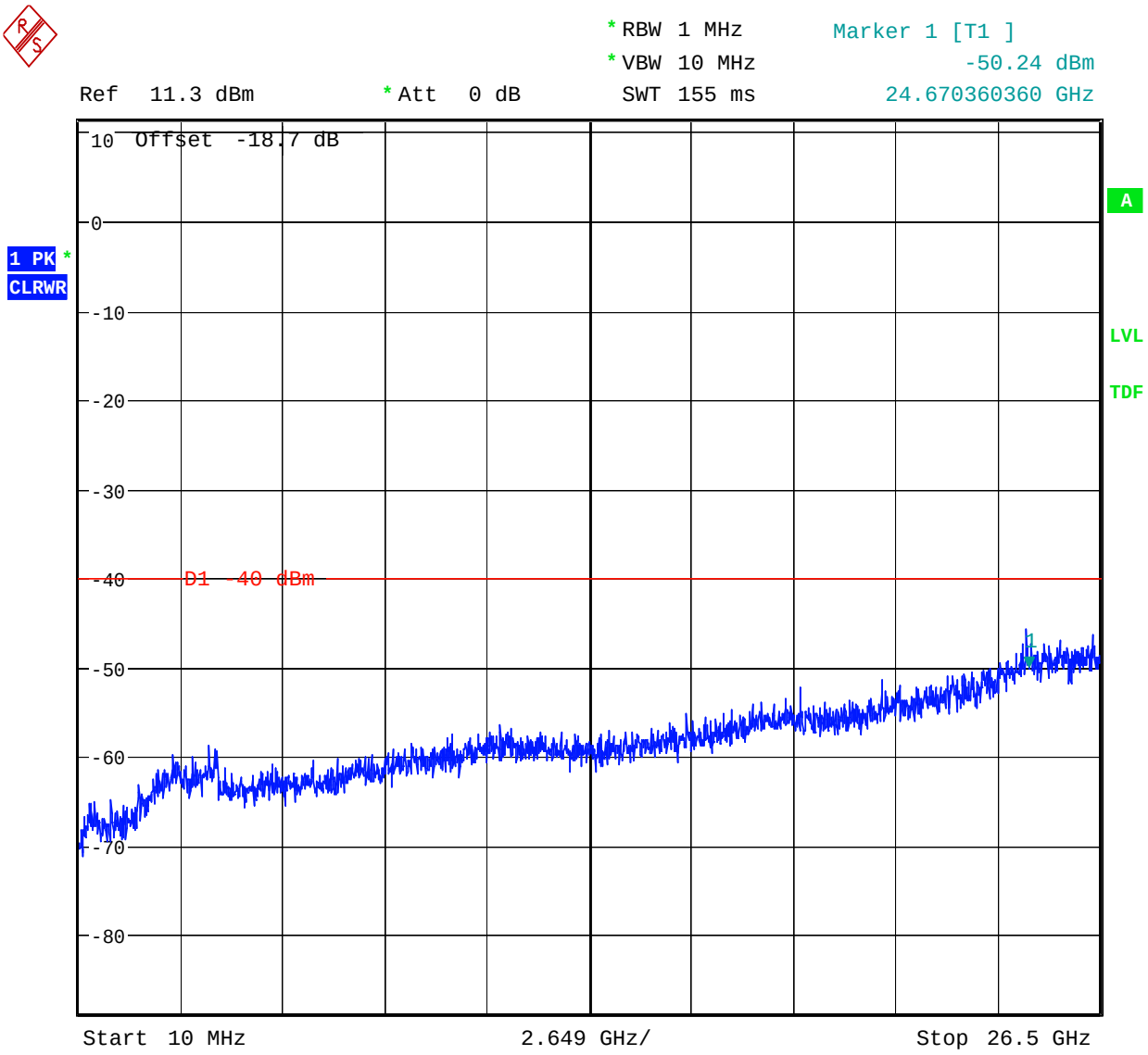


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Figure 10 A Band Low - Mode 2.368 MHz BW

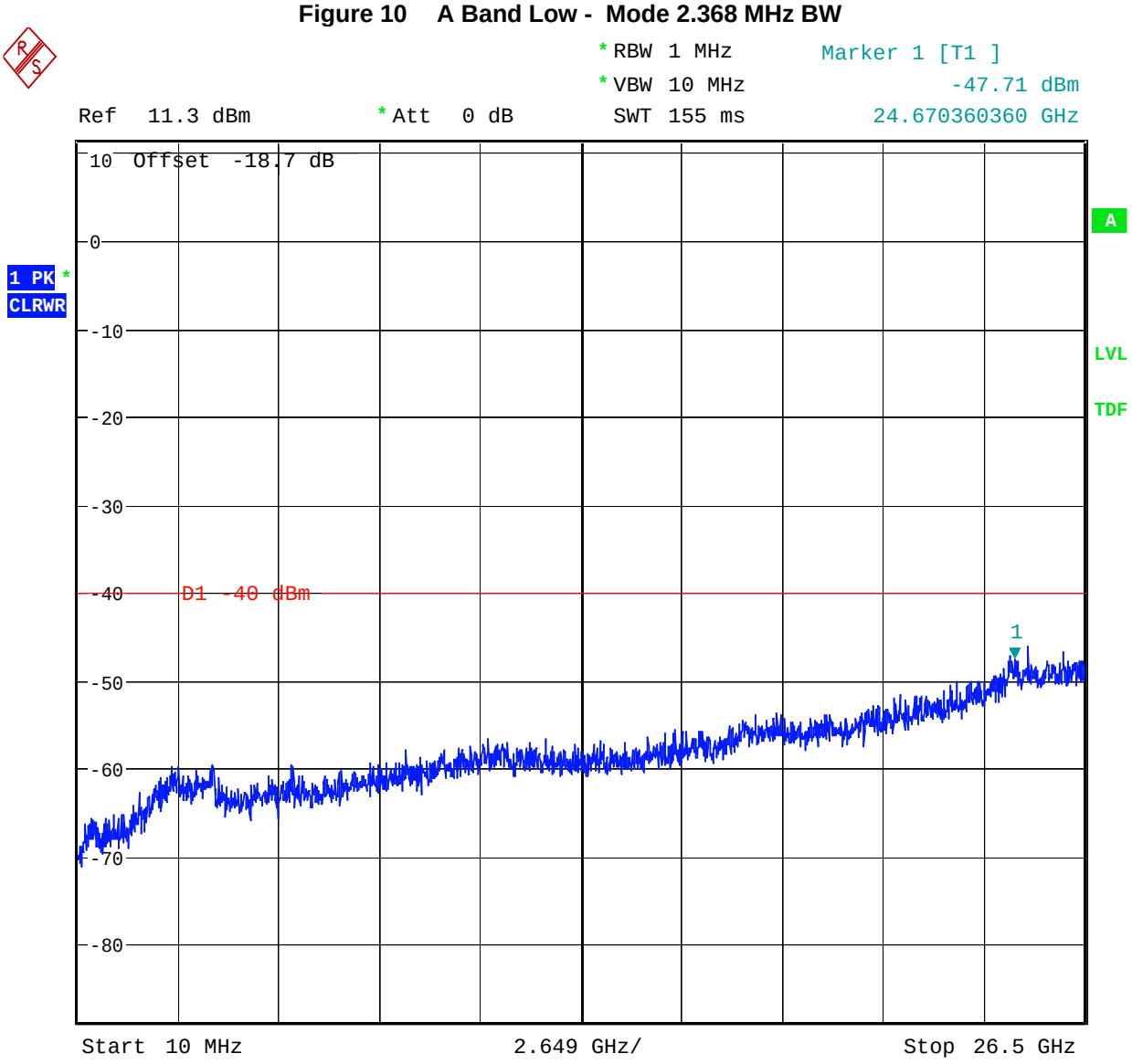

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Figure 11 B Band Low – 4.736 MHz BW

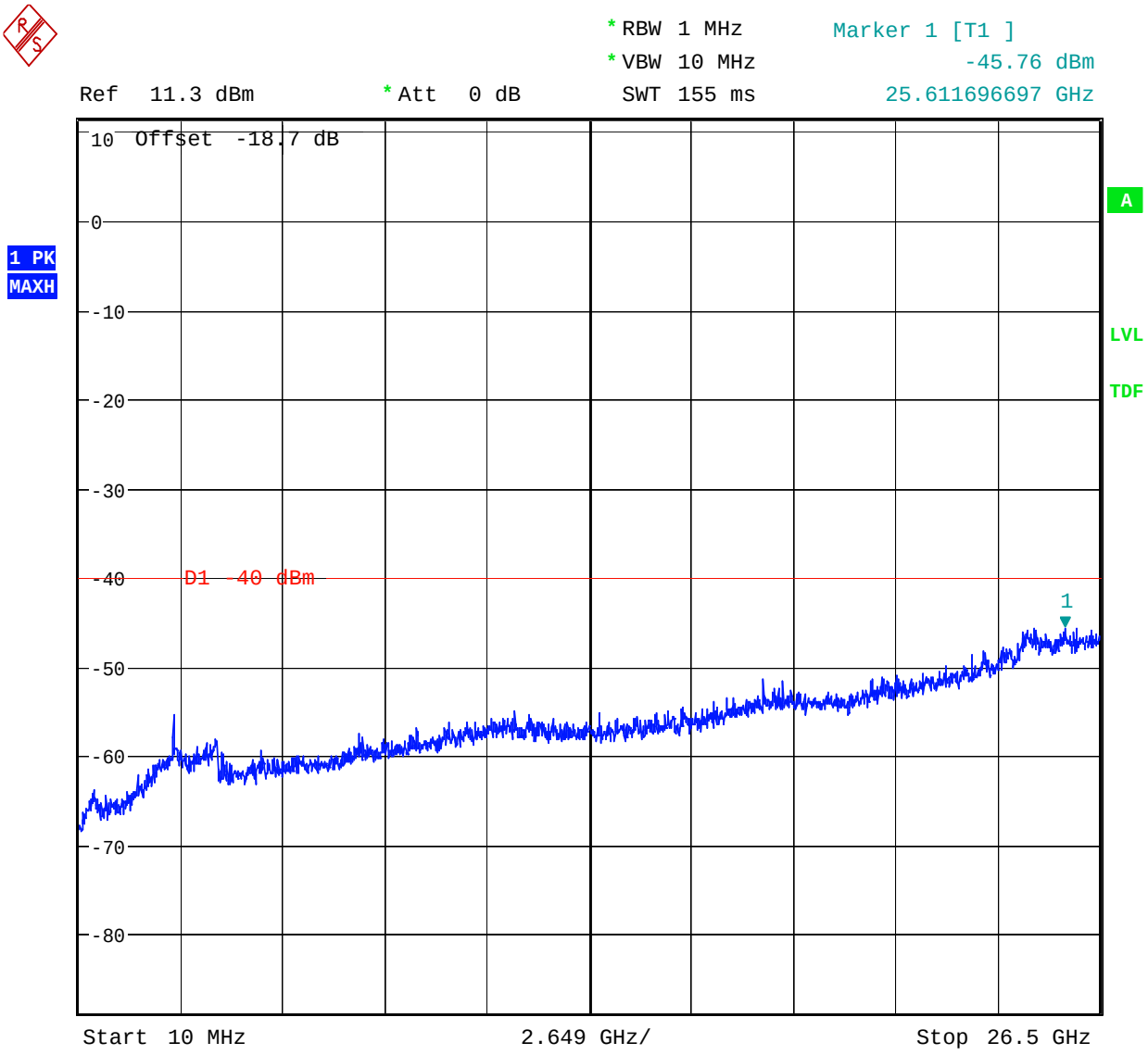

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Figure 12 B Band Low – 2.368 MHz BW

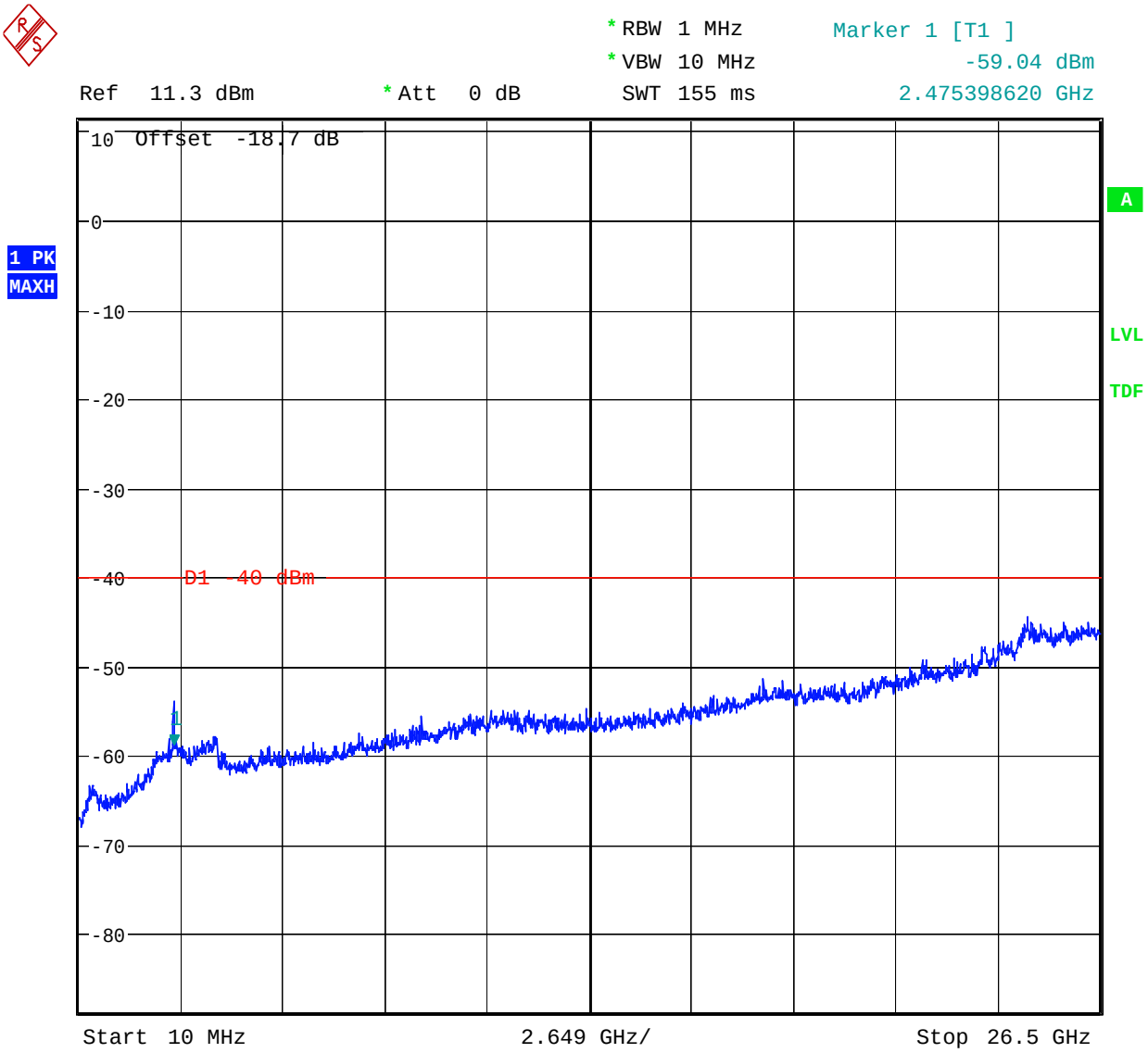
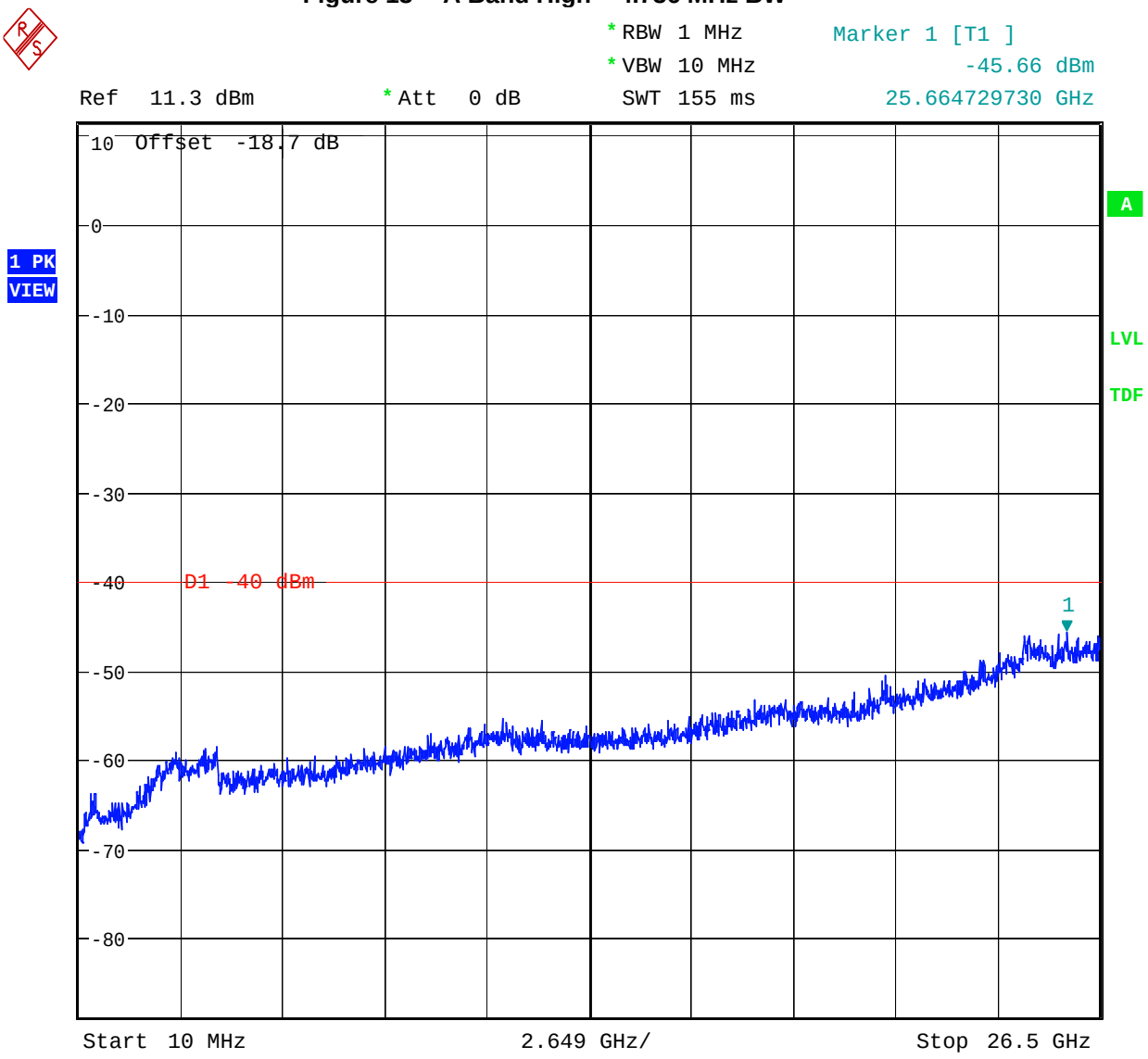
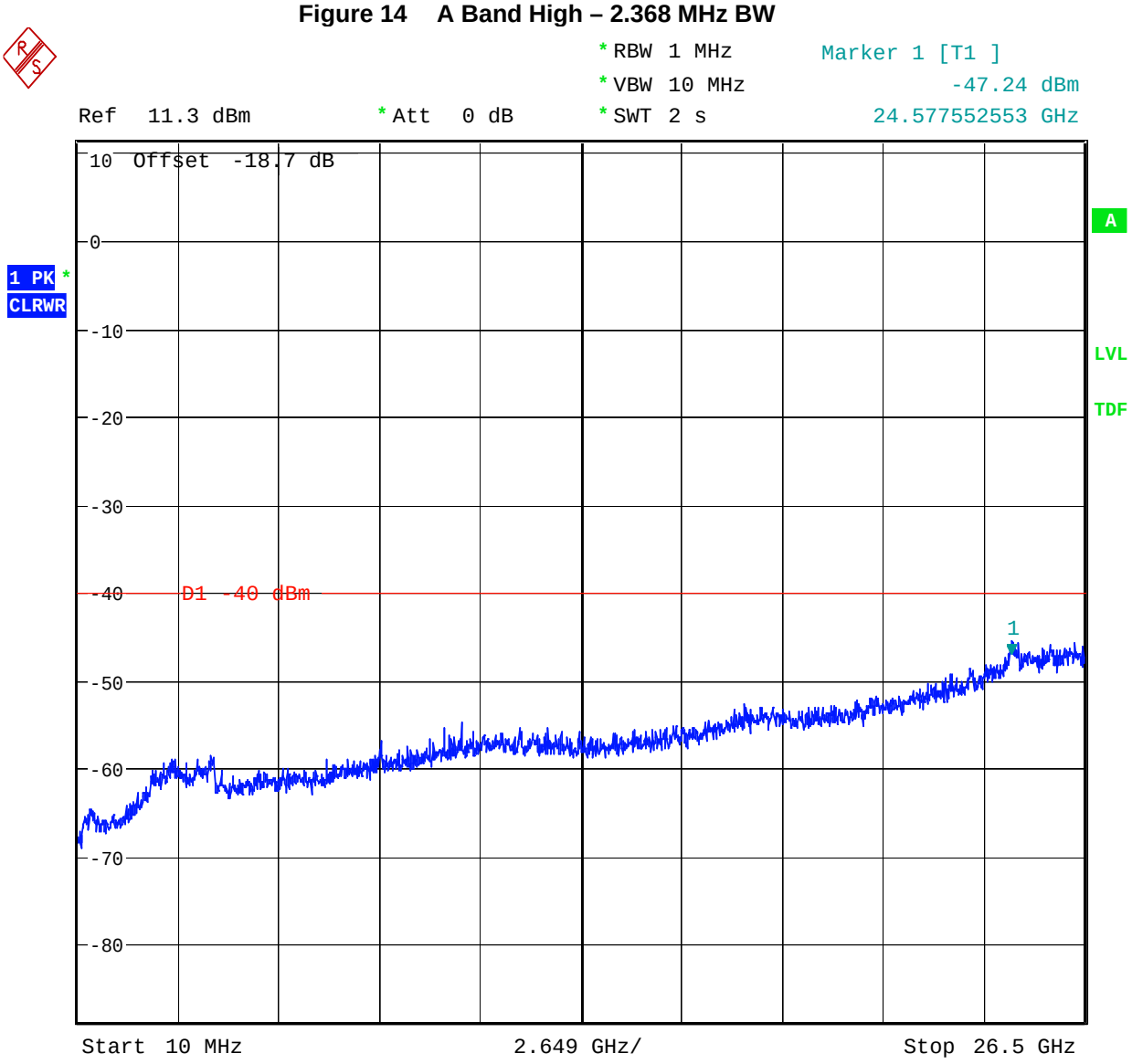


Figure 13 A Band High – 4.736 MHz BW



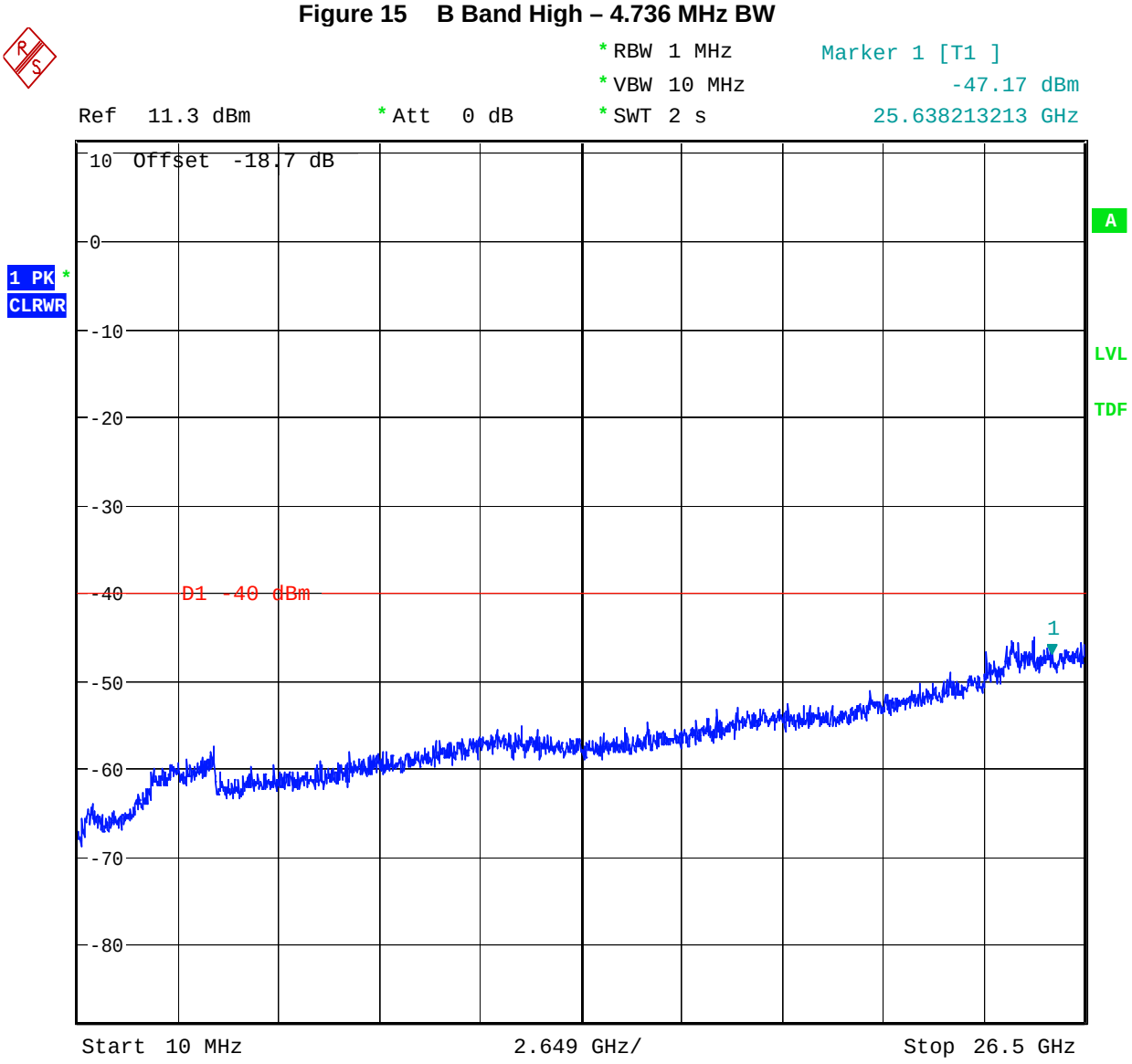
Date: 2.JUL.2007 09:34:17

Figure 14 A Band High – 2.368 MHz BW



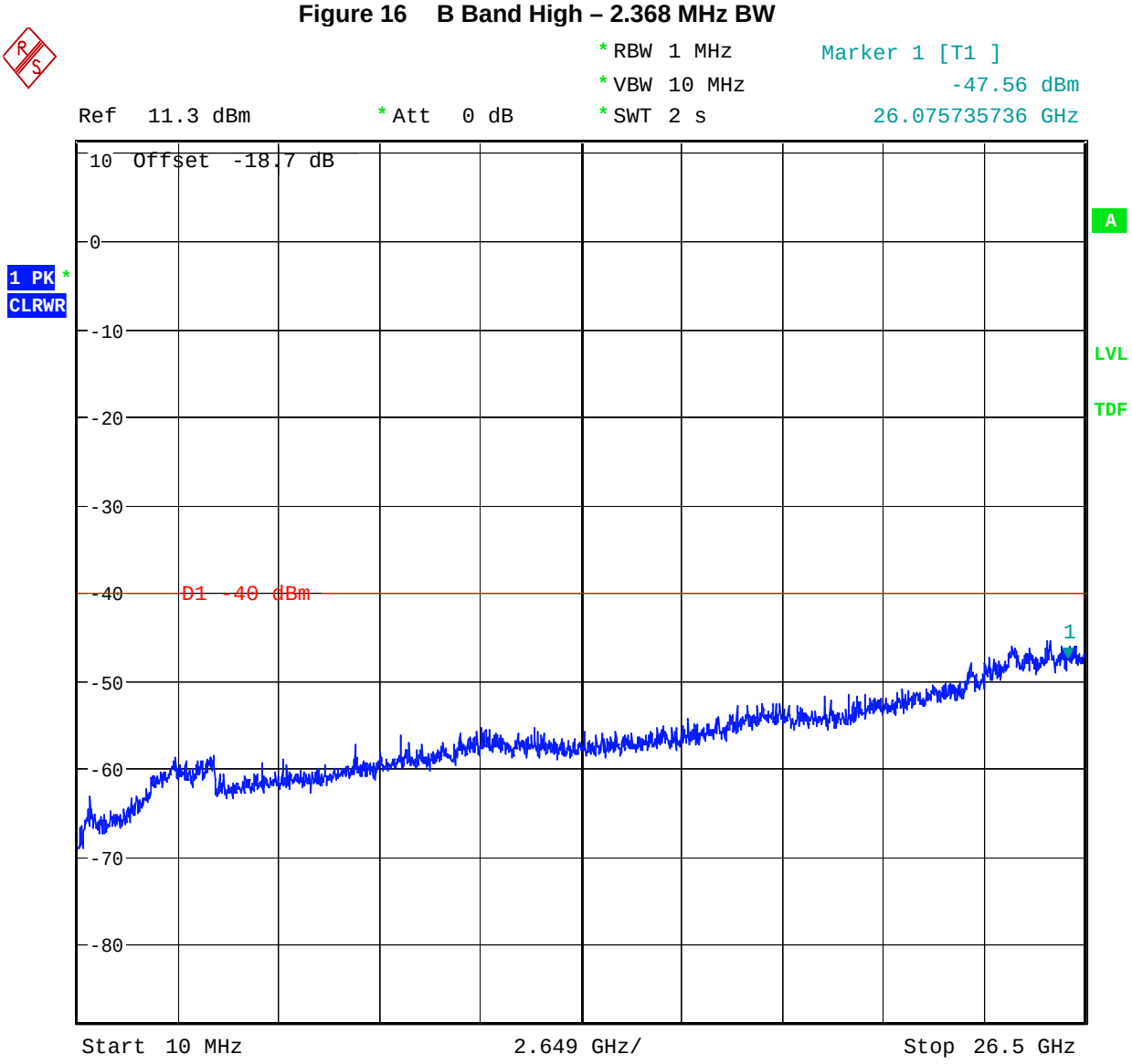
Date: 2.JUL.2007 09:35:01

Figure 15 B Band High – 4.736 MHz BW



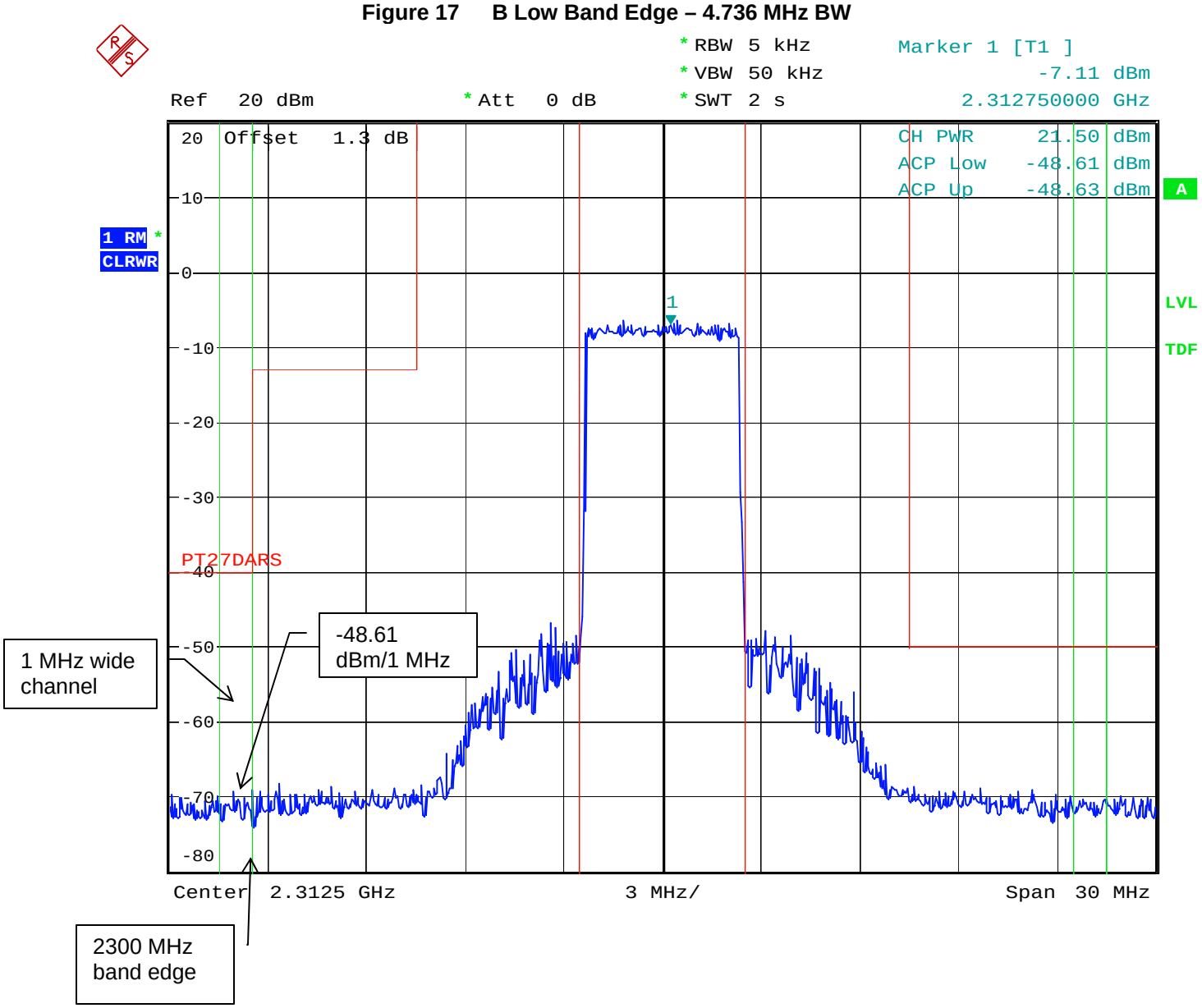
Date: 2.JUL.2007 09:35:39

Figure 16 B Band High – 2.368 MHz BW



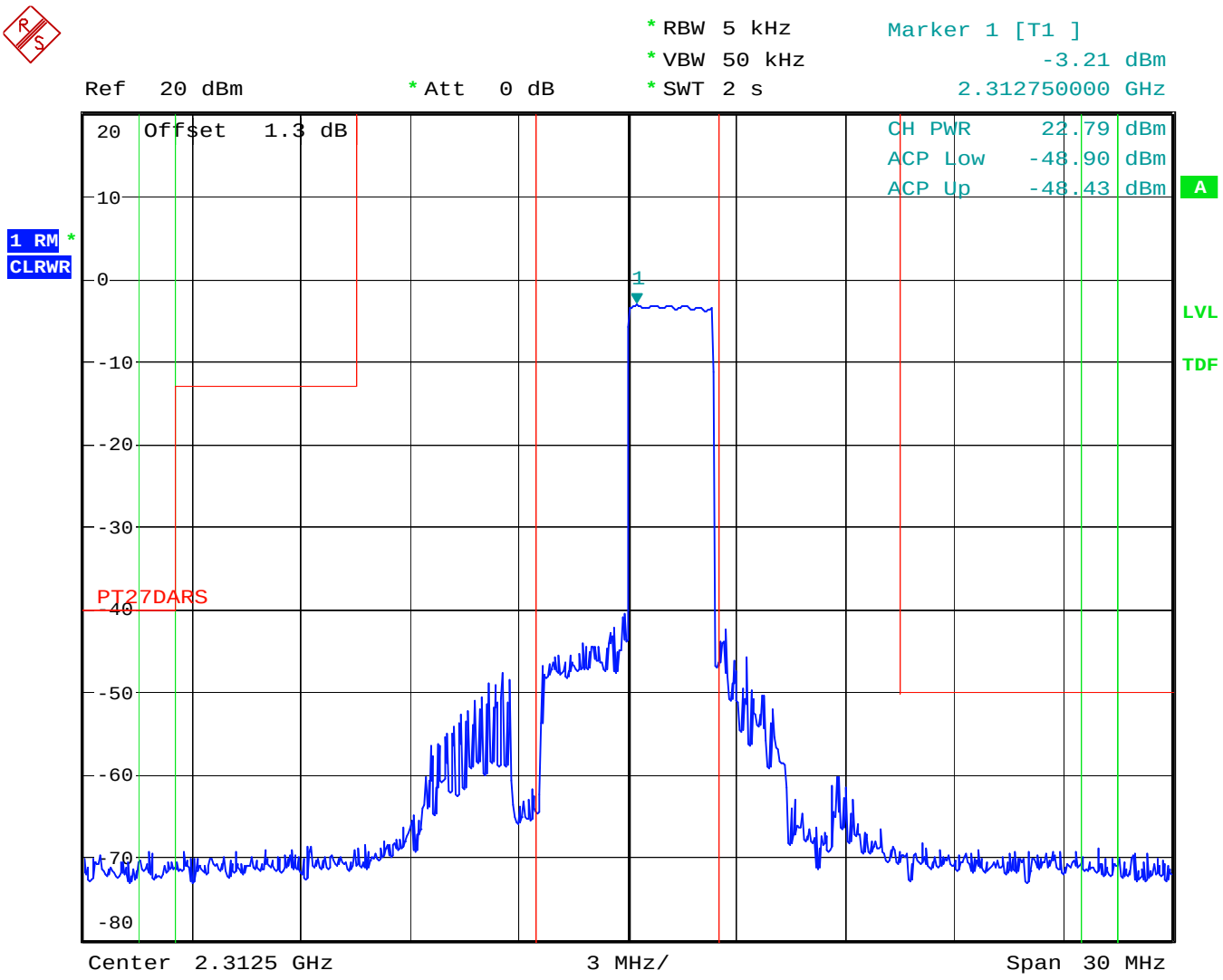
Date: 2.JUL.2007 09:36:31

Figure 17 B Low Band Edge – 4.736 MHz BW



Graph demonstrates compliance at 2300 MHz band edge where the limit -40 dBm/MHz (Attenuation = 70 + 10 log(P). The measured level is -48.61 dBm/MHz

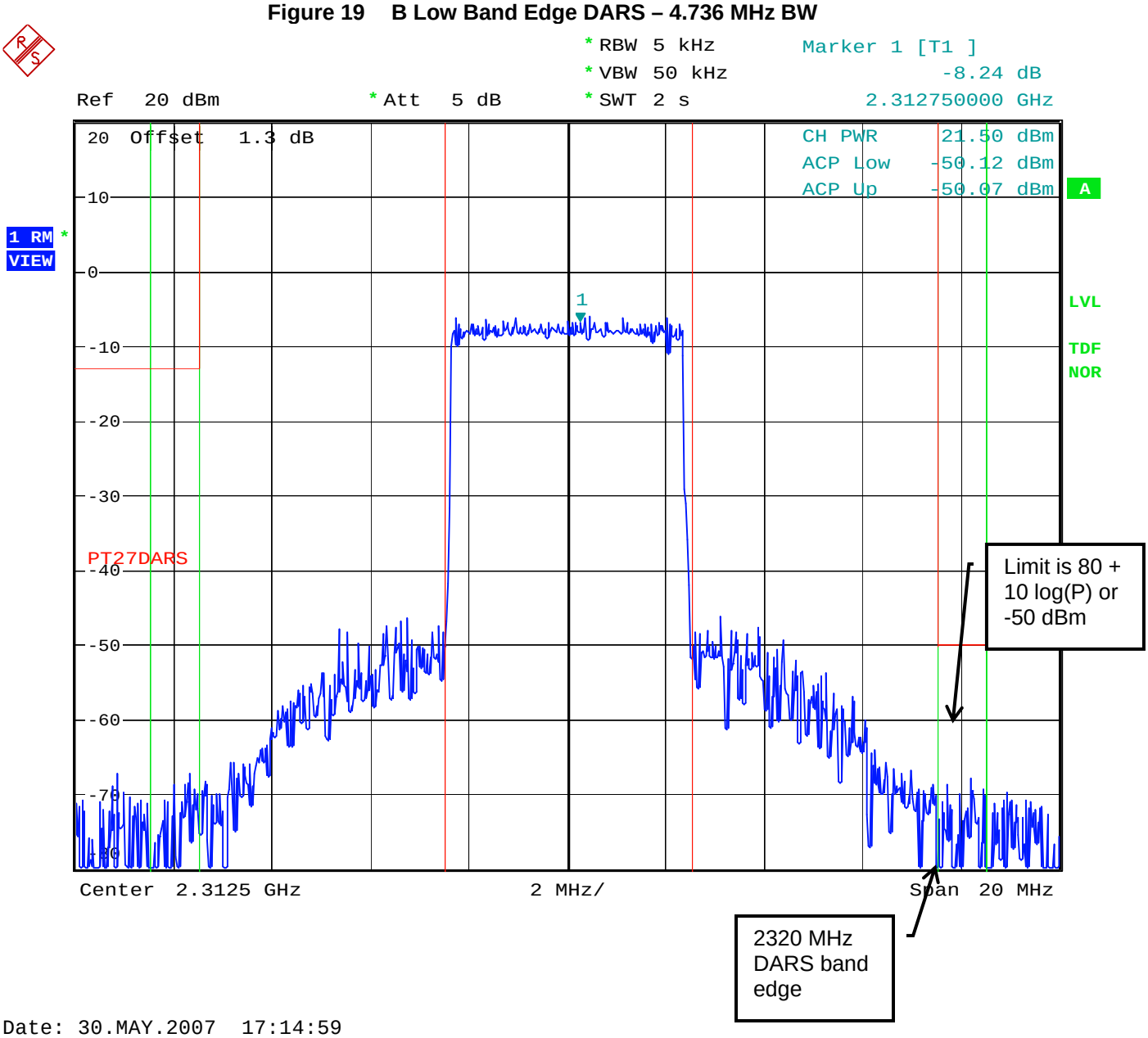
Figure 18 B Low Band Edge – 2.368 MHz BW



Date: 30.MAY.2007 17:56:51

Graph demonstrates compliance at 2300 MHz band edge where the limit -40 dBm/MHz (Attenuation = 70 + 10 log(P). The measured level is -48.61 dBm/MHz

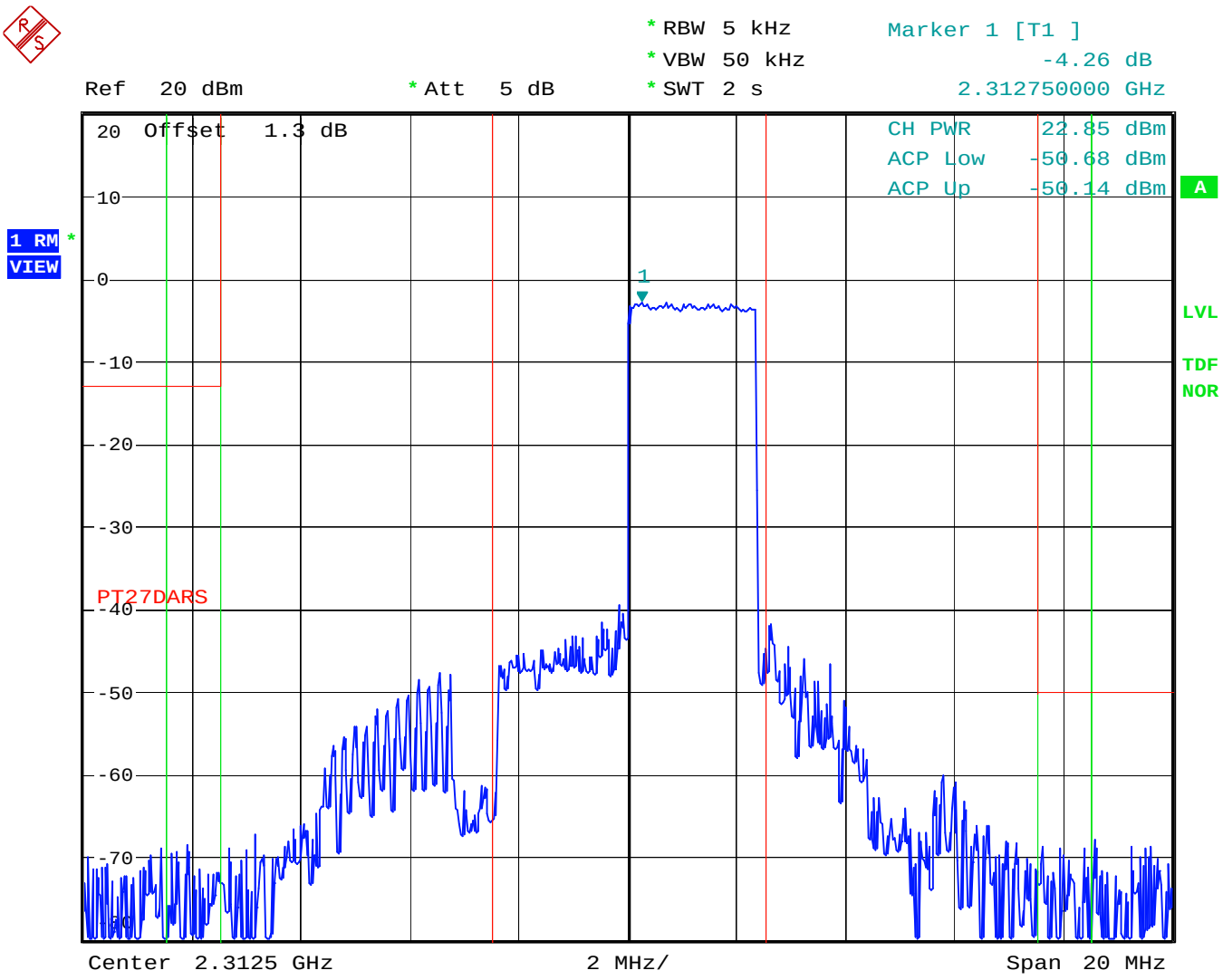
Figure 19 B Low Band Edge DARS – 4.736 MHz BW



Date: 30.MAY.2007 17:14:59

Graph demonstrates compliance at 2320 MHz DARS band edge where the limit -50 dBm/MHz (Attenuation = 80 + 10 log(P). The measured level is -50.07dBm/MHz

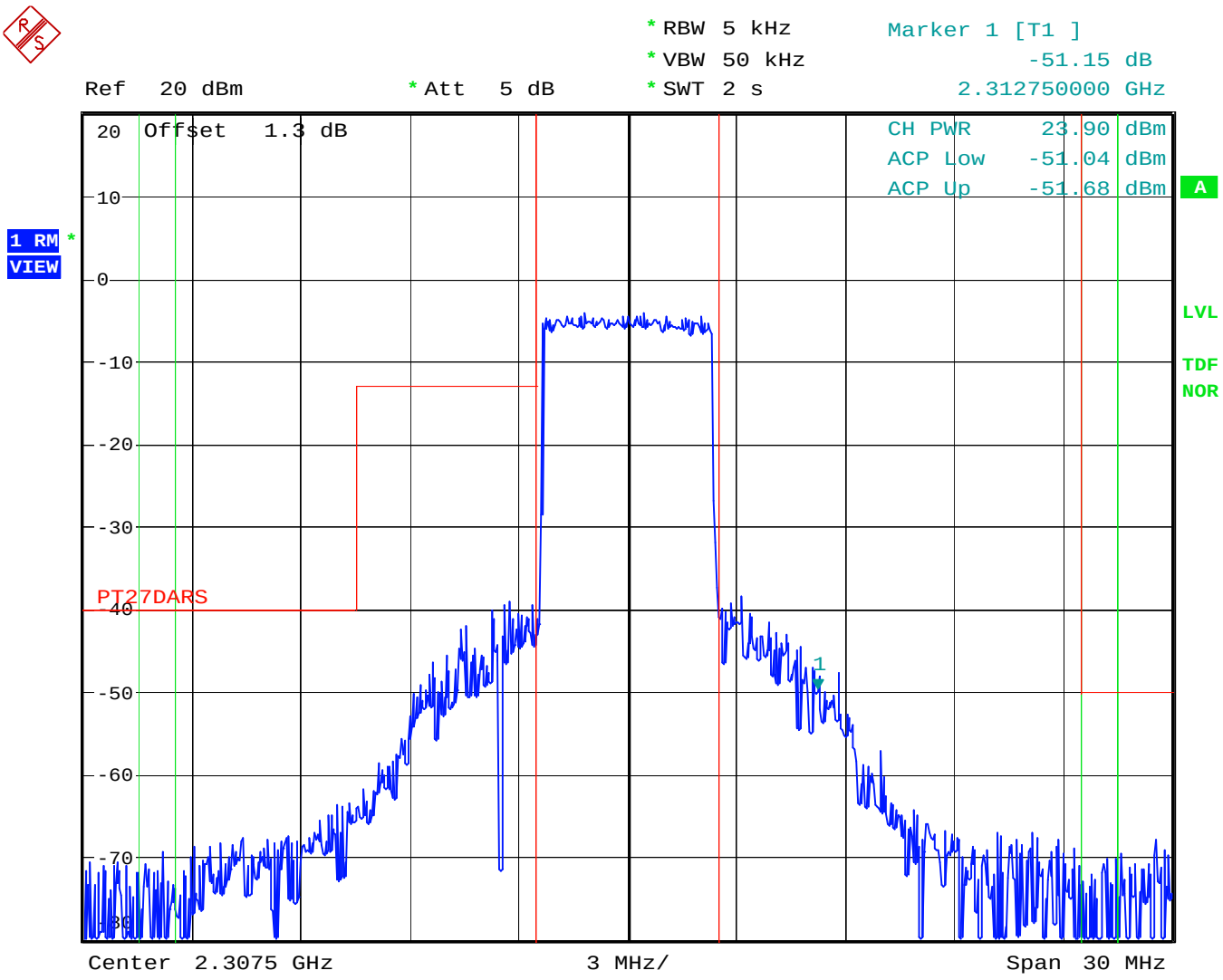
Figure 20 B Low Band Edge DARS – 2.368 MHz BW



Date: 30.MAY.2007 17:52:58

Graph demonstrates compliance at 2320 MHz DARS band edge where the limit -50 dBm/MHz (Attenuation = 80 + 10 log(P). The measured level is -50.14 dBm/MHz

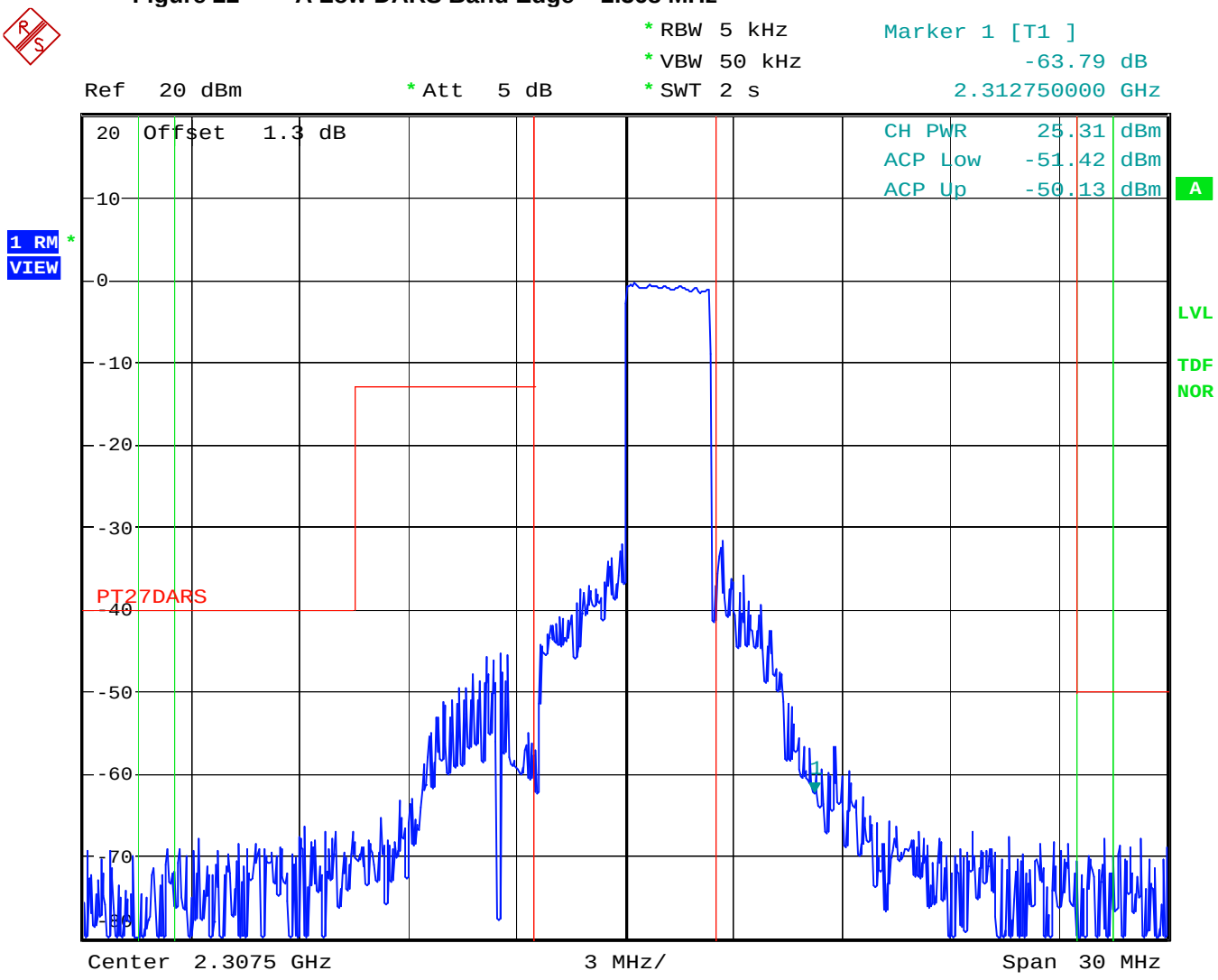
Figure 21 A Low DARS Band Edge – 4.736 MHz



Date: 30.MAY.2007 20:16:16

Graph demonstrates compliance at 2320 MHz DARS band edge where the limit -50 dBm/MHz (Attenuation = 80 + 10 log(P). The measured level is -51.68 dBm/MHz

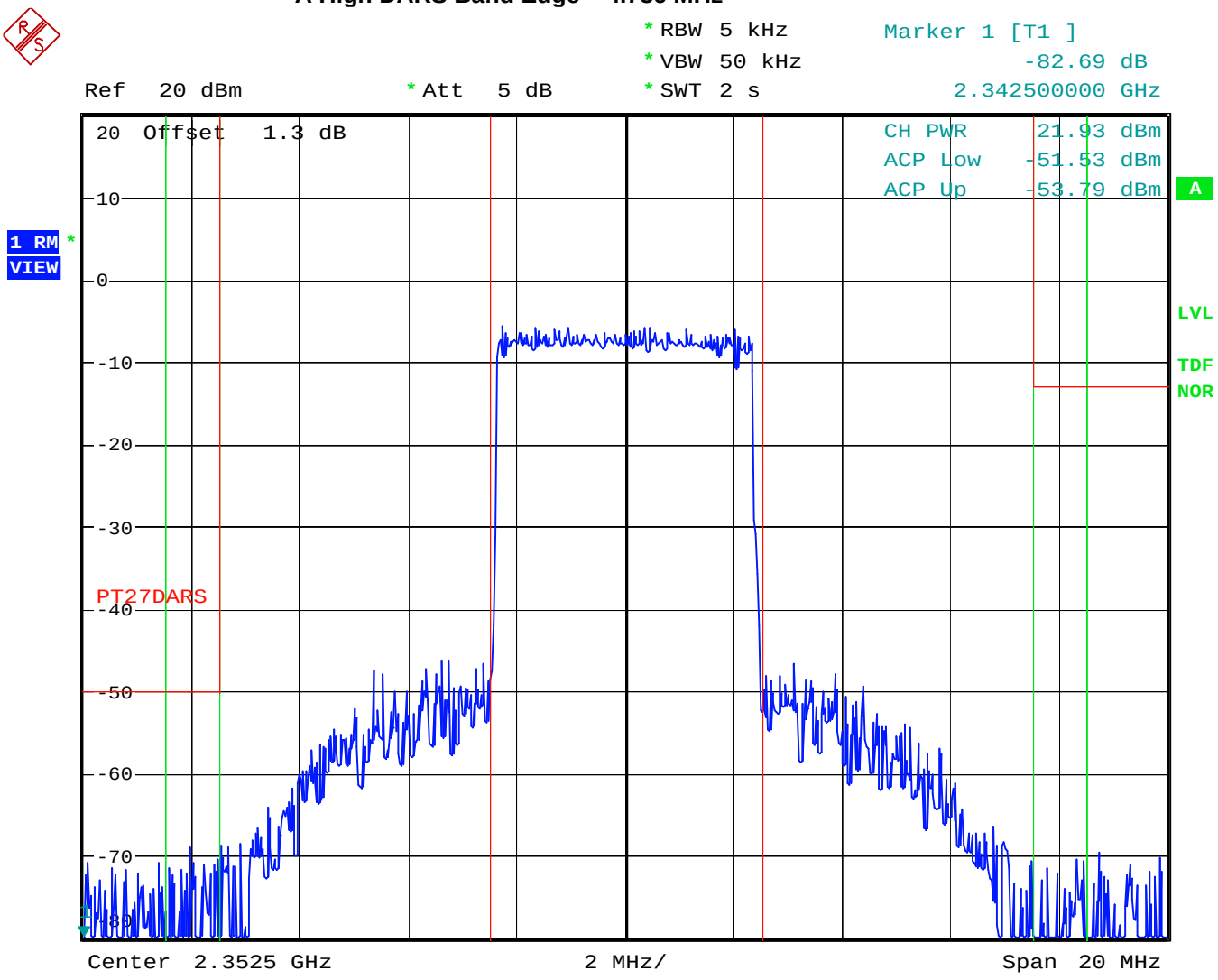
Figure 22 A Low DARS Band Edge – 2.368 MHz



Date: 30.MAY.2007 20:28:33

Graph demonstrates compliance at 2320 MHz DARS band edge where the limit -50 dBm/MHz (Attenuation = 80 + 10 log(P). The measured level is -50.13 dBm/MHz

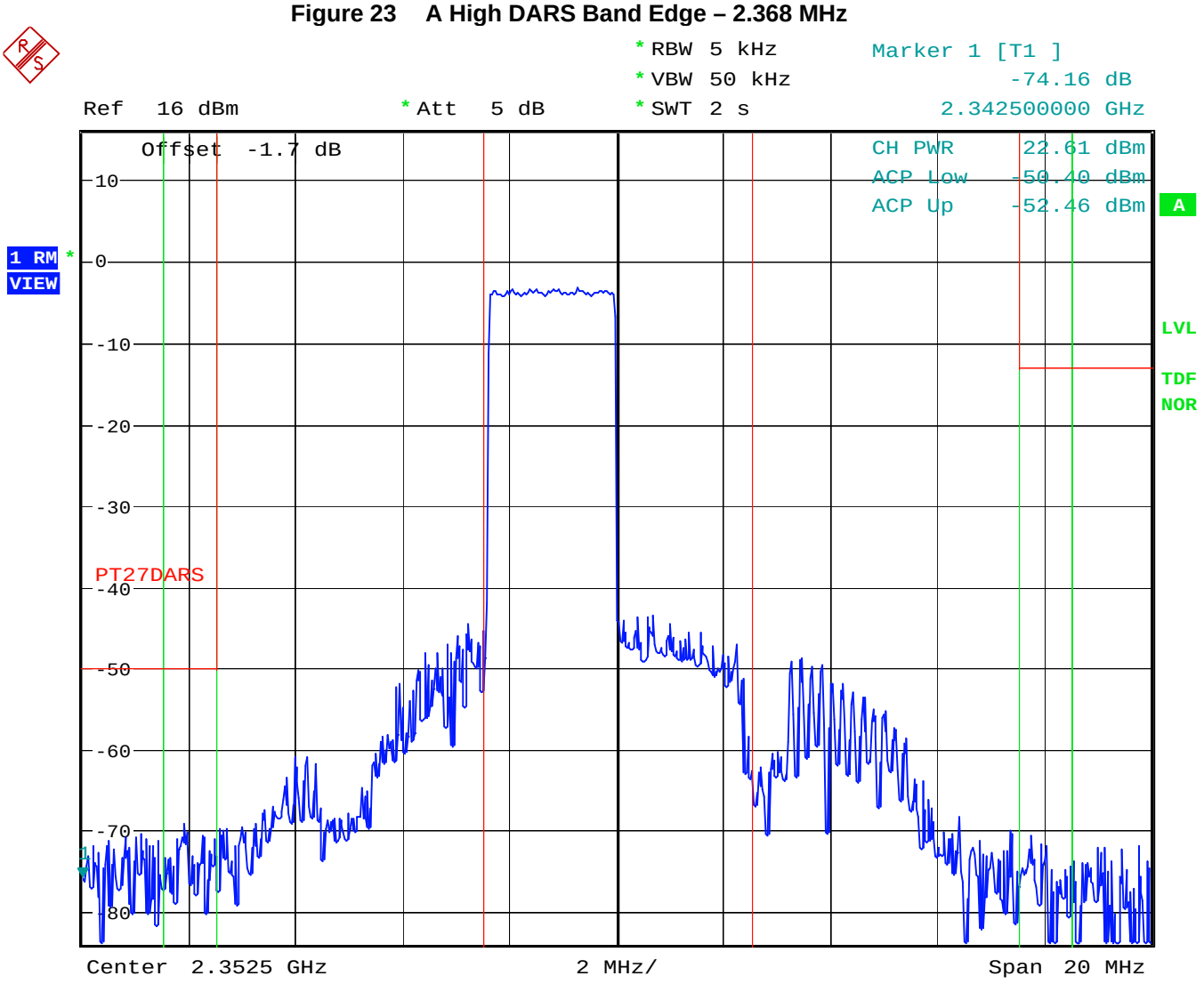
A High DARS Band Edge – 4.736 MHz



Date: 30.MAY.2007 18:10:17

Graph demonstrates compliance at 2345 MHz DARS band edge where the limit -50 dBm/MHz (Attenuation = 80 + 10 log(P). The measured level is -51.53 dBm/MHz

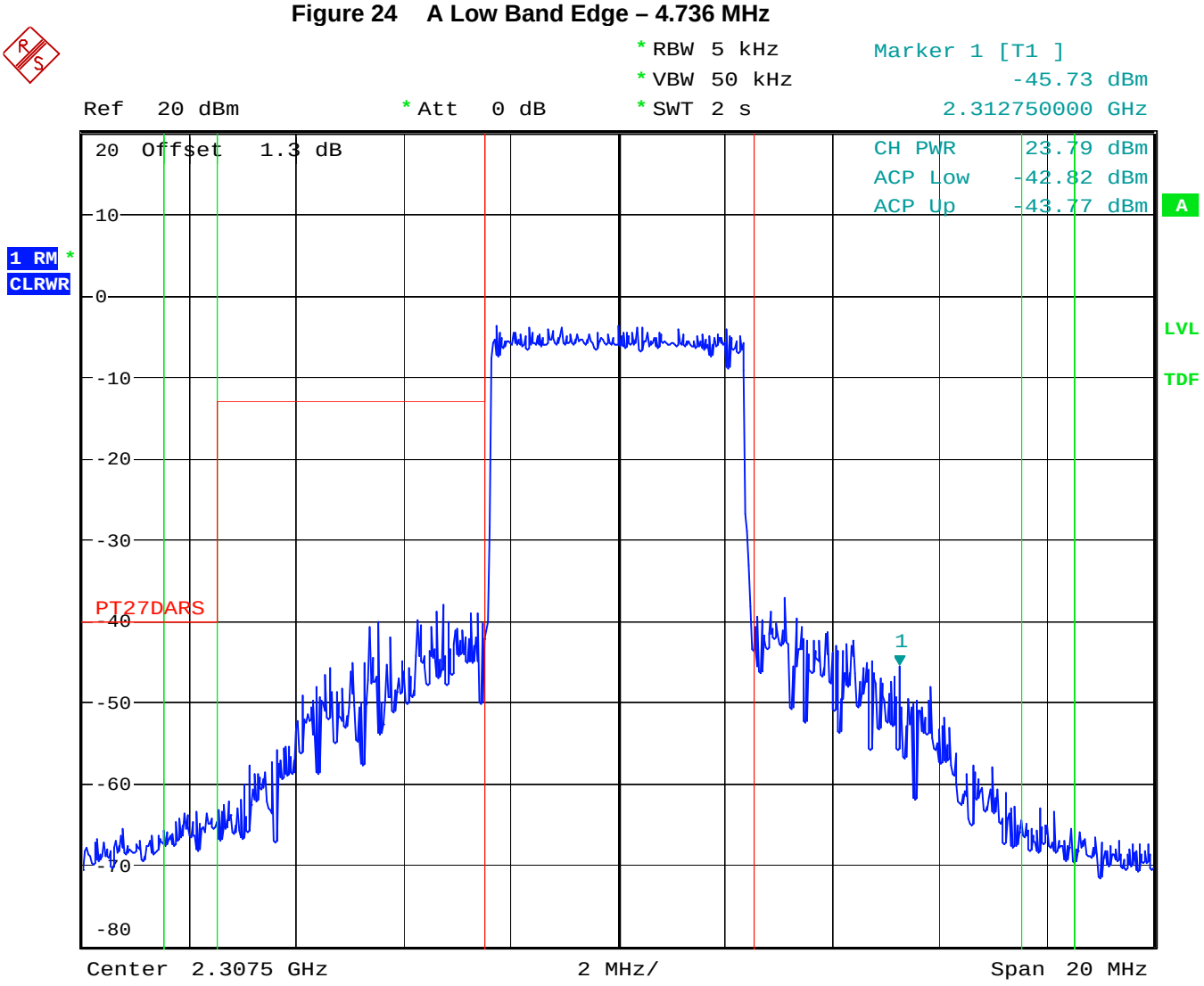
Figure 23 A High DARS Band Edge – 2.368 MHz



Date: 30.MAY.2007 18:30:47

Graph demonstrates compliance at 2345 MHz DARS band edge where the limit -50 dBm/MHz (Attenuation = 80 + 10 log(P). The measured level is -50.40 dBm/MHz

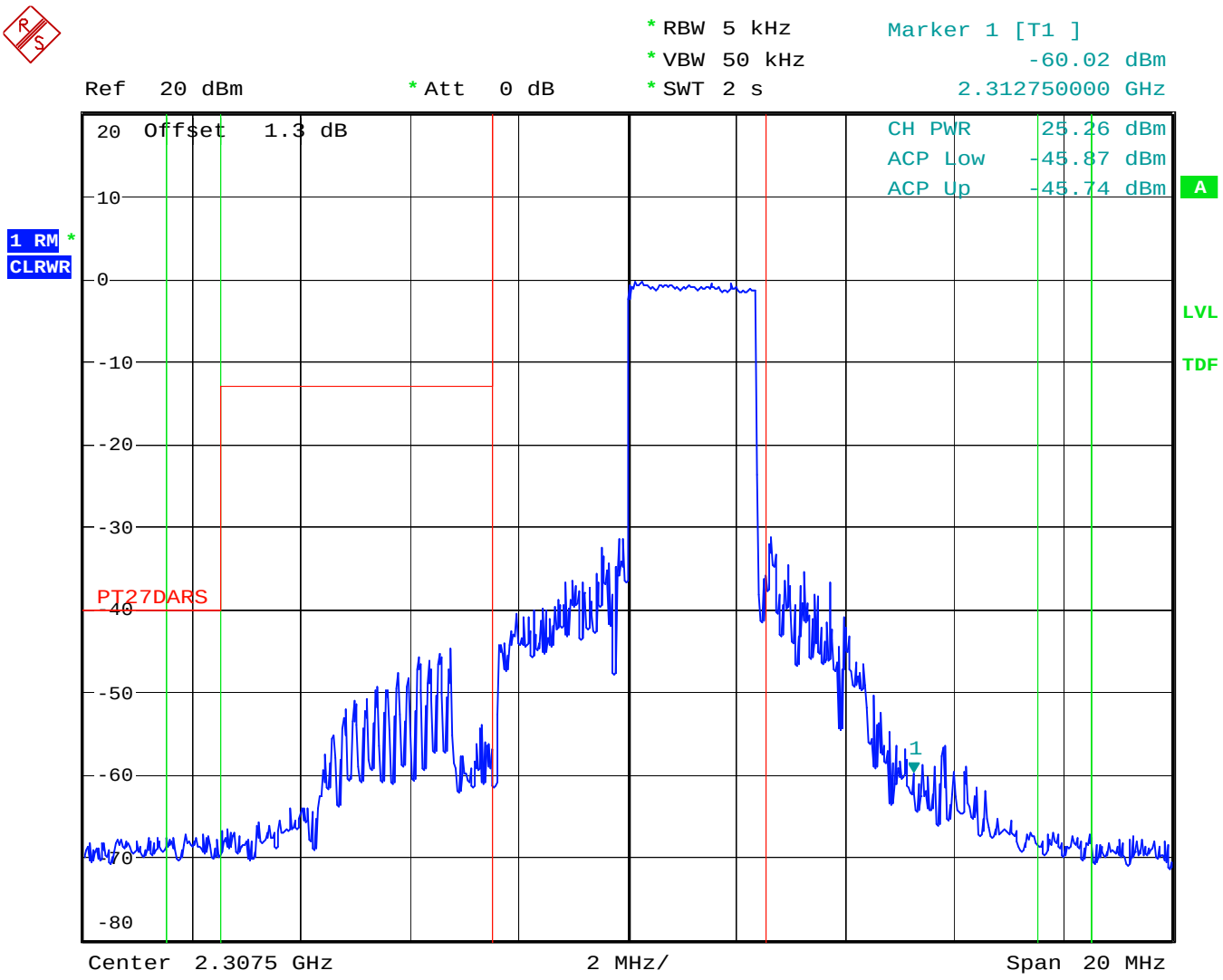
Figure 24 A Low Band Edge – 4.736 MHz



Date: 30.MAY.2007 20:20:05

Graph demonstrates compliance at 2300 MHz lower band edge where the limit is -40 dBm/MHz (Attenuation = 70 + 10 log(P). The measured level is -42.82 dBm/MHz

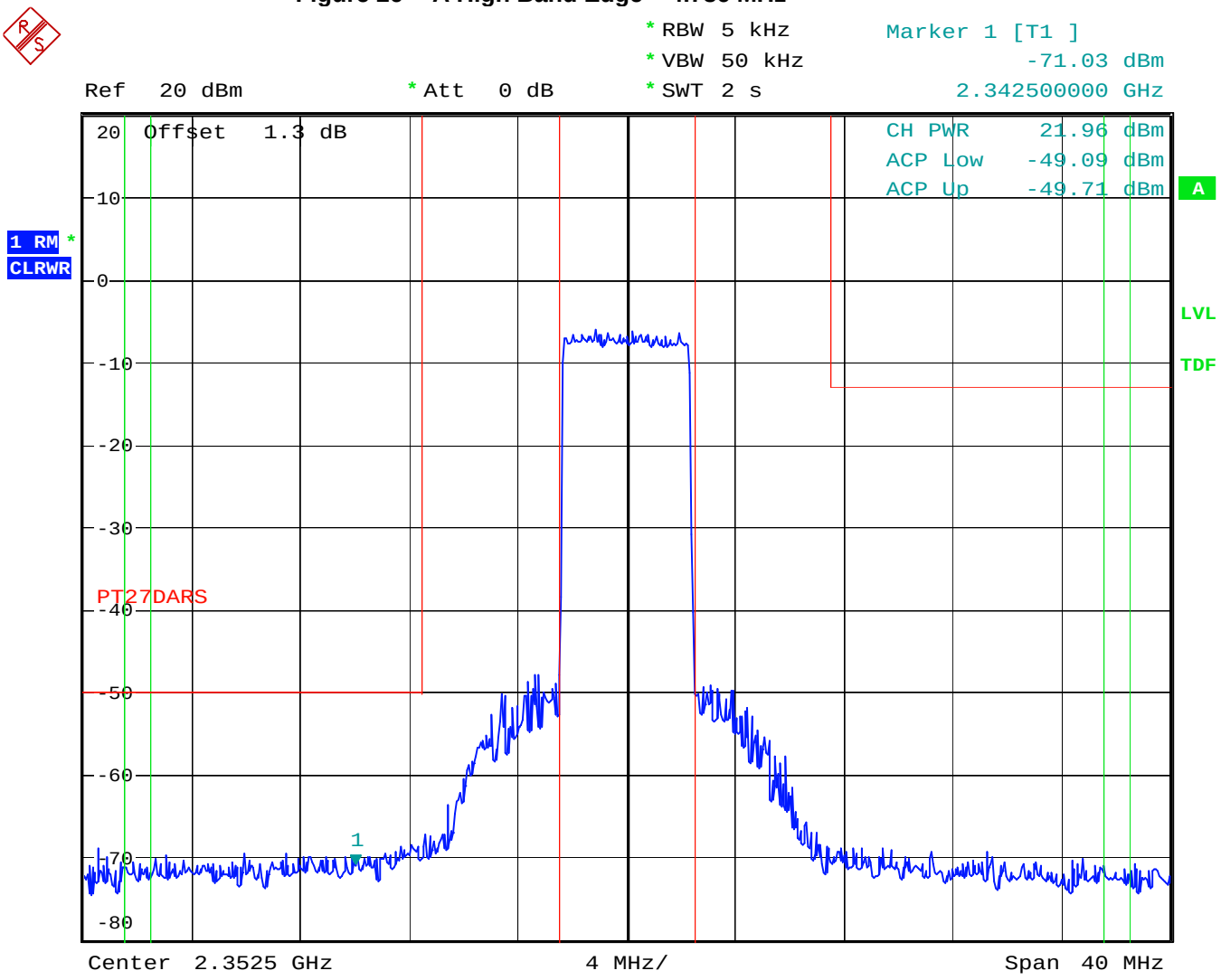
Figure 25 A Low Band Edge – 2.368 MHz



Date: 30.MAY.2007 20:31:14

Graph demonstrates compliance at 2300 MHz lower band edge where the limit is -40 dBm/MHz (Attenuation = 70 + 10 log(P). The measured level is -45.87 dBm/MHz

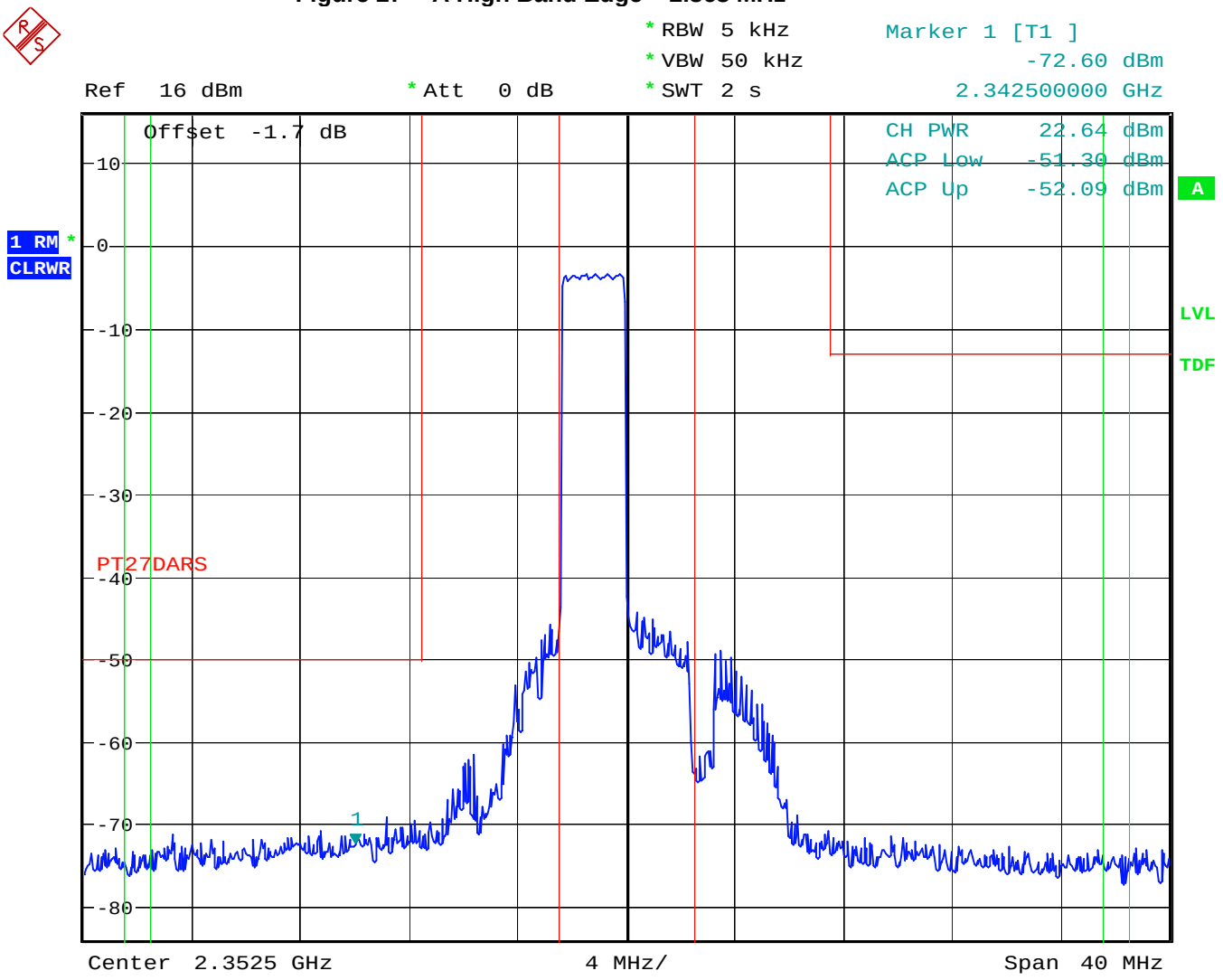
Figure 26 A High Band Edge – 4.736 MHz



Date: 30.MAY.2007 18:11:32

Graph demonstrates compliance at 2370 MHz lower band edge where the limit is -40 dBm/MHz (Attenuation = 70 + 10 log(P). The measured level is -49.71 dBm/MHz

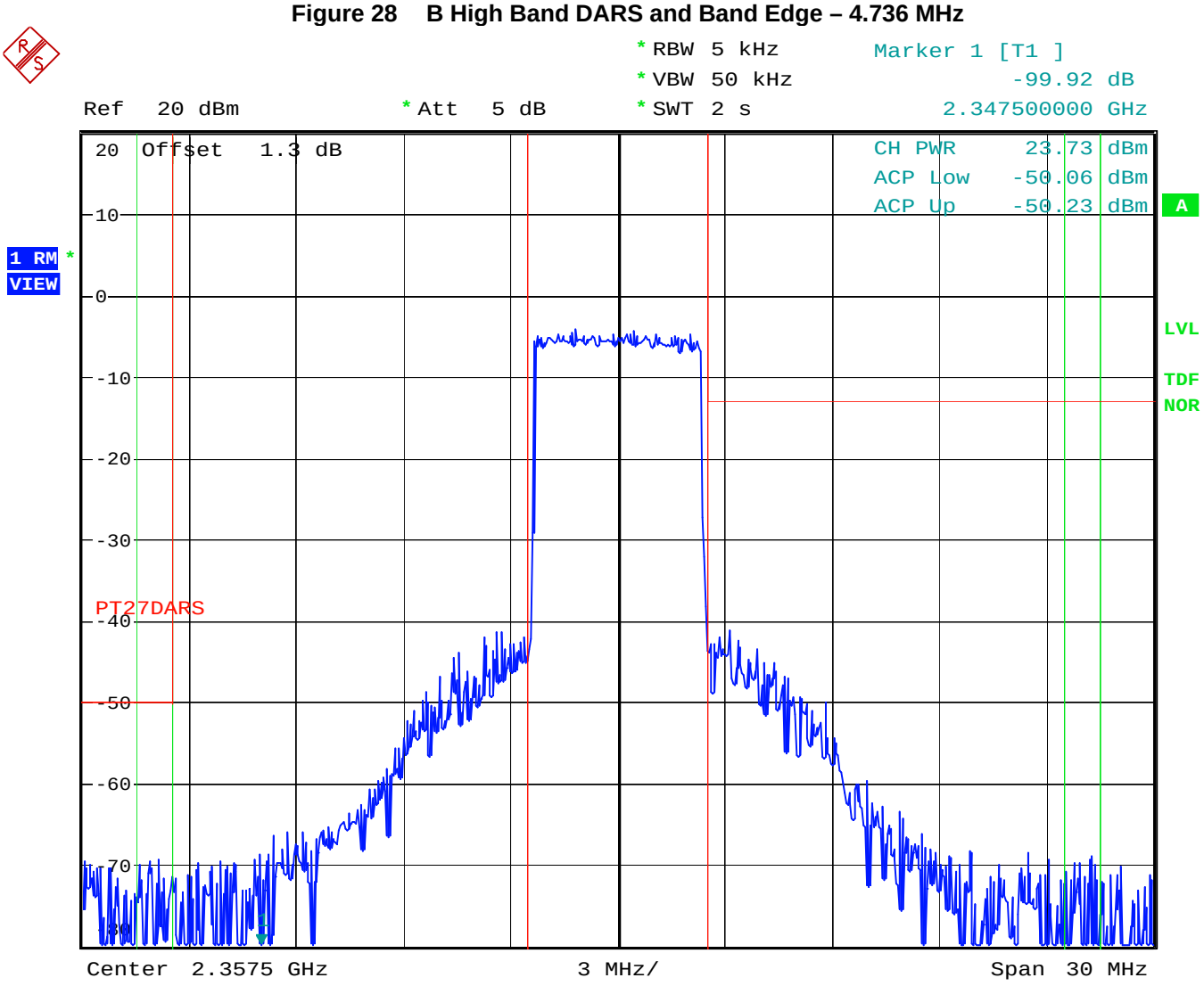
Figure 27 A High Band Edge – 2.368 MHz



Date: 30.MAY.2007 18:31:39

Graph demonstrates compliance at 2370 MHz lower band edge where the limit is -40 dBm/MHz (Attenuation = 70 + 10 log(P). The measured level is -52.09 dBm/MHz

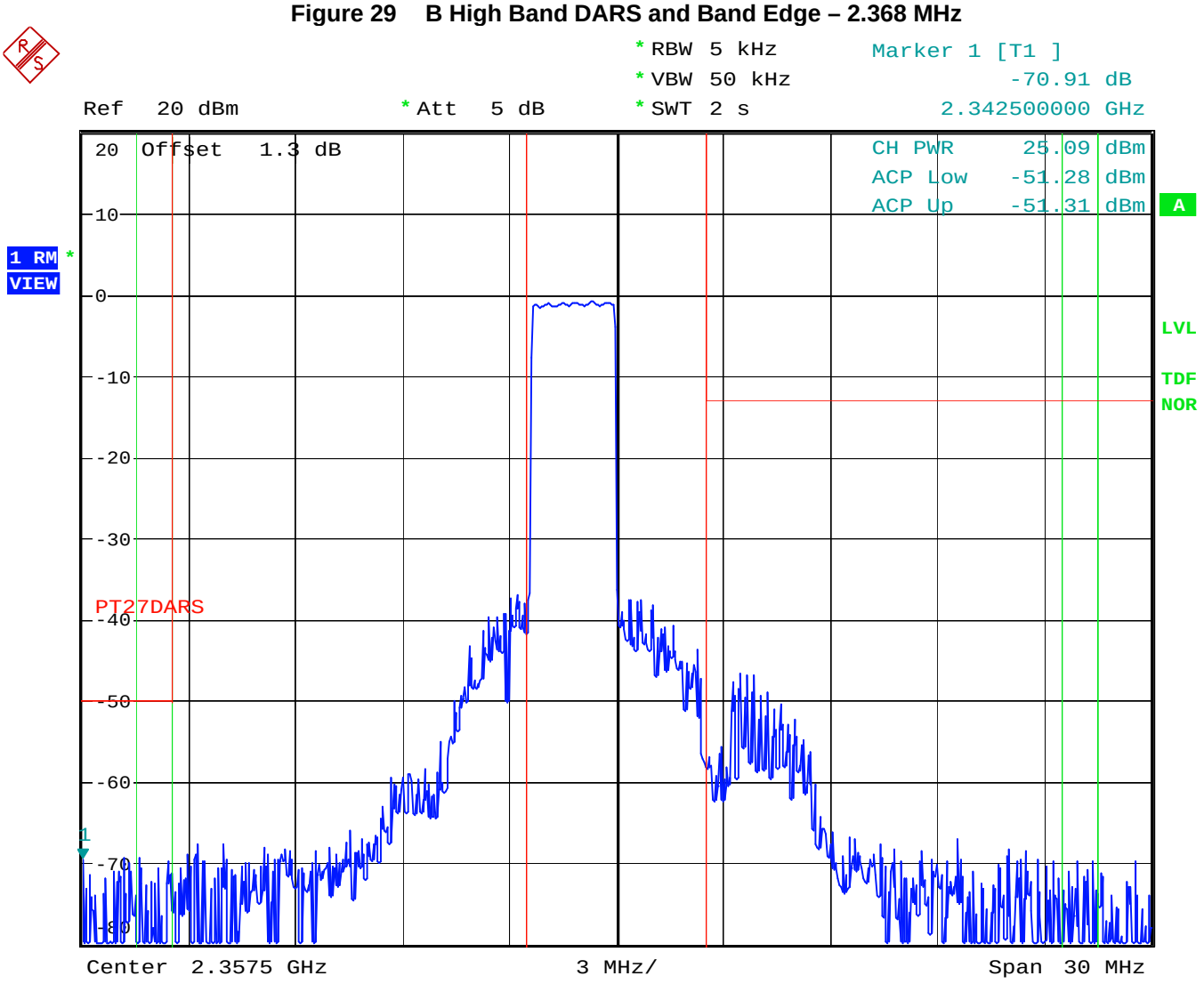
Figure 28 B High Band DARS and Band Edge – 4.736 MHz



Date: 30.MAY.2007 18:40:06

Graph demonstrates compliance at 2345 MHz DARS band edge where the limit -50 dBm/MHz (Attenuation = 80 + 10 log(P). The measured level is -50.06 dBm/MHz.

Figure 29 B High Band DARS and Band Edge – 2.368 MHz



Date: 30.MAY.2007 18:50:44

Graph demonstrates compliance at 2345 MHz DARS band edge where the limit -50 dBm/MHz (Attenuation = 80 + 10 log(P). The measured level is -51.28 dBm/MHz.

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

27.53

(a) For operations in the bands 2305–2320 MHz and 2345–2360 MHz, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by the following amounts:

(1) *For fixed, land, and radiolocation land stations:* By a factor not less than 80 + 10 log (p) dB on all frequencies between 2320 and 2345 MHz;

(2) *For mobile and radiolocation mobile stations:* By a factor not less than 110 + 10 log (p) dB on all frequencies between 2320 and 2345 MHz;

(3) *For fixed, land, mobile, radiolocation land and radiolocation mobile stations:* By a factor not less than 70 + 10 log (p) dB on all frequencies below 2300 MHz and on all frequencies above 2370 MHz; and not less than 43 + 10 log (p) dB on all frequencies between 2300 and 2320 MHz and on all frequencies between 2345 and 2370 MHz that are outside the licensed bands of operation;

(4) Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or less, but at least one percent of the emission bandwidth of the fundamental emission of the transmitter, provided the measured energy is integrated over a 1 MHz bandwidth;

(5) In complying with the requirements in §27.53(a)(1) and §27.53(a)(2), WCS equipment that uses opposite sense circular polarization from that used by Satellite DARS systems in the 2320–2345 MHz band shall be permitted an allowance of 10 dB;

(6) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the edges, both upper and lower, of the licensee's bands of operation as the design permits;

(7) The measurements of emission power can be expressed in peak or average values, provided they are expressed in the same parameters as the transmitter power;

E.3. Test Results

Compliant. The worst-case spurious emission level was -52.6 dBm at 4615 MHz. This level is 12.6 dB below the specification limit of -40 dBm. The spectrum was searched from 30 MHz up to 26.5 GHz.

E.4. Deviations from Normal Operating Mode During Test

None.

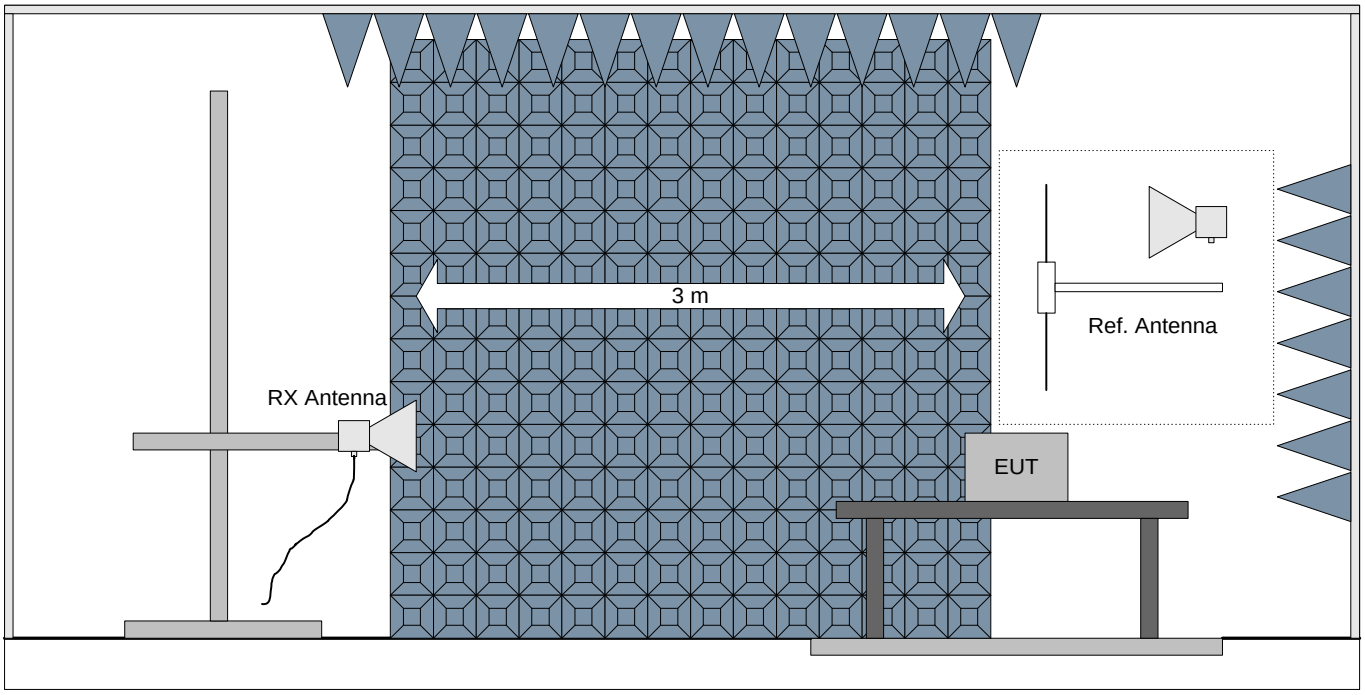
E.5. Sample Calculation

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

Minimum attenuation limit (dB) = 70 + 10 log(P) where P = Peak power of the carrier in watts.

70 + 10 log(P)
70 + 10 log(1.5)
70 + 10 * 0.176
70 + 1.8 = 71.8 dB
31.8 dBm – 71.8 dB = -40 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.

E.7. Test Data

Project No:	Navini Networks W7245
Model:	2.3 GHz Surfer
Comments:	Transmit at full rf output power (2 watts average, 20 watts pk.)
Date:	31 May, 2007

Distance:	3 m	Standard:	CFR 47, Part 2.1043	RBW: 1 MHz VBW: 10Hz

Antenna	Polarization	Frequency	Measured	Substitution Level	Substitution Antenna Gain	Final Measured Value		Peak Carrier Power		Minimum Attenuation Limit	Margin
	(V/H)	(MHz)	(dBm)	(dBm)	(dBi)	(dBm)	(watts)	(dBm)	(watts)	(dBc)	(dB)
Ref. E1019	V	4628	-137	-63.64	8.73	-54.9	3.23E-09	31.8	1.5	71.8	14.9
Ref. E1019	H	4628	-138.7	-65.34	8.73	-56.6	2.18E-09	31.8	1.5	71.8	16.6
Ref. E1019	V	6941	-135.5	-64.01	9.94	-54.1	3.91E-09	31.8	1.5	71.8	14.1
Ref. E1019	H	6941	-135.5	-64.01	9.94	-54.1	3.91E-09	31.8	1.5	71.8	14.1
Ref. E1019	V	9255	-138	-68.19	9.49	-58.7	1.35E-09	31.8	1.5	71.8	18.7
Ref. E1019	H	9255	-138	-68.19	9.49	-58.7	1.35E-09	31.8	1.5	71.8	18.7
Ref. E1019	V	11569	-137.4	-69.32	10.59	-58.7	1.34E-09	31.8	1.5	71.8	18.7
Ref. E1019	H	11569	-137.4	-69.32	10.59	-58.7	1.34E-09	31.8	1.5	71.8	18.7
Ref. E1019	V	13883	-137.4	-71.38	10.09	-61.3	7.44E-10	31.8	1.5	71.8	21.3
Ref. E1019	H	13883	-137.4	-71.38	10.09	-61.3	7.44E-10	31.8	1.5	71.8	21.3
Ref. E1019	V	16196.00	-134.0	-68.92	15.01	-53.9	4.06E-09	31.8	1.5	71.8	13.9
Ref. E1019	H	16196.00	-134.0	-68.92	15.01	-53.9	4.06E-09	31.8	1.5	71.8	13.9

Notes:
(1) A positive margin indicates a passing result
(2) Spurious emissions were measured with average detection and compared to the maximum average fundamental power of 2 watts.
(3) The minimum threshold of sensitivity was sufficient to detect signals within 10 dB of the -40 dBm limit over the frequency range 30 MHz - 26 GHz.

E.8. Test Photo

Removed for Confidentiality

E.9. Tested By

Name: Tom Tidwell,
Function: Manager of Wireless Services

APPENDIX F: 2.1055 FREQUENCY STABILITY

F.1. Base Standard & Test Basis

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

Specifications

27.54 Frequency Stability

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

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

F.4. Observations

The radio ceased transmission when the ambient temperature was below 5 degrees Celsius or above 40 degrees Celsius. The transmit frequency is stable at all times during transmission as demonstrated by the attached data.

F.5. Deviations from Normal Operating Mode During Test

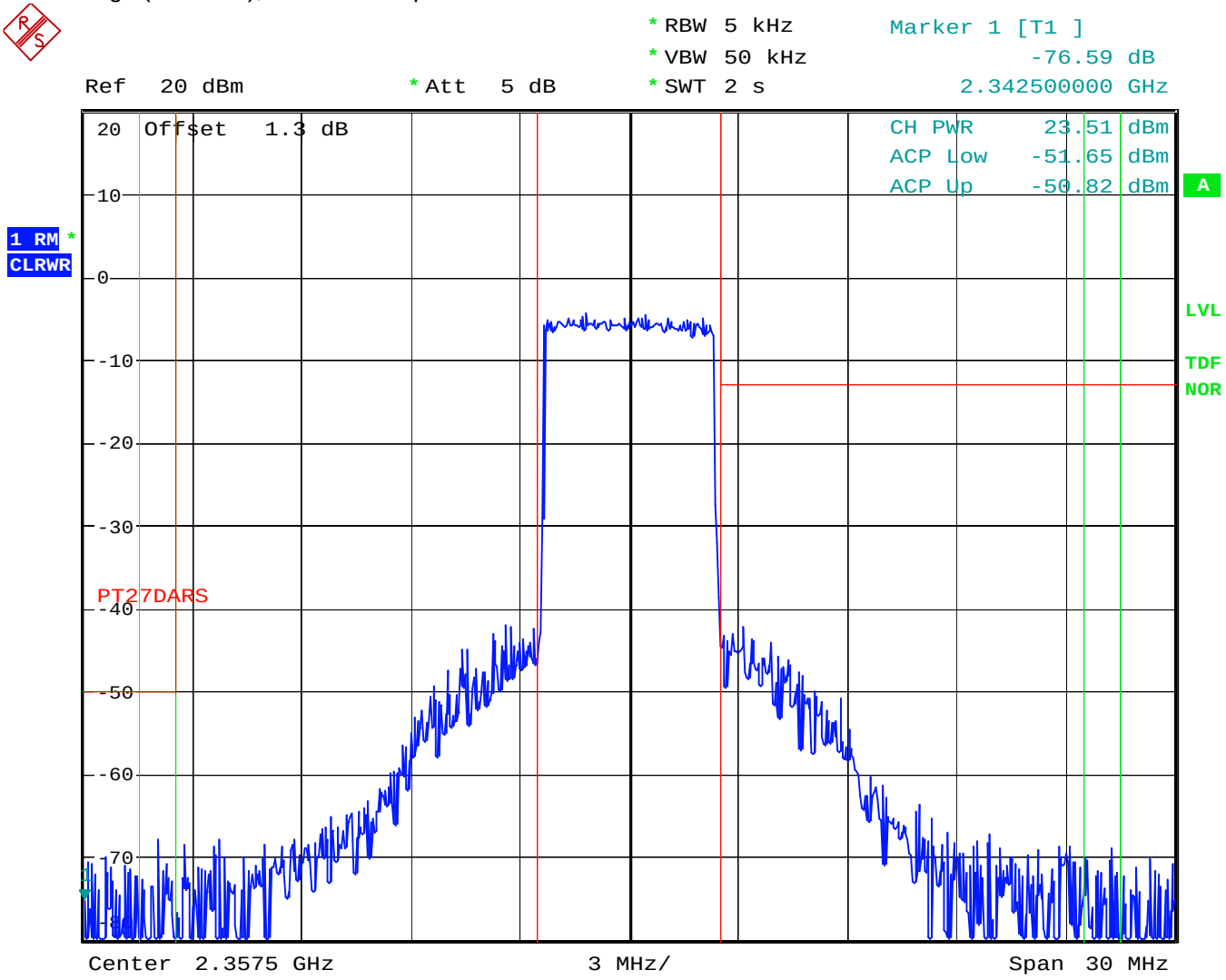
None.

F.6. Sample Calculation

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

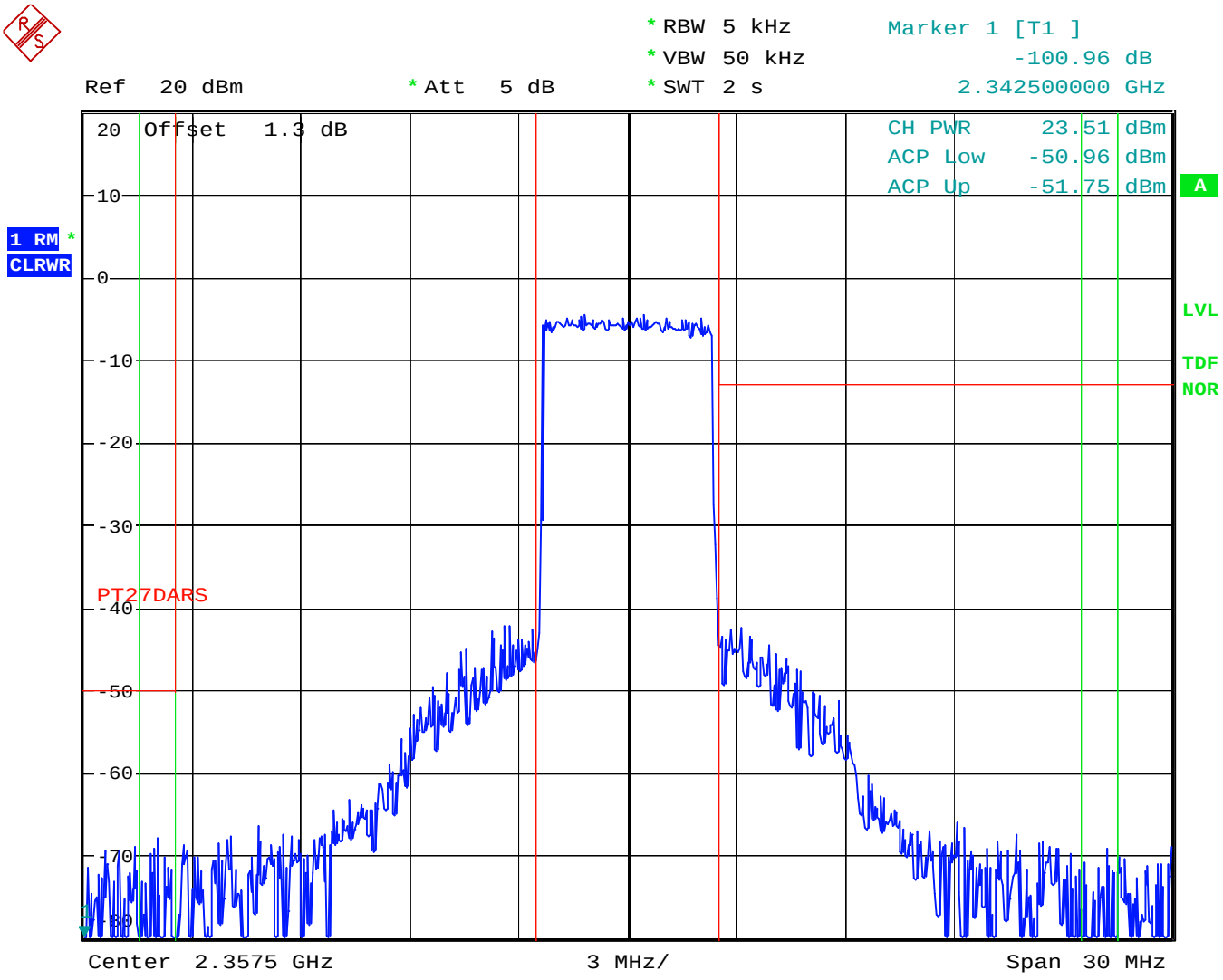
F.7. Test Data

Low Voltage (102 VAC), Ambient Temperature



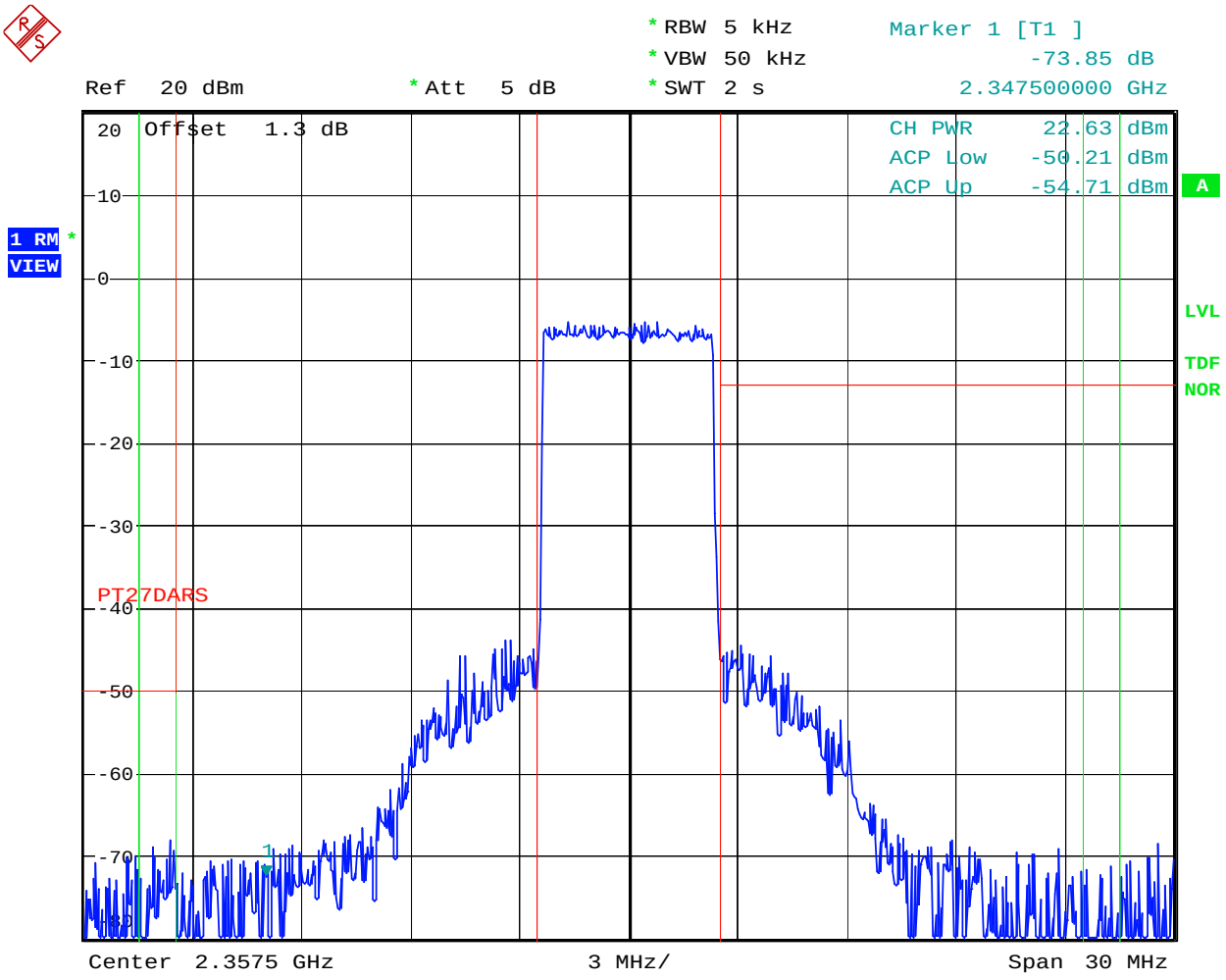
Date: 30.MAY.2007 20:49:42

High Voltage (138 VAC), Ambient Temperature



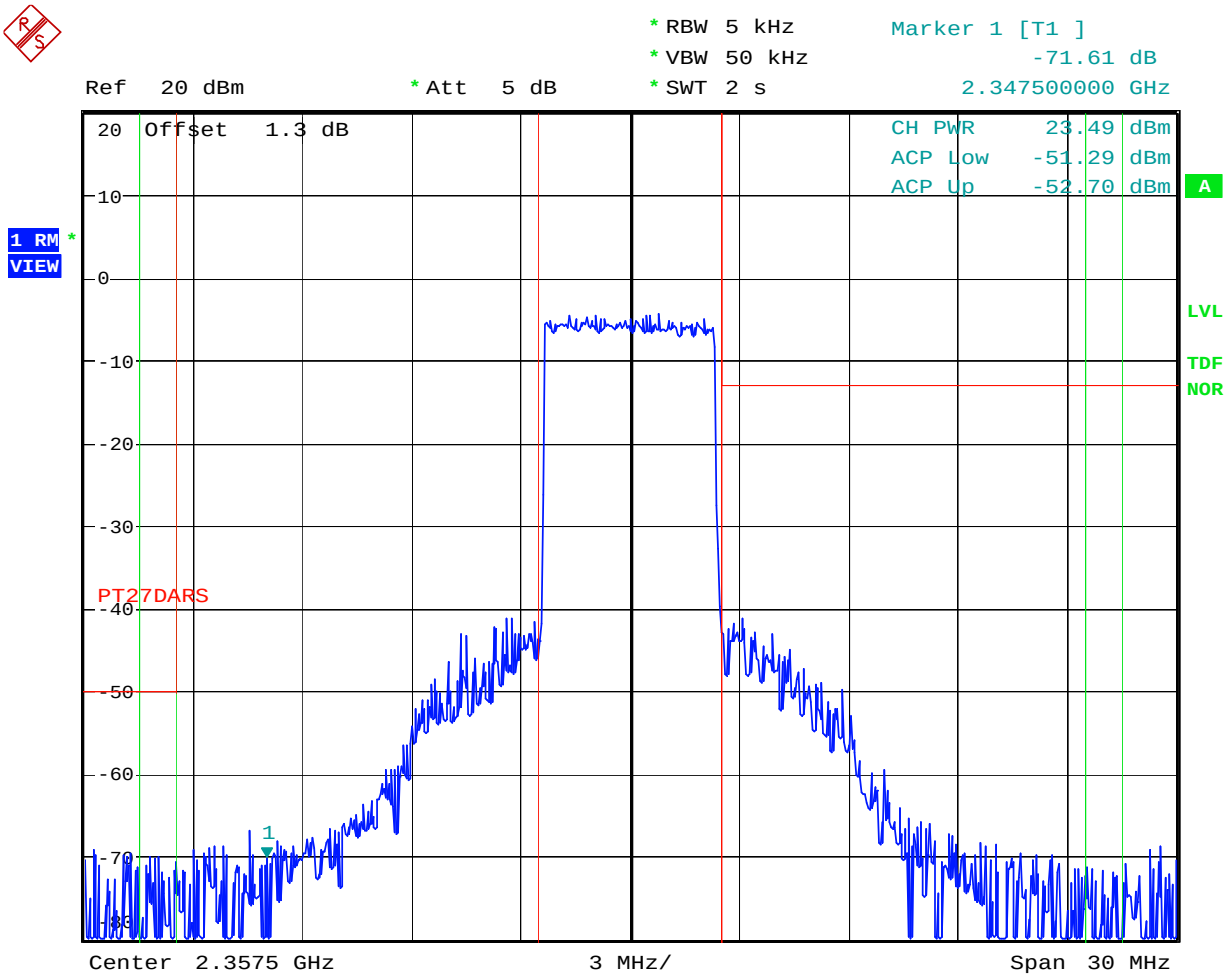
Date: 30.MAY.2007 20:48:38

Normal Voltage (115 VAC), 40 degree C Temperature



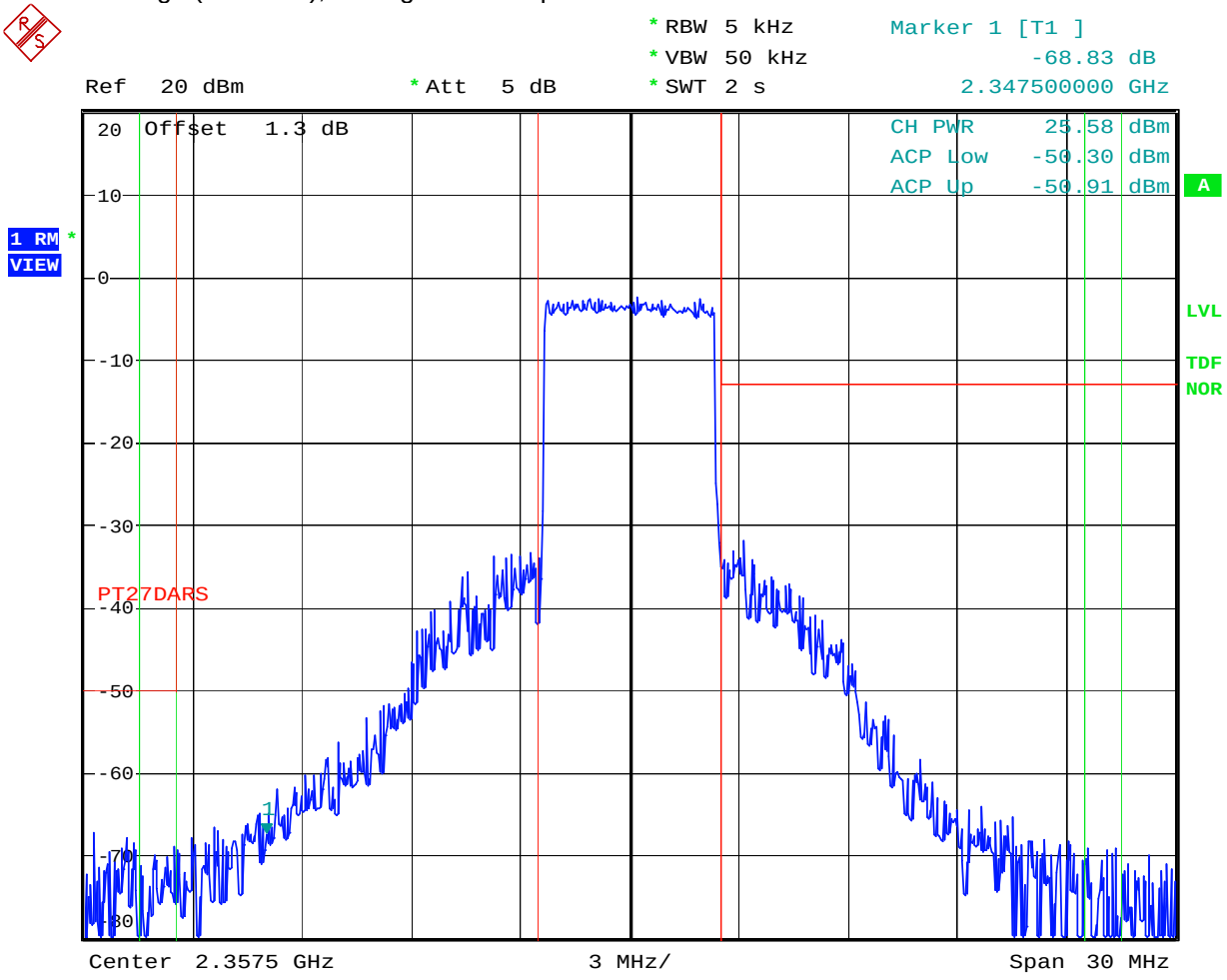
Date: 1.JUN.2007 19:13:52

Normal Voltage (115 VAC), 30 degree C Temperature



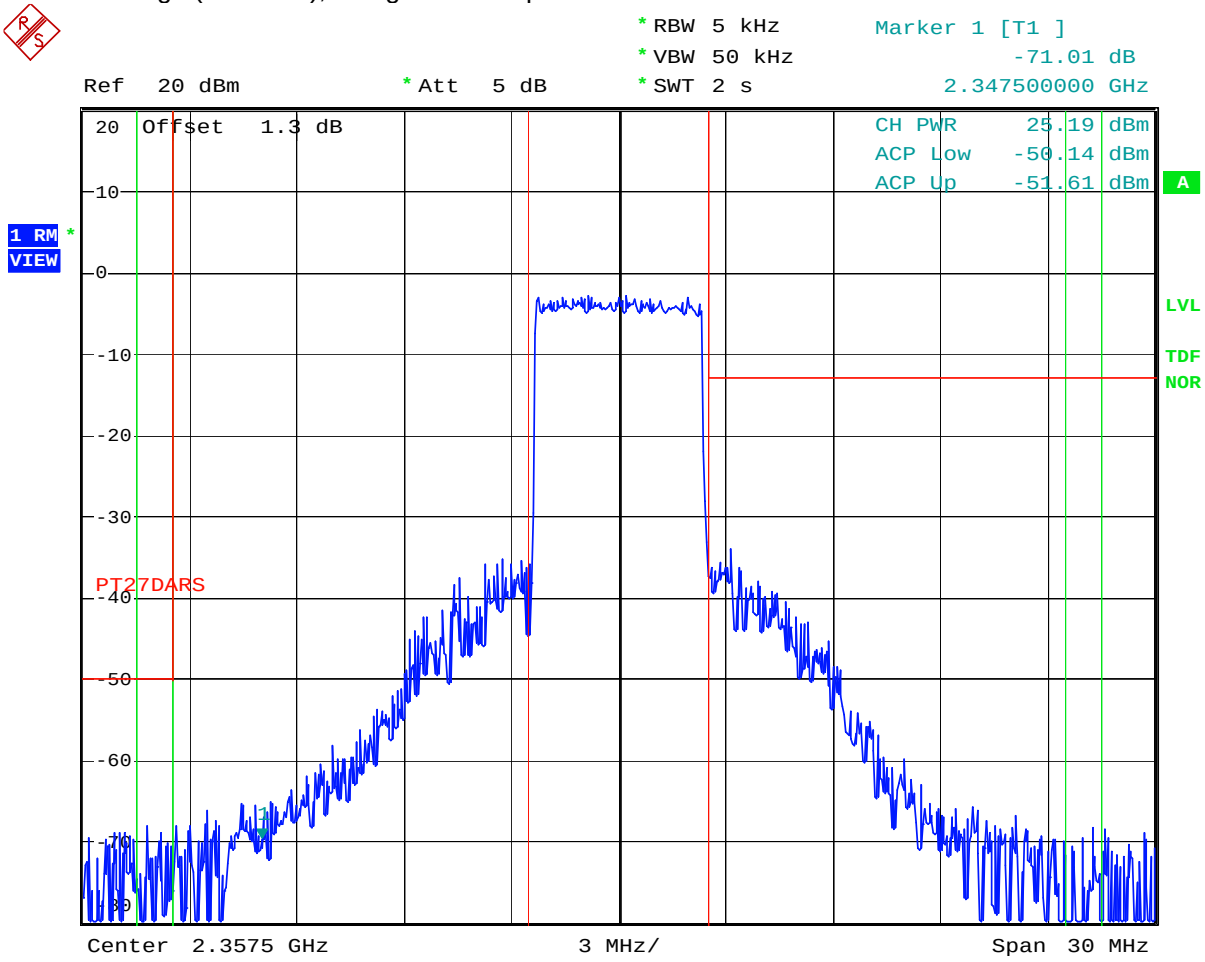
Date: 1.JUN.2007 19:34:49

Normal Voltage (115 VAC), 10 degree C Temperature



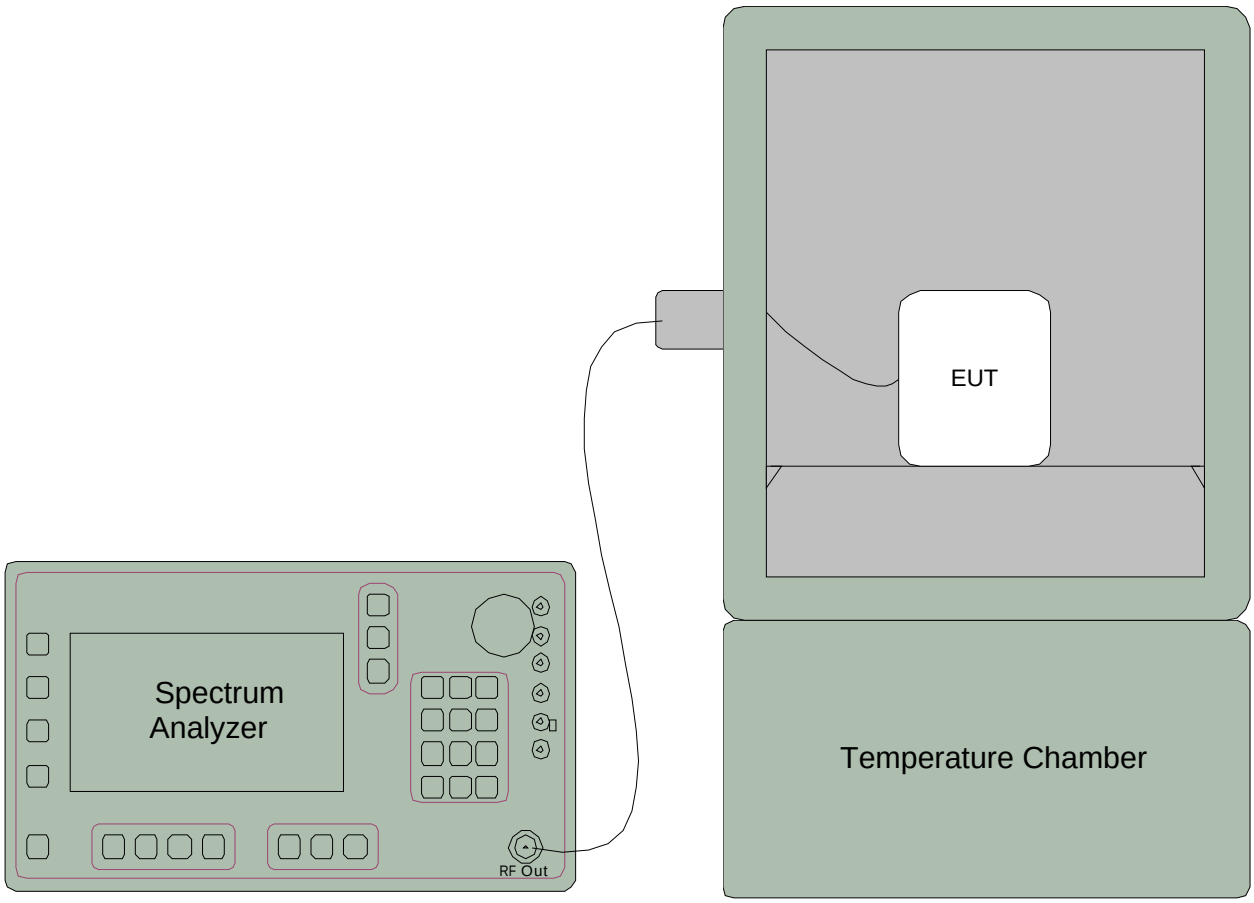
Date: 1.JUN.2007 19:49:20

Normal Voltage (115 VAC), 5 degree C Temperature



Date: 1.JUN.2007 19:56:20

F.8. Test Diagram



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	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	6/30/08	E1010P

G.2. Antenna Conducted Emissions Measurement Equipment

Instrument	Manufacturer	Model	Calibration Frequency	Calibration Due	NTS Control No.
Spectrum Analyzer	Rohde & Schwarz	FSQ 26	12 Months	9/21/07	W1020P
High Frequency Cable	MegaPhase	TM26-3135-144	12 Months	8/23/07	W1010P
Attenuator - 3 dB	Inmet	26A-3	12 Months	9/9/07	W1016P
Attenuator - 3 dB	Inmet	26A-3	12 Months	9/9/07	W1017P
Attenuator - 10 dB	Wiltron	43KC-10	12 Months	9/9/07	W1018P
Attenuator - 20 dB	Inmet	26A-10	12 Months	9/9/07	W1019P

*This device was not used for calibrated measurements.

END OF DOCUMENT