

Intertek ETL SEMKO

10/25/05

Mr. Dave Oswill
Millennial Net, Inc.
2 Fourth Avenue
Burlington, MA 01803

Mr. Dave Oswill:

Enclosed you will find our EMI Test Report covering testing on your MG-5424. Testing was performed from 09/23/05 to 10/14/05

If there are any questions regarding this report, please contact the undersigned or your account representative.

Sincerely,



Nicholas Abbondante
Project Engineer



Jeff Goulet
Engineering Team Leader, EMC

Enclosure

EMISSIONS TEST REPORT

Report Number: 3084056BOX.002

Project Number: 3084056

**Testing performed on the
Gateway
Model: MG-5424**

to

FCC Part 15 Subpart C 15.247

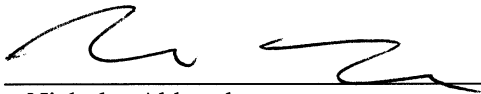
For

Millennial Net, Inc.

Test Performed by:
Intertek – ETL SEMKO
70 Codman Hill Road
Boxborough, MA 01719

Test Authorized by:
Millennial Net, Inc.
2 Fourth Avenue
Burlington, MA 01803

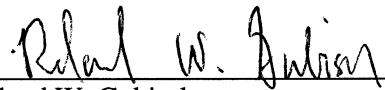
Prepared by:


Nicholas Abbondante

Date:

10/11/05

Reviewed by:


Roland W. Gubisch

Date:

10-13-05

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1.0 Job Description

1.1 Client Information

This EUT has been tested at the request of

Company: Millennial Net, Inc.
2 Fourth Avenue
Burlington, MA 01803
Contact: Dave Oswill
Telephone: 781-222-1030
Fax: 781-222-1039

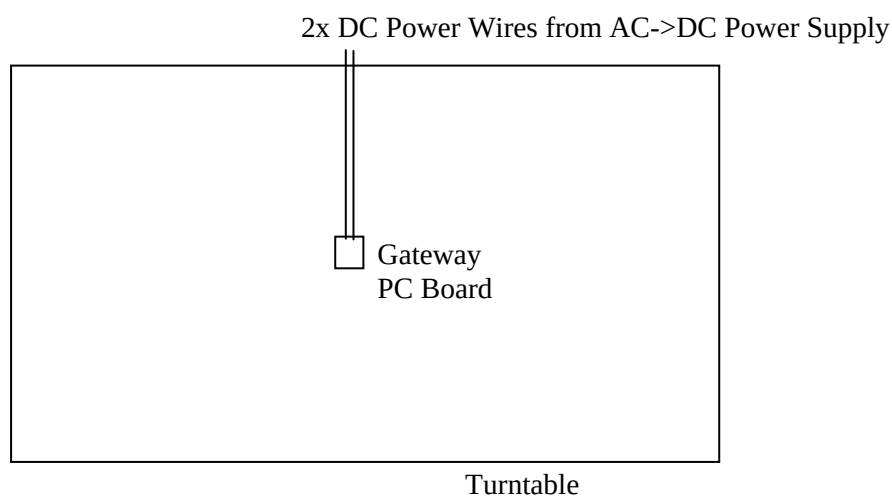
1.2 Equipment Under Test

Equipment Type: Gateway
Model Number(s): MG-5424
Serial number(s): 405330180, 405330110
Manufacturer: Millennial Net, Inc.
EUT receive date: 9/26/2005
EUT received condition: Good
Test start date: 9/26/2005
Test end date: 10/14/2005

1.3 Test Plan Reference: Tested according to the standards listed and ANSI C63.4:2003

1.4 Test Configuration

1.4.1 Block Diagram



1.4.2 Cable List:

Cable	Shielding	Connector	Length (m)	Qty.
DC Power	None	Wire	2	1

1.4.3 Support Equipment:

Name: UNIFIVE AC-DC Power Supply
Model No.: UL305-3315
Serial No.: 408-0021815

1.5 Mode of Operation:

The EUT was operated as a module, with 3.0VDC power applied from a power supply running at 120V/60Hz AC power. The EUT was transmitting continuously throughout testing.

2.0 Test Summary

TEST STANDARD	RESULTS	
FCC Part 15 Subpart C 15.247		
SUB-TEST	TEST PARAMETER	COMMENT
Occupied Bandwidth FCC 15.247(a)(2)	The 6 dB bandwidth must be at least 500 kHz.	Pass
Maximum Peak Conducted Output Power and Human RF Exposure FCC 15.247(b)(3-5)	The output power must not exceed 1 Watt (30 dBm) and 36 dBm EIRP. The human RF Exposure limit is 1 mW/cm ² .	Pass
Antenna Port Conducted Spurious Emissions FCC 15.209, 15.247(d)	The spurious emissions must be attenuated below the level of the fundamental by at least 20 dBc.	Pass
Radiated Spurious Emissions FCC 15.205, 15.209, 15.247(d)	The spurious emissions must be attenuated below the level of the fundamental by at least 20 dBc. Emissions which fall in the restricted bands must meet the general limits of 15.209.	Pass
Peak Power Spectral Density FCC 15.247(e)	The peak power spectral density must not exceed 8 dBm / 3 kHz.	Pass
Band Edge Compliance FCC 15.215	The fundamental frequency must stay within the assigned frequency band.	Pass
AC Line-Conducted Emissions FCC 15.207	The AC line-conducted emissions must not exceed the limits of 15.207.	Pass

Notes: The EUT was tested as a module.

The channels selected for test were channels 11, 18, and 26.

Channel 11: 2405 MHz

Channel 18: 2440 MHz

Channel 26: 2480 MHz

3.0 Sample Calculations

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

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

Where
 FS = Field Strength in dBμV/m
 RA = Receiver Amplitude (including preamplifier) in dBμV
 CF = Cable Attenuation Factor in dB
 AF = Antenna Factor in dB
 AG = Amplifier Gain in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows.

Assume a receiver reading of 52.0 dBμV is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

$$\begin{aligned} RA &= 52.0 \text{ dB}\mu\text{V} \\ AF &= 7.4 \text{ dB/m} \\ CF &= 1.6 \text{ dB} \\ AG &= 29.0 \text{ dB} \\ FS &= 32 \text{ dB}\mu\text{V/m} \end{aligned}$$

$$\text{Level in } \mu\text{V/m} = [10(32 \text{ dB}\mu\text{V/m})/20] = 39.8 \mu\text{V/m}$$

The following is how net line-conducted readings were determined:

$$NF = RF + LF + CF + AF$$

Where NF = Net Reading in dBμV
 RF = Reading from receiver in dBμV
 LF = LISN Correction Factor in dB
 CF = Cable Correction Factor in dB
 AF = Attenuator Loss Factor in dB

To convert from dBμV to μV or mV the following was used:

$$UF = 10^{(NF / 20)} \text{ where UF = Net Reading in } \mu\text{V}$$

Example:

$$\begin{aligned} NF &= RF + LF + CF + AF = 28.5 + 0.2 + 0.4 + 20.0 = 49.1 \text{ dB}\mu\text{V} \\ UF &= 10^{(49.1 \text{ dB}\mu\text{V} / 20)} = 254 \mu\text{V/m} \end{aligned}$$

3.1 Measurement Uncertainty

Compliance of the product is based on the measured value. However, the measurement uncertainty is included for informational purposes.

The expanded uncertainty ($k = 2$) for radiated emissions from 30 to 1000 MHz has been determined to be:
 ± 3.5 dB at 10m, ± 3.8 dB at 3m

The expanded uncertainty ($k = 2$) for mains conducted emissions from 150 kHz to 30 MHz has been determined to be:

± 2.6 dB

The expanded uncertainty ($k = 2$) for telecom port conducted emissions from 150 kHz to 30 MHz has been determined to be:

± 3.2 for ISN and voltage probe measurements

± 3.1 for current probe measurements

3.2 Site Description

Test Site(s): 2

Our OATS are 3m and 10m sheltered emissions measurement ranges located in a light commercial environment in Boxborough, Massachusetts. They meet the technical requirements of ANSI C63.4-2003 and CISPR 22:1993/EN 55022:1994 for radiated and conducted emission measurements. The shelter structure is entirely fiberglass and plastic, with outside dimensions of 33 ft x 57 ft. The structure resembles a quonset hut with a center ceiling height of 16.5 ft.

The testing floor is covered by a galvanized sheet metal groundplane that is earth-grounded via copper rods around the perimeter of the site. The joints between individual metal sheets are bridged with a 2 inch wide metal strips to provide low RF impedance contact throughout. The sheets are screwed in place with stainless steel, round-head screws every three inches. Site illumination and HVAC are provided from beneath the ground reference plane through flush entry ports, the port covers are electrically bonded to the ground plane.

A flush metal turntable with 12 ft. diameter and 5000 lb. load capacity (12,000 lb. in Site 3) is provided for floor-standing equipment. A wooden table 80 cm high is used for table-top equipment. The turntable is electrically connected to the ground plane with three copper straps. The straps are connected to the turntable at the center of it with ground braid. The copper strap is directly connected to the groundplane at the edges of the turntable. The turntable is located on the south end of the structure and the antennas are mounted 3 and 10 meters away to the north. The antenna mast is a non-conductive with remote control of antenna height and polarization. The antenna height is adjustable from 1 to 4 meters.

All final radiated emission measurements are performed with the testing personnel and measurement equipment located below the ground reference plane. The site has a full basement underneath the turntable where support equipment may be remotely located. Operation of the antenna, turntable and equipment under test is controlled by remote controls that manipulate the antenna height and polarization and with a turntable control. Test personnel are located below the ellipse when measurements are performed, however the site maintains the ability of having personnel manipulate cables while monitoring test equipment. Ambient radiated emissions are 6 dB or more below the relevant FCC emission limits.

AC mains power is brought to the equipment under test through a power line filter, to remove ambient conducted noise. 50 Hz (240 VAC single phase), 60 Hz power (120 VAC single phase, 208 VAC three phase), and 60 Hz (480 VAC three phase) are available. Conducted emission measurements are performed with a Line Impedance Stabilization Network (LISN) or Artificial Mains Network (AMN) bonded to the ground reference plane. A removable vertical groundplane (2 meter X 2 meter area) is used for line-conducted measurements for table top equipment. The vertical groundplane is electrically connected to the reference groundplane.

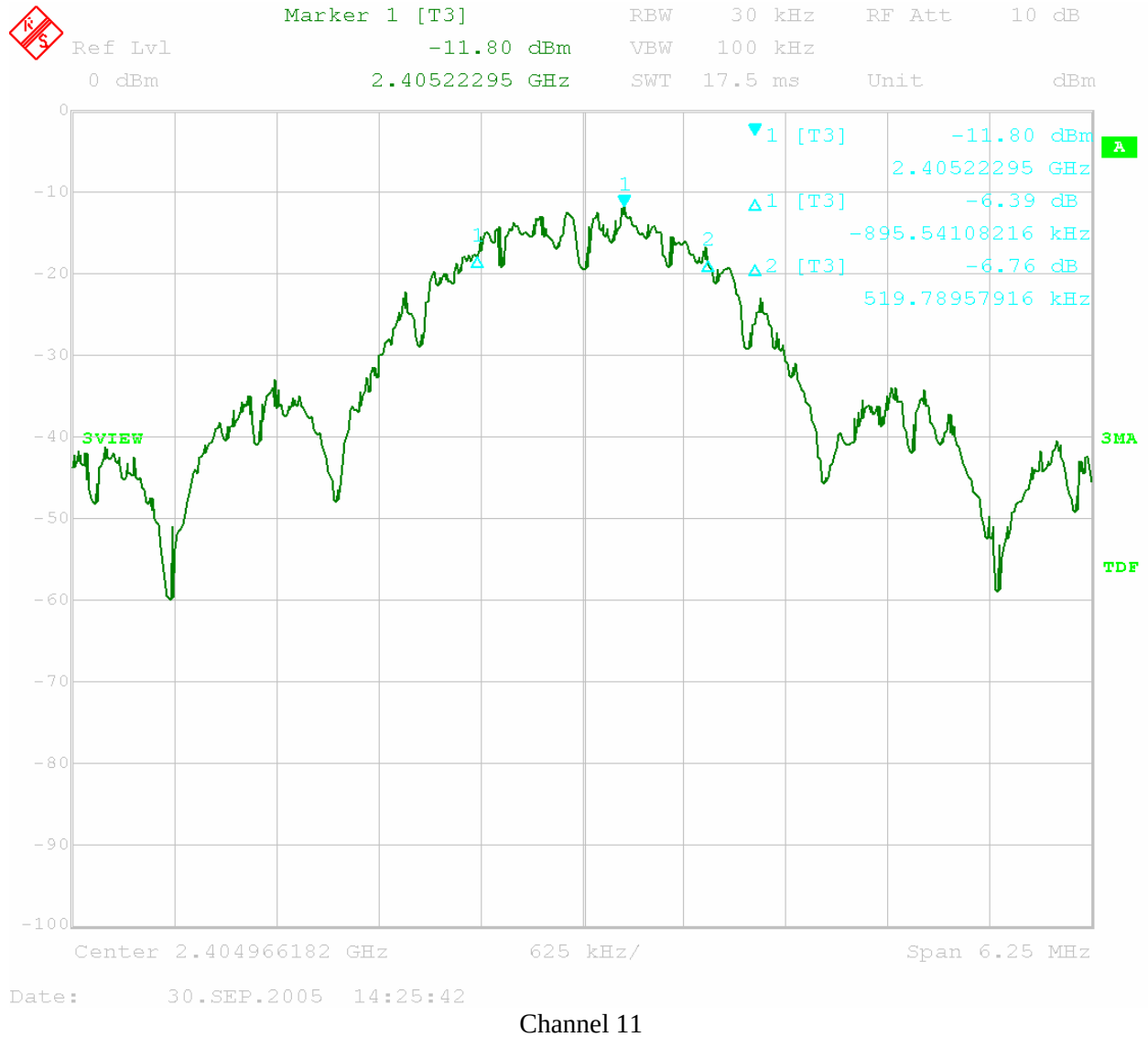
The EMC Lab has two Semi-anechoic Chambers and one Shielded Chamber. AC Mains Power is available at 120, 230, and 277 Single Phase; 208, 400, and 480 3-Phase. Large reference groundplanes are installed in the general lab area to facilitate EMC work not requiring a shielded environment.

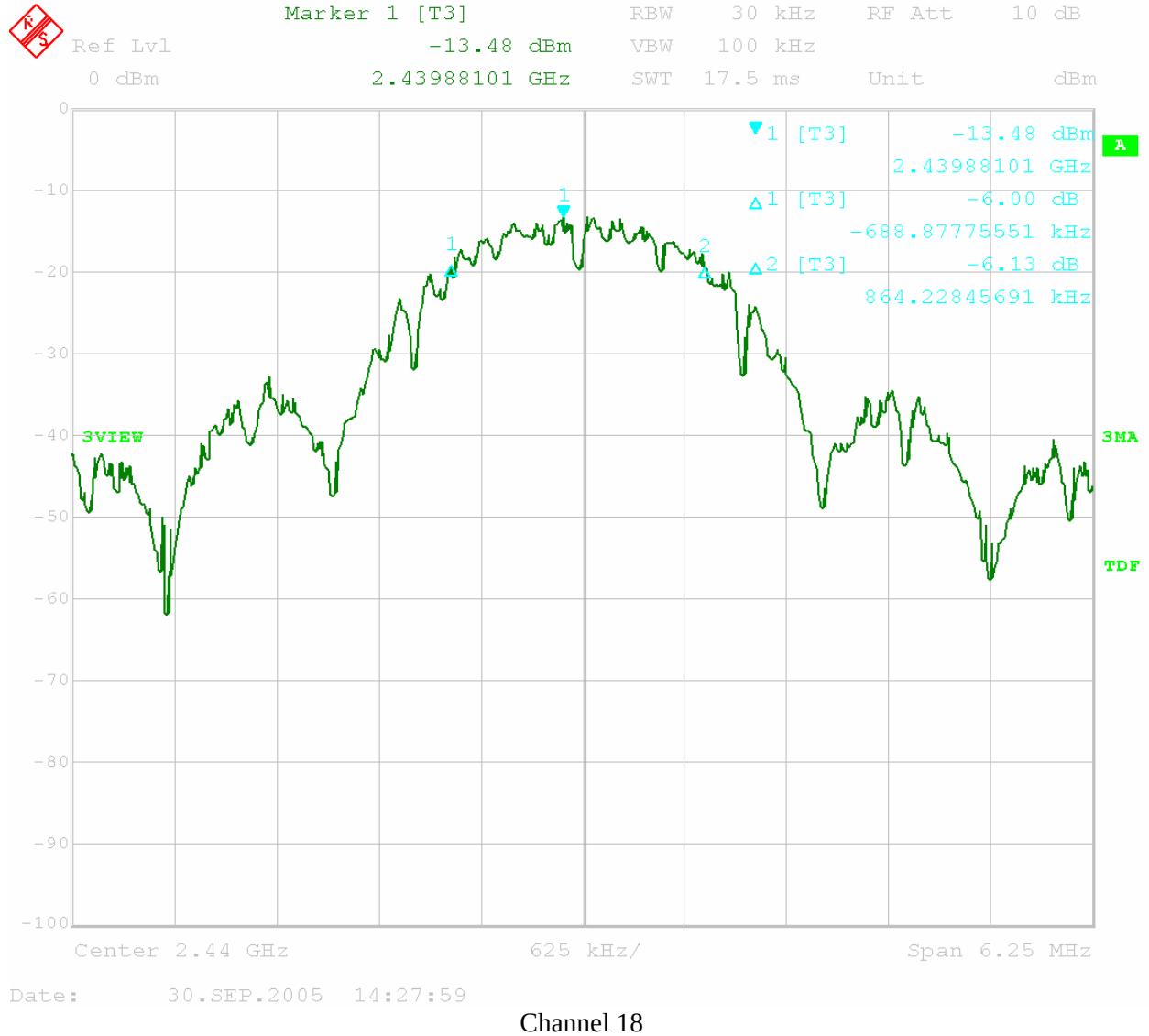
Test Results: Pass**Test Standard:** FCC 15.247(a)(2)**Test:** Occupied Bandwidth**Performance Criterion:** The 6 dB bandwidth must be at least 500 kHz.**Test Date:** 9/30/2005**Engineer Initials:** nan**Date:** 10/11/05**Test Engineer:** Nicholas Abbondante**Reviewer Initials:** RWH**Date:** 10-13-05**Test Equipment Used:**

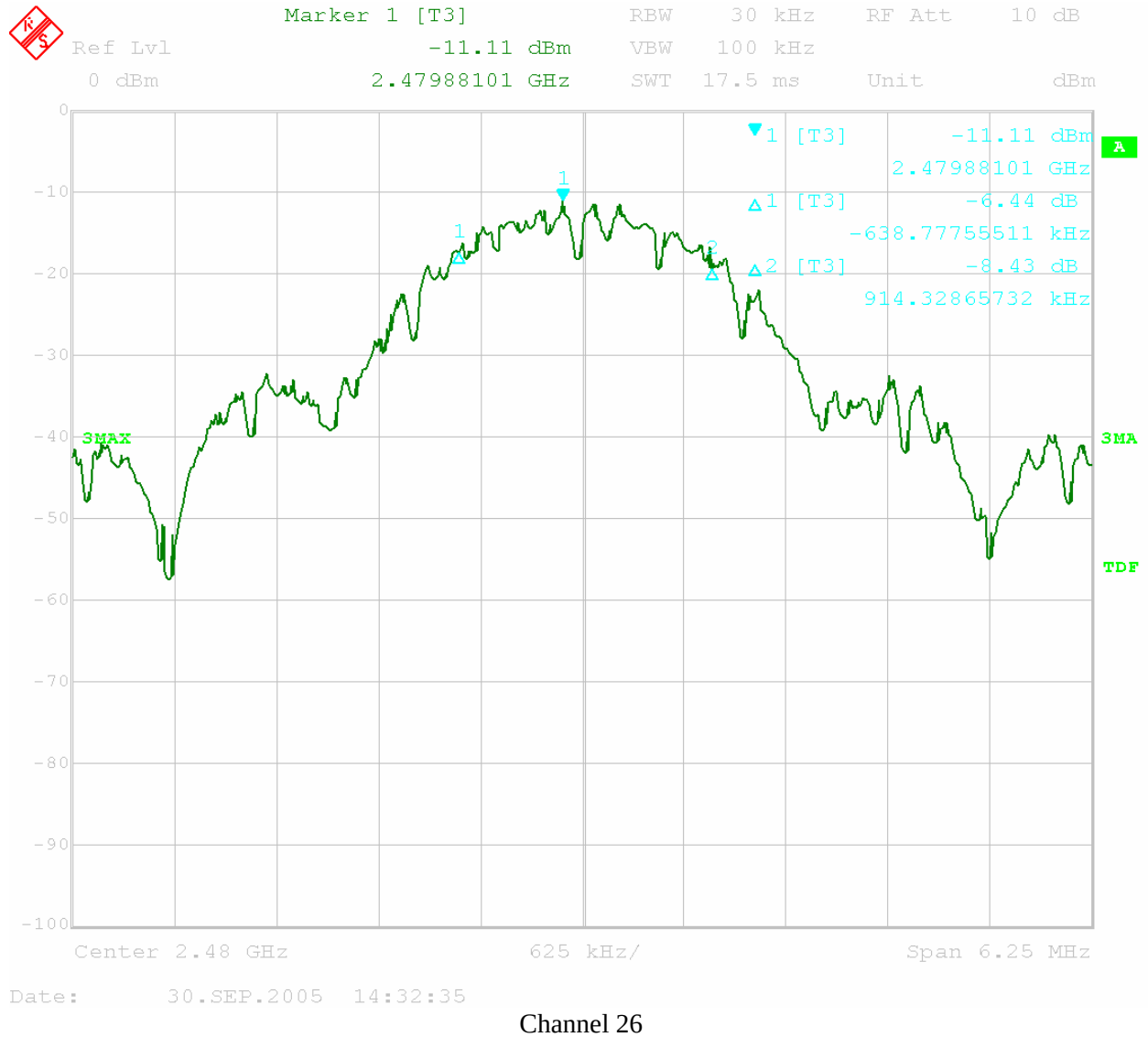
Intertek ID	Manufacturer	Model	Serial Number	Cal. Due
ROS001	Rohde & Schwarz	FSEK-30	100225	07/26/2006
CBL028	Megaphase	TM40 K1K1 197	CBL028	12/01/2005

Test Details:

Channel	Frequency	Bandwidth
11	2405 MHz	1.415 MHz
18	2440 MHz	1.553 MHz
26	2480 MHz	1.553 MHz







Test Results: Pass

Test Standard: FCC 15.247(b)(3-5)

Test: Maximum Peak Conducted Output Power and Human RF Exposure

Performance Criterion: The output power must not exceed 1 Watt (30 dBm) and 36 dBm EIRP. The human RF Exposure limit is 1 mW/cm².

Test Date: 09/27/2005

Engineer Initials: nm

Date: 10/11/05

Test Engineer: Nicholas Abbondante

Reviewer Initials: nwh

Date: 10-13-05

Test Equipment Used:

Intertek ID	Manufacturer	Model	Serial Number	Cal. Due
ROS001	Rohde & Schwarz	FSEK-30	100225	07/26/2006
CBL028	Megaphase	TM40 K1K1 197	CBL028	12/01/2005

Test Details:

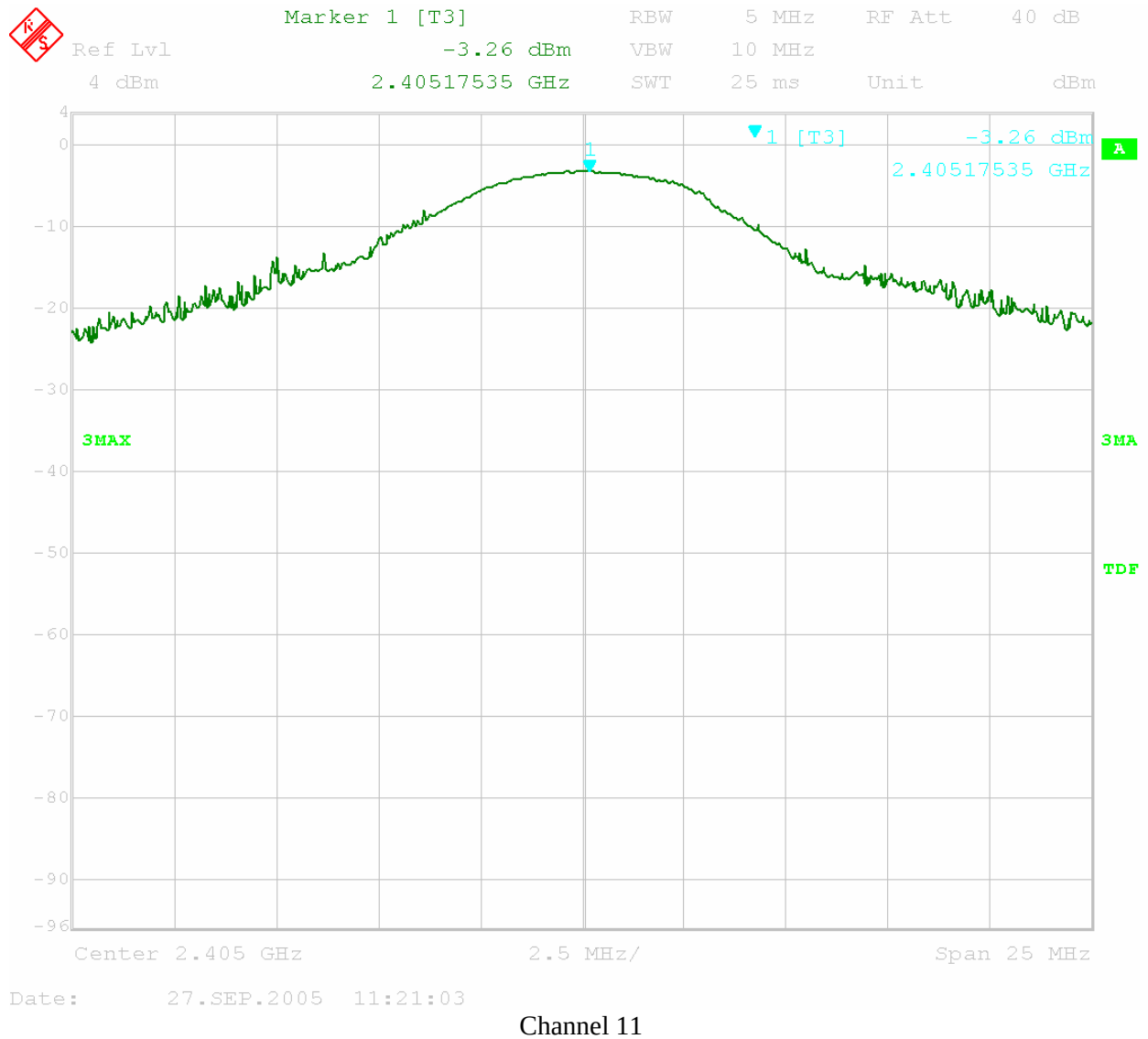
Antenna	Type	Model	Connector	Gain
Centurion WCR ½ Wave Coaxial Dipole	Whip	WCR2400-SMRP	Reverse-SMA	2.0 dBi
Pacific Wireless Rubber Duck Omni	Whip	PAWIN24-5RD	Reverse-SMA	5.5 dBi

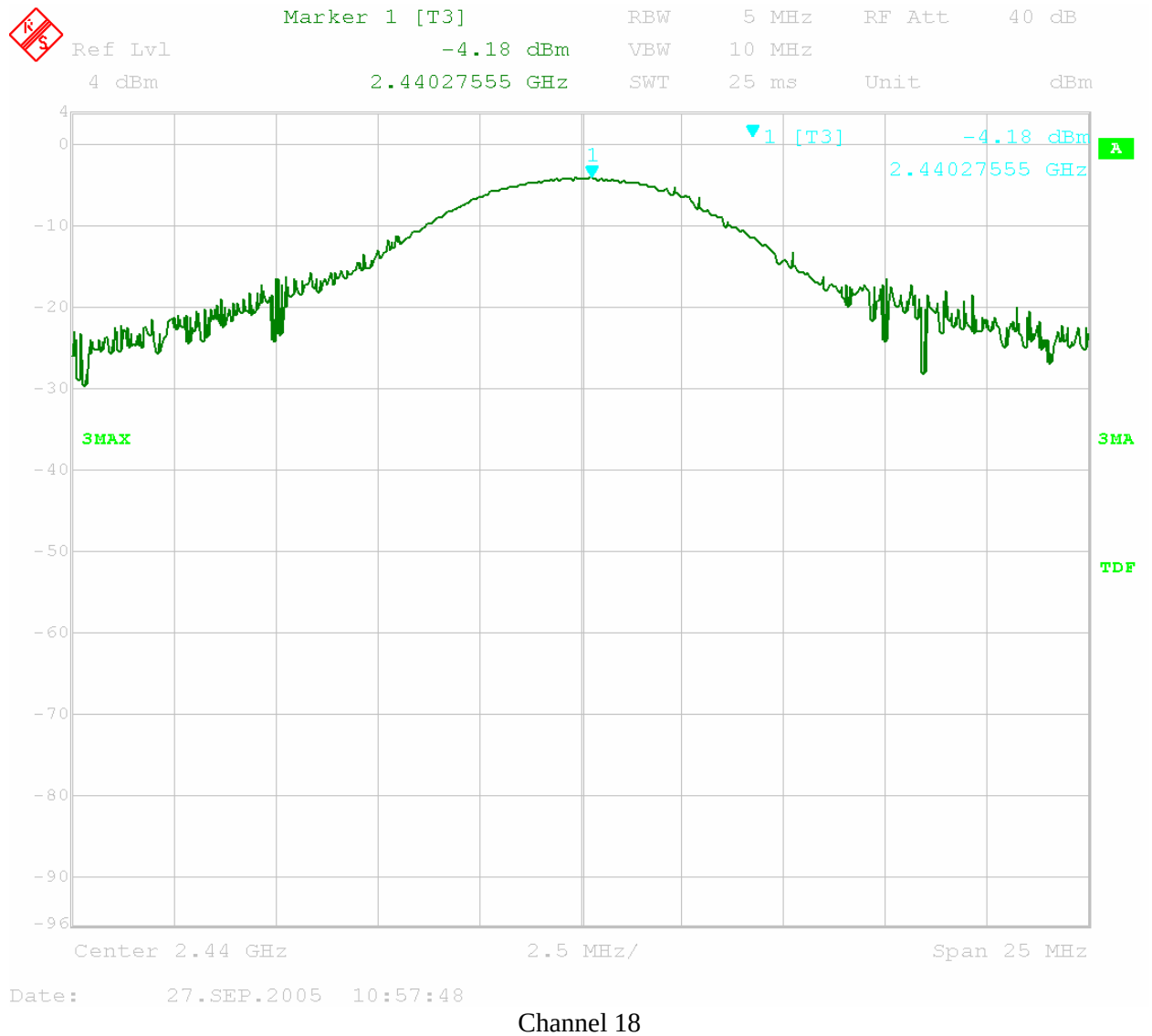
Channel	Frequency	Power	Limit	EIRP	EIRP Limit
11	2405 MHz	-3.26 dBm	30.0 dBm	2.24 dBm	36.0 dBm
18	2440 MHz	-4.18 dBm	30.0 dBm	1.32 dBm	36.0 dBm
26	2480 MHz	-3.35 dBm	30.0 dBm	2.65 dBm	36.0 dBm

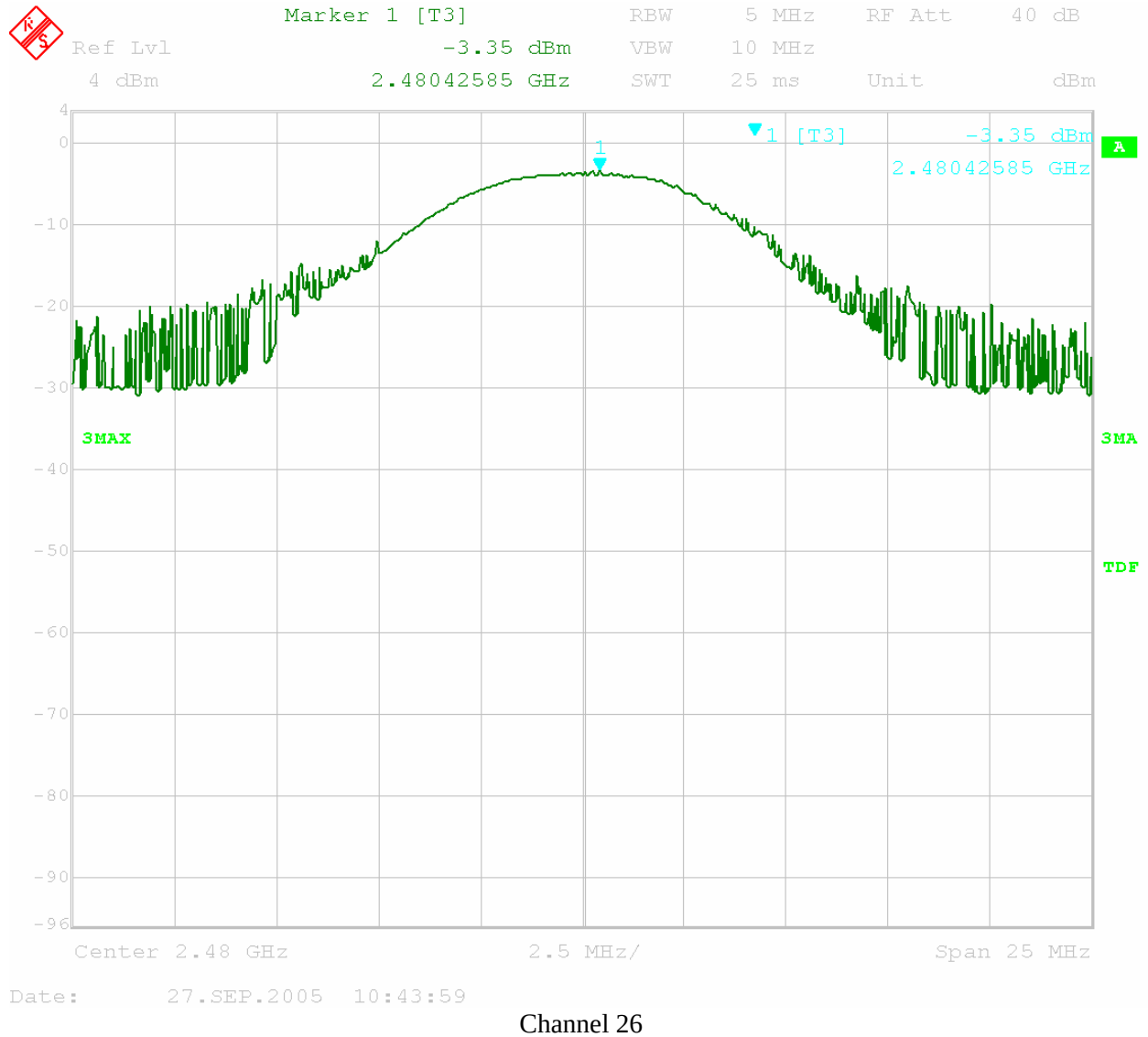
The human RF exposure limit is 1 mW/cm². The power density S generated by some value of EIRP at a given distance d is related by the equation:

$$S = \text{EIRP} / (4\pi d^2)$$

The distance, given a maximum EIRP of 2.65 dBm (1.85 mW) at which the radiated power density of the EUT is equal to the human RF exposure limit is 0.38 cm from the antenna.







Test Results: Pass

Test Standard: FCC 15.209, 15.247(d)

Test: Antenna Port Conducted Spurious Emissions

Performance Criterion: The spurious emissions must be attenuated below the level of the fundamental by at least 20 dBc.

Test Date: 9/27/2005

Engineer Initials: mm

Date: 10/11/05

Test Engineer: Nicholas Abbondante

Reviewer Initials: rw

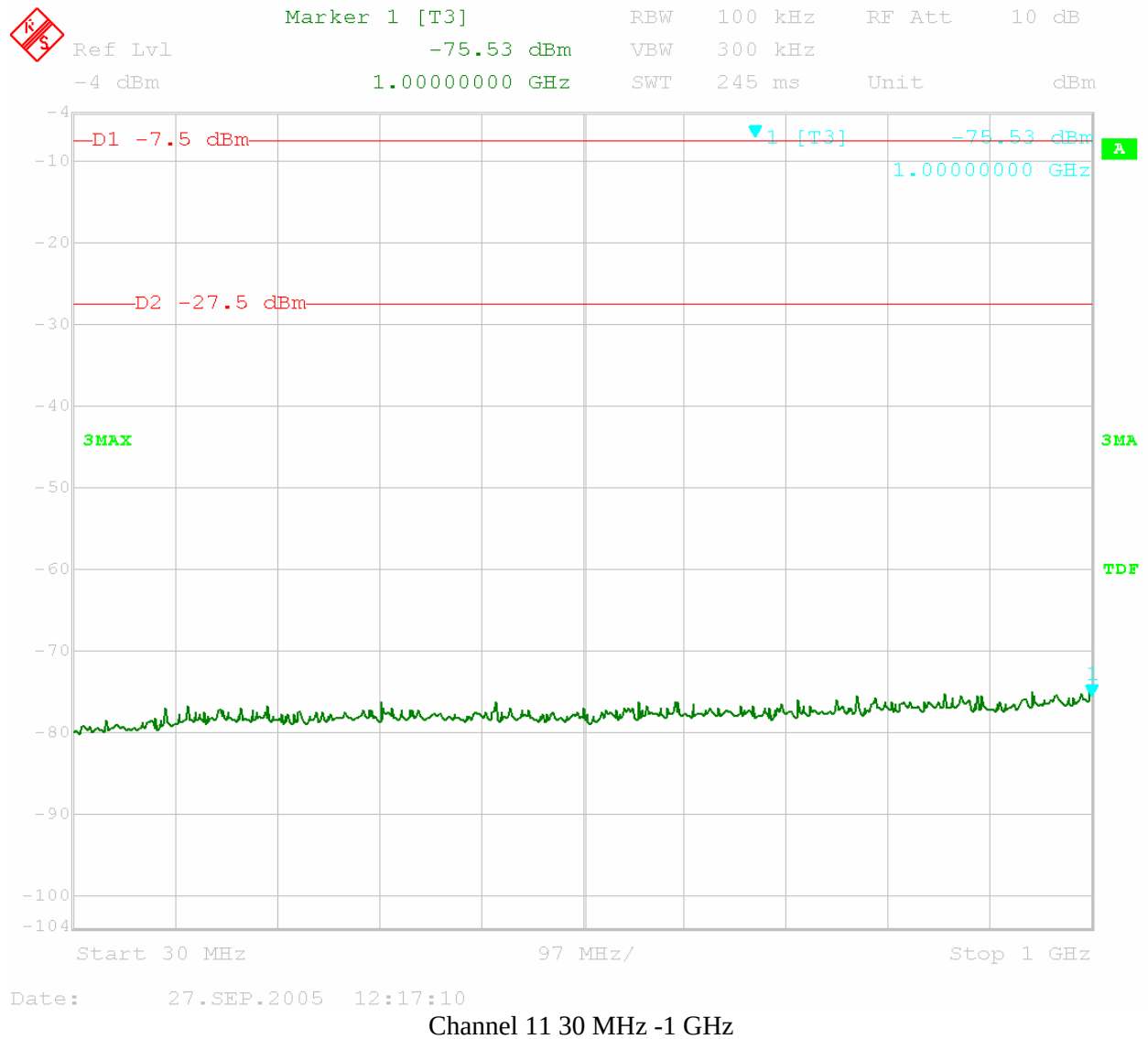
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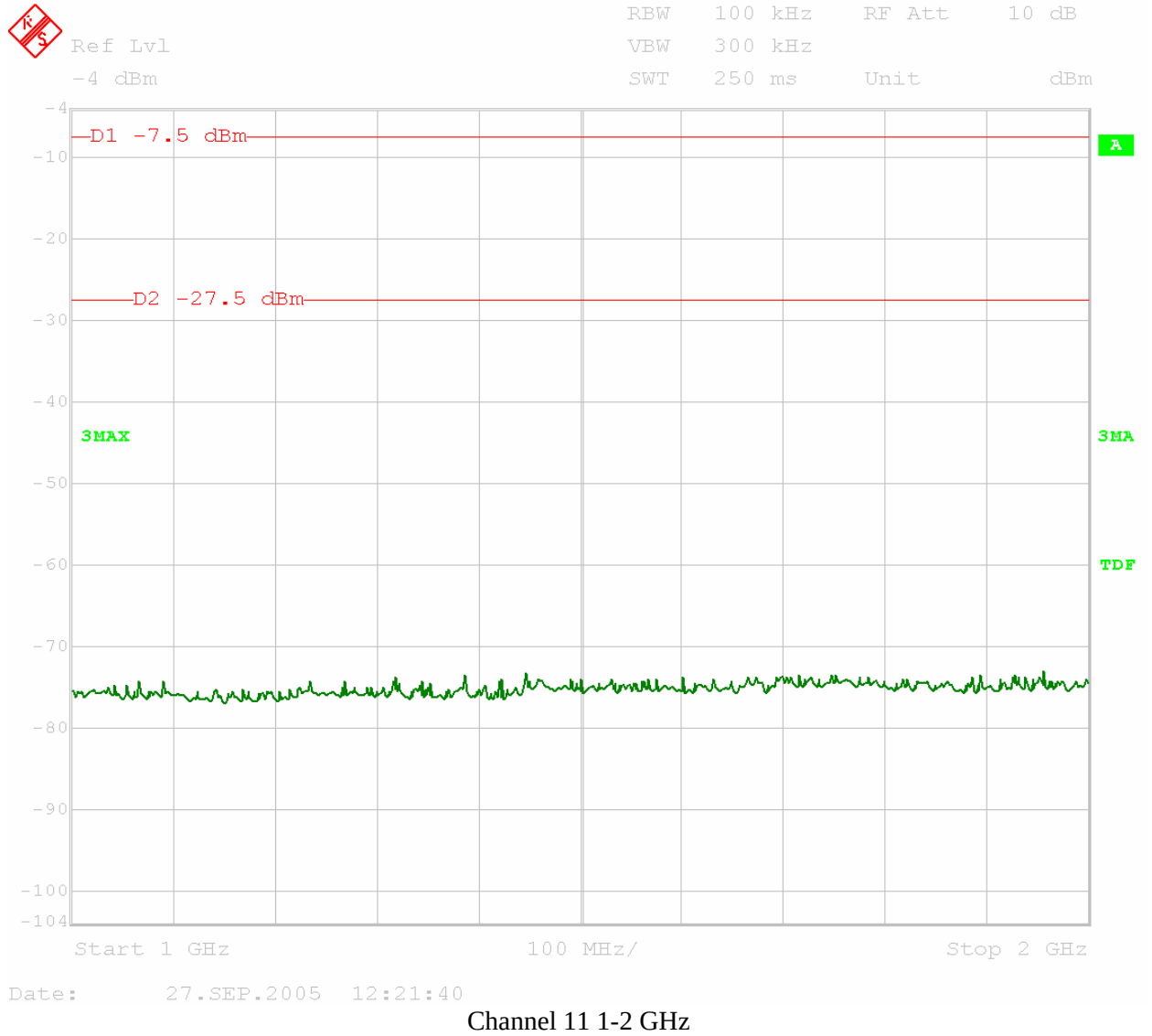
Test Equipment Used:

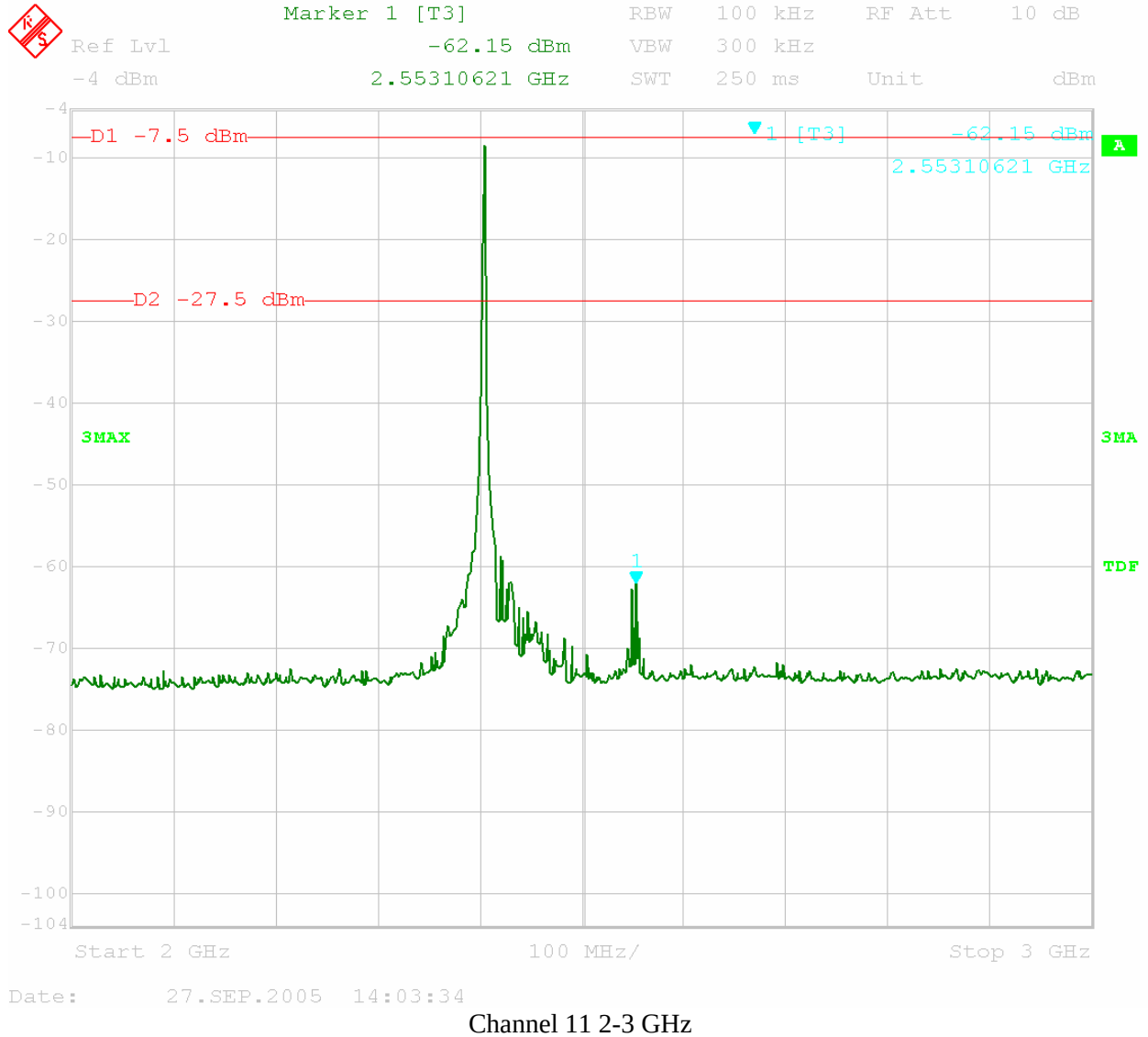
Intertek ID	Manufacturer	Model	Serial Number	Cal. Due
ROS001	Rohde & Schwarz	FSEK-30	100225	07/26/2006
CBL028	Megaphase	TM40 K1K1 197	CBL028	12/01/2005

Test Details:

Notes: A display line was placed at the output power in a 100 kHz bandwidth of the channel under test, and a second display line was placed 20 dB below the first display line.









Ref Lvl

-4 dBm

RBW

100 kHz

RF Att

10 dB

VBW

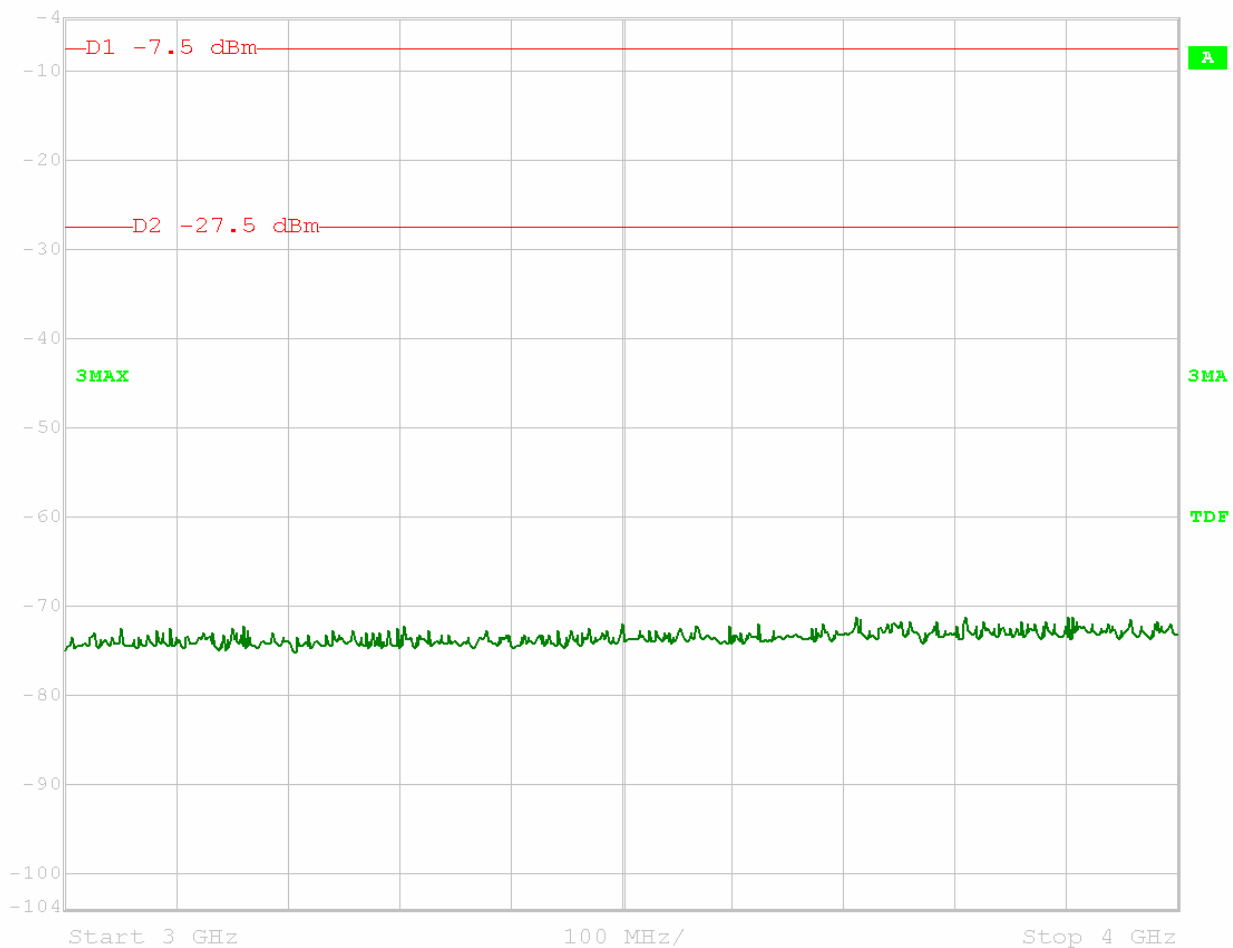
300 kHz

SWT

250 ms

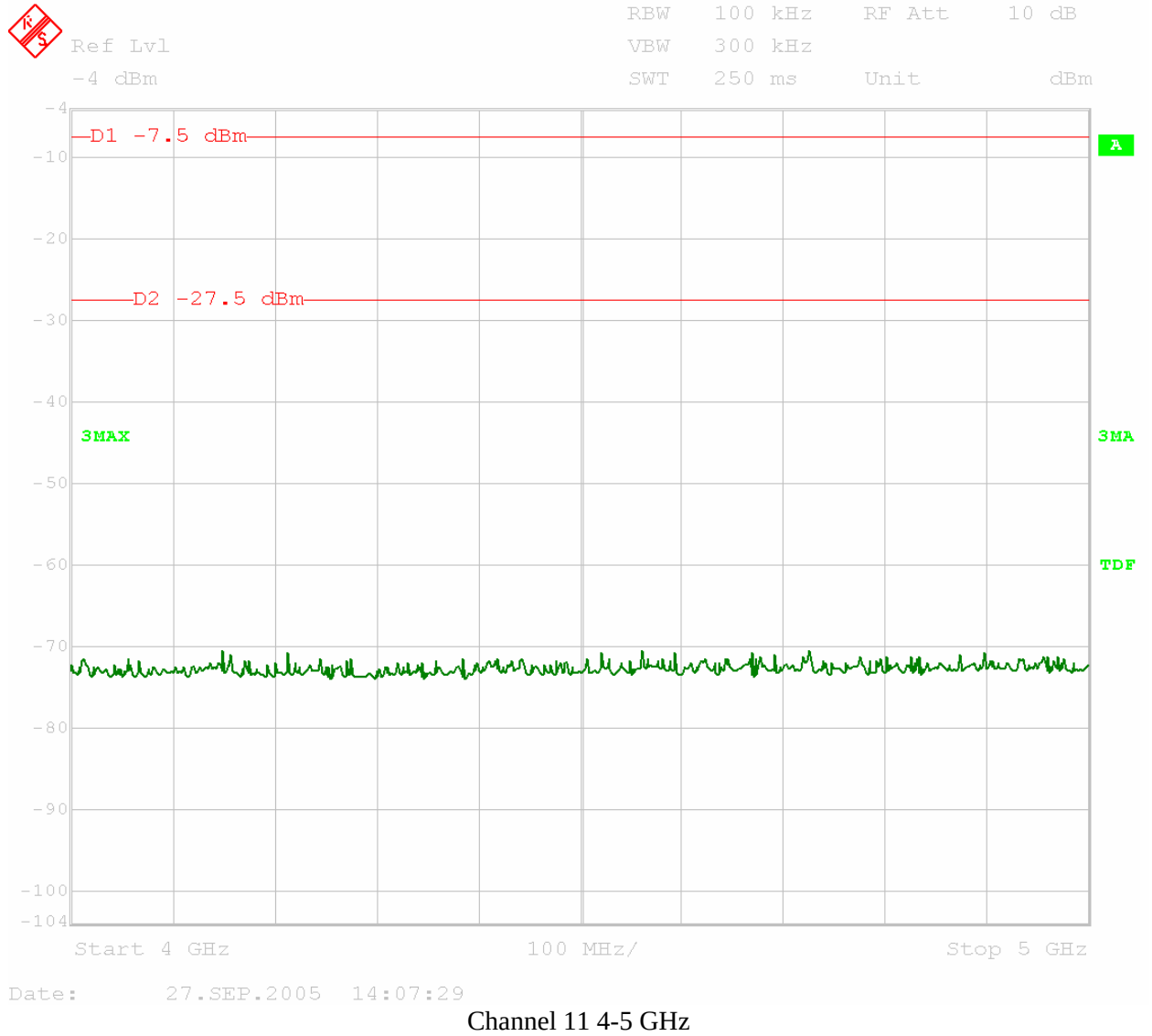
Unit

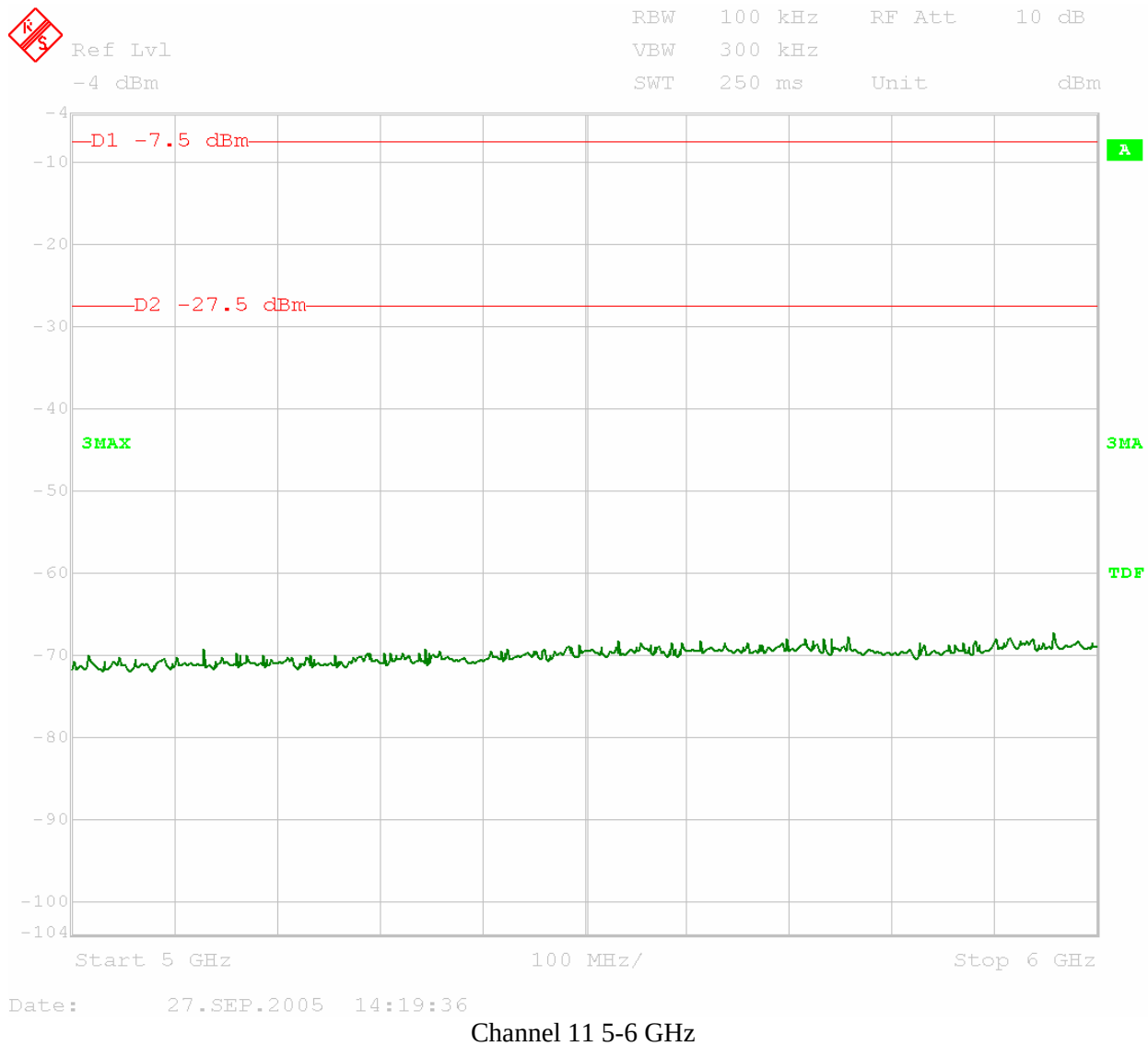
dBm

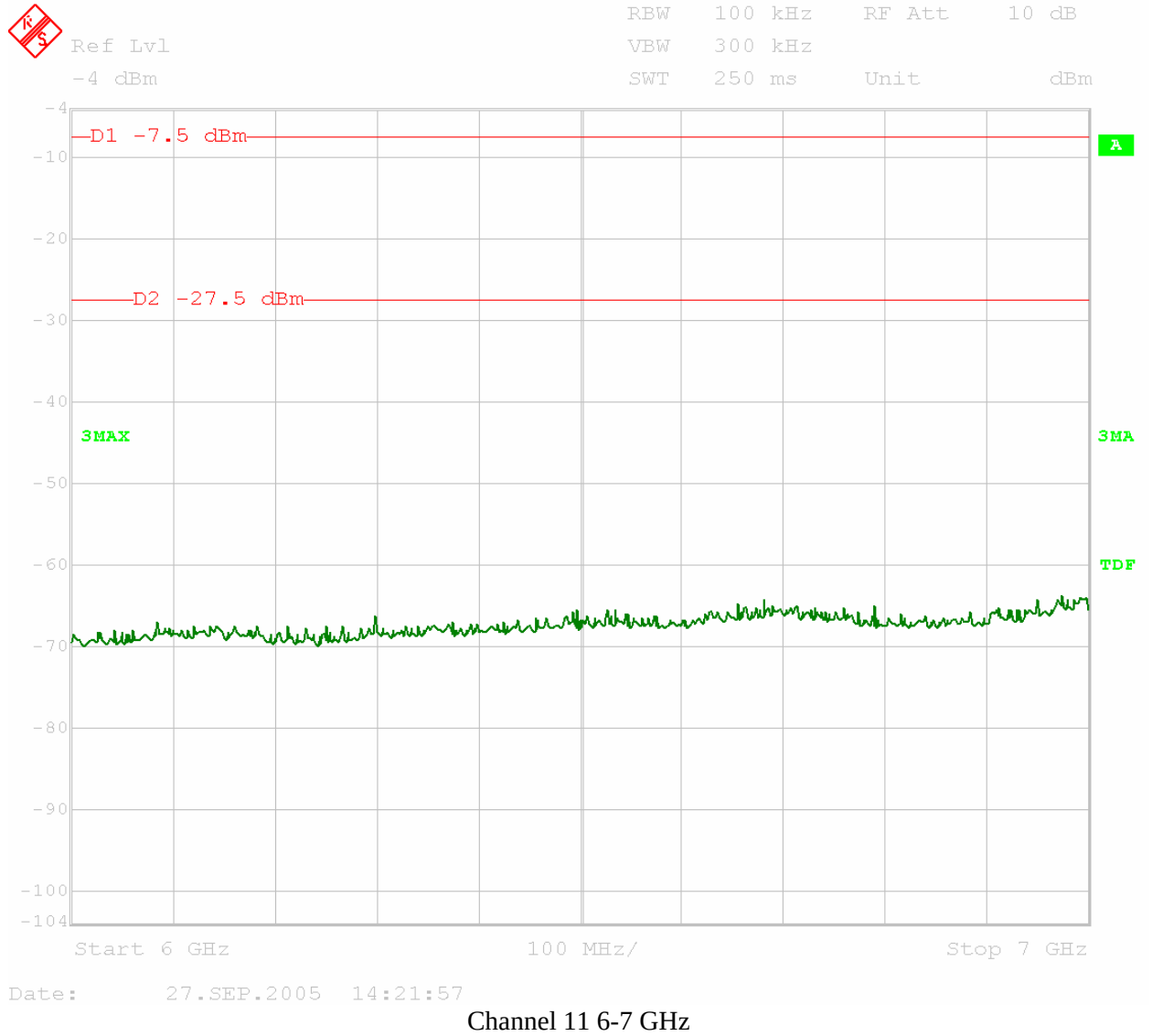


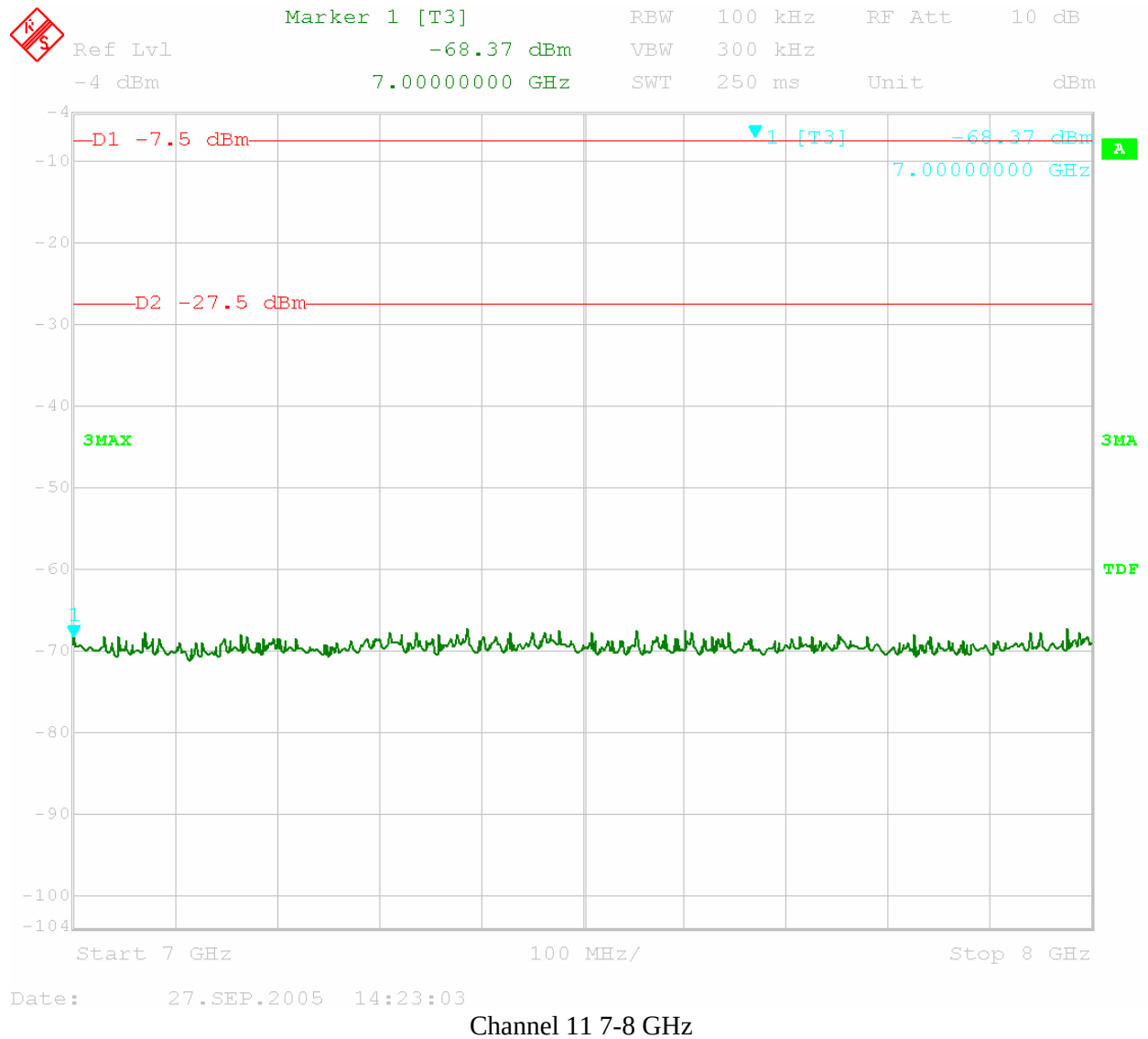
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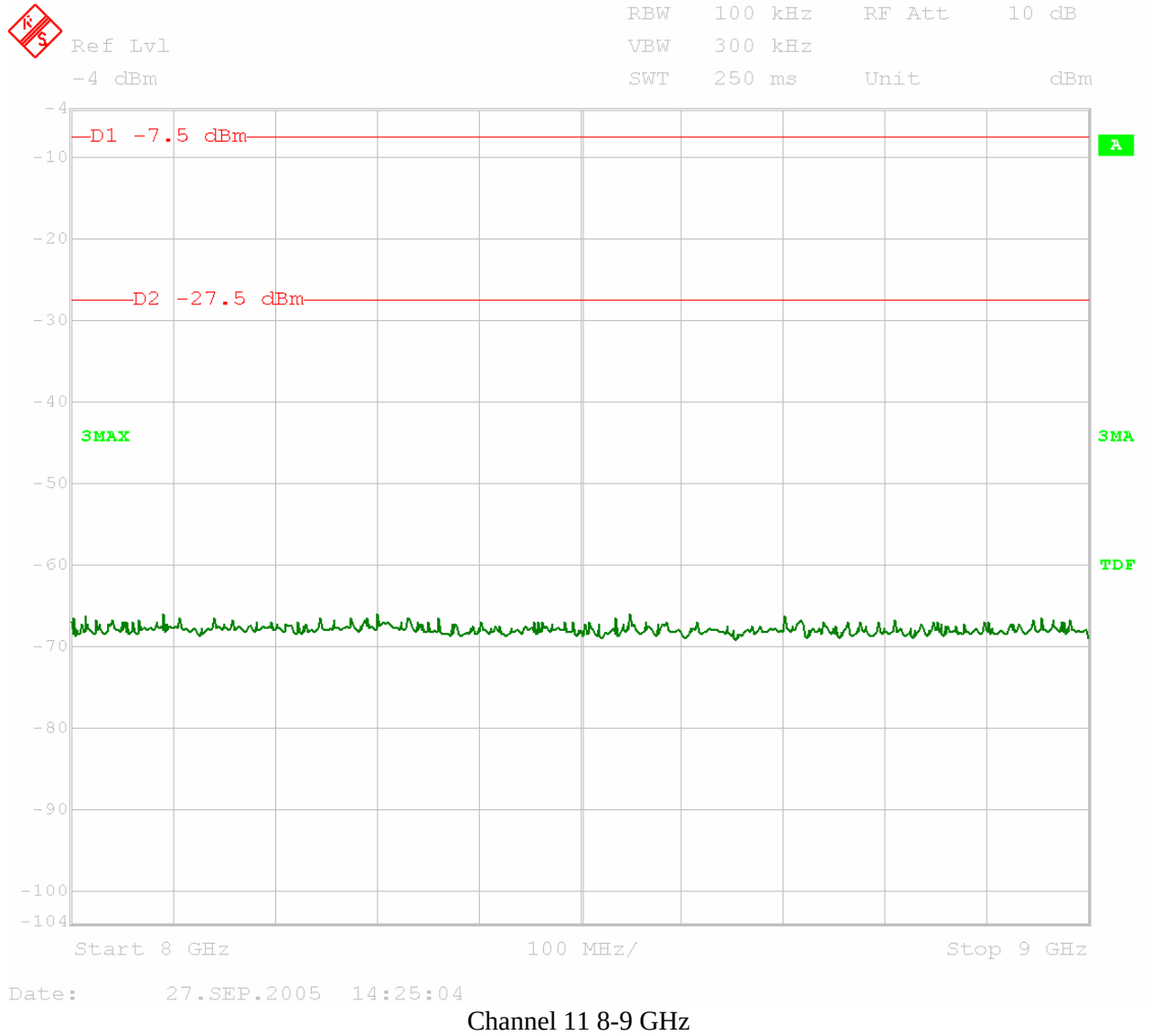
Channel 11 3-4 GHz

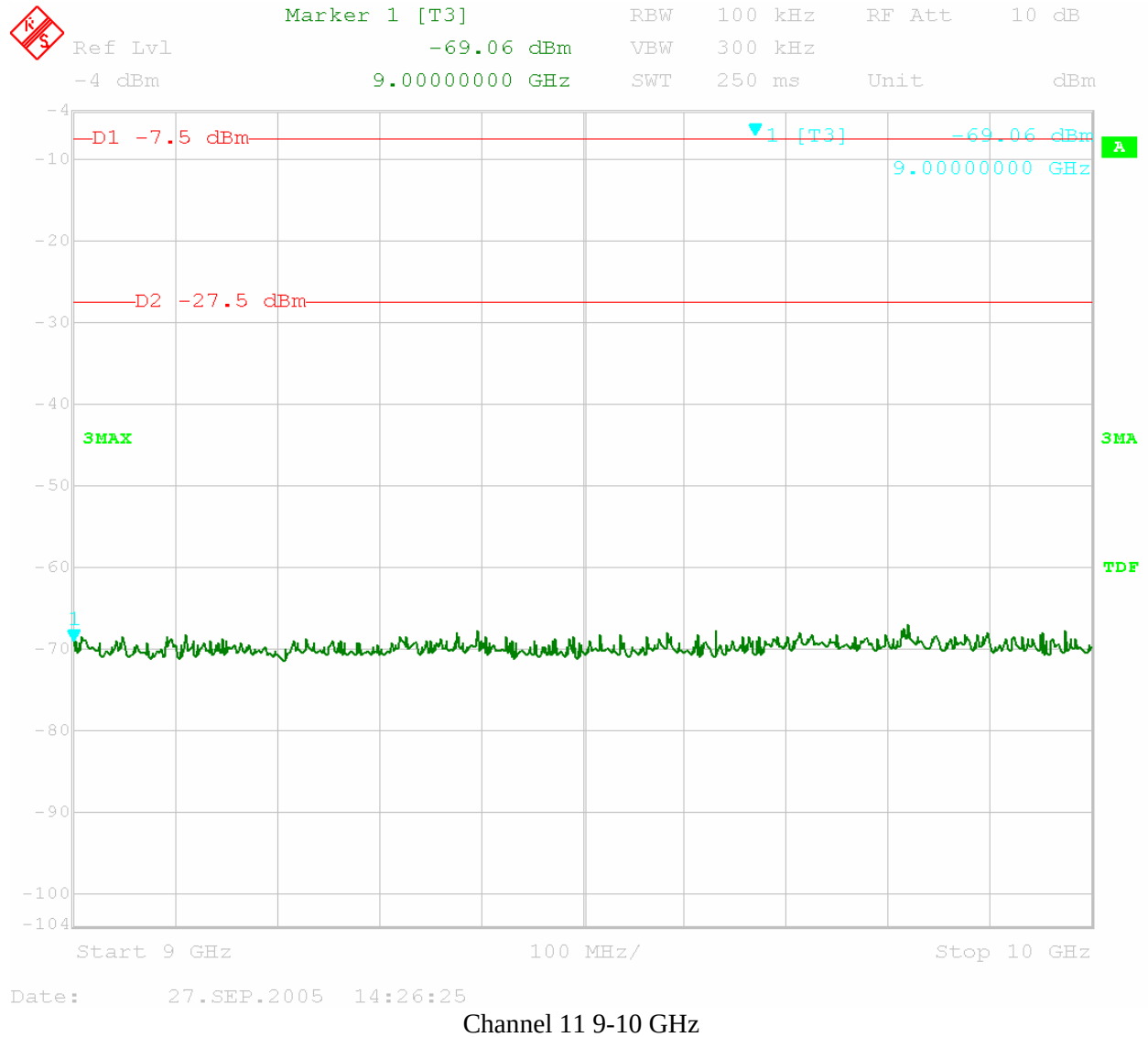


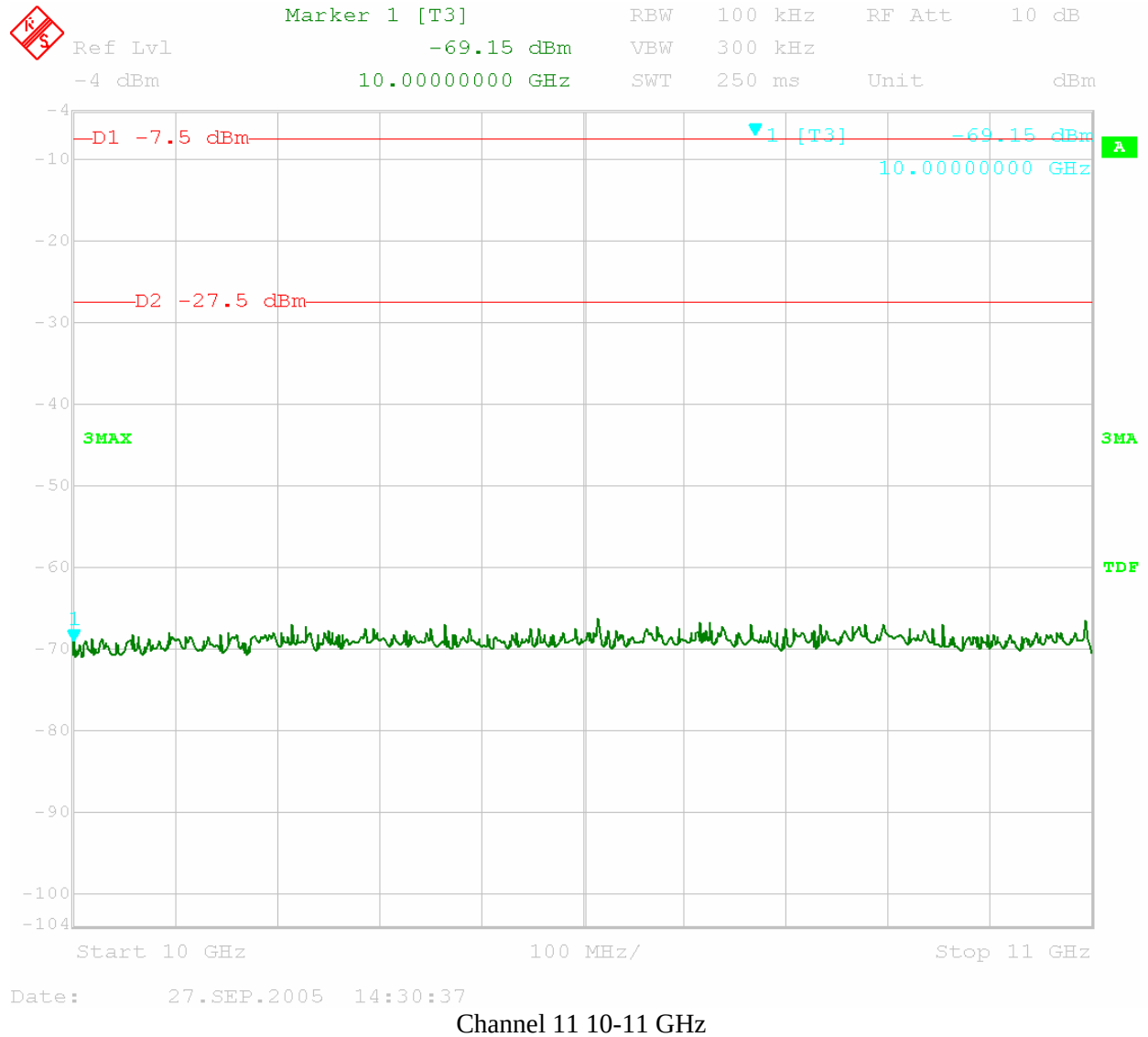


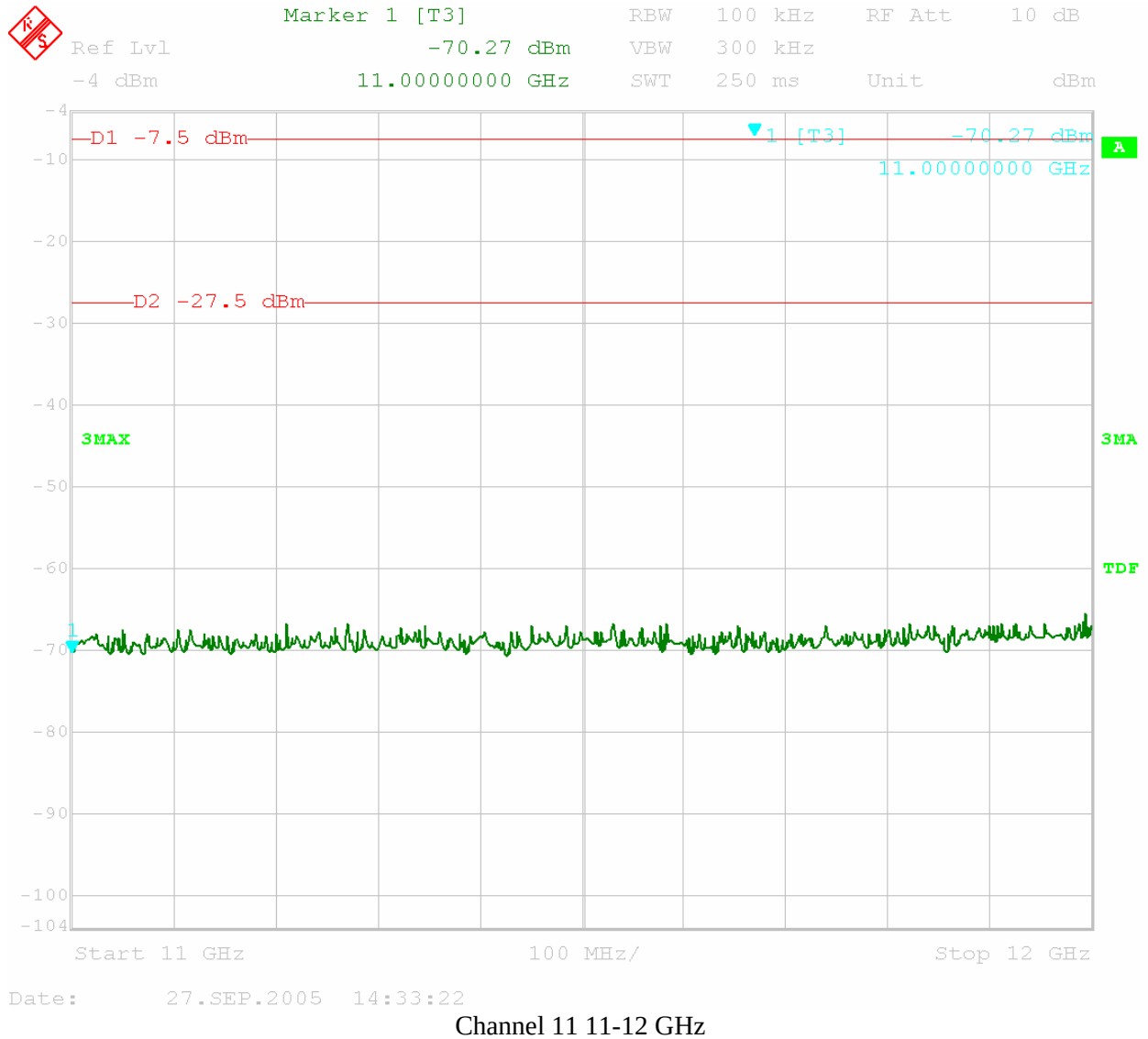


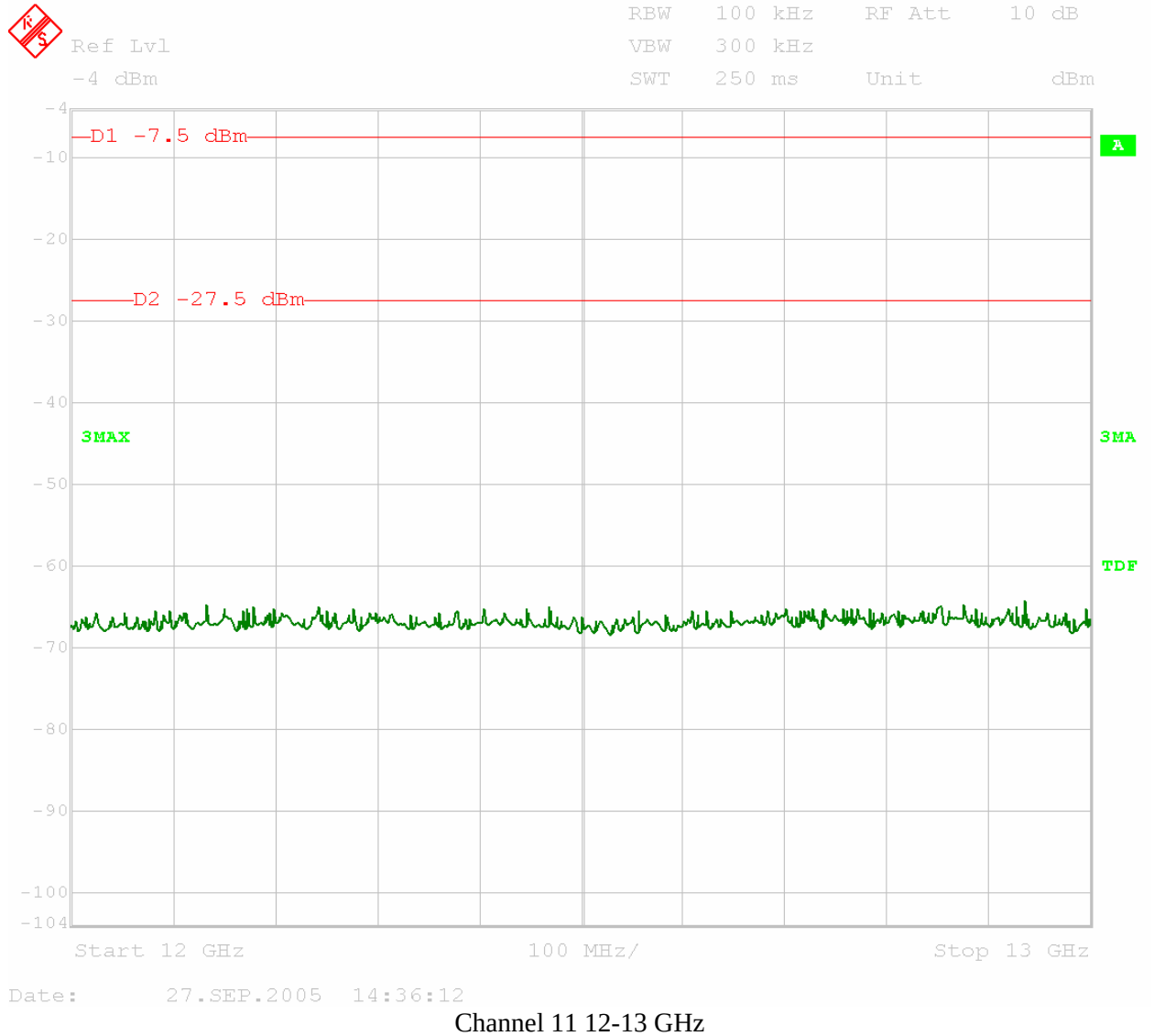








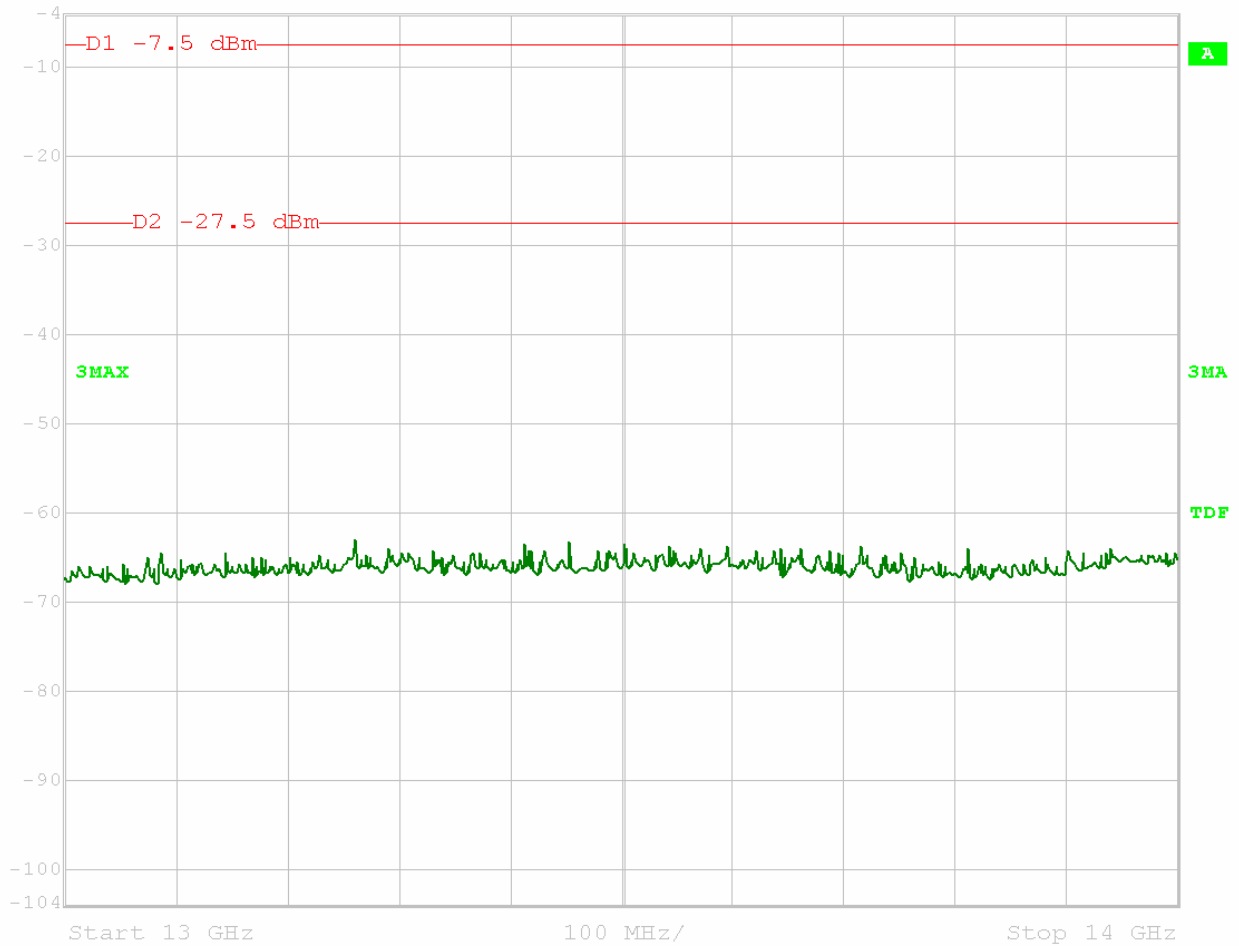






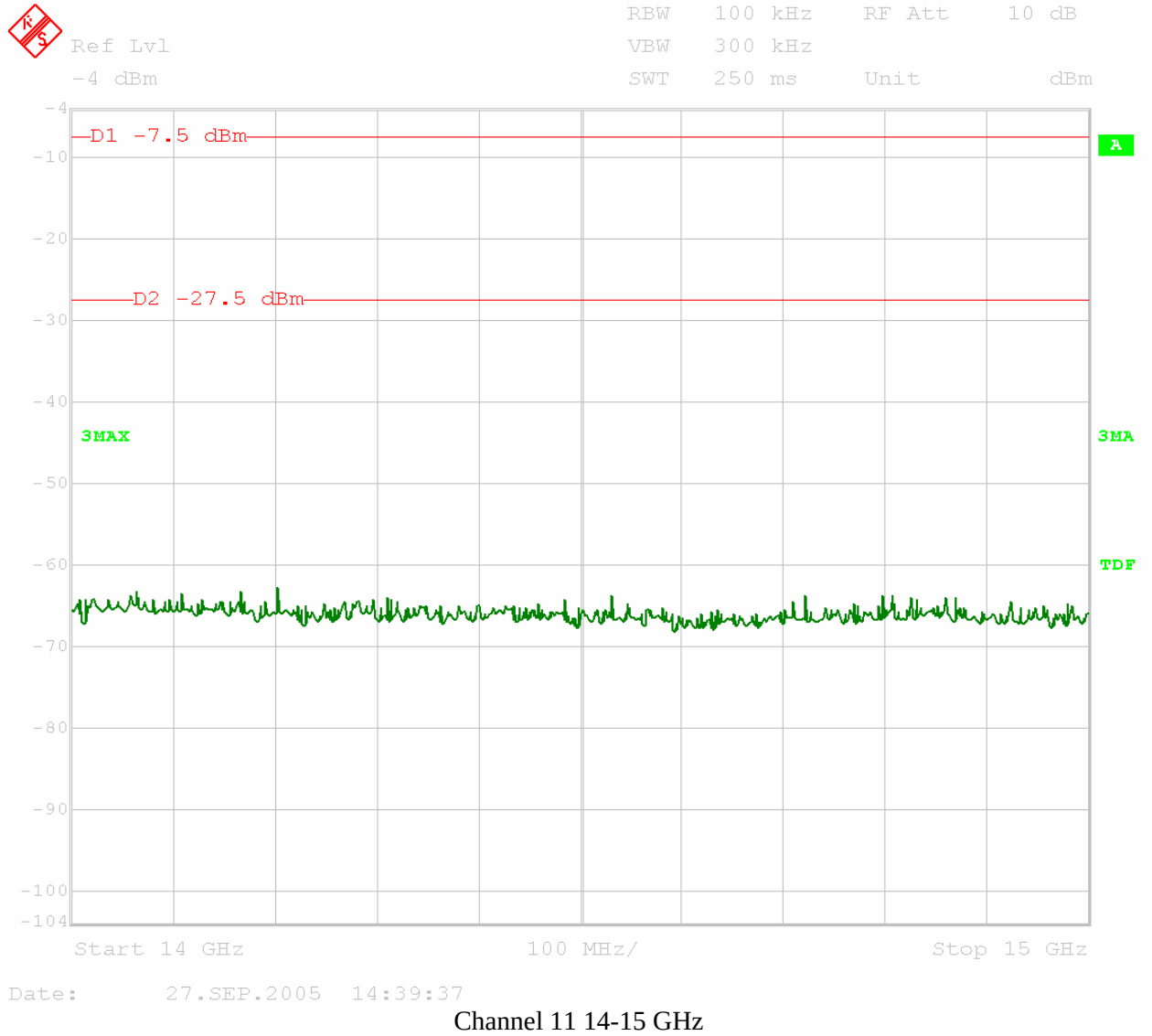
Ref Lvl
-4 dBm

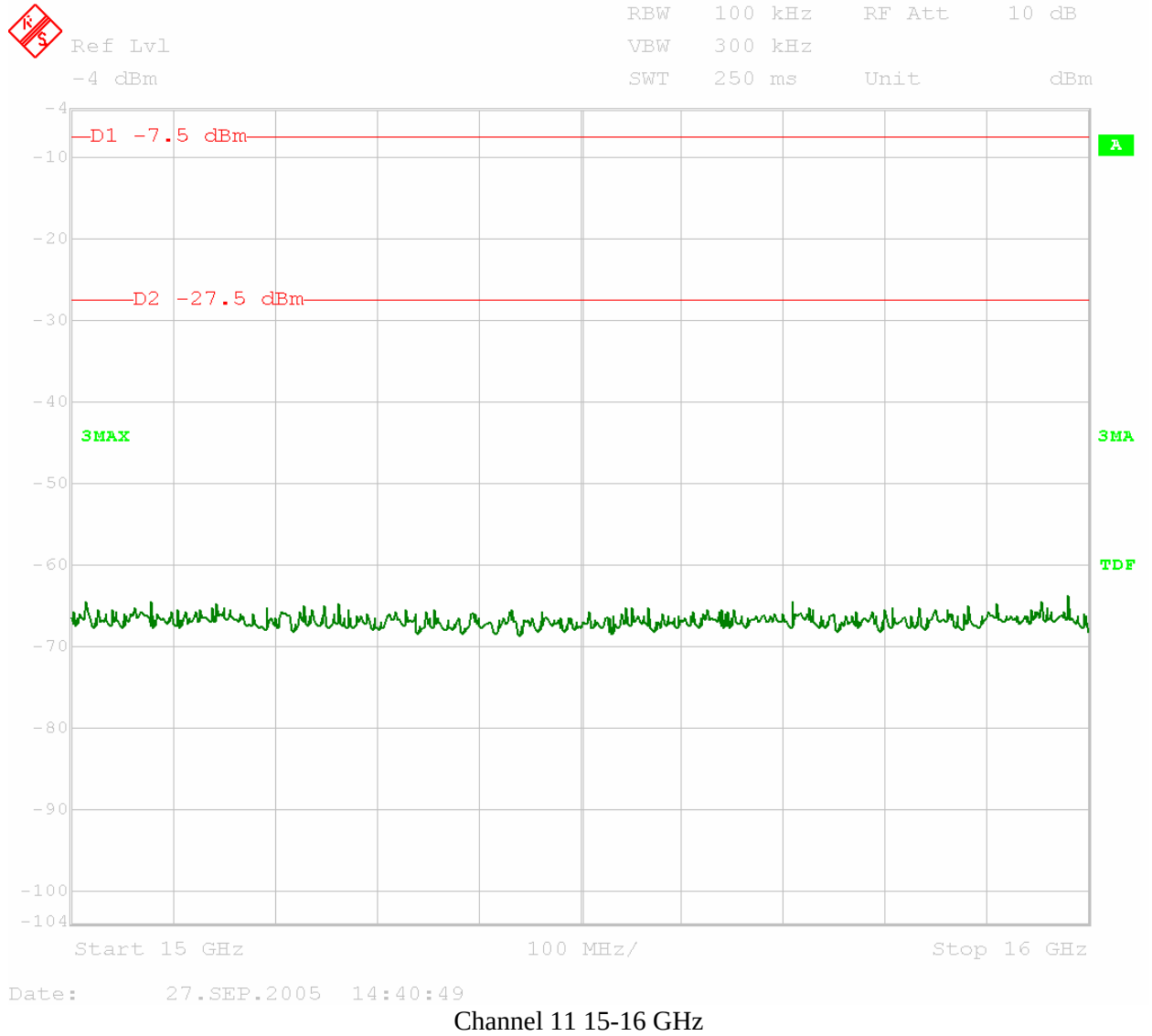
RBW 100 kHz RF Att 10 dB
VBW 300 kHz
SWT 250 ms Unit dBm

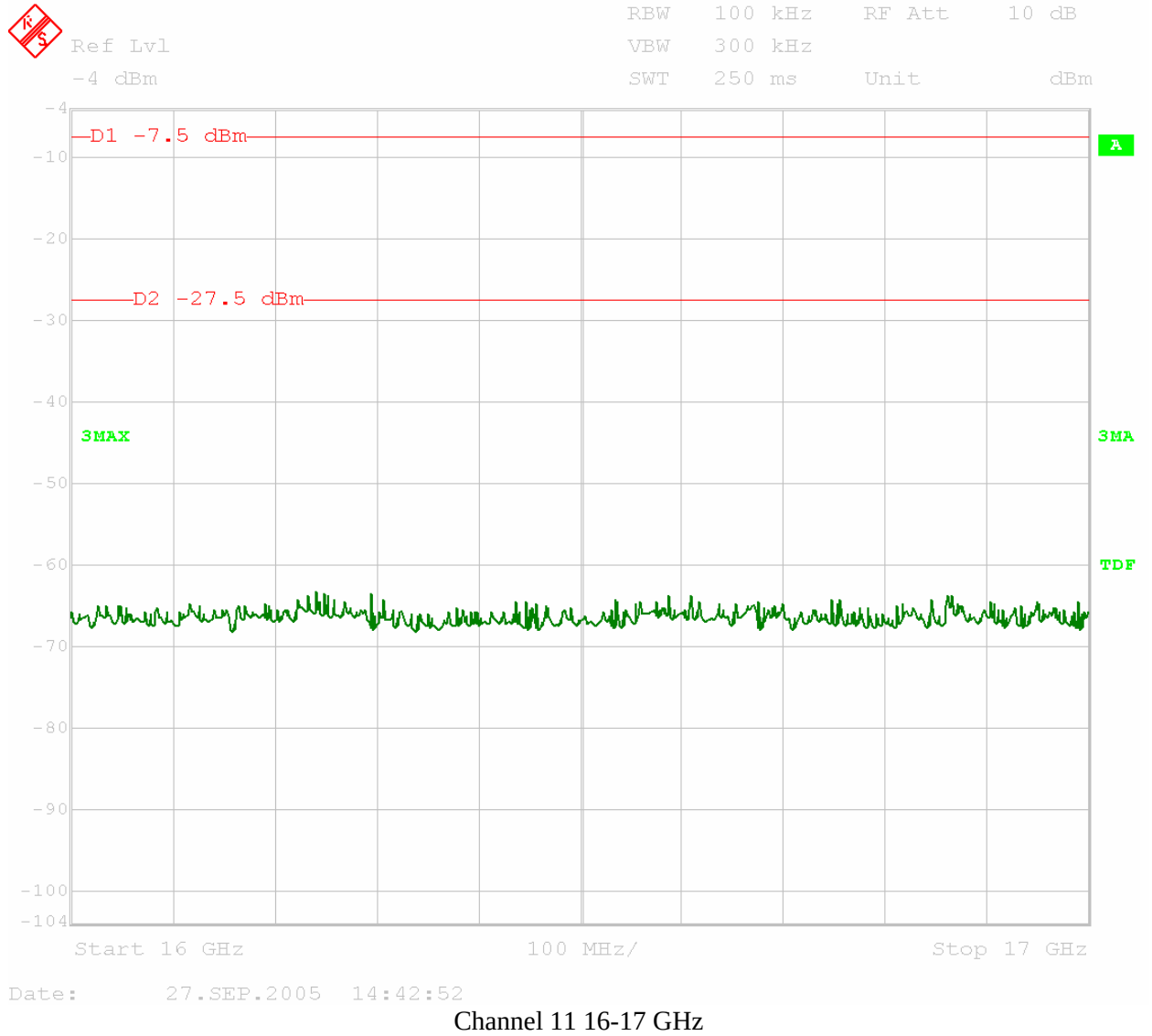


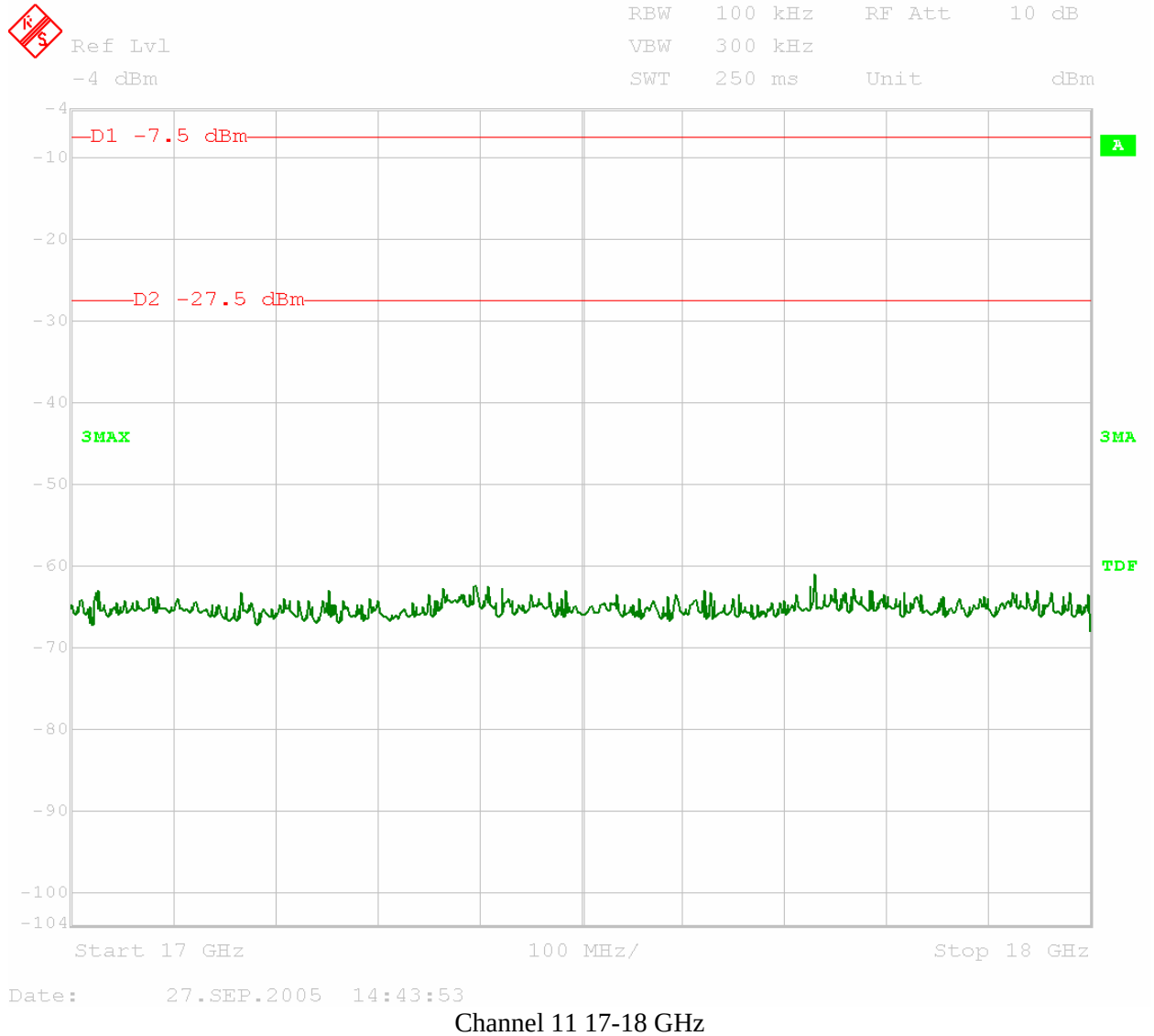
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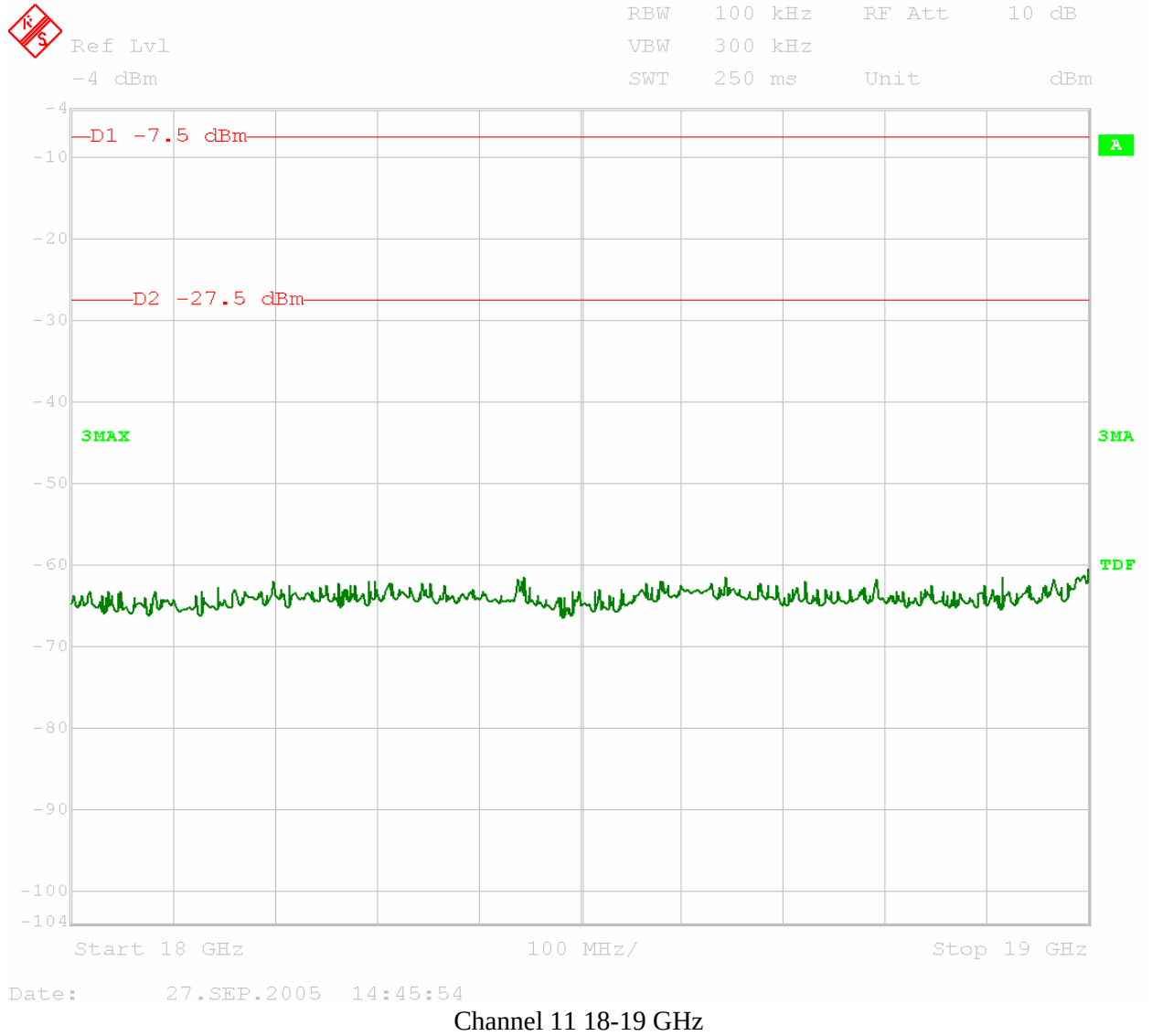
Channel 11 13-14 GHz

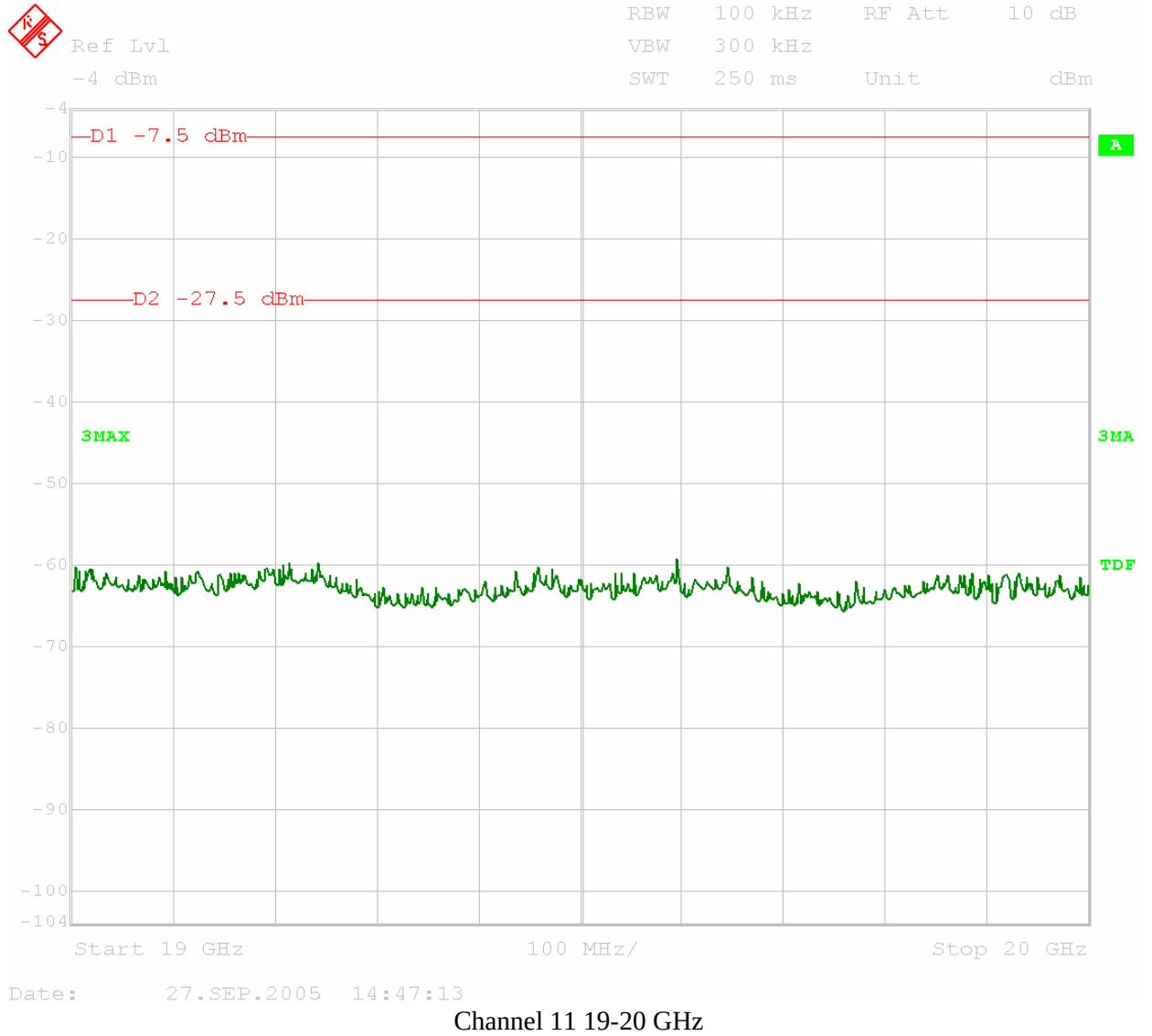


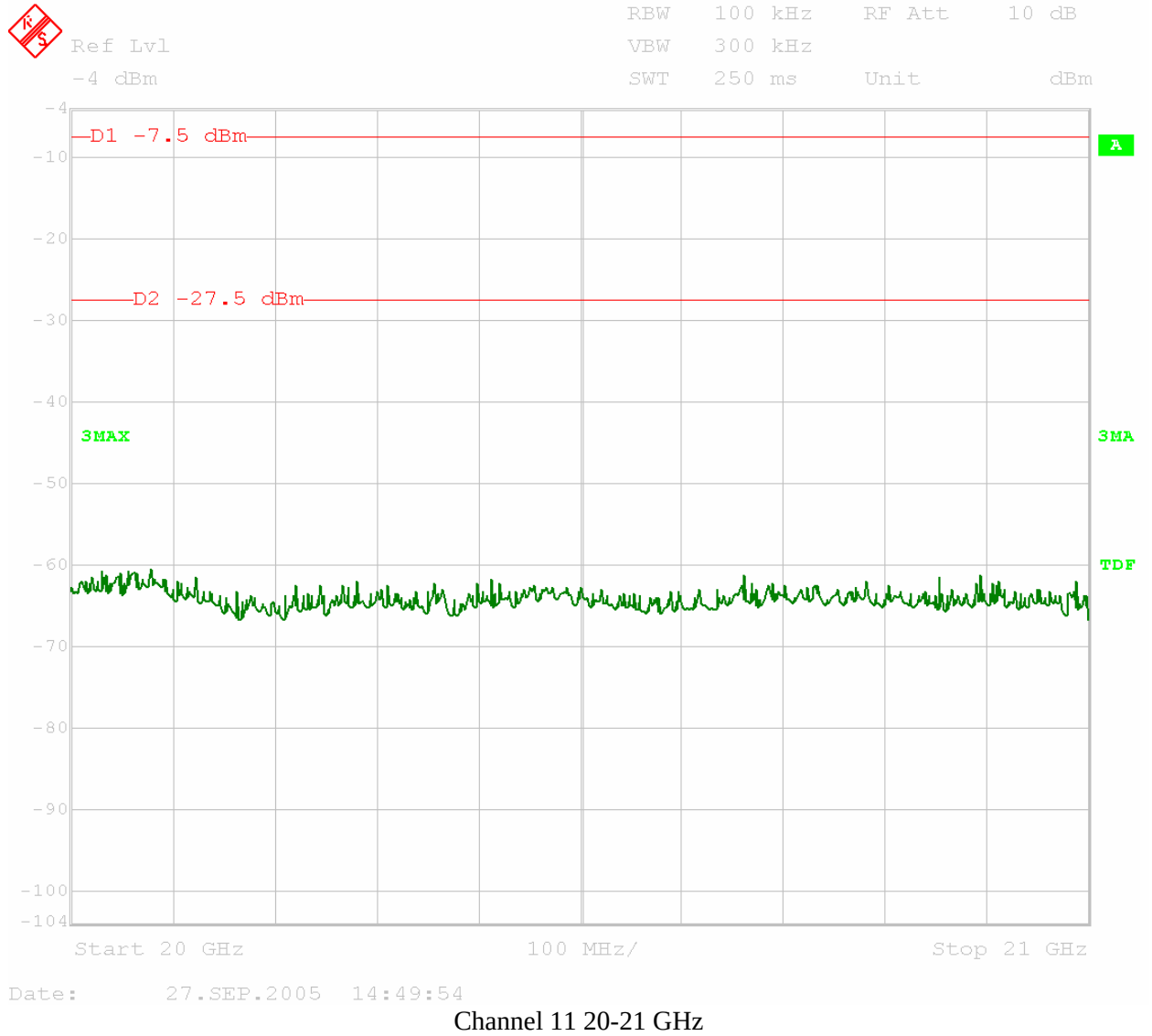




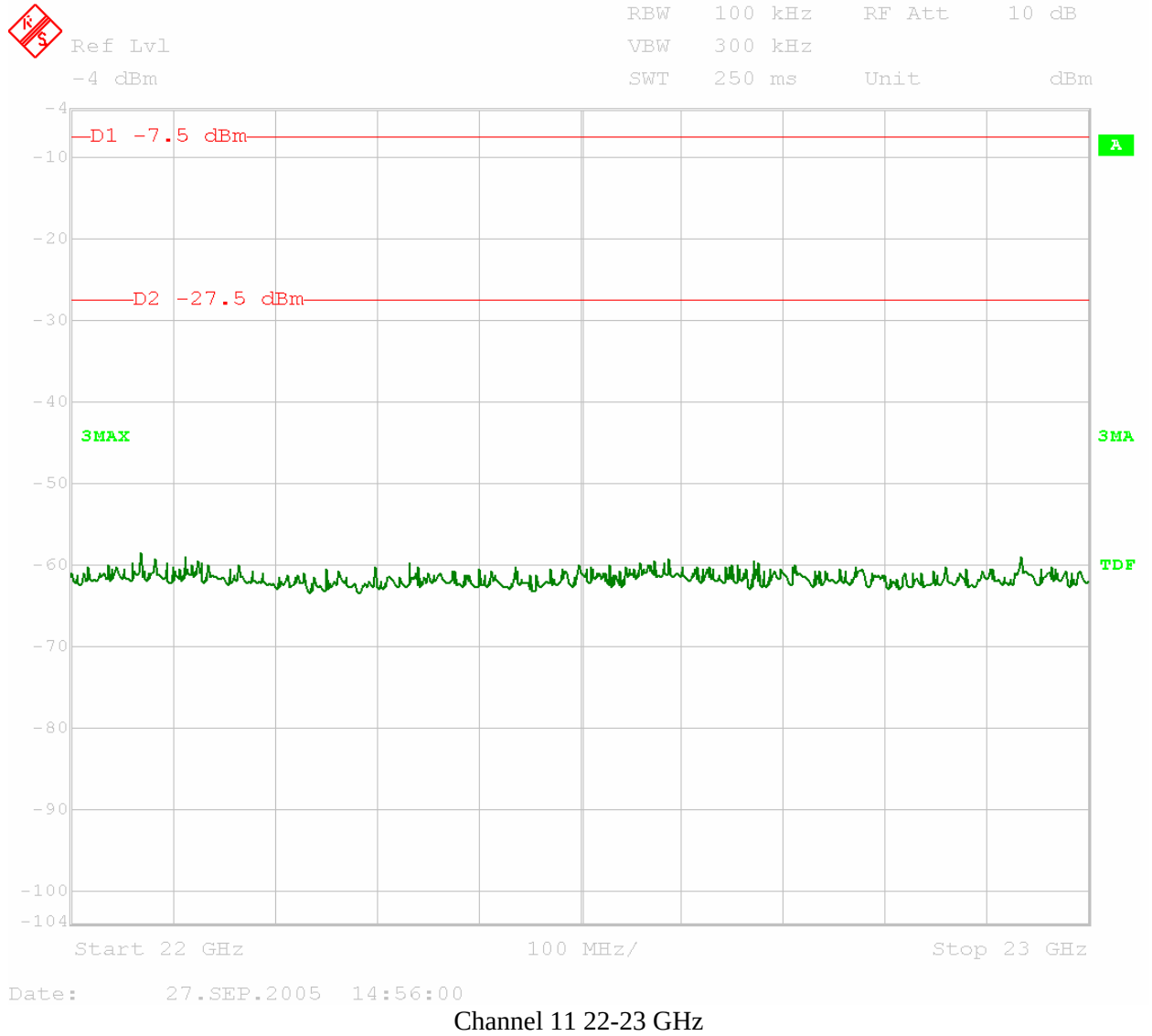


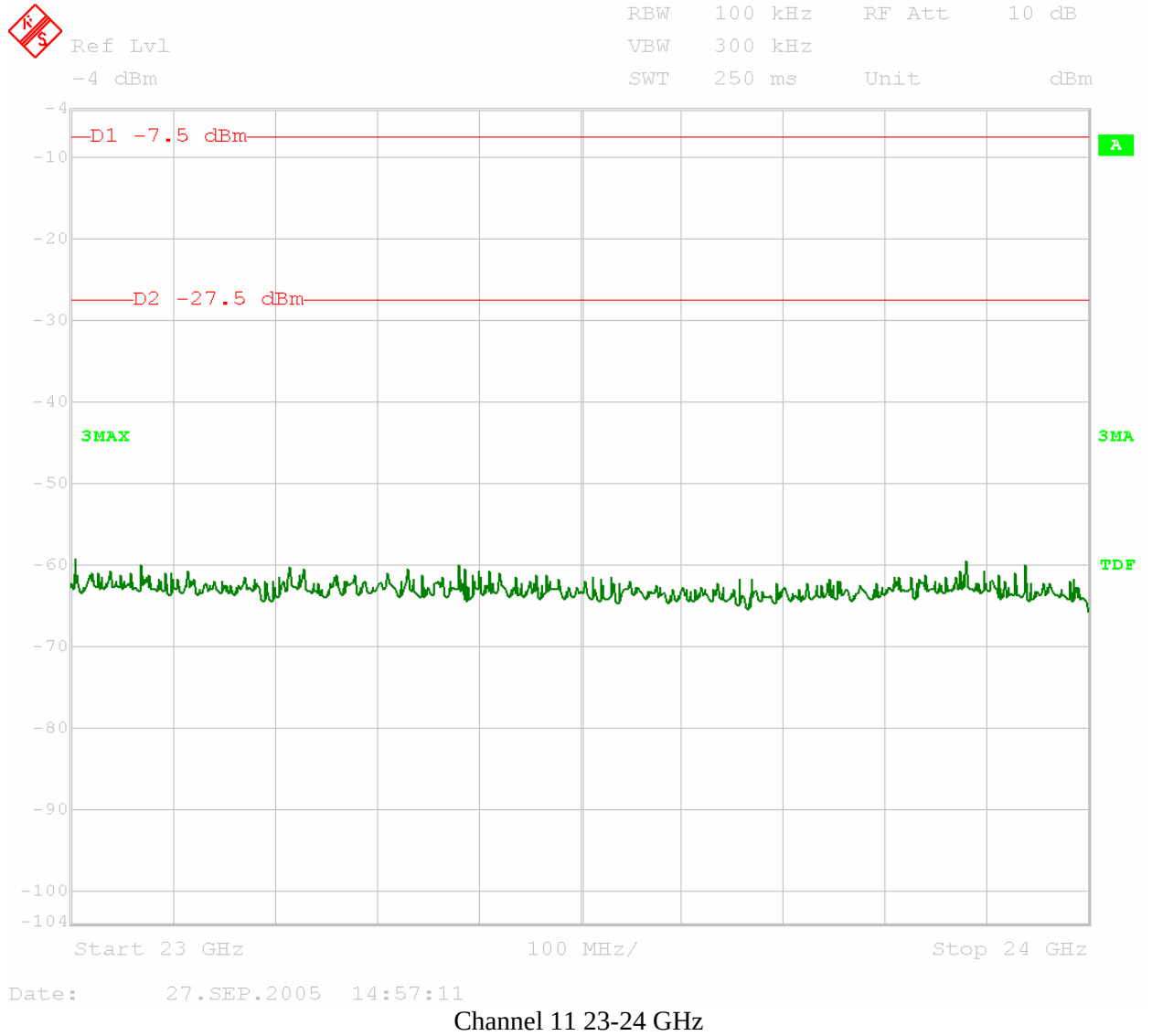














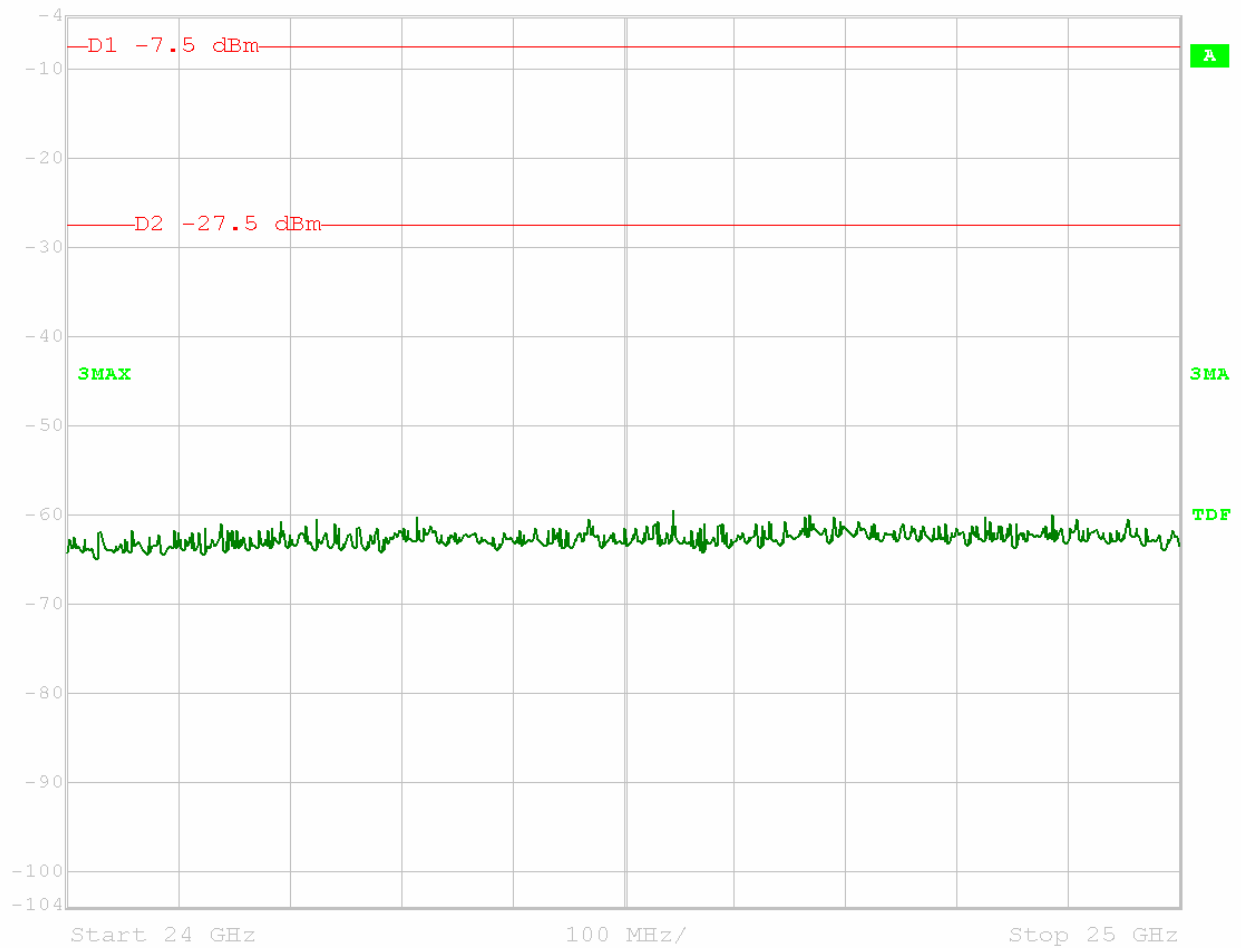
Ref Lvl

-4 dBm

RBW 100 kHz RF Att 10 dB

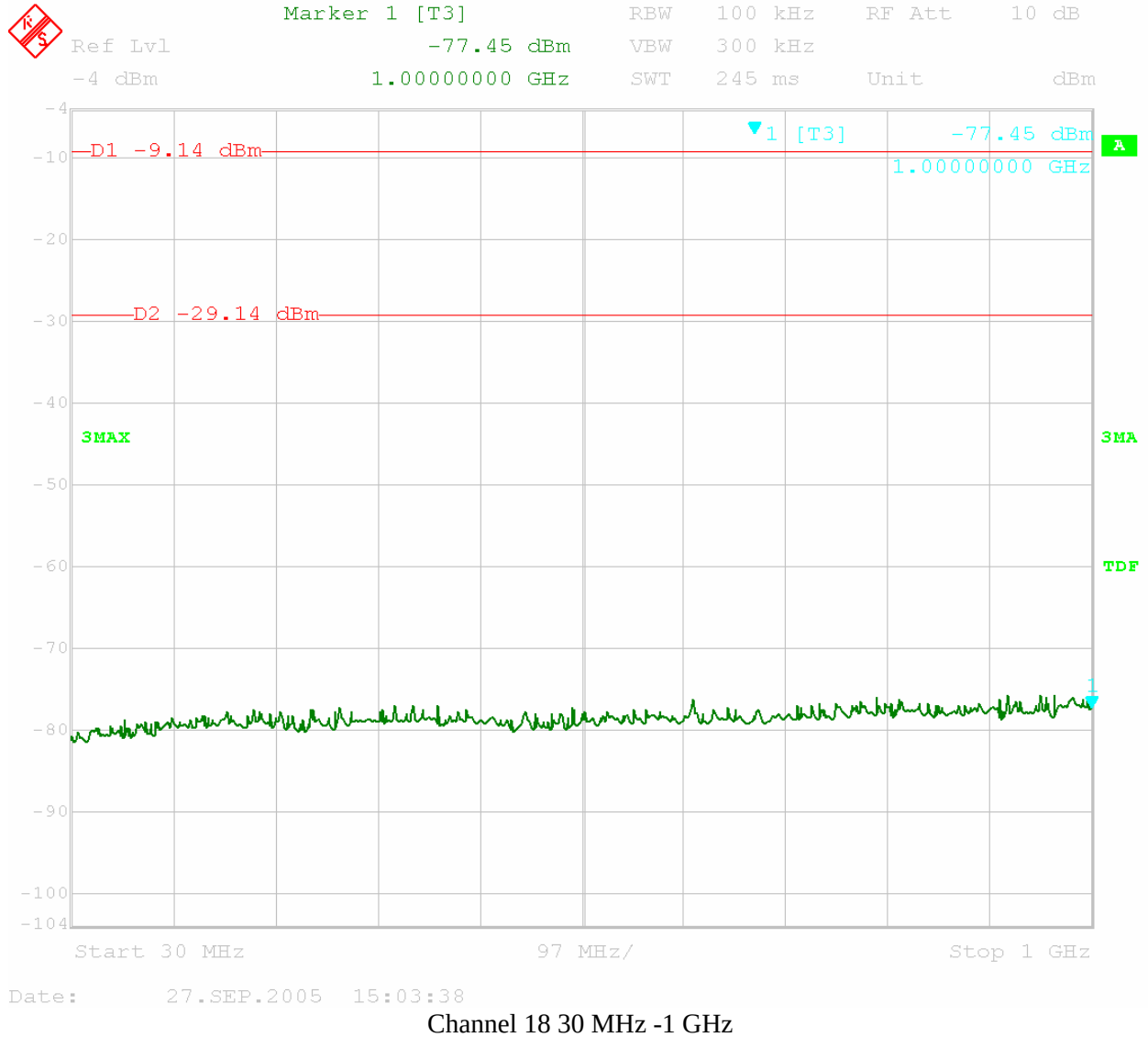
VBW 300 kHz

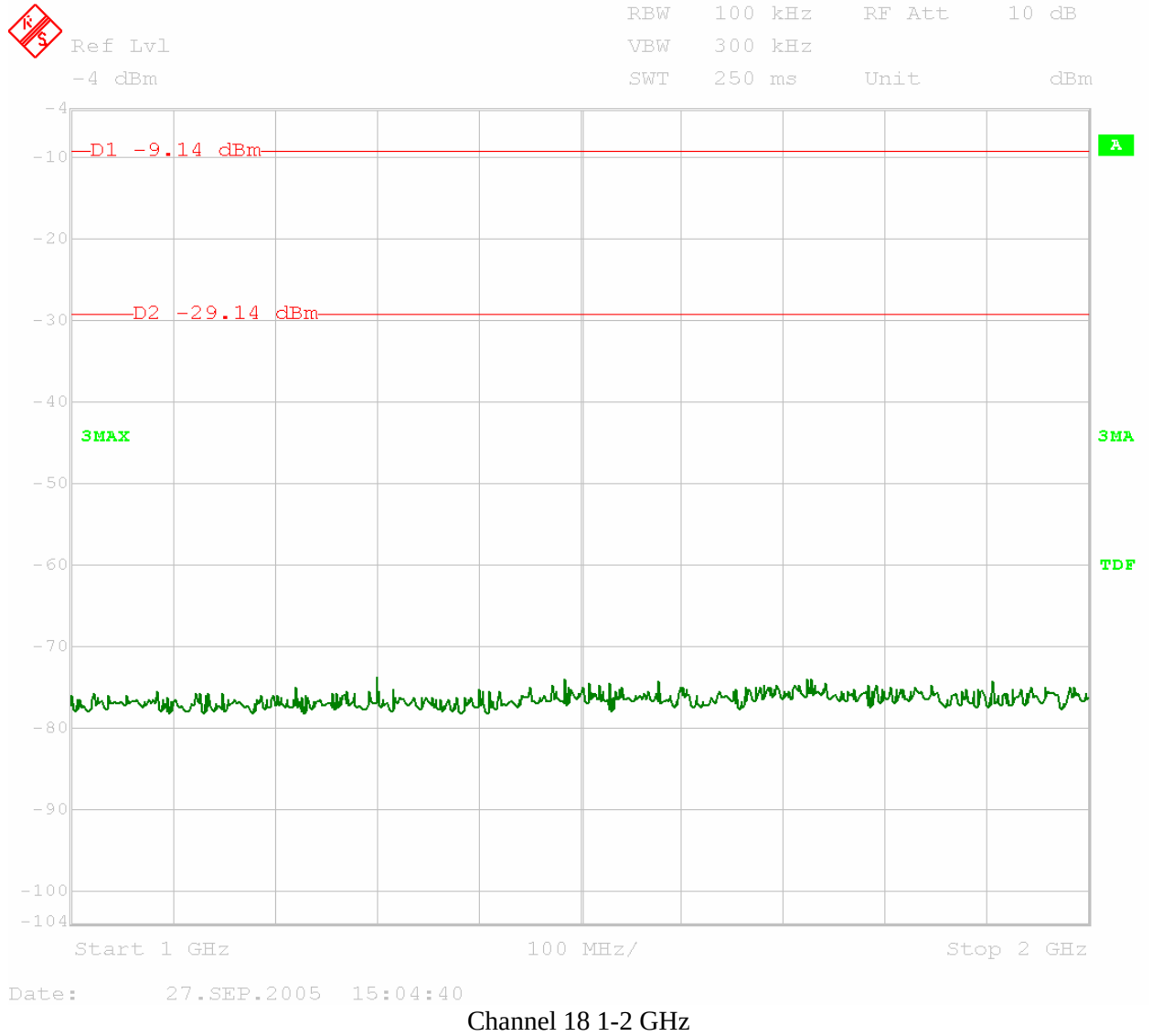
SWT 250 ms Unit dBm



Date: 27.SEP.2005 14:59:25

Channel 11 24-25 GHz

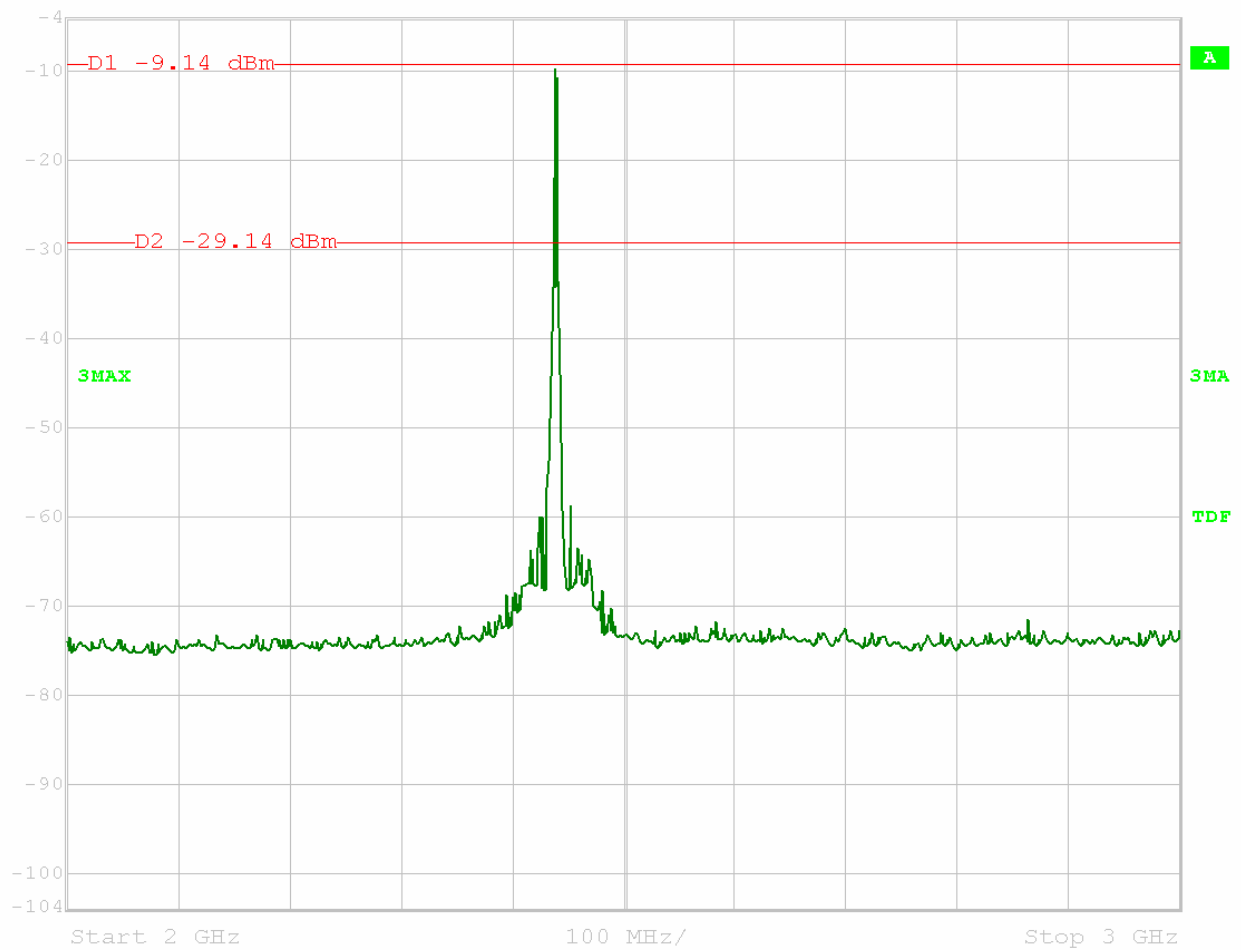






Ref Lvl
-4 dBm

RBW 100 kHz RF Att 10 dB
VBW 300 kHz
SWT 250 ms Unit dBm



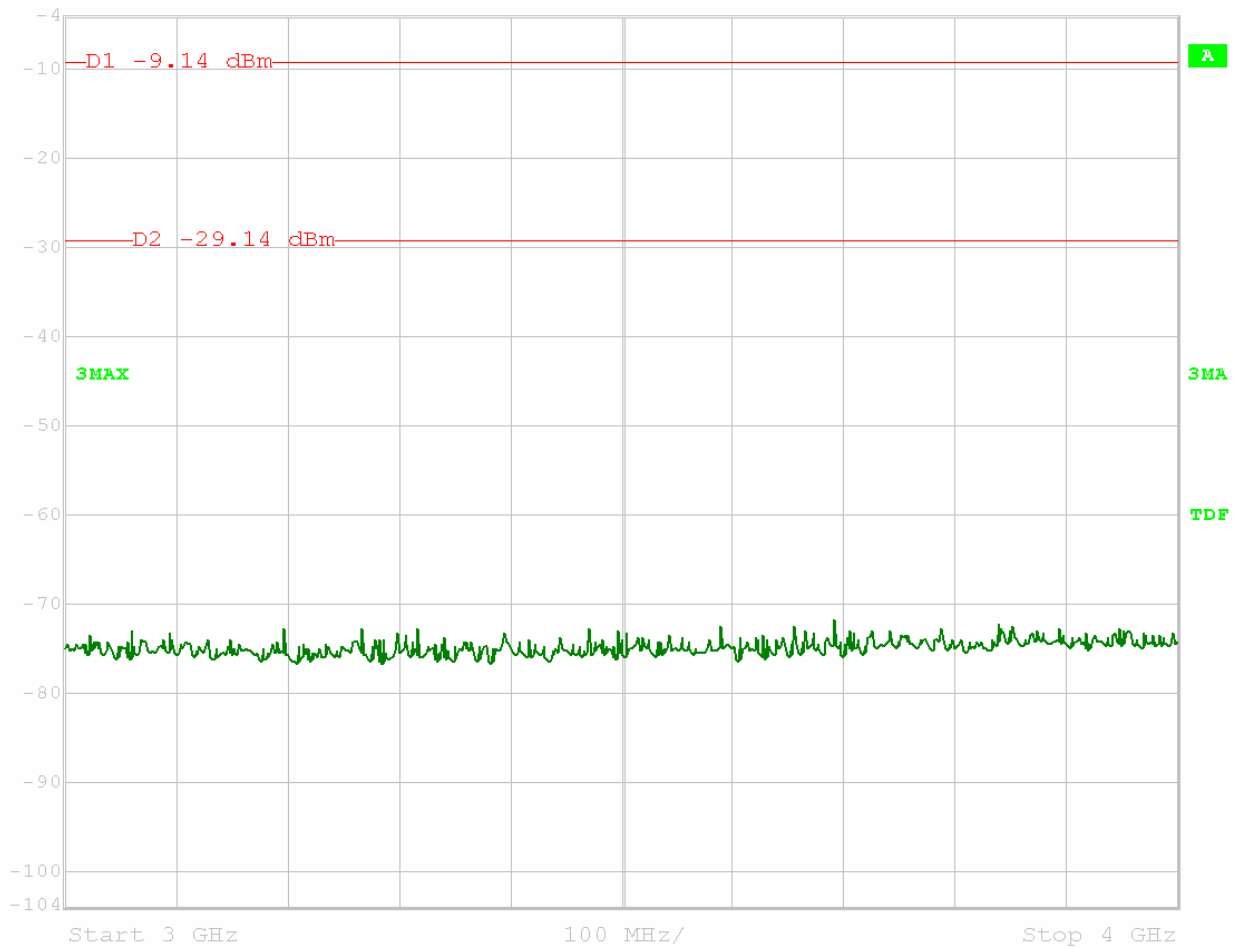
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Channel 18 2-3 GHz



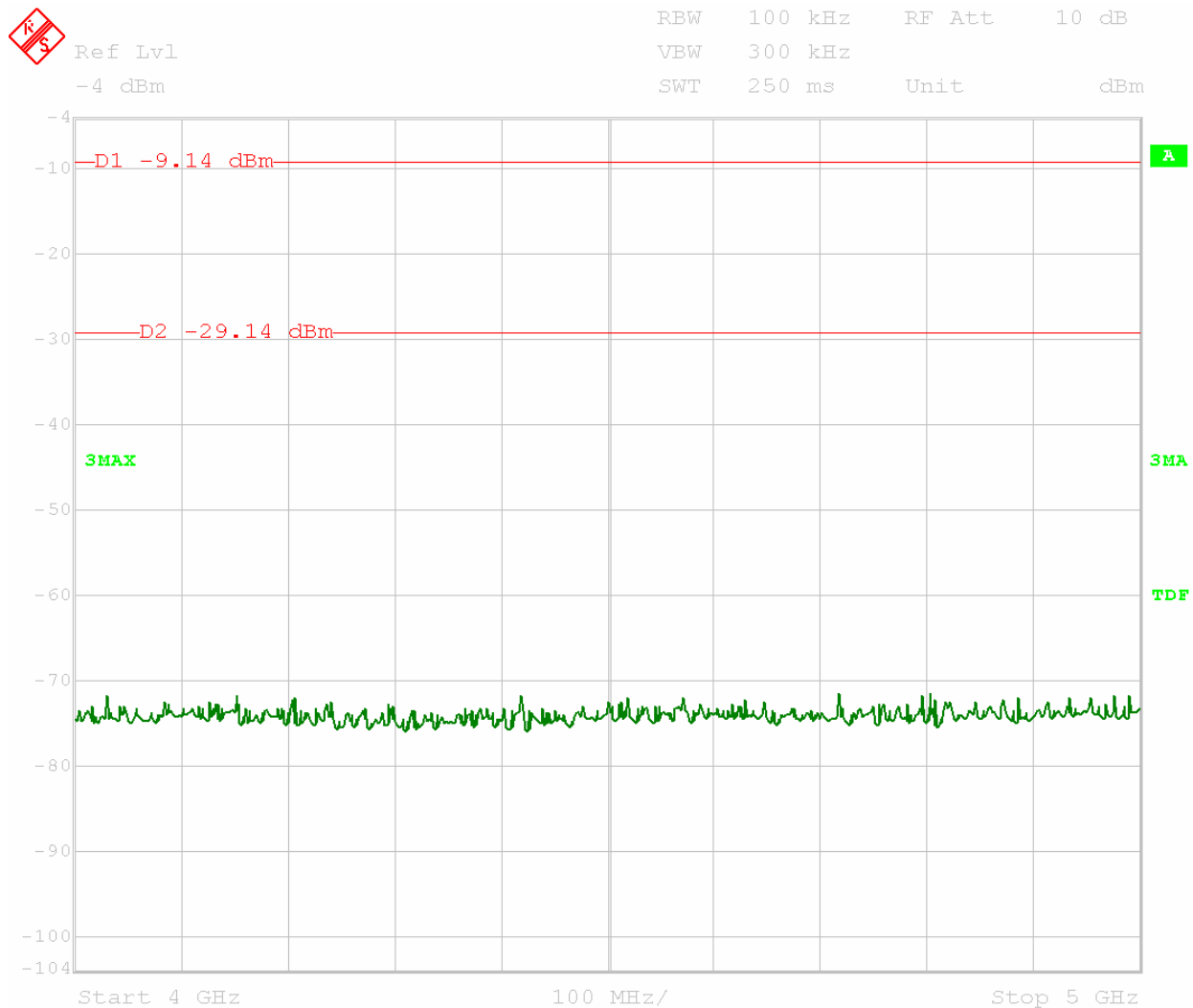
Ref Lvl
-4 dBm

RBW 100 kHz RF Att 10 dB
VBW 300 kHz
SWT 250 ms Unit dBm



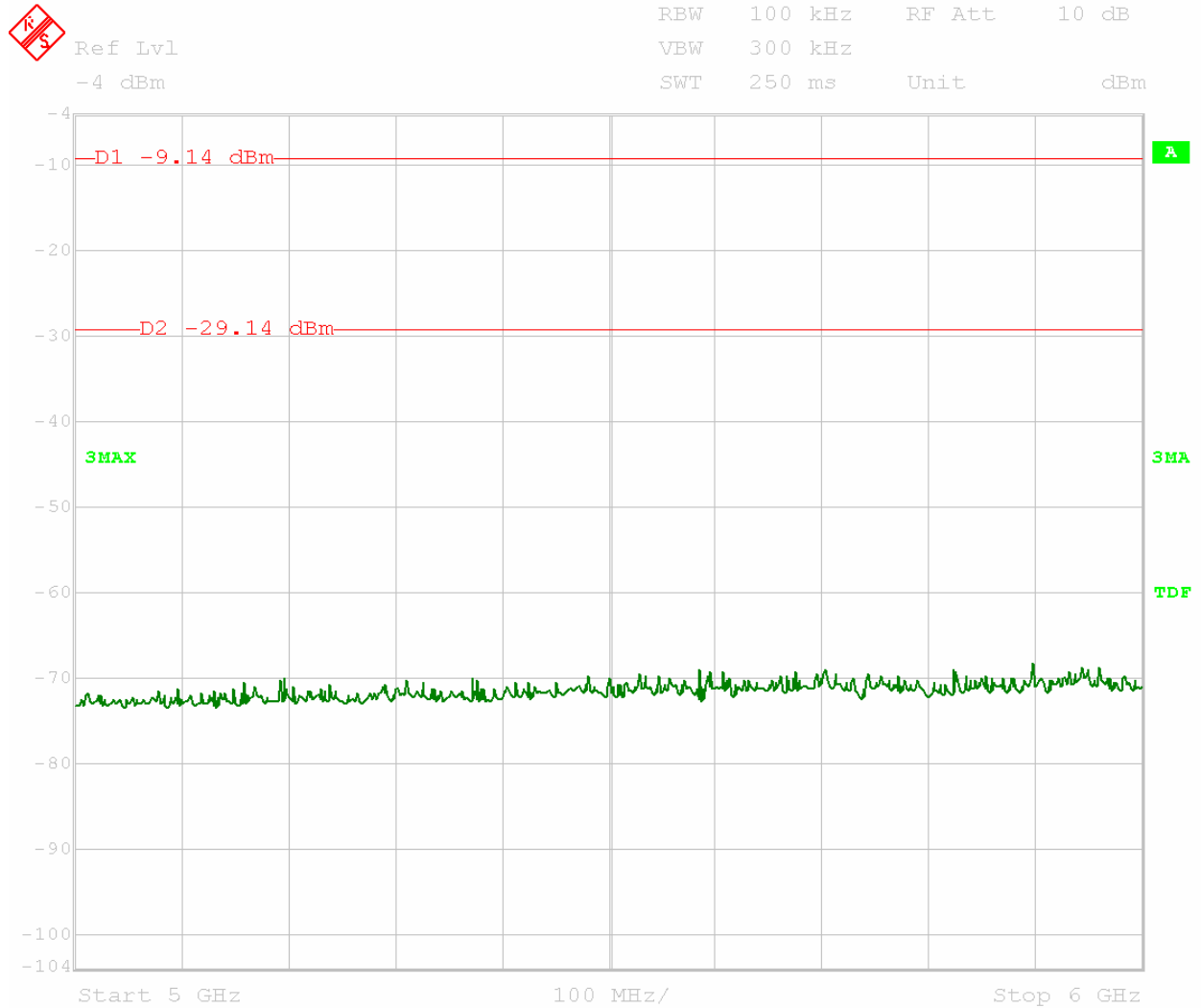
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Channel 18 3-4 GHz



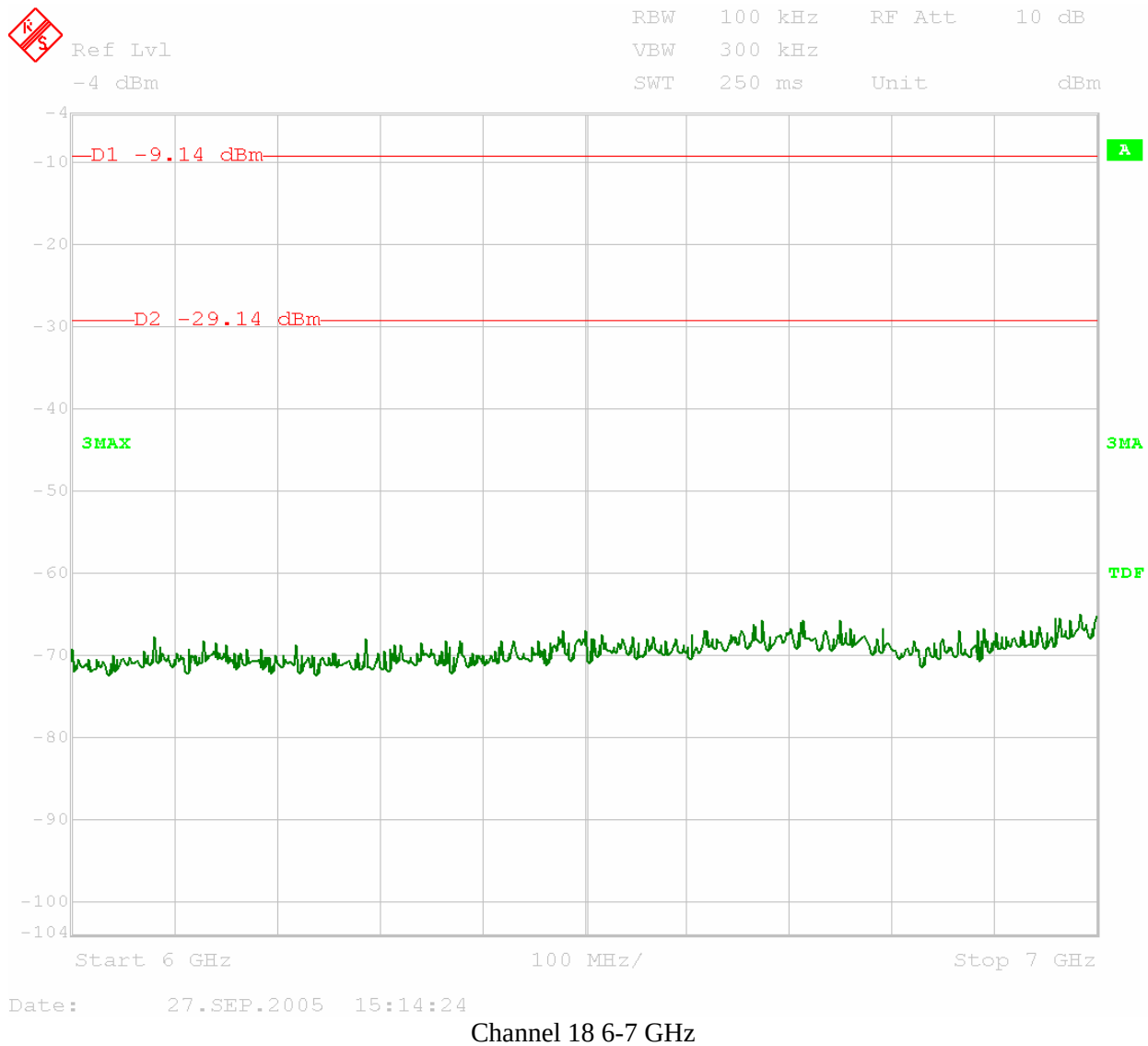
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Channel 18 4-5 GHz



Date: 27.SEP.2005 15:12:17

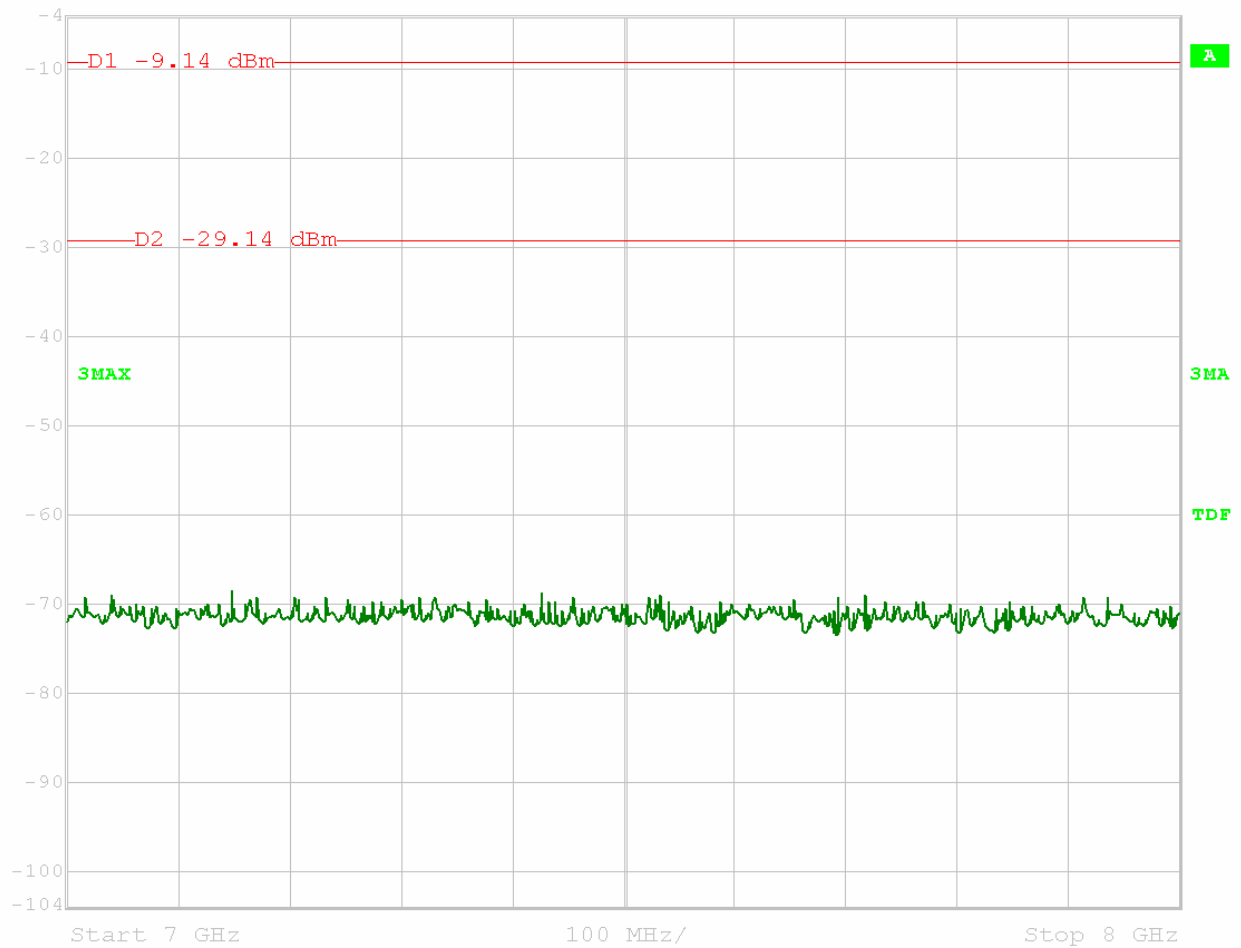
Channel 18 5-6 GHz





Ref Lvl
-4 dBm

RBW 100 kHz RF Att 10 dB
VBW 300 kHz
SWT 250 ms Unit dBm



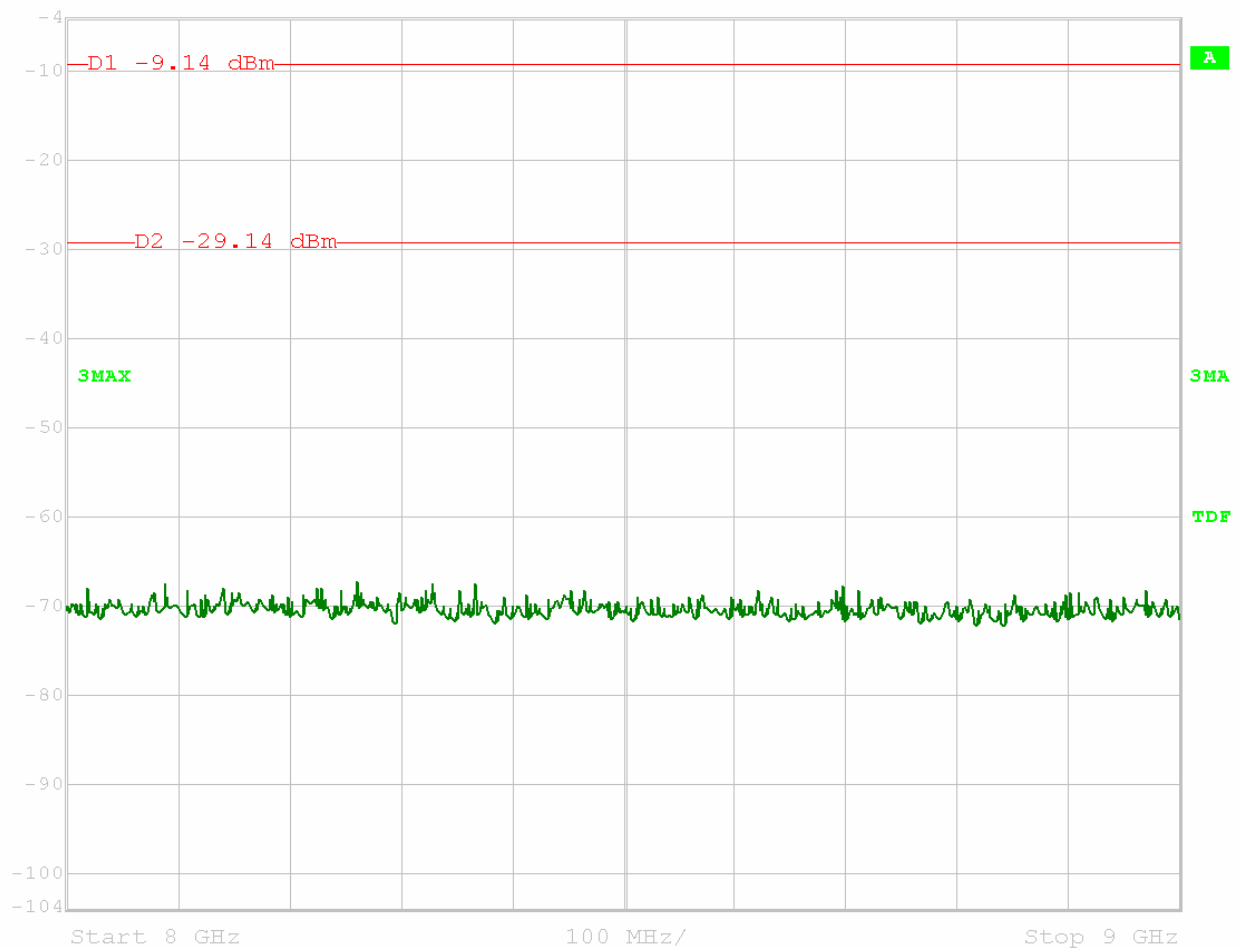
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Channel 18 7-8 GHz



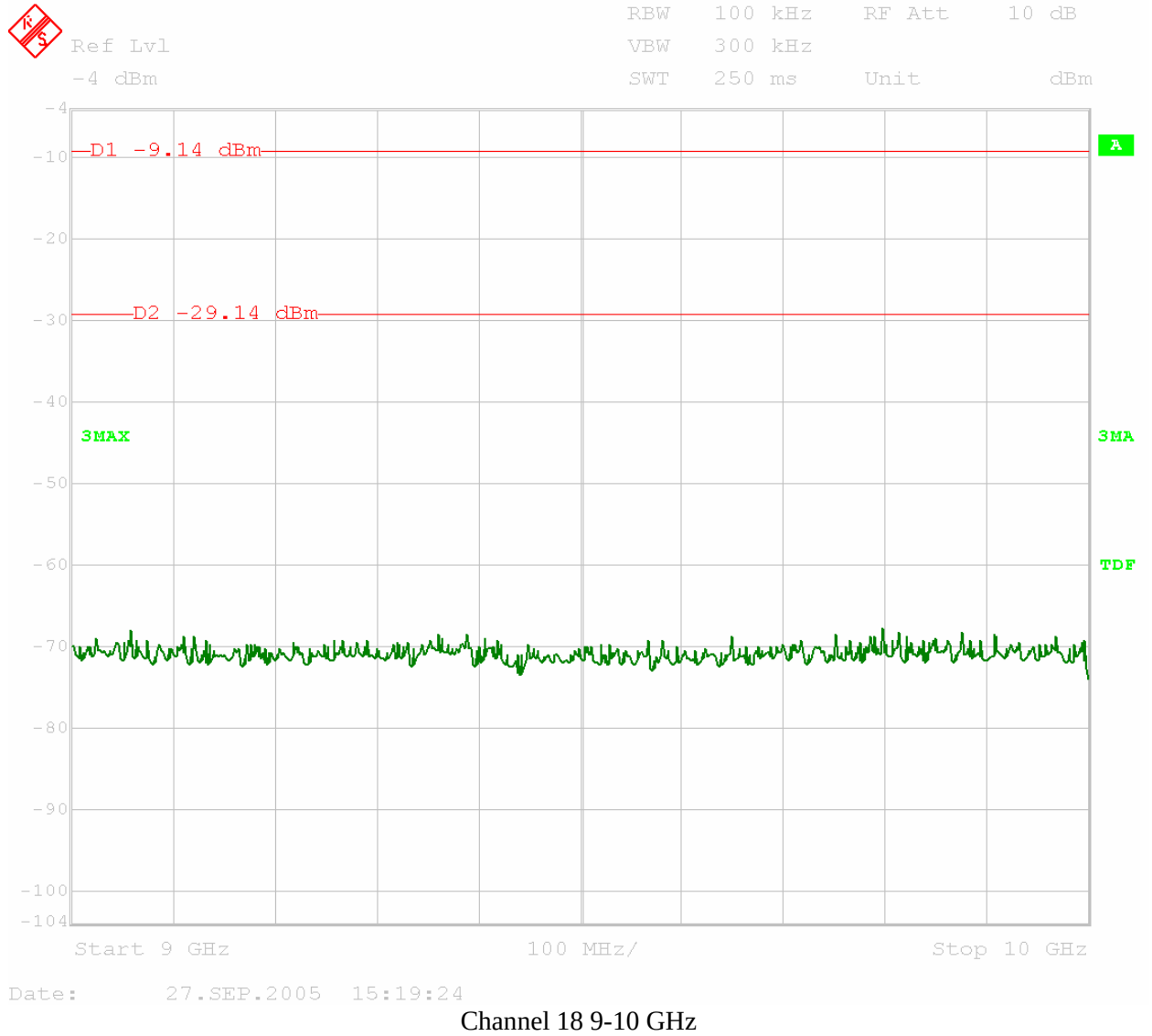
Ref Lvl
-4 dBm

RBW 100 kHz RF Att 10 dB
VBW 300 kHz
SWT 250 ms Unit dBm



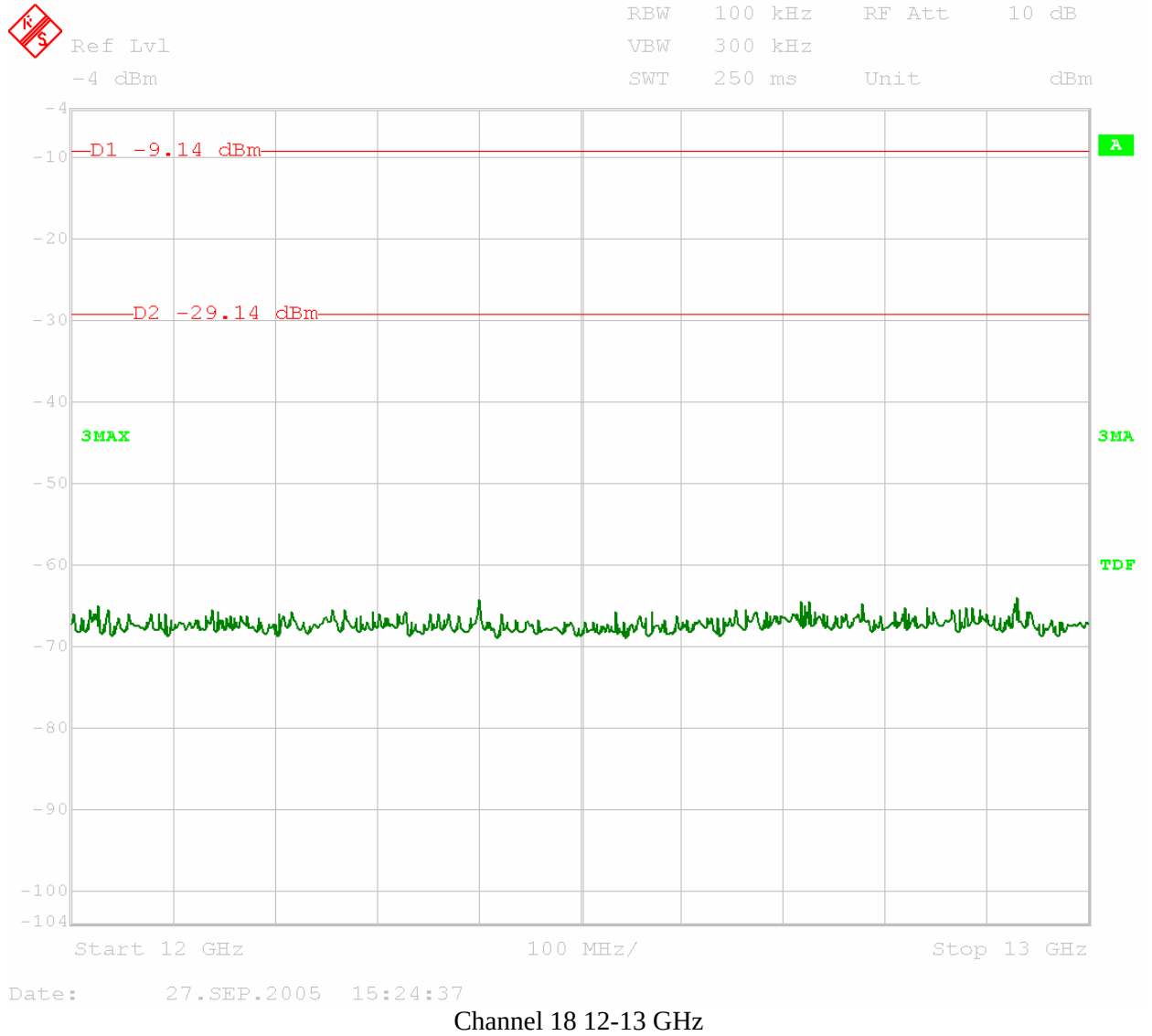
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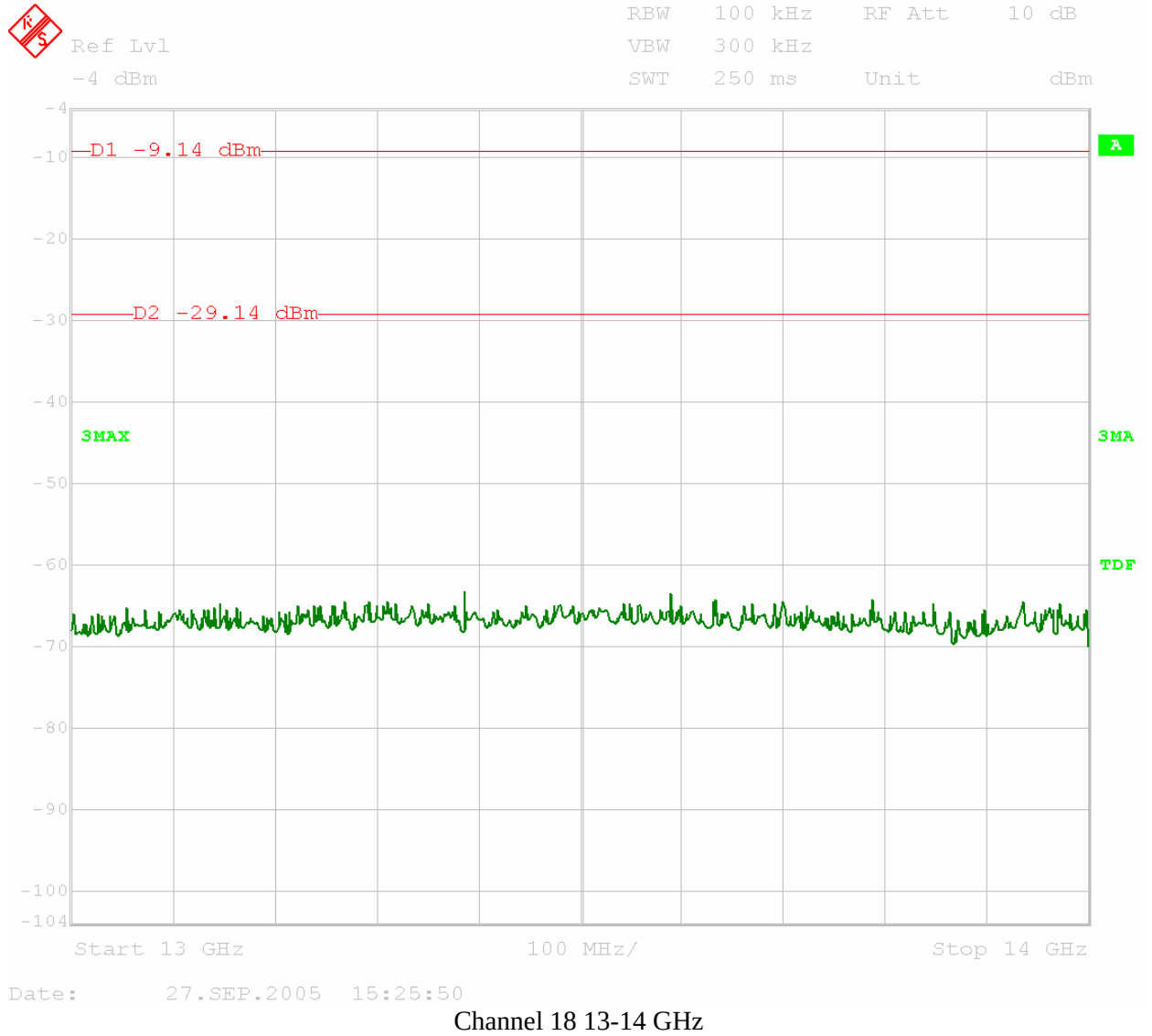
Channel 18 8-9 GHz

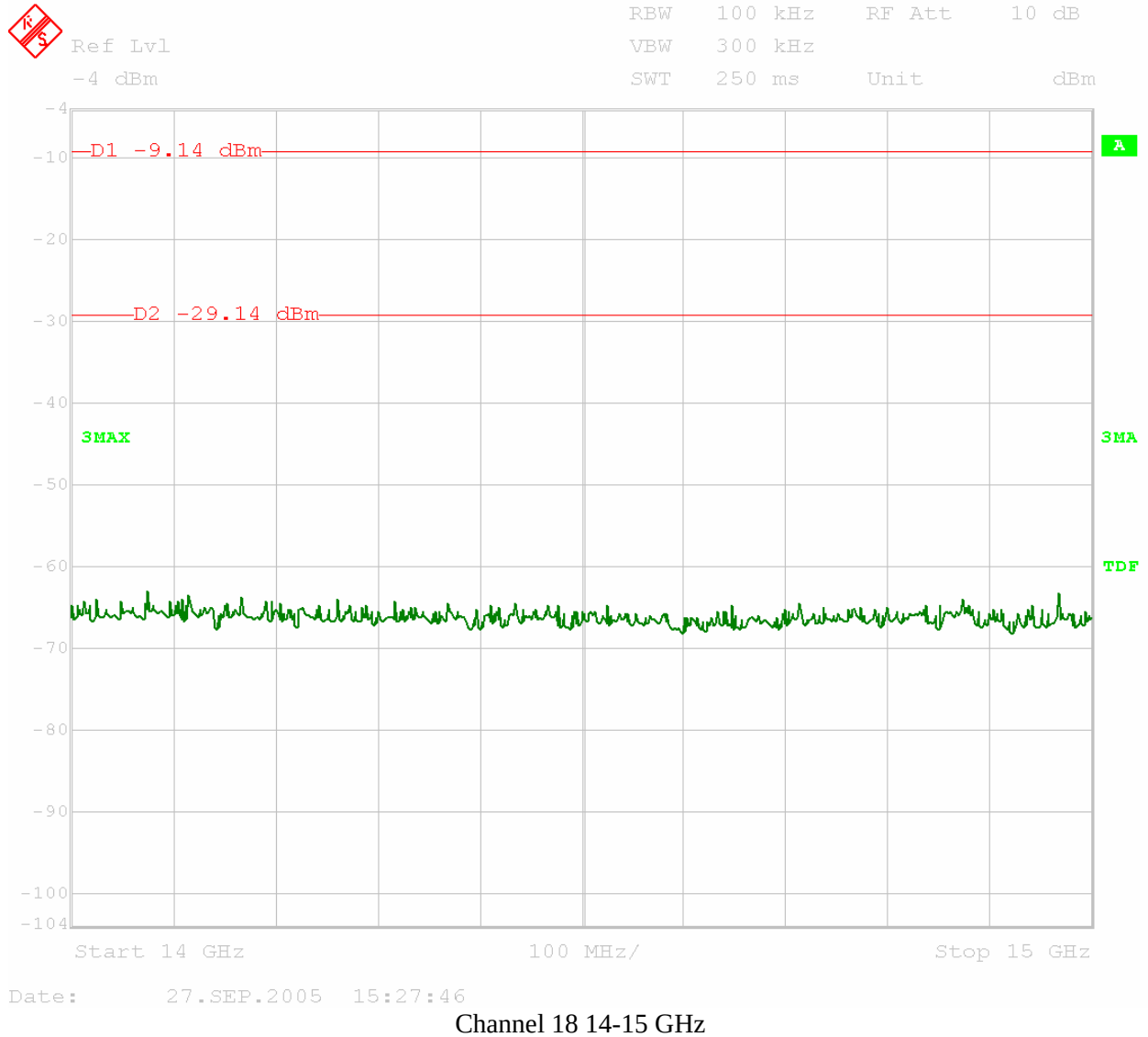


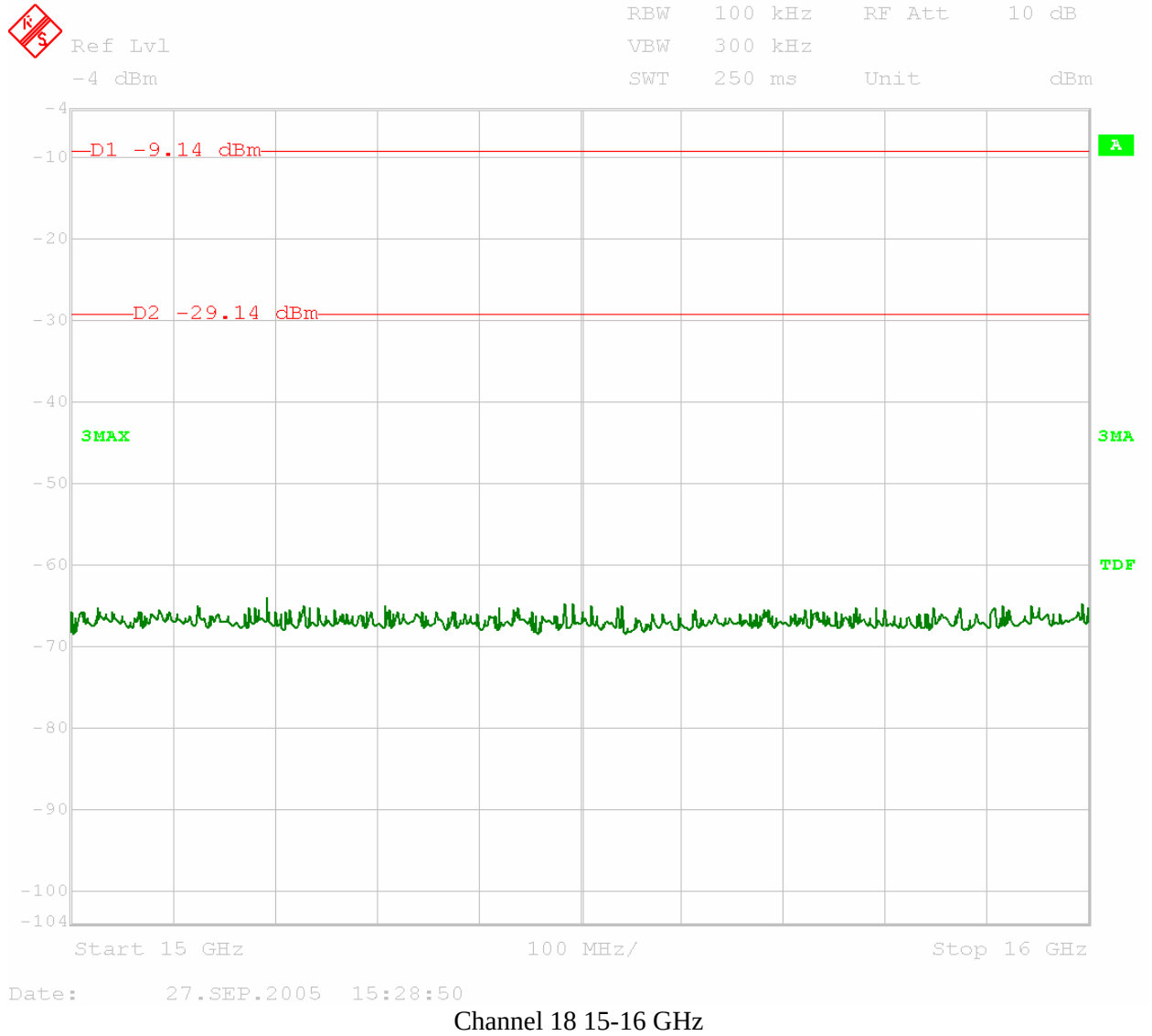




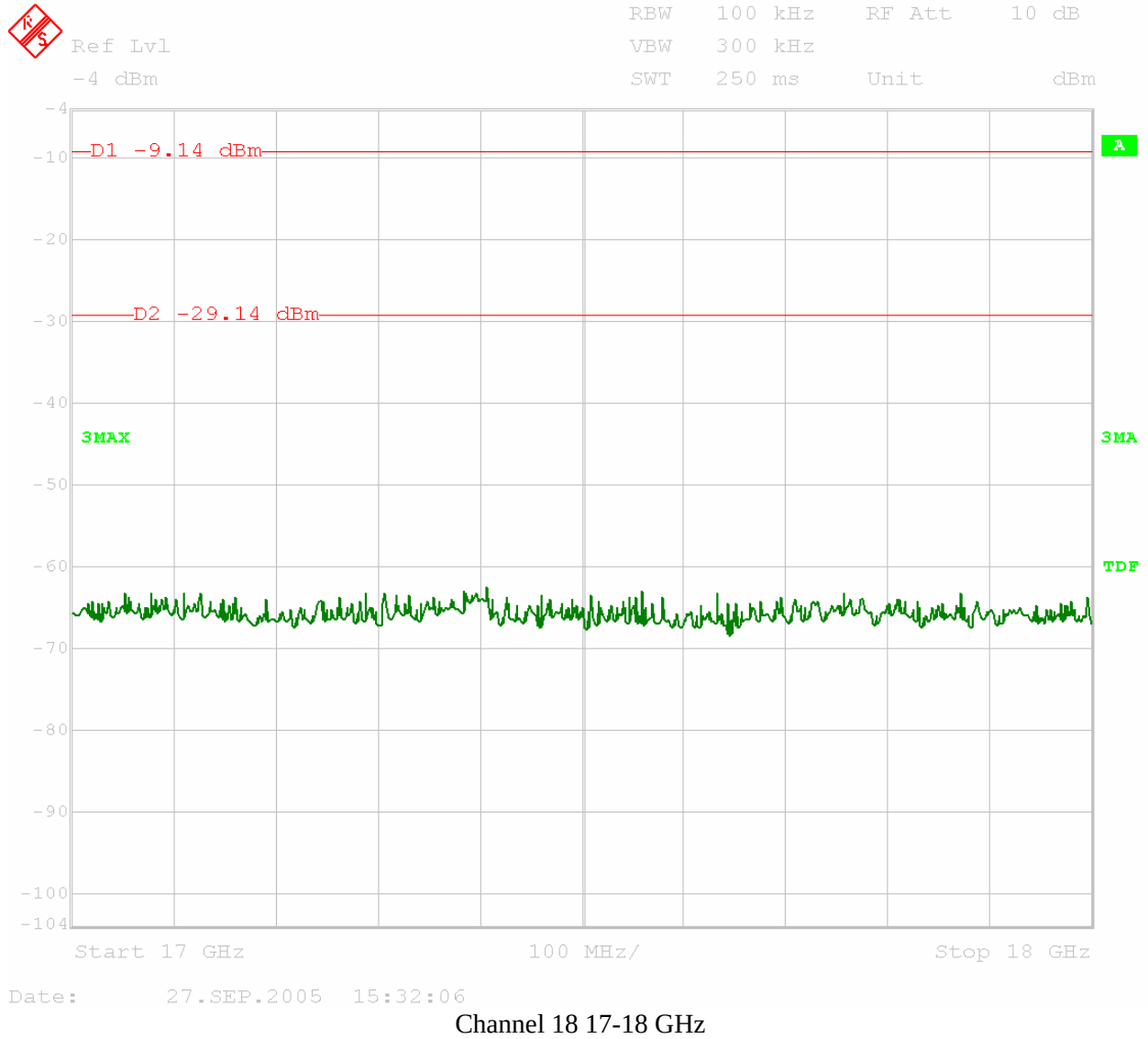




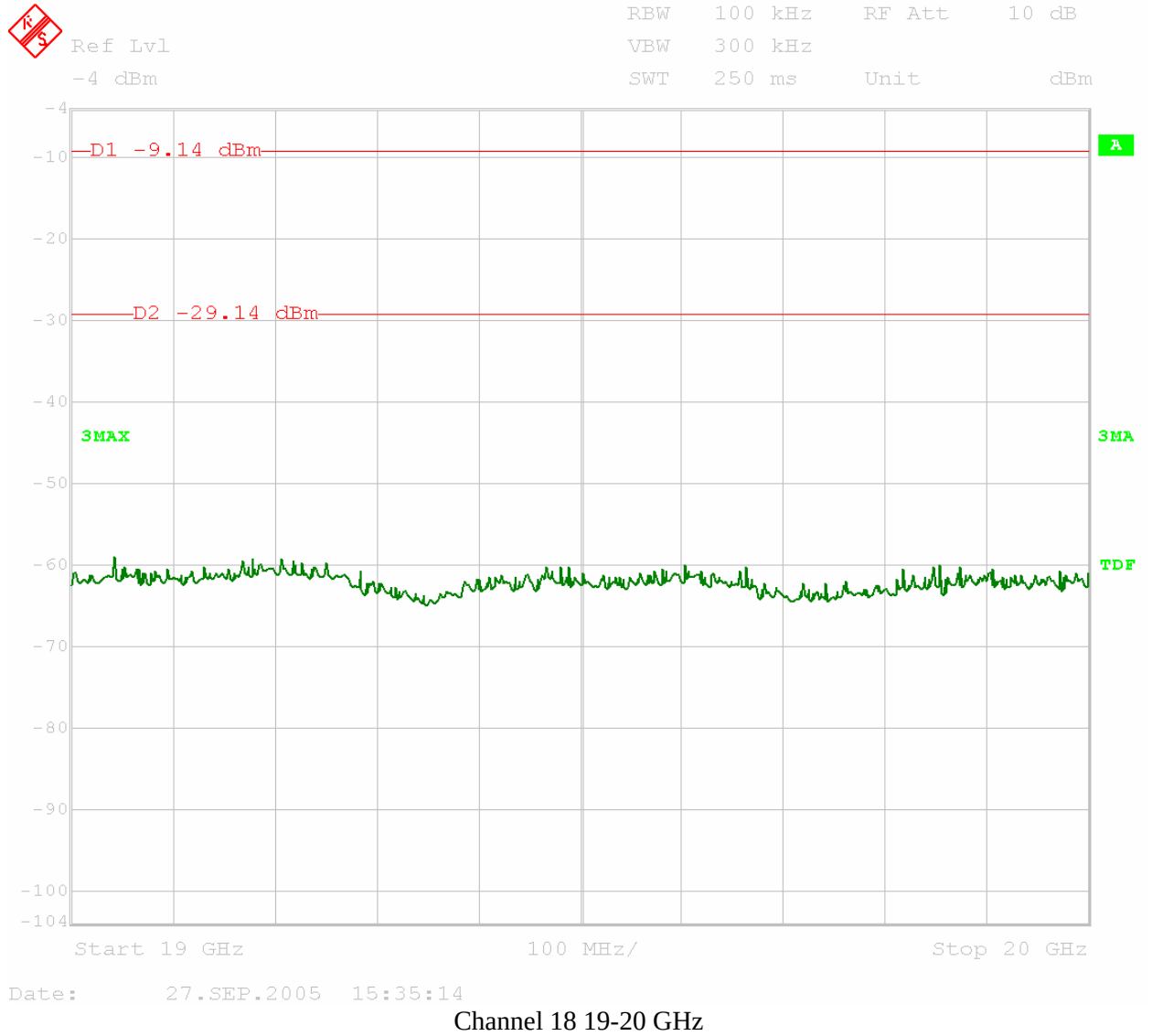










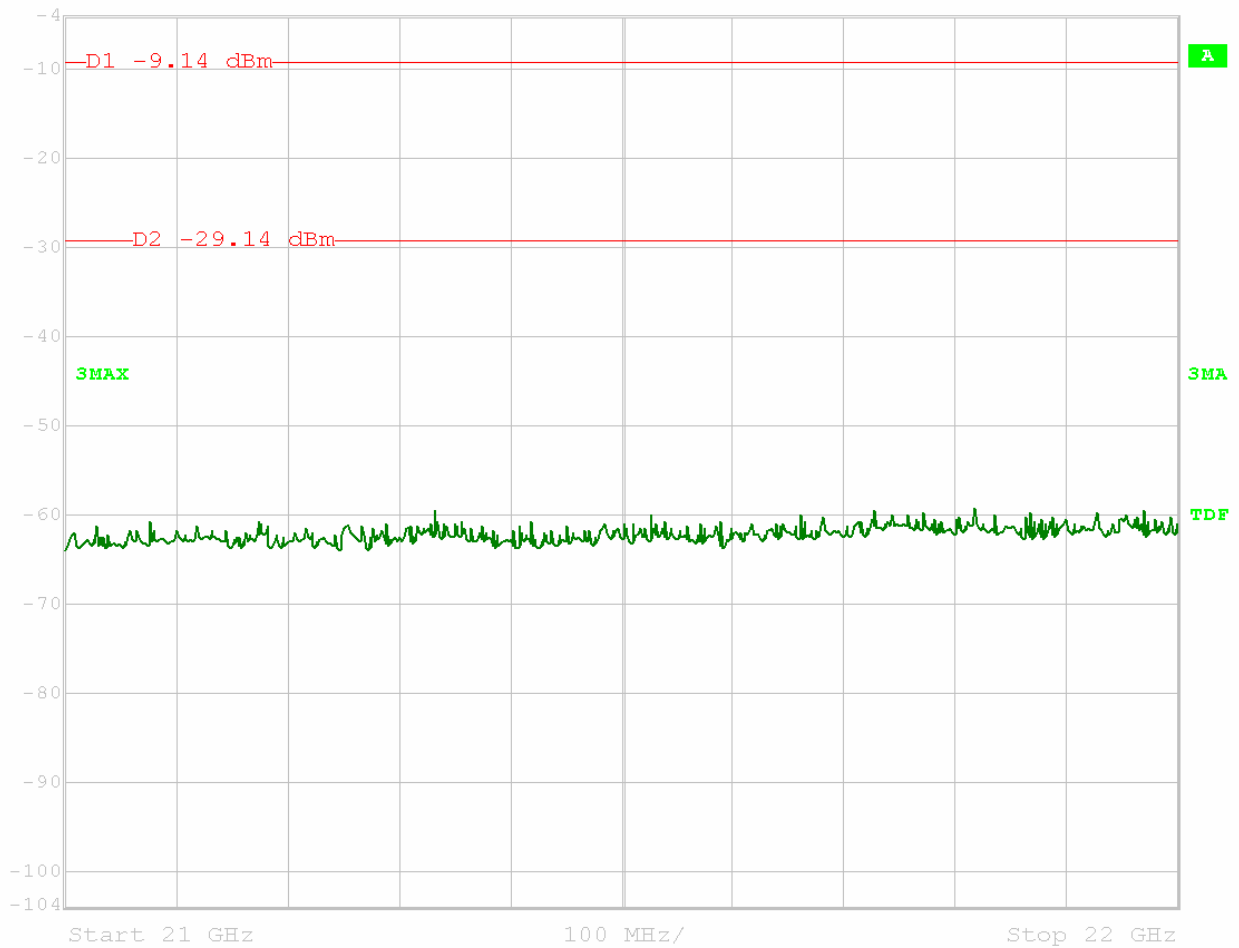






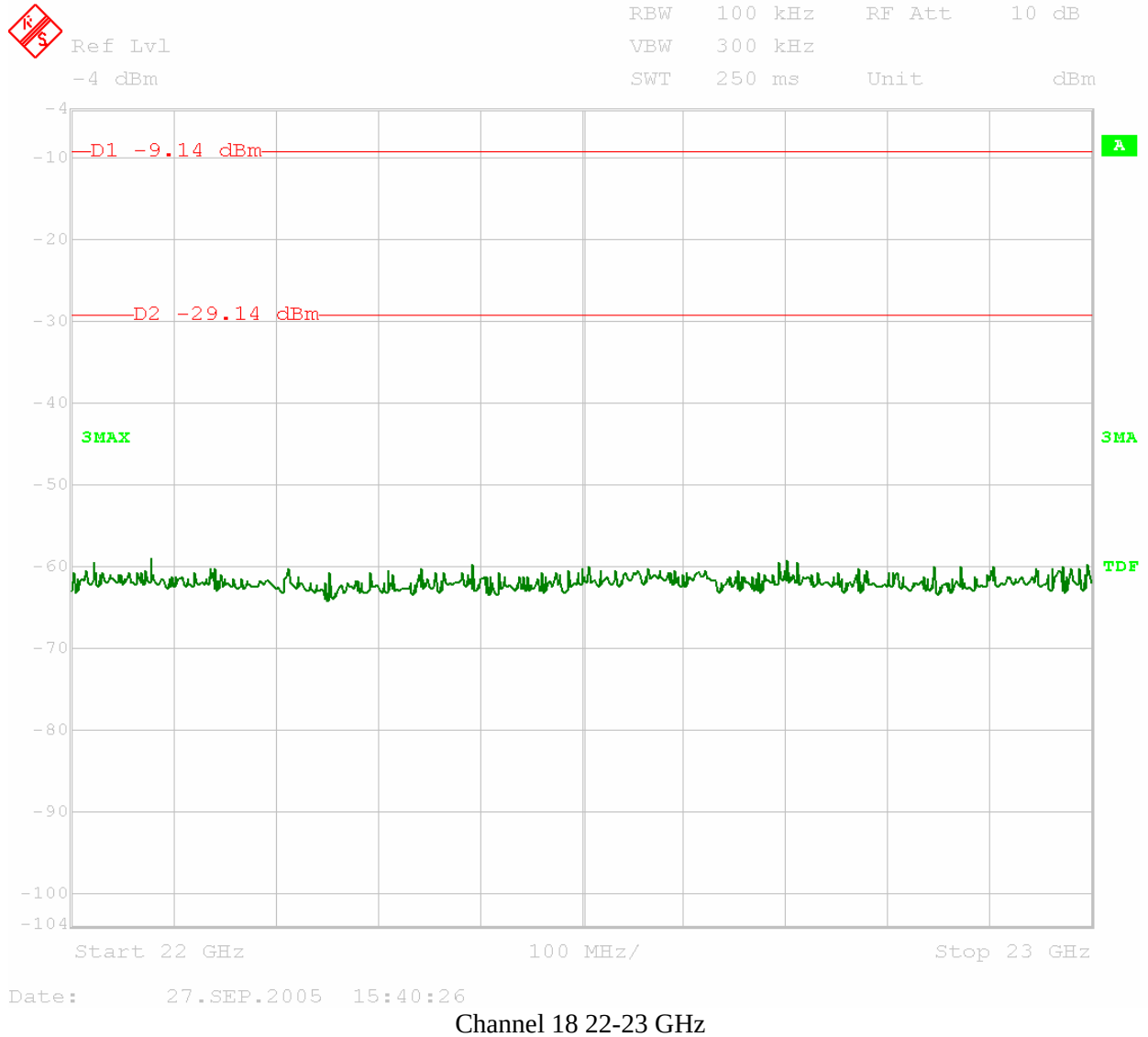
Ref Lvl
-4 dBm

RBW 100 kHz RF Att 10 dB
VBW 300 kHz
SWT 250 ms Unit dBm



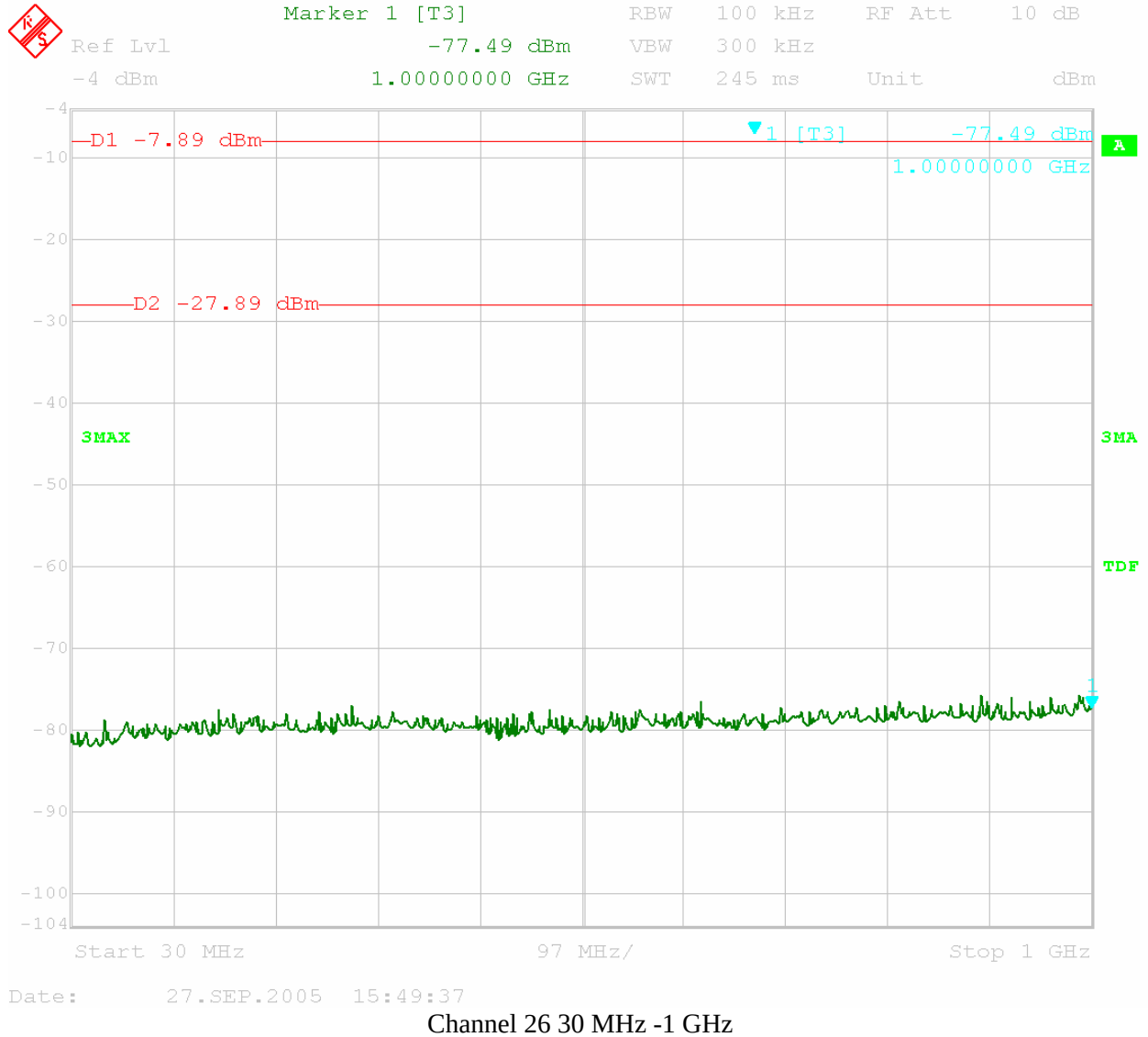
Date: 27.SEP.2005 15:38:24

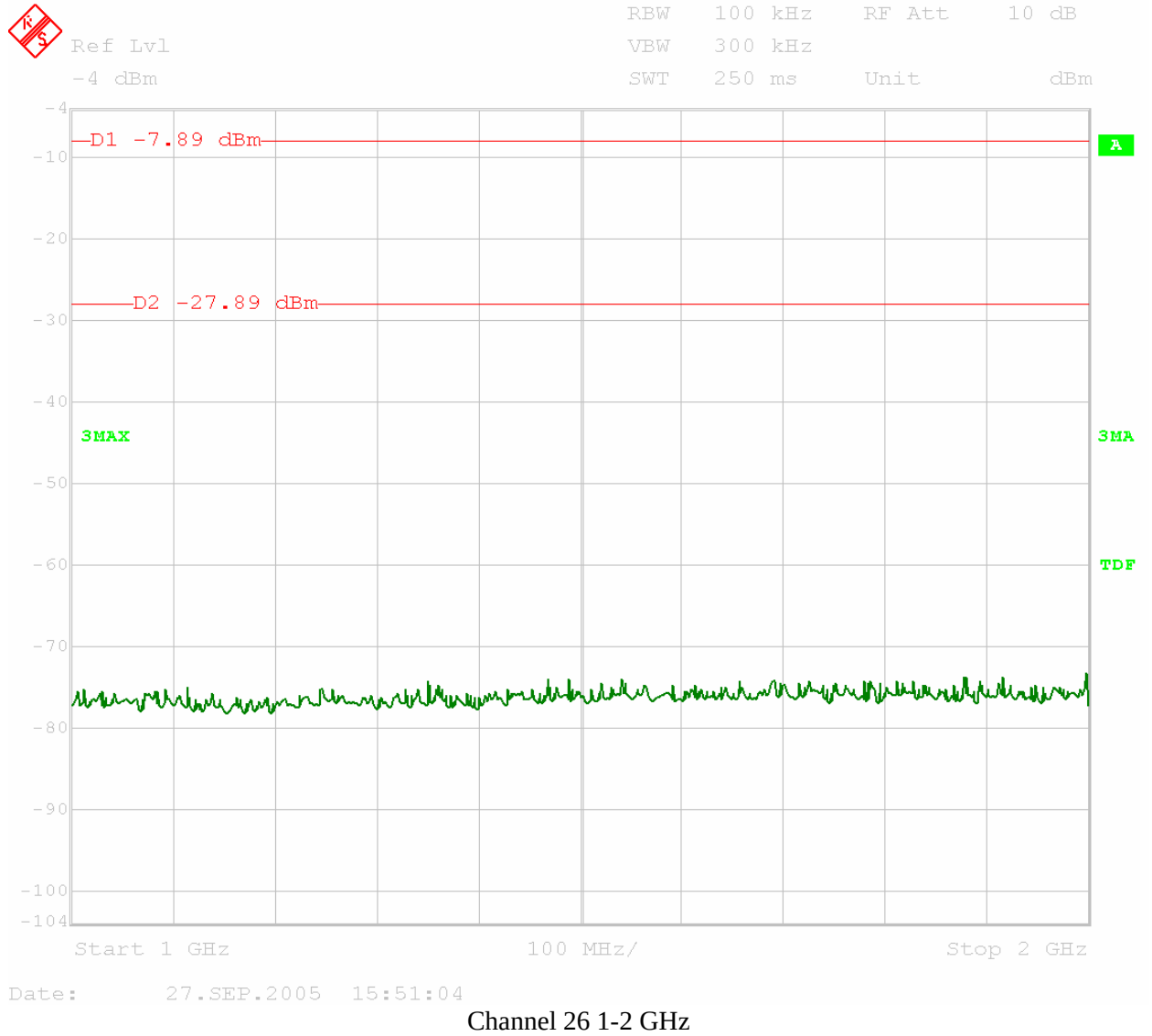
Channel 18 21-22 GHz

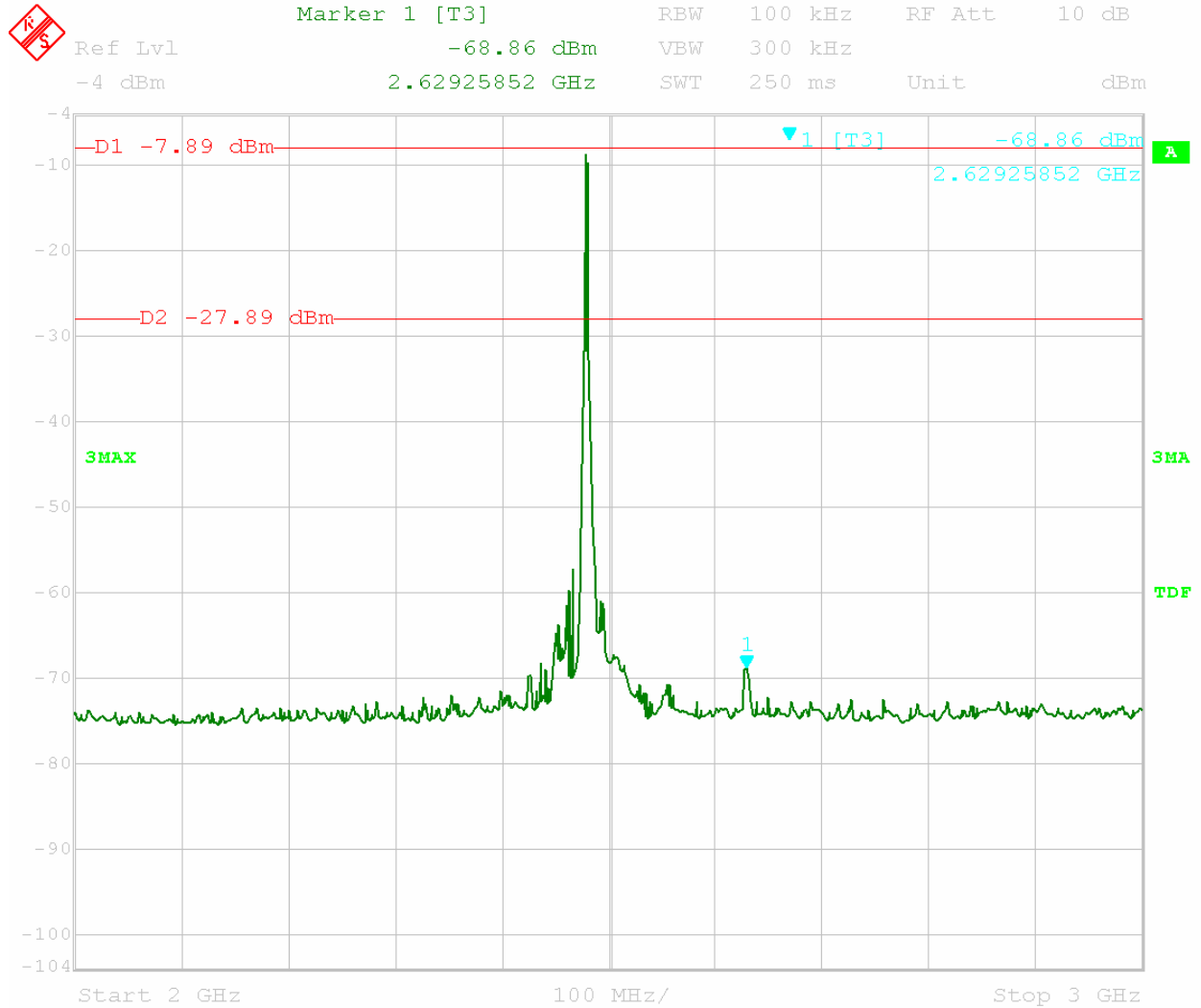












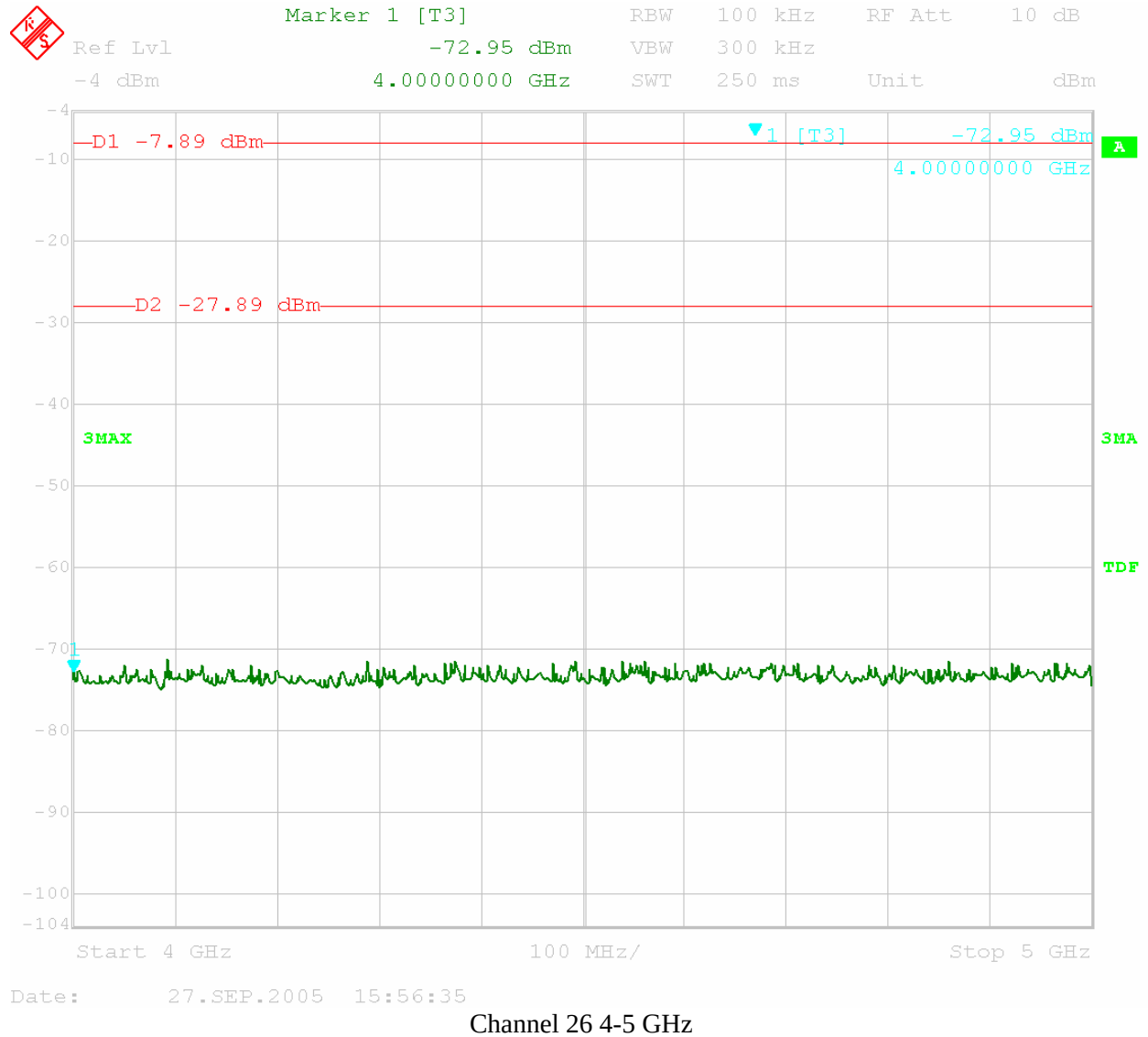
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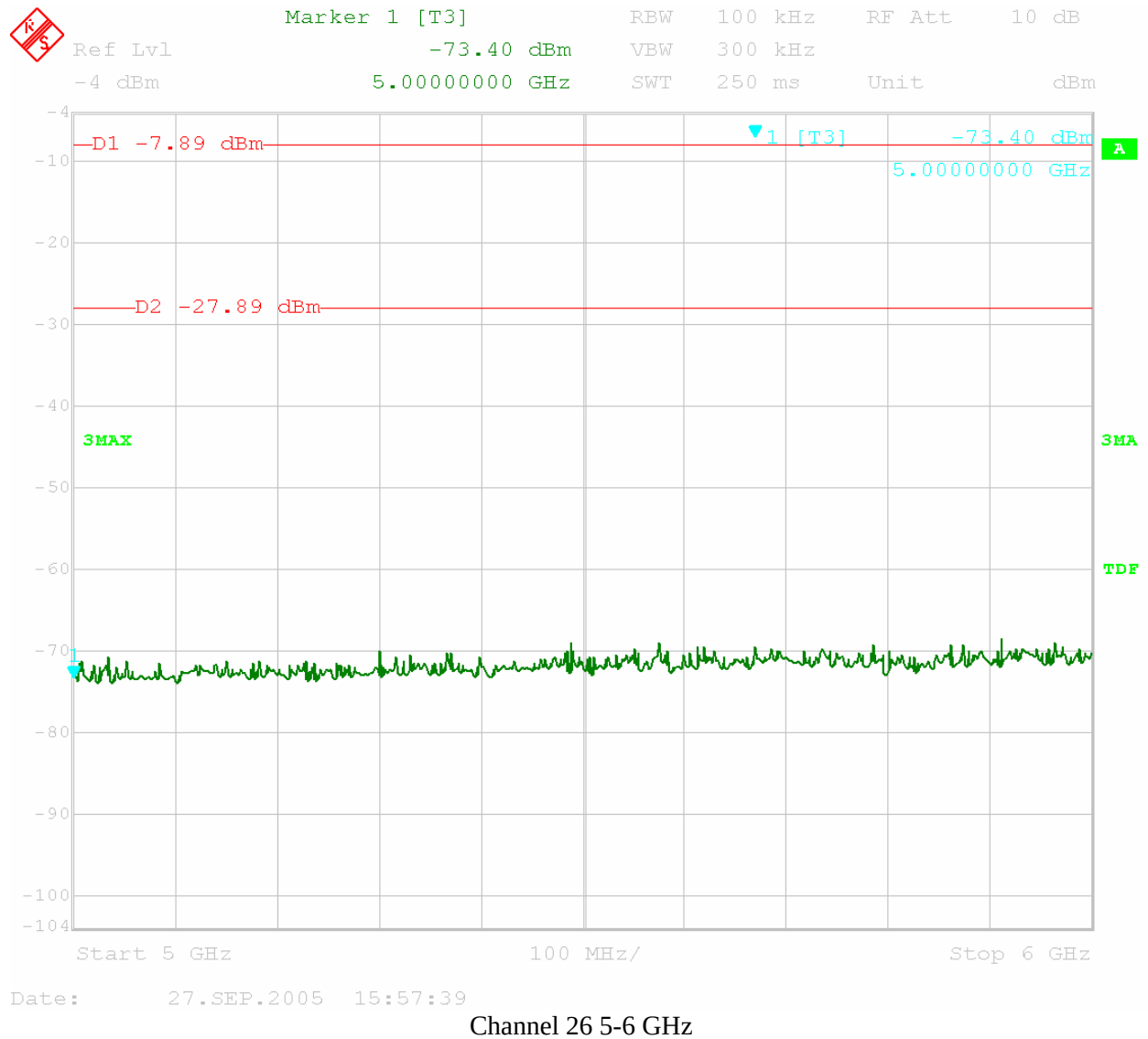
Channel 26 2-3 GHz

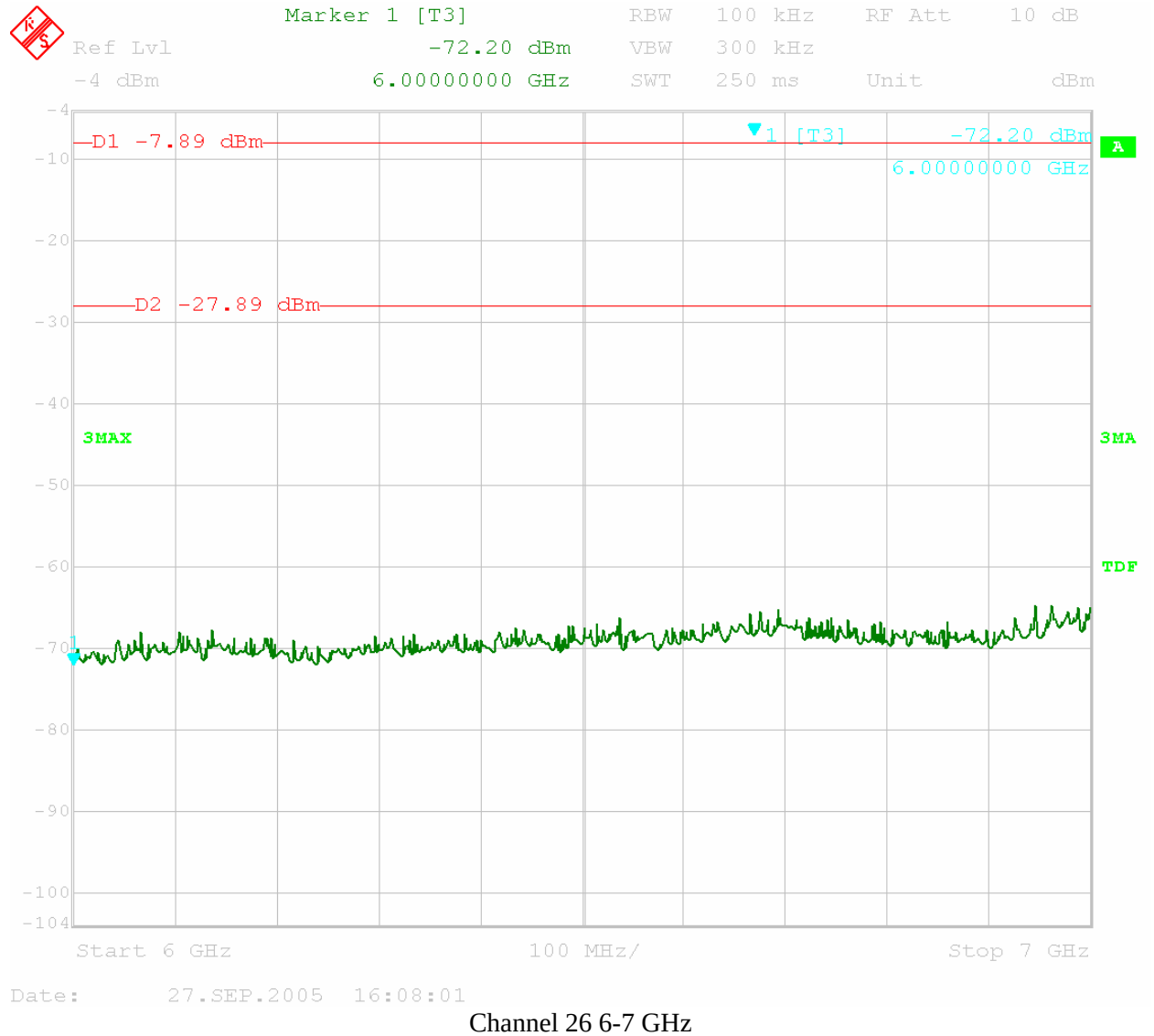


Date: 27.SEP.2005 15:54:17

Channel 26 3-4 GHz









Ref Lvl

-4 dBm

RBW

100 kHz

RF Att

10 dB

VBW

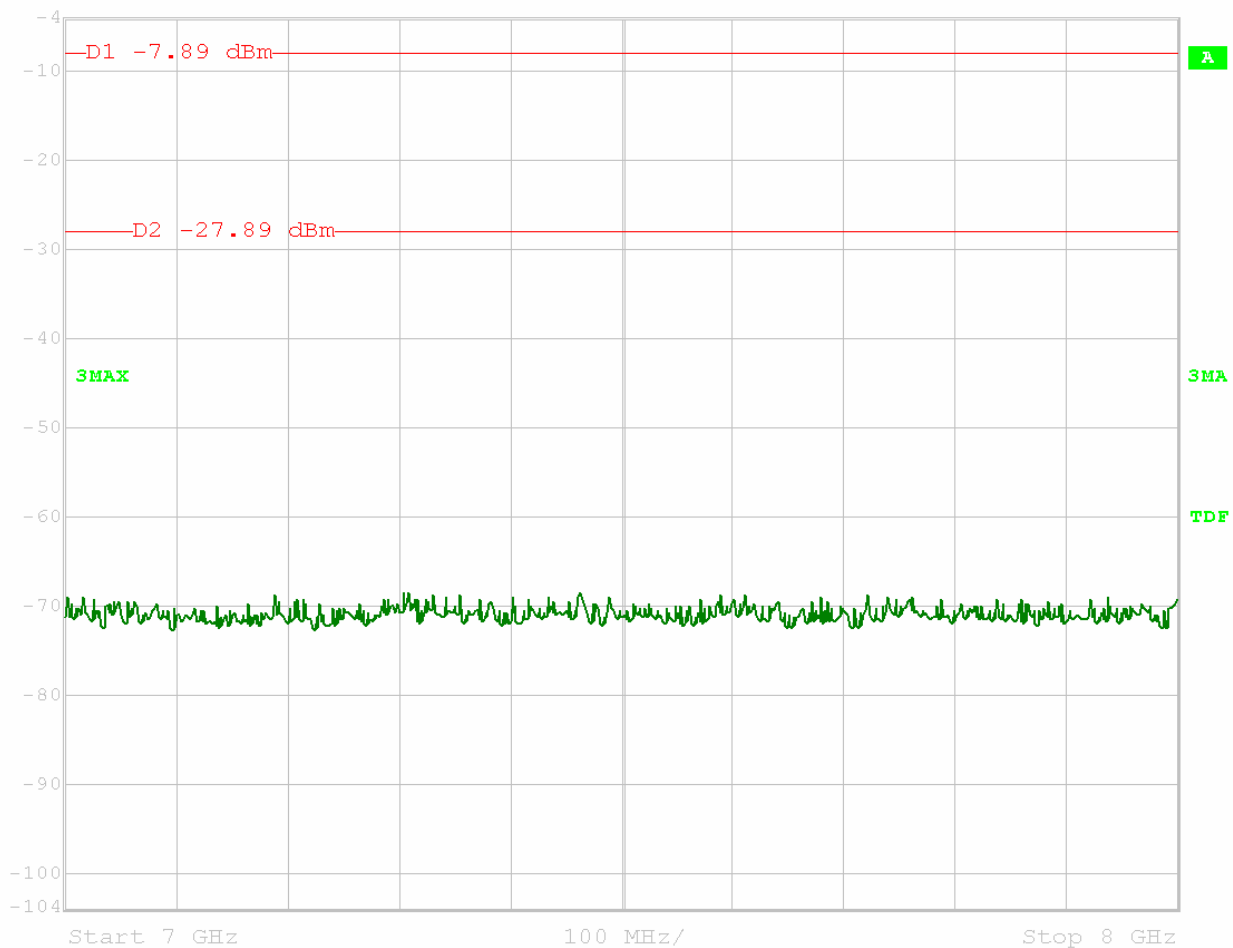
300 kHz

SWT

250 ms

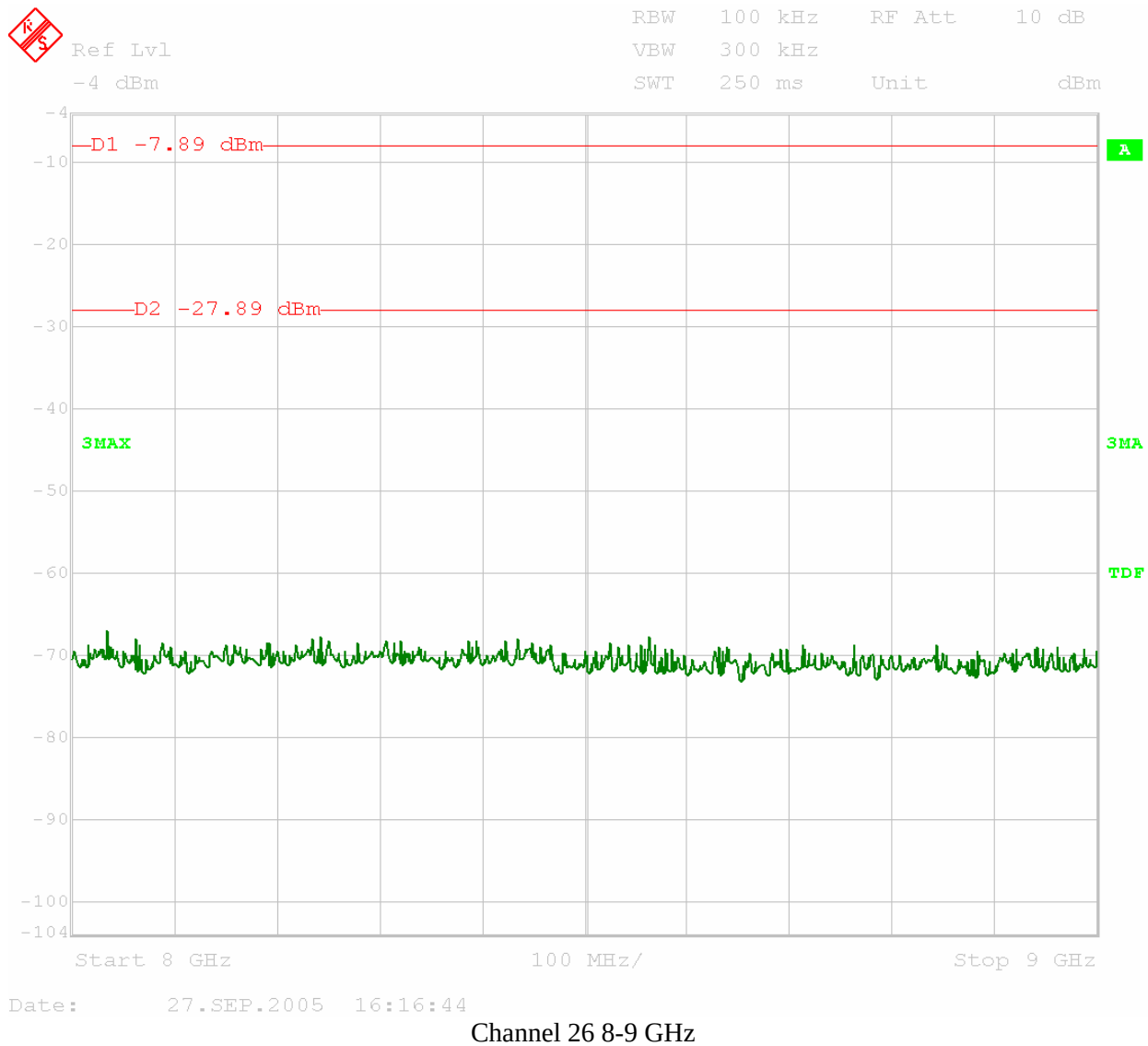
Unit

dBm



Date: 27.SEP.2005 16:09:02

Channel 26 7-8 GHz





Ref Lvl

-4 dBm

RBW

100 kHz

RF Att

10 dB

VBW

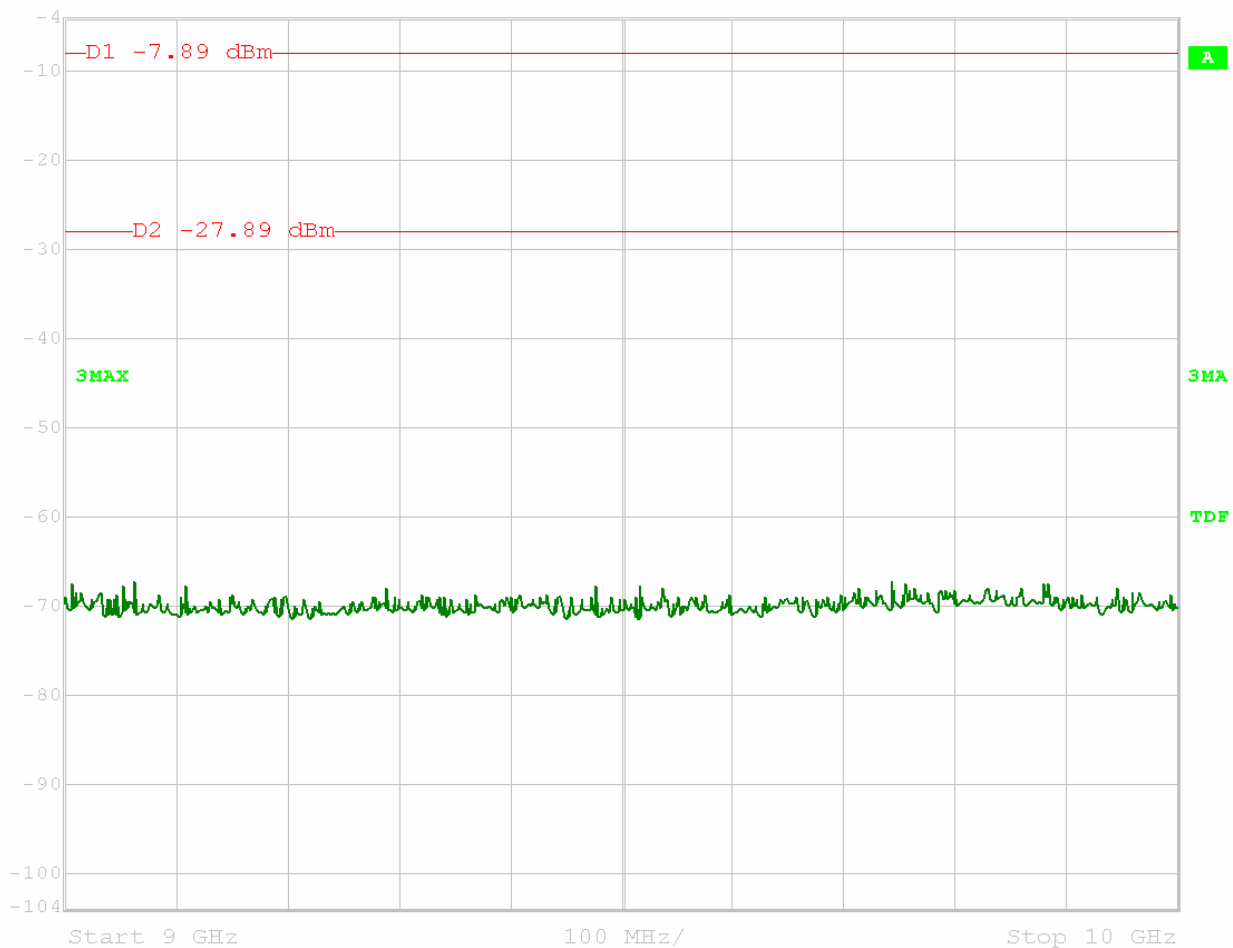
300 kHz

SWT

250 ms

Unit

dBm



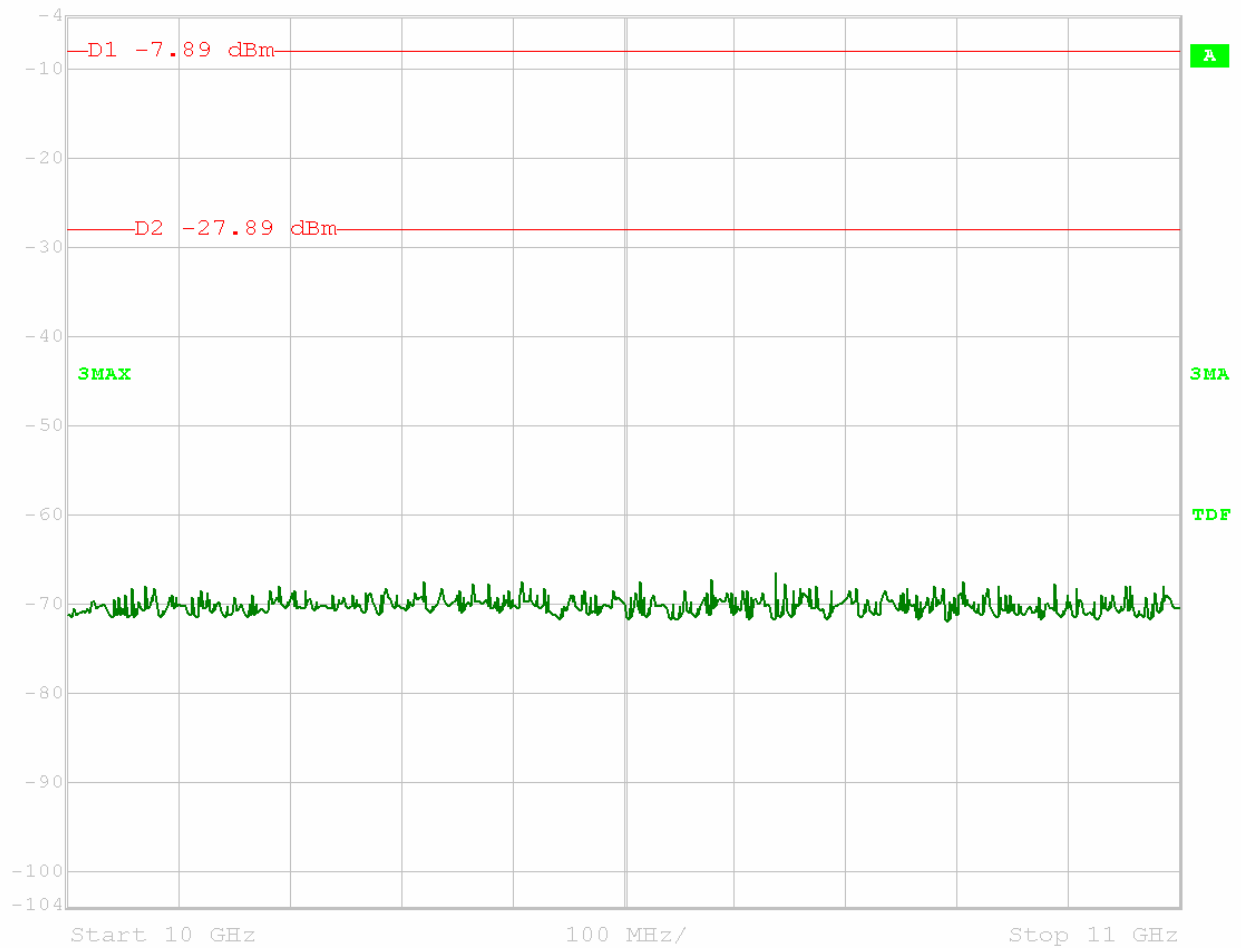
Date: 27.SEP.2005 16:18:22

Channel 26 9-10 GHz



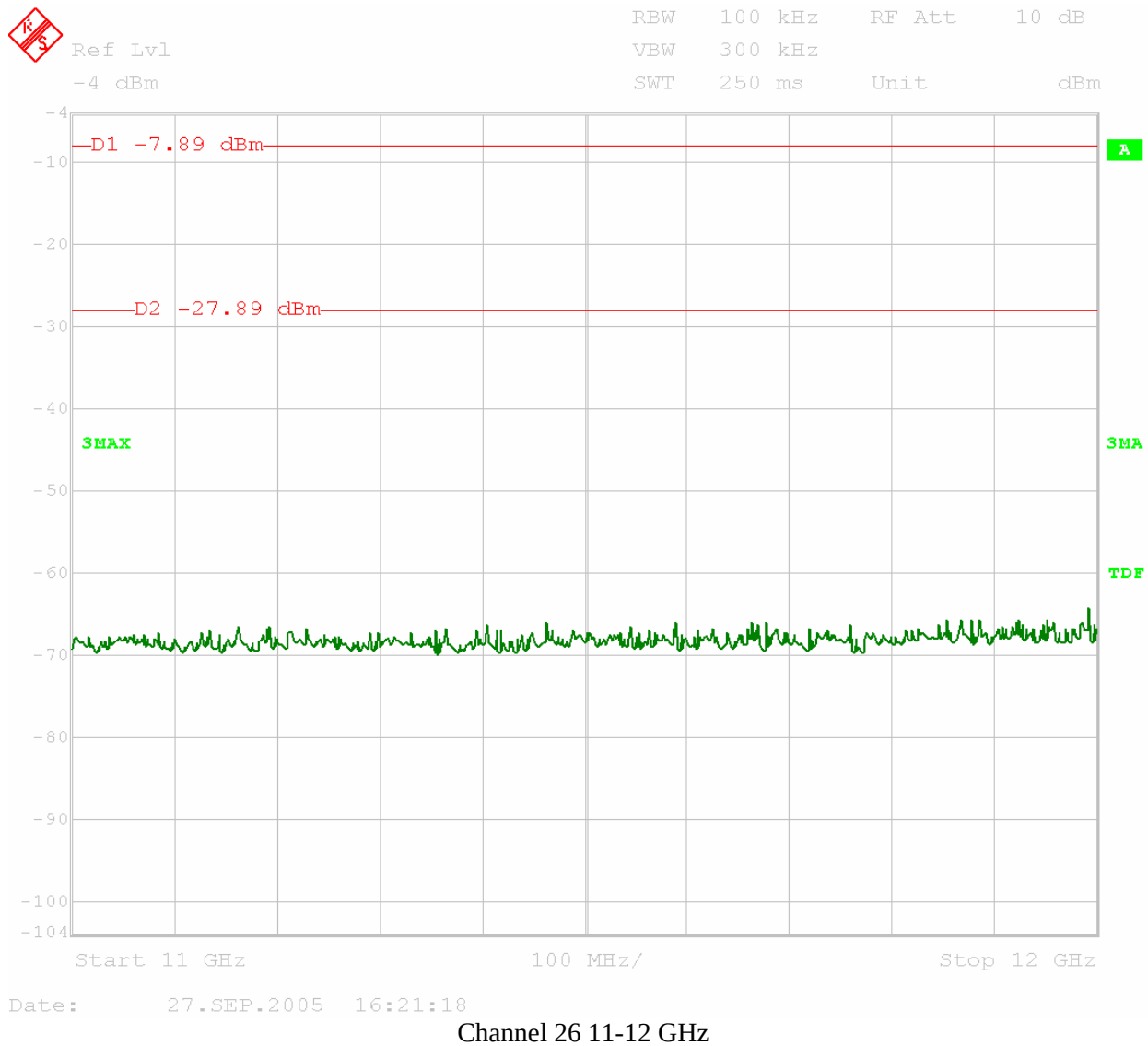
Ref Lvl
-4 dBm

RBW 100 kHz RF Att 10 dB
VBW 300 kHz
SWT 250 ms Unit dBm



Date: 27.SEP.2005 16:20:22

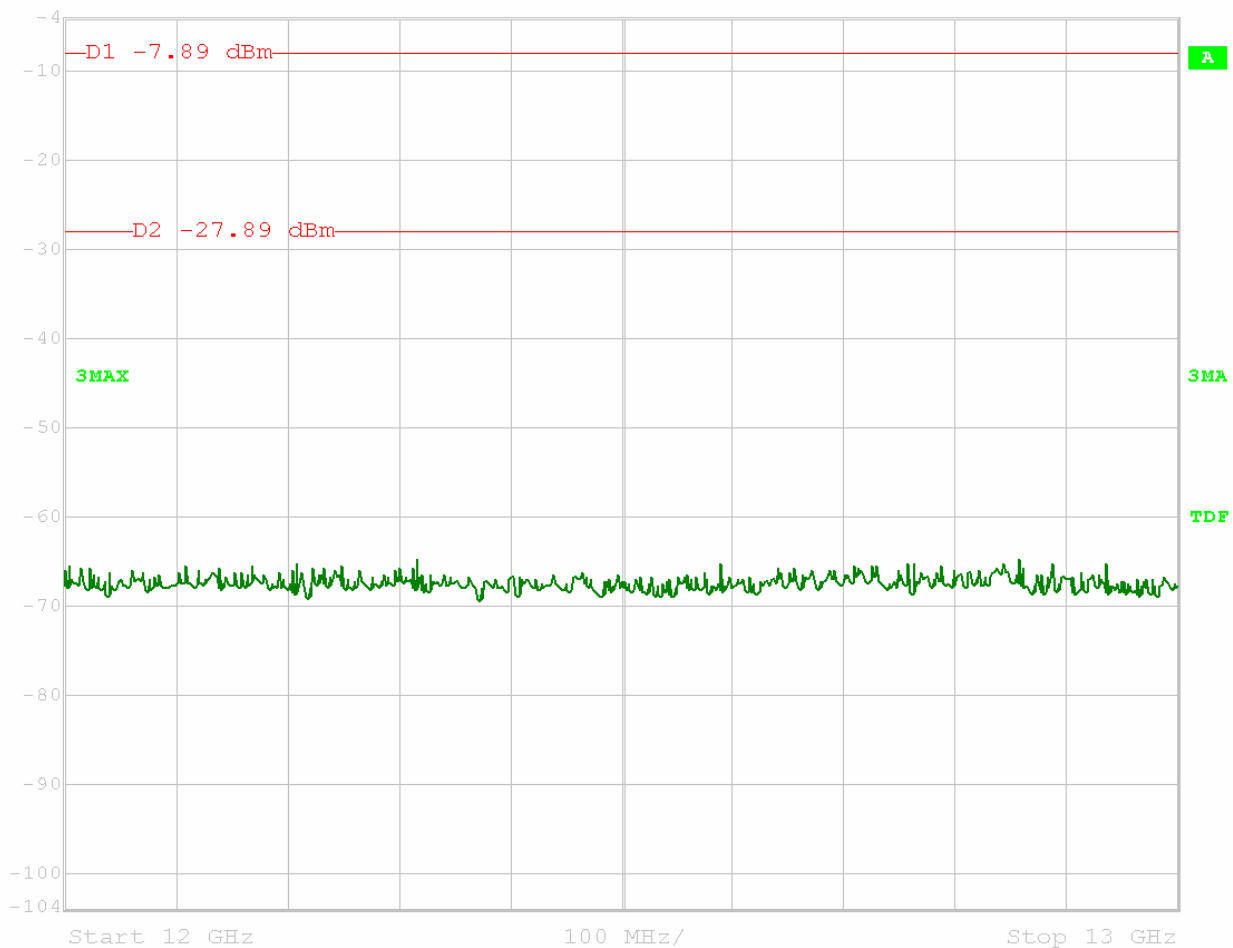
Channel 26 10-11 GHz





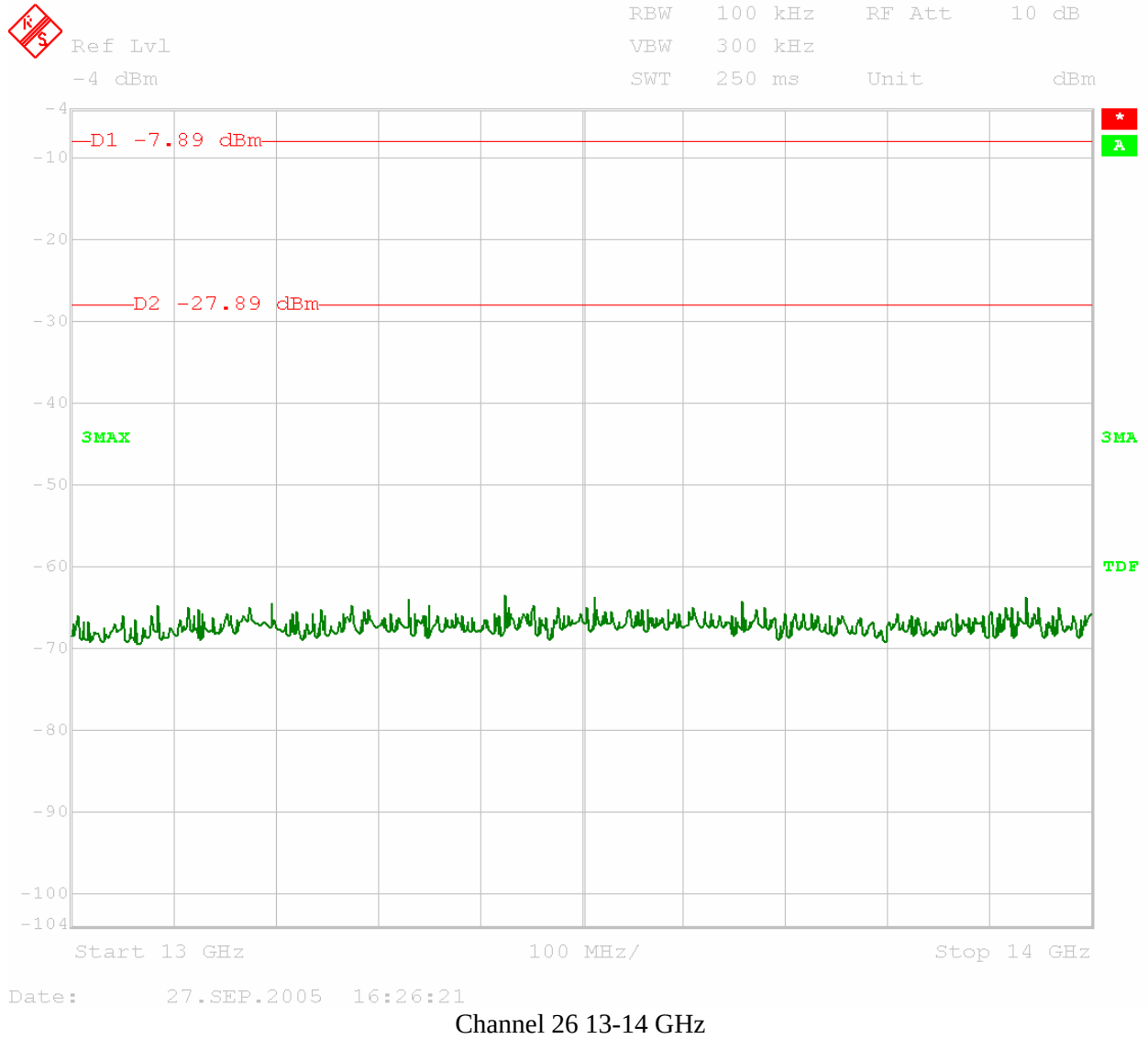
Ref Lvl
-4 dBm

RBW 100 kHz RF Att 10 dB
VBW 300 kHz
SWT 250 ms Unit dBm



Date: 27.SEP.2005 16:23:47

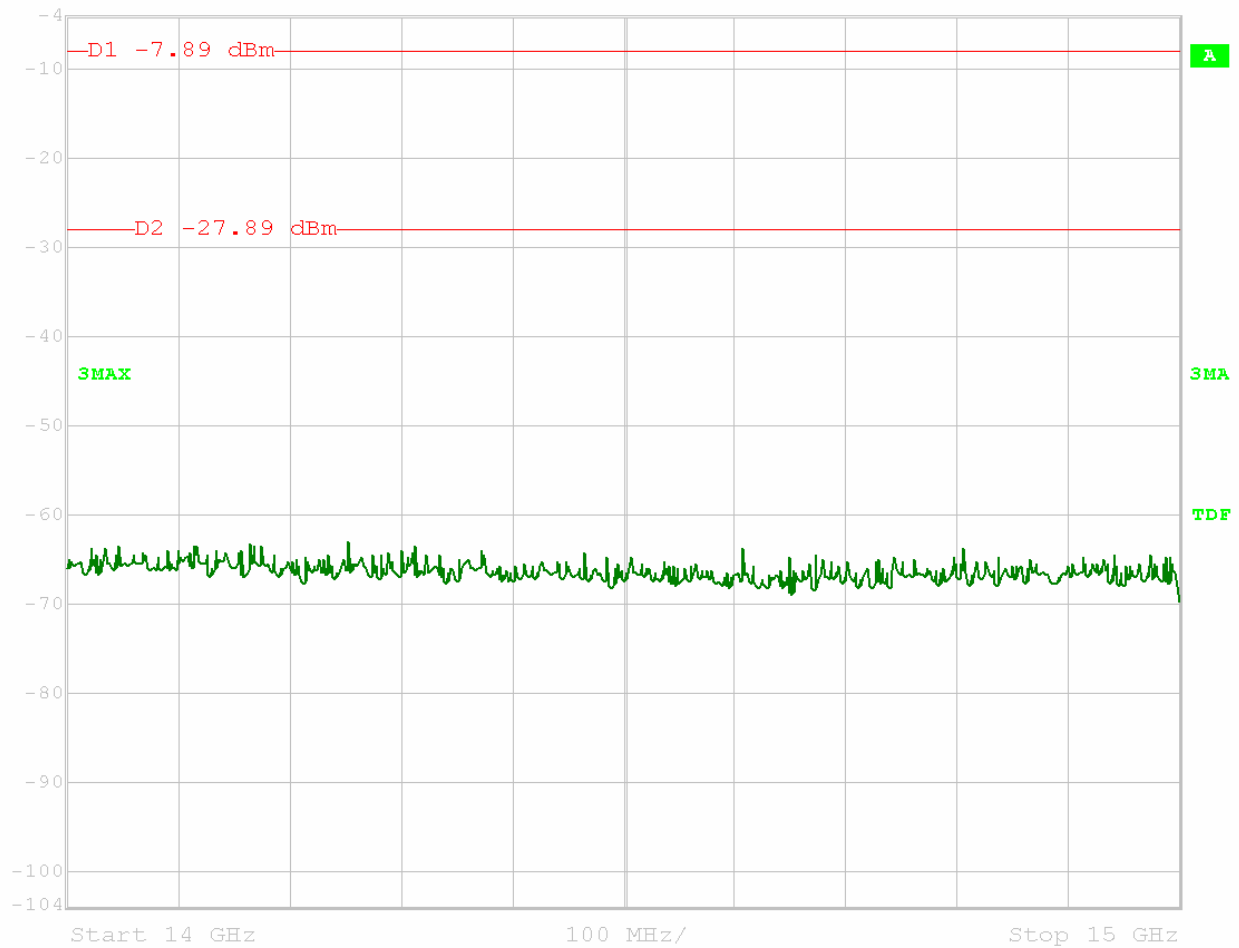
Channel 26 12-13 GHz





Ref Lvl
-4 dBm

RBW 100 kHz RF Att 10 dB
VBW 300 kHz
SWT 250 ms Unit dBm



Date: 27.SEP.2005 16:35:19

Channel 26 14-15 GHz



Ref Lvl

-4 dBm

RBW 100 kHz RF Att 10 dB

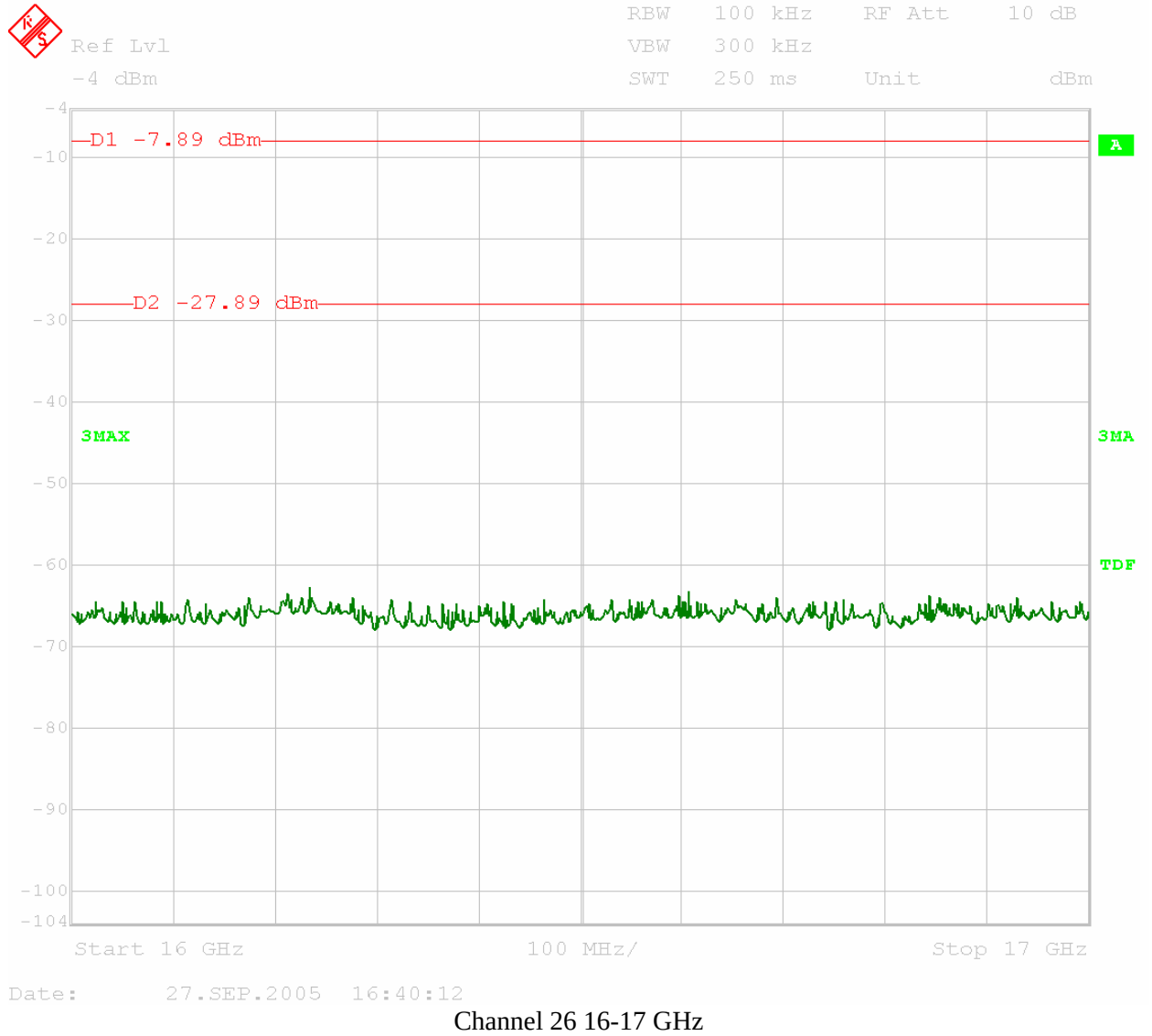
VBW 300 kHz

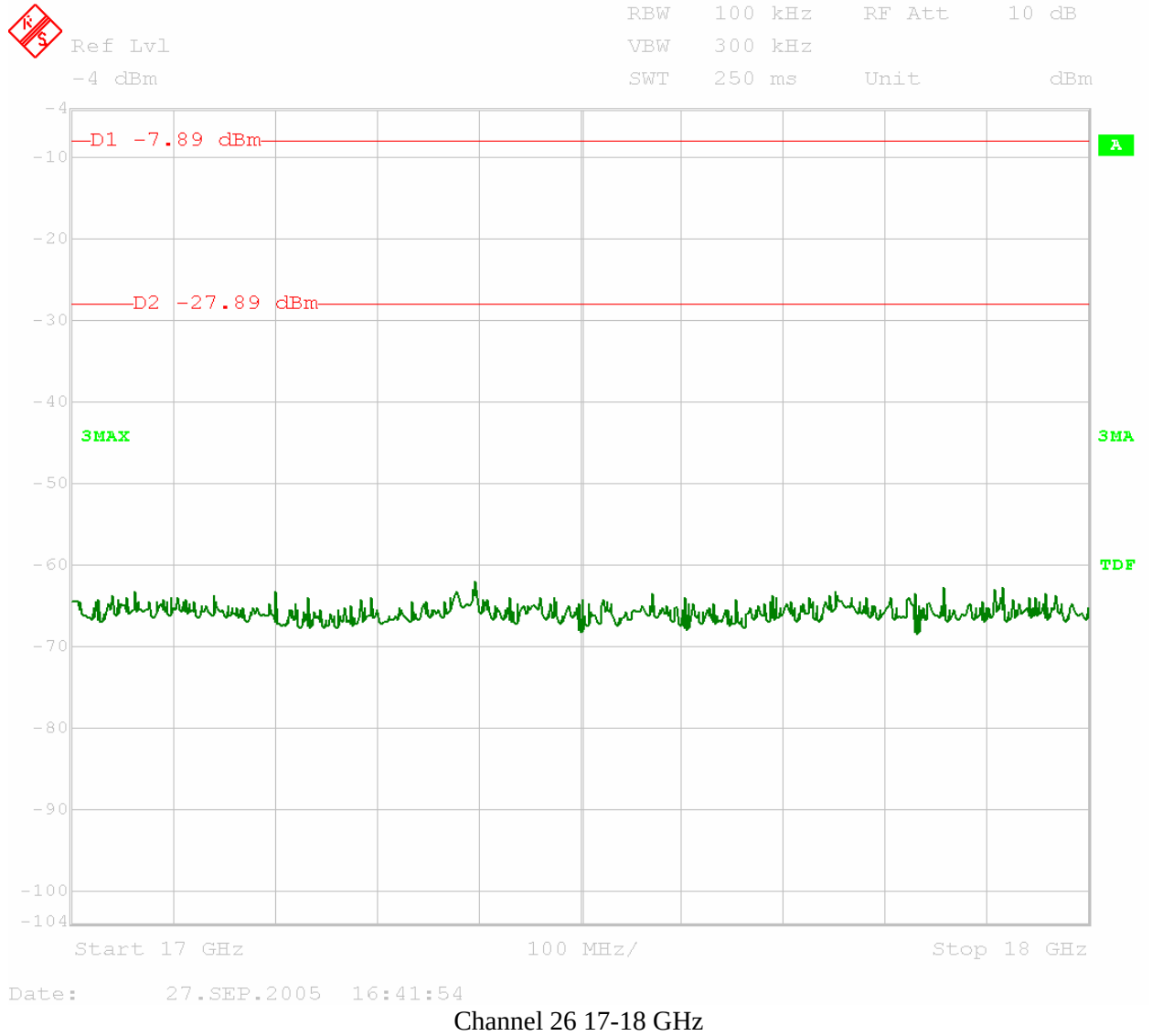
SWT 250 ms Unit dBm



Date: 27.SEP.2005 16:36:38

Channel 26 15-16 GHz

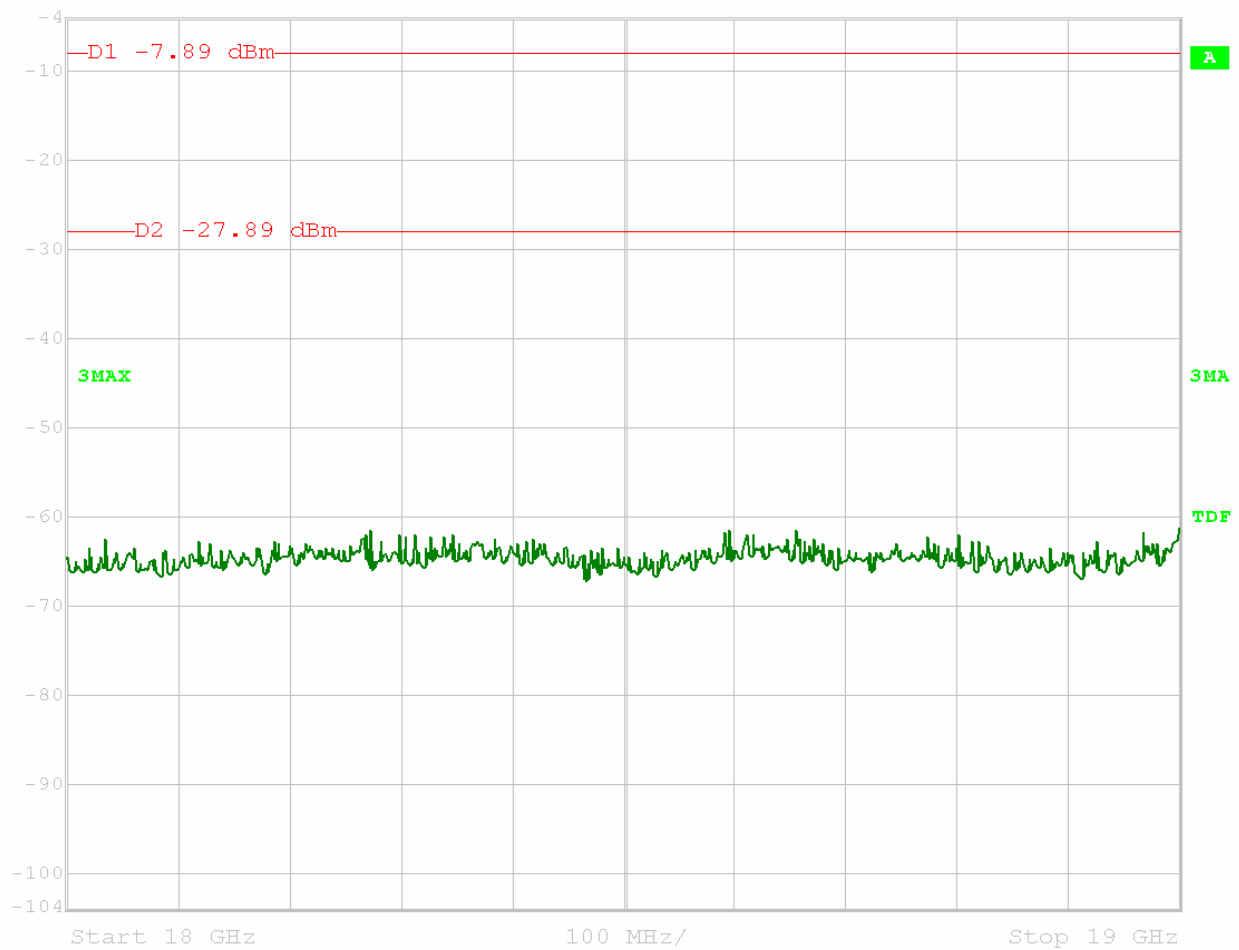






Ref Lvl
-4 dBm

RBW 100 kHz RF Att 10 dB
VBW 300 kHz
SWT 250 ms Unit dBm



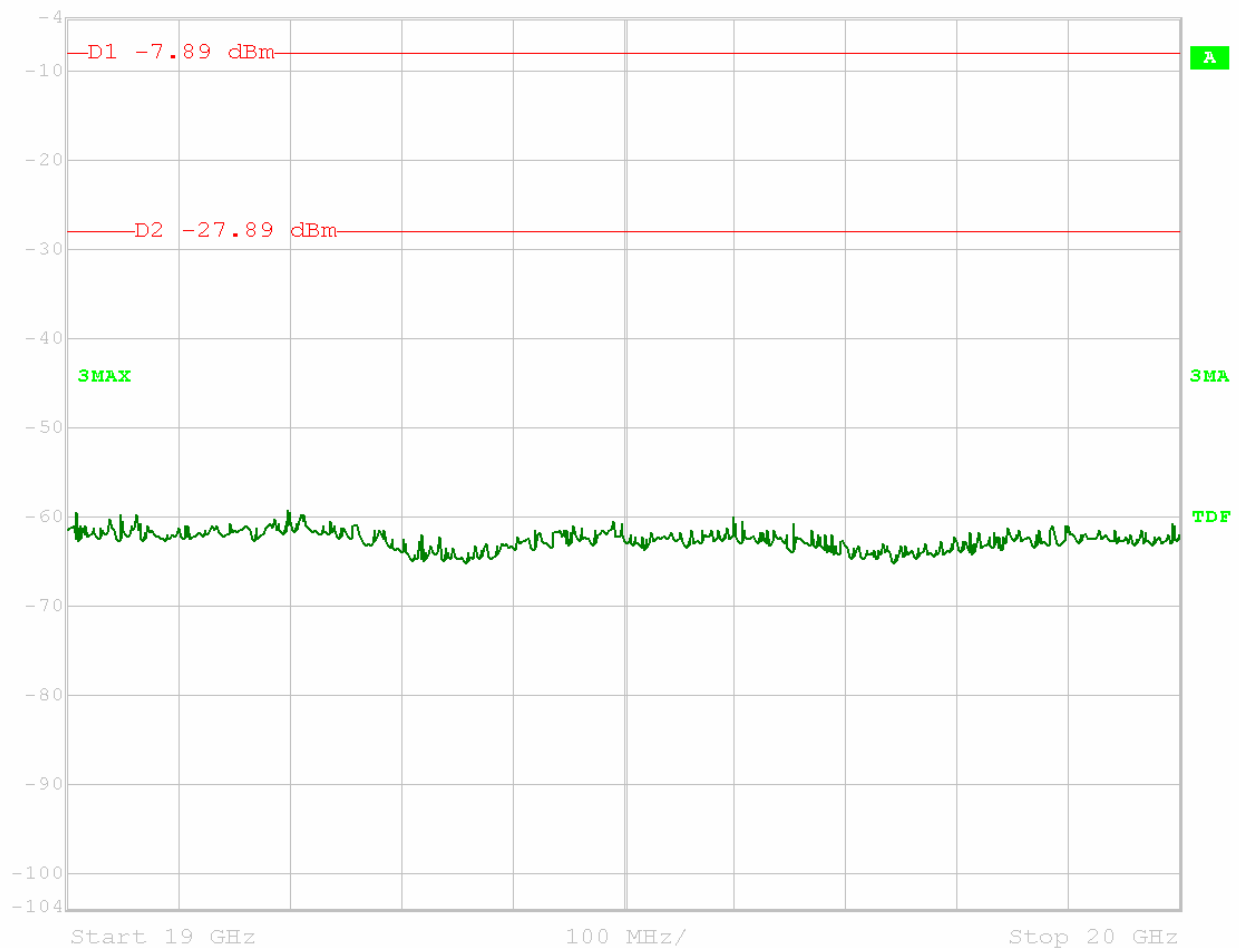
Date: 27.SEP.2005 16:47:34

Channel 26 18-19 GHz



Ref Lvl
-4 dBm

RBW 100 kHz RF Att 10 dB
VBW 300 kHz
SWT 250 ms Unit dBm



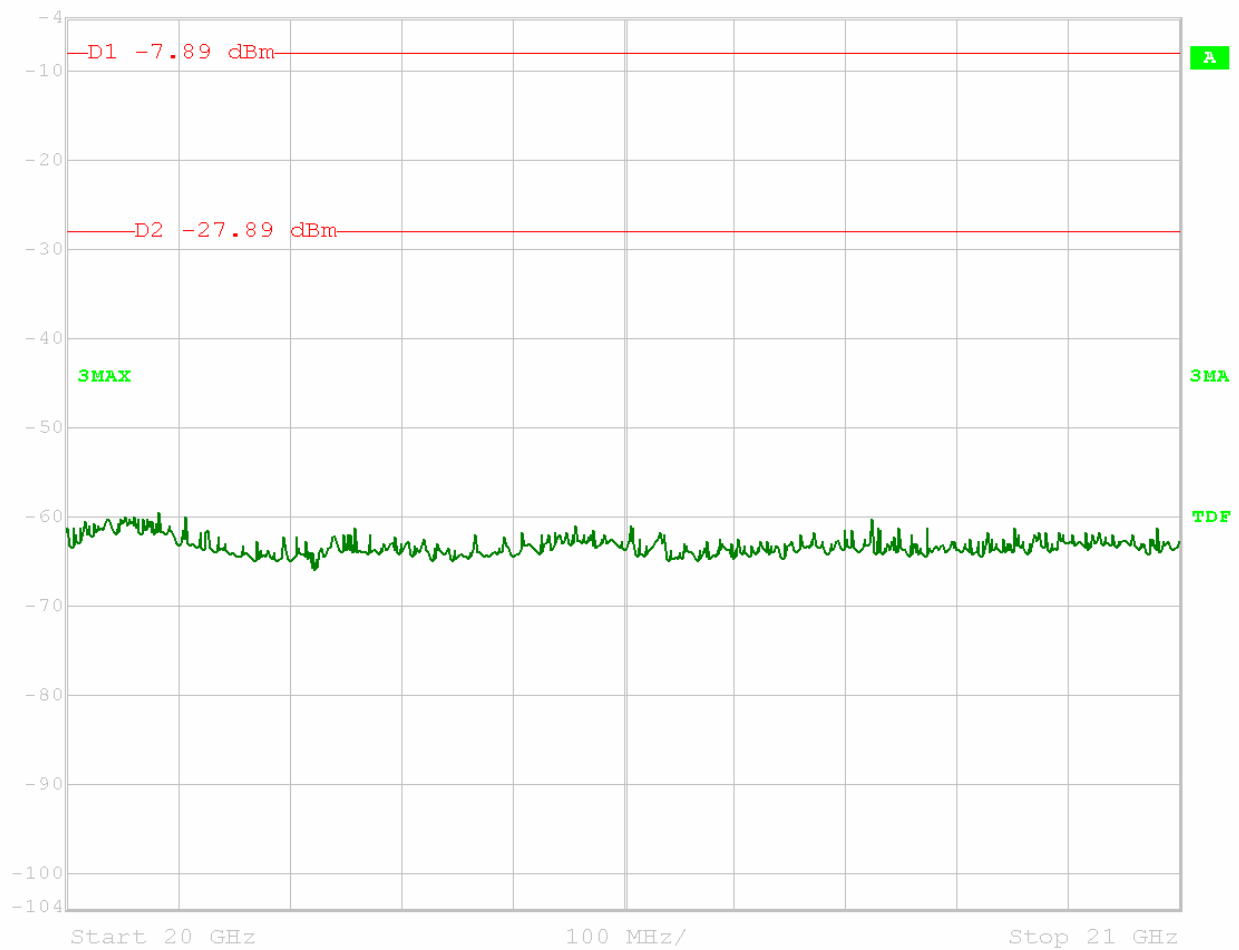
Date: 27.SEP.2005 16:49:02

Channel 26 19-20 GHz



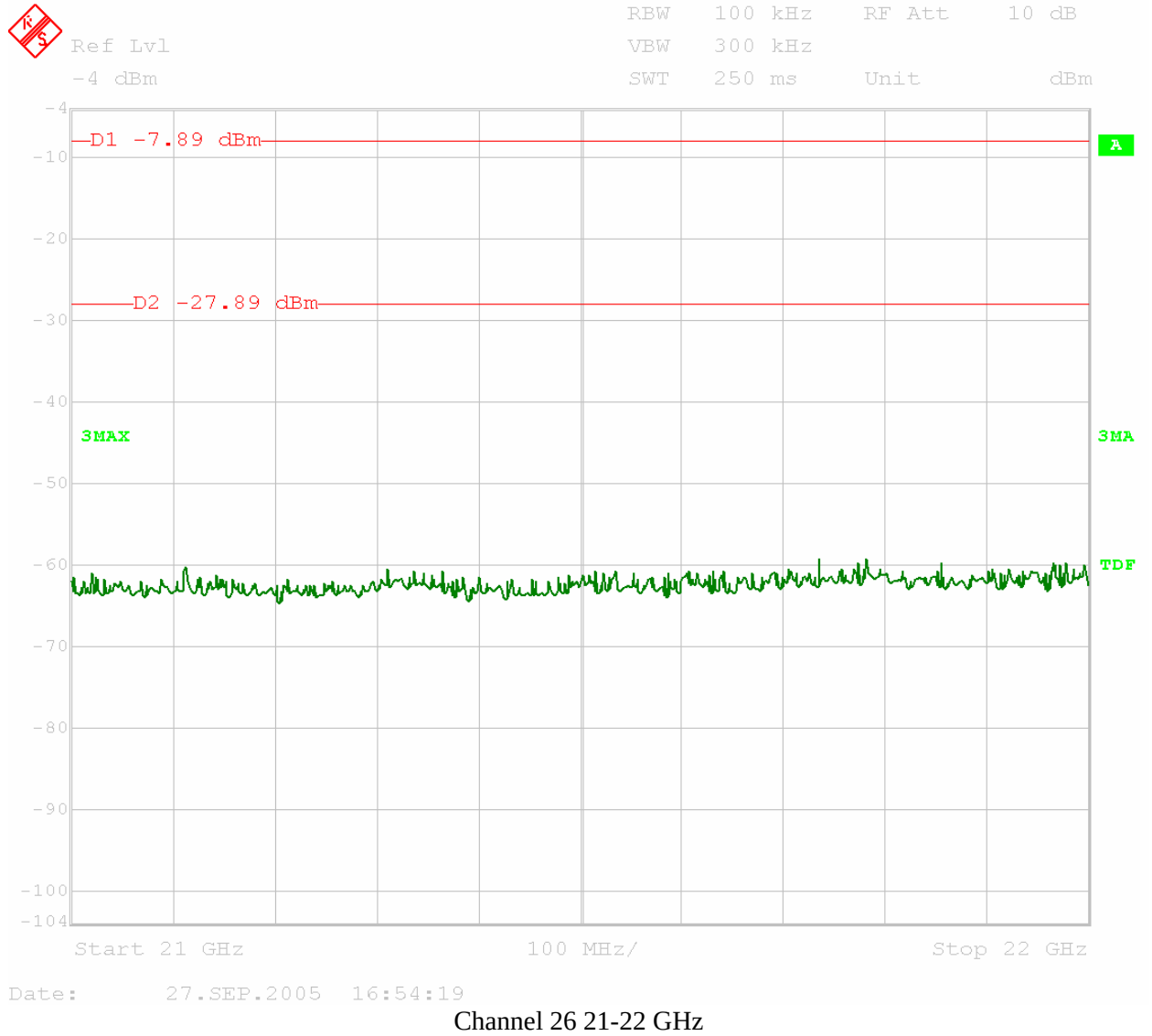
Ref Lvl
-4 dBm

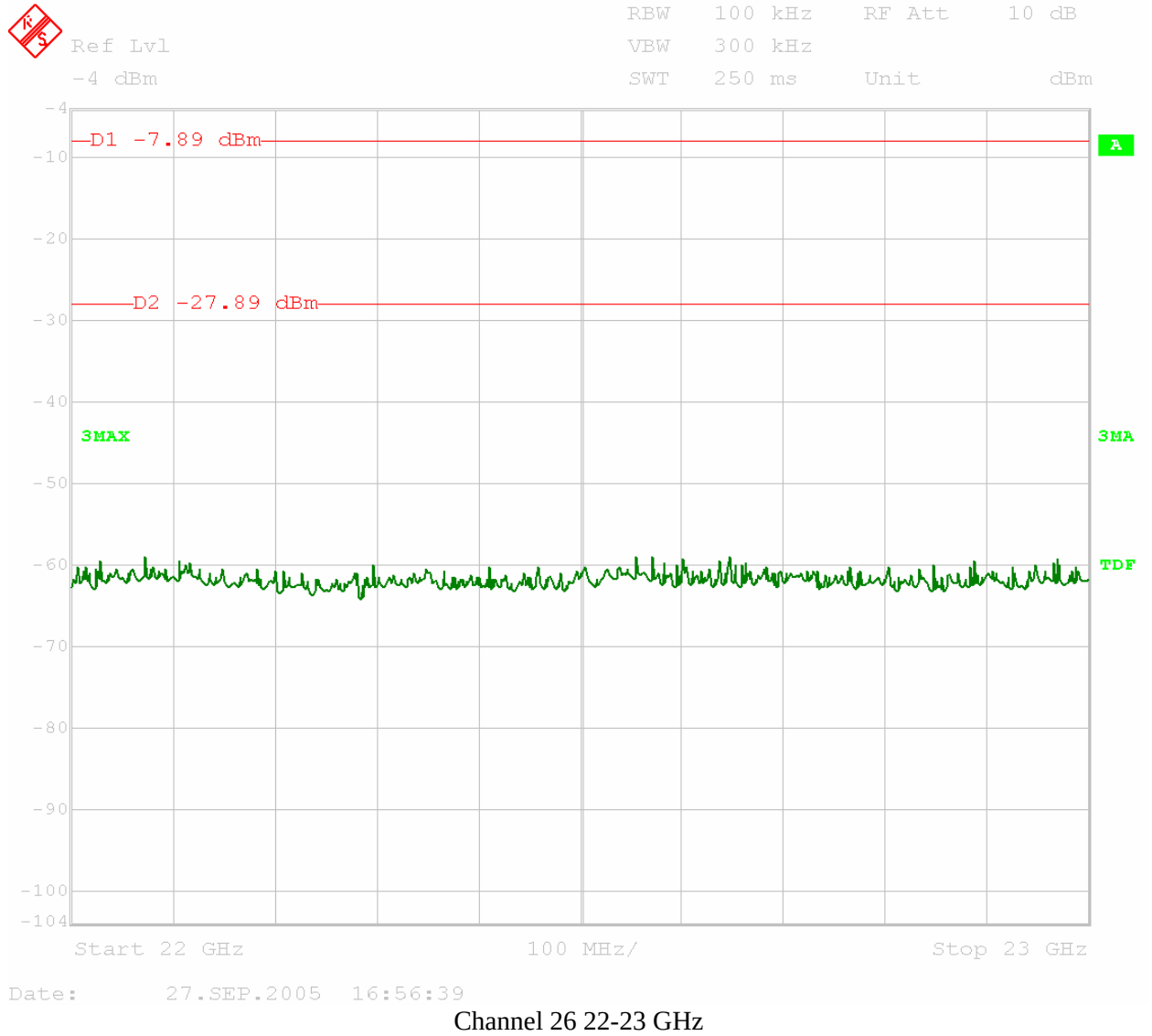
RBW 100 kHz RF Att 10 dB
VBW 300 kHz
SWT 250 ms Unit dBm

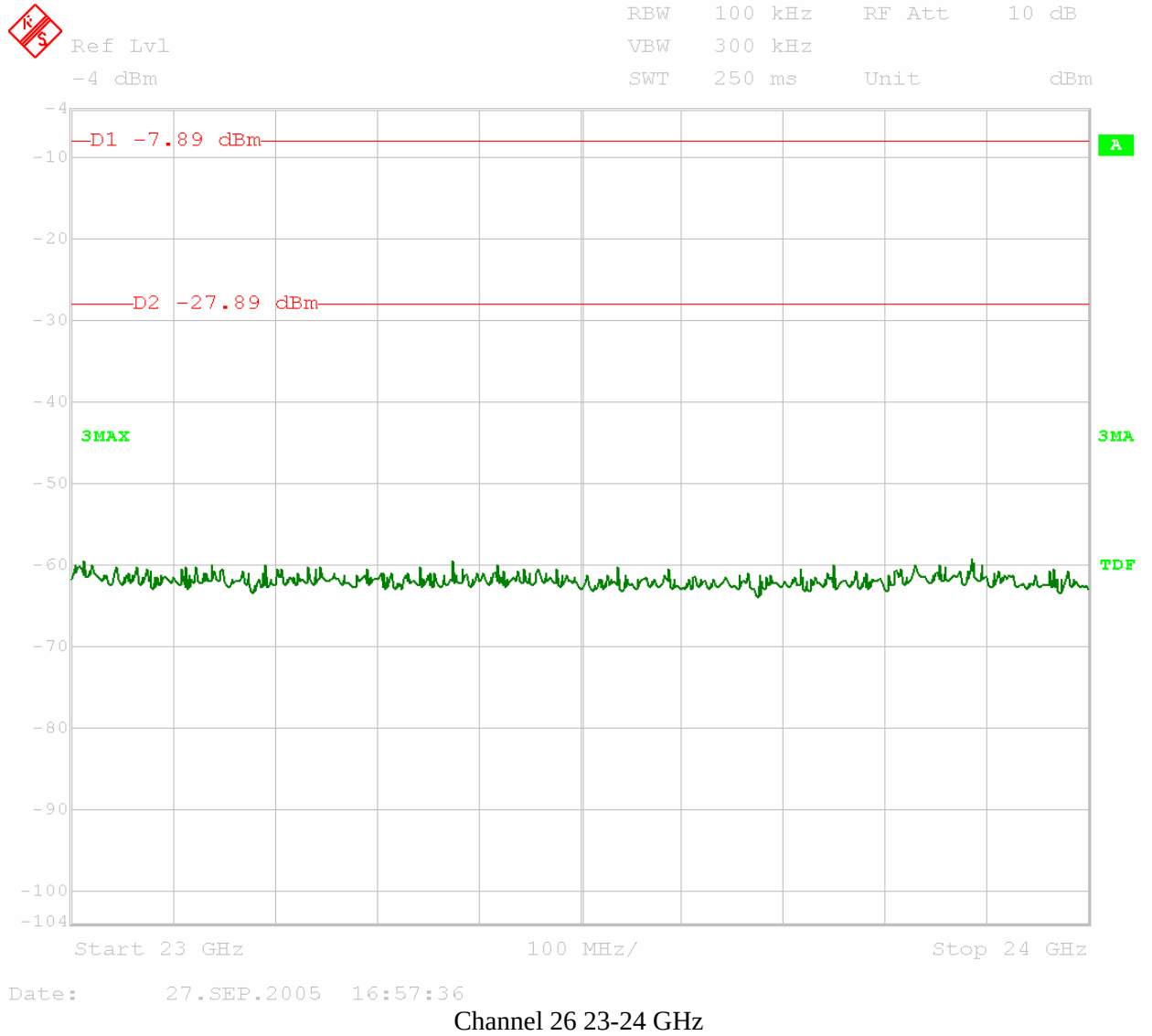


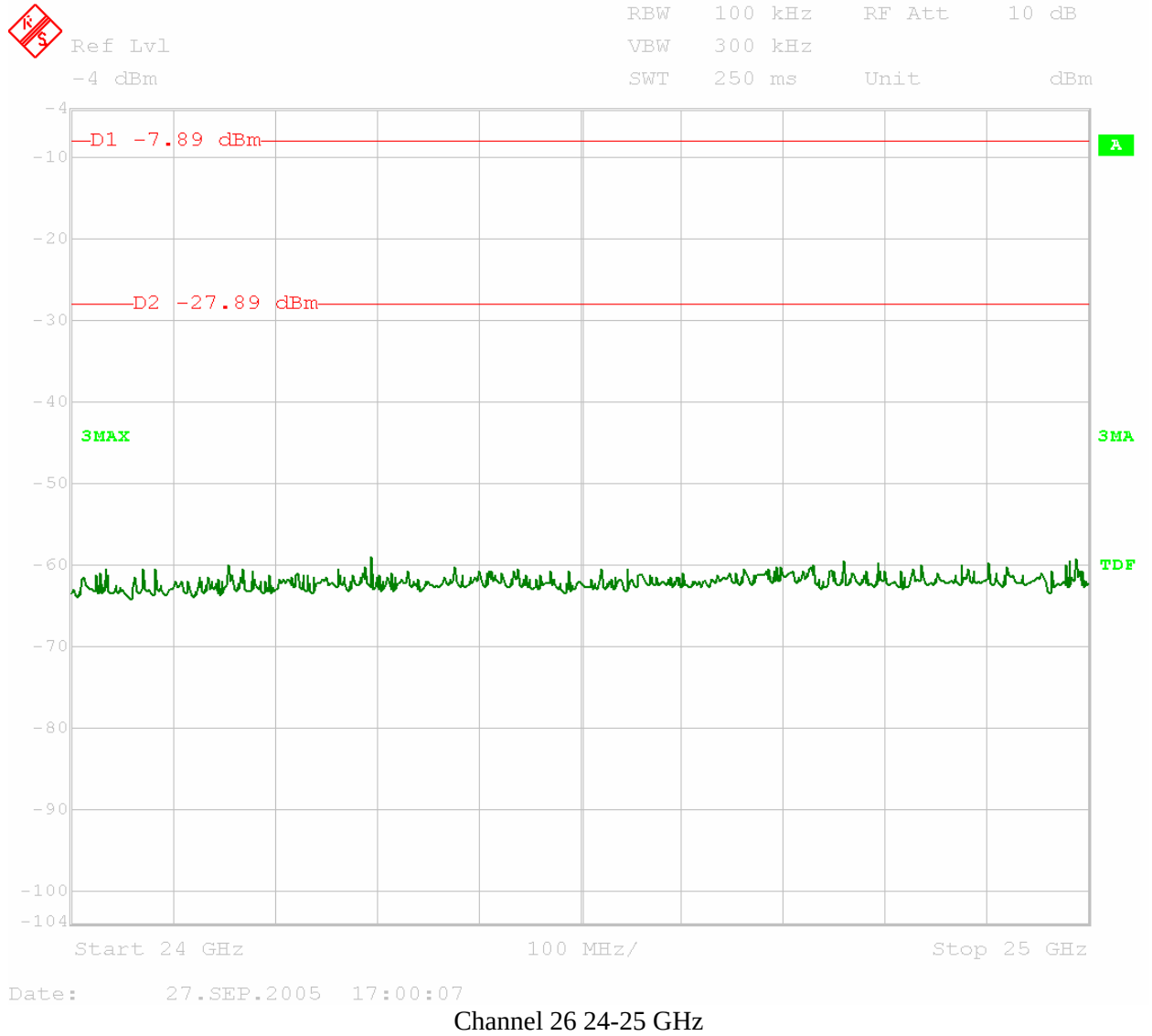
Date: 27.SEP.2005 16:51:27

Channel 26 20-21 GHz









Test Results: Pass

Test Standard: FCC 15.205, 15.209, 15.247(d)

Test: Radiated Spurious Emissions

Performance Criterion: The spurious emissions must be attenuated below the level of the fundamental by at least 20 dBc. Emissions which fall in the restricted bands must meet the general limits of 15.209.

Software:

Name	Manufacturer	Version
EXCEL 2000	Microsoft Corporation	9.0.6926 SP-3
EMI BOXBOROUGH	Intertek	6/01/05 Revision

Test Date: 9/28-30/2005

Engineer Initials: nmj **Date:** 10/11/05

Test Engineer: Nicholas Abbondante

Reviewer Initials: nmj **Date:** 10-13-05

Test Equipment Used:

Intertek ID	Manufacturer	Model	Serial Number	Cal. Due
BAR2	Mannix	0ABA116	BAR2	08/02/2006
LOG2	EMCO	3142	9711-1223	12/13/2005
AGL001	Agilent	E7405A	US40240205	08/09/2006
HORN1	EMCO	3115	9512-4632	11/24/2005
EMC04	EMCO	3116	2090	11/30/2005
CBL028	Megaphase	TM40 K1K1 197	CBL028	12/01/2005
CBL030	Megaphase	TM40 K1K1 80	CBL030	12/01/2005
PRE8	Miteq	NSP4000-NF	507145	11/16/2005
REC2	Hewlett Packard	8542E	3520A00125	02/08/2006
RECFL2	Hewlett Packard	85420E	3427A00126	02/08/2006
S2 10M FLR	ITS	RG214B/U	S2 10M FLR	09/02/2006

Test Details:

Radiated Emissions / Interference

Company: Millennial Net
 Engineer: Nicholas Abbondante
 Project #: 3084056
 Date: 09/28/05 09/29/05
 Standard: FCC Part 15
 Class: -
 Antenna Band: HF
 PreAmp: PRE8 11-16-05.amp
 Limit Distance: 3 meters
 Voltage/Frequency: 120V/60Hz
 Model #: MG-5424
 Serial #: 405330180
 Receiver: Agilent E7405A (AGL001)
 N Antenna: LOG2 12-13-05 V10.txt
 LF Antenna: NONE.
 HF Antenna: HORN1 11-15-05 V3.ant
 SHF Antenna: EMC04 11-30-05 V1.ant
 Cable(s): CBL028 12-1-2005.cbl
 CBL030 12-1-2005.cbl
 Barometer: BAR2
 Pressure: 996mB
 Temp: 21c
 Humidity: 71%
 Bands: N, LF, HF, SHF
 Test Distance: 3 meters
 Frequency Range: 30 MHz - 25 GHz
 Location: Site 2
 Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; Bandwidth denoted as RBW/VBW

Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth
PK	V	2405.000	78.3	30.1	4.2	20.0	0.0	92.7	-	-	100/300 kHz
PK	V	2440.000	76.7	30.2	4.2	20.0	0.0	91.1	-	-	100/300 kHz
PK	V	2480.000	78.3	30.3	4.3	20.0	0.0	92.9	-	-	100/300 kHz
PK	V	4810.000	26.5	34.8	6.4	21.4	0.0	46.3	74.0	-27.7	1/3 MHz
PK	V	4880.000	28.3	34.9	6.4	21.4	0.0	48.3	74.0	-25.7	1/3 MHz
PK	V	4960.000	26.6	35.1	6.5	21.5	0.0	46.7	74.0	-27.3	1/3 MHz
PK	V	7215.000	20.8	37.2	8.2	20.3	0.0	45.9	72.7	-26.8	100/300 kHz
PK	V	7320.000	27.8	37.4	8.3	20.3	0.0	53.2	74.0	-20.8	1/3 MHz
PK	V	7440.000	28.8	37.6	8.3	20.2	0.0	54.6	74.0	-19.4	1/3 MHz
PK	V	9620.000	18.6	39.5	9.9	18.2	0.0	49.7	72.7	-23.0	100/300 kHz
PK	V	9760.000	18.7	39.6	10.0	18.1	0.0	50.1	71.1	-21.1	100/300 kHz
PK	V	9920.000	18.3	39.7	10.1	18.1	0.0	50.0	72.9	-22.9	100/300 kHz
PK	V	12025.000	27.7	40.8	11.5	18.3	0.0	61.7	74.0	-12.3	1/3 MHz
PK	V	12200.000	27.1	40.7	11.6	18.4	0.0	61.0	74.0	-13.0	1/3 MHz
PK	V	12400.000	26.8	40.6	11.7	18.6	0.0	60.6	74.0	-13.4	1/3 MHz
PK	V	14430.000	21.6	41.2	13.3	20.1	0.0	55.9	72.7	-16.7	100/300 kHz
PK	V	14640.000	22.2	41.5	13.4	20.3	0.0	56.8	71.1	-14.3	100/300 kHz
PK	V	14880.000	22.2	41.9	13.6	20.5	0.0	57.2	72.9	-15.7	100/300 kHz
PK	V	16835.000	22.2	42.2	14.8	23.0	0.0	56.2	72.7	-16.5	100/300 kHz
PK	V	17080.000	21.4	43.2	15.1	23.3	0.0	56.4	71.1	-14.7	100/300 kHz
PK	V	17360.000	21.7	44.5	15.8	23.4	0.0	58.7	72.9	-14.2	100/300 kHz
AVG	V	4810.000	18.2	34.8	6.4	21.4	0.0	38.0	54.0	-16.0	1/3 MHz
AVG	V	4880.000	18.1	34.9	6.4	21.4	0.0	38.0	54.0	-16.0	1/3 MHz
AVG	V	4960.000	18.4	35.1	6.5	21.5	0.0	38.5	54.0	-15.5	1/3 MHz
AVG	V	7320.000	19.7	37.4	8.3	20.3	0.0	45.1	54.0	-8.9	1/3 MHz
AVG	V	7440.000	19.4	37.6	8.3	20.2	0.0	45.1	54.0	-8.9	1/3 MHz
AVG	V	12025.000	17.7	40.8	11.5	18.3	0.0	51.7	54.0	-2.3	1/3 MHz
AVG	V	12200.000	17.6	40.7	11.6	18.4	0.0	51.6	54.0	-2.4	1/3 MHz
AVG	V	12400.000	18.0	40.6	11.7	18.6	0.0	51.8	54.0	-2.2	1/3 MHz

Note: No emissions were detected other than the fundamental. All emissions measured other than the fundamental were measurements of the measuring instrumentation noise floor.

Setup Photos





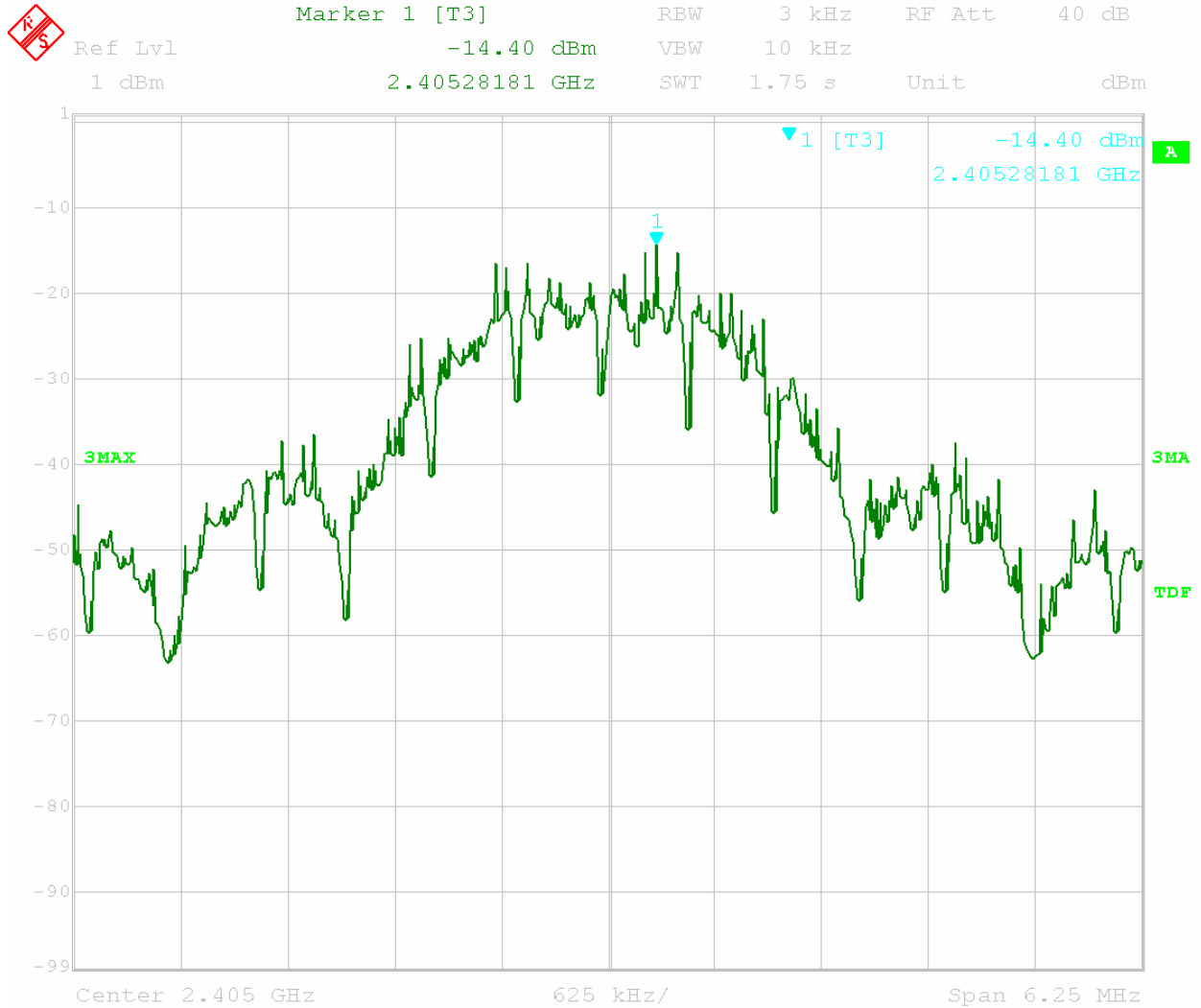
Test Results: Pass**Test Standard:** FCC 15.247(e)**Test:** Peak Power Spectral Density**Performance Criterion:** The peak power spectral density must not exceed 8 dBm / 3 kHz.**Test Date:** 10/14/2005**Engineer Initials:** NNA**Date:** 10/25/05**Test Engineer:** Nicholas Abbondante**Reviewer Initials:** PW**Date:** 10-25-2005**Test Equipment Used:**

Intertek ID	Manufacturer	Model	Serial Number	Cal. Due
ROS001	Rohde & Schwarz	FSEK-30	100225	07/26/2006
CBL028	Megaphase	TM40 K1K1 197	CBL028	12/01/2005

Test Details:

Notes: The cable loss was compensated for in the spectrum analyzer.

Channel	Frequency	Spectral Density	Limit
11	2405 MHz	-14.40 dBm	8 dBm
18	2440 MHz	-15.47 dBm	8 dBm
26	2480 MHz	-15.73 dBm	8 dBm

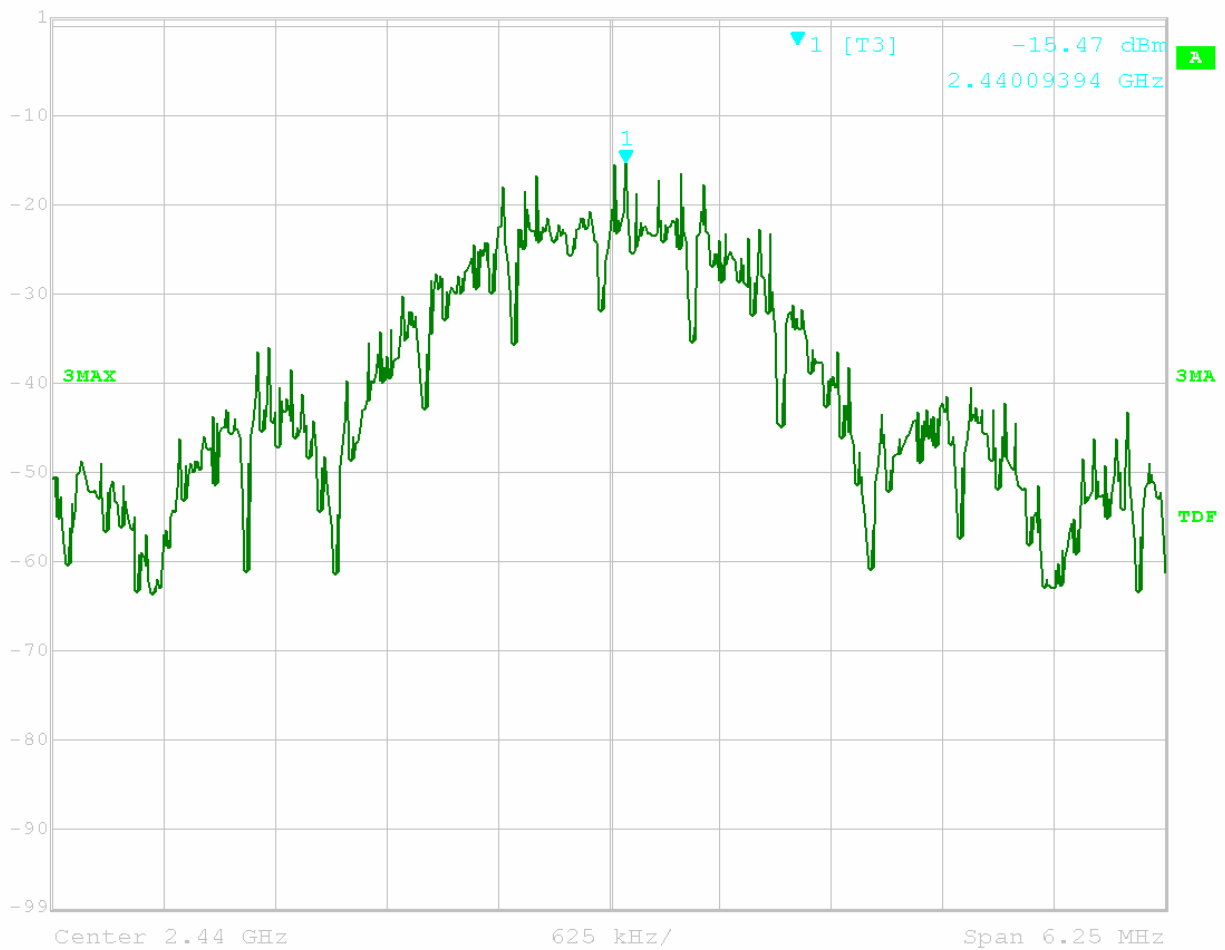


Date: 14.OCT.2005 19:32:52

Channel 11 – 2405 MHz



Marker 1 [T3] RBW 3 kHz RF Att 40 dB
 Ref Lvl -15.47 dBm VBW 10 kHz
 1 dBm 2.44009394 GHz SWT 1.75 s Unit dBm

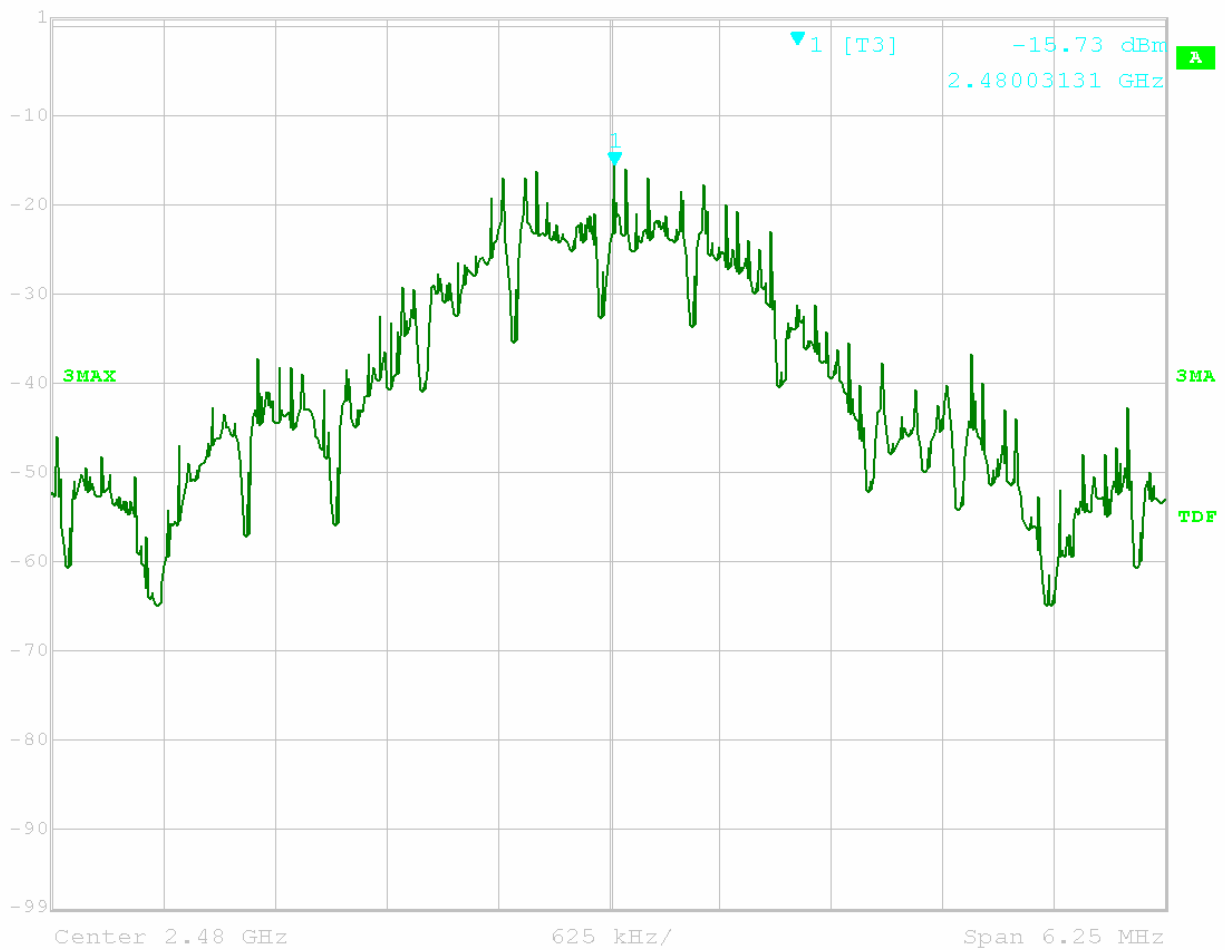


Date: 14.OCT.2005 19:52:22

Channel 18 – 2440 MHz



Marker 1 [T3] RBW 3 kHz RF Att 40 dB
 Ref Lvl -15.73 dBm VBW 10 kHz
 1 dBm 2.48003131 GHz SWT 1.75 s Unit dBm



Date: 14.OCT.2005 19:56:56

Channel 26 – 2480 MHz

Test Results: Pass

Test Standard: FCC 15.215

Test: Band Edge Compliance

Performance Criterion: The fundamental frequency must stay within the assigned frequency band.

Test Date: 9/27/2005

Engineer Initials: NNA

Date: 10/11/05

Test Engineer: Nicholas Abbondante

Reviewer Initials: NWJ

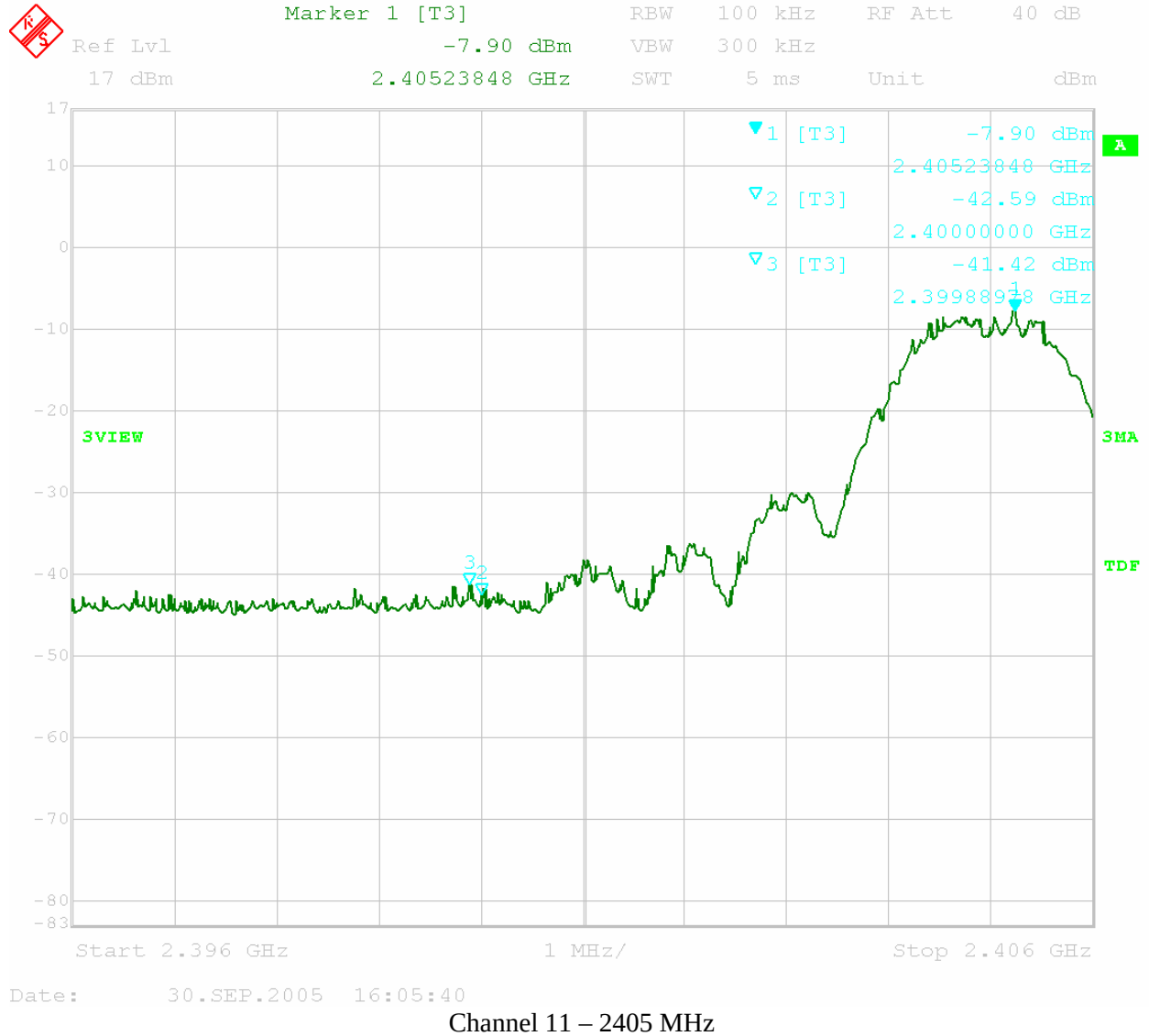
Date: 10-13-05

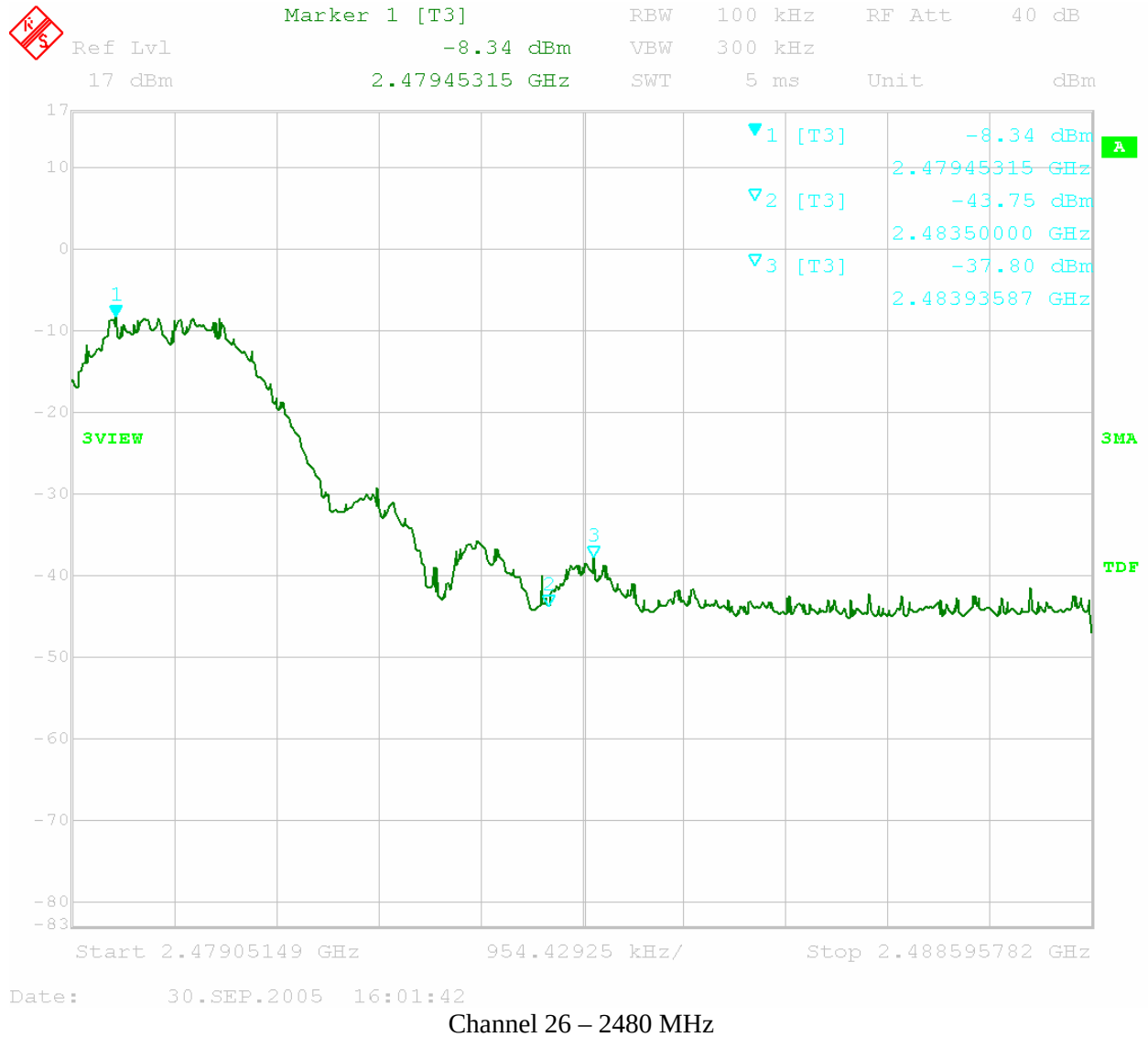
Test Equipment Used:

Intertek ID	Manufacturer	Model	Serial Number	Cal. Due
ROS001	Rohde & Schwarz	FSEK-30	100225	07/26/2006
CBL028	Megaphase	TM40 K1K1 197	CBL028	12/01/2005

Test Details:

Notes: The upper and lower channels (channels 11 and 26) were observed using a 100 kHz bandwidth. A marker was placed at the peak of the fundamental. Another marker was placed at the band edges, 2400 MHz and 2483.5 MHz and at the highest signal level above and below the band edge. It can be seen that the highest signal level below the 2400 MHz band edge is 33.5 dB below the peak signal level of the 2405 MHz fundamental, and the highest signal level above the 2483.5 MHz band edge is 29.5 dB below the peak signal level of the 2480 MHz fundamental.





Test Results: Pass

Test Standard: FCC 15.207

Test: AC Line-Conducted Spurious Emissions

Performance Criterion: Emissions must meet the general limits of 15.207.

Software:

Name	Manufacturer	Version
EXCEL 2000	Microsoft Corporation	9.0.6926 SP-3
EMI BOXBOROUGH	Intertek	2/07/05 Revision

Test Date: 9/30/2005

Engineer Initials: ~NA

Date: 10/14/05

Test Engineer: Nicholas Abbondante

Reviewer Initials: NWJ

Date: 10-13-05

Test Equipment Used:

Intertek ID	Manufacturer	Model	Serial Number	Cal. Due
BAR2	Mannix	0ABA116	BAR2	08/02/2006
DS22A	Mini Circuits	20dB, 50 Ohm	DS22A	11/17/2005
LISN11	Solar Electronics	9252-50-R-24-BNC	941713	07/05/2006
CBL022	Belden	RG-58/U	CBL022	11/17/2005
REC2	Hewlett Packard	8542E	3520A00125	02/08/2006
RECFL2	Hewlett Packard	85420E	3427A00126	02/08/2006

Test Details:

Conducted Emissions / Interference

Company: Millennial Net, Inc. Model #: MG-5424
 Engineer: Nicholas Abbondante Barometer: BAR2 Serial #: 405330110
 Project #: 3084056 Pressure: 1010mB Receiver: HP 8542E (REC2/RECFL2)
 Date: 09/30/05 Temp: 19c Cable: CBL022 11-17-2005.cbl
 Standard: FCC Part 15 Humidity: 64% LISN 1, 2: LISN11 [1] 7-05-06.lsn LISN11 [2] 7-05-06.lsn
 Class: - Group: - LISN 3, N: NONE. NONE.
 Attenuator: DS22A 11-17-2005.att Location: Site 2
 Voltage/Frequency: See Notes Frequency Range: 150 kHz - 30 MHz
 Net is the sum of worst-case lsn, cable, & attenuator losses, preamp gain, and initial reading
 Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; Bandwidth denoted as RBW/VBW

Detector Type	Frequency MHz	Reading Line 1 dB(uV)	Reading Line 2 dB(uV)	Reading Line 3 dB(uV)	Reading Neutral dB(uV)	Net dB(uV)	QP Limit dB(uV)	Margin dB	Bandwidth
Note: 120V/60Hz									
QP	0.150	27.0	26.1			47.2	66.0	-18.8	9/30 kHz
QP	0.346	28.1	27.7			48.3	59.1	-10.8	9/30 kHz
QP	0.518	22.6	20.6			42.8	56.0	-13.2	9/30 kHz
QP	2.977	9.1	8.5			29.5	56.0	-26.5	9/30 kHz
QP	13.700	9.0	13.1			33.8	60.0	-26.2	9/30 kHz
QP	24.000	-3.8	-4.2			17.4	60.0	-42.6	9/30 kHz

Detector Type	Frequency MHz	Reading Line 1 dB(uV)	Reading Line 2 dB(uV)	Reading Line 3 dB(uV)	Reading Neutral dB(uV)	Net dB(uV)	Average Limit dB(uV)	Margin dB	Bandwidth
Note: 120V/60Hz									
AVG	0.150	10.8	11.7			31.9	56.0	-24.1	9/30 kHz
AVG	0.346	17.9	16.0			38.1	49.1	-11.0	9/30 kHz
AVG	0.518	20.8	17.7			41.0	46.0	-5.0	9/30 kHz
AVG	2.977	6.5	5.2			26.9	46.0	-19.1	9/30 kHz
AVG	13.700	6.8	10.7			31.4	50.0	-18.6	9/30 kHz
AVG	24.000	-10.5	-10.7			10.7	50.0	-39.3	9/30 kHz

Setup Photos



