Test of Spectralink RNP2400 Telephone Device

To FCC 47 CFR Part 15.247/IC RSS-210

Test Report Serial No.:
TUVR04a/REV B

TEST REPORT

FROM

MiCOM Labs

Test of SpectraLink RNP2400 Telephone Device

To FCC 47 CFR Part 15.247/IC RSS-210

Test Report Serial No.:
TUVR04a/Rev B

This report supersedes TUVR04a/Rev A

Remarks:

Equipment complied with the specification	[X]
Equipment did not comply with the specification	[ ]

This Test Report is issued Under the Authority of:

Gordon Hurst President & CEO

Copy No: pdf

Issue date: 21st April '03

Equipment Details:

Manufacturer:	SpectraLink Corporation
Type designation:	refer to section 2 of test report
Serial No's:	refer to section 4 of test report

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1 Executive Summary

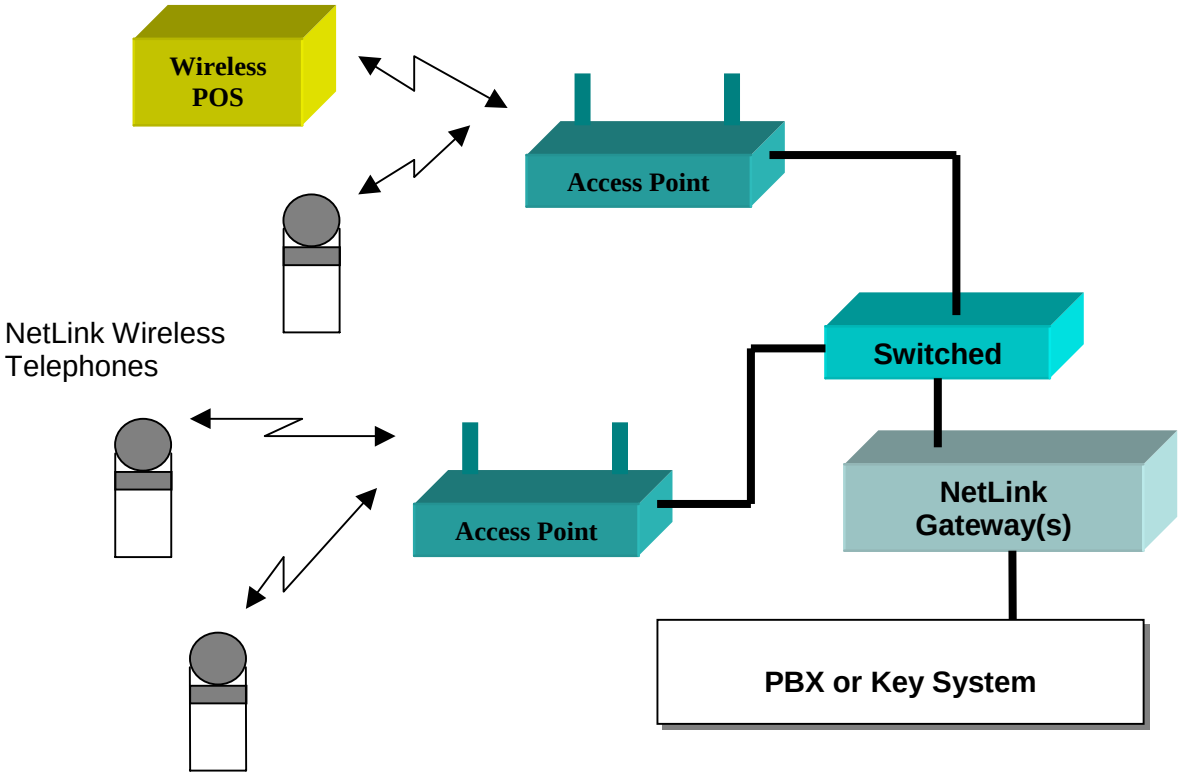
The purpose of this test program was to demonstrate compliance of the RNP2400 SpectraLink Wireless Telephone against the current USA and Canadian specifications for short-range device certification requirements. This report was created to accompany test report TUVR03a/REVA (SNP2400 telephone). The manufacturer declared that the RNP2400 telephone utilizes identical RF components, boards, layout and circuitry that was tested and reported within TUVR03a/REVA (SNP2400) report. As a result of the physical change in case dimension and style only radiated and conducted emissions are reported.

NetLink Wireless Telephone is designed and manufactured by SpectraLink Corporation, and used for NetLink Wireless Telephone System (WTS) also designed and manufactured by SpectraLink Corporation. The WTS is a fully featured, 802.11-b (DSSS) based wireless telephone system, providing both voice and data communications over a single integrated wireless network at in the 2.4GHz frequency band. NetLink WTS has two components, Wireless Telephones and Telephony Gateways.

NetLink Wireless Telephones operate as clients on the WLAN, alongside other mobile 802.11 devices. Wireless LAN fixed radios, called access points (APs), receive IP voice packets from Wireless Telephones and forward them to the NetLink Telephony Gateway over the Ethernet LAN.

The NetLink WTS simplifies LAN management and improves the cost-effectiveness of the network. With the NetLink Wireless Telephone, employees will have a phone whenever they need one, wherever they are in the facility. Wireless Telephones work just like a desktop telephone, with all the features and capabilities that employees desire, including: Display capabilities, Multiple line appearances, Host switch features, Message waiting indication, Messaging.

The following diagram identifies the NetLink system architecture and its position in a typical voice/data network.



2 Technical Details

Purpose	To verify compliance of the RNP2400 Wireless Telephone to FCC and Industry Canada specifications for emission measurements
Applicant / Client	SpectraLink Corporation 5755 Central Avenue Boulder, Colorado 80301 USA
Manufacturer	SpectraLink Corporation
Laboratory performing the tests	MiCOM Labs, Inc. 3922 Valley Avenue, Suite "B" Pleasanton, California 94566 USA
Test report reference number	TUVR04a/Rev B
Date EUT received	22nd January '03
Standard applied	FCC 47 CFR Part 15.247/IC RSS-210
Dates of test (from - to)	11th February '03 – 16th February '03
No of Units:	One
Equipment Category:	802.11b Spread Spectrum Device
Trade Name:	SpectraLink
Type Number:	NetLink Wireless Telephone
Type of Equipment:	Standalone Telephone
Type Designation:	RNP2400
ITU Emission Code(s):	11M0D7E
Full Frequency Range:	2,400 – 2,483.5MHz
Frequency Channel Range:	2,412 – 2,462MHz (Channels 1 – 11)
Modulation:	DSSS
Microprocessor(s):	Texas Instruments 54xx
Operating Frequency (ies):	2,400 – 2,483.5MHz
Clock/Oscillator(s)	32.768KHz, 44MHz
Rated Input Voltage:	Nominal: +4.2Vdc Min - Max: +3.5V – 4.9Vdc
Aggregate Bit Rates:	1Mbit/s, 2Mbit/s, 5.5Mbit/s, 11Mbit/s
Antenna Gain:	0dBi
Nominal Output Power:	+20dBm
Temperature Range:	0 to +40°C
Primary Function Evaluation:	To initiate and receive telephone calls
Intended function in accordance with accompanying documentation	To initiate and receive telephone calls without perceptible degradation of voice quality or loss of correct keypad & display operation
Normal Test Modulation, Error Correction and Control Signals:	IEEE 802.11b

3 Test Summary

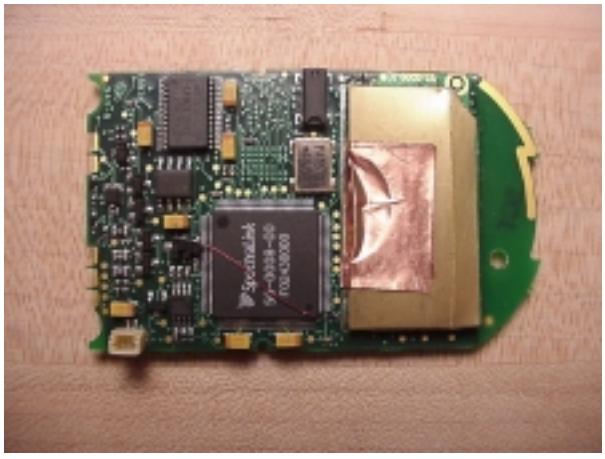
3.1 Test Configurations

Fundamental RF Frequency Generation

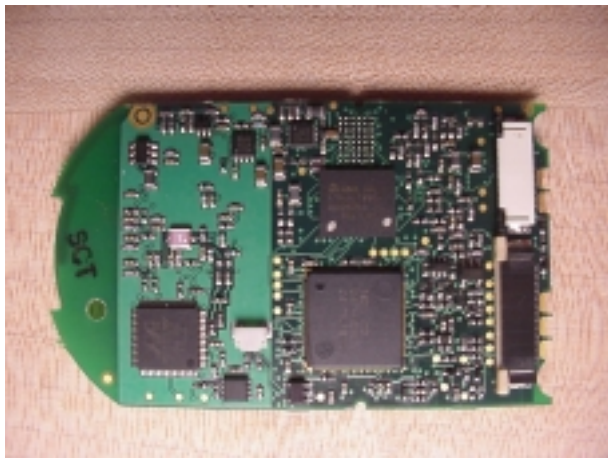
The manufacturer declared that the RF Frequency Generation section within the EUT (RNP2400) was identical to the Spectralink SNP2400, 2.4GHz 802.11b DSSS telephone,. Both products utilize the same part numbers for RF PCB board and components. Verification of the fundamental RF Frequency Generation PCB board and components utilized in telephone design are identified below;

RNP2400 RF Generation Board – Side A

RNP2400 RF Generation Board – Side B



SNP2400 RF Generation Board – Side A



SNP2400 RF Generation Board – Side B

For the reason above measurements for conducted RF measurements were replicated from the SNP2400 telephone and reported within this document, see MiCOM Labs test report TUVR03a Rev A. Section 3.2, List of Measurements summarize all measurements extracted from this report. AC Wireline Conducted Emissions and General Field Strength measurements were targeted on this EUT.

EUT Modes of Operation

The RNP2400 test configuration is a standalone telephone unit with integral antenna. The unit was pre-programmed to simultaneously transmit and receive on the low, mid and high channels or could be set in a continuous receive mode of operation. The following configurations were available:

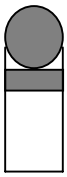
Simultaneous Transmit and Receive Modes:

- Mode I: Channel 1 (2,412MHz) Display "Norm, Tx Chan 1" : Low Channel
- Mode II: Channel 6 (2,437MHz) Display "Norm, Tx Chan 6" : Mid Channel
- Mode III: Channel 11 (2,462MHz) Display "Norm, Tx Chan 11" : High Channel

Continuous Receive Modes:

- Mode VII: Continuous receive mode on Channel 6 (2,437MHz)

The telephone was supplied with an integral antenna, which was used to demonstrate compliance for all emission testing performed.



RNP2400 NetLink Wireless Telephone
Equipment Under Test (EUT) with Integral Antenna

The required tests demonstrated compliance as per client declaration of test configuration, monitoring method and associated pass/fail criteria.

This report provides summarised test results of each test performed. Detailed test results were recorded in Test Results Sheets and retained within the laboratory.

No equipment modification was required to achieve the results reported in this document.

3.2 List of Measurements

The following table represents the list of measurements for Spread Spectrum, Direct Sequence devices under the **FCC, Part 15 Subpart C** and **Industry Canada RSS-210**.

List of Measurements

Section(s)	Test Items		Condition
	Transmit mode (TX):		
15.247(a)(2) **5.9.1**	Bandwidth at 6 dB below	*1	Conducted
15.247(c) **5.9.1** **6.2.2 (o) (e1)**	Occupied BW (or Bandedge) Out of Band Emissions (Bandwidth at 20 dB below)	*1 -The radiated emission in any 100kHz of out-band shall be at least 20dB below the highest in-band spectral density.	Conducted
15.247(b) **6.2.2 (o) (b)**	Transmitter output power	*1 - Shall not exceed 1.0 W	Conducted
15.247(d) **6.2.2 (o) (b)**	Transmitter power spectral density	*1 - Shall not be greater than 8 dBm in any 3kHz band	Conducted
15.247(e) **6.2.2 (o) (b)**	Processing gain	N/A	N/A*2
15.207 **6.6**	AC Wireline Conducted Emissions 450kHz–30MHz	Class B: 250µV	Conducted
15.205/ 209 **6.2.1 / 6.3**	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Shall not exceed the limits specified in FCC 15.209 or RSS-210 Table 3	Radiated (30MHz -1GHz)
			Radiated (1GHz-25GHz)
	Receive mode (RX):		
15.207 **7.4**	AC Wireline Conducted Emissions 450kHz–30MHz	Class B: 250µV	Conducted
15.209 **7.3**	General Field Strength Limits (Radiated Emission Limits)	Shall not exceed the limits specified in RSS-210.	Radiated (30MHz-1GHz)
			Radiated (1GHz-25GHz)

Note 1: These results were extracted from MiCOM Labs test report #: TUVR03a Rev A, see Section 3.1 'Test Configurations'

Note 2: The current specification does not require test of this parameter. The Processing Gain data is excluded from this application according to the FCC rule change on 16 May 2002

3.3 Operational Mode of EUT

Three kinds of modulation are used for transmission with bit rates 1Mbit/s, 5.5Mbit/s and 11Mbit/s. The equipment will be marketed with one antenna (no direct connection from the end user is permitted). The EUT was delivered with an integral antenna for the emission measurements.

Table 3.3(a) – Transmit mode (TX)

OPERATING FREQUENCY (GHZ)	**Rated Output Power (Conducted) [dBm]**			**Test Performed***
	Bit Rate 1Mbit/s	Bit Rate 5.5Mbit/s	Bit Rate 11Mbit/s	
2.412 (Ch. 1)	+20	+20	+20	X
2.417 (Ch. 2)	+20	+20	+20	
2.422 (Ch. 3)	+20	+20	+20	
2.427 (Ch. 4)	+20	+20	+20	
2.432 (Ch. 5)	+20	+20	+20	
2.437 (Ch. 6)	+20	+20	+20	X
2.442 (Ch. 7)	+20	+20	+20	
2.447 (Ch. 8)	+20	+20	+20	
2.452 (Ch. 9)	+20	+20	+20	
2.457 (Ch. 10)	+20	+20	+20	
2.462 (Ch. 11)	+20	+20	+20	X

***** Radiated and Conducted emission testing, bit rate 1Mbit/s

Table 3.3(b) – Receive mode (RX)

OPERATING FREQUENCY (GHZ)	**Test Performed***
2.412 (Ch. 1)	
2.417 (Ch. 2)	
2.422 (Ch. 3)	
2.427 (Ch. 4)	
2.432 (Ch. 5)	
2.437 (Ch. 6)	X
2.442 (Ch. 7)	
2.447 (Ch. 8)	
2.452 (Ch. 9)	
2.457 (Ch. 10)	
2.462 (Ch. 11)	

***** Full emission testing, bit rate 1Mbit/s

Note 1: *The manufacturer declared that the EUT was operated in worst case conditions, simultaneous transmit, receive and standby modes through a single antenna port, therefore only one set of radiated measurements were taken for each channel of interest – refer to transmitter characteristics.*

Note 2: *Two EUT's were delivered for test purposes*

- *RNP2400 with integral antenna*
- *SNP2400 with coaxial flying lead, terminated in an SMA connector*

Note 3: *The SNP2400 telephone with coaxial connector was used for conducted testing*

Note 4: *The RNP2400 telephone with integral antenna was utilised for all emission measurements reported within this document*

4 Measurements, Examinations and Derived Results

4.1 General observations

Equipment model and serial number(s)

Module:	Model Number:	Serial Number:
Netlink Telephone (integral antenna)	RNP2400	RNPFCC#1*****
Netlink Telephone (coaxial connector)	SNP2400	SNPFCC#2*****

*****The telephones submitted for testing was a pre-production model

Additional notes:

1. *This report contains the test results only. Details of the test methods used have been recorded and are kept on file by the laboratory. Wherever possible, the test methods described in ETSI document EN 301 126 have been used.*

2. *The measurement uncertainties stated are based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95% in accordance with UKAS document M 3003.*

4.2 Test Results

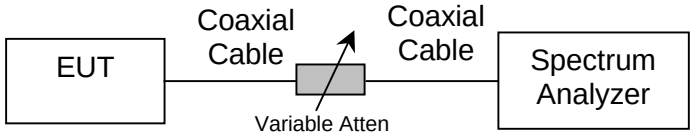
4.2.1 Transmitter characteristics

4.2.1.1 6dB Bandwidth

Test Procedure

The bandwidth at 6 dB down from the highest in-band spectral density is measured with a spectrum analyser connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate centre frequency. The spectrum analyzer was set to:
RBW=100kHz, VBW=100kHz*1, Span=50MHz, Sweep = suitable duration based on the EUT specification
*1: To be adjusted accordingly based on the spectrum stability

Test Measurement Setup



Measurement setup for 6dB bandwidth test

Measurement Results

Ambient conditions.
Temperature: 17 to 22 °C Relative humidity: 34 to 65% Pressure: 999 to 1012 mbar

Radio parameters.
Data Rate(s): 1, 5.5, 11 Mbit/s

Test date: 23rd January '03

TABLE OF RESULTS – **1Mbit/s**

Center Frequency (MHz)	Low Frequency (MHz)	Upper Frequency (MHz)	Plot #	6dB Bandwidth (MHz)
2412 (Ch.1)	2,406.04	2,417.96	TUVR04a/01	11.92
2437 (Ch.6)	2,430.92	2,443.09	TUVR04a/04	12.17
2462 (Ch.11)	2,456.34	2,467.67	TUVR04a/07	11.33

TABLE OF RESULTS – **5.5Mbit/s**

Center Frequency (MHz)	Low Frequency (MHz)	Upper Frequency (MHz)	Plot #	6dB Bandwidth (MHz)
2412 (Ch.1)	2,406.04	2,417.96	TUVR04a/02	11.92
2437 (Ch.6)	2,431.42	2,442.59	TUVR04a/05	11.17
2462 (Ch.11)	2,456.34	2,467.67	TUVR04a/08	11.33

TABLE OF RESULTS – **11Mbit/s**

Center Frequency (MHz)	Low Frequency (MHz)	Upper Frequency (MHz)	Plot #	6dB Bandwidth (MHz)
2412 (Ch.1)	2,406.04	2,417.96	TUVR04a/03	11.92
2437 (Ch.6)	2,431.50	2,442.50	TUVR04a/06	11.00
2462 (Ch.11)	2,456.71	2,467.29	TUVR04a/09	10.58

Specification.

Limits

Minimum 6dB Bandwidth	500KHz

Measurement Uncertainty

Measurement uncertainty (ppm)	±0.86	2.074KHz

Traceability

METHOD	TEST EQUIPMENT USED
Measurements were made per work instruction WI-03	Bar 1, RVA 01, K-CBL 8, K-CBL 10, S-Anlr 1

Note 1: The unit was tested in Tx, Rx and Standby modes simultaneously

4.2.1.2 Occupied Bandwidth / Band-Edge (at 20dB below), Out of Band Emissions

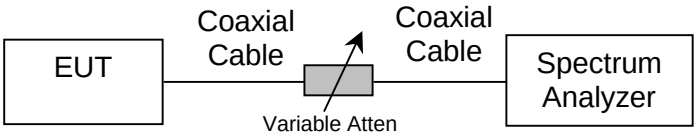
Test Procedure

The bandwidth at 20 dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate center frequency.

The spectrum analyzer is set to:
RBW=100kHz, VBW=100kHz*1, Span=50MHz, Sweep = suitable duration based on the EUT specification

*1: To be adjusted accordingly based on the spectrum stability

Test Measurement Setup



Measurement setup for Occupied Bandwidth / Band-edge (at 20db below), and Out of Band Emissions

Measurement Results of Occupied Bandwidth (20dB)

Ambient conditions.
Temperature: 17 to 22 °C Relative humidity: 34 to 65% Pressure: 999 to 1012 mbar

Radio parameters.
Data Rate(s): 1, 5.5, 11 Mbit/s

Test date: 24th January '03

TABLE OF RESULTS – **1Mbit/s**

Center Frequency (MHz)	Low Frequency (MHz)	Upper Frequency (MHz)	Plot #	20dB Bandwidth (MHz)
2412 (Ch.1)	2,404.25	2,421.17	TUVR04a/25	16.92
2437 (Ch.6)	2,429.25	2,445.75	TUVR04a/28	16.50
2462 (Ch.11)	2,454.67	2,470.17	TUVR04a/31	15.50

TABLE OF RESULTS – **5.5Mbit/s**

Center Frequency (MHz)	Low Frequency (MHz)	Upper Frequency (MHz)	Plot #	20dB Bandwidth (MHz)
2412 (Ch.1)	2,404.17	2,420.92	TUVR04a/26	16.75
2437 (Ch.6)	2,429.67	2,445.42	TUVR04a/29	15.75
2462 (Ch.11)	2,454.92	2,470.58	TUVR04a/32	15.67

TABLE OF RESULTS – **11Mbit/s**

Center Frequency (MHz)	Low Frequency (MHz)	Upper Frequency (MHz)	Plot #	20dB Bandwidth (MHz)
2412 (Ch.1)	2,404.25	2,421.17	TUVR04a/27	16.92
2437 (Ch.6)	2,429.58	2,445.50	TUVR04a/30	15.92
2462 (Ch.11)	2,454.75	2,470.58	TUVR04a/33	15.83

Measurement Results of Band-edge

Test date: 24th January '03

TABLE OF RESULTS – **1Mbit/s**

Center Frequency (MHz)	Low Frequency (MHz)	Upper Frequency (MHz)	Plot #	Margin to Lower Limit (MHz)	Margin to Upper Limit (MHz)
2412 (Ch.1)	2,404.17		TUVR04a/10	4.17	
2462 (Ch.11)		2,470.92	TUVR04a/13		12.58

TABLE OF RESULTS – **5.5Mbit/s**

Center Frequency (MHz)	Low Frequency (MHz)	Upper Frequency (MHz)	Plot #	Margin to Lower Limit (MHz)	Margin to Upper Limit (MHz)
2412 (Ch.1)	2,404.17		TUVR04a/11	4.17	
2462 (Ch.11)		2,470.92	TUVR04a/14		12.58

TABLE OF RESULTS – **11Mbit/s**

Center Frequency (MHz)	Low Frequency (MHz)	Upper Frequency (MHz)	Plot #	Margin to Lower Limit (MHz)	Margin to Upper Limit (MHz)
2412 (Ch.1)	2,404.17		TUVR04a/12	4.17	
2462 (Ch.11)		2,470.92	TUVR04a/15		12.58

Measurement Results of Out of Band Emissions

All conducted emissions in any 100KHz bandwidth outside of the spread spectrum band were at least 20dB lower than the highest in-band power level.

Specification

Limits

Minimum 20dB Bandwidth @ Band-edge	Lower Limit Band-edge	Upper Limit Band-edge
	2,400MHz	2,483.5MHz

Out of Band Emissions	Down on maximum power
	>= 20dB

Measurement Uncertainty Occupied Bandwidth / Band-edge

Measurement uncertainty (ppm)	±0.86	2.074KHz

Measurement Uncertainty Out of Band Emissions

Measurement uncertainty (dB)	+1.38 / -1.84dB

Traceability

METHOD	TEST EQUIPMENT USED
Measurements were made per work instruction WI-01 & 05	Bar 1, RVA 01, K-CBL 8, K-CBL 10, S-Anlr 1

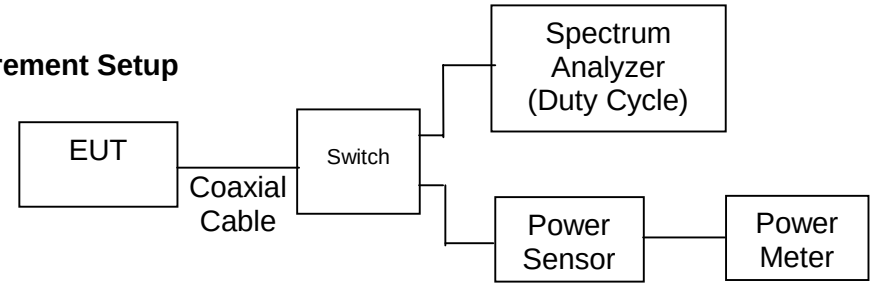
Note 1: The unit was tested in Tx, Rx and Standby modes simultaneously

4.2.1.3 Transmitter Output Power

Test Procedure

- A transmitter antenna terminal of EUT is connected to the input of a RF power sensor.
- Measurement is made while EUT is operating in transmission mode at the appropriate center frequency.

Test Measurement Setup



Measurement setup for Transmitter Output Power

Measurement Results for Transmitter Output Power

Ambient conditions.
Temperature: 17 to 22 °C Relative humidity: 34 to 65% Pressure: 999 to 1012 mbar

Radio parameters.
Data Rate(s): 1, 5.5, 11 Mbit/s

Test date: 23th January '03

TABLE OF RESULTS – **1Mbit/s**

Center Frequency (MHz)	Duty Cycle (%)	Measured on Period (mS)	Measured off Period (mS)	Measured O/P Power (dBm)	Path Loss (dB)	Conducted Power (dBm)
2412 (Ch.1)	5.9	1.18	18.82	19.06	0.5	19.56
2437 (Ch.6)	5.9	1.18	18.82	18.08	0.5	18.58
2462 (Ch.11)	5.9	1.18	18.82	17.08	0.5	17.58

TABLE OF RESULTS – **5.5Mbit/s**

Center Frequency (MHz)	Duty Cycle (%)	Measured on Period (mS)	Measured off Period (mS)	Measured O/P Power (dBm)	Path Loss (dB)	Conducted Power (dBm)
2412 (Ch.1)	1.89	0.364	18.936	19.50	0.5	20.00
2437 (Ch.6)	1.89	0.364	18.936	18.70	0.5	19.20
2462 (Ch.11)	1.89	0.364	18.936	17.56	0.5	18.06

TABLE OF RESULTS – **11Mbit/s**

Center Frequency (MHz)	Duty Cycle (%)	Measured on Period (mS)	Measured off Period (mS)	Measured O/P Power (dBm)	Path Loss (dB)	Conducted Power (dBm)
2412 (Ch.1)	1.48	0.283	18.817	19.59	0.5	20.09
2437 (Ch.6)	1.48	0.283	18.817	18.42	0.5	18.92
2462 (Ch.11)	1.48	0.283	18.817	17.05	0.5	17.55

Specification

Limits

Transmitter Output Power	Watts	dBm
	<= 1	<= +30

Measurement Uncertainty Output Power

Measurement uncertainty (dB)	±1.33

Traceability

METHOD	TEST EQUIPMENT USED
Measurements were made per work instruction WI-01	Bar 1, RVA 01, K-CBL 8, K-CBL 10, S-Anlr 1, PMtr 1, PSnsr 1

Note 1: The unit was tested in Tx, Rx and Standby modes simultaneously

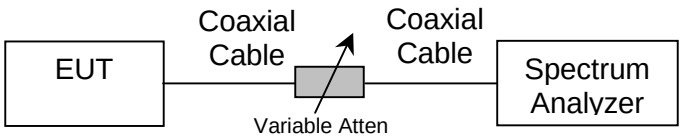
4.2.1.4 Transmitter Power Spectral Density

Test Procedure

The peak power density is measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate center frequency.

The spectrum analyzer is set as follows:
RBW= 3kHz, VBW=100kHz, Suitable Span and Sweep time

Test Measurement Setup



Measurement setup for Transmitter Power Spectral Density

Measurement Results for Transmitter Power Spectral Density

Ambient conditions.
Temperature: 17 to 22 °C Relative humidity: 34 to 65% Pressure: 999 to 1012 mbar

Radio parameters.
Data Rate(s): 1, 5.5, 11 Mbit/s

Test date: 23th January '03

TABLE OF RESULTS – **1Mbit/s**

Center Frequency (MHz)	Spectrum Analyzer Reading (dBm)	Plot #	Path Loss (dB)	Actual Value (dBm)	Limit (dBm)	Margin (dB)
2412 (Ch.1)	-13.50	TUVR03/16	8.5	-5.00	+8.00	13.00
2437 (Ch.6)	-15.33	TUVR03/19	8.5	-6.83	+8.00	14.83
2462 (Ch.11)	-14.83	TUVR03/22	8.5	-6.33	+8.00	14.33

TABLE OF RESULTS – **5.5Mbit/s**

Center Frequency (MHz)	Spectrum Analyzer Reading (dBm)	Plot #	Path Loss (dB)	Actual Value (dBm)	Limit (dBm)	Margin (dB)
2412 (Ch.1)	-14.33	TUVR03/17	8.5	-5.83	+8.00	13.83
2437 (Ch.6)	-15.17	TUVR03/20	8.5	-6.67	+8.00	14.67
2462 (Ch.11)	-16.17	TUVR03/23	8.5	-7.67	+8.00	15.67

TABLE OF RESULTS – **11Mbit/s**

Center Frequency (MHz)	Spectrum Analyzer Reading (dBm)	Plot #	Path Loss (dB)	Actual Value (dBm)	Limit (dBm)	Margin (dB)
2412 (Ch.1)	-15.00	TUVR03/18	8.5	-6.50	+8.00	14.50
2437 (Ch.6)	-16.83	TUVR03/21	8.5	-8.33	+8.00	16.33
2462 (Ch.11)	-15.83	TUVR03/24	8.5	-7.33	+8.00	15.33

Specification

Limits

Transmitter Power Spectral Density	dBm
	<= +8.0

Measurement Uncertainty Spectral Density

Measurement uncertainty (dB)	±1.33

Traceability

METHOD	TEST EQUIPMENT USED
Measurements were made per work instruction WI-01	Bar 1, RVA 01, K-CBL 8, K-CBL 10, S-Anlr 1

Note 1: The unit was tested in Tx, Rx and Standby modes simultaneously

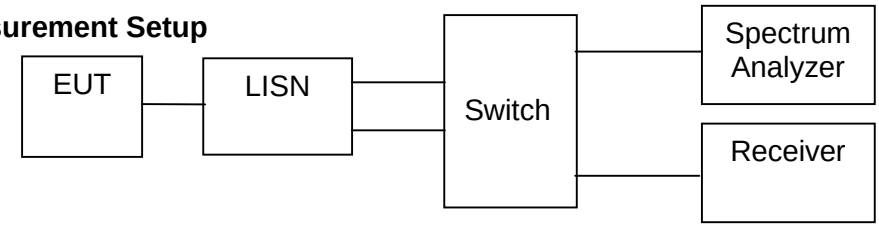
4.2.2 Emission characteristics

4.2.2.1 AC Wireline Conducted Emissions (450KHz – 30MHz)

Test Procedure

The conducted emissions are measured in a shielded room with a spectrum analyzer in peak hold in the first instance. Emissions closest to the limit are measured in the quasi-peak mode (QP) with the tuned receiver using a bandwidth of 9KHz. The emissions are maximized further by cable manipulation. The highest emissions relative to the limit are listed.

Test Measurement Setup



Measurement Results for AC Wireline Conducted Emissions (450KHz – 30MHz)

The EUT was found to comply to the limits of FCC Part 15, Subpart C and RSS-210 with a margin of 12.5dB. The six highest emissions relative to the limit are reported for two modes of operation. Spectrum analyzer pre-scan data plots are held in the laboratory for reference purposes.

Ambient conditions.
Temperature: 17 to 22 °C Relative humidity: 34 to 65% Pressure: 999 to 1012 mbar

Test date: 28/29th January '03

EUT **RNP2400**, Ch 6 (2,437MHz), Tx/Rx/Standby Mode1Mbit/s

Frequency (MHz)	QP Voltage (dBµV)	QP Limit (dBµV)	QP Voltage (µV)	QP Limit (µV)	Phase
0.486	32.96	48	44.46	250	NEUTRAL
0.498	32.12	48	40.36	250	NEUTRAL
29.54	31.85	48	39.13	250	LINE 1
29.67	33.50	48	47.32	250	NEUTRAL
29.77	32.51	48	42.22	250	LINE 1
29.96	33.10	48	45.19	250	NEUTRAL

EUT **RNP2400**, Ch 6 (2,437MHz), Receive only mode

Frequency (MHz)	QP Voltage (dBµV)	QP Limit (dBµV)	QP Voltage (µV)	QP Limit (µV)	Phase
0.474	32.04	48	39.99	250	LINE 1
0.582	30.30	48	32.73	250	NEUTRAL
29.39	32.50	48	42.17	250	LINE 1
29.54	35.50	48	59.57	250	NEUTRAL
29.68	32.99	48	44.62	250	LINE 1
29.83	32.20	48	40.74	250	NEUTRAL

Note 1: Two separate configurations were tested: Tx/Rx/Standby mode and receive only mode

Photographs of the test setup are provided in Section 5.1 'AC WIRELINE CONDUCTED EMISSION TEST SETUP'

Measurement Uncertainty Spectral Density

Measurement uncertainty (dB)	±2.64

Traceability

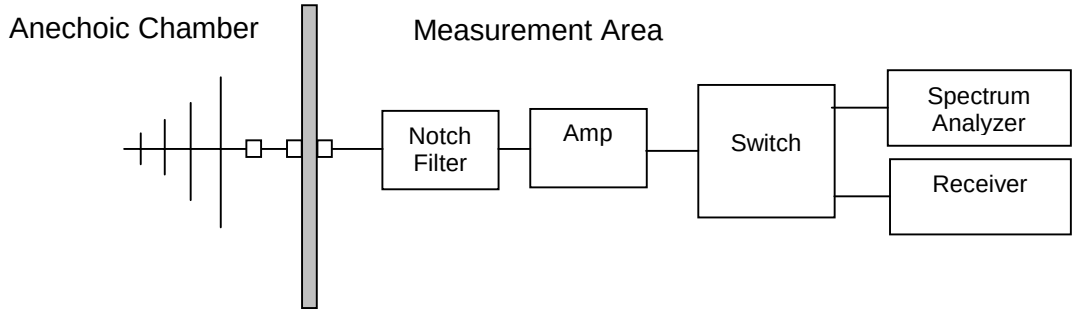
METHOD	TEST EQUIPMENT USED
Measurements were made per work instruction WI-EMC-01	Bar 1, LMT1, 15F50B001, 15F50B002, LISN1, ReCVR1

4.2.2.2 Restricted Bands Radiation (30MHz – 1GHz)

Test Procedure

Preliminary radiated emissions are measured in the anechoic chamber at a 3-meter distance on every azimuth in both horizontal and vertical polarity. The emissions are recorded with a spectrum analyzer in peak hold mode. A notch filter was used to remove the fundamental frequency, see Notch Filter Response plots 05-08 in Section 6, Graphical Results. Emissions closest to the limits are measured in the quasi-peak mode with the tuned receiver using a bandwidth of 120kHz on the Open Area Test Site (OATS). The highest emissions relative to the limit are listed. A photograph of the product tested at the OATS site is available, see Section 5.2.

Preliminary Test Measurement Setup



Final Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Loss, and subtracting Amplifier Gain from the measured reading. In this test facility, the Antenna Factor, Cable Loss, and Amplifier Gains are loaded into the Rohde & Schwarz Receiver and the corrected field strength can be read directly on the receiver.

$$FS = R + AF + CORR$$

where:

FS = Field Strength
R = Measured Receiver Input Amplitude
AF = Antenna Factor
CORR = Correction Factor = CL – AG + NFL
CL = Cable Loss
AG = Amplifier Gain

For example:
Given Receiver input reading of 51.5dBµV; Antenna Factor of 8.5dB, Cable Loss of 1.3dB, an Amplifier Gain of 26dB. The Field Strength of the measured emission is:

$$FS = 51.5 + 8.5 + 1.3 - 26.0 = 35.3 dB\mu V/m$$

Conversion between dBµV/m (or dBµV) and µV/m (or µV) are done as:

$$Level\ (dB\mu V/m) = 20\ \%\ Log\ (Level\ (\mu V/m))$$

40dBµV/m = 100µV/m
48dBµV/m = 250µV/m.

Measurement Results for Restricted Bands Radiation (30MHz – 1GHz)

Ambient conditions.
Temperature: 17 to 22 °C Relative humidity: 34 to 65% Pressure: 999 to 1012 mbar

Test date: Pre-scans 25th/26th January '03 and OATS 7th February '03

EUT **RNP2400**, Ch 1 (2,412MHz), Tx/Rx/Standby Mode 1Mbit/s

Frequency (MHz)	Polarity (H/V)	Measured (dBµV) **(peak)**	Measured (dBµV/m) **(QP)**	Antenna Factor (dB)	Correction Factor (dB)	Field Strength (dBµV/m) **(QP)**	Limit (dBµV/m) **(QP)**	Field Strength (µV/m) **(QP)**	Limit (µV/m) **(QP)**
219.99	V	11.20	10.50	16.3	17.74	28.24	46	25.82	200
307.98	V	17.57	17.18	12.9	14.87	32.05	46	40.04	200
373.99	V	21.10	19.24	15.8	17.93	37.17	46	72.19	200
483.99	V	22.00	20.94	17.4	20.09	41.03	46	112.59	200
573.22	V	13.59	11.90	19.1	22.00	33.90	46	49.55	200
639.24	V	11.00	6.86	19.6	22.83	29.69	46	30.51	200

EUT **RNP2400**, Ch 6 (2,437MHz), Tx/Rx/Standby Mode 1Mbit/s

Frequency (MHz)	Polarity (H/V)	Measured (dBµV) **(peak)**	Measured (dBµV/m) **(QP)**	Antenna Factor (dB)	Correction Factor (dB)	Field Strength (dBµV/m) **(QP)**	Limit (dBµV/m) **(QP)**	Field Strength (µV/m) **(QP)**	Limit (µV/m) **(QP)**
307.99	V	19.08	18.97	12.9	14.87	33.84	46	49.20	200
395.99	V	19.72	19.19	16.6	18.86	38.05	46	79.89	200
484.00	V	22.43	21.97	17.4	20.09	42.06	46	126.77	200
573.23	V	12.87	10.87	19.1	22.00	32.87	46	44.00	200
615.99	V	13.76	11.28	19.6	22.49	33.77	46	48.81	200
659.99	V	14.13	12.79	20.1	23.33	36.12	46	63.97	200

EUT **RNP2400**, Ch 11 (2,462MHz), Tx/Rx/Standby Mode 1Mbit/s

Frequency (MHz)	Polarity (H/V)	Measured (dBµV) **(peak)**	Measured (dBµV/m) **(QP)**	Antenna Factor (dB)	Correction Factor (dB)	Field Strength (dBµV/m) **(QP)**	Limit (dBµV/m) **(QP)**	Field Strength (µV/m) **(QP)**	Limit (µV/m) **(QP)**
219.99	V	12.20	11.10	16.3	17.74	28.84	46	27.67	200
307.98	V	20.93	20.61	12.9	14.87	35.48	46	59.43	200
395.99	V	21.62	20.71	16.6	18.86	39.57	46	95.17	200
483.99	V	23.25	21.28	17.4	20.09	41.37	46	117.08	200
573.25	V	15.71	14.31	19.1	22.00	36.31	46	65.39	200
659.98	V	15.45	14.20	20.1	23.33	37.53	46	75.25	200

EUT **RNP2400**, Ch 6 (2,437MHz), Receive Mode 1Mbit/s

Frequency (MHz)	Polarity (H/V)	Measured (dBµV) **(peak)**	Measured (dBµV/m) **(QP)**	Antenna Factor (dB)	Correction Factor (dB)	Field Strength (dBµV/m) **(QP)**	Limit (dBµV/m) **(QP)**	Field Strength (µV/m) **(QP)**	Limit (µV/m) **(QP)**
219.99	V	11.80	10.60	16.3	17.74	28.34	46	26.12	200
307.99	V	20.86	19.31	12.9	14.87	34.18	46	51.17	200
310.03	V	23.58	10.95	12.9	14.87	25.82	46	19.54	200
395.98	V	20.99	19.68	16.6	18.86	38.54	46	84.53	200
573.26	V	14.03	12.20	19.1	22.00	34.20	46	51.29	200
660.00	V	17.74	15.54	20.1	23.33	38.87	46	87.80	200

Measurement Uncertainty Radiated Emissions

Measurement uncertainty (dB)	+5.6 / -4.5

Traceability

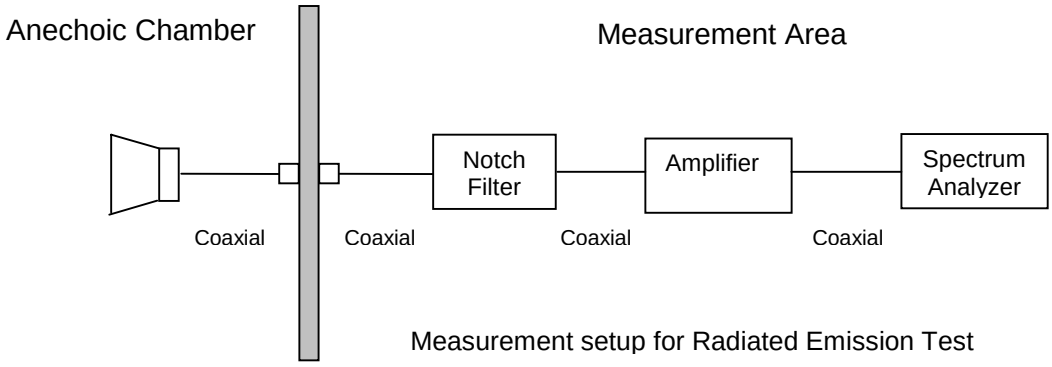
METHOD	TEST EQUIPMENT USED
Measurements were made per work instruction WI-EMC-07	Bar 1, Notch, AMP 3, ANT 1, K-Cbl 11, 10F50N003, 15F50N001, 5F50N001, ReCVR1, SSwpr 1, PSnsr 3

4.2.2.3 Restricted Bands Radiation (1GHz-25GHz)

Test Procedure

Radiated emissions were measured in the frequency range 1GHz to 25GHz in transmitting mode and 1GHz to 12.5GHz in receiving mode. All tests were performed in the anechoic chamber at a 1-meter distance on both horizontal and vertical polarities and extrapolated to 3m. The emissions are recorded with a spectrum analyzer in peak hold mode. The identified emissions are further maximized as a function of azimuth by rotation through 360°. The six highest emissions relative to the limit are listed. A notch filter was used to remove the fundamental frequency, see Notch Filter Response plots 05-08 in Section 6, Graphical Results. After notch filter cut-off waveguide were utilized as high-pass filters from 12.75-25GHz. Frequencies not covered by the 'Restricted Bands of Operation' are compared to the fundamental carrier per 47 CFR 15.247(c).

Test Measurement Setup



Measurement setup for Radiated Emission Test

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Loss, and subtracting Amplifier Gain from the measured reading. All factors are included in the reported data.

FS = R + AF + CORR - FO

where:

FS = Field Strength
R = Measured Spectrum analyzer Input Amplitude
AF = Antenna Factor
CORR = Correction Factor = CL – AG + NFL
CL = Cable Loss
AG = Amplifier Gain
FO = Distance Falloff Factor
NFL = Notch Filter Loss

For example:
Given a Receiver input reading of 51.5dBµV; Antenna Factor of 8.5dB; Cable Loss of 1.3dB; Falloff Factor of 0dB, an Amplifier Gain of 26dB and Notch Filter Loss of 1dB. The Field Strength of the measured emission is:

FS = 51.5 + 8.5 + 1.3 - 26.0 +1 = 36.3dBµV/m

Conversion between dBµV/m (or dBµV) and µV/m (or µV) are done as:

Level (dBµV/m) = 20 % Log (Level (µV/m))

40dBµV/m = 100µV/m
48dBµV/m = 250µV/m.

Measurement Results for Restricted Bands Radiation (1GHz - 25GHz)

Ambient conditions.
Temperature: 17 to 22 °C Relative humidity: 34 to 65% Pressure: 999 to 1012 mbar

Test date: 25th/26th January '03

Results for Variant SNP2400

EUT **RNP2400**, Ch 1 (2,412MHz), Tx/Rx/Standby Mode 1Mbit/s

Frequency (GHz)	Polarity (H/V)	Measured (dBµV) (**peak**)	Measured (dBµV) (**average**)	Antenna Factor (dB)	Correction Factor (dB)	Field Strength (dBµV/m) (**peak**)	FCC/IC Limit (dBµV/m)	Field Strength (dBµV/m) (**average**)	NRB/OB*
2.038	V	56.8	-	28.9	-24.38	61.32	-	-	NRB*
2.038	H	57.4	-	29.1	-24.38	62.12	-	-	NRB*
2.046	H	36.6	-	29.1	-24.38	41.32	-	-	NRB*
2.090	V	36.5	-	28.9	-23.95	41.45	-	-	NRB*
2.112	V	40.3	-	29.4	-23.95	45.75	-	-	NRB*
2.112	H	37.9	-	29.5	-23.95	43.45	-	-	NRB*
2.412	V	56.83	-	30.7	8.0	95.53	OB*	-	OB*
2.412	H	66.67	-	30.7	8.0	105.37	OB*	-	OB*

EUT **RNP2400**, Ch 6 (2,437MHz), Tx/Rx/Standby Mode 1Mbit/s

Frequency (GHz)	Polarity (H/V)	Measured (dBµV) (**peak**)	Measured (dBµV) (**average**)	Antenna Factor (dB)	Correction Factor (dB)	Field Strength (dBµV/m) (**peak**)	FCC/IC Limit (dBµV/m)	Field Strength (dBµV/m) (**average**)	NRB/OB*
2.0625	V	57.2	-	28.9	-23.95	62.15	-	-	NRB*
2.0625	H	58.8	-	29.1	-23.95	63.95	-	-	NRB*
2.178	V	34.4	-	29.4	-22.44	41.36	-	-	NRB*
2.222	V	34.8	-	30.0	-22.44	42.36	54.0	-	
2.222	H	35.0	-	29.8	-22.44	42.36	54.0	-	
2.266	H	33.4	-	30.0	-19.44	43.96	54.0	-	-
2.437	V	53.17	-	30.7	8.0	91.87	OB*	-	OB*
2.437	H	67.67	-	30.7	8.0	106.37	OB*	-	OB*

EUT **RNP2400**, Ch 11 (2,462MHz), Tx/Rx/Standby Mode 1Mbit/s

Frequency (GHz)	Polarity (H/V)	Measured (dBµV) (**peak**)	Measured (dBµV) (**average**)	Antenna Factor (dB)	Correction Factor (dB)	Field Strength (dBµV/m) (**peak**)	FCC/IC Limit (dBµV/m)	Field Strength (dBµV/m) (**average**)	NRB/OB*
2.089	V	59.4	-	28.9	-23.95	64.35	-	-	NRB*
2.089	H	56.7	-	29.1	-23.95	61.82	-	-	NRB*
2.267	H	33.5	-	30.0	-19.44	44.06	54.0	-	-
2.310	H	34.5	-	30.0	-19.44	45.06	54.0	-	-
4.924	H	27.9	-	35.1	-16.96	46.04	54.0	-	-
4.924	V	32.1	-	34.9	-16.96	50.04	54.0	-	-
2.462	V	61.0	-	30.7	8.0	99.70	OB*	-	OB*
2.462	H	68.67	-	30.7	8.0	107.37	OB*	-	OB*

EUT **RNP2400**, Ch 6 (2,437MHz), Receive Mode 1Mbit/s

Frequency (GHz)	Polarity (H/V)	Measured (dBµV) (**peak**)	Measured (dBµV) (**average**)	Antenna Factor (dB)	Correction Factor (dB)	Field Strength (dBµV/m) (**peak**)	FCC/IC Limit (dBµV/m)	Field Strength (dBµV/m) (**average**)	NRB/OB*
1.012	V	30.1	-	24.9	-27.40	27.60	54.0	-	-
1.056	V	30.2	-	24.9	-27.40	27.70	54.0	-	-
1.145	V	29.8	-	24.9	-27.00	27.70	54.0	-	-
2.0625	H	38.0	-	29.1	-23.95	43.15	-	-	NRB*
2.437	H	67.67	-	30.7	8.0	106.37	OB*	-	OB*

***Note:** OB implies Operational Band (2,400 - 2,462MHz); in this case the limit +20dBm was measured with a power meter

NRB implies “Non Restricted Bands of Operation”

Frequencies not covered by the ‘Restricted Bands of Operation’ are compared to the fundamental carrier per 47 CFR 15.247(c). ‘OB’ – Operational Band in the matrix identifies the fundamental carrier.

The Notch Filter Response plots 05-08 are available in Section 6, Graphical Results

Measurement Uncertainty Radiated Emissions

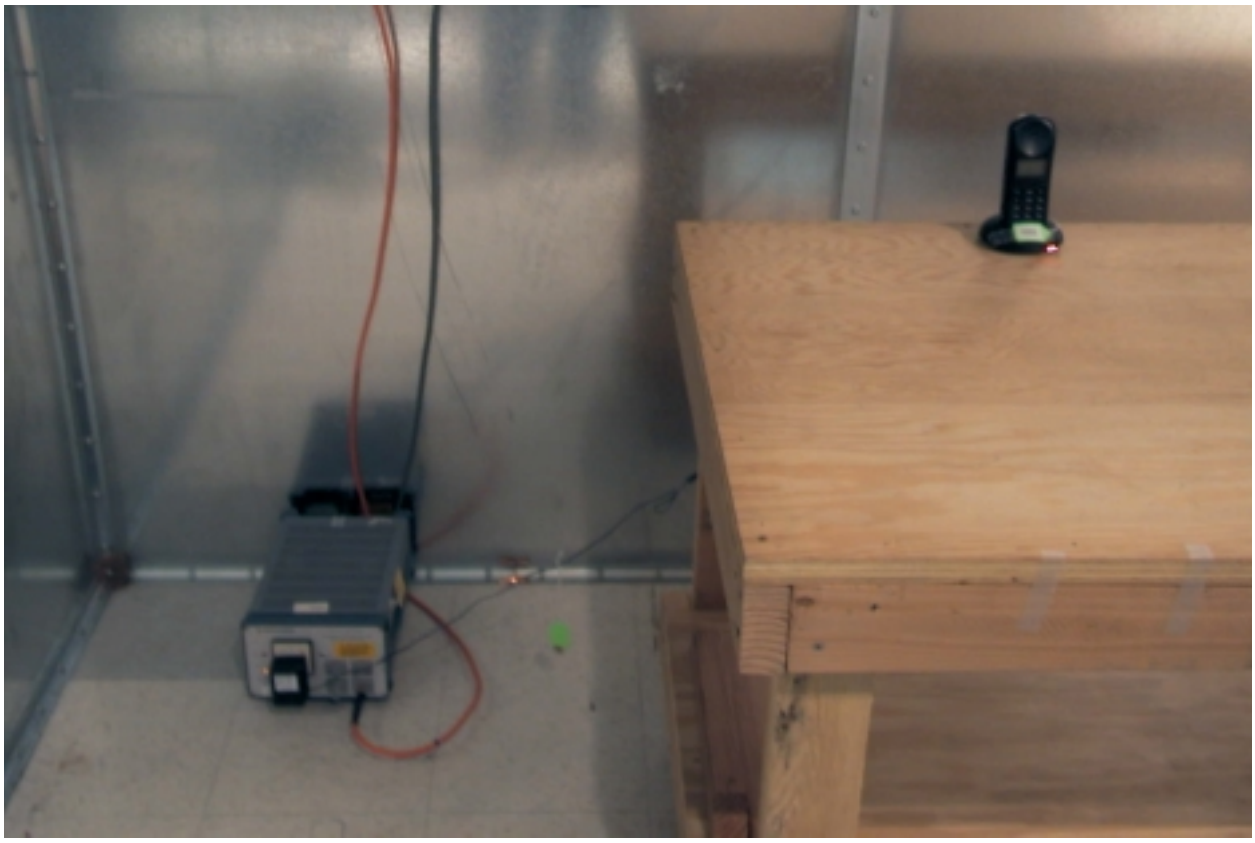
Measurement uncertainty (dB)	+5.6/ -4.5

Traceability

METHOD	TEST EQUIPMENT USED
Measurements were made per work instruction WI-EMC-07	Bar 1, Notch, AMP 3, ANT 1, K-Cbl 11, 10F50N003, 15F50N001, 5F50N001, ReCVR1, SSwpr 1, PSnsr 3

5 Photographs

5.1 AC Wireline Conducted Emission Test Setup

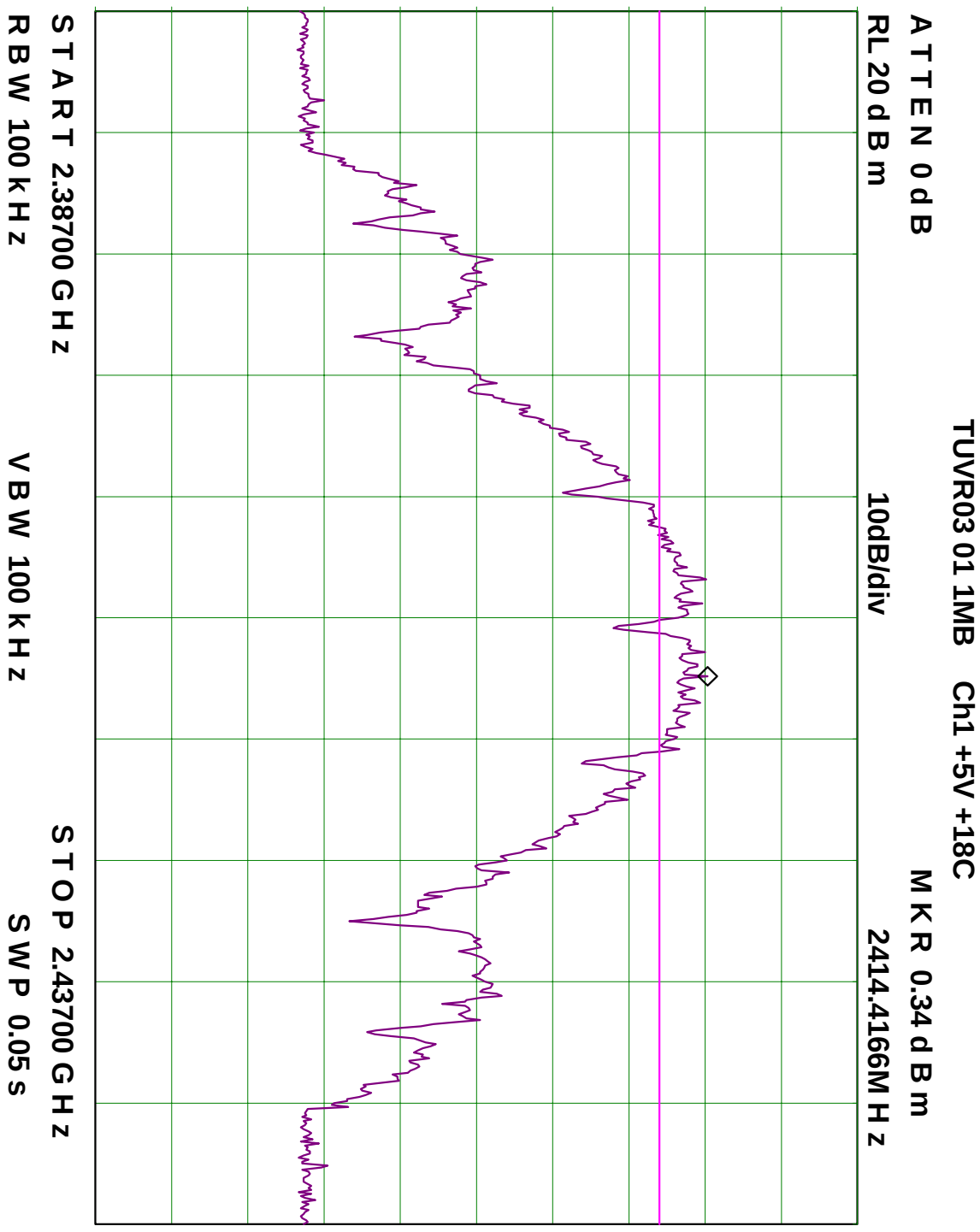


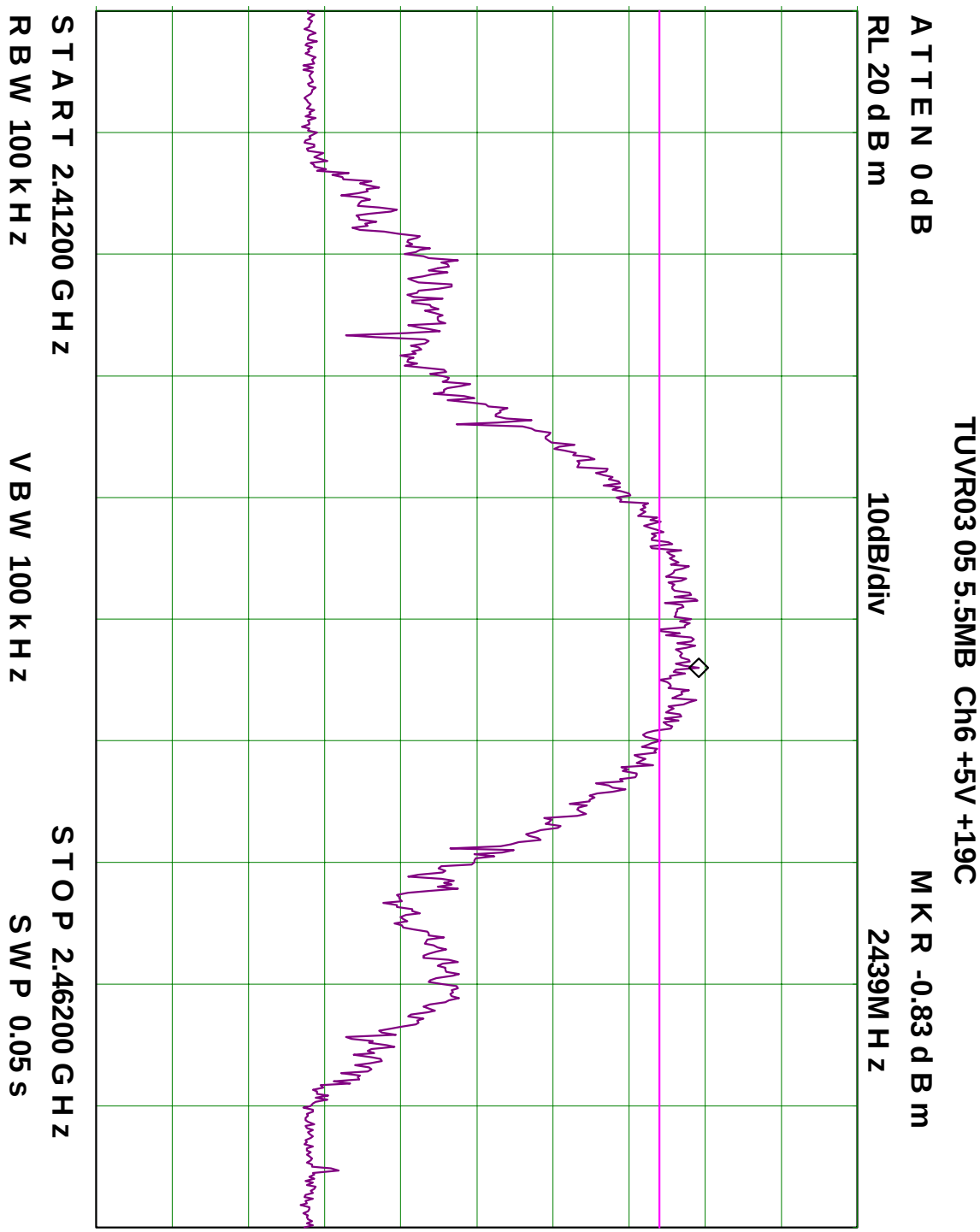
5.2 Restricted Bands Radiation (30MHz – 1GHz)

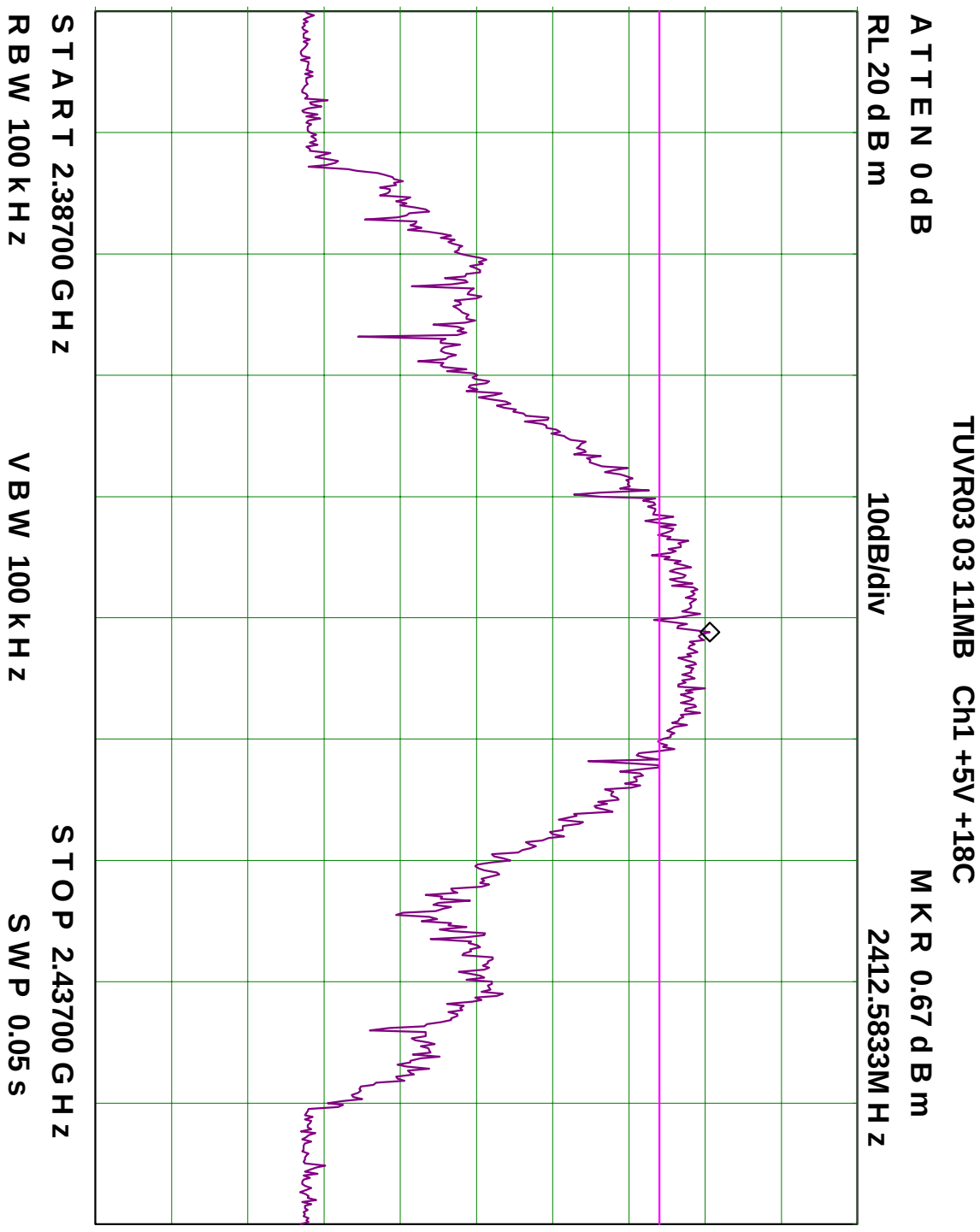
6 Graphical Results

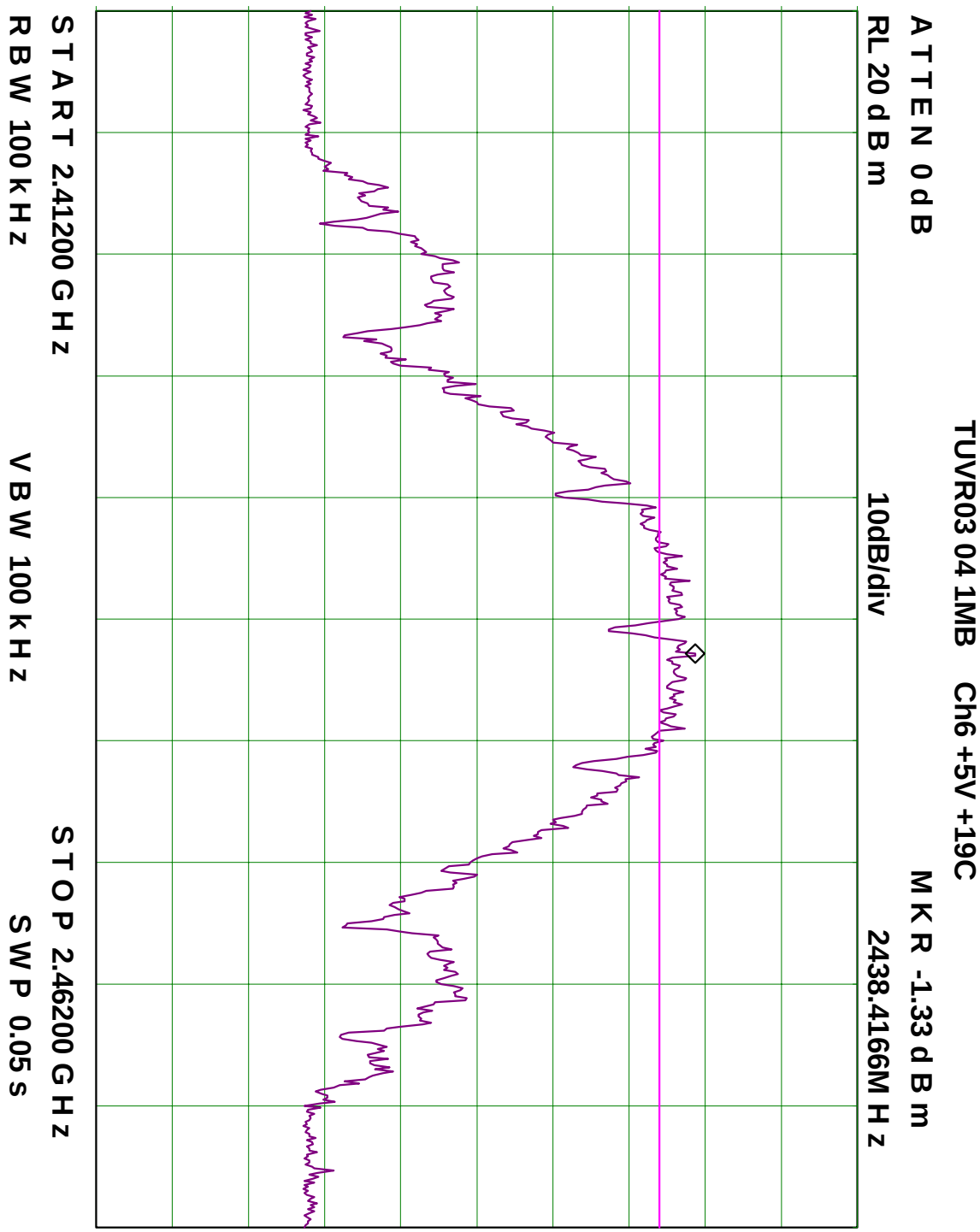
This report contains the following plots as referenced in the test results section

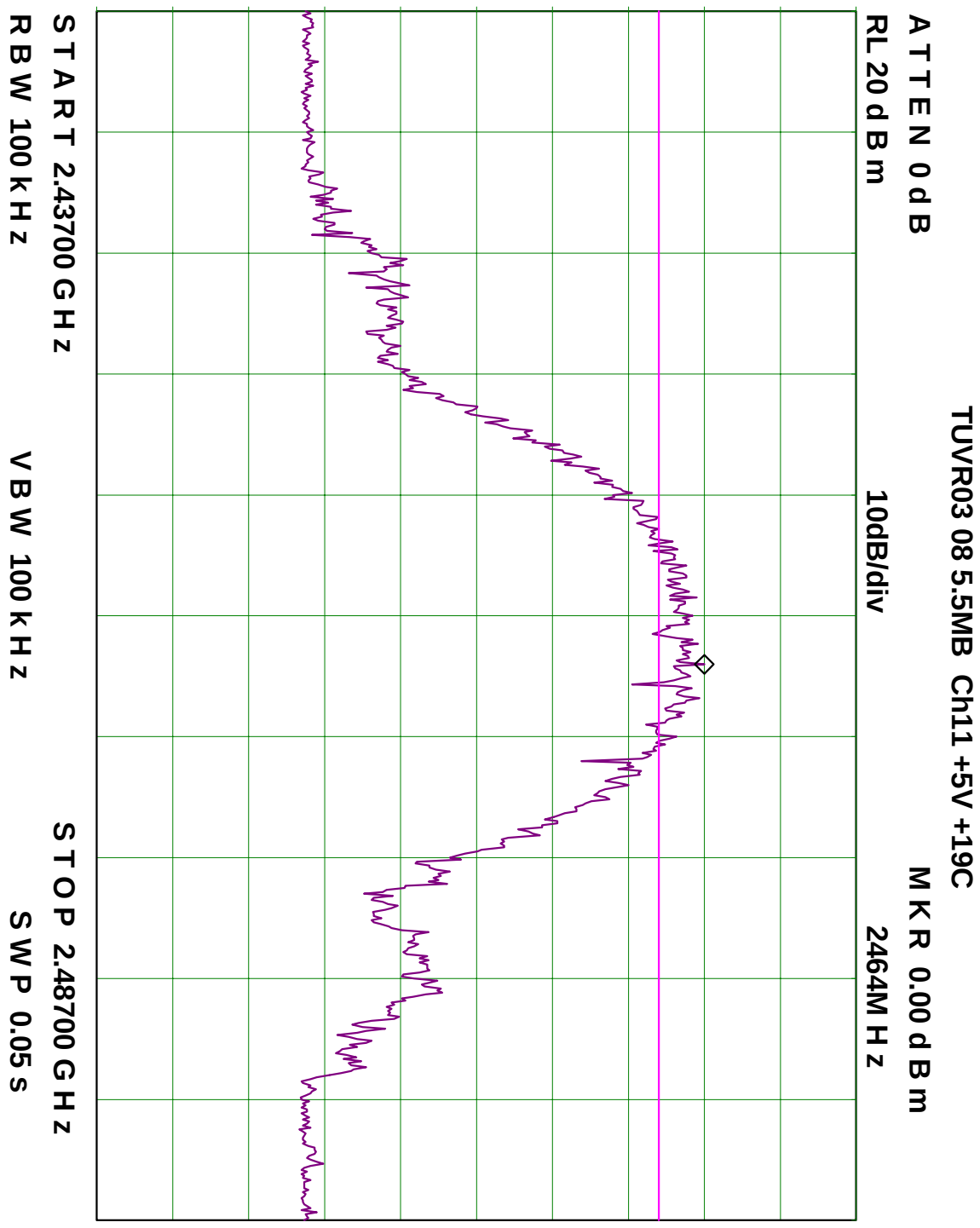
BANDWIDTH AT 6dB	BAND-EDGE
TUVR04a/01	TUVR04a/10
TUVR04a/02	TUVR04a/11
TUVR04a/03	TUVR04a/12
TUVR04a/04	TUVR04a/13
TUVR04a/05	TUVR04a/14
TUVR04a/06	TUVR04a/15
TUVR04a/07	
TUVR04a/08	
TUVR04a/09	
SPECTRAL POWER DENSITY	**OCCUPIED BANDWIDTH 20dB**
TUVR04a/16	TUVR04a/25
TUVR04a/17	TUVR04a/26
TUVR04a/18	TUVR04a/27
TUVR04a/19	TUVR04a/28
TUVR04a/20	TUVR04a/29
TUVR04a/21	TUVR04a/30
TUVR04a/22	TUVR04a/31
TUVR04a/23	TUVR04a/32
TUVR04a/24	TUVR04a/33
CONDUCTED EMISSION PLOTS	**NOTCH FILTER RESPONSE**
TUVR04a/34	TUVR04a/38
TUVR04a/35	TUVR04a/39
TUVR04a/36	TUVR04a/40
TUVR04a/37	TUVR04a/41

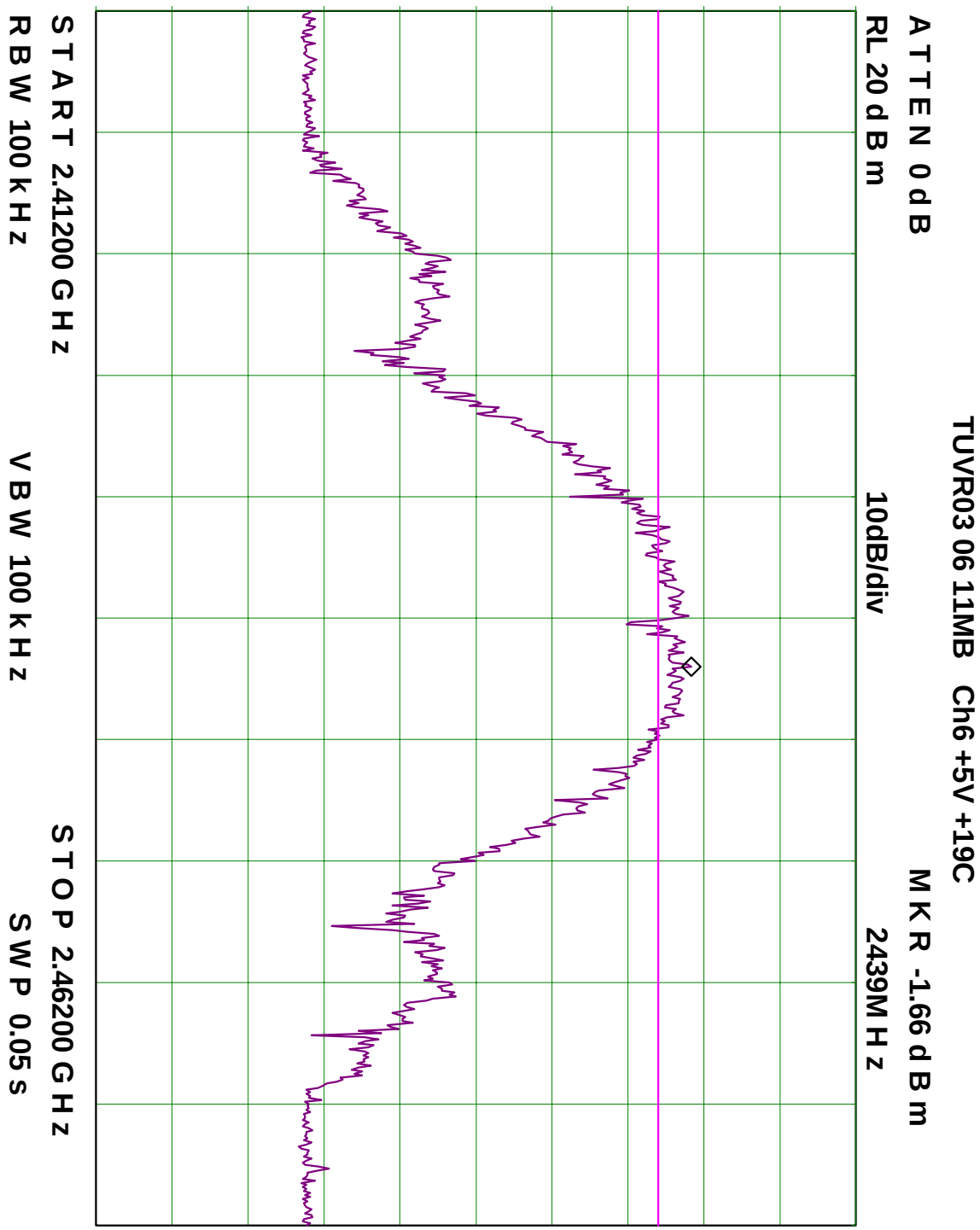

TUVR03 01 1MB Ch1 +5V +18C
ATTEN 0 dB
RL 20 dBm
10dB/div
MKR 0.34 dBm
2414.4166MHz
START 2.38700 GHz
RBW 100 kHz
VBW 100 kHz
STOP 2.43700 GHz
SWP 0.05 s

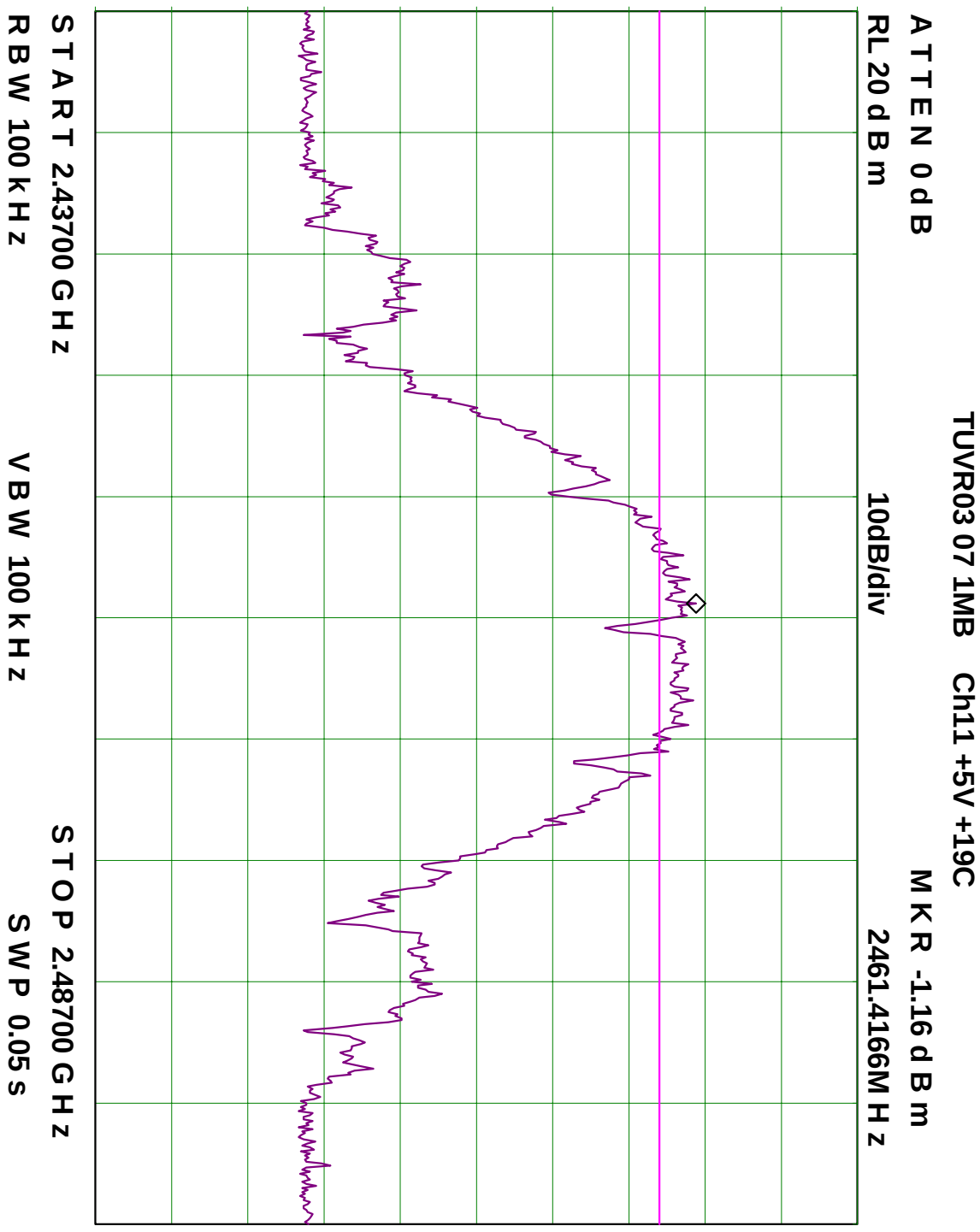

TUVR03 05 5.5MB Ch6 +5V +19C
ATTEN 0 dB
RL 20 dB m
10dB/div
MKR -0.83 dB m
2439M Hz
START 2.41200 GHz
RBW 100 kHz
VBW 100 kHz
STOP 2.46200 GHz
SWP 0.05 s

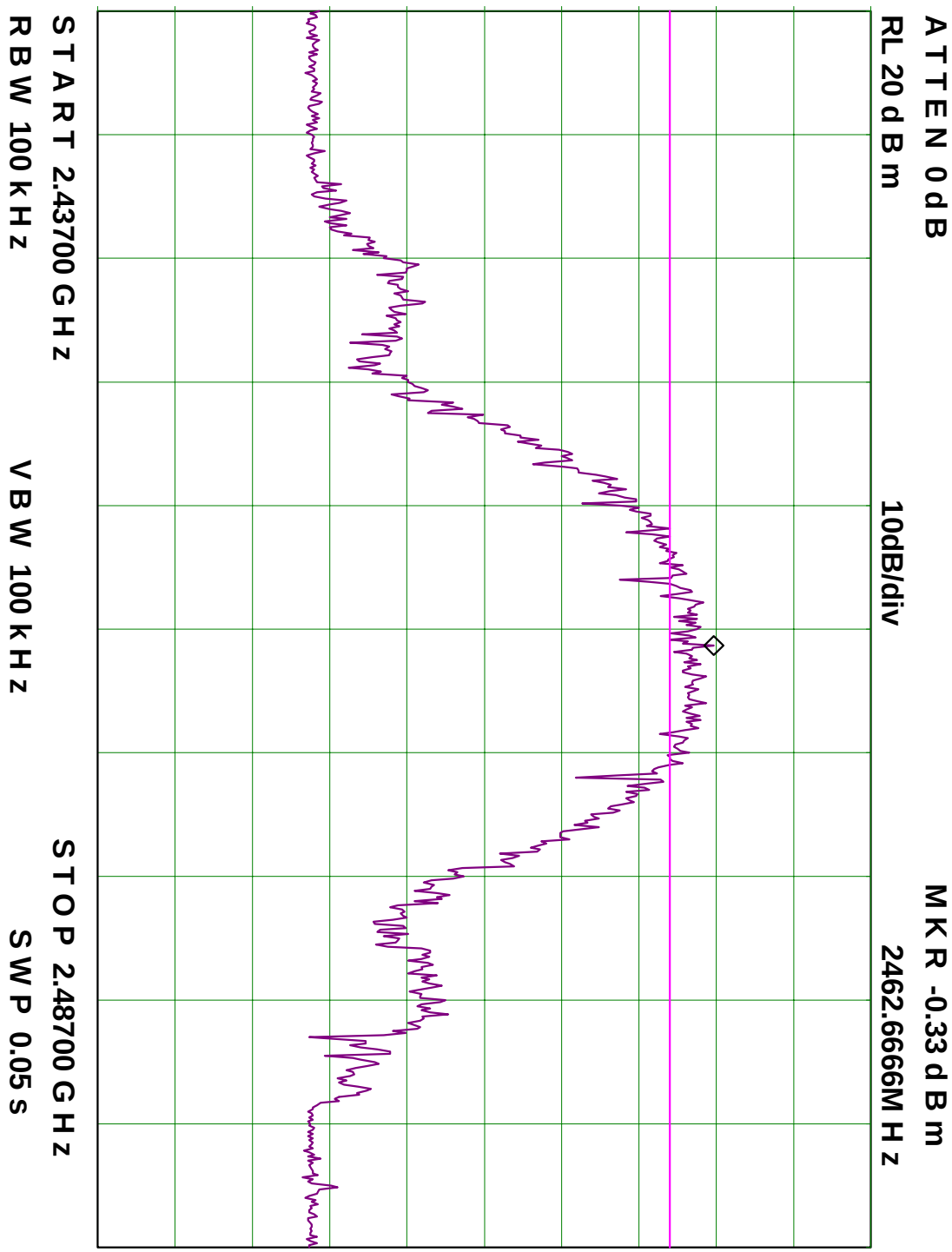

TUVR03 03 11MB Ch1 +5V +18C
ATTEN 0 dB
RL 20 dB m
10dB/div
MKR 0.67 dB m
2412.5833MHz
START 2.38700 GHz
RBW 100 kHz
VBW 100 kHz
STOP 2.43700 GHz
SWP 0.05 s

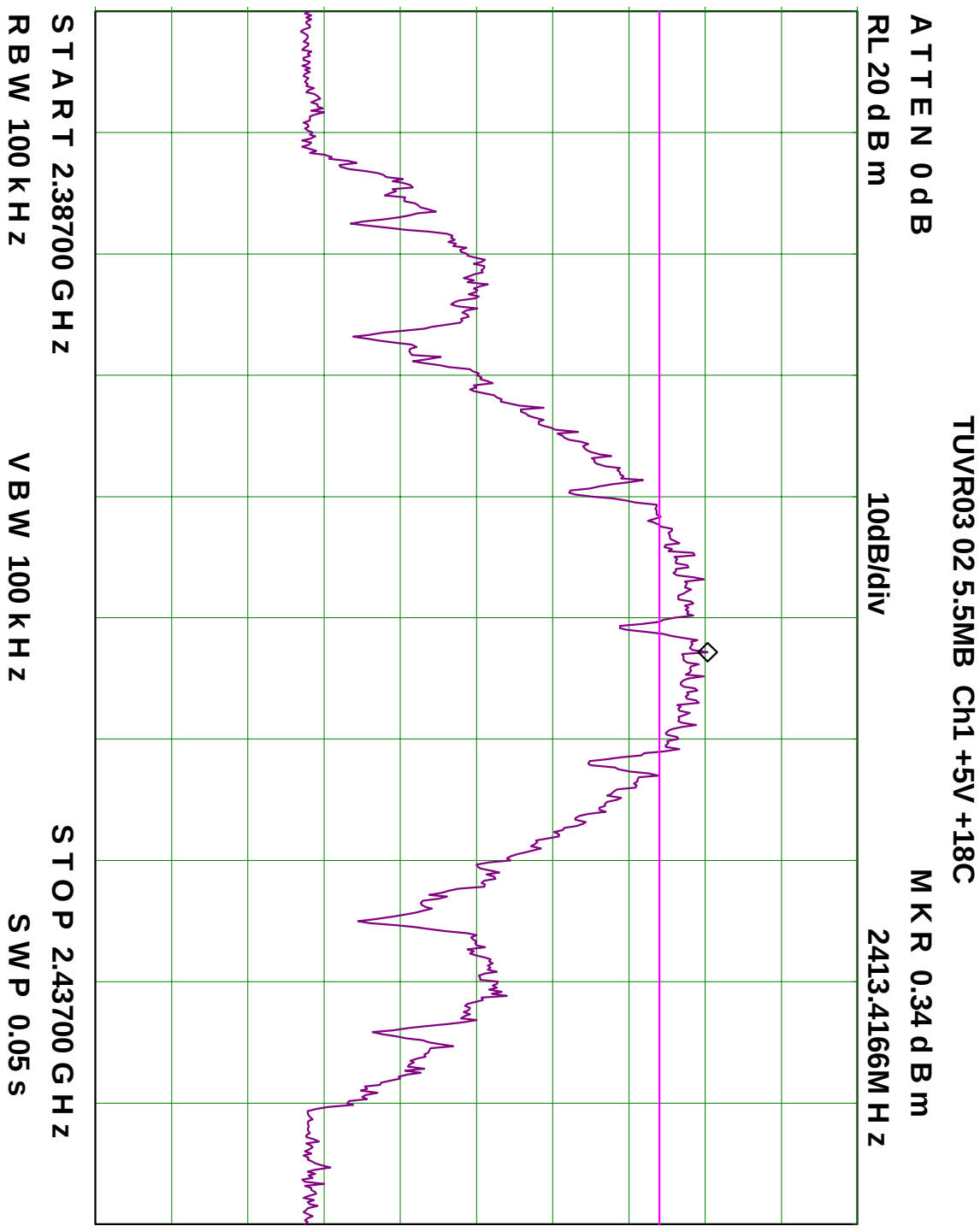

TUVR03 04 1MB Ch6 +5V +19C
ATTEN 0 dB
RL 20 dB m
10dB/div
MKR -1.33 dB m
2438.4166M Hz
START 2.41200 GHz
RBW 100 kHz
VBW 100 kHz
STOP 2.46200 GHz
SWP 0.05 s

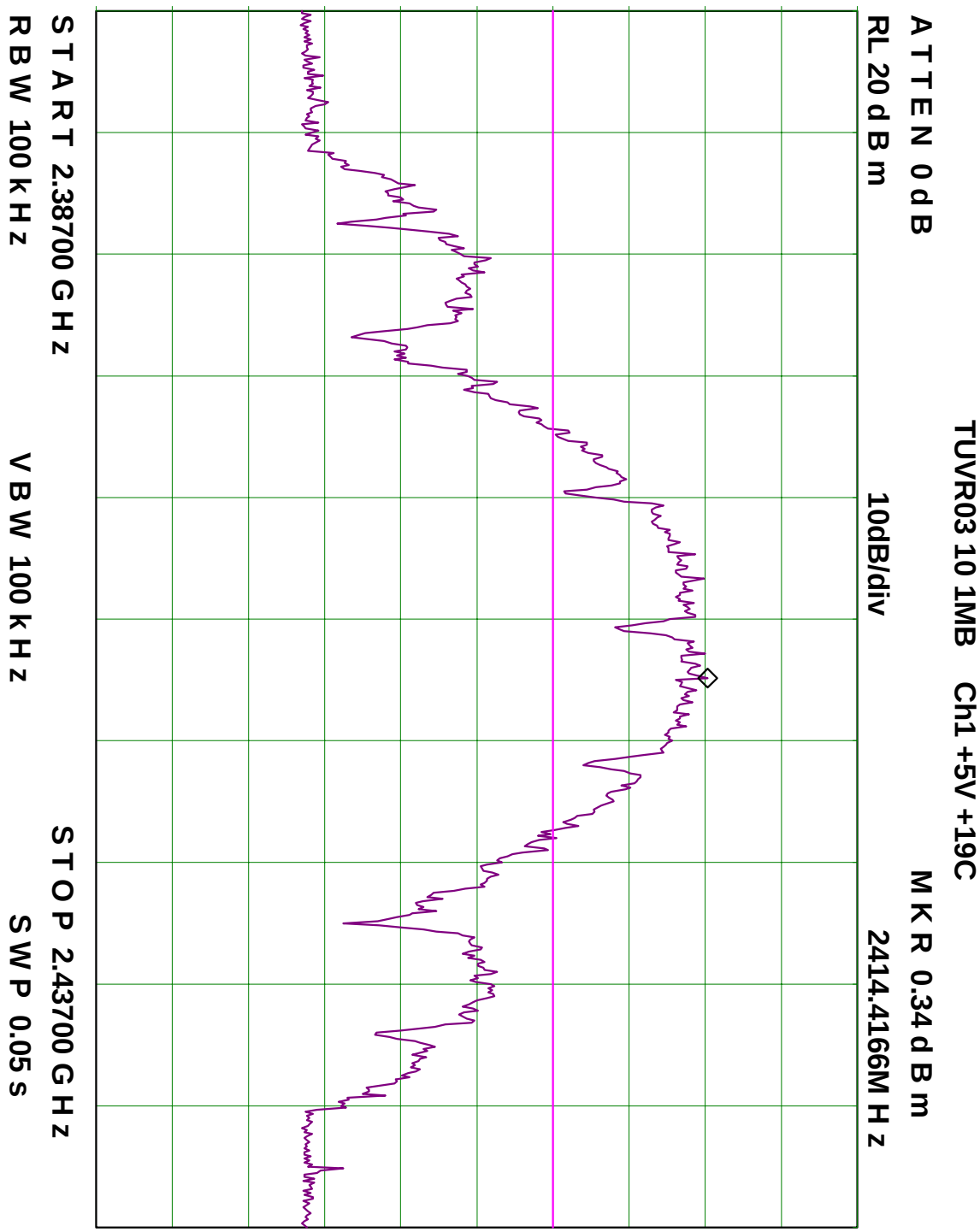

TUVR03 08 5.5MB Ch11 +5V +19C
ATTEN 0 dB
RL 20 dBm
10dB/div
MKR 0.00 dBm
2464M Hz
START 2.43700 GHz
RBW 100 kHz
VBW 100 kHz
STOP 2.48700 GHz
SWP 0.05 s

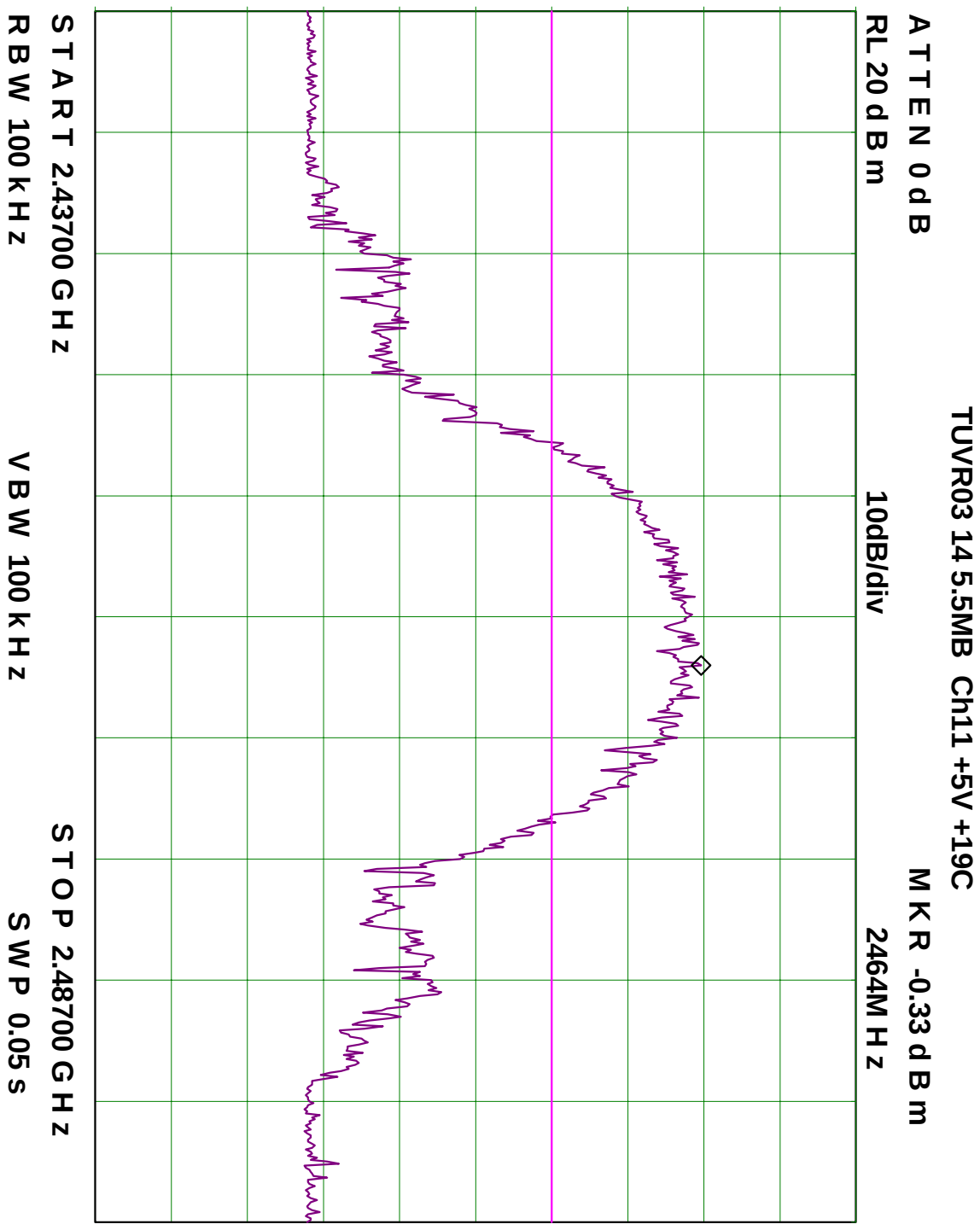

TUVR03 06 11MB Ch6 +5V +19C
ATTEN 0 dB
RL 20 dB m
10dB/div
MKR -1.66 dB m
2439M Hz
START 2.41200 GHz
RBW 100 kHz
VBW 100 kHz
STOP 2.46200 GHz
SWP 0.05 s

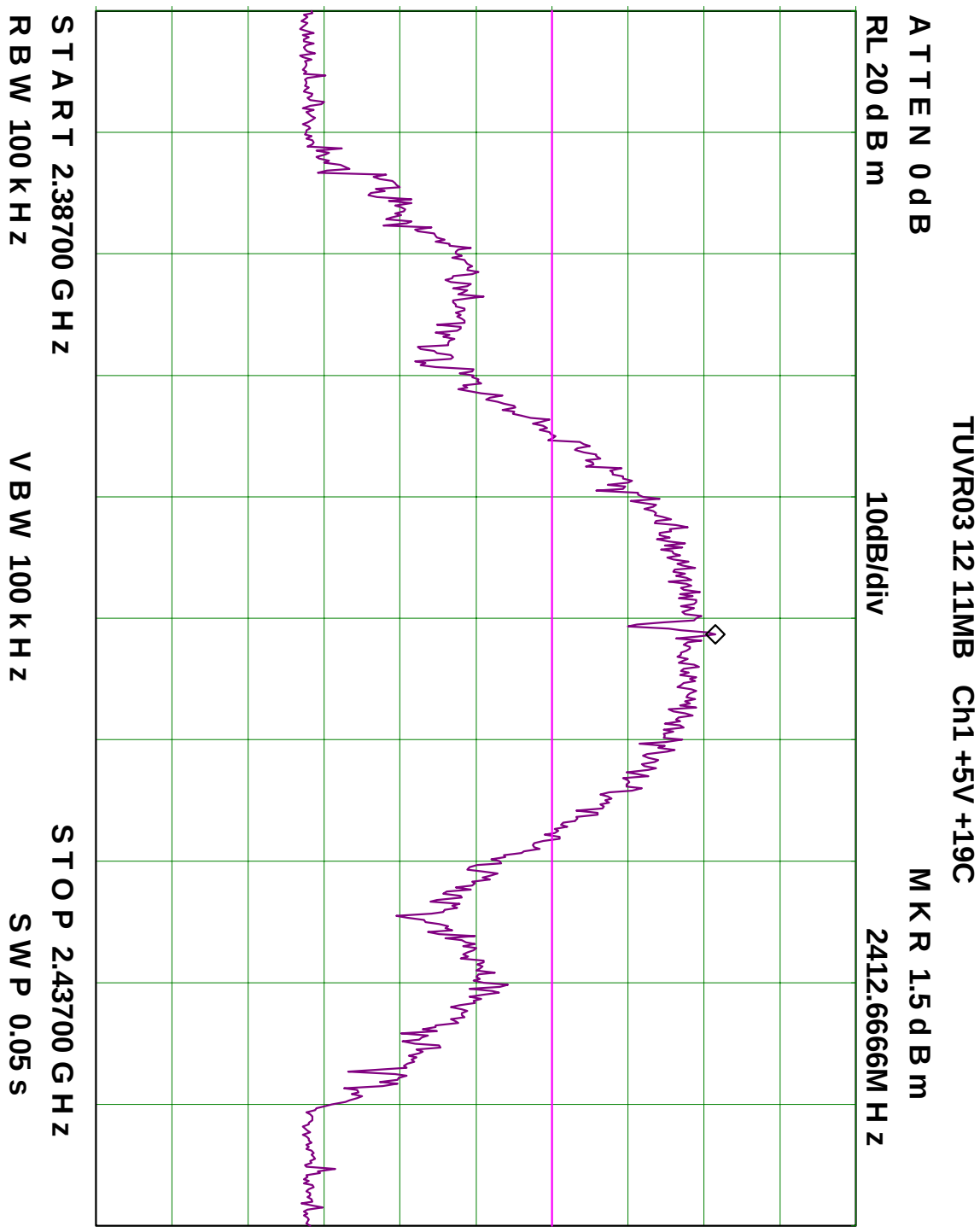

TUVR03 07 1MB Ch11 +5V +19C
ATTEN 0 dB
RL 20 dB m
10dB/div
MKR -1.16 dB m
2461.4166M Hz
START 2.43700 GHz
RBW 100 kHz
VBW 100 kHz
STOP 2.48700 GHz
SWP 0.05 s

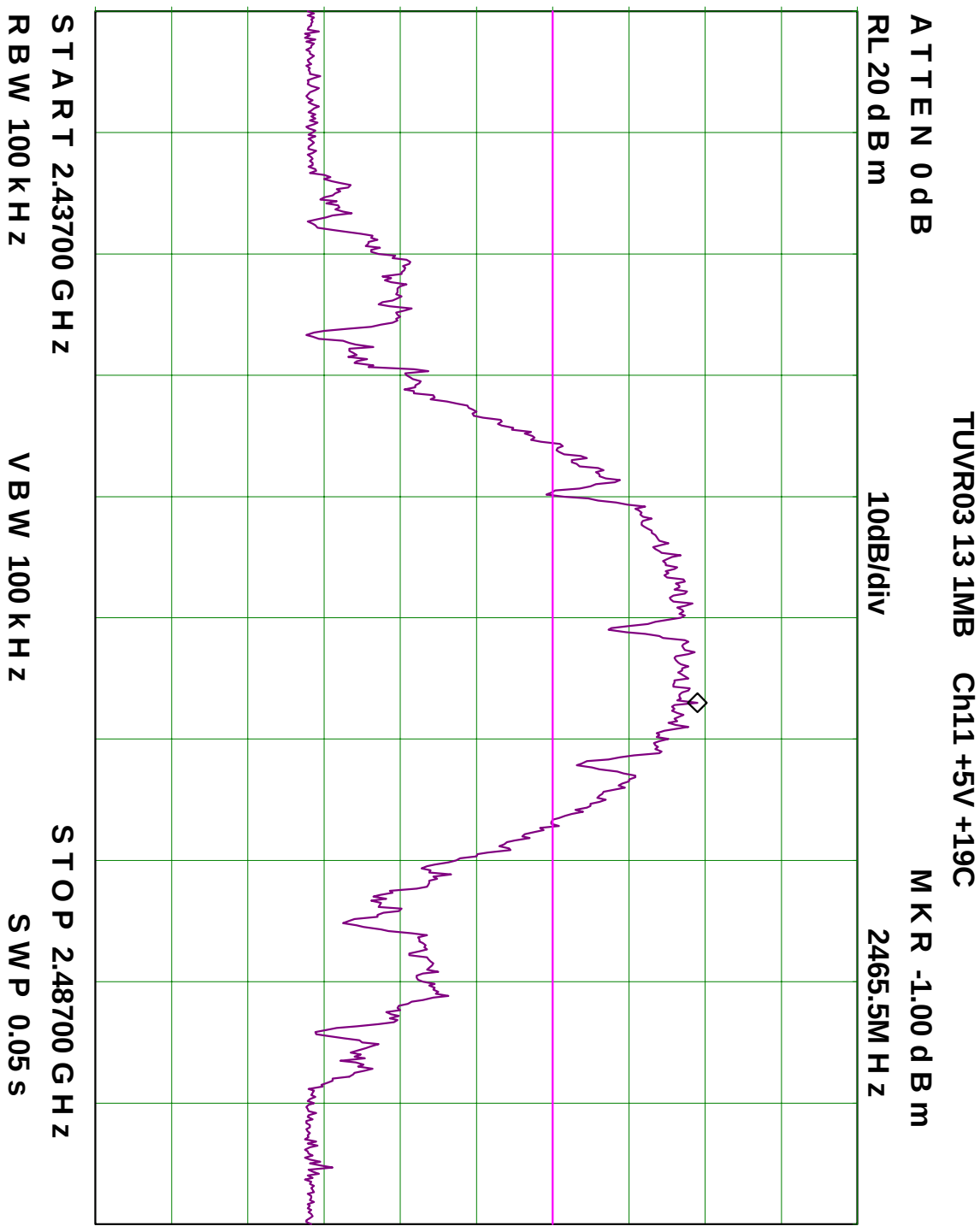

TUVR03 09 11MB Ch11 +5V +19C
ATTEN 0 dB
RL 20 d B m
10dB/div
MKR -0.33 d B m
2462.666M H z
START 2.43700 G H z
R B W 100 k H z
V B W 100 k H z
STOP 2.48700 G H z
SWP 0.05 s

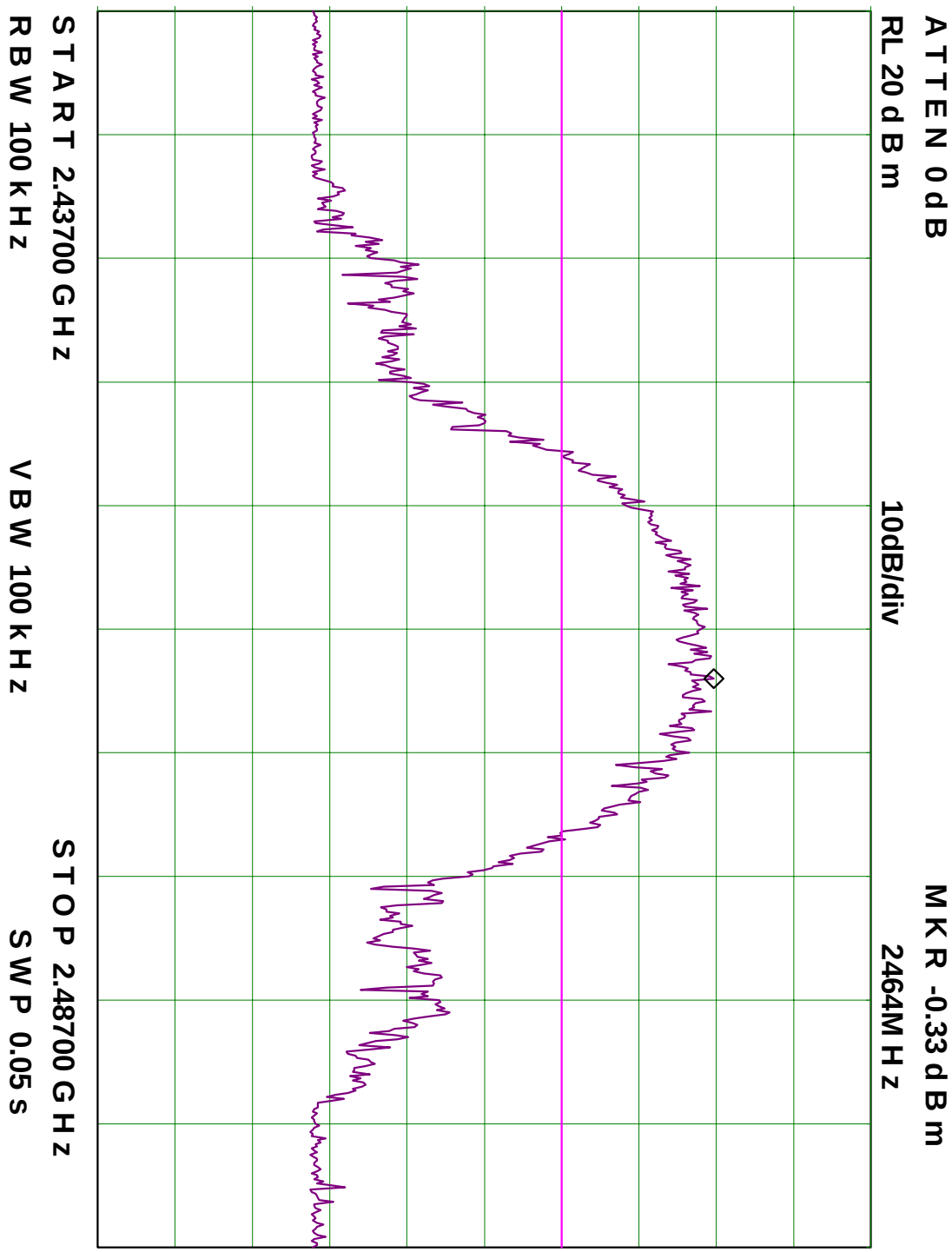

TUVR03 02 5.5MB Ch1 +5V +18C
ATTEN 0 dB
RL 20 dB m
10dB/div
MKR 0.34 dB m
2413.4166M Hz
START 2.38700 GHz
RBW 100 kHz
VBW 100 kHz
STOP 2.43700 GHz
SWP 0.05 s

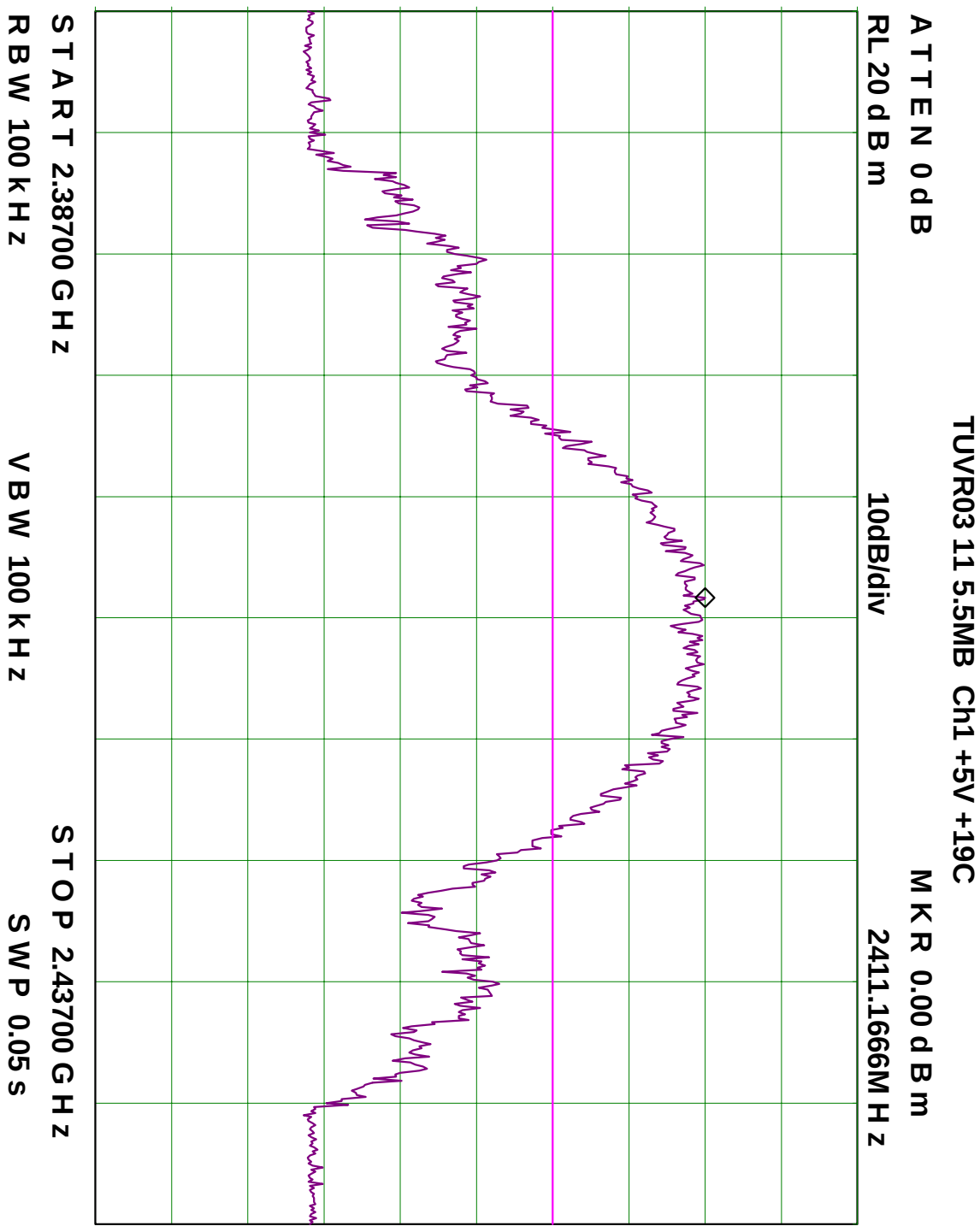

TUVR03 10 1MB Ch1 +5V +19C
ATTEN 0 dB
RL 20 dB m
10dB/div
MKR 0.34 dB m
2414.4166M Hz
START 2.38700 GHz
RBW 100 kHz
VBW 100 kHz
STOP 2.43700 GHz
SWP 0.05 s

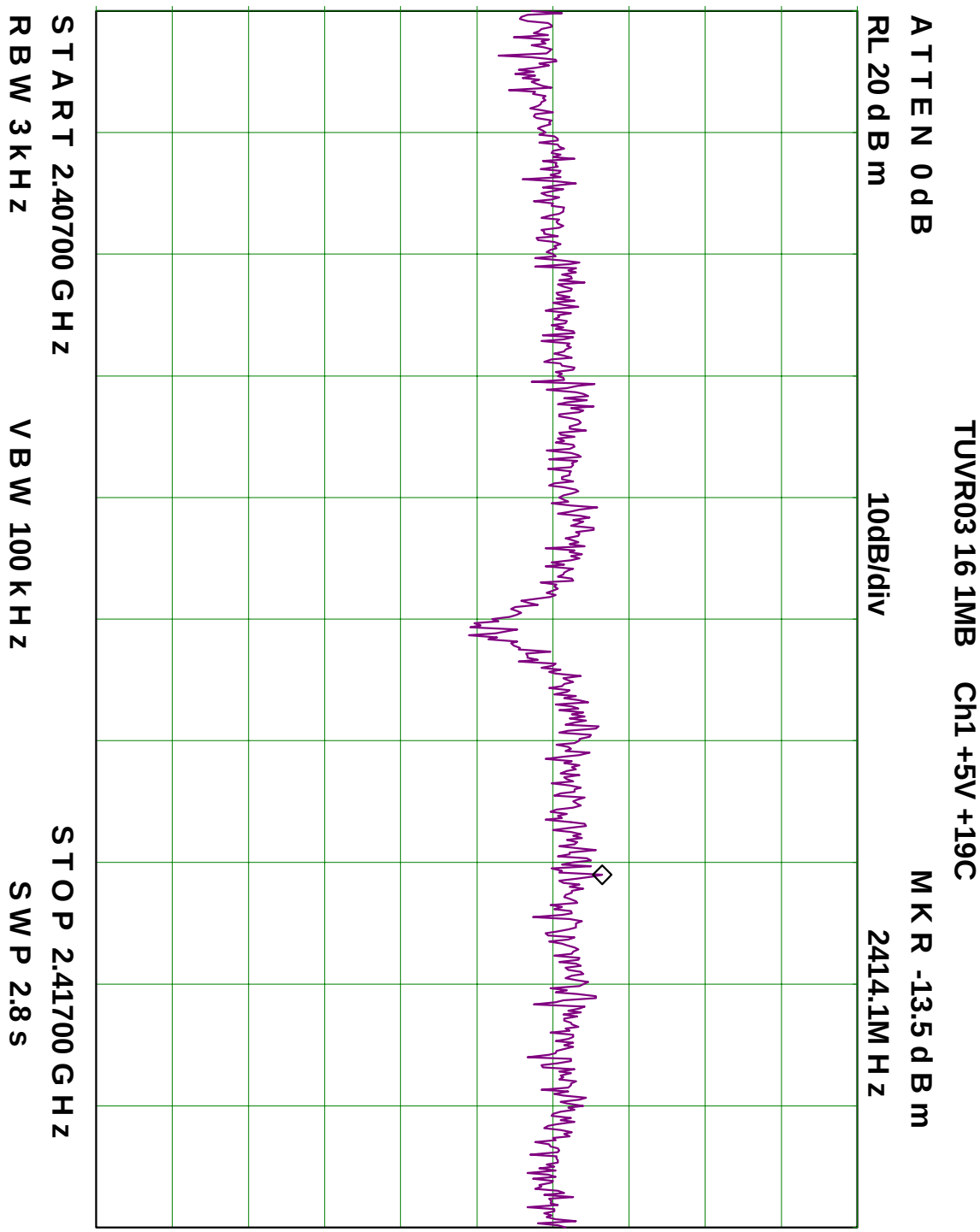

TUVR03 14 5.5MB Ch11 +5V +19C
ATTEN 0 dB
RL 20 dB m
10dB/div
MKR -0.33 dB m
2464M Hz
START 2.43700 GHz
RBW 100 kHz
VBW 100 kHz
STOP 2.48700 GHz
SWP 0.05 s

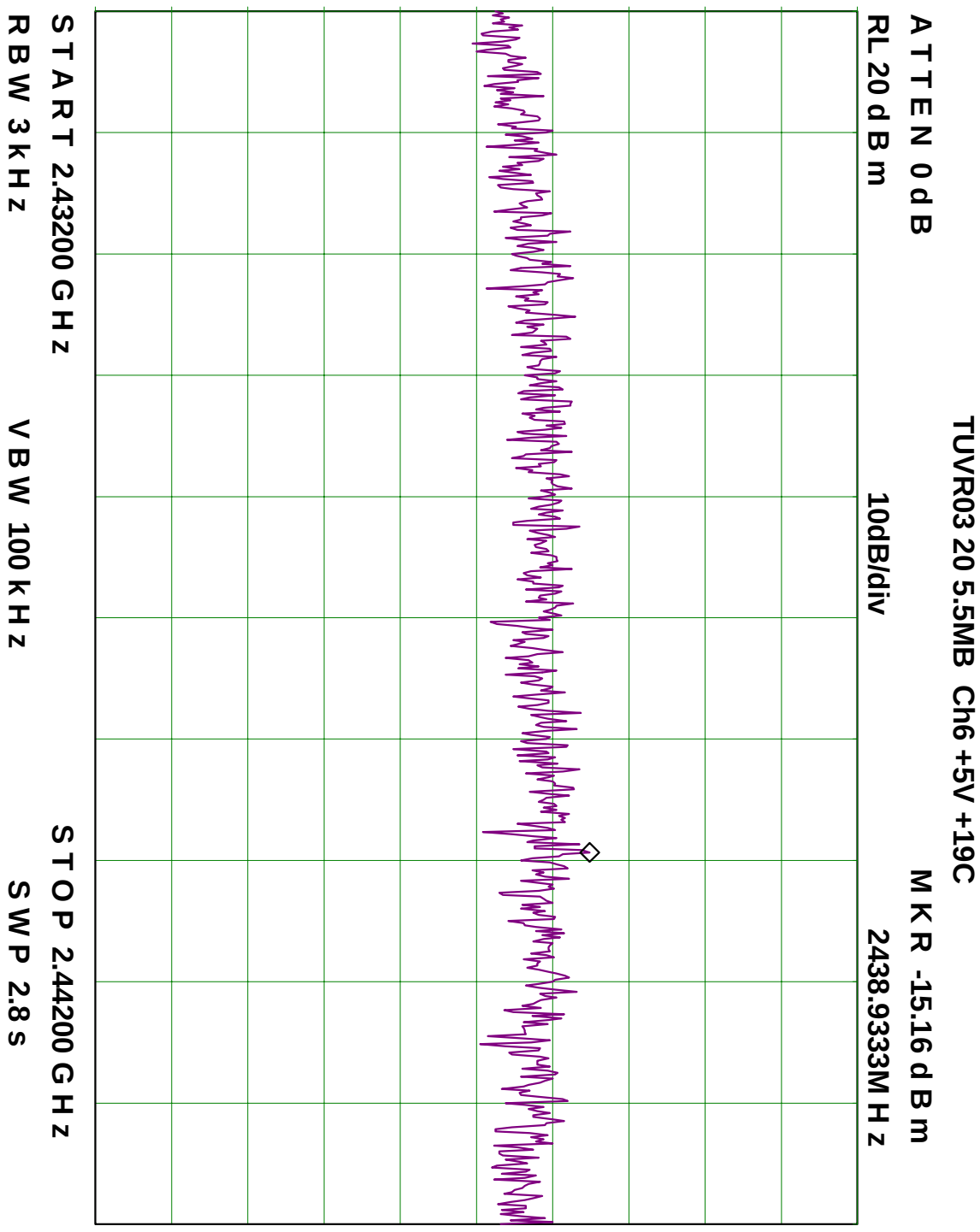

TUVR03 12 11MB Ch1 +5V +19C
ATTEN 0dB
RL 20 dBm
10dB/div
MKR 1.5 dBm
2412.666MHz
START 2.38700 GHz
RBW 100 kHz
VBW 100 kHz
STOP 2.43700 GHz
SWP 0.05s

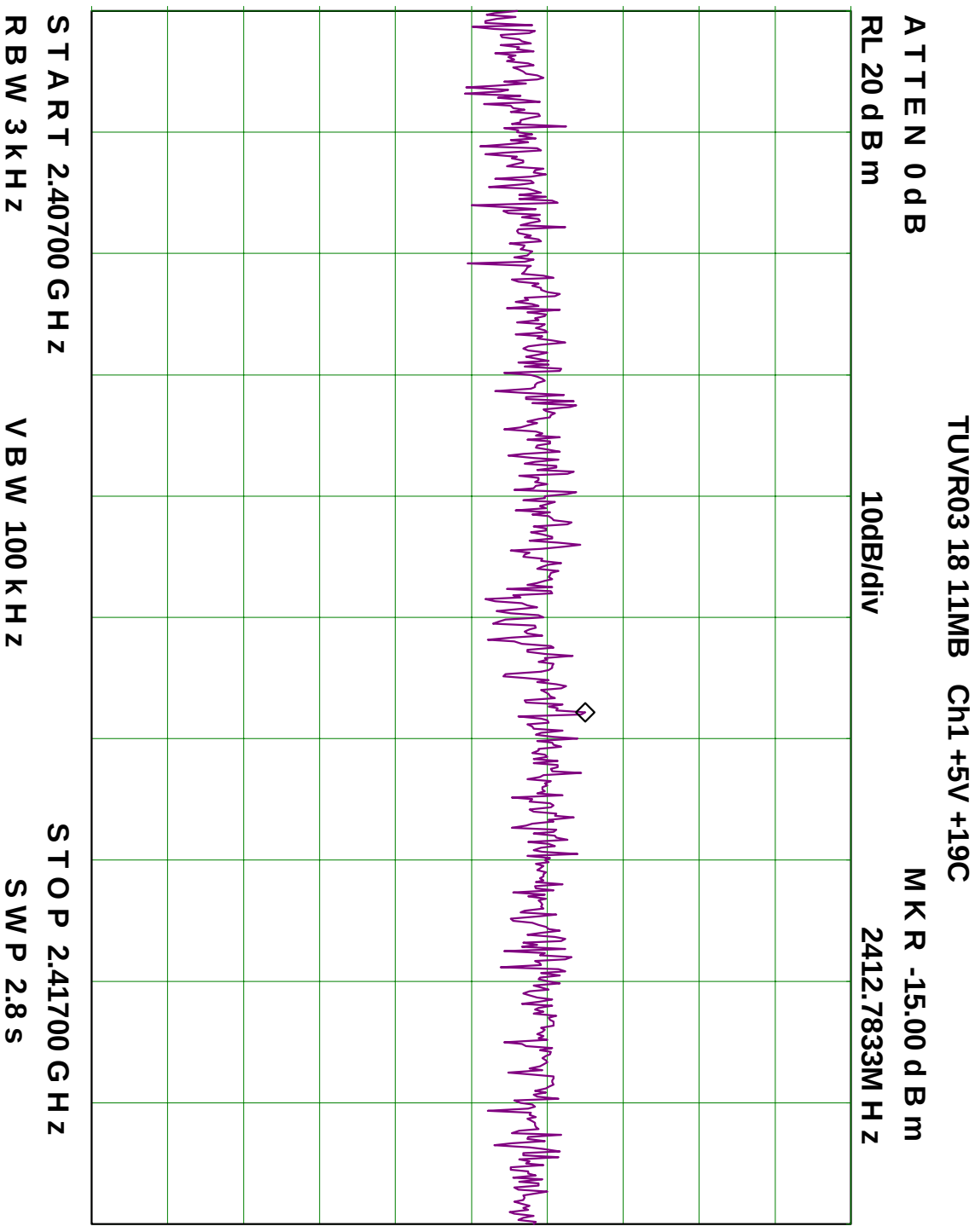

TUVR03 13 1MB Ch11 +5V +19C
ATTEN 0 dB
RL 20 dBm
10dB/div
MKR -1.00 dBm
2465.5MHz
START 2.43700 GHz
RBW 100 kHz
VBW 100 kHz
STOP 2.48700 GHz
SWP 0.05 s

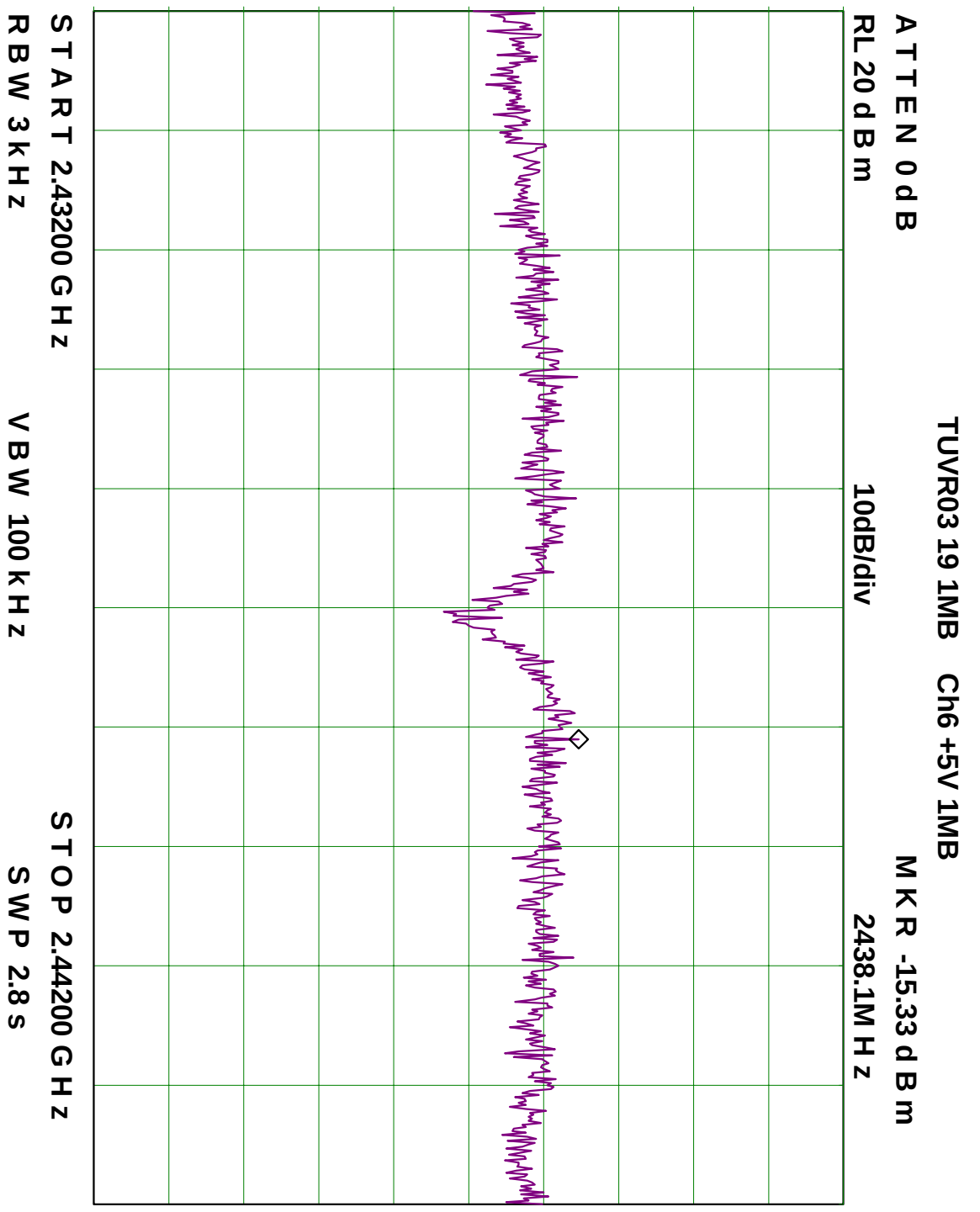

TUVR03 15 11MB Ch11 +5V +19C
ATTEN 0 dB
RL 20 dB m
10dB/div
MKR -0.33 dB m
2464M Hz
START 2.43700 GHz
RBW 100 kHz
VBW 100 kHz
STOP 2.48700 GHz
SWP 0.05 s

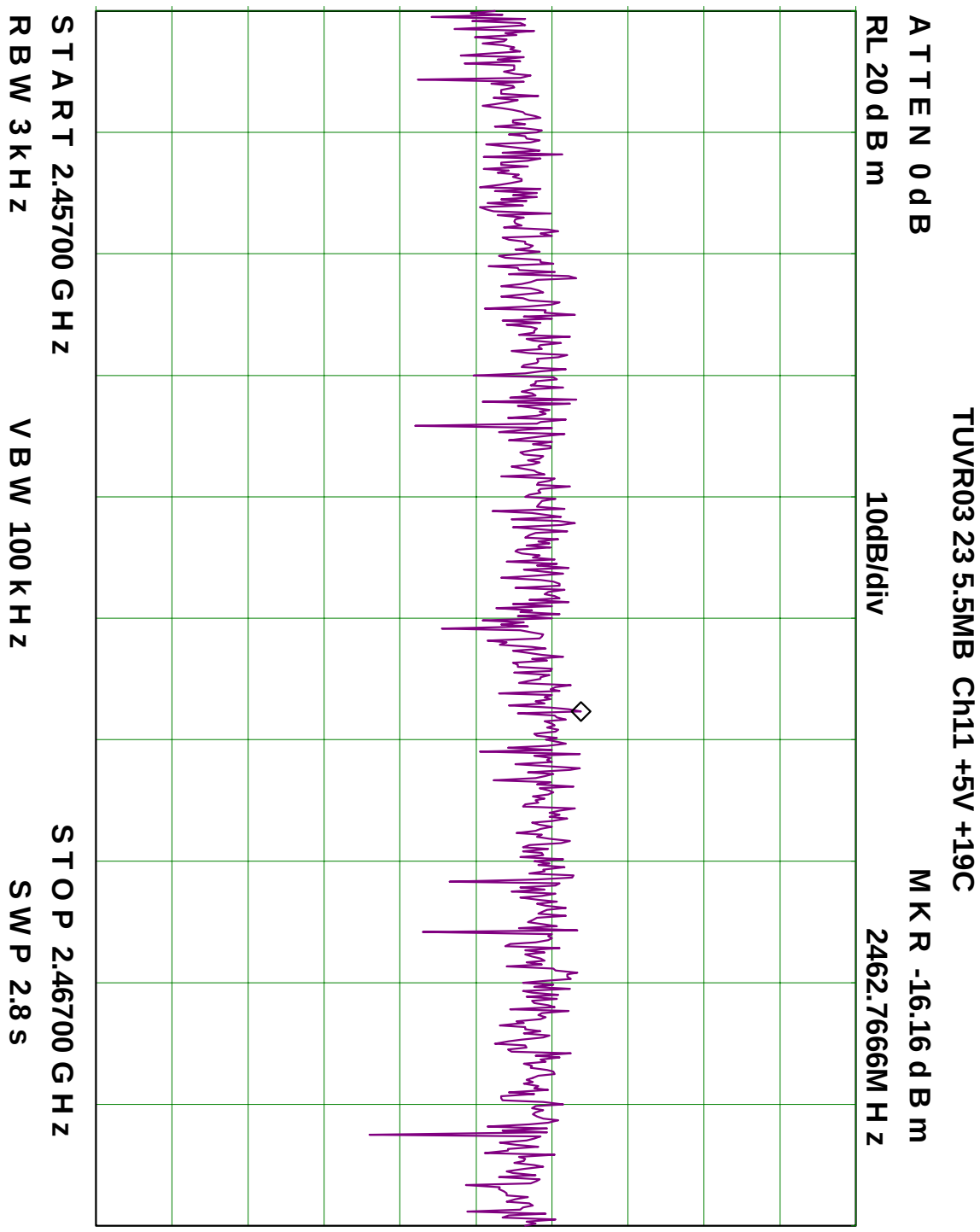

TUVR03 11 5.5MB Ch1 +5V +19C
ATTEN 0 dB
RL 20 dB m
10dB/div
MKR 0.00 dB m
2411.1666M Hz
START 2.38700 GHz
RBW 100 kHz
VBW 100 kHz
STOP 2.43700 GHz
SWP 0.05 s

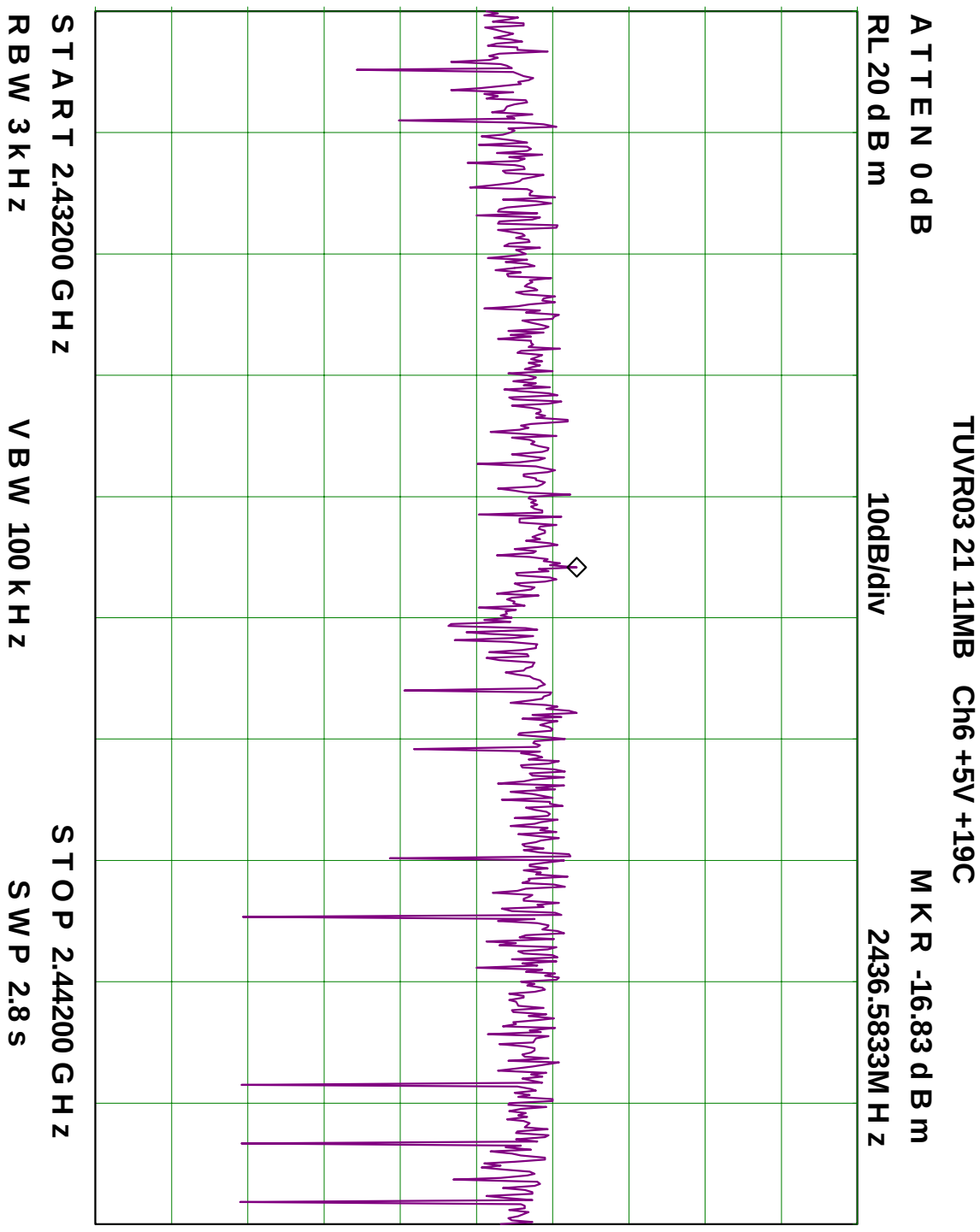

ATTEN 0 dB
RL 20 dBm
10dB/div
TUVR03 16 1MB Ch1 +5V +19C
MKR -13.5 dBm
2414.1MHz
START 2.40700 GHz
RBW 3kHz
VBW 100kHz
STOP 2.41700 GHz
SWP 2.8s

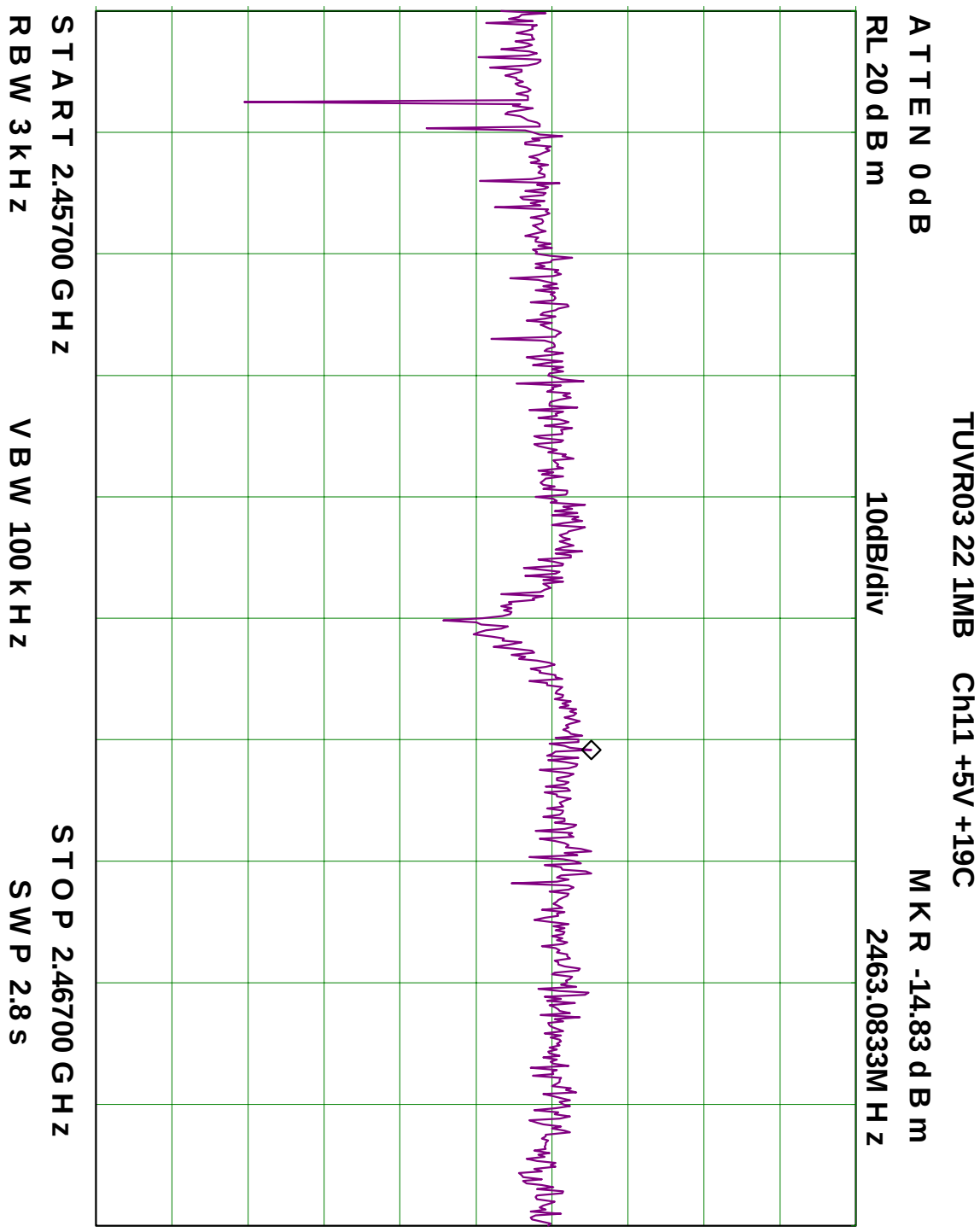

TUVR03 20 5.5MB Ch6 +5V +19C
ATTEN 0dB
RL 20 dBm
10dB/div
MKR -15.16 dBm
2438.9333MHz
START 2.43200 GHz
RBW 3kHz
VBW 100kHz
STOP 2.44200 GHz
SWP 2.8s

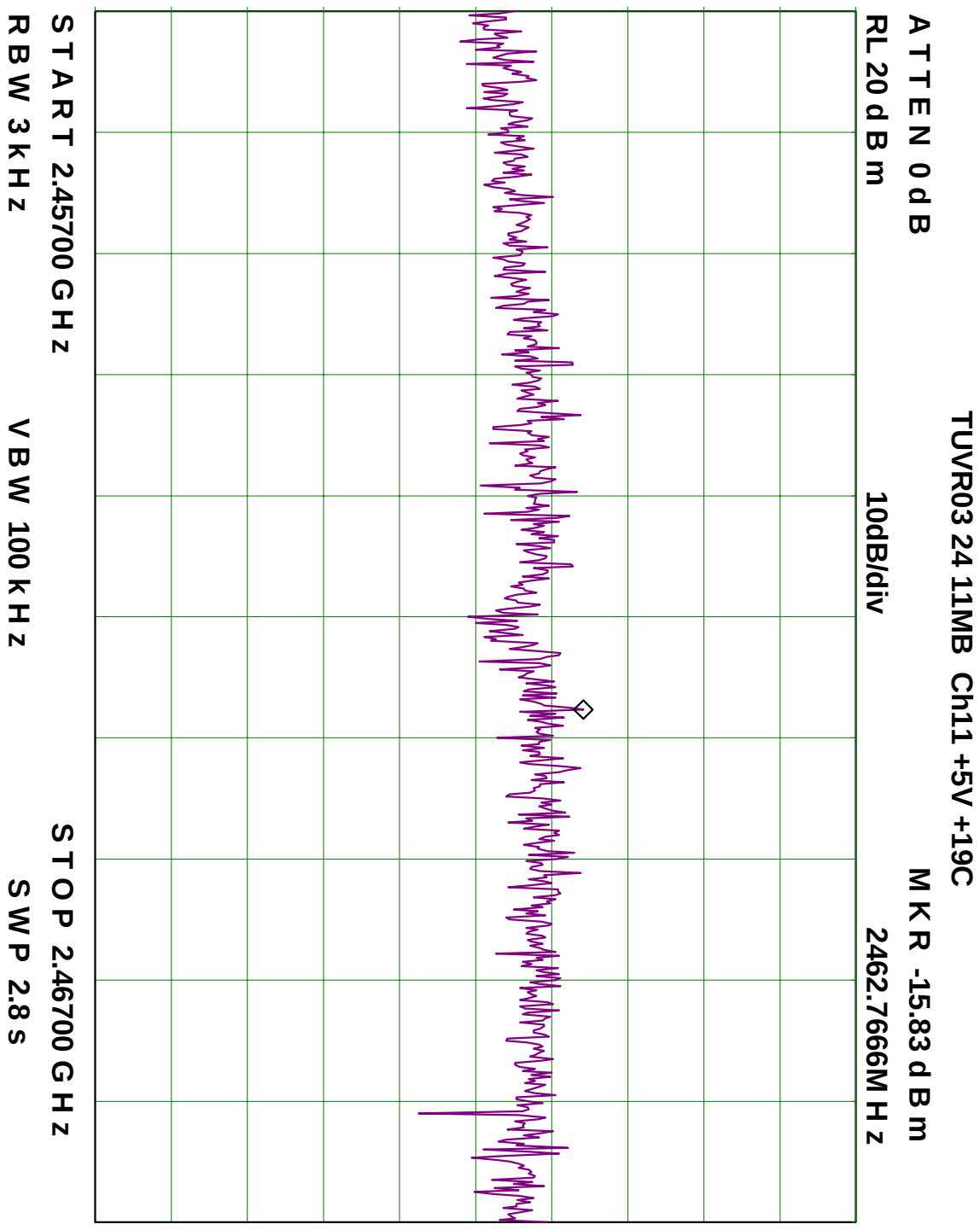

TUVR03 18 11MB Ch1 +5V +19C
ATTEN 0dB
RL 20 dBm
10dB/div
MKR -15.00 dBm
2412.7833MHz
START 2.40700 GHz
RBW 3kHz
VBW 100kHz
STOP 2.41700 GHz
SWP 2.8s

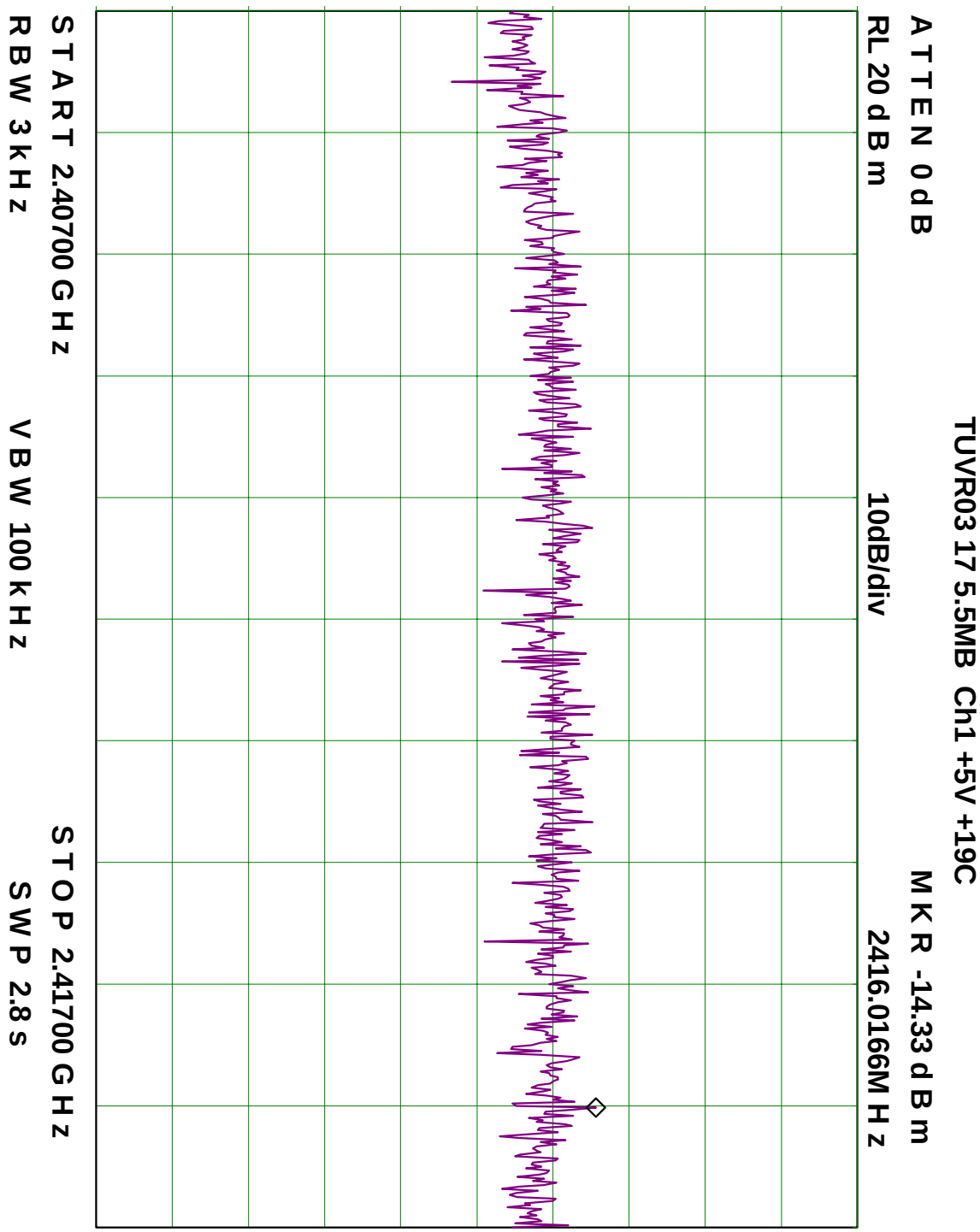

TUVR03 19 1MB Ch6 +5V 1MB
ATTEN 0 dB
RL 20 dB m
10dB/div
MKR -15.33 dB m
2438.1M Hz
START 2.43200 GHz
RBW 3 kHz
VBW 100 kHz
STOP 2.44200 GHz
SWP 2.8 s

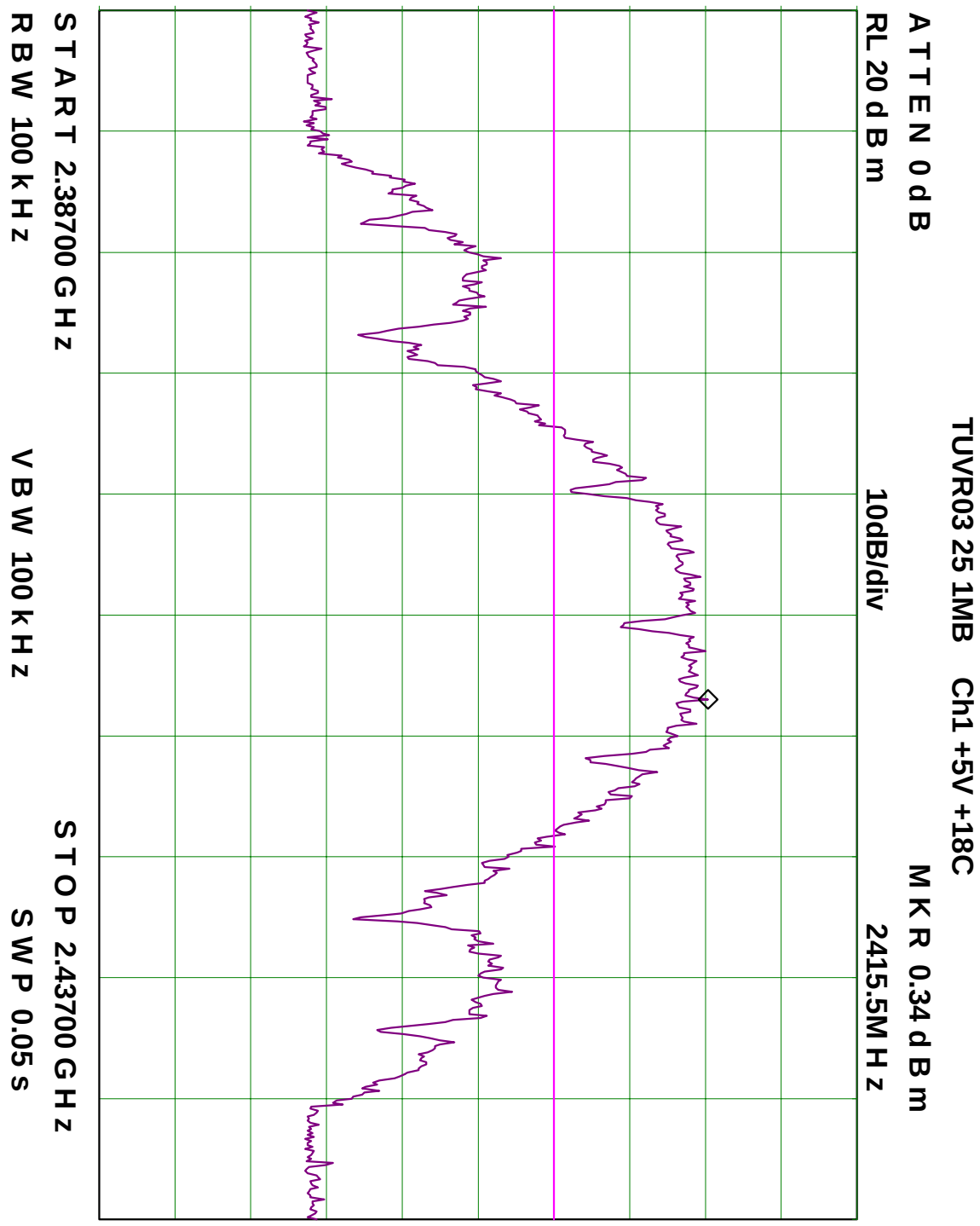

TUVR03 23 5.5MB Ch11 +5V +19C
ATTEN 0dB
RL 20dBm
10dB/div
MKR -16.16dBm
2462.7666MHz
START 2.45700GHz
RBW 3kHz
VBW 100kHz
STOP 2.46700GHz
SWP 2.8s

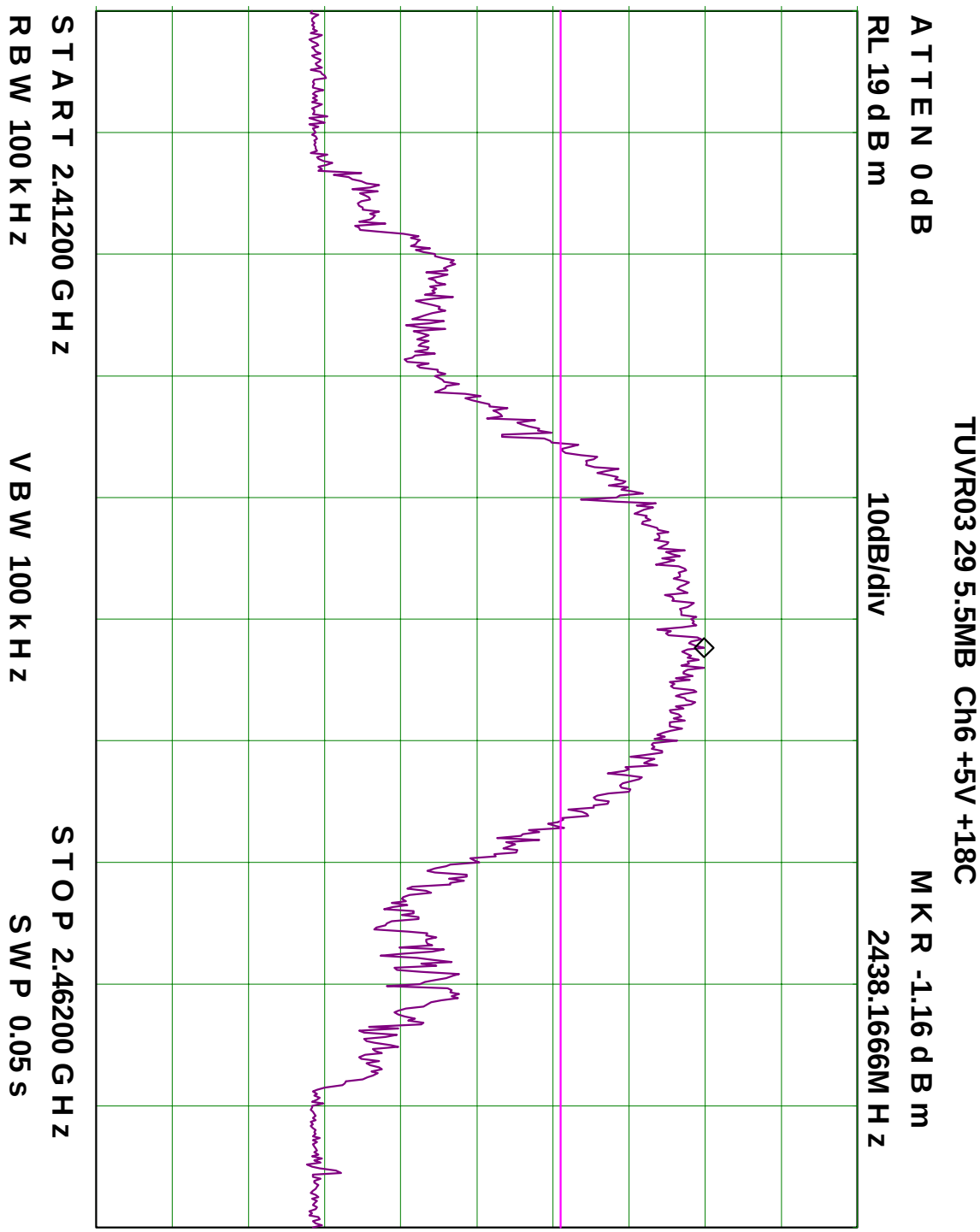

TUVR03 21 11MB Ch6 +5V +19C
ATTEN 0dB
RL 20 dBm
10dB/div
MKR -16.83 dBm
2436.5833MHz
START 2.43200 GHz
RBW 3kHz
VBW 100kHz
STOP 2.44200 GHz
SWP 2.8s

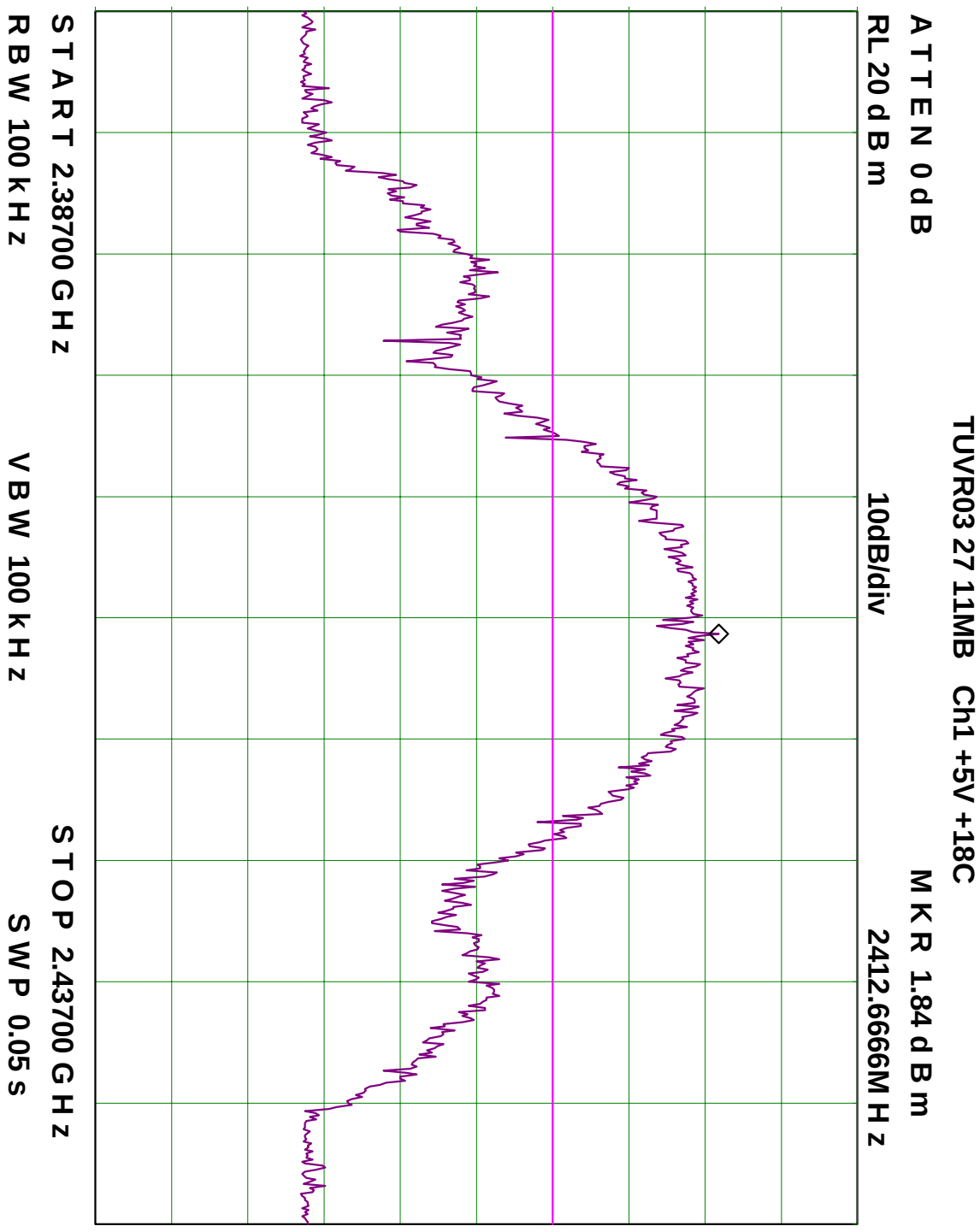

TUVR03 22 1MB Ch11 +5V +19C
ATTEN 0dB
RL 20 dBm
10dB/div
MKR -14.83 dBm
2463.0833MHz
START 2.45700 GHz
RBW 3kHz
VBW 100kHz
STOP 2.46700 GHz
SWP 2.8s

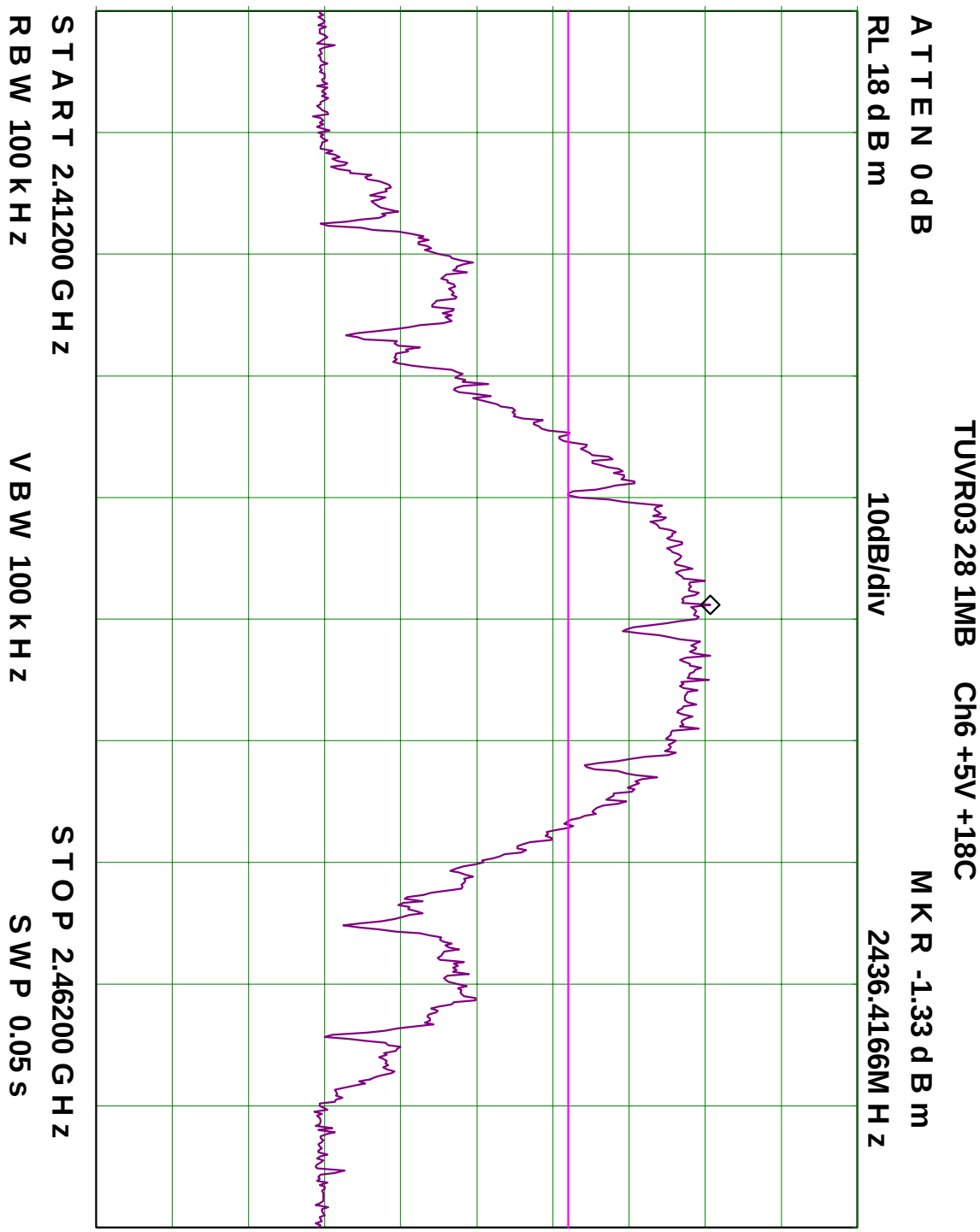

TUVR03 24 11MB Ch11 +5V +19C
ATTEN 0 dB
RL 20 dBm
10dB/div
MKR -15.83 dBm
2462.7666MHz
START 2.45700 GHz
RBW 3 kHz
VBW 100 kHz
STOP 2.46700 GHz
SWP 2.8 s

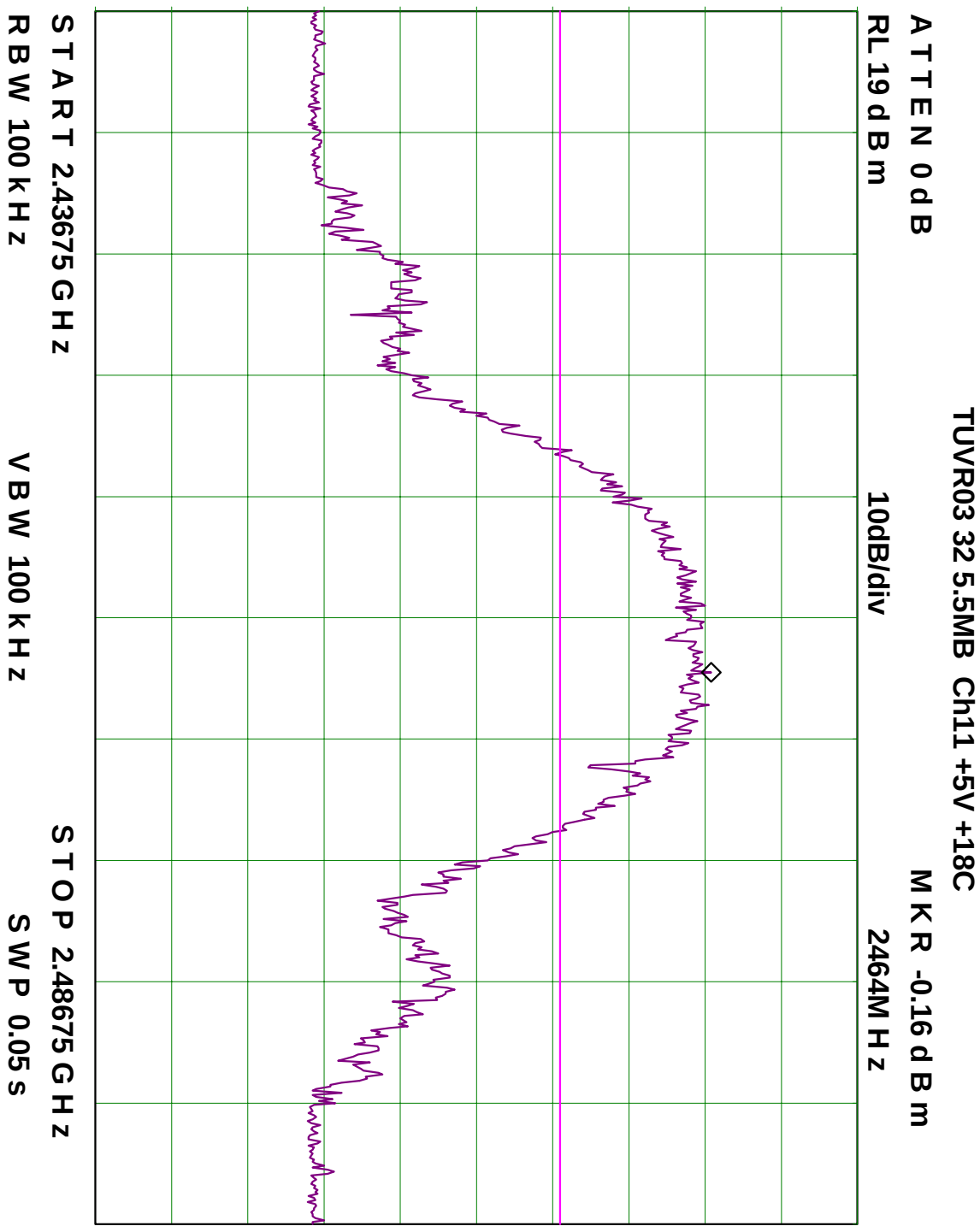

TUVR03 17 5.5MB Ch1 +5V +19C
ATTEN 0dB
RL 20dBm
10dB/div
MKR -14.33dBm
2416.0166MHz
START 2.40700GHz
RBW 3kHz
VBW 100kHz
STOP 2.41700GHz
SWP 2.8s

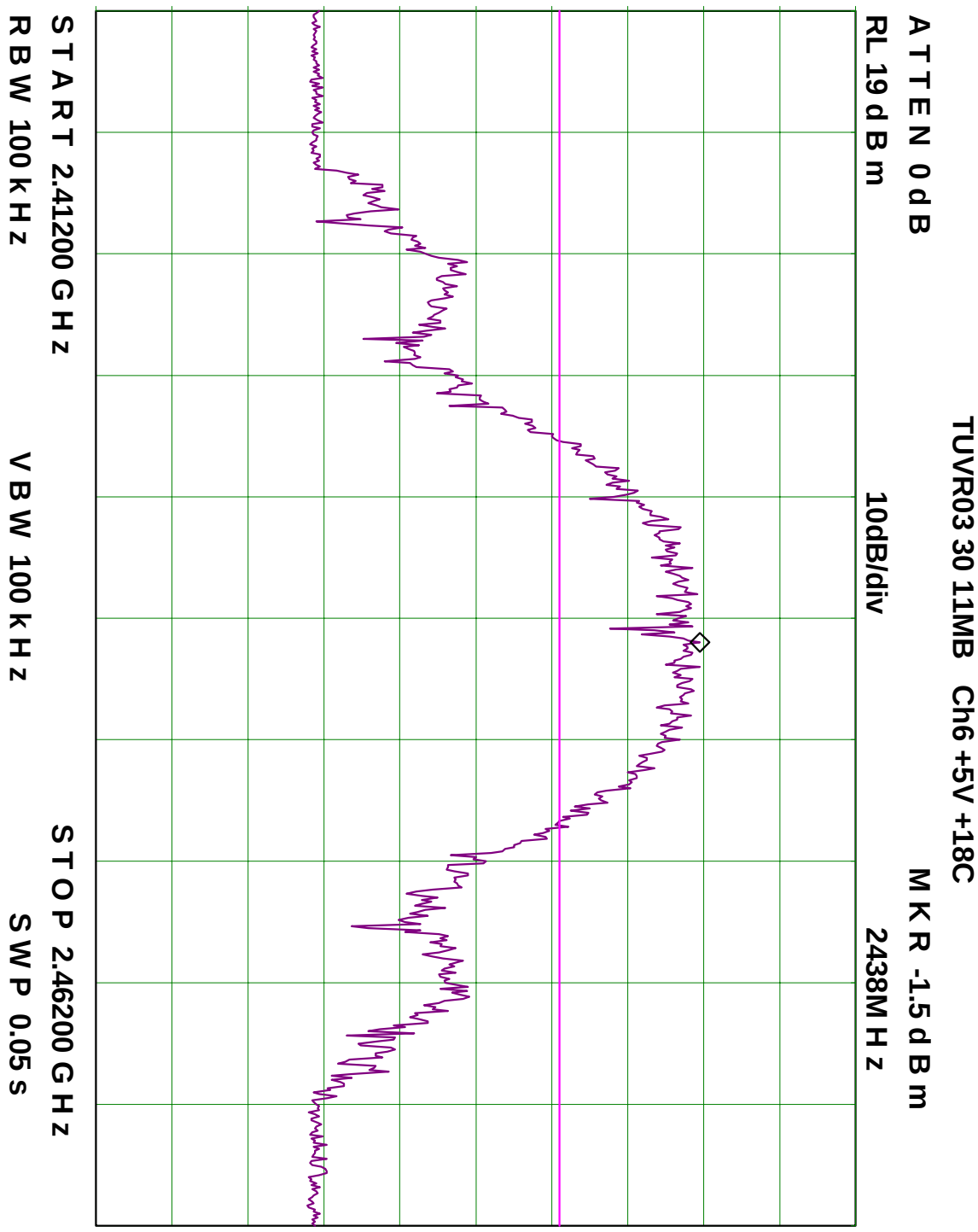

TUVR03 25 1MB Ch1 +5V +18C
ATTEN 0 dB
RL 20 dB m
10dB/div
MKR 0.34 dB m
2415.5M Hz
START 2.38700 GHz
RBW 100 kHz
VBW 100 kHz
STOP 2.43700 GHz
SWP 0.05 s

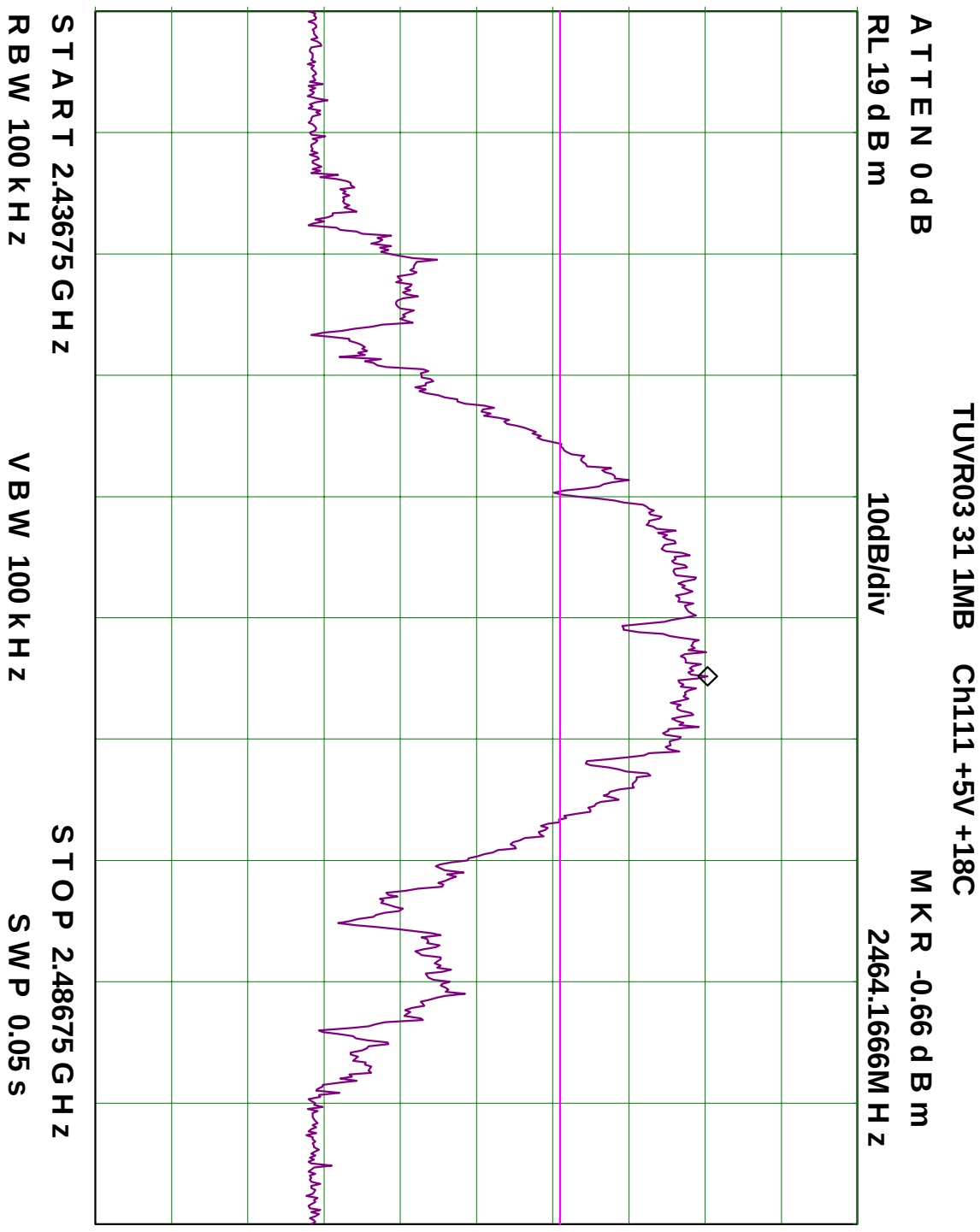

TUVR03 29 5.5MB Ch6 +5V +18C
ATTEN 0dB
RL 19 dBm
10dB/div
MKR -1.16 dBm
2438.1666MHz
START 2.41200 GHz
RBW 100 kHz
VBW 100 kHz
STOP 2.46200 GHz
SWP 0.05 s

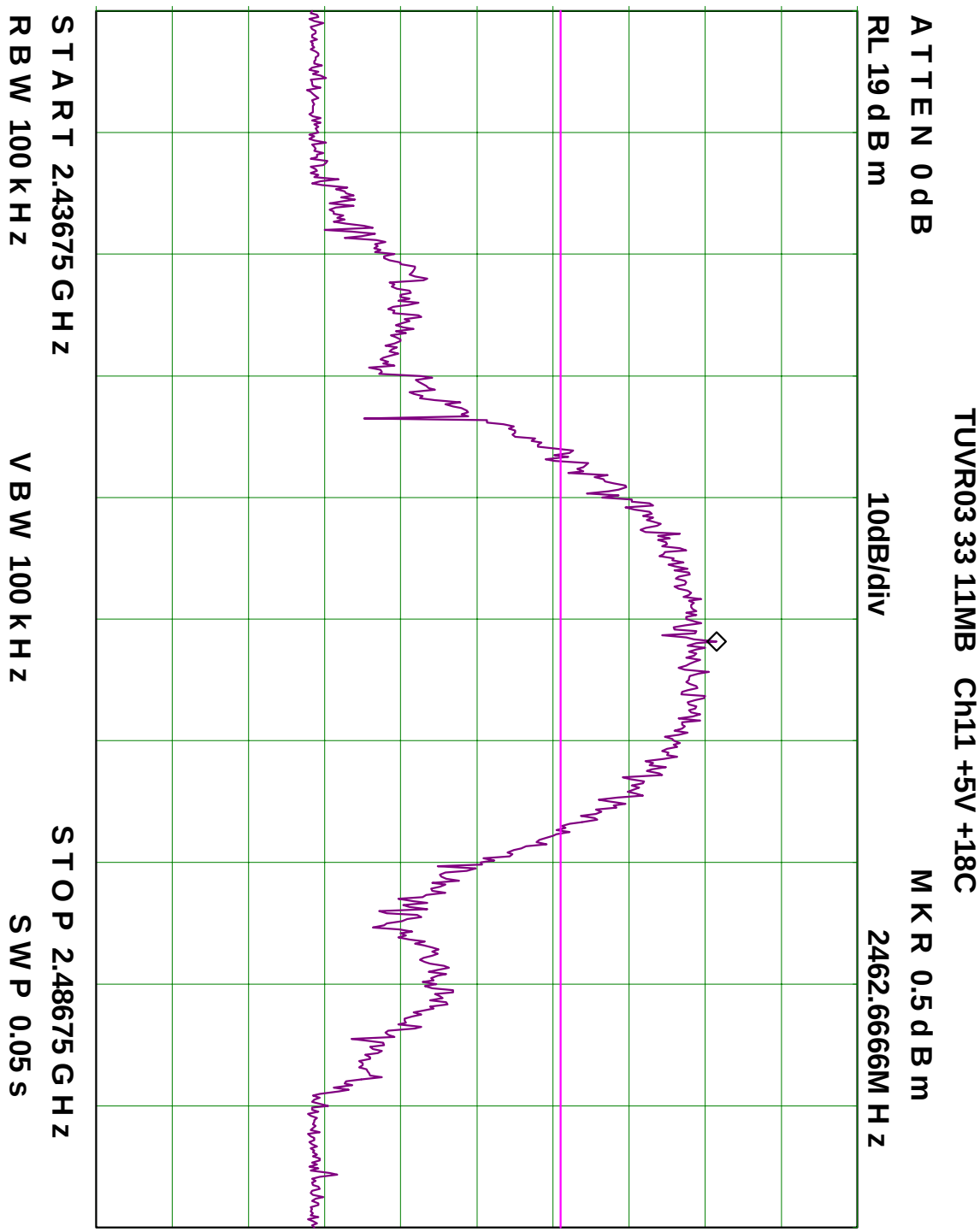

TUVR03 27 11MB Ch1 +5V +18C
ATTEN 0dB
RL 20dBm
10dB/div
MKR 1.84dBm
2412.666MHz
START 2.38700GHz
RBW 100kHz
VBW 100kHz
STOP 2.43700GHz
SWP 0.05s

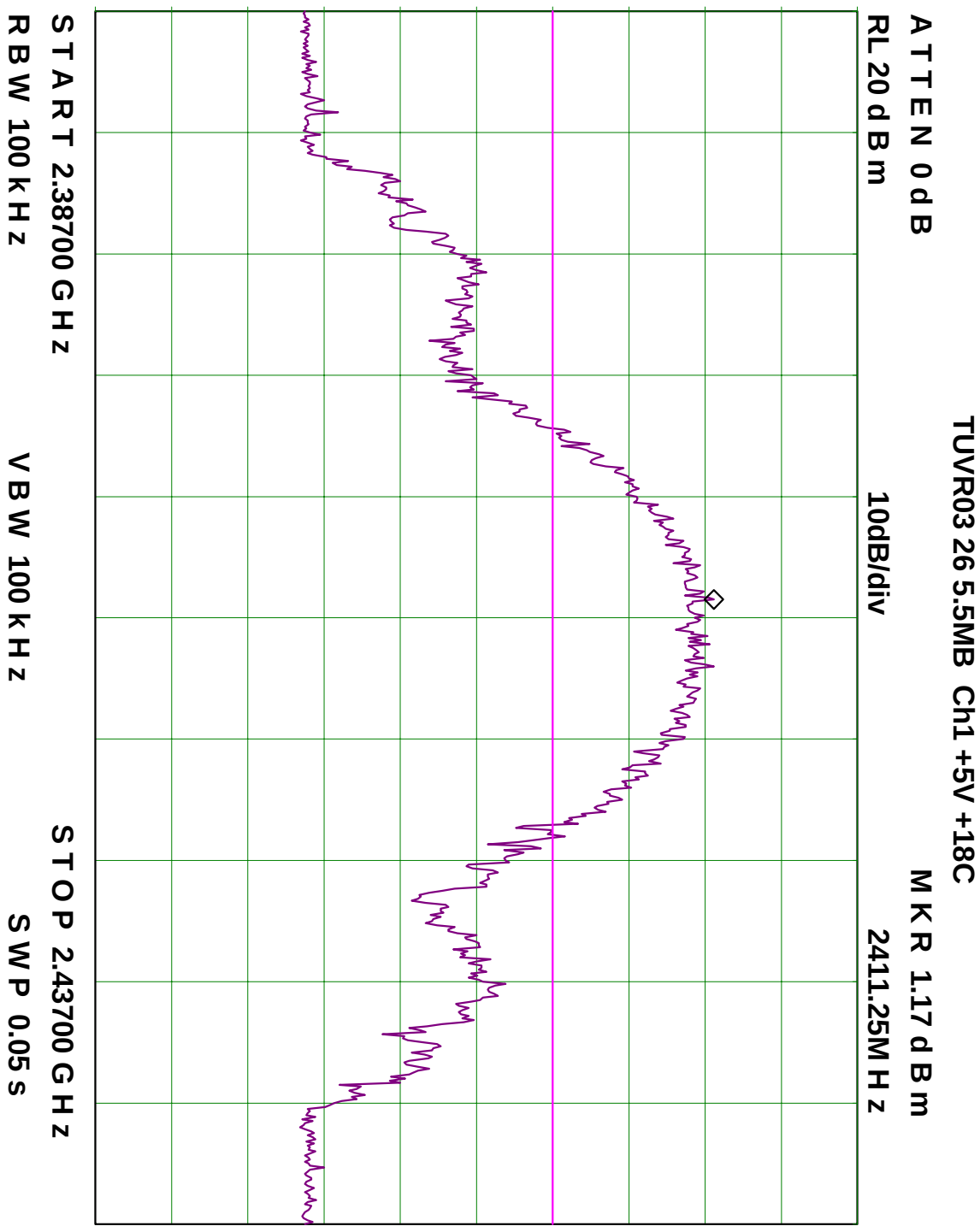

TUVR03 28 1MB Ch6 +5V +18C
ATTEN 0 dB
RL 18 dB m
10dB/div
MKR -1.33 dB m
2436.4166M Hz
START 2.41200 GHz
RBW 100 kHz
VBW 100 kHz
STOP 2.46200 GHz
SWP 0.05 s


TUVR03 32 5.5MB Ch11 +5V +18C
ATTEN 0 dB
RL 19 dB m
10dB/div
MKR -0.16 dB m
2464M Hz
START 2.43675 GHz
RBW 100 kHz
VBW 100 kHz
STOP 2.48675 GHz
SWP 0.05 s

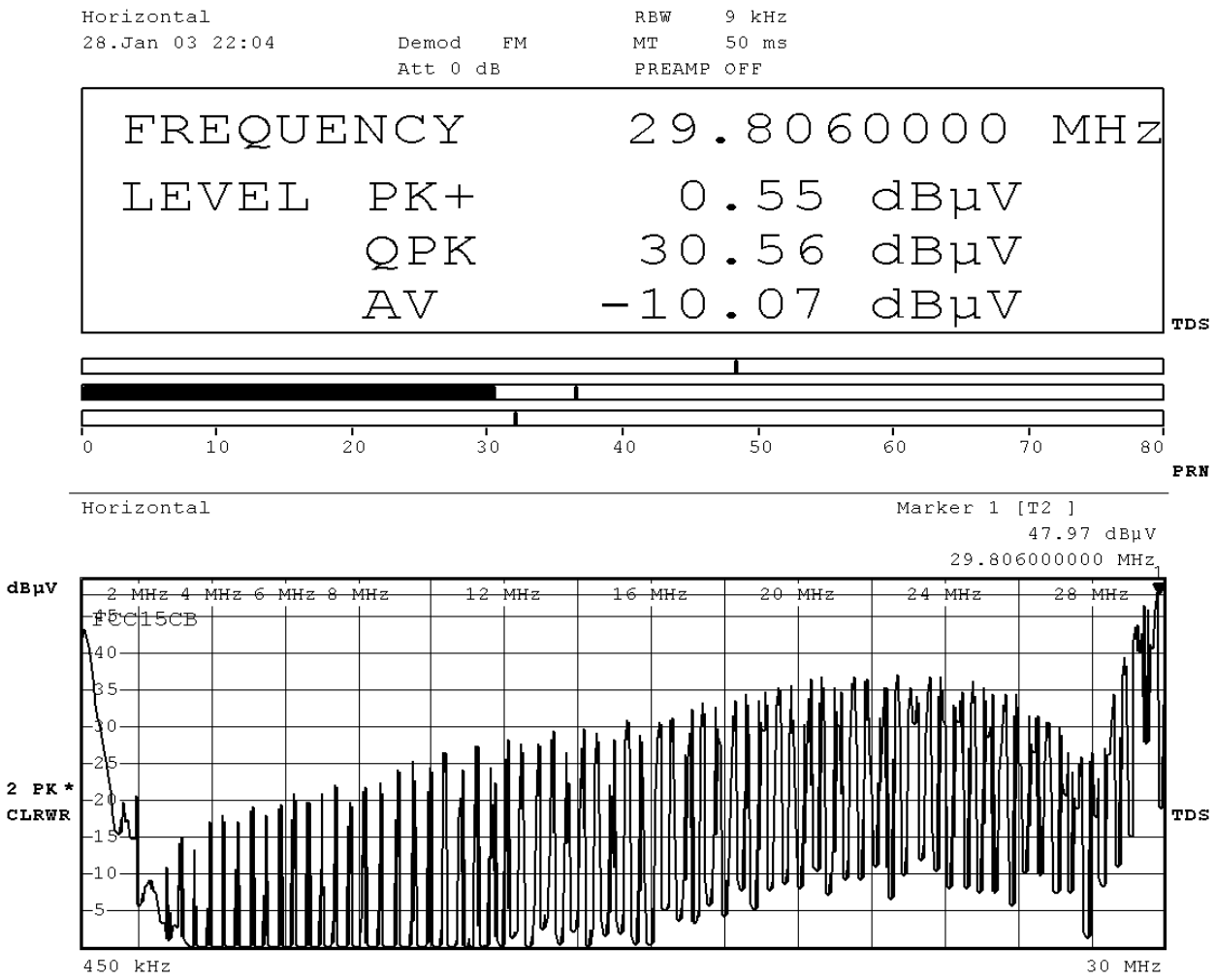

TUVR03 30 11MB Ch6 +5V +18C
ATTEN 0 dB
RL 19 dB m
10dB/div
MKR -1.5 dB m
2438M Hz
START 2.41200 GHz
RBW 100 kHz
VBW 100 kHz
STOP 2.46200 GHz
SWP 0.05 s


TUVR03 31 1MB Ch111 +5V +18C
ATTEN 0 dB
RL 19 dB m
10dB/div
MKR -0.66 dB m
2464.1666M Hz
START 2.43675 GHz
RBW 100 kHz
VBW 100 kHz
STOP 2.48675 GHz
SWP 0.05 s


TUVR03 33 11MB Ch11 +5V +18C
ATTEN 0 dB
RL 19 dB m
10dB/div
MKR 0.5 dB m
2462.666M Hz
START 2.43675 GHz
RBW 100 kHz
VBW 100 kHz
STOP 2.48675 GHz
SWP 0.05 s

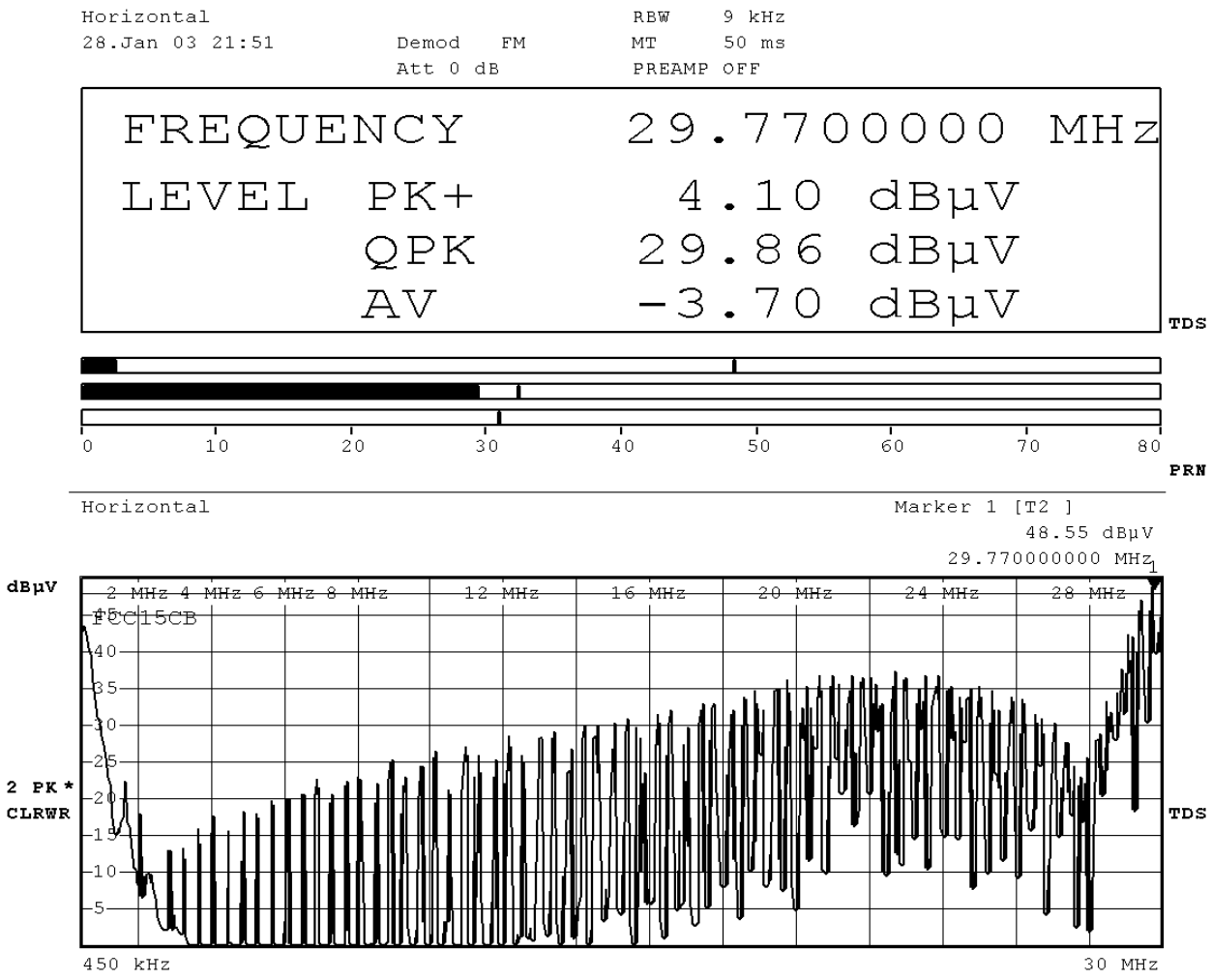

TUVR03 26 5.5MB Ch1 +5V +18C
ATTEN 0dB
RL 20 dBm
10dB/div
MKR 1.17 dBm
2411.25MHz
START 2.38700 GHz
RBW 100 kHz
VBW 100 kHz
STOP 2.43700 GHz
SWP 0.05 s

Plot 34, Line N (Neutral) – Channel 6 (2,437MHz) Receive Mode Only



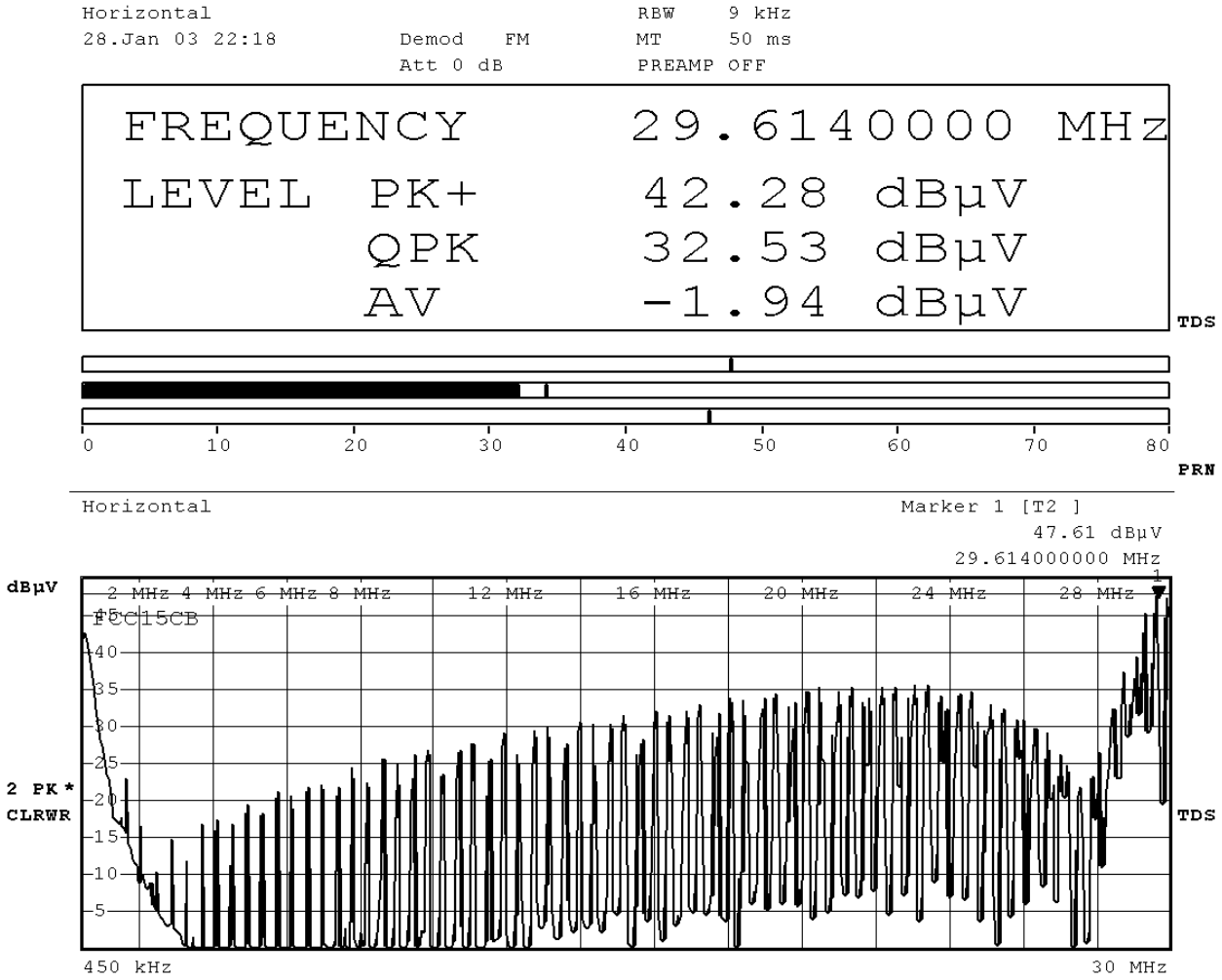
Date: 28.JAN.2003 22:04:31

Plot 35, Line N (Neutral) – Channel 6 (2,437MHz) Tx/Rx/Standby Mode



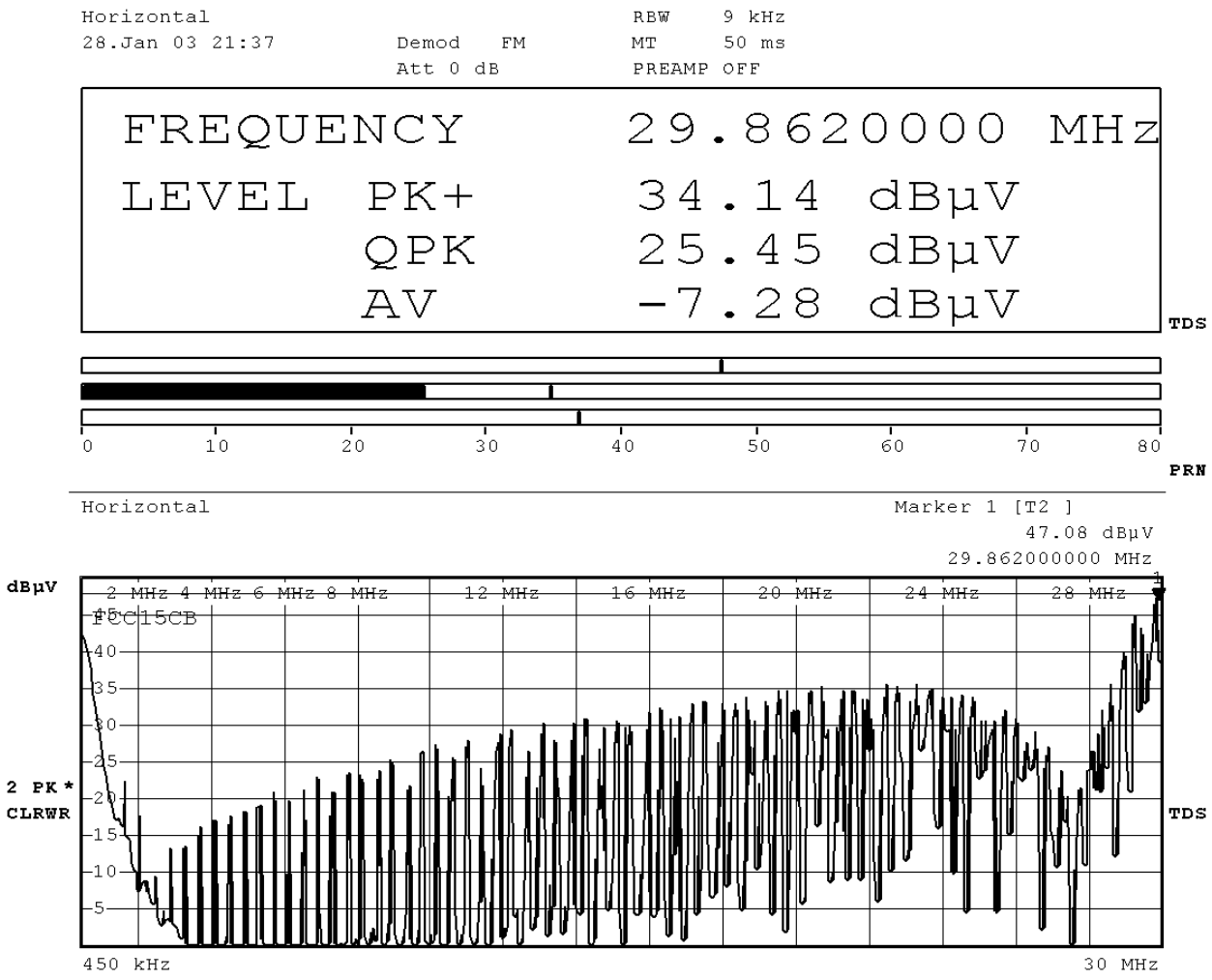
Date: 28.JAN.2003 21:51:23

Plot 36, Line L1 (Hot) – Channel 6 (2,437MHz) Receive Mode



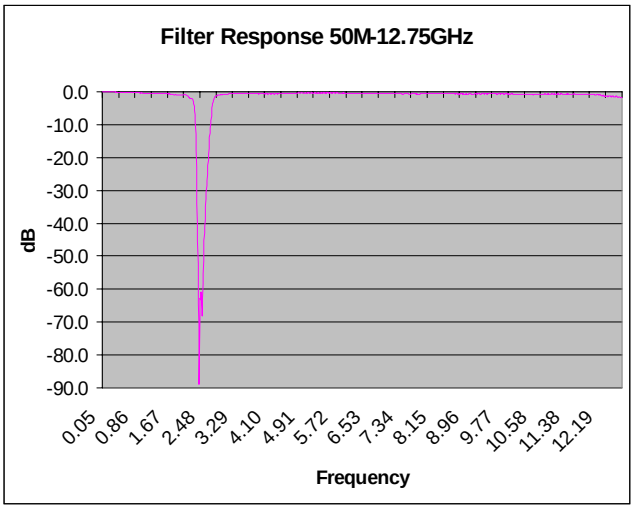
Date: 28.JAN.2003 22:18:49

Plot 37, Line L1 (Hot) – Channel 6 (2,437MHz) Tx/Rx/Standby Mode



Date: 28.JAN.2003 21:37:49

Plots 38, 39, 40, 41 Notch Filter Response



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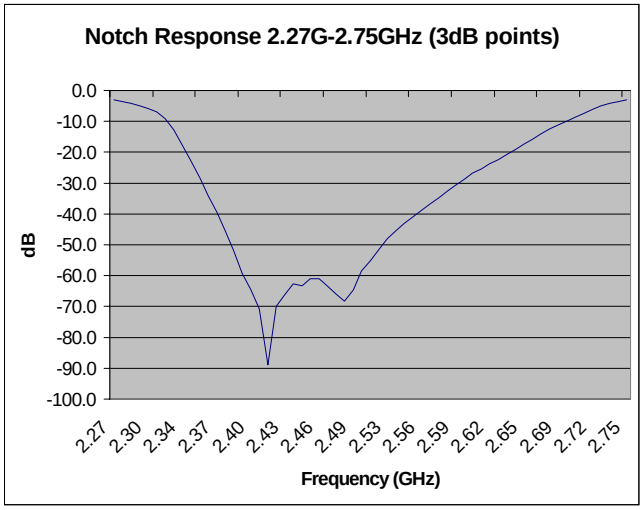
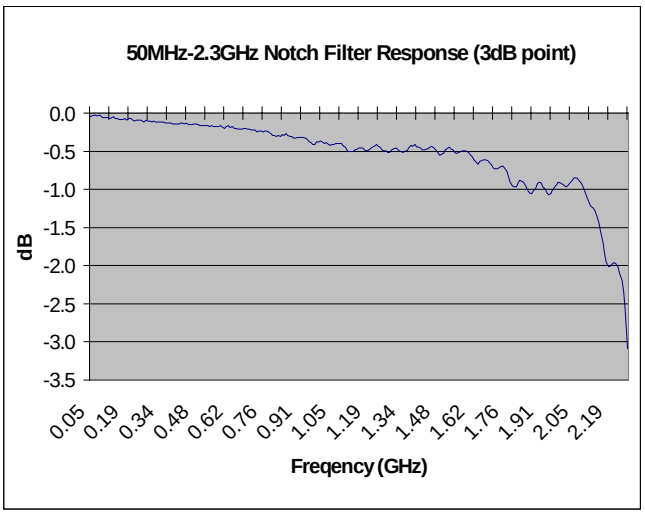
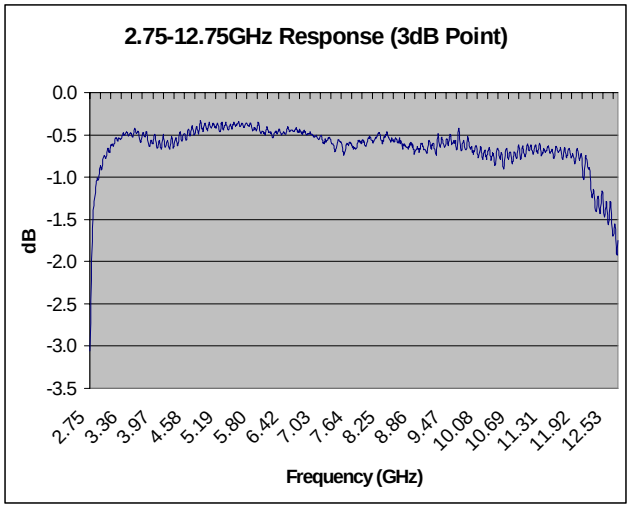


TUVR04a/39



TUVR04a/40



TUVR04a/41

7 Test Equipment

Asset Abbrev. #	Instrument	Manufacturer	Part #	Calibration Due Date	Serial #
Bar 1	Barometer/Thermometer	Control Co.	4196	10 Jun '03	E2844
RVA 01	Variable Coaxial Attenuator	Weinschel	940-60-33	22 Jun '03	A6595
K-CBL 08	SMA Cable	Megaphase	Sucoflex 104	27 Jun '03	Unknown
K-CBL 10	SMA Cable	Megaphase	Sucoflex 104	24 Oct '03	Unknown
K-CBL 11	SMA Cable	Megaphase	Sucoflex 104	27 Jun '03	Unknown
15F50B001	BNC Cable	Megaphase	Unknown	26 Oct '03	Unknown
15F50B002	BNC Cable	Megaphase	Unknown	26 Oct '03	Unknown
10F50B003	BNC Cable	Megaphase	Unknown	26 Oct '03	Unknown
15F50N001	N-Type Cable	Megaphase	Unknown	26 Oct '03	Unknown
5F50N001	N-Type Cable	Megaphase	Unknown	26 Oct '03	Unknown
ANT 1	Antenna (30M-2GHz)	Schaffner and Chase	CBLG140A	Not Applicable	1195
ANT1-18	Horn Antenna	The Electro-Mechanics Company	3115	21 Oct '03	9205-3882
Notch 1	2.4GHz	Microtronics	BRM50701	Not Applicable	001
AMP 3	Amplifier (0.5-22GHz)	Com-Power	PA-122	Not Applicable	181910
ReCVR 1	EMI Receiver	Rhode & Schwartz	ESI 7	11 Apr '03	838496/007
LISN 1	LISN	Rhode & Schwartz	ESH3Z5	25 Oct '03	836679/006
PMtr 1	Power Meter	Hewlett Packard	437B	1 Oct '03	3125U13554
PSnsr 1	Power Sensor	Hewlett Packard	R8485A	30 Jun '03	3318A19694
PSnsr 3	Power Sensor	Hewlett Packard	8487D	1 Oct '03	3318A00371
S-Anlr 1	Spectrum Analyser	Hewlett Packard	8565E	30 Jun '03	3425A00181
SSwpr 4	Synthesized Sweeper	Hewlett Packard	83640A	30 Jun '03	2927A00105

8 Summary Of Test Results

Test results reported in this document relate only to the items tested

Parameter	C	NC	NT	NA	Reference to remark
Transmitter characteristics					
Bandwidth at 6dB	X				
Occupier Bandwidth 20dB	X				
Band-Edge	X				
Out of Band Emissions (20dB)	X				
Processing Gain				X	
Transmitter Output Power	X				
Power Spectral Density	X				
AC Wireline Conducted Emissions (450KHz-30MHz)	X				
Restricted Band Radiation (30MHz-1GHz)	X				
Restricted Band Radiation (1GHz-25GHz)	X				

Note: *C:* *The parameter is compliant with the requirements.*
NC: *The parameter is not compliant with the requirements.*
NT: *The parameter is not tested.*
NA: *The test of this parameter is not applicable.*

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