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Project Number: 15E5499-1b

Prepared for:

Kodaplay Ltd.

By

Compliance Engineering Ireland Ltd

Clonross Lane

Derrockstown

Dunshaughlin

Co. Meath

FCC Site Registration: 92592

Industry Canada Assigned Site Code: 8517A-2

FCC ID: 2AELYPT001

IC: 20138-PT001

Date

29th May 2015

FCC EQUIPMENT AUTHORISATION

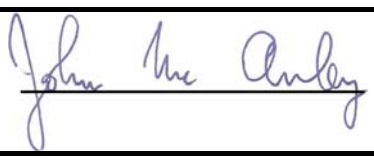
Test Report

EUT Description

Sports Performance Sensor for Athletes

Authorised :

John McAuley



TEST SUMMARY

The equipment complies with the requirements according to the following standards.

Bluetooth Low Energy

FCC Part Section(s)	RSS-210 Section	TEST PARAMETERS	Test Result
15.247a 2	A8.2a	6dB bandwidth	Pass
15.247a	A8.4	99% bandwidth	Pass
15.247e	A8.2(b)	Power Spectral Density	Pass
15.247(b)1	A8.4	Output power Conducted	Pass
15.247(d)1	A8.5	Conducted Spurious Emissions	Pass
15.209	2.6	Radiated Spurious Emissions	Pass

Exhibit A – Technical Report

Table of Contents

1.0 EUT Description

Device name :	Playertek Pod
Model:	PT001
Type:	Sports Performance Sensor for Athletes
FCC ID:	2AELYPT001
Company:	Kodaplay Ltd
Contact	Ronan MacRuairi
Address:	U1,B1, Quayside Business Park Millstreet Dundalk. Louth Ireland
Phone:	+353 85 7275550
e-mail:	ronan@kodaplay.com
Test Standards:	47 CFR, Part 15.247
Type of radio:	Stand-alone
Transmitter Type:	GFSK
Operating Frequency Range(s):	2.402 GHz- 2.48GHz
Number of Channels:	40
Antenna:	Integral
Power configuration:	3.7 v Battery.
Ports:	Micro USB
Oper. Temp Range:	5° C to +35° C
Classification:	DTS, JBP
Test Methodology:	Measurements performed according to the procedures in ANSI C63.4-2009 ANSI C63.10-2009

1.1 EUT Operation

Operating Conditions during Test:

The EUT operates over Bluetooth Low Energy using Channels 0 to 39 for the reporting of sports performance

The EUT was powered from a rechargeable battery.

The EUT was operated in normal operating mode for all tests

Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

☒ Normal

Temperature:	+15 to +35 ° C
Humidity:	20-75 %

1.2 Modifications

No modifications were required in order to pass the test specifications.

1.3 Date of Test

The tests were carried out on one sample of the EUT on 16th 18th and 19th of March 2015.

1.4 Electromagnetic Emissions Testing

The guidelines of CISPR 16-4 were used for all uncertainty calculations, estimates and expressions thereof for EMC testing. A copy of Compliance Engineering Ireland Ltd's policy for EMC Measurement Uncertainty is available on request.

RF Requirements: Spurious emissions in accordance with FCC CFR 15.107, 15.109 and 15.209. Tests were carried out to the requirements of CISPR 16-4 and ANSI C63.4-2009.

1.4.1 Measurement Uncertainty

The measurement uncertainty (with a 95% confidence level) for the conducted emissions test was ±3.5 dB.

The measurement uncertainty (with a 95% confidence level) for the radiated emissions test was ±5.3 dB (from 30 to 100 MHz), ±4.7 dB (from 100 to 300 MHz), ±3.9 dB (from 300 to 1000 MHz) and ±3.8 dB (from 1 GHz to 40 GHz).

2 Emissions Measurements

2.1 Conducted Emissions Measurements

The EUT chip antenna was removed and an SMA connector was connected in its place for conducted radio test.

All results were measured as conducted except radiated spurious emissions.

The EUT was powered from rechargeable battery so conducted emissions on the mains tests were performed using a mains adapter through a LISN.
(Mains adapter =Unifile UBKJ05-0510)

2.2 Radiated Emissions Measurements

Radiated Power measurements were made at the Compliance Engineering Ireland Ltd anechoic chamber located in Dunshaughlin, Co. Meath, Ireland to determine the radio noise radiated from the EUT. A "Description of Measurement Facilities" has been submitted to the FCC and approved pursuant to Section 2.948 of CFR 47 of the FCC rules.

The EUT was centred on a motorized turntable, which allows 360 degree rotation.

Emissions below 1GHz were measured using a bi-log antenna positioned at a distance of 3 metres from the EUT (as measured from the closest point of the EUT). The radiated emissions were maximised by configuring the EUT, by rotating the EUT, and by raising and lowering the antenna from 1 to 4 metres.. In this case the resolution bandwidth was 100kHz.

Emissions above 1GHz were measured using a horn antenna located at 3 metres distance from the EUT in a fully anechoic chamber. The radiated emissions were maximised by configuring the EUT and by rotating the EUT In this case the resolution bandwidth was 1MHz and video bandwidth was 1MHz. for peak measurements. The Video bandwidth was changed to 10Hz for Average measurements (as per ANSI 63.4-2009 Section 4.2.2 e) .

A Radiated Emission prescan was performed which covered the x, y and z orientations for low, mid and high channels in horizontal and vertical polarizations. In each case the emission was maximised.

The result of this prescan showed that the highest emission for vertical polarization was with the EUT in a vertical orientation (orientation1 O1) for low mid and high channels. The highest emission for vertical polarization was the high channel

The EUT flat on the table (orientation3 O3) gave the highest emissions for Low Mid and High channels for horizontal polarization. In this case the high channel gave the highest emission.

A full scan for radiated emission was performed on the high channel in orientation O1 for vertical polarization and high channel in orientation O3 for horizontal polarization.

2.3 Antenna Requirements

According to FCC 47 CFR 15.203:

"An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section."

* The antennas of this E.U.T are permanently attached.

*The E.U.T Complies with the requirement of 15.203

3.0 Results for Conducted emissions on the mains

Mains Conducted Emissions results

The EUT was connected to a charger which was powered from the mains through a LISN.

Detector	Frequency	Reading	Margin	Phase
QP/ Ave	MHz	dBuV	dB	L/N
Average	0.3930	36.03	-13.03	Live
Average	0.8745	30.52	-15.48	Live
Average	1.8780	29.23	-16.77	Live
Quasi-Peak	13.7220	35.91	-24.09	Live

Detector	Frequency	Reading	Margin	Phase
QP/ Ave	MHz	dBuV	dB	L/N
Quasi-Peak	0.2175	43.29	-20.78	Neutral
Average	0.2175	29.31	-24.76	Neutral
Average	7.4130	26.05	-23.95	Neutral

Ref Appendix D for scans

Result: Pass

4. Conducted Measurements

4.1 Bandwidth

4.1.1 6dB bandwidth

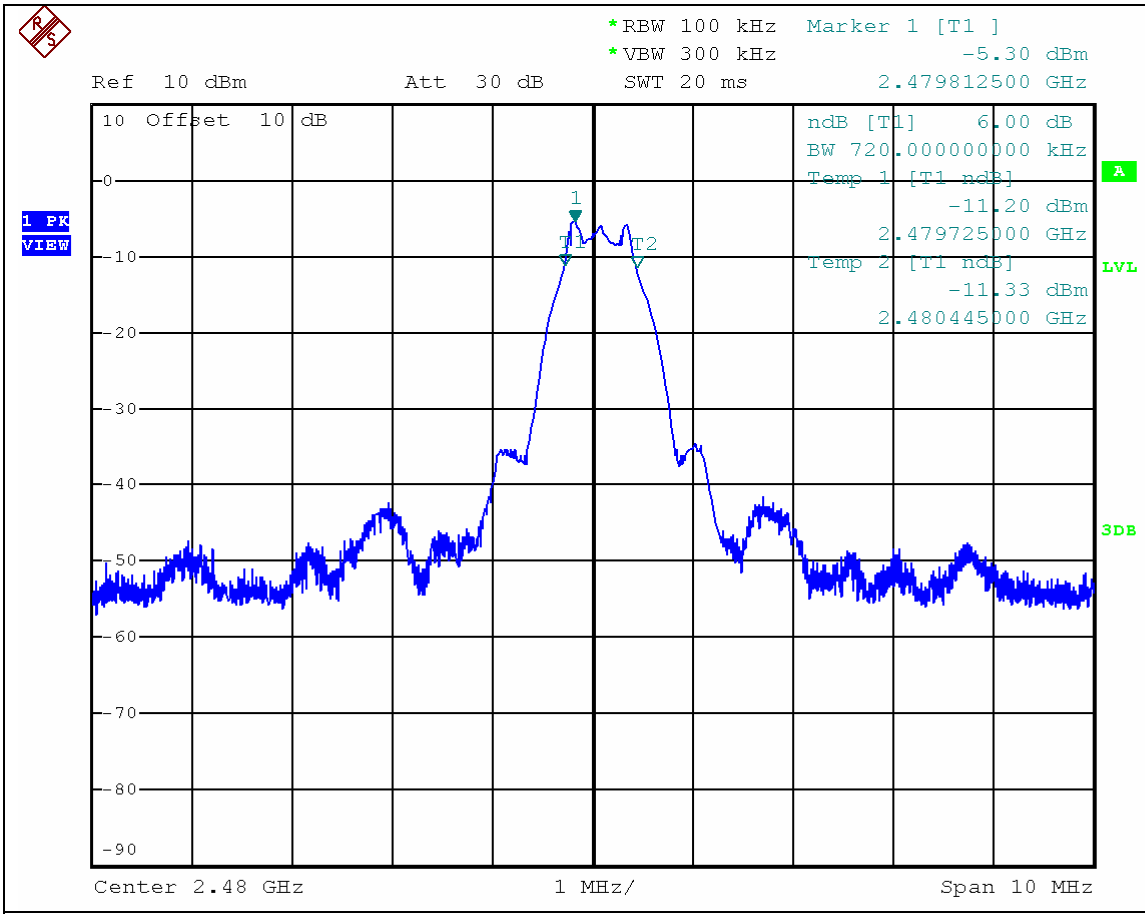


Fig 1 6dB Bandwidth

4.1.2 99% bandwidth

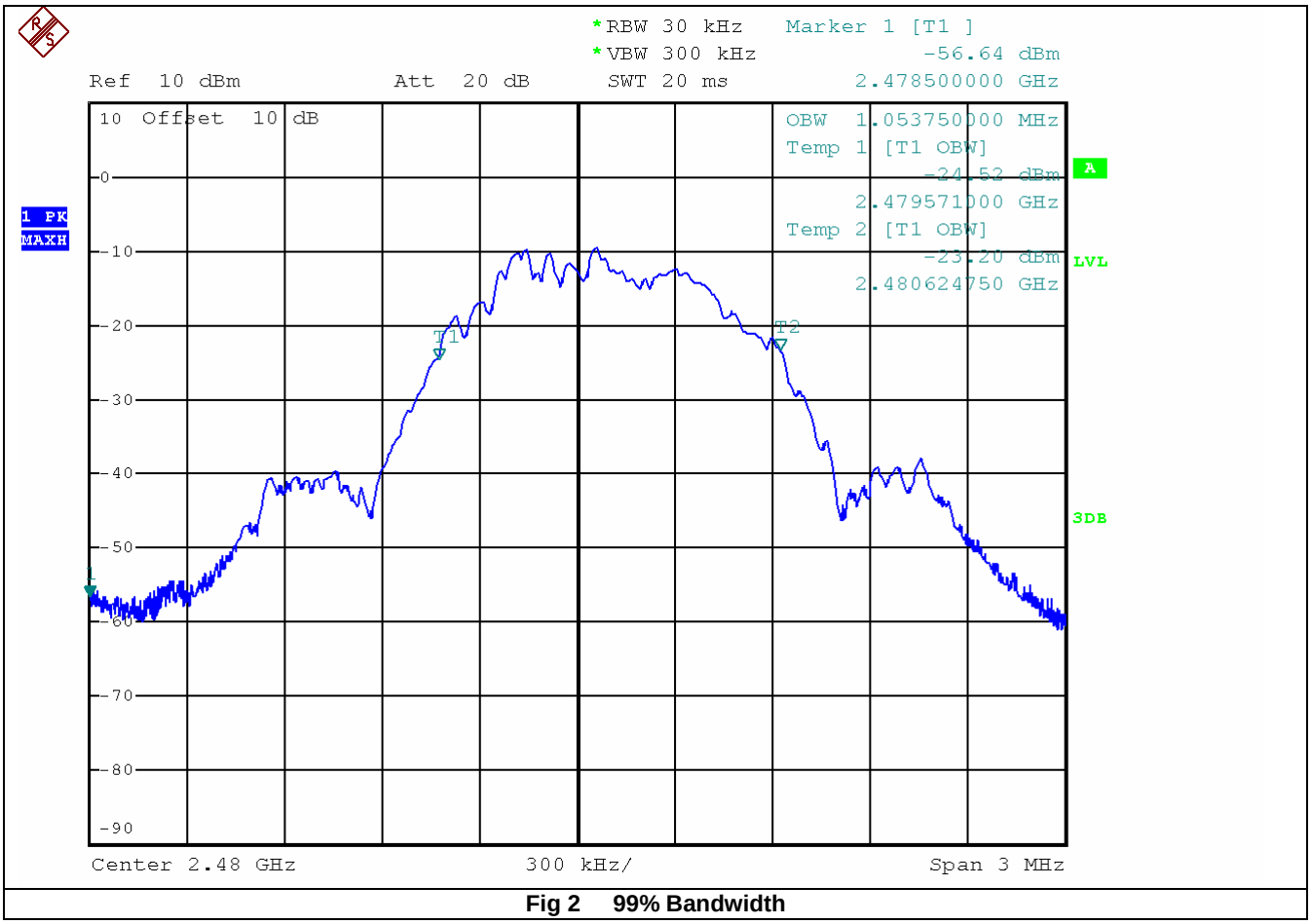


Fig 2 99% Bandwidth

Bandwidth

Channel	Frequency	6dB Bandwidth	99% Bandwidth
	GHz	kHz	KHz
Low	2.402	663	1042
Mid	2.44	690	1048
High	2.48	720	1053

Limit for 6dB Bandwidth = 500KHz min

Result :- Pass

4.2 Power Spectral Density

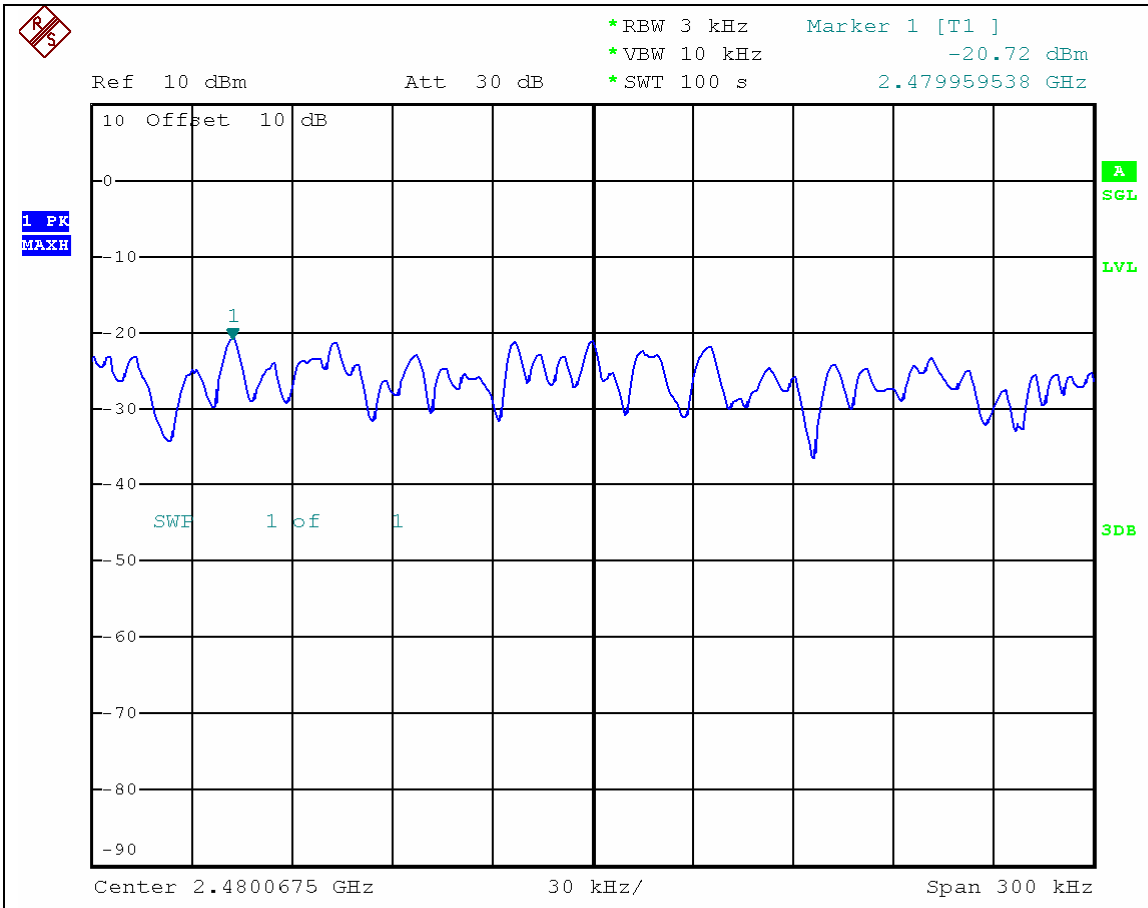


Fig 3 Power Spectral Density

Channel	Operating Frequency	Power Spectral Density	Limit
	GHz	dBm	dBm
Low	2.402	-19.06	8
Mid	2.44	-20.19	8
High	2.48	-20.72	8

Result :- Pass

4.3 Output power Conducted

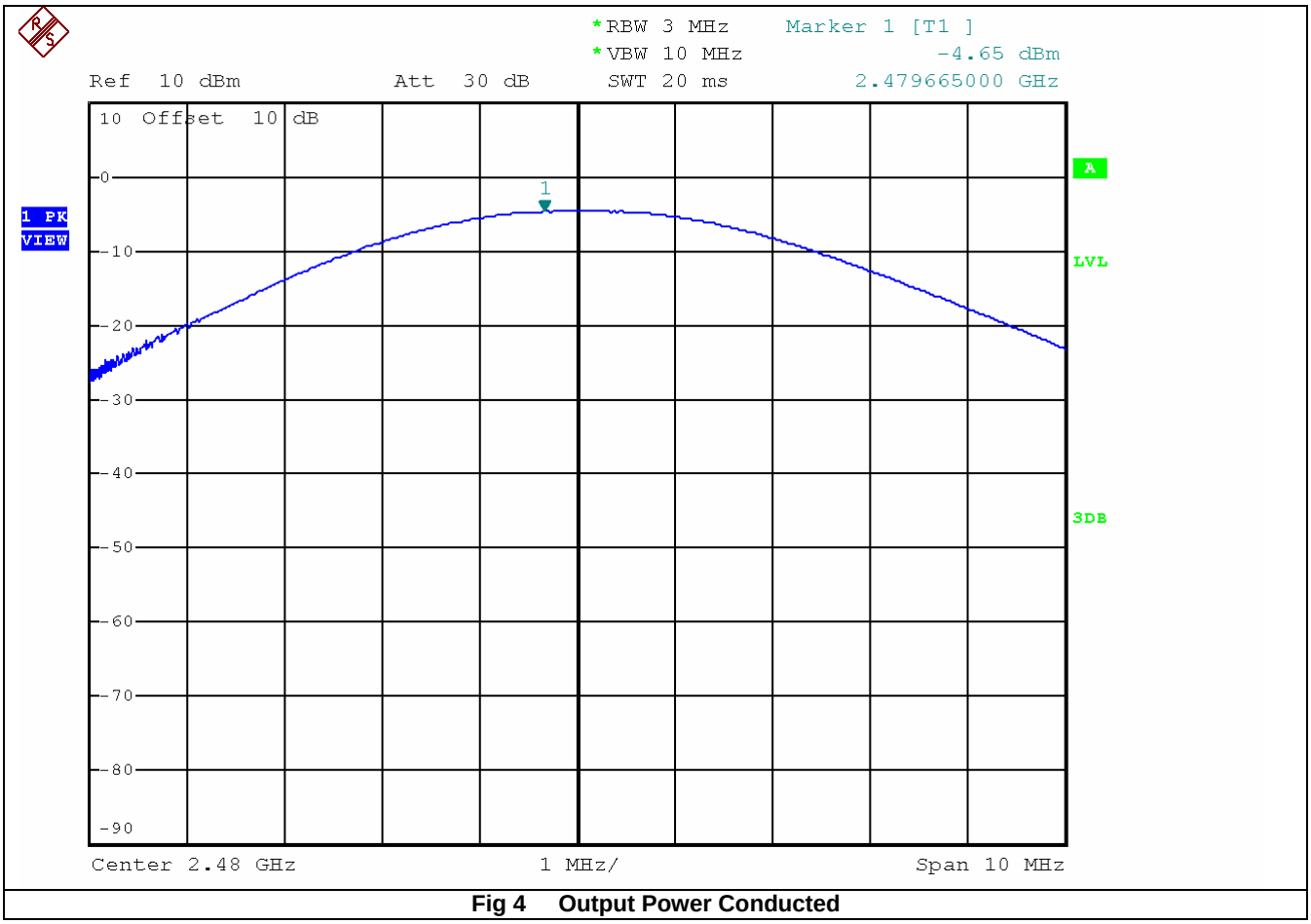


Fig 4 Output Power Conducted

Channel Frequency	Measured Level	Limit Peak Conducted Power	Margin	Result
GHz	dBm	dBm	dB	
2.402	-3.98	30	33.98	Pass
2.44	-4.19	30	34.19	Pass
2.48	-4.65	30	34.65	Pass

4.4 Duty Cycle

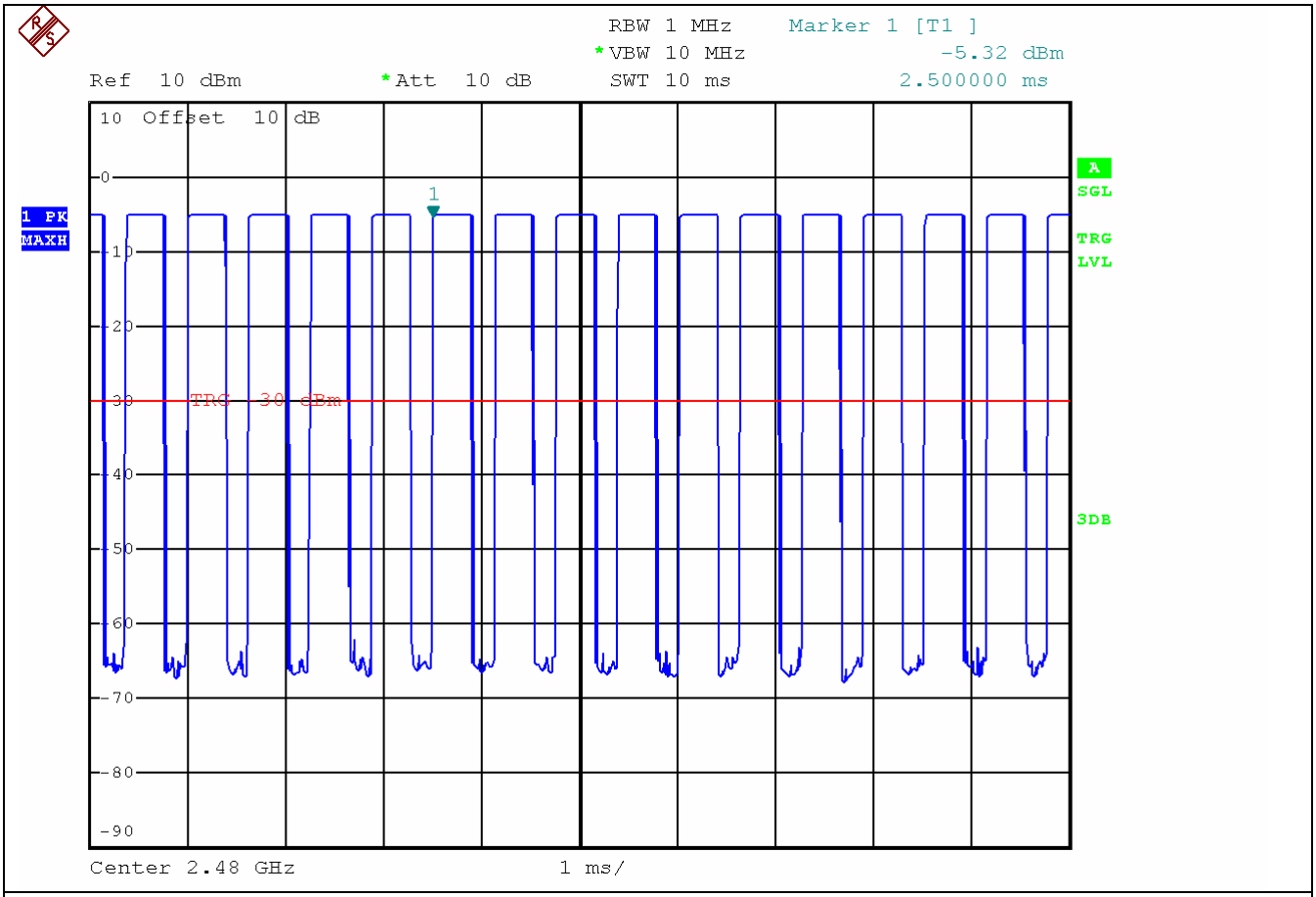


Fig 5 Duty Cycle

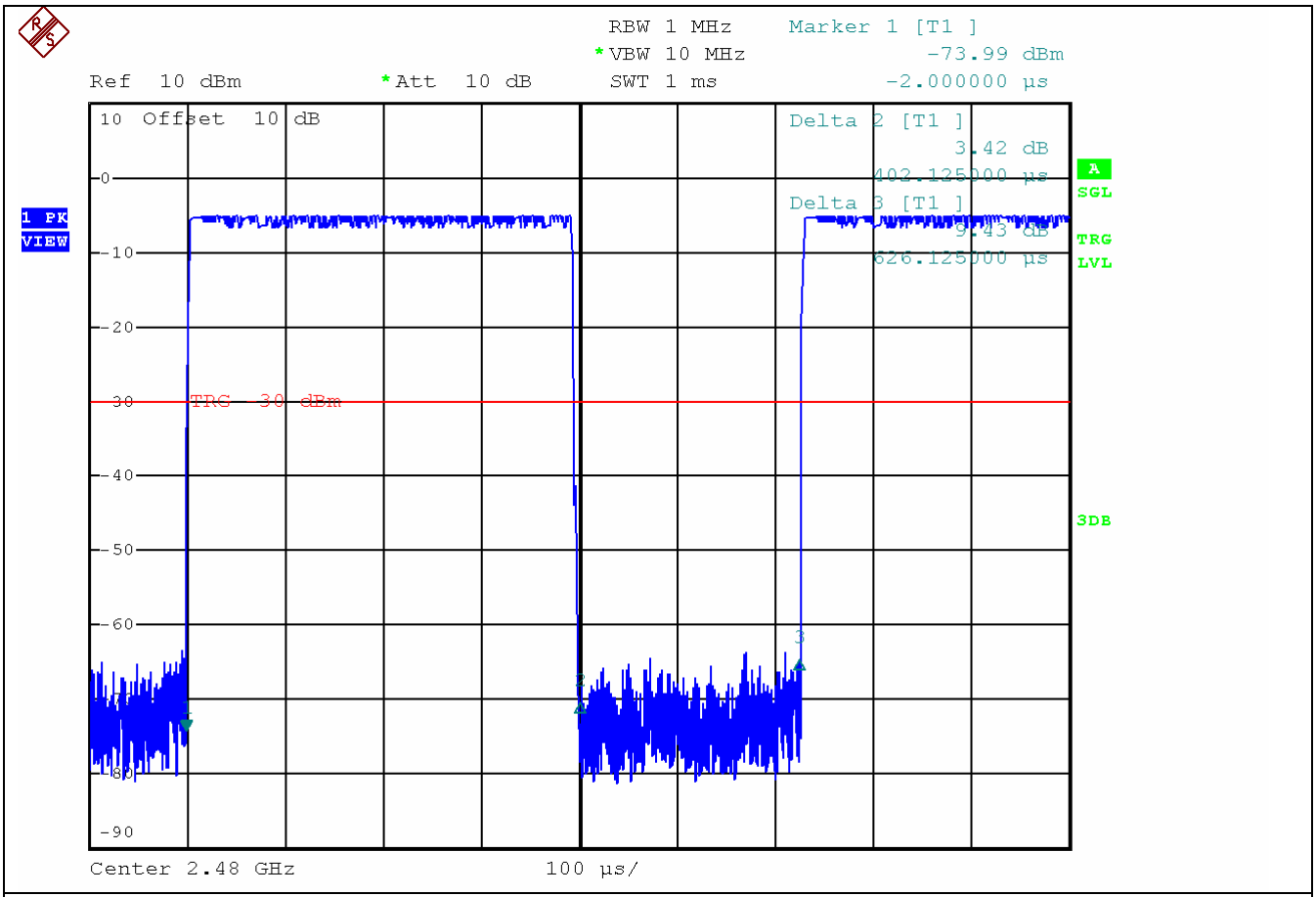


Fig 6 Duty Cycle

5. Radiated Emissions

5.1 Results for Radiated emissions

Appendix B shows the results of the scans in the anechoic chamber, for Bluetooth Low Energy

5.1.1 Measurements with Bilog Antenna (30MHz to 1GHz)

Frequency MHz	Quasi peak Level dBuV/m	EUT Orientation	Antenna Polarity	Antenna Factor dB	Cable loss dB	Final Field Strength Quasi Peak dBuV/m	Average Limit dBuV/m	Margin dB
175.00	11.9	O1	Vertical	9.7	0.2	21.8	43.5	21.7
305.00	11.2	O1	Vertical	12.9	1.2	25.3	46	20.7
144.00	21.8	O3	Horizontal	12	0.2	34.0	43.5	9.5
160.00	13.8	O3	Horizontal	11	0.2	25.0	43.5	18.5
176.00	21.4	O3	Horizontal	9.7	0.2	31.3	43.5	12.2

Result: Pass

5.1.2 **Antenna measurements (1GHz – 26 GHz)**

Frequency GHz	Peak Level dBuV/m	Antenna Factor dB	Preamp Gain dB	Cable Loss dB	Antenna Polarity	EUT Orientation	Final Peak Level dBuV/m	Average Limit +20dB dBuV/m	Margin dB
4.804	54.4	32.3	37.1	5.2	Vertical	O1	54.0	74.0	20.0
4.804	54.4	32.3	37.1	5.2	Horizontal	O3	54.0	74.0	20.0
7.206	62.3	37.7	36.9	6.5	Vertical	O1	55.0	74.0	19.0
7.206	62.9	37.7	36.9	6.5	Horizontal	O3	55.6	74.0	18.4
4.88	53.8	32.3	37.1	5.2	Vertical	O1	53.4	74.0	20.6
4.88	53.1	32.3	37.1	5.2	Horizontal	O3	52.7	74.0	21.3
7.32	63.3	37.7	38	6.7	Vertical	O1	56.9	74.0	17.1
7.32	61.4	37.7	38	6.7	Horizontal	O3	55.0	74.0	19.0
4.96	55.2	34	37.3	5.2	Vertical	O1	53.3	74.0	20.6
4.96	55.4	34	37.3	5.2	Horizontal	O3	53.5	74.0	20.5
7.44	63.1	37.7	37.5	6.3	Vertical	O1	56.6	74.0	17.4
7.44	63.1	37.7	37.5	6.3	Horizontal	O3	56.6	74.0	17.4

Frequency GHz	Final Peak Level dBuV/m	EUT Orientation	Antenna Polarity	Duty Cycle Correction dB	Average Level dBV/m	Average Limit dBuV/m	Margin dB
4.804	54.0	O1	Vertical	-3.8	50.1	54.0	3.9
4.804	54.0	O3	Horizontal	-3.8	50.2	54.0	3.8
7.206	55.0	O1	Vertical	-3.8	51.2	54.0	2.8
7.206	55.6	O3	Horizontal	-3.8	51.8	54.0	2.2
4.88	53.4	O1	Vertical	-3.8	49.5	54.0	4.5
4.88	52.7	O3	Horizontal	-3.8	48.8	54.0	5.1
7.32	56.9	O1	Vertical	-3.8	53.0	54.0	0.9
7.32	55.0	O3	Horizontal	-3.8	51.2	54.0	2.8
4.96	53.3	O1	Vertical	-3.8	49.5	54.0	4.5
4.96	53.5	O3	Horizontal	-3.8	49.7	54.0	4.3
7.44	56.6	O1	Vertical	-3.8	52.7	54.0	1.3
7.44	56.6	O3	Horizontal	-3.8	52.8	54.0	1.2

One Period(mS)	Pulse Width (mS)	Duty Cycle	20 log duty cycle (dB)	Duty Cycle %
0.626125	**0.402125**	**0.6422**	**-3.8**	**64.2**

Duty cycle correction =20Log (duty cycle) dB

Duty Cycle correction for Average measurement of pulsed signal =Peak -3.8dB

as per ANSI C63.10-2009 Section 7.6.3

Result: Pass

6.0 List of Test Equipment

Instrument	Mftr.	Model	CEI Ref No.	Cal Due Date
Horn Antenna	EMCO	3115	655	14/11/2015
Preamplifier	Hewlett Packard	83017A	805	19/09/2015
Spectrum Analyser	Rohde & Schwarz	FSP 40	850	14/08/2015
Spectrum Analyser/Receiver	Rohde & Schwarz	ESR	869	28/05/2016
LISN	Rohde & Schwarz	ESH3-Z5	604	14/12/2015
Antenna Trilog	Schwarzbeck	VULB 9160	889	08/09/2015
Anechoic Chamber	CEI	10M	845	23/09/2015
Horn Antenna	A-inflow	LB-42-25-C-KF	877	04/09/2015
Spectrum Analyser	Rohde & Schwarz	FSP 40	850	14/08/2015
Spectrum Analyser/Receiver	Rohde & Schwarz	ESR	869	28/05/2016
Trilog Antenna	Schwarzbeck	VULB9160	889	08/09/2015

Appendix A

Additional Test Results

For

Bluetooth Low Energy

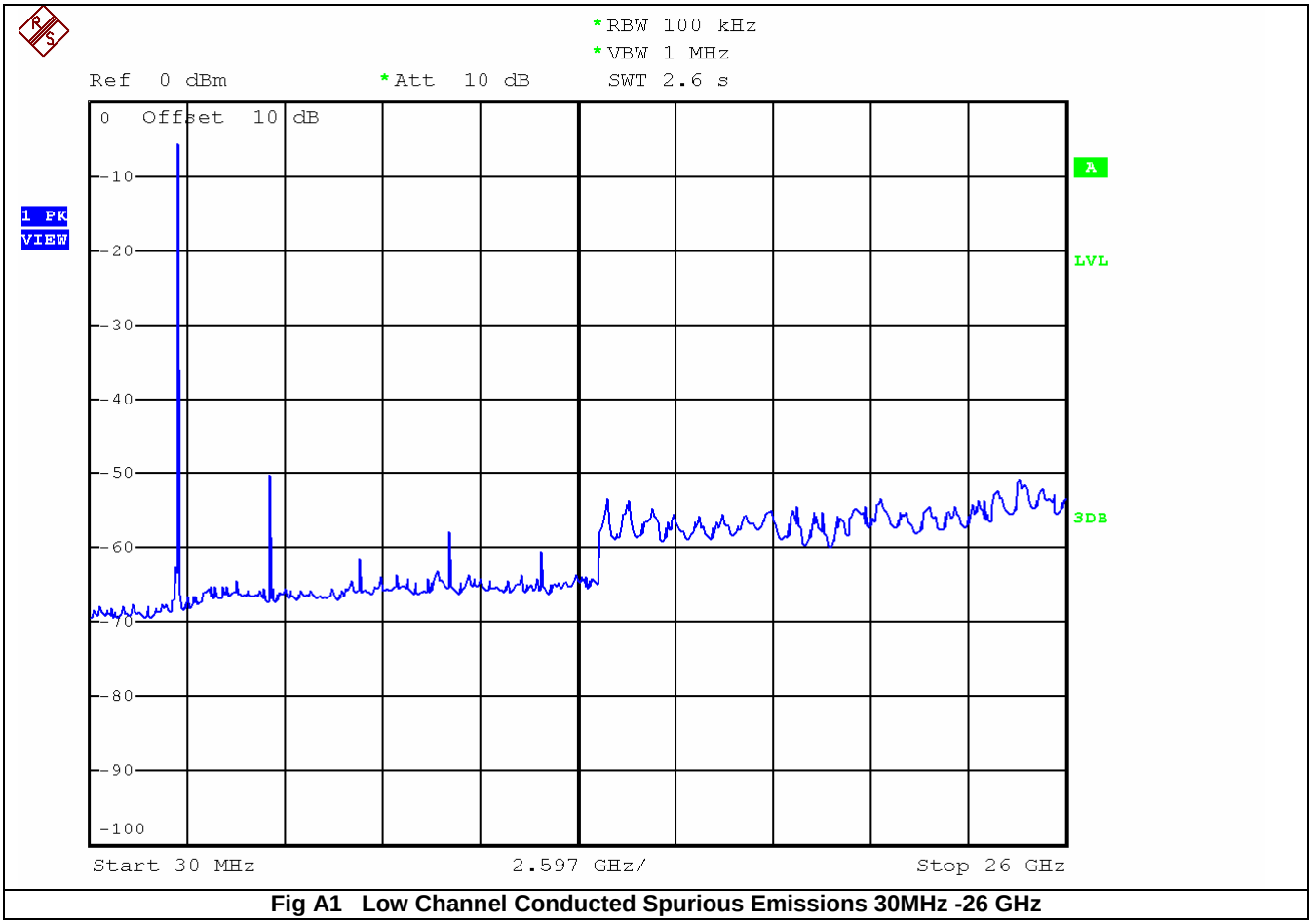


Fig A1 Low Channel Conducted Spurious Emissions 30MHz -26 GHz

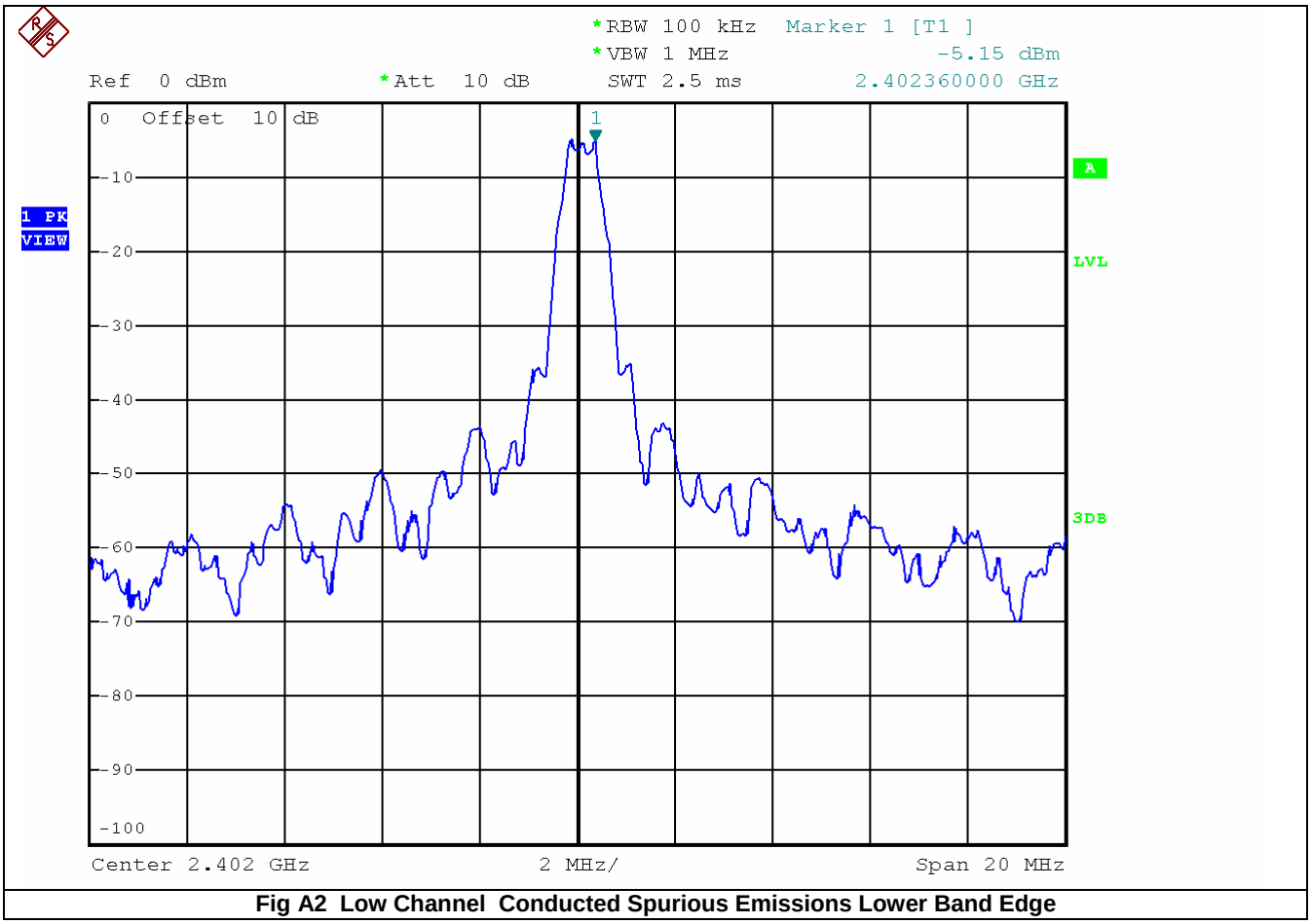


Fig A2 Low Channel Conducted Spurious Emissions Lower Band Edge

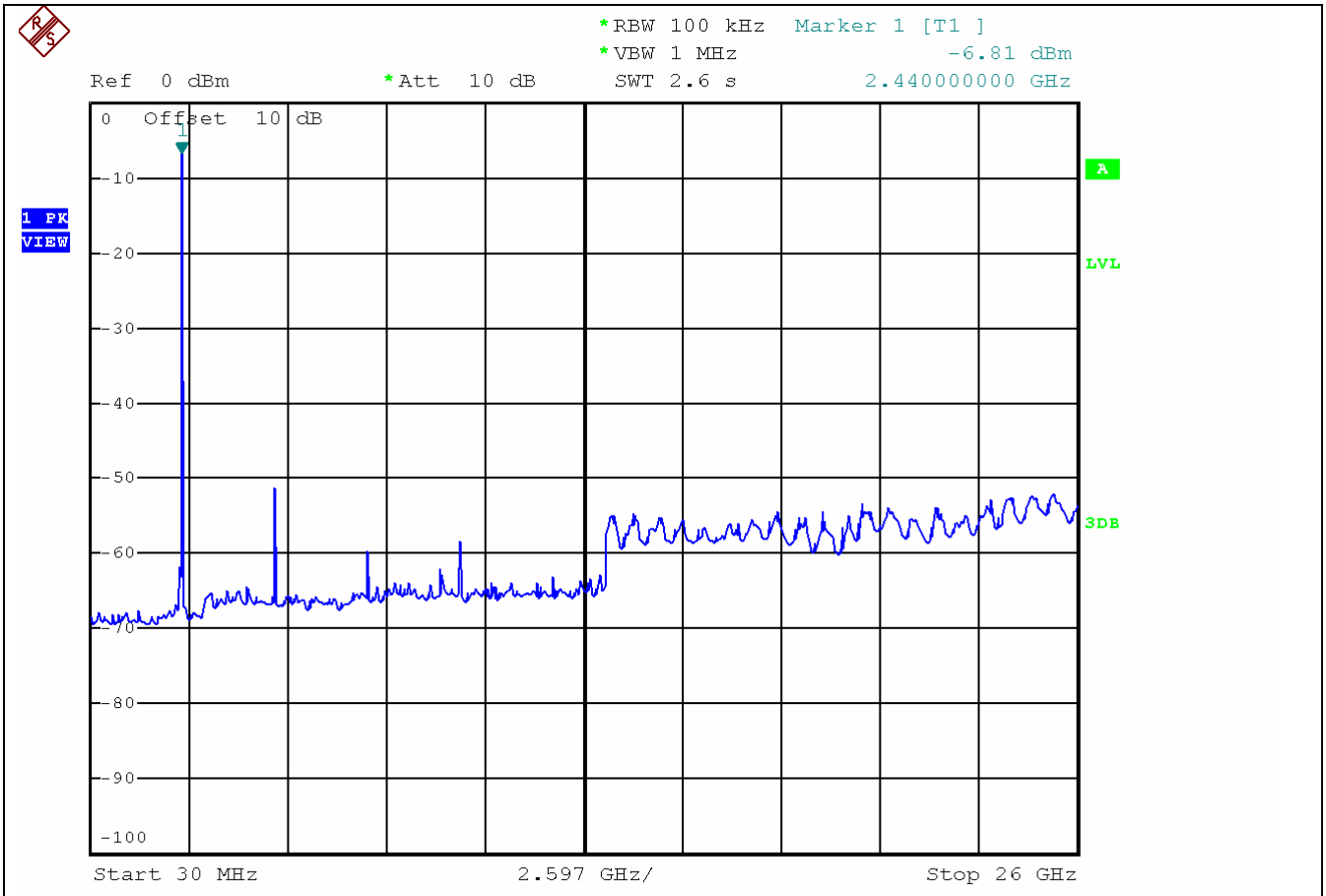


Fig A3 Mid channel Conducted Spurious Emissions 30MHz -26 GHz

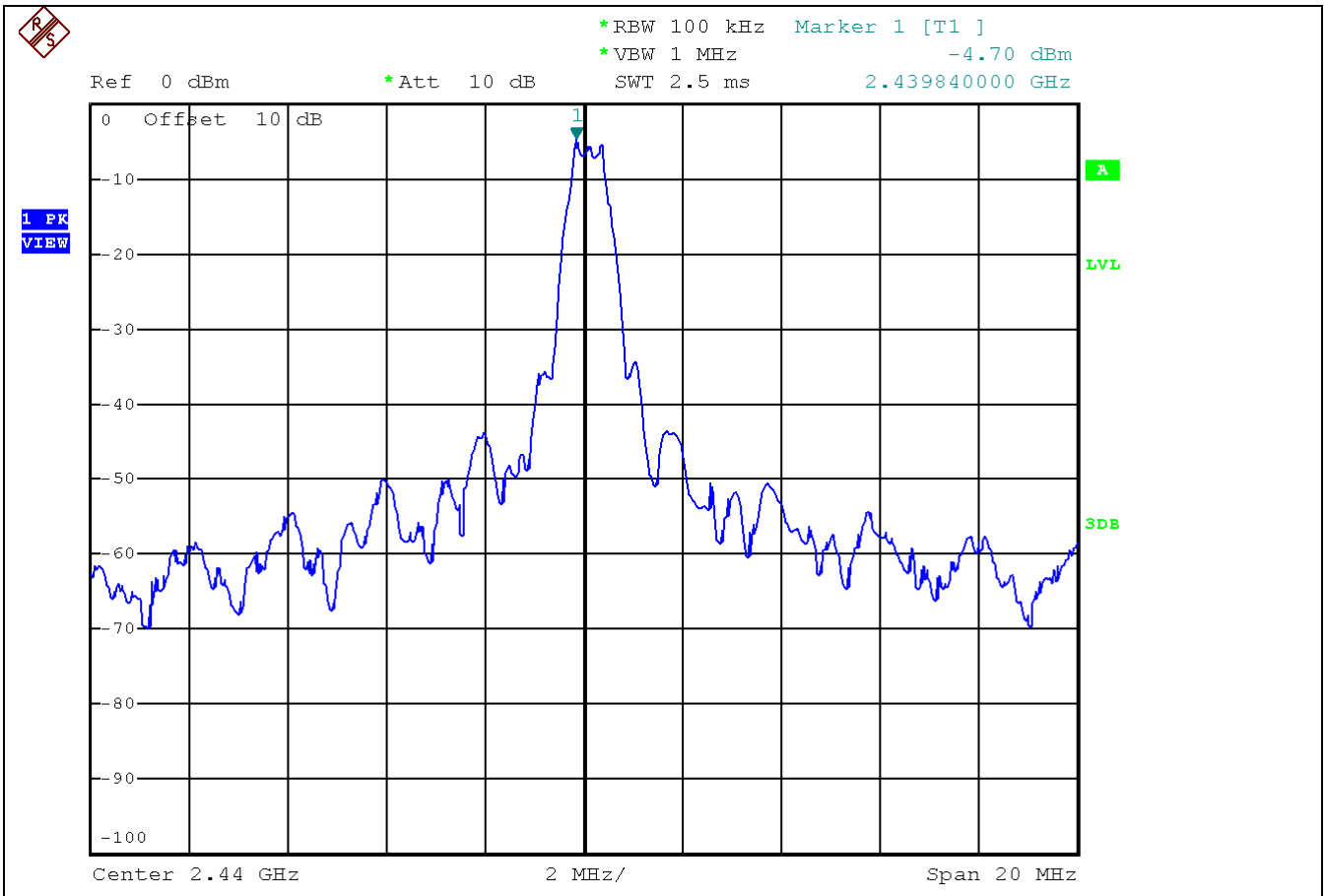


Fig A4 Mid channel Conducted Spurious Emissions

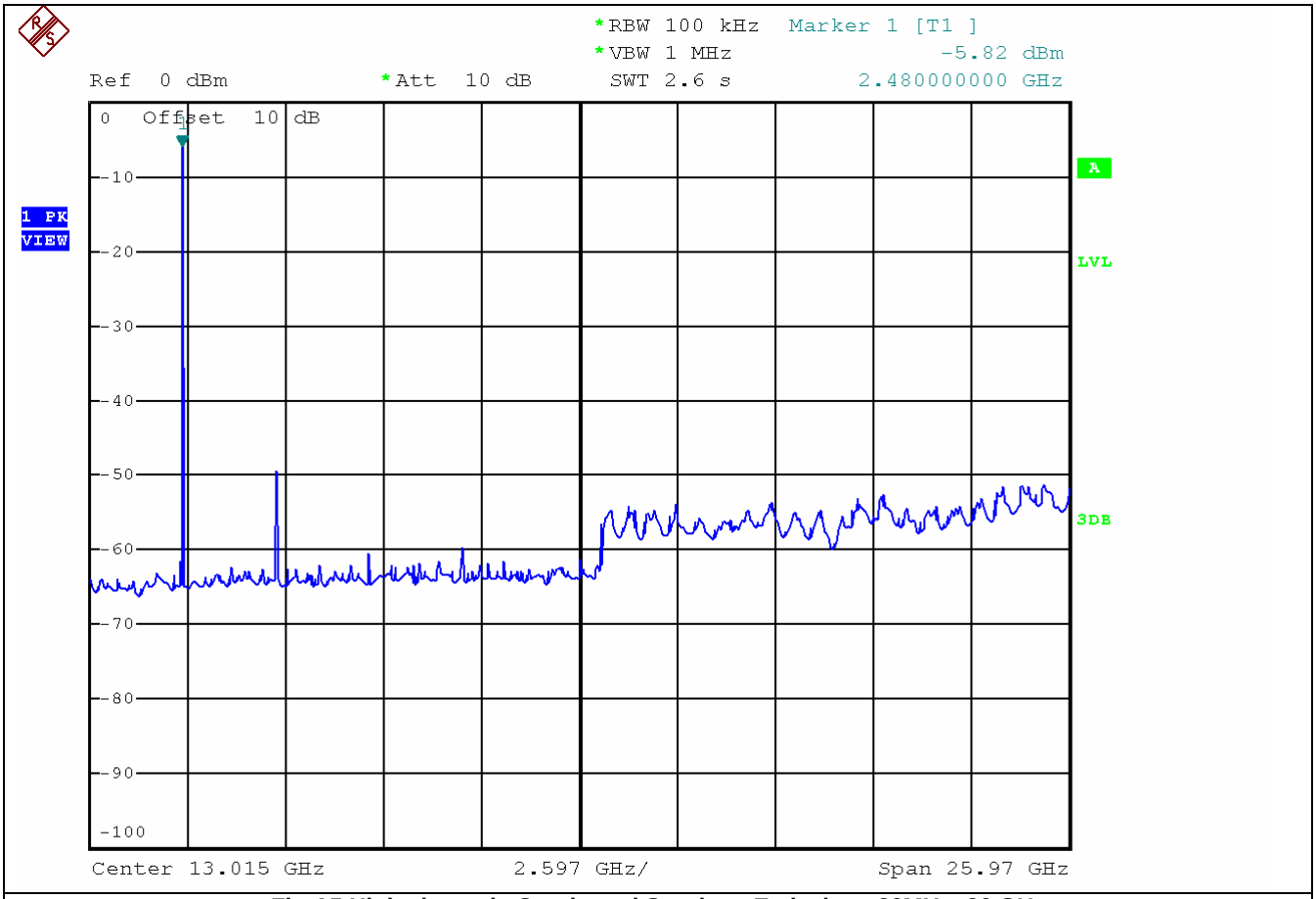


Fig A5 High channel Conducted Spurious Emissions 30MHz -26 GHz

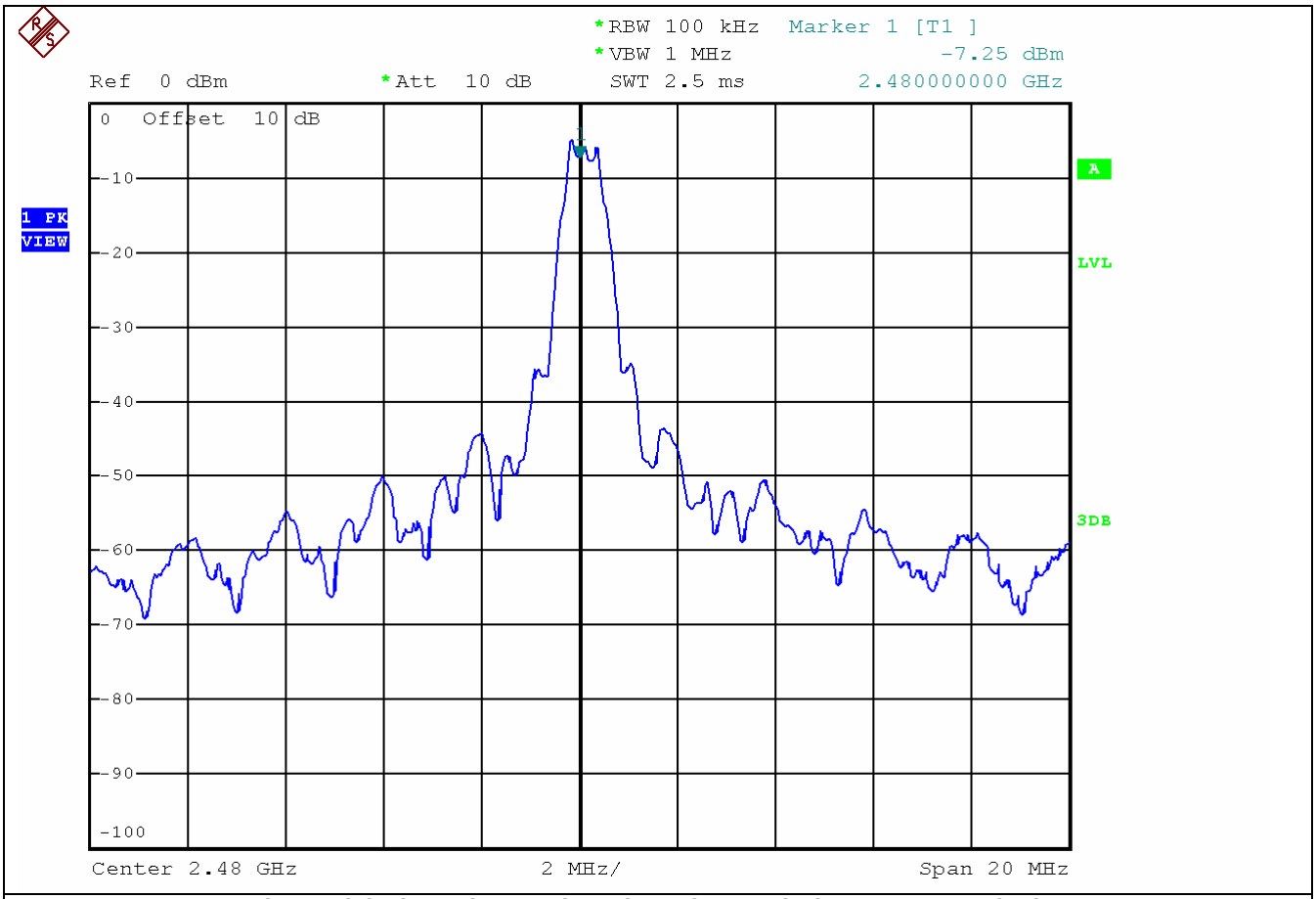


Fig A6 High channel Conducted Spurious Emissions Upper Band Edge

Appendix B

Radiated Spurious Emissions

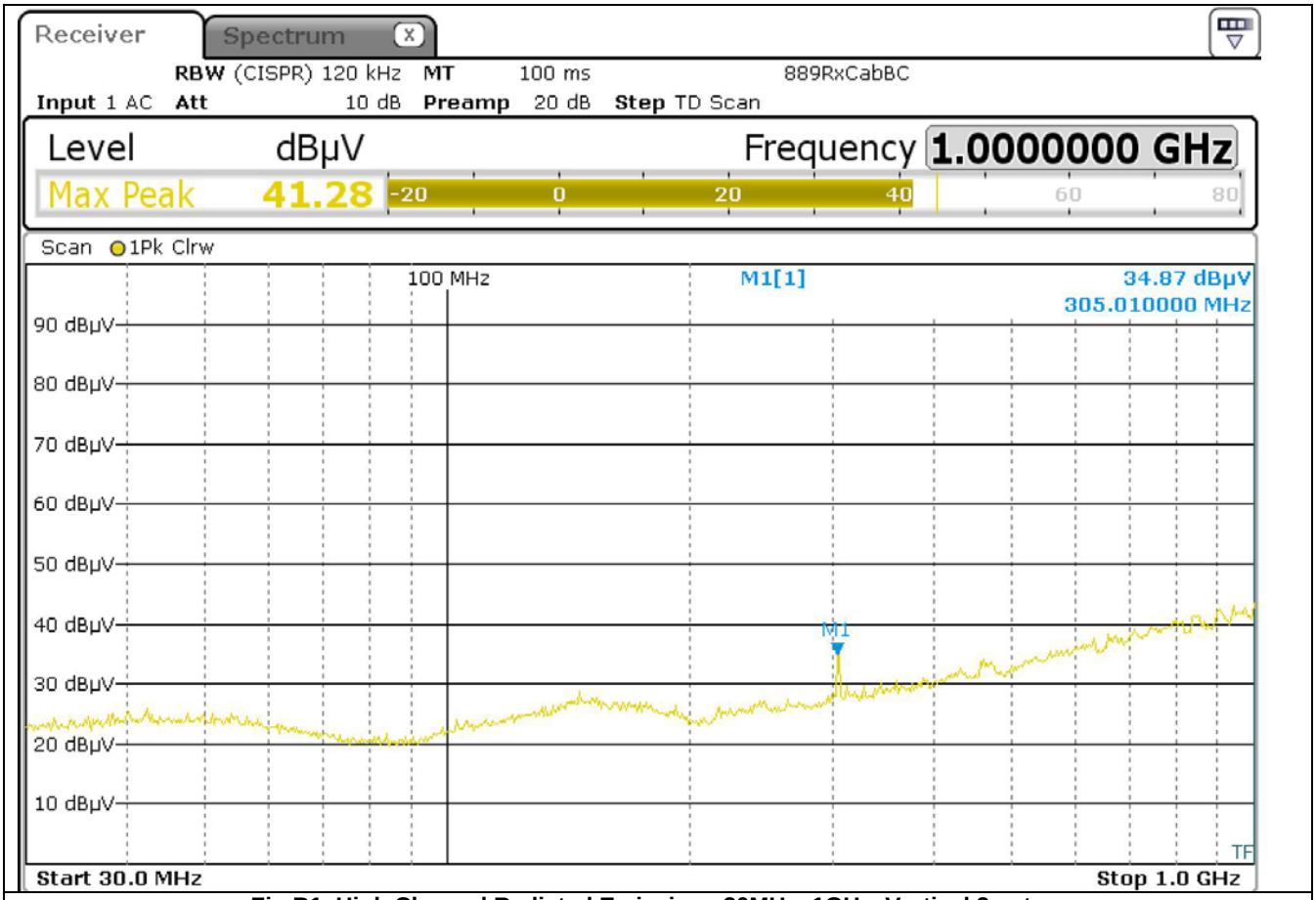


Fig B1 High Channel Radiated Emissions 30MHz -1GHz Vertical 3metres

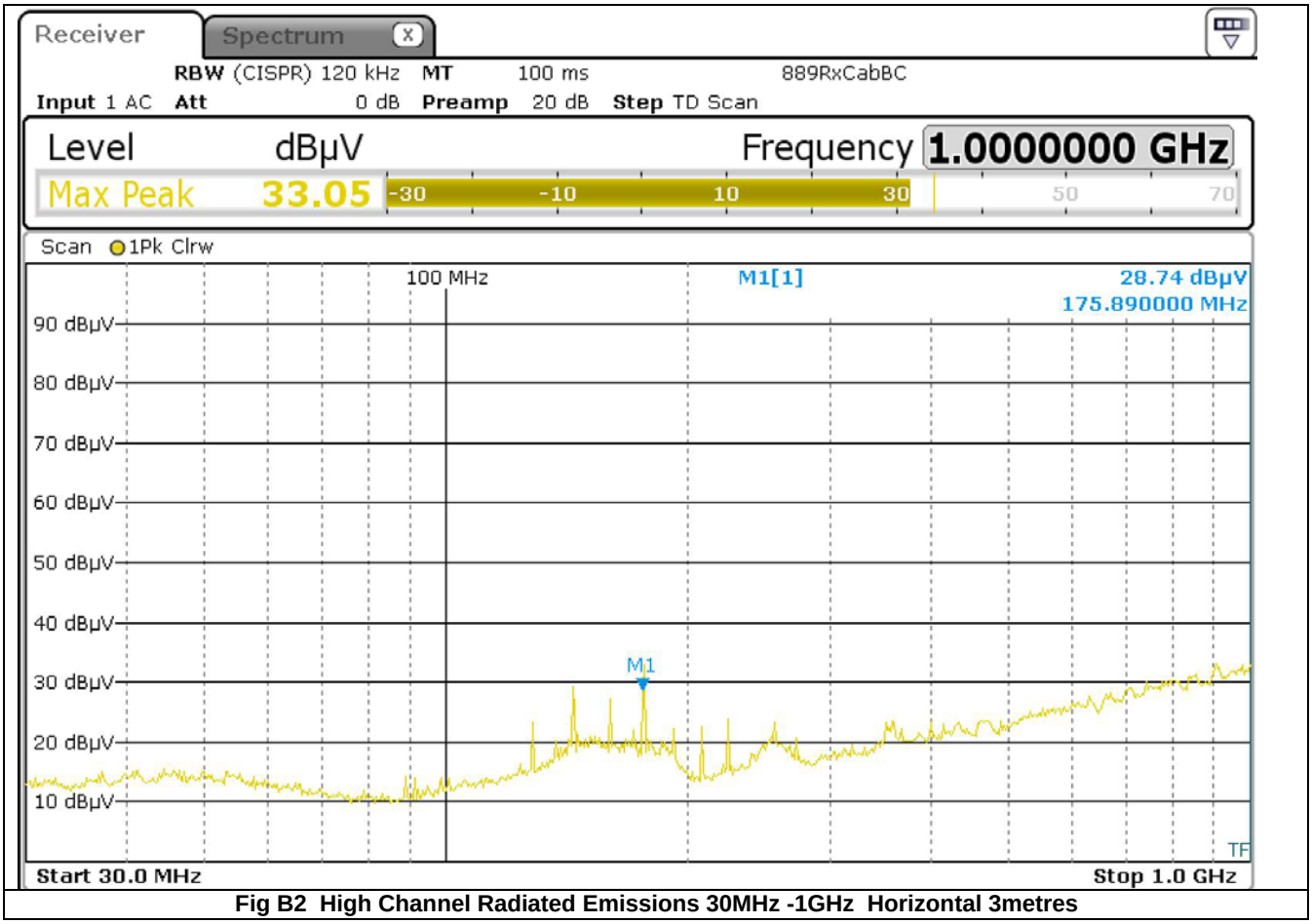


Fig B2 High Channel Radiated Emissions 30MHz -1GHz Horizontal 3metres

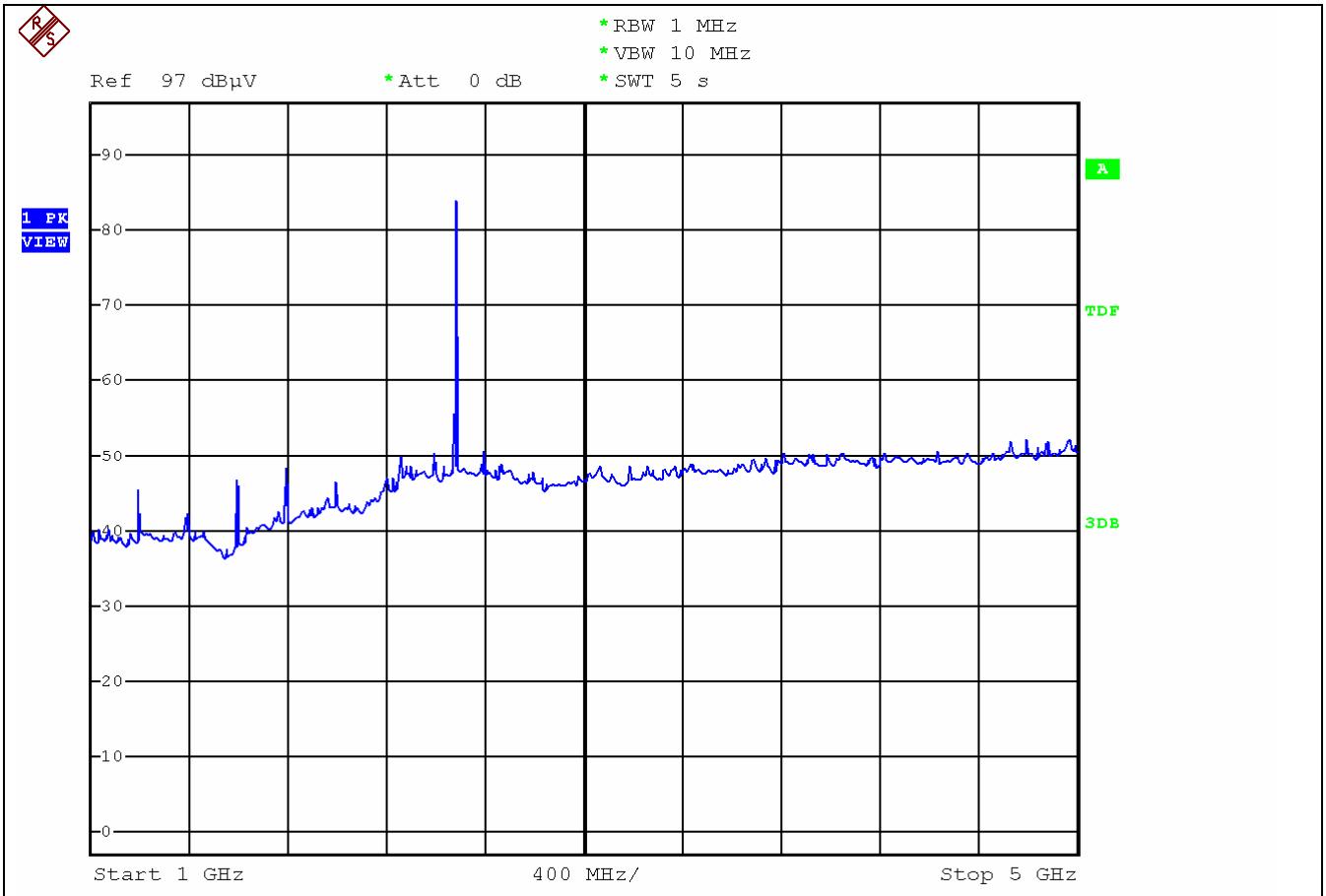


Fig B3 High Channel Radiated Emissions 1GHz -5GHz Vertical 3metres

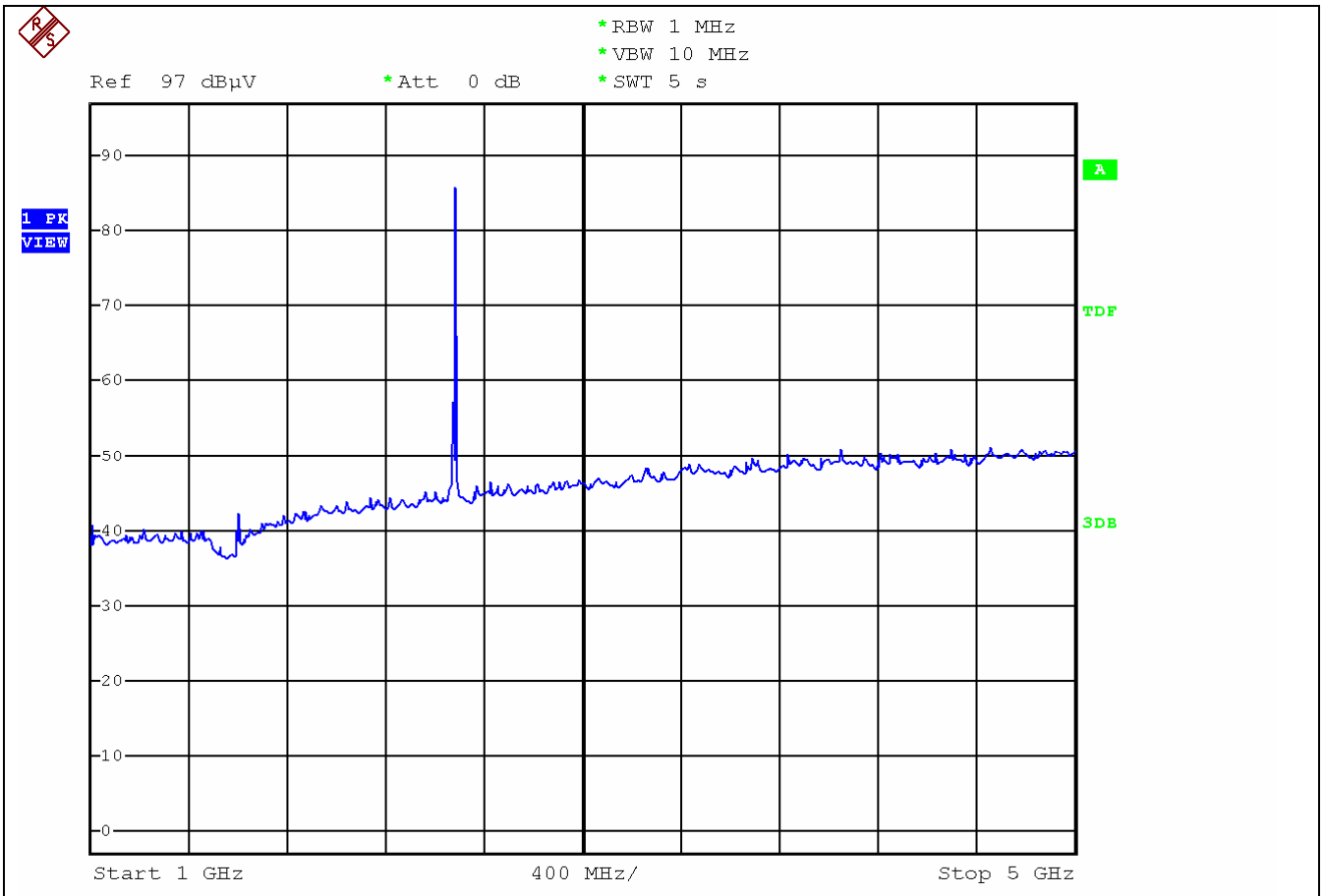


Fig B4 High Channel Radiated Emissions 1GHz -5GHz Horizontal 3metres

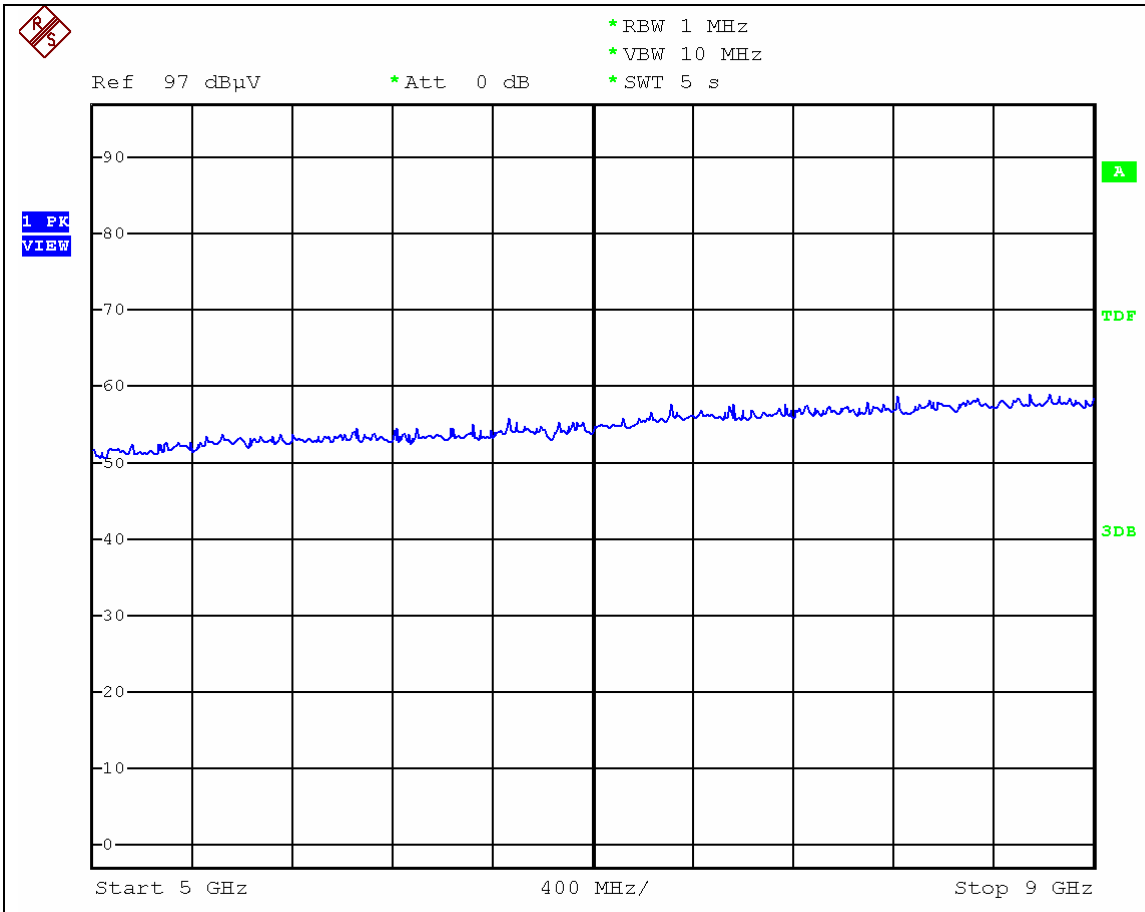


Fig B5 High Channel Radiated Emissions 5GHz -9GHz Vertical 3metres

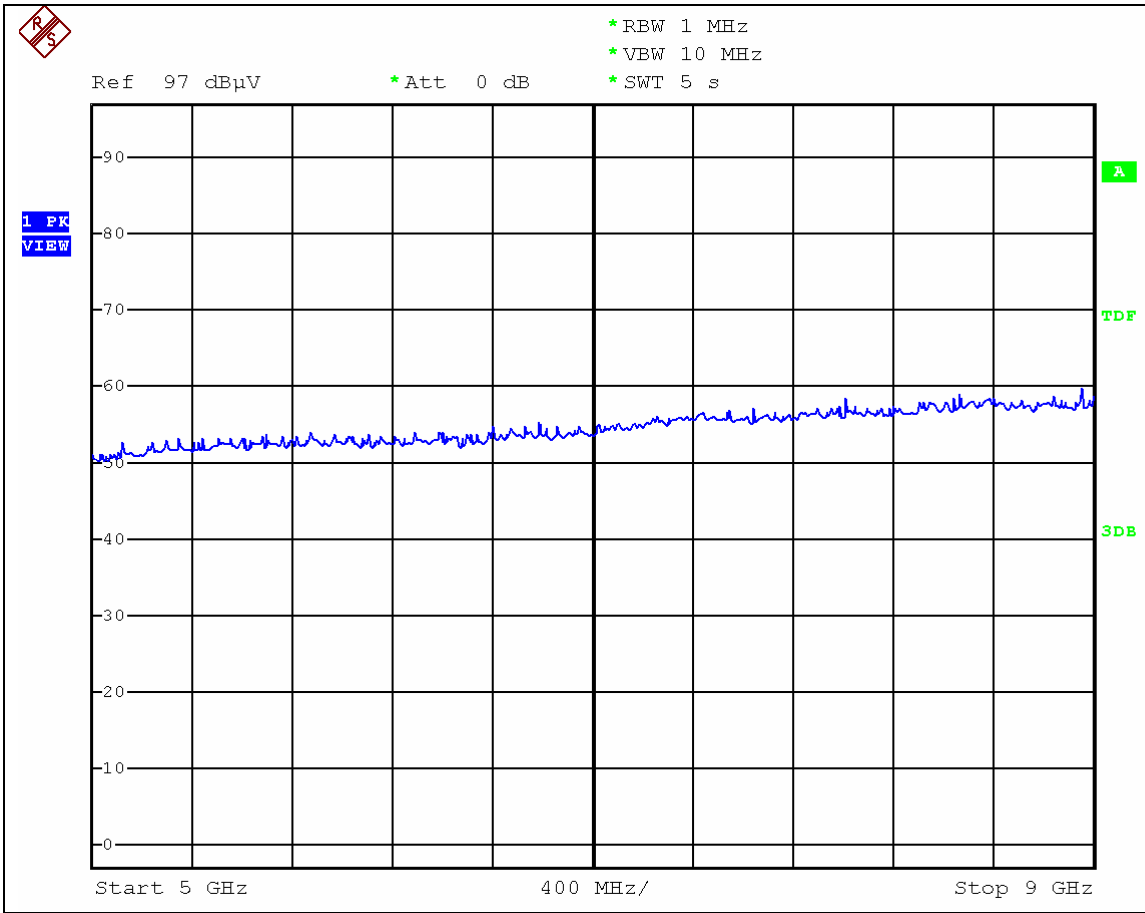


Fig B6 High Channel Radiated Emissions 5GHz -9GHz Horizontal 3metres

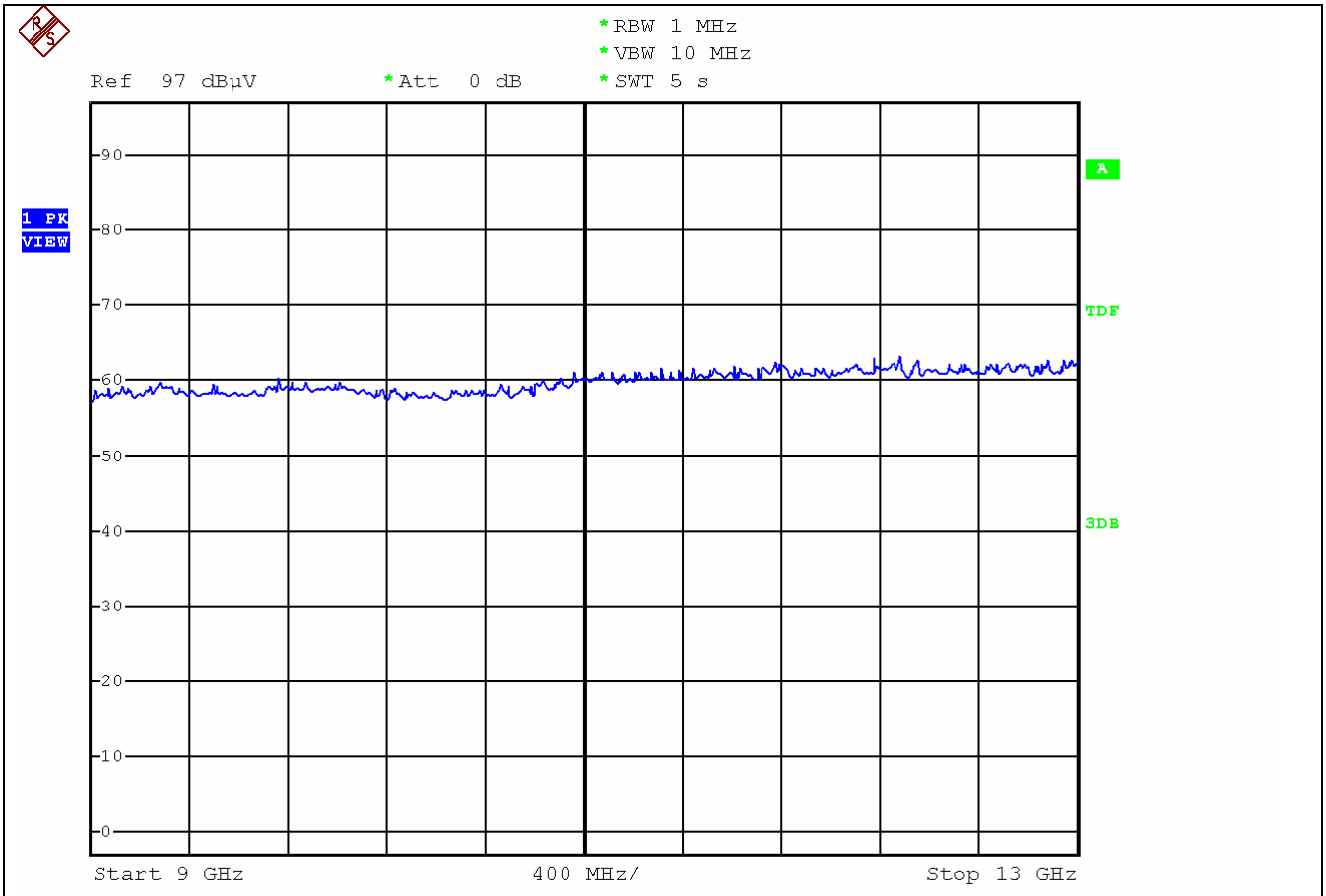


Fig B7 High Channel Radiated Emissions 9GHz -13GHz Vertical 3metres

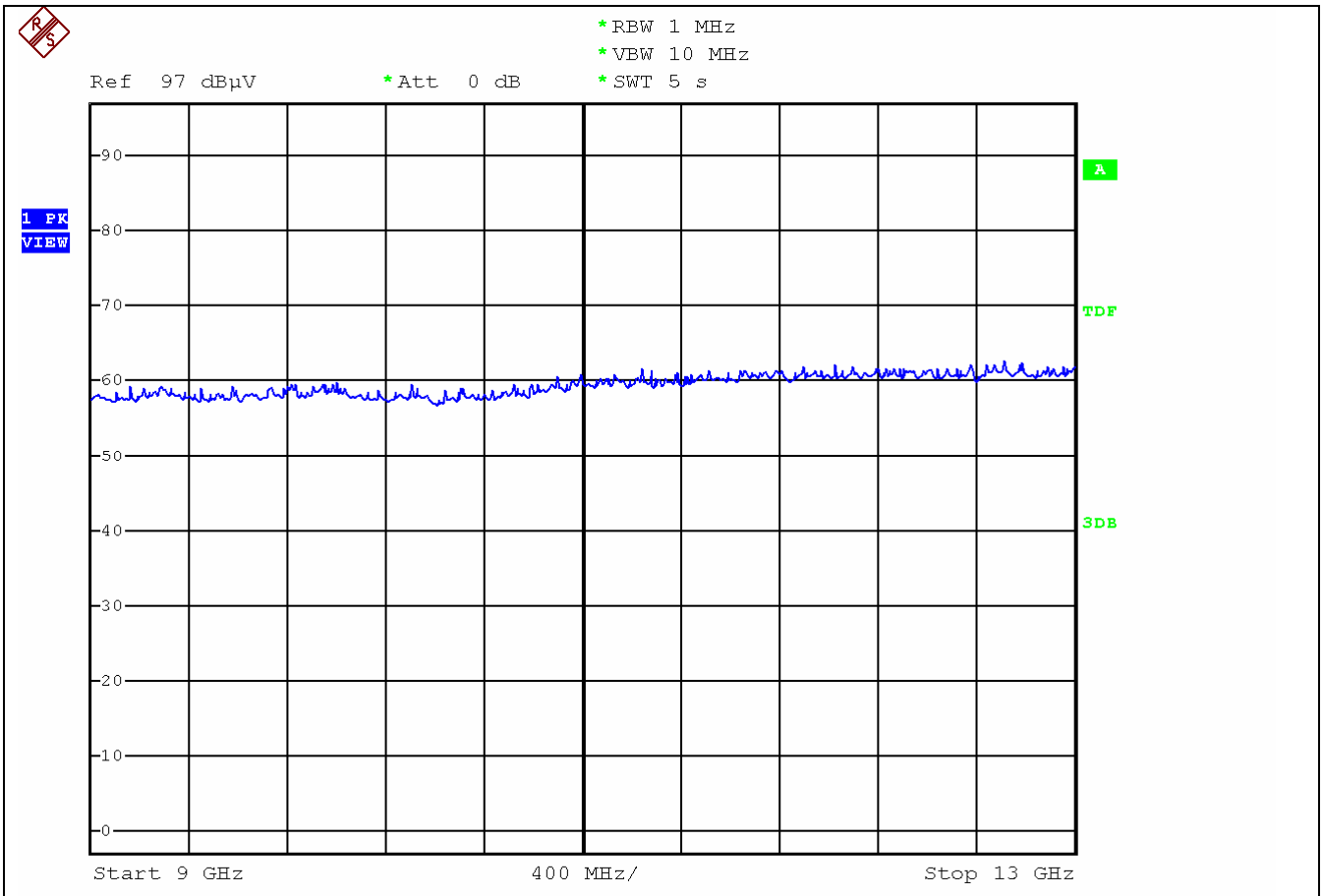


Fig B8 High Channel Radiated Emissions 9GHz -13GHz Horizontal 3metres

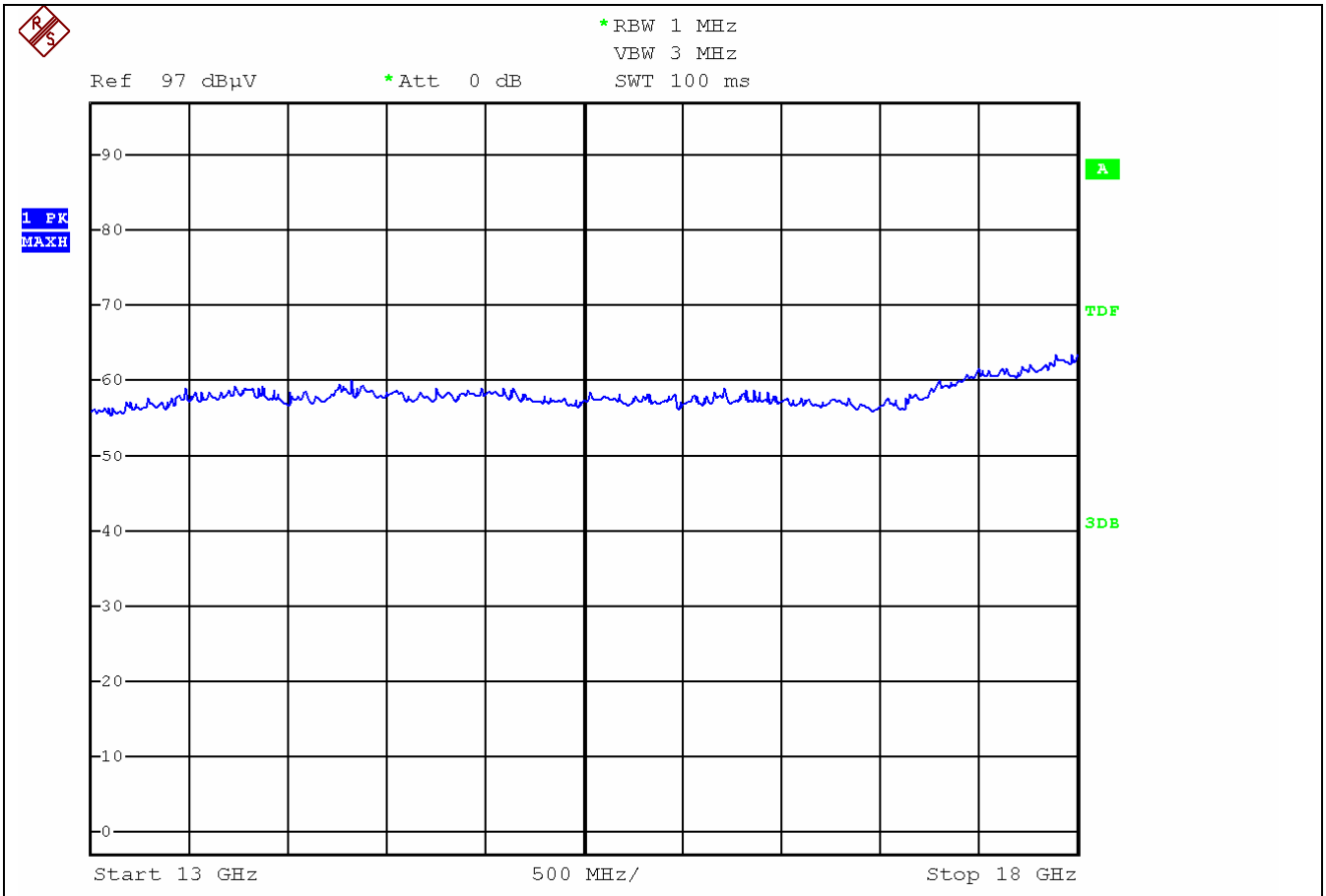


Fig B7 High Channel Radiated Emissions 13GHz -18GHz Vertical 3metres

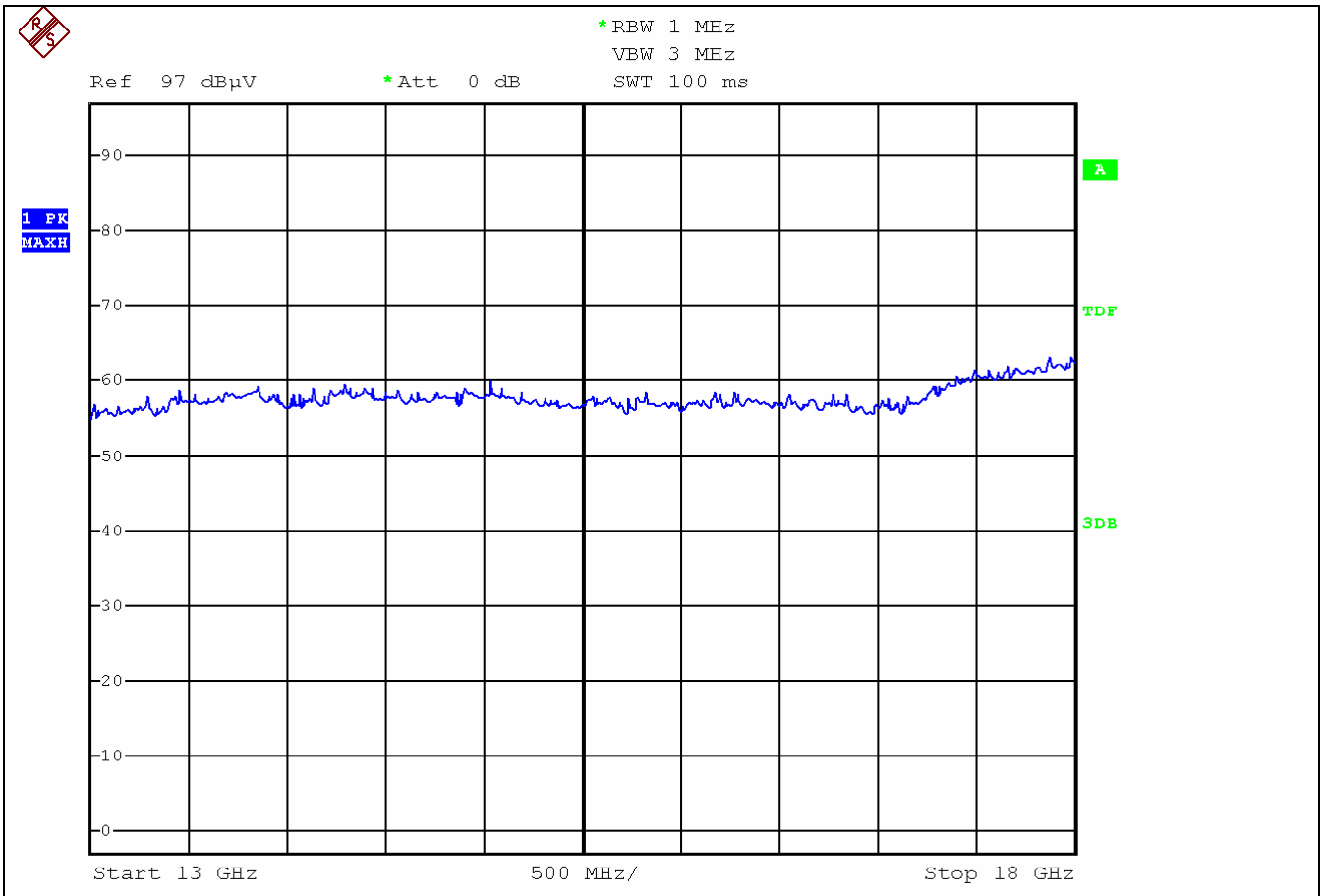


Fig B8 High Channel Radiated Emissions 13GHz -18GHz Horizontal 3metres

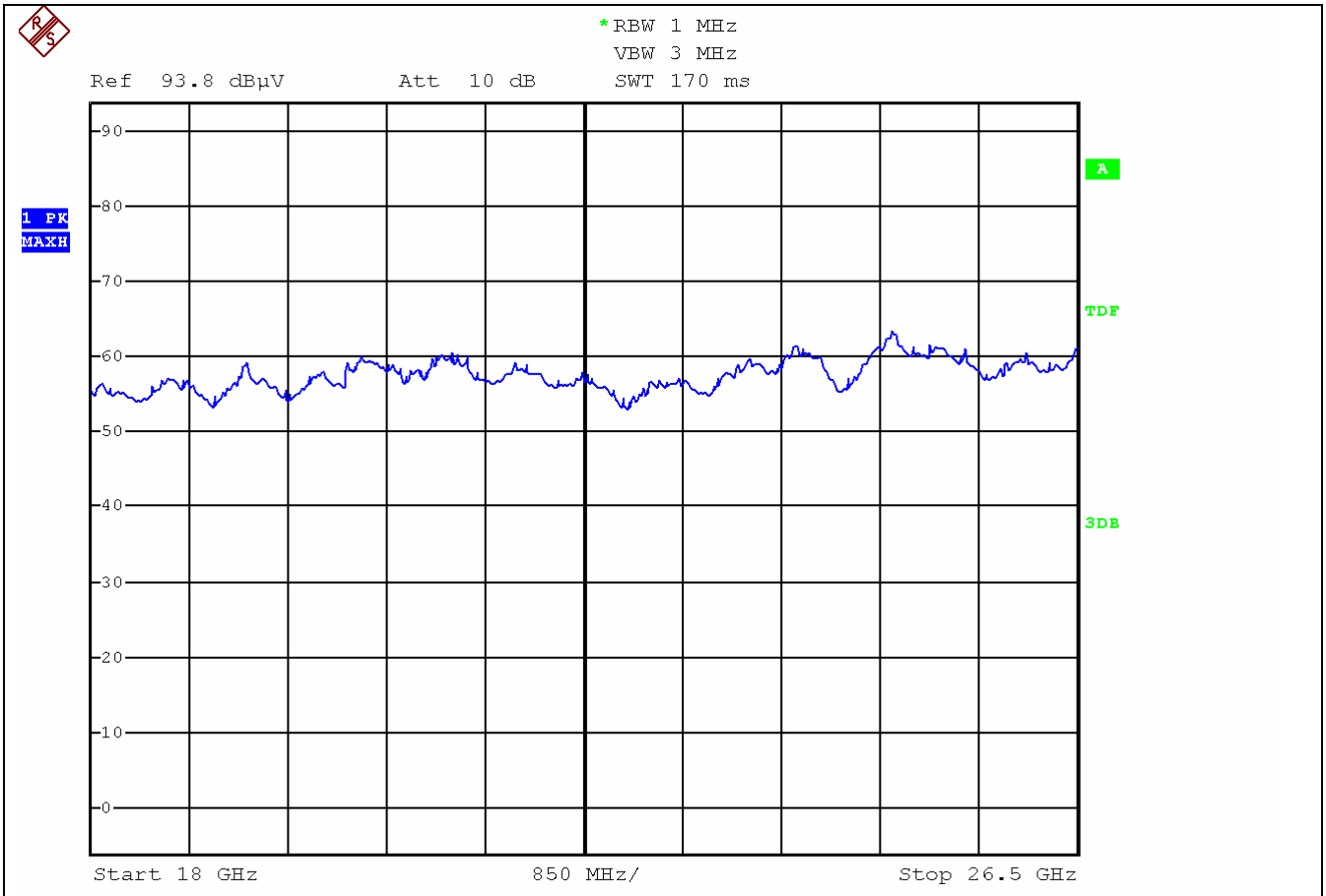


Fig B9 High Channel Radiated Emissions 18GHz -26GHz Vertical 3 metres

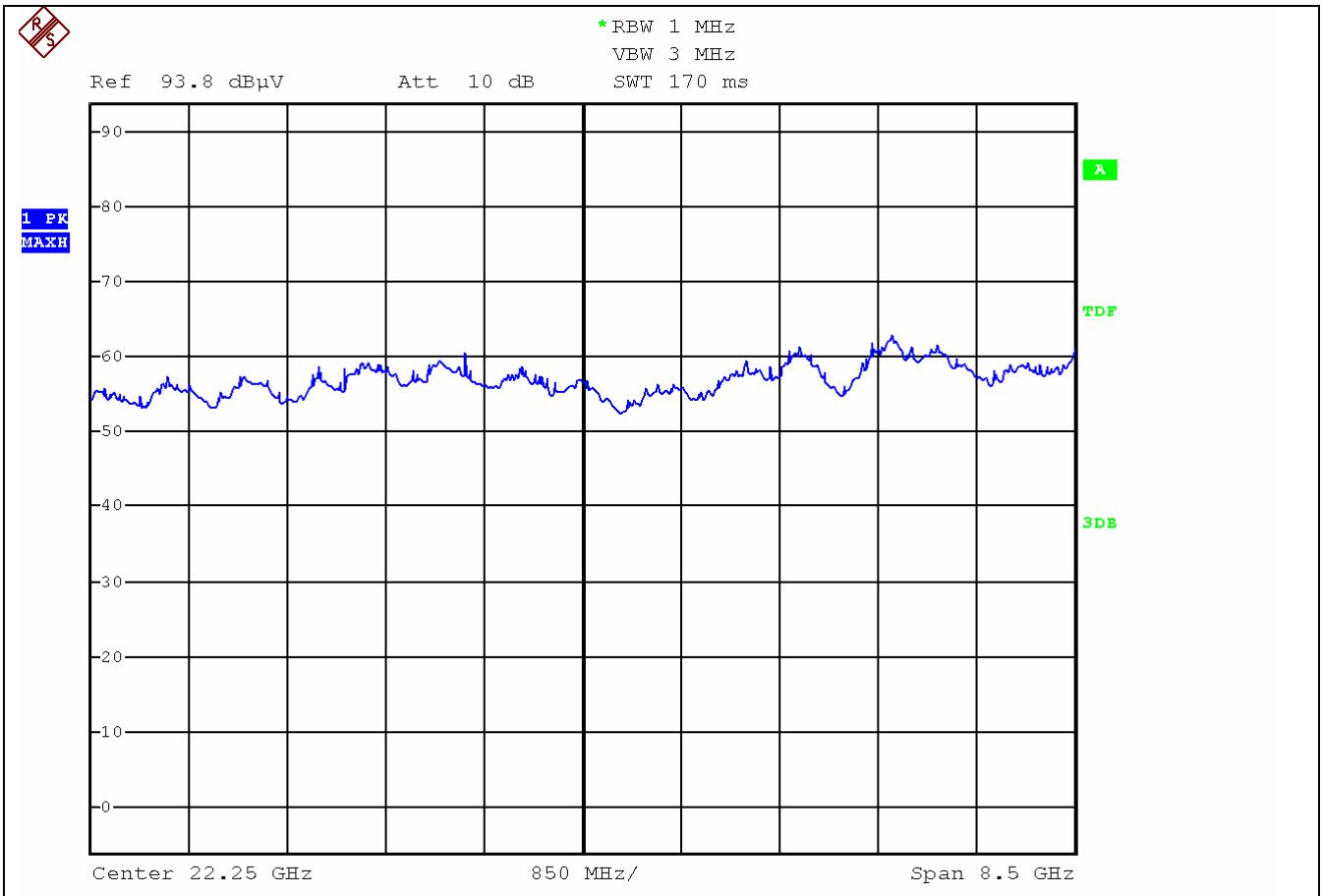


Fig B10 High Channel Radiated Emissions 18GHz -26GHz Horizontal 3metres

Appendix C

Radiated tests for Band Edges /Restricted band

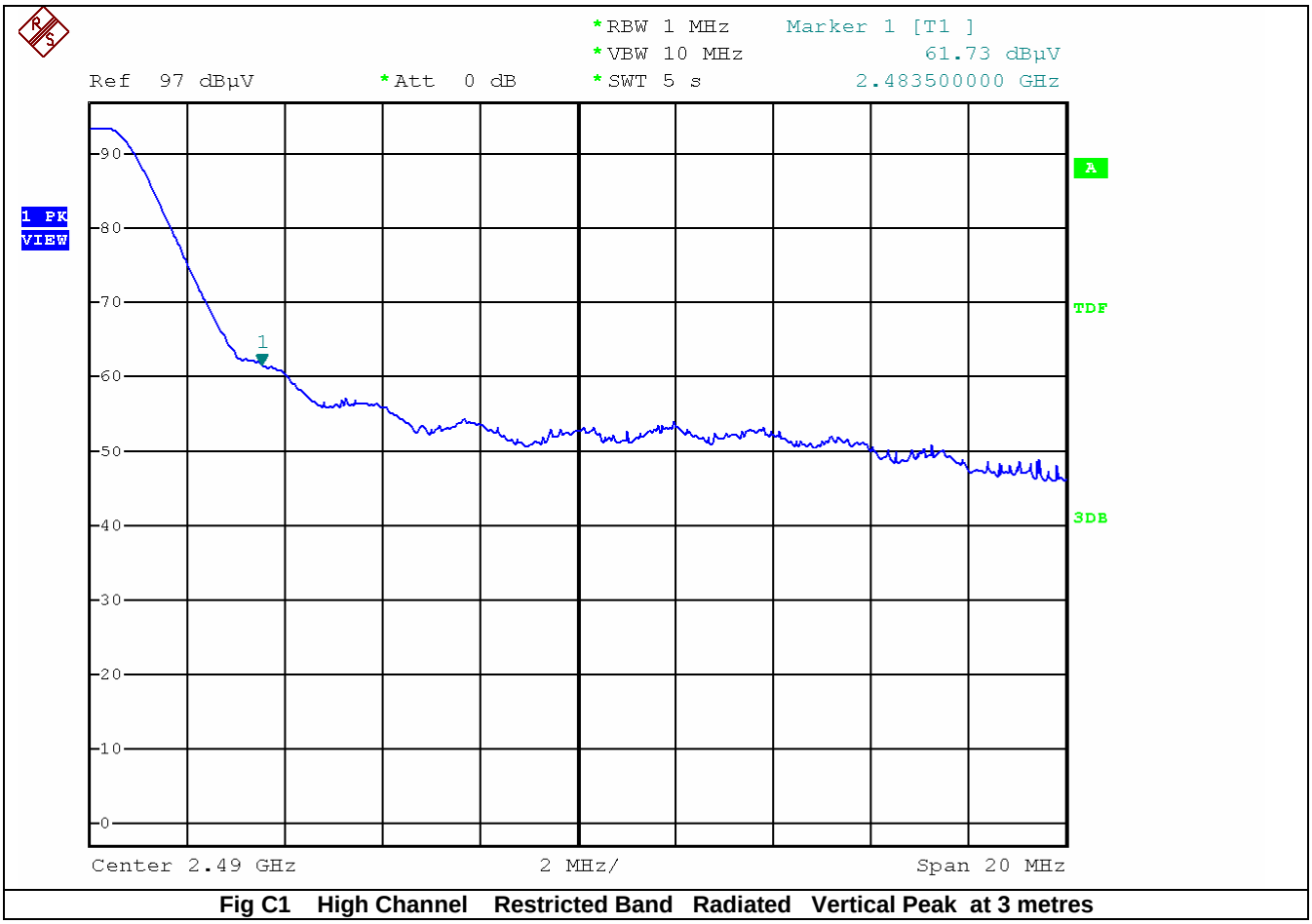


Fig C1 High Channel Restricted Band Radiated Vertical Peak at 3 metres

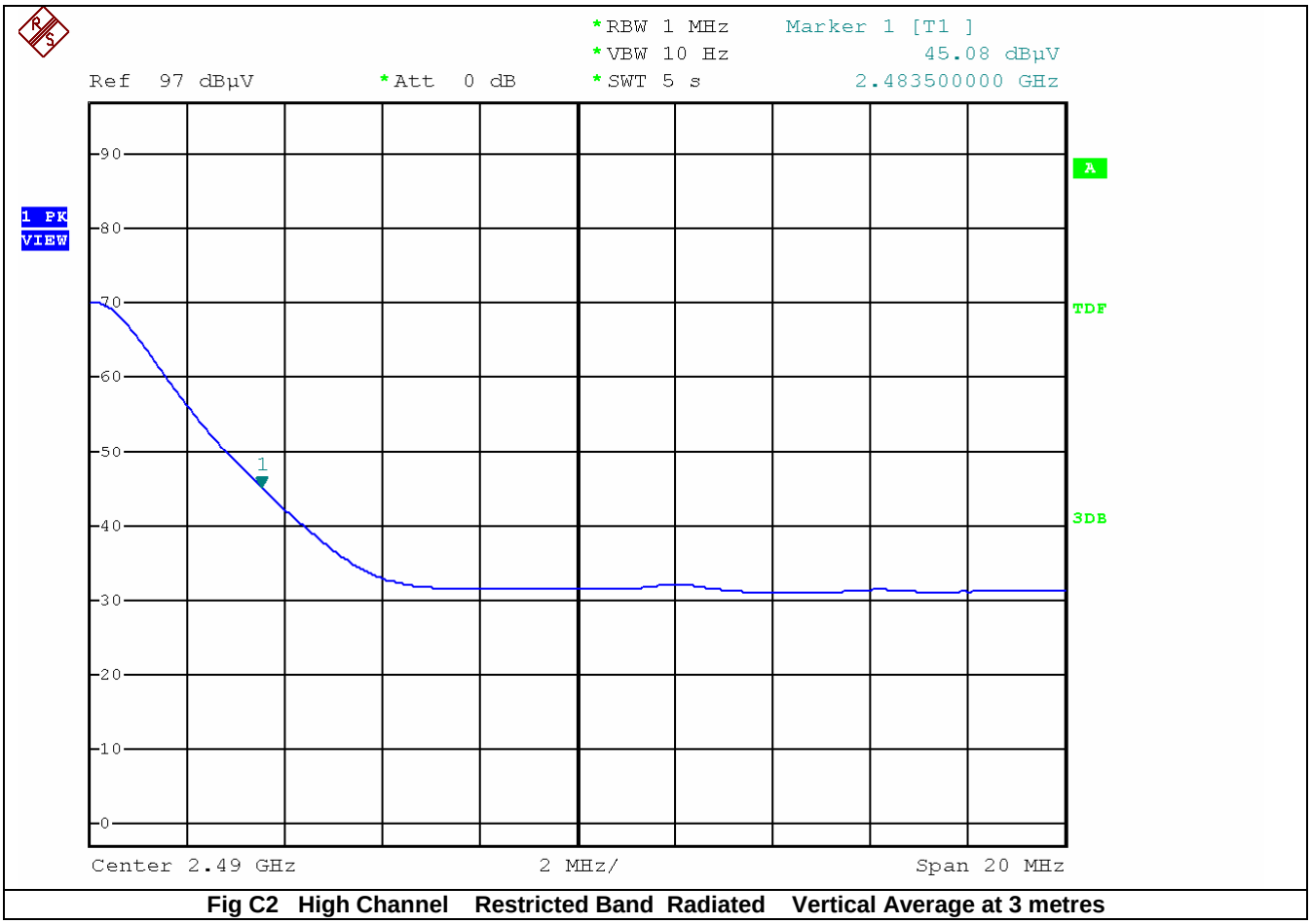


Fig C2 High Channel Restricted Band Radiated Vertical Average at 3 metres

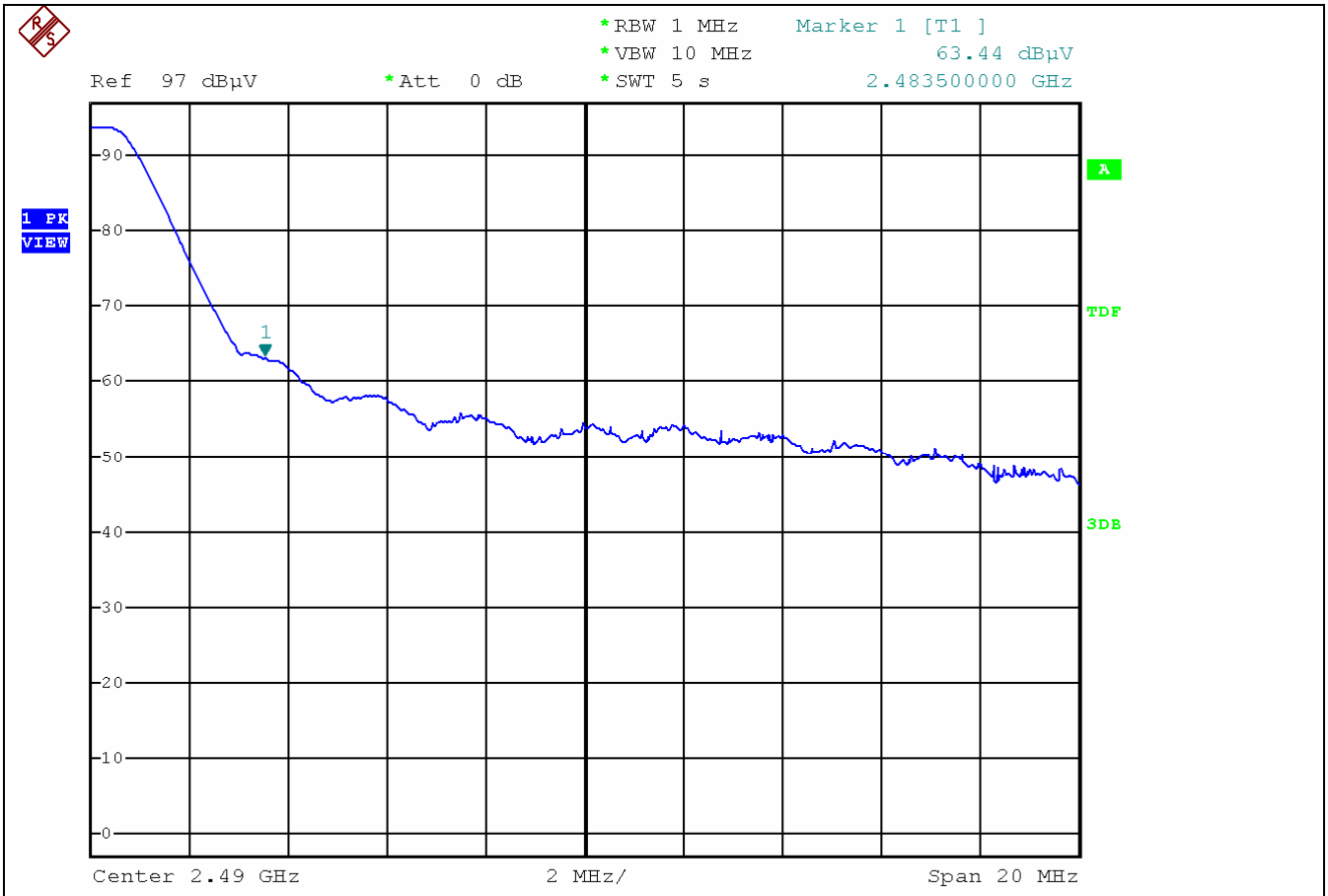


Fig C3 High Channel Restricted Band Radiated Horizontal Peak at 3 metres

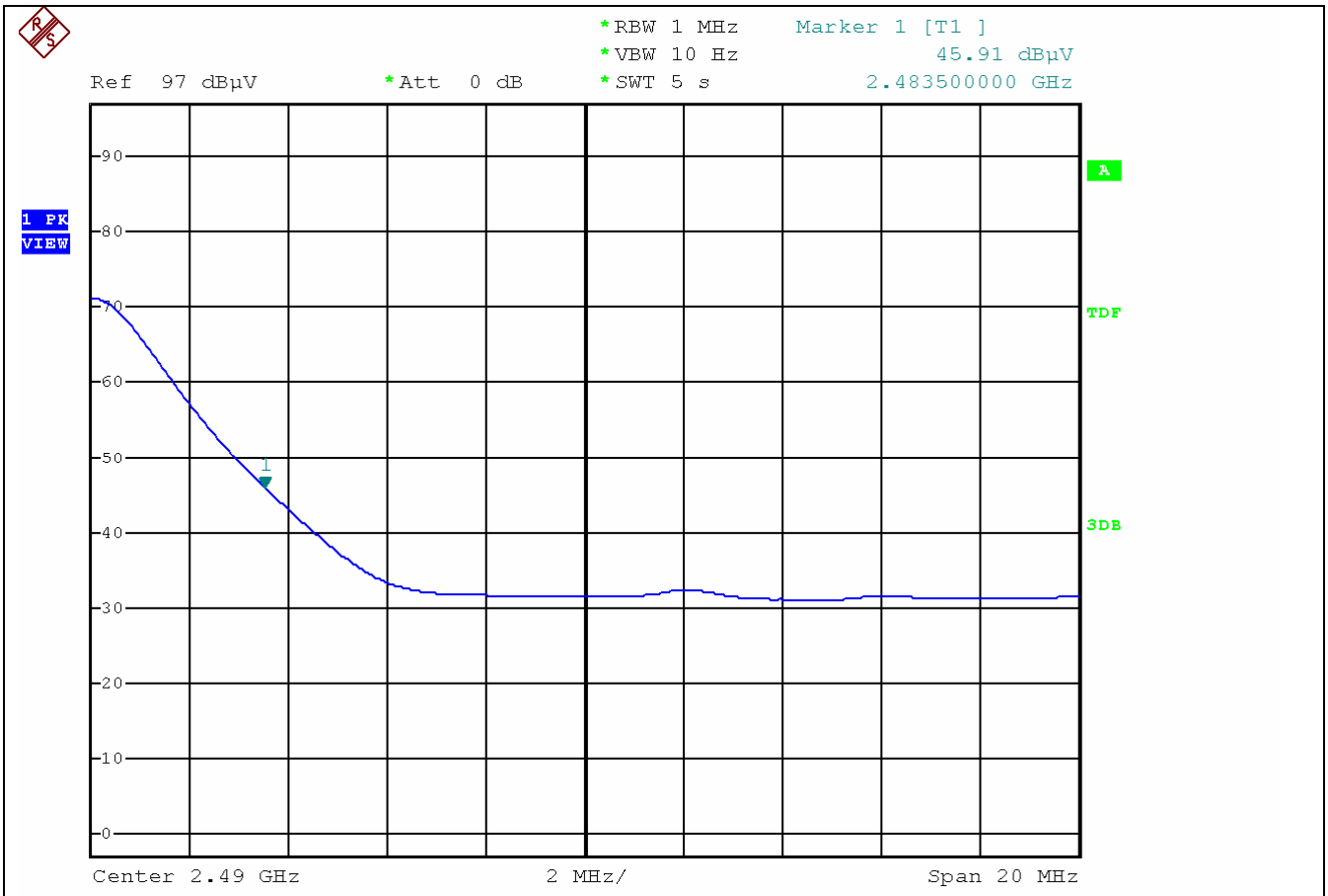


Fig C4 High Channel Restricted Band Radiated Horizontal Average at 3 metres

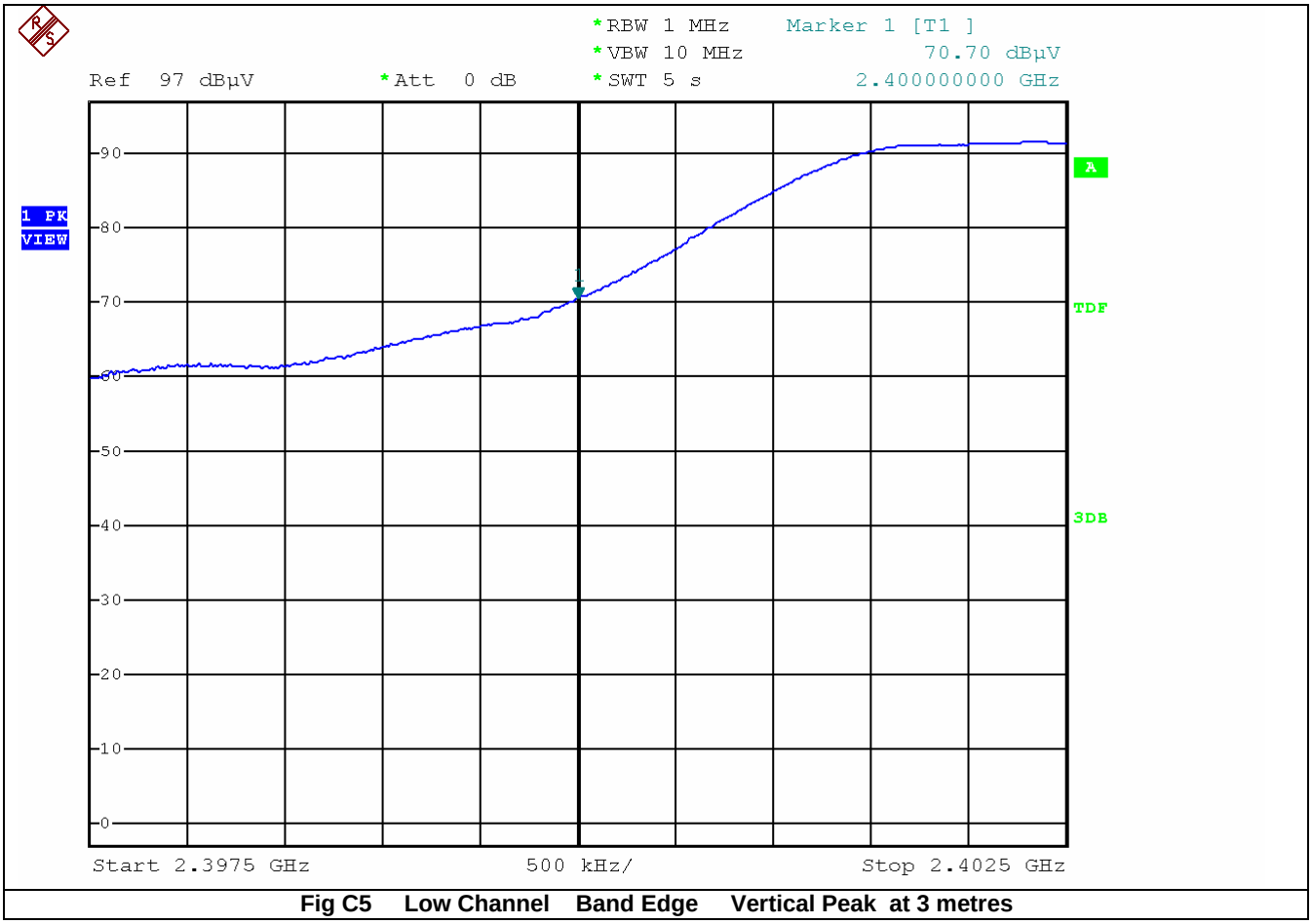


Fig C5 Low Channel Band Edge Vertical Peak at 3 metres

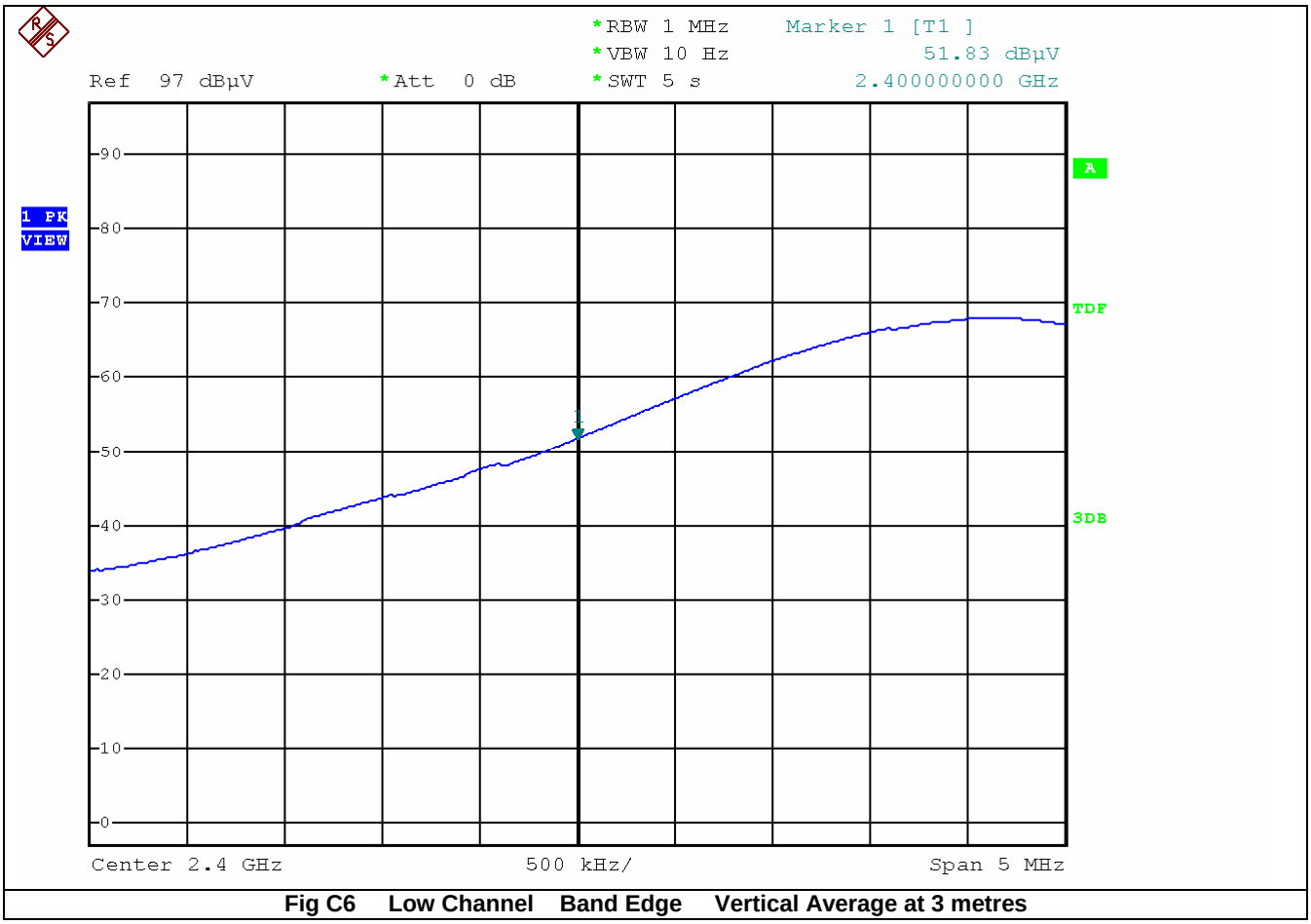


Fig C6 Low Channel Band Edge Vertical Average at 3 metres

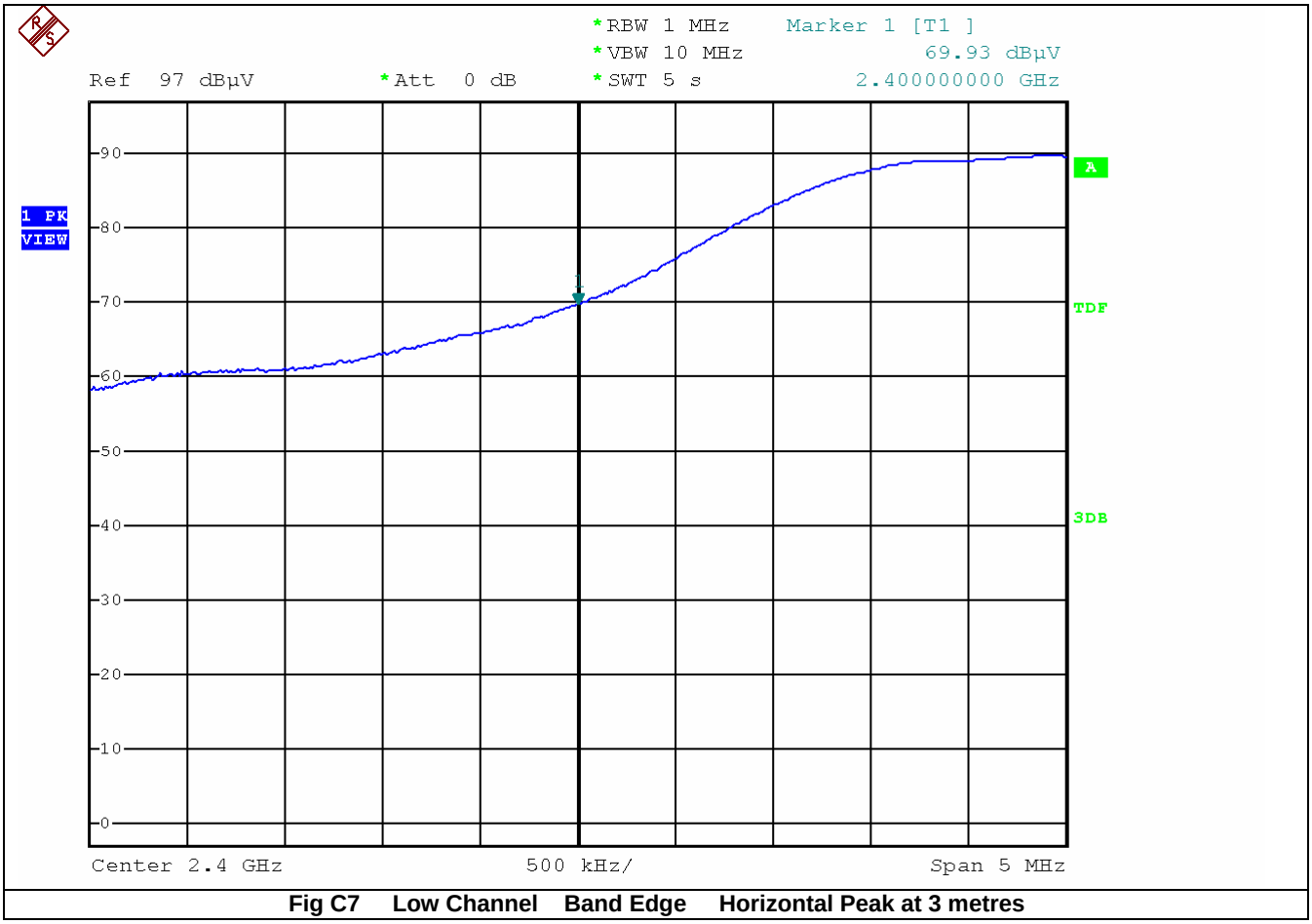


Fig C7 Low Channel Band Edge Horizontal Peak at 3 metres

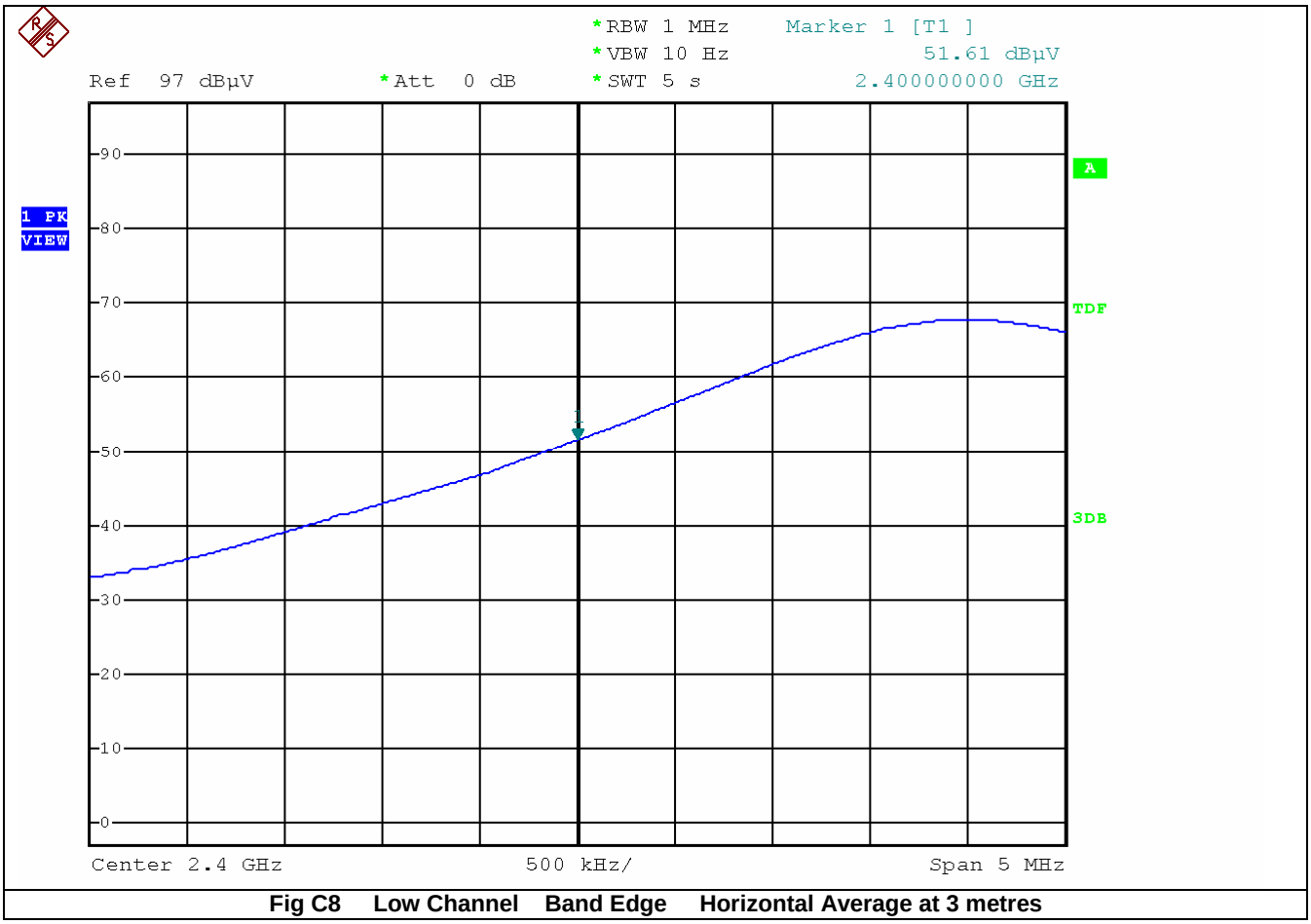


Fig C8 Low Channel Band Edge Horizontal Average at 3 metres

Appendix D

Conducted Emissions on the Mains

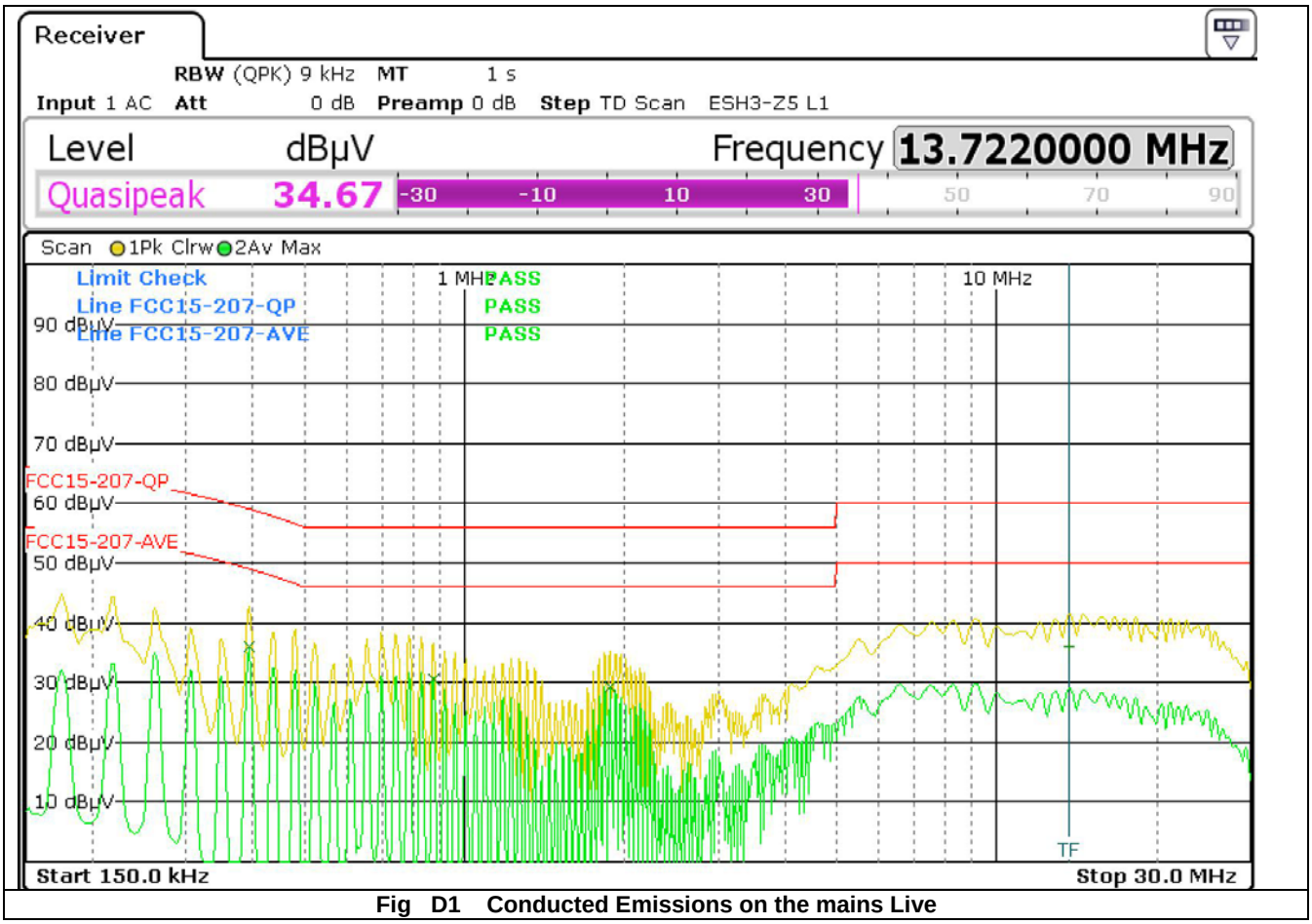


Fig D1 Conducted Emissions on the mains Live

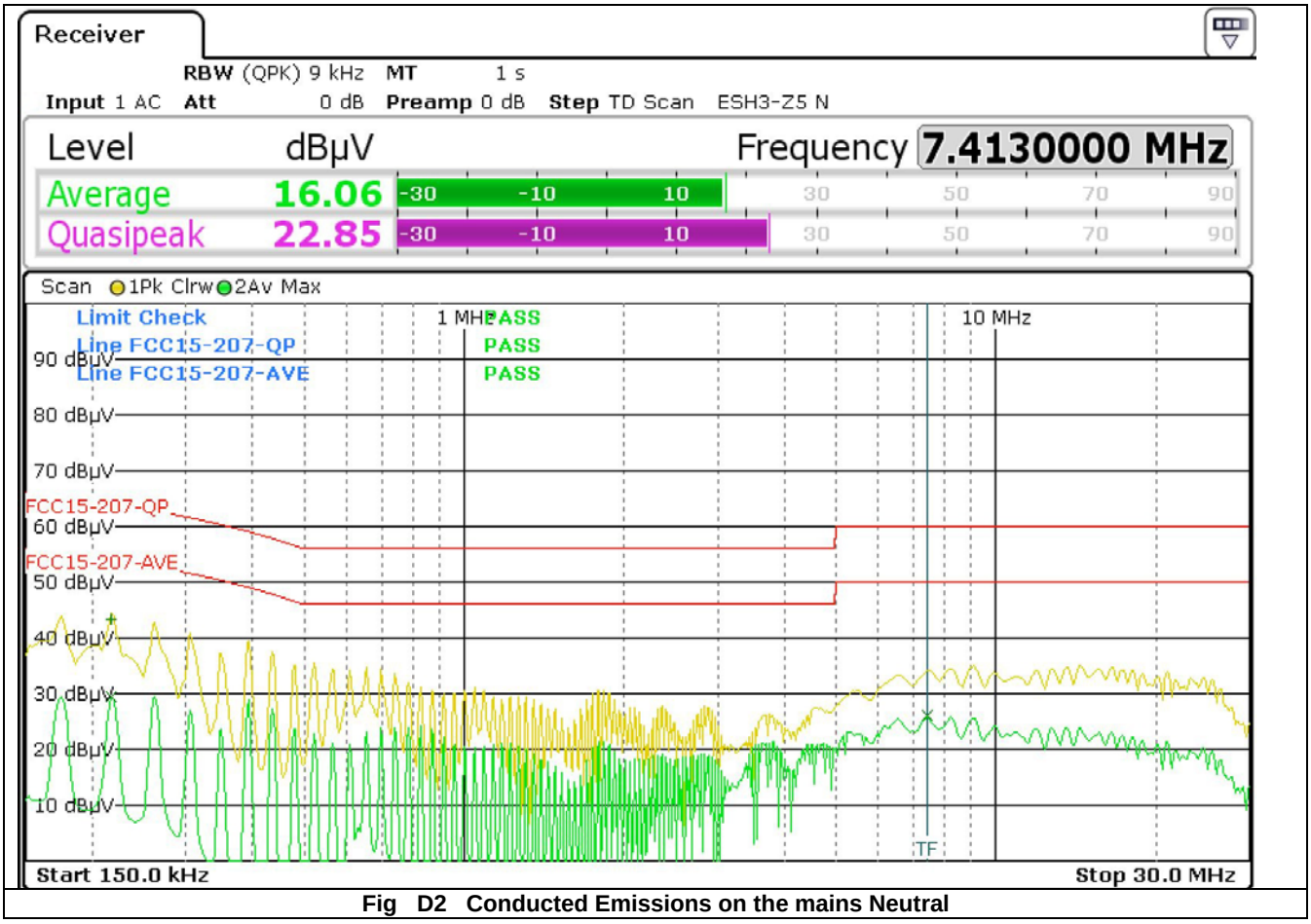


Fig D2 Conducted Emissions on the mains Neutral