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Project Number: 15E5499-2a

Prepared for:

Kodaplay Ltd.

By

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FCC Site Registration: 92592

Industry Canada Assigned Site Code: 8517A-2

FCC ID: 2AELYPT001

IC: 20138-PT001

Date

6th Jun 2015

FCC EQUIPMENT AUTHORISATION

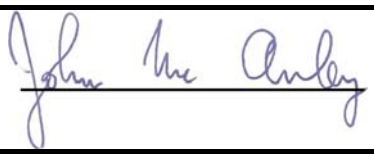
Test Report

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)	TEST PARAMETERS	Test Result
15.109	Radiated Spurious Emissions	Pass
15.107	Conducted Emissions	Pass

Exhibit A – Technical Report

Table of Contents

1.0 EUT Description

The EUT (Playertek pod FCC ID: 2AELYPT001) 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 Playertek pod has a micro usb connection which allows data interchange with a laptop/pc. The EUT can also be charged through this port via laptop/pc or from a mains adapter. Therefore the FCC classification JBP will also apply to this product.

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 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 6th June 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 laptop connected to the mains through a LISN.
(Laptop= HP 15 Notebook PC 15-r150sa serial num CND4390D9Q)

Also 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.

3.0 Results for Conducted emissions on the mains

3.1 EUT powered from Laptop

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

Detector	Frequency	Reading	Margin	Phase
QP/ Ave	MHz	dBuV	dB	L/N
Quasi-Peak	0.1500	42.04	-23.96	Live
Quasi-Peak	0.1973	56.10	-8.55	Live
Average	0.2040	41.33	-13.13	Live
Quasi-Peak	0.2603	46.19	-16.66	Live
Average	0.269	32.89	-19.7	Live
Quasi-Peak	0.326	41.52	-19.47	Live
Quasi-Peak	0.391	36.15	-22.97	Live
Quasi-Peak	0.456	35.89	-21.37	Live
Quasi-Peak	5.334	34.31	-25.69	Live
Quasi-Peak	10.426	35.52	-24.48	Live
Quasi-Peak	11.400	37.14	-22.86	Live
Average	11.533	30.72	-19.28	Live
Quasi-Peak	22.018	36.36	-23.64	Live

Detector	Frequency	Reading	Margin	Phase
QP/ Ave	MHz	dBuV	dB	L/N
Quasi-Peak	0.1523	42.59	-23.35	Neutral
Quasi-Peak	0.1973	57.15	-7.5	Neutral
Average	0.2040	41.52	-12.94	Neutral
Quasi-Peak	0.2603	47.21	-15.64	Neutral
Quasi-Peak	0.3255	42.13	-18.86	Neutral
Quasi-Peak	0.3908	36.88	-22.24	Neutral
Quasi-Peak	0.4560	34.59	-22.67	Neutral
Quasi-Peak	0.5438	35.41	-20.59	Neutral
Quasi-Peak	5.6085	33.94	-26.06	Neutral
Quasi-Peak	7.2713	33.59	-26.41	Neutral
Quasi-Peak	10.3605	38.99	-21.01	Neutral
Average	10.4865	32.89	-17.11	Neutral

3.2 EUT powered from mains adapter

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

Detector	Frequency	Reading	Margin	Phase
QP/ Ave	MHz	dBuV	dB	L/N
Quasi-Peak	0.4110	38.25	-20.29	Live
Average	0.4110	30.45	-18.09	Live
Quasi-Peak	0.4335	30.58	-27.32	Live
Average	0.4403	31.54	-16.17	Live
Average	0.470	27.61	-19.26	Live
Average	0.499	26.76	-19.28	Live

Detector	Frequency	Reading	Margin	Phase
QP/ Ave	MHz	dBuV	dB	L/N
Quasi-Peak	0.4110	34.75	-23.79	Neutral
Average	0.4110	26.68	-21.86	Neutral
Quasi-Peak	0.4380	31.68	-26.09	Neutral
Average	0.4403	25.92	-21.79	Neutral

Ref Appendix A for scans

Result: Pass

4. Radiated Emissions

4.1 Results for Radiated emissions

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

4.1.1 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

4.1.2 **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

5.0 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

Conducted Emissions on the Mains

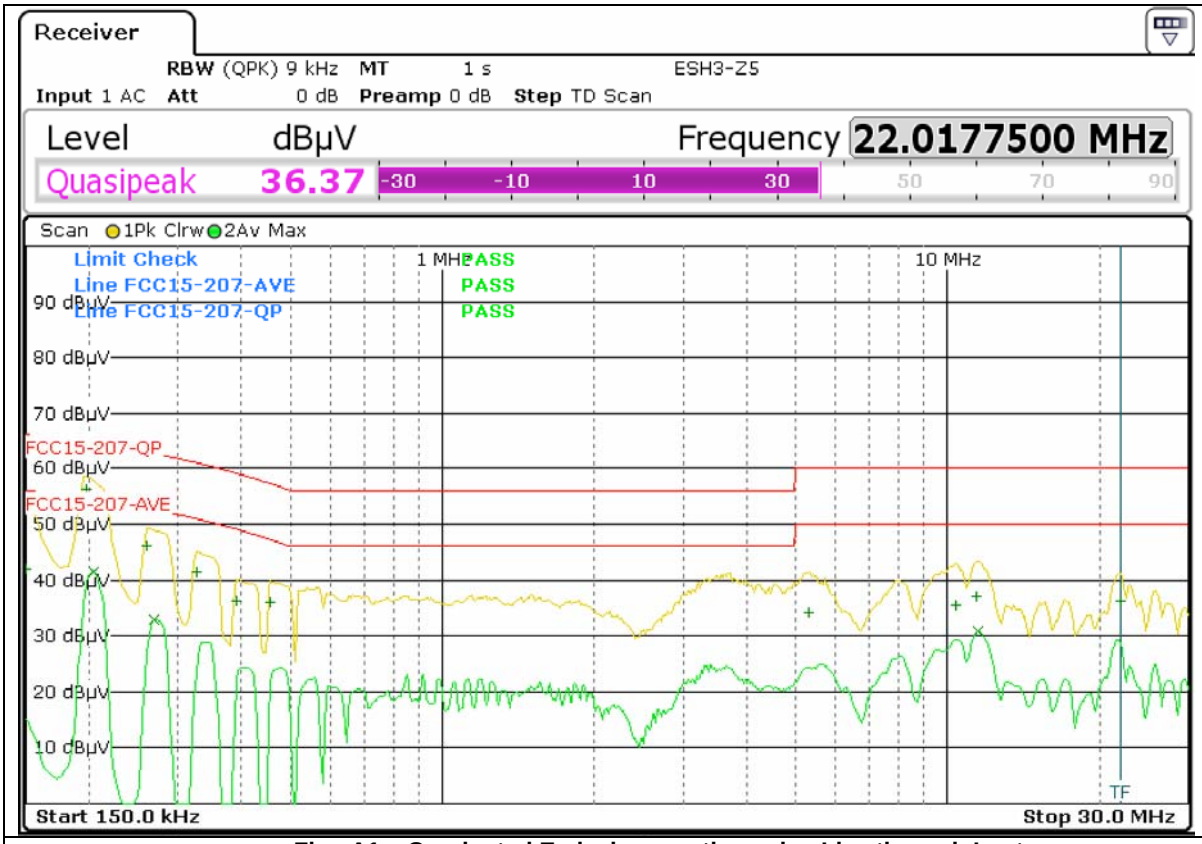


Fig A1 Conducted Emissions on the mains Live through Laptop

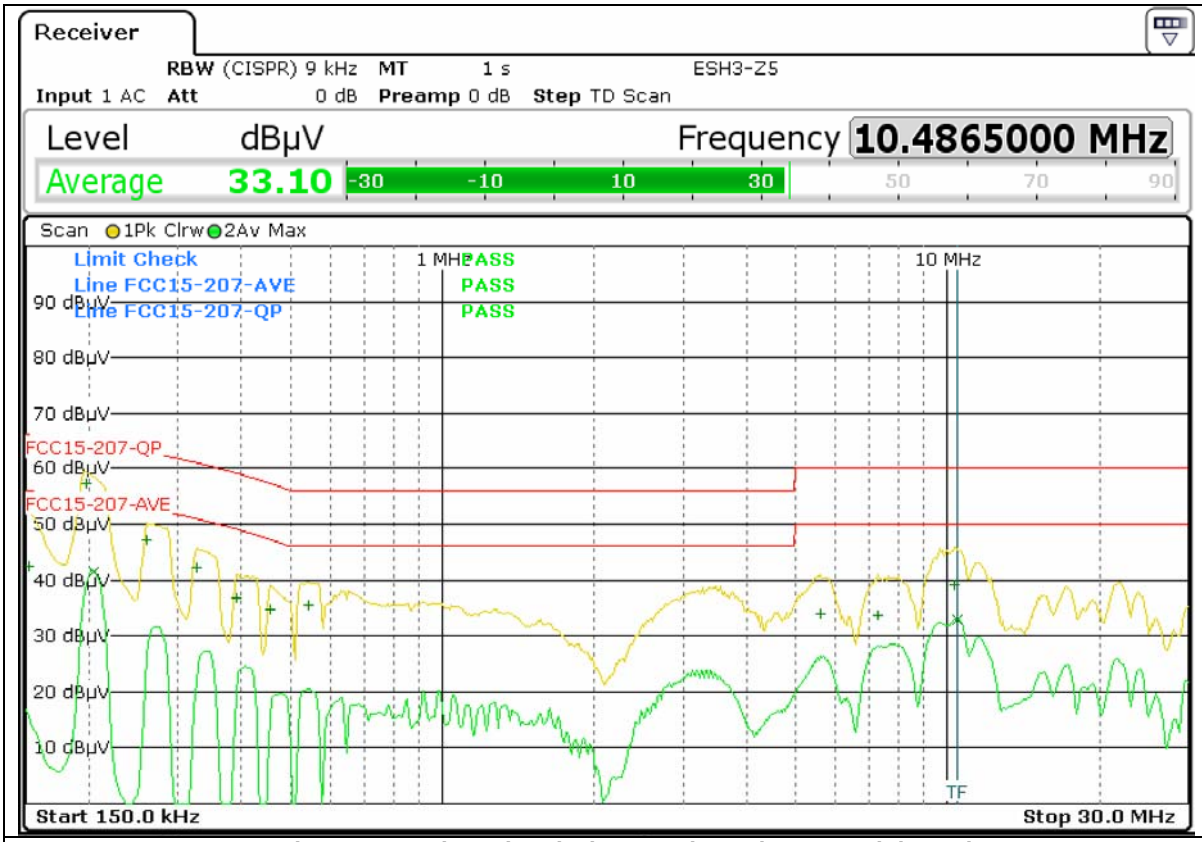


Fig A2 Conducted Emissions on the mains Neutral through Laptop

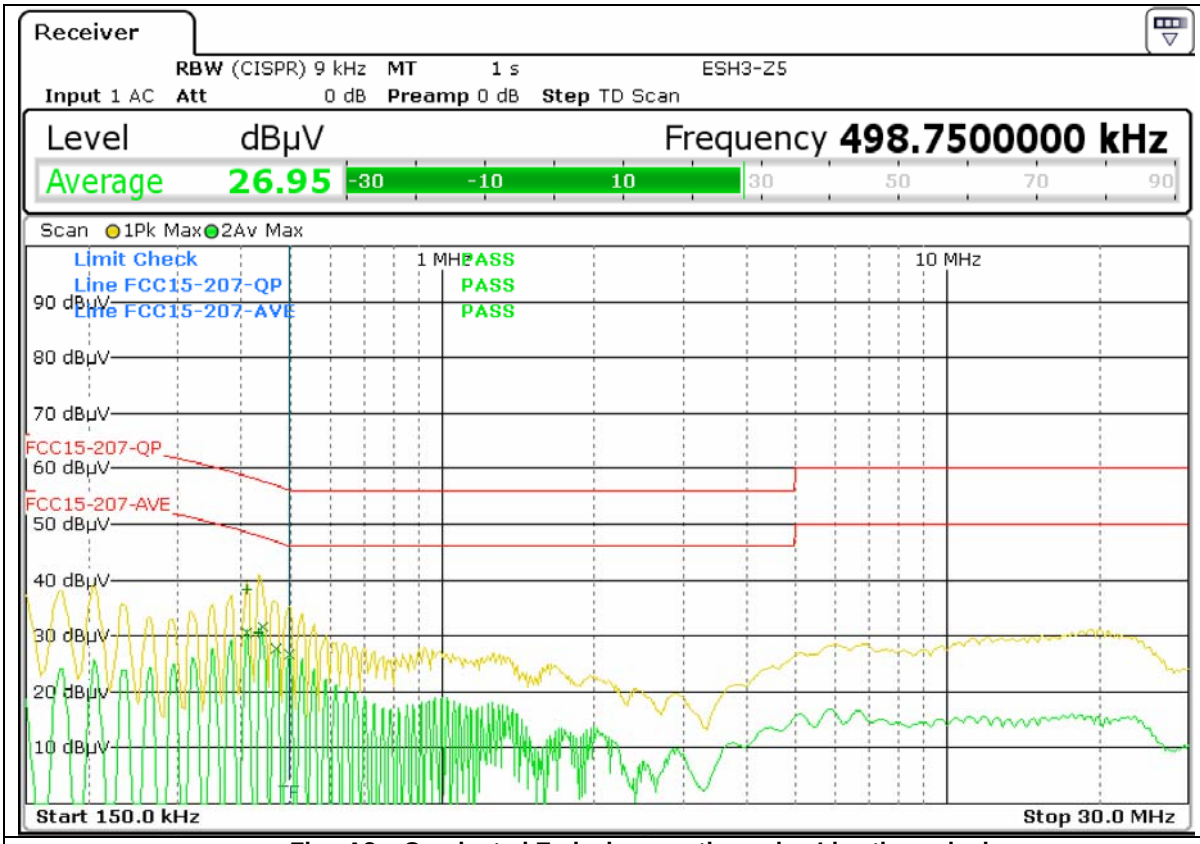


Fig A3 Conducted Emissions on the mains Live through charger

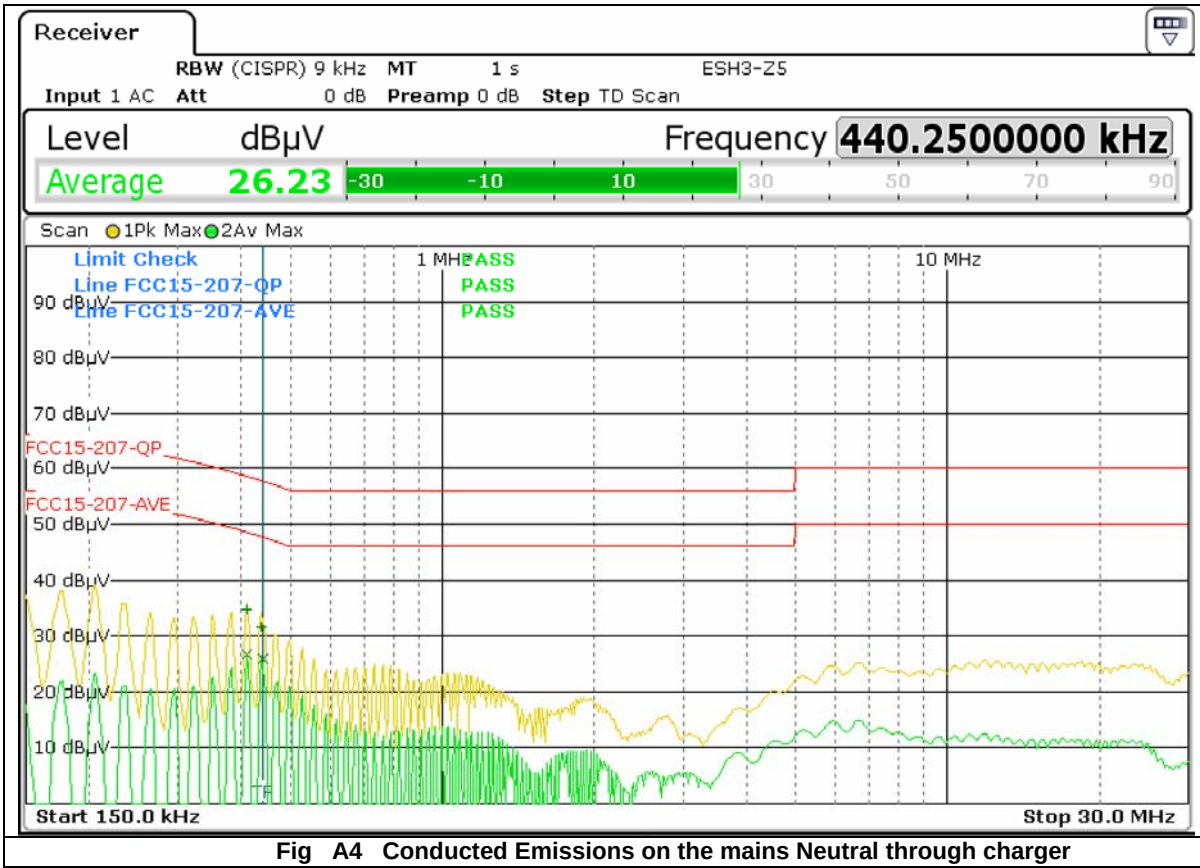


Fig A4 Conducted Emissions on the mains Neutral through charger

Appendix B

Radiated Spurious Emissions

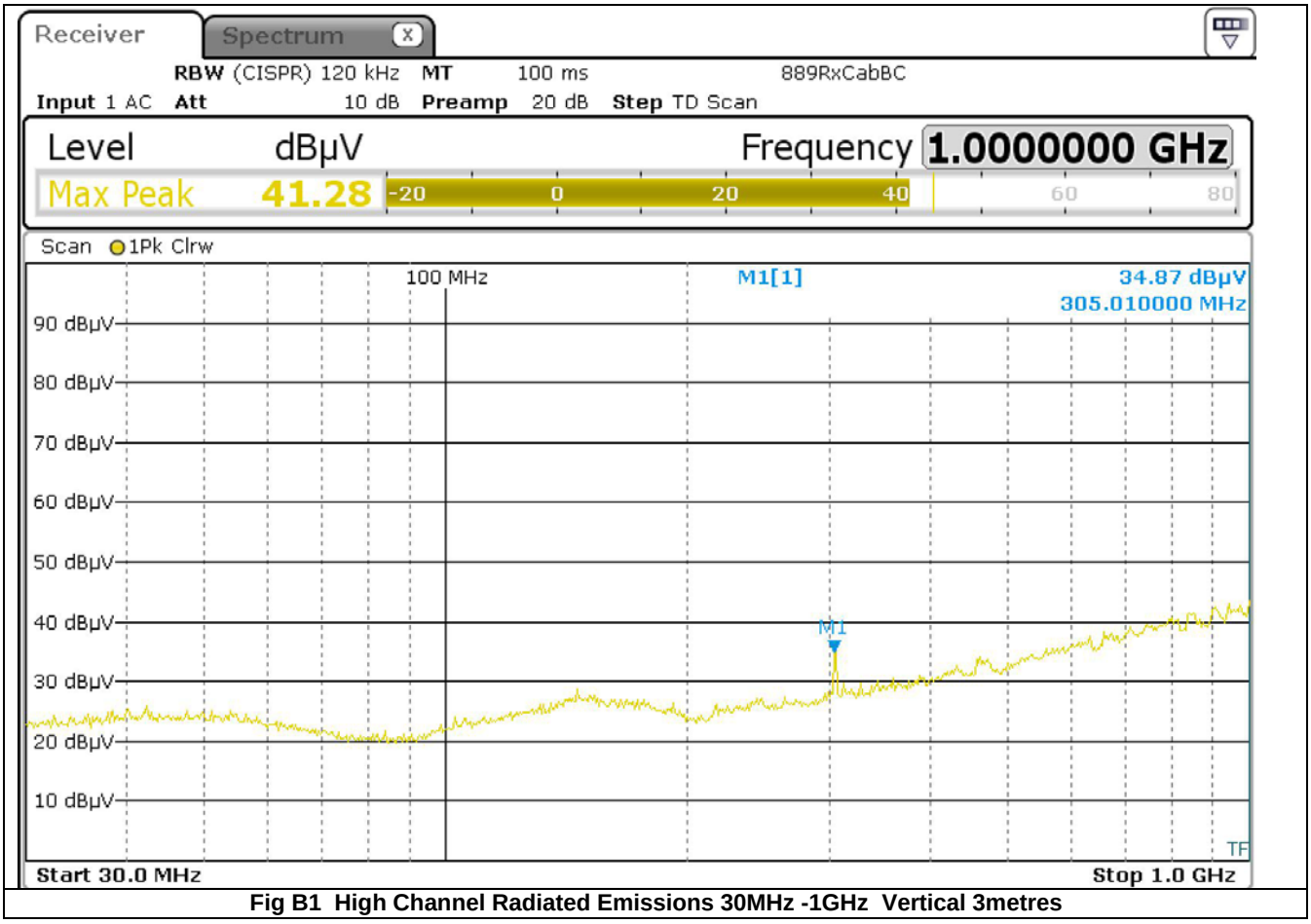


Fig B1 High Channel Radiated Emissions 30MHz -1GHz Vertical 3metres

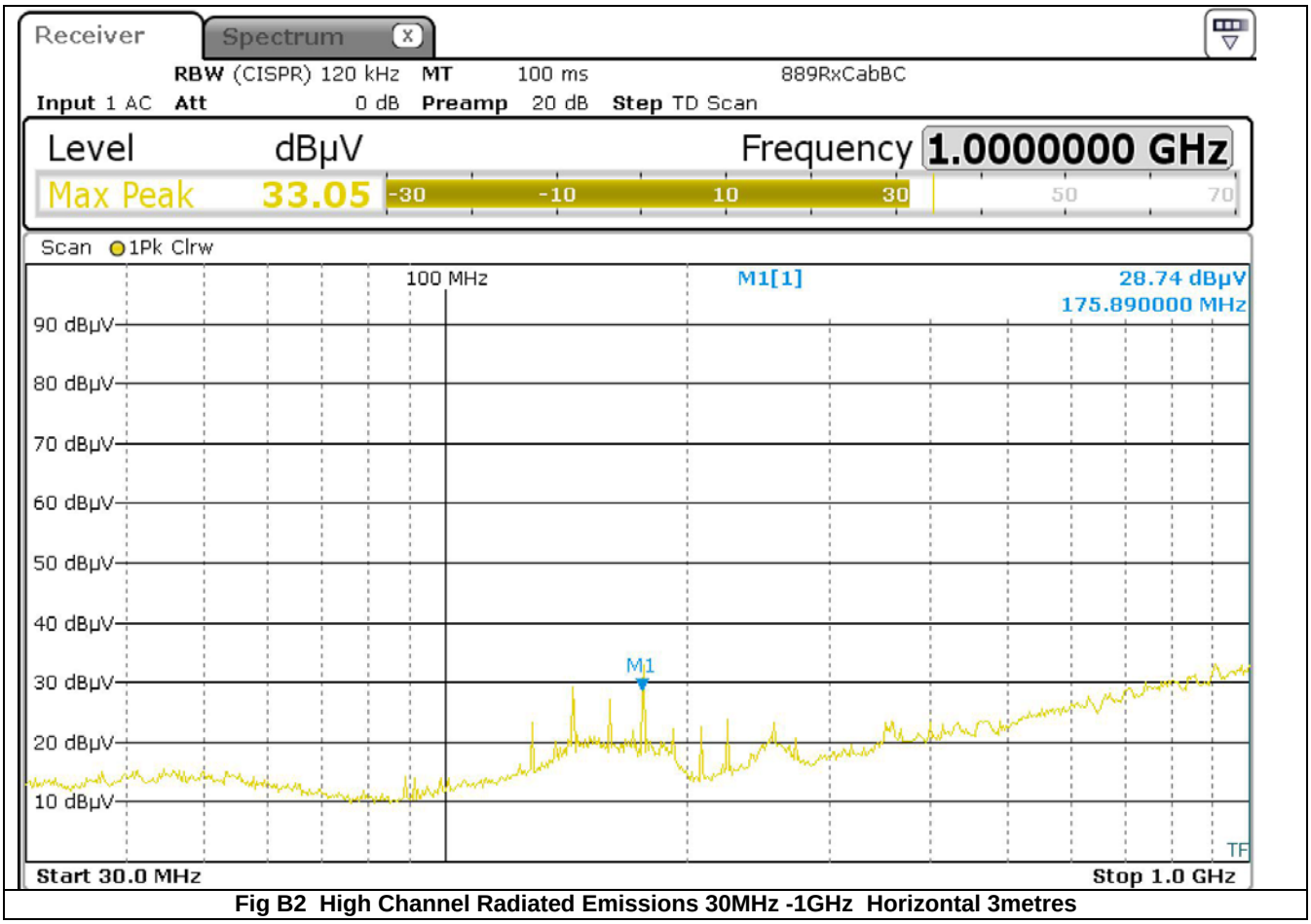


Fig B2 High Channel Radiated Emissions 30MHz -1GHz Horizontal 3metres

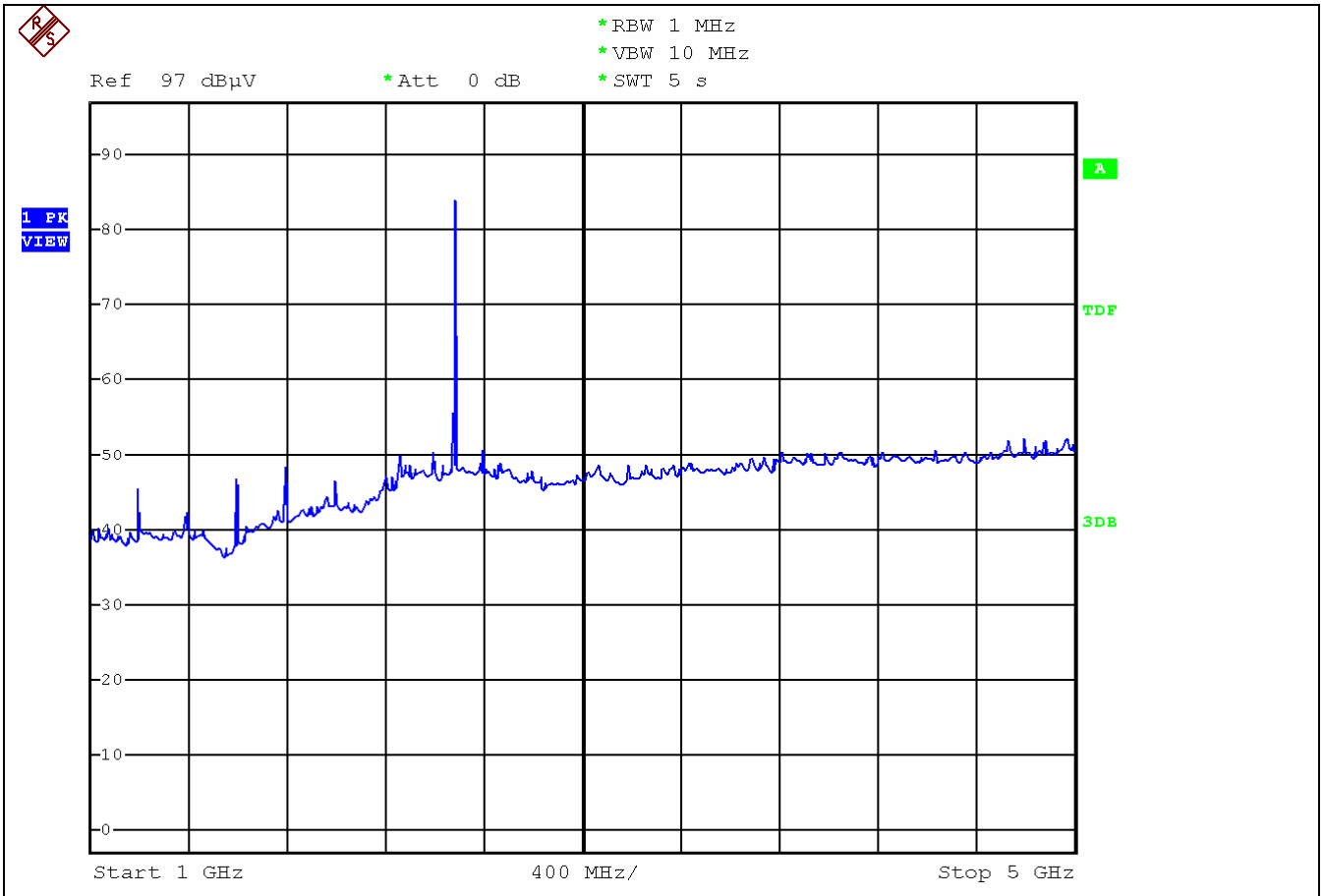


Fig B3 High Channel Radiated Emissions 1GHz -5GHz Vertical 3metres

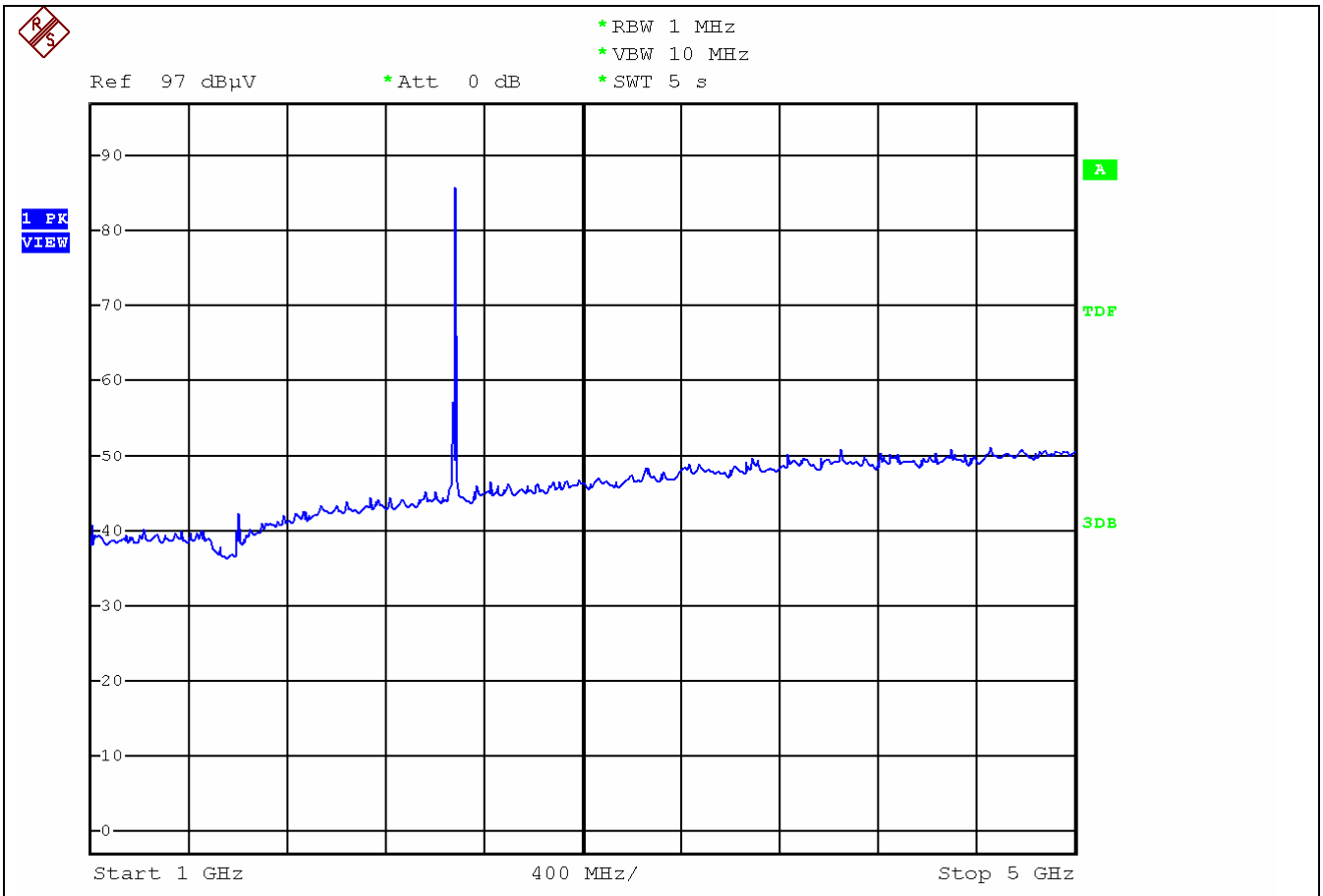


Fig B4 High Channel Radiated Emissions 1GHz -5GHz Horizontal 3metres

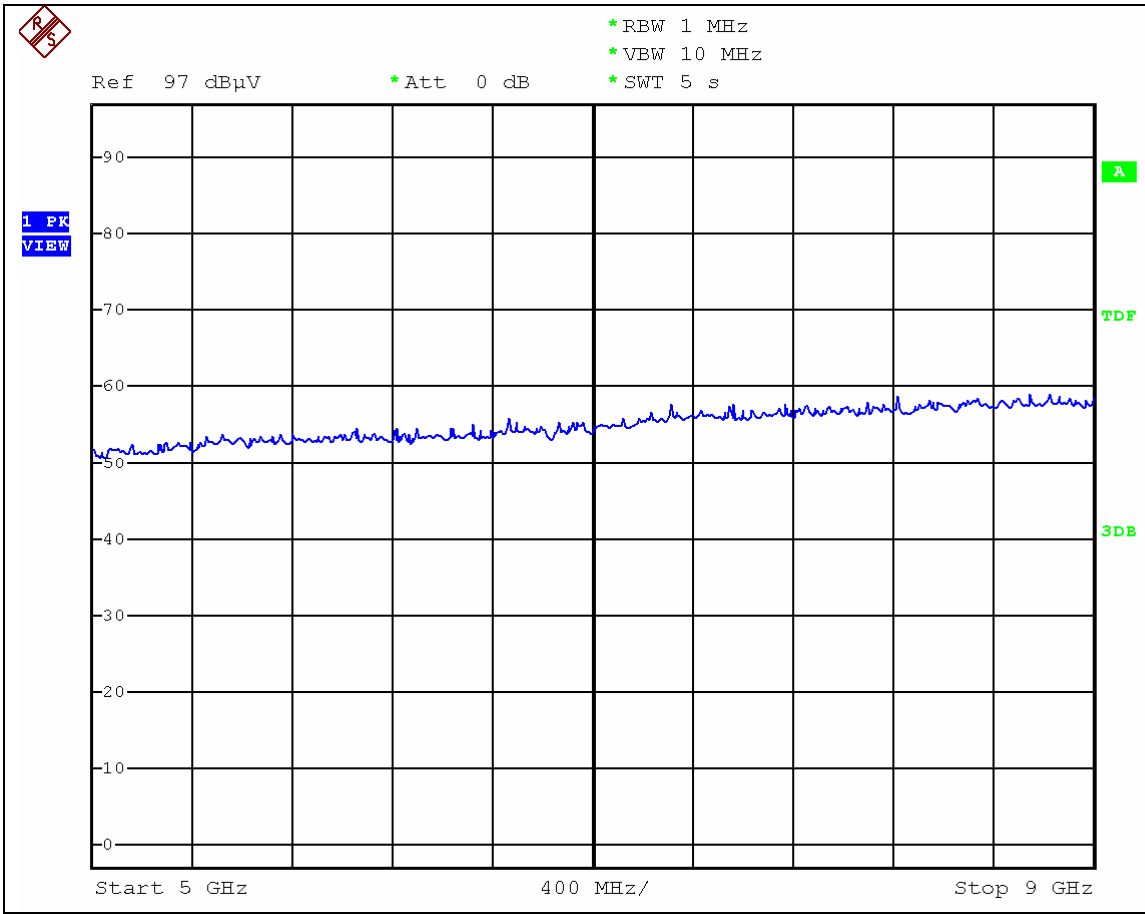


Fig B5 High Channel Radiated Emissions 5GHz -9GHz Vertical 3metres

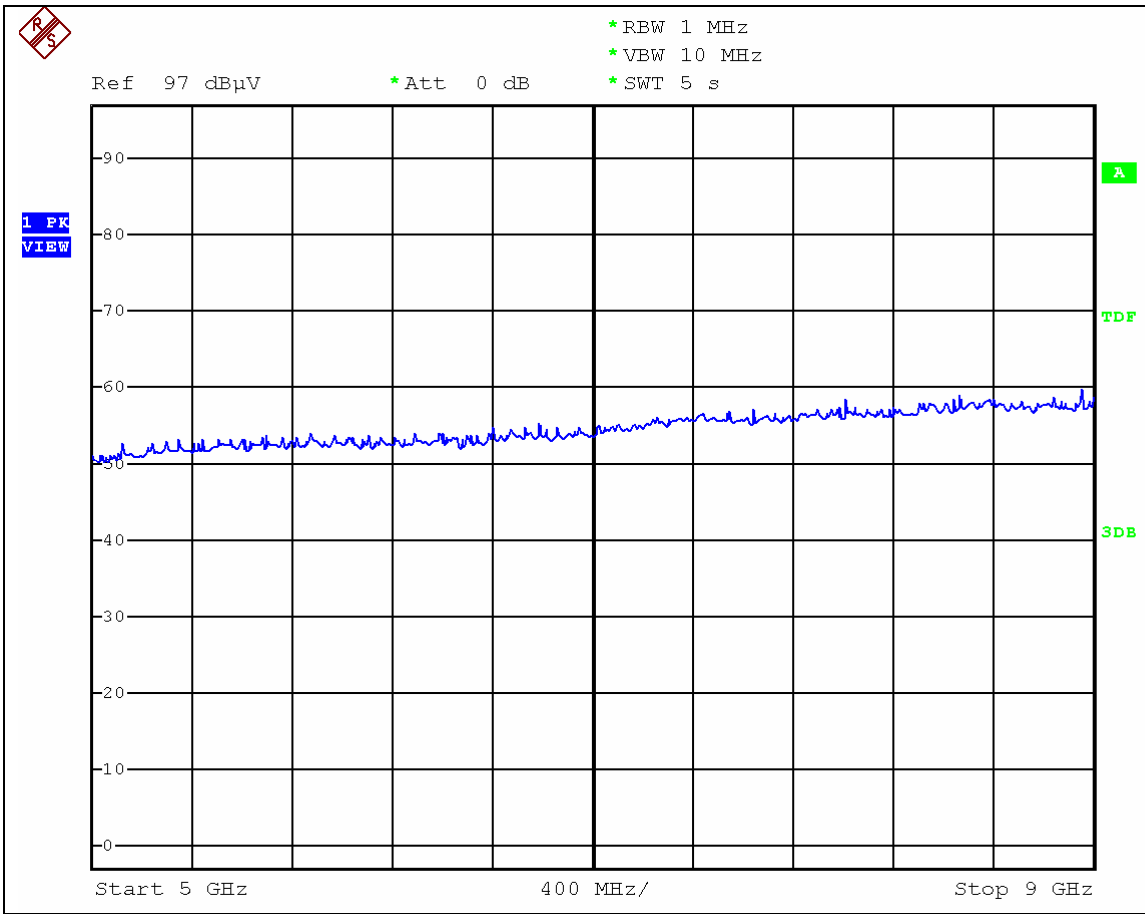


Fig B6 High Channel Radiated Emissions 5GHz -9GHz Horizontal 3metres

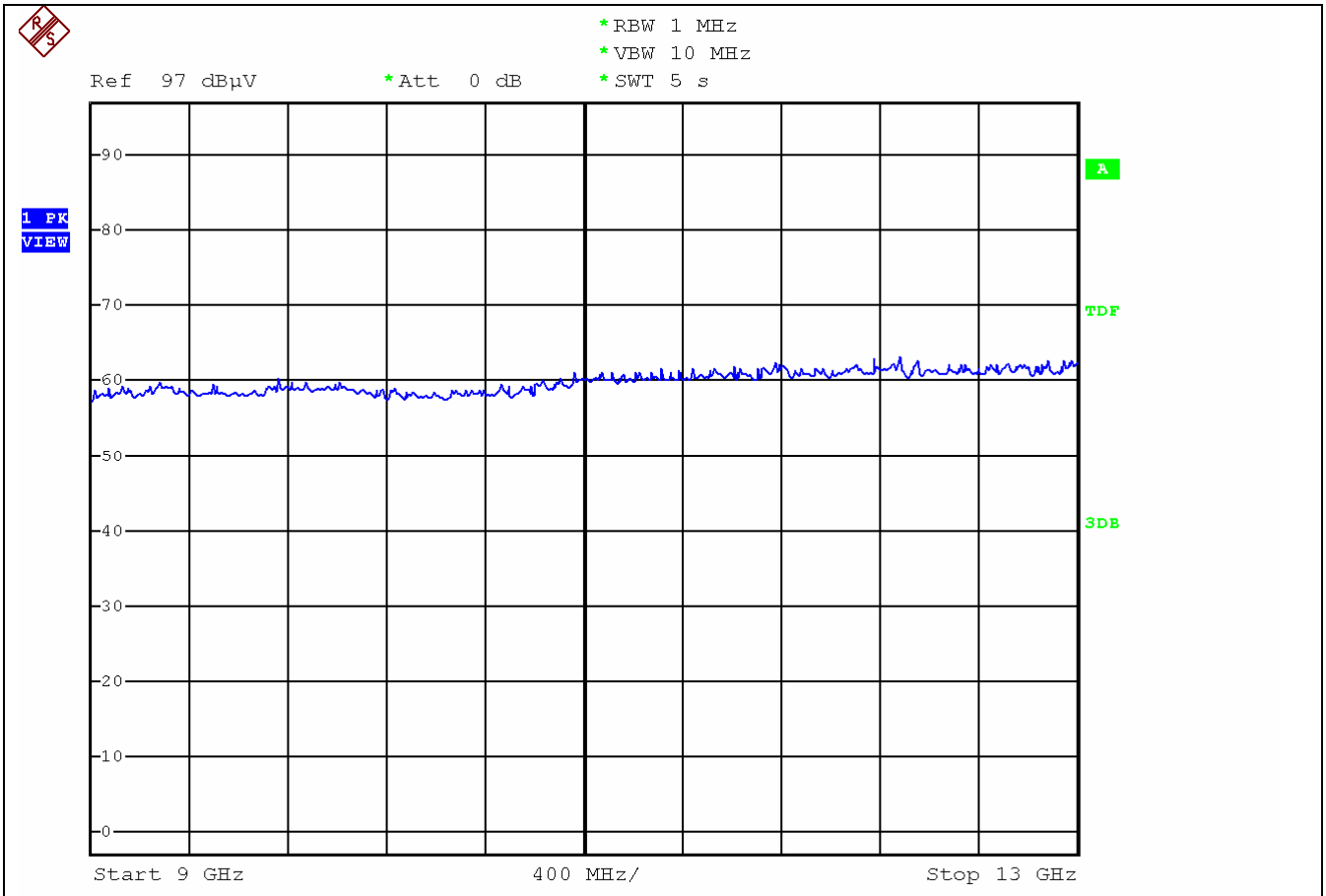


Fig B7 High Channel Radiated Emissions 9GHz -13GHz Vertical 3metres

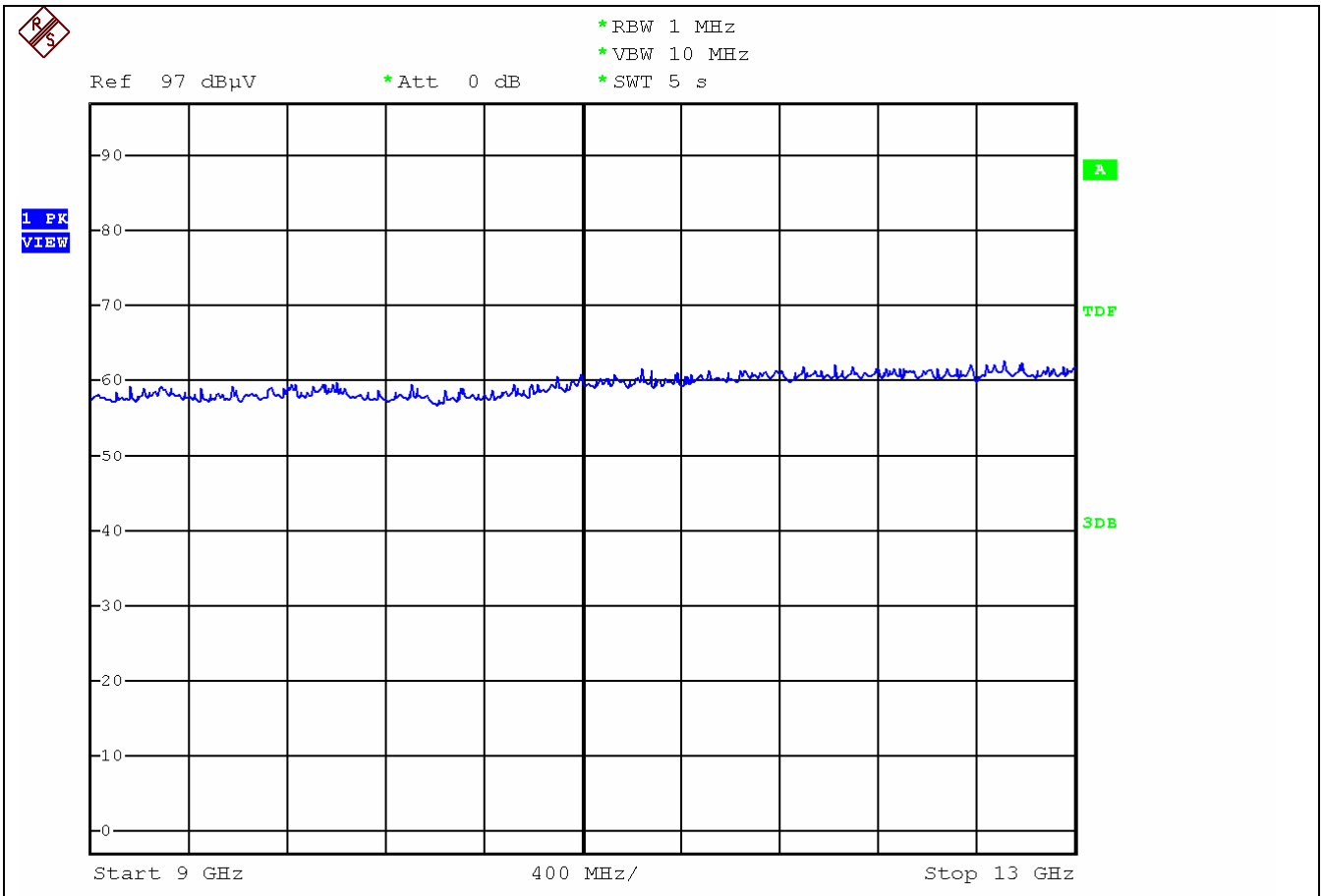


Fig B8 High Channel Radiated Emissions 9GHz -13GHz Horizontal 3metres

Appendix C

Test Configurations

Fig 1 Radiated Emissions 30M -1GHz-

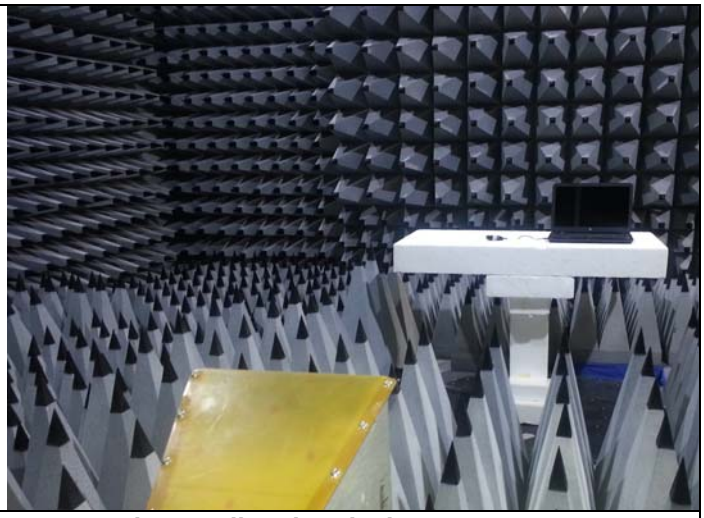


Fig 2 Radiated Emissions 1G-13GHz

Fig 3 Radiated Emissions-

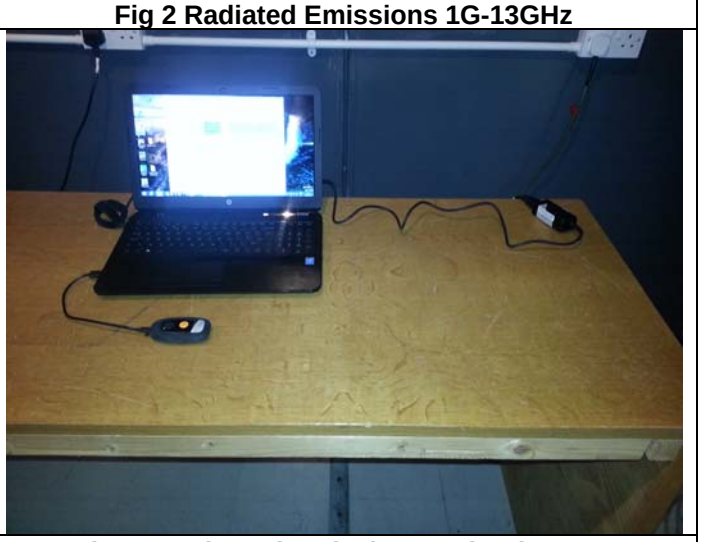


Fig 4 Conducted Emissions Mains (Laptop

Fig 5 Conducted Emissions Mains (Laptop) LISN -

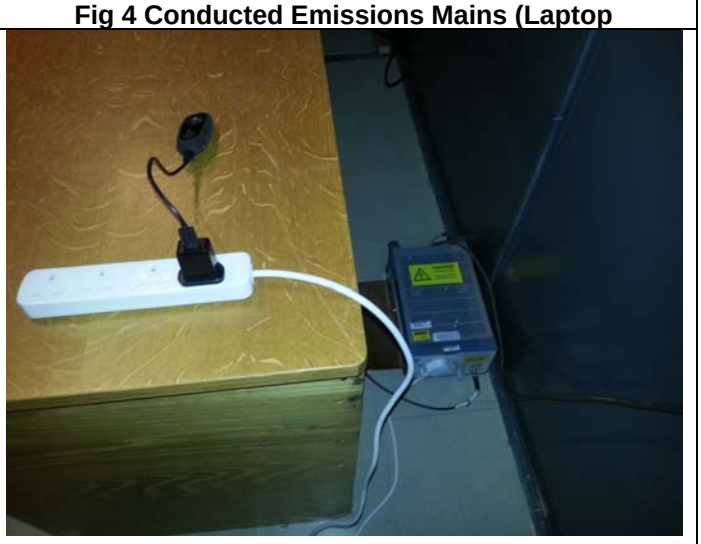


Fig 6 Conducted Emissions Mains (adapter)

End of Report