COMPLIANCE ENGINEERING IRELAND LTD

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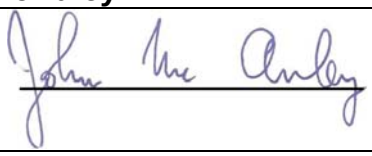
Project Num	17E6742-3b
Quotation	Q17-0205-1b
Prepared For	Nordic ID Oy
Company Address	Myllyojakatku 2A FI-24100 Salo Finland
Prepared By	Compliance Engineering Ireland
Test Lab Address	Clonross Lane, Derrockstown, Dunshaughlin, Co. Meath, Ireland
Tested By	Michael Kirby
Test Report By	Michael Kirby
FCC Site Registration	92592
IC Site Registration	8517-A2, 8517-A1
Date	28th Jun2017
IC Equipment Authorisation	Test Report
EUT Description	RFID Module
FCC ID	SCCNUR21W
IC ID	5137A-NUR21W
Authorised by	**John McAuley**
Authorised Signature :	

TEST SUMMARY

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

FCC Spec.	IC Spec.	Test Parameters	Status
15.109	RSS-Gen-4 8.9 ICES-003-5 6.2	Radiated Emissions	Pass
15.107 15.209	RSS-Gen-4 8.8 ICES-003-5 6.1	Conducted Emissions on the mains	Pass

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Exhibit A – Technical Report

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1.0 EUT Description

Model:	NUR2-1W
Type:	RFID Module
FCC ID:	SCCNUR21W
Company:	Nordic ID Oy
Contact	Rauno Nikkilä
Address:	Myllyojakatku 2A FI-24100 Salo Finland
Phone:	+358 (0)50 5689803
e-mail:	rauno.nikkila@nordicid.com
Test Standards:	47 CFR, Part 15B
Type of radio:	Stand-alone
Transmitter Type:	RFID FHSS

The NUR2-1W is an RFID module using frequency hopping in the 902-928MHz frequency band.

1.1 EUT Operation

1.1.1 Operating Conditions during Test:

The RFID module was fitted to a host pcb to allow powering and control of the module. The EUT was in standby mode for all tests.

1.1.2 Type of EUT NUR2-1W RFID with portable computer

RFID module Power requirements 4.5Vdc
Conducted Emissions performed with AC/DC power adapter
Type Hewlett Packard E3610A

1.1.3 Cable lengths and types

RFID module

Cable Description	Type	Length Metres
Antenna Cable	Coaxial	1
USB cable to computer	unshielded	2
EUT to DC power	unshielded	1.5
Mains lead	unshielded	1.5

Laptop

Cable Description	Type	Length Metres
Laptop to DC power	unshielded	1.8
Mains lead	unshielded	0.8

1.1.4 Peripherals

Laptop DELL D420
Dock DELL PR09S
AC Adapter DELL HA65NS1-00

1.1.5 Environmental conditions

	Temperature	Relative Humidity
Test	°C	%
Conducted Emissions	21	52
Radiated Emissions <1GHz	20	50

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 26th Jun 2017 .

2.0 Results for Conducted emissions on the mains

Conducted Emissions on the mains measurements were performed as per C63.4 2014 .
Measurement uncertainty = +/- 2.9dB

3.1 Laptop

Detector	Frequency	Reading	Margin	Phase
QP/ Ave	MHz	dBuV	dB	L/N
Quasi-Peak	0.1793	39.65	-25.51	Live
Average	0.1793	14.06	-41.1	Live
Quasi-Peak	0.2400	33.20	-30.23	Live
Average	0.2400	9.81	-43.62	Live
Quasi-Peak	0.301	28.51	-33.18	Live
Average	0.301	7.07	-44.62	Live
Quasi-Peak	0.359	26.55	-33.47	Live
Quasi-Peak	0.420	25.44	-32.85	Live

Detector	Frequency	Reading	Margin	Phase
QP/ Ave	MHz	dBuV	dB	L/N
Quasi-Peak	0.2040	54.74	-9.72	Neutral
Quasi-Peak	3.2775	36.23	-19.77	Neutral
Quasi-Peak	3.7545	34.96	-21.04	Neutral
Quasi-Peak	3.9615	41.45	-14.55	Neutral
Quasi-Peak	4.0290	40.09	-15.91	Neutral
Quasi-Peak	4.0988	41.33	-14.67	Neutral
Average	9.3773	41.27	-8.73	Neutral
Average	9.8475	41.21	-8.79	Neutral
Average	10.3155	40.09	-9.91	Neutral

Test Result Pass

2.2 RFID Module

Detector	Frequency	Reading	Margin	Phase
QP/ Ave	MHz	dBuV	dB	L/N
Average	1.7610	34.89	-11.11	Live
Average	1.7790	34.74	-11.26	Live
Quasi-Peak	1.8488	36.21	-19.79	Live
Average	1.8488	34.93	-11.07	Live
Quasi-Peak	3.280	39.98	-16.02	Live
Average	3.282	37.34	-8.66	Live
Average	3.399	34.12	-11.88	Live
Average	3.521	35.98	-10.02	Live
Quasi-Peak	3.631	41.33	-14.67	Live
Average	3.633	37.62	-8.38	Live
Average	3.752	37.99	-8.01	Live
Average	4.103	34.09	-11.91	Live
Average	4.337	33.63	-12.37	Live

Detector	Frequency	Reading	Margin	Phase
QP/ Ave	MHz	dBuV	dB	L/N
Average	1.7610	34.89	-11.11	Neutral
Average	1.7790	34.74	-11.26	Neutral
Quasi-Peak	1.8488	36.21	-19.79	Neutral
Average	1.8488	34.93	-11.07	Neutral
Quasi-Peak	3.2798	39.98	-16.02	Neutral
Average	3.2820	37.34	-8.66	Neutral
Average	3.3990	34.12	-11.88	Neutral
Average	3.5205	35.98	-10.02	Neutral
Quasi-Peak	3.6308	41.33	-14.67	Neutral
Average	3.6330	37.62	-8.38	Neutral
Average	3.7523	37.99	-8.01	Neutral
Average	4.1033	34.09	-11.91	Neutral
Average	4.3373	33.63	-12.37	Neutral

Test Result Pass

3. Radiated Measurements

3.1 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.

An initial prescan was carried out to determine the worst case configuration

Measurements performed according to the procedures in ANSI C63.4-2014

Frequency	Quasi peak Level	Antenna Factor	Preamp Gain	Cable Loss	Antenna Polarity	Final Field Strength Quasi Peak	Average Limit	Margin
MHz	dBuV/m	dB	dB	dB	V/H	dBuV/m	dBuV/m	dB
66.60	16.3	12.77	0	0.2	Vertical	29.3	40.0	10.8
99.78	26.9	9.43	0	0.2	Vertical	36.5	43.5	7.0
199.61	23.4	10.58	0	0.2	Vertical	34.2	43.5	9.4
233.19	24.4	10.83	0	0.2	Vertical	35.4	46.0	10.6
266.13	15.5	12.3	0	0.2	Vertical	28.0	46.0	18.0
498.88	21.0	17	0	1.2	Vertical	39.2	46.0	6.8
565.55	21.5	18.3	0	1.2	Vertical	41.0	46.0	5.0
166.39	24.9	13.31	0	0.2	Horizontal	38.4	43.5	5.1
174.96	8.7	13.07	0	0.2	Horizontal	22.0	43.5	21.5
199.39	25.2	10.58	0	0.2	Horizontal	36.0	43.5	7.5
336.02	14.3	13.97	0	1.2	Horizontal	29.5	46.0	16.5
360.02	14.3	14.46	0	1.2	Horizontal	30.0	46.0	16.0

4 List of Test Equipment

Instrument	Manufacturer	Model	Serial Num	CEI Ref	Cal Due Date	Cal Interval Months
Test Receiver 3.6GHz	Rohde& Schwarz	ESR	1316.3003k03-101625-s	869	04/06/2020	36
Anechoic Chamber	CEI	SAR 10M	845	845	16/03/2019	36
LISN	Rohde& Schwarz	ESH3-Z5	825460/003	604	21/01/2019	36

5 Measurement Uncertainties

Measurement	Uncertainty
Radio Frequency	+/- $5x10^{-7}$
Maximum Frequency Deviation	+/- 1.7 %
Conducted Emissions	+/- 1 dB
Radiated Emission 30MHz-100MHz	+/- 5.3 dB
Radiated Emission 100MHz-300MHz	+/- 4.7 dB
Radiated Emission 300MHz-1GHz	+/- 3.9 dB
Radiated Emission 1GHz-40GHz	+/- 3.8 dB

The measurement uncertainties stated were calculated with a k=2 for a confidence level of over 95% as per ETS TR100 028.

Appendix A

Additional Test Results
For
Radiated Spurious Emissions

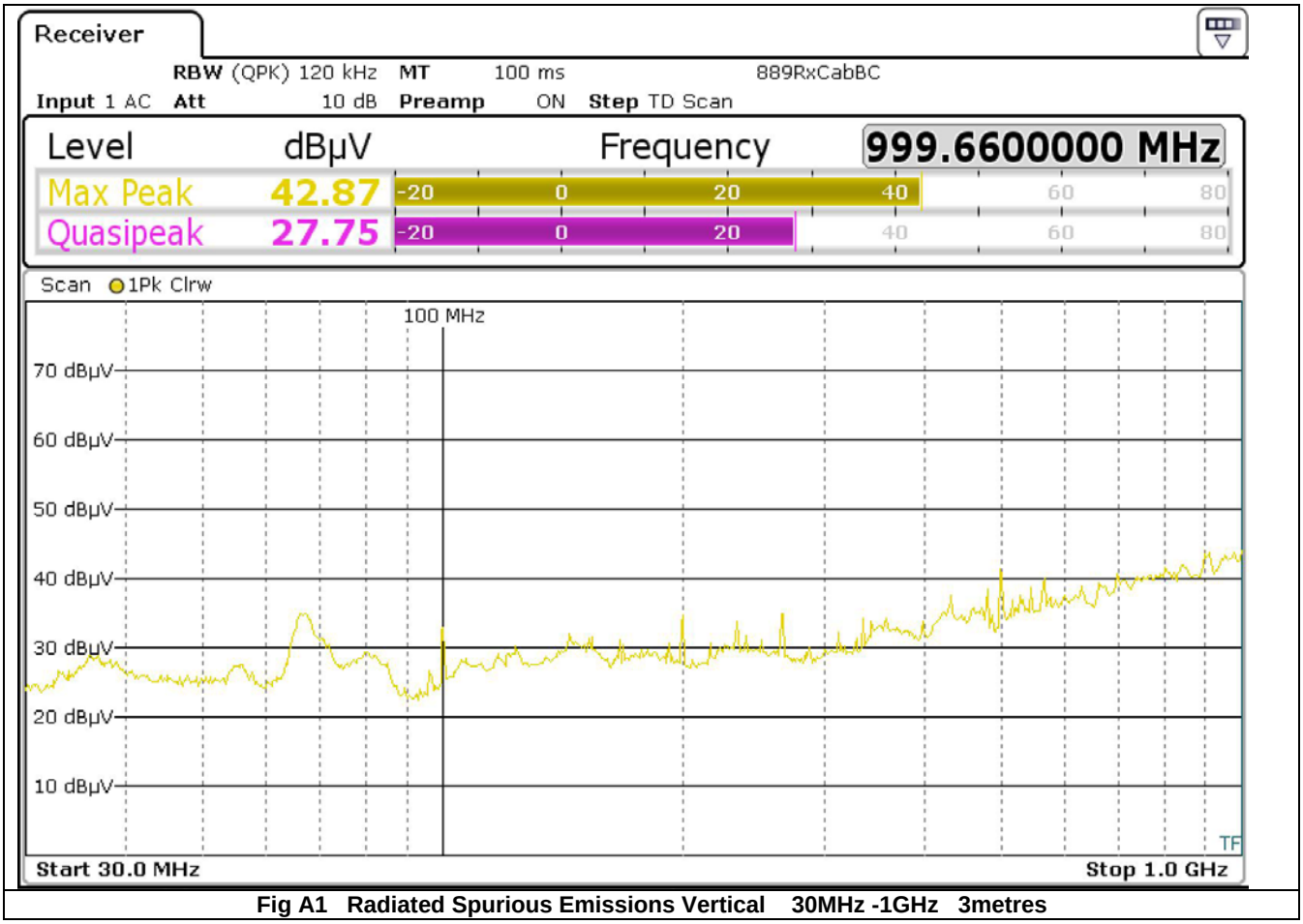

Fig A1 Radiated Spurious Emissions Vertical 30MHz -1GHz 3metres

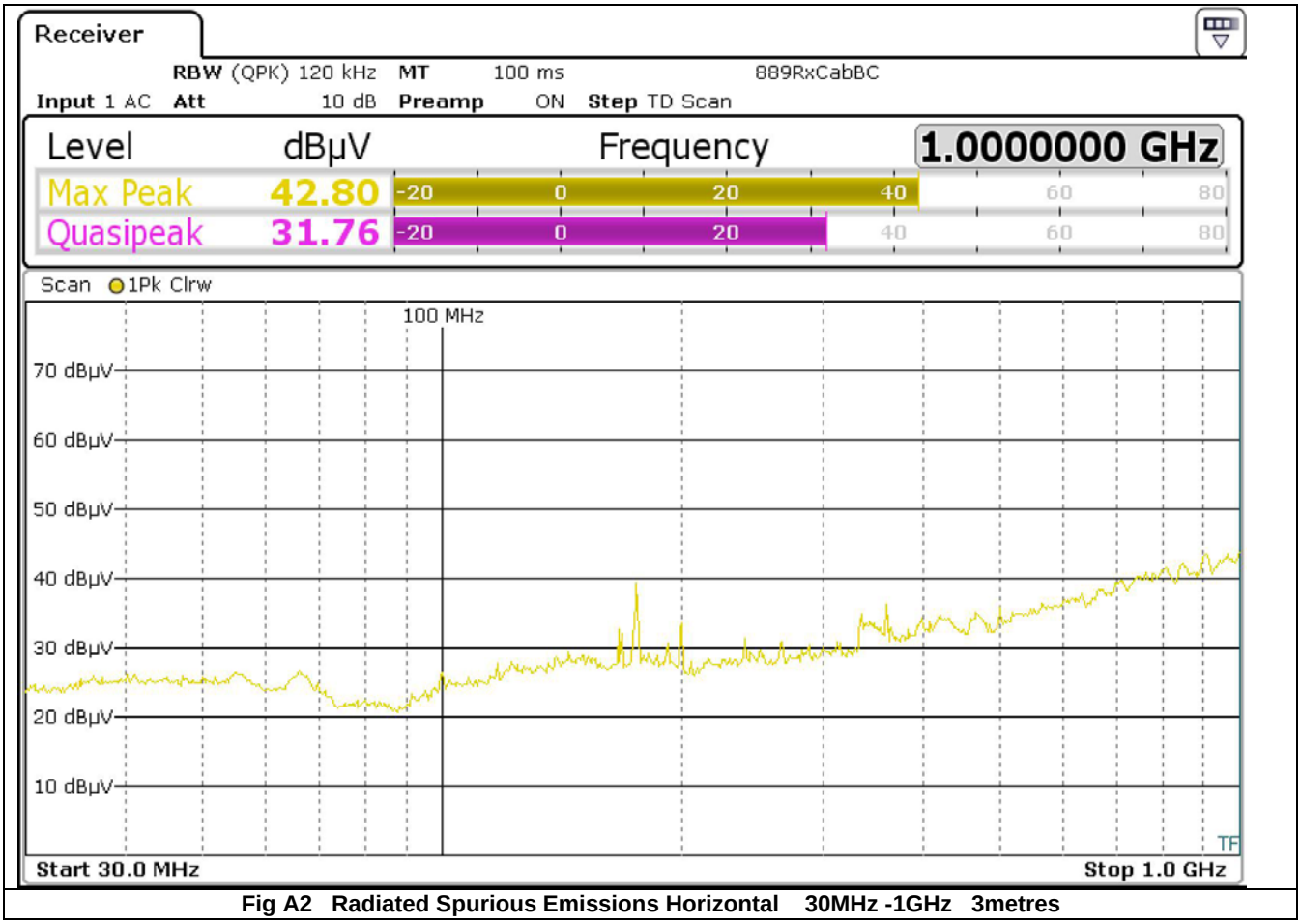

Fig A2 Radiated Spurious Emissions Horizontal 30MHz -1GHz 3metres

Appendix B

Conducted Emissions on the mains

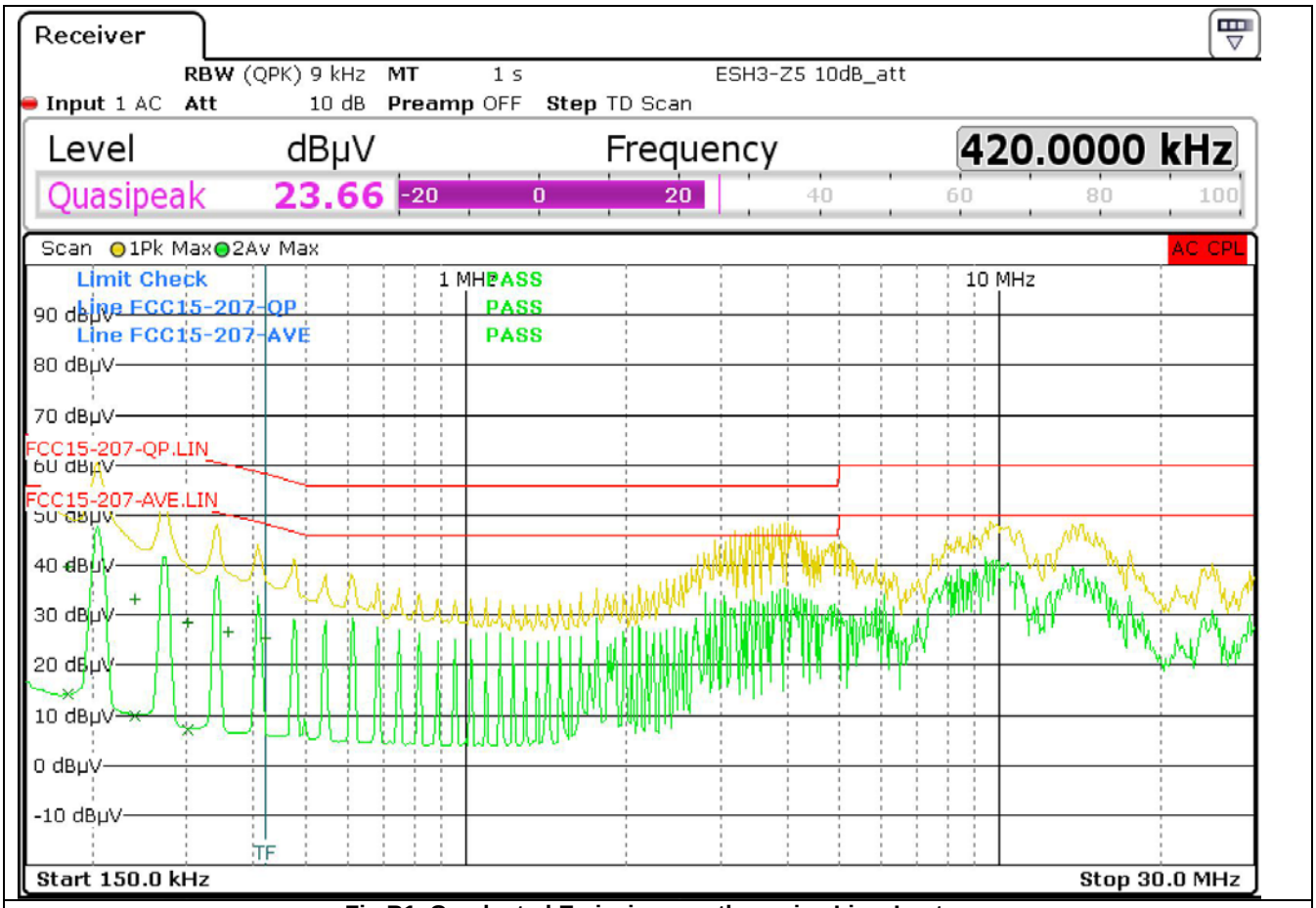

Fig B1 Conducted Emissions on the mains Live Laptop

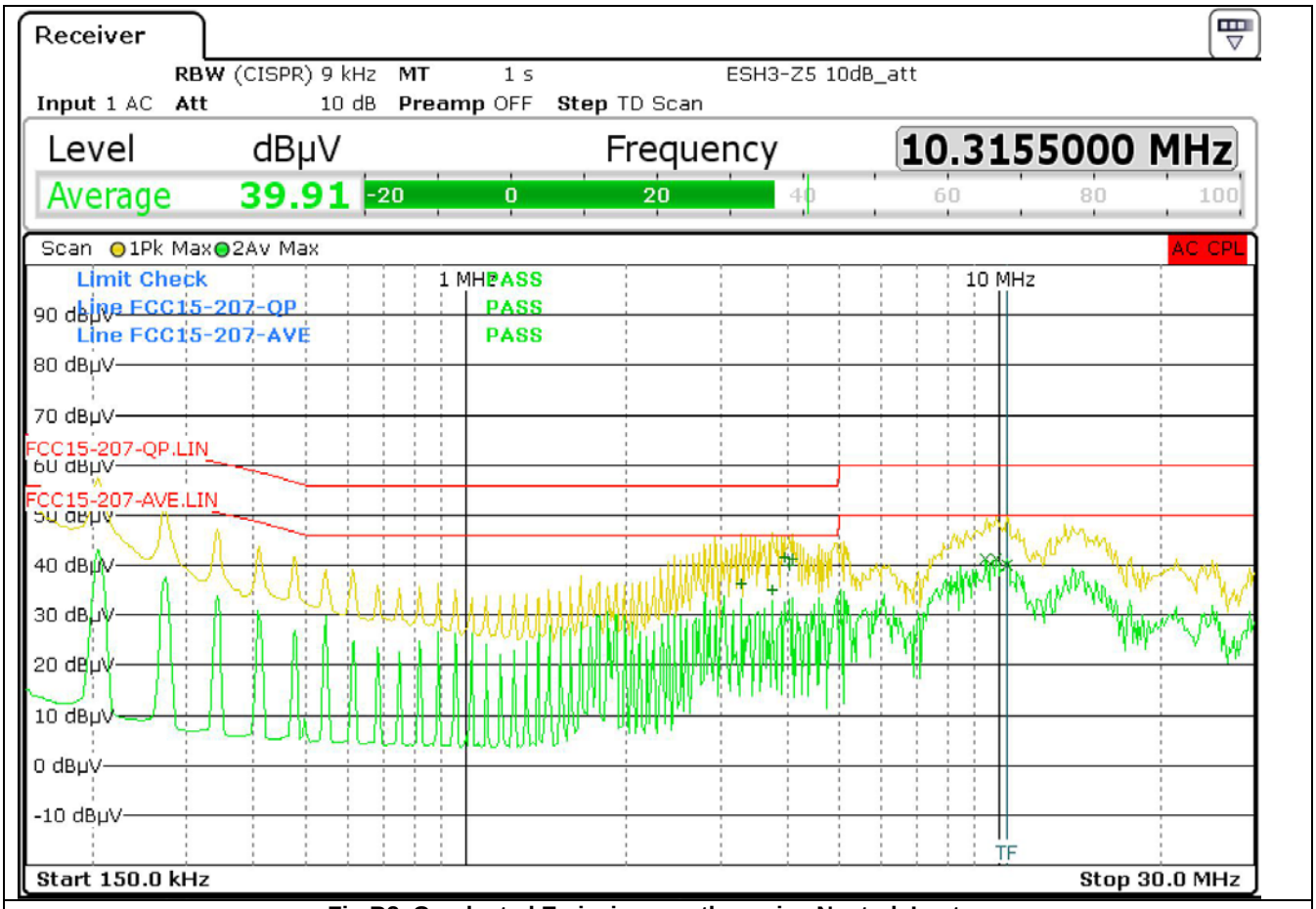

Fig B2 Conducted Emissions on the mains Neutral Laptop

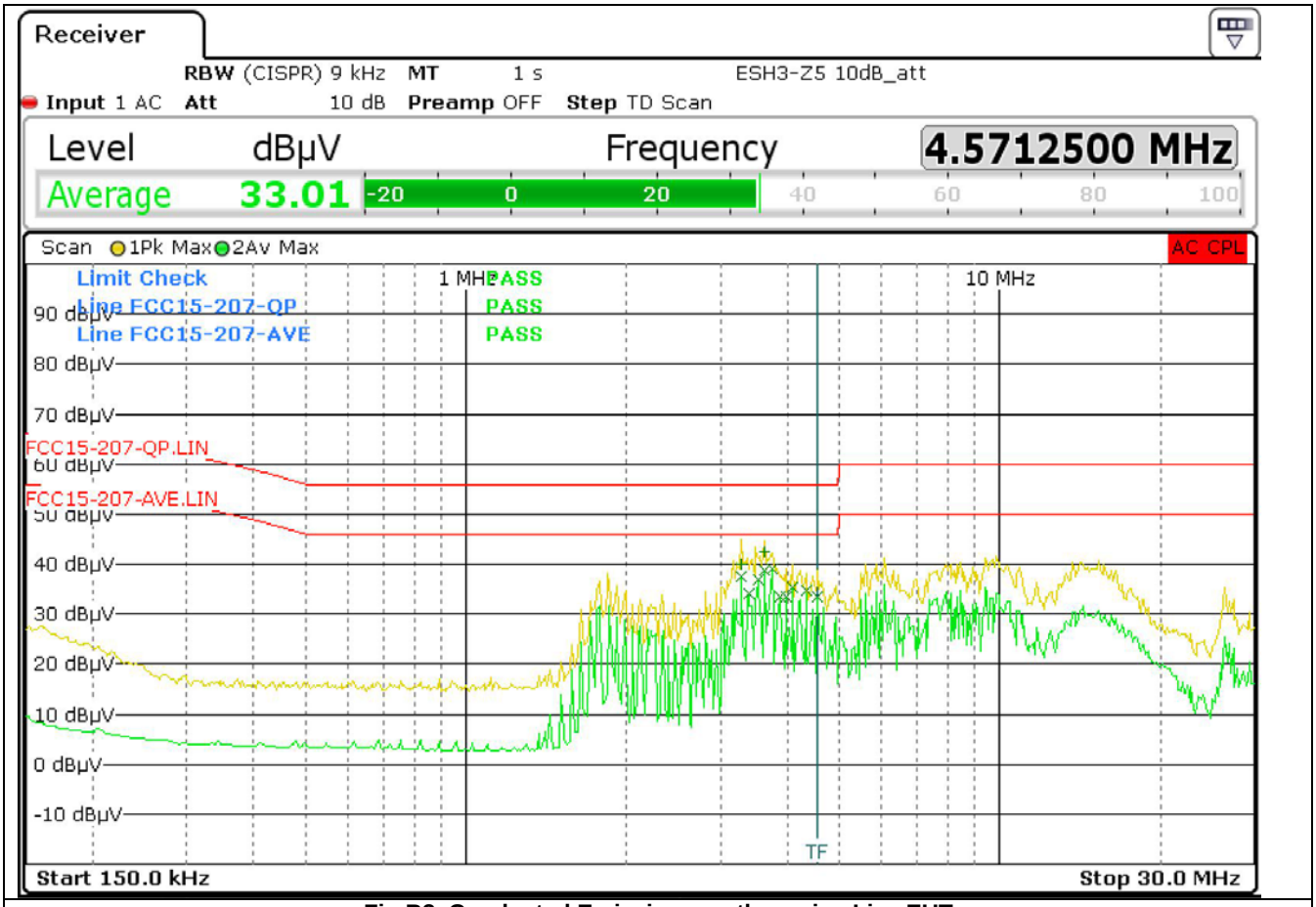

Fig B3 Conducted Emissions on the mains Live EUT

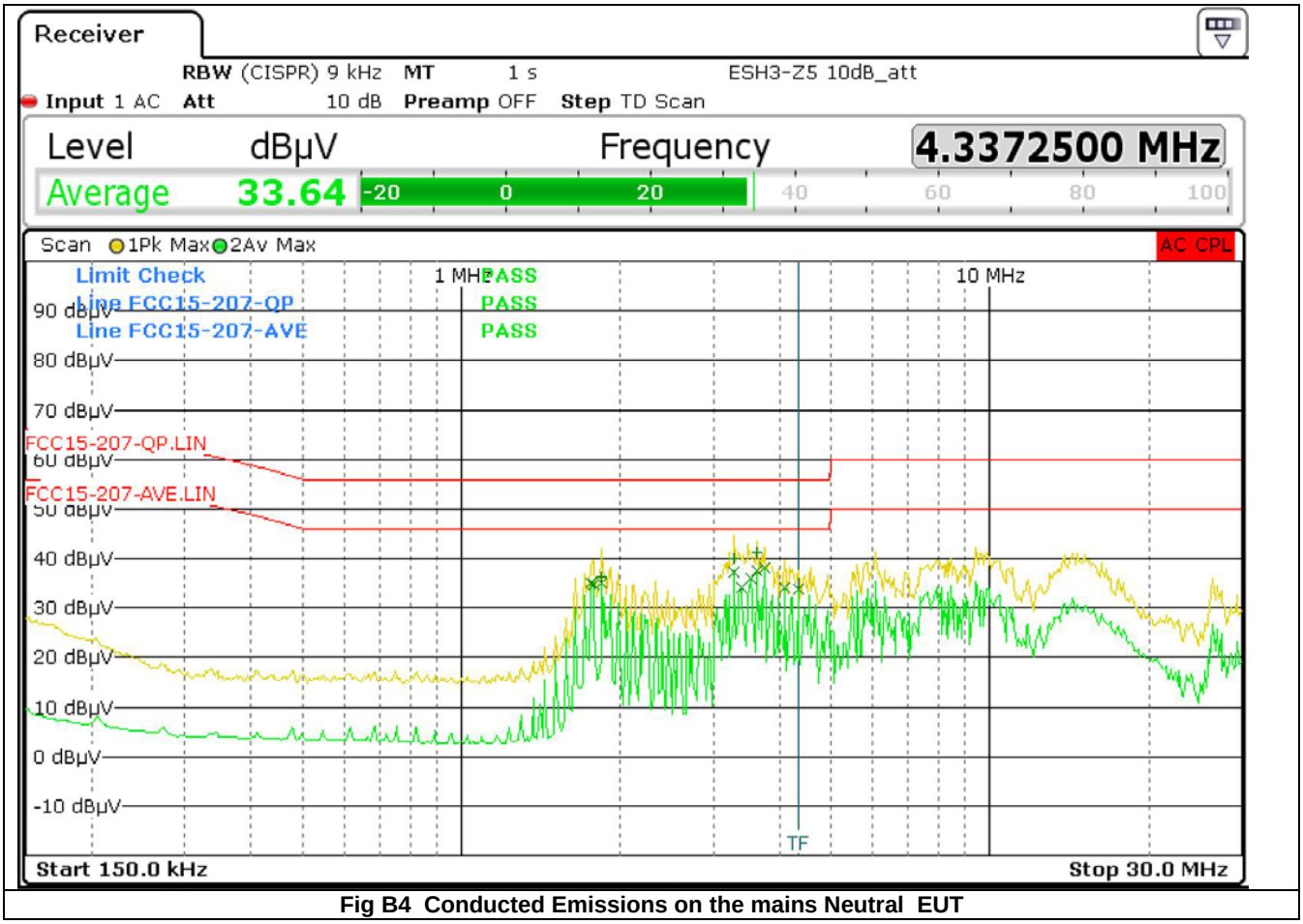

Fig B4 Conducted Emissions on the mains Neutral EUT

End of Report