

Test Report

Product	Wireless charger and communication system for seismic Nodes		
Name and address of the applicant	Stryde limited Chertsey Road, Sunbury upon Thames, Middlesex TW16 7BP - UK		
Name and address of the manufacturer	Stryde limited Chertsey Road, Sunbury upon Thames, Middlesex TW16 7BP - UK		
Model	Nest Case		
Rating	100-240VAC - 10A, 50/60Hz		
Trademark	-		
Serial number	-		
Additional information	-		
Tested according to	FCC Part 15, subpart B Other Class B Digital Device ISED Canada ICES-001, Issue 6 ISM Devices, Wireless Power Transfer		
Order number	402570		
Tested in period	2020-08-27 –2020-09-04		
Issue date	2020-09-29		
Name and address of the testing laboratory	 Instituttveien 6 Kjeller, Norway	CAB Number: FCC: NO0001 ISED: NO0470 TEL: +47 22 96 03 30 FAX: +47 22 96 05 50	  An accredited technical test executed under the Norwegian accreditation scheme
	 Prepared by [Jan G Eriksen]		 Approved by [Frode Sveinsen]
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CONTENTS

Test Report	1
1 INFORMATION	3
1.1 Test Item.....	3
1.2 Test Environment.....	3
1.3 Test Engineer(s)	3
1.4 Test Equipment.....	3
1.5 Comments	3
2 TEST REPORT SUMMARY	4
2.1 General.....	4
2.2 Test Summary	5
3 TEST RESULTS	6
3.1 Power Line Conducted Emissions	6
3.2 Field strength of radiated emissions	7
4 Measurement Uncertainties	10
5 LIST OF TEST EQUIPMENT	11
6 BLOCK DIAGRAM	12
6.1 Power Line Conducted Emission.....	12
6.2 Test Site Radiated Emission.....	13

1 INFORMATION

1.1 Test Item

Name	Nest Case
FCC ID	2AV78-NCASEV1
Model/version	Prototype
Serial number	2100000000
Hardware identity and/or version	Carrier Board RevD. Nest Board RevC
Software identity and/or version	Software for the Nest Board is: 2019-06-19T17:21:12 Software for the Service Board is: 2019-01-15T14:53:45
Operating Modes	Charging
Type of Power Supply	Buildt in AC/DC 100-240V 50/60Hz 6A
Antenna Connector	N/A
Desktop Charger	N/A

Description of Test Item

The EUT is an inductive charger and communication system for 90 STRYDE Nodes.

The EUT consists of a box which contains a power supply, several switches, and one shelf where 90 Nodes or 70 Nodes plus 4 Init Devices can be charged simultaneously.

The charging of each Node can be activated individually or for the whole shelf simultaneously.

The charging frequency used by every single node depends on the battery voltage at the time of charging, and every single node may be charging at a different frequency from the others.

1.2 Test Environment

1.2.1 Normal test condition

Temperature:	21.1 – 22.1 °C
Relative humidity:	41 - 50 %
Normal test voltage:	115V _{AC} 60Hz

The values are the limit registered during the test period.

1.3 Test Engineer(s)

Jan G Eriksen

1.4 Test Equipment

See list of test equipment in clause 4.

1.5 Comments

All ports were populated during spurious emission measurements.

Power supply variation within 85% to 115% of nominal value has no influence on measured values.

2 TEST REPORT SUMMARY

2.1 General

All measurements are traceable to national standards.

The tests were conducted for the purpose of demonstrating compliance with FCC CFR 47 Part 15B.

Tests were performed in accordance with ANSI C63.4-2014.

Radiated tests were made in a semi-anechoic chamber at measuring distances of 3m.

A description of the test facility is on file with the FCC and Industry Canada.

New Submission

Production Unit

Class II Permissive Change

Pre-production Unit

JAB Equipment Code

Family Listing



THIS TEST REPORT APPLIES ONLY TO THE ITEM(S) AND CONFIGURATIONS TESTED.

Deviations from, additions to, or exclusions from the test specifications are described in "Summary of Test Data".

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2.2 Test Summary

Name of test	FCC Part 15 reference	Result
Supply Voltage Variations	15.31(e)	Pass 1)
Power Line Conducted Emission	15.107(a)	Pass
The field strength of radiated emissions	15.109	Pass

- 1) The device operates on AC mains 115V/60Hz
- 2) The device has internal Power Transfer Loops

3 TEST RESULTS

3.1 Power Line Conducted Emissions

FCC Part 15.107(a)

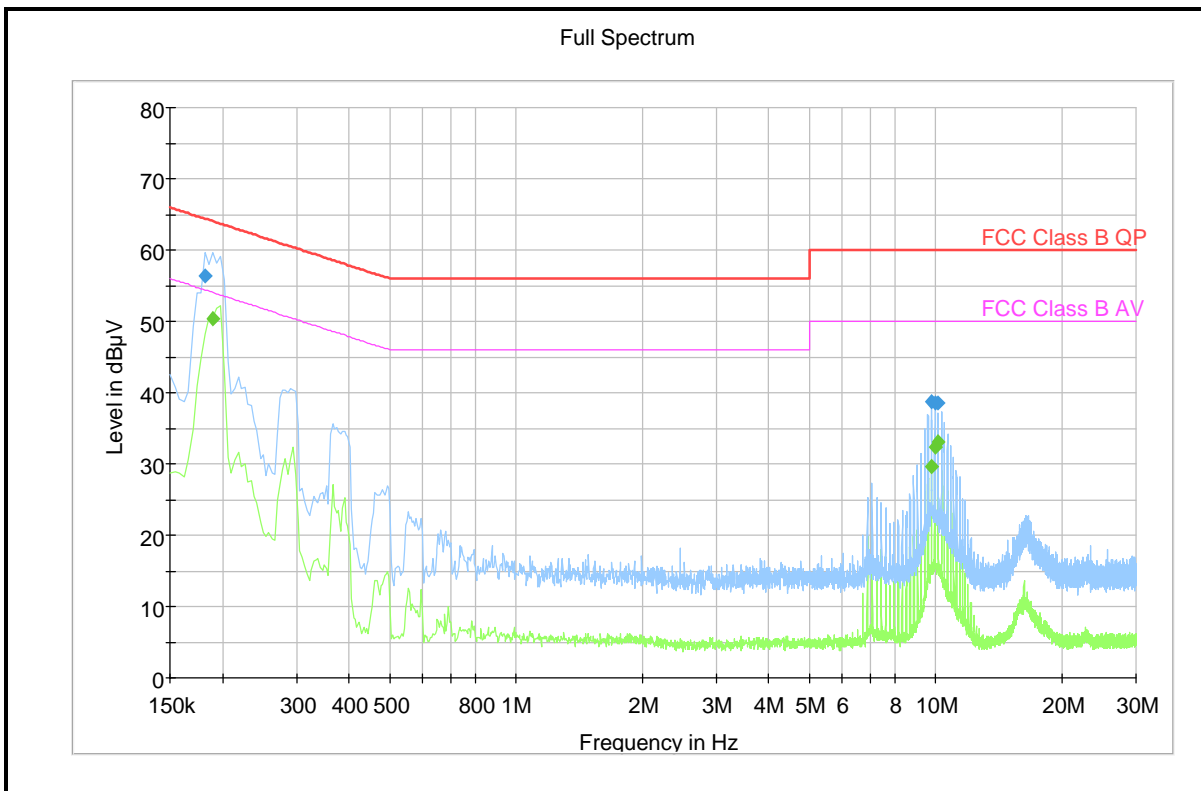
Measurement procedure: ANSI C63.4-2014 using 50 μ H/50 ohms LISN

Test voltage: 115V AC 60Hz

Test Results: Complies

Measurement Data: See attached graph, (Peak detector)

Frequency (MHz)	QuasiPeak (dB μ V)	Average (dB μ V)	Limit (dB μ V)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter
0.182	56.33	---	64.39	8.07	1000	9	N	OFF
0.190	---	50.45	54.04	3.58	1000	9	L1	OFF
9.768	---	29.67	50.00	20.33	1000	9	L1	OFF
9.780	38.82	---	60.00	21.18	1000	9	L1	OFF
9.952	---	32.34	50.00	17.66	1000	9	N	OFF
9.952	38.63	---	60.00	21.37	1000	9	L1	OFF
10.136	38.61	---	60.00	21.39	1000	9	L1	OFF
10.136	---	33.09	50.00	16.92	1000	9	L1	OFF



EUT charging @ 115V AC 60Hz

Plot shows worst case of Phase L1 and Phase N.
 Blue trace is Peak Detector; Green is Average Detector.

3.2 Field strength of radiated emissions

Radiated emission 30 – 1000 MHz.

Test voltage: 115V AC 60Hz

Detector: Quasi-Peak

Measuring distance 3 meters.

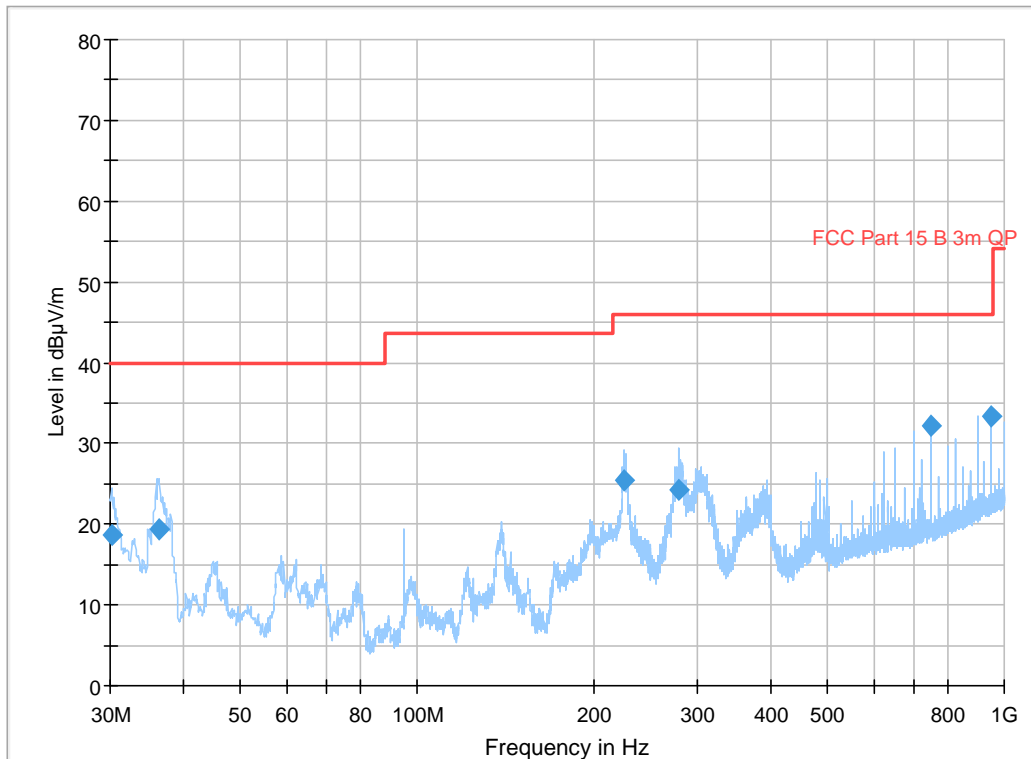
Measured according to FCC setup, method, and Class B limits.

Measurement Data:

Frequency (MHz)	QuasiPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
30.186524	18.55	40.00	21.45	1000.0	120.000	129.0	V	264.0
36.238150	19.44	40.00	20.56	1000.0	120.000	106.0	V	275.0
224.999200	25.49	46.00	20.51	1000.0	120.000	100.0	H	279.0
279.844150	24.32	46.00	21.68	1000.0	120.000	100.0	H	150.0
749.996450	32.27	46.00	13.73	1000.0	120.000	100.0	H	58.0
949.993150	33.30	46.00	12.70	1000.0	120.000	277.0	V	264.0

See attached graphs.

Full Spectrum



Charging mode

Plot shows worst case of Vertical and Horizontal Polarization.

Blue dots show QP-measurement levels according to table above.

Radiated emission 1000 – 6000 MHz.

Test voltage 115V AC 60Hz

Detector: Peak/Average

Measuring distance 3 meters.

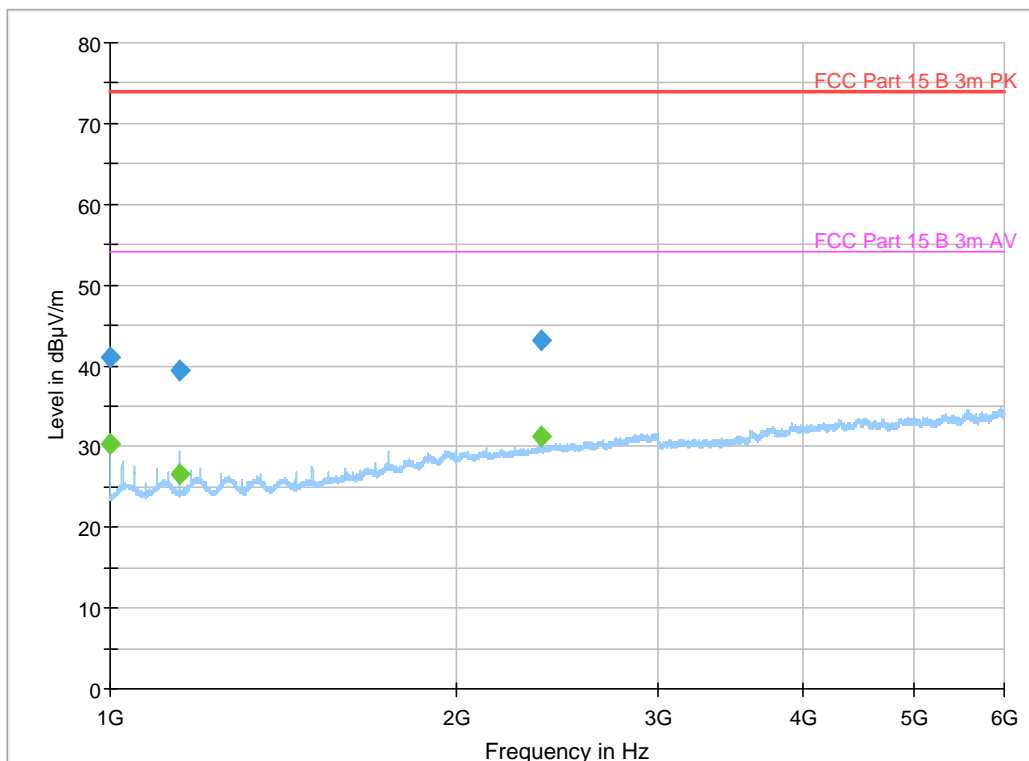
Measured according to FCC setup, method, and Class B limits.

Measurement Data Vertical Polarisation:

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol
1000.002080	---	30.37	54.00	23.63	1000.0	1000.000	100.0	V
1000.002080	41.04	---	74.00	32.96	1000.0	1000.000	100.0	V
1150.010000	39.37	---	74.00	34.63	1000.0	1000.000	100.0	V
1150.010000	---	26.52	54.00	27.48	1000.0	1000.000	100.0	V
2375.160000	43.06	---	74.00	30.94	1000.0	1000.000	100.0	V
2375.160000	---	31.18	54.00	22.82	1000.0	1000.000	100.0	V

See attached graphs.

Full Spectrum



1000-6000 MHz, Vertical polarization.

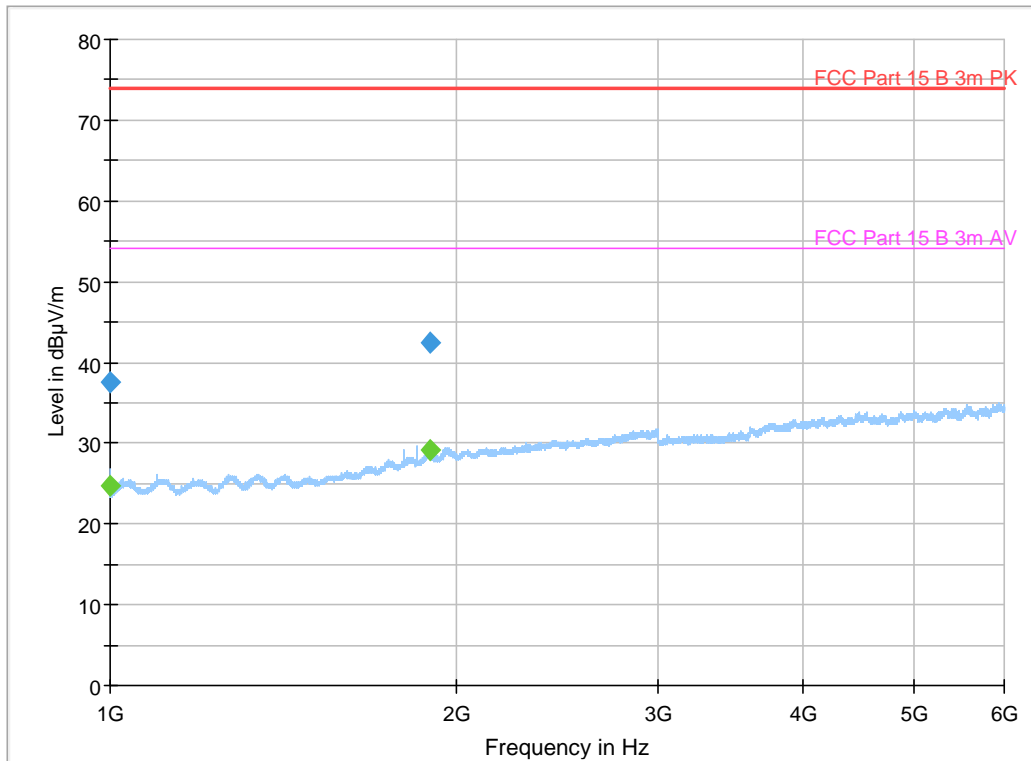
Blue and green dots show Peak and Average measurement values, respectively

Measurement Data Horizontal Polarisation:

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol
1000.004500	---	24.78	54.00	29.22	1000.0	1000.000	100.0	H
1000.004500	37.52	---	74.00	36.48	1000.0	1000.000	100.0	H
1899.999000	---	29.08	54.00	24.92	1000.0	1000.000	100.0	H
1899.999000	42.55	---	74.00	31.45	1000.0	1000.000	100.0	H

See attached graphs.

Full Spectrum



1000-6000 MHz, Horizontal polarization

Blue and green dots show Peak and Average measurement values, respectively

4 Measurement Uncertainties

Measurement Uncertainty Values		
Test Item		Uncertainty
Spurious Emissions, Radiated	< 1 GHz	±2.5 dB
	> 1 GHz	±2.2 dB
Power Line Conducted Emissions		+2.9 / -4.1 dB
Temperature Uncertainty		±1 °C

All uncertainty values are expanded standard uncertainty to give a confidence level of 95%, based on coverage factor k=2

5 LIST OF TEST EQUIPMENT

To facilitate inclusion on each page of the test equipment used for related tests, each item of test equipment and ancillaries are identified (numbered) by the Test Laboratory.

No.	Model number	Description	Manufacturer	Ref. no.	Cal. date	Cal. Due
1	ESU40	Measuring Receiver	Rohde & Schwarz	LR-1639	02/2020	02/2021
2	JB3	BiLog Antenna	Sunol Sciences	N-4525	03/2020	03/2021
3	3117PA	Horn Antenna with preamp	EMCO	LR-1717	12/2017	12/2020
4	HFH2-Z2	Loop Antenna	Rohde & Schwarz	LR-1660	08/2019	08/2021
5	1000iX Series II	AC Power Source	California Instruments	LR-1549	05/2015	05/2021
6	ESH3-Z5	AMN	Rohde & Schwarz	N-3403	11/2019	11/2021
7	ESHS-10	EMI Receiver	Rohde & Schwarz	N-3528	10/2019	10/2021
8	Model 87V	Multimeter	Fluke	LR-1599	02/2019	02/2021

The software listed below has been used for one or more tests.

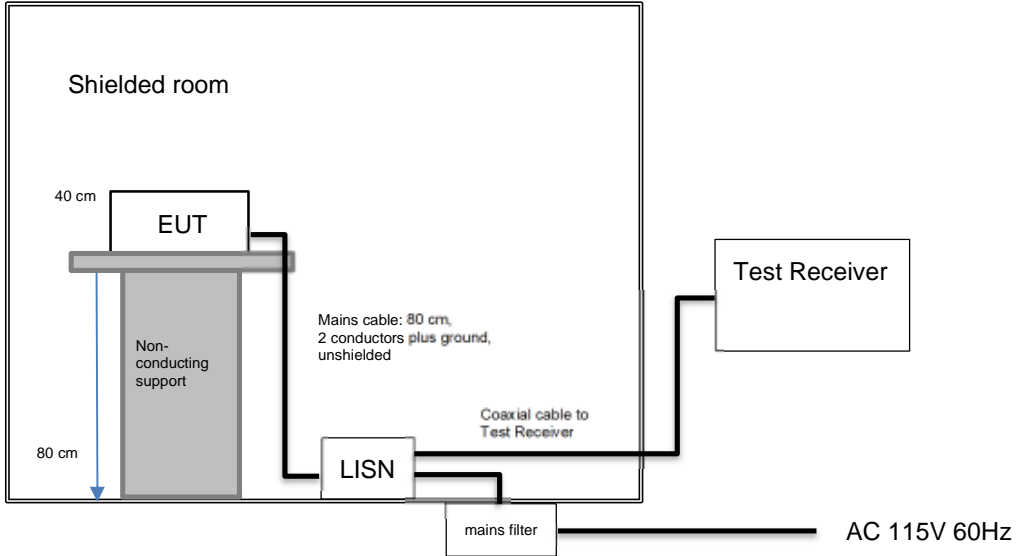
No.	Manufacturer	Name	Version	Comment
1	Rohde & Schwarz	EMC32	10.40.10	Power Line Conducted test software
2	Rohde & Schwarz	EMC32	10.40.10	Radiated Emission test software
3	Rohde & Schwarz	GPIBSHOT	2.7	Screenshots from R&S Spectrum Analyzers
4				

Revision history

Revision	Date	Comment	Sign
00	2020.09.29	First edition	JGE

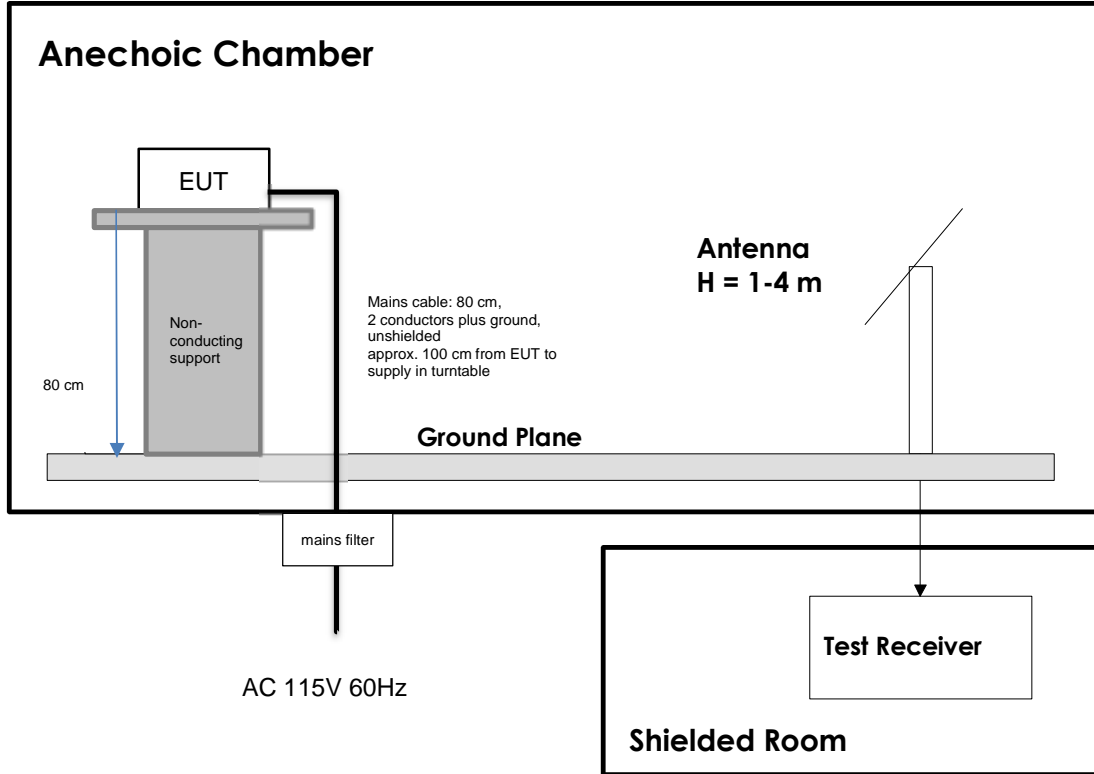
6 BLOCK DIAGRAM

6.1 Power Line Conducted Emission



The test receiver was located outside the shielded room.

6.2 Test Site Radiated Emission



This test setup is used for all radiated emissions tests. For frequencies below 30 MHz the measuring distance is 10m, for all other frequencies measuring distance is 3m.

Emissions above 1 GHz are measured with a Spectrum Analyzer and Horn Antenna and with the preamplifier after the antenna.

Tests above 1GHz were performed with the floor between the EUT and the measuring antenna covered by floor absorbers.