FCC and IC or ISED Test Report

SureFlap Limited
Sure Petcare Hub, Model: iHB v2

In accordance with FCC 47 CFR Part 15B, ICES-003 and ISEDC RSS-GEN

Add value.
Inspire trust.

Prepared for: SureFlap Limited
Ground floor,
Building 2030,
Cambourne Business Park,
Cambourne,
Cambridgeshire,
CB23 6DW,
United Kingdom

FCC ID: XO9-IHB002 IC: 8906A-IHB002

COMMERCIAL-IN-CONFIDENCE

Document 75950946-02 Issue 01

SIGNATURE			
NAME	**JOB TITLE**	**RESPONSIBLE FOR**	**ISSUE DATE**
John Laydon	General Manager	Authorised Signatory	20 April 2021

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD document control rules.

ENGINEERING STATEMENT

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate limited compliance with FCC 47 CFR Part 15B and ICES-003 and ISEDC RSS-GEN. The sample tested was found to comply with the requirements defined in the applied rules.

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Testing	William Mayo	20 April 2021	
Testing	Raneev Palavila	20 April 2021	

FCC Accreditation
217472 Bearley Test Laboratory

Industry Canada Accreditation
2932E Bearley Test Laboratory

EXECUTIVE SUMMARY

A sample of this product was tested and found to be compliant with FCC 47 CFR Part 15B: 2019, ICES-003 Issue 6: 2016 and ISEDC RSS-GEN: Issue 5 (2018) for the tests detailed in section 1.3.

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Contents

1 Report Summary

1.1 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

Issue	Description of Change	Date of Issue
1	First Issue	20 April 2021

Table 1

1.2 Introduction

Applicant	SureFlap Limited
Manufacturer	SureFlap Limited
Model Number(s)	iHB v2
Serial Number(s)	H001-0020392
Hardware Version(s)	V1
Software Version(s)	01713-FF
Number of Samples Tested	1
Test Specification/Issue/Date	FCC 47 CFR Part 15B: 2019, ICES-003 Issue 6: 2016 ISEDC RSS-GEN: Issue 5 (2018)
Order Number Date	4120 08-January-2021
Date of Receipt of EUT	01-March-2021
Start of Test	03-March-2021
Finish of Test	10-March-2021
Name of Engineer(s)	(William Mayo supervised by Callum Smith) (Raneev Palavila supervised by Martin Perry)
Related Document(s)	ANSI C63.4: 2014

1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 15B and ICES-003 and ISEDC RSS-GEN is shown below.

Section	Specification Clause			Test Description	Modification State	Result	Comments/Base Standard
	FCC	ICES	ISEDC				
Configuration and Mode: AC Powered - Idle							
2.1	15.107	3.1	8.8	Conducted Disturbance at Mains Terminals	0	Pass	ANSI C63.4: 2014
2.2	15.109	3.2	7.1	Radiated Disturbance	0	Pass	ANSI C63.4: 2014

Table 2

1.4 Declaration of Build Status

MAIN EUT	
MANUFACTURING DESCRIPTION	Sure Petcare wireless Hub
MANUFACTURER	Sure Flap Ltd
MODEL	iHB v2
PART NUMBER	iHB v2
HARDWARE VERSION	V1
SOFTWARE VERSION	01713-FF
PSU VOLTAGE/FREQUENCY/CURRENT	5 VDC nominal
HIGHEST INTERNALLY GENERATED FREQUENCY	2.48 GHz
FCC ID (if applicable)	XO9-IHB002
INDUSTRY CANADA ID (if applicable)	8906A-IHB002
TECHNICAL DESCRIPTION (a brief technical description of the intended use and operation)	The product connects with all Sure PetCare “Connected” products. It is connected to end user’s router and acts as the link between the “Connected” family product and the server/App. The hub communicates with the “Connected” family product via an 802.15.4 2.4 GHz wireless link.
COUNTRY OF ORIGIN	Peoples Republic of China
RF CHARACTERISTICS (if applicable)	
TRANSMITTER FREQUENCY OPERATING RANGE (MHz)	2425 - 2480
RECEIVER FREQUENCY OPERATING RANGE (MHz)	2425 - 2480
INTERMEDIATE FREQUENCIES	N / A
EMISSION DESIGNATOR(S): https://fccid.io/Emissions-Designator/	2M48F1D
MODULATION TYPES: (i.e. GMSK, QPSK)	O-QPSK
OUTPUT POWER (W or dBm)	7.5 dBm
SEPARATE BATTERY/POWER SUPPLY (if applicable)	
MANUFACTURING DESCRIPTION	USB switching mode power supply
MANUFACTURER	Helms-man industrial co Ltd.
TYPE	SKB
PART NUMBER	SKB0501000P
PSU VOLTAGE/FREQUENCY/CURRENT	5 VDC nominal
COUNTRY OF ORIGIN	Peoples Republic of China

Table 3

I hereby declare that the information supplied is correct and complete.

Name: Dr David Hallas
Position held: Managing Director
Date 10-02-2020

1.5 Product Information

1.5.1 Technical Description

The Equipment under test (EUT) was a Sure Flap Limited, Sure Petcare Wireless Hub.

The primary function of the EUT is to connect with all Sure PetCare “Connected” products. It is connected to end user’s router and acts as the link between the “Connected” family product and the server/App. The hub communicates with the “Connected” family product via an 802.15.4 2.4 GHz wireless link.

Figure 1 - General View - Wireless Traffic/Transmitter Sample

Figure 2 - General View - Product Information and Serial Number

Figure 3 - General View - Wireless Traffic/Receiver Sample

Figure 4 - General View - Product Information and Serial Number

1.5.2 EUT Port/Cable Identification

Port	Max Cable Length specified	Usage	Type	Screened
Configuration and Mode: AC Powered - Idle				
AC Mains	2m	AC Power for the EUT	DC Jack to AC/DC power adapter	No
Ethernet	3m	Ethernet	Cat 5E	Yes

Table 4

1.5.3 Test Configuration

Configuration	Description
AC Powered	The EUT was powered via a AC/DC power adapter, utilising a 120Vac 60Hz supply. An Ethernet cable was connected to the Ethernet Port that provided a connection to the Sure Flap server.

Table 5

1.5.4 Modes of Operation

Mode	Description
Idle	Emissions Wireless Idle - The EUT was powered and connected to the Sure Flap server.

Table 6

1.6 Deviations from the Standard

No deviations from the applicable test standard were made during testing.

1.7 EUT Modification Record

The table below details modifications made to the EUT during the test programme.

The modifications incorporated during each test are recorded on the appropriate test pages.

Modification State	Description of Modification still fitted to EUT	Modification Fitted By	Date Modification Fitted
Model: iHB v2, Serial Number: H001-0020392			
0	As supplied by the customer	Not Applicable	Not Applicable

Table 7

1.8 Test Location

TÜV SÜD conducted the following tests at our Bearley Test Laboratory.

Test Name	Name of Engineer(s)	Accreditation
Configuration and Mode: AC Powered - Idle		
Conducted Disturbance at Mains Terminals	(William Mayo Supervised by Callum Smith) (Raneev Palavila Supervised by Martin Perry)	UKAS
Radiated Disturbance	(Raneev Palavila Supervised by Martin Perry)	UKAS

Table 8

Office Address:

Snitterfield Road
Bearley
Stratford-upon-Avon
Warwickshire
CV37 0EX
United Kingdom

2 Test Details

2.1 Conducted Disturbance at Mains Terminals

2.1.1 Specification Reference

FCC 47 CFR Part 15B Clause 15.107
ICES-003 Clause 3.3
ISEDC RSS-GEN Clause 8.8

2.1.2 Equipment Under Test and Modification State

iHB v2, S/N: H001-0020392 - Modification State 0

2.1.3 Date of Test

04-March-2021

2.1.4 Test Method

The EUT was setup according to ANSI C63.4, clause 5.2.

The EUT was placed on a non-conductive table 0.8 m above a reference ground plane. A vertical coupling plane was placed 0.4 m from the EUT boundary.

A Line Impedance Stabilisation Network (LISN) was directly bonded to the ground-plane. The EUT was located so that the distance between the boundary of the EUT and the closest surface of the LISN was 0.8 m.

Interconnecting cables that hanged closer than 0.4 m to the ground plane were folded back and forth in the centre forming a bundle 0.3 m to 0.4 m long.

Input and output cables were terminated with equipment or loads representative of real usage conditions.

The EUT was configured to give the highest level of emissions within reason of a typical installation as described by the manufacturer.

2.1.5 Example Calculation

Quasi-Peak level (dBµV) = Receiver level (dBµV) + Correction Factor (dB)
Margin (dB) = Quasi-Peak level (dBµV) - Limit (dBµV)

CISPR Average level (dBµV) = Receiver level (dBµV) + Correction Factor (dB)
Margin (dB) = CISPR Average level (dBµV) - Limit (dBµV)

2.1.6 Example Test Setup Diagram

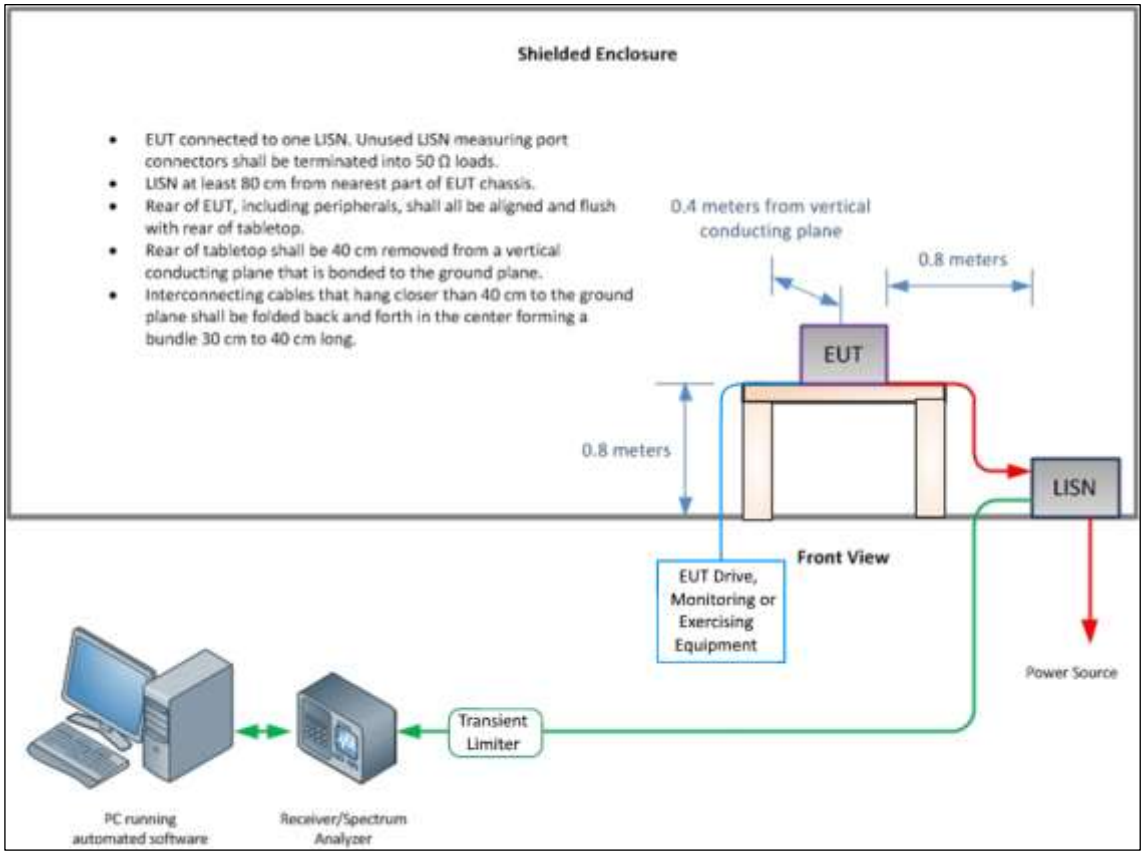

Figure 5 - Conducted Disturbance

2.1.7 Environmental Conditions

Ambient Temperature	16.2 - 22.3 °C
Relative Humidity	31.8 - 44.5 %

2.1.8 Specification Limits

Required Specification Limits - Class B			
Line Under Test	Frequency Range (MHz)	Quasi-Peak Test Limit (dBµV)	CISPR Average Test Limit (dBµV)
AC Power Port	0.15 to 0.5	66 to 56[(1)]	56 to 46[(1)]
	0.5 to 5	56	46
	5 to 30	60	50
Supplementary information: Note 1. Decreases with the logarithm of the frequency.			

Table 9

2.1.9 Test Results

Results for Configuration and Mode: AC Powered - Idle.

This test was performed to the requirements of the Class B limits.

Performance assessment of the EUT made during this test: Pass.

Detailed results are shown below.

Line Under Test: AC Mains L1

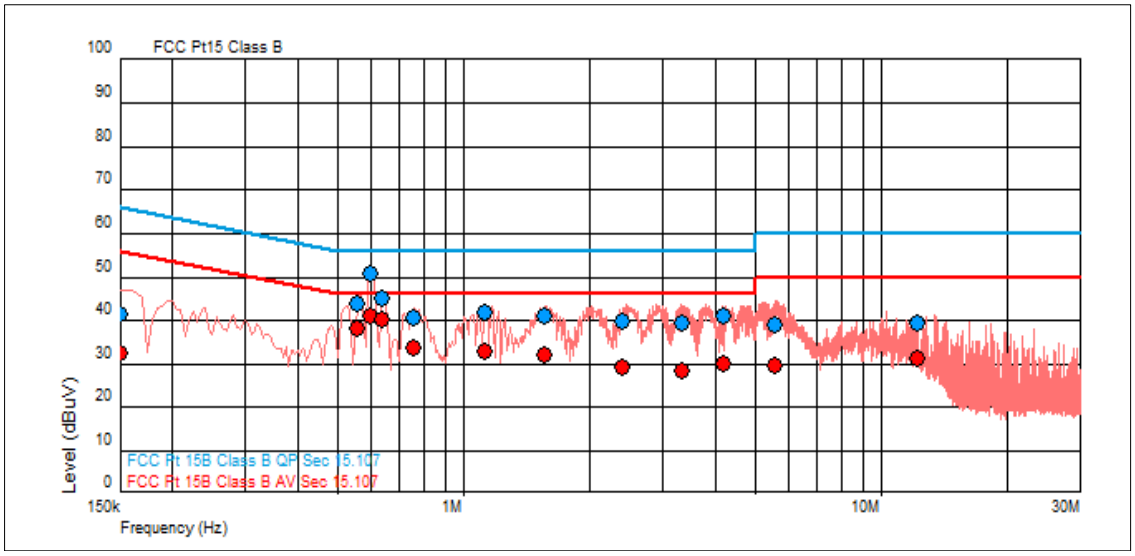

Figure 6 - Graphical Results - AC Mains - Live

Frequency (MHz)	QP Level (dBµV)	QP Limit (dBµV)	QP Margin (dB)	AV Level (dBµV)	AV Limit (dBµV)	AV Margin (dB)
0.151	41.4	66.0	-24.6	32.5	56.0	-23.5
0.558	43.7	56.0	-12.3	37.8	46.0	-8.2
0.598	50.5	56.0	-5.5	40.8	46.0	-5.2
0.641	45.0	56.0	-11.0	40.1	46.0	-5.9
0.759	40.5	56.0	-15.5	33.5	46.0	-12.5
1.122	41.8	56.0	-14.2	32.9	46.0	-13.1
1.559	41.0	56.0	-15.0	32.0	46.0	-14.0
2.404	39.5	56.0	-16.5	29.2	46.0	-16.8
3.341	39.1	56.0	-16.9	28.3	46.0	-17.7
4.196	41.0	56.0	-15.0	30.0	46.0	-16.0
5.586	38.7	60.0	-21.3	29.5	50.0	-20.5
12.197	39.2	60.0	-20.8	31.1	50.0	-18.9

Table 10

No other final measurements were made as all other peak emissions seen during the pre-scan were greater than 6 dB below the CISPR Average test limit

Line Under Test: AC Mains N

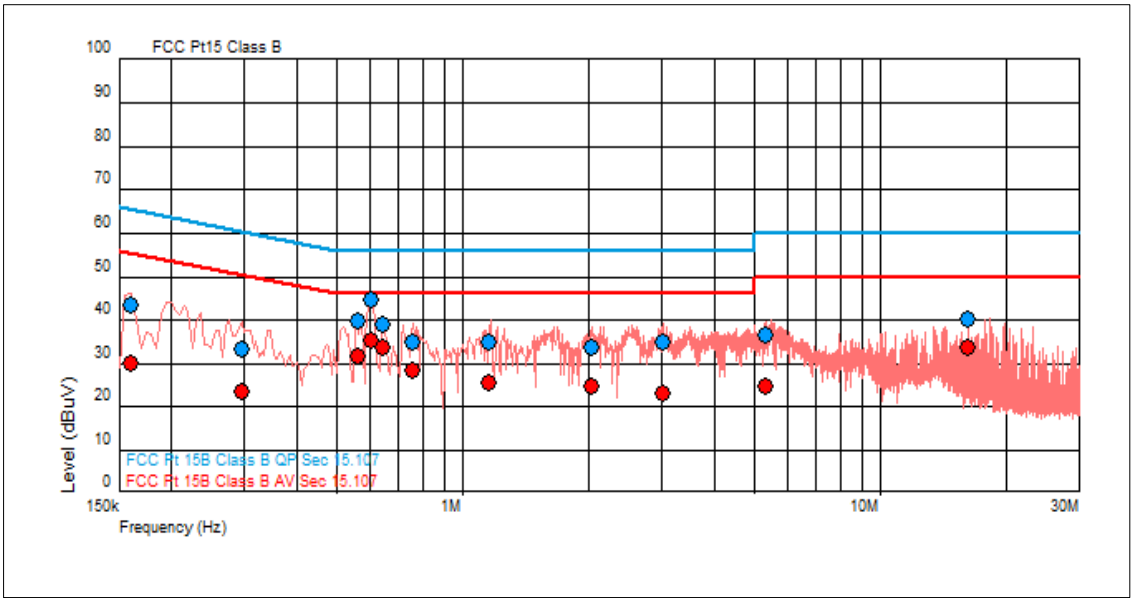

Figure 7 - Graphical Results - AC Mains - Neutral

Frequency (MHz)	QP Level (dBµV)	QP Limit (dBµV)	QP Margin (dB)	AV Level (dBµV)	AV Limit (dBµV)	AV Margin (dB)
0.161	43.1	65.4	-22.3	29.7	55.4	-25.8
0.295	33.0	60.4	-27.4	23.4	50.4	-27.0
0.561	39.6	56.0	-16.4	31.5	46.0	-14.5
0.607	44.6	56.0	-11.4	35.2	46.0	-10.8
0.641	38.7	56.0	-17.3	33.5	46.0	-12.5
0.761	34.9	56.0	-21.1	28.3	46.0	-17.7
1.158	34.8	56.0	-21.2	25.3	46.0	-20.7
2.044	33.5	56.0	-22.5	24.6	46.0	-21.4
3.006	34.9	56.0	-21.1	22.8	46.0	-23.2
5.328	36.4	60.0	-23.6	24.6	50.0	-25.4
16.227	40.0	60.0	-20.0	33.6	50.0	-16.4

Table 11

No other final measurements were made as all other peak emissions seen during the pre-scan were greater than 6 dB below the CISPR Average test limit

Figure 8 - Test Setup

2.1.10 Test Location and Test Equipment Used

This test was carried out in Bearley EMC Chamber 1.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	1425	12	18-Jan-2022
Single Phase LISN	Rohde & Schwarz	ESH3-Z5	1674	12	22-May-2021
Hygromer	Rotronic	A2	1698	12	18-Nov-2021
Termination	MEB Messelektronik	TRA150	1759	12	TU
EMI Test Receiver	Rohde & Schwarz	ESIB26	3763	12	26-Aug-2021
Quadtech Single Phase Programmable AC Source Unit	PDS Instruments Ltd	31020-00071	4133	-	TU
EMC 3m Semi Anechoic Chamber	Rainford	Hybrid	4160	36	16-Dec-2021
Digital Multimeter	Agilent Technologies	U1232A	4161	12	05-Jun-2021
7m N-Type Cable	Teledyne Storm	SA90-195-7MTR	4168	12	07-Apr-2021
Compliance 3 Emissions	Schaffner	C3e Software	4723		Software
Emissions Cable (3m)	Gigatronics	APFZAAPFZAB4W2-3M	4977	12	08-Oct-2021
Cable (18GHz N Type 3m)	Rosenberger	LU7-036-3000	5163	12	10-Dec-2021
Attenuator Precision Fixed	Mini-Circuits	BW-N10W5+	5296	12	29-Jun-2021
Scientific Ambient Monitor	Testo	622	5698	12	17-Feb-2022

Table 12

TU - Traceability Unscheduled

2.2 Radiated Disturbance

2.2.1 Specification Reference

FCC 47 CFR Part 15B Clause 15.109,
ICES-003 Clause 3.2
ISEDC RSS-GEN Clause 7.1

2.2.2 Equipment Under Test and Modification State

iHB v2, S/N: H001-0020392 - Modification State 0

2.2.3 Date of Test

03-March-2021 to 10-March-2021

2.2.4 Test Method

The EUT was set up on a non-conductive table 0.8 m above a reference ground plane within a semi-anechoic chamber on a remotely controlled turntable.

A pre-scan of the EUT emissions profile using a peak detector was made at a 3 m antenna distance whilst varying the antenna-to-EUT azimuth and polarisation.

For an EUT which could reasonable be used in multiple planes, pre-scans were performed with the EUT orientated in X, Y and Z planes with reference to the ground plane.

Using a list of the highest emissions detected during the pre-scan along with their bearing and associated antenna polarisation, the EUT was then formally measured using a Quasi-Peak, Peak or CISPR Average detector as appropriate.

The readings were maximised by adjusting the antenna height, polarisation and turntable azimuth, in accordance with the specification.

2.2.5 Example Calculation

Below 1 GHz:

Quasi-Peak level (dBµV/m) = Receiver level (dBµV) + Correction Factor (dB/m)
Margin (dB) = Quasi-Peak level (dBµV/m) - Limit (dBµV/m)

Above 1 GHz:

CISPR Average level (dBµV/m) = Receiver level (dBµV) + Correction Factor (dB/m)
Margin (dB) = CISPR Average level (dBµV/m) - Limit (dBµV/m)

Peak level (dBµV/m) = Receiver level (dBµV) + Correction Factor (dB/m)
Margin (dB) = Peak level (dBµV/m) - Limit (dBµV/m)

2.2.6 Example Test Setup Diagram

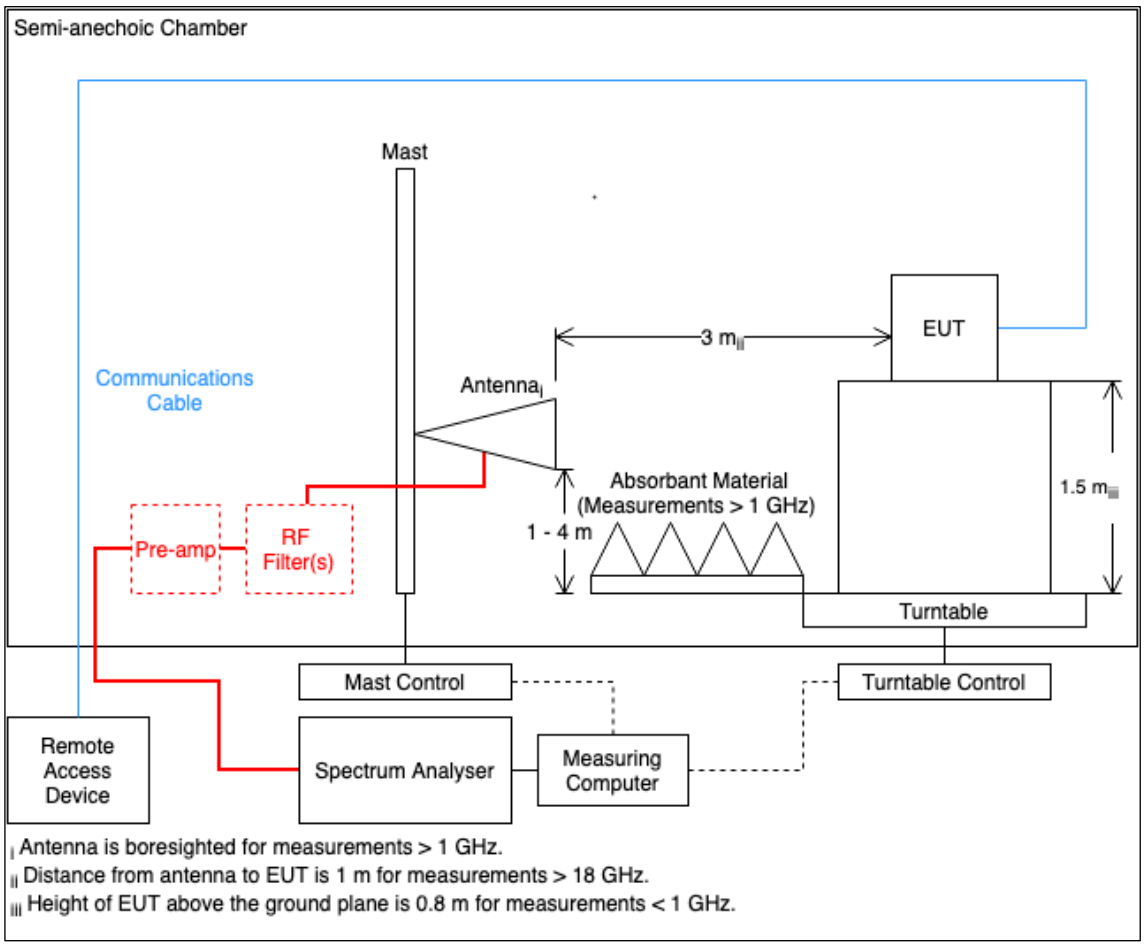

Figure 9

2.2.7 Environmental Conditions

Ambient Temperature	19.6 - 22.2 °C
Relative Humidity	30.2 - 32.2 %

2.2.8 Specification Limits

Required Specification Limits, Field Strength - Class B Test Limit at a 3 m Measurement Distance		
Frequency Range (MHz)	Test Limit (µV/m)	Test Limit (dBµV/m)
30 to 88	100	40.0
88 to 216	150	43.5
216 to 960	200	46.0
Above 960	500	54.0
Supplementary information: Note 1. A Quasi-peak detector is to be used for measurements below 1 GHz. Note 2. A CISPR Average detector is to be used for measurements above 1 GHz. Note 3. The Peak test limit above 1 GHz is 20 dB higher than the CISPR Average test limit.		

Table 13

2.2.9 Test Results

Results for Configuration and Mode: AC Powered - Idle.

This test was performed to the requirements of the Class B limits.

Performance assessment of the EUT made during this test: Pass.

Detailed results are shown below.

Highest frequency generated or used within the EUT: 2480 MHz
Which necessitates an upper frequency test limit of: 15 GHz

Frequency Range of Test: 30 MHz to 1 GHz

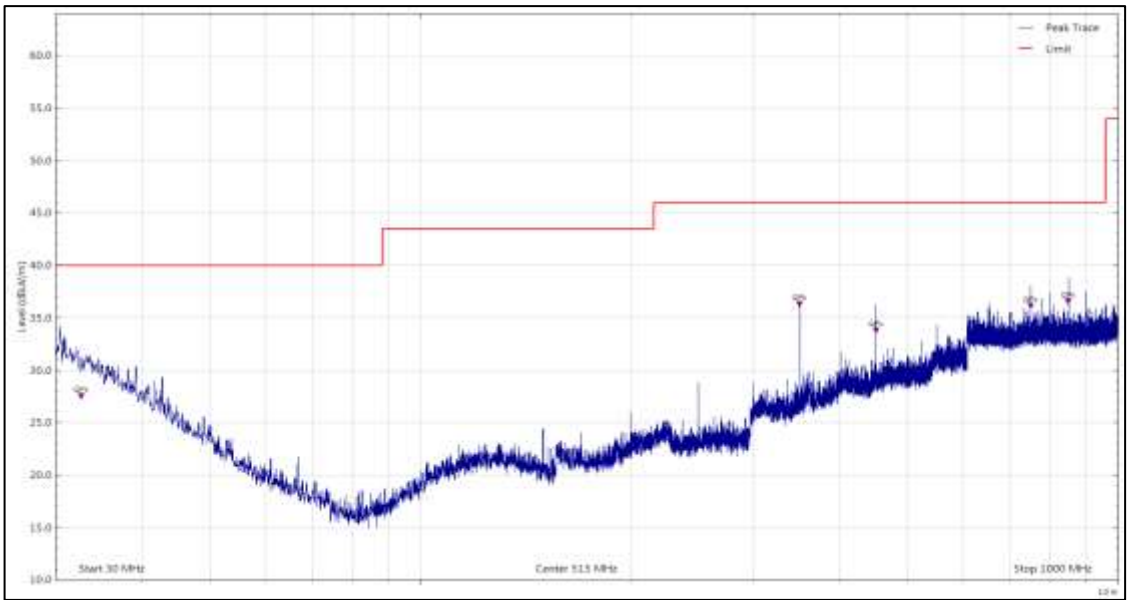

Figure 10 - 30 MHz to 1 GHz, Peak, Horizontal

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation	Results
32.635	27.1	40.0	-12.9	Q-Peak	39	251	Horizontal	Pass
349.984	35.9	46.0	-10.1	Q-Peak	57	100	Horizontal	Pass
450.001	33.4	46.0	-12.7	Q-Peak	351	114	Horizontal	Pass
749.981	35.7	46.0	-10.3	Q-Peak	330	238	Horizontal	Pass
849.987	36.1	46.0	-9.9	Q-Peak	344	110	Horizontal	Pass

Table 14

No other final measurements were made as all other peak emissions seen above the measurement system noise floor during the pre-scan were greater than 10 dB below the test limit.

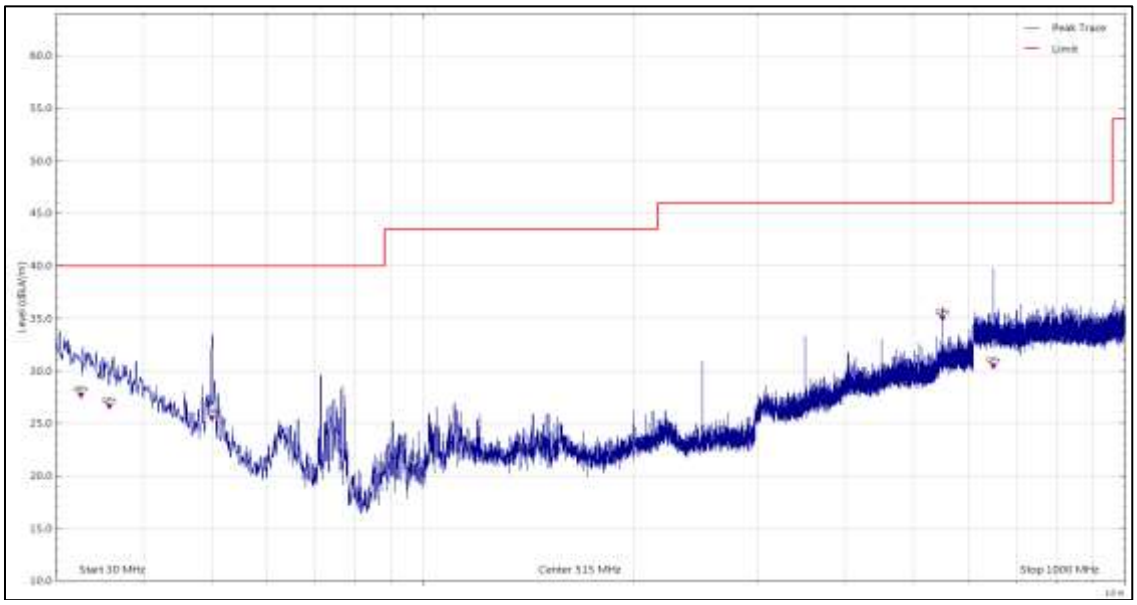

Figure 11 - 30 MHz to 1 GHz, Peak, Vertical

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation	Results
32.600	27.2	40.0	-12.8	Q-Peak	1	384	Vertical	Pass
35.727	26.1	40.0	-13.9	Q-Peak	65	381	Vertical	Pass
50.001	25.0	40.0	-15.0	Q-Peak	77	394	Vertical	Pass
549.981	34.5	46.0	-11.5	Q-Peak	174	110	Vertical	Pass
649.994	30.0	46.0	-16.0	Q-Peak	183	368	Vertical	Pass

Table 15

No other final measurements were made as all other peak emissions seen above the measurement system noise floor during the pre-scan were greater than 10 dB below the test limit.

Frequency Range of Test: 1 GHz to 15 GHz - Peak Detector

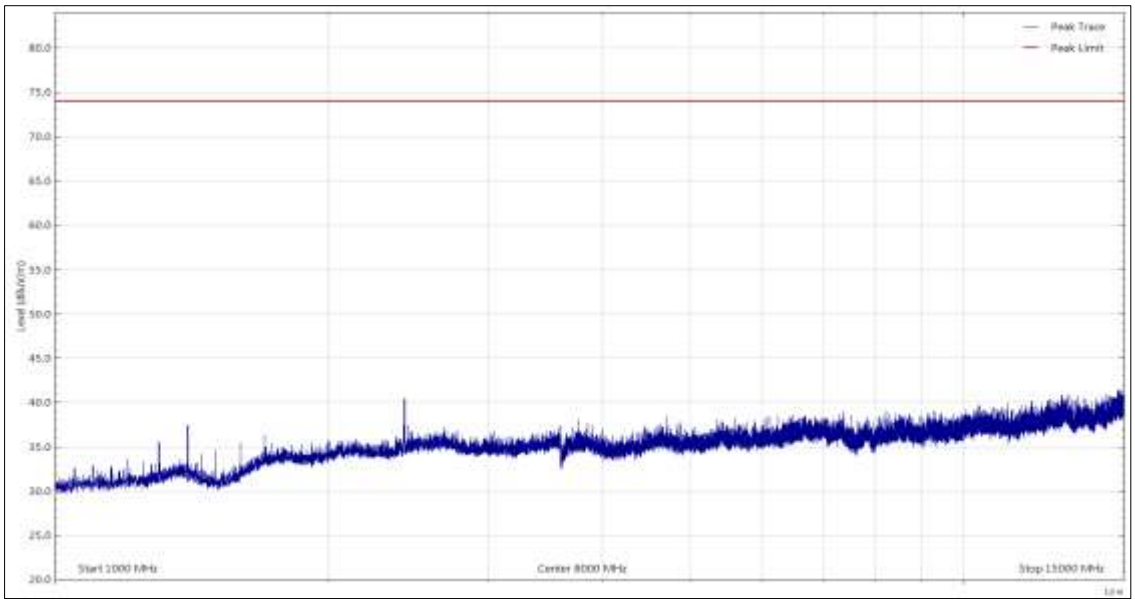

Figure 12 - 1 GHz to 15 GHz, Peak, Horizontal

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation	Orientation
*								

*No final measurements were made as all peak emissions seen above the measurement system noise floor during the pre-scan were greater than 10 dB below the test limit.

Frequency Range of Test: 1 GHz to 15 GHz - Peak Detector

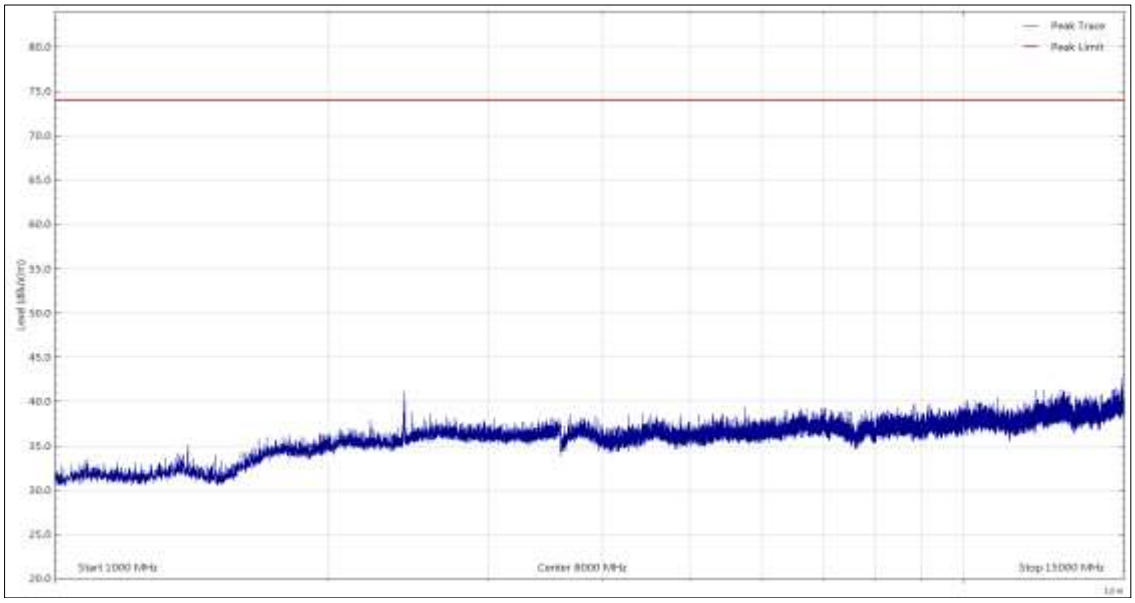

Figure 13 - 1 GHz to 15 GHz, Peak, Vertical

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation	Orientation
*								

*No final measurements were made as all peak emissions seen above the measurement system noise floor during the pre-scan were greater than 10 dB below the test limit.

Frequency Range of Test: 1 GHz to 15 GHz - CISPR Average Detector

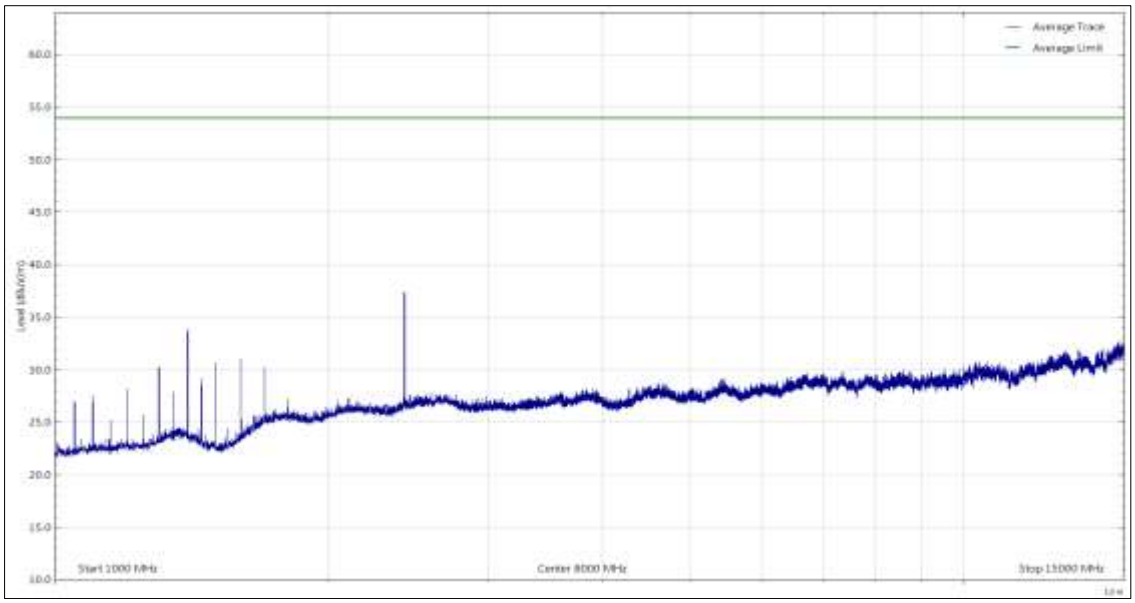

Figure 14 - 1 GHz to 15 GHz, CISPR Average, Horizontal

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation	Orientation
*								

*No final measurements were made as all peak emissions seen above the measurement system noise floor during the pre-scan were greater than 10 dB below the test limit.

Frequency Range of Test: 1 GHz to 15 GHz - CISPR Average Detector

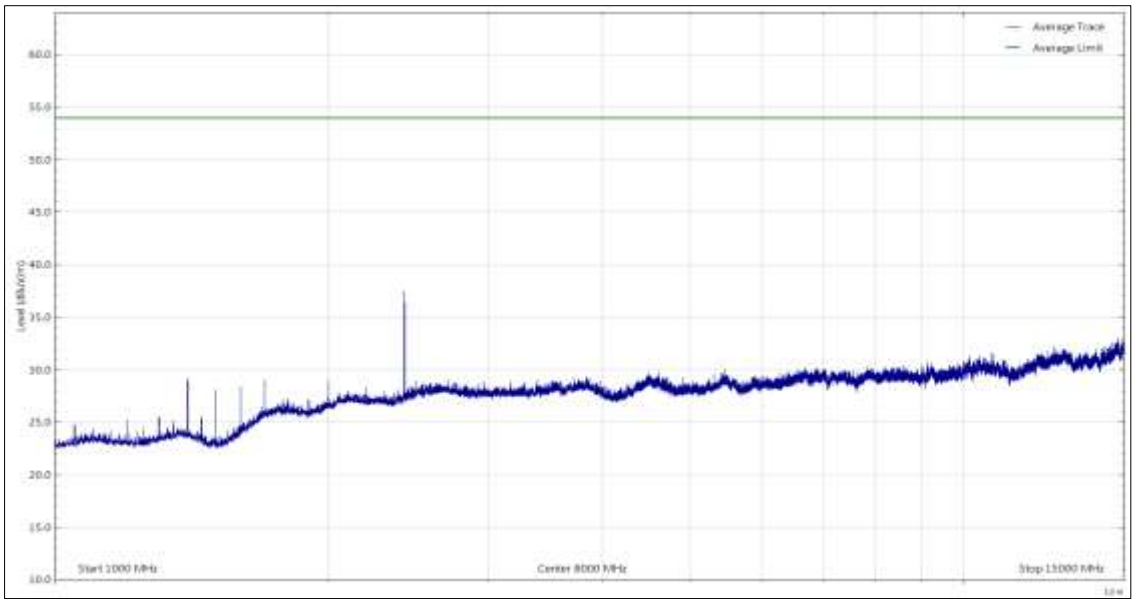

Figure 15 - 1 GHz to 15 GHz, CISPR Average, Vertical

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation	Orientation
*								

*No final measurements were made as all peak emissions seen above the measurement system noise floor during the pre-scan were greater than 10 dB below the test limit.

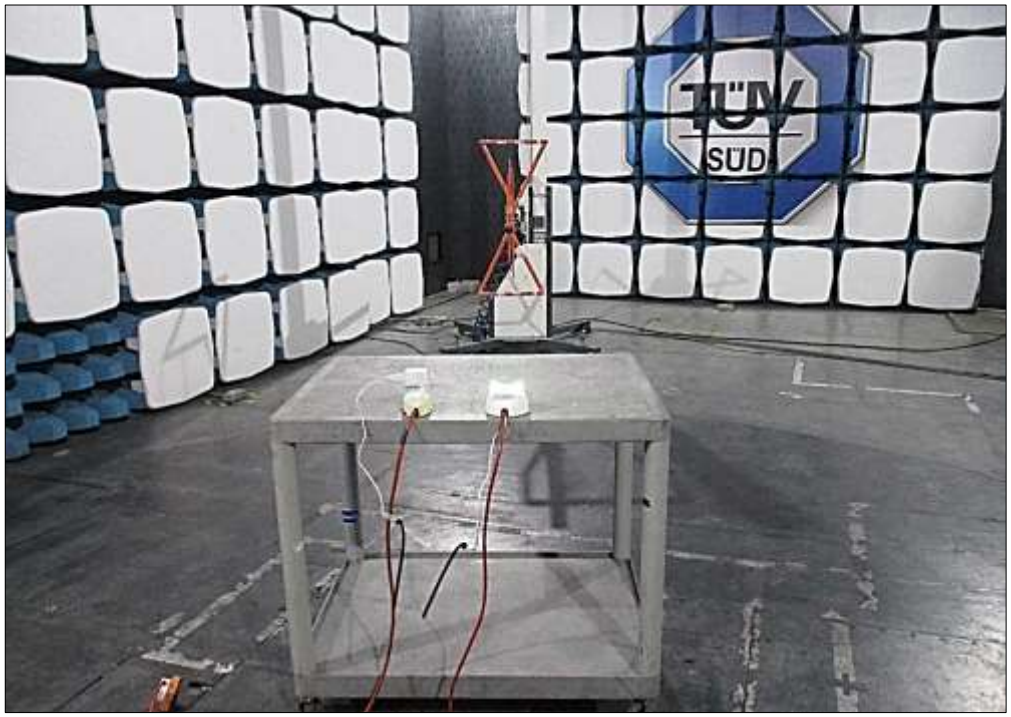

Figure 16 - Test Setup - 30 MHz to 1 GHz

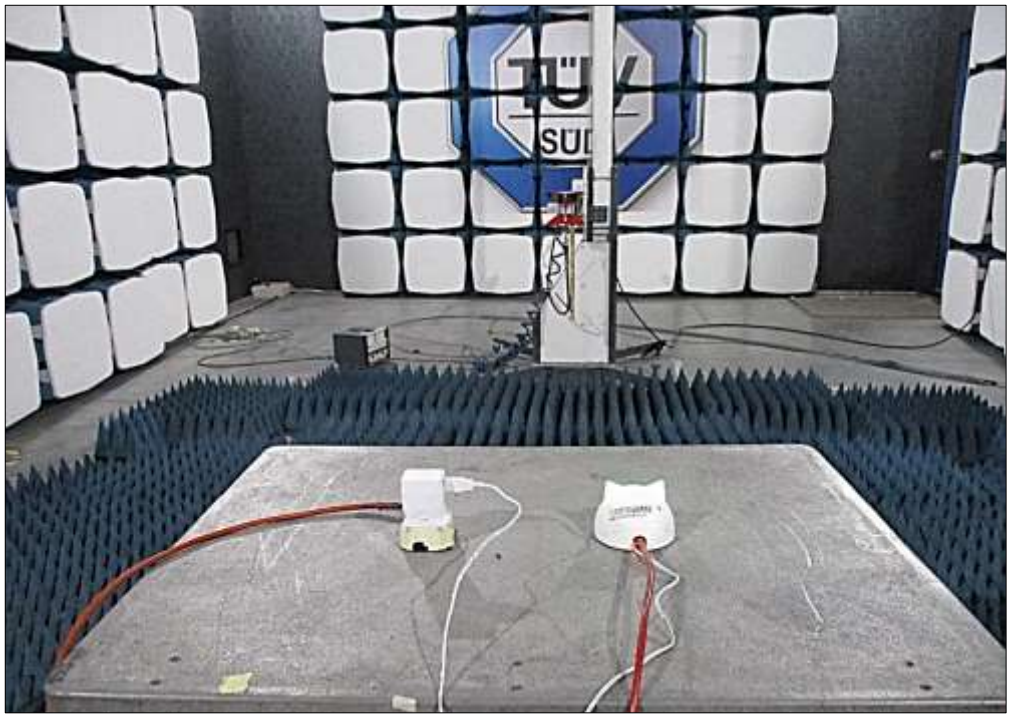

Figure 17 - Test Setup - 1 GHz to 15 GHz

2.2.10 Test Location and Test Equipment Used

This test was carried out in Bearley EMC Chamber 1.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
Bilog Antenna	Schaffner	CBL6143	1858	24	10-Nov-2022
Hygrometer	Rotronic	I-1000	2830	12	01-Oct-2021
EMC 3m Semi Anechoic Chamber	Rainford	Hybrid	4160	36	16-Dec-2021
7m N-Type Cable	Teledyne Storm	SA90-195-7MTR	4168	12	10-Mar-2021
1-8 GHz Amplifier	Wright Technologies	APS04-0085	4674	12	18-Aug-2021
8-18 GHz Amplifier	Wright Technologies	APS04-0086	4675	12	18-Aug-2021
EMC Mast controller	Innco Systems	Controller CO3000	4728	-	TU
1 - 18GHz DRG Horn	ETS-Lindgren	3117	4737	24	28-Jul-2021
EMI Receiver	Keysight Technologies	N9038A MXE	4974	12	20-Jan-2022
EmX Emissions Software	TUV SUD	V2.1.1	5125	-	Software
Cable (18GHz N Type 3m)	Rosenberger	LU7-036-3000	5163	12	10-Dec-2021
Turntable Controller	Maturo	Maturo NCD	5275	-	TU
4dB Attenuator	Pasternack	PE7047-4	5647	24	10-Nov-2022

Table 16

TU - Traceability Unscheduled

3 Incident Reports

No incidents reports were raised.

4 Measurement Uncertainty

For a 95% confidence level, the measurement uncertainties for defined systems are:

Test Name	Measurement Uncertainty
Conducted Disturbance at Mains Terminals	150 kHz to 30 MHz, LISN, ±3.7 dB
Radiated Disturbance	30 MHz to 1 GHz, Bilog Antenna, ±5.2 dB 1 GHz to 40 GHz, Horn Antenna, ±6.3 dB

Table 17

Worst case error for both Time and Frequency measurement 12 parts in 10^6.

Measurement Uncertainty Decision Rule

Determination of conformity with the specification limits is based on the decision rule according to IEC Guide 115: 2007, clause 4.4.3 and 4.5.1.