FCC Test Report

Axnes Aviation AS
Mobile Base Station, Model: BST35

In accordance with FCC 47 CFR Part 15B

Prepared for: Axnes Aviation AS
Terje Lovasvei 1
Grimstad
N-4879
NORWAY

FCC ID: 2AOHPBST3XA

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Document 75948989-01 Issue 01

SIGNATURE			
A J Lawson.			
NAME	**JOB TITLE**	**RESPONSIBLE FOR**	**ISSUE DATE**
Andy Lawson	Senior Engineer	Authorised Signatory	25 June 2020

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. The sample tested was found to comply with the requirements defined in the applied rules.

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Testing	Graeme Lawler	25 June 2020	G Lawler.

FCC Accreditation
90987 Octagon House, Fareham Test Laboratory

EXECUTIVE SUMMARY
A sample of this product was tested and found to be compliant with FCC 47 CFR Part 15B: 2019 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	25 June 2020

Table 1

1.2 Introduction

Applicant	Axnes Aviation AS
Manufacturer	Axnes Aviation AS
Model Number(s)	BST35
Manufacturer Declared Variant(s)	BST30
Serial Number(s)	AXS-SW-0711
Hardware Version(s)	R4
Software Version(s)	AXS-SW-0711
Number of Samples Tested	1
Test Specification/Issue/Date	FCC 47 CFR Part 15B: 2019
Order Number Date	AX-PNG-OTH-2138 06-May-2020
Date of Receipt of EUT	07-May-2020
Start of Test	24-May-2020
Finish of Test	31-May-2020
Name of Engineer(s)	Graeme Lawler
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 is shown below.

Section	Specification Clause	Test Description	Result	Comments/Base Standard
Configuration and Mode: 28 V DC Charger - Idle				
2.2	15.109	Radiated Disturbance	Pass	ANSI C63.4: 2014
Configuration and Mode: USB Charger - Idle				
2.1	15.107	Conducted Disturbance at Mains Terminals	Pass	ANSI C63.4: 2014
2.2	15.109	Radiated Disturbance	Pass	ANSI C63.4: 2014

Table 2

1.4 Manufacturer Declared Variant(s)

Axnes Aviation AS

Declaration of similarity BST30 and BST35

The BST30 and BST35 are two variants of base station in the PNG family of products supplied by Axnes AS, Norway. Both base stations are portable, allowing carry on/temporary installs to various aircrafts and vehicles.

It is hereby declared that the PNG base station BST30 and the PNG base station BST35 are identical, with the exception of BST35 are equipped with six (internal) battery cells, giving the option to operate from external power or to operate from the internal batteries, without external power.

On the BST30 the battery cells are not installed, and external power are required.

The units are otherwise identical.

…………………………………………………………
Petter Johnsen (Chief Technical Officer)
on behalf of Axnes AS

Document number:	AX-PNG-OTH-2170
Revision:	Issue A
Date:	15 Jun 2020

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Email: post@axnes.com

Org. No: N-974 485 753

1.5 Application Form

Equipment Description

Technical Description: *(Please provide a brief description of the intended use of the equipment)*	PNG system is a wireless intercom extension, for use in demanding high noise environments as tracked vehicles, around helicopters and aircrafts and similar high noise and demanding operating environments. The base station (BST35) is connected either a standalone unit or connected to the vehicle/aircraft intercom. The crew is using either and MP30 handset or a MP50 handset, connected to their helmet coms/ or headset. BST35 communicates with the MP30/50 in the UHF band (406-470 MHz band). Actual frequency is programmed according to each customer's licensed band.
Manufacturer:	Axnes AS
Model:	BST35
Part Number:	AXS-BS-D0350-N
Hardware Version:	R4
Software Version:	AXS-SW-0711
FCC ID (if applicable)	2AOHPBST3XA
IC ID (if applicable)	Not Applicable

Intentional Radiators

Technology	The BST35 is the vehicle/aircraft/boat mounted radio communicating with the crew handheld radio MP50 or MP30 in the PNG system. The PNG system is designed for wireless intercom use. The use area are demanding noise environments as tracked vehicles, around helicopters and aircrafts, on boats and similar demanding environments. The system communicates in the 406.1-430 and 450-470 MHz band between the different PNG components for intercom use. In intercom mode the radio operates in digital transmission supporting 16QAM, 25 kHz channel separation, Time Division Multiplexing. One channel will carry 5 voice channels and data, occupying 20kHz band. Alternative robust modulation is available, supporting 8PSK, 25 kHz channel separation, Time Division Multiplexing. One channel will carry 3 voice channels and additional data, occupying 20KHz band. Output power is 400mW.
Frequency Band (MHz)	406-470
Conducted Declared Output Power (dBm)	26
Antenna Gain (dBi)	Typical Gain 5.1
Supported Bandwidth(s) (MHz)	20 kHz OBW and 25 kHz channel separation
Modulation Scheme(s)	8PSK/16QAM
ITU Emission Designator	20K0D7W
Bottom Frequency (MHz)	406.1125
Middle Frequency (MHz)	438.0500
Top Frequency (MHz)	469.9875

Un-intentional Radiators

Highest frequency generated or used in the device or on which the device operates or tunes	469.9875
Lowest frequency generated or used in the device or on which the device operates or tunes	406.1125
Class A Digital Device (Use in commercial, industrial or business environment) ☒ Class B Digital Device (Use in residential environment only) ☐	

DC Power Source

Nominal voltage:	28	V
Extreme upper voltage:	30	V
Extreme lower voltage:	24	V
Max current:	2	A

Battery Power Source

Voltage:	10.8	V
End-point voltage:	9.6	V *(Point at which the battery will terminate)*
Alkaline ☐ Leclanche ☒ Lithium ☐ Nickel Cadmium ☐ Lead Acid* ☐ *(Vehicle regulated)*		
Other ☐	Please detail:	

Charging

Can the EUT transmit whilst being charged	Yes ☒ No ☐

Temperature

Minimum temperature:	-20	°C
Maximum temperature:	50	°C

Antenna Characteristics

Antenna connector ☒			State impedance	50	Ohm
Temporary antenna connector ☐			State impedance		Ohm
Integral antenna ☐	Type:		Gain		dBi
External antenna ☒	Type:	Typical monopol	Gain	5.1	dBi
For external antenna only: Standard Antenna Jack ☒ If yes, describe how user is prohibited from changing antenna (if not professional installed): Equipment is only ever professionally installed ☒ Non-standard Antenna Jack ☐					

Ancillaries (if applicable)

Manufacturer:		Part Number:	
Model:		Country of Origin:	

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

Name: Petter Johnsen
Position held: Logistics manager
Date: 15 June 2020

1.6 Product Information

1.6.1 Technical Description

The (EUT) Equipment Under Test is an AXNES Aviation AS, Model: BST35.

PNG system is a wireless intercom extension, for use in demanding high noise environments such as tracked vehicles, around helicopters and aircrafts and similar environments.
The base station (BST35) is either a standalone unit or connected to the vehicle/aircraft intercom.

The crew is using either the MP30 handset or an MP50 handset, connected to their helmet coms/ or headset.

BST35 communicates with the MP30/50 in the UHF band (406-470 MHz band). Actual frequency is programmed according to each customer's licensed band.

1.6.2 EUT Port/Cable Identification

Port	Max Cable Length specified	Usage	Type	Screened
Antenna Port	N/A	Connection to Antenna	Data	Yes
Audio	1.85 m	Connection to audio device	Data	No
0 VDC	5 m	DC Power for the EUT	DC Power	No
+ 28 VDC	5 m	DC Power for the EUT	DC Power	No
USB Port	1 m	DC Power for charging	Power	No
Neutral	0.8 m	AC Power for the USB charger	120 V AC Mains	No
Live	0.8 m	AC Power for the USB charger	120 V AC Mains	No

Table 3

1.6.3 Test Configuration

Configuration	Description
28 V DC Charger	The EUT was charging via a 28 V DC power supply. The antenna port was fitted with its antenna and the audio port was terminated with the supplied cable and integral load. The USB port was unpopulated.
USB Charger	The EUT was charging via an Artesyn AC to DC USB charger. The antenna port was fitted with its antenna and the audio port was terminated with the supplied cable and integral load.

Table 4

1.6.4 Modes of Operation

Mode	Description
Idle	The EUT was set to the middle channel in idle mode.

Table 5

1.7 Deviations from the Standard

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

1.8 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: BST35, Serial Number: AXS-SW-0711			
0	As supplied by the customer	Not Applicable	Not Applicable

Table 6

1.9 Test Location

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

Test Name	Name of Engineer(s)	Accreditation
Configuration and Mode: 28 V DC Charger - Idle		
Radiated Disturbance	Graeme Lawler	UKAS
Configuration and Mode: USB Charger - Idle		
Conducted Disturbance at Mains Terminals	Graeme Lawler	UKAS
Radiated Disturbance	Graeme Lawler	UKAS

Table 7

Office Address:

Octagon House
Concorde Way
Segensworth North
Fareham
Hampshire
PO15 5RL
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

2.1.2 Equipment Under Test and Modification State

BST35, S/N: AXS-SW-0711 - Modification State 0

2.1.3 Date of Test

31-May-2020

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

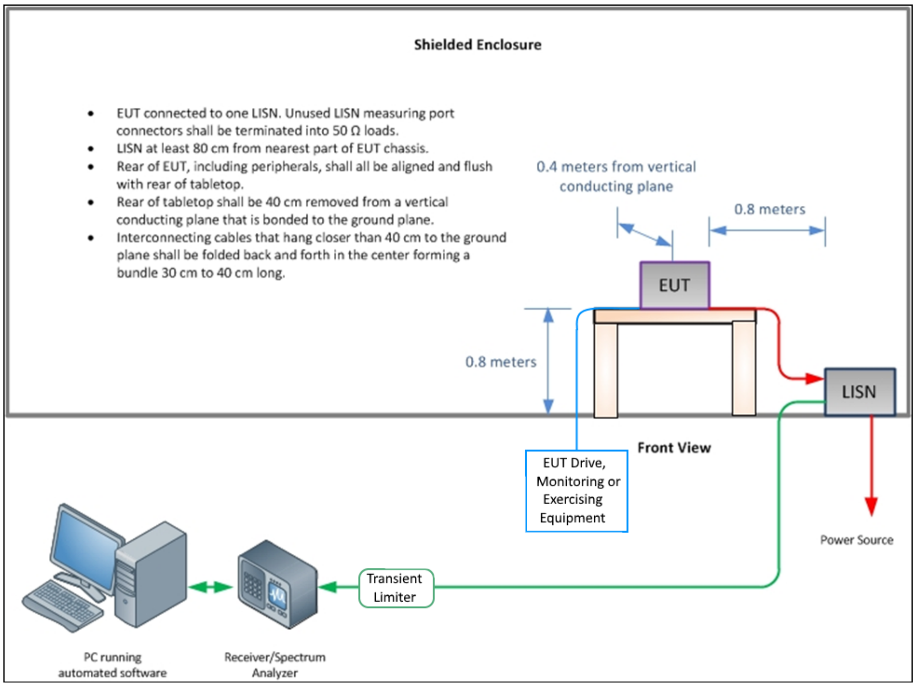

Figure 1 - Conducted Disturbance Example Test Setup

2.1.7 Environmental Conditions

Ambient Temperature 24.2 °C
Relative Humidity 36.8 %

2.1.8 Specification Limits

Required Specification Limits - Class A			
Line Under Test	Frequency Range (MHz)	Quasi-Peak Test Limit (dBµV)	CISPR Average Test Limit (dBµV)
AC Power Port	0.15 to 0.5	79	66
	0.5 to 30	73	60
Supplementary information: None			

Table 8

2.1.9 Test Results

Results for Configuration and Mode: USB Charger - Idle.

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

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

Detailed results are shown below.

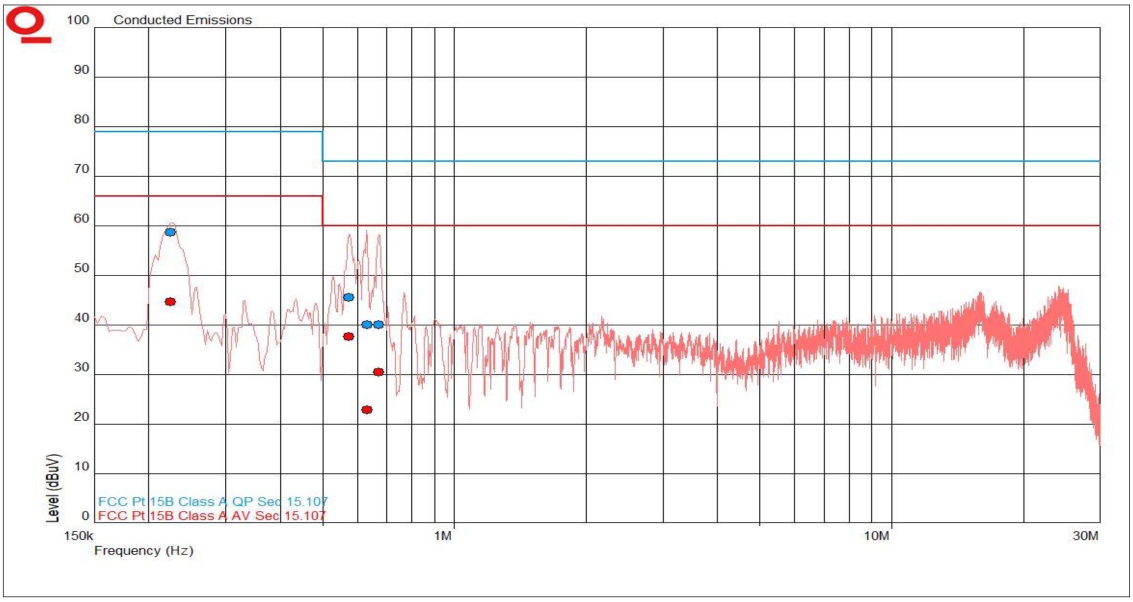

Figure 2 - Graphical Results - Neutral

Frequency (MHz)	QP Level (dBµV)	QP Limit (dBµV)	QP Margin (dB)	AV Level (dBµV)	AV Limit (dBµV)	AV Margin (dB)
0.225	58.8	79.0	-20.2	44.7	66.0	-21.3
0.575	45.7	73.0	-27.3	37.7	60.0	-22.3
0.631	40.1	73.0	-32.9	22.9	60.0	-37.1
0.672	40.0	73.0	-33.0	30.5	60.0	-29.5

Table 9

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 6 dB below the CISPR Average test limit.

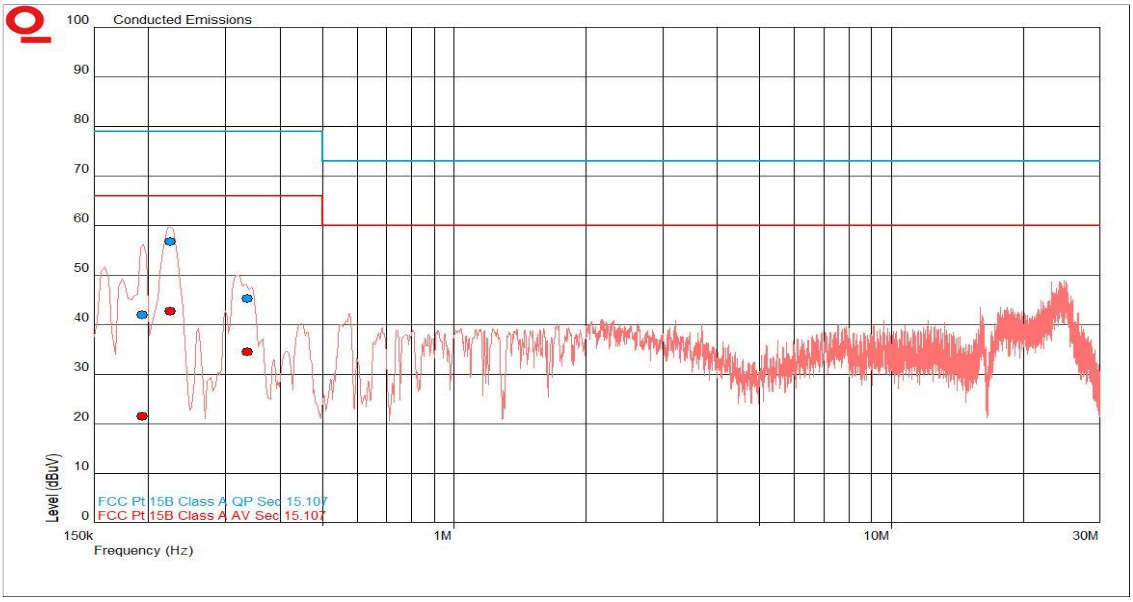

Figure 3 - Graphical Results - Live

Frequency (MHz)	QP Level (dBµV)	QP Limit (dBµV)	QP Margin (dB)	AV Level (dBµV)	AV Limit (dBµV)	AV Margin (dB)
0.194	42.0	79.0	-37.0	21.6	66.0	-44.4
0.225	56.7	79.0	-22.3	42.8	66.0	-23.2
0.338	45.3	79.0	-33.7	34.5	66.0	-31.5

Table 10

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 6 dB below the CISPR Average test limit.

Figure 4 - Test Setup

2.1.10 Test Location and Test Equipment Used

This test was carried out in EMC Chamber 5.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Transient Limiter	Hewlett Packard	11947A	15	12	2-Oct-2020
LISN	Rohde & Schwarz	ESH3-Z5	1390	12	27-Jan-2021
Screened Room (5)	Rainford	Rainford	1545	36	23-Jan-2021
Compliance 5 Emissions	Teseq	V5.26.51 V.5.00.00	3275	-	Software
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	03-Jan-2021
Cable (18 GHz)	Rosenberger	LU7-036-2000	5039	12	06-Oct-2020
Thermo-Hygro-Barometer	PCE Instruments	OCE-THB-40	5470	12	16-Mar-2021
8m N Type Cable	Junkosha	MWX221-08000NMSNMS/B	5519	12	24-Mar-2021

Table 11

2.2 Radiated Disturbance

2.2.1 Specification Reference

FCC 47 CFR Part 15B, Clause 15.109

2.2.2 Equipment Under Test and Modification State

BST35, S/N: AXS-SW-0711 - Modification State 0

2.2.3 Date of Test

24-May-2020

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

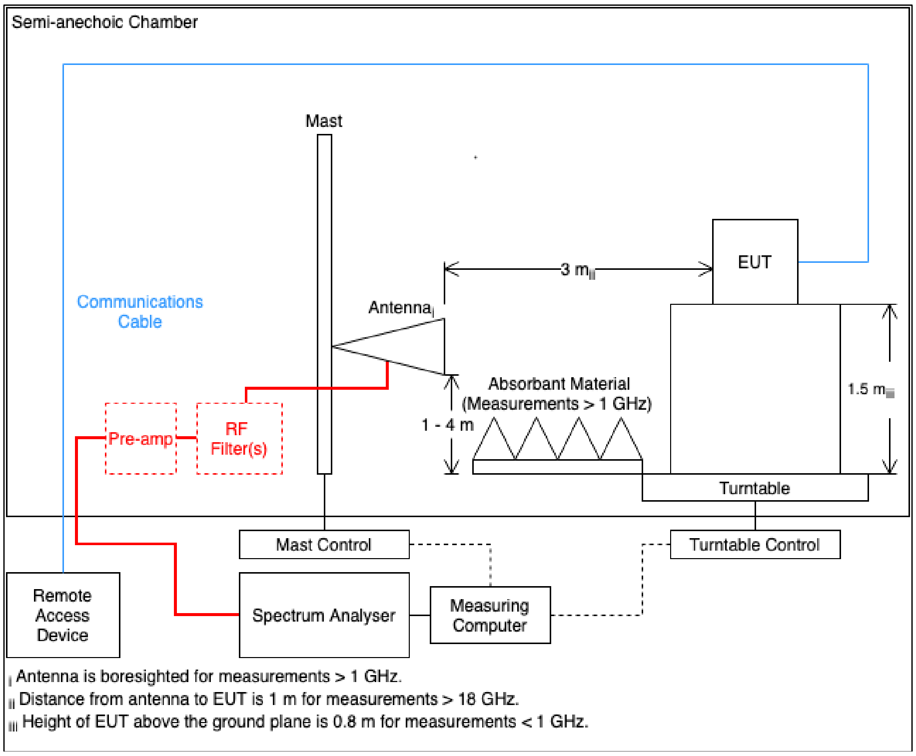

Figure 5

2.2.7 Environmental Conditions

Ambient Temperature	18.8 °C
Relative Humidity	48.2 %

2.2.8 Specification Limits

Required Specification Limits, Field Strength - Class A Test Limit at a 10 m Measurement Distance		
Frequency Range (MHz)	Test Limit (µV/m)	Test Limit (dBµV/m)
30 to 88	90	39.1
88 to 216	150	43.5
216 to 960	210	46.4
Above 960	300	49.5

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 12

2.2.9 Test Results

Results for Configuration and Mode: 28 V DC Charger - Idle.

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

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

Detailed results are shown below.

Highest frequency generated or used within the EUT: 469.9875 MHz
Which necessitates an upper frequency test limit of: 2 GHz

The EUT is handheld, body-worn, or ceiling-mounted equipment and has therefore been tested in three different orientations in accordance with ANSI C63.4, Clause 6.3.2.1.

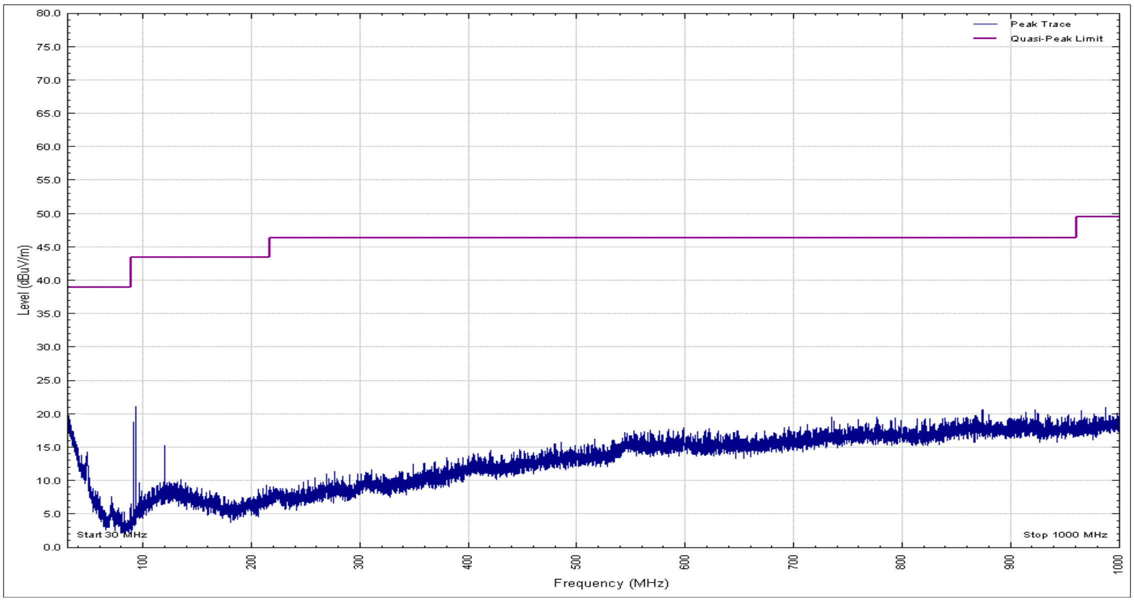

Figure 6 - 30 MHz to 1 GHz, Quasi-Peak, Vertical - X Orientation

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

Table 13

*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.

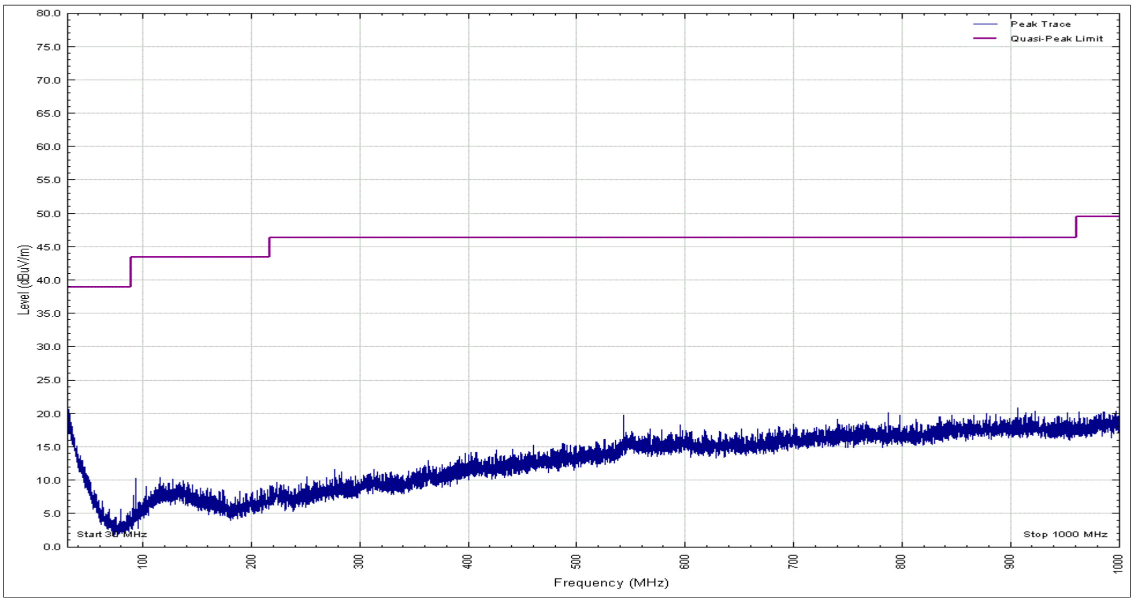

Figure 7 - 30 MHz to 1 GHz, Quasi-Peak, Horizontal - X Orientation

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

Table 14

*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.

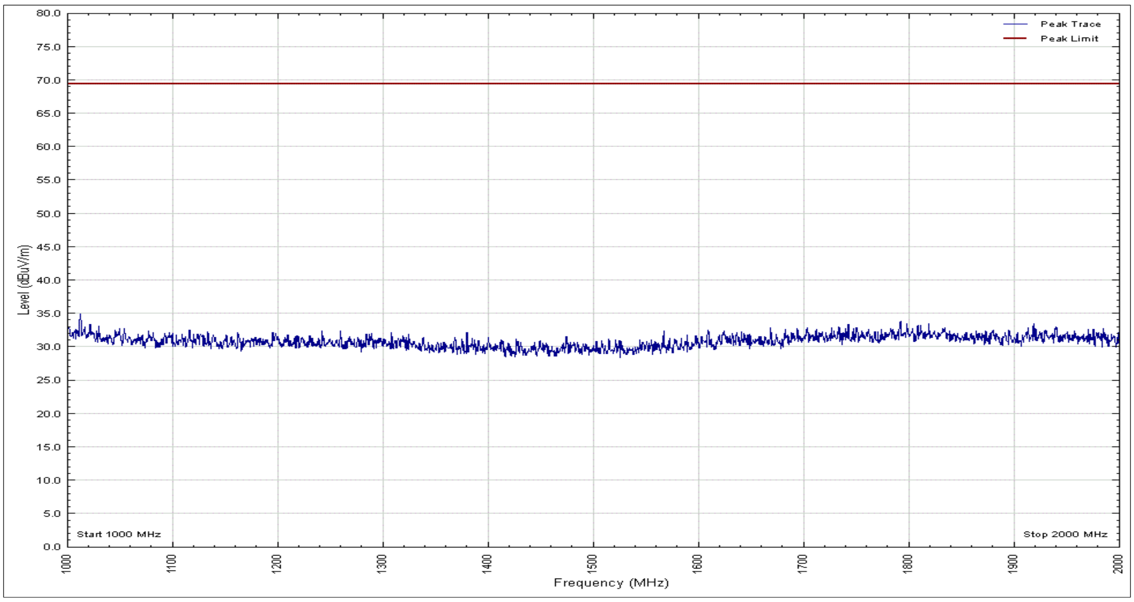

Figure 8 - 1 GHz to 2 GHz, Peak, Vertical - X Orientation

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

Table 15

*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.

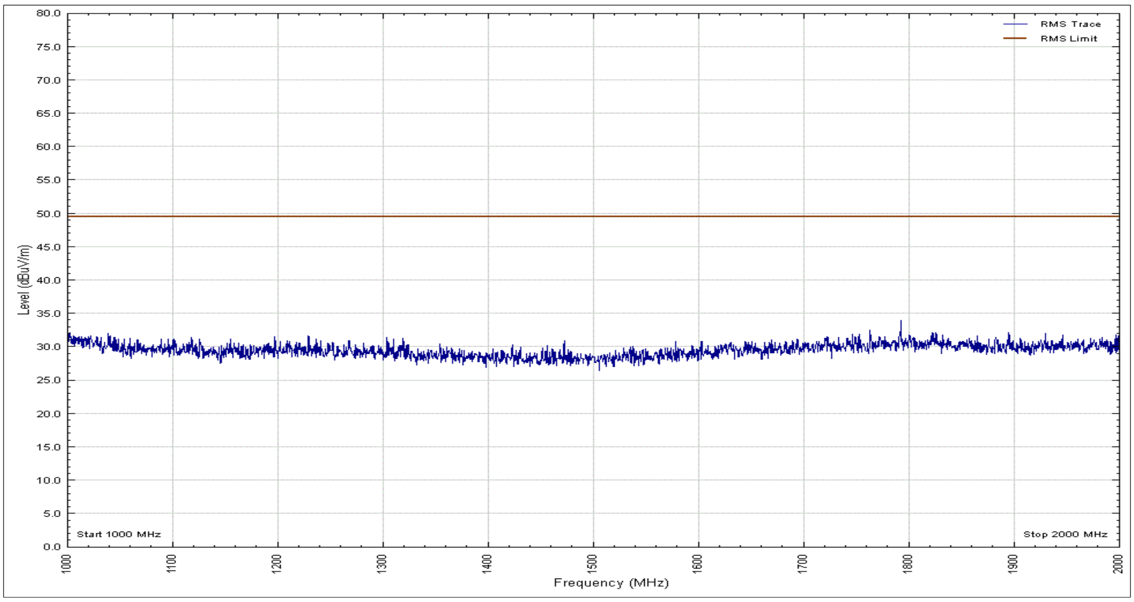

Figure 9 - 1 GHz to 2 GHz, CISPR Average, Vertical - X Orientation

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

Table 16

*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.

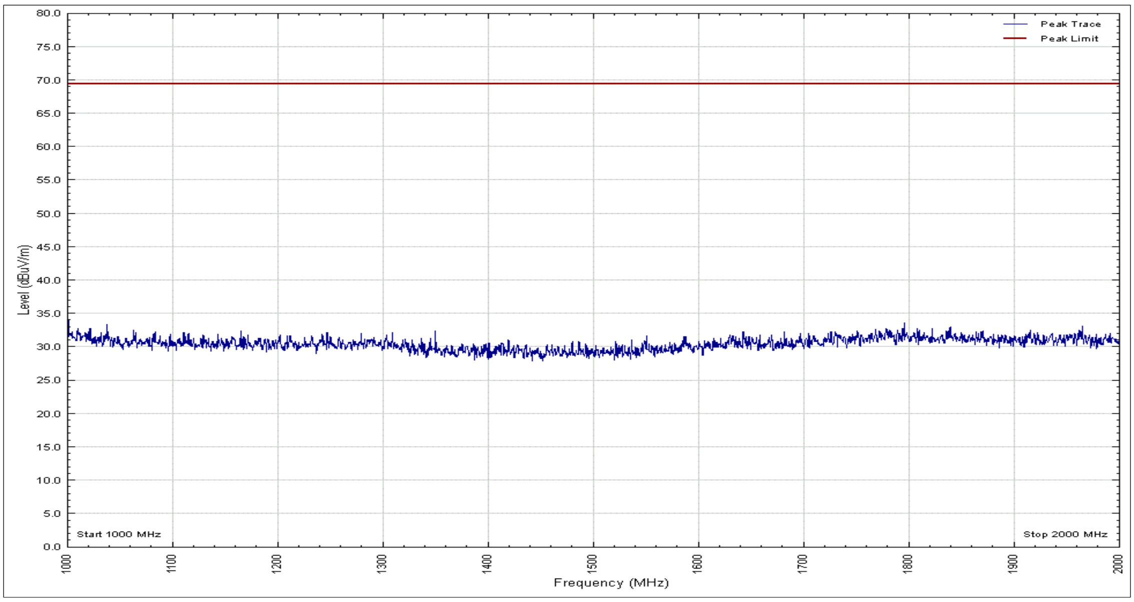

Figure 10 - 1 GHz to 2 GHz, Peak, Horizontal - X Orientation

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

Table 17

*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.

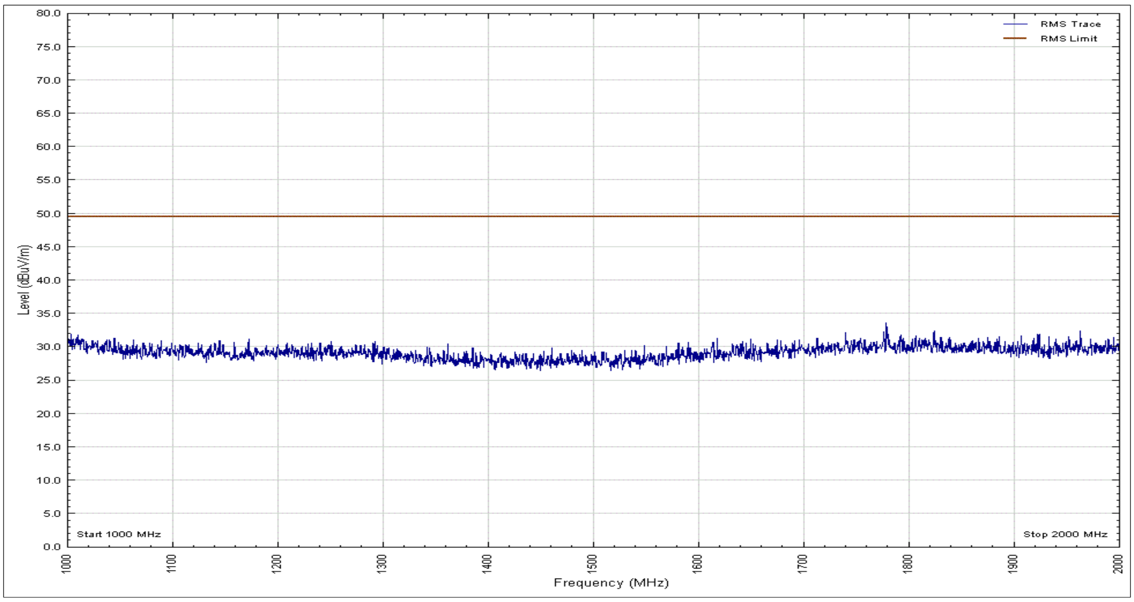

Figure 11 - 1 GHz to 2 GHz, CISPR Average, Horizontal - X Orientation

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

Table 18

*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.

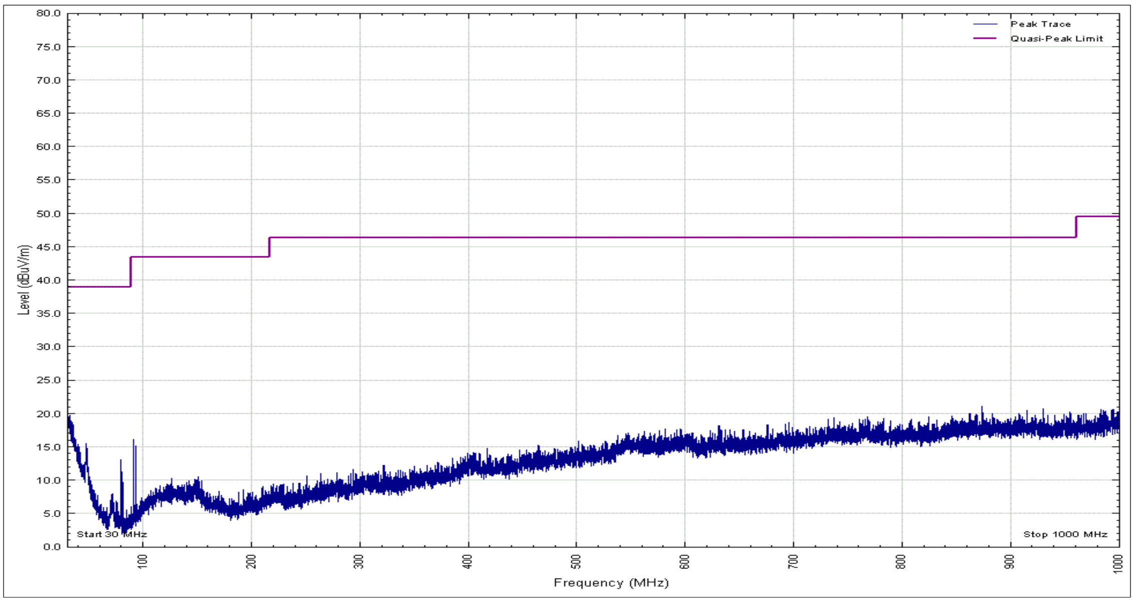

Figure 12 - 30 MHz to 1 GHz, Quasi-Peak, Vertical - Y Orientation

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

Table 19

*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.

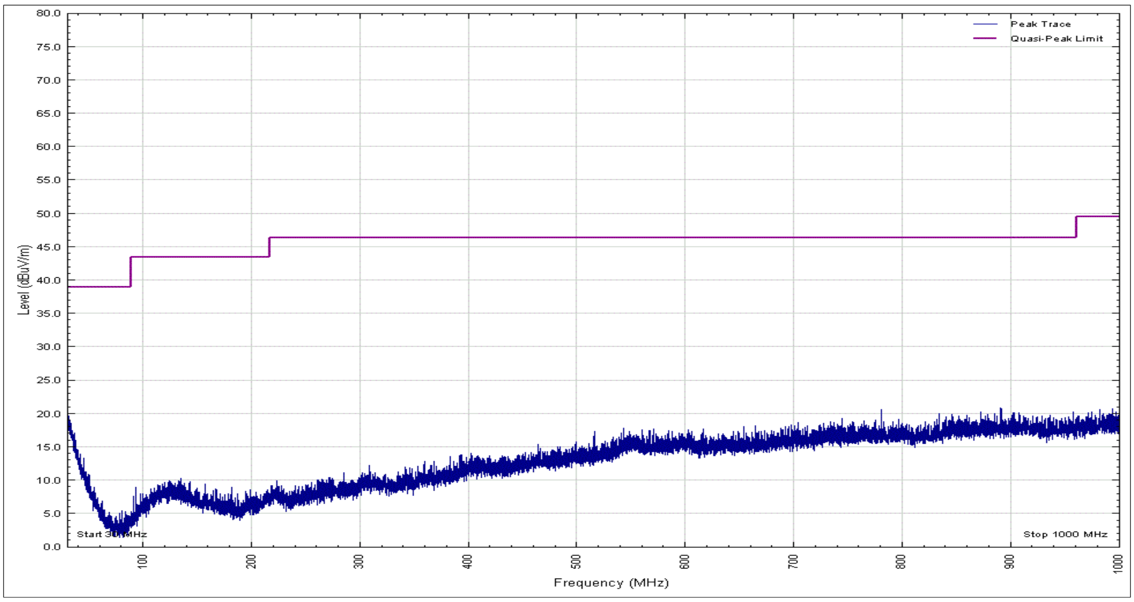

Figure 13 - 30 MHz to 1 GHz, Quasi-Peak, Horizontal - Y Orientation

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

Table 20

*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.

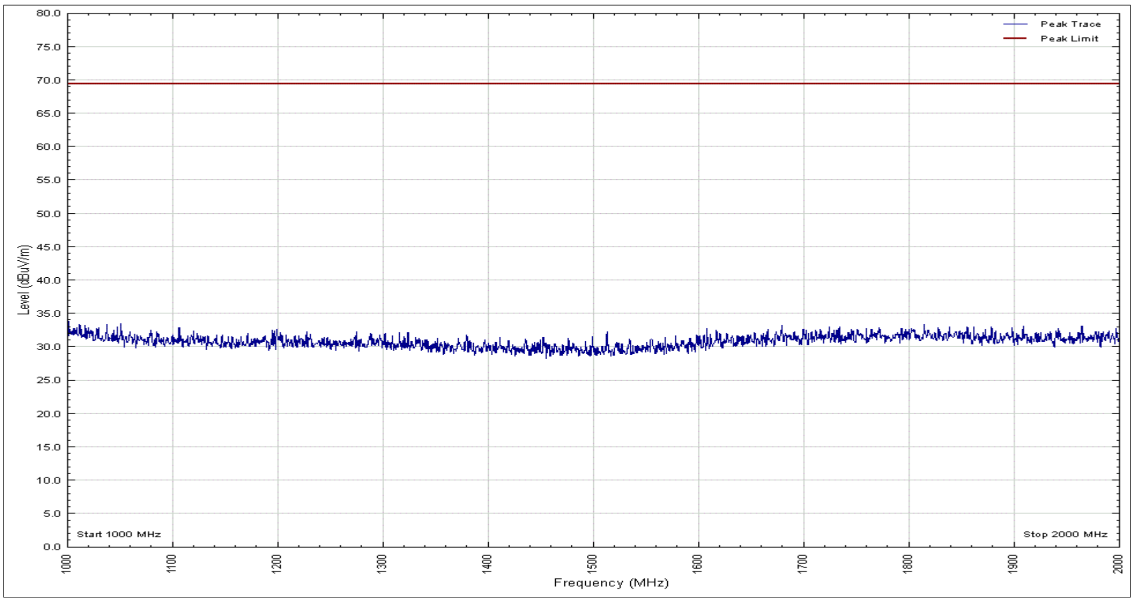

Figure 14 - 1 GHz to 2 GHz, Peak, Vertical - Y Orientation

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

Table 21

*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.

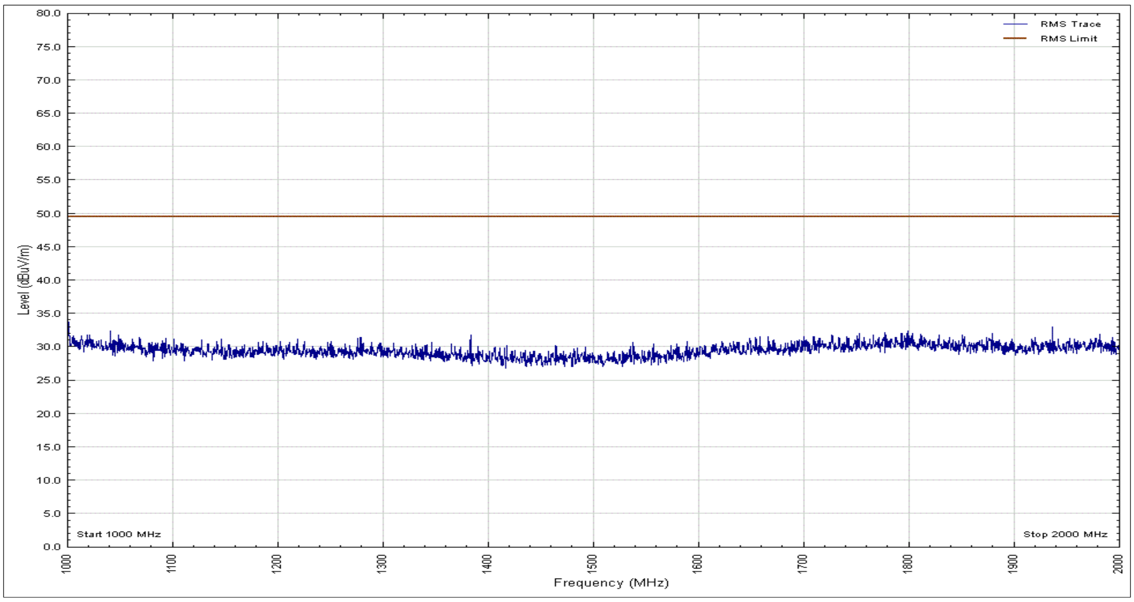

Figure 15 - 1 GHz to 2 GHz, CISPR Average, Vertical - Y Orientation

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

Table 22

*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.

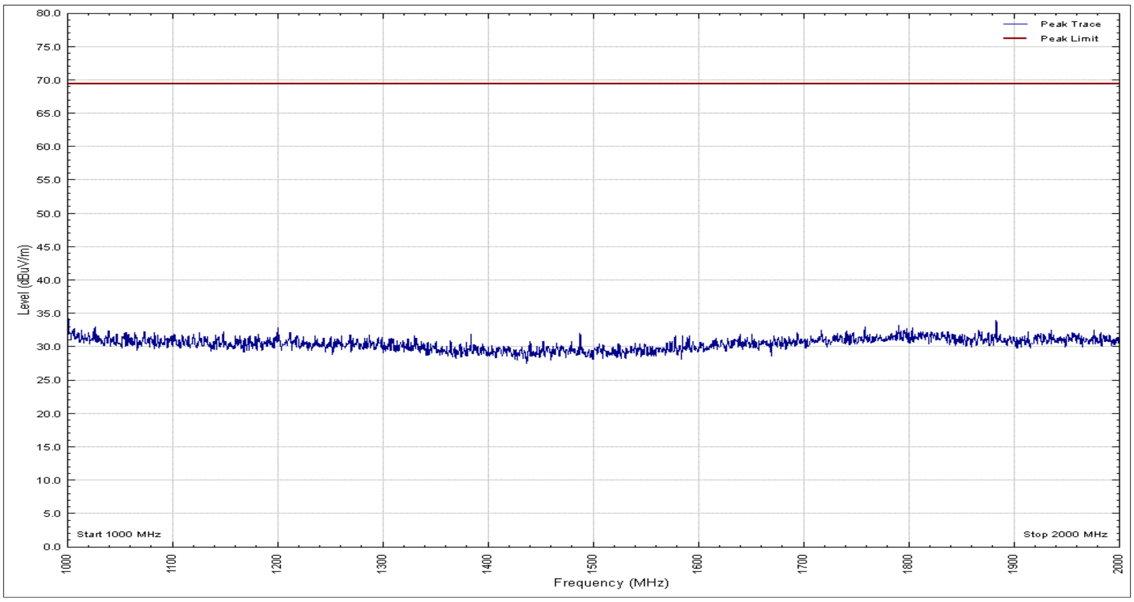

Figure 16 - 1 GHz to 2 GHz, Peak, Horizontal - Y Orientation

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

Table 23

*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.

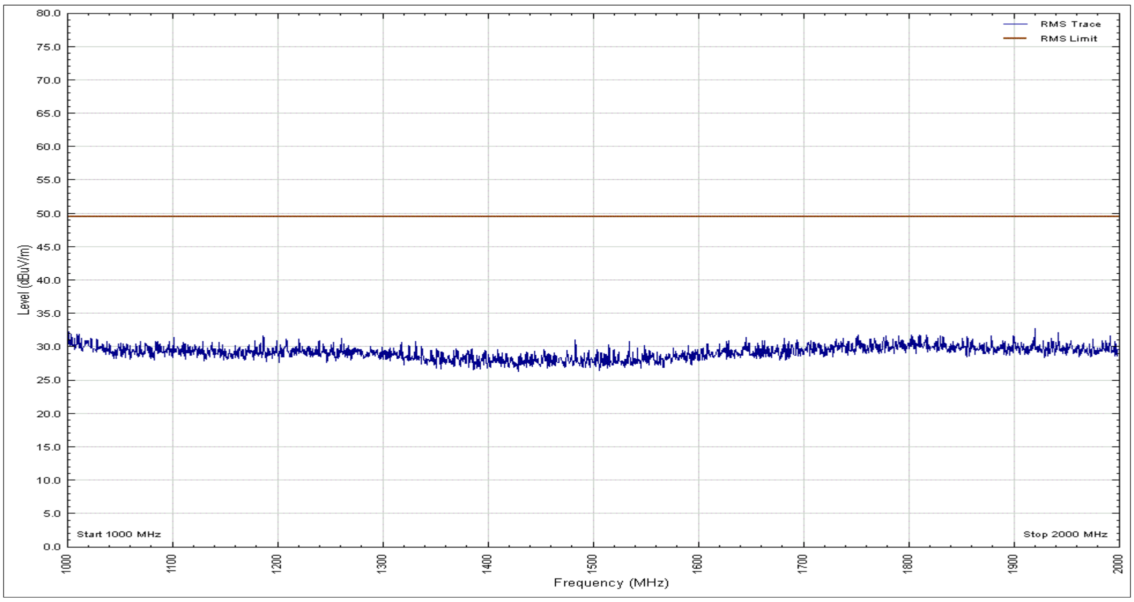

Figure 17 - 1 GHz to 2 GHz, CISPR Average, Horizontal - Y Orientation

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

Table 24

*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.

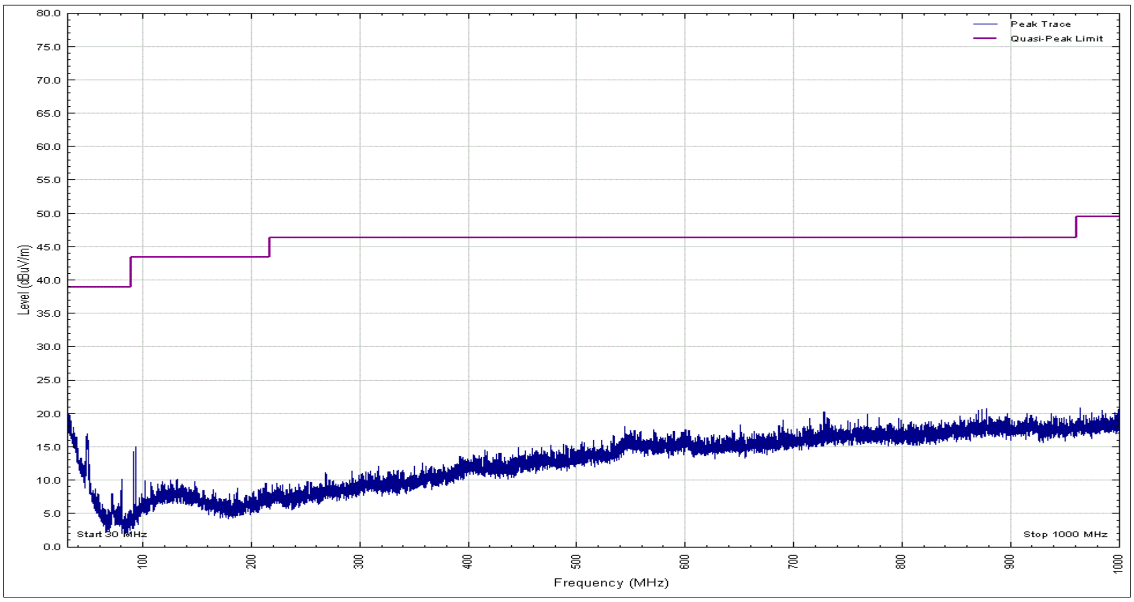

Figure 18 - 30 MHz to 1 GHz, Quasi-Peak, Vertical - Z Orientation

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

Table 25

*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.

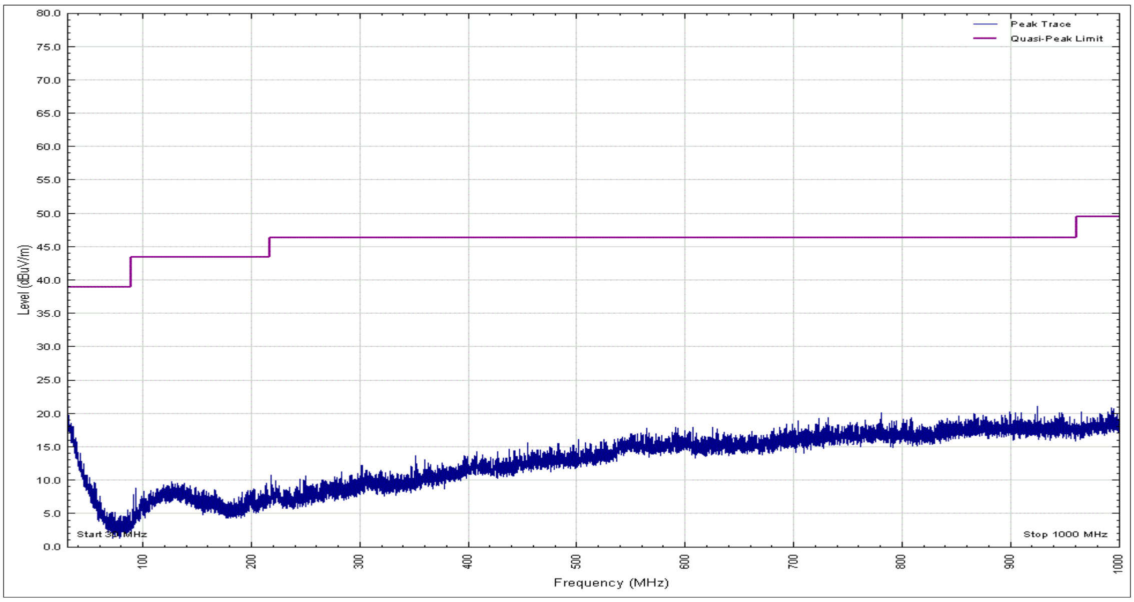

Figure 19 - 30 MHz to 1 GHz, Quasi-Peak, Horizontal - Z Orientation

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

Table 26

*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.

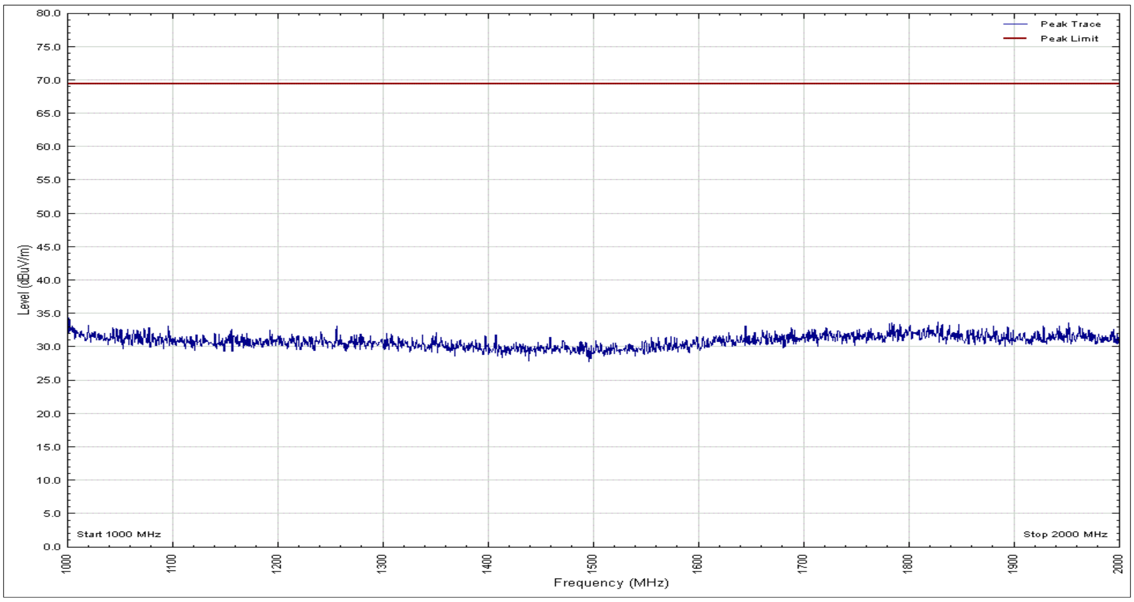

Figure 20 - 1 GHz to 2 GHz, Peak, Vertical - Z Orientation

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

Table 27

*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.

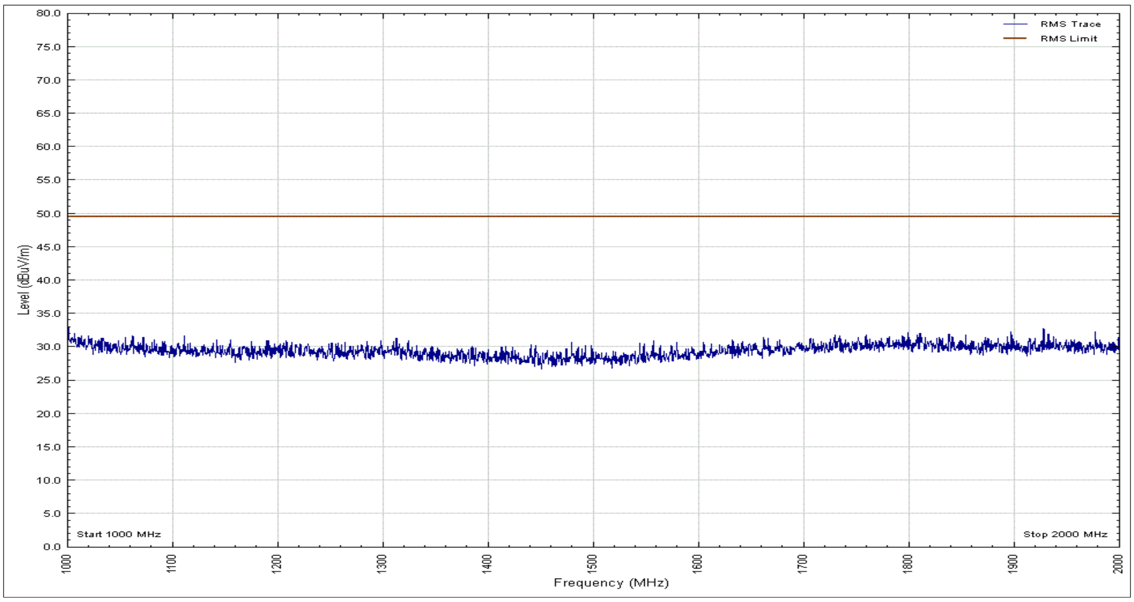

Figure 21 - 1 GHz to 2 GHz, CISPR Average, Vertical - Z Orientation

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

Table 28

*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.

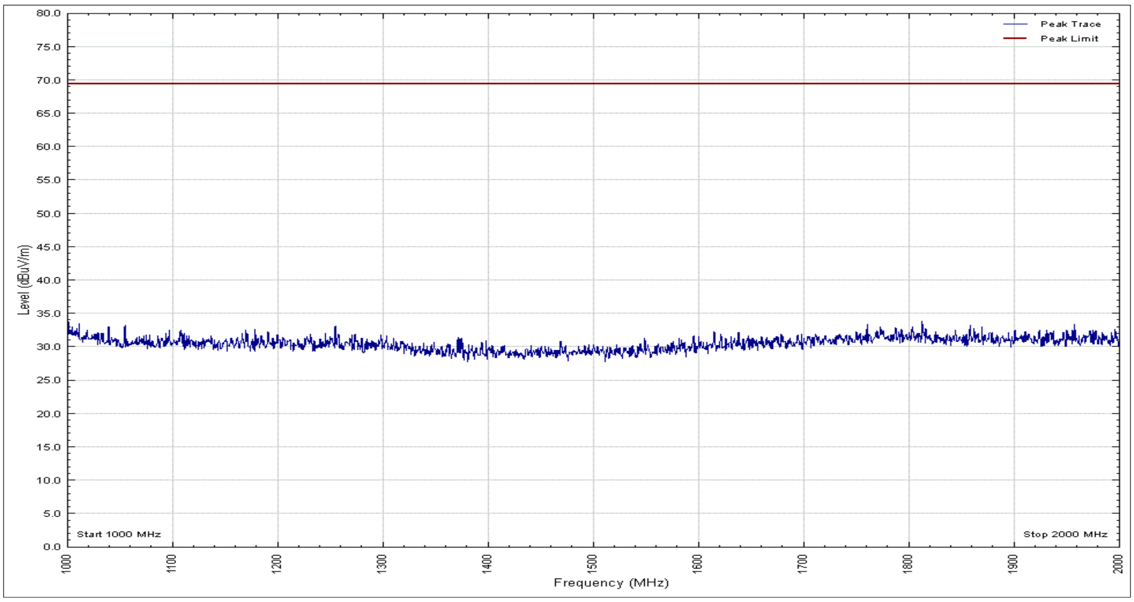

Figure 22 - 1 GHz to 2 GHz, Peak, Horizontal - Z Orientation

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

Table 29

*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.

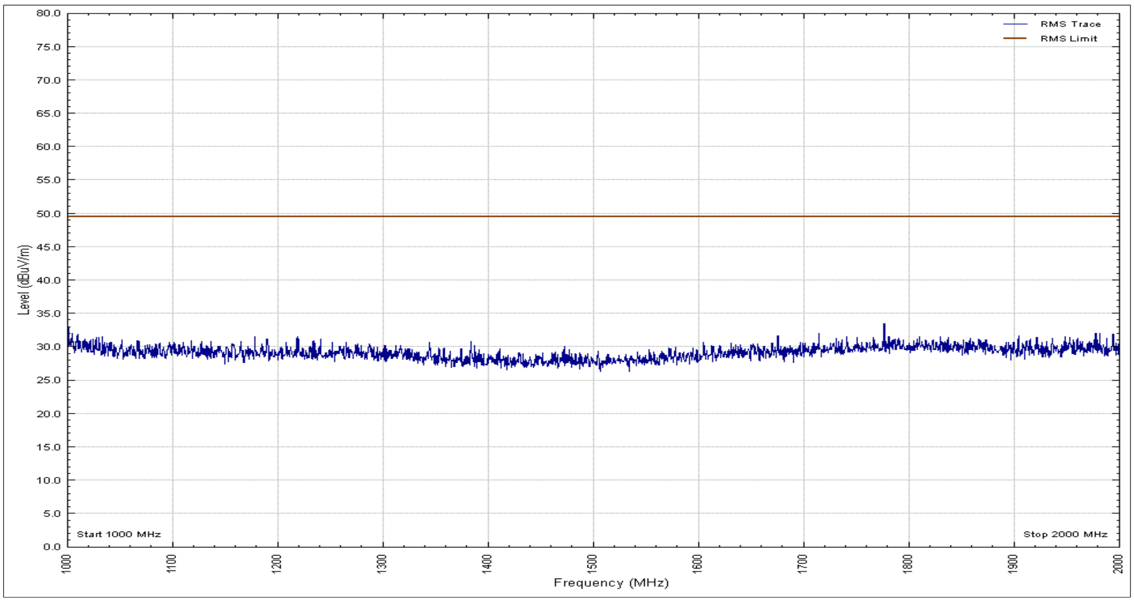

Figure 23 - 1 GHz to 2 GHz, CISPR Average, Horizontal - Z Orientation

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

Table 30

*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.

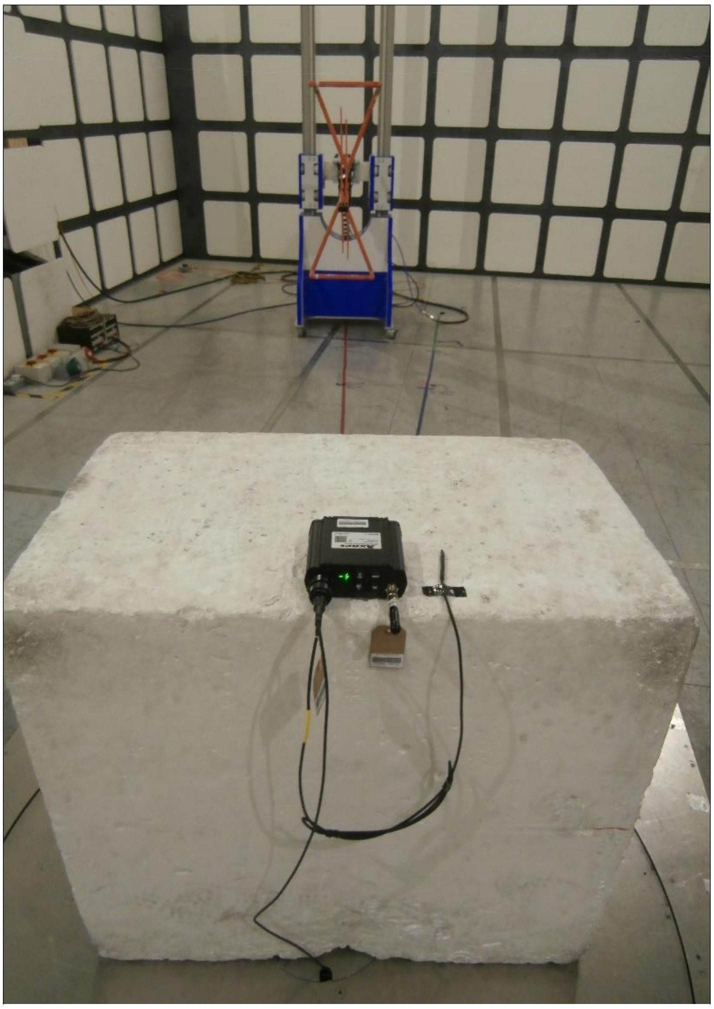

Figure 24 - Test Setup - 30 MHz to 1 GHz, X Orientation

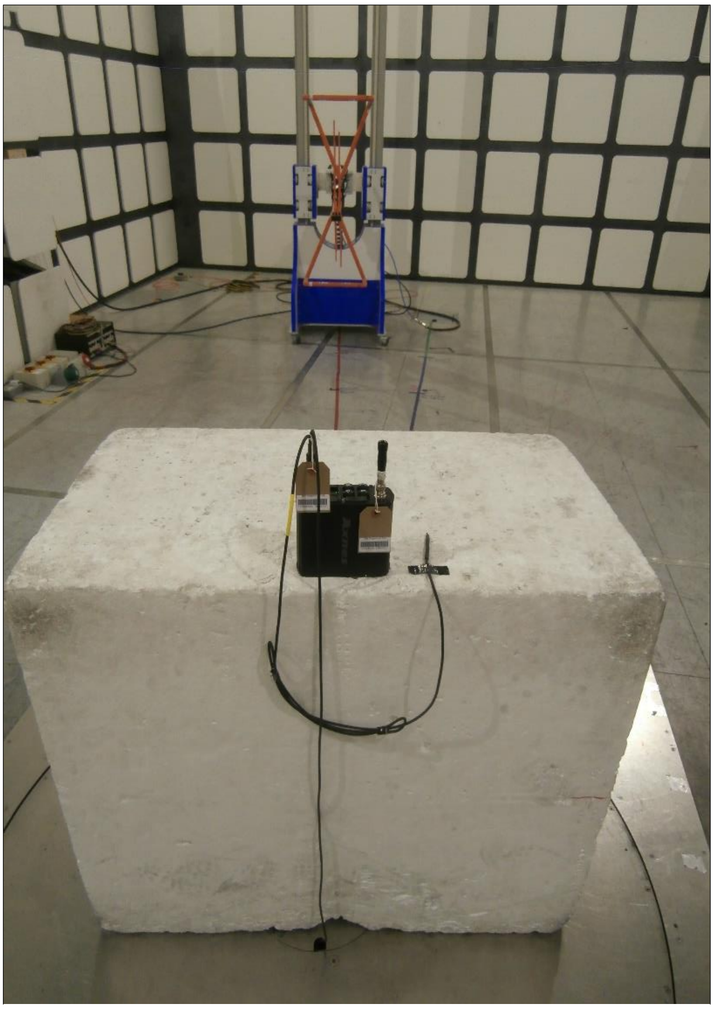

Figure 25 - Test Setup - 30 MHz to 1 GHz, Y Orientation

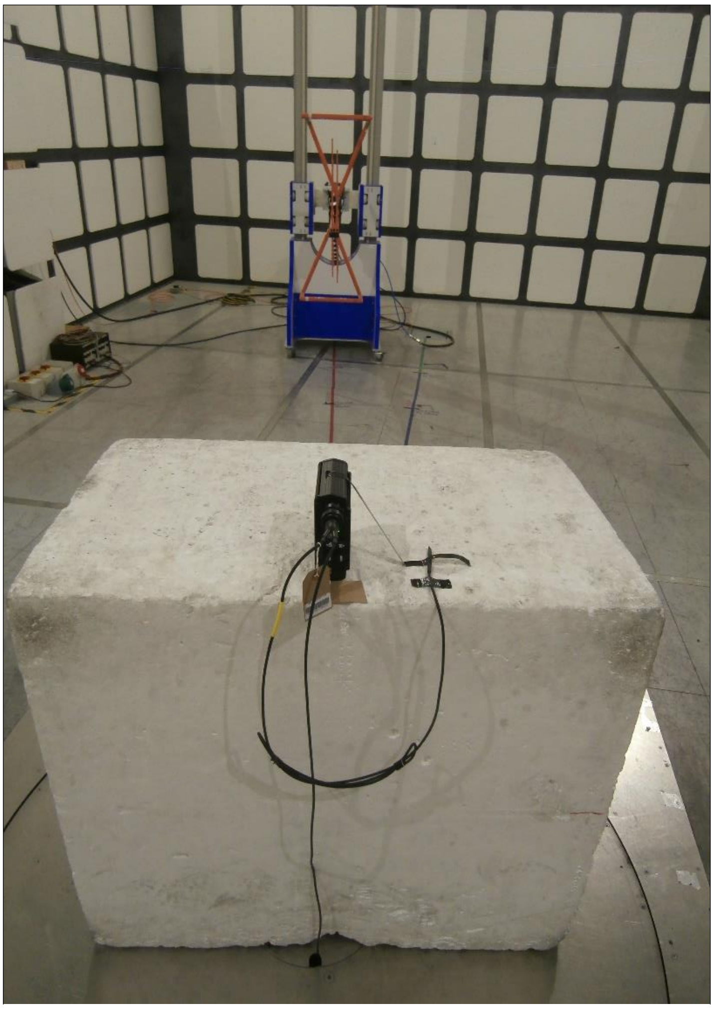

Figure 26 - Test Setup - 30 MHz to 1 GHz, Z Orientation

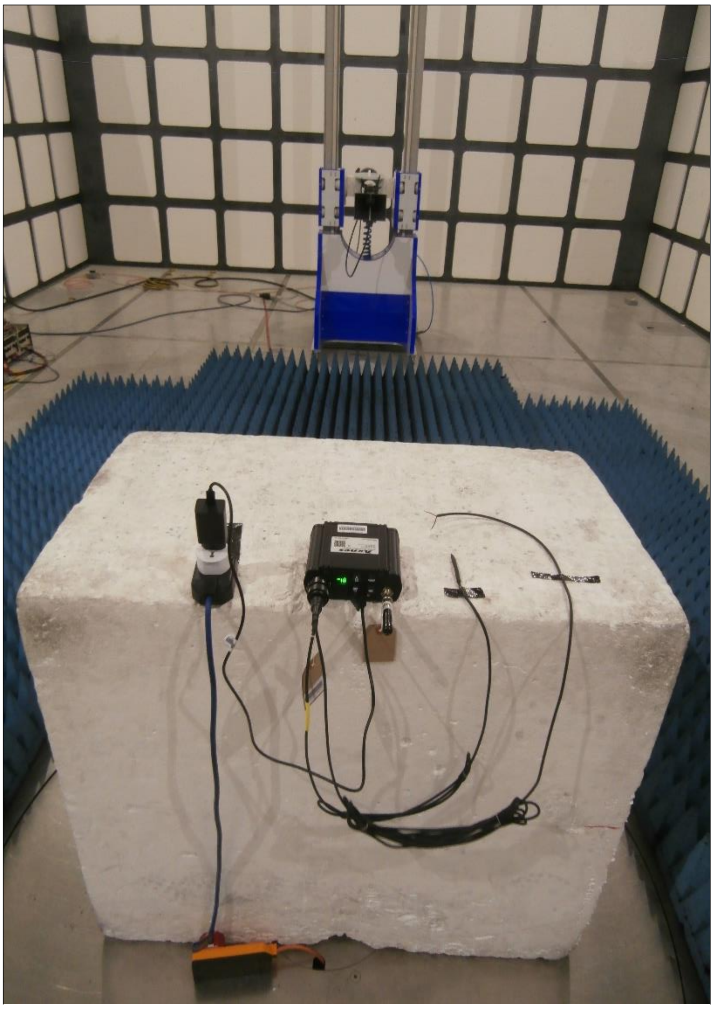

Figure 27 - Test Setup - 1 GHz to 2 GHz, X Orientation

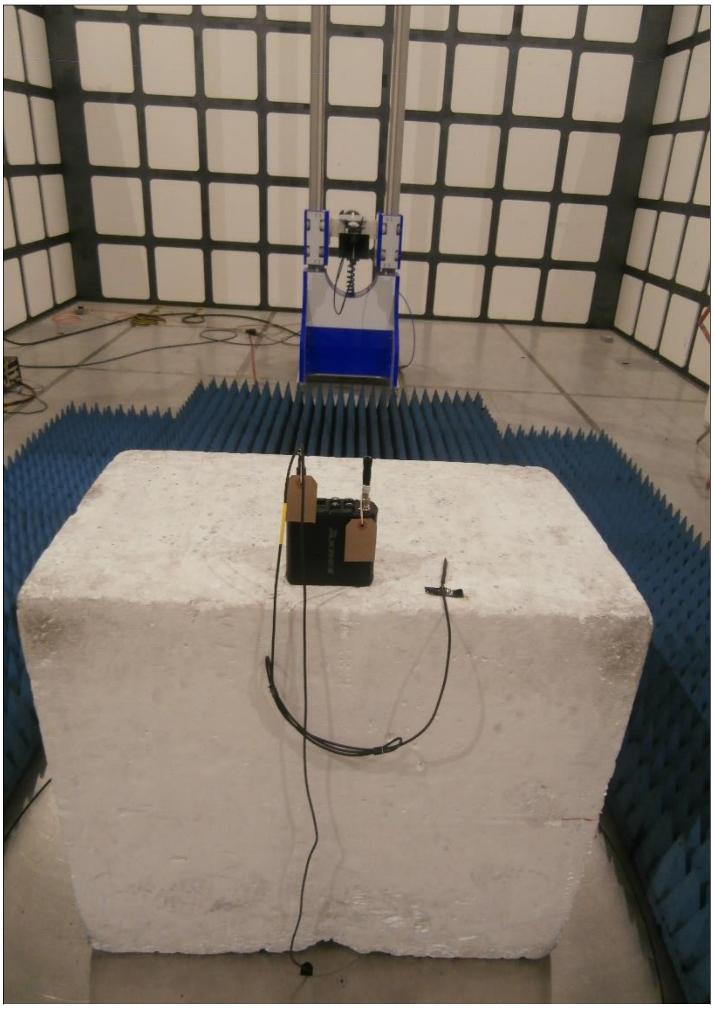

Figure 28 - Test Setup - 1 GHz to 2 GHz, Y Orientation

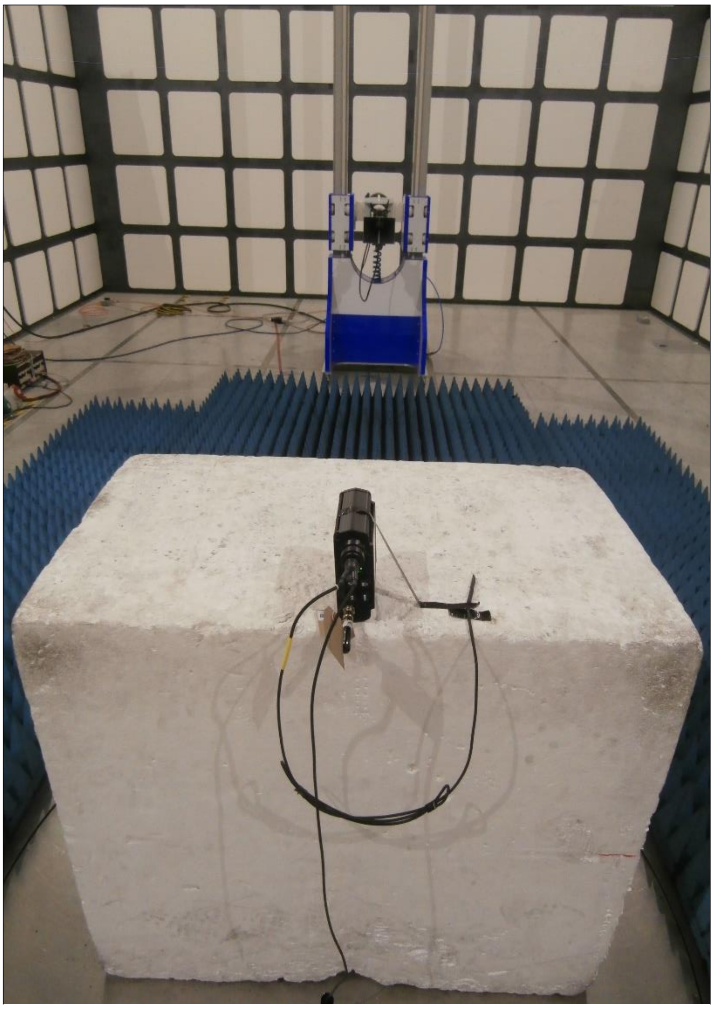

Figure 29 - Test Setup - 1 GHz to 2 GHz, Z Orientation

Results for Configuration and Mode: USB Charger - Idle.

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

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

Detailed results are shown below.

Highest frequency generated or used within the EUT: 469.9875 MHz
Which necessitates an upper frequency test limit of: 2 GHz

The EUT is handheld, body-worn, or ceiling-mounted equipment and has therefore been tested in three different orientations in accordance with ANSI C63.4, Clause 6.3.2.1.

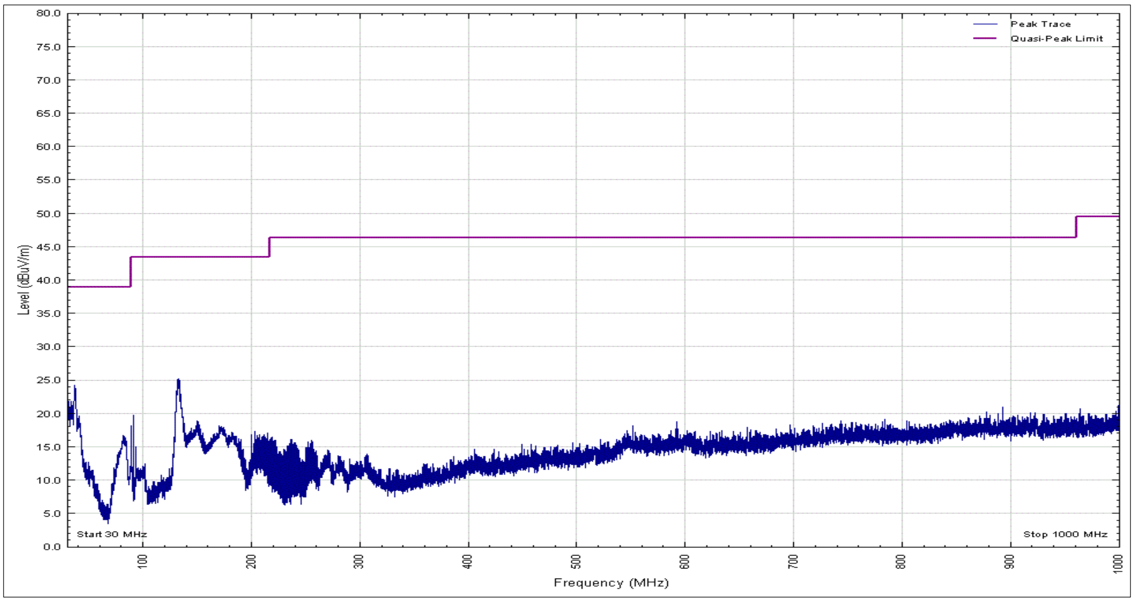

Figure 30 - 30 MHz to 1 GHz, Quasi-Peak, Vertical - X Orientation

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

Table 31

*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.

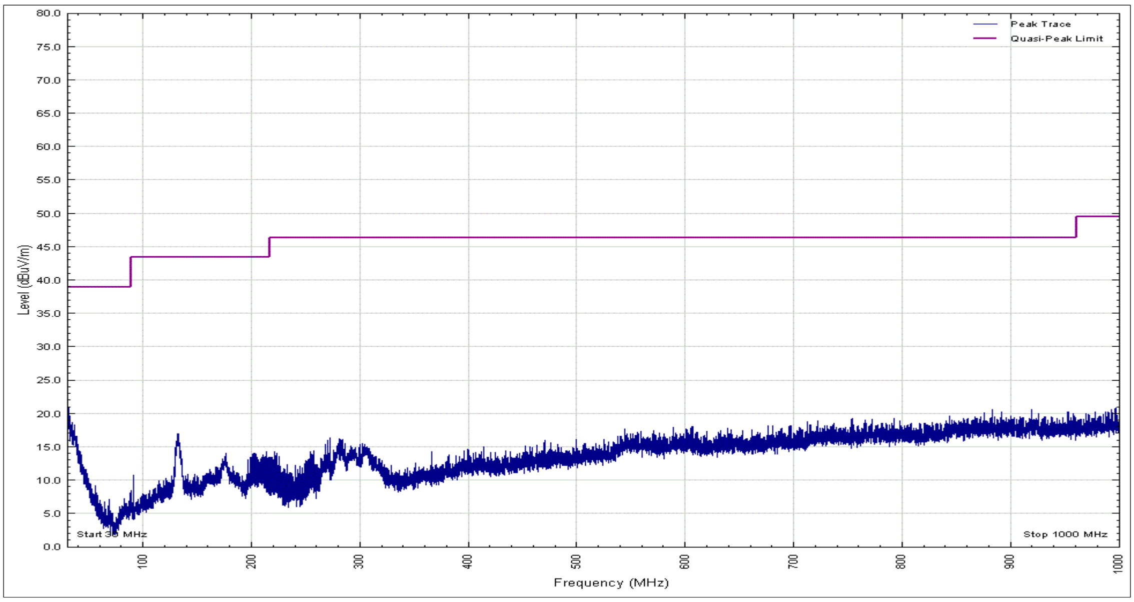

Figure 31 - 30 MHz to 1 GHz, Quasi-Peak, Horizontal - X Orientation

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

Table 32

*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.

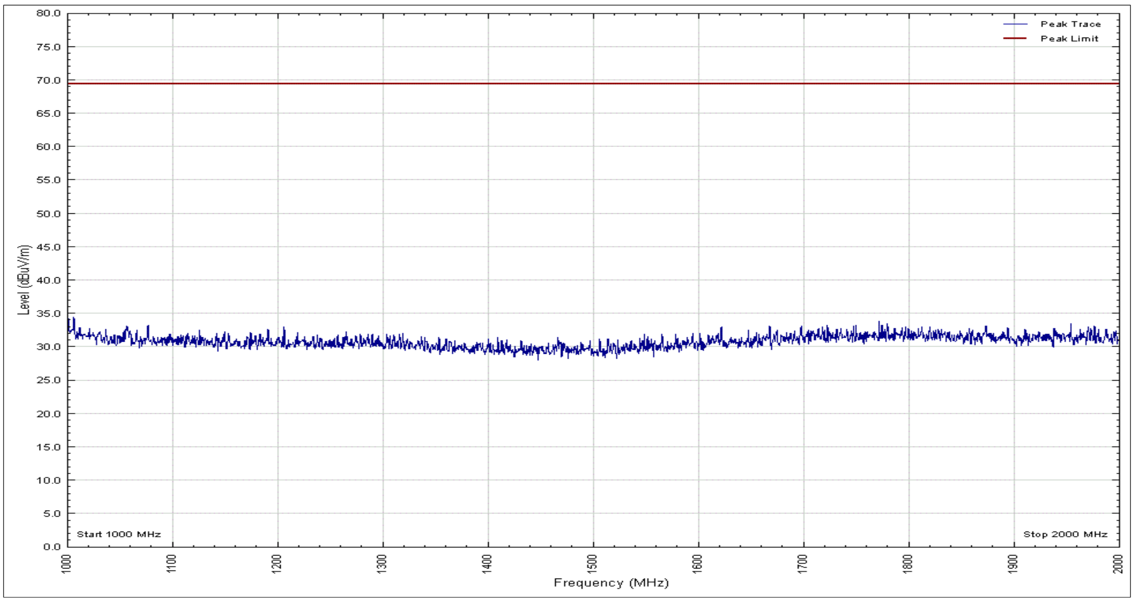

Figure 32 - 1 GHz to 2 GHz, CISPR Average, Vertical - X Orientation

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

Table 33

*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.

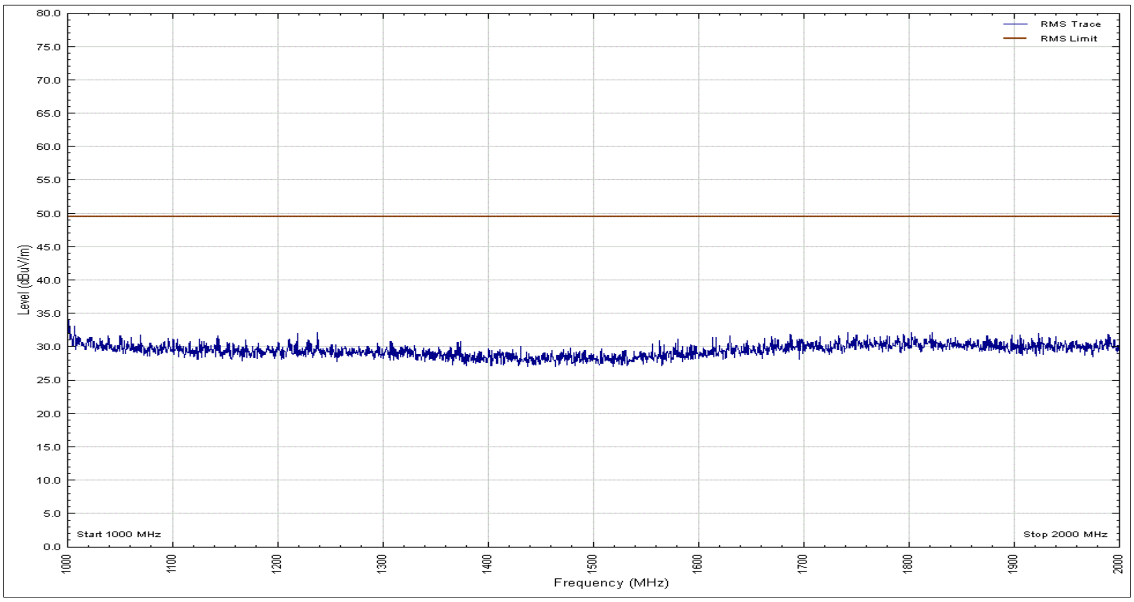

Figure 33 - 1 GHz to 2 GHz, CISPR Average, Vertical - X Orientation

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

Table 34

*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.

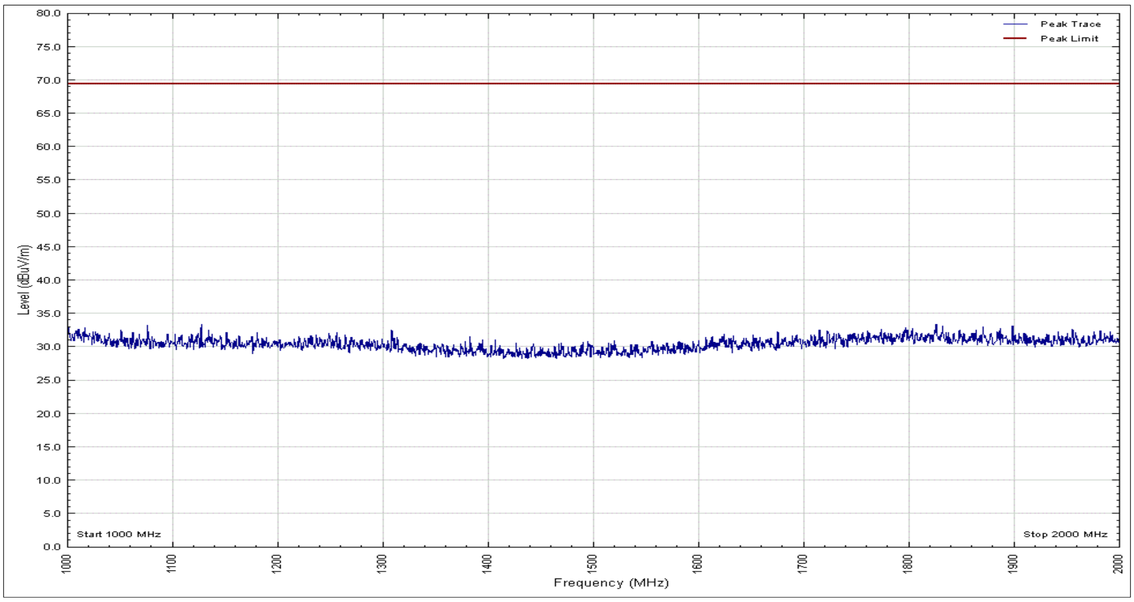

Figure 34 - 1 GHz to 2 GHz, CISPR Average, Horizontal - X Orientation

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

Table 35

*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.

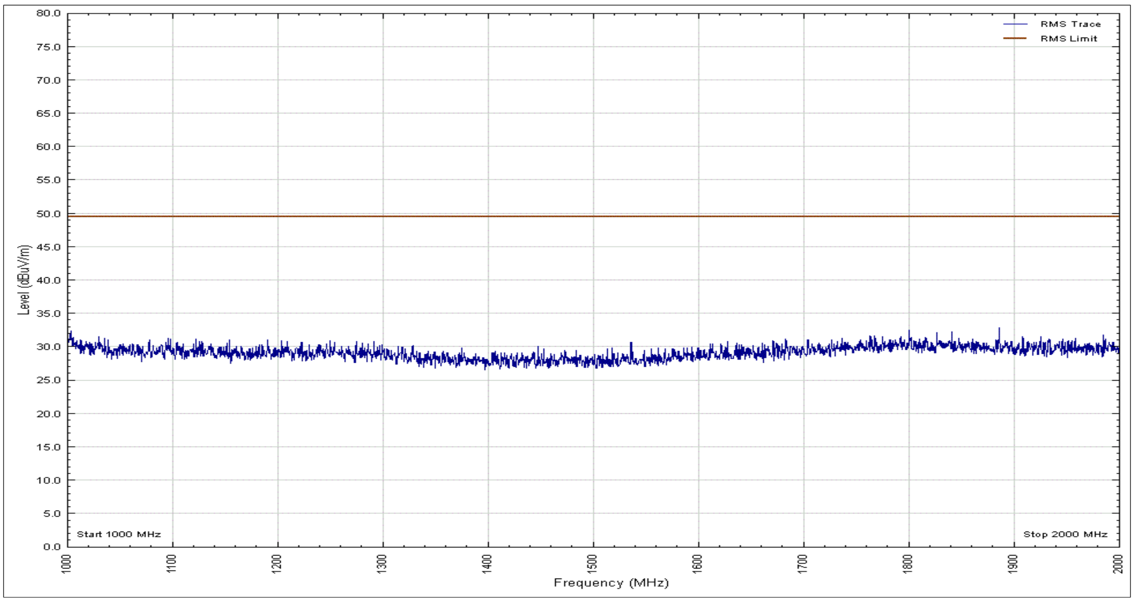

Figure 35 - 1 GHz to 2 GHz, CISPR Average, Horizontal - X Orientation

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

Table 36

*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.

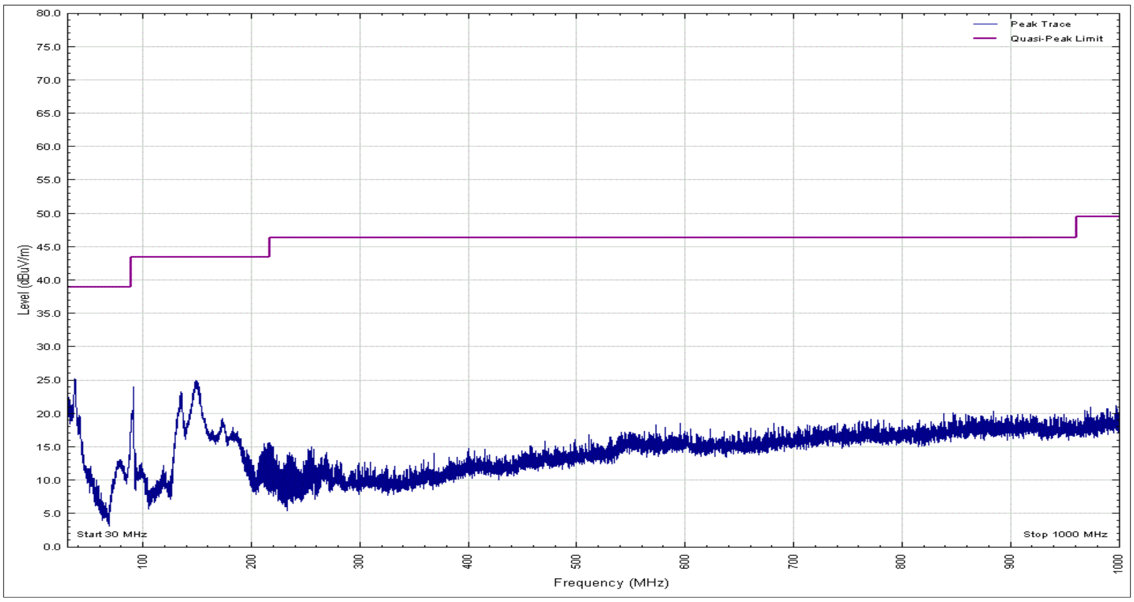

Figure 36 - 30 MHz to 1 GHz, Quasi-Peak, Vertical - Y Orientation

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

Table 37

*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.

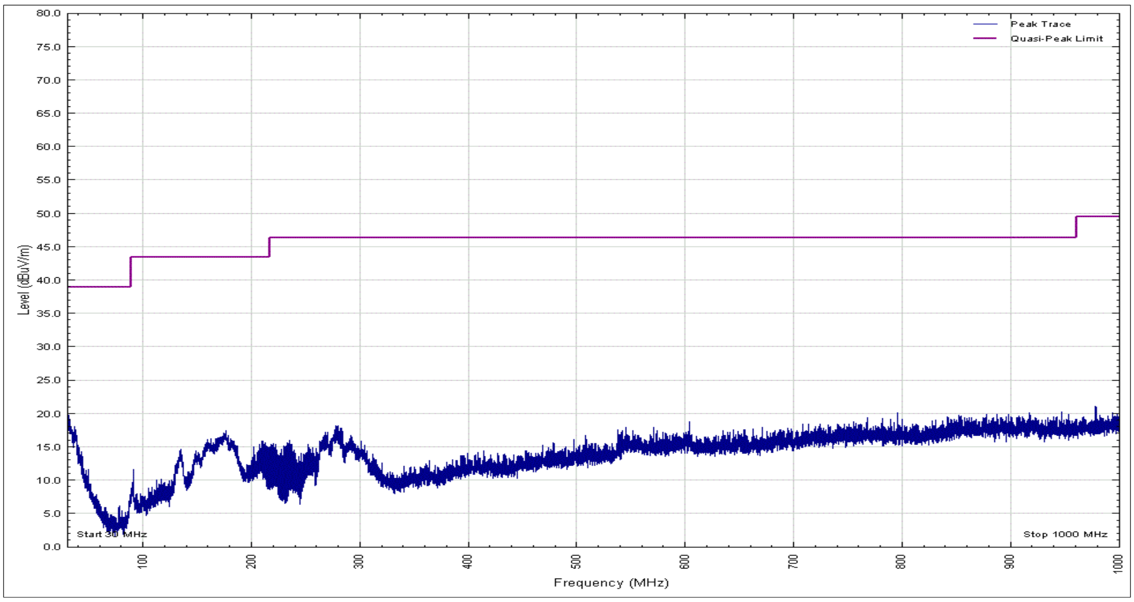

Figure 37 - 30 MHz to 1 GHz, Quasi-Peak, Horizontal - Y Orientation

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

Table 38

*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.

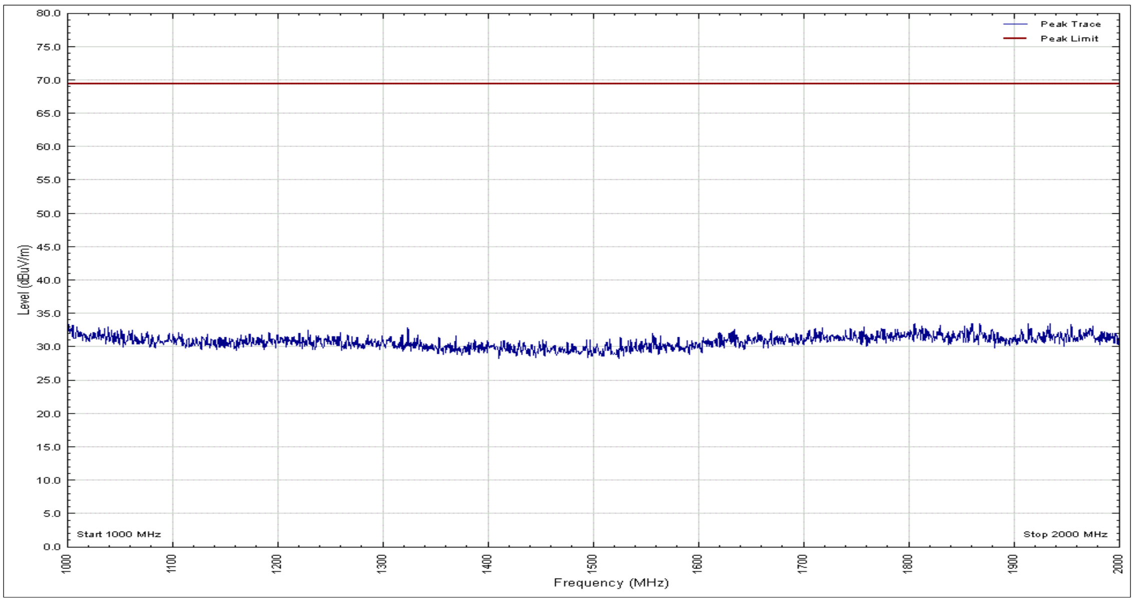

Figure 38 - 1 GHz to 2 GHz, CISPR Average, Vertical - Y Orientation

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

Table 39

*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.

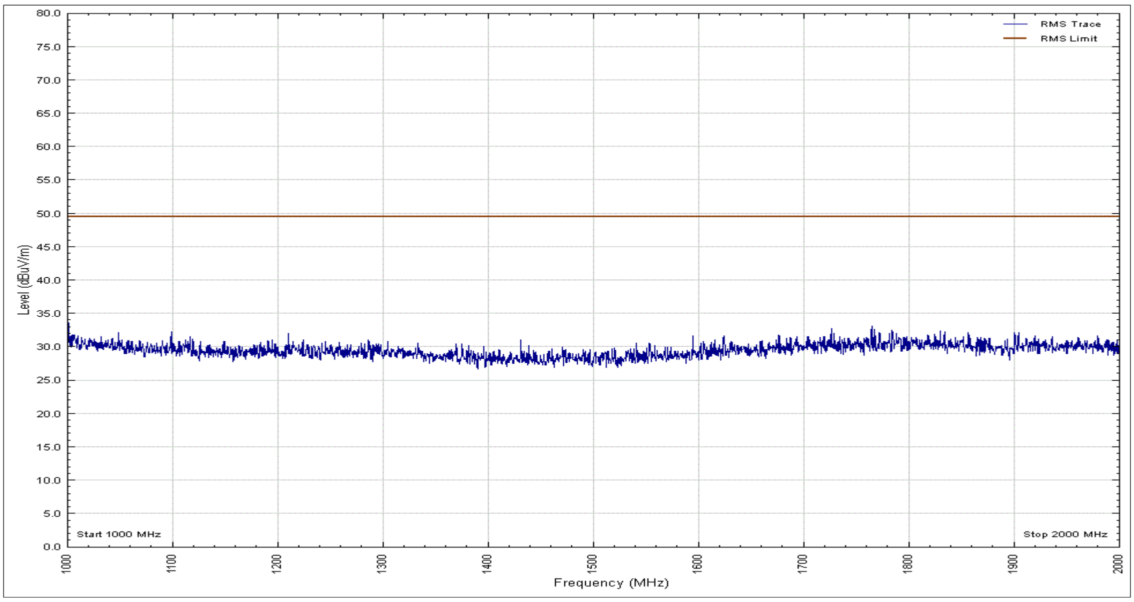

Figure 39 - 1 GHz to 2 GHz, CISPR Average, Vertical - Y Orientation

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

Table 40

*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.

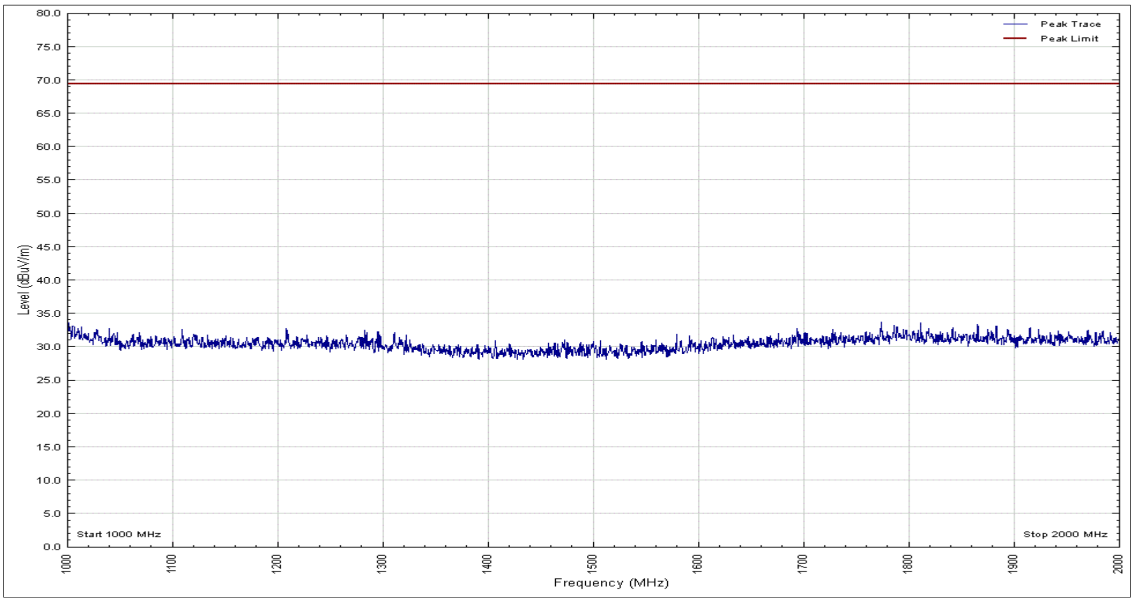

Figure 40 - 1 GHz to 2 GHz, CISPR Average, Horizontal - Y Orientation

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

Table 41

*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.

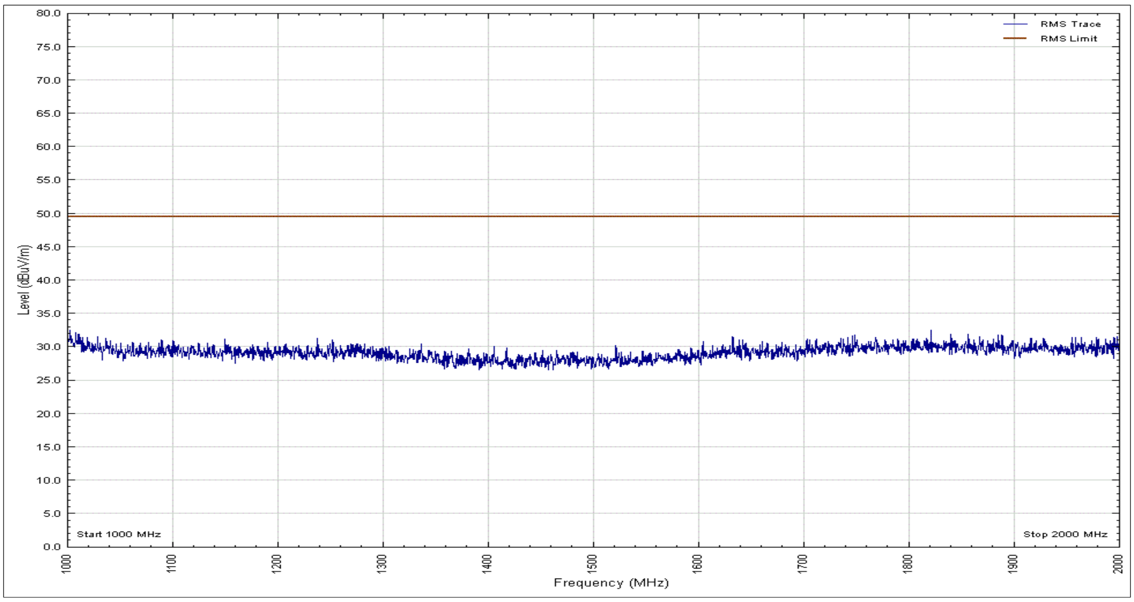

Figure 41 - 1 GHz to 2 GHz, CISPR Average, Horizontal - Y Orientation

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

Table 42

*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.

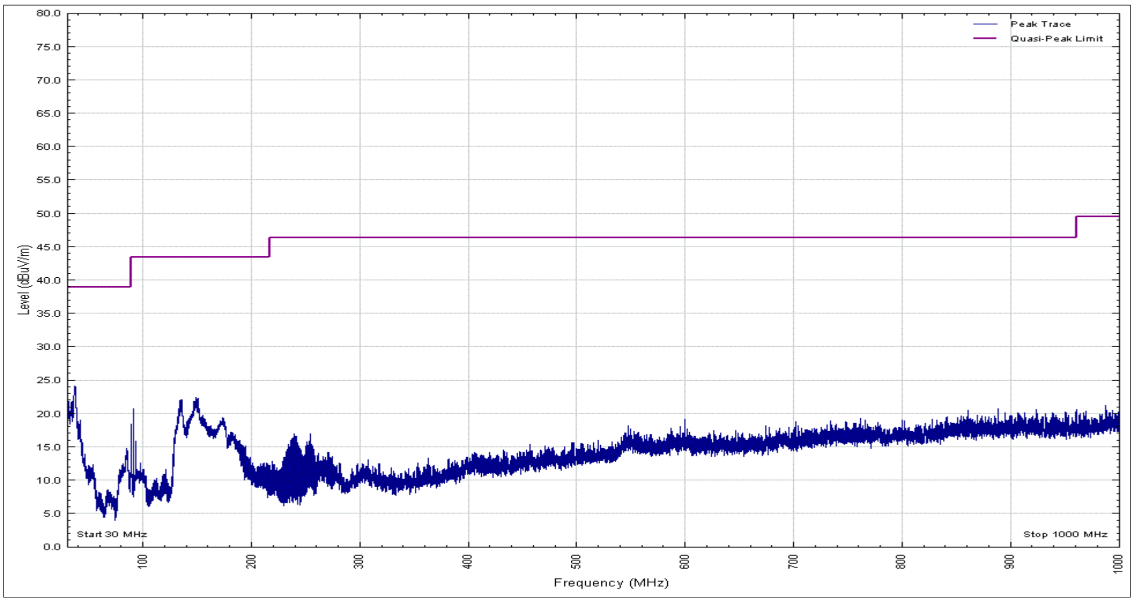

Figure 42 - 30 MHz to 1 GHz, Quasi-Peak, Vertical - Z Orientation

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

Table 43

*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.

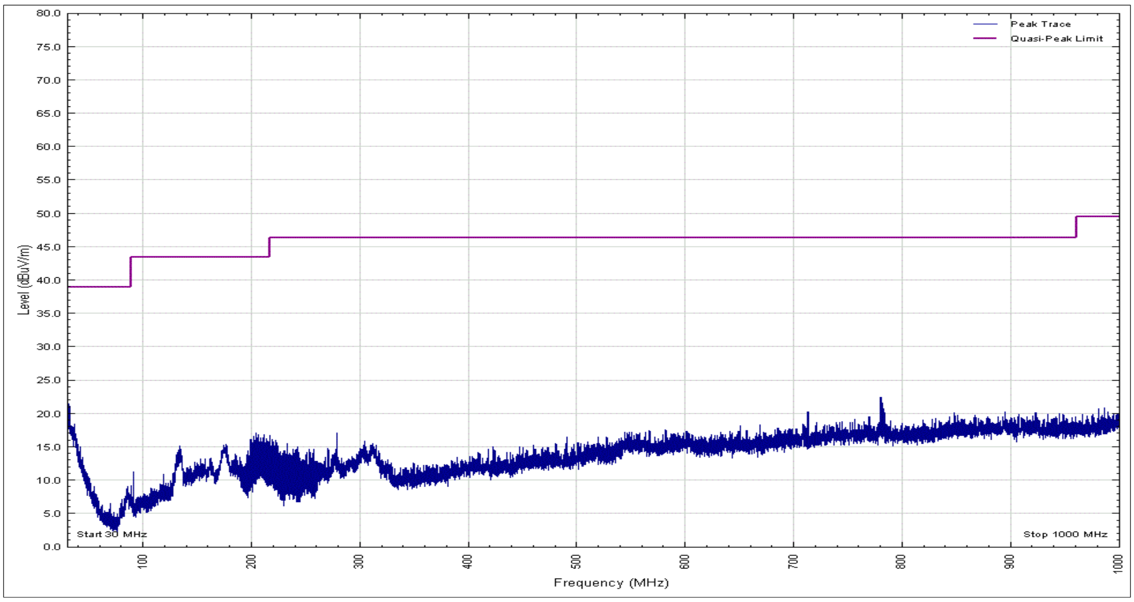

Figure 43 - 30 MHz to 1 GHz, Quasi-Peak, Horizontal - Z Orientation

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

Table 44

*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.

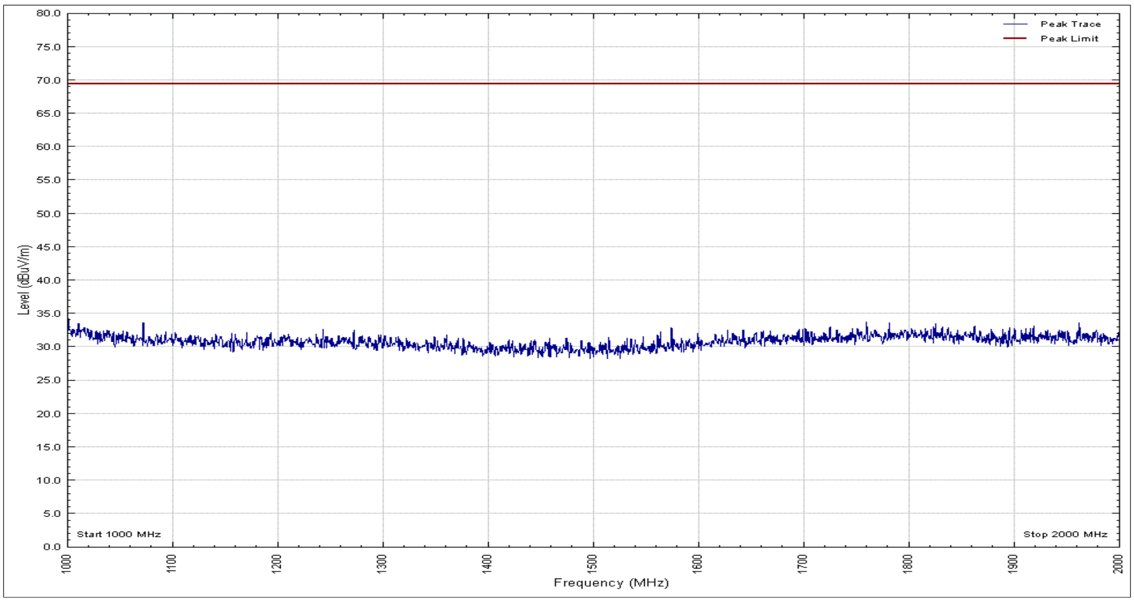

Figure 44 - 1 GHz to 2 GHz, CISPR Average, Vertical - Z Orientation

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

Table 45

*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.

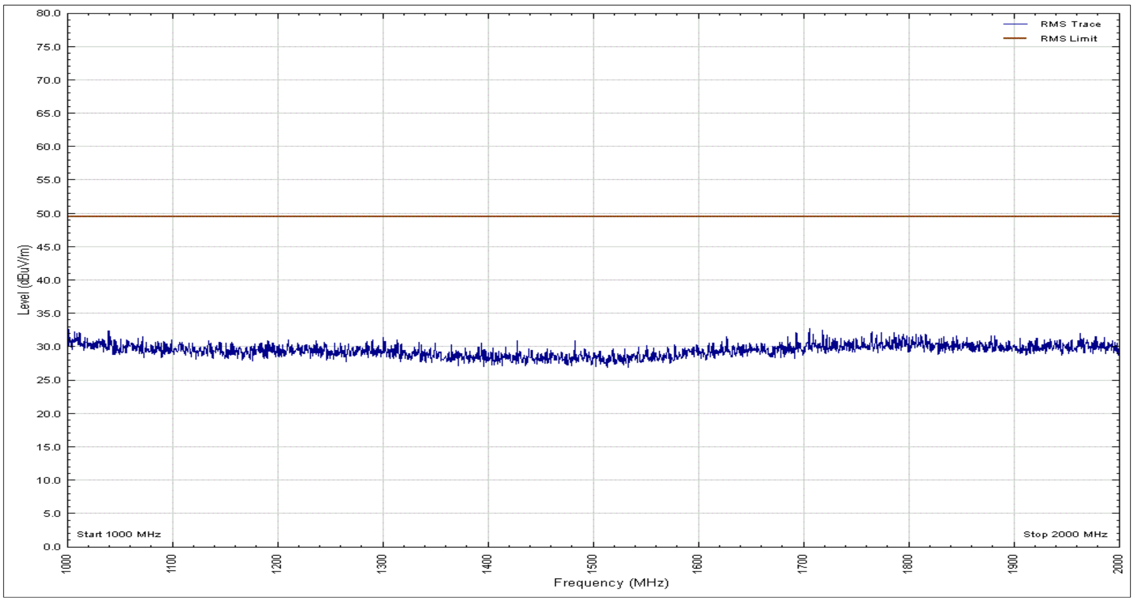

Figure 45 - 1 GHz to 2 GHz, CISPR Average, Vertical - Z Orientation

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

Table 46

*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.

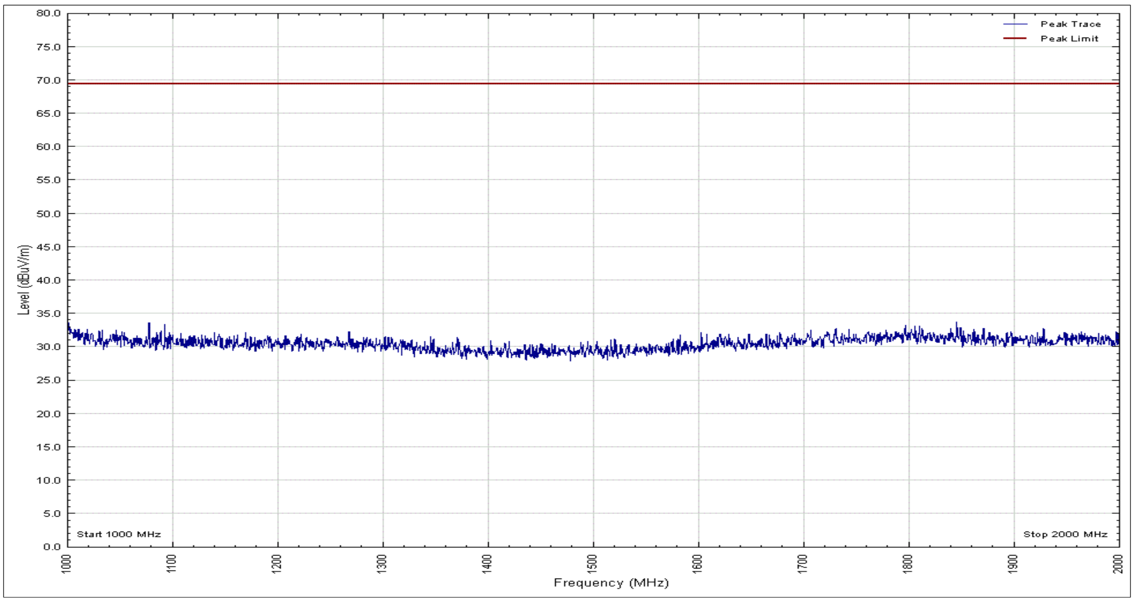

Figure 46 - 1 GHz to 2 GHz, CISPR Average, Horizontal - Z Orientation

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

Table 47

*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.

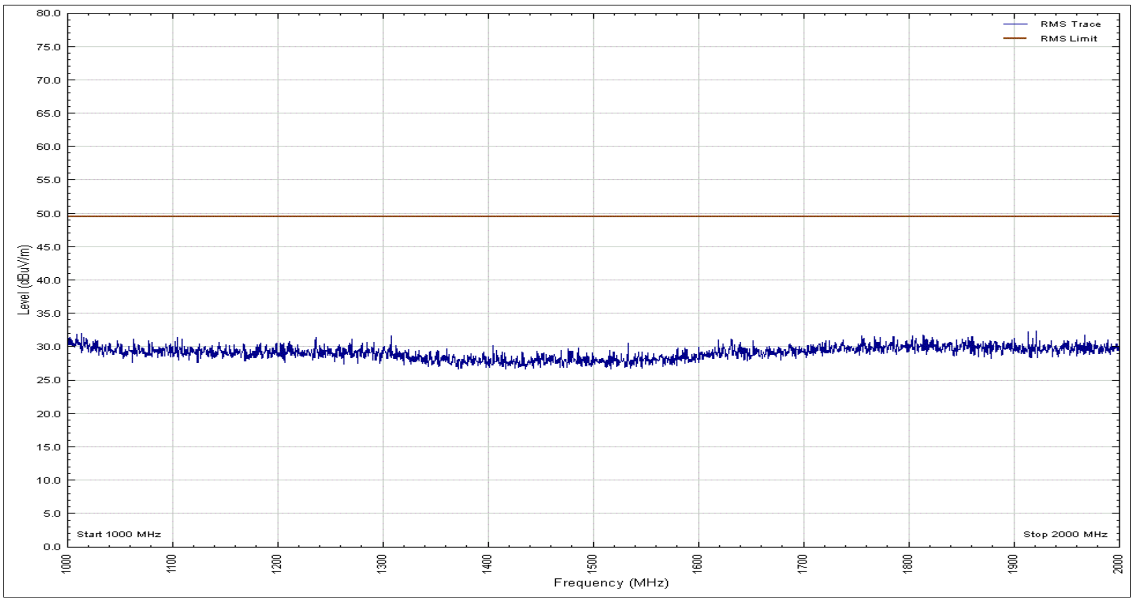

Figure 47 - 1 GHz to 2 GHz, CISPR Average, Horizontal - Z Orientation

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

Table 48

*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.

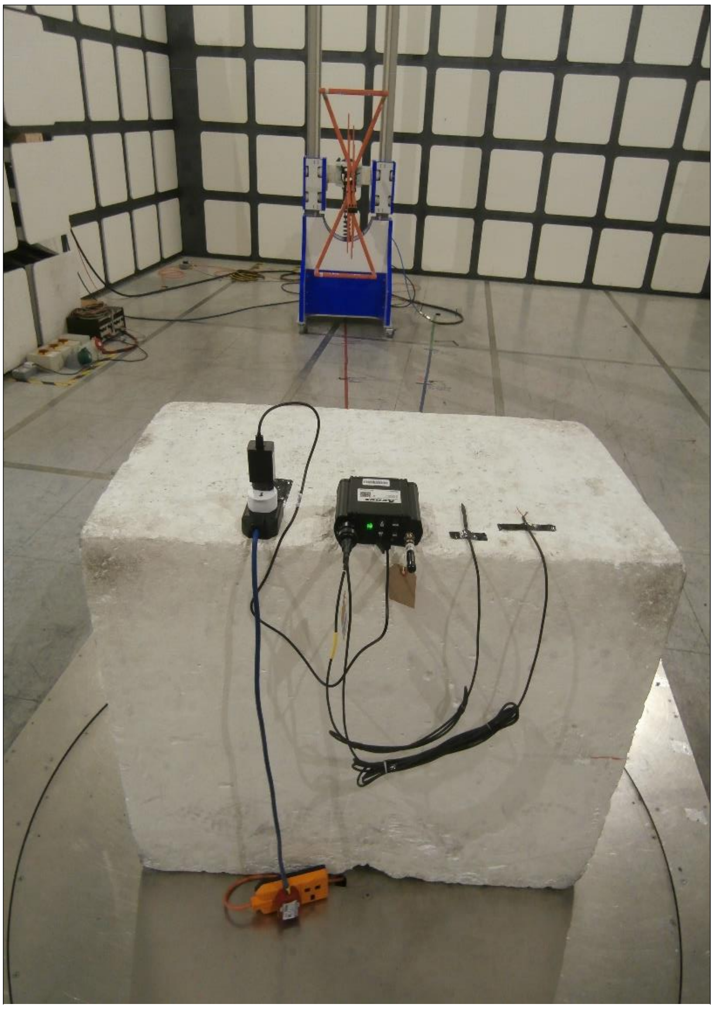

Figure 48 - Test Setup - 30 MHz to 1 GHz, X Orientation

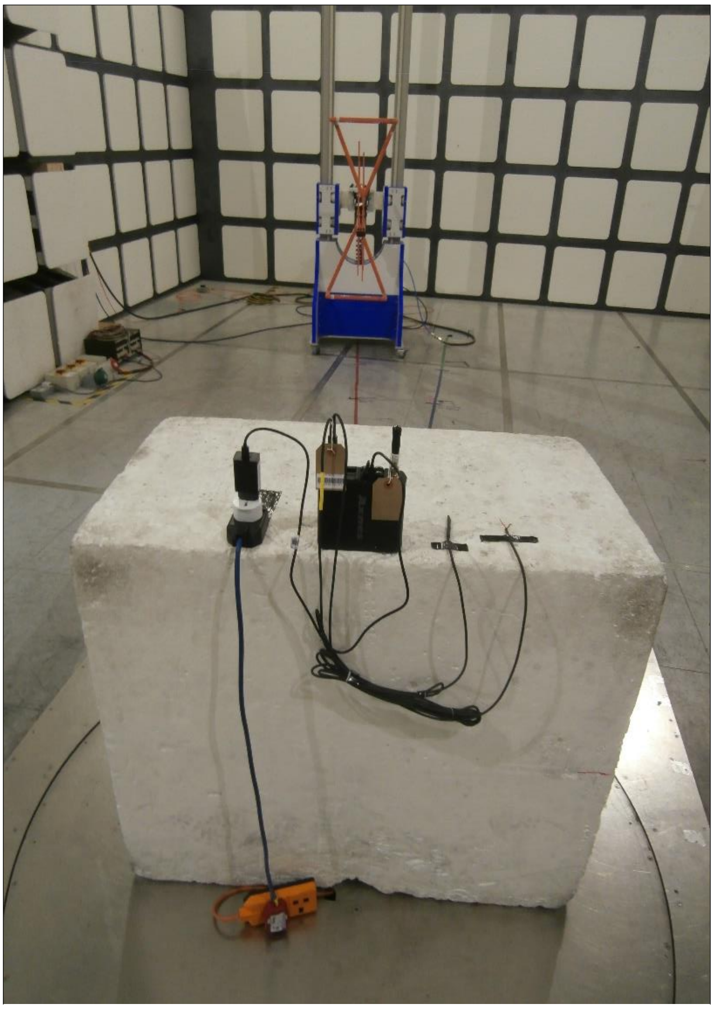

Figure 49 - Test Setup - 30 MHz to 1 GHz, Y Orientation

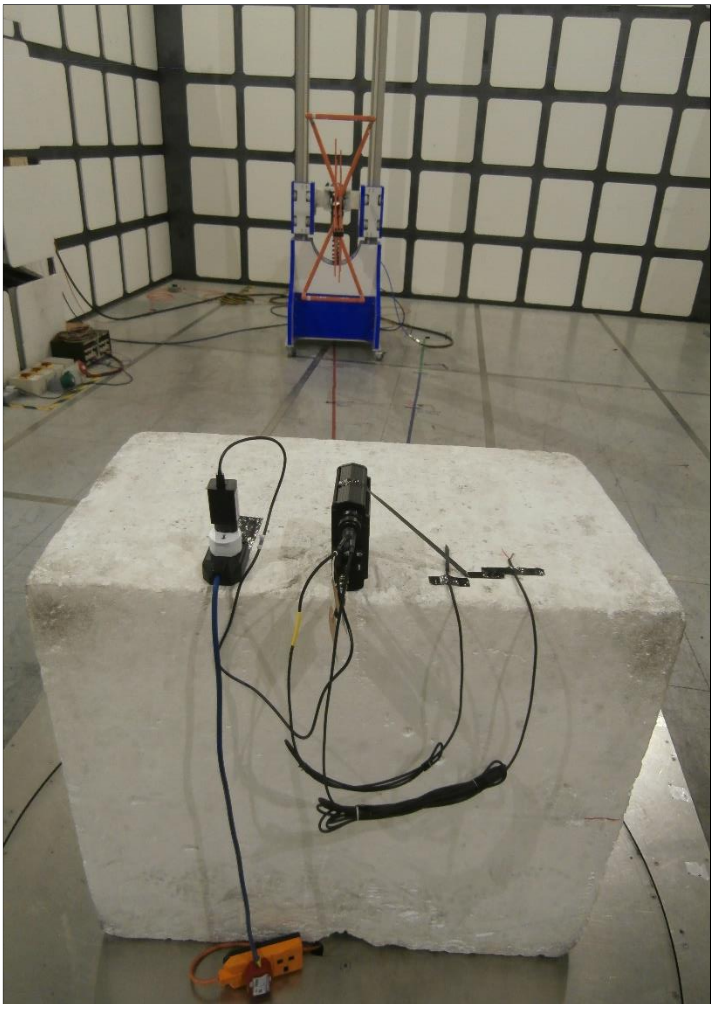

Figure 50 - Test Setup - 30 MHz to 1 GHz, Z Orientation

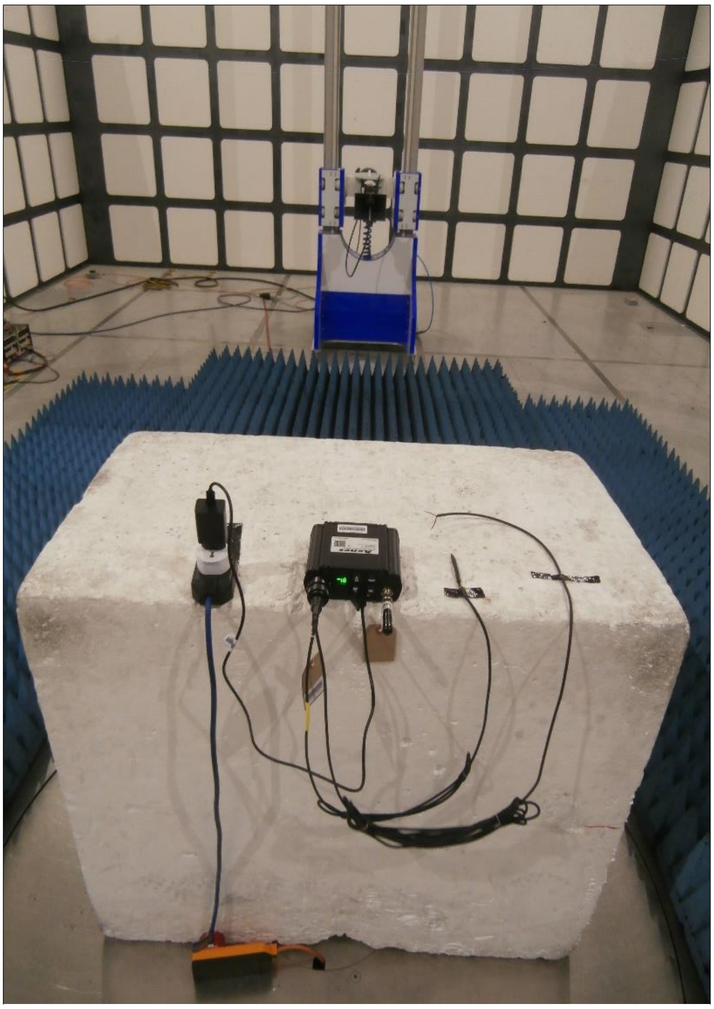

Figure 51 - Test Setup - 1 GHz to 2 GHz, X Orientation

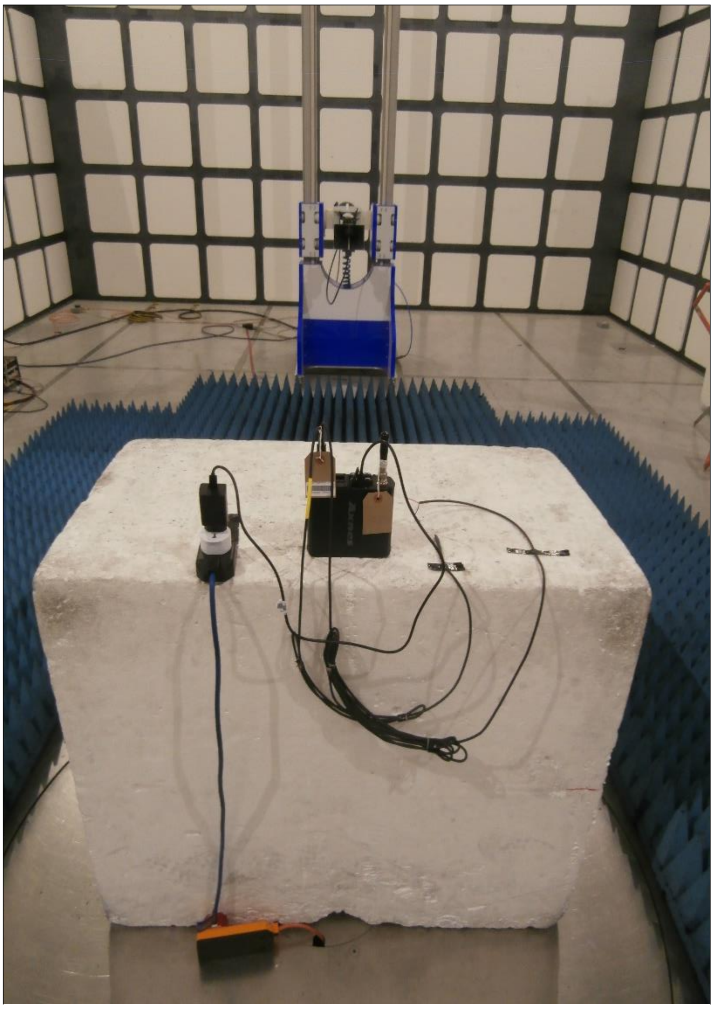

Figure 52 - Test Setup - 1 GHz to 2 GHz, Y Orientation

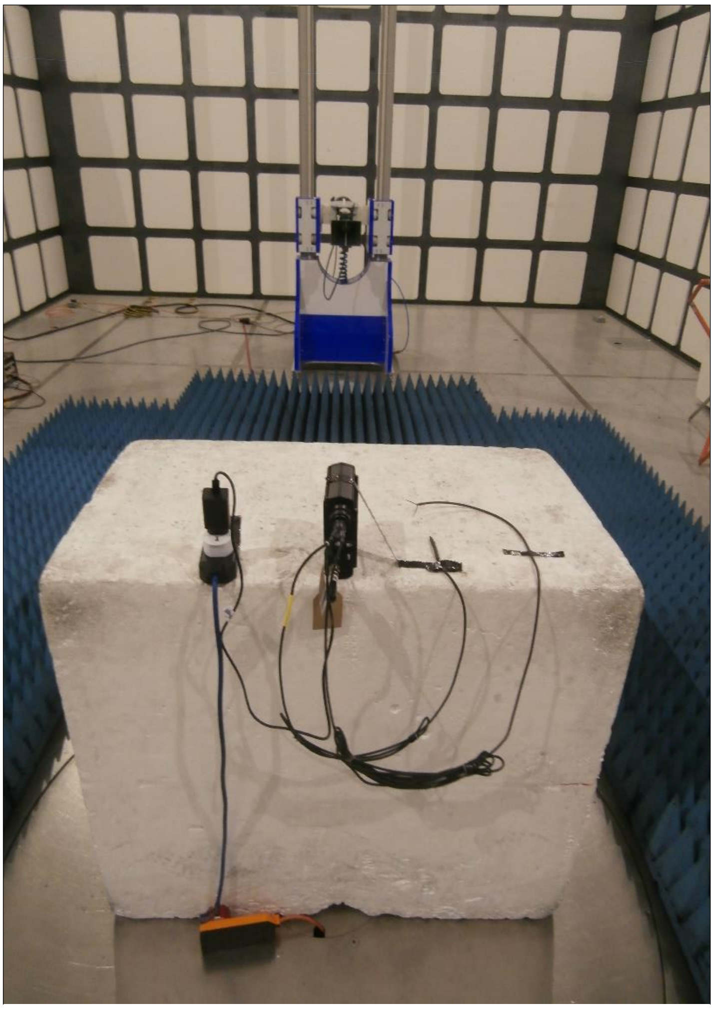

Figure 53 - Test Setup - 1 GHz to 2 GHz, Z Orientation

2.2.10 Test Location and Test Equipment Used

This test was carried out in EMC Chamber 5.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Screened Room (5)	Rainford	Rainford	1545	36	23-Jan-2021
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Multimeter	Iso-tech	IDM 101	2118	12	07-Feb-2021
Antenna with permanent attenuator (Bilog)	Chase	CBL6143	2904	24	30-Sep-2021
Comb Generator	Schaffner	RSG1000	3034	-	TU
Cable (Yellow, Rx, Km-Km 2m)	Scott Cables	KPS-1501-2000-KPS	4527	6	09-Jun-2020
Mast Controller	Maturo Gmbh	NCD	4810	-	TU
Tilt Antenna Mast	Maturo Gmbh	TAM 4.0-P	4811	-	TU
Double Ridge Broadband Horn Antenna	Schwarzbeck	BBHA 9120 B	4848	12	10-Mar-2021
4dB Attenuator	Pasternack	PE7047-4	4935	24	30-Sep-2021
EmX Emissions Software	TUV SUD	EmX	5125	-	Software
8 Meter Cable	Teledyne	PR90-088-8MTR	5212	12	30-Aug-2020
Thermo-Hygro-Barometer	PCE Instruments	OCE-THB-40	5470	12	16-Mar-2021
EMI Test Receiver	Rohde & Schwarz	ESW44	5527	12	06-Feb-2021

Table 49

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 50

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.