

FCC Test Report

MiX Telematics International (Pty) Ltd
Telematics Unit, Model: MiX 6AMB-4G-B

In accordance with FCC 47 CFR Part 15B

Prepared for: MiX Telematics International (Pty) Ltd
Blaauwklip Office Park 2
Cnr Strand & Webersvalley Roads
Stellenbosch
South Africa

FCC ID: 2AFMS-6AMB4G



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Document 75949089-02 Issue 01

SIGNATURE

NAME	JOB TITLE	RESPONSIBLE FOR	ISSUE DATE
Andy Lawson	Senior Engineer	Authorised Signatory	18 February 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. The sample tested was found to comply with the requirements defined in the applied rules.

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Testing	Graeme Lawler	18 February 2021	

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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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	18 February 2021

Table 1

1.2 Introduction

Applicant	MiX Telematics International (Pty) Ltd
Manufacturer	MiX Telematics International (Pty) Ltd
Model Number(s)	MiX 6AMB-4G-B
Manufacturer Declared Variant(s)	MiX 6AMB-4G
Serial Number(s)	66000180
Hardware Version(s)	1
Software Version(s)	2.0.4
Number of Samples Tested	1
Test Specification/Issue/Date	FCC 47 CFR Part 15B: 2019
Order Number	P0093632
Date	20-May-2020
Date of Receipt of EUT	05-January-2021
Start of Test	07-February-2021
Finish of Test	07-February-2021
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: DC Powered - Idle				
2.1	15.109	Radiated Disturbance	Pass	ANSI C63.4: 2014

Table 2



1.4 Manufacturer Declared Variant(s)



Stellenbosch 28 Jan 2021

To: Whom it may concern

From: MiX Telematics International (Pty) Ltd
Blaauwklip Office Park 2, CNR Strand & Webbers Valley
Stellenbosch – South Africa

Subject: Declaration of Similarity

MiX Telematics International (Pty) Ltd, hereby also declare that the battery and non-battery variants, present the same electrical, physical and electro mechanics characteristics, the same PCB (AWZ0006A-1D), layout and components. The only difference between them is that the “-B” models have an internal backup battery plugged in, allowing the device to work after the disconnection of the vehicle’s battery.

The following product variants (with part numbers) are available:

Part Number	Official Product Name	Description	Series
U0042MT	MiX 6AMB-4G	MiX 6000 MK2 6AMB-4G Electronic Unit	MiX 6000 MK2
U0044MT	MiX 6AMB-4G-B	MiX 6000 MK2 6AMB-4G-B Electronic Unit with Backup Battery	MiX 6000 MK2

Tabel 1: Variants in the MiX 6AMB-4G/-B Series of Products

We remain at your disposal for any clarifications that may become necessary.

Sincerely,

Certification Manager: TC Bothma

Blaauwklip Office Park 2, CNR Strand & Webbers Valley – Stellenbosch – South Africa



1.5 Application Form

Equipment Description

Technical Description: (Please provide a brief description of the intended use of the equipment including the technologies the product supports)	The MiX 6AMB-4G is a high-end Fleet product that incorporates the latest market trends. It supports LTE CAT 4 with 2G/3G fall-back, 3-Axis Accelerometer, Wi-Fi, Bluetooth, 433 or 915 MHz Short Range Device and GNSS. The MiX 6AMB-4G-B is the same design, but it also includes a backup battery. The kit consists of: Main Harness MP10, External LTE Antenna PA8, PUCK Antenna and Code Plug Socket Harness CP4	
Manufacturer:	MiX Telematics (Pty) Ltd.	
Model:	MiX 6AMB-4G-B	
Part Number:	U0044MT	
Hardware Version:	1	
Software Version:	2.0.4	
FCC ID of the product under test – see guidance here	2AFMS-6AMB4G	
IC ID of the product under test	Not Applicable	

Table 3

Intentional Radiators

Technology	GSM850	GSM1900	WCDMA BAND II	WCDMA BAND IV	WCDMA BAND V
Frequency Range (MHz to MHz)	824.2-848.8	1850.2-1909.8	1852.4-1907.6	1712.4-1752.6	826.4-846.6
Conducted Declared Output Power (dBm)	33 27	30 26	24	24	24
Antenna Gain (dBi)	2.29	1.59	1.59	2	2.29
Supported Bandwidth(s) (MHz) (e.g. 1 MHz, 20 MHz, 40 MHz)	296Kbps (DL) 236.8Kbps (UL)	296Kbps (DL) 236.8Kbps (UL)	60	45	25
Modulation Scheme(s) (e.g. GFSK, QPSK etc)	GMSK, 8PSK	GMSK, 8PSK	QPSK, 16QAM, 64QAM	QPSK, 16QAM, 64QAM	QPSK, 16QAM, 64QAM
ITU Emission Designator (see guidance here)	247KGXW 245KG7W	249KGXW 249KG7W	4M15F9W	4M14F9W	4M13F9W
Bottom Frequency (MHz)	824.2	1850.2	1850	1710	824
Middle Frequency (MHz)	837	1880	1880	1732.5	836.5
Top Frequency (MHz)	848.8	1909.8	1910	1755	849

Table 4



Technology	SRD 915	SRD2400 BT/BLE	SRD2400 WiFi
Frequency Range (MHz to MHz)	902-928	2402-2480	2412-2467
Conducted Declared Output Power (dBm)	20	6	15.6
Antenna Gain (dBi)	0	3	3
Supported Bandwidth(s) (MHz) (e.g. 1 MHz, 20 MHz, 40 MHz)	0.025	1	20 40
Modulation Scheme(s) (e.g. GFSK, QPSK etc)	2FSK	GFSK 8-DPSK	GFSK (BDR) (1 Mbit/s); $\pi/4$ -DQPSK (EDR) (2 Mbit/s); 8-PSK (EDR) (3 Mbits/s)
ITU Emission Designator (see guidance here)	38K2F7D	1M10F1D	16M7D1D
Bottom Frequency (MHz)	902	2402	2412
Middle Frequency (MHz)	915	2440	2439.5
Top Frequency (MHz)	928	2480	2467

Table 5

Technology	LTE Band 2	LTE Band 4	LTE Band 5	LTE Band 7	LTE Band 12
Frequency Range (MHz to MHz)	1850-1910	1710-1755	824-849	2500-2570	699-716
Conducted Declared Output Power (dBm)	23±2	23±2	23±2	23±2	23±2
Antenna Gain (dBi)	1.59	4.2	2.29	3	3.26
Supported Bandwidth(s) (MHz) (e.g. 1 MHz, 20 MHz, 40 MHz)	1.4, 3, 5,10,15, 20	1.4, 3, 5,10,15, 20	1.4, 3, 5,10,15	5,10,15, 20	1.4, 3, 5,10
Modulation Scheme(s) (e.g. GFSK, QPSK etc)	QPSK 16QAM	QPSK 16QAM	QPSK 16QAM	QPSK 16QAM	QPSK 16QAM
ITU Emission Designator (see guidance here)	17M9G7D 17M9W7D 1M09W7D	17M9G7D 17M9W7D 1M09W7D	8M93G7D 8M93W7D2M 70G7D 1M09W7D	17M9G7D 17M9W7D 4M49W7D	8M93G7D 8M93W7D 1M09W7D
Bottom Frequency (MHz)	1850	1710	824	2500	699
Middle Frequency (MHz)	1880	1732.5	836.5	2535	707.5
Top Frequency (MHz)	1910	1755	849	2570	716

Table 6



Technology	LTE Band 13	LTE Band 25	LTE Band 26	LTE Band 38	LTE Band 41
Frequency Range (MHz to MHz)	777-787	1850-1915	814-849	2570-2620	2496-2690
Conducted Declared Output Power (dBm)	23±2	23±2	23±2	23±2	23±2
Antenna Gain (dBi)	4.45	1.59	2.53	2.06	3
Supported Bandwidth(s) (MHz) (e.g. 1 MHz, 20 MHz, 40 MHz)	5,10	1.4, 3, 5,10,15, 20	1.4, 3, 5,10	5,10,15, 20	5,10,15, 20
Modulation Scheme(s) (e.g. GFSK, QPSK etc)	QPSK 16QAM	QPSK 16QAM	QPSK 16QAM	QPSK 16QAM	QPSK 16QAM
ITU Emission Designator (see guidance here)	8M91G7D 8M91W7D 4M48G7D 4M49W7D	17M9G7D 17M9W7D 8M91G7D 1M09W7D	8M91G7D 8M91W7D 1M09G7D 1M09W7D 13M5G7D 13M4W7D 4M49W7D	17M8G7D 17M8W7D 8M91G7D	17M9G7D 17M9W7D 8M91G7D 4M50W7D
Bottom Frequency (MHz)	777	1850	814	2570	2496
Middle Frequency (MHz)	782	1882.5	831.5	2595	2593
Top Frequency (MHz)	787	1915	849	2620	2690

Table 7

Un-intentional Radiators

Highest frequency generated or used in the device or on which the device operates or tunes	2690 MHz
Lowest frequency generated or used in the device or on which the device operates or tunes	699 MHz
Class A Digital Device (Use in commercial, industrial or business environment) ☐	
Class B Digital Device (Use in residential environment only) ☒	

Table 8



AC Power Source

AC supply frequency:	N/A	Hz
Voltage	N/A	V
Max current:	N/A	A
Single Phase ☐ Three Phase ☐		

Table 9

DC Power Source

Nominal voltage:	13.8/27.6	V
Extreme upper voltage:	32	V
Extreme lower voltage:	10.5	V
Max current:	7.5A absolute max (7.5A Fused) 3.5A typical	A

Table 10

Battery Power Source

Voltage:	3.2	V
End-point voltage:	2.5	V (Point at which the battery will terminate)
Alkaline ☐ Leclanche ☐ Lithium ☒ Nickel Cadmium ☐ Lead Acid* ☒ *(Vehicle regulated)		
Other ☐	Please detail:	

Table 11

Charging

Can the EUT transmit whilst being charged	Yes ☒ No ☐
---	---

Table 12

Temperature

Minimum temperature:	-20	°C
Maximum temperature:	+60 (limited by backup battery) Else +80	°C

Table 13



Antenna Characteristics

Antenna connector ☒			State impedance	50	Ohm
Temporary antenna connector ☐			State impedance		Ohm
Integral antenna ☒	Type:	SRD915	Gain	0	dBi
External antenna ☒	Type:	LTE Primary LTE Diversity Bluetooth/WiFi GNSS	Gain	2.84 (3G); 2.44 (4G) 2 3 RX	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 ☒					

Table 14

Ancillaries (if applicable)

Manufacturer:	CHM	Part Number:	440FT0033
Model:	Main Harness MP10	Country of Origin:	South Africa
Manufacturer:	Jinchang Electron Global Service	Part Number:	A0050MT
Model:	PUCK Antenna, LTE, WiFi/Bluetooth and GNSS Combination Antenna (JCE305)	Country of Origin:	China
Manufacturer:	RF Design	Part Number:	A0049MT
Model:	External LTE antenna PA8 Fakra connector	Country of Origin:	South Africa
Manufacturer:	CHM	Part Number:	440FT0032
Model:	Code Plug Harness with socket CP4	Country of Origin:	South Africa
Manufacturer:	CHM	Part Number:	A0041MT
Model:	Auxiliary Harness AX5 (optional)	Country of Origin:	South Africa
Manufacturer:	CHM	Part Number:	440FT0931
Model:	Serial Harness SR1 (optional)	Country of Origin:	South Africa

Table 15

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

Name: Christo Bothma
Position held: Certification Manager
Date: 26 Nov 2020



1.6 Product Information

1.6.1 Technical Description

The Equipment Under Test (EUT) was a MiX Telematics International (Pty) Ltd, Model: MiX 46MB-4G-B.

The primary function of the EUT is a fleet product that incorporates the latest market trends.

It consists mainly of an on-board computer, an LTE modem with 2G fallback, a GNSS, an accelerometer, Low Energy Bluetooth, I/O, 2 x CAN, 2 x RS232, 4 x positive drives and 434 / 915 MHz short range transceiver.

1.6.2 EUT Port/Cable Identification

Port	Max Cable Length specified	Usage	Type	Screened
Configuration and Mode: DC Powered - Idle				
DC Input	1 m	Power	Power	No
DC Input +ve	1 m	Power	Power	No
DC Input -ve	1 m	Power	Power	No
PUK Antenna - Wi-Fi	3 m	Connection to Antenna	Signal	Yes
PUK Antenna - GNSS	3 m	Connection to Antenna	Signal	Yes
PUK Antenna - LTE Diversity	3 m	Connection to Antenna	Signal	Yes
Blade Antenna	3 m	Connection to Antenna	Signal	Yes
Code Plug	1.15 m	Connection to Code Plug	Signal	No
Serial Comms	1.47 m	Data	Signal	No
Auxiliary Harness	1.5 m	Data	Signal	No
Main Harness	1.5 m	Power and Data	Signal and Power	No

Table 16

1.6.3 Test Configuration

Configuration	Description
DC Powered	Powered via DC power supply at 13.8 V DC, connected via an optical can link to the support Laptop running MiX test software (MiX Test Application:MIX6000 MK2 LTE).

Table 17

1.6.4 Modes of Operation

Mode	Description
Idle	All EUTs RF modules in an idle state. EUT performance is being monitored by test PC with customers test software. The following script was executed in the customers test software: RE - Receivers in RX, Magix9, CP-TEST,CAN-LOOP,Charger-50.

Table 18



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: MiX 6AMB-4G-B, Serial Number: 66000180			
0	As supplied by the customer	Not Applicable	Not Applicable

Table 19

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: DC Powered - Idle		
Radiated Disturbance	Graeme Lawler	UKAS

Table 20

Office Address:

Octagon House
Concorde Way
Segensworth North
Fareham
Hampshire
PO15 5RL
United Kingdom



2 Test Details

2.1 Radiated Disturbance

2.1.1 Specification Reference

FCC 47 CFR Part 15B, Clause 15.109

2.1.2 Equipment Under Test and Modification State

MiX 6AMB-4G-B, S/N: 66000180 - Modification State 0

2.1.3 Date of Test

07-February-2021

2.1.4 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 reasonably 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.

2.1.5 Example Calculation

Below 1 GHz:

$$\begin{aligned}\text{Quasi-Peak level (dB}\mu\text{V/m)} &= \text{Receiver level (dB}\mu\text{V)} + \text{Correction Factor (dB/m)} \\ \text{Margin (dB)} &= \text{Quasi-Peak level (dB}\mu\text{V/m)} - \text{Limit (dB}\mu\text{V/m)}\end{aligned}$$

Above 1 GHz:

$$\begin{aligned}\text{CISPR Average level (dB}\mu\text{V/m)} &= \text{Receiver level (dB}\mu\text{V)} + \text{Correction Factor (dB/m)} \\ \text{Margin (dB)} &= \text{CISPR Average level (dB}\mu\text{V/m)} - \text{Limit (dB}\mu\text{V/m)}\end{aligned}$$

$$\begin{aligned}\text{Peak level (dB}\mu\text{V/m)} &= \text{Receiver level (dB}\mu\text{V)} + \text{Correction Factor (dB/m)} \\ \text{Margin (dB)} &= \text{Peak level (dB}\mu\text{V/m)} - \text{Limit (dB}\mu\text{V/m)}\end{aligned}$$



2.1.6 Example Test Setup Diagram

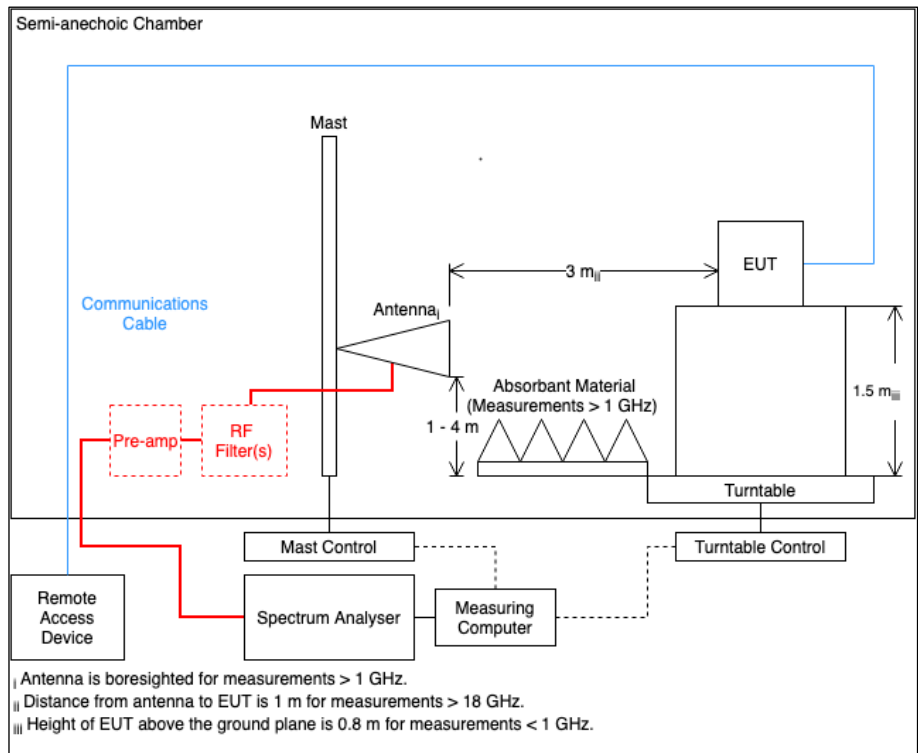


Figure 1

2.1.7 Environmental Conditions

Ambient Temperature 22.2 °C
Relative Humidity 26.9 %

2.1.8 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 21

2.1.9 Test Results

Results for Configuration and Mode: DC 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: 2690 MHz

Which necessitates an upper frequency test limit of: 14 GHz

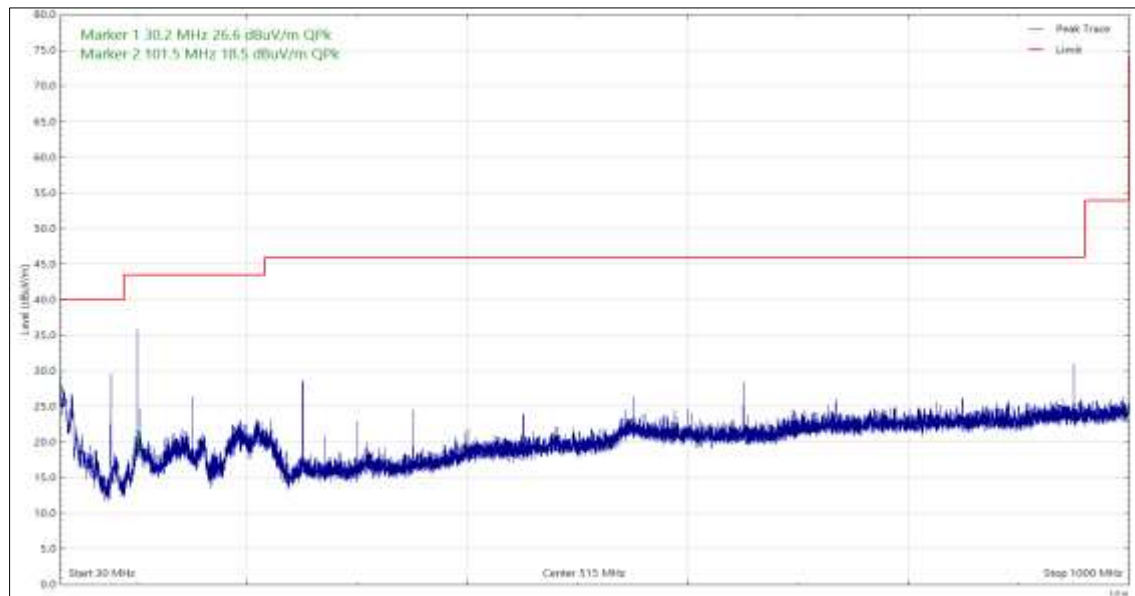


Figure 2 - 30 MHz to 1 GHz, Quasi-Peak, Vertical, X Orientation

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation	Orientation
30.230	26.6	40.0	-13.4	Q-Peak	7	379	Vertical	X
101.495	18.5	43.5	-25.0	Q-Peak	30	106	Vertical	X

Table 22

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.

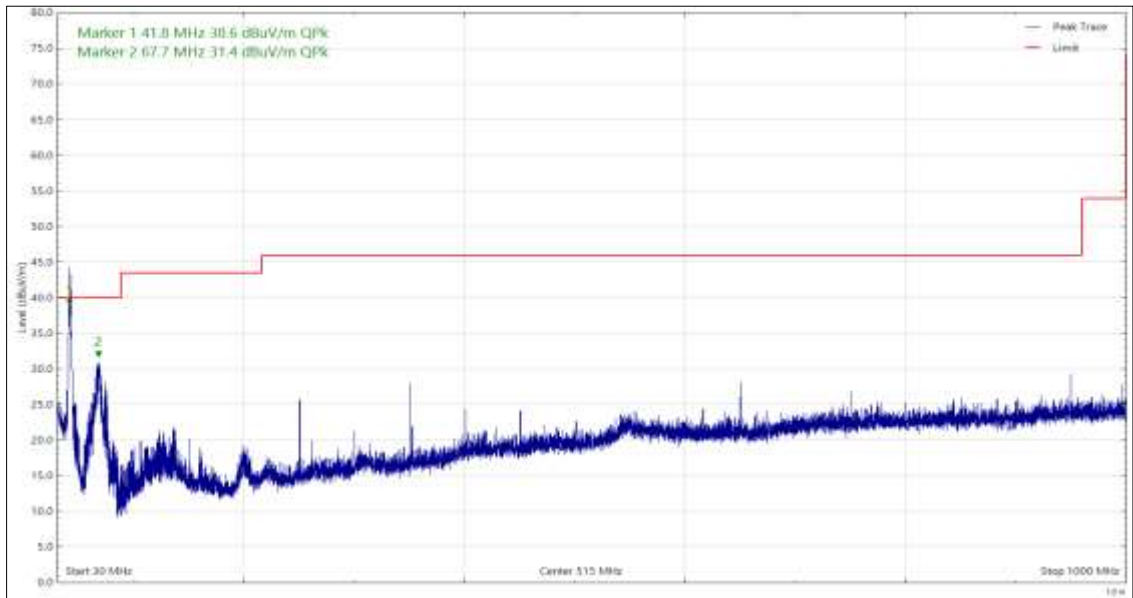


Figure 3 - 30 MHz to 1 GHz, Quasi-Peak, Horizontal, X Orientation

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation	Orientation
41.807	38.6	40.0	-1.4	Q-Peak	177	100	Horizontal	X
67.660	31.4	40.0	-8.6	Q-Peak	198	393	Horizontal	X

Table 23

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.

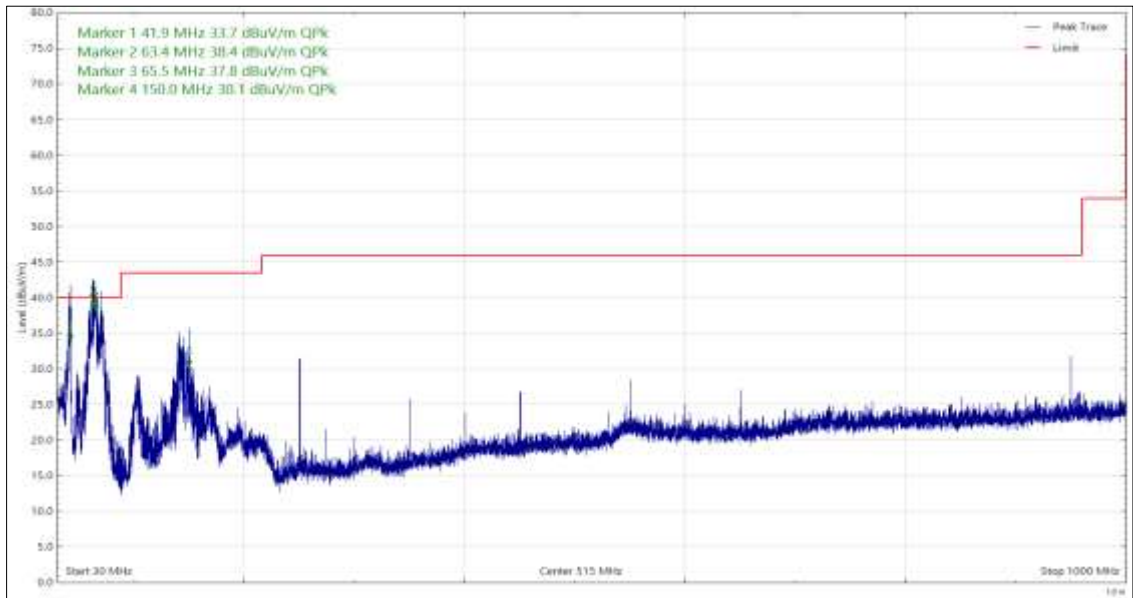


Figure 4 - 30 MHz to 1 GHz, Quasi-Peak, Vertical, Y Orientation

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation	Orientation
41.881	33.7	40.0	-6.4	Q-Peak	194	105	Vertical	Y
63.352	38.4	40.0	-1.6	Q-Peak	57	100	Vertical	Y
65.507	37.8	40.0	-2.2	Q-Peak	159	108	Vertical	Y
150.016	30.1	43.5	-13.4	Q-Peak	202	100	Vertical	Y

Table 24

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.

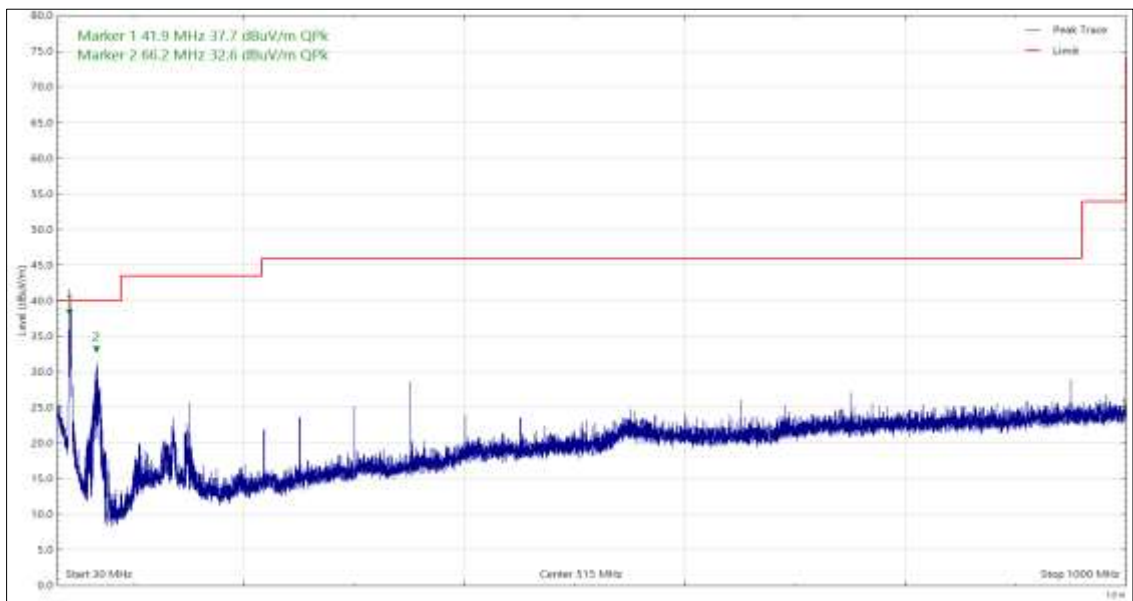


Figure 5 - 30 MHz to 1 GHz, Quasi-Peak, Horizontal, Y Orientation

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation	Orientation
41.859	37.7	40.0	-2.4	Q-Peak	152	103	Horizontal	Y
66.204	32.6	40.0	-7.5	Q-Peak	178	397	Horizontal	Y

Table 25

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.

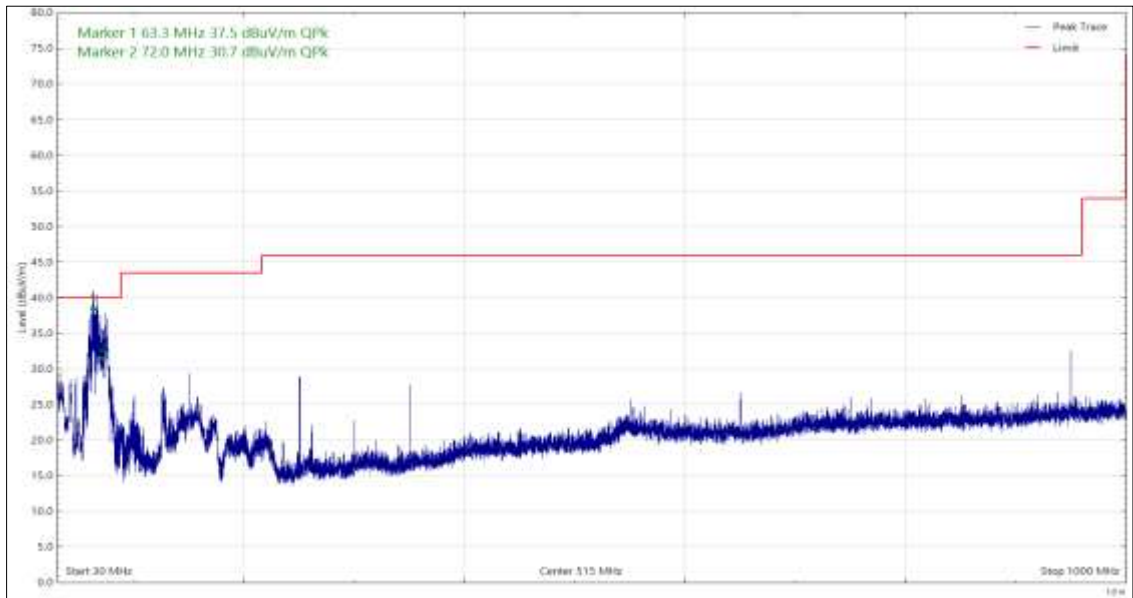


Figure 6 - 30 MHz to 1 GHz, Quasi-Peak, Vertical, Z Orientation

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation	Orientation
63.344	37.5	40.0	-2.5	Q-Peak	341	135	Vertical	Z
72.000	30.7	40.0	-9.3	Q-Peak	224	175	Vertical	Z

Table 26

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.

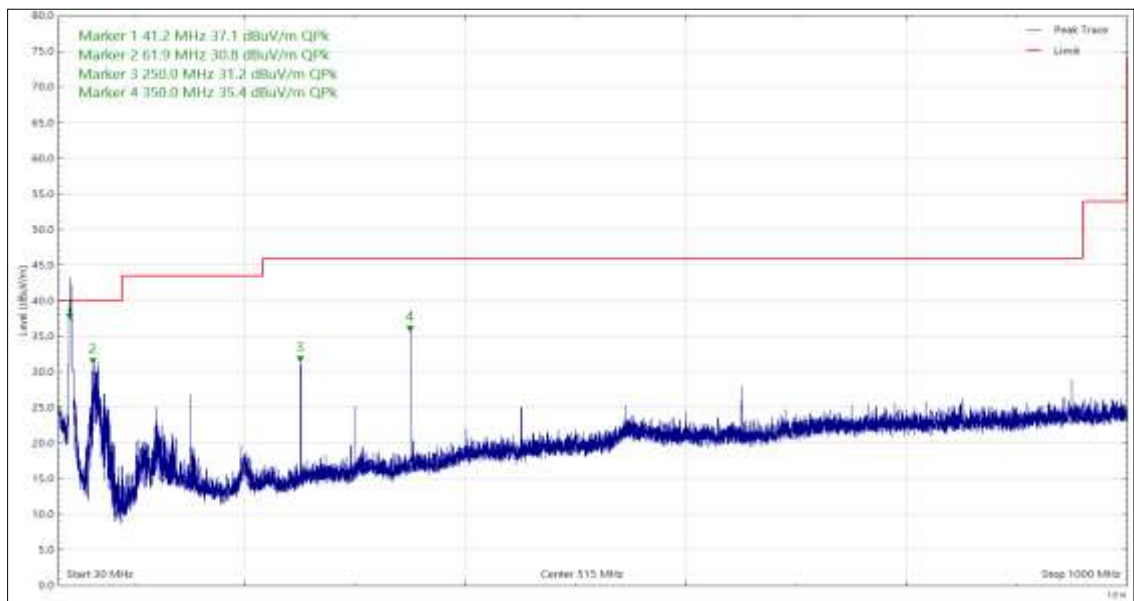


Figure 7 - 30 MHz to 1 GHz, Quasi-Peak, Horizontal, Z Orientation

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation	Orientation
41.190	37.1	40.0	-2.9	Q-Peak	194	108	Horizontal	Z
61.875	30.8	40.0	-9.2	Q-Peak	204	309	Horizontal	Z
250.001	31.2	46.0	-14.9	Q-Peak	266	128	Horizontal	Z
350.007	35.4	46.0	-10.6	Q-Peak	277	103	Horizontal	Z

Table 27

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.

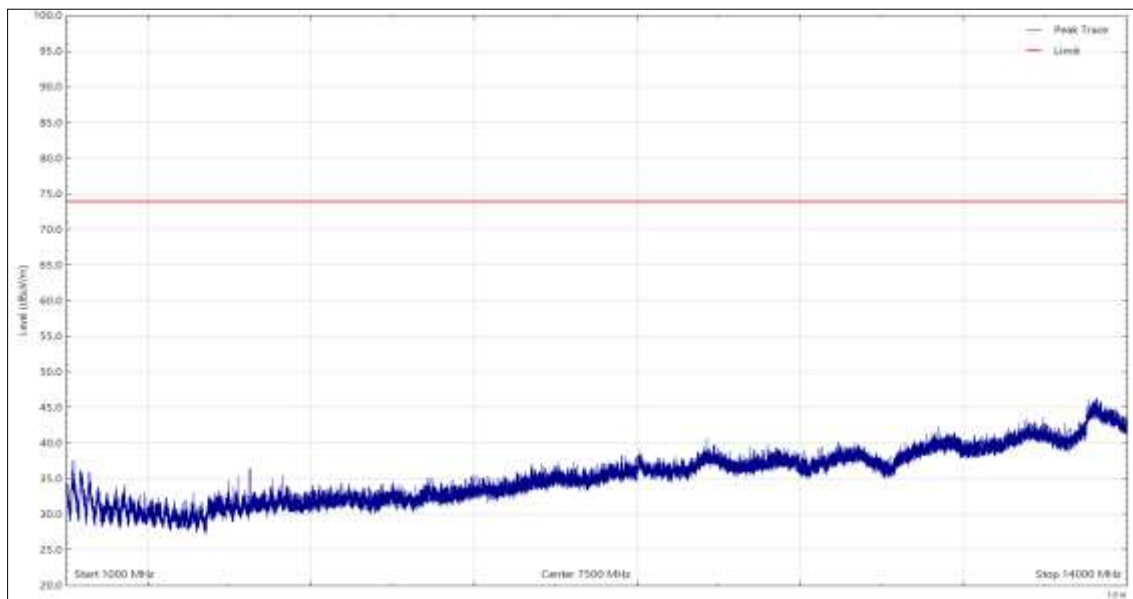


Figure 8 - 1 GHz to 14 GHz, Peak, Vertical, X Orientation

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/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.

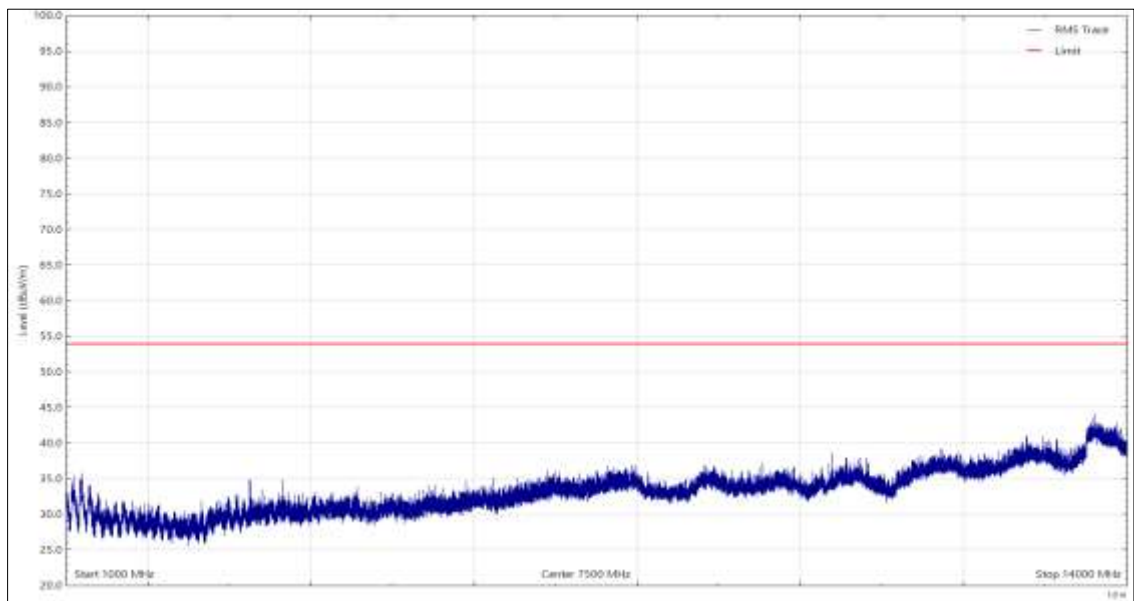


Figure 9 - 1 GHz to 14 GHz, CISPR Average, Vertical, X Orientation

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/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.

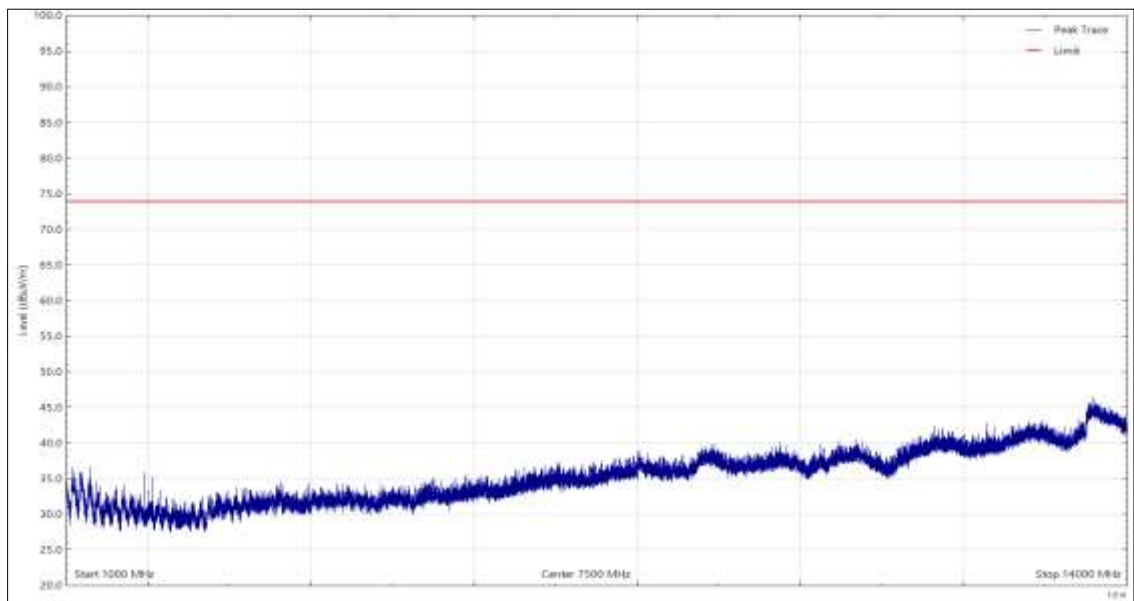


Figure 10 - 1 GHz to 14 GHz, Peak, Horizontal, X Orientation

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/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.

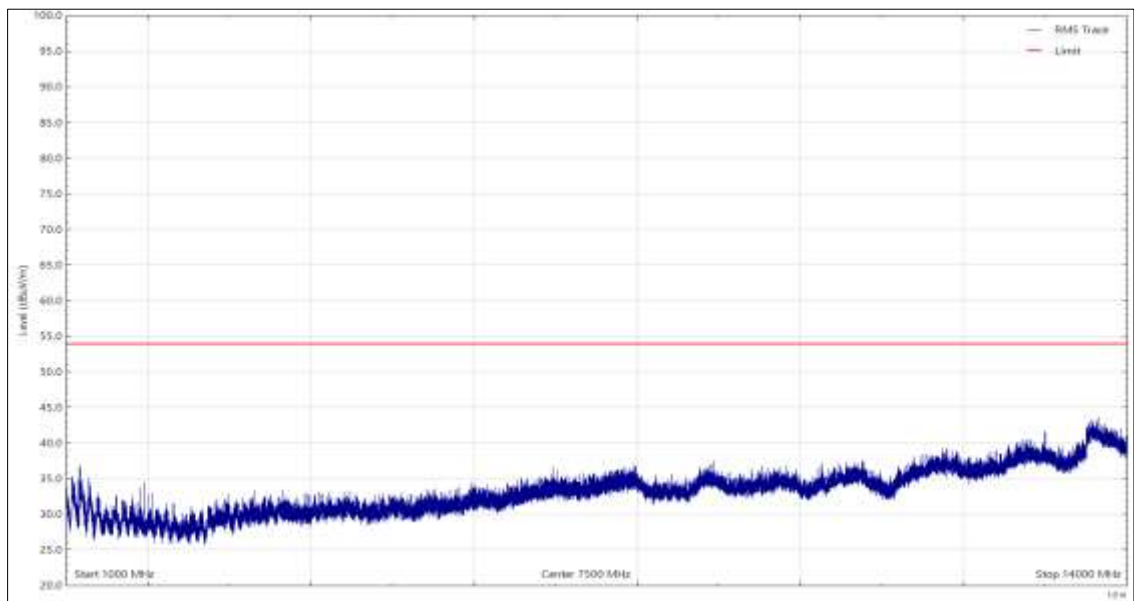


Figure 11 - 1 GHz to 14 GHz, CISPR Average, Horizontal, X Orientation

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/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.

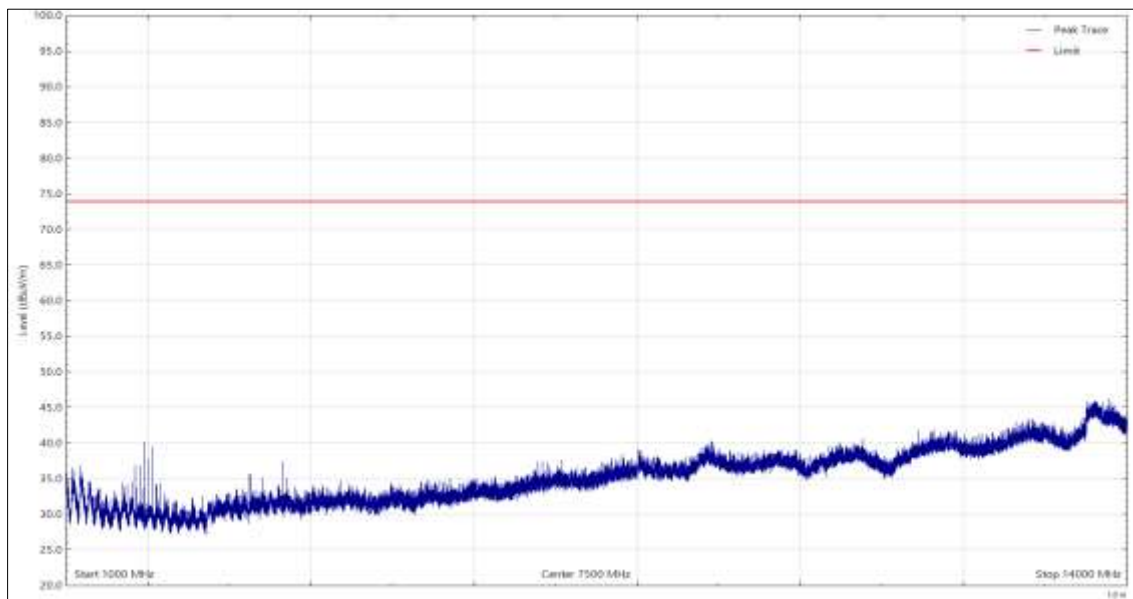


Figure 12 - 1 GHz to 14 GHz, Peak, Vertical, Y Orientation

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/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.

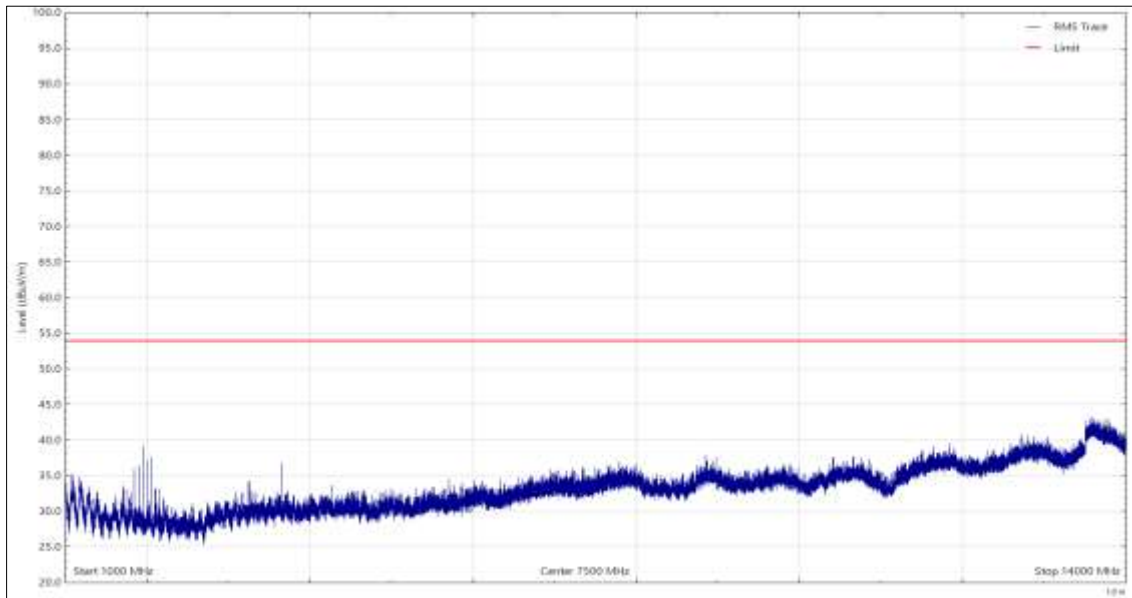


Figure 13 - 1 GHz to 14 GHz, CISPR Average, Vertical, Y Orientation

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/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.

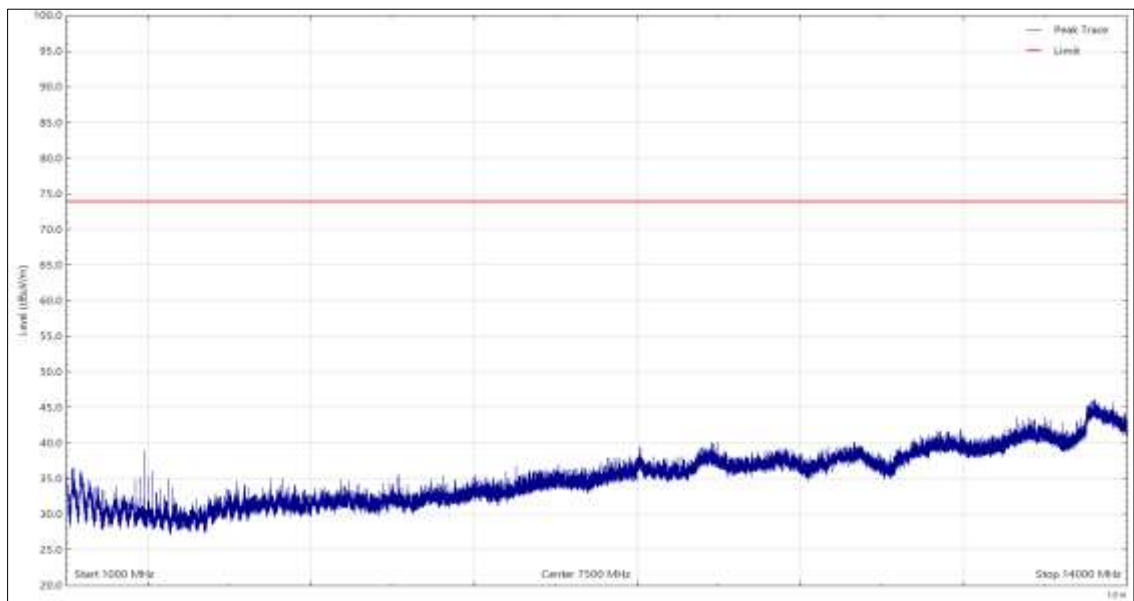


Figure 14 - 1 GHz to 14 GHz, Peak, Horizontal, Y Orientation

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/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.

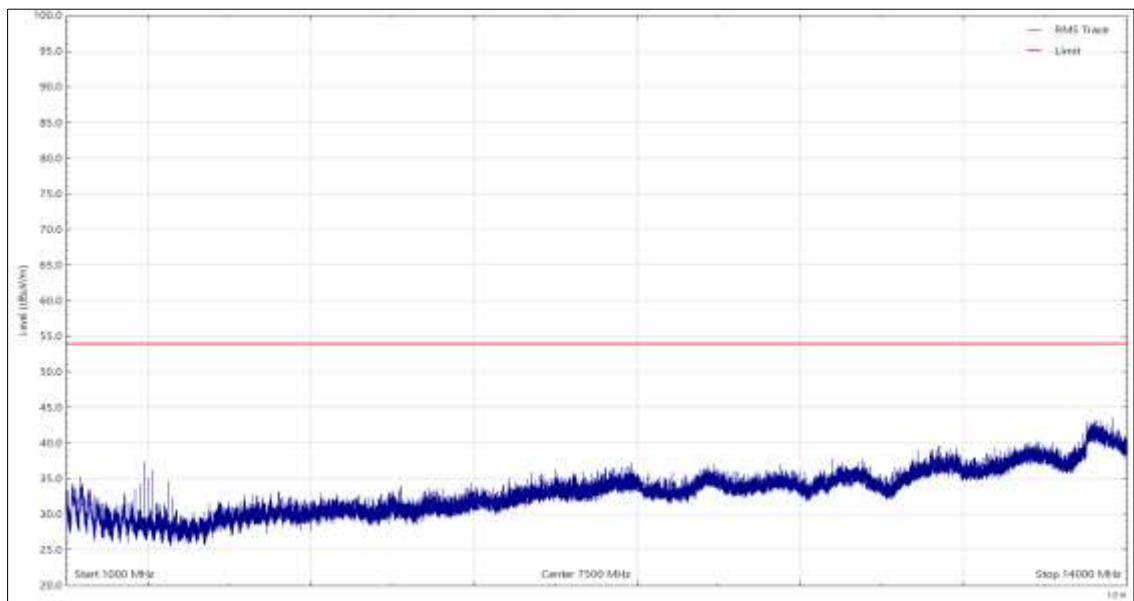


Figure 15 - 1 GHz to 14 GHz, CISPR Average, Horizontal, Y Orientation

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/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.

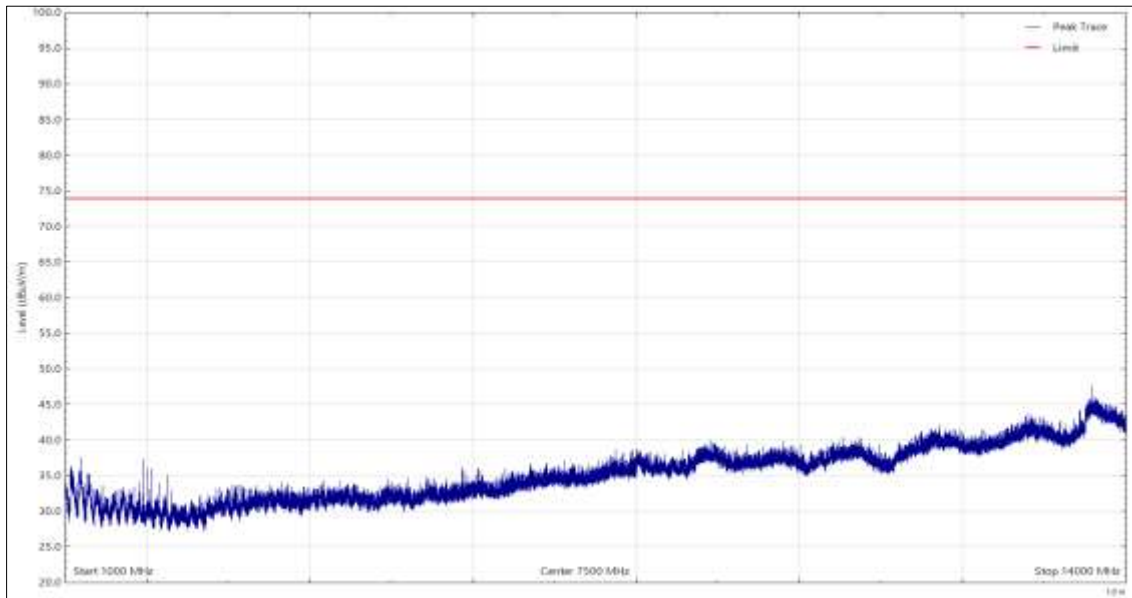


Figure 16 - 1 GHz to 14 GHz, Peak, Vertical, Z Orientation

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/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.

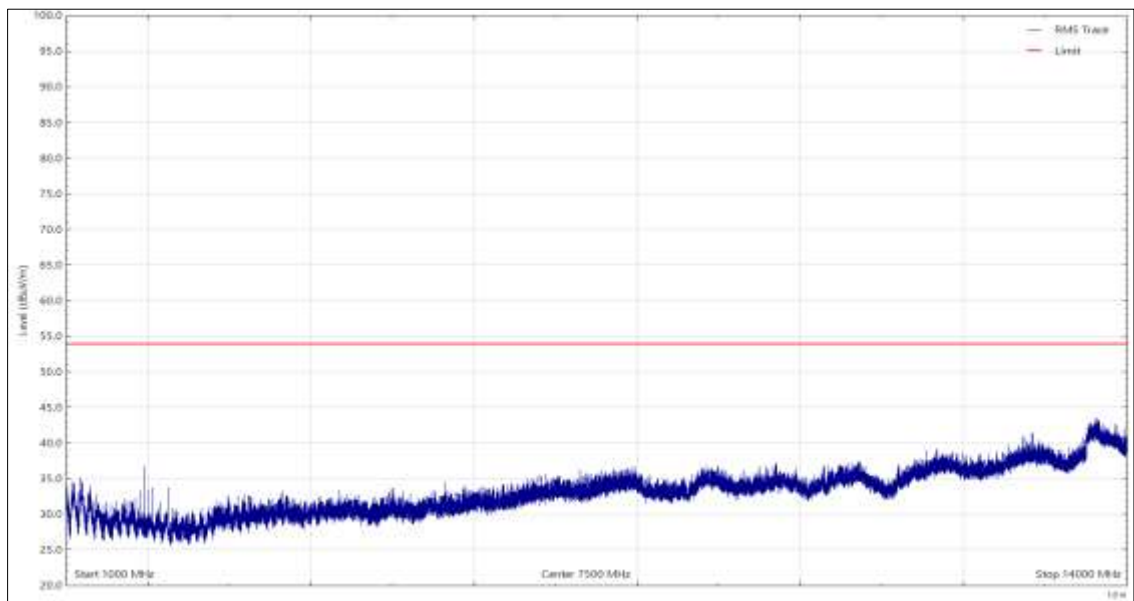


Figure 17 - 1 GHz to 14 GHz, CISPR Average, Vertical, Z Orientation

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/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.

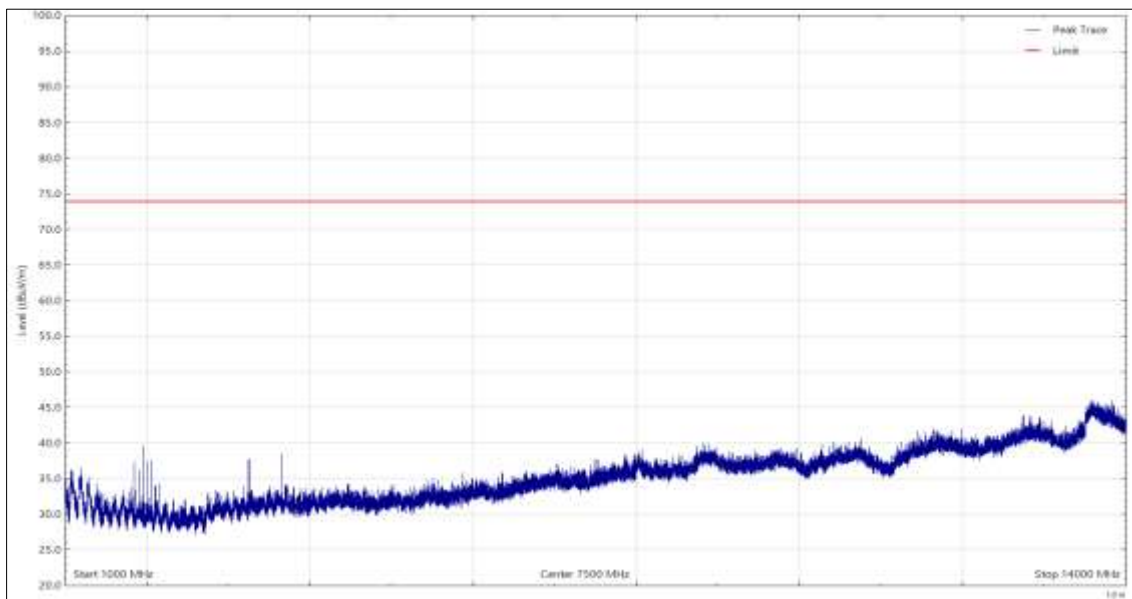


Figure 18 - 1 GHz to 14 GHz, Peak, Horizontal, Z Orientation

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/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.

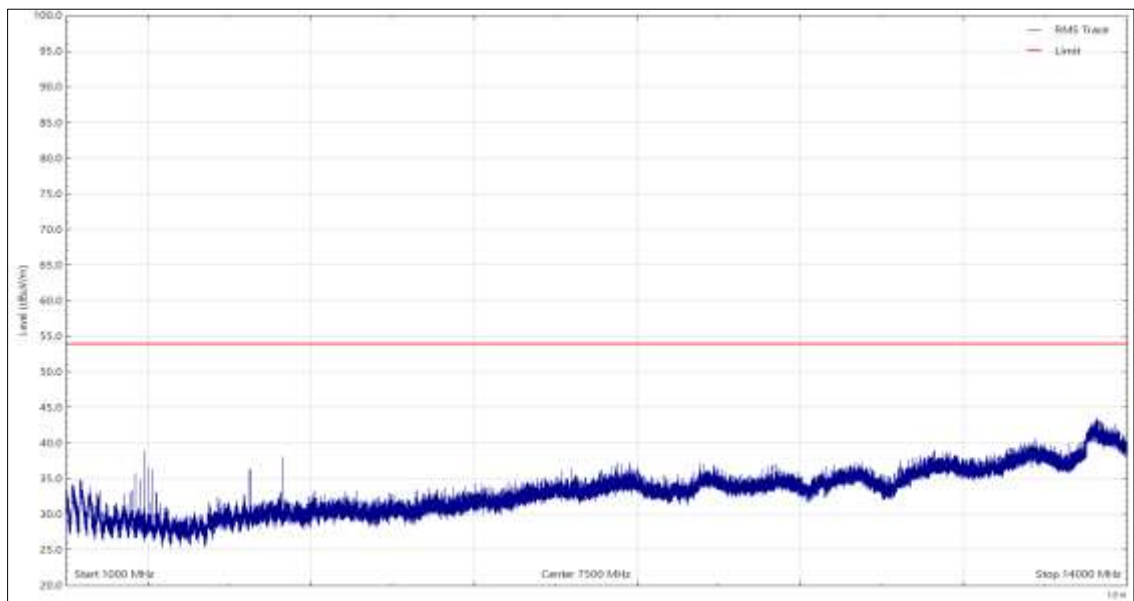


Figure 19 - 1 GHz to 14 GHz, CISPR Average, Horizontal, Z Orientation

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/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 20 - Test Setup - 30 MHz to 1 GHz - X - Orientation



Figure 21 - Test Setup - 30 MHz to 1 GHz - Y - Orientation



Figure 22 - Test Setup - 30 MHz to 1 GHz - Z - Orientation



Figure 23 - Test Setup - 1 GHz to 14 GHz - X - Orientation

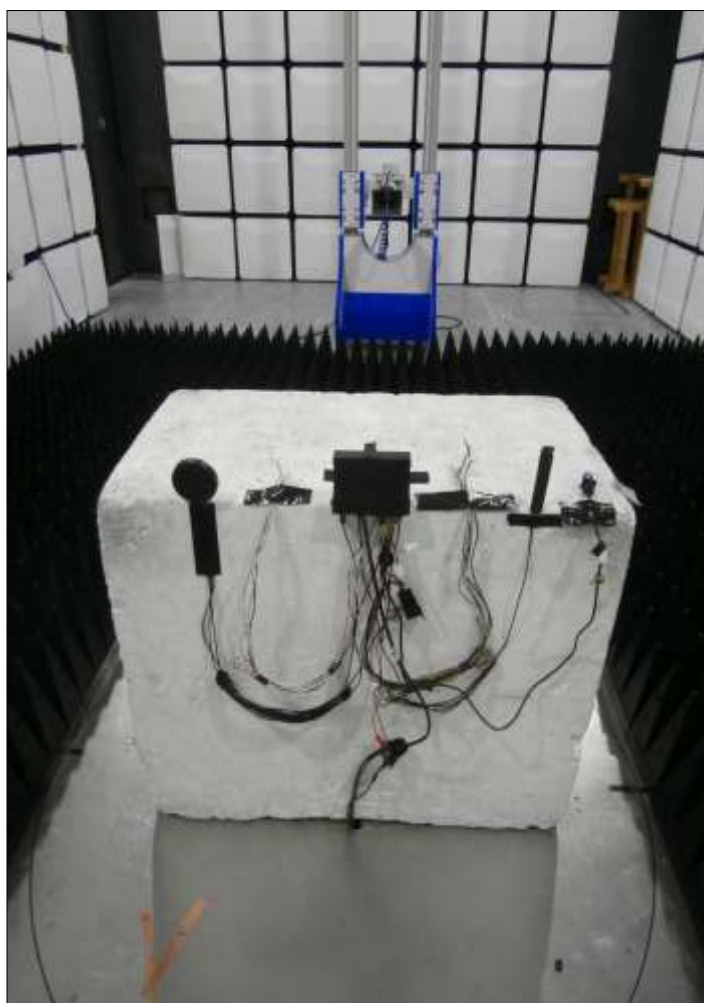


Figure 24 - Test Setup - 1 GHz to 14 GHz - Y - Orientation



Figure 25 - Test Setup - 1 GHz to 14 GHz - Z - Orientation



2.1.10 Test Location and Test Equipment Used

This test was carried out in EMC Chamber 12.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
3m Semi Anechoic Chamber	MVG	EMC-3	5621	36	11-Aug-2023
EmX Emissions Software	TUV SUD	V2.1.0	5125	-	Software
Test Receiver	Rohde & Schwarz	ESW44	5379	12	15-Dec-2021
Turntable & Mast Controller	Maturo Gmbh	NCD/498/2799.01	5612	-	TU
Tilt Antenna Mast TAM 4.0-P	Maturo Gmbh	TAM 4.0-P	5613	-	TU
Tilt Antenna Mast TAM 4.0-P	Maturo Gmbh	Turntable 1.5 SI-2t	5614	-	TU
3.5 mm 2m Cable	Junkosha	MWX221-02000DMS	5428	12	15-Oct-2021
1m K-Type Cable	Junkosha	MWX241-01000KMSKMS/A	5511	12	03-Apr-2021
8m N Type Cable	Junkosha	MWX221-08000NMSNMS/B	5519	12	24-Mar-2021
Preamplifier (30dB 1GHz to 18GHz)	Schwarzbeck	BBV 9718 C	5350	12	21-Sep-2021
Antenna with permanent attenuator (Bilog)	Schaffner	CBL6143	287	24	14-Oct-2022
Broadband Horn Antenna (1-10 GHz)	Schwarzbeck	BBHA 9120 B	5611	12	22-Sep-2021
DRG Horn Antenna (7.5-18GHz)	Schwarzbeck	HWRD750	5610	12	22-Sep-2021

Table 40

TU - Traceability Unscheduled



3 Test Equipment Information

3.1 General Test Equipment Used

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Comb Generator	Schaffner	RSG1000	3034	-	TU
Thermo-Hygro-Barometer	PCE Instruments	PCE-THB-40	5481	12	18-Mar-2021

Table 41

TU - Traceability Unscheduled



4 Incident Reports

No incidents reports were raised.



5 Measurement Uncertainty

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

Test Name	Measurement Uncertainty
Radiated Disturbance	30 MHz to 1 GHz, Bilog Antenna, ± 5.2 dB 1 GHz to 40 GHz, Horn Antenna, ± 6.3 dB

Table 42

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.