FCC and ISED Test Report

PervasID Limited, Flow Ranger incorporating. Security Ranger, Model SRM 9380 (8-Port Master) Security Ranger, Model: SRS 9380 (8-Port Slave)

In accordance with FCC 47 CFR Part 15B and ICES-003

Prepared for: PervasID Limited
St John's Innovation Centre
Cowley Road
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UNITED KINGDOM

Add value.
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FCC ID: 2AQQWSR9380
IC ID: Not Applicable

COMMERCIAL-IN-CONFIDENCE

Document 75957241-02 Issue 02

SIGNATURE			
NAME	**JOB TITLE**	**RESPONSIBLE FOR**	**ISSUE DATE**
John Laydon	General Manager	Authorised Signatory	30 April 2024

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

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Testing	James Cumming	30 April 2024	

FCC Accreditation
90987 Octagon House, Fareham Test Laboratory

ISED Accreditation
12669A 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 and ICES-003: 2021 and Issue 7: 2020 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	12 September 2023
2	Changed FCC ID configuration	30 April 2024

Table 1

1.2 Introduction

Applicant	PervasID Limited
Manufacturer	PervasID Limited
Model Number(s)	SRM 9380 (8-port Master) SRS 9380 (8-port Slave)
Serial Number(s)	14051278-0046 14199633-0010
Hardware Version(s)	Motherboard v6.5.4 FR-DB v1.0 (Slave only) Sync-DB v0.2
Software Version(s)	Software: SR-0.1.0.4 Radio FW: 3.9.0.1 FR-DB FW: 1.0.2 (Slave only)
Number of Samples Tested	One System
Test Specification/Issue/Date	FCC 47 CFR Part 15B and ICES-003: 2021 and Issue 7: 2020
Order Number Date	PO-0774 09-December-2022
Date of Receipt of EUT	09-February-2023
Start of Test	29-June-2023
Finish of Test	29-June-2023
Name of Engineer(s)	James Cumming
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 is shown below.

Section	Specification Clause	Test Description	Result	Comments/Base Standard
Configuration and Mode: AC Powered - Idle				
2.1	15.109 and 3.2	Radiated Disturbance	Pass	ANSI C63.4: 2014

Table 2

1.4 Declaration of Build Status

MAIN EUT	
MANUFACTURING DESCRIPTION	UHF RFID Distributed Antenna System
MANUFACTURER	PervasID Ltd
MODEL	SRM 9380 (8-port Master) SRS 9380 (8-port Slave)
PART NUMBER	N/A
HARDWARE VERSION	Motherboard v6.5.4; FR-DB v1.0 (Slave only); Sync-DB v0.2
SOFTWARE VERSION	Software: SR-0.1.0.4; Radio FW: 3.9.0.1; FR-DB FW: 1.0.2 (Slave only)
PSU VOLTAGE/FREQUENCY/CURRENT	24 V DC, 4 A
HIGHEST INTERNALLY GENERATED FREQUENCY	868 MHz
FCC ID (if applicable)	2AQQWSR9380
INDUSTRY CANADA ID (if applicable)	Not Applicable
TECHNICAL DESCRIPTION (a brief technical description of the intended use and operation)	UHF RFID Distributed Antenna System - intended use detection and monitoring of UHF RFID tags
COUNTRY OF ORIGIN	UK
RF CHARACTERISTICS (if applicable)	
TRANSMITTER FREQUENCY OPERATING RANGE (MHz)	865-868 MHz
RECEIVER FREQUENCY OPERATING RANGE (MHz)	865-868 MHz
INTERMEDIATE FREQUENCIES	Direct conversion
EMISSION DESIGNATOR(S): **https://fccid.io/Emissions-Designator/**	
MODULATION TYPES: (i.e., GMSK, QPSK)	PR-ASK
OUTPUT POWER (W or dBm)	33 dBm (Master), 32 dBm (Slave)
SEPARATE BATTERY/POWER SUPPLY (if applicable)	
MANUFACTURING DESCRIPTION	AC/DC Power Supply
MANUFACTURER	Generic (see “Power Supply Unit Specification for 93x0 Readers”)
TYPE	
PART NUMBER	E.g., XP Power AEJ100PS24
PSU VOLTAGE/FREQUENCY/CURRENT	100 to 264 V AC, 47 – 63 Hz, ≥ 92 W
COUNTRY OF ORIGIN	
MODULES (if applicable)	
ANCILLARIES (if applicable)	

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

Name: Andrew Bell
Position held: VP Engineering
Date: 06 Feb 2023

1.5 Product Information

1.5.1 Technical Description

The Equipment under test (EUT) was a PervasID Limited Flow Ranger, incorporation Security Ranger Model: SRM 9380 (8-port Master) and Security Ranger Model: SRS 9380 (8-port Slave).

The primary function of the EUT is to detect and monitor UHF RFID tags.

Figure 1 – EUT Front View - SRM 9380 (8-port Master)

Figure 2 – EUT Rear View - SRM 9380 (8-port Master)

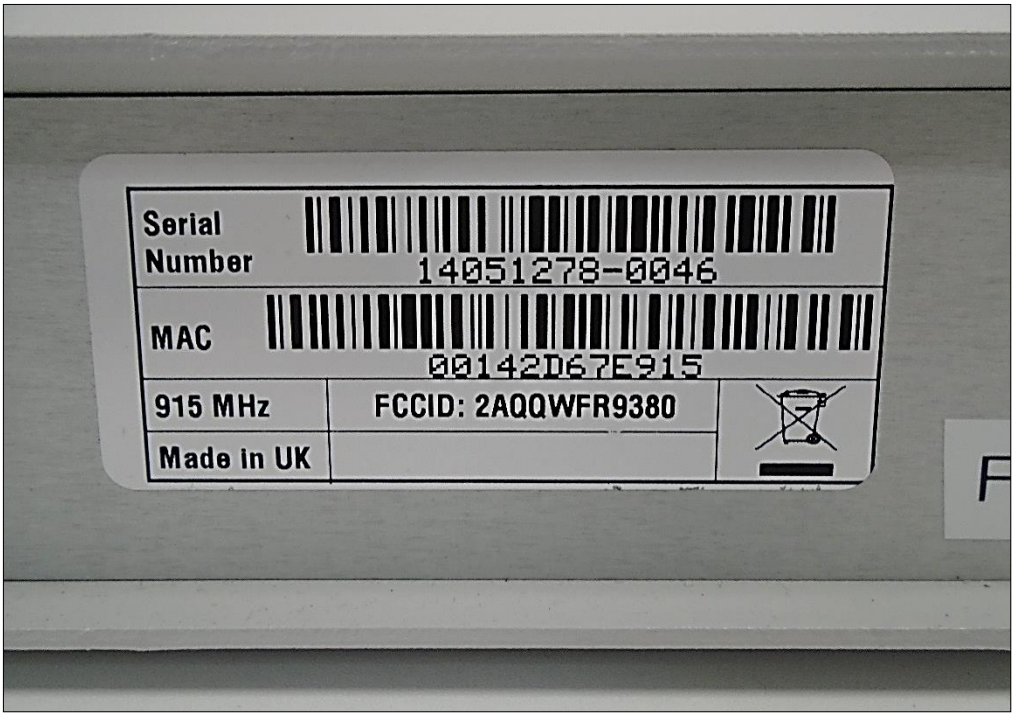

Figure 3 – EUT Product Identification - SRM 9380 (8-port Master)

1.5.2 EUT Port/Cable Identification

Port	Max Cable Length specified	Usage	Type	Screened
AC Power Port	2 m	Power to EUT	AC to DC power adapter	No
RF antenna Port 1	3 m	Communication	RF antenna port	Yes
RF antenna Port 2	3 m	Communication	RF antenna port	Yes
RF antenna Port 3	3 m	Communication	RF antenna port	Yes
RF antenna Port 4	3 m	Communication	RF antenna port	Yes
RF antenna Port 5	3 m	Communication	RF antenna port	Yes
RF antenna Port 6	3 m	Communication	RF antenna port	Yes
RF antenna Port 7	3 m	Communication	RF antenna port	Yes
RF antenna Port 8	3 m	Communication	RF antenna port	Yes
Host Port	2 m	Data	USB Micro – Type B	Yes
IDE Port	5 m	Data	Ribbon Cable	No
Network Port	2 m	Data	Cat 6 Ethernet	Yes

Table 3

1.5.3 Test Configuration

Configuration	Description
AC Powered	The EUT was powered from a 120 V 60 Hz AC supply. The following connections were made to the EUT: RF antenna Ports 1 to 8 were fitted with client provided terminations. The Ethernet port was terminated using a network switch. The IDE port of both parts of the EUT were connected to each other.

Table 4

1.5.4 Modes of Operation

Mode	Description
Idle	The EUT was powered and operating with the EUT's intentional transmitters switched off from the internal settings of the EUT.

Table 5

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: SRM 9380 (8-port Master), Serial Number: 14051278-0046			
0	As supplied by the customer	Not Applicable	Not Applicable
Model: SRS 9380 (8-port Slave), Serial Number: 14199633-0010			
0	As supplied by the customer	Not Applicable	Not Applicable

Table 6

1.8 Test Location

TÜV SÜD conducted the following tests at our Octagon House Test Laboratory.

Test Name	Name of Engineer(s)	Accreditation
Configuration and Mode: AC Powered - Idle		
Radiated Disturbance	James Cumming	UKAS

Table 7

Office Address:

TÜV SÜD
Octagon House
Concorde Way
Fareham
Hampshire
PO15 5RL
United Kingdom

2 Test Details

2.1 Radiated Disturbance

2.1.1 Specification Reference

FCC 47 CFR Part 15B and ICES-003, Clause 15.109 and 3.2

2.1.2 Equipment Under Test and Modification State

SRM 9380 (8-port Master), S/N: 14051278-0046 - Modification State 0
SRS 9380 (8-port Slave), S/N: 14199633-0010 - Modification State 0

2.1.3 Date of Test

29-June-2023

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 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.

2.1.5 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)

2.1.6 Example Test Setup Diagram

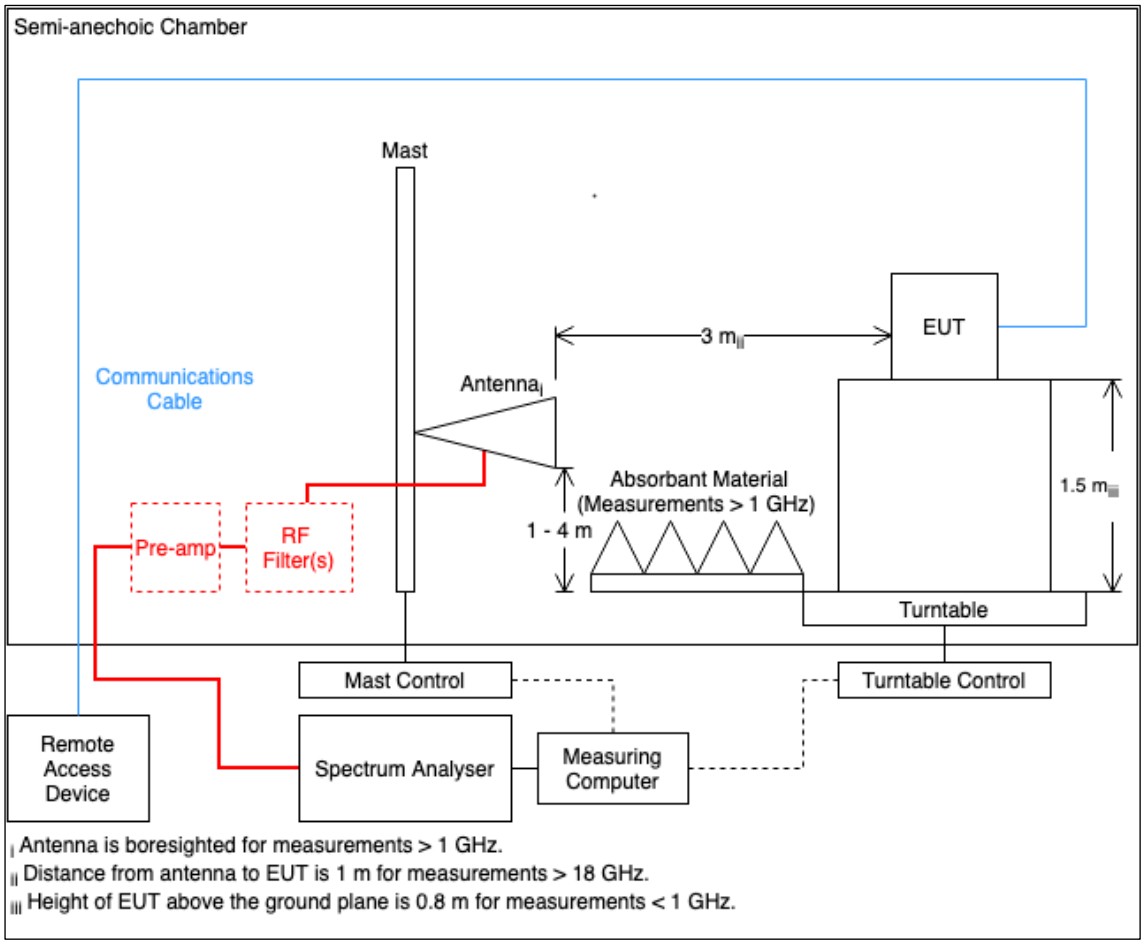

Figure 4

2.1.7 Environmental Conditions

Ambient Temperature	18.1 °C
Relative Humidity	63 %
Atmospheric Pressure	1009.2 mbar

2.1.8 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 8

2.1.9 Test Results

Results for Configuration and Mode: AC Powered - 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: 868 MHz
Which necessitates an upper frequency test limit of: 5 GHz (Tested to 10 GHz as per quotation).

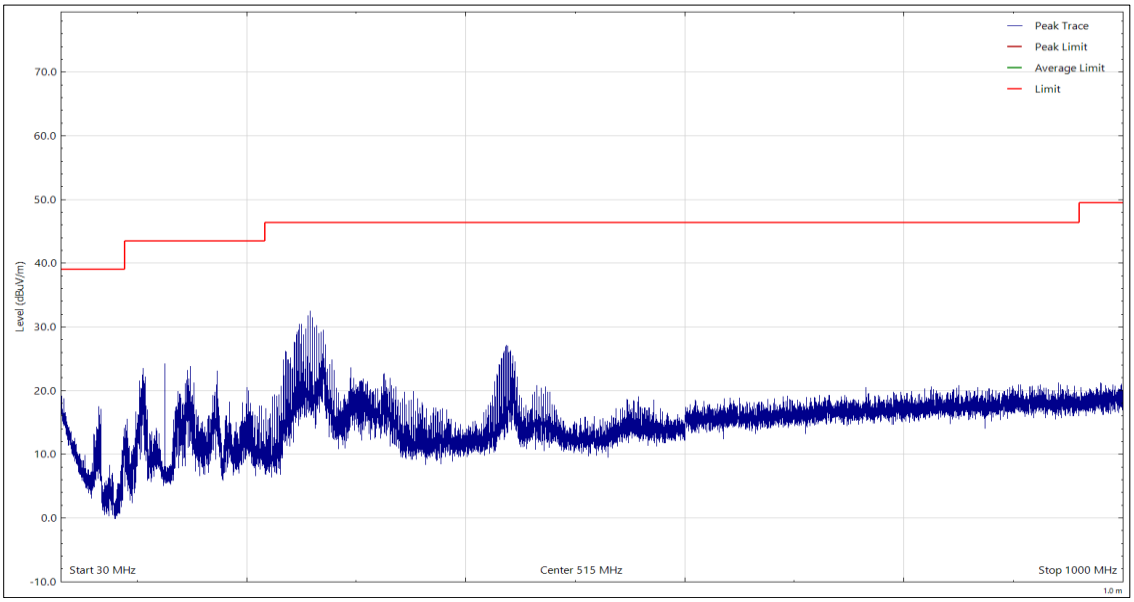

Figure 5 - 30 MHz to 1 GHz, Quasi-Peak, Horizontal

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

Table 9

*No final measurements were made as all peak emissions seen were greater than 10 dB below the Quasi-Peak test limit.

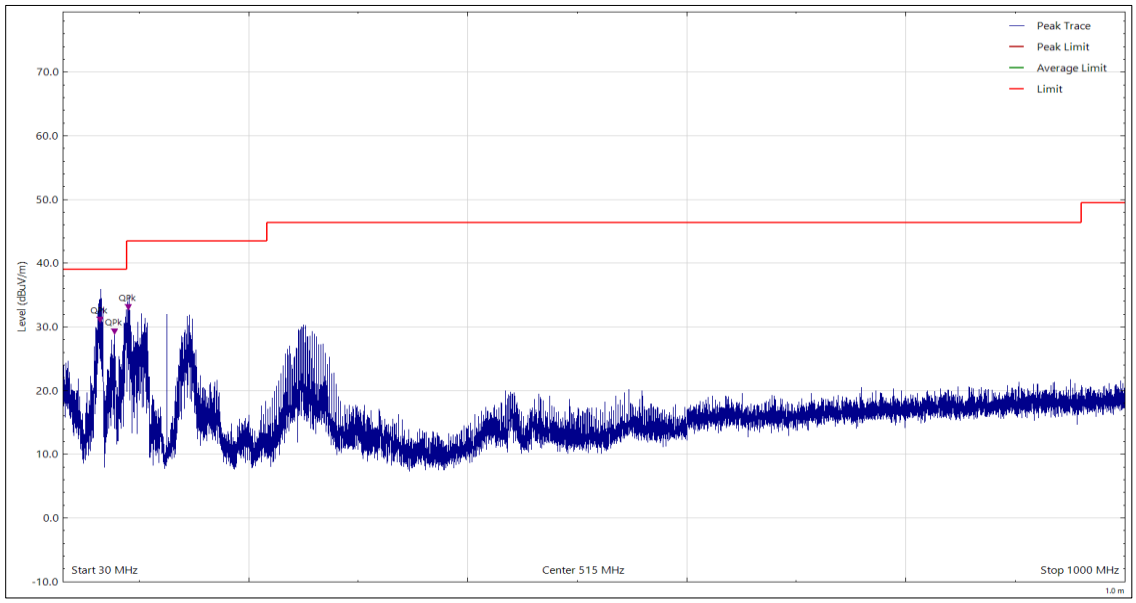

Figure 6 - 30 MHz to 1 GHz, Quasi-Peak, Vertical

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
64.188	30.36	39.10	-8.74	Q-Peak	1	100	Vertical
77.186	28.51	39.10	-10.59	Q-Peak	339	101	Vertical
90.343	32.32	43.50	-11.18	Q-Peak	332	100	Vertical

Table 10

*No final measurements were made as all peak emissions seen were greater than 10 dB below the Quasi-Peak test limit.

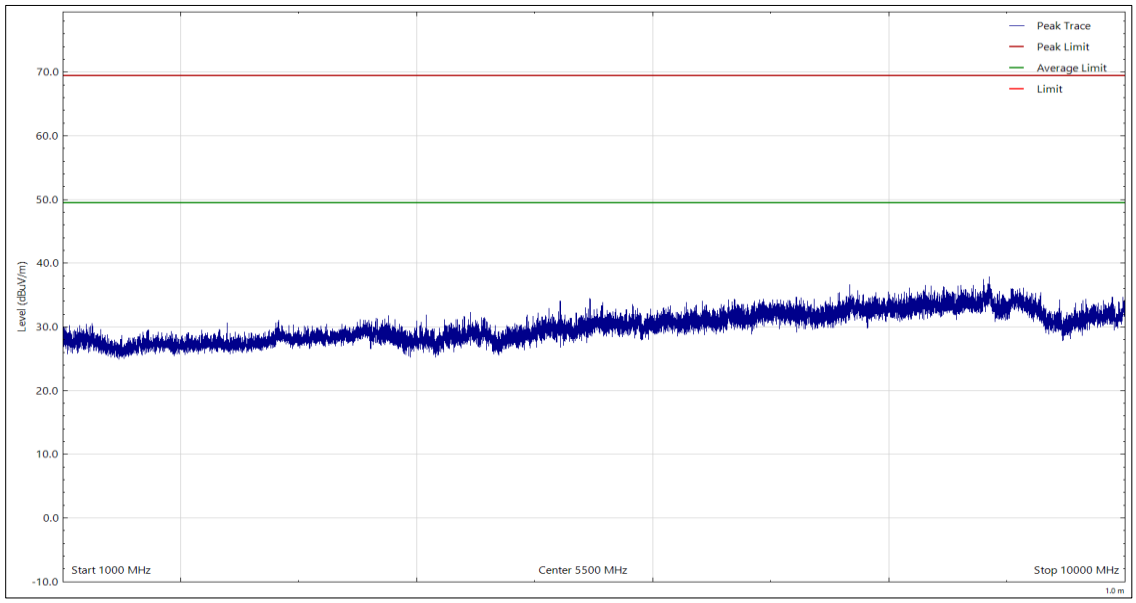

Figure 7 - 1 GHz to 10 GHz, Peak and CISPR Average, Horizontal

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

Table 11

*No final measurements were made as all peak emissions seen were greater than 10 dB below the CISPR average test limit.

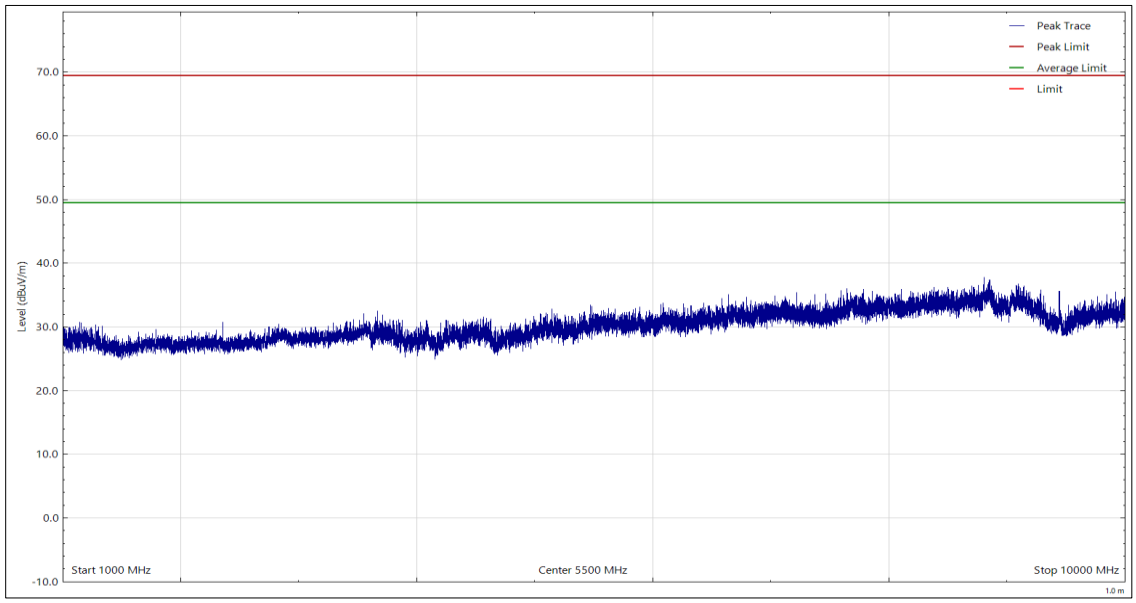

Figure 8 - 1 GHz to 10 GHz, Peak and CISPR Average, Vertical

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

Table 12

*No final measurements were made as all peak emissions seen were greater than 10 dB below the CISPR average test limit.

Figure 9 - Test Setup - 30 MHz to 1 GHz

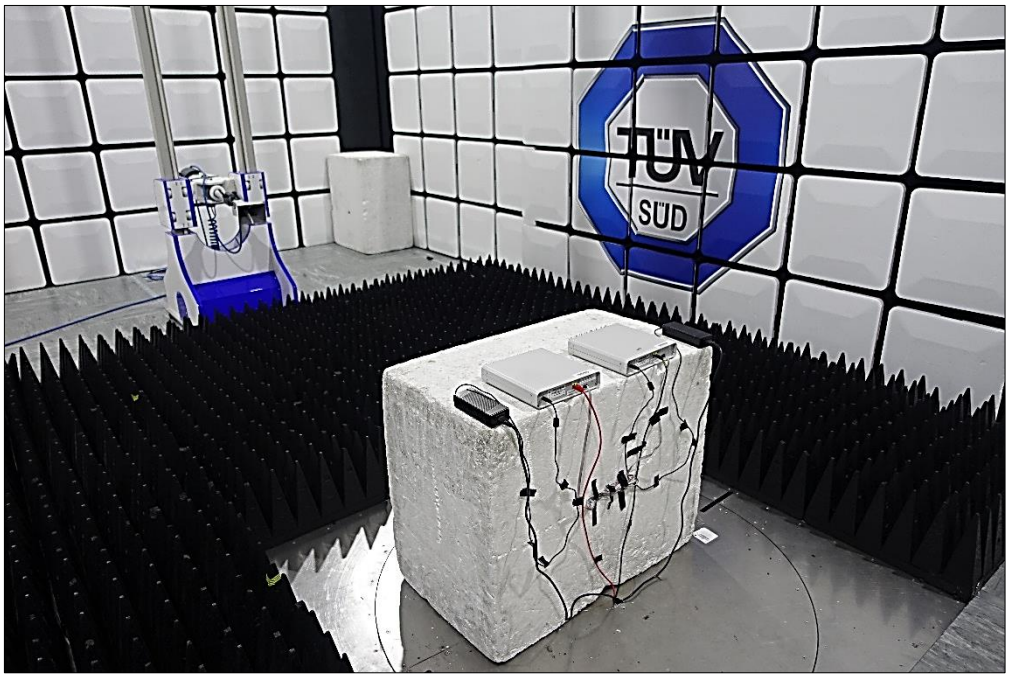

Figure 10 - Test Setup - 1 GHz to 10 GHz

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 Expires
Antenna (Bilog with attenuator, 30 MHz to 3 GHz)	Schaffner	CBL6143	287	24	02-Dec-2024
Test Receiver	Rohde & Schwarz	ESU40	3506	12	30-Mar-2024
Emissions Software	TUV SUD	EmX V3.1.12	5125	-	N/A - Software
Pre-Amplifier (1 GHz to 26.5 GHz)	Agilent Technologies	8449B	5445	12	25-May-2024
Cable (K-Type to K-Type, 2 m)	Junkosha	MWX241-02000KMSKMS/A	5524	12	24-Oct-2023
Antenna (DRG, 1 GHz to 10.5 GHz)	Schwarzbeck	BBHA9120B	5611	12	16-Oct-2023
Turntable & Mast Controller	Maturo Gmbh	NCD/498/2799.01	5612	-	TU
Tilt Antenna Mast	Maturo Gmbh	TAM 4.0-P	5613	-	TU
Screened Room (12)	MVG	EMC-3	5621	36	11-Aug-2023
Cable (SMA to N-Type, 2 m)	Junkosha	MWX241/B	5817	6	04-Aug-2023
Cable (N to N 8m)	Junkosha	MWX221-08000NMSNMS/B	6321	12	04-Feb-2024

Table 13

TU - Traceability Unscheduled

3 Test Equipment Information

3.1 General Test Equipment Used

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
Thermo-Hygro-Barometer	PCE Instruments	PCE-THB-40	5471	12	28-Apr-2024

Table 14

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 15

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 115:2021, Clause 4.4.3 (Procedure 2). The measurement results are directly compared with the test limit to determine conformance with the requirements of the standard.

Risk: The uncertainty of measurement about the measured result is negligible with regard to the final pass/fail decision. The measurement result can be directly compared with the test limit to determine conformance with the requirement (compare IEC Guide 115). The level of risk to falsely accept and falsely reject items is further described in ILAC-G8.