FCC and ISED Test Report

Sensium Healthcare Ltd
Vitals Patch, Model: Vitals Patch US

In accordance with FCC 47 CFR Part 15C, ISED RSS-210 and ISED RSS-GEN (Short Range Device)

Add value.
Inspire trust.

Prepared for: Sensium Healthcare Ltd
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FCC ID: AEJSH202165 IC: 27456-SH202165

COMMERCIAL-IN-CONFIDENCE

Document 75952927-02 Issue 02

SIGNATURE			
NAME	**JOB TITLE**	**RESPONSIBLE FOR**	**ISSUE DATE**
Steve Marshall	Senior Engineer	Authorised Signatory	27 August 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 15C, ISED RSS-210 and ISED RSS-GEN. The sample tested was found to comply with the requirements defined in the applied rules.

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Testing	Graeme Lawler	27 August 2021	
Testing	Matthew Russell	27 August 2021	

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 15C: 2020, ISED RSS-210: Issue 10 (12-2019) + A1 (2020-04) and ISED RSS-GEN: Issue 05 (2018-04) + A2 (2021-02) for the tests detailed in section 1.3.

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ACCREDITATION

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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	25-August-2021
2	Correction to a typographical error in table 14	27-August-2021

Table 1

1.2 Introduction

Applicant	Sensium Healthcare Ltd
Manufacturer	Sensium Healthcare Ltd
Model Number(s)	Vitals Patch US
Serial Number(s)	HEX ID: 39 7F 8C 2B D4 A4
Hardware Version(s)	SH202165-US Issue A
Software Version(s)	PAT_US_915MHz_64K_P_CUS1_FW1-0-6
Number of Samples Tested	1
Test Specification/Issue/Date	FCC 47 CFR Part 15C: 2020 ISED RSS-210: Issue 10 (12-2019) + A1 (2020-04) ISED RSS-GEN: Issue 05 (2018-04) + A2 (2021-02)
Order Number Date	5813 23-July-2021
Date of Receipt of EUT	27-July-2021
Start of Test	27-July-2021
Finish of Test	18-August-2021
Name of Engineer(s)	Graeme Lawler and Matthew Russell
Related Document(s)	ANSI C63.10 (2013)

1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 15C, ISED RSS-210 and ISED RSS-GEN is shown below.

Section	Specification Clause			Test Description	Result	Comments/Base Standard
	Part 15C	RSS-210	RSS-GEN			
Configuration and Mode: Short Range Device (SRD) - Transmit						
2.1	15.215 (c)	-	6.7	20 dB Bandwidth & 99% Occupied Bandwidth	Pass	
2.2	15.249 (d)	B.10(b)	-	Authorised Band Edges	Pass	
2.3	15.249 (a)	B.10(a)	-	Field Strength of Fundamental	Pass	
2.4	15.249 (a)(d)	B.10(a)	-	Field Strength of Emissions	Pass	

Table 2

1.4 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 SH202165 SensiumVitals Patch is a disposable device which is worn on the body and measures heart rate, respiratory rate, axillary temperature, posture and activity every 2 minutes and transmits this via its 902 MHz – 928 MHz SRD link.
Manufacturer:	Sensium
Model:	Vitals Patch US
Part Number:	SH202165-US
Hardware Version:	SH202165-US Issue A
Software Version:	PAT_US_915MHz_64K_P_CUS1_FW1-0-6
FCC ID of the product under test – see guidance here	AEJSH202165
IC ID of the product under test – see guidance here	27456-SH202165

Table 3

Intentional Radiators

Technology	Proprietary
Frequency Range (MHz to MHz)	902-928 MHz
Conducted Declared Output Power (dBm)	-4 dBm
Antenna Gain (dBi)	0.45
Supported Bandwidth(s) (MHz) (e.g 1 MHz, 20 MHz, 40 MHz)	120 kHz
Modulation Scheme(s) (e.g GFSK, QPSK etc)	FSK
ITU Emission Designator (see guidance here) (not mandatory for Part 15 devices)	120KFD
Bottom Frequency (MHz)	902.2 MHz
Middle Frequency (MHz)	915 MHz
Top Frequency (MHz)	927.8 MHz

Table 4

Un-intentional Radiators

Highest frequency generated or used in the device or on which the device operates or tunes	927.8 MHz
Lowest frequency generated or used in the device or on which the device operates or tunes	
Class A Digital Device (Use in commercial, industrial or business environment) ☒ Class B Digital Device (Use in residential environment only) ☐	

Table 5

Battery Power Source

Voltage:	3.6	V
End-point voltage:	2.3	V *(Point at which the battery will terminate)*
Alkaline ☐ Leclanche ☐ Lithium ☒ Nickel Cadmium ☐ Lead Acid* ☐ **(Vehicle regulated)*		
Other ☐ Please detail:		

Table 6

Charging

Can the EUT transmit whilst being charged	Yes ☐ No ☒

Table 7

Temperature

Minimum temperature:	15	°C
Maximum temperature:	40	°C

Table 8

Cable Loss

Adapter Cable Loss (Conducted sample)	N/A	dB

Table 9

Antenna Characteristics

Antenna connector ☐			State impedance		Ohm
Temporary antenna connector ☐			State impedance		Ohm
Integral antenna ☒	Type:	Printed Flex antenna	Gain	0.45	dBi
External antenna ☐	Type:		Gain		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 10

Ancillaries (if applicable)

Manufacturer:		Part Number:	
Model:		Country of Origin:	

Table 11

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

Name: Paul Dodds
Position held: RF Compliance Engineer
Date: 29 July 2021

1.5 Product Information

1.5.1 Technical Description

The SH202165 SensiumVitals Patch is a disposable device which is worn on the body and measures heart rate, respiratory rate, axillary temperature, posture and activity every 2 minutes and transmits this via its 902 MHz – 928 MHz SRD link.

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: Vitals Patch US, Serial Number: HEX ID: 39 7F 8C 2B D4 A4			
0	As supplied by the customer	Not Applicable	Not Applicable

Table 12

1.8 Test Location

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

Test Name	Name of Engineer(s)	Accreditation
Configuration and Mode: Short Range Device (SRD) - Transmit		
20 dB Bandwidth & 99% Occupied Bandwidth	Graeme Lawler and Matthew Russell	UKAS
Authorised Band Edges	Graeme Lawler	UKAS
Field Strength of Fundamental	Graeme Lawler	UKAS
Field Strength of Emissions	Graeme Lawler	UKAS

Table 13

Office Address:

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

2 Test Details

2.1 20 dB Bandwidth & 99% Occupied Bandwidth

2.1.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.215 (c)
ISED RSS-GEN, Clause 6.7

2.1.2 Equipment Under Test and Modification State

Vitals Patch US, S/N: HEX ID: 39 7F 8C 2B D4 A4 - Modification State 0

2.1.3 Date of Test

28-July-2021 to 18-August-2021

2.1.4 Test Method

The test was performed in accordance with ANSI C63.10, clause 6.9.1.

2.1.5 Environmental Conditions

Ambient Temperature	20.7 - 23.0 °C
Relative Humidity	61.5 - 68.1 %

2.1.6 Test Results

Short Range Device (SRD) - Transmit

Frequency (MHz)	20 dB Bandwidth (kHz)	99% Occupied Bandwidth (kHz)	F_{LOWER} (MHz)	F_{UPPER} (MHz)
902.2	176.282	228.365	902.116	902.293
915.0	174.679	195.513	914.916	915.091
927.8	175.481	187.500	927.718	927.893

Table 14

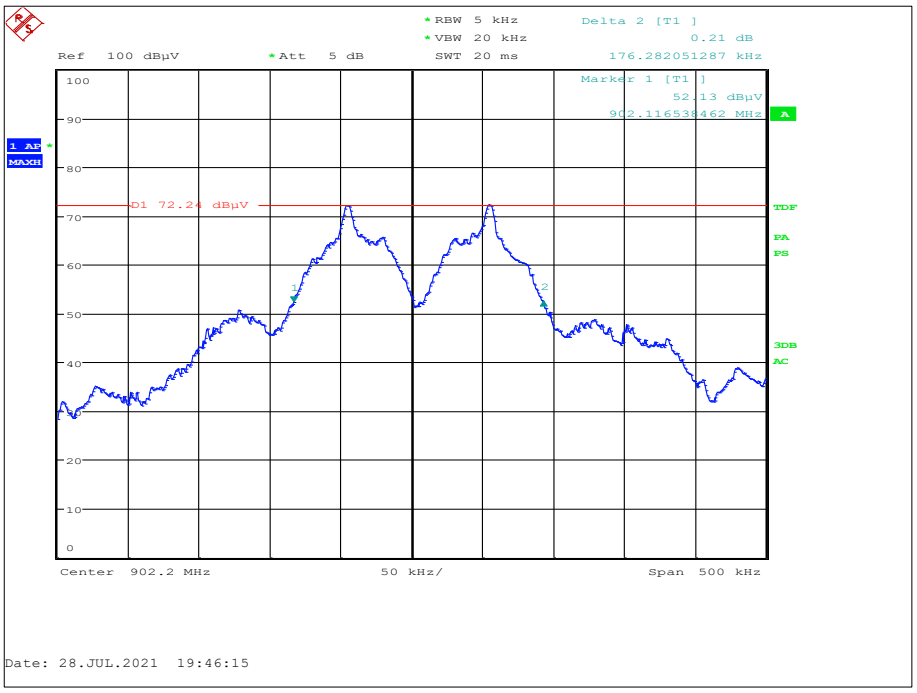

Figure 1 - 20 dB Bandwidth

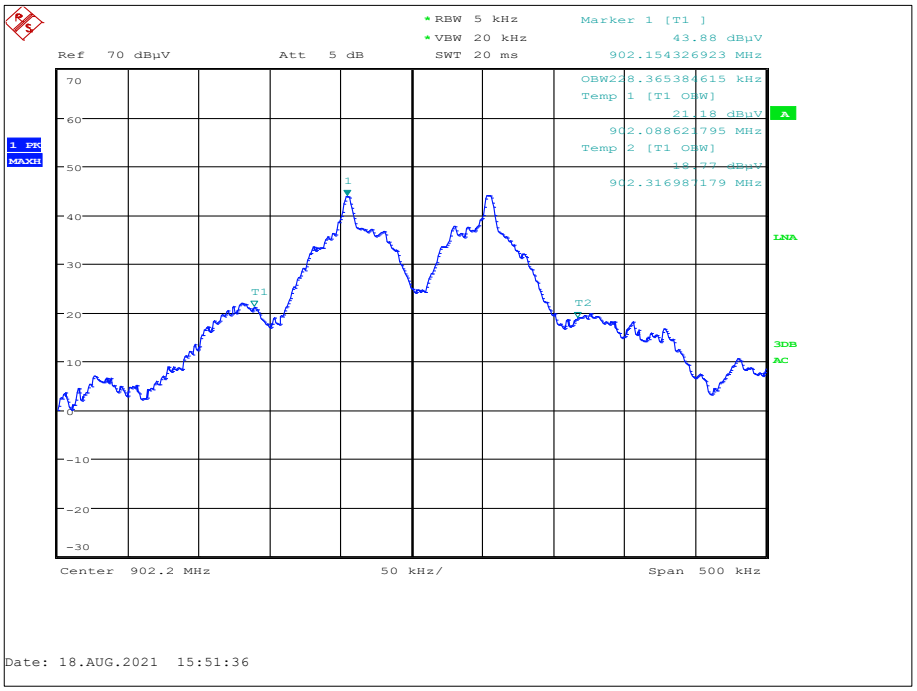

Figure 2 - 99% Occupied Bandwidth

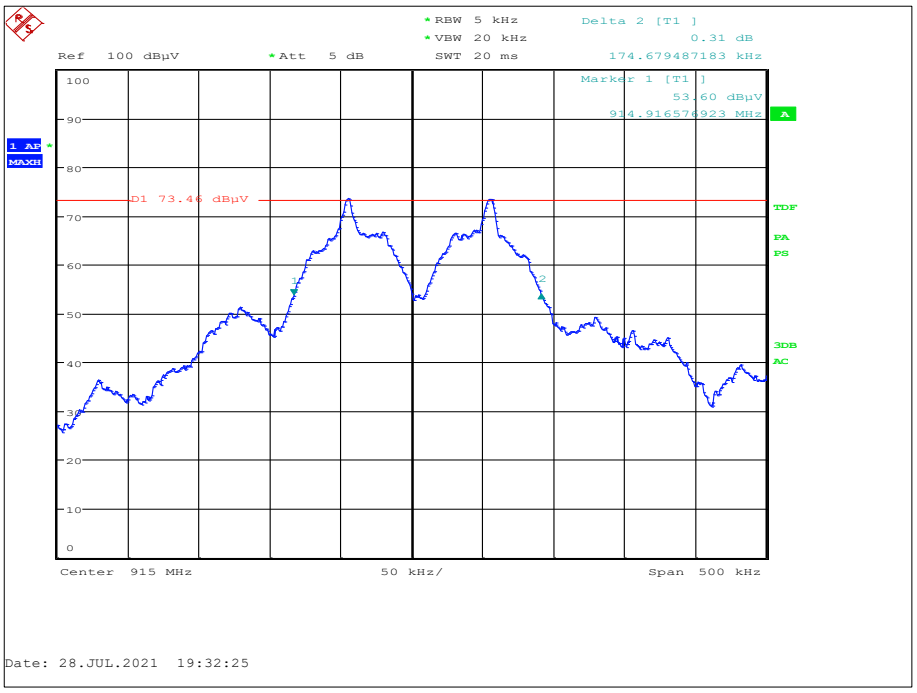

Figure 3 - 20 dB Bandwidth

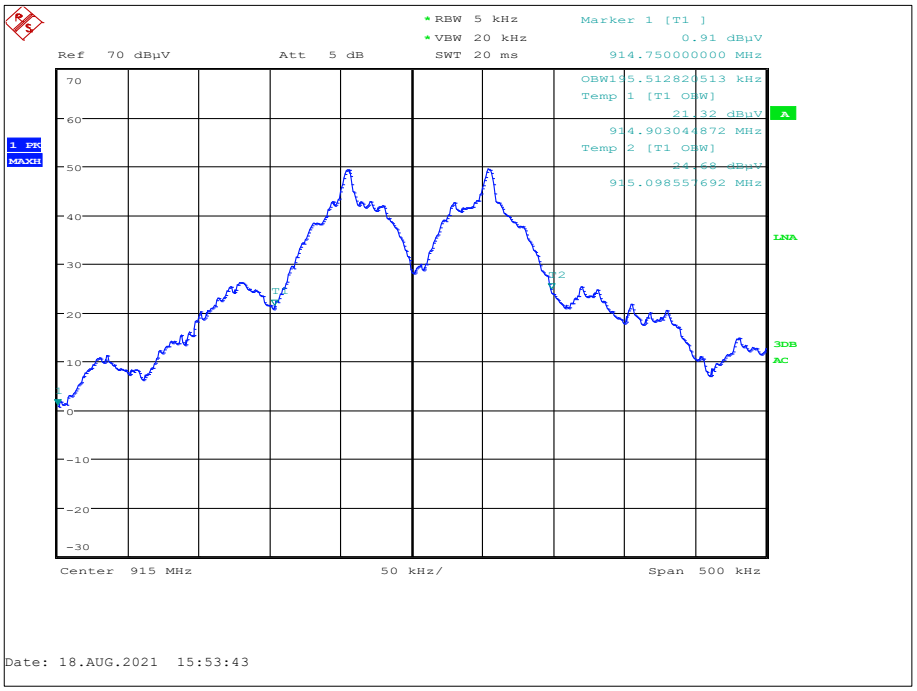

Figure 4 - 99% Occupied Bandwidth

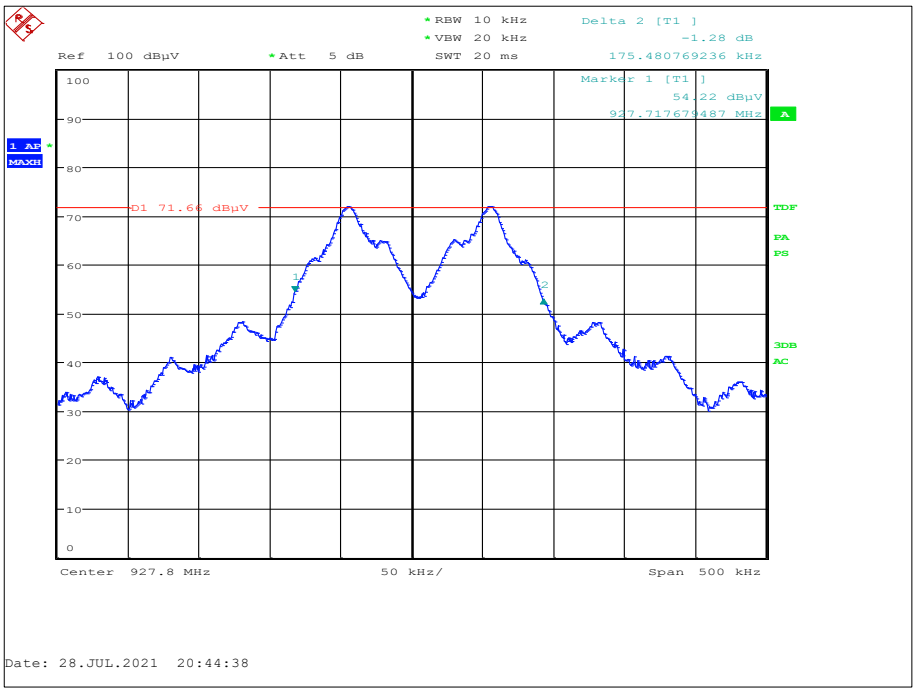

Figure 5 - 20 dB Bandwidth

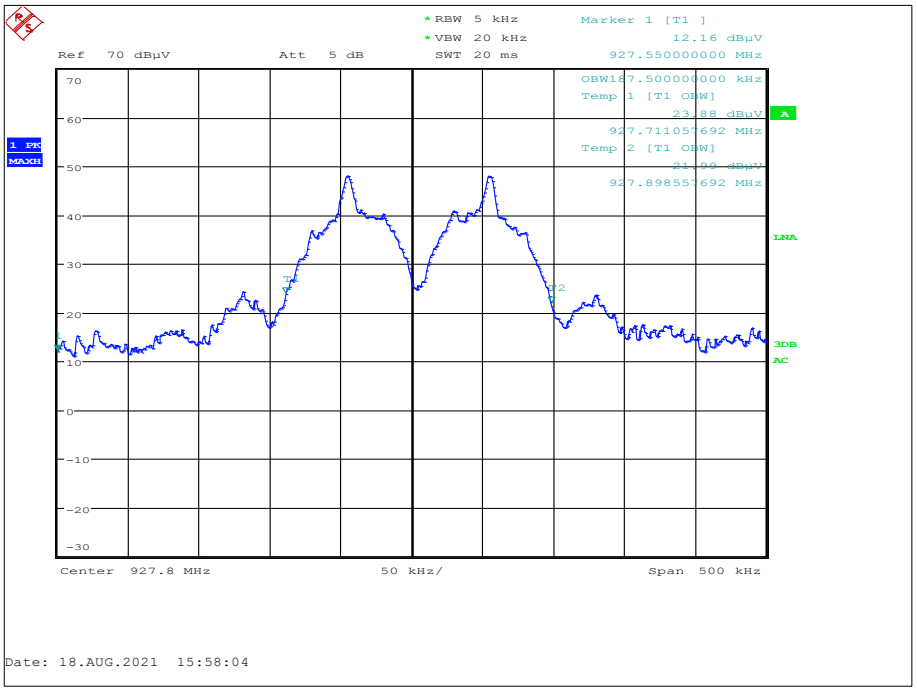

Figure 6 - 99% Occupied Bandwidth

FCC 47 CFR Part 15C, Limit Clause 15.215 (c)

The 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

ISED RSS 210 and ISED RSS GEN, Limit Clause

None specified.

2.1.7 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 Expiry Date
Antenna with permanent attenuator (Bilog)	Schaffner	CBL6143	287	24	14-Oct-2022
Comb Generator	Schaffner	RSG1000	3034	-	TU
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	18-Mar-2022
Cable (18 GHz)	Rosenberger	LU7-036-1000	5031	12	23-Jul-2022
EmX Emissions Software	TUV SUD	V2.1.11 V.V2.1.11	5125	-	Software
3.5 mm 2m Cable	Junkosha	MWX221-02000DMS	5428	12	15-Oct-2021
Thermo-Hygro-Barometer	PCE Instruments	PCE-THB-40	5481	12	31-Mar-2022
Broadband Horn Antenna (1-10 GHz)	Schwarzbeck	BBHA 9120 B	5611	12	22-Sep-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
Turntable	Maturo Gmbh	Turntable 1.5 SI-2t	5614	-	TU
3m Semi Anechoic Chamber	MVG	EMC-3	5621	36	11-Aug-2023
Cable Assembly - 18GHz 8m	Junkosha	MWX221-08000NMSNMS/B	5732	6	05-Feb-2022

Table 15

TU – Traceability Unscheduled

2.2 Authorised Band Edges

2.2.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.249 (d)
ISED RSS-210, Clause B.10(b)

2.2.2 Equipment Under Test and Modification State

Vitals Patch US, S/N: HEX ID: 39 7F 8C 2B D4 A4 - Modification State 0

2.2.3 Date of Test

28-July-2021

2.2.4 Test Method

The test was performed in accordance with ANSI C63.10, clause 6.3, 6.5 and 6.10.6.

The following conversion can be applied to convert from dBµV/m to µV/m:
10^(Field Strength in dBµV/m/20)

2.2.5 Environmental Conditions

Ambient Temperature	20.7 °C
Relative Humidity	68.1 %

2.2.6 Test Results

Short Range Device (SRD) - Transmit

Frequency (MHz)	Measured Frequency (MHz)	Peak Level (dBµV/m)	Average Level (dBµV/m)
902.2	902.0	42.26	-
927.8	928.0	41.00	-

Table 16 - Authorised Band Edge Results

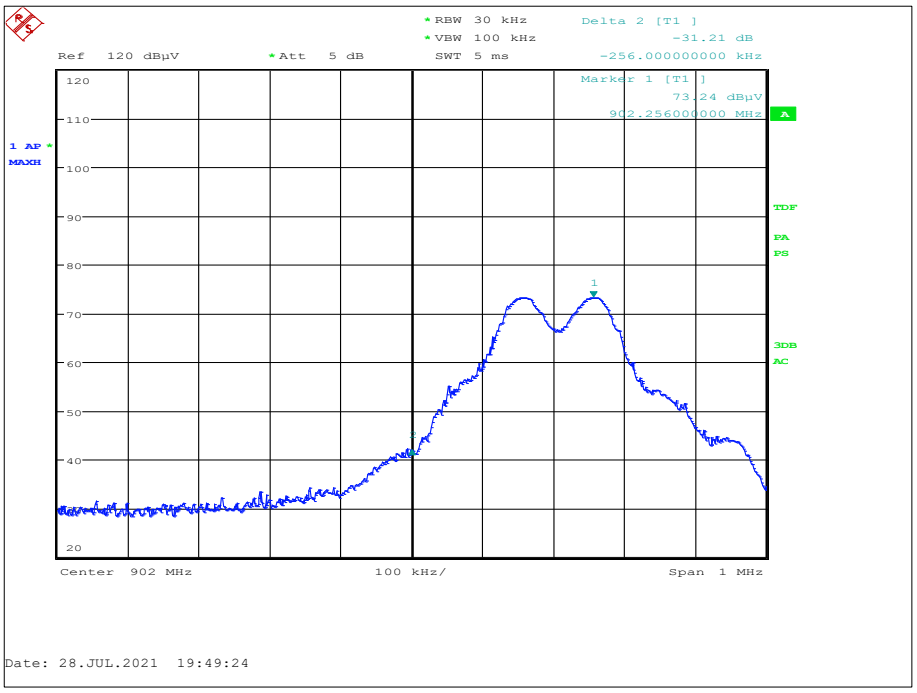

Figure 7 - 902.2 MHz, Measured Frequency 902.0 MHz, Peak

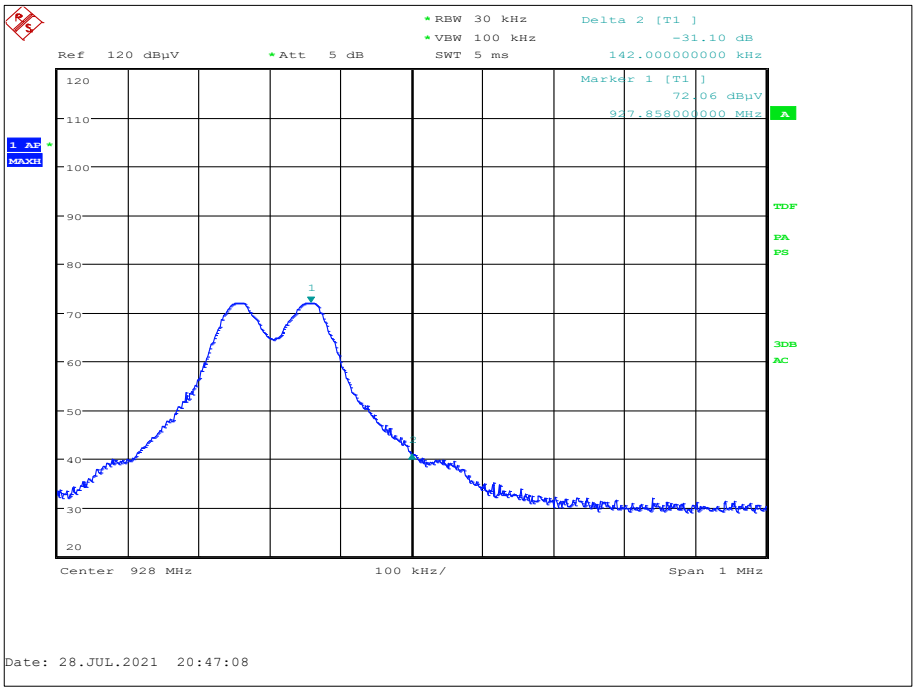

Figure 8 - 927.8 MHz Measured Frequency 928.0 MHz, Peak

FCC 47 CFR Part 15C, Limit Clause 15.249 (d)

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in § 15.209, whichever is the lesser attenuation.

FCC 47 CFR Part 15C, Limit Clause 15.209

Frequency (MHz)	Field Strength (µV/m at 3 m)
30 to 88	100
88 to 216	150
216 to 960	200
Above 960	500

Table 17

ISED RSS-210, Limit Clause B.10 (b)

Emissions radiated outside of the specified frequency bands, except for harmonic emissions, shall be attenuated by at least 50 dB below the level of the fundamental emissions or to the general field strength limits listed in RSS-Gen, whichever is less stringent.

ISED RSS-GEN, Limit Clause 8.9

Frequency (MHz)	Field Strength (µV/m at 3 m)
30 to 88	100
88 to 216	150
216 to 960	200
Above 960	500

Table 18

2.2.7 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 with permanent attenuator (Bilog)	Schaffner	CBL6143	287	24	14-Oct-2022
Comb Generator	Schaffner	RSG1000	3034	-	TU
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	18-Mar-2022
EmX Emissions Software	TUV SUD	V2.1.11 V.V2.1.11	5125	-	Software
3.5 mm 2m Cable	Junkosha	MWX221-02000DMS	5428	12	15-Oct-2021
Thermo-Hygro-Barometer	PCE Instruments	PCE-THB-40	5481	12	31-Mar-2022
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
Turntable	Maturo Gmbh	Turntable 1.5 SI-2t	5614	-	TU
3m Semi Anechoic Chamber	MVG	EMC-3	5621	36	11-Aug-2023
Cable Assembly - 18GHz 8m	Junkosha	MWX221-08000NMSNMS/B	5732	6	05-Feb-2022

Table 19

TU – Traceability Unscheduled

2.3 Field Strength of Fundamental

2.3.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.249 (a)
ISED RSS-210, Clause B.10 (a)

2.3.2 Equipment Under Test and Modification State

Vitals Patch US, S/N: HEX ID: 39 7F 8C 2B D4 A4 - Modification State 0

2.3.3 Date of Test

28-July-2021

2.3.4 Test Method

The test was performed in accordance with ANSI C63.10, clause 6.3, 6.4 and 6.5.

The following conversion can be applied to convert from dBµV/m to µV/m:
10^(Field Strength in dBµV/m/20)

2.3.5 Environmental Conditions

Ambient Temperature	20.7 °C
Relative Humidity	68.1 %

2.3.6 Test Results

Short Range Device (SRD) - Transmit

Frequency MHz	Field Strength (dBµv/m)	
	Peak	Average
902.2	73.47	-
915.0	74.55	-
927.8	72.10	-

Table 20 - Fundamental Field Strength Results

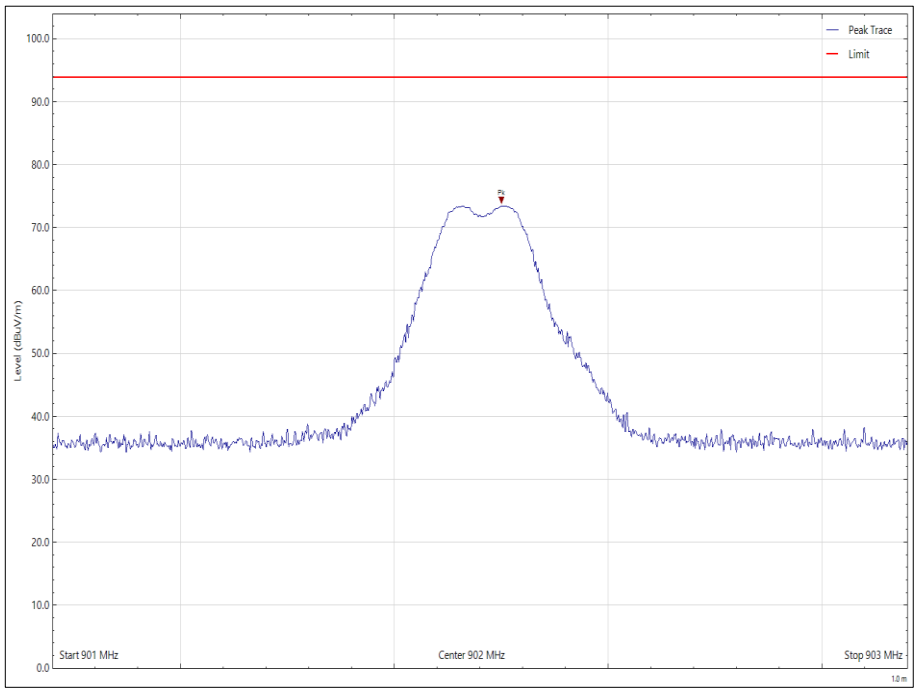

Figure 9 - 902.2 MHz, Peak

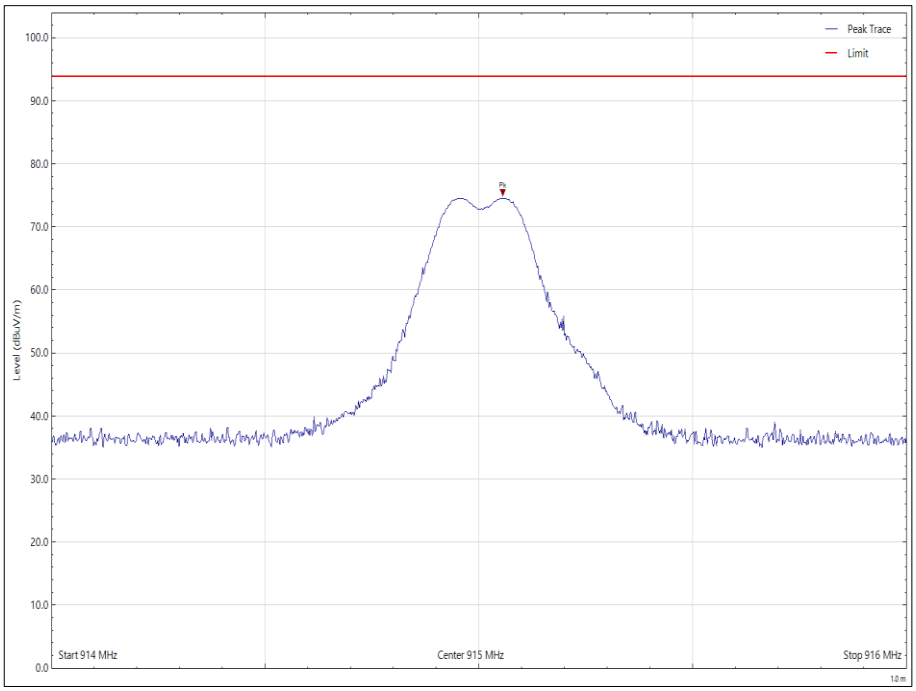

Figure 10 - 915.0 MHz, Peak

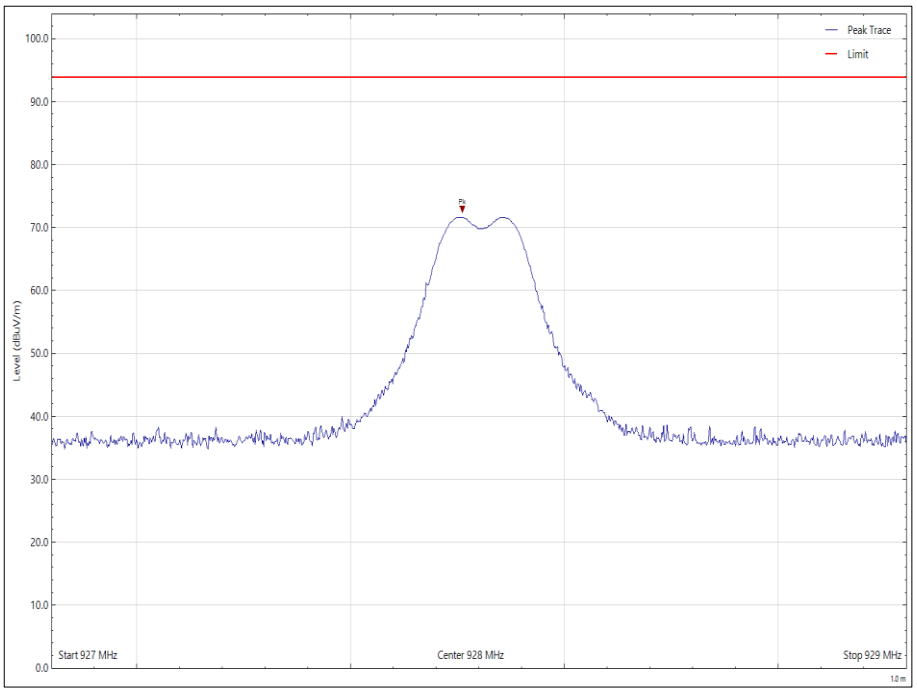

Figure 11 - 927.8 MHz, Peak

FCC 47 CFR Part 15C, Limit Clause 15.249 (a)

Fundamental Frequency (MHz)	Field Strength of Fundamental (mV/m)
902 to 928	50
2400 to 2483.5	50
5725 to 5875	50
24000 to 24250	250

Table 21

ISED RSS-210, Limit Clause B.10 (a)

The field strength of fundamental and harmonic emissions, measured at 3 m, shall not exceed 50 mV/m and 0.5 mV/m respectively.

2.3.7 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 with permanent attenuator (Bilog)	Schaffner	CBL6143	287	24	14-Oct-2022
Comb Generator	Schaffner	RSG1000	3034	-	TU
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	18-Mar-2022
EmX Emissions Software	TUV SUD	V2.1.11 V.V2.1.11	5125	-	Software
3.5 mm 2m Cable	Junkosha	MWX221-02000DMS	5428	12	15-Oct-2021
Thermo-Hygro-Barometer	PCE Instruments	PCE-THB-40	5481	12	31-Mar-2022
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
Turntable	Maturo Gmbh	Turntable 1.5 SI-2t	5614	-	TU
3m Semi Anechoic Chamber	MVG	EMC-3	5621	36	11-Aug-2023
Cable Assembly - 18GHz 8m	Junkosha	MWX221-08000NMSNMS/B	5732	6	05-Feb-2022

Table 22

TU – Traceability Unscheduled

2.4 Field Strength of Emissions

2.4.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.249 (a)(d)
ISED RSS-210, Clause B.10 (a)

2.4.2 Equipment Under Test and Modification State

Vitals Patch US, S/N: HEX ID: 39 7F 8C 2B D4 A4 - Modification State 0

2.4.3 Date of Test

27-July-2021 to 28-July-2021

2.4.4 Test Method

This test was performed in accordance with ANSI C63.10, clause 6.3, 6.4 and 6.5.

The plots show the characterization of the EUT.

The limits shown have been used as a threshold to determine where further measurements are necessary. Where results are within 10 dB of the limits shown on the plots, further investigation was carried out and reported in results tables.

For frequencies greater than 1 GHz, plots for average measurements were taken with an RMS detector and a max hold trace to characterize the EUT. Where emissions were detected, final average measurements were taken in accordance with ANSI C63.10 clause 4.1.4.2.2.

If emissions were found to be pulsed, final measurements were taken in accordance with ANSI C63.10 clause 7.5. A peak measurement is performed. A duty cycle correction factor is then determined by the expression duty (dB) = 20log(On Time/(On Time + Off Time)).

This factor is then added to the peak value to determine the average value.

The following conversion can be applied to convert from dBµV/m to µV/m: 10^(Field Strength in dBµV/m/20).

2.4.5 Example Test Setup Diagram

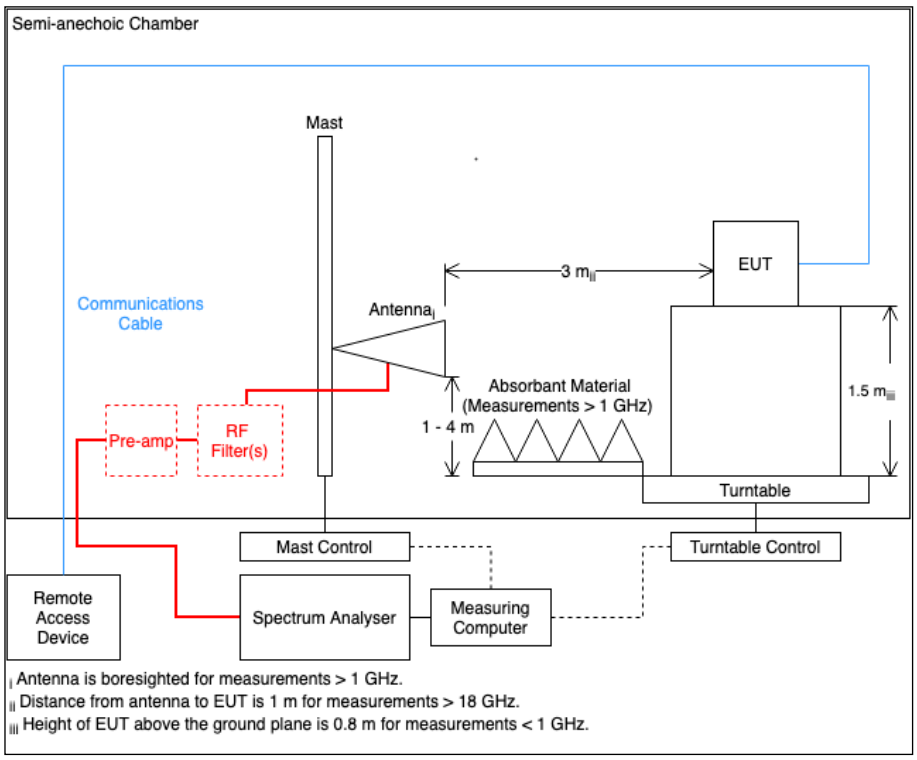

Figure 12

2.4.6 Environmental Conditions

Ambient Temperature	20.4 - 20.7 °C
Relative Humidity	68.1 - 72.9 %

2.4.7 Test Results

Short Range Device (SRD) - Transmit

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

Table 23 - 902.2 MHz - 30 MHz to 1 GHz - X Orientation, Horizontal

* No emissions were detected within 10 dB of the limit

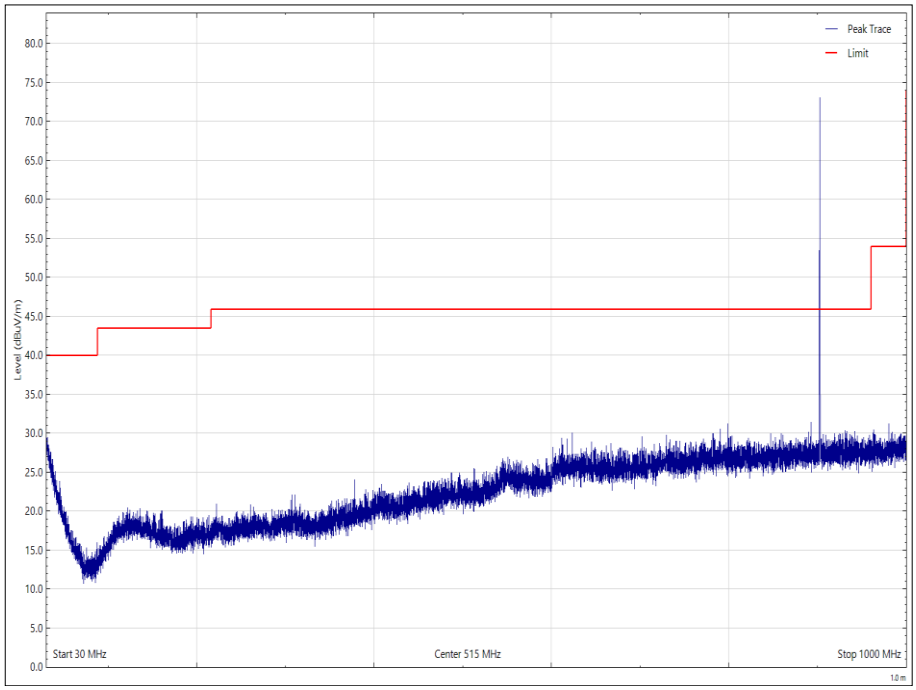

Figure 13 - 902.2 MHz - 30 MHz to 1 GHz - X Orientation, Horizontal

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

Table 24 - 902.2 MHz - 30 MHz to 1 GHz - X Orientation, Vertical

* No emissions were detected within 10 dB of the limit

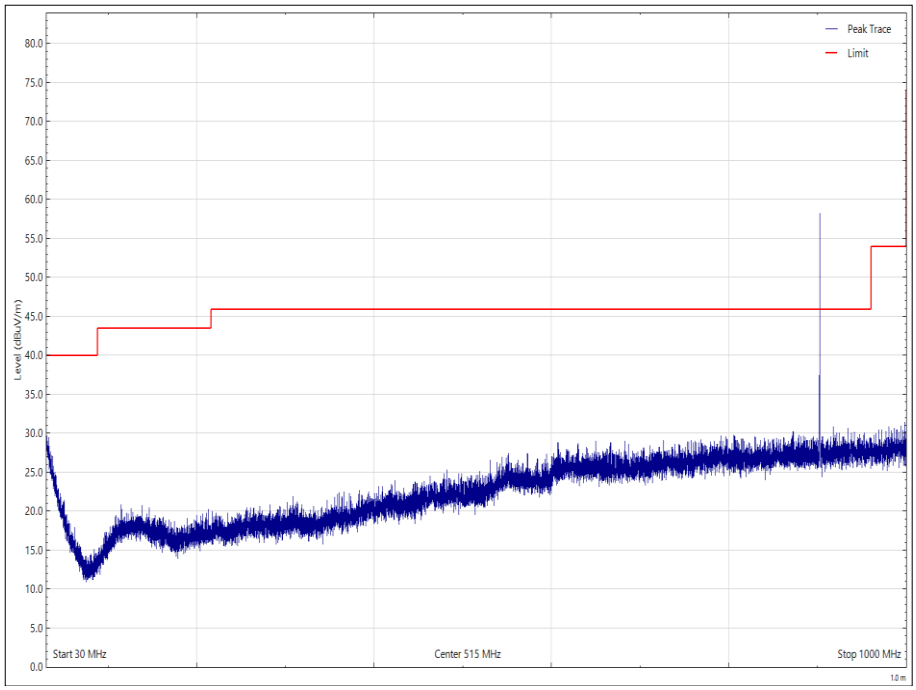

Figure 14 - 902.2 MHz - 30 MHz to 1 GHz - X Orientation, Vertical

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

Table 25 - 902.2 MHz - 30 MHz to 1 GHz - Y Orientation, Horizontal

* No emissions were detected within 10 dB of the limit

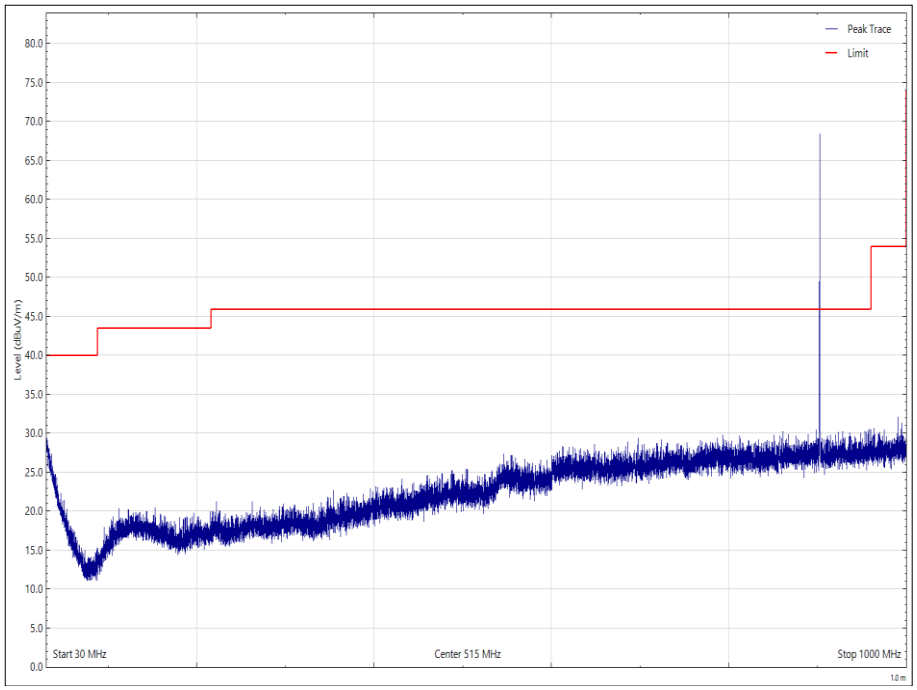

Figure 15 - 902.2 MHz - 30 MHz to 1 GHz - Y Orientation, Horizontal

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

Table 26 - 902.2 MHz - 30 MHz to 1 GHz - Y Orientation, Vertical

* No emissions were detected within 10 dB of the limit

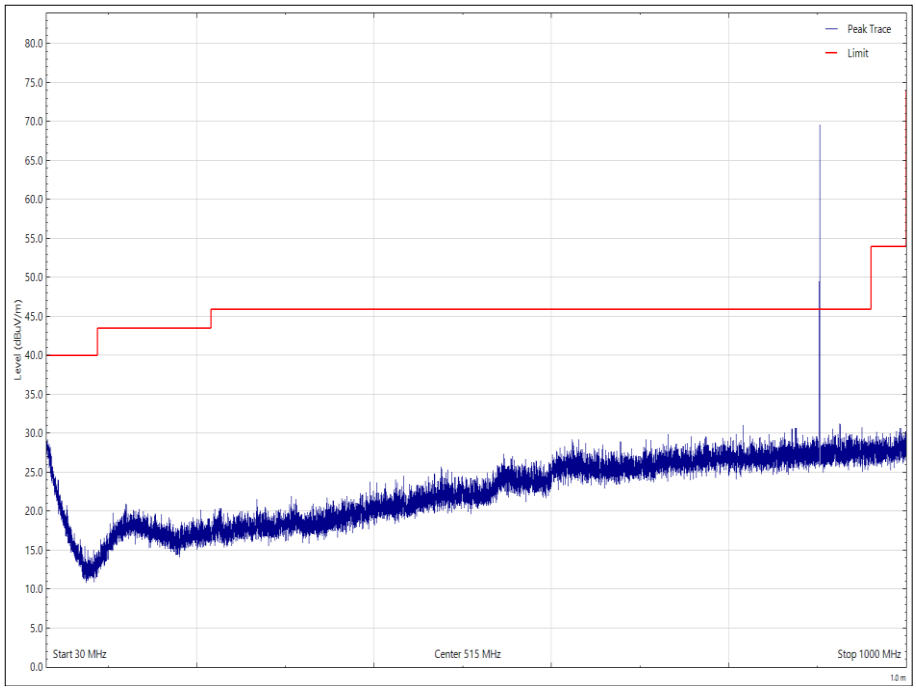

Figure 16 - 902.2 MHz - 30 MHz to 1 GHz - Y Orientation, Vertical

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

Table 27 - 902.2 MHz - 30 MHz to 1 GHz - Z Orientation, Horizontal

* No emissions were detected within 10 dB of the limit

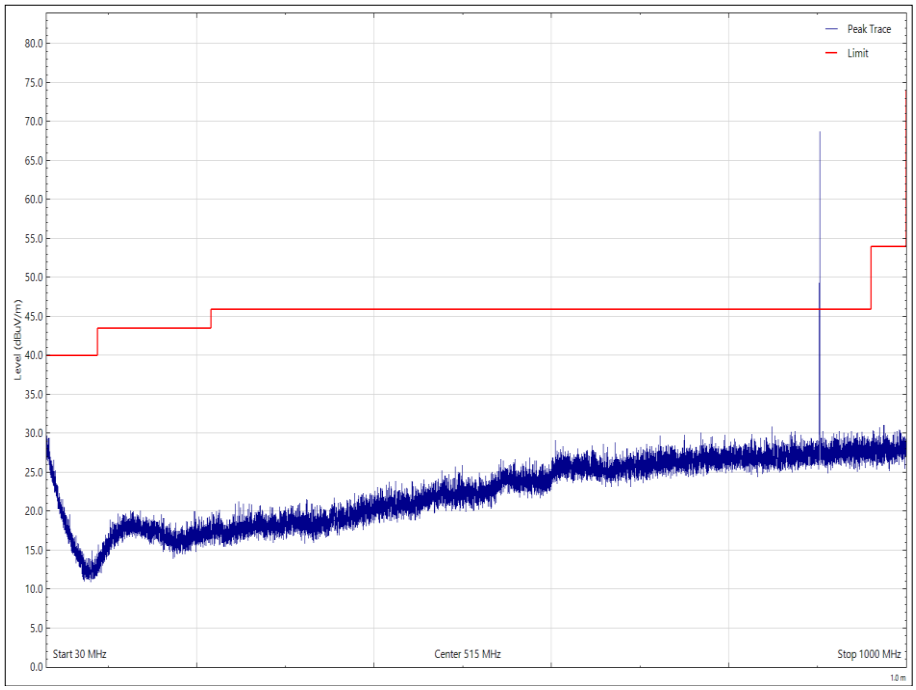

Figure 17 - 902.2 MHz - 30 MHz to 1 GHz - Z Orientation, Horizontal

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

Table 28 - 902.2 MHz - 30 MHz to 1 GHz - Z Orientation, Vertical

* No emissions were detected within 10 dB of the limit

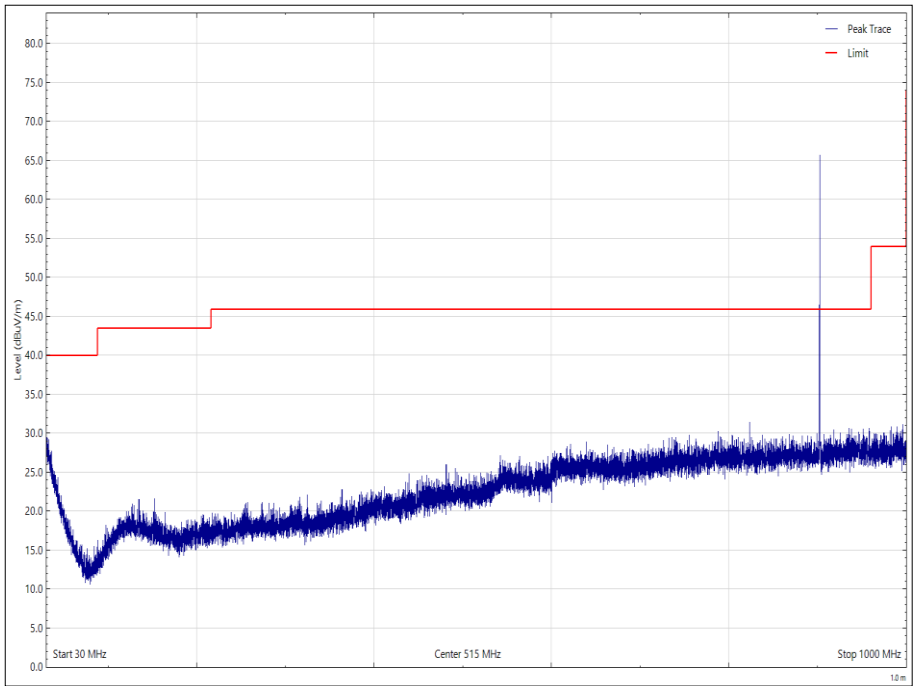

Figure 18 - 902.2 MHz - 30 MHz to 1 GHz - Z Orientation, Vertical

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

Table 29 - 902.2 MHz - 1 GHz to 10 GHz - X Orientation

* No emissions were detected within 10 dB of the limit

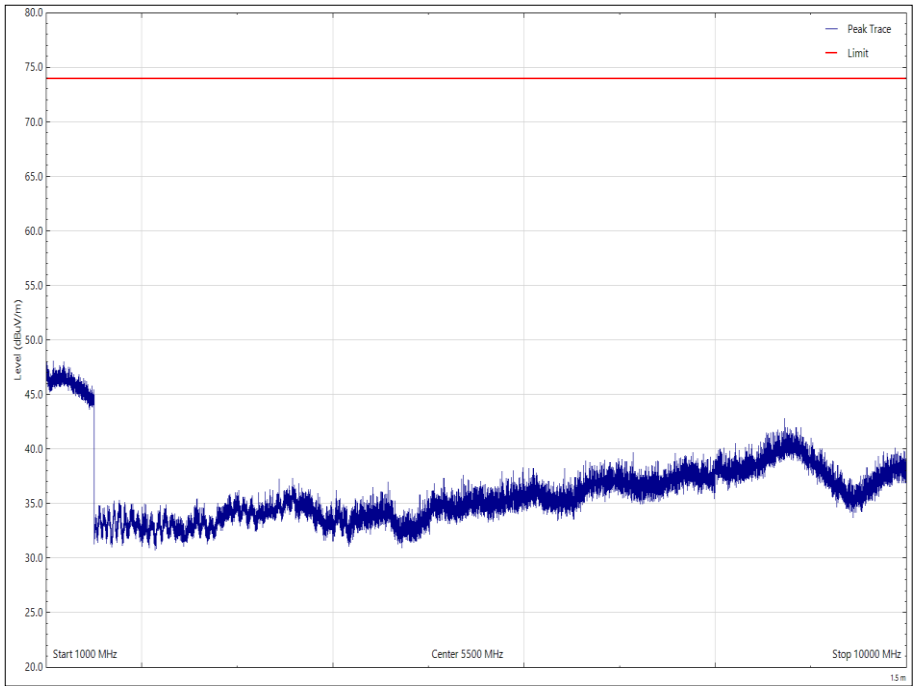

Figure 19 - 902.2 MHz - 1 GHz to 10 GHz - X Orientation - Vertical – Peak

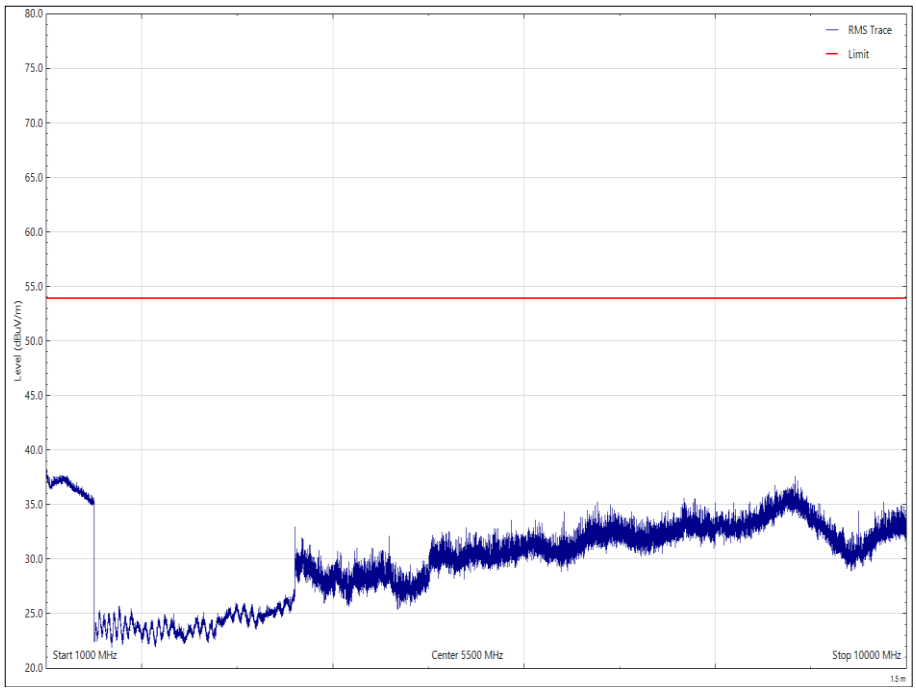

Figure 20 - 902.2 MHz - 1 GHz to 10 GHz - X Orientation - Vertical - Average

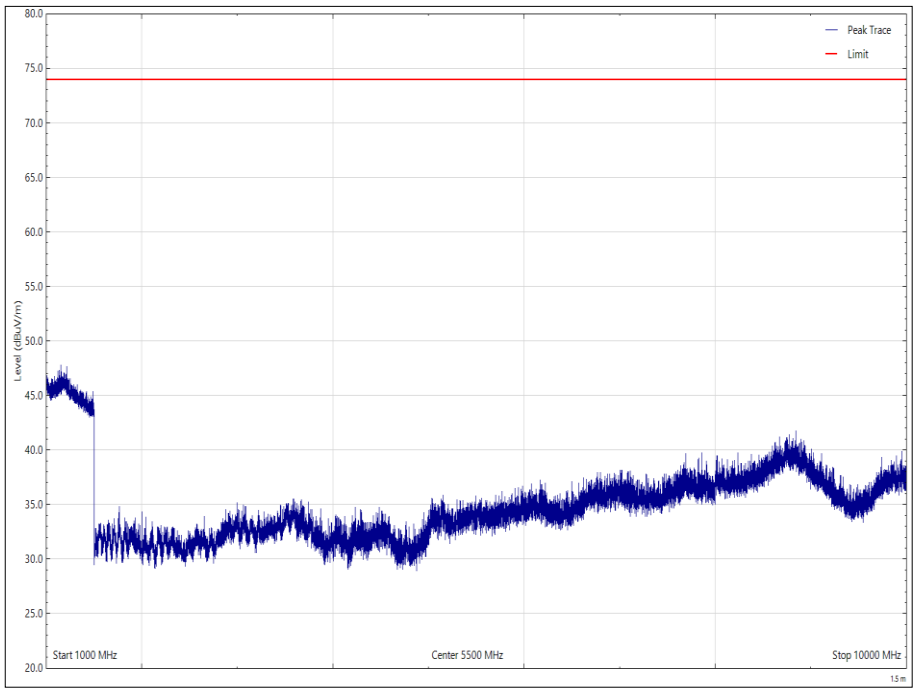

Figure 21 - 902.2 MHz - 1 GHz to 10 GHz - X Orientation - Horizontal - Peak

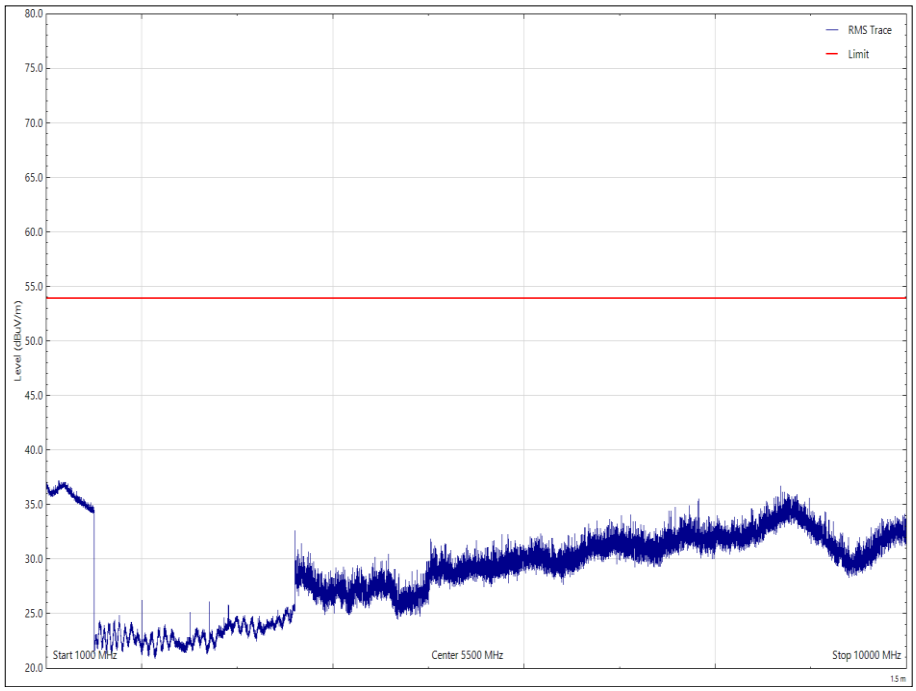

Figure 22 - 902.2 MHz - 1 GHz to 10 GHz - X Orientation - Horizontal - Average

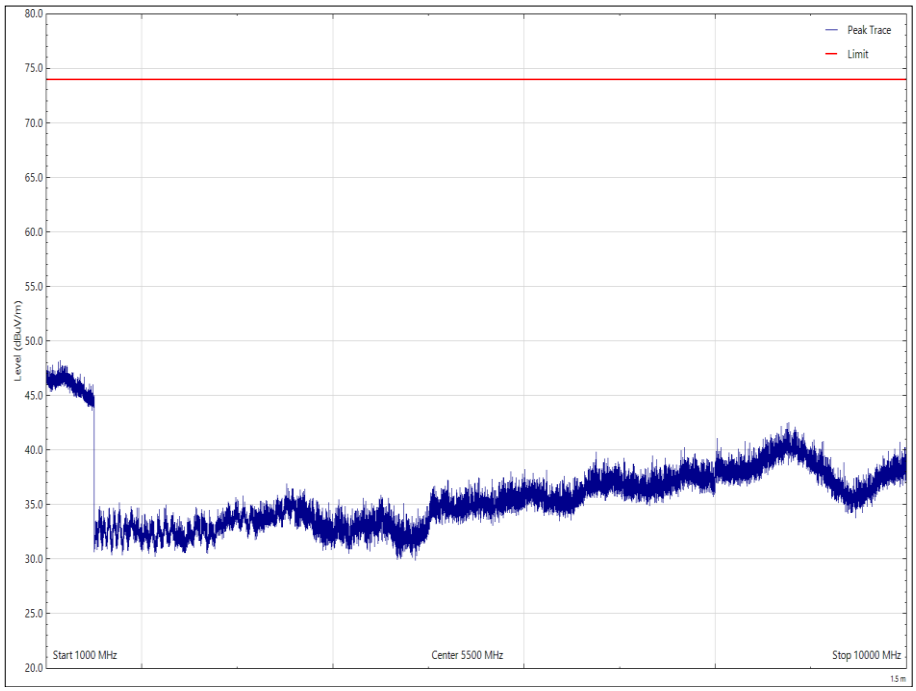

Figure 23 - 902.2 MHz - 1 GHz to 10 GHz - Y Orientation - Vertical - Peak

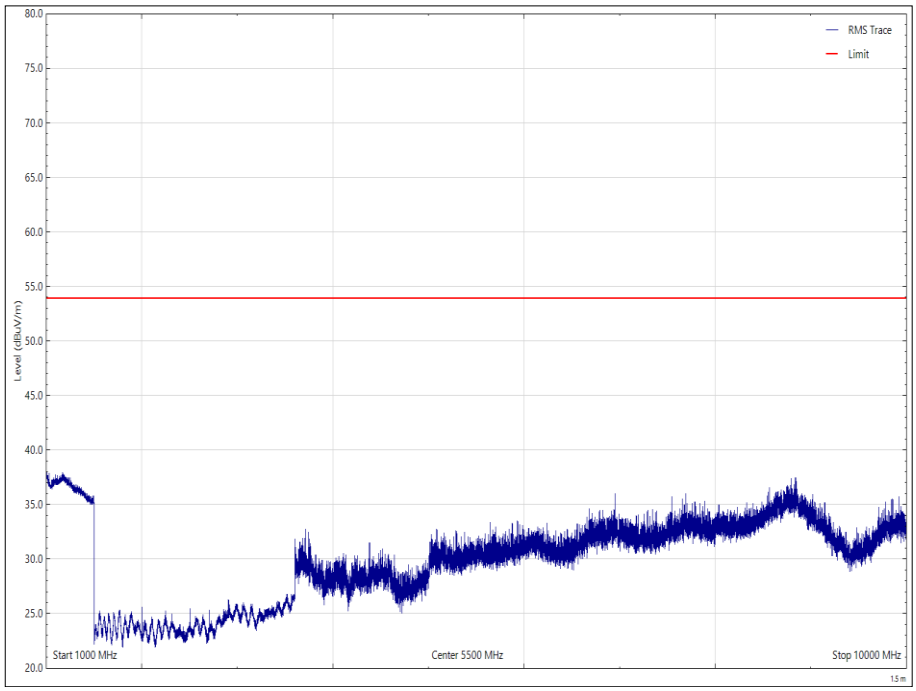

Figure 24 - 902.2 MHz - 1 GHz to 10 GHz - Y Orientation - Vertical - Average

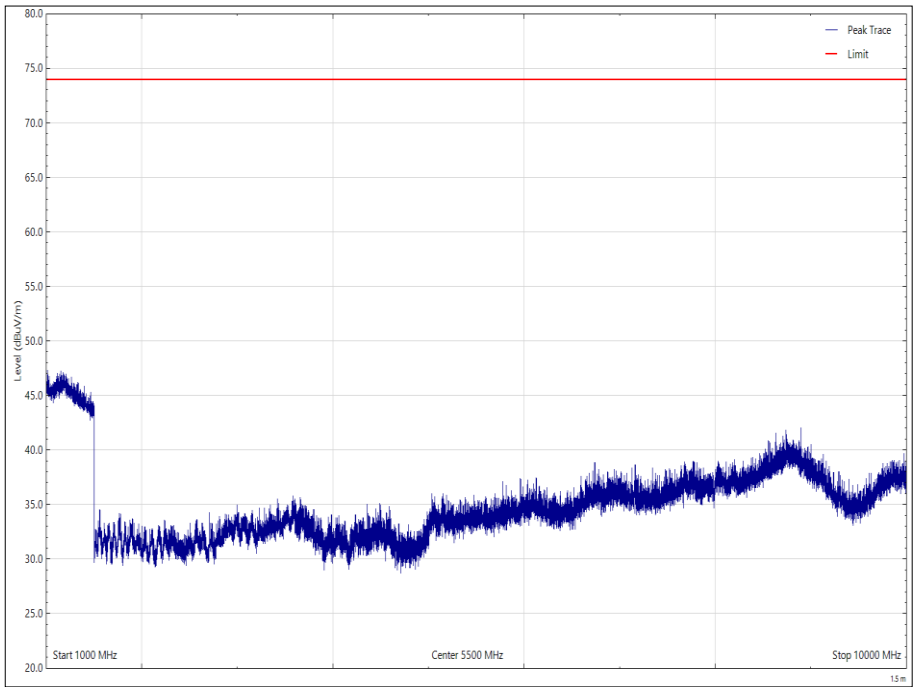

Figure 25 - 902.2 MHz - 1 GHz to 10 GHz - Y Orientation - Horizontal - Peak

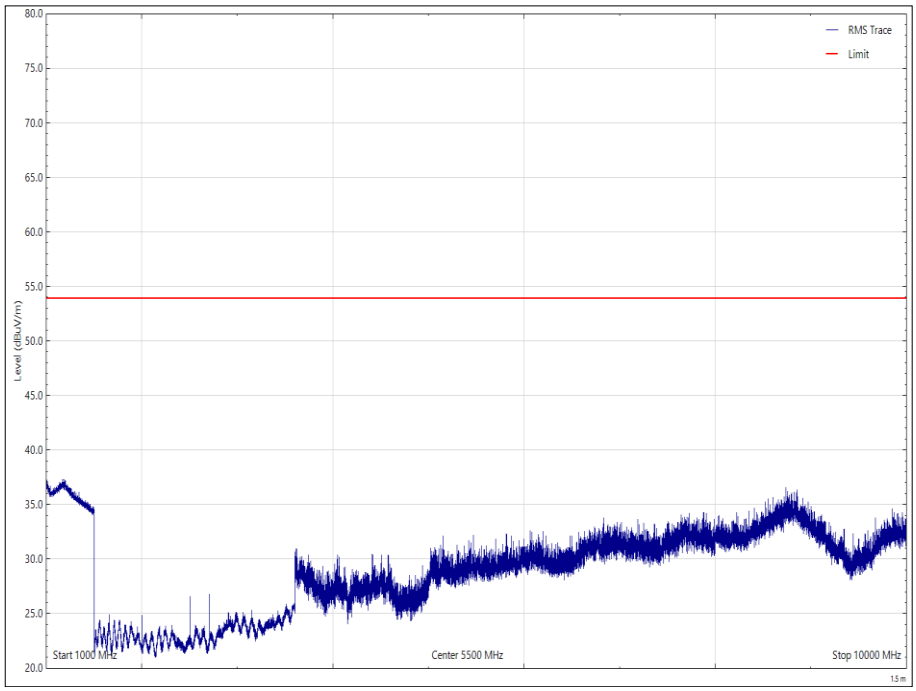

Figure 26 - 902.2 MHz - 1 GHz to 10 GHz - Y Orientation - Horizontal - Average

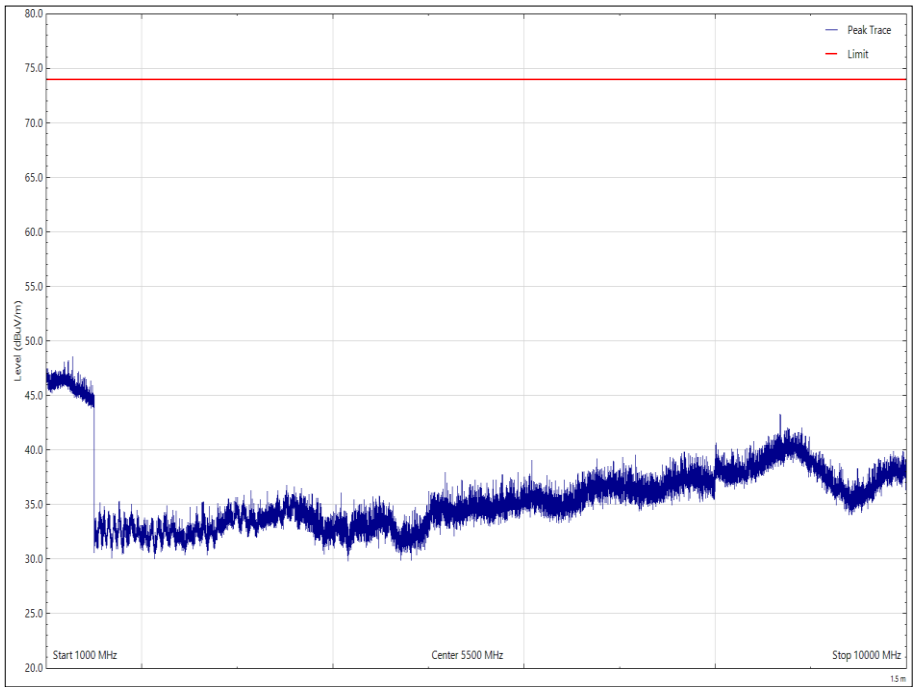

Figure 27 - 902.2 MHz - 1 GHz to 10 GHz - Z Orientation - Vertical - Peak

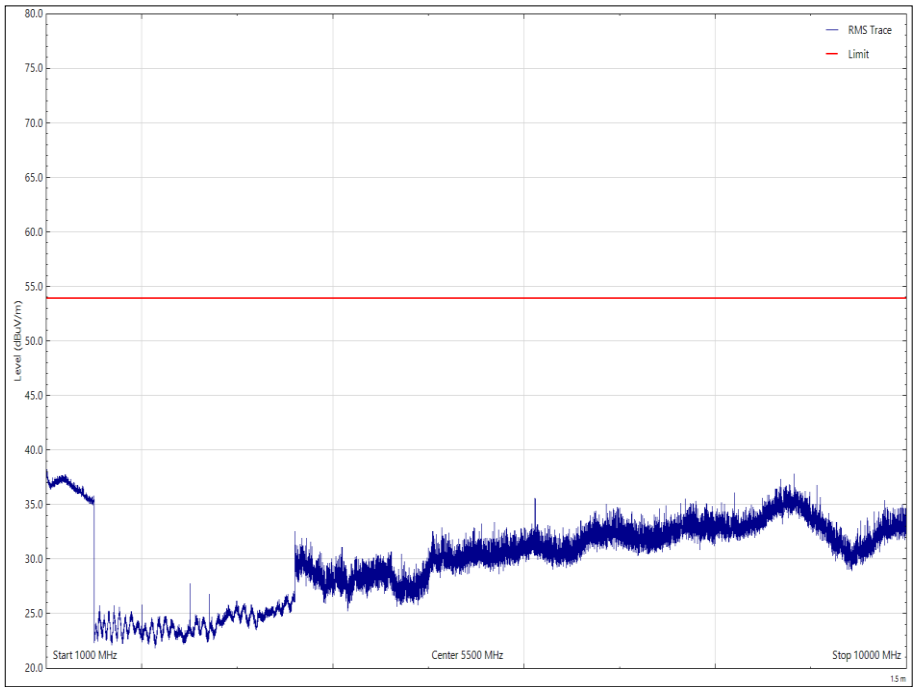

Figure 28 - 902.2 MHz - 1 GHz to 10 GHz - Z Orientation - Vertical - Average

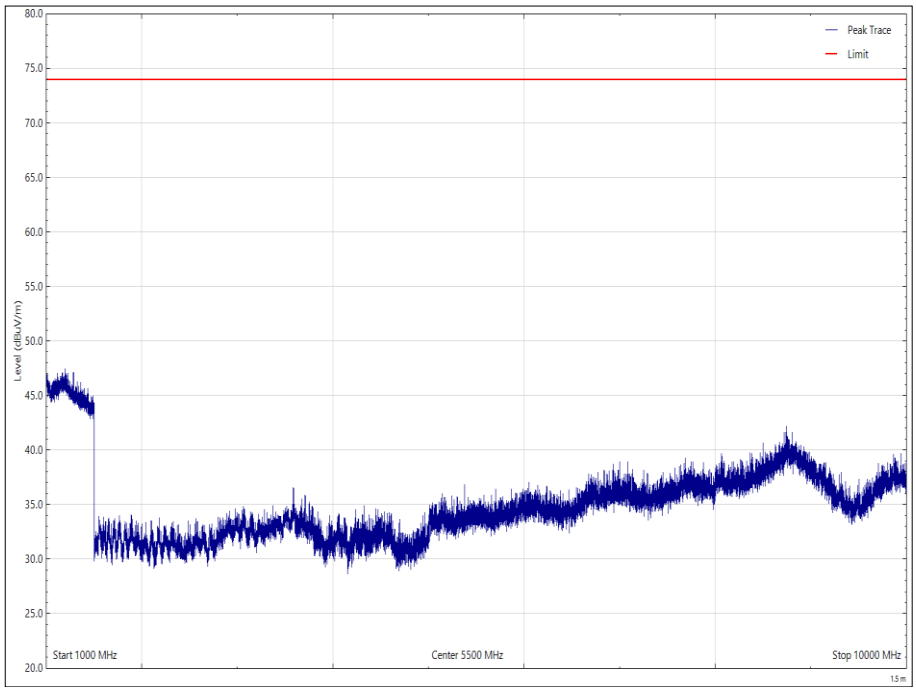

Figure 29 - 902.2 MHz - 1 GHz to 10 GHz - Z Orientation - Horizontal - Peak

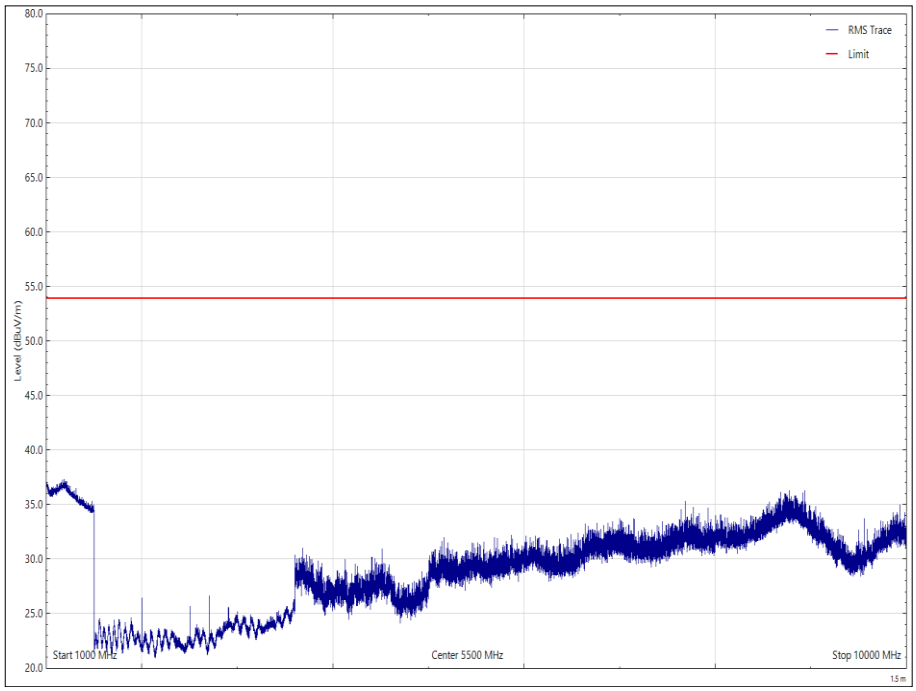

Figure 30 - 902.2 MHz - 1 GHz to 10 GHz - Z Orientation - Horizontal - Average

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

Table 30 - 915.0 MHz - 30 MHz to 1 GHz - X Orientation, Horizontal

* No emissions were detected within 10 dB of the limit

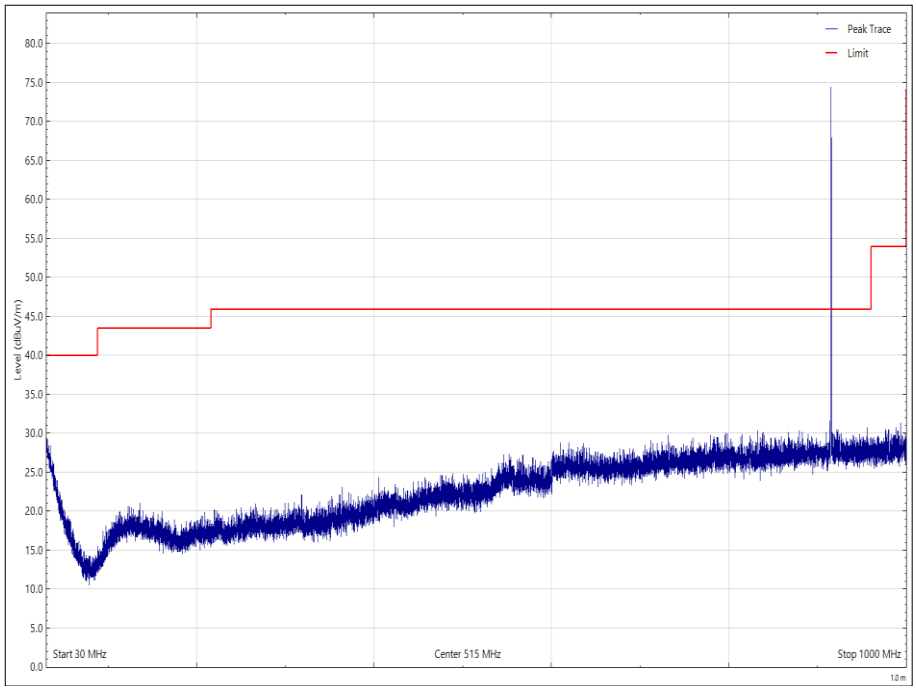

Figure 31 - 915.0 MHz - 30 MHz to 1 GHz - X Orientation, Horizontal

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

Table 31 - 915.0 MHz - 30 MHz to 1 GHz - X Orientation, Vertical

* No emissions were detected within 10 dB of the limit

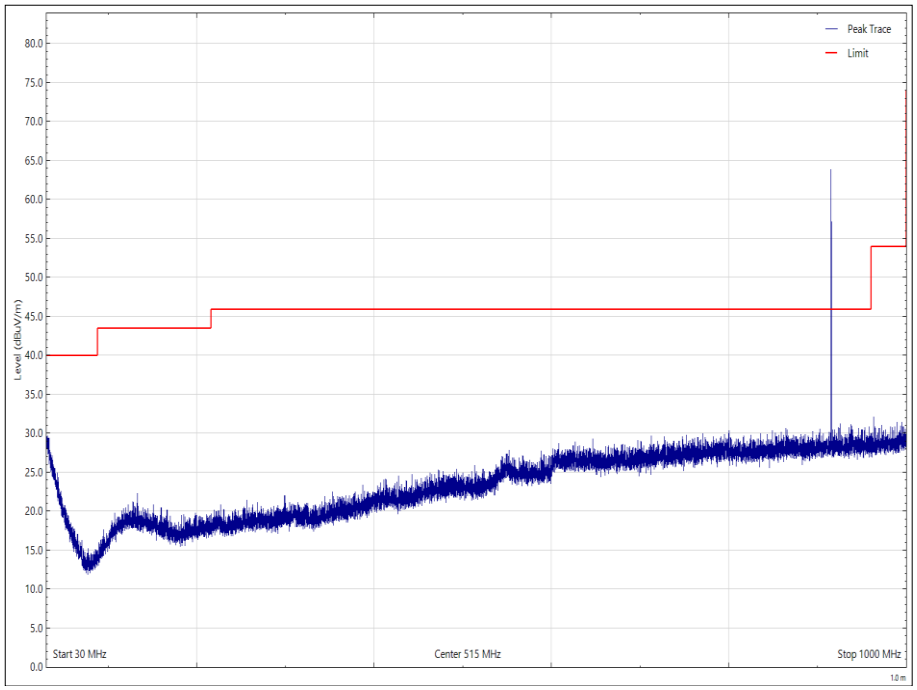

Figure 32 - 915.0 MHz - 30 MHz to 1 GHz - X Orientation, Vertical

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

Table 32 - 915.0 MHz - 30 MHz to 1 GHz - Y Orientation, Horizontal

* No emissions were detected within 10 dB of the limit

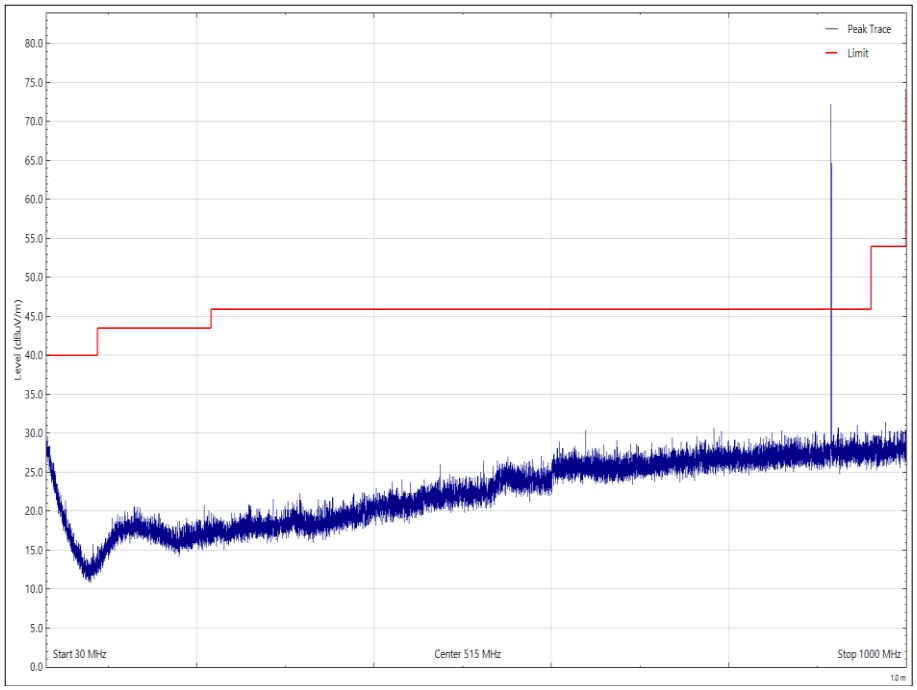

Figure 33 - 915.0 MHz - 30 MHz to 1 GHz - Y Orientation, Horizontal

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

Table 33 - 915.0 MHz - 30 MHz to 1 GHz - Y Orientation, Vertical

* No emissions were detected within 10 dB of the limit

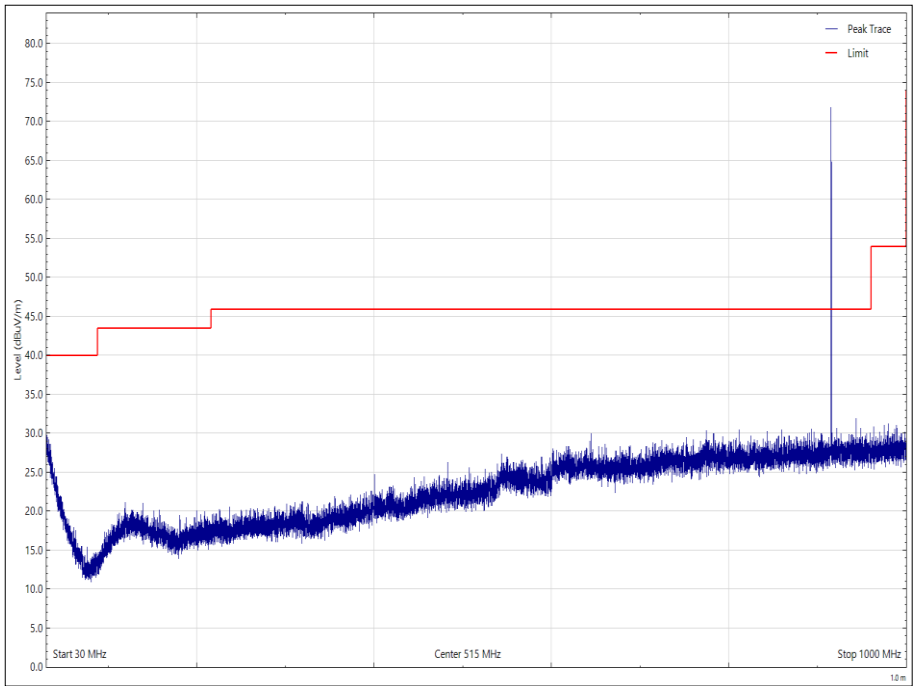

Figure 34 - 915.0 MHz - 30 MHz to 1 GHz - Y Orientation, Vertical

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

Table 34 - 915.0 MHz - 30 MHz to 1 GHz - Z Orientation, Horizontal

* No emissions were detected within 10 dB of the limit

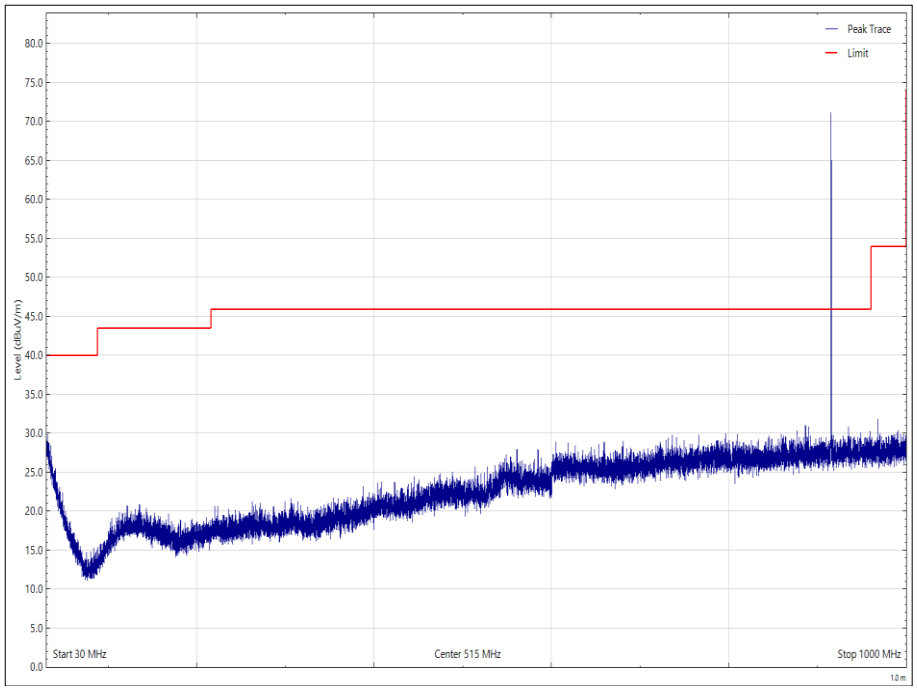

Figure 35 - 915.0 MHz - 30 MHz to 1 GHz - Z Orientation, Horizontal

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

Table 35 - 915.0 MHz - 30 MHz to 1 GHz - Z Orientation, Vertical

* No emissions were detected within 10 dB of the limit

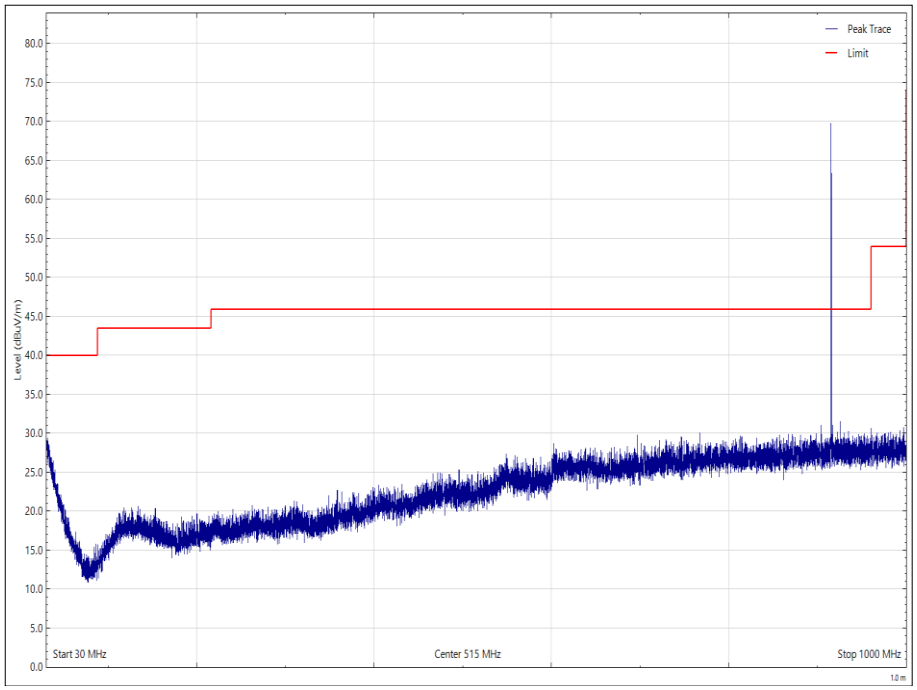

Figure 36 - 915.0 MHz - 30 MHz to 1 GHz - Z Orientation, Vertical

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

Table 36 915.0 MHz - 1 GHz to 10 GHz - X Orientation

* No emissions were detected within 10 dB of the limit

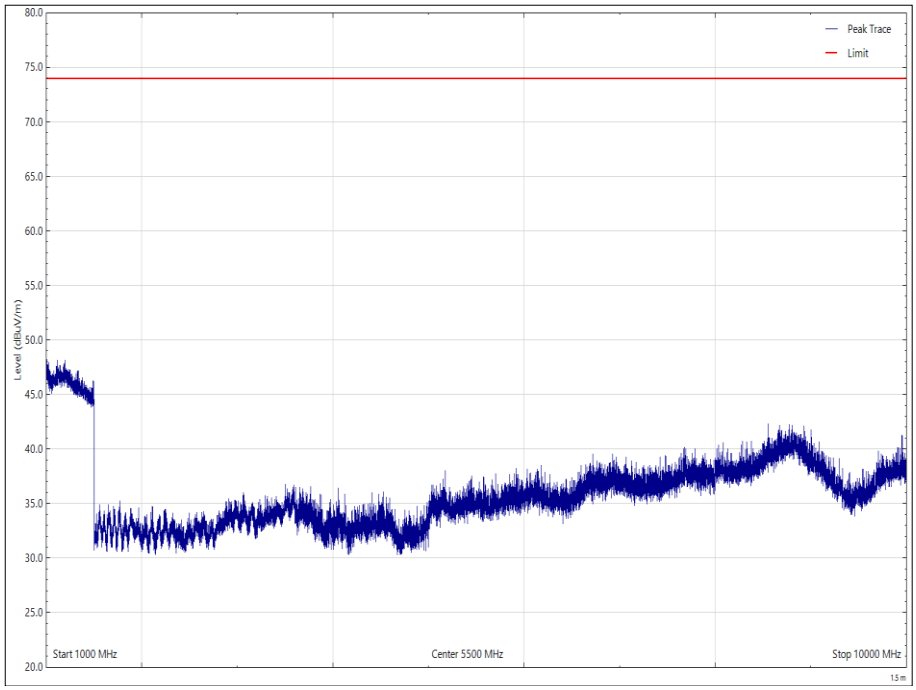

Figure 37 - 915.0 MHz - 1 GHz to 10 GHz - X Orientation - Vertical - Peak

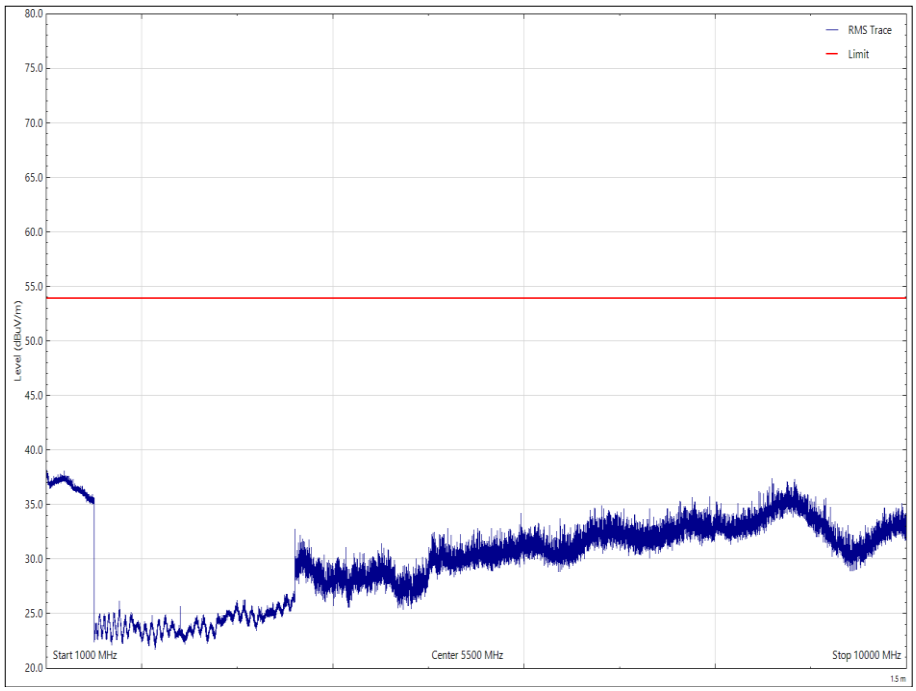

Figure 38 - 915 MHz - 1 GHz to 10 GHz - X Orientation - Vertical - Average

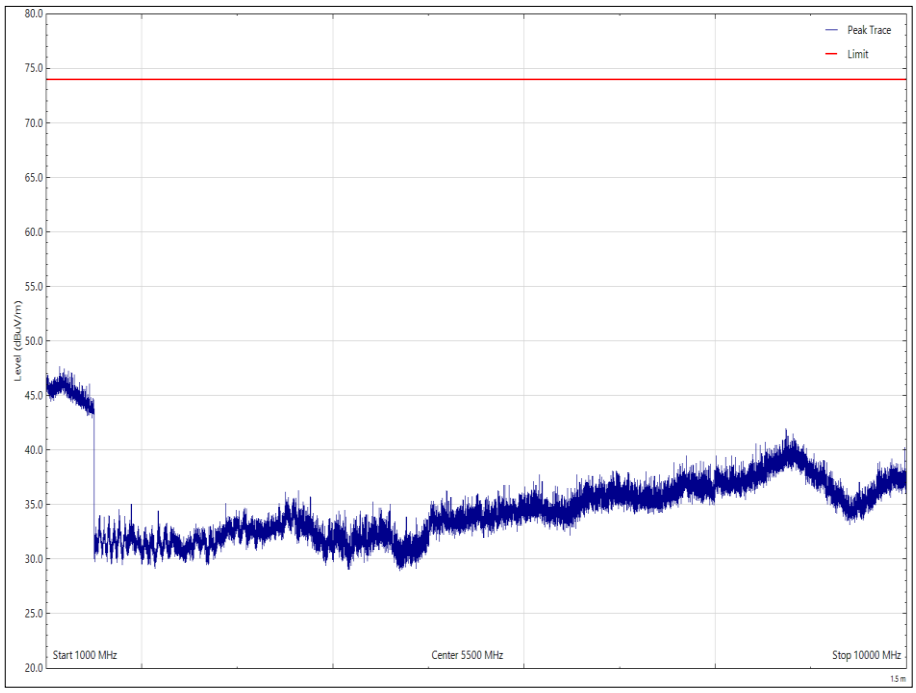

Figure 39 - 915 MHz - 1 GHz to 10 GHz - X Orientation - Horizontal - Peak

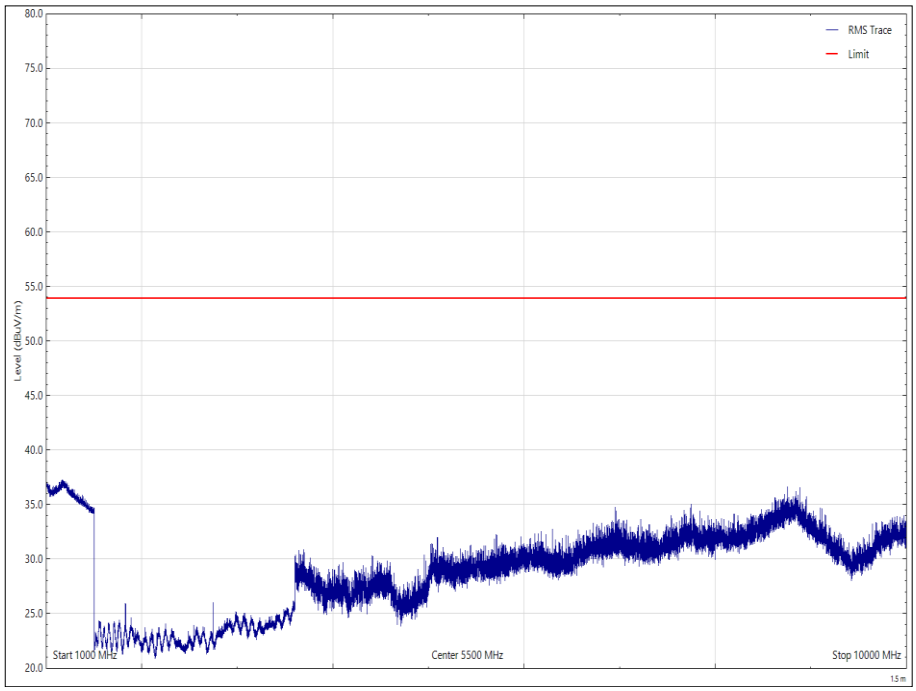

Figure 40 - 915 MHz - 1 GHz to 10 GHz - X Orientation - Horizontal - Average

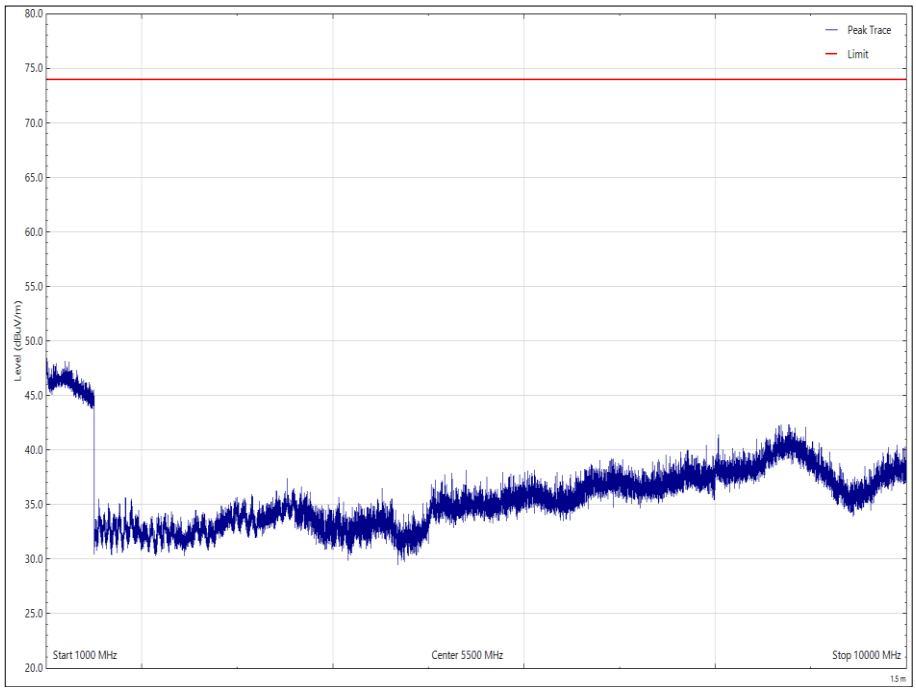

Figure 41 - 915 MHz - 1 GHz to 10 GHz - Y Orientation - Vertical - Peak

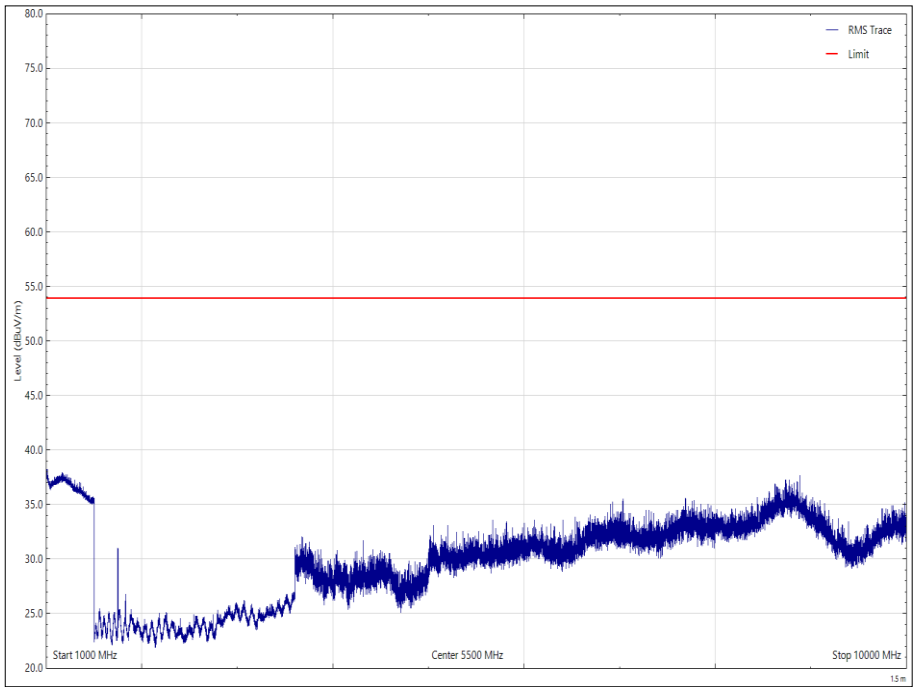

Figure 42 - 915 MHz - 1 GHz to 10 GHz - Y Orientation - Vertical - Average

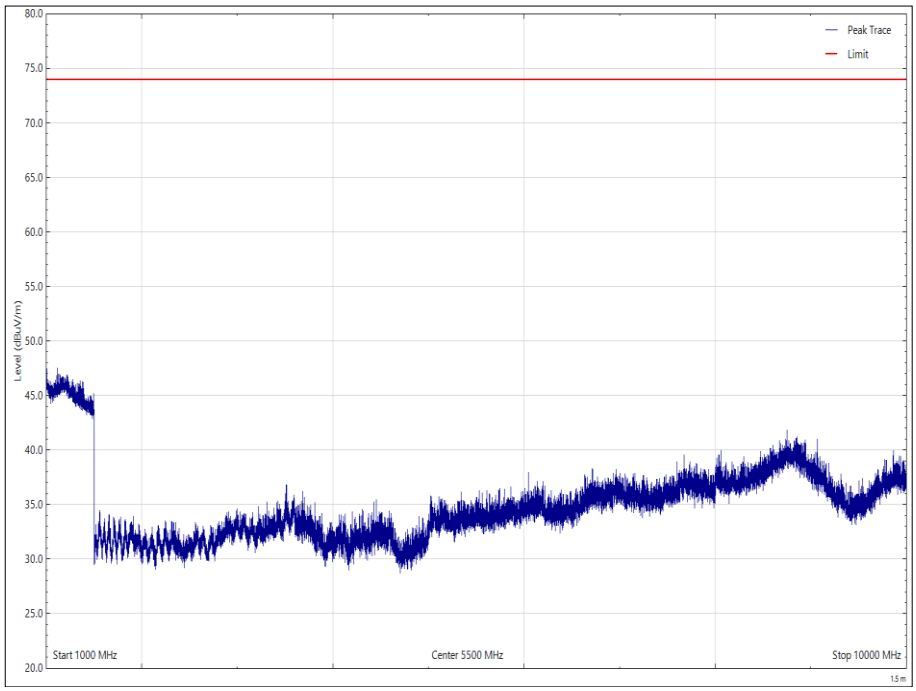

Figure 43 - 915 MHz - 1 GHz to 10 GHz - Y Orientation - Horizontal - Peak

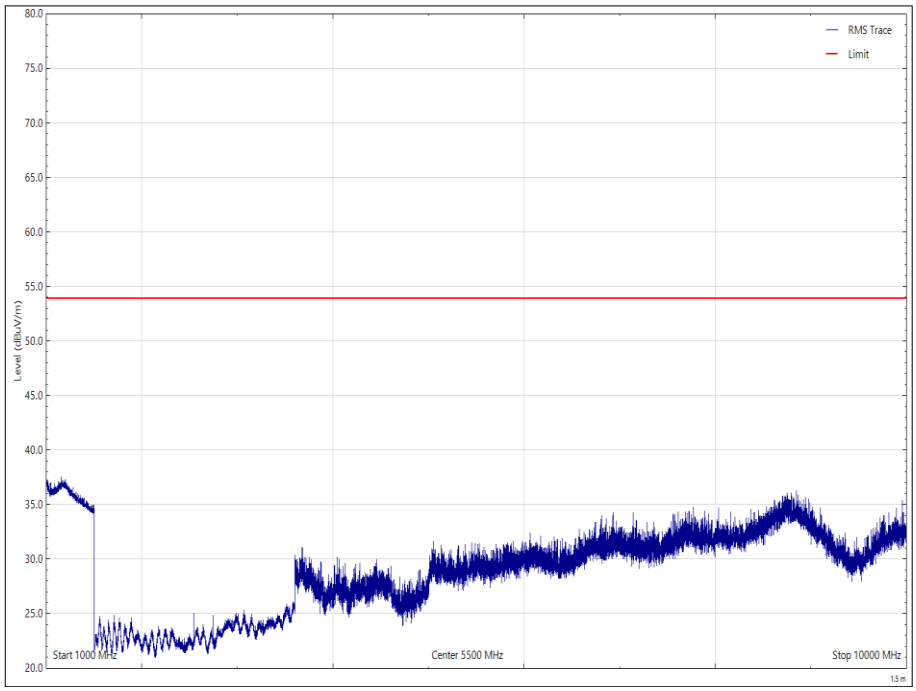

Figure 44 - 915 MHz - 1 GHz to 10 GHz - Y Orientation - Horizontal - Average

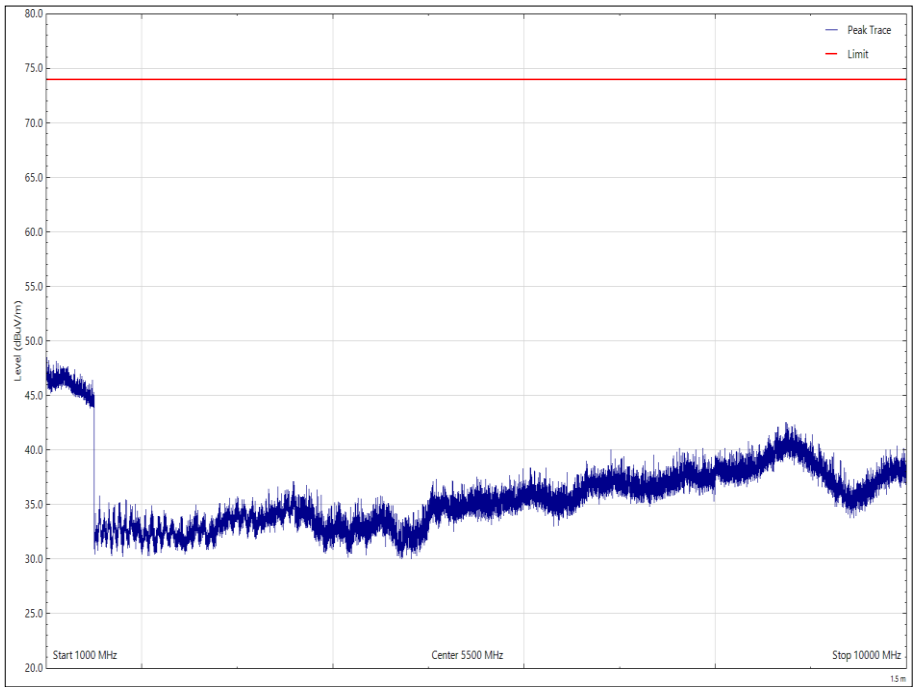

Figure 45 - 915 MHz - 1 GHz to 10 GHz - Z Orientation - Vertical - Peak

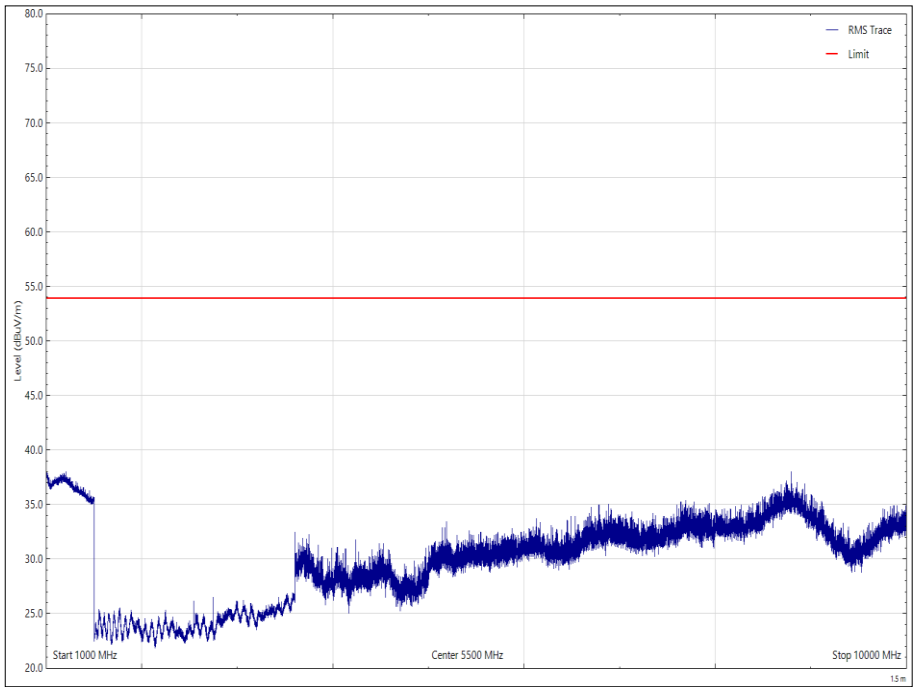

Figure 46 - 915 MHz - 1 GHz to 10 GHz - Z Orientation - Vertical - Average

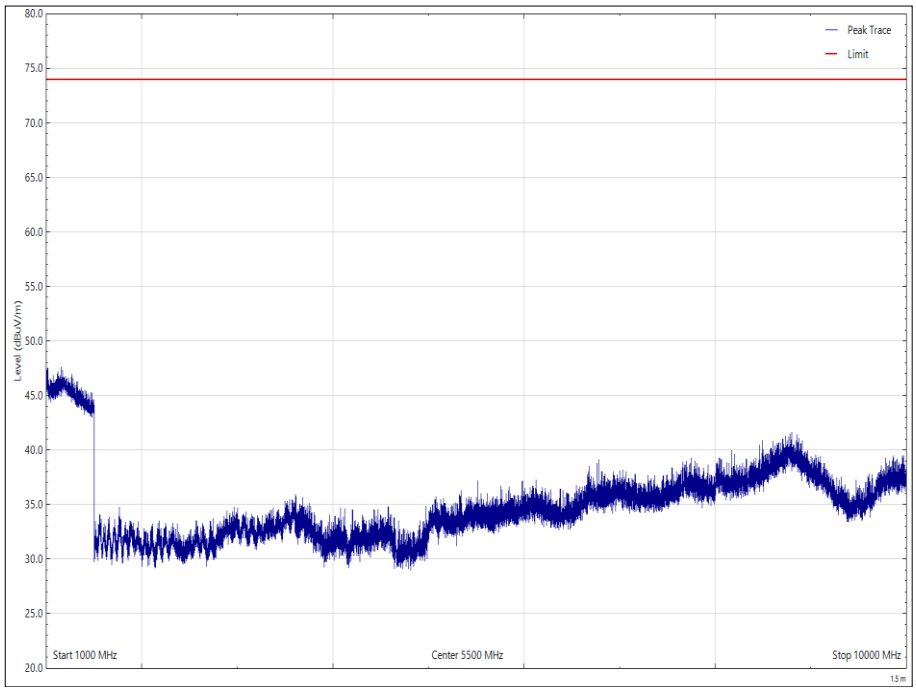

Figure 47 - 915 MHz - 1 GHz to 10 GHz - Z Orientation - Horizontal - Peak

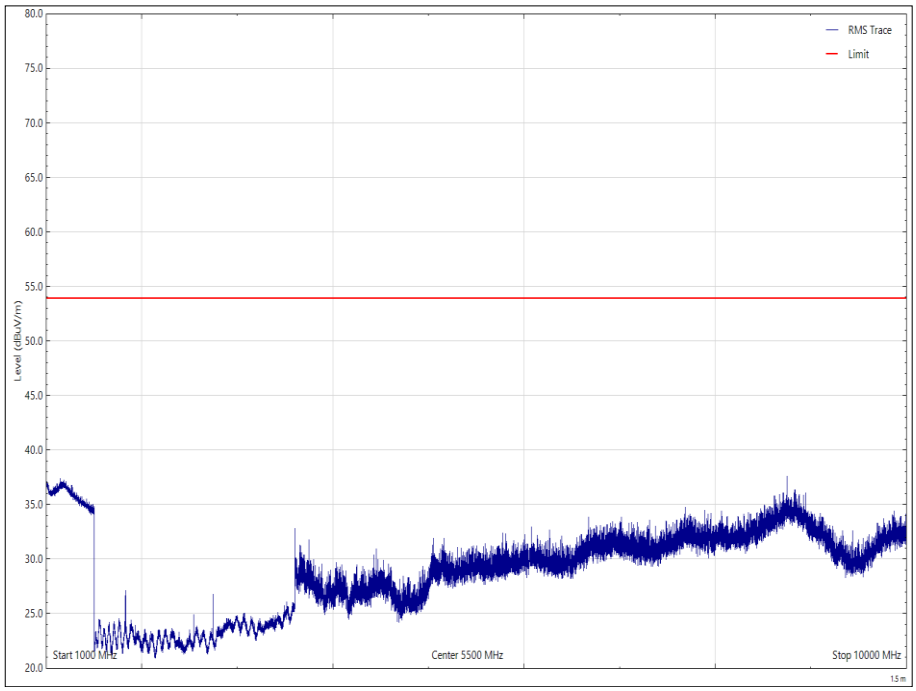

Figure 48 - 915 MHz - 1 GHz to 10 GHz - Z Orientation - Horizontal - Average

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

Table 37 - 927.8 MHz - 30 MHz to 1 GHz - X Orientation, Horizontal

* No emissions were detected within 10 dB of the limit

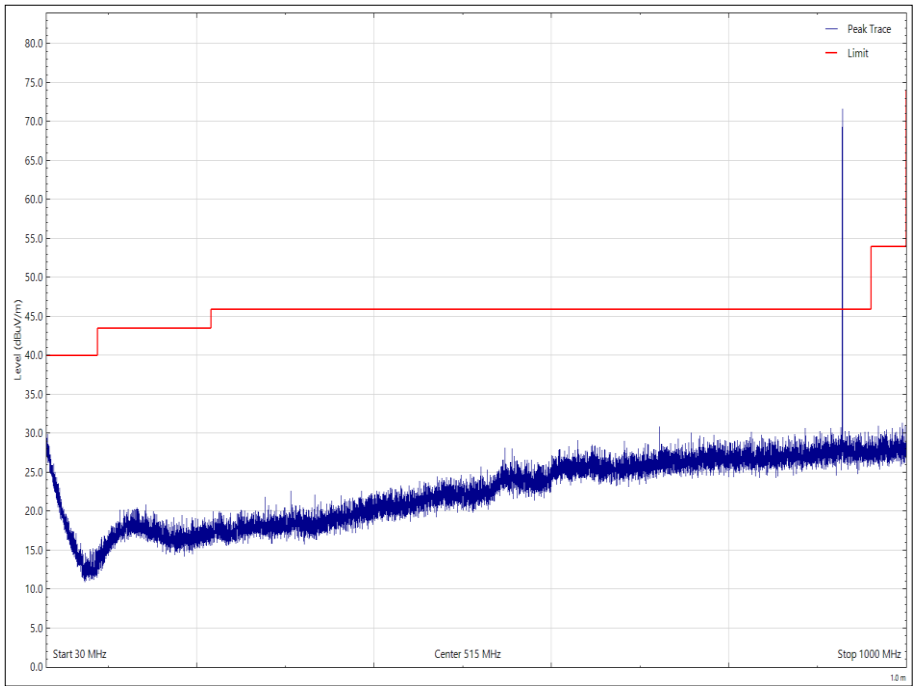

Figure 49 - 927.8 MHz - 30 MHz to 1 GHz - X Orientation, Horizontal

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

Table 38 - 927.8 MHz - 30 MHz to 1 GHz - X Orientation, Vertical

* No emissions were detected within 10 dB of the limit

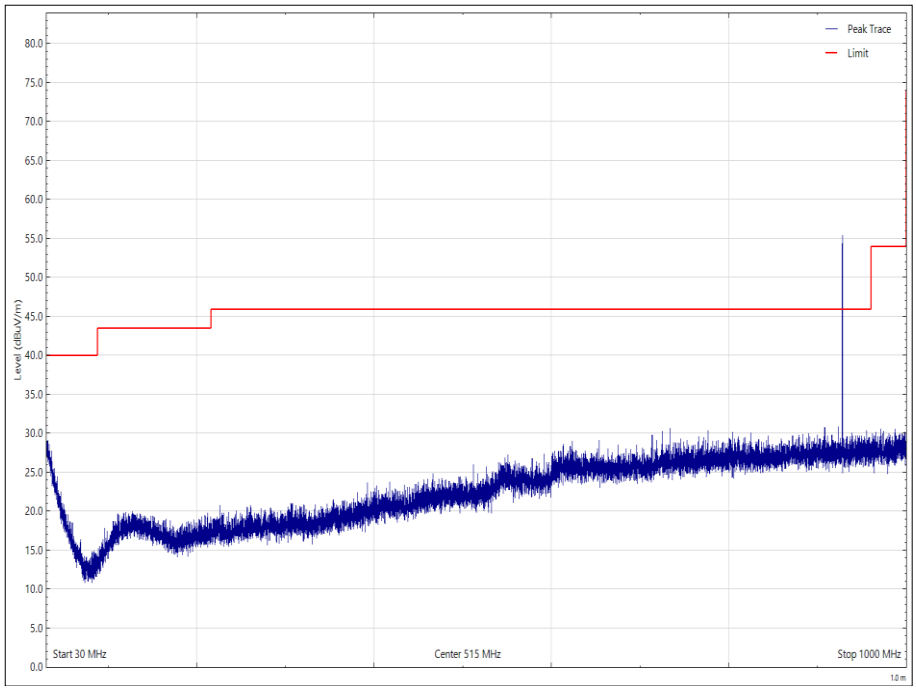

Figure 50 - 927.8 MHz - 30 MHz to 1 GHz - X Orientation, Vertical

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

Table 39 - 927.8 MHz - 30 MHz to 1 GHz - Y Orientation, Horizontal

* No emissions were detected within 10 dB of the limit

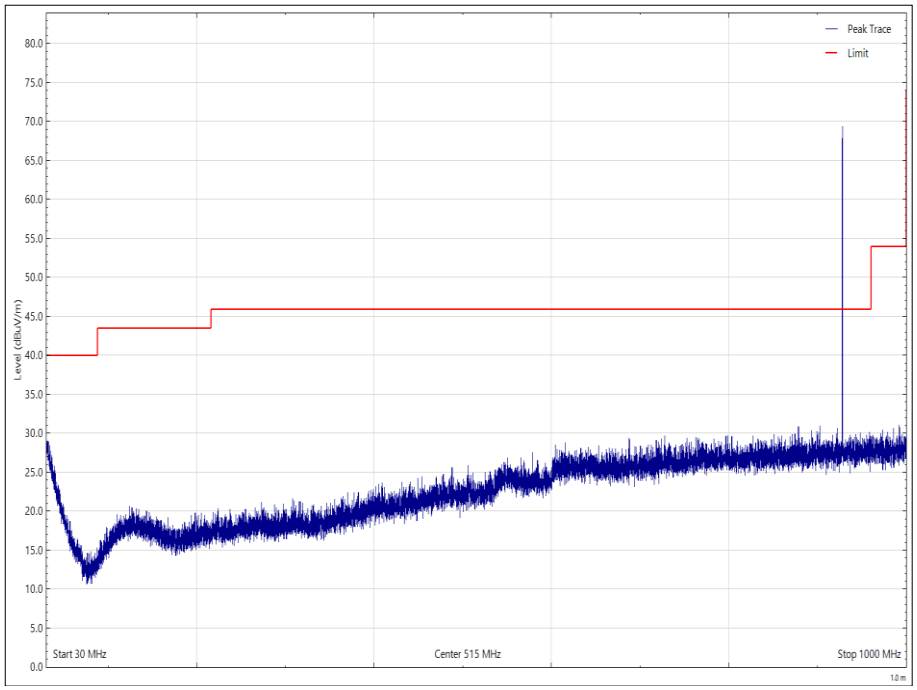

Figure 51 - 927.8 MHz - 30 MHz to 1 GHz - Y Orientation, Horizontal

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

Table 40 - 927.8 MHz - 30 MHz to 1 GHz - Y Orientation, Vertical

* No emissions were detected within 10 dB of the limit

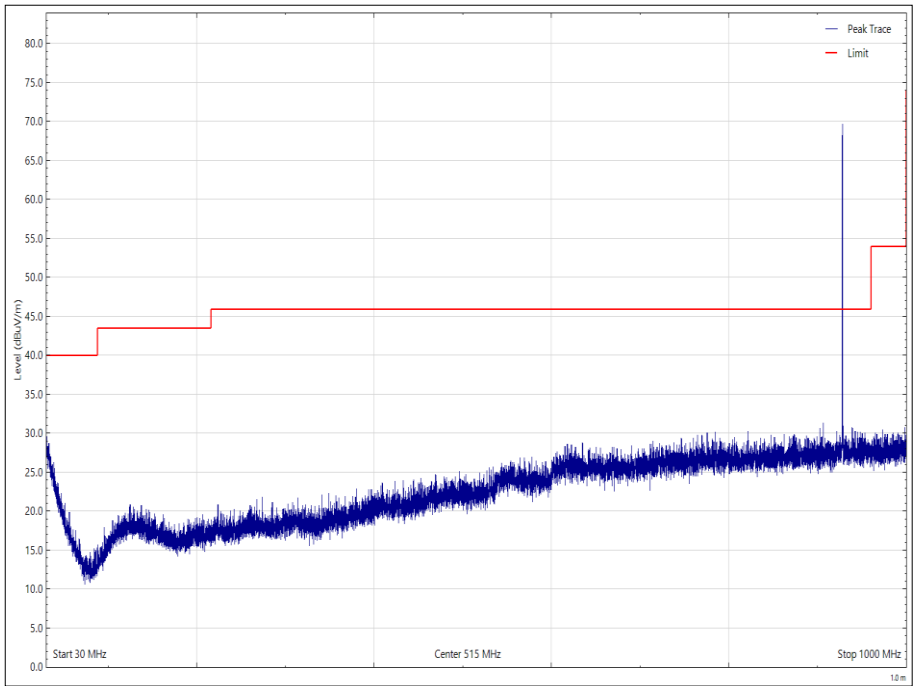

Figure 52 - 927.8 MHz - 30 MHz to 1 GHz - Y Orientation, Vertical

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

Table 41 - 927.8 MHz - 30 MHz to 1 GHz - Z Orientation, Horizontal

* No emissions were detected within 10 dB of the limit

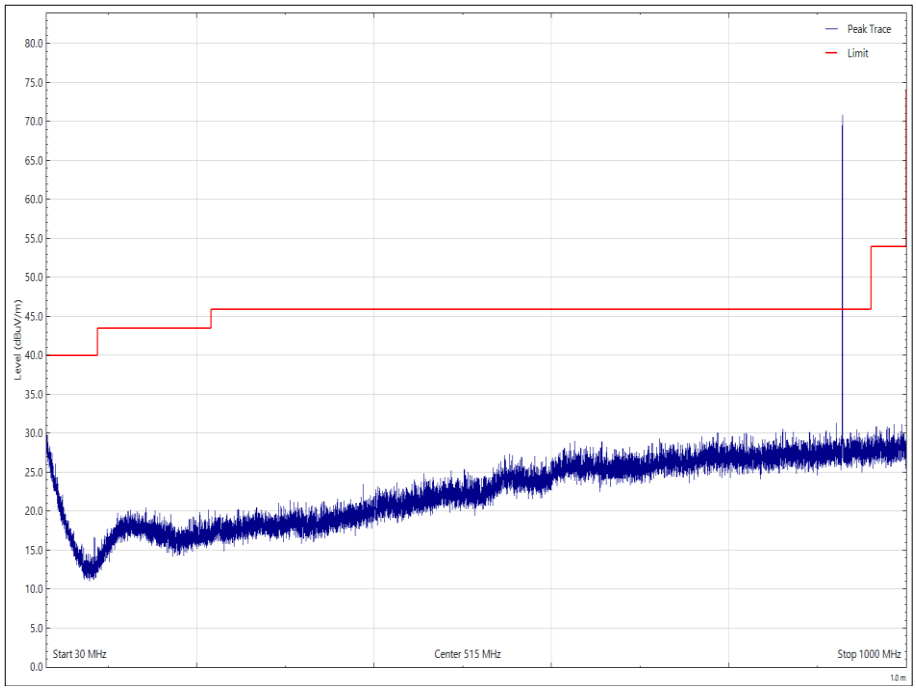

Figure 53 - 927.8 MHz - 30 MHz to 1 GHz - Z Orientation, Horizontal

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

Table 42 - 927.8 MHz - 30 MHz to 1 GHz - Z Orientation, Vertical

* No emissions were detected within 10 dB of the limit

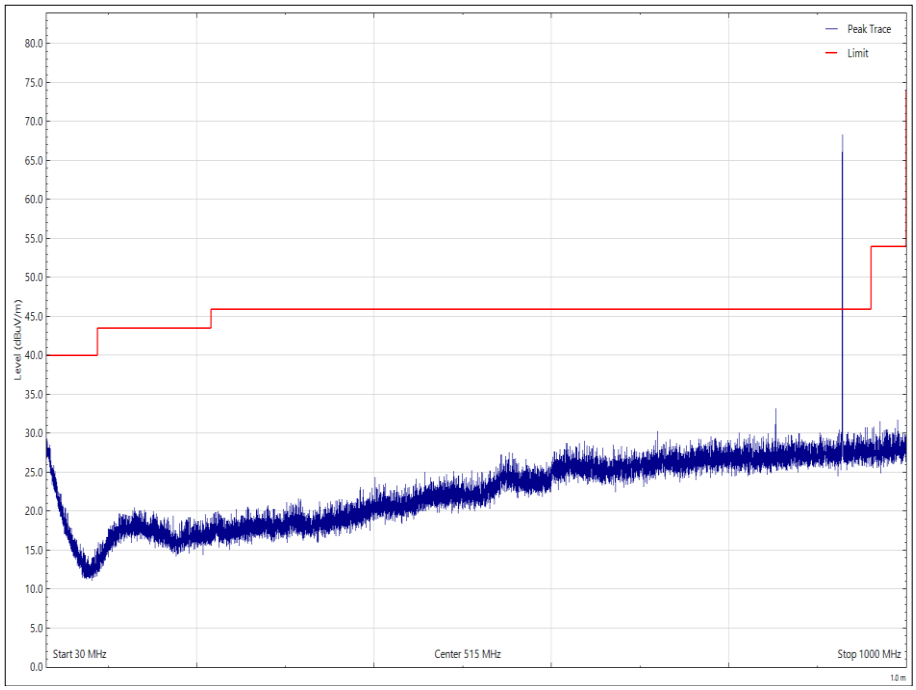

Figure 54 - 927.8 MHz - 30 MHz to 1 GHz - Z Orientation, Vertical

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

Table 43- 927.8 MHz - 1 GHz to 10 GHz - X Orientation

* No emissions were detected within 10 dB of the limit

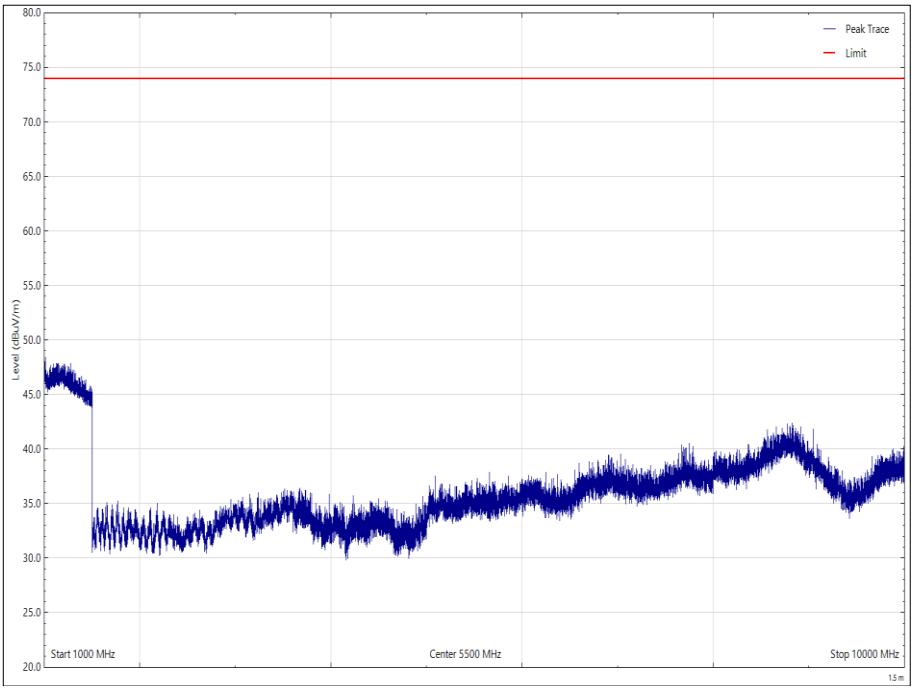

Figure 55 - 927.8 MHz - 1 GHz to 10 GHz - X Orientation - Vertical - Peak

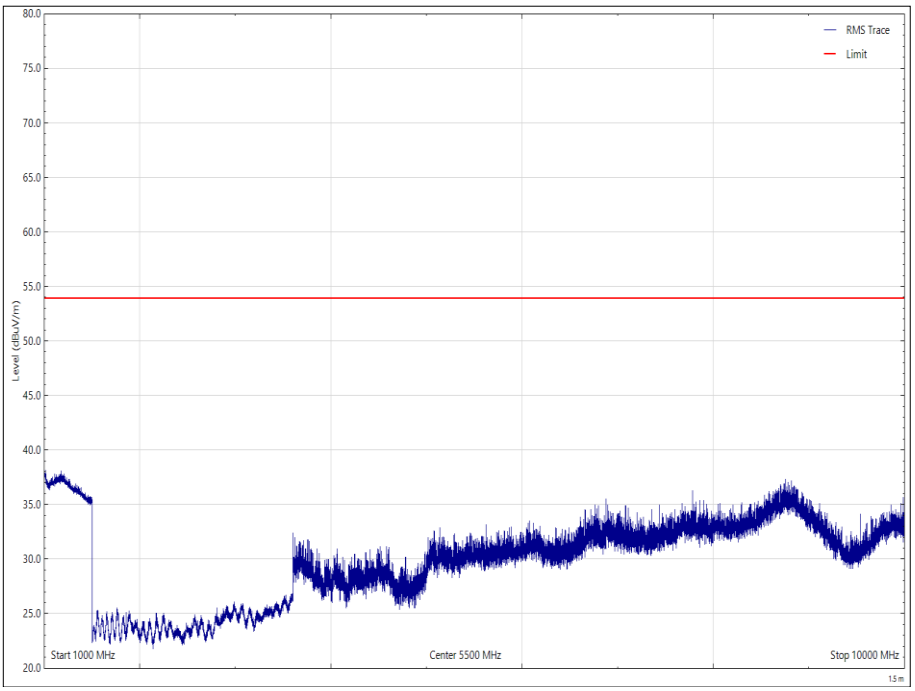

Figure 56 - 927.8 MHz - 1 GHz to 10 GHz - X Orientation - Vertical - Average

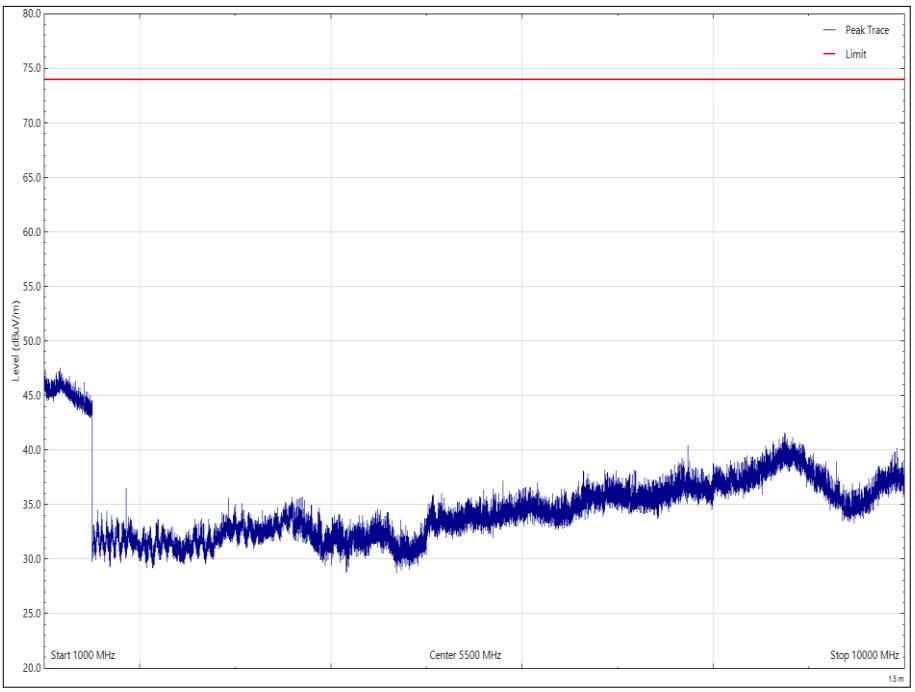

Figure 57 - 927.8 MHz - 1 GHz to 10 GHz - X Orientation - Horizontal - Peak

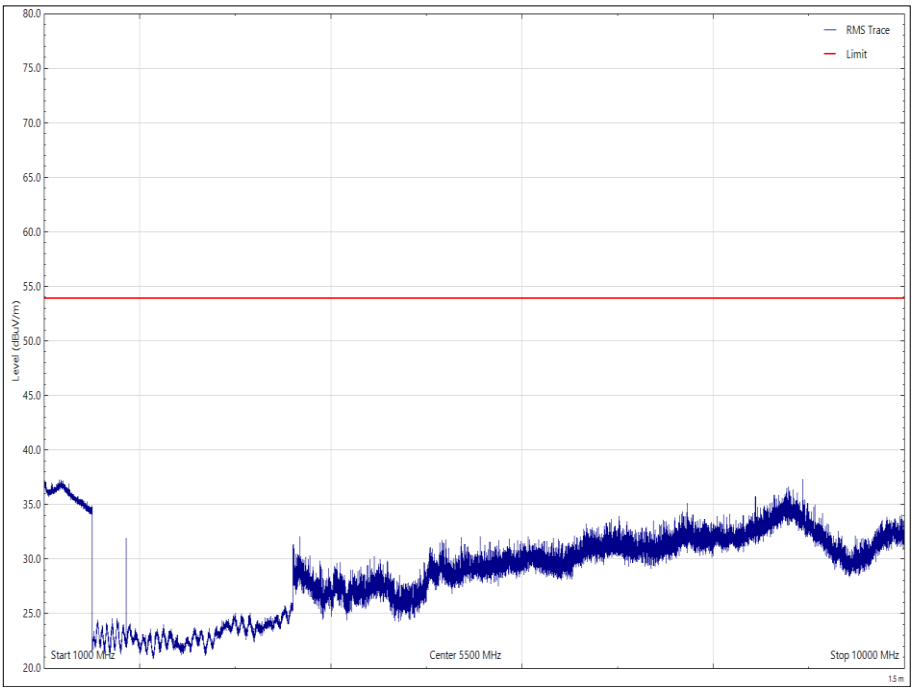

Figure 58 - 927.8 MHz - 1 GHz to 10 GHz - X Orientation - Horizontal - Average

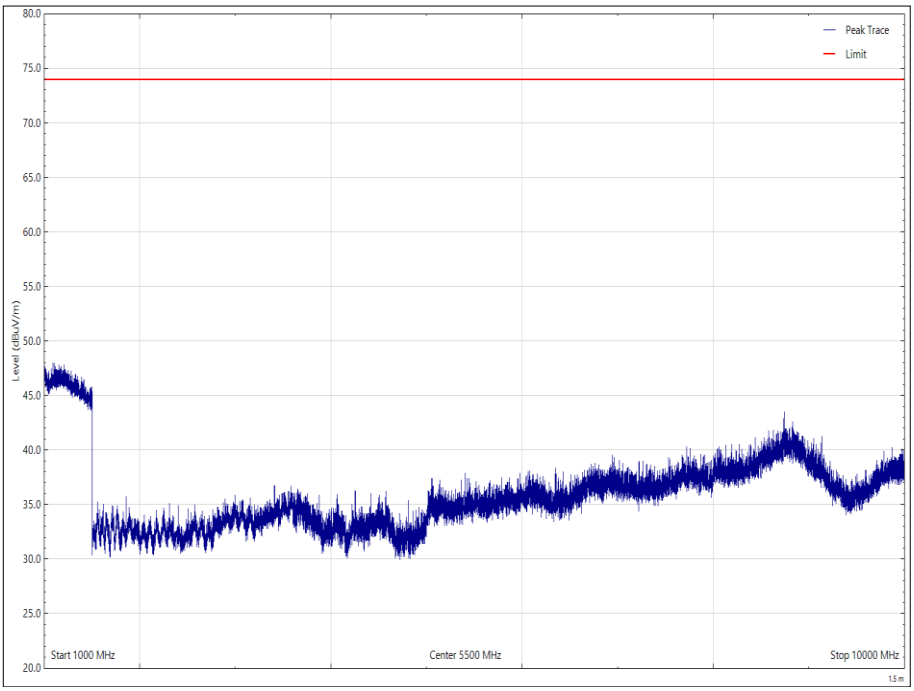

Figure 59 - 927.8 MHz - 1 GHz to 10 GHz - Y Orientation - Vertical - Peak

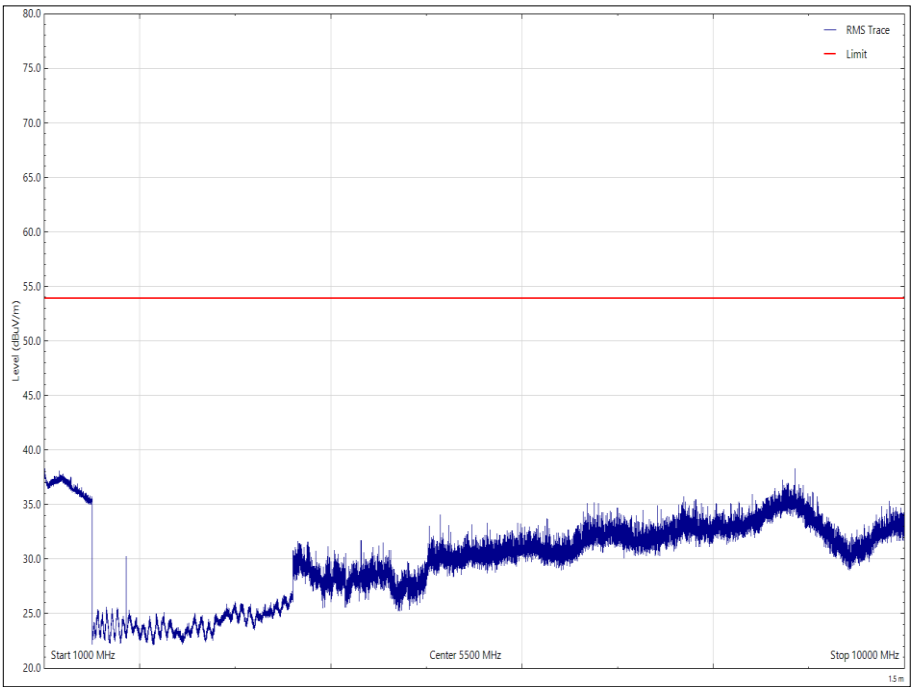

Figure 60 - 927.8 MHz - 1 GHz to 10 GHz - Y Orientation - Vertical - Average

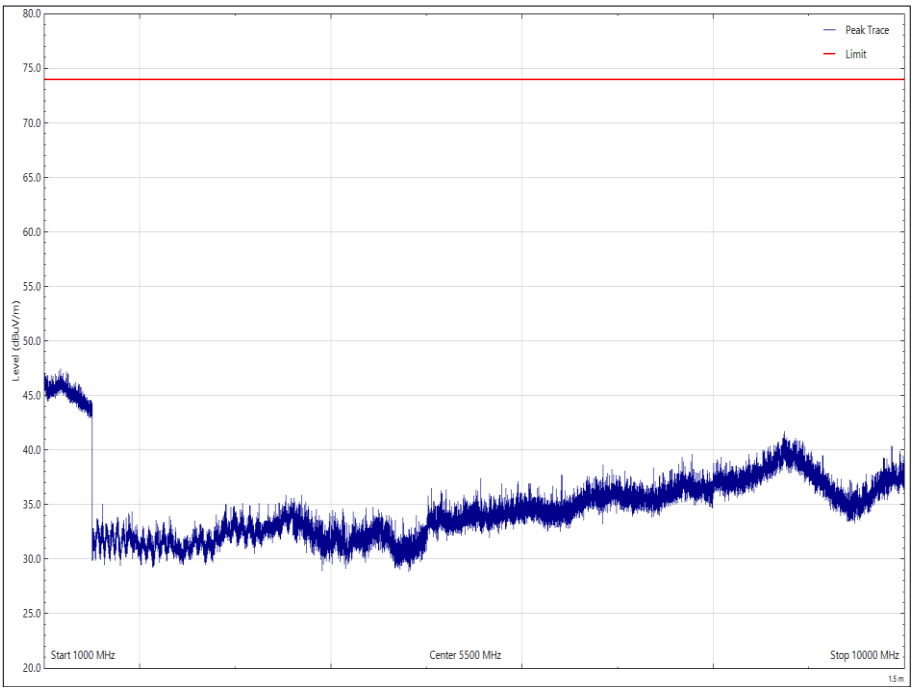

Figure 61 - 927.8 MHz - 1 GHz to 10 GHz - Y Orientation - Horizontal - Peak

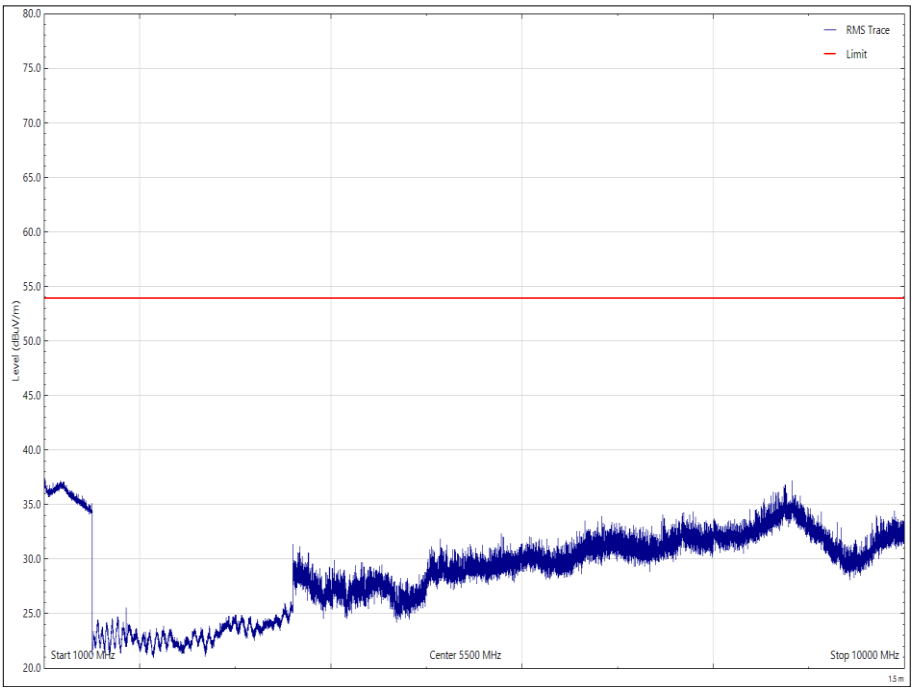

Figure 62 - 927.8 MHz - 1 GHz to 10 GHz - Y Orientation - Horizontal - Average

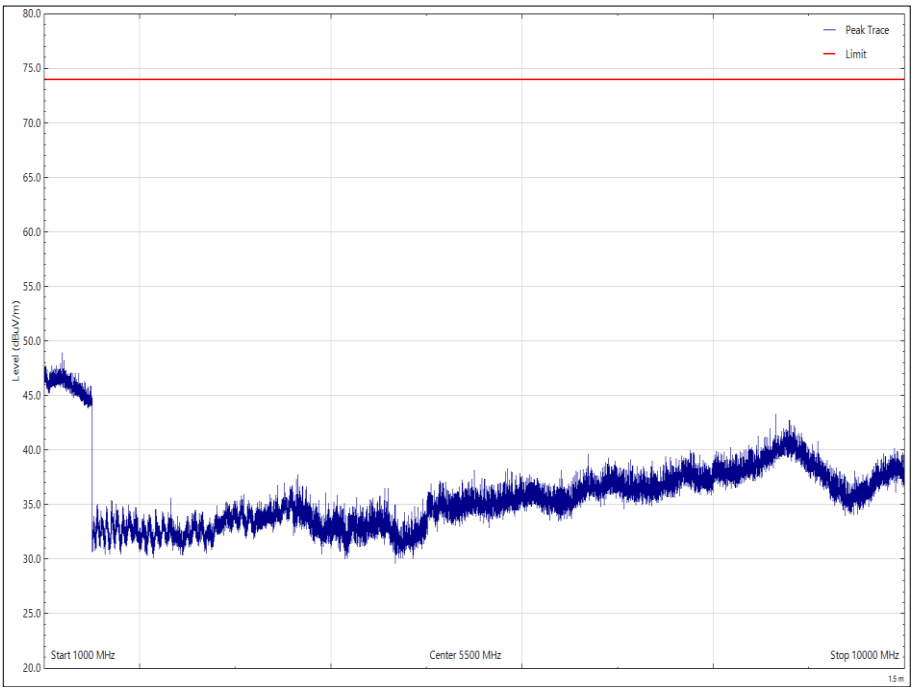

Figure 63 - 927.8 MHz - 1 GHz to 10 GHz - Z Orientation - Vertical - Peak

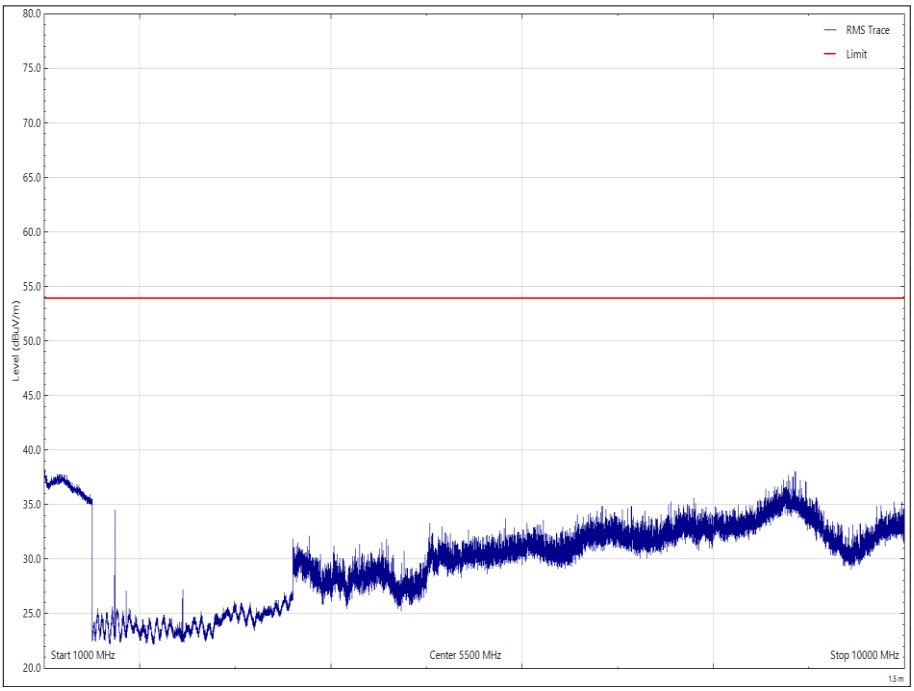

Figure 64 - 927.8 MHz - 1 GHz to 10 GHz - Z Orientation - Vertical - Average

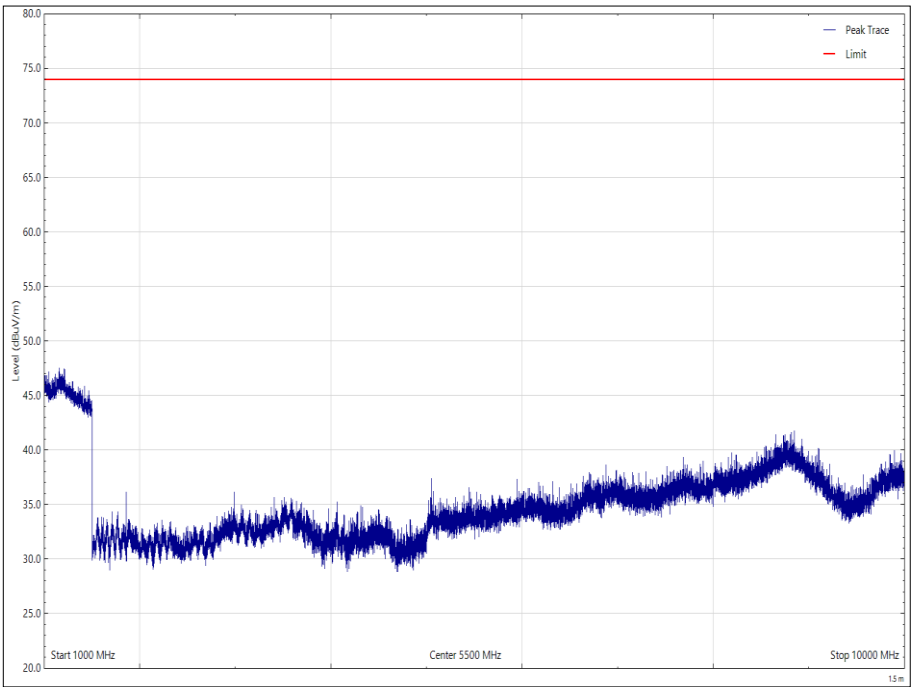

Figure 65 - 927.8 MHz - 1 GHz to 10 GHz - Z Orientation - Horizontal - Peak

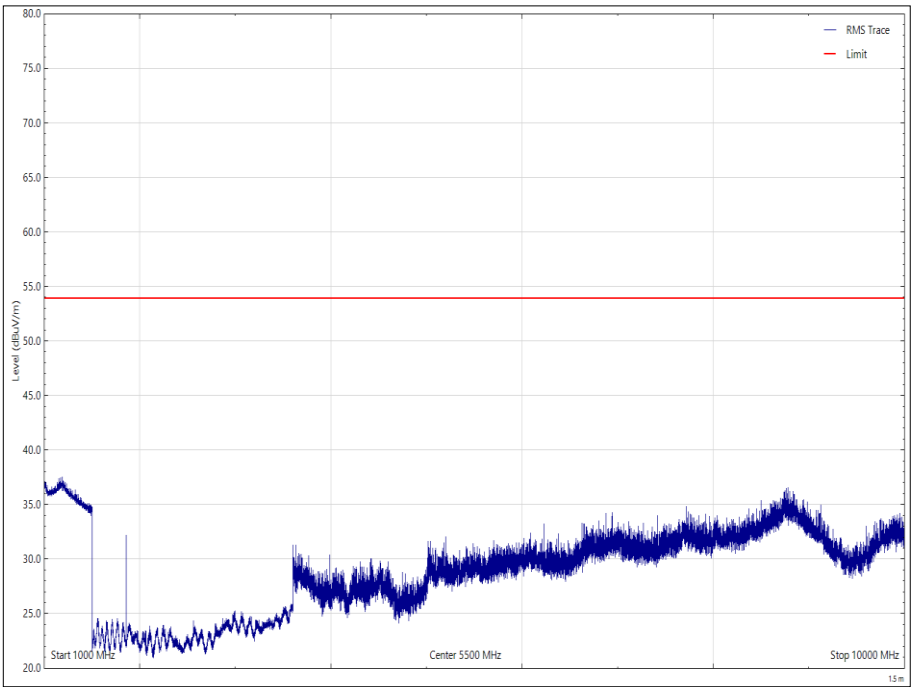

Figure 66 - 927.8 MHz - 1 GHz to 10 GHz - Z Orientation - Horizontal - Average

FCC 47 CFR Part 15C, Limit Clause 15.249 (d)

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in § 15.209, whichever is the lesser attenuation.

FCC 47 CFR Part 15C, Limit Clause 15.209

Frequency (MHz)	Field Strength (µV/m at 3 m)
30 to 88	100
88 to 216	150
216 to 960	200
Above 960	500

Table 44

ISED RSS-210, Limit Clause B.10

The field strength of fundamental and harmonic emissions, measured at 3 m, shall not exceed 50 mV/m and 0.5 mV/m respectively.

The field strength limits shall be measured using an average detector, except for the fundamental emission in the frequency band 902-928 MHz, which is based on measurements using an International Special Committee on Radio Interference (CISPR) quasi-peak detector.

Emissions radiated outside of the specified frequency bands, except for harmonic emissions, shall be attenuated by at least 50 dB below the level of the fundamental emissions or to the general field strength limits listed in RSS-Gen, whichever is less stringent.

ISED RSS-GEN, Limit Clause 8.9

Frequency (MHz)	Field Strength (µV/m at 3 m)
30 to 88	100
88 to 216	150
216 to 960	200
Above 960	500

Table 45

2.4.8 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 with permanent attenuator (Bilog)	Schaffner	CBL6143	287	24	14-Oct-2022
Comb Generator	Schaffner	RSG1000	3034	-	TU
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	18-Mar-2022
High Pass filter	Wainwright	WHKX12-1290-1500-18000-80SS	4961	12	25-Mar-2022
EmX Emissions Software	TUV SUD	V2.1.11 V.V2.1.11	5125	-	Software
1 Meter Cable	Teledyne	PR90-088-1MTR	5193	12	02-Aug-2022
Preamplifier (30dB 1GHz to 18GHz)	Schwarzbeck	BBV 9718 C	5350	12	21-Sep-2021
3.5 mm 2m Cable	Junkosha	MWX221-02000DMS	5428	12	15-Oct-2021
Thermo-Hygro-Barometer	PCE Instruments	PCE-THB-40	5481	12	31-Mar-2022
Broadband Horn Antenna (1-10 GHz)	Schwarzbeck	BBHA 9120 B	5611	12	22-Sep-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
Turntable	Maturo Gmbh	Turntable 1.5 SI-2t	5614	-	TU
3m Semi Anechoic Chamber	MVG	EMC-3	5621	36	11-Aug-2023
Cable Assembly - 18GHz 8m	Junkosha	MWX221-08000NMSNMS/B	5732	6	05-Feb-2022

Table 46

TU – Traceability Unscheduled

3 Photographs

3.1 Test Setup Photographs

Figure 67 - Test Setup - 30 MHz to 1 GHz - X Orientation

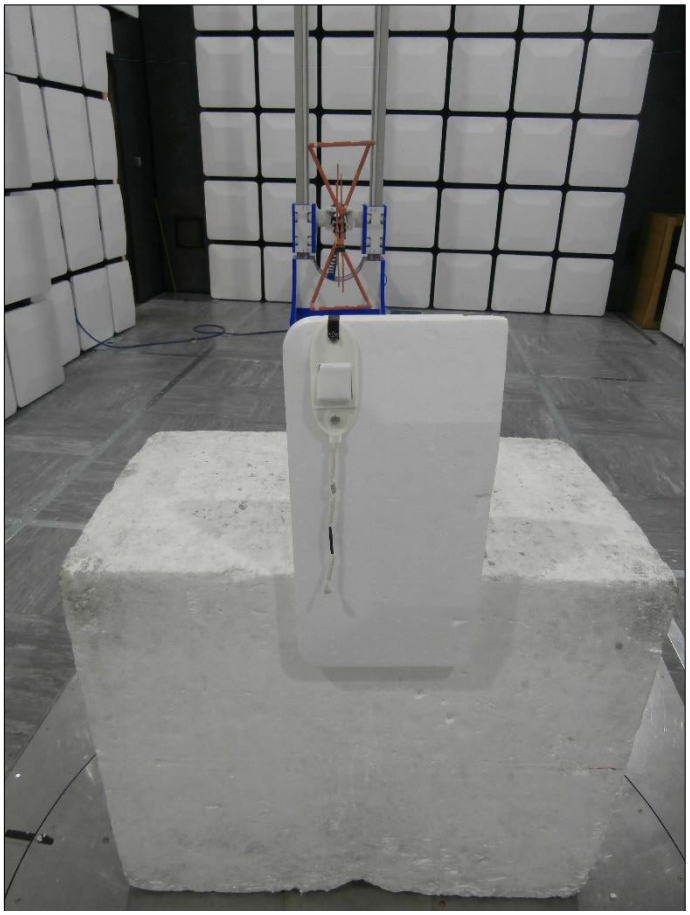

Figure 68 - Test Setup - 30 MHz to 1 GHz - Y Orientation

Figure 69 - Test Setup - 30 MHz to 1 GHz - Z Orientation

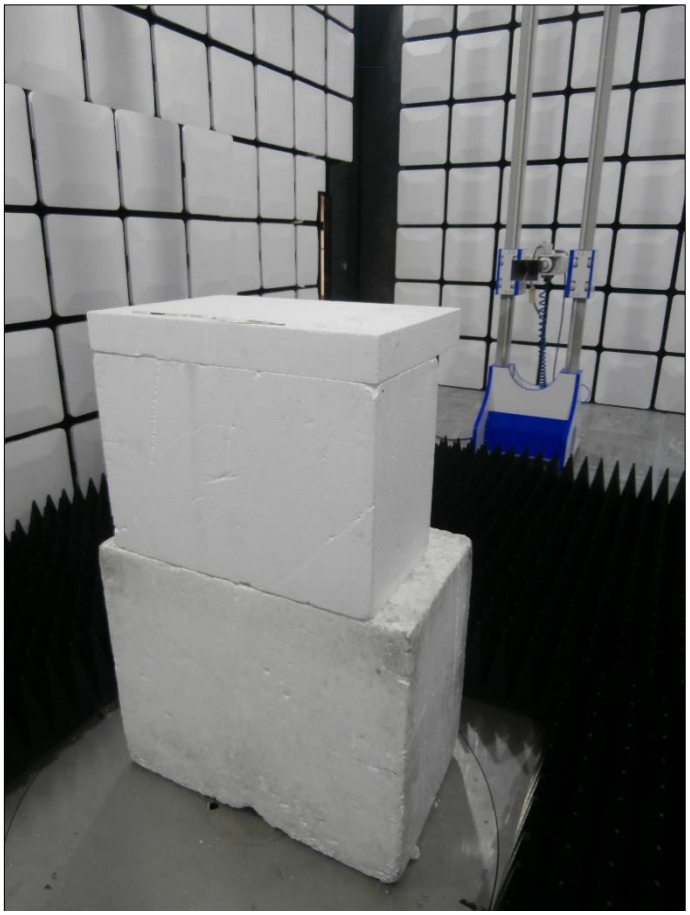

Figure 70 - Test Setup - 1 GHz to 10 GHz - X Orientation

Figure 71 - Test Setup - 1 GHz to 10 GHz - Y Orientation

Figure 72 - Test Setup - 1 GHz to 10 GHz - Z Orientation

4 Measurement Uncertainty

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

Test Name	Measurement Uncertainty
20 dB Bandwidth	± 5.07 kHz
Authorised Band Edges	Conducted: ± 3.08 dB Radiated: 30 MHz to 1 GHz: ± 5.1 dB Radiated: 1 GHz to 40 GHz: ± 6.3 dB
Field Strength of Fundamental	30 MHz to 1 GHz: ± 5.2 dB 1 GHz to 40 GHz: ± 6.3 dB
Field Strength of Emissions	30 MHz to 1 GHz: ± 5.2 dB 1 GHz to 40 GHz: ± 6.3 dB

Table 47

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.