FCC and ISED Test Report

Sensium Healthcare Ltd.
Base station, Model: Vitals Base Station US

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

Prepared for: Sensium Healthcare Ltd.
115 Olympic Avenue
Building 3, Milton Park
Abingdon, Oxfordshire
OX14 4SA
United Kingdom

Add value.
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FCC ID: AEJSH202075 IC: 27456-SH202075

COMMERCIAL-IN-CONFIDENCE

Document 75953351-02 Issue 01

SIGNATURE			
NAME	**JOB TITLE**	**RESPONSIBLE FOR**	**ISSUE DATE**
Steve Marshall	Senior Engineer	Authorised Signatory	21 December 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 and 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	21 December 2021	
Testing	Paul Dickson	21 December 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.

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	21-December-2021

Table 1

1.2 Introduction

Applicant	Sensium Healthcare Ltd.
Manufacturer	Sensium Healthcare Ltd.
Model Number(s)	Vitals Base Station US
Serial Number(s)	Not Serialised (FAR-0604952-002)
Hardware Version(s)	SH202075 v1.5
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	0000005831 14-September-2021
Date of Receipt of EUT	28-September-2021 and 17-December-2021
Start of Test	20-October-2021
Finish of Test	19-December-2021
Name of Engineer(s)	Graeme Lawler and Paul Dickson
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: DC Powered - Operating						
2.1	15.215 (c)	-	6.7	20 dB Bandwidth & 99% Occupied Bandwidth	Pass	
2.2	15.249 (a).	B.10 (a)	-	Field Strength of Fundamental	Pass	
2.3	15.249 (a)(d)	B.10 (a)	-	Field Strength of Emissions	Pass	
2.4	15.249 (d)	B.10 (b)	-	Authorised Band Edge	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 SH202075 SensiumVitals Base Station is a radio module that communicates with the Sensium Vitals Patch. It collects data from the patches over ISM band link and passes that data to the Sensium Vitals Bridge, into which it is integrated. The Bridge takes the data and forwards it to the Sensium Servers for processing.
Manufacturer:	Sensium
Model:	Vitals Base Station US
Part Number:	SH202075
Hardware Version:	SH202075 v1.5
Software Version:	PAT_US_915MHz_64K_P_CUS1_FW1-0-6
FCC ID of the product under test – see guidance here	AEJSH202075
IC ID of the product under test – see guidance here	27456-SH202075

Table 3

Intentional Radiators

Technology	Proprietary					
Frequency Range (MHz to MHz)	902-928 MHz					
Conducted Declared Output Power (dBm)	-4 dBm					
Antenna Gain (dBi)	-3 (internal chip antenna)					
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)	902.6					
Middle Frequency (MHz)	915.0					
Top Frequency (MHz)	927.4					

Table 4

Un-intentional Radiators

Highest frequency generated or used in the device or on which the device operates or tunes	
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

AC Power Source

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

Table 6

DC Power Source

Nominal voltage:	3.3	V
Extreme upper voltage:	3.6	V
Extreme lower voltage:	3.2	V
Max current:		A

Table 7

Battery Power Source

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

Table 8

Charging

Can the EUT transmit whilst being charged	Yes ☐ No ☒

Table 9

Temperature

Minimum temperature:		°C
Maximum temperature:		°C

Table 10

Cable Loss

Adapter Cable Loss (Conducted sample)		dB

Table 11

Antenna Characteristics

Antenna connector ☐			State impedance		Ohm
Temporary antenna connector ☐			State impedance		Ohm
Integral antenna ☒	Type:	Monopole chip ant.	Gain	-3	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 12

Ancillaries (if applicable)

Manufacturer:		Part Number:	
Model:		Country of Origin:	

Table 13

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

Name: Paul Dodds
Position held: RF Compliance Engineer
Date: 23rd September 2021

1.5 Product Information

1.5.1 Technical Description

The SH202075 SensiumVitals Base Station is a radio module that communicates with the Sensium Vitals Patch. It collects data from the patches over ISM band link and passes that data to the Sensium Vitals Bridge, into which it is integrated.

The Bridge takes the data and forwards it to the Sensium Servers for processing.

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 Base Station US, Serial Number: Not serialised (FAR-0604952-002)			
0	As supplied by the customer	Not Applicable	Not Applicable
1	Software setting re-configured to select 902.6 MHz as the bottom channel and 927.4 MHz as the top channel.	Graeme Lawler	19-Dec-2021

Table 14

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: DC Powered - Operating		
20 dB Bandwidth & 99% Occupied Bandwidth	Graeme Lawler	UKAS
Field Strength of Fundamental	Graeme Lawler	UKAS
Field Strength of Emissions	Paul Dickson and Graeme Lawler	UKAS
Authorised Band Edge	Graeme Lawler	UKAS

Table 15

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 Base Station US, S/N: Not serialised (FAR-0604952-002) - Modification State 1

2.1.3 Date of Test

19-December-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	24.2 °C
Relative Humidity	29.4 %

2.1.6 Test Results

DC Powered - Operating

Frequency (MHz)	20 dB Bandwidth (Hz)	99% Occupied Bandwidth (Hz)	F_{LOWER} (MHz)	F_{UPPER} (MHz)
902.6	172275	180500.000	902.518500000	902.699000000
915.0	174679	209134.615	914.919871795	915.094551000
927.4	173878	180000.000	927.321141026	927.495019000

Table 16

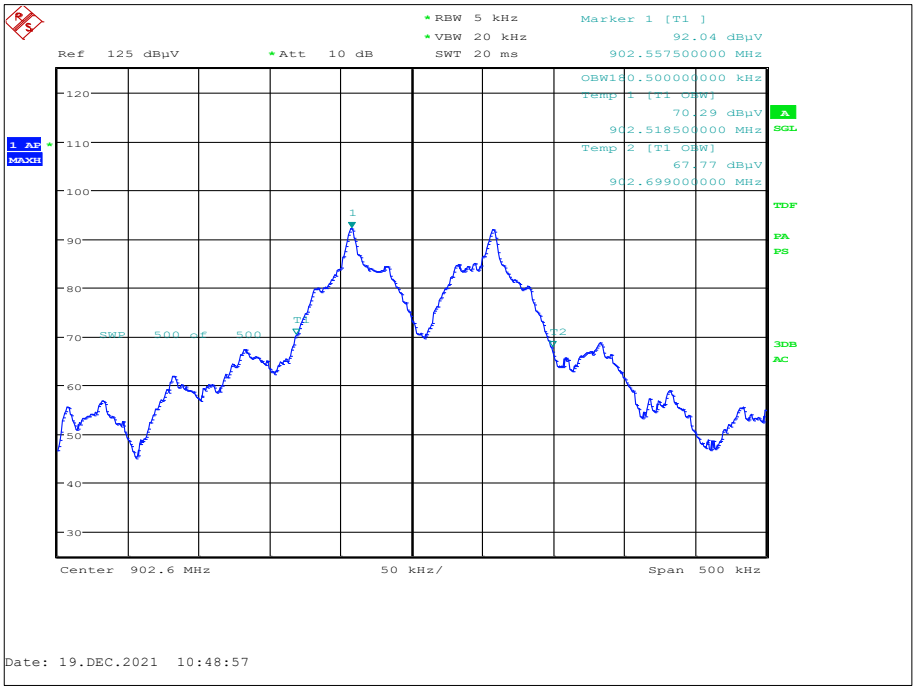

Figure 1 – 902.6 MHz, 99% Occupied Bandwidth

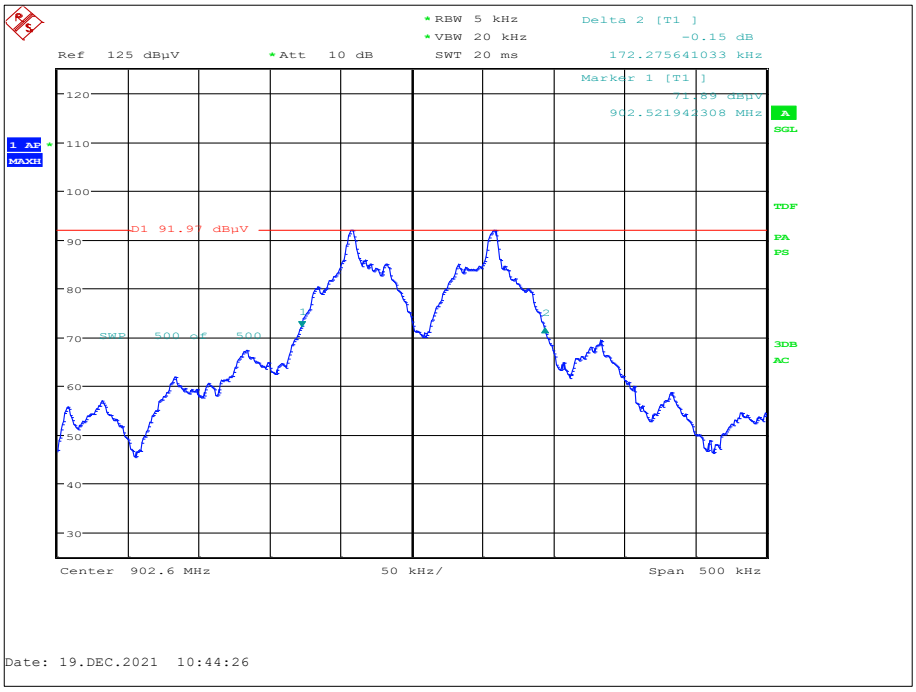

Figure 2 – 902.6 MHz, 20 dB Bandwidth

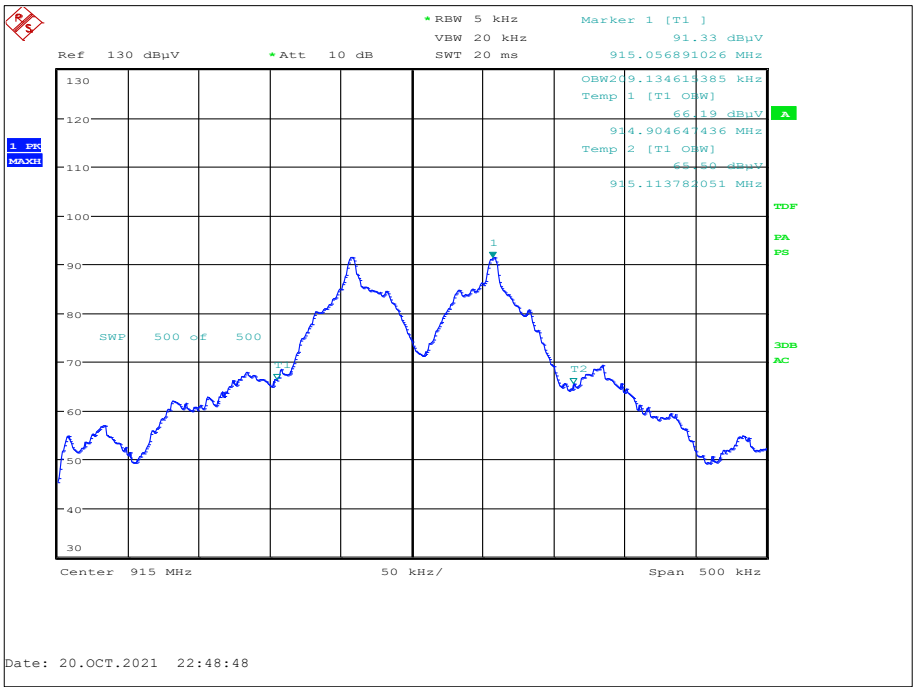

Figure 3 – 915.0 MHz 99%Occupied Bandwidth

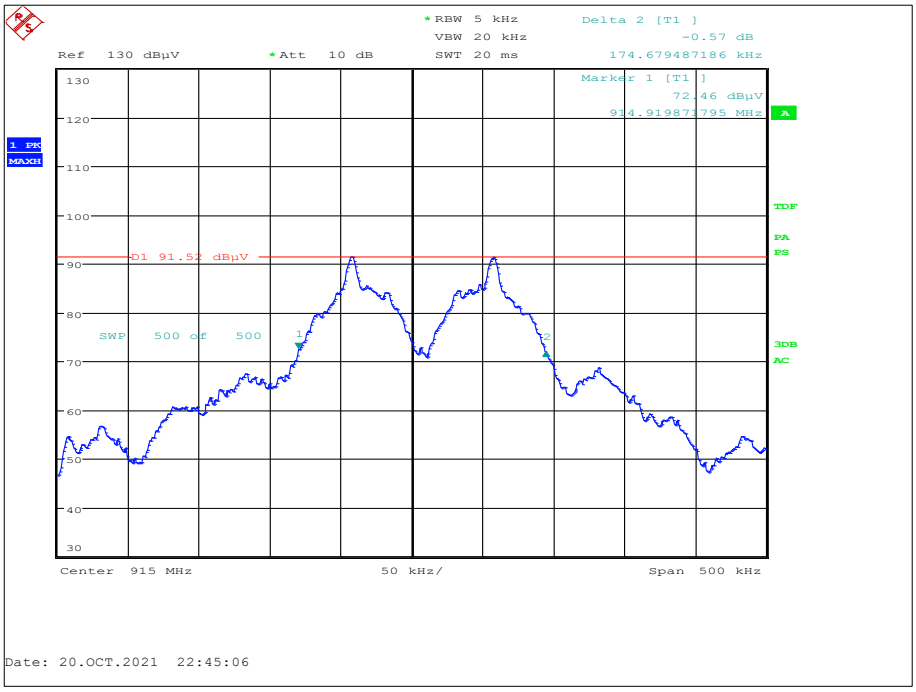

Figure 4 – 915.0 MHz, 20 dB Bandwidth

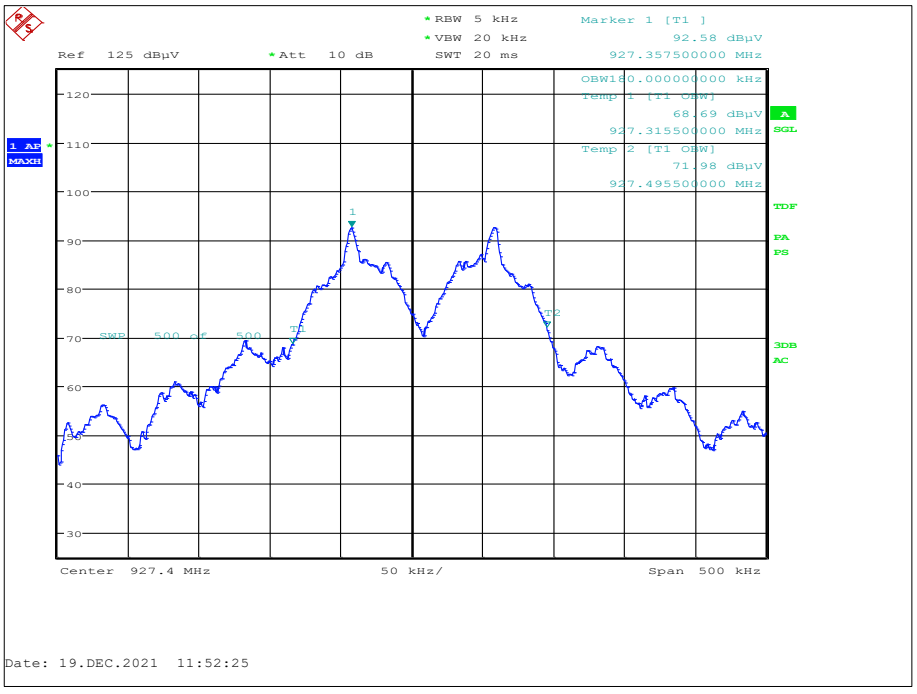

Figure 5 – 927.4 MHz, 99% Occupied Bandwidth

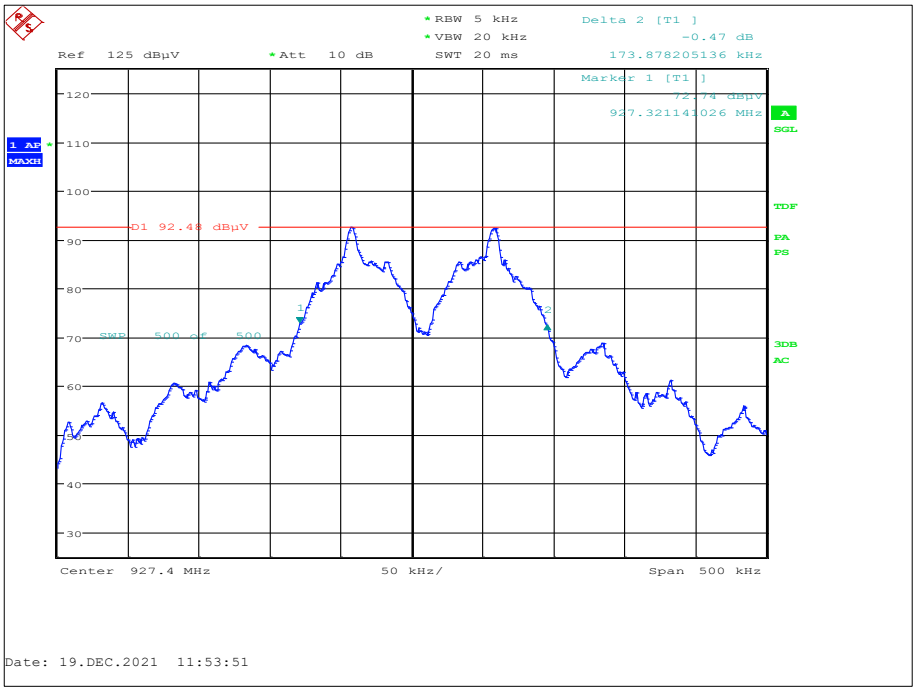

Figure 6 – 927.4 MHz, 20 dB Bandwidth

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 Expires
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
Antenna with attenuator (Bilog, 30 MHz to 3 GHz)	Schaffner	CBL6143	287	24	14-Oct-2022
Comb Generator	Schaffner	RSG1000	3034	-	TU
Test Receiver	Rohde & Schwarz	ESU40	3506	12	18-Mar-2022
Multimeter	Fluke	177	3832	12	08-Jul-2022
Cable (K-Type to K-Type, 2 m)	Scott Cables	KPS-1501-2000-KPS	4526	6	06-Mar-2022
Emissions Software	TUV SUD	EmX V2.1.11	5125	-	Software
Cable (N-Type to N-Type, 8 m)	Teledyne	PR90-088-8MTR	5450	6	08-Mar-2022
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	Maturo Gmbh	TAM 4.0-P	5613	-	TU
Turntable	Maturo Gmbh	Turntable 1.5 SI-2t	5614	-	TU
Screened Room (12)	MVG	EMC-3	5621	36	11-Aug-2023

Table 17

TU - Traceability Unscheduled
O/P Mon – Output Monitored using calibrated equipment

2.2 Field Strength of Fundamental

2.2.1 Specification Reference

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

2.2.2 Equipment Under Test and Modification State

Vitals Base Station US, S/N: Not serialised (FAR-0604952-002) - Modification State 1

2.2.3 Date of Test

19-December-2021

2.2.4 Test Method

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

Note: Final measurements recorded in the table below were taken using a Quasi-Peak detector.

2.2.5 Environmental Conditions

Ambient Temperature	24.2 °C
Relative Humidity	29.4 %

2.2.6 Test Results

DC Powered - Operating

Frequency MHz	Field Strength (dBµv/m)	
	Quasi-Peak	Average
902.6	92.50	N/A
915.0	92.58	N/A
927.4	92.00	N/A

Table 18 - Fundamental Field Strength Results

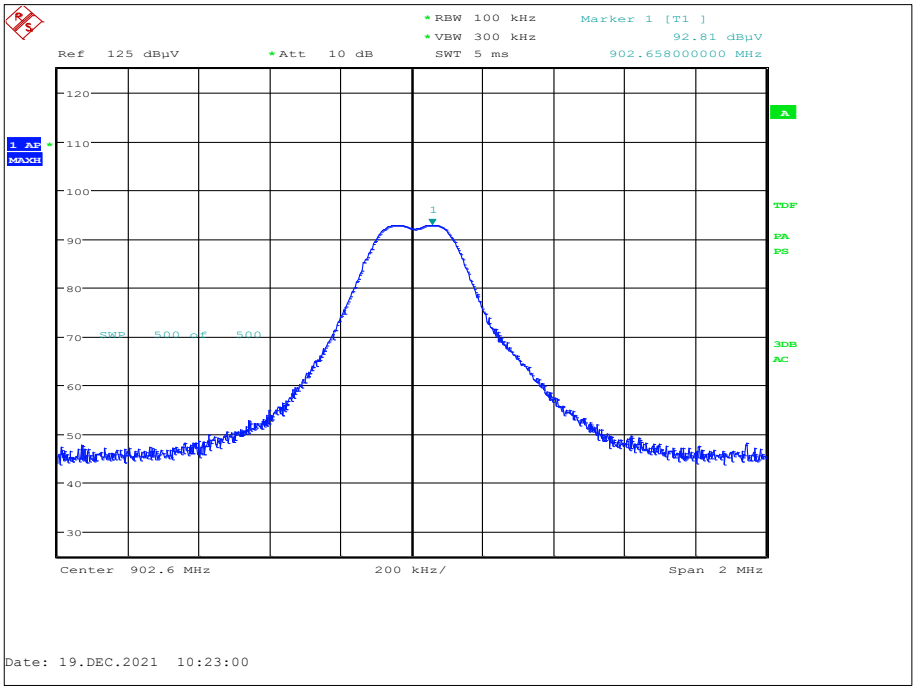

Figure 7 - 902.6 MHz, Peak

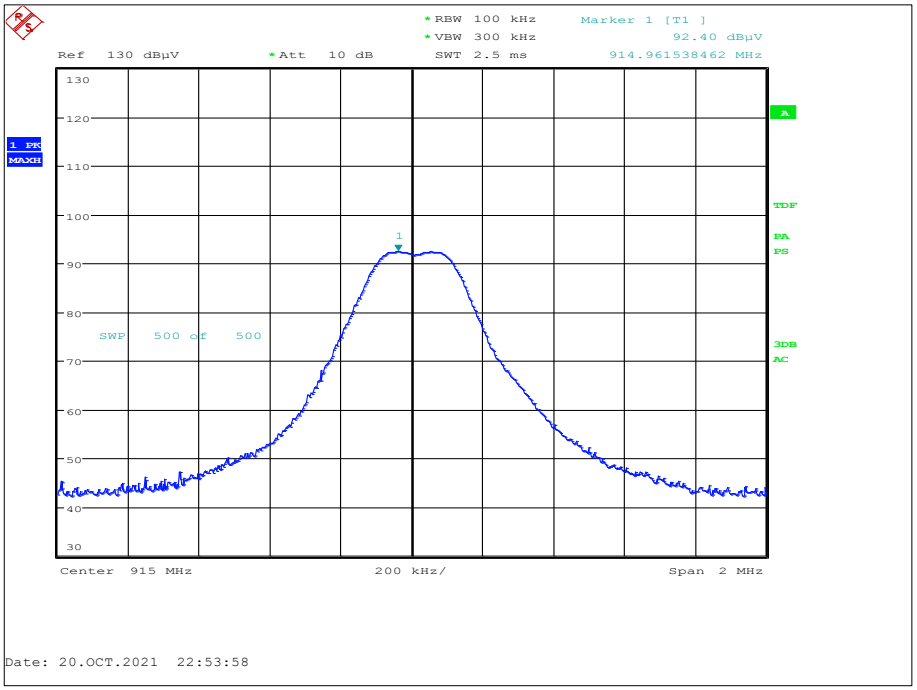

Figure 8 – 915.0 MHz, Peak

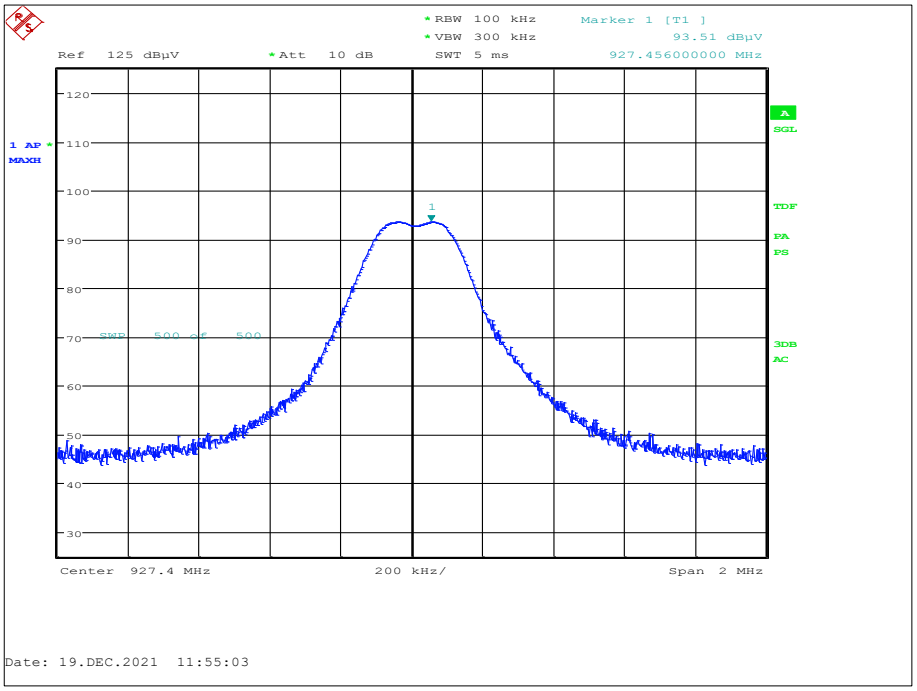

Figure 9 - 927.4 MHz, Peak

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

Fundamental Frequency (MHz)	Field Strength of Fundamental (mV/m)	Field Strength of Fundamental (dBµV/m at 3m)
902 to 928	50	93.98
2400 to 2483.5	50	93.98
5725 to 5875	50	93.98
24000 to 24250	250	107.96

Table 19

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.

2.2.7 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
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
Antenna with attenuator (Bilog, 30 MHz to 3 GHz)	Schaffner	CBL6143	287	24	14-Oct-2022
Comb Generator	Schaffner	RSG1000	3034	-	TU
Test Receiver	Rohde & Schwarz	ESU40	3506	12	18-Mar-2022
Multimeter	Fluke	177	3832	12	08-Jul-2022
Cable (K-Type to K-Type, 2 m)	Scott Cables	KPS-1501-2000-KPS	4526	6	06-Mar-2022
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Cable (N-Type to N-Type, 8 m)	Teledyne	PR90-088-8MTR	5450	6	08-Mar-2022
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	Maturo Gmbh	TAM 4.0-P	5613	-	TU
Turntable	Maturo Gmbh	Turntable 1.5 SI-2t	5614	-	TU
Screened Room (12)	MVG	EMC-3	5621	36	11-Aug-2023

Table 20

TU - Traceability Unscheduled
O/P Mon – Output Monitored using calibrated equipment

2.3 Field Strength of Emissions

2.3.1 Specification Reference

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

2.3.2 Equipment Under Test and Modification State

Vitals Base Station US, S/N: Not serialised (FAR-0604952-002) - Modification State 0

2.3.3 Date of Test

20-October-2021 to 21-October-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 EUT was placed on the non-conducting platform in a manner typical of a normal installation.

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.

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

2.3.5 Example Test Setup Diagram

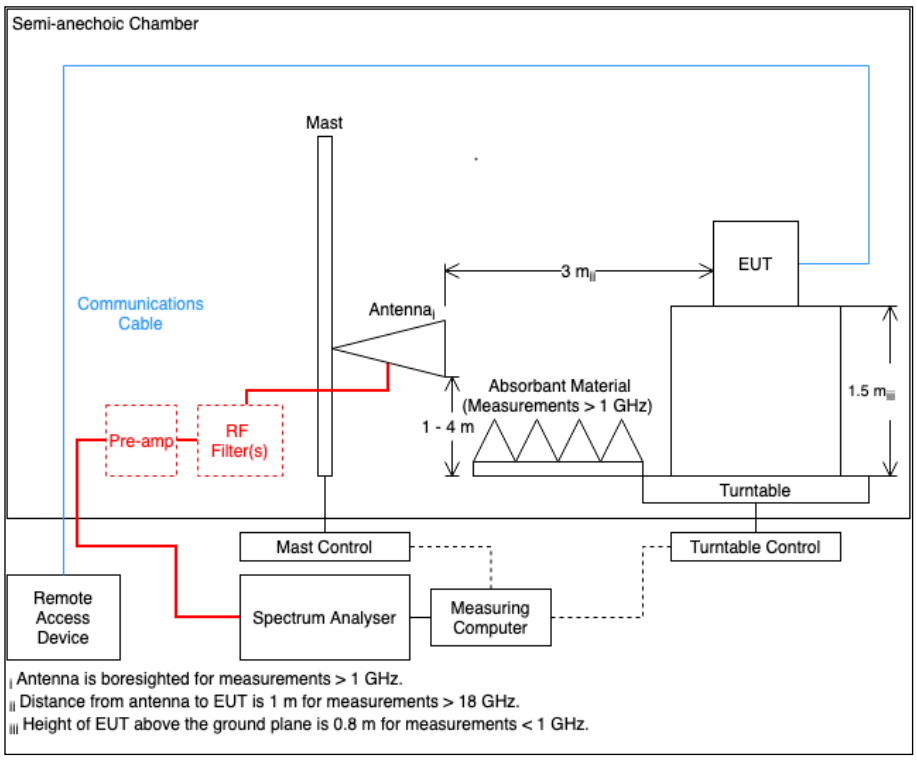

Figure 10

2.3.6 Environmental Conditions

Ambient Temperature	19.3 - 26.9 °C
Relative Humidity	39.9 - 61.2 %

2.3.7 Test Results

DC Powered - Operating

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

Table 21 - 902.2 MHz - 30 MHz to 1 GHz, Vertical

No emissions were detected within 10 dB of the limit.

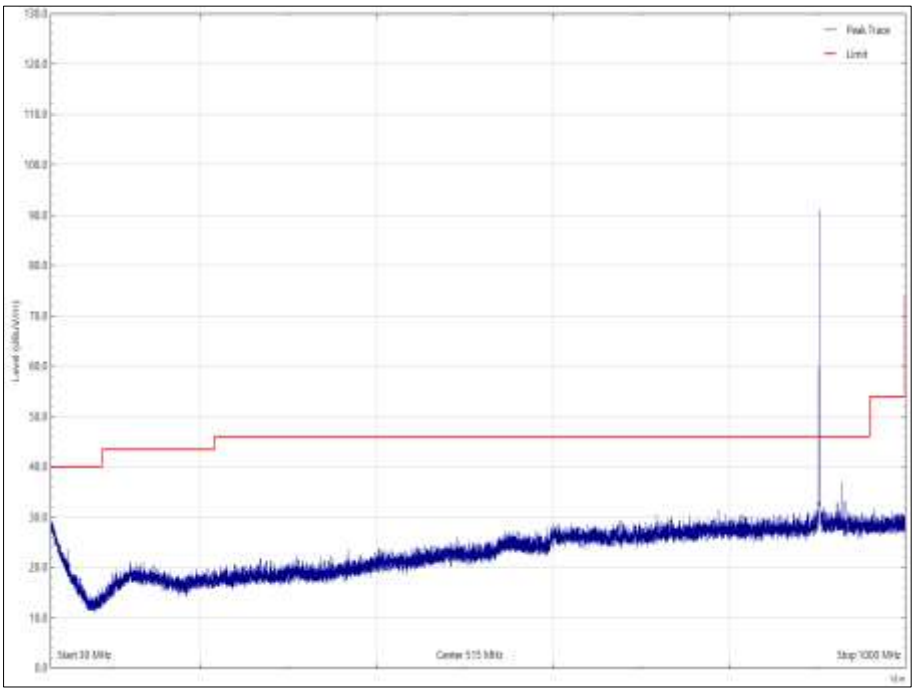

Figure 11 - 902.2 MHz - 30 MHz to 1 GHz, Vertical

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

Table 22 - 902.2 MHz - 30 MHz to 1 GHz, Horizontal

No emissions were detected within 10 dB of the limit.

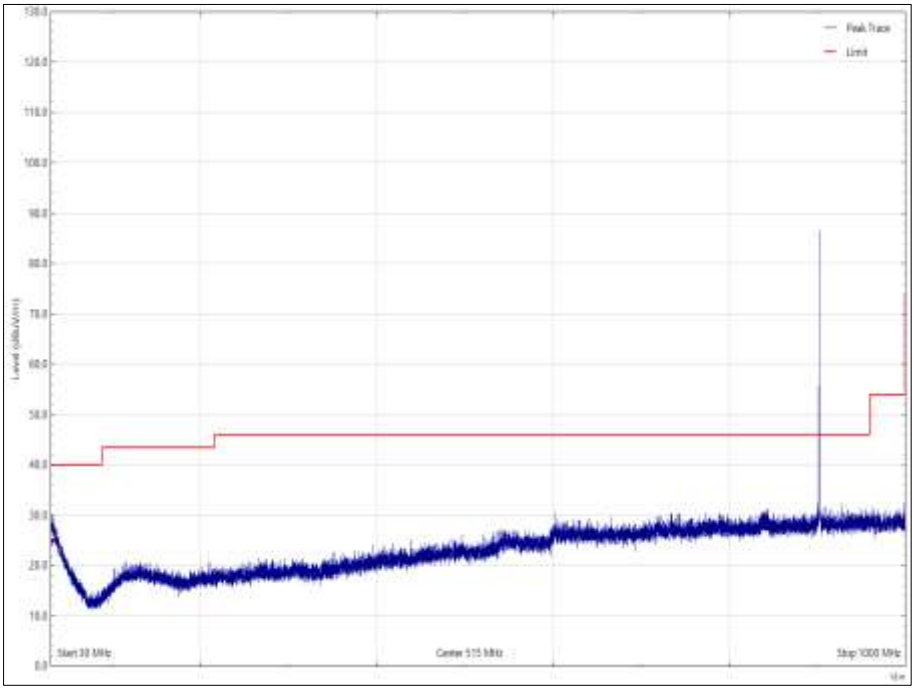

Figure 12 - 902.2 MHz - 30 MHz to 1 GHz, Horizontal

Frequency (MHz)	Final Peak (dBµV/m)	Final Average (dBµV/m)	Final Peak (µV/m)	Final Average (µV/m)	Angle (°)	Height (m)	Polarisation
*							

Table 23 - 902.2 MHz - 1 GHz to 10 GHz

No emissions were detected within 10 dB of the limit.

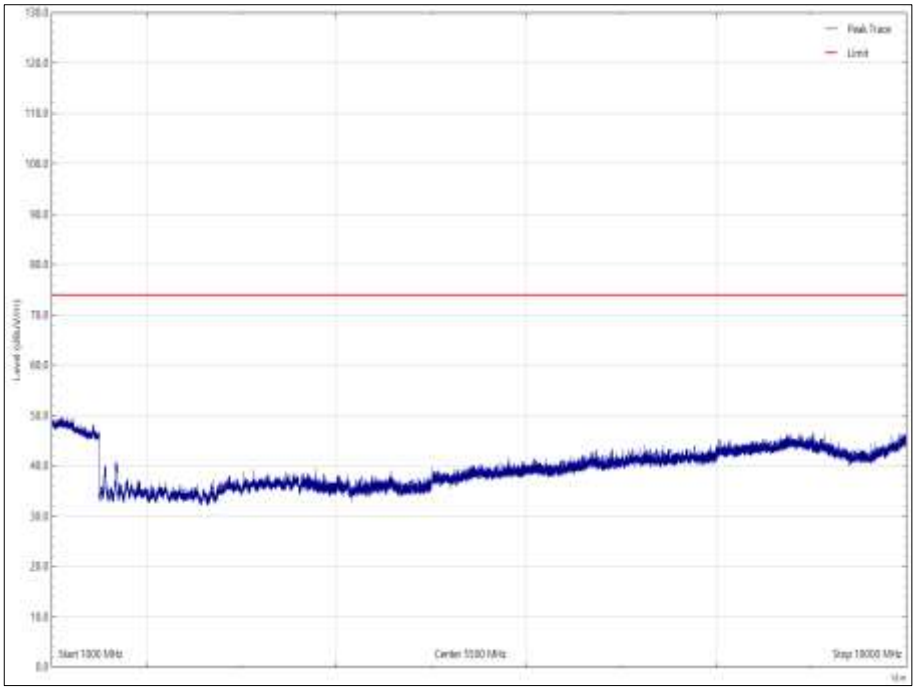

Figure 13 - 902.2 MHz - 1 GHz to 10 GHz - Vertical Peak

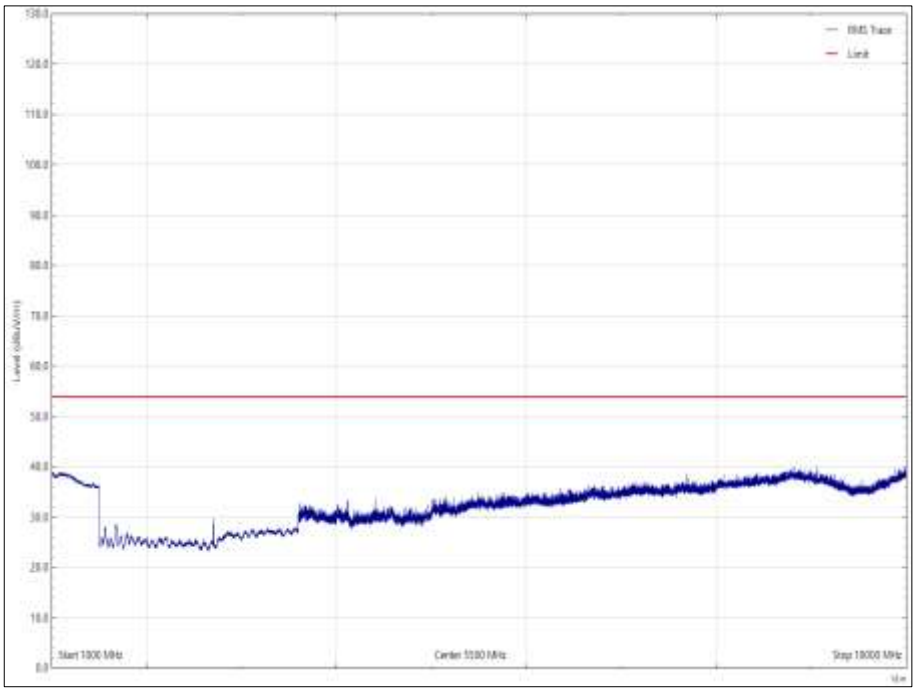

Figure 14 - 902.2 MHz - 1 GHz to 10 GHz - Vertical Average

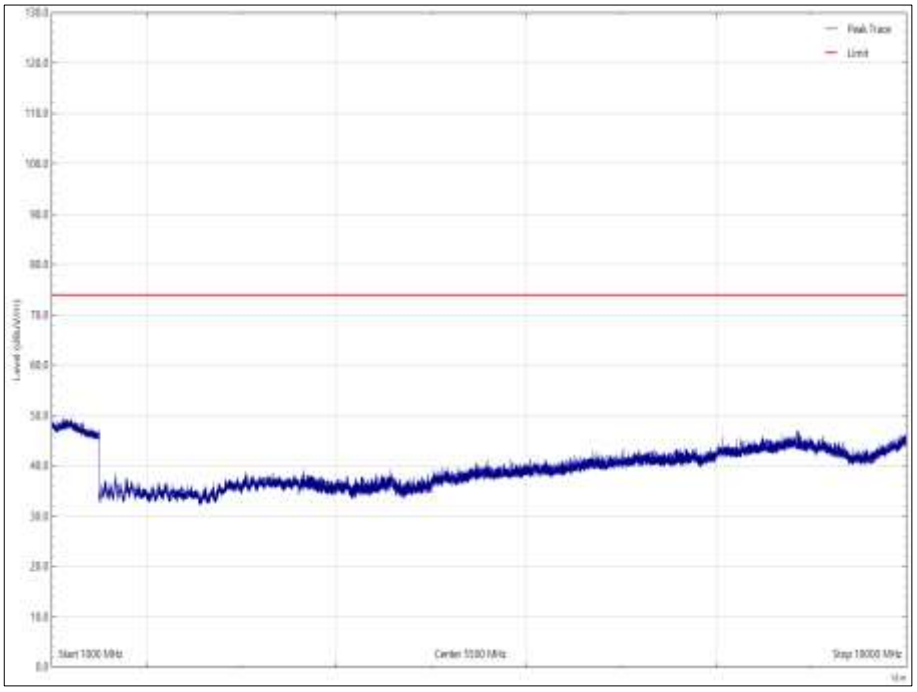

Figure 15 - 902.2 MHz - 1 GHz to 10 GHz - Horizontal Peak

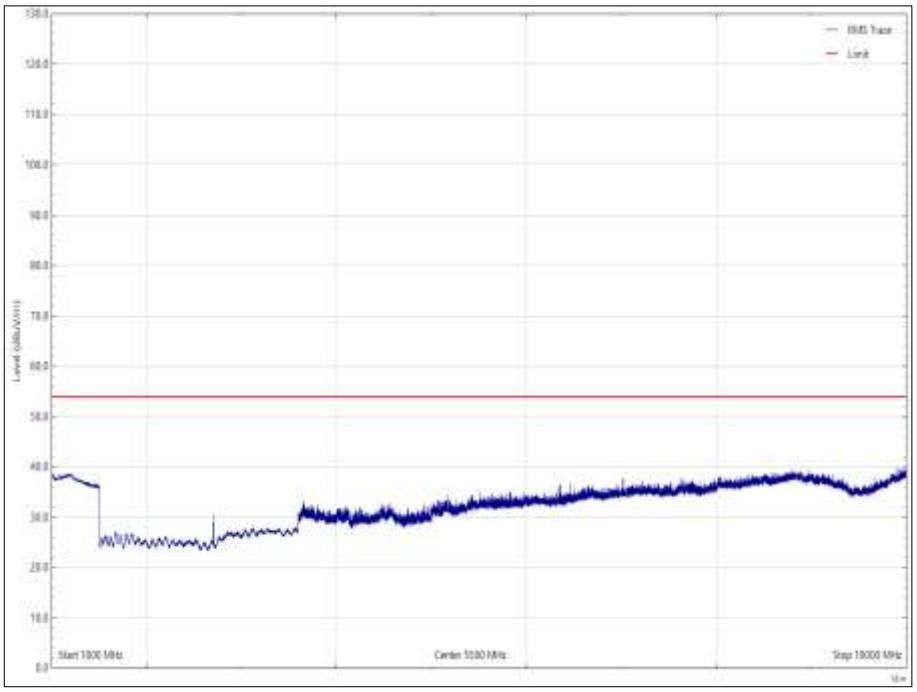

Figure 16 - 902.2 MHz - 1 GHz to 10 GHz - Horizontal Average

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
928.015	36.6	46.0	-9.4	Q-Peak	123	108	Vertical

Table 24 - 915 MHz - 30 MHz to 1 GHz, Vertical

*No other emissions were detected within 10 dB of the limit.

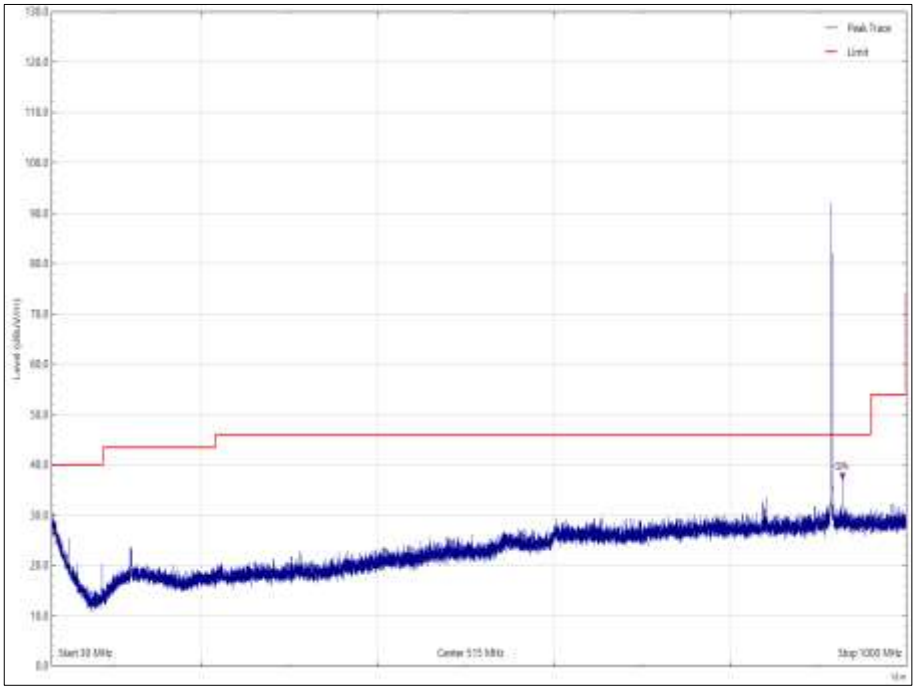

Figure 17 - 915 MHz - 30 MHz to 1 GHz, Vertical

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

Table 25 - 915 MHz - 30 MHz to 1 GHz, Horizontal

No emissions were detected within 10 dB of the limit.

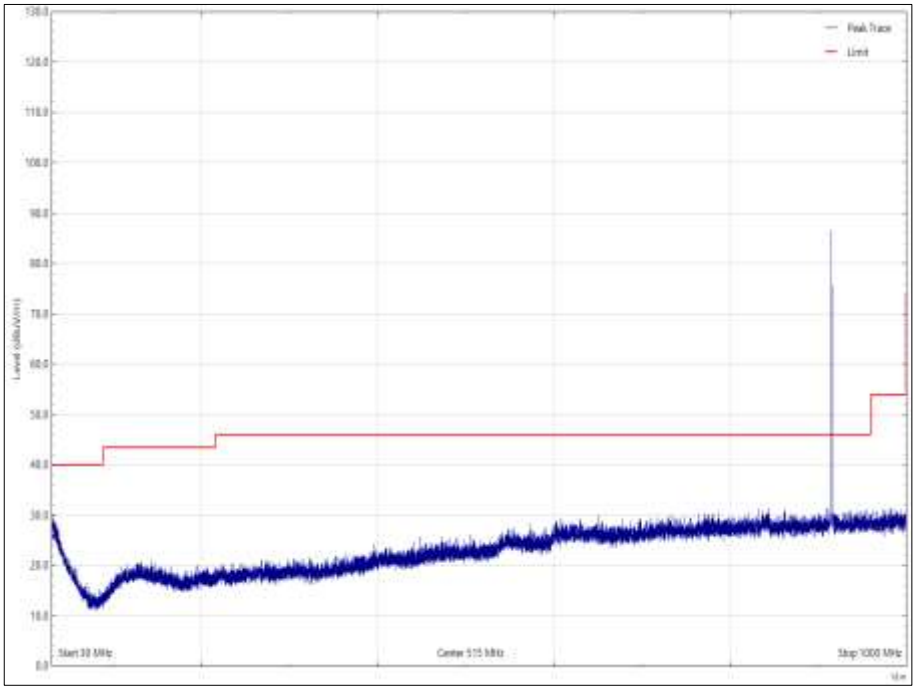

Figure 18 - 915 MHz - 30 MHz to 1 GHz, Horizontal

Frequency (MHz)	Final Peak (dBµV/m)	Final Average (dBµV/m)	Final Peak (µV/m)	Final Average (µV/m)	Angle (°)	Height (m)	Polarisation
*							

Table 26 - 915 MHz - 1 GHz to 10 GHz

No other emissions were detected within 10 dB of the limit.

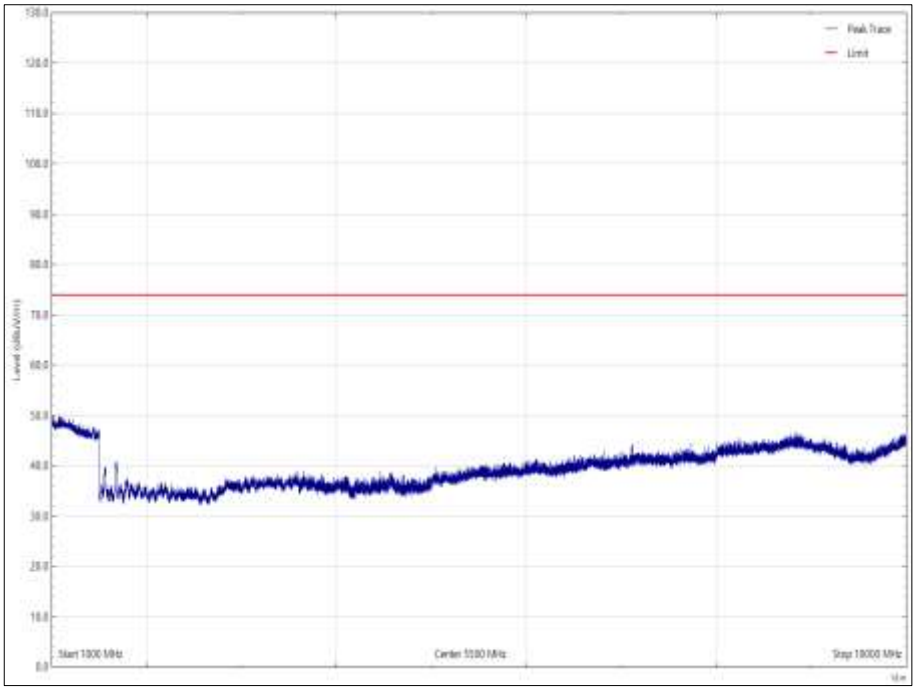

Figure 19 - 915 MHz - 1 GHz to 10 GHz - Vertical Peak

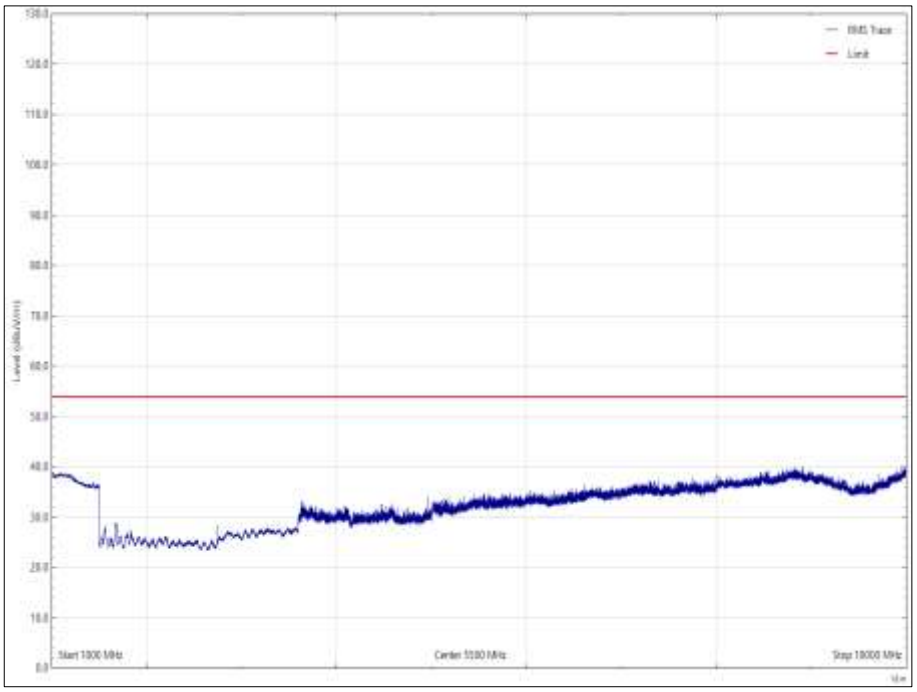

Figure 20 - 915 MHz - 1 GHz to 10 GHz - Vertical Average

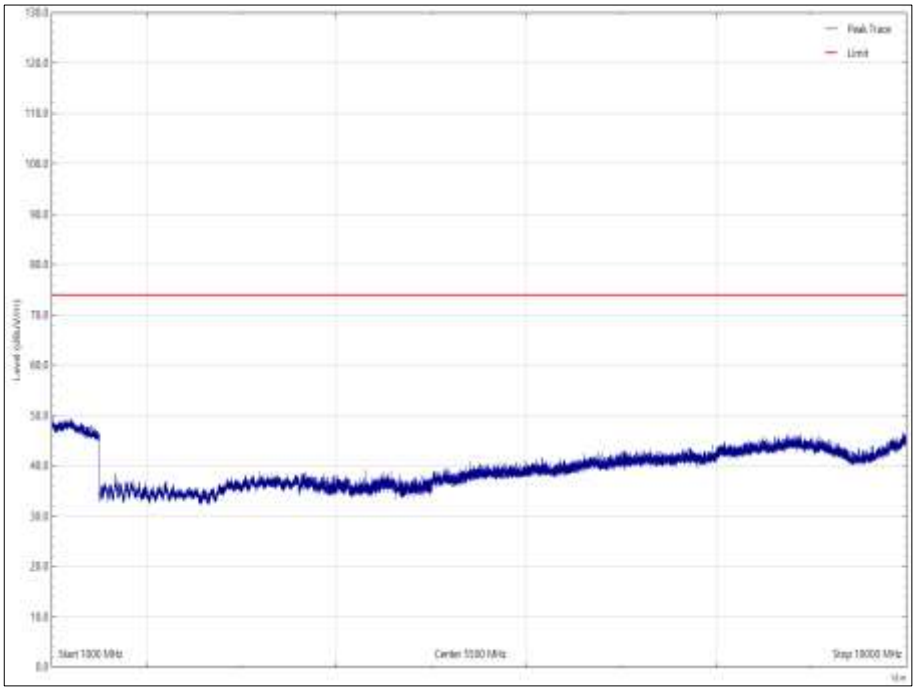

Figure 21 - 915 MHz - 1 GHz to 10 GHz - Horizontal Peak

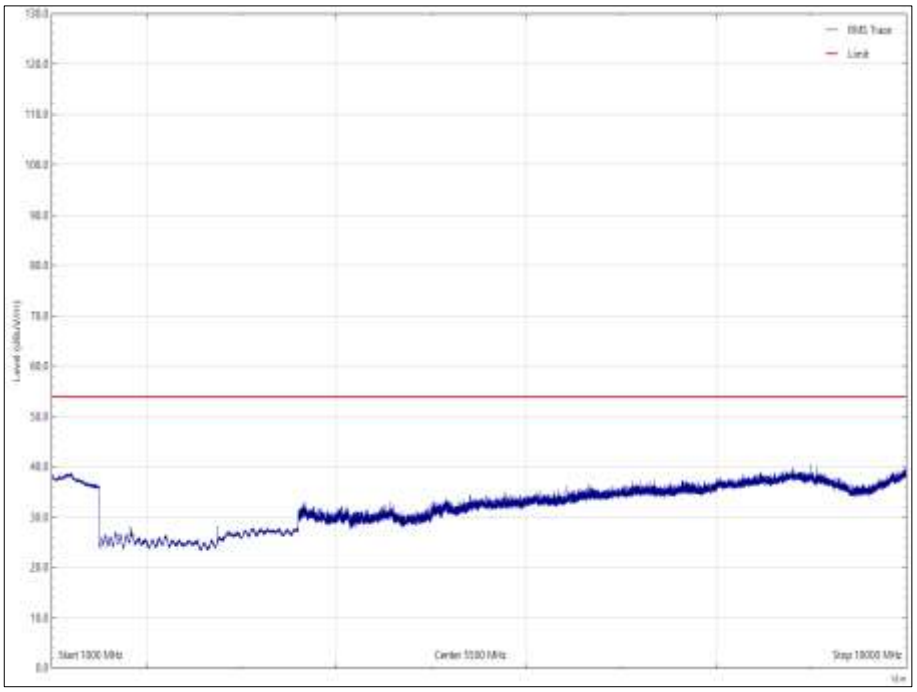

Figure 22 - 915 MHz - 1 GHz to 10 GHz - Horizontal Average

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

Table 27 - 927.8 MHz - 30 MHz to 1 GHz, Vertical

No emissions were detected within 10 dB of the limit.

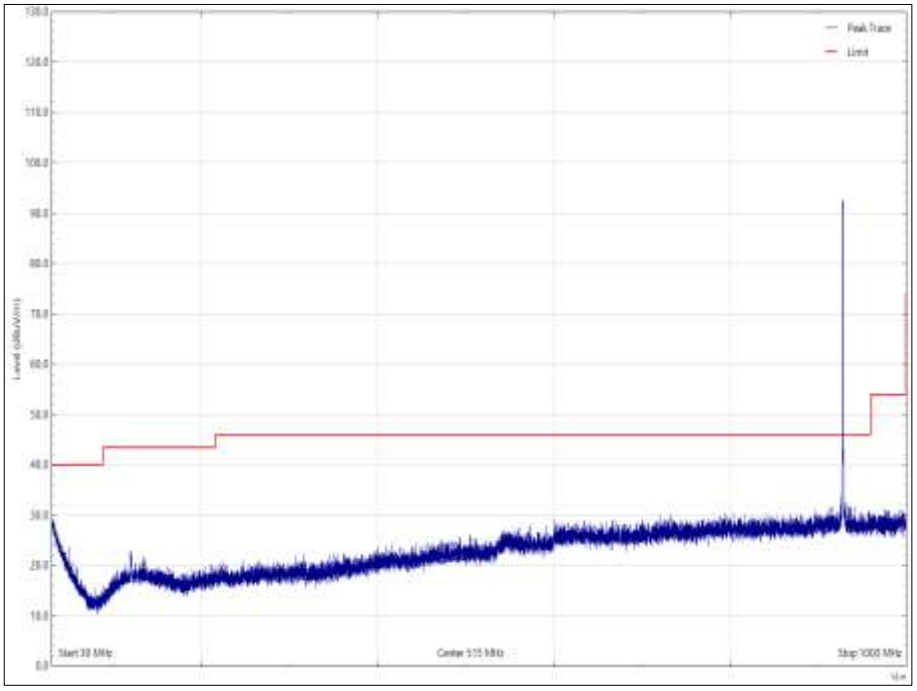

Figure 23 - 927.8 MHz - 30 MHz to 1 GHz, Vertical

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

Table 28 - 927.8 MHz - 30 MHz to 1 GHz, Horizontal

No emissions were detected within 10 dB of the limit.

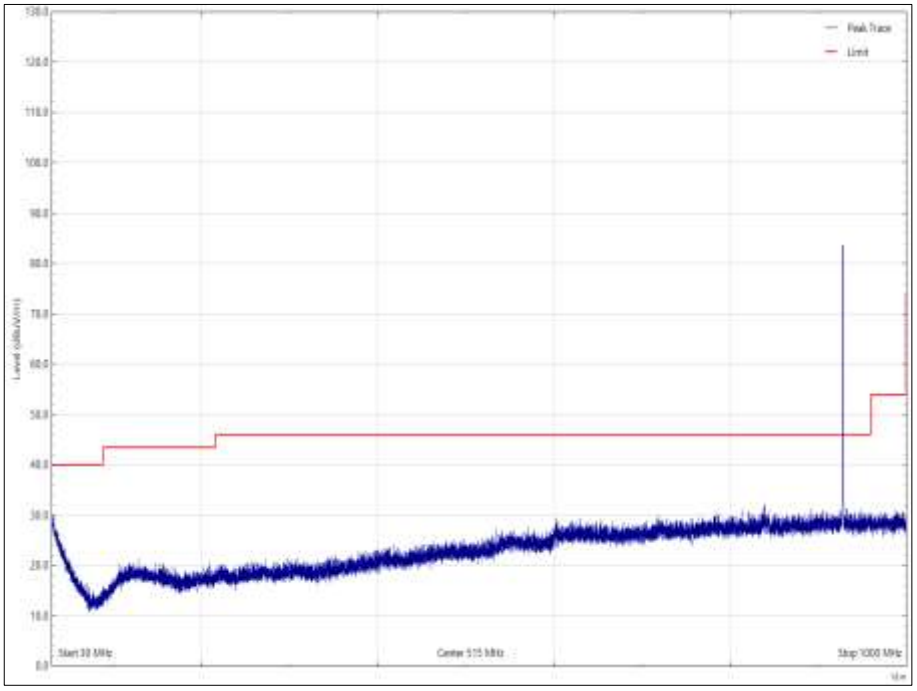

Figure 24 - 927.8 MHz - 30 MHz to 1 GHz, Horizontal

Frequency (MHz)	Final Peak (dBµV/m)	Final Average (dBµV/m)	Final Peak (µV/m)	Final Average (µV/m)	Angle (°)	Height (m)	Polarisation
*							

Table 29 - 927.8 MHz - 1 GHz to 10 GHz

No emissions were detected within 10 dB of the limit.

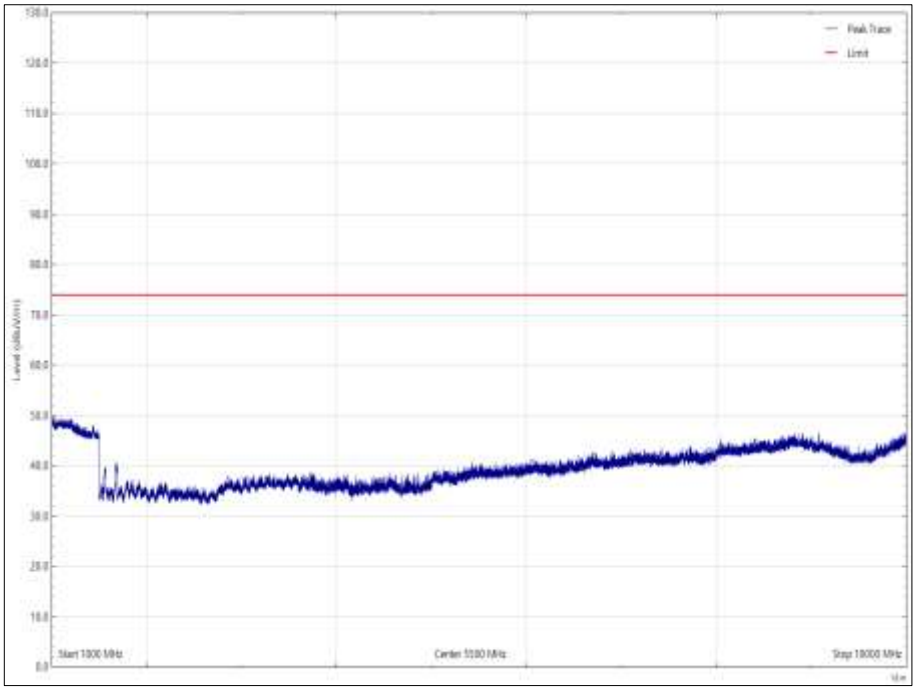

Figure 25 - 927.8 MHz - 1 GHz to 10 GHz - Vertical Peak

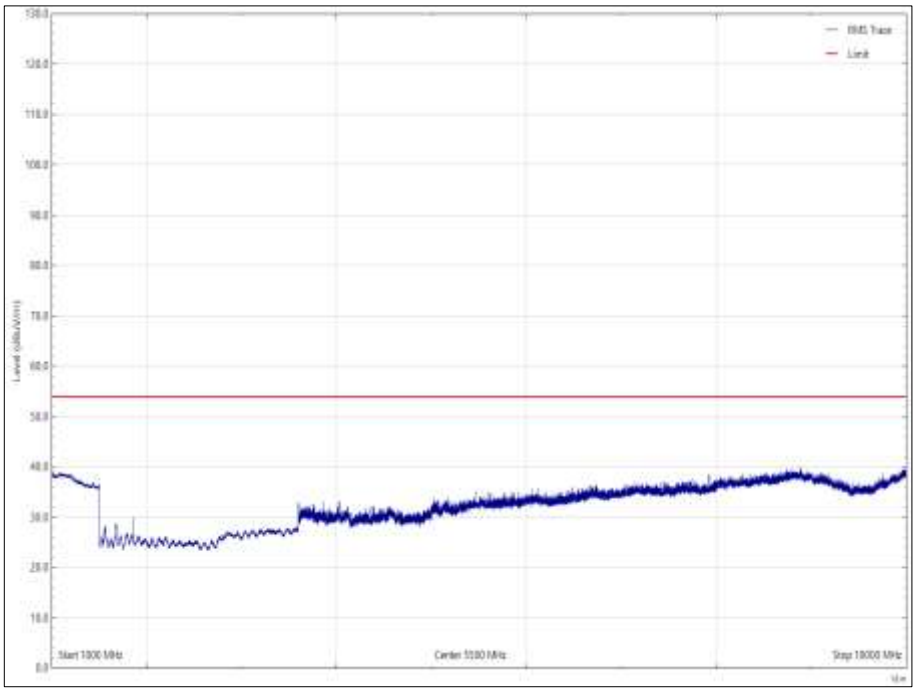

Figure 26 - 927.8 MHz - 1 GHz to 10 GHz - Vertical Average

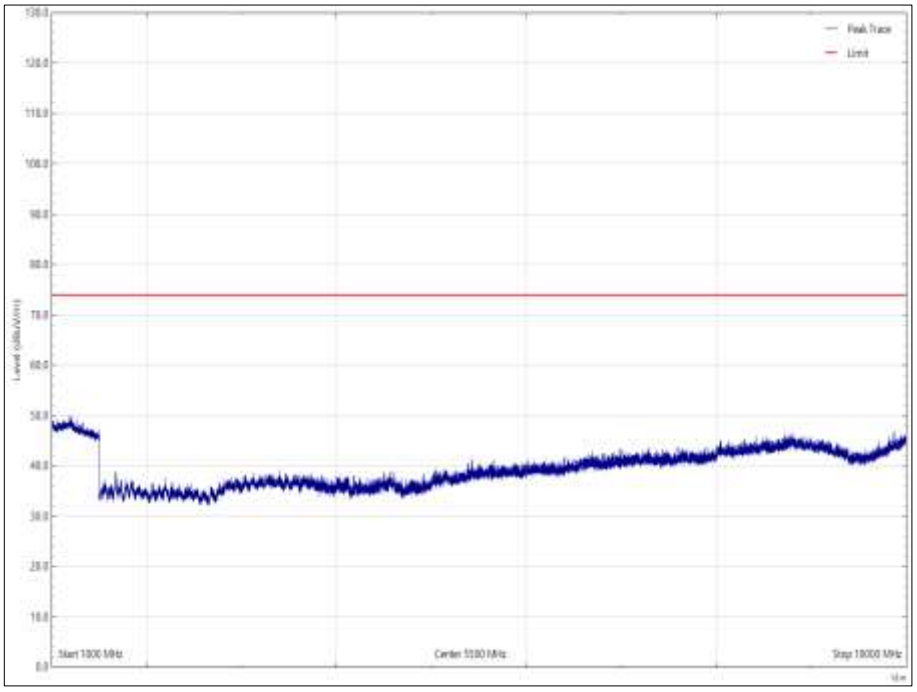

Figure 27 - 927.8 MHz - 1 GHz to 10 GHz - Horizontal Peak

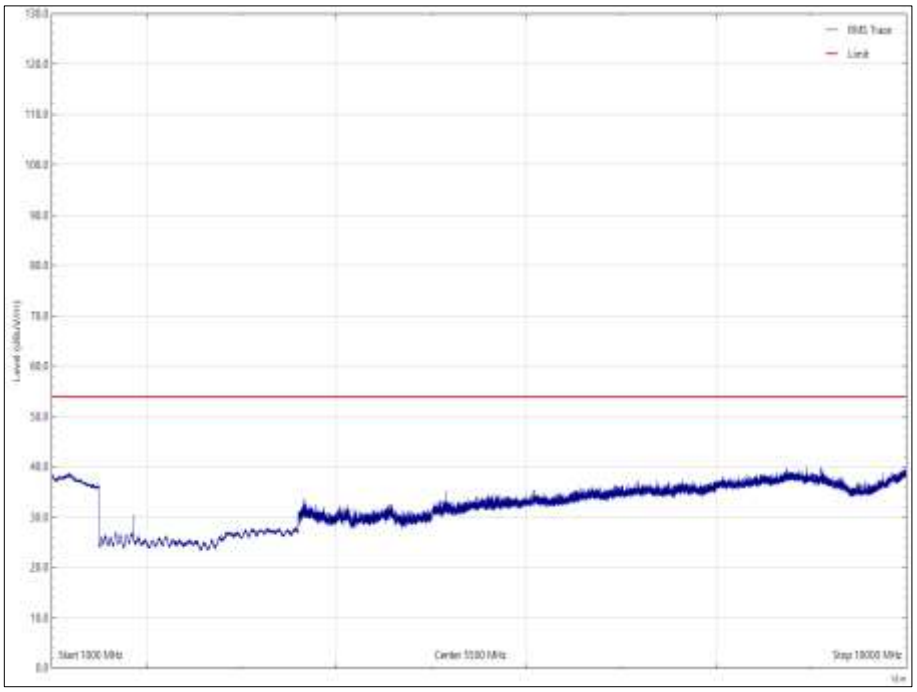

Figure 28- 927.8 MHz - 1 GHz to 10 GHz - Horizontal Average

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)	Field Strength (dBµV/m at 3 m)
30 to 88	100	40.00
88 to 216	150	43.52
216 to 960	200	46.02
Above 960	500	53.98

Table 30

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)	Field Strength (dBµV/m at 3 m)
30 to 88	100	40.00
88 to 216	150	43.52
216 to 960	200	46.02
Above 960	500	53.98

Table 31

2.3.8 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
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
Antenna with attenuator (Bilog, 30 MHz to 3 GHz)	Schaffner	CBL6143	287	24	14-Oct-2022
Comb Generator	Schaffner	RSG1000	3034	-	TU
Multimeter	Fluke	79 Series II	3057	12	23-Aug-2022
Test Receiver	Rohde & Schwarz	ESU40	3506	12	18-Mar-2022
Multimeter	Fluke	177	3832	12	08-Jul-2022
Cable (K-Type to K-Type, 2 m)	Scott Cables	KPS-1501-2000-KPS	4526	6	06-Mar-2022
High Pass filter	Wainwright	WHKX12-1290-1500-18000-80SS	4961	12	25-Mar-2022
Cable (N-Type to N-Type, 1 m)	Rosenberger	LU7-036-1000	5031	12	23-Jul-2022
Emissions Software	TUV SUD	EmX V2.1.11	5125	-	Software
Pre-Amplifier (1 GHz to 18 GHz)	Schwarzbeck	BBV 9718 C	5350	12	22-Sep-2022
Cable (N-Type to N-Type, 8 m)	Teledyne	PR90-088-8MTR	5450	6	08-Mar-2022
Thermo-Hygro-Barometer	PCE Instruments	PCE-THB-40	5481	12	31-Mar-2022
Antenna (DRG, 1 GHz to 10 GHz)	Schwarzbeck	BBHA 9120 B	5611	12	15-Oct-2022
Turntable & Mast Controller	Maturo Gmbh	NCD/498/2799.01	5612	-	TU
Tilt Antenna Mast	Maturo Gmbh	TAM 4.0-P	5613	-	TU
Turntable	Maturo Gmbh	Turntable 1.5 SI-2t	5614	-	TU
Screened Room (12)	MVG	EMC-3	5621	36	11-Aug-2023

Table 32

TU - Traceability Unscheduled
O/P Mon – Output Monitored using calibrated equipment

2.4 Authorised Band Edge

2.4.1 Specification Reference

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

2.4.2 Equipment Under Test and Modification State

Vitals Base Station US, S/N: Not serialised (FAR-0604952-002) - Modification State 1

2.4.3 Date of Test

19-December-2021

2.4.4 Test Method

The test was performed in accordance with ANSI C63.10, clause 11.11.3.

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

Note: Final measurements recorded in the table below were taken using a Quasi-Peak detector.

2.4.5 Environmental Conditions

Ambient Temperature	24.2 °C
Relative Humidity	29.4 %

2.4.6 Test Results

DC Powered - Operating

Frequency (MHz)	Measured Frequency (MHz)	Quasi-Peak Level (dBµV/m)	Average Level (dBµV/m)
902.6	902.0	40.30	N/A
927.4	928.0	42.71	N/A

Table 33 – Authorised Band Edge Results

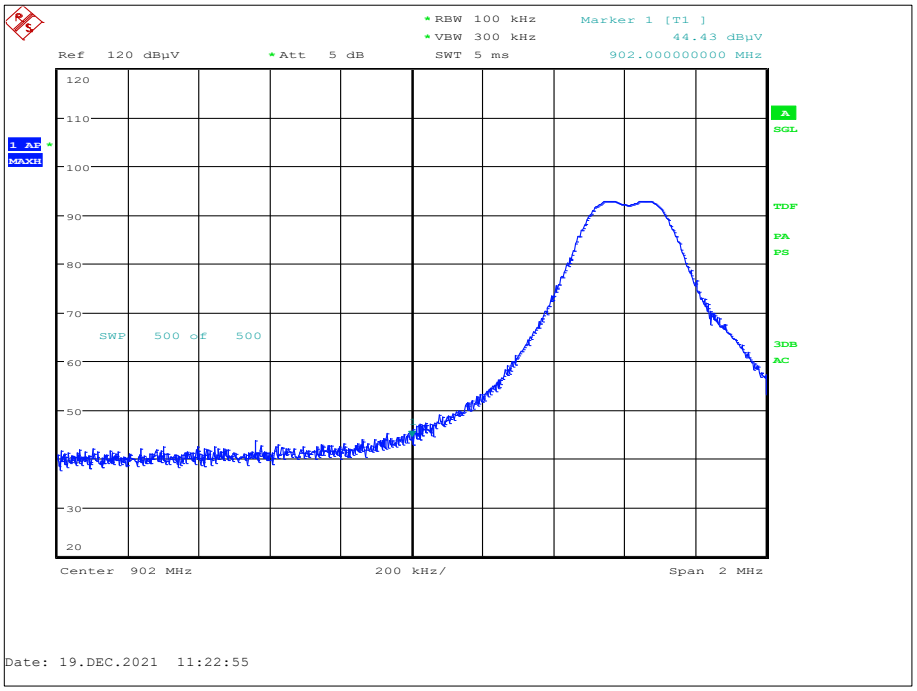

Figure 29 – Authorised Band Edge, 902.6 MHz, Band Edge Frequency: 902.0 MHz

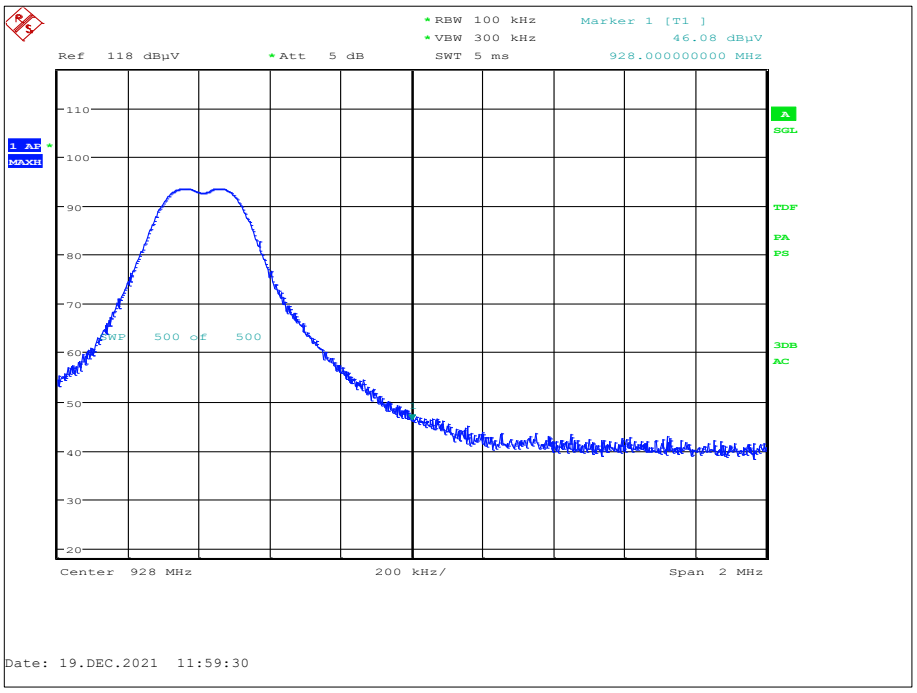

Figure 30 – Authorised Band Edge, 927.4 MHz, Band Edge Frequency: 928.0 MHz

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)	Field Strength (dBµV/m at 3 m)
30 to 88	100	40.00
88 to 216	150	43.52
216 to 960	200	46.02
Above 960	500	53.98

Table 34

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)	Field Strength (dBµV/m at 3 m)
30 to 88	100	40.00
88 to 216	150	43.52
216 to 960	200	46.02
Above 960	500	53.98

Table 35

2.4.7 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
Power Supply Unit	Hewlett Packard	6269B	113	-	O/P Mon
Antenna with attenuator (Bilog, 30 MHz to 3 GHz)	Schaffner	CBL6143	287	24	14-Oct-2022
Comb Generator	Schaffner	RSG1000	3034	-	TU
Test Receiver	Rohde & Schwarz	ESU40	3506	12	18-Mar-2022
Multimeter	Fluke	177	3832	12	08-Jul-2022
Cable (K-Type to K-Type, 2 m)	Scott Cables	KPS-1501-2000-KPS	4526	6	06-Mar-2022
Emissions Software	TUV SUD	EmX V2.1.11	5125	-	Software
Cable (N-Type to N-Type, 8 m)	Teledyne	PR90-088-8MTR	5450	6	08-Mar-2022
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	Maturo Gmbh	TAM 4.0-P	5613	-	TU
Turntable	Maturo Gmbh	Turntable 1.5 SI-2t	5614	-	TU
Screened Room (12)	MVG	EMC-3	5621	36	11-Aug-2023

Table 36

TU - Traceability Unscheduled
O/P Mon – Output Monitored using calibrated equipment

3 Photographs

3.1 Test Setup Photographs

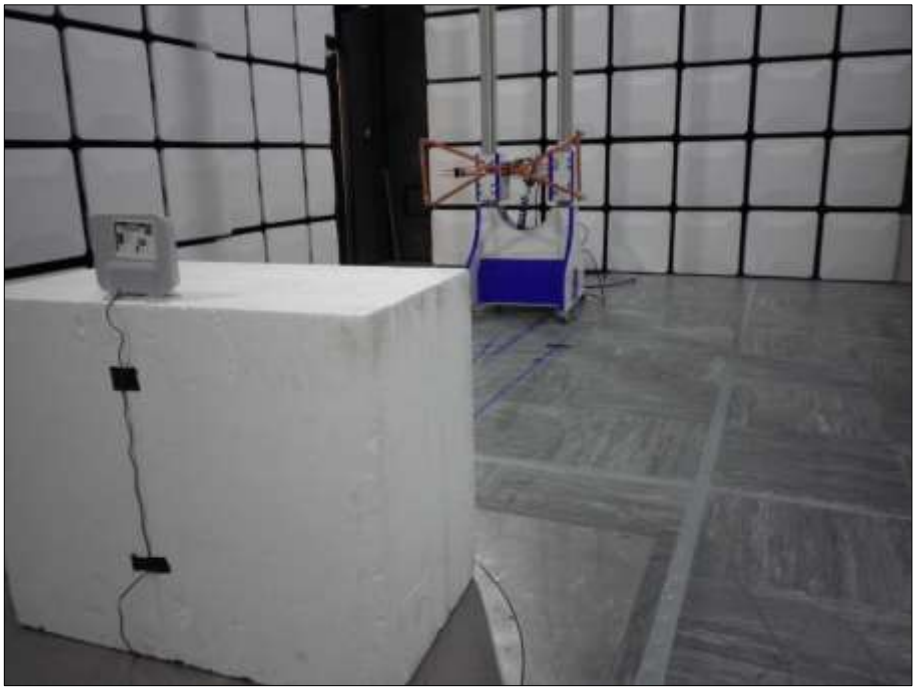

Figure 31 - 30 MHz to 1 GHz

Figure 32- 1 GHz to 10 GHz

4 Measurement Uncertainty

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

Test Name	Measurement Uncertainty
20 dB Bandwidth & 99% Occupied Bandwidth	± 5.07 kHz
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 37

Measurement Uncertainty Decision Rule – Accuracy Method

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. (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.