# FCC and ISEDC Test Report

## Sepura Ltd
## TETRA Radio, Model: SC2028

## In accordance with FCC 47 CFR Part 15B, ICES-003 and ISEDC RSS-GEN

Add value.
Inspire trust.

Prepared for: Sepura Ltd
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Beach Drive
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United Kingdom

FCC ID: XX6SC2028 IC: 8739A-SC2028

## COMMERCIAL-IN-CONFIDENCE

Document 75947270-01 Issue 01

| SIGNATURE | | | |
|---|---|---|---|
| AJ Lawson. | | | |
| **NAME** | **JOB TITLE** | **RESPONSIBLE FOR** | **ISSUE DATE** |
| Andy Lawson | Senior Engineer | Authorised Signatory | 20 January 2020 |

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD document control rules.

**ENGINEERING STATEMENT**

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate limited compliance with FCC 47 CFR Part 15B, ICES-003 and ISEDC RSS-GEN. The sample tested was found to comply with the requirements defined in the applied rules.

| RESPONSIBLE FOR | NAME | DATE | SIGNATURE |
|---|---|---|---|
| Testing | Connor Lee | 20 January 2020 | |

FCC Accreditation
90987 Octagon House, Fareham Test Laboratory

ISEDC 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: 2018, ICES-003: 2016 and ISEDC RSS-GEN: Issue 5 (04-2018) + A1 (03-2019) for the tests detailed in section 1.3.



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# Contents

# 1 Report Summary

## 1.1 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

| Issue | Description of Change | Date of Issue |
|---|---|---|
| 1 | First Issue | 20 January 2020 |

**Table 1**

## 1.2 Introduction

| | |
|---|---|
| Applicant | Sepura Ltd |
| Manufacturer | Sepura Ltd |
| Model Number(s) | SC2028 |
| Serial Number(s) | 1PR001925GK63ZJ |
| Hardware Version(s) | Pre-Production |
| Software Version(s) | 2001 730 07367 |
| Number of Samples Tested | 1 |
| Test Specification/Issue/Date | FCC 47 CFR Part 15B: 2018<br>ICES-003: 2016<br>ISEDC RSS-GEN: Issue 5 (04-2018) + A1 (03-2019) |
| Order Number<br>Date | PLC-PO014257-2<br>11-October-2019 |
| Date of Receipt of EUT | 22-October-2019 and 06-December-2019 |
| Start of Test | 03-January-2020 |
| Finish of Test | 06-January-2020 |
| Name of Engineer(s) | Connor Lee |
| 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, ICES-003 and ISEDC RSS-GEN is shown below.

| Section | Specification Clause | | | Test Description | Result | Comments/Base Standard |
|---|---|---|---|---|---|---|
| | Part 15B | ICES-003 | RSS-GEN | | | |
| Configuration and Mode: AC powered with standard battery - Transmitting and charging | | | | | | |
| 2.1 | 15.107 | 6.1 | 8.8 | Conducted Disturbance at Mains Terminals | Pass | ANSI C63.4: 2014 |
| Configuration and Mode: AC powered with standard battery - Idle and charging | | | | | | |
| 2.2 | 15.109 | 6.2 | 7.1 | Radiated Disturbance | Pass | ANSI C63.4: 2014 |
| Configuration and Mode: AC powered with high capacity battery - Transmitting and charging | | | | | | |
| 2.1 | 15.107 | 6.1 | 8.8 | Conducted Disturbance at Mains Terminals | Pass | ANSI C63.4: 2014 |
| Configuration and Mode: AC powered with high capacity battery - Idle and charging | | | | | | |
| 2.2 | 15.109 | 6.2 | 7.1 | Radiated Disturbance | Pass | ANSI C63.4: 2014 |

**Table 2**

## 1.4 Declaration of Build Status

### Equipment Description

| | |
|---|---|
| Technical Description:<br>*(Please provide a brief description of the intended use of the equipment)* | The SC20 hand-portable terminal is a TETRA enabled radio with Bluetooth and Wi-Fi capability |
| Manufacturer: | Sepura Limited |
| Model: | SC2028 |
| Part Number: | N/A |
| Hardware Version: | Pre-Production |
| Software Version: | 2001 730 07367 |
| FCC ID (if applicable) | XX6SC2028 |
| IC ID (if applicable) | 8739A-SC2028 |

### Intentional Radiators

| Technology | TETRA | TETRA | BT Classic/EDR | BLE | WLAN | |
|---|---|---|---|---|---|---|
| Frequency Band (MHz) | 806-824 | 851-869 | 2402-2480 | 2402-2480 | 2412-2462 | |
| Conducted Declared Output Power (dBm) | 34 | 34 | 7.382 | 7.382 | 16.5 | |
| Antenna Gain (dBi) | > 0 | > 0 | 2.5 | 2.5 | 2.5 | |
| Supported Bandwidth(s) (MHz) | 25 kHz | 25 kHz | 1 | 2 | 16.5<br>22<br>16.5 | |
| Modulation Scheme(s) | π/4 DQPSK | π/4 DQPSK | 8PSK, DQPSK, GFSK | 8PSK, DQPSK, GFSK | 802.11g, 802.11b 802.11n | |
| ITU Emission Designator | 22K0DXW | 22K0DXW | 1M00F1D | 2M00F1D | 16M5D1D<br>22M0G1D<br>16M5D1D | |
| Bottom Frequency (MHz) | 806 | 851 | 2402 | 2402 | 2412 | |
| Middle Frequency (MHz) | 815 | 860 | 2441 | 2441 | 2437 | |
| Top Frequency (MHz) | 824 | 869 | 2480 | 2480 | 2462 | |

### Un-intentional Radiators

| | |
|---|---|
| Highest frequency generated or used in the device or on which the device operates or tunes | 2480 MHz |
| Lowest frequency generated or used in the device or on which the device operates or tunes | 32.768 kHz |
| Class A Digital Device (Use in commercial, industrial or business environment) ☒<br>Class B Digital Device (Use in residential environment only) ☐ | |

### AC Power Source

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

## DC Power Source

| | | |
|---|---|---|
| Nominal voltage: | 7.4 | V |
| Extreme upper voltage: | 7.4 | V |
| Extreme lower voltage: | 6.2 | V |
| Max current: | 2 | A |

## Battery Power Source

| | | |
|---|---|---|
| Voltage: | 7.4 | V |
| End-point voltage: | 6.2 | V *(Point at which the battery will terminate)* |
| Alkaline ☐ Leclanche ☒ Lithium ☐ Nickel Cadmium ☐ Lead Acid* ☐ **(Vehicle regulated)* | | |
| Other ☐ Please detail: | | |

## Charging

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

## Temperature

| | | |
|---|---|---|
| Minimum temperature: | -30 | °C |
| Maximum temperature: | +65 | °C |

## Antenna Characteristics

| | | | | | |
|---|---|---|---|---|---|
| Antenna connector ☒ TETRA | | | State impedance | 50 | Ohm |
| Temporary antenna connector ☐ | | | State impedance | | Ohm |
| Integral antenna ☒ | Type: | PCB | State impedance | 50 | Ohm |
| External antenna ☐ | Type: | | State impedance | | dBI |

## Ancillaries (if applicable)

| | | | |
|---|---|---|---|
| Manufacturer: | | Part Number: | |
| Model: | | Country of Origin: | |

The SC2028 may be used with standard SC20 accessories, batteries, chargers, belt clips, holsters, remote speaker and microphones, earpieces etc

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

Name: Chris Beecham
Position held: Conformance Engineer
Date: 21 October 2019

## 1.5 Product Information

### 1.5.1 Technical Description

The SC20 hand-portable terminal is a TETRA enabled radio with Bluetooth and Wi-Fi capability.

The EUT was tested using the following ancillary items which were not under test:

- Antenna Model: Serial Number: Not serialised (0075947270-TSR0004)
- Battery, Model: 300-01852, Serial Number: 6E000000BC04173D
- Battery, Model: 300-01853, Serial Number: 38000000A984183D
- Charging Station, Model: STP/SC2 Series 1+1 Charger, Serial Number: 300-019307PP101839B91JQT
- AC to DC power adaptor, Model: ABSP024100240-1, Serial Number: 0075947270-TSR00020


**Figure 1 - Front view**


**Figure 2 - Rear view**

### 1.5.2 EUT Port/Cable Identification

| Port | Max Cable Length specified | Usage | Type | Screened |
|---|---|---|---|---|
| Configuration and Mode: AC powered with standard battery - Transmitting and charging | | | | |
| 120 V AC Live | 1.5 Meters | Power | 120 V AC Power | No |
| 120 V AC Neutral | 1.5 Meters | Power | 120 V AC Power | No |
| Configuration and Mode: AC powered with standard battery - Transmitting and charging | | | | |
| 120 V AC Live | 1.5 Meters | Power | 120 V AC Power | No |
| 120 V AC Neutral | 1.5 Meters | Power | 120 V AC Power | No |

**Table 3**

### 1.5.3 Test Configuration

| Configuration | Description |
|---|---|
| AC powered with standard battery | The EUT was situated in its charging station during testing.<br>The charging station was powered from a 120 V 60 Hz AC supply.<br>The EUT had a standard battery fitted during testing. |
| AC powered with high capacity battery | The EUT was situated in its charging station during testing.<br>The charging station was powered from a 120 V 60 Hz AC supply.<br>The EUT had a high capacity battery fitted during testing. |

**Table 4**

### 1.5.4 Modes of Operation

| Mode | Description |
|---|---|
| Idle and charging | The product was in an idle state and was situated in its charge station with a discharged battery fitted so that the EUT was drawing maximum current. |
| Transmitting and charging | The product was in a transmitting state and was situated in its charge station with a discharged battery fitted so that the EUT was drawing maximum current. |

**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 |
|---|---|---|---|
| Handset Model: SC2028, Serial Number: 1PR001925GK63ZJ | | | |
| 0 | As supplied by the customer | Not Applicable | Not Applicable |

**Table 6**

## 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: AC powered with standard battery - Idle and charging | | |
| Radiated Disturbance | Connor Lee | UKAS |
| Configuration and Mode: AC powered with high capacity battery - Idle and charging | | |
| Radiated Disturbance | Connor Lee | UKAS |
| Configuration and Mode: AC powered with standard battery - Transmitting and charging | | |
| Conducted Disturbance at Mains Terminals | Connor Lee | UKAS |
| Configuration and Mode: AC powered with high capacity battery - Transmitting and charging | | |
| Conducted Disturbance at Mains Terminals | Connor Lee | UKAS |

**Table 7**

Office Address:

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

# 2 Test Details

## 2.1 Conducted Disturbance at Mains Terminals

### 2.1.1 Specification Reference

FCC 47 CFR Part 15B, Clause 15.107
ICES-003, Clause 6.1
ISEDC RSS-GEN, Clause 8.8

### 2.1.2 Equipment Under Test and Modification State

SC2028, S/N: 1PR001925GK63ZJ - Modification State 0

### 2.1.3 Date of Test

06-January-2020

### 2.1.4 Test Method

The EUT was setup according to ANSI C63.4, clause 5.2.

The EUT was placed on a non-conductive table 0.8 m above a reference ground plane. A vertical coupling plane was placed 0.4 m from the EUT boundary. A Line Impedance Stabilisation Network (LISN) was directly bonded to the ground-plane. The EUT was located so that the distance between the boundary of the EUT and the closest surface of the LISN was 0.8 m.

Interconnecting cables that hanged closer than 0.4 m to the ground plane were folded back and forth in the centre forming a bundle 0.3 m to 0.4 m long.

Input and output cables were terminated with equipment or loads representative of real usage conditions.

The EUT was configured to give the highest level of emissions within reason of a typical installation as described by the manufacturer.

### 2.1.5 Example Calculation

Quasi-Peak level (dBµV) = Receiver level (dBµV) + Correction Factor (dB)
Margin (dB) = Quasi-Peak level (dBµV) - Limit (dBµV)

CISPR Average level (dBµV) = Receiver level (dBµV) + Correction Factor (dB)
Margin (dB) = CISPR Average level (dBµV) - Limit (dBµV)

### 2.1.6 Example Test Setup Diagram

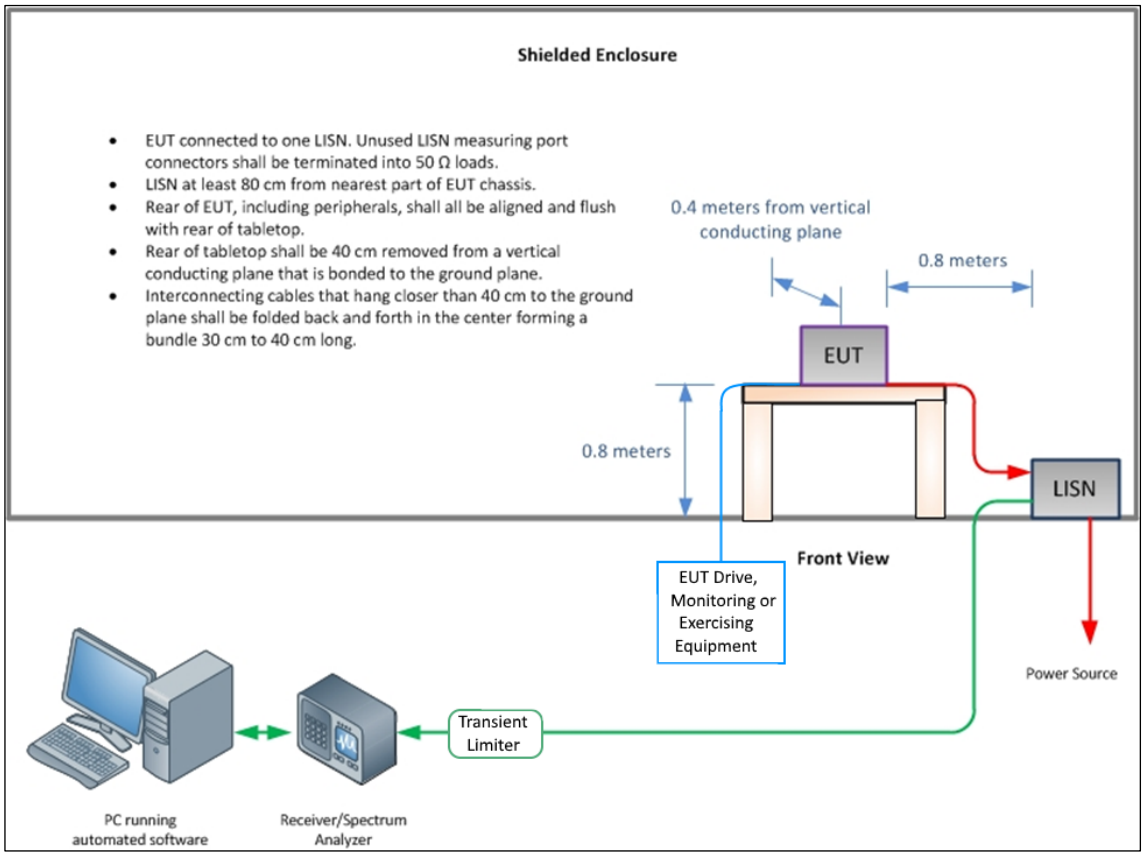


**Figure 3 - Conducted Disturbance Example Test Setup**

### 2.1.7 Environmental Conditions

| | |
|---|---|
| Ambient Temperature | 19.9 °C |
| Relative Humidity | 34.0 % |

### 2.1.8 Specification Limits

| Required Specification Limits (Class A) | | | |
|---|---|---|---|
| Line Under Test | Frequency Range (MHz) | Quasi-peak (dBµV) | CISPR Average (dBµV) |
| AC Power Port | 0.15 to 0.5 | 79 | 66 |
| | 0.5 to 30 | 73 | 60 |

**Table 8**

### 2.1.9 Test Results

**Results for Configuration and Mode: AC powered with standard battery - Transmitting and charging.**

**The test was performed in accordance with the Class A limits.**

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

Detailed results are shown below.

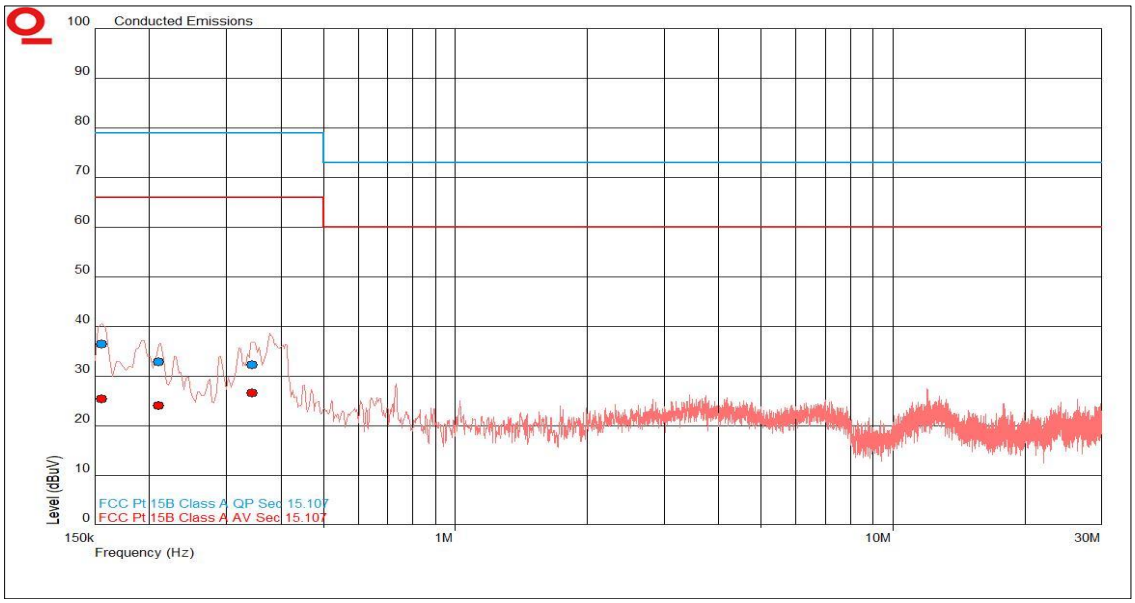


**Figure 4 - Graphical Results - 120 V AC Live**

| Frequency (MHz) | QP Level (dBµV) | QP Limit (dBµV) | QP Margin (dB) | CISPR Average Level (dBµV) | CISPR Average Limit (dBµV) | CISPR Average Margin (dB) |
|---|---|---|---|---|---|---|
| 0.156 | 36.4 | 79.0 | -42.6 | 25.4 | 66.0 | -40.6 |
| 0.210 | 32.9 | 79.0 | -46.1 | 24.1 | 66.0 | -41.9 |
| 0.344 | 32.3 | 79.0 | -46.7 | 26.6 | 66.0 | -39.4 |

**Table 9**

No other formal measurements were made as all other peak emissions seen were greater than 20 dB below the CISPR Average test limit.

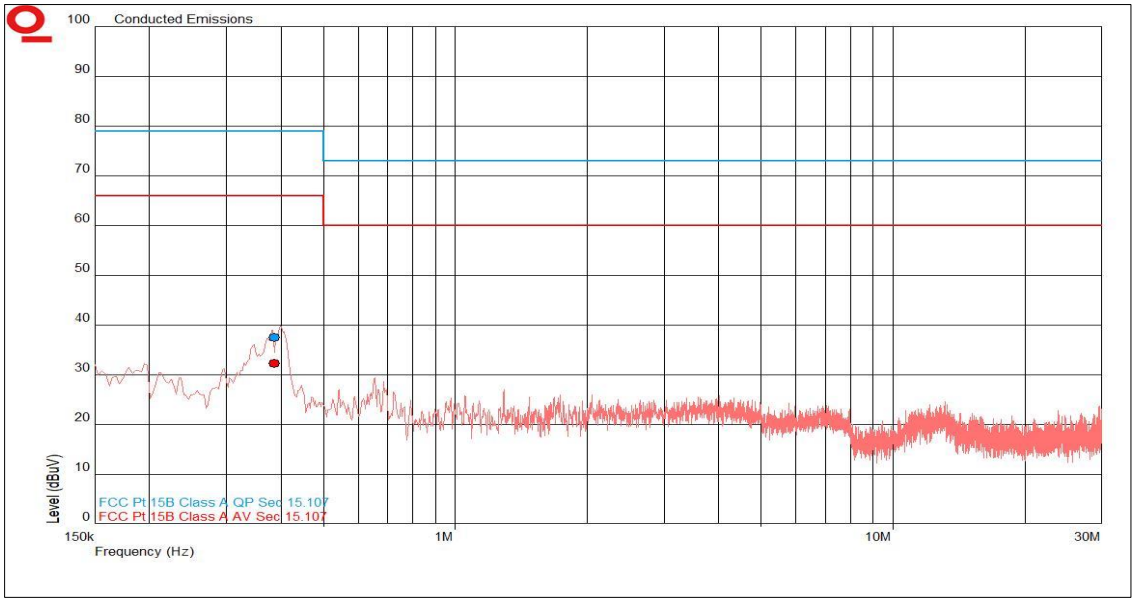


**Figure 5 - Graphical Results - 120 V AC Neutral**

| Frequency (MHz) | QP Level (dBµV) | QP Limit (dBµV) | QP Margin (dB) | CISPR Average Level (dBµV) | CISPR Average Limit (dBµV) | CISPR Average Margin (dB) |
|---|---|---|---|---|---|---|
| 0.387 | 37.5 | 79.0 | -41.5 | 32.3 | 66.0 | -33.7 |

**Table 10**

No other formal measurements were made as all other peak emissions seen were greater than 20 dB below the CISPR Average test limit.

**Results for Configuration and Mode: AC powered with high capacity battery - Transmitting and charging.**

**The test was performed in accordance with the Class A limits.**

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

Detailed results are shown below.

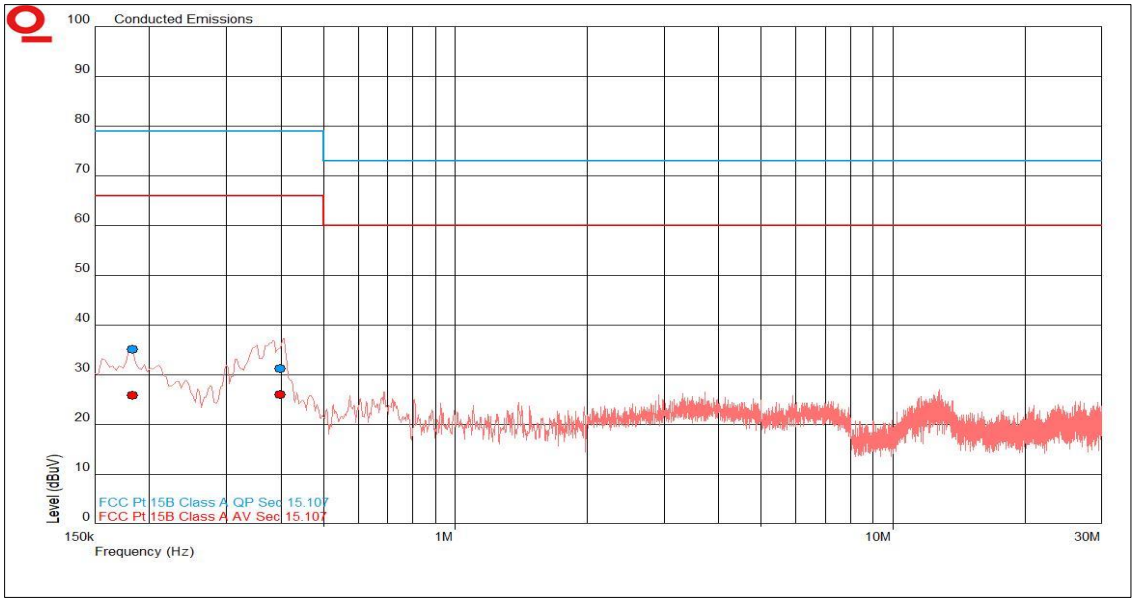


**Figure 6 - Graphical Results - 120 V AC Live**

| Frequency (MHz) | QP Level (dBµV) | QP Limit (dBµV) | QP Margin (dB) | CISPR Average Level (dBµV) | CISPR Average Limit (dBµV) | CISPR Average Margin (dB) |
|---|---|---|---|---|---|---|
| 0.183 | 35.1 | 79.0 | -43.9 | 25.9 | 66.0 | -40.1 |
| 0.397 | 31.2 | 79.0 | -47.8 | 26.0 | 66.0 | -40.0 |

**Table 11**

No other formal measurements were made as all other peak emissions seen were greater than 20 dB below the CISPR Average test limit.

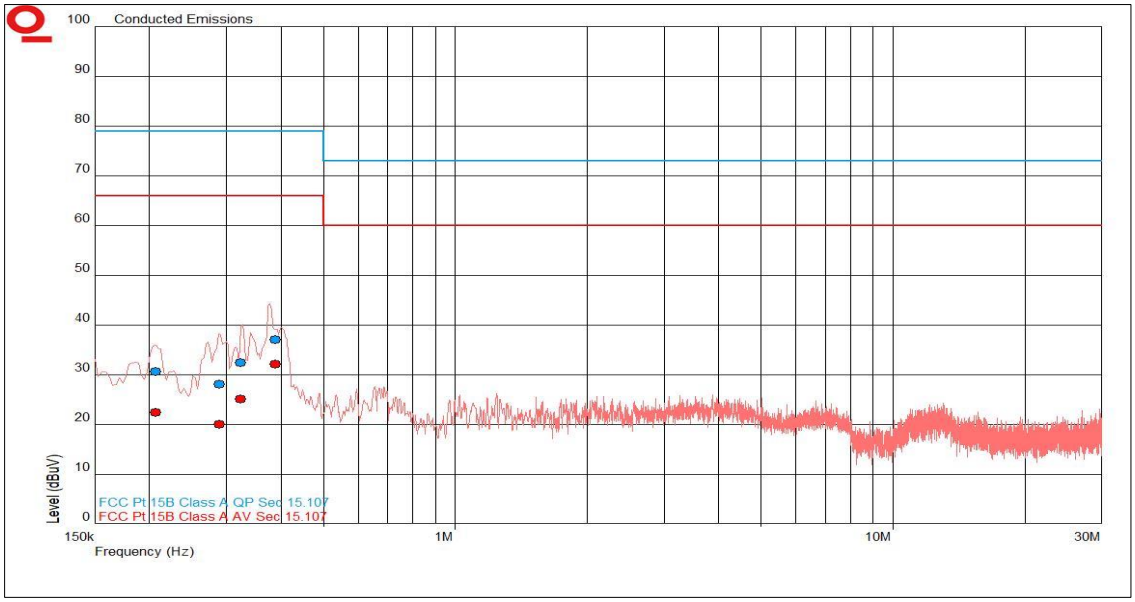


**Figure 7 - Graphical Results - 120 V AC Neutral**

| Frequency (MHz) | QP Level (dBµV) | QP Limit (dBµV) | QP Margin (dB) | CISPR Average Level (dBµV) | CISPR Average Limit (dBµV) | CISPR Average Margin (dB) |
|---|---|---|---|---|---|---|
| 0.207 | 30.6 | 79.0 | -48.4 | 22.5 | 66.0 | -43.5 |
| 0.290 | 28.1 | 79.0 | -50.9 | 20.1 | 66.0 | -45.9 |
| 0.323 | 32.4 | 79.0 | -46.6 | 25.2 | 66.0 | -40.8 |
| 0.388 | 37.0 | 79.0 | -42.0 | 32.1 | 66.0 | -33.9 |

**Table 12**

No other formal measurements were made as all other peak emissions seen were greater than 20 dB below the CISPR Average test limit.

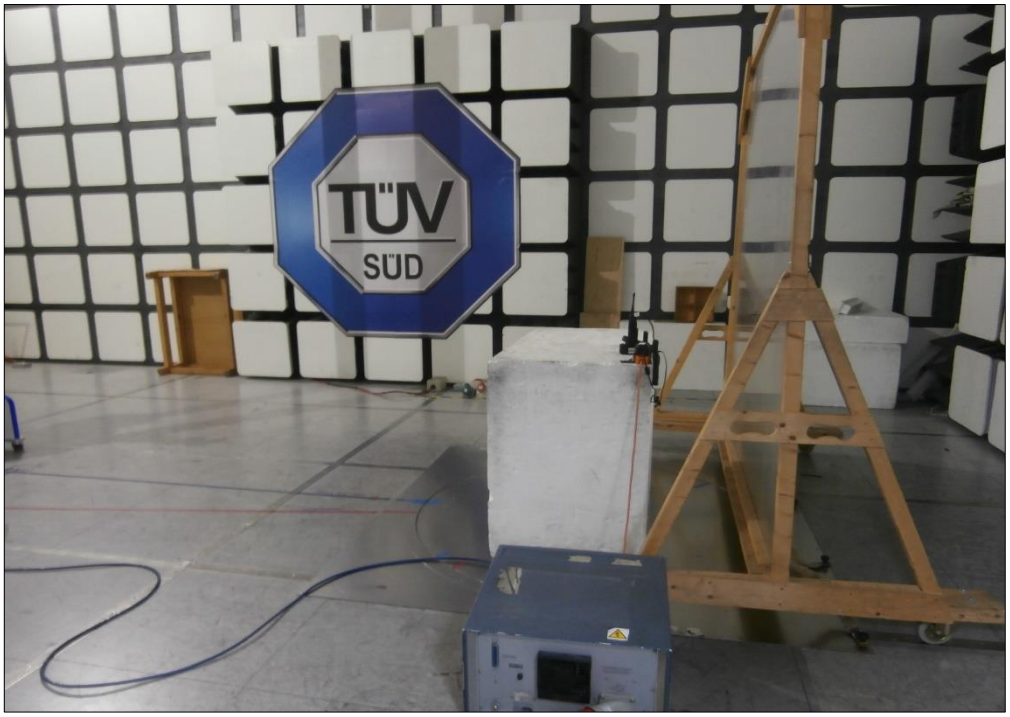


**Figure 8 - Test Setup**

**Figure 9 - Test Setup**

### 2.1.10 Test Location and Test Equipment Used

This test was carried out in EMC Chamber 5.

| Instrument | Manufacturer | Type No | TE No | Calibration Period (months) | Calibration Due |
|---|---|---|---|---|---|
| Screened Room (5) | Rainford | Rainford | 1545 | 36 | 23-Jan-2021 |
| Compliance 5 Emissions | Teseq | V5.26.51 | 3275 | - | Software |
| EMI Test Receiver | Rohde & Schwarz | ESU40 | 3506 | 12 | 03-Jan-2021 |
| Transient Limiter | Hewlett Packard | 11947A | 2377 | 12 | 26-Feb-2020 |
| 3 Phase Artificial Mains Network (LISN) | Rohde & Schwarz | ESH2-Z5 | 16 | 12 | 28-Feb-2020 |
| 8 Meter Cable | Teledyne | PR90-088-8MTR | 5212 | 12 | 30-Aug-2020 |

**Table 13**

## 2.2 Radiated Disturbance

### 2.2.1 Specification Reference

FCC 47 CFR Part 15B, Clause 15.109
ICES-003, Clause 6.2
ISEDC RSS-GEN, Clause 7.1

### 2.2.2 Equipment Under Test and Modification State

SC2028, S/N: 1PR001925GK63ZJ - Modification State 0

### 2.2.3 Date of Test

03-January-2020

### 2.2.4 Test Method

The EUT was set up in a semi-anechoic chamber on a remotely controlled turntable and placed on a non-conductive table 0.8m above a reference ground plane.

A pre-scan of the EUT emissions profile was made at a 3m distance while varying the antenna-to-EUT azimuth and polarisation using a peak detector.

Using a list of the highest emissions detected during the pre-scan along with their bearing and associated antenna polarisation, the EUT was formally measured using a Quasi-Peak, Peak or CISPR Average detector as appropriate.

The readings were maximised by adjusting the antenna height, polarisation and turntable azimuth, in accordance with the specification.

### 2.2.5 Example Calculation

Below 1GHz:

Quasi-Peak level (dBµV/m) = Receiver level (dBµV) + Correction Factor (dB)
Margin (dB) = Quasi-Peak level (dBµV/m) - Limit (dBµV/m)

Above 1GHz:

CISPR Average level (dBµV/m) = Receiver level (dBµV) + Correction Factor (dB)
Margin (dB) = CISPR Average level (dBµV/m) - Limit (dBµV/m)

Peak level (dBµV/m) = Receiver level (dBµV) + Correction Factor (dB)
Margin (dB) = Peak level (dBµV/m) - Limit (dBµV/m)

### 2.2.6 Example Test Setup Diagram

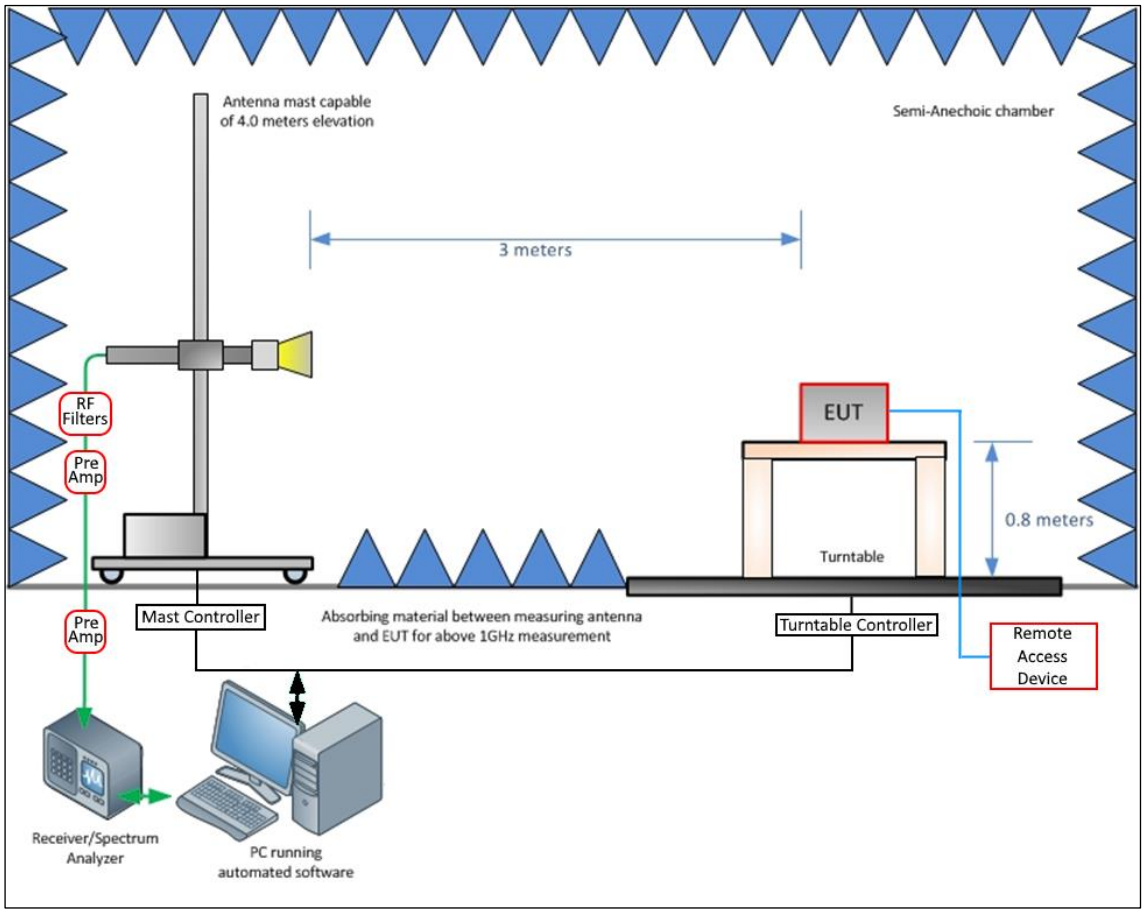


**Figure 10 - Radiated Disturbance Example Test Setup**

### 2.2.7 Environmental Conditions

| | |
|---|---|
| Ambient Temperature | 19.2 - 20.7 °C |
| Relative Humidity | 34.0 - 36.0 % |

### 2.2.8 Specification Limits

| Required Specification Limits, Field Strength (Class A @ 10m) | | |
|---|---|---|
| Frequency Range (MHz) | (µV/m) | (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:**<br>Quasi-peak detector to be used for measurements below 1 GHz<br>CISPR Average detector to be used for measurements above 1 GHz<br>Peak test limit above 1 GHz is 20 dB higher than the CISPR Average test limit. | | |

**Table 14**

### 2.2.9 Test Results

**Results for Configuration and Mode: AC powered with standard battery - Idle and charging.**

**The test was performed in accordance with 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: 2.48 GHz
Which necessitates an upper frequency test limit of: 13.00 GHz

Frequency Range of Test: 30 MHz to 1 GHz

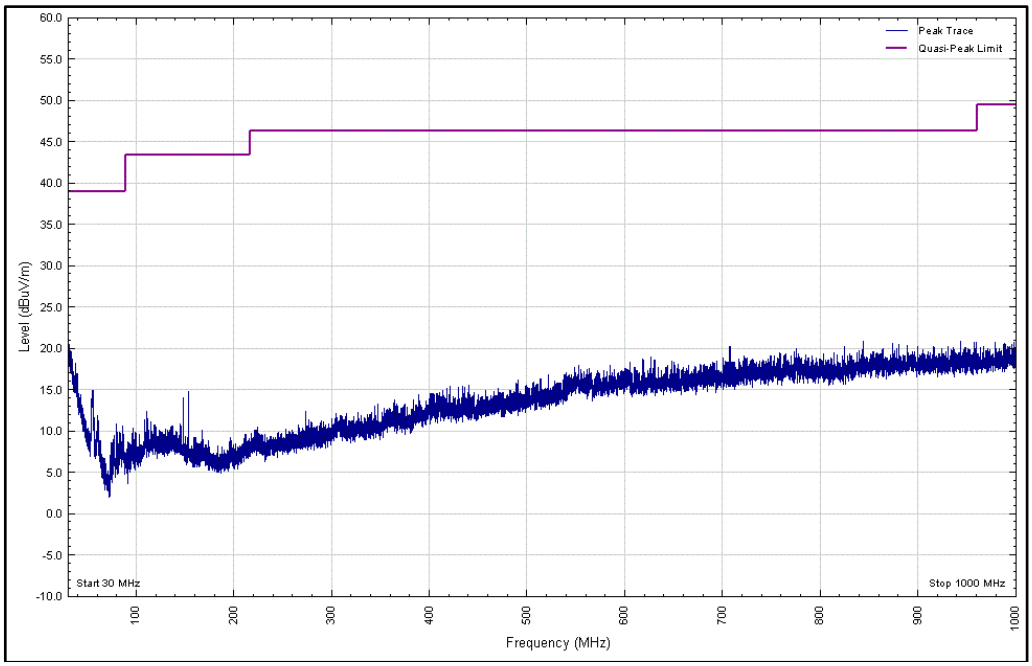


**Figure 11 - Graphical Results - Vertical Polarity**

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

**Table 15**

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

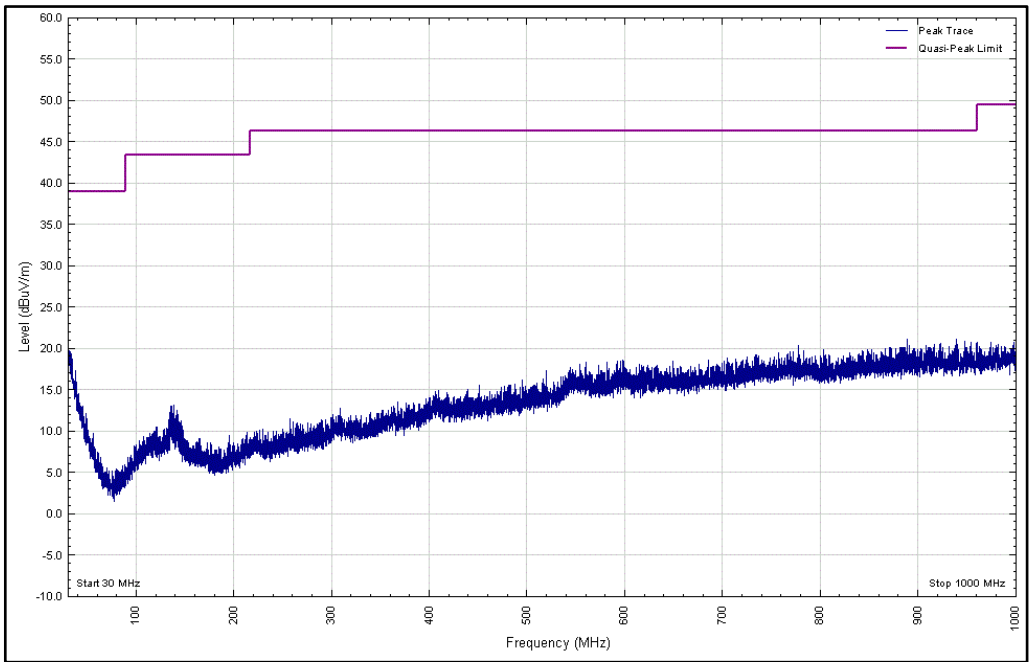


**Figure 12 - Graphical Results - Horizontal Polarity**

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

**Table 16**

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

Frequency Range of Test: 1 GHz to 13 GHz - Peak

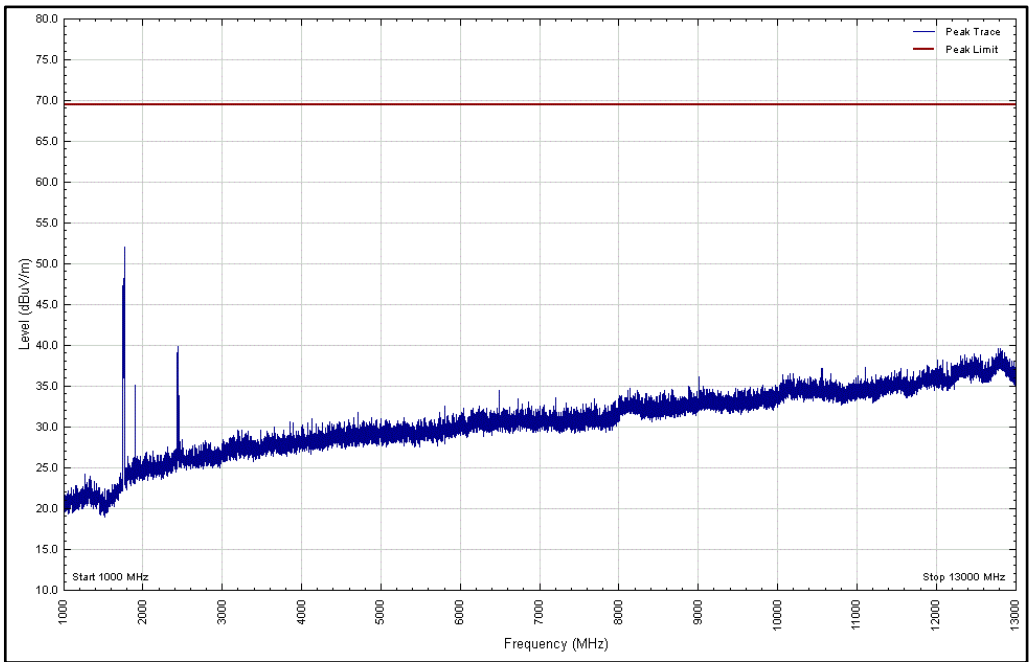


**Figure 13 - Graphical Results - Vertical Polarisation**

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

**Table 11**

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

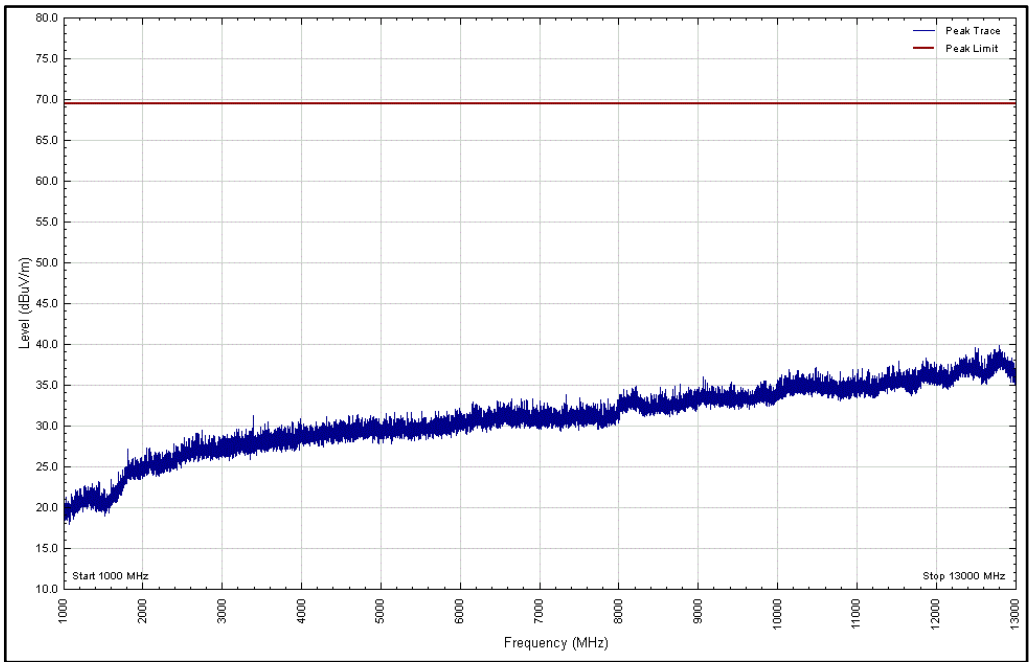


**Figure 14 - Graphical Results – Horizontal Polarisation**

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

**Table 11**

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

Frequency Range of Test: 1 GHz to 13 GHz – CISPR Average

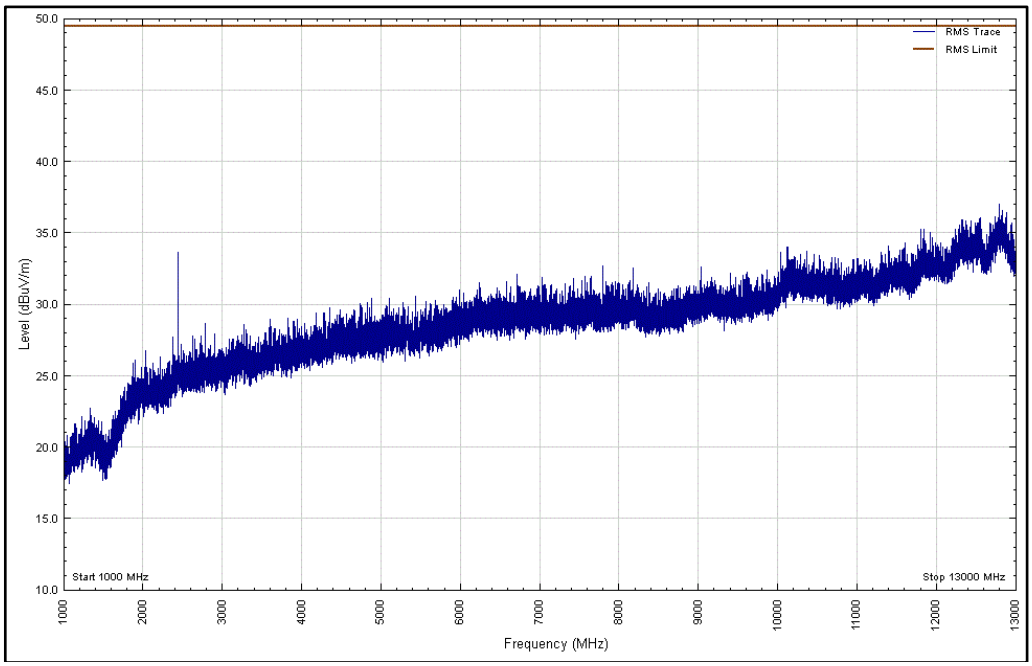


**Figure 15 - Graphical Results - Vertical Polarisation**

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

**Table 11**

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

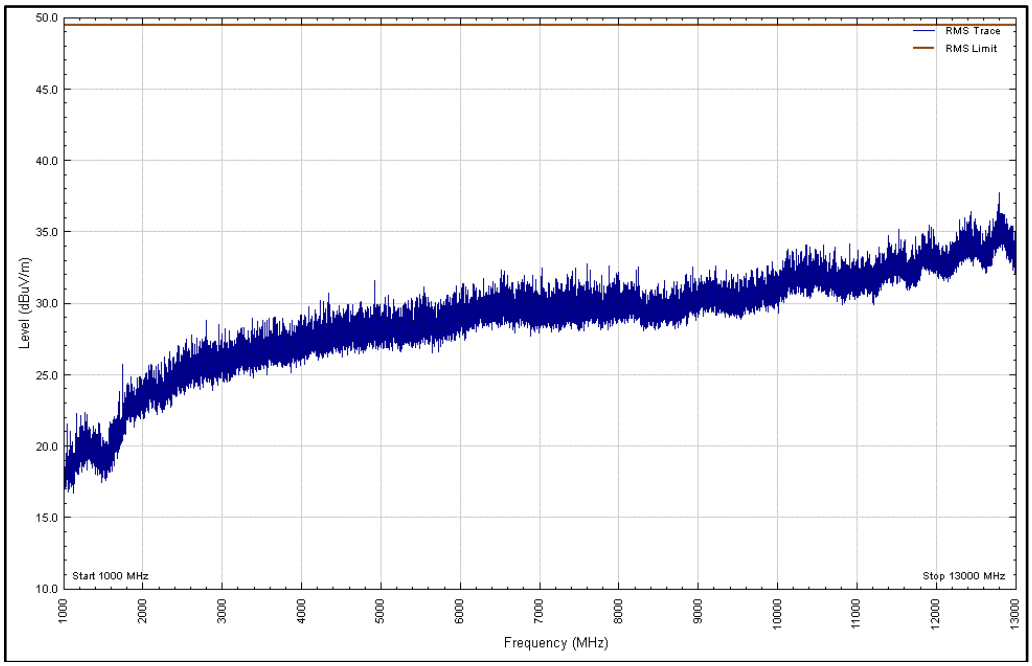


**Figure 16 - Graphical Results – Horizontal Polarisation**

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

**Table 11**

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

**Results for Configuration and Mode: AC powered with high capacity battery - Idle and charging.**

**The test was performed in accordance with 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: 2480 MHz
Which necessitates an upper frequency test limit of: 13 GHz

Frequency Range of Test: 30 MHz to 1 GHz

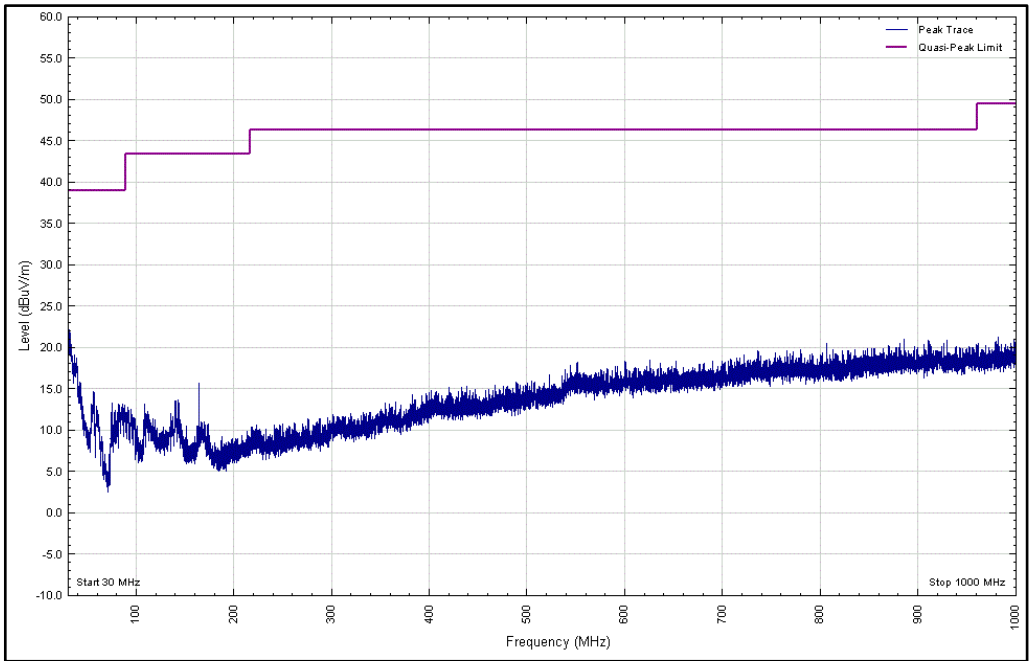


**Figure 17 - Graphical Results - Vertical Polarisation**

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

**Table 17**

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

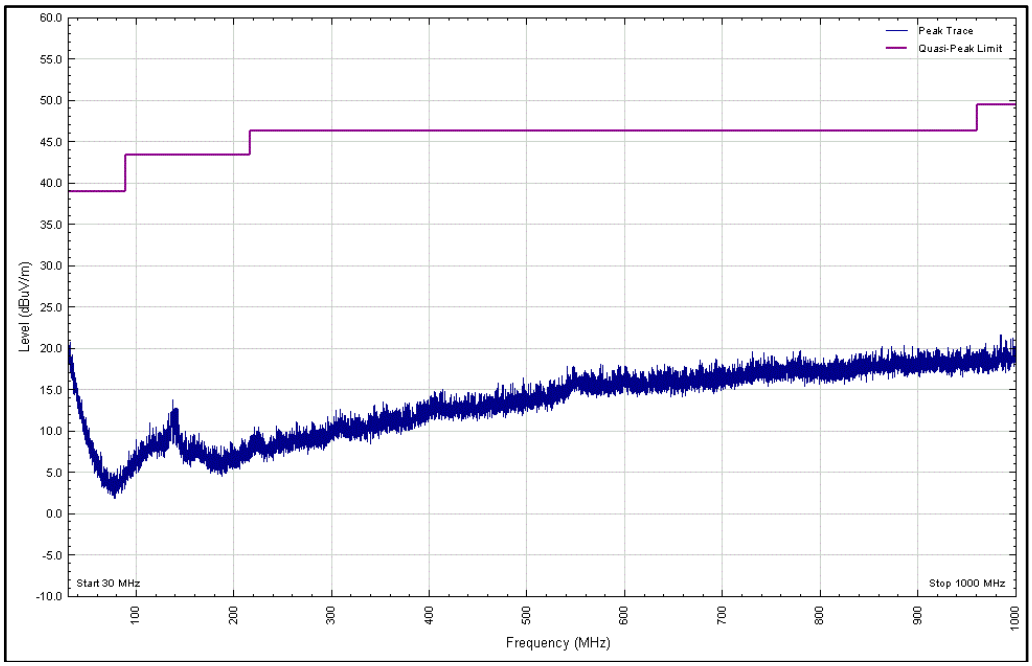


**Figure 18 - Graphical Results - Horizontal Polarisation**

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

**Table 18**

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

Frequency Range of Test: 1 GHz to 13 GHz - Peak

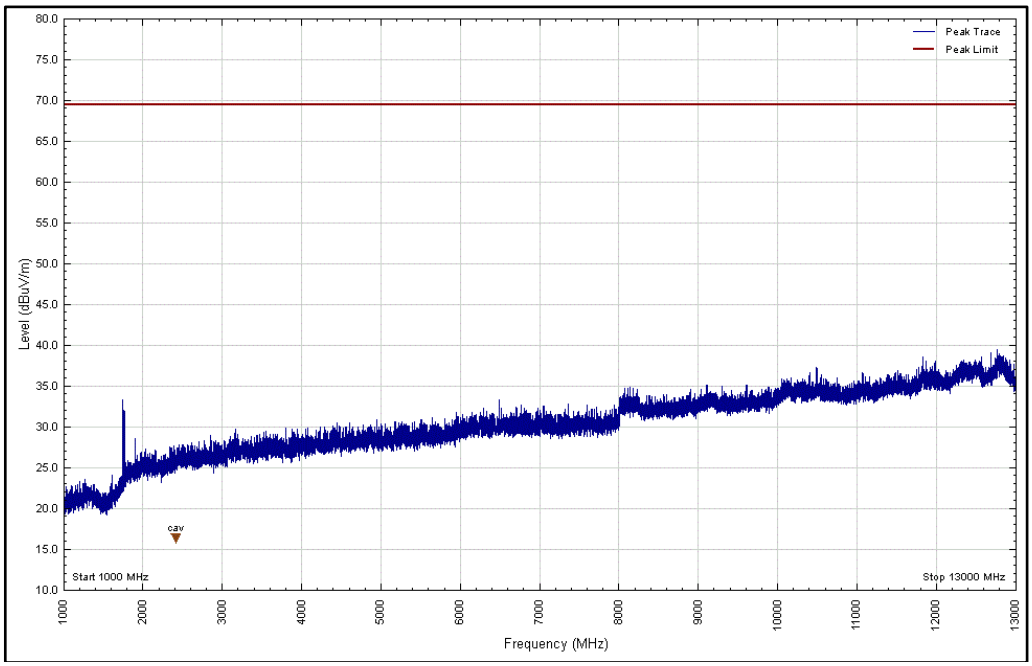


**Figure 19 - Graphical Results - Vertical Polarisation**

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

**Table 11**

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

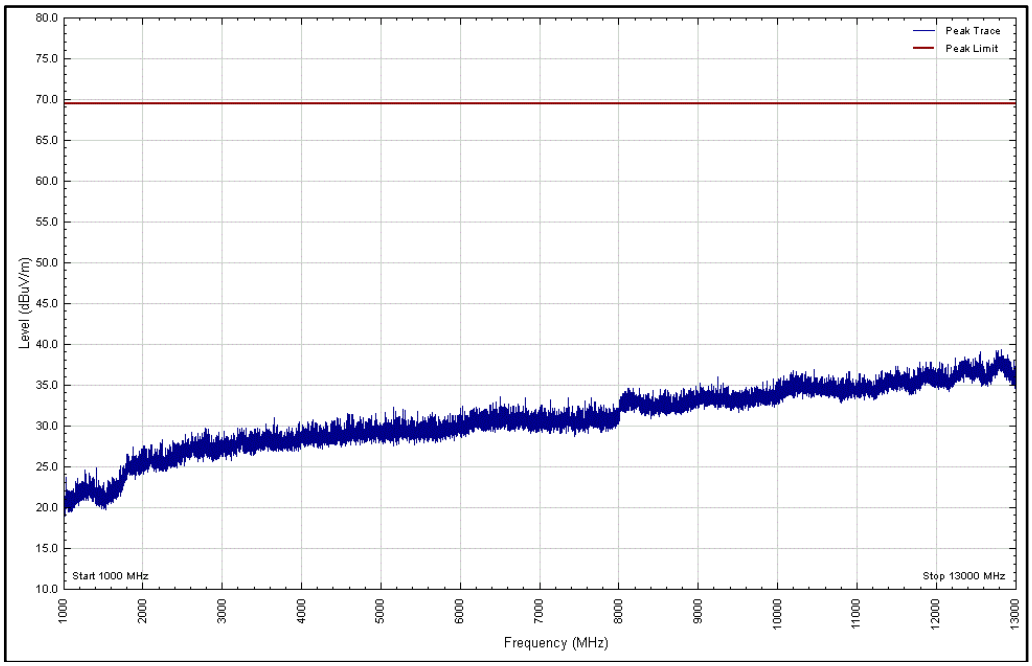


**Figure 20 - Graphical Results – Horizontal Polarisation**

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

**Table 11**

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

Frequency Range of Test: 1 GHz to 13 GHz – CISPR Average

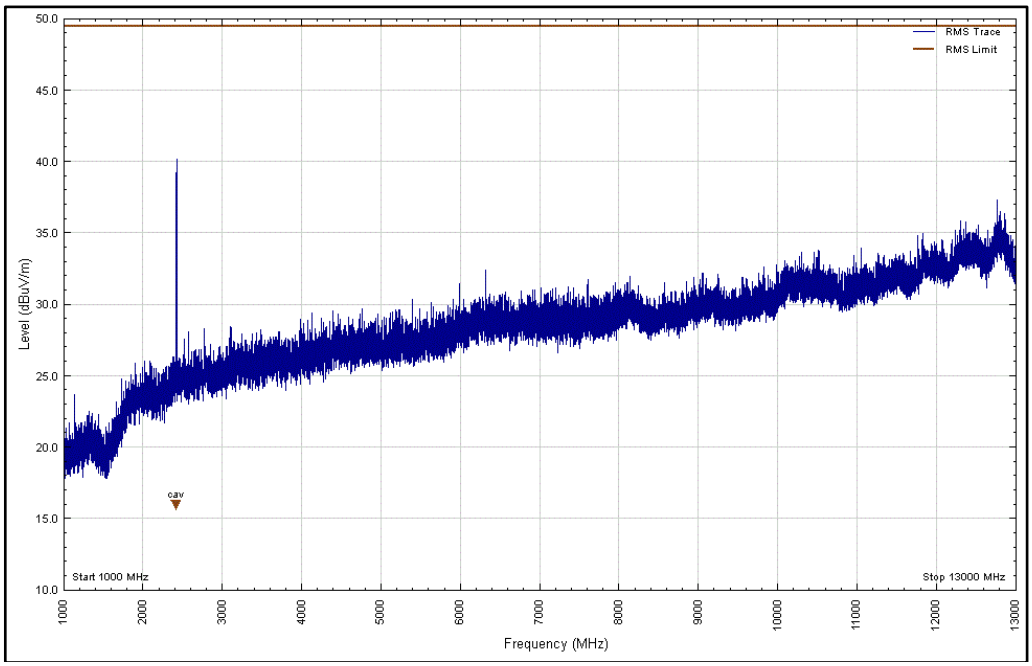


**Figure 21 - Graphical Results - Vertical Polarity**

| Frequency (MHz) | Level (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Detector | Angle (°) | Height (cm) | Polarisation | Orientation |
|---|---|---|---|---|---|---|---|---|
| 2423.932 | 15.5 | 49.5 | -34.0 | CAV | 29 | 105 | Vertical | N/A |

**Table 11**

No other formal measurements were made as all other peak emissions seen were greater than 10 dB below the test limit.

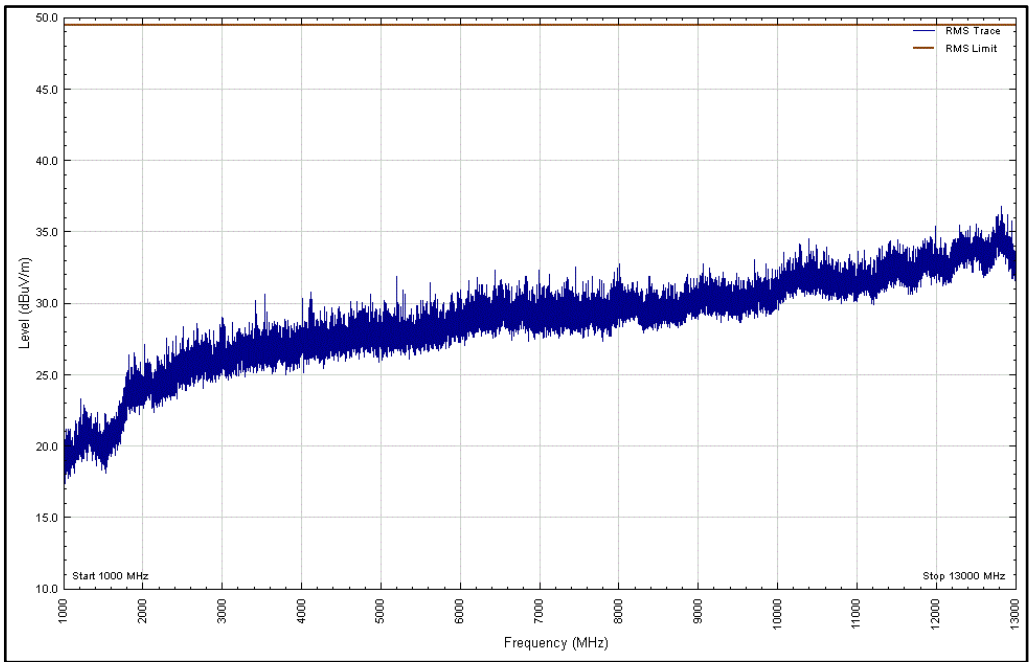


**Figure 22 - Graphical Results – Horizontal Polarity**

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

**Table 11**

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

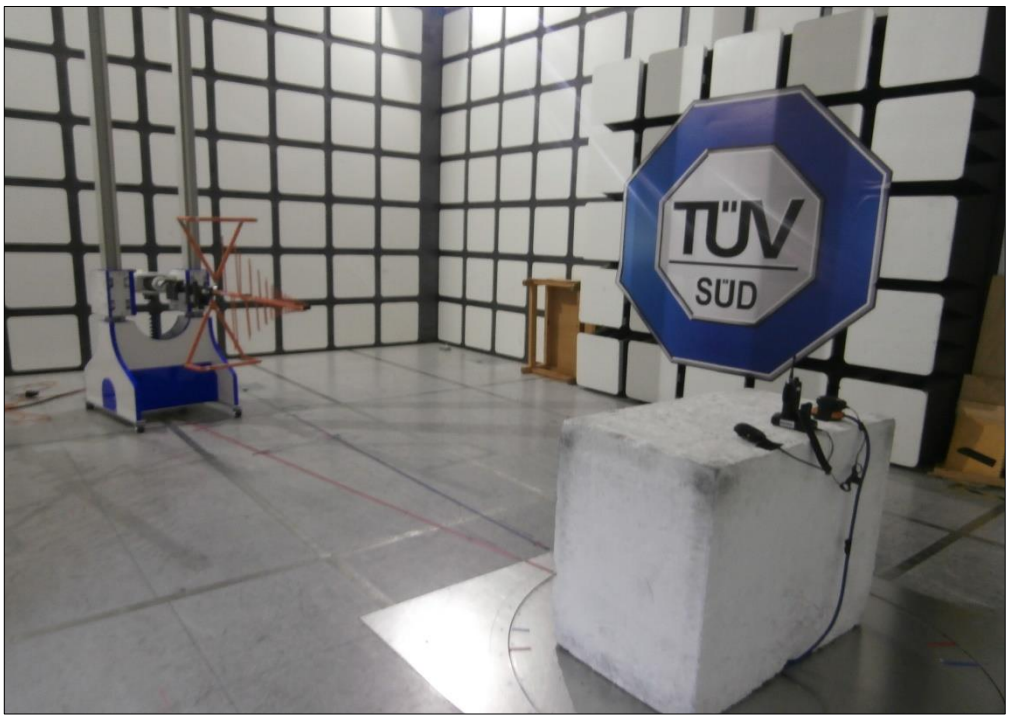


**Figure 23 - Test Setup - 30 MHz to 1 GHz**


**Figure 24 - Test Setup - Above 1 GHz**

### 2.2.10 Test Location and Test Equipment Used

This test was carried out in EMC Chamber 5.

| Instrument | Manufacturer | Type No | TE No | Calibration Period (months) | Calibration Due |
|---|---|---|---|---|---|
| Screened Room (5) | Rainford | Rainford | 1545 | 36 | 23-Jan-2021 |
| EmX Emissions Software | TUV SUD | EmX | 5125 | - | Software |
| EMI Test Receiver | Rohde & Schwarz | ESW44 | 5382 | 12 | 08-Oct-2020 |
| Turntable Controller | Inn-Co GmbH | CO 1000 | 1606 | - | TU |
| Mast Controller | Maturo Gmbh | NCD | 4810 | - | TU |
| Tilt Antenna Mast | Maturo Gmbh | TAM 4.0-P | 4811 | - | TU |
| 1 GHz to 8 GHz Low Noise Amplifier | Wright Technologies | APS04-0085 | 4365 | 12 | 14-Nov-2020 |
| 8 GHz to 18 GHz Low Noise Amplifier | Phase One | PS04-0086 | 1533 | 12 | 08-Feb-2020 |
| Antenna with permanent attenuator (Bilog) | Chase | CBL6143 | 2904 | 24 | 30-Sep-2021 |
| Double Ridged Waveguide Horn Antenna | ETS-Lindgren | 3117 | 4722 | 12 | 05-Mar-2020 |
| '2.92mm' - '2.92mm' RF Cable (2m) | Rhophase | KPS-1503-2000-KPS | 3695 | 12 | 11-Jun-2020 |
| 1.5m 40GHz RF Cable | Scott Cables | KPS-1501-2000-KPS | 5127 | 6 | 20-Jan-2020 |
| 8 Meter Cable | Teledyne | PR90-088-8MTR | 5212 | 12 | 30-Aug-2020 |

**Table 19**

TU - Traceability Unscheduled

# 3 Incident Reports

No incidents reports were raised.

# 4 Measurement Uncertainty

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

| Test Name | Measurement Uncertainty |
|---|---|
| Radiated Disturbance | 30 MHz to 1 GHz, Bilog Antenna, ±5.2 dB<br>1 GHz to 40 GHz, Horn Antenna, ±6.3 dB |
| Conducted Disturbance at Mains Terminals | 150 kHz to 30 MHz, LISN, ±3.7 dB |

**Table 20**

Worst case error for both Time and Frequency measurement 12 parts in $10^6$.

Measurement Uncertainty Decision Rule

Determination of conformity with the specification limits is based on the decision rule according to IEC Guide 115: 2007, clause 4.4.3 and 4.5.1.