# FCC and ISED Test Report

## Sepura Limited
## Tetra Mobile Radio, Model: SCG22

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

Prepared for: Sepura Limited
9000 Cambridge Research Park
Beach Drive
Waterbeach
Cambridge
CB25 9TL
United Kingdom

FCC ID: XX6SCG2229 IC: 8739A-SCG2229

## COMMERCIAL-IN-CONFIDENCE

Document 75948283-01 Issue 01

| SIGNATURE | | | |
|---|---|---|---|
| AJ Lawson. | | | |
| **NAME** | **JOB TITLE** | **RESPONSIBLE FOR** | **ISSUE DATE** |
| Andy Lawson | Senior Engineer | Authorised Signatory | 10 July 2029 |

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

**ENGINEERING STATEMENT**

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

| RESPONSIBLE FOR | NAME | DATE | SIGNATURE |
|---|---|---|---|
| Testing | Ahmad Javid | 10 July 2020 | |
| Testing | Graeme Lawler | 10 July 2020 | |

FCC Accreditation
90987 Octagon House, Fareham Test Laboratory

ISED Accreditation
12669A Octagon House, Fareham Test Laboratory

**EXECUTIVE SUMMARY**

A sample of this product was tested and found to be compliant with FCC 47 CFR Part 15B: 2019 and ICES-003:2016 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 | 10 July 2020 |

**Table 1**

## 1.2 Introduction

| | |
|---|---|
| Applicant | Sepura Limited |
| Manufacturer | Sepura Limited |
| Model Number(s) | SCG22 |
| Serial Number(s) | 1PR002007GPH5XV |
| Hardware Version(s) | Pre-production |
| Software Version(s) | 1785 004 10138 |
| Number of Samples Tested | 1 |
| Test Specification/Issue/Date | FCC 47 CFR Part 15B: 2019<br>ICES-003: 2016 |
| Order Number<br>Date | PLC-PO015398-1<br>12-February-2020 |
| Date of Receipt of EUT | 10-March-2020 |
| Start of Test | 12-May-2020 |
| Finish of Test | 13-May-2020 |
| Name of Engineer(s) | Ahmad Javid and Graeme Lawler |
| Related Document(s) | ANSI C63.4: 2014 |

## 1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 15B and ICES-003 is shown below.

| Section | Specification Clause | | Test Description | Result | Comments/Base Standard |
|---|---|---|---|---|---|
| | Part 15B | ICES-003 | | | |
| Configuration and Mode: DC Powered, Vehicle RSM - Idle | | | | | |
| 2.1 | 15.109 | 6.2 | Radiated Disturbance | Pass | ANSI C63.4: 2014 |
| Configuration and Mode: DC Powered, Vehicle HBC3 - Idle | | | | | |
| 2.1 | 15.109 | 6.2 | Radiated Disturbance | Pass | ANSI C63.4: 2014 |

**Table 2**

## 1.4 Application Form

Equipment Description

| | |
|---|---|
| Technical Description:<br>*(Please provide a brief description of the intended use of the equipment)* | TETRA mobile radio for use within cars, trucks, mobile and fixed control rooms, motorcycles, boats and trains, with Wi-Fi, Bluetooth, GPS and Ethernet functions. |
| Manufacturer: | Sepura |
| Model: | SCG22 Series |
| Part Number: | SCG2229 |
| Hardware Version: | Pre-production |
| Software Version: | 1785 004 10138 |
| FCC ID (if applicable) | XX6SCG2229 |
| IC ID (if applicable) | 8739A-SCG2229 |

Intentional Radiators

| Technology | TETRA | Bluetooth LE | Bluetooth Classic / EDR | Wi-Fi 802.11b, g | Wi-Fi 802.11n | Wi-Fi 802.11n |
|---|---|---|---|---|---|---|
| Frequency Band (MHz) | 380 - 470 MHz | 2402 - 2480 MHz | 2402 - 2480 MHz | 2412 - 2462 MHz | 2412 - 2462 MHz | 2422 - 2452 MHz |
| Conducted Declared Output Power (dBm) | 41.5 | 7.4 | 7.382 | 16.5 | 16.5 | 16.5 |
| Antenna Gain (dBi) | 2 | Element 3:<br>2 dBi | Element 3:<br>2 dBi | Element 3:<br>2 dBi | Element 3:<br>2 dBi | Element 3:<br>2 dBi |
| Supported Bandwidth(s) (MHz) | 0.025 / 0.02 | 1 | 1 | 20 | 20 | 40 |
| Modulation Scheme(s) | π/4 DQPSK | GFSK | GFSK<br>π/4 DQPSK<br>8DPSK | 802.11b:<br>CCK,<br>DBPSK,<br>DQPSK<br>802.11g:<br>BPSK,<br>QPSK,<br>16QAM,<br>64QAM | BPSK,<br>QPSK,<br>16QAM,<br>64QAM | BPSK,<br>QPSK,<br>16QAM,<br>64QAM |
| ITU Emission Designator | 22K0DXW<br>20K0DXW | 1181F1D | 1M01F1D<br>1M01G1D | 19M7G1D | 19M7D1D | 36M8D1D |
| Bottom Frequency (MHz) | 380 | 2402 | 2402 | 2412 | 2412 | 2422 |
| Middle Frequency (MHz) | 425 | 2441 | 2441 | 2437 | 2437 | 2437 |
| Top Frequency (MHz) | 470 | 2480 | 2480 | 2462 | 2462 | 2452 |

## 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: | 12 | V |
| Extreme upper voltage: | 15.6 | V |
| Extreme lower voltage: | 10.8 | V |
| Max current: | 5 | A |

## Battery Power Source None

| | | |
|---|---|---|
| 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: | | |

## Charging

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

## Temperature

| | | |
|---|---|---|
| Minimum temperature: | -20 | °C |
| Maximum temperature: | +60 | °C |

## Antenna Characteristics

| | | | | | |
|---|---|---|---|---|---|
| Antenna connector ☒ | | | State impedance | 50 | Ohm |
| Temporary antenna connector ☐ | | | State impedance | | Ohm |
| Integral antenna ☐ | Type: | | Gain | | dBi |
| External antenna ☒ | Type: | | Gain | | dBi |
| For external antenna only:<br>Standard Antenna Jack ☒ If yes, describe how user is prohibited from changing antenna (if not professional installed):<br>Equipment is only ever professionally installed ☒<br>Non-standard Antenna Jack ☐ | | | | | |

Ancillaries (if applicable)

| | | | |
|---|---|---|---|
| Manufacturer: | Sepura | Part Number: | GPSB4 |
| Model: | GPSB4 Vehicle Roof Antenna | Country of Origin: | Unknown |
| Manufacturer: | Sepura | Part Number: | AFB-TET |
| Model: | AFB-VAR 380-430 MHz antenna | Country of Origin: | Unknown |
| Manufacturer: | Sepura | Part Number: | AFB-UT |
| Model: | AFB-VAR 406-472 MHz antenna | Country of Origin: | Unknown |
| Manufacturer: | Sepura | Part Number: | 300-02012 rev001 |
| Model: | Extended SCG Loudspeaker / IO USB Host lead | Country of Origin: | Unknown |
| Manufacturer: | Sepura | Part Number: | 300-02014 rev001 |
| Model: | Extended SCG Expansion Board Loudspeaker / 8 GPIO lead | Country of Origin: | Unknown |
| Manufacturer: | Sepura | Part Number: | Netgear GS105 ProSAFE Gigabit Switch |
| Model: | Netgear GS105 ProSAFE Gigabit Switch | Country of Origin: | Unknown |
| Manufacturer: | Sepura | Part Number: | 300-02010 |
| Model: | SCG Power/ignition Lead | Country of Origin: | Unknown |
| Manufacturer: | Sepura | Part Number: | 300-00069 |
| Model: | Mobile Remote Cable 5.0M | Country of Origin: | Unknown |
| Manufacturer: | Sepura | Part Number: | 300-00670 |
| Model: | HBC Interface and Hands-free Box | Country of Origin: | Unknown |
| Manufacturer: | Sepura | Part Number: | 300-00079 |
| Model: | Remote Microphone And Switch Set | Country of Origin: | Unknown |
| Manufacturer: | Sepura | Part Number: | 300-00292 |
| Model: | Remote Microphone (Handsfree Kit) 3m | Country of Origin: | Unknown |
| Manufacturer: | Sepura | Part Number: | 300-01801 |
| Model: | Handset Based Console (HBC3) | Country of Origin: | Unknown |
| Manufacturer: | Sepura | Part Number: | 300-00082 |
| Model: | Detachable Loudspeaker extension Cable | Country of Origin: | Unknown |
| Manufacturer: | Sepura | Part Number: | 300-00062 |
| Model: | Fist microphone | Country of Origin: | Unknown |
| Manufacturer: | Sepura | Part Number: | 300-01808 |
| Model: | SCC3 (colour console) | Country of Origin: | Unknown |
| Manufacturer: | Sepura | Part Number: | 300-01961 |
| Model: | CC VAC RSM (Long Cable) | Country of Origin: | Unknown |
| Manufacturer: | Sepura | Part Number: | 300-00719 |
| Model: | Loudspeaker | Country of Origin: | Unknown |
| Manufacturer: | Sepura | Part Number: | 300-01837 |
| Model: | Loudspeaker | Country of Origin: | Unknown |

I hereby declare that the information supplied is correct and complete.
Name: Chris Beecham
Position held: Conformance Engineer
Date: 10 March 2020

## 1.5 Product Information

### 1.5.1 Technical Description

The Equipment Under Test (EUT) was a TETRA mobile radio for use within cars, trucks, mobile and fixed control rooms, motorcycles, boats and trains, with Wi-Fi, Bluetooth, GPS and Ethernet functions

### 1.5.2 EUT Port/Cable Identification

| Port | Max Cable Length specified | Usage | Type | Screened |
|---|---|---|---|---|
| Ethernet Port | 100 m | Ethernet | Data | FTP |
| GPS Antenna Port | 15 m | Connection to GPS Antenna | Data | Coax |
| Tetra Antenna Port | 15 m | Connection to Tetra Antenna | Data | Coax |
| WLAN & Bluetooth Port | 8 m | Connection to WLAN Antenna | Data | Coax |
| DC Positive Permanent | 5 m | DC Power to EUT | Positive | No |
| DC Positive Switched | 5 m | DC Power to EUT | Positive | No |
| DC Negative | 5 m | DC Power to EUT | Negative | Yes |
| USB Port | 30 m | Connection to USB | Data | No |
| SCC3 / HBC3 Port | 0.5 m | Connection to SCC3 / HBC3 Port | Data | No |
| IO Cable | 6 m | Data | Data | No |

**Table 3**

Client to confirm maximum specified length of each cable, and whether screened or not

### 1.5.3 Test Configuration

| Configuration | Description |
|---|---|
| DC Powered, Vehicle RSM | The EUT was powered by 12 V DC.<br>The EUT was populated with two SCC3 units each with a Vehicle RSM connected. Also, a Hands-Free Kit was connected to each of the SCC3 units. Two loudspeakers of type 300-00719 were connected. |
| DC Powered, Vehicle HBC3 | The EUT was powered by 12 V DC.<br>The EUT was populated with two HBC3 units each with a Hands-Free Kit connected. Two Heavy Duty Loudspeakers of type 300-01837 were connected. |

**Table 4**

### 1.5.4 Modes of Operation

| Mode | Description |
|---|---|
| Idle | All transmitters were configured to idle. GPS was set to receive.<br>Bi-directional traffic was established over the ethernet port. |

**Table 5**

### 1.6 Deviations from the Standard

No deviations from the applicable test standard were made during testing.

### 1.7 EUT Modification Record

The table below details modifications made to the EUT during the test programme.

The modifications incorporated during each test are recorded on the appropriate test pages.

| Modification State | Description of Modification still fitted to EUT | Modification Fitted By | Date Modification Fitted |
|---|---|---|---|
| Model: SCG22, Serial Number: 1PR002007GPH5XV | | | |
| 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: DC Powered, Vehicle RSM - Idle | | |
| Radiated Disturbance | Ahmad Javid and Graeme Lawler | UKAS |
| Configuration and Mode: DC Powered, Vehicle HBC3 - Idle | | |
| Radiated Disturbance | Ahmad Javid | UKAS |

**Table 7**

Office Address:

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

# 2 Test Details

## 2.1 Radiated Disturbance

### 2.1.1 Specification Reference

FCC 47 CFR Part 15B, Clause 15.109
ICES-003, Clause 6.2

### 2.1.2 Equipment Under Test and Modification State

SCG22, S/N: 1PR002007GPH5XV - Modification State 0

### 2.1.3 Date of Test

12-May-2020 to 13-May-2020

### 2.1.4 Test Method

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

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

For an EUT which could reasonable be used in multiple planes, pre-scans were performed with the EUT orientated in X, Y and Z planes with reference to the ground plane.

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

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

### 2.1.5 Example Calculation

Below 1 GHz:

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

Above 1 GHz:

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

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

### 2.1.6 Example Test Setup Diagram

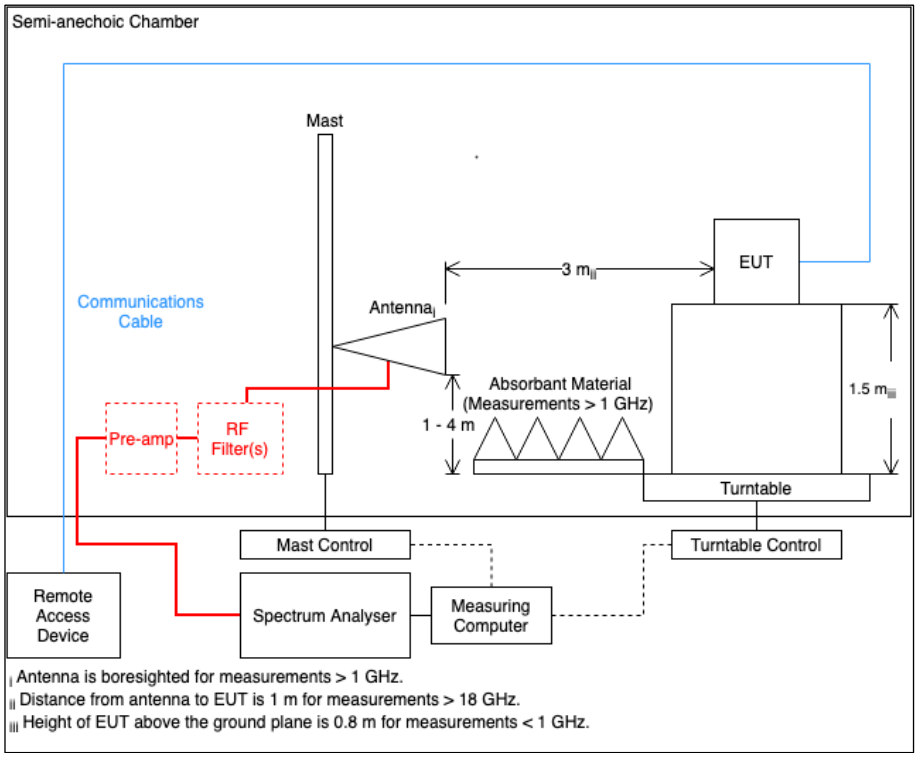


**Figure 1**

### 2.1.7 Environmental Conditions

| | |
|---|---|
| Ambient Temperature | 21.4 - 21.5 °C |
| Relative Humidity | 26.6 - 33.0 % |

### 2.1.8 Specification Limits

| Required Specification Limits, Field Strength (Class A @ 10 m) | | |
|---|---|---|
| Frequency Range (MHz) | Test Limit (µV/m) | Test Limit (dBµV/m) |
| 30 to 88 | 90 | 39.1 |
| 88 to 216 | 150 | 43.5 |
| 216 to 960 | 210 | 46.4 |
| Above 960 | 300 | 49.5 |
| **Supplementary information:**<br>Note 1. Quasi-Peak detector to be used for measurements below 1 GHz.<br>Note 2. CISPR Average detector to be used for measurements above 1 GHz.<br>Note 3. Peak test limit above 1 GHz is 20 dB higher than the CISPR Average test limit. | | |

**Table 8**

### 2.1.9 Test Results

**Results for Configuration and Mode: DC Powered and Vehicle RSM - Idle.**

**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

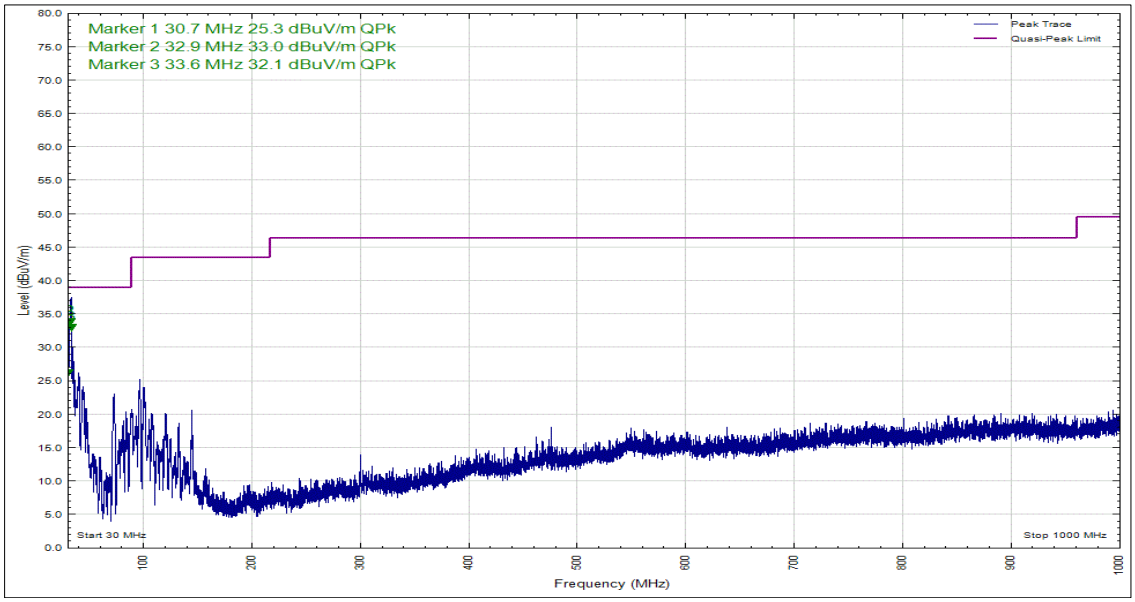


**Figure 2 - 30 MHz to 1 GHz, Quasi-Peak, Vertical**

| Frequency (MHz) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Angle (°) | Height (cm) | Polarisation |
|---|---|---|---|---|---|---|---|
| 32.907 | 33.0 | 39.1 | -6.1 | Q-Peak | 204 | 107 | Vertical |
| 33.552 | 32.1 | 39.1 | -7.0 | Q-Peak | 358 | 104 | Vertical |

**Table 9**

No other final measurements were made as all other peak emissions seen above the measurement system noise floor during the pre-scan were greater than 10 dB below the test limit.

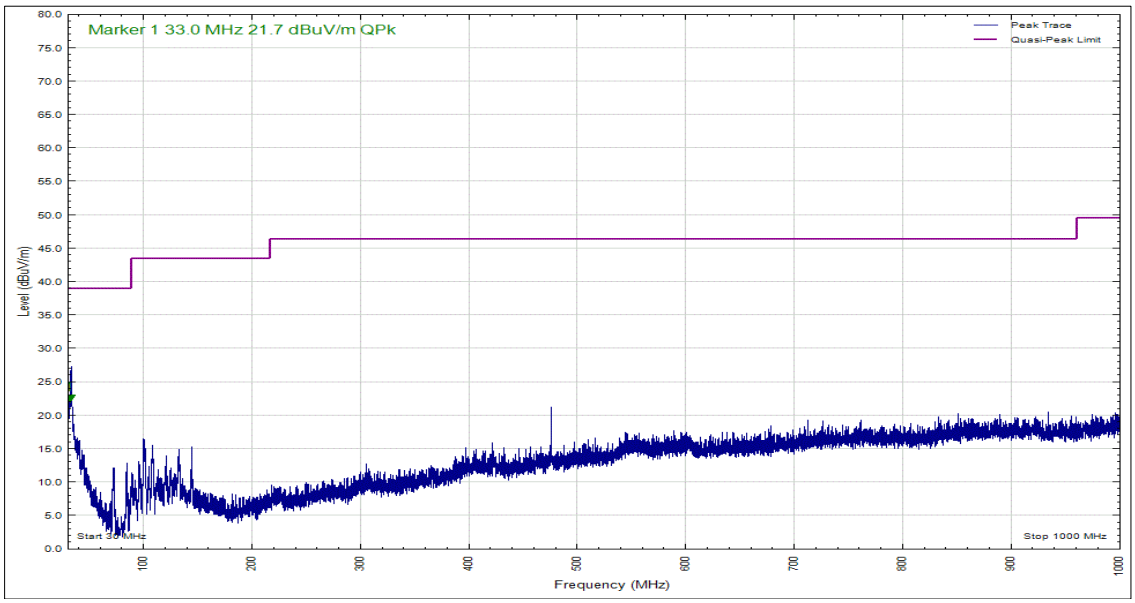


**Figure 3 - 30 MHz to 1 GHz, Quasi-Peak, Horizontal**

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

**Table 10**

*No final measurements were made as all peak emissions seen above the measurement system noise floor during the pre-scan were greater than 10 dB below the test limit.

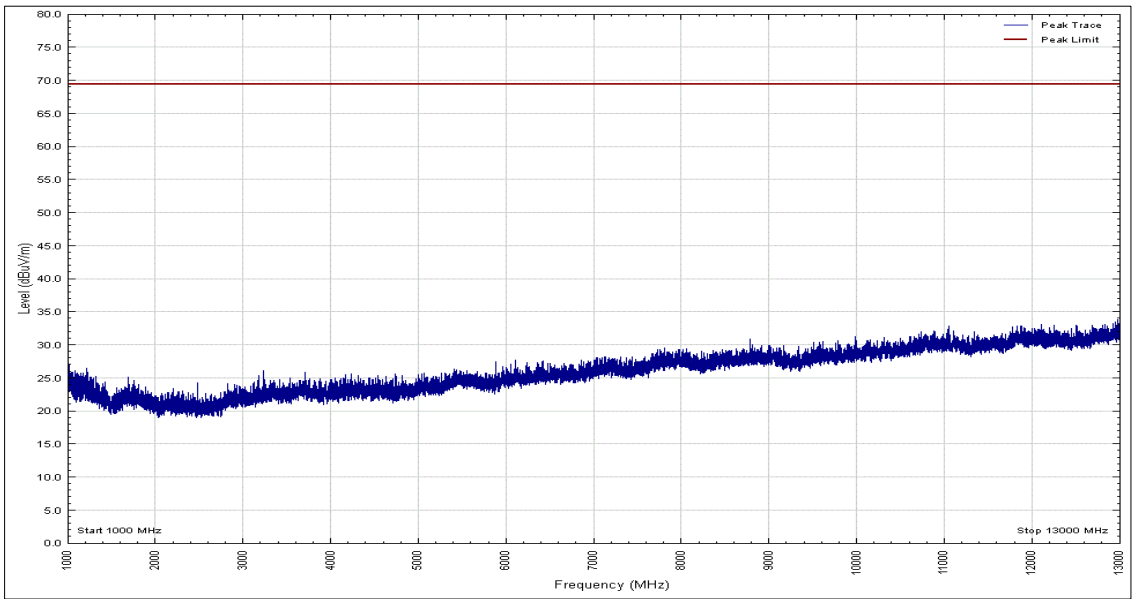


**Figure 4 - 1 GHz to 13 GHz, Peak, Vertical**

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

**Table 11**

*No final measurements were made as all peak emissions seen above the measurement system noise floor during the pre-scan were greater than 10 dB below the test limit.

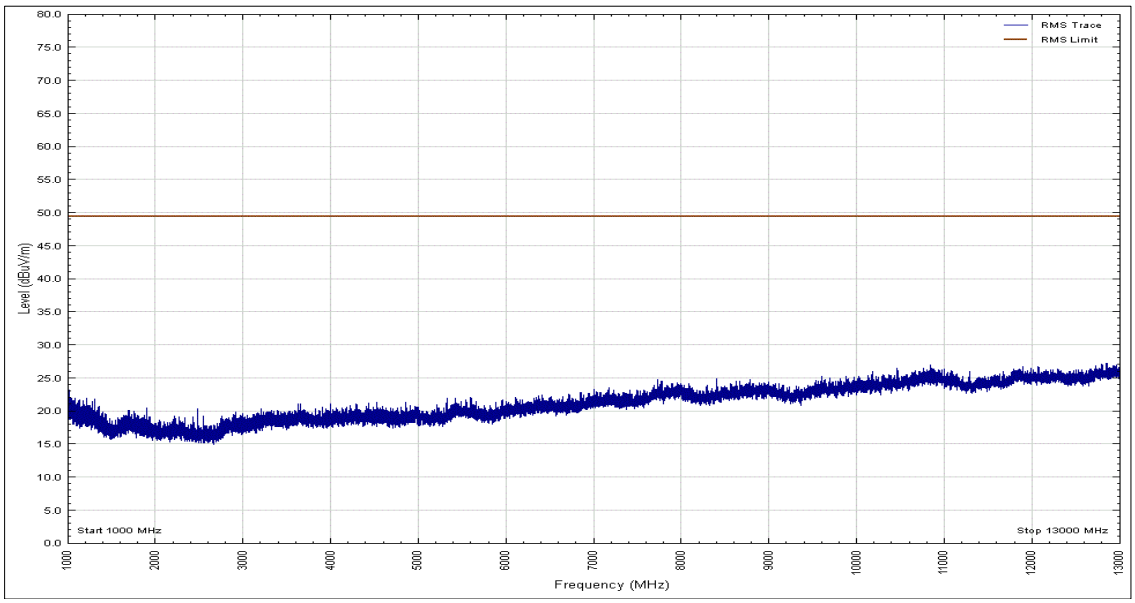


**Figure 5 - 1 GHz to 13 GHz, Average, Vertical**

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

**Table 12**

*No final measurements were made as all peak emissions seen above the measurement system noise floor during the pre-scan were greater than 10 dB below the test limit.

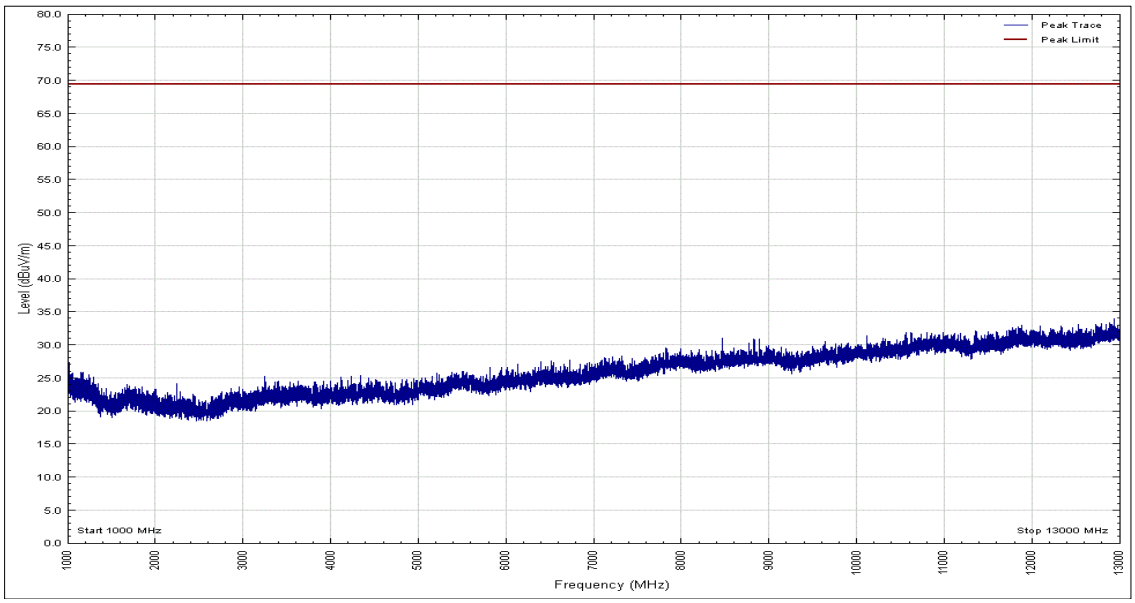


**Figure 6 - 1 GHz to 13 GHz, Peak, Horizontal**

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

**Table 13**

*No final measurements were made as all peak emissions seen above the measurement system noise floor during the pre-scan were greater than 10 dB below the test limit.

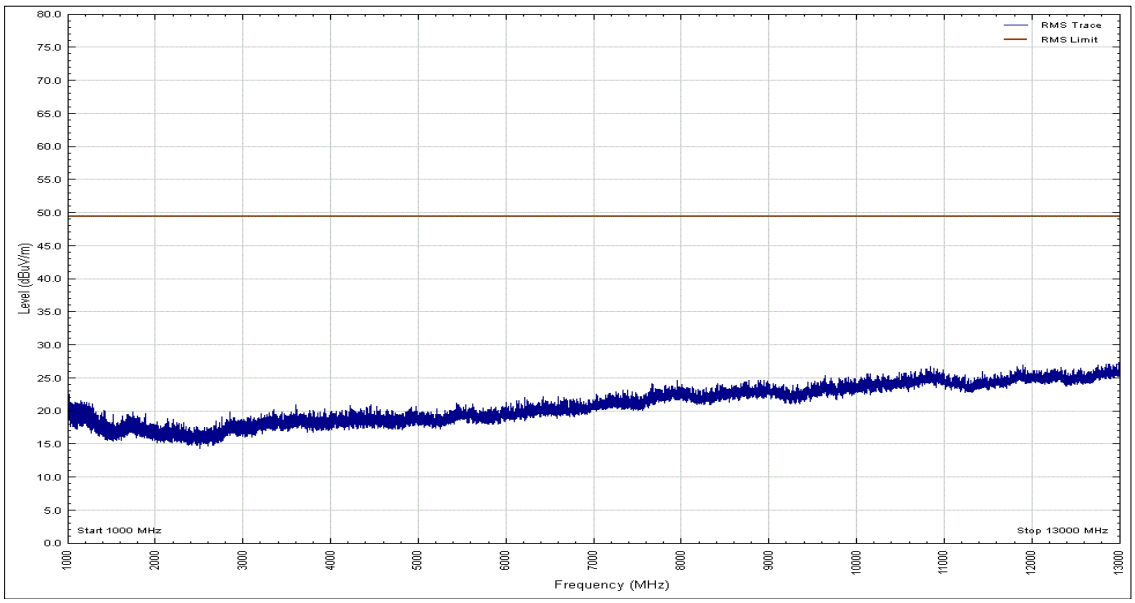


**Figure 7 - 1 GHz to 13 GHz, Average, Horizontal**

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

**Table 14**

*No final measurements were made as all peak emissions seen above the measurement system noise floor during the pre-scan were greater than 10 dB below the test limit.

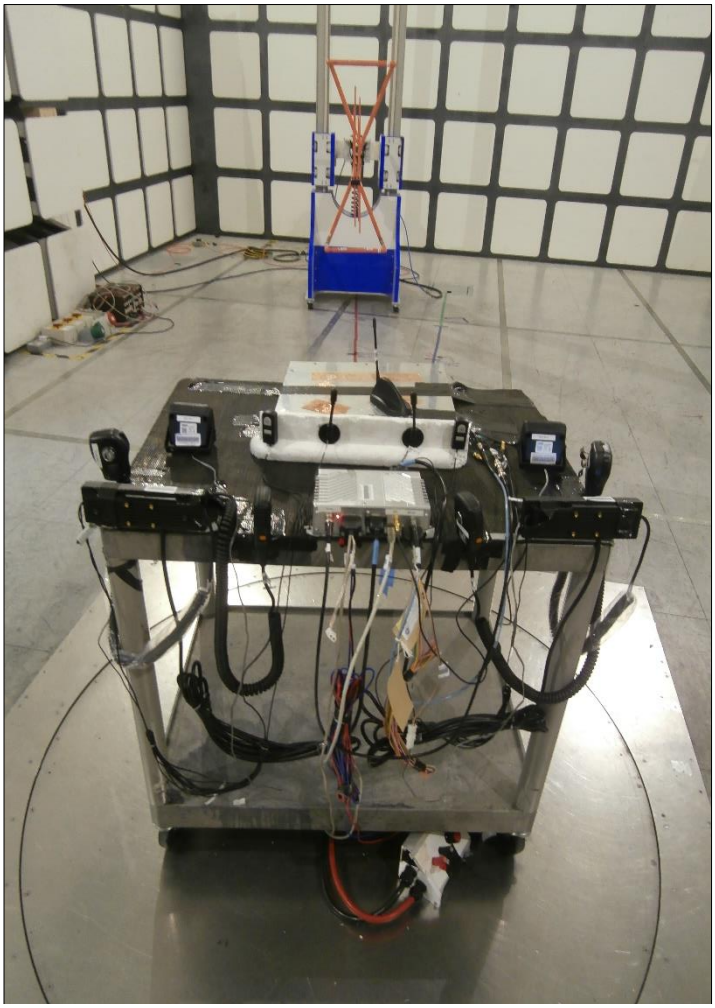

**Figure 8 - Test Setup - 30 MHz to 1 GHz**

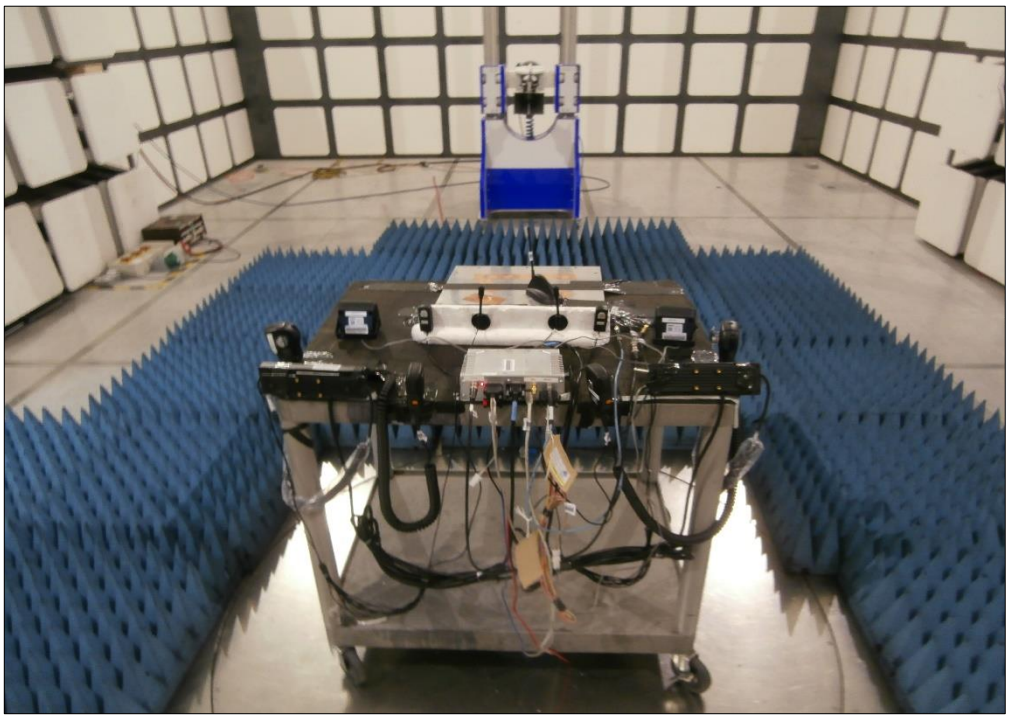

**Figure 9 - Test Setup - 1 GHz to 8 GHz**

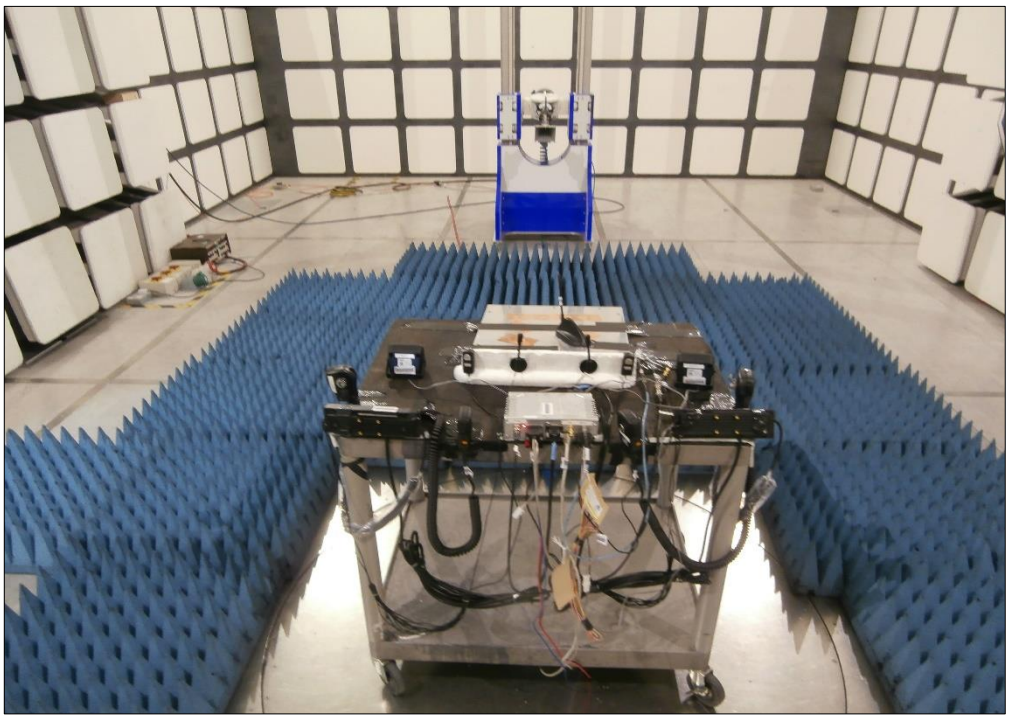

**Figure 10 - Test Setup - 8 GHz to 13 GHz**

**Results for Configuration and Mode: DC Powered and Vehicle HBC3 - Idle.**

**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

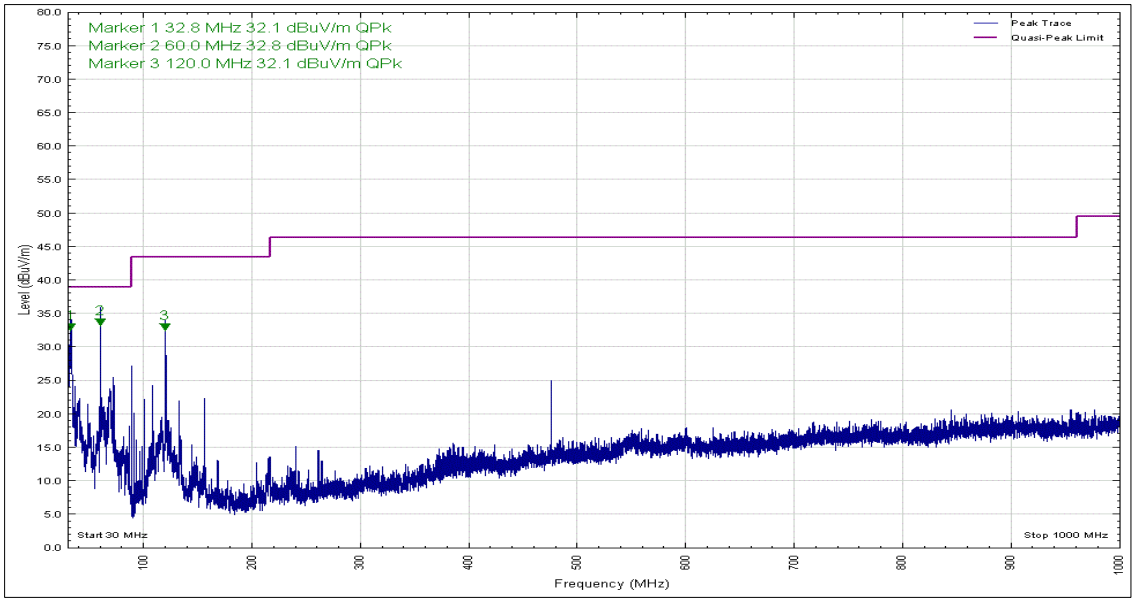


**Figure 11 - 30 MHz to 1 GHz, Quasi-Peak, Vertical**

| Frequency (MHz) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Angle (°) | Height (cm) | Polarisation |
|---|---|---|---|---|---|---|---|
| 32.832 | 32.1 | 39.1 | -7.0 | Q-Peak | 0 | 100 | Vertical |
| 60.000 | 32.8 | 39.1 | -6.3 | Q-Peak | 9 | 100 | Vertical |
| 119.999 | 32.1 | 43.5 | -11.4 | Q-Peak | 131 | 108 | Vertical |

**Table 15**

No other final measurements were made as all other peak emissions seen above the measurement system noise floor during the pre-scan were greater than 10 dB below the test limit.

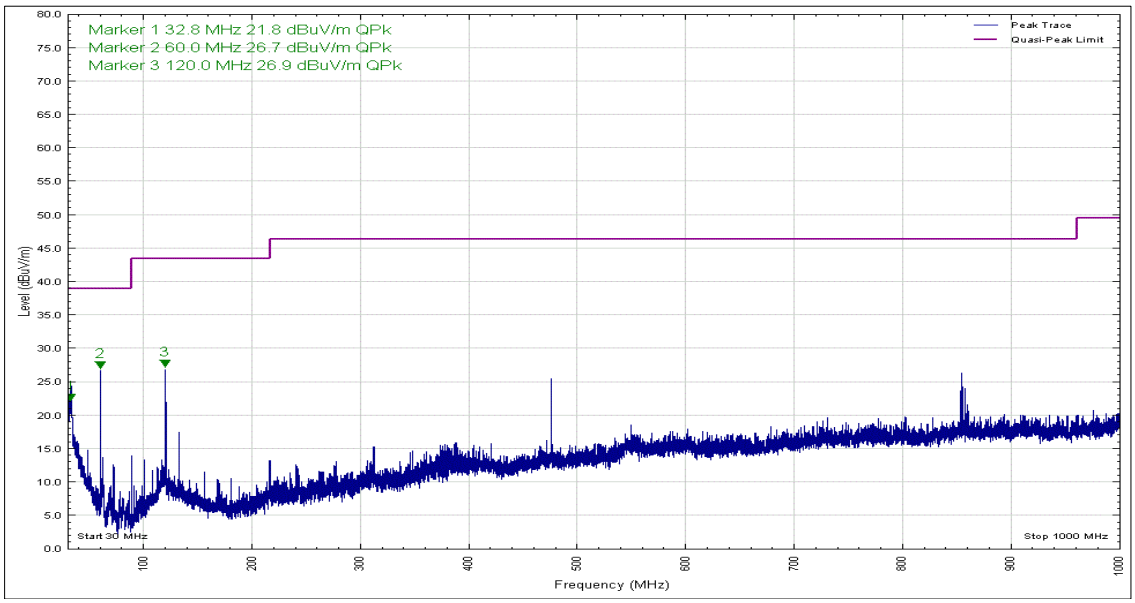


**Figure 12 - 30 MHz to 1 GHz, Quasi-Peak, Horizontal**

| Frequency (MHz) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Angle (°) | Height (cm) | Polarisation |
|---|---|---|---|---|---|---|---|
| 32.838 | 21.8 | 39.1 | -17.3 | Q-Peak | 283 | 107 | Horizontal |
| 60.004 | 26.7 | 39.1 | -12.4 | Q-Peak | 262 | 359 | Horizontal |
| 119.999 | 26.9 | 43.5 | -16.7 | Q-Peak | 90 | 249 | Horizontal |

**Table 16**

No other final measurements were made as all other peak emissions seen above the measurement system noise floor during the pre-scan were greater than 10 dB below the test limit.

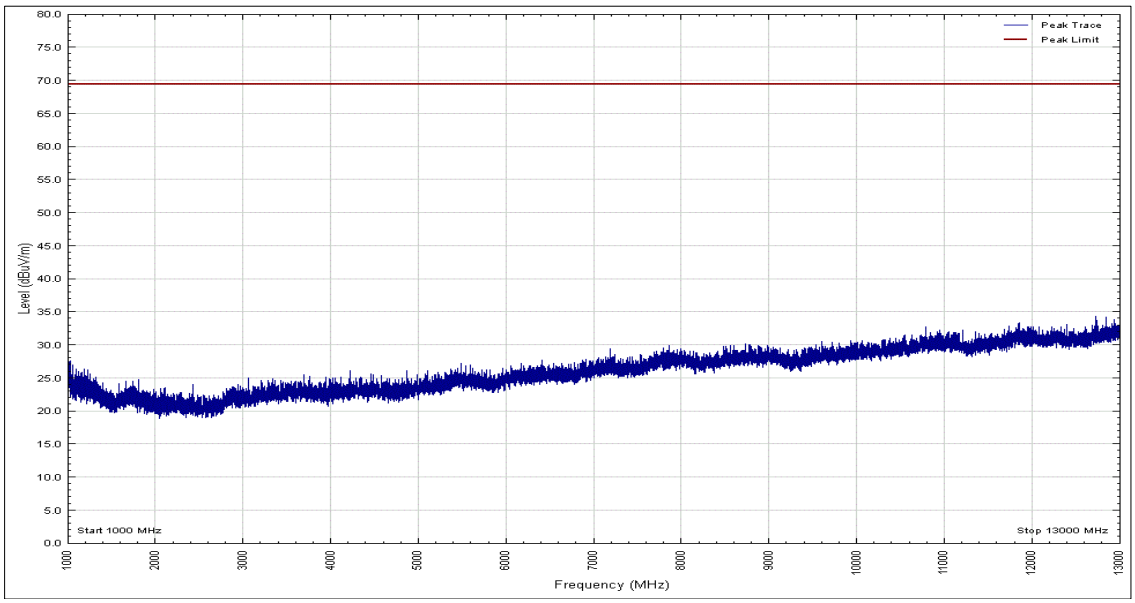


**Figure 13 - 1 GHz to 13 GHz, Peak, Vertical**

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

**Table 17**

*No final measurements were made as all peak emissions seen above the measurement system noise floor during the pre-scan were greater than 10 dB below the test limit.

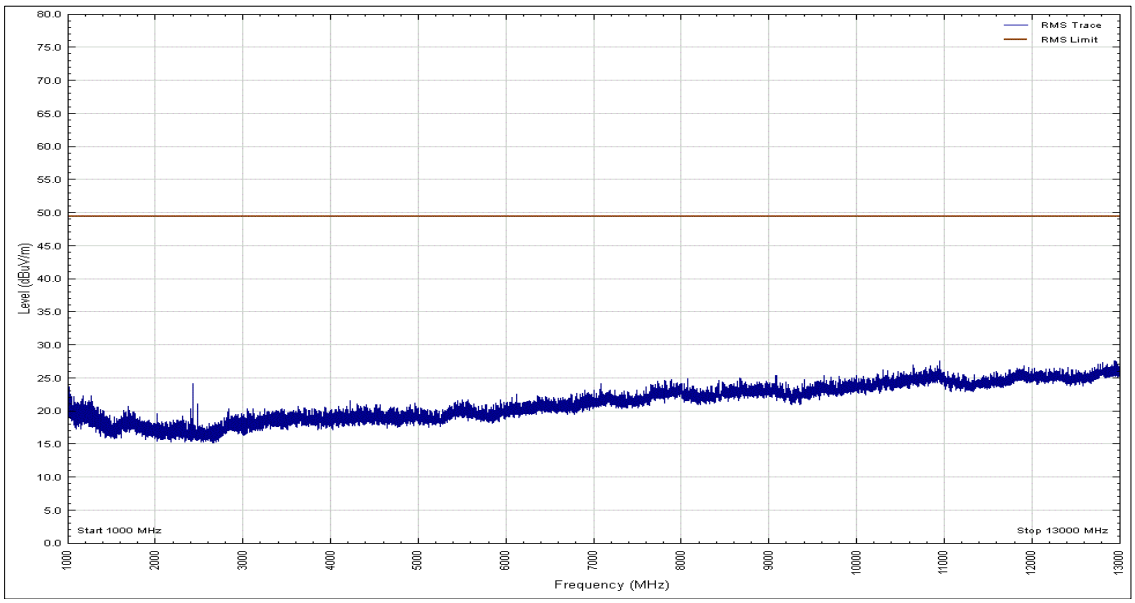


**Figure 14 - 1 GHz to 13 GHz, Average, Vertical**

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

**Table 18**

*No final measurements were made as all peak emissions seen above the measurement system noise floor during the pre-scan were greater than 10 dB below the test limit.

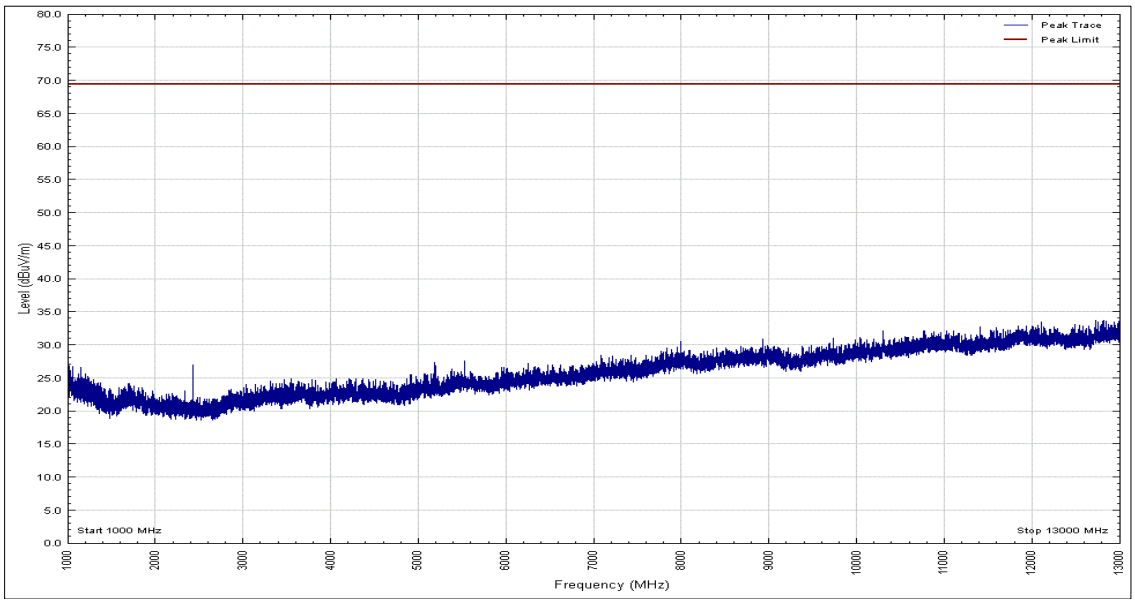


**Figure 15 - 1 GHz to 13 GHz, Peak, Horizontal**

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

**Table 19**

*No final measurements were made as all peak emissions seen above the measurement system noise floor during the pre-scan were greater than 10 dB below the test limit.

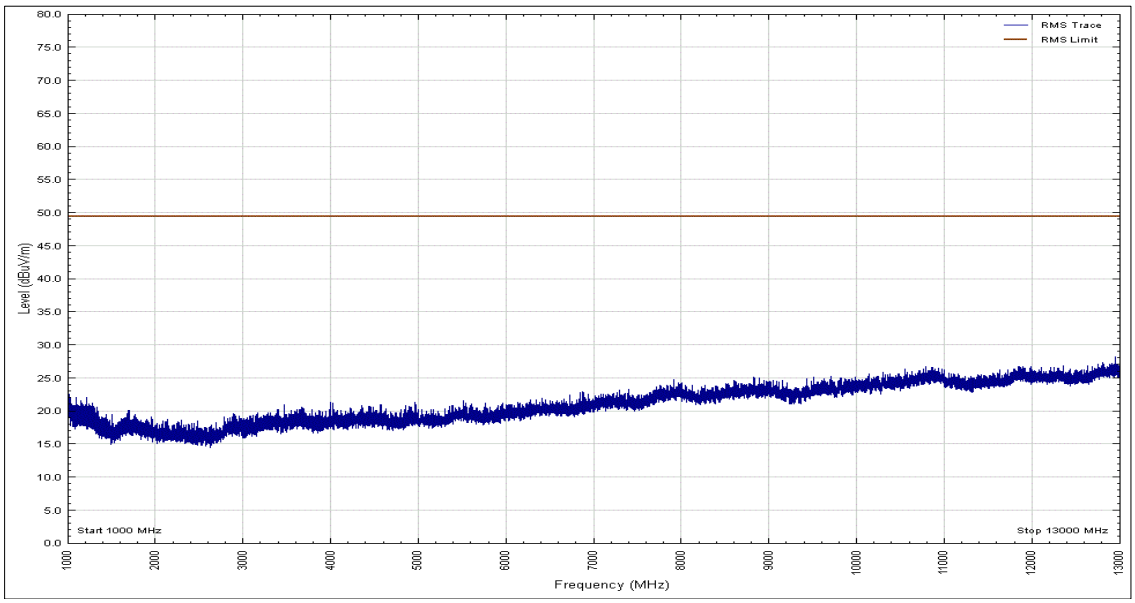


**Figure 16 - 1 GHz to 13 GHz, Average, Horizontal**

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

**Table 20**

*No final measurements were made as all peak emissions seen above the measurement system noise floor during the pre-scan were greater than 10 dB below the test limit.

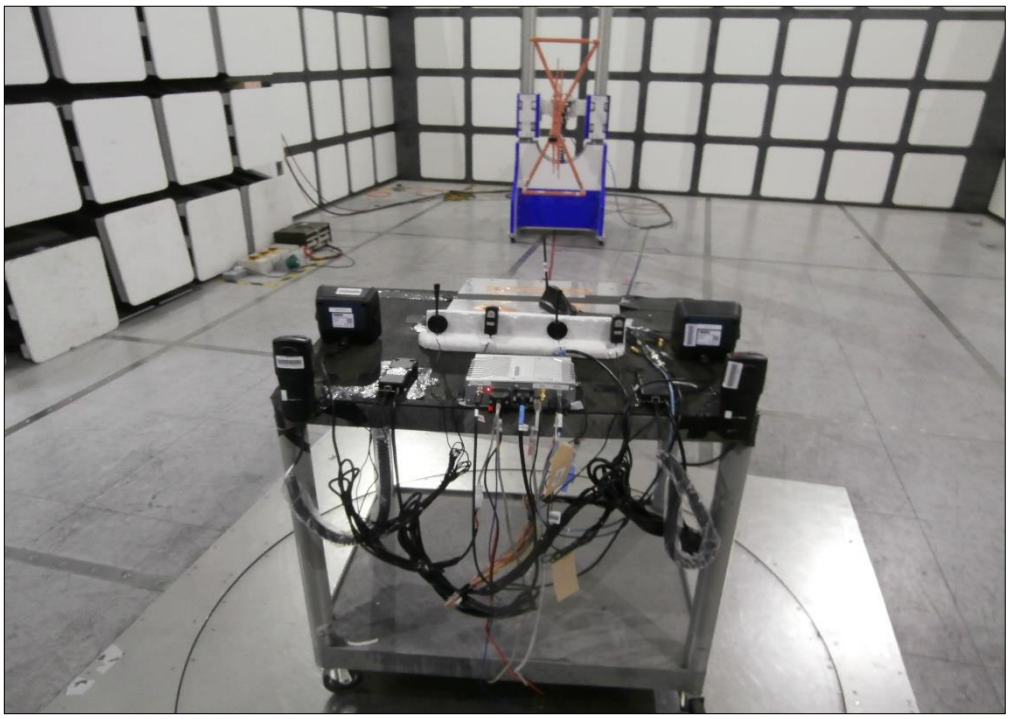

**Figure 17 - Test Setup - 30 MHz to 1 GHz**

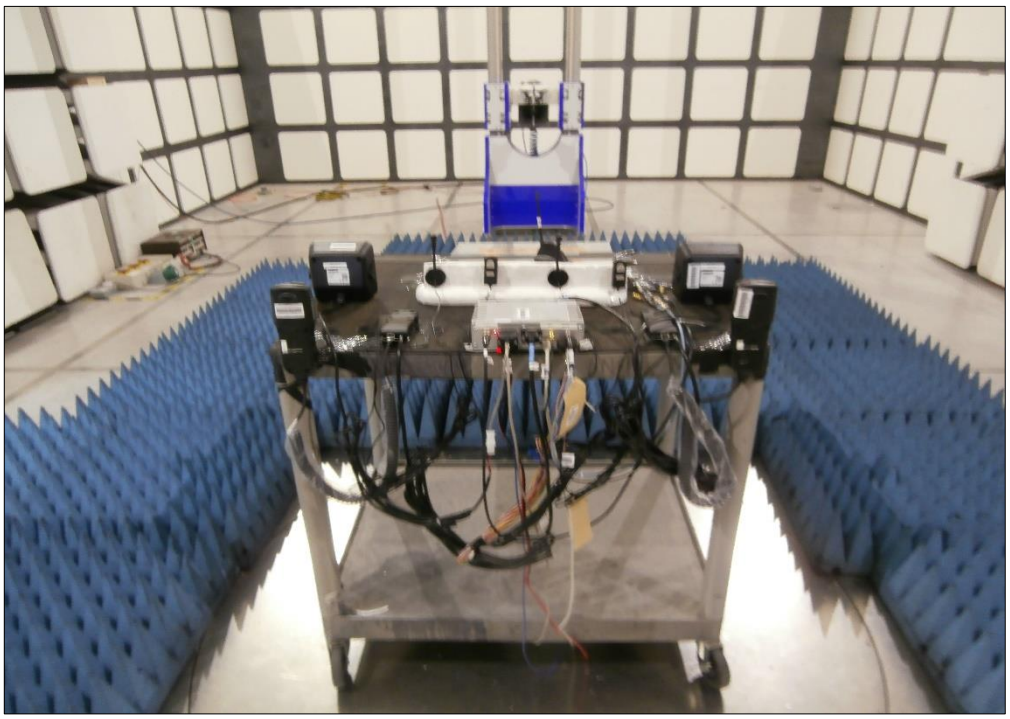

**Figure 18 - Test Setup - 1 GHz to 8 GHz**

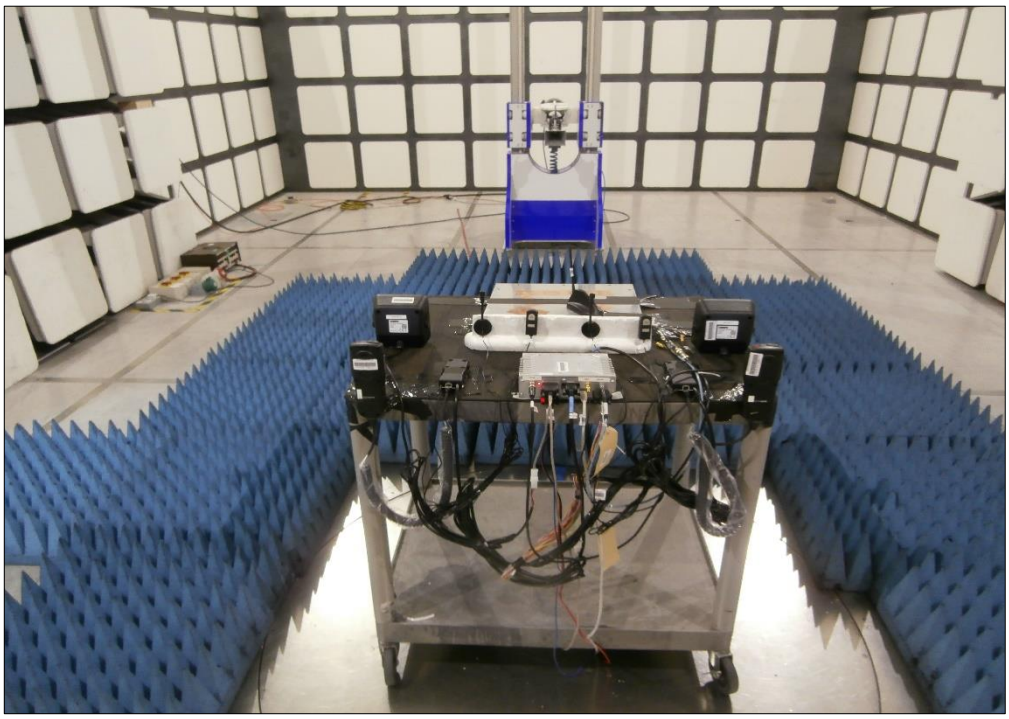

**Figure 19 - Test Setup - 8 GHz to 13 GHz**

### 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 |
| EmX Emissions Software | TUV SUD | EmX V.V1.5.10 | 5125 | - | Software |
| EMI Test Receiver | Rohde & Schwarz | ESW44 | 5527 | 12 | 06-Feb-2021 |
| 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 |
| Preamplifier (30dB 1GHz to 18GHz) | Schwarzbeck | BBV 9718 C | 5261 | 12 | 07-Apr-2021 |
| 4dB Attenuator | Pasternack | PE7047-4 | 4935 | 24 | 30-Sep-2021 |
| Antenna with permanent attenuator (Bilog) | Chase | CBL6143 | 2904 | 24 | 30-Sep-2021 |
| Double Ridge Broadband Horn Antenna | Schwarzbeck | BBHA 9120 B | 4848 | 12 | 10-Mar-2021 |
| Antenna (DRG Horn 7.5-18GHz) | Schwarzbeck | HWRD750 | 5348 | 12 | 04-Sep-2020 |
| Cable (Yellow, Rx, Km-Km 2m) | Scott Cables | KPS-1501-2000-KPS | 4527 | 6 | 09-Jun-2020 |
| Cable (18 GHz) | Rosenberger | LU7-071-1000 | 5103 | 12 | 06-Oct-2020 |
| 8 Meter Cable | Teledyne | PR90-088-8MTR | 5212 | 12 | 30-Aug-2020 |
| Multimeter | Iso-tech | IDM 101 | 2118 | 12 | 07-Feb-2021 |
| Programmable Power Supply | Iso-tech | IPS 2010 | 2437 | - | O/P Mon |
| Comb Generator | Schaffner | RSG1000 | 3034 | - | TU |
| Thermo-Hygro-Barometer | PCE Instruments | OCE-THB-40 | 5470 | 12 | 16-Mar-2021 |

**Table 21**

TU – Traceability Unscheduled
O/P Mon – Output Monitored Using Calibrated Test Equipment

# 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 |

**Table 22**

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.