FCC Test Report

Rexon Technology Corp., Ltd.
Aviation Portable Radio, Model: PJ2

In accordance with FCC 47 CFR Part 15B

Prepared for: Rexon Technology Corp., Ltd.
No. 261
Jen Hwa Rd.
Tali
Taichung
TAIWAN

FCC ID: I7OPJ2

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Document Number: 75946622-01 | Issue: 01

SIGNATURE			
			
NAME	**JOB TITLE**	**RESPONSIBLE FOR**	**ISSUE DATE**
Kim Archer	Sales Manager	Authorised Signatory	23 October 2019

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

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Testing	Graeme Lawler	23 October 2019	

FCC Accreditation
90987 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 for the tests detailed in section 1.3.

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United Kingdom

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	23 October 2019

Table 1

1.2 Introduction

Applicant	Rexon Technology Corp., Ltd.
Manufacturer	Rexon Technology Corp., Ltd.
Model Number(s)	PJ2
Serial Number(s)	R1907AV0003
Hardware Version(s)	SP170 Factory 0.0.0.6
Software Version(s)	PJ2_test.set
Number of Samples Tested	1
Test Specification/Issue/Date	FCC 47 CFR Part 15B: 2018
Order Number Date	Signed QAF 22-July-2019
Date of Receipt of EUT	05-August-2019
Start of Test	01-October-2019
Finish of Test	01-October-2019
Name of Engineer(s)	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 is shown below.

Section	Specification Clause	Test Description	Result	Comments/Base Standard
Configuration and Mode: AC/DC Power Supply, VHF Receive				
2.1	15.107	Conducted Disturbance at Mains Terminals – Class A.	Pass	ANSI C63.4: 2014
2.2	15.109	Radiated Disturbance – Class A.	Pass	ANSI C63.4: 2014

Table 2

1.4 Application Form

Equipment Description

Technical Description: *(Please provide a brief description of the intended use of the equipment)*	Aviation Portable Radio
Manufacturer:	Rexon Technology Co., LTD
Model:	PJ2
Part Number:	700-01170-00000
Hardware Version:	SP170 Factory 0.0.0.6
Software Version:	PJ2_test.set
FCC ID (if applicable)	I7OPJ2
IC ID (if applicable)	Not Applicable

Intentional Radiators

Technology	Aviation Portable Radio
Frequency Band (MHz)	118.000 to 136.975
Conducted Declared Output Power (dBm)	32 (1.5 W)
Antenna Gain (dBi)	0
Supported Bandwidth(s) (MHz)	25KHz
Modulation Scheme(s)	Amplitude Modulation
ITU Emission Designator	6K00A3E
Bottom Frequency (MHz)	118.000
Middle Frequency (MHz)	127.500
Top Frequency (MHz)	136.975

Un-intentional Radiators

Highest frequency generated or used in the device or on which the device operates or tunes	209.625 MHz
Lowest frequency generated or used in the device or on which the device operates or tunes	118.000 MHz
Class A Digital Device (Use in commercial, industrial or business environment) ☒ Class B Digital Device (Use in residential environment only) ☐	

AC Power Source

AC supply frequency: 50/60 (Hz)	
100~240 V	Max current: 3 A
Single Phase ☒ Three Phase ☐	

DC Power Source

Nominal voltage: 9 V
Extreme upper voltage: 9.6 V
Extreme lower voltage: 7.2 V
Max current: 1.5. A

Battery Power Source

Voltage: 9 V
End-point voltage: 7.2 V *(Point at which the battery will terminate)*
Alkaline ☒ Leclanche ☐ Lithium ☐ Nickel Cadmium ☐ Lead Acid* ☐ **(Vehicle regulated)*
Other ☐ Please detail: Click to edit

Charging

Can the EUT transmit whilst being charged	Yes ☐ No ☒

Temperature

Minimum temperature: -30 °C	Maximum temperature: +50 °C

Antenna Characteristics

Antenna connector ☒ State impedance 50 Ohm
Temporary antenna connector ☐ State impedance Click to edit Ohm
Integral antenna ☐ Type Click to edit State impedance Click to edit dBi
External antenna ☒ Type Helical State impedance 0 dBi

Ancillaries (if applicable)

Manufacturer: Click to edit	Part Number: Click to edit
Model: Click to edit	Country of Origin: Click to edit

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

Name: Ken Chen
Position held: R&D Manager
Date: July.29.2019

1.5 Product Information

1.5.1 Technical Description

Aviation Portable Radio.

1.5.2 EUT Port/Cable Identification

Port	Max Cable Length specified	Usage	Type	Screened
Configuration and Mode: AC/DC Power Supply, VHF Receive				
AC Mains Neutral	0.8 m	AC Power for AC Adapter	Neutral	No
AC Mains Live	0.8 m	AC Power for AC Adapter	AC Live	No

Table 3

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: PJ2: Serial Number: R1907AV0003			
0	As supplied by the customer	Not Applicable	Not Applicable

Table 4

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/DC Power Supply, VHF Receive		
Conducted Disturbance at Mains Terminals	Graeme Lawler	UKAS
Radiated Disturbance	Graeme Lawler	UKAS

Table 5

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

2.1.2 Equipment Under Test and Modification State

PJ2, S/N: R1907AV0003 - Modification State 0

2.1.3 Date of Test

01-October-2019

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 reference ground plane was positioned 0.4 m to the rear of the EUT.

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) = Limit (dBµV) – Quasi-Peak level (dBµV)

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

2.1.6 Example Test Setup Diagram

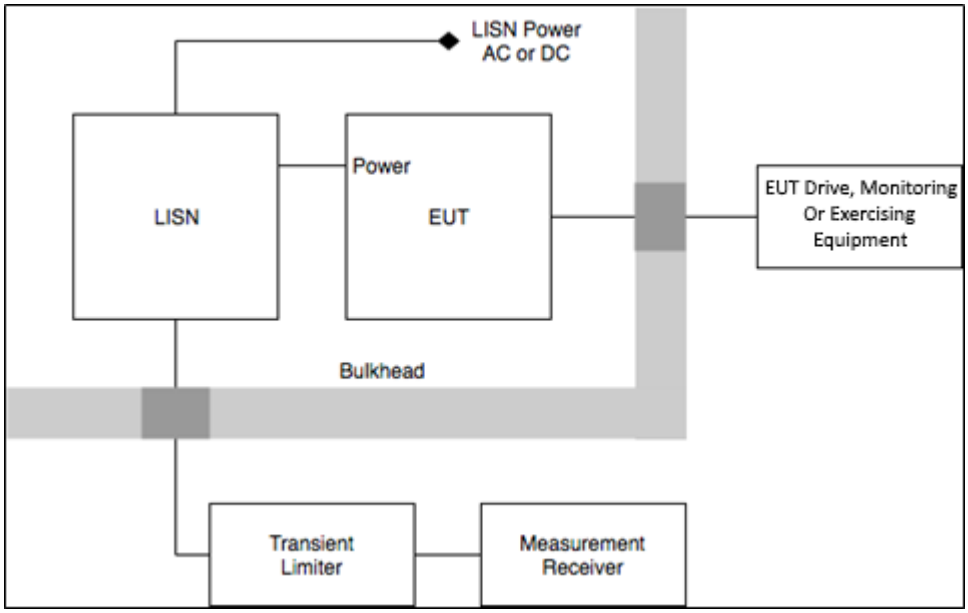

Figure 1 - Conducted Disturbance Example Test Setup

2.1.7 Environmental Conditions

Ambient Temperature	21.7 °C
Relative Humidity	69.1 %

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 6

2.1.9 Test Results

Results for Configuration and Mode: AC/DC Power Supply, VHF Receive.

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

Tested to Class A Test Limits.

Detailed results are shown below.

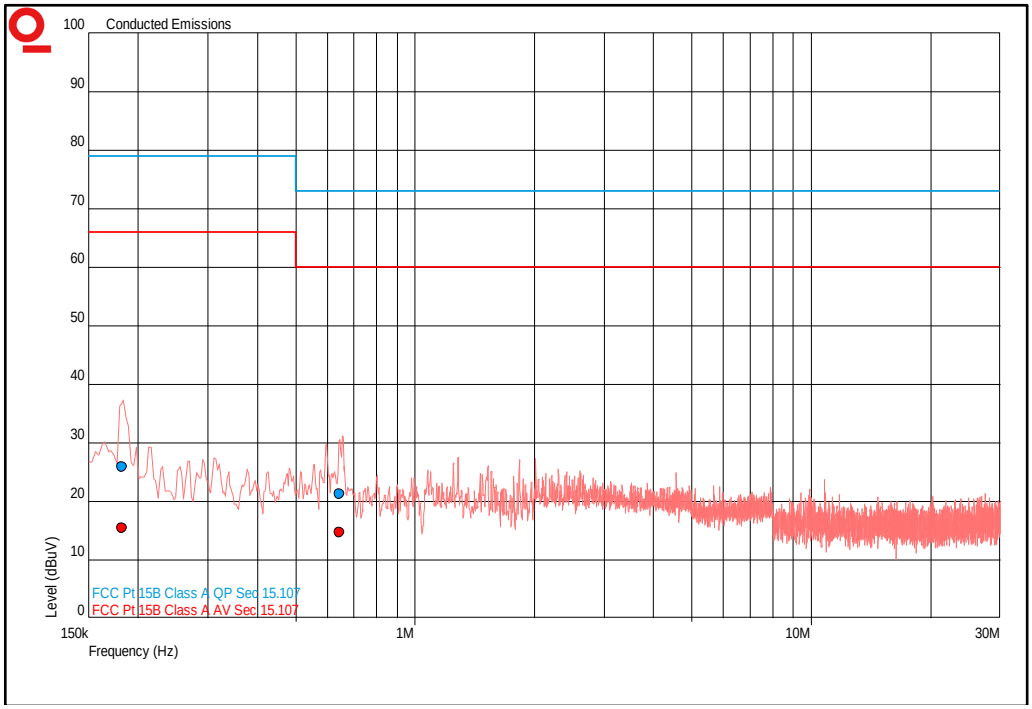

Figure 2 - Graphical Results - AC Mains Neutral

Frequency (MHz)	QP Level (dBµV)	QP Limit (dBµV)	QP Margin (dBµV)	AV Level (dBµV)	AV Limit (dBµV)	AV Margin (dBµV)
0.182	25.9	79.0	-53.1	15.5	66.0	-50.5
0.644	21.3	73.0	-51.7	14.7	60.0	-45.3

Table 7

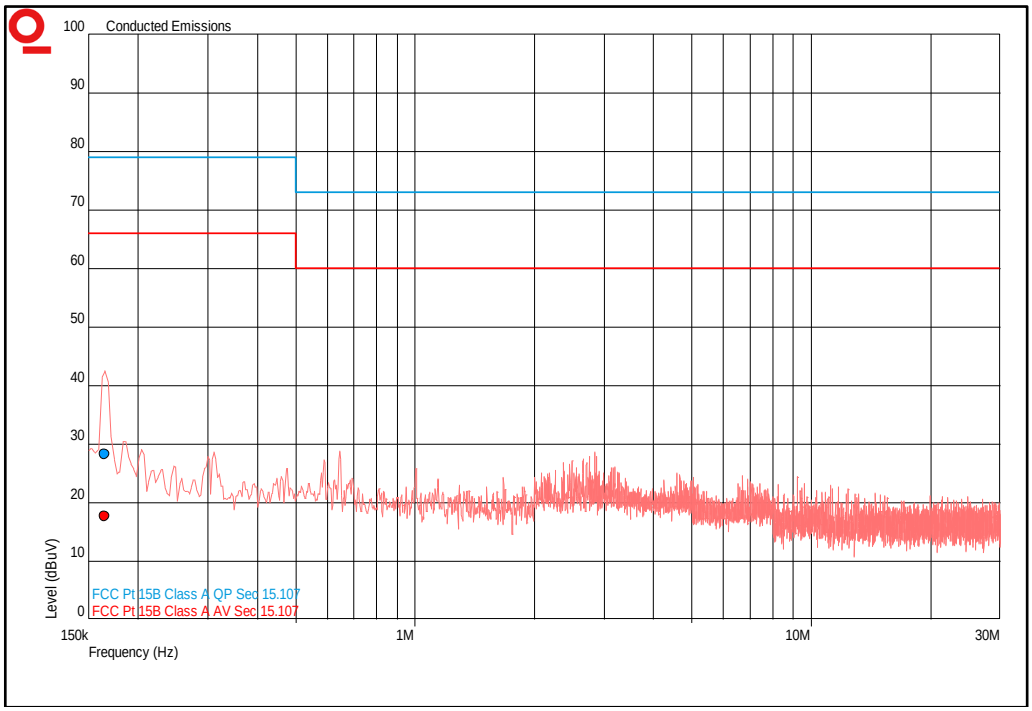

Figure 3 - Graphical Results - AC Mains Live

Frequency (MHz)	QP Level (dBµV)	QP Limit (dBµV)	QP Margin (dBµV)	AV Level (dBµV)	AV Limit (dBµV)	AV Margin (dBµV)
0.165	28.3	79.0	-50.7	17.7	66.0	-48.3

Table 8

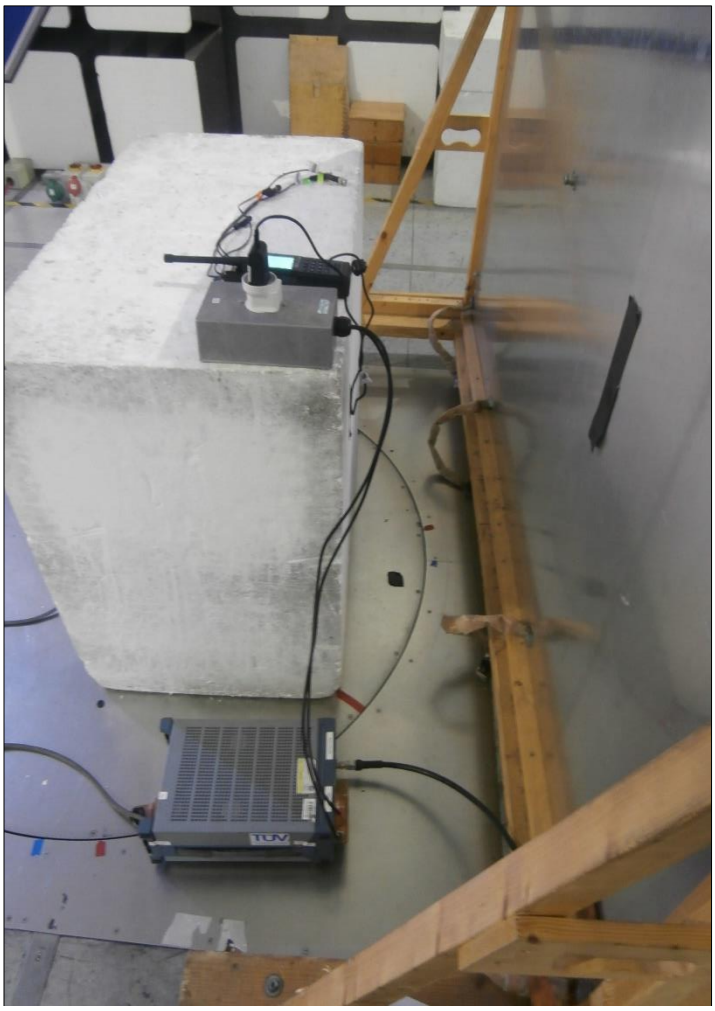

Figure 4 - AC Line Conducted Emissions

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
LISN	Rohde & Schwarz	ESH3-Z5	1390	12	20-Nov-2019
Screened Room (5)	Rainford	Rainford	1545	36	23-Jan-2021
Multimeter	Iso-tech	IDM 101	2118	12	08-Feb-2020
Transient Limiter	Hewlett Packard	11947A	2377	12	26-Feb-2020
Cable (3m, N-type)	Rhophase	NPS-350-3000-NPS	2859	-	TU
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	17-Dec-2019

Table 9

TU - Traceability Unscheduled

2.2 Radiated Disturbance

2.2.1 Specification Reference

FCC 47 CFR Part 15B, Clause 15.109

2.2.2 Equipment Under Test and Modification State

PJ2, S/N: R1907AV0003 - Modification State 0

2.2.3 Date of Test

01-October-2019

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 0.8 m above a reference ground plane.

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.

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 1 GHz:

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

Above 1 GHz:

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

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

2.2.6 Example Test Setup Diagram

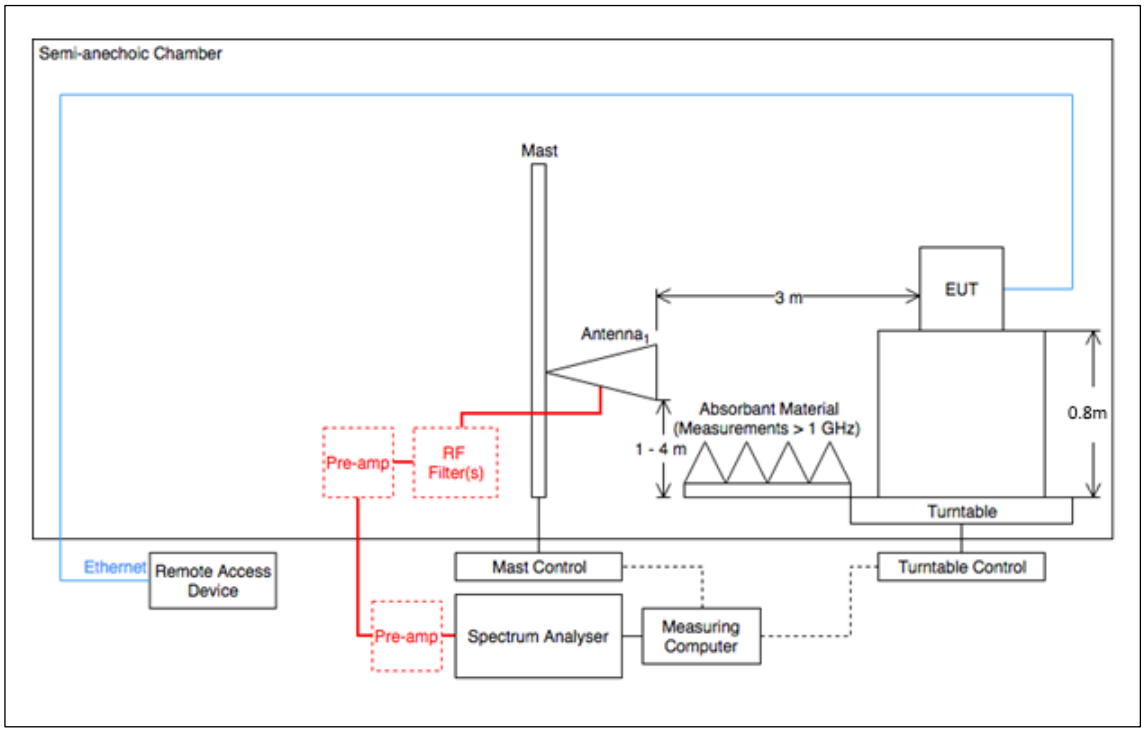

Figure 5 - Radiated Disturbance Example Test Setup

2.2.7 Environmental Conditions

Ambient Temperature	15.5 - 21.7 °C
Relative Humidity	69.1 - 80.3 %

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: Quasi-peak detector to be used for measurements below 1 GHz CISPR Average detector to be used for measurements above 1 GHz Peak test limit above 1 GHz is 20 dB higher than the CISPR Average test limit.		

Table 10

2.2.9 Test Results

Results for Configuration and Mode: AC/DC Power Supply, VHF Receive.

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

Tested to Class A Test Limits.

Detailed results are shown below.

Highest frequency generated or used within the EUT: 209.625MHz
Which necessitates an upper frequency test limit of: 2 GHz

Frequency Range of Test: 30 MHz to 1 GHz - X Orientation

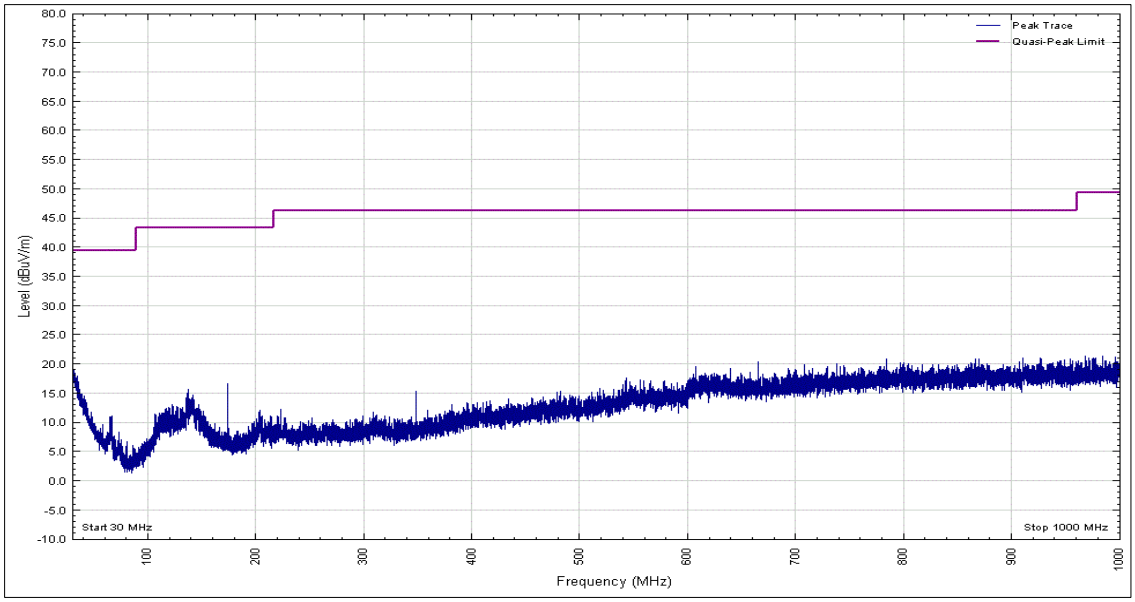

Figure 6 - Graphical Results - Vertical Polarity

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

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

Frequency Range of Test: 30 MHz to 1 GHz - X Orientation

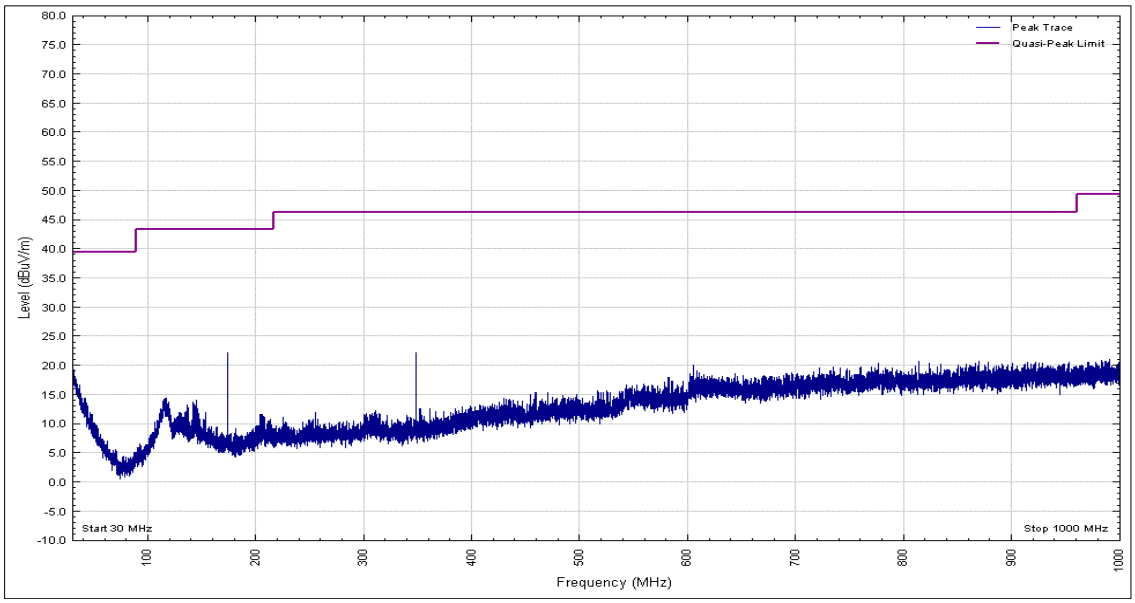

Figure 7 - Graphical Results - Horizontal Polarity

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

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

Frequency Range of Test: 1 GHz to 2 GHz - Peak - X Orientation

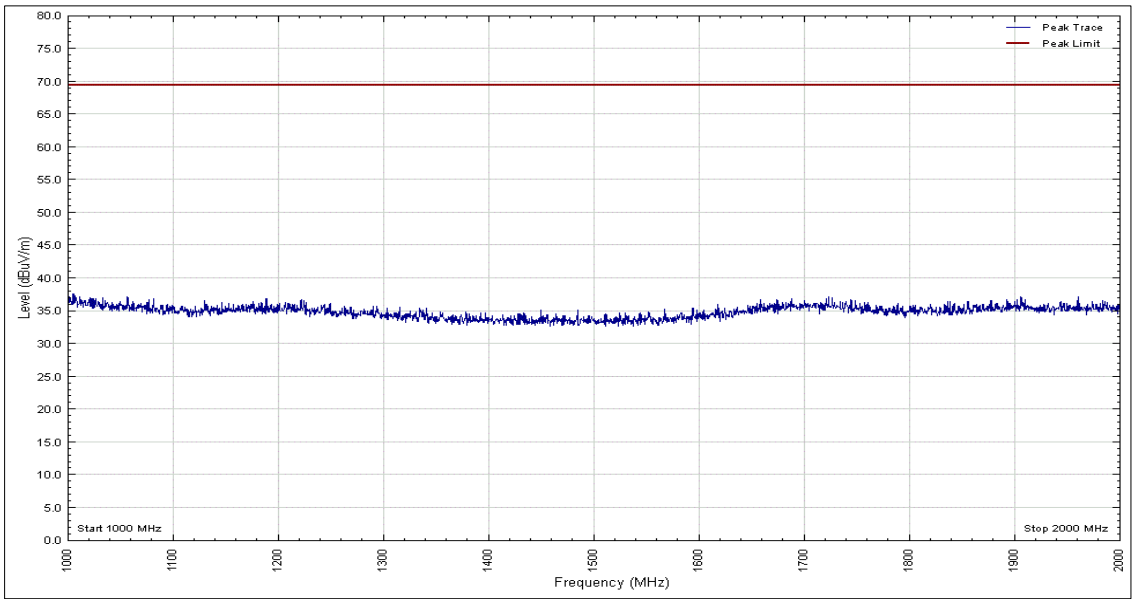

Figure 8 - Graphical Results - Vertical Polarity

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

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

Frequency Range of Test: 1 GHz to 2 GHz - Average - X Orientation

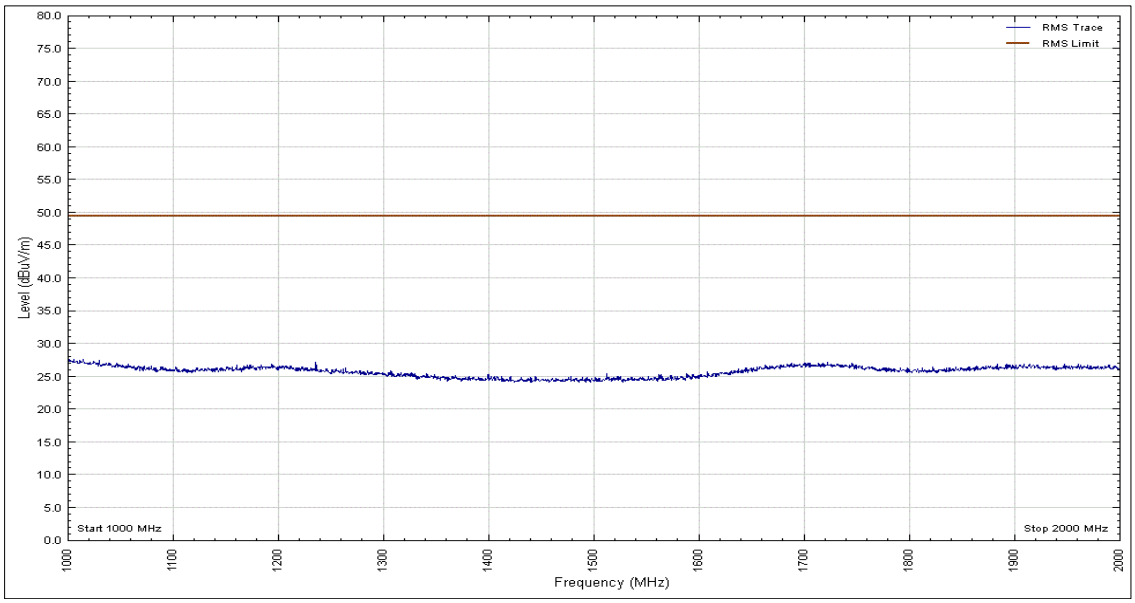

Figure 9 - Graphical Results - Vertical Polarity

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

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

Frequency Range of Test: 1 GHz to 2 GHz - Peak - X Orientation

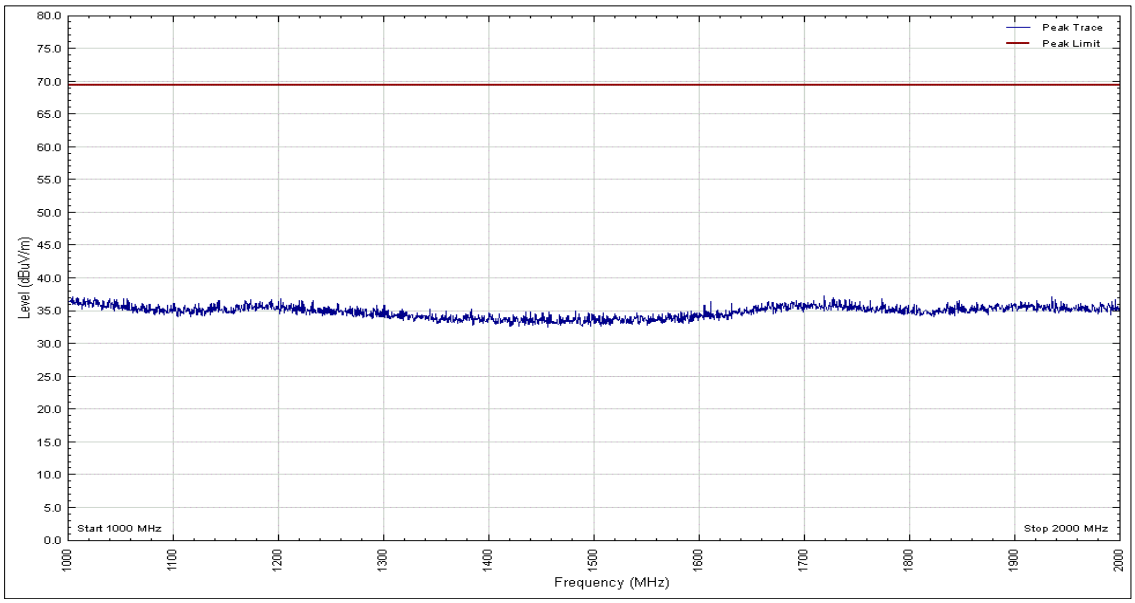

Figure 10 - Graphical Results - Horizontal Polarity

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

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

Frequency Range of Test: 1 GHz to 2 GHz - Average - X Orientation

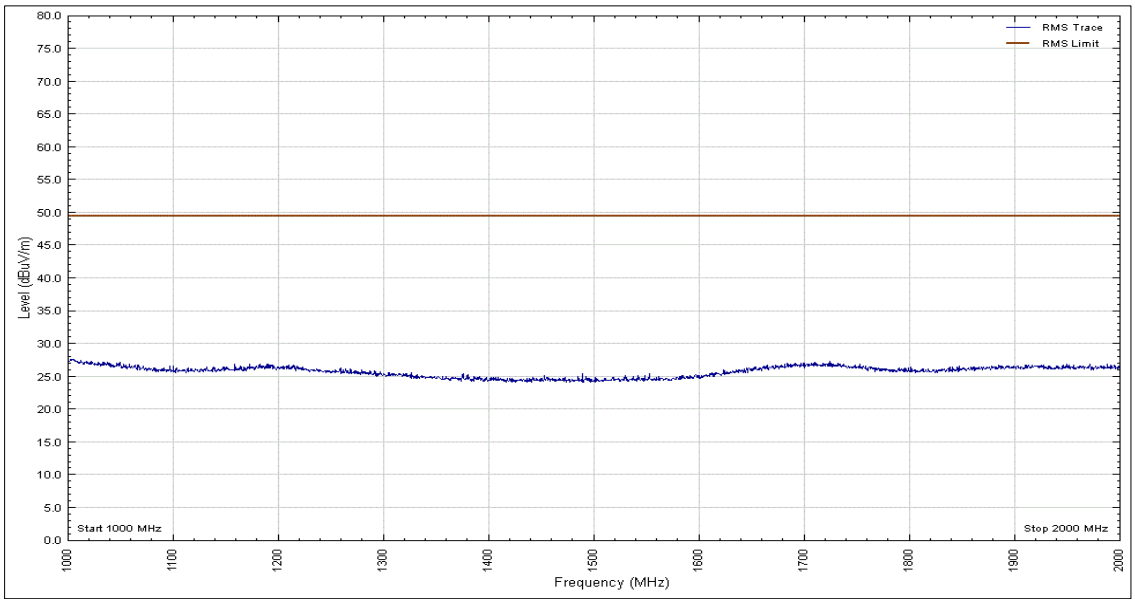

Figure 11 - Graphical Results - Horizontal Polarity

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

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

Frequency Range of Test: 30 MHz to 1 GHz - Y Orientation

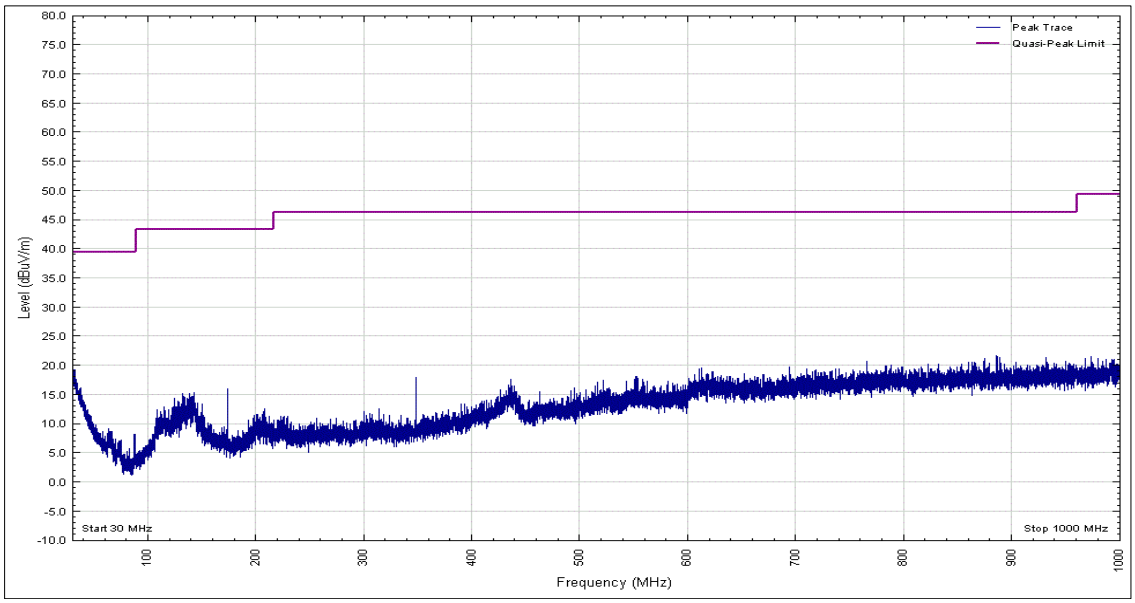

Figure 12 - Graphical Results - Vertical Polarity

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

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

Frequency Range of Test: 30 MHz to 1 GHz - Y Orientation

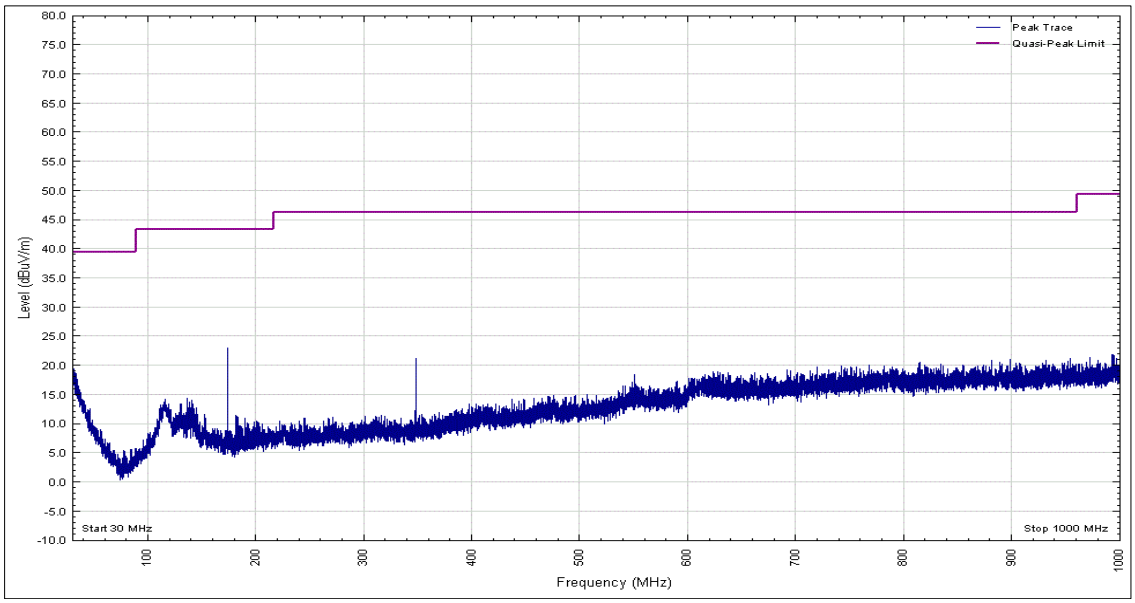

Figure 13 - Graphical Results - Horizontal Polarity

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

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

Frequency Range of Test: 1 GHz to 2 GHz - Peak - Y Orientation

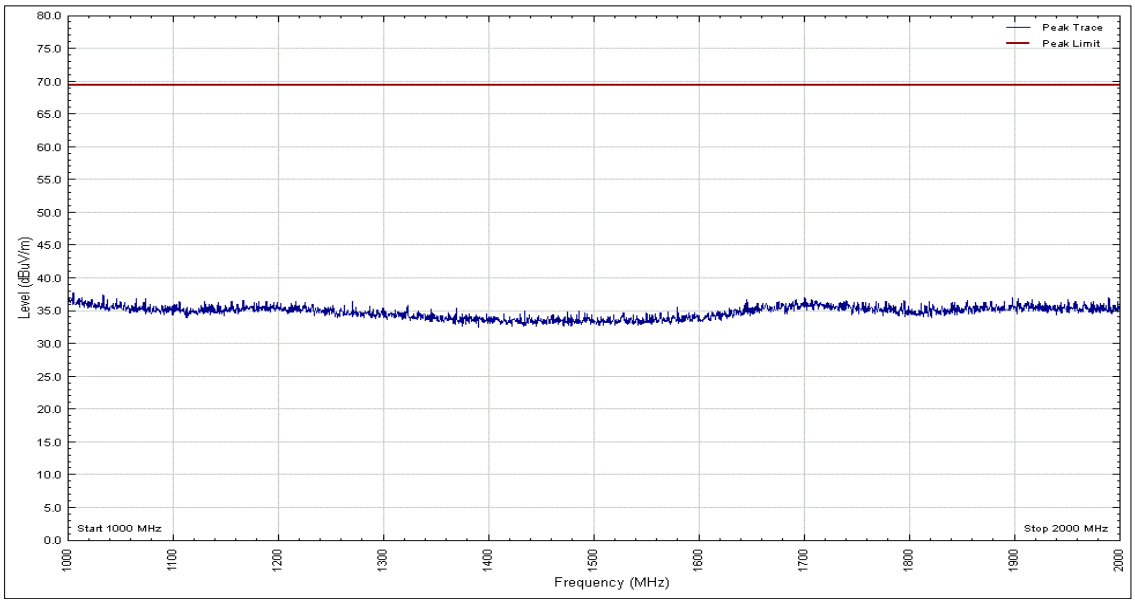

Figure 14 - Graphical Results - Vertical Polarity

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

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

Frequency Range of Test: 1 GHz to 2 GHz - Average - Y Orientation

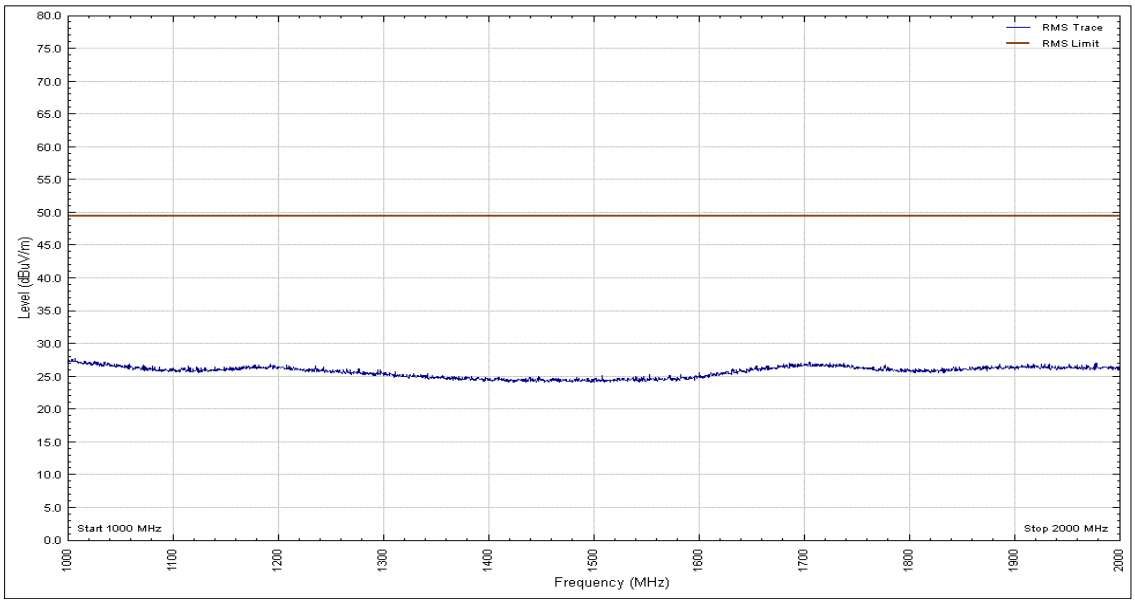

Figure 15 - Graphical Results - Vertical Polarity

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

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

Frequency Range of Test: 1 GHz to 2 GHz - Peak - Y Orientation

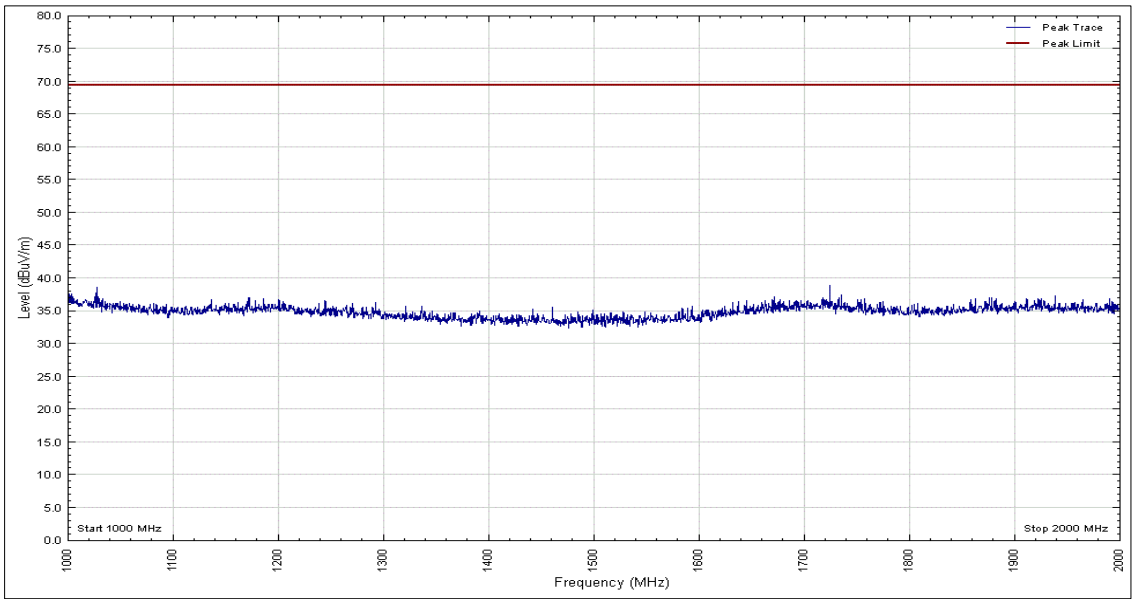

Figure 16 - Graphical Results - Horizontal Polarity

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

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

Frequency Range of Test: 1 GHz to 2 GHz - Average - Y Orientation

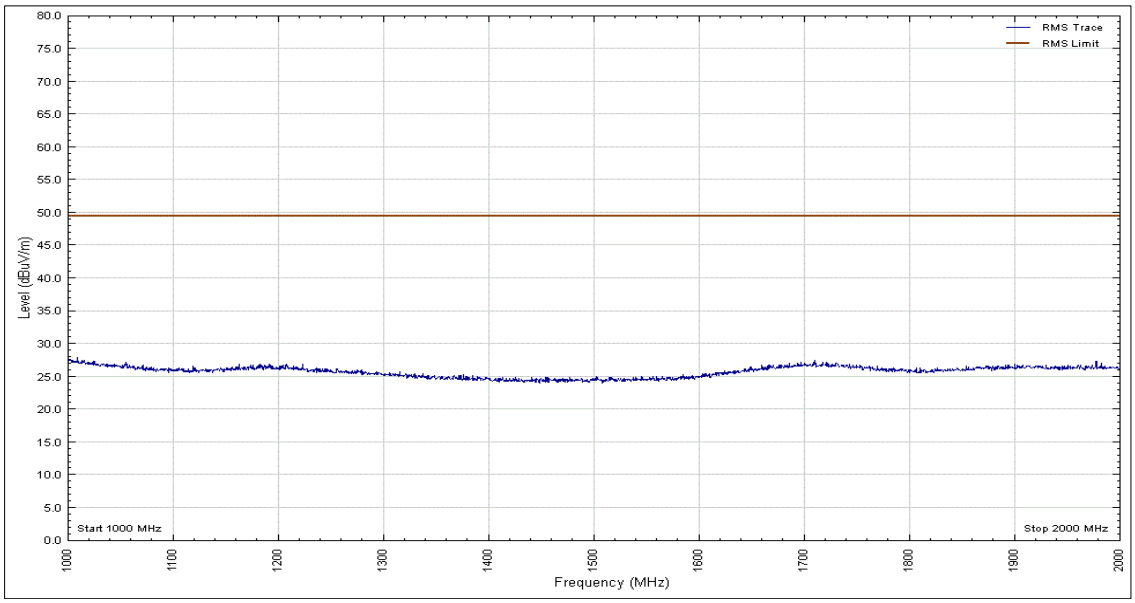

Figure 17 - Graphical Results - Horizontal Polarity

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

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

Frequency Range of Test: 30 MHz to 1 GHz - Z Orientation

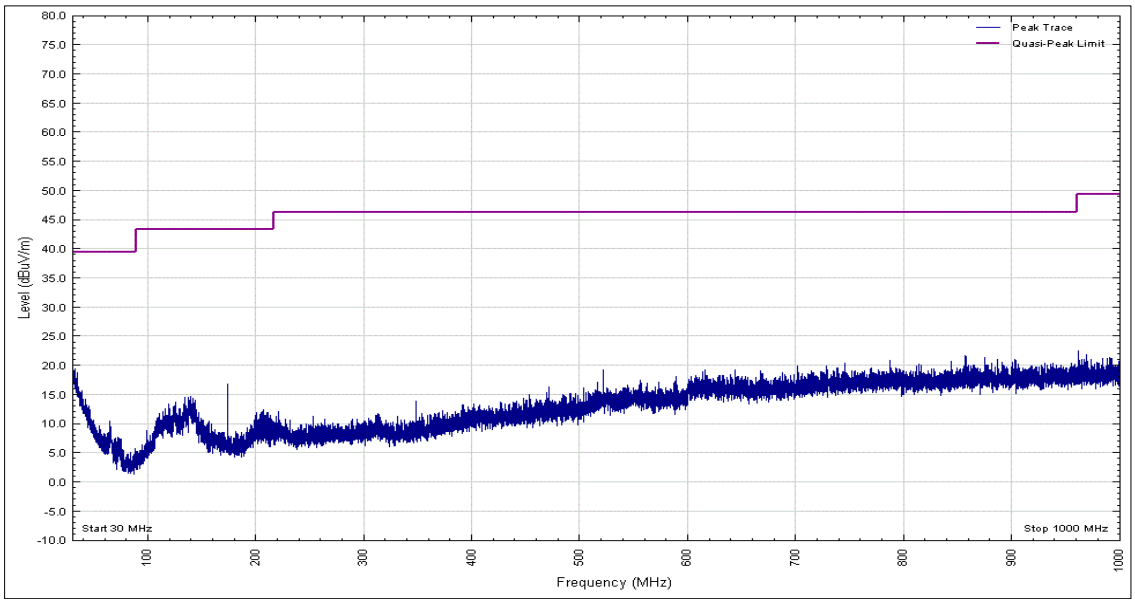

Figure 18 - Graphical Results - Vertical Polarity

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

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

Frequency Range of Test: 30 MHz to 1 GHz - Z Orientation

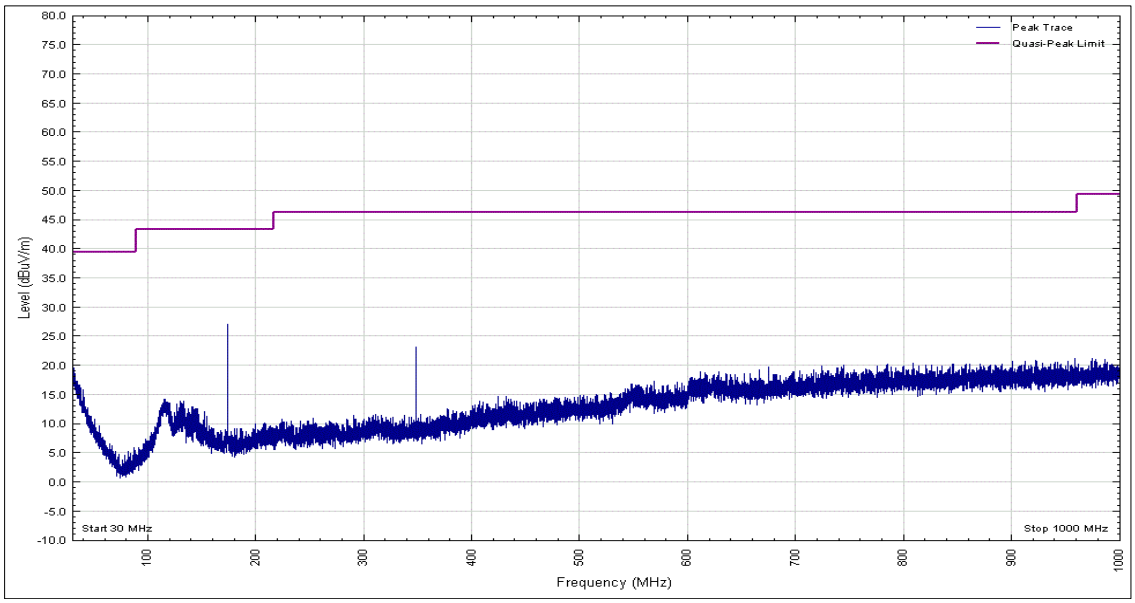

Figure 19 - Graphical Results - Horizontal Polarity

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

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

Frequency Range of Test: 1 GHz to 2 GHz - Peak - Z Orientation

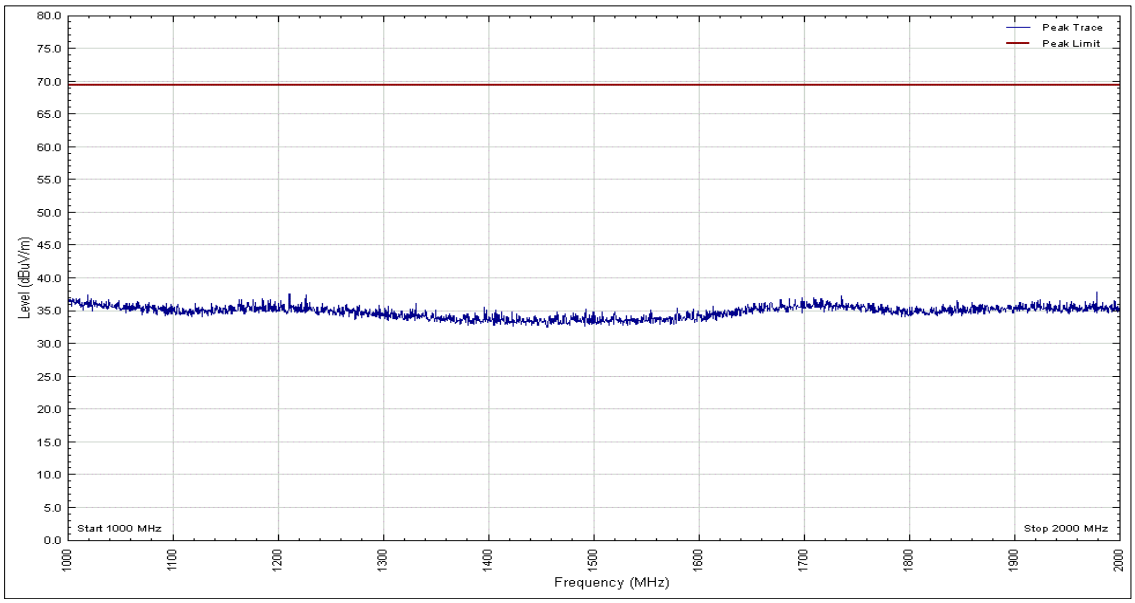

Figure 20 - Graphical Results - Vertical Polarity

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

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

Frequency Range of Test: 1 GHz to 2 GHz - Average - Z Orientation

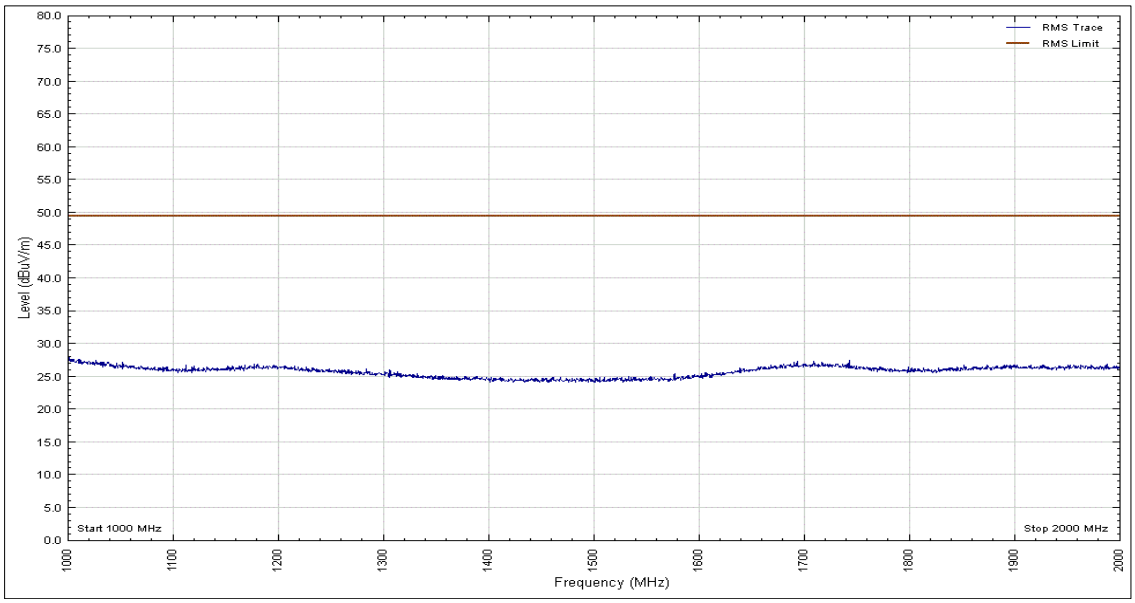

Figure 21 - **Graphical Results - Vertical Polarity**

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

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

Frequency Range of Test: 1 GHz to 2 GHz - Peak - Z Orientation

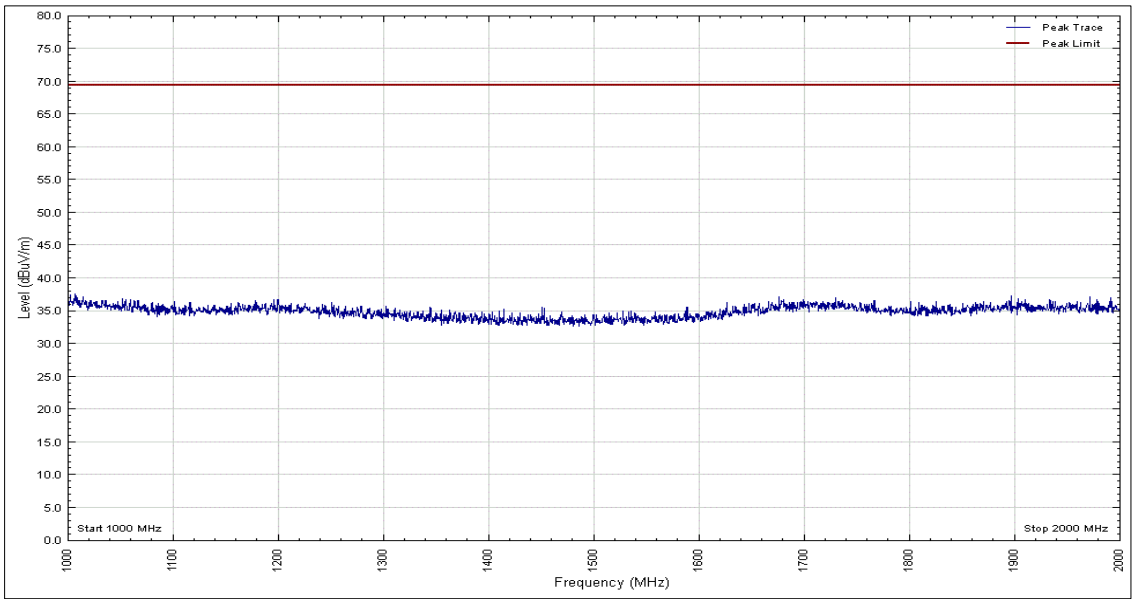

Figure 22 - **Graphical Results - Horizontal Polarity**

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

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

Frequency Range of Test: 1 GHz to 2 GHz - Average - Z Orientation

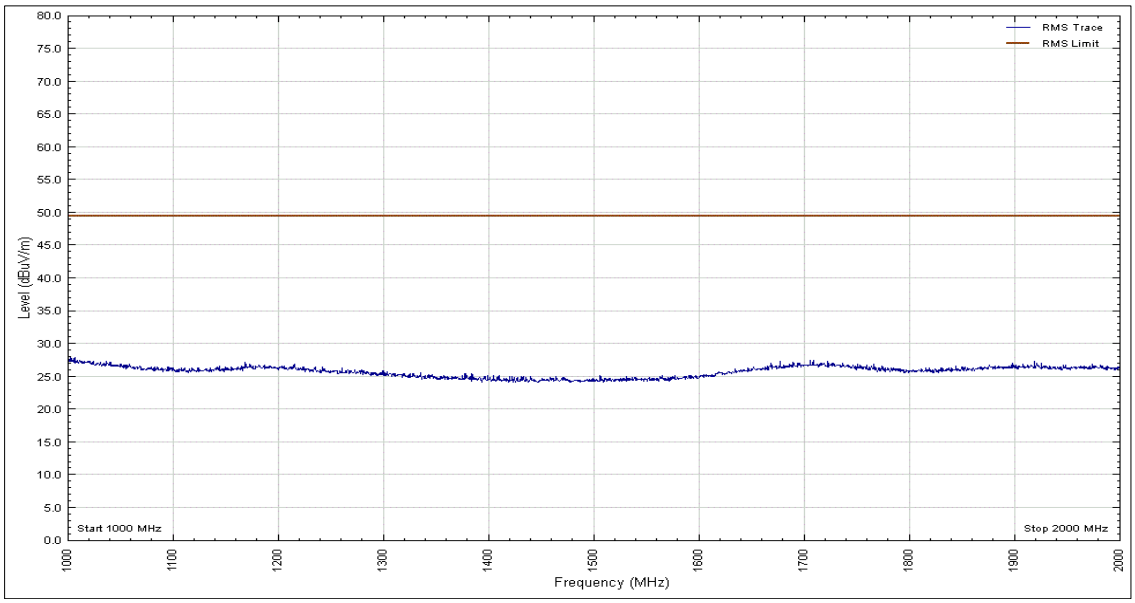

Figure 23 - **Graphical Results - Horizontal Polarity**

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

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

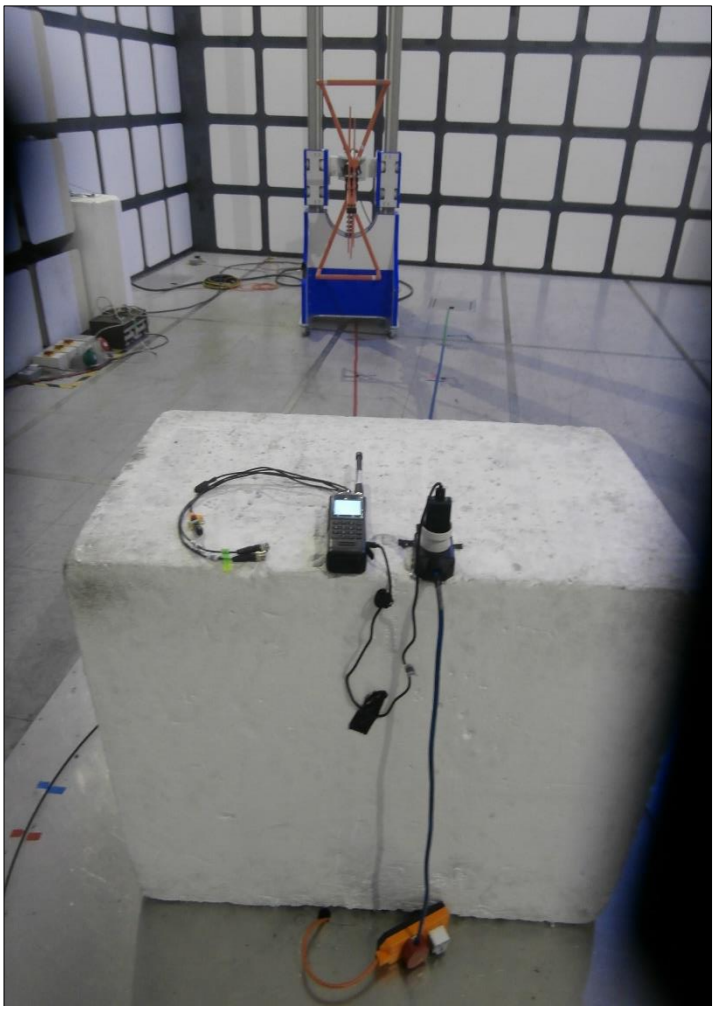

Figure 24 - 30 MHz to 1 GHz - X Orientation

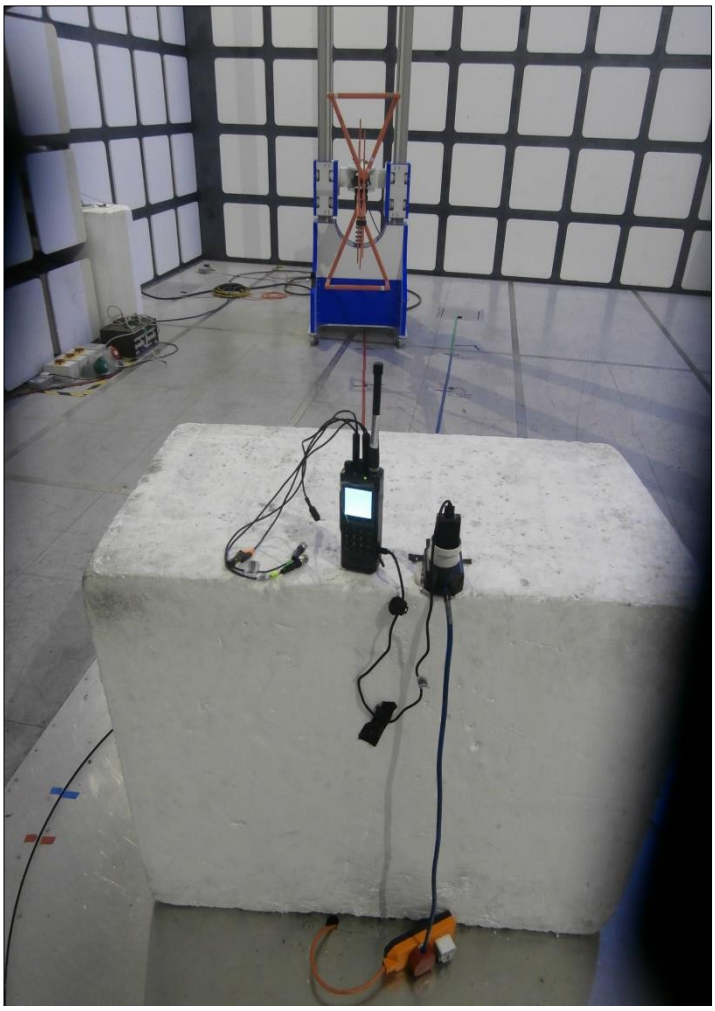

Figure 25 - 30 MHz to 1 GHz - Y Orientation

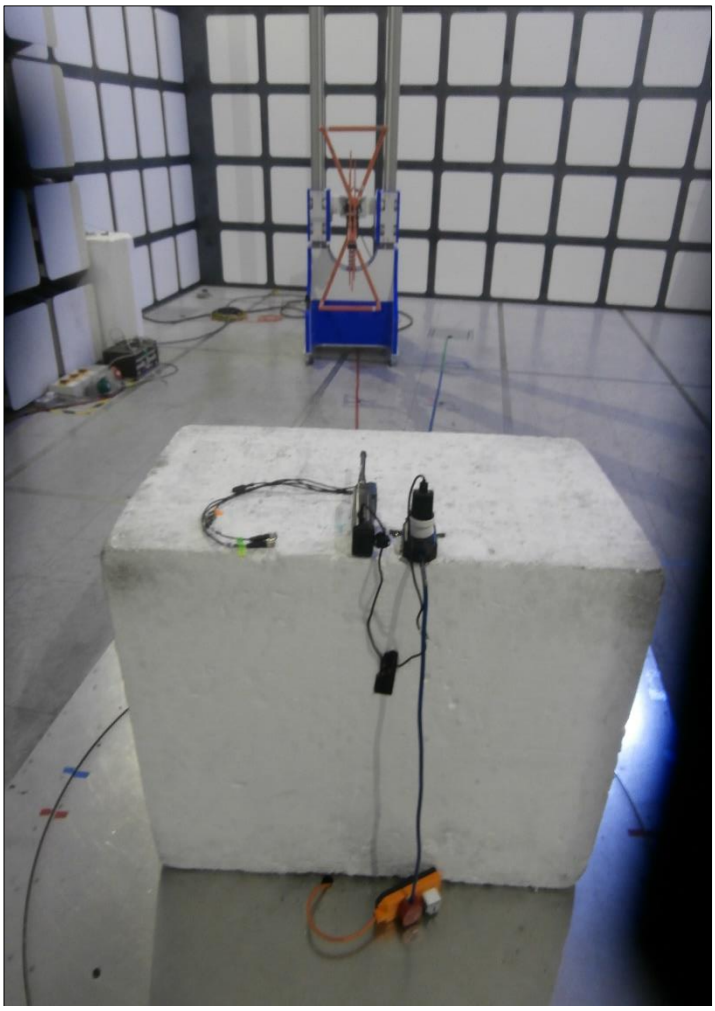

Figure 26 - 30 MHz to 1 GHz - Z Orientation

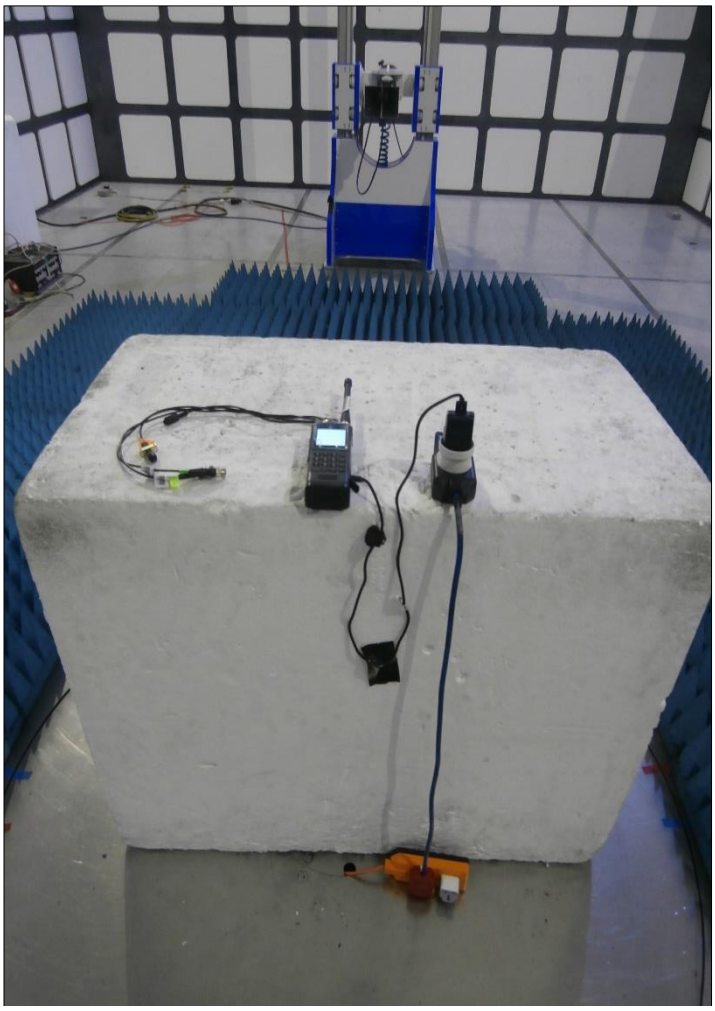

Figure 27 - 1 GHz to 2 GHz - X Orientation

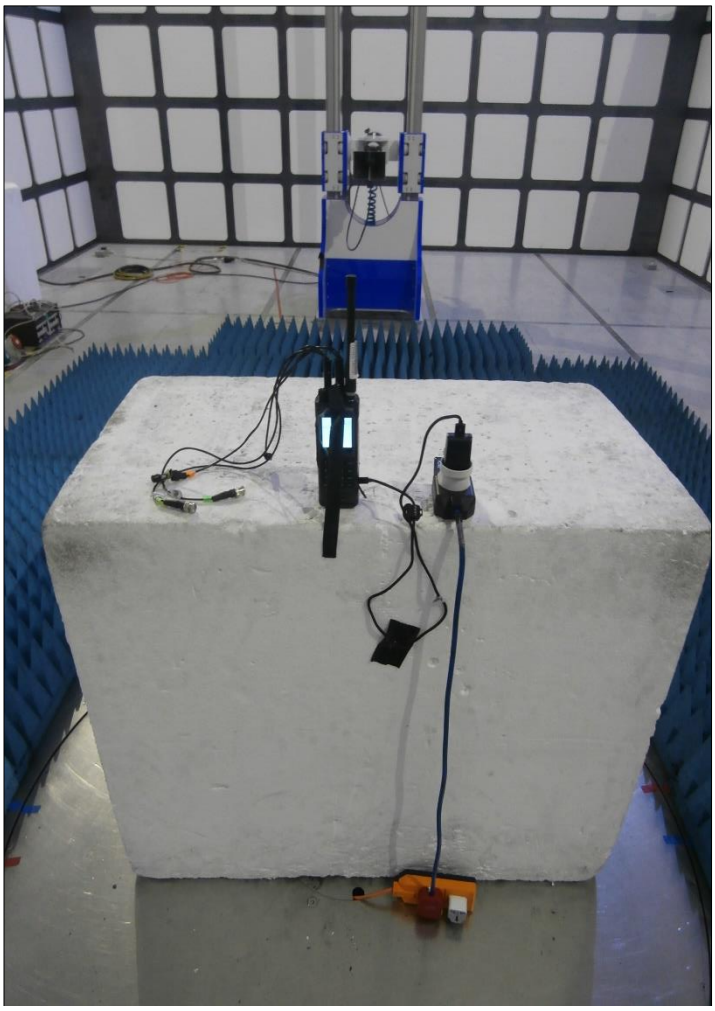

Figure 28 - 1 GHz to 2 GHz - Y Orientation

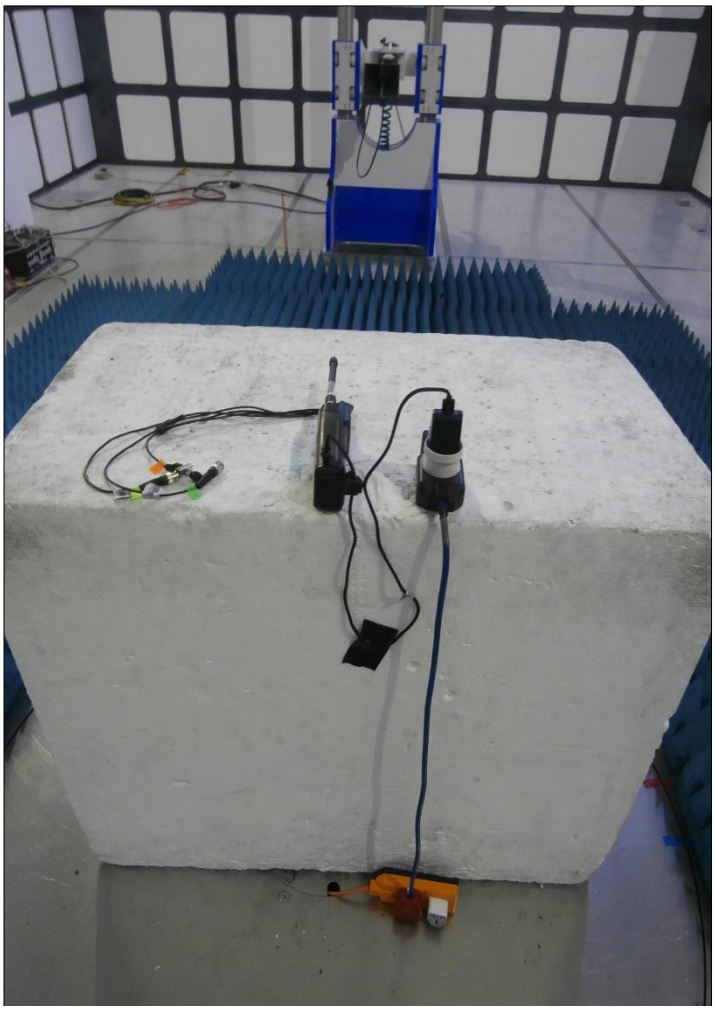

Figure 29 - 1 GHz to 2 GHz - Z Orientation

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
Antenna with permanent attenuator (Bilog)	Schaffner	CBL6143	287	24	15-May-2020
Screened Room (5)	Rainford	Rainford	1545	36	23-Jan-2021
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Multimeter	Iso-tech	IDM 101	2118	12	08-Feb-2020
Hygromer	Rotronic	A1	2677	12	20-Feb-2020
Comb Generator	Schaffner	RSG1000	3034	-	TU
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	17-Dec-2019
Cable (Rx, Km-Km 2m)	Scott Cables	KPS-1501-2000-KPS	4526	6	11-Dec-2019
Mast Controller	Maturo Gmbh	NCD	4810	-	TU
Tilt Antenna Mast	Maturo Gmbh	TAM 4.0-P	4811	-	TU
Double Ridge Broadband Horn Antenna	Schwarzbeck	BBHA 9120 B	4848	12	11-Mar-2020
8m N-Type RF Cable	Teledyne	PR90-088-8MTR	5093	12	04-Oct-2019
EmX Emissions Software	TUV SUD	EmX	5125	-	Software

Table 11

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 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 12

Worst case error for both Time and Frequency measurement 12 parts in 10^6.
All measurement uncertainties have been calculated using CISPR guidelines.