

FCC Test Report

MiX Telematics International (Pty) Ltd
Telematics Unit, Model: MiX 6AMB-4G-B

In accordance with FCC 47 CFR Part 15C,
FCC 47 CFR Part 22, FCC 47 CFR Part 24 and
FCC 47 CFR Part 27 (Simultaneous Transmission)

Prepared for: MiX Telematics International (Pty) Ltd
Blauwklip Office Park 2
Cnr Strand & Webersvalley Roads
Stellenbosch
South Africa



FCC ID: 2AFMS-6AMB4G

COMMERCIAL-IN-CONFIDENCE

Document 75949089-12 Issue 01

SIGNATURE			
NAME	JOB TITLE	RESPONSIBLE FOR	ISSUE DATE
	Senior engineer	Authorised Signatory	21 February 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, FCC 47 CFR Part 22, FCC 47 CFR Part 24 and FCC 47 CFR Part 27. The sample tested was found to comply with the requirements defined in the applied rules.

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Testing	Daniel Cameron	22 February 2021	
Testing	Graeme Lawler	22 February 2021	

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 15C: 2019, FCC 47 CFR Part 22: 2019, FCC 47 CFR Part 24: 2019 and FCC 47 CFR Part 27: 2019 for the tests detailed in section 1.3.

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Contents

1	Report Summary	2
1.1	Report Modification Record.....	2
1.2	Introduction.....	2
1.3	Brief Summary of Results	3
1.4	Manufacturer Declared Variant(s)	4
1.5	Application Form	5
1.6	Product Information	10
1.7	Deviations from the Standard.....	10
1.8	EUT Modification Record	10
1.9	Test Location	11
2	Test Details	12
2.1	Radiated Spurious Emissions (Simultaneous Transmission)	12
3	Measurement Uncertainty	34



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	22 February 2021

Table 1

1.2 Introduction

Applicant	MiX Telematics International (Pty) Ltd
Manufacturer	MiX Telematics International (Pty) Ltd
Model Number(s)	MiX 6AMB-4G-B
Manufacturer Declared Variant	MiX 6AMB-4G
Serial Number(s)	66000181
Hardware Version(s)	1
Software Version(s)	V2.0.4
Number of Samples Tested	1
Test Specification/Issue/Date	FCC 47 CFR Part 15C: 2019 FCC 47 CFR Part 22: 2019 FCC 47 CFR Part 24: 2019 FCC 47 CFR Part 27: 2019
Order Number	P0093632
Date	20-May-2020
Date of Receipt of EUT	19-January-2021
Start of Test	26-January-2021
Finish of Test	31-January-2021
Name of Engineer(s)	Daniel Cameron and Graeme Lawler
Related Document(s)	ANSI C63.4 ANSI C63.26: 2015 ANSI C63.10: 2013 KDB 996369 D04



1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 15C, FCC 47 CFR Part 22, FCC 47 CFR Part 24 and FCC 47 CFR Part 27 is shown below.

Section	Specification Clause				Test Description	Result	Comments/Base Standard
	FCC Part 15C	FCC Part 22	FCC Part 24	FCC Part 27			
Configuration and Mode: Main Antenna - Bluetooth Low Energy (middle channel) + 915 MHz SRD (middle channel) + GSM 850 (middle channel)							
2.1	15.247 (d), and 15.205	22.917 (a)	-	-	Radiated Spurious Emissions (Simultaneous Transmission)	Pass	ANSI C63.26: 2015 ANSI C63.10: 2013
Configuration and Mode: Main Antenna - 2.4 GHz Wi-Fi (802.11b, middle channel) + 915 MHz SRD (middle channel) + PCS 1900 (middle channel)							
2.1	15.247 (d), and 15.205	-	24.238 (a)	-	Radiated Spurious Emissions (Simultaneous Transmission)	Pass	ANSI C63.26: 2015 ANSI C63.10: 2013
Configuration and Mode: Main Antenna - Bluetooth EDR (middle channel) + 915 MHz SRD (middle channel) + WCDMA FDD BII (middle channel)							
2.1	15.247 (d), and 15.205	-	24.238 (a)	-	Radiated Spurious Emissions (Simultaneous Transmission)	Pass	ANSI C63.26: 2015 ANSI C63.10: 2013
Configuration and Mode: Main Antenna - 2.4 GHz Wi-Fi (802.11b, middle channel) + 915 MHz SRD (middle channel) + WCDMA FDD BV (middle channel)							
2.1	15.247 (d), and 15.205	22.917 (a)	-	-	Radiated Spurious Emissions (Simultaneous Transmission)	Pass	ANSI C63.26: 2015 ANSI C63.10: 2013
Configuration and Mode: Main Antenna - Bluetooth EDR (middle channel) + 915 MHz SRD (middle channel) + LTE FDD B2 (middle channel)							
2.1	15.247 (d), and 15.205	-	24.238 (a)	-	Radiated Spurious Emissions (Simultaneous Transmission)	Pass	ANSI C63.26: 2015 ANSI C63.10: 2013
Configuration and Mode: Main Antenna - 2.4 GHz Wi-Fi (802.11b, middle channel) + 915 MHz SRD (middle channel) + LTE FDD B12 (middle channel)							
2.1	15.247 (d), and 15.205	-	-	27.53 (g)	Radiated Spurious Emissions (Simultaneous Transmission)	Pass	ANSI C63.26: 2015 ANSI C63.10: 2013

Table 2

Note: Antenna diversity is only supported in the downlink, therefore no assessment was made using this antenna.



1.4 Manufacturer Declared Variant(s)



Stellenbosch 28 Jan 2021

To: Whom it may concern

From: MIX Telematics International (Pty) Ltd
Blaauwklip Office Park 2, CNR Strand & Webbers Valley
Stellenbosch – South Africa

Subject: Declaration of Similarity

MIX Telematics International (Pty) Ltd, hereby also declare that the battery and non-battery variants present the same electrical, physical and electro-mechanics characteristics, the same PCB (AWZ0006A-1D), layout and components. The only difference between them is that the “-B” models have an Internal backup battery plugged in, allowing the device to work after the disconnection of the vehicle’s battery.

The following product variants (with part numbers) are available:

Part Number	Official Product Name	Description	Series
U0042MT	MIX 6AMB-4G	MIX 6000 MK2 6AMB-4G Electronic Unit	MIX 6000 MK2
U0044MT	MIX 6AMB-4G-B	MIX 6000 MK2 6AMB-4G-B Electronic Unit with Backup Battery	MIX 6000 MK2

Tabel 1. Variants in the MIX 6AMB-4G/-B Series of Products

We remain at your disposal for any clarifications that may become necessary.

Sincerely,

Certification Manager: TC Bothma

Blaauwklip Office Park 2, CNR Strand & Webbers Valley – Stellenbosch – South Africa



1.5 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 MiX 6AMB-4G is a high-end Fleet product that incorporates the latest market trends. It supports LTE CAT 4 with 2G/3G fall-back, 3-Axis Accelerometer, WiFi, Bluetooth, 433 or 915 MHz Short Range Device and GNSS. The MiX 6AMB-4G-B is the same design, but it also includes a backup battery. The kit consists of: Main Harness MP10, External LTE Antenna PA8, PUCK Antenna and Code Plug Socket Harness CP4	
Manufacturer:	MiX Telematics (Pty) Ltd.	
Model:	MiX 6AMB-4G-B	
Part Number:	U0044MT	
Hardware Version:	1	
Software Version:	2.0.4	
FCC ID of the product under test – see guidance here	2AFMS-6AMB4G	
IC ID of the product under test	Not Applicable	

Intentional Radiators

Technology	GSM850	GSM1900	WCDMA BAND II	WCDMA BAND IV	WCDMA BAND V
Frequency Range (MHz to MHz)	824.2-848.8	1850.2-1909.8	1852.4-1907.6	1712.4-1752.6	826.4-846.6
Conducted Declared Output Power (dBm)	33 27	30 26	24	24	24
Antenna Gain (dBi)	2.29	1.59	1.59	2	2.29
Supported Bandwidth(s) (MHz) (e.g 1 MHz, 20 MHz, 40 MHz)	296Kbps (DL) 236.8Kbps (UL)	296Kbps (DL) 236.8Kbps (UL)	60	45	25
Modulation Scheme(s) (e.g GFSK, QPSK etc)	GMSK, 8PSK	GMSK, 8PSK	QPSK, 16QAM, 64QAM	QPSK, 16QAM, 64QAM	QPSK, 16QAM, 64QAM
ITU Emission Designator (see guidance here)	247KGXW 245KG7W	249KGXW 249KG7W	4M15F9W	4M14F9W	4M13F9W
Bottom Frequency (MHz)	824.2	1850.2	1850	1710	824
Middle Frequency (MHz)	837	1880	1880	1732.5	836.5
Top Frequency (MHz)	848.8	1909.8	1910	1755	849



Technology	SRD 915	SRD2400 BT/BLE	SRD2400 WiFi
Frequency Range (MHz to MHz)	902-928	2402-2480	2412-2467
Conducted Declared Output Power (dBm)	20	6	15.6
Antenna Gain (dBi)	0	3	3
Supported Bandwidth(s) (MHz) (e.g 1 MHz, 20 MHz, 40 MHz)	0.025	1	20
Modulation Scheme(s) (e.g GFSK, QPSK etc)	2FSK	GFSK 8-DPSK	GFSK (BDR) (1 Mbit/s); $\pi/4$ -DQPSK (EDR) (2 Mbit/s); 8-PSK (EDR) (3 Mbits/s)
ITU Emission Designator (see guidance here)	38K2F7D	1M10F1D	16M7D1D
Bottom Frequency (MHz)	902	2402	2412
Middle Frequency (MHz)	915	2440	2437
Top Frequency (MHz)	928	2480	2467

Technology	LTE Band 2	LTE Band 4	LTE Band 5	LTE Band 7	LTE Band 12
Frequency Range (MHz to MHz)	1850-1910	1710-1755	824-849	2500-2570	699-716
Conducted Declared Output Power (dBm)	23±2	23±2	23±2	23±2	23±2
Antenna Gain (dBi)	1.59	4.2	2.29	3	3.26
Supported Bandwidth(s) (MHz) (e.g 1 MHz, 20 MHz, 40 MHz)	1.4, 3, 5,10,15, 20	1.4, 3, 5,10,15, 20	1.4, 3, 5,10,15	5,10,15, 20	1.4, 3, 5,10
Modulation Scheme(s) (e.g GFSK, QPSK etc)	QPSK, 16QAM	QPSK, 16QAM	QPSK, 16QAM	QPSK, 16QAM	QPSK, 16QAM
ITU Emission Designator (see guidance here)	17M9G7D 17M9W7D 1M09W7D	17M9G7D 17M9W7D 1M09W7D	8M93G7D 8M93W7D2M 70G7D 1M09W7D	17M9G7D 17M9W7D 4M49W7D	8M93G7D 8M93W7D 1M09W7D
Bottom Frequency (MHz)	1850	1710	824	2500	699
Middle Frequency (MHz)	1880	1732.5	836.5	2535	707.5
Top Frequency (MHz)	1910	1755	849	2570	716



Technology	LTE Band 13	LTE Band 25	LTE Band 26	LTE Band 38	LTE Band 41
Frequency Range (MHz to MHz)	777-787	1850-1915	814-849	2570-2620	2496-2690
Conducted Declared Output Power (dBm)	23±2	23±2	23±2	23±2	23±2
Antenna Gain (dBi)	4.45	1.59	2.53	2.06	3
Supported Bandwidth(s) (MHz) (e.g 1 MHz, 20 MHz, 40 MHz)	5,10	1.4, 3, 5,10,15, 20	1.4, 3, 5,10	5,10,15, 20	5,10,15, 20
Modulation Scheme(s) (e.g GFSK, QPSK etc)	QPSK, 16QAM	QPSK, 16QAM	QPSK, 16QAM	QPSK, 16QAM	QPSK, 16QAM
ITU Emission Designator (see guidance here)	8M91G7D 8M91W7D 4M48G7D 4M49W7D	17M9G7D 17M9W7D 8M91G7D 1M09W7D	8M91G7D 8M91W7D 1M09G7D 1M09W7D 13M5G7D 13M4W7D 4M49W7D	17M8G7D 17M8W7D 8M91G7D	17M9G7D 17M9W7D 8M91G7D 4M50W7D
Bottom Frequency (MHz)	777	1850	814	2570	2496
Middle Frequency (MHz)	782	1882.5	831.5	2595	2593
Top Frequency (MHz)	787	1915	849	2620	2690

Un-intentional Radiators

Highest frequency generated or used in the device or on which the device operates or tunes	2690 MHz
Lowest frequency generated or used in the device or on which the device operates or tunes	699 MHz
Class A Digital Device (Use in commercial, industrial or business environment) <input type="checkbox"/>	
Class B Digital Device (Use in residential environment only) <input checked="" type="checkbox"/>	

DC Power Source

Nominal voltage:	13.8/27.6	V
Extreme upper voltage:	32	V
Extreme lower voltage:	10.5	V
Max current:	7.5A absolute max (7.5A Fused) 3.5A typical	A

Battery Power Source

Voltage:	3.2	V
End-point voltage:	2.5	V (Point at which the battery will terminate)
Alkaline <input type="checkbox"/> Leclanche <input type="checkbox"/> Lithium <input checked="" type="checkbox"/> Nickel Cadmium <input type="checkbox"/> Lead Acid* <input checked="" type="checkbox"/> *(Vehicle regulated)		
Other <input type="checkbox"/>	Please detail:	



Charging

Can the EUT transmit whilst being charged	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
---	---

Temperature

Minimum temperature:	-20	°C
Maximum temperature:	+60 (limited by backup battery) Else +80	°C

Antenna Characteristics

Antenna connector <input checked="" type="checkbox"/>		State impedance	50	Ohm
Temporary antenna connector <input type="checkbox"/>		State impedance		Ohm
Integral antenna <input checked="" type="checkbox"/>	Type:	SRD915	Gain	0 dBi
External antenna <input checked="" type="checkbox"/>	Type:	LTE Primary	Gain	2.84 (3G); 2.44 (4G)
		LTE Diversity		2
		Bluetooth/WiFi		3
		GNSS		RX
For external antenna only: Standard Antenna Jack <input type="checkbox"/> If yes, describe how user is prohibited from changing antenna (if not professional installed): Equipment is only ever professionally installed <input type="checkbox"/> Non-standard Antenna Jack <input checked="" type="checkbox"/>				



Ancillaries (if applicable)

Manufacturer:	CHM	Part Number:	440FT0033
Model:	Main Harness MP10	Country of Origin:	South Africa
Manufacturer:	Jinchang Electron Global Service	Part Number:	A0050MT
Model:	PUCK Antenna, LTE, WiFi/Bluetooth and GNSS Combination Antenna (JCE305)	Country of Origin:	China
Manufacturer:	RF Design	Part Number:	A0049MT
Model:	External LTE antenna PA8 Fakra connector	Country of Origin:	South Africa
Manufacturer:	CHM	Part Number:	440FT0032
Model:	Code Plug Harness with socket CP4	Country of Origin:	South Africa
Manufacturer:	CHM	Part Number:	A0041MT
Model:	Auxiliary Harness AX5 (optional)	Country of Origin:	South Africa
Manufacturer:	CHM	Part Number:	440FT0931
Model:	Serial Harness SR1 (optional)	Country of Origin:	South Africa

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

Name: Christo Bothma
Position held: Certification Manager
Date: 17 February 2021



1.6 Product Information

1.6.1 Technical Description

The MiX 6AMB-4G is a high-end Fleet product that incorporates the latest market trends. It supports LTE CAT 4 with 2G/3G fallback, 3-Axis Accelerometer, WiFi, Bluetooth, 434 or 915 MHz Short Range Device and GNSS. The MiX 6AMB-4G-B is the same design, but it also includes a backup battery.

1.7 Deviations from the Standard

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

1.8 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: MiX 6AMB-4G-B, Serial Number: 66000181			
0	As supplied by the customer	Not Applicable	Not Applicable

Table 3



1.9 Test Location

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

Test Name	Name of Engineer(s)	Accreditation
Configuration and Mode: Main Antenna - Bluetooth Low Energy (middle channel) + 915 MHz SRD (middle channel) + GSM 850 (middle channel)		
Radiated Spurious Emissions (Simultaneous Transmission)	Daniel Cameron and Graeme Lawler	UKAS
Configuration and Mode: Main Antenna - 2.4 GHz Wi-Fi (802.11b, middle channel) + 915 MHz SRD (middle channel) + PCS 1900 (middle channel)		
Radiated Spurious Emissions (Simultaneous Transmission)	Daniel Cameron and Graeme Lawler	UKAS
Configuration and Mode: Main Antenna - Bluetooth EDR (middle channel) + 915 MHz SRD (middle channel) + WCDMA FDD BII (middle channel)		
Radiated Spurious Emissions (Simultaneous Transmission)	Daniel Cameron and Graeme Lawler	UKAS
Configuration and Mode: Main Antenna - 2.4 GHz Wi-Fi (802.11b, middle channel) + 915 MHz SRD (middle channel) + WCDMA FDD BV (middle channel)		
Radiated Spurious Emissions (Simultaneous Transmission)	Daniel Cameron and Graeme Lawler	UKAS
Configuration and Mode: Main Antenna - Bluetooth EDR (middle channel) + 915 MHz SRD (middle channel) + LTE FDD B2 (middle channel)		
Radiated Spurious Emissions (Simultaneous Transmission)	Daniel Cameron and Graeme Lawler	UKAS
Configuration and Mode: Main Antenna - 2.4 GHz Wi-Fi (802.11b, middle channel) + 915 MHz SRD (middle channel) + LTE FDD B12 (middle channel)		
Radiated Spurious Emissions (Simultaneous Transmission)	Daniel Cameron and Graeme Lawler	UKAS

Table 4

Office Address:

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



2 Test Details

2.1 Radiated Spurious Emissions (Simultaneous Transmission)

2.1.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.247 (d) and 15.205
FCC 47 CFR Part 22, Clause 22.917 (a)
FCC 47 CFR Part 24, Clause 24.238 (a)
FCC 47 CFR Part 27, Clause 27.53(g)

2.1.2 Equipment Under Test and Modification State

MiX 6AMB-4G-B, S/N: 66000181 - Modification State 0

2.1.3 Date of Test

26-January-2021 to 31-January-2021

2.1.4 Test Method

Testing was performed in accordance with ANSI C63.26, clause 5.5.

Prescans were performed using the direct field strength method. Any emissions found within 10 dB of the specification limit were formally measured using the substitution method.

The limit line on the prescan plots was calculated from equation c) in clause 5.2.7.

To determine the emission characteristic of the EUT above 18 GHz, the test antenna was swept over all faces of the EUT whilst observing a spectral display. The frequency of any emissions of interest was noted for formal measurement at the correct measurement distance of 3m. This procedure was repeated for all relevant transmit operating channels.

The EUT was placed on a non-conducting platform in a manner typical of a normal installation. The EUT could be fitted in multiple planes, therefore, pre-scans were performed with the EUT orientated in X, Y and Z planes with reference to the ground plane.

Ports on the EUT were terminated with loads as described in ANSI C63.4 clause 6.2.4

A plot has been presented in the plots section to show measurement system sensitivity for the X – plane only over the frequency range from 18 GHz to 25 GHz.

2.1.5 Test Setup Diagram(s)

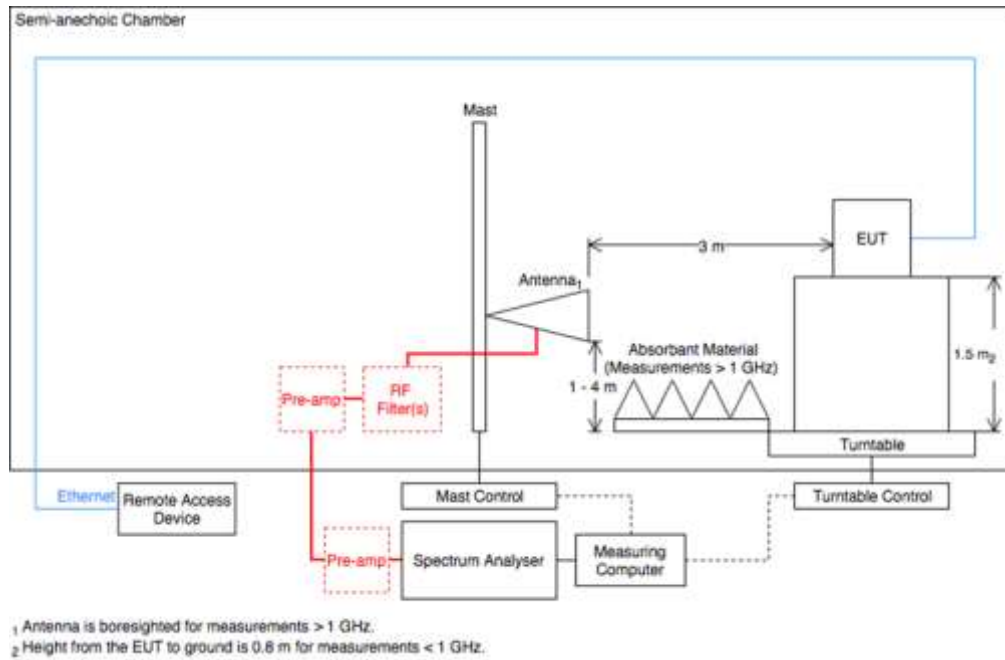


Table 5

2.1.6 Environmental Conditions

Ambient Temperature	24.1 - 25.5 °C
Relative Humidity	24.9 - 38.1 %



2.1.7 Test Results

Main Antenna - Bluetooth Low Energy (middle channel) + 915 MHz SRD (middle channel) + GSM 850 (middle channel)

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

Table 6 - 2440 MHz, 915 MHz and 836.4 MHz, 30 MHz to 25 GHz, Orientation X

*No emissions found within 10 dB of the limit.

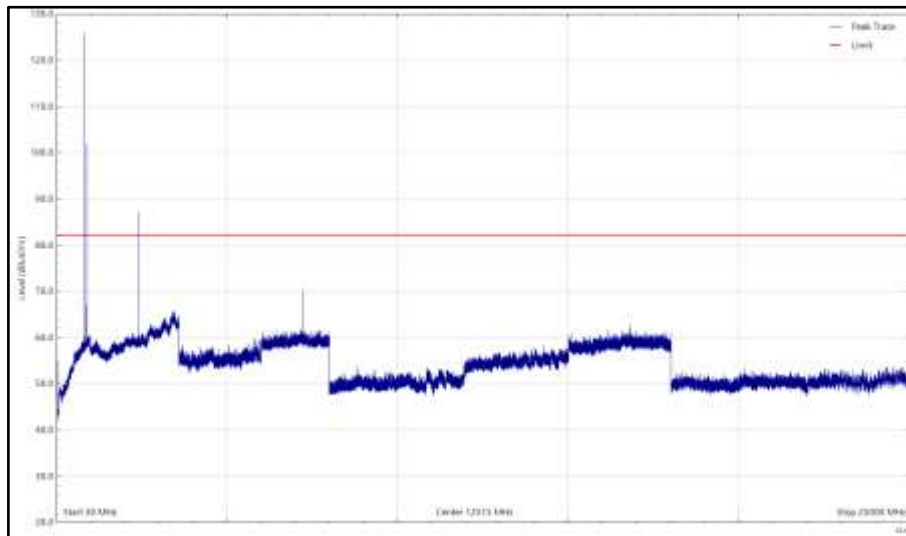


Figure 1 - 2440 MHz, 915 MHz and 836.4 MHz, 30 MHz to 25 GHz, Orientation X, Horizontal (Peak)

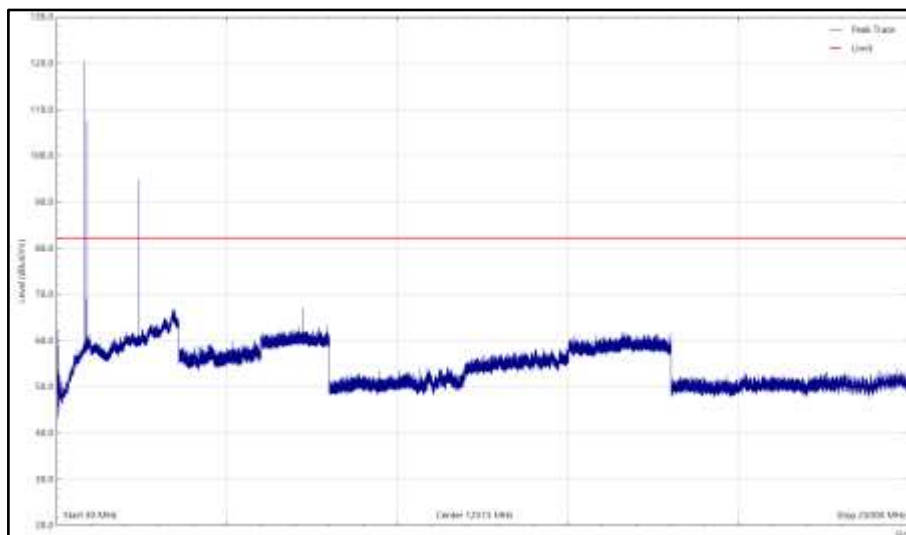


Figure 2 - 2440 MHz, 915 MHz and 836.4 MHz, 30 MHz to 25 GHz, Orientation X, Vertical (Peak)



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

Table 7 - 2440 MHz, 915 MHz and 836.4 MHz, 30 MHz to 25 GHz Orientation Y

*No emissions found within 10 dB of the limit.

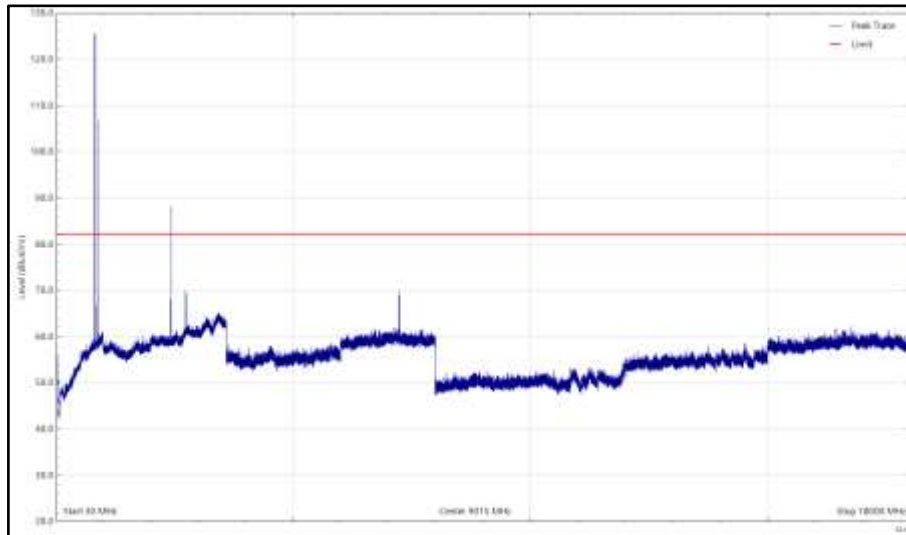


Figure 3 - 2440 MHz, 915 MHz and 836.4 MHz, 30 MHz to 18 GHz, Orientation Y, Horizontal (Peak)

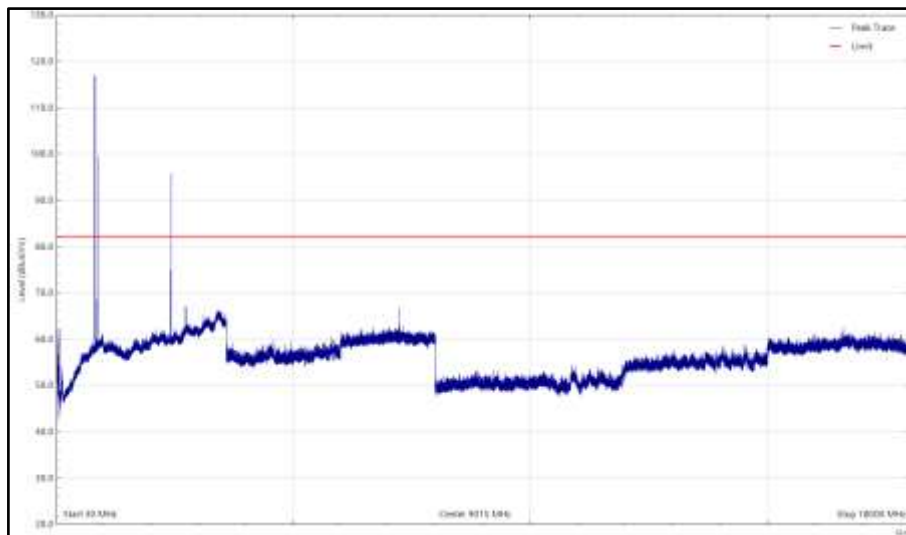


Figure 4 - 2440 MHz, 915 MHz and 836.4 MHz, 30 MHz to 18 GHz, Orientation Y, Vertical (Peak)



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

Table 8 - 2440 MHz, 915 MHz and 836.4 MHz, 30 MHz to 25 GHz, Orientation Z

*No emissions found within 10 dB of the limit.

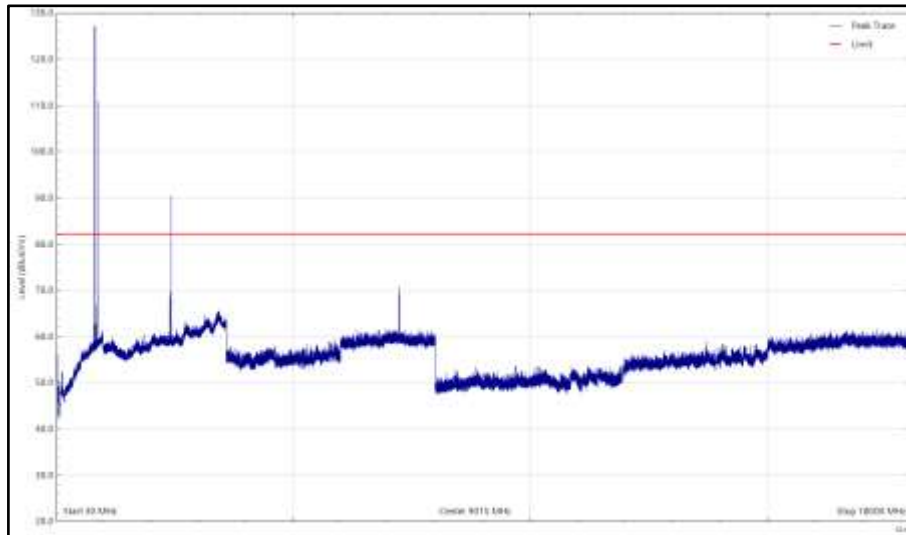


Figure 5 - 2440 MHz, 915 MHz and 836.4 MHz, 30 MHz to 18 GHz, Orientation Z, Horizontal (Peak)

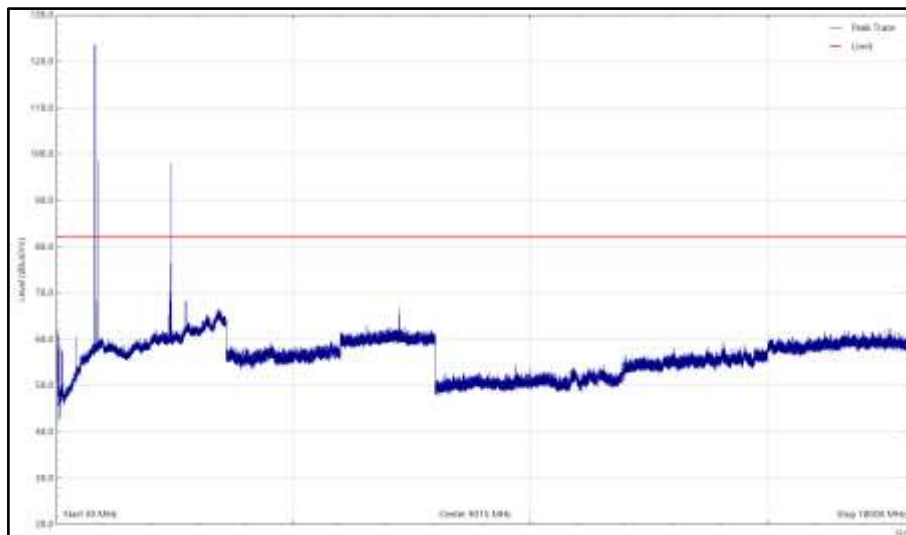


Figure 6 - 2440 MHz, 915 MHz and 836.4 MHz, 30 MHz to 18 GHz, Orientation Z, Vertical (Peak)



Main Antenna - 2.4 GHz Wi-Fi (802.11b and middle channel) + 915 MHz SRD (middle channel) + PCS 1900 (middle channel)

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

Table 9 - 2437 MHz, 915 MHz and 1880 MHz, 30 MHz to 25 GHz, Orientation X

*No emissions found within 10 dB of the limit.

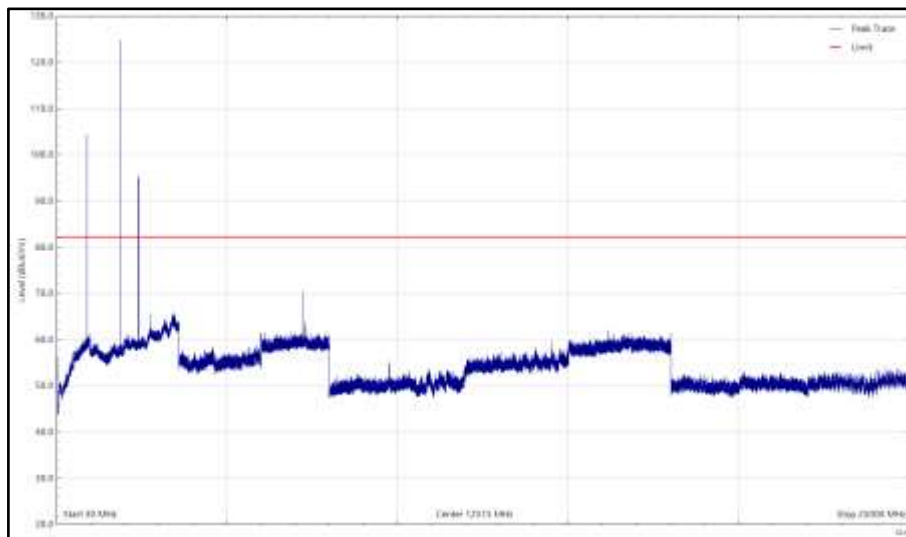


Figure 7 - 2437 MHz, 915 MHz and 1880 MHz, 30 MHz to 25 GHz, Orientation X, Horizontal (Peak)

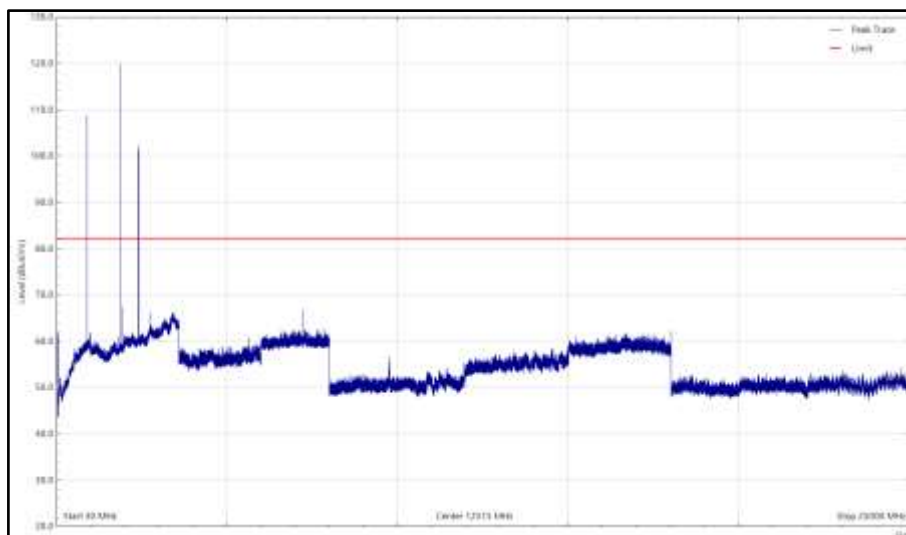


Figure 8 - 2437 MHz, 915 MHz and 1880 MHz, 30 MHz to 25 GHz, Orientation X, Vertical (Peak)



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

Table 10 - 2437 MHz, 915 MHz and 1880 MHz, 30 MHz to 25 GHz, Orientation Y

*No emissions found within 10 dB of the limit.

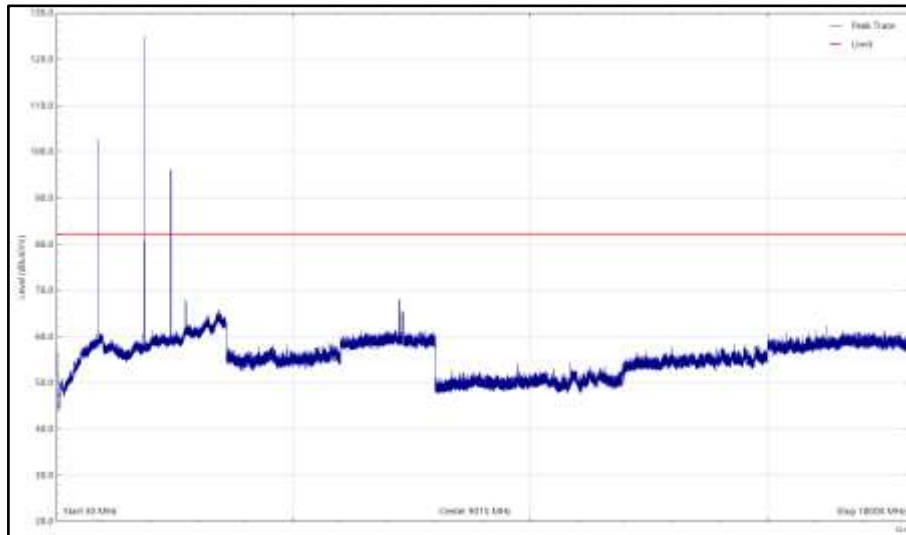


Figure 9 - 2437 MHz, 915 MHz and 1880 MHz, 30 MHz to 18 GHz, Orientation Y, Horizontal (Peak)

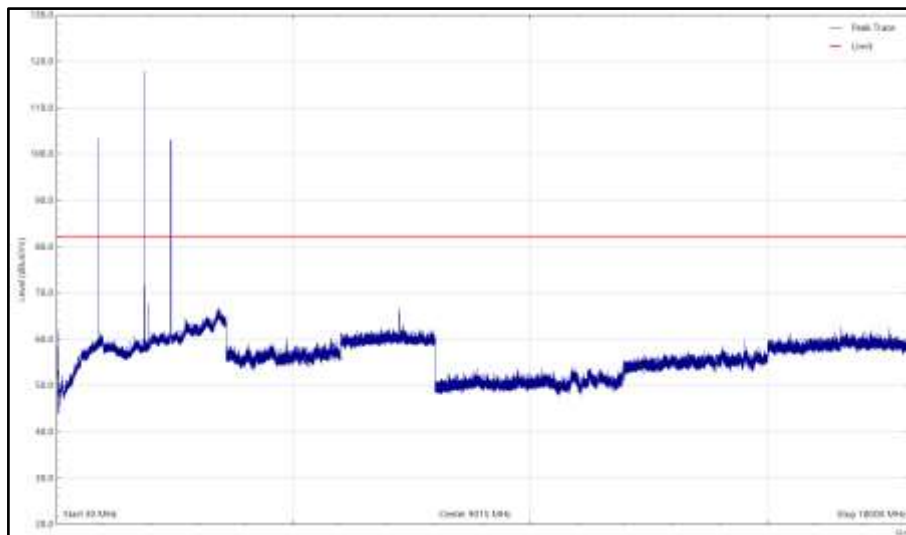


Figure 10 - 2437 MHz, 915 MHz and 1880 MHz, 30 MHz to 18 GHz, Orientation Y, Vertical (Peak)



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

Table 11 - 2437 MHz, 915 MHz and 1880 MHz, 30 MHz to 25 GHz, Orientation Z

*No emissions found within 10 dB of the limit.

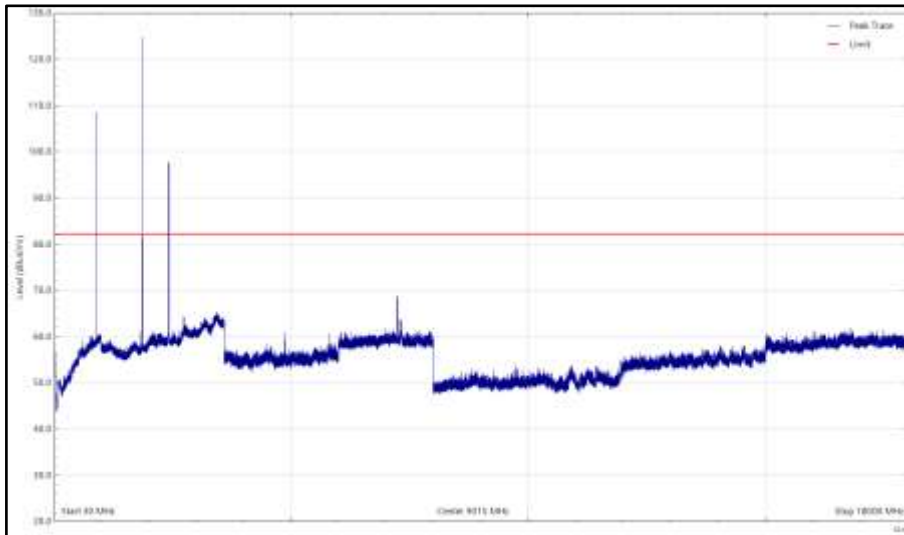


Figure 11 - 2437 MHz, 915 MHz and 1880 MHz, 30 MHz to 18 GHz, Orientation Z, Horizontal (Peak)

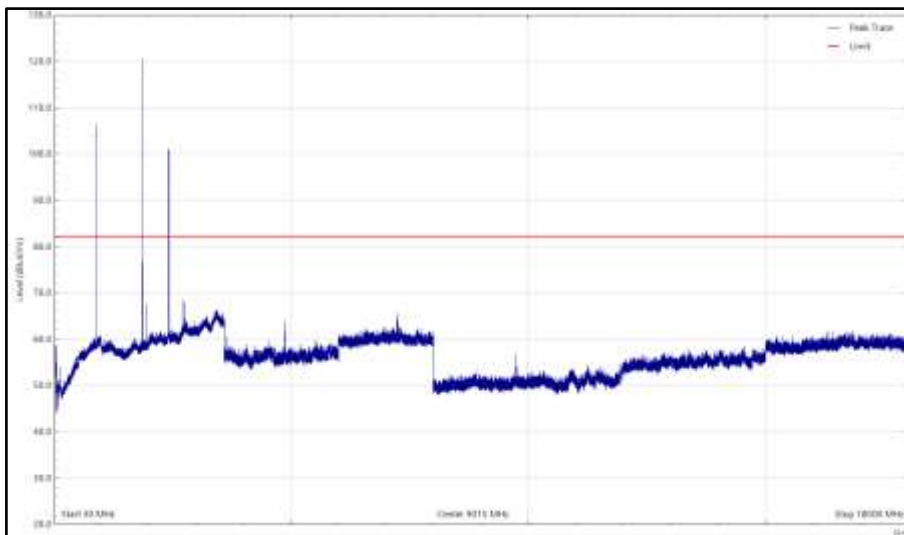


Figure 12 - 2437 MHz, 915 MHz and 1880 MHz, 30 MHz to 18 GHz, Orientation Z, Vertical (Peak)



Main Antenna - Bluetooth EDR (middle channel) + 915 MHz SRD (middle channel) + WCDMA FDD BII (middle channel)

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

Table 12 - 2441 MHz, 915 MHz and 1880 MHz, 30 MHz to 25 GHz Orientation X

*No emissions found within 10 dB of the limit.

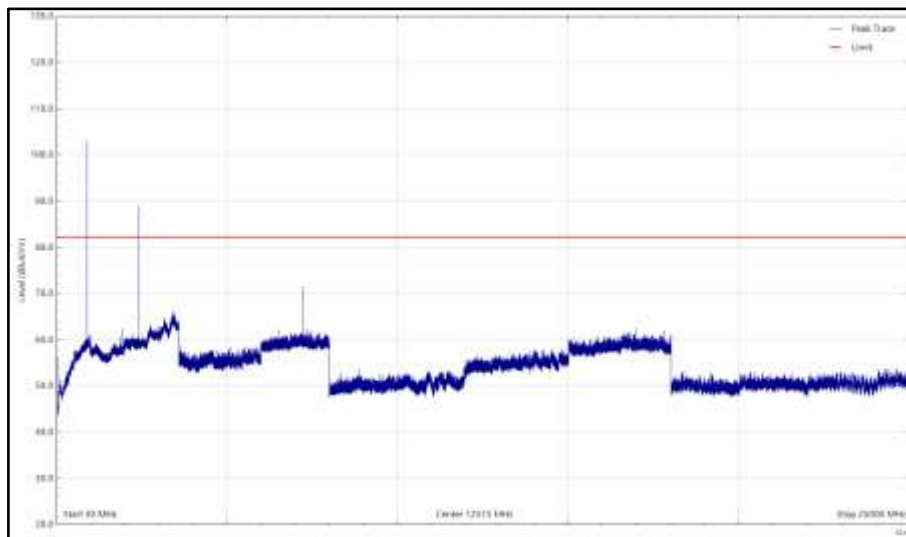


Figure 13 - 2441 MHz, 915 MHz and 1880 MHz, 30 MHz to 25 GHz, Orientation X, Horizontal (Peak)

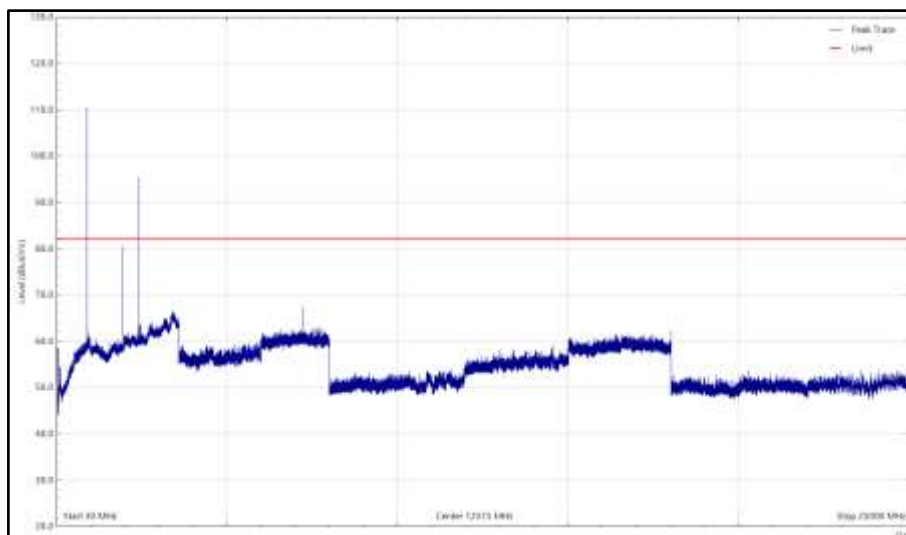


Figure 14 - 2441 MHz, 915 MHz and 1880 MHz, 30 MHz to 25 GHz, Orientation X, Vertical (Peak)



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

Table 13 - 2441 MHz, 915 MHz and 1880 MHz, 30 MHz to 25 GHz Orientation Y

*No emissions found within 10 dB of the limit.

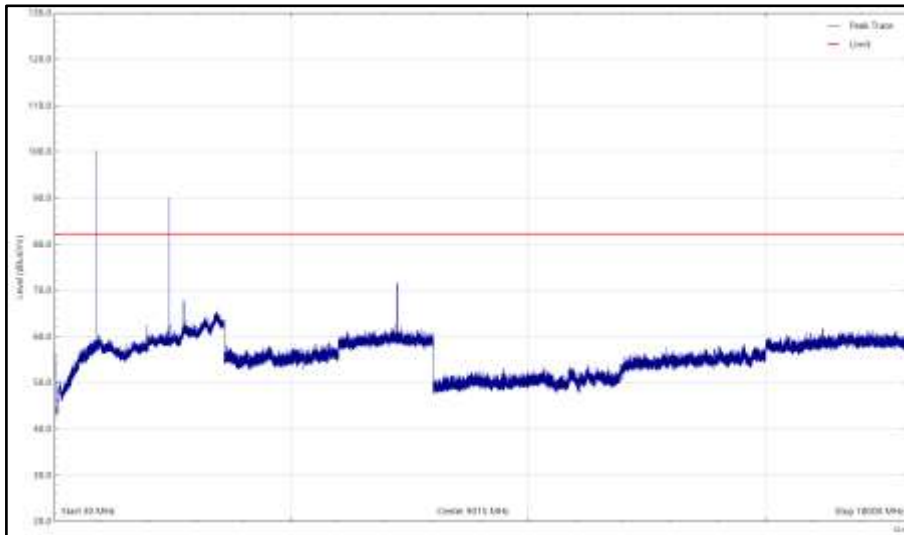


Figure 15 - 2441 MHz, 915 MHz and 1880 MHz, 30 MHz to 18 GHz, Orientation Y, Horizontal (Peak)

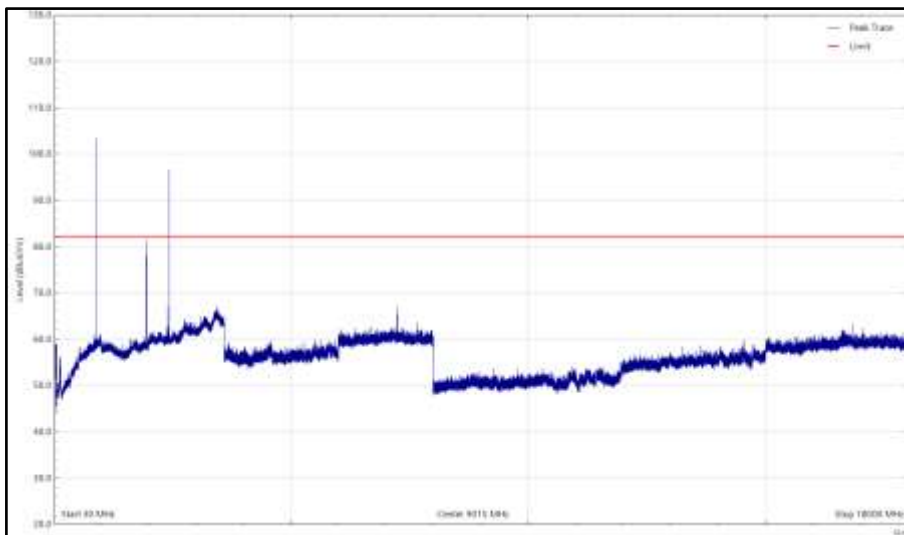


Figure 16 - 2441 MHz, 915 MHz and 1880 MHz, 30 MHz to 18 GHz, Orientation Y, Vertical (Peak)



Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
7240.033	73.7	82.2	-8.5	Peak	195	100	Horizontal

Table 14 - 2441 MHz, 915 MHz and 1880 MHz, 30 MHz to 25 GHz Orientation Z

No other emissions found within 10 dB of the limit.

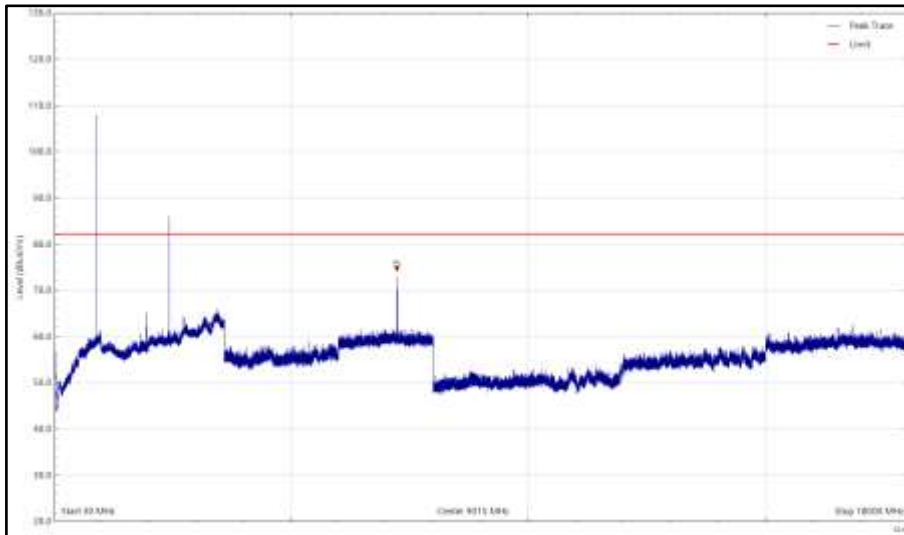


Figure 17 - 2441 MHz, 915 MHz and 1880 MHz, 30 MHz to 18 GHz, Orientation Z, Horizontal (Peak)

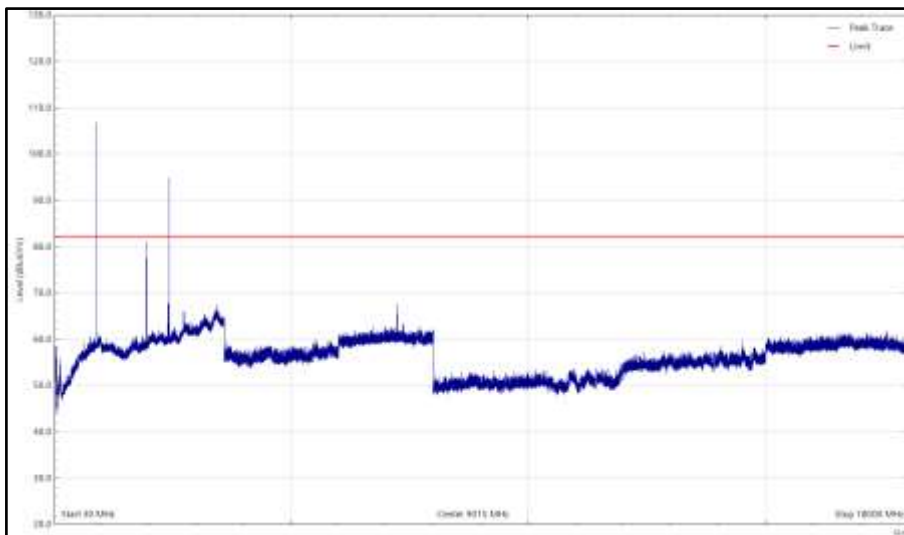


Figure 18 - 2441 MHz, 915 MHz and 1880 MHz, 30 MHz to 18 GHz, Orientation Z, Vertical (Peak)



Main Antenna - 2.4 GHz Wi-Fi (802.11b and middle channel) + 915 MHz SRD (middle channel) + WCDMA FDD BV (middle channel)

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

Table 15 - 2437 MHz, 915 MHz and 836.4 MHz, 30 MHz to 25 GHz Orientation X

*No emissions found within 10 dB of the limit.

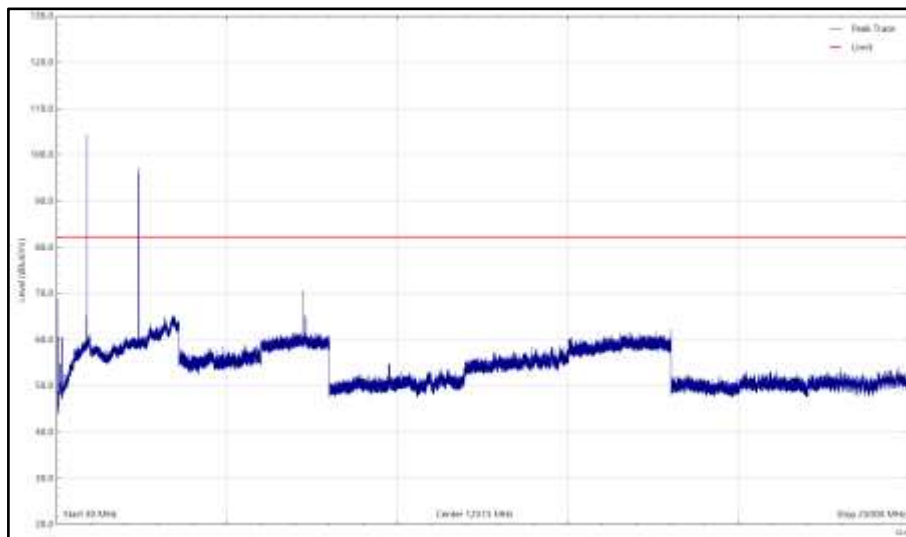


Figure 19 - 2437 MHz, 915 MHz and 836.4 MHz, 30 MHz to 25 GHz, Orientation X, Horizontal (Peak)

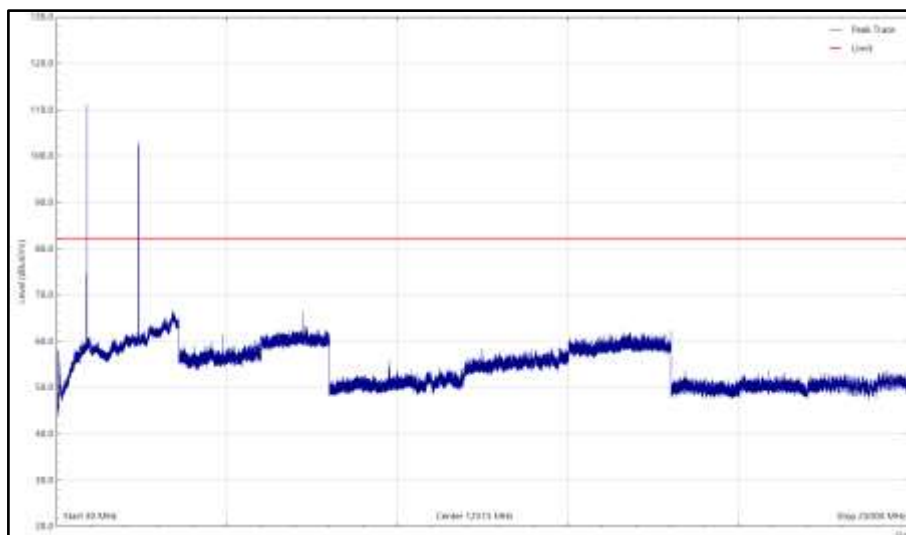


Figure 20 - 2437 MHz, 915 MHz and 836.4 MHz, 30 MHz to 25 GHz, Orientation X, Vertical (Peak)



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

Table 16 - 2437 MHz, 915 MHz and 836.4 MHz, 30 MHz to 25 GHz Orientation Y

*No emissions found within 10 dB of the limit.

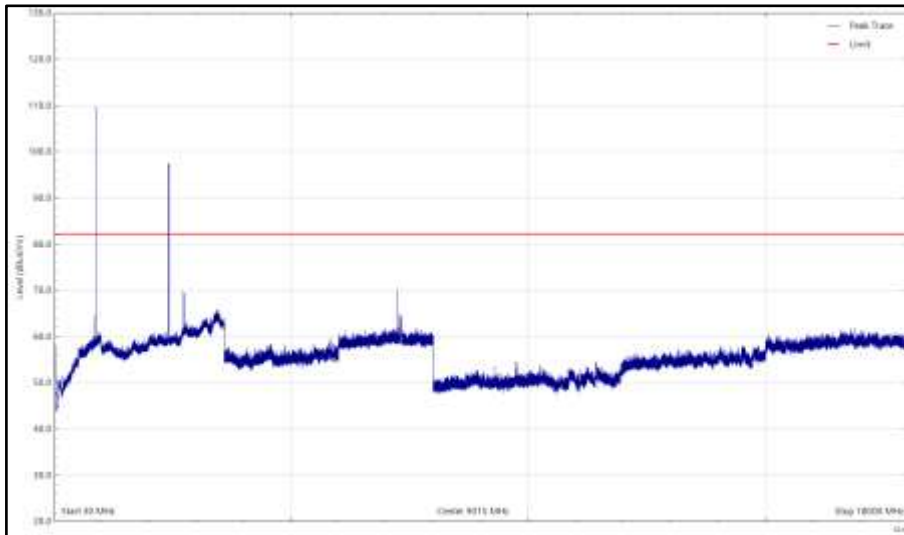


Figure 21 - 2437 MHz, 915 MHz and 836.4 MHz, 30 MHz to 18 GHz, Orientation Y, Horizontal (Peak)

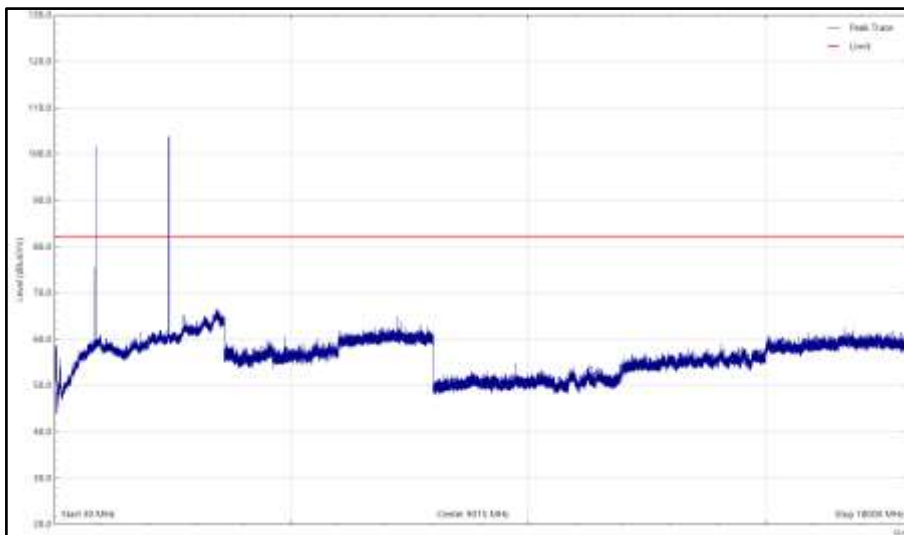


Figure 22 - 2437 MHz, 915 MHz and 836.4 MHz, 30 MHz to 18 GHz, Orientation Y, Vertical (Peak)



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

Table 17 - 2437 MHz, 915 MHz and 836.4 MHz, 30 MHz to 25 GHz Orientation Z

*No emissions found within 10 dB of the limit.

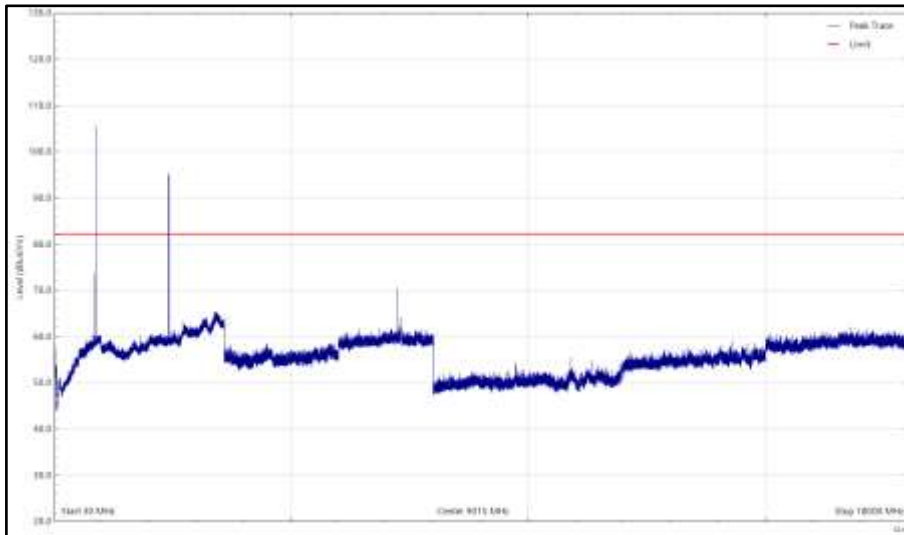


Figure 23 - 2437 MHz, 915 MHz and 836.4 MHz, 30 MHz to 18 GHz, Orientation Z, Horizontal (Peak)

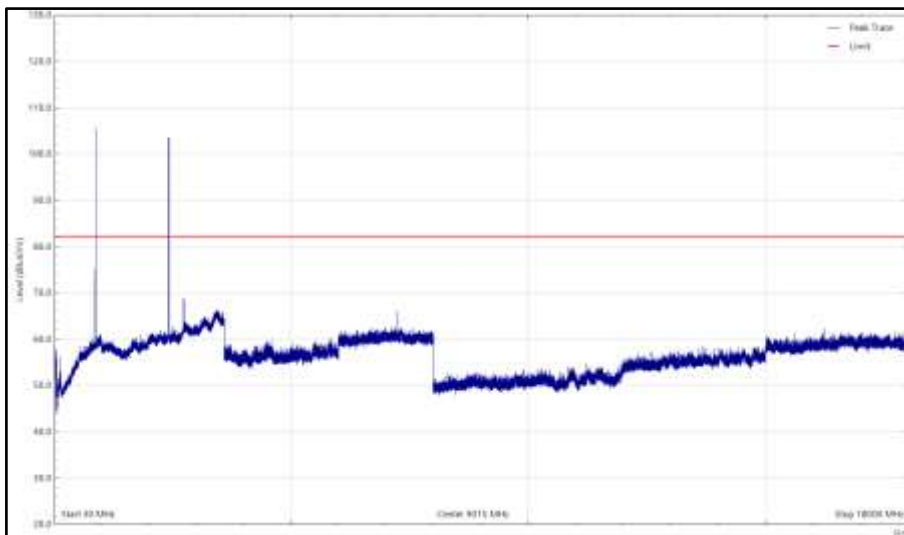


Figure 24 - 2437 MHz, 915 MHz and 836.4 MHz, 30 MHz to 18 GHz, Orientation Z, Vertical (Peak)



Main Antenna - Bluetooth EDR (middle channel) + 915 MHz SRD (middle channel) + LTE FDD B2 (middle channel)

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

Table 18 - 2441 MHz, 915 MHz and 1880 MHz, 30 MHz to 25 GHz, Orientation X

*No emissions found within 10 dB of the limit.

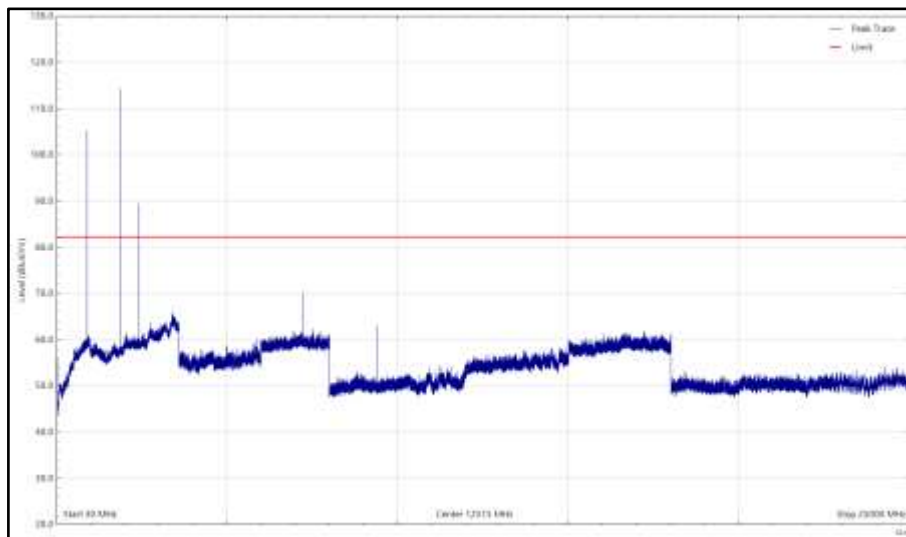


Figure 25 - 2441 MHz, 915 MHz and 1880 MHz, 30 MHz to 25 GHz, Orientation X, Horizontal (Peak)

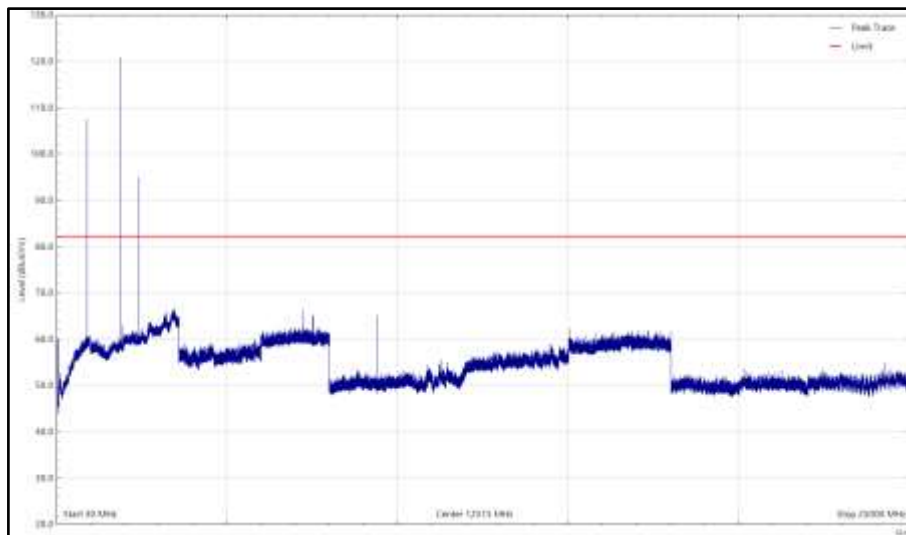


Figure 26 - 2441 MHz, 915 MHz and 1880 MHz, 30 MHz to 25 GHz, Orientation X, Vertical (Peak)



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

Table 19 - 2441 MHz, 915 MHz and 1880 MHz, 30 MHz to 25 GHz, Orientation Y

*No emissions found within 10 dB of the limit.

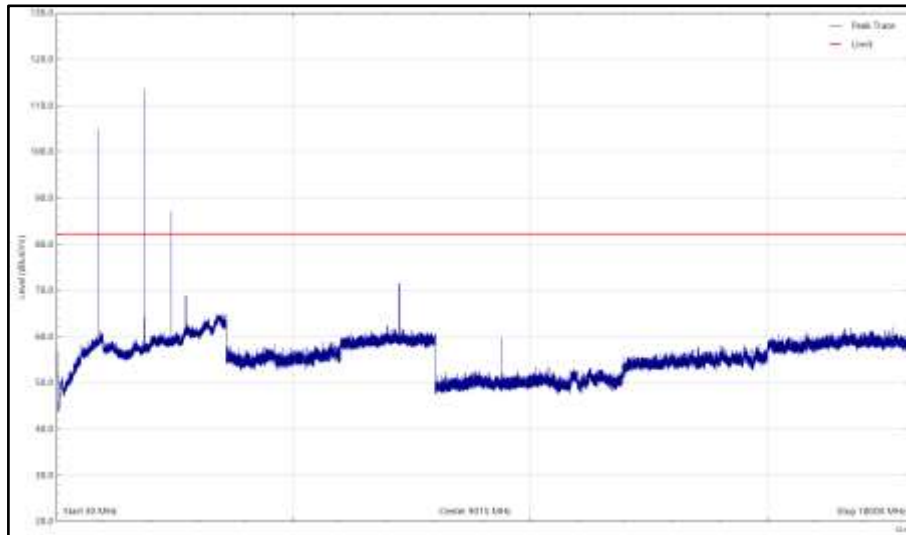


Figure 27 - 2441 MHz, 915 MHz and 1880 MHz, 30 MHz to 18 GHz, Orientation Y, Horizontal (Peak)

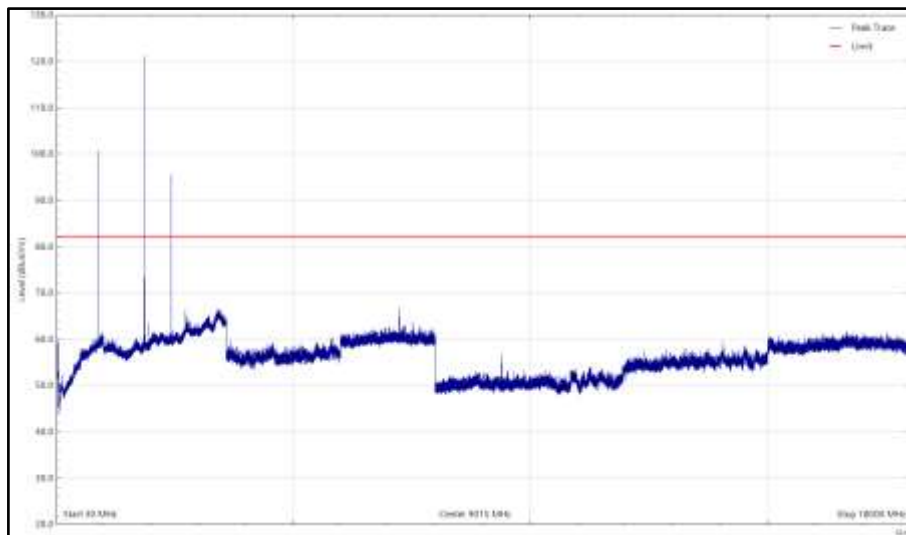


Figure 28 - 2441 MHz, 915 MHz and 1880 MHz, 30 MHz to 18 GHz, Orientation Y, Vertical (Peak)



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

Table 20 - 2441 MHz, 915 MHz and 1880 MHz, 30 MHz to 25 GHz, Orientation Z

*No emissions found within 10 dB of the limit.

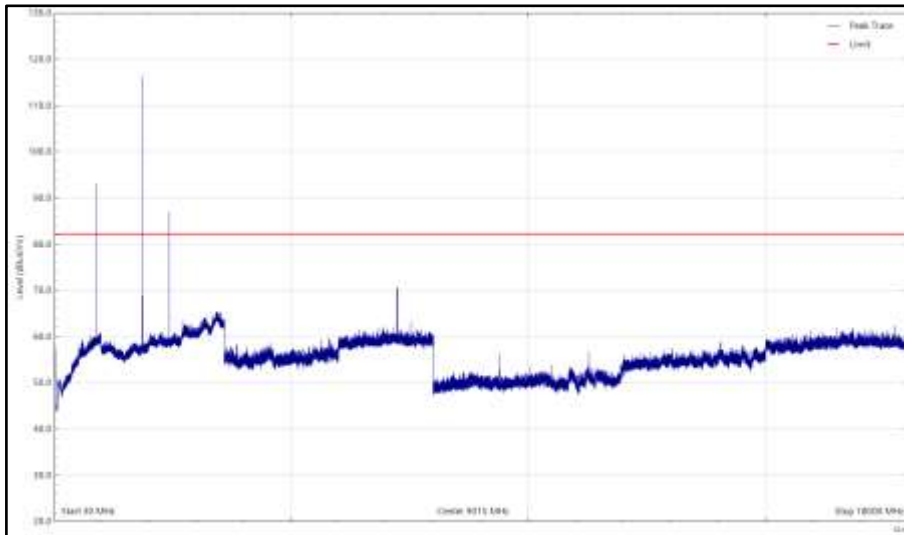


Figure 29 - 2441 MHz, 915 MHz and 1880 MHz, 30 MHz to 18 GHz, Orientation Z, Horizontal (Peak)

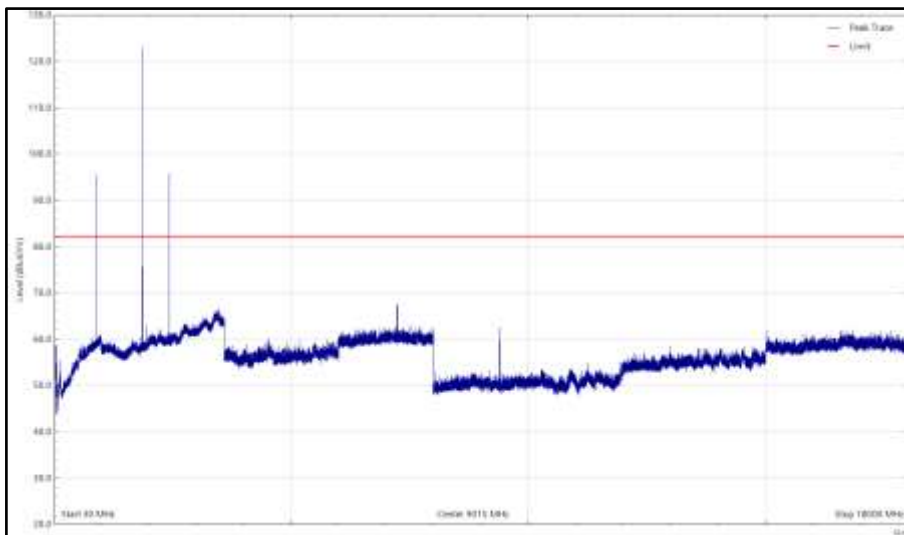


Figure 30 - 2441 MHz, 915 MHz and 1880 MHz, 30 MHz to 18 GHz, Orientation Z, Vertical (Peak)



Main Antenna - 2.4 GHz Wi-Fi (802.11b middle channel) + 915 MHz SRD (middle channel) + LTE FDD B12 (middle channel)

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation
7241.765	72.5	82.2	-9.7	Peak	196	139	Horizontal

Table 21 - 2437 MHz, 915 MHz and 707.5 MHz, 30 MHz to 25 GHz, Orientation X

No other emissions found within 10 dB of the limit.

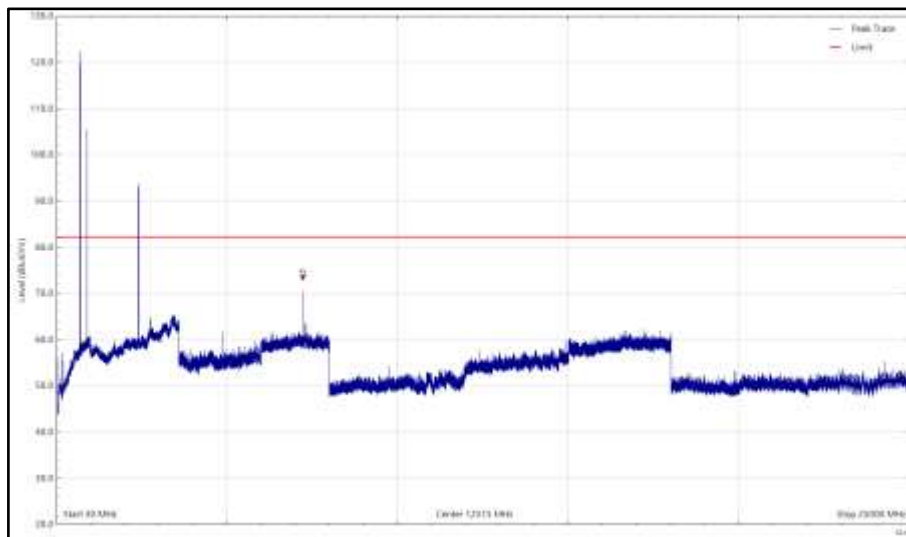


Figure 31 - 2437 MHz, 915 MHz and 707.5 MHz, 30 MHz to 25 GHz, Orientation X, Horizontal (Peak)

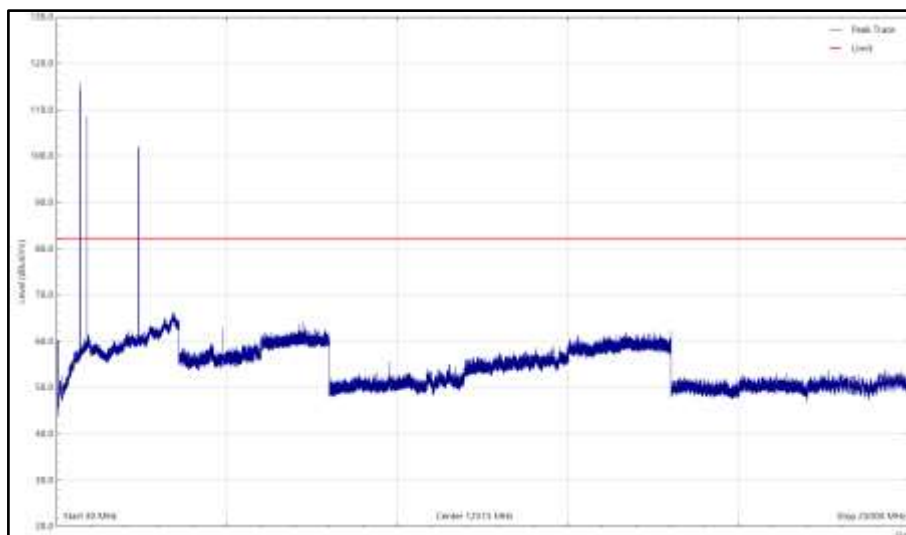


Figure 32 - 2437 MHz, 915 MHz and 707.5 MHz, 30 MHz to 25 GHz, Orientation X, Vertical (Peak)



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

Table 22 - 2437 MHz, 915 MHz and 707.5 MHz, 30 MHz to 25 GHz, Orientation Y

*No emissions found within 10 dB of the limit.

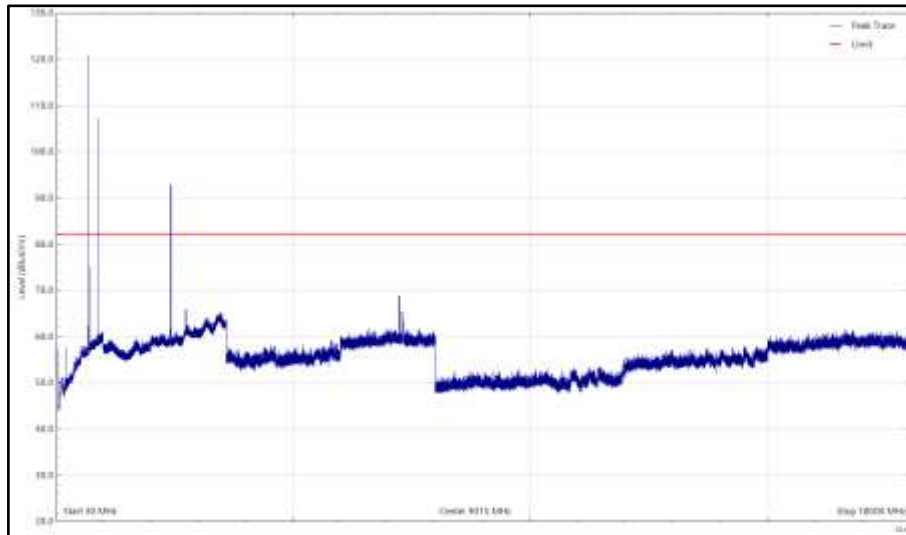


Figure 33 - 2437 MHz, 915 MHz and 707.5 MHz, 30 MHz to 18 GHz, Orientation Y, Horizontal (Peak)

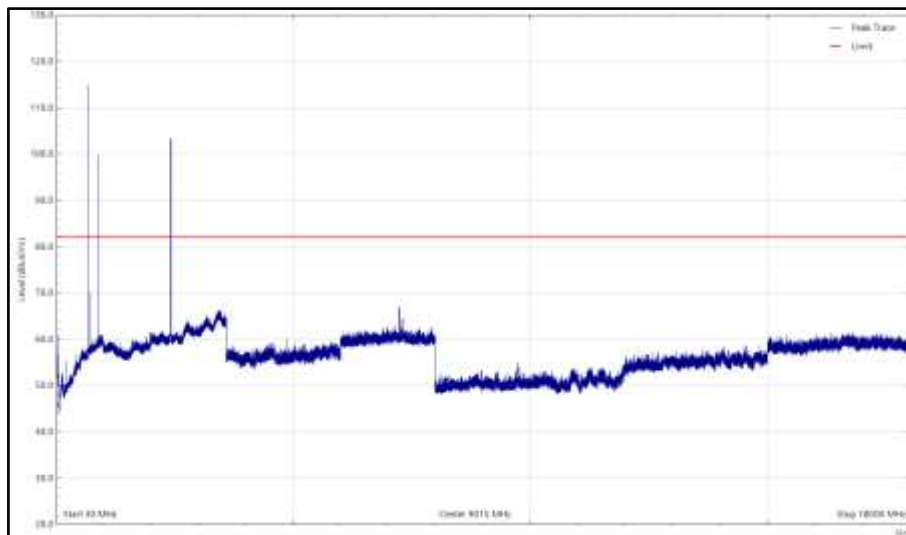


Figure 34 - 2437 MHz, 915 MHz and 707.5 MHz, 30 MHz to 18 GHz, Orientation Y, Vertical (Peak)



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

Table 23 - 2437 MHz, 915 MHz and 707.5 MHz, 30 MHz to 25 GHz, Orientation Z,

*No emissions found within 10 dB of the limit.

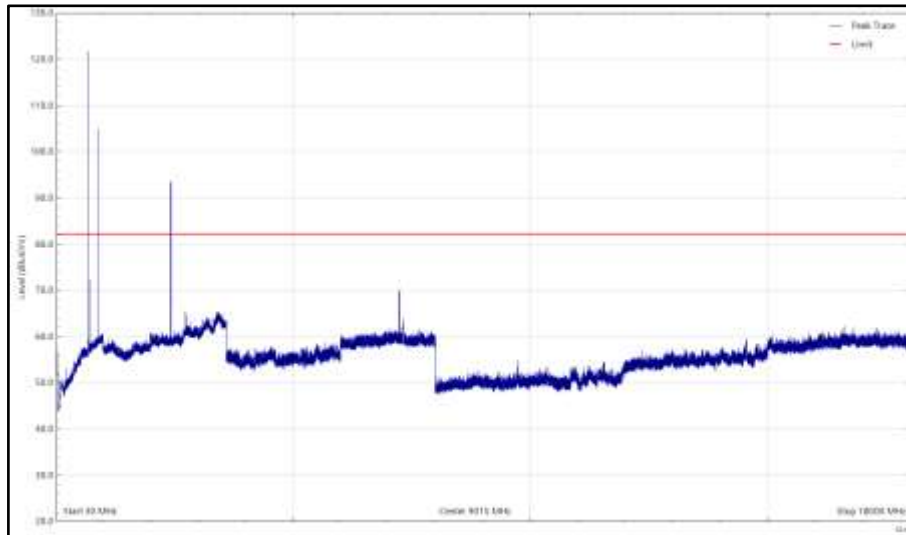


Figure 35 - 2437 MHz, 915 MHz and 707.5 MHz, 30 MHz to 18 GHz, Orientation Z, Horizontal (Peak)

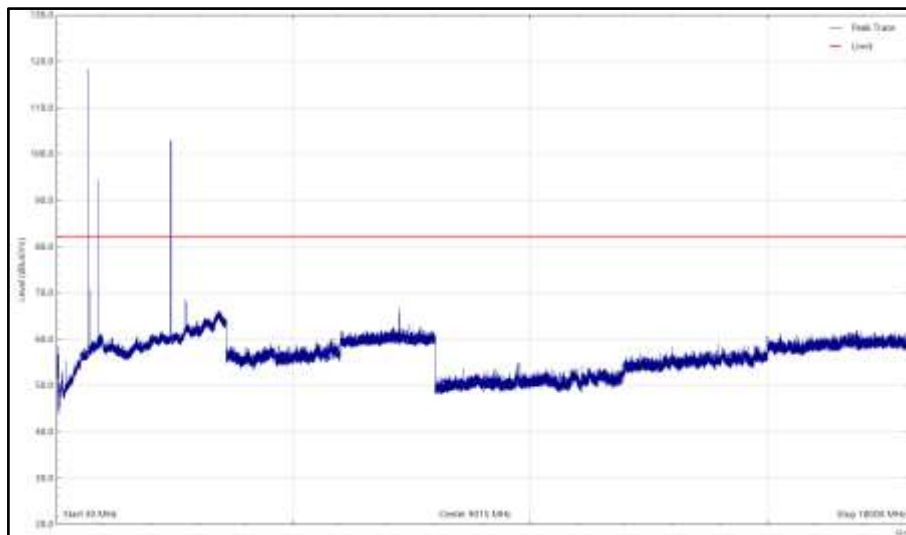


Figure 36 - 2437 MHz, 915 MHz and 707.5 MHz, 30 MHz to 18 GHz, Orientation Z, Vertical (Peak)



Limit Clause

The least stringent limit from the applicable rule parts was used to determine compliance for Radiated Emissions testing of multiple transmission sources.

The least stringent applicable limit was:

Clause	Limit
FCC 47 CFR Part 22, Clause 22.917 (a) FCC 47 CFR Part 24, Clause 24.238 (a) FCC 47 CFR Part 27, Clause 27.53(g)	-13 dBm (68.2 dBµV/m at 3m)

Table 24



2.1.8 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 Due
Antenna 18-40GHz (Double Ridge Guide)	Link Microtek Ltd	AM180HA-K-TU2	230	24	27-Jul-2022
Antenna with permanent attenuator (Bilog)	Schaffner	CBL6143	287	24	14-Oct-2022
DC Power Supply	Hewlett Packard	6269B	326	-	TU
Radio Communications Test Set	Rohde & Schwarz	CMU 200	442	12	23-Apr-2021
18GHz - 40GHz Pre-Amplifier	Phase One	PSO4-0087	1534	12	18-Feb-2021
Multimeter	Iso-tech	IDM101	2424	12	14-Dec-2021
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	14-Jan-2022
Multimeter	Fluke	175	4427	12	16-Mar-2021
Wideband Radio Test Set	Rohde & Schwarz	CMW500	4546	12	10-Dec-2021
EmX Emissions Software	TUV SUD	V2.1.1 V.V2.1.1	5125	-	N/A - Software
3.5 mm 2m Cable	Junkosha	MWX221-02000DMS	5428	12	15-Oct-2021
Thermo-Hygro-Barometer	PCE Instruments	PCE-THB-40	5481	12	18-Mar-2021
1m K-Type Cable	Junkosha	MWX241-01000KMSKMS/A	5511	12	3-Apr-2021
1m K-Type Cable	Junkosha	MWX241-01000KMSKMS/A	5512	12	3-Apr-2021
8m N Type Cable	Junkosha	MWX221-08000NMSNMS/B	5519	12	24-Mar-2021
3 GHz High pass Filter	Wainwright	WHKX12-2580-3000-18000-80SS	5548	12	5-May-2021
DRG Horn Antenna (7.5-18GHz)	Schwarzbeck	HWRD750	5610	12	22-Sep-2021
Broadband Horn Antenna (1-10 GHz)	Schwarzbeck	BBHA 9120 B	5611	12	22-Sep-2021
Turntable & Mast Controller	Maturo Gmbh	NCD/498/2799.01	5612	-	TU
Tilt Antenna Mast TAM 4.0-P	Maturo Gmbh	TAM 4.0-P	5613	-	TU
Turntable	Maturo Gmbh	Turntable 1.5 SI-2t	5614	-	TU
3m Semi Anechoic Chamber	MVG	EMC-3	5621	36	11-Aug-2023

Table 25

TU – Traceability Unscheduled



3 Measurement Uncertainty

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

Test Name	Measurement Uncertainty
Radiated Spurious Emissions (Simultaneous Transmission)	30 MHz to 1 GHz: ± 5.2 dB 1 GHz to 40 GHz: ± 6.3 dB

Table 26

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.