FCC and IC Test Report

Paxton Access Ltd
Battery powered smart electronic lock
Sample 5 - Paxton 10 PaxLock Pro - Standard Sample
Model: 900-630BL

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

Add value.
Inspire trust.

Prepared for: Paxton Access Ltd
Paxton House
Home Farm Road
Brighton
BN1 9HU
United Kingdom

COMMERCIAL-IN-CONFIDENCE

Document 75947459-01 Issue 02

SIGNATURE			
NAME	**JOB TITLE**	**RESPONSIBLE FOR**	**ISSUE DATE**
John Laydon	General Manager	Authorised Signatory	08 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 and ICES-003. The sample tested was found to comply with the requirements defined in the applied rules.

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Testing	Raneev Palavila (Supervised by Martin Perry)	08 January 2020	

FCC Accreditation
217472 Bearley Test Laboratory

EXECUTIVE SUMMARY
A sample of this product was tested and found to be compliant with FCC 47 CFR Part 15B: 2018 and ICES-003 issue 6: 2016 for the tests detailed in section 1.3.

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ACCREDITATION
Our UKAS Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our UKAS Accreditation. Results of tests not covered by our UKAS Accreditation Schedule are marked NUA (Not UKAS Accredited).

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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	08 January 2020
2	Modify the Model number	08 January 2020

Table 1

1.2 Introduction

Applicant	Paxton Access Ltd
Manufacturer	Paxton Access Ltd
Model Number(s)	Paxton 10 PaxLock Pro (900-630BL)
Declared Variant(s)	Paxton 10 PaxLock Pro (900-640WT) Paxton 10 PaxLock Pro (900-650WT) Paxton 10 PaxLock Pro (900-650BL) Paxton 10 PaxLock Pro (900-620WT) Paxton 10 PaxLock Pro (900-620BL) Paxton 10 PaxLock Pro (900-650WT) Paxton 10 PaxLock Pro (900-650BL) Paxton 10 PaxLock Pro (900-630WT) Paxton 10 PaxLock Pro (900-630BL)
Serial Number(s)	900-630BL
Hardware Version(s)	z-pl33_rev4 ppc-pl33C
Software Version(s)	216
Number of Samples Tested	1
Test Specification/Issue/Date	FCC 47 CFR Part 15B: 2018 ICES-003 issue 6: 2016
Test Plan/Issue/Date	Not applicable
Order Number Date	188838 07-November-2019
Date of Receipt of EUT	06-December-2019
Start of Test	10-December-2019
Finish of Test	12-December-2019
Name of Engineer(s)	Raneev Palavila (Supervised by Martin Perry)
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: Battery Powered - 2.4 GHz BLE Transceiver					
2.1	15.109	6.2	Radiated Disturbance	Pass	ANSI C63.4: 2014

Table 2

1.4 Declaration of Build Status

Equipment Description

Technical Description: *(Please provide a brief description of the intended use of the equipment)*	The Paxlock is the battery powered smart electronic lock providing both access control and reader functions. The unit combines a 125kHz and 13.56 MHz proximity reader, a wireless bluetooth interface 2.4GHz and a locking mechanism. PaxLock is a complete standalone system, there's nothing to wire together and no mains connection is required. The unit is powered by four replaceable AA batteries. The purpose of the equipment is to receive validated user input via a radio signal from a passive proximity token (card or keyfob) and then provide a digital output to the internal locking mechanism for access control. An event of this process is then transmitted to the PC through the wireless interface and stored as an archive. User's access rights are configured at the PC and the PaxLock unit is then updated as required using the same wireless method.
Manufacturer:	Paxton Access Limited
Model:	900-640WT Paxton 10 PaxLock Pro - Mortise, Galaxy, white 900-640BL Paxton 10 PaxLock Pro - Mortise, Galaxy, black 900-650WT Paxton 10 PaxLock Pro - Mortise, Eclipse, white 900-650BL Paxton 10 PaxLock Pro - Mortise, Eclipse, black 900-620WT Paxton 10 PaxLock Pro - Latch, Galaxy, white 900-620BL Paxton 10 PaxLock Pro - Latch, Galaxy, black 900-630WT Paxton 10 PaxLock Pro - Latch, Eclipse, white 900-630BL Paxton 10 PaxLock Pro - Latch, Eclipse, black
Part Number:	900-640WT Paxton 10 PaxLock Pro - Mortise, Galaxy, white 900-640BL Paxton 10 PaxLock Pro - Mortise, Galaxy, black 900-650WT Paxton 10 PaxLock Pro - Mortise, Eclipse, white 900-650BL Paxton 10 PaxLock Pro - Mortise, Eclipse, black 900-620WT Paxton 10 PaxLock Pro - Latch, Galaxy, white 900-620BL Paxton 10 PaxLock Pro - Latch, Galaxy, black 900-630WT Paxton 10 PaxLock Pro - Latch, Eclipse, white 900-630BL Paxton 10 PaxLock Pro - Latch, Eclipse, black
Hardware Version:	z-pl33_rev4 ppc-pl33C
Software Version:	216
FCC ID (if applicable)	USE 900650 (these are the proposed IDs after testing and filing is complete)
IC ID (if applicable)	10217A 900650 (these are the proposed IDs after testing and filing is complete)

Table 3

Intentional Radiators

Technology	RFID (HITAG)	RFID (MIFARE)	Bluetooth low energy
Frequency Band (MHz)	125 KHz (0.125 MHz)	13.56MHz	2.4 GHz (2400 MHz)
Conducted Declared Output Power (dBm)			<10mW
Antenna Gain (dBi)			4 dBi
Supported Bandwidth(s) (MHz)			2400 MHz to 2483.5 MHz
Modulation Scheme(s)	AM	AM	Bluetooth low energy 5.0 (GFSK)
ITU Emission Designator	G1D		
Bottom Frequency (MHz)	2400 MHz		
Middle Frequency (MHz)	2440 MHz		
Top Frequency (MHz)	2483.5 MHz		

Table 4

Un-intentional Radiators

Highest frequency generated or used in the device or on which the device operates or tunes	The highest clock frequency that we generate is 48MhZ **Note that the radio circuitry has a 2.4GHz oscillator in it
Lowest frequency generated or used in the device or on which the device operates or tunes	
Class A Digital Device (Use in commercial, industrial or business environment) ☐ Class B Digital Device (Use in residential environment only) ☒	

Table 5

AC Power Source

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

Table 6

DC Power Source

Nominal voltage:	N/A	V
Extreme upper voltage:	N/A	V
Extreme lower voltage:	N/A	V
Max current:	N/A	A

Table 7

Battery Power Source

Voltage:	6	V
End-point voltage:	6	V *(Point at which the battery will terminate)*
Alkaline ☒ Leclanche ☐ Lithium ☐ Nickel Cadmium ☐ Lead Acid* ☐ **(Vehicle regulated)*		
Other ☐ Please detail:		

Table 8

Charging

Can the EUT transmit whilst being charged	Yes ☐ No ☒

Table 9

Temperature

Minimum temperature:	-20 (External variant)	°C
Maximum temperature:	+55 (External variant)	°C

Table 10

Antenna Characteristics

Antenna connector ☐			State impedance		Ohm
Temporary antenna connector ☐			State impedance		Ohm
Integral antenna ☒	Type:		Gain	4	dBi
External antenna ☐	Type:		Gain		dBi
For external antenna only: Standard Antenna Jack ☐ If yes, describe how user is prohibited from changing antenna (if not professional installed): Equipment is only ever professionally installed ☐ Non-standard Antenna Jack ☐					

Table 11

Ancillaries (if applicable)

Manufacturer:		Part Number:	
Model:		Country of Origin:	

Table 12

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

Name: Kevin Feeney
Position held: Compliance Engineer
Date: 07.12.2020

1.5 Product Information

1.5.1 Technical Description

The Equipment Under Test (EUT) was a Paxton Access Ltd, Paxton 10 PaxLock Pro, Model: Paxton 10 PaxLock Pro (900-630BL).

The EUT is a battery powered smart electronic lock providing both access control and reader functions. The unit combines a 125 kHz and 13.56 MHz proximity reader, a wireless Bluetooth interface 2.4 GHz and a locking mechanism.

PaxLock is a completely standalone system, there's nothing to wire together and no mains connection is required. The unit is powered by four replacement AA batteries.

The purpose of the equipment is to receive validated user input via a radio signal from a passive proximity token (card or key fob) and then provide a digital output to the internal locking mechanism for access control. An event of this process is then transmitted to the PC through the wireless interface and stored as an archive. User's access rights are configured at the PC and the PaxLock unit is then updated as required using the same wireless method.

A full description and detailed product specification details are available from the manufacturer.

Figure 1 - Front View

Figure 2 - Rear View

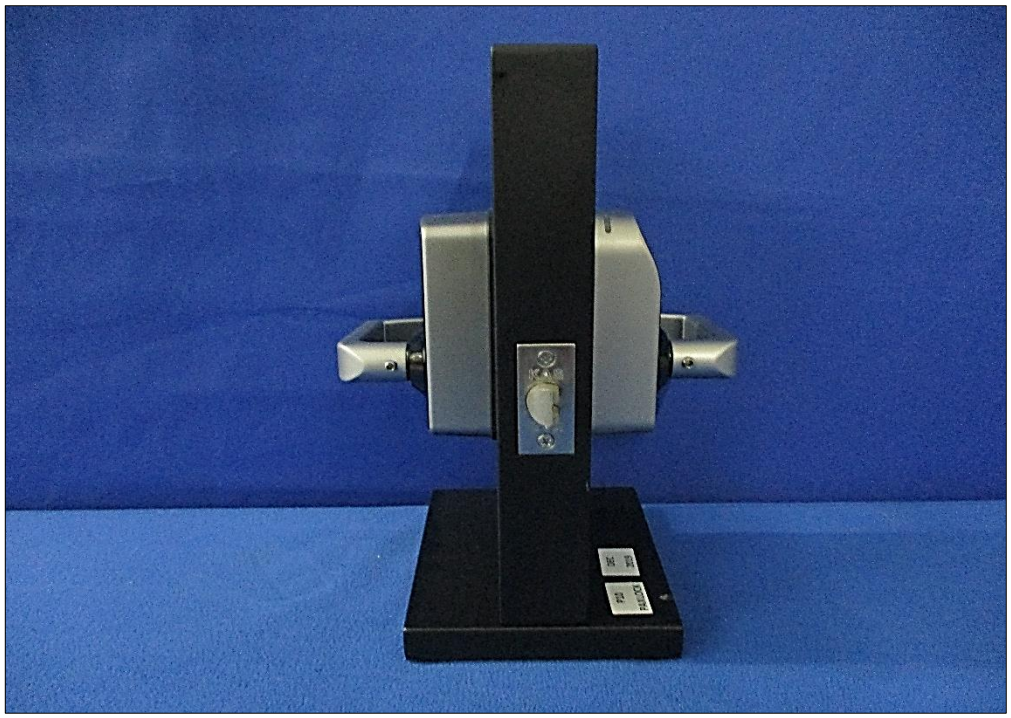

Figure 3 - Left Hand View

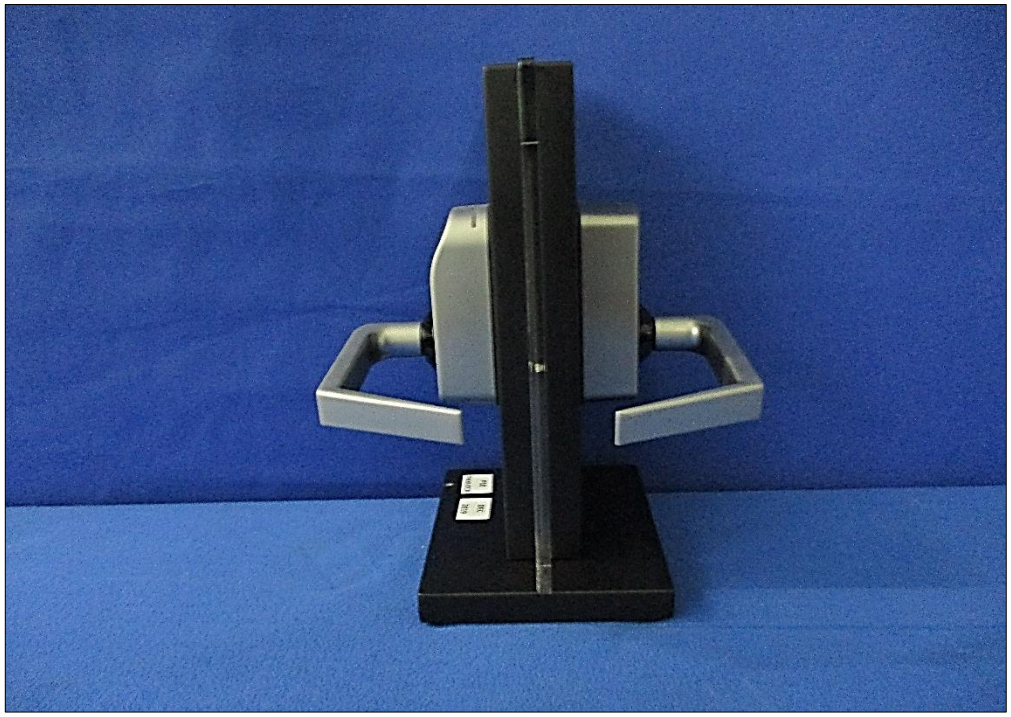

Figure 4 - Right hand View

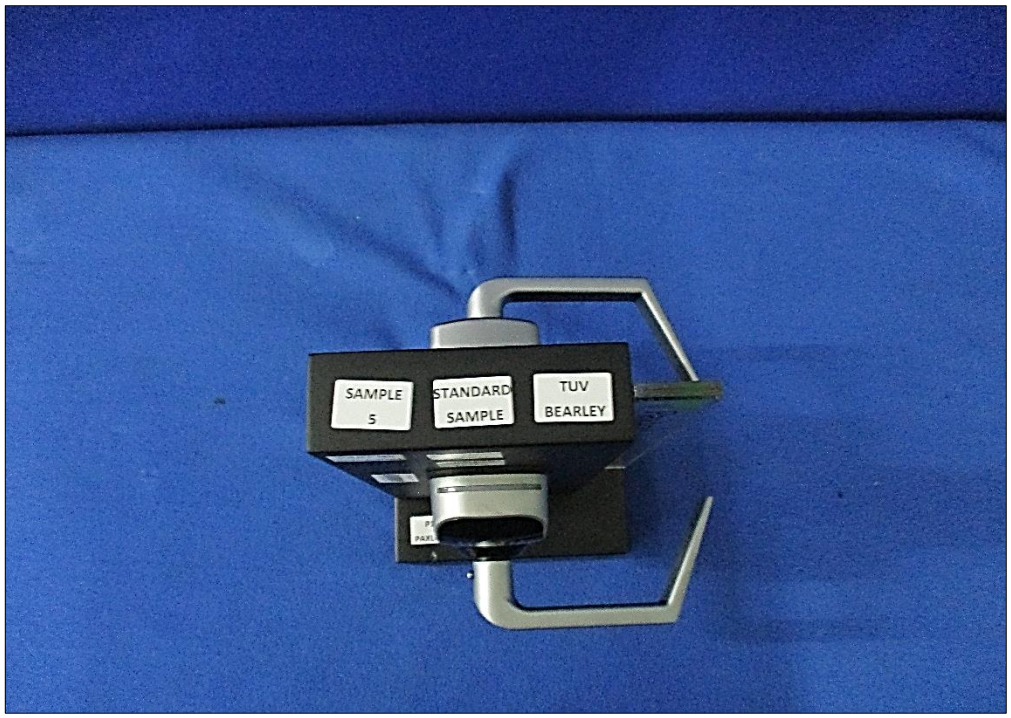

Figure 5 - Top View

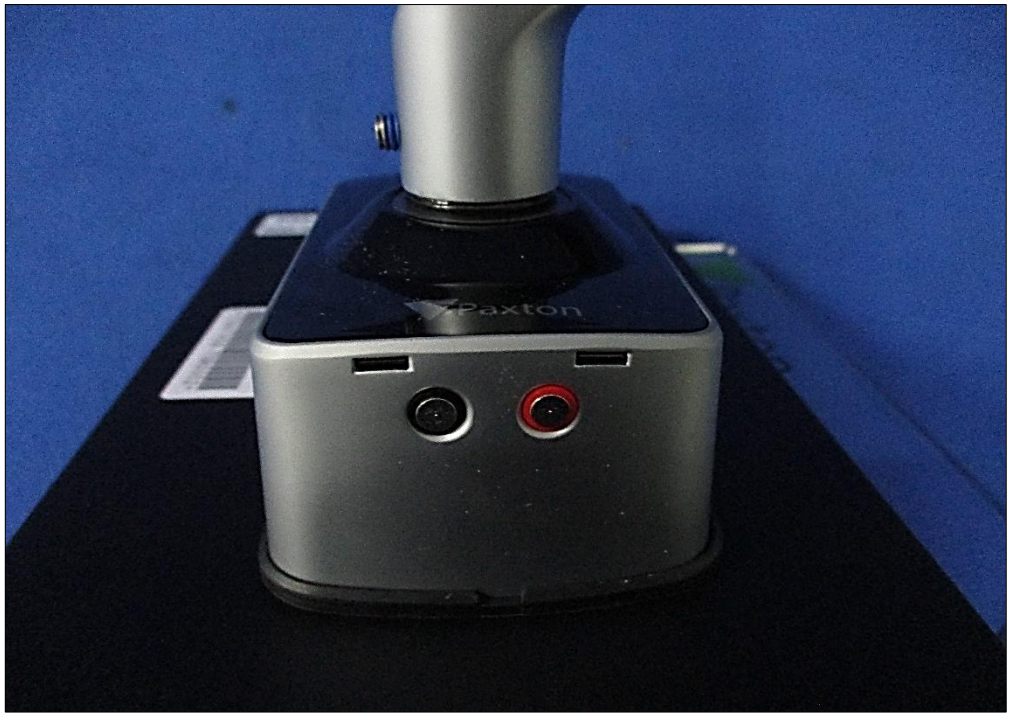

Figure 6 - Bottom Handle View

1.5.2 Test Configuration

Configuration	Description
Battery Powered	The EUT was powered from its own internal battery. Where required, an RPiD card was positioned on the EUT where the EUT could read it.

Table 13

1.5.3 Modes of Operation

Mode	Description
2.4 GHz BLE Transceiver	The EUT was placed in a test mode that continuously transmitted a BLE signal.

Table 14

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: Paxton 10 Pax Lock Pro: Serial Number: 900-630BL			
0	As supplied by the customer	Not Applicable	Not Applicable

Table 15

1.8 Test Location

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

Test Name	Name of Engineer(s)	Accreditation
Configuration and Mode: Battery Powered - 2.4 GHz BLE Transceiver		
Radiated Disturbance	Raneev Palavila (Supervised by Martin Perry)	UKAS

Table 16

Office Address:

Snitterfield Road
Bearley
Warwickshire
CV37 0EX
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

PAXTON 10 PAXLOCK PRO, S/N: 900-630BL - Modification State 0

2.1.3 Date of Test

10-December-2019 to 12-December-2019

2.1.4 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.

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.

2.1.5 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)

2.1.6 Test Setup Diagram

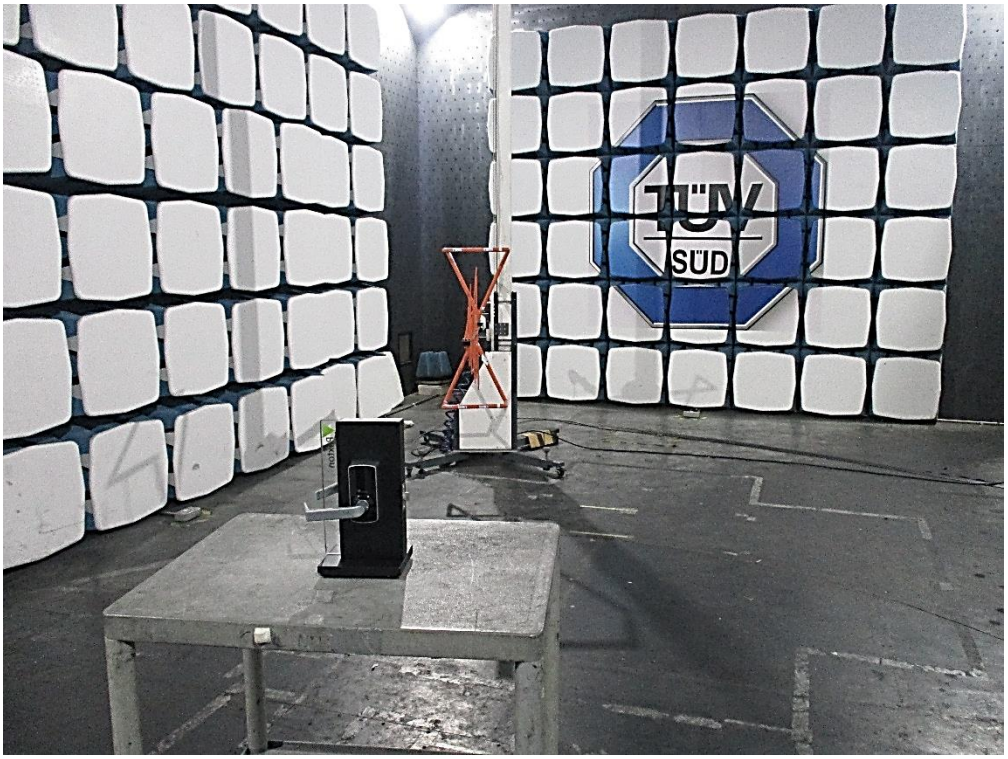

Figure 7 - Radiated Disturbance Test Setup

2.1.7 Environmental Conditions

Ambient Temperature	17.7 °C
Relative Humidity	44.0 %

2.1.8 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 17

Note: - Radiated emissions were measured in a 3 metre chamber and the results were then extrapolated to show a 10 metre measurement using an inverse proportionality factor of 20dB per decade

2.1.9 Test Results

Results for Configuration and Mode: Battery Powered - 2.4 GHz BLE Transceiver

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: 48 MHz
**Note that the radio circuitry has a 2.4 GHz oscillator in it.

Which necessitates an upper frequency test limit of: 13 GHz

Frequency Range of Test: 30 MHz to 1 GHz

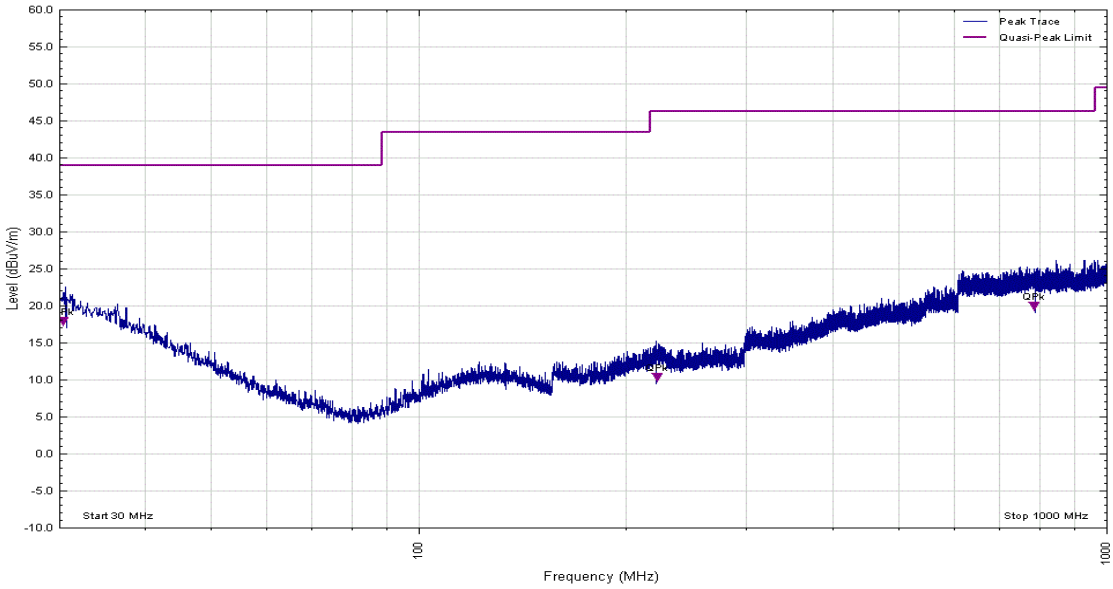

Figure 8 - Graphical Results - Vertical Polarity

Frequency (MHz)	Level	Limit	Margin	Detector	Unit	Angle (°)	Height (cm)	Polarisation
30.373	17.0	39.1	-22.1	Q-Peak	dBuv/m	001	374	Vertical
222.592	9.4	46.4	-37.0	Q-Peak	dBuv/m	253	310	Vertical
786.184	19.1	46.4	-27.3	Q-Peak	dBuv/m	188	362	Vertical

Table 18

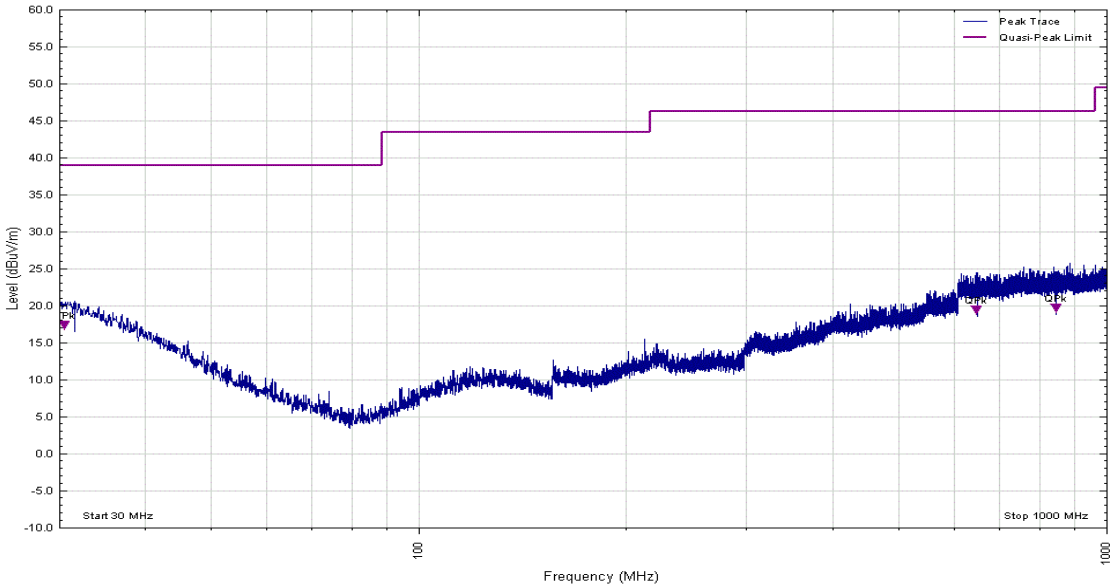

Figure 9 - Graphical Results - Horizontal Polarity

Frequency (MHz)	Level	Limit	Margin	Detector	Unit	Angle (°)	Height (cm)	Polarisation
30.487	16.5	39.1	-22.6	Q-Peak	dBuv/m	090	397	Horizontal
646.296	18.5	46.4	-27.9	Q-Peak	dBuv/m	000	227	Horizontal
845.322	18.8	46.4	-27.6	Q-Peak	dBuv/m	143	273	Horizontal

Table 19

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

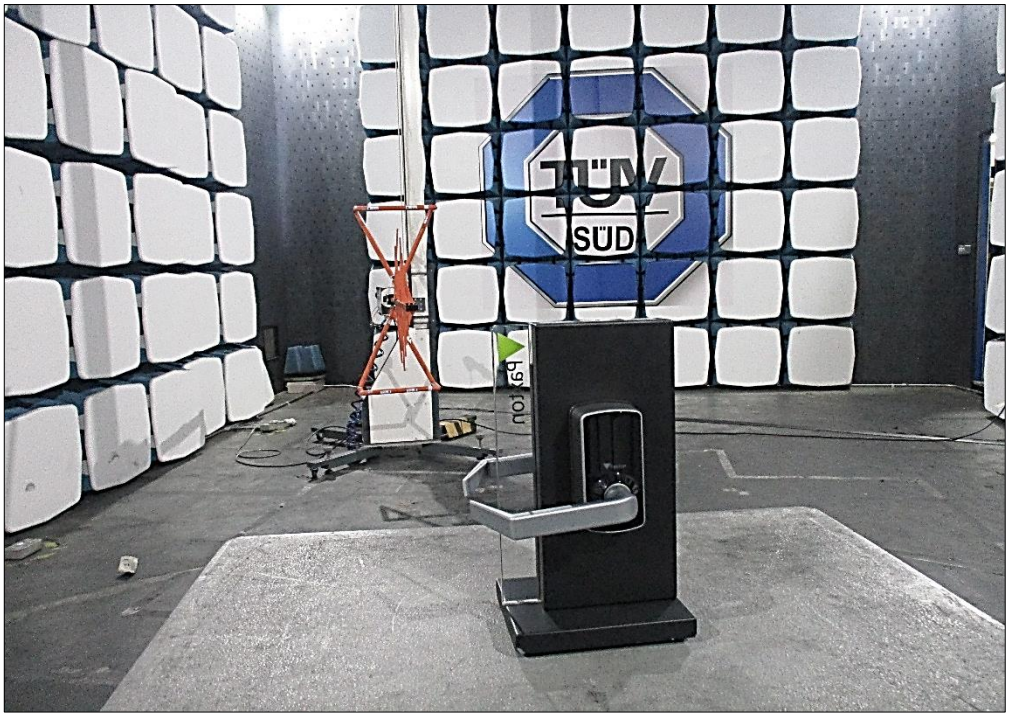

Figure 10 - Test Setup - 30 MHz to 1 GHz

Frequency Range of Test: 1 GHz to 8 GHz

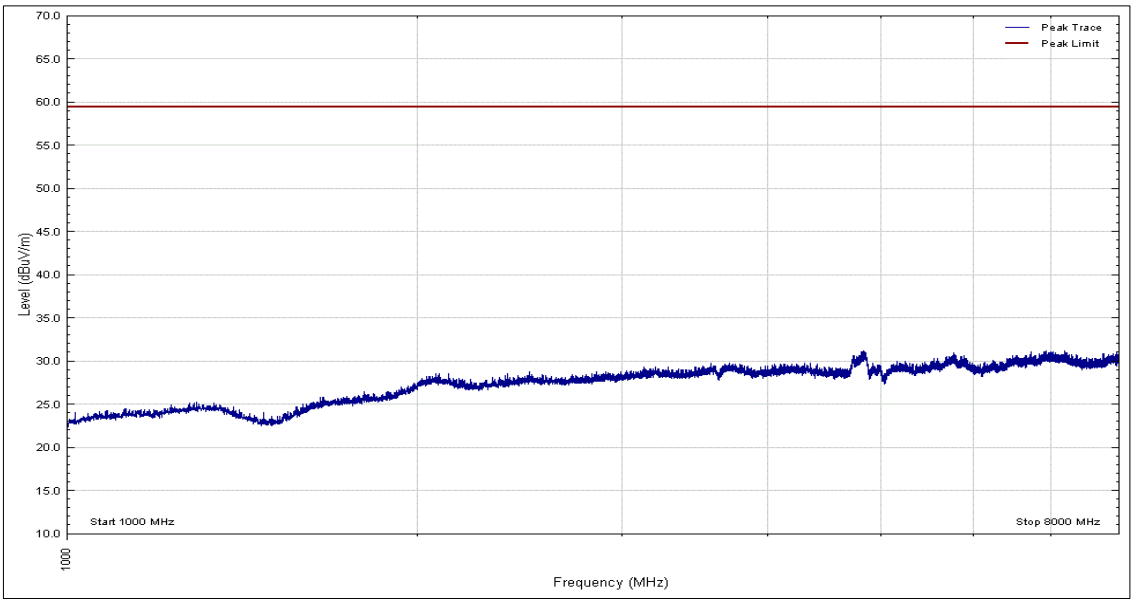

Figure 11 - Graphical Results - Vertical Polarity

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

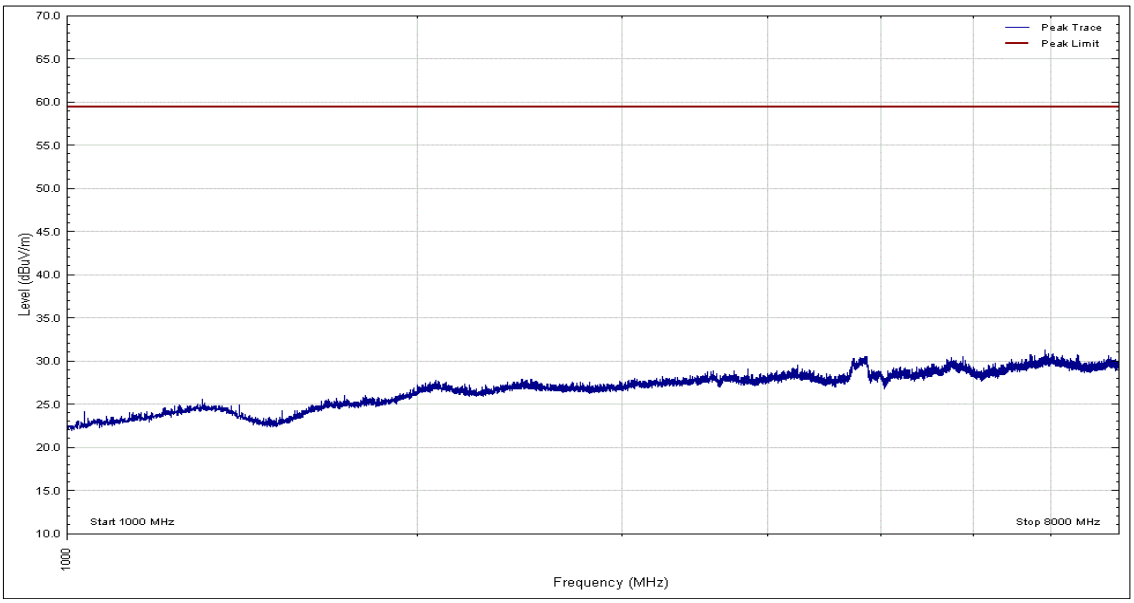

Figure 12 - Graphical Results - Horizontal Polarity

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

Frequency Range of Test: 8 GHz to 13 GHz

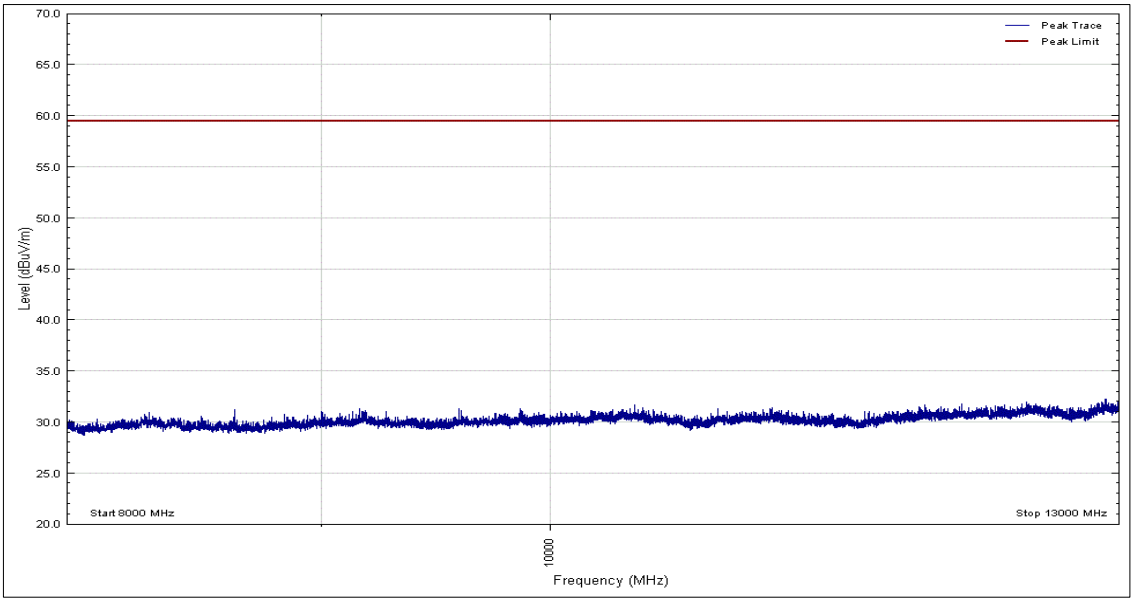

Figure 13 - Graphical Results - Vertical Polarity

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

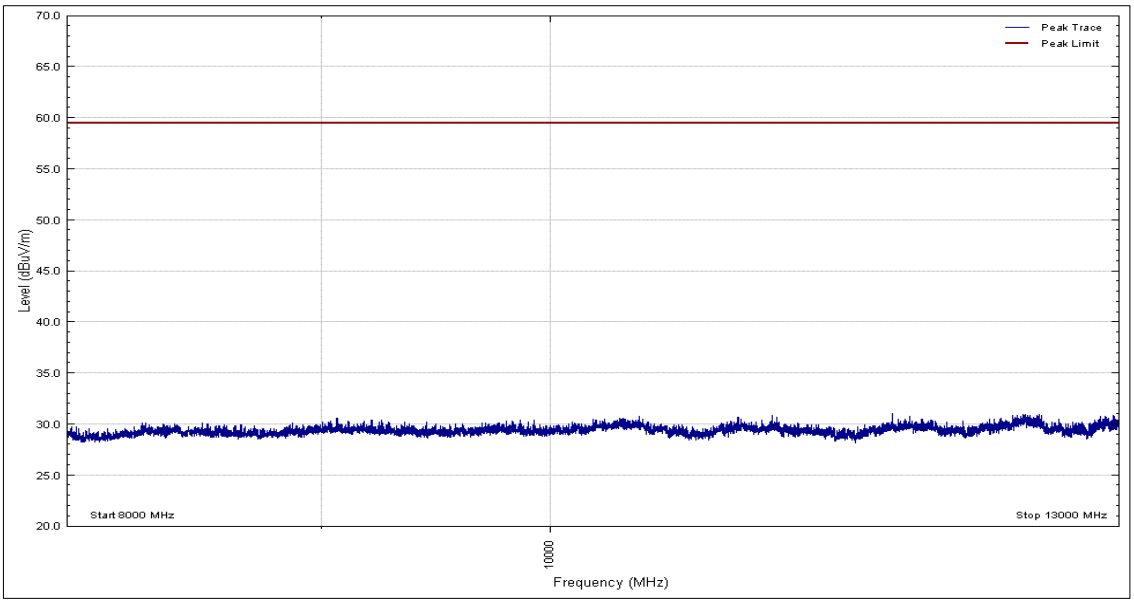

Figure 14 - Graphical Results - Horizontal Polarity

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

Figure 15 - Test Setup - 1 GHz to 13GHz

2.1.10 Test Location and Test Equipment Used

This test was carried out in Bearley EMC Chamber 1.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Power Supply	Farnell	LT30-2	1673	-	TU
Hygrometer	Rotronic	A2	1698	12	17-Oct-2020
Bilog Antenna	Schaffner	CBL6143	1858	24	11-Apr-2021
EMC 3m Semi Anechoic Chamber	Rainford	Hybrid	4160	36	16-Dec-2021
1-8 GHz Amplifier	Wright Technologies	APS04-0085	4674	12	12-Aug-2020
8-18 GHz Amplifier	Wright Technologies	APS04-0086	4675	12	12-Aug-2020
EMC Mast Controller	Innco Systems	CONTROLLER CO3000	4728	-	TU
Cable (N-N, 10m)	Teledyne Stom	PR90-088-393.7	4733	12	01-Mar-2020
1-18 GHz DRN Horn	ETS-Lindgren	3117	4737	24	28-Jul-2021
4dB Attenuator	Pasternack	7047-4	4933	12	11-Apr-2020
4 metre N-N type cable	Suhner	4 metre Enviroflex RG214/U	4950	12	29-Mar-2020
EmX Emissions Software	TUV SUD	EmX V.V1.5.1	5125	-	Software
Cable (18 GHz N Type 3m)	Rosenberger	LU7-036-3000	5163	12	06-Dec-2020
Turntable Controller	Maturo	Maturo NCD	5275	-	TU
Emissions Cable 10m	Unknown	117882	5302	12	12-Jul-2020

Table 20

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

Table 21

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.