FCC Testing of the
ip.access Ltd
S6x Family Access Point. Model: 435R
In accordance with FCC 47 CFR Part 15B

Product Service

Choose certainty.
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Prepared for: ip.access Ltd
Building 2020
Cambourne Business Park
Cambourne
CB23 6DW
United Kingdom

FCC ID: QGGIPA435R

COMMERCIAL-IN-CONFIDENCE

Date: October 2017
Document Number: 75939956-01 | Issue: 01

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Project Management	Natalie Bennett	04 October 2017	
Authorised Signatory	Andy Lawson	04 October 2017	

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD Product Service 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	04 October 2017	

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: 2016 for the tests detailed in section 1.3.

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ACCREDITATION
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Product Service

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	04 October 2017

Table 1

1.2 Introduction

Applicant	ip.access Ltd
Manufacturer	ip.access Ltd
Model Number(s)	435R
Serial Number(s)	000295-0200004111
Hardware Version(s)	Rev C
Software Version(s)	2.0.0 9770 (lte_s60_230.X)
Number of Samples Tested	3
Test Specification/Issue/Date	FCC 47 CFR Part 15B: 2016
Order Number Date	PO39550 25-July-2017
Date of Receipt of EUT	09-August-2017
Start of Test	13-September-2017
Finish of Test	17-September-2017
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 - Idle				
2.1	15.107	AC Power Line Conducted Emissions	Pass	ANSI C63.4
2.2	15.109	Radiated Emissions	Pass	ANSI C63.4
Configuration and Mode: PoE Power Supply - Idle				
2.1	15.107	AC Power Line Conducted Emissions	Pass	ANSI C63.4
2.2	15.109	Radiated Emissions	Pass	ANSI C63.4

Table 2

Product Service

1.4 Application Form

Manufacturer	IP Access Ltd
Country of origin	UK
UK Agent	N/A
Technical Description	LTE Access Point
Model No	S60 FDD Band 2
Part No	435R
Serial No	000295-0200004111 000295-0200004122
Drawing Number	435#010_PRT_Issue_B
Build Status	289
Software Issue	2.0.0 9770 (lte_s60_230.X)
Hardware Issue	Rev C
Highest Internally Generated Frequency	1990 MHz
FCC ID	QGGIPA435R
Industry Canada ID	N/A

Signature	
Date	09-08-2017
D of B S Serial No	N/A

Note: This document has been prepared to enable manufacturers with no mechanism for producing their own Declaration of Build Status, to declare the build state of the equipment submitted for test.

No responsibility will be accepted by TÜV SÜD Product Service as to the accuracy of the information declared in this document by the manufacturer.

1.5 Product Information

1.5.1 Technical Description

LTE Access Point.

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
Serial Number: 000295-0200004111			
0	As supplied by the customer	Not Applicable	Not Applicable

Table 3

1.8 Test Location

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

Test Name	Name of Engineer(s)	Accreditation
Configuration and Mode: AC/DC Power Supply - Idle		
AC Power Line Conducted Emissions	Graeme Lawler	UKAS
Radiated Emissions	Graeme Lawler	UKAS
Configuration and Mode: PoE Power Supply - Idle		
AC Power Line Conducted Emissions	Graeme Lawler	UKAS
Radiated Emissions	Graeme Lawler	UKAS

Table 4

Office Address:

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

2 Test Details

2.1 AC Power Line Conducted Emissions

2.1.1 Specification Reference

FCC 47 CFR Part 15B, Clause 15.107

2.1.2 Equipment Under Test and Modification State

435R, S/N: 000295-0200004111 - Modification State 0

2.1.3 Date of Test

13-September-2017 to 17-September-2017

2.1.4 Test Method

The test was performed in accordance with ANSI C63.4, clause 7.

2.1.5 Environmental Conditions

Ambient Temperature	17.5 - 19.6 °C
Relative Humidity	49.0 - 53.0 %

2.1.6 Test Results

AC/DC Power Supply - Idle

Applied supply Voltage: 60 Hz
Applied supply frequency: 120 Vac

Frequency (MHz)	QP Level (dBuV)	QP Limit (dBuV)	QP Margin (dBuV)	AV Level (dBuV)	AV Limit (dBuV)	AV Margin (dBuV)
0.150	57.7	66.0	-8.3	45.0	56.0	-11.0
0.161	54.4	65.4	-11.0	42.7	55.4	-12.7
0.179	49.2	64.5	-15.3	35.8	54.5	-18.7
0.189	48.9	64.1	-15.2	35.7	54.1	-18.4
0.201	44.4	63.6	-19.1	33.3	53.6	-20.3
0.412	42.3	57.6	-15.3	37.6	47.6	-10.0

Table 5 - Live Line Emissions Results

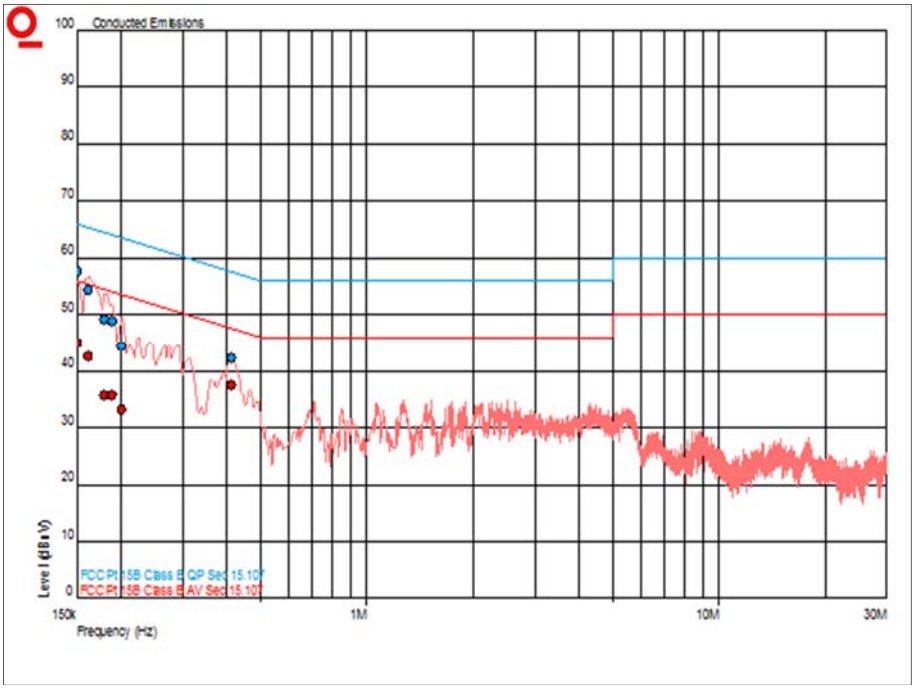

Figure 1 - Live Line - 150 kHz to 30 MHz

Frequency (MHz)	QP Level (dBuV)	QP Limit (dBuV)	QP Margin (dBuV)	AV Level (dBuV)	AV Limit (dBuV)	AV Margin (dBuV)
0.150	58.0	66.0	-8.0	45.0	56.0	-11.0
0.155	53.7	65.7	-12.0	42.0	55.7	-13.8
0.168	52.0	65.1	-13.0	41.1	55.1	-13.9
0.177	49.9	64.6	-14.7	37.7	54.6	-17.0
0.190	49.4	64.1	-14.7	36.1	54.1	-18.0
0.268	41.7	61.2	-19.5	31.5	51.2	-19.7

Table 6 - Neutral Line Emissions Results

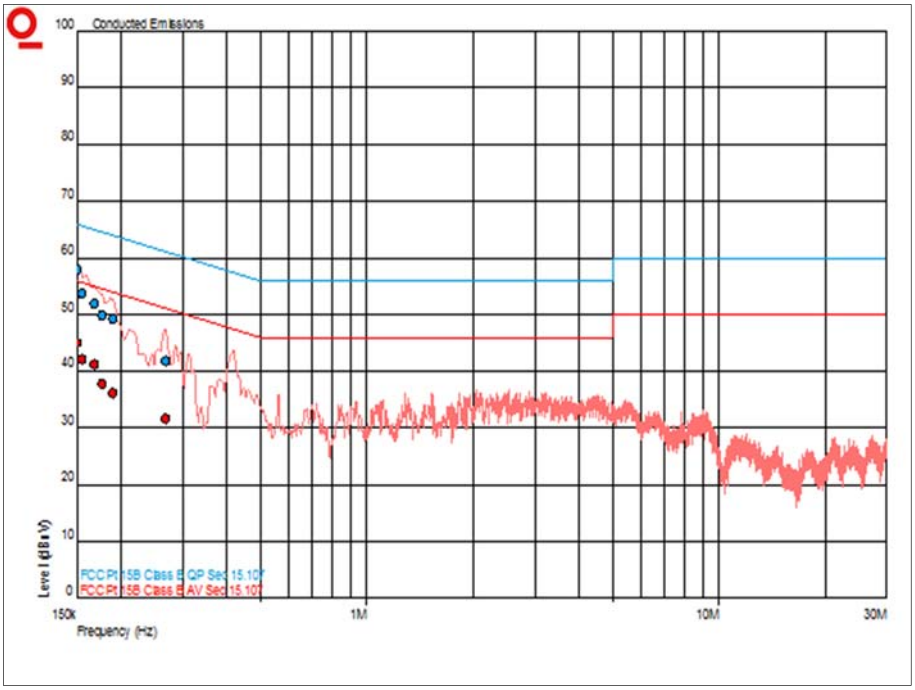

Figure 2 - Neutral Line - 150 kHz to 30 MHz

FCC 47 CFR Part 15, Limit Clause 15.107

Frequency of Emission (MHz)	Conducted Limit (dBµV)	
	Quasi-Peak	Average
0.15 to 0.5	66 to 56*	56 to 46*
0.5 to 5	56	46
5 to 30	60	50

Table 7

*Decreases with the logarithm of the frequency.

PoE Power Supply - Idle

Applied supply Voltage: 60 Hz
Applied supply frequency: 120 Vac

Frequency (MHz)	QP Level (dBuV)	QP Limit (dBuV)	QP Margin (dBuV)	AV Level (dBuV)	AV Limit (dBuV)	AV Margin (dBuV)
0.150	48.2	66.0	-17.8	32.5	56.0	-23.5
0.194	41.8	63.9	-22.1	28.9	53.9	-24.9
0.786	37.0	56.0	-19.0	36.7	46.0	-9.3
13.579	41.4	60.0	-18.6	39.3	50.0	-10.7
14.624	41.0	60.0	-19.0	38.6	50.0	-11.4
16.199	41.4	60.0	-18.6	38.4	50.0	-11.6

Table 8 - Live Line Emissions Results

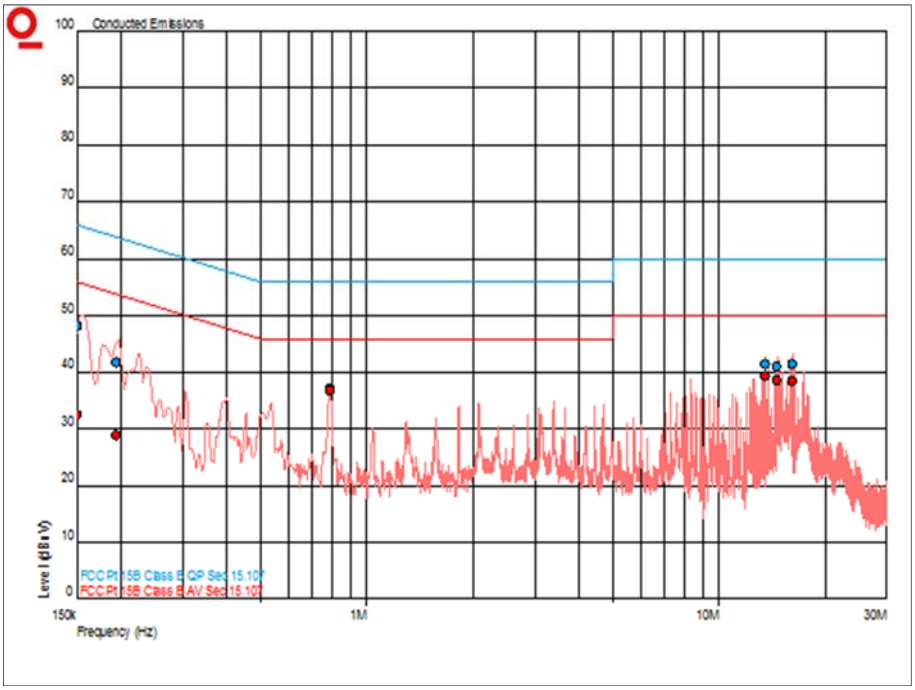

Figure 3 - Live Line - 150 kHz to 30 MHz

Frequency (MHz)	QP Level (dBuV)	QP Limit (dBuV)	QP Margin (dBuV)	AV Level (dBuV)	AV Limit (dBuV)	AV Margin (dBuV)
0.150	49.3	66.0	-16.7	33.4	56.0	-22.6
0.193	42.0	63.9	-21.9	28.3	53.9	-25.6
0.787	37.1	56.0	-18.9	36.9	46.0	-9.1
13.551	41.5	60.0	-18.5	38.2	50.0	-11.8
14.593	42.1	60.0	-17.9	39.6	50.0	-10.4
16.172	42.1	60.0	-17.9	39.2	50.0	-10.8

Table 9 - Neutral Line Emissions Results

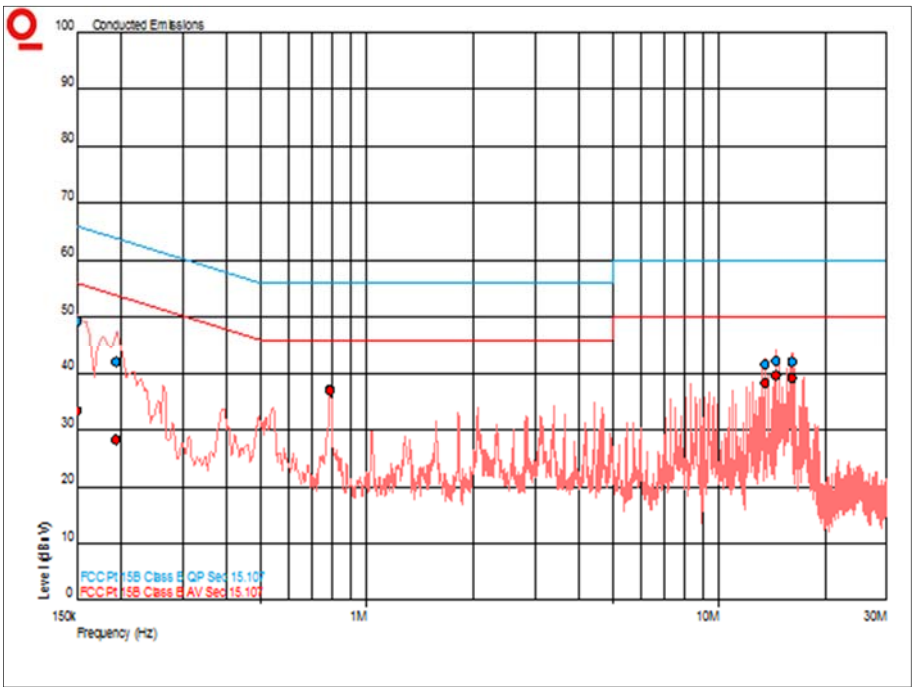

Figure 4 - Neutral Line - 150 kHz to 30 MHz

FCC 47 CFR Part 15, Limit Clause 15.107

Frequency of Emission (MHz)	Conducted Limit (dBµV)	
	Quasi-Peak	Average
0.15 to 0.5	66 to 56*	56 to 46*
0.5 to 5	56	46
5 to 30	60	50

Table 10

*Decreases with the logarithm of the frequency.

2.1.7 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
Transient Limiter	Hewlett Packard	11947A	15	12	30-May-2018
LISN (1 Phase)	Chase	MN 2050	336	12	07-Apr-2018
Screened Room (5)	Rainford	Rainford	1545	36	20-Dec-2017
Multimeter	Iso-tech	IDM101	2417	12	30-Sep-2017
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	12-Nov-2017
Digital thermo Hygrometer	Radio Spares	1260	4300	12	30-Aug-2018

Table 11

2.2 Radiated Emissions

2.2.1 Specification Reference

FCC 47 CFR Part 15B, Clause 15.109

2.2.2 Equipment Under Test and Modification State

435R, S/N: 000295-0200004111 - Modification State 0

2.2.3 Date of Test

13-September-2017 to 17-September-2017

2.2.4 Test Method

The test was performed in accordance with ANSI C63.4, clause 8.

2.2.5 Environmental Conditions

Ambient Temperature	17.5 - 19.6 °C
Relative Humidity	49.0 - 53.0 %

2.2.6 Test Results

AC/DC Power Supply - Idle

Highest frequency generated or used within the EUT: 1990 MHz
Upper frequency test limit: 10 GHz

Frequency (MHz)	QP Level (dBuV/m)	QP Limit (dBuV/m)	QP Margin (dBuV/m)	Angle(Deg)	Height(m)	Polarity
31.944	30.2	40.0	-9.8	146	1.00	Vertical
58.602	25.4	40.0	-14.6	200	1.00	Vertical
85.014	29.2	40.0	-10.8	26	1.00	Vertical
86.160	29.9	40.0	-10.1	98	1.00	Vertical
159.672	31.9	43.5	-11.6	82	1.00	Vertical
192.868	34.1	43.5	-9.4	82	1.00	Vertical

Table 12 - 30 MHz to 1 GHz

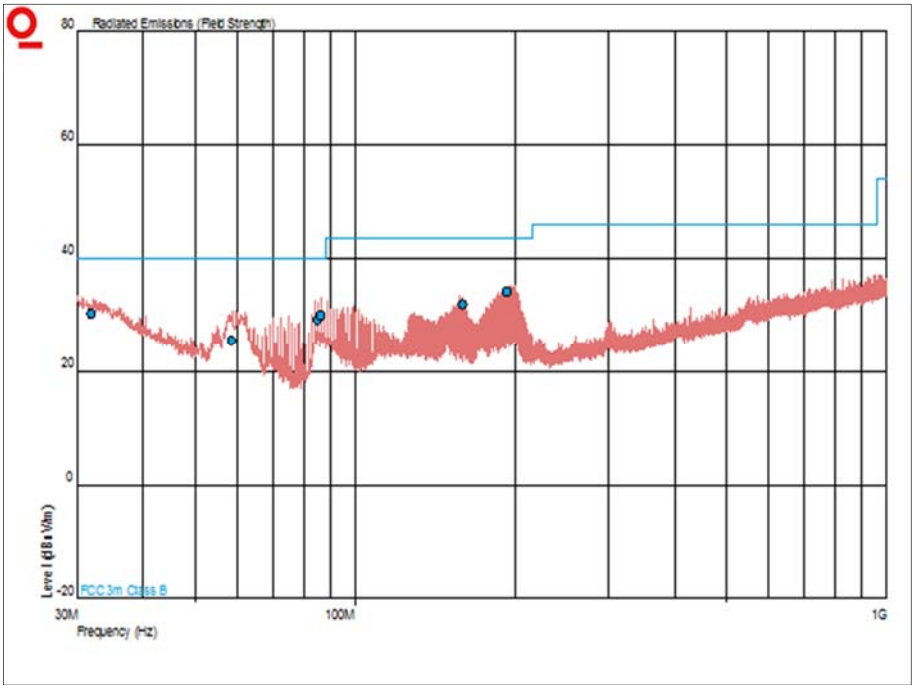

Figure 5 - 30 MHz to 1 GHz - Horizontal and Vertical

Frequency (GHz)	Result (µV/m)		Limit (µV/m)		Margin (µV/m)		Angle (°)	Height (m)	Polarisation
	Peak	Average	Peak	Average	Peak	Average			
*									

Table 13 - 1 GHz to 10 GHz

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

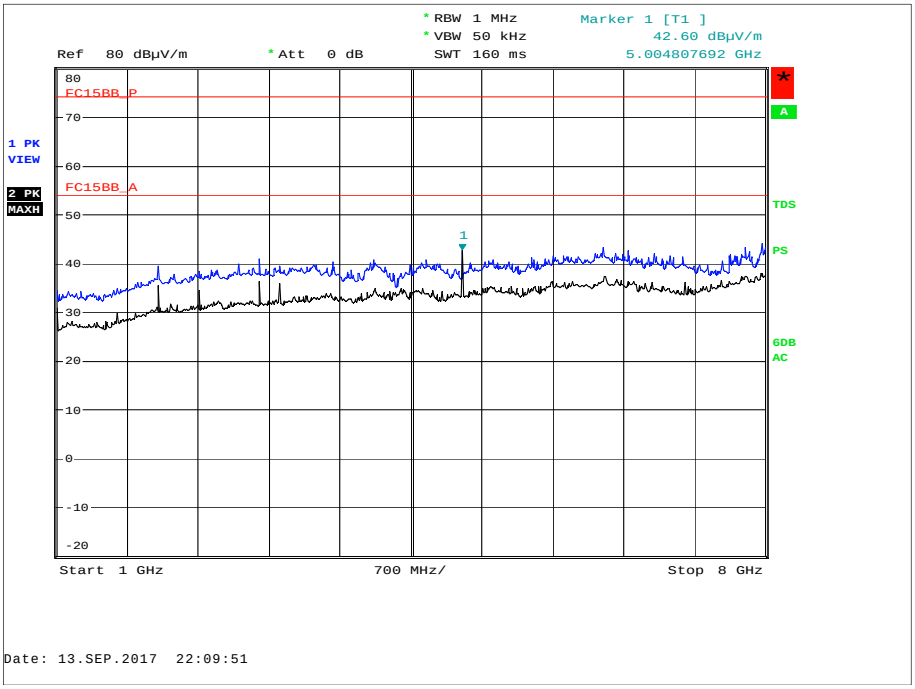

Figure 6 - 1 GHz to 8 GHz - Horizontal and Vertical

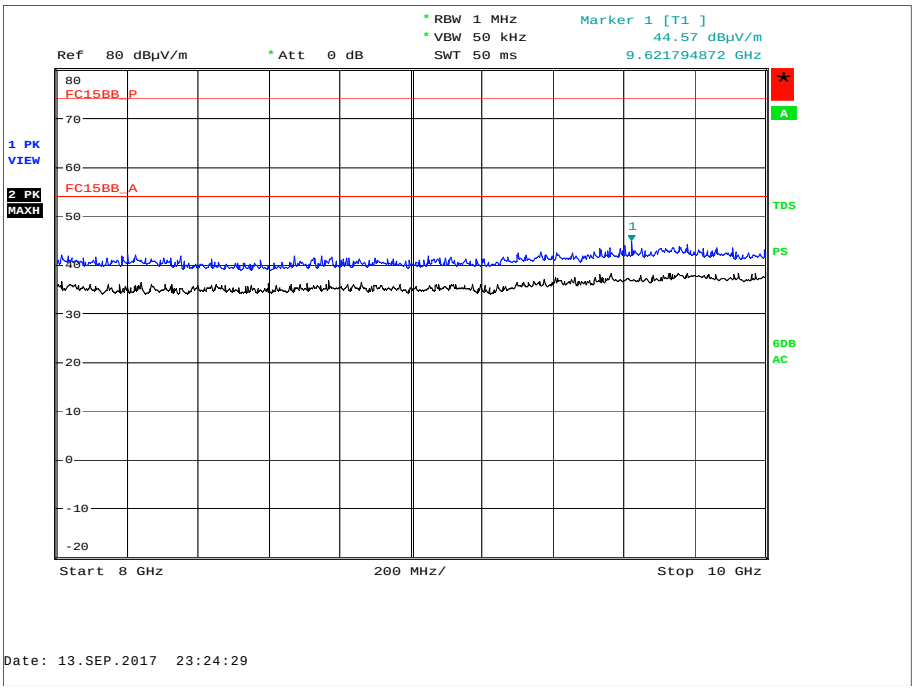

Figure 7 - 8 GHz to 10 GHz - Horizontal and Vertical

FCC 47 CFR Part 15, Limit Clause 15.109

Frequency of Emission (MHz)	Field Strength (μV/m)
30 to 88	100.0
88 to 216	150.0
216 to 960	200.0
Above 960	500.0

PoE Power Supply - Idle

Highest frequency generated or used within the EUT: 1990 MHz
Upper frequency test limit: 10 GHz

Frequency (MHz)	QP Level (dBuV/m)	QP Limit (dBuV/m)	QP Margin (dBuV/m)	Angle(Deg)	Height(m)	Polarity
30.039	34.5	40.0	-5.5	38	1.00	Vertical
31.634	34.9	40.0	-5.1	200	1.00	Vertical
34.280	37.9	40.0	-2.1	0	1.00	Vertical
35.323	34.7	40.0	-5.3	122	1.00	Vertical
93.135	31.2	43.5	-12.3	207	1.00	Vertical
350.739	32.4	46.0	-13.6	30	1.00	Horizontal

Table 14 - 30 MHz to 1 GHz

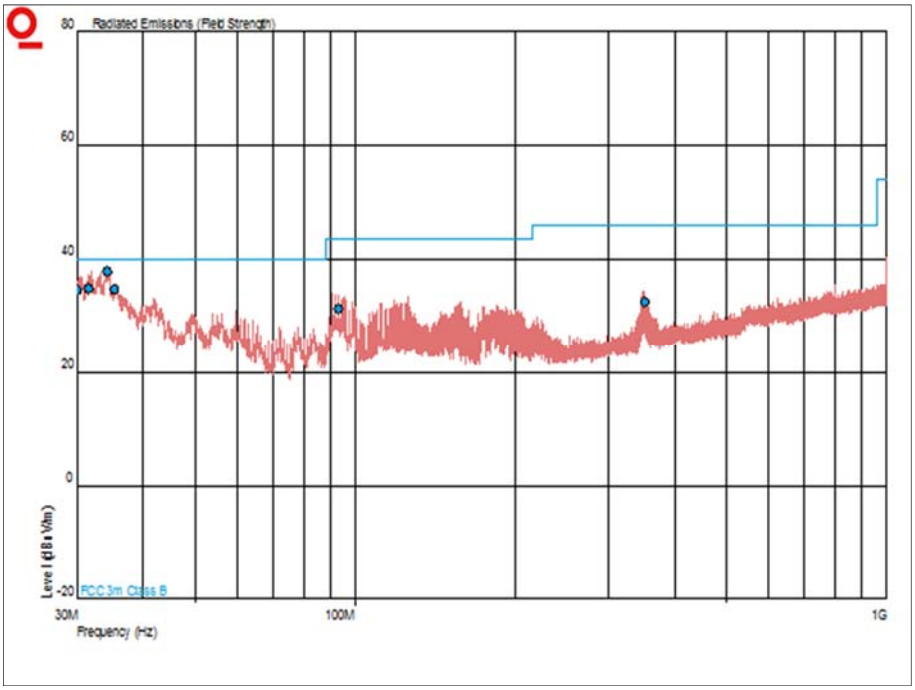

Figure 8 - 30 MHz to 1 GHz - Horizontal and Vertical

Frequency (GHz)	Result (µV/m)		Limit (µV/m)		Margin (µV/m)		Angle (°)	Height (m)	Polarisation
	Peak	Average	Peak	Average	Peak	Average			
*									

Table 15 - 1 GHz to 10 GHz

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

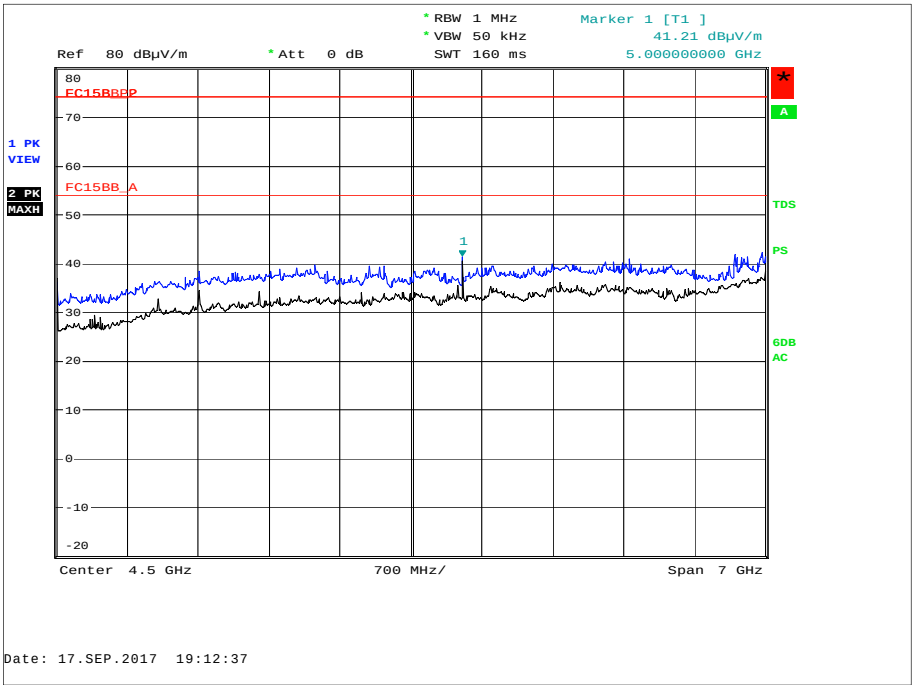

Figure 9 - 1 GHz to 8 GHz - Horizontal and Vertical

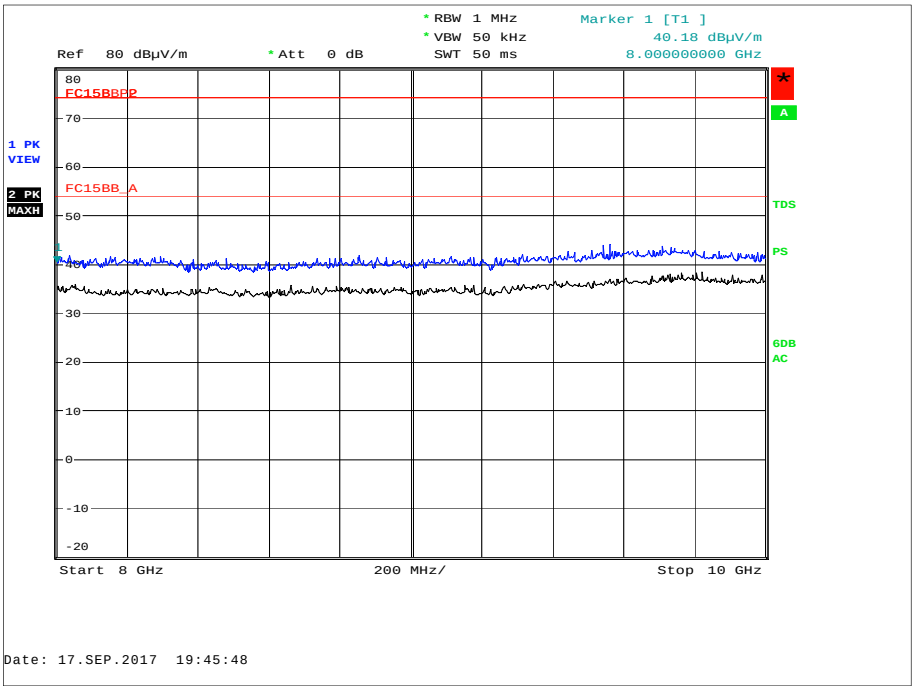

Figure 10 - 8 GHz to 10 GHz - Horizontal and Vertical

FCC 47 CFR Part 15, Limit Clause 15.109

Frequency of Emission (MHz)	Field Strength (µV/m)
30 to 88	100.0
88 to 216	150.0
216 to 960	200.0
Above 960	500.0

2.2.7 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 (Bilog)	Schaffner	CBL6143	287	24	18-Apr-2018
Pre-Amplifier	Phase One	PS04-0086	1533	12	31-Jul-2018
Screened Room (5)	Rainford	Rainford	1545	36	20-Dec-2017
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Multimeter	Iso-tech	IDM101	2417	12	30-Sep-2017
Comb Generator	Schaffner	RSG1000	3034	-	TU
Signal Generator (10MHz to 40GHz)	Rohde & Schwarz	SMR40	3171	12	02-Nov-2017
Cable (N-N, 8m)	Rhophase	NPS-2302-8000-NPS	3248	12	02-May-2018
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	12-Nov-2017
Tilt Antenna Mast	maturo Gmbh	TAM 4.0-P	3916	-	TU
Mast Controller	maturo Gmbh	NCD	3917	-	TU
Digital thermo Hygrometer	Radio Spares	1260	4300	12	30-Aug-2018
1GHz to 8GHz Low Noise Amplifier	Wright Technologies	APS04-0085	4365	12	17-Oct-2017
Cable (Yellow, Rx, Km-Km 2m)	Scott Cables	KPS-1501-2000-KPS	4527	6	04-Nov-2017
Cable (Rx, SMAm-SMAm 0.5m)	Scott Cables	SLSLL18-SMSM-00.50M	4528	-	O/P Mon
Double Ridged Waveguide Horn Antenna	ETS-Lindgren	3117	4722	12	17-Feb-2018

Table 16

TU - Traceability Unscheduled
O/P Mon – Output Monitored using calibrated equipment

3 Measurement Uncertainty

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

Test Name	Measurement Uncertainty
AC Power Line Conducted Emissions	150 kHz to 30 MHz, LISN, ±3.7 dB
Radiated Emissions	30 MHz to 1 GHz: ±5.2 dB 1 GHz to 40 GHz: ±6.3 dB

Table 17