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# Report On

FCC Testing of the  
ip.access Ltd 243BA S16 3G AP (Bands 2 & 5)  
In accordance with FCC CFR 47 Part 15B

COMMERCIAL-IN-CONFIDENCE

FCC ID: QGGIPA243BA

Document 75918692 Report 04 Issue 1

October 2012



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COMMERCIAL-IN-CONFIDENCE

**REPORT ON**

FCC Testing of the  
ip.access Ltd 243BA S16 3G AP (Bands 2 & 5)  
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**PREPARED FOR**

ip.access Ltd  
Building 2020  
Cambourne Business Park  
Cambourne  
Cambridge  
CB23 6DW

**PREPARED BY**

**Natalie Bennett**  
Senior Administrator (Technical)

**APPROVED BY**

**Mark Jenkins**  
Authorised Signatory

**DATED**

10 October 2012

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**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 CFR 47 Part 15B. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);

G Lawler





## CONTENTS

Section	Page No
<b>1</b>	<b>REPORT SUMMARY ..... 3</b>
1.1	Introduction ..... 4
1.2	Brief Summary of Results ..... 5
1.3	Application Form ..... 6
1.4	Product Information ..... 8
1.5	Test Conditions ..... 8
1.6	Deviations from the Standard ..... 8
1.7	Modification Record ..... 8
<b>2</b>	<b>TEST DETAILS ..... 9</b>
2.1	AC Line Conducted Emissions ..... 10
2.2	Radiated Emissions ..... 15
<b>3</b>	<b>TEST EQUIPMENT USED ..... 20</b>
3.1	Test Equipment Used ..... 21
3.2	Measurement Uncertainty ..... 22
<b>4</b>	<b>ACCREDITATION, DISCLAIMERS AND COPYRIGHT ..... 23</b>
4.1	Accreditation, Disclaimers and Copyright ..... 24



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## **SECTION 1**

### **REPORT SUMMARY**

FCC Testing of the  
ip.access Ltd 243BA S16 3G AP (Bands 2 & 5)  
In accordance with FCC CFR 47 Part 15B



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## 1.1 INTRODUCTION

The information contained in this report is intended to show verification of the FCC Testing of the ip.access Ltd 243BA S16 3G AP (Bands 2 & 5) to the requirements of FCC CFR 47 Part 15B.

Objective	To perform FCC Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.
Manufacturer	ip.access Ltd
Model Number(s)	243BA
Serial Number(s)	000295-0000106246 Containing board 000106147 243BA030XA
Number of Samples Tested	1
Test Specification/Issue/Date	FCC CFR 47 Part 15B (2011)
Incoming Release Date	Application Form 23 August 2012
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	PO30806 06 July 2012
Start of Test	24 September 2012
Finish of Test	24 September 2012
Name of Engineer(s)	G Lawler



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## 1.2 BRIEF SUMMARY OF RESULTS

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

Section	Spec Clause	Test Description	Result	Comments/Base Standard
Idle with 12V AC/DC Adapter				
2.1	15.107	AC Line Conducted Emissions	Pass	
2.2	15.109	Radiated Emissions	Pass	
Idle with POE				
2.1	15.107	AC Line Conducted Emissions	Pass	
2.2	15.109	Radiated Emissions	Pass	



1.3 APPLICATION FORM

APPLICANT'S DETAILS	
COMPANY NAME :	IP Access Ltd
ADDRESS :	Building 2020 Cambourne Business Park Cambourne Cambridge CB23 6DW
NAME FOR CONTACT PURPOSES :	Costa Panayi
TELEPHONE NO: 01954 713721	FAX NO: 01954 713799
	E-MAIL: costa.panayi@ipaccess.com

EQUIPMENT INFORMATION			
Model name/number	nano3G S16 Access Point	Identification/Part number	243BA (Bands 2 & 5)
Hardware Version	XA	Software Version	SR2.7.573.0.7749_PL1
Manufacturer	IP Access Ltd	Country of Origin	UK
FCC ID	QGGIPA243BA	Industry Canada ID	N/A
Technical description (a brief description of the intended use and operation):			
The 243BA S16 Access Point is a 16 user 3G Basestation operating in Bands 2 & 5 for the US market.			
<u>Supply Voltage:</u>			
<input checked="" type="checkbox"/>	AC mains	State AC voltage	110 V and AC frequency 60 Hz
<input checked="" type="checkbox"/>	POE DC (external)	State DC voltage	48 V and DC current 0.25 A
<input type="checkbox"/>	DC (internal)	State DC voltage	..... V and Battery type .....
<u>Frequency characteristics:</u>			
Transmitter Frequency range	869 MHz to 894 MHz	Channel spacing	5 MHz (if channelized)
	1930 MHz to 1990 MHz		
Receiver Frequency range (if different)	824 MHz to 849 MHz	Channel spacing	5 MHz (if channelized)
	1850 MHz to 1910 MHz		
Designated test frequencies:			
Bottom:	871.4 MHz	Middle:	881.6 MHz
		Top:	891.6 MHz
Bottom:	1932.4 MHz	Middle:	1960.0 MHz
		Top:	1987.6 MHz
Intermediate Frequencies :	N/A		
Highest Internally Generated Frequency :	1987.6 MHz		
<u>Power characteristics:</u>			
Maximum transmitter power	0.1 W (Band 2)	Minimum transmitter power	N/A
	0.1 W (Band 5)	(if variable)	
<input checked="" type="checkbox"/>	Continuous transmission		
<input type="checkbox"/>	Intermittent transmission	State duty cycle	.....
	If intermittent, can transmitter be set to continuous transmit test mode?	Y/N	
<u>Antenna characteristics:</u>			
<input type="checkbox"/>	Antenna connector	State impedance	..... ohm
<input type="checkbox"/>	Temporary antenna connector	State impedance	..... ohm
<input checked="" type="checkbox"/>	Integral antenna	State gain	0 dBi
<u>Modulation characteristics:</u>			
<input checked="" type="checkbox"/>	Amplitude	<input type="checkbox"/>	Other
<input type="checkbox"/>	Frequency	Details: .....	
<input checked="" type="checkbox"/>	Phase		
Can the transmitter operate un-modulated?	No		
ITU Class of emission:	5M00D1W		
<u>Battery/Power Supply</u>			
Model name/number	POE Single Port Midspan	Identification/Part number	PD-3501G
Manufacturer	PowerDsine	Country of Origin	Taiwan
Model name/number	POE Active Splitter	Identification/Part number	MIT-06I-1209-IP
Manufacturer	MSTronic	Country of Origin	China
Model name/number	Switching Adapter	Identification/Part number	PSA15R-090PV
Manufacturer	Phihong	Country of Origin	Taiwan
<u>Extreme conditions:</u>			
Maximum temperature	40 °C	Minimum temperature	0 °C
Maximum supply voltage	..... V	Minimum supply voltage	..... V



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I hereby declare that I am entitled to sign on behalf of the applicant and that the information supplied is correct and complete.

Signature : Held on file at TÜV SÜD Product Service Ltd

Name : Costa Panayi

Position held : Product Design and Development Engineer

Date : 23<sup>rd</sup> August 2012

TÜV Product Service Ltd formally certifies that the manufacturer's declaration as typed out in this report, is a true and accurate record of the original received from the applicant.





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## **1.4 PRODUCT INFORMATION**

### **1.4.1 Technical Description**

The Equipment Under Test (EUT) was a ip.access Ltd 243BA S16 3G AP (Bands 2 & 5). A full technical description can be found in the manufacturer's documentation.

## **1.5 TEST CONDITIONS**

For all tests the EUT was set up in accordance with the relevant test standard and to represent typical operating conditions. Tests were applied with the EUT situated in a shielded enclosure.

The EUT was powered from a 12 V DC supply.

FCC Accreditation  
90987 Octagon House, Fareham Test Laboratory

## **1.6 DEVIATIONS FROM THE STANDARD**

No deviations from the applicable test standard or test plan were made during tesgin.

## **1.7 MODIFICATION RECORD**

Modification 0 - No modifications were made to the test sample during testing.



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## **SECTION 2**

### **TEST DETAILS**

FCC Testing of the  
ip.access Ltd 243BA S16 3G AP (Bands 2 & 5)  
In accordance with FCC CFR 47 Part 15B



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## **2.1 AC LINE CONDUCTED EMISSIONS**

### **2.1.1 Specification Reference**

FCC CFR 47 Part 15B, Clause 15.107

### **2.1.2 Equipment Under Test and Modification State**

243BA S/N: 000295-0000106246 - Modification State 0

### **2.1.3 Date of Test**

24 September 2012

### **2.1.4 Test Equipment Used**

The major items of test equipment used for the above tests are identified in Section 3.1.

### **2.1.5 Test Procedure**

The EUT is set up on a test table 800mm above a horizontal ground plane. A vertical ground plane is also required and is placed 400mm from the EUT. Where a EUT is floor standing it will be stood on but insulated from the ground plane by up to 12mm.

The EUT is powered through a Line Impedance Stabilisation Network (LISN) which is bonded to the ground plane. The EUT is located so that the distance between the EUT and the LISN is no less than 800mm. Where possible the cable between the mains input of the EUT and the LISN is 1m. Where this is not possible the cable is non inductively bundled with the bundle not exceeding 400mm in length.

A preliminary profile of the Conducted Emissions is obtained over the frequency range 150kHz to 30MHz. Any points of interest are noted for formal measurements.

During formal measurements, the measuring receiver is tuned to the emission of interest where Quasi – Peak and Average measurements are performed in a 9kHz Video and Resolution Bandwidth.

### **2.1.6 Environmental Conditions**

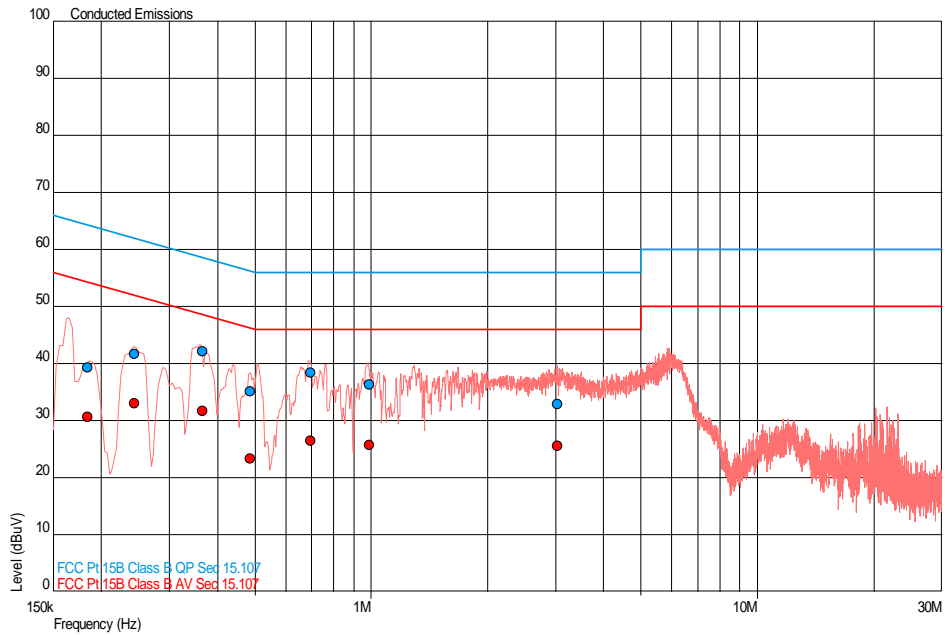
Ambient Temperature	20.0°C
Relative Humidity	45.0%



2.1.7 Test Results

Idle with 12V AC/DC Adapter

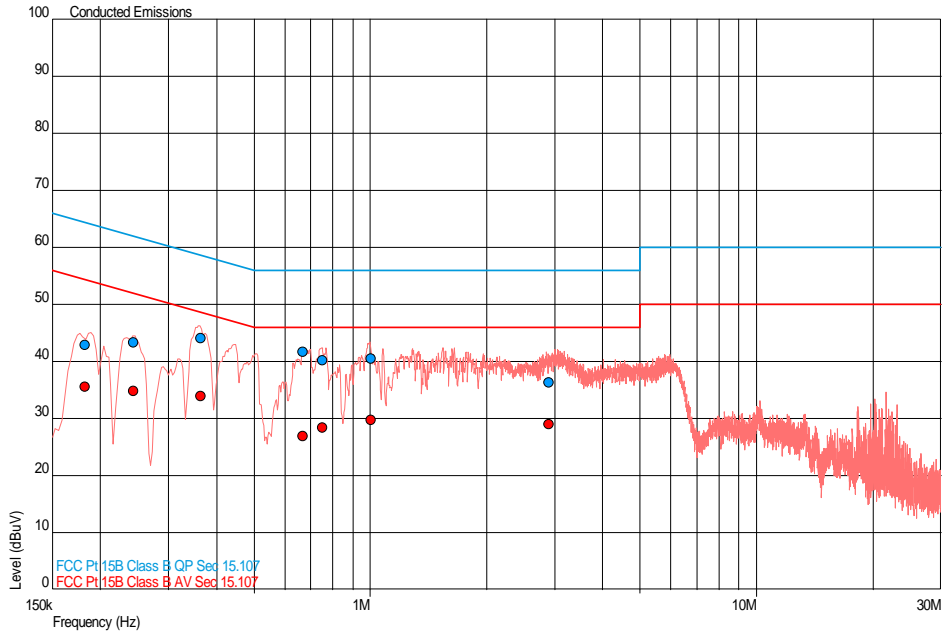
Live Line



Frequency (MHz)	QP Level (dBμV)	QP Limit (dBμV)	QP Margin (dBμV)	AV Level (dBμV)	AV Limit (dBμV)	AV Margin (dBμV)
0.184	39.4	64.3	-24.9	30.7	54.3	-23.6
0.244	41.7	62.0	-20.3	33.0	52.0	-18.9
0.365	42.2	58.6	-16.4	31.6	48.6	-17.0
0.485	35.1	56.2	-21.2	23.3	46.2	-22.9
0.697	38.4	56.0	-17.6	26.5	46.0	-19.5
0.991	36.4	56.0	-19.6	25.7	46.0	-20.3
3.028	32.9	56.0	-23.1	25.5	46.0	-20.5



Neutral Line



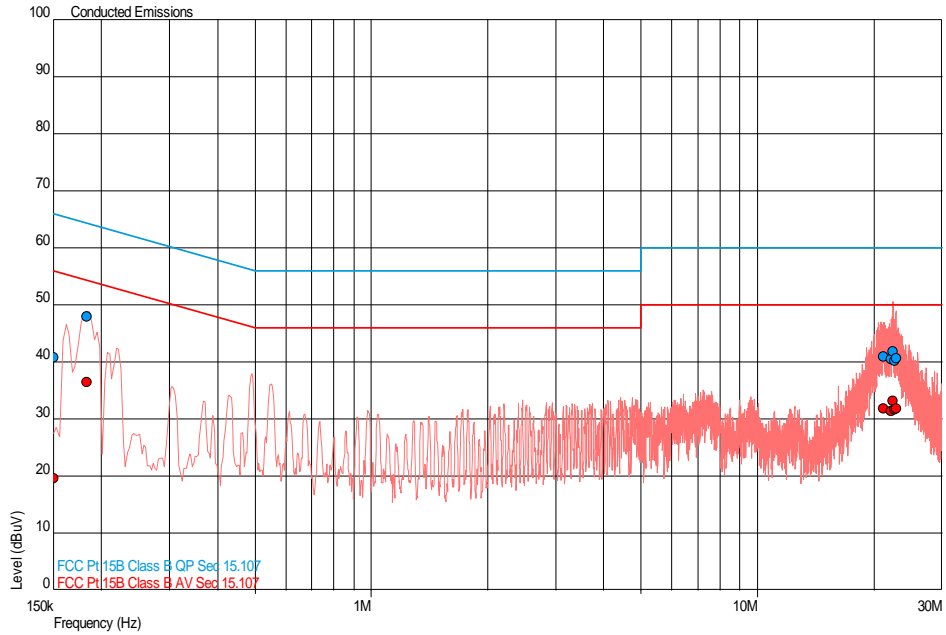
Frequency (MHz)	QP Level (dBµV)	QP Limit (dBµV)	QP Margin (dBµV)	AV Level (dBµV)	AV Limit (dBµV)	AV Margin (dBµV)
0.183	42.9	64.4	-21.5	35.6	54.4	-18.7
0.243	43.3	62.0	-18.6	34.8	52.0	-17.1
0.363	44.1	58.7	-14.6	34.0	48.7	-14.7
0.670	41.7	56.0	-14.3	27.0	46.0	-19.0
0.750	40.2	56.0	-15.8	28.4	46.0	-17.6
1.003	40.6	56.0	-15.4	29.8	46.0	-16.2
2.892	36.4	56.0	-19.6	29.1	46.0	-16.9



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Idle with POE

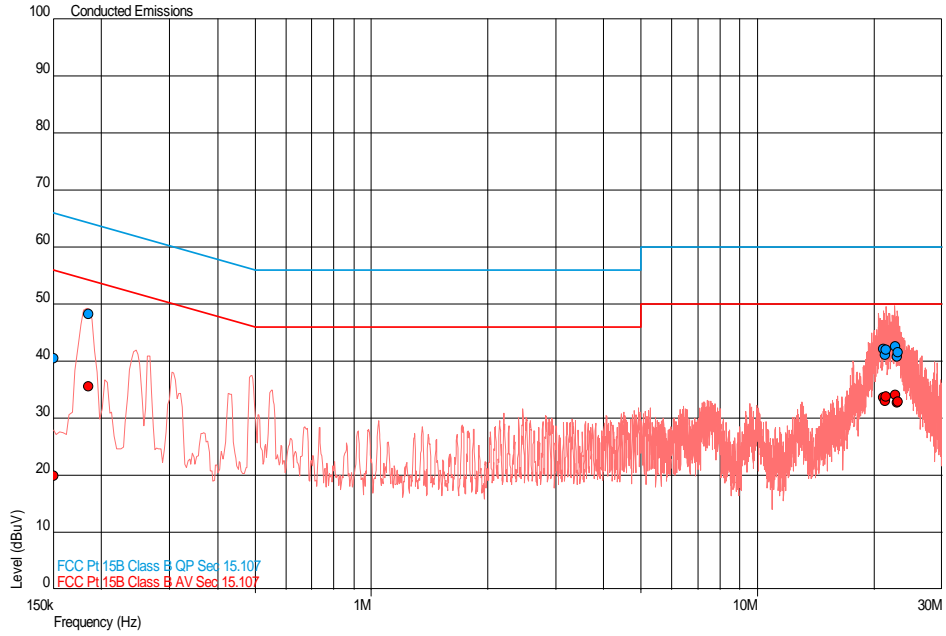
Live Line



Frequency (MHz)	QP Level (dBµV)	QP Limit (dBµV)	QP Margin (dBµV)	AV Level (dBµV)	AV Limit (dBµV)	AV Margin (dBµV)
0.150	40.8	66.0	-25.2	19.7	56.0	-36.3
0.183	47.9	64.3	-16.4	36.5	54.3	-17.9
21.190	40.9	60.0	-19.1	31.8	50.0	-18.2
22.207	40.6	60.0	-19.4	31.5	50.0	-18.5
22.456	41.9	60.0	-18.1	33.3	50.0	-16.7
22.597	40.2	60.0	-19.8	31.7	50.0	-18.3
22.818	40.6	60.0	-19.4	31.9	50.0	-18.1



Neutral Line



Frequency (MHz)	QP Level (dBµV)	QP Limit (dBµV)	QP Margin (dBµV)	AV Level (dBµV)	AV Limit (dBµV)	AV Margin (dBµV)
0.150	40.5	66.0	-25.5	19.9	56.0	-36.1
0.185	48.4	64.2	-15.9	35.6	54.2	-18.7
21.164	42.1	60.0	-17.9	33.7	50.0	-16.3
21.354	41.2	60.0	-18.8	33.0	50.0	-17.0
21.526	42.0	60.0	-18.0	33.8	50.0	-16.2
22.725	42.6	60.0	-17.4	34.1	50.0	-15.9
22.980	40.9	60.0	-19.1	32.8	50.0	-17.2
23.060	41.6	60.0	-18.4	33.0	50.0	-17.0



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## 2.2 RADIATED EMISSIONS

### 2.2.1 Specification Reference

FCC CFR 47 Part 15B, Clause 15.109

### 2.2.2 Equipment Under Test and Modification State

243BA S/N: 000295-0000106246 - Modification State 0

### 2.2.3 Date of Test

24 September 2012

### 2.2.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

### 2.2.5 Test Procedure

A preliminary profile of the Spurious Radiated Emissions is obtained up to the 5th harmonic of the EUT's highest internally generated fundamental frequency. For frequencies from 30MHz to 18GHz the EUT is placed on a test table 800mm above the ground plane. For frequencies above 18GHz, the EUT height is increased by 200mm to a height of 1000mm. This is to ensure the beam width of the measuring antenna gives sufficient vertical coverage of the EUT.

During characterisation the turntable azimuth is adjusted from 0 to 360 degrees with the measuring antenna in one polarity. It is then repeated for the other polarity. Any frequencies of interest are noted for formal measuring later. The distance from the measuring antenna to the boundary of the EUT is 3m. Above 18GHz this distance may be reduced to 1m.

During formal measurement the spectrum analyser is tuned to the frequency of the emission. The turntable azimuth is adjusted from 0 to 360 degrees to determine the point at which the maximum emission level occurs. Then the height of the measuring antenna is adjusted from a height of 1m to 4m to determine the height at which the maximum emission level occurs. Once the point of maximum emission has been determined the emission is measured. Emissions in the 30MHz to 1GHz range are measured using a CISPR Quasi – Peak detector function in a 120kHz bandwidth. Emissions in the range 1GHz to 40GHz require Peak and Average measurements. The Peak measurements are made using a peak detector with 1MHz Resolution and Video bandwidths. The average measurements employ a peak detector with a Resolution bandwidth of 1MHz and a Video bandwidth of 10Hz. If measurements are made at a 1m measuring distance, then 10dB is added to the specification limit.

### 2.2.6 Environmental Conditions

Ambient Temperature	20.0°C
Relative Humidity	45.0%

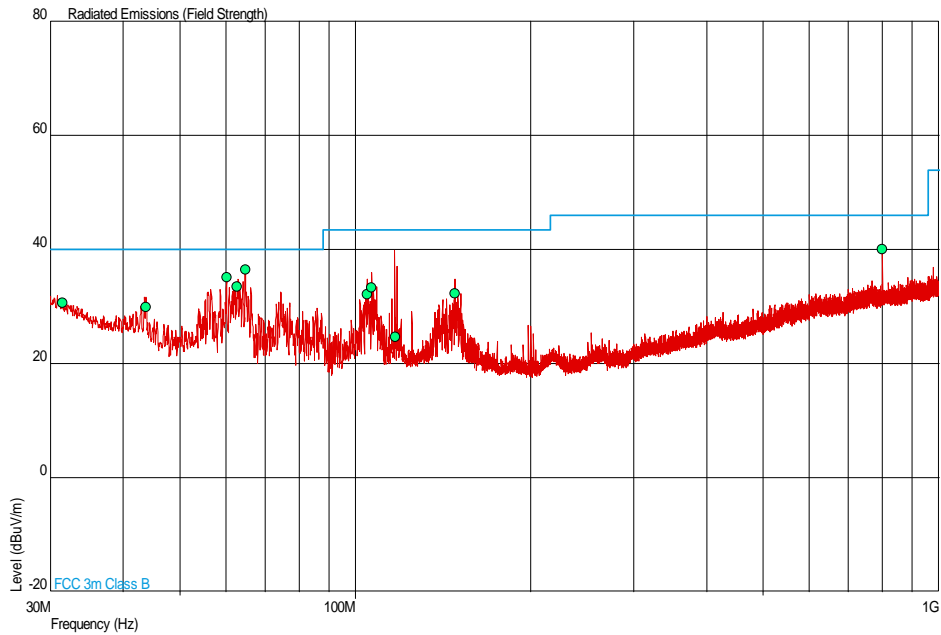




**2.2.7 Test Results**

Idle with 12V AC/DC Adapter

30 MHz to 1 GHz



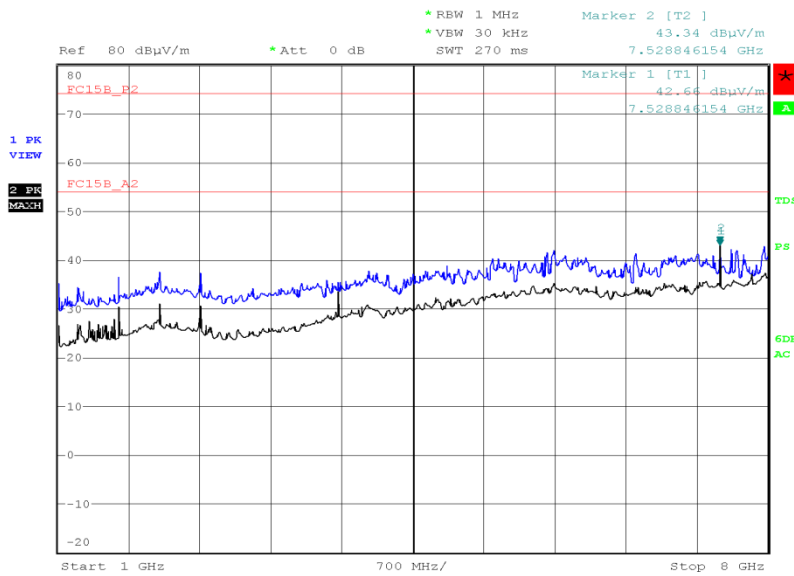
Frequency (MHz)	QP Level (dB $\mu$ V/m)	QP Level ( $\mu$ V/m)	QP Limit (dB $\mu$ V/m)	QP Limit ( $\mu$ V/m)	QP Margin (dB $\mu$ V/m)	QP Margin ( $\mu$ V/m)	Angle (Deg)	Height (m)	Polarity
31.498	30.6	33.9	40.0	100	-9.4	66.1	257	1.00	Horizontal
43.790	29.9	31.3	40.0	100	-10.1	68.7	2	1.00	Vertical
60.239	35.1	56.9	40.0	100	-4.9	43.1	20	1.00	Vertical
62.765	33.5	47.3	40.0	100	-6.5	52.7	268	1.00	Vertical
64.771	36.5	66.8	40.0	100	-3.5	33.2	0	1.00	Vertical
104.734	32.1	40.3	43.5	150	-11.4	109.7	360	1.00	Vertical
106.728	33.4	46.8	43.5	150	-10.1	103.2	74	1.00	Vertical
117.094	24.8	17.4	43.5	150	-18.7	132.6	7	1.00	Vertical
148.120	32.3	41.2	43.5	150	-11.2	108.8	187	1.00	Vertical
800.000	40.1	101.2	46.0	200	-5.9	98.8	317	1.00	Horizontal



1 GHz to 13 GHz

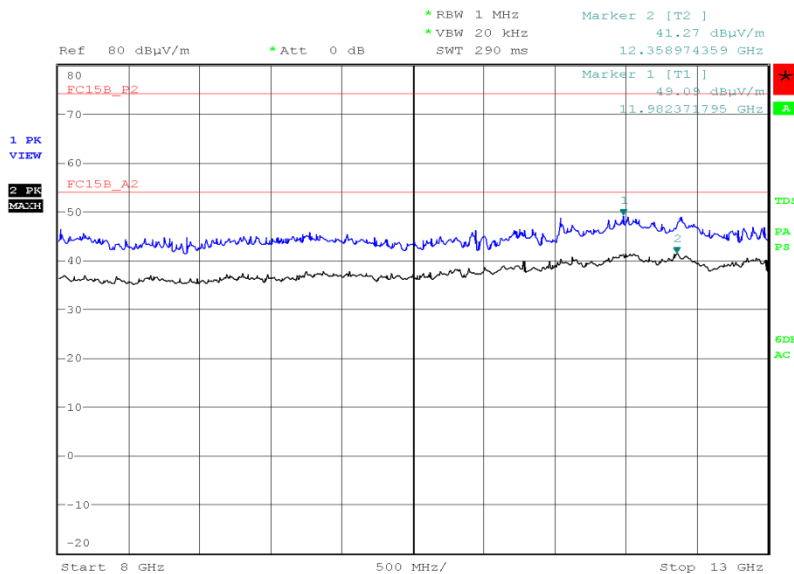
Frequency (GHz)	Antenna Polarisation	Antenna Height (cm)	EUT Arc (degrees)	Final Peak (dBµV/m)	Final Average (dBµV/m)
7.520	Vertical	100	054	50.09	45.51

1 GHz to 8 GHz



Date: 24.SEP.2012 19:11:36

8 GHz to 13 GHz

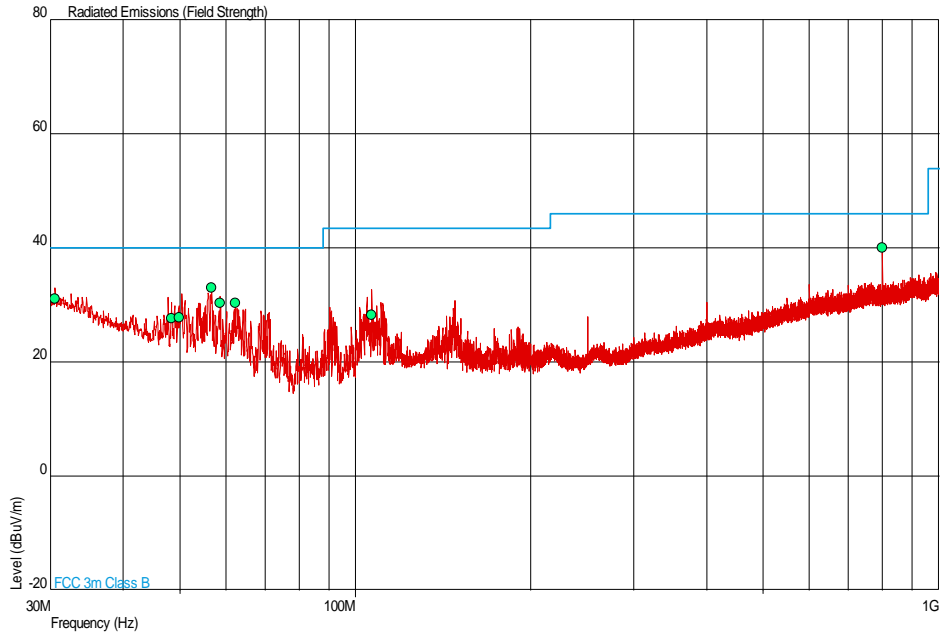


Date: 24.SEP.2012 18:41:20



Idle with POE

30 MHz to 1 GHz



Frequency (MHz)	QP Level (dBµV/m)	QP Level (µV/m)	QP Limit (dBµV/m)	QP Limit (µV/m)	QP Margin (dBµV/m)	QP Margin (µV/m)	Angle (Deg)	Height (m)	Polarity
30.607	31.1	35.9	40.0	100	-8.9	64.1	316	1.00	Horizontal
48.438	27.7	24.3	40.0	100	-12.3	75.7	242	1.00	Vertical
49.859	27.9	24.8	40.0	100	-12.1	75.2	224	1.00	Vertical
56.666	33.1	45.2	40.0	100	-6.9	54.8	263	1.24	Vertical
58.724	30.4	33.1	40.0	100	-9.6	66.9	165	1.00	Vertical
62.232	30.4	33.1	40.0	100	-9.6	66.9	233	1.00	Vertical
106.695	28.3	26.0	43.5	150	-15.2	124.0	3	1.00	Vertical
800.002	40.1	101.2	46.0	200	-5.9	98.8	277	1.00	Horizontal

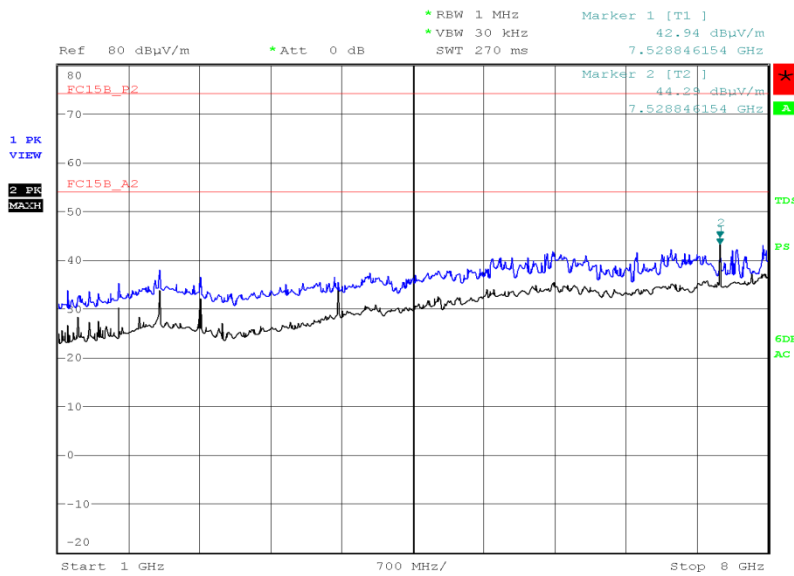


Product Service

1 GHz to 13 GHz

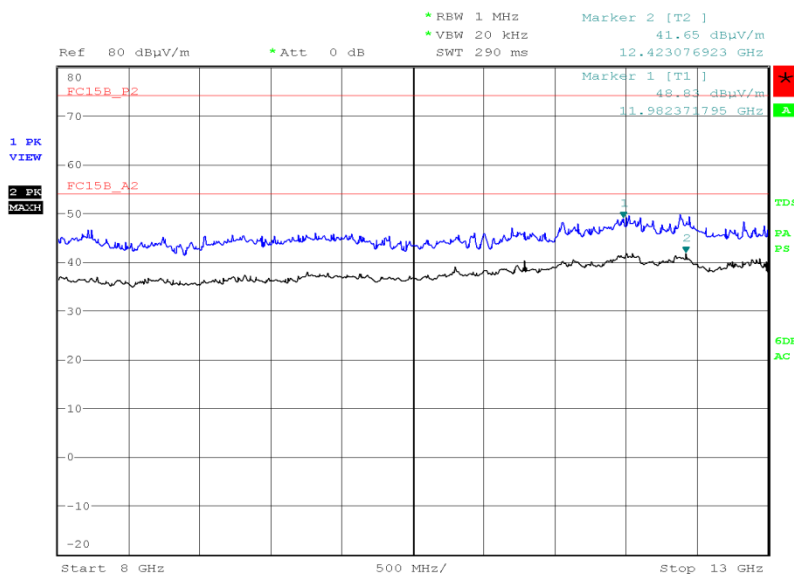
Frequency (GHz)	Antenna Polarisation	Antenna Height (cm)	EUT Arc (degrees)	Final Peak (dBµV/m)	Final Average (dBµV/m)
7.520	Vertical	133	328	49.70	44.62

1 GHz to 8 GHz



Date: 24.SEP.2012 18:56:53

8 GHz to 13 GHz



Date: 24.SEP.2012 18:48:31



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### **SECTION 3**

#### **TEST EQUIPMENT USED**



### 3.1 TEST EQUIPMENT USED

List of absolute measuring and other principal items of test equipment.

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
<b>Section 2.1 – AC Line Conducted Emissions</b>					
Transient Limiter	Hewlett Packard	11947A	15	12	1-Dec-2012
LISN (1 Phase)	Chase	MN 2050	336	12	23-Mar-2013
Transient Limiter	Hewlett Packard	11947A	1032	12	28-Jun-2013
Screened Room (5)	Rainford	Rainford	1545	36	25-Dec-2013
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	29-Sep-2012
7m Armoured RF Cable	SSI Cable Corp.	1501-13-13-7m WA(-)	3600	-	TU
<b>Section x.x EMC - Radiated Emissions</b>					
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	8-Dec-2012
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	235	12	14-Nov-2012
Antenna (Double Ridge Guide)	Q-Par Angus Ltd	QSH 180K	1511	-	TU
Pre-Amplifier	Phase One	PS04-0086	1533	12	27-Sep-2013
Pre-Amplifier	Phase One	PSO4-0087	1534	12	26-Sep-2012
Screened Room (5)	Rainford	Rainford	1545	36	25-Dec-2013
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Antenna (Bilog)	Chase	CBL6143	2904	24	12-May-2013
Signal Generator (10MHz to 40GHz)	Rohde & Schwarz	SMR40	3171	12	30-Aug-2013
High Pass Filter (3GHz)	RLC Electronics	F-100-3000-5-R	3349	12	29-May-2013
Signal Generator: 10MHz to 20GHz	Rohde & Schwarz	SMR20	3475	12	20-Dec-2012
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	29-Sep-2012
3 GHz High Pass Filter	K&L Microwave	11SH10-3000/X18000-O/O	3552	12	16-Apr-2013
7m Armoured RF Cable	SSI Cable Corp.	1501-13-13-7m WA(-)	3600	-	TU
9m RF Cable (N Type)	Rhophase	NPS-2303-9000-NPS	3791	-	TU
Tilt Antenna Mast	maturo GmbH	TAM 4.0-P	3916	-	TU
Mast Controller	maturo GmbH	NCD	3917	-	TU
Low Noise Amplifier	Wright Technologies	APS04-0085	3969	-	TU

TU – Traceability Unscheduled



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### 3.2 MEASUREMENT UNCERTAINTY

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

Test Discipline	MU
Radiated Emissions	30MHz to 1GHz: $\pm 5.1$ dB 1GHz to 40GHz: $\pm 6.3$ dB
AC Line Conducted Emissions	$\pm 3.2$ dB



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## **SECTION 4**

### **ACCREDITATION, DISCLAIMERS AND COPYRIGHT**





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#### 4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT



This report relates only to the actual item/items tested.

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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