Report On

FCC Testing of the
ip.access Ltd
237B 3G S8 Access Point

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FCC ID: QGGIPA237B

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REPORT ON

FCC Testing of the
ip.access Ltd
237B 3G S8 Access Point

Document 75912614 Report 02 Issue 1

April 2011

PREPARED FOR

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Building 2020
Cambourne Business Park
Cambourne
CB23 6DW

PREPARED BY

N Bennett
Senior Administrator

APPROVED BY

M J Hardy
Authorised Signatory

DATED 19 April 2011

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 2 and 22. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);

R Henley G Lawler

UKAS TESTING 0141

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SECTION 1

REPORT SUMMARY

FCC Testing of the
ip.access Ltd
237B 3G S8 Access Point

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1.1 INTRODUCTION

The information contained in this report is intended to show verification of ip.access Ltd 237B 3G S8 Access Point to the requirements of FCC CFR 47 Part 2 and 22.

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)	237B 3G S8 Access Point
Serial Number(s)	000295-0000024652
Software Version	SR1.2.0-491.8.0
Hardware Version	B
Number of Samples Tested	1
Test Specification/Issue/Date	FCC CFR 47 Part 2: 2010 FCC CFR 47 Part 22: 2010
Incoming Release Date	Application Form 18 April 2011
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	PO26016 28 January 2011
Start of Test	14 February 2011
Finish of Test	17 April 2011
Name of Engineer(s)	R Henley G Lawler
Related Document(s)	ANSI C63.4: 2003

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1.2 BRIEF SUMMARY OF RESULTS

A brief summary of results for each configuration, in accordance with FCC CFR 47 Part 2 and 22 is shown below.

Configuration 1: PoE Supply							
Section	Spec Clause		Test Description	Mode	Mod State	Result	Base Standard
	Part 2	Part 22					
2.1	2.1051	22.905	Spurious Emissions at Band Edge	871.4 MHz	0	Pass	
				881.4 MHz		N/A	
				891.6 MHz	0	Pass	
2.2	-	22.913(a)	Effective Radiated Power	871.4 MHz	0	Pass	
				881.4 MHz	0	Pass	
				891.6 MHz	0	Pass	
2.3	2.1046	22.913(a)	Maximum Peak Output Power – Conducted	871.4 MHz	0	Pass	
				881.4 MHz	0	Pass	
				891.6 MHz	0	Pass	
2.4	-	22.917	Emission Limitations for Cellular Equipment	871.4 MHz	0	Pass	
				881.4 MHz	0	Pass	
				891.6 MHz	0	Pass	
2.5	2.1051	22.917(a)	Conducted Spurious Emissions	871.4 MHz	0	Pass	
				881.4 MHz	0	Pass	
				891.6 MHz	0	Pass	
2.6	2.1049(h)	22.917(b)	Occupied Bandwidth	871.4 MHz	0	Pass	
				881.4 MHz	0	Pass	
				891.6 MHz	0	Pass	
2.7	2.1047(d)	-	Modulation Characteristics	871.4 MHz		N/A	
				881.4 MHz			Customer Description
				891.6 MHz		N/A	
2.8	2.1055	22.355	Frequency Stability Under Temperature Variations	871.4 MHz		N/A	
				881.4 MHz	0	Pass	
				891.6 MHz		N/A	
2.9	2.1055	22.355	Frequency Stability Under Voltage Variations	871.4 MHz		N/A	
				881.4 MHz	0	Pass	
				891.6 MHz		N/A	

Product Service

Configuration 1: 9 VDC Supply							
Section	Spec Clause		Test Description	Mode	Mod State	Result	Base Standard
	Part 2	Part 22					
	2.1051	22.905	Spurious Emissions at Band Edge	871.4 MHz	-	N/A	
				881.4 MHz	-	N/A	
				891.6 MHz	-	N/A	
2.2	-	22.913(a)	Effective Radiated Power	871.4 MHz	0	Pass	
				881.4 MHz	0	Pass	
				891.6 MHz	0	Pass	
	2.1046	22.913(a)	Maximum Peak Output Power – Conducted	871.4 MHz	-	N/A	
				881.4 MHz	-	N/A	
				891.6 MHz	-	N/A	
2.4	-	22.917	Emission Limitations for Cellular Equipment	871.4 MHz	0	Pass	
				881.4 MHz	0	Pass	
				891.6 MHz	0	Pass	
	2.1051	22.917(a)	Conducted Spurious Emissions	871.4 MHz	-	N/A	
				881.4 MHz	-	N/A	
				891.6 MHz	-	N/A	
	2.1049(h)	22.917(b)	Occupied Bandwidth	871.4 MHz	-	N/A	
				881.4 MHz	-	N/A	
				891.6 MHz	-	N/A	
	2.1047(d)	-	Modulation Characteristics	871.4 MHz	-	N/A	
				881.4 MHz	-	N/A	
				891.6 MHz	-	N/A	
	2.1055	22.355	Frequency Stability Under Temperature Variations	871.4 MHz	-	N/A	
				881.4 MHz	-	N/A	
				891.6 MHz	-	N/A	
	2.1055	22.355	Frequency Stability Under Voltage Variations	871.4 MHz	-	N/A	
				881.4 MHz	-	N/A	
				891.6 MHz	-	N/A	

N/A – Not Applicable

Product Service

1.3 APPLICATION FORM

APPLICANT'S DETAILS		
COMPANY NAME :	ip.access Ltd	
ADDRESS :	2020 Cambourne Business 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

Equipment designator:
Model name/number: nano3G S8 Access Point 237B (Bands 2 & 5)

Supply Voltage:

[X]	AC mains	State AC voltage	110 V	and AC frequency	60 Hz
[X] POE	DC (external)	State DC voltage	48 V	and DC current	0.25 A
[ ]	DC (internal)	State DC voltage …… V		and Battery type ……	

Frequency characteristics:

Frequency range	869 MHz to 894 MHz 1930 MHz to 1990 MHz	Channel spacing	200 kHz (if channelized)

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

Power characteristics:

Maximum transmitter power	0.02 W	Minimum transmitter power (if variable)	…… W

[X] Continuous transmission
[ ] Intermittent transmission — State duty cycle ……
If intermittent, can transmitter be set to continuous transmit test mode? Y/N

Antenna characteristics:

[ ]	Antenna connector	State impedance ……	ohm
[ ]	Temporary antenna connector	State impedance ……	ohm
[X]	Integral antenna	State gain	2 dBi

Modulation characteristics:

[X]	Amplitude	[ ]	Other
[ ]	Frequency	Details: ……..	
[X]	Phase		

Can the transmitter operate un-modulated? No
ITU Class of emission: 5M00D1W

Extreme conditions:

Maximum temperature	40 ºC	Minimum temperature	0 ºC
Maximum supply voltage	…… V	Minimum supply voltage	…… V

MANUFACTURING DESCRIPTION	237B nano3G S8 Access Point (Bands 2 & 5)
MANUFACTURER	IP Access Ltd
HARDWARE VERSION	B
SOFTWARE VERSION	SR1.2.0 - 491.8.0
TRANSMITTER OPERATING RANGE	869 – 894 MHz or 1930 – 1990 MHz
RECEIVER OPERATING RANGE	824 – 849 MHz or 1850 – 1910 MHz
COUNTRY OF ORIGIN	UK
INTERMEDIATE FREQUENCIES	NONE
EMISSION DESIGNATOR(S): (i.e. G1D, GXW)	ITU CLASS 5M00D1W
MODULATION TYPES: (i.e. GMSK, QPSK)	SPREAD SPECTRUM W-CDMA
HIGHEST INTERNALLY GENERATED FREQUENCY	1990 MHz
FCC ID	QGGIPA237B
INDUSTRY CANADA ID	N/A
TECHNICAL DESCRIPTION (a brief description of the intended use and operation)	8 user 3G Access Point operating in Bands 2 & 5
POE INSERTER	
MANUFACTURING DESCRIPTION	Power over Ethernet single port Midspan
MANUFACTURER	PowerDsine
TYPE	PoE Midspan
PART NUMBER	PD-3501G
VOLTAGE	INPUT: 100-240Vac, 50/60Hz, 0.5A OUTPUT: 48Vdc, 0.35A
COUNTRY OF ORIGIN	China
POE SPLITTER	
MANUFACTURING DESCRIPTION	Power over Ethernet Active Splitter with Isolation
MANUFACTURER	MSTronic
TYPE	PoE Splitter
PART NUMBER	MIT-06I-1209-IP
VOLTAGE	INPUT: 48Vdc, 0.35A OUTPUT: 9V, 1.33A LPS
COUNTRY OF ORIGIN	Taiwan
POWER SUPPLY	
MANUFACTURING DESCRIPTION	Switching Adapter
MANUFACTURER	Phihong
TYPE	PSU
PART NUMBER	PSA15R-090PV
VOLTAGE	INPUT: 100-240Vac, 50/60Hz, 0.5A OUTPUT: 9Vdc, 1.67A LPS
COUNTRY OF ORIGIN	China

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 : Mechanical Design and Approvals Engineer
Date : 18 April 2011

TÜV SÜD 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.

Product Service

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was an ip.access Ltd 237B 3G S8 Access Point. A full technical description can be found in the manufacturer's documentation.

1.4.2 Test Configuration

Configuration 1: PoE Supply

The EUT was configured in accordance with FCC CFR 47 Part 2 and 22.

Configuration 2: 9 V DC Supply

The EUT was configured in accordance with FCC CFR 47 Part 2 and 22.

1.4.3 EUT Cable / Port Identification

Port	Max Cable Length specified	Usage	Type	Screened
AC Power (for POE Inserter)	2m	Mains Lead	3 core	No
Signal	<100m (total length from source)	Signal/Power Lead	Cat 5	No
DC Power POE	<100m (total length from source)	Signal/Power Lead	Cat 5	No
DC Power	<3m	Power Cable	2 core	No

1.4.4 Modes of Operation

Modes of operation of each EUT during testing were as follows:

Mode 1 – 871.4 MHz

Mode 2 – 881.4 MHz

Mode 3 – 891.6 MHz

Information on the specific test modes utilised are detailed in the test procedure for each individual test.

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 or test laboratories as appropriate.

The EUT was powered from either a 9 V DC Supply or a PoE Supply.

FCC Accreditation
90987 Octagon House, Fareham Test Laboratory

1.6 DEVIATIONS FROM THE STANDARD

No deviations from the applicable test standards or test plan were made during testing.

1.7 MODIFICATION RECORD

No modifications were made to the EUT during testing.

Product Service

SECTION 2

TEST DETAILS

FCC Testing of the
ip.access Ltd
237B 3G S8 Access Point

Product Service

2.1 SPURIOUS EMISSIONS AT BAND EDGE

2.1.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1051
FCC CFR 47 Part 22, Clause 22.905

2.1.2 Equipment Under Test

237B 3G S8 Access Point, S/N: 000295-0000024652

2.1.3 Date of Test and Modification State

09 March 2011 - Modification State 0

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 Method and Operating Modes

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 2 and 22.

In accordance with 22.917(e), any emissions outside of the block edges shall be attenuated by at least 43 + 10 log (P). The measurements are shown to ±1 MHz from the block edges. The plots shown under the Spurious Emissions sections covers the required range of 9 kHz to 9 GHz.

The reference power and path losses of all channels used for testing in each frequency block were measured. Having entered the reference level offset , a limit line was displayed, showing the -13 dBm (43 + 10 log (P)), limit. The EUT was operated at maximum power WCDMA moduation schemes.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 1
- Mode 3

2.1.6 Environmental Conditions

	09 March 2011
Ambient Temperature	23.8°C
Relative Humidity	22.2%

Product Service

2.1.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 2 and 22 for Spurious Emissions at Band Edge.

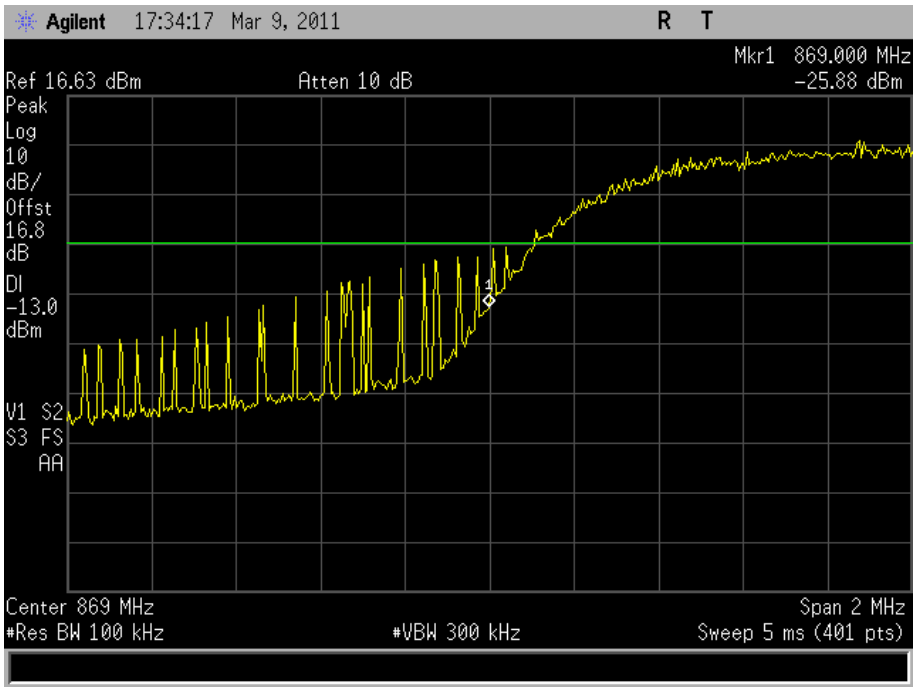
The test results are shown below.

Configuration 1 – Modes 1 and 3

9 V DC Supply

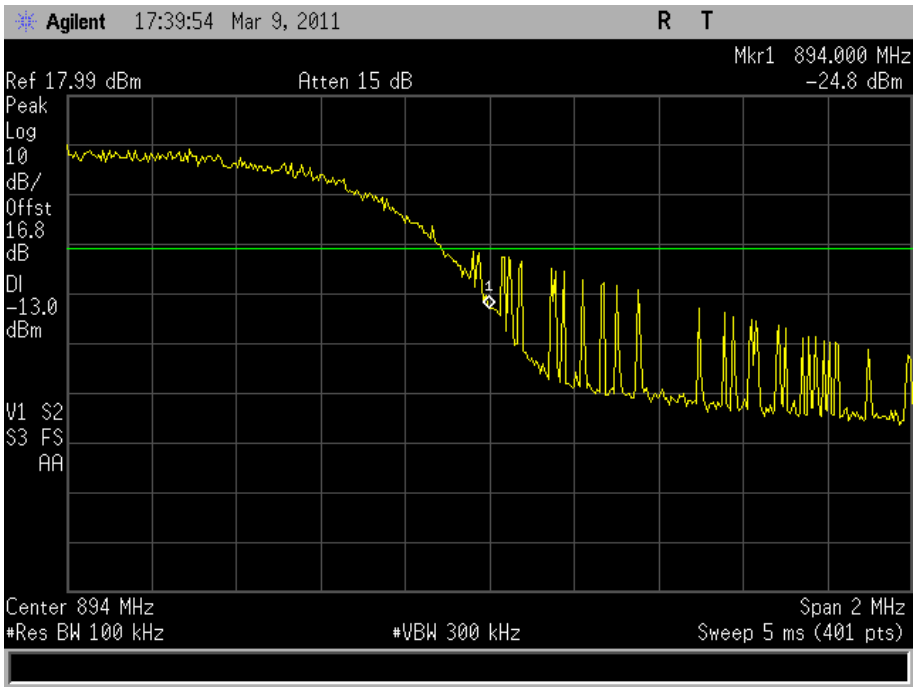
Frequency Block (mhz)	Mode	Lower Block Edge Test Channels/Frequencies	Upper Block Edge Test Channels/Frequencies
A :(824.0 – 835.0)	WCDMA	Channel : 4357 Frequency : 871.4 MHz	N/A
B :(846.5 – 849.0)	WCDMA	N/A	Channel : 4458 Frequency : 891.6MHz

Frequency Block A



Product Service

Frequency Block B



Limit Clause

-13 dBm at block edge.

2.2 EFFECTIVE RADIATED POWER

2.2.1 Specification Reference

FCC CFR 47 Part 22, Clause 22.913(a)

2.2.2 Equipment Under Test

237B 3G S8 Access Point, S/N: 000295-0000024652

2.2.3 Date of Test and Modification State

14 February and 17 April 2011 - Modification State 0

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 Method and Operating Modes

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 22.

Measurements of the fundamental from the EUT were obtained with the Measurement Antenna in both Horizontal and Vertical Polarisations. The fundamental frequency was maximised by adjusting the antenna height, antenna polarisation and turntable azimuth. A peak detector was used with the trace set to max hold. The maximum result was recorded.

The EUT was then removed from the chamber and replaced with a substitution antenna. Using a signal generator the level was adjusted to achieve the same value on the measuring instrument as previously recorded with the EUT. The final result (ERP) was determined by a calculation using the signal generator level, antenna gain and cable loss.

The measurements were performed at a 3m distance unless otherwise stated.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 1
- Mode 2
- Mode 3

Configuration 2 - Mode 1
- Mode 2
- Mode 3

2.2.6 Environmental Conditions

	14 February 2011	17 April 2011
Ambient Temperature	20.8°C	19.5°C
Relative Humidity	32%	33%
Atmospheric Pressure	997mbar	1021mbar

Product Service

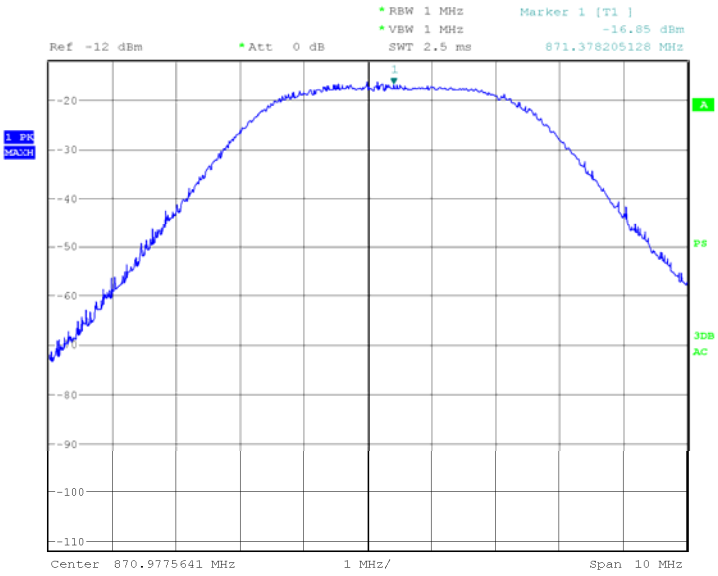
2.2.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 22 for Effective Isotropic Radiated Power.

The test results are shown below.

Configuration 1 - Mode 1

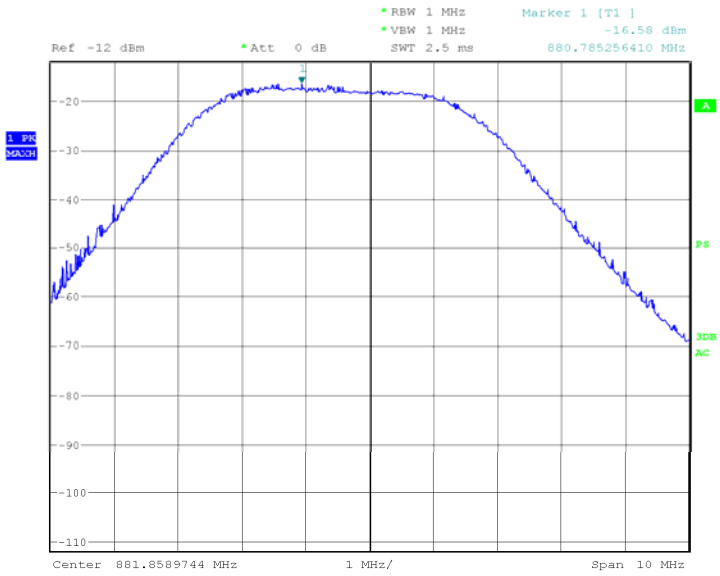
Frequency (MHz)	Result (dBm)	Limit (dBm)	Result (W)	Limit (W)
871.4	16.30	38.45	0.042	7.0



Product Service

Configuration 1 - Mode 2

Frequency (MHz)	Result (dBm)	Limit (dBm)	Result (W)	Limit (W)
881.4	16.50	38.45	0.045	7.0

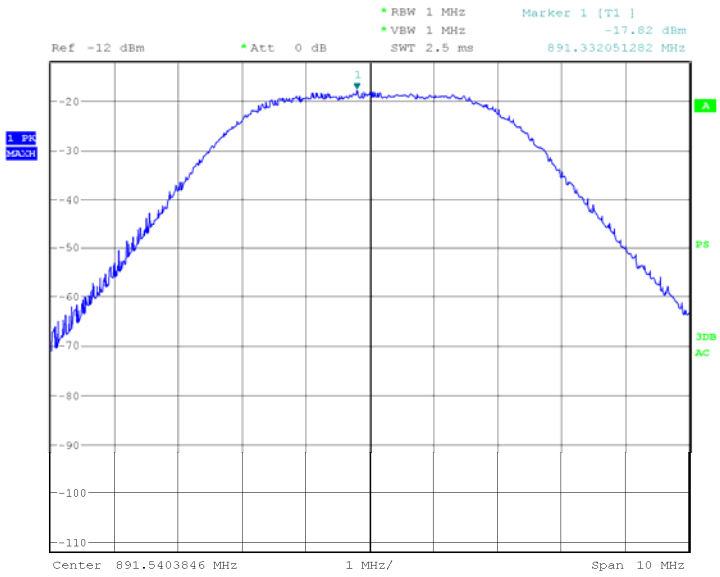


Date: 14.FEB.2011 20:27:05

Product Service

Configuration 1 - Mode 3

Frequency (MHz)	Result (dBm)	Limit (dBm)	Result (W)	Limit (W)
891.6	15.60	38.45	0.036	7.0

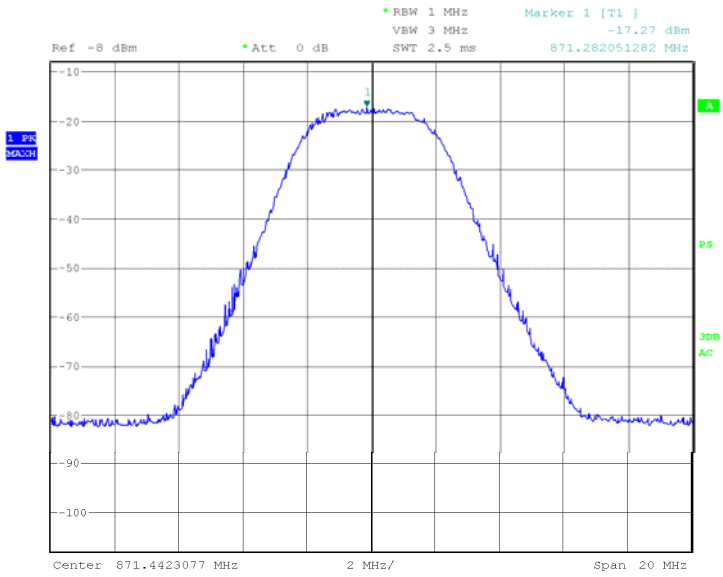


Date: 14.FEB.2011 20:10:47

Product Service

Configuration 2 - Mode 1

Frequency (MHz)	Result (dBm)	Limit (dBm)	Result (W)	Limit (W)
871.4	17.0	38.45	0.50	7.0

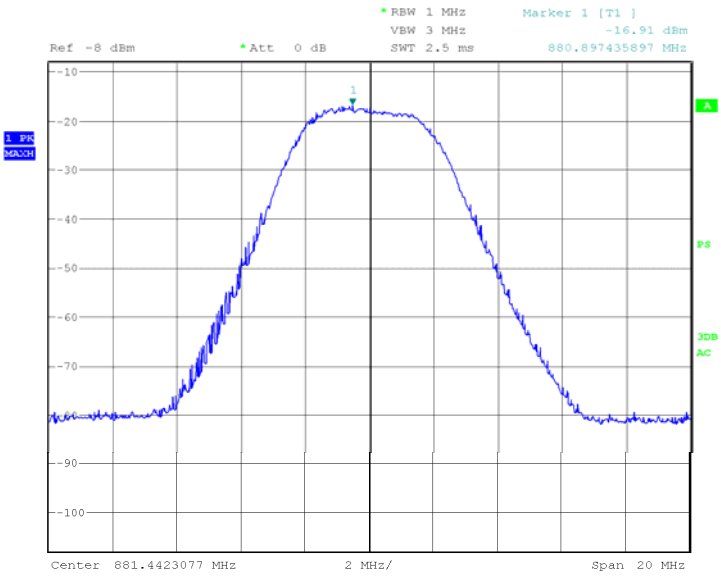


Date: 17.APR.2011 09:46:42

Product Service

Configuration 2 - Mode 2

Frequency (MHz)	Result (dBm)	Limit (dBm)	Result (W)	Limit (W)
881.4	16.3	38.45	0.043	7.0

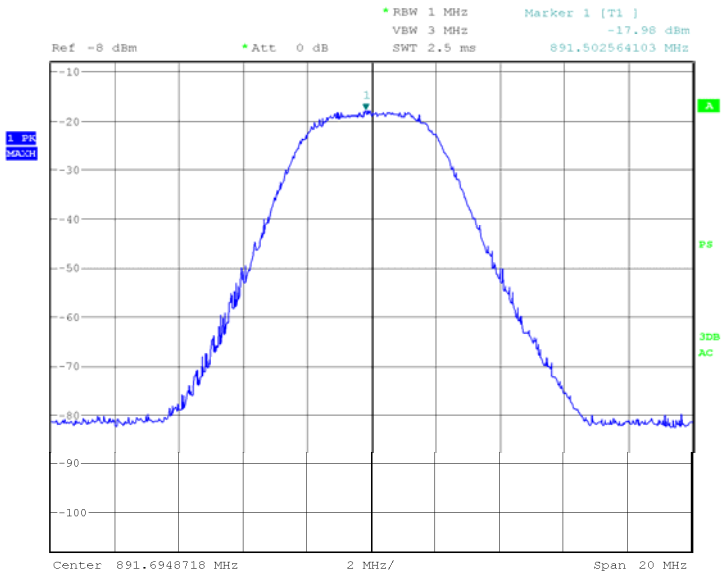


Date: 17.APR.2011 09:42:40

Product Service

Configuration 2 - Mode 3

Frequency (MHz)	Result (dBm)	Limit (dBm)	Result (W)	Limit (W)
891.6	15.6	38.45	0.036	7.0



Date: 17.APR.2011 09:26:33

Limit Clause

Mobile – 7 W, Base Stations – 500 W

Product Service

2.3 MAXIMUM PEAK OUTPUT POWER - CONDUCTED

2.3.1 Specification Reference

FCC CFR 47 Part 22, Clause 2.1046
FCC CFR 47 Part 22, Clause 22.913(a)

2.3.2 Equipment Under Test

237B 3G S8 Access Point, S/N: 000295-0000024652

2.3.3 Date of Test and Modification State

09 March 2011 - Modification State 0

2.3.4 Test Equipment Used

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

2.3.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 2 and 22.

Using a spectrum analyser and attenuator(s), the output power of the EUT was measured at the antenna terminals.

The EUT supports WCDMA and was tested in this mode of operation.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 1
- Mode 2
- Mode 3

2.3.6 Environmental Conditions

	09 March 2011
Ambient Temperature	23.8°C
Relative Humidity	22.2%

Product Service

2.3.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 2 and 22 for Maximum Peak Output Power - Conducted.

The test results are shown below.

Configuration 1 - Modes 1, 2 and 3

9 V DC Supply

Frequency (MHz)	Mode	Result (dBm)	Result (W)
871.4 MHz	WCDMA	23.03	0.201
881.4 MHz	WCDMA	22.16	0.164
891.6 MHz	WCDMA	22.64	0.184

Limit Clause

Mobile – 7 W
Base Stations – 500 W

2.4 EMISSION LIMITATIONS FOR CELLULAR EQUIPMENT

2.4.1 Specification Reference

FCC CFR 47 Part 22, Clause 22.917

2.4.2 Equipment Under Test

237B 3G S8 Access Point, S/N: 000295-0000024652

2.4.3 Date of Test and Modification State

14 February 2011 and 17 April 2011 - Modification State 0

2.4.4 Test Equipment Used

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

2.4.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 2 and 22.

A preliminary profile of the Spurious Radiated Emissions was obtained up to the 10th harmonic by operating the EUT on a remotely controlled turntable within a semi-anechoic chamber. Measurements of emissions from the EUT were obtained with the Measurement Antenna in both Horizontal and Vertical Polarisations. The profiling produced a list of the worst-case emissions together with the EUT azimuth and antenna polarisation.

Using the information from the preliminary profiling of the EUT, the list of emissions was then confirmed or updated under Alternative Open Site conditions. Emission levels were maximised by adjusting the antenna height, antenna polarisation and turntable azimuth.

The EUT was set to transmit on full power on WCDMA modulation. The EUT was tested on bottom, middle and top channels at maximum power.

For any emissions found the EUT was then removed from the chamber and replaced with a substitution antenna. Using a signal generator the level was adjusted to achieve the same value on the measuring instrument as previously recorded with the EUT. The final result was determined by a calculation using the signal generator level, antenna gain and cable loss. The measurements were performed at a 3m distance unless otherwise stated.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 1
- Mode 2
- Mode 3

Configuration 2 - Mode 1
- Mode 2
- Mode 3

Product Service

2.4.6 Environmental Conditions

	14 February 2011	17 April 2011
Ambient Temperature	20.8°C	19.5°C
Relative Humidity	32%	33%
Atmospheric Pressure	997mbar	1021mbar

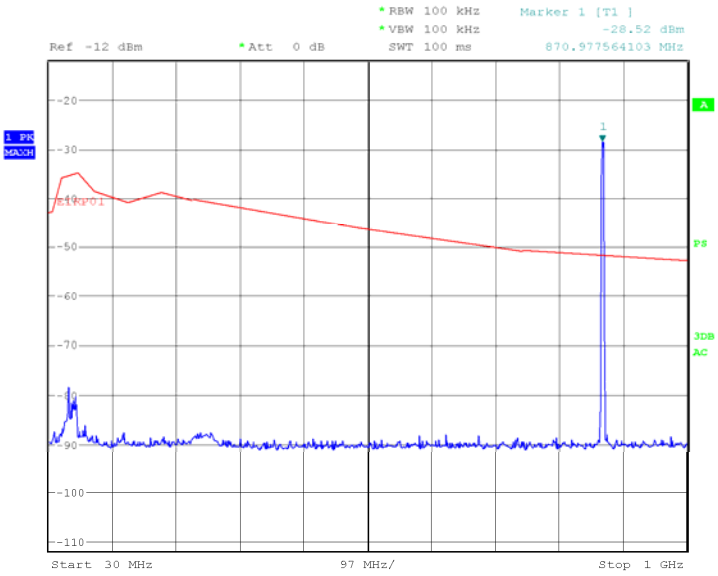
2.4.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 22 for Emission Limitations for Cellular Equipment.

The test results are shown below.

Configuration 1 - Mode 1

30MHz to 1GHz



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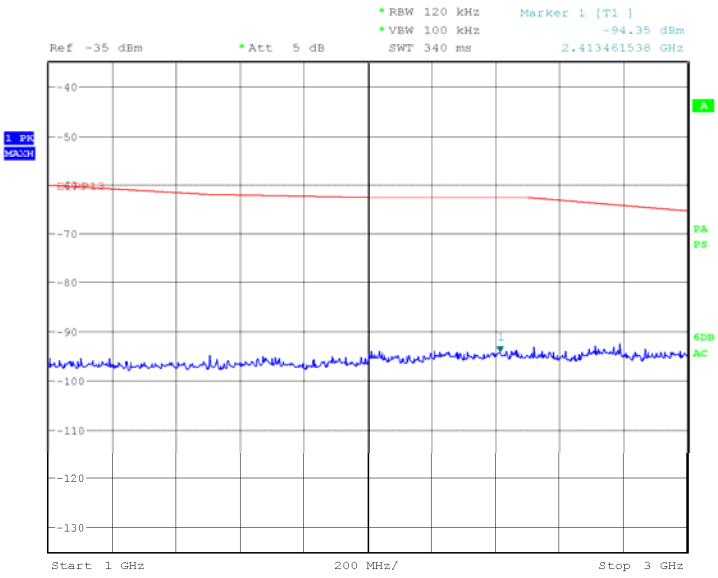
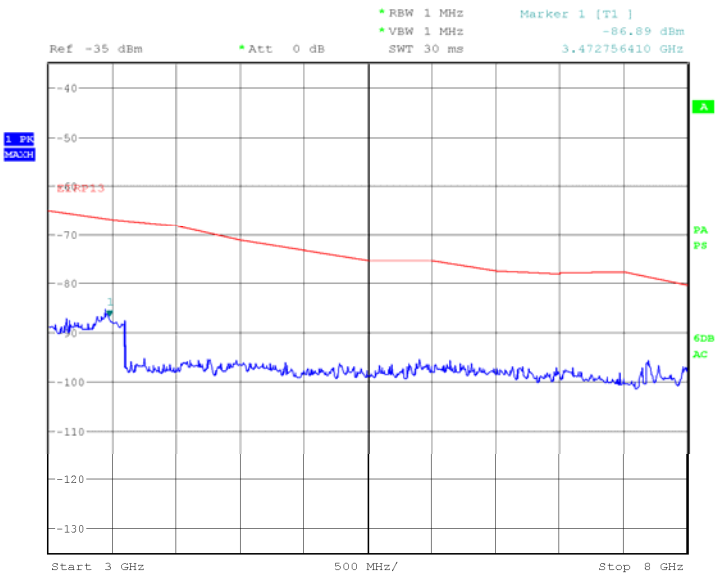
Product Service

1GHz to 3GHz



Date: 14.FEB.2011 23:03:50

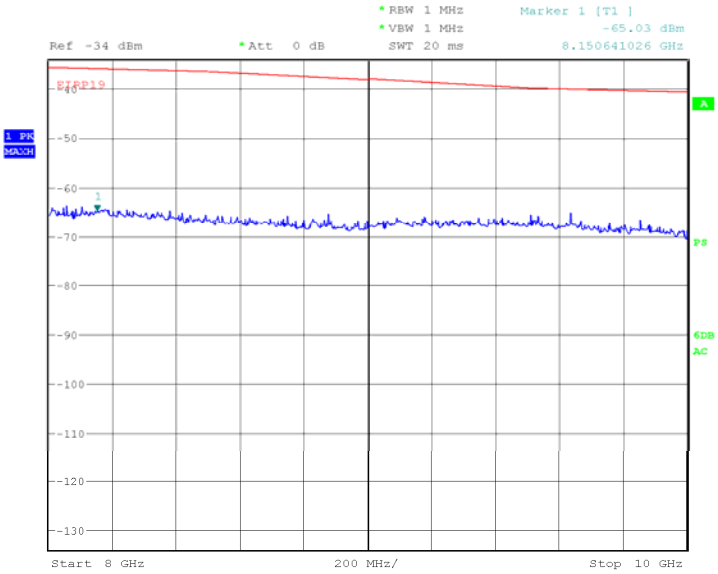
3GHz to 8GHz



Date: 14.FEB.2011 22:57:39

Product Service

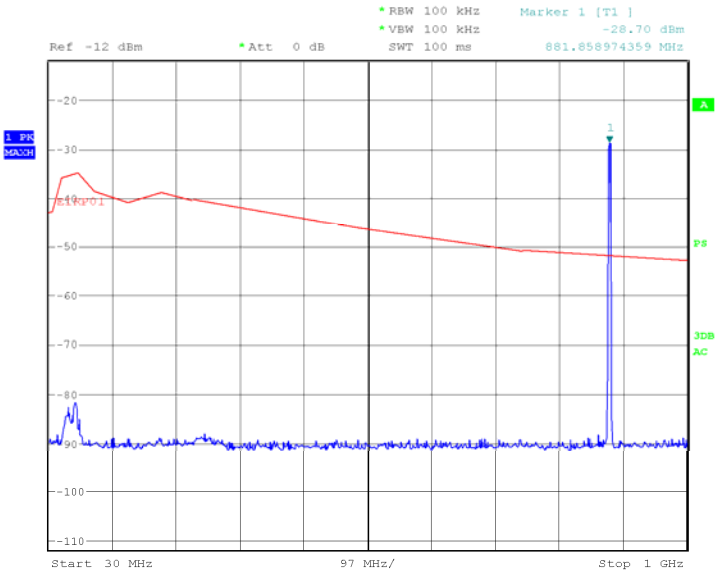
8GHz to 10GHz



Date: 14.FEB.2011 23:24:42

Configuration 1 - Mode 2

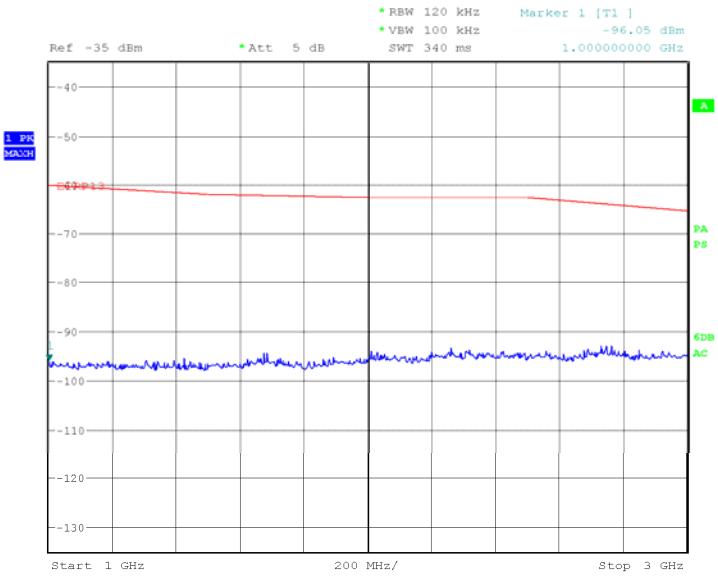
30MHz to 1GHz



Date: 14.FEB.2011 20:21:14

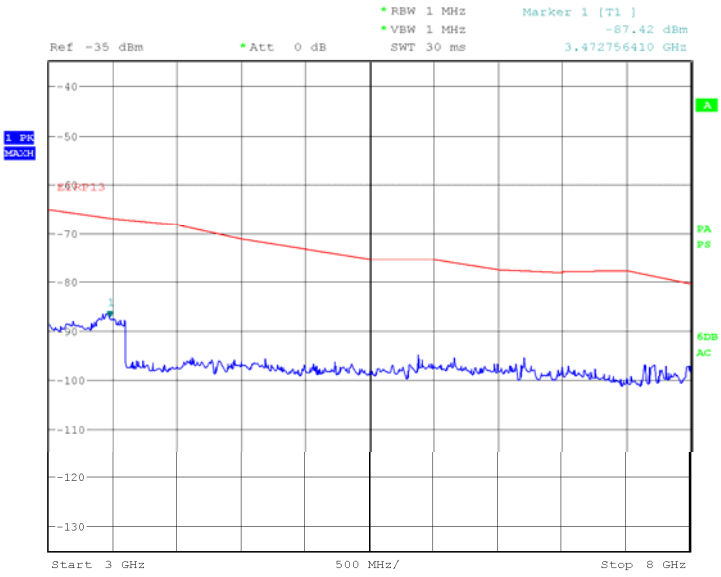
Product Service

1GHz to 3GHz



Date: 14.FEB.2011 23:06:21

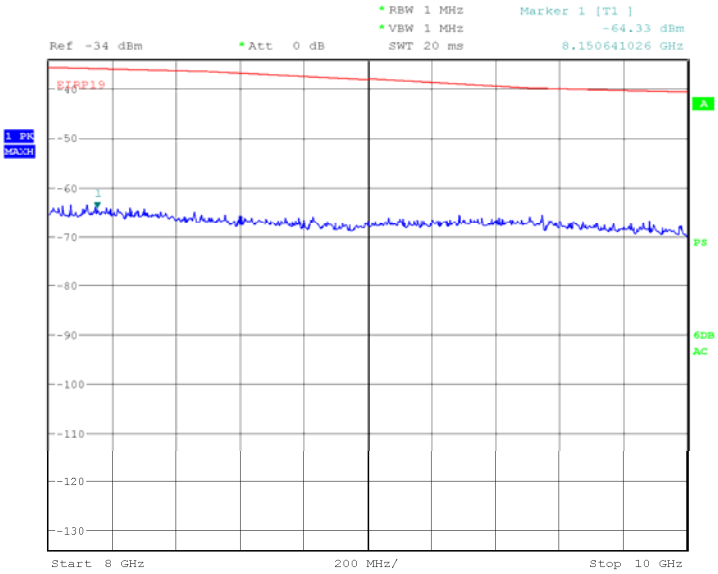
3GHz to 8GHz



Date: 14.FEB.2011 22:54:58

Product Service

8GHz to 10GHz



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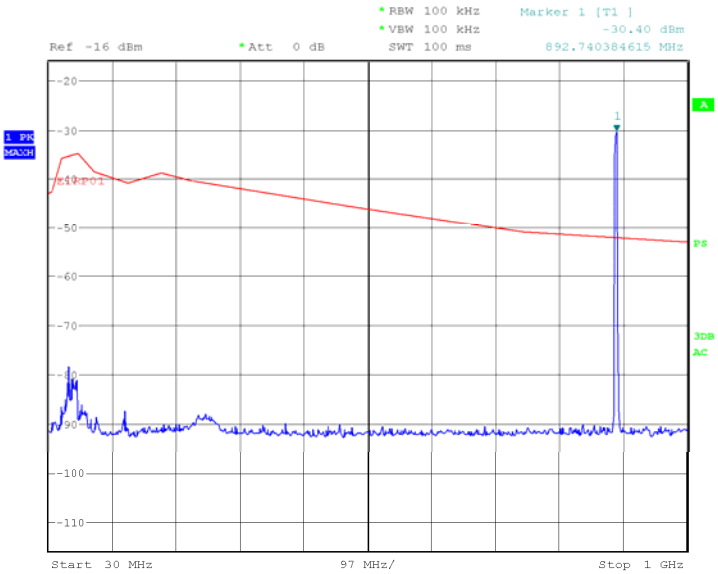
Configuration 1 - Mode 3

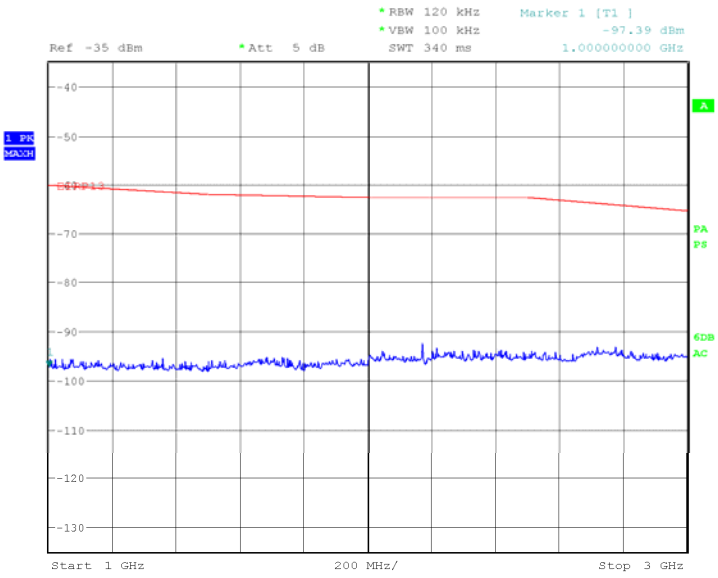
30MHz to 1GHz



Date: 14.FEB.2011 20:01:09

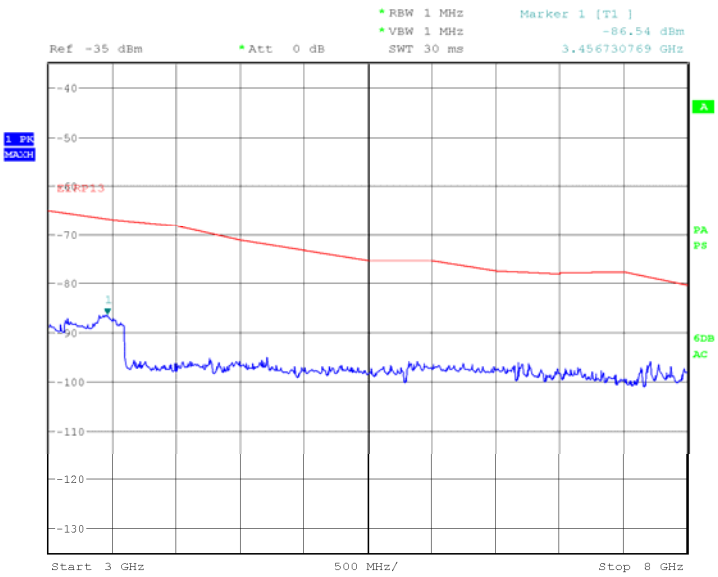
Product Service

1GHz to 3GHz



Date: 14.FEB.2011 23:08:28

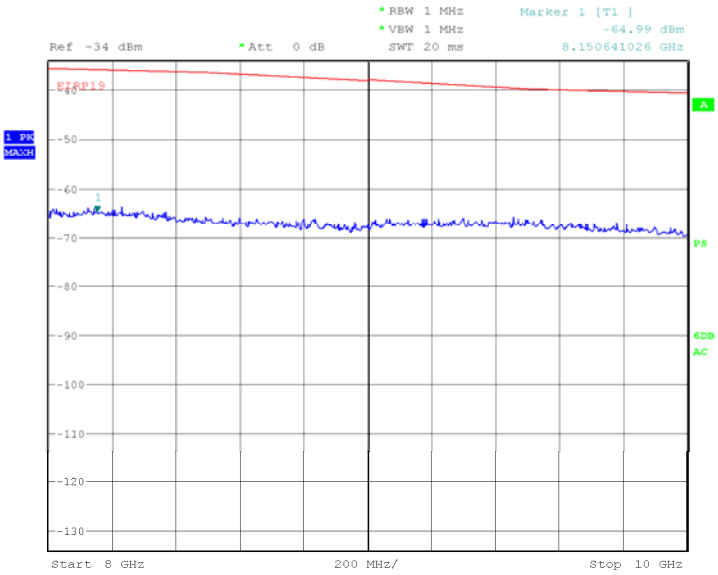
3GHz to 8GHz



Date: 14.FEB.2011 22:52:29

Product Service

8GHz to 10 GHz

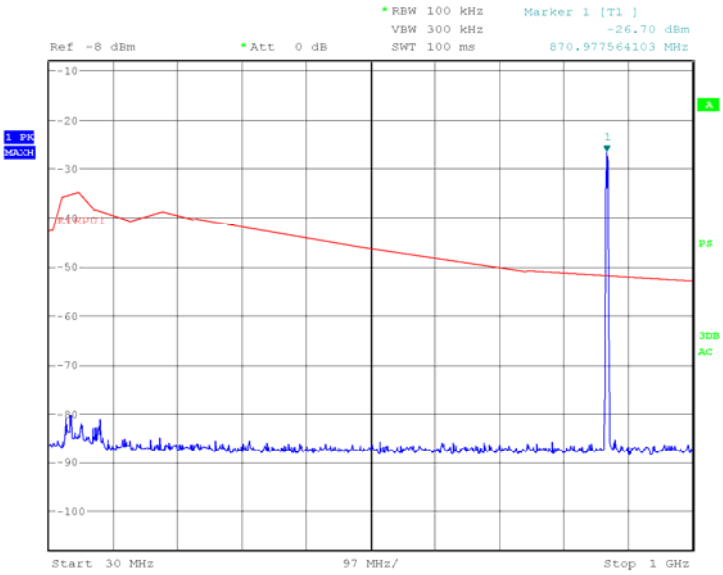


Date: 14.FEB.2011 23:30:34

Product Service

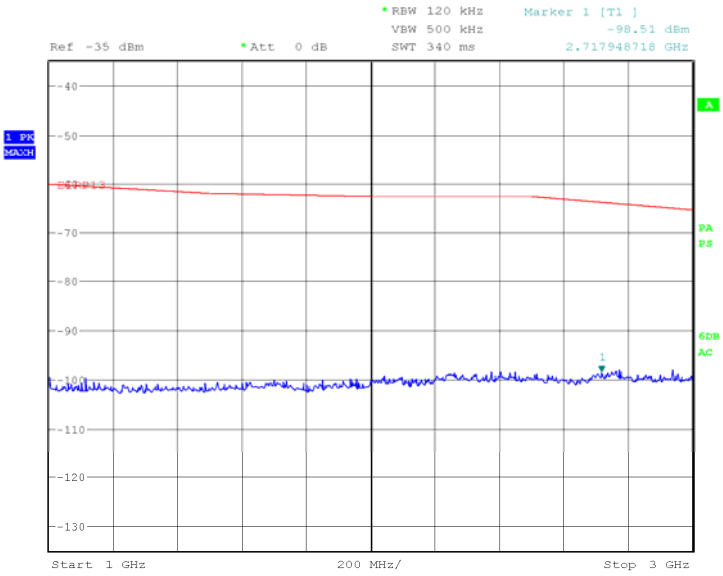
Configuration 2 - Mode 1

30MHz to 1GHz



Date: 17.APR.2011 09:50:21

1GHz to 3GHz



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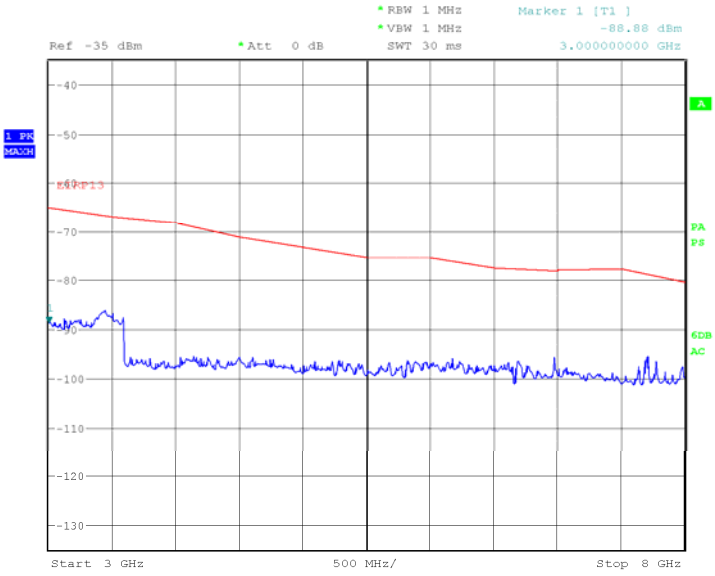
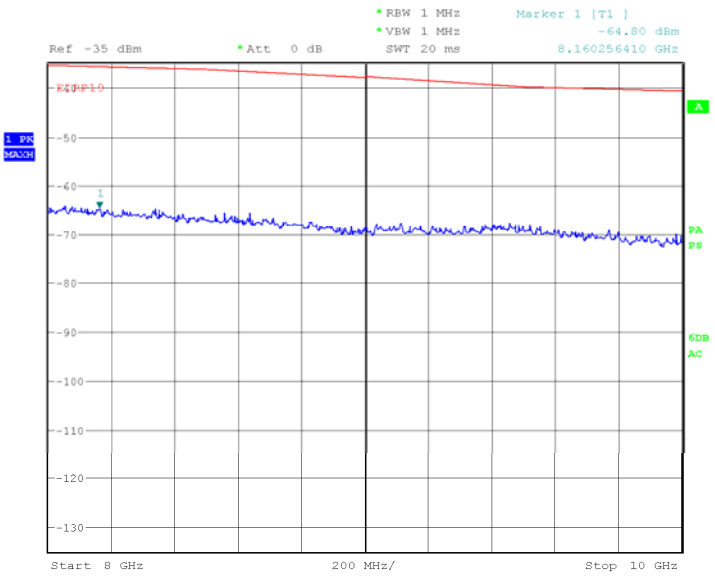
Product Service

3GHz to 8GHz



Date: 17.APR.2011 11:06:53

8GHz to 10GHz

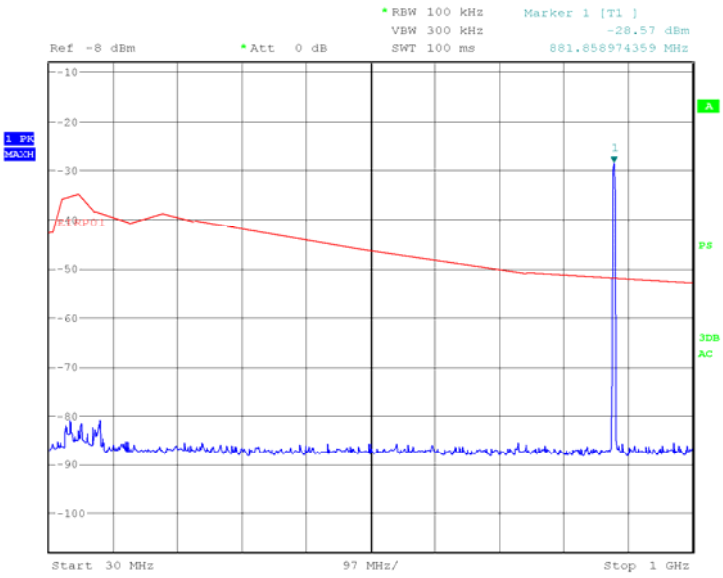


Date: 17.APR.2011 13:51:07

Product Service

Configuration 2 - Mode 2

30MHz to 1GHz



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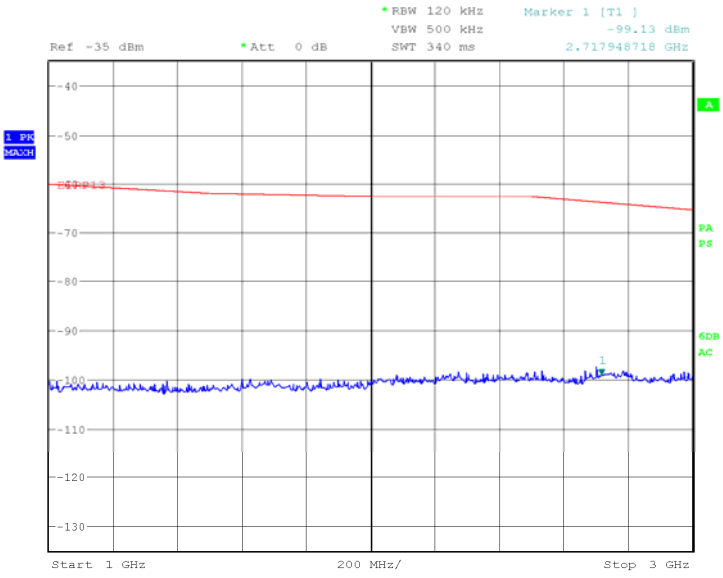
1GHz to 3GHz



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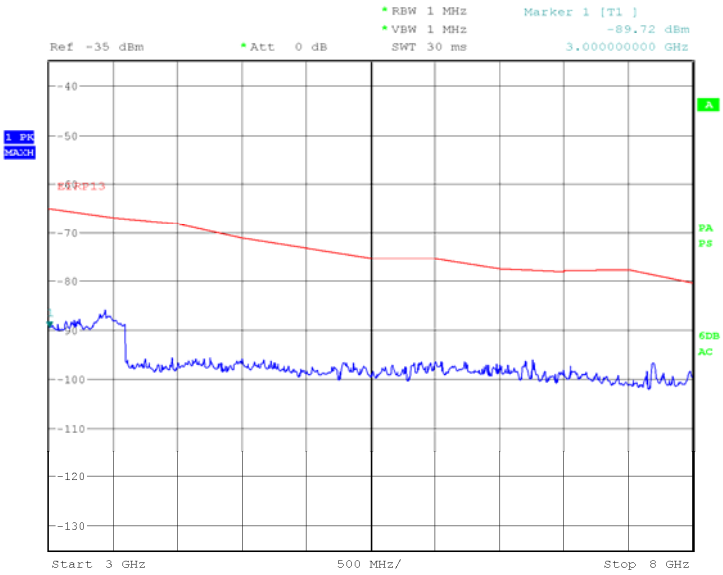
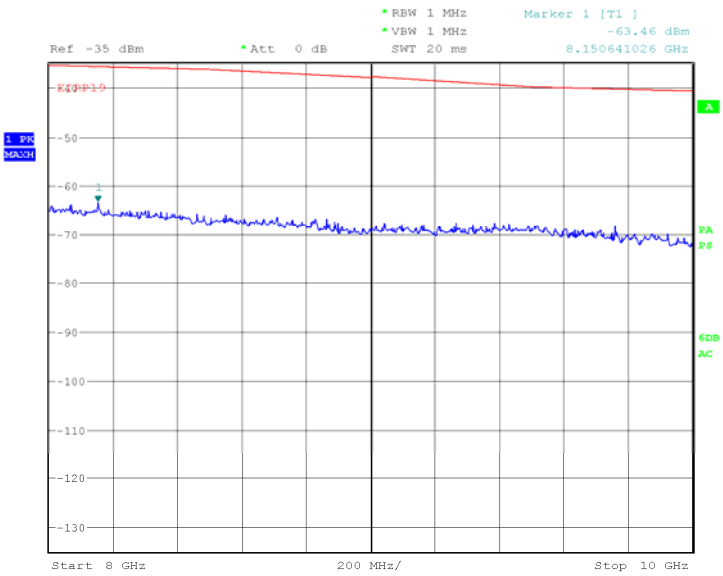
Product Service

3GHz to 8GHz



Date: 17.APR.2011 11:09:24

8GHz to 10GHz

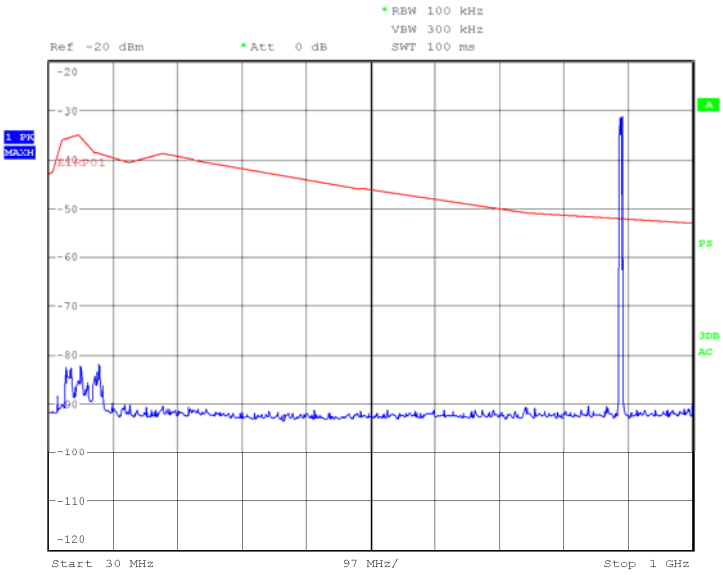


Date: 17.APR.2011 13:55:04

Product Service

Configuration 2 - Mode 3

30MHz to 1GHz



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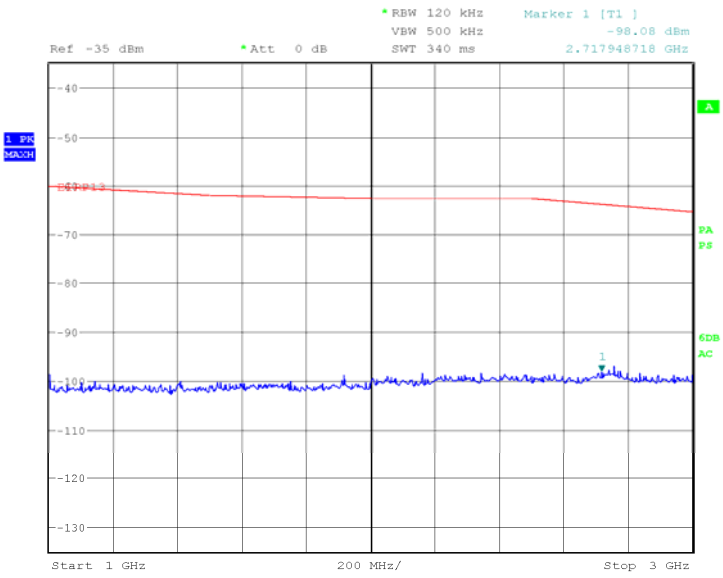
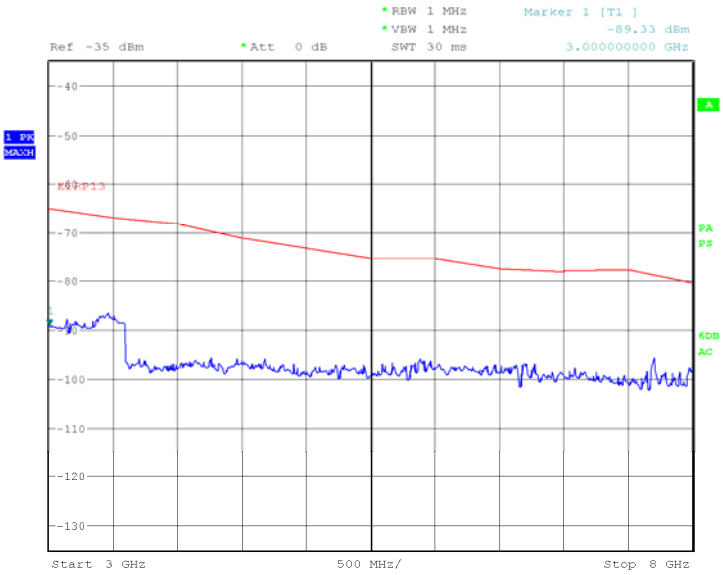
1GHz to 3GHz



Date: 17.APR.2011 10:56:51

Product Service

3GHz to 8GHz



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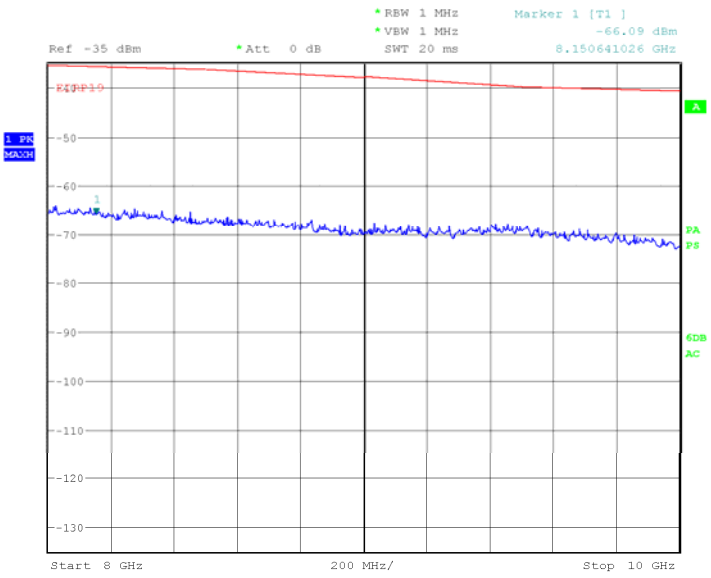
8GHz to 10GHz



Date: 17.APR.2011 13:57:46

Limit Clause

43+10log(P) or -13 dBm

2.5 CONDUCTED SPURIOUS EMISSIONS

2.5.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1051
FCC CFR 47 Part 22, Clause 22.917(a)

2.5.2 Equipment Under Test

237B 3G S8 Access Point, S/N: 000295-0000024652

2.5.3 Date of Test and Modification State

09 March 2011 - Modification State 0

2.5.4 Test Equipment Used

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

2.5.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 2 and 22.

In accordance with Part 2.1051, the spurious emissions from the antenna terminal were measured. The transmitter output power was attenuated using a combination of filters and attenuators and the frequency spectrum investigated from 9 kHz to 9 GHz. The EUT was set to transmit on full power with WCDMA modulation. The EUT was tested on Bottom, Middle and Top channels for maximum power. The resolution and video bandwidths were set to 1 MHz and 3 MHz thus meeting the requirements of Part 22.917(b). The spectrum analyser detector was set to max hold.

From 9 kHz to 4 GHz, an attenuator was used. For measuring the range 1.5 GHz to 9 GHz an attenuator and high pass filter were used. This was to reduce saturation effects in the spectrum analyser.

The maximum path loss across the measurement band were used as reference level offsets to ensure worst case.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 1
- Mode 2
- Mode 3

2.5.6 Environmental Conditions

	09 March 2011
Ambient Temperature	23.8°C
Relative Humidity	22.2%

Product Service

2.5.7 Test Results

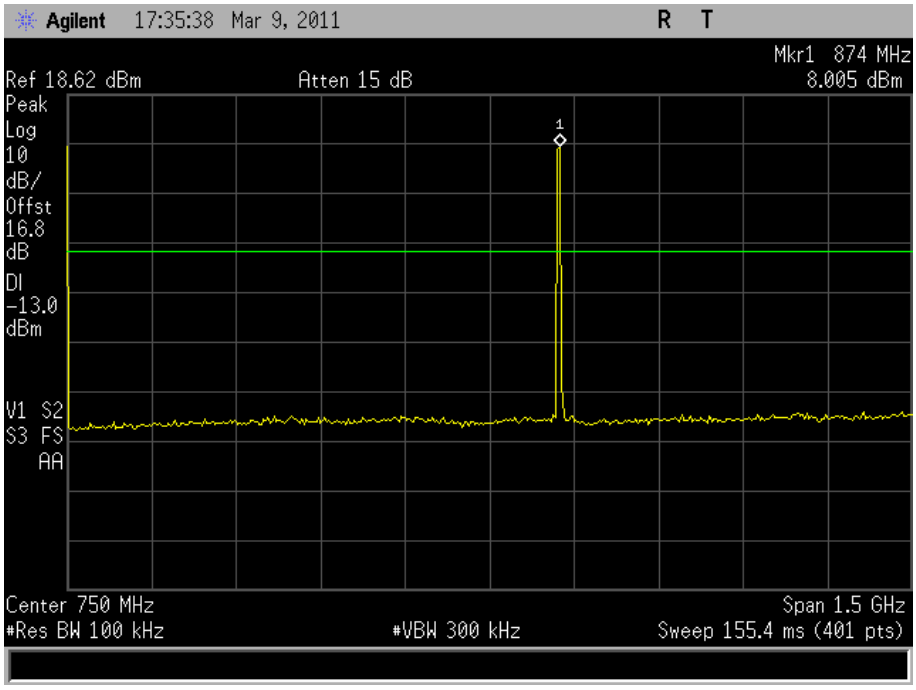
For the period of test the EUT met the requirements of FCC CFR 47 Part 2 and 22 for Conducted Spurious Emissions.

The test results are shown below.

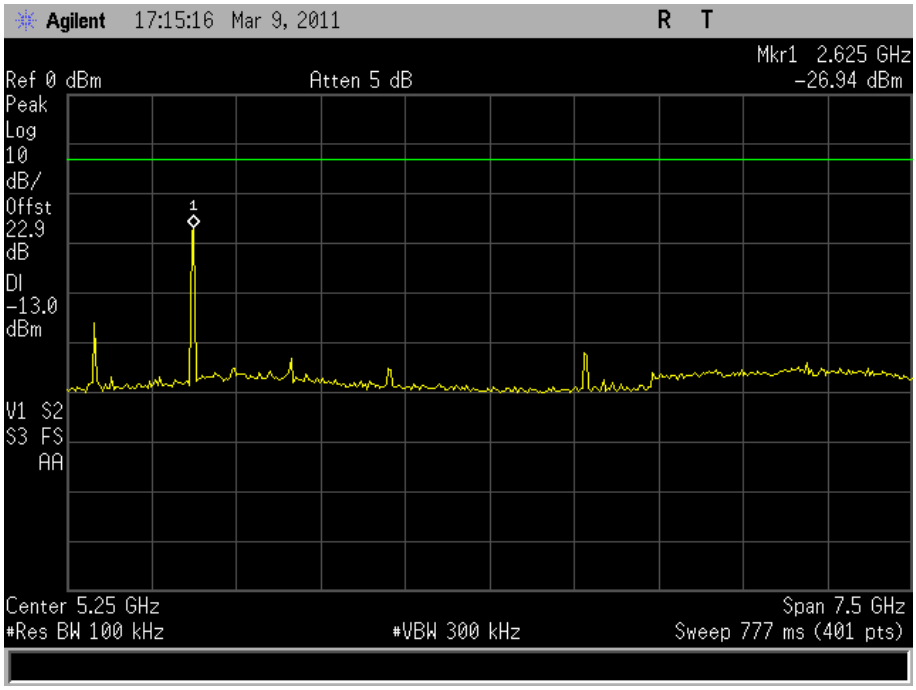
9 V DC Supply

Configuration 1 – Mode 1

9 kHz to 9 GHz

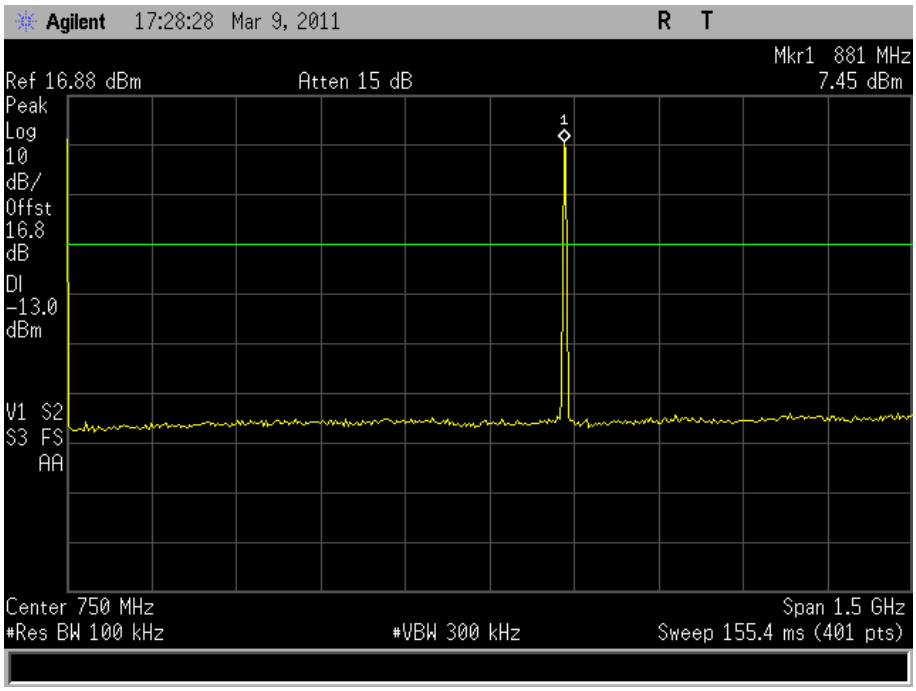


Product Service

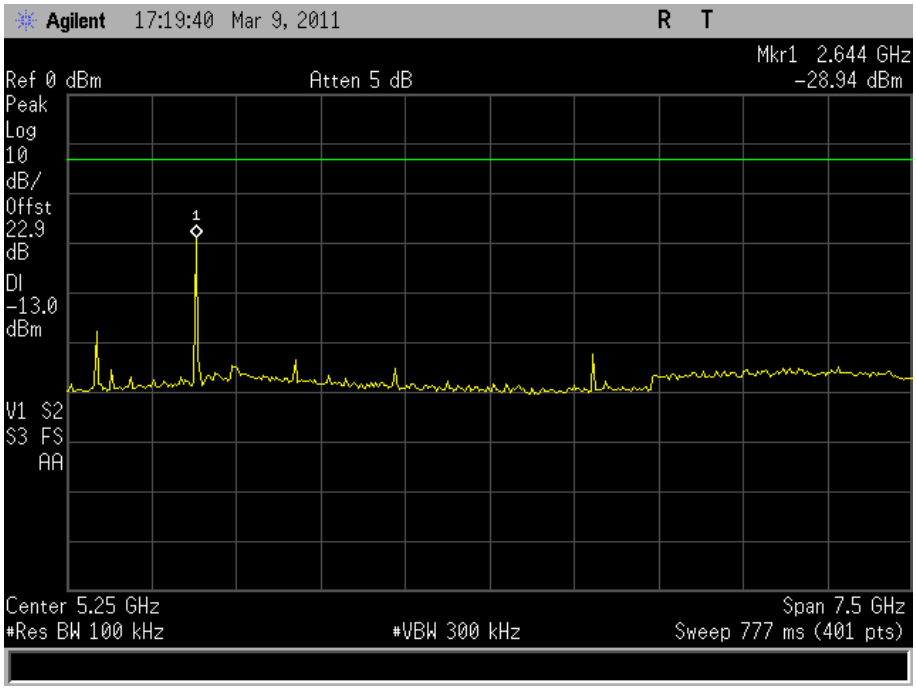


Configuration 1 - Mode 2

9 kHz to 9 GHz

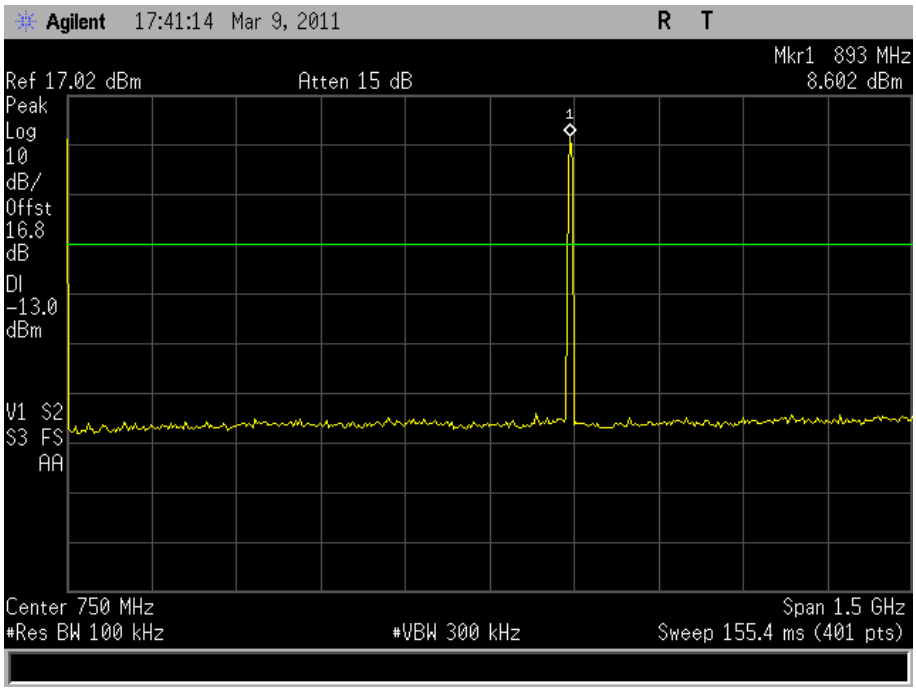


Product Service

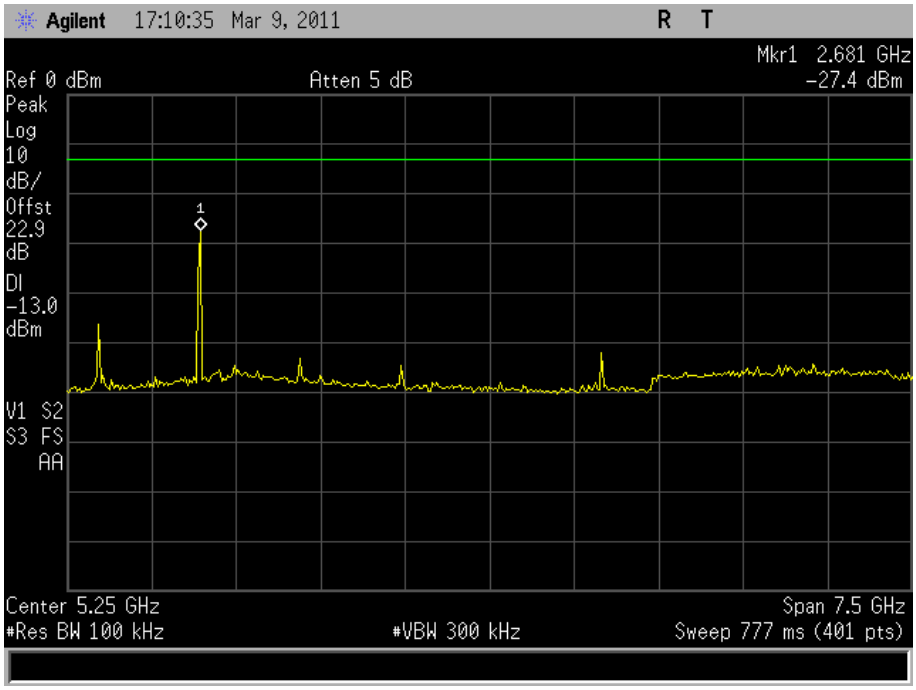


Configuration 1 - Mode 3

9 kHz to 9 GHz



Product Service



Limit Clause

43+10log(P) or -13 dBm

Product Service

2.6 OCCUPIED BANDWIDTH

2.6.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1049 (h)
FCC CFR 47 Part 22, Clause 22.917(b)

2.6.2 Equipment Under Test

237B 3G S8 Access Point, S/N: 000295-0000024652

2.6.3 Date of Test and Modification State

09 March 2011 - Modification State 0

2.6.4 Test Equipment Used

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

2.6.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 2 and 22.

The EUT was transmitting at maximum power, with WCDMA modulation. Using a resolution bandwidth of 10 kHz and a video bandwidth of 30 kHz, the -26 dBc points were established and the emission bandwidth determined.

The plot of the following pages shows the resultant display from the Spectrum Analyser.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 1
- Mode 2
- Mode 3

2.6.6 Environmental Conditions

	09 March 2011
Ambient Temperature	23.8°C
Relative Humidity	22.2%

Product Service

2.6.7 Test Results

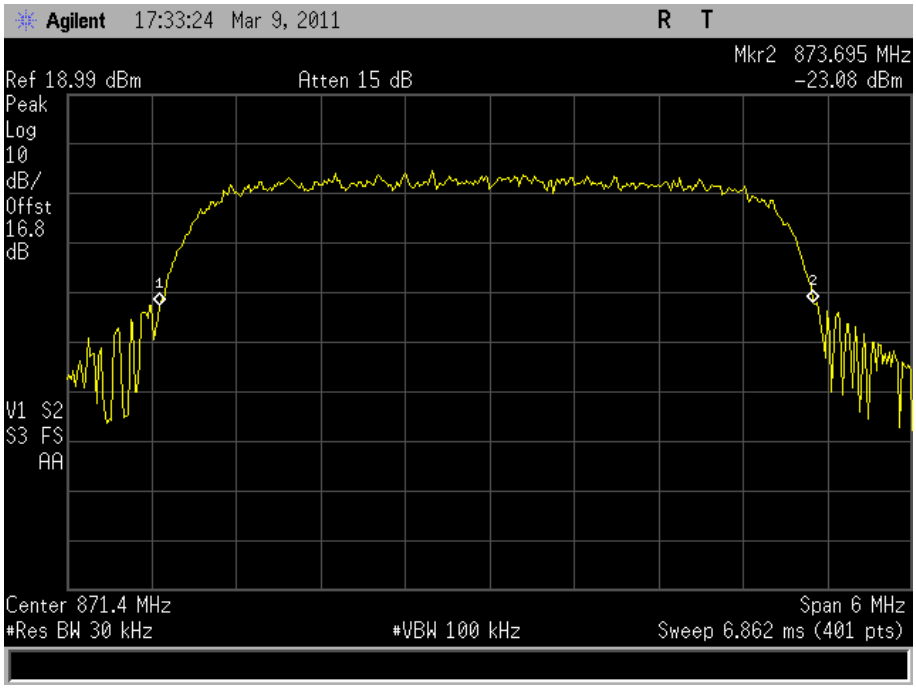
For the period of test the EUT met the requirements of FCC CFR 47 Part 2 and 22 for Occupied Bandwidth.

The test results are shown below.

9 V DC Supply

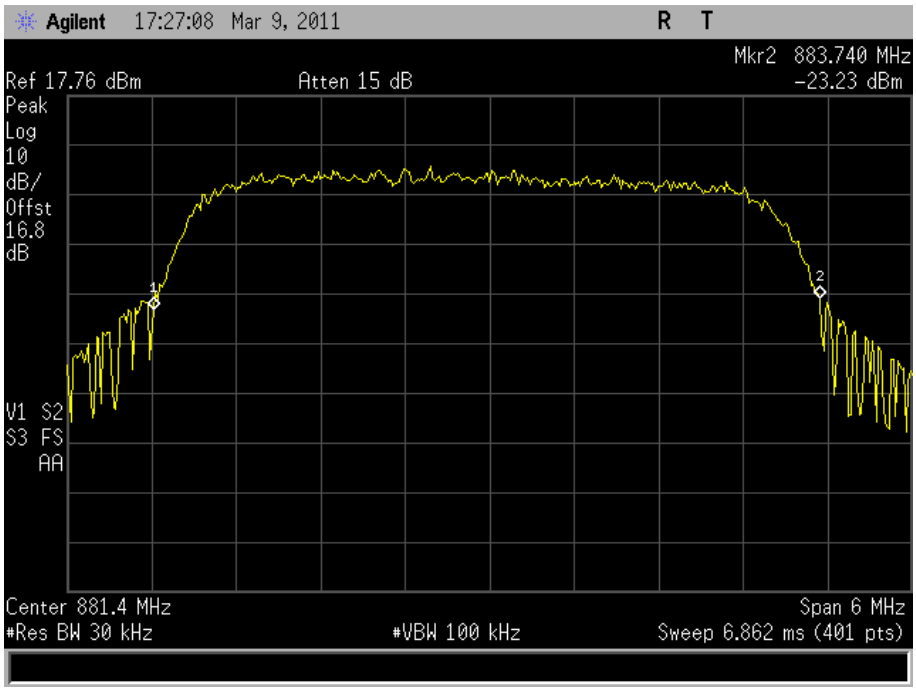
Frequency (MHz)	Mode	Occupied Bandwidth (kHz)
871.4	WCDMA	4635
881.4	WCDMA	4725
891.6	WCDMA	4695

Configuration 1 – Mode 1

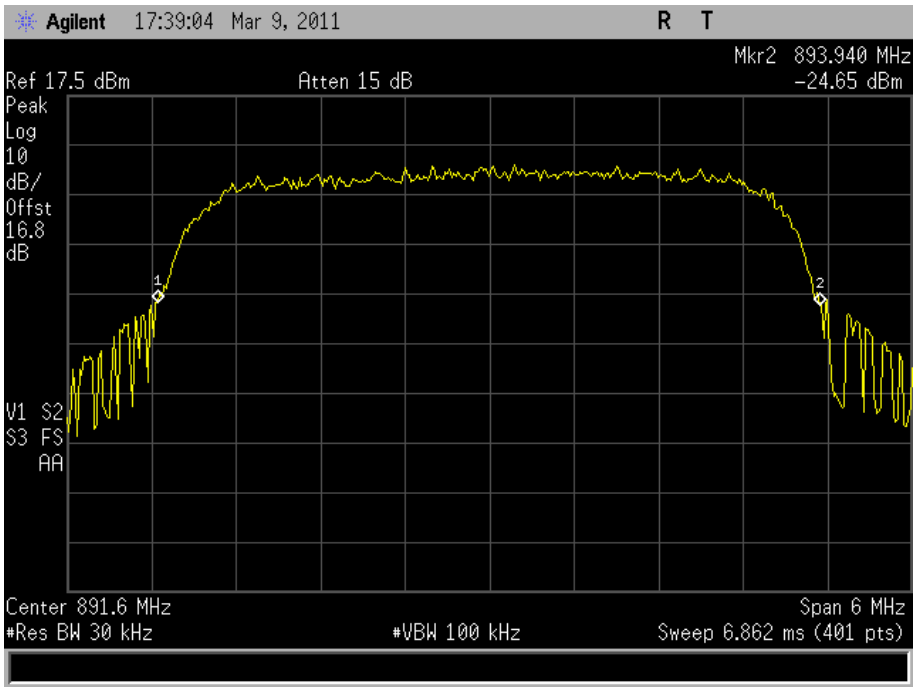


Product Service

Configuration 1 - Mode 2



Configuration 1 - Mode 3



Limit Clause

The occupied bandwidth, that is the frequency bandwidth such that, below is lower and above is upper frequency limits, the mean powers radiated are each equal to 0.5% of the total mean power radiated by a given emission.

2.7 MODULATION CHARACTERISTICS

2.7.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1047(d)

2.7.2 Equipment Under Test

237B 3G S8 Access Point

2.7.3 Test Results

As shown in the Application Form in Section 1.3, the modulation type used by the 237BA 3G S8 Access Point is Spread Spectrum WCDMA.

2.8 FREQUENCY STABILITY UNDER TEMPERATURE VARIATIONS

2.8.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1055
FCC CFR 47 Part 22, Clause 22.355

2.8.2 Equipment Under Test

237B 3G S8 Access Point, S/N: 000295-0000024652

2.8.3 Date of Test and Modification State

07 March 2011 - Modification State 0

2.8.4 Test Equipment Used

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

2.8.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 2 and 22.

The EUT was set to transmit on maximum power with WCMDA modulation. An FSQ Signal Analyser, was used to measure the frequency error. The maximum result was taken over 200 bursts. The temperature was adjusted between -30°C and +50°C in 10° steps as per 2.1055.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 2

2.8.6 Environmental Conditions

	07 March 2011
Ambient Temperature	23.7°C
Relative Humidity	19.4%

Product Service

2.8.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 2 and 22 for Frequency Stability Under Temperature Variations.

The test results are shown below.

Configuration 1 - Mode 2

9 V DC Supply

Temperature Interval (ºC)	Test Frequency (MHz)	Mode	Deviation (Hz)	Limit (kHz)
-30	881.4	WCDMA	+121	±1.5ppm or ±1.322
-20	881.4	WCDMA	+154	±1.5ppm or ±1.322
-10	881.4	WCDMA	+182	±1.5ppm or ±1.322
0	881.4	WCDMA	+175	±1.5ppm or ±1.322
+10	881.4	WCDMA	+152	±1.5ppm or ±1.322
+20	881.4	WCDMA	+89	±1.5ppm or ±1.322
+30	881.4	WCDMA	+53	±1.5ppm or ±1.322
+40	881.4	WCDMA	-27	±1.5ppm or ±1.322
+50	881.4	WCDMA	-115	±1.5ppm or ±1.322

Limit Clause

Frequency Range (MHz)	Base, Fixed (ppm)	Mobile ≤ 3 watts (ppm)	Mobile ≤ 3 watts (ppm)
25 to 50	20	20	50
50 to 450	5	5	50
450 to 512	2.5	5	5
821 to 896	1.5	2.5	2.5
928 to 929	5.0	n/a	n/a
929 to 960	1.5	n/a	n/a
2110 to 2220	10	n/a	n/a

2.9 FREQUENCY STABILITY UNDER VOLTAGE VARIATIONS

2.9.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1055
FCC CFR 47 Part 22, Clause 22.355

2.9.2 Equipment Under Test

237B 3G S8 Access Point, S/N: 000295-0000024652

2.9.3 Date of Test and Modification State

08 March 2011 - Modification State 0

2.9.4 Test Equipment Used

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

2.9.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 2 and 22.

The EUT was set to transmit on maximum power on WCDMA modulation. An FSQ Signal Anlayser, was used to measure the frequency error. The maximum result was taken over 200 bursts.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 2

2.9.6 Environmental Conditions

	08 March 2011
Ambient Temperature	24.5°C
Relative Humidity	22.1%

Product Service

2.9.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 2 and 22 for Frequency Stability Under Voltage Variations.

The test results are shown below.

Configuration 1 - Mode 2

DC Voltage (V)	Test Frequency (MHz)	Mode	Deviation (Hz)	Deviation Limit (kHz)
7.65	881.4	WCDMA	+85	±1.5ppm or ±1.322
9.0	881.4	WCDMA	+89	±1.5ppm or ±1.322
10.35	881.4	WCDMA	+88	±1.5ppm or ±1.322

Limit Clause

Frequency Range (MHz)	Base, Fixed (ppm)	Mobile ≤ 3 watts (ppm)	Mobile ≤ 3 watts (ppm)
25 to 50	20	20	50
50 to 450	5	5	50
450 to 512	2.5	5	5
821 to 896	1.5	2.5	2.5
928 to 929	5.0	n/a	n/a
929 to 960	1.5	n/a	n/a
2110 to 2220	10	n/a	n/a

Product Service

SECTION 3

TEST EQUIPMENT USED

Product Service

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
Section 2.1 – Spurious Emissions at Band Edge					
Multimeter	White Gold	WG022	190	12	26-Oct-2011
Dual programable power supply	Thurlby	T-1000	418	-	TU
Spectrum Analyser	Hewlett Packard	E4407B	1154	12	17-Jun-2011
Cable [1m, sma(m) - sma(m)]	Reynolds	262-0248-1000	2406	12	13-Oct-2011
Attenuator (10dB, 50W)	Aeroflex / Weinschel	47-10-34	3166	12	10-Jun-2011
Hygrometer	Rotronic	I-1000	3220	12	27-Apr-2011
Wideband Power Sensor, 50MHz - 18GHz	Rohde & Schwarz	NRP-Z51	3492	12	15-Apr-2011
Vector Signal Generator	Rohde & Schwarz	SMU 200A	3493	12	10-Aug-2011
'N' - 'N' RF Cable (2m)	Rhophase	NPS-1803-2000-NPS	3698	12	11-Jan-2012
Combiner/Splitter	Weinschel	1506A	3877	12	22-Feb-2012
Section 2.2 – Effective Radiate Power					
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	12-Nov-2011
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	235	12	12-Nov-2011
Screened Room (5)	Rainford	Rainford	1545	24	27-Jan-2013
Mast Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Turntable/Mast Controller	EMCO	2090	1607	-	TU
Antenna (Bilog)	Chase	CBL6143	2904	24	4-Dec-2011
Signal Generator (10MHz to 40GHz)	Rohde & Schwarz	SMR40	3171	12	12-Aug-2011
Amplifier (1 - 8GHz)	Phase One	PS06-0060	3175	12	2-Jul-2011
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	9-Sep-2011
Section 2.3 - Maximum Peak Output Power - Conducted					
Multimeter	White Gold	WG022	190	12	26-Oct-2011
Dual programable power supply	Thurlby	T-1000	418	-	TU
Spectrum Analyser	Hewlett Packard	E4407B	1154	12	17-Jun-2011
Cable [1m, sma(m) - sma(m)]	Reynolds	262-0248-1000	2406	12	13-Oct-2011
Attenuator (10dB, 50W)	Aeroflex / Weinschel	47-10-34	3166	12	10-Jun-2011
Hygrometer	Rotronic	I-1000	3220	12	27-Apr-2011
Wideband Power Sensor, 50MHz - 18GHz	Rohde & Schwarz	NRP-Z51	3492	12	15-Apr-2011
Vector Signal Generator	Rohde & Schwarz	SMU 200A	3493	12	10-Aug-2011
'N' - 'N' RF Cable (2m)	Rhophase	NPS-1803-2000-NPS	3698	12	11-Jan-2012
Combiner/Splitter	Weinschel	1506A	3877	12	22-Feb-2012

Product Service

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.4 - Emission Limitations for Cellular Equipment					
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	12-Nov-2011
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	235	12	12-Nov-2011
Antenna (Bilog)	Schaffner	CBL6143	287	24	19-Jan-2012
Dual Power Supply Unit	Thurlby	PL320	288	-	TU
Antenna (Double Ridge Guide)	Q-Par Angus Ltd	QSH 180K	1511	24	2-Aug-2012
Pre-Amplifier	Phase One	PS04-0086	1533	12	15-Sep-2011
Pre-Amplifier	Phase One	PSO4-0087	1534	12	22-Sep-2011
Screened Room (5)	Rainford	Rainford	1545	24	3-Feb-2014
Antenna (Bilog)	Chase	CBL6143	2904	24	4-Dec-2011
Signal Generator (10MHz to 40GHz)	Rohde & Schwarz	SMR40	3171	12	12-Aug-2011
Amplifier (1 - 8GHz)	Phase One	PS06-0060	3175	12	2-Jul-2011
1m RF Cable sma(m)-sma(m)	Reynolds	262-0248-1000	3453	-	TU
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	9-Sep-2011
3 GHz High Pass Filter	K&L uwave	11SH10-3000/X18000-O/O	3552	12	14-Apr-2011
'3.5mm' - '3.5mm' RF Cable (2m)	Rhophase	3PS-1803-2000-3PS	3703	12	TU
9m RF Cable (N Type)	Rhophase	NPS-2303-9000-NPS	3791	12	10-Aug-2011
Section 2.5 - Conducted Spurious Emissions					
Multimeter	White Gold	WG022	190	12	26-Oct-2011
Dual programable power supply	Thurlby	T-1000	418	-	TU
Spectrum Analyser	Hewlett Packard	E4407B	1154	12	17-Jun-2011
Cable [1m, sma(m) - sma(m)]	Reynolds	262-0248-1000	2406	12	13-Oct-2011
High Pass Filter (4GHz)	RLC Electronics	F-100-4000-5-R	2773	12	6-Sep-2011
Filter	Daden Anthony Ass	MH-1500-7SS	2778	12	22-Dec-2011
Attenuator (10dB, 50W)	Aeroflex / Weinschel	47-10-34	3166	12	10-Jun-2011
Hygrometer	Rotronic	I-1000	3220	12	27-Apr-2011
Wideband Power Sensor, 50MHz - 18GHz	Rohde & Schwarz	NRP-Z51	3492	12	15-Apr-2011
Vector Signal Generator	Rohde & Schwarz	SMU 200A	3493	12	10-Aug-2011
'N' - 'N' RF Cable (2m)	Rhophase	NPS-1803-2000-NPS	3698	12	11-Jan-2012
Combiner/Splitter	Weinschel	1506A	3877	12	22-Feb-2012
Section 2.6 - Occupied Bandwidth					
Multimeter	White Gold	WG022	190	12	26-Oct-2011
Spectrum Analyser	Hewlett Packard	E4407B	1154	12	17-Jun-2011
Cable [1m, sma(m) - sma(m)]	Reynolds	262-0248-1000	2406	12	13-Oct-2011
Attenuator (10dB, 50W)	Aeroflex / Weinschel	47-10-34	3166	12	10-Jun-2011
Hygrometer	Rotronic	I-1000	3220	12	27-Apr-2011
Wideband Power Sensor, 50MHz - 18GHz	Rohde & Schwarz	NRP-Z51	3492	12	15-Apr-2011
Vector Signal Generator	Rohde & Schwarz	SMU 200A	3493	12	10-Aug-2011
'N' - 'N' RF Cable (2m)	Rhophase	NPS-1803-2000-NPS	3698	12	11-Jan-2012
Combiner/Splitter	Weinschel	1506A	3877	12	22-Feb-2012
Section 2.8 - Frequency Tolerance under Temperature Variations					
Multimeter	White Gold	WG022	190	12	26-Oct-2011
RF Coupler	TUV	T�V	415	-	TU
Dual programable power supply	Thurlby	T-1000	418	-	TU
Temperature Chamber	Montford	2F3	467	-	O/P Mon
Thermocouple Thermometer	Fluke	51	3173	12	12-Jul-2011
Hygrometer	Rotronic	I-1000	3220	12	27-Apr-2011
Signal Analyser	Rohde & Schwarz	FSQ 26	3545	12	23-Feb-2012

Product Service

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.9 - Frequency Tolerance under Voltage Variations					
Multimeter	White Gold	WG022	190	12	26-Oct-2011
Dual programable power supply	Thurlby	T-1000	418	-	TU
Temperature Chamber	Montford	2F3	467	-	O/P Mon
Thermocouple Thermometer	Fluke	51	3173	12	12-Jul-2011
Hygrometer	Rotronic	I-1000	3220	12	27-Apr-2011
Signal Analyser	Rohde & Schwarz	FSQ 26	3545	12	23-Feb-2012

TU – Traceability Unscheduled
O/P Mon – Output monitored using calibrated equipment.

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3.2 MEASUREMENT UNCERTAINTY

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

Test Discipline	Frequency / Parameter	MU
Radiated Emissions, Bilog Antenna, AOATS	30MHz to 1GHz Amplitude	5.1dB*
Radiated Emissions, Horn Antenna, AOATS	1GHz to 40GHz Amplitude	6.3dB*
Conducted Emissions, LISN	150kHz to 30MHz Amplitude	3.2dB*
Conducted Emissions, ISN	150kHz to 30MHz Amplitude	2.1dB
Substitution Antenna, Radiated Field	30MHz to 18GHz Amplitude	2.6dB
Discontinuous Interference	150kHz to 30MHz Amplitude	3.0dB*
Interference Power	30MHz to 300MHz Amplitude	3.0dB*
Radiated E-Field Susceptibility	10MHz to 6GHz Test Amplitude	2.0dB†
Conducted Susceptibility RF	50kHz to 1000MHz Amplitude EM Clamp Method of Test CDN Method of Test BCI Clamp Method of Test Direct Injection Method of Test	 3.1dB• 1.2dB• 1.1dB• 1.2dB•
Conducted Susceptibility LF	DC to 150kHz	1.0%†
Power Frequency Magnetic Field	50Hz/60Hz Amplitude	0.45%
Magnetic Emissions	9kHz to 30MHz Amplitude	3.4dB*
Magnetic Field/Flux iaw EN 50366	10Hz to 400kHz	2.64%
Harmonics and Flicker	The test was applied using proprietary equipment that meets the requirements of EN 61000-3-2 and EN 61000-3-3	—
Mains Voltage Variations and Interrupts	The test was applied using proprietary equipment that meets the requirements of EN 61000-4-11	—
Fast Transient Burst	The test was applied using proprietary equipment that meets the requirements of EN 61000-4-4	—
Electrostatic Discharge	The test was applied using proprietary equipment that meets the requirements of EN 61000-4-2	—
Surge	The test was applied using proprietary equipment that meets the requirements of EN 61000-4-5	—
Vehicle Transients	The test was applied using proprietary equipment that meets the requirements of ISO 7637-1 and 2	—
Compass Safe Distance	Azimuth Accuracy	0.10°
Channel Occupancy/Separation	19.1kHz	N/A
Maximum Output Power	Not Applicable	±0.5dB
Number of Channels	Not Applicable	N/A
20dB Bandwidth	19.1kHz	±0.5dB

Worst case error for both Time and Frequency measurement 12 parts in 10^6.

* In accordance with CISPR 16-4-2
† In accordance with UKAS Lab 34
• In accordance with EN61000-4-6

Product Service

SECTION 5

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

Product Service

4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

UKAS TESTING 0141

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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