Report On

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

COMMERCIAL-IN-CONFIDENCE

FCC ID: QGGIPA237CA

Document 75912616 Report 02 Issue 1 May 2011

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REPORT ON

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

Document 75912616 Report 02 Issue 1

May 2011

PREPARED FOR

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

PREPARED BY

N Bennett
Senior Administrator

APPROVED BY

M J Hardy
Authorised Signatory

DATED 11 May 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: Parts 2 and 27. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);

B Airs G Lawler

UKAS TESTING 0141

Product Service

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SECTION 1

REPORT SUMMARY

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

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1.1 INTRODUCTION

The information contained in this report is intended to show verification of the ip.access Ltd, 237CA 3G S8 Access Point to the requirements of FCC CFR 47 Part 2 and 27.

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)	nano3G 237CA
Serial Number(s)	000295-0000024625
Software Version	SR1.2.0-491.8.0
Hardware Version	XA
Number of Samples Tested	1
Test Specification/Issue/Date	FCC CFR 47 Part 27: 2010
Incoming Release Date	Application Form 18 April 2011
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	PO26015 28 January 2011
Start of Test	02 March 2011
Finish of Test	25 April 2011
Name of Engineer(s)	G Lawler B Airs
Related Document(s)	ANSI C63.4 : 2003

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1.2 BRIEF SUMMARY OF RESULTS

A brief summary of results in accordance with FCC CFR 47 Part 2 and 27, is shown below.

Configuration 1 - PoE Supply						
Section	Spec Clause		Test Description	Mode	Mod State	Result
	Part 2	Part 27				
2.1	2.1046	27.50(d)	EIRP Peak Power	2112.4 MHz	0	Pass
				2132.4 MHz	0	Pass
				2152.6 MHz	0	Pass
2.2	2.1046	27.50(d)(2)	Carrier Power	2112.4 MHz	0	Pass
				2132.4 MHz	0	Pass
				2152.6 MHz	0	Pass
2.3	-	27.50(d)(5)	Carrier Power – PAR	2112.4 MHz	0	Pass
				2132.4 MHz	0	Pass
				2152.6 MHz	0	Pass
2.4	2.1051 and 2.1053	27.53	Spurious Conducted Emissions	2112.4 MHz	0	Pass
				2132.4 MHz	0	Pass
				2152.6 MHz	0	Pass
2.5	2.1053	27.53(h)	Spurious Radiated Emissions	2112.4 MHz	0	Pass
				2132.4 MHz	0	Pass
				2152.6 MHz	0	Pass
2.6	2.1049	27.53(h)(1)	26dB Bandwidth	2112.4 MHz	0	Pass
				2132.4 MHz	0	Pass
				2152.6 MHz	0	Pass
2.7	2.1051	27.53(h)(1)	Conducted Emissions – Block Edge	2112.4 MHz	0	Pass
				2132.4 MHz	-	N/A
				2152.6 MHz	0	Pass
2.8	2.1055(d)(1)	27.54	Frequency Stability Under Voltage Variations	2112.4 MHz	-	N/A
				2132.4 MHz	0	Pass
				2152.6 MHz	-	N/A
2.9	2.1055	27.54	Frequency Stability Under Temperature Variations	2112.4 MHz	-	N/A
				2132.4 MHz	0	Pass
				2152.6 MHz	-	N/A

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Configuration 2 – 9 V DC Supply						
Section	Spec Clause		Test Description	Mode	Mod State	Result
	Part 2	Part 27				
2.1	2.1046	27.50(d)	EIRP Peak Power	2112.4 MHz	1	Pass
				2132.4 MHz	1	Pass
				2152.6 MHz	1	Pass
	2.1046	27.50(d)(2)	Carrier Power	2112.4 MHz	-	N/A
				2132.4 MHz	-	N/A
				2152.6 MHz	-	N/A
	-	27.50(d)(5)	Carrier Power – PAR	2112.4 MHz	-	N/A
				2132.4 MHz	-	N/A
				2152.6 MHz	-	N/A
	2.1051 and 2.1053	27.53	Spurious Conducted Emissions	2112.4 MHz	-	N/A
				2132.4 MHz	-	N/A
				2152.6 MHz	-	N/A
2.5	2.1053	27.53(h)	Spurious Radiated Emissions	2112.4 MHz	1	Pass
				2132.4 MHz	1	Pass
				2152.6 MHz	1	Pass
	2.1049	27.53(h)(1)	26dB Bandwidth	2112.4 MHz	-	N/A
				2132.4 MHz	-	N/A
				2152.6 MHz	-	N/A
	2.1051	27.53(h)(1)	Conducted Emissions – Block Edge	2112.4 MHz	-	N/A
				2132.4 MHz	-	N/A
				2152.6 MHz	-	N/A
	2.1055(d)(1)	27.54	Frequency Stability Under Voltage Variations	2112.4 MHz	-	N/A
				2132.4 MHz	-	N/A
				2152.6 MHz	-	N/A
	2.1055	27.54	Frequency Stability Under Temperature Variations	2112.4 MHz	-	N/A
				2132.4 MHz	-	N/A
				2152.6 MHz	-	N/A

N/A – Not Applicable

Product Service

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

Equipment designator:
Model name/number: nano3G S8 Access Point 237CA (Band 4)

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 2110 MHz to 2155 MHz Channel spacing 200 kHz (if channelized)

Designated test frequencies:
Bottom: 2112.4 MHz Middle: 2132.4 MHz Top: 2152.6 MHz

Power characteristics:
Maximum transmitter power 0.02 W Minimum transmitter power ..... W (if variable)

[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	237CA nano3G S8 Access Point (Band 4)
MANUFACTURER	IP Access Ltd
HARDWARE VERSION	XA
SOFTWARE VERSION	SR1.2.0 - 491.8.0
TRANSMITTER OPERATING RANGE	2110 - 2155 MHz
RECEIVER OPERATING RANGE	1710 – 1755 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	2155 MHz
FCC ID	QGGIPA237CA
INDUSTRY CANADA ID	N/A
TECHNICAL DESCRIPTION (a brief description of the intended use and operation)	8 user 3G Access Point operating in Band 4
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: 48V, 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-061-1209-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
SERIAL NUMBER	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.

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a IP-Access Ltd 237CA 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 27.

Configuration 2: 9 V DC Supply

The EUT was configured in accordance with FCC CFR 47 Part 27.

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 – 2112.4 MHz
Mode 2 – 2132.4 MHz
Mode 3 – 2152.6 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, test laboratories or an open test area as appropriate.

The EUT was powered from a 9 V DC PSU or 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

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
0	As supplied by the customer	Not Applicable	Not Applicable
1	A few component changes made to resolve a radiated emission failure at between 6 and 7GHz	Adrian Pearce	13 April 2011

Product Service

SECTION 2

TEST DETAILS

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

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2.1 EIRP PEAK POWER

2.1.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1046
FCC CFR 47 Part 27, Clause 27.50(d)

2.1.2 Equipment Under Test

237CA 3G S8 Access Point, S/N: 000295-0000024625

2.1.3 Date of Test and Modification State

24 April 2011 - Modification State 1

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 27.

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

2.1.6 Environmental Conditions

	24 April 2011
Ambient Temperature	20.6°C
Relative Humidity	43%
Atmospheric Pressure	1013mbar

Product Service

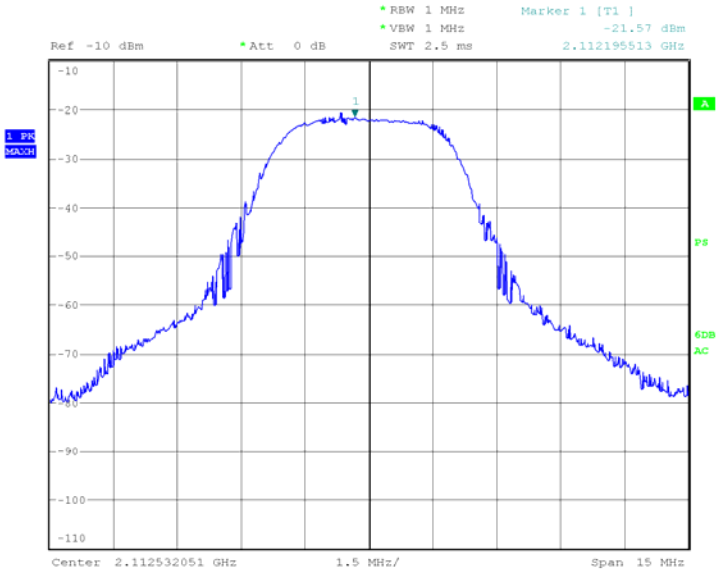
2.1.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 27 for EIRP Peak Power.

The test results are shown below.

Configuration 1 - Mode 1

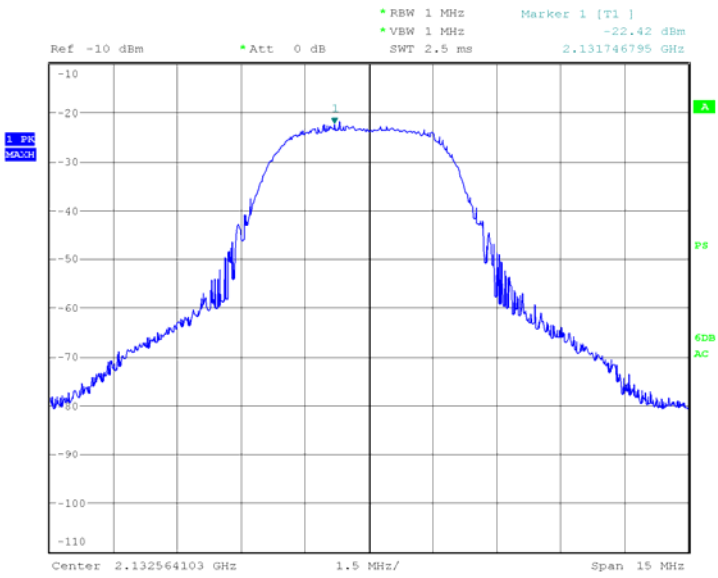
Frequency (MHz)	Result (dBm)	Limit (dBm)	Result (W)	Limit (W)
2112.4	21.3	62.15	0.135	1640



Product Service

Configuration 1 - Mode 2

Frequency (MHz)	Result (dBm)	Limit (dBm)	Result (W)	Limit (W)
2132.4	22.0	62.15	0.159	1640

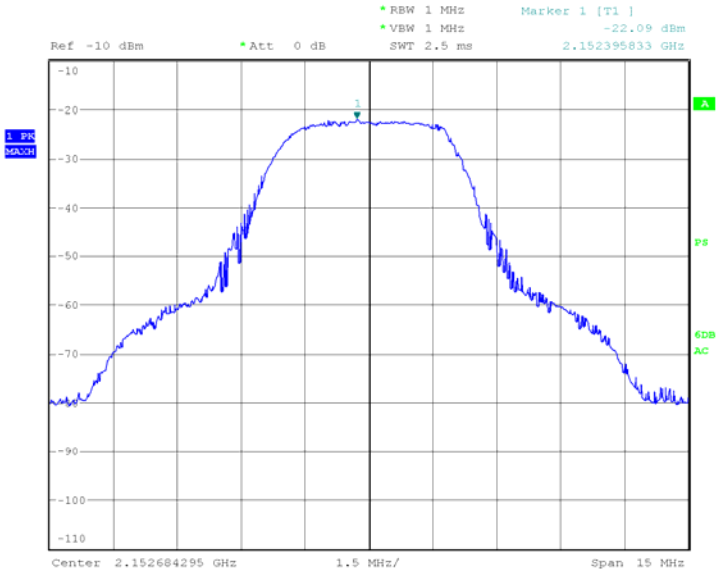


Date: 24.APR.2011 15:27:53

Product Service

Configuration 1 - Mode 3

Frequency (MHz)	Result (dBm)	Limit (dBm)	Result (W)	Limit (W)
2152.6	22.1	62.15	0.162	1640

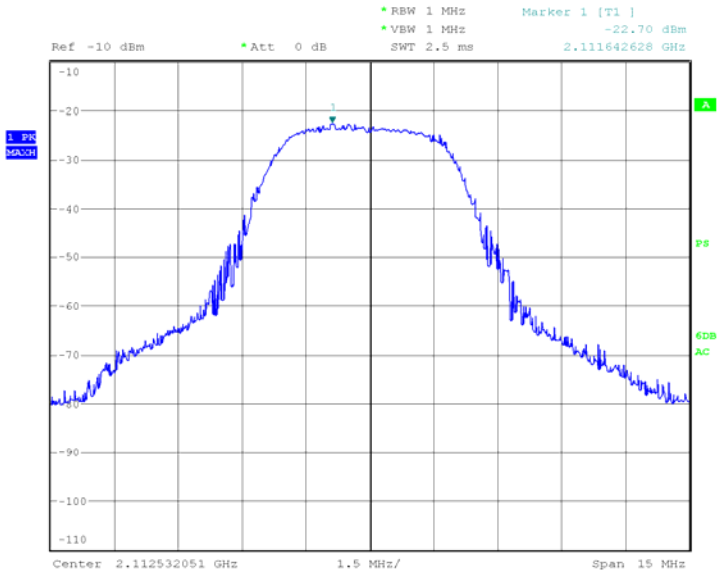


Date: 24.APR.2011 16:21:09

Product Service

Configuration 2 - Mode 1

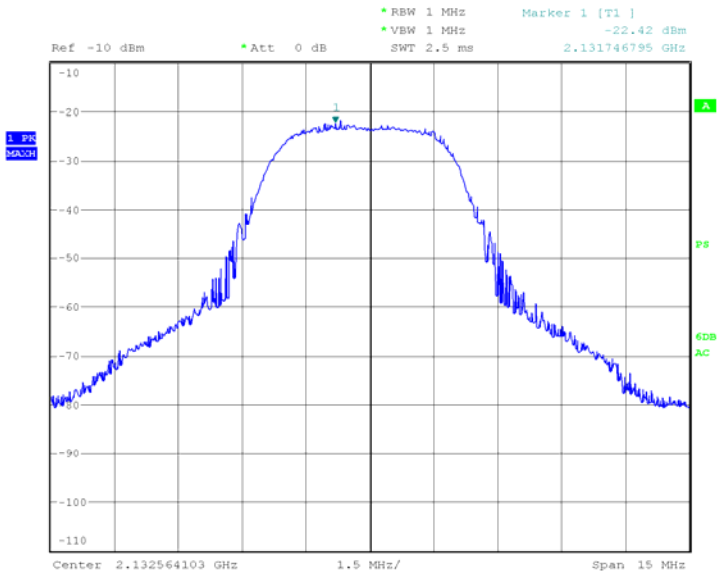
Frequency	Result (dBm)	Limit (dBm)	Result (W)	Limit (W)
2112.4	20.2	62.15	0.105	1640



Product Service

Configuration 2 - Mode 2

Frequency	Result (dBm)	Limit (dBm)	Result (W)	Limit (W)
2132.4	20.4	62.15	0.110	1640

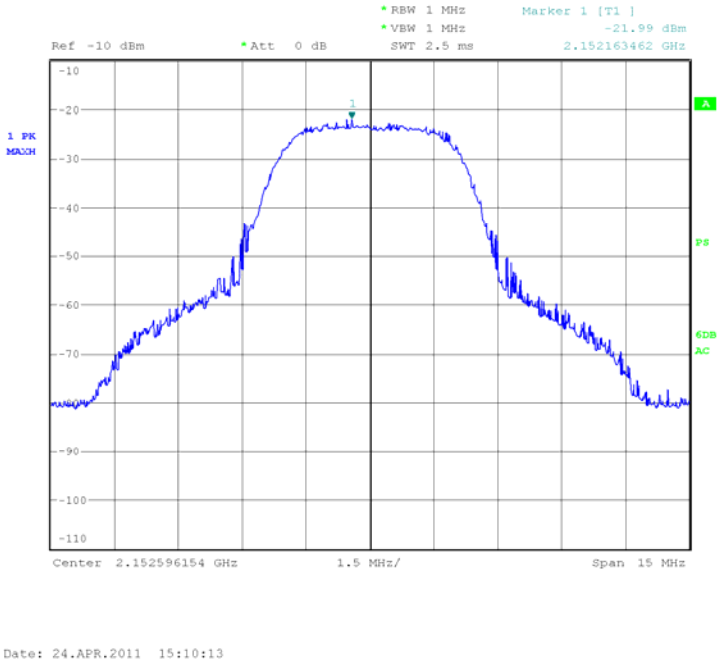


Date: 24.APR.2011 15:27:53

Product Service

Configuration 2 - Mode 3

Frequency	Result (dBm)	Limit (dBm)	Result (W)	Limit (W)
2152.6	22.0	62.15	0.158	1640



Product Service

2.2 CARRIER POWER

2.2.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1046
FCC CFR 47 Part 27, Clause 27.50(d)(2)

2.2.2 Equipment Under Test

237CA 3G S8 Access Point, S/N: 000295-0000024625

2.2.3 Date of Test and Modification State

14 March 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 27.

The EUT was connected to a spectrum analyser via a 10dB attenuator. The path loss between the EUT and the spectrum analyser was measured and entered as a reference level offset. The detector was set to rms and the trace set to the max hold. The carrier power was then measured in two ways, on bottom, middle and top channels at maximum power:

- Power in a 1MHz bandwidth using a spectrum analyser.
- Wideband power using a peak power meter.

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

Configuration 1 - Mode 1
- Mode 2
- Mode 3

2.2.6 Environmental Conditions

	14 March 2011
Ambient Temperature	25.0°C
Relative Humidity	27.0%

Product Service

2.2.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 27 for Carrier Power.

The test results are shown below.

Configuration 1 – Modes 1, 2 and 3

Frequency (MHz)	1 MHz RBW, 3MHz VBW				Wideband Power			
	Average		Peak		Average		Peak	
	dBm	mW	dBm	mW	dBm	mW	dBm	mW
2112.4	16.05	40.272	17.36	54.450	11.83	15.241	22.24	167.494
2132.4	15.91	38.994	17.89	61.518	12.07	16.106	21.80	151.356
2152.6	15.29	33.806	17.27	53.333	12.00	15.849	22.21	166.341

Limit

≤ 1640W/MHz

Product Service

2.3 CARRIER POWER - PAR

2.3.1 Specification Reference

FCC CFR 47 Part 27, Clause 27.50(d)(5)

2.3.2 Equipment Under Test

237CA 3G S8 Access Point, S/N: 000295-0000024625

2.3.3 Date of Test and Modification State

14 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 27.

To demonstrate compliance with the PAR (Peak to Average Ratio) of 13dB defined in 27.50(d)(5) the peak and average values were measured using a wideband power sensor. The difference between the peak and average results were calculated and recorded as the PAR.

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

	14 March 2011
Ambient Temperature	25.0°C
Relative Humidity	27.0%

Product Service

2.3.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 27 for Carrier Power - PAR.

The test results are shown below.

Configuration 1 – Modes 1, 2 and 3

Frequency (MHz)	Peak to Average Radio (dB)
2112.4	10.41
2132.4	9.73
2152.6	10.21

Limit

≤ 13dB

Product Service

2.4 SPURIOUS CONDUCTED EMISSIONS

2.4.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1051 and 2.1053
FCC CFR 47 Part 27, Clause 27.53

2.4.2 Equipment Under Test

237CA 3G S8 Access Point, S/N: S/N: 000295-0000024625

2.4.3 Date of Test and Modification State

14 March 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 27.

The EUT was set up to transmit on max power in accordance with 2.1051. Emissions were searched for from 9kHz to 4GHz via a 20dB attenuator, from 4GHz to 18GHz via a 10dB attenuator and a 4GHz high pass filter and from 18GHz to 22GHz using waveguide. Plots were taken on bottom, middle and top channels. Path losses of each set up were offset in the analyser.

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

Configuration 1 - Mode 1
- Mode 2
- Mode 3

2.4.6 Environmental Conditions

	14 March 2011
Ambient Temperature	25.0°C
Relative Humidity	27.0%

Product Service

2.4.7 Test Results

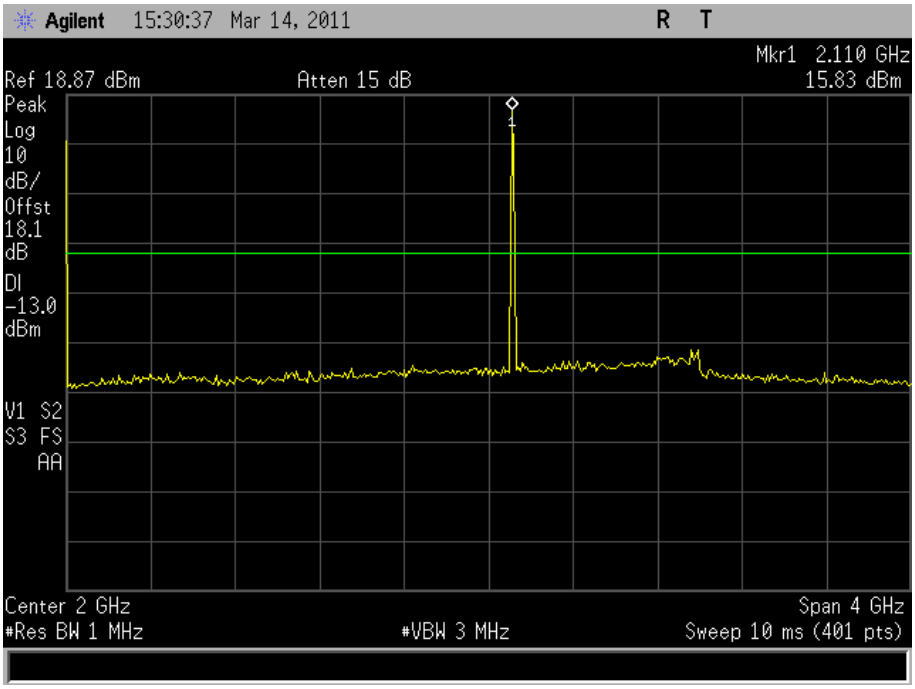
For the period of test the EUT met the requirements of FCC CFR 47 Part 27 for Spurious Conducted Emissions.

The test results are shown below.

Configuration 1 – Mode 1

2112.4 MHz

9kHz to 4GHz



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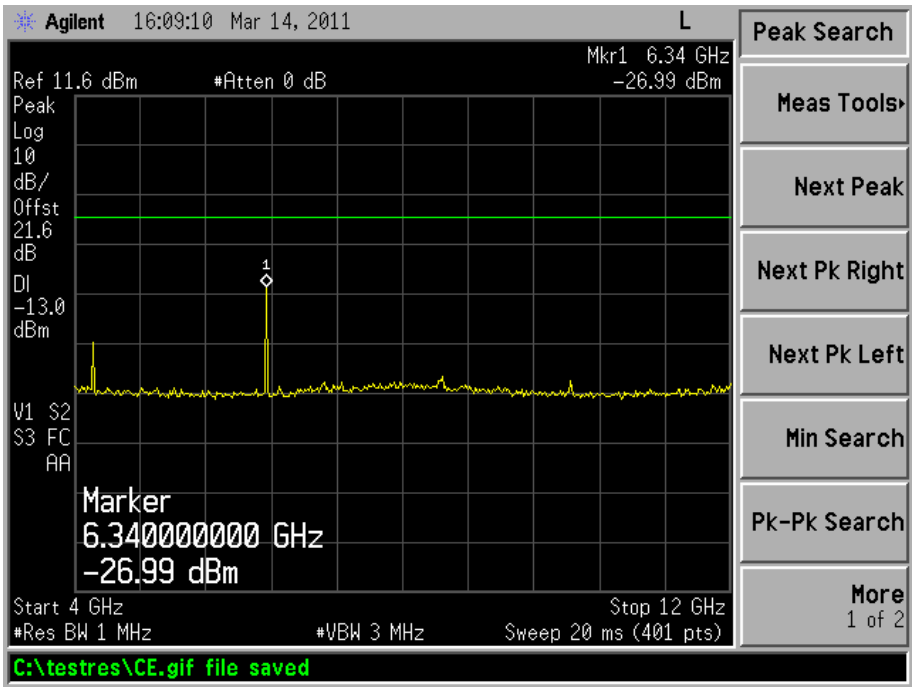
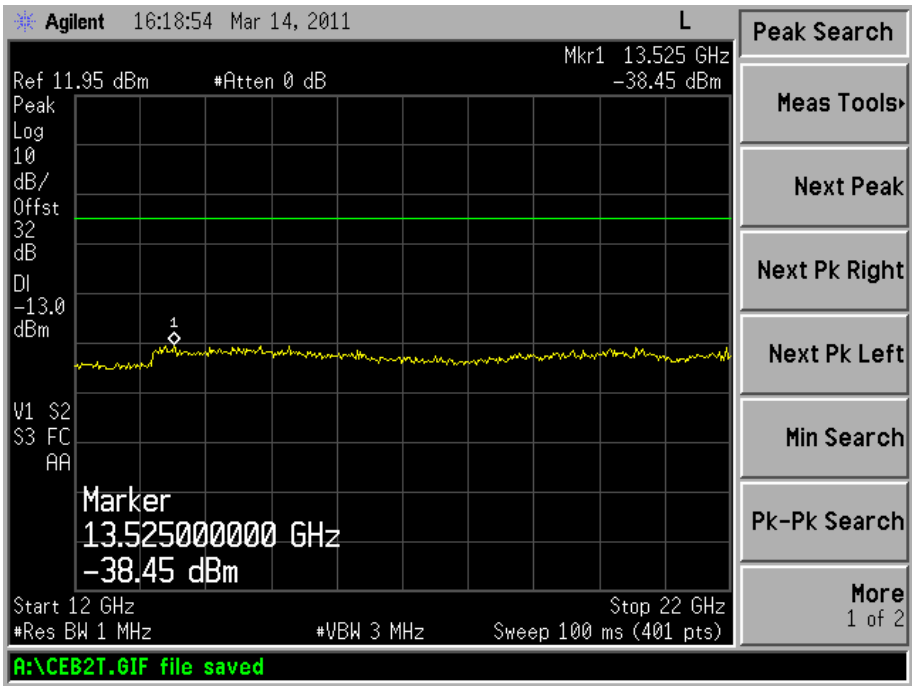
4GHz to 12GHz



12GHz to 22GHz

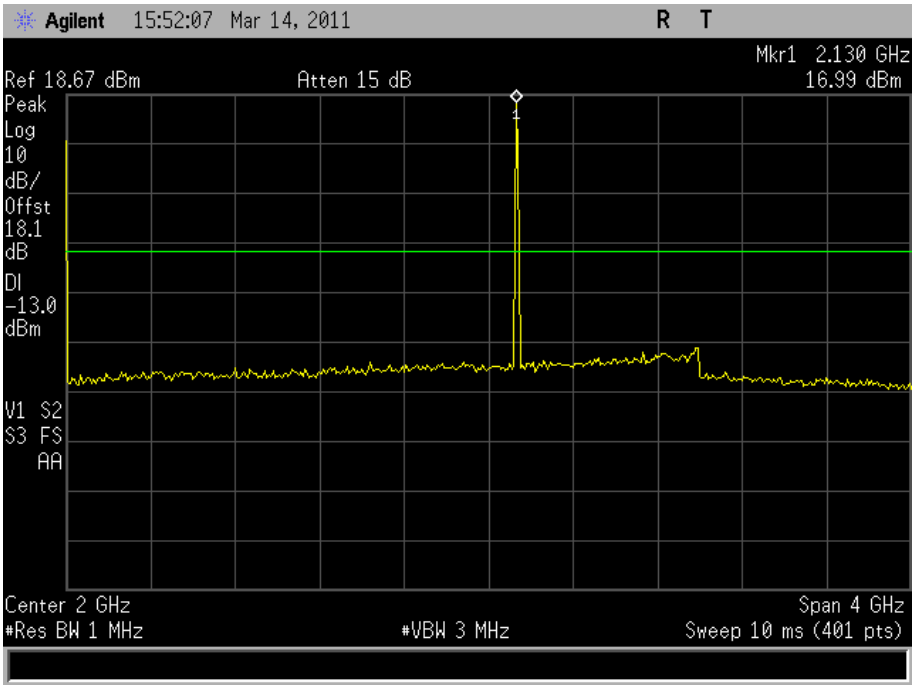


Product Service

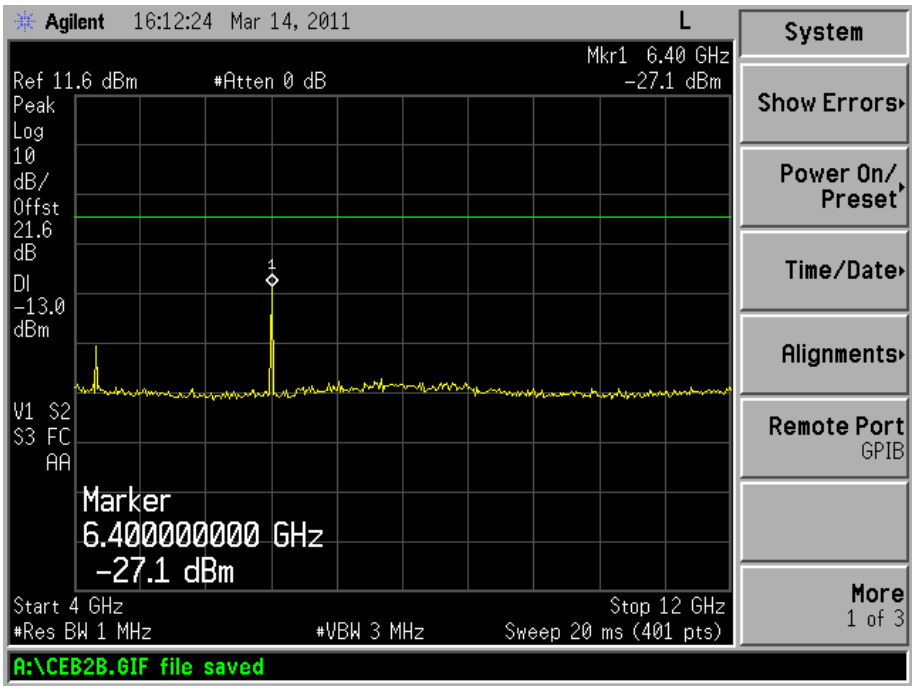
Configuration 1 – Mode 2

2132.4 MHz

9kHz to 4GHz

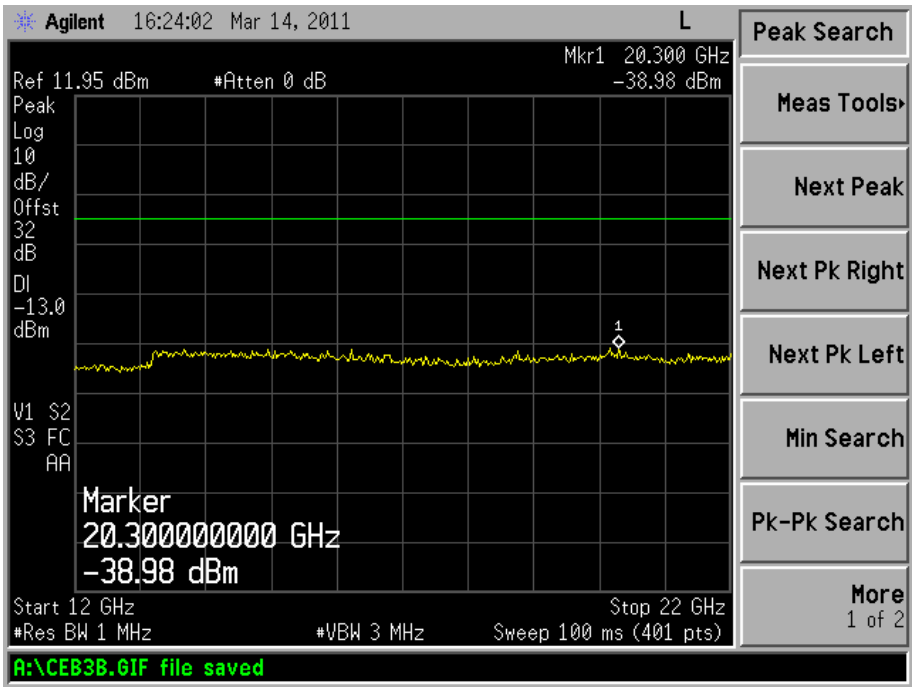


4GHz to 12GHz



Product Service

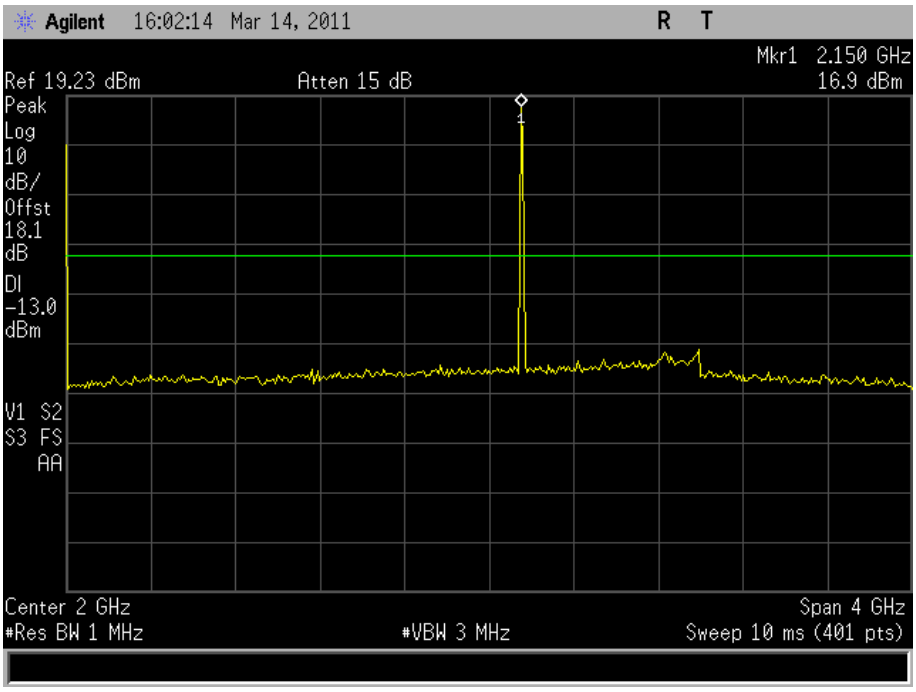
12GHz to 22GHz



Configuration 1 – Mode 3

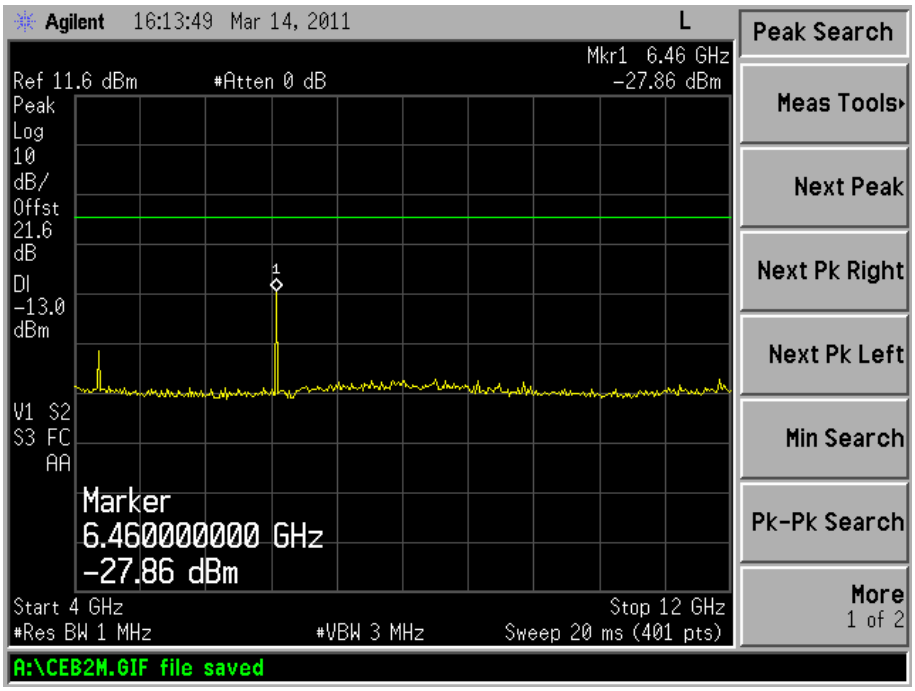
2152.6 MHz

9kHz to 4GHz

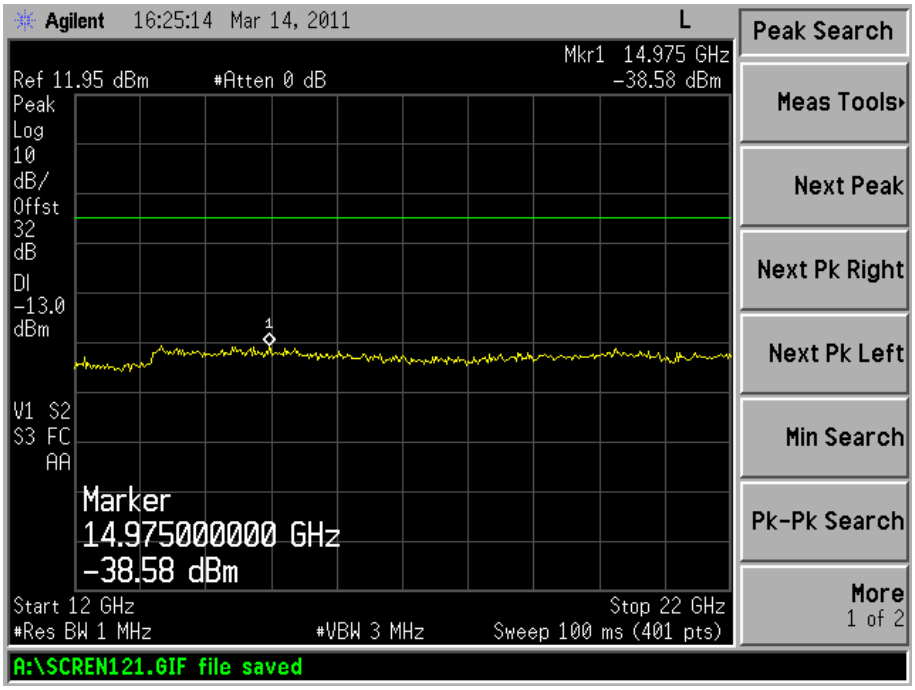


Product Service

4GHz to 12GHz



12GHz to 22GHz



Limit

≤ +13dBm

Product Service

2.5 SPURIOUS RADIATED EMISSIONS

2.5.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1053
FCC CFR 47 Part 27, Clause 27.53(h)

2.5.2 Equipment Under Test

237CA 3G S8 Access Point, S/N: 000295-0000024625

2.5.3 Date of Test and Modification State

24 April 2011 - Modification State 1

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 27.

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

2.5.6 Environmental Conditions

	24 April 2011
Ambient Temperature	20.6°C
Relative Humidity	43.0%
Atmospheric Pressure	1013mbar

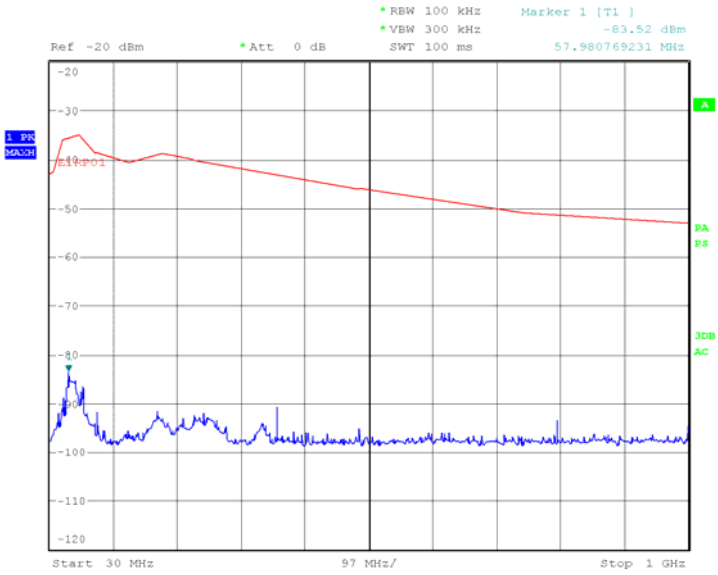
2.5.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 27 for Spurious Radiated Emissions.

The test results are shown below.

Configuration 1 - Mode 1

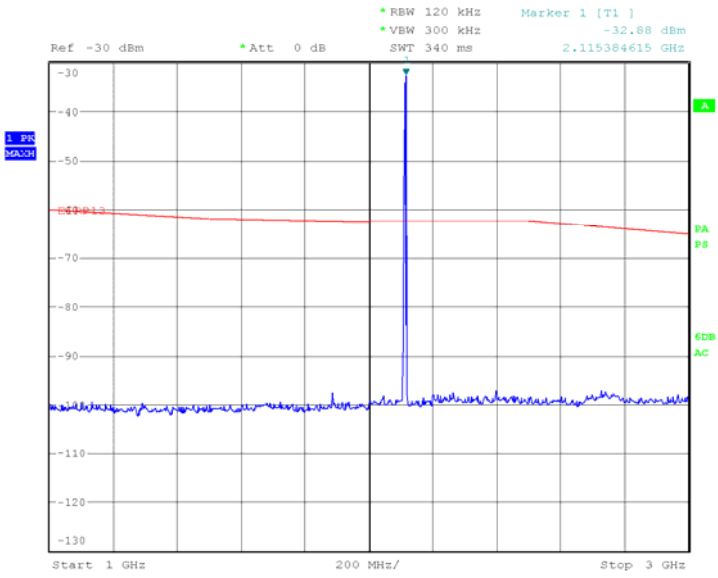
30MHz to 1GHz



Date: 24.APR.2011 13:23:29

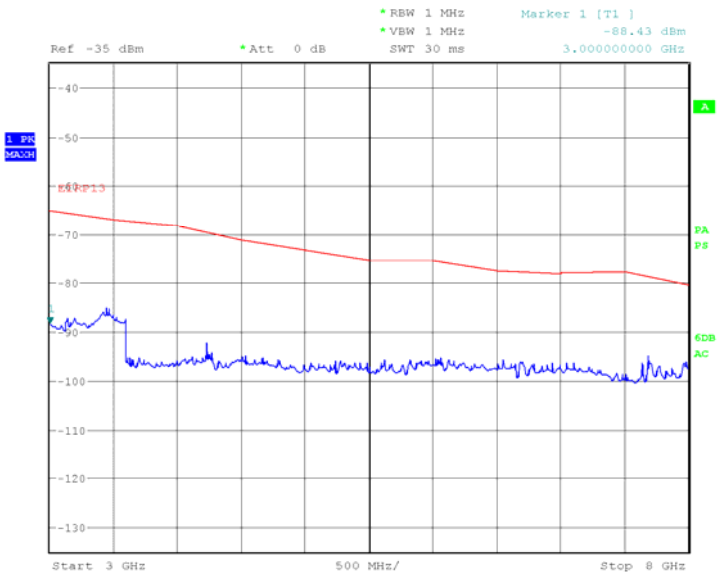
Product Service

1GHz to 3GHz



Date: 24.APR.2011 14:11:10

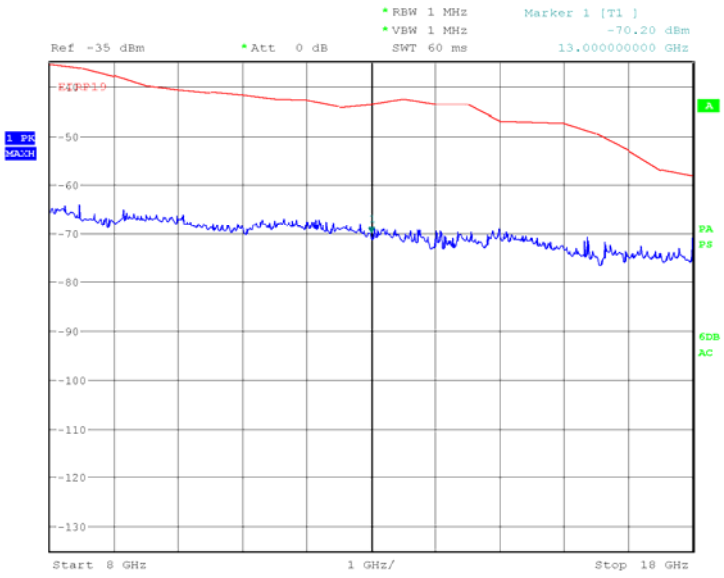
3GHz to 8GHz



Date: 24.APR.2011 14:36:44

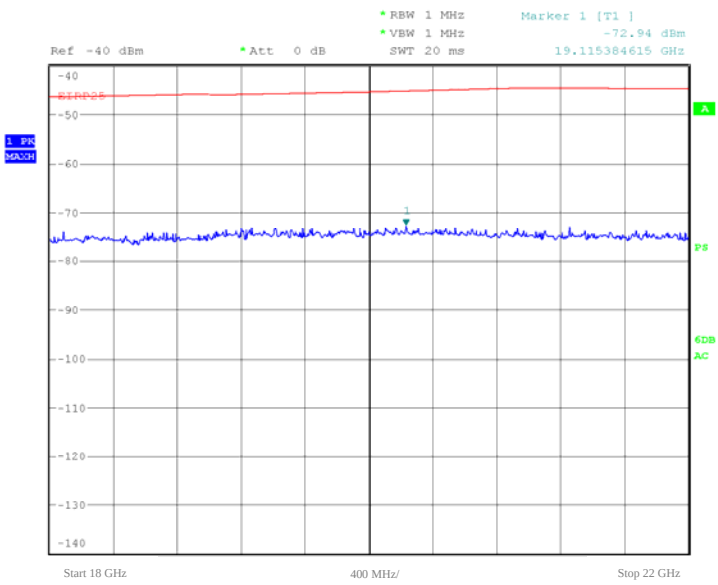
Product Service

8GHz to 18GHz



Date: 24.APR.2011 17:51:32

18GHz to 22GHz

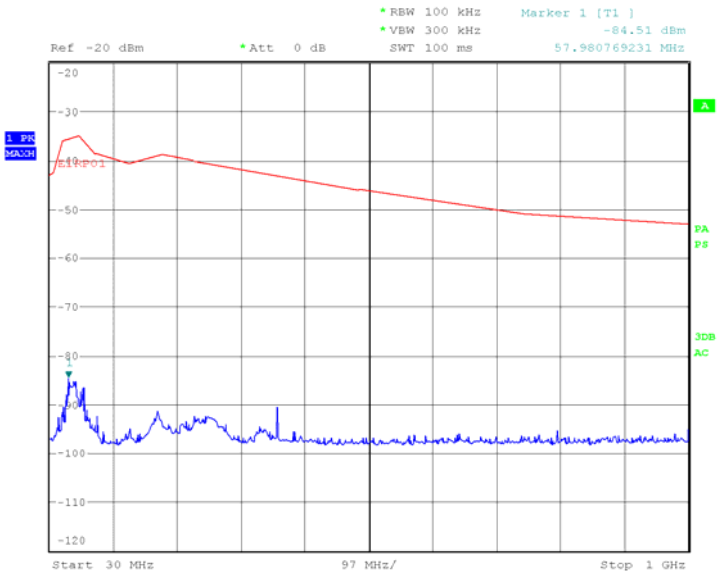


Date: 25.APR.2011 07:48:24

Product Service

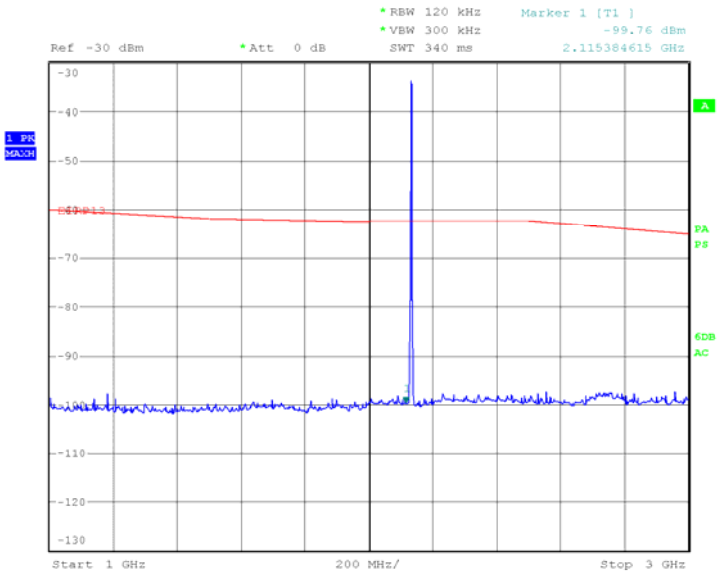
Configuration 1 - Mode 2

30MHz to 1GHz



Date: 24.APR.2011 13:19:09

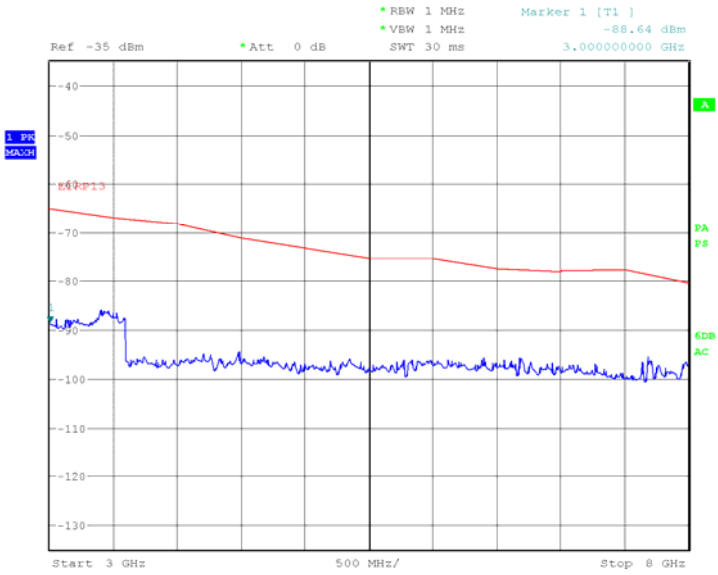
1GHz to 3GHz



Date: 24.APR.2011 14:13:50

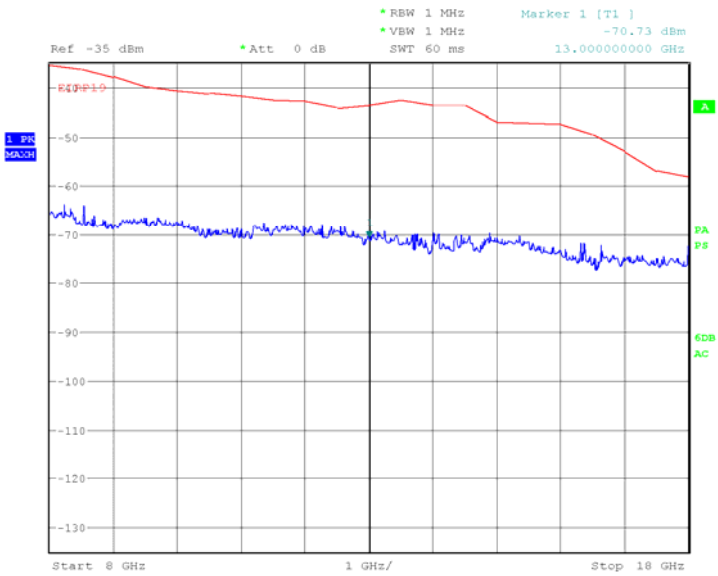
Product Service

3GHz to 8GHz



Date: 24.APR.2011 14:27:15

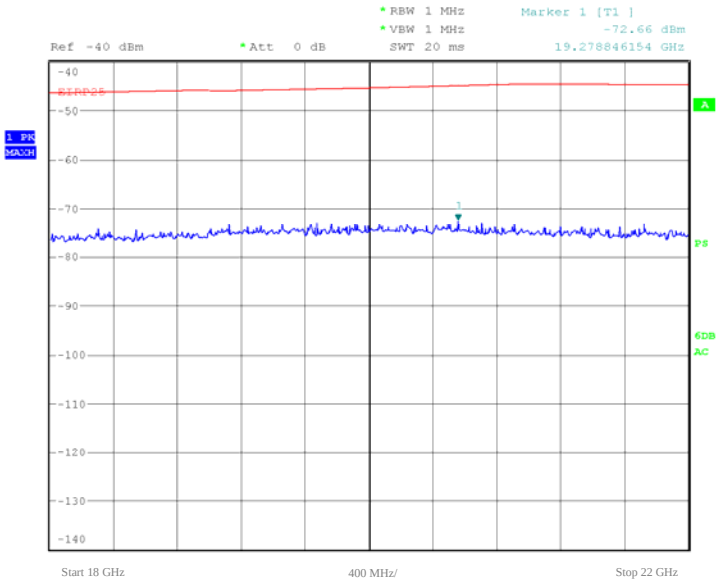
8GHz to 18GHz



Date: 24.APR.2011 17:56:27

Product Service

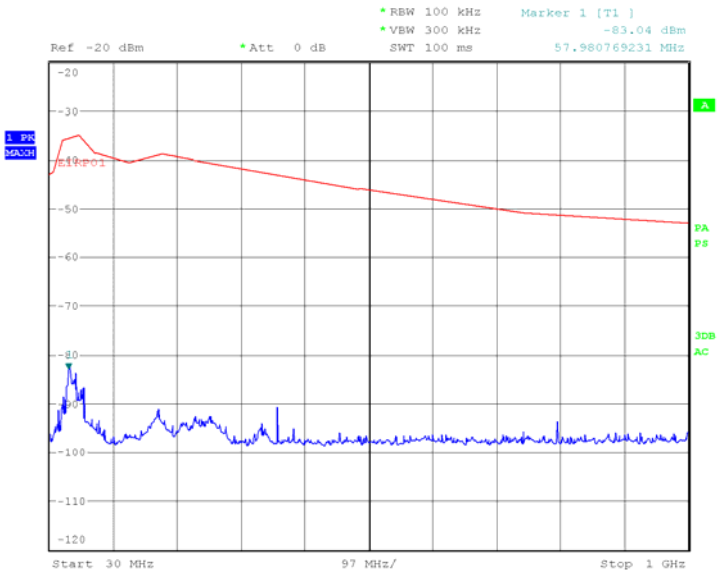
18GHz to 22GHz



Date: 25.APR.2011 07:49:40

Configuration 1 - Mode 3

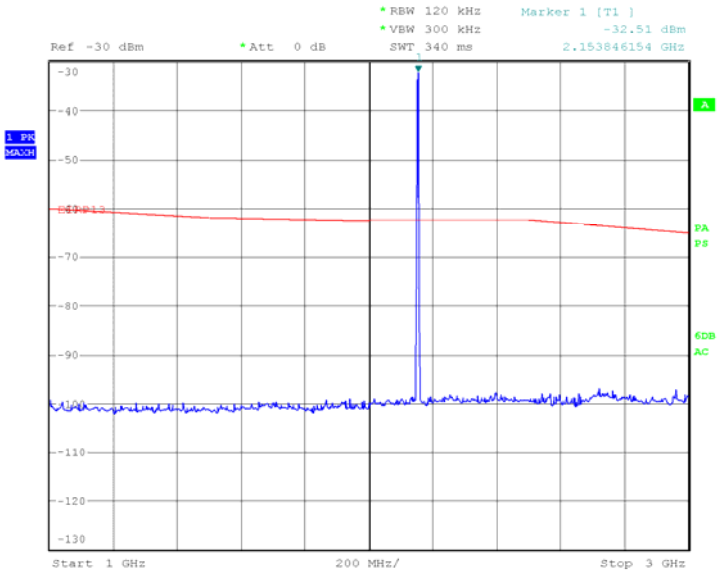
30MHz to 1GHz



Date: 24.APR.2011 13:11:26

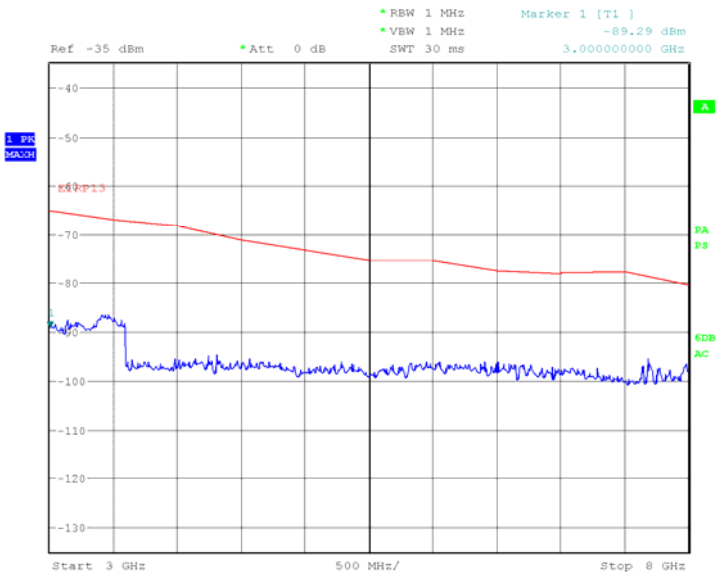
Product Service

1GHz to 3GHz



Date: 24.APR.2011 14:15:46

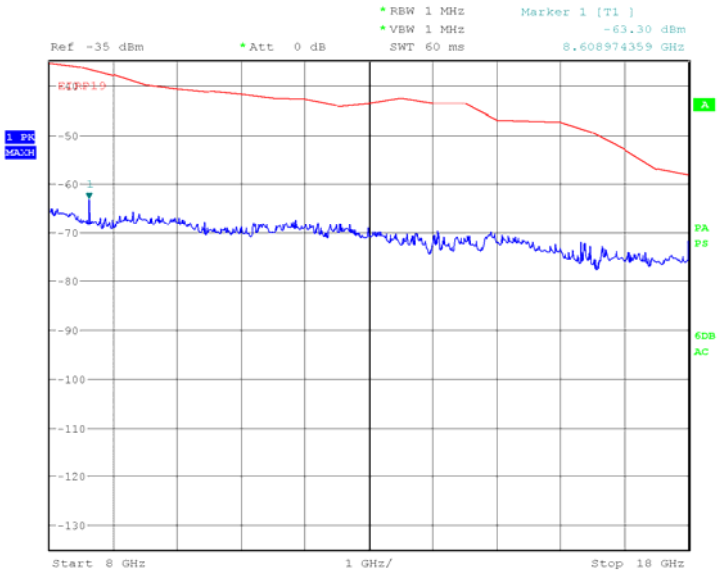
3GHz to 8GHz



Date: 24.APR.2011 14:22:27

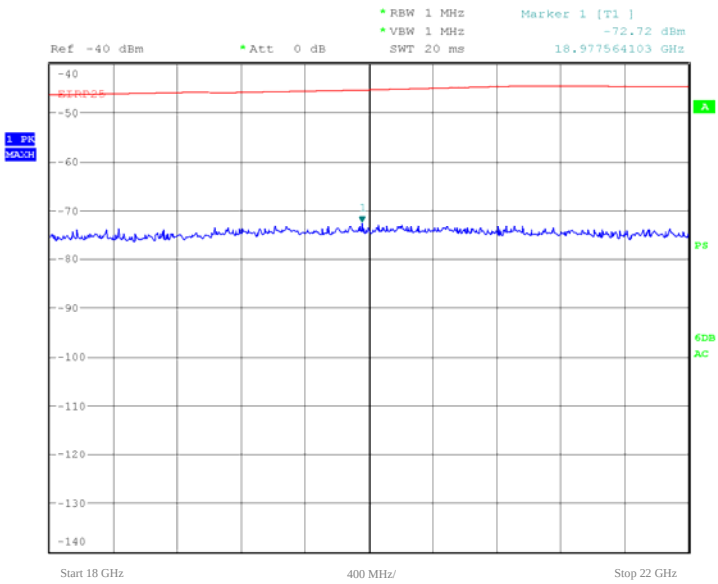
Product Service

8GHz to 18GHz



Date: 24.APR.2011 18:25:10

18GHz to 22GHz

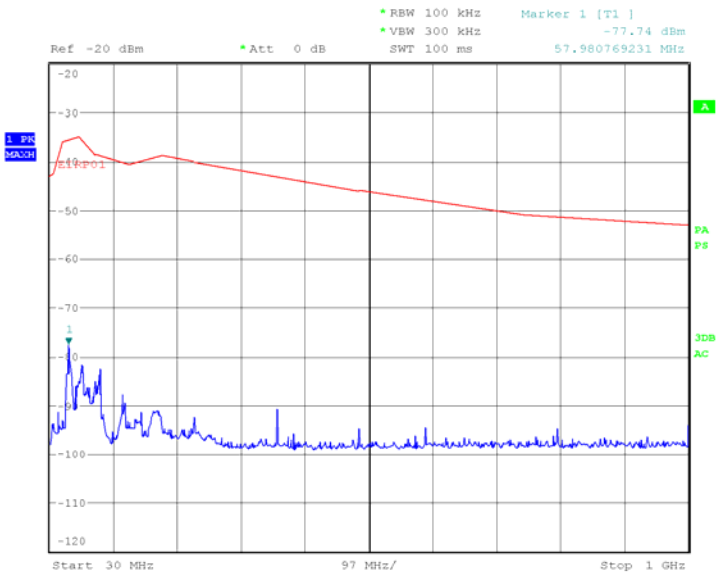


Date: 25.APR.2011 07:52:10

Product Service

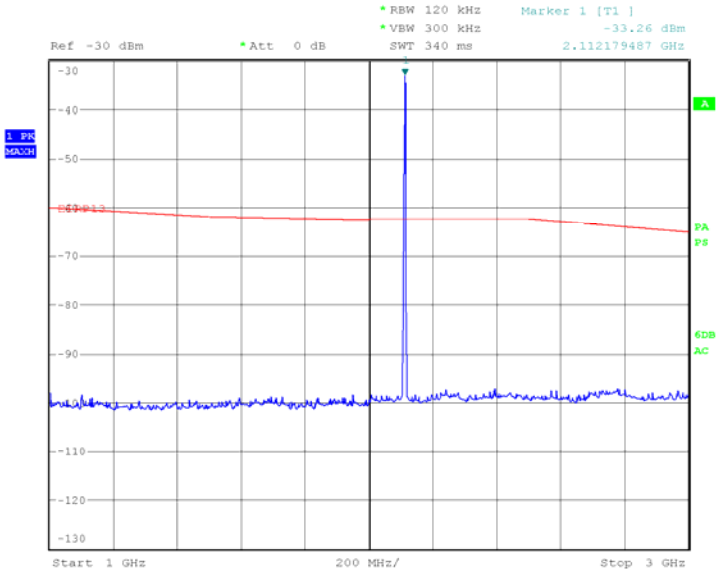
Configuration 2 - Mode 1

30MHz to 1GHz



Date: 24.APR.2011 12:52:34

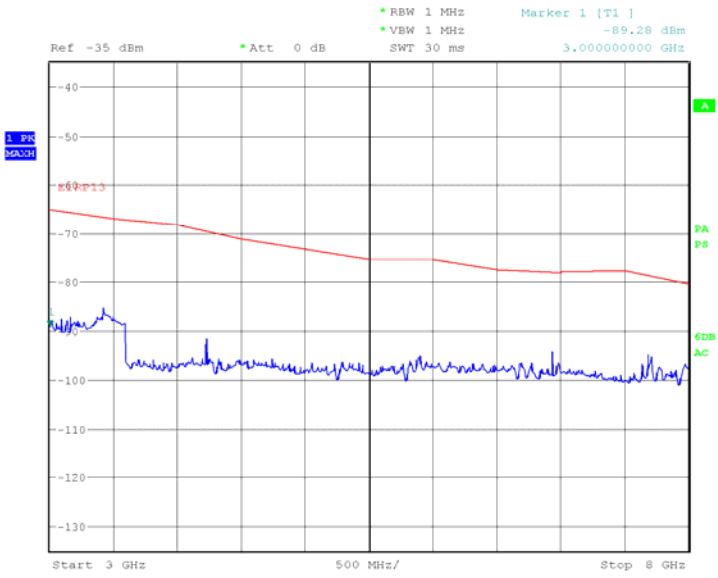
1GHz to 3GHz



Date: 24.APR.2011 15:00:16

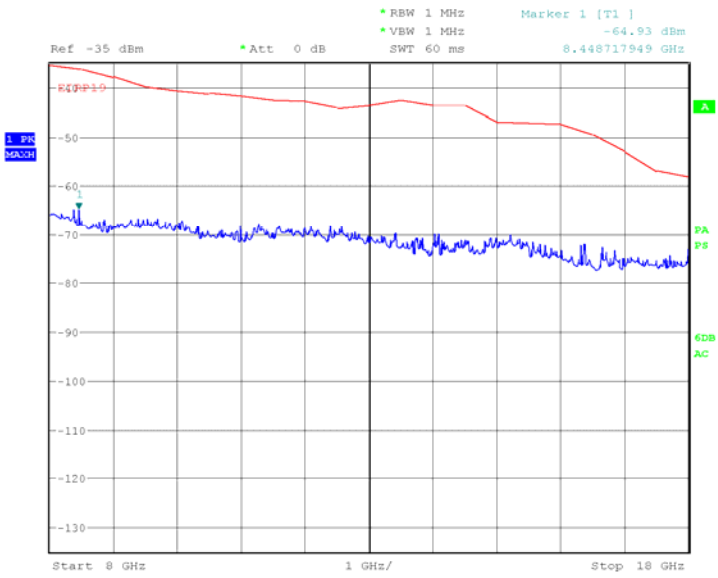
Product Service

3GHz to 8GHz



Date: 24.APR.2011 14:46:00

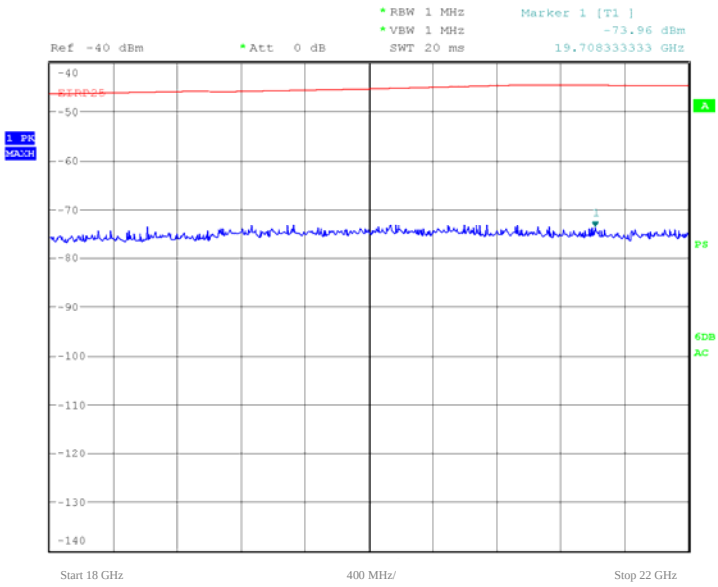
8GHz to 18GHz



Date: 24.APR.2011 18:20:37

Product Service

18GHz to 22GHz

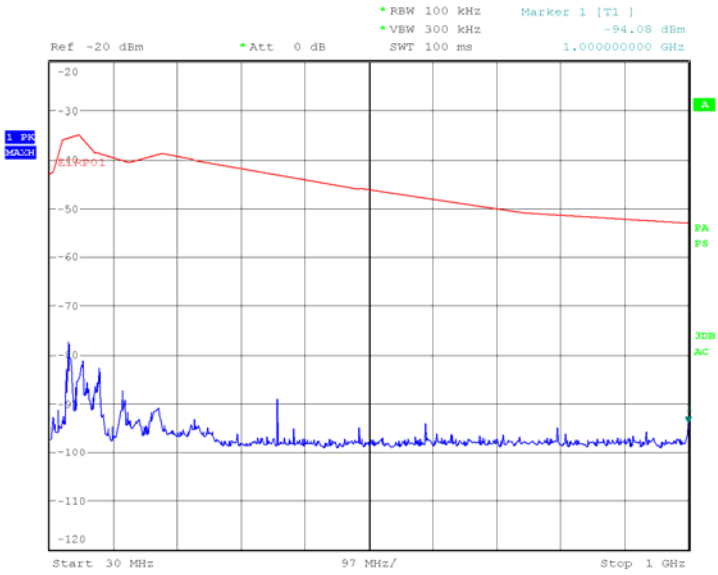


Date: 25.APR.2011 08:10:30

Product Service

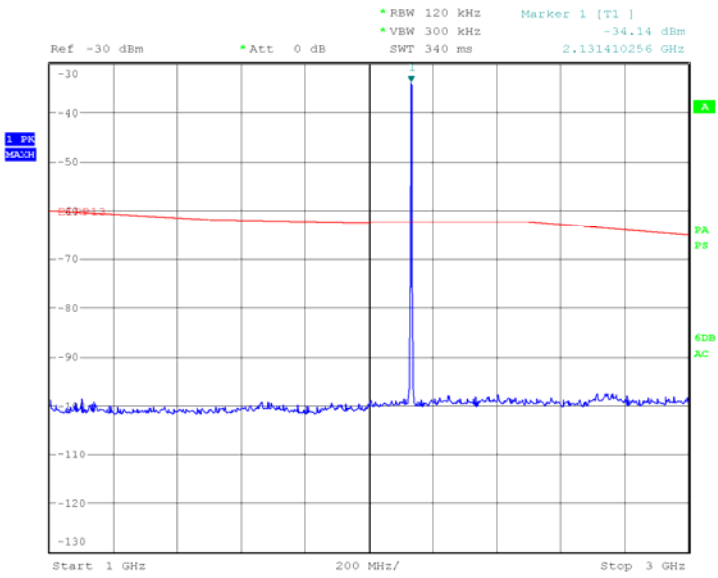
Configuration 2 - Mode 2

30MHz to 1GHz



Date: 24.APR.2011 12:50:37

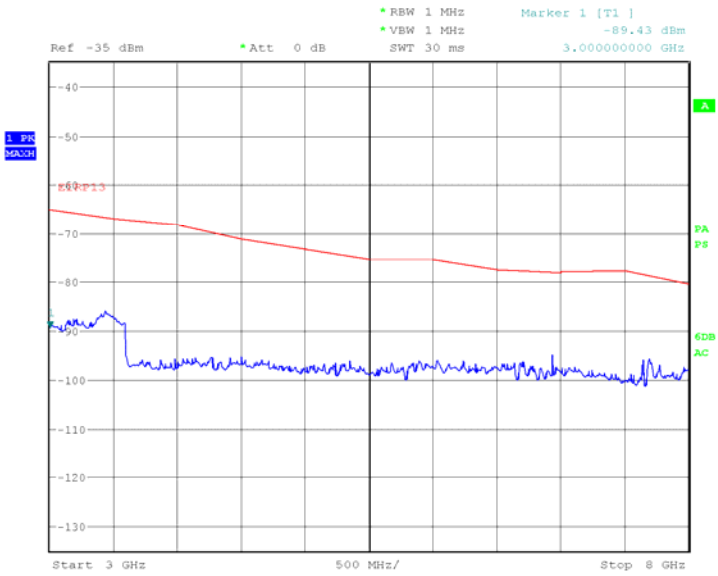
1GHz to 3GHz



Date: 24.APR.2011 14:53:58

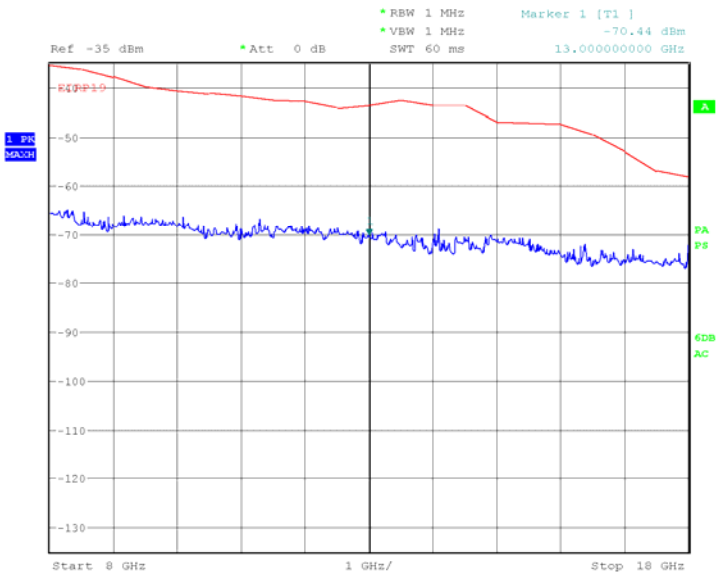
Product Service

3GHz to 8GHz



Date: 24.APR.2011 14:48:43

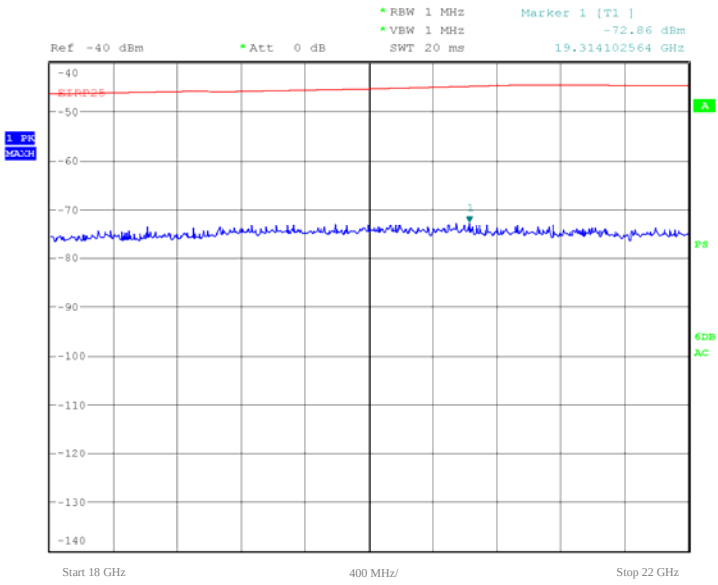
8GHz to 18GHz



Date: 24.APR.2011 18:15:25

Product Service

18GHz to 22GHz

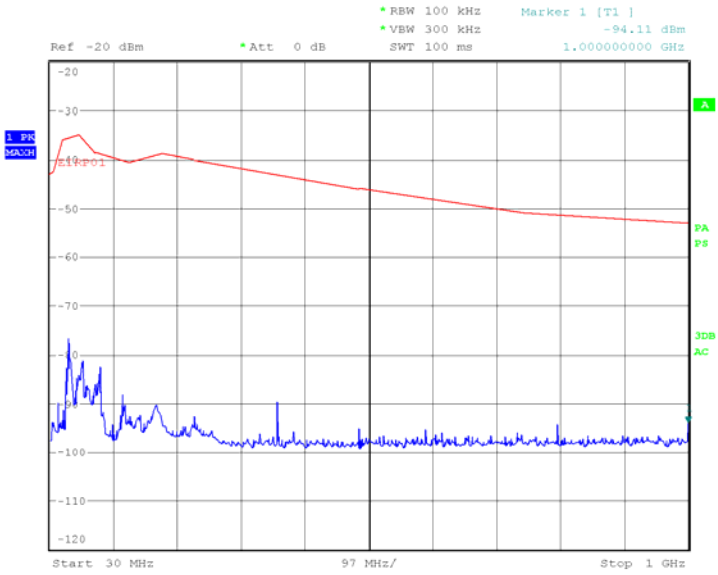


Date: 25.APR.2011 08:11:20

Product Service

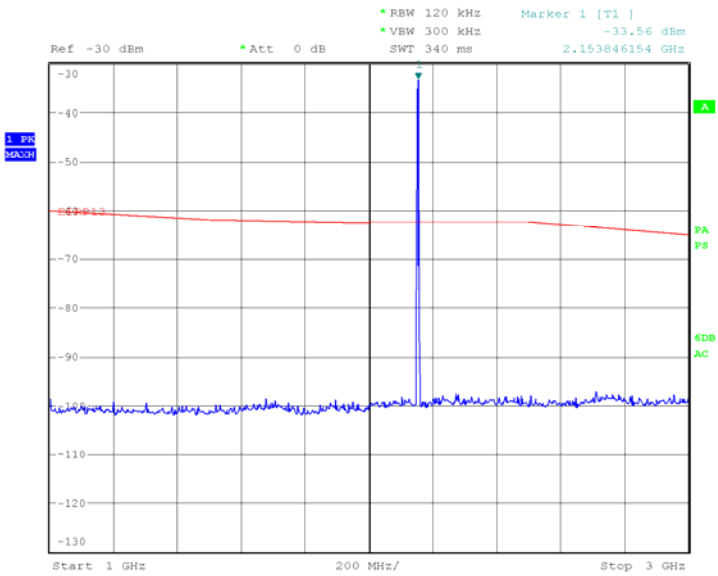
Configuration 2 - Mode 3

30MHz to 1GHz



Date: 24.APR.2011 12:48:27

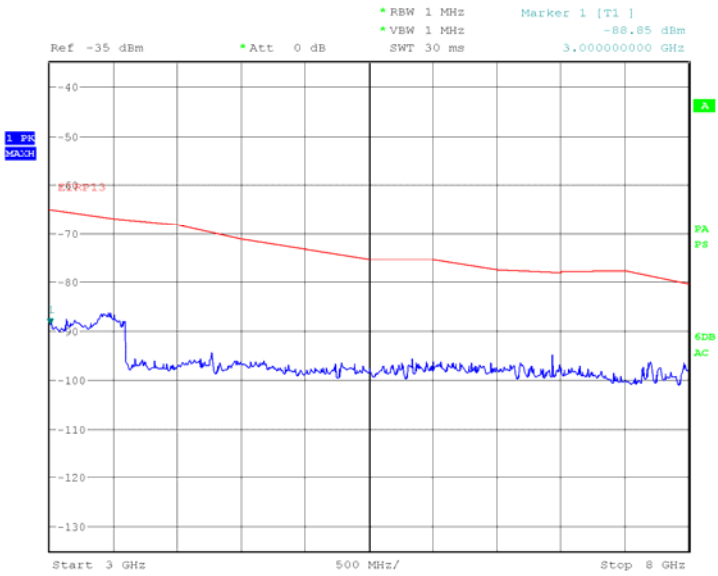
1GHz to 3GHz



Date: 24.APR.2011 15:03:27

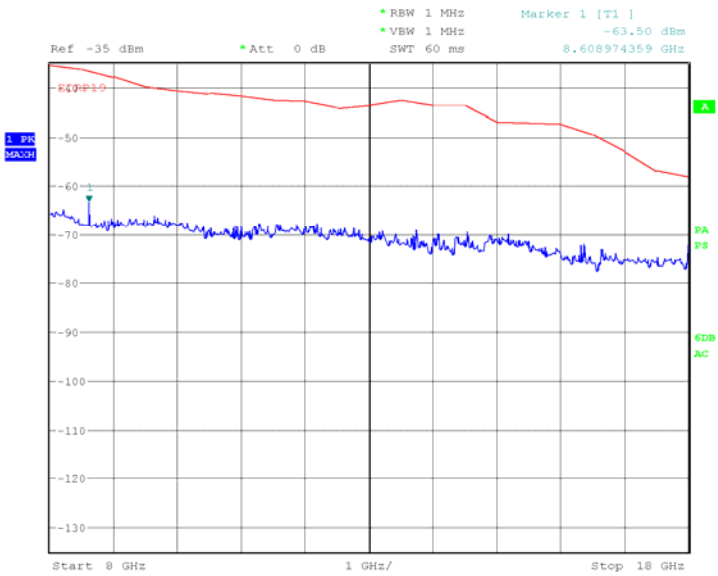
Product Service

3GHz to 8GHz



Date: 24.APR.2011 14:50:37

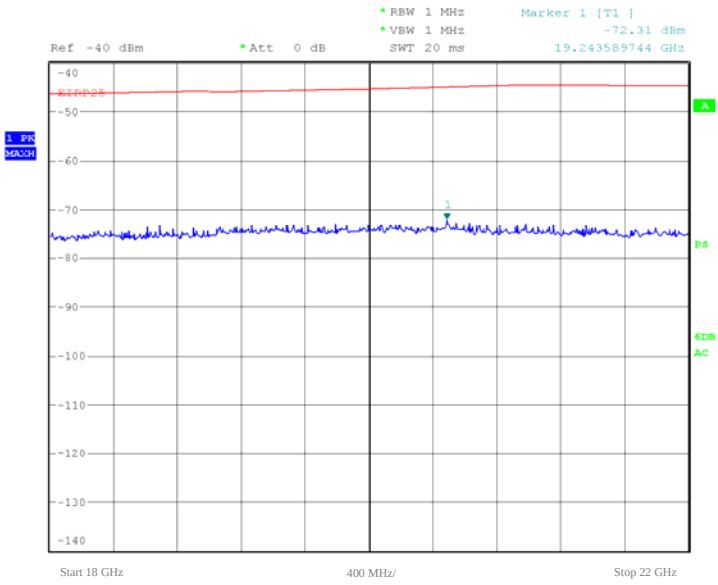
8GHz to 18GHz



Date: 24.APR.2011 18:11:06

Product Service

18GHz to 22GHz



Date: 25.APR.2011 08:12:32

Limit Clause

<-13 dBm

Product Service

2.6 26dB BANDWIDTH

2.6.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1051
FCC CFR 47 Part 27, Clause 27.53(h)(1)

2.6.2 Equipment Under Test

237CA 3G S8 Access Point, S/N: 000295-0000024625

2.6.3 Date of Test and Modification State

14 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 27.

The EUT was connected to a spectrum anlalyser via an attenuator and cable. The EUT was configured to transmit Test Model 1 on bottom, middle and top channels. The trace was set to max hold and using the markers, the 26dB bandwidth was established. The plots are shown on the following pages.

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

	14 March 2011
Ambient Temperature	25.0°C
Relative Humidity	27.0%

Product Service

2.6.7 Test Results

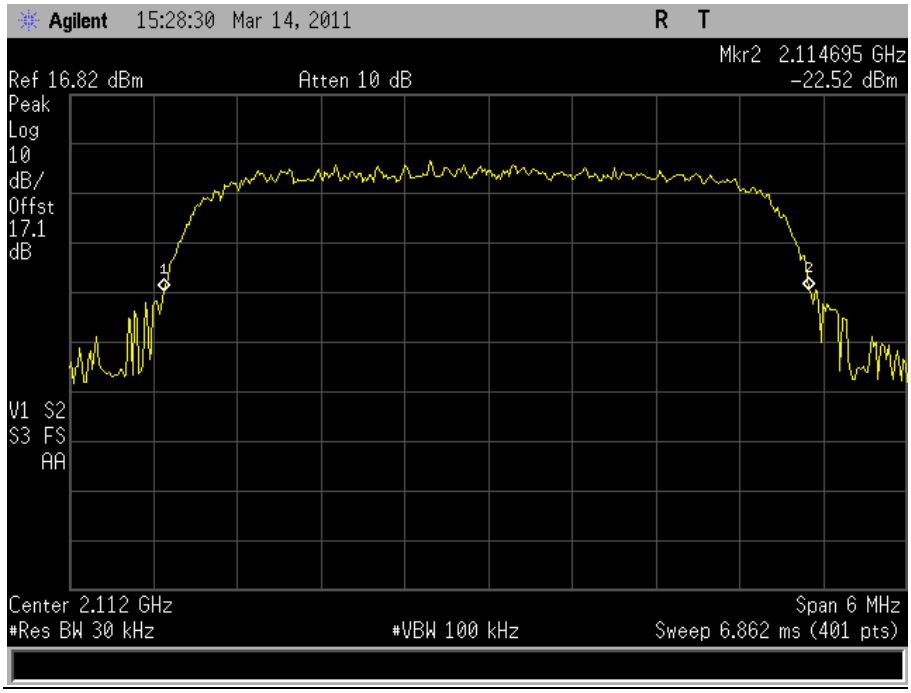
For the period of test the EUT met the requirements of FCC CFR 47 Part 27 for 26dB Bandwidth.

The test results are shown below.

Configuration 1 – Modes 1, 2 and 3

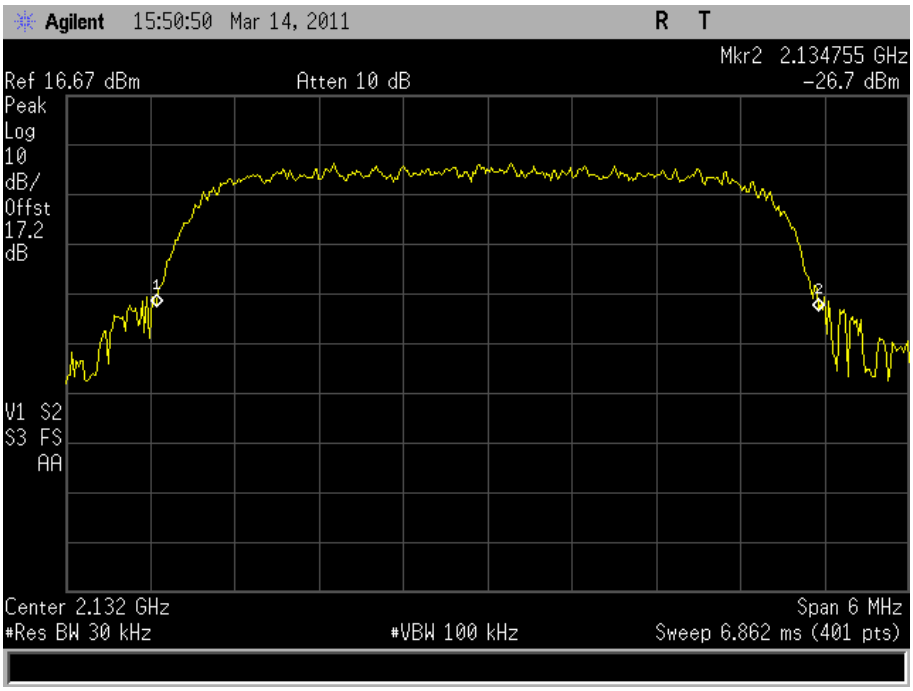
Frequency (MHz)	Mode	26dB Bandwidth (kHz)
2112.4	WCDMA	4620
2132.4	WCDMA	4710
2152.6	WCDMA	4650

2112.4 MHz

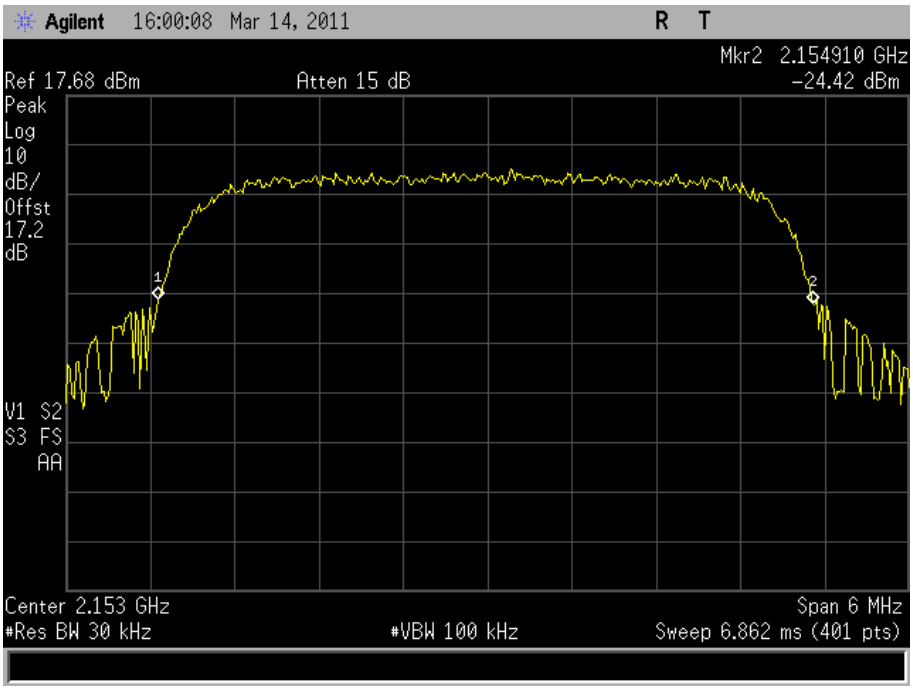


Product Service

2132.4MHz



2152.6MHz



Product Service

2.7 CONDUCTED EMISSIONS – BLOCK EDGE

2.7.1 Specification Reference

FCC CFR 47 Part 27, Clause 27.53(h)(1)

2.7.2 Equipment Under Test

237CA 3G S8 Access Point, S/N: 000295-0000024625

2.7.3 Date of Test and Modification State

14 March 2011 - Modification State 0

2.7.4 Test Equipment Used

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

2.7.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 27.

Using a spectrum analyser and attenuator the emissions were made between the block edge frequency up to 1MHz away to ensure compliance with the 43 +10 log P limit.

Measurements were performed using a peak detector with the trace display set to max hold. An RBW of at least 1% of the measurement 26dB bandwidth was used, in this case 100kHz RBW and 300kHz VBW. The measured path loss was entered as a reference level offset to the spectrum analyser.

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

Configuration 1 - Mode 1
- Mode 3

2.7.6 Environmental Conditions

	14 March 2011
Ambient Temperature	25.0°C
Relative Humidity	27.0%

Product Service

2.7.7 Test Results

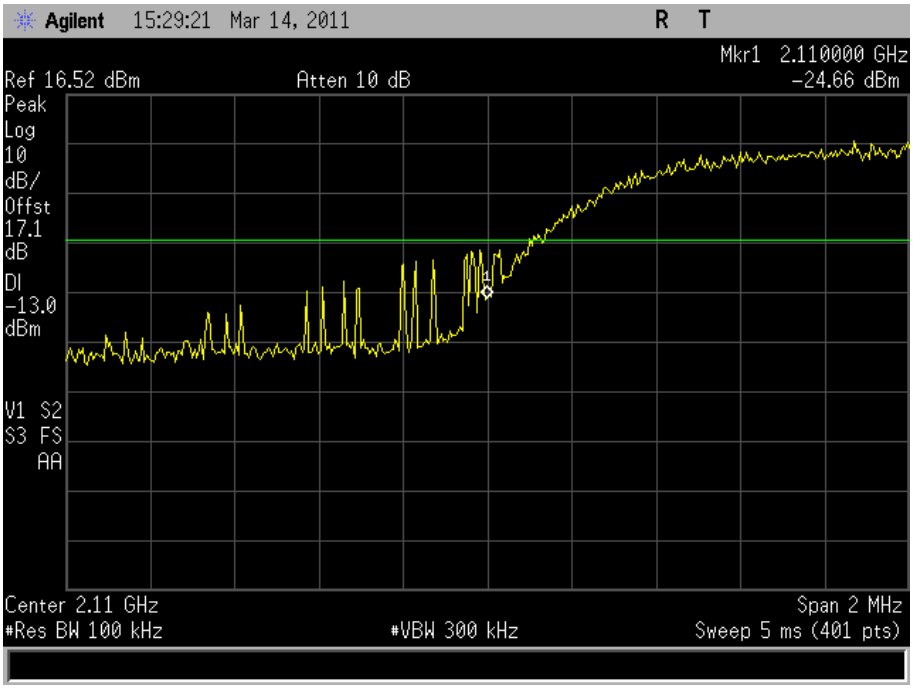
For the period of test the EUT met the requirements of FCC CFR 47 Part 27 for Conducted Emissions – Block Edge.

The test results are shown below.

Configuration 1 – Mode 1 and 3

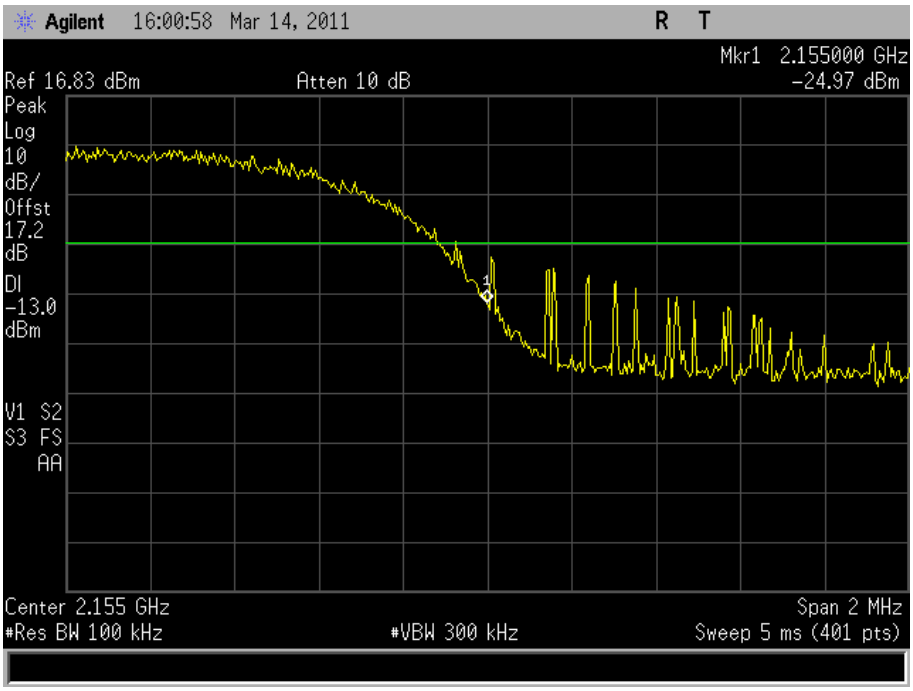
Frequency Block Edge	Frequency (MHz)
2110 MHz	2112.4
2155MHz	2152.6

2112.4 MHz



Product Service

2152.6 MHz



Limit:

Block Edges (2110MHz and 2155MHz)	≤ -13dBm

Product Service

2.8 FREQUENCY STABILITY UNDER VOLTAGE VARIATIONS

2.8.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1055(d)(1)
FCC CFR 47 Part 27, Clause 27.54

2.8.2 Equipment Under Test

237CA 3G S8 Access Point, S/N: 000295-0000024625

2.8.3 Date of Test and Modification State

15 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 Procedure

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 27.

The EUT was set to transmit on maximum power with test model 1. In accordance with 2.1055 (d)(1) the primary supply voltage was varied by ± 15% and the frequency error recorded. The results were then reviewed and the block edge measurements examined to ensure that the fundamental remained within the authorised bands of operation.

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

Configuration 1 - Mode 2

2.8.6 Environmental Conditions

	15 March 2011
Ambient Temperature	25.0°C
Relative Humidity	32.0%

Product Service

2.8.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 27 for Frequency Stability Under Voltage Variations.

The test results are shown below.

Configuration 1 – Mode 2

2132.4 MHz

DC Voltage	Mode	Deviation (Hz)	Limit
7.65	WCDMA	-33	2100 MHz to 2155 MHz
9.00	WCDMA	-37	2100 MHz to 2155 MHz
10.35	WCDMA	-39	2100 MHz to 2155 MHz

Limit:

The fundamental must remain within the authorised frequency block.

Note
The frequency deviation when applied to the band edge plots does not render the fundamental outside of the block edge.

Product Service

2.9 FREQUENCY STABILITY UNDER TEMPERATURE VARIATIONS

2.9.1 Specification Reference

FCC CFR 47 Part 27, Clause 27.540/2.1055

2.9.2 Equipment Under Test

237CA 3G S8 Access Point, S/N: 000295-0000024625

2.9.3 Date of Test and Modification State

15 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 Procedure

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 27.

The EUT was set to transmit on maximum power with test model 1. In accordance with 2.1055, the temperature was varied from -30°C to +50° in 10° steps. Testing was performed on the middle channel only, 2132.4MHz, Channel 1637.

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

Configuration 1 - Mode 2

2.9.6 Environmental Conditions

	15 March 2011
Ambient Temperature	25.0°C
Relative Humidity	32.0%

Product Service

2.9.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 27 for Frequency Stability Under Temperature Variations.

The test results are shown below.

Configuration 1 – Mode 2

2132.4MHz

Temperature Interval (ºC)	Mode	Frequency Error (Hz)	Limit
-30	WCDMA	-64	2110 MHz to 2155 MHz
-20	WCDMA	-46	2110 MHz to 2155 MHz
-10	WCDMA	-38	2110 MHz to 2155 MHz
0	WCDMA	-37	2110 MHz to 2155 MHz
+10	WCDMA	-42	2110 MHz to 2155 MHz
+20	WCDMA	-37	2110 MHz to 2155 MHz
+30	WCDMA	-47	2110 MHz to 2155 MHz
+40	WCDMA	-40	2110 MHz to 2155 MHz
+50	WCDMA	-48	2110 MHz to 2155 MHz

Limit:

The fundamental must remain within the authorised frequency block.

Note
The frequency deviation when applied to the band edge plots does not render the fundamental outside of the block edge.

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 - EIRP Peak Power					
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	235	12	12-Nov-2011
Screened Room (5)	Rainford	Rainford	1545	24	3-Feb-2014
Antenna (Bilog)	Chase	CBL6143	2904	24	4-Dec-2011
Signal Generator: 10MHz to 20GHz	Rohde & Schwarz	SMR20	3475	12	20-Dec-2011
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	9-Sep-2011
9m RF Cable (N Type)	Rhophase	NPS-2303-9000-NPS	3791	12	10-Aug-2011
Section 2.2 and 2.3 – Carrier Power and Carrier Power CCDF					
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
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	11-Sep-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
Signal Generator (10MHz to 40GHz)	Rohde & Schwarz	SMR40	3171	12	12-Aug-2011
Hygrometer	Rotronic	I-1000	3220	12	27-Apr-2011
Power Meter	Rohde & Schwarz	NRP	3491	-	TU
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 2.4 - Spurious Conducted Emissions					
Multimeter	White Gold	WG022	190	12	26-Oct-2011
Dual programable power supply	Thurlby	T-1000	418	-	TU
Filter (High Pass)	Lorch	SHP7-7000-SR	566	12	TU
Spectrum Analyser	Hewlett Packard	E4407B	1154	12	17-Jun-2011
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	11-Sep-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
Attenuator (10dB, 50W)	Aeroflex / Weinschel	47-10-34	3166	12	10-Jun-2011
Signal Generator (10MHz to 40GHz)	Rohde & Schwarz	SMR40	3171	12	12-Aug-2011
Hygrometer	Rotronic	I-1000	3220	12	27-Apr-2011
Attenuator (10dB, 20W)	Lucas Weinschel	1	3225	12	13-Oct-2011
Power Splitter	Aeroflex / Weinschel	1534	3247	12	31-Mar-2011
Power Meter	Rohde & Schwarz	NRP	3491	-	TU
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 2.5 – Spurious Radiated Emissions					
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	235	12	12-Nov-2011
Antenna (Bilog)	Schaffner	CBL6143	287	24	19-Jan-2012
LISN (1 Phase)	Chase	MN 2050	336	12	25-Mar-2011
Screened Room (5)	Rainford	Rainford	1545	24	3-Feb-2014
Transient Limiter	Hewlett Packard	11947A	2378	12	22-Jun-2011
Amplifier (1 - 8GHz)	Phase One	PS06-0060	3175	12	2-Jul-2011
Amplifier (8 - 18GHz)	Phase One	PS06-0061	3176	12	2-Jul-2011
1m RF Cable sma(m)-sma(m)	Reynolds	262-0248-1000	3453	-	TU
Signal Generator: 10MHz to 20GHz	Rohde & Schwarz	SMR20	3475	12	20-Dec-2011
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	9-Sep-2011
Microwave Downconvertor	Hewlett Packard	11793A	3709	-	TU
9m RF Cable (N Type)	Rhophase	NPS-2303-9000-NPS	3791	12	10-Aug-2011
Section 2.6 – 26dB Bandwidth					
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
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	11-Sep-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
Signal Generator (10MHz to 40GHz)	Rohde & Schwarz	SMR40	3171	12	12-Aug-2011
Hygrometer	Rotronic	I-1000	3220	12	27-Apr-2011
Power Meter	Rohde & Schwarz	NRP	3491	-	TU
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 2.7 – Conducted Emissions – Block 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
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	11-Sep-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
Signal Generator (10MHz to 40GHz)	Rohde & Schwarz	SMR40	3171	12	12-Aug-2011
Hygrometer	Rotronic	I-1000	3220	12	27-Apr-2011
Power Meter	Rohde & Schwarz	NRP	3491	-	TU
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 2.8 - Frequency Tolerance under Voltage Variations					
Multimeter	White Gold	WG022	190	12	26-Oct-2011
RF Coupler	TUV	TUV	415	-	TU
Dual programable power supply	Thurlby	T-1000	418	-	TU
Temperature Chamber	Montford	2F3	467	-	O/P Mon
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	11-Sep-2011
Cable [1m, sma(m) - sma(m)]	Reynolds	262-0248-1000	2406	12	13-Oct-2011
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
Section 2.9 - Frequency Tolerance under Temperature Variations					
Multimeter	White Gold	WG022	190	12	26-Oct-2011
RF Coupler	TUV	TUV	415	-	TU
Dual programable power supply	Thurlby	T-1000	418	-	TU
Temperature Chamber	Montford	2F3	467	-	O/P Mon
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	11-Sep-2011
Cable [1m, sma(m) - sma(m)]	Reynolds	262-0248-1000	2406	12	13-Oct-2011
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	26MHz to 2.5GHz Test Amplitude	1.4dB†
Conducted Susceptibility	100kHz to 250MHz Amplitude	1.8dB†
DC Input Ripple Immunity	Current Voltage	0.45% 0.91%
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°

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

* In accordance with CISPR 16-4
† In accordance with UKAS Lab 34

Product Service

SECTION 4

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).