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Report On

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

COMMERCIAL-IN-CONFIDENCE

FCC ID: QGGIPA237C

Document 75912613 Report 02 Issue 1

May 2011



Product Service

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COMMERCIAL-IN-CONFIDENCE

REPORT ON

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

Document 75912613 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 Jenkins
Authorised Signatory

DATED

16 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 27. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);

B Aires

G Lawler





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SECTION 1

REPORT SUMMARY

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



1.1 INTRODUCTION

The information contained in this report is intended to show verification of the ip.access Ltd, 237C 3G S8 Access Point to the requirements of FCC CFR 47 Part 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 237C
Serial Number(s)	000295-0000024562
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	PO26012 28 January 2011
Start of Test	01 March 2011
Finish of Test	27 April 2011
Name of Engineer(s)	G Lawler B Airs
Related Document(s)	ANSI C63.4 : 2003



1.2 BRIEF SUMMARY OF RESULTS

A brief summary of results in accordance with FCC CFR 47 Part 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 – CCDF	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



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	0	Pass
				2132.4 MHz	0	Pass
				2152.6 MHz	0	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 – CCDF	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	0	Pass
				2132.4 MHz	0	Pass
				2152.6 MHz	0	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



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			
<u>Equipment designator:</u>			
Model name/number: nano3G S8 Access Point 237C (Band 4)			
<u>Supply Voltage:</u>			
☒ [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
<u>Frequency characteristics:</u>			
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
<u>Power characteristics:</u>			
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		
<u>Antenna characteristics:</u>			
[]	Antenna connector	State impedance ohm	
[]	Temporary antenna connector	State impedance ohm	
☒ [X]]	Integral antenna	State gain 2 dBi	
<u>Modulation characteristics:</u>			
☒ [X]]	Amplitude	[]	Other
[]	Frequency	Details:	
☒ [X]]	Phase		
Can the transmitter operate un-modulated?		No	
ITU Class of emission: 5M00D1W			
<u>Extreme conditions:</u>			
Maximum temperature	40 °C	Minimum temperature	0 °C
Maximum supply voltage	 V	Minimum supply voltage	 V



Product Service

MANUFACTURING DESCRIPTION	237C 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	QGGIPA237C
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-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
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 237C 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



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SECTION 2

TEST DETAILS

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



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

237C 3G S8 Access Point, S/N: 000295-0000024562

2.1.3 Date of Test and Modification State

26 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

	26 April 2011
Ambient Temperature	19.4°C
Relative Humidity	41.0%
Atmospheric Pressure	1020mbar



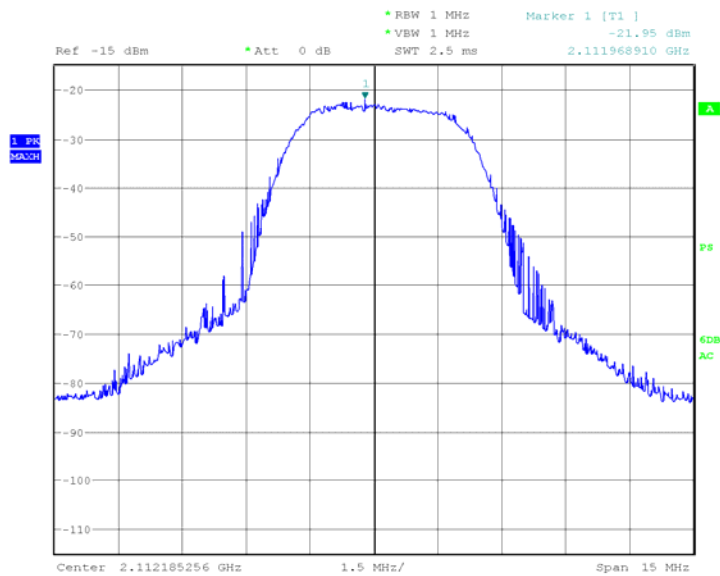
2.1.7 Test Results

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

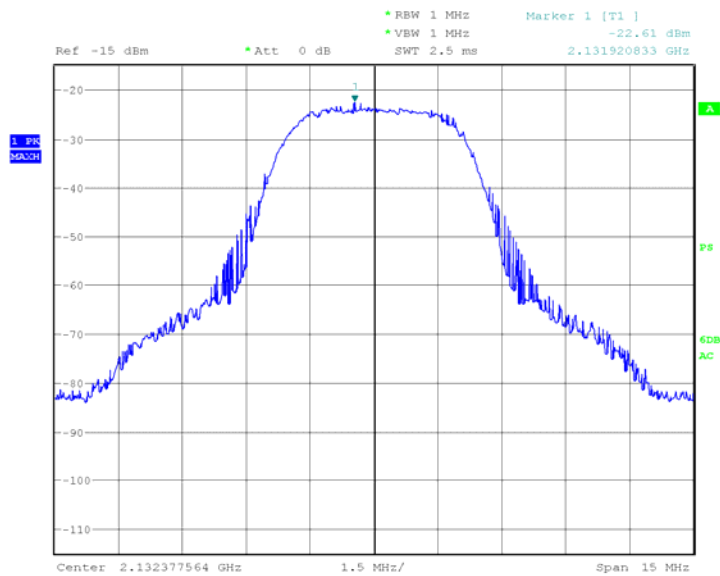
Frequency (MHz)	Result (dBm)	Limit (dBm)	Result (W)	Limit (W)
2112.4	21.2	38.45	0.132	7



Date: 26.APR.2011 23:06:52

Configuration 1 - Mode 2

Frequency (MHz)	Result (dBm)	Limit (dBm)	Result (W)	Limit (W)
2132.4	21.2	38.45	0.132	7



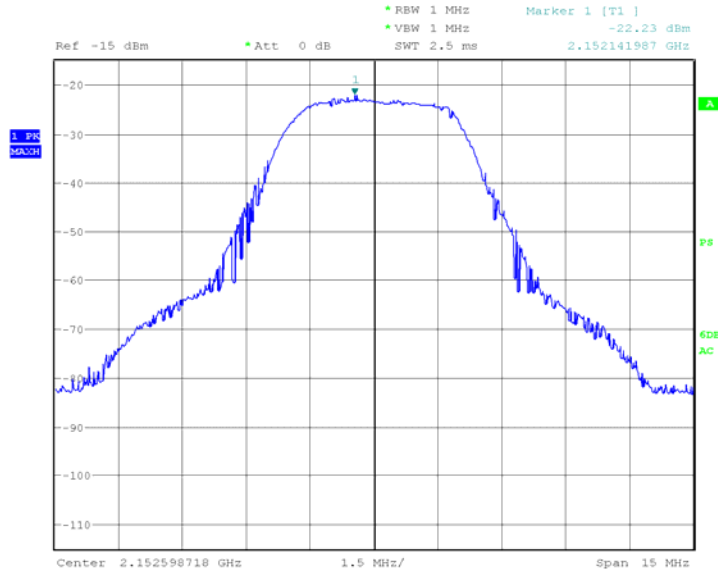
Date: 26.APR.2011 23:01:44



Product Service

Configuration 1 - Mode 3

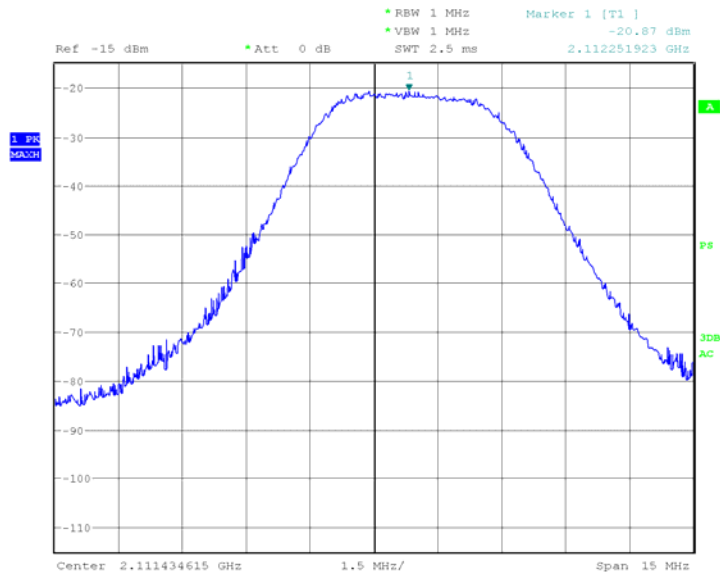
Frequency	Result (dBm)	Limit (dBm)	Result (W)	Limit (W)
2152.6	22.6	38.45	0.182	7



Date: 26.APR.2011 22:49:30

Configuration 2 - Mode 1

Frequency (MHz)	Result (dBm)	Limit (dBm)	Result (W)	Limit (W)
2112.4	22.3	38.45	0.170	7



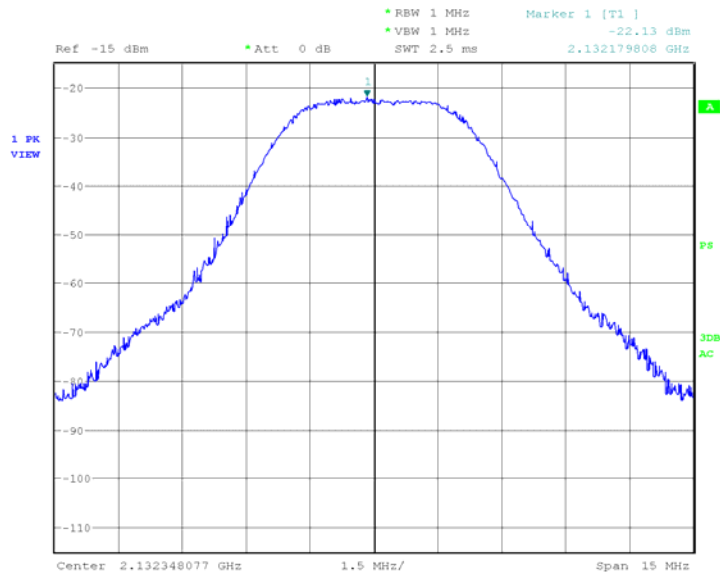
Date: 26.APR.2011 21:55:46



Product Service

Configuration 2 - Mode 2

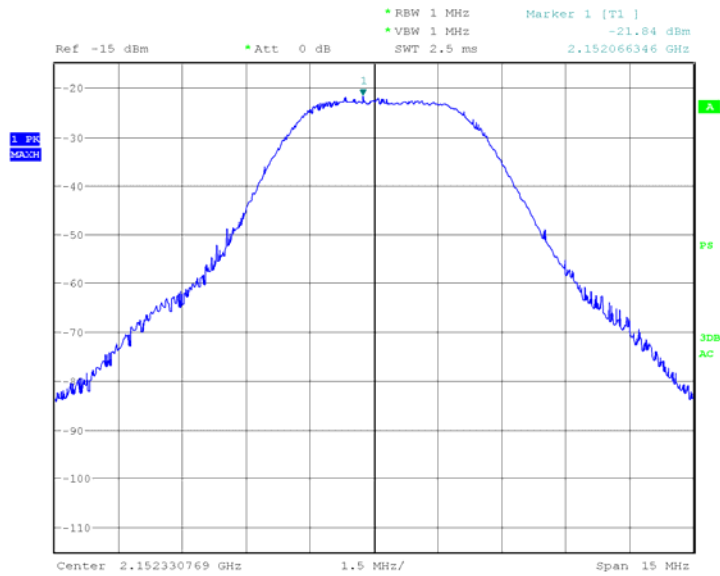
Frequency (MHz)	Result (dBm)	Limit (dBm)	Result (W)	Limit (W)
2132.4	21.7	38.45	0.148	7



Date: 26.APR.2011 21:37:31

Configuration 2 - Mode 3

Frequency (MHz)	Result (dBm)	Limit (dBm)	Result (W)	Limit (W)
2152.6	23.0	38.45	0.200	7



Date: 26.APR.2011 21:32:09



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

237C 3G S8 Access Point, S/N: 000295-0000024562

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 analyser.

Both average and peak reading were recorded in a 1MHz bandwidth and wideband power measurement.

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 24.0°C

Relative Humidity 25.0%



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	15.19	33.037	16.28	42.462	11.59	14.421	21.68	147.231
2132.4	14.45	27.861	16.41	43.752	11.30	13.490	21.17	130.918
2152.6	14.37	27.353	15.90	38.904	10.83	12.106	21.12	129.420

Limit

≤ 1640W/MHz



Product Service

2.3 CARRIER POWER - CCDF

2.3.1 Specification Reference

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

2.3.2 Equipment Under Test

237C 3G S8 Access Point, S/N: 000295-0000024562

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 CCDF function of the spectrum analyser was used. The following plots show the CCDF statistics and compliance with the 13dB 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 24.0°C

Relative Humidity 25.0%



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 - CCDF.

The test results are shown below.

Configuration 1 – Modes 1, 2 and 3

Frequency (MHz)	Peak to Average Ratio (dB)
2112.4	10.09
2132.4	9.87
2152.6	10.29

Limit

$\leq 13\text{dB}$



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

237C 3G S8 Access Point, S/N: S/N: 000295-0000024562

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 18GHz to 22GHz 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 24.0°C

Relative Humidity 25.0%



Product Service

2.4.7 Test Results

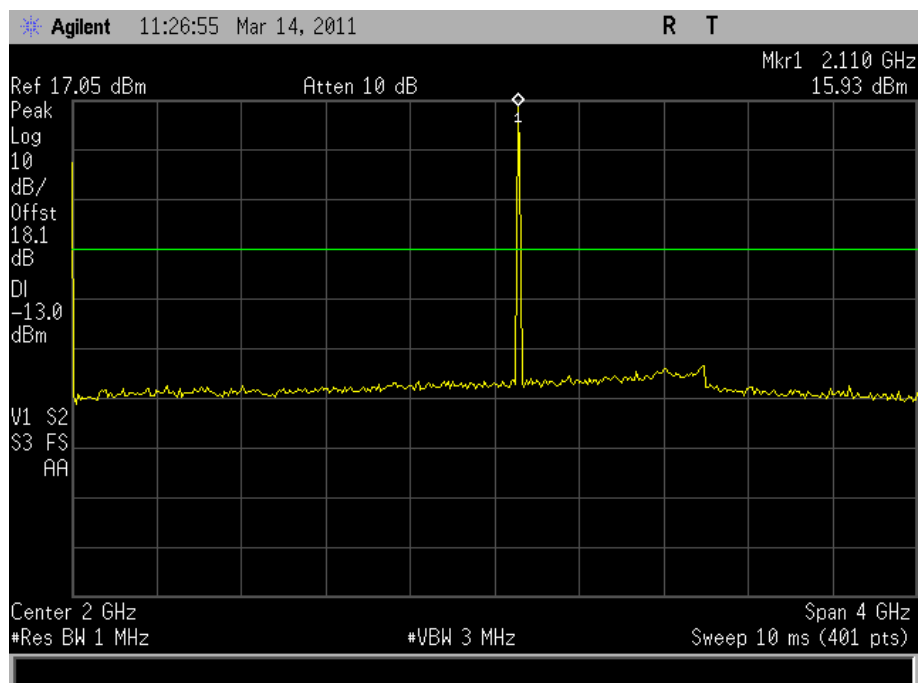
For the period of test the EUT met the requirements of FCC CFR 47 Part 27 for Spurious Conducted Emissions.

The test results are shown below.

Configuration 1 – Mode 1

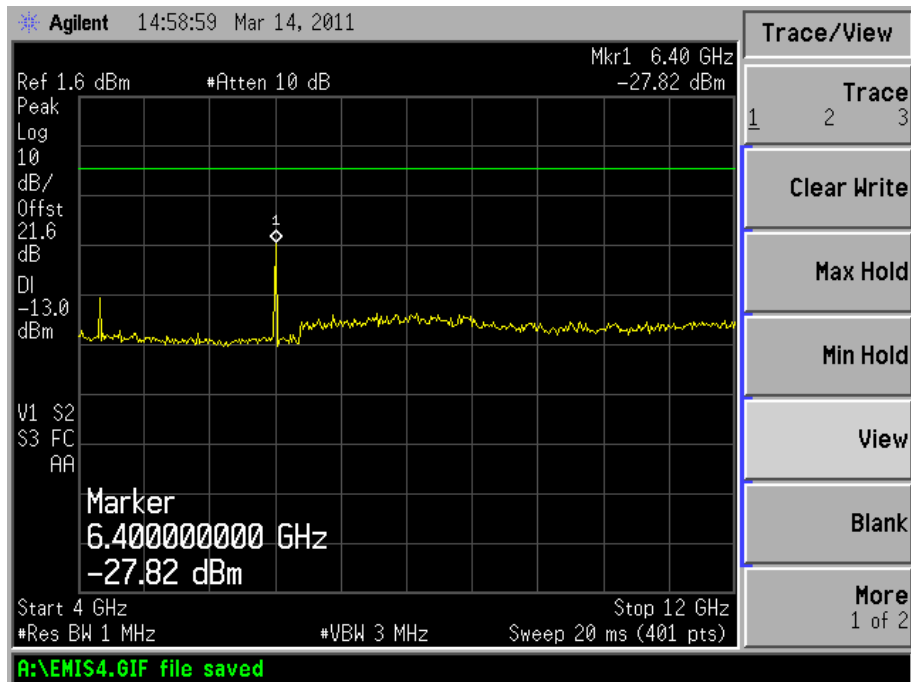
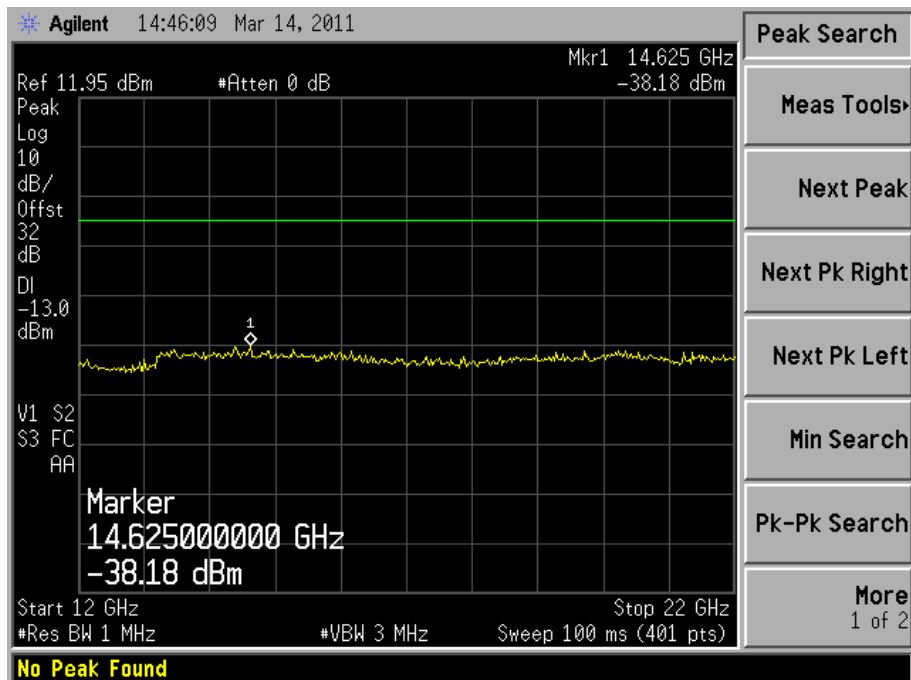
2112.4 MHz

9kHz to 4GHz



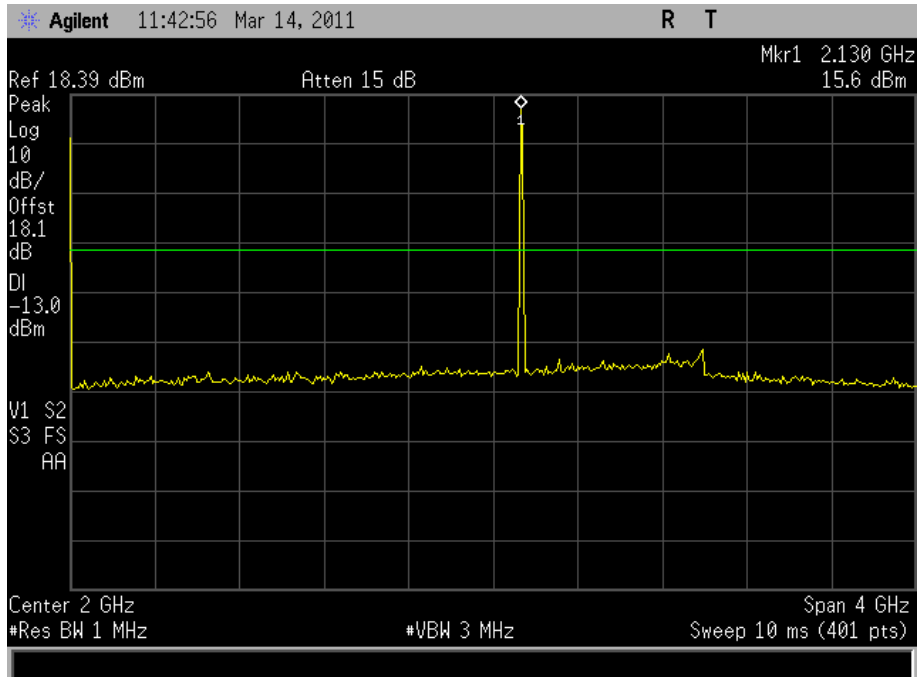
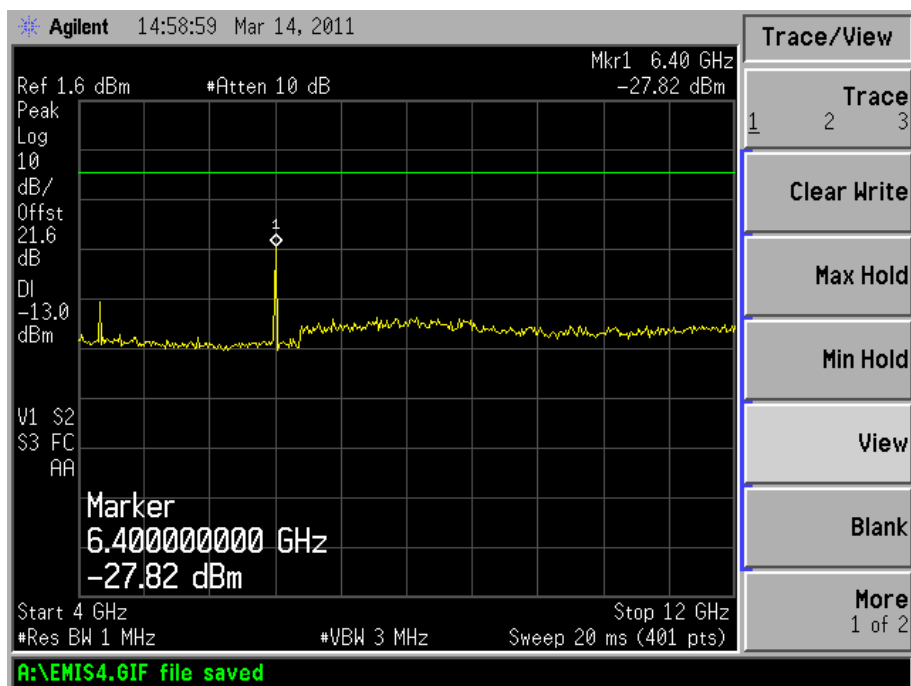


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4GHz to 12GHz12GHz to 22GHz

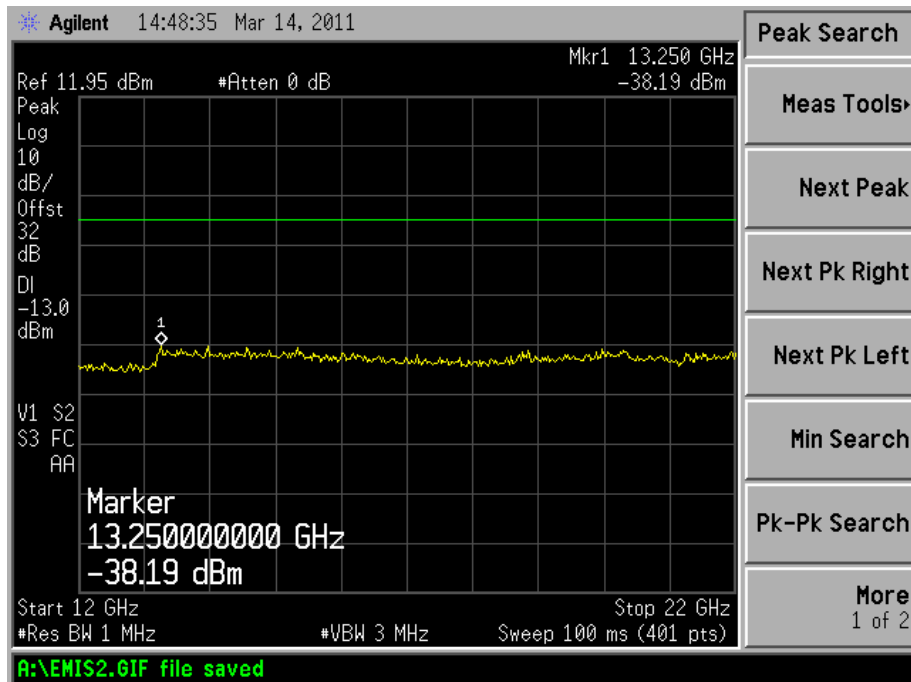
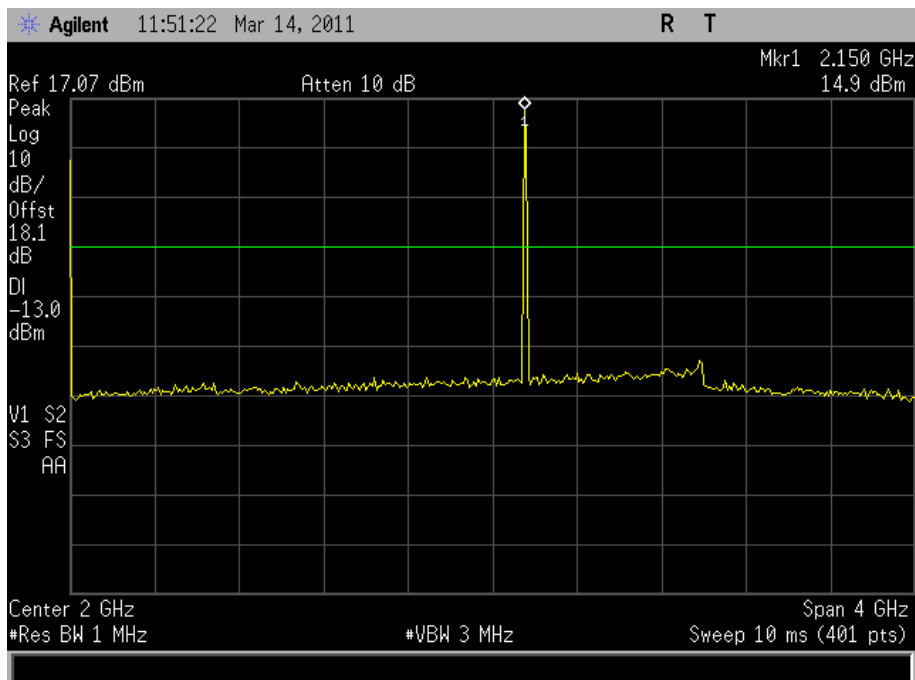


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Configuration 1 – Mode 22132.4 MHz9kHz to 4GHz4GHz to 12GHz

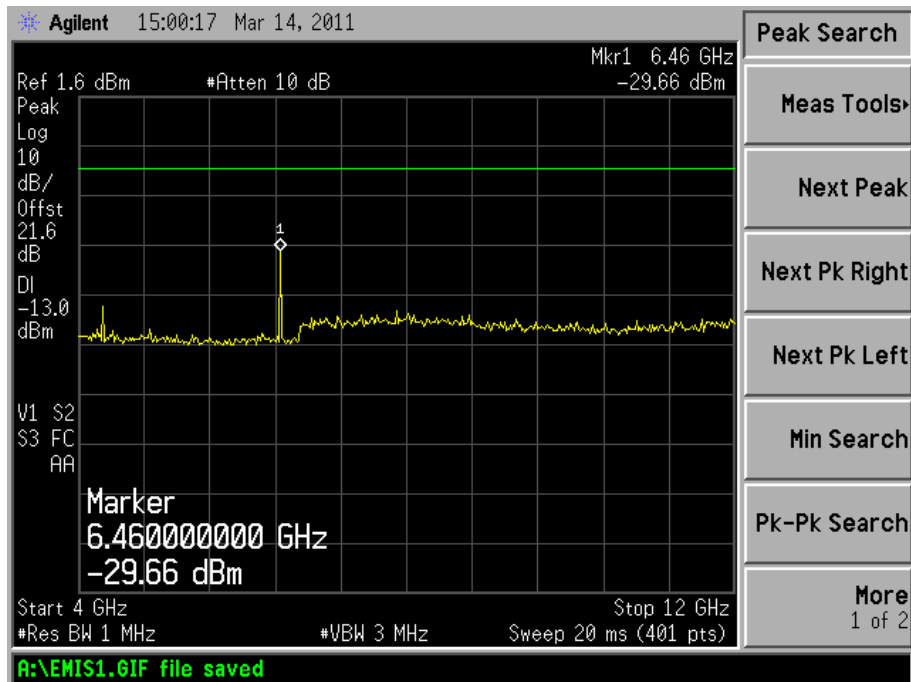
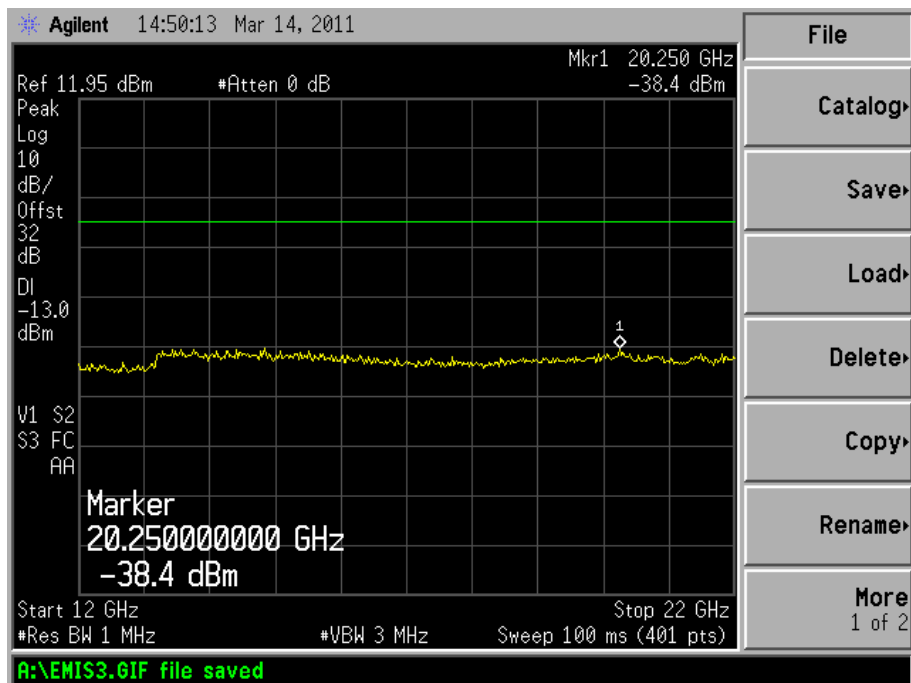


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12GHz to 22GHzConfiguration 1 – Mode 32152.6 MHz9kHz to 4GHz



Product Service

4GHz to 12GHz12GHz to 22GHzLimit $\leq +13\text{dBm}$



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

237C 3G S8 Access Point, S/N: 000295-0000024562

2.5.3 Date of Test and Modification State

27 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

27 April 2011

Ambient Temperature 19.4°C

Relative Humidity 41.0%

Atmospheric Pressure 1020mbar

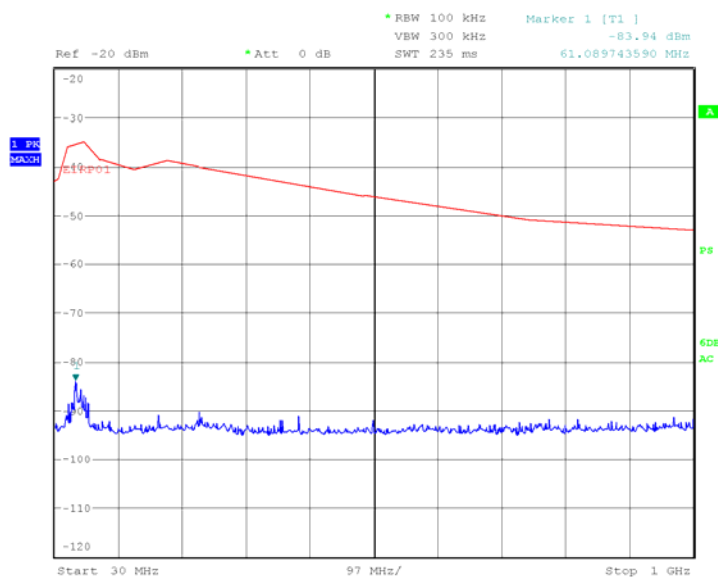
2.5.7 Test Results

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

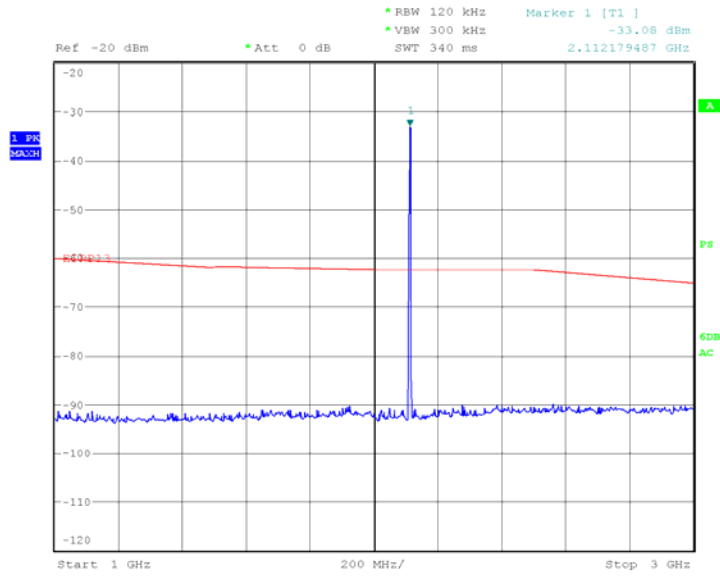


Date: 26.APR.2011 18:46:44



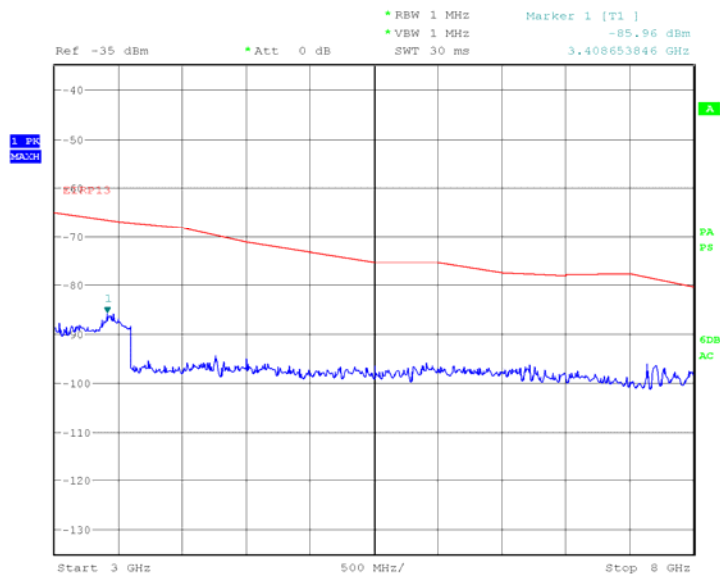
Product Service

1GHz to 3GHz



Date: 26.APR.2011 22:33:22

3GHz to 8GHz

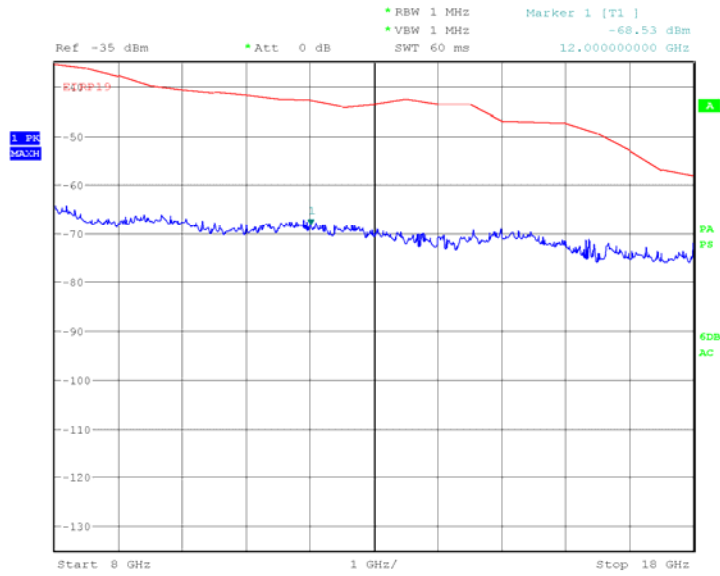


Date: 26.APR.2011 22:36:23



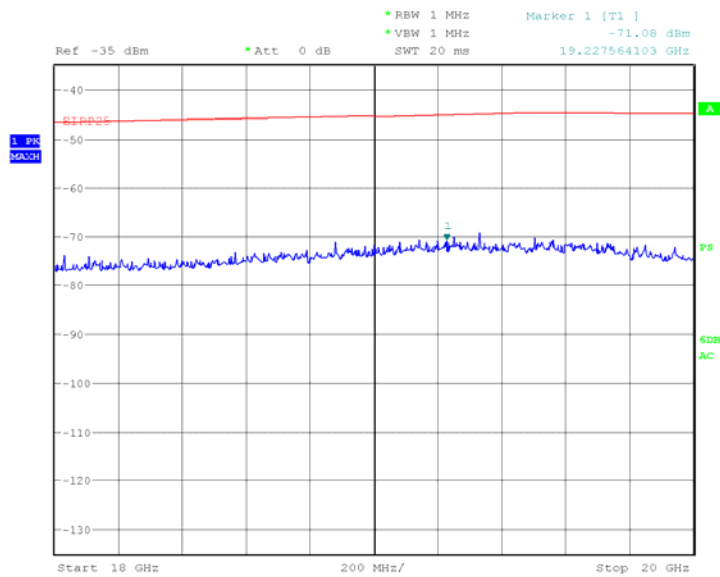
Product Service

8GHz to 18GHz



Date: 27.APR.2011 18:55:39

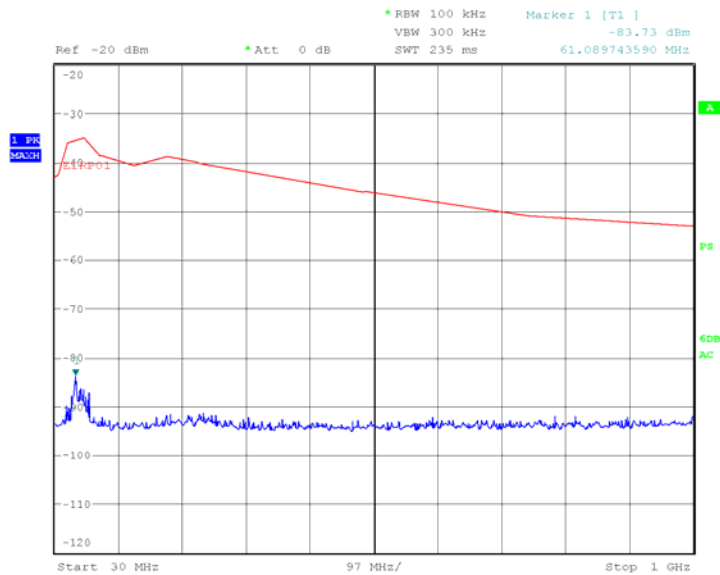
18GHz to 20GHz



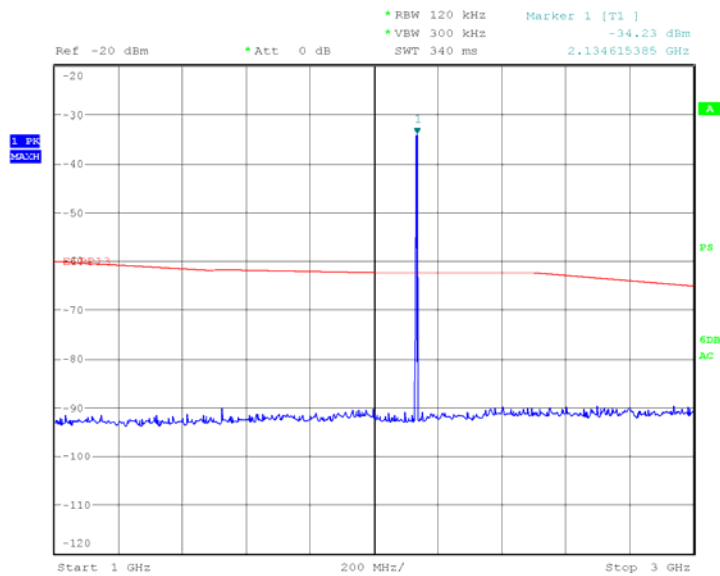
Date: 27.APR.2011 21:04:07



Product Service

Configuration 1 - Mode 230MHz to 1GHz

Date: 26.APR.2011 18:45:00

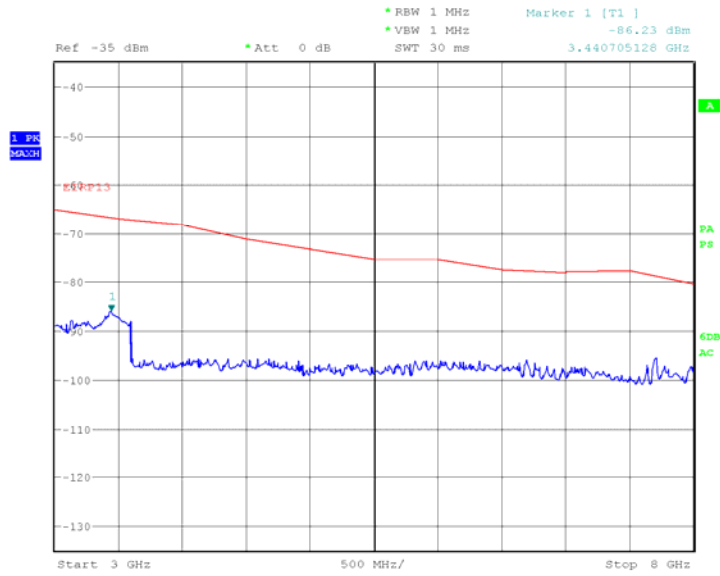
1GHz to 3GHz

Date: 26.APR.2011 22:31:52



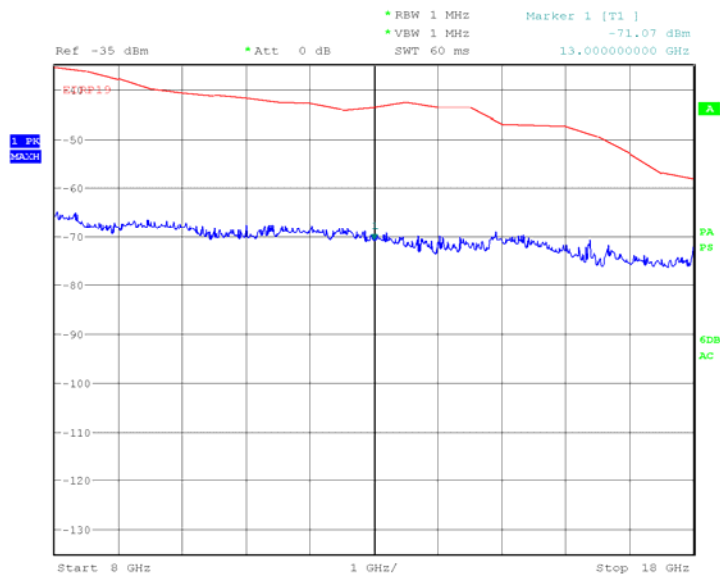
Product Service

3GHz to 8GHz

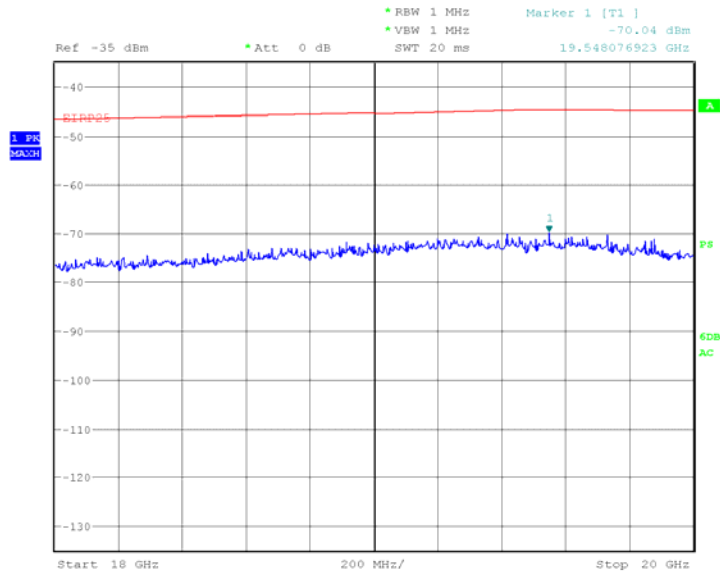


Date: 26.APR.2011 22:39:37

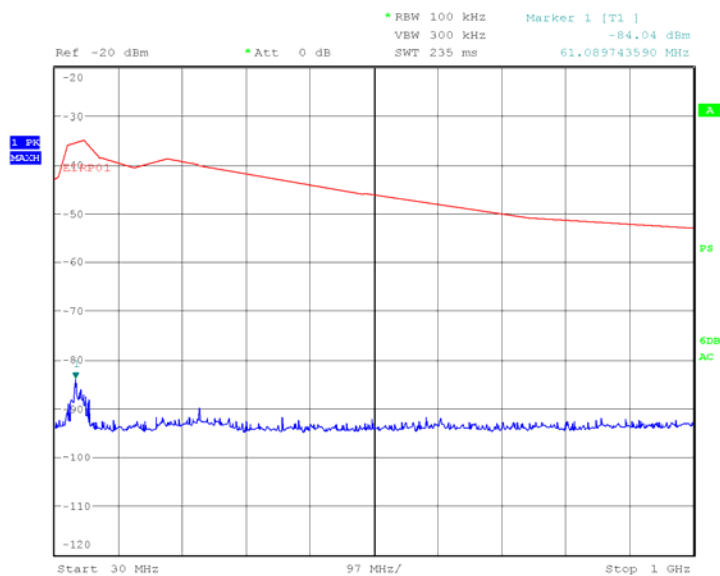
8GHz to 18GHz



Date: 27.APR.2011 18:59:17

18GHz to 20GHz

Date: 27.APR.2011 21:09:32

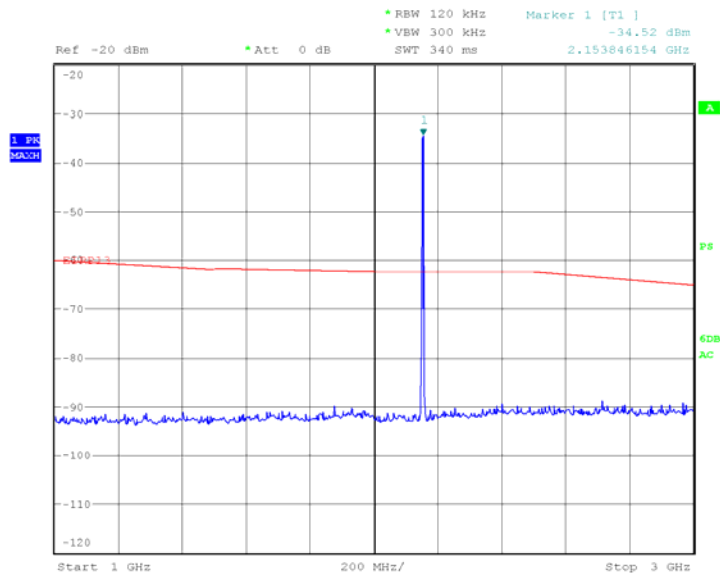
Configuration 1 - Mode 330MHz to 1GHz

Date: 26.APR.2011 18:43:08



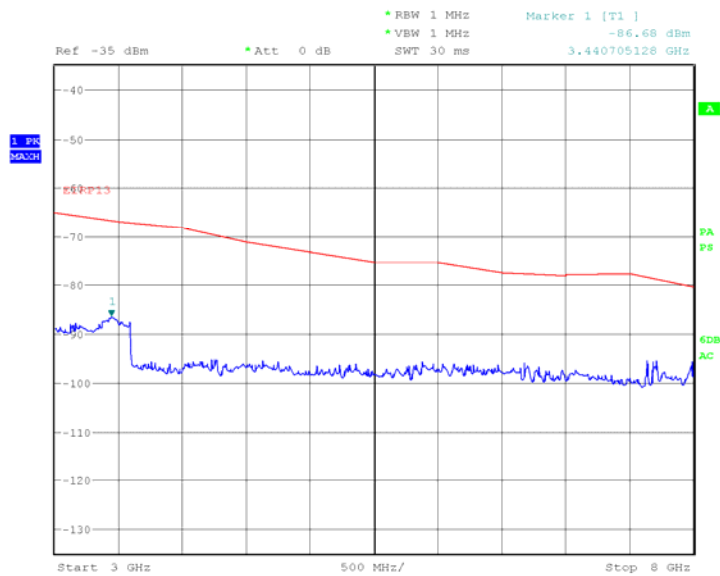
Product Service

1GHz to 3GHz



Date: 26.APR.2011 22:30:02

3GHz to 8GHz

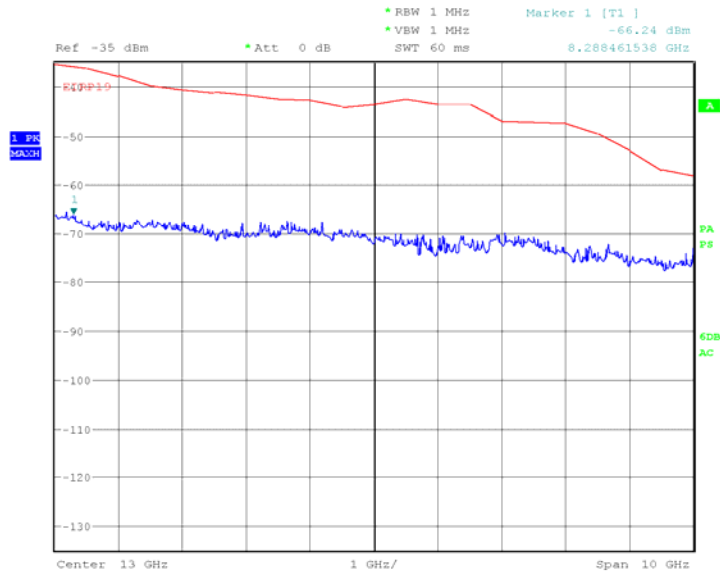


Date: 26.APR.2011 22:42:56



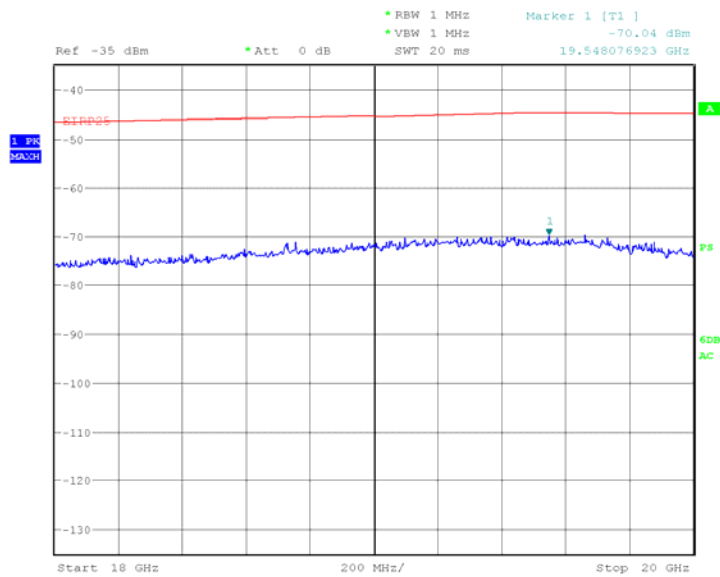
Product Service

8GHz to 18GHz



Date: 27.APR.2011 19:06:43

18GHz to 20GHz



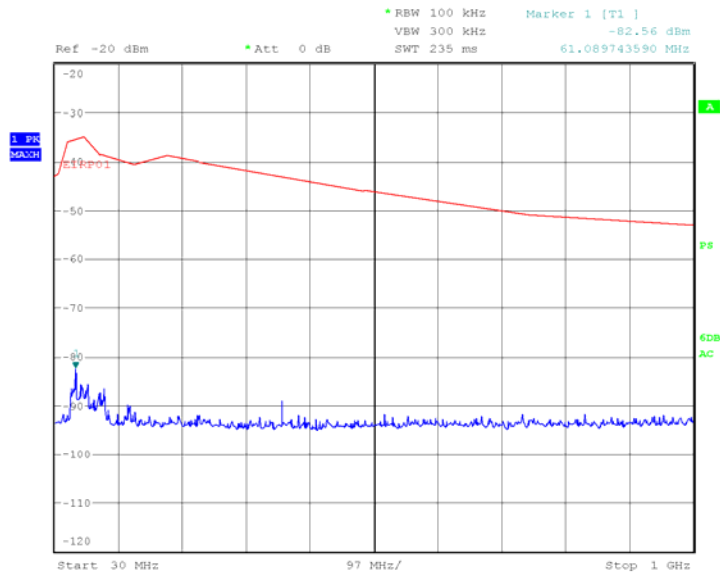
Date: 27.APR.2011 21:11:37



Product Service

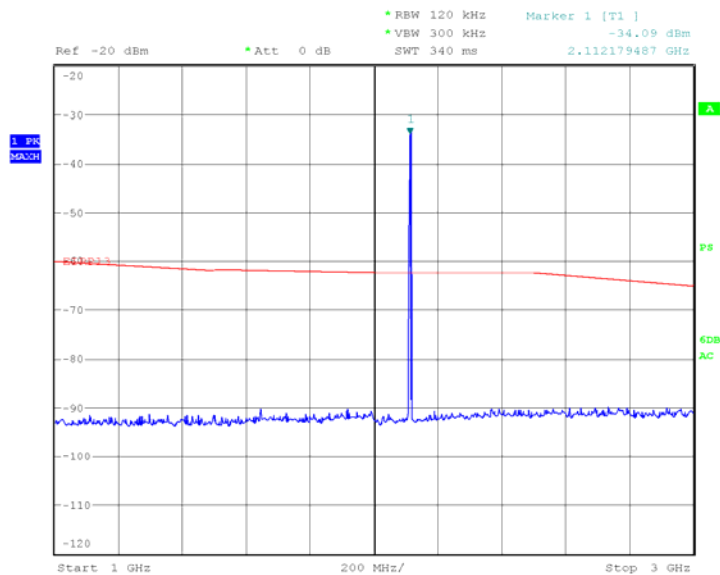
Configuration 2 - Mode 1

30MHz to 1GHz



Date: 26.APR.2011 18:30:08

1GHz to 3GHz

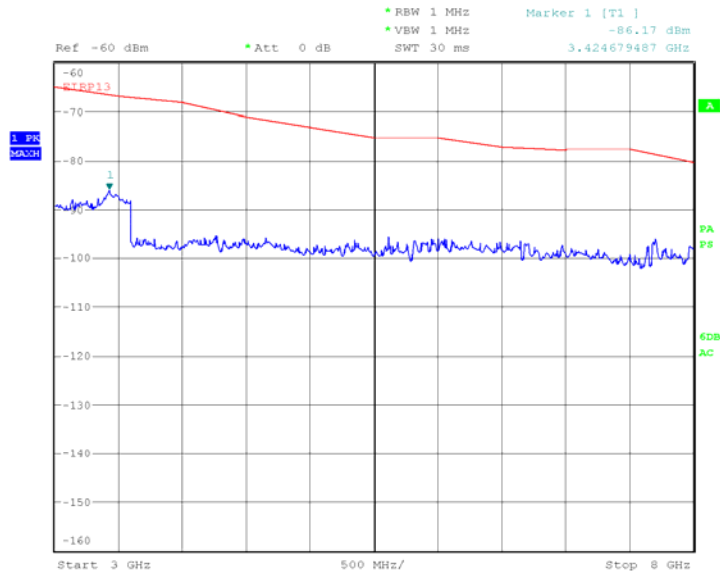


Date: 26.APR.2011 22:08:02

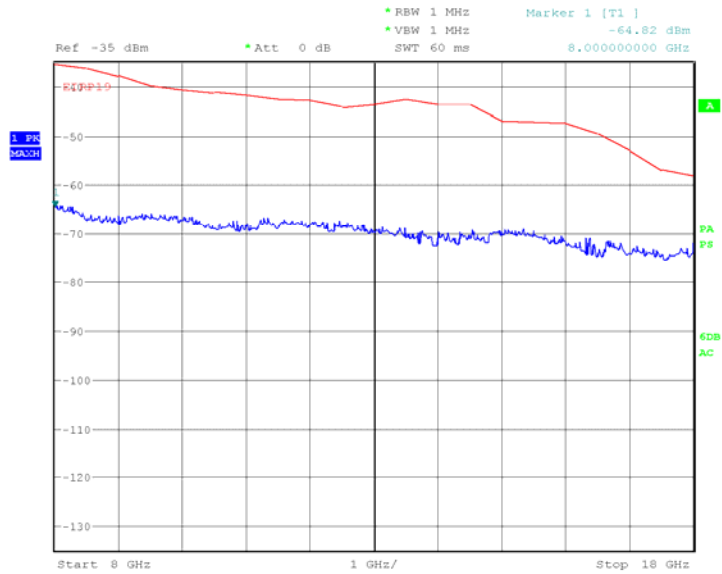


Product Service

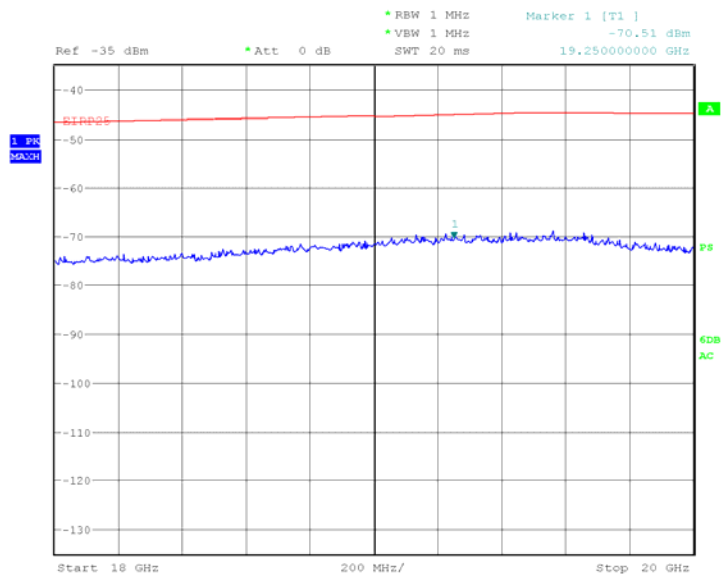
3GHz to 8GHz



Date: 26.APR.2011 22:20:26

8GHz to 18GHz

Date: 27.APR.2011 19:50:50

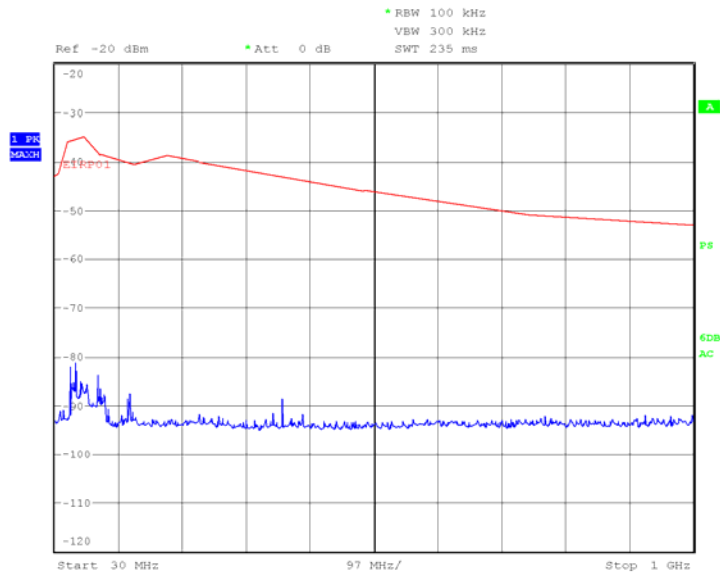
18GHz to 20GHz

Date: 27.APR.2011 20:22:04



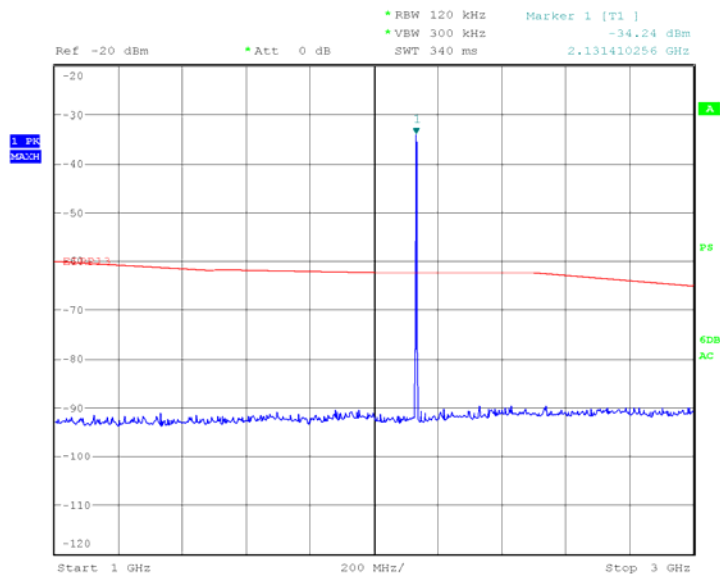
Configuration 2 - Mode 2

30MHz to 1GHz



Date: 26.APR.2011 18:27:52

1GHz to 3GHz

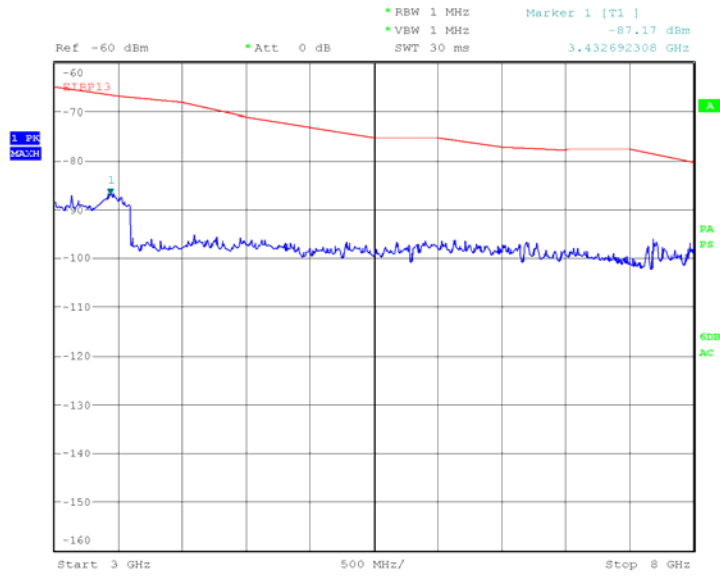


Date: 26.APR.2011 22:09:34



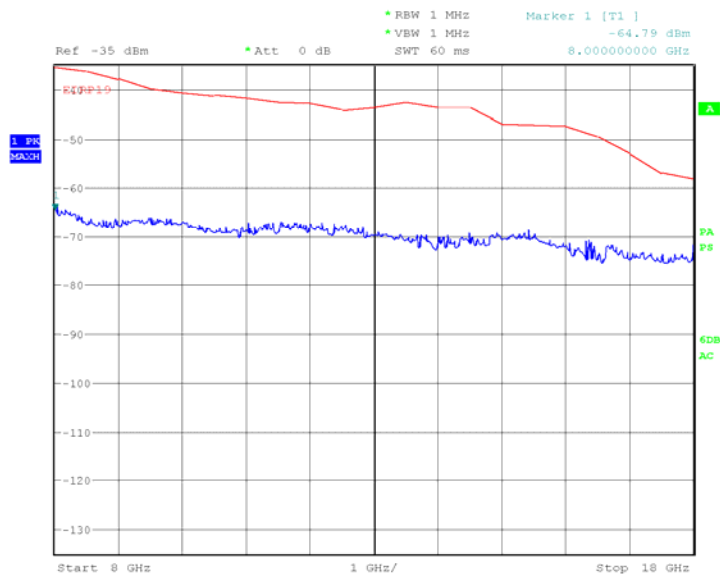
Product Service

3GHz to 8GHz



Date: 26.APR.2011 22:18:03

8GHz to 18GHz

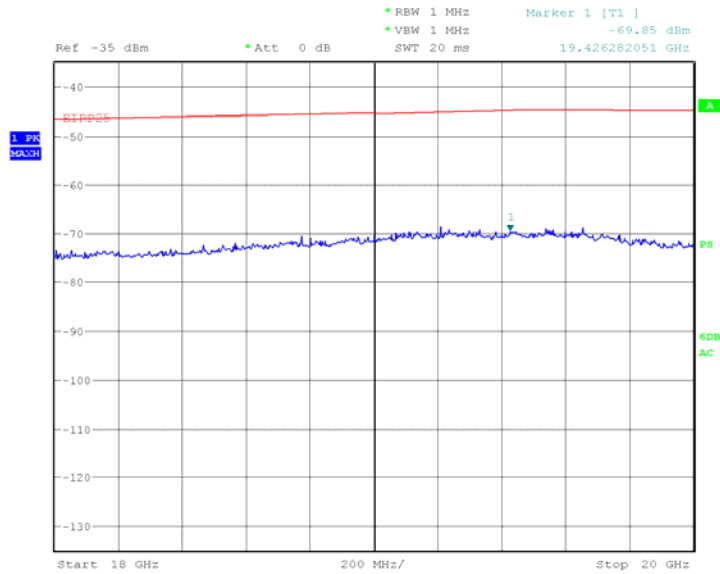


Date: 27.APR.2011 19:34:34

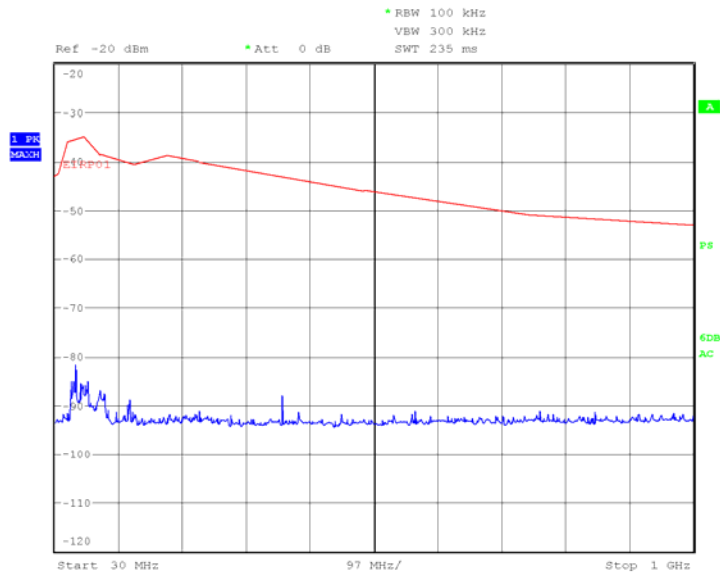


Product Service

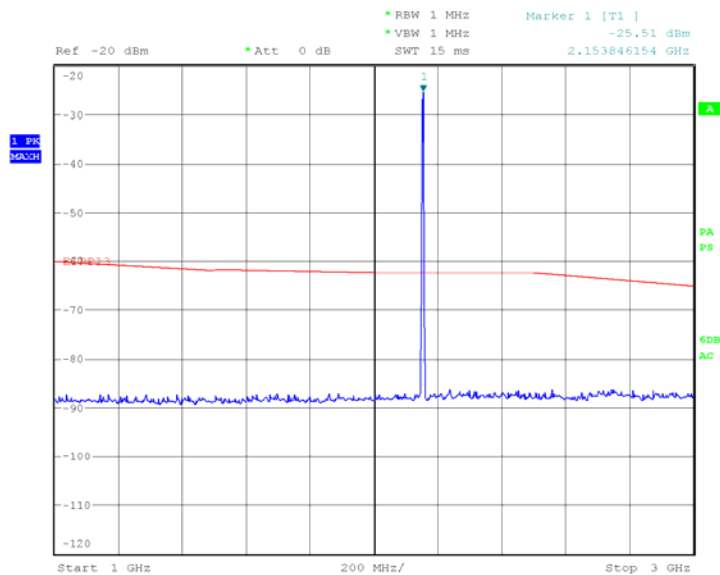
18GHz to 20GHz



Date: 27.APR.2011 20:54:46

Configuration 2 - Mode 330MHz to 1GHz

Date: 26.APR.2011 18:25:33

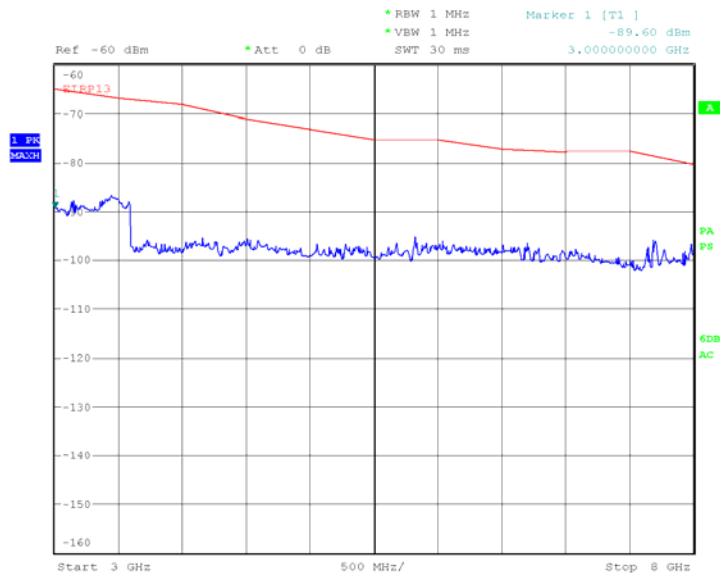
1GHz to 3GHz

Date: 26.APR.2011 22:22:25



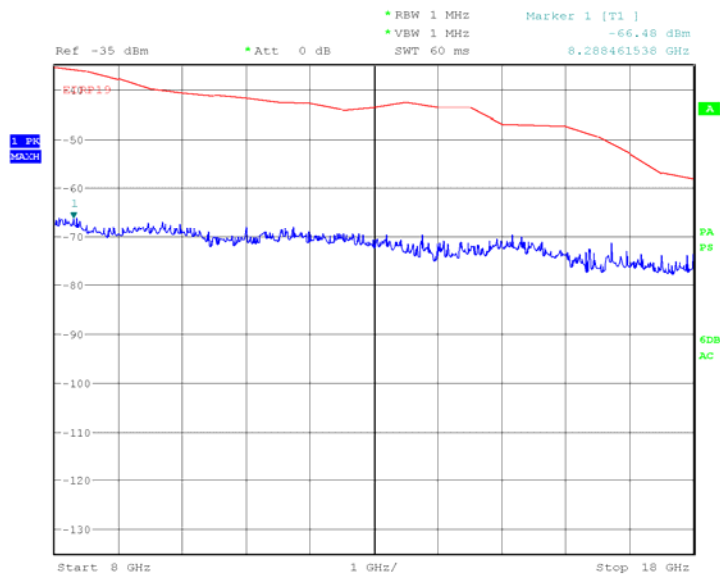
Product Service

3GHz to 8GHz

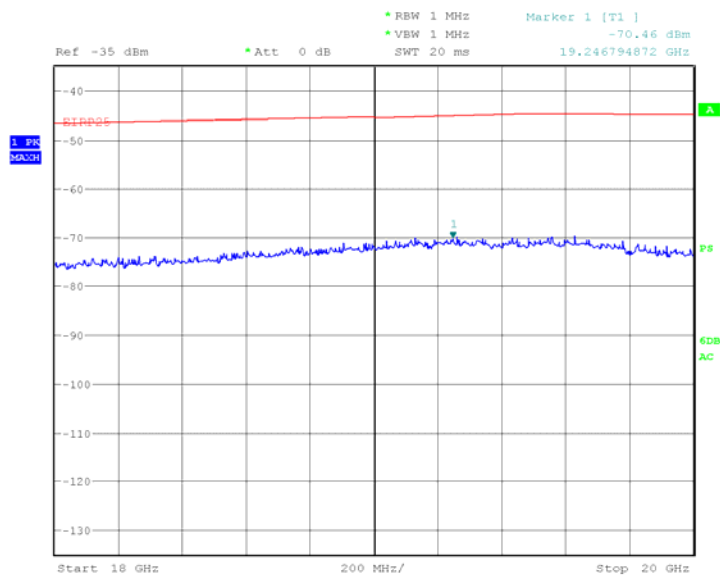


Date: 26.APR.2011 22:16:24

8GHz to 18GHz



Date: 27.APR.2011 19:24:29

18GHz to 20GHz

Date: 27.APR.2011 20:57:27

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

237C 3G S8 Access Point, S/N: 000295-0000024562

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 analyser 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 24.0°C

Relative Humidity 25.0%



Product Service

2.6.7 Test Results

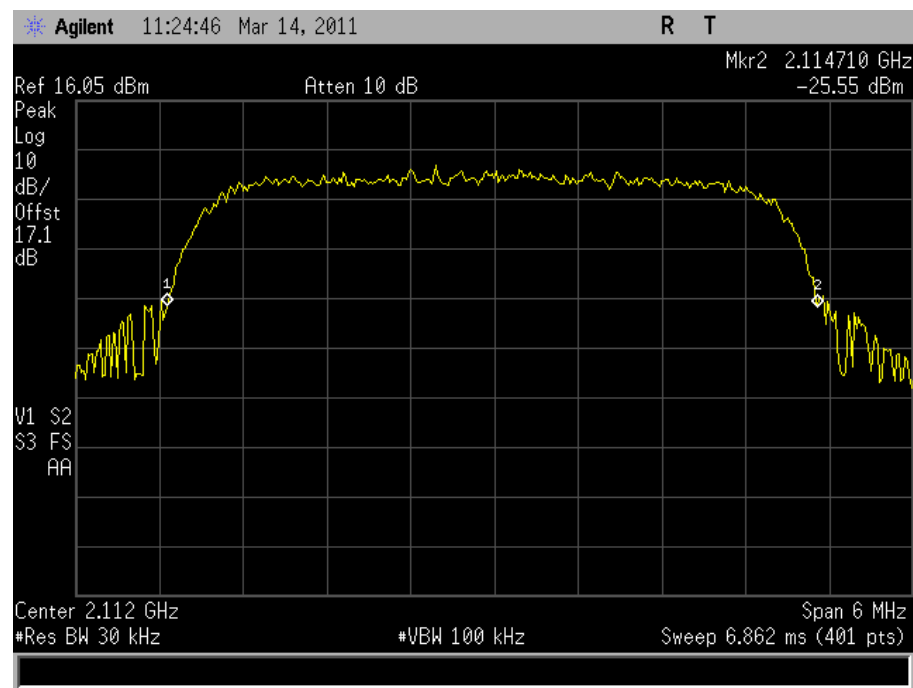
For the period of test the EUT met the requirements of FCC CFR 47 Part 27 for 26dB Bandwidth.

The test results are shown below.

Configuration 1 – Modes 1, 2 and 3

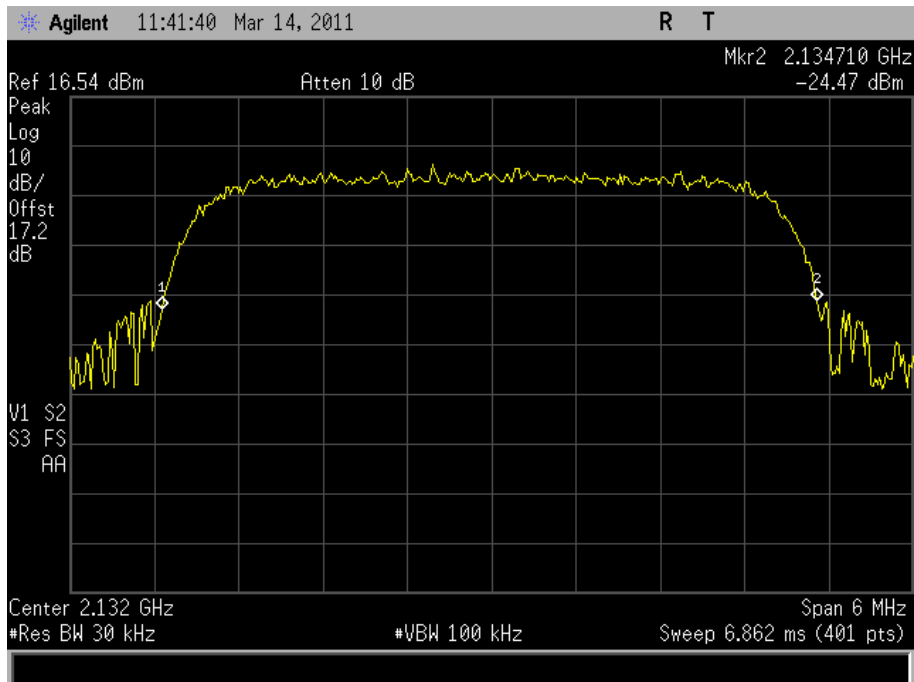
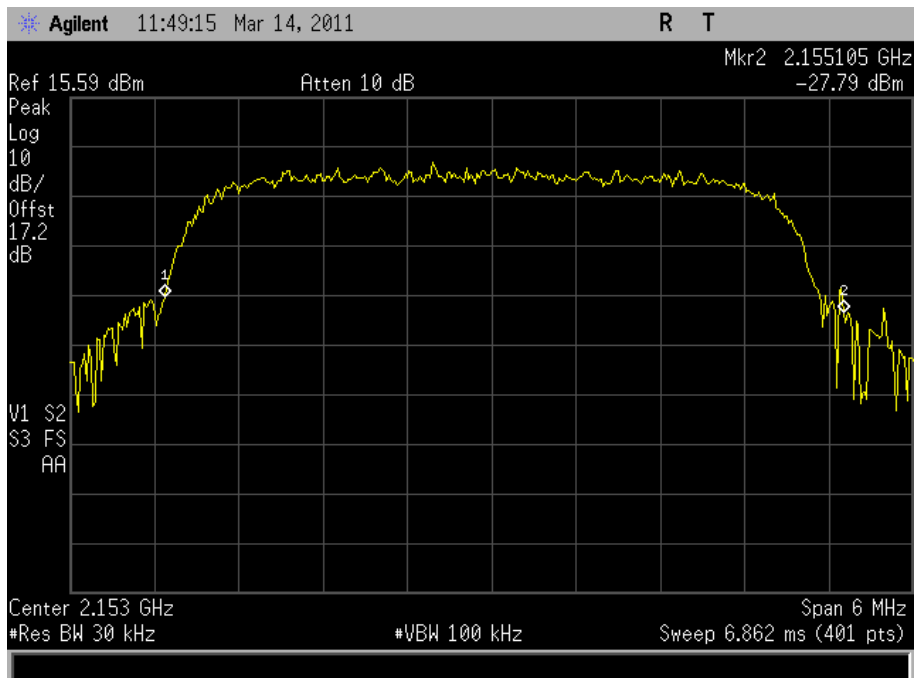
Frequency (MHz)	Mode	26dB Bandwidth (kHz)
2112.4	WCDMA	4650
2132.4	WCDMA	4650
2152.6	WCDMA	4830

2112.4 MHz





Product Service

2132.4MHz2152.6MHz

Limit:

The emission bandwidth is defined as the width of the signal between two points, one below the carrier centre frequency and one above the carrier centre frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.



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

237C 3G S8 Access Point, S/N: 000295-0000024562

2.7.3 Date of Test and Modification State

15 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 an rms detector with the trace display set to average. 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

15 March 2011

Ambient Temperature 24.0°C

Relative Humidity 31.0%



2.7.7 Test Results

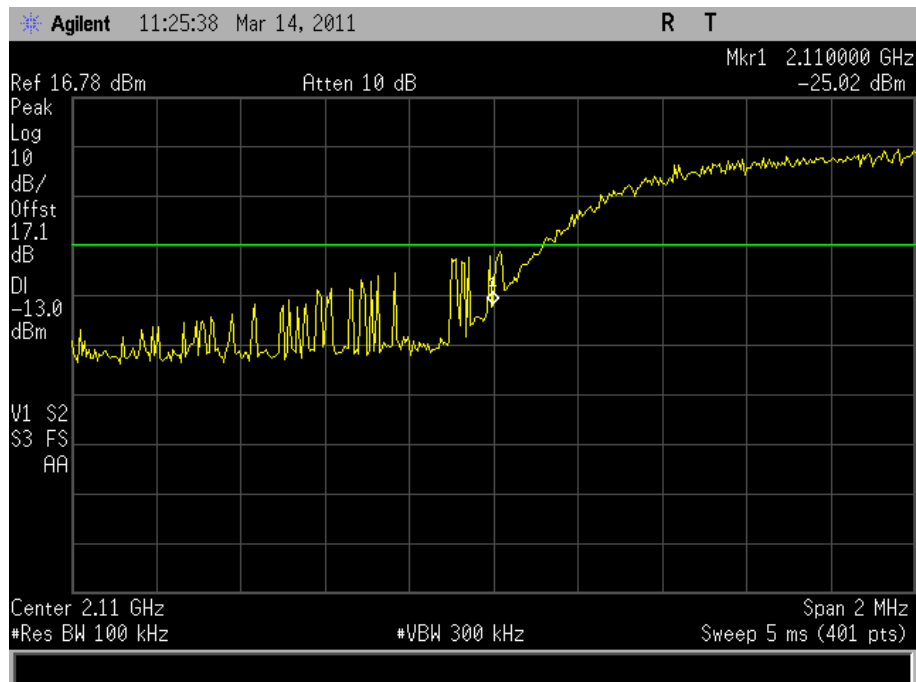
For the period of test the EUT met the requirements of FCC CFR 47 Part 27 for Conducted Emissions – Block Edge.

The test results are shown below.

Configuration 1 – Mode 1 and 3

Frequency Block	Frequency (MHz)
2100 MHz	2112.4
2155MHz	2152.6

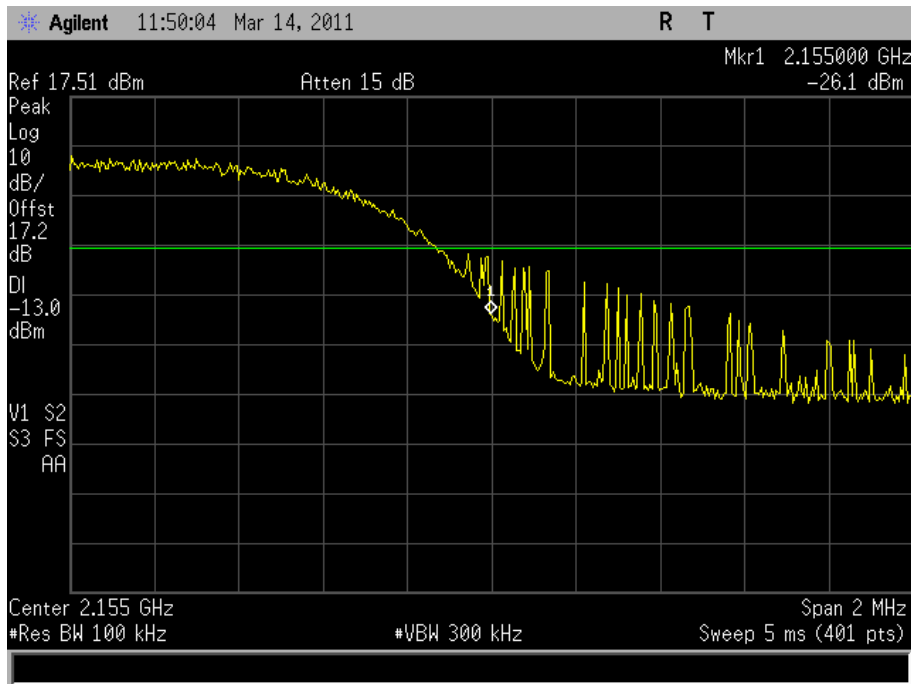
2112.4 MHz





Product Service

2152.6 MHz



Limit:

At block A and F (2110MHz and 2155MHz)	$\leq -13\text{dBm}$
--	----------------------



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

237C 3G S8 Access Point, S/N: 000295-0000024562

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 $\pm 15\%$ 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	24.0°C
Relative Humidity	31.0%



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	-105	2100 MHz to 2155 MHz
9.00	WCDMA	-112	2100 MHz to 2155 MHz
10.35	WCDMA	-109	2100 MHz to 2155 MHz

Limit:

The fundamental must remain within the authorised frequency block.
--



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

237C 3G S8 Access Point, S/N: 000295-0000024562

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. 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

	14 March 2011
Ambient Temperature	24.0°C
Relative Humidity	33.0%



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 °C	Mode	Frequency Error (Hz)	Limit
-30	WCDMA	+162	2110 MHz to 2155 MHz
-20	WCDMA	+44	2110 MHz to 2155 MHz
-10	WCDMA	+138	2110 MHz to 2155 MHz
0	WCDMA	+130	2110 MHz to 2155 MHz
+10	WCDMA	+79	2110 MHz to 2155 MHz
+20	WCDMA	-112	2110 MHz to 2155 MHz
+30	WCDMA	-126	2110 MHz to 2155 MHz
+40	WCDMA	-279	2110 MHz to 2155 MHz
+50	WCDMA	-284	2110 MHz to 2155 MHz

Limit:

The fundamental must remain within the authorised frequency block.
--



Product Service

SECTION 3

TEST EQUIPMENT USED



3.1 TEST EQUIPMENT USED

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

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
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
Thermal Power Sensor, 0 - 18GHz, 1uW to 100mW	Rohde & Schwarz	NRV-Z51	3498	-	TU
'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



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
Antenna (Double Ridge Guide)	Q-Par Angus Ltd	QSH 180K	1511	24	2-Aug-2012
Pre-Amplifier	Phase One	PSO4-0087	1534	12	22-Sep-2011
Screened Room (5)	Rainford	Rainford	1545	24	3-Feb-2014
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
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
Power magnetic field Coil (Horizontal 2.1m*2.2m)	TUV	N/A	3522	-	TU
Microwave Downconverter	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 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
Section 2.9 - 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

TU – Traceability Unscheduled

O/P Mon – Output monitored using calibrated equipment



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 10⁶.

* 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



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
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