



Registration No. 440

Certification Test Report

CFR 47 FCC Part 15, Subpart C Section
15.247

Industry Canada RSS 210, Issue 7

AlphaGIGABIT Secure Wireless Router 8400

FCC ID # V8B-8400

IC # 7667A-8400

Project Code CG-799

(Report CG-799-RA-1-2)

Revision: 2

(This report supersedes CG-799-RA-1-1)

July 3, 2008

Prepared for: Saafnet Canada Inc.

Author: Deniz Demirci
Senior EMC / Wireless Technologist

Approved by: Nick Kobrosly
Lab Manager

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Report Summary

Test Facility:	National Technical Systems, Canada Product Integrity Laboratory 5151-47 th Street, N.E. Calgary Alberta T3J 3R2
Accreditation Numbers:	FCC 101386 IC 3978A-1 Accredited by Standards Council of Canada Accredited Laboratory No. 440 Conforms with requirements of CAN-P-4D (ISO/IEC 17025) CLIENTS SERVED: All interested parties FIELDS OF TESTING: Electrical/Electronic, Mechanical/Physical ACCREDITATION DATE:: 2002-03-20 VALID TO: 2009-03-20
Applicant:	Saafnet Canada Inc. 107 – 1089 E. Kent Avenue North Vancouver, BC Canada V5X 4V9 www.alphashield.com
Customer Representative:	Name: Vinesh Sami Phone #: (604)-435-0700 Fax #: (604)435-0702 Email Address: vnsami@alphashield.com

EUT Description

EUT Description	Manufacturer	Model	Revision	Serial Number
AlphaGIGABIT 802.11b / 802.11g Secure Wireless Router 8400	Saafnet	8400	N/A	N/A

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Test Summary

Appendix	Test/Requirement Description	Deviations* from:			Pass / Fail	Applicable FCC Rule Parts	Applicable Industry Canada Rule Parts
		Base Standard	Test Basis	NTS Procedure			
A	Power line Conducted Emission	No	No	No	Pass	FCC Subpart C 15.207 (a)	RSS-Gen Issue 2 7.2.2
B	6 dB Bandwidth	No	No	No	Pass	FCC Subpart C 15.247 (a) (2)	RSS 210 Issue 7 A8.2 (a)
C	Occupied Bandwidth (99% emission bandwidth)	No	No	No	N/A	N/A	RSS-Gen Issue 2 4.6.1
D	Peak Power Output	No	No	No	Pass	FCC Subpart C 15.247 (b) (3)	RSS 210 Issue 7 A8.4 (4)
E	Power Spectral Density	No	No	No	Pass	FCC Subpart C 15.247 (e)	RSS 210 Issue 7 A8.2 (b)
F	Duty Cycle	No	No	No	N/A	FCC Subpart C 15.35 (c)	RSS-Gen Issue 2 4.5
G	Conducted Spurious Emissions	No	No	No	Pass	FCC Subpart C 15.247 (d)	RSS 210 Issue 7 A8.5
H	Conducted Spurious Emissions Band Edge	No	No	No	Pass	FCC Subpart C 15.247 (d)	RSS 210 Issue 7 A8.5
I	Radiated Spurious Emissions Band Edge	No	No	No	Pass	FCC Subpart C 15.247, 15.205	RSS 210 Issue 7 2.6, A8.5
J	Radiated Spurious Emissions (TX and RX)	No	No	No	Pass	FCC Subpart C 15.247, 15.205	RSS 210 Issue 7 2.6, A8.5

Test Result: The product presented for testing complied with test requirements as shown above.

Prepared By: _____
Deniz Demirci
Senior EMC / Wireless Technologist

Reviewed By: _____
Glen Moore
EMC / Wireless Manager

Approved By: _____
Robyn Zuehlke
Quality Management Representative

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Register of revisions

Revision	Date	Description of Revisions
1	May 20, 2008	Final release
2	July 3, 2008	Changes for TCB response; Saafnet Canada (6432) 1RT.pdf

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1.0 INTRODUCTION

1.1 PURPOSE

The purpose of this document is to describe the tests applied by NTS Canada to demonstrate compliance of the AlphaGIGABIT Secure Wireless Router 8400 to FCC Part 15 Subpart C section 15.247 for DTS transmitter and the equivalent sections of Industry Canada's RSS 210, Issue 7

2.0 EUT DESCRIPTION

2.1 CONFIGURATION

Description of EUT

	Name	Model	Revision	Serial Number
EUT	AlphaGIGABIT Secure Wireless Router 8400	8400	N/A	N/A
Power Supply	Ktec AC Adaptor	KSAFD058259W1US	N/A	N/A
Classification	Mobile			
Antenna	Omni-directional 235 mm dipole 7 dBi External Antenna (Non-Detachable) Omni-directional dipole 3 dBi Integral Antenna (Non-Detachable)			
Modulation	802.11b DQPSK, DBPSK, DSSS, CCK 802.11g BPSK, QPSK, 16QAM, OFDM			
EUT Size (H x W x D) (in mm)	280 x 120 x 40			
EUT Weight (in grams)	250			
Channels/Frequency Range	11 Channels from 2.400 GHz to 2.4835 GHz			
Functional Description	The router allows the user to share files and printers on the network, and surf the Internet with the performance benefits of network optimization using StreamEngine Technology, Gigabit Ethernet and Turbo Wireless-G and the built in security benefits of the AlphaShield firewall with AlphaGAP technology. Standards: IEEE 802.11g Wireless Standard IEEE 802.11b Wireless Standard IEEE 802.3 Ethernet Standard 10Mbps IEEE 802.3u Ethernet Standard 100Mbps IEEE 802.3ab Ethernet Standard 1Gbps			

2.1.1 EUT POWERS

Voltage	120 VAC 60 Hz with Ktec AC Adaptor Model:KSAFD058259W1US
Number of Feeds	1 (1 Hot, 1 Return)

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2.2 EUT CABLES

Quantity	Model/Type	Routing		Shielded / Unshielded	Description	Cable Length (m)
		From	To			
1	Power	Power Supply	EUT	Unshielded	Permanent connection to power supply	1.8
1	Ethernet	EUT	Computer	Unshielded	CAT 5	1

2.3 MODE OF OPERATION DURING TESTS

See related appendixes for each test.

3.0 SUPPORT EQUIPMENT

3.1 CONFIGURATION

Dell Inspiron Laptop computer s/n: TW-0791UH-12800-12G-5260 was used for setting up the EUT.

Settings:

http://192.168.0.240

Wireless network name ubicom_eval

Super mode disabled

Fragmentation threshold 2346

RTS threshold 2346

Beacon period 100

DTIM Interval 1

Computer was used for configuring the EUT only and it was not connected during the tests.

3.2 TEST BED/PERIPHERAL CABLES

NA

4.0 TEST ENVIRONMENT

4.1 NORMAL TEST CONDITIONS

Temperature: 20 – 23 °C

Relative Humidity: 28 – 35 %

Atmospheric pressure: 883 – 890 mbar

Nominal test voltage: 120 VAC 60Hz

The values are the limits registered during the test period.

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APPENDICES

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APPENDIX A: POWER LINE CONDUCTED EMISSION

A.1. Base Standard & Test Basis

Base Standard	FCC PART 15.207 (a) RSS-Gen Issue 2 7.2.2
Test Basis	ANSI C63.4-2003
Test Method	NTS Conducted Emissions 150 kHz – 30 MHz Test Method SOP COR EMC 04

A.2. Specifications

Frequency MHz	Limit	
	Quasi-Peak dB μ V	Average dB μ V
0.150 – 0.500	66 to 56 ¹	56 to 46 ¹
0.500 – 5.00	56	46
5.00 – 30.00	60	50

Note 1: decrease with the logarithm of the frequency

A.3. Deviations

Deviation Number	Time & Date	Description and Justification of Deviation	Deviation Reference			Approval
			Base Standard	Test Basis	NTS Procedure	
None						

A.4. Observations

None

A.5. Operating Mode During Test

The 8400 was tuned to Ch6 (2437 MHz) operating with 802.11b continuous transmit mode.
Power setting: 15 (Software).
Ktec AC Adaptor, Model: KSAFD058259W1US was used.

A.6. Deviations from Normal Operating Mode During Test

None

A.7. Sample Calculation

none

A.8. Test Data & Photographs

The test data and photographs collected during this test appear following this page.


A.9. Test Results

The highest emission measured related to the limit line was 30.54 dB μ V with average detector at 1.058 MHz. It has 15.46 dB margin to the FCC Part 15.207 and RSS-Gen Issue 2 7.2.2 limits

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A.10. Test data summary



Product Integrity
Laboratory V2.5

Project Number: CG-799
Model: Alphashield 8400 Router
Comments: 802.11b EUT Tabletop horizontal with 24cm external antenna, software settings; Ch6,Continuous TX Antenna#1 P:15, 11Mbps,

Tester: Deniz Demirci
Test ID: CE02-3m-799

Standard:
FCC15_B
120 VAC 60 Hz

Voltage/Line	Frequency (MHz)	Measurement Detector	Emission Level (dBµV)	Limit Type	Limit (dBµV)	Margin (dB)
120 VAC Line (L1)	0.154	QP	46.43	QP	65.78	19.35
120 VAC Line (L1)	0.154	AV	15.84	AV	55.78	39.94
120 VAC Line (L1)	0.178	QP	43.91	QP	64.58	20.67
120 VAC Line (L1)	0.178	AV	23.66	AV	54.58	30.92
120 VAC Line (L1)	0.206	QP	41.47	QP	63.37	21.90
120 VAC Line (L1)	0.206	AV	12.03	AV	53.37	41.34
120 VAC Line (L1)	0.230	QP	39.18	QP	62.45	23.27
120 VAC Line (L1)	0.230	AV	10.09	AV	52.45	42.36
120 VAC Line (L1)	0.282	QP	34.90	QP	60.76	25.86
120 VAC Line (L1)	0.282	AV	6.80	AV	50.76	43.96
120 VAC Line (L1)	2.866	QP	30.26	QP	56.00	25.74
120 VAC Line (L1)	2.866	AV	22.80	AV	46.00	23.20
120 VAC Return (L2)	0.170	QP	45.28	QP	64.96	19.68
120 VAC Return (L2)	0.170	AV	17.52	AV	54.96	37.44
120 VAC Return (L2)	0.198	QP	42.26	QP	63.69	21.43
120 VAC Return (L2)	0.198	AV	17.17	AV	53.69	36.52
120 VAC Return (L2)	0.222	QP	39.96	QP	62.74	22.78
120 VAC Return (L2)	0.222	AV	10.36	AV	52.74	42.38
120 VAC Return (L2)	0.274	QP	35.57	QP	61.00	25.43
120 VAC Return (L2)	0.274	AV	8.88	AV	51.00	42.12
120 VAC Return (L2)	0.326	QP	32.28	QP	59.55	27.27
120 VAC Return (L2)	0.326	AV	7.98	AV	49.55	41.57
120 VAC Return (L2)	1.058	QP	32.34	QP	56.00	23.66
120 VAC Return (L2)	1.058	AV	30.54	AV	46.00	15.46

A.11. Tested By

This testing was conducted in accordance with the ISO 17025:2005 scope of accreditation, table 1; Quality Manual.

Name: Deniz Demirci
Function: Senior EMC / Wireless Technologist

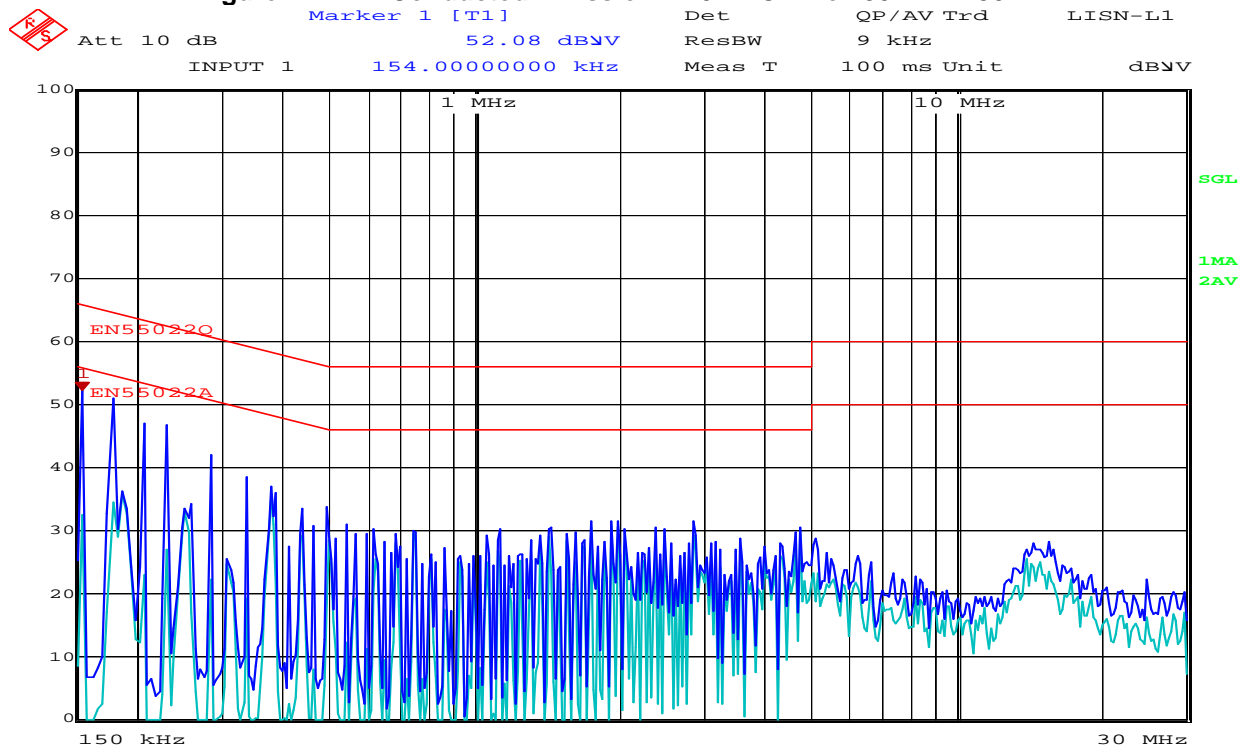
A.12. Test date

Test started: April 14, 2008 Ended: April 14, 2008

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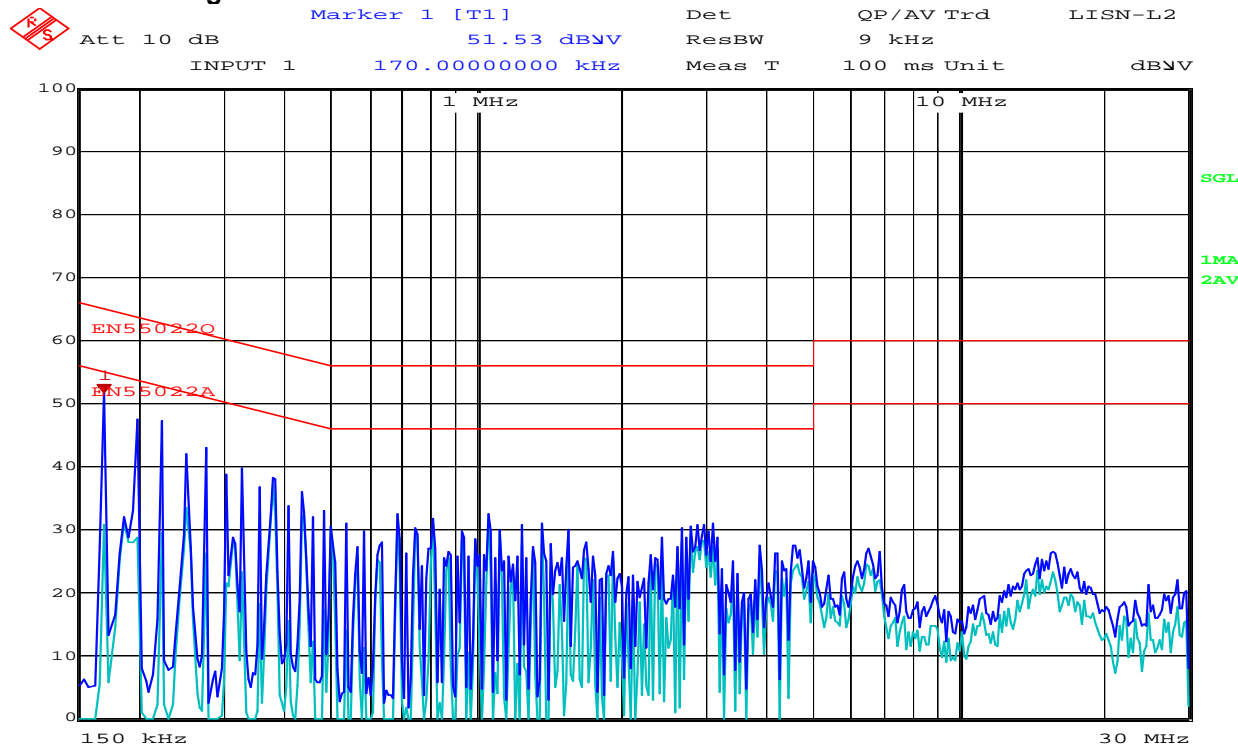
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Figure 1 Conducted Emission 120 VAC Line 150 kHz – 30 MHz



Title: CG-799 Alphashield 8400 Wireless Router
Date: 14.APR.2008 17:43:17

Figure 2 Conducted Emission 120 VAC Return 150 kHz – 30 MHz



Title: CG-799 Alphashield 8400 Wireless Router
Date: 14.APR.2008 17:53:11

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APPENDIX B: 6 DB BANDWIDTH

B.1. Base Standard & Test Basis

Base Standard	FCC PART 15.247 (a) (2) RSS 210 Issue 7 A8.2 (a)
Test Basis	FCC Publication 558074 RSS-Gen Issue 2 4.6.2
Test Method	FCC Publication 558074 RSS 210 Issue 7 A8.2 (a)

B.2. Specifications

15.247 2) Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

B.3. Deviations

Deviation Number	Time & Date	Description and Justification of Deviation	Deviation Reference			Approval
			Base Standard	Test Basis	NTS Procedure	
None						

B.4. Test Procedure

FCC Publication 558074 .

B.5. Test Results

The EUT is in compliance with the requirement as specified above

Mode	Channel	Frequency (MHz)	6 dB Bandwidth (MHz)
802.11b	1	2412	11.663
	6	2437	11.022
	11	2462	11.182
802.11g	1	2412	16.553
	6	2437	16.633
	11	2462	16.633
802.11g Super G	6	2437	33.026

Power supply variation within 85 % (102 VAC) to 115 % (138 VAC) of nominal value has no measurable influence on the carrier frequency and carrier levels.

B.6. Operating Mode During Test

The 8400 was tuned to a low, middle, and high channel operating with 802.11b, 802.11g and 802.11g Super G (Ch 6 only) modes. Power setting: 15 (Software). Measurements were taken from Main output of the radio.

B.7. Tested By

This testing was conducted in accordance with the ISO 17025:2005 scope of accreditation, table 1; Quality Manual.

Name: Deniz Demirci
Function: Senior EMC / Wireless Technologist

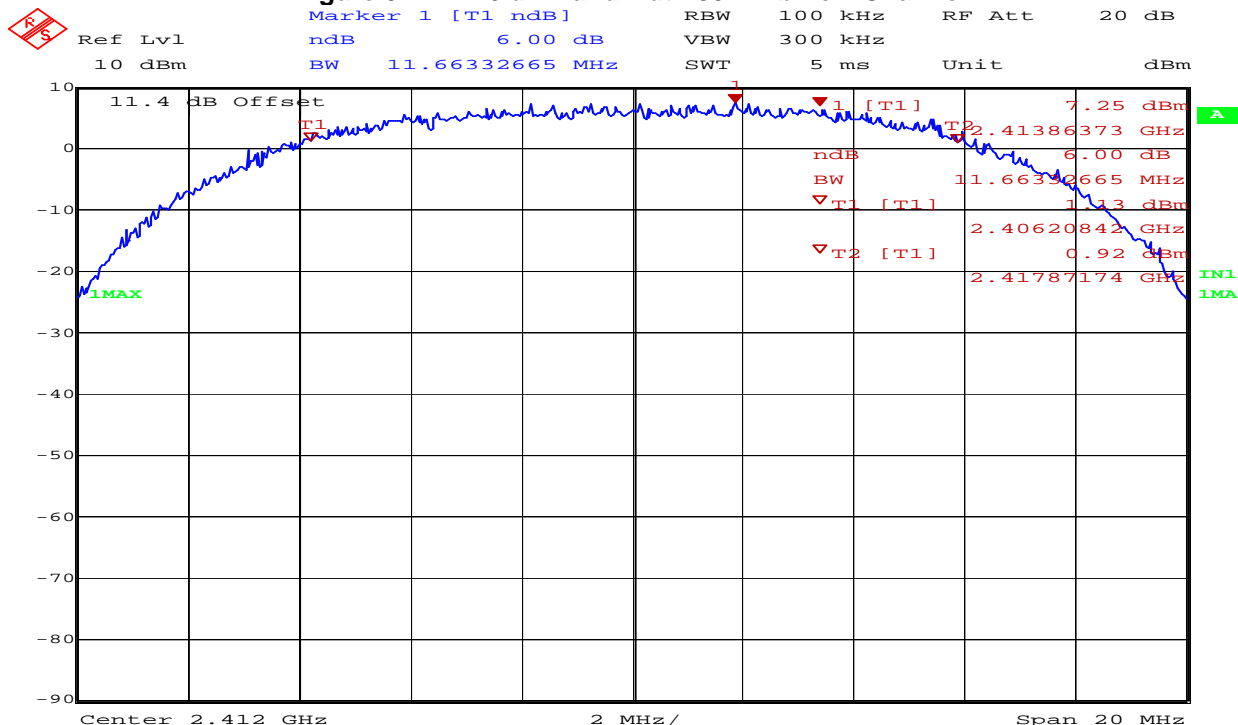
B.8. Test date

Test started: April 17, 2008 Ended: May 15, 2008

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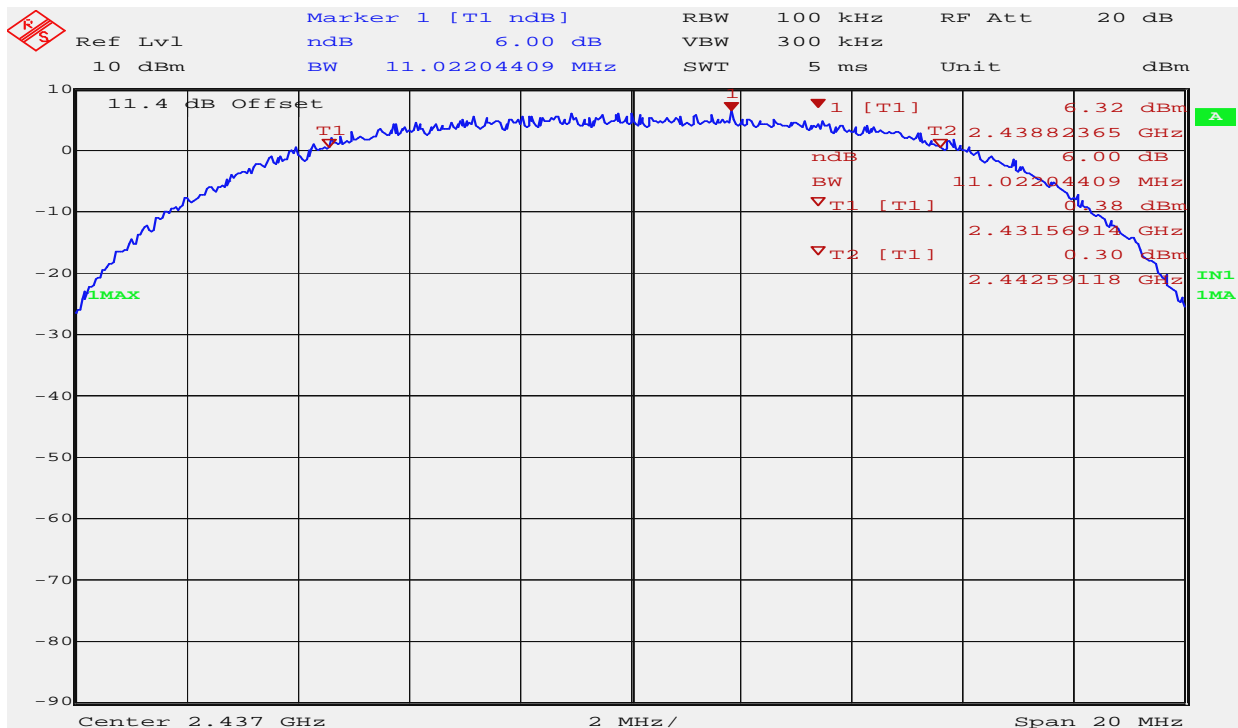
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Figure 3 6 dB Bandwidth 802.11b Low Channel



Title: CG-799 Alphashield 8400
Comment A: 802.11b, Ch1, Cont.Tx, P:15, DR:11, Rf out:Main (integral)
Date: 17.APR.2008 14:20:19

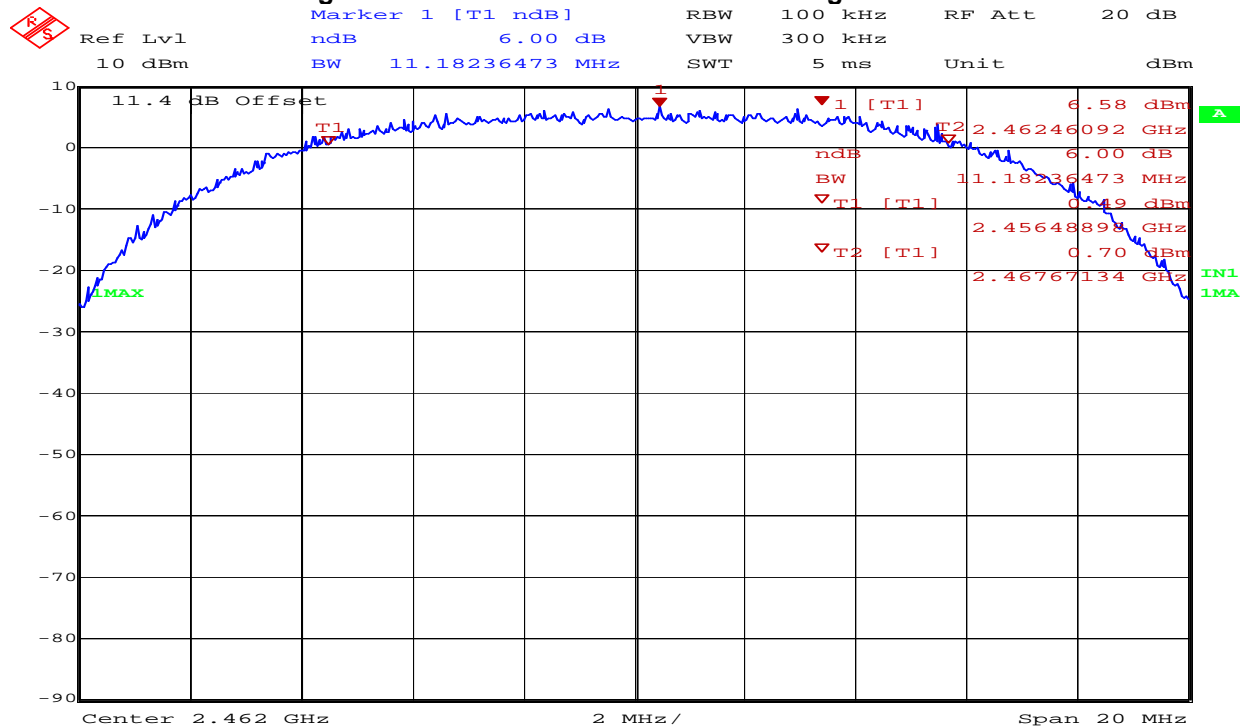
Figure 4 6 dB Bandwidth 802.11b Mid Channel



Title: CG-799 Alphashield 8400
Comment A: 802.11b, Ch6, Cont.Tx, P:15, DR:11, Rf out:Main (integral)
Date: 17.APR.2008 14:18:15

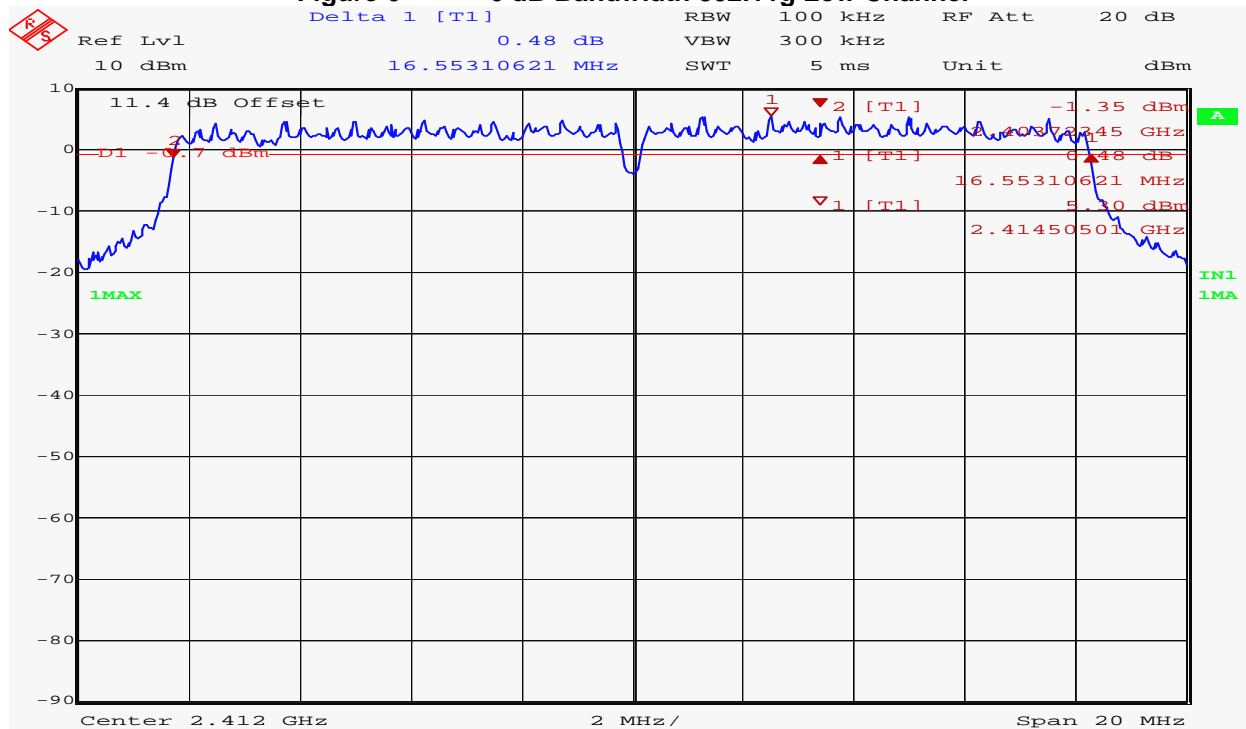
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Figure 5 6 dB Bandwidth 802.11b High Channel



Title: CG-799 Alphashield 8400
Comment A: 802.11b, Ch11, Cont.Tx, P:15, DR:11, Rf out:Main (integral)
Date: 17.APR.2008 14:16:59

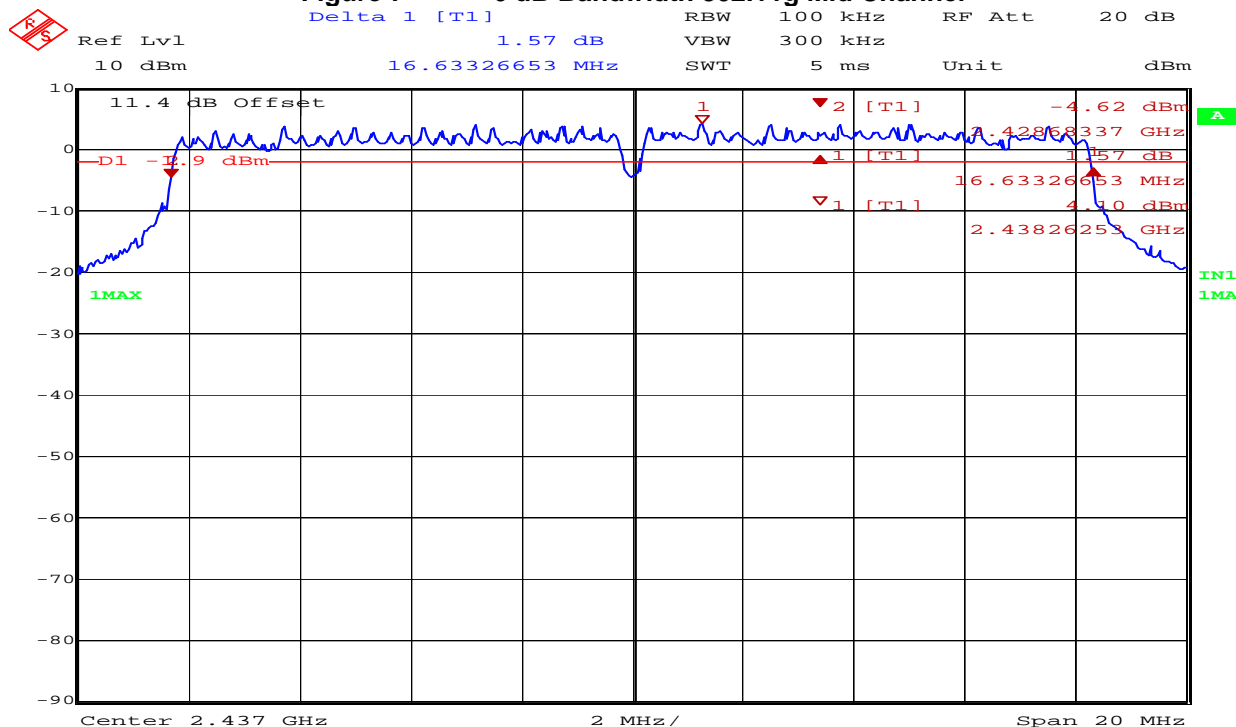
Figure 6 6 dB Bandwidth 802.11g Low Channel



```
Title:      CG-799 Alphashield 8400
Comment A:  802.11g, Ch1, Cont.Tx, P:15, DR:54, Rf out: Main (integral)
Date:       17.APR.2008   22:05:24
```

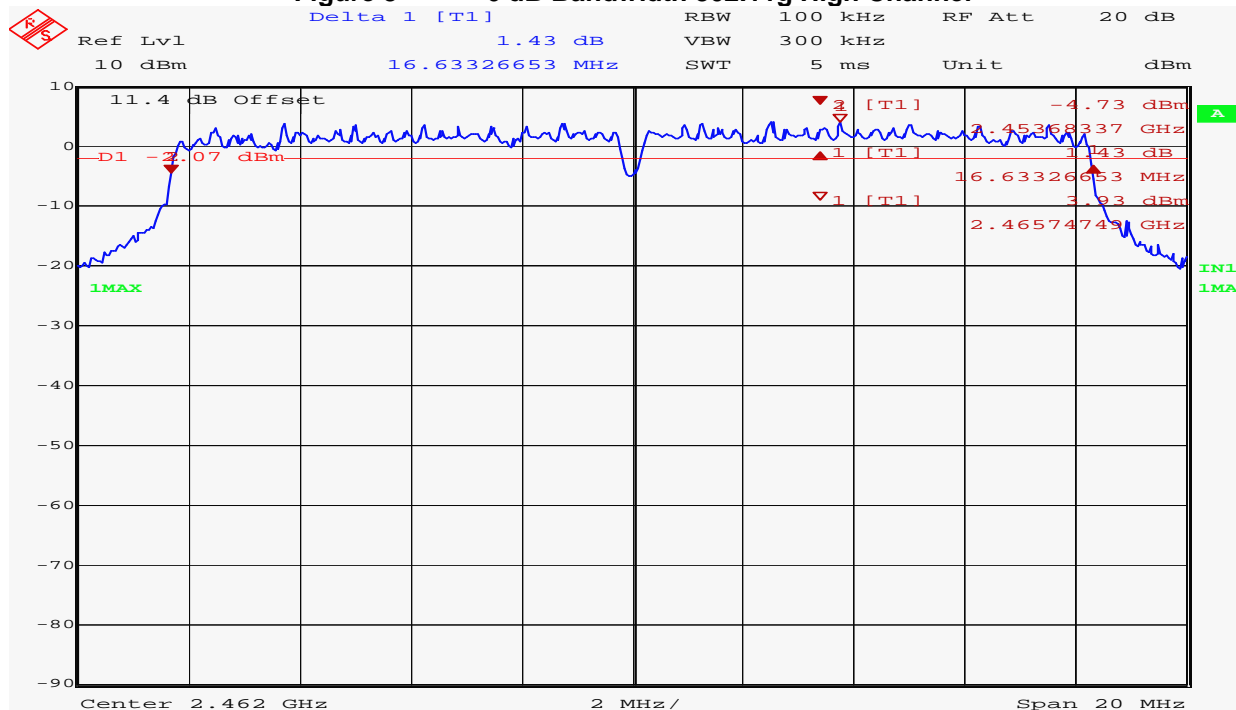
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Figure 7 6 dB Bandwidth 802.11g Mid Channel



Title: CG-799 Alphashield 8400
Comment A: 802.11g, Ch6, Cont.Tx, P:15, DR:54, Rf out: Main (integral)
Date: 17.APR.2008 22:08:44

Figure 8 6 dB Bandwidth 802.11g High Channel



Title: CG-799 Alphashield 8400
Comment A: 802.11g, Ch11, Cont.Tx, P:15, DR:54, Rf out: Main (integral)
Date: 17.APR.2008 22:11:56

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APPENDIX C: OCCUPIED BANDWIDTH

C.1. Base Standard & Test Basis

Base Standard	RSS-Gen Issue 2 4.6.1
Test Basis	RSS-Gen Issue 2 4.6.1
Test Method	RSS-Gen Issue 2 4.6.1

C.2. Specifications

4.6.1 When an occupied bandwidth value is not specified in the applicable RSS, the transmitted signal bandwidth to be reported is to be its 99% emission bandwidth, as calculated or measured.

C.3. Deviations

Deviation Number	Time & Date	Description and Justification of Deviation	Deviation Reference			Approval
			Base Standard	Test Basis	NTS Procedure	
None						

C.4. Test Procedure

RSS-Gen Issue 2

C.5. Test Results

Mode	Channel	Frequency (MHz)	Occupied Bandwidth (MHz)
802.11b	1	2412	15.390
	6	2437	15.350
	11	2462	15.430
802.11g	1	2412	16.472
	6	2437	16.472
	11	2462	16.472
802.11g Super G	6	2437	32.865

Power supply variation within 85 % (102 VAC) to 115 % (138 VAC) of nominal value has no measurable influence on the carrier frequency and carrier levels.

C.6. Operating Mode During Test

The 8400 was tuned to a low, middle, and high channel operating with 802.11b, 802.11g and 802.11g Super G (Ch 6 only) modes. Power setting: 15 (Software). Measurements were taken from Main output of the radio.

C.7. Tested By

This testing was conducted in accordance with the ISO 17025:2005 scope of accreditation, table 1; Quality Manual.

Name: Deniz Demirci
Function: Senior EMC / Wireless Technologist

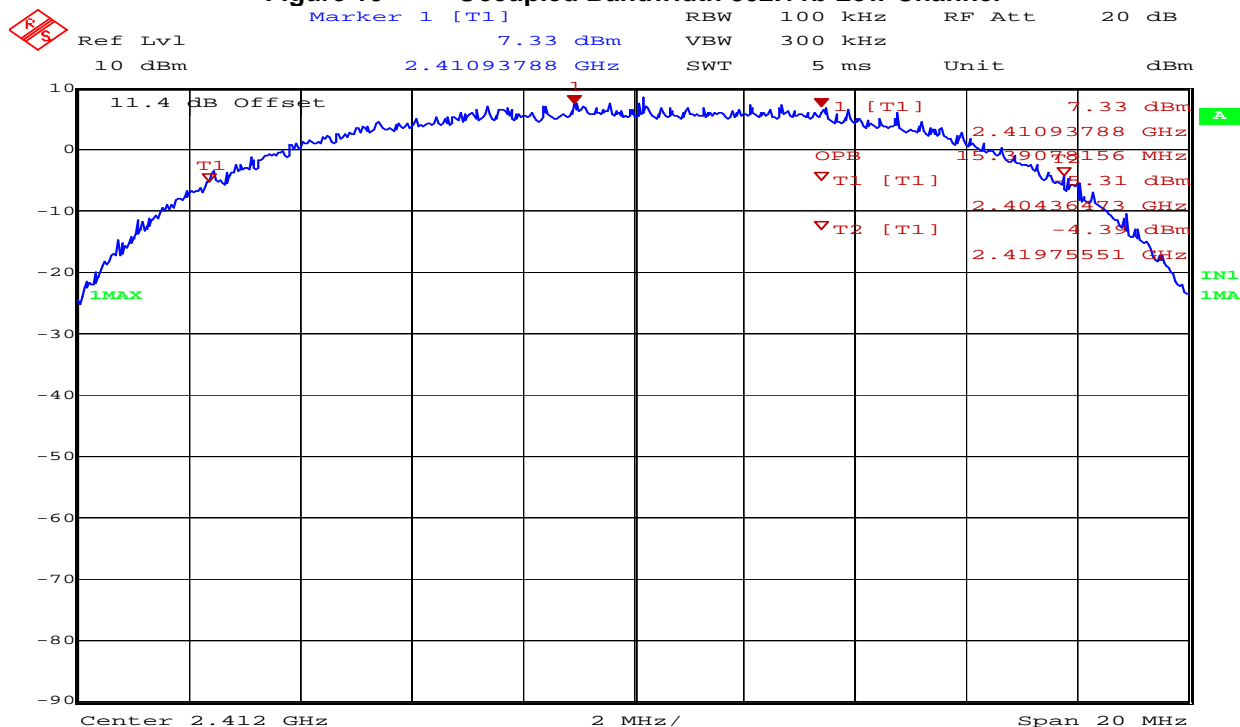
C.8. Test date

Test started: April 17, 2008 Ended: May 15, 2008

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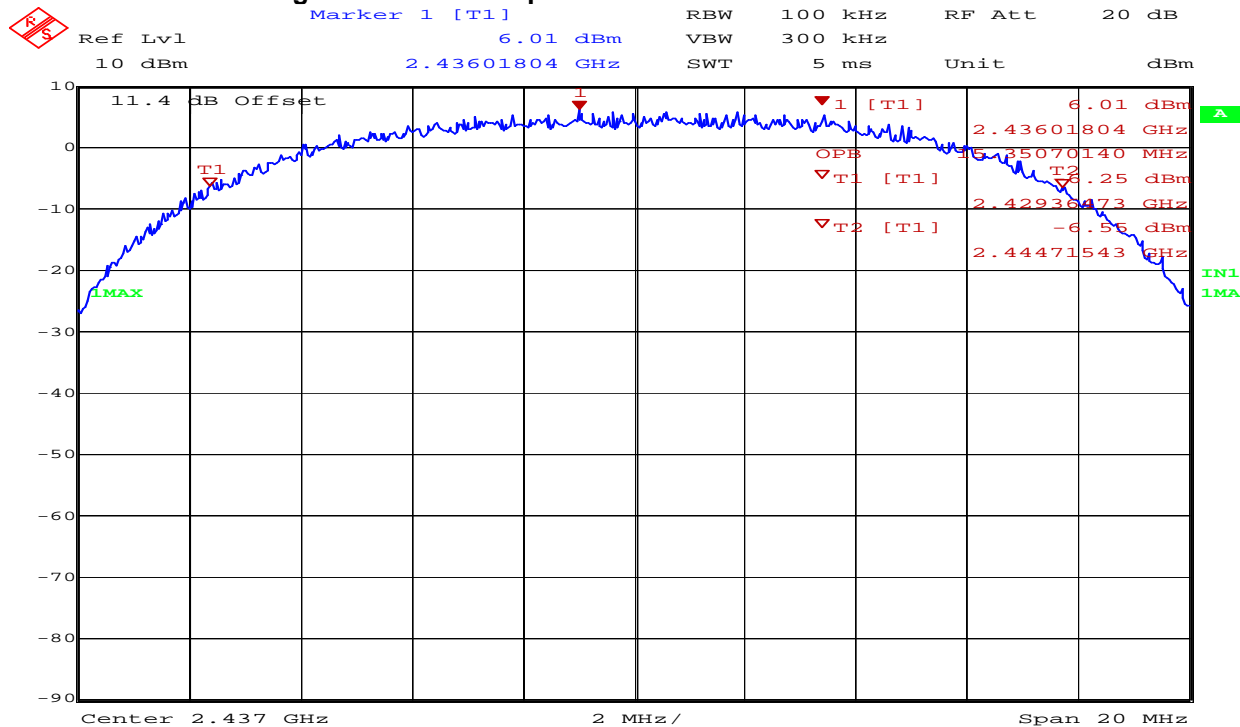
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Figure 10 Occupied Bandwidth 802.11b Low Channel



Title: CG-799 Alphashield 8400
Comment A: 802.11b, Ch1, Cont.Tx, P:15, DR:11, Rf out:Main (integral)
Date: 17.APR.2008 14:53:01

Figure 11 Occupied Bandwidth 802.11b Mid Channel

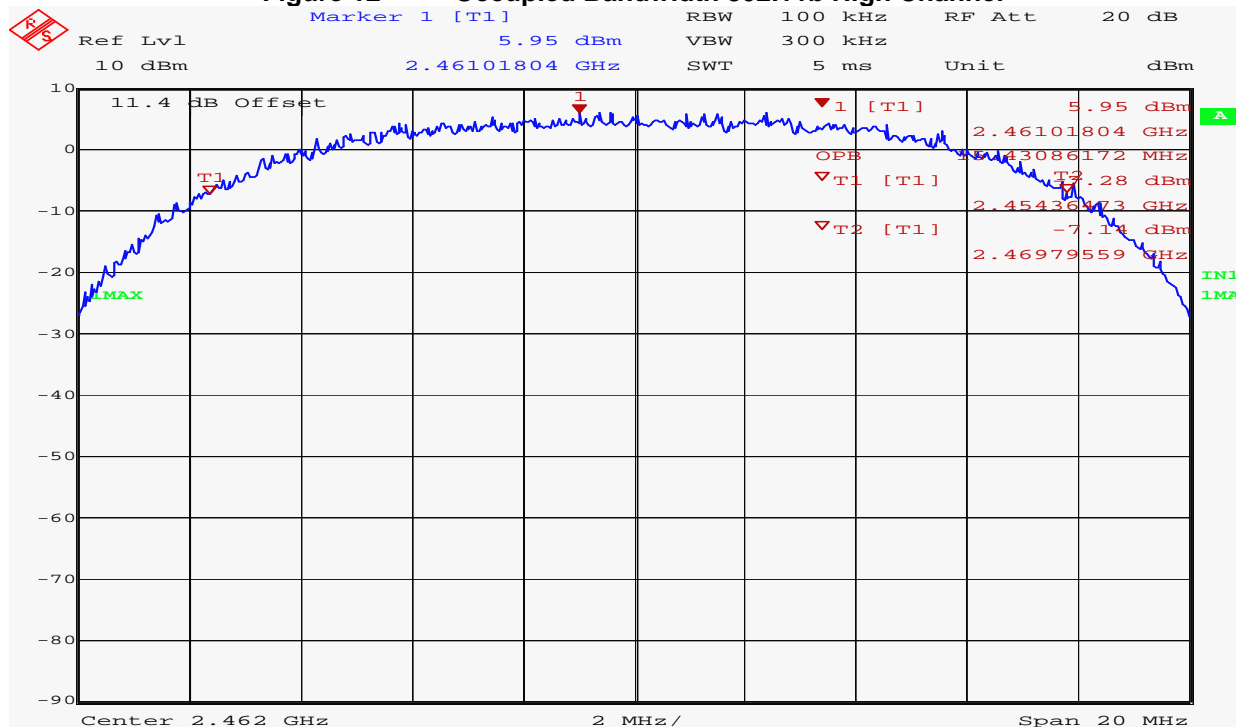


Title: CG-799 Alphashield 8400
Comment A: 802.11b, Ch6, Cont.Tx, P:15, DR:11, Rf out:Main (integral)
Date: 17.APR.2008 14:53:54

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Figure 12 Occupied Bandwidth 802.11b High Channel



Title: CG-799 Alphashield 8400
Comment A: 802.11b, Ch11, Cont.Tx, P:15, DR:11, Rf out:Main (integral)
Date: 17.APR.2008 14:55:25

Figure 13 Occupied Bandwidth 802.11g Low Channel

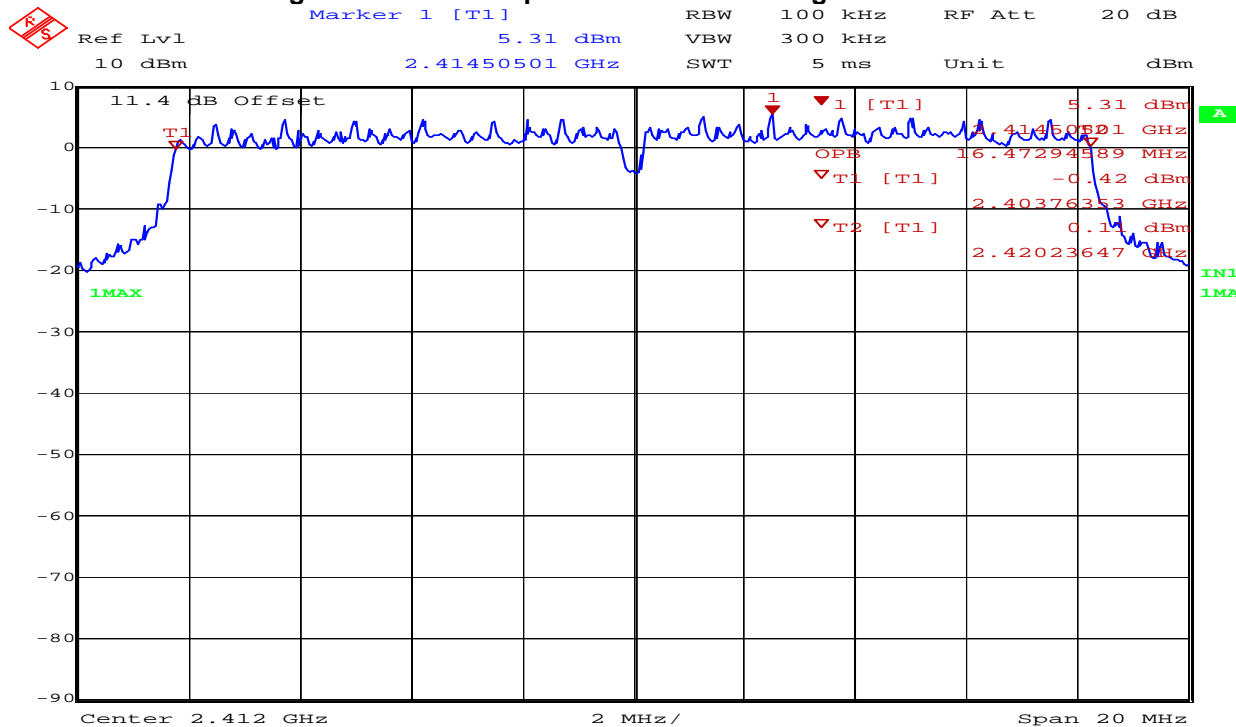
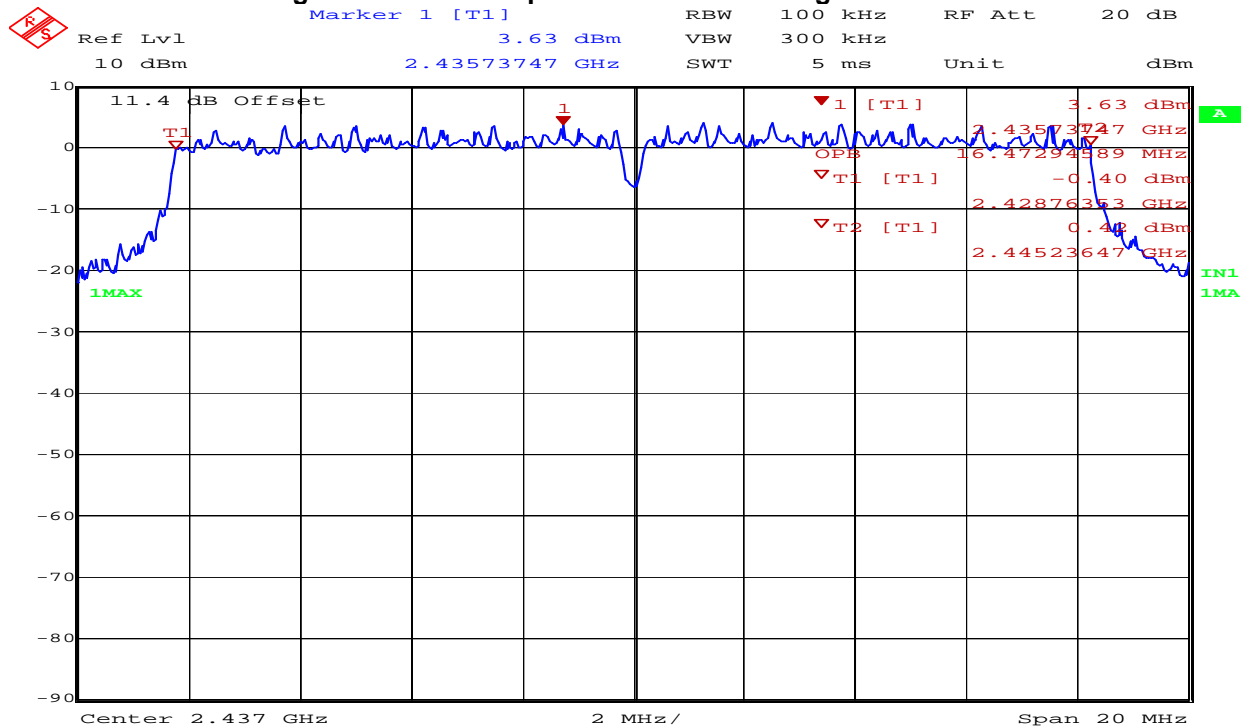
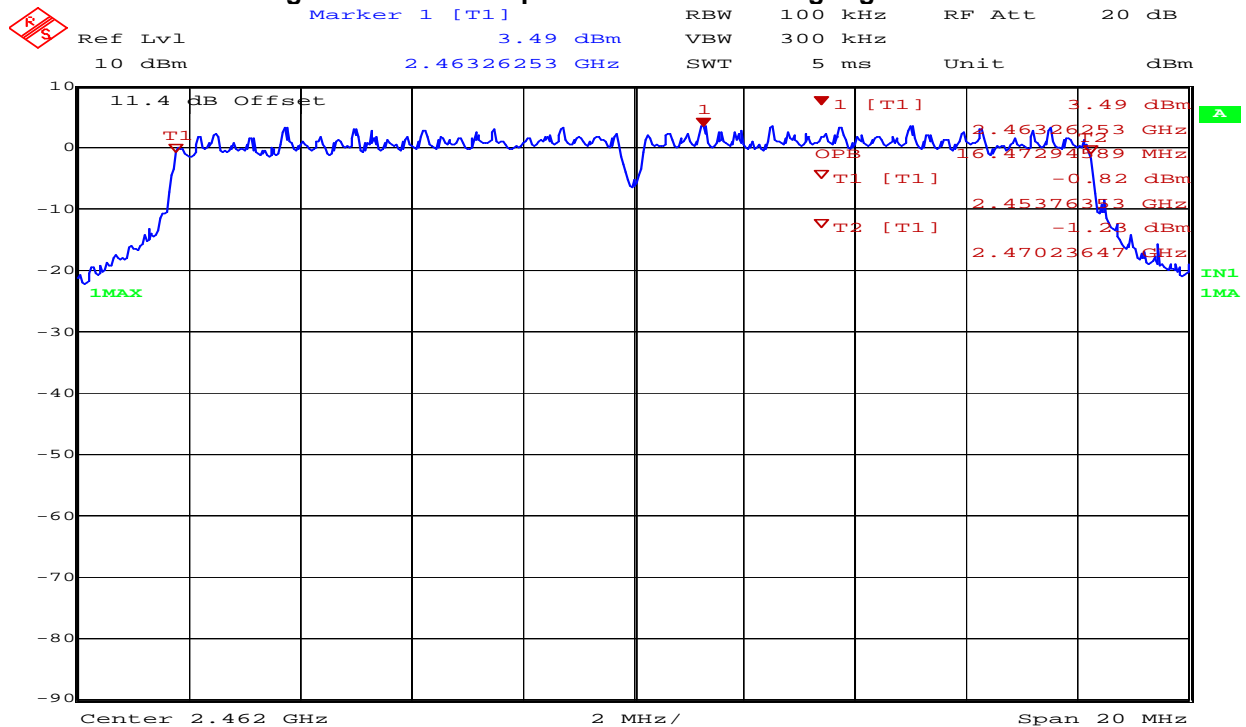


Figure 14 Occupied Bandwidth 802.11g Mid Channel



Title: CG-799 Alphashield 8400
Comment A: 802.11g, Ch6, Cont.Tx, P:15, DR:54, Rf out:Main (integral)
Date: 17.APR.2008 14:50:10

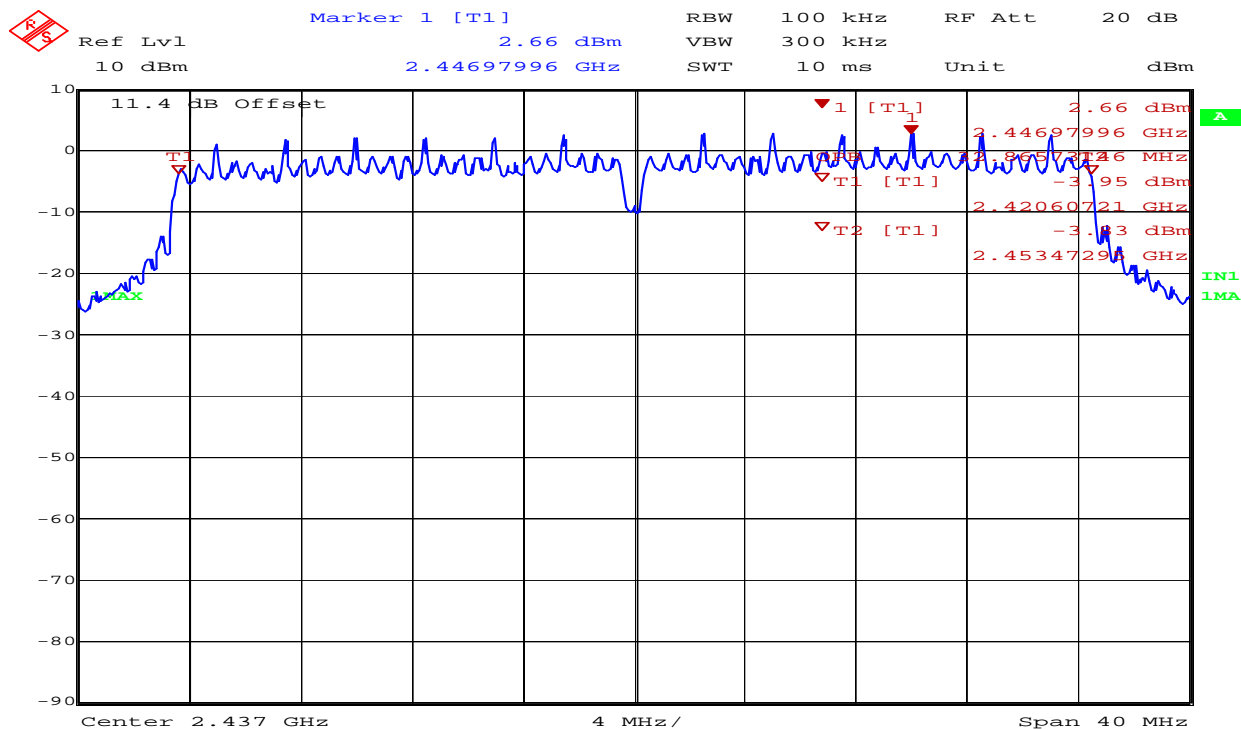
Figure 15 Occupied Bandwidth 802.11g High Channel



Title: CG-799 Alphashield 8400
Comment A: 802.11g, Ch11, Cont.Tx, P:15, DR:54, Rf out:Main (integral)
Date: 17.APR.2008 14:49:08

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in whole or part without permission from the testing body and the customer.

Figure 16 Occupied Bandwidth 802.11g Super G mode



Title: CG-799 Alphashield 8400
Comment A: 802.11g SuperG with StaticTurbo,P:15,DR:108, Cont.Tx Main
Date: 15.MAY.2008 17:30:31

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in whole or part without permission from the testing body and the customer.

NTS Product Integrity Laboratory, 5151-47th Street N.E. Tel: 403-568-6605, Fax: 403-568-6970

APPENDIX D: PEAK POWER OUTPUT

D.1. Base Standard & Test Basis

Base Standard	FCC 15.247 RSS 210 Issue 7 A8.4 (4)
Test Basis	FCC 15.247 as per FCC Publication 558074 RSS-Gen Issue 2 4.8
Test Method	FCC Publication 558074 and RSS-Gen Issue 2 4.8

D.2. Specifications

The maximum peak output power shall not exceed 30 dBm in the 2400 MHz- 2483.5 MHz band

D.3. Deviations

Deviation Number	Time & Date	Description and Justification of Deviation	Deviation Reference			Approval
			Base Standard	Test Basis	NTS Procedure	
None						

D.4. Test Procedure

FCC Publication 558074 Method #3and RSS-Gen Issue 2 4.8

D.5. Operating Mode During Test

The 8400 was tuned to a low, middle, and high channel operating with all available data rates of 802.11b and 802.11g modes. Power setting: 15 (Software).

Measurements were taken from Main and Aux output of the radio.

D.6. Test Results

Compliant

The maximum peak power output was 18.79 dBm with 802.11b mode and 16.22 dBm with 802.11g mode

Maximum emission plots are presented

D.7. Sample Calculation

Peak RF Power = Measured P (dB) + 10*Log (EBW/1MHz)

802.11b EBW = 19.118 MHz, Band Width Correction Factor = 10*Log (19.118/1) = 12.81 dB

802.11g EBW = 21.893 MHz, Band Width Correction Factor = 10*Log (21.893/1) = 13.40 dB

802.11g Super G EBW = 44.488 MHz, BWCF = 10*Log (44.488/1) = 16.48 dB

D.8. Tested By

This testing was conducted in accordance with the ISO 17025:2005 scope of accreditation, table 1; Quality Manual.

Name: Deniz Demirci
Function: Senior EMC / Wireless Technologist

D.9. Test date

Test started: April 24, 2008 Ended: May 15, 2008

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in whole or part without permission from the testing body and the customer.

NTS Product Integrity Laboratory, 5151-47th Street N.E. Tel: 403-568-6605, Fax: 403-568-6970

D.10. Test Data Summary

D.10.1. 802.1b Main

Channel	Frequency (MHz)	Data rate (Mbps)	Measured (dBm)	BW Correction Factor (dB)	Peak RF Power (dBm)
1	2412	1	5.96	12.81	18.77
		2	5.91	12.81	18.72
		5.5	5.77	12.81	18.58
		11	5.41	12.81	18.22
6	2437	1	5.11	12.81	17.92
		2	5.21	12.81	18.02
		5.5	5.43	12.81	18.24
		11	4.83	12.81	17.64
11	2462	1	5.56	12.81	18.37
		2	5.37	12.81	18.18
		5.5	5.23	12.81	18.04
		11	4.88	12.81	17.69

D.10.2. 802.11b Aux

Channel	Frequency (MHz)	Data rate (Mbps)	Measured (dBm)	BW Correction Factor (dB)	Peak RF Power (dBm)
1	2412	1	5.98	12.81	18.79
		2	5.85	12.81	18.66
		5.5	5.74	12.81	18.55
		11	5.29	12.81	18.10
6	2437	1	5.08	12.81	17.89
		2	5.01	12.81	17.82
		5.5	4.93	12.81	17.74
		11	4.60	12.81	17.41
11	2462	1	5.25	12.81	18.06
		2	5.25	12.81	18.06
		5.5	5.04	12.81	17.85
		11	4.80	12.81	17.61

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in whole or part without permission from the testing body and the customer.

D.10.3. 802.11g Main

Channel	Frequency (MHz)	Data rate (Mbps)	Measured (dBm)	BW Correction Factor (dB)	Peak RF Power (dBm)
1	2412	6	2.74	13.40	16.14
		9	2.78	13.40	16.18
		12	2.69	13.40	16.09
		18	2.69	13.40	16.09
		24	2.68	13.40	16.08
		36	2.70	13.40	16.10
		48	2.64	13.40	16.04
		54	2.60	13.40	16.00
6	2437	6	2.39	13.40	15.79
		9	2.25	13.40	15.65
		12	2.11	13.40	15.51
		18	1.98	13.40	15.38
		24	2.14	13.40	15.54
		36	2.16	13.40	15.56
		48	2.10	13.40	15.50
		54	2.13	13.40	15.53
		108	-1.67	16.48	14.81
11	2462	6	2.20	13.40	15.60
		9	2.21	13.40	15.61
		12	2.14	13.40	15.54
		18	2.15	13.40	15.55
		24	2.21	13.40	15.61
		36	2.19	13.40	15.59
		48	2.13	13.40	15.53
		54	2.22	13.40	15.62

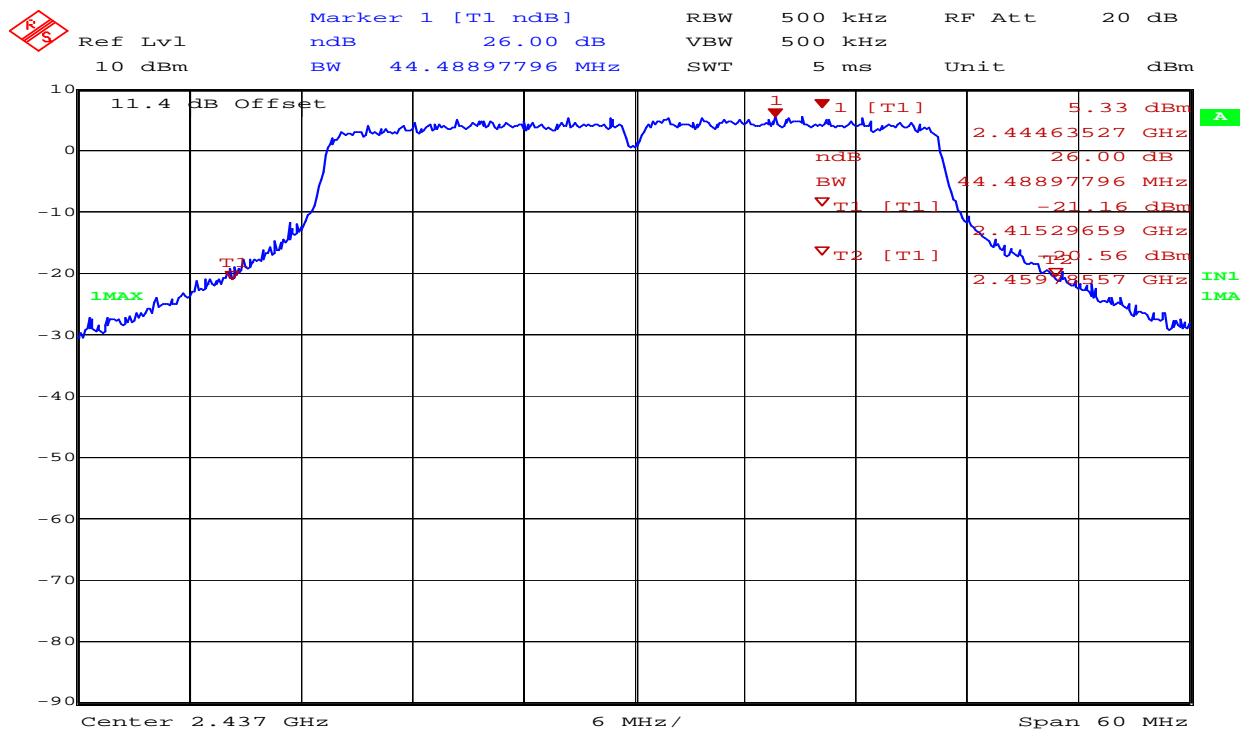
The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in whole or part without permission from the testing body and the customer.

D.10.4. 802.11g Aux

Channel	Frequency (MHz)	Data rate (Mbps)	Measured (dBm)	BW Correction Factor (dB)	Peak RF Power (dBm)
1	2412	6	2.82	13.40	16.22
		9	2.78	13.40	16.18
		12	2.56	13.40	15.96
		18	2.54	13.40	15.94
		24	2.45	13.40	15.85
		36	2.55	13.40	15.95
		48	2.57	13.40	15.97
		54	2.56	13.40	15.96
6	2437	6	2.09	13.40	15.49
		9	2.07	13.40	15.47
		12	1.98	13.40	15.38
		18	2.09	13.40	15.49
		24	2.04	13.40	15.44
		36	2.07	13.40	15.47
		48	2.04	13.40	15.44
		54	2.04	13.40	15.44
		108	-1.84	16.48	14.64
11	2462	6	2.01	13.40	15.41
		9	1.96	13.40	15.36
		12	1.87	13.40	15.27
		18	1.90	13.40	15.30
		24	2.12	13.40	15.52
		36	2.05	13.40	15.45
		48	2.00	13.40	15.40
		54	2.13	13.40	15.53

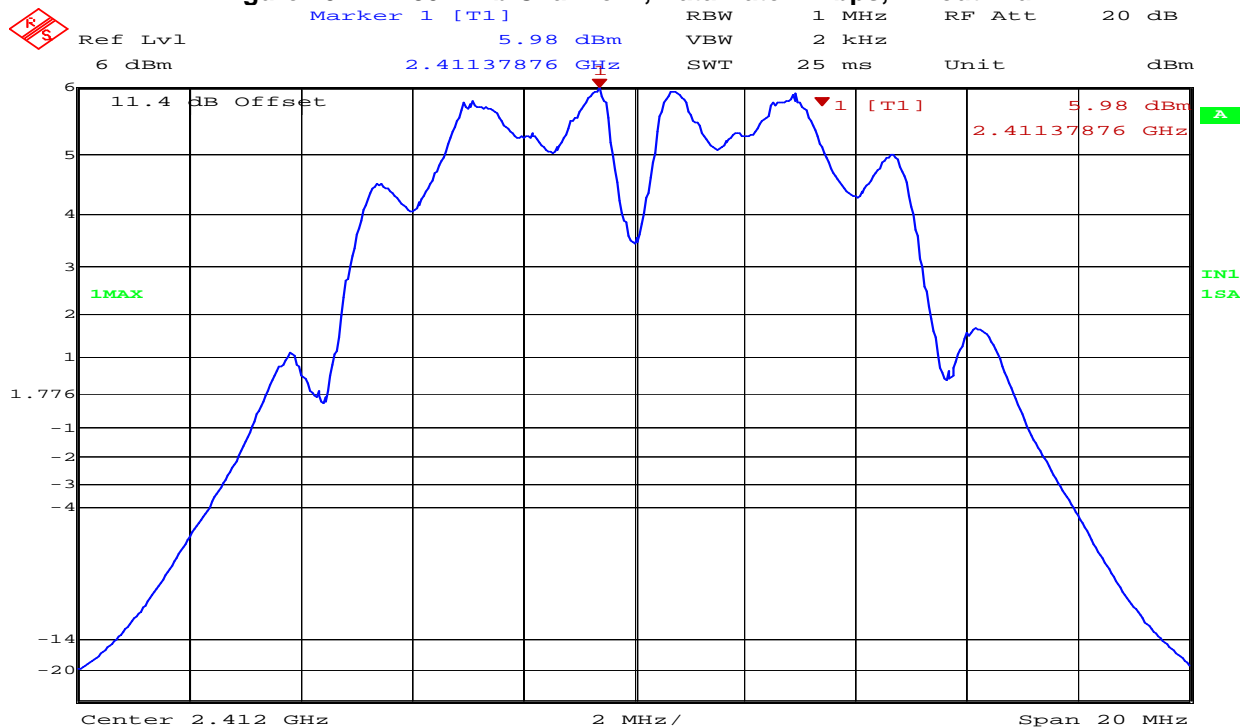
The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in whole or part without permission from the testing body and the customer.

Figure 19 802.11g Super G Mode Emission Bandwidth



Title: CG-799 Alphashield 8400
Comment A: 802.11g Super G with StaticTurbo, P:15, DR:108, Cont. Tx
Date: 15.MAY.2008 16:34:13

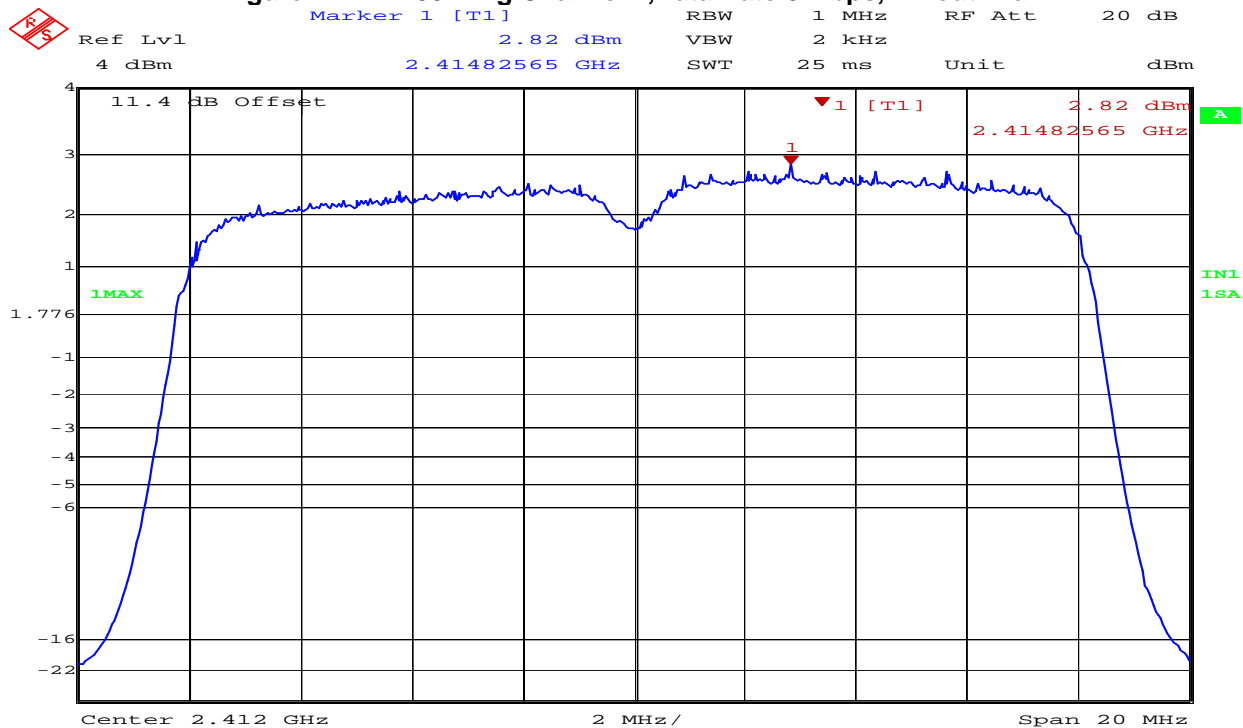
Figure 20 802.11b Channel 1, Data Rate 1 Mbps, RF out: Aux



Title: CG-799 Alphashield 8400
Comment A: 802.11b, Ch1, Cont.Tx, P:15, DR:1, RF out: Aux (External)
Date: 24.APR.2008 10:49:41

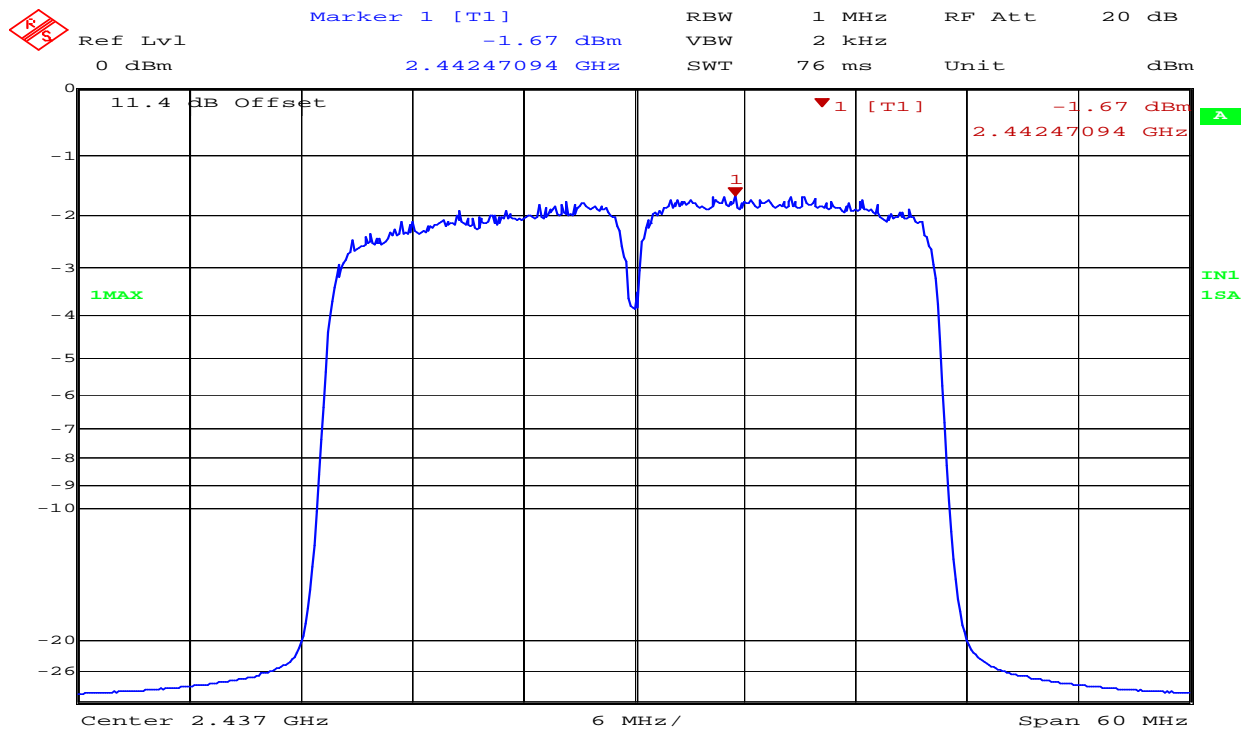
The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in whole or part without permission from the testing body and the customer.

Figure 21 802.11g Channel 1, Data Rate 6 Mbps, RF out: Aux



Title: CG-799 Alphashield 8400
Comment A: 802.11g, Ch1, Cont.Tx, P:15, DR:6, RF out: Aux (External)
Date: 24.APR.2008 10:03:53

Figure 22 802.11g Super G mode Channel 6, Data Rate 108 Mbps, RF out: Main



Title: CG-799 Alphashield 8400
Comment A: 802.11g Supe G with StaticTurbo, P:15, DR:108, Cont.Tx Main
Date: 15.MAY.2008 16:46:54

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in whole or part without permission from the testing body and the customer.

APPENDIX E: POWER SPECTRAL DENSITY

E.1. Base Standard & Test Basis

Base Standard	FCC 15.247 (e) RSS 210 Issue 7 A8.2 (b)
Test Basis	FCC 15.247 as per FCC Publication 558074 RSS 210 Issue 7 A8.2 (b)
Test Method	FCC Publication 558074 and RSS 210 Issue 7 A8.2 (b)

E.2. Specifications

15.247 e) For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

E.3. Deviations

Deviation Number	Time & Date	Description and Justification of Deviation	Deviation Reference			Approval
			Base Standard	Test Basis	NTS Procedure	
none						

E.4. Test Procedure

FCC Publication 558074

E.5. Operating Mode During Test

The 8400 was tuned to a low, middle, and high channel operating with 802.11b, 802.11g and 802.11g Super G (Ch 6 only) modes. Power setting: 15 (Software). Measurements were taken from Main and Aux output of the radio.

E.6. Test Results

Compliant. The maximum measured power spectral density was -5.84 dBm

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in whole or part without permission from the testing body and the customer.

NTS Product Integrity Laboratory, 5151-47th Street N.E. Tel: 403-568-6605, Fax: 403-568-6970

E.7. Test Data Summary

Mode	RF Output	Channel	Frequency (MHz)	Power Spectral Density (dBm)
802.11b	Main	1	2413.005	-6.32
		6	2437.305	-7.03
		11	2462.951	-6.80
	Aux	1	2413.564	-5.84
		6	2435.533	-7.32
		11	2464.614	-6.51
802.11g	Main	1	2408.219	-7.41
		6	2436.031	-8.12
		11	2460.415	-8.46
	Aux	1	2417.321	-7.78
		6	2432.617	-8.89
		11	2466.979	-8.57
802.11g Super G	Main	6	2432.032	-12.73
	Aux	6	2433.819	-12.21

E.8. Sample Calculation

None

E.9. Tested By

This testing was conducted in accordance with the ISO 17025:2005 scope of accreditation, table 1; Quality Manual.

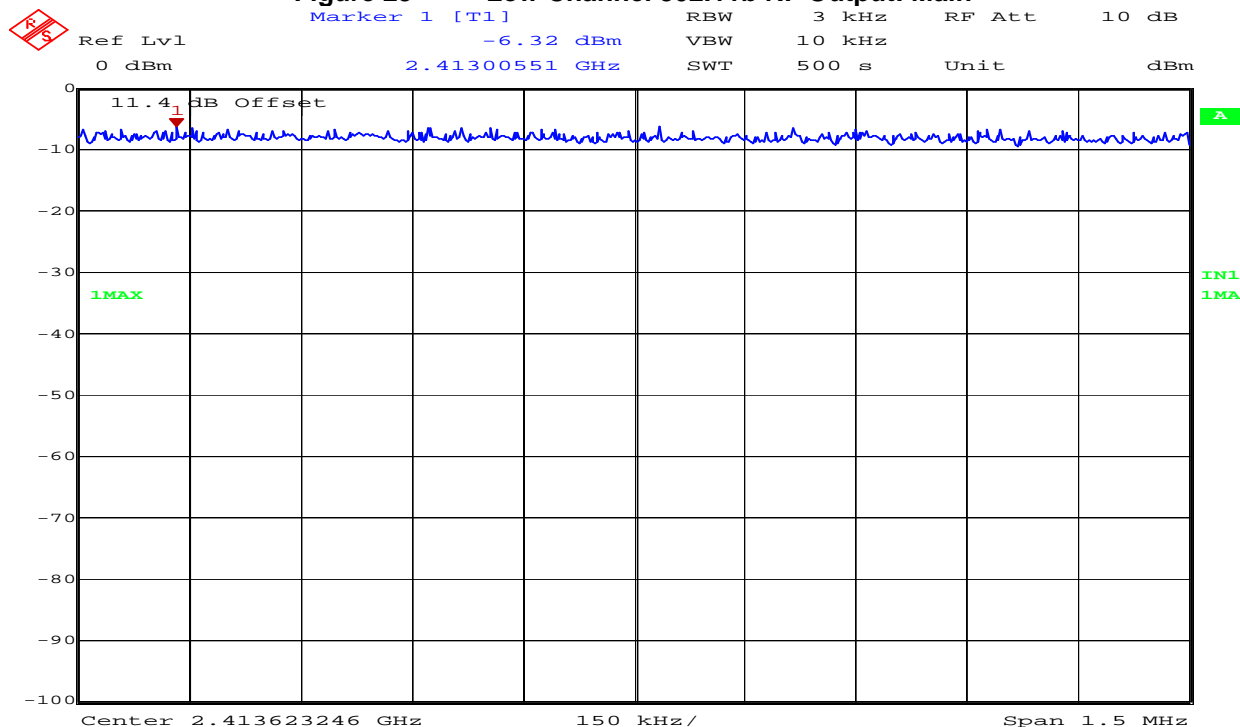
Name: Deniz Demirci
Function: Senior EMC / Wireless Technologist

E.10. Test date

Test started: April 17, 2008 Ended: May 15, 2008

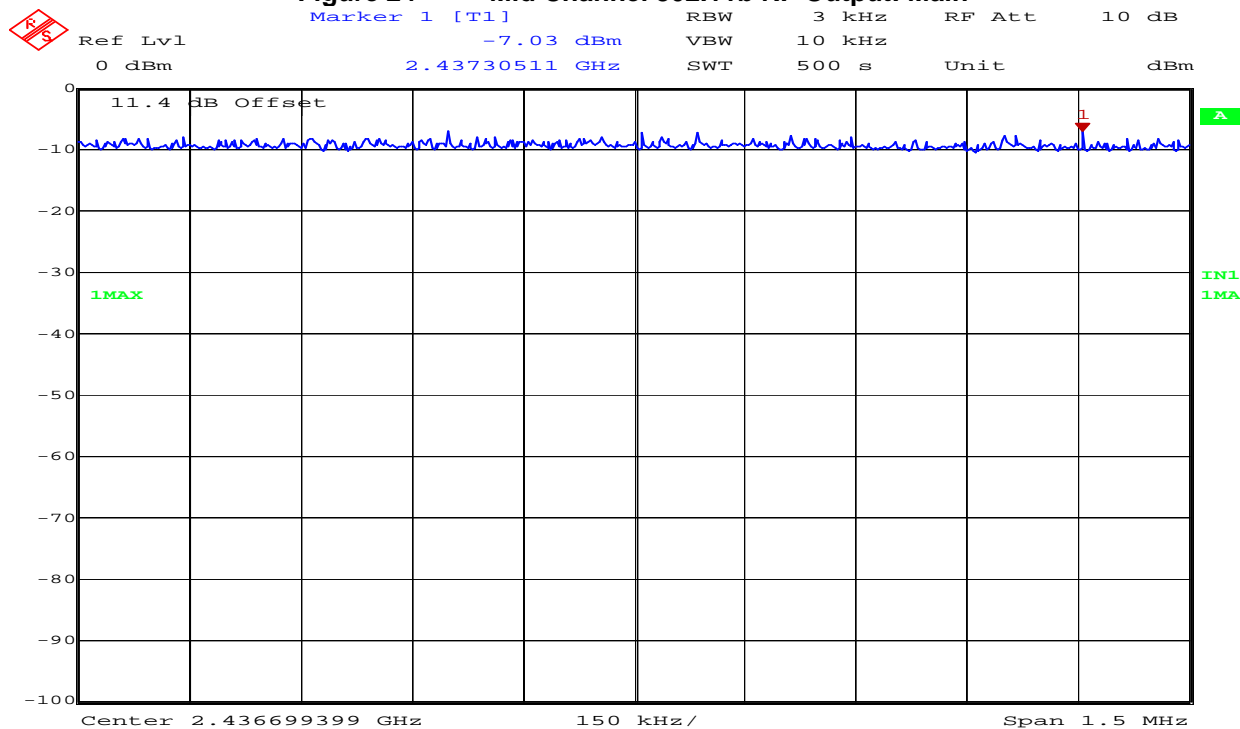
The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in whole or part without permission from the testing body and the customer.

Figure 23 Low Channel 802.11b RF Output: Main



Title: CG-799 Alphashield 8400
Comment A: 802.11b, Ch1, Cont.Tx, P:15, DR:11, RF out: Main (integral)
Date: 22.APR.2008 11:24:15

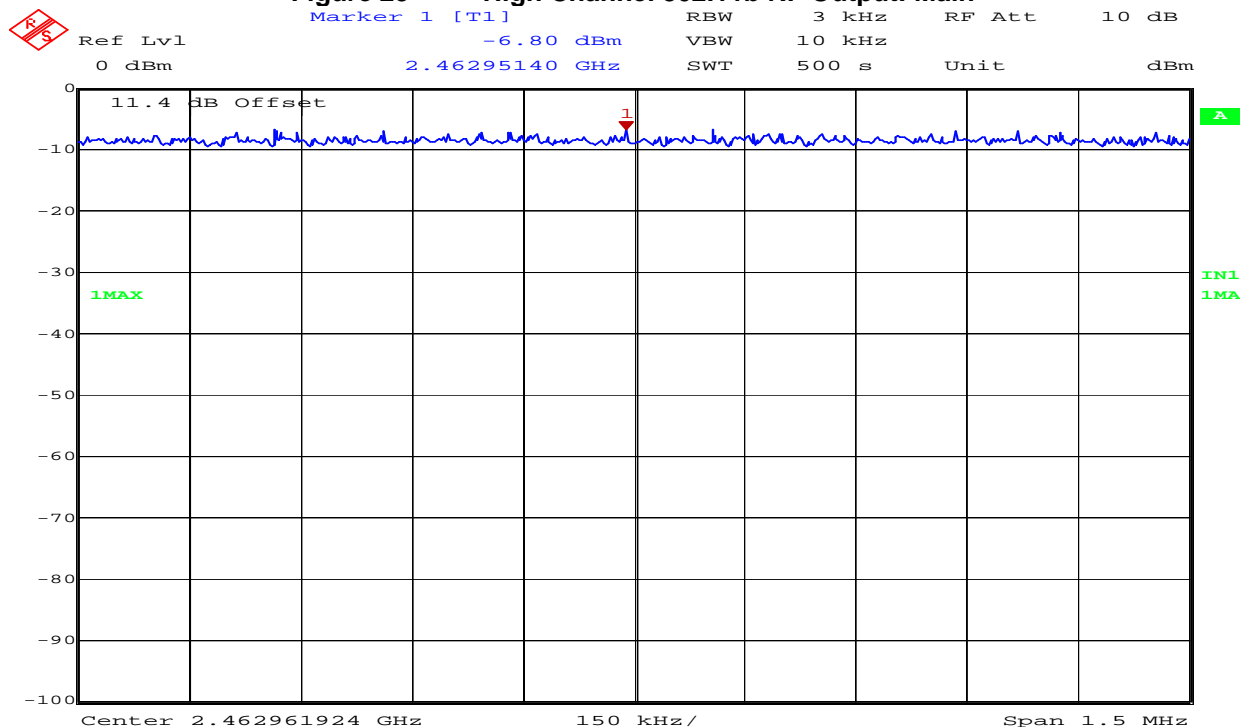
Figure 24 Mid Channel 802.11b RF Output: Main



Title: CG-799 Alphashield 8400
Comment A: 802.11b, Ch6, Cont.Tx, P:15, DR:11, RF out: Main (integral)
Date: 22.APR.2008 11:48:56

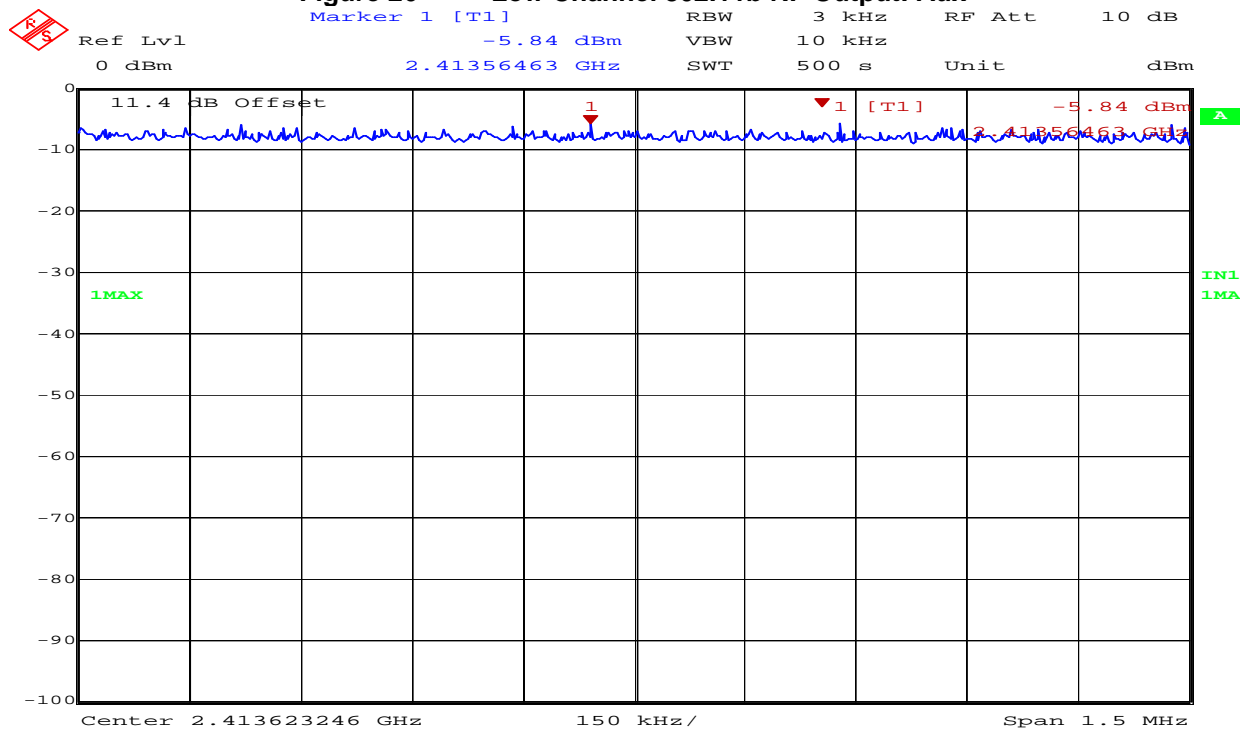
The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in whole or part without permission from the testing body and the customer.

Figure 25 High Channel 802.11b RF Output: Main



Title: CG-799 Alphashield 8400
Comment A: 802.11b, Ch11, Cont.Tx, P:15, DR:11, RF out: Main (integral)
Date: 22.APR.2008 14:29:38

Figure 26 Low Channel 802.11b RF Output: Aux



Title: CG-799 Alphashield 8400
Comment A: 802.11b, Ch1, Cont.Tx, P:15, DR:11, Rf out: Aux (external)
Date: 21.APR.2008 16:08:39

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in whole or part without permission from the testing body and the customer.

Figure 27 Mid Channel 802.11b RF Output: Aux

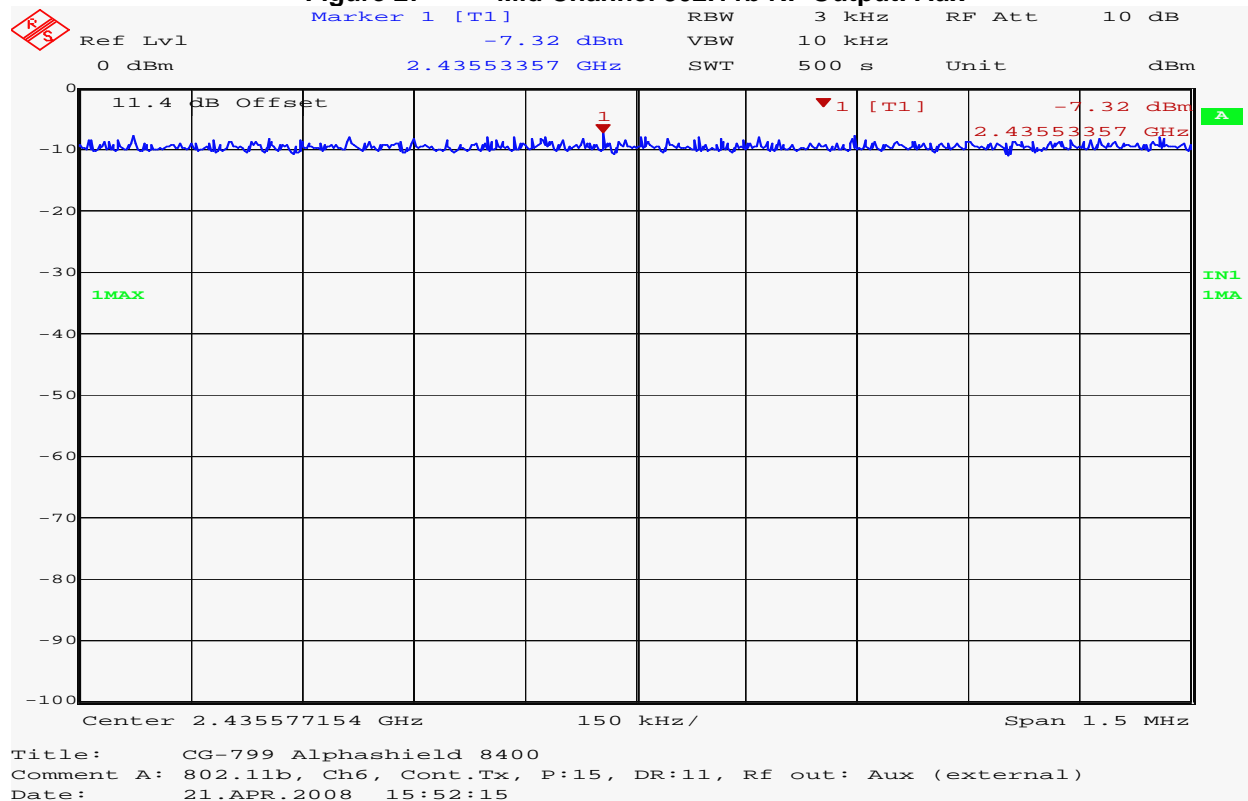
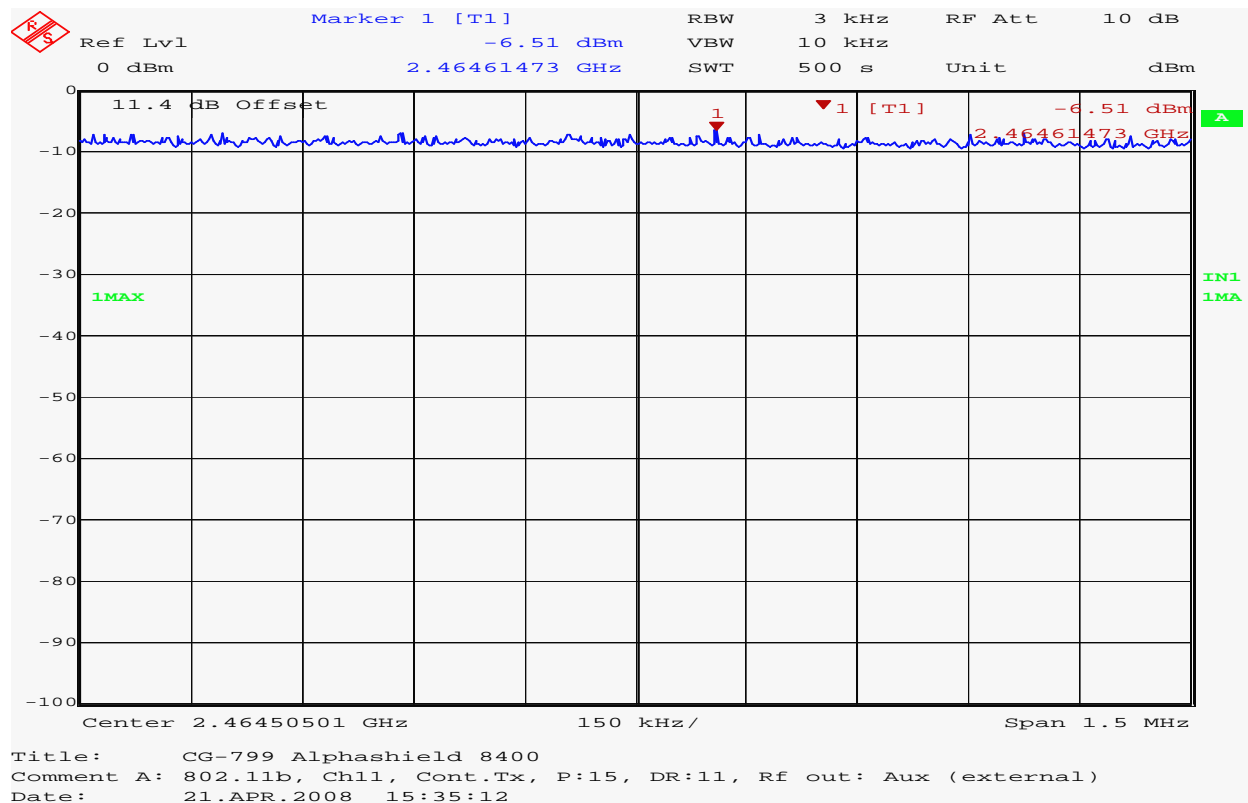
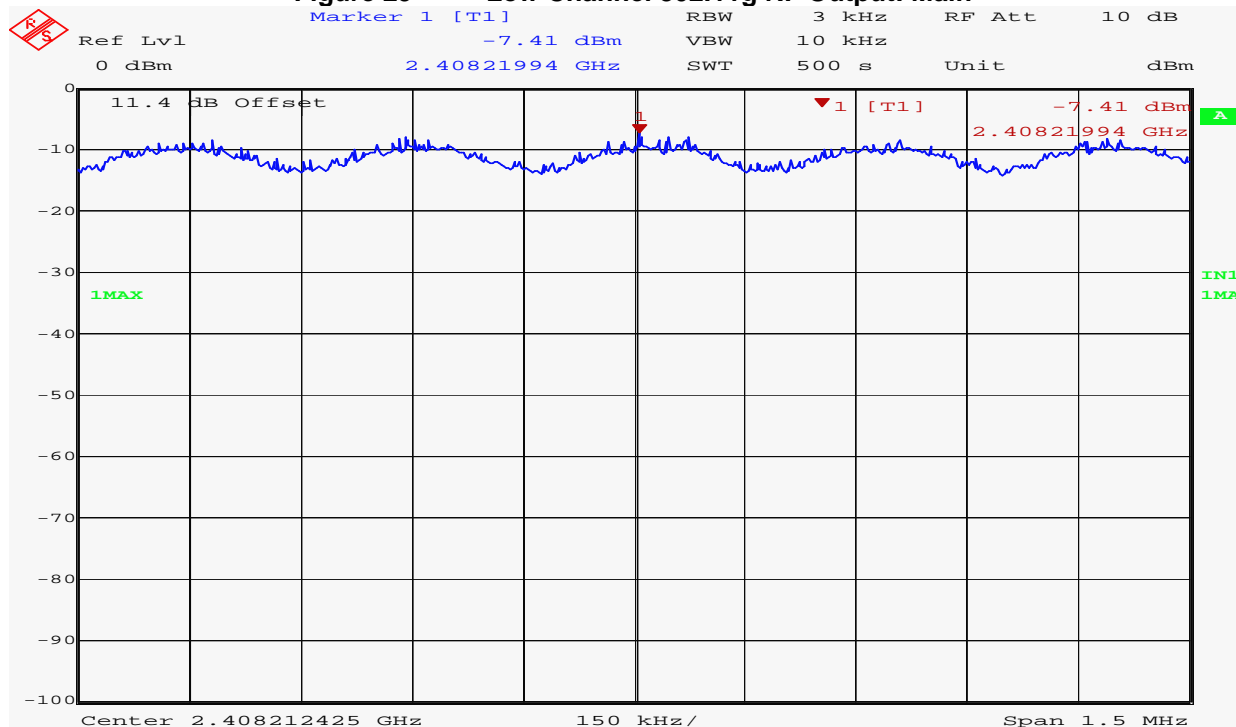


Figure 28 High Channel 802.11b RF Output: Aux



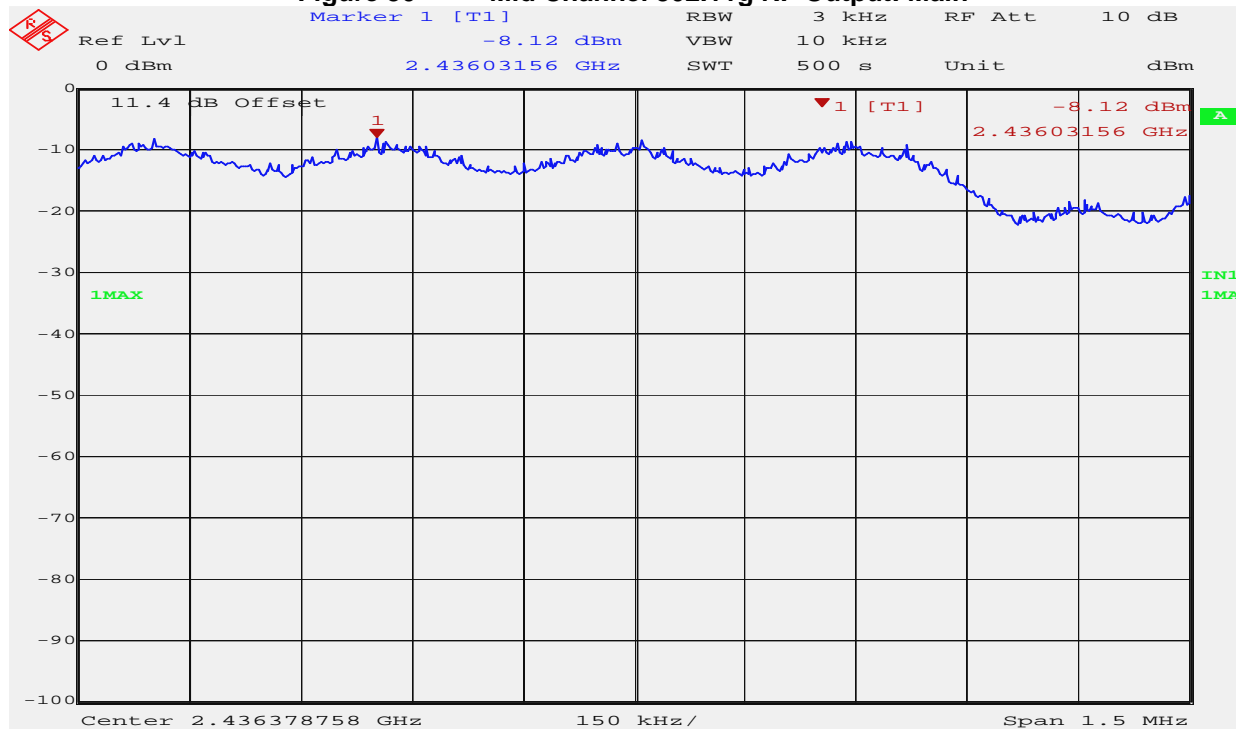
The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in whole or part without permission from the testing body and the customer.

Figure 29 Low Channel 802.11g RF Output: Main



Title: CG-799 Alphashield 8400
Comment A: 802.11g, Ch1, Cont.Tx, P:15, DR:54, Rf out: Main (integral)
Date: 17.APR.2008 23:21:40

Figure 30 Mid Channel 802.11g RF Output: Main



Title: CG-799 Alphashield 8400
Comment A: 802.11g, Ch6, Cont.Tx, P:15, DR:54, Rf out: Main (integral)
Date: 17.APR.2008 23:03:22

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in whole or part without permission from the testing body and the customer.

Figure 31 High Channel 802.11g RF Output: Main

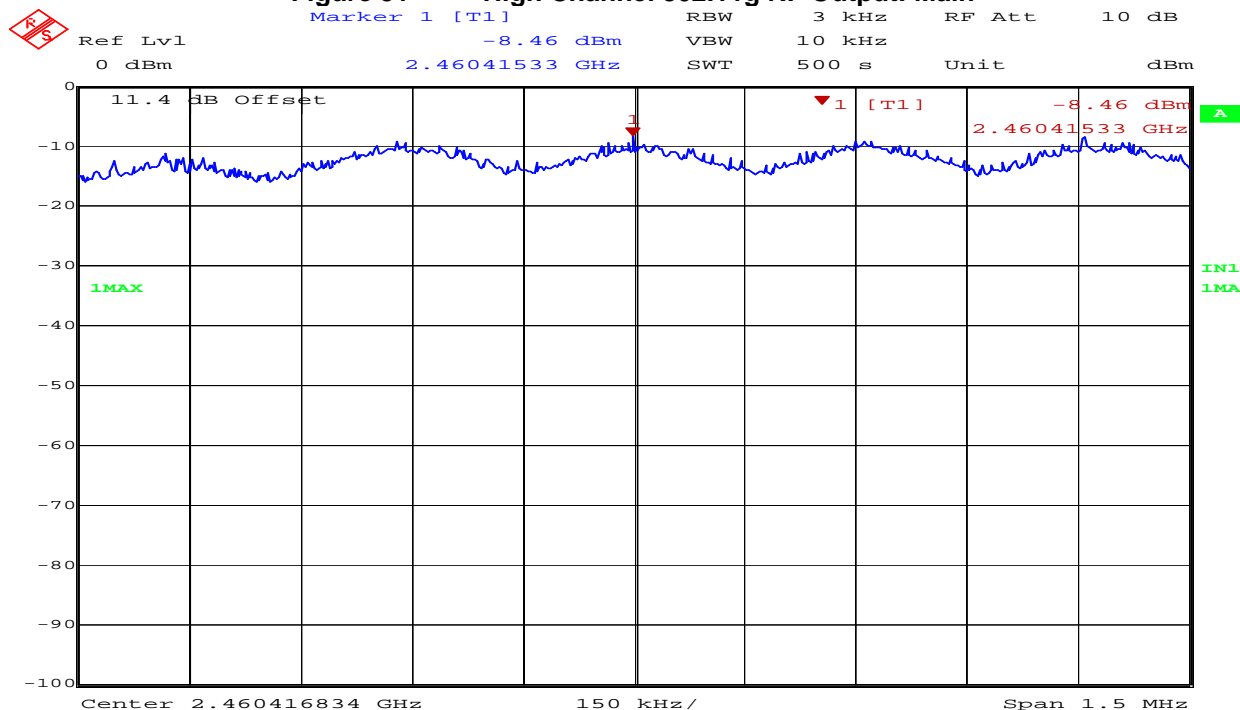
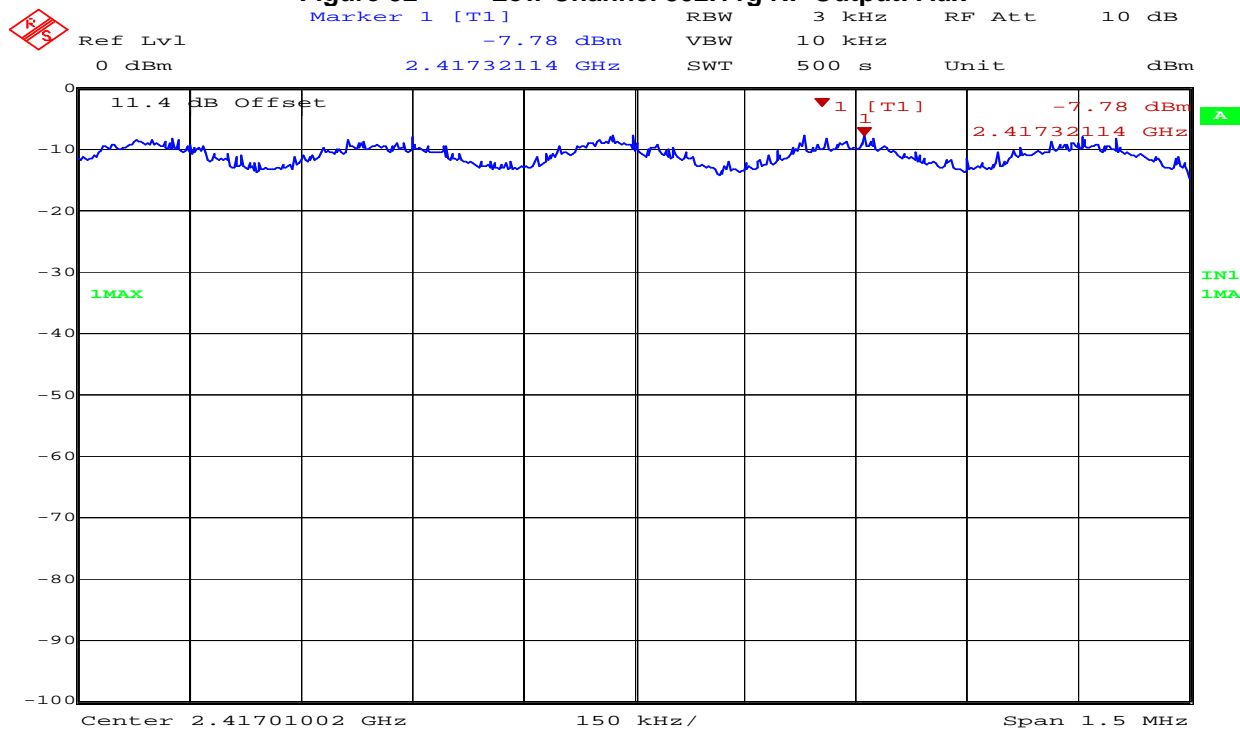
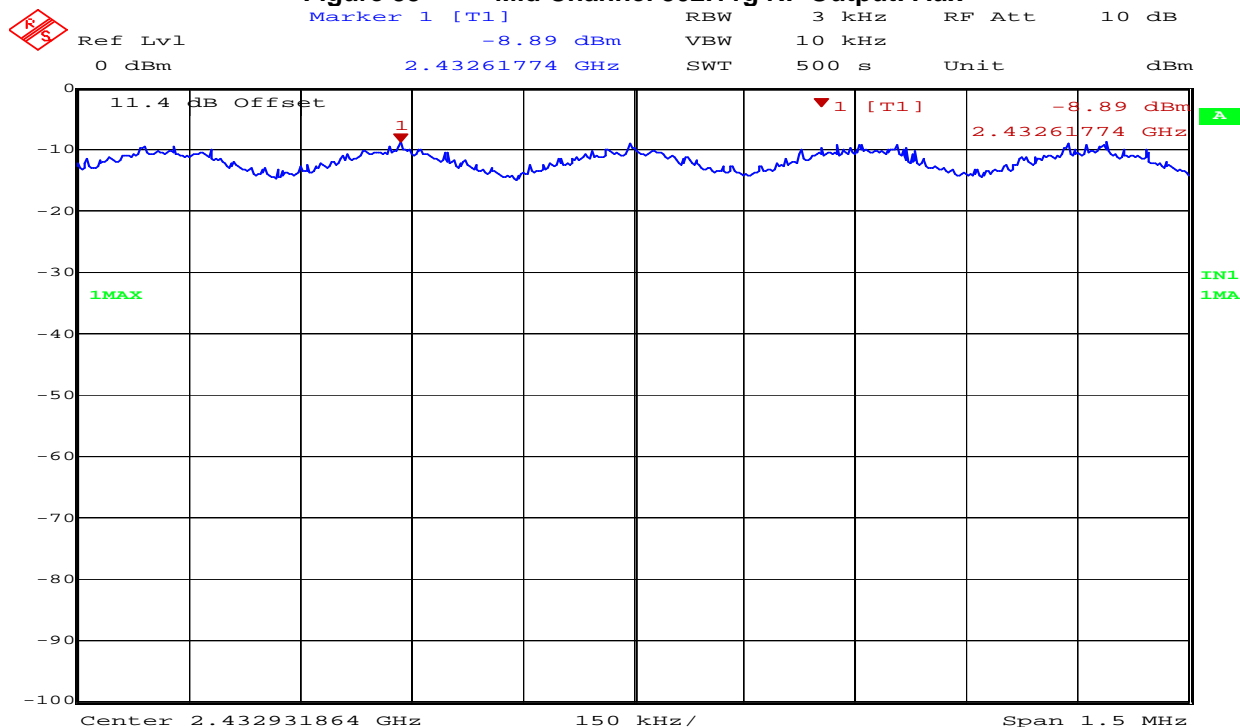


Figure 32 Low Channel 802.11g RF Output: Aux



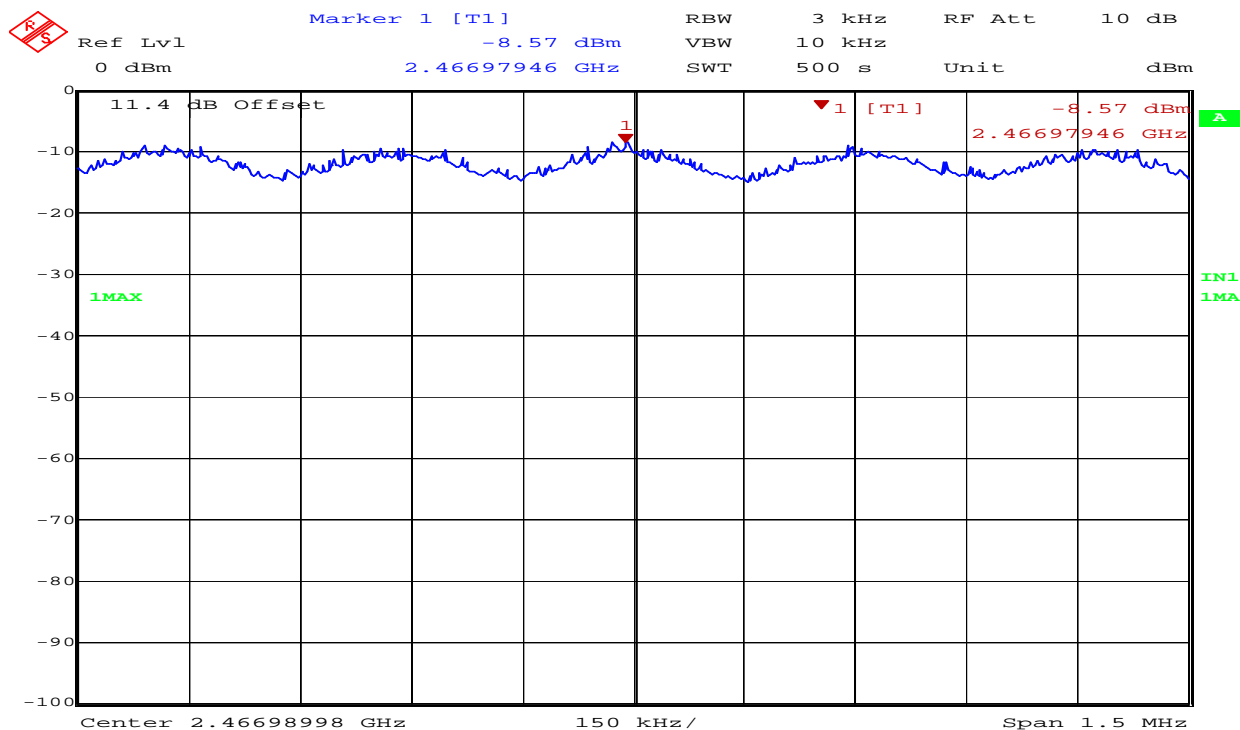
The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in whole or part without permission from the testing body and the customer.

Figure 33 Mid Channel 802.11g RF Output: Aux



Title: CG-799 Alphashield 8400
Comment A: 802.11g, Ch6, Cont.Tx, P:15, DR:54, Rf out: Aux (external)
Date: 21.APR.2008 13:21:15

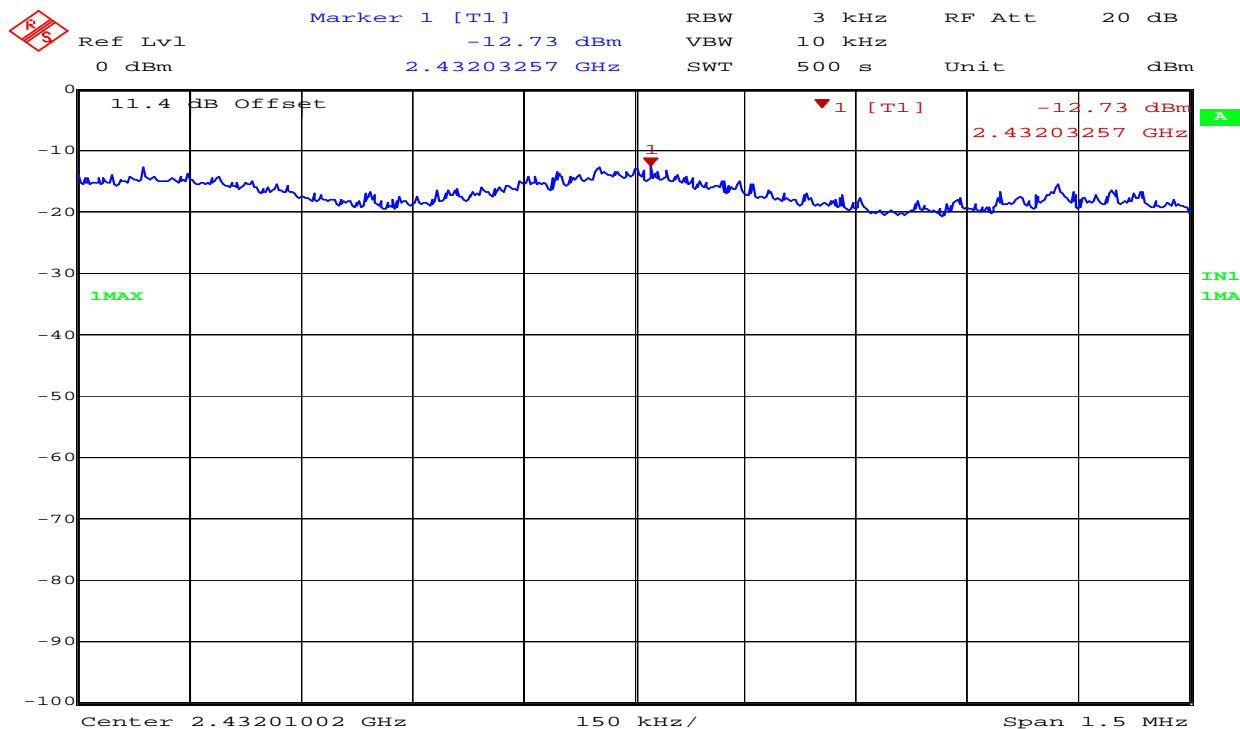
Figure 34 High Channel 802.11g RF Output: Aux



Title: CG-799 Alphashield 8400
Comment A: 802.11g, Ch11, Cont.Tx, P:15, DR:54, Rf out: Aux (external)
Date: 21.APR.2008 13:40:11

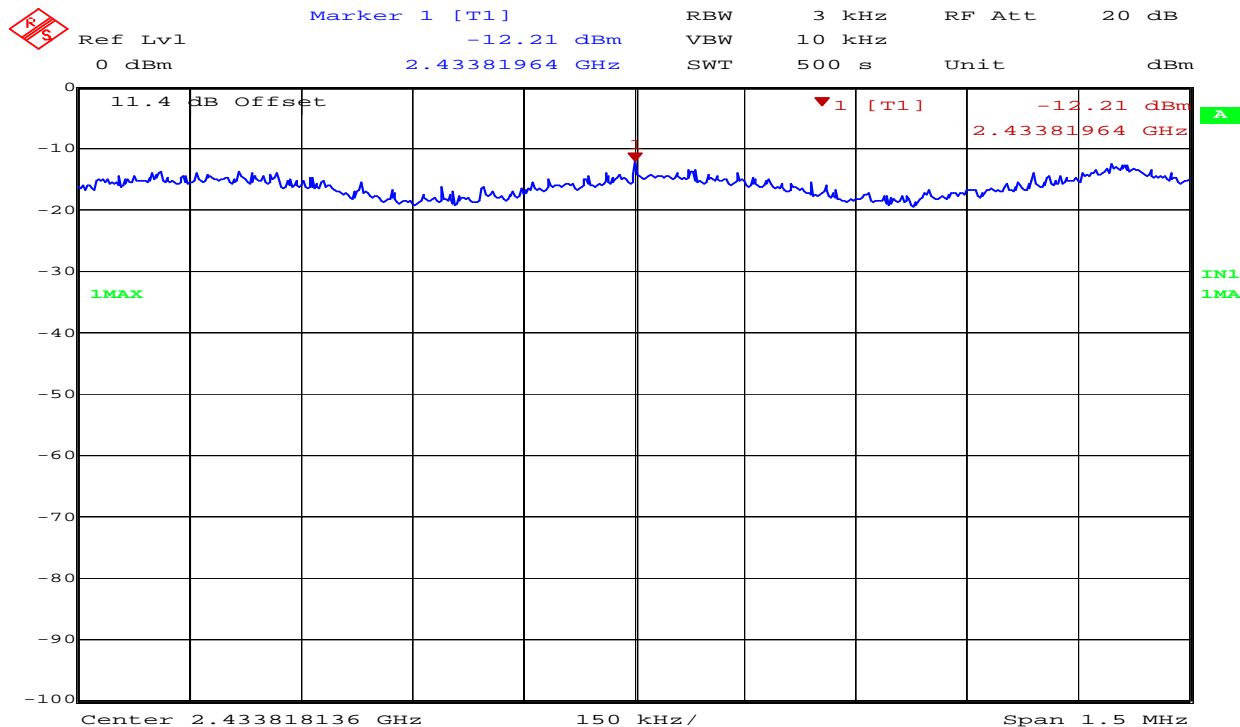
The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in whole or part without permission from the testing body and the customer.

Figure 35 Mid Channel 802.11g Super G Mode RF Output: Main



Title: CG-799 Alphashield 8400
Comment A: 802.11g SuperG with StaticTurbo,P:15,DR:108, Cont.Tx Main
Date: 15.MAY.2008 17:02:11

Figure 36 Mid Channel 802.11g Super G Mode RF Output: Aux



Title: CG-799 Alphashield 8400
Comment A: 802.11g SuperG with StaticTurbo,P:15,DR:108, Cont.Tx Aux
Date: 15.MAY.2008 17:21:20

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in whole or part without permission from the testing body and the customer.

APPENDIX F: DUTY CYCLE

F.1. Base Standard & Test Basis

Base Standard	FCC 15.35 (c) RSS-Gen Issue 2 4.5
Test Basis	FCC 15.35 (c) as per FCC Publication 558074 RSS-Gen Issue 2 4.5
Test Method	Zero span

F.2. Specifications

15.35 (c) Unless otherwise specified, e.g. §15.255(b), when the radiated emission limits are expressed in terms of the average value of the emission, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value. The exact method of calculating the average field strength shall be submitted with any application for certification or shall be retained in the measurement data file for equipment subject to notification or verification.

F.3. Deviations

Deviation Number	Time & Date	Description and Justification of Deviation	Deviation Reference			Approval
			Base Standard	Test Basis	NTS Procedure	
none						

F.4. Test Procedure

Zero span.

F.5. Operating Mode During Test

The 8400 was tuned to Channel 1 operating with the highest data rate (11 Mbps) 802.11b, the highest data rate (54 Mbps) 802.11g and Channel 6 108 Mbps 802.11g Super G modes.

Measurements were taken from Main output of the radio.

F.6. Test Results

802.11b; On time: 2896 μ s, period: 2.913 μ s
802.11g; On time: 593 μ s, period: 613 μ s
802.11g Super G; On Time: 308 μ s, period: 317 μ s

F.7. Tested By

This testing was conducted in accordance with the ISO 17025:2005 scope of accreditation, table 1; Quality Manual.

Name: Deniz Demirci
Function: Senior EMC / Wireless Technologist

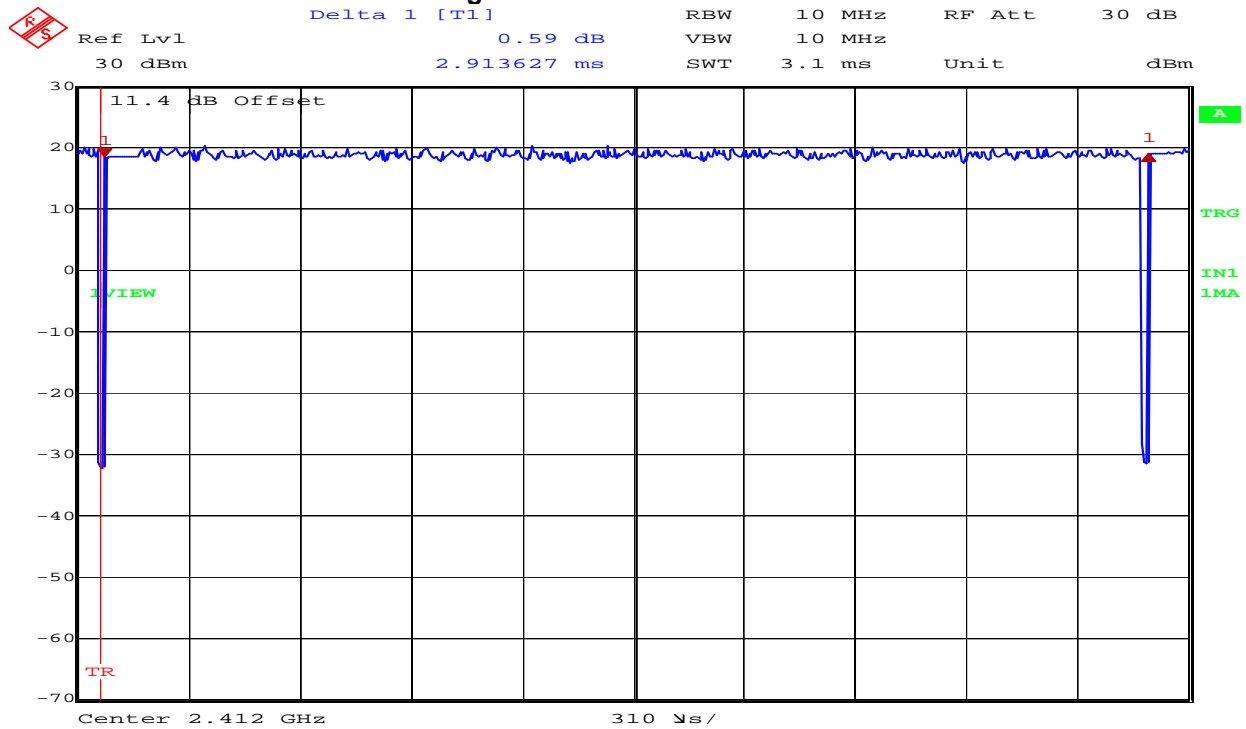
F.8. Test date

Test started: April 23, 2008 Ended: May 15, 2008

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in whole or part without permission from the testing body and the customer.

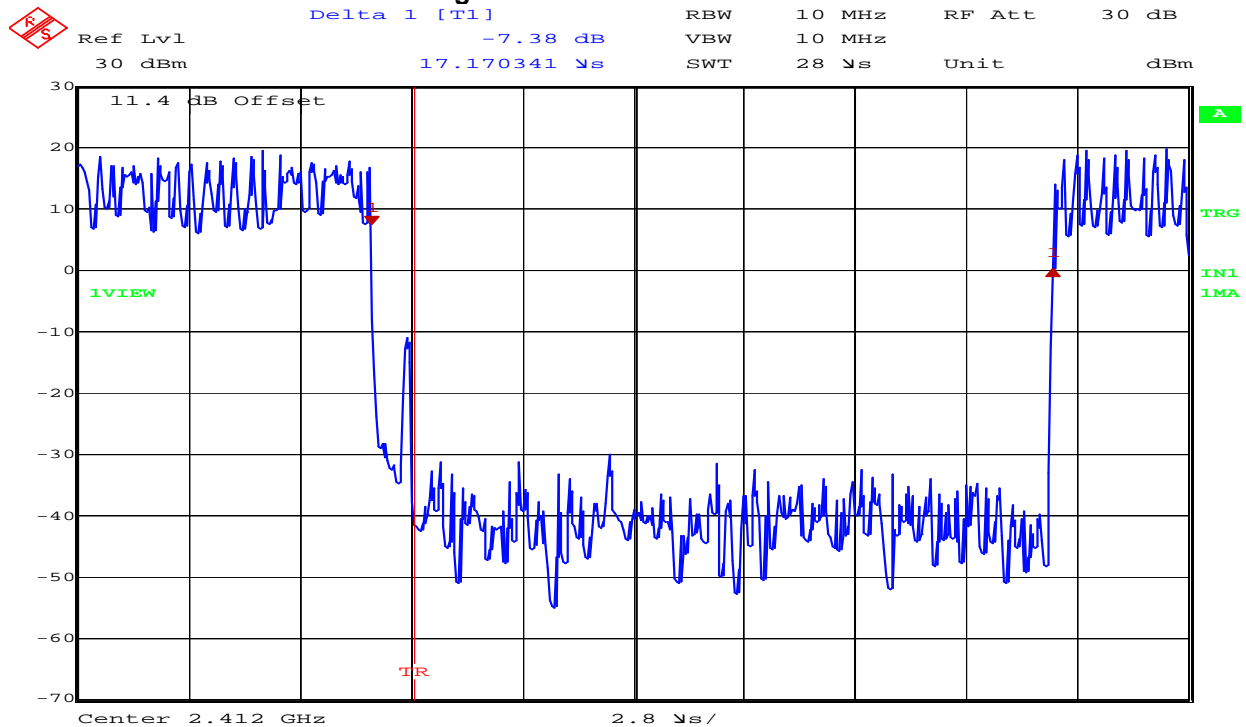
NTS Product Integrity Laboratory, 5151-47th Street N.E. Tel: 403-568-6605, Fax: 403-568-6970

Figure 37 **802.11b Period**



Title: CG-799 Alphashield 8400
Comment A: 802.11b, Ch1, Cont.Tx, P:15, DR:11, RF out: Main (integral)
Date: 23.APR.2008 10:55:39

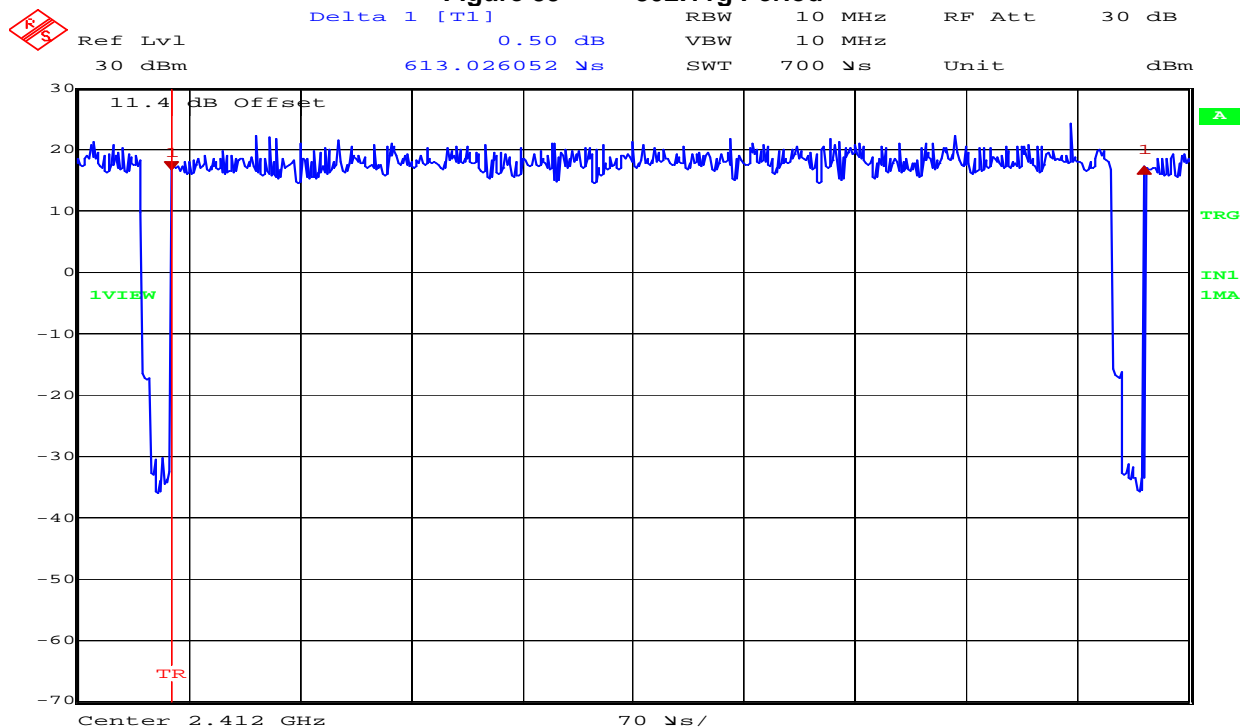
Figure 38 **802.11b Off Time**



Title: CG-799 Alphashield 8400
Comment A: 802.11b, Ch1, Cont.Tx, P:15, DR:11, RF out: Main (integral)
Date: 23.APR.2008 10:57:45

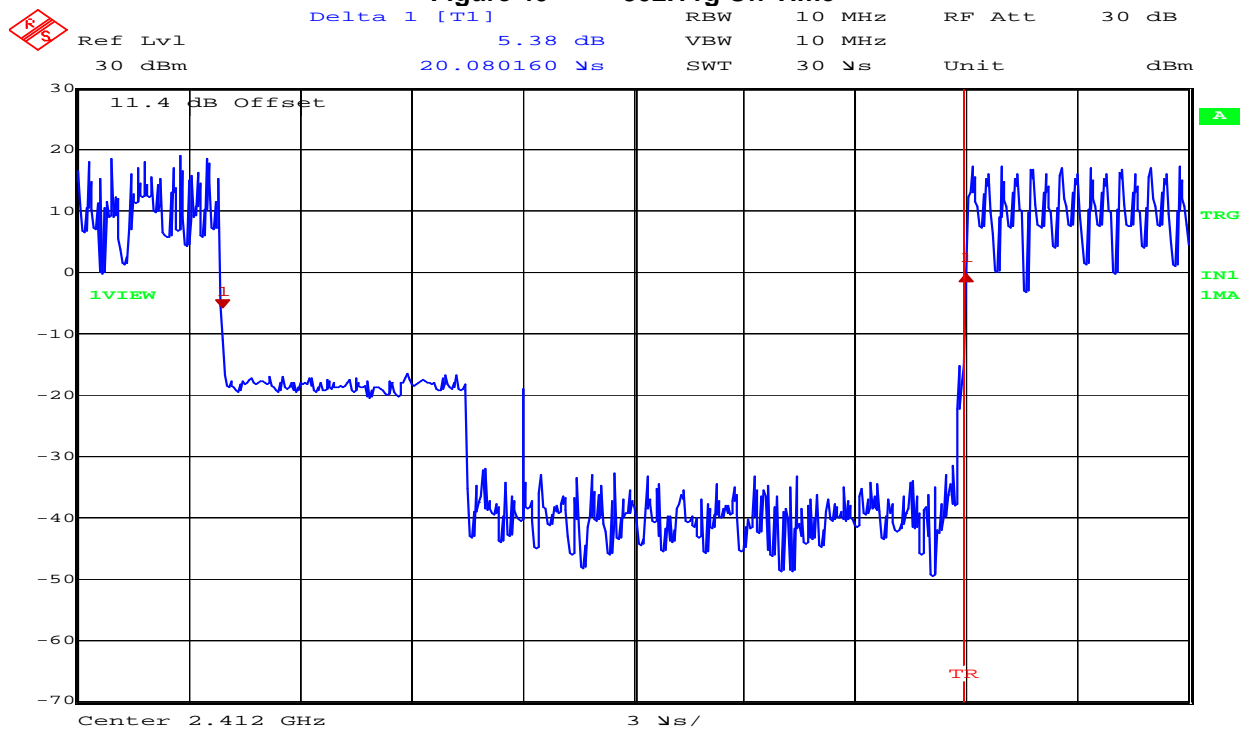
The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in whole or part without permission from the testing body and the customer.

Figure 39 802.11g Period



Title: CG-799 Alphashield 8400
Comment A: 802.11g, Ch1, Cont.Tx, P:15, DR:54, RF out: Main (integral)
Date: 23.APR.2008 11:02:57

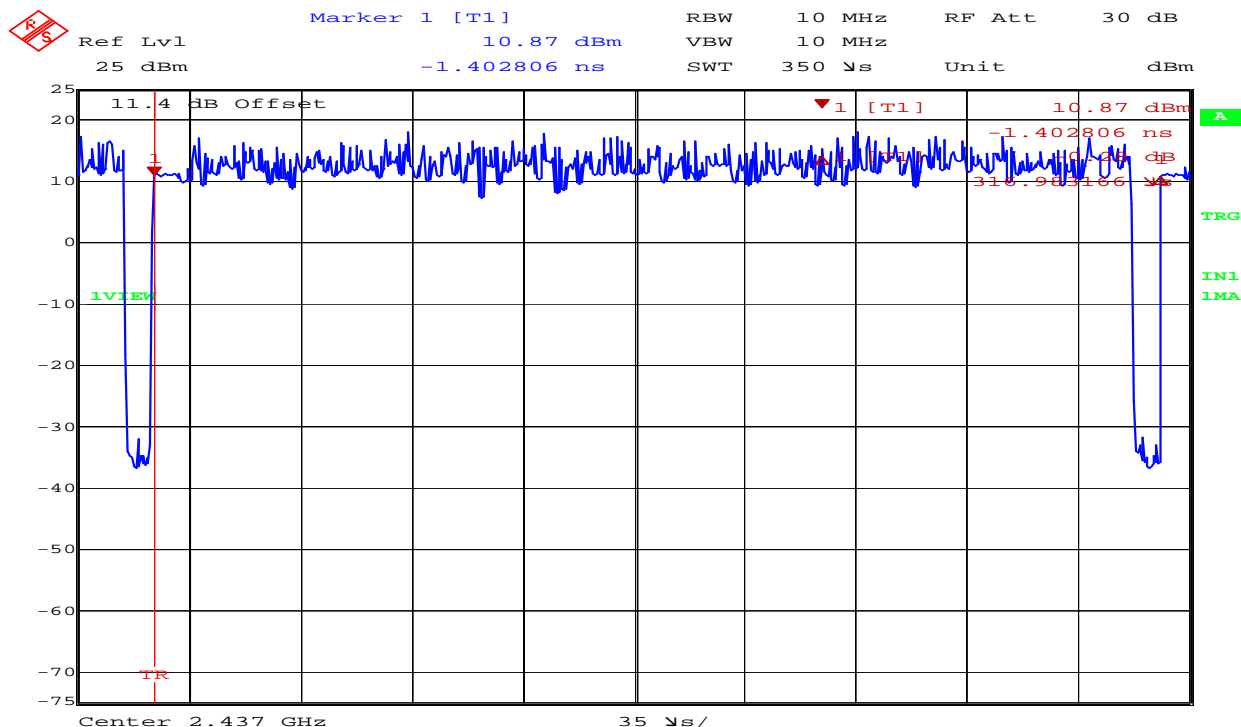
Figure 40 802.11g Off Time



Title: CG-799 Alphashield 8400
Comment A: 802.11g, Ch1, Cont.Tx, P:15, DR:54, RF out: Main (integral)
Date: 23.APR.2008 11:06:18

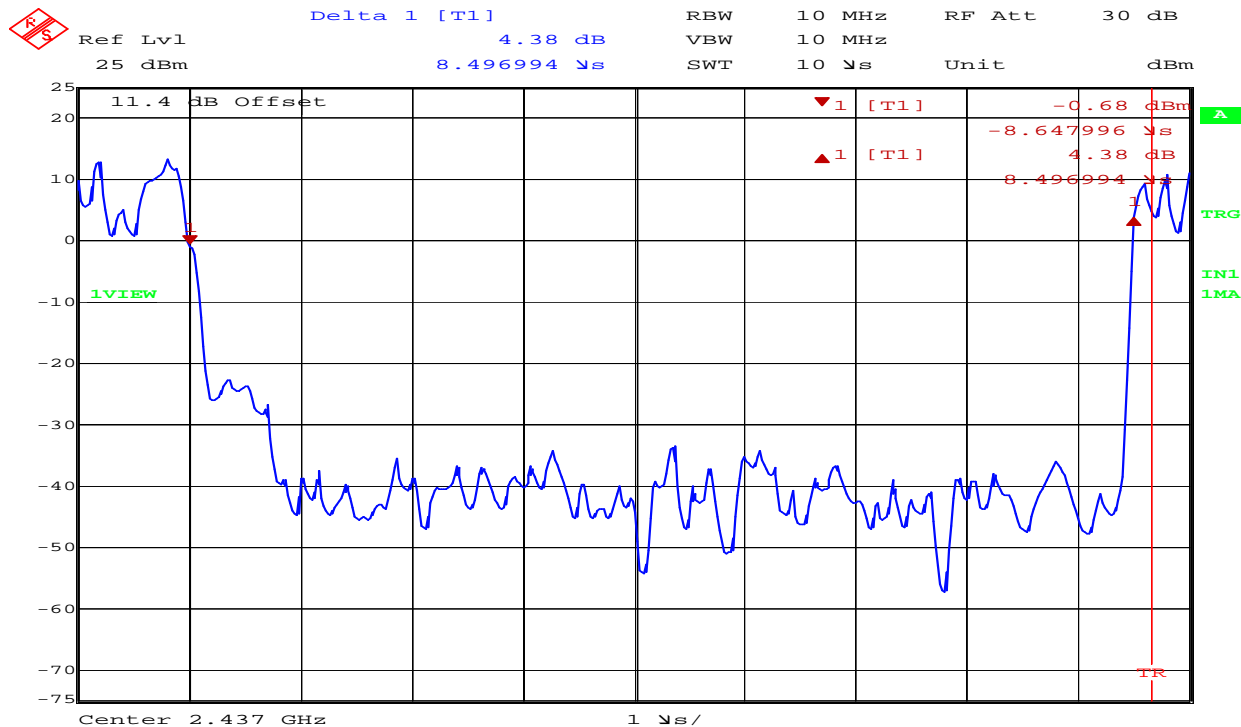
The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in whole or part without permission from the testing body and the customer.

Figure 41 802.11g Super G Period



Title: CG-799 Alphashield 8400
Comment A: 802.11g Super G with StaticTurbo, P:15, DR:108, Cont. Tx
Date: 15.MAY.2008 16:18:35

Figure 42 802.11g Super G Off Time



Title: CG-799 Alphashield 8400
Comment A: 802.11g Super G with StaticTurbo, P:15, DR:108, Cont. Tx
Date: 15.MAY.2008 16:21:48

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in whole or part without permission from the testing body and the customer.

APPENDIX G: CONDUCTED SPURIOUS EMISSIONS

G.1. Base Standard & Test Basis

Base Standards	FCC CFR Title 47 – Telecommunications, Chapter I Part 15.247 (d) RSS-210 Issue 7 A8.5
Test Basis	RF conducted as per FCC Publication 558074 RSS-210 Issue 7 A8.5
Test Method	RF conducted as per FCC Publication 558074 RSS-210 Issue 7 A8.5

G.2. Specifications

(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

G.3. Deviations

Deviation Number	Time & Date	Description and Justification of Deviation	Deviation Reference			Approval
			Base Standard	Test Basis	NTS Procedure	
none						

G.4. Test Procedure

FCC Publication 558074

G.5. Operating Mode During Test

The 8400 was tuned to a low, middle, and high channel operating with 802.11b, 802.11g and 802.11g Super G modes. Power setting: 15 (Software). Measurements were taken from Main and Aux output of the radio.

G.6. Test Results

Compliant,

Worst case spurious emission with 802.11b mode was 53.13 dB below the carrier at Channel 11 in Aux output.

Worst case spurious emission with 802.11g (Super G) mode was 51.30 dB below the carrier at Channel 6 in Main output.

G.7. Tested By

This testing was conducted in accordance with the ISO 17025: 2005 scope of accreditation, table 1; Quality Manual.

Name: Deniz Demirci

Function: Senior EMC / Wireless Technologist

G.8. Test date

Test started: April 23, 2008 Ended: May 15, 2008

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in whole or part without permission from the testing body and the customer.

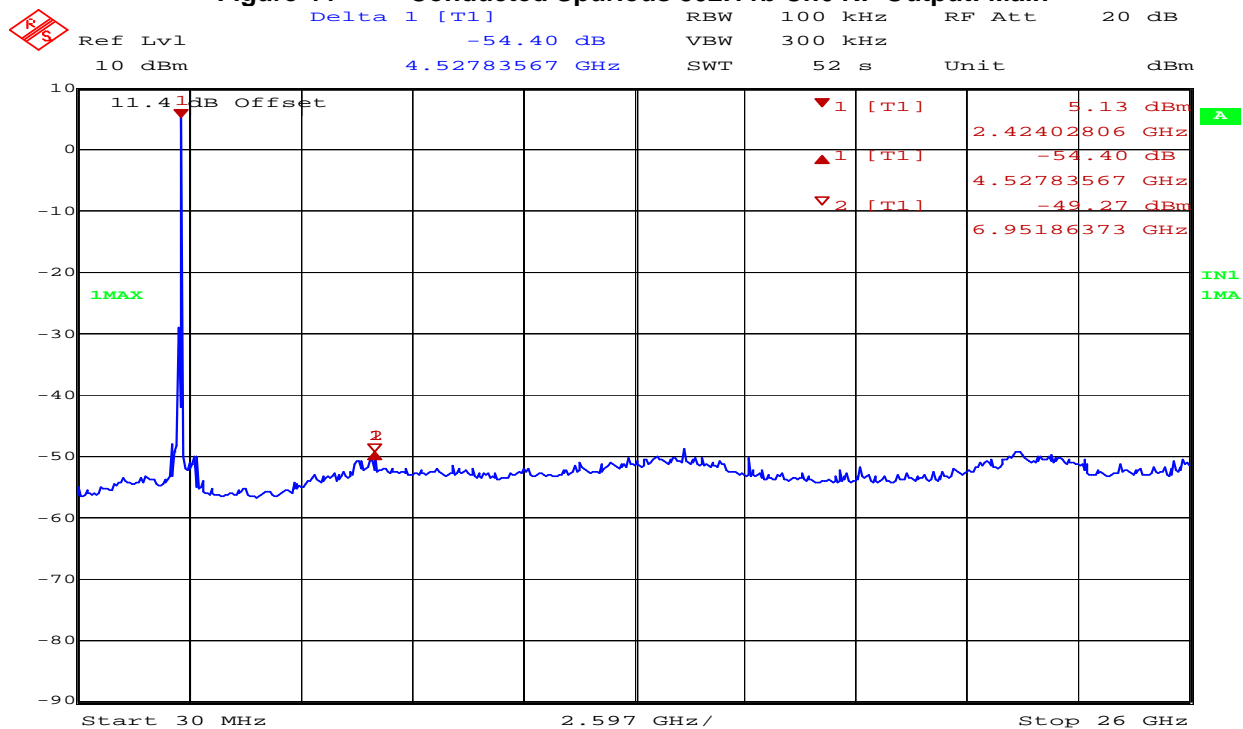
NTS Product Integrity Laboratory, 5151-47th Street N.E. Tel: 403-568-6605, Fax: 403-568-6970

Figure 43 Conducted Spurious 802.11b Ch1 RF Output: Main



Title: CG-799 Alphashield 8400
Comment A: 802.11b, Ch1, Cont.Tx, P:15, DR:11, RF out: Main (Integral)
Date: 23.APR.2008 14:50:52

Figure 44 Conducted Spurious 802.11b Ch6 RF Output: Main



Title: CG-799 Alphashield 8400
Comment A: 802.11b, Ch6, Cont.Tx, P:15, DR:11, RF out: Main (Integral)
Date: 23.APR.2008 14:57:51

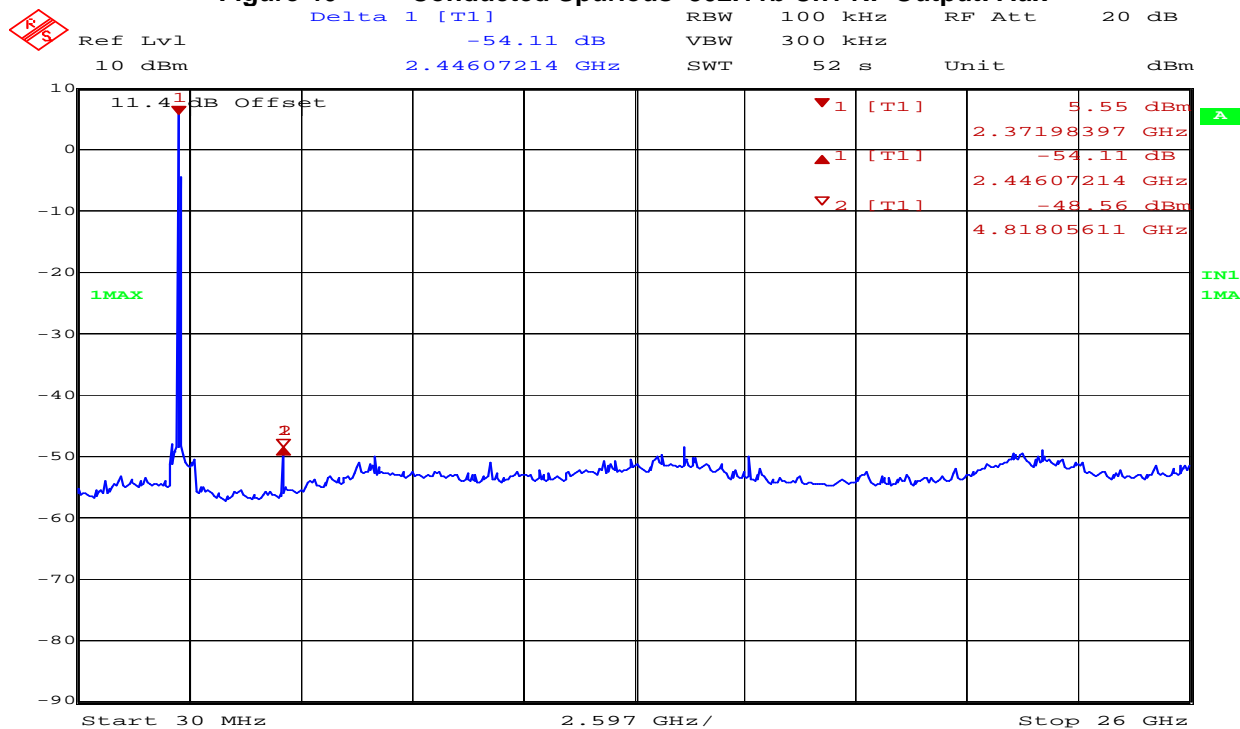
The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in whole or part without permission from the testing body and the customer.

Figure 45 Conducted Spurious 802.11b Ch11 RF Output: Main



Title: CG-799 Alphashield 8400
Comment A: 802.11b, Ch11, Cont.Tx, P:15, DR:11, RF out: Main (Integral)
Date: 23.APR.2008 15:02:51

Figure 46 Conducted Spurious 802.11b Ch1 RF Output: Aux



Title: CG-799 Alphashield 8400
Comment A: 802.11b, Ch1, Cont.Tx, P:15, DR:11, RF out: Aux (External)
Date: 23.APR.2008 13:24:00

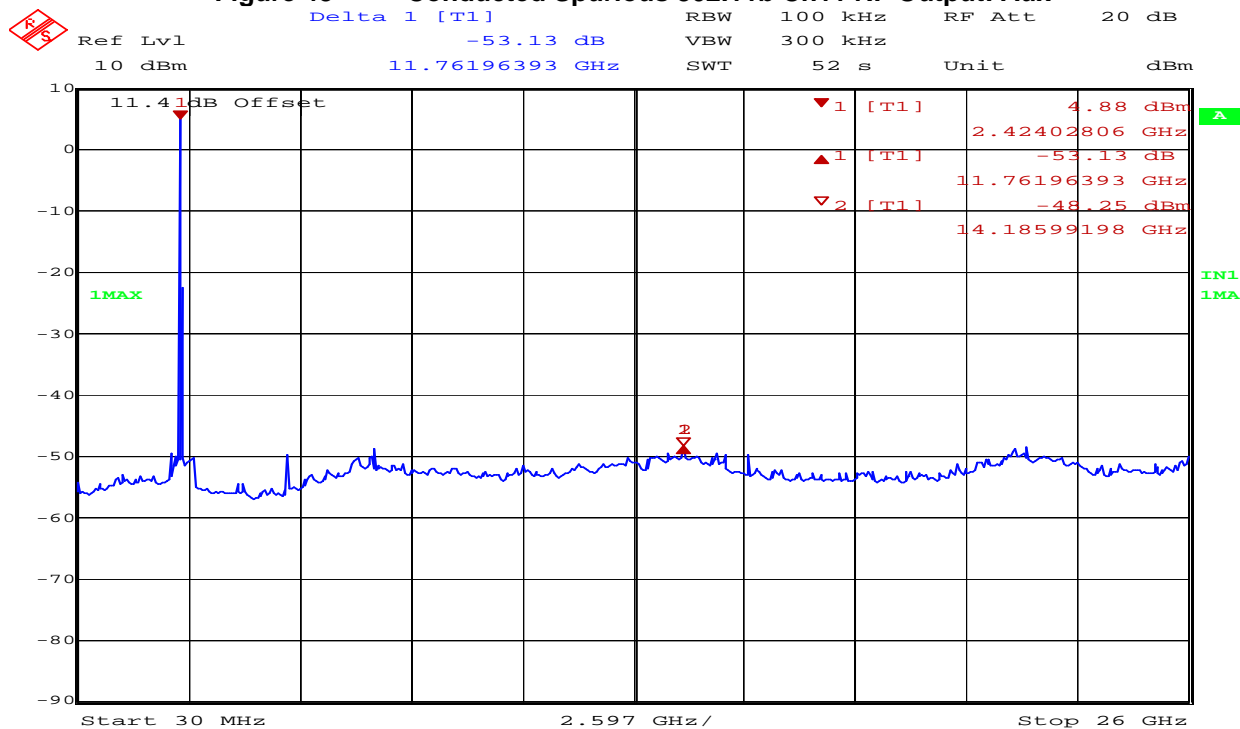
The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in whole or part without permission from the testing body and the customer.

Figure 47 Conducted Spurious 802.11b Ch6 RF Output: Aux



Title: CG-799 Alphashield 8400
Comment A: 802.11b, Ch6, Cont.Tx, P:15, DR:11, RF out: Aux (External)
Date: 23.APR.2008 13:26:10

Figure 48 Conducted Spurious 802.11b Ch11 RF Output: Aux



Title: CG-799 Alphashield 8400
Comment A: 802.11b, Ch11, Cont.Tx, P:15, DR:11, RF out: Aux (External)
Date: 23.APR.2008 13:21:15

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in whole or part without permission from the testing body and the customer.

Figure 49 Conducted Spurious 802.11g Ch1 RF Output: Main



Title: CG-799 Alphashield 8400
Comment A: 802.11g, Ch1, Cont.Tx, P:15, DR:54, RF out: Main (Integral)
Date: 23.APR.2008 14:09:51

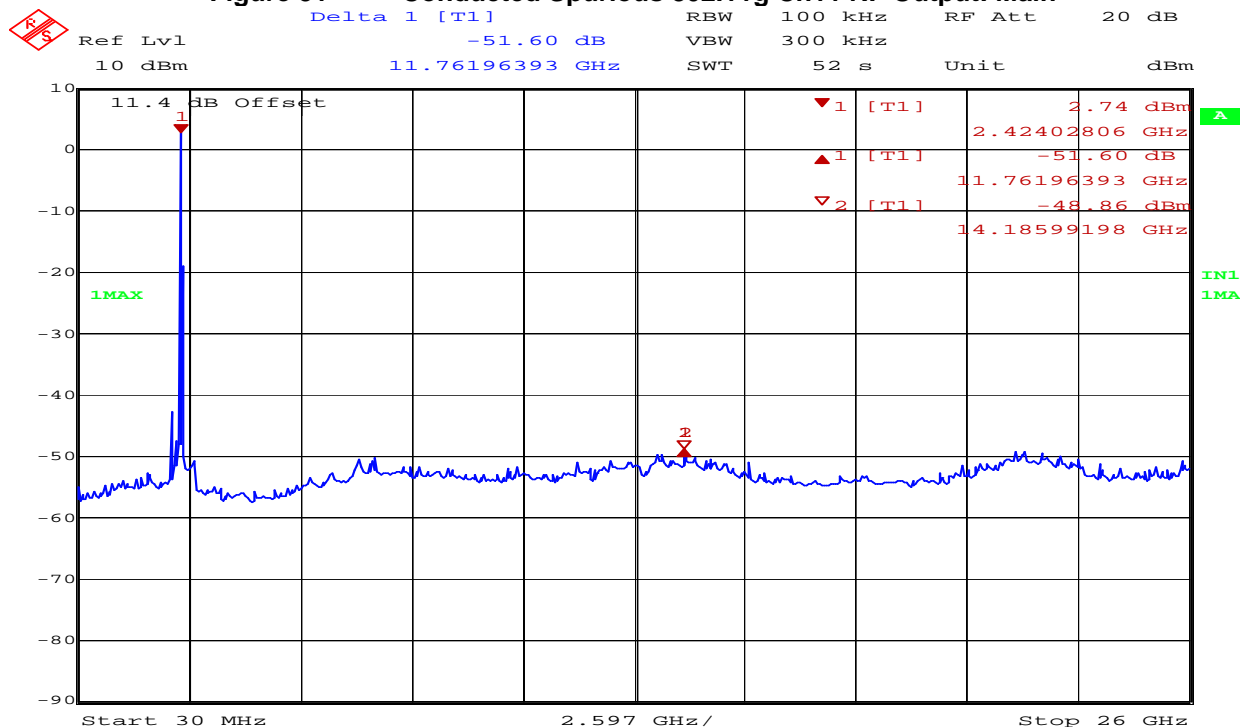
Figure 50 Conducted Spurious 802.11g Ch6 RF Output: Main



Title: CG-799 Alphashield 8400
Comment A: 802.11g, Ch6, Cont.Tx, P:15, DR:54, RF out: Main (Integral)
Date: 23.APR.2008 14:02:16

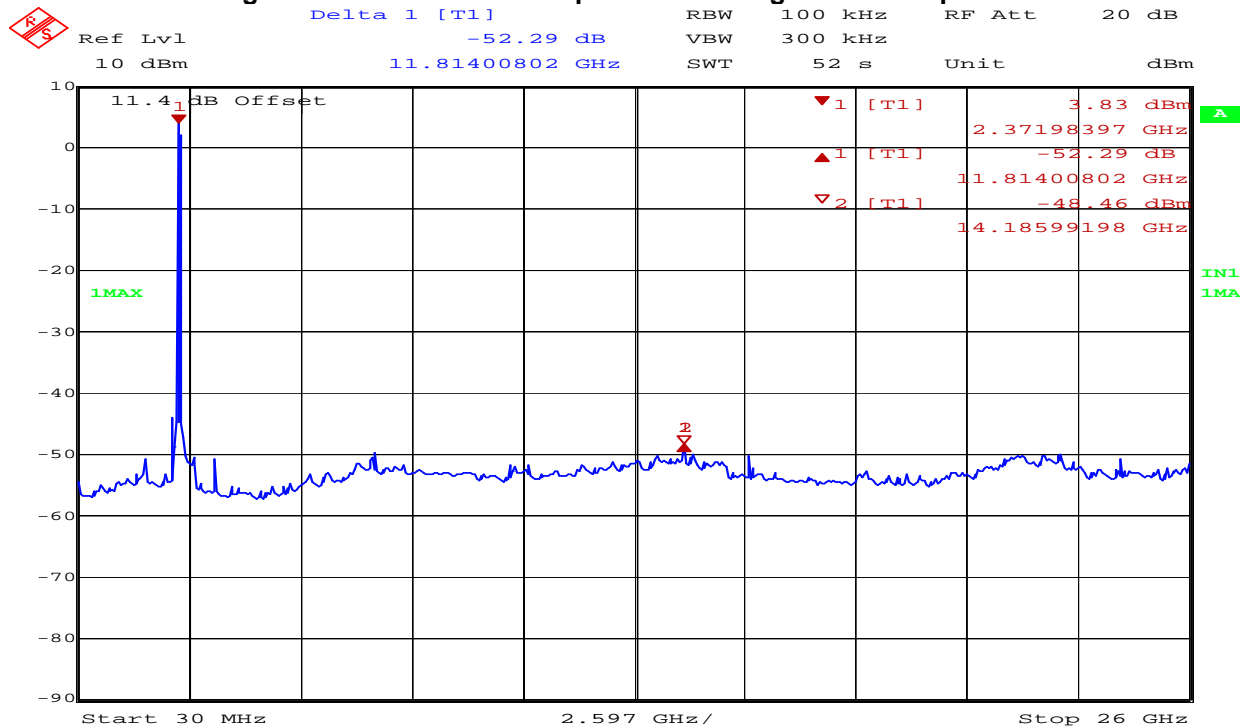
The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in whole or part without permission from the testing body and the customer.

Figure 51 Conducted Spurious 802.11g Ch11 RF Output: Main



Title: CG-799 Alphashield 8400
Comment A: 802.11g, Ch11, Cont.Tx, P:15, DR:54, RF out: Main (Integral)
Date: 23.APR.2008 14:00:06

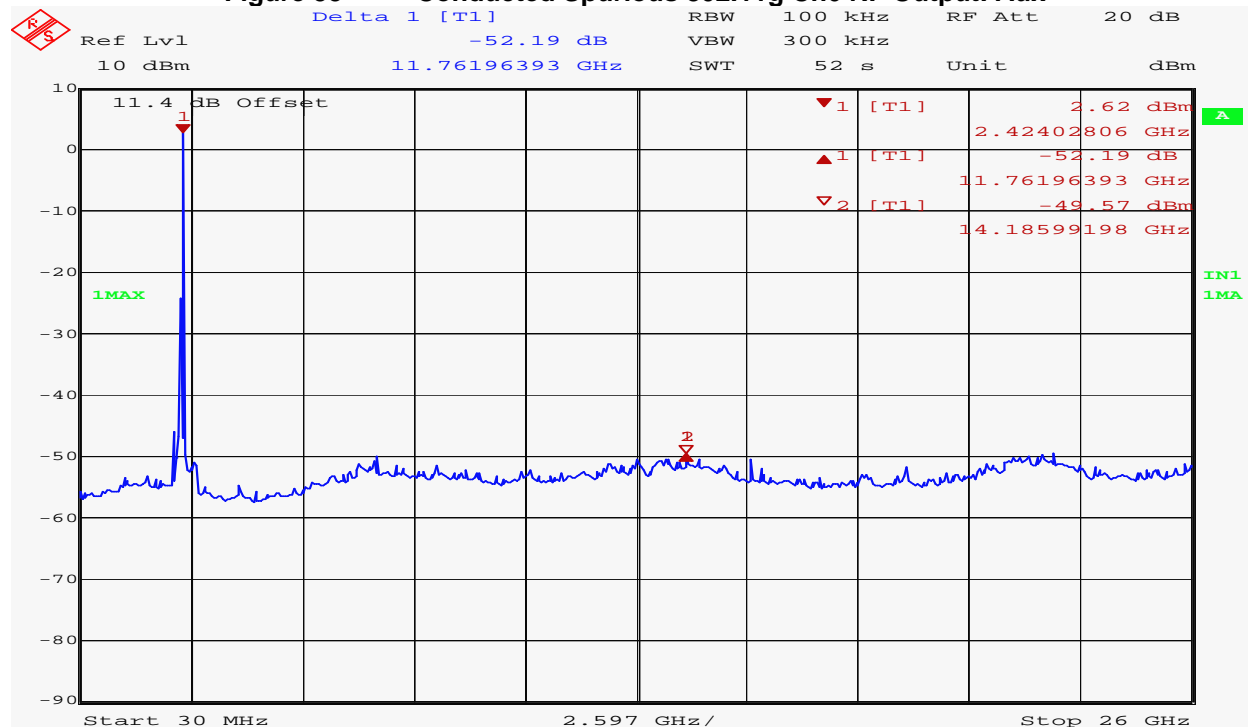
Figure 52 Conducted Spurious 802.11g Ch1 RF Output: Aux



Title: CG-799 Alphashield 8400
Comment A: 802.11g, Ch1, Cont.Tx, P:15, DR:54, RF out: Aux (External)
Date: 23.APR.2008 13:34:06

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in whole or part without permission from the testing body and the customer.

Figure 53 Conducted Spurious 802.11g Ch6 RF Output: Aux



Title: CG-799 Alphashield 8400
Comment A: 802.11g, Ch6, Cont.Tx, P:15, DR:54, RF out: Aux (External)
Date: 23.APR.2008 13:31:49

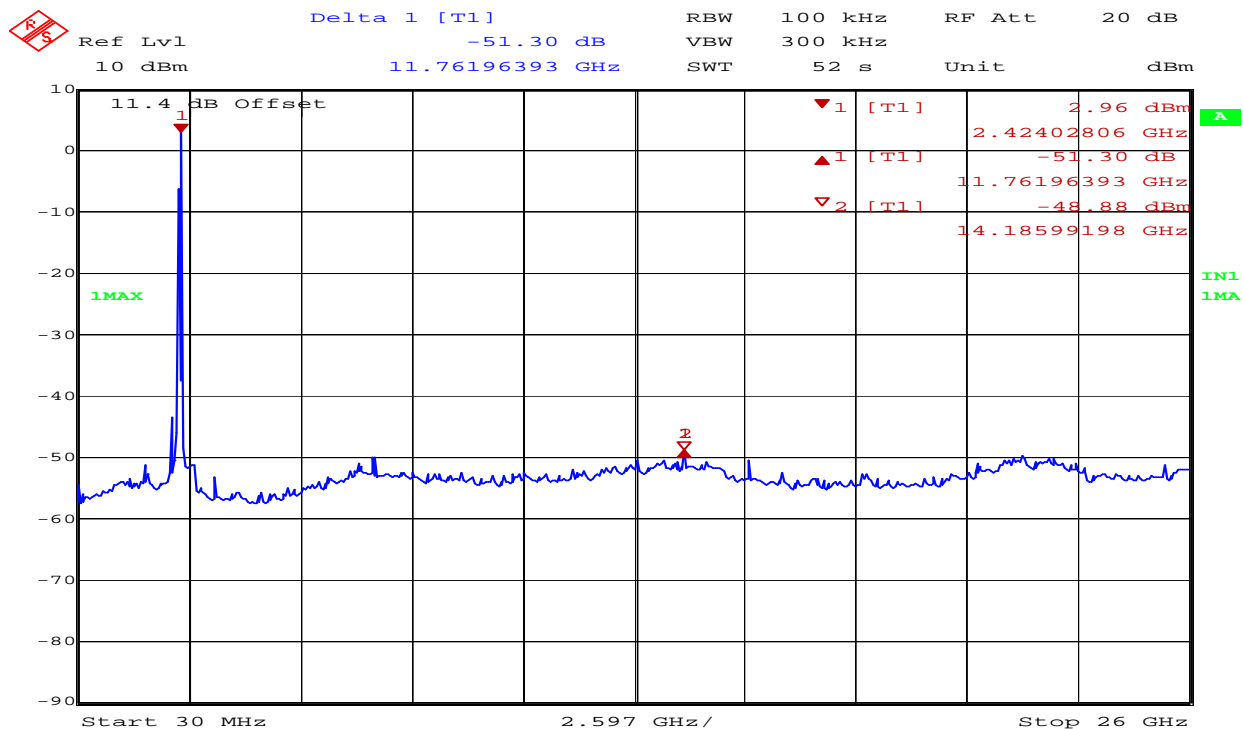
Figure 54 Conducted Spurious 802.11g Ch11 RF Output: Aux



Title: CG-799 Alphashield 8400
Comment A: 802.11g, Ch11, Cont.Tx, P:15, DR:54, RF out: Aux (External)
Date: 23.APR.2008 13:36:12

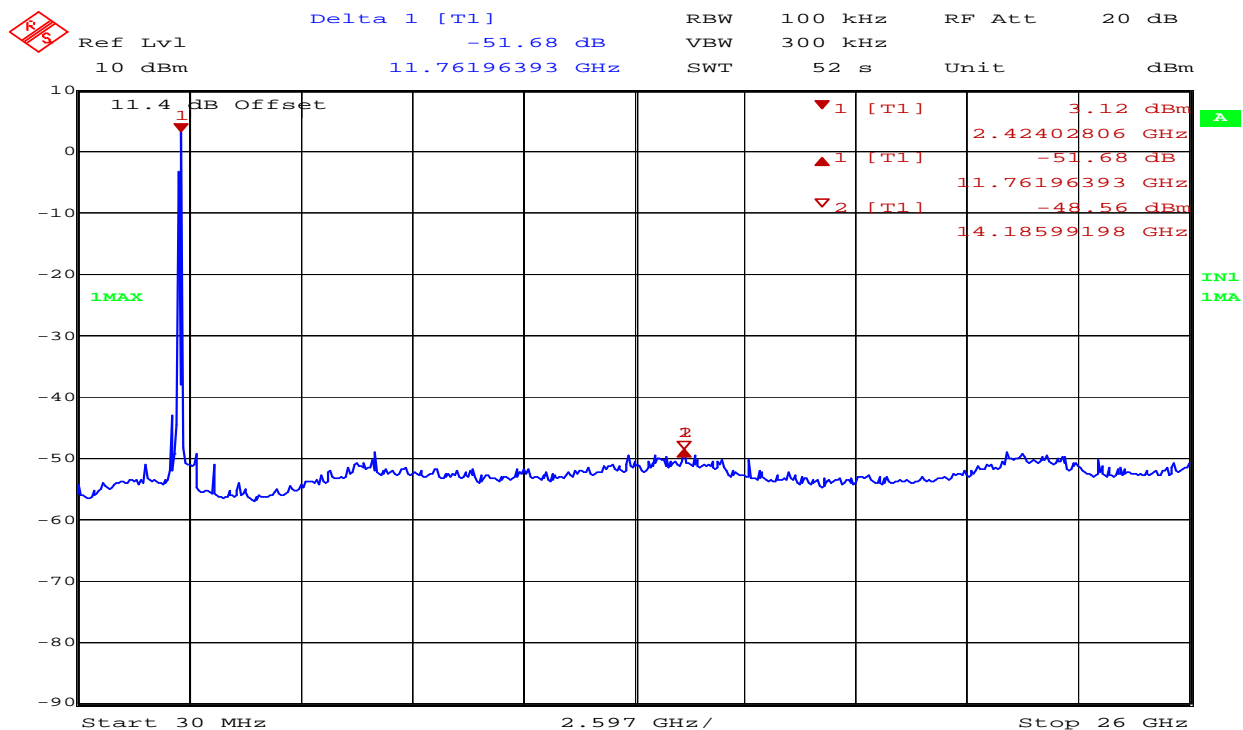
The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in whole or part without permission from the testing body and the customer.

Figure 55 Conducted Spurious 802.11g Super G Ch6 RF Output: Main



Title: CG-799 Alphashield 8400
Comment A: 802.11g SuperG with StaticTurbo,P:15,DR:108, Cont.Tx Main
Date: 15.MAY.2008 17:45:28

Figure 56 Conducted Spurious 802.11g Super G Ch6 RF Output: Aux



Title: CG-799 Alphashield 8400
Comment A: 802.11g SuperG with StaticTurbo,P:15,DR:108, Cont.Tx Aux
Date: 15.MAY.2008 17:42:35

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in whole or part without permission from the testing body and the customer.

APPENDIX H: CONDUCTED SPURIOUS EMISSIONS BAND EDGE

H.1. Base Standard & Test Basis

Base Standards	FCC CFR Title 47 – Telecommunications, Chapter I Part 15.247 (d) RSS-210 Issue 7 A8.5
Test Basis	RF conducted as per FCC Publication 558074 RSS-210 Issue 7 A8.5
Test Method	RF conducted as per FCC Publication 558074 RSS-210 Issue 7 A8.5

H.2. Specifications

15.247 (d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

H.3. Deviations

Deviation Number	Time & Date	Description and Justification of Deviation	Deviation Reference			Approval
			Base Standard	Test Basis	NTS Procedure	
none						

H.4. Test Procedure

FCC Publication 558074

H.5. Operating Mode During Test

The 8400 was tuned to a low and high channels operating with 802.11b and 802.11g modes. Power setting: 15 (Software). Measurements were taken from Main and Aux output of the radio.

H.6. Test Results

Compliant,

Worst case spurious emission with 802.11b mode was 40.86 dB below the carrier at Channel 1 in Main output

Worst case band edge emission with 802.11g mode was 27.04 dB below the carrier at Channel 1 in Main output

H.7. Sample Calculation

None.

H.8. Tested By

This testing was conducted in accordance with the ISO 17025:2005 scope of accreditation, table 1; Quality Manual.

Name: Deniz Demirci
Function: Senior EMC / Wireless Technologist

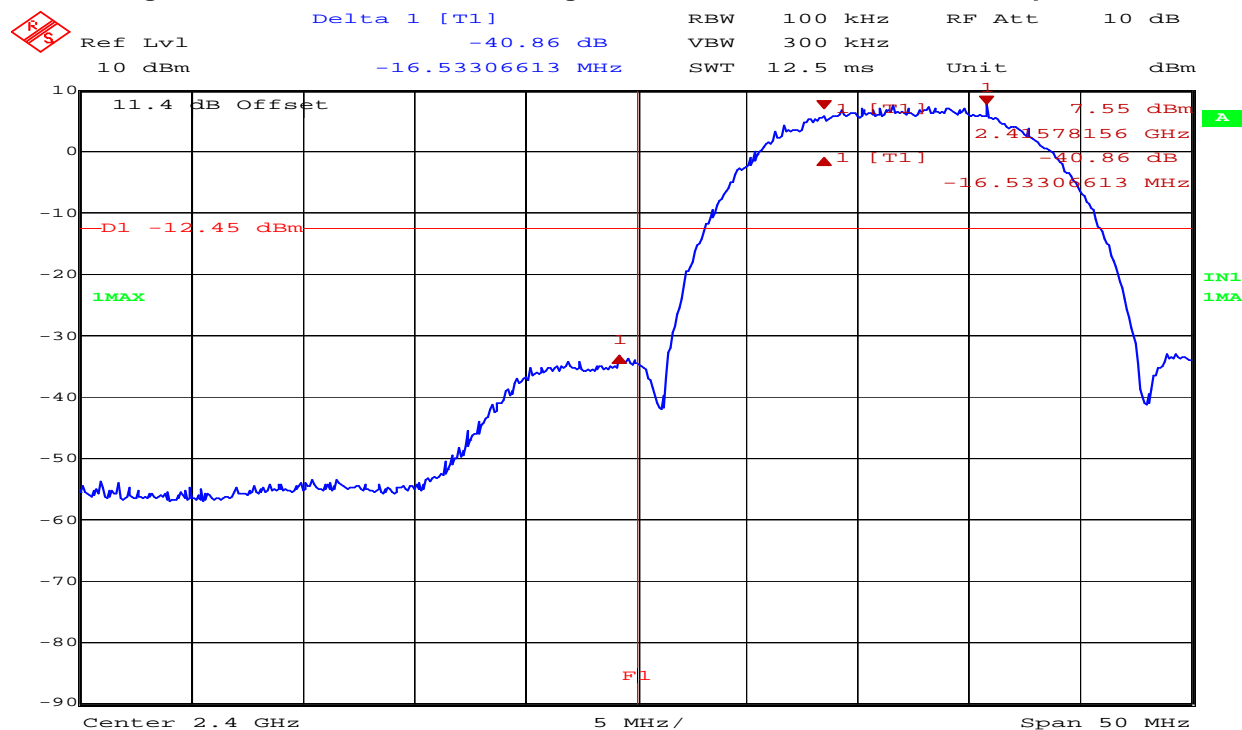
H.9. Test date

Test started: April 23, 2008 Ended: April 23, 2008

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in whole or part without permission from the testing body and the customer.

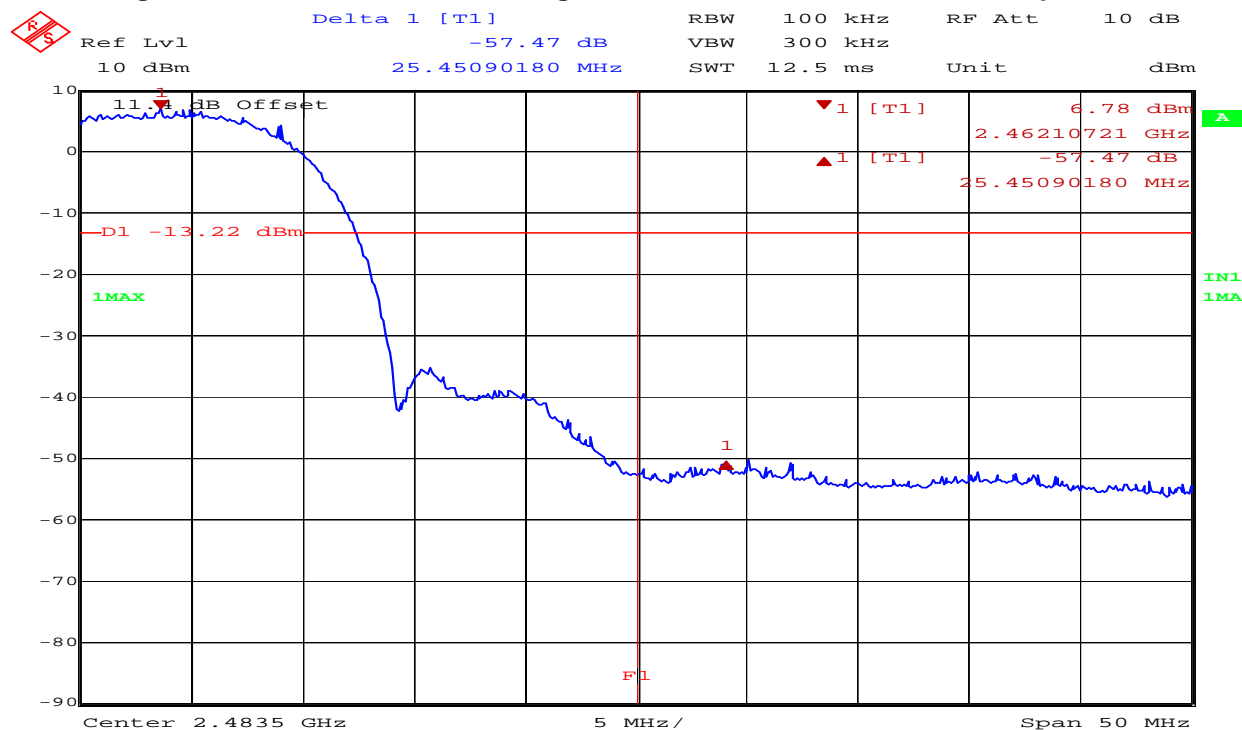
NTS Product Integrity Laboratory, 5151-47th Street N.E. Tel: 403-568-6605, Fax: 403-568-6970

Figure 57 Conducted Band edge Measurement 802.11b Ch1 RF Output: Main



Title: CG-799 Alphashield 8400
Comment A: 802.11b, Ch1, Cont.Tx, P:15, DR:11, RF out: Main (integral)
Date: 23.APR.2008 12:52:12

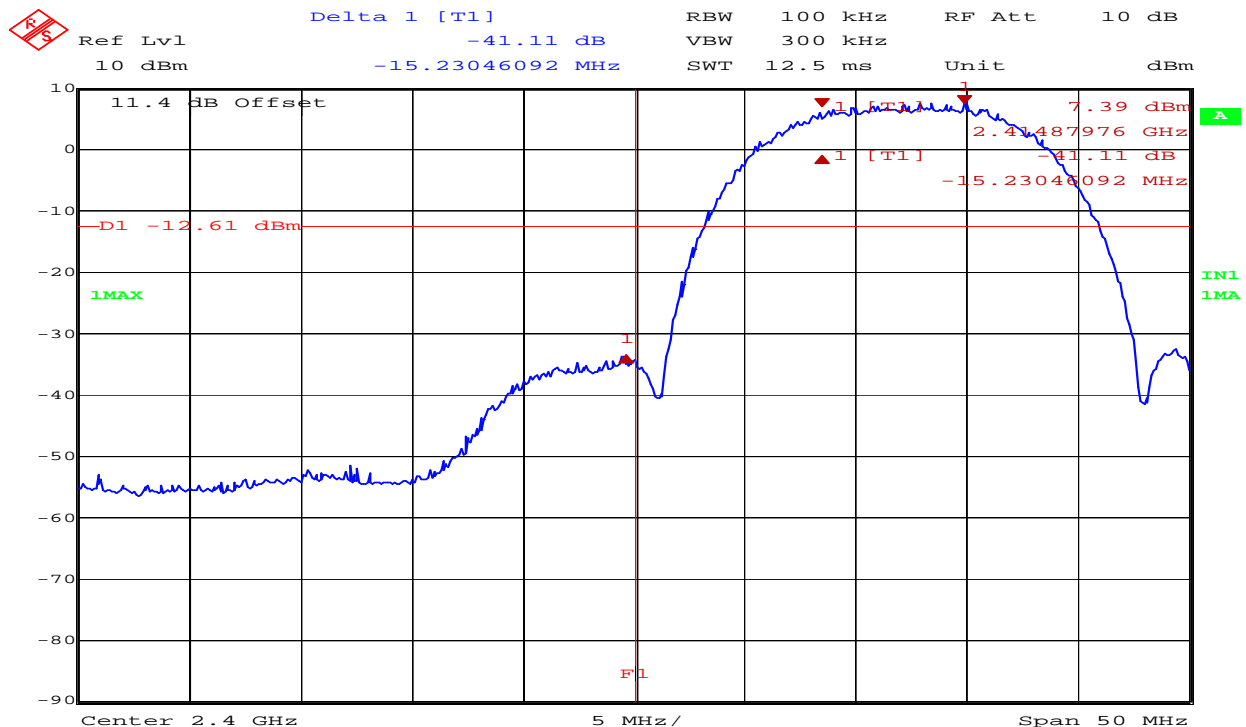
Figure 58 Conducted Band edge Measurement 802.11b Ch11 RF Output: Main



Title: CG-799 Alphashield 8400
Comment A: 802.11b, Ch11, Cont.Tx, P:15, DR:11, RF out: Main (integral)
Date: 23.APR.2008 12:40:27

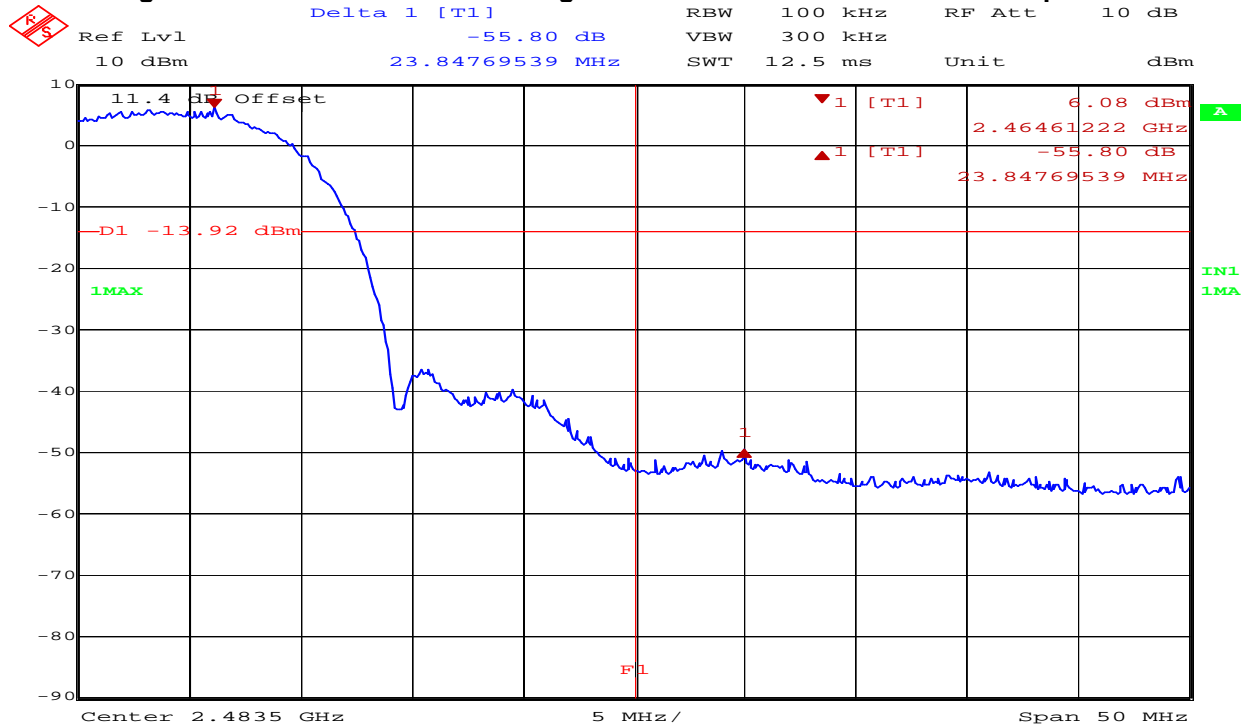
The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in whole or part without permission from the testing body and the customer.

Figure 59 Conducted Band edge Measurement 802.11b Ch1 RF Output: Aux



Title: CG-799 Alphashield 8400
Comment A: 802.11b, Ch1, Cont.Tx, P:15, DR:11, RF out: Aux (External)
Date: 23.APR.2008 12:59:06

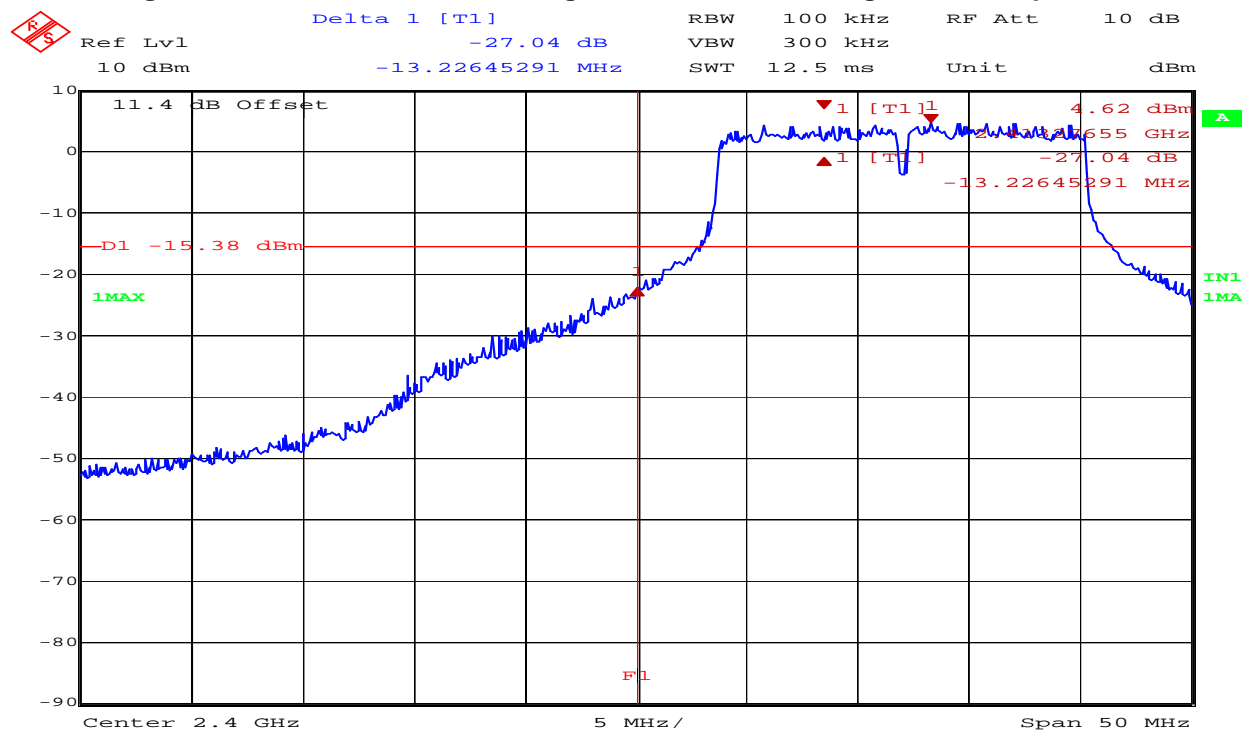
Figure 60 Conducted Band edge Measurement 802.11b Ch11 RF Output: Aux



Title: CG-799 Alphashield 8400
Comment A: 802.11b, Ch11, Cont.Tx, P:15, DR:11, RF out: Aux (External)
Date: 23.APR.2008 13:04:43

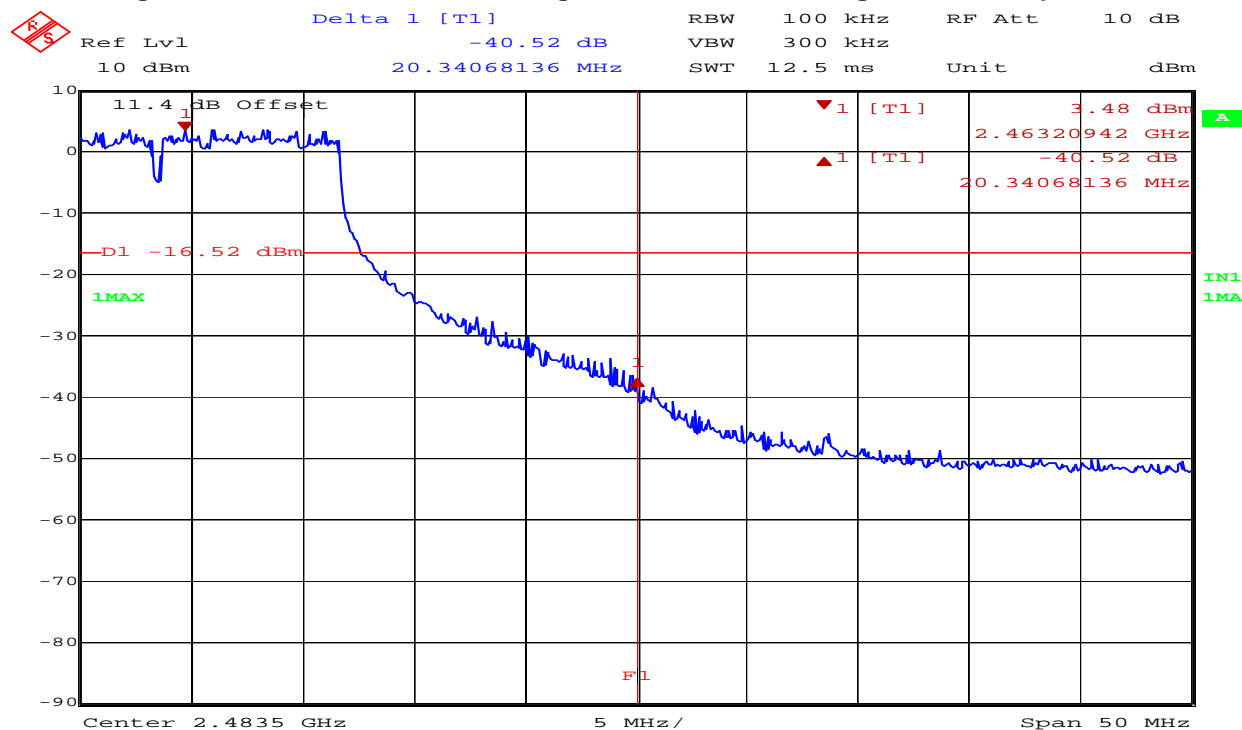
The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in whole or part without permission from the testing body and the customer.

Figure 61 Conducted Band edge Measurement 802.11g Ch1 RF Output: Main



Title: CG-799 Alphashield 8400
Comment A: 802.11g, Ch1, Cont.Tx, P:15, DR:54, RF out: Main (integral)
Date: 23.APR.2008 12:50:08

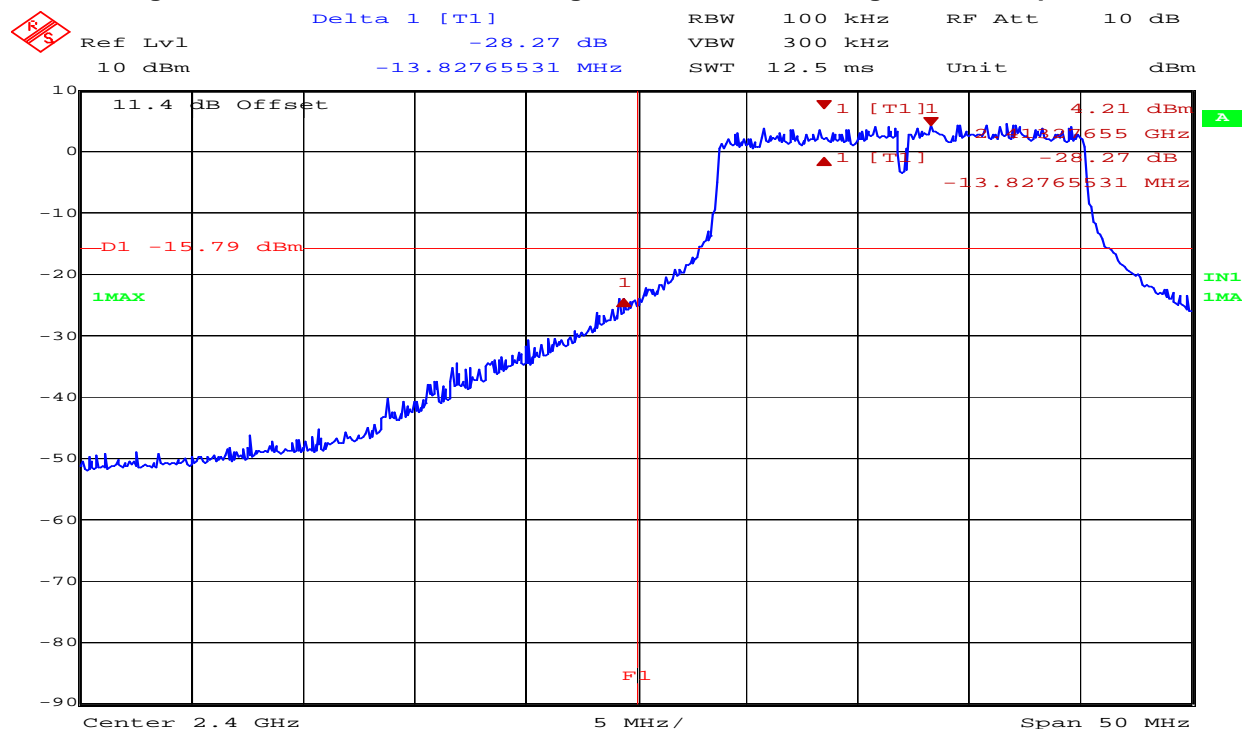
Figure 62 Conducted Band edge Measurement 802.11g Ch11 RF Output: Main



Title: CG-799 Alphashield 8400
Comment A: 802.11g, Ch11, Cont.Tx, P:15, DR:54, RF out: Main (integral)
Date: 23.APR.2008 12:43:19

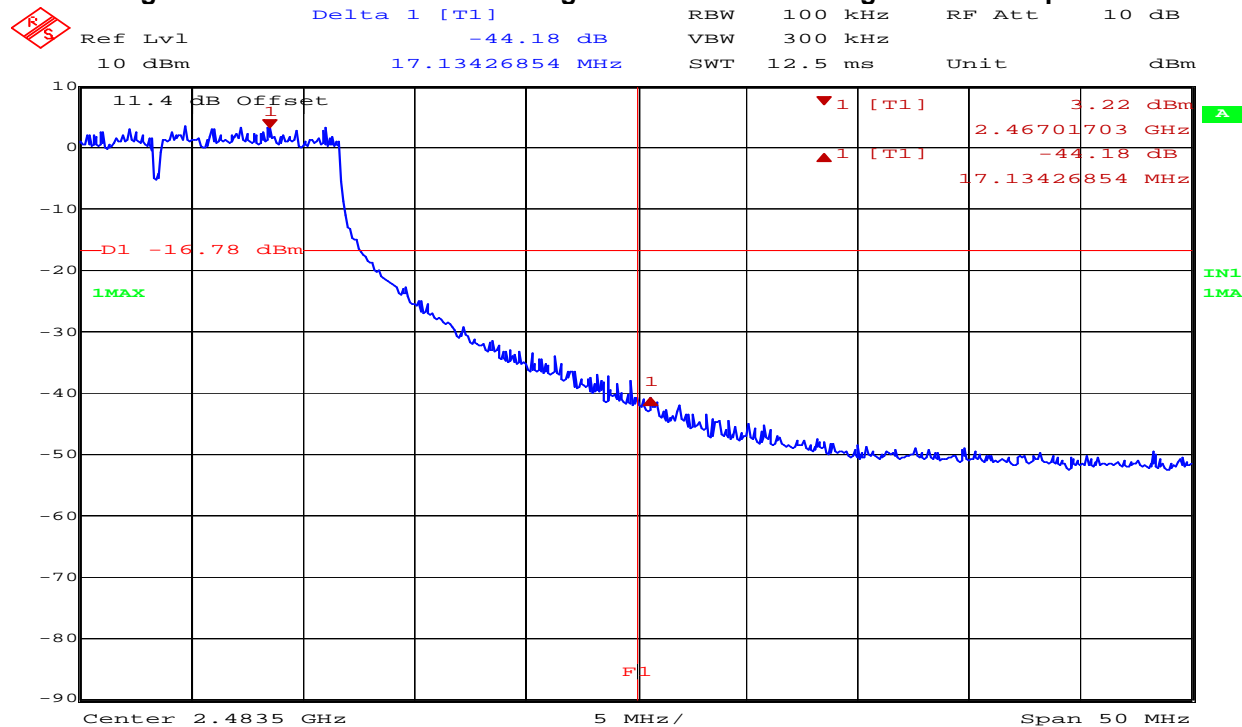
The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in whole or part without permission from the testing body and the customer.

Figure 63 Conducted Band edge Measurement 802.11g Ch1 RF Output: Aux



Title: CG-799 Alphashield 8400
Comment A: 802.11g, Ch1, Cont.Tx, P:15, DR:54, RF out: Aux (External)
Date: 23.APR.2008 13:01:24

Figure 64 Conducted Band edge Measurement 802.11g Ch11 RF Output: Aux



Title: CG-799 Alphashield 8400
Comment A: 802.11g, Ch11, Cont.Tx, P:15, DR:54, RF out: Aux (External)
Date: 23.APR.2008 13:03:02

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in whole or part without permission from the testing body and the customer.

APPENDIX I: RADIATED SPURIOUS EMISSIONS BAND EDGE

I.1. Base Standard & Test Basis

Base Standard	FCC CFR Title 47 – Telecommunications, Chapter I Part 15.209 – Radio Frequency Devices, Part 15.205 – Restricted bands of operation RSS 210 Issue 7 A8.5
Test Basis	ANSI C63.4-2003 Methods of Measurement of Radio Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz, FCC Publication 558074
Test Method	NTS Radiated Emissions Test Method E001R7 and FCC Publication 558074

I.2. Specifications: FCC 15.205 and RSS 210 Issue 7 2.2 Restricted bands of operation.

MHz	MHz	MHz	GHz
0.090–0.110	16.42–16.423	399.9–410	4.5–5.15
¹ 0.495–0.505	16.69475–16.69525	608–614	5.35–5.46
2.1735–2.1905	16.80425–16.80475	960–1240	7.25–7.75
4.125–4.128	25.5–25.67	1300–1427	8.025–8.5
4.17725–4.17775	37.5–38.25	1435–1626.5	9.0–9.2
4.20725–4.20775	73–74.6	1645.5–1646.5	9.3–9.5
6.215–6.218	74.8–75.2	1660–1710	10.6–12.7
6.26775–6.26825	108–121.94	1718.8–1722.2	13.25–13.4
6.31175–6.31225	123–138	2200–2300	14.47–14.5
8.291–8.294	149.9–150.05	2310–2390	15.35–16.2
8.362–8.366	156.52475–156.52525	2483.5–2500	17.7–21.4
8.37625–8.38675	156.7–156.9	2690–2900	22.01–23.12
8.41425–8.41475	162.0125–167.17	3260–3267	23.6–24.0
12.29–12.293	167.72–173.2	3332–3339	31.2–31.8
12.51975–12.52025	240–285	3345.8–3358	36.43–36.5
12.57675–12.57725	322–335.4	3600–4400	N/A
13.36–13.41	N/A	N/A	N/A

(b) The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in §15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in §15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in §15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in §15.35 apply to these measurements.

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in whole or part without permission from the testing body and the customer.

NTS Product Integrity Laboratory, 5151-47th Street N.E. Tel: 403-568-6605, Fax: 403-568-6970

I.3. Deviations

Deviation Number	Time & Date	Description and Justification of Deviation	Deviation Reference			Approval
			Base Standard	Test Basis	NTS Procedure	
none						

I.4. Test Procedure

RF radiated measurement at 3 meters distance per FCC Publication 558074

558074 (c) (2) Radiated emission test: Applies to harmonics/spurs that fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209.

For average measurements above 1 GHz, set RBW = 1 MHz, VBW = 10 Hz, Sweep: Auto.

For peak measurements above 1 GHz, Set RBW = 1 MHz, VBW = 1 MHz, Sweep: Auto.

I.5. Operating Mode During Test

The 8400 was tuned to a low and high channels operating with 802.11b and 802.11g modes. Power setting: 15 (Software). Measurements were taken with external antenna active and integral antenna active modes. Measurements were taken with EUT horizontal and EUT upright positions also. Worst case orientations and worst case antenna settings are presented

I.6. Test Results

Compliant

Maximum peak measurement was 70.47 dBµV/m at 2389.88 MHz with 802.11g mode.

It has 3.51 dB margin to the 15.209 limit.

Maximum average measurement was 50.61 dBµV/m at 2389.88 MHz with 802.11g mode.

It has 3.37 dB margin to the 15.209 limit.

Worst case emission plots presented

I.7. Sample Calculations

Part 15.209

Average Limit: $500 \mu\text{V/m} @ 3\text{m} = 20 \cdot \log(500) = 53.98 \text{ dB}\mu\text{V/m}$,

Peak limit = $73.98 \text{ dB}\mu\text{V/m}$

Radiated emission level (dBµV/m) = Measured level (dBµV) + Receive antenna factor (dB) + Receive cable loss (dB)

I.8. Tested By

This testing was conducted in accordance with the ISO 17025:2005 scope of accreditation, table 1; Quality Manual.

Name: Deniz Demirci
Function: Senior EMC / Wireless Technologist

I.9. Test date

Test started: March 25, 2008 Ended: April 25, 2008

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in whole or part without permission from the testing body and the customer.

NTS Product Integrity Laboratory, 5151-47th Street N.E. Tel: 403-568-6605, Fax: 403-568-6970

I.10. Test Data Summary

Mode	Channel	Frequency (MHz)	EUT Antenna*	EUT orientation**	Detector	Measured level (dBµV)	Receive Antenna factor (dB)	Receive cable loss (dB)	Radiated emission level (dBµV/m)	Limit (dBµV/m)	Margin (dB)
802.11b	1	2386.94	1	u	PK	27.55	28.17	2.65	58.37	73.98	15.61
		2390.00	1	u	AV	15.30	28.17	2.65	46.12	53.98	7.86
		2388.85	1	h	PK	27.47	28.17	2.65	58.29	73.98	15.69
		2388.85	1	h	AV	15.31	28.17	2.65	46.13	53.98	7.85
		2390.00	2	h	PK	26.78	28.17	2.65	57.60	73.98	16.38
		2390.00	2	h	AV	15.00	28.17	2.65	45.82	53.98	8.16
		2387.14	2	u	PK	28.07	28.17	2.65	58.89	73.98	15.09
		2390.00	2	u	AV	15.00	28.17	2.65	45.82	53.98	8.16
	11	2484.85	1	u	PK	27.02	28.45	2.69	58.16	73.98	15.82
		2483.50	1	u	AV	15.28	28.45	2.69	46.42	53.98	7.56
		2483.85	2	h	PK	27.14	28.45	2.69	58.28	73.98	15.70
		2483.50	2	h	AV	14.72	28.45	2.69	45.86	53.98	8.12
802.11g	1	2390.00	1	u	PK	34.62	28.17	2.65	65.44	73.98	8.54
		2390.00	1	u	AV	18.17	28.17	2.65	48.99	53.98	4.99
		2389.88	1	h	PK	39.65	28.17	2.65	70.47	73.98	3.51
		2389.88	1	h	AV	19.79	28.17	2.65	50.61	53.98	3.37
		2389.88	2	h	PK	28.92	28.17	2.65	59.74	73.98	14.24
		2390.00	2	h	AV	15.22	28.17	2.65	46.04	53.98	7.94
	11	2483.70	1	u	PK	39.13	28.45	2.69	70.27	73.98	3.71
		2483.50	1	u	AV	18.29	28.45	2.69	49.43	53.98	4.55
		2486.03	2	h	PK	31.05	28.45	2.69	62.19	73.98	11.79
		2483.50	2	h	AV	15.43	28.45	2.69	46.57	53.98	7.41
		2483.50	2	u	PK	28.60	28.45	2.69	59.74	73.98	14.24
		2483.50	2	u	AV	15.68	28.45	2.69	46.82	53.98	7.16

EUT Antenna*

1 - AUX, external antenna, software setting antenna#1

2 - Main, Integral antenna, software setting antenna#2

EUT orientation**

h – Horizontal tabletop orientation

u – Upright standing orientation

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Figure 65 Radiated Band Edge Peak Measurement 802.11g Channel 1

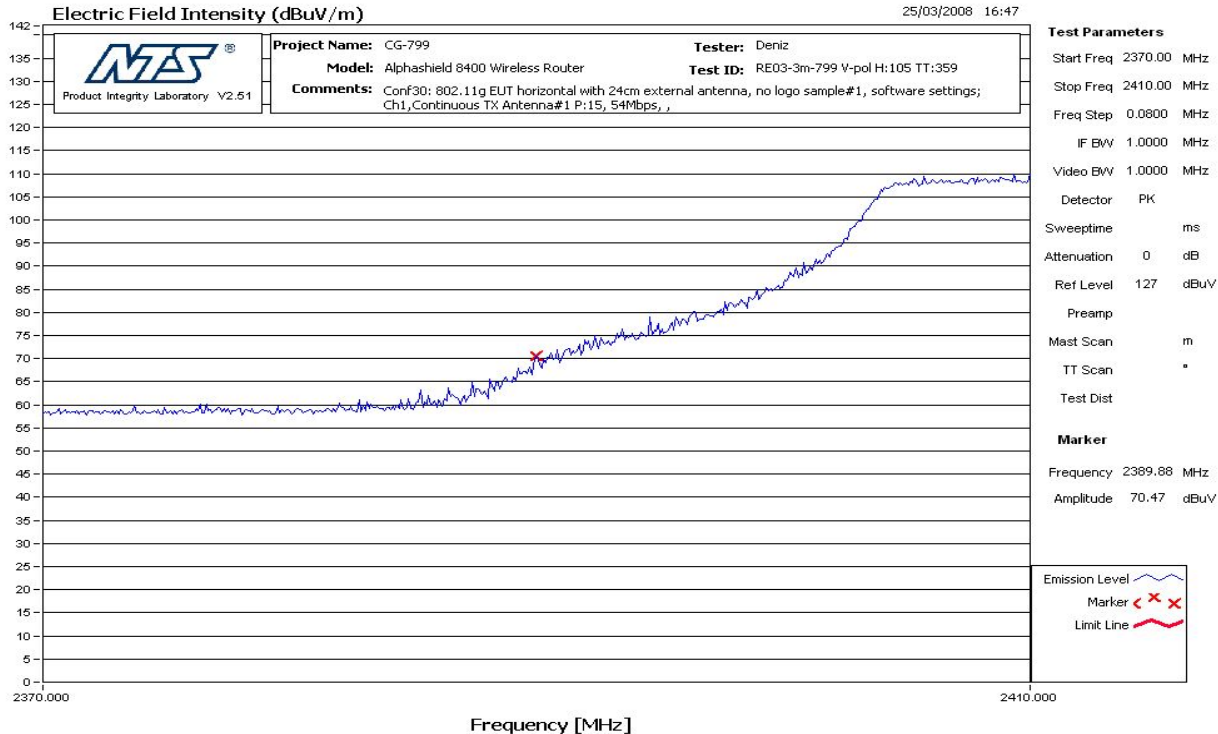
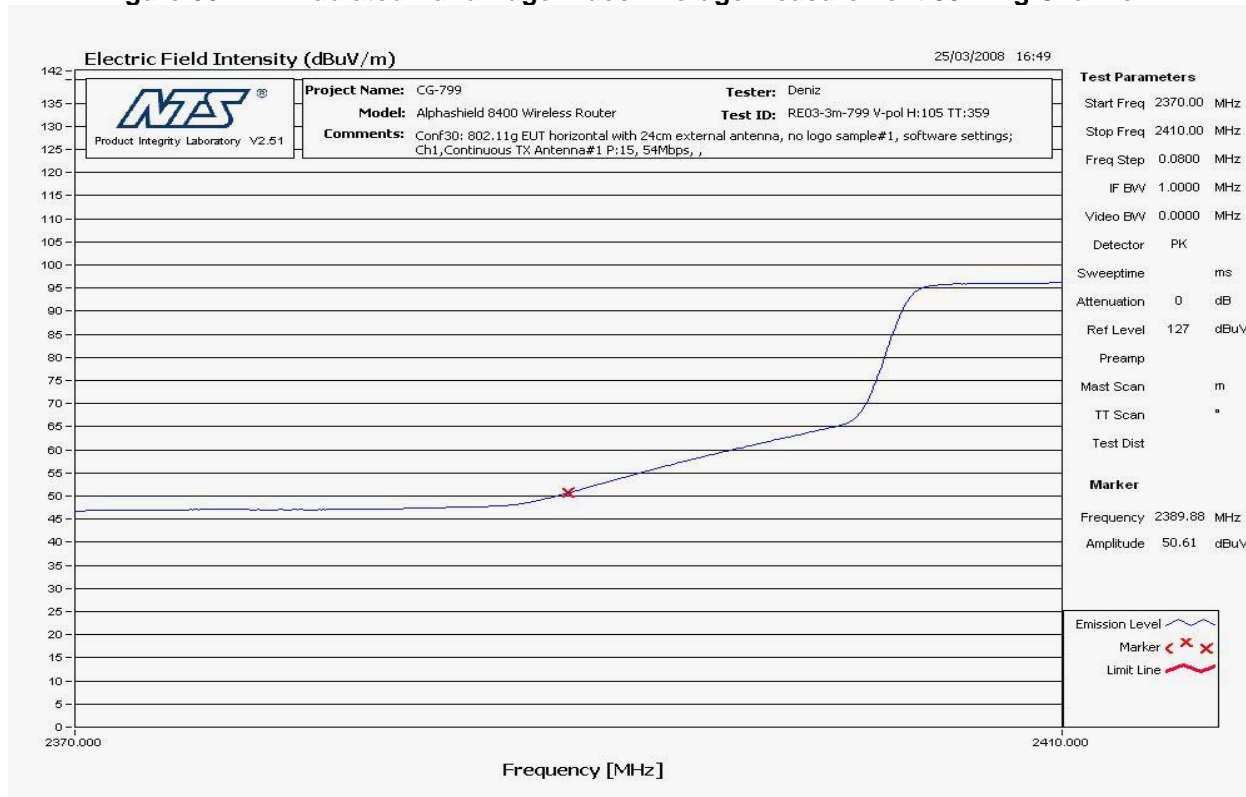


Figure 66 Radiated Band Edge Video Average Measurement 802.11g Channel 1



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APPENDIX J: RADIATED SPURIOUS EMISSIONS (TX AND RX)

J.1. Base Standard & Test Basis

Base Standard	FCC CFR Title 47 – Telecommunications, Chapter I Part 15.209 – Radio Frequency Devices, Part 15.205 – Restricted bands of operation RSS 210 Issue 7, 2.6 and A8.5
Test Basis	ANSI C63.4-2003 Methods of Measurement of Radio Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz, FCC Publication 558074
Test Method	NTS Radiated Emissions Test Method E001R7 and FCC Publication 558074

Specifications: FCC 15.205 and RSS 210 Issue 7 Restricted bands of operation.

(a) Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090–0.110	16.42–16.423	399.9–410	4.5–5.15
¹ 0.495–0.505	16.69475–16.69525	608–614	5.35–5.46
2.1735–2.1905	16.80425–16.80475	960–1240	7.25–7.75
4.125–4.128	25.5–25.67	1300–1427	8.025–8.5
4.17725–4.17775	37.5–38.25	1435–1626.5	9.0–9.2
4.20725–4.20775	73–74.6	1645.5–1646.5	9.3–9.5
6.215–6.218	74.8–75.2	1660–1710	10.6–12.7
6.26775–6.26825	108–121.94	1718.8–1722.2	13.25–13.4
6.31175–6.31225	123–138	2200–2300	14.47–14.5
8.291–8.294	149.9–150.05	2310–2390	15.35–16.2
8.362–8.366	156.52475–156.52525	2483.5–2500	17.7–21.4
8.37625–8.38675	156.7–156.9	2690–2900	22.01–23.12
8.41425–8.41475	162.0125–167.17	3260–3267	23.6–24.0
12.29–12.293	167.72–173.2	3332–3339	31.2–31.8
12.51975–12.52025	240–285	3345.8–3358	36.43–36.5
12.57675–12.57725	322–335.4	3600–4400	N/A
13.36–13.41	N/A	N/A	N/A

(b) The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in §15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in §15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in §15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in §15.35 apply to these measurements.

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J.2. Deviations

Deviation Number	Time & Date	Description and Justification of Deviation	Deviation Reference			Approval
			Base Standard	Test Basis	NTS Procedure	
none						

J.3. Test Procedure

FCC Publication 558074 (c) (2) Radiated emission test Applies to harmonics/spurs that fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209. A pre-amp (and possibly a high-pass filter) is necessary for this measurement. For average measurements above 1 GHz, set RBW = 1 MHz, VBW = 10 Hz, Sweep: Auto. For peak measurements above 1 GHz, Set RBW = 1 MHz, VBW = 1 MHz, Sweep: Auto.

Note: In some bands, a lower RBW detector was used to identify and detect emissions with better measurement system sensitivity.

J.4. Operating Mode During Test

The 8400 was tuned to a low, mid and high channel operating with 802.11b and 802.11g modes. Power setting: 15 (Software). Measurements were taken with external antenna active and integral antenna active modes. Measurements were taken with EUT horizontal and EUT upright positions also. Worst case orientations and worst case antenna settings are presented.

The 8400 was tuned to a low, mid and high channel operating with 802.11b and 802.11g Receive modes.

J.5. Test Results

Maximum radiated emission level was 51.94 dB μ V/m with video average measurement at 4924.85 MHz, when the receive antenna was horizontally polarized in Channel 11, 802.11g mode. The second harmonic of the carrier has 2.04 dB margin to the FCC Part 15.209 and RSS 210 limits.

J.6. Sample Calculations

Part 15.209 Average Limit: 500 μ V/m @ 3m = 20*Log (500) = 53.98 dB μ V/m
Peak Limit = Average Limit + 20 (dB) = 73.98 dB μ V/m

Total correction factor (dB) = Receive antenna factor (dB) + Receive cable loss (dB) + High pass filter loss (dB) – LNA gain (dB)

Radiated emission level (dB μ V/m) = Radiated measured level (dB μ V) + Total correction factor (dB)

J.7. Tested By

This testing was conducted in accordance with the ISO 17025:2005 scope of accreditation, table 1; Quality Manual.

Name: Deniz Demirci
Function: Senior EMC / Wireless Technologist

J.8. Test date

Test started: April 9, 2008 Ended: April 25, 2008

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J.9. Test Data Summary

J.9.1. Transmitter Mode

Mode	Channel	Frequency (MHz)	Receive antenna polarization	EUT Antenna**	EUT orientation***	Detector	Radiated measured level (dBμV)	Total correction factor (dB)	Radiated emission level (dBμV/m)	Limit (dBμV/m)	Margin (dB)
802.11b	1	155.01	H-pol	2	h	QP	34.75	-14.82	19.93	33.06	13.13
	1	250.01	H-pol	2	h	QP	32.18	-11.70	20.48	35.56	15.08
	1	400.01	H-pol	2	h	QP	41.04	-8.32	32.72	35.56	2.84
	1	250.01	V-pol	2	h	QP	35.02	-11.40	23.62	35.56	11.94
	1	325.01	V-pol	2	h	QP	31.67	-9.86	21.81	35.56	13.75
	1	400.00	V-pol	2	h	QP	35.25	-7.82	27.43	35.56	8.13
	1	3216.00*	V-pol	1	u	PK	46.34	2.82	49.16	73.98	24.82
	1	4823.95	H-pol	1	u	PK	58.32	5.92	64.24	73.98	9.74
	1	4824.05	V-pol	1	u	PK	50.22	5.98	56.20	73.98	17.78
	6	4874.10	H-pol	1	u	PK	56.97	5.94	62.91	73.98	11.07
	11	4923.95	H-pol	1	u	PK	58.09	6.30	64.39	73.98	9.59
802.11g	1	4822.85	H-pol	1	u	PK	60.41	4.79	65.20	73.98	8.78
	1	4826.75	V-pol	1	u	PK	52.10	4.80	56.90	73.98	17.08
	6	4874.06	H-pol	1	u	PK	62.95	5.94	68.89	73.98	5.09
	6	4882.78	V-pol	1	u	PK	55.26	6.06	61.32	73.98	12.66
	11	4922.44	H-pol	1	u	PK	62.26	6.27	68.53	73.98	5.45
	11	4921.04	V-pol	1	u	PK	52.24	6.33	58.57	73.98	15.41
802.11b	1	4825.85	H-pol	1	u	Video AV	44.16	5.90	50.06	53.98	3.92
	1	4825.85	V-pol	1	u	Video AV	35.96	5.97	41.93	53.98	12.05
	6	4875.80	H-pol	1	u	Video AV	43.42	5.98	49.40	53.98	4.58
	11	4925.75	H-pol	1	u	Video AV	43.91	6.33	50.24	53.98	3.74
802.11g	1	4825.25	H-pol	1	u	Video AV	42.70	4.74	47.44	53.98	6.54
	1	4825.55	V-pol	1	u	Video AV	35.49	4.80	40.29	53.98	13.69
	6	4875.06	H-pol	1	u	Video AV	44.67	5.96	50.63	53.98	3.35
	6	4874.76	V-pol	1	u	Video AV	37.00	6.03	43.03	53.98	10.95
	11	4924.85	H-pol	1	u	Video AV	45.62	6.32	51.94	53.98	2.04
	11	4922.95	V-pol	1	u	Video AV	35.25	6.37	41.62	53.98	12.36

* Emission is not in the restricted bands (FCC part 15.205 and RSS 210)

** EUT Antenna

1 - AUX, external antenna, software setting antenna#1

2 - Main, Integral antenna, software setting antenna#2

*** EUT orientation

h – Horizontal tabletop orientation

u – Upright standing orientation

Maximum radiated emission level was 51.94 dBμV/m with video average measurement at 4924.85 MHz, when the receive antenna was horizontally polarized in Channel 11, 802.11g mode. It has 2.04 dB margin to the Part 15.209 and RSS 210 limits.

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J.9.2. Receiver Mode

Mode	Channel	Frequency (MHz)	Receive antenna polarization	EUT Antenna*	EUT orientation**	Detector	Radiated measured level (dBµV)	Total correction factor (dB)	Radiated emission level (dBµV/m)	Limit (dBµV/m)	Margin (dB)
802.11b Receive Mode	1	155.01	H-pol	2	h	QP	34.75	-14.82	19.93	33.06	13.13
		250.01	H-pol	2	h	QP	32.18	-11.70	20.48	35.56	15.08
		400.01	H-pol	2	h	QP	41.04	-8.32	32.72	35.56	2.84
		250.01	V-pol	2	h	QP	35.02	-11.40	23.62	35.56	11.94
		325.01	V-pol	2	h	QP	31.67	-9.86	21.81	35.56	13.75
		400.00	V-pol	2	h	QP	35.25	-7.82	27.43	35.56	8.13
		3282.55	H-pol	1	u	PK	47.48	1.33	48.81	73.98	25.17
		3282.59	H-pol	1	u	AV	45.16	1.33	46.49	53.98	7.49
		3282.63	V-pol	1	u	PK	45.38	1.38	46.76	73.98	27.22
		3282.69	V-pol	1	u	AV	43.03	1.38	44.41	53.98	9.57

Maximum measured level was 32.72 dBµV/m with quasi-peak detector at 400.01 MHz, when antenna was horizontally polarized. It has 2.84 dB margin to the RSS 210 Receiver mode limits.

EUT Antenna*

1 - AUX, external antenna, software setting antenna#1

2 - Main, Integral antenna, software setting antenna#2

EUT orientation**

h – Horizontal tabletop orientation

u – Upright standing orientation

Plots were not provided in order to reduce file size

APPENDIX K: MEASUREMENT EQUIPMENT

10 m SEMI-ANECHOIC CHAMBER 30 MHz – 1 GHz Radiated Emission tests					
Descriptions	Manufacturer	Type/Model	Serial #	Cal Due	Cal Date
Bilog Antenna	Teseq	CBL 6112D	CG1177	10OCT08	10OCT07
Test Receiver	Rohde & Schwarz	ESMI	CG0433/ CG0434	02APR09	02APR08
HPIB Extender	HP	37204	CG0181	N/A	N/A
Mast Controller	EMCO	2090	CG0179	N/A	N/A
Turntable Controller	EMCO	2090	CG0178	N/A	N/A
Digital Barometer / Thermometer	Cole-Parmer	1870	CG0728	19JUN08	19JUN07
3 m SEMI-ANECHOIC CHAMBER 150 kHz – 30 MHz Conducted Emission, 1 GHz – 26 GHz Radiated Emission and Radio tests					
Table Top LISN	EMCO	3825	CG0367	18JAN10	18JAN08
Horn Antenna (Rx) 1 GHz – 18 GHz	EMCO	3115	CG0103	30AUG08	30AUG06
Standard Gain Horn (Rx) 18 GHz – 26.5 GHz	EMCO	3160-09	CG0075	N/A ⁽¹⁾	27NOV01
High pass filter F > 1000 MHz	MicroTronics	HPM14576	CG0963	10AUG08	10AUG06
High pass filter F > 2800 MHz	MicroTronics	HPM50111	CG0964	10AUG08	10AUG06
LNA 1 GHz - 18 GHz	Miteq	JSD00121	CG0317	10AUG08	10AUG06
LNA 18 GHz - 26.5 GHz	Miteq	JSD00119	CG0482	19JAN09	19JAN07
Spectrum Analyzer 9 kHz – 40 GHz	Rohde & Schwarz	FSEK-20	CG0118	19JUN08	19JUN07
EMI Receiver 9 kHz – 40 GHz	Rohde & Schwarz	ESI	CG0109	12NOV08	12NOV07
LNA DC Power Supply	Xantrex	LXO 30-2	CG0493	N/A	N/A
HPIB Extender	HP	37204	CG0110	N/A	N/A
Turntable and Mast Controller	EMCO	2090	CG0161	N/A	N/A

(1): As per manufacturer recommend, this item does not require periodic calibration. Its electromagnetic performance is almost exclusively depended on the physical dimension of the horn. A thorough mechanical check is all that is needed to guarantee the antenna performance.

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END OF DOCUMENT

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