

Test of DNMA-83 802.11 a/b/g/n Wireless
Module

To: FCC 47 CFR Part 15.407 & IC RSS-210

Test Report Serial No.: HWPD03-A6 Rev A



TEST REPORT

FROM



Test of DNMA-83 802.11 a/b/g/n Wireless Module
to

To: FCC 47 CFR Part 15.407 & IC RSS-210

Class II Permissive Change, FCC ID: RTP-DNMA83
Additional Antenna

Test Report Serial No.: HWPD03-A6 Rev A

This report supersedes NONE

Applicant: Hewlett Packard
200 Forest Street MR01-2/M18
Marlborough
Massachusetts 01752-3085 , USA

Product Function: 802.11a/b/g/n Wireless Access Card

Copy No: pdf Issue Date: 20th July 2009

This Test Report is Issued Under the Authority of:

MiCOM Labs, Inc.
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CERTIFICATE #2381.01

MiCOM Labs is an ISO 17025 Accredited Testing Laboratory



Title: DNMA-83 802.11 a/b/g/n Wireless Module
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: HWPD03-A6 Rev A
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ACCREDITATION, LISTINGS & RECOGNITION

MiCOM Labs, Inc. an accredited laboratory complies with the international standard BS EN ISO/IEC 17025. The company is accredited by the American Association for Laboratory Accreditation (A2LA) www.a2la.org test laboratory number 2381.01. MiCOM Labs test schedule is available at the following URL; <http://www.a2la.org/scopepdf/2381-01.pdf>



THE AMERICAN ASSOCIATION FOR
LABORATORY ACCREDITATION

ACCREDITED LABORATORY

A2LA has accredited

MICOM LABS
Pleasanton, CA

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 *General Requirements for the Competence of Testing and Calibration Laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-LAF Communiqué dated 18 June 2005).



A2LA

Presented this 26th day of February 2008.



President
For the Accreditation Council
Certificate Number 2381.01
Valid to November 30, 2009

For the tests or types of tests to which this accreditation applies,
please refer to the laboratory's Electrical Scope of Accreditation.

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LISTINGS

MiCOM Labs test facilities are listed by the following organizations;

North America

United States of America

Federal Communications Commission (FCC) Listing #: 102167

Canada

Industry Canada (IC) Listing #:4143A-2

Japan Registration

VCCI Membership Number: 2959

- Radiation 3 meter site; Registration No. R-2881
- Line Conducted, Registration Nos. C-3181 & T-1470
- Emissions; Registration Nos. C-3180 & T-1469

RECOGNITION

APEC MRA (Asia-Pacific Economic Community Mutual Recognition Agreement)

Conformity Assessment Body (CAB) – MiCOM Labs

Test data generated by MiCOM Labs is accepted in the following countries under the APEC MRA.

Country	Recognition Body	Phase	CAB Identification No.
Australia	Australian Communications and Media Authority (ACMA)	I	US0159
Hong Kong	Office of the Telecommunication Authority (OFTA)	I	
Korea	Ministry of Information and Communication Radio Research Laboratory (RRL)	I	
Singapore	Infocomm Development Authority (IDA)	I	
Taiwan	National Communications Commission (NCC) Bureau of Standards, Metrology and Inspection (BSMI)	I	

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DOCUMENT HISTORY

Document History		
Revision	Date	Comments
Draft		
Rev A	20 th July 2009	Initial release.

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1. TEST RESULT CERTIFICATE

Applicant:	Hewlett Packard 200 Forest Street MR01-2/M18 Marlborough Massachusetts 01752-3085 , USA	Tested By:	MiCOM Labs, Inc. 440 Boulder Court Suite 200 Pleasanton California, 94566, USA
EUT:	Wireless Access Card	Telephone:	+1 925 462 0304
Model:	DNMA-83	Fax:	+1 925 462 0306
S/N:	D029829A043BJ01		
Test Date(s):	4th May to 5th June '09	Website:	www.micomlabs.com

STANDARD(S)	TEST RESULTS
FCC 47 CFR Part 15.407 & IC RSS-210 Limited to Radiated Testing of Additional Antennas	EQUIPMENT COMPLIES

MiCOM Labs, Inc. tested the equipment mentioned in accordance with the requirements set forth in the above standards. Test results indicate that the equipment tested is capable of demonstrating compliance with the requirements as documented within this report.

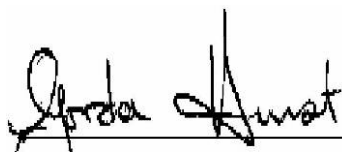
Notes:

1. This document reports conditions under which testing was conducted and the results of testing performed.
2. Details of test methods used have been recorded and kept on file by the laboratory.
3. Test results apply only to the item(s) tested.

Approved & Released for MiCOM Labs, Inc. by:



Graeme Grieve
Quality Manager MiCOM Labs,



Gordon Hurst
President & CEO MiCOM Labs, Inc.



CERTIFICATE #2381.01

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2. REFERENCES AND MEASUREMENT UNCERTAINTY

2.1. Normative References

Ref.	Publication	Year	Title
(i)	FCC 47 CFR Part Sub-Part E 15.407	2007	Code of Federal Regulations
(ii)	Industry Canada RSS-210	Issue 7 June 2007	Low Power License-Exempt Radiocommunication Devices (All Frequency Bands): Category 1 Equipment
(iii)	Industry Canada RSS-Gen	Issue 2 June 2007	General Requirements and Information for the Certification of Radiocommunication Equipment
(iv)	ANSI C63.4	2003	American National Standards for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
(v)	CISPR 22/ EN 55022	1997 1998	Limits and Methods of Measurements of Radio Disturbance Characteristics of Information Technology Equipment
(vi)	M 3003	Edition 1 Dec. 1997	Expression of Uncertainty and Confidence in Measurements
(vii)	LAB34	Edition 1 Aug 2002	The expression of uncertainty in EMC Testing
(viii)	ETSI TR 100 028	2001	Parts 1 and 2 Electromagnetic compatibility and Radio Spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics
(ix)	A2LA	14 th September 2005	Reference to A2LA Accreditation Status – A2LA Advertising Policy
(x)	FCC Public Notice – DA 02-2138	2002	Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices

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2.2. Test and Uncertainty Procedures

Conducted and radiated emission measurements were conducted in accordance with American National Standards Institute ANSI C63.4, listed in the Normative References section of this report.

Measurement uncertainty figures are calculated in accordance with ETSI TR 100 028 Parts 1 and 2.

Measurement uncertainties stated are based on a standard uncertainty multiplied by a coverage factor $k = 2$, providing a level of confidence of approximately 95 % in accordance with UKAS document M 3003 listed in the Normative References section of this report.

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3. PRODUCT DETAILS AND TEST CONFIGURATIONS

3.1. Technical Details

Details	Description
Purpose:	Test of the DNMA-83 802.11 a/b/g/n Wireless Module in the frequency range 5150 – 5250 MHz to FCC Part 15.407 and Industry Canada RSS-210 regulations.
Applicant:	Hewlett Packard 200 Forest Street MR01-2/M18 Marlborough Massachusetts 01752-3085 , USA
Manufacturer:	Winstron NEWEB Corp
Laboratory performing the tests:	MiCOM Labs, Inc. 440 Boulder Court, Suite 200 Pleasanton, California 94566 USA
FCC ID:	RTP-DNMA83
IC ID:	4891A-DNMA83
Test report reference number:	HWP03-A6 Rev A
Date EUT received:	4 th May 2009
Standard(s) applied:	FCC 47 CFR Part 15.407 & IC RSS-210
Dates of test (from - to):	4 th May to 5 th June 2009
No of Units Tested:	1
Type of Equipment:	802.11a/b/g/n Wireless Access Card
Applicants Trade Name:	WLAN a+b+g mini-PCI Module
Model(s):	DNMA-83
Software Release	5.3
Hardware Release:	-030
Declared Frequency Range(s):	5,150 to 5,250 MHz
Type of Modulation:	Per 802.11 –CCK, BPSK, QPSK, DSSS, OFDM
Declared Nominal Output Power: (Average Power)	802.11a: Legacy +18 dBm 802.11n HT-20 +20 dBm 802.11n HT-40 +20 dBm
EUT Modes of Operation:	Legacy 802.11 a/b/g/n
Transmit/Receive Operation:	Time Division Duplex
Rated Input Voltage and Current:	Power Supply 3.3 Vdc @ 1 A
Operating Temperature Range:	Declared range 0 to +40°C
Frequency Stability:	±20 ppm max
Equipment Dimensions:	2.5" x 2.5"
Weight:	2oz
Primary function of equipment:	Wireless Access Card for transmitting data and voice

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3.2. Scope of Test Program

RF Testing

The scope of the compliance program was to test an additional three antennas for the 802.11 a/b/g/n wireless module in the frequency range 5150 – 5250 MHz for compliance against FCC 47 CFR Part 15.407 and Industry Canada RSS-210 specifications.

The antennas tested is detailed in section 3.4 “Antenna Details”.

Although this is for a Limited Modular Approval (LMA) the module was tested in a host device; HP MSM-410 Wireless Access Point.

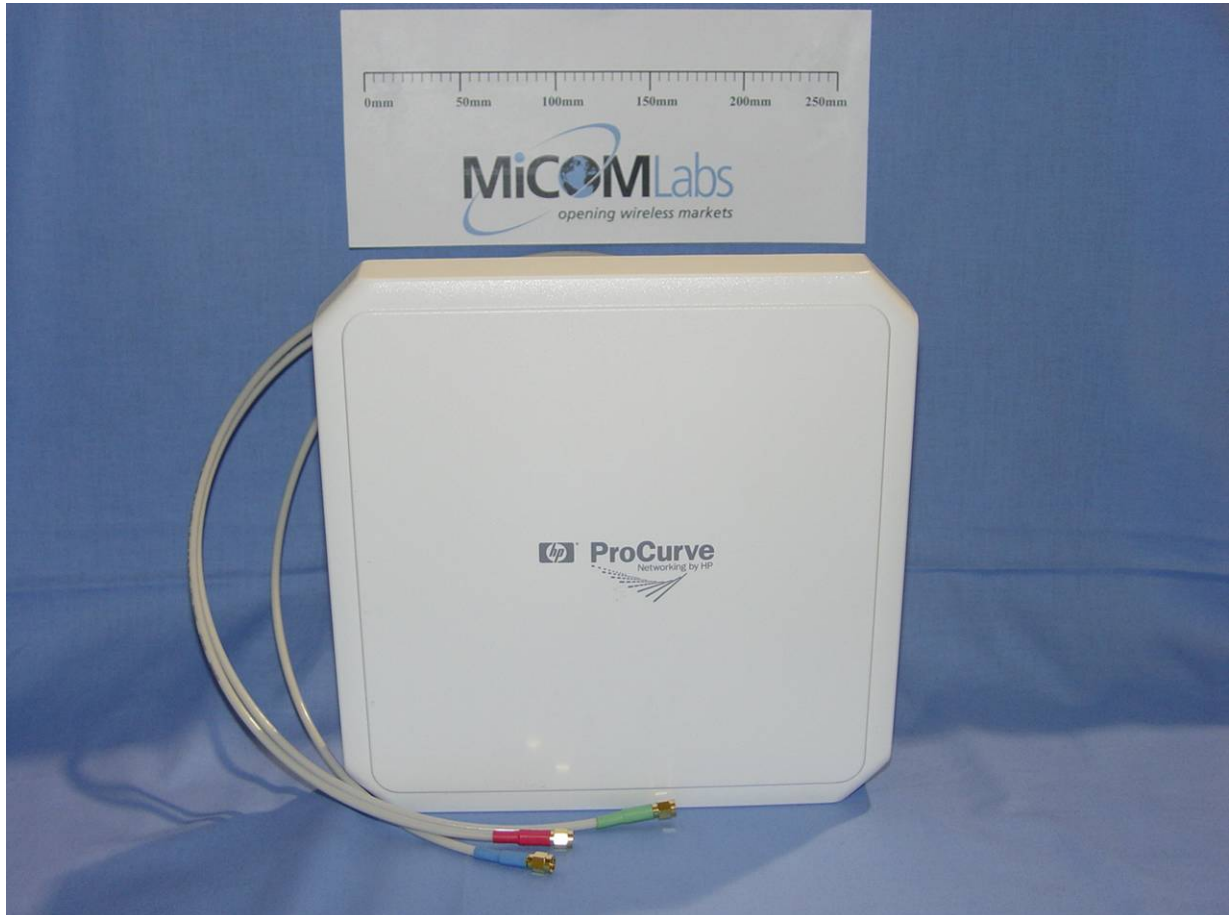
Only spurious emissions testing above 1 GHz were performed in order to provide compliance.

Identification

FCC ID: RTP-DNMA83
IC ID: 4891A-DNMA83

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J9169A Antenna



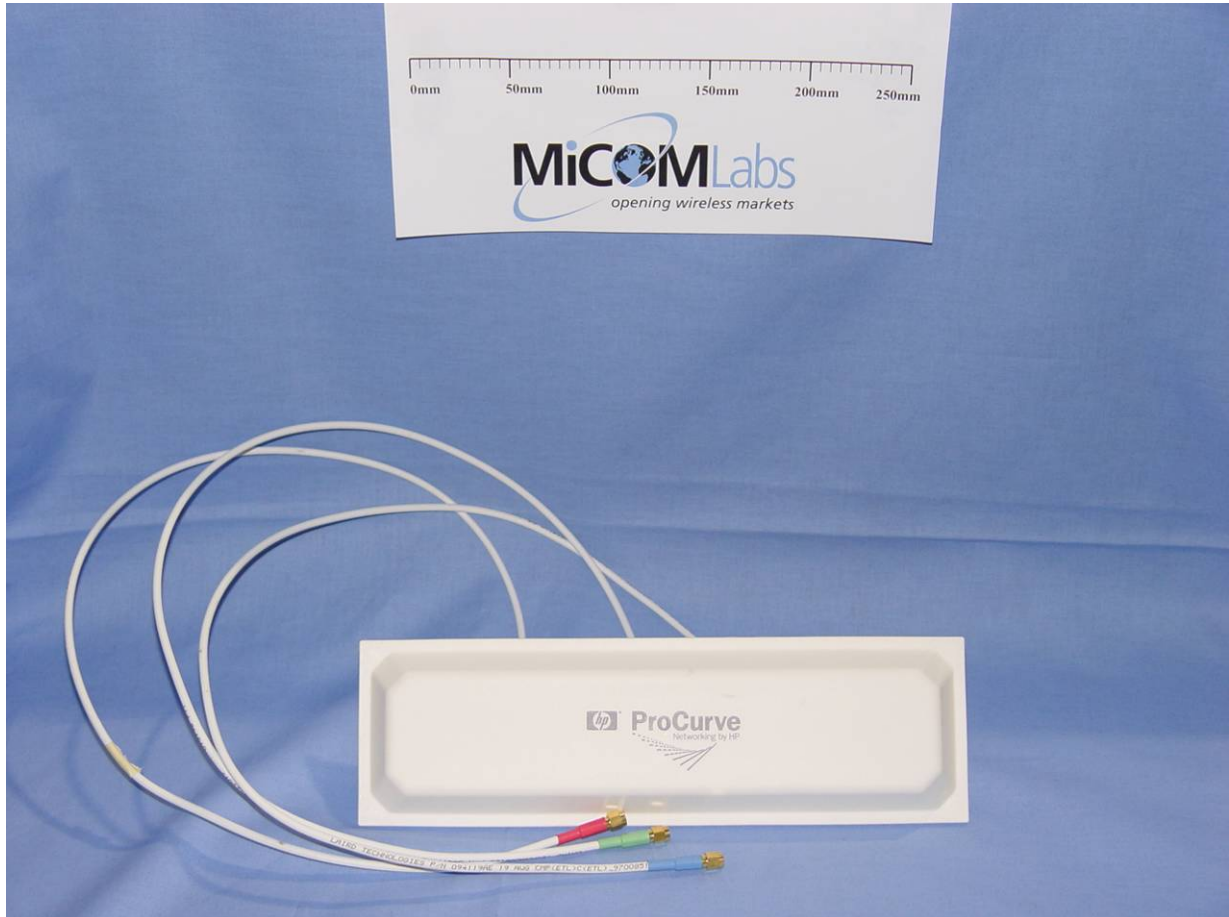
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J9170A Antenna



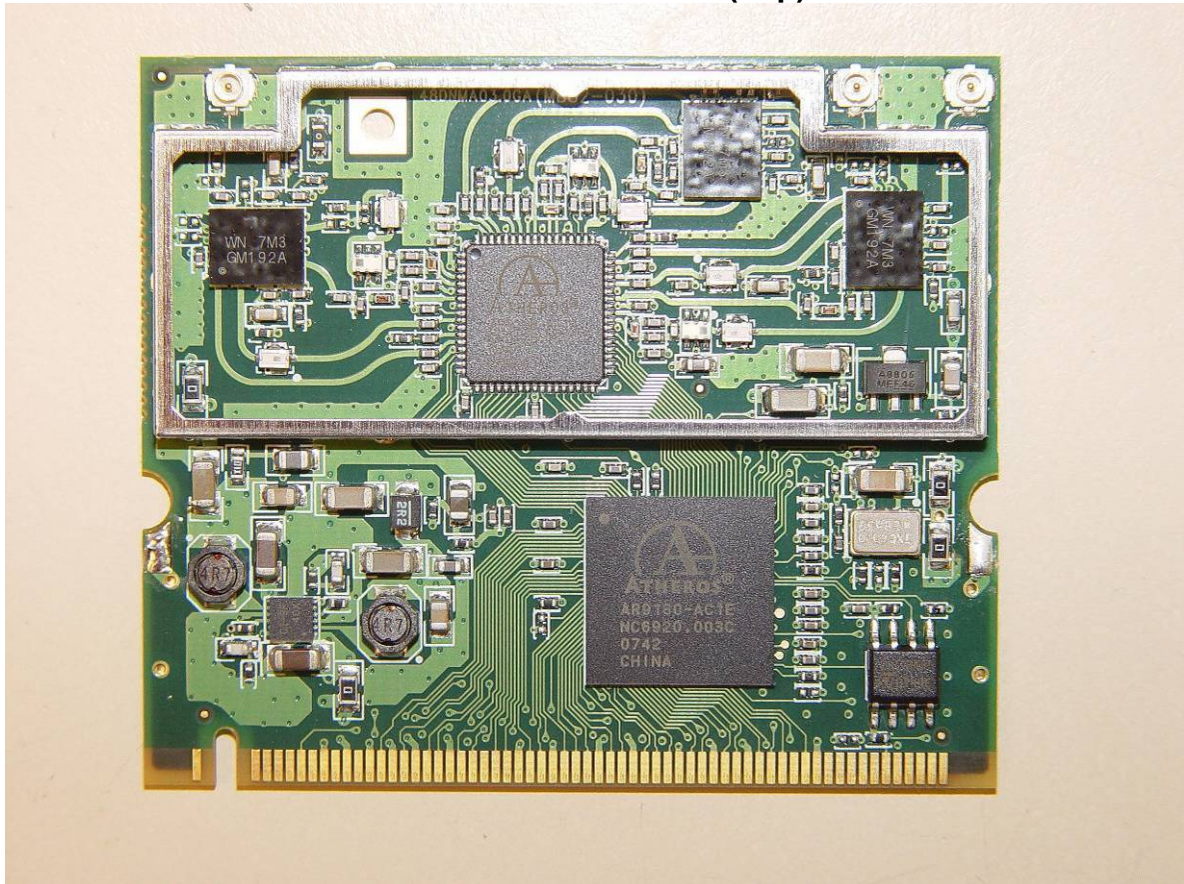
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J9171A Antenna



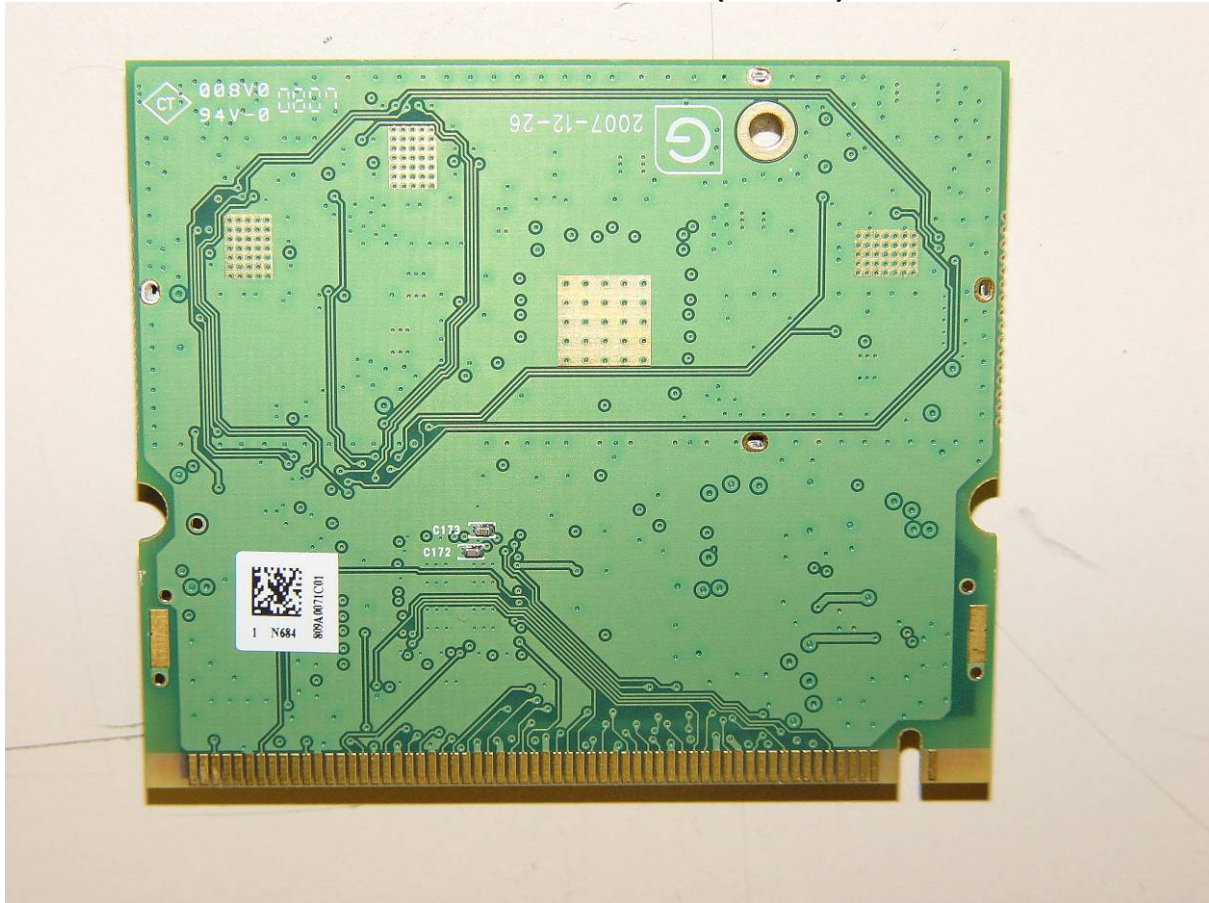
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**802.11 a/b/g/n DNMA-83 wireless card
Wireless Access Card (Top)**



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**802.11 a/b/g/n DNMA-83 wireless card
Wireless Access Card (Bottom)**





3.3. Equipment Model(s) and Serial Number(s)

Type (EUT/Support)	Equipment Description (Including Brand Name)	Mfr	Model No.	Serial No.
EUT	Access Card		DNMA-83	D029829A043BJ01
Support	Wireless Access Point	Colubris Networks	MSM410	--
Support	Laptop PC	HP		

3.4. Antenna Details

Antenna	Gain (dBi) 5,150 – 5,250 MHz
J9169A	10.7
J9170A	13.5
J9171A	4.0

3.5. Cabling and I/O Ports

Number and type of I/O ports on supporting wireless access point

- 1 X RJ-45 , 10/100/1000 BASE-T Ethernet
- 1 X RJ-45 , 10/100/1000 BASE-T Ethernet with POE.



3.6. Test Configurations

Testing was performed to determine the highest power level versus bit rate. The variant with the highest power was used to exercise the product.

Matrix of test configurations

Operational Mode(s) (802.11)	Variant	Data Rates with Highest Power	Frequencies (MHz)
a	Legacy	6 MBit/s	5,180
n	HT-20	6.5 MCS	5,200
			5,240
	HT-40	13.5 MCS	5,190
			5,230



3.7. Equipment Modifications

The following modifications were required to bring the equipment into compliance:

In order to meet the spurious emissions and band edge requirements of the FCC and IC standards the transmitter power was set in accordance with the following tables for each model of antenna.

Antenna J9169A

15.407 – 5,150 -5,250 MHz Channels

Operational Mode	Frequency	Test Code Value From Test Plan	Spurious Emissions Value *	Band-Edge Value *	Test Code Power Setting	Max Compliant Power
	[MHz]					[dBm]
a	5180	7			7	12.3
	5200	7			7	12.3
	5240	7			7	12.1
HT-20	5180	7			7	12.3
	5200	7			7	12.3
	5240	7			7	12
HT-40	5190	6			6	12
	5230	6.5			6.5	12.3

Antenna J9170A

15.407 – 5,150 -5,250 MHz Channels

Operational Mode	Frequency	Test Code Value From Test Plan	Spurious Emissions Value *	Band-Edge Value *	Test Code Power Setting	Max Compliant Power
	[MHz]					[dBm]
a	5180	4.5			4.5	9.5
	5200	4.5			4.5	9.5
	5240	4.5			4.5	9.4
HT-20	5180	4.5			4.5	9.5
	5200	4.5			4.5	9.5
	5240	4.5			4.5	9.4
HT-40	5190	3.5			3.5	9.3
	5230	3.5			3.5	9.5

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Antenna J9171A

15.407 – 5,150 -5,250 MHz Channels

Operational Mode	Frequency	Test Code Value From Test Plan	Spurious Emissions Value *	Band-Edge Value *	Test Code Power Setting	Max Compliant Power
	[MHz]					[dBm]
a	5180	11			11	16.6
	5200	11.5			11.5	16.6
	5240	12			12	16.6
HT-20	5180	11			11	16.5
	5200	11.5			11.5	16.4
	5240	12			12	16.5
HT-40	5190	11.5			11.5	16.8
	5230	11.5			11.5	16.7

3.8. Deviations from the Test Standard

The following deviations from the test standard were required in order to complete the test program:

1. None

3.9. Subcontracted Testing or Third Party Data

1. NONE



4. TEST SUMMARY

List of Measurements

The following table represents the list of measurements required under the **FCC CFR47 Part 15.407** and **Industry Canada RSS-210** and **Industry Canada RSS-Gen**.

Section(s)	Test Items	Description	Condition	Result	Test Report Section
15.407(b)(2) 15.205(a) 15.209(a) 2.2 2.6 A9.3(2) 4.7	Radiated Emissions		Radiated		5.1.2
	Transmitter Radiated Spurious Emissions	Emissions above 1 GHz		Complies	5.1.2.1
	Radiated Band Edge	Band edge results		Complies	5.1.2.1
RSS-GEN §4.8, §6	Receiver Radiated Spurious Emissions	Emissions above 1 GHz		Complies	5.1.2.2

Note 1: Test results reported in this document relate only to the items tested

Note 2: The required tests demonstrated compliance as per client declaration of test configuration, monitoring methodology and associated pass/fail criteria

Note 3: Section 3.7 Equipment Modifications highlights the equipment modifications that were required to bring the product into compliance with the above test matrix

5. TEST RESULTS

5.1. Device Characteristics

5.1.1. Radiated Emissions (15.407, RSS-210)

5.1.1.1. Transmitter Radiated Spurious Emissions (above 1 GHz) and Radiated Band Edge Measurements – Restricted Bands

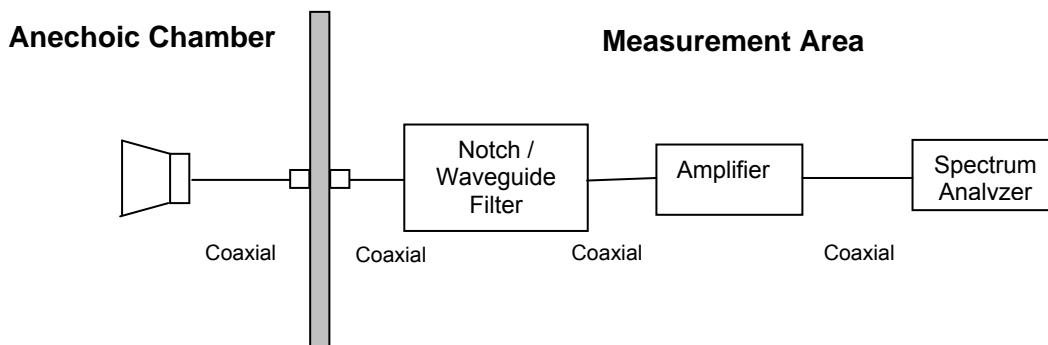
FCC, Part 15 Subpart C §15.407(b)(2), §15.205(a)/15.209(a)
Industry Canada RSS-210 §A9.3(2); §2.2; §2.6; RSS-Gen §4.7

Test Procedure

Radiated emissions above 1 GHz are measured in the anechoic chamber at a 3-meter distance on every azimuth in both horizontal and vertical polarities. The emissions are recorded and maximized as a function of azimuth by rotation through 360° with a spectrum analyzer in peak hold mode. Depending on the frequency band spanned a notch filter and waveguide filter was used to remove the fundamental frequency. The highest emissions relative to the limit are listed for each frequency spanned.

All measurements on any frequency or frequencies over 1 MHz are based on the use of measurement instrumentation employing an average detector function. All measurements above 1 GHz were performed using a minimum resolution bandwidth of 1 MHz.

Test Measurement Set up



Measurement set up for Radiated Emission Test

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Loss, and subtracting Amplifier Gain from the measured reading. All factors are included in the reported data.

$$FS = R + AF + CORR - FO$$

where: FS = Field Strength

R = Measured Spectrum analyzer Input Amplitude

AF = Antenna Factor

CORR = Correction Factor = CL – AG + NFL

CL = Cable Loss

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AG = Amplifier Gain
FO = Distance Falloff Factor
NFL = Notch Filter Loss or Waveguide Loss

For example:
Given receiver input reading of 51.5 dB μ V; Antenna Factor of 8.5 dB; Cable Loss of 1.3 dB; Falloff Factor of 0 dB, an Amplifier Gain of 26 dB and Notch Filter Loss of 1 dB. The Field Strength of the measured emission is:

$$FS = 51.5 + 8.5 + 1.3 - 26.0 + 1 = 36.3 \text{ dB}\mu\text{V/m}$$

Conversion between dB μ V/m (or dB μ V) and μ V/m (or μ V) are done as:

$$\text{Level (dB}\mu\text{V/m)} = 20 * \text{Log (level (\mu\text{V/m}))}$$

$$\begin{aligned} 40 \text{ dB}\mu\text{V/m} &= 100 \mu\text{V/m} \\ 48 \text{ dB}\mu\text{V/m} &= 250 \mu\text{V/m} \end{aligned}$$

The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength (dB μ V/m);

$$E = 1000000 \times \sqrt{30P} / 3 \mu\text{V/m}$$

where P is the EIRP in Watts

$$\text{Therefore: } -27 \text{ dBm/MHz} = 68.23 \text{ dB}\mu\text{V/m}$$

Note: The data in this Section identifies that the EUT is in compliance with the -27dBm/MHz EIRP limit (68.23 dB μ V/m) for out of band emissions. All peak emissions are less than 68.23 dB μ V/m.

Measurement Results Transmitter Radiated Spurious Emissions above 1 GHz

Ambient conditions.

Temperature: 17 to 23°C Relative humidity: 31 to 57 % Pressure: 999 to 1012 mbar

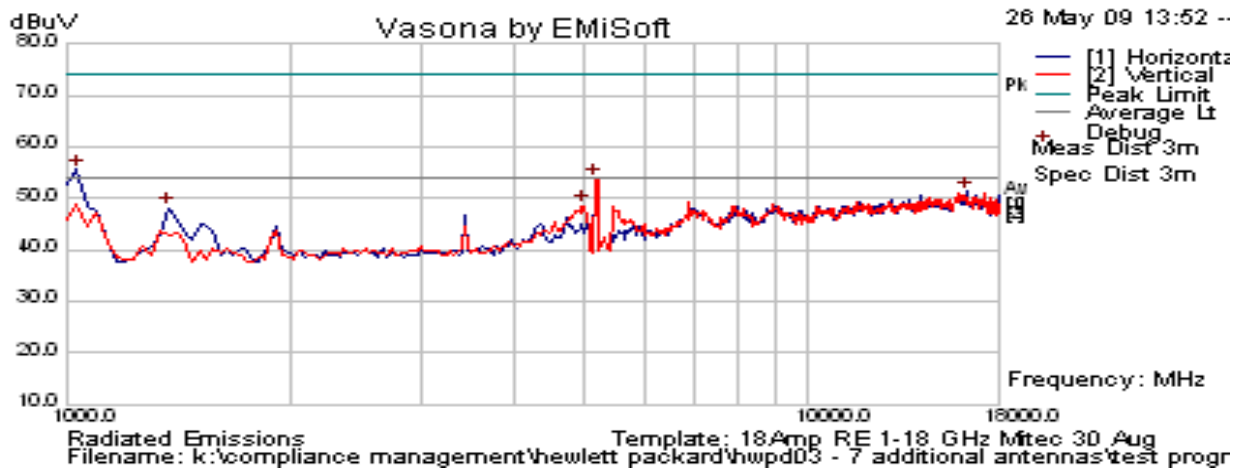
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ANTENNA J9169A Radiated Emissions in the 5,150 – 5,250 MHz Band

Radiated Spurious Emissions above 1 GHz

Date	26th May, 2009
Engineer	GMH
Test Case	HWPD03 - FCC 15.407 [Country = US/CAN] Spurious Emissions > 1GHz
Frequency	5180
Antenna Model	J9169A Antenna / Gain = 10.7 dBi
Power setting	7 in ART Test Utility
Test	802.11a 6 Mb/s;
Conditions	MSM410 DNMA-83 Platform Radio

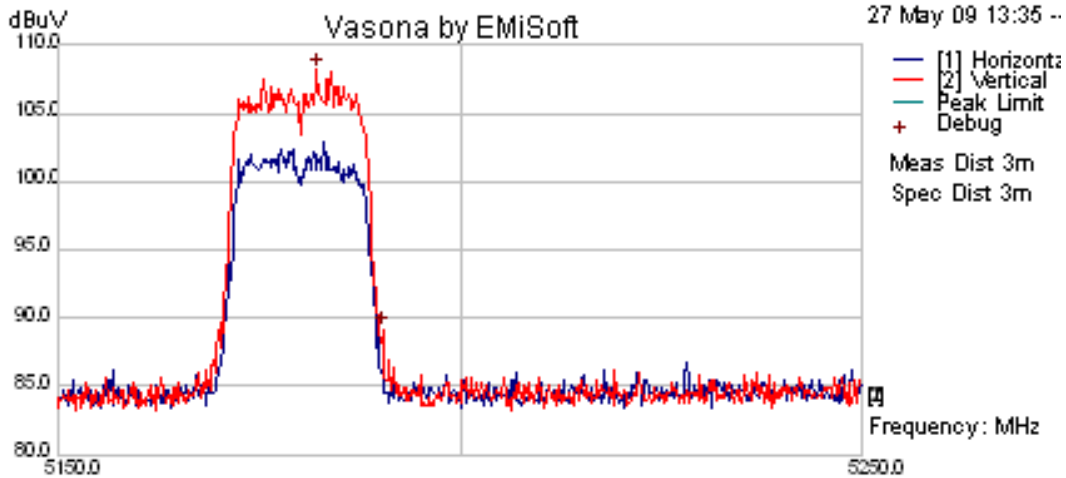


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5182.064	58.9	14.62	34.65	108.2	Peak [Scan]	V						
1040.251	65.9	1.99	-15.67	52.22	Peak Max	H	99	121	74	-21.78	Pass	RB
1040.251	44.35	1.99	-15.67	30.67	Average Max	H	99	121	54	-23.33	Pass	RB
5150.0000	Power Setting = 7.0			49.58	Peak Max	V	--	--	74	-24.42	Pass	BE
5150.0000				36.51	Average Max	V	--	--	54	-17.49	Pass	BE

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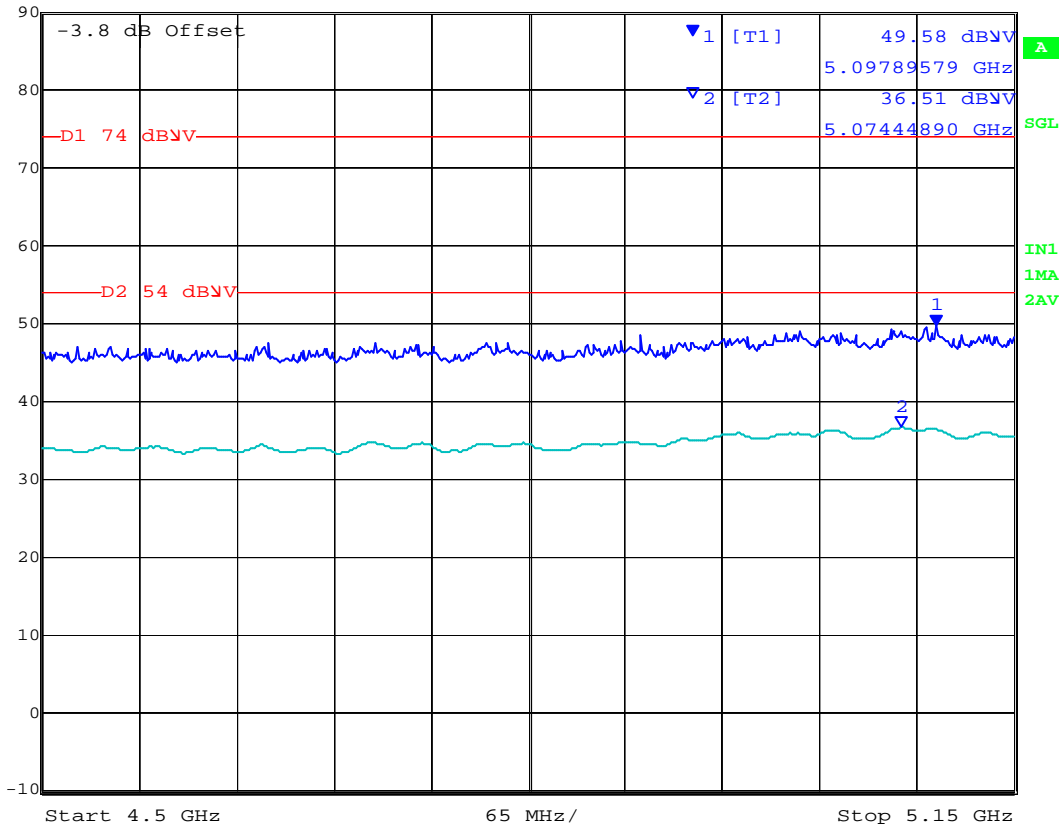
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Radiated Emissions Template: 18Amp RE 1-18 GHz Mitec 30 Aug
 Filename: k:\compliance management\hewlett packard\hwpd03 - 7 additional antennas\test progr



Marker 1 [T1] RBW 1 MHz RF Att 20 dB
 Ref Lvl 49.58 dBuV VBW 1 MHz
 90 dBuV 5.09789579 GHz SWT 60 s Unit dBuV



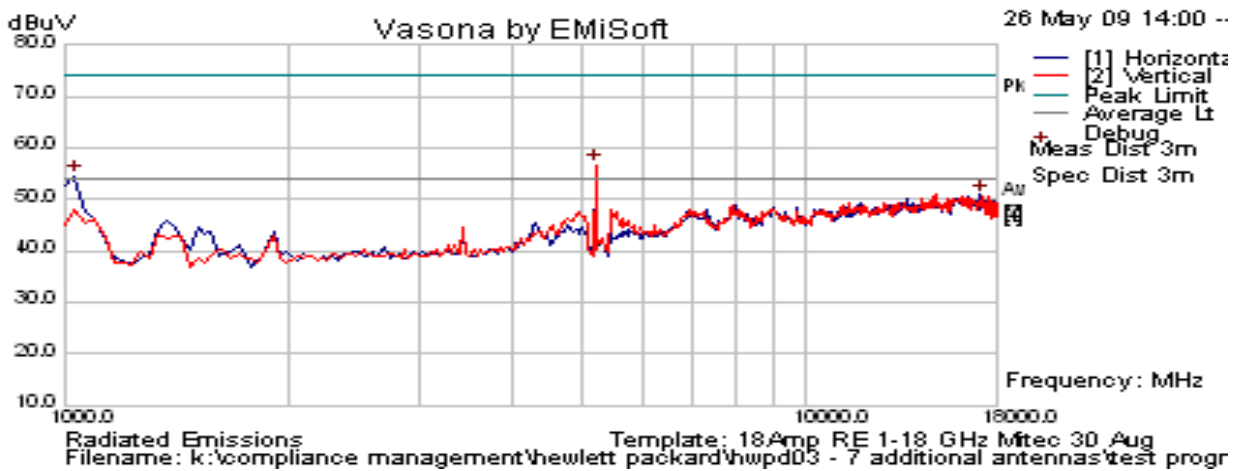
Date: 28.MAY.2009 14:55:21

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Date 26th May, 2009
Engineer GMH
Test Case HWPD03 - FCC 15.407 [Country = US/CAN] Spurious Emissions > 1GHz
Frequency 5200
Antenna Model J9169A Antenna / Gain = 10.7 dBi
Power setting 7 in ART Test Utility
Test 802.11a 6 Mb/s;
Conditions MSM410 DNMA-83 Platform Radio

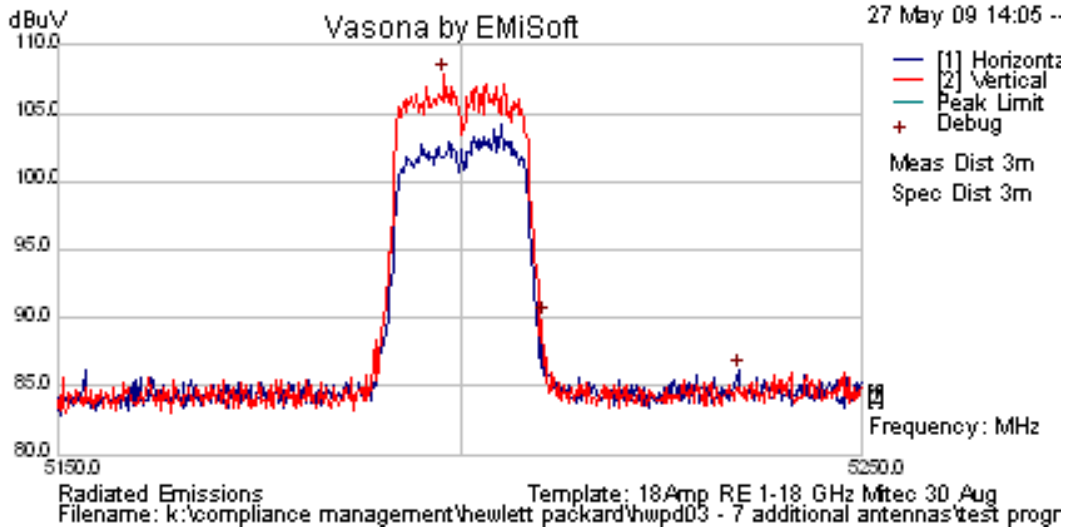


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5197.896	58.54	14.62	34.66	107.8	Peak [Scan]	V						
1040.251	65.9	1.99	-15.67	52.22	Peak Max	H	99	121	74	-21.78	Pass	RB
1040.251	44.35	1.99	-15.67	30.67	Average Max	H	99	121	54	-23.33	Pass	RB

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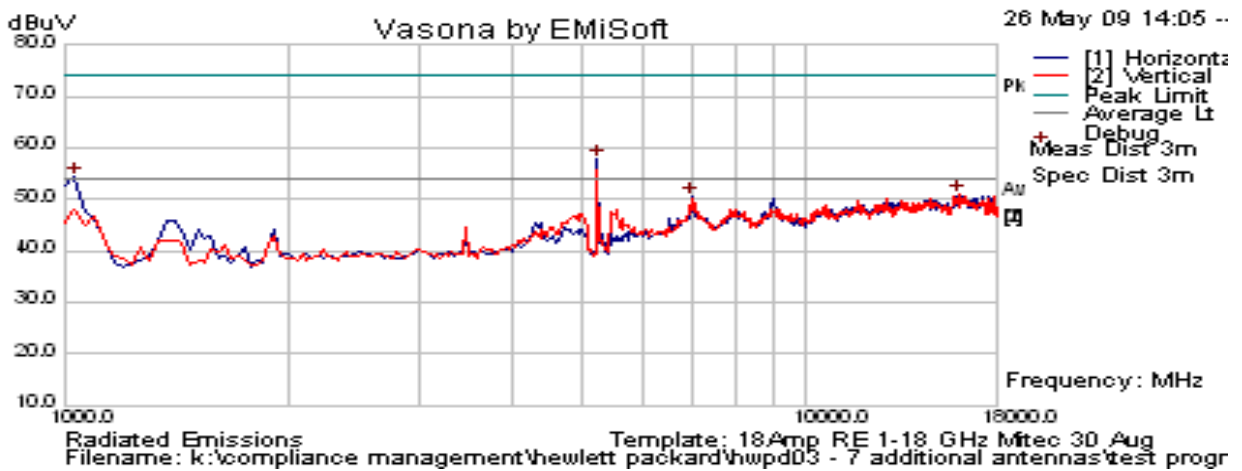


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Title: DNMA-83 802.11 a/b/g/n Wireless Module
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Date	26th May, 2009
Engineer	GMH
Test Case	HWPD03 - FCC 15.407 [Country = US/CAN] Spurious Emissions > 1GHz
Frequency	5240
Antenna Model	J9169A Antenna / Gain = 10.7 dBi
Power setting	7 in ART Test Utility
Test	802.11a 6 Mb/s;
Conditions	MSM410 DNMA-83 Platform Radio



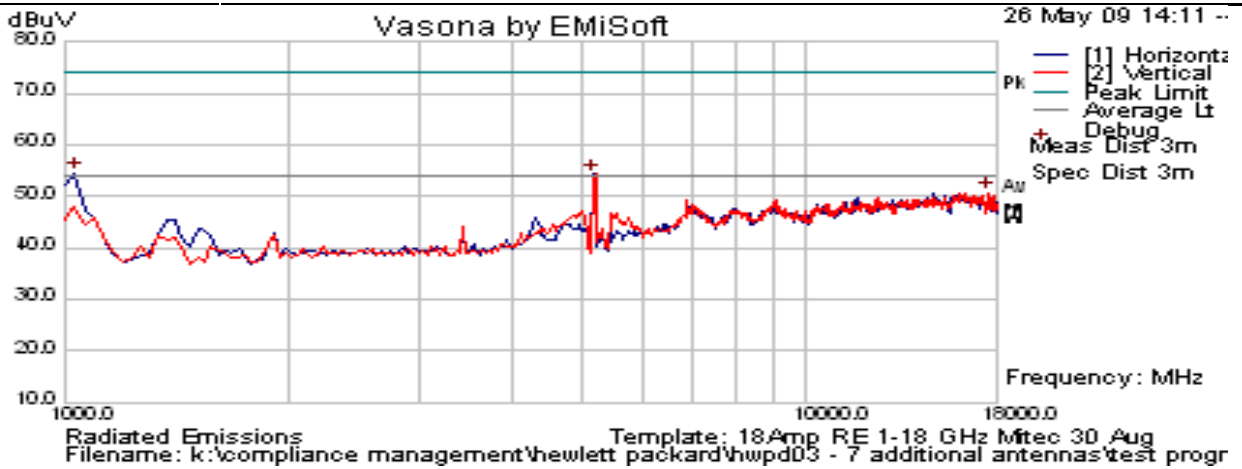
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5242.986	58.75	14.62	34.7	108.1	Peak [Scan]	V						
6995.992	46.61	5.38	-1.56	50.42	Peak [Scan]	H	100	0	68.23	-17.81	Pass	NRB
1040.251	65.9	1.99	-15.67	52.22	Peak Max	H	99	121	74	-21.78	Pass	RB
1040.251	44.35	1.99	-15.67	30.67	Average Max	H	99	121	54	-23.33	Pass	RB
5350.0000	Power Setting = 7.0			60.37	Peak Max	V	--	--	74	-13.63	Pass	BE
5350.0000	Power Setting = 7.0			42.93	Average Max	V	--	--	54	-21.07	Pass	BE

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Date 26th May, 2009
Engineer GMH
Test Case HWPD03 - FCC 15.407 [Country = US/CAN] Spurious Emissions > 1GHz
Frequency 5180
Antenna Model J9169A Antenna / Gain = 10.7 dBi
Power setting 7 in ART Test Utility
Test 802.11n HT-20 6.5 MCS
Conditions MSM410 DNMA-83 Platform Radio

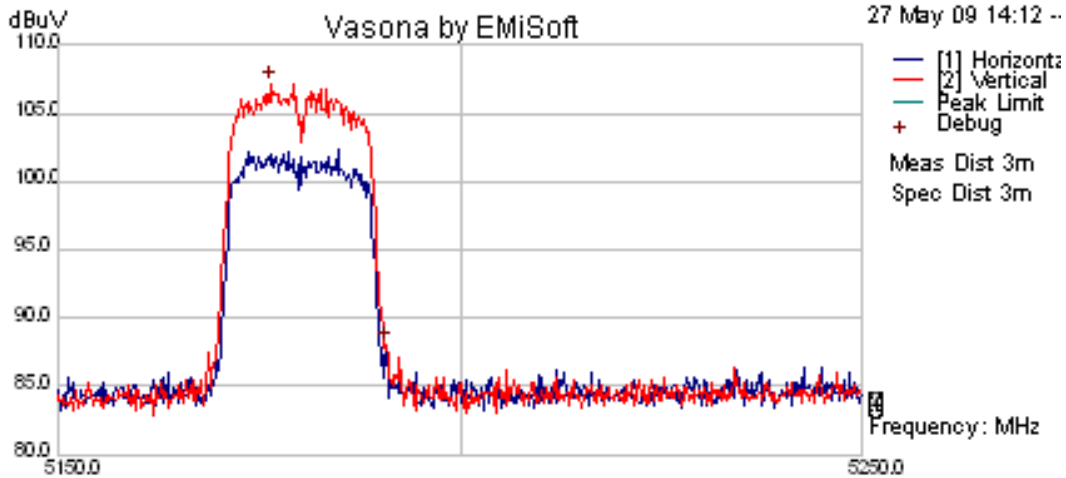


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5176.253	57.88	14.62	34.65	107.1	Peak [Scan]	V						
1040.251	65.9	1.99	-15.67	52.22	Peak Max	H	99	121	74	-21.78	Pass	RB
1040.251	44.35	1.99	-15.67	30.67	Average Max	H	99	121	54	-23.33	Pass	RB
5150.0000	Power Setting = 7.0			49.40	Peak Max	V	--	--	74	-24.60	Pass	BE
5150.0000	Power Setting = 7.0			36.51	Average Max	V	--	--	54	-17.49	Pass	BE

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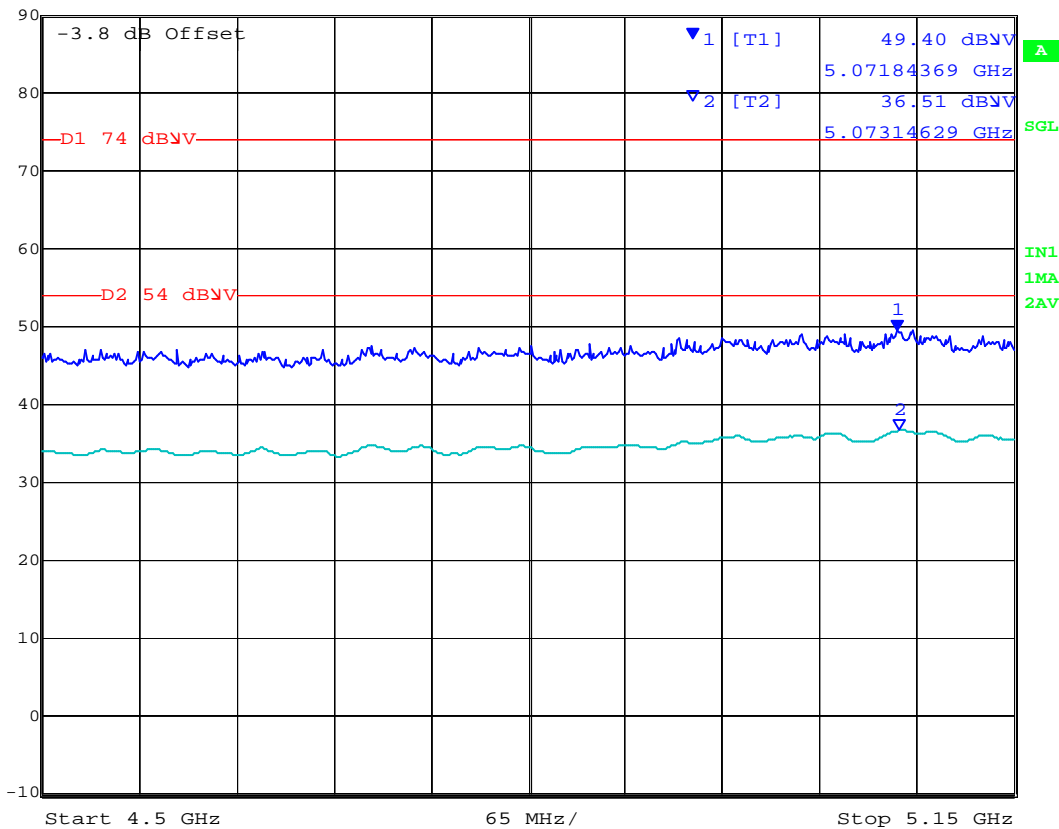
Title: DNMA-83 802.11 a/b/g/n Wireless Module
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Radiated Emissions
 Filename: k:\compliance management\hewlett packard\hwpd03 - 7 additional antennas\test progr
 Template: 18Amp RE 1-18 GHz Mitec 30 Aug



Marker 1 [T1] RBW 1 MHz RF Att 20 dB
 Ref Lvl 49.40 dBuV VBW 1 MHz
 90 dBuV 5.07184369 GHz SWT 60 s Unit dBuV



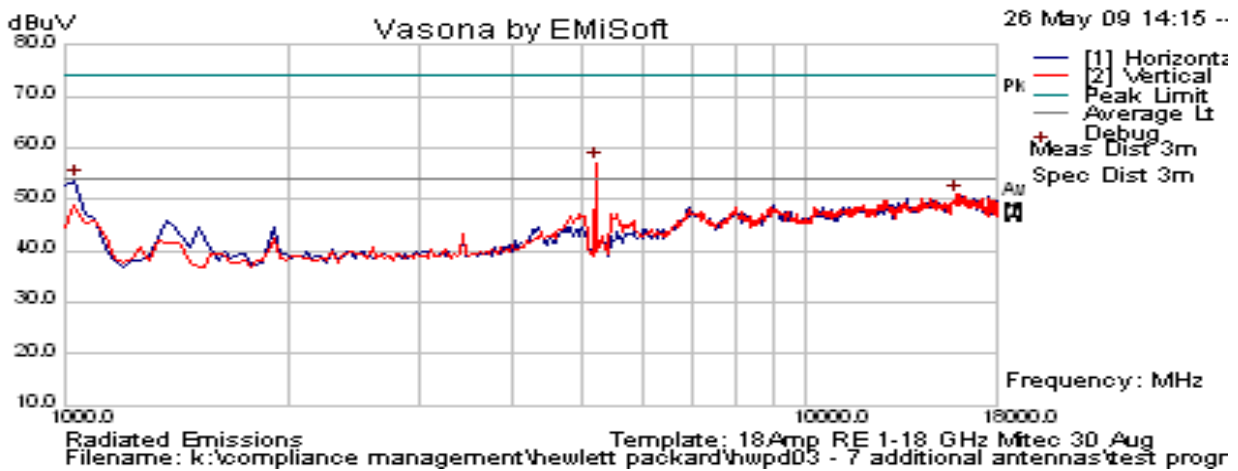
Date: 28.MAY.2009 14:57:53

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Date	26th May, 2009
Engineer	GMH
Test Case	HWPD03 - FCC 15.407 [Country = US/CAN] Spurious Emissions > 1GHz
Frequency	5200
Antenna Model	J9169A Antenna / Gain = 10.7 dBi
Power setting	7 in ART Test Utility
Test	802.11n HT-20 6.5 MCS
Conditions	MSM410 DNMA-83 Platform Radio

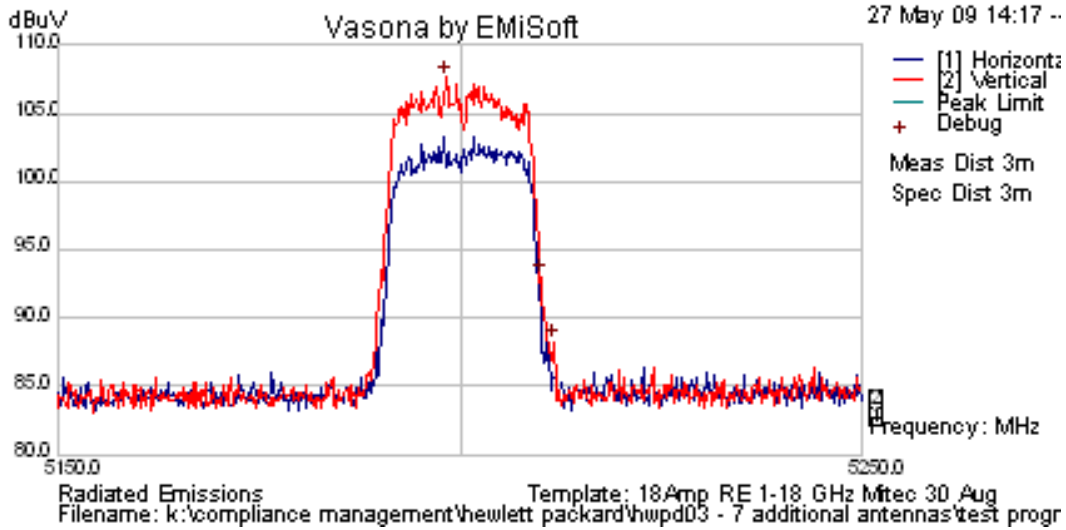


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5198.096	58.35	14.62	34.66	107.6	Peak [Scan]	V						
1040.251	65.9	1.99	-15.67	52.22	Peak Max	H	99	121	74	-21.78	Pass	RB
1040.251	44.35	1.99	-15.67	30.67	Average Max	H	99	121	54	-23.33	Pass	RB

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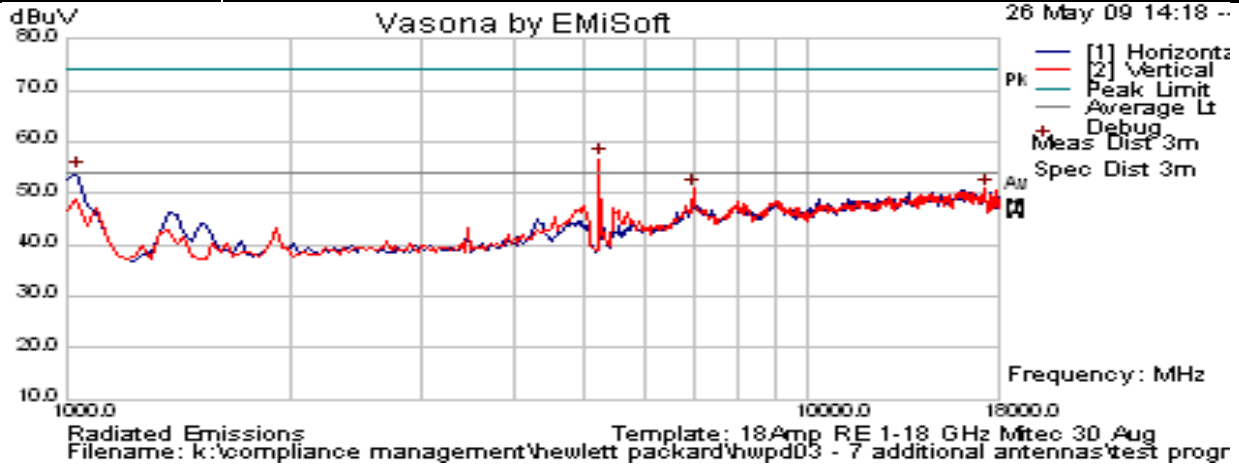


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Date 26th May, 2009
Engineer GMH
Test Case HWPD03 - FCC 15.407 [Country = US/CAN] Spurious Emissions > 1GHz
Frequency 5240
Antenna Model J9169A Antenna / Gain = 10.7 dBi
Power setting 7 in ART Test Utility
Test 802.11n HT-20 6.5 MCS
Conditions MSM410 DNMA-83 Platform Radio

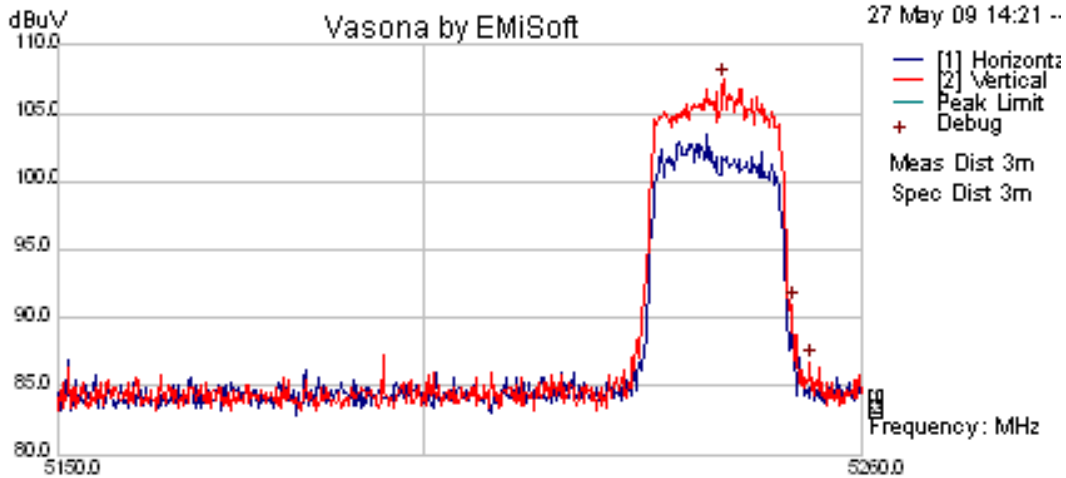


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5241.042	58.13	14.62	34.7	107.5	Peak [Scan]	V						
6995.992	47.09	5.38	-1.56	50.91	Peak [Scan]	V	100	0	68.23	-17.32	Pass	NRB
1040.251	65.9	1.99	-15.67	52.22	Peak Max	H	99	121	74	-21.78	Pass	RB
1040.251	44.35	1.99	-15.67	30.67	Average Max	H	99	121	54	-23.33	Pass	RB
5350.0000	Power Setting = 7.0			61.48	Peak Max	V	--	--	74	-12.52	Pass	BE
5350.0000	Power Setting = 7.0			42.90	Average Max	V	--	--	54	-11.10	Pass	BE

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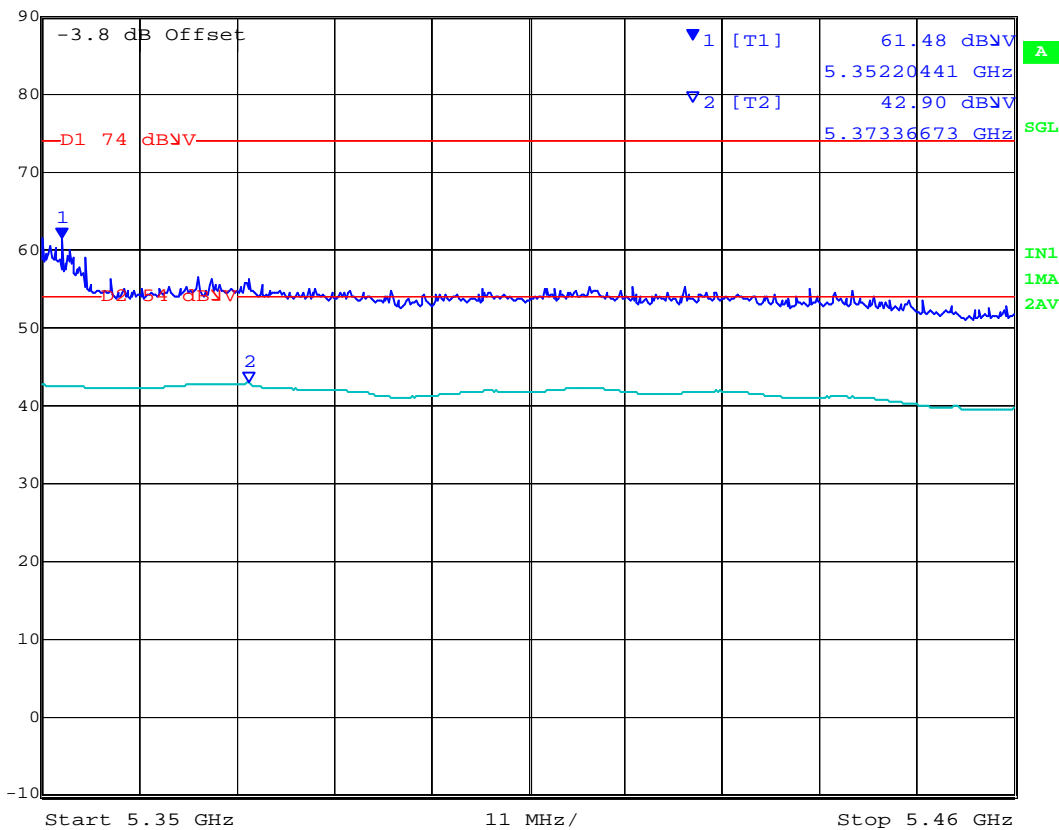
Title: DNMA-83 802.11 a/b/g/n Wireless Module
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Radiated Emissions
 File name: k:\compliance management\hewlett packard\hwpd03 - 7 additional antennas\test progr
 Template: 18Amp RE 1-18 GHz Mitec 30_Aug



Marker 1 [T1] RBW 1 MHz RF Att 20 dB
 Ref Lvl 61.48 dBuV VBW 1 MHz
 90 dBuV 5.35220441 GHz SWT 60 s Unit dBuV



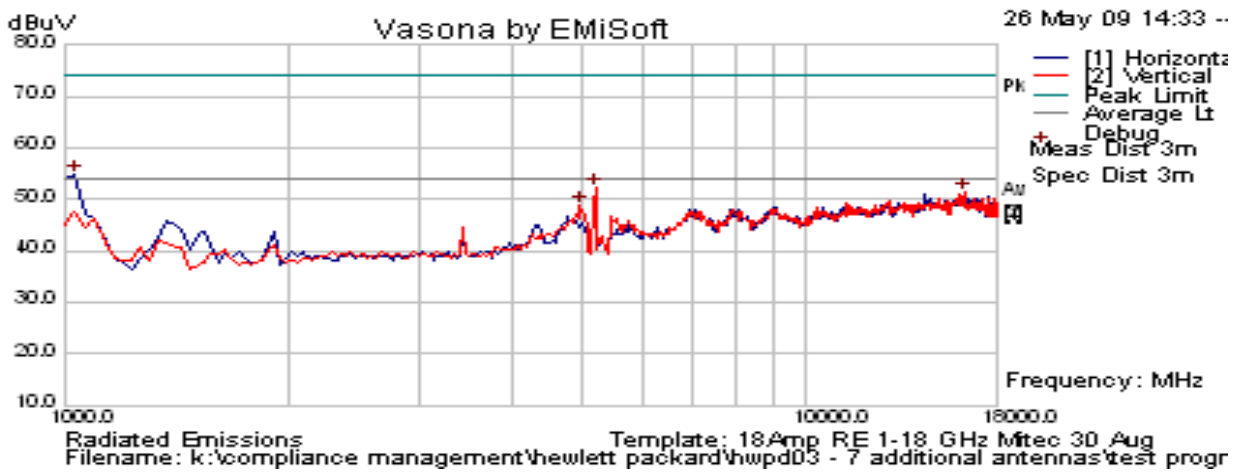
Date: 28.MAY.2009 15:23:42

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Date	26th May, 2009
Engineer	GMH
Test Case	HWPD03 - FCC 15.407 [Country = US/CAN] Spurious Emissions > 1GHz
Frequency	5190
Antenna Model	J9169A Antenna / Gain = 10.7 dBi
Power setting	6 in ART Test Utility
Test	802.11n HT-40 13.5 MCS
Conditions	MSM410 DNMA-83 Platform Radio

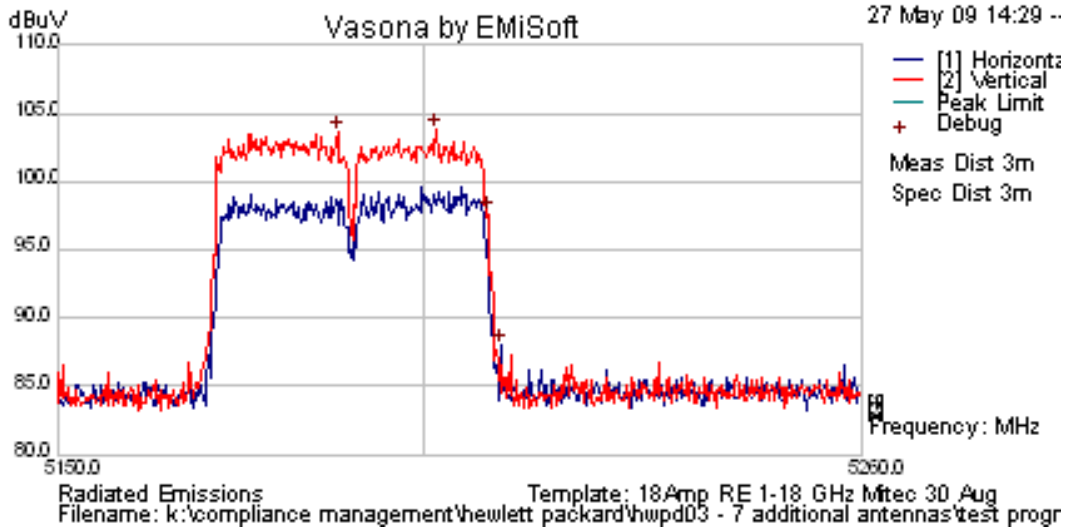


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5201.583	54.44	14.62	34.67	103.7	Peak [Scan]	V						
1040.251	65.9	1.99	-15.67	52.22	Peak Max	H	99	121	74	-21.78	Pass	RB
1040.251	44.35	1.99	-15.67	30.67	Average Max	H	99	121	54	-23.33	Pass	RB
5150.0000	Power Setting = 6.0			55.75	Peak Max	V	--	--	74	-18.25	Pass	BE
5150.0000				41.00	Average Max	V	--	--	54	-13.00	Pass	BE

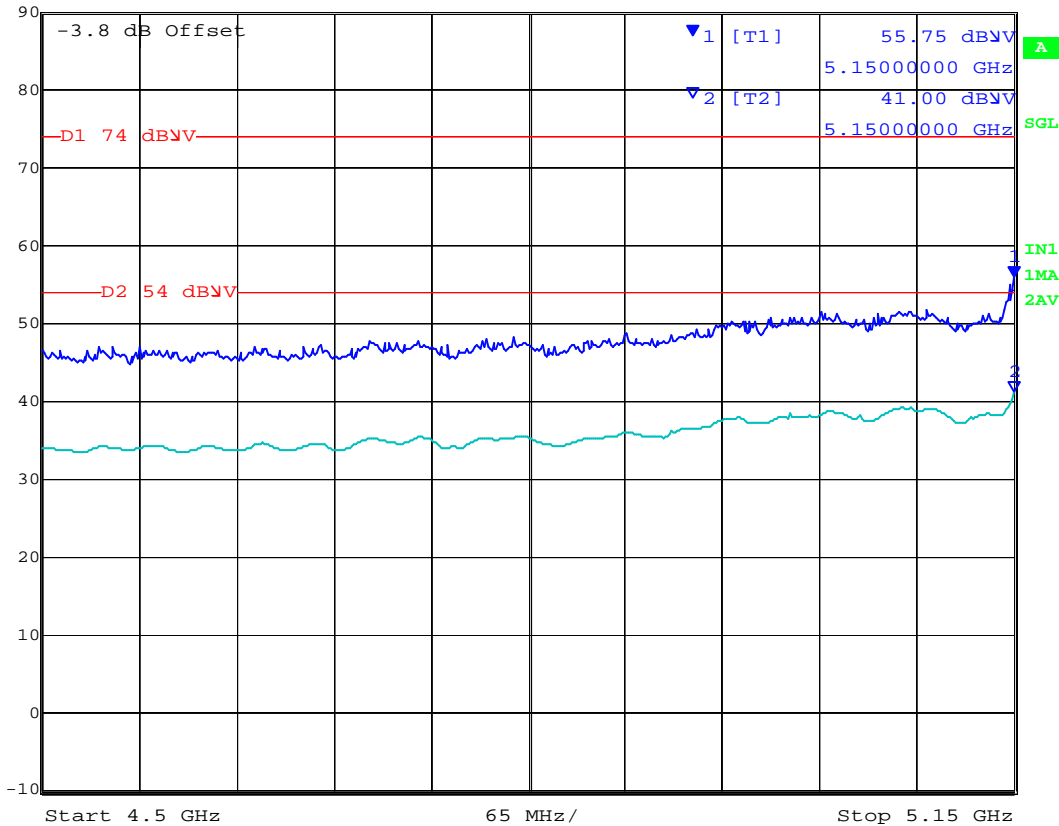
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	Marker 1 [T1]	RBW	1 MHz	RF Att	20 dB
	Ref Lvl	55.75 dBuV	VBW	1 MHz	
	90 dBuV	5.1500000 GHz	SWT	60 s	Unit dBuV



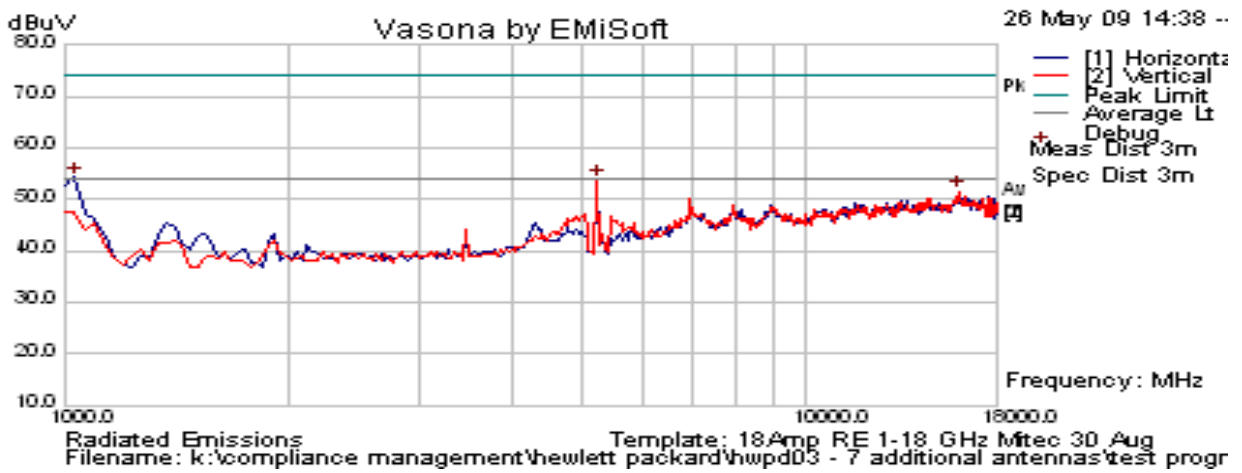
Date: 28.MAY.2009 15:00:22

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Date	Date
Engineer	GMH
Test Case	HWPD03 - FCC 15.407 [Country = US/CAN] Spurious Emissions > 1GHz
Frequency	5230
Antenna Model	J9169A Antenna / Gain = 10.7 dBi
Power setting	6.5 in ART Test Utility
Test	802.11n HT-40 13.5 MCS
Conditions	MSM410 DNMA-83 Platform Radio

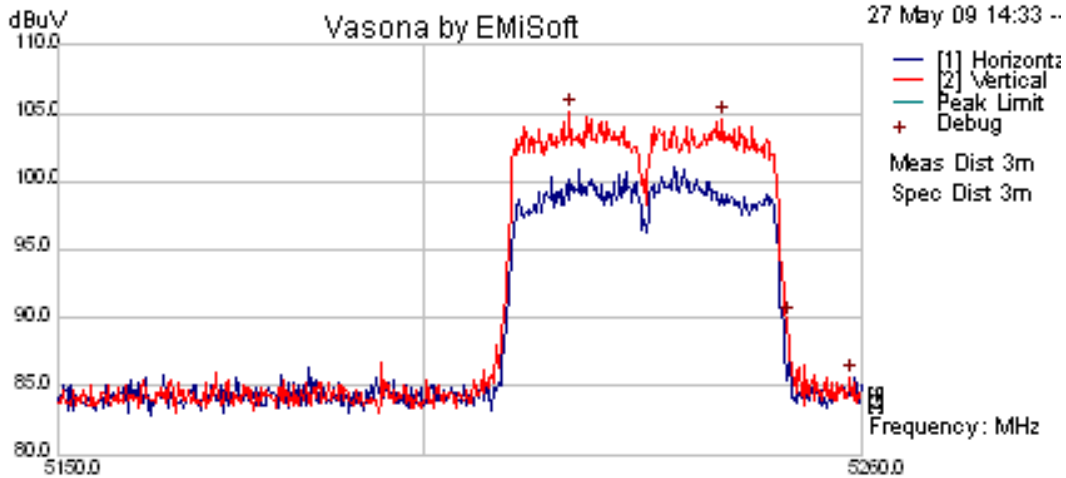


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5219.88	55.88	14.62	34.68	105.2	Peak [Scan]	V						
1040.251	65.9	1.99	-15.67	52.22	Peak Max	H	99	121	74	-21.78	Pass	RB
1040.251	44.35	1.99	-15.67	30.67	Average Max	H	99	121	54	-23.33	Pass	RB
5350.0000	Power Setting = 6.5			69.40	Peak Max	V	--	--	74	-14.60	Pass	BE
5350.0000	Power Setting = 6.5			51.25	Average Max	V	--	--	54	-2.75	Pass	BE

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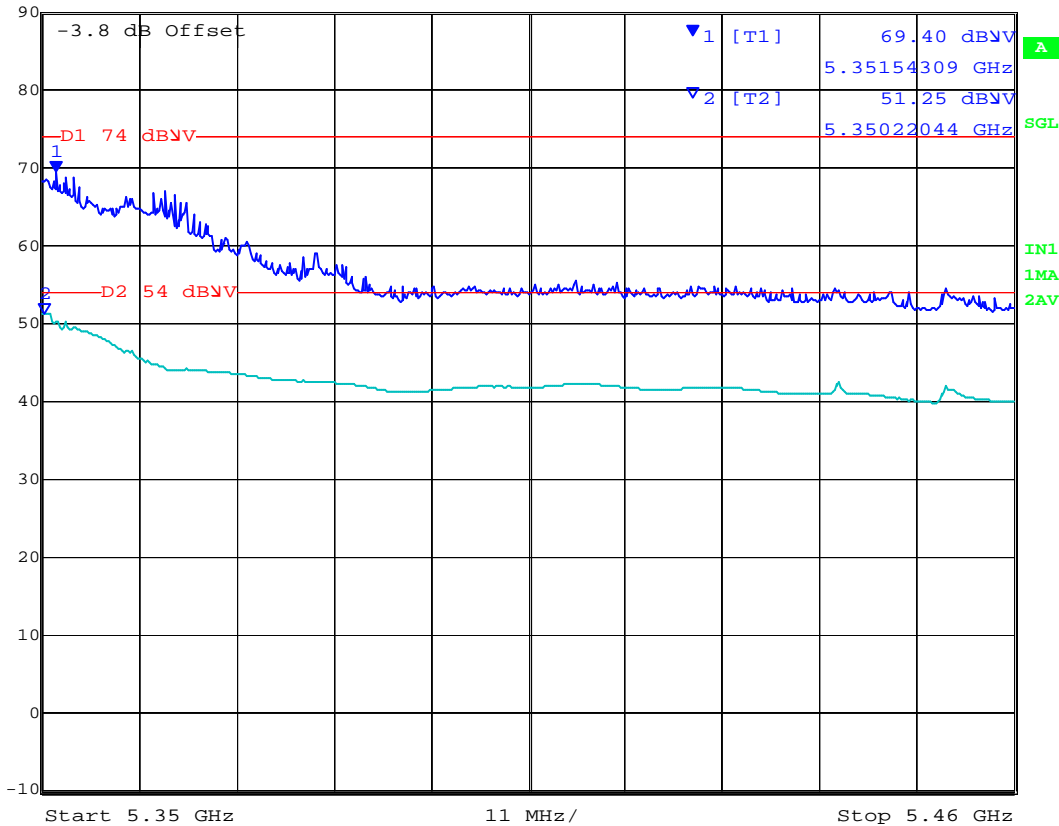


Radiated Emissions
 Template: 18Amp RE 1-18 GHz Mitec 30 Aug
 Filename: k:\compliance management\hewlett packard\hwpd03 - 7 additional antennas\test progr



Marker 1 [T1] RBW 1 MHz RF Att 20 dB

Ref Lvl 69.40 dBuV VBW 1 MHz
 90 dBuV 5.35154309 GHz SWT 60 s Unit dBuV



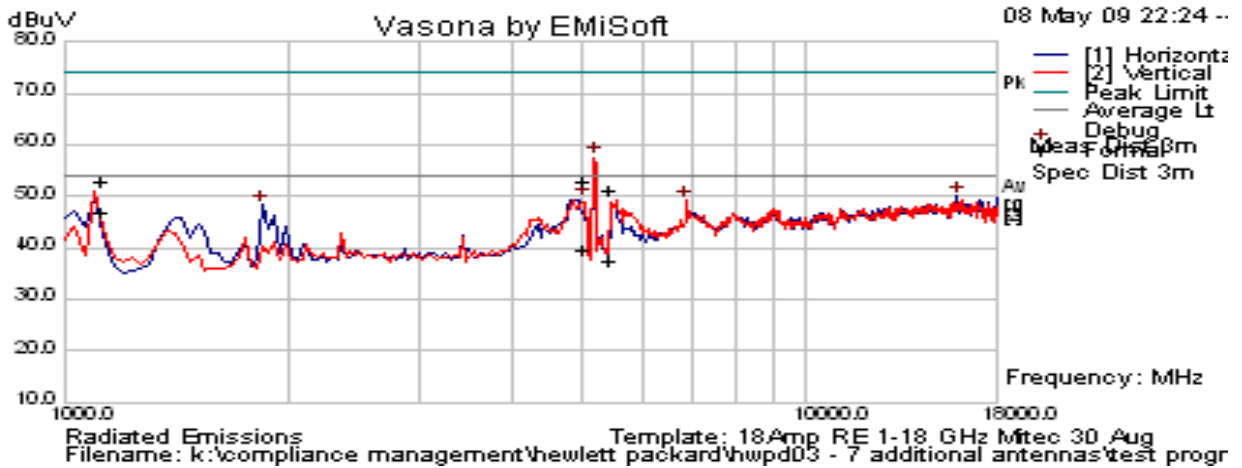
Date: 28.MAY.2009 15:27:08

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ANTENNA J9170A Radiated Emissions in the 5,150 – 5,250 MHz Band

Date	5/8/2009
Engineer	CSB
Test Case	HWPd03 - FCC [Country = United States] Spurious Emissions > 1GHz
Frequency	5180
Antenna Model	J9170A Antenna / Gain = 13.5 dBi
Power setting	4.5 dBm in ART Test Utility [Version 0_5 Build 26]
Test	DNMA-83 Radio - 802.11a 6 Mb/s;
Conditions	MSM410 Platform Radio 1

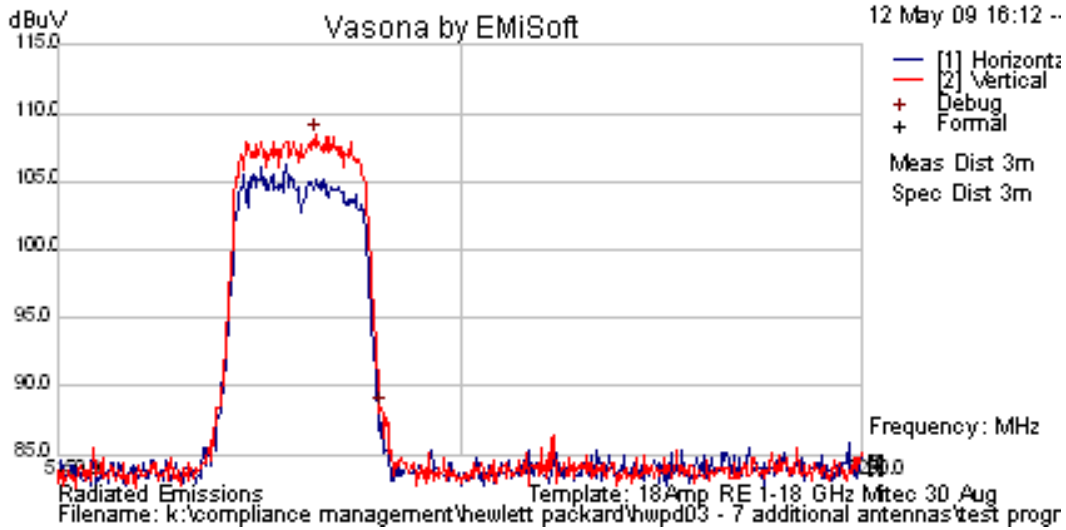


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5181.864	59.19	14.6	34.65	108.5	Peak [Scan]	V						
1125.066	66.53	2.07	-15.52	53.08	Peak Max	V	109	294	74	-20.92	Pass	RB
5026.726	57.04	4.62	-8.64	53.02	Peak Max	V	98	9	74	-20.98	Pass	RB
5450.388	55.04	4.62	-8.43	51.23	Peak Max	V	103	5	74	-22.77	Pass	RB
1125.066	60.28	2.07	-15.52	46.83	Average Max	H	151	286	54	-7.17	Pass	RB
5026.726	43.54	4.62	-8.64	39.52	Average Max	V	98	9	54	-14.48	Pass	RB
5450.388	41.33	4.62	-8.43	37.52	Average Max	H	122	11	54	-16.48	Pass	RB
1851.703	57.39	2.65	-11.82	48.22	Peak [Scan]	H	100	0	54	-20.01	Pass	NRB
6893.788	46.41	5.33	-2.56	49.18	Peak [Scan]	V	100	0	54	-19.05	Pass	NRB
5150.0000	Power Setting = 4.5			56.63	Peak Max	V	--	--	74	-17.37	Pass	BE
5150.0000				41.86	Average Max	V	--	--	54	-12.14	Pass	BE

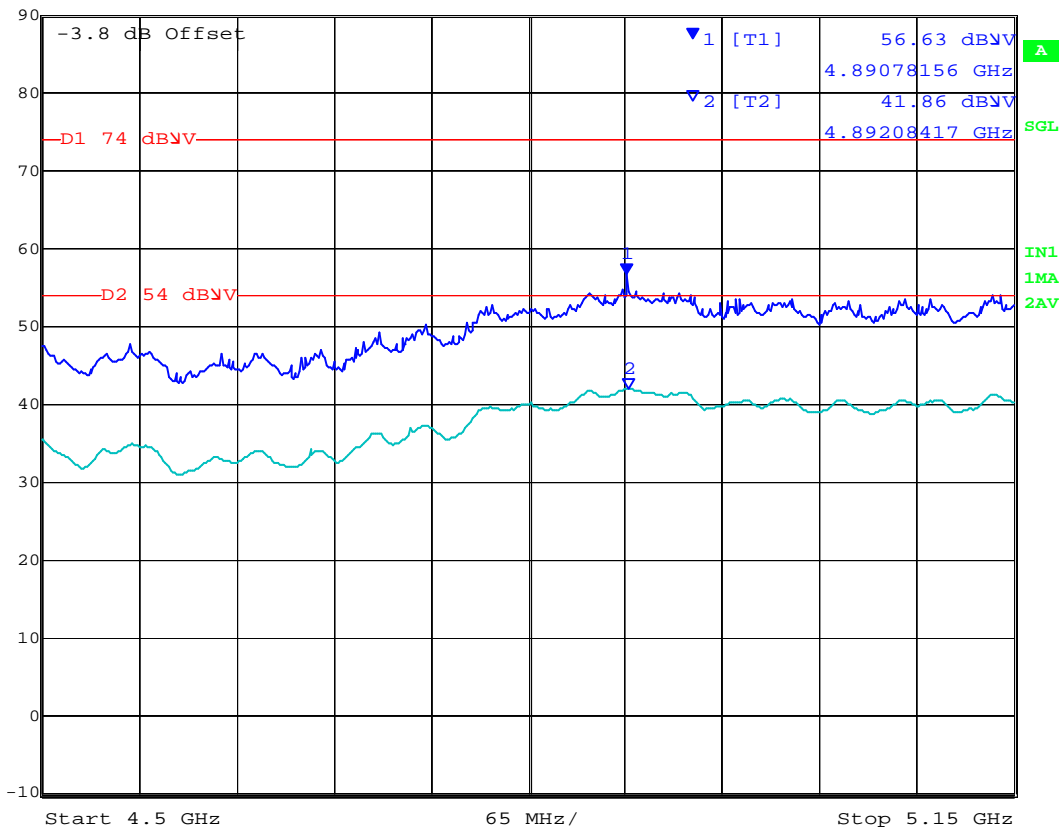
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Marker 1 [T1] RBW 1 MHz RF Att 0 dB
 Ref Lvl 56.63 dBuV VBW 1 MHz
 90 dBuV 4.89078156 GHz SWT 60 s Unit dBuV



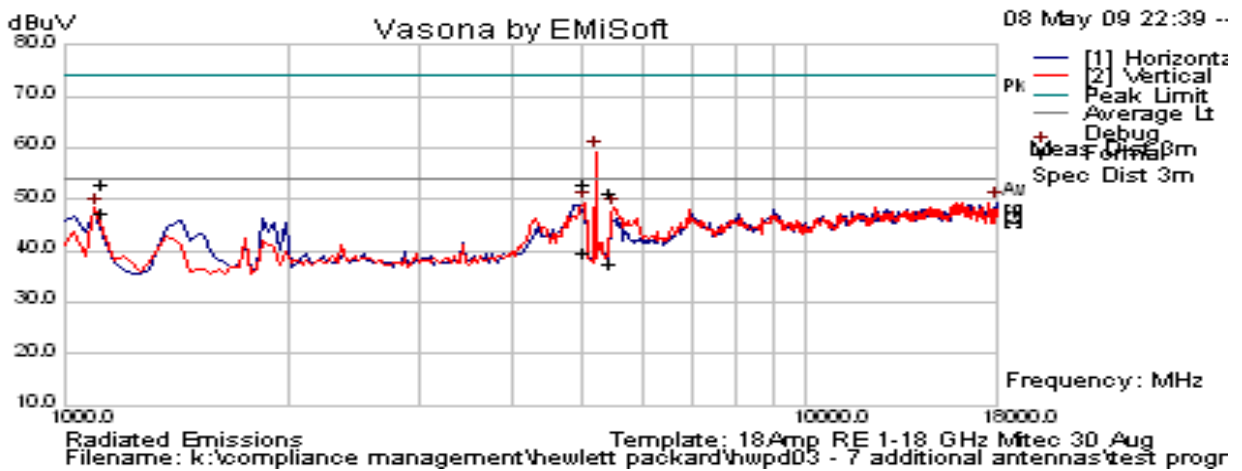
Date: 8.MAY.2009 13:41:17

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Date	5/8/2009
Engineer	CSB
Test Case	HWPD03 - FCC [Country = United States] Spurious Emissions > 1GHz
Frequency	5200
Antenna Model	J9170A Antenna / Gain = 13.5 dBi
Power setting	4.5 dBm in ART Test Utility [Version 0_5 Build 26]
Test	DNMA-83 Radio - 802.11a 6 Mb/s;
Conditions	MSM410 Platform Radio 1

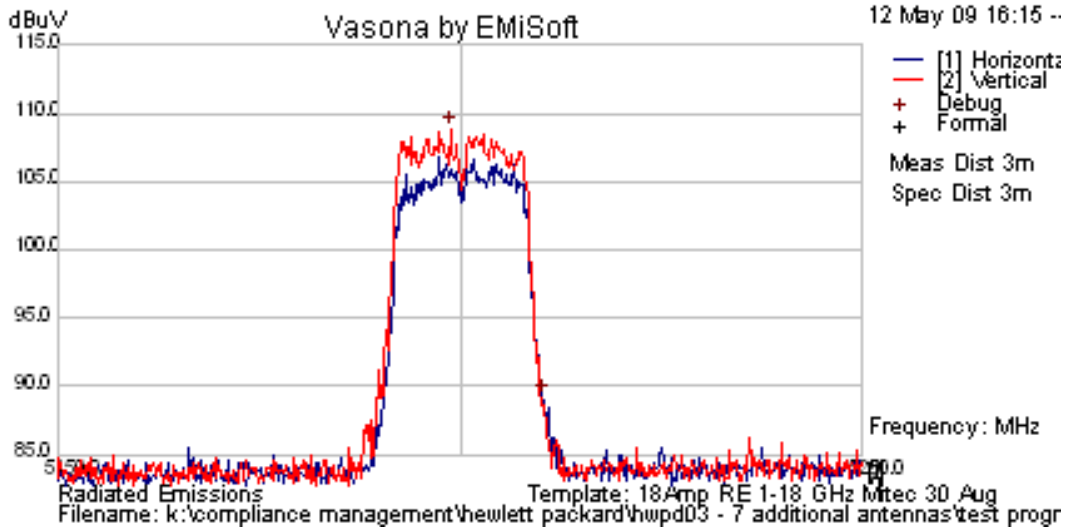


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5198.697	59.56	14.6	34.66	108.8	Peak [Scan]	V						
4868.216	59.27	4.51	-8.76	55.02	Peak Max	H	117	7	74	-18.98	Pass	RB
5452.906	55.91	4.62	-8.42	52.11	Peak Max	V	118	4	74	-21.89	Pass	RB
4868.216	46.44	4.51	-8.76	42.19	Average Max	H	117	7	54	-11.81	Pass	RB
5452.906	43.22	4.62	-8.42	39.42	Average Max	V	118	4	54	-14.58	Pass	RB
1125.066	66.53	2.07	-15.52	53.08	Peak Max	V	109	294	74	-20.92	Pass	RB
1125.066	60.28	2.07	-15.52	46.83	Average Max	H	151	286	54	-7.17	Pass	RB
1851.703	57.28	2.65	-11.82	48.1	Peak [Scan]	H	100	0	68.23	-20.13	Pass	NRB

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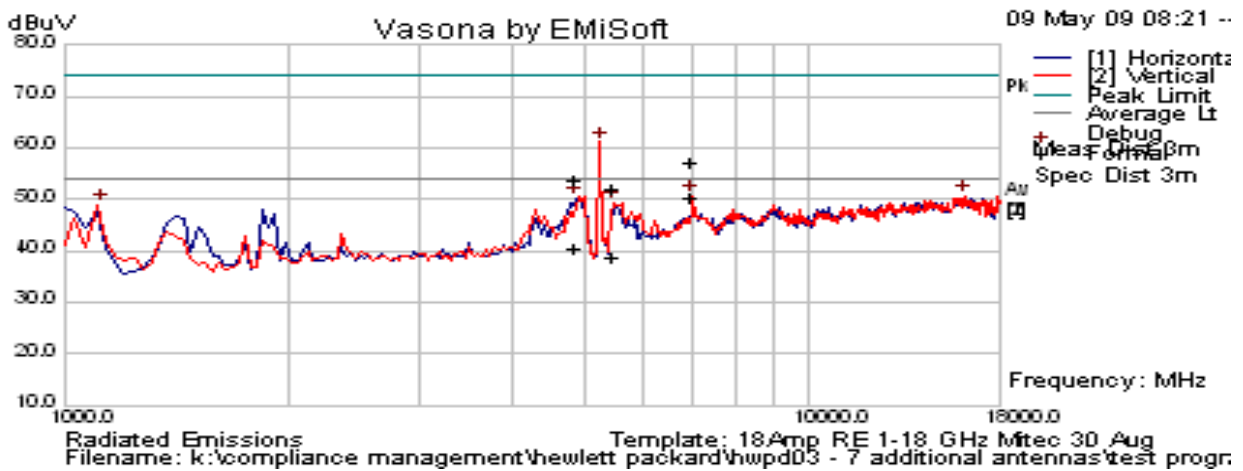


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Date	5/8/2009
Engineer	CSB
Test Case	HWPD03 - FCC [Country = United States] Spurious Emissions > 1GHz
Frequency	5240
Antenna Model	J9170A Antenna / Gain = 13.5 dBi
Power setting	4.5 dBm in ART Test Utility [Version 0_5 Build 26]
Test	DNMA-83 Radio - 802.11a 6 Mb/s;
Conditions	MSM410 Platform Radio 1

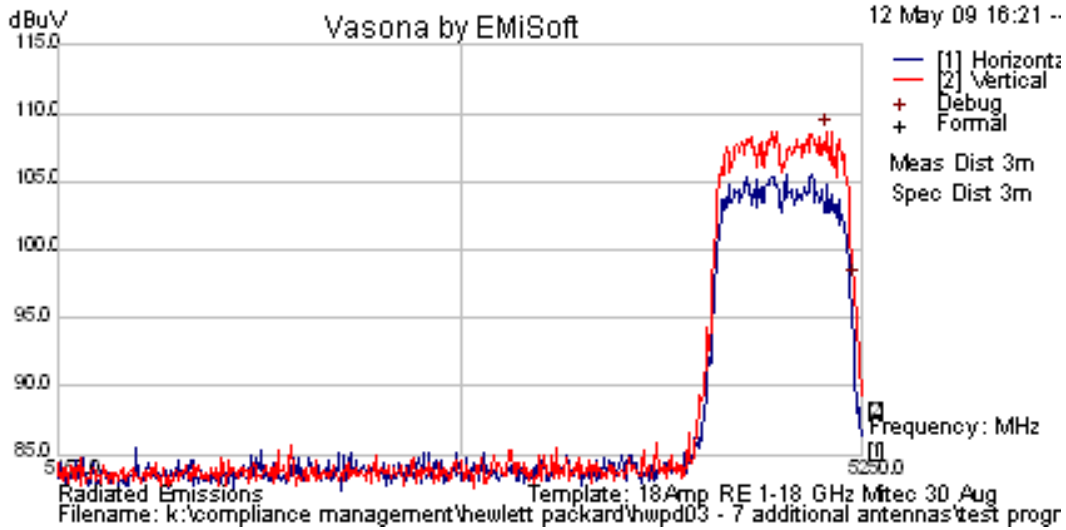


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5245.591	59.35	14.6	34.7	108.7	Peak [Scan]	V						
4867.014	57.97	4.5	-8.76	53.71	Peak Max	H	121	5	74	-20.29	Pass	RB
5454.163	55.79	4.62	-8.42	51.99	Peak Max	H	101	5	74	-22.01	Pass	RB
6986.718	46.63	5.37	-1.65	50.36	Average Max	V	142	173	68.23	-17.87	Pass	NRB
4867.014	44.65	4.5	-8.76	40.39	Average Max	H	121	5	54	-13.61	Pass	RB
5454.163	42.72	4.62	-8.42	38.93	Average Max	H	101	5	54	-15.07	Pass	RB
1125.066	66.53	2.07	-15.52	53.08	Peak Max	V	109	294	74	-20.92	Pass	NRB
1125.066	60.28	2.07	-15.52	46.83	Average Max	H	151	286	54	-7.17	Pass	NRB
5350.0000	Power Setting = 4.5			58.64	Peak Max	V	--	--	74	-15.36	Pass	BE
5350.0000				41.74	Average Max	V	--	--	54	-12.26	Pass	BE

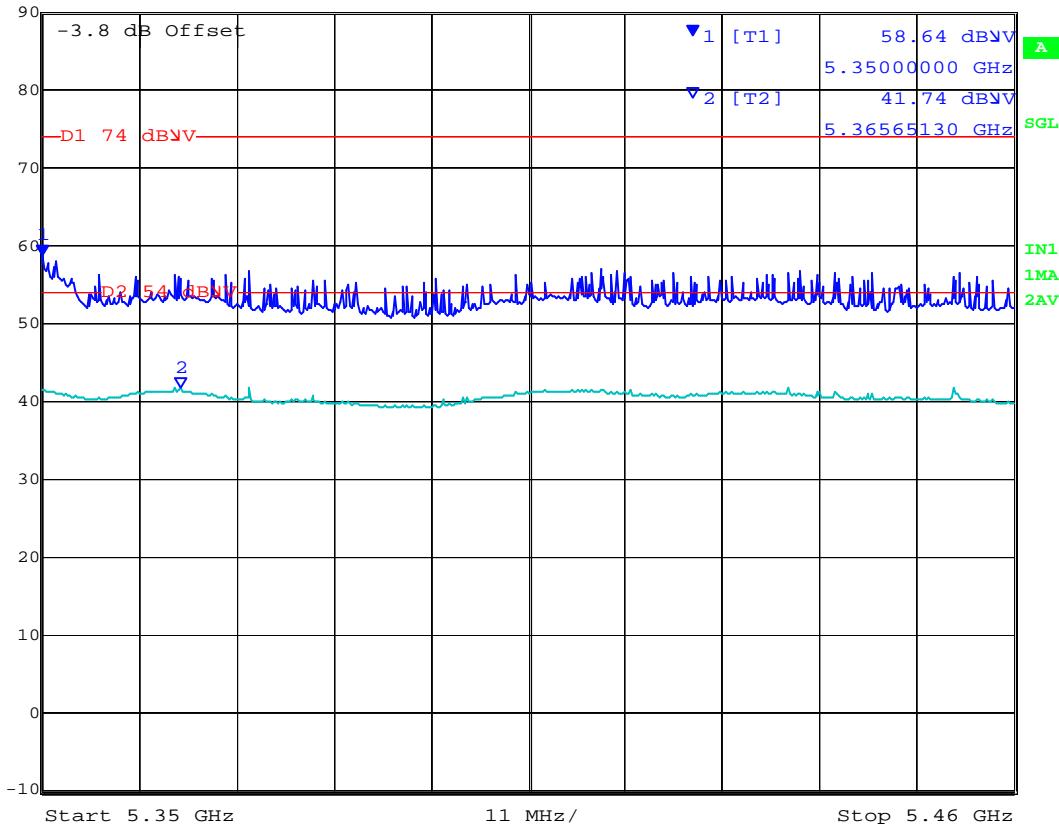
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Ref Lvl	Marker 1 [T1]	RBW	1 MHz	RF Att	0 dB
90 dBuV	58.64 dBuV	VBW	1 MHz	Unit	dBuV
	5.3500000 GHz	SWT	60 s		



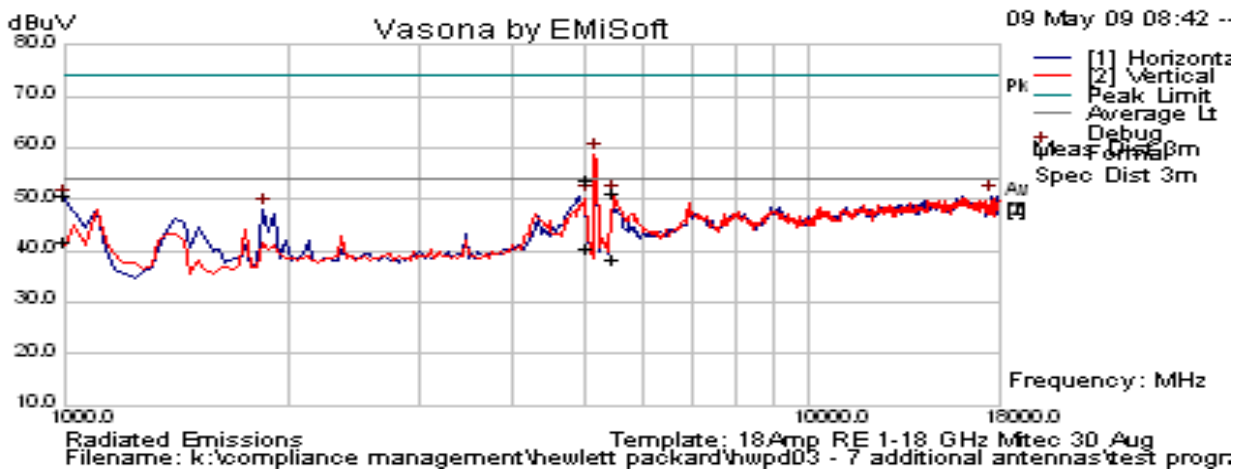
Date: 8.MAY.2009 14:03:23

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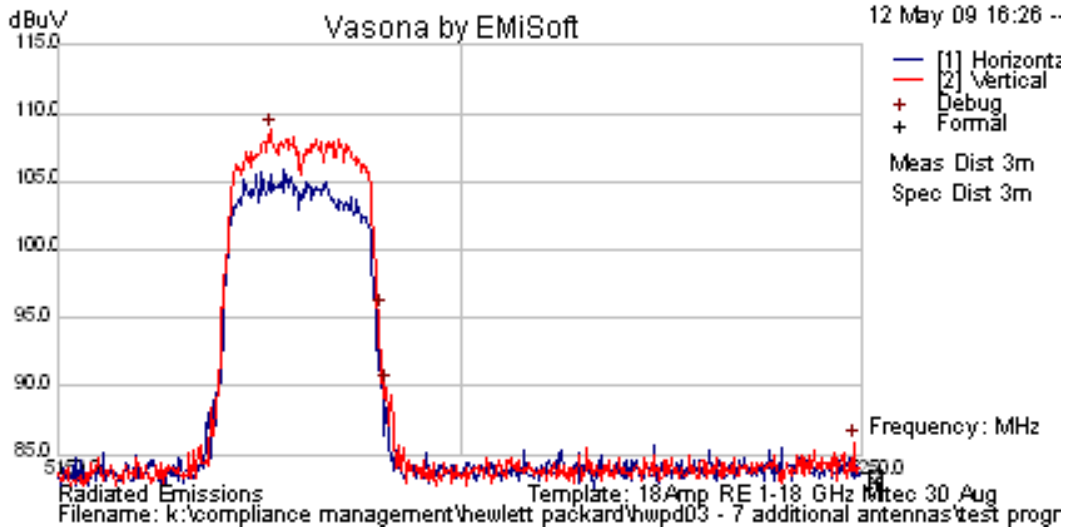
Title: DNMA-83 802.11 a/b/g/n Wireless Module
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: HWPD03-A6 Rev A
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Date	5/8/2009
Engineer	CSB
Test Case	HWPD03 - FCC [Country = United States] Spurious Emissions > 1GHz
Frequency	5180
Antenna Model	J9170A Antenna / Gain = 13.5 dBi
Power setting	4.5 dBm in ART Test Utility [Version 0_5 Build 26]
Test	DNMA-83 Radio - 802.11 HT-20 6.5 MCS
Conditions	MSM410 Platform Radio 1

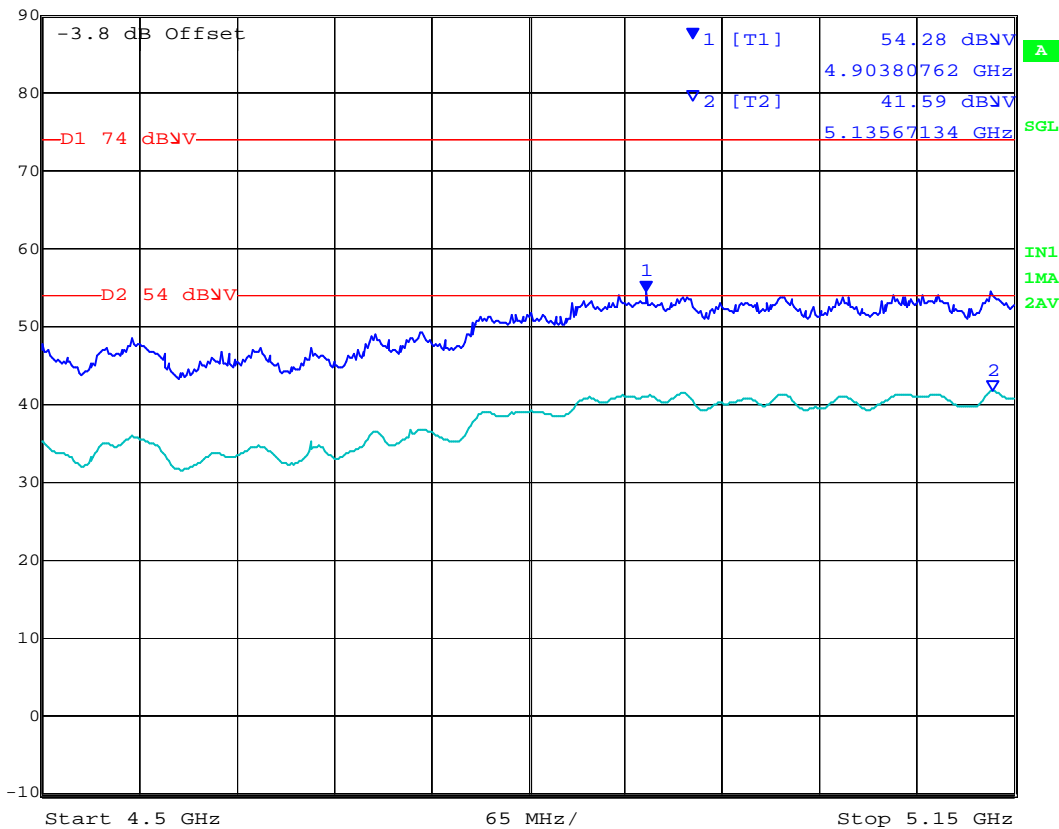


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5176.253	59.49	14.62	34.65	108.8	Peak [Scan]	V						
1000.399	64.74	1.95	-15.82	50.87	Peak Max	H	98	269	74	-23.13	Pass	RB
1000.399	55.42	1.95	-15.82	41.55	Average Max	H	98	269	54	-12.45	Pass	RB
5022.685	57.7	4.62	-8.64	53.68	Peak	V	98	4	74	-20.32	Pass	RB
5022.685	44.45	4.62	-8.64	40.42	Average	V	98	4	54	-13.58	Pass	RB
5451.783	55.04	4.62	-8.42	51.24	Peak	V	98	4	74	-22.76	Pass	RB
5451.783	42	4.62	-8.42	38.2	Average	V	98	4	54	-15.8	Pass	RB
1125.066	66.53	2.07	-15.52	53.08	Peak Max	V	109	294	74	-20.92	Pass	RB
1125.066	60.28	2.07	-15.52	46.83	Average Max	H	151	286	54	-7.17	Pass	RB
1851.703	57.24	2.65	-11.82	48.06	Peak [Scan]	H	100	0	68.23	-20.17	Pass	NRB
5150.0000	Power Setting = 4.5			54.28	Peak Max	V	--	--	74	-19.72	Pass	BE
5150.0000				41.59	Average Max	V	--	--	54	-12.41	Pass	BE

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Marker 1 [T1] RBW 1 MHz RF Att 0 dB
 Ref Lvl 54.28 dBuV VBW 1 MHz
 90 dBuV 4.90380762 GHz SWT 60 s Unit dBuV



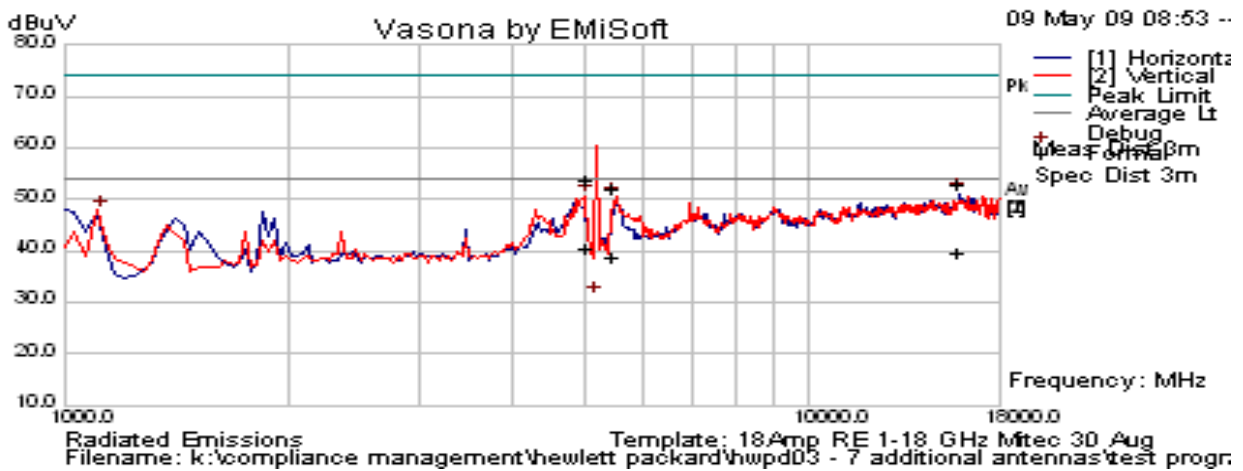
Date: 8.MAY.2009 13:47:42

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Date	5/8/2009
Engineer	CSB
Test Case	HWPD03 - FCC [Country = United States] Spurious Emissions > 1GHz
Frequency	5200
Antenna Model	J9170A Antenna / Gain = 13.5 dBi
Power setting	4.5 dBm in ART Test Utility [Version 0_5 Build 26]
Test	DNMA-83 Radio - 802.11 HT-20 6.5 MCS
Conditions	MSM410 Platform Radio 1

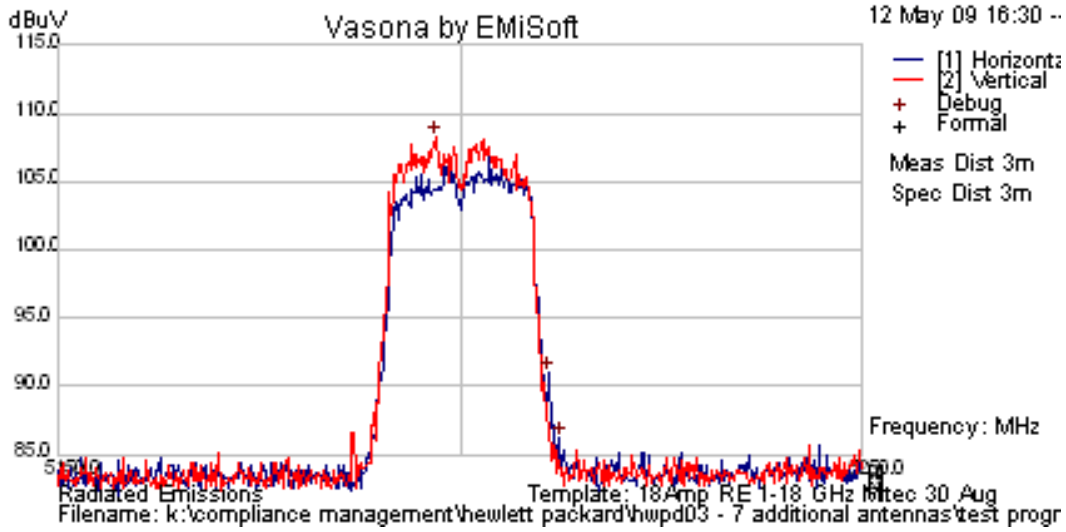


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5196.894	58.96	14.62	34.66	108.2	Peak [Scan]	V						
5025.611	44.65	4.62	-8.64	40.63	Average	V	98	5	54	-13.37	Pass	RB
5025.611	57.57	4.62	-8.64	53.55	Peak	V	98	5	74	-20.45	Pass	RB
5453.788	42.71	4.62	-8.42	38.91	Average	V	98	5	54	-15.09	Pass	RB
5453.788	55.91	4.62	-8.42	52.11	Peak	V	98	5	74	-21.89	Pass	RB
15955.57	30.94	8.95	-0.49	39.4	Average	H	98	5	54	-14.6	Pass	RB
15955.57	44.27	8.95	-0.49	52.73	Peak	H	98	5	74	-21.27	Pass	RB
1125.066	66.53	2.07	-15.52	53.08	Peak Max	V	109	294	74	-20.92	Pass	RB
1125.066	60.28	2.07	-15.52	46.83	Average Max	H	151	286	54	-7.17	Pass	RB

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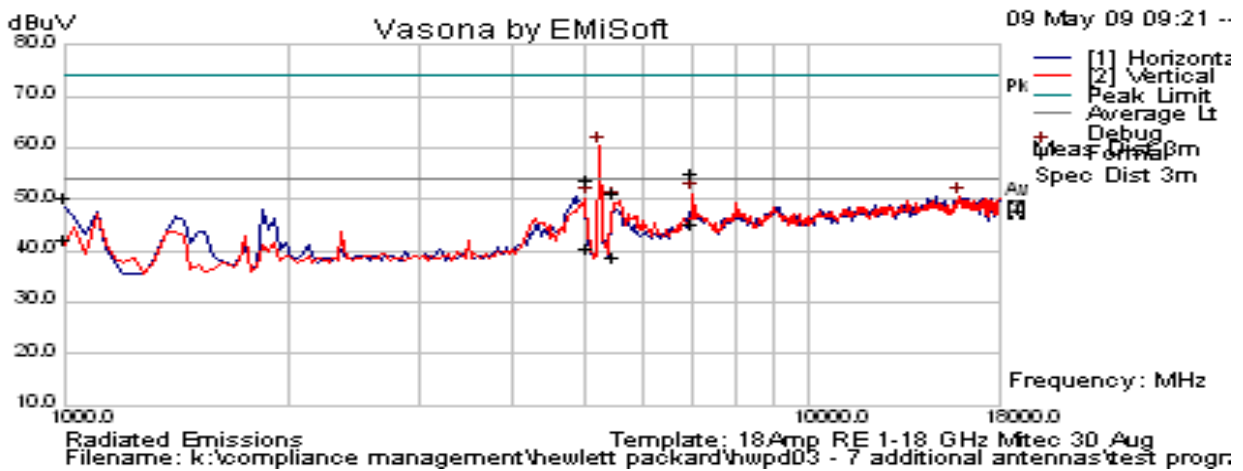
Title: DNMA-83 802.11 a/b/g/n Wireless Module
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Date	5/8/2009
Engineer	CSB
Test Case	HWPd03 - FCC [Country = United States] Spurious Emissions > 1GHz
Frequency	5240
Antenna Model	J9170A Antenna / Gain = 13.5 dBi
Power setting	4.5 dBm in ART Test Utility [Version 0_5 Build 26]
Test	DNMA-83 Radio - 802.11 HT-20 6.5 MCS
Conditions	MSM410 Platform Radio 1

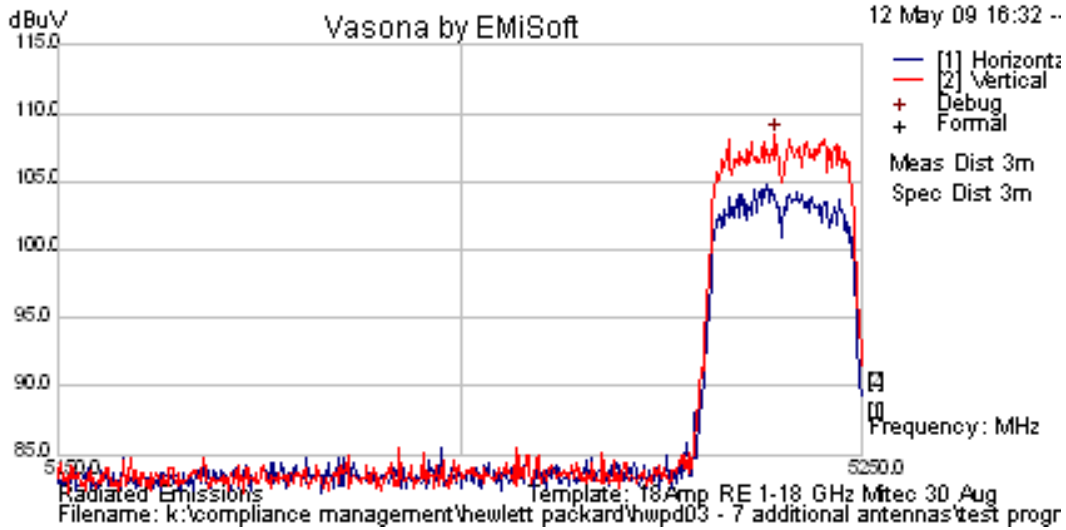


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5239.178	59.09	14.62	34.7	108.4	Peak [Scan]	V						
1000.269	64.23	1.95	-15.82	50.36	Peak Max	H	98	275	74	-23.64	Pass	RB
1000.269	55.9	1.95	-15.82	42.03	Average Max	H	98	275	54	-11.97	Pass	RB
5024.93	57.97	4.62	-8.64	53.95	Peak	V	98	4	74	-20.05	Pass	RB
5024.93	44.5	4.62	-8.64	40.48	Average	V	98	4	54	-13.52	Pass	RB
5453.587	55.16	4.62	-8.42	51.37	Peak	V	98	4	74	-22.63	Pass	RB
5453.587	42.37	4.62	-8.42	38.57	Average	V	98	4	54	-15.43	Pass	RB
6986.646	51.16	5.37	-1.65	54.89	Peak	V	98	4	74	-19.11	Pass	NRB
6986.646	41.3	5.37	-1.65	45.02	Average	V	98	4	54	-8.98	Pass	NRB
1125.066	66.53	2.07	-15.52	53.08	Peak Max	V	109	294	74	-20.92	Pass	RB
1125.066	60.28	2.07	-15.52	46.83	Average Max	H	151	286	54	-7.17	Pass	RB
5350.0000	Power Setting = 4.5			58.13	Peak Max	V	--	--	74	-15.87	Pass	BE
5350.0000				41.86	Average Max	V	--	--	54	-12.14	Pass	BE

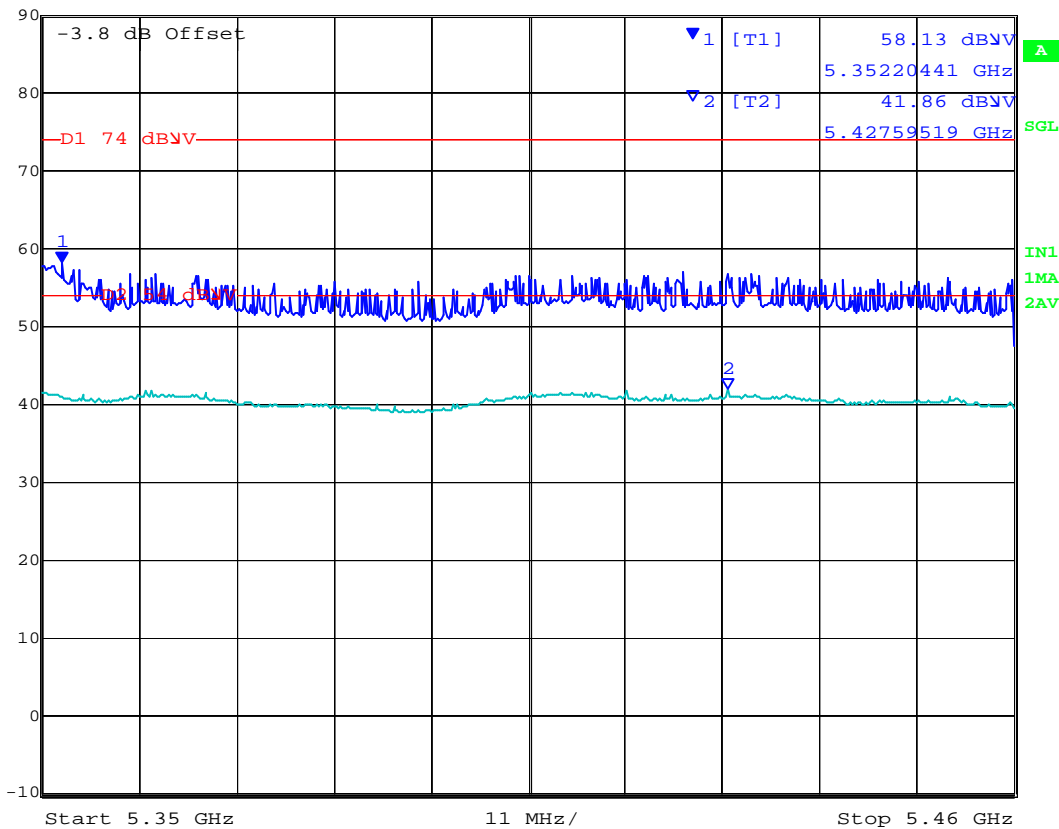
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	Marker 1 [T1]	RBW	1 MHz	RF Att	0 dB
	Ref Lvl	58.13 dBuV	VBW	1 MHz	
	90 dBuV	5.35220441 GHz	SWT	60 s	Unit dBuV

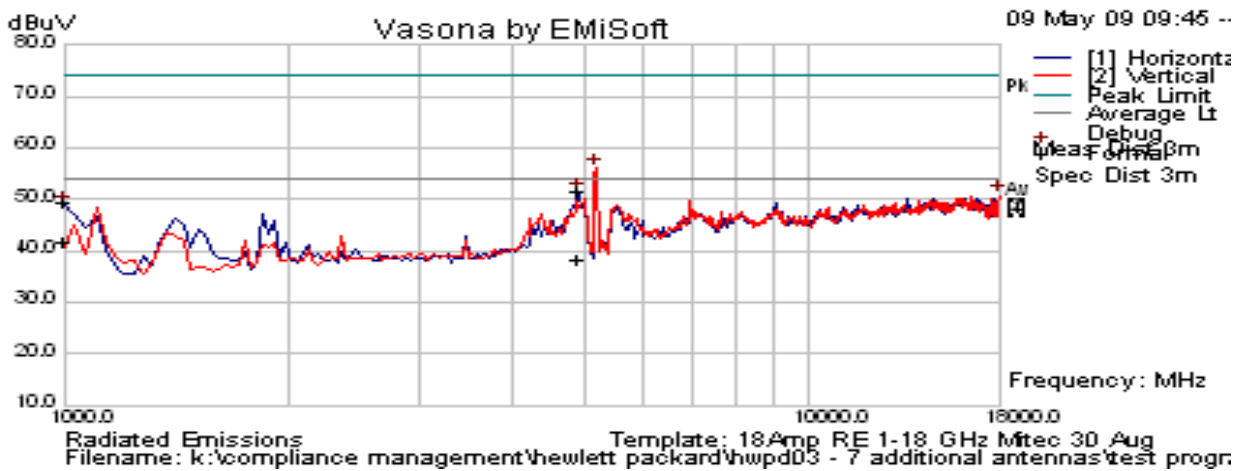


Date: 8.MAY.2009 14:13:25

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Date	5/8/2009
Engineer	CSB
Test Case	HWPD03 - FCC [Country = United States] Spurious Emissions > 1GHz
Frequency	5190
Antenna Model	J9170A Antenna / Gain = 13.5 dBi
Power setting	3.5 dBm in ART Test Utility [Version 0_5 Build 26]
Test	DNMA-83 Radio - 802.11 HT-40 13.5 MCS
Conditions	MSM410 Platform Radio 1

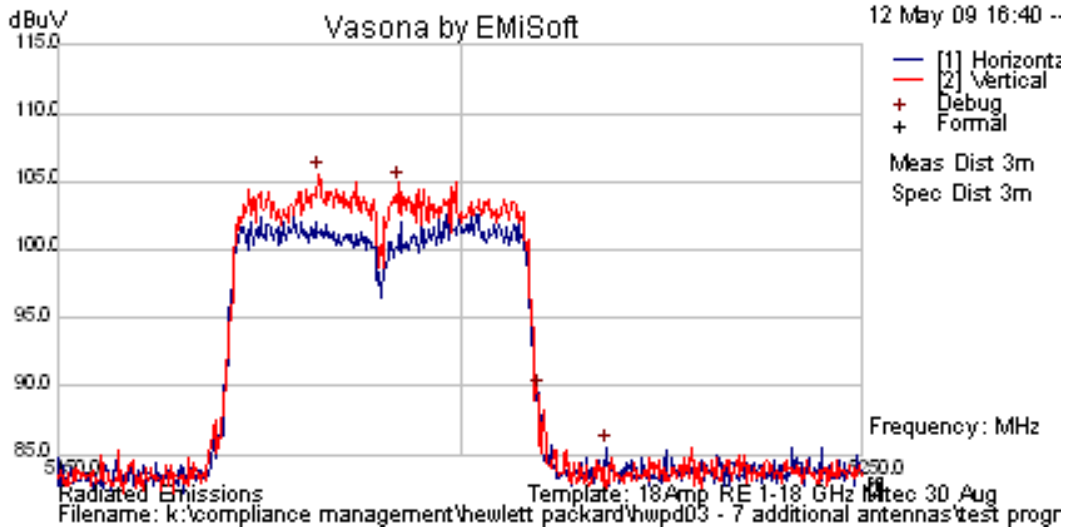


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5182.265	56.26	14.62	34.65	105.5	Peak [Scan]	V						
1000.359	63.45	1.95	-15.82	49.58	Peak Max	H	101	277	74	-24.42	Pass	RB
1000.359	55.5	1.95	-15.82	41.63	Average Max	H	101	277	54	-12.37	Pass	RB
4897.635	55.91	4.53	-8.72	51.72	Peak	V	98	5	74	-22.28	Pass	RB
4897.635	42.69	4.53	-8.72	38.5	Average	V	98	5	54	-15.5	Pass	RB
5150.0000	Power Setting = 3.5			58.09	Peak Max	V	--	--	74	-15.91	Pass	BE
5150.0000	Power Setting = 3.5			43.35	Average Max	V	--	--	54	-10.65	Pass	BE

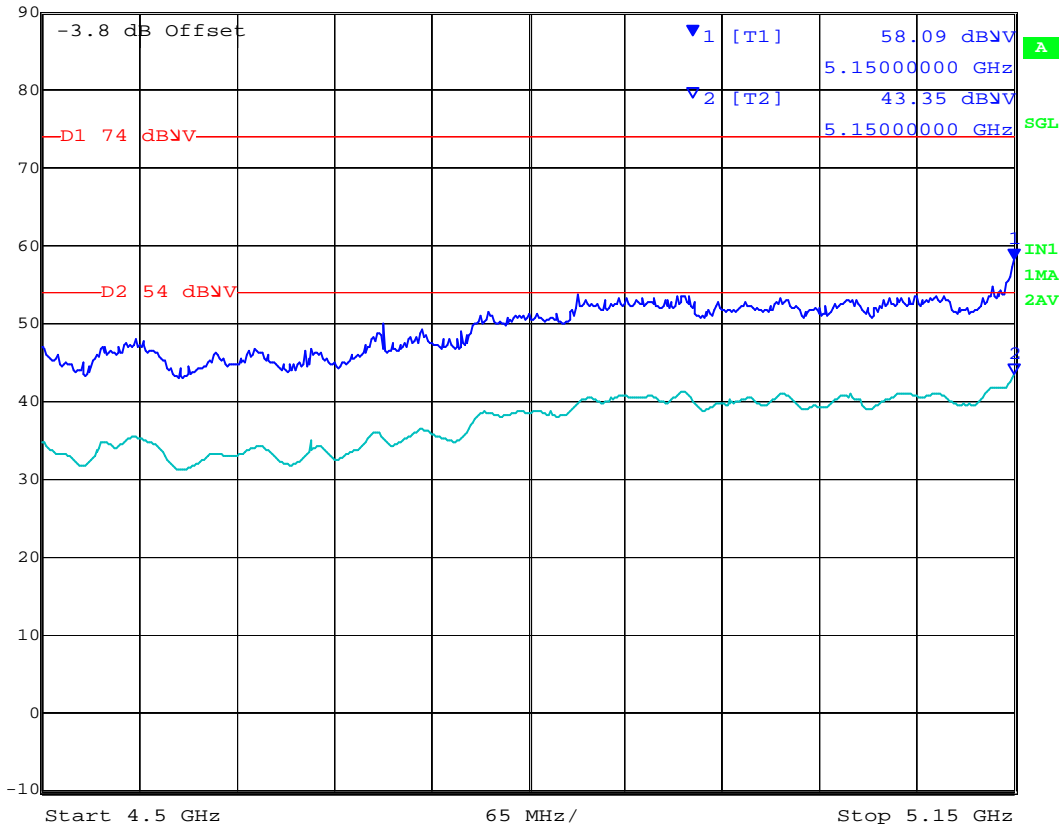
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OVL D Marker 1 [T1] RBW 1 MHz RF Att 0 dB
 Ref Lvl 58.09 dBuV VBW 1 MHz
 90 dBuV 5.1500000 GHz SWT 60 s Unit dBuV



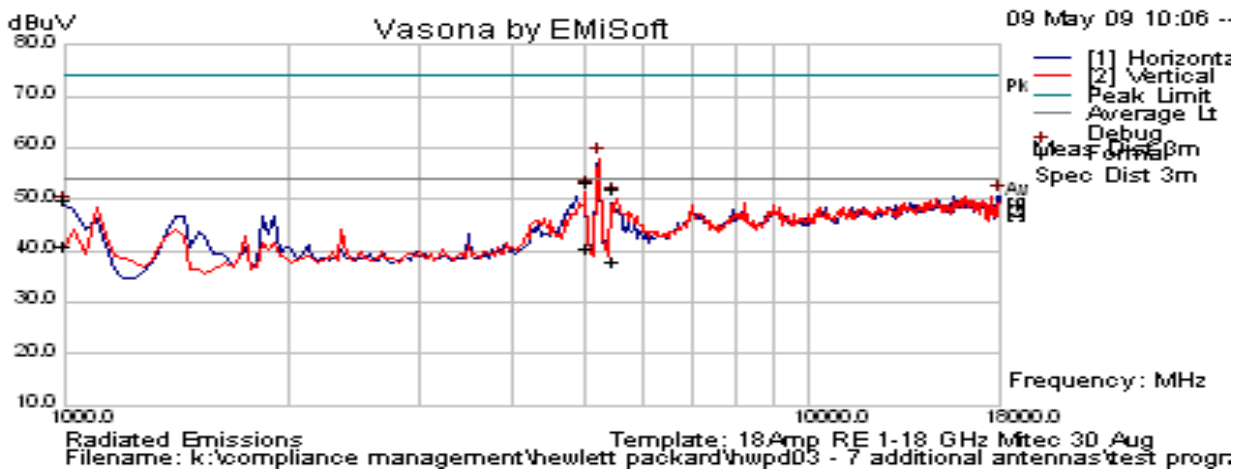
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Date	5/8/2009
Engineer	CSB
Test Case	HWPD03 - FCC [Country = United States] Spurious Emissions > 1GHz
Frequency	5230
Antenna Model	J9170A Antenna / Gain = 13.5 dBi
Power setting	3.5 dBm in ART Test Utility [Version 0_5 Build 26]
Test	DNMA-83 Radio - 802.11 HT-40 13.5 MCS
Conditions	MSM410 Platform Radio 1

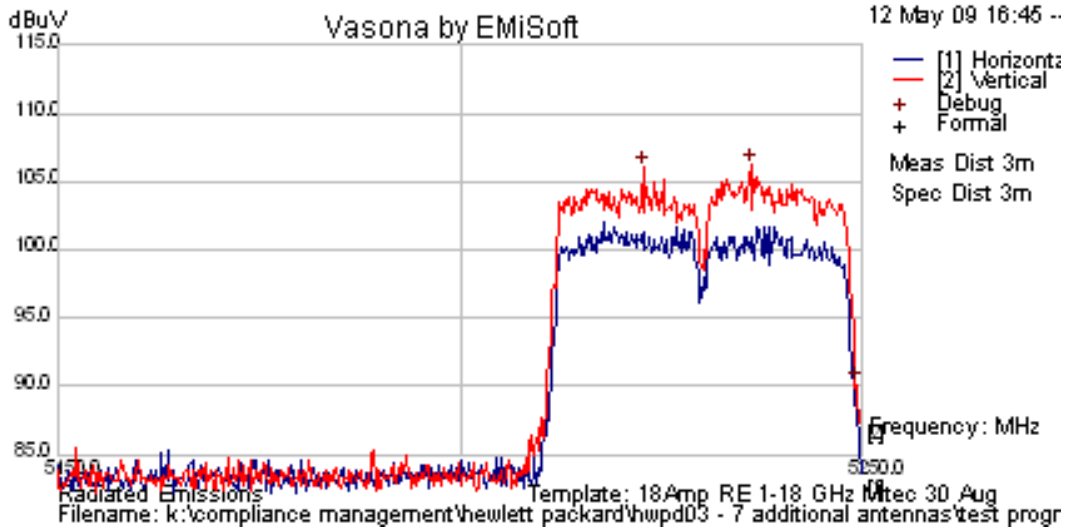


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5236.172	56.88	14.62	34.69	106.2	Peak [Scan]	V						
1000.243	63.58	1.95	-15.82	49.72	Peak Max	H	103	271	74	-24.28	Pass	RB
1000.243	54.78	1.95	-15.82	40.91	Average Max	H	103	271	54	-13.09	Pass	RB
5020.04	57.44	4.62	-8.65	53.41	Peak	V	98	4	74	-20.59	Pass	RB
5020.04	44.3	4.62	-8.65	40.27	Average	V	98	4	54	-13.73	Pass	RB
5450.581	55.79	4.62	-8.43	51.98	Peak	V	112	4	74	-22.02	Pass	RB
5450.581	41.85	4.62	-8.43	38.05	Average	V	112	4	54	-15.95	Pass	RB
5350.0000	Power Setting = 3.5			63.82	Peak Max	V	--	--	74	-10.18	Pass	BE
5350.0000				48.59	Average Max	V	--	--	54	-15.41	Pass	BE

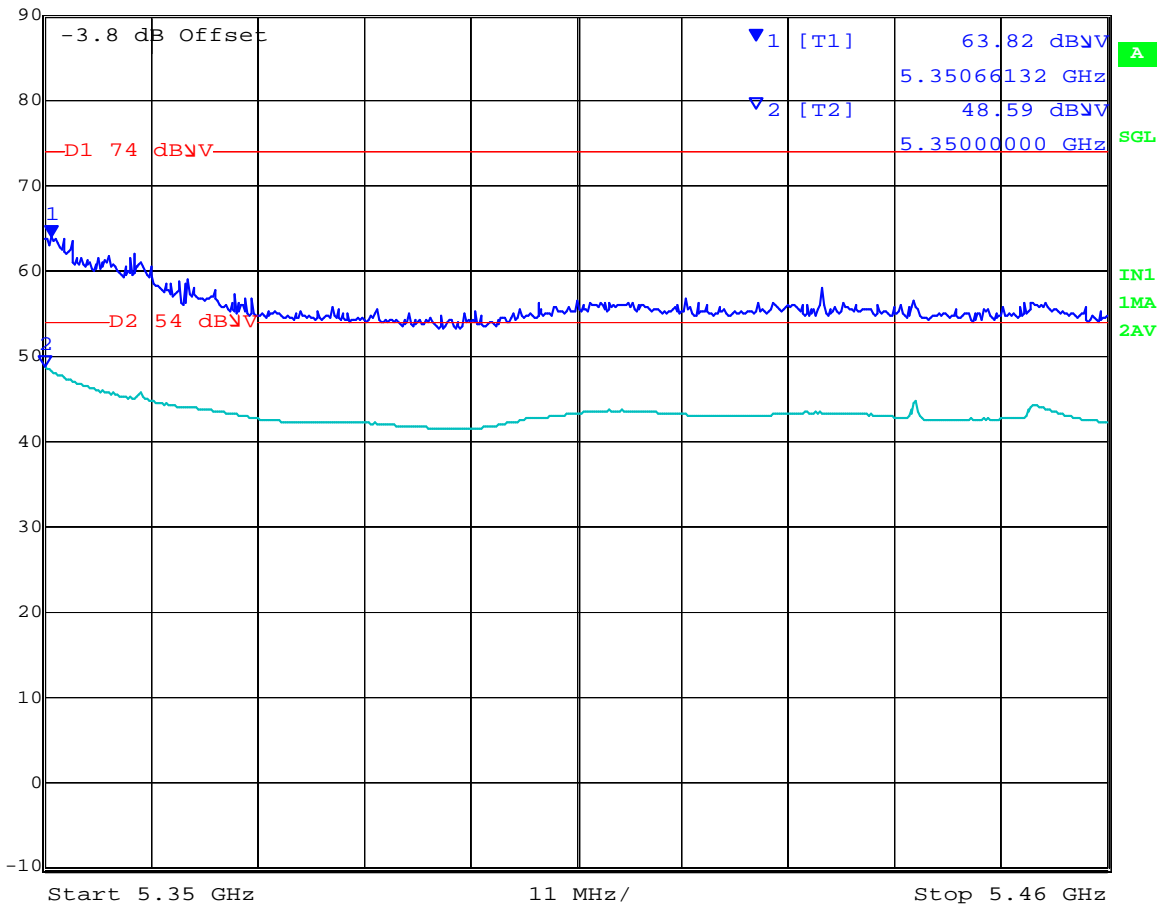
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	OVLD	Marker 1 [T1]	RBW	1 MHz	RF Att	0 dB
	Ref Lvl	63.82 dBuV	VBW	1 MHz		
	90 dBuV	5.35066132 GHz	SWT	60 s	Unit	dBuV



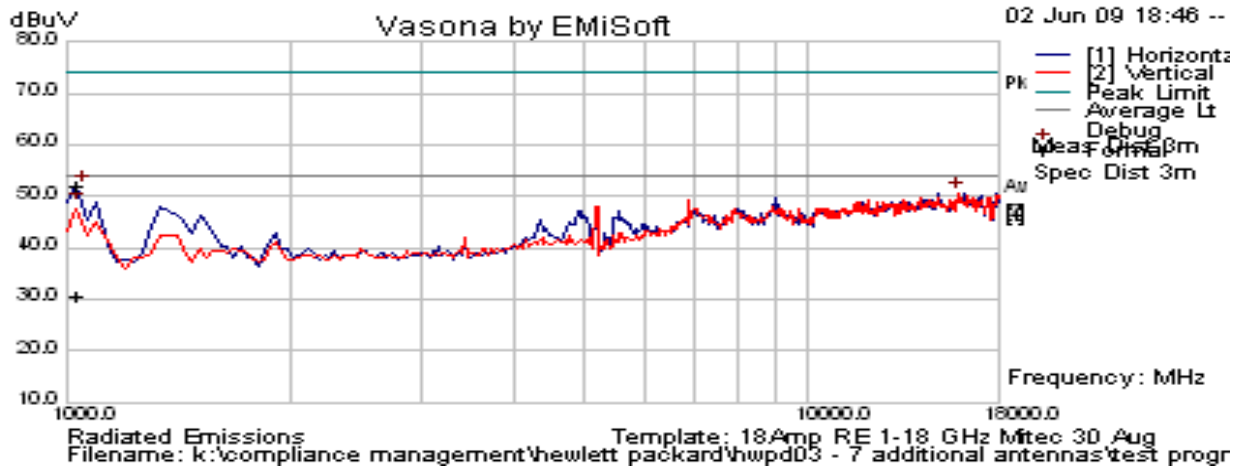
Date: 8.MAY.2009 14:09:37

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ANTENNA J9171A Radiated Emissions in the 5,150 – 5,250 MHz Band

Date	6/2/2009
Engineer	CSB
Test Case	HWPD03 - FCC 15.407 [Country = US/CAN] Spurious Emissions > 1GHz
Frequency	5180
Antenna Model	J9171A Antenna / Gain = 4 dBi
Power setting	11 in ART Test Utility
Test	802.11a 6.5 Mb/s;
Conditions	MSM-410 Platform Radio

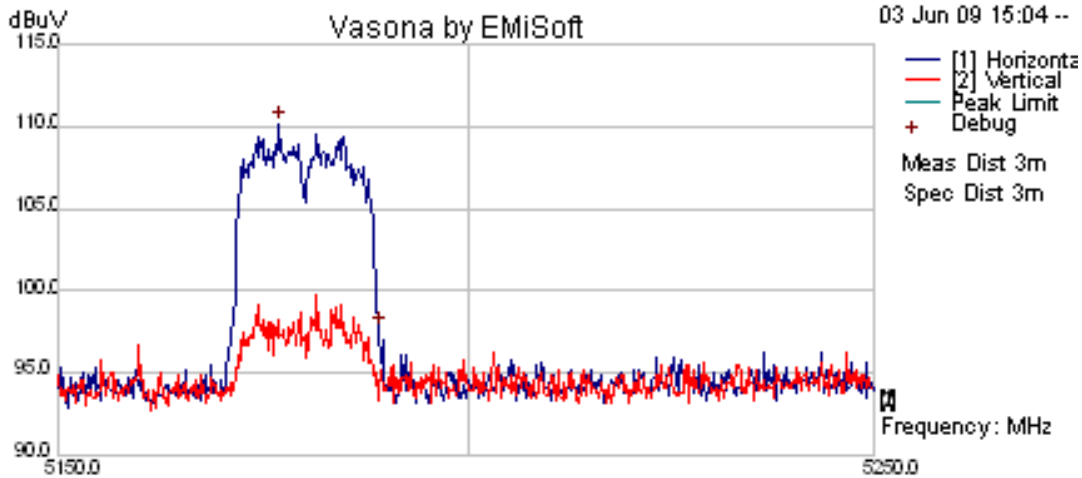


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5176.854	60.92	14.62	34.65	110.2	Peak [Scan]	H						
1040.251	65.9	1.99	-15.67	52.22	Peak Max	H	99	121	74	-21.78	Pass	RB
1040.251	44.35	1.99	-15.67	30.67	Average Max	H	99	121	54	-23.33	Pass	RB
1057.916	68.28	2.01	-15.65	54.63	Peak Max	H	98	114	74	-19.37	Pass	RB
1057.916	48.91	2.01	-15.65	35.26	Average Max	H	98	114	54	-18.74	Pass	RB
5150.0000	Power Setting = 11.0			49.09	Peak Max	V	--	--	74	-24.91	Pass	BE
5150.0000				35.85	Average Max	V	--	--	54	-18.15	Pass	BE

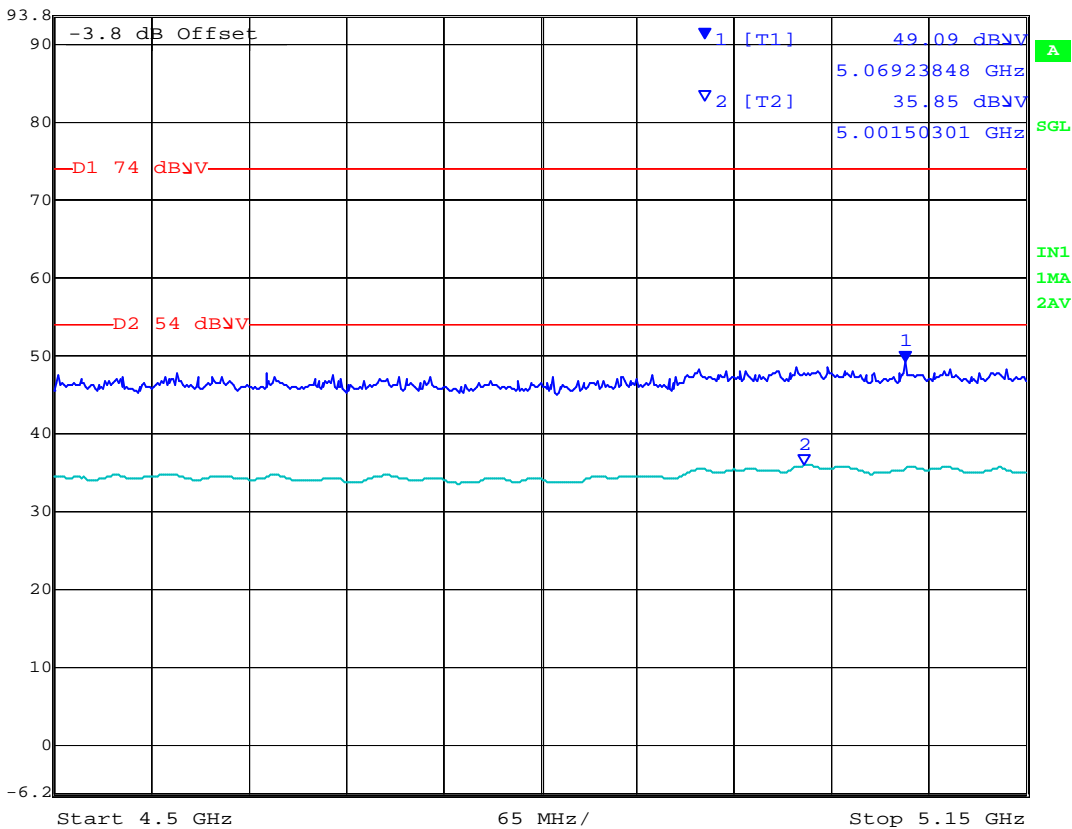
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Marker 1 [T1] RBW 1 MHz RF Att 20 dB
 Ref Lvl 49.09 dBuV VBW 1 MHz
 93.8 dBuV 5.06923848 GHz SWT 60 s Unit dBuV



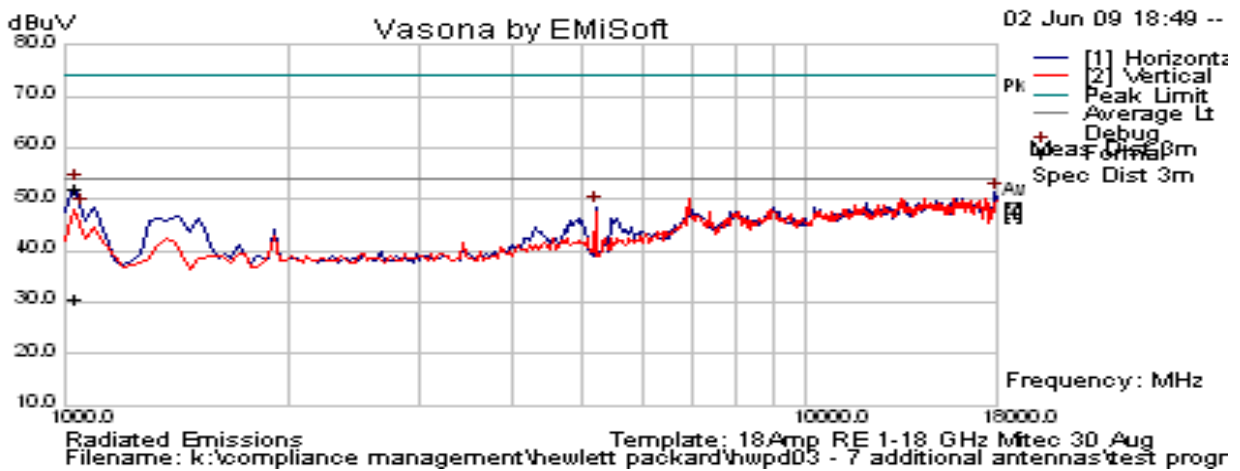
Date: 29.MAY.2009 11:30:58

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Date	6/2/2009
Engineer	CSB
Test Case	HWPD03 - FCC 15.407 [Country = US/CAN] Spurious Emissions > 1GHz
Frequency	5200
Antenna Model	J9171A Antenna / Gain = 4 dBi
Power setting	11.5 in ART Test Utility
Test	802.11a 6.5 Mb/s;
Conditions	MSM-410 Platform Radio

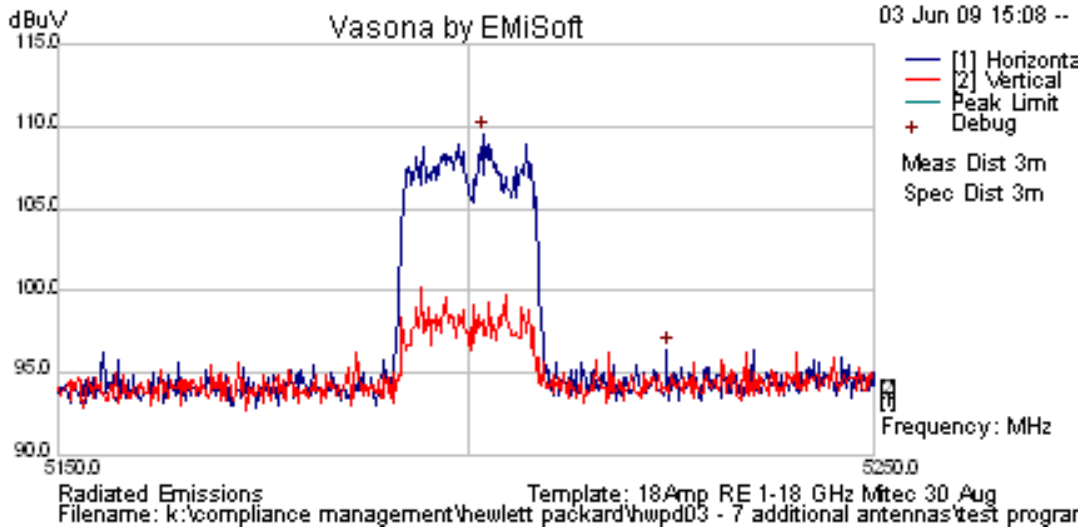


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5201.904	60.28	14.62	34.67	109.6	Peak [Scan]	H						
1040.251	65.9	1.99	-15.67	52.22	Peak Max	H	99	121	74	-21.78	Pass	RB
1040.251	44.35	1.99	-15.67	30.67	Average Max	H	99	121	54	-23.33	Pass	RB
1057.916	68.28	2.01	-15.65	54.63	Peak Max	H	98	114	74	-19.37	Pass	RB
1057.916	48.91	2.01	-15.65	35.26	Average Max	H	98	114	54	-18.74	Pass	RB

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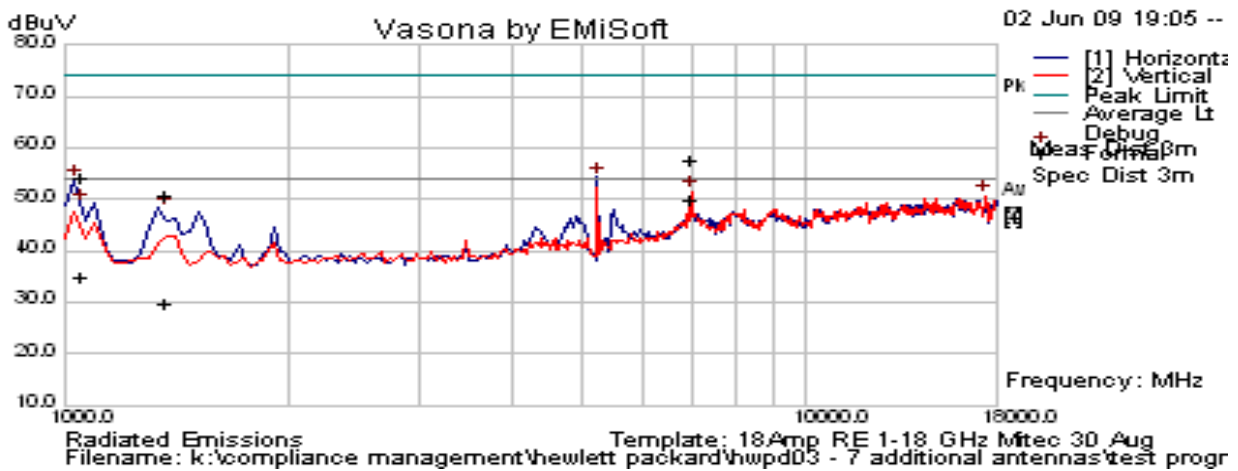


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Title: DNMA-83 802.11 a/b/g/n Wireless Module
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Date	6/2/2009
Engineer	CSB
Test Case	HWPD03 - FCC 15.407 [Country = US/CAN] Spurious Emissions > 1GHz
Frequency	5240
Antenna Model	J9171A Antenna / Gain = 4 dBi
Power setting	12 in ART Test Utility
Test	802.11a 6.5 Mb/s;
Conditions	MSM-410 Platform Radio

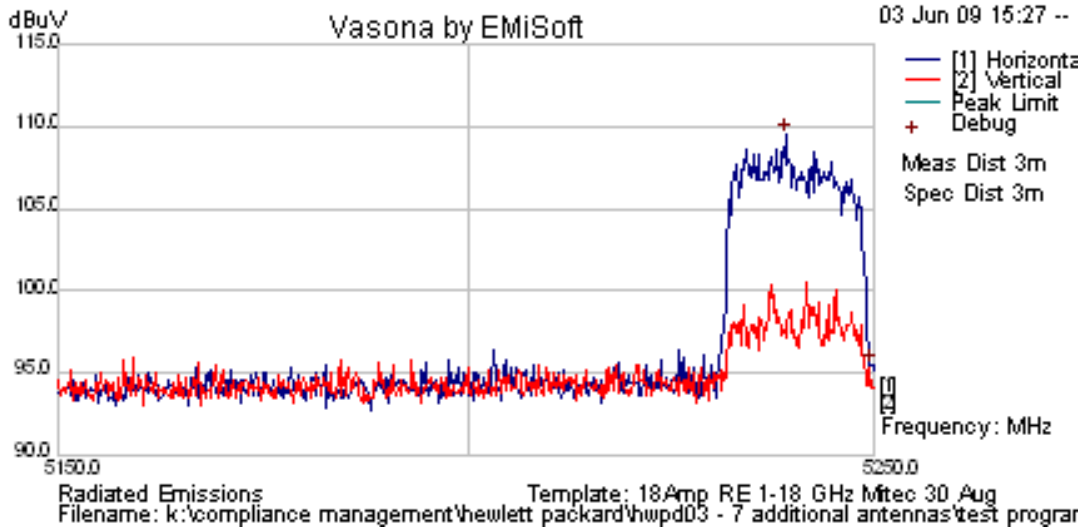


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5238.978	60.21	14.62	34.7	109.5	Peak [Scan]	H						
1057.635	67.77	2.01	-15.65	54.13	Peak Max	H	99	115	74	-19.87	Pass	RB
1057.635	48.49	2.01	-15.65	34.85	Average Max	H	99	115	54	-19.15	Pass	RB
1365.501	63.45	2.27	-15.11	50.61	Peak Max	H	103	216	74	-23.39	Pass	RB
1365.501	42.43	2.27	-15.11	29.59	Average Max	H	103	216	54	-24.41	Pass	RB
6986.701	46.37	5.37	-1.65	50.1	Average Max	V	130	167	54	-3.9	Pass	NRB
6986.701	53.76	5.37	-1.65	57.48	Peak Max	V	130	167	74	-16.52	Pass	NRB
1040.251	65.9	1.99	-15.67	52.22	Peak Max	H	99	121	74	-21.78	Pass	RB
1040.251	44.35	1.99	-15.67	30.67	Average Max	H	99	121	54	-23.33	Pass	RB
5350.0000	Power Setting = 12.0			50.92	Peak Max	V	--	--	74	-23.08	Pass	BE
5350.0000				37.32	Average Max	V	--	--	54	-16.68	Pass	BE

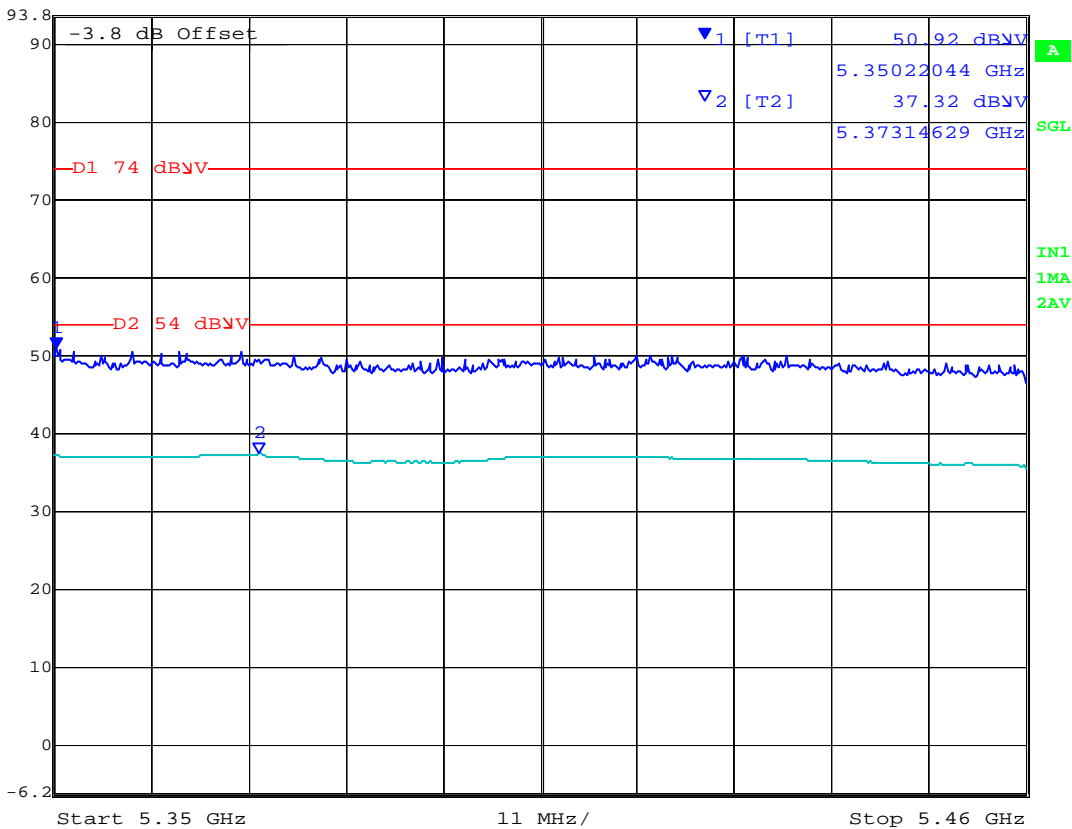
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Ref Lvl	50.92 dBuV	RBW	1 MHz	RF Att	20 dB
93.8 dBuV	5.35022044 GHz	VBW	1 MHz	Unit	dBuV
		SWT	60 s		



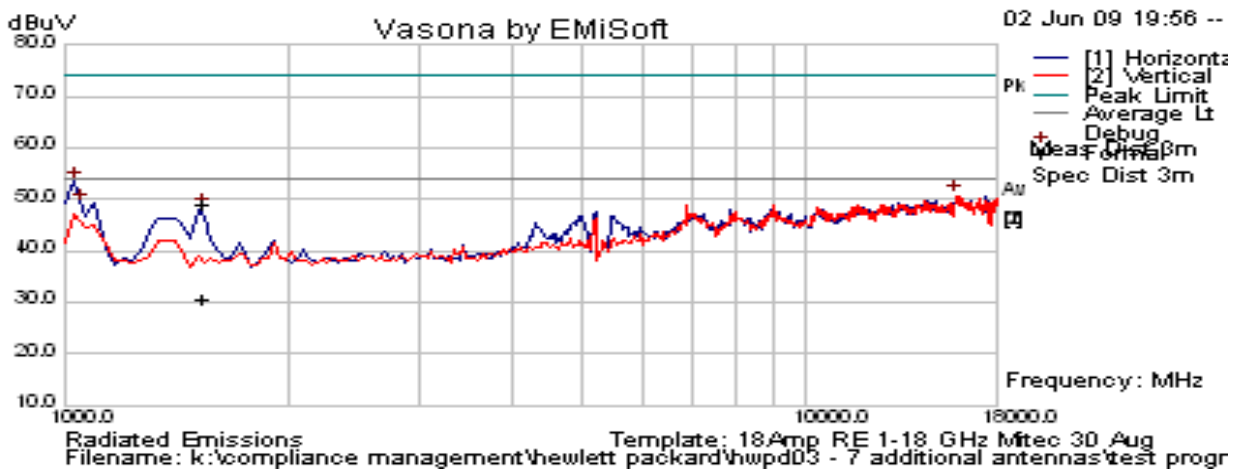
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Date 6/2/2009
Engineer CSB
Test Case HWPD03 - FCC 15.407 [Country = US/CAN] Spurious Emissions > 1GHz
Frequency 5180
Antenna Model J9171A Antenna / Gain = 4 dBi
Power setting 11 in ART Test Utility
Test 802.11 HT-20 6.5 MCS
Conditions MSM-410 Platform Radio

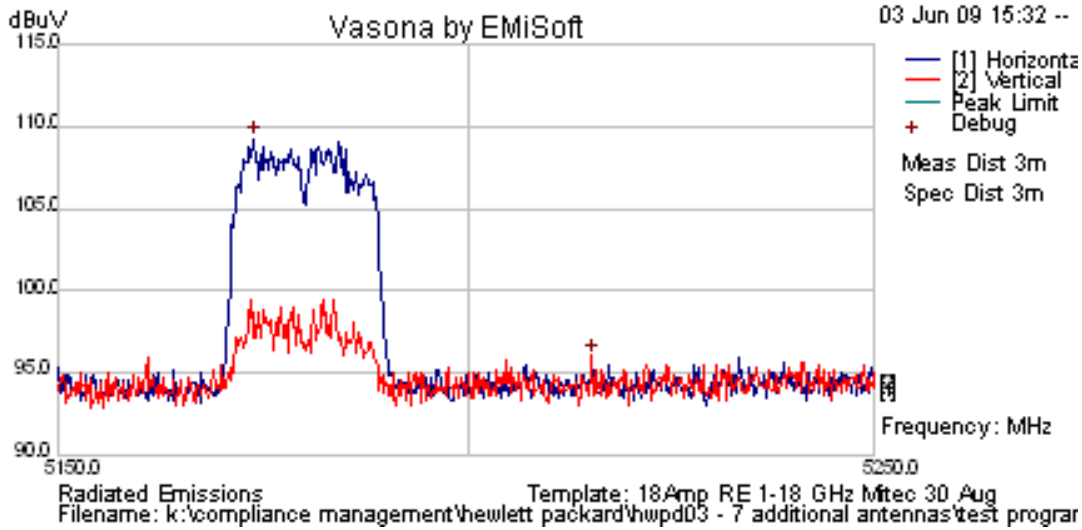


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5173.848	60.02	14.62	34.64	109.3	Peak [Scan]	H						
1540.2	61.26	2.4	-14.5	49.17	Peak Max	H	98	352	74	-24.83	Pass	RB
1540.2	42.84	2.4	-14.5	30.75	Average Max	H	98	352	54	-23.25	Pass	RB
1040.251	65.9	1.99	-15.67	52.22	Peak Max	H	99	121	74	-21.78	Pass	RB
1040.251	44.35	1.99	-15.67	30.67	Average Max	H	99	121	54	-23.33	Pass	RB
1057.916	68.28	2.01	-15.65	54.63	Peak Max	H	98	114	74	-19.37	Pass	RB
1057.916	48.91	2.01	-15.65	35.26	Average Max	H	98	114	54	-18.74	Pass	RB
5150.0000	Power Setting = 11.0			49.07	Peak Max	V	--	--	74	-24.93	Pass	BE
5150.0000	Power Setting = 11.0			35.85	Average Max	V	--	--	54	-18.15	Pass	BE

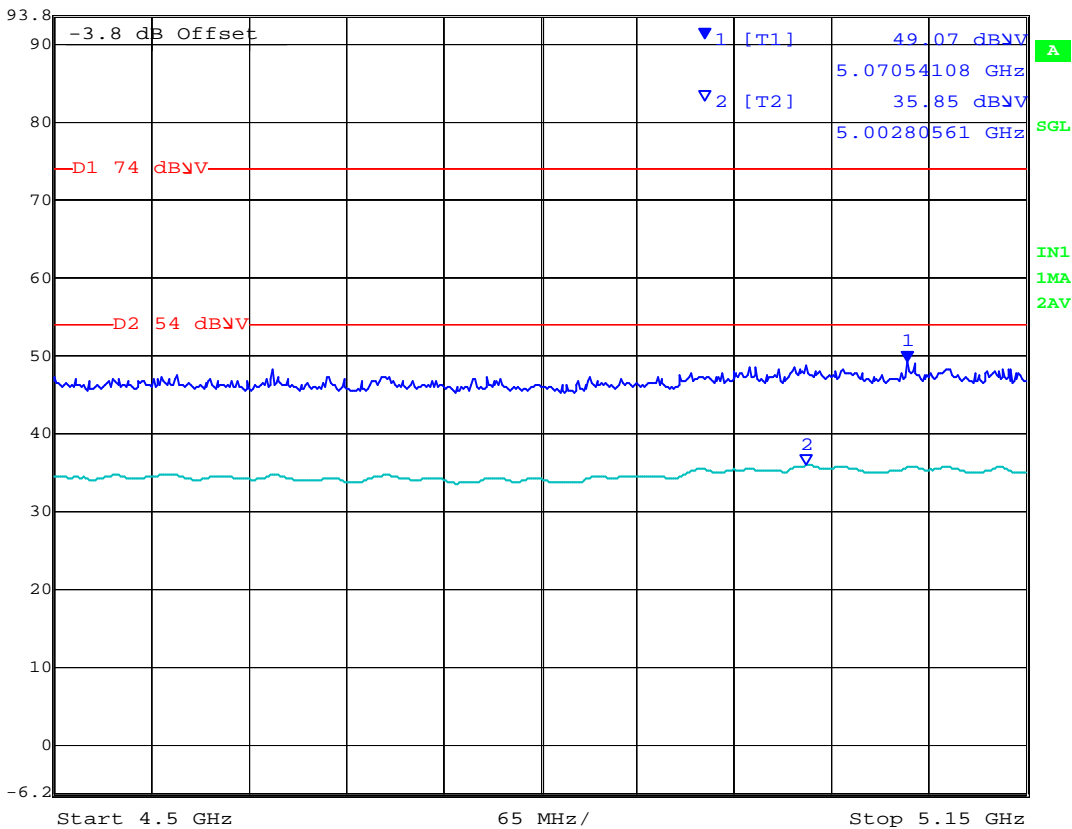
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Marker 1 [T1] RBW 1 MHz RF Att 20 dB
 Ref Lvl 49.07 dBuV VBW 1 MHz
 93.8 dBuV 5.07054108 GHz SWT 60 s Unit dBuV



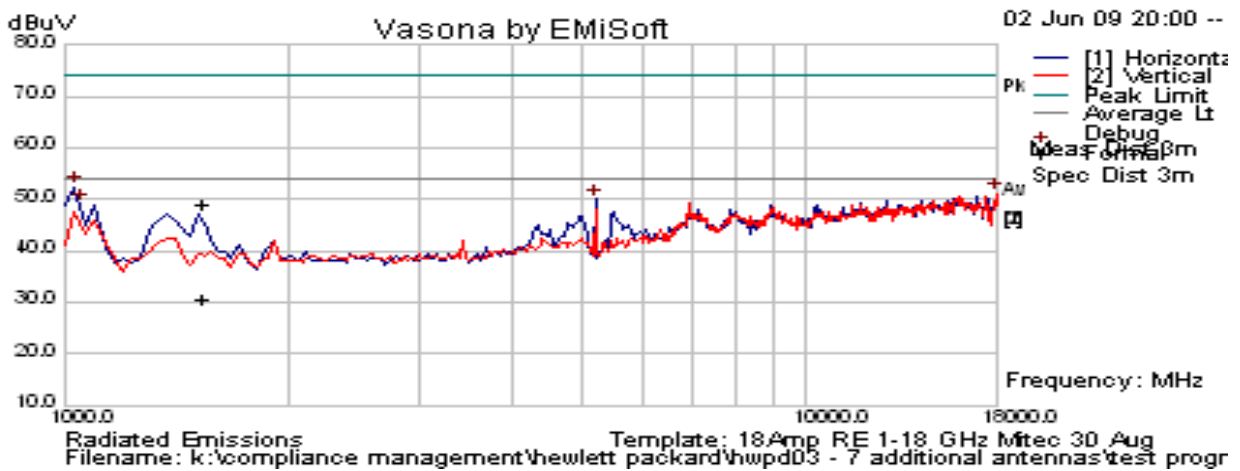
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Date 6/2/2009
Engineer CSB
Test Case HWPD03 - FCC 15.407 [Country = US/CAN] Spurious Emissions > 1GHz
Frequency 5200
Antenna Model J9171A Antenna / Gain = 4 dBi
Power setting 11.5 in ART Test Utility
Test 802.11 HT-20 6.5 MCS
Conditions MSM-410 Platform Radio

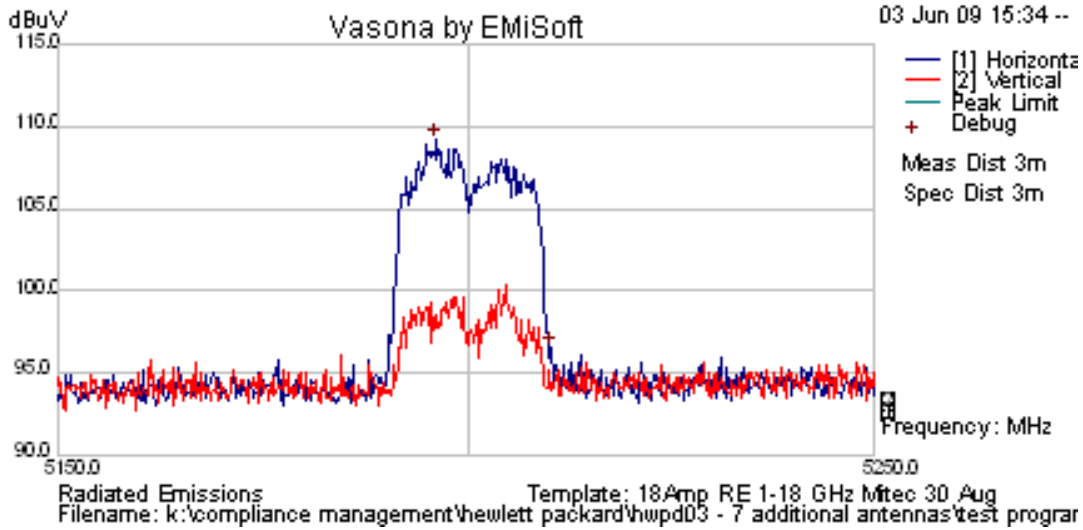


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5196.092	59.91	14.62	34.66	109.2	Peak [Scan]	H						
1040.251	65.9	1.99	-15.67	52.22	Peak Max	H	99	121	74	-21.78	Pass	RB
1040.251	44.35	1.99	-15.67	30.67	Average Max	H	99	121	54	-23.33	Pass	RB
1057.916	68.28	2.01	-15.65	54.63	Peak Max	H	98	114	74	-19.37	Pass	RB
1057.916	48.91	2.01	-15.65	35.26	Average Max	H	98	114	54	-18.74	Pass	RB

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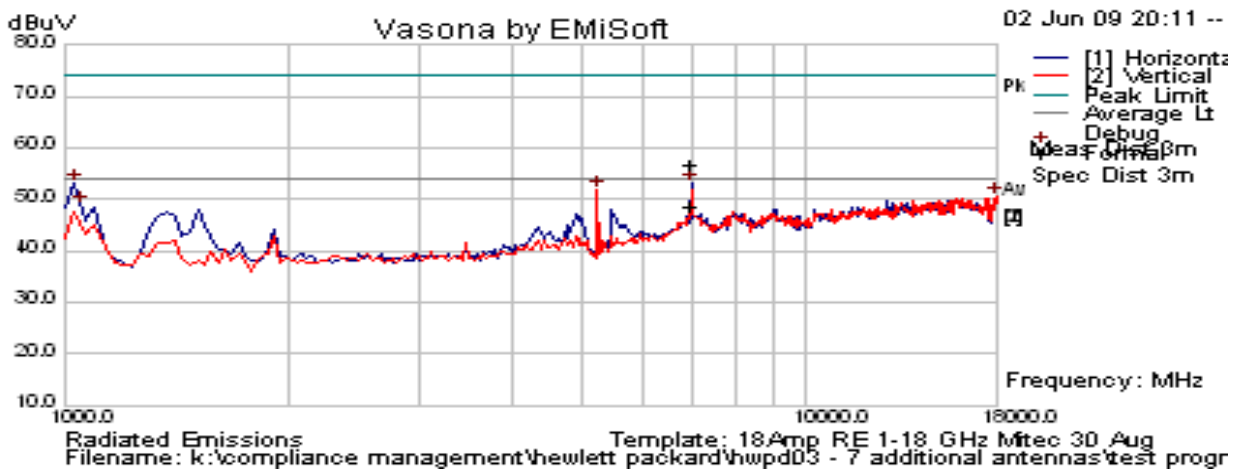


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Date 6/2/2009
Engineer CSB
Test Case HWPD03 - FCC 15.407 [Country = US/CAN] Spurious Emissions > 1GHz
Frequency 5240
Antenna Model J9171A Antenna / Gain = 4 dBi
Power setting 12 in ART Test Utility
Test 802.11 HT-20 6.5 MCS
Conditions MSM-410 Platform Radio

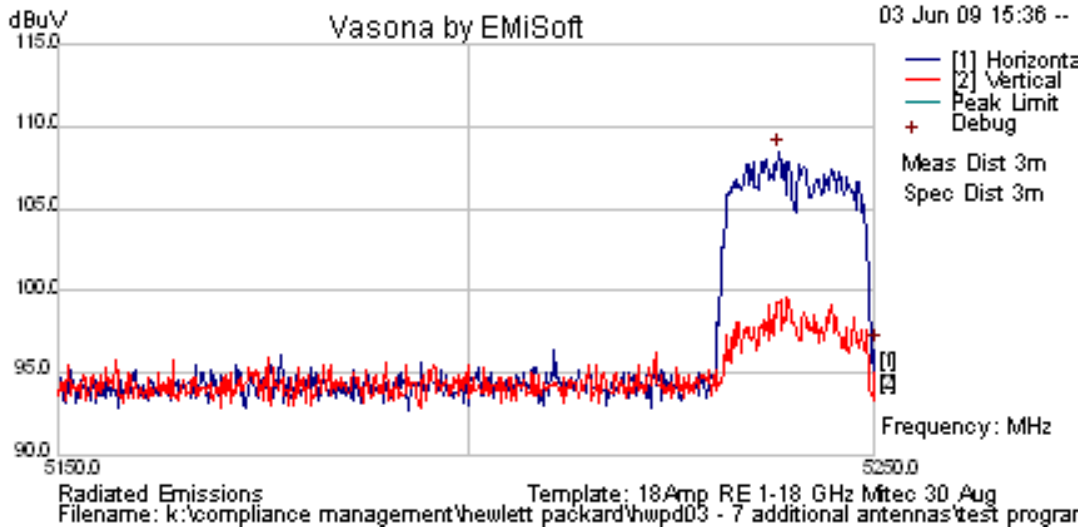


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5238.176	59.22	14.62	34.7	108.5	Peak [Scan]	H						
6986.701	52.99	5.37	-1.65	56.71	Peak Max	H	99	41	74	-17.29	Pass	NRB
6986.701	44.72	5.37	-1.65	48.44	Average Max	H	99	41	54	-5.56	Pass	NRB
1040.251	65.9	1.99	-15.67	52.22	Peak Max	H	99	121	74	-21.78	Pass	RB
1040.251	44.35	1.99	-15.67	30.67	Average Max	H	99	121	54	-23.33	Pass	RB
1057.916	68.28	2.01	-15.65	54.63	Peak Max	H	98	114	74	-19.37	Pass	RB
1057.916	48.91	2.01	-15.65	35.26	Average Max	H	98	114	54	-18.74	Pass	RB
5350.0000	Power Setting = 12.0			55.06	Peak Max	V	--	--	74	-18.94	Pass	BE
5350.0000				37.51	Average Max	V	--	--	54	-16.49	Pass	BE

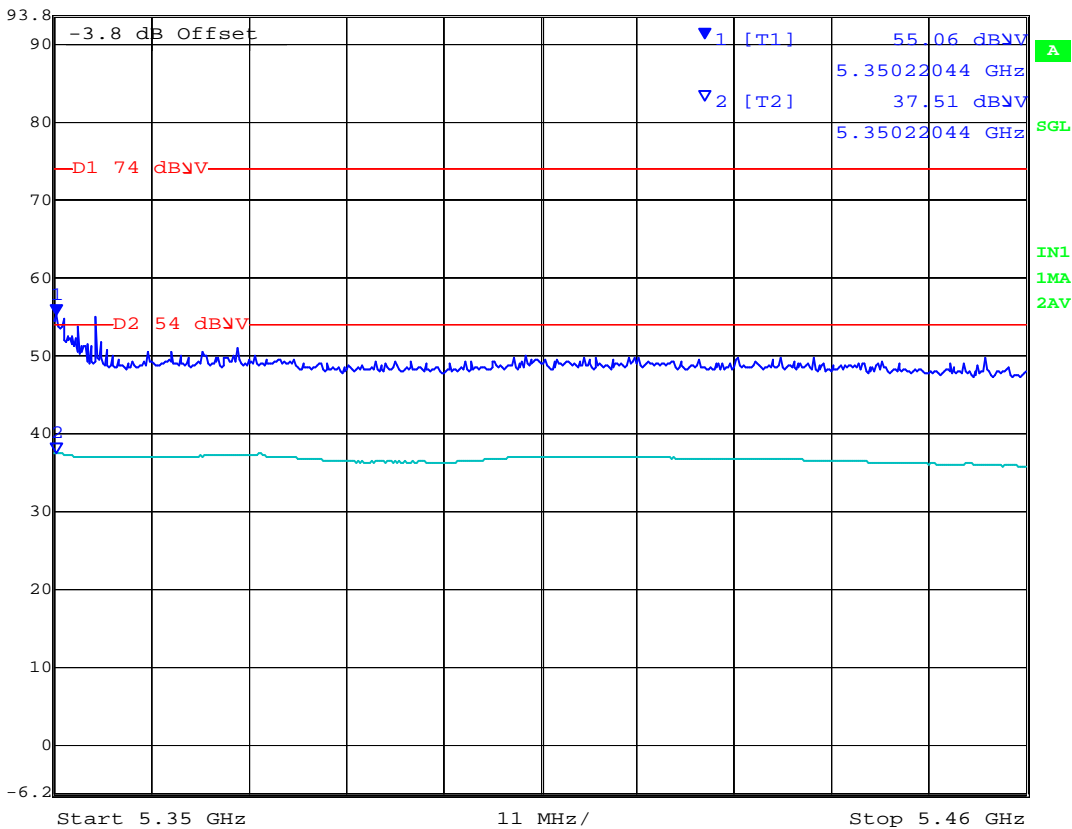
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	Marker 1 [T1]	RBW	1 MHz	RF Att	20 dB
	Ref Lvl	55.06 dBuV	VBW	1 MHz	
	93.8 dBuV	5.35022044 GHz	SWT	60 s	Unit dBuV



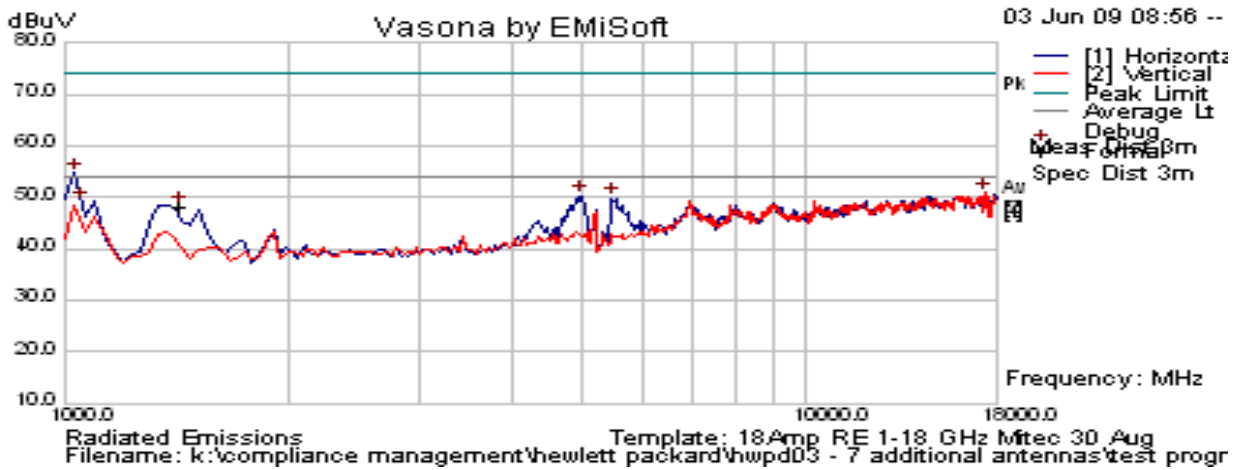
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Date 6/3/2009
Engineer CSB
Test Case HWPD03 - FCC 15.407 [Country = US/CAN] Spurious Emissions > 1GHz
Frequency 5190
Antenna Model J9171A Antenna / Gain = 4 dBi
Power setting 11.5 in ART Test Utility
Test 802.11 HT-40 13.5 MCS
Conditions MSM-410 Platform Radio

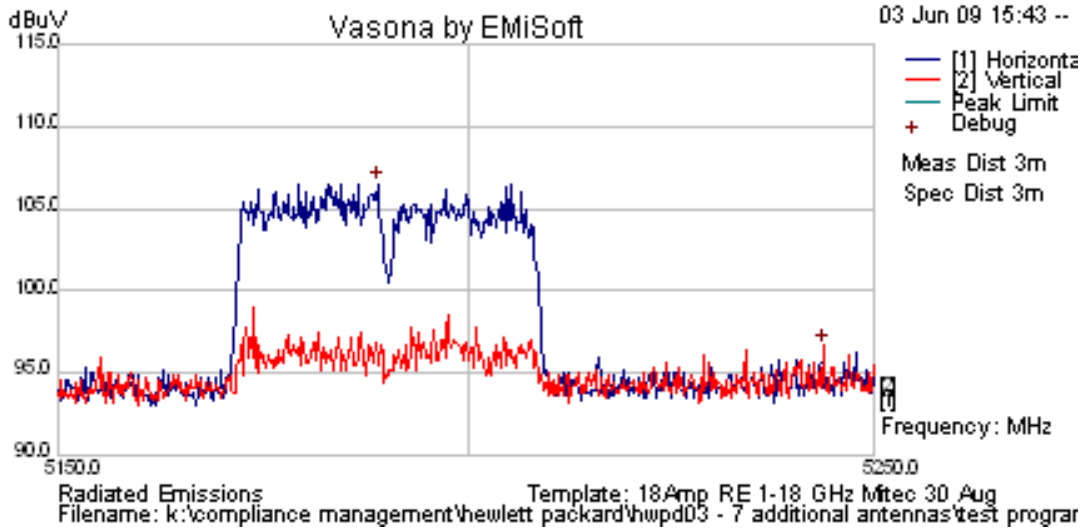


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5188.878	57.27	14.62	34.66	106.5	Peak [Scan]	H						
1432.425	62.08	2.32	-14.99	49.41	Peak Max	H	102	201	74	-24.59	Pass	NRB
1432.425	40.79	2.32	-14.99	28.13	Average Max	H	102	201	54	-25.87	Pass	NRB
1040.251	65.9	1.99	-15.67	52.22	Peak Max	H	99	121	74	-21.78	Pass	RB
1040.251	44.35	1.99	-15.67	30.67	Average Max	H	99	121	54	-23.33	Pass	RB
1057.916	68.28	2.01	-15.65	54.63	Peak Max	H	98	114	74	-19.37	Pass	RB
1057.916	48.91	2.01	-15.65	35.26	Average Max	H	98	114	54	-18.74	Pass	RB
5150.0000	Power Setting = 11.5			61.38	Peak Max	V	--	--	74	-12.62	Pass	BE
5150.0000				41.76	Average Max	V	--	--	54	-12.24	Pass	BE

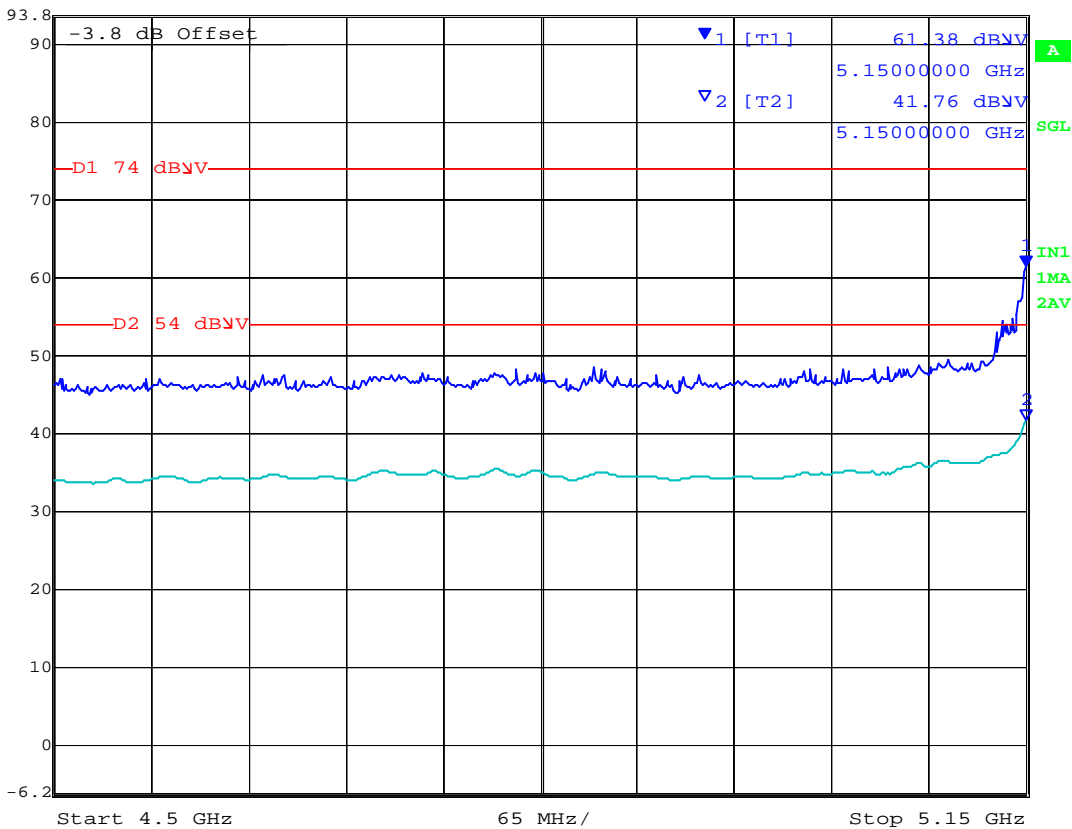
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Marker 1 [T1] RBW 1 MHz RF Att 20 dB
 Ref Lvl 61.38 dBuV VBW 1 MHz
 93.8 dBuV 5.1500000 GHz SWT 60 s Unit dBuV



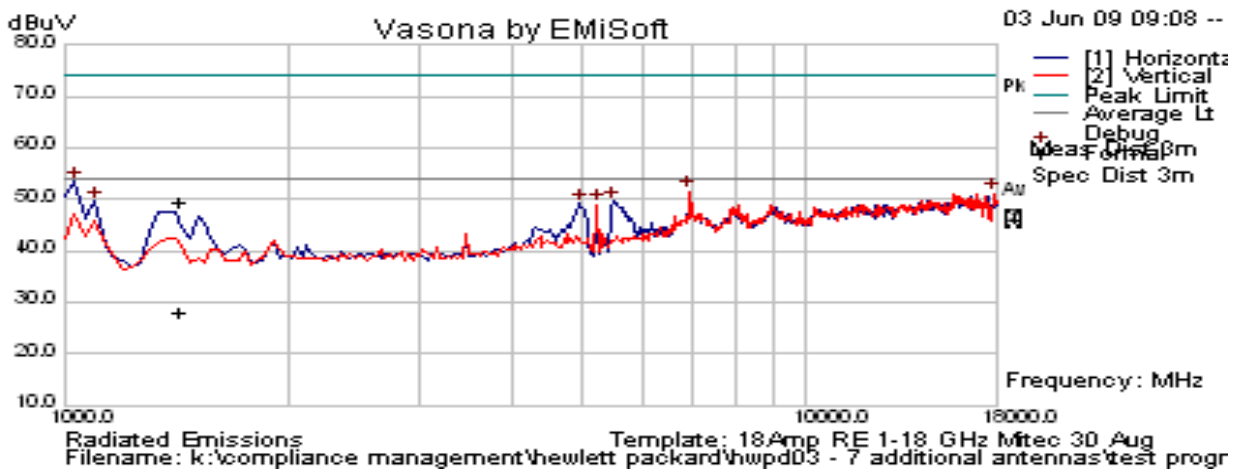
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Date	6/3/2009
Engineer	CSB
Test Case	HWPD03 - FCC 15.407 [Country = US/CAN] Spurious Emissions > 1GHz
Frequency	5230
Antenna Model	J9171A Antenna / Gain = 4 dBi
Power setting	11.5 in ART Test Utility
Test	802.11 HT-40 13.5 MCS
Conditions	MSM-410 Platform Radio

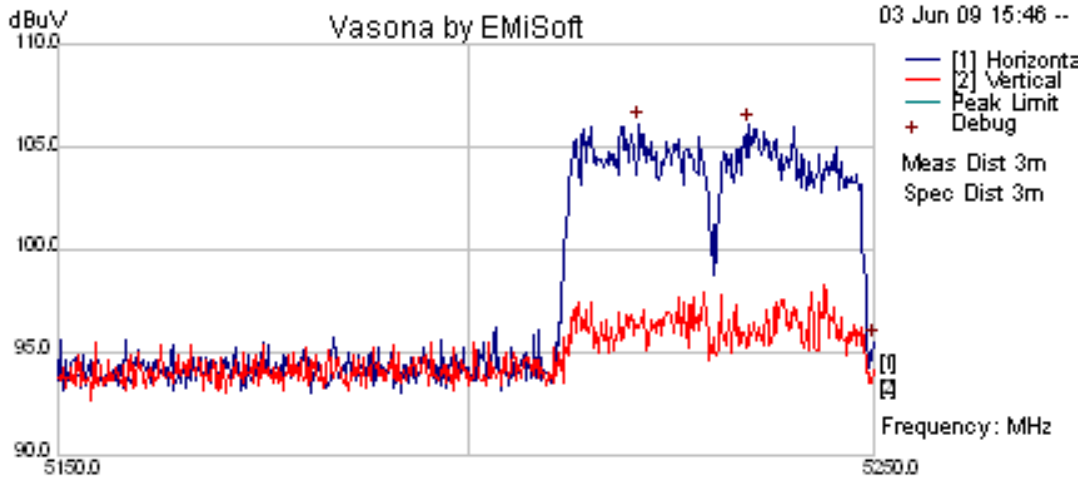


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5220.942	56.87	14.62	34.68	106.2	Peak [Scan]	H						
6973.363	54.4	5.37	-1.77	58	Peak Max	V	132	168	74	-16	Pass	NRB
6973.363	48.85	5.37	-1.77	52.44	Average Max	V	132	168	54	-1.56	Pass	NRB
1040.251	65.9	1.99	-15.67	52.22	Peak Max	H	99	121	74	-21.78	Pass	RB
1040.251	44.35	1.99	-15.67	30.67	Average Max	H	99	121	54	-23.33	Pass	RB
1057.916	68.28	2.01	-15.65	54.63	Peak Max	H	98	114	74	-19.37	Pass	RB
1057.916	48.91	2.01	-15.65	35.26	Average Max	H	98	114	54	-18.74	Pass	RB
5350.0000	Power Setting = 11.5			64.81	Peak Max	V	--	--	74	-9.19	Pass	BE
5350.0000				45.54	Average Max	V	--	--	54	-8.46	Pass	BE

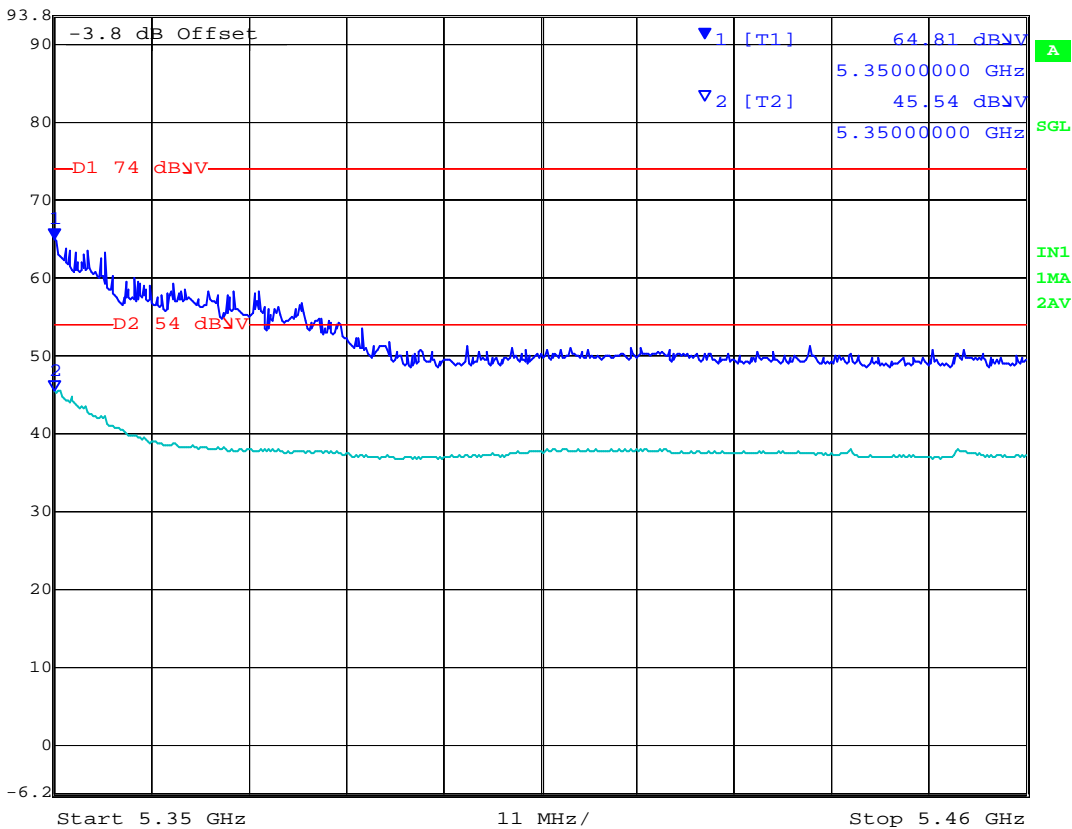
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	Marker 1 [T1]	RBW	1 MHz	RF Att	20 dB
	Ref Lvl	64.81 dBuV	VBW	1 MHz	
	93.8 dBuV	5.3500000 GHz	SWT	60 s	Unit dBuV



Date: 29.MAY.2009 11:59:13

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SPECIFICATION

Limits

15.407 (b)(2). All emissions outside of the 5,150-5,350MHz band shall not exceed an EIRP of -27dBm/MHz.

§15.205 (a) Except as shown in paragraph (d) of 15.205 (a), only spurious emissions are permitted in any of the frequency bands listed.

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

§15.209 (a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table.

RSS-210 §A9.3(2) For transmitters operating in the 5250-5350 MHz band, all emissions outside the 5150-5350 MHz band shall not exceed -27 dBm/MHz e.i.r.p. Devices operating in the 5250-5350 MHz band that generate emissions in the 5150-5250 MHz band shall not exceed out of band emission limit of 27 dBm/MHz e.i.r.p. in the 5150-5250 MHz band in order to operate indoor/outdoor, or alternatively shall comply with the spectral power density for operation within the 5150-5250 MHz band and shall be labeled “for indoor use only”.

RSS-Gen §4.7 The search for unwanted emissions shall be from the lowest frequency internally generated or used in the device (local oscillator, intermediate of carrier frequency), or from 30 MHz, whichever is the lowest frequency, to the 5th harmonic of the highest frequency generated without exceeding 40 GHz.

RSS-Gen §6 Receiver Spurious Emission Standard

If a radiated measurement is made, all spurious emissions shall comply with the limits of the following Table. The resolution bandwidth of the spectrum analyzer shall be 100 kHz for spurious emission measurements below 1.0 GHz and 1.0 MHz for measurements above 1.0 GHz

§15.209 (a) Limit Matrix

Frequency(MHz)	Field Strength (μV/m)	Field Strength (dBμV/m)	Measurement Distance (meters)
30-88	100	40.0	3
88-216	150	43.5	3
216-960	200	46.0	3
Above 960	500	54.0	3

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Laboratory Measurement Uncertainty for Radiated Emissions

Measurement uncertainty	+5.6/ -4.5 dB
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Traceability

Method	Test Equipment Used
Measurements were made per work instruction WI-03 'Measurement of Radiated Emissions'	0088, 0158, 0134, 0304, 0311, 0315, 0310, 0312

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5.1.1.2. Receiver Radiated Spurious Emissions (above 1 GHz)

Industry Canada RSS-Gen §4.8, §6

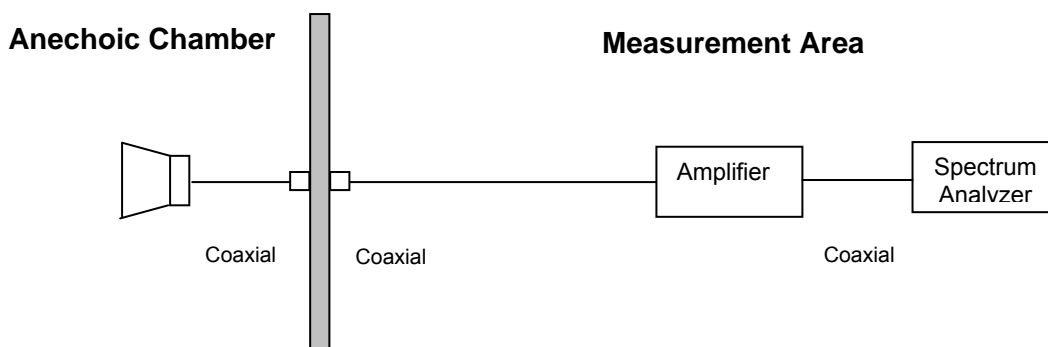
Test Procedure

Radiated emissions above 1 GHz are measured in the anechoic chamber at a 3-meter distance on every azimuth in both horizontal and vertical polarities. The emissions are recorded and maximized as a function of azimuth by rotation through 360° with a spectrum analyzer in peak hold mode. Depending on the frequency band spanned a notch filter and waveguide filter was used to remove the fundamental frequency. The highest emissions relative to the limit are listed for each frequency spanned.

All measurements on any frequency or frequencies over 1 MHz are based on the use of measurement instrumentation employing an average detector function. All measurements above 1 GHz were performed using a minimum resolution bandwidth of 1 MHz.

All Sectors of the EUT were tested simultaneously

Test Measurement Set up



Measurement set up for Radiated Emission Test

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Loss, and subtracting Amplifier Gain from the measured reading. All factors are included in the reported data.

$$FS = R + AF + CORR - FO$$

where: FS = Field Strength

R = Measured Spectrum analyzer Input Amplitude

AF = Antenna Factor

CORR = Correction Factor = CL – AG + NFL

CL = Cable Loss

AG = Amplifier Gain

FO = Distance Falloff Factor

NFL = Notch Filter Loss or Waveguide Loss



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For example:

Given receiver input reading of 51.5 dB μ V; Antenna Factor of 8.5 dB; Cable Loss of 1.3 dB; Falloff Factor of 0 dB, an Amplifier Gain of 26 dB and Notch Filter Loss of 1 dB. The Field Strength of the measured emission is:

$$FS = 51.5 + 8.5 + 1.3 - 26.0 + 1 = 36.3 \text{ dB}\mu\text{V/m}$$

Conversion between dB μ V/m (or dB μ V) and μ V/m (or μ V) are done as:

$$\text{Level (dB}\mu\text{V/m)} = 20 * \text{Log (level (\mu\text{V/m}))}$$

$$40 \text{ dB}\mu\text{V/m} = 100 \mu\text{V/m}$$

$$48 \text{ dB}\mu\text{V/m} = 250 \mu\text{V/m}$$

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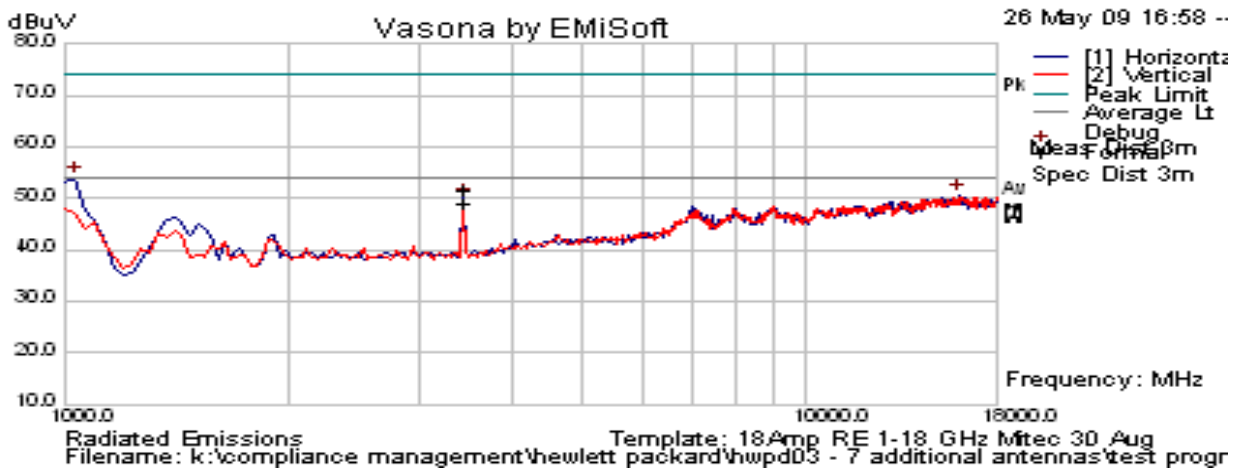


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Receiver Radiated Spurious Emissions above 1 GHz

Channel 5200 MHz

Date	26th May, 2009
Engineer	GMH
Test Case	HWP03 - FCC 15.407 [Country = US/CAN] Spurious Emissions > 1GHz
Frequency	5200
Antenna Model	J9169A Antenna / Gain = 10.7 dBi
Power setting	N/A
Test	802.11n a, n HT-20, n HT-40;
Conditions	MSM410 DNMA-83 Platform Radio



Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
3466.668	59.51	3.59	-11.3	51.8	Peak Max	H	98	143	74	-22.2	Pass	
3466.668	56.92	3.59	-11.3	49.2	Average Max	H	98	143	54	-4.8	Pass	
1040.251	65.9	1.99	-15.67	52.22	Peak Max	H	99	121	74	-21.78	Pass	
1040.251	44.35	1.99	-15.67	30.67	Average Max	H	99	121	54	-23.33	Pass	

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Specification

Receiver Radiated Spurious Emissions

Industry Canada RSS-Gen §4.8,

The search for spurious emissions shall be from the lowest frequency internally generated or used in the receiver (e.g. local oscillator, intermediate or carrier frequency), or 30 MHz, whichever is the higher, to at least 3 times the highest tunable or local oscillator frequency, whichever is the higher, without exceeding 40 GHz.

RSS-Gen §6

The following receiver spurious emission limits shall be complied with;

(a) If a radiated measurement is made, all spurious emissions shall comply with the limits of Table 1.

Frequency (MHz)	Field Strength ($\mu\text{V/m}$)	Field Strength ($\text{dB}\mu\text{V/m}$)	Measurement Distance (meters)
30-88	100	40.0	3
88-216	150	43.5	3
216-960	200	46.0	3
Above 960	500	54.0	3

Laboratory Measurement Uncertainty for Radiated Emissions

Measurement uncertainty	+5.6/ -4.5 dB
-------------------------	---------------

Traceability

Method	Test Equipment Used
Measurements were made per work instruction WI-03 'Measurement of Radiated Emissions'	0088, 0158, 0134, 0304, 0311, 0315, 0310, 0312

6. PHOTOGRAPHS

6.1. Radiated Emissions > 1GHz



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7. TEST EQUIPMENT DETAILS

Asset #	Instrument	Manufacturer	Part #	Serial #
0088	Spectrum Analyzer	Hewlett Packard	8564E	3410A00141
0134	Amplifier	Com Power	PA 122	181910
0158	Barometer /Thermometer	Control Co.	4196	E2846
0193	EMI Receiver	Rhode & Schwartz	ESI 7	838496/007
0252	SMA Cable	Megaphase	Sucoflex 104	None
0310	2m SMA Cable	Micro-Coax	UFA210A-0-0787-3G03G0	209089-001
0312	3m SMA Cable	Micro-Coax	UFA210A-1-1181-3G0300	209092-001
0313	Coupler	Hewlett Packard	86205A	3140A01285
0314	30dB N-Type Attenuator	ARRA	N9444-30	1623
0070	Power Meter	Hewlett Packard	437B	3125U11552
0116	Power Sensor	Hewlett Packard	8485A	3318A19694
0117	Power Sensor	Hewlett Packard	8487D	3318A00371
0184	Pulse Limiter	Rhode & Schwartz	ESH3Z2	357.8810.52
0190	LISN	Rhode & Schwartz	ESH3Z5	836679/006
0293	BNC Cable	Megaphase	1689 1GVT4	15F50B001
0301	5.6 GHz Notch Filter	Micro-Tronics	RBC50704	001
0302	5.25 GHz Notch Filter	Micro-Tronics	BRC50703	002
0303	5.8 GHz Notch Filter	Micro-Tronics	BRC50705	003
0304	2.4GHzHz Notch Filter	Micro-Tronics	--	001
0307	BNC Cable	Megaphase	1689 1GVT4	15F50B002
0335	1-18GHz Horn Antenna	ETS- Lindgren	3117	00066580
0337	Amplifier	MiCOM Labs	--	--
0338	Antenna	Sunol Sciences	JB-3	A052907

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