Test of Aruba AP-92/93 802.11a/b/g/n Wireless AP

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

Test Report Serial No.: ARUB51-U2 Rev A

TEST REPORT

FROM

Test of Aruba Networks, Inc AP-92/93 802.11a/b/g/n Wireless AP
to

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

Test Report Serial No.: ARUB51-U2 Rev A

Note: this report contains data with regard to the 5,150 to 5,250 MHz band for the Aruba Networks, Inc AP-92 & AP-93 Wireless Access Point. 2.4 and 5.8 GHz test data are reported in MiCOM Labs test report ARUB51-U1.

This report supersedes None

Applicant: Aruba Networks, Inc
1344 Crossman Avenue
Sunnyvale
CA 94089, USA

Product Function: Wireless Access Point

Copy No: pdf Issue Date: 18th May 2010

This Test Report is Issued Under the Authority of;

MiCOM Labs, Inc.
440 Boulder Court, Suite 200
Pleasanton, CA 94566 USA
Phone: +1 (925) 462-0304
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www.micomlabs.com

ACCREDITED
CERTIFICATE #2381.01

MiCOM Labs is an ISO 17025 Accredited Testing Laboratory

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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

ilac-MRA

The American Association for Laboratory Accreditation

World Class 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-IAF Communiqué dated 8 January 2009*).

Presented this 14th day of April 2010.

President & CEO
For the Accreditation Council
Certificate Number 2381.01
Valid to November 30, 2011

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

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

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 I	
Vietnam	Ministry of Information and Communications	I	

DOCUMENT HISTORY

Document History		
Revision	**Date**	**Comments**
Draft		
Rev A	18th May 2010	Initial release.

1. TEST RESULT CERTIFICATE

Applicant:	Aruba Networks, Inc 1344 Crossman Avenue Sunnyvale CA 94089, USA	Tested By:	MiCOM Labs, Inc. 440 Boulder Court Suite 200 Pleasanton California, 94566, USA
EUT:	802.11a/b/g/n Wireless Access Point	Tel:	+1 925 462 0304
Model:	AP-92 & AP-93	Fax:	+1 925 462 0306
S/N:	AP-92 AN0000305 (Conducted) AP-92 AN0000307 (Radiated) AP-93 AN0000330 (Radiated)		
Test Date(s):	3rd to 28th April 2010	Website:	www.micomlabs.com

STANDARD(S)	TEST RESULTS
FCC 47 CFR Part 15.407 & IC RSS-210	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.

ACCREDITED
CERTIFICATE #2381.01

Approved & Released for MiCOM Labs, Inc. by:

Graeme Grieve
Quality Manager MiCOM Labs,

Gordon Hurst
President & CEO MiCOM Labs, Inc.

2. REFERENCES AND MEASUREMENT UNCERTAINTY

2.1. Normative References

Ref.	Publication	Year	Title
(i)	FCC 47 CFR Part 15.407	2009	Code of Federal Regulations
(ii)	FCC 06-96	June 2006	Memorandum Opinion and Order
(iii)	Industry Canada RSS-210	Issue 7 June 2007	Low Power License-Exempt Radiocommunication Devices (All Frequency Bands): Category 1 Equipment
(iv)	Industry Canada RSS-Gen	Issue 2 June 2007	General Requirements and Information for the Certification of Radiocommunication Equipment
(v)	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
(vi)	CISPR 22/ EN 55022	1997 1998	Limits and Methods of Measurements of Radio Disturbance Characteristics of Information Technology Equipment
(vii)	M 3003	Edition 1 Dec. 1997	Expression of Uncertainty and Confidence in Measurements
(viii)	LAB34	Edition 1 Aug 2002	The expression of uncertainty in EMC Testing
(ix)	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
(x)	A2LA	14th September 2005	Reference to A2LA Accreditation Status – A2LA Advertising Policy
(xi)	FCC Public Notice – DA 02-2138	2002	Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices

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.

3. PRODUCT DETAILS AND TEST CONFIGURATIONS

3.1. Technical Details

Details	Description
Purpose:	Test of the Aruba AP-92/93 802.11a/b/g/n Wireless AP in the frequency ranges 5150 to 5250 MHz to FCC Part 15.407 and Industry Canada RSS-210 regulations.
Applicant:	Aruba Networks, Inc 1344 Crossman Avenue Sunnyvale CA 94089, USA
Manufacturer:	As applicant
Laboratory performing the tests:	MiCOM Labs, Inc. 440 Boulder Court, Suite 200 Pleasanton, California 94566 USA
Test report reference number:	ARUB51-U2 Rev A
Date EUT received:	3rd April 2010
Standard(s) applied:	FCC 47 CFR Part 15.407 & IC RSS-210
Dates of test (from - to):	3rd to 28th April 2010
No of Units Tested:	Three (separate units for conducted and radiated)
Type of Equipment:	802.11a/b/g/n Wireless Access Point, 2x2 Spatial Multiplexing MIMO configuration
Applicants Trade Name:	Aruba Networks, Inc
Model(s):	AP-92 (external antenna), AP-93 (integral antenna)
Software Release	5.0.1.0 ART v0_9-b16ALL
Location for use:	Indoor
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 +17 dBm 802.11n: HT-20 +17 dBm 802.11n: HT-40 +17 dBm
EUT Modes of Operation:	Legacy 802.11a/b/g, 802.11n HT-20, HT-40
Transmit/Receive Operation:	Time Division Duplex
Rated Input Voltage and Current:	DC: Nominal: 12V DC Current: 1.25 A ENET: Nominal: 48 V DC Current: 0.350 A
Operating Temperature Range:	Nominal: 20 ºC Max: 50 ºC Min: 0 ºC
ITU Emission Designator:	5150 – 5250 MHz 802.11a 18M5D1D 5150 – 5250 MHz 802.11n HT-20 19M5D1D 5150 – 5250 MHz 802.11n HT-40 39M9D1D
Frequency Stability:	±20 ppm
Equipment Dimensions:	12.0 cm x 12.7 cm x 3.2 cm
Weight:	375 grams
Primary function of equipment:	Wireless Access Point for transmitting data and voice

3.2. Scope of Test Program

RF Testing

The scope of the compliance program was to test the Aruba AP-92 and AP-93 wireless Access Point, 2x2 Spatial Multiplexing MIMO configurations in the frequency ranges 5150 - 5250 MHz for compliance against FCC 47 CFR Part 15.407 and Industry Canada RSS-210 specifications.

The Aruba Networks, Inc AP-92 has external reverse SMA connectors which utilize external antennas while the AP-93 has integral antenna(s). The antennas used with the AP-92 and AP-93 are detailed in section 3.4 “Antenna Details”.

Aruba AP-92, AP-93 Access Point

The AP-92 and AP-93 are high-speed, affordable, and reliable 802.11n access points for indoor environments. Designed for both ceiling and wall mounting, the compact AP-92 and AP-93 deliver wire-like performance at data rates up to 300Mbps. The AP-92 and AP-93 are built to deliver years of trouble-free operation and are backed by Aruba’s limited lifetime warranty program.

Working in conjunction with Aruba’s line of centralized Mobility Controllers, the AP-92 and AP-93 deliver high-speed, secure network services that let users finally move to a “wireless where possible, wired where necessary” network access model. The network can then be rightsized, with unnecessary ports eliminated to lower operating costs. The key to rightsizing is Aruba’s unique Adaptive Radio Management technology, which manages channel, power, and wireless client behavior to deliver wire-like performance and reliability. By rightsizing network infrastructure, organizations significantly enhance user mobility and efficiency while lowering total cost of ownership.

The multifunction AP-92 and AP-93 can be configured through the controller to provide wireless LAN access, air monitoring, remote networking, secure enterprise mesh, and wireless intrusion detection and prevention over the 2.4GHz and 5GHz RF spectrum. The AP-92 and AP-93 feature a 100/1000Base-T Ethernet interface and operate from either standard 802.3af Power over Ethernet (PoE) sources or a 12VDC power supply.

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

Type (EUT/ Support)	Equipment Description (Including Brand Name)	Mfr	Model No.	Serial No.
EUT	802.11a/b/g/n Wireless Access Point	Aruba Networks , Inc	AP-92 AP-92 AP-93	AN0000305 (Conducted Testing) AN0000307 (Radiated Testing) AN0000330 (Radiated Testing)
Support	Laptop PC	IBM	Thinkpad	None

3.4. Antenna Details

Antenna Type	Manufacturer	Model	Gain (dBi / dBd)	Frequency Range (MHz)
Integral	Aruba Networks, Inc	Integral Antenna	5.8	4900 - 5875
External	Aruba Networks, Inc	AP-ANT-10	6	4900 - 5875
External	Aruba Networks, Inc	AP-ANT-12	14	4900 - 5875

3.5. Cabling and I/O Ports

Number and type of I/O ports

Description	Type	Length	Additional Information
ENET	RJ-45 Ethernet Port	Greater than 10m	Ethernet connection; Only non-shielded CAT-5 cable was used during testing. Port not connected to public utility/telecommunication network.
CONSOLE	RJ-45 Serial Port	Greater than 10m	For EUT setup only, not connected during typical EUT operation; Only non-shielded CAT-5 cable was used during testing.
DC Power	DC Power Port	Less than 3m	AC adaptor with attached DC cable supplied with EUT
AC Power	AC Adaptor	Less than 3m	AC adaptor and mains cable supplied with EUT

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,n	Legacy	6 MBit/s	5,180 5,200 5,240
	HT-20	6.5 MCS	
	HT-40	13.5 MCS	5,190 5,230

Antenna Test Configurations for Radiated Emissions and Band-Edge

The following measurements were performed on all antenna configurations identified in Section 3.4 Antenna Details.

Spurious Emission and Band-Edge Test Strategy

11a	11n HT-20	11n HT-40
SE 5180	SE 5180	SE 5190
SE 5200	SE 5200	
SE 5240	SE 5240	SE 5230
BE 5150	BE 5150	BE 5150
Pk 5180	Pk 5180	Pk 5190
Pk 5200	Pk 5200	
Pk 5240	Pk 5240	Pk 5230

KEY:-

SE – Spurious Emissions

BE – Band-Edge

PK - Peak Emission

3.7. Equipment Modifications

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

EUT Software Power Settings

The following tables were generated identifying the reduction in power required bringing the EUT into compliance for both conducted and radiated test limits. These tables take account of;

Conducted Testing - Reduction in output power required to meet the Peak Power Spectral Density EIRP limits, ART power = 14 for all configurations.

Radiated Testing - Reduction in output power to meet band-edge and emission requirements was required in certain circumstances.

5150 – 5250 MHz Integral Antenna (5.8 dBi)

	Channel Freq (MHz)	Nominal ART Power	Passing ART Power	Tx 1 Measured Pwr (dBm)	Tx 2 Measured Pwr (dBm)	Aggregate Measured Pwr (dBm)
11a	5180	20	14	16.31	15.91	19.16
	5200	20	14	15.00	14.93	17.59
	5240	20	14	15.57	15.1	17.32
HT-20	5180	20	14	16.05	15.97	19.24
	5200	20	14	14.91	14.95	16.97
	5240	20	14	14.25	15.11	18.06
HT-40	5190	20	12	12.27	13.32	15.86
	5230	20	14	14.36	14.90	17.96

5150 – 5250 MHz Antenna AP-ANT-10 (6 dBi) Omni-directional antenna

	Channel Freq (MHz)	Nominal ART Power	Passing ART Power	Tx 1 Measured Pwr (dBm)	Tx 2 Measured Pwr (dBm)	Aggregate Measured Pwr (dBm)
11a	5180	20	12	13.88	13.99	17.12
	5200	20	14	15.00	14.93	17.59
	5240	20	14	15.57	15.1	17.32
HT-20	5180	20	12	13.93	14.08	17.20
	5200	20	14	14.91	14.95	16.97
	5240	20	14	14.25	15.11	18.06
HT-40	5190	20	7.5	6.42	8.21	10.12
	5230	20	14	14.36	14.90	17.96

5150 – 5250 MHz Antenna AP-ANT-12 (14 dBi) Directional antenna

	Channel Freq (MHz)	Nominal ART Power	Passing ART Power	Tx 1 Measured Pwr (dBm)	Tx 2 Measured Pwr (dBm)	Aggregate Measured Pwr (dBm)
11a	5180	20	7	7.84	8.99	11.67
	5200	20	8	8.26	8.88	10.19
	5240	20	8	7.51	8.31	10.28
HT-20	5180	20	7	8.1	8.97	11.66
	5200	20	8	8.62	8.97	10.46
	5240	20	8	7.45	8.28	10.3
HT-40	5190	20	6	3.63	5.98	7.68
	5230	20	8	7.96	7.8	10.99

Note: Maximum conducted power for use with 14 dBi antenna is 9dBm per antenna chain.

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(a) **A9.2(2)** **4.4**	26dB and 99% Emission BW	Emission bandwidth measurement	Conducted	Complies	5.1.1
15.407(a) **A9.2(2)** **4.6**	Transmit Output Power	Power Measurement	Conducted	Complies	5.1.2
15.407(a) **A9.2(2)**	Peak Power Spectral Density	PPSD	Conducted	Complies	5.1.3
15.407(a)(6)	Peak Excursion Ratio	<13dB in any 1MHz bandwidth	Conducted	Complies	5.1.4
15.407(g) **15.31** **2.1** **4.5**	Frequency Stability	Limits: contained within band of operation at all times.	Applicant declaration	Complies	5.1.5
15.407(f) **5.5**	Radio Frequency Radiation Exposure	Exposure to radio frequency energy levels, Maximum Permissible Exposure (MPE)	Conducted	Complies	5.1.6

List of Measurements (continued)

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		5.1.7
	Transmitter Radiated Spurious Emissions	Emissions above 1 GHz		Complies	*5.1.7.1*
	Radiated Band Edge	Band edge results		Complies	*5.1.7.1*
Industry Canada only **RSS-Gen §4.10, §6**	Receiver Radiated Spurious Emissions	Emissions above 1 GHz		Complies	*5.1.7.2*
15.407(b)(6) **15.205(a)** **15.209(a)** **2.2**	Radiated Emissions	Emissions <1 GHz (30M-1 GHz)		Complies	*5.1.7.3*
15.407(b)(6) **15.207** **7.2.2**	AC Wireline Conducted Emissions 150 kHz–30 MHz	Conducted Emissions	Conducted	Complies	5.1.8

5. TEST RESULTS

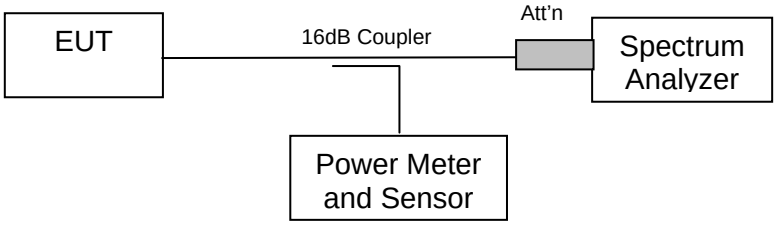
5.1. Device Characteristics

5.1.1. 26 dB and 99 % Bandwidth

FCC, Part 15 Subpart C §15.407(a)
Industry Canada RSS-210 § A9.2(2)
Industry Canada RSS-Gen 4.4

Test Procedure
The bandwidth at 26 dB and 99 % is measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate center frequency.

Test Measurement Set up



Measurement set up for 26 dB and 99 % bandwidth test

Radio Parameters
Duty Cycle: 100%
Output: Modulated Carrier
Power: Maximum Default Power

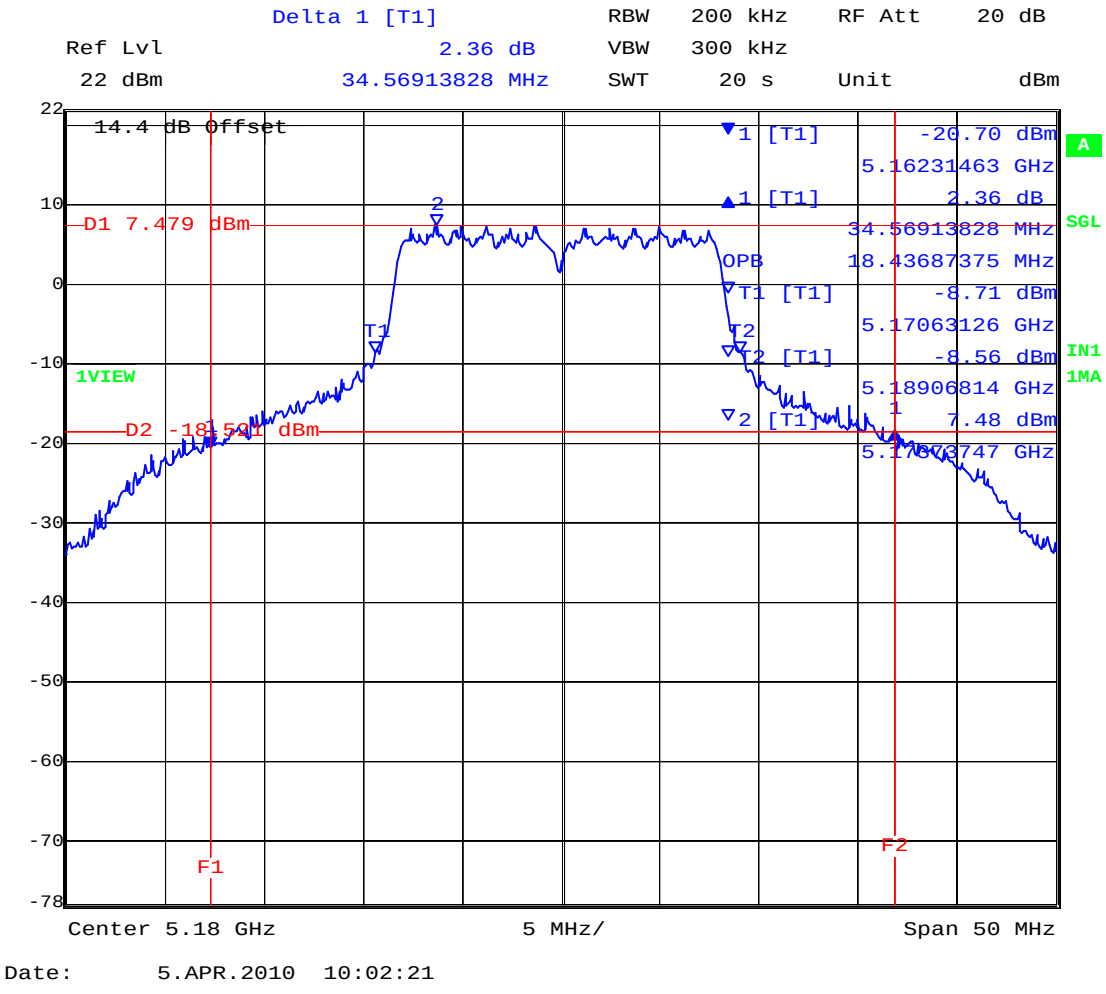
Measurement Results for 26 dB and 99 % Operational Bandwidth(s)

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

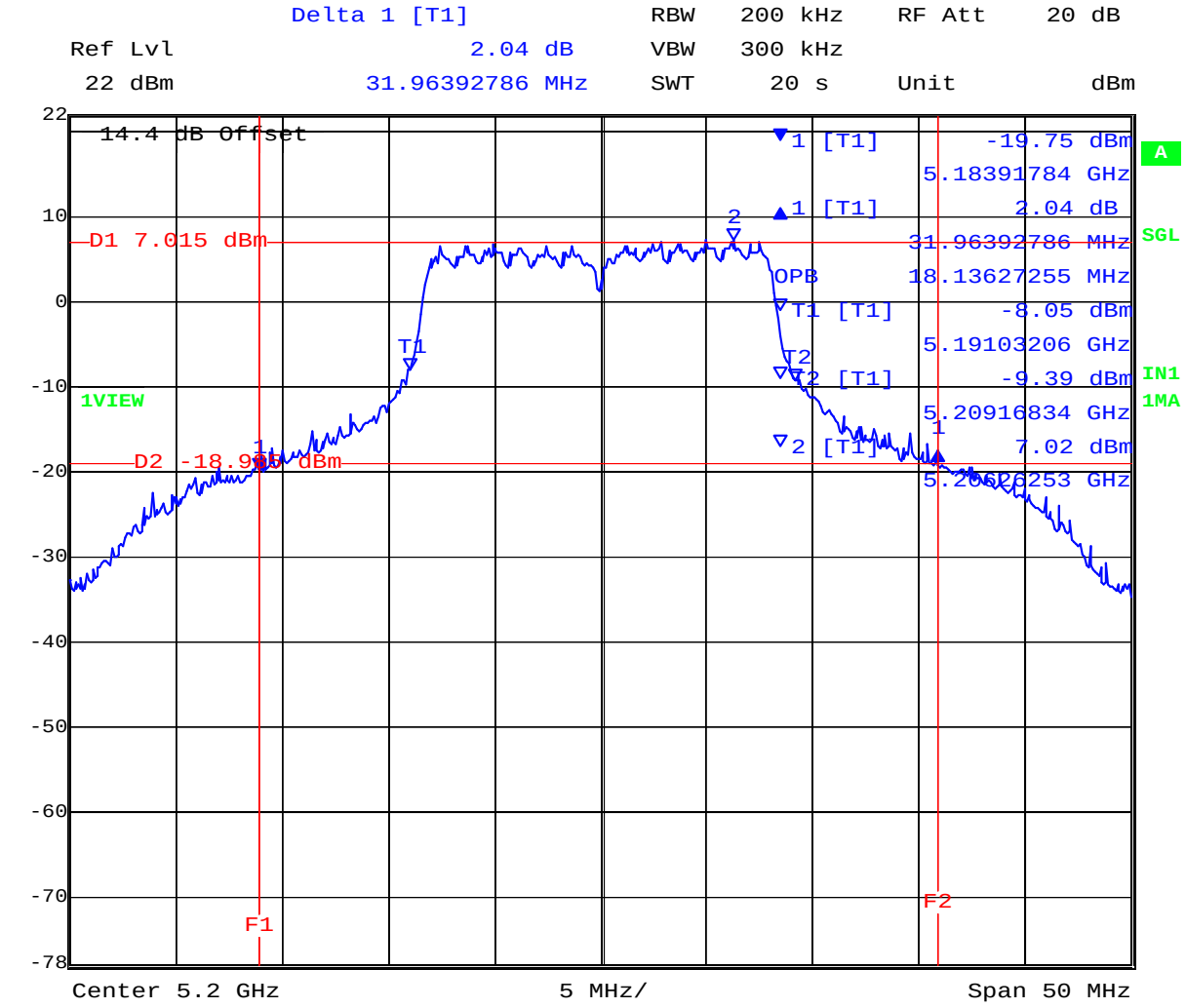
TABLE OF RESULTS – **802.11a Legacy**

Center Frequency (MHz)	26 dB Bandwidth (MHz)	99 % BW (MHz)
5,180	34.569	18.437
5,200	31.964	18.136
5,240	30.862	17.735

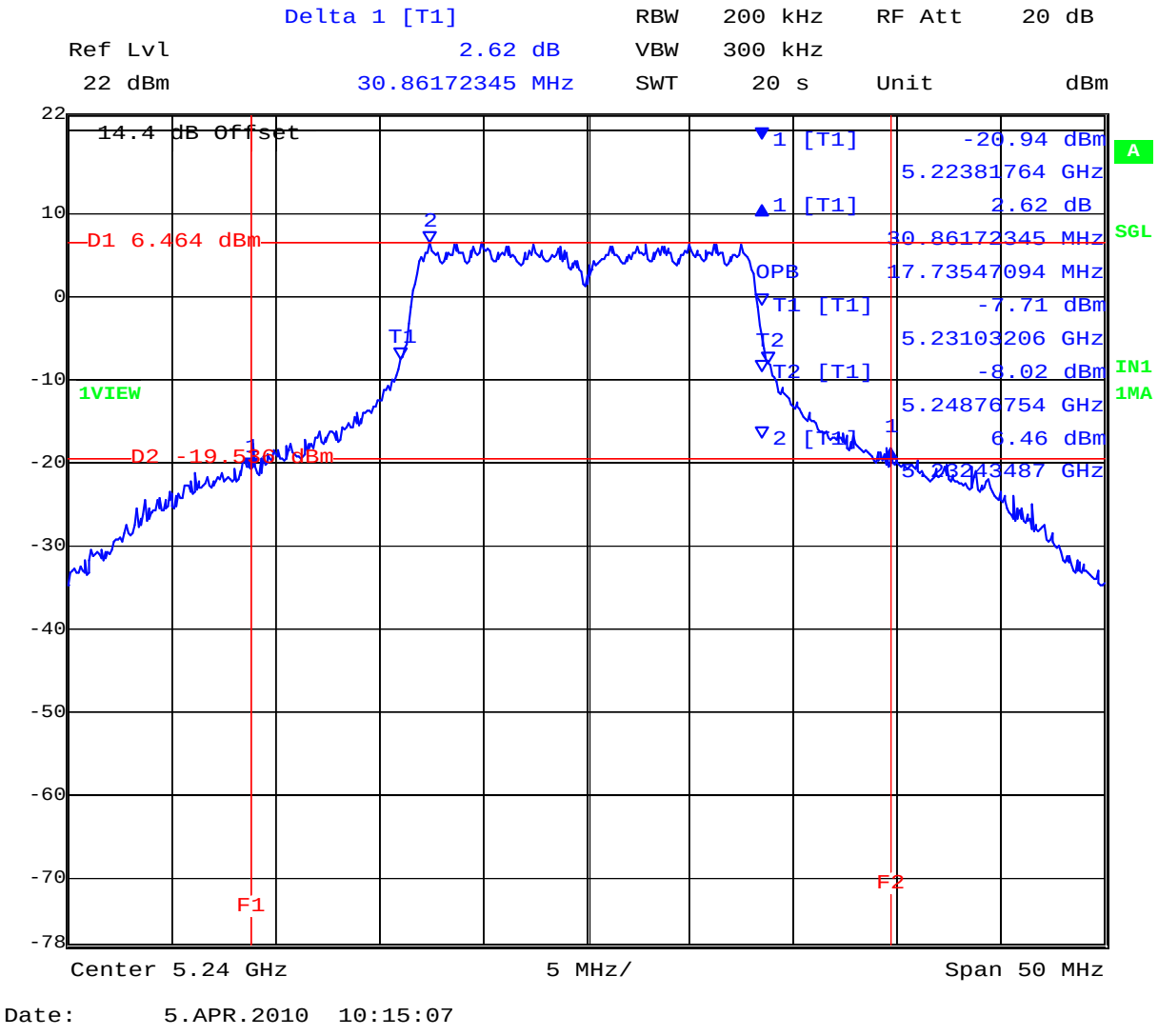
5,180 MHz 802.11a Legacy 26 dB and 99 % Bandwidth



5,200 MHz 802.11a Legacy 26 dB and 99 % Bandwidth



5,240 MHz 802.11a Legacy 26 dB and 99 % Bandwidth

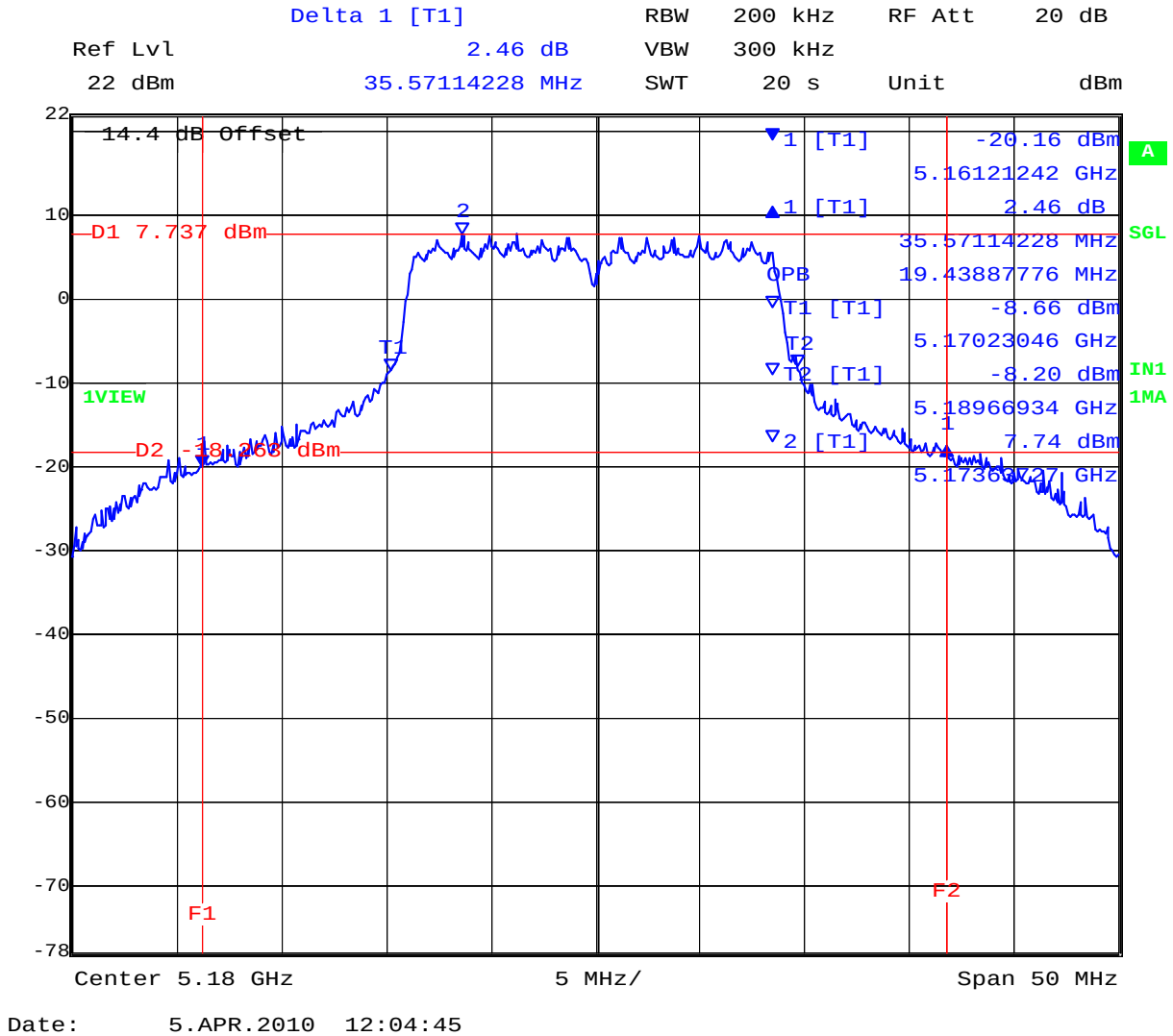


Measurement Results for 26 dB and 99 % Operational Bandwidth(s) -Continue

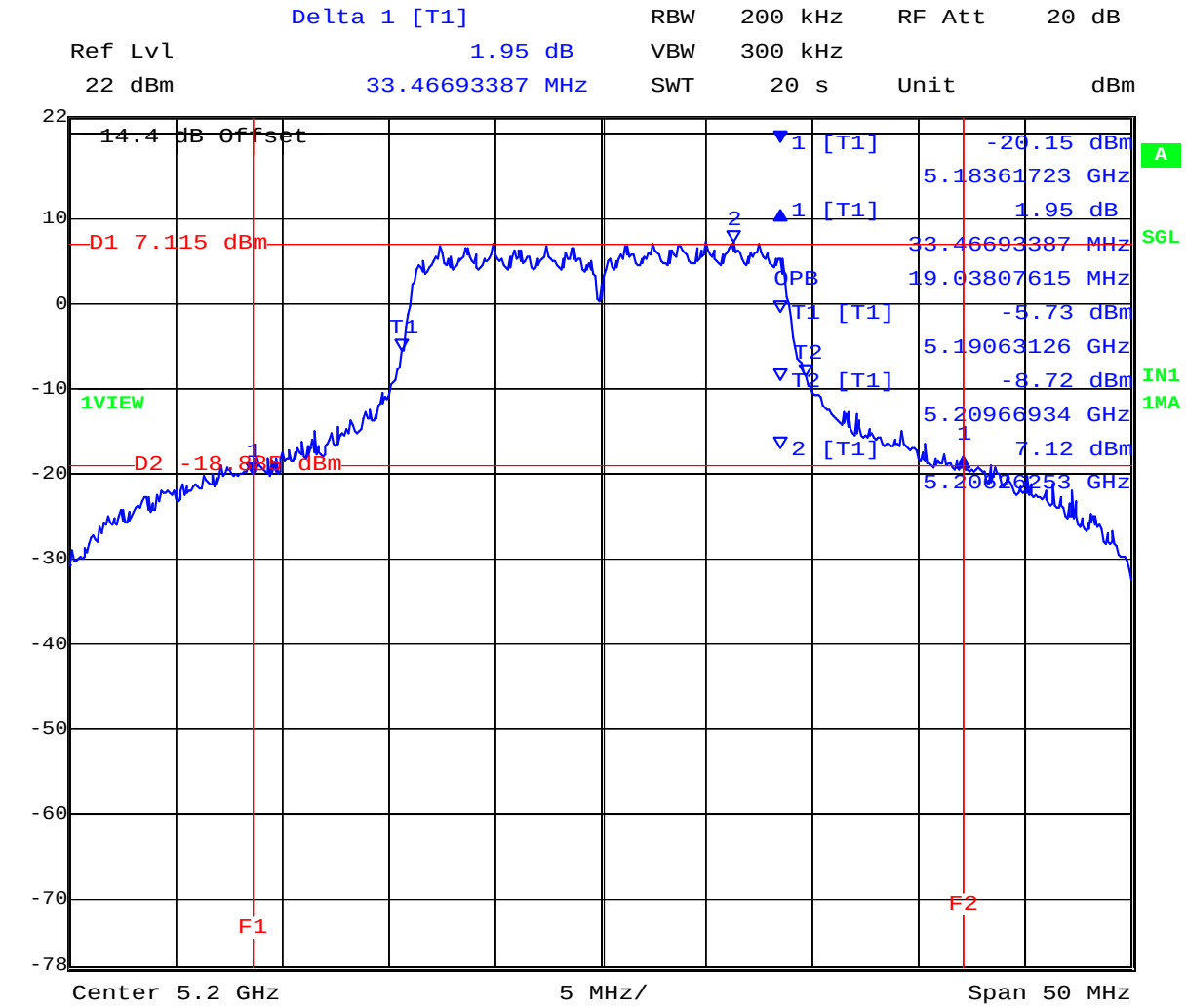
TABLE OF RESULTS – **802.11n HT20**

Center Frequency (MHz)	26 dB Bandwidth (MHz)	99 % BW (MHz)
5,180	35.571	19.439
5,200	33.467	19.038
5,240	31.363	18.838

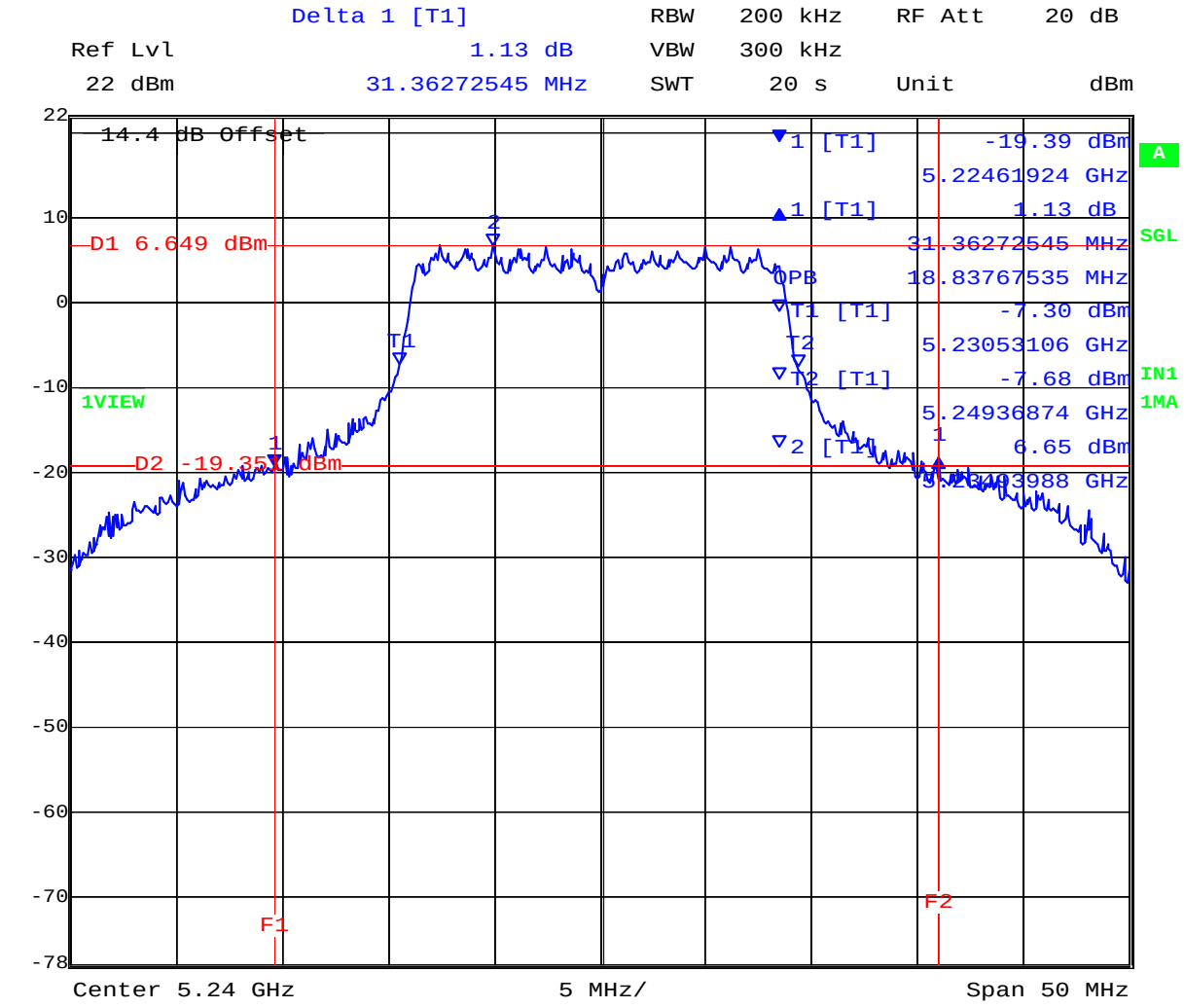
5,180 MHz 802.11n HT20 26 dB and 99 % Bandwidth



5,200 MHz 802.11n HT20 26 dB and 99 % Bandwidth



5,240 MHz 802.11n HT20 26 dB and 99 % Bandwidth

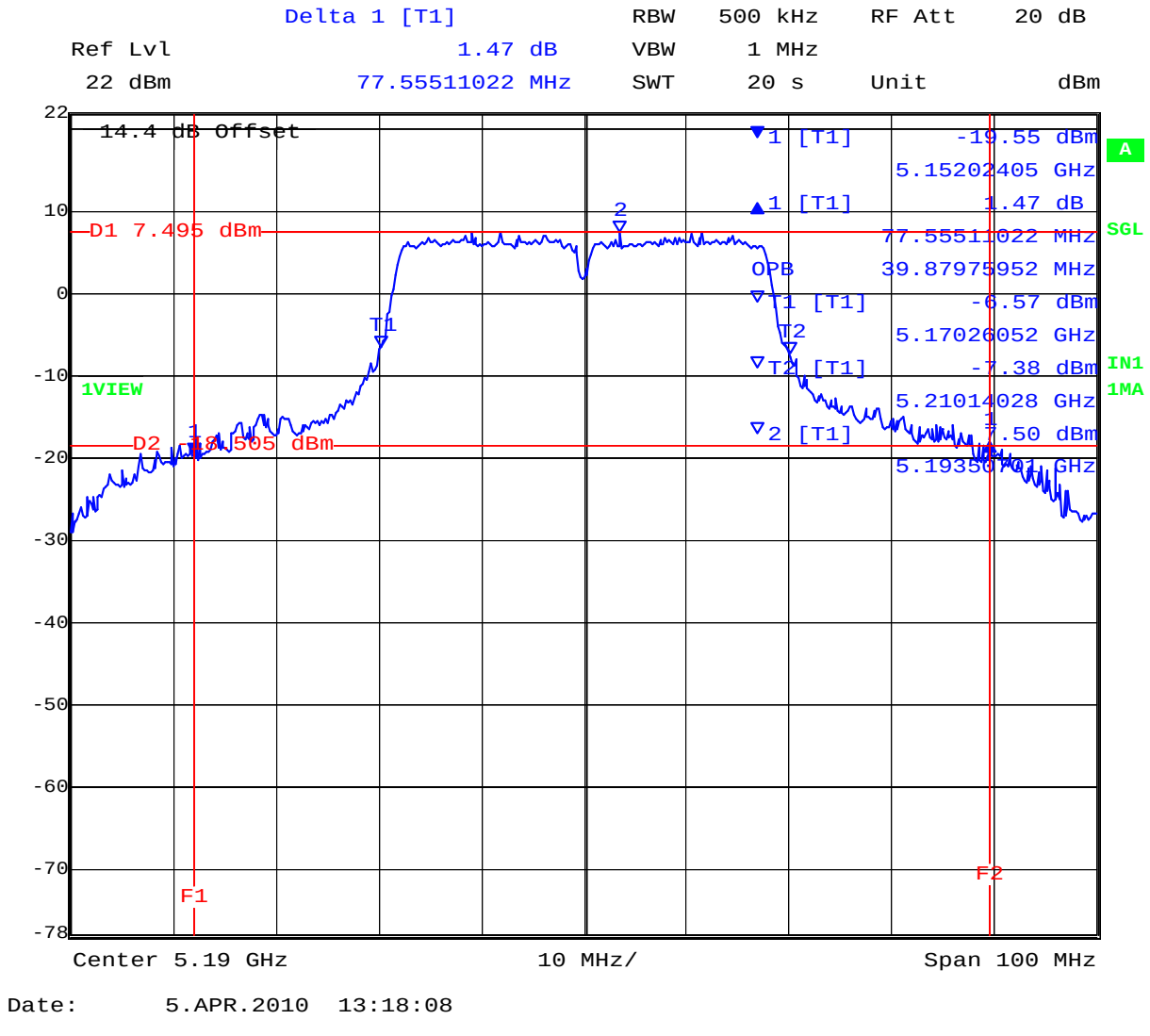


Measurement Results for 26 dB and 99 % Operational Bandwidth(s) -Continued

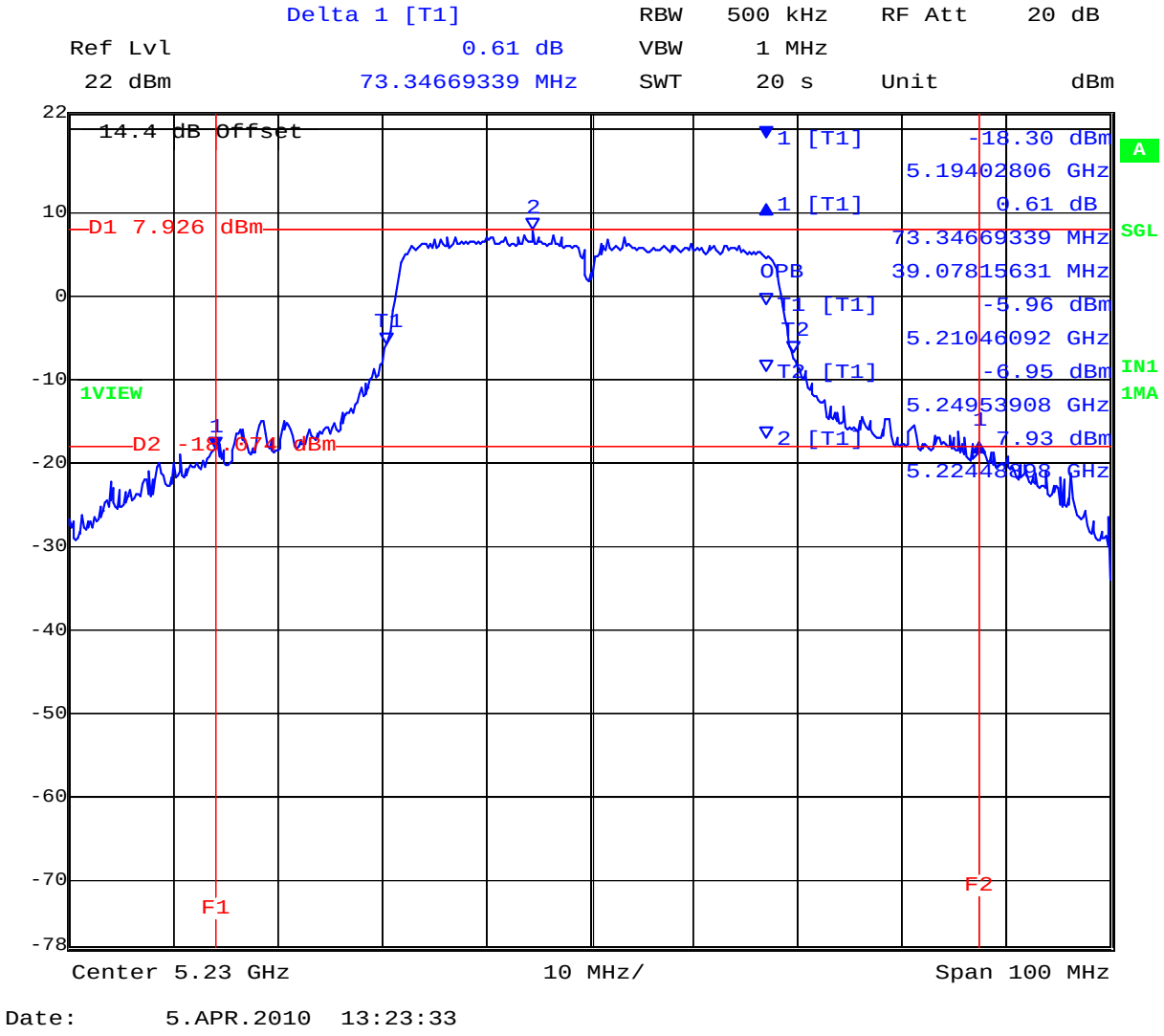
TABLE OF RESULTS – **802.11n HT40**

Center Frequency (MHz)	26 dB Bandwidth (MHz)	99 % BW (MHz)
5,190	77.555	39.880
5,230	73.347	39.078

5,190 MHz 802.11n HT40 26 dB and 99 % Bandwidth



5,230 MHz 802.11n HT40 26 dB and 99 % Bandwidth



Specification

Limits

FCC, Part 15 §15.407 (a)(1), (a)(2) and Industry Canada RSS-210 § A9.2(2)

(a)(1) For the band 5.15-5.25 GHz the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or +4 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the peak power spectral density shall not exceed +4 dBm in any 1 megahertz band.

(a)(2) For the 5.25-5.35 GHz band the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or +11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the peak power spectral density shall not exceed +11 dBm in any 1 megahertz band.

Industry Canada RSS-Gen 4.4

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.

Laboratory Measurement Uncertainty for Spectrum Measurement

Measurement uncertainty	±2.81 dB

Traceability

Method	Test Equipment Used
Measurements were made per work instruction WI-03 'Measurement of RF Spectrum Mask'	0158, 0287, 0252, 0313, 0314, 0070, 0116, 0117

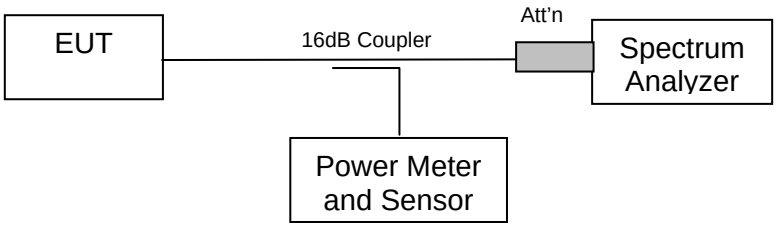
5.1.2. Transmit Output Power

FCC, Part 15 Subpart C §15.407(a)
Industry Canada RSS-210 §9.9(2)
Industry Canada RSS-Gen 4.6

Test Procedure

The transmitter terminal of EUT was connected to the input of an average power meter. Measurements were made while EUT was operating in a continuous transmission mode i.e. 100 % duty cycle at the appropriate center frequency. All cable losses and offsets were taken into consideration in the measured result.

Test Measurement Set up



Measurement set up for Transmitter Output Power

Maximum Transmit Power, FCC Limits

Limit 5150 – 5250 MHz: Lesser of 50 mW (+17dBm) or 4 + 10 Log (B) dBm

Mode	Frequency Range (MHz)	Maximum 26 dB Bandwidth (MHz)	4 + 10 Log (B) (dBm)	Limit (dBm)
a	5150 – 5250	34.569	19.39	+17.00
HT-20		35.571	19.51	+17.00
HT-40		77.555	22.90	+17.00

Maximum Conducted Power Industry Canada Limits

Limit 5150 – 5250 MHz: Lesser of 200 mW (+23 dBm) or 10 + 10 Log (B) dBm

Mode	Frequency Range (MHz)	Maximum 99% Bandwidth (MHz)	10 + 10 Log (B) (dBm)	EIRP Limit (dBm)
a	5150 – 5250	18.437	22.66	+23.00
HT-20		19.439	22.89	+23.00
HT-40		39.880	26.01	+23.00

Measurement Results for Transmit Output Power
Ambient conditions.
Temperature: 17 to 23 °C Relative humidity: 31 to 57 % Pressure: 999 to 1012 mbar

EUT parameters.
Power Level: Maximum
Duty Cycle: 100%
Temperature: Ambient

TABLE OF RESULTS – **802.11a Legacy**

Center Frequency (MHz)	Maximum Conducted Power (dBm)
5,180	+16.95
5,200	+16.07
5,240	+16.12

TABLE OF RESULTS – **802.11n HT20**

Center Frequency (MHz)	Maximum Conducted Power (dBm)
5,180	+16.88
5,200	+16.20
5,240	+16.04

TABLE OF RESULTS – **802.11n HT40**

Center Frequency (MHz)	Maximum Conducted Power (dBm)
5,190	+16.99
5,230	+16.78

Maximum Permissible Power V's Antenna Gain

Operational Mode	Antenna	Antenna Gain	Maximum Conducted Power (dBm)	Maximum EIRP (dBm)
a	Integral	5.8	+16.95	+22.75
	AP-ANT-10	6.0	+16.95	+22.95
	AP-ANT-12	14.0	+8.95	+22.95
	AP-ANT-13B	3.3	+16.95	+20.25
HT-20	Integral	5.8	+16.88	+22.68
	AP-ANT-10	6.0	+16.88	+22.88
	AP-ANT-12	14.0	+8.88	+22.88
	AP-ANT-13B	3.3	+16.88	+20.18
HT-40	Integral	5.8	+16.99	+22.79
	AP-ANT-10	6.0	+16.99	+22.99
	AP-ANT-12	14.0	+8.99	+22.99
	AP-ANT-13B	3.3	+16.99	+20.29

Output Power V's Software Setting

The AP-92 output power was exercised over the entire software range. The test software driving the AP-92 was driven by the Atheros test suit "ART". The ART setting was varied 1 dB over the entire range. Measurements were compiled for Antenna Port 1, Antenna Port 2 and combined power (Antenna 1 + Antenna 2)

802.11 a Legacy

802.11a (Legacy) Channel 5180 MHz

Configuration	ART Power Setting	Tx 1 Measured Pwr (dBm)	Tx 2 Measured Pwr (dBm)	Aggregate Measured Pwr (dBm)
a	0	-11.62	-11.68	-5.41
	1	-10.99	-11.5	-5.62
	2	-19.39	-2.7	-8.63
	3	-3.67	2.03	2.80
	4	1.78	4.72	6.08
	5	3.47	6.19	8.44
	6	6.39	7.75	10.14
	7	7.84	9.04	11.67
	8	9.62	10.09	13.01
	9	11.13	11.03	13.72
	10	10.52	11.79	15.17
	11	12.2	12.73	16.19
	12	13.88	13.99	17.12
	13	14.92	15.13	18.16
	14	16.31	15.91	19.16
	14.5	16.64	16.28	19.57
	15	16.95	16.64	20.01

802.11a (Legacy) Channel 5200 MHz

Configuration	ART Power Setting	Tx 1 Measured Pwr (dBm)	Tx 2 Measured Pwr (dBm)	Aggregate Measured Pwr (dBm)
a	0	-9.92	-10.57	-4.73
	1	-9.91	-10.68	-4.78
	2	-10.09	-10.85	-4.96
	3	-18.26	-4.51	-24.26
	4	-1.09	0.92	1.83
	5	2.86	3.62	4.79
	6	4.83	5.38	6.86
	7	6.59	7.33	8.44
	8	8.26	8.88	10.19
	9	10.00	9.82	11.56
	10	10.98	10.63	12.52
	11	11.83	11.69	14.27
	12	12.61	12.66	14.52
	13	14.04	13.91	15.72
	14	15.00	14.93	17.59
	15	16.07	15.64	17.8

802.11a (Legacy) Channel 5240 MHz

Configuration	ART Power Setting	Tx 1 Measured Pwr (dBm)	Tx 2 Measured Pwr (dBm)	Aggregate Measured Pwr (dBm)
a	0	-10.3	-10.84	-4.78
	1	-9.92	-10.59	-4.66
	2	-9.8	-10.57	-4.64
	3	-24.47	-21.89	-11.69
	4	-0.12	-0.66	0.76
	5	3.43	2.7	4.61
	6	5.41	4.78	6.84
	7	6.76	6.87	9.53
	8	7.51	8.31	10.28
	9	9.97	9.66	12.37
	10	10.3	10.82	12.87
	11	11.52	11.68	13.79
	12	13.05	13.02	14.92
	13	14.49	14.2	16.16
	14	15.57	15.1	17.32
	15	15.94	16.12	18.09

802.11a HT-20

802.11 HT-20 Channel 5180 MHz

Configuration	ART Power Setting	Tx 1 Measured Pwr (dBm)	Tx 2 Measured Pwr (dBm)	Aggregate Measured Pwr (dBm)
HT-20	0	-10.12	-10.66	-4.68
	1	-10.18	-10.85	-5.07
	2	-2.68	-3.67	-10.29
	3	-2.61	1.88	2.56
	4	2.34	4.29	6.36
	5	4.72	6.29	8.60
	6	6.86	7.66	10.18
	7	8.00	9.26	11.66
	8	9.66	10.20	13.05
	9	11.08	11.04	14.22
	10	12.27	11.86	15.25
	11	13.32	12.76	16.26
	12	13.93	14.08	17.20
	13	15.02	15.15	18.36
	14	16.05	15.97	19.24
	14.5	16.47	16.27	19.33
	15	16.88	16.61	19.40

802.11 HT-20 Channel 5200 MHz

Configuration	ART Power Setting	Tx 1 Measured Pwr (dBm)	Tx 2 Measured Pwr (dBm)	Aggregate Measured Pwr (dBm)
HT-20	0	-9.46	-10.12	-4.35
	1	-9.65	-10.14	-4.33
	2	-9.76	-10.34	-4.54
	3	-12.55	-3.39	-4.76
	4	-0.99	1.28	3.10
	5	2.24	3.70	5.83
	6	4.23	5.62	6.77
	7	6.34	7.20	8.59
	8	8.62	8.97	10.46
	9	9.93	9.86	12.71
	10	10.77	10.75	13.65
	11	11.65	11.58	14.60
	12	12.57	12.86	15.56
	13	13.69	14.07	16.60
	14	14.91	14.95	16.97
	15	16.20	15.74	18.64

802.11 HT-20 Channel 5240 MHz

Configuration	ART Power Setting	Tx 1 Measured Pwr (dBm)	Tx 2 Measured Pwr (dBm)	Aggregate Measured Pwr (dBm)
HT-20	0	-9.82	-10.46	-4.56
	1	-9.87	-10.57	-4.81
	2	-9.81	-10.24	-4.49
	3	-13.03	-11.93	-6.25
	4	-1.39	-1.22	1.83
	5	2.09	2.73	5.63
	6	3.88	4.77	7.47
	7	5.65	6.97	9.48
	8	7.45	8.28	10.30
	9	10.08	9.66	12.49
	10	10.00	10.76	12.80
	11	12.12	11.69	13.77
	12	13.17	12.96	15.56
	13	13.17	14.21	16.95
	14	14.25	15.11	18.06
	15	15.10	16.04	18.78

802.11 HT-40 Channel 5190 MHz

Configuration	ART Power Setting	Tx 1 Measured Pwr (dBm)	Tx 2 Measured Pwr (dBm)	Aggregate Measured Pwr (dBm)
HT-40	0	-9.67	-10.18	-4.42
	1	-9.83	-10.46	-4.65
	2	-9.88	-10.88	-5.11
	3	-17.07	-3.39	-11.41
	4	-3.25	1.68	2.17
	5	0.95	4.21	5.83
	6	3.63	5.98	7.68
	7	5.00	7.48	9.40
	7.5	6.42	8.21	10.12
	8	7.71	8.94	10.85
	9	9.91	10.10	12.44
	10	11.28	10.81	13.77
	11	11.21	11.75	14.76
	12	12.27	13.32	15.86
	13	13.21	14.55	16.89
	14	14.62	15.37	18.18
	15	15.67	16.21	19.07
	16	16.40	16.99	19.78

802.11 HT-40 Channel 5230 MHz

Configuration	ART Power Setting	Tx 1 Measured Pwr (dBm)	Tx 2 Measured Pwr (dBm)	Aggregate Measured Pwr (dBm)
HT-40	0	-9.80	-10.50	-4.68
	1	-9.75	-10.46	-4.65
	2	-9.67	-10.19	-4.39
	3	-9.87	-10.43	-4.76
	4	-3.94	-4.23	-1.82
	5	1.21	1.05	4.30
	6	3.52	3.88	7.02
	7	5.50	5.89	8.93
	8	7.96	7.80	10.99
	9	8.87	9.53	12.42
	10	10.38	10.61	13.69
	11	11.10	11.45	14.49
	12	12.07	12.49	15.52
	13	13.37	13.80	16.76
	14	14.36	14.90	17.96
	15	15.54	15.87	18.88
	16	16.55	16.78	19.69

Specification

Limits

FCC, Part 15 §15.407 (a)(1), (a)(2) and Industry Canada RSS-210 § A9.2(2)

(a)(1) For the band 5.15-5.25 GHz the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or +4 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the peak power spectral density shall not exceed +4 dBm in any 1 megahertz band.

(a)(2) For the 5.25-5.35 and 5470-5725 MHz GHz band the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or +11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the peak power spectral density shall not exceed +11 dBm in any 1 megahertz band.

Industry Canada RSS-210 §A9.2(2)

For the band 5150-5250 MHz, the maximum equivalent isotropically radiated power (e.i.r.p.) shall not exceed 200 mW or 10 + 10 log10 B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

For the band 5250-5350 MHz and 5470-5725 MHz, the maximum conducted output power shall not exceed 250 mW or 11 + 10 log10 B, dBm, whichever power is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band. The maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log10 B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz.

Industry Canada RSS-Gen 4.4

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.

Laboratory Measurement Uncertainty for Power Measurements

Measurement uncertainty	±1.33 dB

Traceability

Method	Test Equipment Used
Measurements were made per work instruction WI-01 'Measuring RF Output Power'	0158, 0287, 0252, 0313, 0314, 0070, 0116, 0117

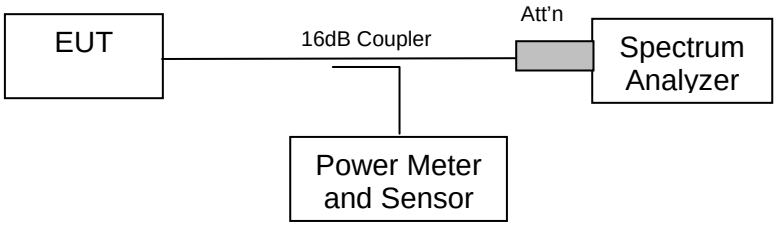
5.1.3. Peak Power Spectral Density

FCC, Part 15 Subpart C §15.407(a)
Industry Canada RSS-210 § A9.2(2)

Test Procedure

The transmitter output was connected to a spectrum analyzer and the peak power spectral density measured. Method 2 Sample Detection and power averaging, specified in FCC document DA 02-2138 (Normative Reference (ix) Section 2.1 "Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices") was used to determine the peak power spectral density of the emission. The Peak Power Spectral Density is the highest level found across the emission in a 1 MHz resolution bandwidth.

Test Measurement Set up



Measurement set up for Peak Power Spectral Density

Measurement Results for Peak Power Spectral Density

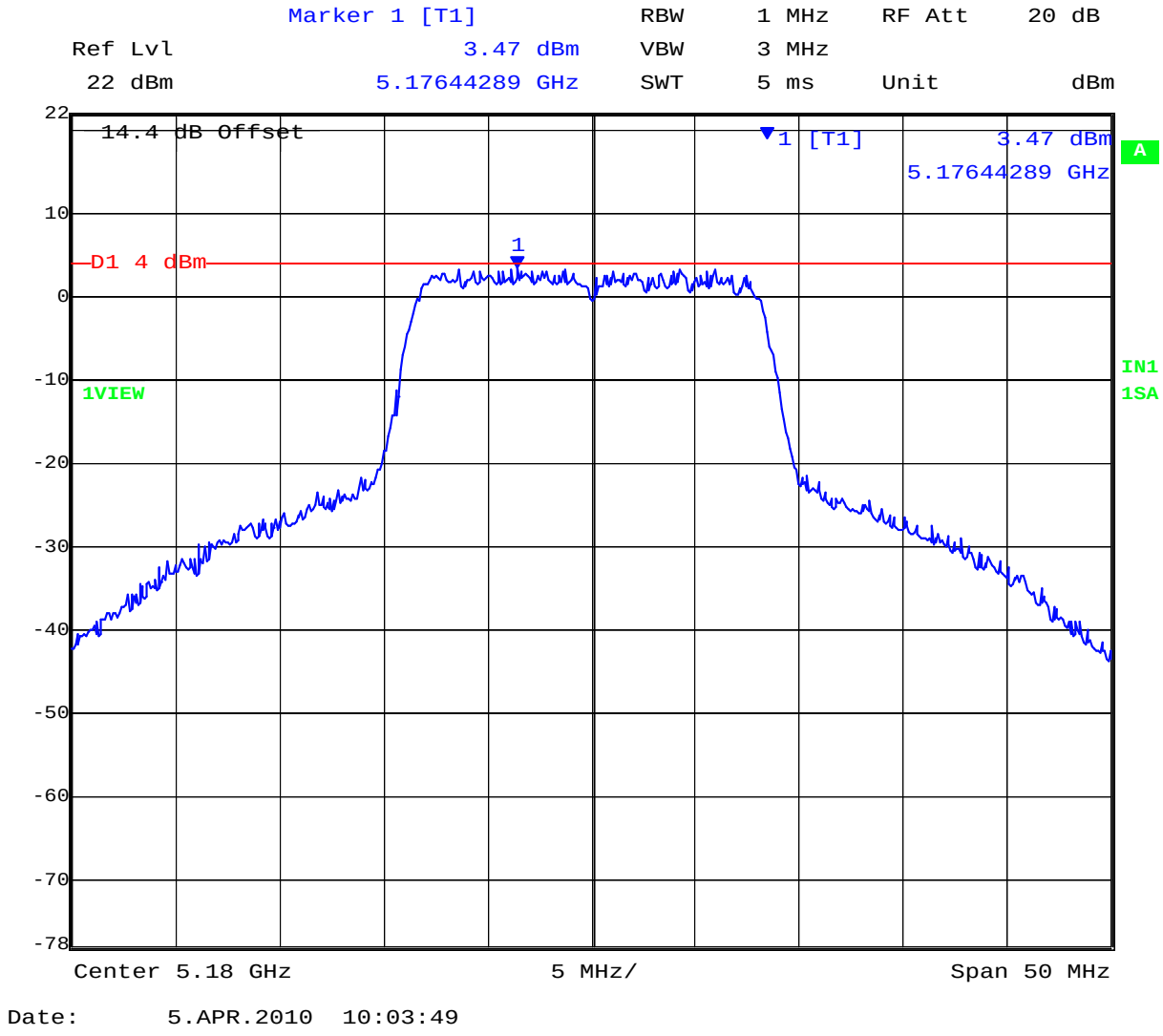
Ambient conditions.
Temperature: 17 to 23 °C Relative humidity: 31 to 57 % Pressure: 999 to 1012 mbar

Radio Parameters
Duty Cycle: 100%
Output: Modulated Carrier
Power: Maximum Default Power

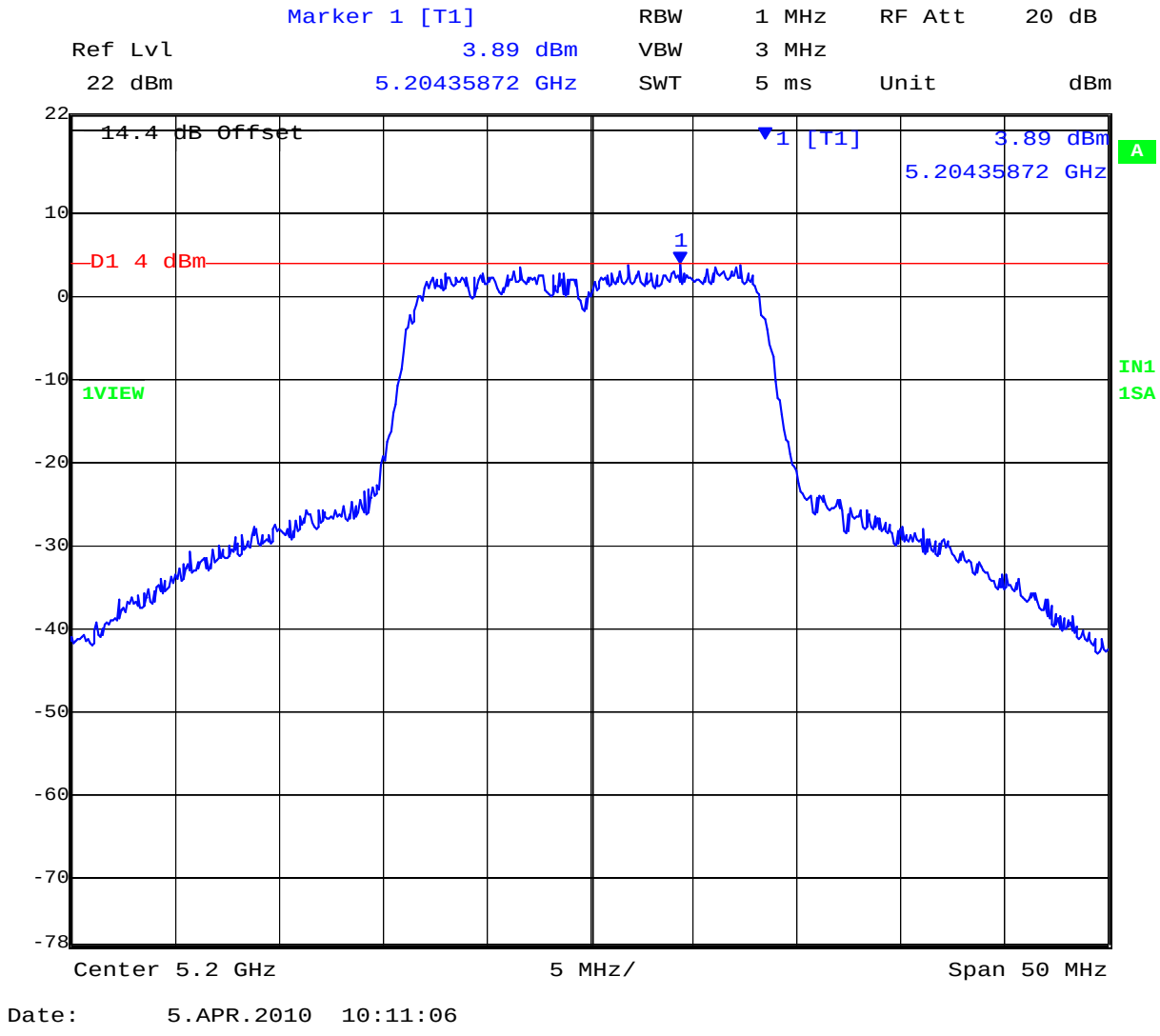
TABLE OF RESULTS – **802.11a Legacy**

Center Frequency (MHz)	Peak Frequency (MHz)	PPSD (dBm)
5,180	5176.44289	+3.47
5,200	5204.35872	+3.89
5,240	5246.06212	+2.84

5,180 MHz 802.11a Legacy Peak Power Spectral Density



5,200 MHz 802.11a Legacy Peak Power Spectral Density



5,240 MHz 802.11a Legacy Peak Power Spectral Density

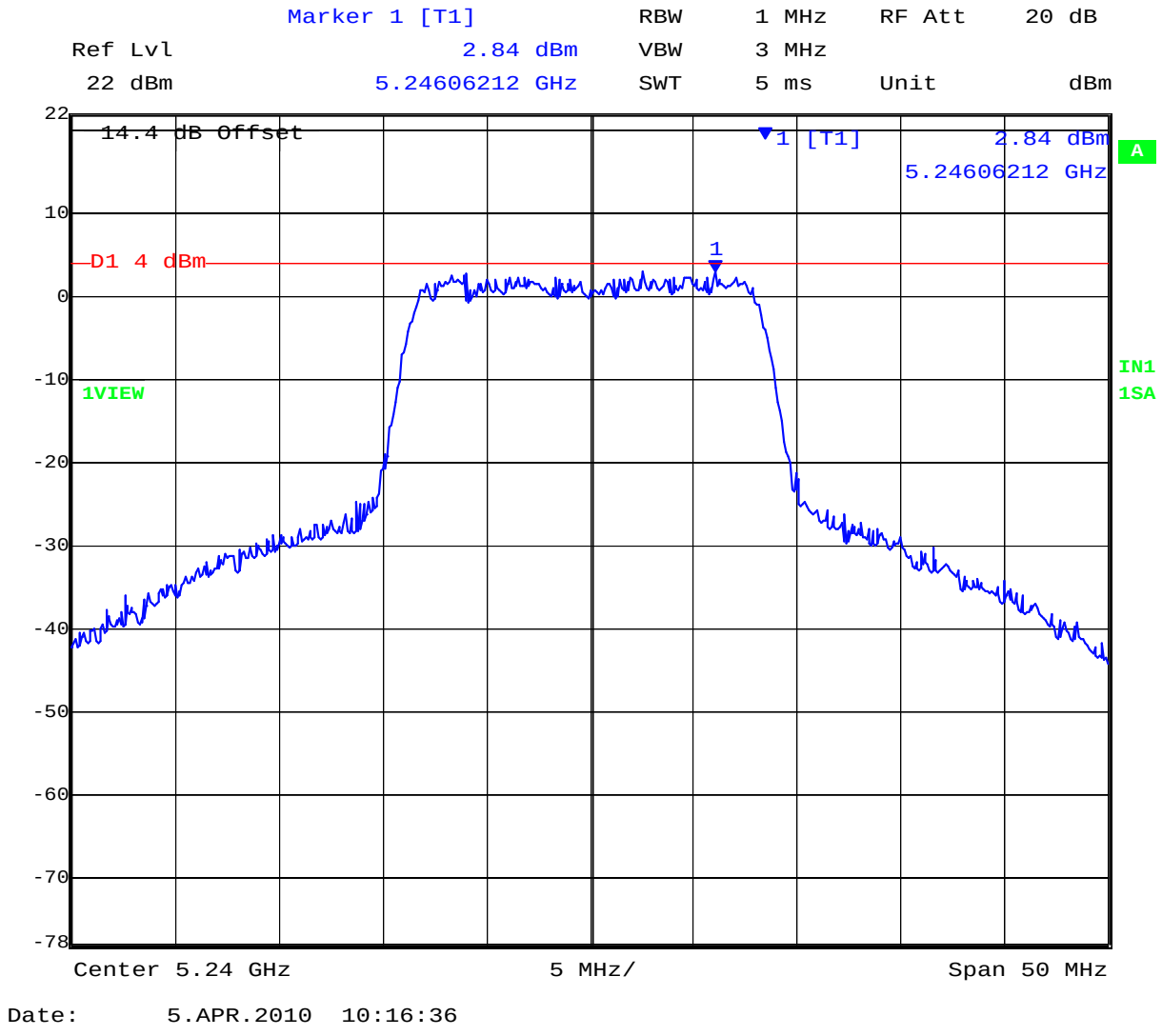
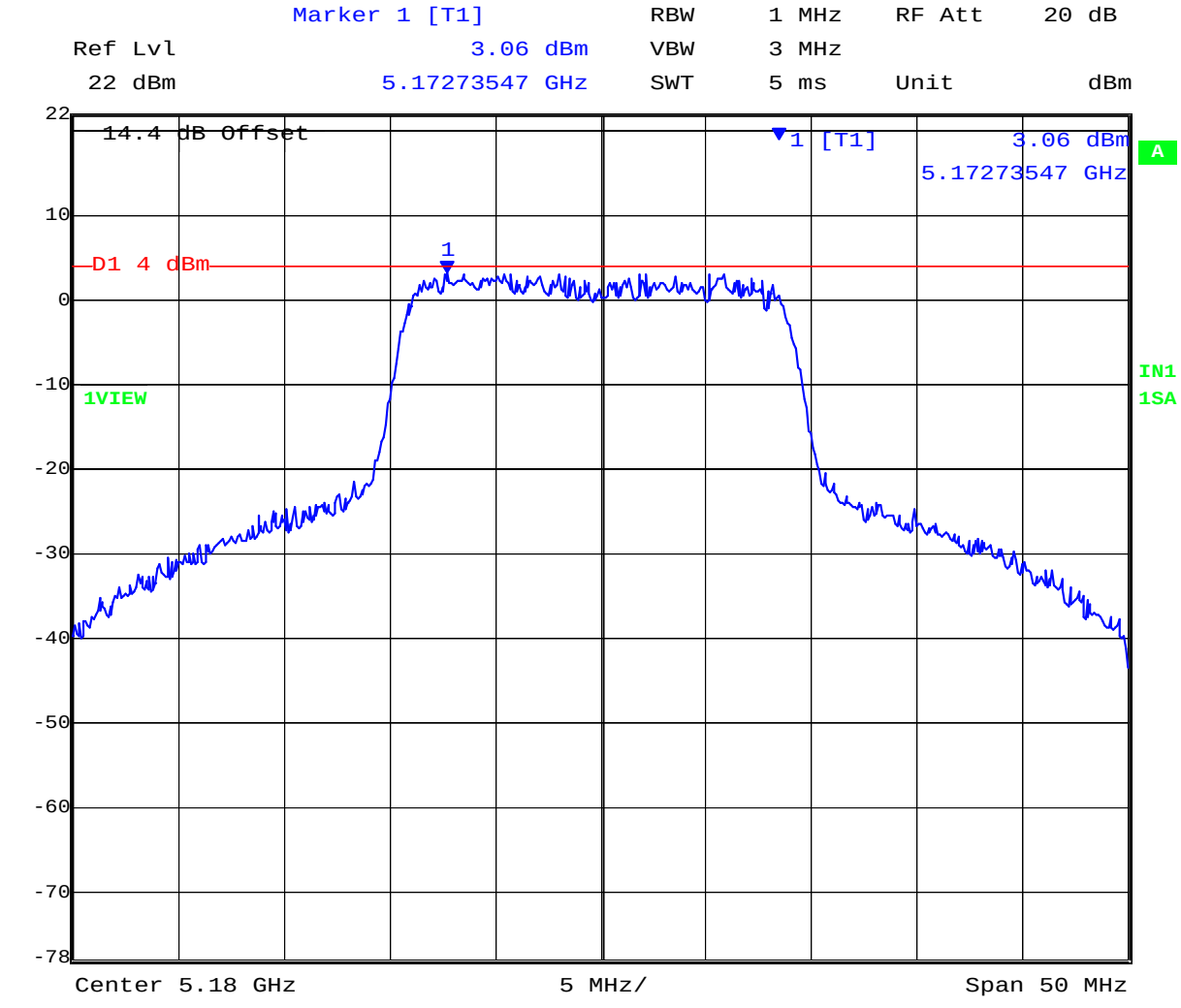


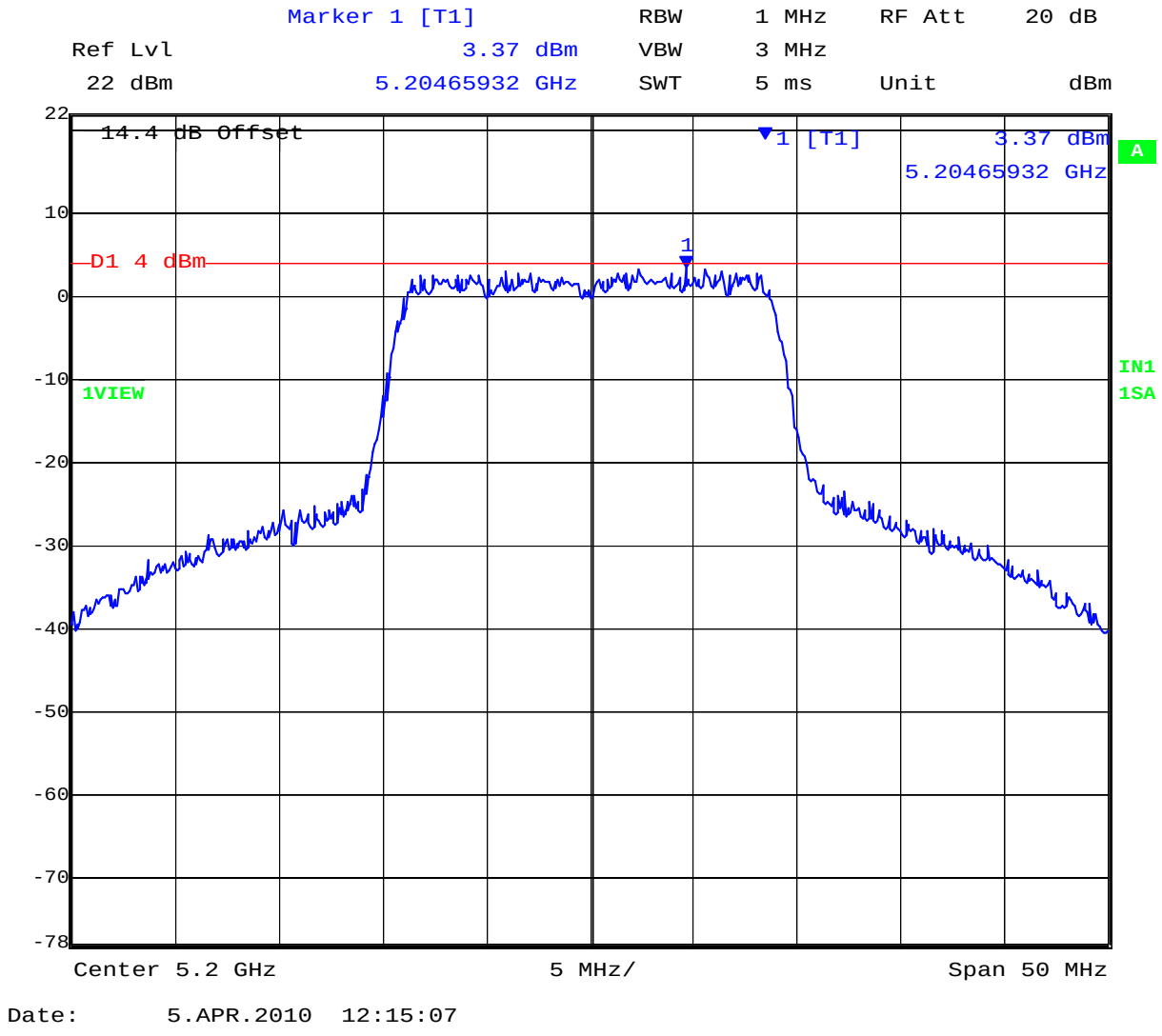
TABLE OF RESULTS – **802.11n HT20**

Center Frequency (MHz)	Peak Frequency (MHz)	PPSD (dBm)
5,180	5172.75547	+3.06
5,200	5204.65932	+3.37
5,240	5238.94790	+3.00

5,180 MHz 802.11n HT20 Peak Power Spectral Density



5,200 MHz 802.11n HT20 Peak Power Spectral Density



5,240 MHz 802.11n HT20 Peak Power Spectral Density

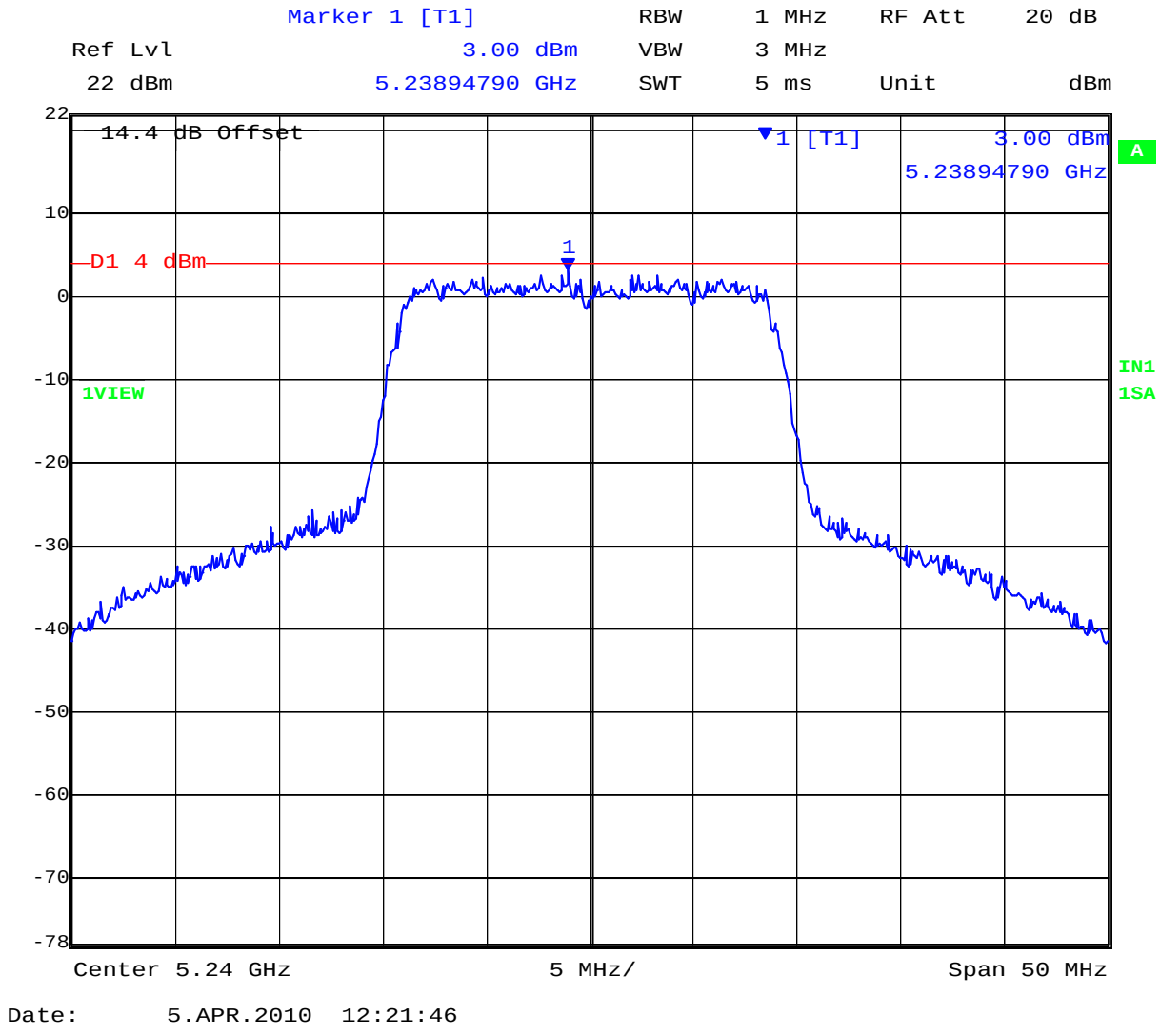
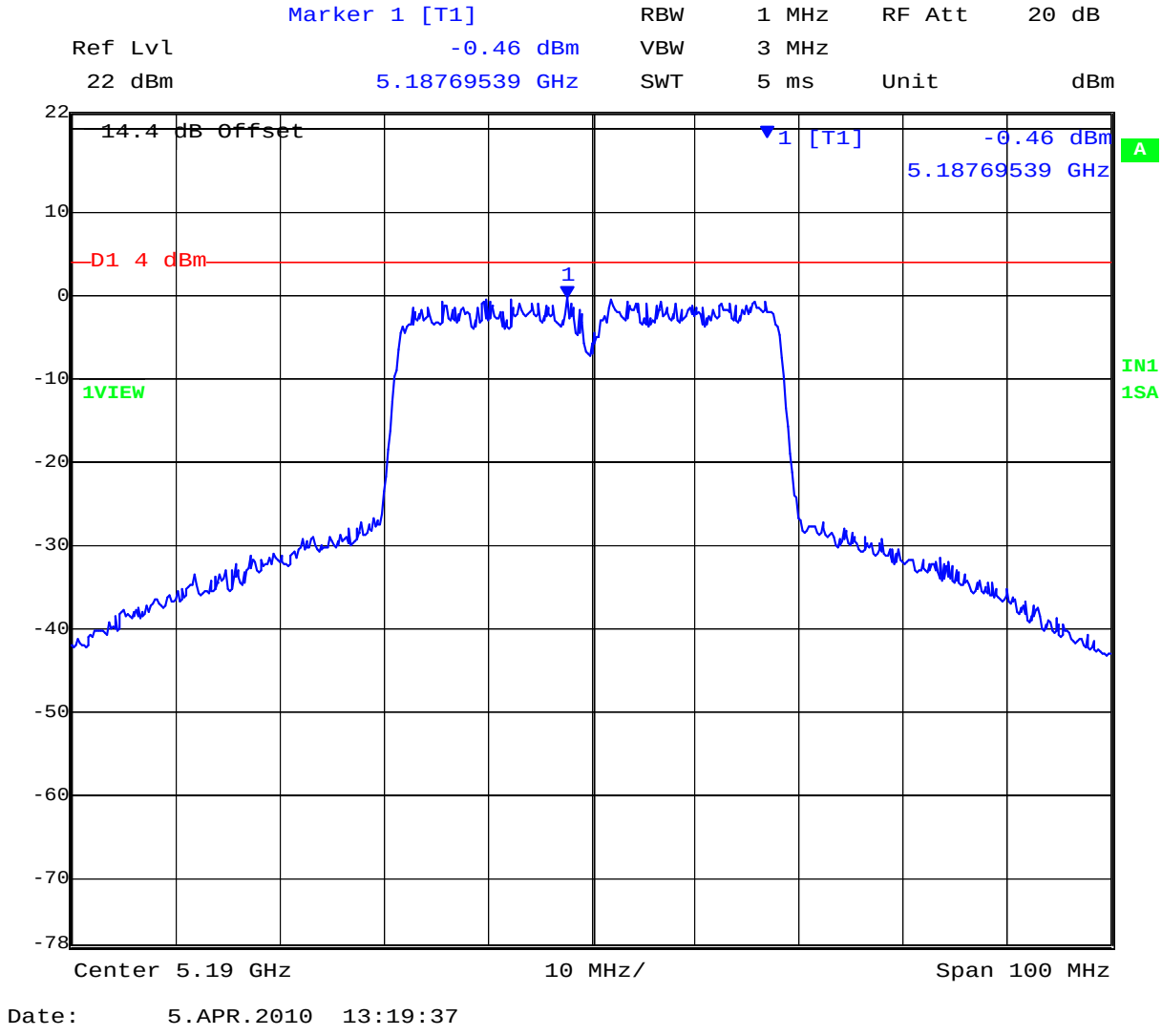


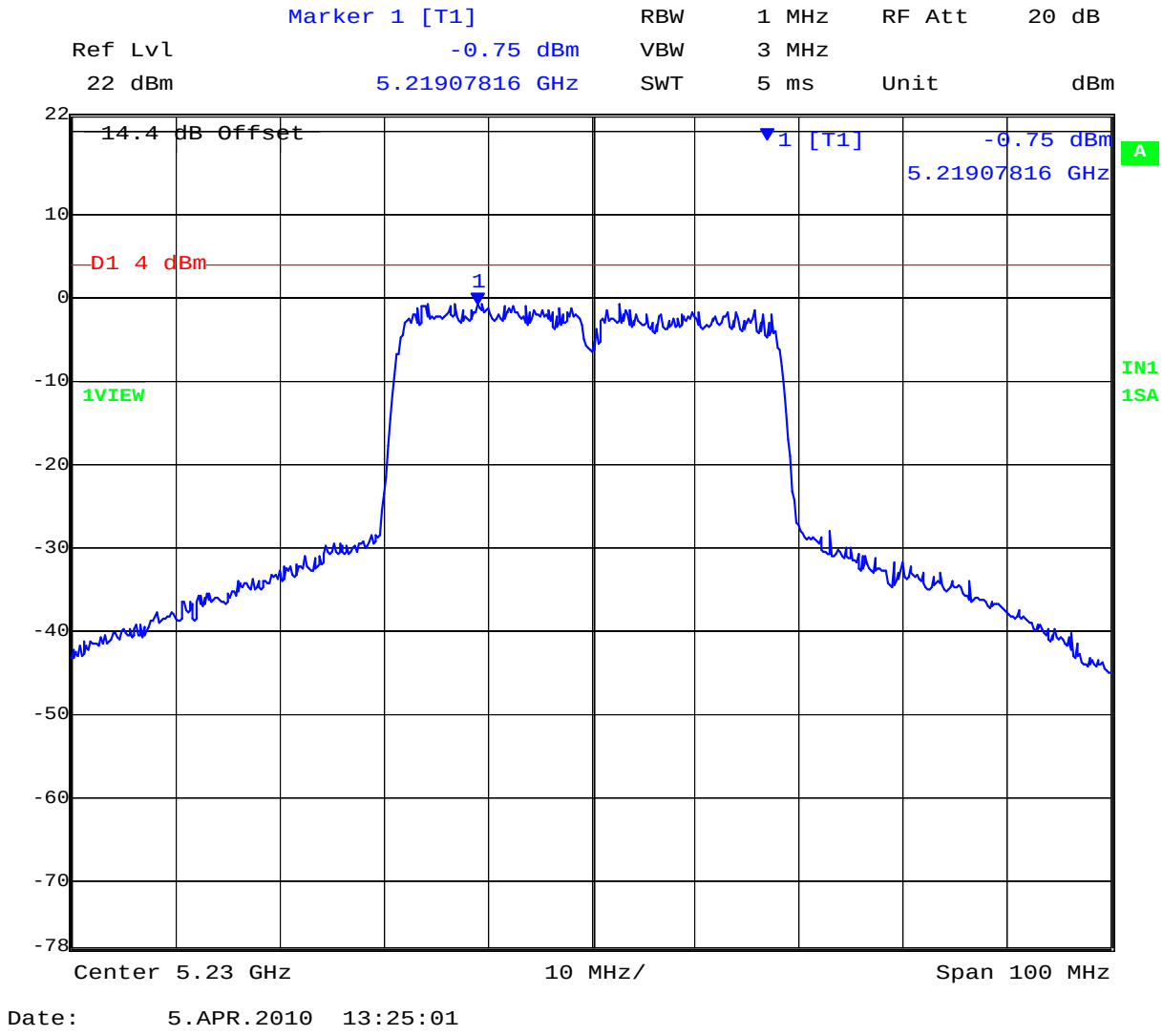
TABLE OF RESULTS – **802.11n HT40**

Center Frequency (MHz)	Peak Frequency (MHz)	PPSD (dBm)
5,190	5187.69539	-0.46
5,230	5219.07816	-0.75

5,190 MHz 802.11n HT40 Peak Power Spectral Density



5,230 MHz 802.11n HT40 Peak Power Spectral Density



Specification

FCC, Part 15 §15.407 (a)(1), (a)(2)
5150 – 5250 MHz
(a)(1) The peak power spectral density shall not exceed +4 dBm in any 1 megahertz band.

5250 – 5350 MHz & 5470 – 5725 MHz
(a)(2) The peak power spectral density shall not exceed +11 dBm in any 1 megahertz band.

Industry Canada RSS-210 § **A9.2(1), A9.2(2)**
5150 – 5250 MHz
§ **A9.2(1)** The eirp spectral density shall not exceed +10 dBm in any 1 MHz band

5250 – 5350 MHz & 5470 – 5725 MHz
§ **A9.2(2)** The power spectral density shall not exceed +11 dBm in any 1 MHz band

Laboratory Measurement Uncertainty for Spectral Density

Measurement uncertainty	±1.33 dB

Traceability

Method	Test Equipment Used
Measurements were made per work instruction WI-01 'Measuring RF Output Power'	0158, 0287, 0252, 0313, 0314, 0070, 0116, 0117

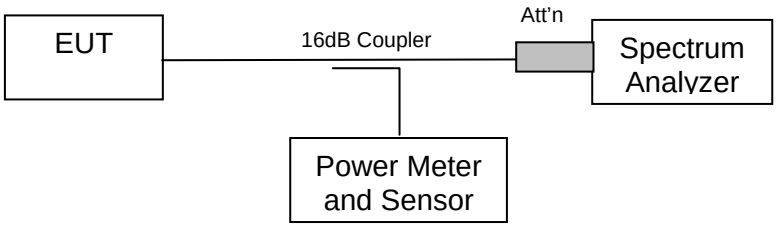
5.1.4. Peak Excursion Ratio

FCC, Part 15 Subpart C §15.407(a)(6)

Test Procedure

Normative Reference (xi) Section 2.1 Measurement Procedure DA 02-2138 "Measurement Procedure Updated for Peak Transmit Power in the UNII Bands" was implemented to determine the Peak Excursion Ratio. This is a conducted measurement using a spectrum analyzer. The Peak Excursion Ratio is the difference in amplitude (dB) between the two traces.

Test Measurement Set up



Measurement set up for Peak Excursion Ratio

Measurement Results for Peak Excursion Ratio

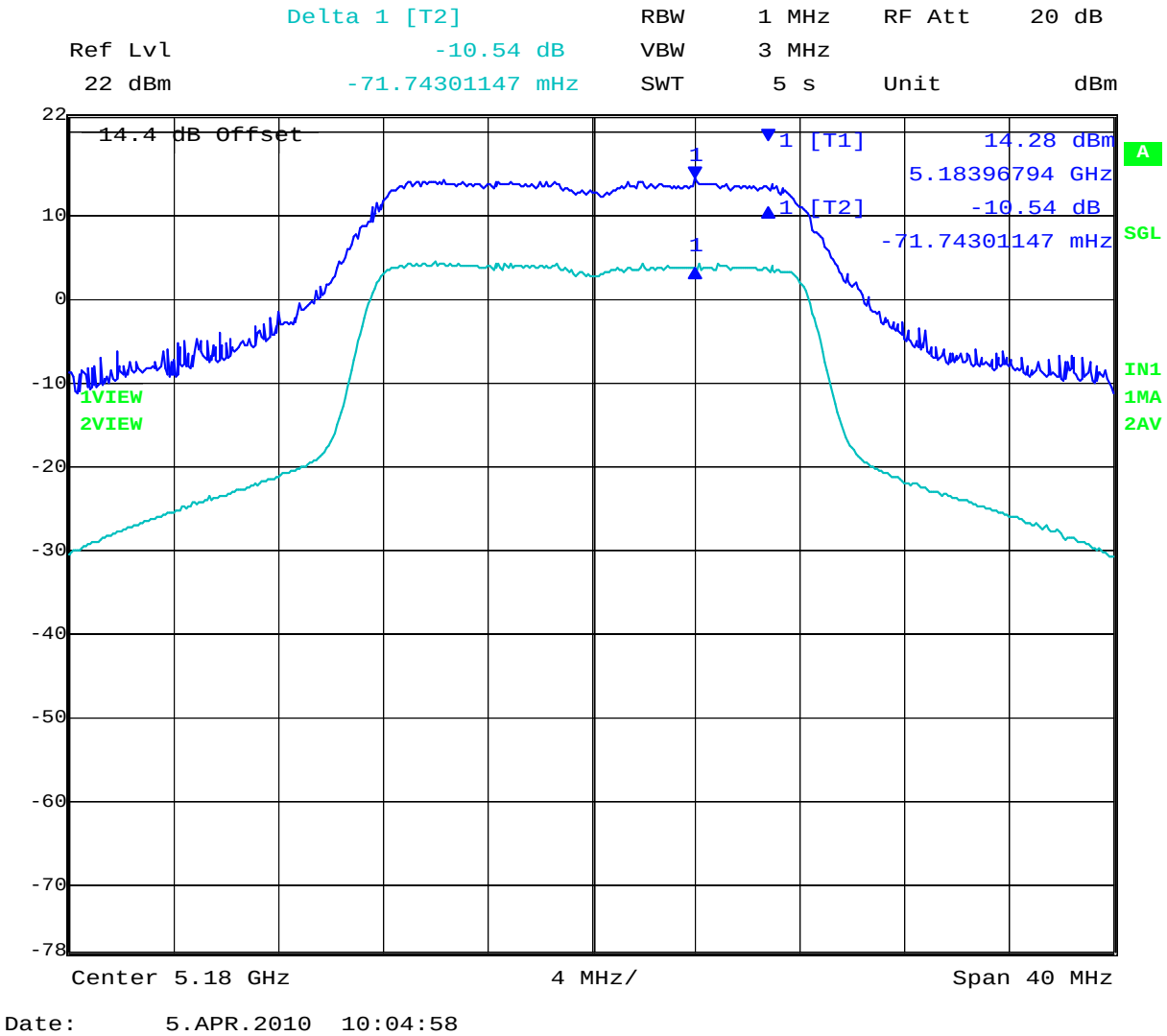
Ambient conditions.
Temperature: 17 to 23 °C Relative humidity: 31 to 57% Pressure: 999 to 1012 mbar

Radio Parameters
Duty Cycle: 100%
Output: Modulated Carrier
Power: Maximum Default Power

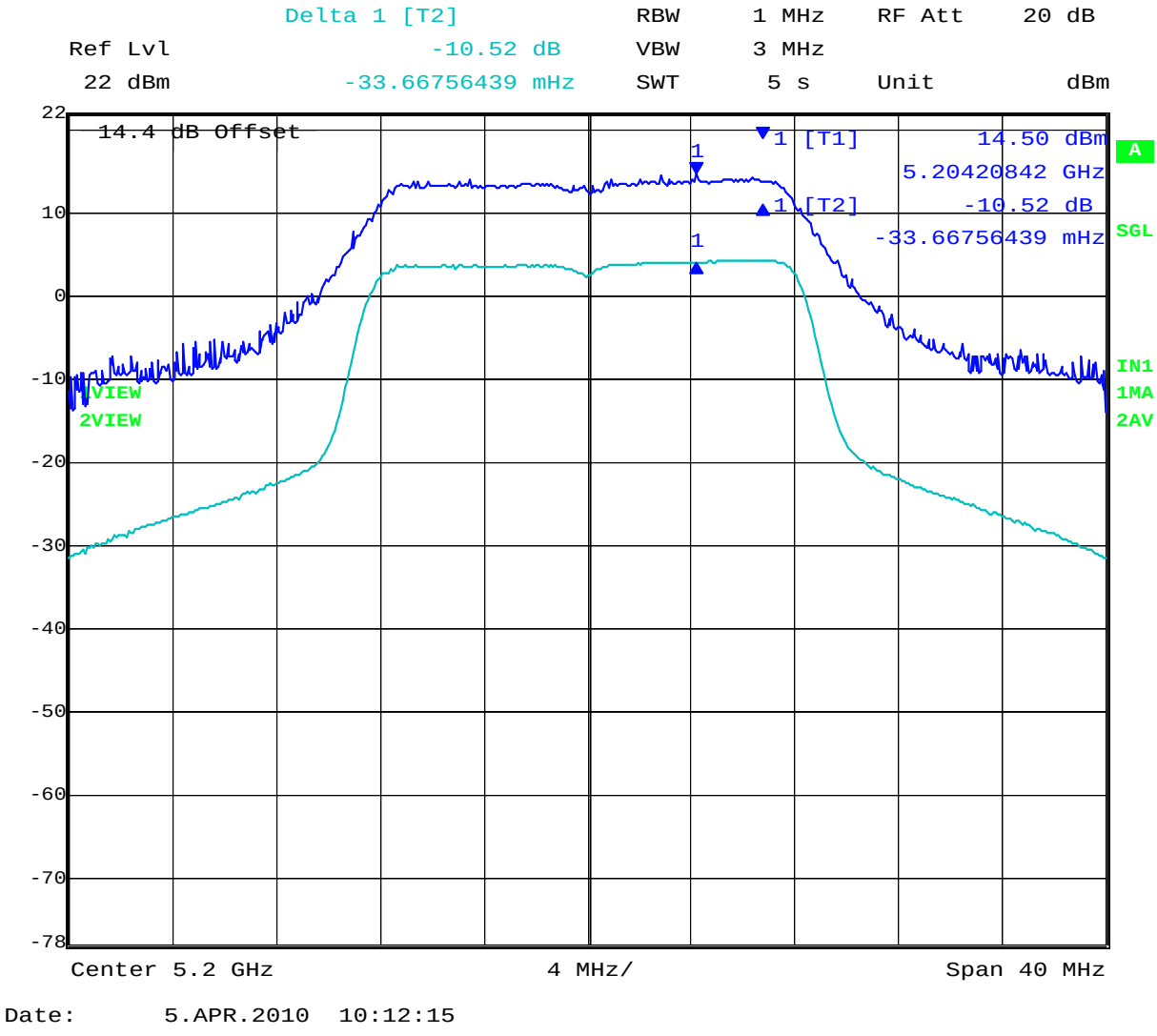
TABLE OF RESULTS – **802.11a Legacy**

Centre Frequency (MHz)	Peak Excursion Ratio (dB)	Margin (dB)
5,180	-10.54	-2.46
5,200	-10.52	-2.48
5,240	-9.83	-3.17

5,180 MHz 802.11a Legacy - Peak Excursion Ratio



5,200 MHz 802.11a Legacy - Peak Excursion Ratio



5,240 MHz 802.11a Legacy - Peak Excursion Ratio

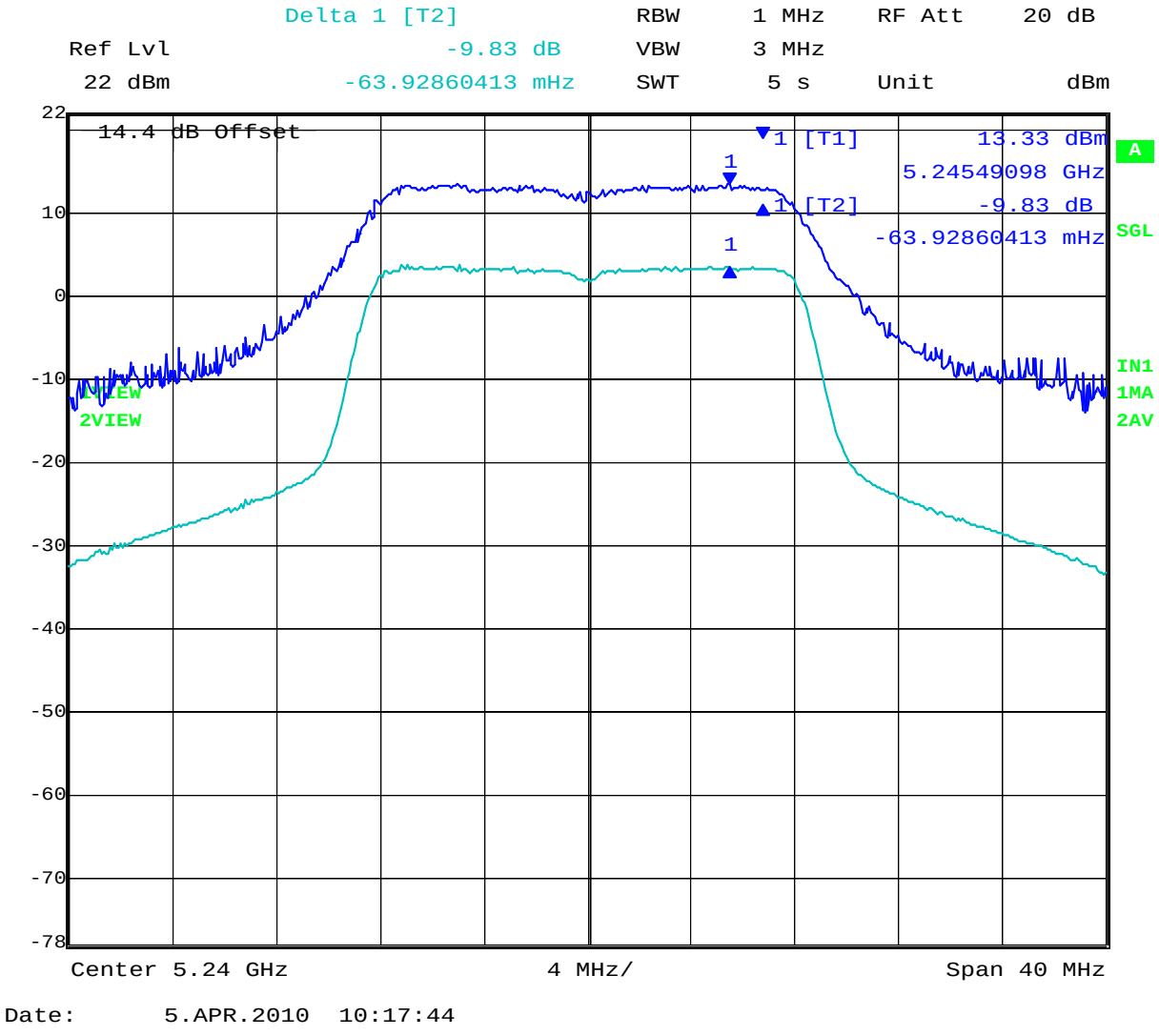
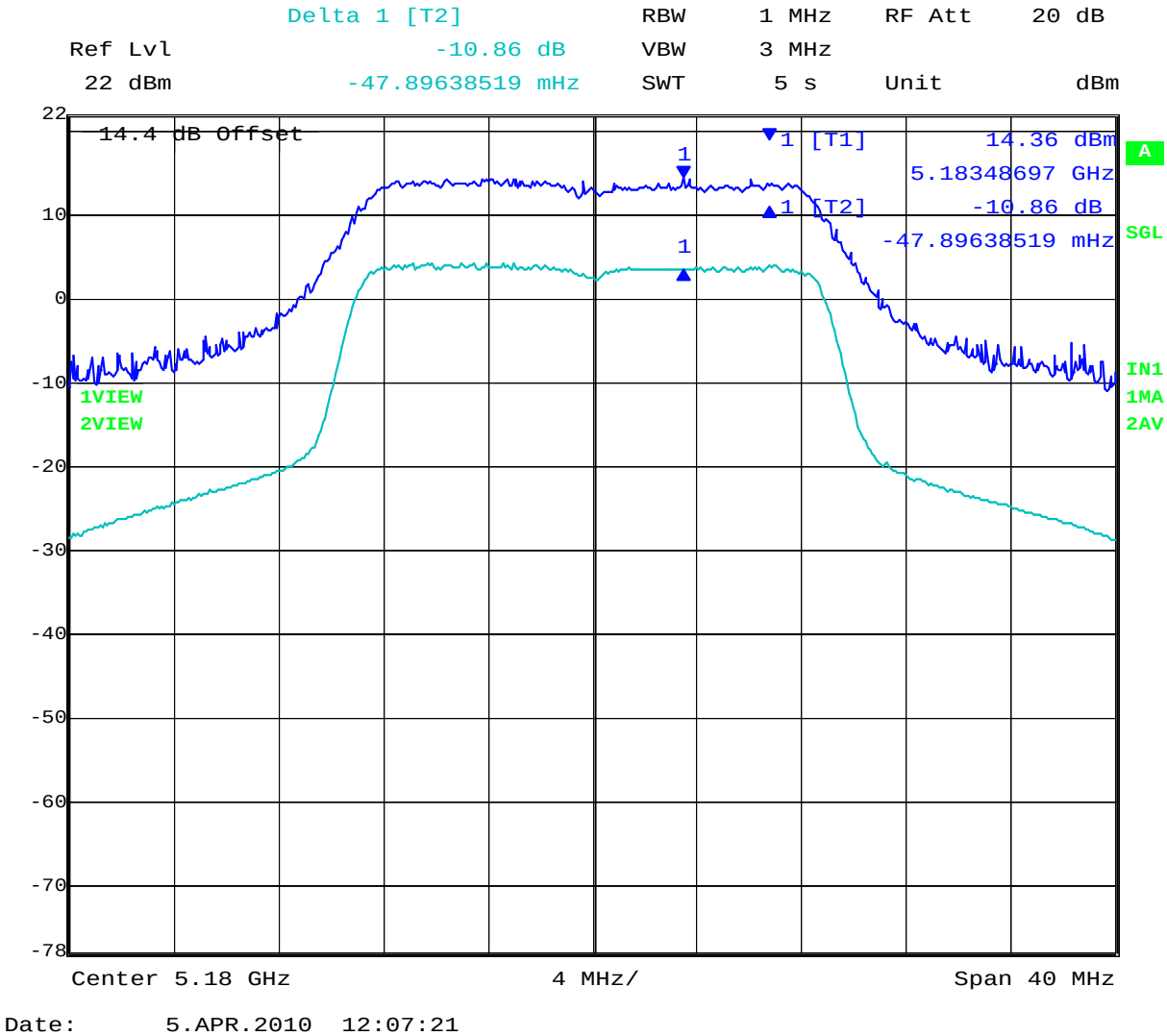


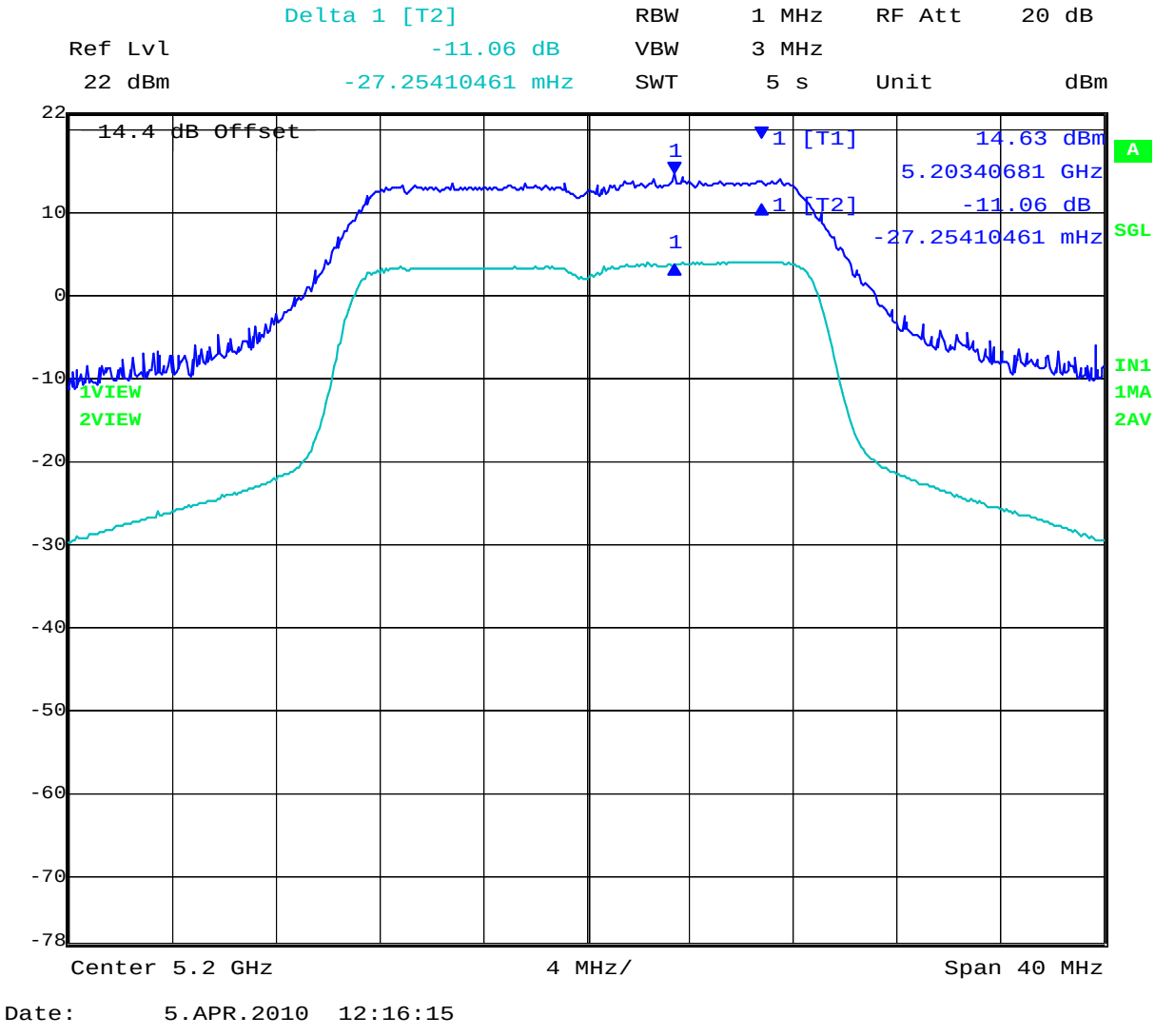
TABLE OF RESULTS – **802.11n HT20**

Centre Frequency (MHz)	Peak Excursion Ratio (dB)	Margin (dB)
5,180	-10.86	-2.14
5,200	-11.06	-1.94
5,240	-10.57	-2.43

5,180 MHz 802.11n HT20 - Peak Excursion Ratio



5,200 MHz 802.11n HT20 - Peak Excursion Ratio



5,240 MHz 802.11n HT20 - Peak Excursion Ratio

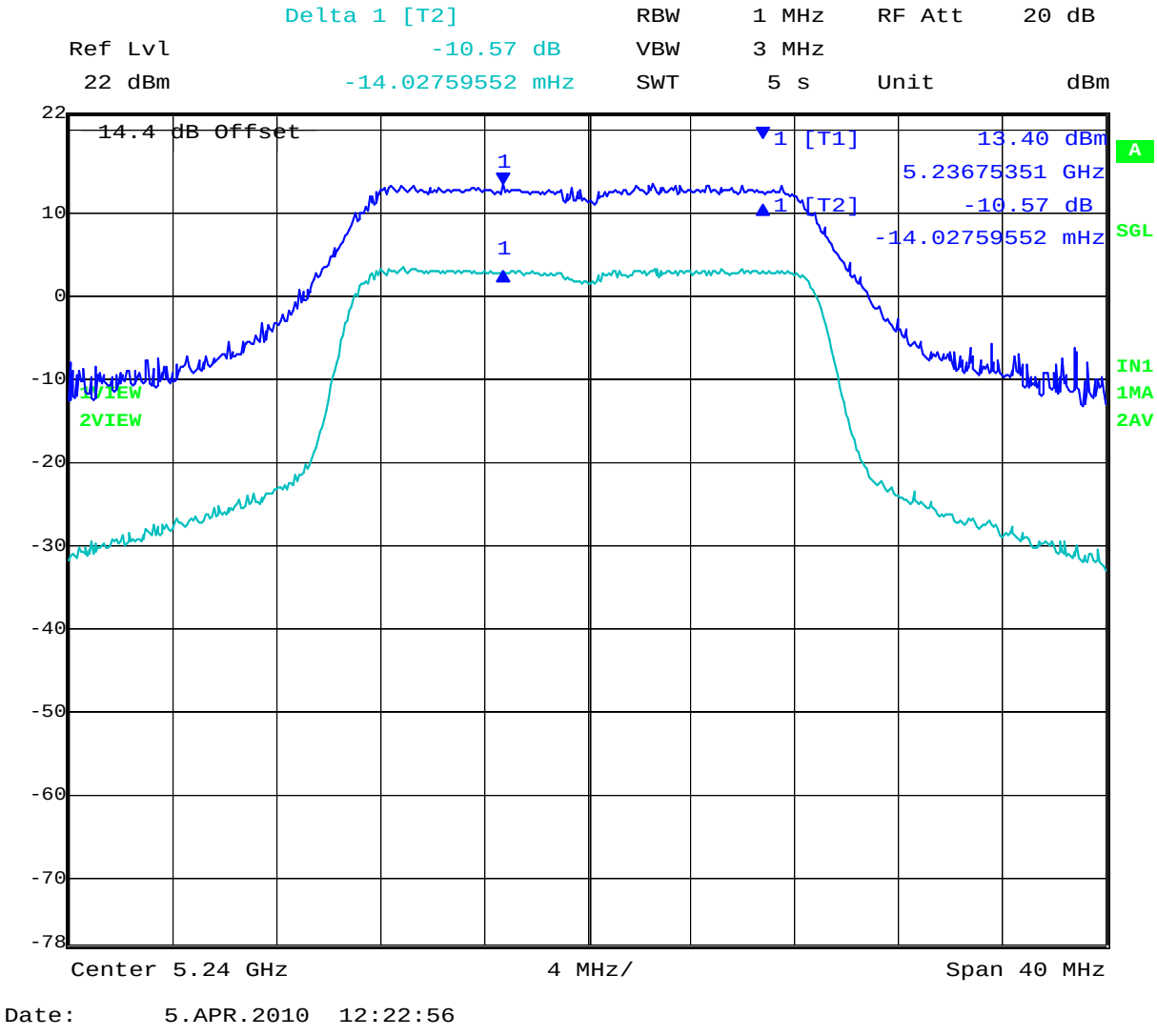
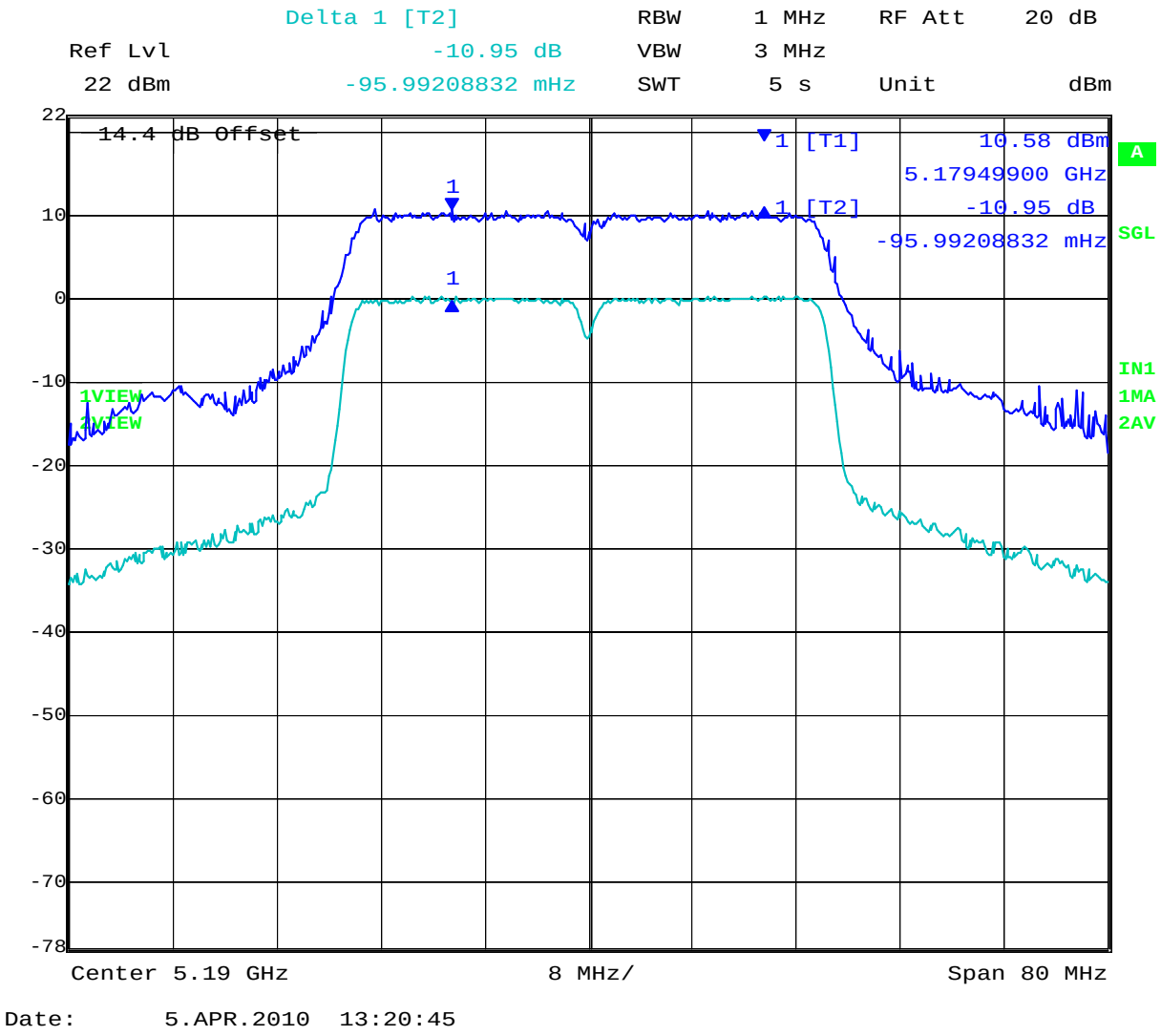


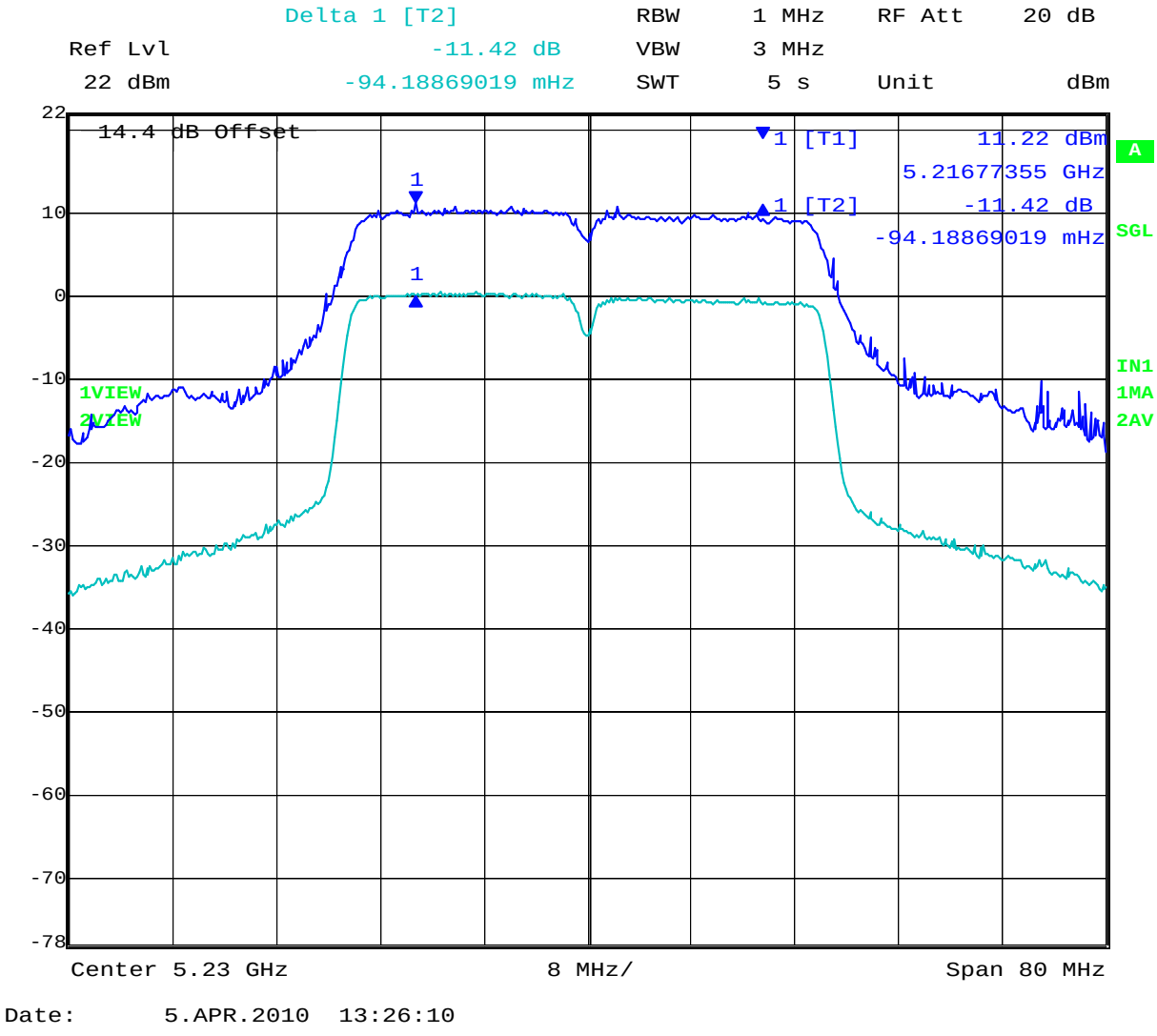
TABLE OF RESULTS – **802.11n HT40**

Centre Frequency (MHz)	Peak Excursion Ratio (dB)	Margin (dB)
5,190	-10.95	-2.05
5,230	-11.42	-1.58

5,190 MHz 802.11n HT40 - Peak Excursion Ratio



5,230 MHz 802.11n HT40 - Peak Excursion Ratio



Specification

Limits

§15.407 (a)(6) The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified in this paragraph) shall not exceed 13dB across any 1MHz bandwidth or the emission bandwidth whichever is less

Laboratory Measurement Uncertainty for Spectrum Measurement

Measurement uncertainty	± 2.81dB

Traceability

Method	Test Equipment Used
Measurements were made per work instruction WI-03 'Measurement of RF Spectrum Mask'	0158, 0287, 0252, 0313, 0314, 0070, 0116, 0117

5.1.5. Frequency Stability

FCC, Part 15 Subpart C §15.407(g)
Industry Canada RSS-210 §2.1

Test Procedure

The manufacturer of the equipment is responsible for ensuring that the frequency stability is such that emissions are always maintained within the band of operation under all conditions.

Manufacturer Declaration

The frequency stability of the reference oscillator sets the frequency stability of the RF transceiver signals. Therefore all of the RF signals should have ±20ppm stability.
This stability accounts for room temp tolerance of the crystal oscillator circuit, frequency variation across temperature, and crystal ageing.

±20ppm at 5.250 GHz translates to a maximum frequency shift of ±105 KHz. As the edge of the channels is at least one MHz from either of the band edges, ±105 KHz is more than sufficient to guarantee that the intentional emission will remain in the band over the entire operating range of the EUT.

Specification

Limits

§15.407 (g) Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

5.1.6. Maximum Permissible Exposure

FCC, Part 15 Subpart C §15.407(f)
Industry Canada RSS-Gen §5.5

Calculations for Maximum Permissible Exposure Levels

Power Density = Pd (mW/cm^2) = EIRP/(4πd^2)

EIRP = P * G * 2

P = Peak output power (mW)

G = Antenna numeric gain (numeric)

d = Separation distance (cm)

Numeric Gain = 10 ^ (G (dBi)/10)

The Aruba AP92 / AP93 has two transmitters. The peak power in the table below is calculated by assuming a worst case scenario where the two transmitters are operating simultaneously in the same band. The Peak Power in mW is calculated by taking the maximum conducted power measured in each band and multiplying by 2.

Because the EUT belongs to the General Population/Uncontrolled Exposure the limit of power density is 1.0 mW/cm^2

Freq. Band (MHz)	Antenna Gain (dBi)	Numeric Gain (numeric)	Peak Output Power (dBm)	Peak Output Power x 2 (mW)	Calculated Safe Distance @ 1mW/cm^2 Limit(cm)	Minimum Separation Distance (cm)
5150 - 5250	14.0	25.1	+16.99	100.00	14.13	20.00

Note: for mobile or fixed location transmitters the minimum separation distance is 20cm, even if calculations indicate the MPE distance to be less.

Specification
Maximum Permissible Exposure Limits

FCC §1.1310 Limit = 1mW / cm^2 from 1.310 Table 1

RSS-Gen §5.5 Before equipment certification is granted, the application requirements of RSS-102 shall be met.

Laboratory Measurement Uncertainty for Power Measurements

Measurement uncertainty	±1.33 dB

5.1.7. Radiated Emissions

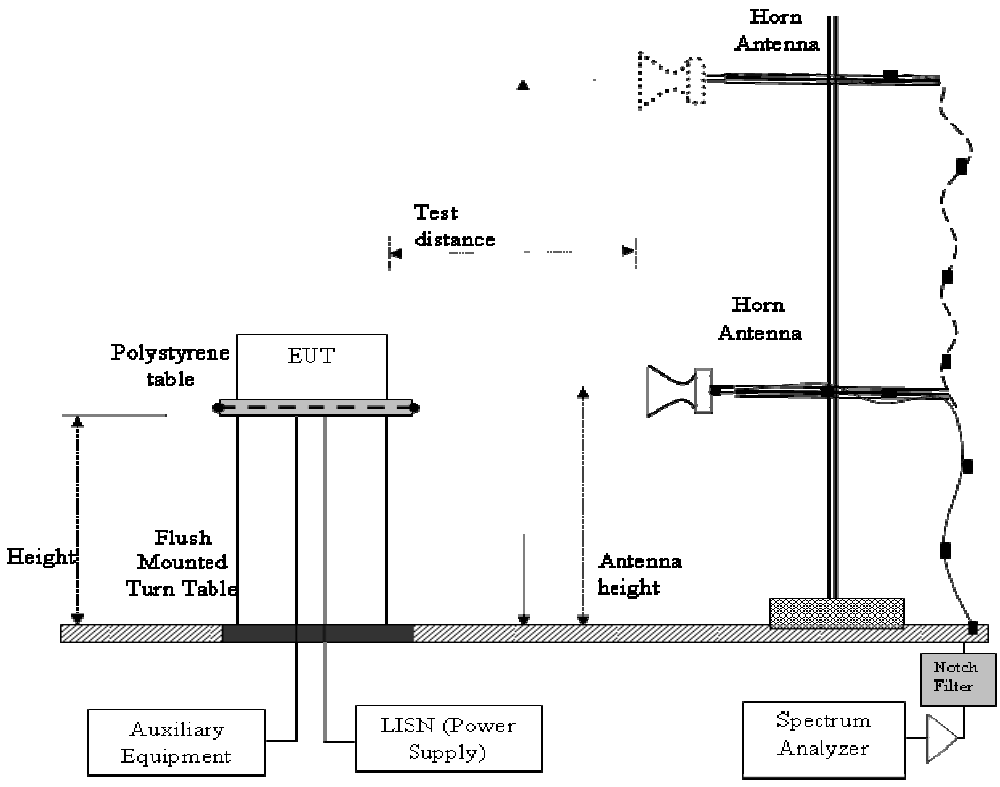
FCC, Part 15 Subpart C §15.407(b)(2), §15.205(a)/15.209(a)
Industry Canada RSS-210 §A9.3(2); §2.2; §2.6; RSS-Gen §4.7

Test Procedure

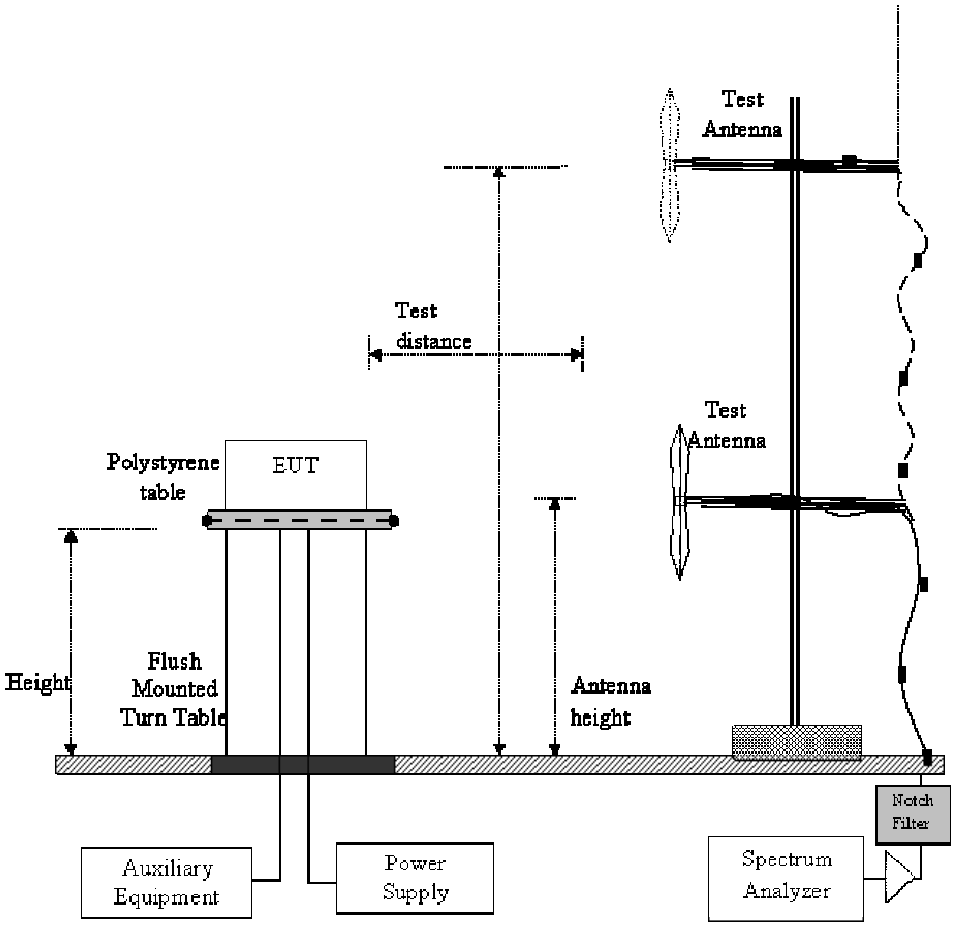
Testing was performed in a 3-meter anechoic chamber. Preliminary radiated emissions were measured on every azimuth and with the receiving antenna in both horizontal and vertical polarizations. Preliminary emissions were recorded with in Spectrum Analyzer mode, using a maximum peak detector while in peak hold mode. Depending on the frequency band spanned a notch filter and/or waveguide filter was used to remove the fundamental frequency.

Emissions nearest the limits were chosen for maximization and formal measurement using a CISPR compliant receiver. Emissions above 1000 MHz are measured utilizing a CISPR compliant average detector with a tuned receiver, using a bandwidth of 1 MHz. Emissions from 30 MHz – 1000 MHz are measured utilizing a CISPR compliant quasi-peak detector with a tuned receiver, using a bandwidth of 120 kHz. Only the highest emissions relative to the limit are listed.

Test Measurement Set Up



Radiated Emission Measurement Setup – Above 1 GHz



Radiated Emission Measurement Setup – Below 1 GHz

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

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

Field Strength Calculation Example:

Given receiver input reading of 51.5 dBμV; 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 dBμV/m

Conversion between dBμV/m (or dBμV) and μV/m (or μV) are done as:

Level (dBμV/m) = 20 * Log (level (μV/m))

40 dBμV/m = 100 μV/m
48 dBμV/m = 250 μV/m

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

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

where P is the EIRP in Watts

Therefore: -27 dBm/MHz = 68.23 dBuV/m

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

Specification

Radiated Spurious Emissions

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

FCC §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.

FCC §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.

FCC §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

Table 1: FCC 15.209 Spurious Emissions Limits

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

Laboratory Measurement Uncertainty for Spectrum Measurement

Measurement Uncertainty	+5.6/ -4.5 dB

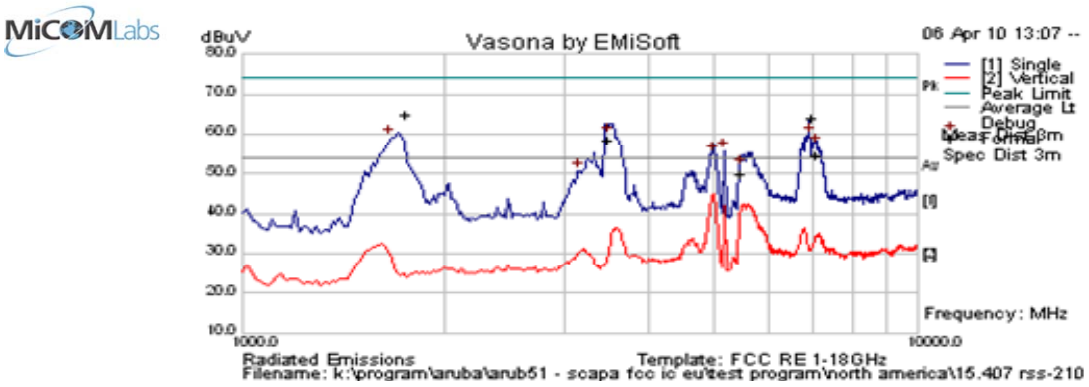
Traceability:

Method	Test Equipment Used
Work instruction WI-03	0088, 0158, 0134, 0304, 0311, 0315, 0310, 0312

5.1.7.1. Integral Antenna – Radiated Spurious Emissions – Above 1 GHz

Characterization of broadband spurious emissions

Test Freq.	5150-5250 MHz Band	**Engineer**	CSB
Variant	802.11a/n; 6.5 MCS	**Temp (°C)**	21
Freq. Range	1000 MHz - 10000 MHz	**Rel. Hum.(%)**	36
Power Setting	15 in ART test utility	**Press. (mBars)**	1018
Antenna	Integral	**Duty Cycle (%)**	100
Test Notes 1	Broadband emissions that were present during all modes of operation were measured at the highest power setting used during this test program.		
Test Notes 2	Plot from 1 GHz - 10 GHz of Spurious emissions from the EUT. Blue plot is peak emissions. Red plot is average emissions using a CISPR AVE Detector.		



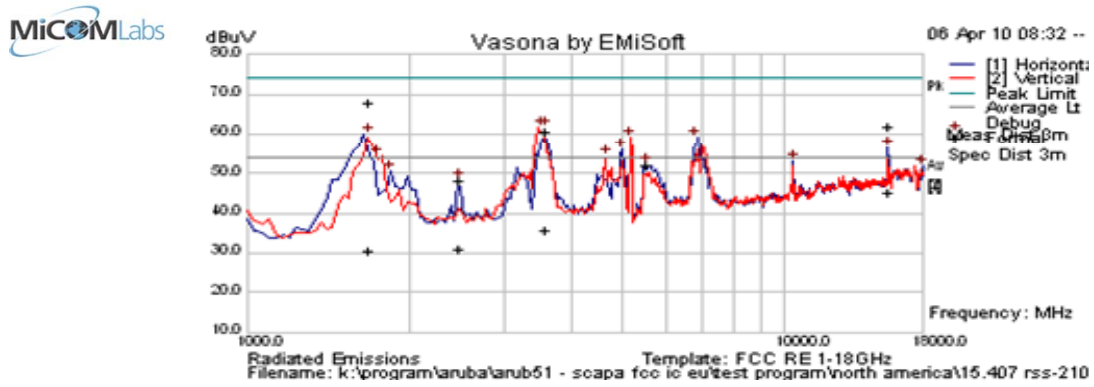
Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
1650.669	71.1	2.5	-13.8	59.8	Peak	H	126	0	68.23	-8.4	Pass	NRB
1685.584	79.1	2.5	-13.7	67.9	Peak	H	172	66	74.0	-6.1	Pass	RB
1686.734	41.8	2.5	-13.7	30.6	Average	H	172	66	54.0	-23.4	Pass	RB
2491.984	56.3	3.0	-11.1	48.2	Peak	H	131	67	74	-25.8	Pass	RB
2492.225	39.2	3.0	-11.1	31.1	Average	H	131	67	54	-22.9	Pass	RB
3547.575	42.8	3.6	-11.2	35.3	Average	H	126	0	54.00	-18.7	Pass	NRB
3548.878	68.0	3.6	-11.1	60.5	Peak	H	126	0	68.23	-7.7	Pass	NRB
3601.122	42.8	3.7	-10.8	35.7	Average	H	187	0	54	-18.3	Pass	RB
3601.122	67.8	3.7	-10.8	60.6	Peak	H	187	0	74	-13.4	Pass	RB
6817.555	36.5	5.3	-5.6	36.2	Average	V	126	0	54.00	-17.8	Pass	NRB
6817.555	57.3	5.3	-5.6	57.0	Peak	V	126	0	68.23	-11.2	Pass	NRB

Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

LOW BAND: 5150 – 5250 MHz: 802.11a

Test Freq.	5180 MHz	**Engineer**	CSB
Variant	802.11a; 6 Mbs	**Temp (°C)**	19.5
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	15 in ART test utility	**Press. (mBars)**	1018
Antenna	Integral	**Duty Cycle (%)**	100
Test Notes 1	EUT in vertical position; Filter used to attenuate carrier.		
Test Notes 2			

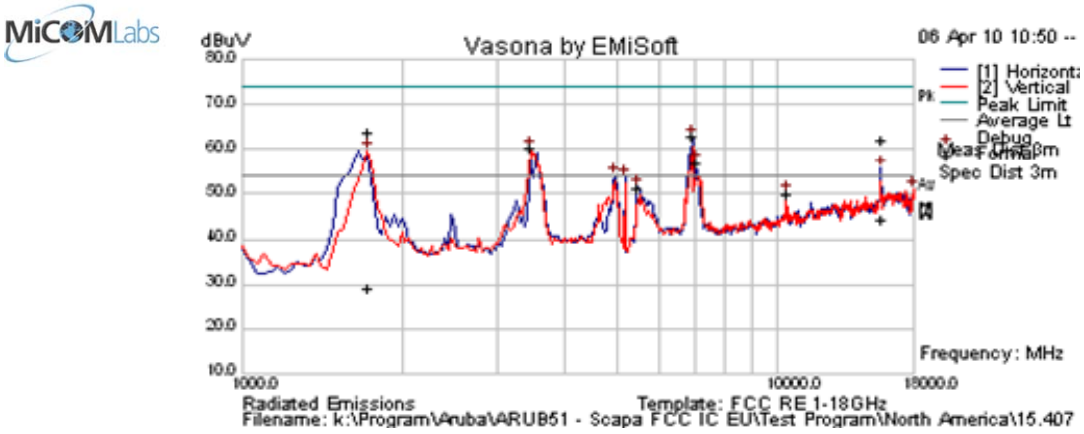


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
10361.462	48.3	6.7	-2.1	53.0	Peak [Scan]	H	--	--	68.23	-15.3	Pass	NRB
15541.403	37.0	8.3	0.0	45.3	Average	H	110	352	54	-8.7	Pass	RB
15541.403	53.5	8.3	0.0	61.8	Peak	H	110	352	74	-12.2	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

Test Freq.	5200 MHz	**Engineer**	CSB
Variant	802.11a; 6 Mbs	**Temp (°C)**	19.5
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	15 in ART test utility	**Press. (mBars)**	1018
Antenna	Integral	**Duty Cycle (%)**	100
Test Notes 1	EUT in vertical position; Filter used to attenuate carrier.		
Test Notes 2			

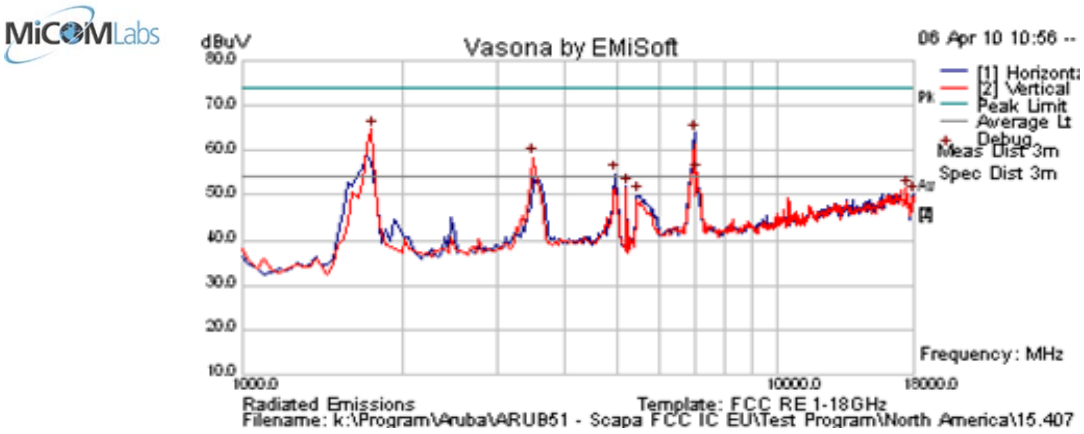


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
10399.359	45.6	6.7	-2.3	50.0	Peak [Scan]	V	--	--	68.23	-18.2	Pass	NRB
15597.274	35.7	8.4	0.4	44.5	Average Max	H	98	349	54	-9.5	Pass	RB
15597.274	53.3	8.4	0.4	62.0	Peak Max	H	98	349	74	-12.0	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

Test Freq.	5240 MHz	**Engineer**	CSB
Variant	802.11a; 6 Mbs	**Temp (°C)**	19.5
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	15 in ART test utility	**Press. (mBars)**	1018
Antenna	Integral	**Duty Cycle (%)**	100
Test Notes 1	EUT in vertical position; Filter used to attenuate carrier.		
Test Notes 2			



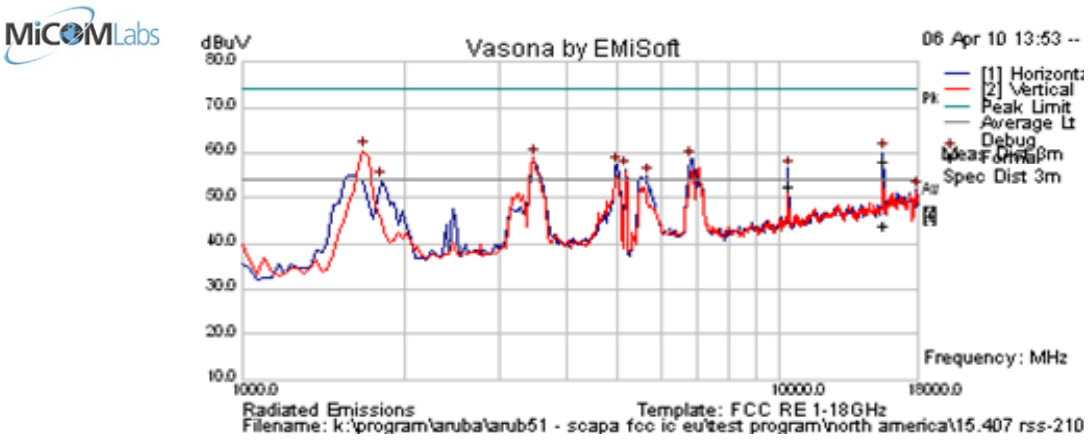
Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
No Harmonic emissions. Please see characterization for spurious emissions levels.												

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

LOW BAND: 5150 – 5250 MHz: 802.11n HT-20

Test Freq.	5180 MHz	**Engineer**	CSB
Variant	802.11n HT-20; 6.5 MCS	**Temp (°C)**	21.5
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	15 in ART test utility	**Press. (mBars)**	1017
Antenna	Integral	**Duty Cycle (%)**	100
Test Notes 1	EUT in vertical position; Filter used to attenuate carrier.		
Test Notes 2			

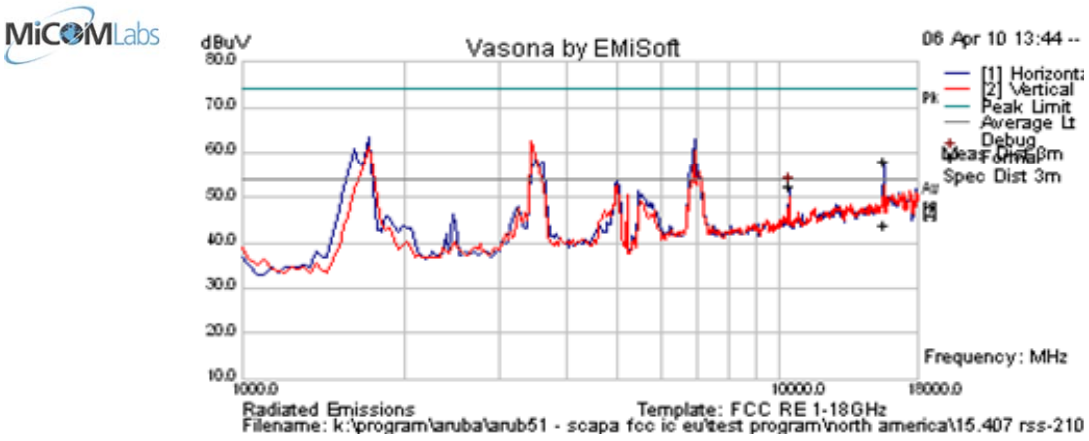


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
10361.223	47.7	6.7	-2.1	52.4	Peak [Scan]	H	--	--	68.23	-15.8	Pass	NRB
15535.510	51.3	8.3	0.0	59.5	Peak Max	H	163	329	74.0	-14.5	Pass	RB
15535.510	34.5	8.3	0.0	42.7	Average Max	H	163	329	54	-11.3	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

Test Freq.	5200 MHz	**Engineer**	CSB
Variant	802.11n HT-20; 6.5 MCS	**Temp (°C)**	21.5
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	15 in ART test utility	**Press. (mBars)**	1017
Antenna	Integral	**Duty Cycle (%)**	100
Test Notes 1	EUT in vertical position; Filter used to attenuate carrier.		
Test Notes 2			

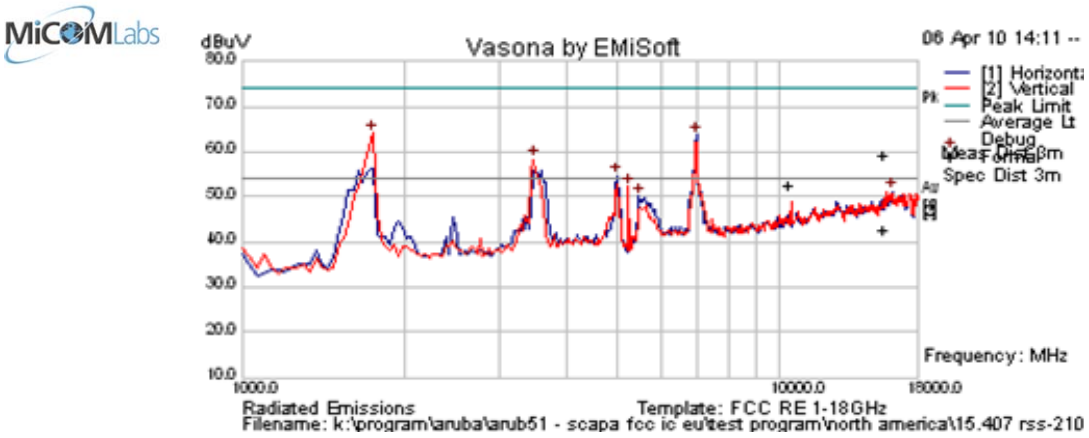


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
10405.471	48.1	6.7	-2.4	52.4	Peak [Scan]	H	--	--	68.23	-15.8	Pass	NRB
15603.366	49.2	8.4	0.5	58.1	Peak Max	H	102	337	74.0	-16.0	Pass	RB
15603.366	34.9	8.4	0.5	43.8	Average Max	H	102	337	54	-10.2	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

Test Freq.	5240 MHz	**Engineer**	CSB
Variant	802.11n HT-20; 6.5 MCS	**Temp (°C)**	21.5
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	15 in ART test utility	**Press. (mBars)**	1017
Antenna	Integral	**Duty Cycle (%)**	100
Test Notes 1	EUT in vertical position; Filter used to attenuate carrier.		
Test Notes 2			



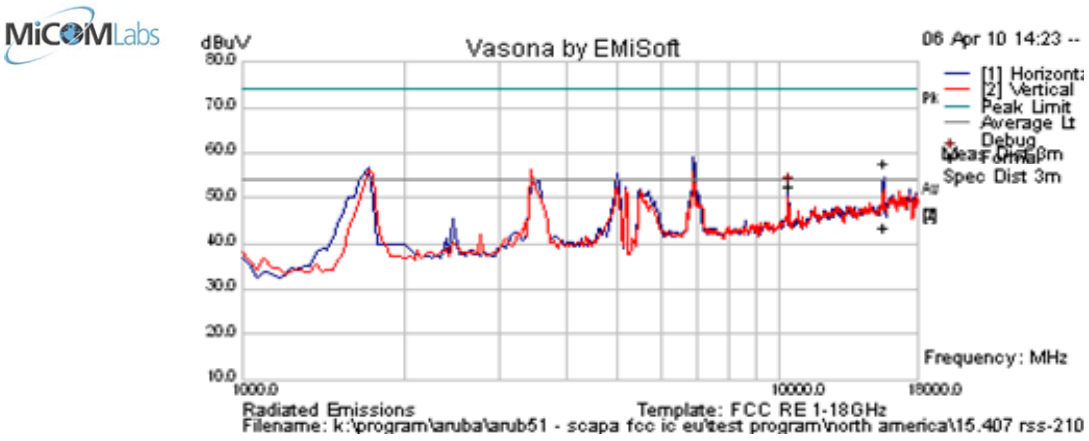
Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
No Harmonic emissions. Please see characterization for spurious emissions levels.												

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

LOW BAND: 5150 – 5250 MHz: 802.11n HT-40

Test Freq.	5190 MHz	**Engineer**	CSB
Variant	802.11n HT-40; 13.5 MCS	**Temp (°C)**	21.5
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	15 in ART test utility	**Press. (mBars)**	1017
Antenna	Integral	**Duty Cycle (%)**	100
Test Notes 1	EUT in vertical position; Filter used to attenuate carrier.		
Test Notes 2			

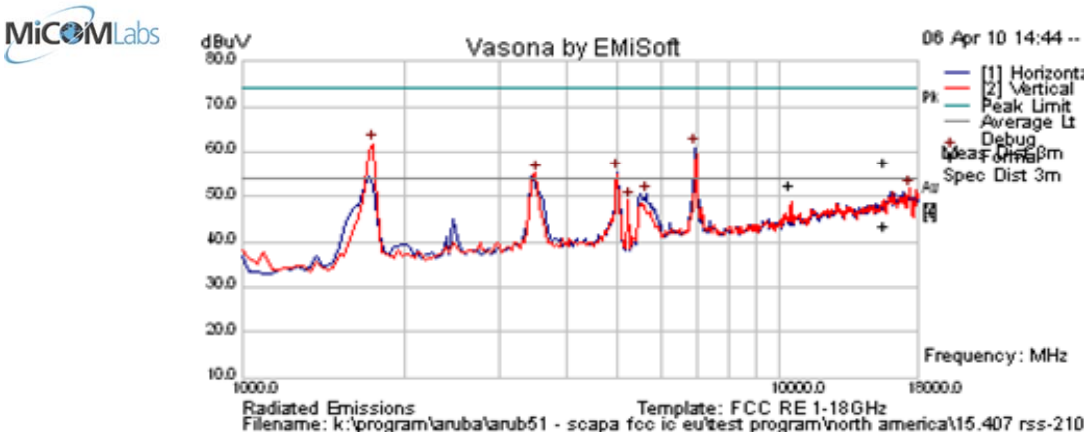


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
15584.078	48.9	8.4	0.4	57.6	Peak Max	H	154	290	74.0	-16.4	Pass	RB
15584.078	34.7	8.4	0.4	43.4	Average Max	H	154	290	54.0	-10.6	Pass	RB
10379.981	47.8	6.7	-2.1	52.4	Peak [Scan]	H	--	--	68.23	-15.8	Pass	NRB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

Test Freq.	5230 MHz	**Engineer**	CSB
Variant	802.11n; HT-40; 13.5 MCS	**Temp (°C)**	21.5
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	15 in ART test utility	**Press. (mBars)**	1017
Antenna	Integral	**Duty Cycle (%)**	100
Test Notes 1	EUT in vertical position; Filter used to attenuate carrier.		
Test Notes 2			



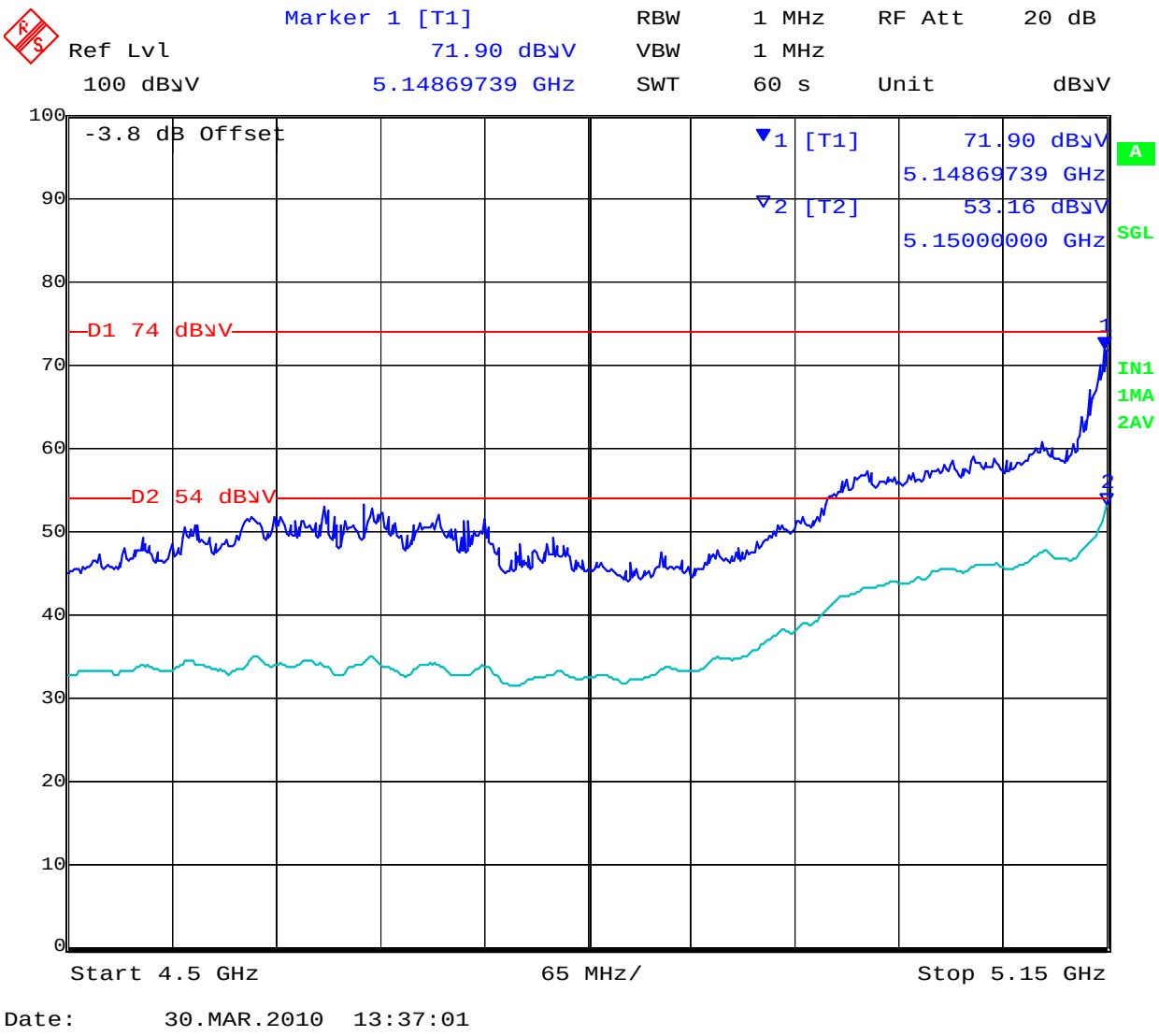
Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
No Harmonic emissions. Please see characterization for spurious emissions levels.												

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

5.1.7.2. Integral Antenna – Band edge spurious emissions

5180 MHz - 802.11a 4500-5150 MHz



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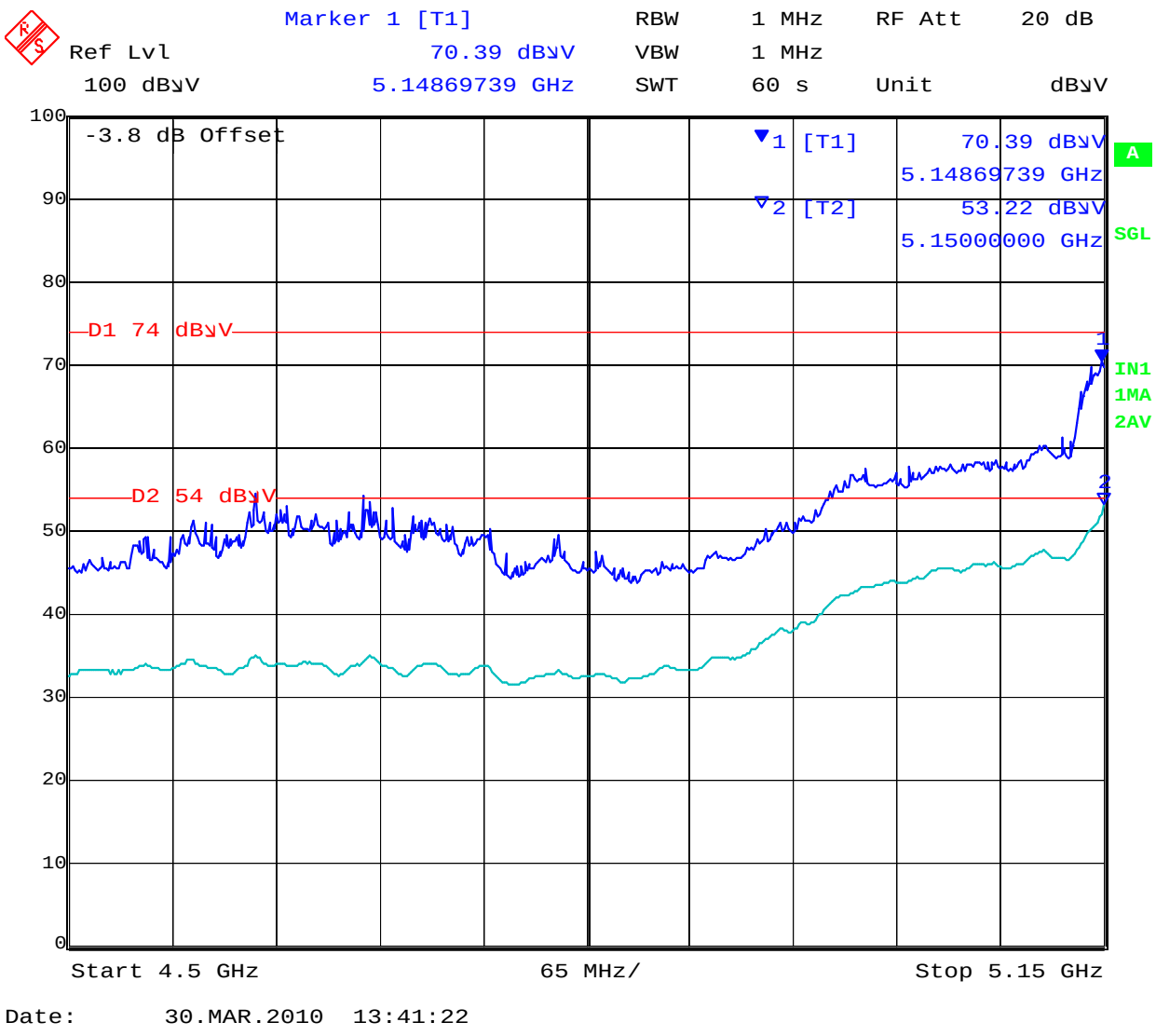
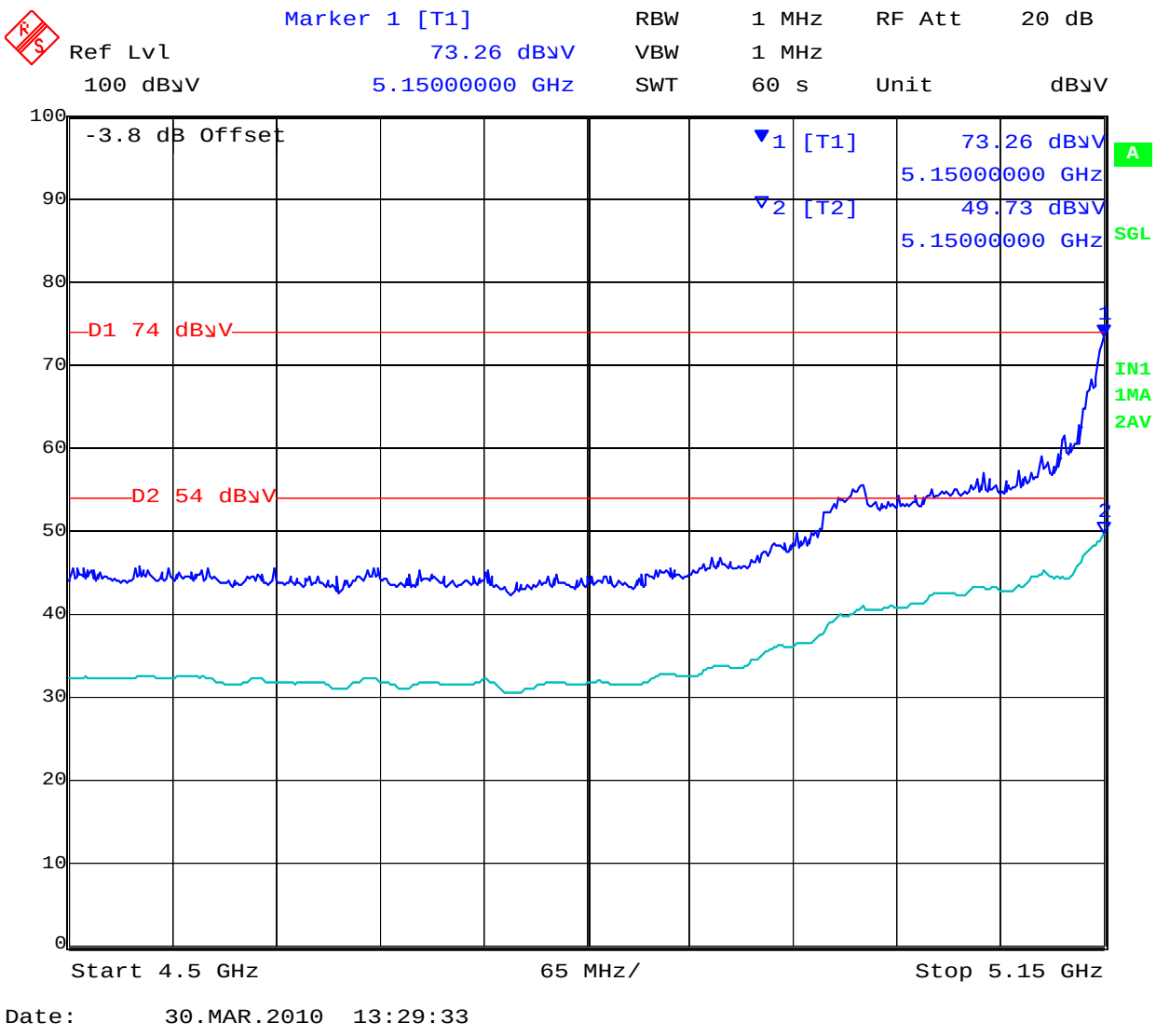
5180 MHz - 802.11n HT-20 4500-5150 MHz



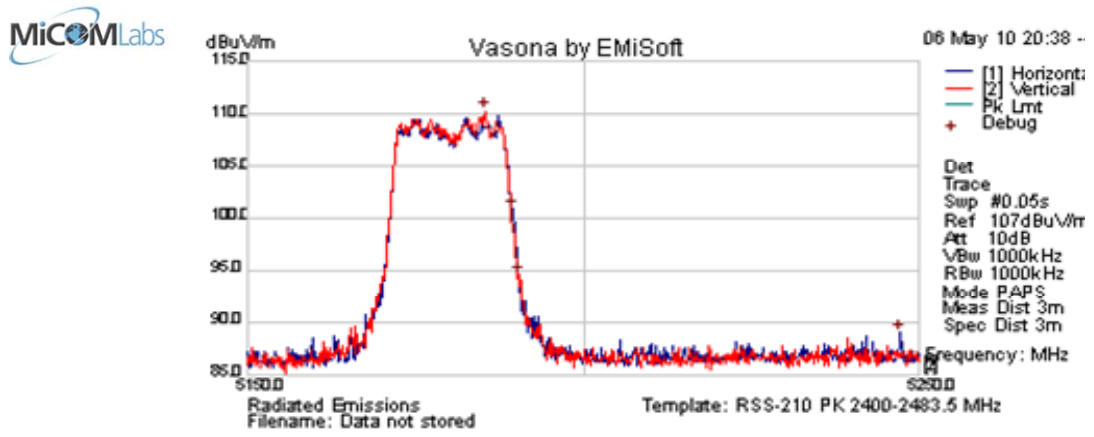
5190 MHz - 802.11n HT-40 4500-5150 MHz



5.1.7.3. Integral Antenna – Peak Emissions (RSS-210/RSS-GEN)

LOW BAND: 5150 – 5250 MHz: 802.11a

Test Freq.	5180 MHz	**Engineer**	CSB
Variant	802.11a; 6 Mbs	**Temp (°C)**	21
Freq. Range	5150 - 5250 MHz	**Rel. Hum.(%)**	33
Power Setting	15 in ART test utility	**Press. (mBars)**	998
Antenna	Integral	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

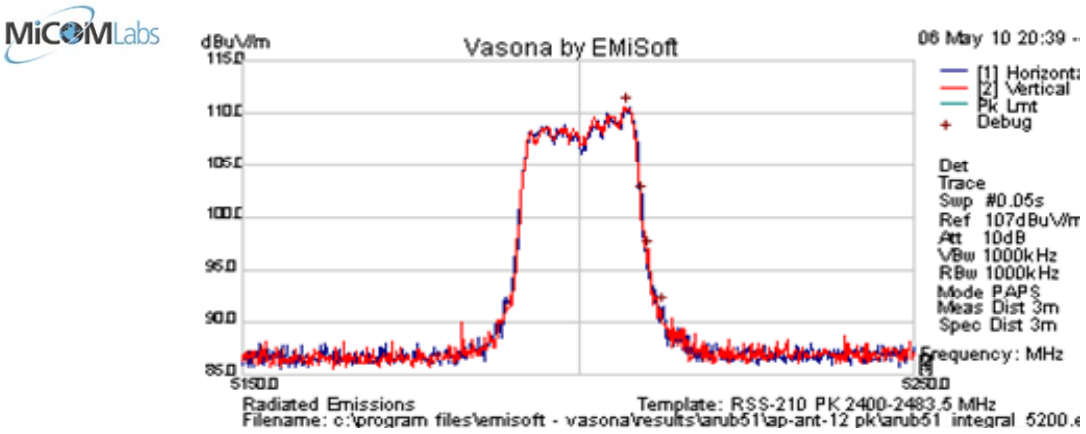


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5185.167	63.6	11.3	35.4	110.3	Peak [Scan]	V						PK

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	PK = Peak emission of fundamental

Test Freq.	5200 MHz	**Engineer**	CSB
Variant	802.11a; 6 Mbs	**Temp (°C)**	21
Freq. Range	5150 - 5250 MHz	**Rel. Hum.(%)**	33
Power Setting	15 in ART test utility	**Press. (mBars)**	998
Antenna	Integral	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

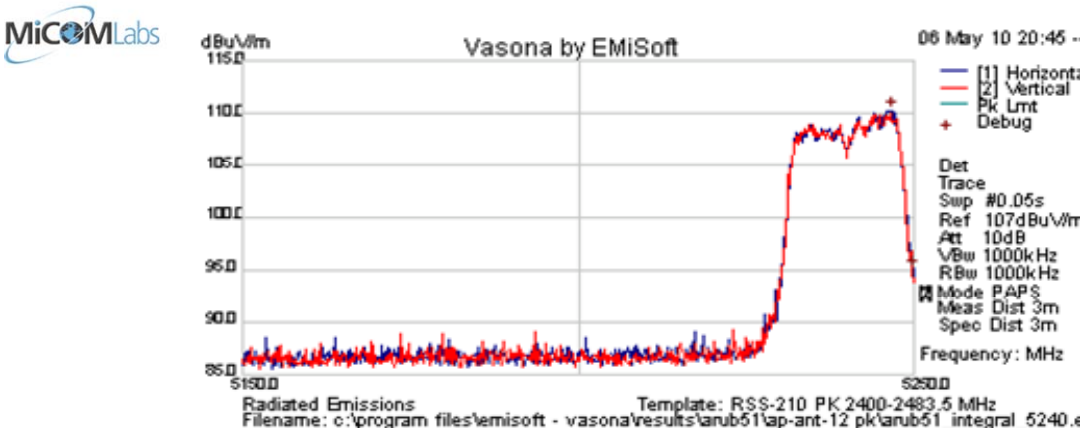


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5207.000	63.9	11.3	35.4	110.7	Peak [Scan]	V						PK

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	PK = Peak emission of fundamental

Test Freq.	5240 MHz	**Engineer**	CSB
Variant	802.11a; 6 Mbs	**Temp (°C)**	21
Freq. Range	5150 - 5250 MHz	**Rel. Hum.(%)**	33
Power Setting	15 in ART test utility	**Press. (mBars)**	998
Antenna	Integral	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			



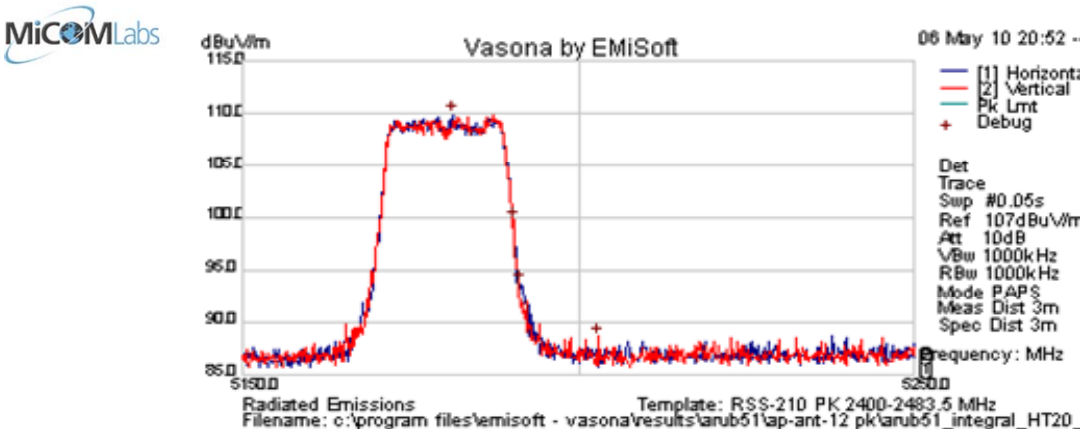
Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5246.667	63.4	11.4	35.5	110.3	Peak [Scan]	V						PK

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	PK = Peak emission of fundamental

LOW BAND: 5150 – 5250 MHz: 802.11n HT-20

Test Freq.	5180 MHz	**Engineer**	CSB
Variant	802.11n; HT-20; 6.5 MCS	**Temp (°C)**	21
Freq. Range	5150 - 5250 MHz	**Rel. Hum.(%)**	33
Power Setting	15 in ART test utility	**Press. (mBars)**	998
Antenna	Integral	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

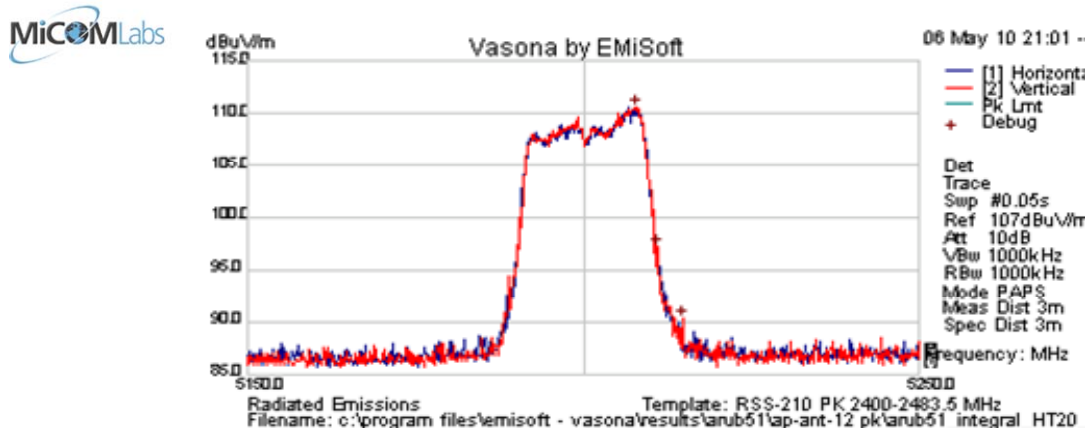


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5181.167	63.3	11.3	35.4	109.9	Peak [Scan]	V						PK

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	PK = Peak emission of fundamental

Test Freq.	5200 MHz	**Engineer**	CSB
Variant	802.11n; HT-20; 6.5 MCS	**Temp (°C)**	21
Freq. Range	5150 - 5250 MHz	**Rel. Hum.(%)**	33
Power Setting	15 in ART test utility	**Press. (mBars)**	998
Antenna	Integral	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

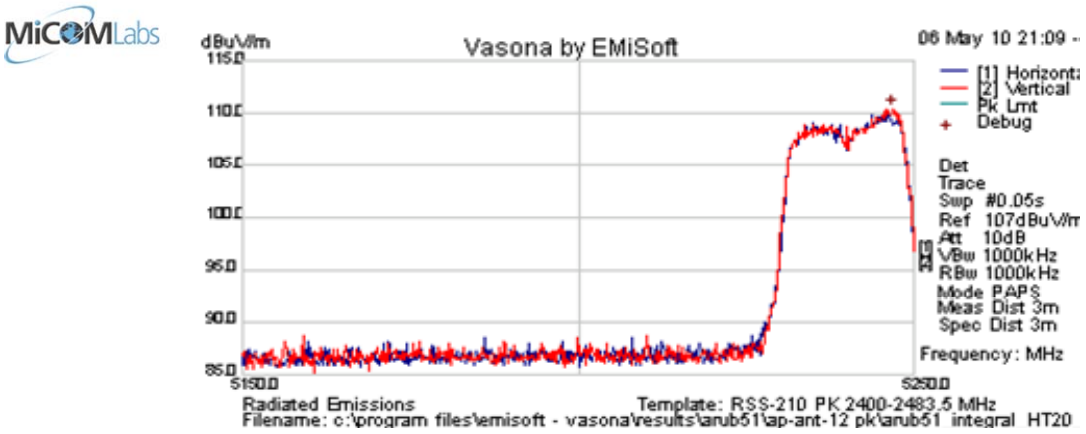


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5207.833	63.8	11.3	35.4	110.5	Peak [Scan]	V						PK

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	PK = Peak emission of fundamental

Test Freq.	5240 MHz	**Engineer**	CSB
Variant	802.11n; HT-20; 6.5 MCS	**Temp (°C)**	21
Freq. Range	5150 - 5250 MHz	**Rel. Hum.(%)**	33
Power Setting	15 in ART test utility	**Press. (mBars)**	998
Antenna	Integral	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			



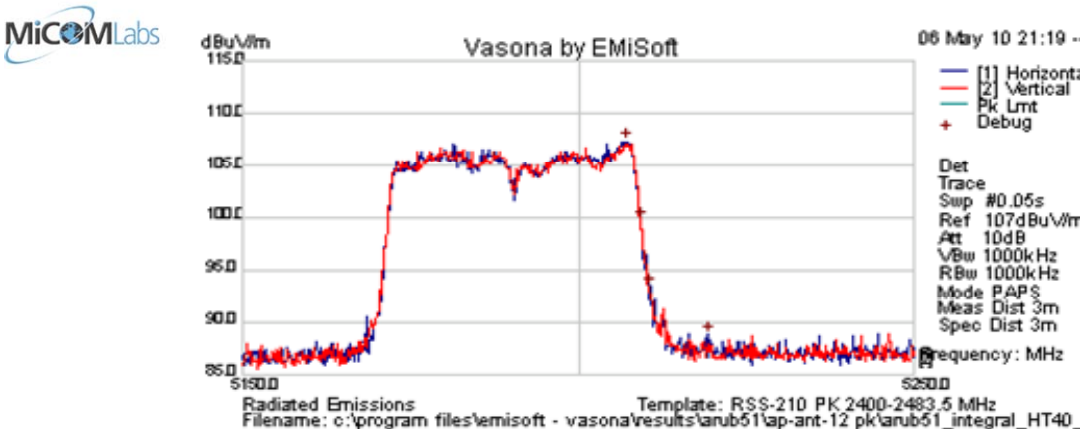
Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5246.833	63.6	11.4	35.5	110.5	Peak [Scan]	V						PK

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	PK = Peak emission of fundamental

LOW BAND: 5150 – 5250 MHz: 802.11n HT-40

Test Freq.	5190 MHz	**Engineer**	CSB
Variant	802.11n; HT-40; 13.5 MCS	**Temp (°C)**	21
Freq. Range	5150 - 5250 MHz	**Rel. Hum.(%)**	33
Power Setting	15 in ART test utility	**Press. (mBars)**	998
Antenna	Integral	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

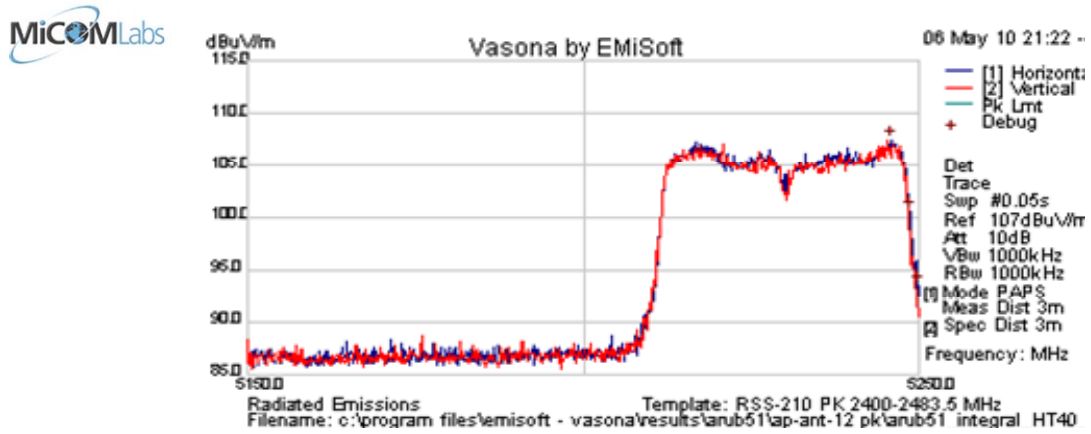


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5207.167	60.6	11.3	35.4	107.3	Peak [Scan]	V						PK

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	PK = Peak emission of fundamental

Test Freq.	5230 MHz	**Engineer**	CSB
Variant	802.11n; HT-40; 13.5 MCS	**Temp (°C)**	21
Freq. Range	5150 - 5250 MHz	**Rel. Hum.(%)**	33
Power Setting	15 in ART test utility	**Press. (mBars)**	998
Antenna	Integral	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			



Formally measured emission peaks

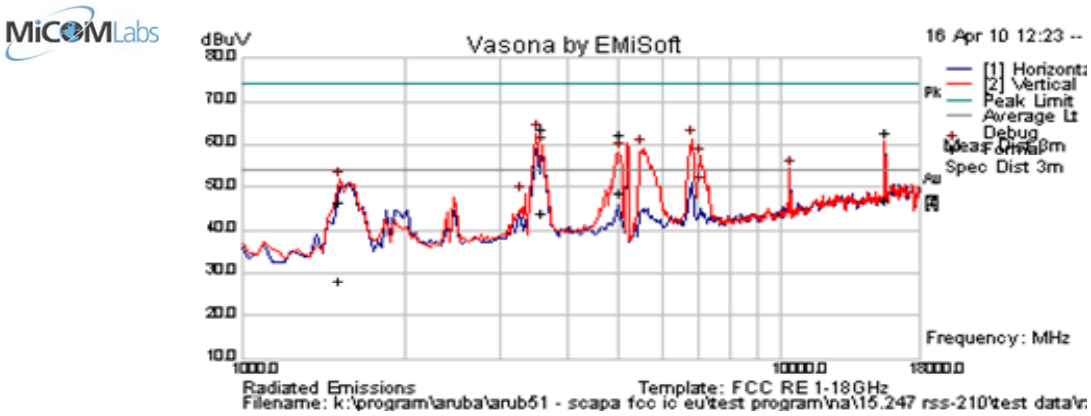
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5245.833	60.6	11.4	35.5	107.5	Peak [Scan]	V						PK

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	PK = Peak emission of fundamental

5.1.7.4. AP-ANT-10 - Transmitter Radiated Spurious Emissions

LOW BAND: 5150 – 5250 MHz: 802.11a

Test Freq.	5180 MHz	**Engineer**	CSB
Variant	802.11a; 6 Mbs	**Temp (ºC)**	22.5
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	37
Power Setting	15 in Art test utility	**Press. (mBars)**	1010
Antenna	AP-ANT-10	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

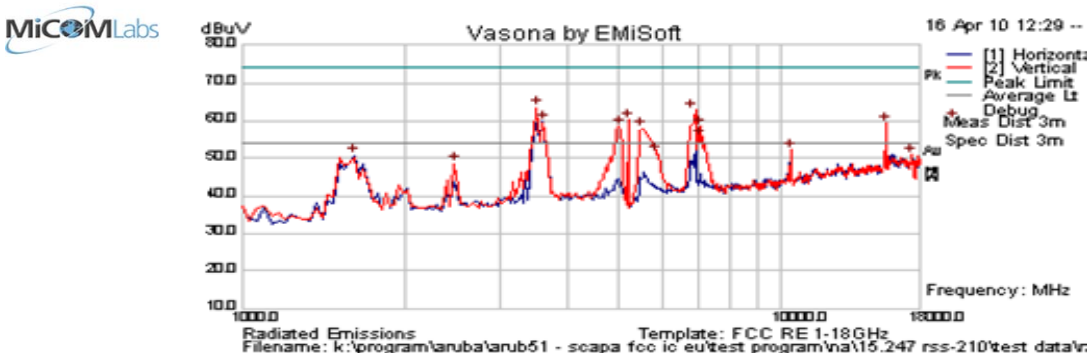


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
1511.022	58.6	2.4	-14.7	46.3	Peak Max	V	106	65	74	-27.7	Pass	RB
1511.022	40.2	2.4	-14.7	27.9	Average Max	V	106	65	54	-26.1	Pass	RB
3606.974	51.0	3.7	-10.8	43.9	Average Max	V	103	180	54	-10.1	Pass	RB
3606.974	70.8	3.7	-10.8	63.7	Peak Max	V	103	180	74	-10.3	Pass	RB
4992.064	53.2	4.6	-9.1	48.7	Average Max	V	109	23	54	-5.3	Pass	RB
4992.064	66.9	4.6	-9.1	62.4	Peak Max	V	109	23	74	-11.6	Pass	RB
15539.479	38.8	8.3	0.0	47.1	Average Max	V	98	0	54	-6.9	Pass	RB
15539.479	54.3	8.3	0.0	62.6	Peak Max	V	98	0	74	-11.4	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

Test Freq.	5200 MHz	**Engineer**	CSB
Variant	802.11a; 6 Mbs	**Temp (ºC)**	22.5
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	37
Power Setting	15 in Art test utility	**Press. (mBars)**	1010
Antenna	AP-ANT-10	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

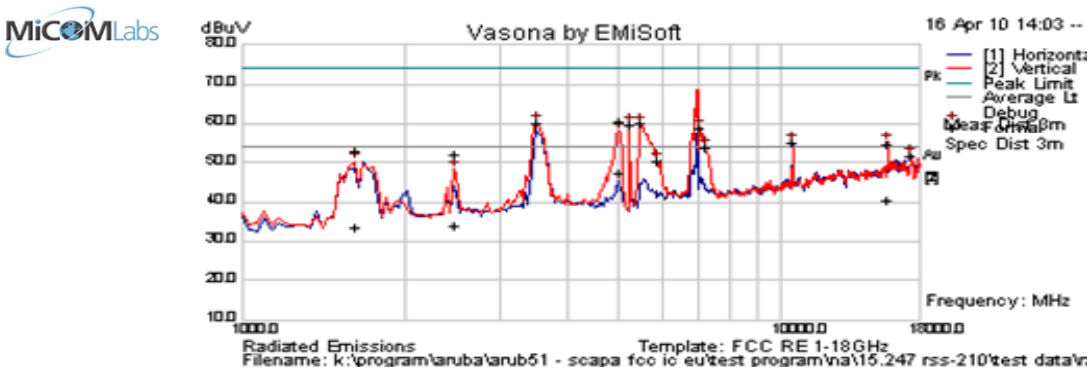


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
1618.637	69.5	2.5	-14.2	57.9	Peak Max	H	178	299	74	-16.2	Pass	RB
1618.637	49.7	2.5	-14.2	38.1	Average Max	H	178	299	54	-15.9	Pass	RB
2490.982	58.1	3.0	-11.1	50.0	Peak Max	V	98	310	74	-24.0	Pass	RB
2490.982	40.3	3.0	-11.1	32.2	Average Max	V	98	310	54	-21.8	Pass	RB
3529.459	71.3	3.6	-11.4	63.5	Peak [Scan]	V	--	--	68.23	-4.7	Pass	NRB
3610.741	72.3	3.7	-10.7	65.2	Peak Max	H	99	301	74	-8.8	Pass	RB
3610.741	51.9	3.7	-10.7	44.8	Average Max	H	99	301	54	-9.2	Pass	RB
4992.705	67.0	4.6	-9.1	62.5	Peak Max	V	98	362	74	-11.5	Pass	RB
4992.705	53.1	4.6	-9.1	48.6	Average Max	V	98	362	54	-5.4	Pass	RB
15598.557	53.7	8.4	0.4	62.4	Peak Max	V	102	0	74	-11.6	Pass	RB
15598.557	37.7	8.4	0.4	46.5	Average Max	V	102	0	54	-7.5	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

Test Freq.	5240 MHz	**Engineer**	CSB
Variant	802.11a; 6 Mbs	**Temp (ºC)**	22.5
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	37
Power Setting	15 in Art test utility	**Press. (mBars)**	1010
Antenna	AP-ANT-10	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			



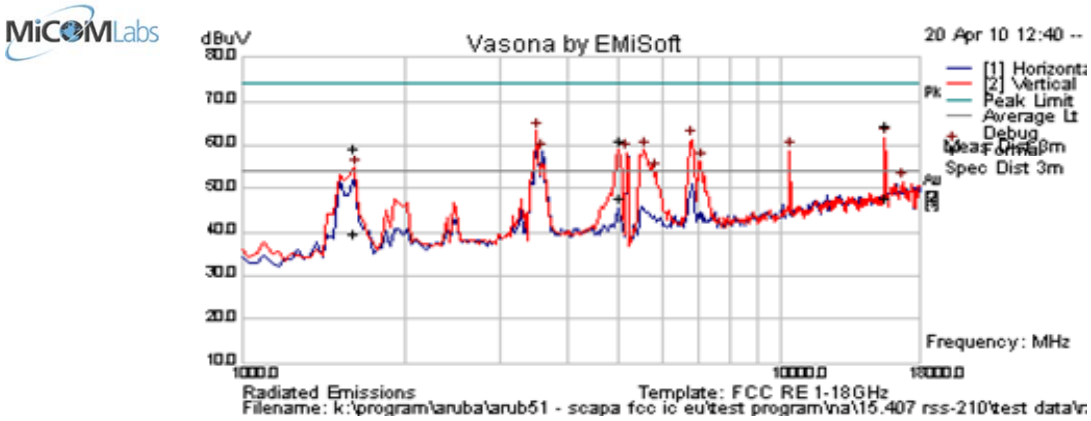
Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
1621.242	45.1	2.5	-14.1	33.4	Average Max	H	99	237	54.0	-20.6	Pass	RB
1621.242	64.4	2.5	-14.1	52.7	Peak Max	H	99	237	74.0	-21.3	Pass	RB
2491.944	60.1	3.0	-11.1	52.0	Peak Max	V	105	314	74	-22.0	Pass	RB
2491.944	42.1	3.0	-11.1	34.0	Average Max	V	105	314	54	-20.0	Pass	RB
3530.741	68.0	3.6	-11.4	60.2	Peak [Scan]	V	--	--	68.23	-8.0	Pass	NRB
4992.826	65.3	4.6	-9.1	60.8	Peak Max	V	103	3	74	-13.2	Pass	RB
4992.826	51.9	4.6	-9.1	47.4	Average Max	V	103	3	54	-6.6	Pass	RB
6985.691	67.4	5.4	-5.1	67.7	Peak [Scan]	V	--	--	68.23	-0.5	Pass	NRB
7076.713	58.9	5.4	-5.2	59.1	Peak [Scan]	V	--	--	68.23	-9.1	Pass	NRB
10470.943	50.9	6.8	-2.6	55.1	Peak [Scan]	H	--	--	68.23	-13.2	Pass	NRB
15722.084	46.9	8.6	-0.7	54.8	Peak Max	V	201	360	74	-19.3	Pass	RB
15722.084	32.7	8.6	-0.7	40.6	Average Max	V	201	360	54	-13.4	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

LOW BAND: 5150 – 5250 MHz: 802.11n HT-20

Test Freq.	5180 MHz	**Engineer**	CSB
Variant	802.11n; HT-20; 6.5 MCS	**Temp (ºC)**	22.5
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	37
Power Setting	15 Art setting	**Press. (mBars)**	1010
Antenna	AP-ANT-10	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

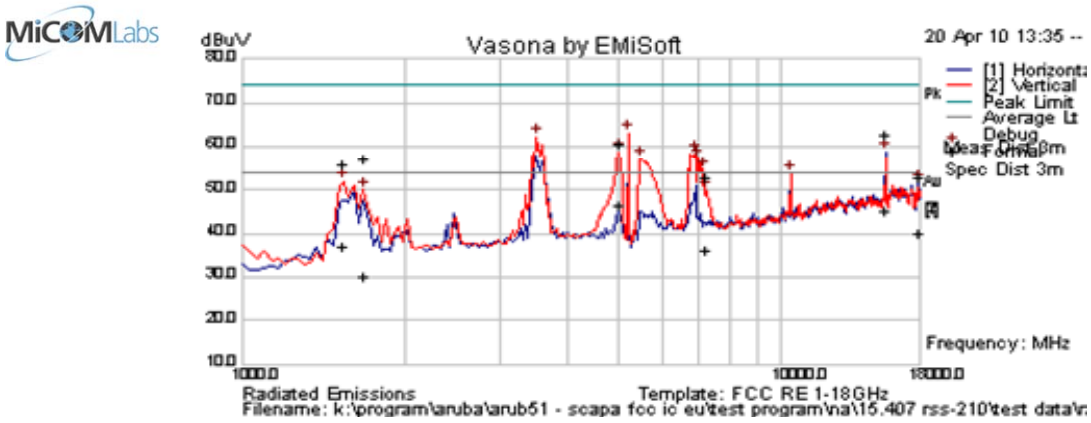


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
1619.459	70.8	2.5	-14.1	59.2	Peak Max	V	104	305	74	-14.9	Pass	RB
1619.459	51.3	2.5	-14.1	39.6	Average Max	V	104	305	54	-14.4	Pass	RB
4995.559	65.4	4.6	-9.1	60.9	Peak Max	V	102	103	74.0	-13.1	Pass	RB
4995.559	52.1	4.6	-9.1	47.7	Average Max	V	102	103	54	-6.3	Pass	RB
15537.298	56.4	8.3	0.0	64.7	Peak Max	V	98	0	74.0	-9.3	Pass	RB
15537.298	39.4	8.3	0.0	47.7	Average Max	V	98	0	54	-6.3	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

Test Freq.	5200 MHz	**Engineer**	CSB
Variant	802.11n; HT-20; 6.5 MCS	**Temp (ºC)**	22.5
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	37
Power Setting	15 Art setting	**Press. (mBars)**	1010
Antenna	AP-ANT-10	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

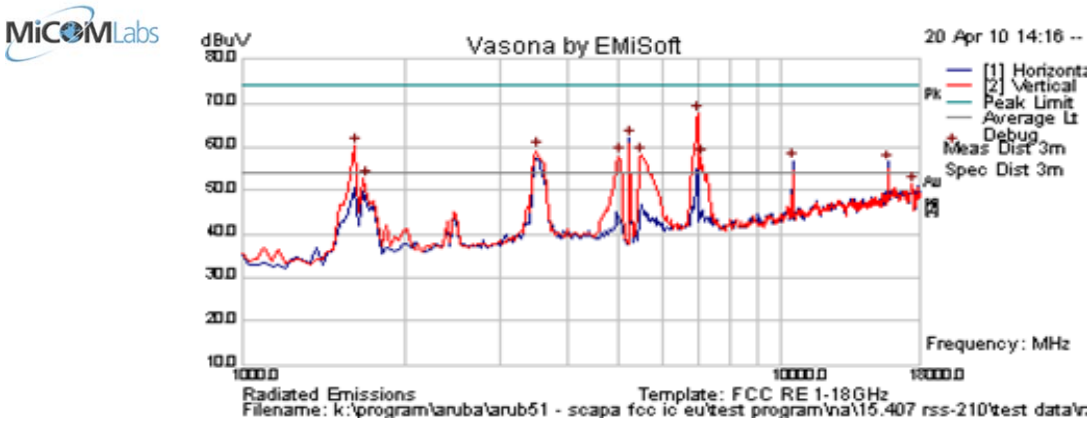


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
1543.379	68.2	2.4	-14.5	56.0	Peak Max	V	113	314	74.0	-18.0	Pass	RB
1543.379	49.1	2.4	-14.5	37.0	Average Max	V	113	314	54.0	-17.0	Pass	RB
1691.214	68.3	2.5	-13.7	57.2	Peak Max	V	109	113	74	-16.8	Pass	RB
1691.214	41.1	2.5	-13.7	30.0	Average Max	V	109	113	54	-24.0	Pass	RB
4996.241	65.0	4.6	-9.1	60.5	Peak Max	V	98	195	74	-13.5	Pass	RB
4996.241	50.8	4.6	-9.1	46.3	Average Max	V	98	195	54	-7.7	Pass	RB
7268.689	35.7	5.4	-5.1	36.0	Average Max	V	127	201	54	-18.0	Pass	RB
7268.689	52.5	5.4	-5.1	52.8	Peak Max	V	127	201	74	-21.2	Pass	RB
15592.080	54.2	8.4	0.4	62.9	Peak Max	H	151	19	74	-11.1	Pass	RB
15592.080	36.5	8.4	0.4	45.2	Average Max	H	151	19	54	-8.8	Pass	RB
17930.549	42.9	8.8	1.3	53.0	Peak Max	V	112	313	74	-21.0	Pass	RB
17930.549	29.9	8.8	1.3	40.0	Average Max	H	201	345	54	-14.0	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

Test Freq.	5240 MHz	**Engineer**	CSB
Variant	802.11n; HT-20; 6.5 MCS	**Temp (ºC)**	22.5
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	37
Power Setting	15 Art setting	**Press. (mBars)**	1010
Antenna	AP-ANT-10	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			



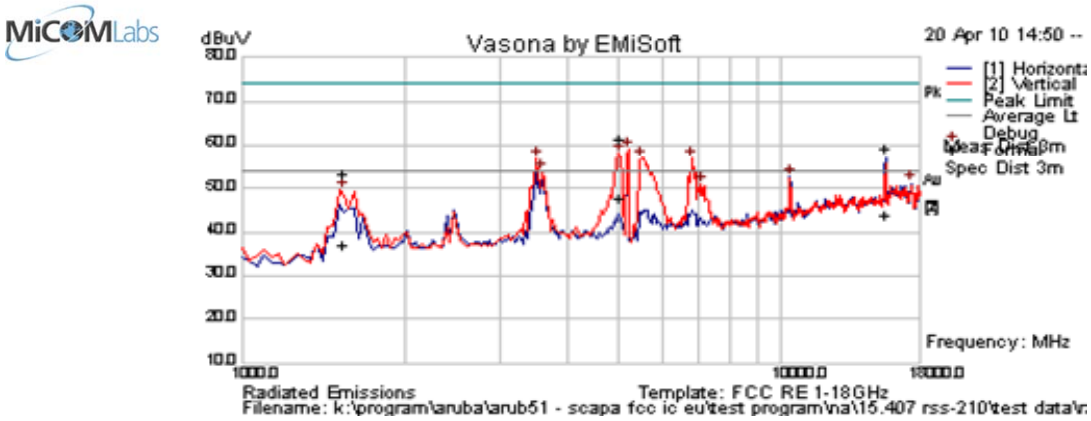
Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
1621.700	50.8	2.5	-14.1	39.1	Average Max	V	102	307	54.0	-14.9	Pass	RB
1621.700	70.0	2.5	-14.1	58.4	Peak Max	V	102	307	74.0	-15.7	Pass	RB
1696.400	69.2	2.5	-13.6	58.1	Peak Max	V	101	113	74	-15.9	Pass	RB
1696.400	48.5	2.5	-13.6	37.5	Average Max	V	101	113	54	-16.6	Pass	RB
4995.799	51.9	4.6	-9.1	47.4	Average Max	V	98	118	54	-6.6	Pass	RB
4995.799	66.5	4.6	-9.1	62.1	Peak Max	V	98	118	74	-11.9	Pass	RB
15729.820	35.2	8.6	-0.5	43.3	Average Max	H	98	298	54	-10.7	Pass	RB
15729.820	50.8	8.6	-0.5	58.9	Peak Max	H	98	298	74	-15.1	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

LOW BAND: 5150 – 5250 MHz: 802.11n HT-40

Test Freq.	5190 MHz	**Engineer**	CSB
Variant	802.11n; HT-40; 13.5 MCS	**Temp (°C)**	22.5
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	37
Power Setting	15 Art setting	**Press. (mBars)**	1010
Antenna	AP-ANT-10	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

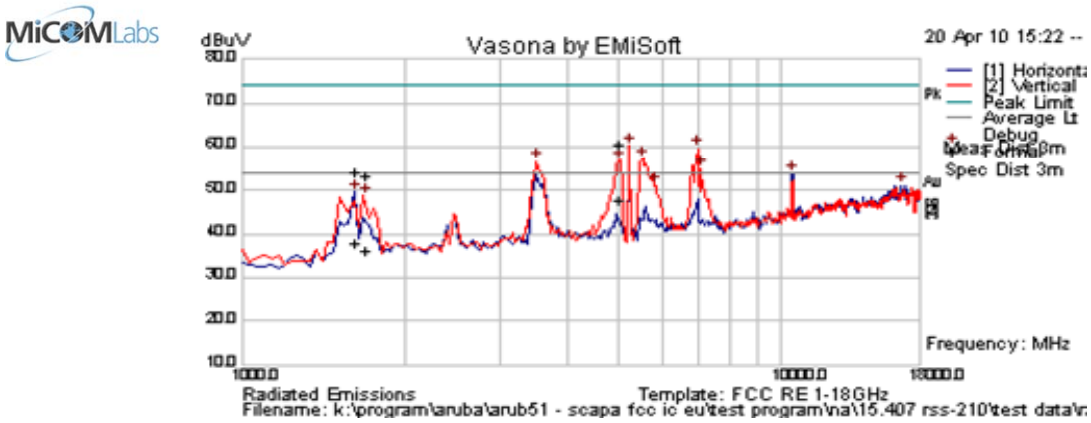


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
1543.776	65.6	2.4	-14.5	53.5	Peak Max	V	105	313	74	-20.5	Pass	RB
1543.776	49.3	2.4	-14.5	37.2	Average Max	V	105	313	54	-16.8	Pass	RB
4994.429	66.1	4.6	-9.1	61.7	Peak Max	V	101	90	74.0	-12.3	Pass	RB
4994.429	52.4	4.6	-9.1	47.9	Average Max	V	101	90	54	-6.1	Pass	RB
15583.431	50.5	8.4	0.4	59.2	Peak Max	H	122	307	74.0	-14.8	Pass	RB
15583.431	35.2	8.4	0.4	43.9	Average Max	H	122	307	54	-10.1	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

Test Freq.	5230 MHz	**Engineer**	CSB
Variant	802.11n; HT-40; 13.5 MCS	**Temp (ºC)**	22.5
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	37
Power Setting	15 Art setting	**Press. (mBars)**	1010
Antenna		**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			



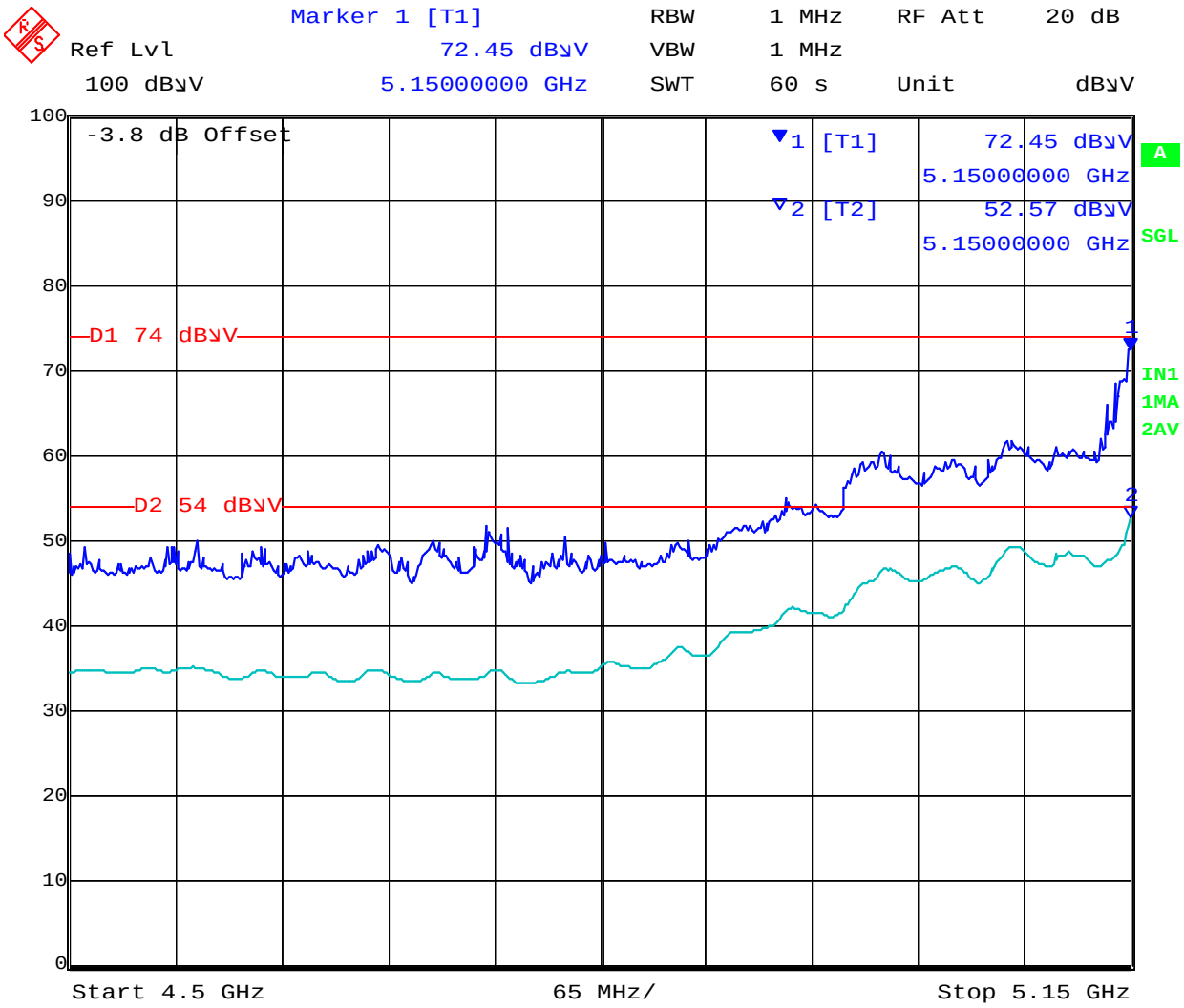
Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
1619.631	65.9	2.5	-14.1	54.2	Peak Max	V	99	305	74.0	-19.8	Pass	RB
1619.631	49.4	2.5	-14.1	37.7	Average Max	V	99	305	54.0	-16.3	Pass	RB
1700.594	64.5	2.5	-13.6	53.5	Peak Max	V	98	114	74	-20.5	Pass	RB
1700.594	47.1	2.5	-13.6	36.0	Average Max	V	98	114	54	-18.0	Pass	RB
4998.020	52.1	4.6	-9.1	47.6	Average Max	V	101	104	54	-6.4	Pass	RB
4998.020	65.3	4.6	-9.1	60.8	Peak Max	V	101	104	74	-13.2	Pass	RB

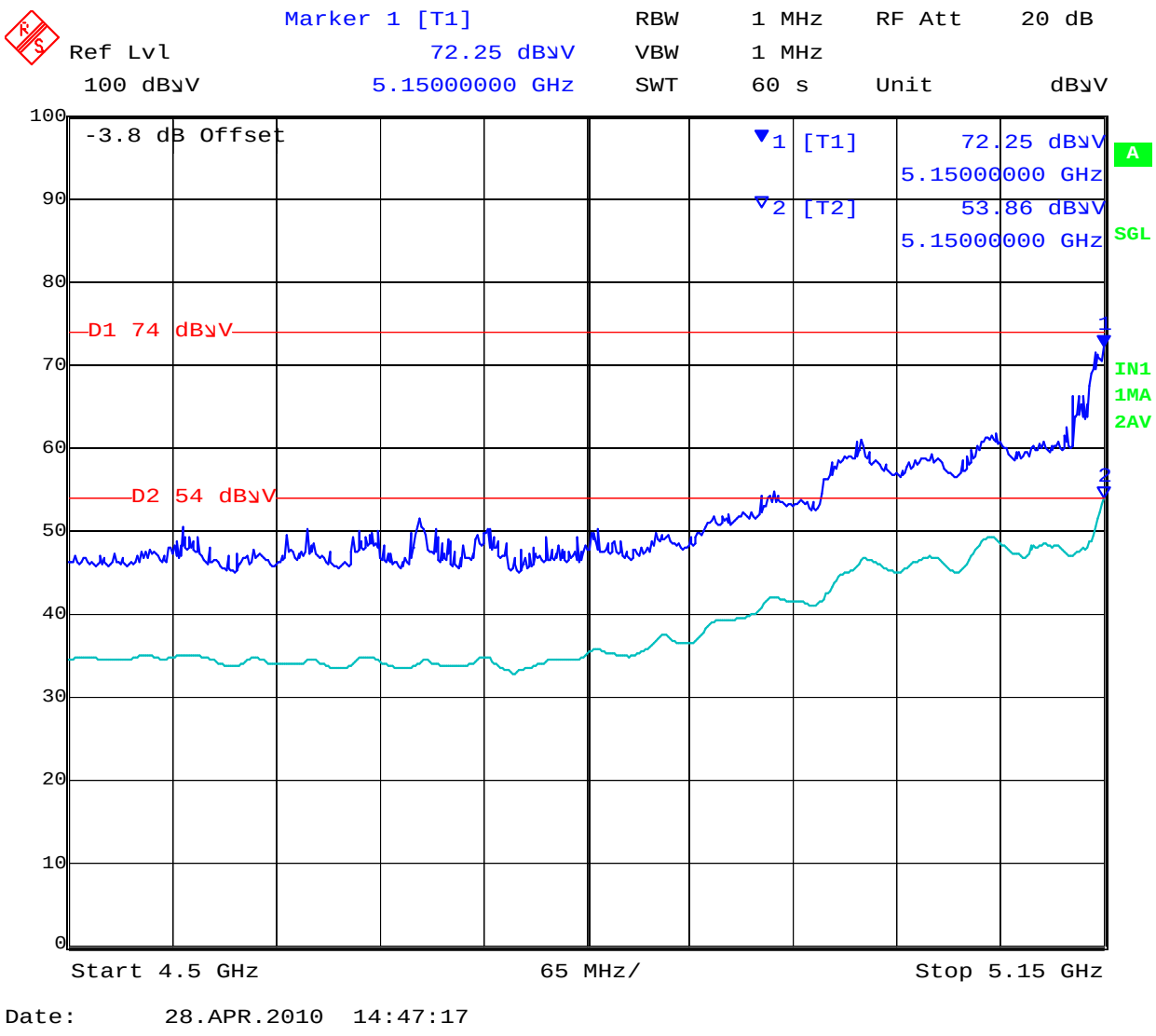
Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

5.1.7.5. AP-ANT-10 - Band edge spurious emissions

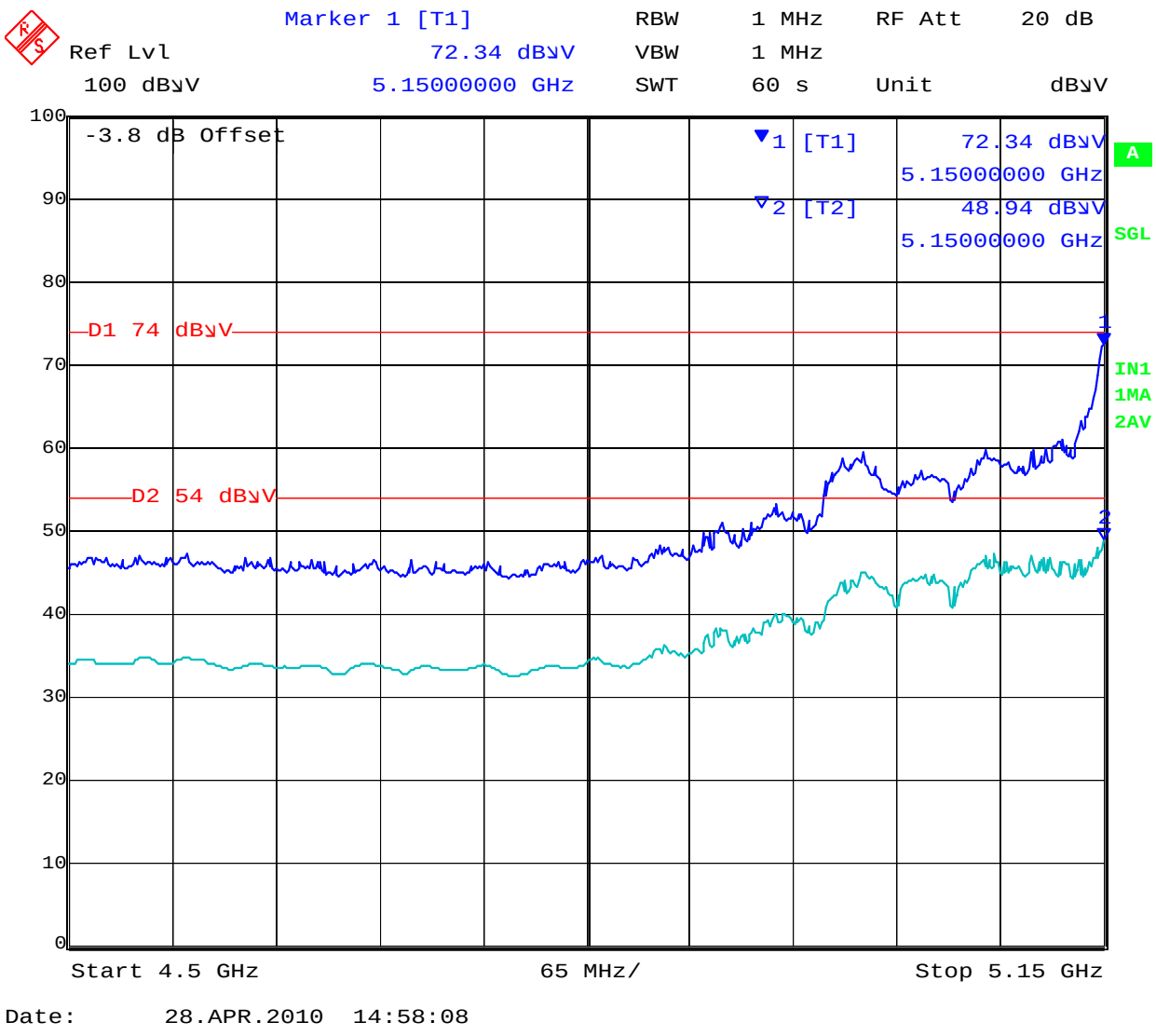
5180 MHz - 802.11a 4500-5150 MHz



5180 MHz - 802.11n HT-20 4500-5150 MHz



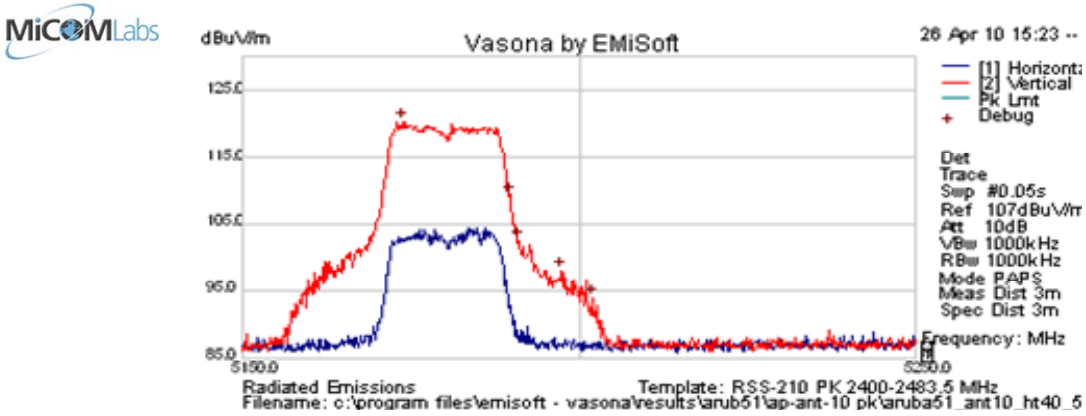
5190 MHz - 802.11n HT-40 4500-5150 MHz



5.1.7.6. AP-ANT-10 - Peak Emissions (RSS-210/RSS-GEN)

LOW BAND: 5150 – 5250 MHz: 802.11a

Test Freq.	5180 MHz	**Engineer**	CSB
Variant	802.11a; 6 Mbs	**Temp (ºC)**	19.5
Freq. Range	5150 - 5250 MHz	**Rel. Hum.(%)**	38
Power Setting	15 in art	**Press. (mBars)**	1004
Antenna	AP-ANT-10	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

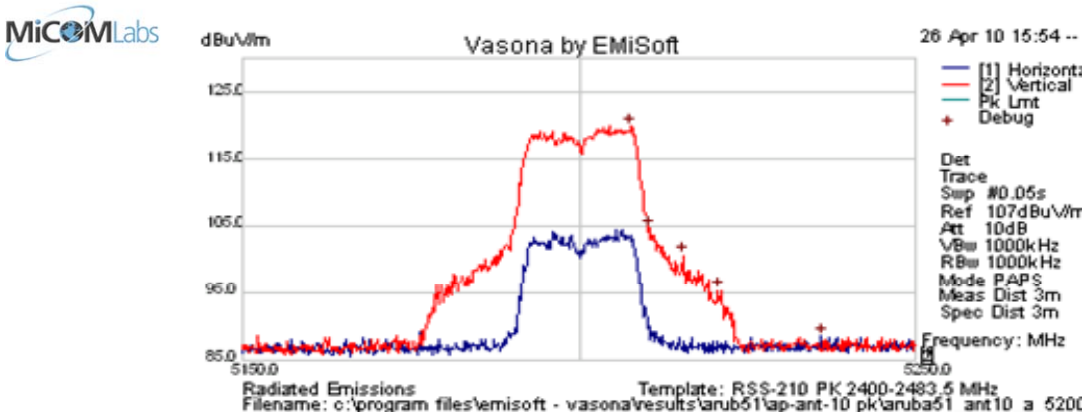


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5173.667	73.8	11.3	35.3	120.4	Peak [Scan]	V						PK

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	PK = Peak emissions of fundamental

Test Freq.	5200 MHz	**Engineer**	CSB
Variant	802.11a; 6 Mbs	**Temp (ºC)**	19.5
Freq. Range	5150 - 5250 MHz	**Rel. Hum.(%)**	38
Power Setting	15 in art	**Press. (mBars)**	1004
Antenna	AP-ANT-10	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

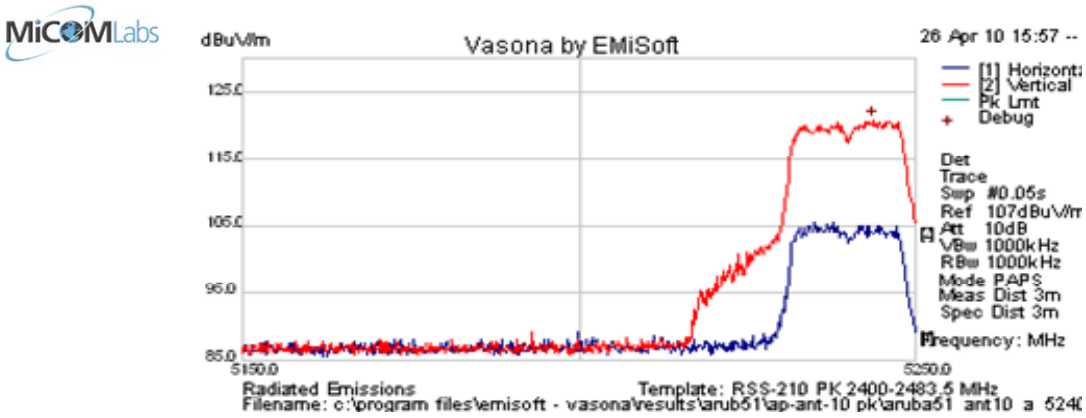


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5207.500	73.3	11.3	35.4	120.0	Peak [Scan]	V						PK

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	PK = Peak emissions of fundamental

Test Freq.	5240 MHz	**Engineer**	CSB
Variant	802.11a; 6 Mbs	**Temp (ºC)**	19.5
Freq. Range	5150 - 5250 MHz	**Rel. Hum.(%)**	38
Power Setting	15 in art	**Press. (mBars)**	1004
Antenna	AP-ANT-10	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			



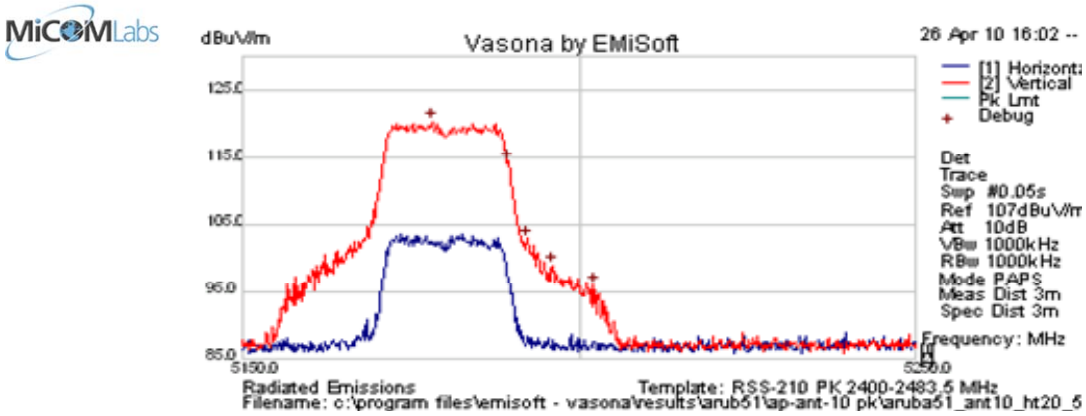
Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5243.667	74.1	11.4	35.5	121.0	Peak [Scan]	V						PK

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	PK = Peak emissions of fundamental

LOW BAND: 5150 – 5250 MHz: 802.11n HT-20

Test Freq.	5180 MHz	**Engineer**	CSB
Variant	802.11n; HT-20; 6.5 MCS	**Temp (°C)**	19.5
Freq. Range	5150 - 5250 MHz	**Rel. Hum.(%)**	38
Power Setting	15 in art	**Press. (mBars)**	1004
Antenna	AP-ANT-10	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

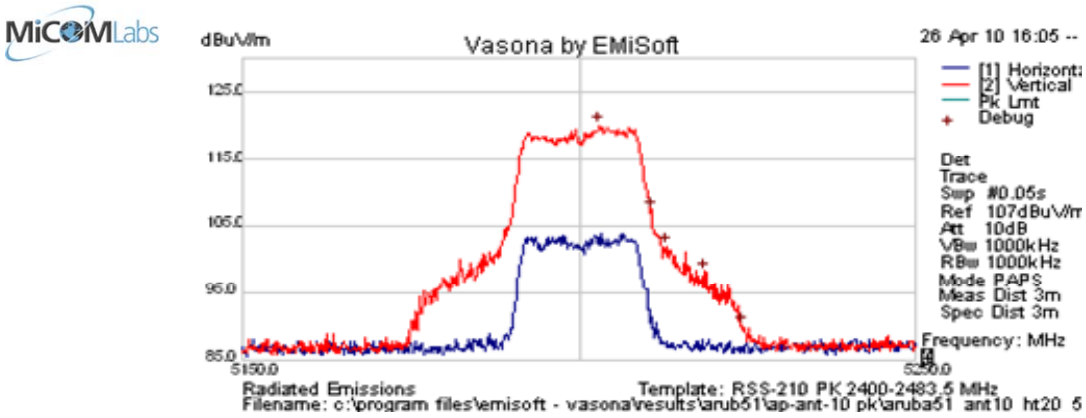


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5178.000	73.8	11.3	35.3	120.4	Peak [Scan]	V						PK

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	PK = Peak emissions of fundamental

Test Freq.	5200 MHz	**Engineer**	CSB
Variant	802.11n; HT-20; 6.5 MCS	**Temp (ºC)**	19.5
Freq. Range	5150 - 5250 MHz	**Rel. Hum.(%)**	38
Power Setting	15 in art	**Press. (mBars)**	1004
Antenna	AP-ANT-10	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

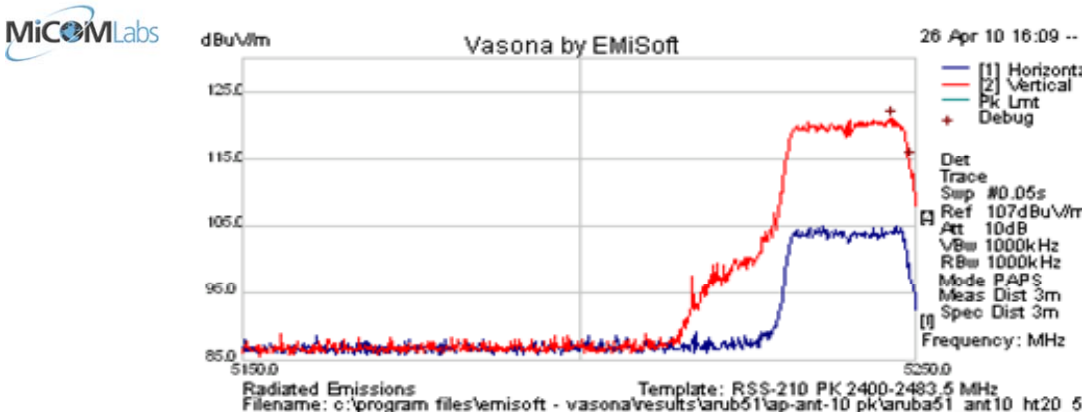


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5202.833	73.4	11.3	35.4	120.1	Peak [Scan]	V						PK

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	PK = Peak emissions of fundamental

Test Freq.	5240 MHz	**Engineer**	CSB
Variant	802.11n; HT-20; 6.5 MCS	**Temp (ºC)**	19.5
Freq. Range	5150 - 5250 MHz	**Rel. Hum.(%)**	38
Power Setting	15 in art	**Press. (mBars)**	1004
Antenna	AP-ANT-10	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			



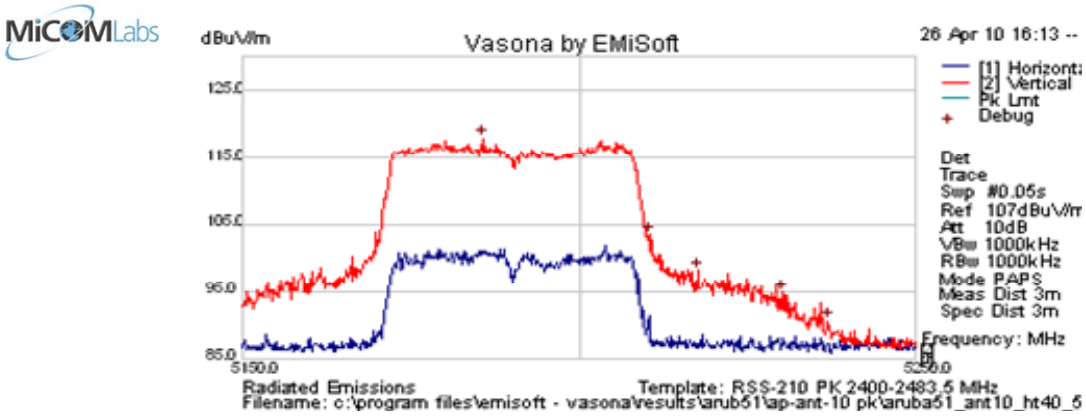
Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5246.500	74.3	11.4	35.5	121.1	Peak [Scan]	V						PK

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	PK = Peak emissions of fundamental

LOW BAND: 5150 – 5250 MHz: 802.11n HT-40

Test Freq.	5190 MHz	**Engineer**	CSB
Variant	802.11n; HT-40; 13.5 MCS	**Temp (°C)**	19.5
Freq. Range	5150 - 5250 MHz	**Rel. Hum.(%)**	38
Power Setting	15 in art	**Press. (mBars)**	1004
Antenna	AP-ANT-10	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

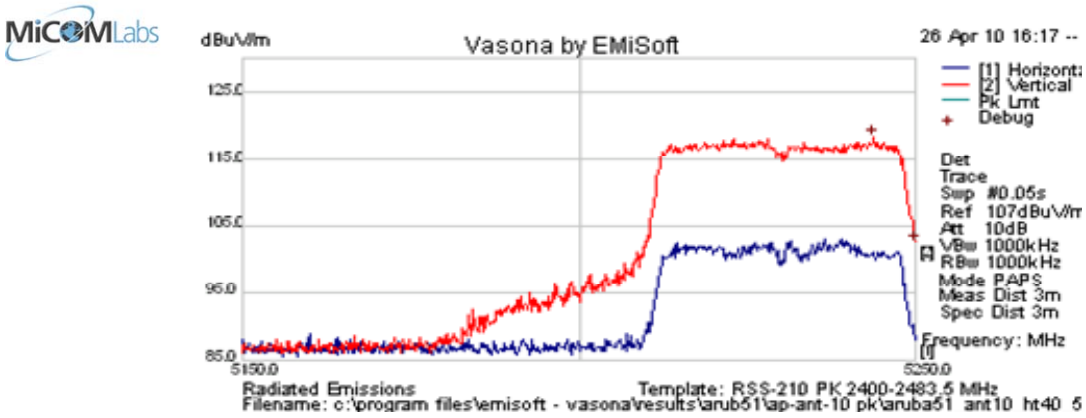


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5185.500	71.3	11.3	35.4	117.9	Peak [Scan]	V						PK

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	PK = Peak emissions of fundamental

Test Freq.	5230 MHz	**Engineer**	CSB
Variant	802.11n; HT-40; 13.5 MCS	**Temp (ºC)**	19.5
Freq. Range	5150 - 5250 MHz	**Rel. Hum.(%)**	38
Power Setting	15 in art	**Press. (mBars)**	1004
Antenna	AP-ANT-10	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			



Formally measured emission peaks

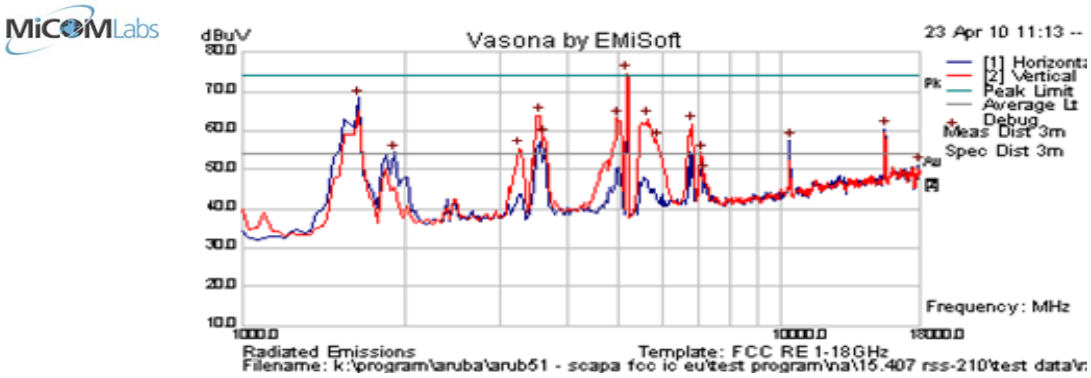
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5243.667	71.4	11.4	35.5	118.3	Peak [Scan]	V						PK

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	PK = Peak emissions of fundamental

5.1.7.7. AP-ANT-12 - Transmitter Radiated Spurious Emissions – Above 1 GHz

LOW BAND: 5150 – 5250 MHz: 802.11a

Test Freq.	5180 MHz	**Engineer**	CSB
Variant	802.11a; 6 Mbs	**Temp (ºC)**	24
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	38
Power Setting	15 in Art	**Press. (mBars)**	1006
Antenna	AP-ANT-12	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

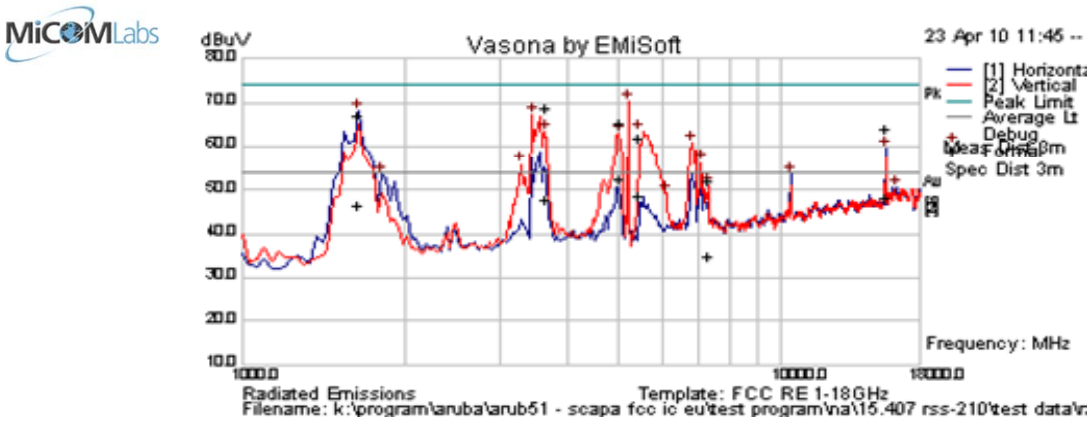


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
1722.164	34.8	2.6	-13.3	24.1	Average	H	175	139	54.0	-29.9	Pass	RB
1722.164	54.5	2.6	-13.3	43.7	Peak	H	175	139	74.0	-30.3	Pass	RB
1647.263	79.3	2.5	-13.8	68.0	Peak Max	H	186	101	74.0	-6.0	Pass	RB
1647.263	65.0	2.5	-13.8	53.7	Average Max	H	186	101	54.0	-0.3	Pass	RB
3356.211	51.6	3.5	-11.8	43.4	Average Max	V	98	3	54	-10.6	Pass	RB
3356.211	66.6	3.5	-11.8	58.4	Peak Max	V	98	3	74	-15.6	Pass	RB
3648.733	50.0	3.7	-10.7	43.1	Average Max	V	106	355	54	-10.9	Pass	RB
3648.733	64.7	3.7	-10.7	57.8	Peak Max	V	106	355	74	-16.2	Pass	RB
4995.442	71.2	4.6	-9.1	66.8	Peak Max	V	108	360	74	-7.2	Pass	RB
4995.442	57.5	4.6	-9.1	53.0	Average Max	V	108	360	54	-1.0	Pass	RB
5459.958	69.4	4.6	-9.0	65.0	Peak Max	V	117	4	74	-9.0	Pass	RB
5459.958	54.6	4.6	-9.0	50.2	Average Max	V	117	4	54	-3.8	Pass	RB
15535.812	43.2	8.3	0.0	51.4	Average Max	H	139	291	54	-2.6	Pass	RB
15535.812	58.8	8.3	0.0	67.0	Peak Max	H	139	291	74	-7.0	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

Test Freq.	5200 MHz	**Engineer**	CSB
Variant	802.11a; 6 Mbs	**Temp (ºC)**	24
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	38
Power Setting	15 in Art	**Press. (mBars)**	1006
Antenna	AP-ANT-12	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

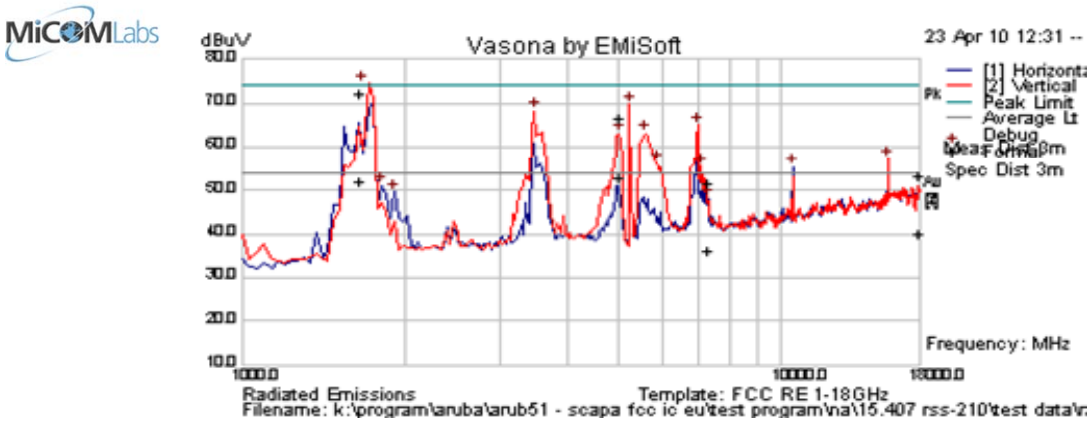


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
1645.509	78.4	2.5	-13.9	67.0	Peak Max	H	98	91	74.0	-7.0	Pass	RB
1645.509	58.0	2.5	-13.9	46.7	Average Max	H	98	91	54	-7.3	Pass	RB
3648.460	75.9	3.7	-10.7	68.9	Peak Max	V	107	360	74.0	-5.1	Pass	RB
3648.460	54.7	3.7	-10.7	47.8	Average Max	V	107	360	54	-6.3	Pass	RB
4991.884	70.0	4.6	-9.1	65.5	Peak Max	V	98	3	74	-8.5	Pass	RB
4991.884	56.8	4.6	-9.1	52.3	Average Max	V	98	3	54	-1.7	Pass	RB
5456.356	66.1	4.6	-9.0	61.8	Peak Max	V	132	360	74	-12.2	Pass	RB
5456.356	53.1	4.6	-9.0	48.7	Average Max	V	132	360	54	-5.3	Pass	RB
7302.248	51.5	5.4	-4.9	52.1	Peak Max	V	108	332	74	-21.9	Pass	RB
7302.248	34.5	5.4	-4.9	35.1	Average Max	V	108	332	54	-18.9	Pass	RB
15596.380	55.1	8.4	0.4	63.9	Peak Max	H	113	318	74	-10.1	Pass	RB
15596.380	39.4	8.4	0.4	48.2	Average Max	H	113	318	54	-5.8	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

Test Freq.	5240 MHz	**Engineer**	CSB
Variant	802.11a; 6 Mbs	**Temp (ºC)**	24
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	38
Power Setting	15 in Art	**Press. (mBars)**	1006
Antenna	AP-ANT-12	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			



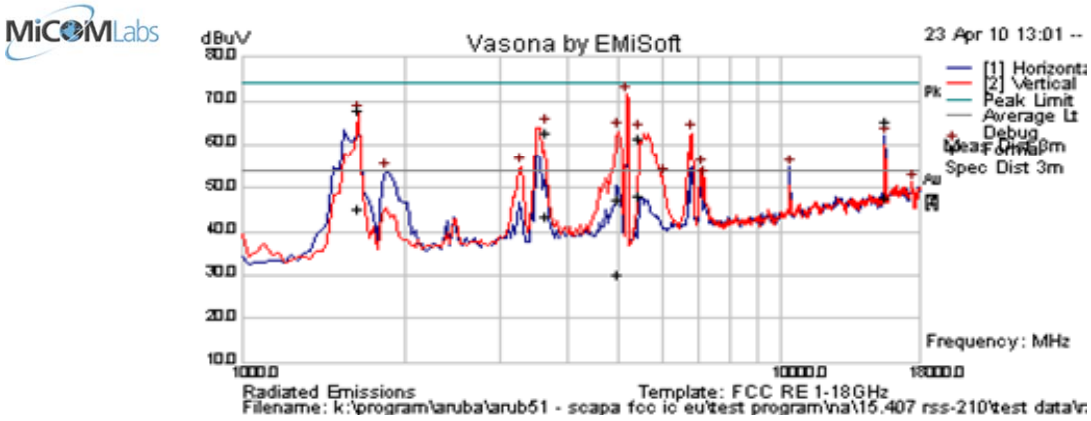
Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
1662.458	79.1	2.5	-13.6	67.9	Peak Max	V	110	0	74.0	-1.9	Pass	RB
1662.458	63.3	2.5	-13.6	52.1	Average Max	V	110	0	54	-1.9	Pass	RB
4992.597	71.0	4.6	-9.1	66.5	Peak Max	V	100	0	74.0	-7.5	Pass	RB
4992.597	57.5	4.6	-9.1	53.0	Average Max	V	100	0	54	-1.0	Pass	RB
7301.928	51.3	5.4	-4.9	51.8	Peak Max	H	129	344	74	-22.2	Pass	RB
7301.928	35.6	5.4	-4.9	36.1	Average Max	H	129	344	54	-17.9	Pass	RB
17930.513	43.3	8.8	1.3	53.4	Peak Max	V	98	141	74	-20.6	Pass	RB
17930.513	29.9	8.8	1.3	40.0	Average Max	V	98	141	54	-14.0	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

LOW BAND: 5150 – 5250 MHz: 802.11n HT-20

Test Freq.	5180 MHz	**Engineer**	CSB
Variant	802.11n HT-20; 6.5 MCS	**Temp (°C)**	24
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	38
Power Setting	15 IN ART	**Press. (mBars)**	1006
Antenna	AP-ANT-12	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

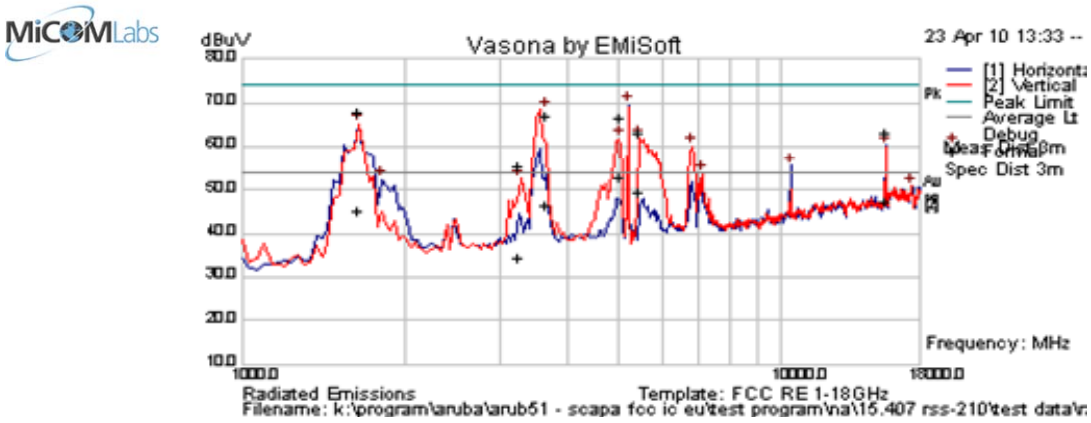


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
1646.914	79.2	2.5	-13.8	67.9	Peak Max	V	106	360	74.0	-6.1	Pass	RB
1646.914	56.6	2.5	-13.8	45.2	Average Max	V	106	360	54	-8.8	Pass	RB
3645.615	69.8	3.7	-10.7	62.8	Peak Max	V	110	360	74.0	-11.2	Pass	RB
3645.615	50.4	3.7	-10.7	43.5	Average Max	V	110	360	54	-10.5	Pass	RB
4989.006	51.9	4.6	-9.1	47.4	Peak Max	V	98	90	74	-26.6	Pass	RB
4989.006	34.7	4.6	-9.1	30.2	Average Max	V	98	90	54	-23.8	Pass	RB
5456.412	65.9	4.6	-9.0	61.5	Peak Max	V	105	8	74	-12.5	Pass	RB
5456.412	52.7	4.6	-9.0	48.3	Average Max	V	105	8	54	-5.7	Pass	RB
15540.020	57.2	8.3	0.0	65.5	Peak Max	H	103	322	74	-8.5	Pass	RB
15540.020	39.4	8.3	0.0	47.7	Average Max	H	103	322	54	-6.3	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

Test Freq.	5200 MHz	**Engineer**	CSB
Variant	802.11n HT-20; 6.5 MCS	**Temp (ºC)**	24
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	38
Power Setting	15 IN ART	**Press. (mBars)**	1006
Antenna	AP-ANT-12	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

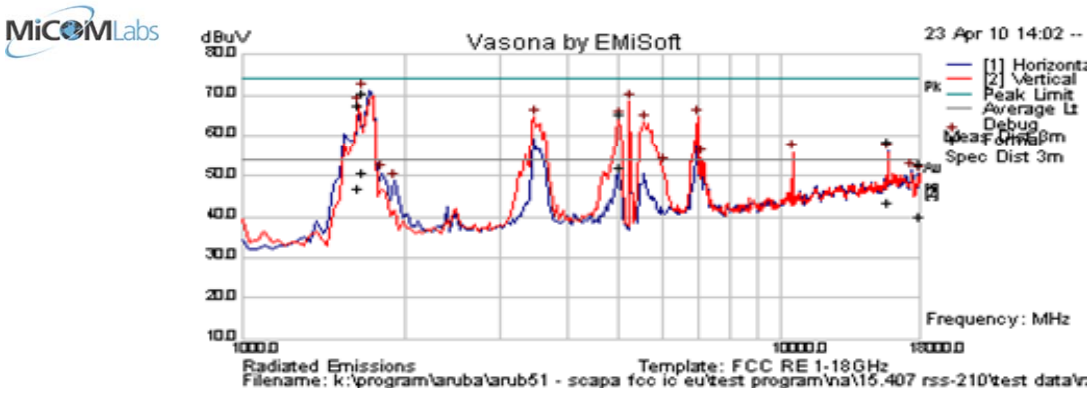


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
1646.479	79.3	2.5	-13.8	68.0	Peak Max	V	98	338	74.0	-6.0	Pass	RB
1646.479	56.6	2.5	-13.8	45.2	Average Max	V	98	338	54	-8.8	Pass	RB
3266.473	63.4	3.5	-11.5	55.5	Peak Max	V	98	360	74	-18.6	Pass	RB
3266.473	42.6	3.5	-11.5	34.6	Average Max	V	98	360	54	-19.4	Pass	RB
3652.693	74.0	3.7	-10.7	67.0	Peak Max	V	108	360	74.0	-7.0	Pass	RB
3652.693	53.4	3.7	-10.7	46.5	Average Max	V	108	360	54	-7.5	Pass	RB
4990.778	71.0	4.6	-9.1	66.5	Peak Max	V	100	361	74	-7.5	Pass	RB
4990.778	57.3	4.6	-9.1	52.8	Average Max	V	100	361	54	-1.2	Pass	RB
5459.202	67.5	4.6	-9.0	63.2	Peak Max	V	118	4	74	-10.9	Pass	RB
5459.202	53.9	4.6	-9.0	49.5	Average Max	V	118	4	54	-4.5	Pass	RB
15598.889	54.6	8.4	0.4	63.4	Peak Max	H	100	286	74	-10.6	Pass	RB
15598.889	38.7	8.4	0.4	47.5	Average Max	H	100	286	54	-6.6	Pass	RB

Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

Test Freq.	5240 MHz	**Engineer**	CSB
Variant	802.11n HT-20; 6.5 MCS	**Temp (ºC)**	24
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	38
Power Setting	15 IN ART	**Press. (mBars)**	1006
Antenna	AP-ANT-12	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			



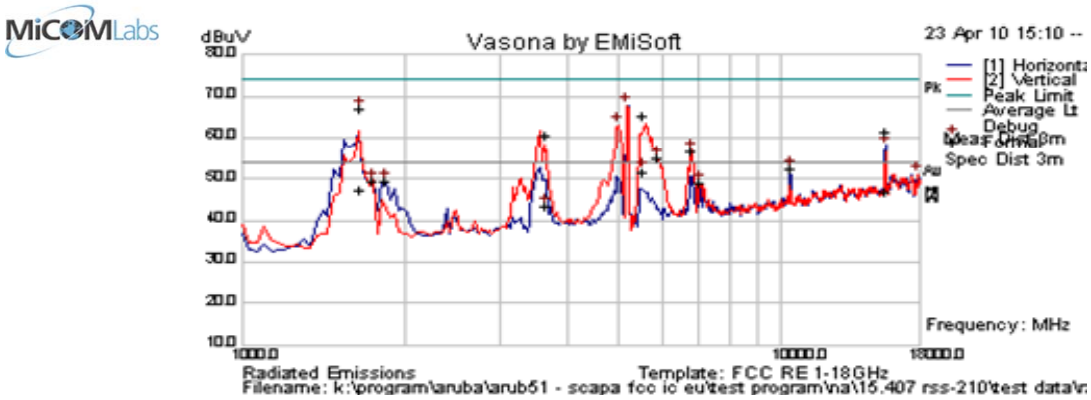
Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
1645.418	78.9	2.5	-13.8	67.6	Peak Max	V	98	360	74.0	-6.4	Pass	RB
1645.418	58.1	2.5	-13.8	46.7	Average Max	V	98	360	54	-7.3	Pass	RB
1667.174	81.5	2.5	-13.6	70.4	Peak Max	H	100	103	74.0	-3.6	Pass	RB
1667.174	61.8	2.5	-13.6	50.7	Average Max	H	100	103	54	-3.3	Pass	RB
1817.635	60.9	2.6	-12.8	50.7	Peak [Scan]	H	--	--	68.23	-17.6	Pass	NRB
1919.840	57.8	2.7	-11.8	48.7	Peak [Scan]	H	--	--	68.23	-19.5	Pass	NRB
3486.974	72.6	3.6	-11.6	64.6	Peak [Scan]	V	--	--	68.23	-3.6	Pass	NRB
4993.318	69.9	4.6	-9.1	65.4	Peak Max	V	98	4	74	-8.6	Pass	RB
4993.318	56.5	4.6	-9.1	52.0	Average Max	V	98	4	54	-2.0	Pass	RB
6995.992	64.4	5.4	-5.1	64.7	Peak [Scan]	V	--	--	68.23	-3.6	Pass	NRB
7098.196	54.4	5.4	-5.2	54.6	Peak [Scan]	V	--	--	68.23	-13.7	Pass	NRB
10470.942	51.8	6.8	-2.6	55.9	Peak [Scan]	V	--	--	68.23	-12.3	Pass	NRB
15724.837	50.3	8.6	-0.6	58.3	Peak Max	H	106	318	74	-15.7	Pass	RB
15724.837	35.4	8.6	-0.6	43.4	Average Max	H	106	318	54	-10.6	Pass	RB
17928.197	42.9	8.8	1.3	52.9	Peak Max	H	180	148	74	-21.1	Pass	RB
17928.197	29.8	8.8	1.3	39.9	Average Max	H	180	148	54	-14.1	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

LOW BAND: 5150 – 5250 MHz: 802.11n HT-40

Test Freq.	5190 MHz	**Engineer**	CSB
Variant	802.11n HT-40; 13.5 MCS	**Temp (ºC)**	24
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	38
Power Setting	15 in ART test utility	**Press. (mBars)**	1006
Antenna	AP-ANT-12	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

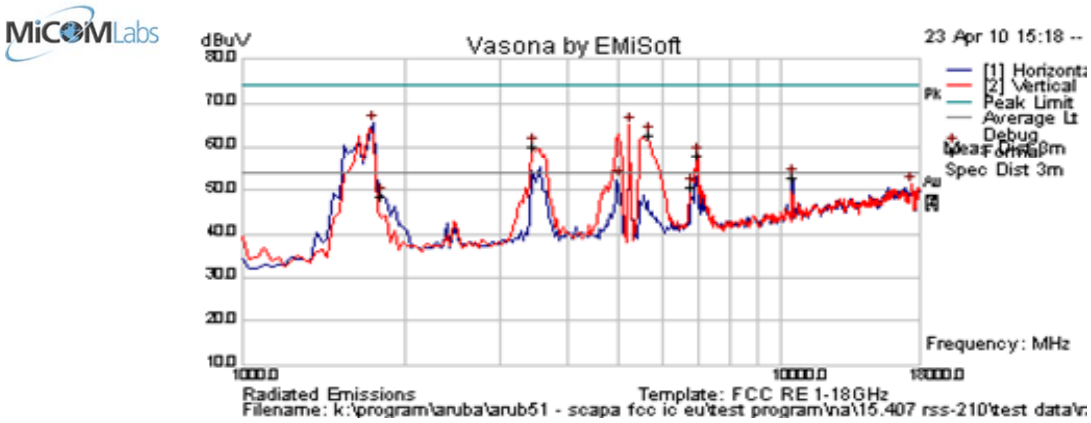


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
1662.806	58.4	2.5	-13.6	47.2	Average Max	V	110	360	54.0	-6.8	Pass	RB
1662.806	78.3	2.5	-13.6	67.2	Peak Max	V	110	360	74.0	-6.9	Pass	RB
1749.499	60.1	2.6	-13.1	49.6	Peak [Scan]	V	--	--	68.23	-18.6	Pass	NRB
1851.703	59.3	2.7	-12.5	49.4	Peak [Scan]	H	--	--	68.23	-18.8	Pass	NRB
3648.597	67.4	3.7	-10.7	60.4	Peak Max	V	98	360	74	-13.6	Pass	RB
3648.597	50.3	3.7	-10.7	43.4	Average Max	V	98	360	54	-10.6	Pass	RB
5557.675	69.0	4.7	-8.5	65.2	Peak Max	V	--	--	68.23	-3.1	Pass	NRB
5905.812	58.9	4.8	-8.7	55.0	Peak [Scan]	V	--	--	68.23	-13.2	Pass	NRB
6825.651	57.3	5.3	-5.7	56.9	Peak [Scan]	V	--	--	68.23	-11.3	Pass	NRB
7064.128	48.7	5.4	-5.1	49.0	Peak [Scan]	V	--	--	68.23	-19.2	Pass	NRB
10376.873	48.0	6.7	-2.1	52.6	Peak [Scan]	H	--	--	68.23	-15.6	Pass	NRB
15574.669	38.1	8.3	0.4	46.9	Average Max	H	105	320	54	-7.1	Pass	RB
15574.669	52.9	8.3	0.4	61.6	Peak Max	H	105	320	74	-12.4	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

Test Freq.	5230 MHz	**Engineer**	CSB
Variant	802.11n HT-40; 13.5 MCS	**Temp (ºC)**	24
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	38
Power Setting	15 in ART test utility	**Press. (mBars)**	1006
Antenna	AP-ANT-12	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			



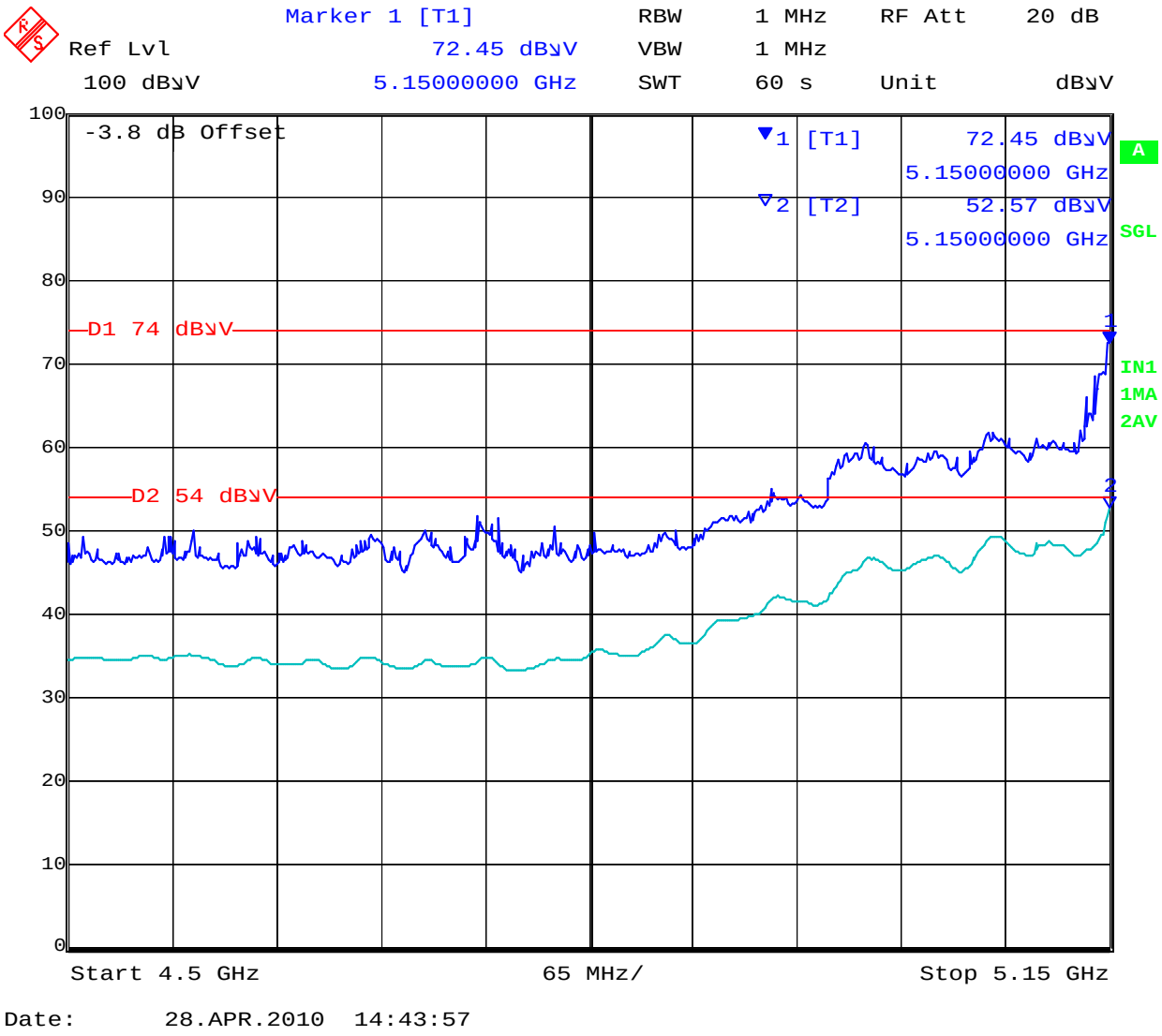
Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
1817.635	58.9	2.6	-12.8	48.7	Peak [Scan]	H	--	--	68.23	-19.5	Pass	NRB
3452.906	68.2	3.6	-11.5	60.3	Peak [Scan]	V	--	--	68.23	-8.0	Pass	NRB
5667.335	66.3	4.7	-8.2	62.9	Peak [Scan]	V	--	--	68.23	-5.4	Pass	NRB
6822.445	51.2	5.3	-5.6	50.9	Peak [Scan]	V	--	--	68.23	-17.3	Pass	NRB
6995.992	58.0	5.4	-5.1	58.2	Peak [Scan]	V	--	--	68.23	-10.0	Pass	NRB
10458.197	48.6	6.8	-2.6	52.8	Peak [Scan]	H	--	--	68.23	-15.5	Pass	NRB

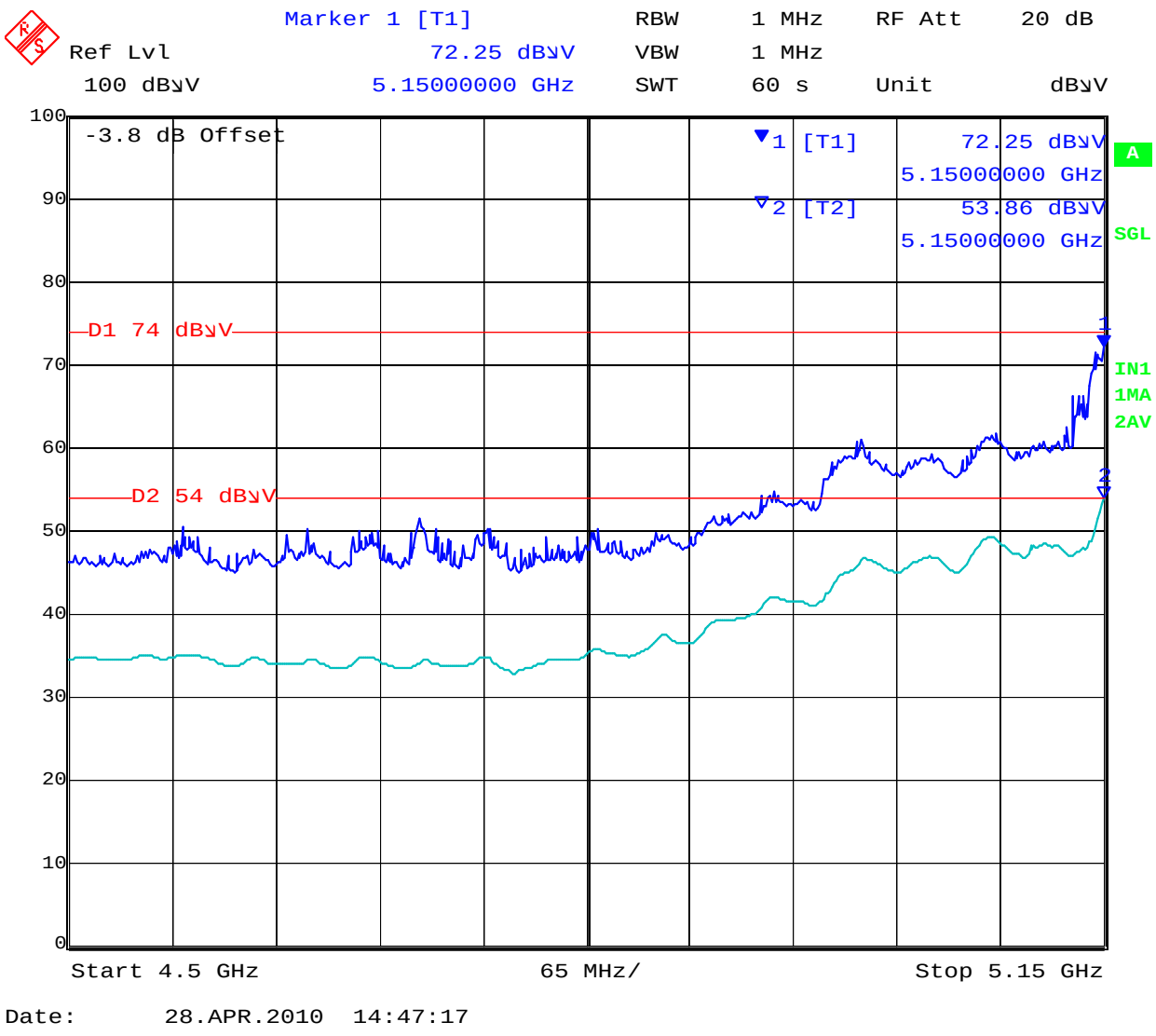
Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

5.1.7.8. AP-ANT-12 - Band edge spurious emissions

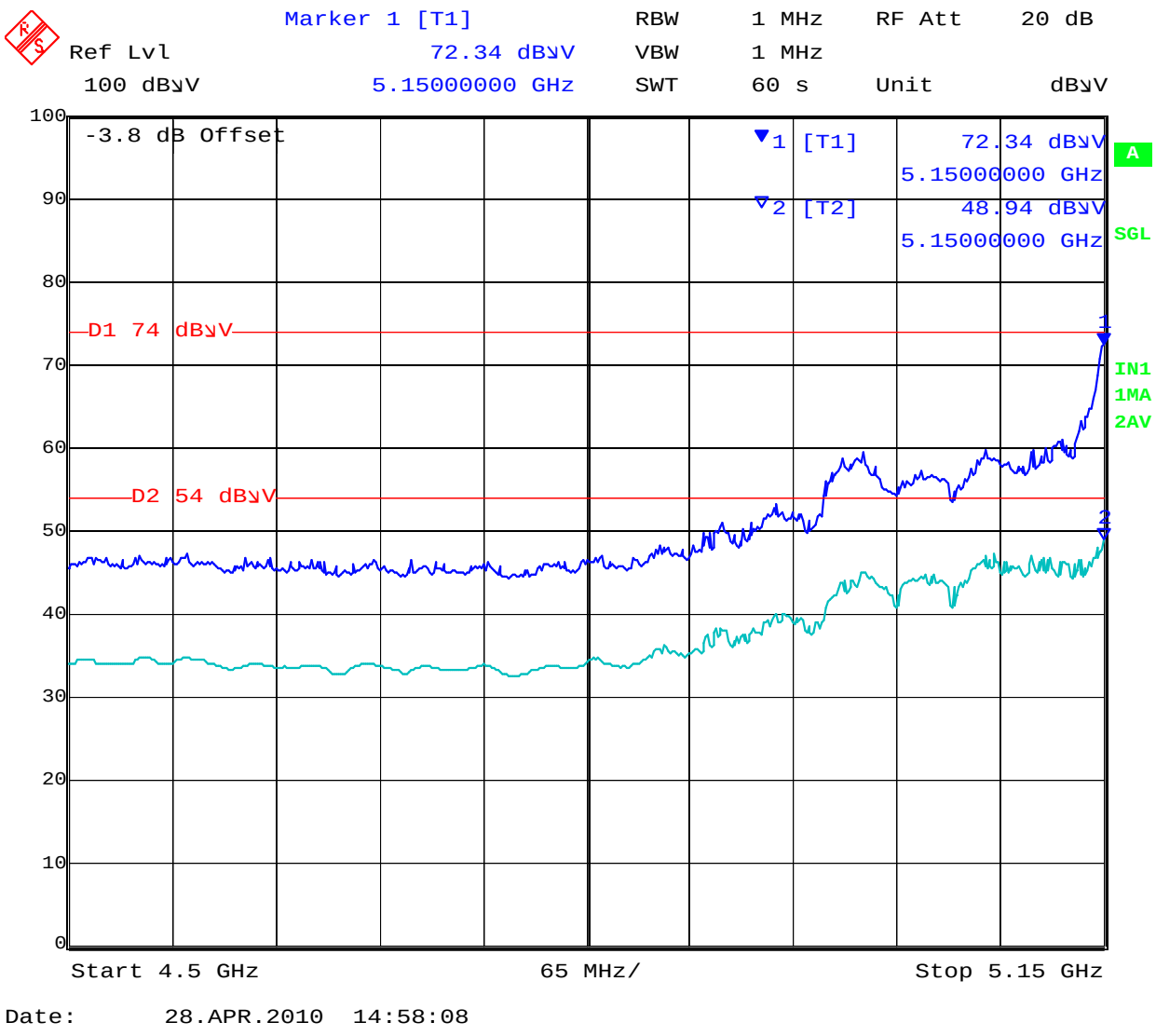
5180 MHz - 802.11a 4500-5150 MHz



5180 MHz - 802.11n HT-20 4500-5150 MHz



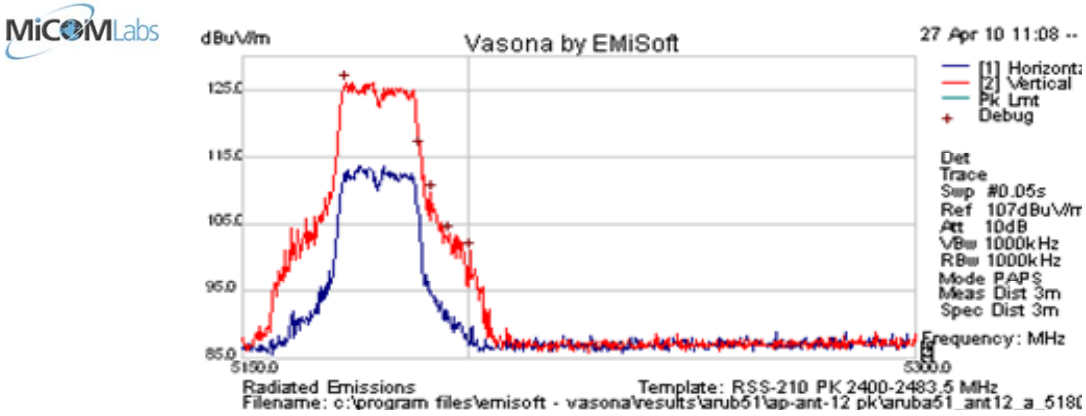
5190 MHz - 802.11n HT-40 4500-5150 MHz



5.1.7.9. AP-ANT-12 - Peak Emissions (RSS-210/RSS-GEN)

LOW BAND: 5150 – 5250 MHz: 802.11a

Test Freq.	5180 MHz	**Engineer**	CSB
Variant	802.11a; 6 Mbs	**Temp (ºC)**	19.5
Freq. Range	5150 - 5250 MHz	**Rel. Hum.(%)**	38
Power Setting	15 in ART test utility	**Press. (mBars)**	1004
Antenna	AP-ANT-12	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

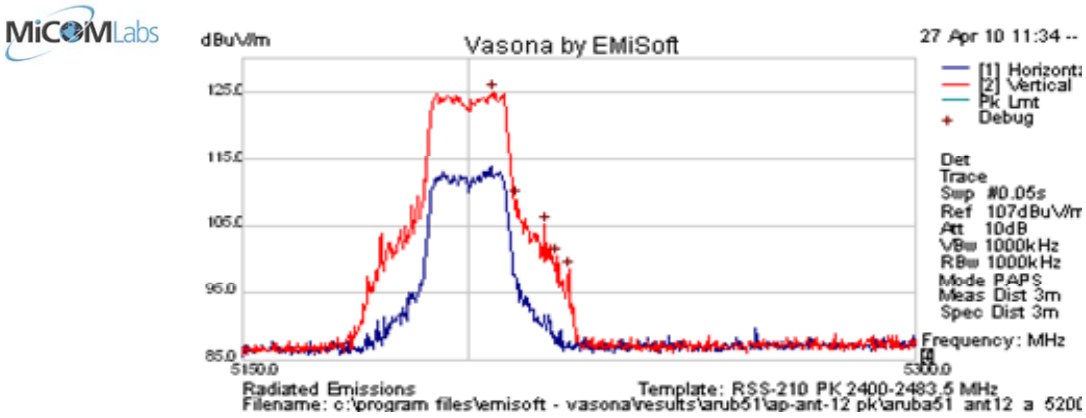


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5173.000	79.6	11.3	35.3	126.2	Peak [Scan]	V						PK

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	PK = Peak emissions of fundamental

Test Freq.	5200 MHz	**Engineer**	CSB
Variant	802.11a; 6 Mbs	**Temp (ºC)**	19.5
Freq. Range	5150 - 5250 MHz	**Rel. Hum.(%)**	38
Power Setting	15 in ART test utility	**Press. (mBars)**	1004
Antenna	AP-ANT-12	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

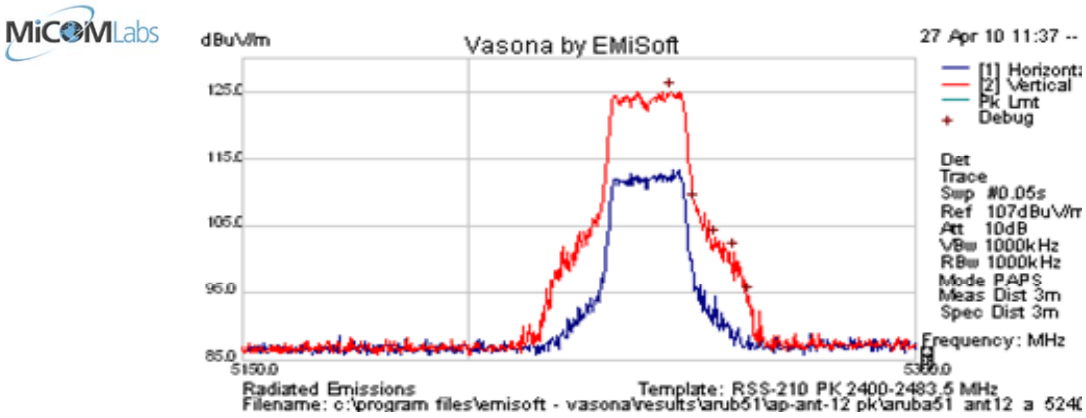


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5205.500	78.3	11.3	35.4	125.0	Peak [Scan]	V						PK

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	PK = Peak emissions of fundamental

Test Freq.	5240 MHz	**Engineer**	CSB
Variant	802.11a; 6 Mbs	**Temp (ºC)**	19.5
Freq. Range	5150 - 5250 MHz	**Rel. Hum.(%)**	38
Power Setting	15 in ART test utility	**Press. (mBars)**	1004
Antenna	AP-ANT-12	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			



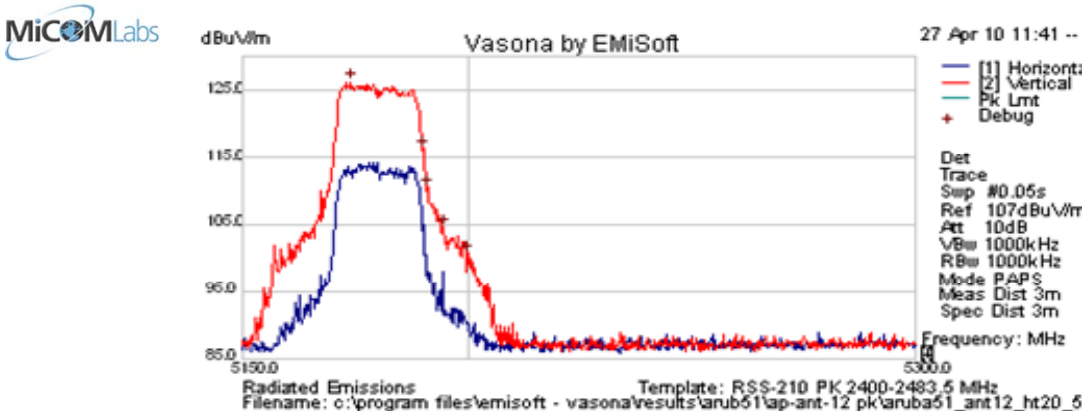
Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5245.000	78.3	11.4	35.5	125.1	Peak [Scan]	V						PK

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	PK = Peak emissions of fundamental

LOW BAND: 5150 – 5250 MHz: 802.11n HT-20

Test Freq.	5180 MHz	**Engineer**	CSB
Variant	802.11n HT-20; 6.5 MCS	**Temp (°C)**	19.5
Freq. Range	5150 - 5250 MHz	**Rel. Hum.(%)**	38
Power Setting	15 in art	**Press. (mBars)**	1004
Antenna	AP-ANT-12	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

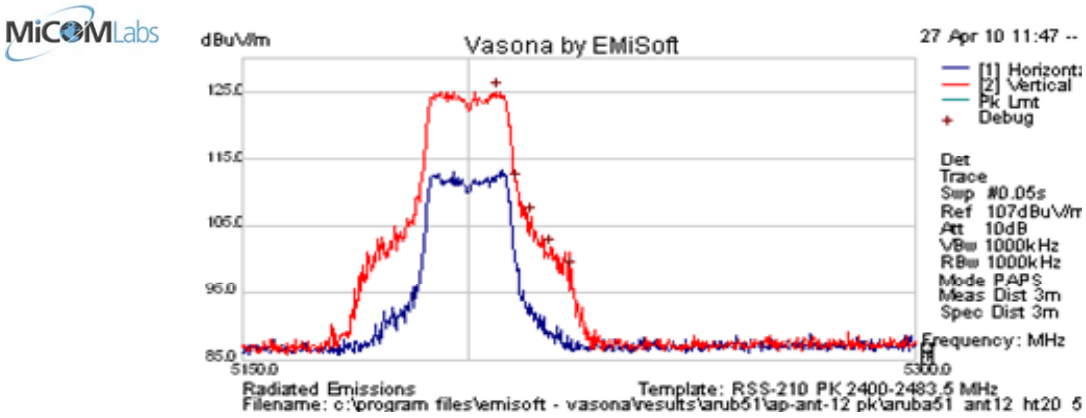


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5174.000	79.6	11.3	35.3	126.2	Peak [Scan]	V						PK

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	PK = Peak emissions of fundamental

Test Freq.	5200 MHz	**Engineer**	CSB
Variant	802.11n HT-20; 6.5 MCS	**Temp (ºC)**	19.5
Freq. Range	5150 - 5250 MHz	**Rel. Hum.(%)**	38
Power Setting	15 in art	**Press. (mBars)**	1004
Antenna	AP-ANT-12	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

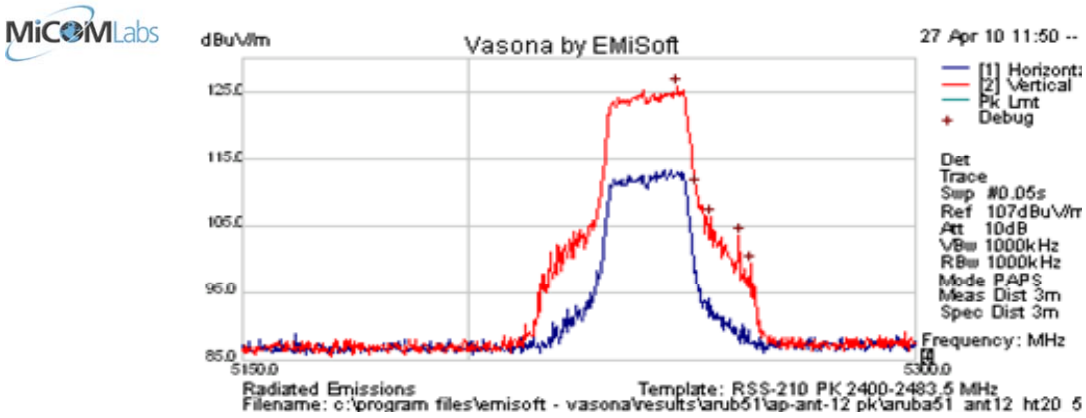


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5206.250	78.4	11.3	35.4	125.2	Peak [Scan]	V						PK

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	PK = Peak emissions of fundamental

Test Freq.	5240 MHz	**Engineer**	CSB
Variant	802.11n HT-20; 6.5 MCS	**Temp (ºC)**	19.5
Freq. Range	5150 - 5250 MHz	**Rel. Hum.(%)**	38
Power Setting	15 in art	**Press. (mBars)**	1004
Antenna	AP-ANT-12	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			



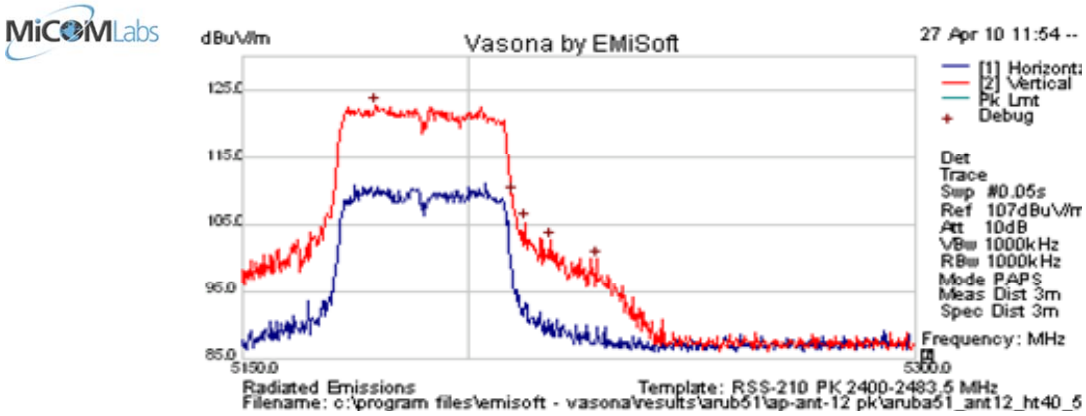
Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5246.500	78.9	11.4	35.5	125.8	Peak [Scan]	V						PK

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	PK = Peak emissions of fundamental

LOW BAND: 5150 – 5250 MHz: 802.11n HT-40

Test Freq.	5190 MHz	**Engineer**	CSB
Variant	802.11n HT-40; 13.5 MCS	**Temp (°C)**	19.5
Freq. Range	5150 - 5250 MHz	**Rel. Hum.(%)**	38
Power Setting	15 in art	**Press. (mBars)**	1004
Antenna	AP-ANT-12	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

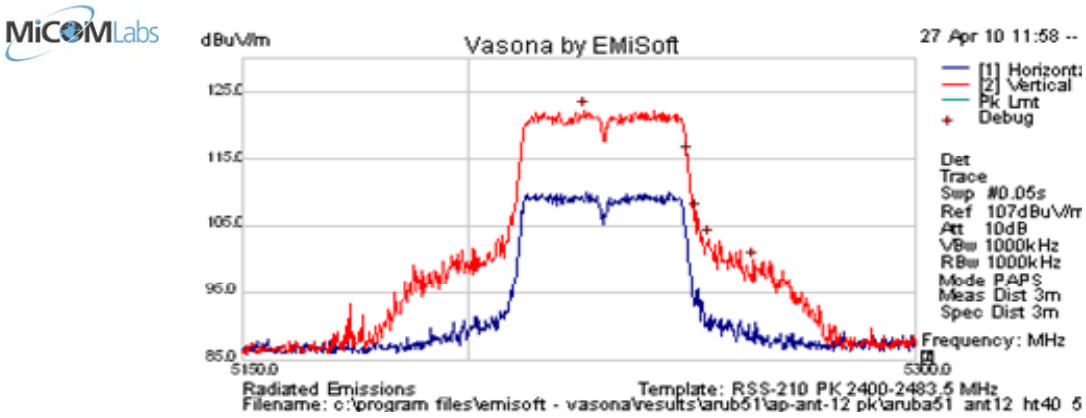


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5179.250	76.1	11.3	35.3	122.7	Peak [Scan]	V						PK

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	PK = Peak emissions of fundamental

Test Freq.	5230 MHz	**Engineer**	CSB
Variant	802.11n HT-40; 13.5 MCS	**Temp (ºC)**	19.5
Freq. Range	5150 - 5250 MHz	**Rel. Hum.(%)**	38
Power Setting	15 in art	**Press. (mBars)**	1004
Antenna	AP-ANT-12	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			



Formally measured emission peaks

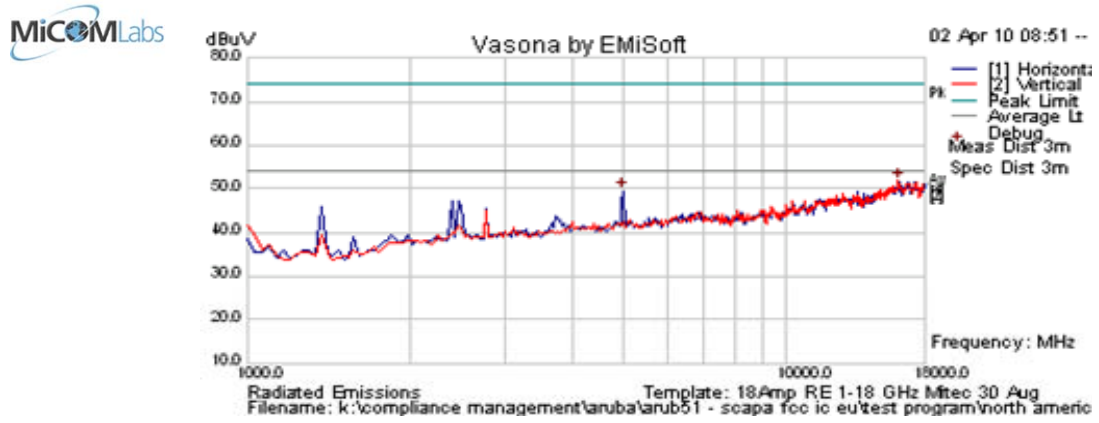
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5225.750	75.6	11.3	35.5	122.4	Peak [Scan]	V						PK

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	PK = Peak emissions of fundamental

5.1.7.10.Receiver Radiated Spurious Emissions

Receiver Radiated Spurious Emissions

Test Freq.	5200 MHz	**Engineer**	CSB
Variant	Receive in Test Utility	**Temp (ºC)**	19
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	Not Applicable in Receive Mode	**Press. (mBars)**	1011
Antenna	Integral Antenna's connected during testing		
Test Notes 1	EUT vertical in Chamber. AC powered.		
Test Notes 2			



Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
No Receiver Emissions within 6dB of limit.												

Legend:	TRANS = Transient Emission; RB = Restricted Band; NRB = Non-Restricted Band;
	BE = Emission in Restricted Band Nearest Transmission Band Edge; FUND = Fundamental Freq.

Specification

Limits

§15.407(b)(6) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in Section 15.209.

§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 §2.2 refers to Section 2.7 Table 2 below;-

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

Laboratory Measurement Uncertainty for Radiated Emissions

Measurement uncertainty	+5.6/ -4.5 dB

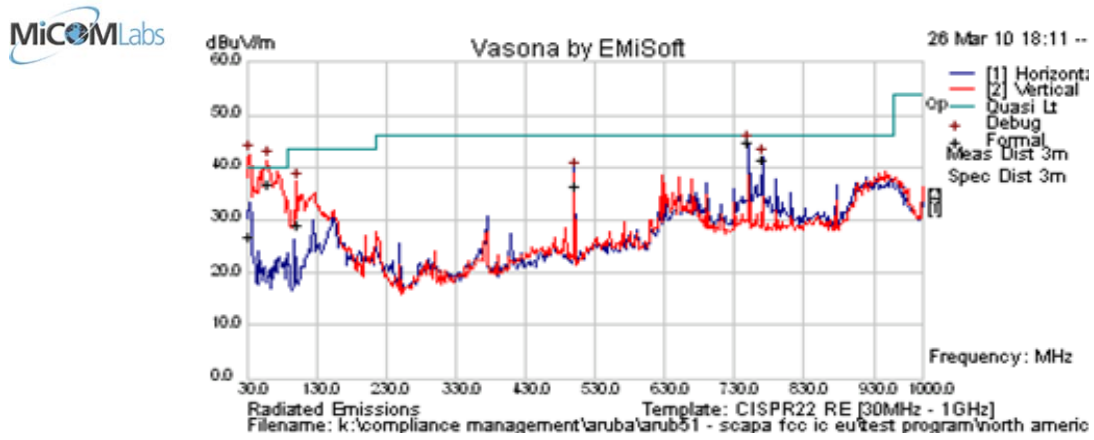
Traceability

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

5.1.7.11.Radiated Spurious Emissions – 30MHz – 1000MHz

Note: No radio emissions were present below 1 GHz. Emissions were investigated while the unit was transmitting at maximum power and in receive mode for both AC Adaptor powered and POE (Power Over Ethernet) configuration.

Test Freq.	2437 MHz	**Engineer**	CSB
Variant	Digital Emissions	**Temp (°C)**	23
Freq. Range	30 MHz - 1000 MHz	**Rel. Hum.(%)**	38
Power Setting	N/A - Receive Mode	**Press. (mBars)**	1013
Antenna	Integral Antennas		
Test Notes 1	AC Power - 120V AC; 60 Hz		
Test Notes 2			

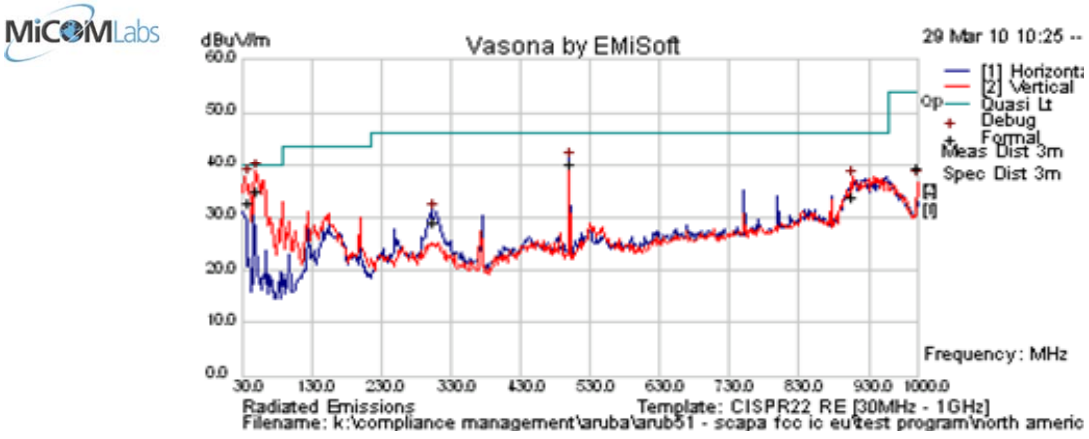


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
33.051	35.2	3.4	-11.8	26.8	Quasi Max	V	261	113	40	-13.2	Pass	DIG
60.938	56.8	3.8	-23.8	36.9	Quasi Max	V	134	77	40	-3.1	Pass	DIG
103.311	44.8	4.2	-19.9	29.1	Quasi Max	V	98	102	43.5	-14.4	Pass	DIG
499.984	42.8	6.0	-12.6	36.3	Quasi Max	H	98	142	46	-9.8	Pass	DIG
749.984	46.9	6.9	-9.0	44.8	Quasi Max	H	109	350	46	-1.2	Pass	DIG
769.990	43.2	7.0	-8.8	41.4	Quasi Max	H	109	353	46	-4.6	Pass	DIG

Legend:	DIG = Digital Device Emission; TX = Transmitter Emission; FUND = Fundamental Frequency
	NRB = Non-Restricted Band, Limit is 20 dB below Fundamental; RB = Restricted Band

Test Freq.	2437 MHz - Rx Mode	**Engineer**	CSB
Variant	Digital Emissions	**Temp (°C)**	21.5
Freq. Range	30 MHz - 1000 MHz	**Rel. Hum.(%)**	36
Power Setting	N/A	**Press. (mBars)**	1008
Antenna	Integral Antenna		
Test Notes 1	EUT powered via PoE (Power Over Ethernet) - PowerDsine 7001G		
Test Notes 2			



Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
40.261	46.0	3.6	-17.0	32.6	Quasi Max	V	101	176	40	-7.4	Pass	DIG
50.782	54.4	3.7	-23.2	35.0	Quasi Max	V	98	113	40	-5.0	Pass	DIG
305.043	40.3	5.2	-16.7	28.9	Quasi Max	H	99	48	46	-17.1	Pass	DIG
499.989	46.8	6.0	-12.6	40.2	Quasi Max	V	116	228	46	-5.8	Pass	DIG
906.845	33.7	7.3	-7.2	33.9	Quasi Max	V	132	14	46	-12.1	Pass	DIG
999.988	37.7	7.7	-6.1	39.2	Quasi Max	V	108	353	54	-14.8	Pass	DIG

Legend:	DIG = Digital Device Emission; TX = Transmitter Emission; FUND = Fundamental Frequency
	NRB = Non-Restricted Band, Limit is 20 dB below Fundamental; RB = Restricted Band

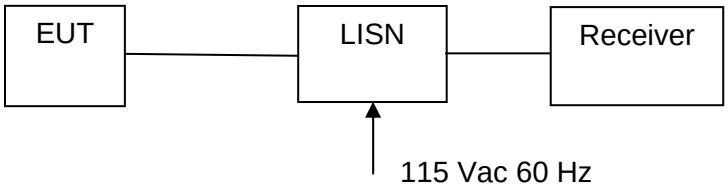
5.1.8. AC Wireline Conducted Emissions (150 kHz – 30 MHz)

FCC, Part 15 Subpart C §15.407(b)(6)/15.207
Industry Canada RSS-Gen §7.2.2

Test Procedure

The EUT is configured in accordance with ANSI C63.4. The conducted emissions are measured in a shielded room with a spectrum analyzer in peak hold in the first instance. Emissions closest to the limit are measured in the quasi-peak mode (QP) with the tuned receiver using a bandwidth of 9 kHz. The emissions are maximized further by cable manipulation. The highest emissions relative to the limit are listed.

Test Measurement Set up



Measurement set up for AC Wireline Conducted Emissions Test

Specification

Limit

§15.407 (b)(6); Any U-NII devices using an AC power line are required to comply also with the limits set forth in Section 15.207.

§15.207 (a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μΩ line impedance stabilization network (LISN), see §15.207 (a) matrix below. Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal.

RSS-Gen §7.2.2

The radio frequency voltage that is conducted back into the AC power lines in the frequency range of 0.15 MHz to 30 MHz shall not exceed the limits shown in the table below. The tighter limit applies at the frequency range boundaries.

§15.207 (a) and **RSS-Gen §7.2.2** Limit Matrix
The lower limit applies at the boundary between frequency ranges

Frequency of Emission (MHz)	Conducted Limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency

Laboratory Measurement Uncertainty for Conducted Emissions

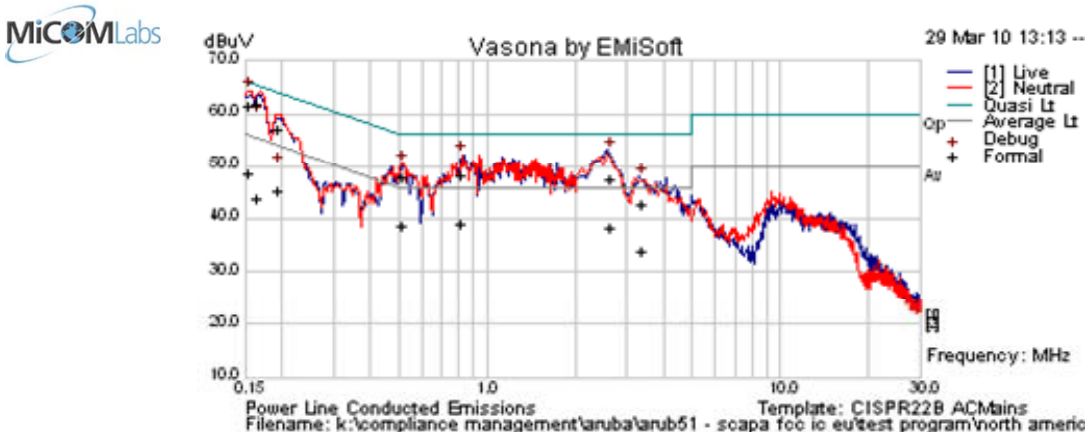
Measurement uncertainty	±2.64 dB

Traceability

Method	Test Equipment Used
Measurements were made per work instruction WI-EMC-01 'Measurement of Conducted Emissions'	0158, 0184, 0287, 0190, 0293, 0307

Measurement Results for AC Wireline Conducted Emissions (150 kHz – 30 MHz)

Test Freq.	2437 - Rx Mode	**Engineer**	CSB
Variant	AC Line Emissions	**Temp (ºC)**	22
Freq. Range	0.150 MHz - 30 MHz	**Rel. Hum.(%)**	38
Power Setting	N/A	**Press. (mBars)**	1006
Antenna	Integral Antennas		
Test Notes 1	AC Powered - 120V AC 60Hz		
Test Notes 2			

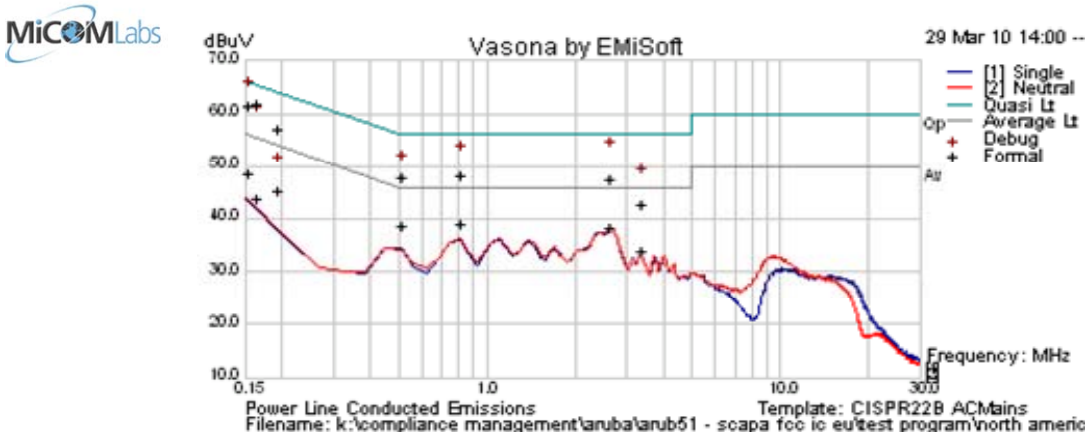


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	Factors dB	Level dBuV	Measurement Type	Line	Limit dBuV	Margin dB	Pass /Fail	Comments
0.155	38.8	9.9	0.1	48.8	Average	Neutral	55.73	-7.0	Pass	DIG
0.155	51.6	9.9	0.1	61.6	Quasi Peak	Neutral	65.73	-4.2	Pass	DIG
0.167	33.8	9.9	0.1	43.7	Average	Neutral	55.11	-11.4	Pass	DIG
0.167	51.7	9.9	0.1	61.7	Quasi Peak	Neutral	65.11	-3.4	Pass	DIG
0.194	35.4	9.9	0.1	45.3	Average	Neutral	53.86	-8.5	Pass	DIG
0.194	47.2	9.9	0.1	57.1	Quasi Peak	Neutral	63.86	-6.7	Pass	DIG
0.516	28.6	9.9	0.1	38.6	Average	Neutral	46	-7.4	Pass	DIG
0.516	37.8	9.9	0.1	47.9	Quasi Peak	Neutral	56	-8.2	Pass	DIG
0.828	38.4	9.9	0.1	48.4	Quasi Peak	Neutral	56	-7.6	Pass	DIG
0.828	29.1	9.9	0.1	39.1	Average	Neutral	46	-6.9	Pass	DIG
2.661	28.2	10.1	0.1	38.4	Average	Live	46	-7.6	Pass	DIG
2.661	37.3	10.1	0.1	47.6	Quasi Peak	Live	56	-8.5	Pass	DIG

Legend:	DIG = Digital Device Emission; TX = Transmitter Emission; FUND = Fundamental Frequency
	NRB = Non-Restricted Band, Limit is 20 dB below Fundamental; RB = Restricted Band

Test Freq.	2437 - Rx Mode		CSB
Variant	AC Line Emissions		22
Freq. Range	0.150 MHz - 30 MHz		38
Power Setting	N/A		1006
Antenna	Integral Antennas		
Test Notes 1	AC Powered - 120V AC 60Hz		
Test Notes 2	Red trace = Neautral, AVG Detector; Blue trace = Live, AVG Detector		



6. 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
0287	EMI Receiver	Rhode & Schwartz	ESIB 40	100201
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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