

Test of Fluke Networks Sensor4 Wireless Client

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

Test Report Serial No.: AMGT14-U2 Rev B





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to

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Test Report Serial No.: AMGT14-U2 Rev B

Note: this report contains data with regard to the 5,150 to 5,350 MHz and 5,470 to 5,725 MHz bands for Fluke Networks, Sensor4 Wireless Client. 2.4 and 5.8 GHz test data are reported in MiCOM Labs test report AMGT14-U1

This report supersedes AMGT14-U2 Rev A

Applicant: Fluke Networks
2575 Augustine Dr.
Santa Clara
California 95054, USA

Product Function: Wireless LAN Client

Copy No: pdf Issue Date: 20th June 2012

This Test Report is Issued Under the Authority of:

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CERTIFICATE #2381.01

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ACCREDITATION, LISTINGS & RECOGNITION

TESTING ACCREDITATION

MiCOM Labs, Inc. is an accredited Electrical testing laboratory per the international standard 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>



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RECOGNITION

MiCOM Labs, Inc has widely recognized Electrical testing capabilities. Our international recognition includes Conformity Assessment Body designation by APEC MRA** countries. Our test reports are widely accepted for global type approvals.

Country	Recognition Body	Status	Phase	Identification No.
USA	Federal Communications Commission (FCC)	TCB	-	Listing #: 102167
Canada	Industry Canada (IC)	FCB	APEC MRA 2	Listing #: 4143A-2
Japan	MIC (Ministry of Internal Affairs and Communication)	CAB	APEC MRA 2	210
	VCCI	--	--	No. 2959
Europe	European Commission	NB	EU MRA	NB 2280
Australia	Australian Communications and Media Authority (ACMA)	CAB	APEC MRA 1	US0159
Hong Kong	Office of the Telecommunication Authority (OFTA)	CAB	APEC MRA 1	
Korea	Ministry of Information and Communication Radio Research Laboratory (RRL)	CAB	APEC MRA 1	
Singapore	Infocomm Development Authority (IDA)	CAB	APEC MRA 1	
Taiwan	National Communications Commission (NCC) Bureau of Standards, Metrology and Inspection (BSMI)	CAB	APEC MRA 1	
Vietnam	Ministry of Communication (MIC)	CAB	APEC MRA 1	

**APEC MRA – Asia Pacific Economic Community Mutual Recognition Agreement.

Is a recognition agreement under which test lab is accredited to regulatory standards of the APEC member countries.

Phase I - recognition for product testing

Phase II – recognition for both product testing and certification

N/A – Not Applicable

**EU MRA – European Union Mutual Recognition Agreement.

Is a recognition agreement under which test lab is accredited to regulatory standards of the EU member countries.

**NB – Notified Body

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PRODUCT CERTIFICATION

MiCOM Labs, Inc. is an accredited Product Certification Body per the international standard EN ISO/IEC Guide 65. The company is accredited by the American Association for Laboratory Accreditation (A2LA) www.a2la.org test laboratory number 2381.02. MiCOM Labs test schedule is available at the following URL; <http://www.a2la.org/scopepdf/2381-02.pdf>



The American Association for Laboratory Accreditation

World Class Accreditation

Accredited Product Certification Body

A2LA has accredited

MICOM LABS

Pleasanton, CA

for technical competence as a

Product Certification Body

This product certification body is accredited in accordance with the recognized International Standard ISO/IEC Guide 65:1996 *General requirements for bodies operating product certification systems*. This accreditation demonstrates technical competence for a defined scope and the operation of a quality management system for a Telecommunications Certification Body (TCB) meeting FCC (U.S.) and IC (Canada) requirements.



Presented this 24th day of June 2010.

President & CEO
For the Accreditation Council
Certificate Number 2381.02
Valid to November 30, 2011

For the product certification schemes to which this accreditation applies, please refer to the organization's Product Certification Scope of Accreditation.

USA Telecommunication Certification Body (TCB) - TCB Identifier – US0159

Industry Canada Certification Body - CAB Identifier – US0159

European Notified Body - Notified Body Identifier - 2280

Japan – Recognized Certification Body (RCB) - RCB Identifier - 210

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DOCUMENT HISTORY

Document History		
Revision	Date	Comments
Draft		
Rev A	4 th June 2012	Initial release.
Rev B	20 th June 2012	Clarification of antenna details.

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1. TEST RESULT CERTIFICATE

Applicant:	Fluke Networks 2575 Augustine Dr. Santa Clara California 95054, USA	Tested By:	MiCOM Labs, Inc. 440 Boulder Court Suite 200 Pleasanton California, 94566, USA
EUT:	Product Description	Tel:	+1 925 462 0304
Model:	Sensor4	Fax:	+1 925 462 0306
S/N:	Engineering samples: Integral NG5-x & External NG5-y		
Test Date(s):	7th February - 17th May 2012	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.

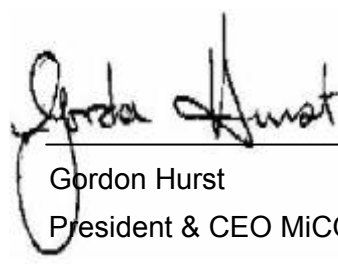
Approved & Released for MiCOM Labs, Inc. by:



Testing CERTIFICATE #2381.01



Graeme Grieve
Quality Manager MiCOM Labs,



Gordon Hurst
President & CEO MiCOM Labs, Inc.

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2. REFERENCES AND MEASUREMENT UNCERTAINTY

2.1. Normative References

Ref.	Publication	Year	Title
(i)	FCC 47 CFR Part 15.407	2010	Code of Federal Regulations
(ii)	FCC 06-96	June 2006	Memorandum Opinion and Order
(iii)	FCC OET KDB 662911	4 th April 2011	Emissions Testing of Transmitters with Multiple Outputs in the Same Band
(iv)	Industry Canada RSS-210	2010	Low Power License-Exempt Radiocommunication Devices (All Frequency Bands): Category 1 Equipment
(v)	Industry Canada RSS-Gen	2010	General Requirements and Information for the Certification of Radiocommunication Equipment
(vi)	ANSI C63.4	2009	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
(vii)	CISPR 22/ EN 55022	2008 2006+A1:2007	Limits and Methods of Measurements of Radio Disturbance Characteristics of Information Technology Equipment
(viii)	M 3003	Edition 1 Dec. 1997	Expression of Uncertainty and Confidence in Measurements
(ix)	LAB34	Edition 1 Aug 2002	The expression of uncertainty in EMC Testing
(x)	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
(xi)	A2LA	March 2012	Reference to A2LA Accreditation Status – A2LA Advertising Policy
(xii)	FCC Public Notice – DA 02-2138	2002	Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices



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2.2. Test and Uncertainty Procedures

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

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

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

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3. PRODUCT DETAILS AND TEST CONFIGURATIONS

3.1. Technical Details

Details	Description
Purpose:	Test of the Fluke Networks Sensor4 Wireless Client in the frequency ranges 5,250 to 5,350 and 5,470 to 5,725 MHz to FCC Part 15.407 and Industry Canada RSS-210 regulations.
Applicant:	Fluke Networks 2575 Augustine Dr. Santa Clara California 95054, USA
Manufacturer:	As applicant
Laboratory performing the tests:	MiCOM Labs, Inc. 440 Boulder Court, Suite 200 Pleasanton, California 94566 USA
Test report reference number:	AMGT14-U2 Rev B
Date EUT received:	7th February 2012
Standard(s) applied:	FCC 47 CFR Part 15.407 & IC RSS-210
Dates of test (from - to):	7th February - 17th May 2012
No of Units Tested:	Two
Type of Equipment:	802.11a/b/g/n Wireless LAN Access Point, 3x3 Spatial Multiplexing MIMO configuration
Manufacturers Trade Name:	Wireless Client
Model(s):	Sensor4
Location for use:	Indoor
Declared Frequency Range(s):	5,150 to 5,350 and 5,470 to 5,725 MHz
Software Release	Build 26809
Hardware Release:	assembly rev 5, pcb rev 3
Type of Modulation:	Per 802.11 – OFDM
EUT Modes of Operation:	Legacy 802.11a, 802.11n HT-20, HT-40
Transmit/Receive Operation:	Time Division Duplex
System Beam Forming:	Sensor4 has no capability for beam forming
Rated Input Voltage and Current:	12 Vdc 0.65 A: POE 48 Vdc 0.2A
Operating Temperature Range:	Declared range 0° to +50°C
ITU Emission Designator:	802.11a 18M8D1D 802.11n HT-20 19M9D1D 802.11n HT-40 36M7D1D
Equipment Dimensions:	7.5" x 7.5" x 1.5"
Weight:	1 lb (0.454 Kg)
Primary function of equipment:	WiFi scanning
Secondary function of equipment:	Spectrum analyzer

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3.2. Scope of Test Program

Fluke Networks Sensor4 Wireless Client RF Testing

The scope of the test program was to test the Fluke Networks Sensor4 802.11a/b/g/n Wireless LAN Access Point, 3x3 Spatial Multiplexing MIMO configurations in the frequency ranges 5,150 to 5,250, 5,250 – 5,350 and 5,470 to 5,725 MHz for compliance against FCC 47 CFR Part 15.407 and Industry Canada RSS-210 specifications.

The Sensor4 wireless client will be can be marketed using a number of different models each configured differently.

Sensor Model	Features
SENSOR4-R1S0-I	AIRMAGNET SENSOR, 4TH GEN, 1 X 11N RADIO, INTERNAL ANTENNA.
SENSOR4-R1S1-I	AIRMAGNET SPECTRUM SENSOR, 4TH GEN, 1 X 11N RADIO, INTERNAL ANTENNA.
SENSOR4-R2S0-I	AIRMAGNET SENSOR, 4TH GEN, 2 X 11N RADIO, INTERNAL ANTENNA.
SENSOR4-R2S1-I	AIRMAGNET SPECTRUM SENSOR, 4TH GEN, 2 X 11N RADIO, INTERNAL ANTENNA.
SENSOR4-R1S0-E	AIRMAGNET SENSOR, 4TH GEN, 1 X 11N RADIO 4 EXTERNAL ANTENNAS.
SENSOR4-R1S1-E	AIRMAGNET SPECTRUM SENSOR, 4TH GEN, 1 X 11N RADIO 4 EXTERNAL ANTENNAS.
SENSOR4-R2S0-E	AIRMAGNET SENSOR, 4TH GEN, 2 X 11N RADIO 8 EXTERNAL ANTENNAS.
SENSOR4-R2S1-E	AIRMAGNET SPECTRUM SENSOR, 4TH GEN, 2 X 11N RADIO 8 EXTERNAL ANTENNAS.

The test results reported in this document test worst case fully loaded configurations;

SENSOR4-R2S1-I (integral antenna)
SENSOR4-R2S1-E (external antenna)

FCC OET KDB Implementation

This test program implements the following FCC KDB – 662911 4/4/2011;

Emissions Testing of Transmitters with Multiple Outputs in the Same Band

The KDB document provides guidance for measurements of conducted output emissions of devices that employ a single transmitter with multiple outputs in the same band, with the outputs occupying the same or overlapping frequency ranges. It applies to EMC compliance measurements on devices that transmit on multiple antennas simultaneously in the same or overlapping frequency ranges through a coordinated process. Examples include, but are not limited to, devices employing beam forming or multiple-input and multiple-output (MIMO.) This guidance applies to both licensed and unlicensed devices wherever the FCC rules call for conducted output measurements. Guidance is provided for in-band, out-of-band and spurious emission measurements.

This guidance does not apply to the multiple transmitters included in a composite device, such as a device that combines an 802.11 modem with a cell phone in one enclosure with each driving its own antenna.

**Sensor4 802.11 a/b/g/n Wireless Client
Integral Antenna**



**Sensor4 802.11 a/b/g/n Wireless Client
External Antenna**





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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	Fluke Networks	Sensor4	Engineering samples: Integral NG5-x & External NG5-y
EUT	POE	PowerDSine	PD-3501/AC	--
EUT	ac/dc Adaptor	Fairway Electronic 100-240Vac 50-60Hz 12Vdc, 1.66A	VE20-120	--
Support	Laptop PC	Dell	--	None

3.4. Antenna Details

Type	Model	Gain (dBi)	Frequency Range (MHz)
External	Omni Rubber Duck: Wanshih SQ1WFI0001A	2.0	2400 – 2483.5
		2.3	5150 - 5350
		1.0	5725 - 5850
Integral	Laird NanoGreen	0.9	2400 – 2483.5
		3.1	5150 - 5350
		4.8	5725 - 5850

Cabling and I/O Ports

Number and type of I/O ports

- 1 x 10/100/1000 Ethernet
- dc Power In (48 Vdc POE)
- RF Ports 50Ω, N-type connector(s)
 - 3 x 2.4 GHz Ports (Ports 1, 2 and 3)
 - 3 x 5 GHz Ports (Ports 4, 5 and 6)
- GND Connection (2 x bolts)

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3.5. 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	5180, 5200, 5240 5260, 5300, 5320
	HT-20	6.5 MCS	5500, 5580, 5700
	HT-40	13.5 MCS	5190, 5310 5270, 5230 5510, 5550, 5670

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 Band 5,150 – 5,350

11a	11n HT-20	11n HT-40
BE 5150	BE 5150	BE 5150
SE 5180	SE 5180	SE 5190
SE 5200	SE 5200	
SE 5240	SE 5240	SE 5230
SE 5260	SE 5260	SE 5270
SE 5300	SE 5300	
SE 5320	SE 5320	SE 5310
BE 5350	BE 5350	BE 5350

KEY:-

SE – Spurious Emissions

BE – Band-Edge

PK - Peak Emission

Band 5,470 – 5,725

11a	11n HT-20	11n HT-40
SE 5500	SE 5500	SE 5510
SE 5580	SE 5580	SE 5550
SE 5700	SE 5700	SE 5670
BE 5460	BE 5460	BE 5460



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3.6. Equipment Modifications

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

1. Output Power Settings

The output power values reported in section 5.1.2 Peak Output Power take into account any power reduction due to radiated spurious emissions and radiated band-edge measurement results.

2. Spurious Emissions V's Antenna Installation Positioning

It was found that the positioning of the external antennas was crucial in the reduction and control of spurious emissions. The device antennas were tested per the following client supplied document. Any deviation from this installation will result in non-compliant operation.

Fluke Networks Sensor4 External Antenna Model Installation instructions

1. Screw on the supplied antennas to the RP-TNC connectors on the sensor side plates.
2. Position the antenna angles as shown in Figures 1 thru 5.
3. Hand tighten the antenna to the sensor while maintaining the angles depicted.
4. Apply a small amount of Loctite or similar adhesive in the antenna joint (elbow) to maintain antenna angle positioning during and after sensor installation.

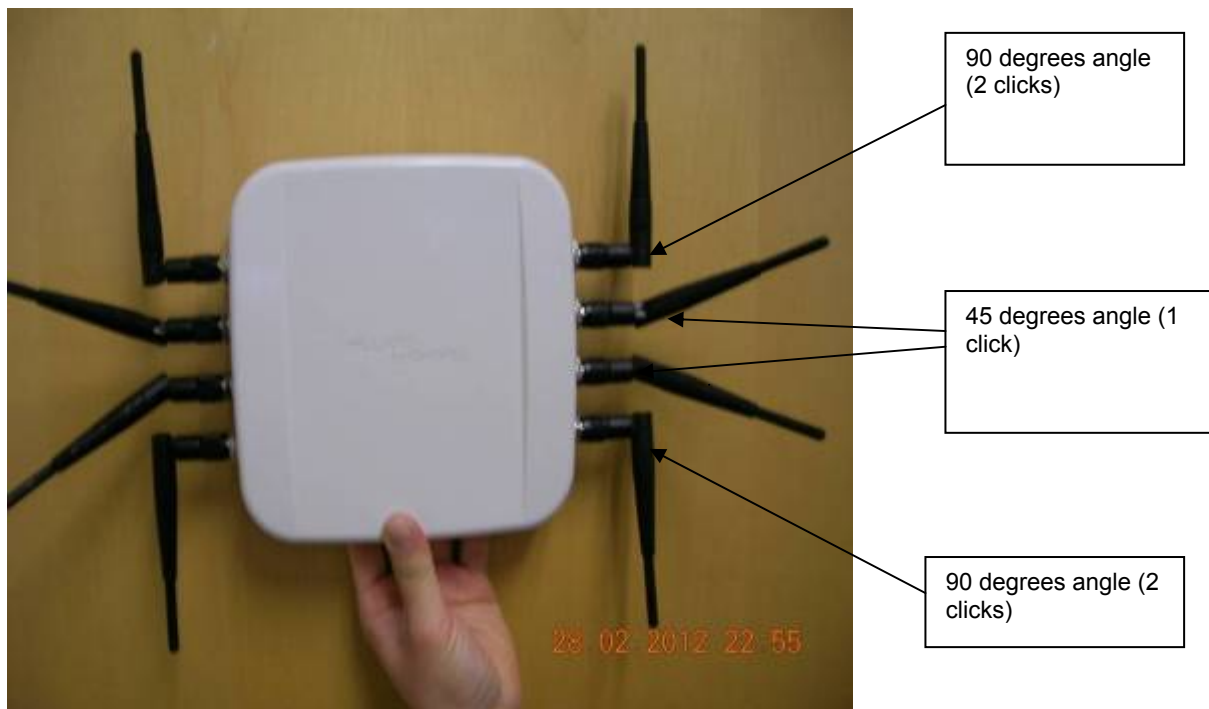


Figure 1: Top view



Figure 2: Front View

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Figure 3: Diagonal view



90 degrees angle
between the 2
antennas

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Figure 4: Side view left.

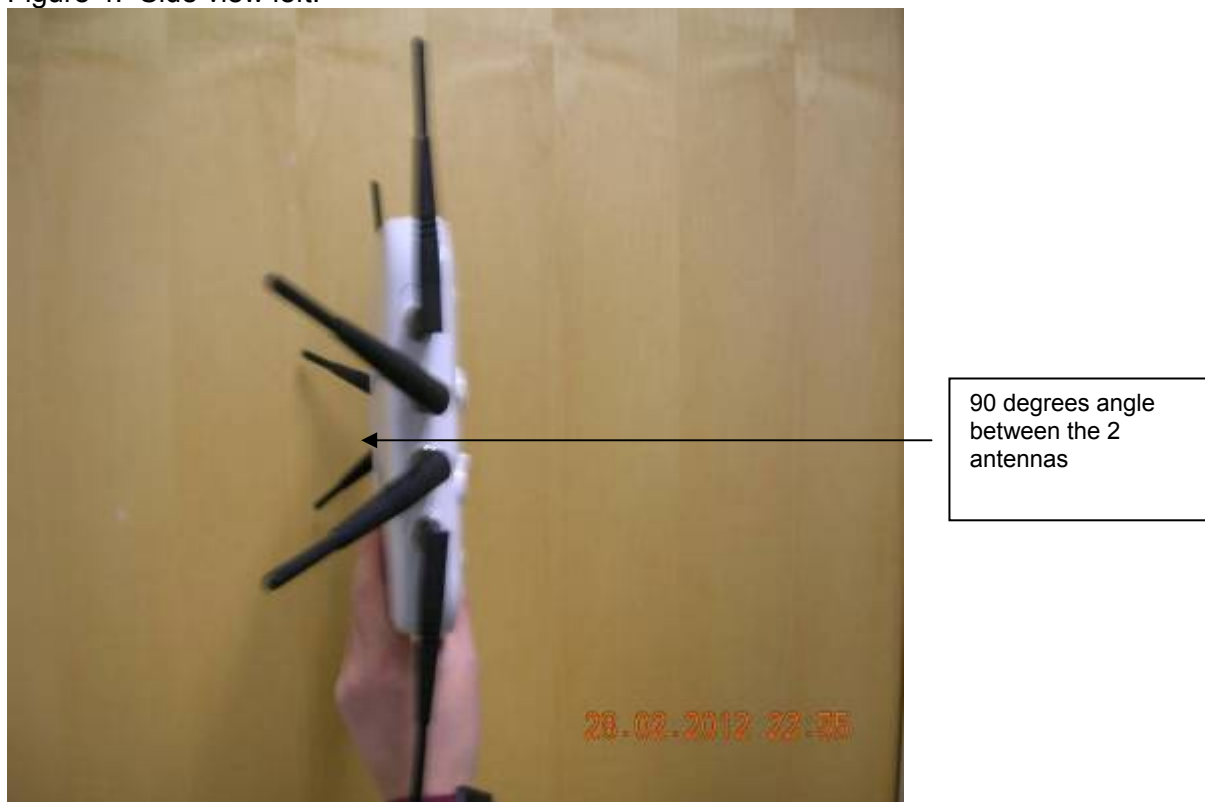


Figure 5: Side view right

3.7. Deviations from the Test Standard

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

1. NONE

3.8. Subcontracted Testing or Third Party Data

1. NONE



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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

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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

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List of Measurements (cont'd)

Dynamic Frequency Selection (DFS)

The following table represents the list of measurements required under the **FCC CFR47 Part 15.407(h)(2)** and **FCC Memorandum Opinion and Order FCC 06-96 (Compliance Measurement procedures for Unlicensed National Information Infrastructure devices operating in the 5250-5350 MHz and 5470-5725 MHz bands incorporating dynamic frequency selection)**.

Tests performed on Master Device

Section	Test Items	Description	Condition	Result	Test Report Section
	Dynamic Frequency Selection				5.1.9
7.8.1	Detection Bandwidth	UNII Detection Bandwidth	Conducted	Not Applicable	
7.8.2.1	Performance Requirements Check	Initial Channel Availability Check Time	Conducted	Not Applicable	
7.8.2.2		Radar Burst at the Beginning of the Channel Availability Check Time	Conducted	Not Applicable	
7.8.2.3		Radar Burst at the End of the Channel Availability Check Time	Conducted	Not Applicable	
7.8.3	In-Service Monitoring	In-Service Monitoring for Channel Move Time, Channel Closing Transmission Time and Non-Occupancy Period	Conducted	Complies	
7.8.4	Radar Detection	Statistical Performance Check	Conducted	Not Applicable	

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

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

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

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5. TEST RESULTS

5.1. Device Characteristics

5.1.1. 26 dB and 99 % Bandwidth

FCC, Part 15 Subpart C §15.407(a)

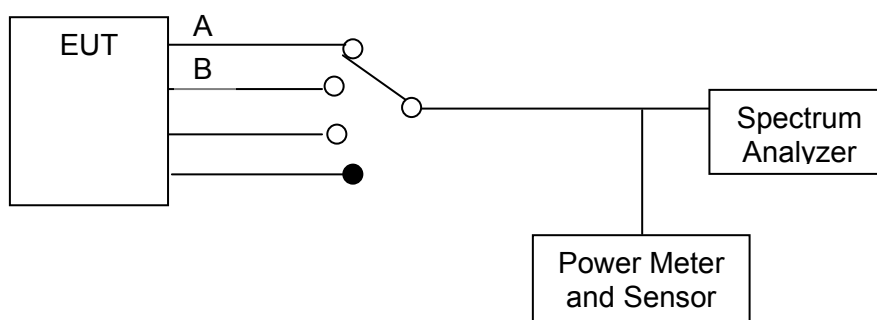
Industry Canada RSS-210 § A9.2(2)

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



Title: Fluke Networks Sensor4 Wireless Client
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Serial #: AMGT14-U2 Rev B
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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 5150 – 5250 MHz

Test Conditions:	15.247 (a)(2)	Rel. Humidity (%):	35 to 42
Variant:	802.11a	Ambient Temp. (°C):	19 to 22
TPC:	HIGH	Pressure (mBars):	998 to 1003
Modulation:	ON	Duty Cycle (x):	100
Beam Forming Gain (Y):	N/A dB	Antenna Gain:	0 dBi
Applied Voltage:	48.0 Vdc		
Notes 1:			
Notes 2:			

26 dB Bandwidth

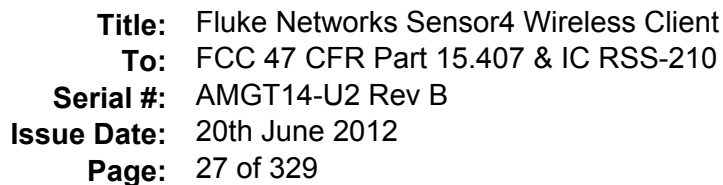
26 dB Bandwidth							
Test Frequency	26 dB Bandwidth				Minimum 6dB Bandwidth Limit		Margin
	MHz						
MHz	a	b	c	d	kHz	MHz	MHz
5180	22.445000	22.946000	23.447000		500	0.5	-21.945000
5200	22.445000	22.846000	23.146000				-21.945000
5240	22.345000	23.146000	23.347000				-21.845000

99% Bandwidth

99 % Bandwidth							
Test Frequency	99 % Bandwidth						
	MHz						
MHz	a	b	c	d			
5180	16.733000	16.834000	16.834000				
5200	16.733000	16.733000	16.934000				
5240	16.733000	16.733000	16.834000				

Measurement uncertainty:	±2.81 dB
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Ref Lvl 0.92 dB Delta 1 [T1] RBW 200 kHz RF Att 10 dB

17.7 dBm 22.44488978 MHz SWT 20 s Unit dBm

17.7 dB Offset

Point	Frequency (MHz)	Power (dBm)
D1	-0.831	-0.831
D2	-26.831	-26.831
T1	5.16902806	-9.34
T2	5.17163327	-9.61
F1	5.18495992	-26.831
F2	5.18495992	-26.831

Center 5.18 GHz Span 50 MHz

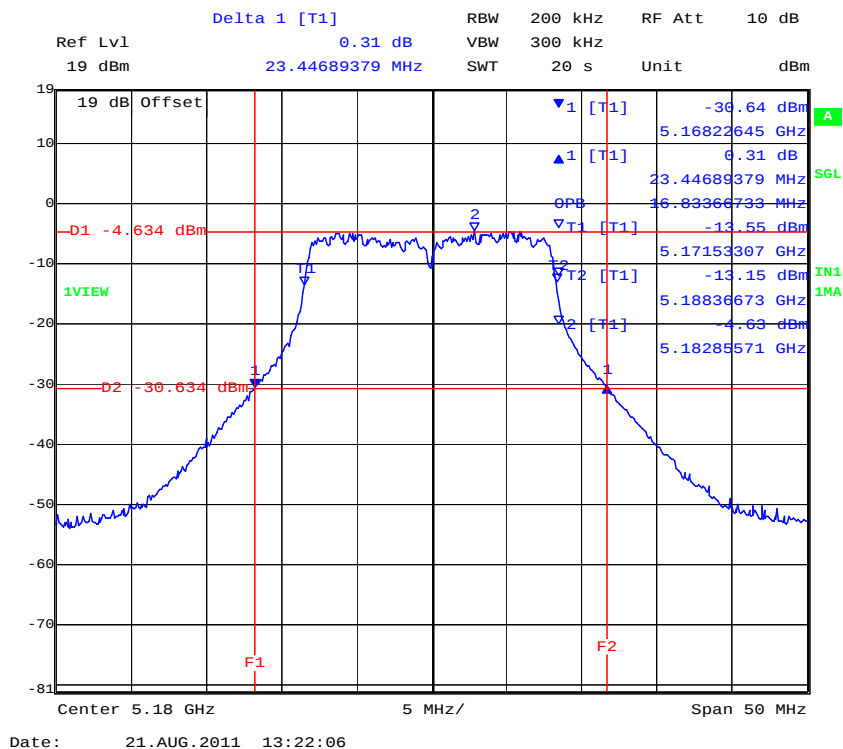
[illegible]

MiCOM Labs, 440 Boulder Court, Suite 200, Pleasanton, CA 94566 USA, Phone: 925.462.0304, Fax: 925.462.0306, www.micomlabs.com

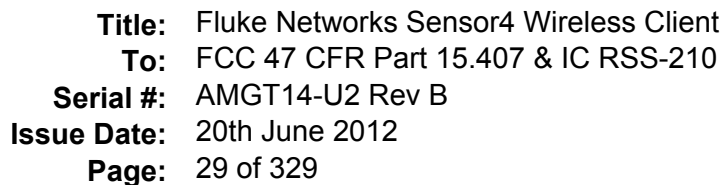


Title: Fluke Networks Sensor4 Wireless Client
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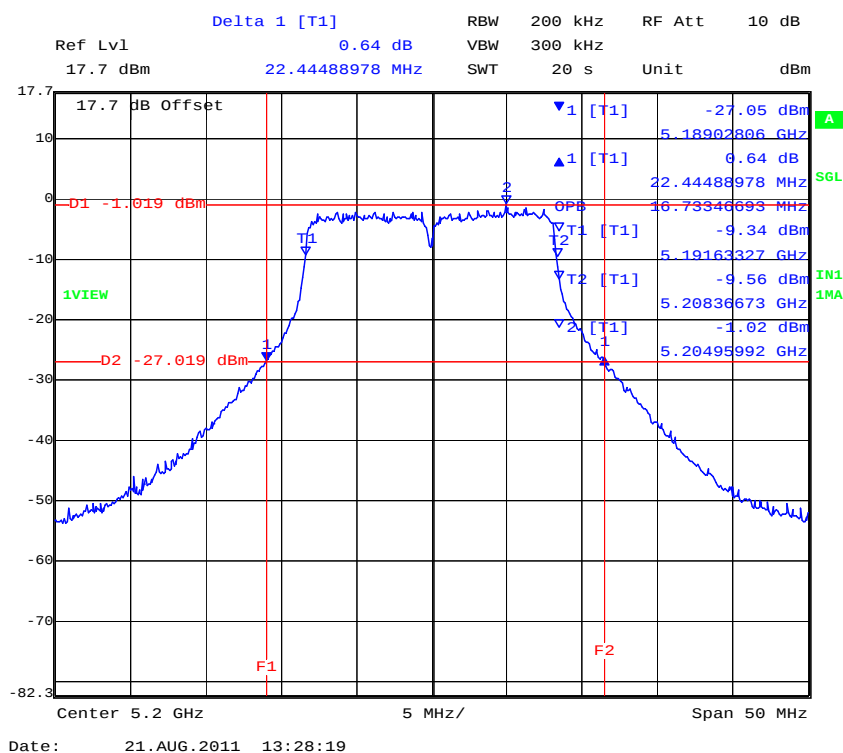
PORT C 5,180 MHz 802.11a Legacy 26 dB and 99 % Bandwidth



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[illegible]

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

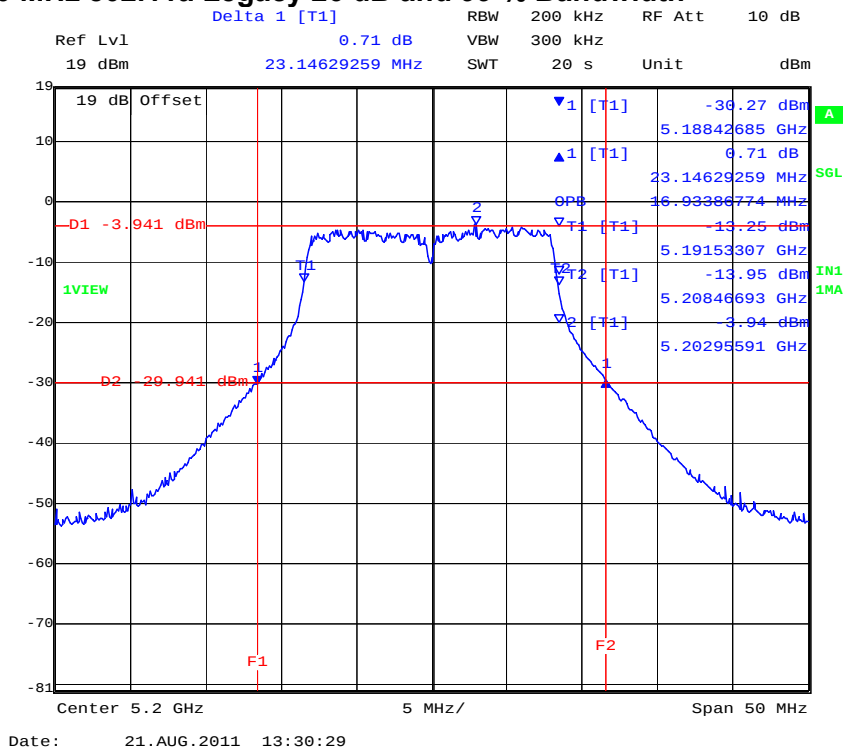


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PORT C 5,200 MHz 802.11a Legacy 26 dB and 99 % Bandwidth

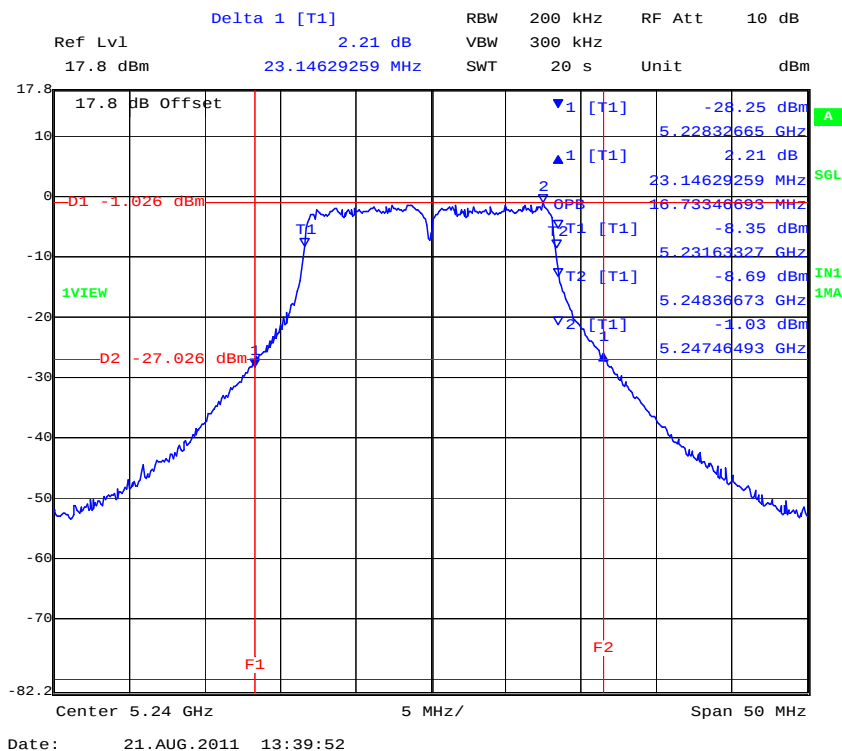


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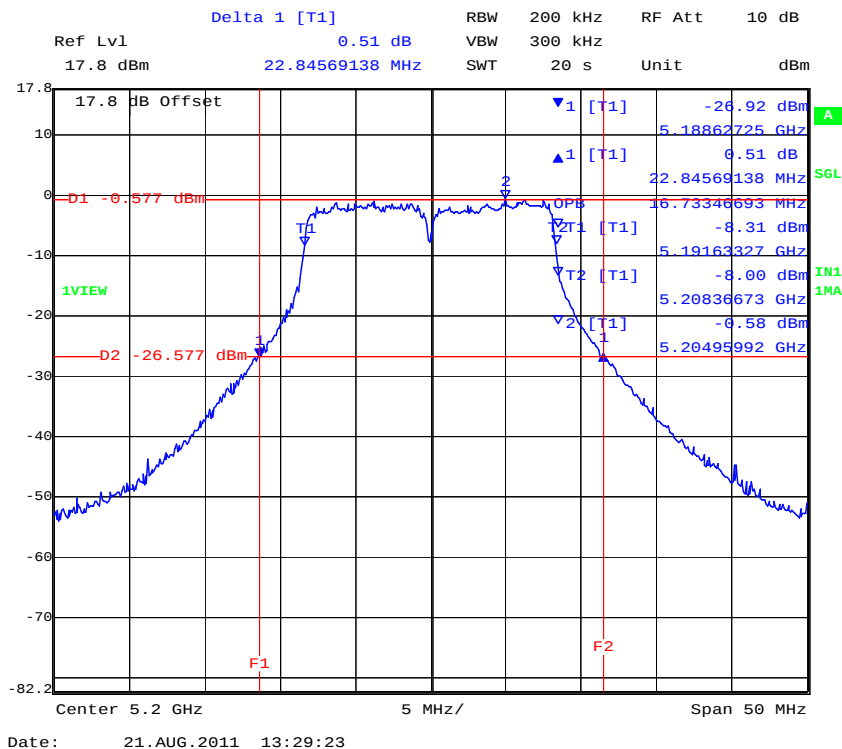


Title: Fluke Networks Sensor4 Wireless Client
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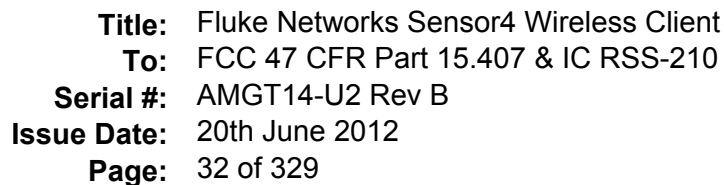
PORT A 5,240 MHz 802.11a Legacy 26 dB and 99 % Bandwidth



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



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Delta 1 [T1]

Ref Lvl 19 dBm Offset 0.46 dB

RBW 200 kHz VBW 300 kHz RF Att 10 dB

SWT 20 s Unit dBm

19 dB Offset

D1 -4.203 dBm

1VIEW

D2 -30.203 dBm

1

T1

2

T2

T1 [T1]

T2 [T1]

T1 [T1]

T2 [T1]

T1 [T1]

T2 [T1]

-30.43 dBm

5.22822645 GHz

0.46 dB

23.34669339 MHz

16.89366793 MHz

-13.09 dBm

5.23153307 GHz

-12.19 dBm

5.24836673 GHz

-4.20 dBm

5.24285571 GHz

Center 5.24 GHz

5 MHz/

Span 50 MHz

Date: 21.AUG.2011 13:40:57

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Title: Fluke Networks Sensor4 Wireless Client
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TABLE OF RESULTS – 802.11n HT-20 5150 – 5250 MHz

Test Conditions:	15.247 (a)(2)	Rel. Humidity (%):	35 to 42
Variant:	802.11n HT-20	Ambient Temp. (°C):	19 to 22
TPC:	HIGH	Pressure (mBars):	998 to 1003
Modulation:	ON	Duty Cycle (x):	100
Beam Forming Gain (Y):	N/A dB	Antenna Gain:	0 dBi
Applied Voltage:	48.0 Vdc		
Notes 1:			
Notes 2:			

26 dB Bandwidth

Test Frequency	26 dB Bandwidth				Minimum 6dB Bandwidth Limit		Margin
	MHz						
MHz	a	b	c	d	kHz	MHz	MHz
5180	23.547000	23.547000	24.549000		500	0.5	-23.047000
5200	23.246000	23.547000	24.549000				-22.746000
5240	23.347000	23.347000	24.649000				-22.847000

99% Bandwidth

Test Frequency	99 % Bandwidth						
	MHz						
MHz	a	b	c	d			
5180	17.936000	17.936000	18.036000				
5200	17.936000	18.036000	18.036000				
5240	17.936000	17.936000	18.036000				

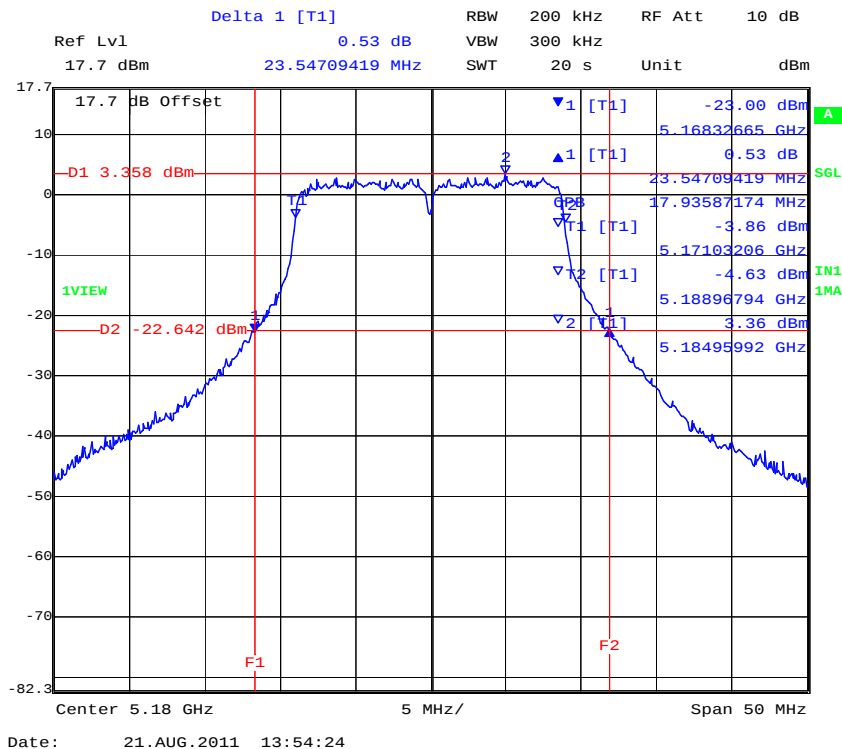
Measurement uncertainty:	±2.81 dB
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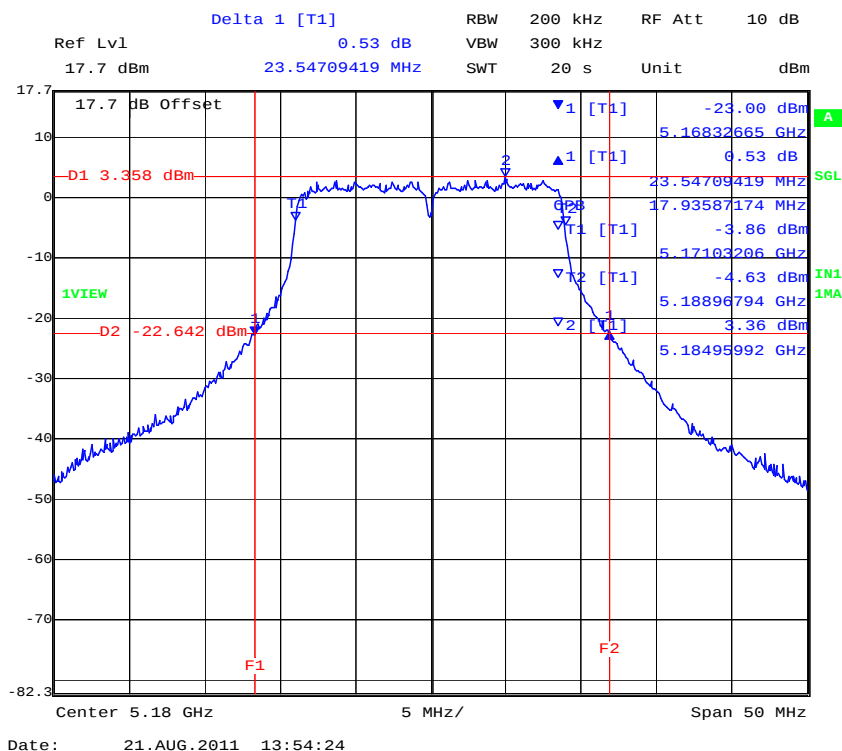


Title: Fluke Networks Sensor4 Wireless Client
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PORT A 5,180 MHz 802.11n HT-20 26 dB and 99 % Bandwidth



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

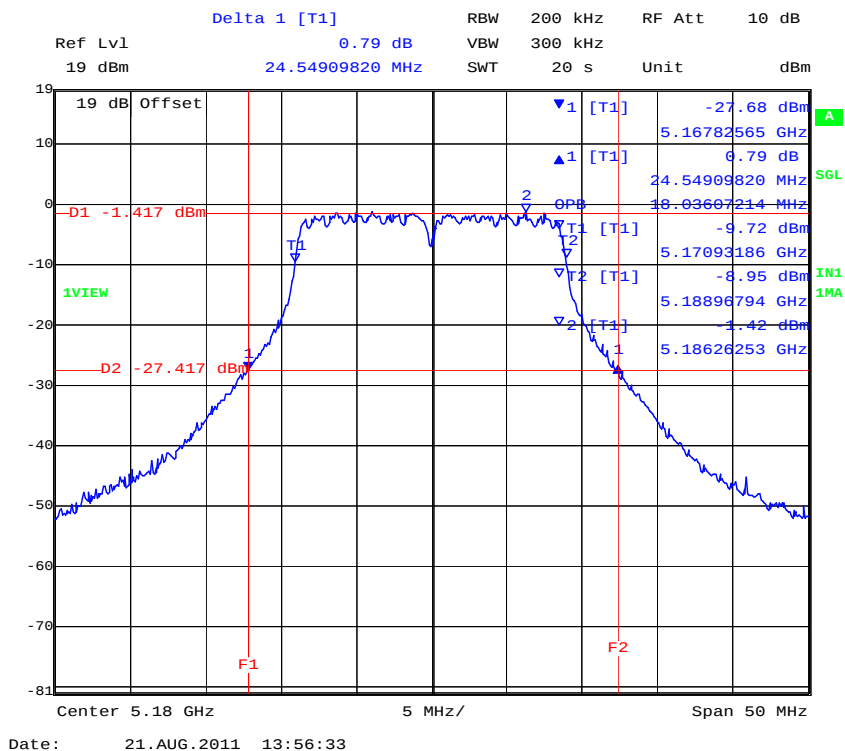


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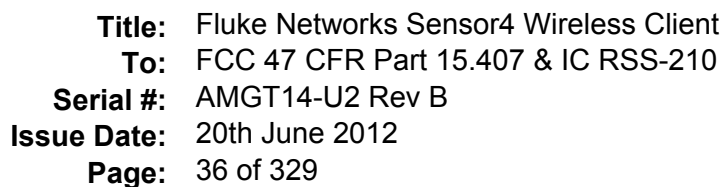


Title: Fluke Networks Sensor4 Wireless Client
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PORT C 5,180 MHz 802.11a Legacy 26 dB and 99 % Bandwidth



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Ref Lvl 17.7 dBm Delta 1 [T1] 0.33 dB RBW 200 kHz RF Att 10 dB Unit dBm

17.7 dB Offset 23.24649299 MHz VBW 300 kHz SWT 20 s

17.7 dBm -22.46 dBm 5.18852705 GHz 0.33 dB 23.24649299 MHz 17.93587174 MHz -4.56 dBm 5.19103206 GHz -5.01 dBm 5.20896794 GHz 3.61 dBm 5.20495992 GHz

1VIEW

Center 5.2 GHz 5 MHz/ Span 50 MHz

Date: 21.AUG.2011 14:06:07

Ref Lvl 17.8 dBm Delta 1 [T1] 0.38 dB RBW 200 kHz RF Att 10 dB
 17.8 dB Offset 23.54709419 MHz VBW 300 kHz SWT 20 s Unit dBm

17.8 dB Offset
 -D1 3.763 dBm
 1VIEW
 -D2 -22.237 dBm
 F1
 F2
 -22.29 dBm
 5.18802605 GHz
 0.38 dB
 23.54709419 MHz
 18.03607214 MHz
 -4.98 dBm
 5.19093186 GHz
 -5.44 dBm
 5.20896794 GHz
 3.76 dBm
 5.20746493 GHz

Center 5.2 GHz 5 MHz/ Span 50 MHz

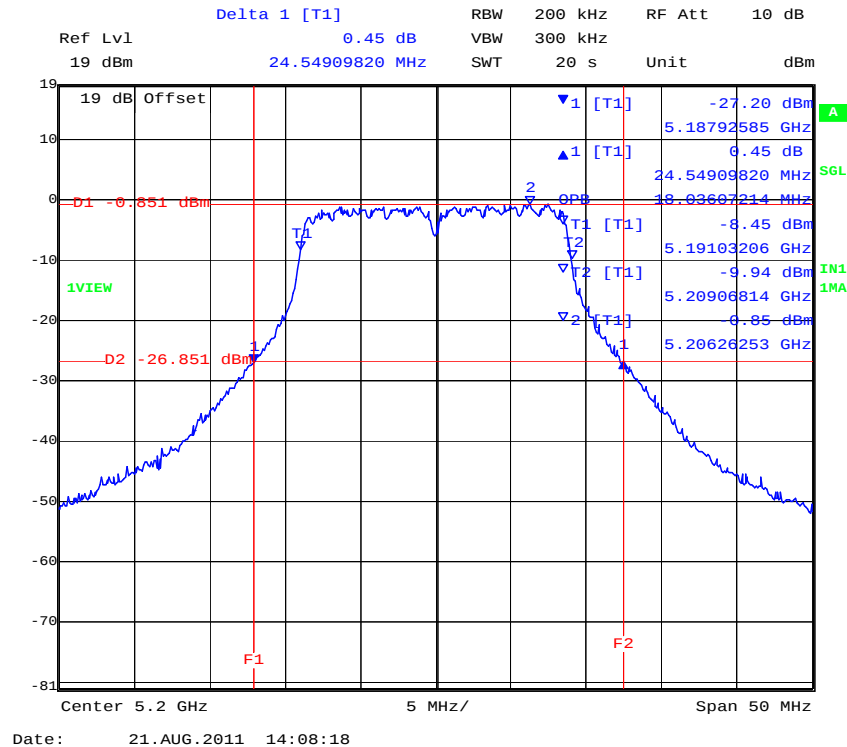
Date: 21.AUG.2011 14:07:13

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

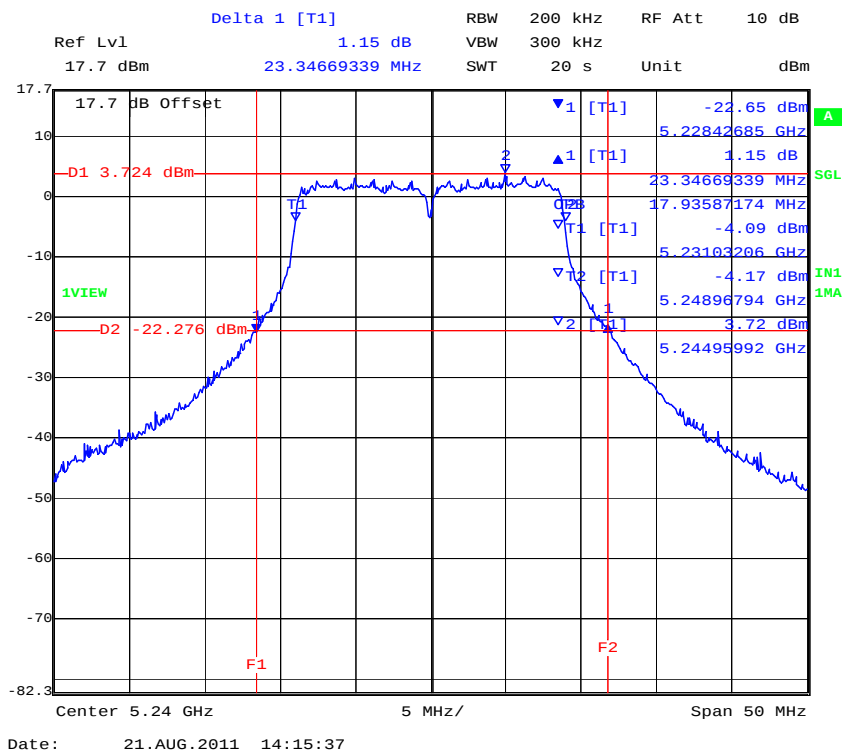


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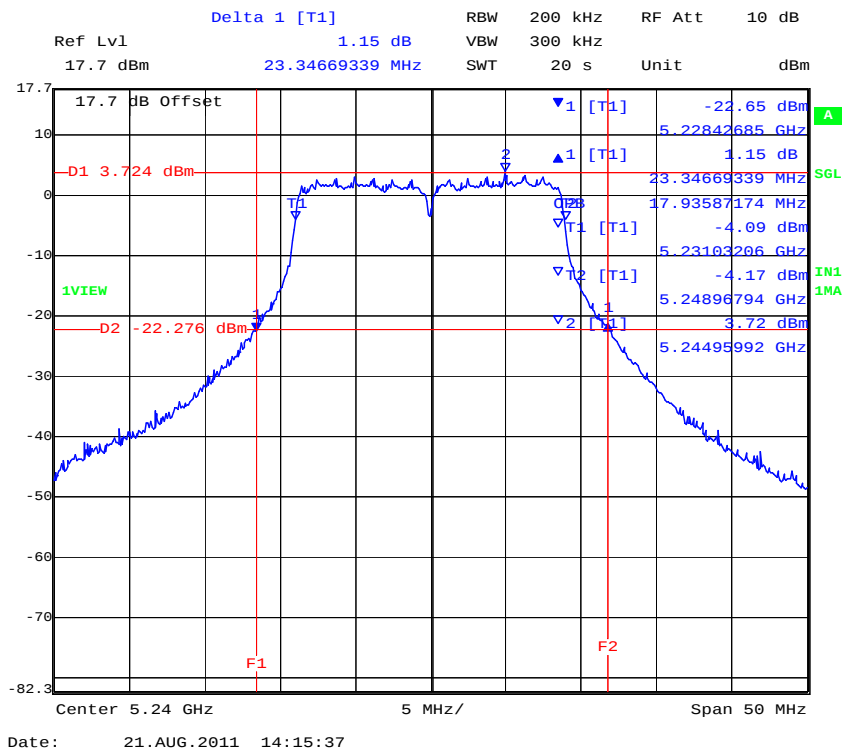


Title: Fluke Networks Sensor4 Wireless Client
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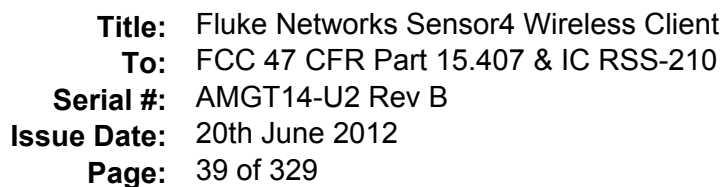
PORT A 5,240 MHz 802.11n HT-20 26 dB and 99 % Bandwidth



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



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Delta 1 [T1]

RBW 200 kHz

VBW 300 kHz

RF Att 10 dB

Ref Lvl 19 dBm

Unit dBm

24.64929860 MHz

SWT 20 s

19 dB Offset

D1 -0.86 dBm

D2 -26.86 dBm

F1

F2

Center 5.24 GHz

Span 50 MHz

Date: 21.AUG.2011 14:17:50

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TABLE OF RESULTS – 802.11n HT-40 5150 – 5250 MHz

Test Conditions:	15.247 (a)(1)	Rel. Humidity (%):	35 to 42
Variant:	802.11n HT-40	Ambient Temp. (°C):	19 to 22
TPC:	HIGH	Pressure (mBars):	998 to 1003
Modulation:	ON	Duty Cycle (x):	100
Beam Forming Gain (Y):	N/A dB	Antenna Gain:	0 dBi
Applied Voltage:	48.0 Vdc		
Notes 1:			
Notes 2:			

26 dB Bandwidth

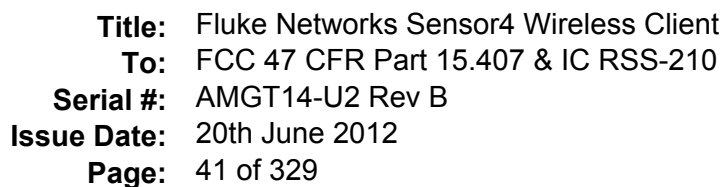
26 dB Bandwidth							
Test Frequency	26 dB Bandwidth				Minimum 6dB Bandwidth Limit		Margin
	MHz						
MHz	a	b	c	d	kHz	MHz	MHz
5190	43.487000	44.689000	46.894000		500	0.5	-42.987000
5230	44.088000	44.489000	46.693000				

99% Bandwidth

Test Frequency	99 % Bandwidth						
	MHz						
MHz	a	b	c	d			
5190	36.473000	36.473000	36.473000				
5230	36.473000	36.473000	36.473000				

Measurement uncertainty:	±2.81 dB
---------------------------------	----------

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Ref Lvl 17.7 dBm Delta 1 [T1] 0.14 dB RBW 200 kHz RF Att 10 dB VBW 300 kHz Unit dBm SWT 20 s

17.7 dB Offset

D1 1.922 dBm

D2 -24.078 dBm

F1 F2

1 [T1] -24.21 dBm 5.16865731 GHz

2 [T1] 0.14 dB 43.48697395 MHz

3 [T1] 36.47294589 MHz

4 [T1] -3.65 dBm 5.17186373 GHz

5 [T1] -4.22 dBm 5.20833667 GHz

6 [T1] 1.92 dBm 5.20492986 GHz

1VIEW

IN1 1MA

Center 5.19 GHz 10 MHz/ Span 100 MHz

Date: 21.AUG.2011 15:09:15

Delta 1 [T1] RBW 200 kHz RF Att 10 dB
 Ref Lvl 1.32 dB VBW 300 kHz
 17.8 dBm 44.68937876 MHz SWT 20 s Unit dBm

17.8 dB Offset

D1 0.527 dBm

1VIEW

D2 -25.473 dBm

F1 F2

Center 5.19 GHz 10 MHz/ Span 100 MHz

▼1 [T1] -26.12 dBm 5.16785571 GHz
 ▲1 [T1] 1.32 dB 44.68937876 MHz
 2 36.47294589 MHz
 ▼F1 [T1] -4.73 dBm 5.17186373 GHz
 ▼F2 [T1] -5.05 dBm 5.20833667 GHz
 ▼2 [T1] 0.53 dBm 5.20492086 GHz

A SGL IN1 1MA

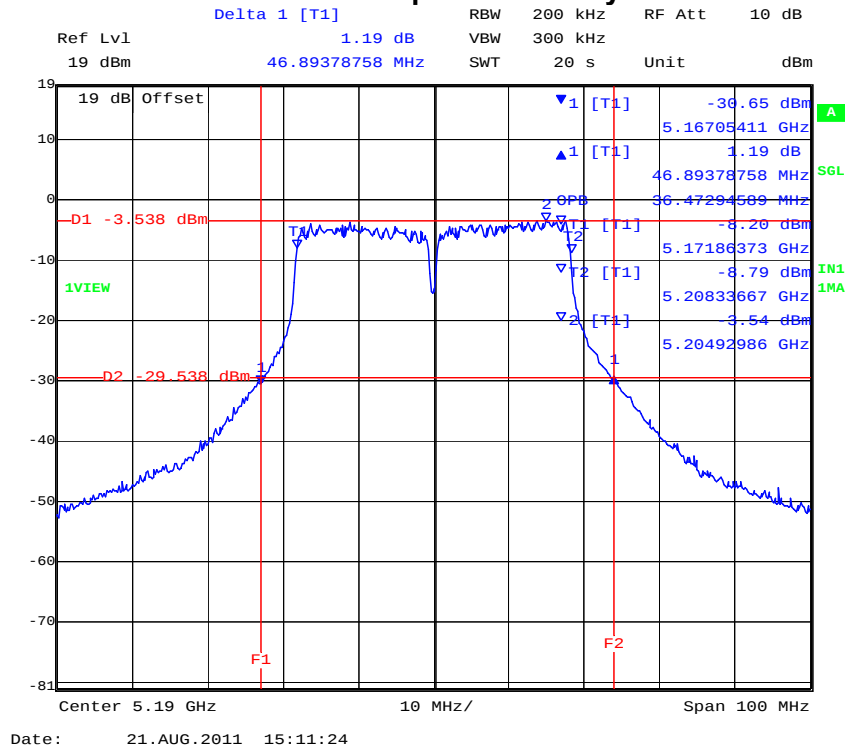
Date: 21.AUG.2011 15:10:19

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PORT C 5,190 MHz 802.11n HT-20 Power Spectral Density

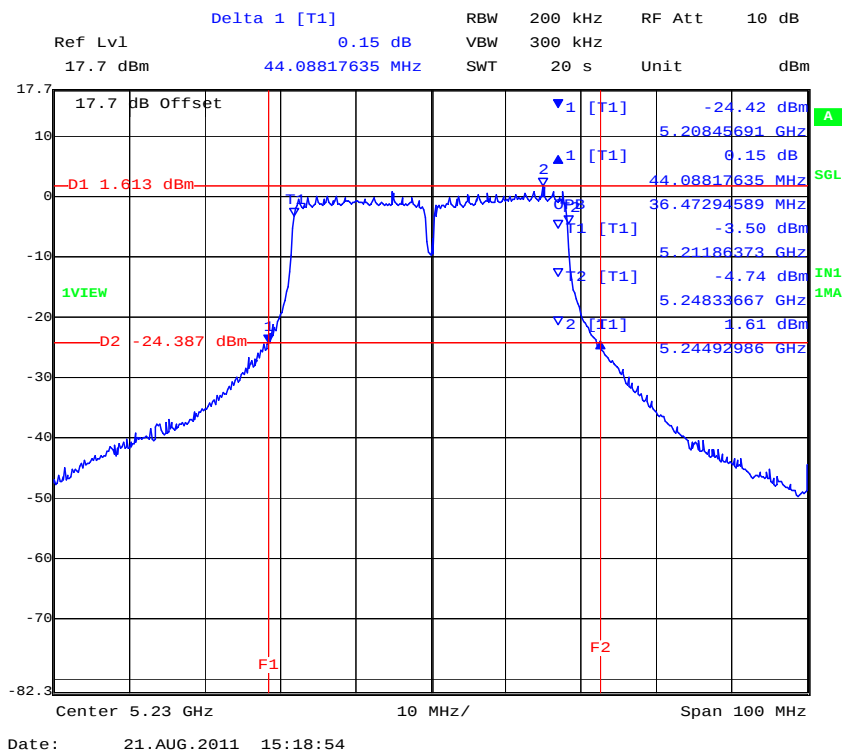


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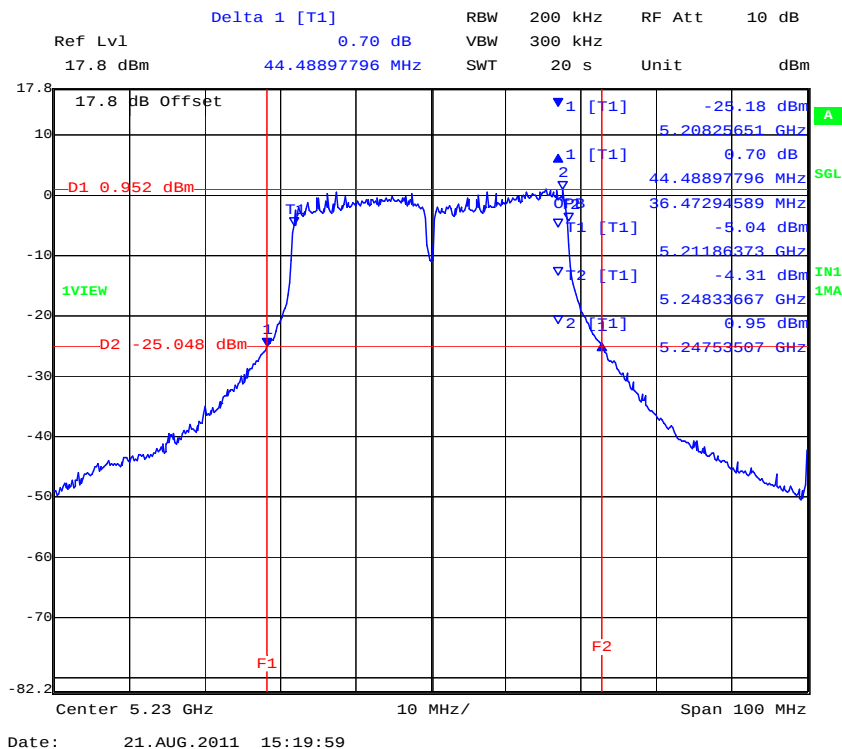


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PORT A 5,230 MHz 802.11n HT-20 Power Spectral Density



PORT B 5,230 MHz 802.11n HT-20 Power Spectral Density

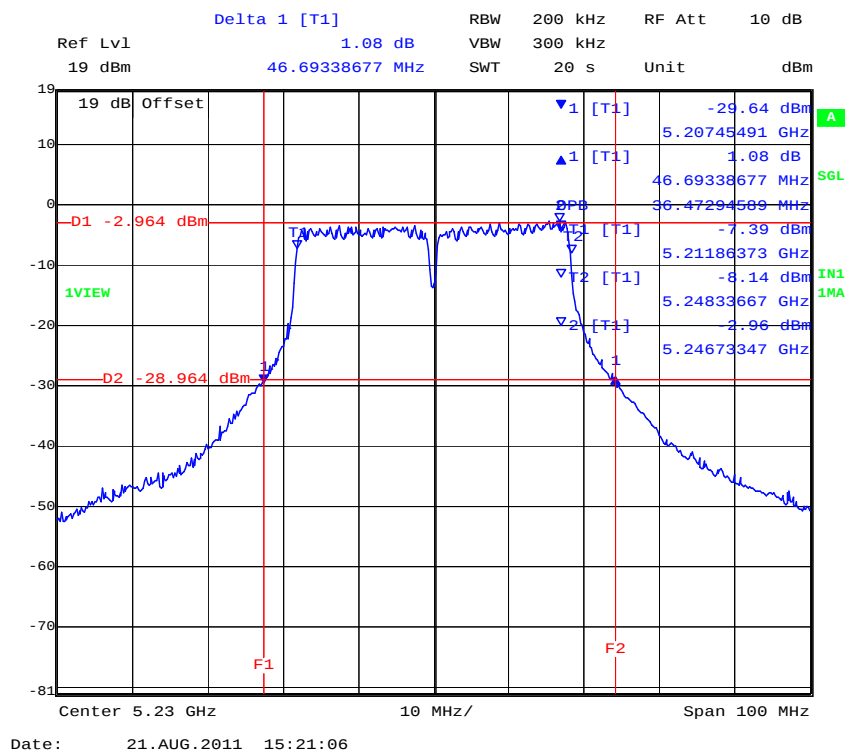


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PORT C 5,230 MHz 802.11n HT-20 Power Spectral Density



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TABLE OF RESULTS – 802.11a Legacy 5250 – 5350 MHz

Test Conditions:	15.247 (a)(2)	Rel. Humidity (%):	35 to 42
Variant:	802.11a	Ambient Temp. (°C):	19 to 22
TPC:	HIGH	Pressure (mBars):	998 to 1003
Modulation:	ON	Duty Cycle (x):	100
Beam Forming Gain (Y):	N/A dB	Antenna Gain:	0 dBi
Applied Voltage:	48.0 Vdc		
Notes 1:			
Notes 2:			

26 dB Bandwidth

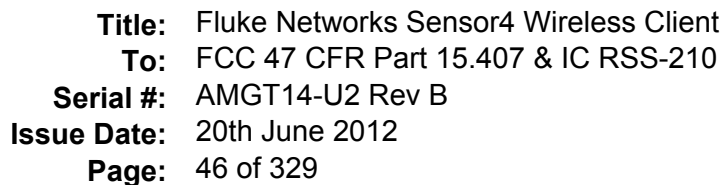
Test Frequency	26 dB Bandwidth				Minimum 6dB Bandwidth Limit		Margin
	MHz						
MHz	a	b	c	d	kHz	MHz	MHz
5260	29.559000	30.661000	28.257000		500	0.5	-27.757000
5300	32.866000	28.357000	28.858000				-27.857000
5320	32.565000	25.952000	28.958000				-25.452000

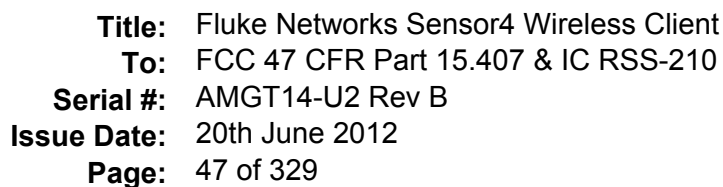
99% Bandwidth

Test Frequency	99 % Bandwidth						
	MHz						
MHz	a	b	c	d			
5260	17.335000	17.134000	17.134000				
5300	18.236000	16.733000	17.134000				
5320	18.838000	16.733000	17.134000				

Measurement uncertainty:	±2.81 dB
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Delta 1 [T1] 1.86 dB

Ref Lvl 19 dB

28.25651303 MHz

RBW 200 kHz

VBW 300 kHz

SWT 20 s

RF Att 10 dB

Unit dBm

19 dB Offset

D1 7.103 dBm

D2 -18.897 dBm

1VIEW

1 [T1] -19.58 dBm

2 [T1] -7.61 dBm

28.25651303 MHz

17.13426854 MHz

5.25143287 GHz

5.26856713 GHz

5.2641992 GHz

Center 5.26 GHz

5 MHz/

Span 50 MHz

Date: 7. JUL. 2011 18:41:42

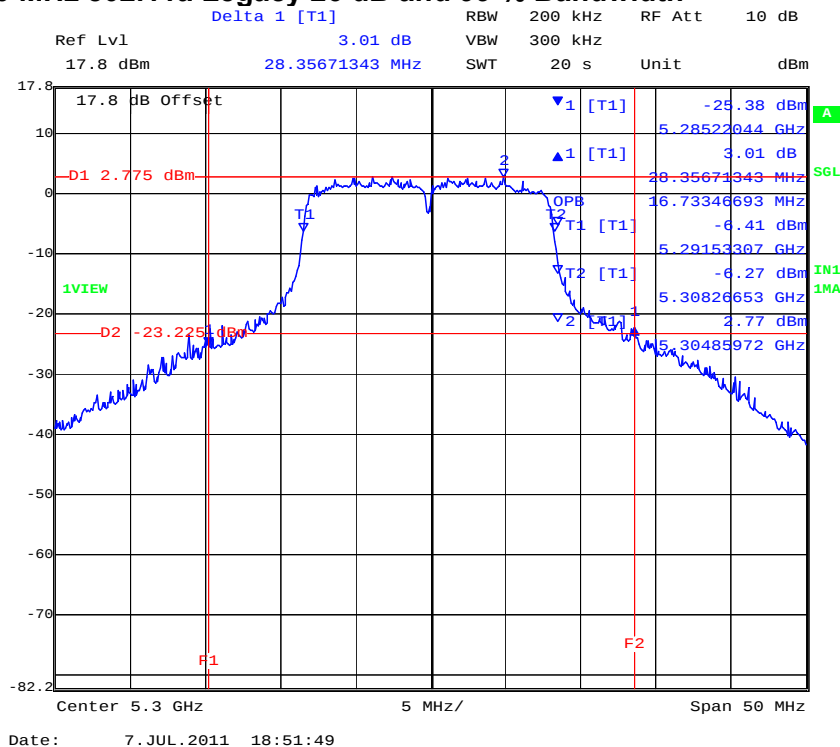
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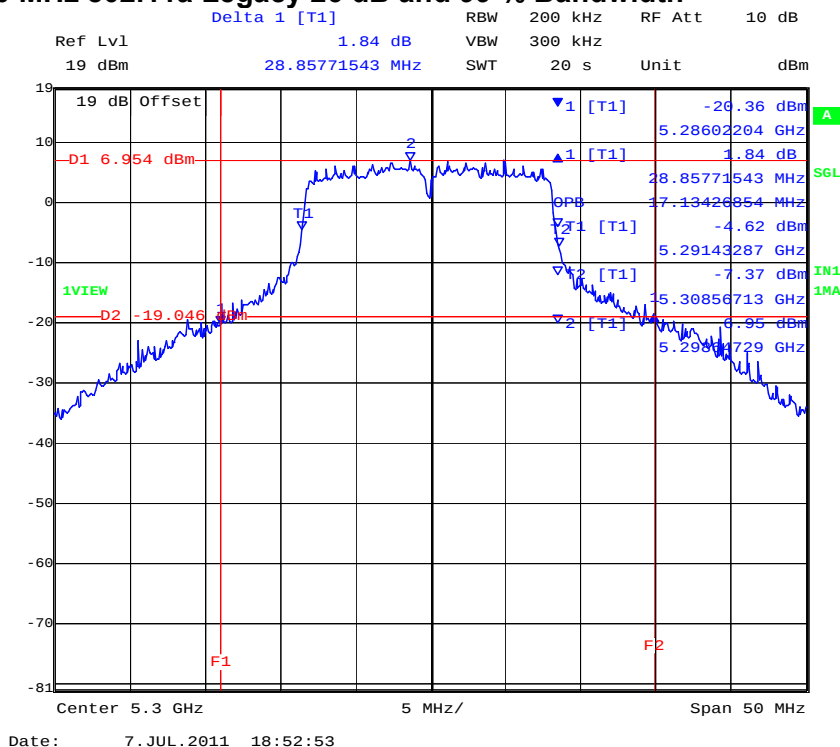


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PORT B 5,300 MHz 802.11a Legacy 26 dB and 99 % Bandwidth



PORT C 5,300 MHz 802.11a Legacy 26 dB and 99 % Bandwidth

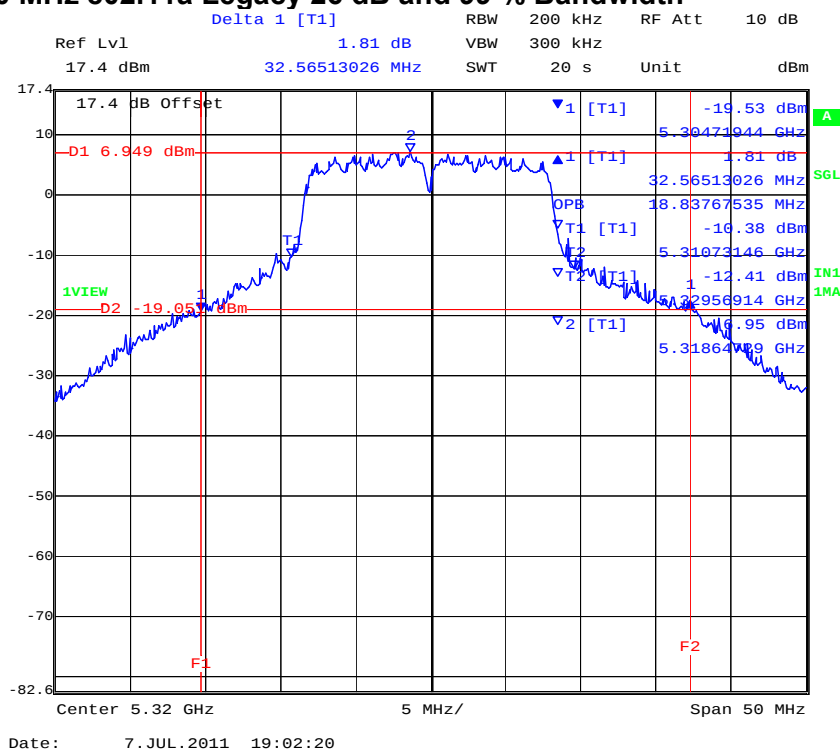


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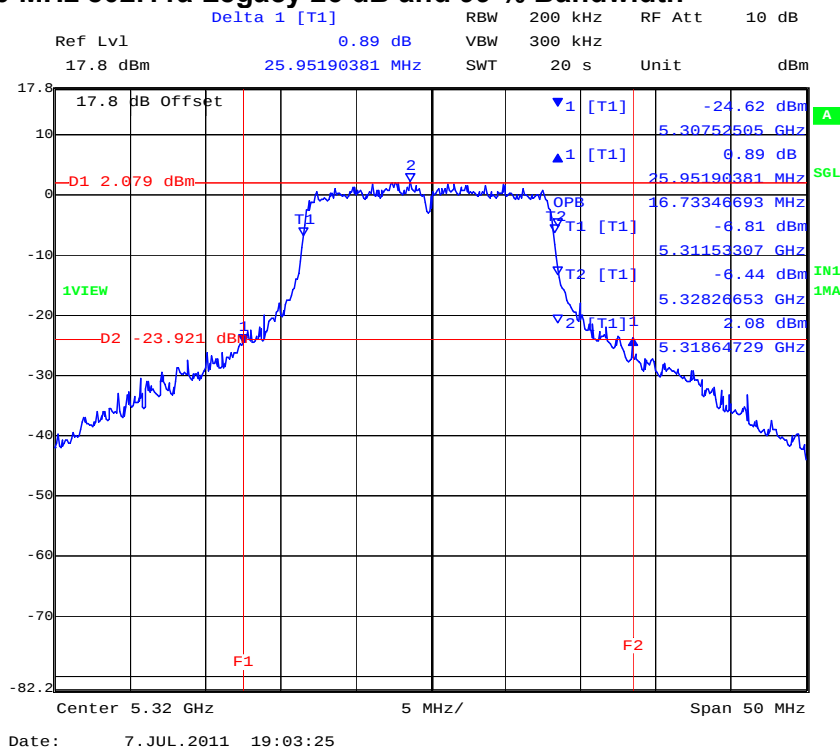


Title: Fluke Networks Sensor4 Wireless Client
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PORT A 5,320 MHz 802.11a Legacy 26 dB and 99 % Bandwidth



PORT B 5,320 MHz 802.11a Legacy 26 dB and 99 % Bandwidth

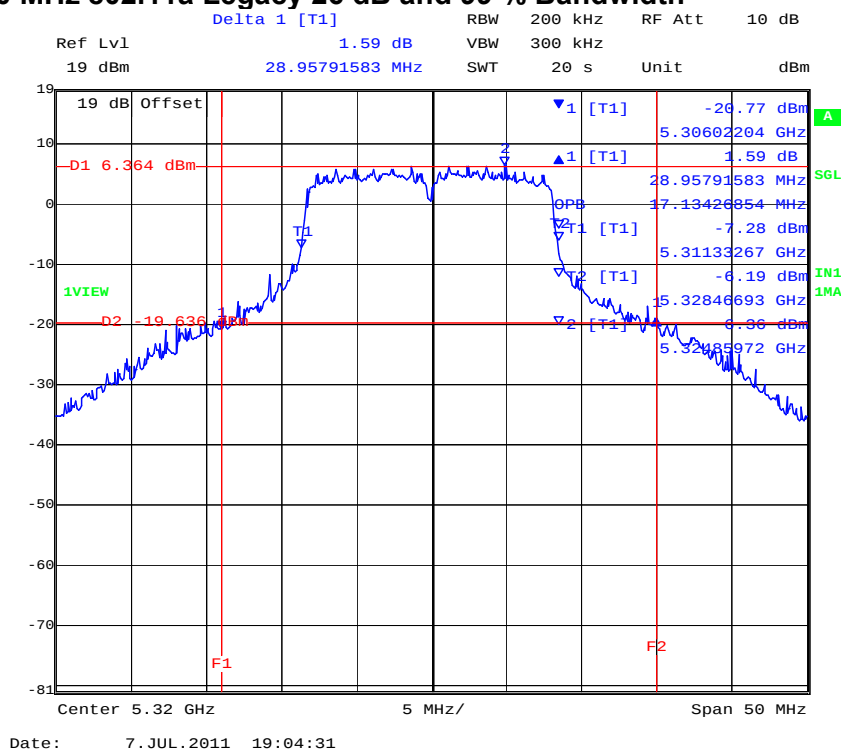


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PORT C 5,320 MHz 802.11a Legacy 26 dB and 99 % Bandwidth



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Title: Fluke Networks Sensor4 Wireless Client
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: AMGT14-U2 Rev B
Issue Date: 20th June 2012
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Measurement Results for 26 dB and 99 % Operational Bandwidth(s)

TABLE OF RESULTS – 802.11n HT20 5250 – 5350 MHz

Test Conditions:	15.247 (a)(2)	Rel. Humidity (%):	35 to 42
Variant:	802.11n HT-20	Ambient Temp. (°C):	19 to 22
TPC:	HIGH	Pressure (mBars):	998 to 1003
Modulation:	ON	Duty Cycle (x):	100
Beam Forming Gain (Y):	N/A dB	Antenna Gain:	0 dBi
Applied Voltage:	48.0 Vdc		
Notes 1:			
Notes 2:			

26 dB Bandwidth

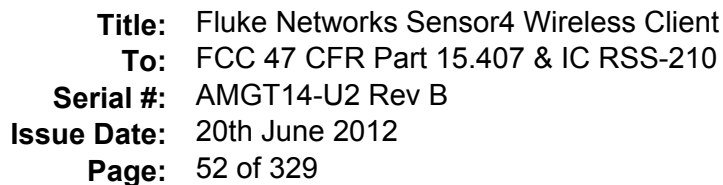
26 dB Bandwidth							
Test Frequency	26 dB Bandwidth				Minimum 6dB Bandwidth Limit		Margin
	MHz						
MHz	a	b	c	d	kHz	MHz	MHz
5260	29.960000	28.858000	28.858000		500	0.5	-28.358000
5300	32.766000	26.754000	32.766000				-26.254000
5320	36.273000	25.150000	30.962000				-24.650000

99% Bandwidth

99 % Bandwidth							
Test Frequency	MHz						
MHz	a	b	c	d			
5260	18.136000	18.036000	18.036000				
5300	18.938000	17.936000	18.236000				
5320	19.940000	17.936000	18.236000				

Measurement uncertainty:	±2.81 dB
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Ref Lvl 17.4 dBm Delta 1 [T1] 0.38 dB RBW 200 kHz VBW 300 kHz RF Att 10 dB

17.4 dB Offset 29.95991984 MHz SWT 20 s Unit dBm

17.4 dB Offset

-D1 6.261 dBm

1VIEW

D2 -19.73 dBm

1 [T1] -19.98 dBm

1 [T1] 0.38 dB

29.95991984 MHz

18.13627255 MHz

1 [T1] -4.13 dBm

5.25083166 GHz

1 [T1] -3.99 dBm

5.26896794 GHz

1 [T1] 6.26 dBm

5.25864729 GHz

Center 5.26 GHz 5 MHz/ Span 50 MHz

Date: 7.JUL.2011 19:19:10

Delta 1 [T1] 1.95 dB RBW 200 kHz RF Att 10 dB

Ref Lvl 17.8 dBm 28.85771543 MHz SWT 20 s Unit dBm

17.8 dB Offset

D1 4.998 dBm

1VIEW

D2 -21.002 dBm

F1

F2

Center 5.26 GHz 5 MHz/ Span 50 MHz

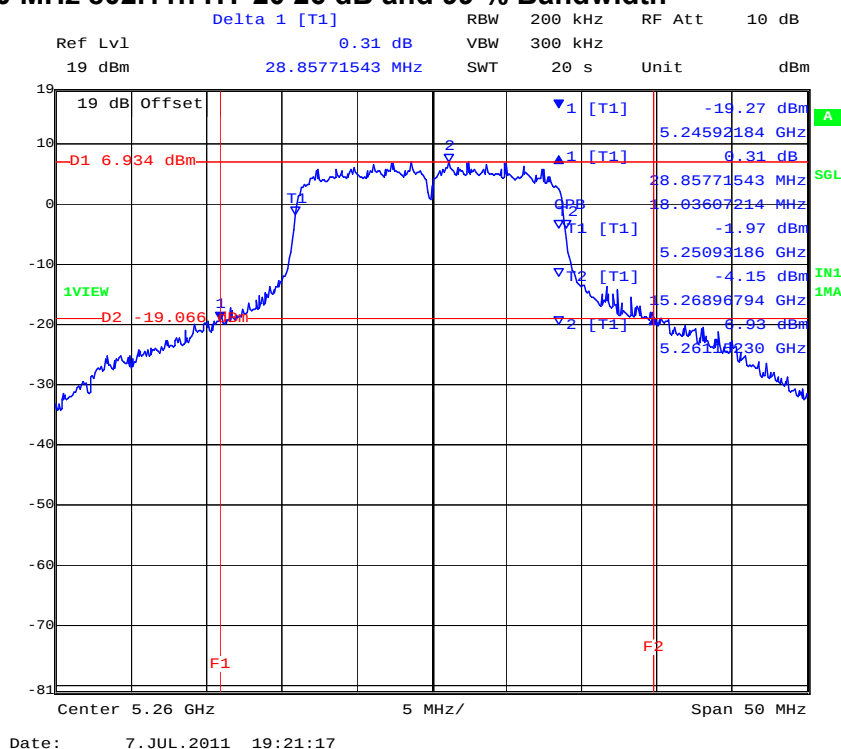
Date: 7.JUL.2011 19:20:13

MiCOM Labs, 440 Boulder Court, Suite 200, Pleasanton, CA 94566 USA, Phone: 925.462.0304, Fax: 925.462.0306, www.micomlabs.com

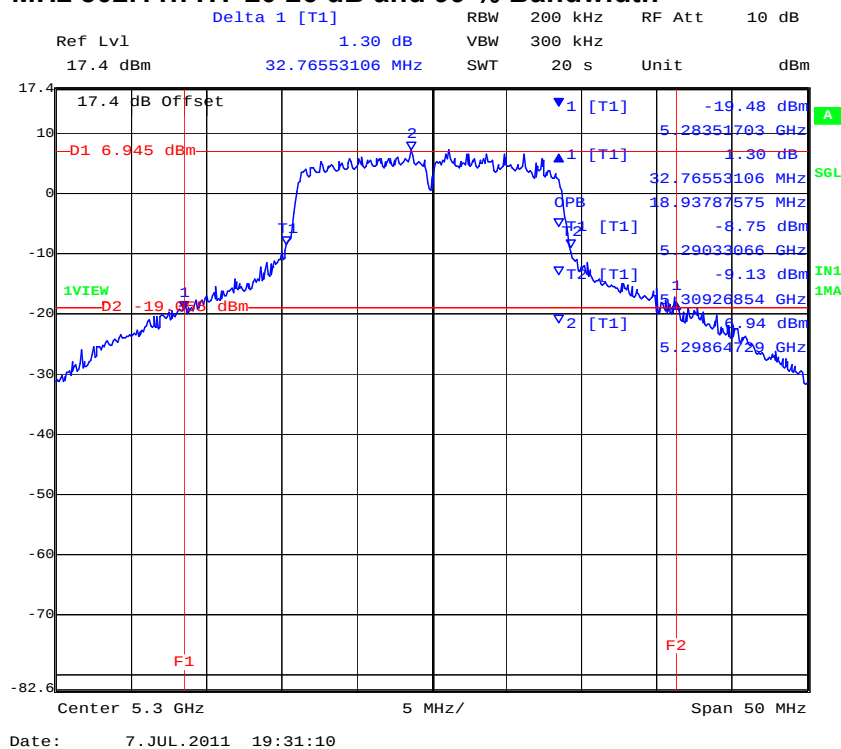


Title: Fluke Networks Sensor4 Wireless Client
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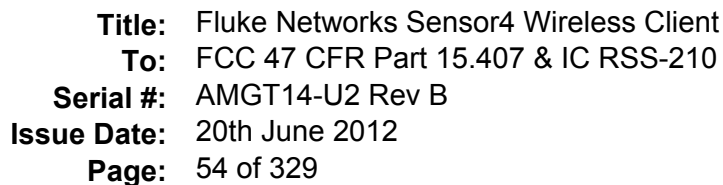
PORT C 5,260 MHz 802.11n HT-20 26 dB and 99 % Bandwidth



PORT A 5300 MHz 802.11n HT-20 26 dB and 99 % Bandwidth



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Delta 1 [T1] 1.97 dB

Ref Lvl 17.8 dBm

26.75350701 MHz

RBW 200 kHz

VBW 300 kHz

SWT 20 s

RF Att 10 dB

Unit dBm

17.8 dB Offset

D1 3.078 dBm

D2 -22.922 dBm

1VIEW

F1

F2

Center 5.3 GHz

5 MHz/

Span 50 MHz

Date: 7.JUL.2011 19:32:14

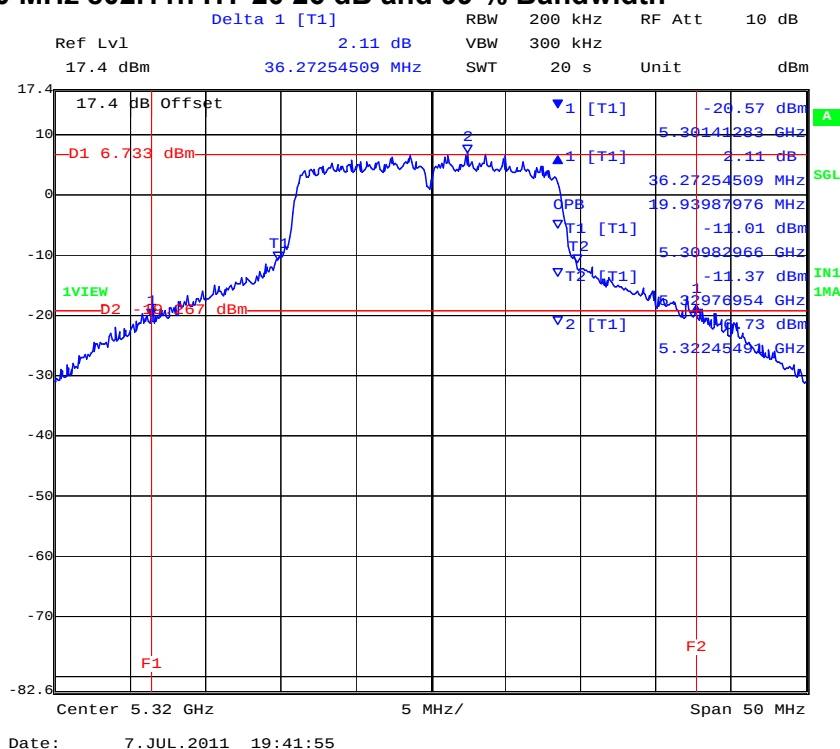
[illegible]

MiCOM Labs, 440 Boulder Court, Suite 200, Pleasanton, CA 94566 USA, Phone: 925.462.0304, Fax: 925.462.0306, www.micomlabs.com

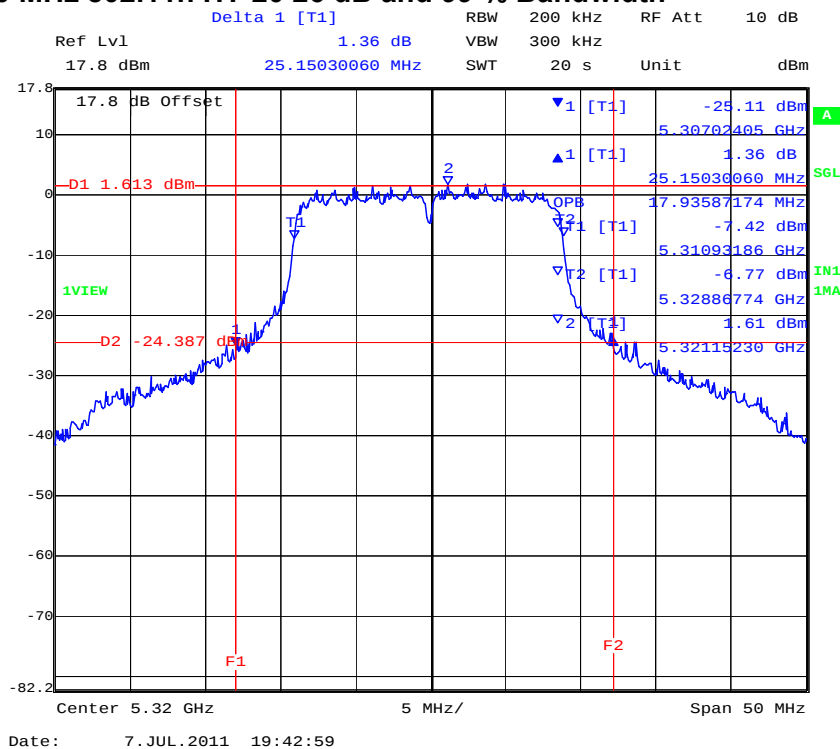


Title: Fluke Networks Sensor4 Wireless Client
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: AMGT14-U2 Rev B
Issue Date: 20th June 2012
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PORT A 5,320 MHz 802.11n HT-20 26 dB and 99 % Bandwidth



PORT B 5,320 MHz 802.11n HT-20 26 dB and 99 % Bandwidth

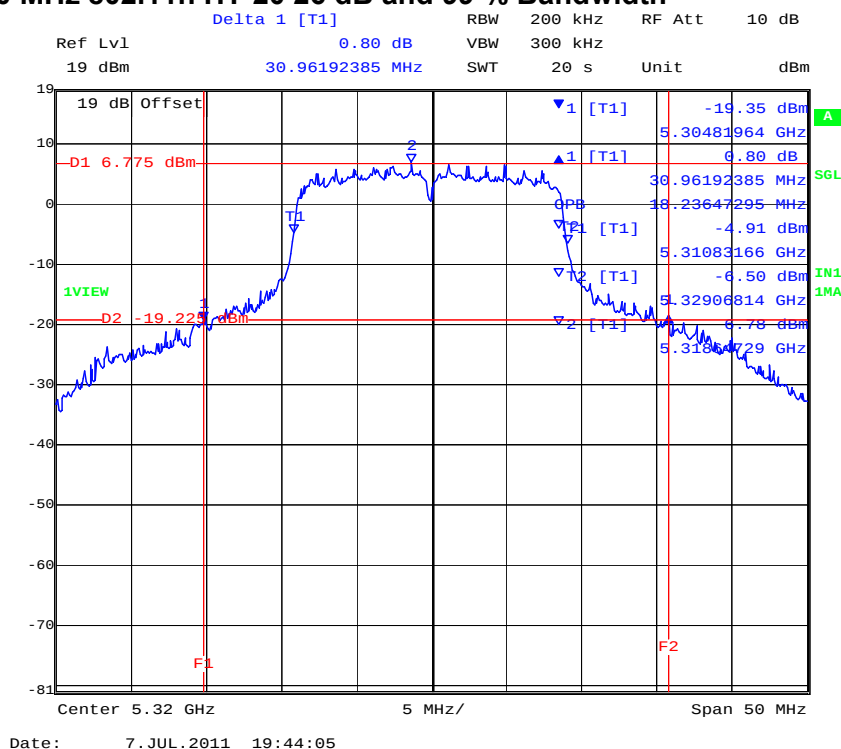


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PORT C 5,320 MHz 802.11n HT-20 26 dB and 99 % Bandwidth



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Serial #: AMGT14-U2 Rev B
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Measurement Results for 26 dB and 99 % Operational Bandwidth(s)

TABLE OF RESULTS – 802.11n HT40 5250 – 5350 MHz

Test Conditions:	15.247 (a)(2)	Rel. Humidity (%):	35 to 42
Variant:	802.11n HT-40	Ambient Temp. (°C):	19 to 22
TPC:	HIGH	Pressure (mBars):	998 to 1003
Modulation:	ON	Duty Cycle (x):	100
Beam Forming Gain (Y):	N/A dB	Antenna Gain:	0 dBi
Applied Voltage:	48.0 Vdc		
Notes 1:			
Notes 2:			

26 dB Bandwidth

Test Frequency	26 dB Bandwidth				Minimum 6dB Bandwidth Limit		Margin
	MHz						
MHz	a	b	c	d	kHz	MHz	MHz
5270	46.894000	47.896000	47.495000		500	0.5	-46.394000
5310	61.122000	45.892000	47.094000				-45.392000

99% Bandwidth

Test Frequency	99 % Bandwidth						
	MHz						
MHz	a	b	c	d			
5270	36.473000	36.473000	36.673000				
5310	36.673000	36.473000	36.473000				

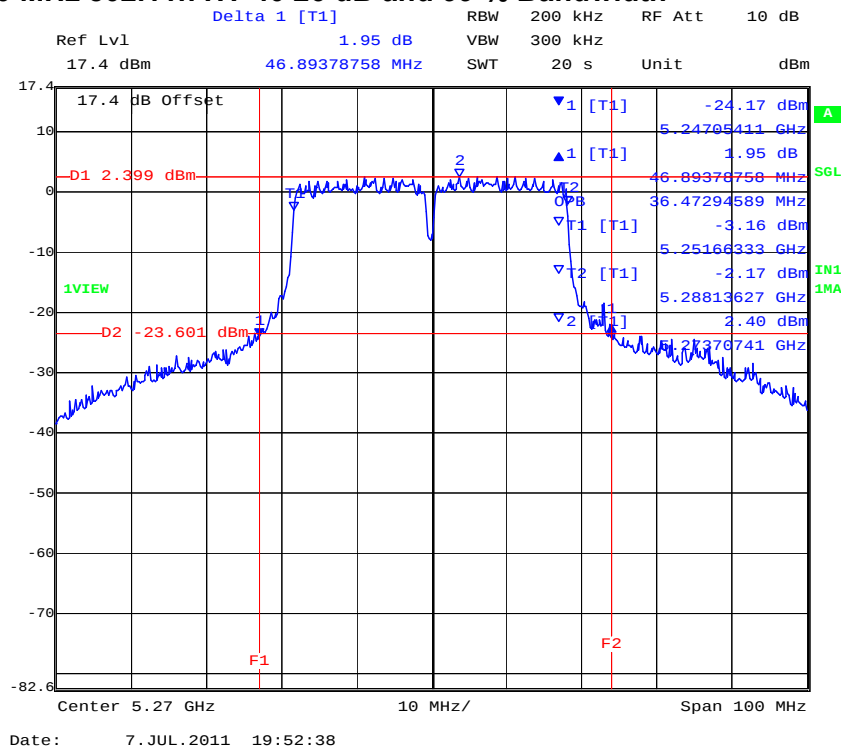
Measurement uncertainty:	±2.81 dB
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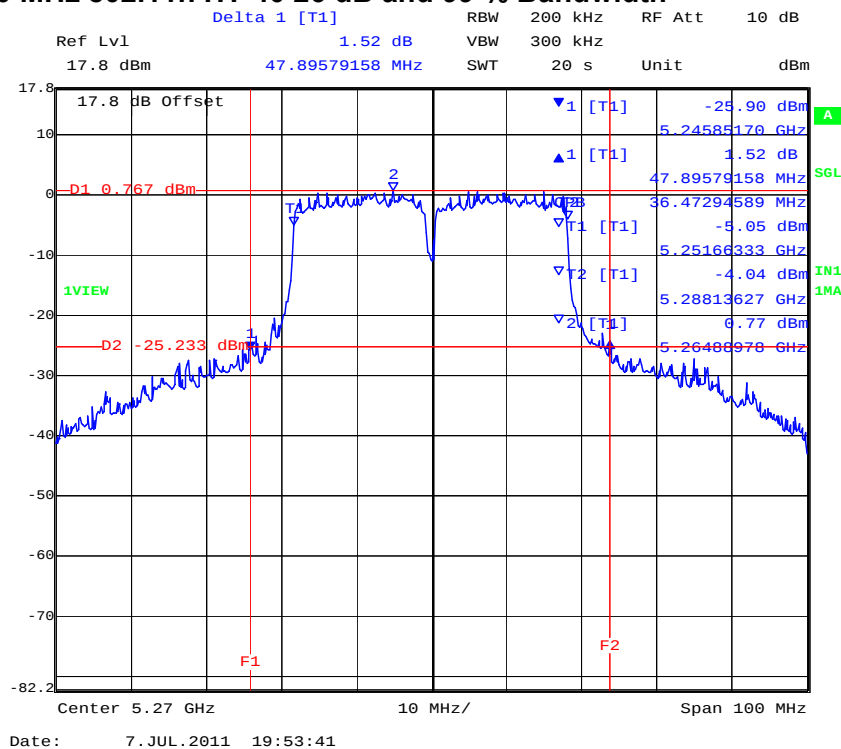


Title: Fluke Networks Sensor4 Wireless Client
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PORT A 5,270 MHz 802.11n HT-40 26 dB and 99 % Bandwidth



PORT B 5,270 MHz 802.11n HT-40 26 dB and 99 % Bandwidth

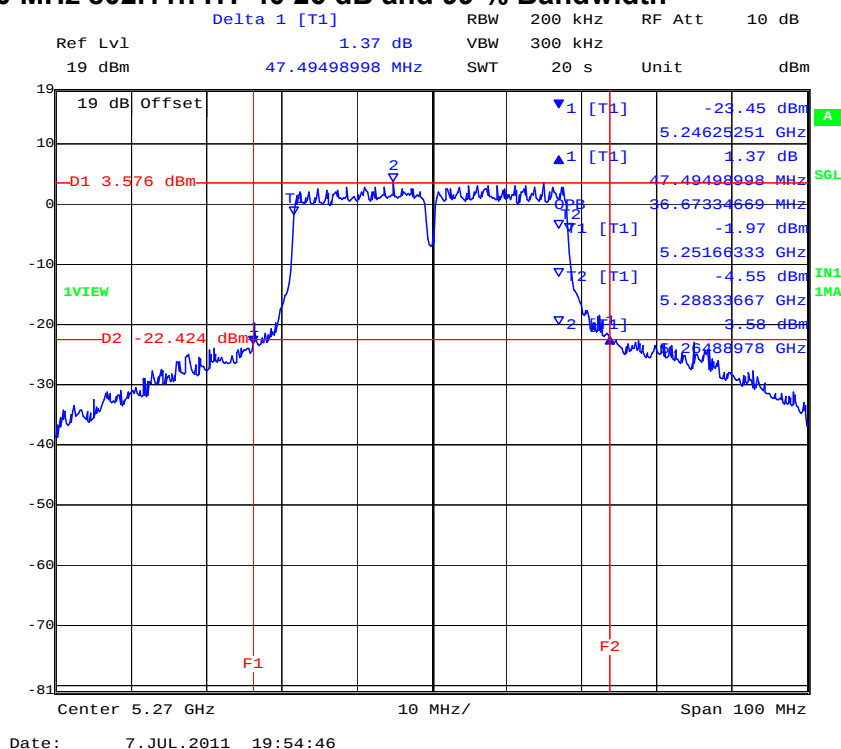


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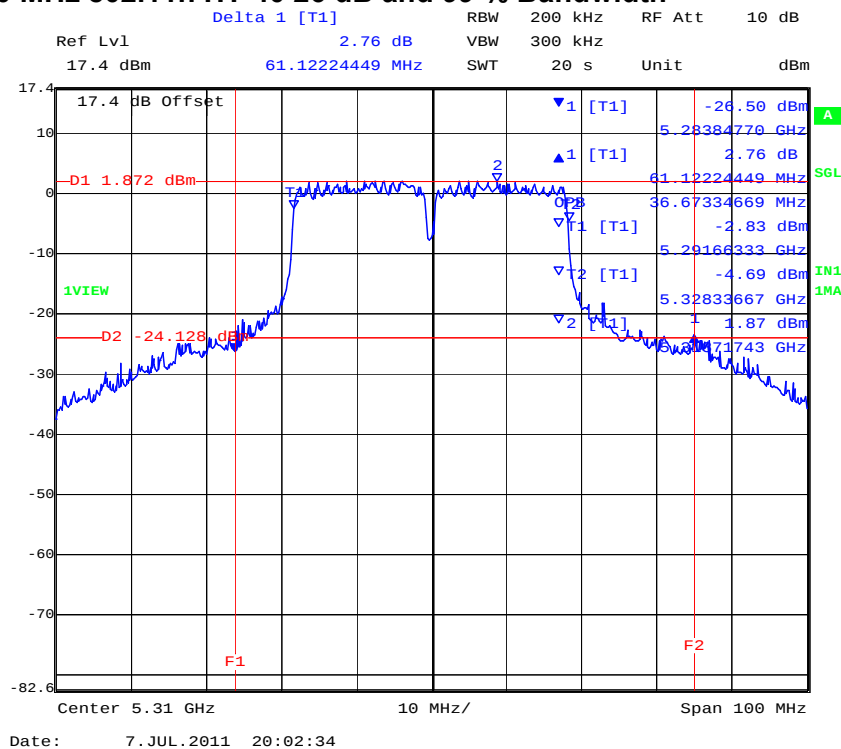


Title: Fluke Networks Sensor4 Wireless Client
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PORT C 5,270 MHz 802.11n HT-40 26 dB and 99 % Bandwidth



PORT A 5,310 MHz 802.11n HT-40 26 dB and 99 % Bandwidth

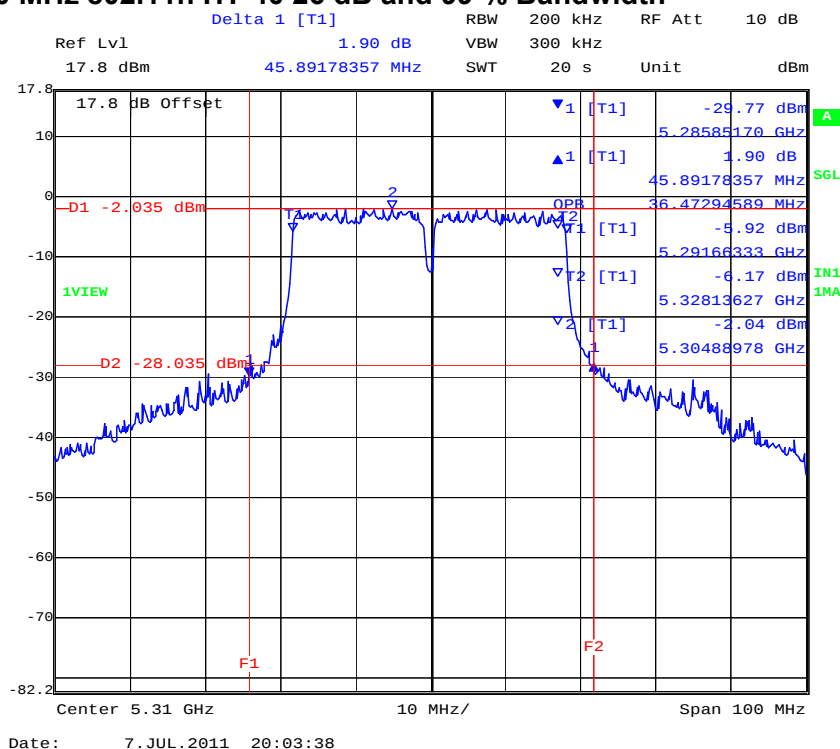


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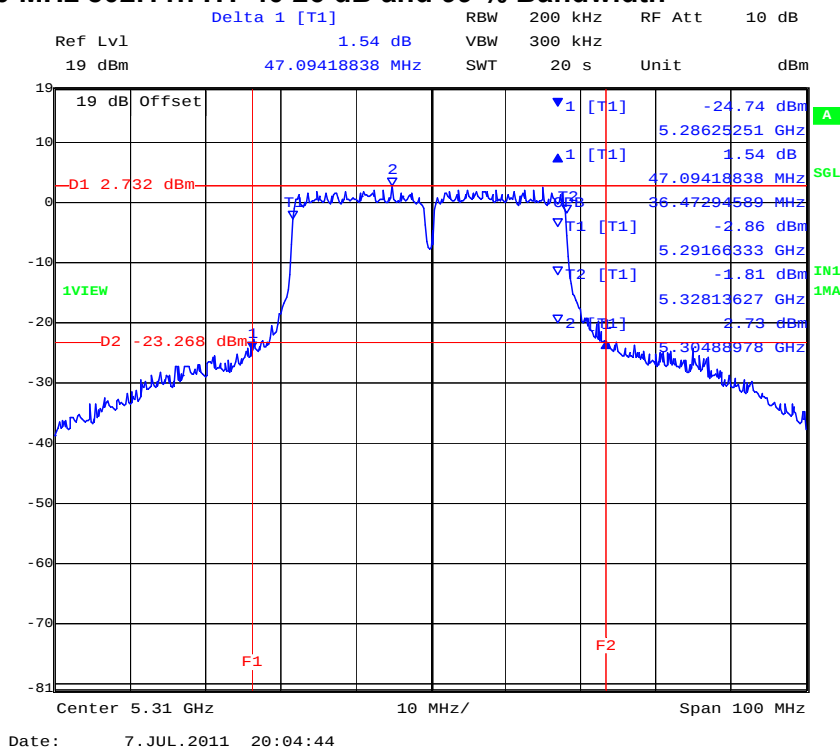


Title: Fluke Networks Sensor4 Wireless Client
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PORT B 5,310 MHz 802.11n HT-40 26 dB and 99 % Bandwidth



PORT C 5,310 MHz 802.11n HT-40 26 dB and 99 % Bandwidth



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Title: Fluke Networks Sensor4 Wireless Client
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: AMGT14-U2 Rev B
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TABLE OF RESULTS – 802.11a Legacy 5500 – 5700 MHz

Test Conditions:	15.247 (a)(2)	Rel. Humidity (%):	35 to 42
Variant:	802.11a	Ambient Temp. (°C):	19 to 22
TPC:	HIGH	Pressure (mBars):	998 to 1003
Modulation:	ON	Duty Cycle (x):	100
Beam Forming Gain (Y):	N/A dB	Antenna Gain:	0 dBi
Applied Voltage:	48.0 Vdc		
Notes 1:			
Notes 2:			

26 dB Bandwidth

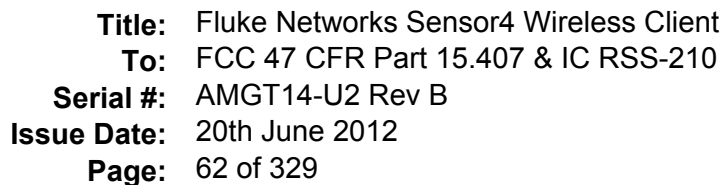
Test Frequency	26 dB Bandwidth				Minimum 6dB Bandwidth Limit		Margin
	MHz						
MHz	a	b	c	d	kHz	MHz	MHz
5500	24.850000	25.150000	23.747000		500	0.5	-23.247000
5580	26.653000	28.357000	27.956000				-26.153000
5700	28.257000	22.044000	24.549000				-21.544000

99% Bandwidth

Test Frequency	99 % Bandwidth						
	MHz						
MHz	a	b	c	d			
5500	16.733000	16.733000	16.733000				
5580	16.934000	16.934000	16.934000				
5700	16.934000	16.633000	16.733000				

Measurement uncertainty:	±2.81 dB
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Delta 1 [T1]

Ref Lvl 17.6 dBm

Delta 1 [T1] 1.12 dB

RBW 200 kHz

VBW 300 kHz

RF Att 10 dB

SWT 20 s

Unit dBm

17.6 dB Offset

-D1 4.913 dBm

1VIEW

D2 -21.087 dBm

F1

F2

1 [T1] -21.76 dBm

2 5.48742485 GHz

24.84969940 MHz

16.73346693 MHz

1 [T1] -3.26 dBm

2 [T1] -3.97 dBm

1 5.50826653 GHz

2 4.91 dBm

5.49784569 GHz

Center 5.5 GHz

5 MHz/

Span 50 MHz

Date: 7 JUL 2011 20:17:44

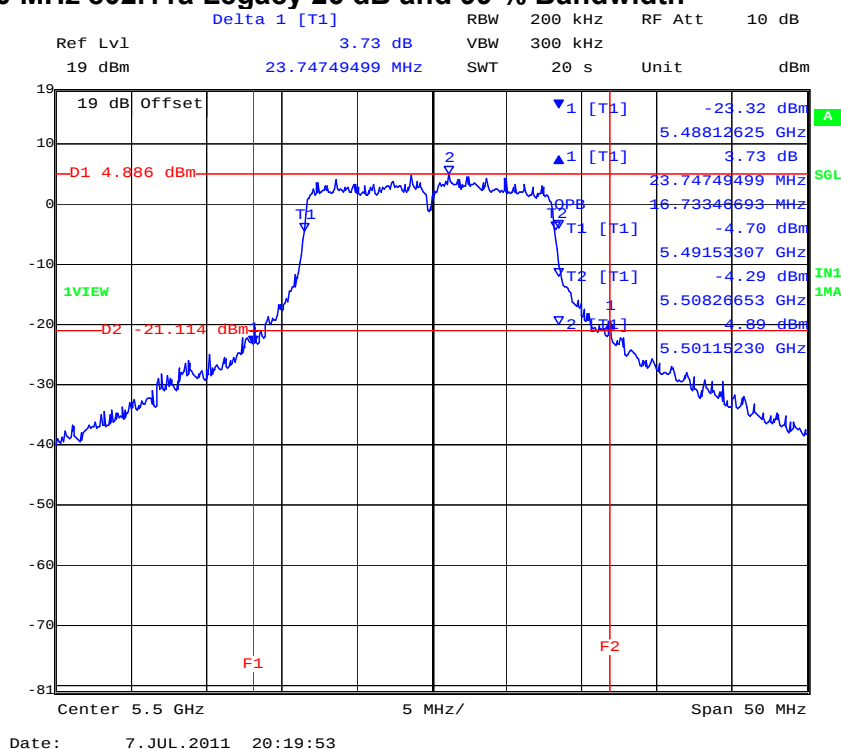
[illegible]

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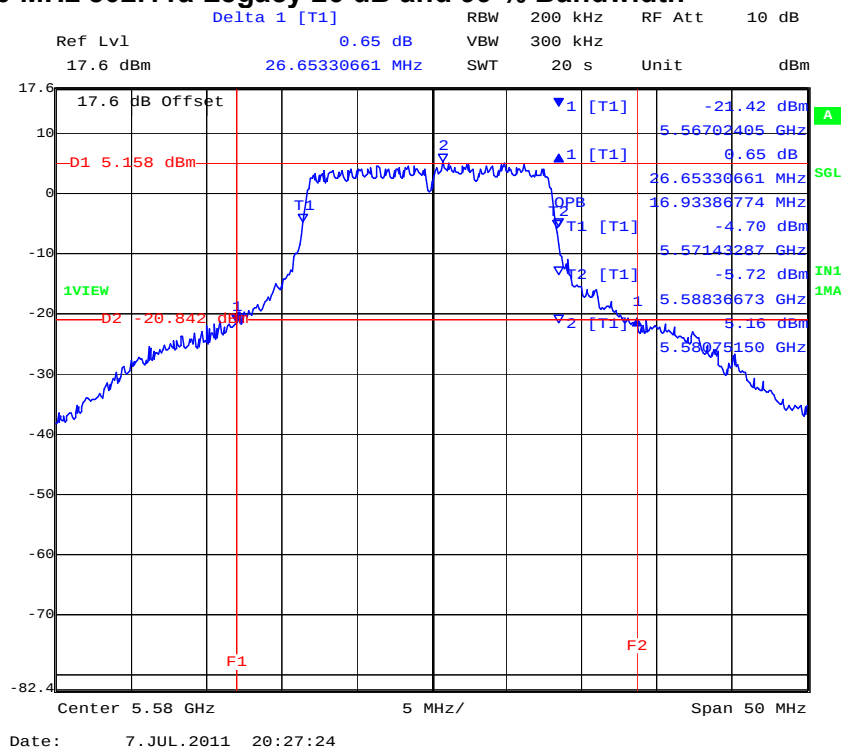


Title: Fluke Networks Sensor4 Wireless Client
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PORT C 5,500 MHz 802.11a Legacy 26 dB and 99 % Bandwidth



PORT A 5,580 MHz 802.11a Legacy 26 dB and 99 % Bandwidth

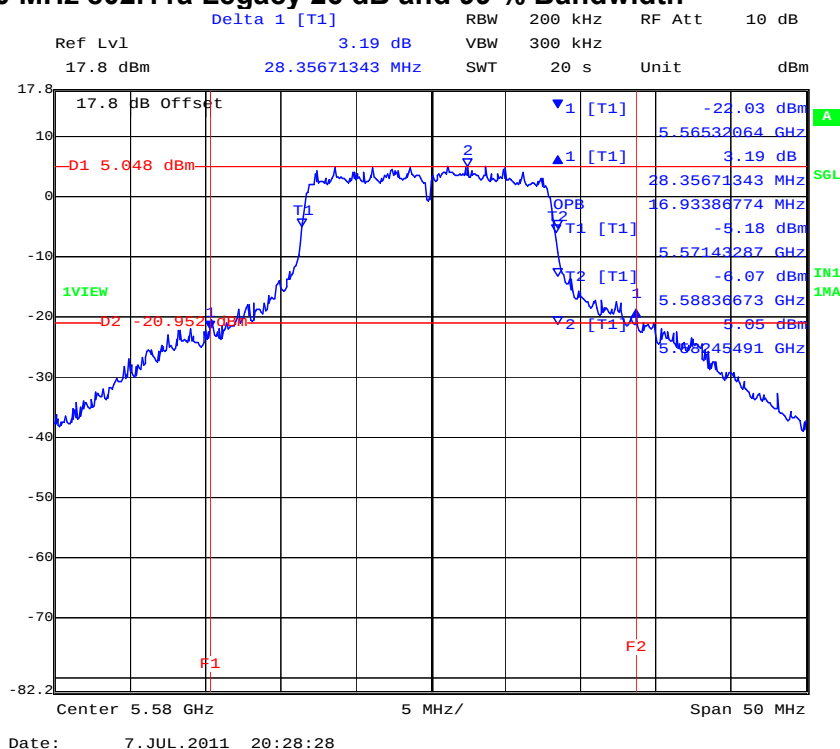


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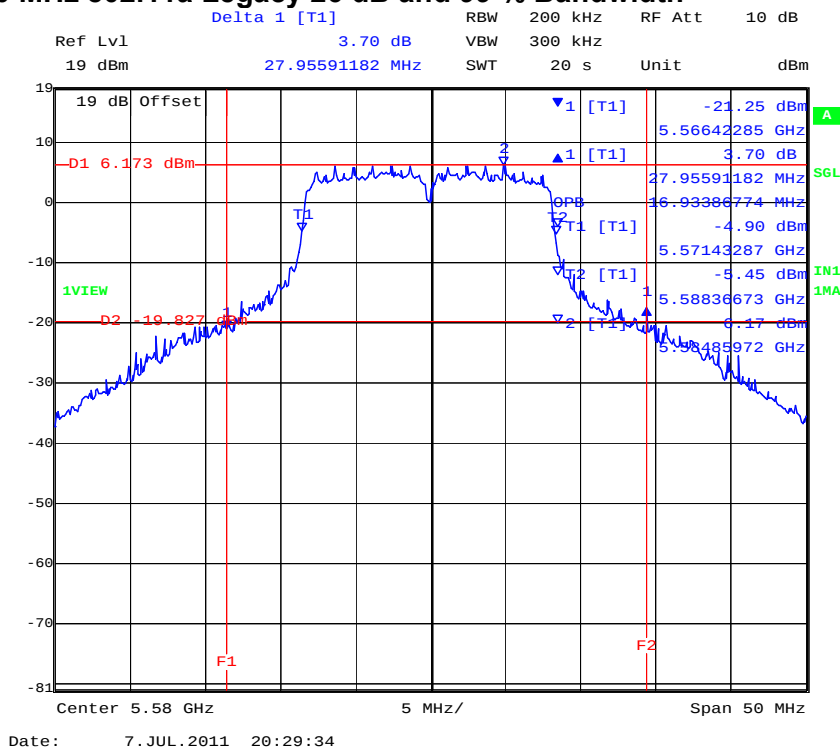


Title: Fluke Networks Sensor4 Wireless Client
To: FCC 47 CFR Part 15.407 & IC RSS-210
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PORT B 5,580 MHz 802.11a Legacy 26 dB and 99 % Bandwidth



PORT C 5,580 MHz 802.11a Legacy 26 dB and 99 % Bandwidth

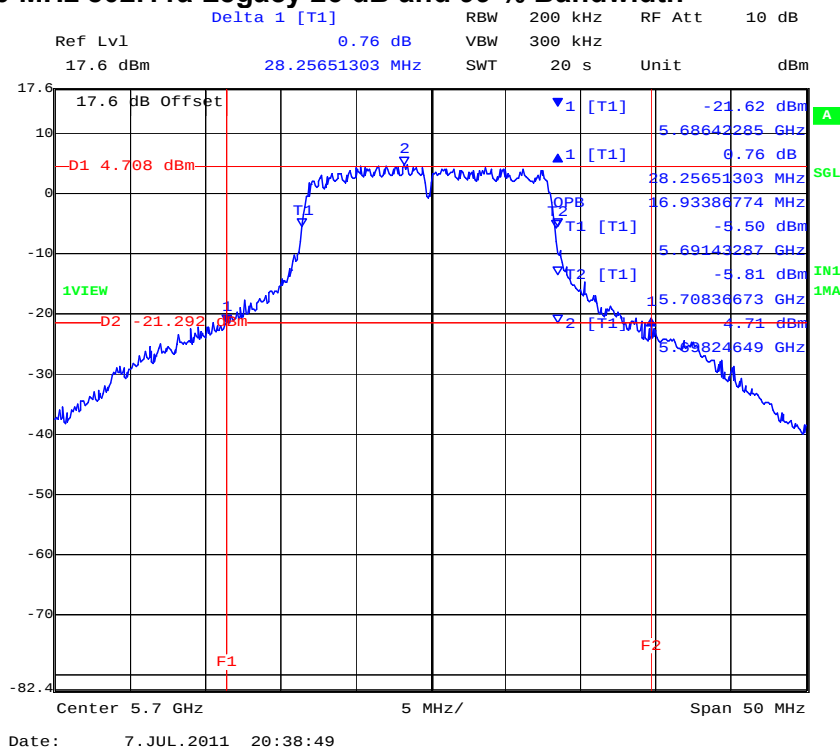


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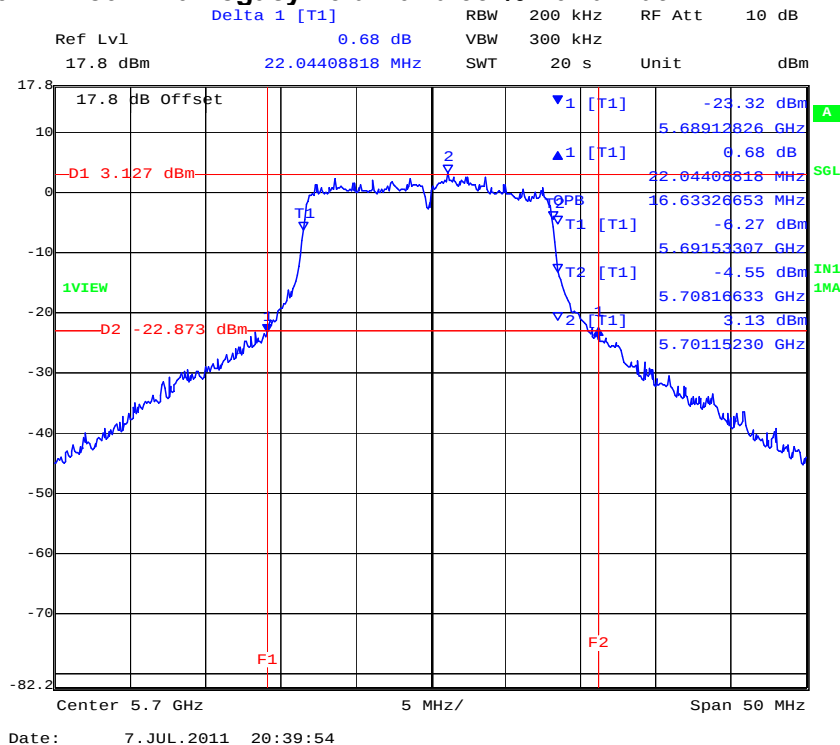


Title: Fluke Networks Sensor4 Wireless Client
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Serial #: AMGT14-U2 Rev B
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PORT A 5,700 MHz 802.11a Legacy 26 dB and 99 % Bandwidth



PORT B 5,700 MHz 802.11a Legacy 26 dB and 99 % Bandwidth

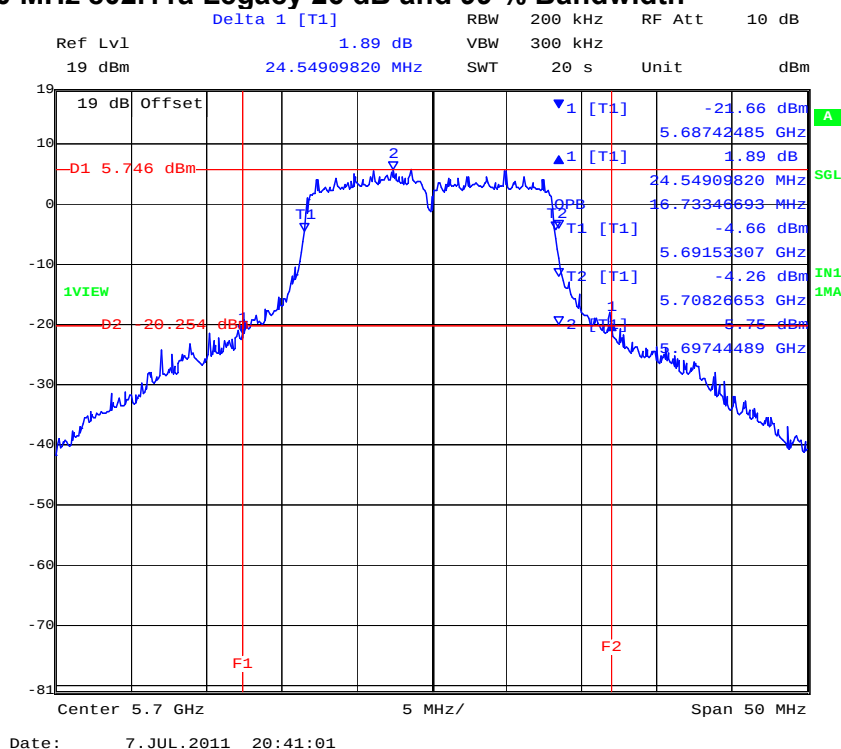


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Title: Fluke Networks Sensor4 Wireless Client
To: FCC 47 CFR Part 15.407 & IC RSS-210
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PORT C 5,700 MHz 802.11a Legacy 26 dB and 99 % Bandwidth



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Title: Fluke Networks Sensor4 Wireless Client
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: AMGT14-U2 Rev B
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TABLE OF RESULTS – 802.11n HT-20 5500 – 5700 MHz

Test Conditions:	15.247 (a)(2)	Rel. Humidity (%):	35 to 42
Variant:	802.11n HT-20	Ambient Temp. (°C):	19 to 22
TPC:	HIGH	Pressure (mBars):	998 to 1003
Modulation:	ON	Duty Cycle (x):	100
Beam Forming Gain (Y):	N/A dB	Antenna Gain:	0 dBi
Applied Voltage:	48.0 Vdc		
Notes 1:			
Notes 2:			

26 dB Bandwidth

Test Frequency	26 dB Bandwidth				Minimum 6dB Bandwidth Limit		Margin
	MHz						
MHz	a	b	c	d	kHz	MHz	MHz
5500	24.950000	26.353000	24.248000		500	0.5	-23.748000
5580	27.355000	29.259000	31.764000				-26.855000
5700	26.253000	23.046000	24.850000				-22.546000

99% Bandwidth

Test Frequency	99 % Bandwidth						
	MHz						
MHz	a	b	c	d			
5500	17.936000	17.836000	17.735000				
5580	18.136000	18.136000	18.136000				
5700	18.036000	17.735000	17.836000				

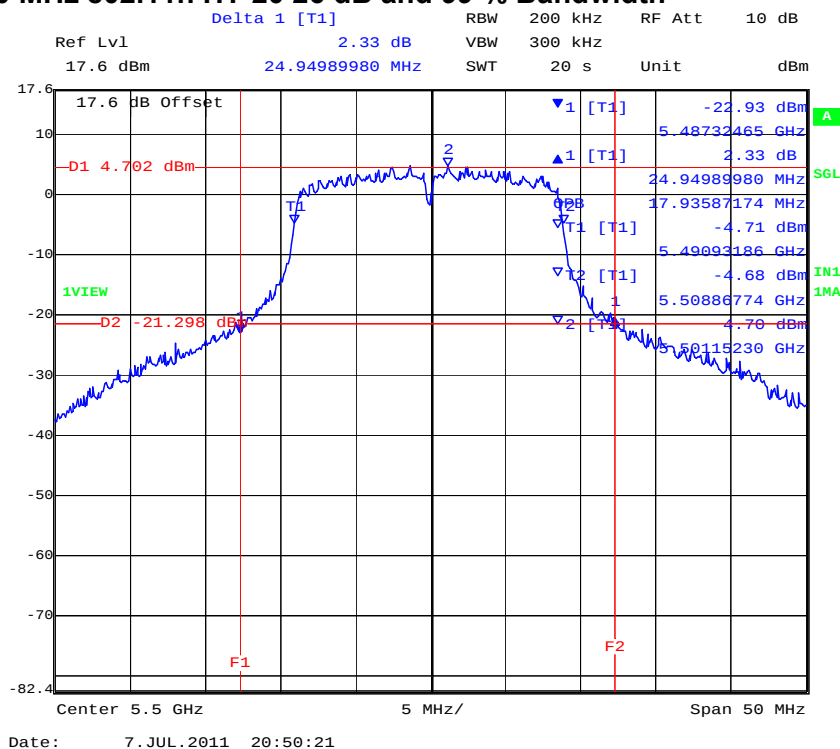
Measurement uncertainty:	±2.81 dB
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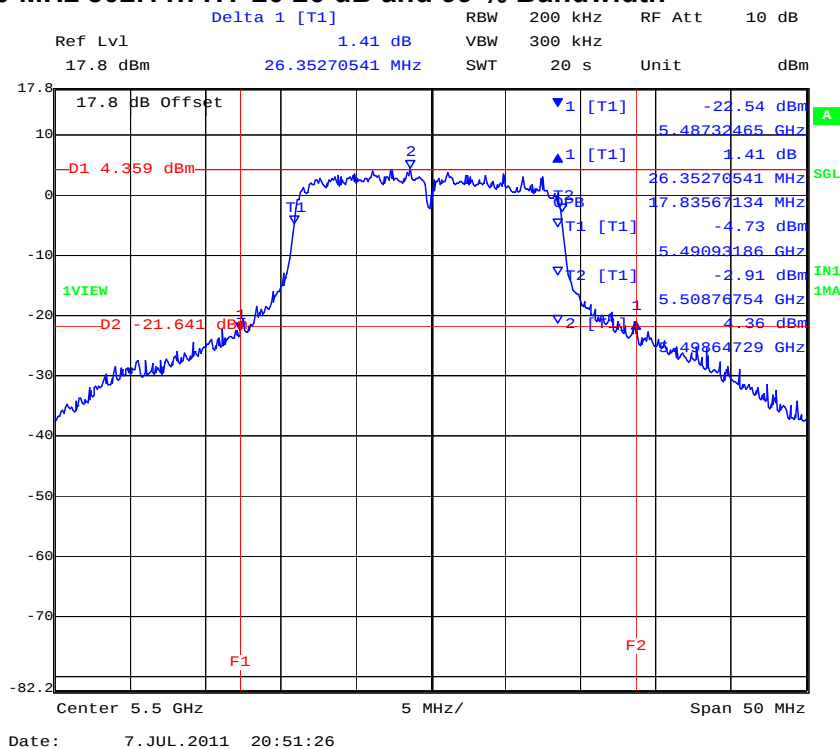


Title: Fluke Networks Sensor4 Wireless Client
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: AMGT14-U2 Rev B
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PORT A 5,500 MHz 802.11n HT-20 26 dB and 99 % Bandwidth



PORT B 5,500 MHz 802.11n HT-20 26 dB and 99 % Bandwidth

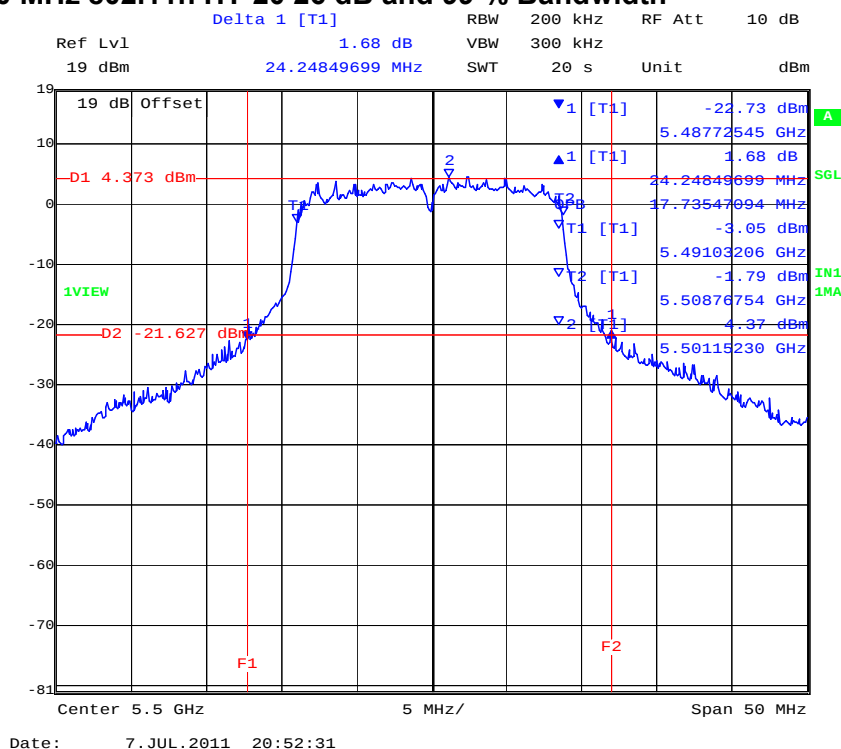


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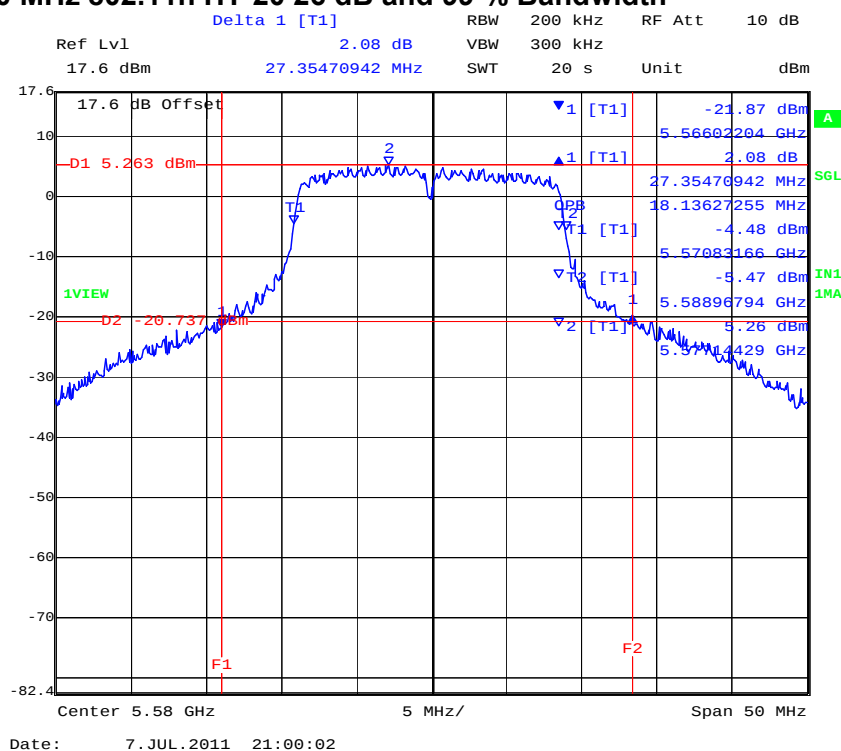


Title: Fluke Networks Sensor4 Wireless Client
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: AMGT14-U2 Rev B
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PORT C 5,500 MHz 802.11n HT-20 26 dB and 99 % Bandwidth



PORT A 5,580 MHz 802.11n HT-20 26 dB and 99 % Bandwidth

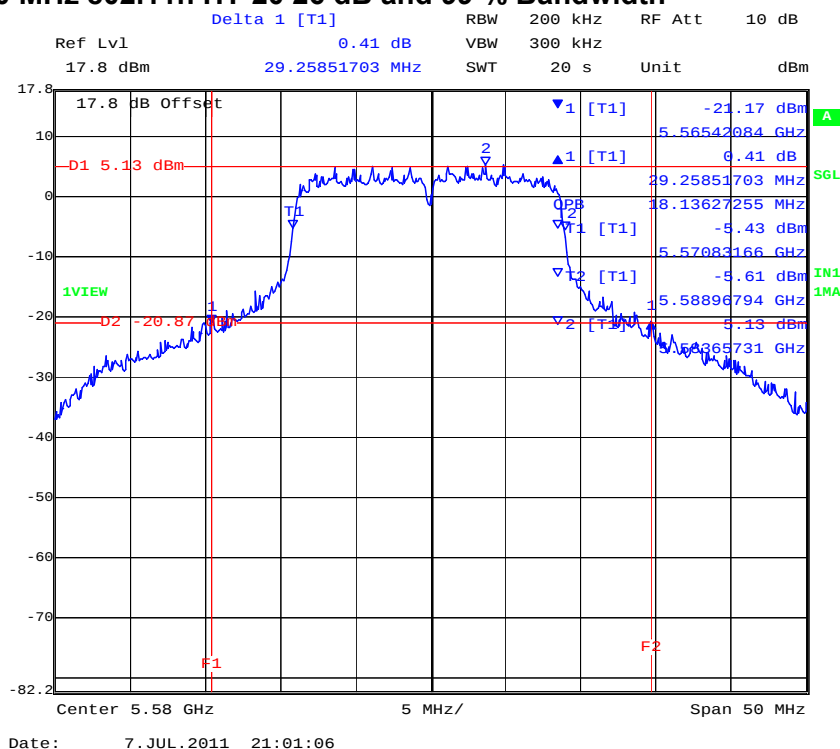


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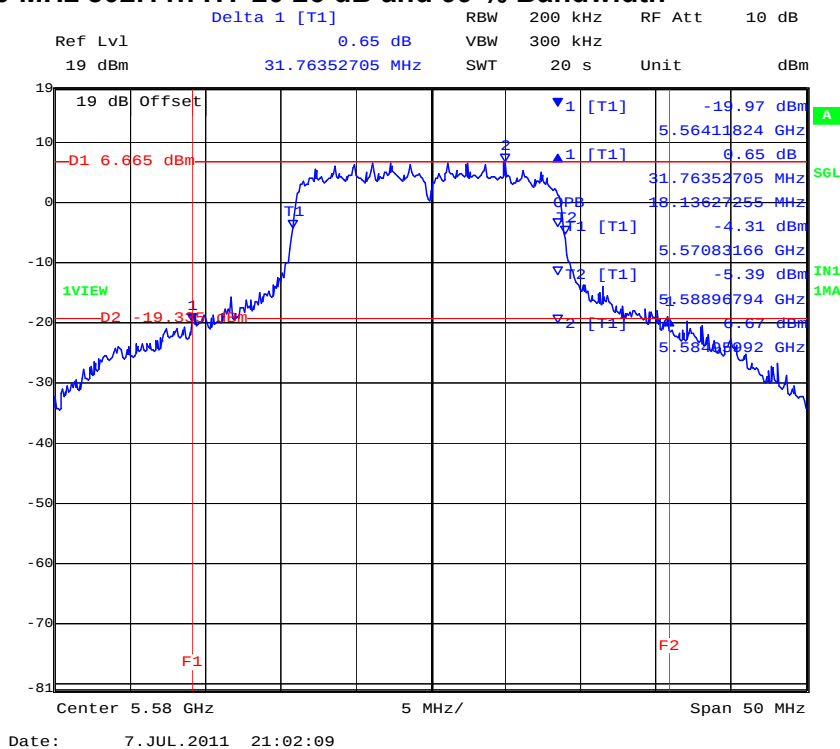


Title: Fluke Networks Sensor4 Wireless Client
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: AMGT14-U2 Rev B
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PORT B 5,580 MHz 802.11n HT-20 26 dB and 99 % Bandwidth



PORT C 5,580 MHz 802.11n HT-20 26 dB and 99 % Bandwidth

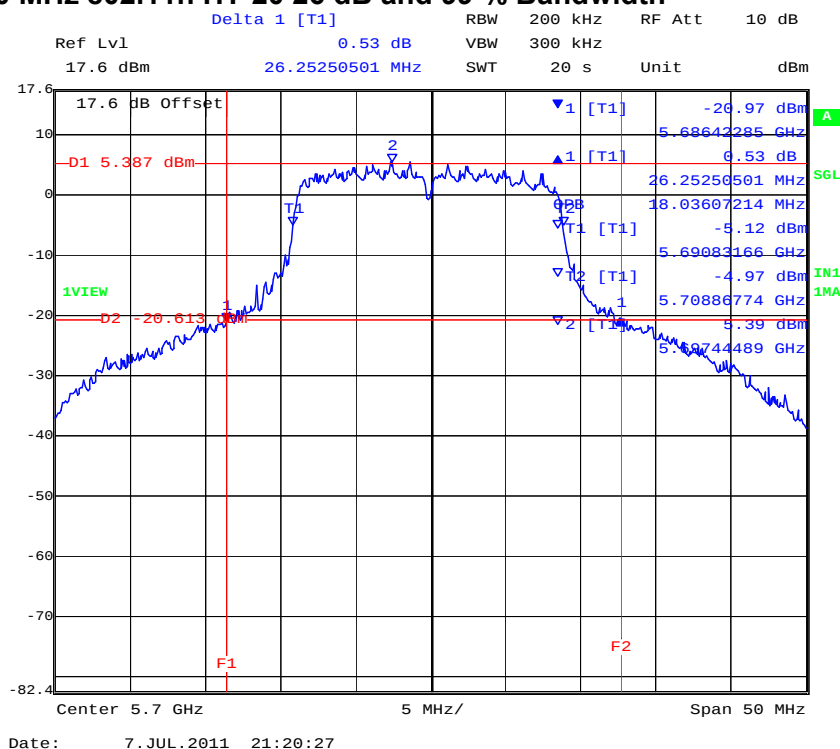


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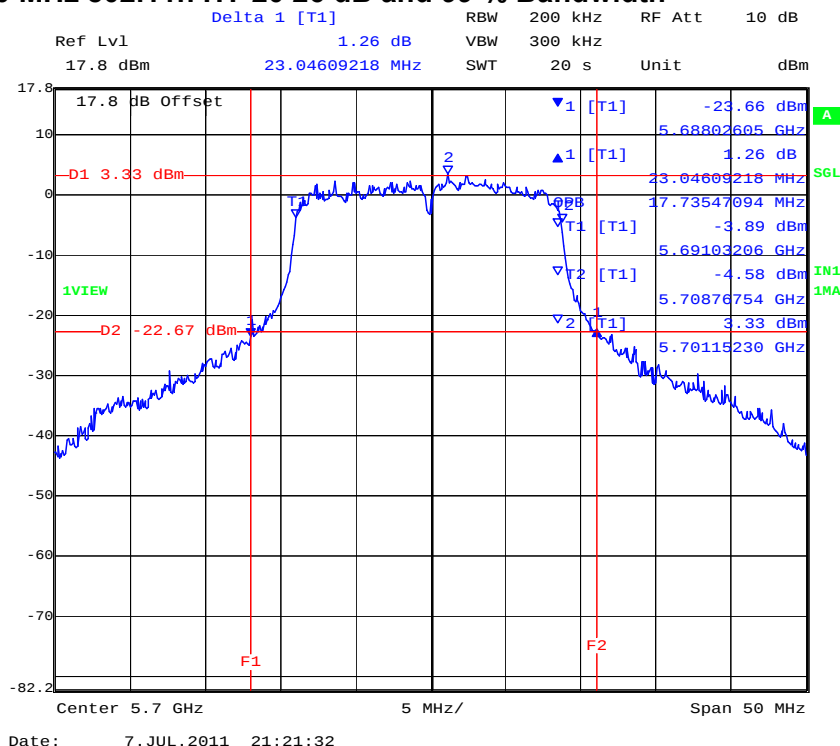


Title: Fluke Networks Sensor4 Wireless Client
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PORT A 5,700 MHz 802.11n HT-20 26 dB and 99 % Bandwidth



PORT B 5,700 MHz 802.11n HT-20 26 dB and 99 % Bandwidth

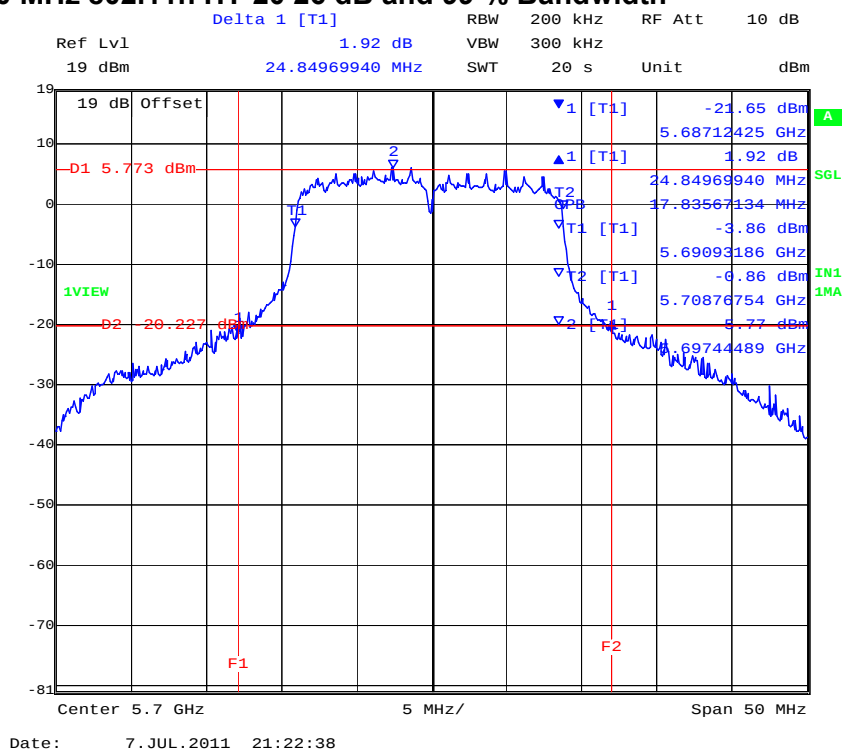


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Title: Fluke Networks Sensor4 Wireless Client
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PORT C 5,700 MHz 802.11n HT-20 26 dB and 99 % Bandwidth



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Title: Fluke Networks Sensor4 Wireless Client
To: FCC 47 CFR Part 15.407 & IC RSS-210
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TABLE OF RESULTS – 802.11n HT-40 5500 – 5700 MHz

Test Conditions:	15.247 (a)(2)	Rel. Humidity (%):	35 to 42
Variant:	802.11n HT-40	Ambient Temp. (°C):	19 to 22
TPC:	HIGH	Pressure (mBars):	998 to 1003
Modulation:	ON	Duty Cycle (x):	100
Beam Forming Gain (Y):	N/A dB	Antenna Gain:	0 dBi
Applied Voltage:	48.0 Vdc		
Notes 1:			
Notes 2:			

26 dB Bandwidth

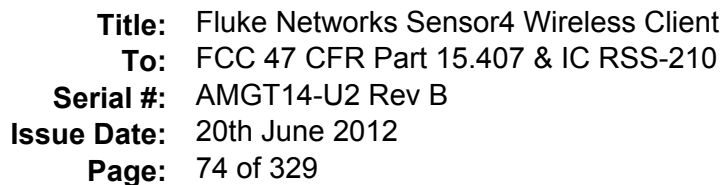
26 dB Bandwidth							
Test Frequency	26 dB Bandwidth				Minimum 6dB Bandwidth Limit		Margin
	MHz						
MHz	a	b	c	d	kHz	MHz	MHz
5510	45.892000	48.096000	42.285000		500	0.5	-41.785000
5550	47.896000	48.697000	45.892000				-45.392000
5670	49.900000	45.090000	47.094000				-44.590000

99% Bandwidth

Test Frequency	99 % Bandwidth						
	MHz						
MHz	a	b	c	d			
5510	36.473000	36.473000	36.273000				
5550	36.473000	36.473000	36.473000				
5670	36.473000	36.473000	36.473000				

Measurement uncertainty:	±2.81 dB
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Ref Lvl 17.6 dBm Delta 1 [T1] 3.10 dB RBW 200 kHz RF Att 10 dB
 17.6 dB Offset 45.89178357 MHz VBW 300 kHz Unit dBm
 17.6 dB Offset
 D1 1.239 dBm
 1VIEW
 D2 -24.761 dBm
 F1
 F2
 1 [T1] -25.60 dBm
 1 [T1] 5.48725451 GHz
 2 [T1] 3.10 dB
 2 [T1] 45.89178357 MHz
 1 [T1] 36.47294589 MHz
 1 [T1] -4.23 dBm
 2 [T1] 5.49166333 GHz
 1 [T1] -3.29 dBm
 2 [T1] 5.52813627 GHz
 2 [T1] 1.24 dBm
 2 [T1] 5.52252505 GHz
 Center 5.51 GHz 10 MHz/ Span 100 MHz
 Date: 7.JUL.2011 21:30:02

Ref Lvl 17.8 dBm Delta 1 [T1] 1.41 dB RBW 200 kHz RF Att 10 dB
 48.09619238 MHz SWT 20 s Unit dBm

1VIEW
 1MA

Center 5.51 GHz 10 MHz/ Span 100 MHz

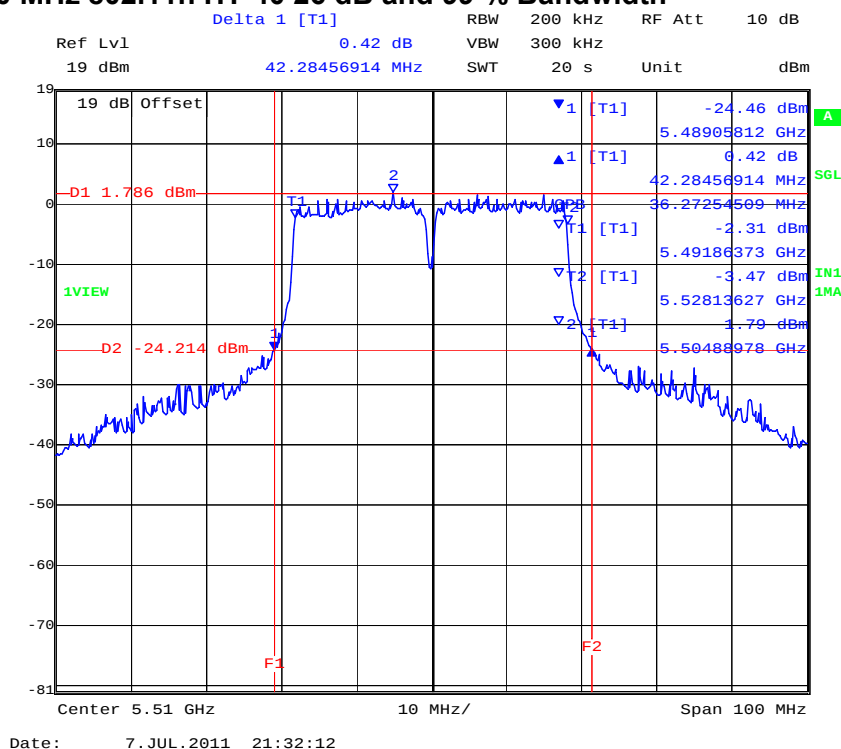
Date: 7.JUL.2011 21:31:07

MiCOM Labs, 440 Boulder Court, Suite 200, Pleasanton, CA 94566 USA, Phone: 925.462.0304, Fax: 925.462.0306, www.micomlabs.com

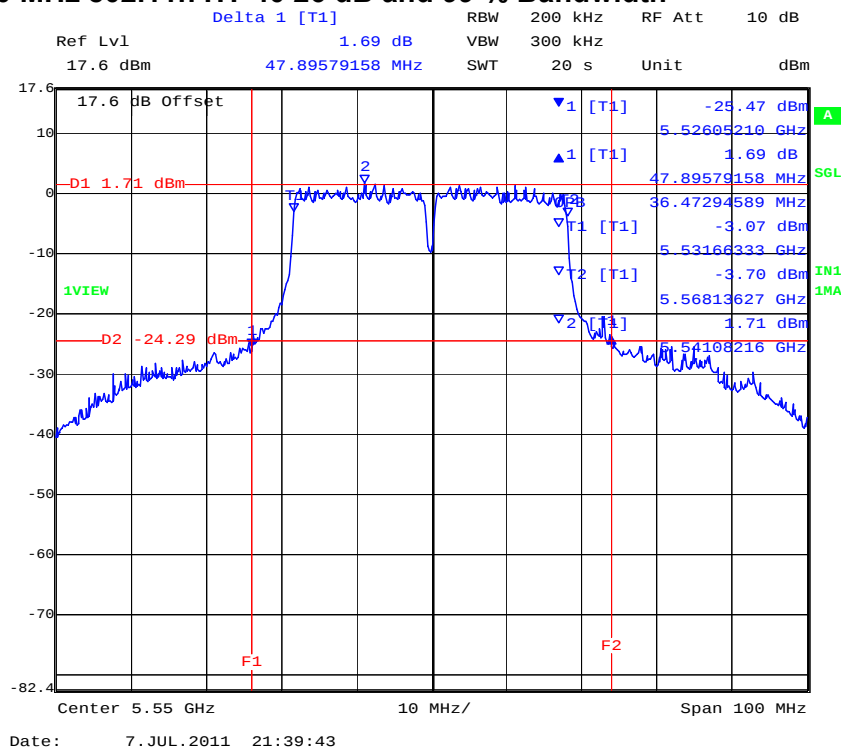


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PORT C 5,510 MHz 802.11n HT-40 26 dB and 99 % Bandwidth



PORT A 5,550 MHz 802.11n HT-40 26 dB and 99 % Bandwidth

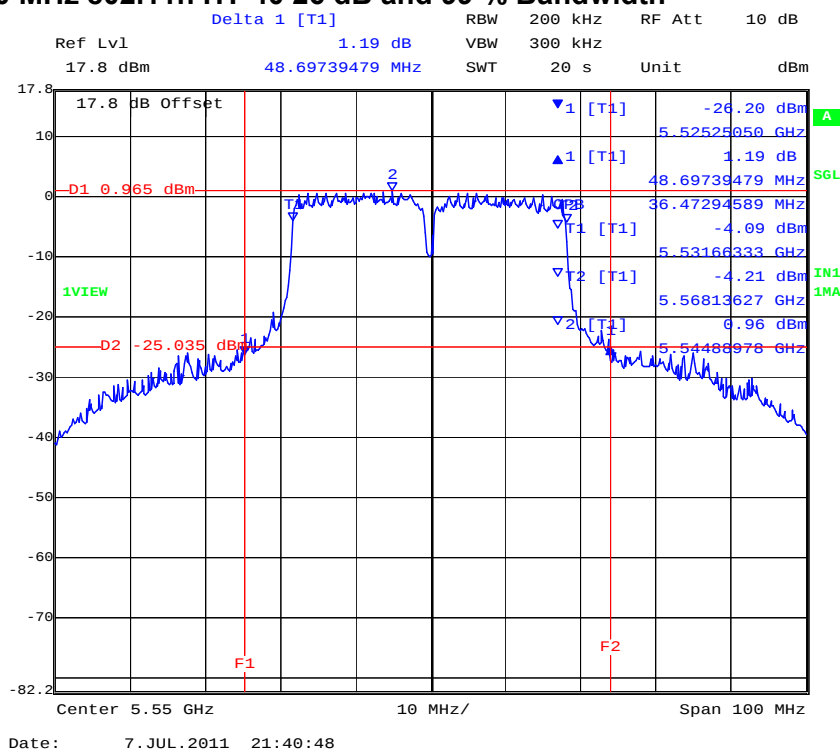


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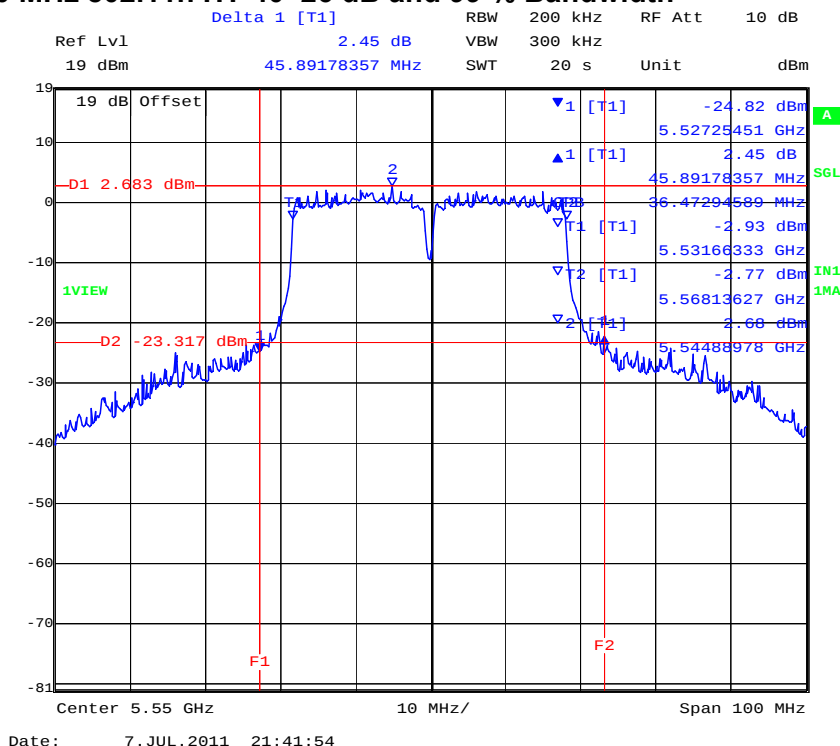


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PORT B 5,550 MHz 802.11n HT-40 26 dB and 99 % Bandwidth



PORT C 5,550 MHz 802.11n HT-40 26 dB and 99 % Bandwidth

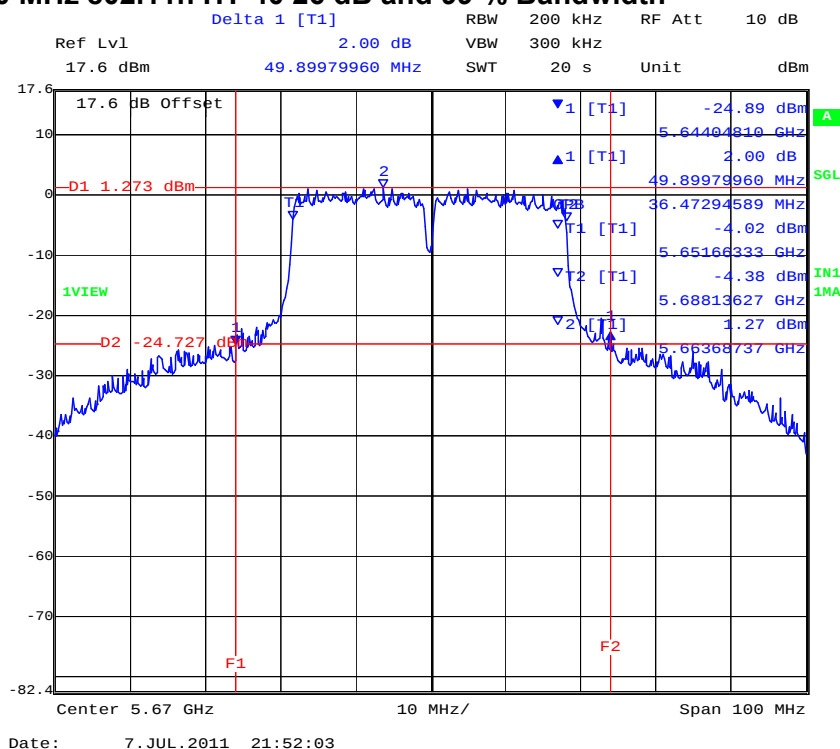


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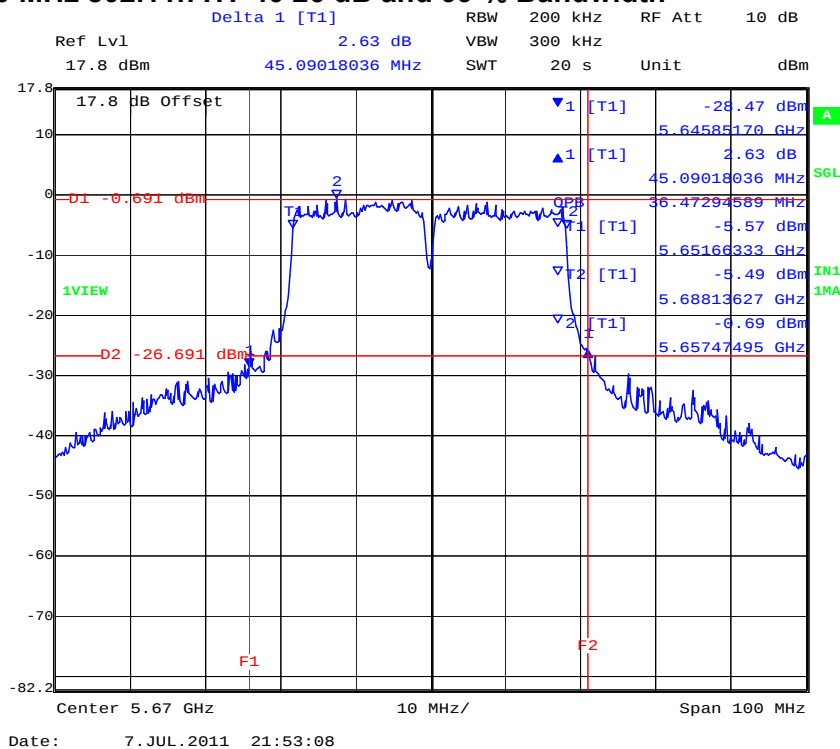


Title: Fluke Networks Sensor4 Wireless Client
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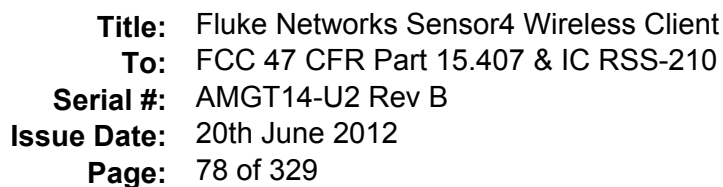
PORT A 5,670 MHz 802.11n HT-40 26 dB and 99 % Bandwidth



PORT B 5,670 MHz 802.11n HT-40 26 dB and 99 % Bandwidth



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MHz Offset F1 to 10 dB and 99% Bandwidth
 Delta 1 [T1] RBW 200 kHz RF Att 10 dB
 Ref Lvl 3.08 dB VBW 300 kHz
 19 dBm 47.09418838 MHz SWT 20 s Unit dBm

19 dB Offset
 D1 2.468 dBm
 D2 -23.532 dBm
 F1
 F2
 Center 5.67 GHz 10 MHz/ Span 100 MHz

Marker	Type	Value
1	[T1]	-25.69 dBm
2	[T1]	3.08 dB
3	[T1]	5.64525050 GHz
4	[T1]	47.09418838 MHz
5	[T1]	36.47294589 MHz
6	[T1]	-2.14 dBm
7	[T1]	5.65166333 GHz
8	[T1]	-2.79 dBm
9	[T1]	5.68813627 GHz
10	[T1]	2.47 dBm
11	[T1]	5.66488978 GHz

Date: 7.JUL.2011 21:54:15

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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
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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

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5.1.2. Transmit Output Power

FCC, Part 15 Subpart C §15.407(a)

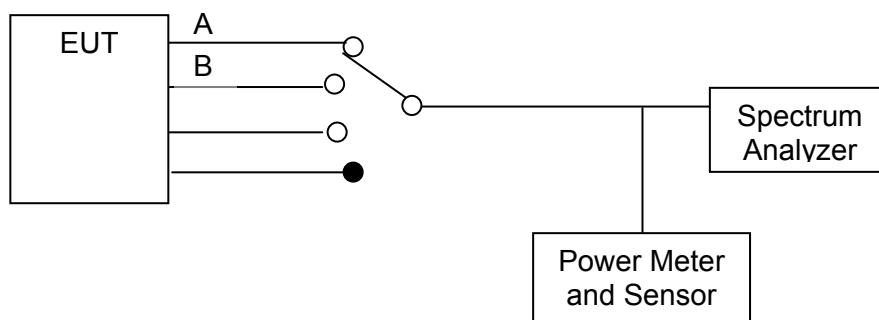
Industry Canada RSS-210 §9.9(2)

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



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Maximum Transmit (Conducted) Power, FCC Limits and Industry Canada Limits

Bands 5150 – 5250 MHz

FCC Limits

Conducted Power Limit lesser of: 50 mW or 4 dBm + 10 log (B) dBm

Mode	Frequency Range (MHz)	Minimum 26 dB Bandwidth (MHz)	4 + 10 Log (B) (dBm)	Limit (dBm)
a	5150 – 5250	22.3	+17.48	+17.00
HT-20		23.2	+17.65	+17.00
HT-40		43.5	+20.38	+17.00

Industry Canada Limits

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

Mode	Frequency Range (MHz)	Minimum 26 dB Bandwidth (MHz)	4 + 10 Log (B) (dBm)	EIRP Limit (dBm)
a	5150 – 5250	22.3	+23.48	+23.00
HT-20		23.2	+23.65	+23.00
HT-40		43.5	+26.38	+23.00

FCC Limits and Industry Canada Limits

Bands 5250 – 5350 and 5470 – 5725 MHz

Limit lesser of: 250 mW or 11 dBm + 10 log (B) dBm

Mode	Frequency Range (MHz)	Minimum 26 dB Bandwidth (MHz)	11 + 10 Log (B) (dBm)	Limit (dBm)
a	5250 – 5350 5470 – 5725	26.0	+25.15	+24.00
HT-20		25.2	+25.01	+24.00
HT-40		45.9	+27.62	+24.00

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Antenna Beam and Non-Beam Forming Power Levels

15. 407 (a)(1), (a) (2) Operation with directional antenna gains greater than 6 dBi.

If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Further FCC KDB 662911 D01 Multiple Transmitter Output v01 requires that the gain of antennas transmitting the same data (legacy 802.11a mode) must be increased by $10 * \log(N)$ when N is the number of antenna elements.

Operating Frequency Band 5150-5250 MHz

MIMO Operation

Antenna	Gain	Max. Allowable Conducted Peak Power (dBm)		Maximum EIRP
(dB)	(dBi)	Non-Beam Forming	Beam Forming	(dBm)
Integral	4.8	+17.0	N/A	+23.0
External	2.0	+17.0		+23.0

Non-MIMO Operation (Legacy)

Antenna	Gain dBi	Increased Gain V's No. Antenna Ports		Total Gain	Max. Allowable Conducted Peak Power	Maximum EIRP
(dB)		Ports	dB	dBi	(dBm)	(dBm)
Integral	4.8	3	4.77	9.57	+13.43	+23.0
External	2.0	3	4.77	6.77	+16.23	+23.0



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MIMO Operation 5250-5350 and 5470 – 5725 MHz

Antenna	Gain	Max. Allowable Conducted Peak Power (dBm)		Maximum EIRP
(dB)	(dBi)	Non-Beam Forming	Beam Forming	(dBm)
Integral	4.8	+24.0	N/A	+30.0
External	2.0	+24.0		+30.0

Non-MIMO Operation (Legacy) 5250-5350 and 5470 – 5725 MHz

Antenna	Gain dBi	Increased Gain V's No. Antenna Ports		Total Gain	Max. Allowable Conducted Peak Power	Maximum EIRP
(dB)		Ports	dB	dBi	(dBm)	(dBm)
Integral	4.8	3	4.77	9.57	+20.43	+30.0
External	2.0	3	4.77	6.77	+23.23	+30.0

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

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TABLE OF RESULTS – 802.11a Legacy 5150 - 5250

Output Power Conditions for Integral Antenna

Test Conditions:	15.407 (a)(1)	Rel. Humidity (%):	35	to	42
Variant:	802.11 a	Ambient Temp. (°C):	19	to	22
TPC:	HIGH	Pressure (mBars):	998	to	1003
Modulation:	ON	Duty Cycle (x):	100		
Beam Forming Gain (Y):	N/A dB	Antenna Gain:	4.8 dBi		
Applied Voltage:	48.0 Vdc				
Notes 1:					
Notes 2:					

Test Frequency	Measured Peak Power				Total Power (dBm)		Limit	Margin
	RF Port (dBm)				Combined	Calculated		
MHz	a	b	c	d			dBm	dB
5180	8.97	7.18	9.11	--	N/A	13.28	13.43	-0.15
5200	9.39	7.63	8.76	--	N/A	13.42	13.43	-0.01
5240	9.00	6.94	8.53	--	N/A	13.01	13.43	-0.42

Measurement uncertainty:	±1.33 dB
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Output Power Conditions for External Antenna

Test Conditions:	15.407 (a)(1)	Rel. Humidity (%):	35	to	42
Variant:	802.11 a	Ambient Temp. (°C):	19	to	22
TPC:	HIGH	Pressure (mBars):	998	to	1003
Modulation:	ON	Duty Cycle (x):	100		
Beam Forming Gain (Y):	N/A dB	Antenna Gain:	2 dBi		
Applied Voltage:	48.0 Vdc				
Notes 1:					
Notes 2:					

Test Frequency	Measured Peak Power				Total Power (dBm)		Limit	Margin
	RF Port (dBm)				Combined	Calculated		
MHz	a	b	c	d			dBm	dB
5180	11.52	9.61	11.64	--	N/A	15.79	16.23	-0.44
5200	11.39	9.93	10.96	--	N/A	15.57	16.23	-0.66
5240	12.00	9.94	11.53	--	N/A	16.01	16.23	-0.22

Measurement uncertainty:	±1.33 dB
---------------------------------	----------

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TABLE OF RESULTS – 802.11n HT-20 5150 - 5250

Output Power Conditions for Integral Antenna

Test Conditions:	15.407 (a)(1)	Rel. Humidity (%):	35	to	42
Variant:	802.11 n HT-20	Ambient Temp. (°C):	19	to	22
TPC:	HIGH	Pressure (mBars):	998	to	1003
Modulation:	ON	Duty Cycle (x):	100		
Beam Forming Gain (Y):	N/A dB	Antenna Gain:	4.8 dBi		
Applied Voltage:	48.0 Vdc				
Notes 1:					
Notes 2:					

Test Frequency	Measured Peak Power				Total Power (dBm)		Limit	Margin
	RF Port (dBm)				Combined	Calculated		
MHz	a	b	c	d			dBm	dB
5180	12.41	10.70	13.01	--	N/A	16.92	17.00	-0.08
5200	12.42	11.33	12.49	--	N/A	16.88	17.00	-0.12
5240	12.49	11.04	12.17	--	N/A	16.71	17.00	-0.29

Measurement uncertainty:	±1.33 dB
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Output Power Conditions for External Antenna

Test Conditions:	15.407 (a)(1)	Rel. Humidity (%):	35	to	42
Variant:	802.11 n HT-20	Ambient Temp. (°C):	19	to	22
TPC:	HIGH	Pressure (mBars):	998	to	1003
Modulation:	ON	Duty Cycle (x):	100		
Beam Forming Gain (Y):	N/A dB	Antenna Gain:	2 dBi		
Applied Voltage:	48.0 Vdc				
Notes 1:					
Notes 2:					

Test Frequency	Measured Peak Power				Total Power (dBm)		Limit	Margin
	RF Port (dBm)				Combined	Calculated		
MHz	a	b	c	d			dBm	dB
5180	12.59	11.30	12.10	--	N/A	16.80	17.00	-0.20
5200	12.23	11.39	12.71	--	N/A	16.91	17.00	-0.09
5240	12.35	11.44	12.34	--	N/A	16.83	17.00	-0.17

Measurement uncertainty:	±1.33 dB
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TABLE OF RESULTS – 802.11n HT-40 5150 - 5250

Output Power Conditions for Integral Antenna

Test Conditions:	15.407 (a)(1)	Rel. Humidity (%):	35	to	42
Variant:	802.11 n HT-40	Ambient Temp. (°C):	19	to	22
TPC:	HIGH	Pressure (mBars):	998	to	1003
Modulation:	ON	Duty Cycle (x):	100		
Beam Forming Gain (Y):	N/A dB	Antenna Gain:	4.8 dBi		
Applied Voltage:	48.0 Vdc				
Notes 1:					
Notes 2:					

Test Frequency	Measured Peak Power				Total Power (dBm)		Limit	Margin
	RF Port (dBm)				Combined	Calculated		
MHz	a	b	c	d	Combined	Calculated	dBm	dB
5190	11.01	8.21	11.73	--	N/A	15.33	17.00	-1.67
5230	12.55	11.67	11.78	--	N/A	16.79	17.00	-0.21

Measurement uncertainty:	±1.33 dB
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Output Power Conditions for External Antenna

Test Conditions:	15.407 (a)(1)	Rel. Humidity (%):	35	to	42
Variant:	802.11 n HT-40	Ambient Temp. (°C):	19	to	22
TPC:	HIGH	Pressure (mBars):	998	to	1003
Modulation:	ON	Duty Cycle (x):	100		
Beam Forming Gain (Y):	N/A dB	Antenna Gain:	2 dBi		
Applied Voltage:	48.0 Vdc				
Notes 1:					
Notes 2:					

Test Frequency	Measured Peak Power				Total Power (dBm)		Limit	Margin
	RF Port (dBm)				Combined	Calculated		
MHz	a	b	c	d	Combined	Calculated	dBm	dB
5190	11.97	9.31	12.57	--	N/A	16.27	17.00	-0.73
5230	12.69	11.57	12.15	--	N/A	16.93	17.00	-0.07

Measurement uncertainty:	±1.33 dB
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TABLE OF RESULTS – 802.11a Legacy 5250 - 5350

Output Power Conditions for Integral Antenna

Test Conditions:	15.407 (a)(1)	Rel. Humidity (%):	35	to	42
Variant:	802.11 a	Ambient Temp. (°C):	19	to	22
TPC:	HIGH	Pressure (mBars):	998	to	1003
Modulation:	ON	Duty Cycle (x):	100		
Beam Forming Gain (Y):	N/A dB	Antenna Gain:	4.8 dBi		
Applied Voltage:	48.0 Vdc				
Notes 1:					
Notes 2:					

Test Frequency	Measured Peak Power				Total Power (dBm)		Limit	Margin
	RF Port (dBm)				Combined	Calculated		
MHz	a	b	c	d			dBm	dB
5260	15.87	14.65	15.50	--	N/A	20.14	20.43	-0.29
5300	16.18	14.19	14.49	--	N/A	19.82	20.43	-0.61
5320	15.52	13.97	14.62	--	N/A	19.52	20.43	-0.91

Measurement uncertainty:	±1.33 dB
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Output Power Conditions for External Antenna

Test Conditions:	15.407 (a)(1)	Rel. Humidity (%):	35	to	42
Variant:	802.11 a	Ambient Temp. (°C):	19	to	22
TPC:	HIGH	Pressure (mBars):	998	to	1003
Modulation:	ON	Duty Cycle (x):	100		
Beam Forming Gain (Y):	N/A dB	Antenna Gain:	2 dBi		
Applied Voltage:	48.0 Vdc				
Notes 1:					
Notes 2:					

Test Frequency	Measured Peak Power				Total Power (dBm)		Limit	Margin
	RF Port (dBm)				Combined	Calculated		
MHz	a	b	c	d			dBm	dB
5260	18.87	17.65	18.50	--	N/A	23.14	23.23	-0.09
5300	19.18	17.19	17.49	--	N/A	22.82	23.23	-0.41
5320	17.31	15.76	16.71	--	N/A	21.41	23.23	-1.82

Measurement uncertainty:	±1.33 dB
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TABLE OF RESULTS – 802.11n HT-20 5250 - 5350

Output Power Conditions for Integral Antenna

Test Conditions:	15.407 (a)(1)	Rel. Humidity (%):	35	to	42
Variant:	802.11 n HT-20	Ambient Temp. (°C):	19	to	22
TPC:	HIGH	Pressure (mBars):	998	to	1003
Modulation:	ON	Duty Cycle (x):	100		
Beam Forming Gain (Y):	N/A dB	Antenna Gain:	4.8 dBi		
Applied Voltage:	48.0 Vdc				
Notes 1:					
Notes 2:					

Test Frequency	Measured Peak Power				Total Power (dBm)		Limit	Margin
	RF Port (dBm)				Combined	Calculated		
MHz	a	b	c	d			dBm	dB
5260	18.67	17.55	18.39	--	N/A	23.00	24.00	-1.00
5300	18.92	17.26	17.77	--	N/A	22.81	24.00	-1.19
5320	15.62	13.43	14.42	--	N/A	19.35	24.00	-4.65

Measurement uncertainty:	±1.33 dB
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Output Power Conditions for External Antenna

Test Conditions:	15.407 (a)(1)	Rel. Humidity (%):	35	to	42
Variant:	802.11 n HT-20	Ambient Temp. (°C):	19	to	22
TPC:	HIGH	Pressure (mBars):	998	to	1003
Modulation:	ON	Duty Cycle (x):	100		
Beam Forming Gain (Y):	N/A dB	Antenna Gain:	2 dBi		
Applied Voltage:	48.0 Vdc				
Notes 1:					
Notes 2:					

Test Frequency	Measured Peak Power				Total Power (dBm)		Limit	Margin
	RF Port (dBm)				Combined	Calculated		
MHz	a	b	c	d			dBm	dB
5260	18.67	17.55	18.39	--	N/A	23.00	24.00	-1.00
5300	18.92	17.26	17.77	--	N/A	22.81	24.00	-1.19
5320	17.53	15.11	16.87	--	N/A	21.39	24.00	-2.61

Measurement uncertainty:	±1.33 dB
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TABLE OF RESULTS – 802.11n HT-40 5250 - 5350

Output Power Conditions for Integral Antenna

Test Conditions:	15.407 (a)(1)	Rel. Humidity (%):	35	to	42
Variant:	802.11 n HT-40	Ambient Temp. (°C):	19	to	22
TPC:	HIGH	Pressure (mBars):	998	to	1003
Modulation:	ON	Duty Cycle (x):	100		
Beam Forming Gain (Y):	N/A dB	Antenna Gain:	4.8 dBi		
Applied Voltage:	48.0 Vdc				
Notes 1:					
Notes 2:					

Test Frequency	Measured Peak Power				Total Power (dBm)		Limit	Margin
	RF Port (dBm)				Combined	Calculated		
MHz	a	b	c	d	Combined	Calculated	dBm	dB
5270	19.06	17.35	18.16	--	N/A	23.02	24.00	-0.98
5310	13.46	10.14	11.18	--	N/A	16.59	24.00	-7.41

Measurement uncertainty:	±1.33 dB
---------------------------------	----------

Output Power Conditions for External Antenna

Test Conditions:	15.407 (a)(1)	Rel. Humidity (%):	35	to	42
Variant:	802.11 n HT-40	Ambient Temp. (°C):	19	to	22
TPC:	HIGH	Pressure (mBars):	998	to	1003
Modulation:	ON	Duty Cycle (x):	100		
Beam Forming Gain (Y):	N/A dB	Antenna Gain:	2 dBi		
Applied Voltage:	48.0 Vdc				
Notes 1:					
Notes 2:					

Test Frequency	Measured Peak Power				Total Power (dBm)		Limit	Margin
	RF Port (dBm)				Combined	Calculated		
MHz	a	b	c	d	Combined	Calculated	dBm	dB
5270	19.06	17.35	18.16	--	N/A	23.02	24.00	-0.98
5310	14.66	10.74	12.98	--	N/A	17.85	24.00	-6.15

Measurement uncertainty:	±1.33 dB
---------------------------------	----------

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TABLE OF RESULTS – 802.11a Legacy 5470 - 5725

Output Power Conditions for Integral Antenna

Test Conditions:	15.407 (a)(1)	Rel. Humidity (%):	35	to	42
Variant:	802.11 a	Ambient Temp. (°C):	19	to	22
TPC:	HIGH	Pressure (mBars):	998	to	1003
Modulation:	ON	Duty Cycle (x):	100		
Beam Forming Gain (Y):	N/A dB	Antenna Gain:	4.8 dBi		
Applied Voltage:	48.0 Vdc				
Notes 1:					
Notes 2:					

Test Frequency	Measured Peak Power				Total Power (dBm)		Limit	Margin
	RF Port (dBm)				Combined	Calculated		
MHz	a	b	c	d			dBm	dB
5500	16.32	13.84	14.52	--	N/A	19.79	20.43	-0.64
5580	16.55	14.35	15.01	--	N/A	20.17	20.43	-0.26
5700	16.01	14.16	14.24	--	N/A	19.66	20.43	-0.77

Measurement uncertainty:	±1.33 dB
---------------------------------	----------

Output Power Conditions for External Antenna

Test Conditions:	15.407 (a)(1)	Rel. Humidity (%):	35	to	42
Variant:	802.11 a	Ambient Temp. (°C):	19	to	22
TPC:	HIGH	Pressure (mBars):	998	to	1003
Modulation:	ON	Duty Cycle (x):	100		
Beam Forming Gain (Y):	N/A dB	Antenna Gain:	2 dBi		
Applied Voltage:	48.0 Vdc				
Notes 1:					
Notes 2:					

Test Frequency	Measured Peak Power				Total Power (dBm)		Limit	Margin
	RF Port (dBm)				Combined	Calculated		
MHz	a	b	c	d			dBm	dB
5500	18.32	15.84	16.52	--	N/A	21.79	23.23	-1.44
5580	18.55	16.35	17.01	--	N/A	22.17	23.23	-1.06
5700	19.01	17.16	17.24	--	N/A	22.66	23.23	-0.57

Measurement uncertainty:	±1.33 dB
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TABLE OF RESULTS – 802.11n HT-20 5470 - 5725

Output Power Conditions for Integral Antenna

Test Conditions:	15.407 (a)(1)	Rel. Humidity (%):	35	to	42
Variant:	802.11 n HT-20	Ambient Temp. (°C):	19	to	22
TPC:	HIGH	Pressure (mBars):	998	to	1003
Modulation:	ON	Duty Cycle (x):	100		
Beam Forming Gain (Y):	N/A dB	Antenna Gain:	4.8 dBi		
Applied Voltage:	48.0 Vdc				
Notes 1:					
Notes 2:					

Test Frequency	Measured Peak Power				Total Power (dBm)		Limit	Margin
	RF Port (dBm)				Combined	Calculated		
MHz	a	b	c	d			dBm	dB
5500	18.13	16.01	16.42	--	N/A	21.73	24.00	-2.27
5580	18.30	16.34	17.02	--	N/A	22.07	24.00	-1.93
5700	19.25	17.18	17.06	--	N/A	22.72	24.00	-1.28

Measurement uncertainty:	±1.33 dB
---------------------------------	----------

Output Power Conditions for External Antenna

Test Conditions:	15.407 (a)(1)	Rel. Humidity (%):	35	to	42
Variant:	802.11 n HT-20	Ambient Temp. (°C):	19	to	22
TPC:	HIGH	Pressure (mBars):	998	to	1003
Modulation:	ON	Duty Cycle (x):	100		
Beam Forming Gain (Y):	N/A dB	Antenna Gain:	2 dBi		
Applied Voltage:	48.0 Vdc				
Notes 1:					
Notes 2:					

Test Frequency	Measured Peak Power				Total Power (dBm)		Limit	Margin
	RF Port (dBm)				Combined	Calculated		
MHz	a	b	c	d			dBm	dB
5500	18.13	16.01	16.42	--	N/A	21.73	24.00	-2.27
5580	18.30	16.34	17.02	--	N/A	22.07	24.00	-1.93
5700	19.25	17.18	17.06	--	N/A	22.72	24.00	-1.28

Measurement uncertainty:	±1.33 dB
---------------------------------	----------

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TABLE OF RESULTS – 802.11n HT-40 5470 - 5725

Output Power Conditions for Integral Antenna

Test Conditions:	15.407 (a)(1)	Rel. Humidity (%):	35	to	42
Variant:	802.11 n HT-40	Ambient Temp. (°C):	19	to	22
TPC:	HIGH	Pressure (mBars):	998	to	1003
Modulation:	ON	Duty Cycle (x):	100		
Beam Forming Gain (Y):	N/A dB	Antenna Gain:	4.8 dBi		
Applied Voltage:	48.0 Vdc				
Notes 1:					
Notes 2:					

Test Frequency	Measured Peak Power				Total Power (dBm)		Limit	Margin
	RF Port (dBm)				Combined	Calculated		
MHz	a	b	c	d			dBm	dB
5500	17.16	13.75	13.88	--	N/A	20.01	24.00	-3.99
5580	19.09	16.28	17.06	--	N/A	22.41	24.00	-1.59
5700	19.25	16.99	16.97	--	N/A	22.65	24.00	-1.35

Measurement uncertainty:	±1.33 dB
---------------------------------	----------

Output Power Conditions for External Antenna

Test Conditions:	15.407 (a)(1)	Rel. Humidity (%):	35	to	42
Variant:	802.11 n HT-40	Ambient Temp. (°C):	19	to	22
TPC:	HIGH	Pressure (mBars):	998	to	1003
Modulation:	ON	Duty Cycle (x):	100		
Beam Forming Gain (Y):	N/A dB	Antenna Gain:	2 dBi		
Applied Voltage:	48.0 Vdc				
Notes 1:					
Notes 2:					

Test Frequency	Measured Peak Power				Total Power (dBm)		Limit	Margin
	RF Port (dBm)				Combined	Calculated		
MHz	a	b	c	d			dBm	dB
5500	19.31	15.96	16.04	--	N/A	22.17	24.00	-1.83
5580	19.09	16.28	17.06	--	N/A	22.41	24.00	-1.59
5700	19.25	16.99	16.97	--	N/A	22.65	24.00	-1.35

Measurement uncertainty:	±1.33 dB
---------------------------------	----------

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Power Settings V's Frequency Band

Frequency Band 5150 – 5250 MHz

	Integral Antenna			External Antenna	
	a	HT-20		a	HT-20
5180	8	13		11	16
5200	10	15		12	17
5240	10	15		13	17

	HT-40			HT-40	
5190	10			11	
5230	14			17	

Frequency Band 5250 – 5350 MHz

	Integral Antenna			External Antenna	
	a	HT-20		a	HT-20
5260	17	20		20	20
5300	17	20		20	20
5240	19	16		18	18

	HT-40			HT-40	
5270	20			20	
5310	13			13	

Frequency Band 5470 – 5725 MHz

	Integral Antenna			External Antenna	
	a	HT-20		a	HT-20
5500	18	20		20	20
5580	18	20		20	20
5700	17	20		20	20

	HT-40			HT-40	
5510	17			20	
5550	20			20	
5670	20			20	

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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 $+4 \text{ dBm} + 10 \log B$, 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 $+11 \text{ dBm} + 10 \log B$, 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 $10 + 10 \log_{10} B$, 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 $11 + 10 \log_{10} B$, 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 $17 + 10 \log_{10} B$, 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	$\pm 1.33 \text{ dB}$
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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

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5.1.3. Peak Power Spectral Density

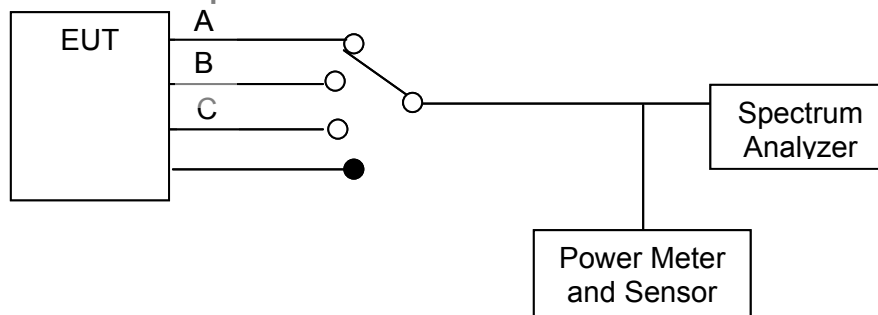
FCC, Part 15 Subpart C §15.407(a)
Industry Canada RSS-210 § A9.2(2)

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

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



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TABLE OF RESULTS – 802.11a Legacy 5150 – 5250 MHz

Test Conditions:	15.407 (a)	Rel. Humidity (%):	35	to	42
Variant:	802.11a	Ambient Temp. (°C):	19	to	22
TPC:	HIGH	Pressure (mBars):	998	to	1003
Modulation:	ON	Duty Cycle (%):	100		
Beam Forming Gain (Y):	N/A dB	Antenna Gain:	0 dBi		
Applied Voltage:	48.0 Vdc	Antenna Ports (N):	3		
Notes 1:					
Notes 2:					

Test Frequency	Measured Peak Power				Correction factor	Peak Power Spectral Density	Limit	Margin
	RF Port (dBm)							
MHz	a	b	c	d	10Log(N)	dBm	dBm	dB
5180.00	-5.37	-4.52	-7.77	--	4.77	0.25	4.00	-3.75
5200.00	-4.83	-3.89	-8.02	--	4.77	0.89	4.00	-3.11
5240.00	-4.96	-4.91	-8.22	--	4.77	-0.14	4.00	-4.14

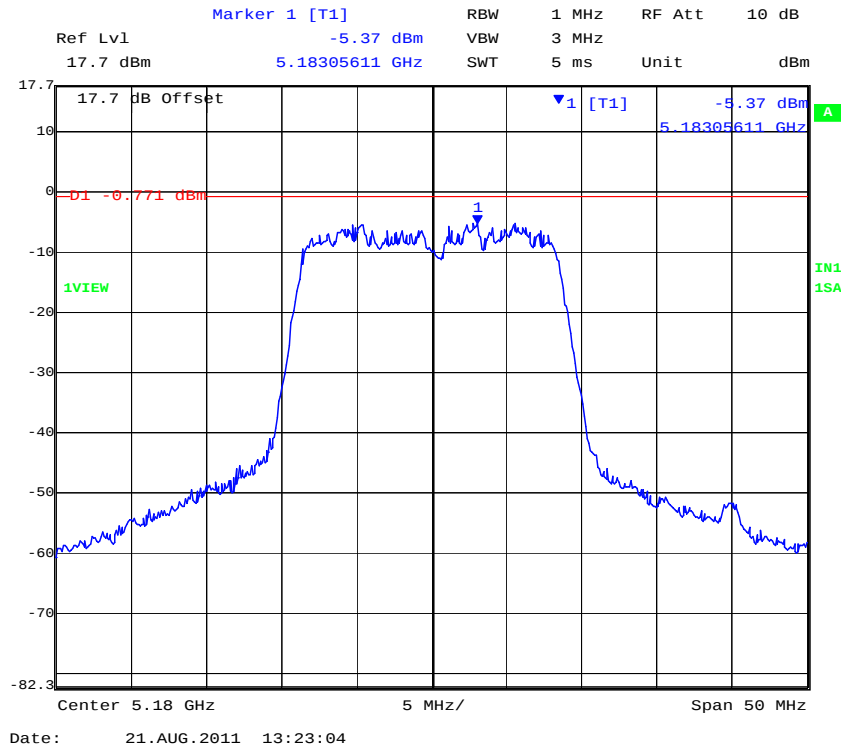
Measurement uncertainty:	±1.33 dB
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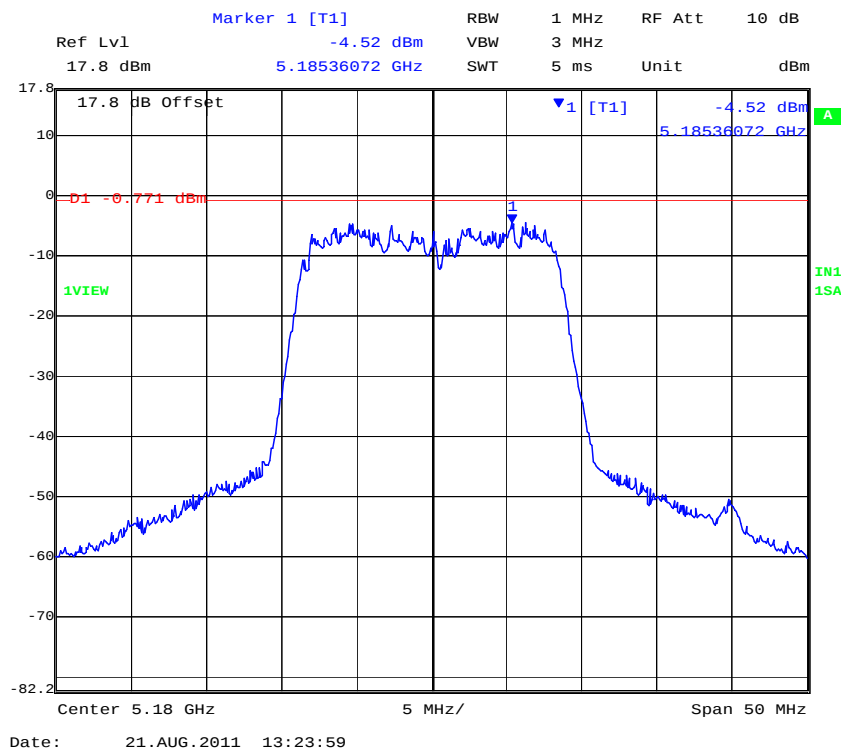


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PORT A 5,1800 MHz 802.11a Legacy Power Spectral Density



PORT B 5,1800 MHz 802.11a Legacy Power Spectral Density

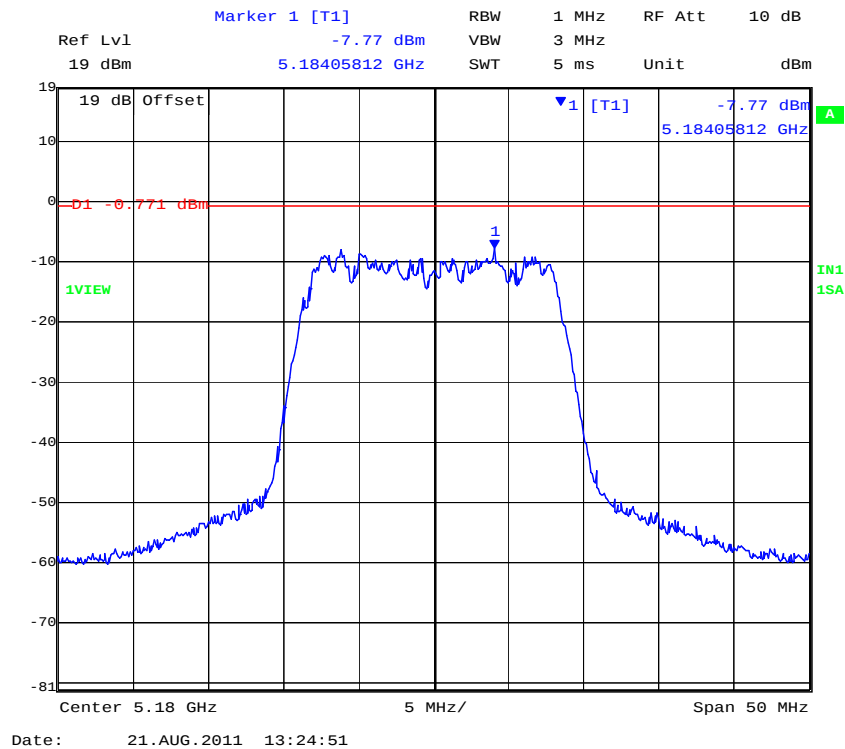


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PORT C 5,1800 MHz 802.11a Legacy Power Spectral Density

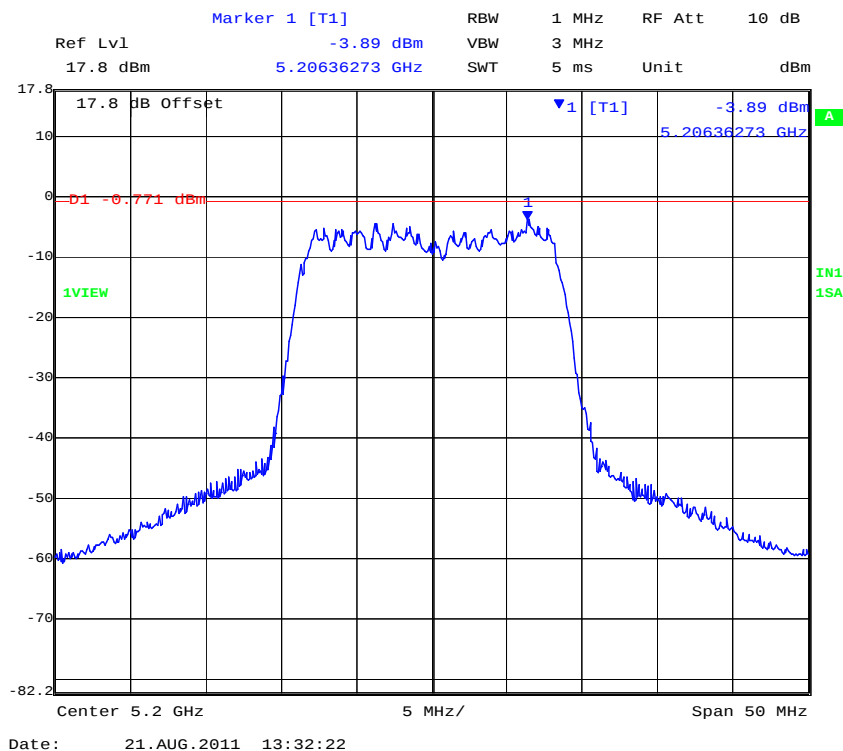


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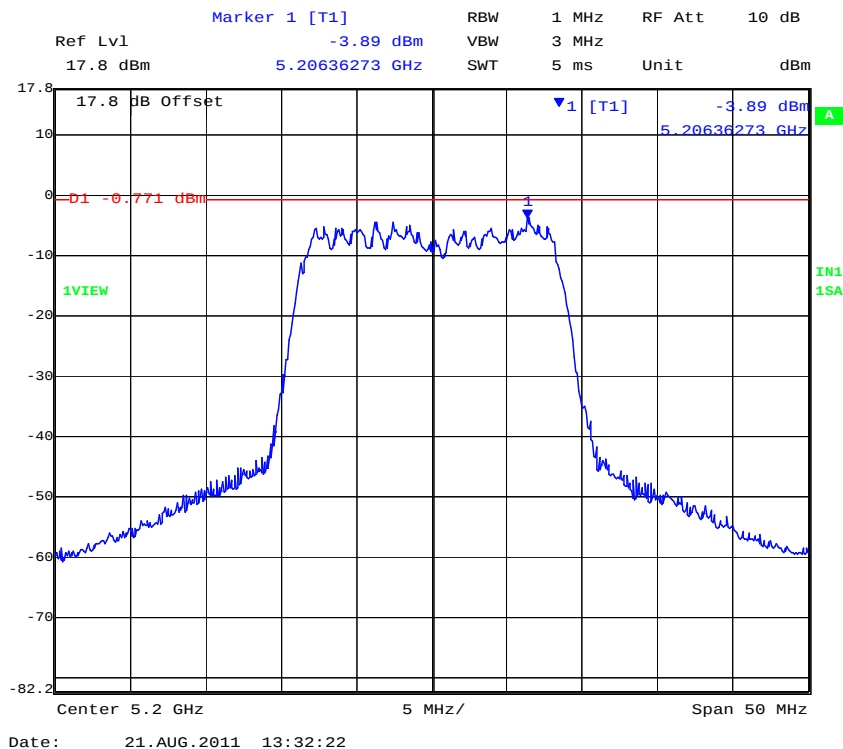


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PORT A 5,200 MHz 802.11a Legacy Power Spectral Density



PORT B 5,200 MHz 802.11a Legacy Power Spectral Density

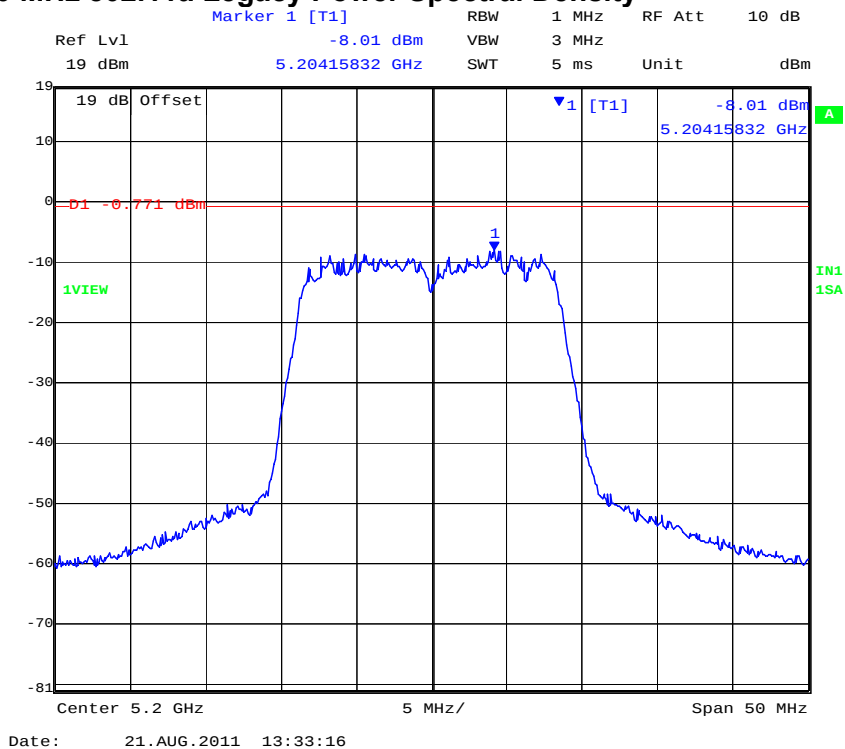


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PORT C 5,200 MHz 802.11a Legacy Power Spectral Density

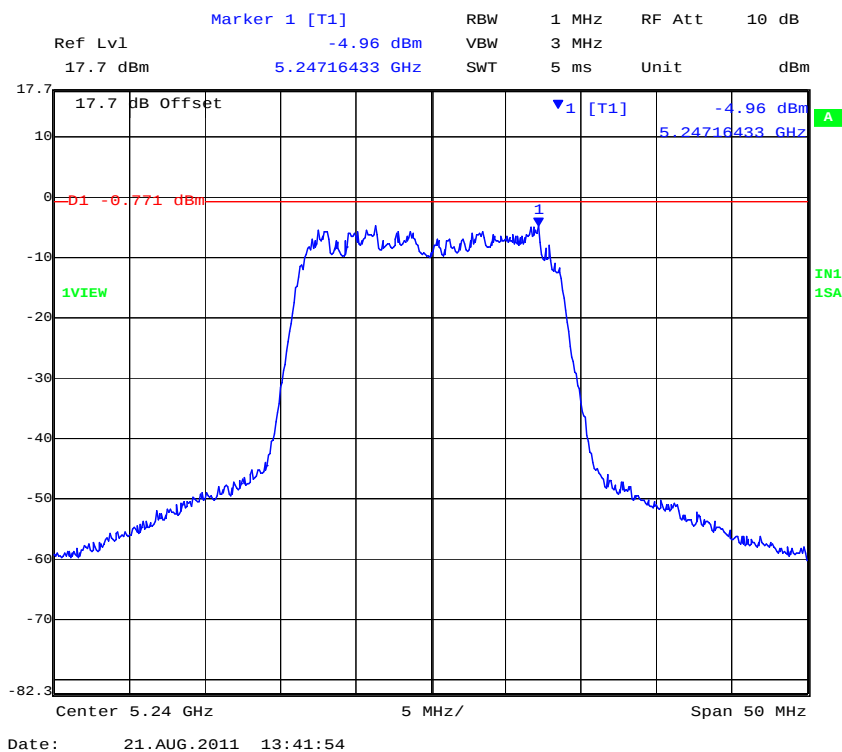


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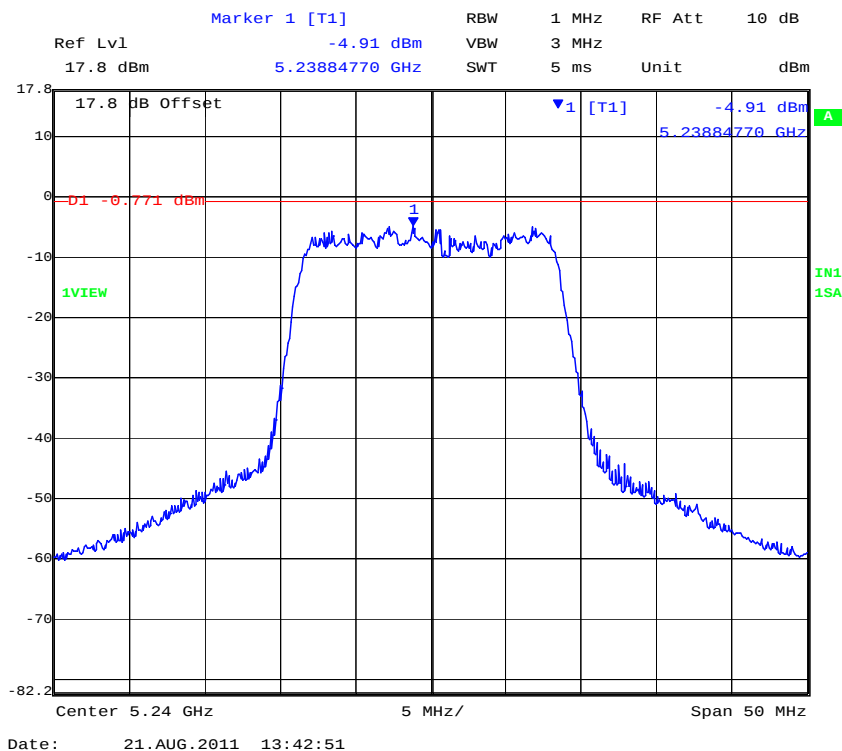


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PORT A 5,240 MHz 802.11a Legacy Power Spectral Density



PORT B 5,240 MHz 802.11a Legacy Power Spectral Density

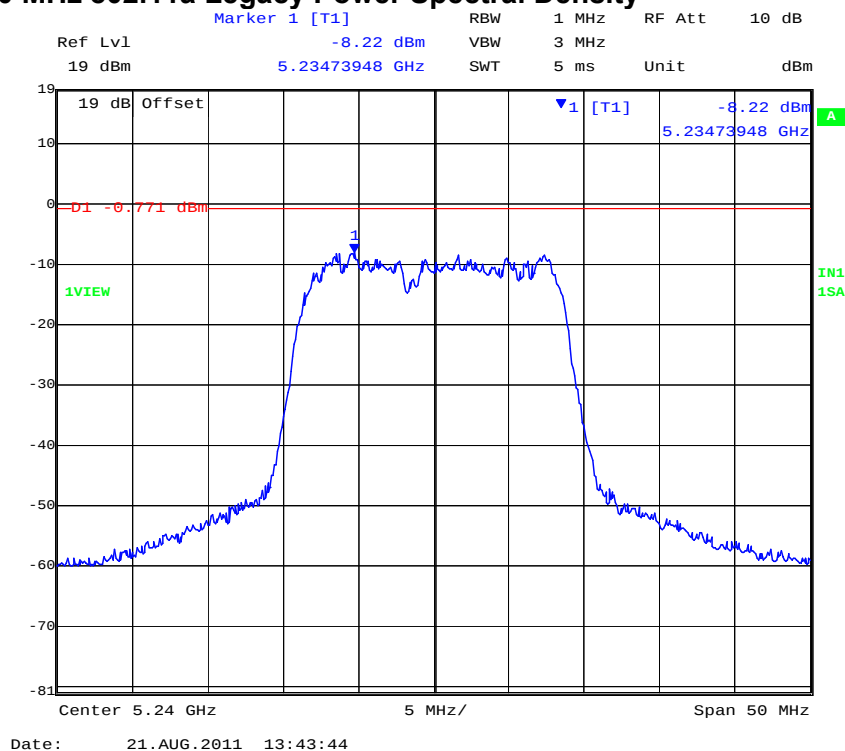


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PORT C 5,240 MHz 802.11a Legacy Power Spectral Density



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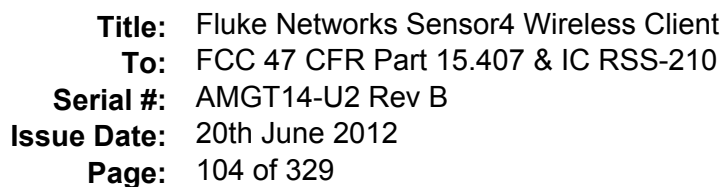
TABLE OF RESULTS – 802.11n HT-20 5150 – 5250 MHz

Test Conditions:	15.407 (a)	Rel. Humidity (%):	35	to	42
Variant:	802.11n HT-20	Ambient Temp. (°C):	19	to	22
TPC:	HIGH	Pressure (mBars):	998	to	1003
Modulation:	ON	Duty Cycle (%):	100		
Beam Forming Gain (Y):	N/A dB	Antenna Gain:	0 dBi		
Applied Voltage:	48.0 Vdc	Antenna Ports (N):	3		
Notes 1:					
Notes 2:					

Test Frequency	Measured Peak Power				Correction factor	Peak Power Spectral Density	Limit	Margin
	RF Port (dBm)							
MHz	a	b	c	d	10Log(N)	dBm	dBm	dB
5180	-1.84	-2.30	-5.90	--	4.77	2.93	4.00	-1.07
5200	-1.80	-0.84	-5.39	--	4.77	3.93	4.00	-0.07
5240	-1.69	-2.05	-5.72	--	4.77	3.08	4.00	-0.92

Measurement uncertainty:	±1.33 dB
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Ref Lvl 17.7 dBm

Marker 1 [T1] -1.84 dBm

RBW 1 MHz

RF Att 10 dB

VBW 3 MHz

SWT 5 ms

Unit dBm

17.7

10

0

-10

-20

-30

-40

-50

-60

-70

-82.3

17.7 dB Offset

1 [T1] -1.84 dBm

5.17734469 GHz

01 -0.771 dBm

1VIEW

IN1 1SA

Center 5.18 GHz

5 MHz/

Span 50 MHz

Date: 21.AUG.2011 14:33:44

Marker 1 [T1] RBW 1 MHz RF Att 10 dB
 Ref Lvl -2.30 dBm VBW 3 MHz
 17.8 dBm 5.18275551 GHz SWT 5 ms Unit dBm

17.8 dB Offset
 1 [T1] -2.30 dBm
 5.18275551 GHz

DI -0.771 dBm
 1VIEW
 IN1 1SA

Center 5.18 GHz 5 MHz/ Span 50 MHz

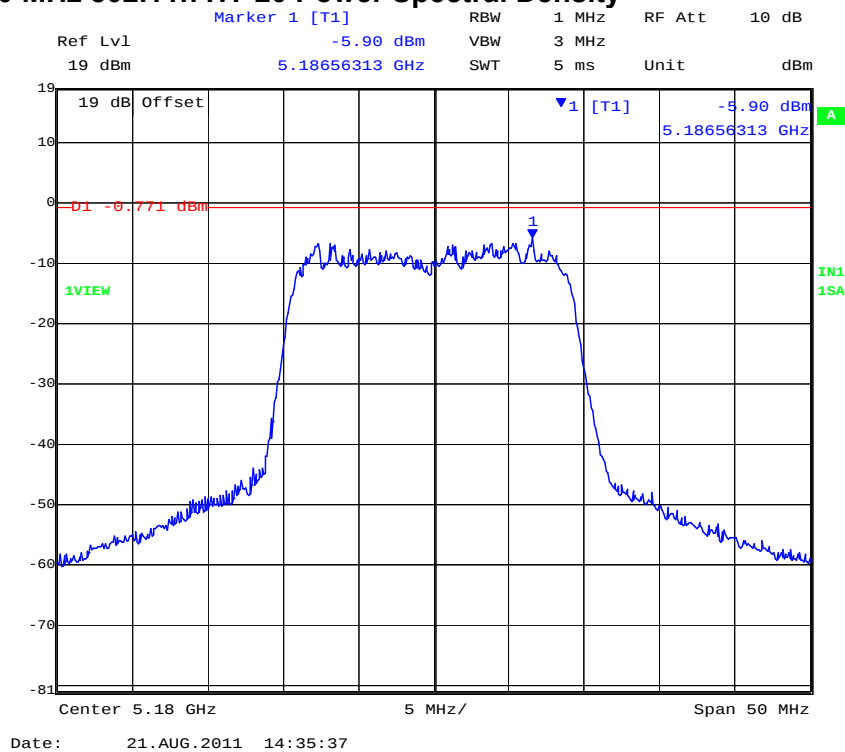
Date: 21.AUG.2011 14:34:41

MiCOM Labs, 440 Boulder Court, Suite 200, Pleasanton, CA 94566 USA, Phone: 925.462.0304, Fax: 925.462.0306, www.micomlabs.com



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PORT C 5,180 MHz 802.11n HT-20 Power Spectral Density

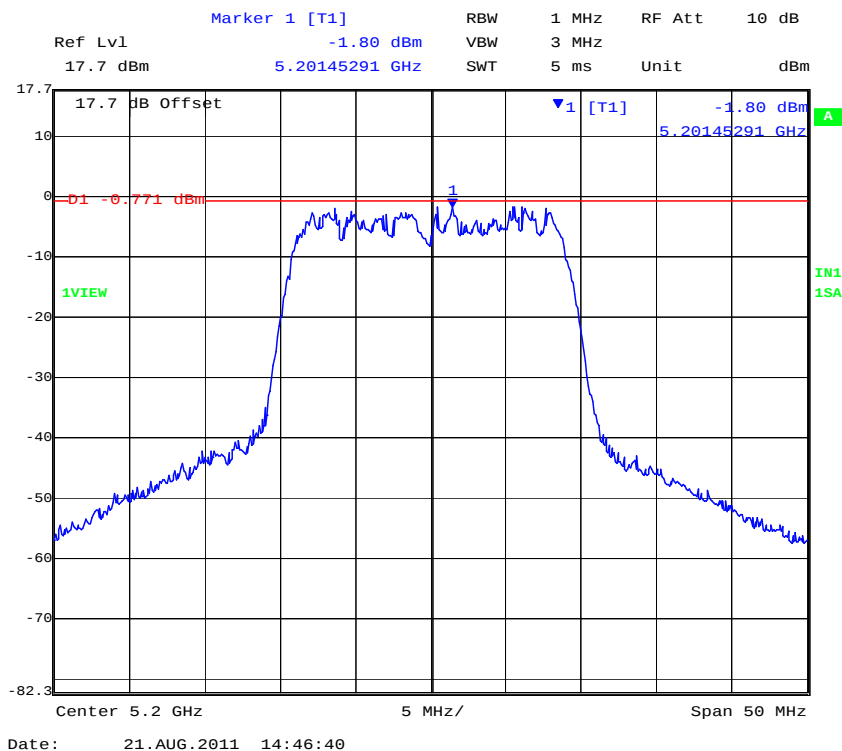


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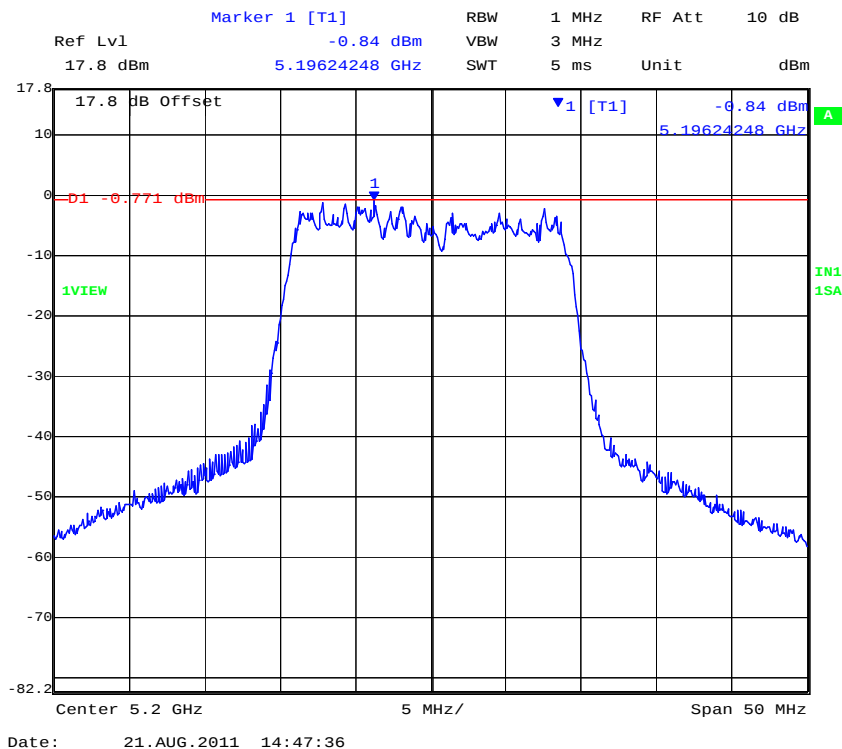


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PORT A 5,200 MHz 802.11n HT-20 Power Spectral Density



PORT B 5,200 MHz 802.11n HT-20 Power Spectral Density

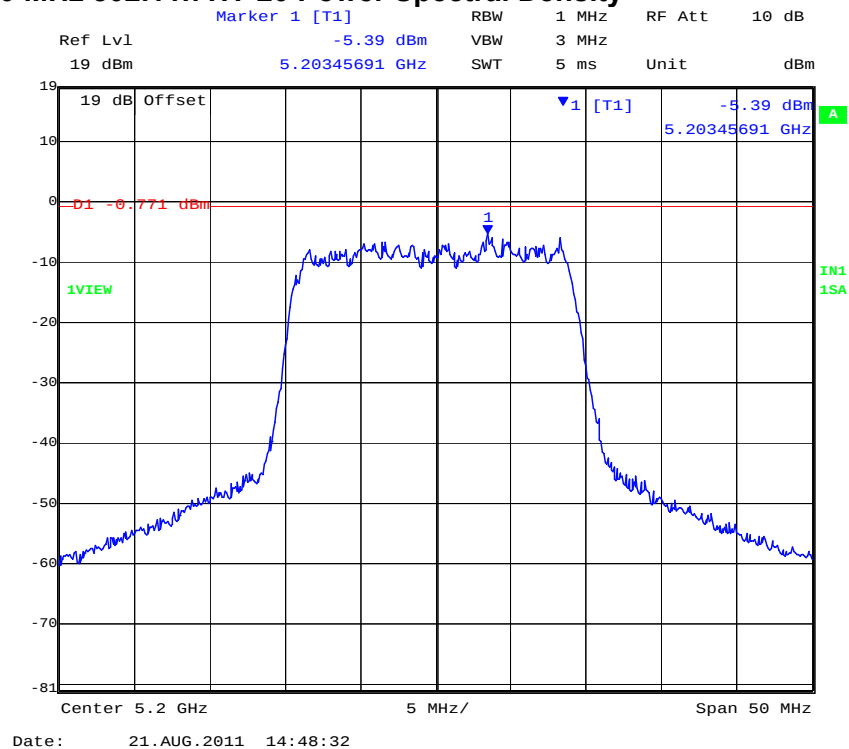


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PORT C 5,200 MHz 802.11n HT-20 Power Spectral Density

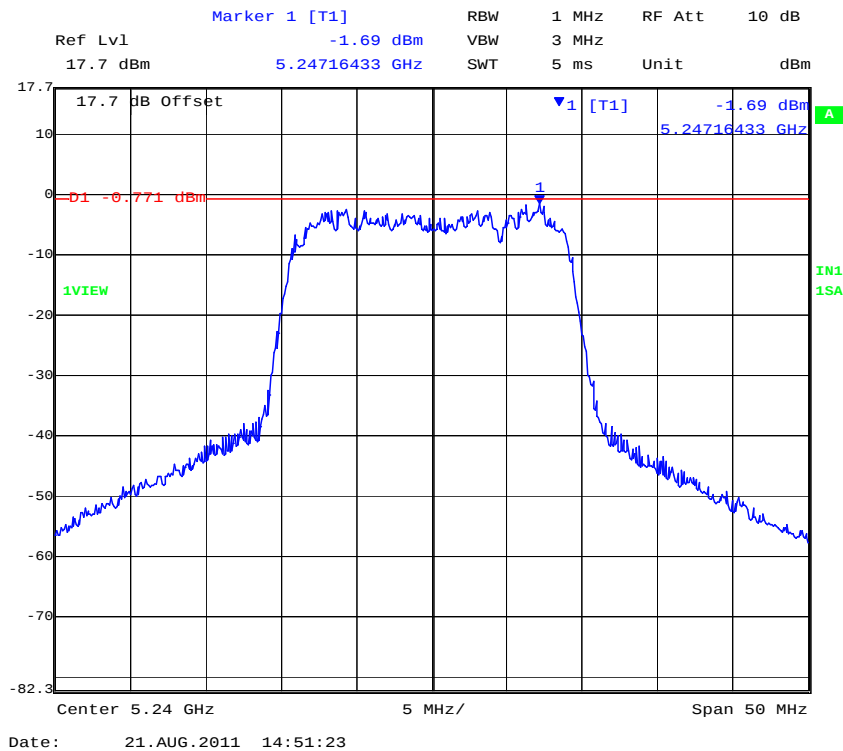


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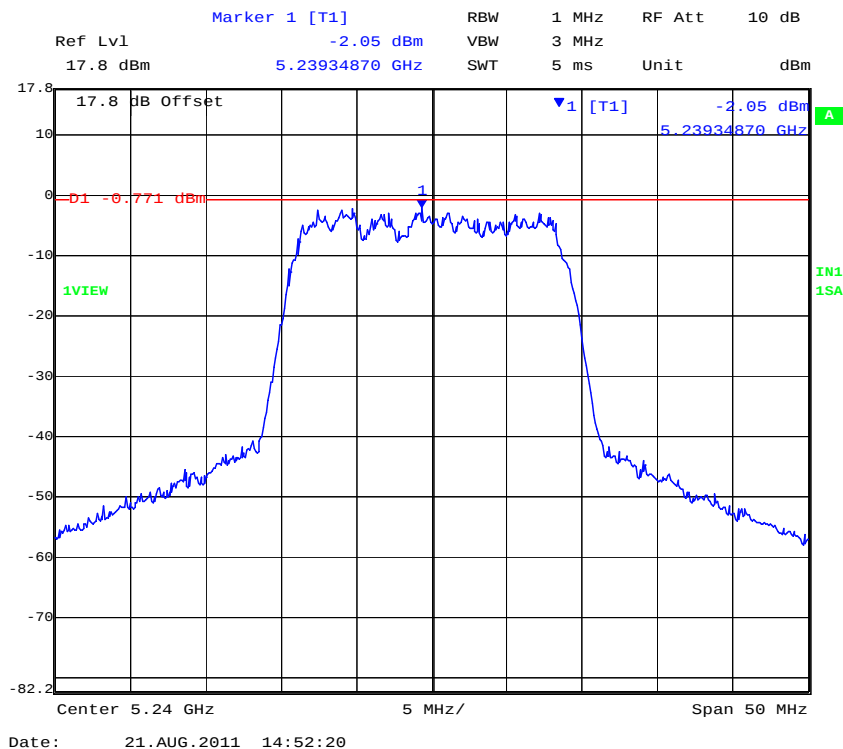


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PORT A 5,240 MHz 802.11n HT-20 Power Spectral Density



PORT B 5,240 MHz 802.11n HT-20 Power Spectral Density

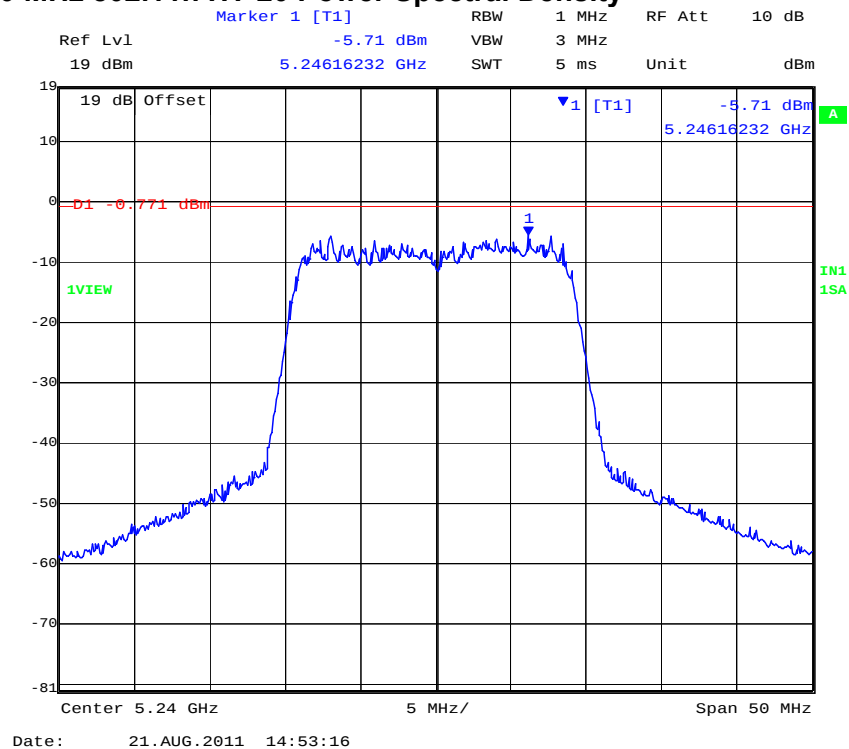


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PORT C 5,240 MHz 802.11n HT-20 Power Spectral Density



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TABLE OF RESULTS – 802.11n HT-40 5150 – 5250 MHz

Test Conditions:	15.407 (a)	Rel. Humidity (%):	35	to	42
Variant:	802.11n HT-40	Ambient Temp. (°C):	19	to	22
TPC:	HIGH	Pressure (mBars):	998	to	1003
Modulation:	ON	Duty Cycle (%):	100		
Beam Forming Gain (Y):	N/A dB	Antenna Gain:	0 dBi		
Applied Voltage:	48.0 Vdc	Antenna Ports (N):	3		
Notes 1:					
Notes 2:					

Test Frequency	Measured Peak Power				Correction factor	Peak Power Spectral Density	Limit	Margin
	RF Port (dBm)							
MHz	a	b	c	d	10Log(N)	dBm	dBm	dB
5190.00	-3.75	-3.63	-7.21	--	4.77	1.14	4.00	-2.86
5230.00	-3.77	-3.52	-7.24	--	4.77	1.25	4.00	-2.75

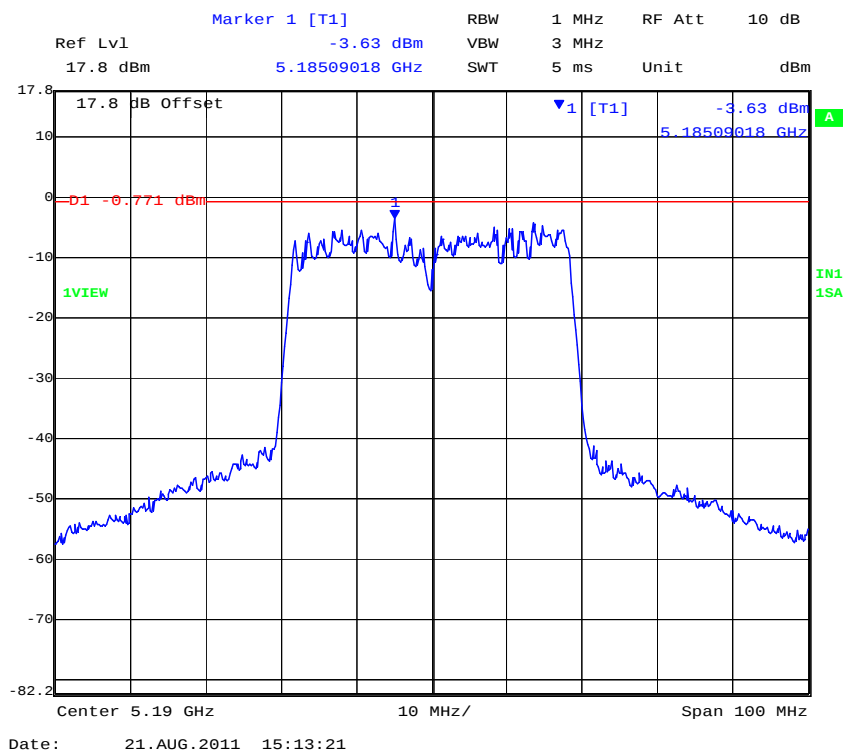
Measurement uncertainty:	±1.33 dB
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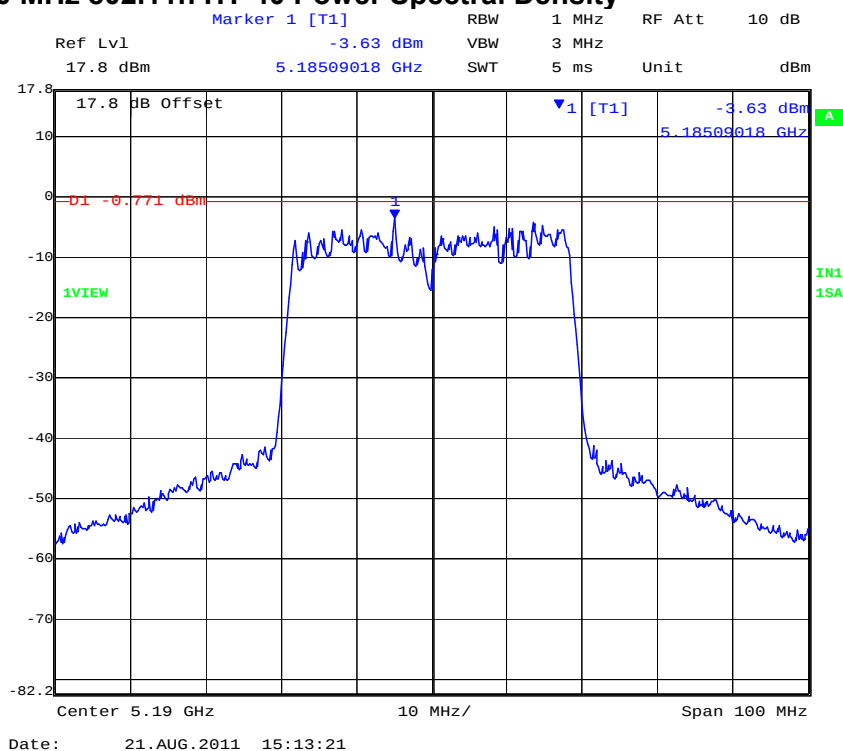


Title: Fluke Networks Sensor4 Wireless Client
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PORT A 5,190 MHz 802.11n HT-40 Power Spectral Density



PORT B 5,190 MHz 802.11n HT-40 Power Spectral Density

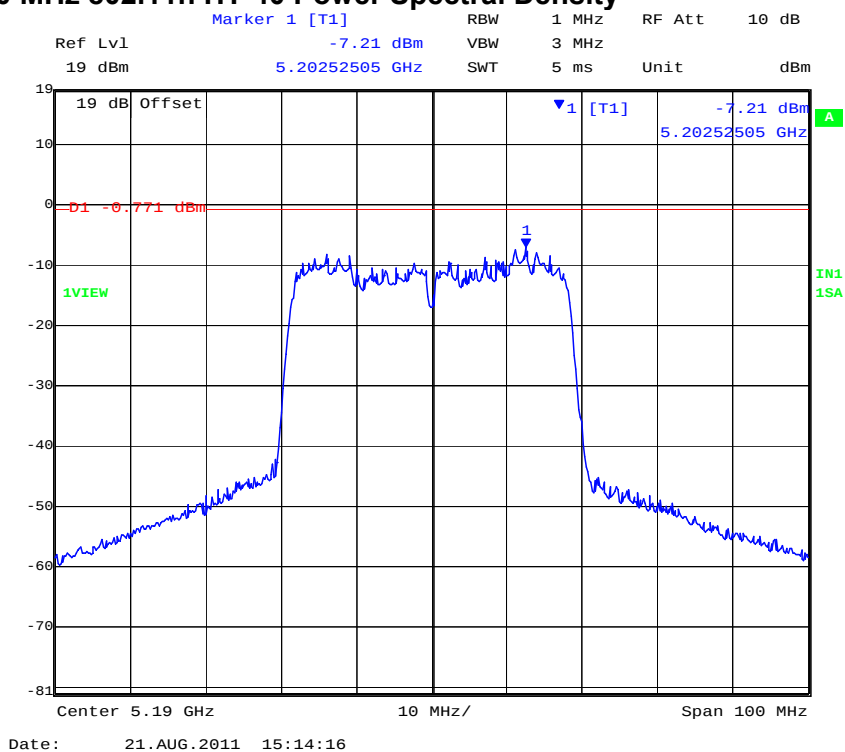


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PORT C 5,190 MHz 802.11n HT-40 Power Spectral Density

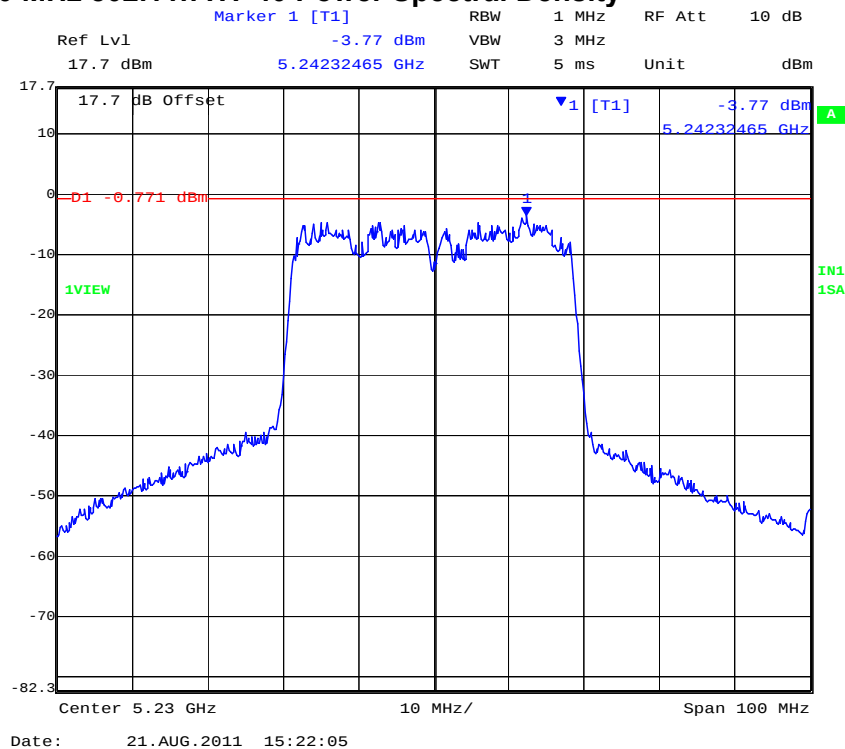


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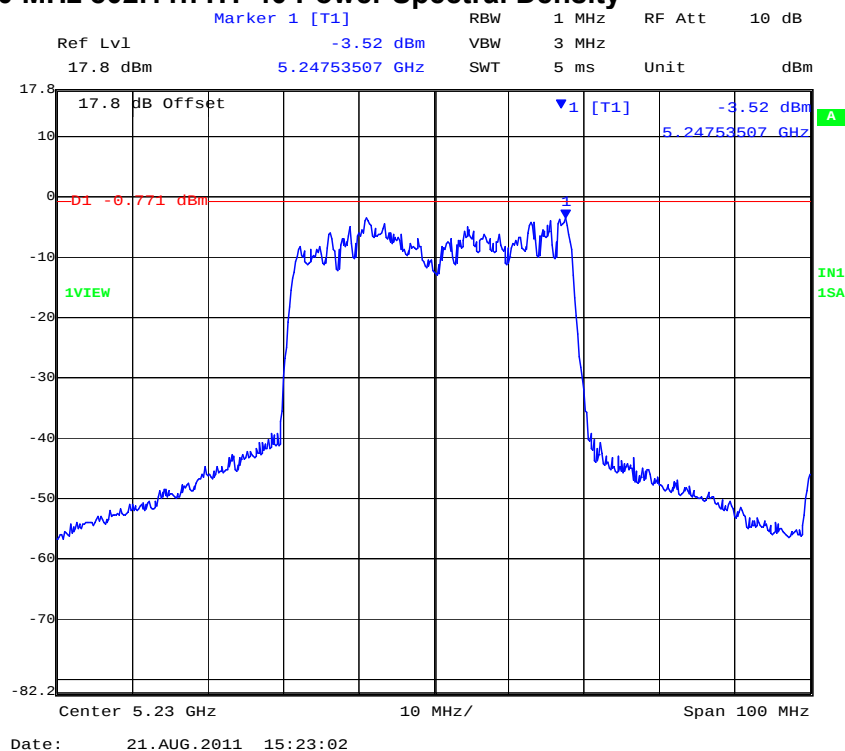


Title: Fluke Networks Sensor4 Wireless Client
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PORT A 5,230 MHz 802.11n HT-40 Power Spectral Density



PORT B 5,230 MHz 802.11n HT-40 Power Spectral Density

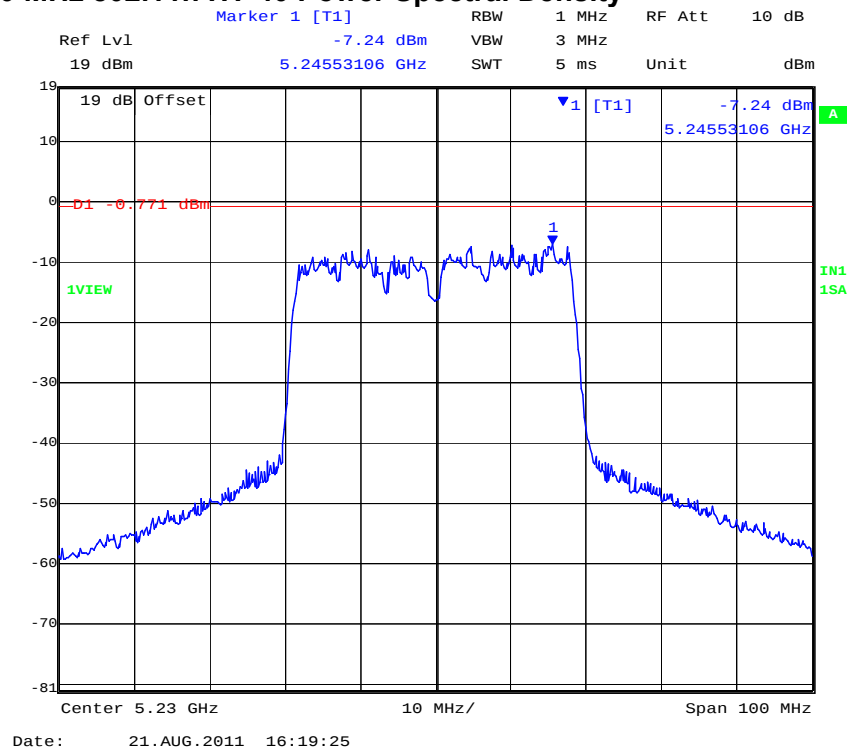


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Title: Fluke Networks Sensor4 Wireless Client
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PORT C 5,230 MHz 802.11n HT-40 Power Spectral Density



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TABLE OF RESULTS – 802.11a Legacy 5250 -5350 MHz

Test Conditions:	15.407 (a)	Rel. Humidity (%):	35	to	42
Variant:	802.11a	Ambient Temp. (°C):	19	to	22
TPC:	HIGH	Pressure (mBars):	998	to	1003
Modulation:	ON	Duty Cycle (%):	100		
Beam Forming Gain (Y):	N/A dB	Antenna Gain:	0 dBi		
Applied Voltage:	48.0 Vdc	Antenna Ports (N):	3		
Notes 1:					
Notes 2:					

Test Frequency	Measured Peak Power				Correction factor	Peak Power Spectral Density	Limit	Margin
	RF Port (dBm)							
MHz	a	b	c	d	10Log(N)	dBm	dBm	dB
5260.00	3.60	2.06	4.07	--	4.77	8.84	11.00	-2.16
5300.00	3.08	-0.61	4.04	--	4.77	8.81	11.00	-2.19
5320.00	3.47	-0.90	3.04	--	4.77	8.24	11.00	-2.76

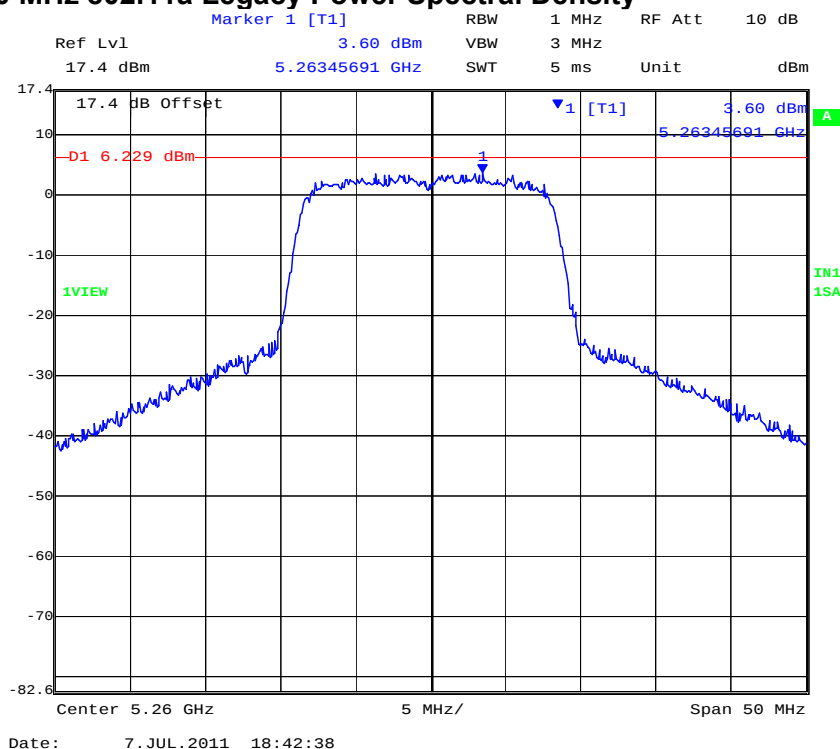
Measurement uncertainty:	±1.33 dB
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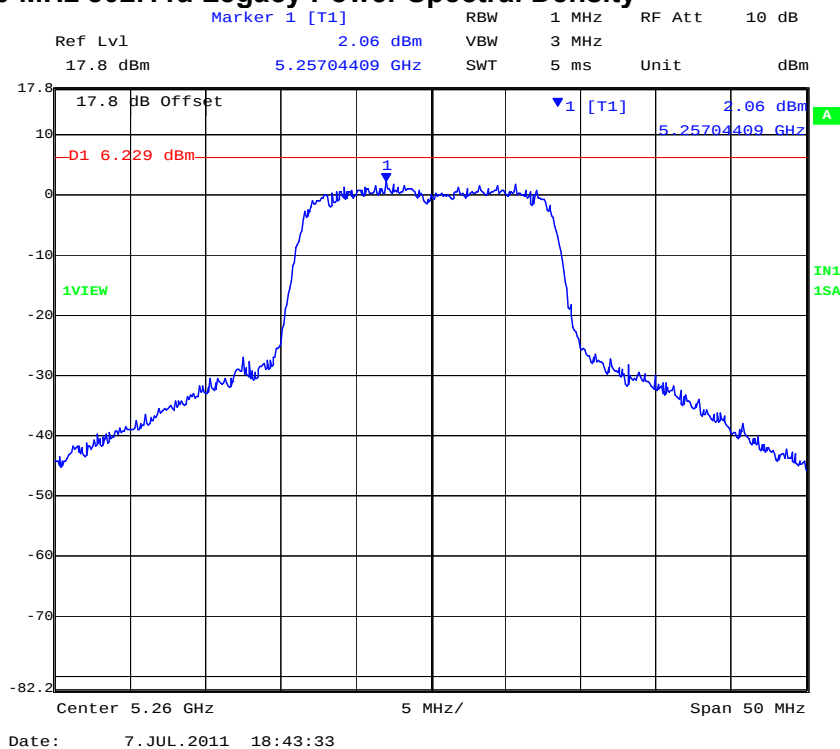


Title: Fluke Networks Sensor4 Wireless Client
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PORT A 5,260 MHz 802.11a Legacy Power Spectral Density



PORT B 5,260 MHz 802.11a Legacy Power Spectral Density

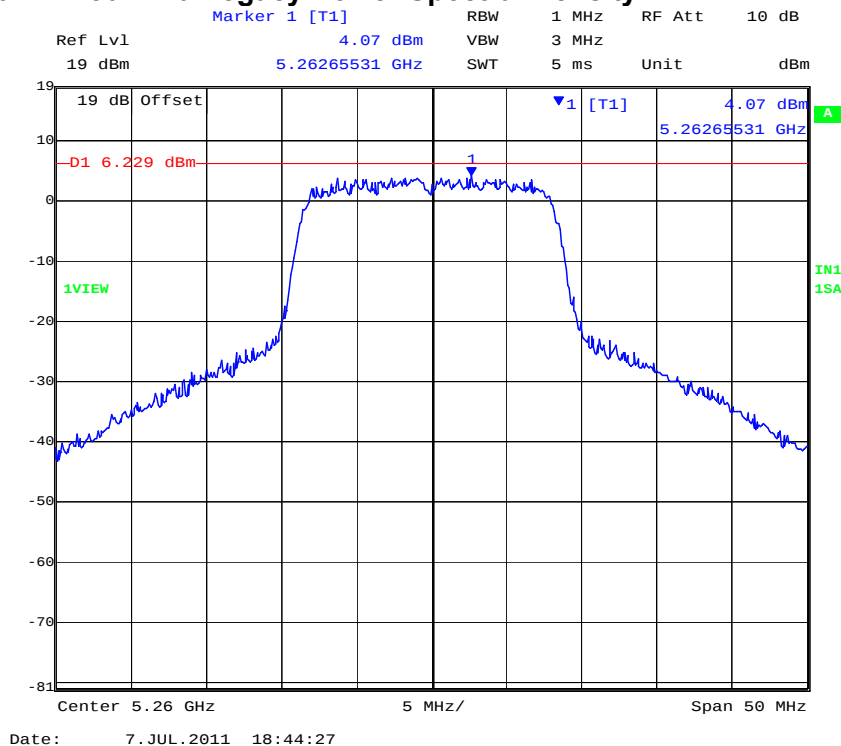


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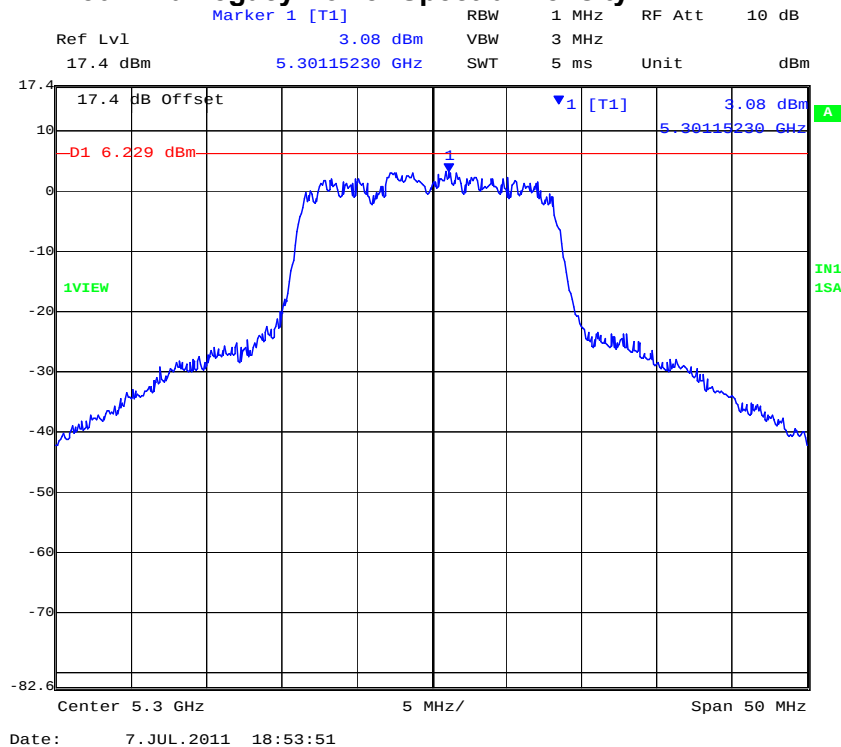


Title: Fluke Networks Sensor4 Wireless Client
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PORT C 5,260 MHz 802.11a Legacy Power Spectral Density



PORT A 5300 MHz 802.11a Legacy Power Spectral Density

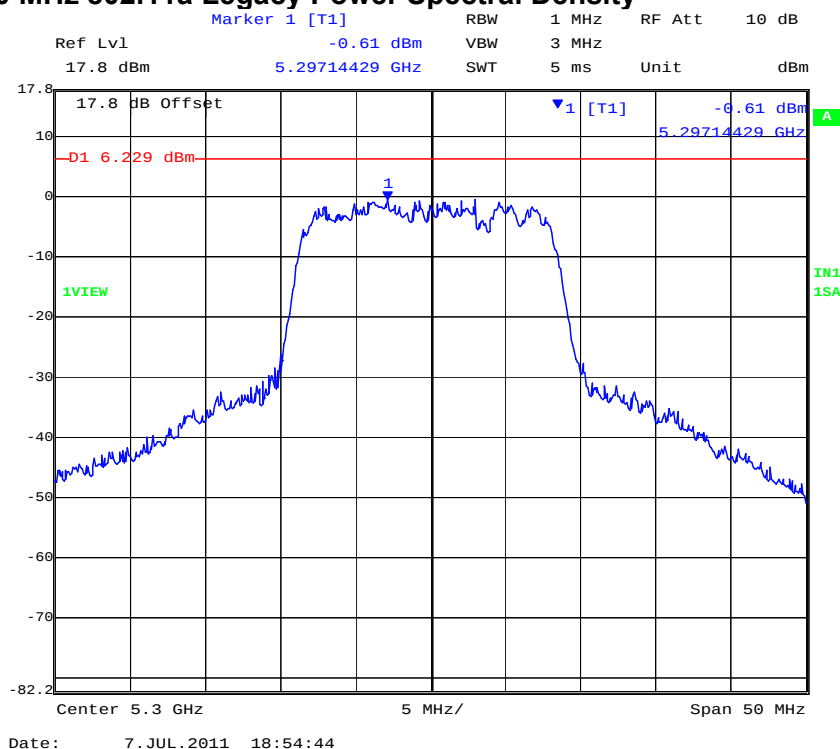


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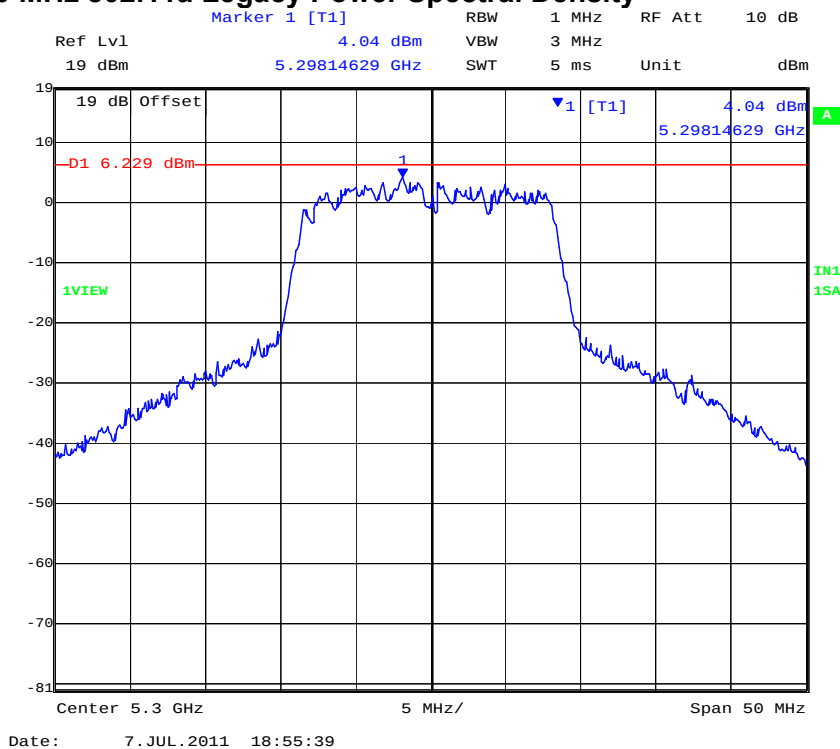


Title: Fluke Networks Sensor4 Wireless Client
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PORT B 5,300 MHz 802.11a Legacy Power Spectral Density



PORT C 5,300 MHz 802.11a Legacy Power Spectral Density

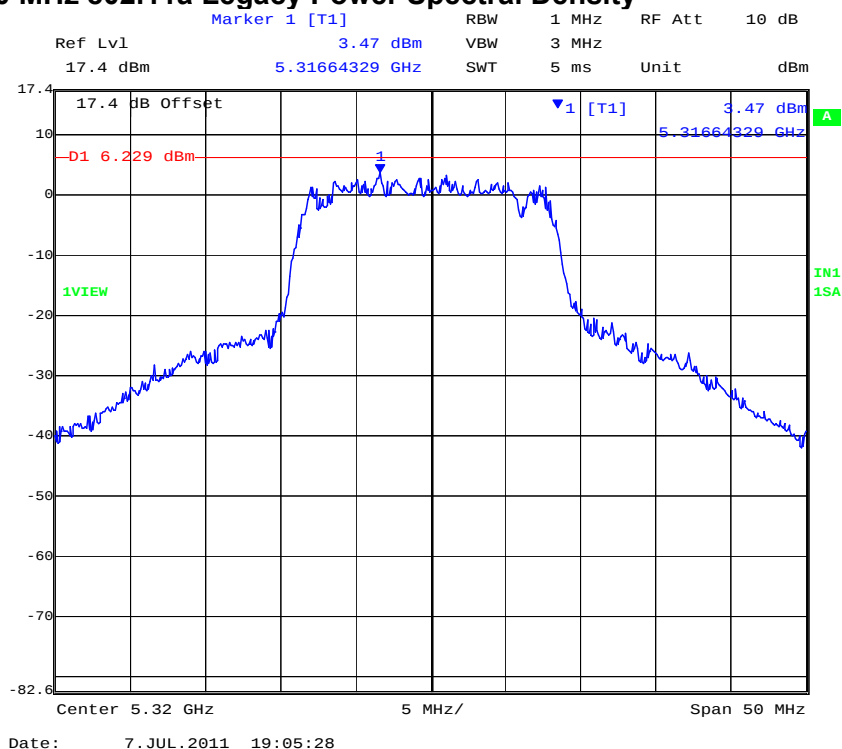


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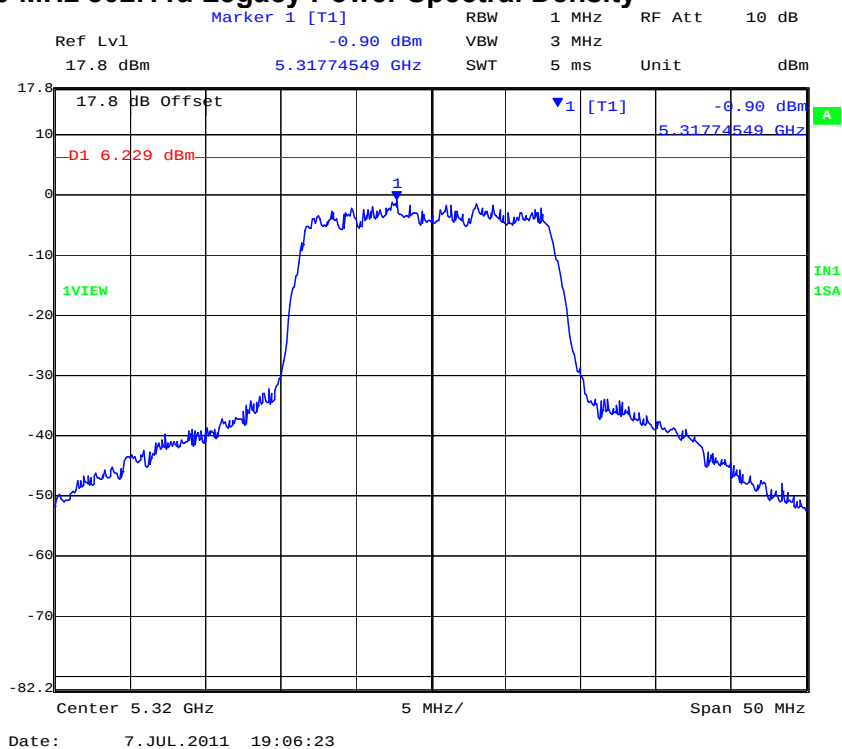


Title: Fluke Networks Sensor4 Wireless Client
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PORT A 5,320 MHz 802.11a Legacy Power Spectral Density



PORT B 5,320 MHz 802.11a Legacy Power Spectral Density

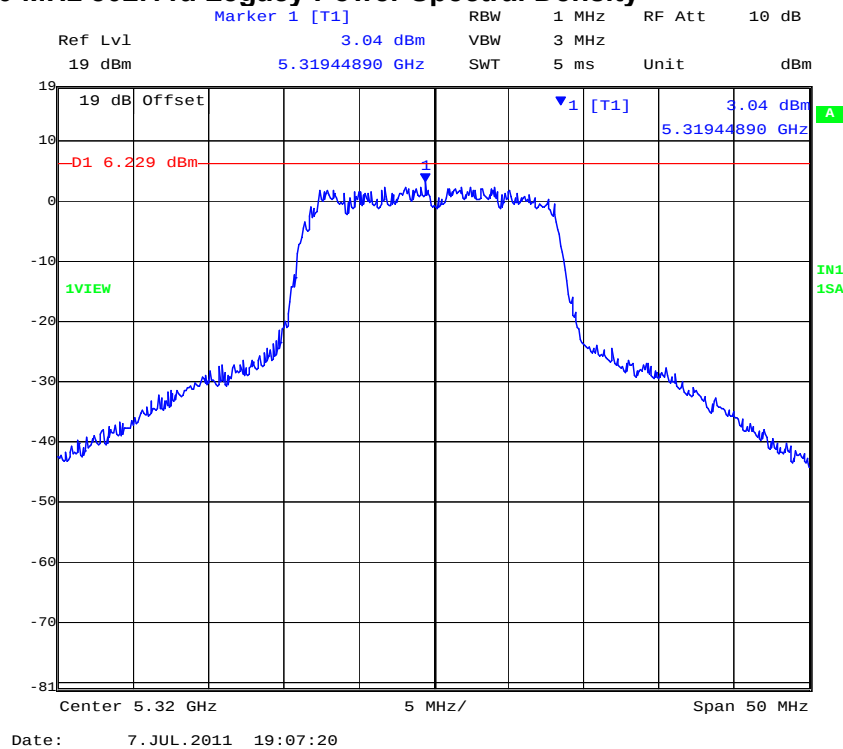


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PORT C 5,320 MHz 802.11a Legacy Power Spectral Density



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Title: Fluke Networks Sensor4 Wireless Client
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TABLE OF RESULTS – 802.11n HT-20 5250 -5350 MHz

Test Conditions:	15.407 (a)	Rel. Humidity (%):	35	to	42
Variant:	802.11n HT-20	Ambient Temp. (°C):	19	to	22
TPC:	HIGH	Pressure (mBars):	998	to	1003
Modulation:	ON	Duty Cycle (%):	100		
Beam Forming Gain (Y):	N/A dB	Antenna Gain:	0 dBi		
Applied Voltage:	48.0 Vdc	Antenna Ports (N):	3		
Notes 1:					
Notes 2:					

Test Frequency	Measured Peak Power				Correction factor	Peak Power Spectral Density	Limit	Margin
	RF Port (dBm)							
MHz	a	b	c	d	10Log(N)	dBm	dBm	dB
5260.00	2.68	1.28	3.32	--	4.77	8.09	11.00	-2.91
5300.00	2.68	0.01	3.60	--	4.77	8.37	11.00	-2.63
5320.00	2.60	-2.12	3.21	--	4.77	7.98	11.00	-3.02

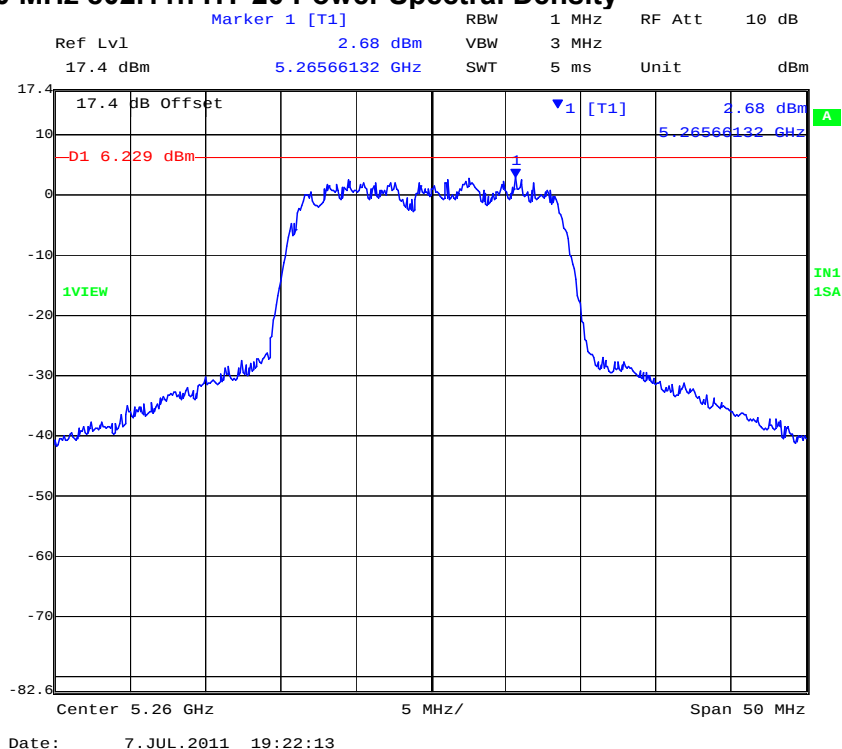
Measurement uncertainty:	±1.33 dB
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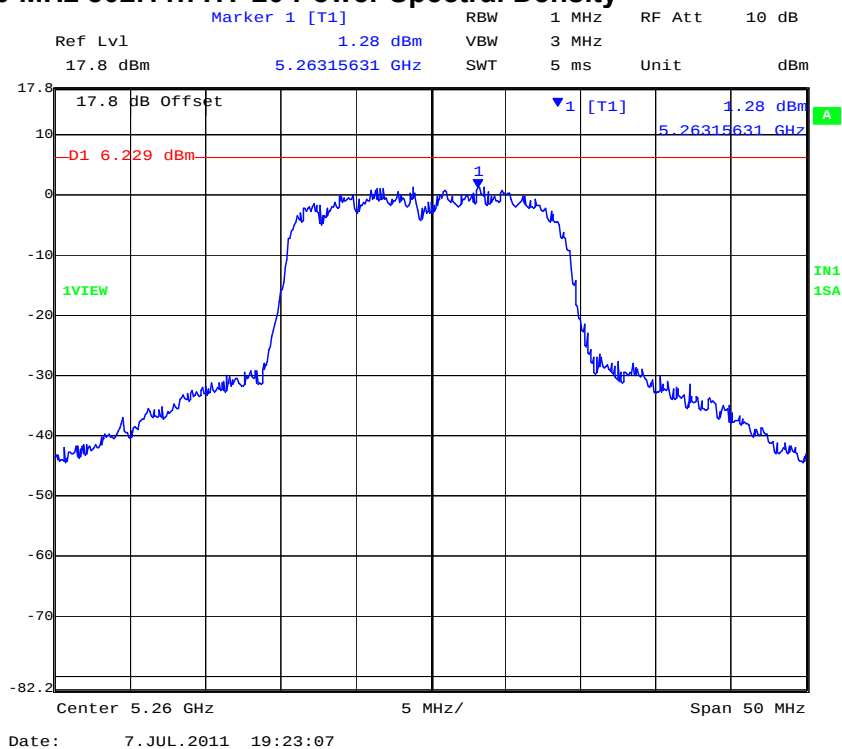


Title: Fluke Networks Sensor4 Wireless Client
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PORT A 5,260 MHz 802.11n HT-20 Power Spectral Density



PORT B 5,260 MHz 802.11n HT-20 Power Spectral Density

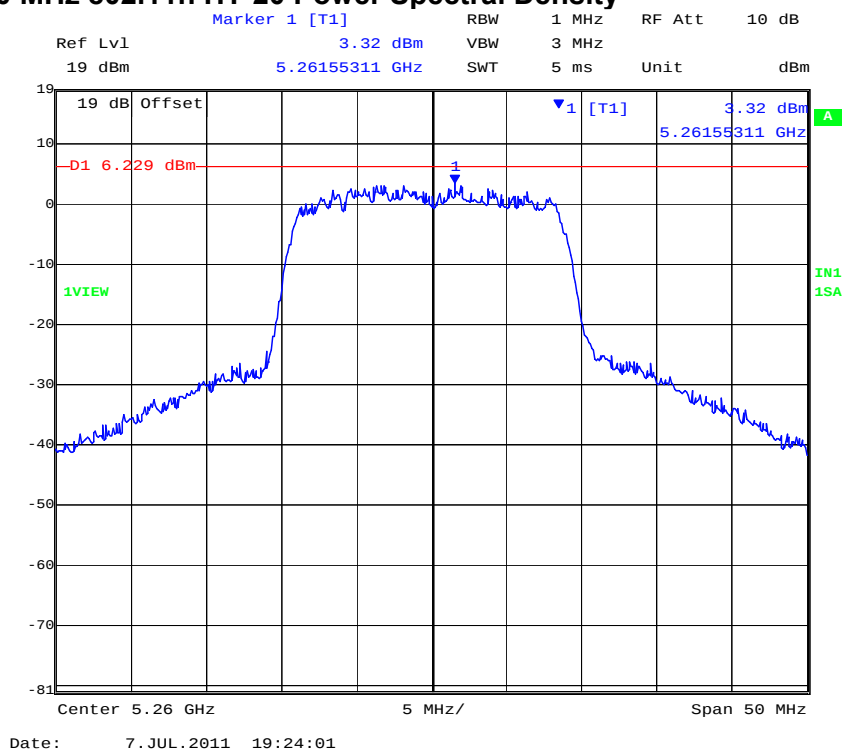


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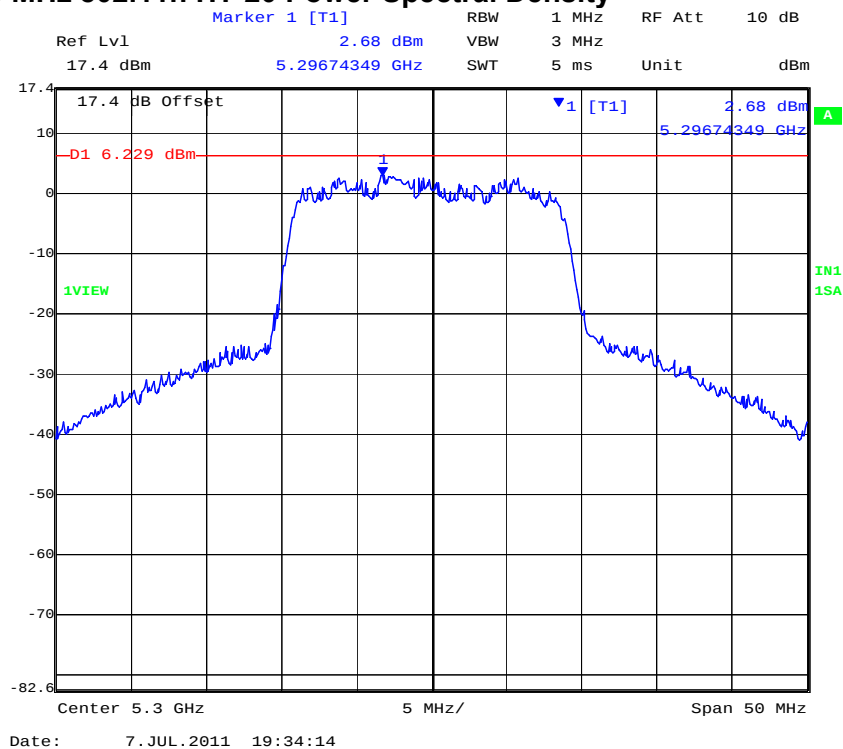


Title: Fluke Networks Sensor4 Wireless Client
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PORT C 5,260 MHz 802.11n HT-20 Power Spectral Density



PORT A 5300 MHz 802.11n HT-20 Power Spectral Density

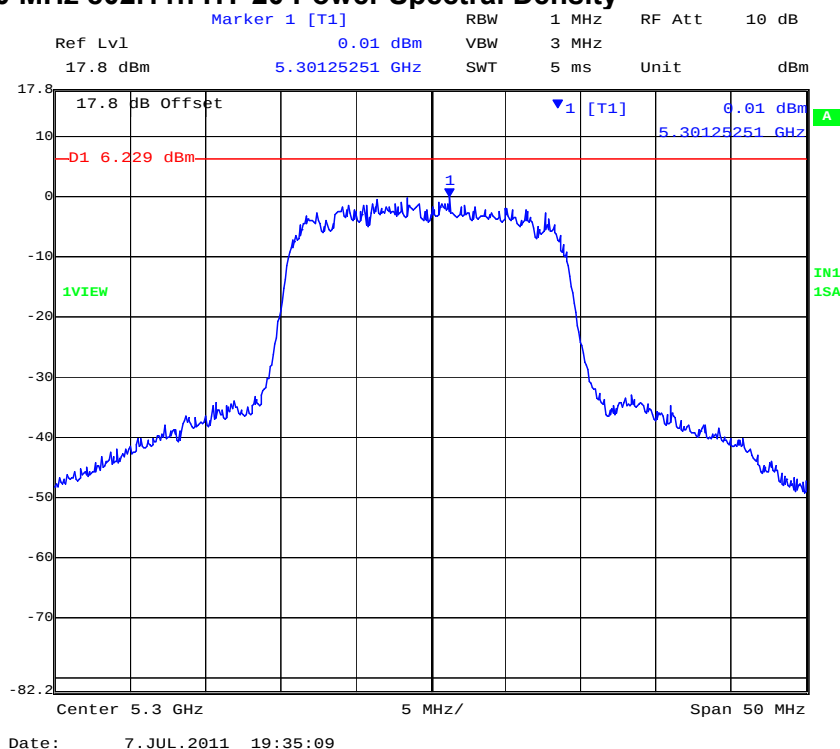


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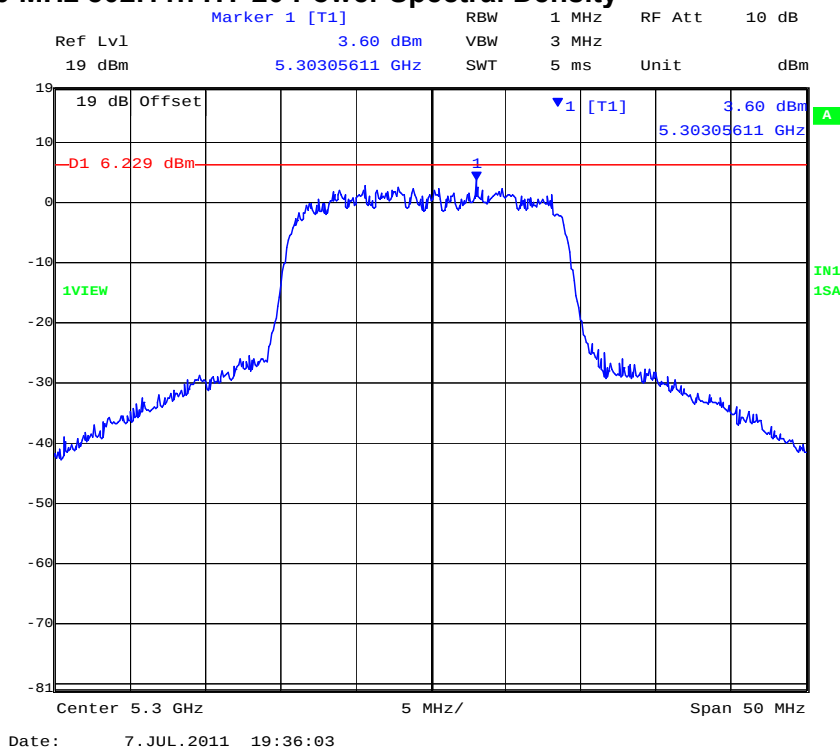


Title: Fluke Networks Sensor4 Wireless Client
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PORT B 5,300 MHz 802.11n HT-20 Power Spectral Density



PORT C 5,300 MHz 802.11n HT-20 Power Spectral Density

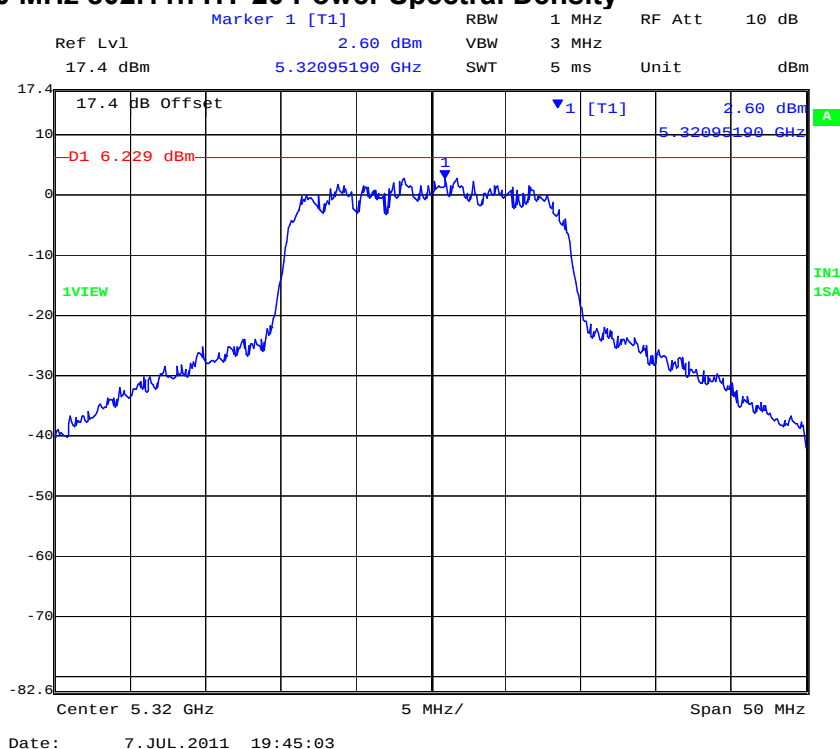


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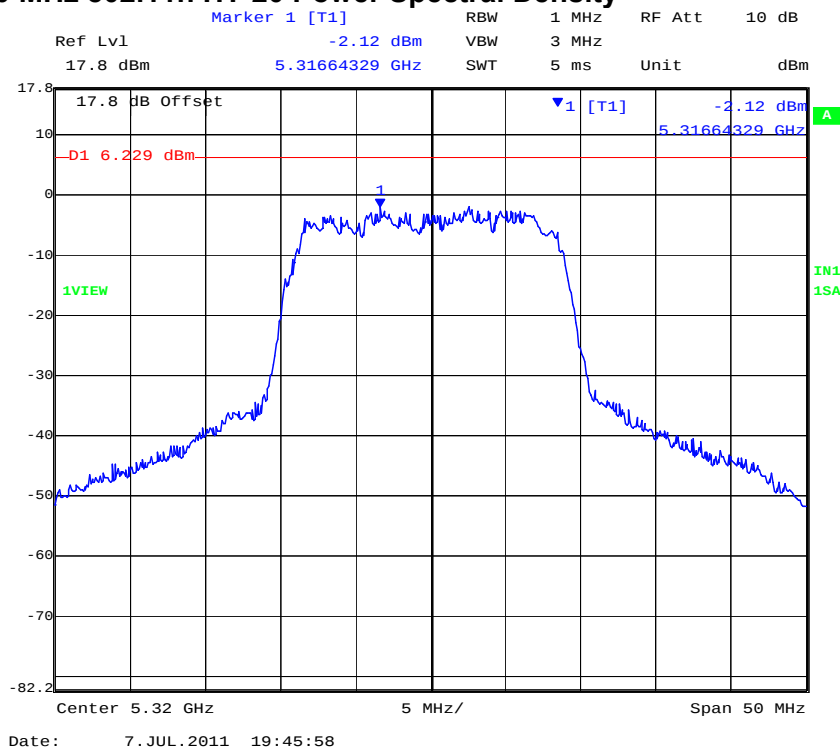


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PORT A 5,320 MHz 802.11n HT-20 Power Spectral Density



PORT B 5,320 MHz 802.11n HT-20 Power Spectral Density

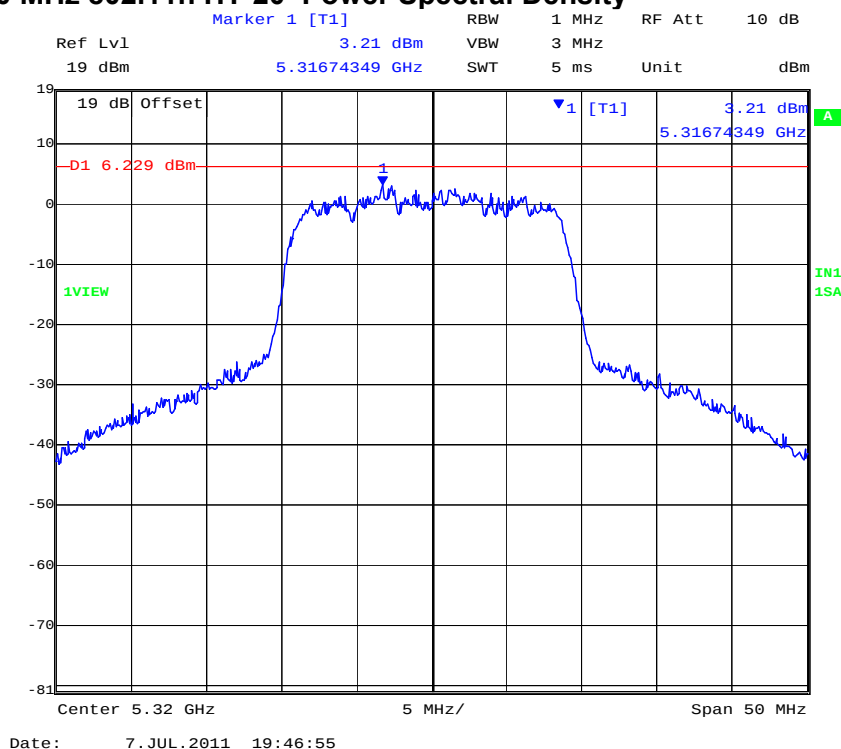


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PORT C 5,320 MHz 802.11n HT-20 Power Spectral Density



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TABLE OF RESULTS – 802.11n HT-40 5250 -5350 MHz

Test Conditions:	15.407 (a)	Rel. Humidity (%):	35	to	42
Variant:	802.11n HT-40	Ambient Temp. (°C):	19	to	22
TPC:	HIGH	Pressure (mBars):	998	to	1003
Modulation:	ON	Duty Cycle (%):	100		
Beam Forming Gain (Y):	N/A dB	Antenna Gain:	0 dBi		
Applied Voltage:	48.0 Vdc	Antenna Ports (N):	3		
Notes 1:					
Notes 2:					

Test Frequency	Measured Peak Power				Correction factor	Peak Power Spectral Density	Limit	Margin
	RF Port (dBm)							
MHz	a	b	c	d	10Log(N)	dBm	dBm	dB
5270.00	-1.23	-3.64	-1.15	--	4.77	3.62	11.00	-7.38
5310.00	-1.65	-5.56	-0.98	--	4.77	3.79	11.00	-7.21

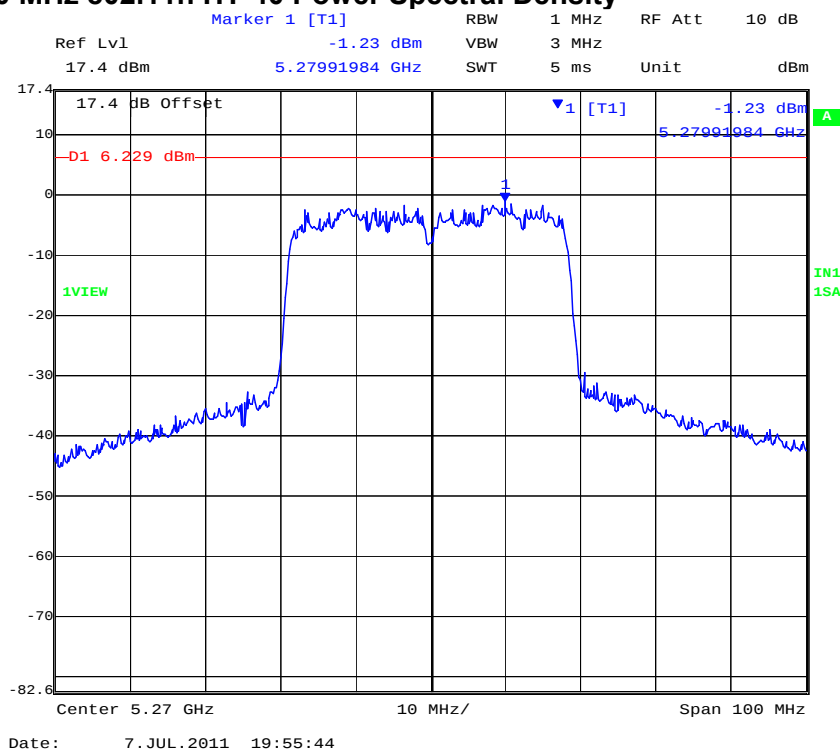
Measurement uncertainty:	±1.33 dB
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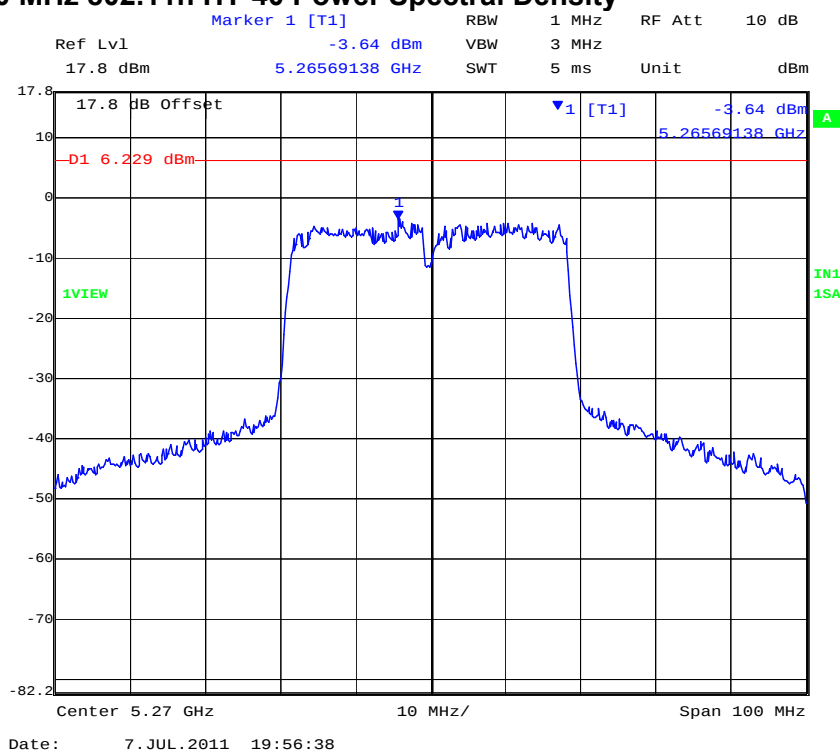


Title: Fluke Networks Sensor4 Wireless Client
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PORT A 5,270 MHz 802.11n HT-40 Power Spectral Density



PORT B 5,270 MHz 802.11n HT-40 Power Spectral Density

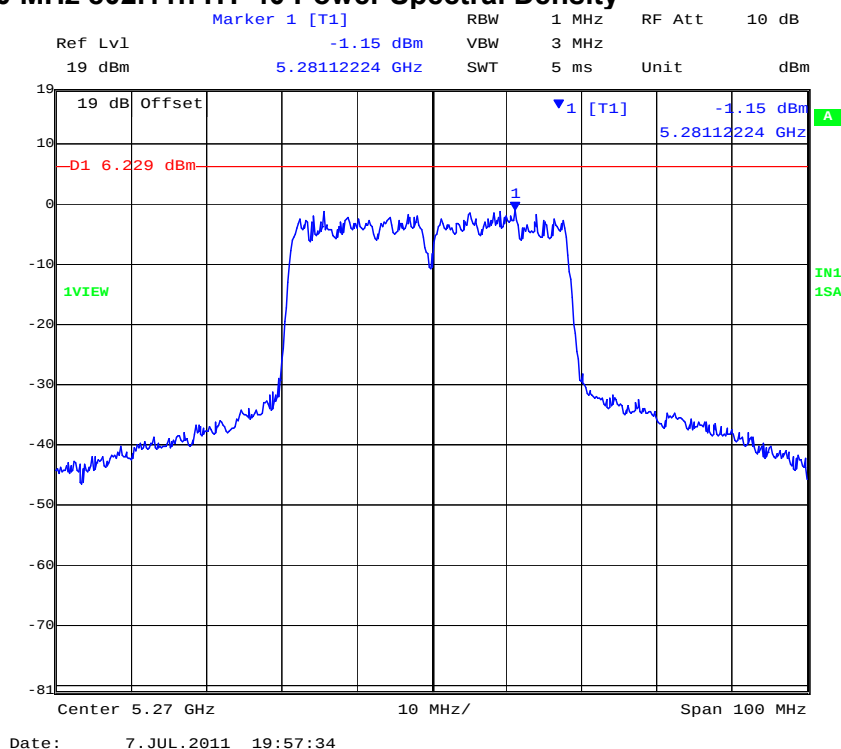


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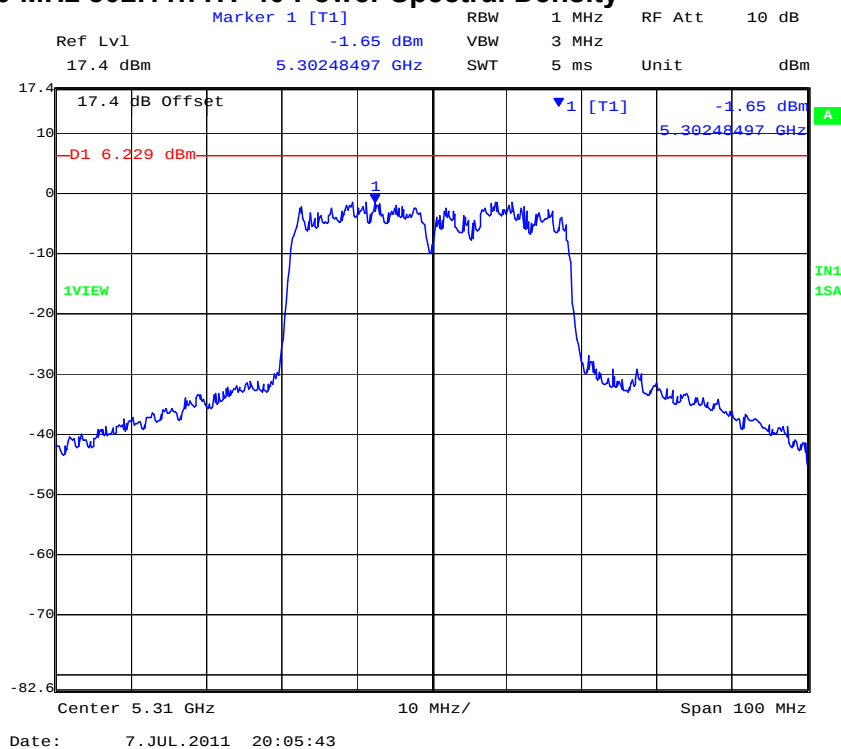


Title: Fluke Networks Sensor4 Wireless Client
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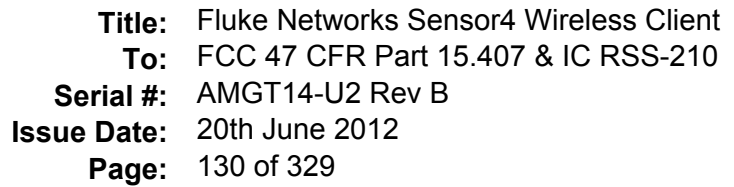
PORT C 5,270 MHz 802.11n HT-40 Power Spectral Density



PORT A 5,310 MHz 802.11n HT-40 Power Spectral Density



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Ref Lvl 17.8 dBm 17.8 dB Offset

Marker 1 [T1] -5.56 dBm 5.30488978 GHz

RBW 1 MHz RF Att 10 dB

VBW 3 MHz

SWT 5 ms Unit dBm

17.8 10 0 -10 -20 -30 -40 -50 -60 -70 -82.2

17.8 dB Offset

▼1 [T1] -5.56 dBm 5.30488978 GHz

-D1 6.229 dBm

1

1VIEW

IN1 1SA

Center 5.31 GHz 10 MHz/ Span 100 MHz

Date: 7. JUL. 2011 20:06:37

Marker 1 [T1] RBW 1 MHz RF Att 10 dB
 Ref Lvl -0.98 dBm VBW 3 MHz
 19 dBm 5.31490982 GHz SWT 5 ms Unit dBm

19 dB Offset
 1 [T1] -0.98 dBm
 5.31490982 GHz
 -D1 6.229 dBm
 1VIEW
 IN1 1SA
 Center 5.31 GHz 10 MHz/ Span 100 MHz
 Date: 7. JUL. 2011 20:07:33

MiCOM Labs, 440 Boulder Court, Suite 200, Pleasanton, CA 94566 USA, Phone: 925.462.0304, Fax: 925.462.0306, www.micomlabs.com



Title: Fluke Networks Sensor4 Wireless Client
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TABLE OF RESULTS – 802.11a Legacy 5500 - 5700 MHz

Test Conditions:	15.407 (a)	Rel. Humidity (%):	35	to	42
Variant:	802.11a	Ambient Temp. (°C):	19	to	22
TPC:	HIGH	Pressure (mBars):	998	to	1003
Modulation:	ON	Duty Cycle (%):	100		
Beam Forming Gain (Y):	N/A dB	Antenna Gain:	0 dBi		
Applied Voltage:	48.0 Vdc	Antenna Ports (N):	3		
Notes 1:					
Notes 2:					

Test Frequency	Measured Peak Power				Correction factor	Peak Power Spectral Density	Limit	Margin
	RF Port (dBm)							
MHz	a	b	c	d	10Log(N)	dBm	dBm	dB
5500.00	1.54	1.39	0.99	--	4.77	6.31	11.00	-4.69
5580.00	2.21	0.90	3.42	--	4.77	8.19	11.00	-2.81
5700.00	1.69	0.24	1.82	--	4.77	6.59	11.00	-4.41

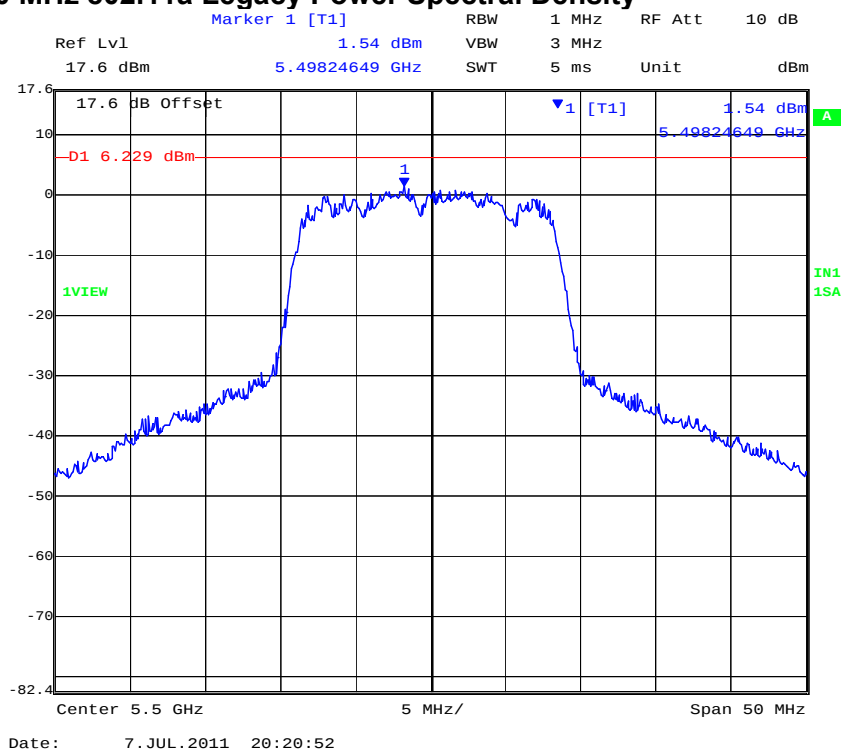
Measurement uncertainty:	±1.33 dB
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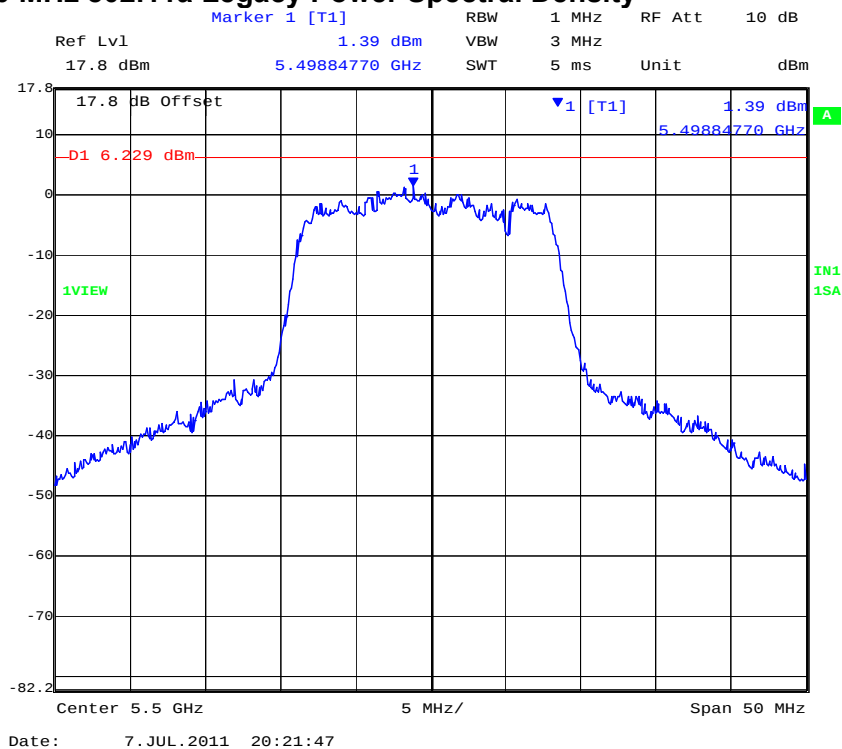


Title: Fluke Networks Sensor4 Wireless Client
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PORT A 5,500 MHz 802.11a Legacy Power Spectral Density



PORT B 5,500 MHz 802.11a Legacy Power Spectral Density

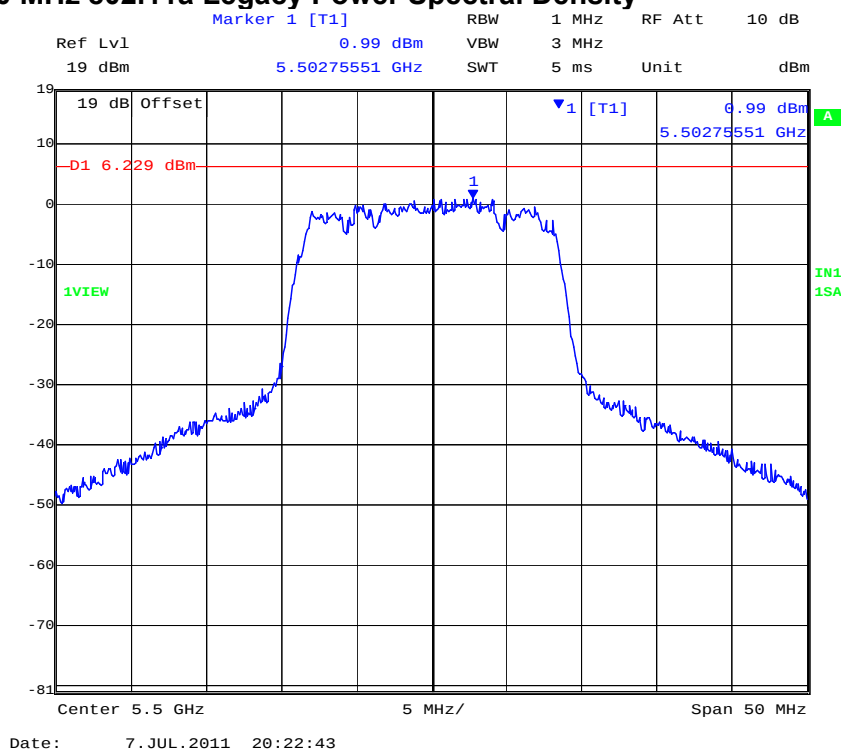


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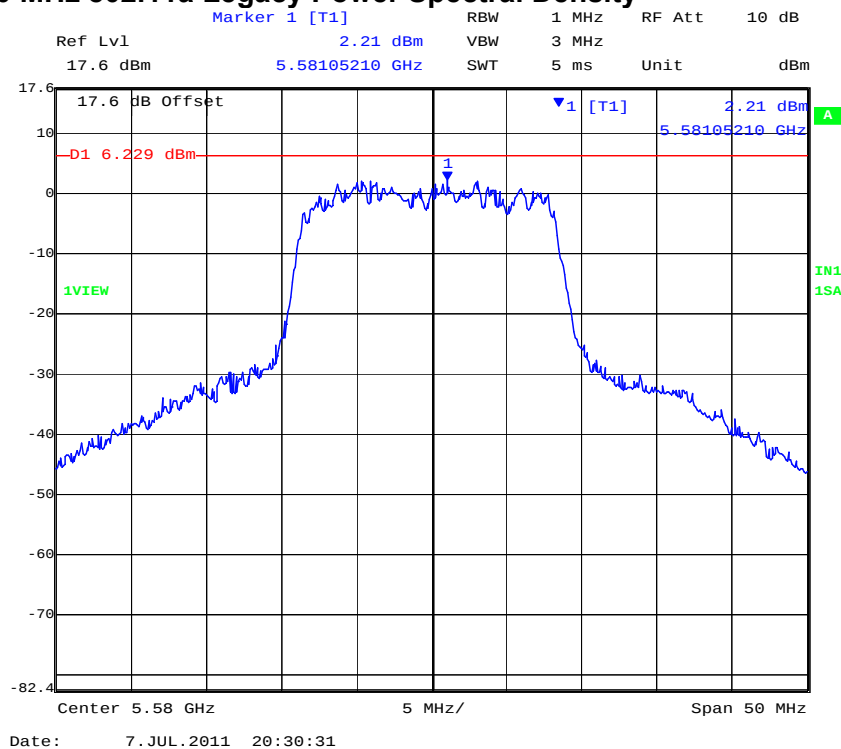


Title: Fluke Networks Sensor4 Wireless Client
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PORT C 5,500 MHz 802.11a Legacy Power Spectral Density



PORT A 5,580 MHz 802.11a Legacy Power Spectral Density

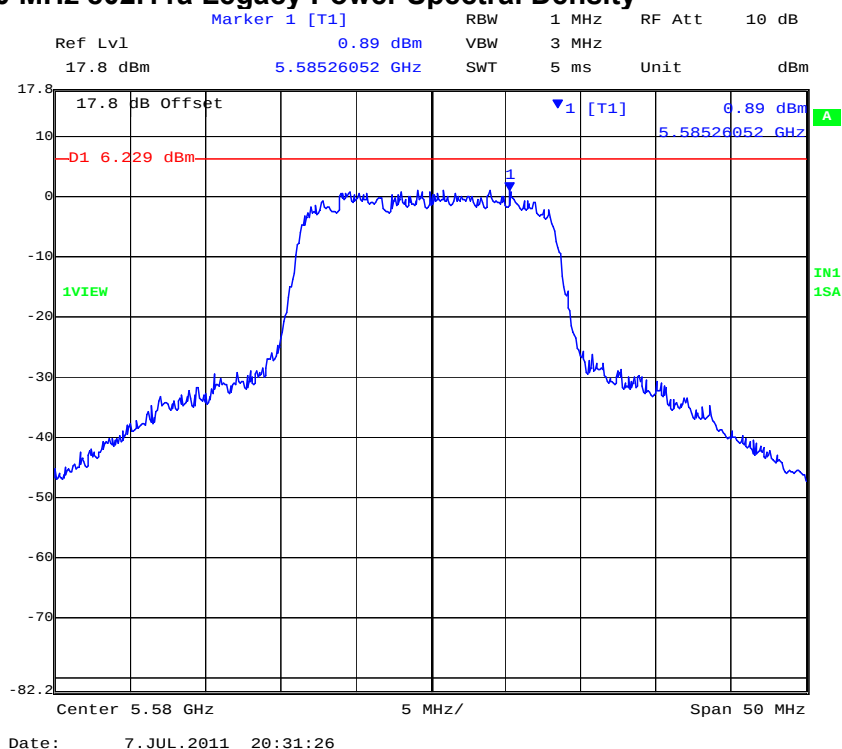


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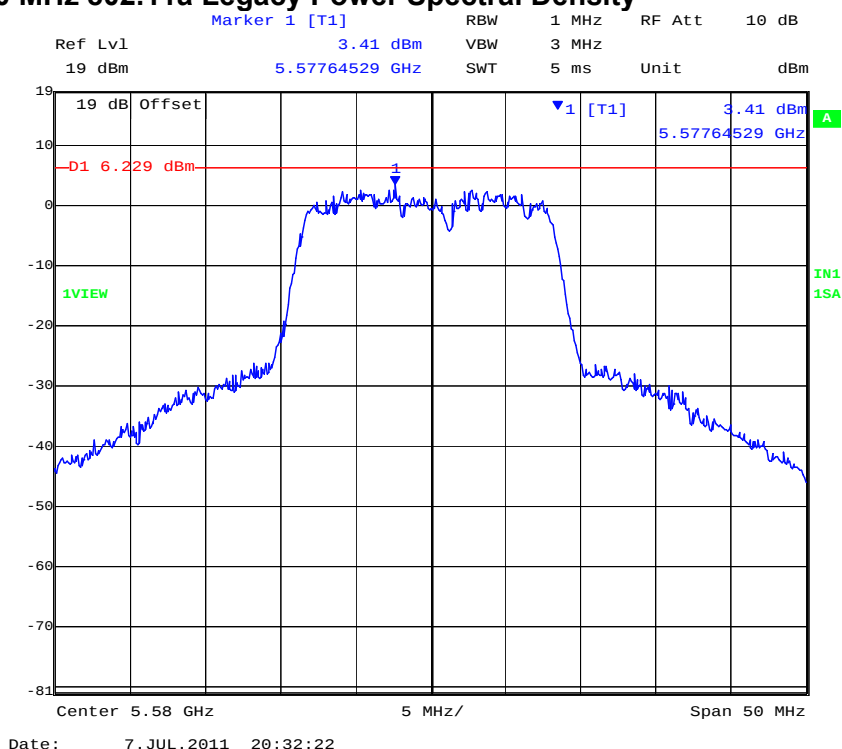


Title: Fluke Networks Sensor4 Wireless Client
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PORT B 5,580 MHz 802.11a Legacy Power Spectral Density



PORT C 5,580 MHz 802.11a Legacy Power Spectral Density

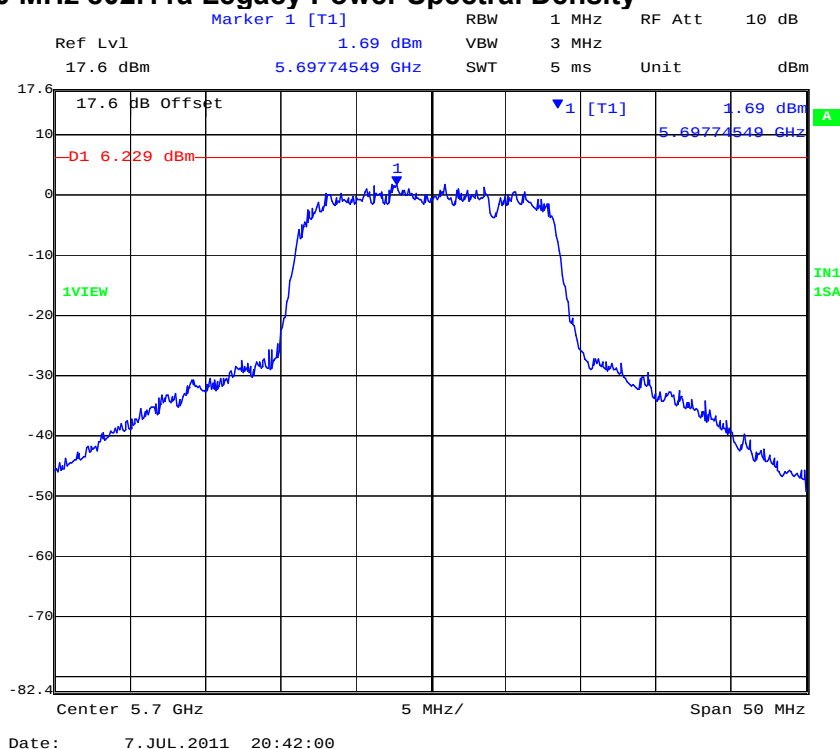


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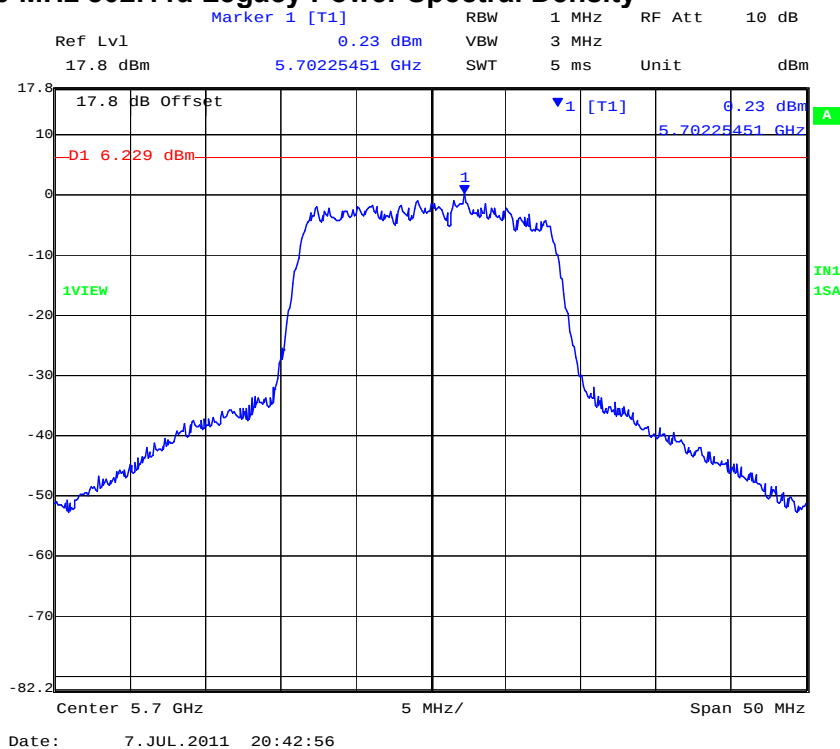


Title: Fluke Networks Sensor4 Wireless Client
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: AMGT14-U2 Rev B
Issue Date: 20th June 2012
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PORT A 5,700 MHz 802.11a Legacy Power Spectral Density



PORT B 5,700 MHz 802.11a Legacy Power Spectral Density

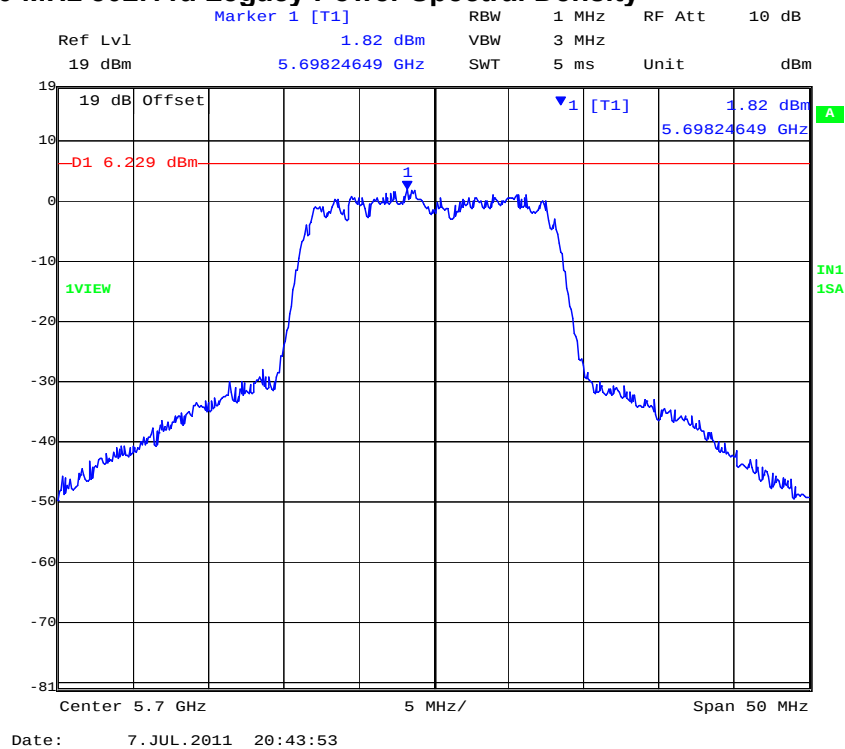


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Title: Fluke Networks Sensor4 Wireless Client
To: FCC 47 CFR Part 15.407 & IC RSS-210
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PORT C 5,700 MHz 802.11a Legacy Power Spectral Density



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To: FCC 47 CFR Part 15.407 & IC RSS-210
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TABLE OF RESULTS – 802.11n HT-20 5500 - 5700 MHz

Test Conditions:	15.407 (a)	Rel. Humidity (%):	35	to	42
Variant:	802.11n HT-20	Ambient Temp. (°C):	19	to	22
TPC:	HIGH	Pressure (mBars):	998	to	1003
Modulation:	ON	Duty Cycle (%):	100		
Beam Forming Gain (Y):	N/A dB	Antenna Gain:	0 dBi		
Applied Voltage:	48.0 Vdc	Antenna Ports (N):	3		
Notes 1:					
Notes 2:					

Test Frequency	Measured Peak Power				Correction factor	Peak Power Spectral Density	Limit	Margin
	RF Port (dBm)							
MHz	a	b	c	d	10Log(N)	dBm	dBm	dB
5500.00	2.07	0.72	1.66	--	4.77	6.84	11.00	-4.16
5580.00	2.03	1.04	3.05	--	4.77	7.82	11.00	-3.18
5700.00	0.74	-1.89	2.00	--	4.77	6.78	11.00	-4.22

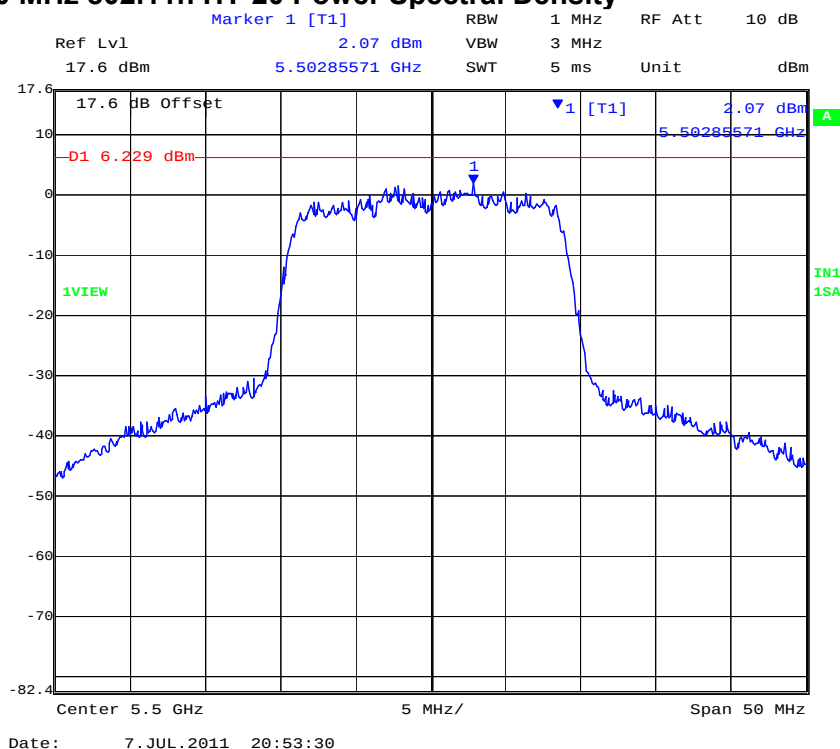
Measurement uncertainty:	±1.33 dB
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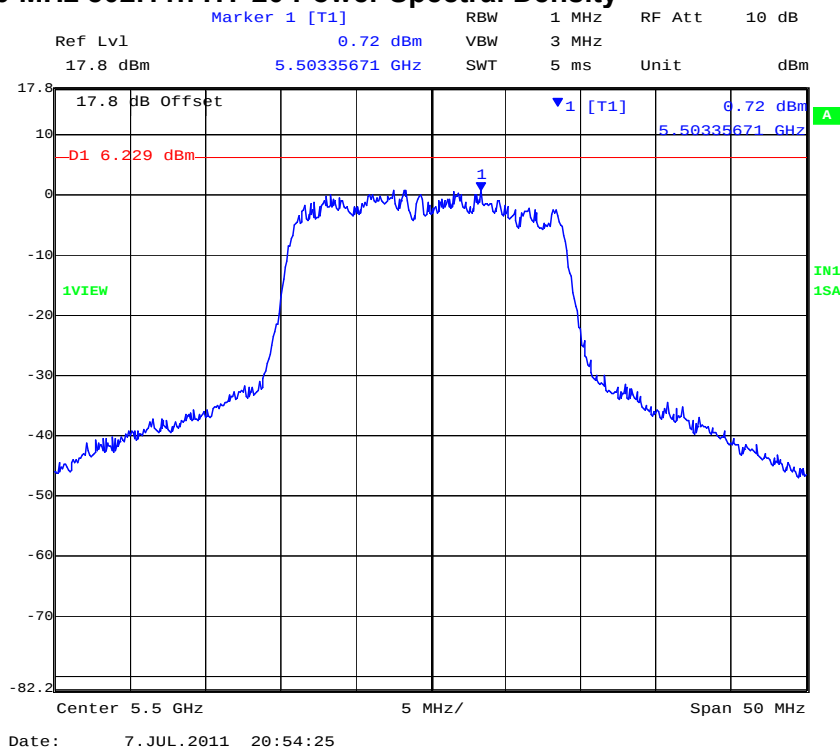


Title: Fluke Networks Sensor4 Wireless Client
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PORT A 5,500 MHz 802.11n HT-20 Power Spectral Density



PORT B 5,500 MHz 802.11n HT-20 Power Spectral Density

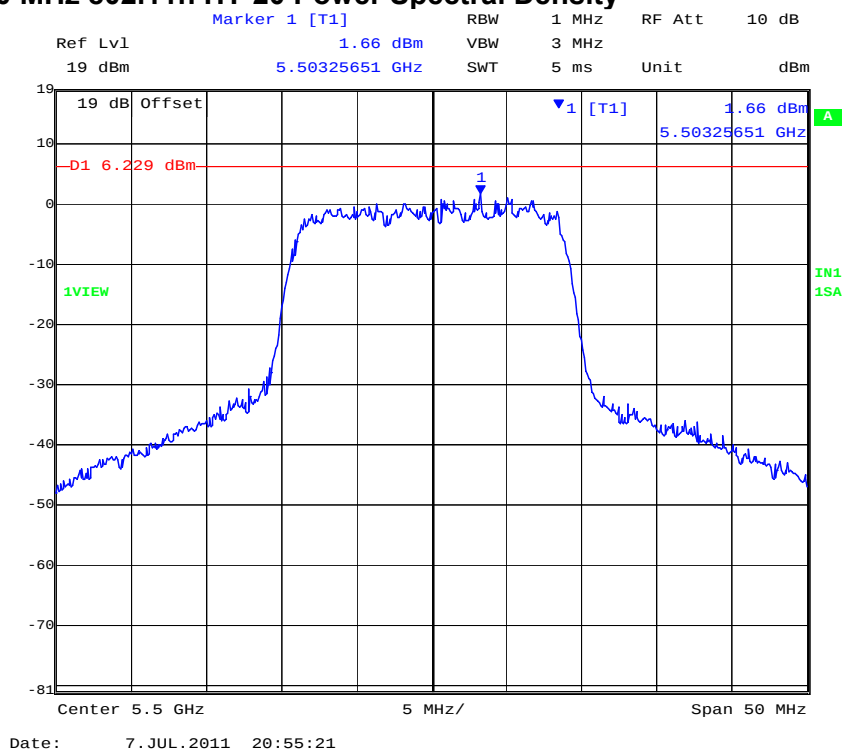


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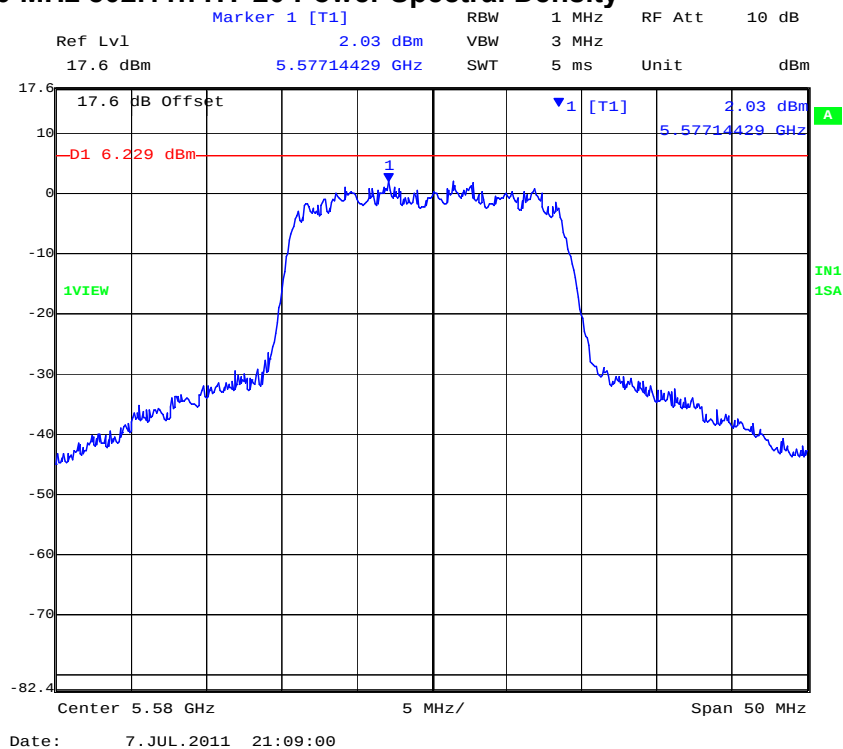


Title: Fluke Networks Sensor4 Wireless Client
To: FCC 47 CFR Part 15.407 & IC RSS-210
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PORT C 5,500 MHz 802.11n HT-20 Power Spectral Density



PORT A 5,580 MHz 802.11n HT-20 Power Spectral Density

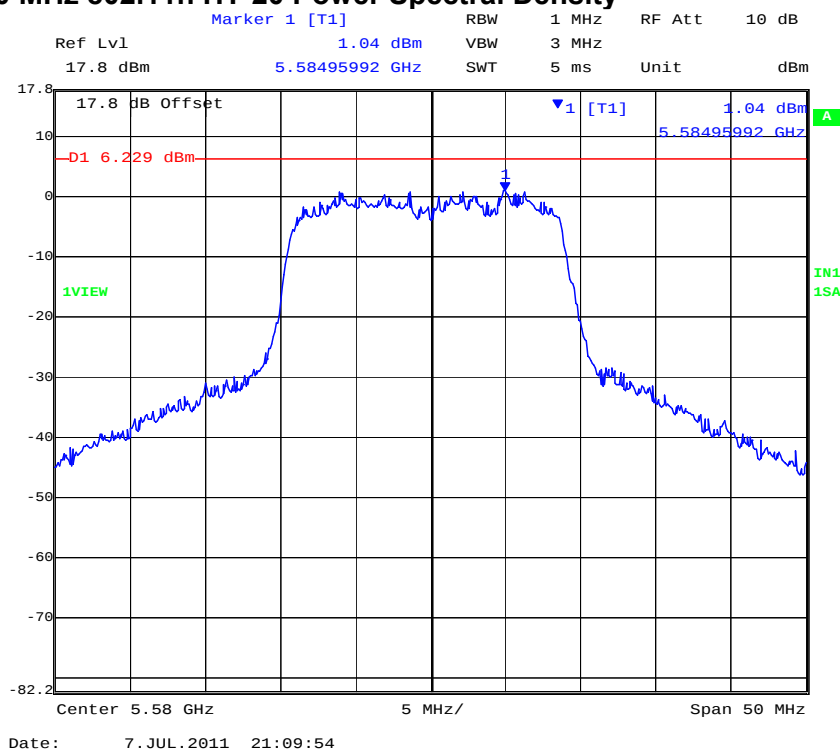


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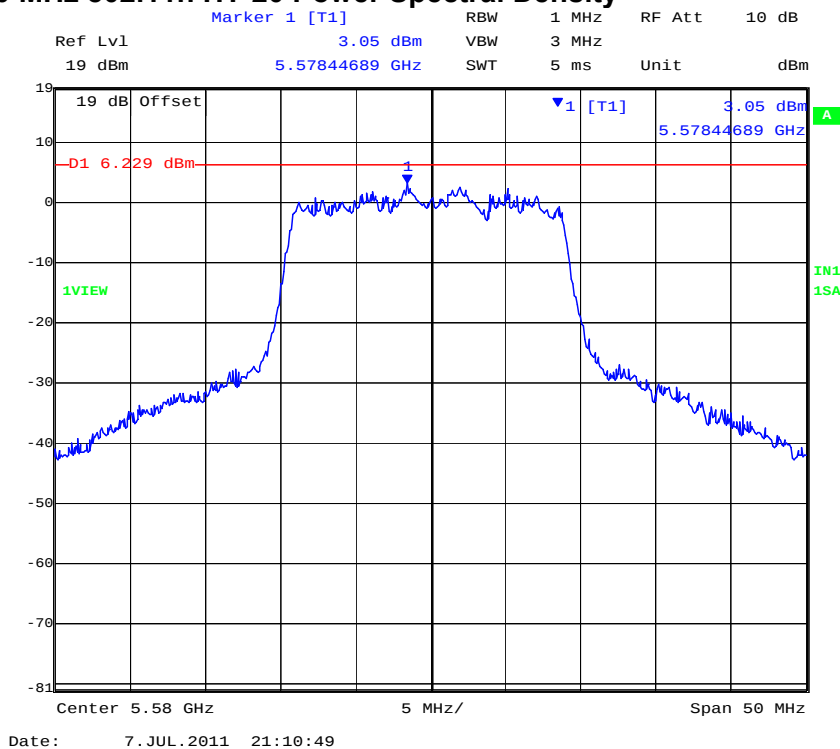


Title: Fluke Networks Sensor4 Wireless Client
To: FCC 47 CFR Part 15.407 & IC RSS-210
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PORT B 5,580 MHz 802.11n HT-20 Power Spectral Density



PORT C 5,580 MHz 802.11n HT-20 Power Spectral Density

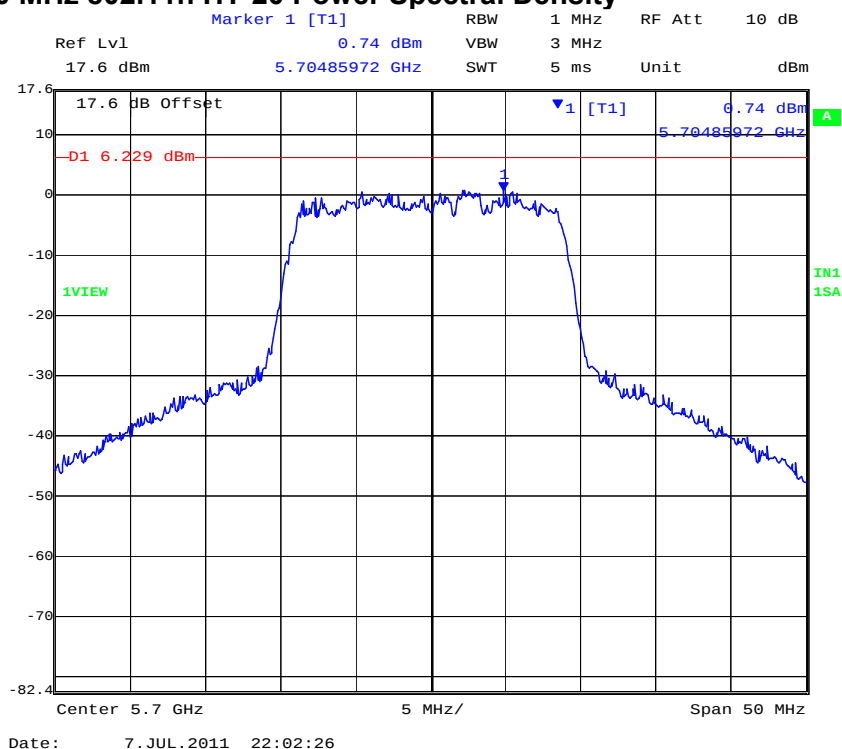


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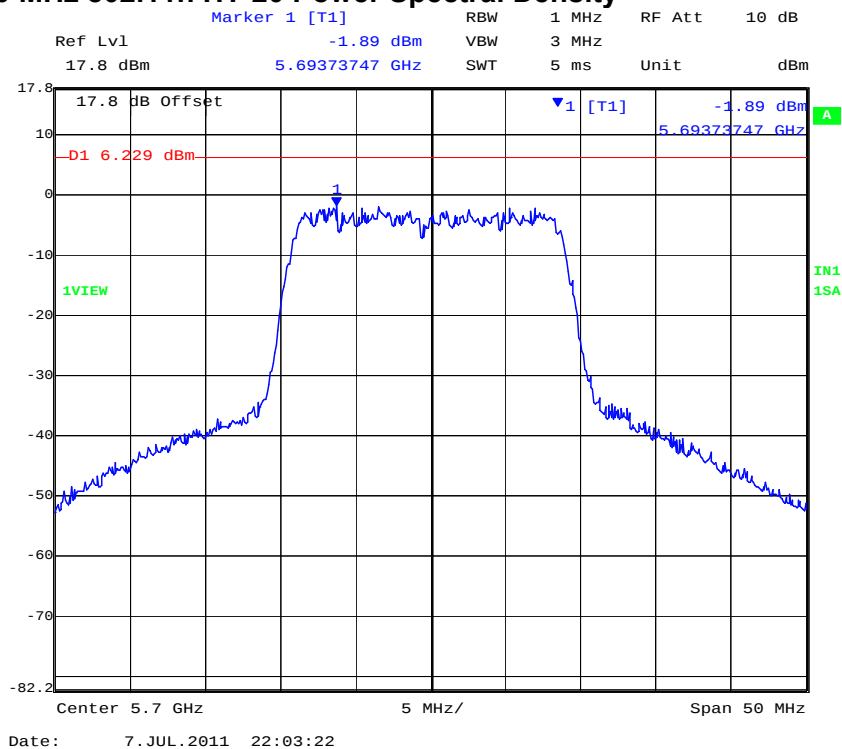


Title: Fluke Networks Sensor4 Wireless Client
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PORT A 5,700 MHz 802.11n HT-20 Power Spectral Density



PORT B 5,700 MHz 802.11n HT-20 Power Spectral Density

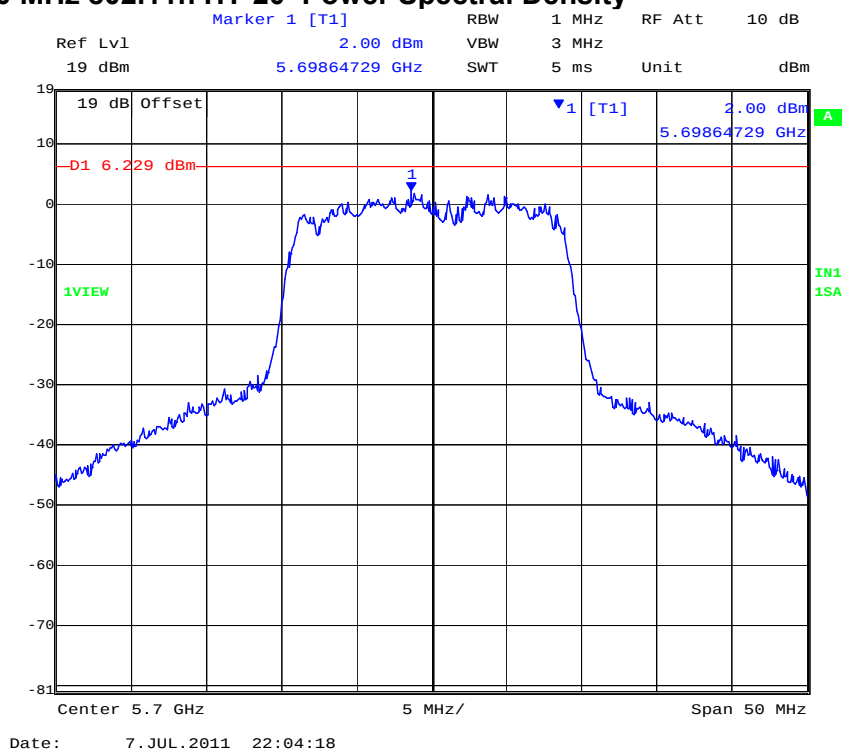


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PORT C 5,700 MHz 802.11n HT-20 Power Spectral Density



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TABLE OF RESULTS – 802.11n HT-40 5500 - 5700 MHz

Test Conditions:	15.407 (a)	Rel. Humidity (%):	35	to	42
Variant:	802.11n HT-40	Ambient Temp. (°C):	19	to	22
TPC:	HIGH	Pressure (mBars):	998	to	1003
Modulation:	ON	Duty Cycle (%):	100		
Beam Forming Gain (Y):	N/A dB	Antenna Gain:	0 dBi		
Applied Voltage:	48.0 Vdc	Antenna Ports (N):	3		
Notes 1:					
Notes 2:					

Test Frequency	Measured Peak Power				Correction factor	Peak Power Spectral Density	Limit	Margin
	RF Port (dBm)							
MHz	a	b	c	d	10Log(N)	dBm	dBm	dB
5510.00	-2.23	-3.65	-2.79	--	4.77	2.54	11.00	-8.46
5550.00	-2.01	-2.69	-1.51	--	4.77	3.27	11.00	-7.73
5670.00	-3.01	-4.75	-1.70	--	4.77	3.07	11.00	-7.93

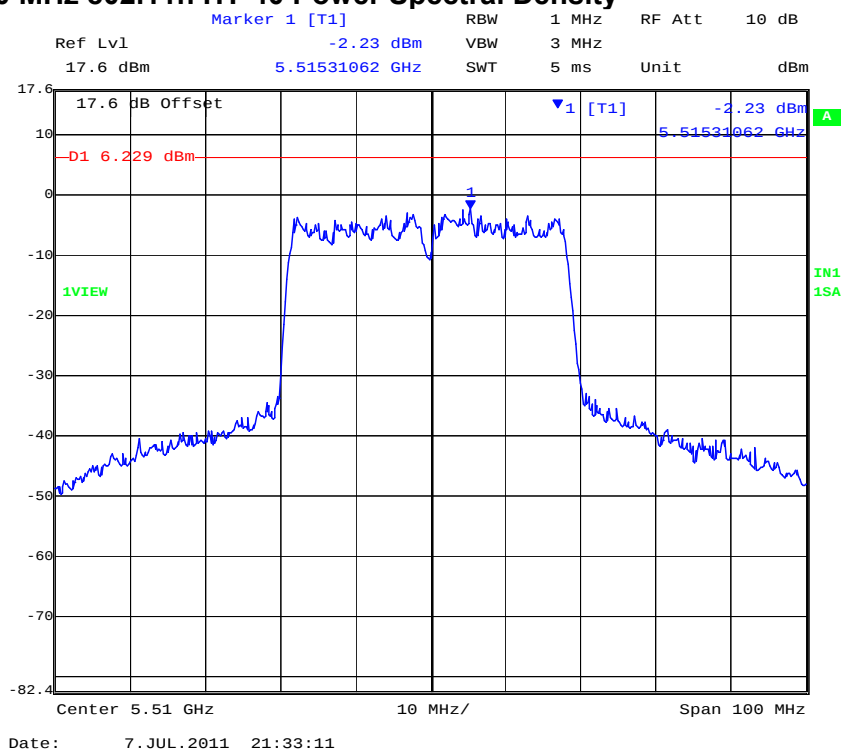
Measurement uncertainty:	±1.33 dB
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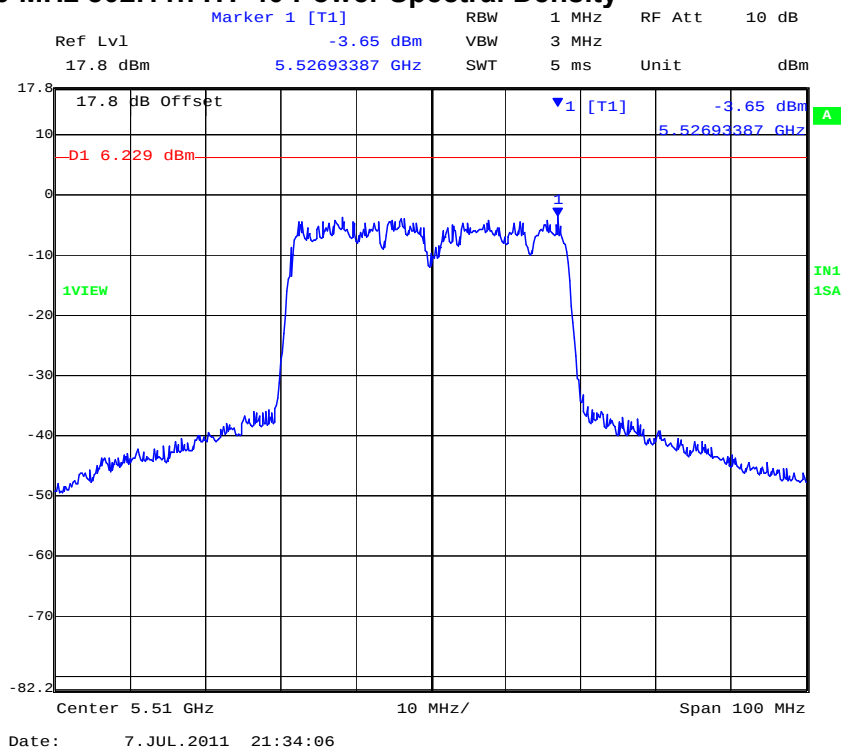


Title: Fluke Networks Sensor4 Wireless Client
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PORT A 5,510 MHz 802.11n HT-40 Power Spectral Density



PORT B 5,510 MHz 802.11n HT-40 Power Spectral Density

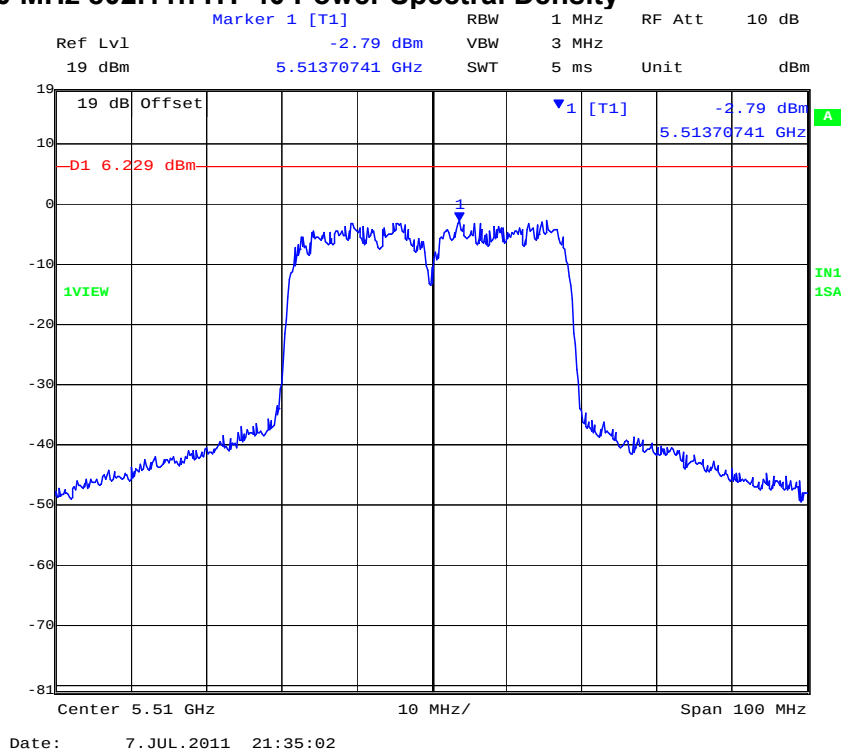


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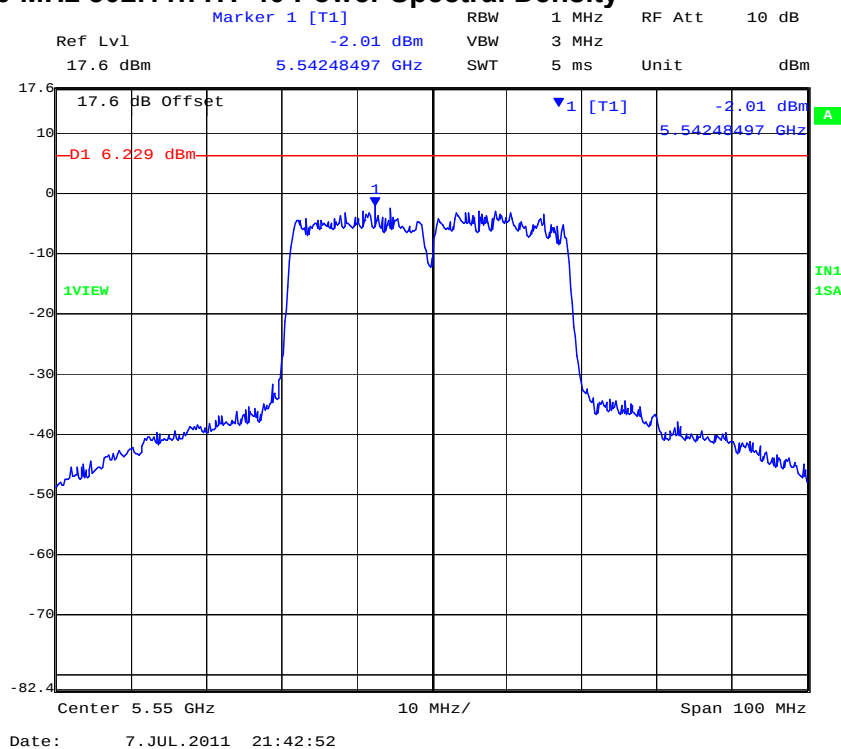


Title: Fluke Networks Sensor4 Wireless Client
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PORT C 5,510 MHz 802.11n HT-40 Power Spectral Density



PORT A 5,500 MHz 802.11n HT-40 Power Spectral Density

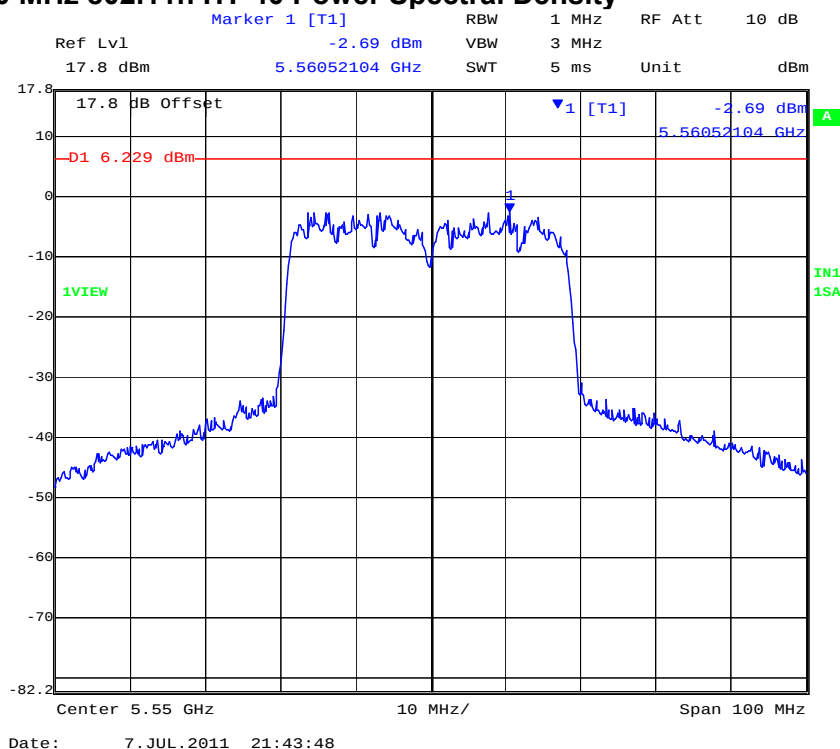


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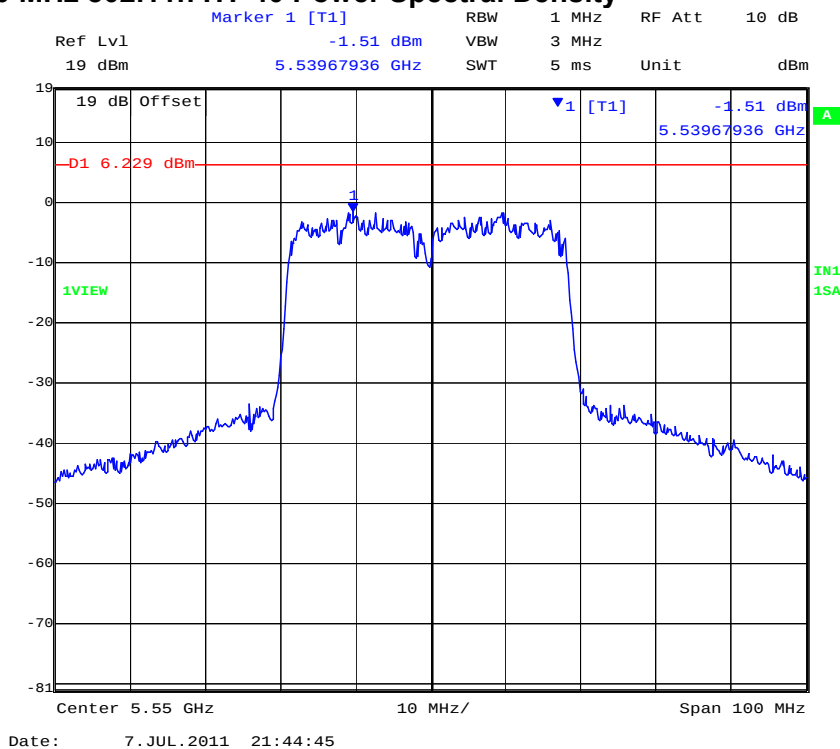


Title: Fluke Networks Sensor4 Wireless Client
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PORT B 5,550 MHz 802.11n HT-40 Power Spectral Density



PORT C 5,550 MHz 802.11n HT-40 Power Spectral Density

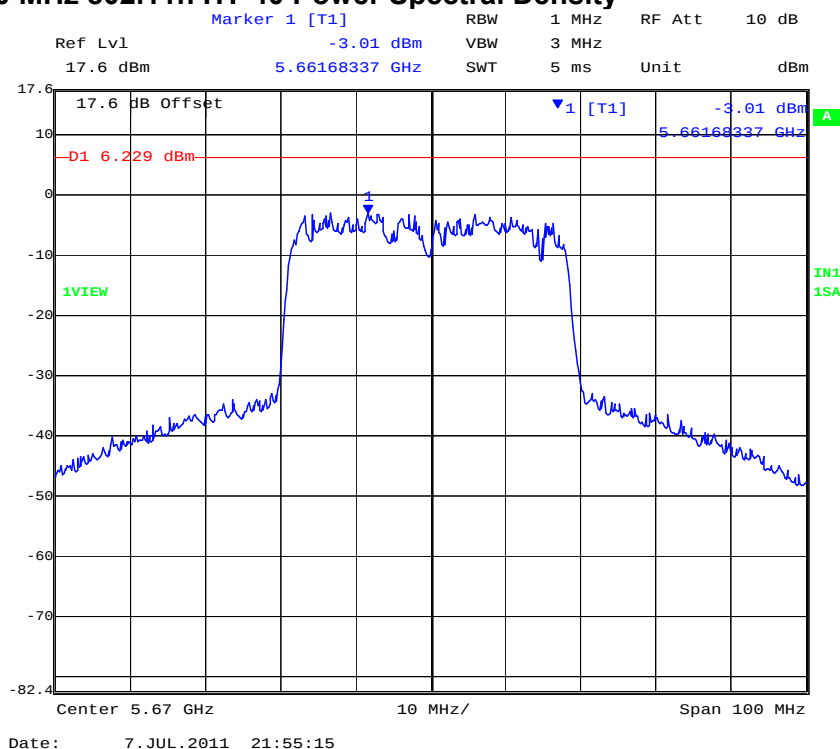


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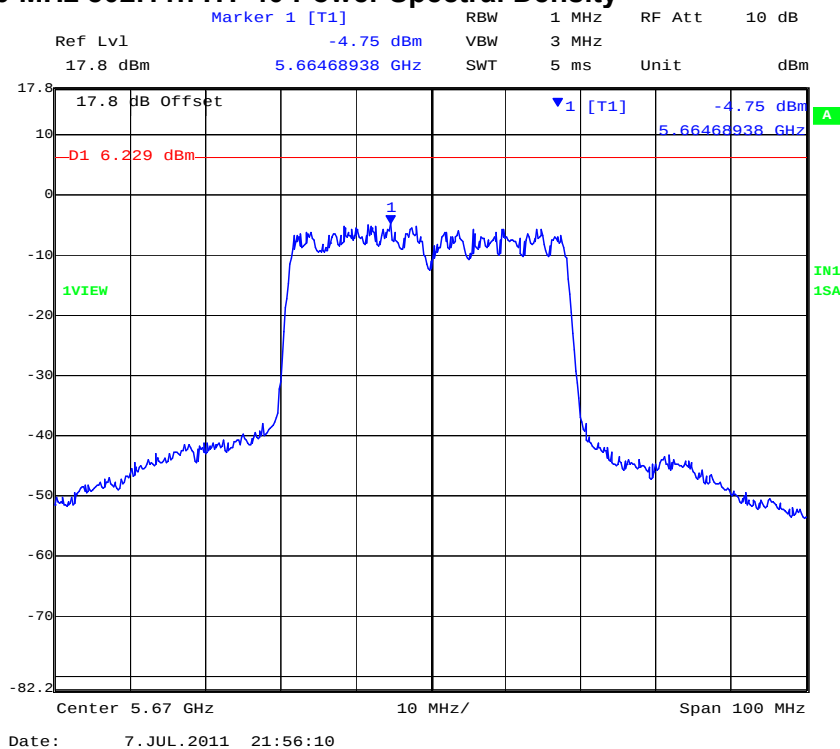


Title: Fluke Networks Sensor4 Wireless Client
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PORT A 5,690 MHz 802.11n HT-40 Power Spectral Density



PORT B 5,690 MHz 802.11n HT-40 Power Spectral Density

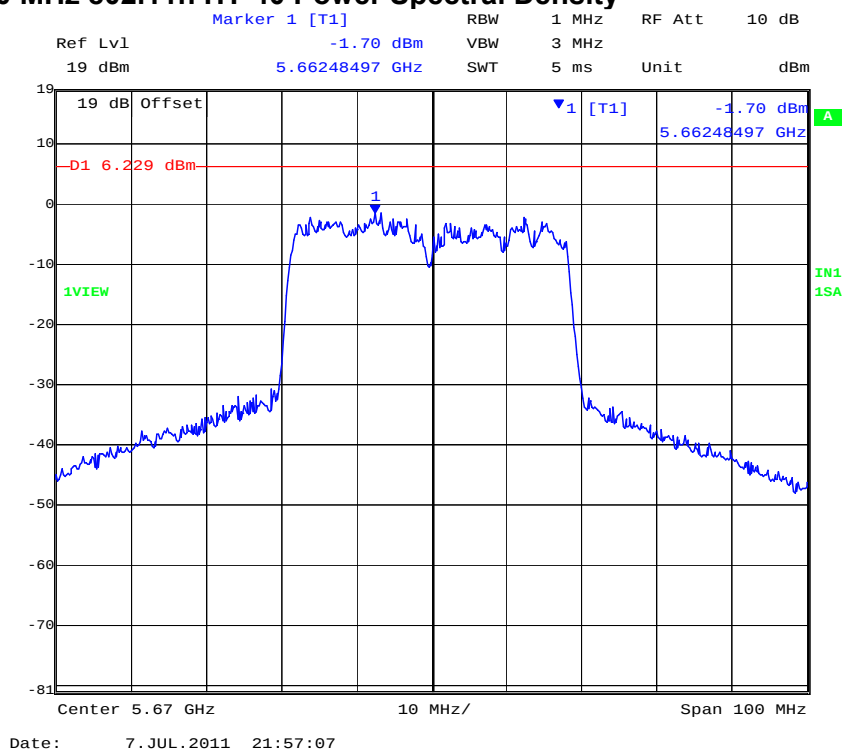


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Title: Fluke Networks Sensor4 Wireless Client
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PORT C 5,690 MHz 802.11n HT-40 Power Spectral Density



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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
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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

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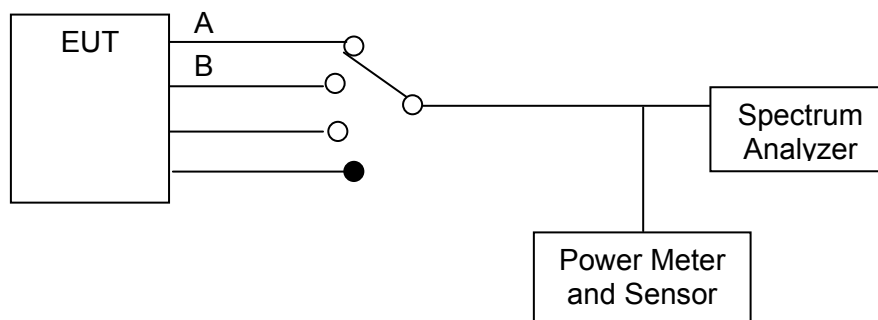
5.1.4. Peak Excursion Ratio

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



Title: Fluke Networks Sensor4 Wireless Client
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TABLE OF RESULTS – 802.11a Legacy 5150 – 5250 MHz

Test Conditions:	15.407 (a)	Rel. Humidity (%):	35	to	42
Variant:	802.11 a	Ambient Temp. (°C):	19	to	22
TPC:	HIGH	Pressure (mBars):	998	to	1003
Modulation:	ON	Duty Cycle (%):	100		
Beam Forming Gain (Y):	N/A dB	Antenna Gain:	2 dBi		
Applied Voltage:	48.0 Vdc				
Notes 1:					
Notes 2:					

Test Frequency	Trace Δ Marker				Limit	Margin
	Port A	Port B	Port C	Port D		
MHz	dB	dB	dB	dB	dB	dB
5180	-11.15	-10.30	-11.67	--	-13.00	-1.33
5200	-11.23	-10.45	-12.26	--		-0.74
5240	-11.38	-10.74	-11.56	--		-1.44

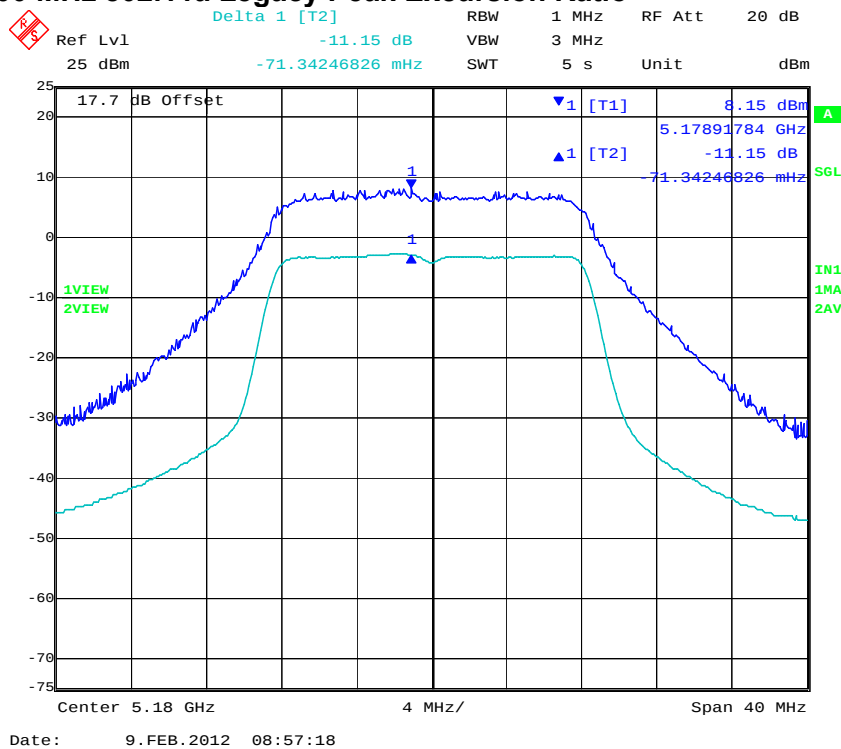
Measurement uncertainty:	±1.33 dB
---------------------------------	----------

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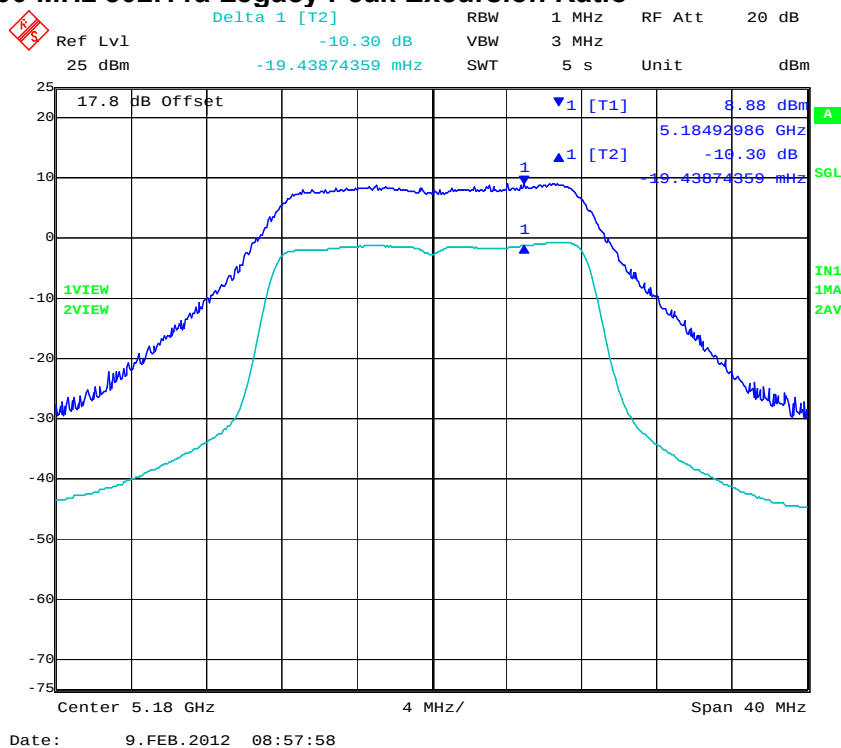


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PORT A 5,1800 MHz 802.11a Legacy Peak Excursion Ratio



PORT B 5,1800 MHz 802.11a Legacy Peak Excursion Ratio

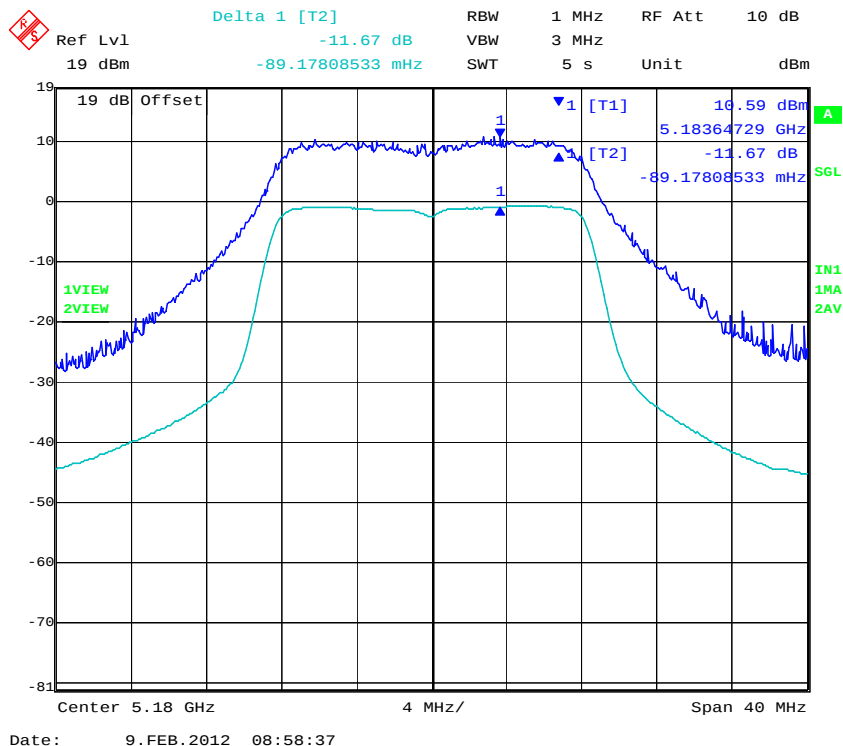


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PORT C 5,1800 MHz 802.11a Legacy Excursion Ratio

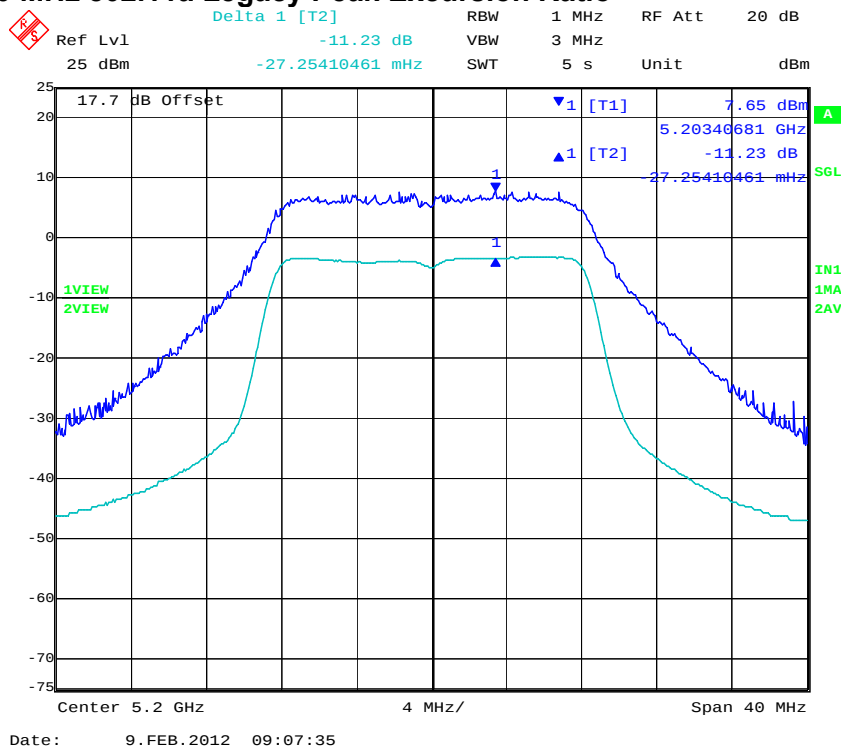


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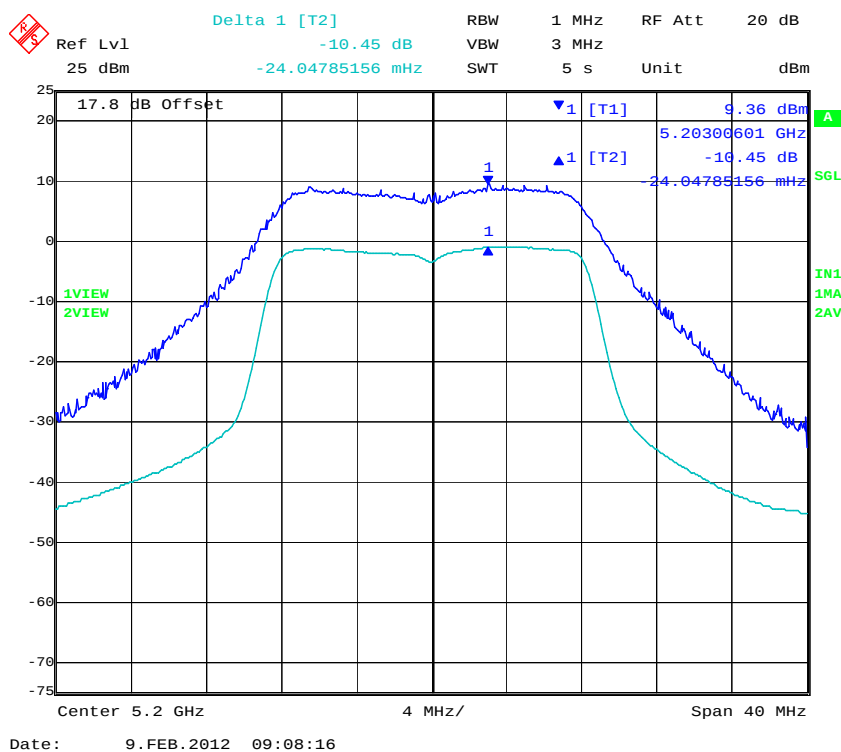


Title: Fluke Networks Sensor4 Wireless Client
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PORT A 5,200 MHz 802.11a Legacy Peak Excursion Ratio



PORT B 5,200 MHz 802.11a Legacy Peak Excursion Ratio

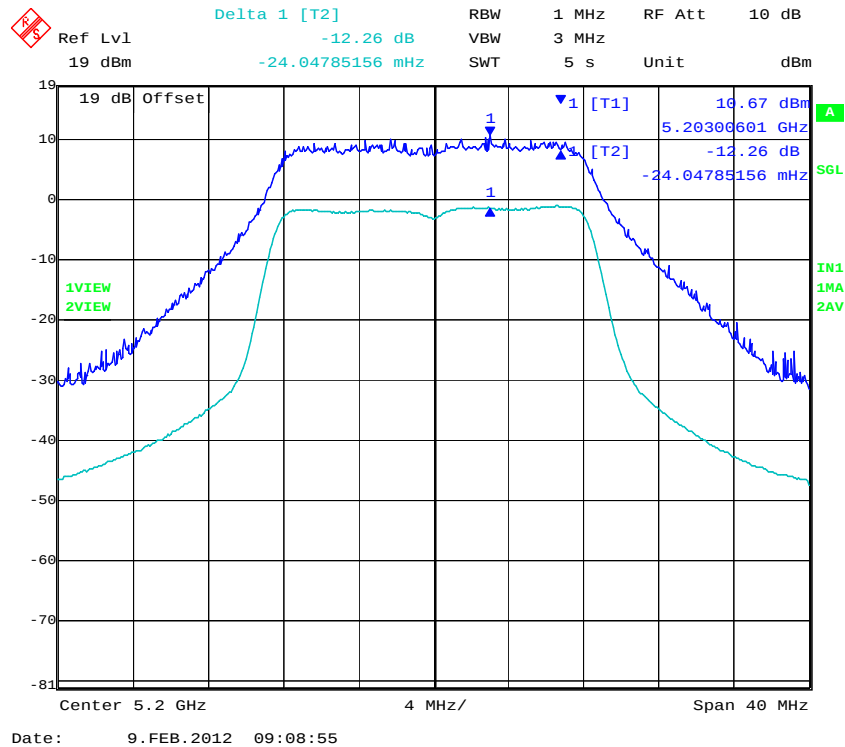


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To: FCC 47 CFR Part 15.407 & IC RSS-210
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PORT C 5,200 MHz 802.11a Legacy Peak Excursion Ratio

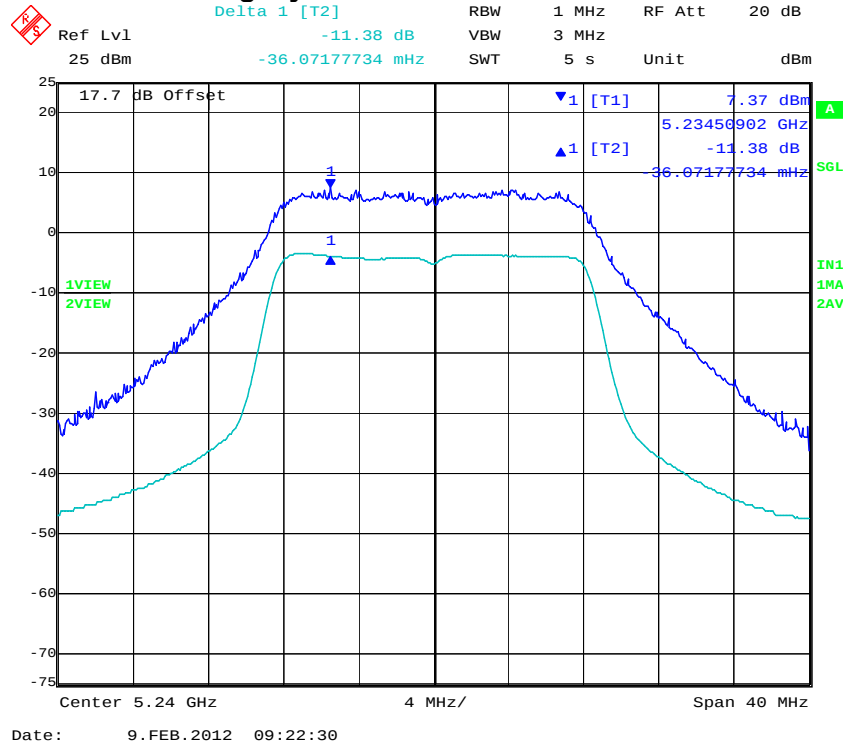


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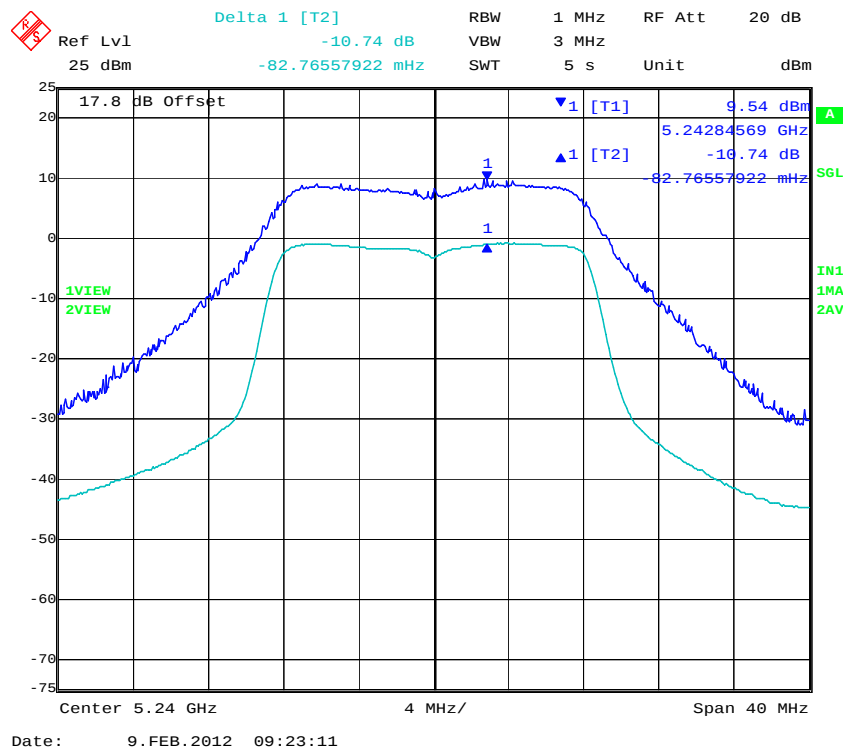


Title: Fluke Networks Sensor4 Wireless Client
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PORT A 5,240 MHz 802.11a Legacy Peak Excursion Ratio



PORT B 5,240 MHz 802.11a Legacy Peak Excursion Ratio

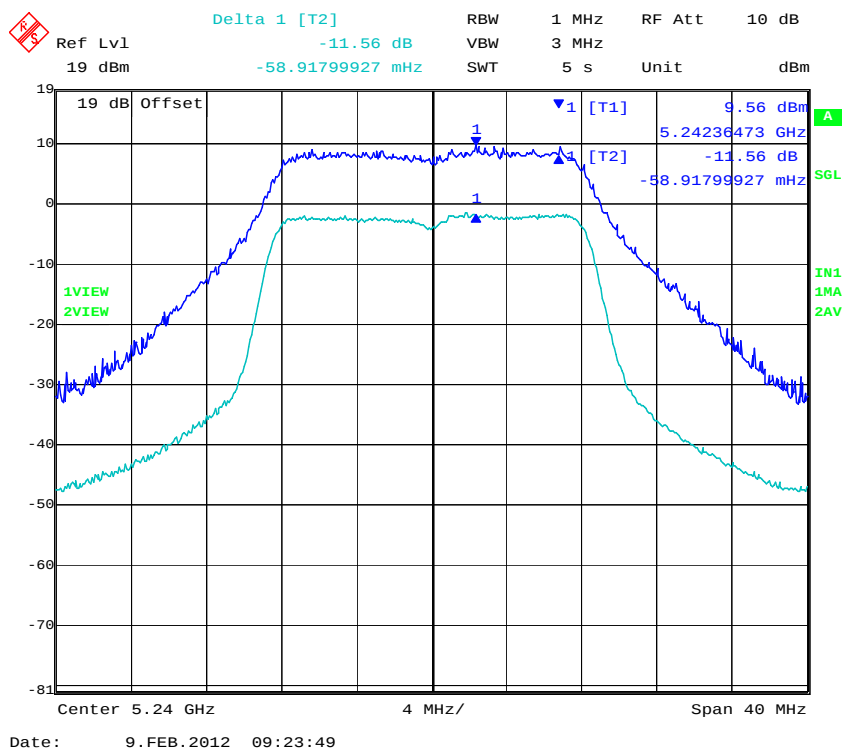


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PORT C 5,240 MHz 802.11a Legacy Peak Excursion Ratio



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TABLE OF RESULTS – 802.11n HT-20 5150 – 5250 MHz

Test Conditions:	15.407 (a)	Rel. Humidity (%):	35	to	42
Variant:	802.11 n HT-20	Ambient Temp. (°C):	19	to	22
TPC:	HIGH	Pressure (mBars):	998	to	1003
Modulation:	ON	Duty Cycle (%):	100		
Beam Forming Gain (Y):	N/A dB	Antenna Gain:	2 dBi		
Applied Voltage:	48.0 Vdc				
Notes 1:					
Notes 2:					

Test Frequency	Trace Δ Marker				Limit	Margin
	Port A	Port B	Port C	Port D		
MHz	dB	dB	dB	dB	dB	dB
5180	-10.74	-10.53	-11.12	--	-13.00	-1.88
5200	-10.89	-11.41	-11.12	--		-1.59
5240	-10.88	-10.69	-11.25	--		-1.75

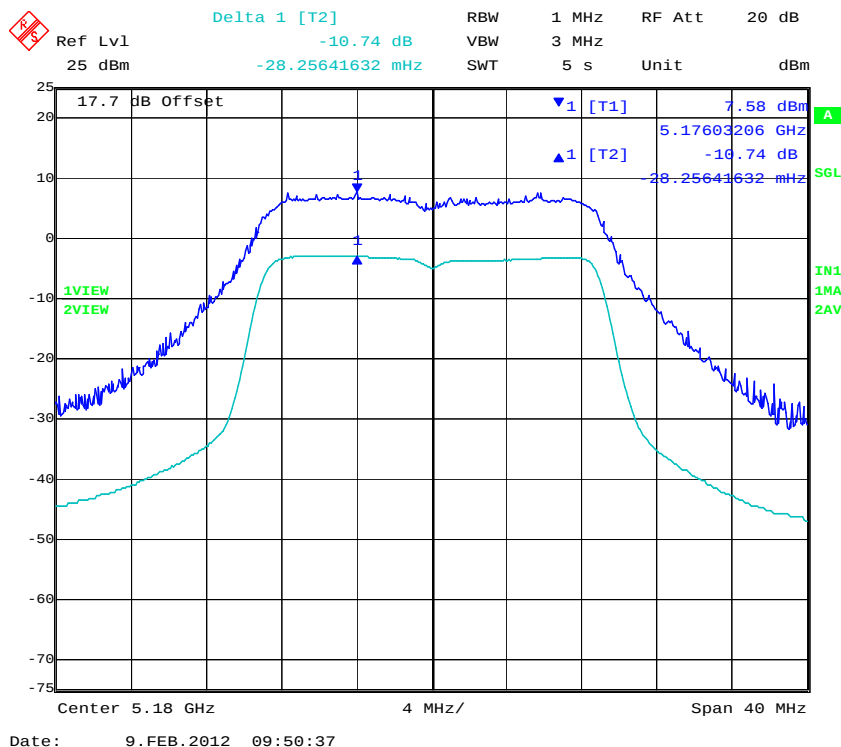
Measurement uncertainty:	±1.33 dB
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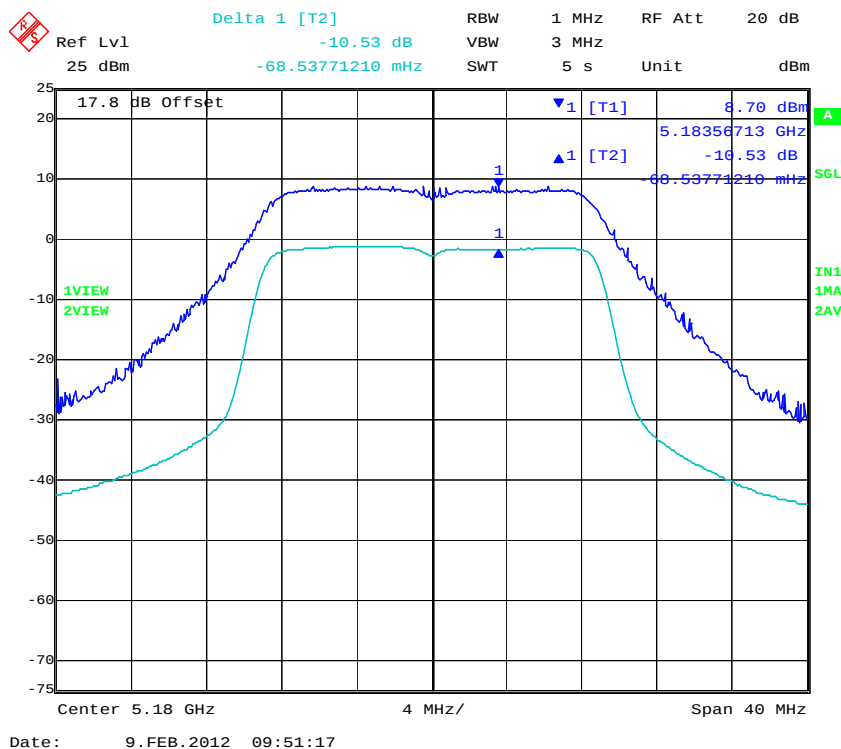


Title: Fluke Networks Sensor4 Wireless Client
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PORT A 5,1800 MHz 802.11n HT-20 Peak Excursion Ratio



PORT B 5,1800 MHz 802.11n HT-20 Peak Excursion Ratio

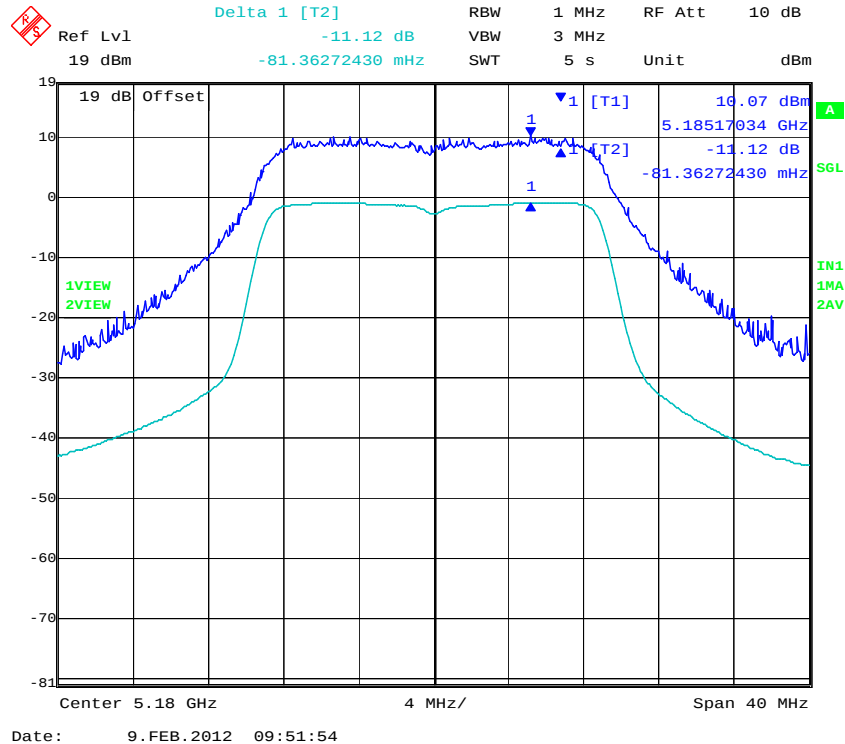


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PORT C 5,1800 MHz 802.11n HT-20 Peak Excursion Ratio

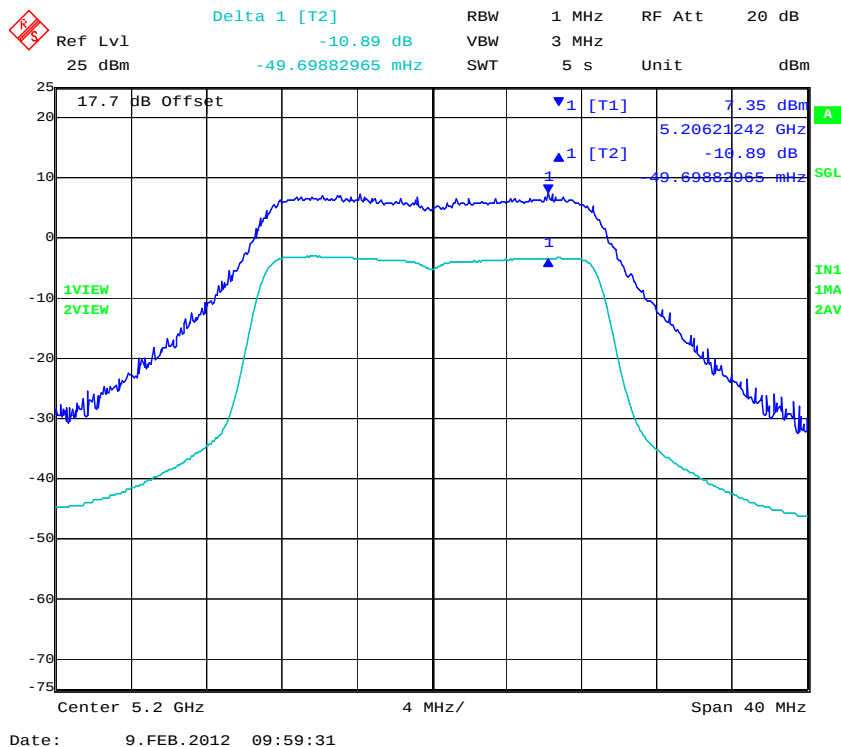


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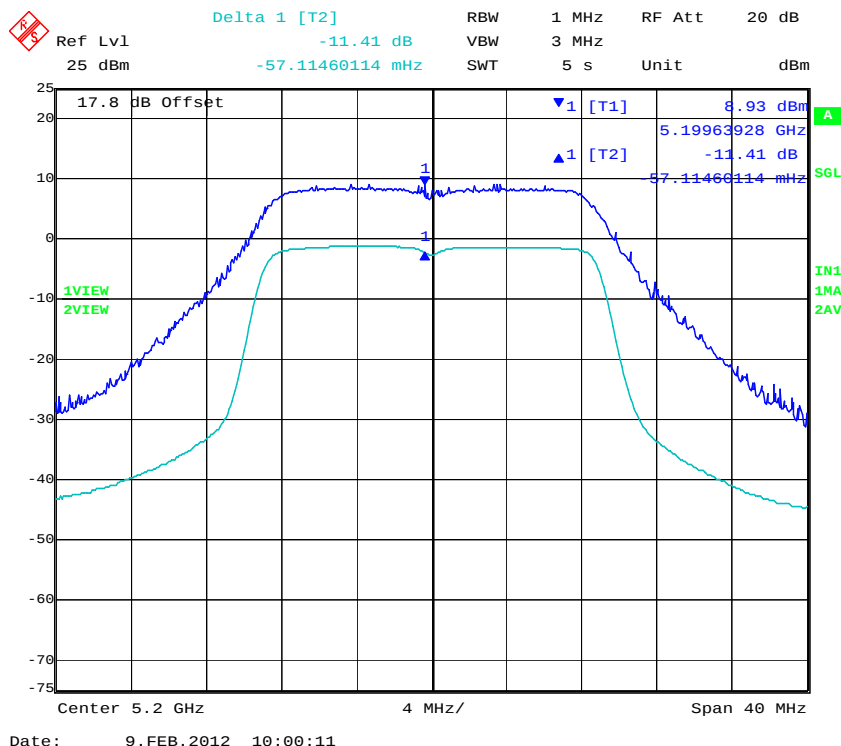


Title: Fluke Networks Sensor4 Wireless Client
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PORT A 5,200 MHz 802.11n HT-20 Peak Excursion Ratio



PORT B 5,200 MHz 802.11n HT-20 Peak Excursion Ratio

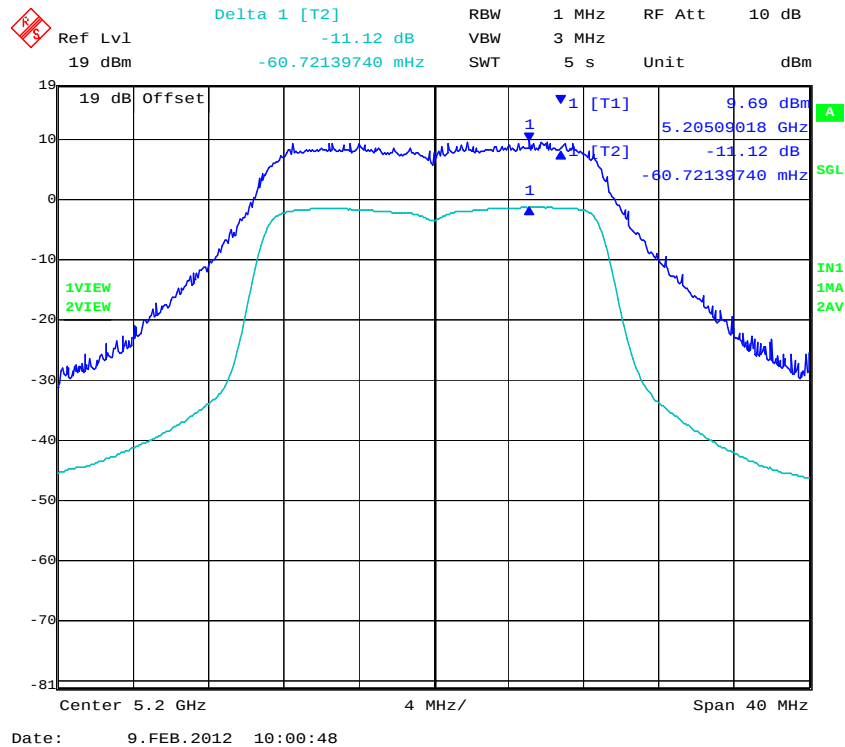


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PORT C 5,200 MHz 802.11n HT-20 Peak Excursion Ratio

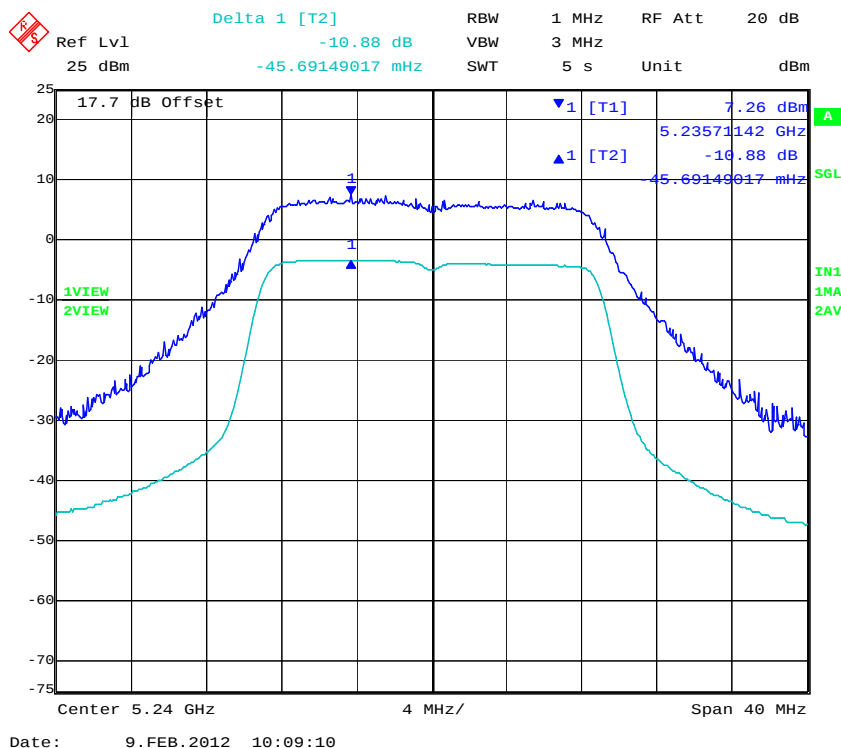


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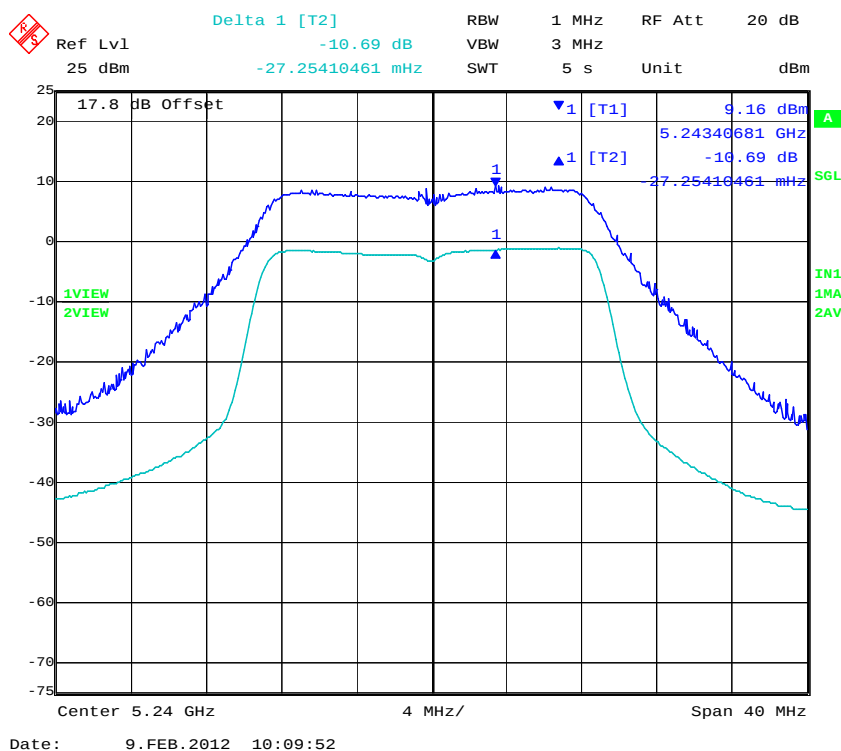


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PORT A 5,240 MHz 802.11n HT-20 Peak Excursion Ratio



PORT B 5,240 MHz 802.11n HT-20 Peak Excursion Ratio

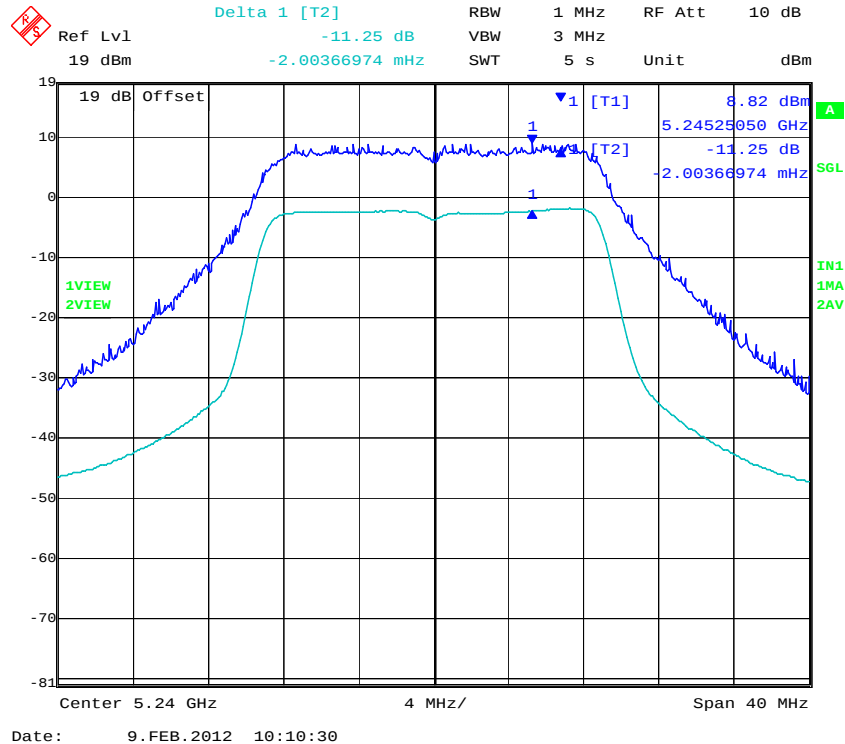


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PORT C 5,240 MHz 802.11n HT-20 Peak Excursion Ratio



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TABLE OF RESULTS – 802.11n HT-40 5150 – 5250 MHz

Test Conditions:	15.407 (a)	Rel. Humidity (%):	35	to	42
Variant:	802.11 n HT-40	Ambient Temp. (°C):	19	to	22
TPC:	HIGH	Pressure (mBars):	998	to	1003
Modulation:	ON	Duty Cycle (%):	100		
Beam Forming Gain (Y):	N/A dB	Antenna Gain:	2 dBi		
Applied Voltage:	48.0 Vdc				
Notes 1:					
Notes 2:					

Test Frequency	Trace Δ Marker				Limit	Margin
	Port A	Port B	Port C	Port D		
MHz	dB	dB	dB	dB	dB	dB
5190	-11.13	-10.11	-11.61	--	-13.00	-1.39
5230	-11.28	-10.58	-11.69	--		-1.31

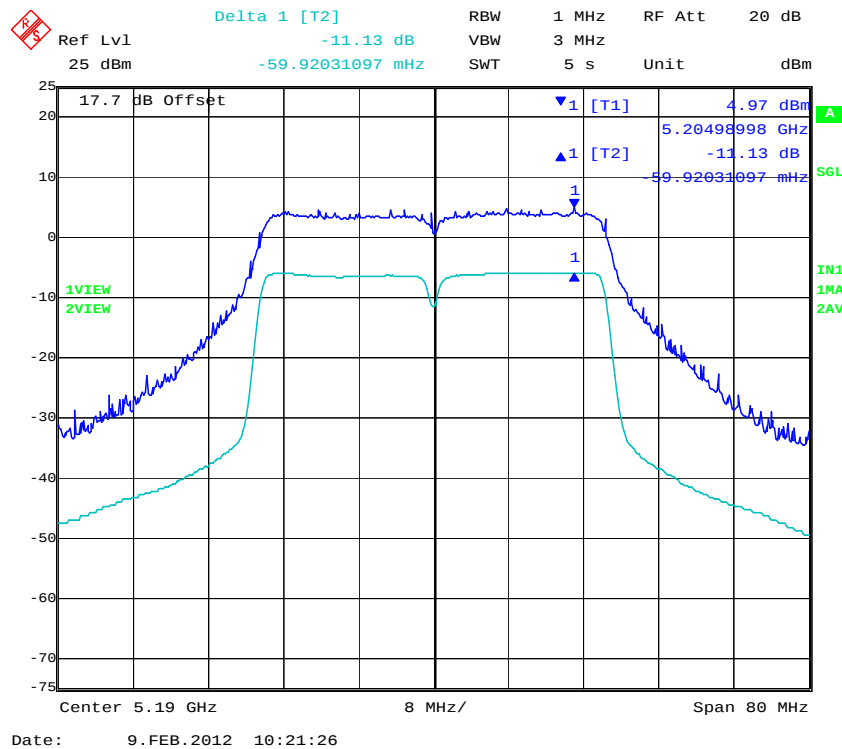
Measurement uncertainty:	±1.33 dB
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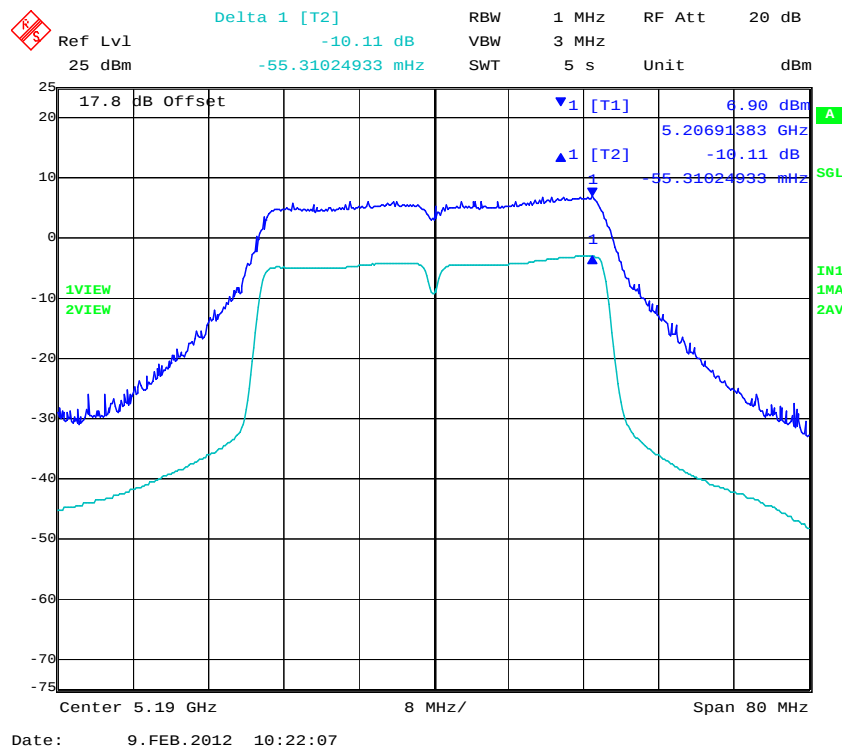


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PORT A 5,190 MHz 802.11n HT-40 Peak Excursion Ratio



PORT B 5,190 MHz 802.11n HT-40 Peak Excursion Ratio

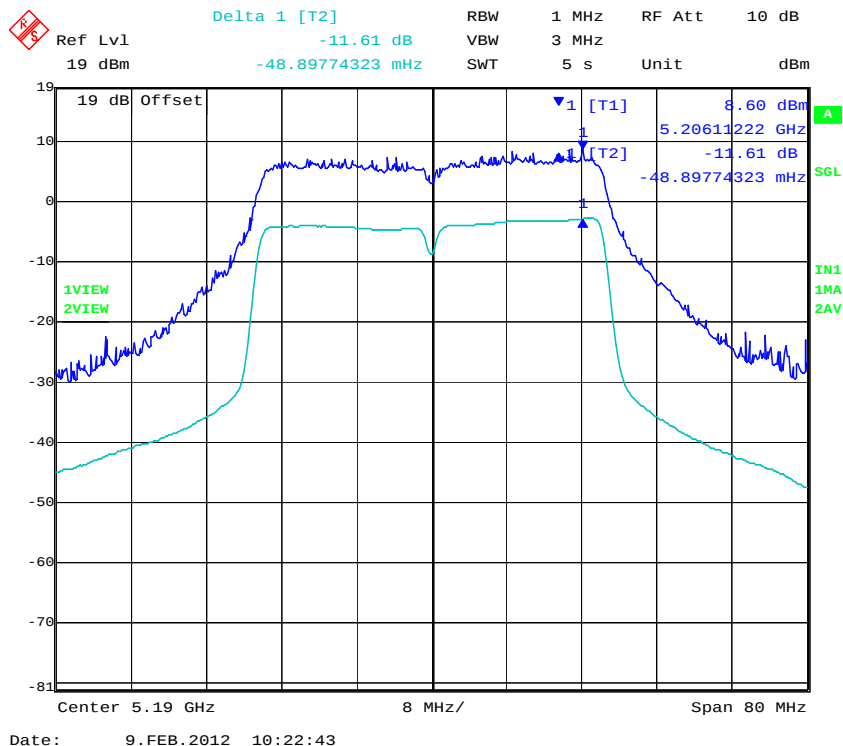


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PORT C 5,190 MHz 802.11n HT-40 Peak Excursion Ratio

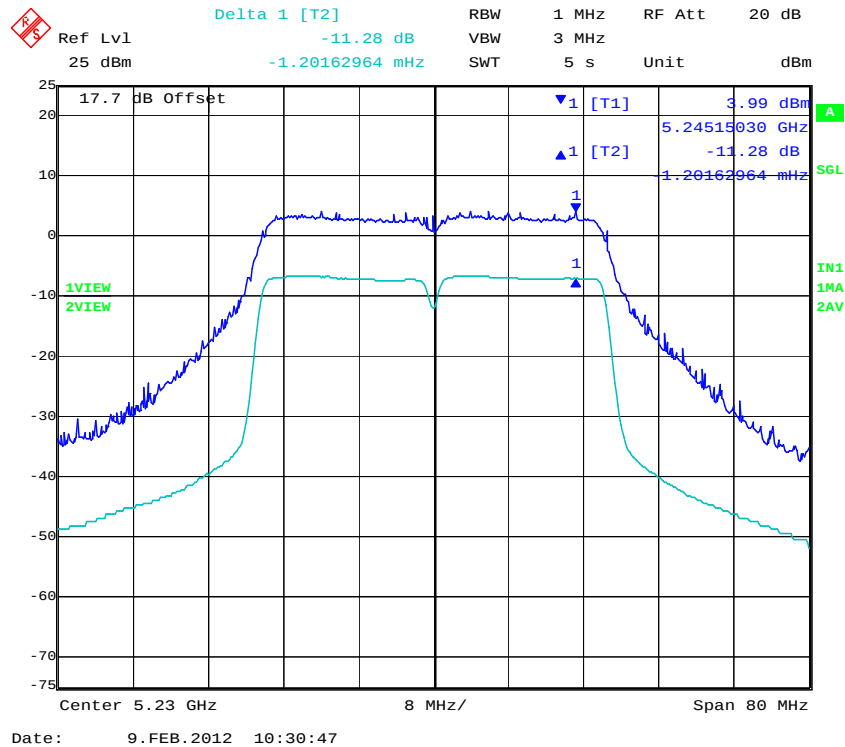


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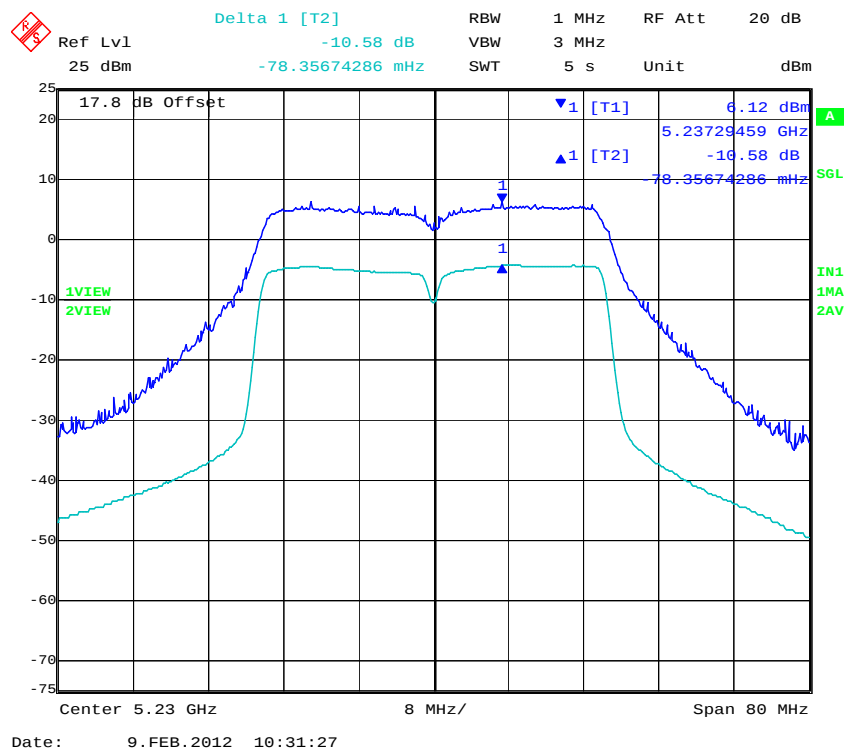


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PORT A 5,230 MHz 802.11n HT-40 Peak Excursion Ratio



PORT B 5,230 MHz 802.11n HT-40 Peak Excursion Ratio

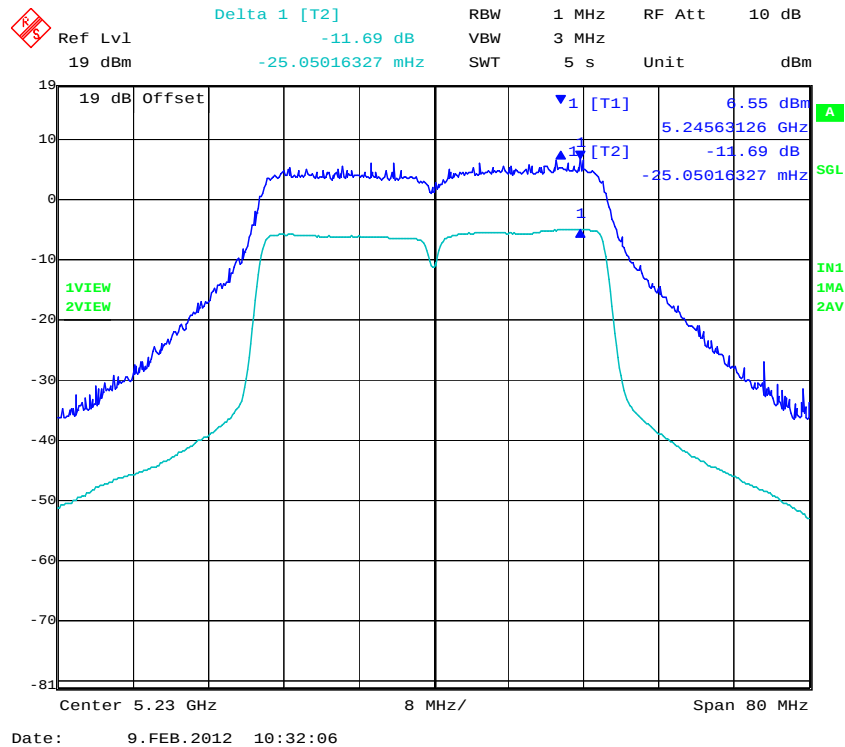


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PORT C 5,230 MHz 802.11n HT-40 Peak Excursion Ratio



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TABLE OF RESULTS – 802.11a Legacy 5250 -5350 MHz

Test Conditions:	15.407 (a)	Rel. Humidity (%):	35	to	42
Variant:	802.11 a	Ambient Temp. (°C):	19	to	22
TPC:	HIGH	Pressure (mBars):	998	to	1003
Modulation:	ON	Duty Cycle (%):	100		
Beam Forming Gain (Y):	N/A dB	Antenna Gain:	2 dBi		
Applied Voltage:	48.0 Vdc				
Notes 1:					
Notes 2:					

Test Frequency	Trace Δ Marker				Limit	Margin
	Port A	Port B	Port C	Port D		
MHz	dB	dB	dB	dB	dB	dB
5260	-11.29	-10.56	-11.50	--	-13.00	-1.50
5300	-11.25	-10.53	-11.02	--		-1.75
5320	-11.18	-10.74	-12.29	--		-0.71

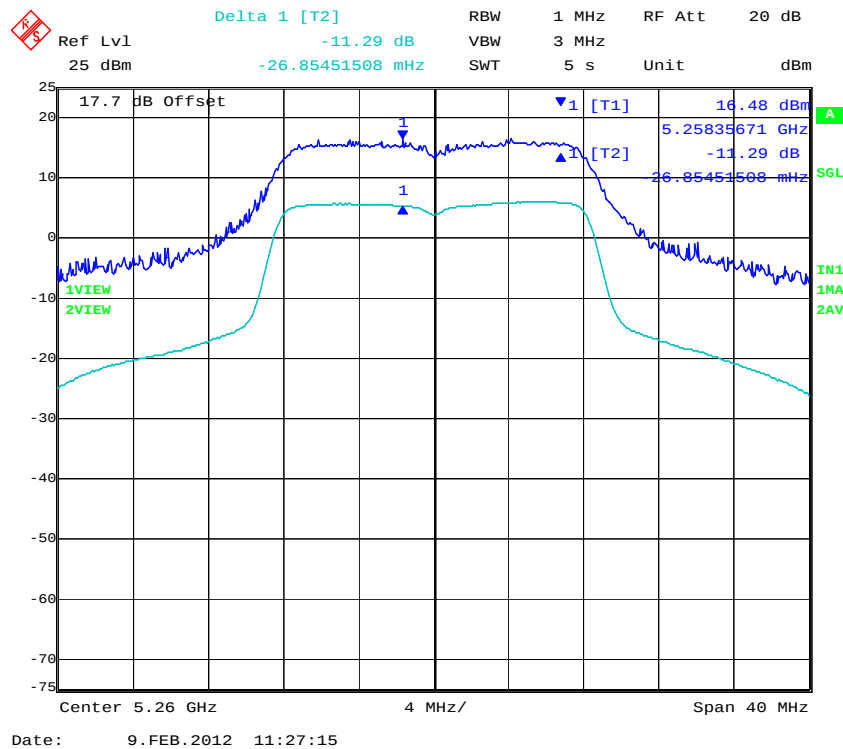
Measurement uncertainty:	±1.33 dB
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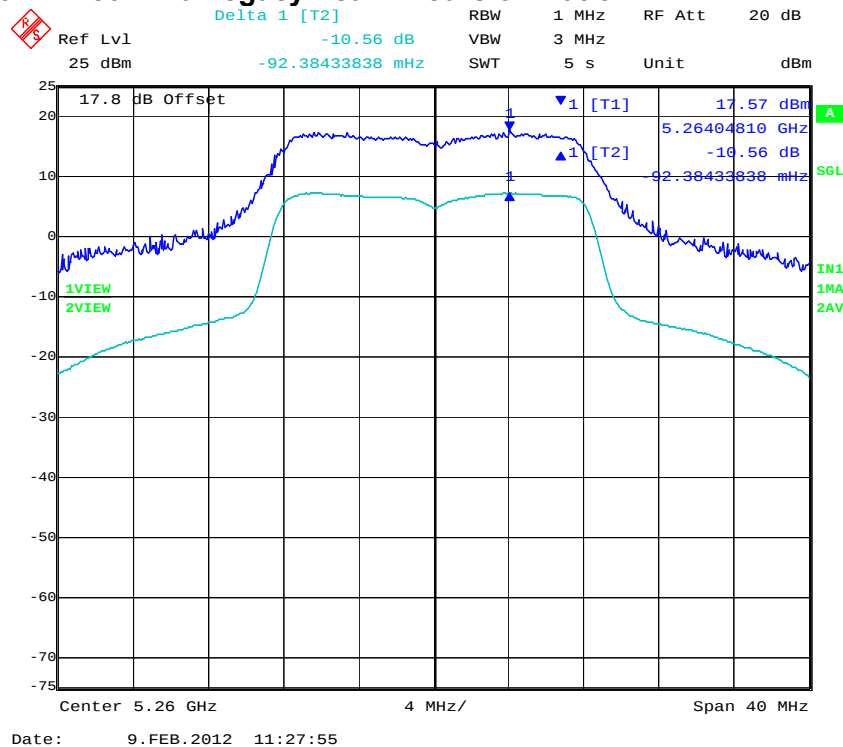


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PORT A 5,260 MHz 802.11a Legacy Peak Excursion Ratio



PORT B 5,260 MHz 802.11a Legacy Peak Excursion Ratio

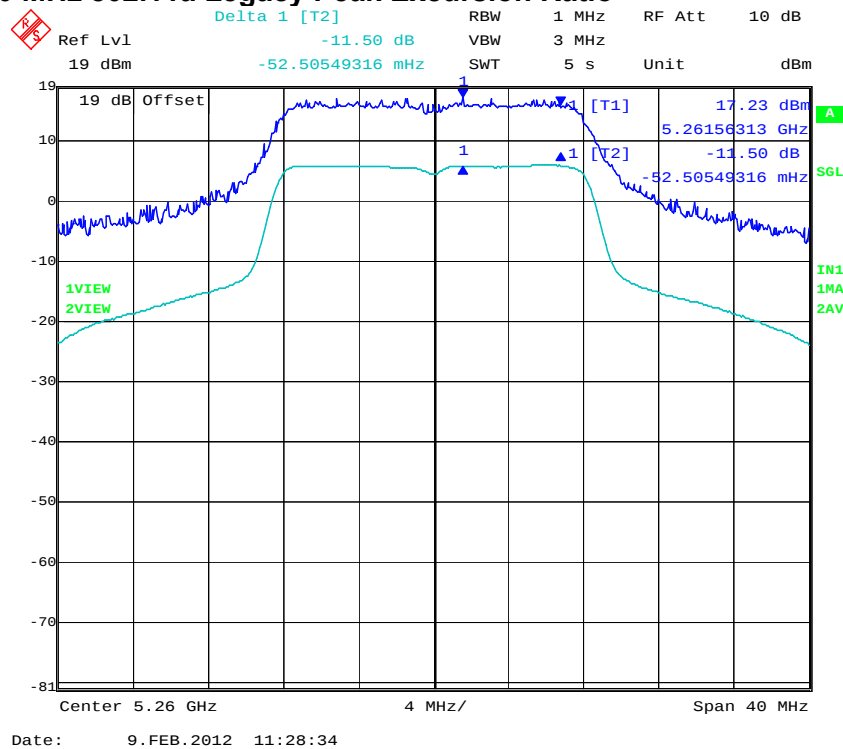


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PORT C 5,260 MHz 802.11a Legacy Peak Excursion Ratio

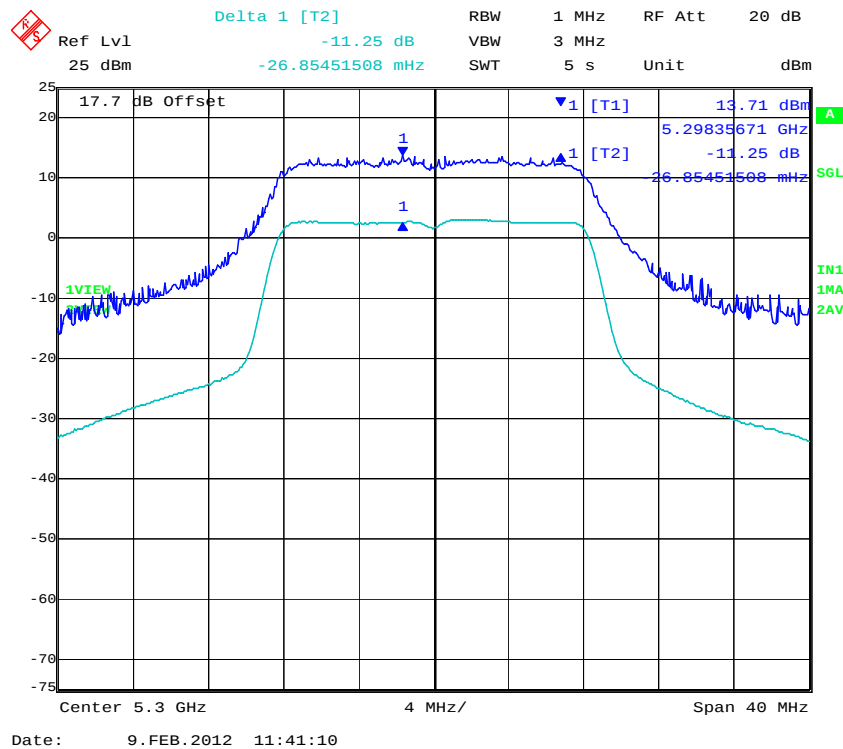


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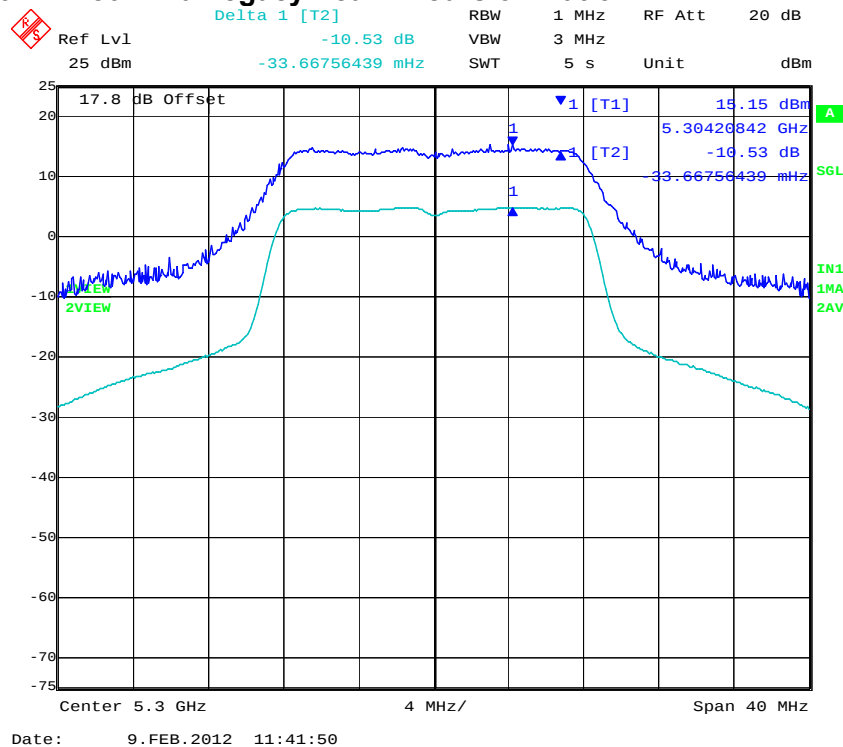


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PORT A 5300 MHz 802.11a Legacy Peak Excursion Ratio



PORT B 5,300 MHz 802.11a Legacy Peak Excursion Ratio

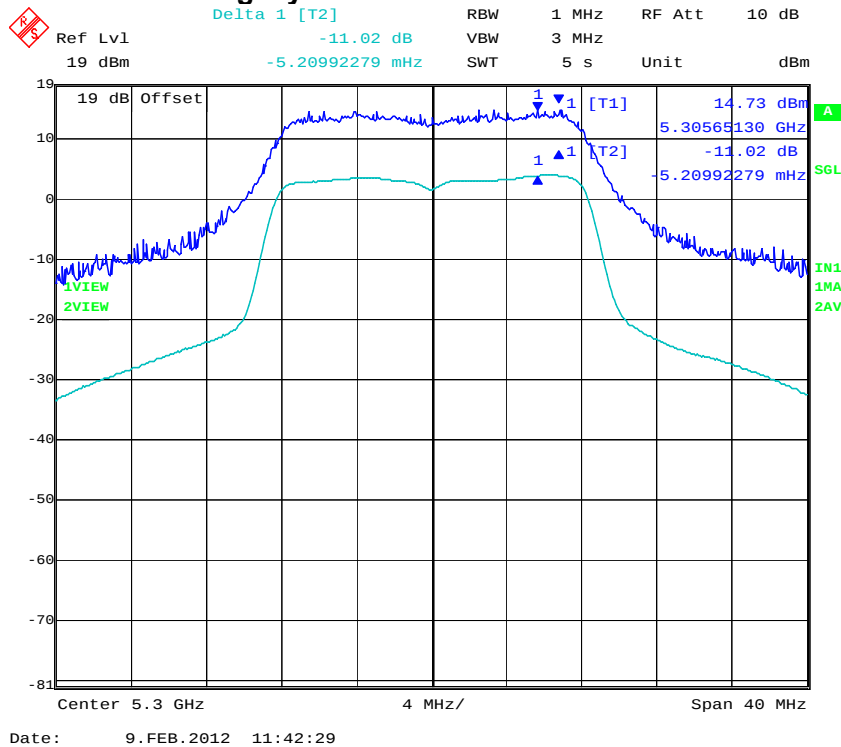


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PORT C 5,300 MHz 802.11a Legacy Peak Excursion Ratio

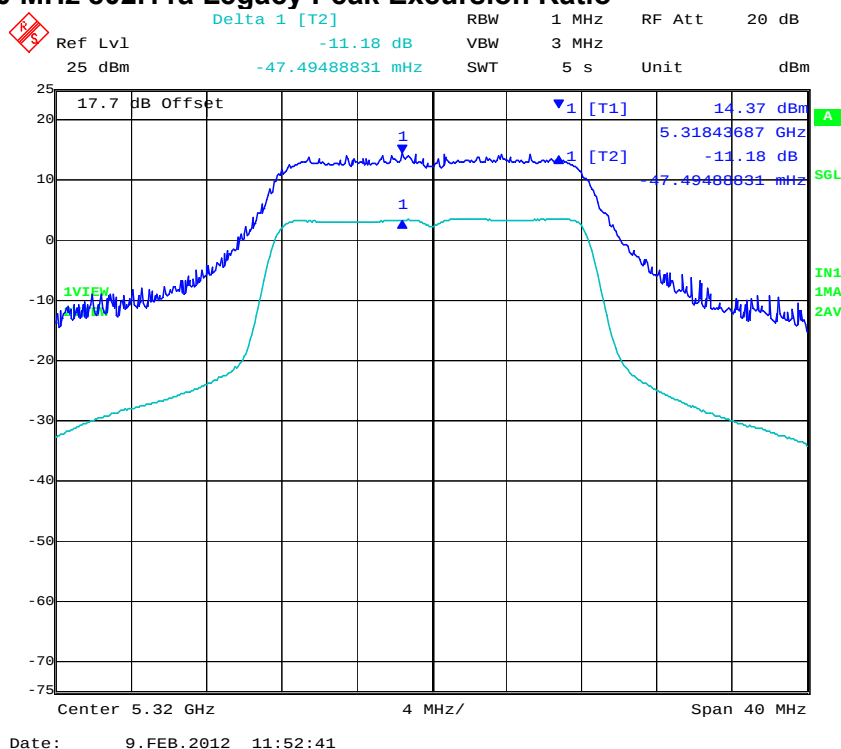


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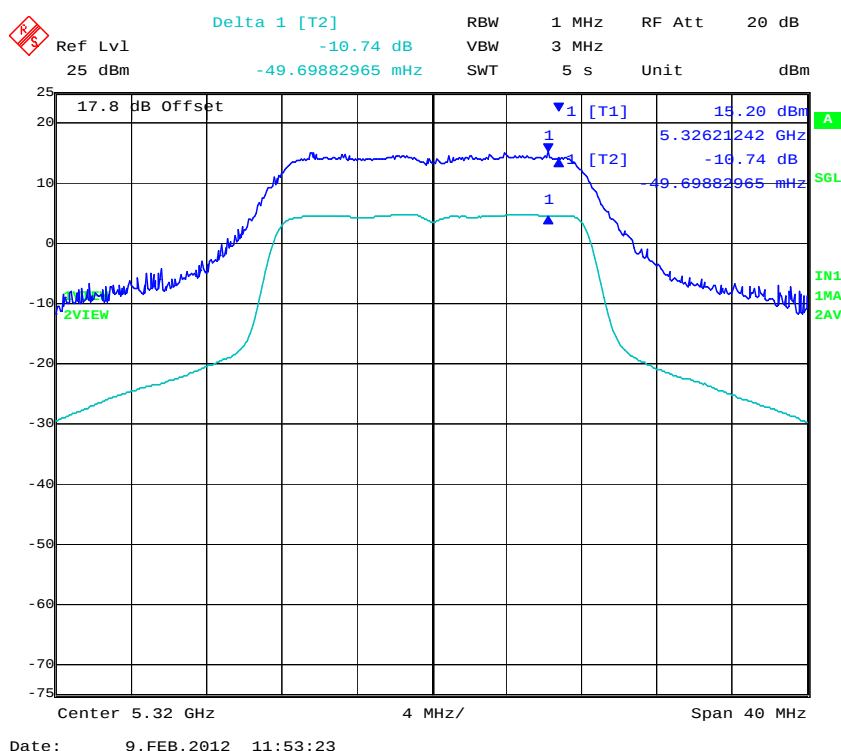


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PORT A 5,320 MHz 802.11a Legacy Peak Excursion Ratio



PORT B 5,320 MHz 802.11a Legacy Peak Excursion Ratio



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