Test of Polycom Spectralink 8440 Wi-Fi handset with Bluetooth

To: FCC 47 CFR Part 15, SubPart E 15.407 & RSS-210 Annex 9

Test Report Serial No.: POLY06-U12 Rev A

TEST REPORT

From

Test of: Polycom Spectralink 8440 Wi-Fi handset with Bluetooth

To: FCC 47 CFR Part 15, SubPart E 15.407 & RSS-210 Annex 9

Test Report Serial No.: POLY06-U12 Rev A

Reference Test Report: POLY06-U18, POLY06-U7a, POLY06-U7b

This report supersedes: None

Applicant:	Polycom 4750 Willow Road Pleasanton, CA 94588-2708 USA
Product Function:	Wi-Fi handset with Bluetooth
Copy No: pdf	**Issue Date:** 28th February 2011

This Test Report is Issued Under the Authority of;

MiCOM Labs, Inc.
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ACCREDITED
TESTING CERTIFICATE #2381.01

MiCOM Labs is an ISO 17025 Accredited Testing Laboratory

TABLE OF CONTENTS

1 ACCREDITATION, LISTINGS & RECOGNITION

1.1 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

1.2 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
Japan	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

1.3 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.

United States of America – Telecommunication Certification Body

TCB Identifier – US0159

Industry Canada – Certification Body

CAB Identifier – US0159

Europe – Notified Body

Notified Body Identifier - 2280

2 DOCUMENT HISTORY

Document History		
Revision	**Date**	**Comments**
Draft		
Rev A	28th February 2010	Initial release

3 TEST RESULT CERTIFICATE

Applicant:	Polycom 4750 Willow Road Pleasanton California , 94588-2708, USA	Tested By:	MiCOM Labs, Inc. 440 Boulder Court Suite 200 Pleasanton California, 94566, USA
Product:	Spectralink 8400 series Wi-Fi handsets with Bluetooth	Telephone:	+1 925 462 0304
Model No.:	Spectralink 8440	Fax:	+1 925 462 0306
S/No's:	600826511 (radiated) 600840963 (radiated) 600830461 (conducted)		
Date(s) Tested:	Dec 21st - Jan 19th, 2011	Website:	www.micomlabs.com

STANDARD(S)	TEST RESULTS
FCC 47 CFR Part 15, SubPart E 15.407 & RSS-210 Annex 9	EQUIPMENT COMPLIES

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

Notes:

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

ACCREDITED
TESTING CERTIFICATE #2381.01

Approved & Released for MiCOM Labs, Inc. by:

Graeme Grieve
Quality Manager MiCOM Labs, Inc.

Gordon Hurst
President & CEO MiCOM Labs, Inc.

4 REFERENCES AND MEASUREMENT UNCERTAINTY

4.1 Normative References

Ref.	Publication	Year	Title
i.	FCC 47 CFR Part 15, SubPart C 15.247	2010	Title 47: Telecommunication PART 15—RADIO FREQUENCY DEVICES Subpart C—Intentional Radiators
ii.	FCC 47 CFR Part 15 SubPart E 15.407	2010	Title 47: Telecommunication PART 15—RADIO FREQUENCY DEVICES Subpart E—Unlicensed National Information Infrastructure Devices
iii.	RSS-210 Annex 9	2010	Radio Standards Specification 210, Issue 8, Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment,
iv.	RSS-GEN	2010	Radio Standards Specification-Gen, Issue 3, General Requirements and Information for the Certification of Radiocommunication Equipment,
v.	47 CFR Part 15, SubPart B	2010	47 CFR Part 15, SubPart B; Unintentional Radiators
vi.	ICES-003	2004	Spectrum Management and Telecommunications Policy Interference-Causing Equipment Standard Digital Apparatus; Issue 4
vii.	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
viii.	CISPR 22/ EN 55022	2008 2006+A1:2007	Limits and Methods of Measurements of Radio Disturbance Characteristics of Information Technology Equipment
ix.	M 3003	Edition 1 Dec. 1997	Expression of Uncertainty and Confidence in Measurements
x.	LAB34	Edition 1 Aug 2002	The expression of uncertainty in EMC Testing
xi.	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
xii.	A2LA	9th June 2010	Reference to A2LA Accreditation Status – A2LA Advertising Policy

4.2 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.

5 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
FCC §15.407(a)(1)(2) **RSS-210 §A9.2(2)** **RSS-Gen §4.4**	26dB and 99% Emission BW	Emission bandwidth measurement	Conducted	Complies	7.1
FCC §15.407(a)(1)(2) **RSS-210 §A9.2(2)** **RSS-Gen §4.6**	Transmit Output Power	Power Measurement	Conducted	Complies	7.2
FCC §15.407(a)(6)	Peak Excursion Ratio	<13dB in any 1MHz bandwidth	Conducted	Complies	7.3
FCC §15.407(a)(1)(2) **RSS-210 §A9.2(1)(2)**	Peak Power Spectral Density	PPSD	Conducted	Complies	7.4
FCC §15.407(g) **RSS-Gen §7.2.6**	Frequency Stability	Limits: contained within band of operation at all times.	Applicant declaration	Complies	7.5
FCC §1.1310 **RSS-Gen §5.6**	Maximum Permissible Exposure	Exposure to radio frequency energy levels, Maximum Permissible Exposure (MPE)	Calculated	Complies	7.6

List of Measurements (continued)

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

Section(s)	Test Items	Description	Condition	Result	Test Report Section
FCC §15.407(b)(2) **FCC §15.205(a)** **FCC §15.209(a)** **RSS-210 §A9.3(2)** **RSS-Gen §4.7** **RSS-Gen §4.8** **RSS-Gen §6**	Radiated Emissions		Radiated		7.8
	Transmitter Radiated Spurious Emissions	Emissions above 1 GHz		Complies	7.8.1
	Radiated Band Edge	Band-edge results		Complies	7.8.2
	Padiated Peak Emissions	Peak Emissions results		Complies	7.8.3
	Receiver Radiated Spurious Emissions	Rx Emissions		Complies	7.8.4
	Radiated Spurious Emissions - Digital	Emissions below 1 GHz (30M-1 GHz)		Complies	N/A
FCC §15.407(b)(6) **FCC §15.207(a)** **RSS-Gen §7.2.4**	AC Wireline Conducted Emissions 150 kHz–30 MHz	Conducted Emissions	Conducted	Complies	7.9

List of Measurements (continued)

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)**.

Industry Canada RSS-210 §A9.3

Tests performed on Client Device without Radar Detection

Section	Test Items	Description	Condition	Result	Test Report Section
7.8.3	In-Service Monitoring	In-Service Monitoring for Channel Move Time, Channel Closing Transmission Time and Non-Occupancy Period	Conducted	Complies	7.7

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 6.11 Equipment Modifications highlights the equipment modifications that were required to bring the product into compliance with the above test matrix

Note 4: Complete Radiated Emissions – Digital Apparatus & AC Mains test results are presented in MiCOM Labs test report POLY06-U18.

Note 5: Radio's included within the Spectralink 8400 Series wireless handsets are declared identical by the manufacturer. EUT's were tested for RF output power. Unit and model (Model: 8440 S/N: 600830461) with highest output power was utilized for testing.

6 PRODUCT DETAILS AND TEST CONFIGURATIONS

6.1 Test Program Scope

The scope of the test program was to test the WiFi transmitter (802.11a/n) utilized in the Polycom Spectralink 8440 Wi-Fi handset with Bluetooth for compliance against FCC 47 CFR Part 15, SubPart E 15.407 & RSS-210 Annex 9.

Two Spectralink 8400 Series handsets (models 8440 and 8450) were tested during this test program. These products share the same RF circuitry. Conducted RF testing was performed only on the 8440 model. RF Conducted Emission results of 8440 model are presented in this report.

Applicant: Polycom **Product:** Spectralink 8440 Wi-Fi handset Front

Applicant: Polycom **Product:** Spectralink 8440 Wi-Fi handset Back

Applicant: Polycom **Product:** AC-DC Adapter/ Charger Model SA106B-05 for Spectralink 8400 series handsets

6.2 EUT Details

Detail	Description
Purpose:	Test of the Polycom Spectralink 8440 Wi-Fi handset with Bluetooth for compliance against FCC 47 CFR Part 15, SubPart E 15.407 & RSS-210 Annex 9
Applicant:	Polycom 4750 Willow Road Pleasanton, CA 94588-2708 USA
Manufacturer:	Same as Applicant
Test Laboratory:	MiCOM Labs, Inc. 440 Boulder Court, Suite 200 Pleasanton, California 94566 USA
Test report reference number:	POLY06-U12
Date EUT received:	11/11/2010
Dates of test (from - to):	12/21/2010 – 1/19/2011
No of Units Tested:	S/N: 600826511 (radiated) S/N: 600840963 (radiated) S/N: 600830461 (conducted)
Product Name:	Spectralink 8400 series Wi-Fi handset
Manufacturers Trade Name:	Polycom Spectralink 8400 series Wi-Fi handsets
Model No.:	Spectralink 8440 handset with Bluetooth
Equipment Primary Function:	Wi-Fi handset with Bluetooth
Equipment Secondary Function(s):	N/A
Type of Technology:	802.11 a/b/g/n and Bluetooth
Installation type:	Portable
Construction/Location for Use:	Indoor/Outdoor
Software/Firmware Release:	BootROM Mink Phoenix E6 FCC Test 14.
Rated Input Voltage and Current DC:	Nominal: 3.8V; Battery: 3.5V - 4.2V, Charger (USB or Base) supply: 5V +/- 10%
Operating Temperature Range ºC:	Min: 0 °C Max: 40 °C
Equipment Dimensions:	5.75” x 2.125” x 0.9”
Weight:	8 oz
Long Term Frequency Stability:	20 p.p.m.
Transmit/Receive Operation:	Full Duplex
Output Power Type	Fixed

6.3 External A.C. / D.C. Power Adaptor

Model	Description
SA106B-05	GCI Technologies switching adaptor: Input: 100 - 240V AC; 50-60 Hz; 0.25 Amp Output: 5V DC; 1 Amp

6.4 Operational Power Range

Fundamental Frequency (MHz)	Conducted RF Emissions Limit (dBm)	Max Test Utility Setting	Utility Setting Used During Test	Measured Output Power (dBm)	TX SPR: Utility Setting Used During Test	Band Edge: Utility Setting Used During Test	Compliant Test Utility Setting	Compliant Output Power (dBm)
802.11a	Preliminary Conditions		Conducted RF Emissions		Radiated RF Emissions		Final Results	
5180	15.46	24	14	14.69	24	14	14	14.69
5200	15.46	24	14	14.63	24		14	14.63
5240	15.46	24	14	14.72	24		14	14.72
802.11n HT-20	Preliminary Conditions		Conducted RF Emissions		Radiated RF Emissions		Final Results	
5180	15.46	24	14	14.81	24	14	14	14.81
5200	15.46	24	14	14.91	24		14	14.91
5240	15.46	24	14	14.75	24		14	14.75
802.11a	Preliminary Conditions		Conducted RF Emissions		Radiated RF Emissions		Final Results	
5260	22.46	24	16	15.38	24		16	15.38
5280	22.46	24	16	15.51	24		16	15.51
5320	22.46	24	16	15.39	24	16	16	15.39
802.11n HT-20	Preliminary Conditions		Conducted RF Emissions		Radiated RF Emissions		Final Results	
5260	22.46	24	16	15.27	24		16	15.27
5280	22.46	24	16	15.17	24		16	15.17
5320	22.46	24	16	15.36	24	16	16	15.36
802.11a	Preliminary Conditions		Conducted RF Emissions		Radiated RF Emissions		Final Results	
5500	22.46	24	16	16.04	24	16	16	16.04
5600	22.46	24	16	16.03	24		16	16.03
5700	22.46	24	16	16.42	24		16	16.42
802.11n HT-20	Preliminary Conditions		Conducted RF Emissions		Radiated RF Emissions		Final Results	
5500	22.46	24	16	15.93	24	16	16	15.93
5600	22.46	24	16	15.90	24		16	15.90
5700	22.46	24	16	16.30	24		16	16.30

6.5 Types of Modulation Supported

Modulation / Mode	BW 1
802.11a	OFDM
802.11n HT-20	OFDM

6.6 Antenna Details

The following is a description of the EUT antennas.

Antenna Type	Manufacturer	Model	Gain	Frequency Range
Plated antenna on PCB	Polycom	N/A	2.50 dBi	2400 - 2483.5 MHz
			5.51 dBi	5150 - 5850 MHz

6.7 Cabling and I/O Ports

The following is a description of the cable and input/ output ports available on the EUT.

Type of I/O Ports	Description	Screened (Y/N)	Length	Qty	Tested (Y/N)
Battery terminal	Battery connections for removable battery	N	N/A	1	N
1/8th" Stereo connector	Connection to hands free headset	Y	< 3 meters	1	Y
AC-DC Adapter/ Charger	Power connector - mini USB for charging using AC-DC Adapter/ Charger (model: SA106B-05)	Y	< 3 meters	1	Y
Charging terminals	Charging terminal for charging EUT with docking options	N	N/A	1	Y

6.8 EUT Configurations

Frequency bands:

Test Mode	Start Freq. (MHz)	Stop Freq. (MHz)	Rated Output Power (Watts)	Frequency Tolerence (p.p.m.)	20dB BW (MHz)	Emission Designator
802.11a	5180	5240	0.030	20	16.633	16M7D1D
802.11n HT-20	5180	5240	0.031	20	17.735	17M8D1D
802.11a	5260	5320	0.036	20	16.633	16M7D1D
802.11n HT-20	5260	5320	0.035	20	17.735	17M8D1D
802.11a	5500	5700	0.044	20	16.733	16M8D1D
802.11n HT-20	5500	5700	0.043	20	17.936	18M0D1D

Channel plan and spacing:

Band (GHz)	Mode	Freq Band (MHz)	Freq Range (MHz)	Low Ch	Mid Ch	High Ch	# Ch	Ch Spacing (MHz)
5.2	802.11a	5180-5240	5150-5250	5180	5200	5240	4	20
5.2	802.11n HT-20	5180-5240	5150-5250	5180	5200	5240	4	20
5.3	802.11a	5260-5320	5250-5350	5260	5280	5320	4	20
5.3	802.11n HT-20	5260-5320	5250-5350	5260	5280	5320	4	20
5.7	802.11a	5500-5700	5470-5725	5500	5580/5600	5700	11	20
5.7	802.11n HT-20	5500-5700	5470-5725	5500	5580/5600	5700	11	20

6.9 Equipment Details

The following is a description of supporting equipment used during the test program.

Equipment	Equipment Description	Manufacturer	Model No.	Serial No (s).	Tested
Battery	Alpha SAMPLE	Polycom	ESB-RS657+002	AC10103200B7	N
Battery	Alpha SAMPLE	Polycom	ESB-RS657+002	AC1010320232	Y
Battery	Alpha SAMPLE	Polycom	ESB-RS657+002	AC101032008E	Y
Battery	Alpha SAMPLE	Polycom	ESB-RS658+002	AD101032019C	N
Charging Dock	Alpha SAMPLE	Polycom	ESB-DCA39+001	AlphaB391741033	N
AC-DC Adapter	I.T.E. Power Supply	HON-KWANG	HK-U-120A050-CP	N/A	N
AC-DC Adapter/ Charger	Switching Adapter	GCi technologies	SA106B-05	N/A	Y
Speaker Dock	10uF @ U8 Pin4 to Ground Dock PCB Revision X4	Polycom	N/A	N/A	N
AC-DC Adapter	I.T.E. Power Supply	HON-KWANG	HK-AX-120A200-CP	N/A	N
Headset	Encore Headset	Plantronics	P/N: 29951-12	0E0723 K7	Y
Charging Station	Alpha SAMPLE	Polycom	ESB-DCA 40+001	AlphaB400241032	N
Power Splitter/ Combiner	ZAPD-4	Mini-Circuits	15542	0 9729	Y
Access Point	Aironet 802.11 a/ b/ g	Cisco	AIR-AP1242AG-A-K9	FTX0940B04J	Y
Switching AC Adapter for Access Point	Switching Adapter	PHIHONG	PSA18U-480C	N/A	Y
Computer	Personal Computer	Eee	1005HAB	1005HAB-BLU001X	Y
AC-DC Adapter for PC	Power Supply	ASUS	ADP-40PH AB	N/A	Y

6.10 Test Configurations

Operational Mode(s)	Data Rate Tested	Duty Cycle (Conducted Emissions)	Duty Cycle (Radiated Emissions)
a	6 MBit/s	100%	10%
n HT-20	6.5 MCS	100%	10%

6.11 Equipment Modifications

The following modifications were required to complete testing of the UUT:

1. Conducted Emissions – unit with 100% duty cycle was provided by the customer in order to complete the testing

6.12 Deviations from the Test Standard

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

1. NONE

7 TEST RESULTS

7.1 26 dB and 99 % Bandwidth

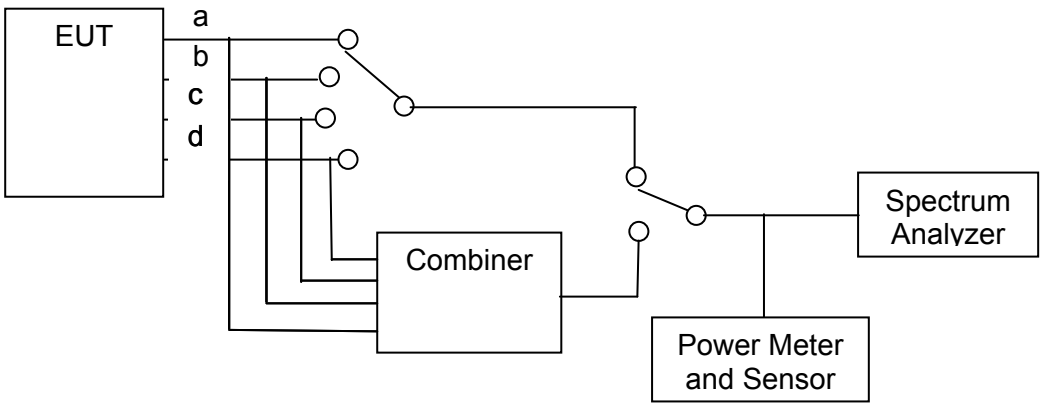
FCC, Part 15 Subpart E §15.407(a)(1)(2)
Industry Canada RSS-210 § A9.2(2)
Industry Canada RSS-Gen §4.4

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.

Testing was restricted to a single port.

Test Configuration



Measurement set up for 26 dB and 99 % bandwidth test

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-210 §A9.2(2)

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

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

Industry Canada RSS-Gen §4.4

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

Laboratory Measurement Uncertainty for Spectrum Measurement

Measurement uncertainty	±2.81 dB

Traceability

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

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

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

7.1.1 5150 MHz - 5250 MHz; 26 dB and 99 % Operational Bandwidth(s)

TABLE OF RESULTS – 802.11a

Test Conditions:	15.247 (a)(2)	**Rel. Humidity (%):**	35 to 42
Variant:	802.11a	**Ambient Temp. (ºC):**	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:**	5.51 dBi
Applied Voltage:	4.2 Vdc		
Notes 1:			
Notes 2:			

26 dB Bandwidth

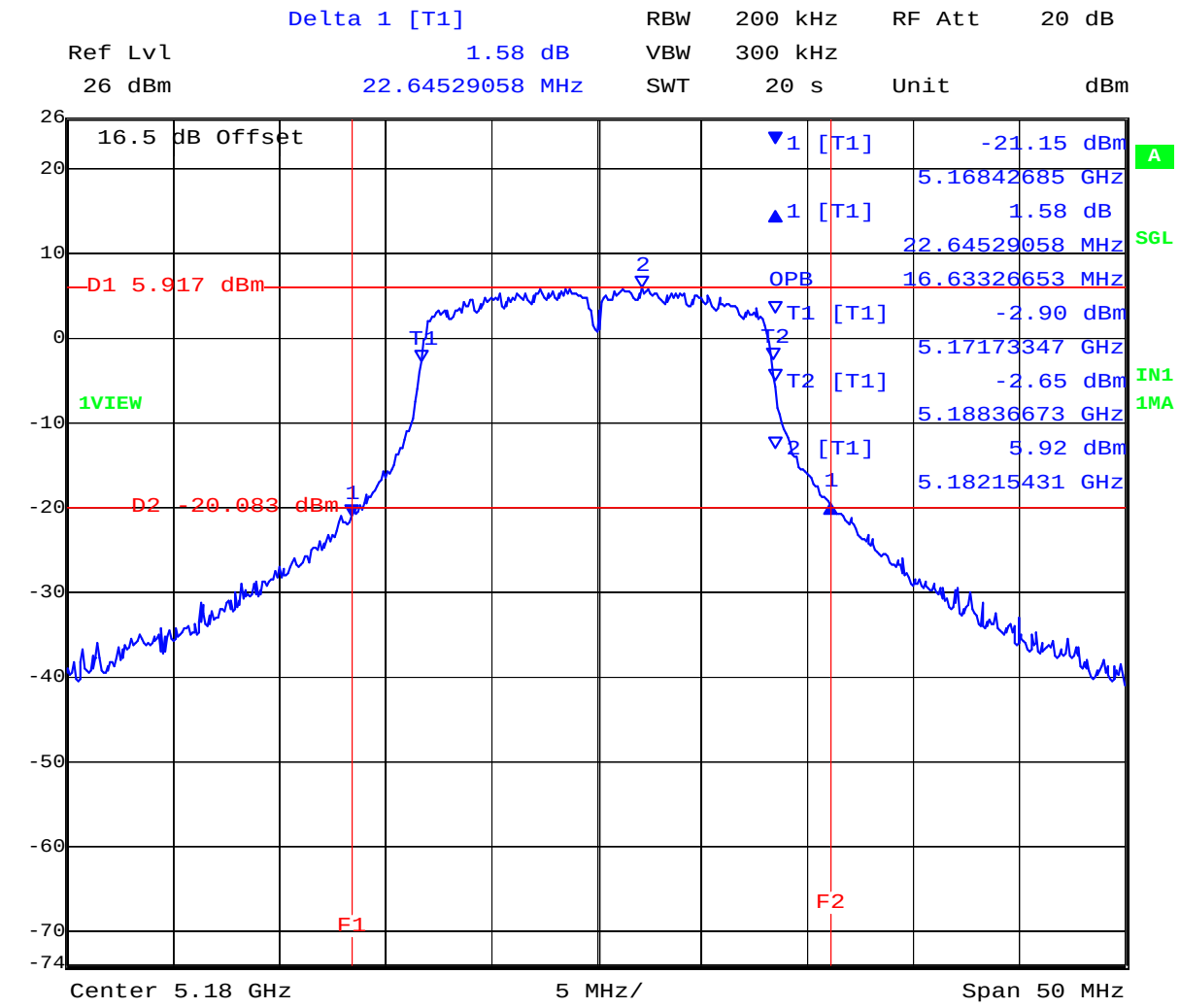
Test Frequency	26 dB Bandwidth				Minimum 6dB Bandwidth Limit		Margin
	MHz						
MHz	a	b	c	d	kHz	MHz	MHz
5180	22.645000				500	0.5	-22.145000
5200	22.244000						-21.744000
5240	21.844000						-21.344000

99% Bandwidth

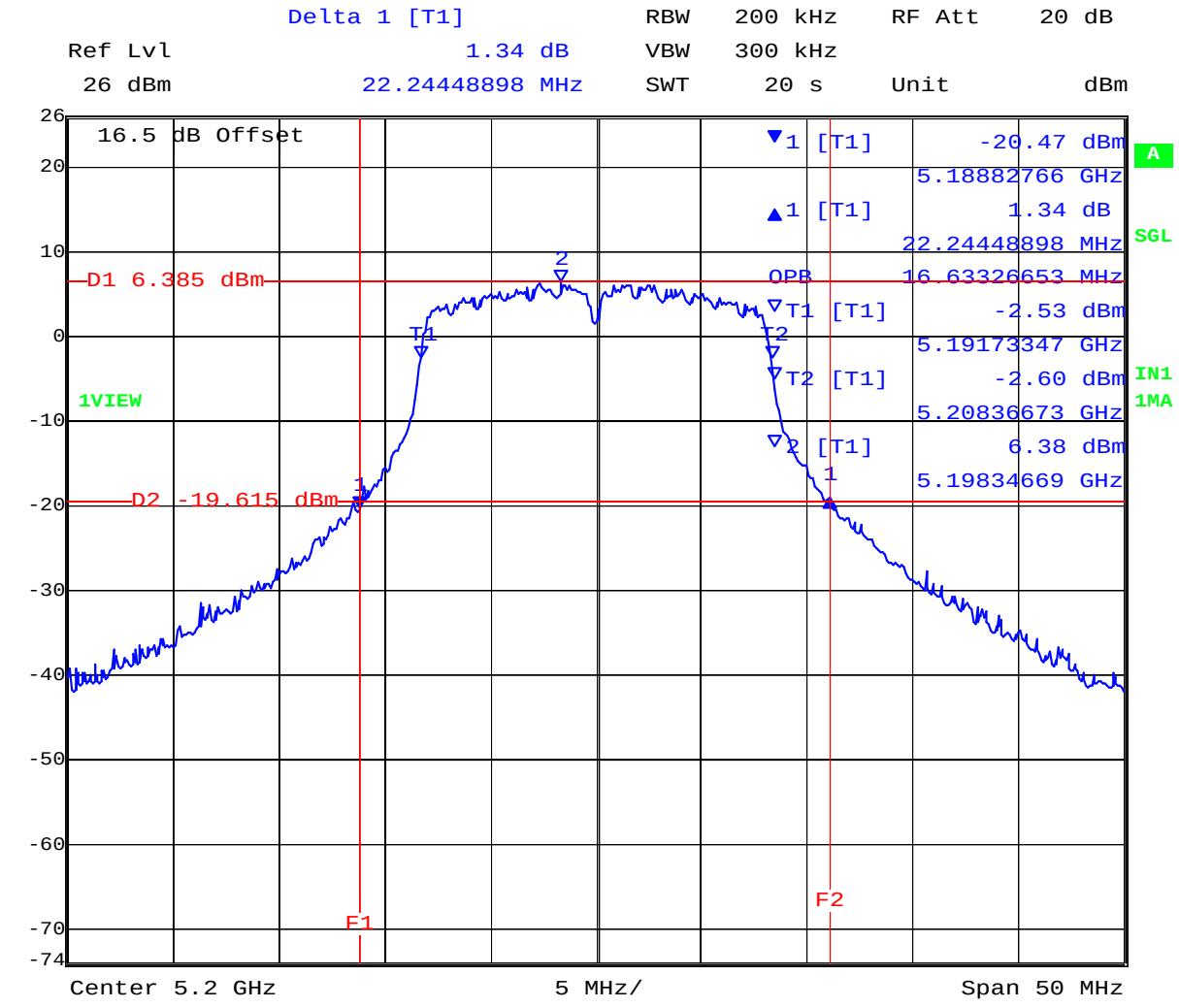
Test Frequency	99 % Bandwidth						
	MHz						
MHz	a	b	c	d			
5180	16.633000						
5200	16.633000						
5240	16.633000						

Measurement uncertainty:	±2.81 dB

26dB OBW 99% Ambient 5180MHz 4.20V 14.71dBm



26dB OBW 99% Ambient 5200MHz 4.20V 14.55dBm



26dB OBW 99% Ambient 5240MHz 4.20V 15.36dBm

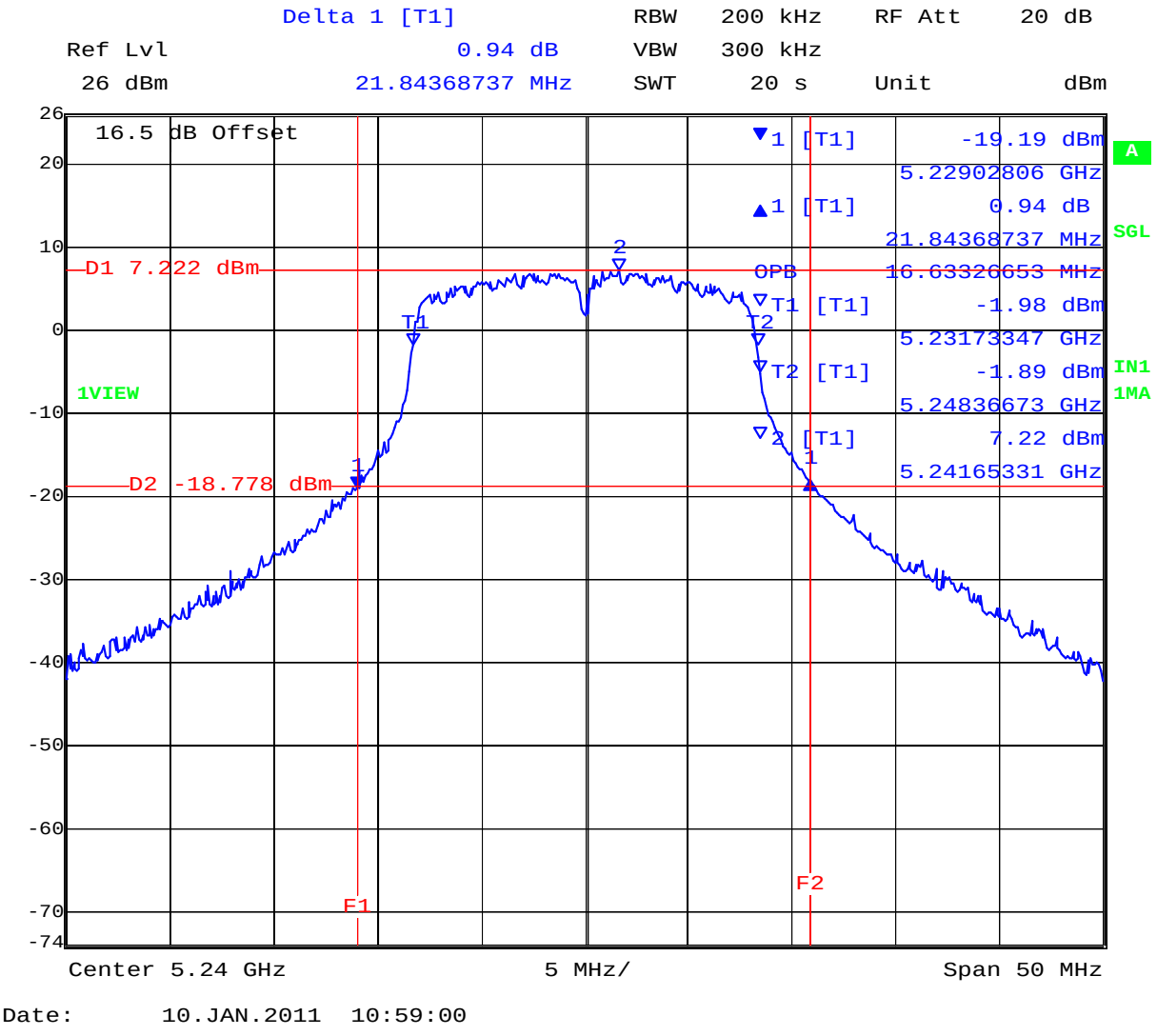


TABLE OF RESULTS – 802.11 HT-20

Test Conditions:	15.247 (a)(2)	**Rel. Humidity (%):**	35 to 42
Variant:	802.11n HT-20	**Ambient Temp. (ºC):**	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:**	5.51 dBi
Applied Voltage:	4.2 Vdc		
Notes 1:			
Notes 2:			

26 dB Bandwidth

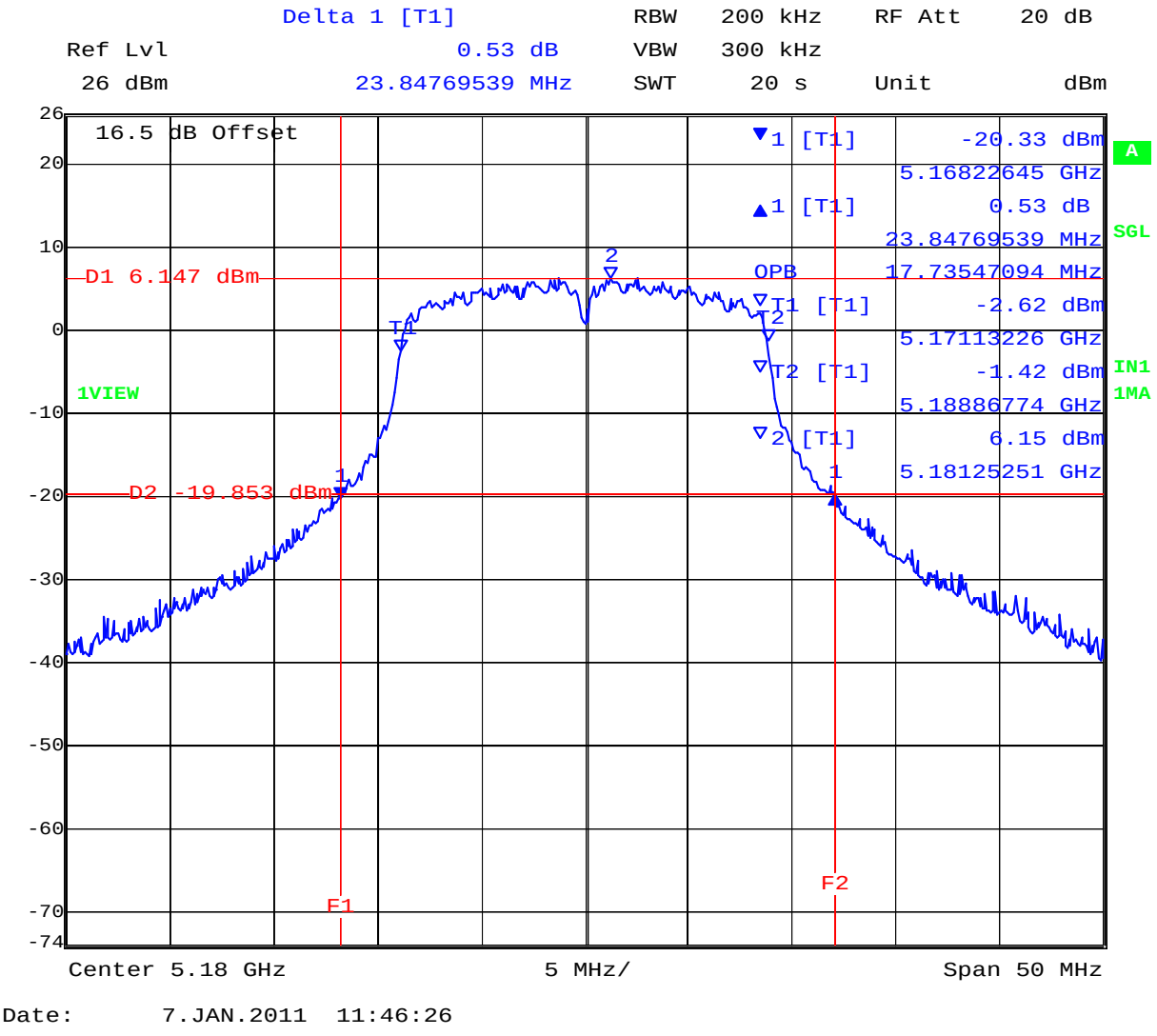
Test Frequency	26 dB Bandwidth MHz				Minimum 6dB Bandwidth Limit		Margin
MHz	**a**	**b**	**c**	**d**	**kHz**	**MHz**	**MHz**
5180	23.848000				500	0.5	-23.348000
5200	23.747000						-23.247000
5240	23.447000						-22.947000

99% Bandwidth

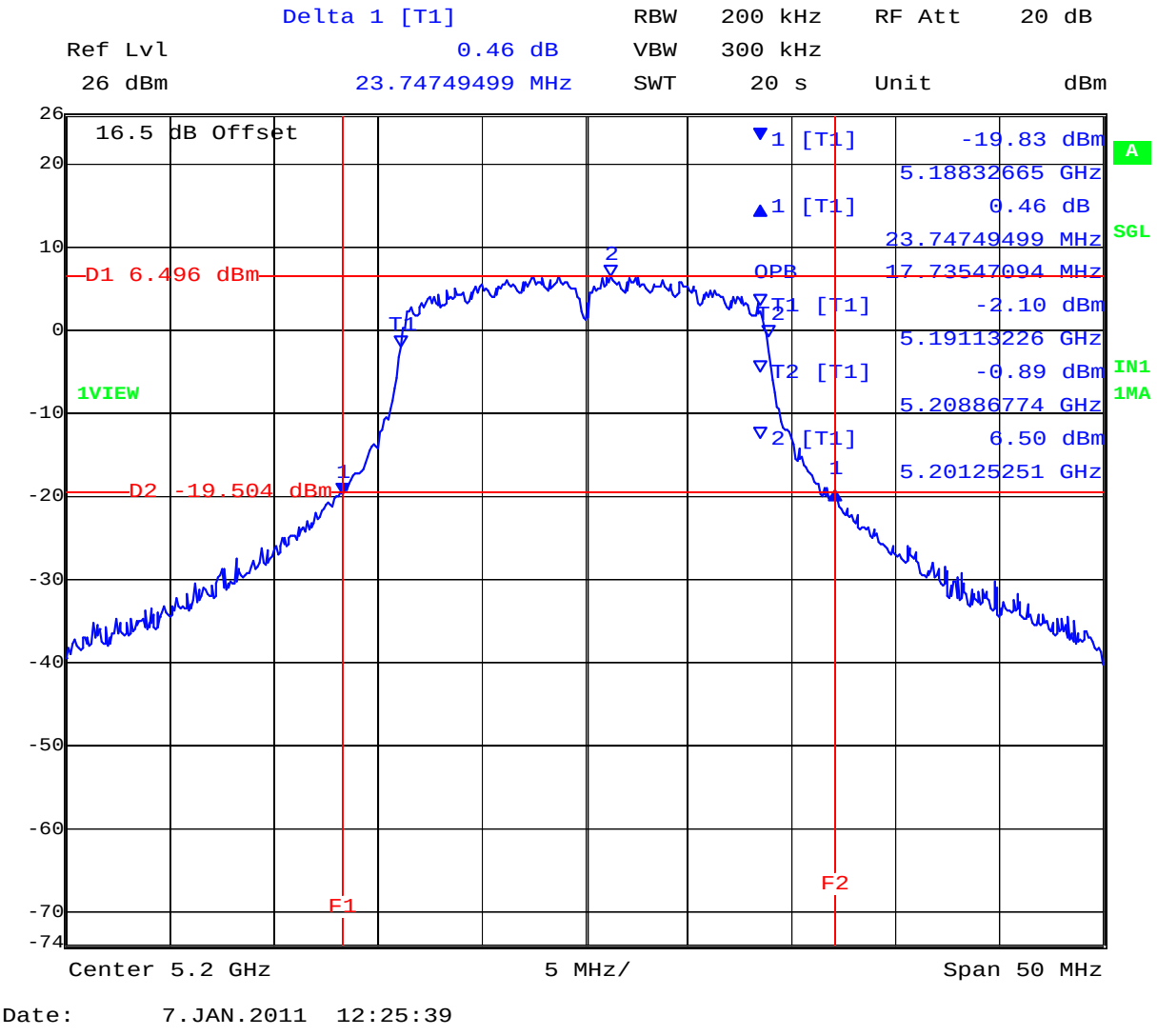
Test Frequency	99 % Bandwidth MHz						
MHz	**a**	**b**	**c**	**d**			
5180	17.735000						
5200	17.735000						
5240	17.735000						

Measurement uncertainty:	±2.81 dB

26dB OBW 99% Ambient 5180MHz 4.20V 14.66dBm

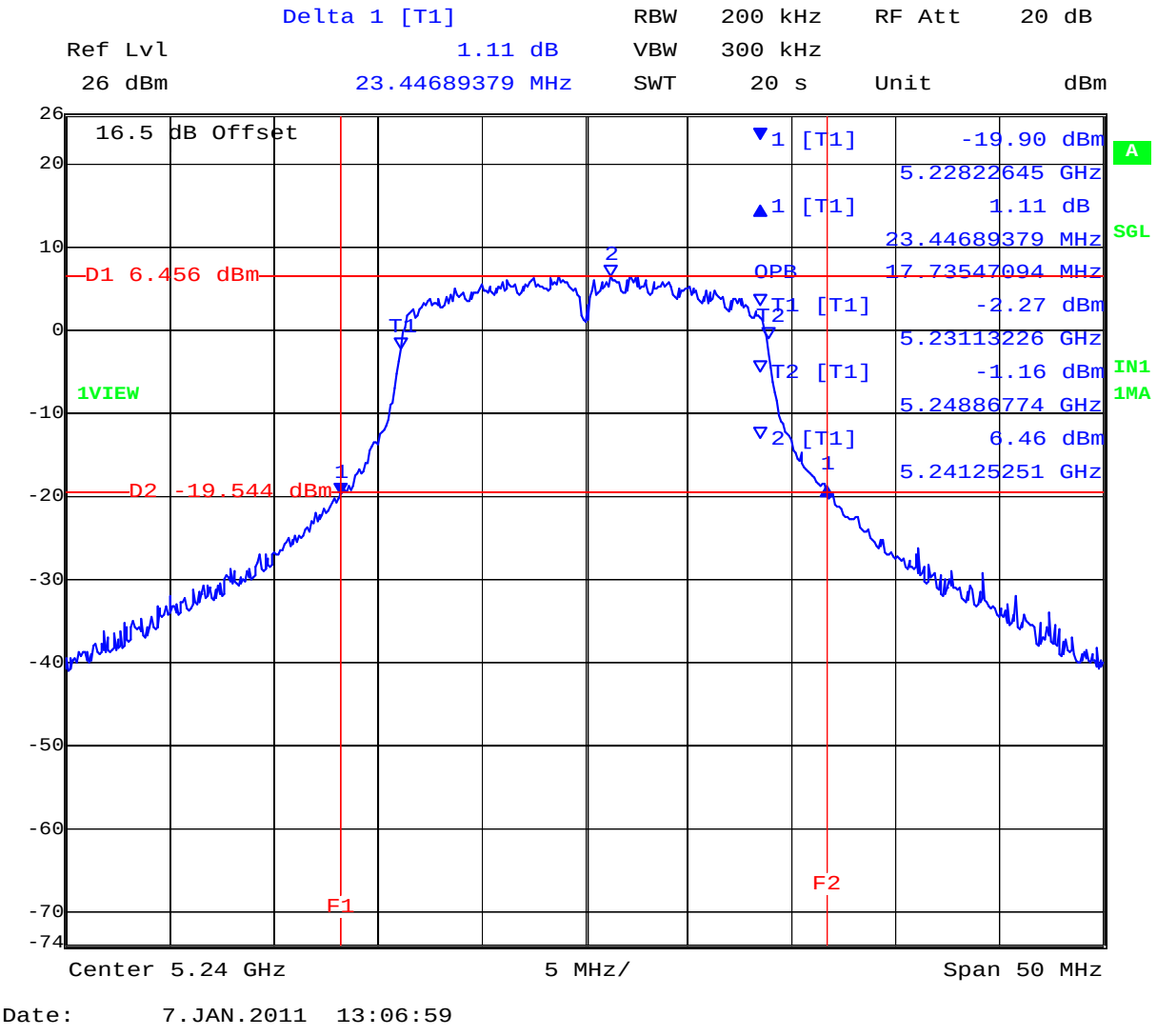


26dB OBW 99% Ambient 5200MHz 4.20V 14.95dBm



Date: 7.JAN.2011 12:25:39

26dB OBW 99% Ambient 5240MHz 4.20V 14.77dBm



7.1.2 5250 MHz - 5350 MHz; 26 dB and 99 % Operational Bandwidth(s)

TABLE OF RESULTS – 802.11a

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:**	5.51 dBi
Applied Voltage:	4.2 Vdc		
Notes 1:			
Notes 2:			

26 dB Bandwidth

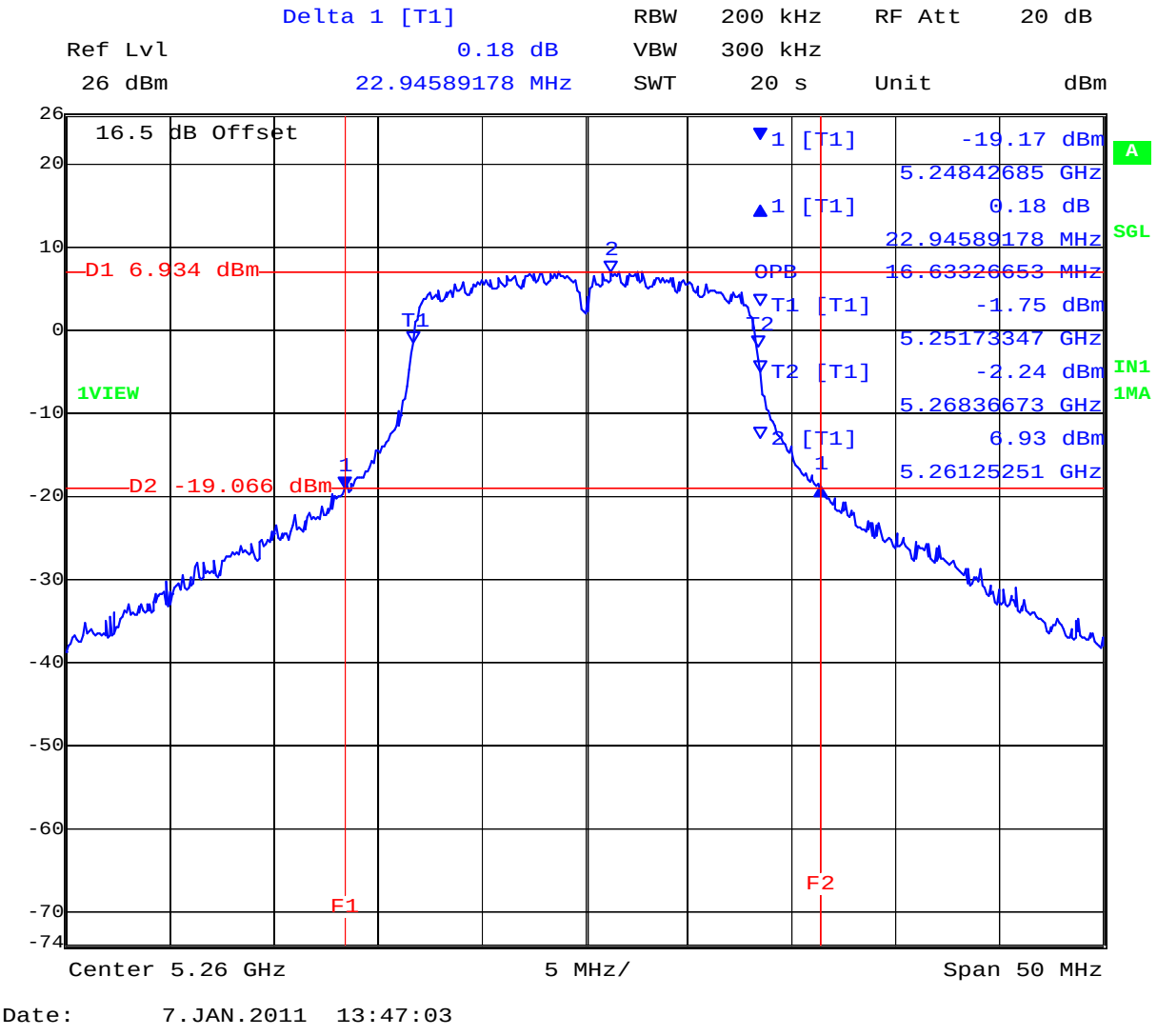
Test Frequency	26 dB Bandwidth MHz				Minimum 6dB Bandwidth Limit		Margin
MHz	**a**	**b**	**c**	**d**	**kHz**	**MHz**	**MHz**
5260	22.946000				500	0.5	-22.446000
5280	22.946000						-22.446000
5320	23.046000						-22.546000

99% Bandwidth

Test Frequency	99 % Bandwidth MHz						
MHz	**a**	**b**	**c**	**d**			
5260	16.633000						
5280	16.633000						
5320	16.633000						

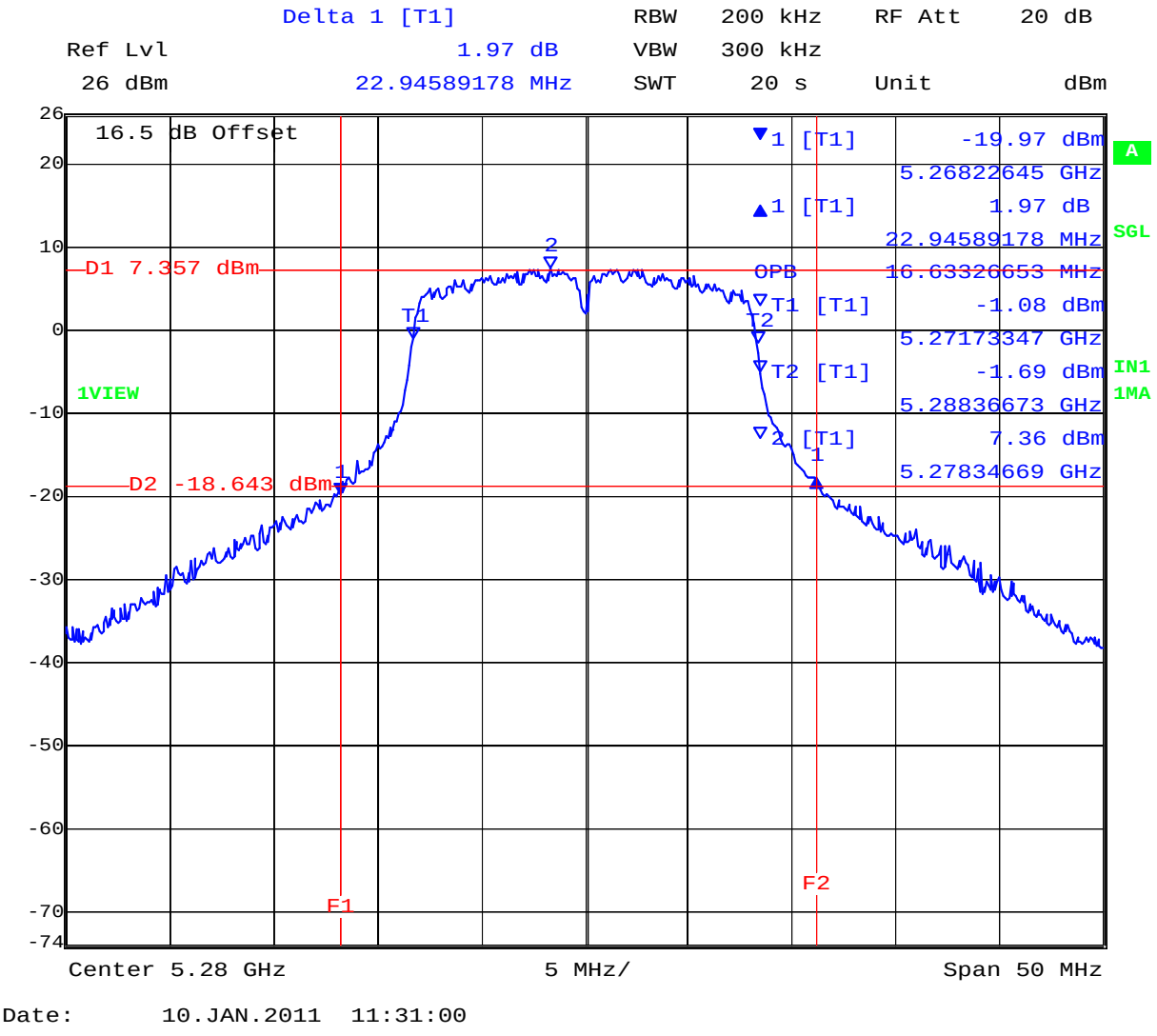
Measurement uncertainty:	±2.81 dB

26dB OBW 99% Ambient 5260MHz 4.20V 15.37dBm



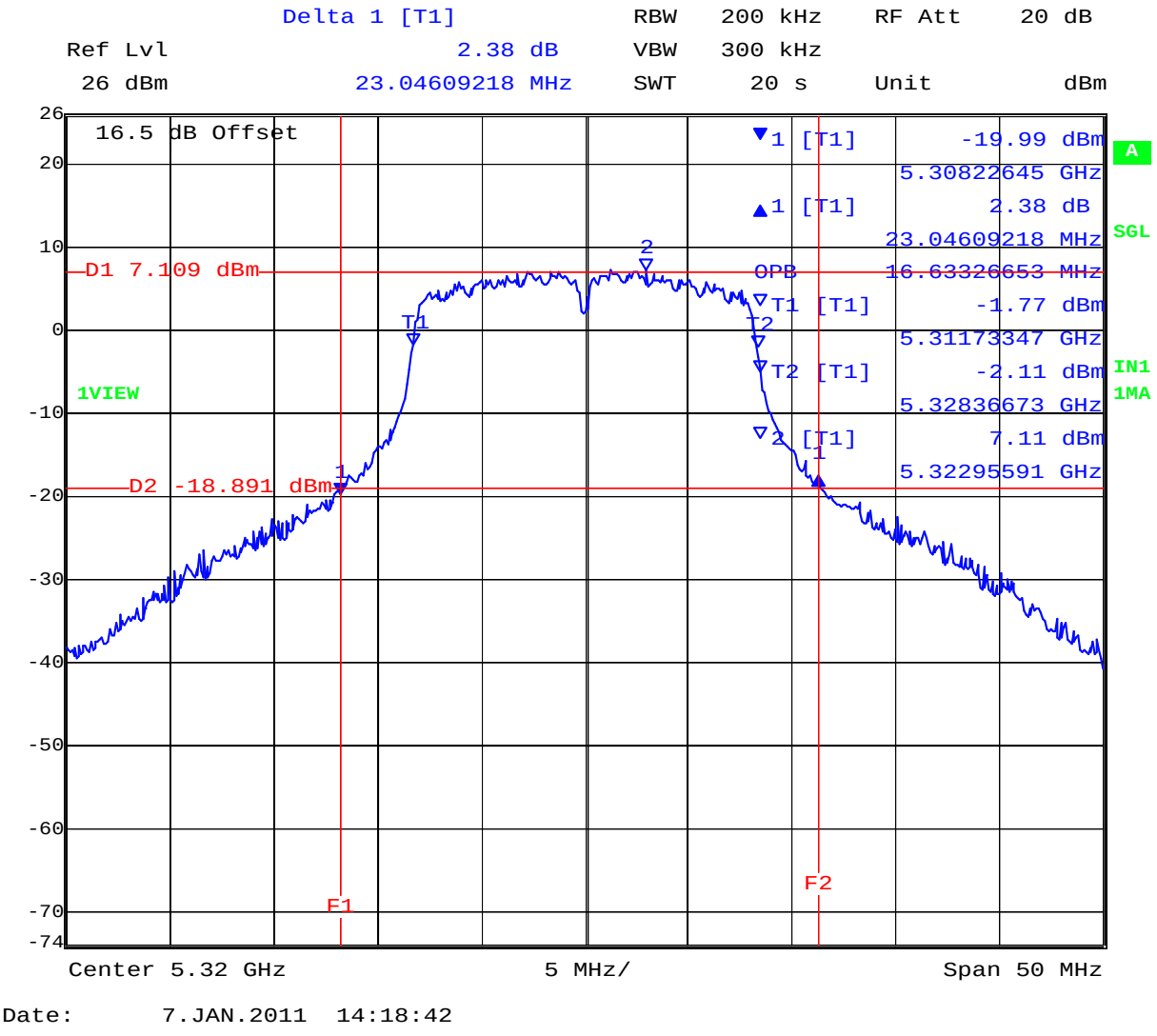
Date: 7.JAN.2011 13:47:03

26dB OBW 99% Ambient 5280MHz 4.20V 15.99dBm



Date: 10.JAN.2011 11:31:00

26dB OBW 99% Ambient 5320MHz 4.20V 15.43dBm



Date: 7.JAN.2011 14:18:42

TABLE OF RESULTS – 802.11 HT-20

Test Conditions:	15.247 (a)(2)	**Rel. Humidity (%):**	35 to 42
Variant:	802.11n HT-20	**Ambient Temp. (ºC):**	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:**	5.51 dBi
Applied Voltage:	4.2 Vdc		
Notes 1:			
Notes 2:			

26 dB Bandwidth

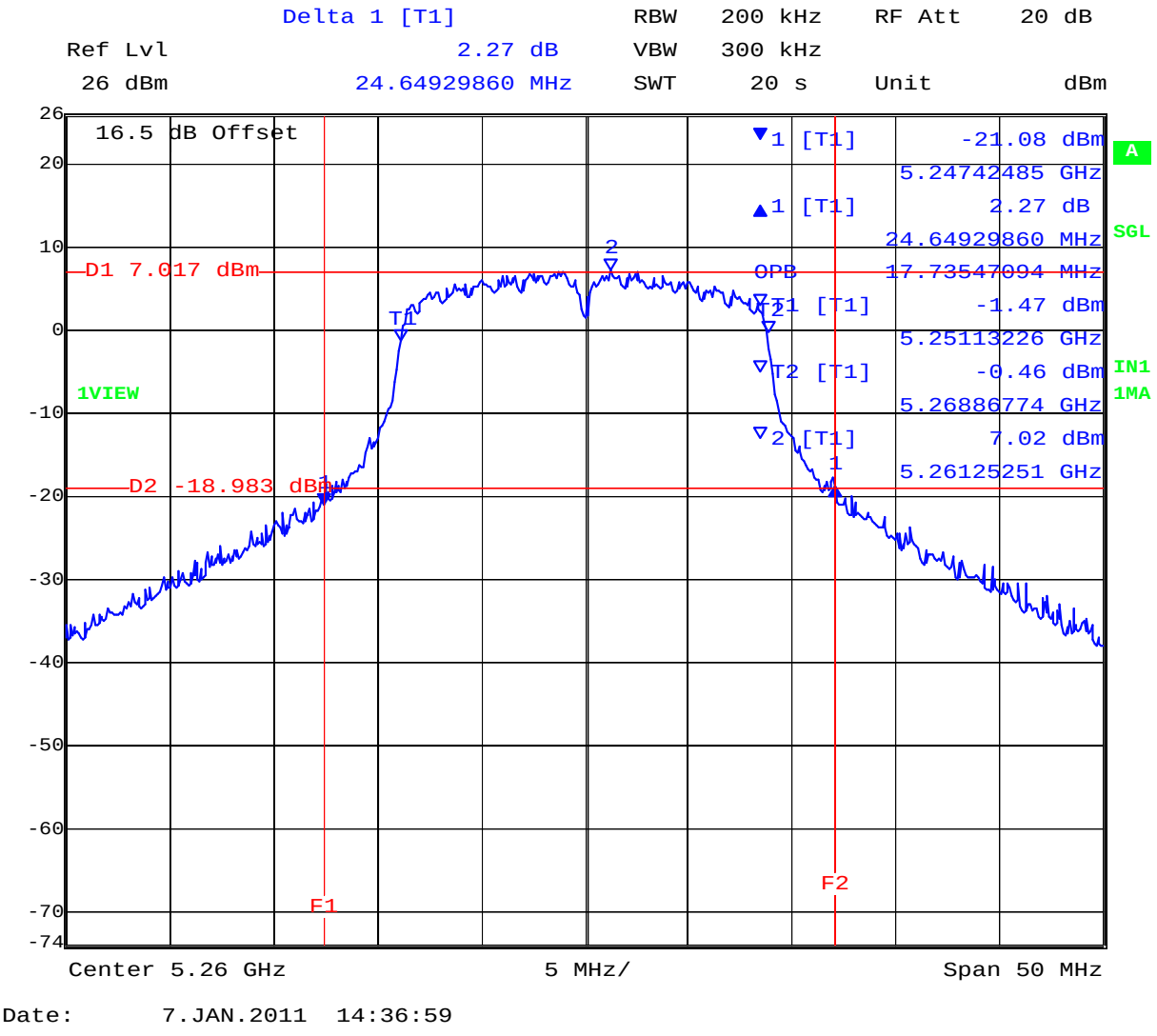
Test Frequency	26 dB Bandwidth				Minimum 6dB Bandwidth Limit		Margin
	MHz						
MHz	**a**	**b**	**c**	**d**	**kHz**	**MHz**	**MHz**
5260	24.649000				500	0.5	-24.149000
5280	24.549000						-24.049000
5320	24.148000						-23.648000

99% Bandwidth

Test Frequency	99 % Bandwidth						
	MHz						
MHz	**a**	**b**	**c**	**d**			
5260	17.735000						
5280	17.735000						
5320	17.735000						

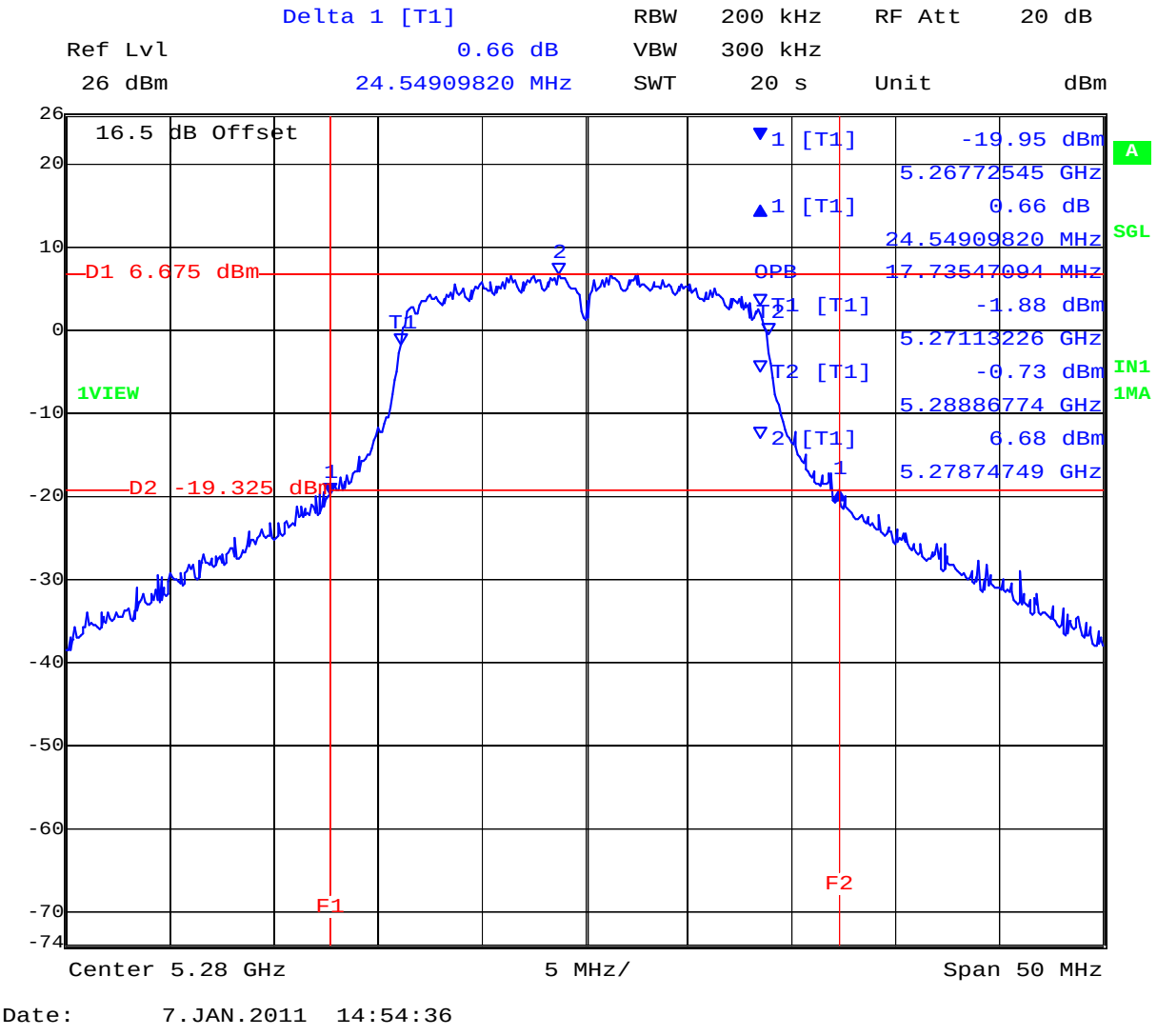
Measurement uncertainty:	±2.81 dB

26dB OBW 99% Ambient 5260MHz 4.20V 15.30dBm

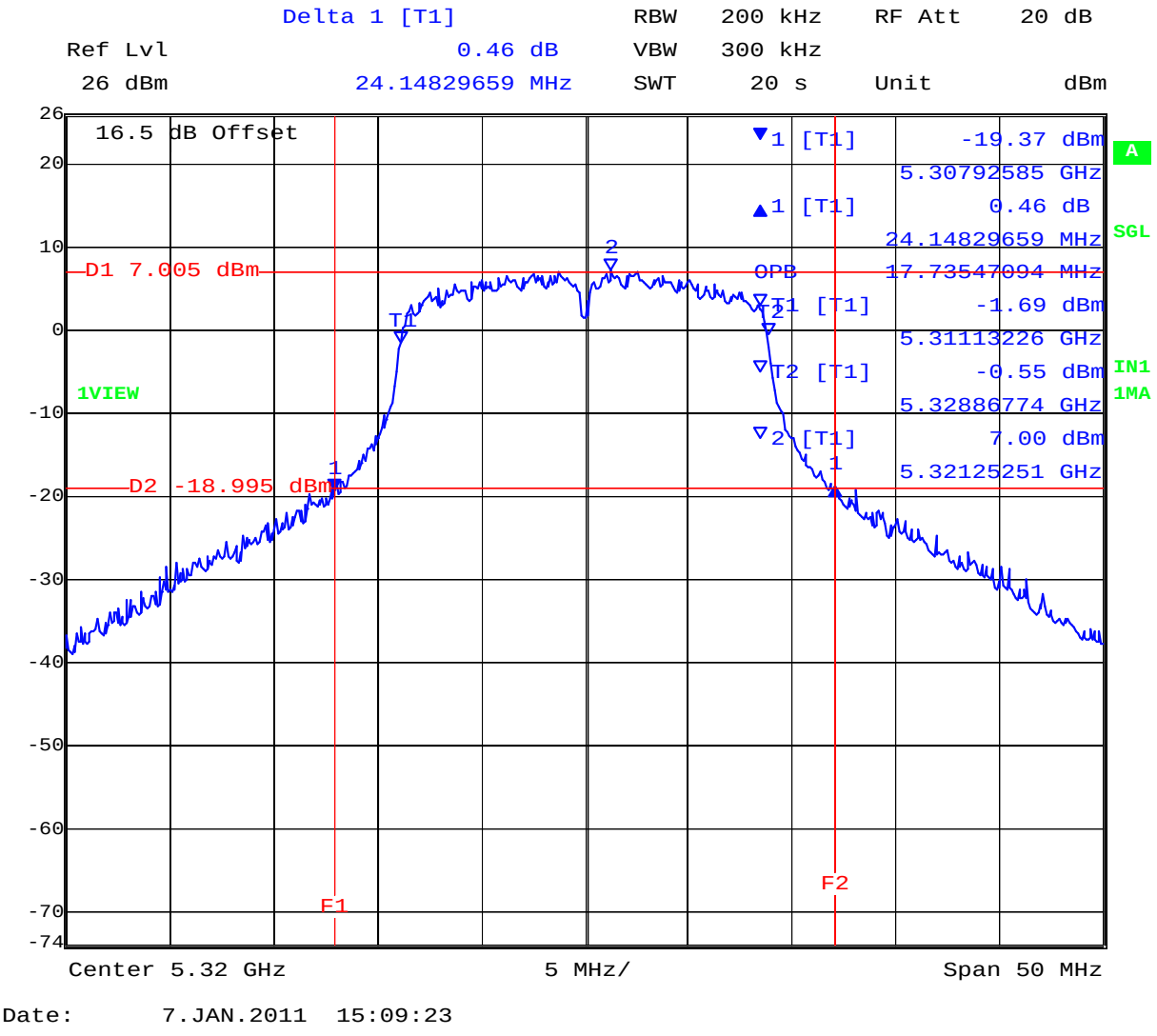


Date: 7.JAN.2011 14:36:59

26dB OBW 99% Ambient 5280MHz 4.20V 15.21dBm



26dB OBW 99% Ambient 5320MHz 4.20V 15.26dBm



Date: 7.JAN.2011 15:09:23

7.1.3 5470 MHz - 5725 MHz; 26 dB and 99 % Operational Bandwidth(s)

TABLE OF RESULTS – 802.11a

Test Conditions:	15.247 (a)(2)	**Rel. Humidity (%):**	35 to 42
Variant:	802.11a	**Ambient Temp. (ºC):**	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:**	5.51 dBi
Applied Voltage:	4.2 Vdc		
Notes 1:			
Notes 2:			

26 dB Bandwidth

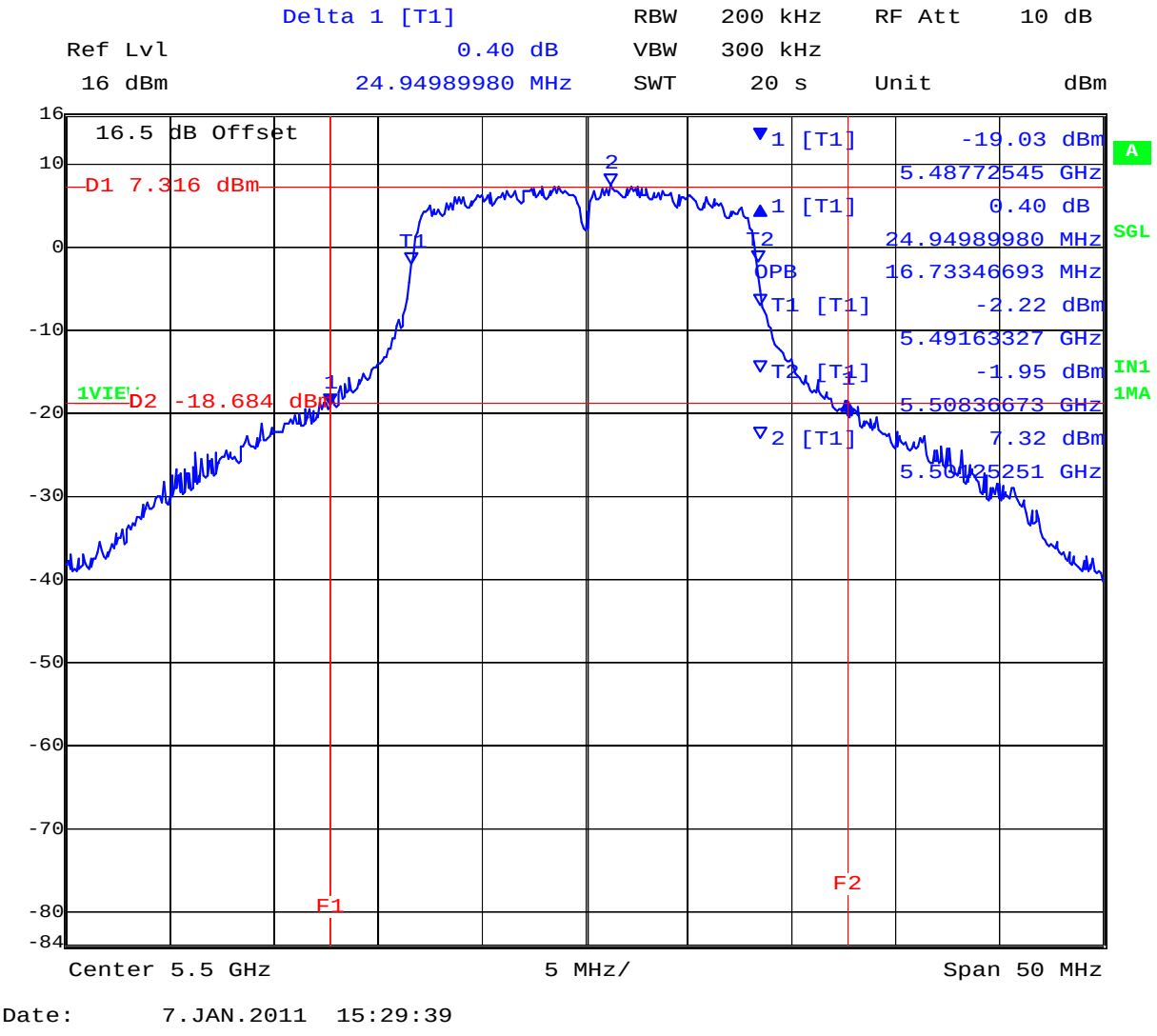
Test Frequency	26 dB Bandwidth				Minimum 6dB Bandwidth Limit		Margin
	MHz						
MHz	**a**	**b**	**c**	**d**	**kHz**	**MHz**	**MHz**
5500	24.950000				500	0.5	-24.450000
5580	25.651000						-25.151000
5700	26.453000						-25.953000

99% Bandwidth

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

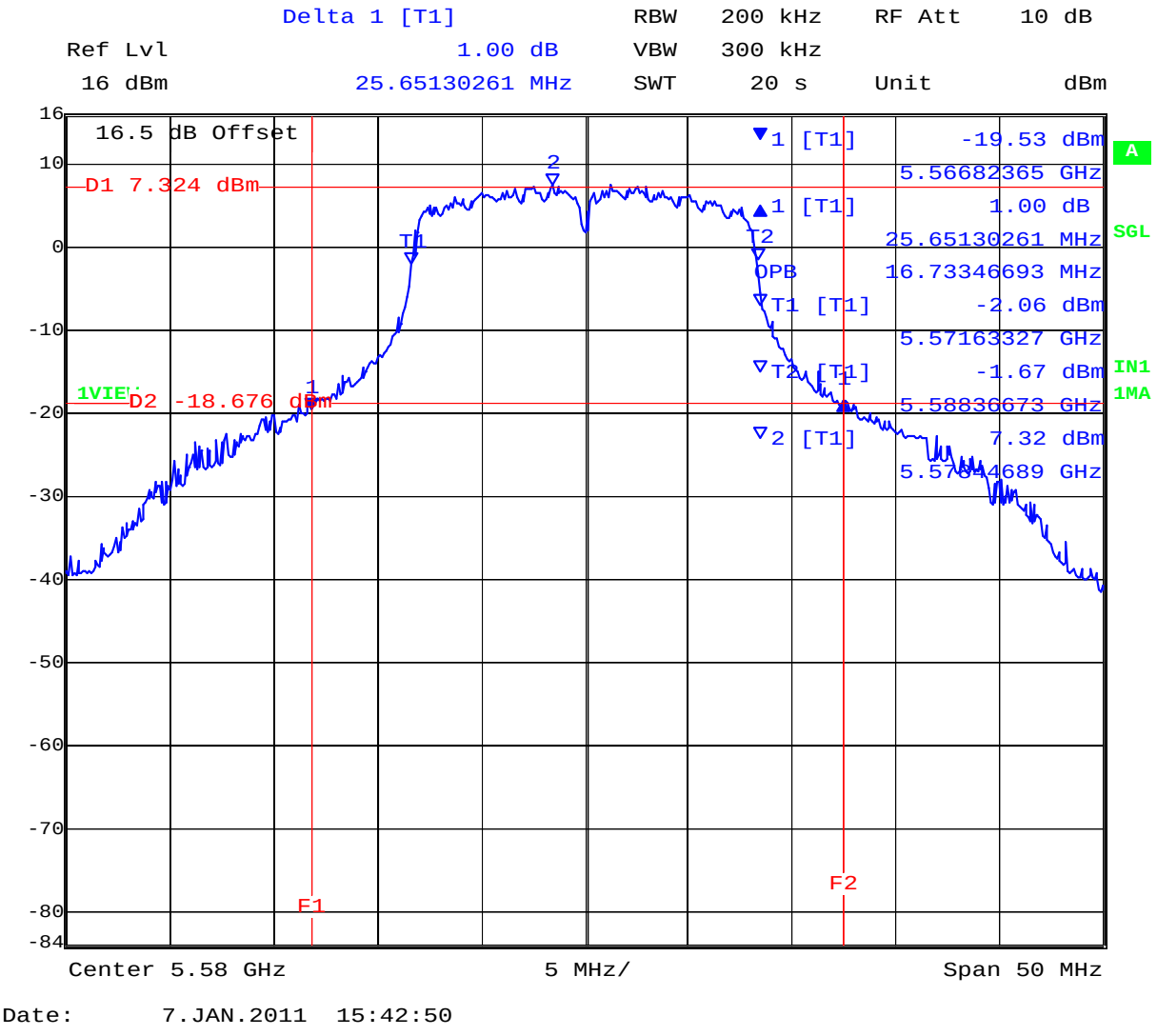
Measurement uncertainty:	±2.81 dB

26dB OBW 99% Ambient 5500MHz 4.20V 16.04dBm



Date: 7.JAN.2011 15:29:39

26dB OBW 99% Ambient 5580MHz 4.20V 16.02dBm



26dB OBW 99% Ambient 5700MHz 4.20V 16.47dBm

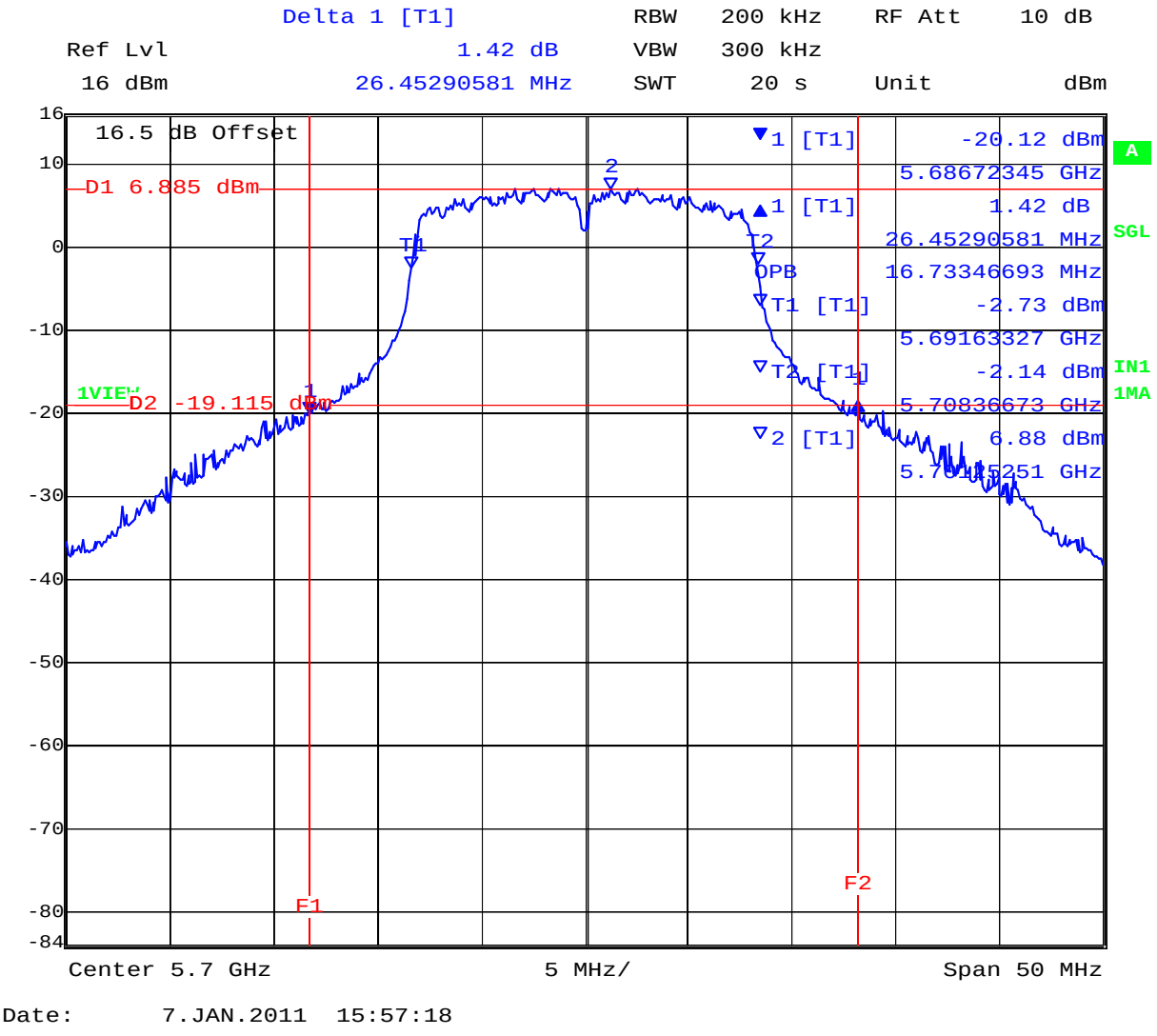


TABLE OF RESULTS – 802.11 HT-20

Test Conditions:	15.247 (a)(2)	**Rel. Humidity (%):**	35 to 42
Variant:	802.11n HT-20	**Ambient Temp. (ºC):**	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:**	5.51 dBi
Applied Voltage:	4.2 Vdc		
Notes 1:			
Notes 2:			

26 dB Bandwidth

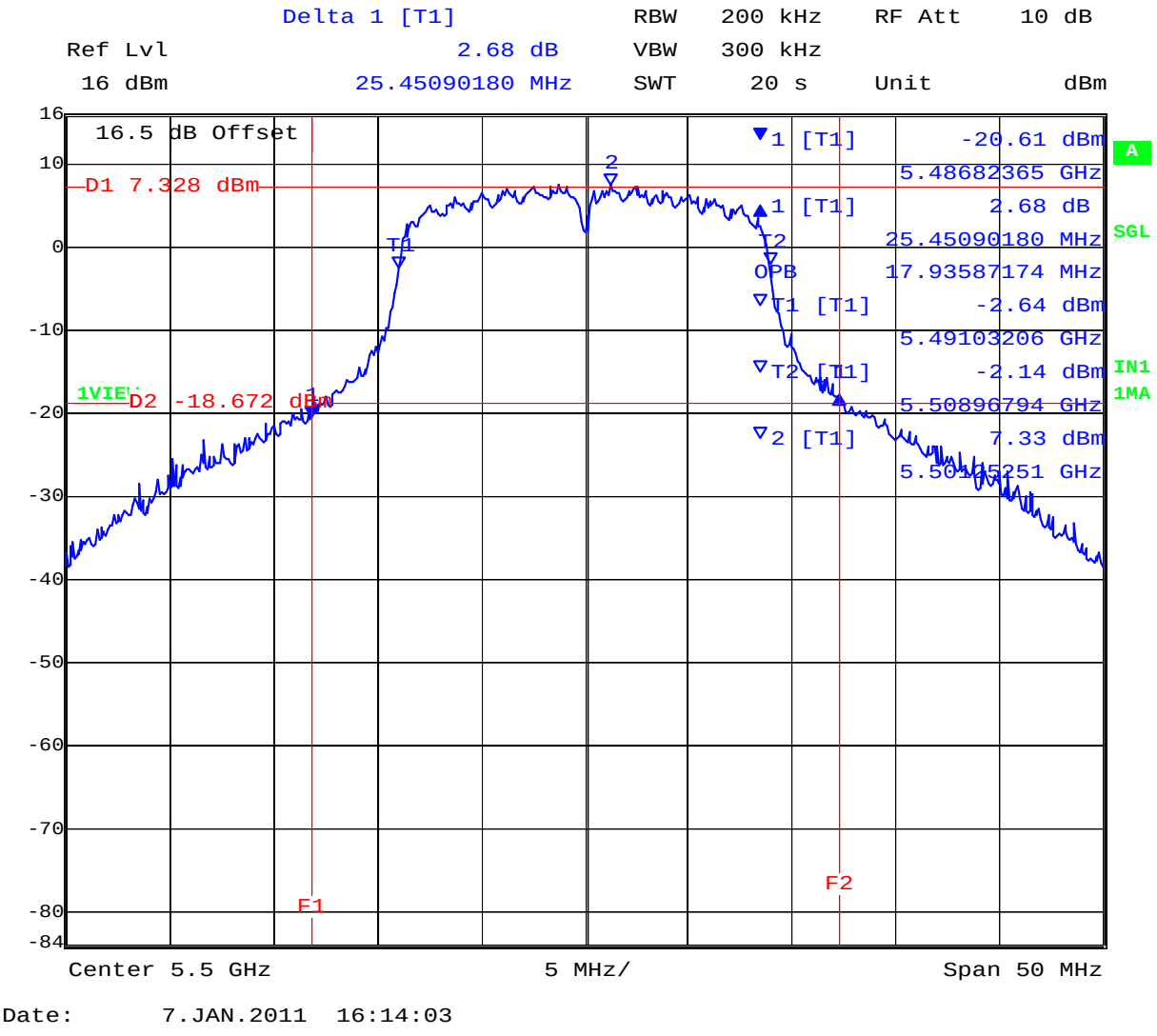
Test Frequency	26 dB Bandwidth MHz				Minimum 6dB Bandwidth Limit		Margin
MHz	**a**	**b**	**c**	**d**	**kHz**	**MHz**	**MHz**
5500	25.451000				500	0.5	-24.951000
5580	27.355000						-26.855000
5700	25.752000						-25.252000

99% Bandwidth

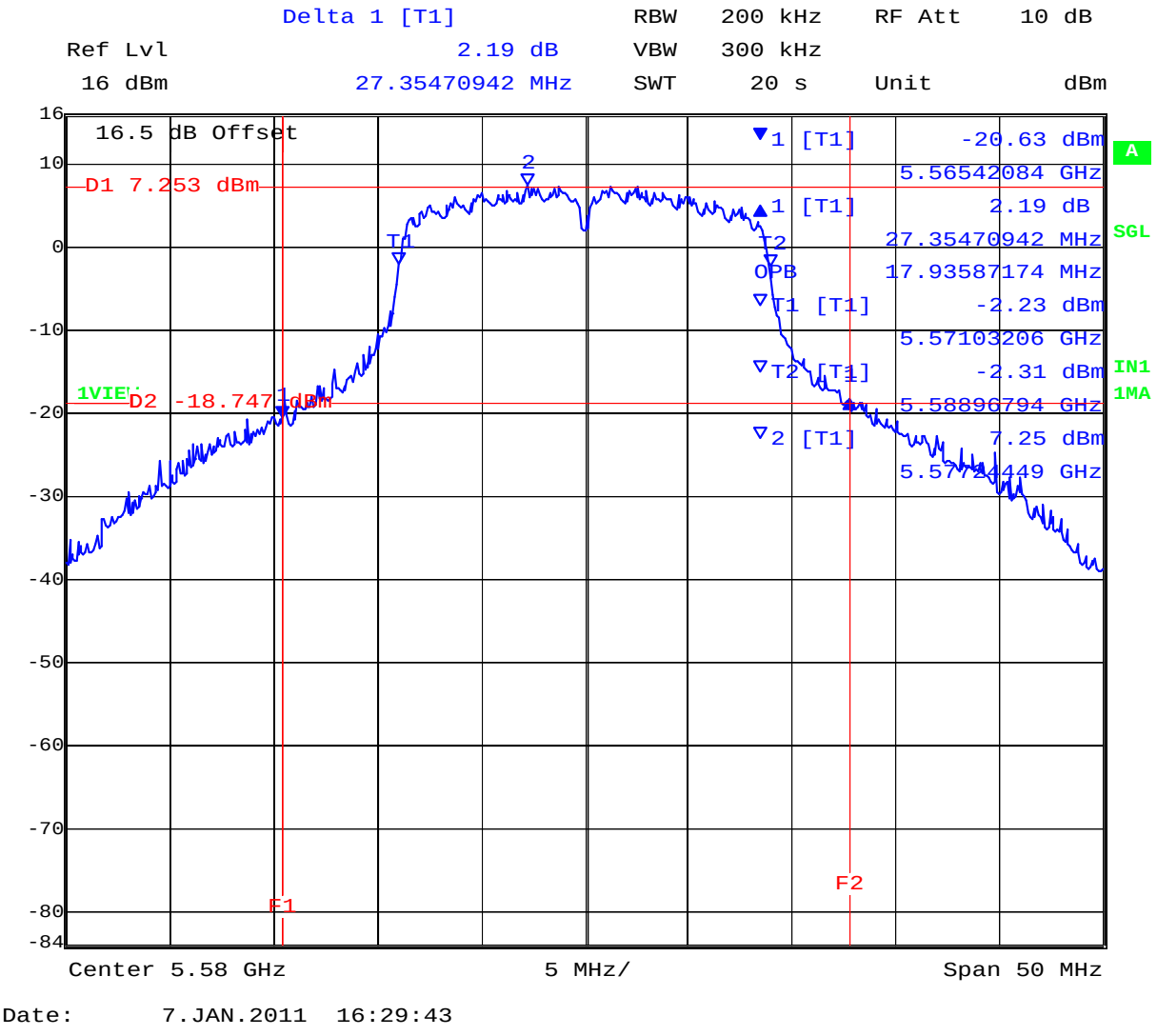
Test Frequency	99 % Bandwidth MHz						
MHz	**a**	**b**	**c**	**d**			
5500	17.936000						
5580	17.936000						
5700	17.936000						

Measurement uncertainty:	±2.81 dB

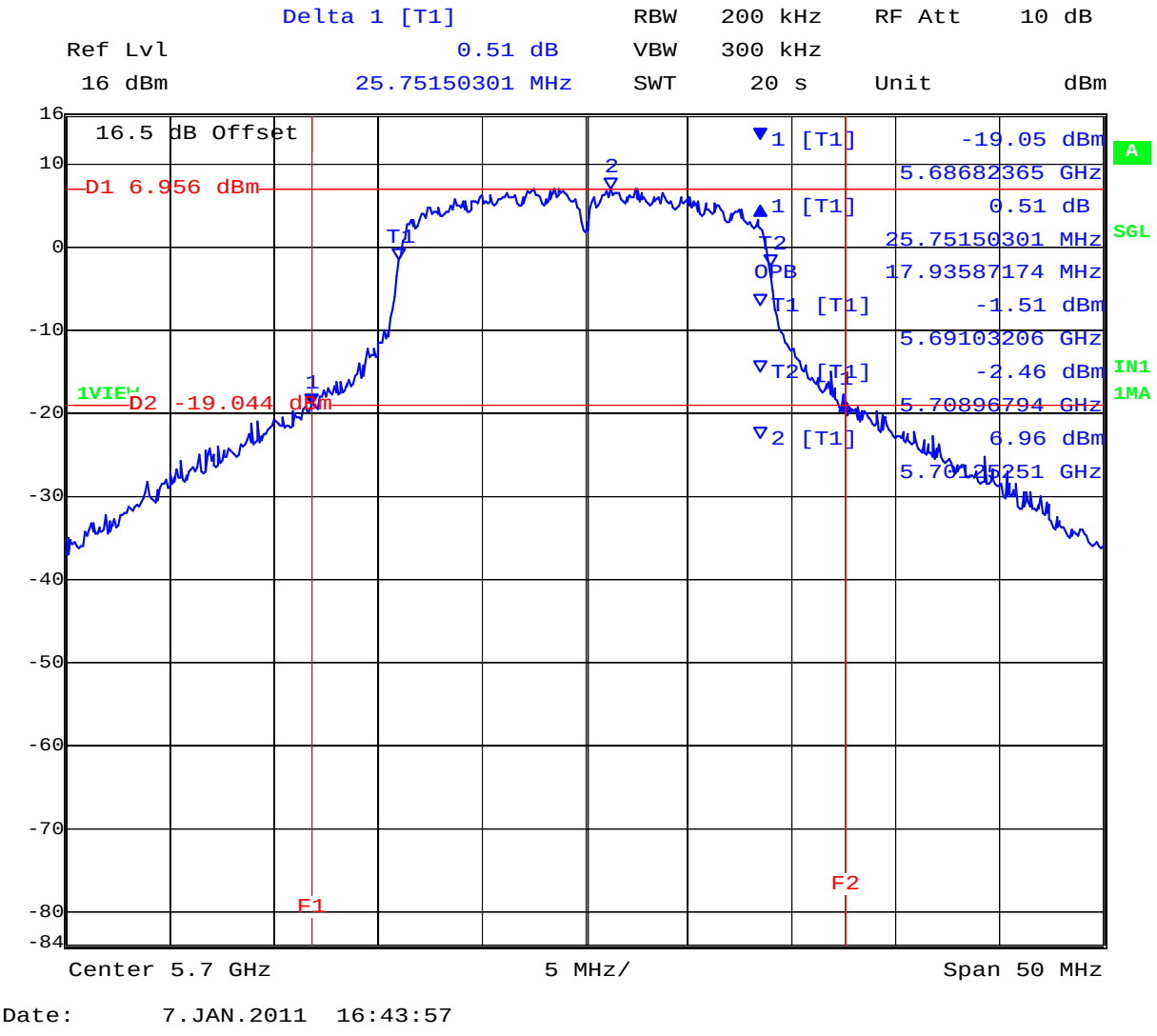
26dB OBW 99% Ambient 5500MHz 4.20V 15.96dBm



26dB OBW 99% Ambient 5580MHz 4.20V 15.92dBm



26dB OBW 99% Ambient 5700MHz 4.20V 16.27dBm



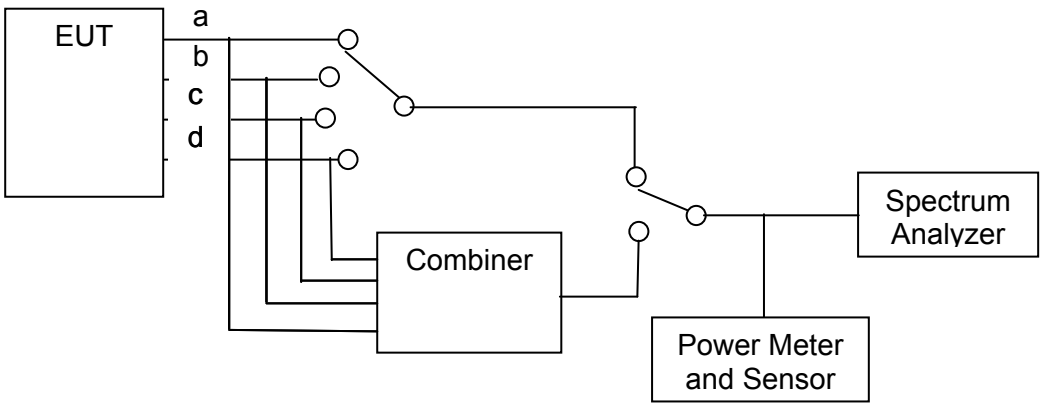
7.2 Transmit Output Power

FCC, Part 15 Subpart E §15.407(a)(1)(2)
Industry Canada RSS-210 §9.2(2)
RSS-Gen §4.4

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 Setup



Measurement setup for Transmitter Output Power

Specification

Limits

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

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

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

Industry Canada RSS-210 § A9.2(2)

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

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

Industry Canada RSS-Gen 4.4

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

Antenna Gain - Maximum Permissible Peak Transmit Power

If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The maximum allowable peak power in the 5150 – 5250 MHz frequency band is +17 dBm.

The maximum allowable peak power in the 5250 – 5350 MHz, and 5470 – 5725 MHz frequency band is + 24 dBm.

Maximum Transmit Power, FCC Limits

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

Frequency Range (MHz)	Maximum 26 dB Bandwidth (MHz)	4 + 10 Log (B) (dBm)	Limit (dBm)
5150 – 5250	23.848	17.77	17.00

Limit 5250 – 5350 and 5470 – 5725: Lesser of 250 mW (+24 dBm) or 11 + 10 Log (B) dBm

Frequency Range (MHz)	Maximum 26 dB Bandwidth (MHz)	11 + 10 Log (B) (dBm)	Limit (dBm)
5250 - 5350	26.649	25.26	24.00
5470 - 5725	27.355	25.37	24.00

Maximum Transmit Power Industry Canada Limits

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

Frequency Range (MHz)	Maximum 99% Bandwidth (MHz)	10 + 10 Log (B) (dBm)	EIRP Limit (dBm)
5150 – 5250	17.735	22.49	22.49

Limit 5250 – 5350 and 5470 – 5725: Lesser of 250 mW (+24 dBm) or 11 + 10 Log (B) dBm

Frequency Range (MHz)	Maximum 99% Bandwidth (MHz)	11 + 10 Log (B) (dBm)	EIRP Limit (dBm)
5250 - 5350	17.735	23.49	23.49
5470 - 5725	17.936	23.54	23.54

Laboratory Measurement Uncertainty for Power Measurements

Measurement uncertainty	±1.33 dB

Traceability

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

Measurement Results for Transmit Output Power

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

7.2.1 5150 MHz - 5250 MHz; Peak Output Power

TABLE OF RESULTS – 802.11a

Test Conditions:	15.407 (a)(1)	**Rel. Humidity (%):**	35 to 42
Variant:	802.11a	**Ambient Temp. (ºC):**	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:**	5.51 dBi
Applied Voltage:	4.2 Vdc		
Notes 1:			
Notes 2:			

Test Frequency	Measured Peak Power RF Port (dBm)				Total Power (dBm)		Limit	Margin
MHz	a	b	c	d	Combined	Calculated	dBm	dB
5180	14.69				14.69		17.00	-2.31
5200	14.63				14.63		17.00	-2.37
5240	14.72				14.72		17.00	-2.28

Measurement uncertainty:	±1.33 dB

TABLE OF RESULTS – 802.11n HT-20

Test Conditions:	15.407 (a)(1)	**Rel. Humidity (%):**	35 to 42
Variant:	802.11n HT-20	**Ambient Temp. (ºC):**	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:**	5.51 dBi
Applied Voltage:	4.2 Vdc		
Notes 1:			
Notes 2:			

Test Frequency	Measured Peak Power RF Port (dBm)				Total Power (dBm)		Limit	Margin
MHz	**a**	**b**	**c**	**d**	**Combined**	**Calculated**	**dBm**	**dB**
5180	14.81				14.81		17.00	-2.19
5200	14.91				14.91		17.00	-2.09
5240	14.75				14.75		17.00	-2.25

Measurement uncertainty:	±1.33 dB

7.2.2 5250 MHz - 5350 MHz; Peak Output Power

TABLE OF RESULTS – 802.11a

Test Conditions:	15.407 (a)(1)	**Rel. Humidity (%):**	35 to 42
Variant:	802.11a	**Ambient Temp. (ºC):**	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:**	5.51 dBi
Applied Voltage:	4.2 Vdc		
Notes 1:			
Notes 2:			

Test Frequency	Measured Peak Power RF Port (dBm)				Total Power (dBm)		Limit	Margin
MHz	a	b	c	d	Combined	Calculated	dBm	dB
5260	15.38				15.38		24.00	-8.62
5280	15.51				15.51		24.00	-8.49
5320	15.39				15.39		24.00	-8.61

Measurement uncertainty:	±1.33 dB

TABLE OF RESULTS – 802.11n HT-20

Test Conditions:	15.407 (a)(1)	**Rel. Humidity (%):**	35 to 42
Variant:	802.11n HT-20	**Ambient Temp. (ºC):**	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:**	5.51 dBi
Applied Voltage:	4.2 Vdc		
Notes 1:			
Notes 2:			

Test Frequency	Measured Peak Power RF Port (dBm)				Total Power (dBm)		Limit	Margin
MHz	**a**	**b**	**c**	**d**	**Combined**	**Calculated**	**dBm**	**dB**
5260	15.27				15.27		24.00	-8.73
5280	15.17				15.17		24.00	-8.83
5320	15.36				15.36		24.00	-8.64

Measurement uncertainty:	±1.33 dB

7.2.3 5470 MHz - 5725 MHz; Peak Output Power

TABLE OF RESULTS – 802.11a

Test Conditions:	15.407 (a)(1)	**Rel. Humidity (%):**	35 to 42
Variant:	802.11a	**Ambient Temp. (ºC):**	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:**	5.51 dBi
Applied Voltage:	4.2 Vdc		
Notes 1:			
Notes 2:			

Test Frequency	Measured Peak Power RF Port (dBm)				Total Power (dBm)		Limit	Margin
MHz	a	b	c	d	Combined	Calculated	dBm	dB
5500	16.04				16.04		24.00	-7.96
5580	16.03				16.03		24.00	-7.97
5700	16.42				16.42		24.00	-7.58

Measurement uncertainty:	±1.33 dB

TABLE OF RESULTS – 802.11n HT-20

Test Conditions:	15.407 (a)(1)		**Rel. Humidity (%):**	35 to 42	
Variant:	802.11n HT-20		**Ambient Temp. (ºC):**	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:**	5.51	dBi
Applied Voltage:	4.2	Vdc			
Notes 1:					
Notes 2:					

Test Frequency	Measured Peak Power RF Port (dBm)				Total Power (dBm)		Limit	Margin
MHz	**a**	**b**	**c**	**d**	**Combined**	**Calculated**	**dBm**	**dB**
5500	15.93				15.93		24.00	-8.07
5580	15.90				15.90		24.00	-8.10
5700	16.30				16.30		24.00	-7.70

Measurement uncertainty:	±1.33 dB

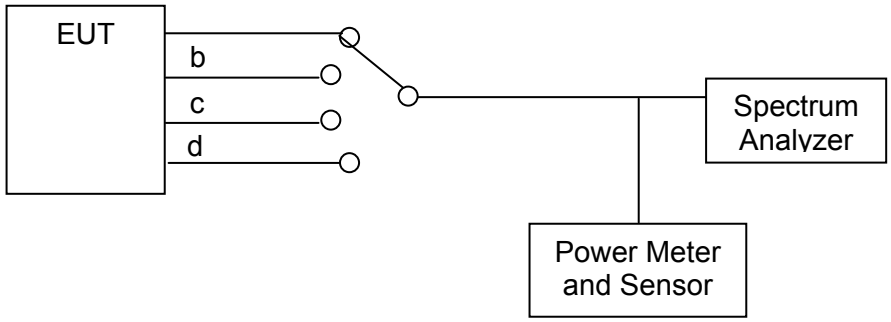
7.3 Peak Excursion Ratio

FCC, Part 15 Subpart E §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

Specification

Limits

§15.407 (a)(6)

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

Laboratory Measurement Uncertainty for Spectrum Measurement

Measurement uncertainty	± 2.81dB

Traceability

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

Measurement Results for Peak Excursion Ratio

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

7.3.1 5150 MHz - 5250 MHz; Peak Excursion Ratio

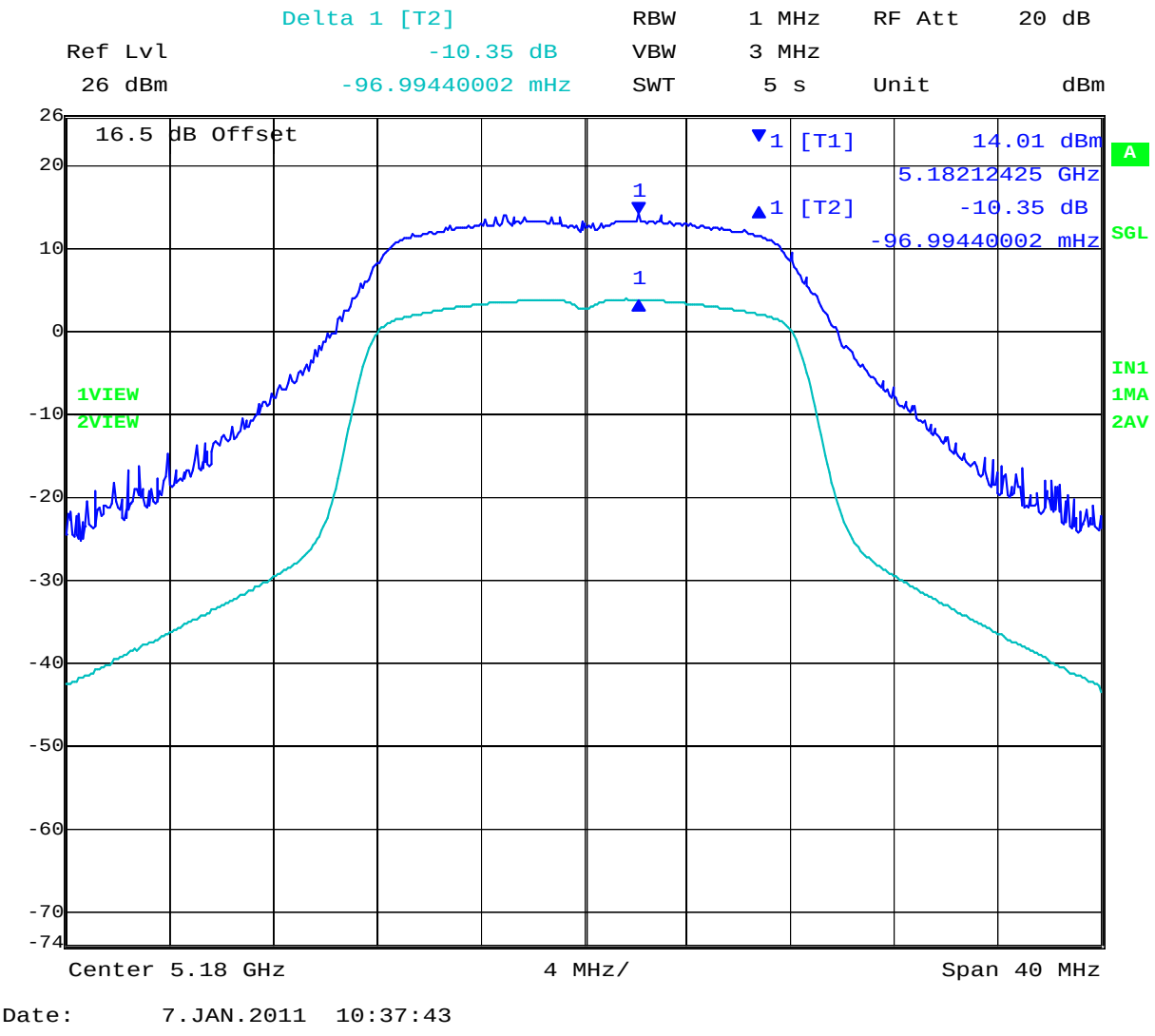
TABLE OF RESULTS – 802.11a

Test Conditions:	15.407 (a)		**Rel. Humidity (%):**	35	to	42
Variant:	802.11a		**Ambient Temp. (ºC):**	19	to	22
TPC:	HIGH		**Pressure (mBars):**	998	to	1003
Modulation:	ON		**Duty Cycle (%):**	100		
Beam Forming Gain (Y):	N/A	dB	**Antenna Gain:**	5.51	dBi	
Applied Voltage:	N/A	Vdc				
Notes 1:						
Notes 2:						

Test Frequency	Trace Peak Power Markers		Δ Marker (Marker 1 – 2)	Limit	Margin
	1	2			
MHz	dBm	dBm	dB	dB	dB
5180	14.01	3.66	-10.35	13	-2.65
5200	14.34	3.56	-10.78	13	-2.22
5240	14.35	3.86	-10.49	13	-2.51

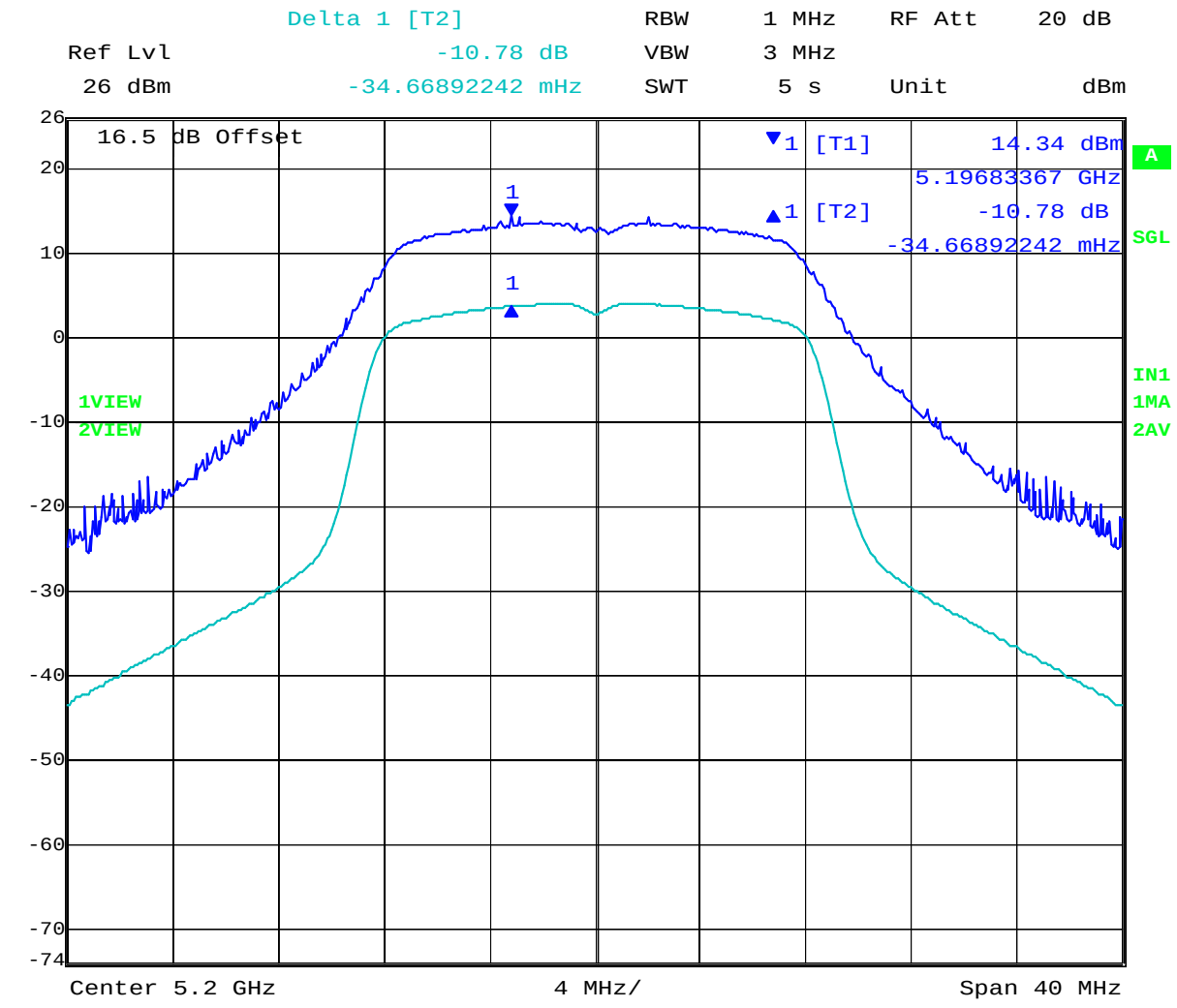
Measurement uncertainty:	±1.33 dB

Pk Excursion Ambient 5180MHz 4.20V 14.69dBm



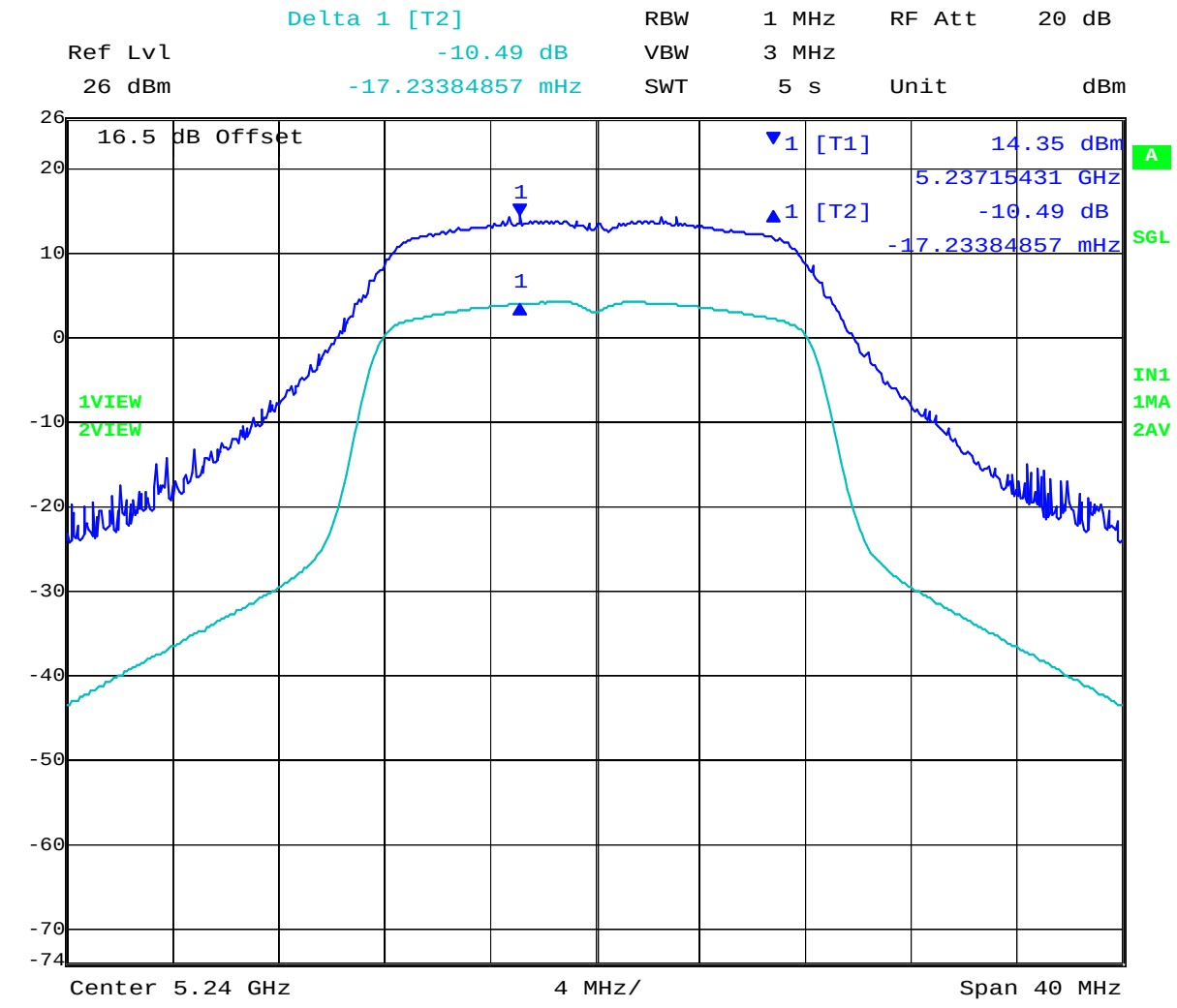
Date: 7.JAN.2011 10:37:43

Pk Excursion Ambient 5200MHz 4.20V 14.62dBm



Date: 7.JAN.2011 11:10:41

Pk Excursion Ambient 5240MHz 4.20V 14.72dBm



Date: 7.JAN.2011 11:31:00

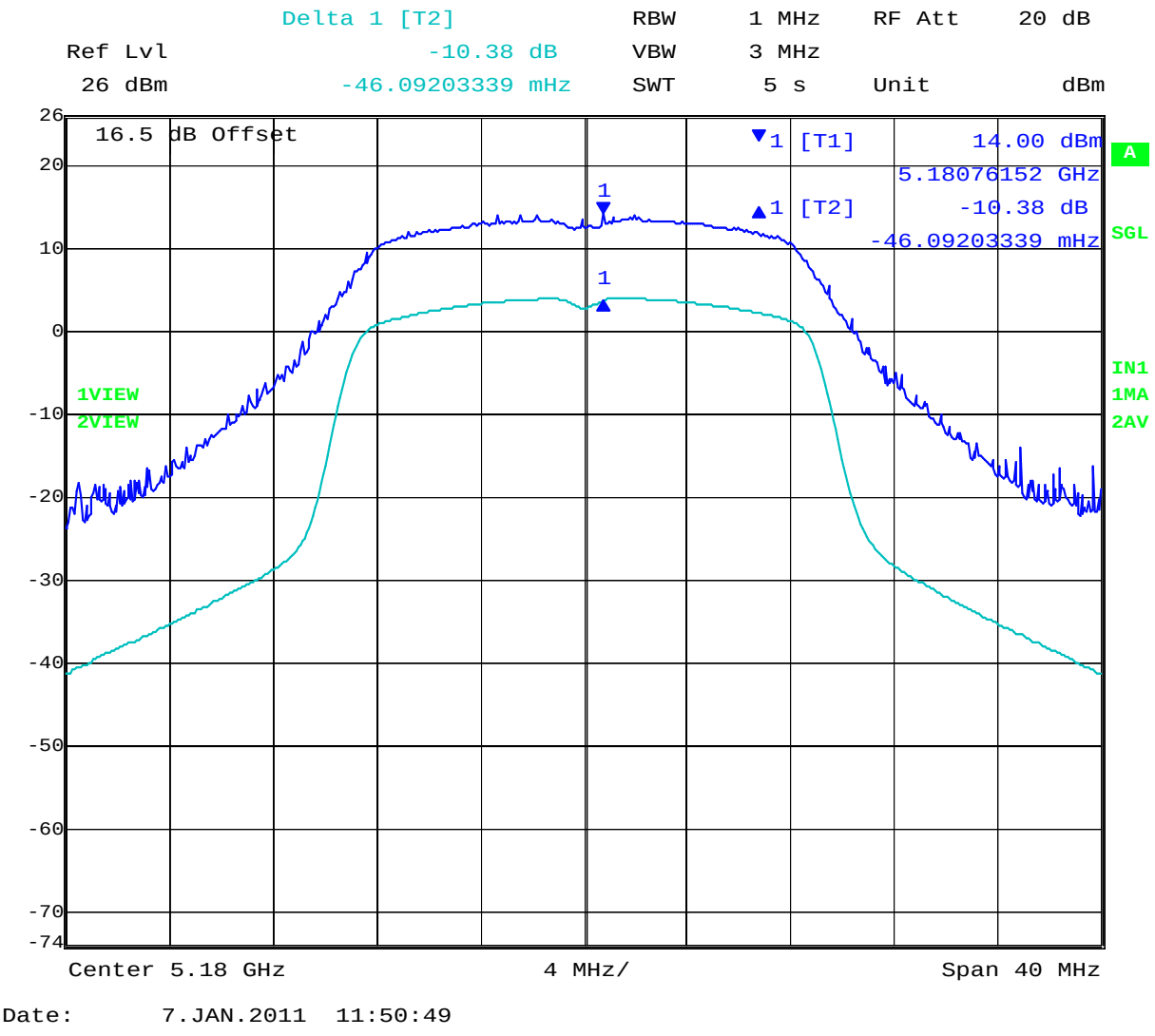
TABLE OF RESULTS – 802.11HT-20

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:**	5.51	dBi
Applied Voltage:	N/A	Vdc			
Notes 1:					
Notes 2:					

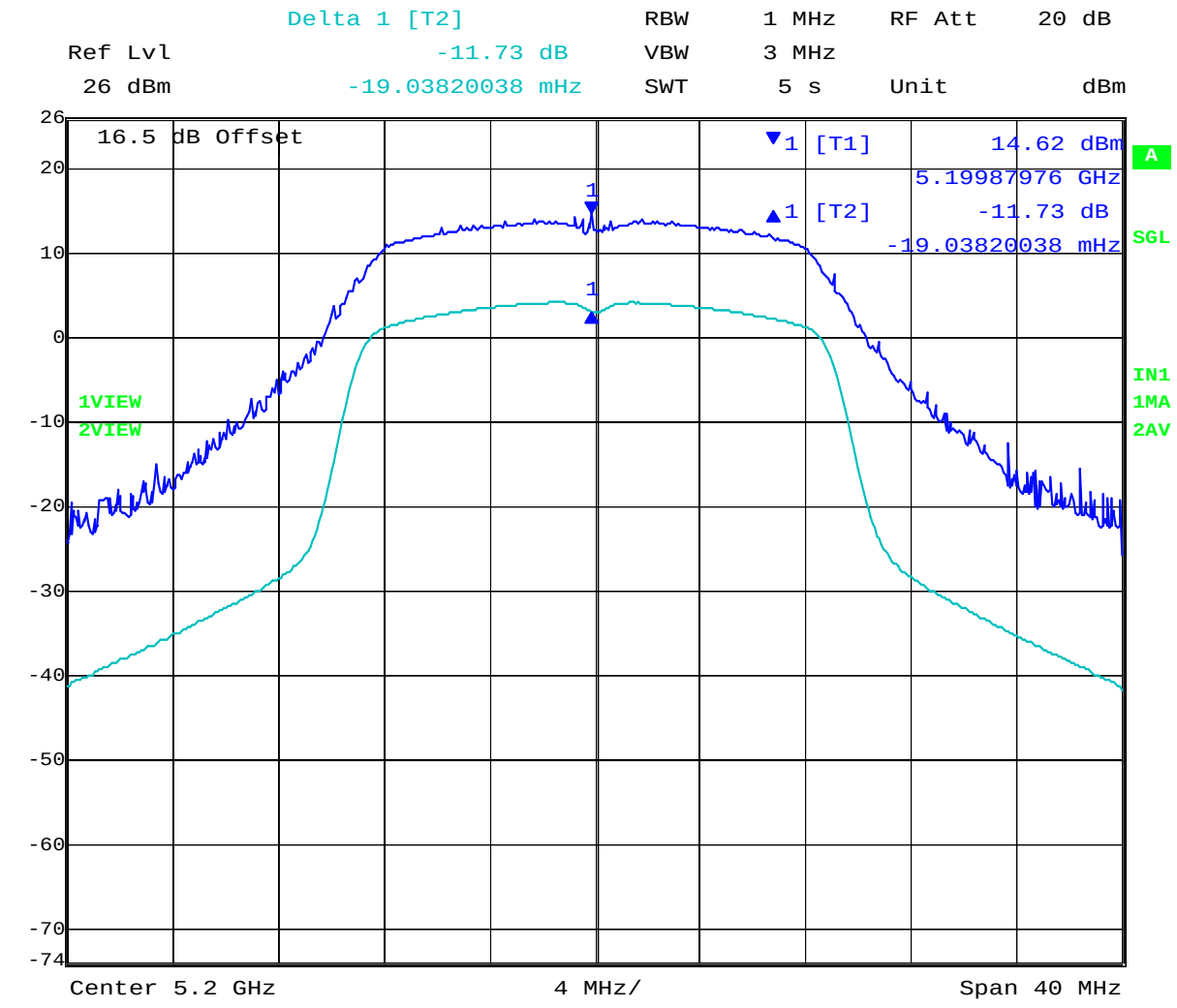
Test Frequency	Trace Peak Power Markers		Δ Marker (Marker 1 – 2)	Limit	Margin
	1	2			
MHz	**dBm**	**dBm**	**dB**	**dB**	**dB**
5180	14.00	3.62	-10.38	13	-2.62
5200	14.62	2.89	-11.73	13	-1.27
5240	13.75	3.76	-9.99	13	-3.01

Measurement uncertainty:	±1.33 dB

Pk Excursion Ambient 5180MHz 4.20V 14.83dBm

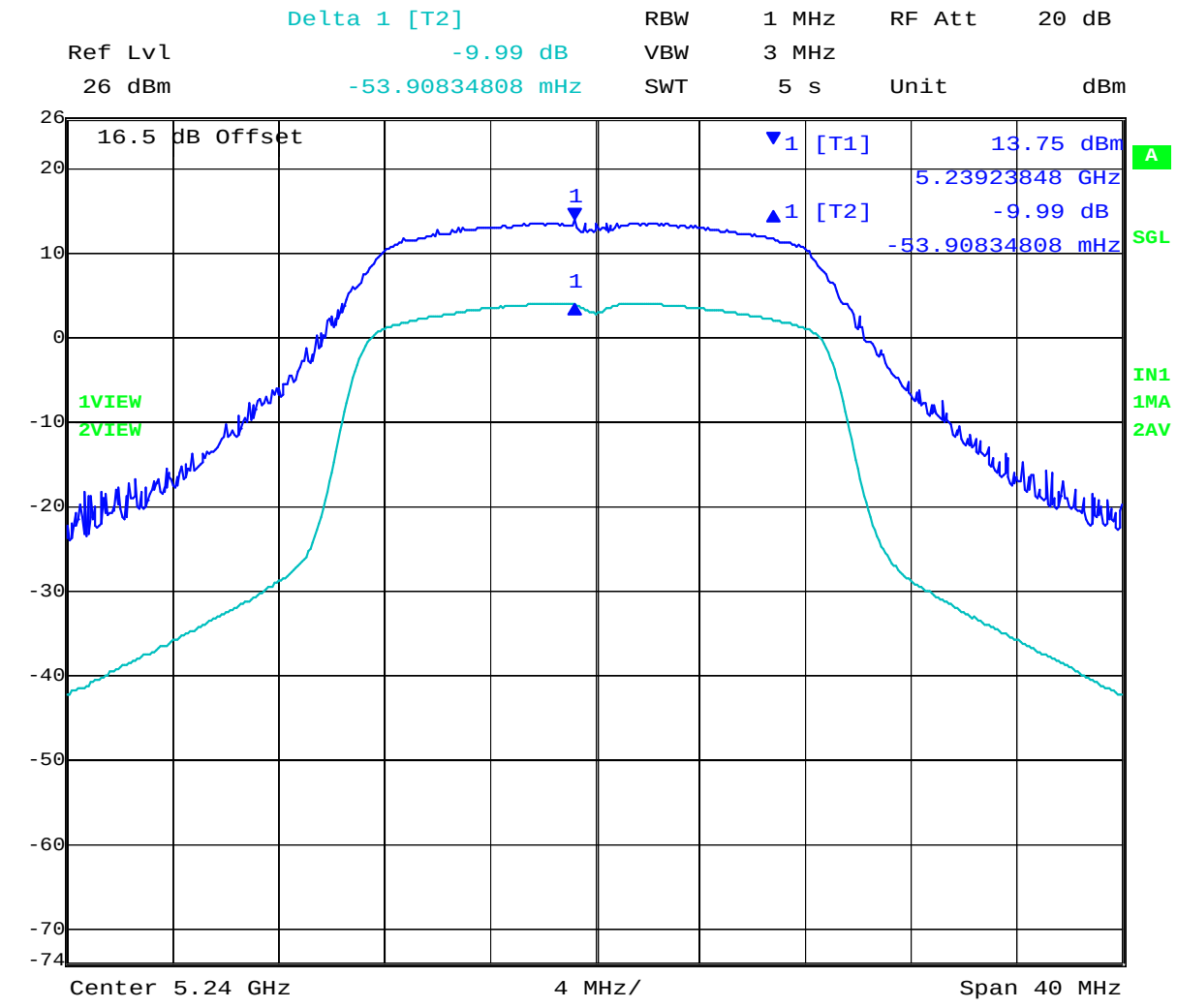


Pk Excursion Ambient 5200MHz 4.20V 14.91dBm



Date: 7.JAN.2011 12:30:00

Pk Excursion Ambient 5240MHz 4.20V 14.75dBm



Date: 7.JAN.2011 13:11:20

7.3.2 5250 MHz - 5350 MHz; Peak Excursion Ratio

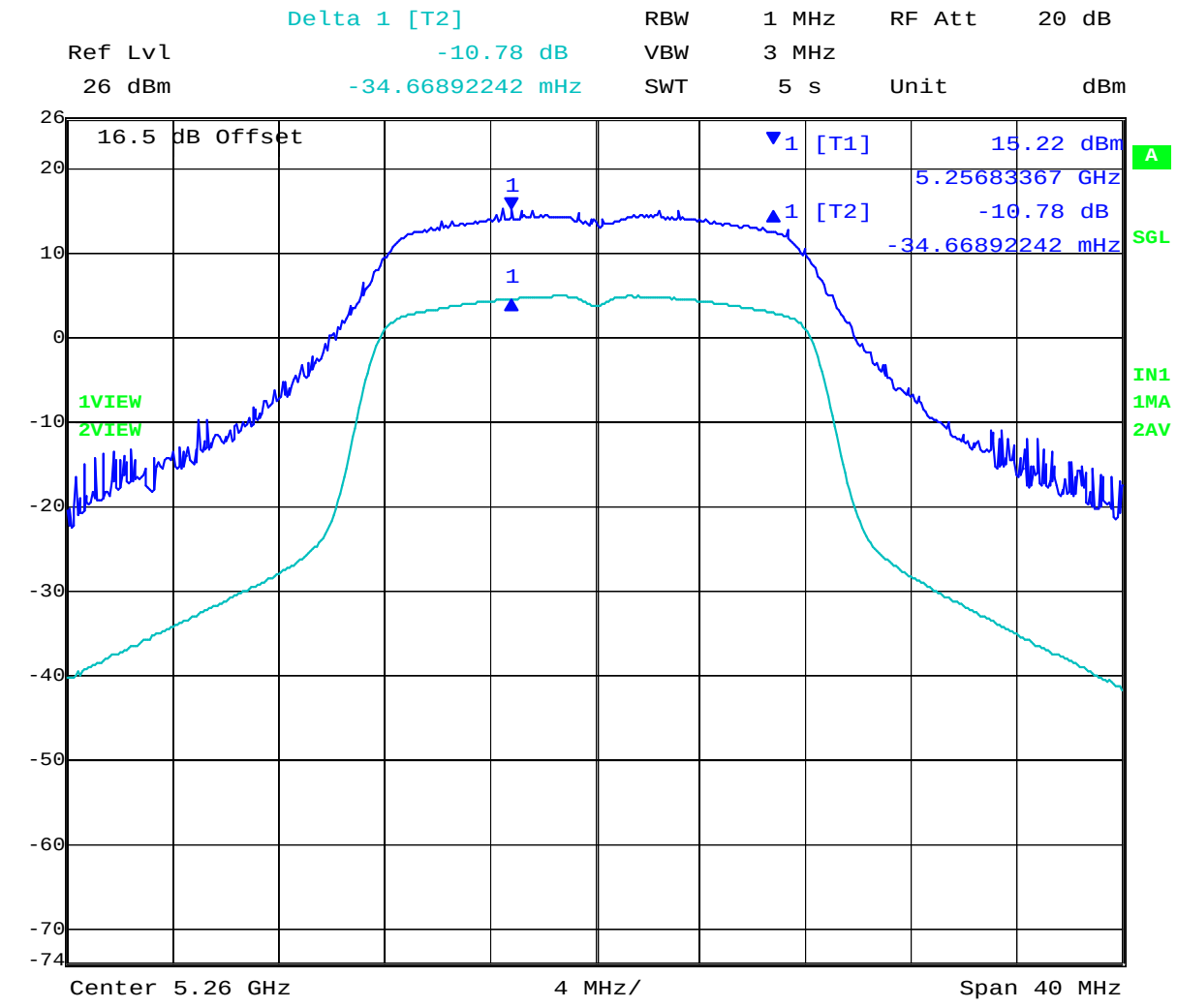
TABLE OF RESULTS – 802.11a

Test Conditions:	15.407 (a)	**Rel. Humidity (%):**	35 to 42
Variant:	802.11a	**Ambient Temp. (ºC):**	19 to 22
TPC:	HIGH	**Pressure (mBars):**	998 to 1003
Modulation:	ON	**Duty Cycle (%):**	100
Beam Forming Gain (Y):	N/A dB	**Antenna Gain:**	5.51 dBi
Applied Voltage:	N/A Vdc		
Notes 1:			
Notes 2:			

Test Frequency	Trace Peak Power Markers		Δ Marker (Marker 1 – 2)	Limit	Margin
	1	2			
MHz	**dBm**	**dBm**	**dB**	**dB**	**dB**
5260	15.22	4.44	-10.78	13	-2.22
5280	14.92	4.49	-10.43	13	-2.57
5320	15.24	4.41	-10.83	13	-2.17

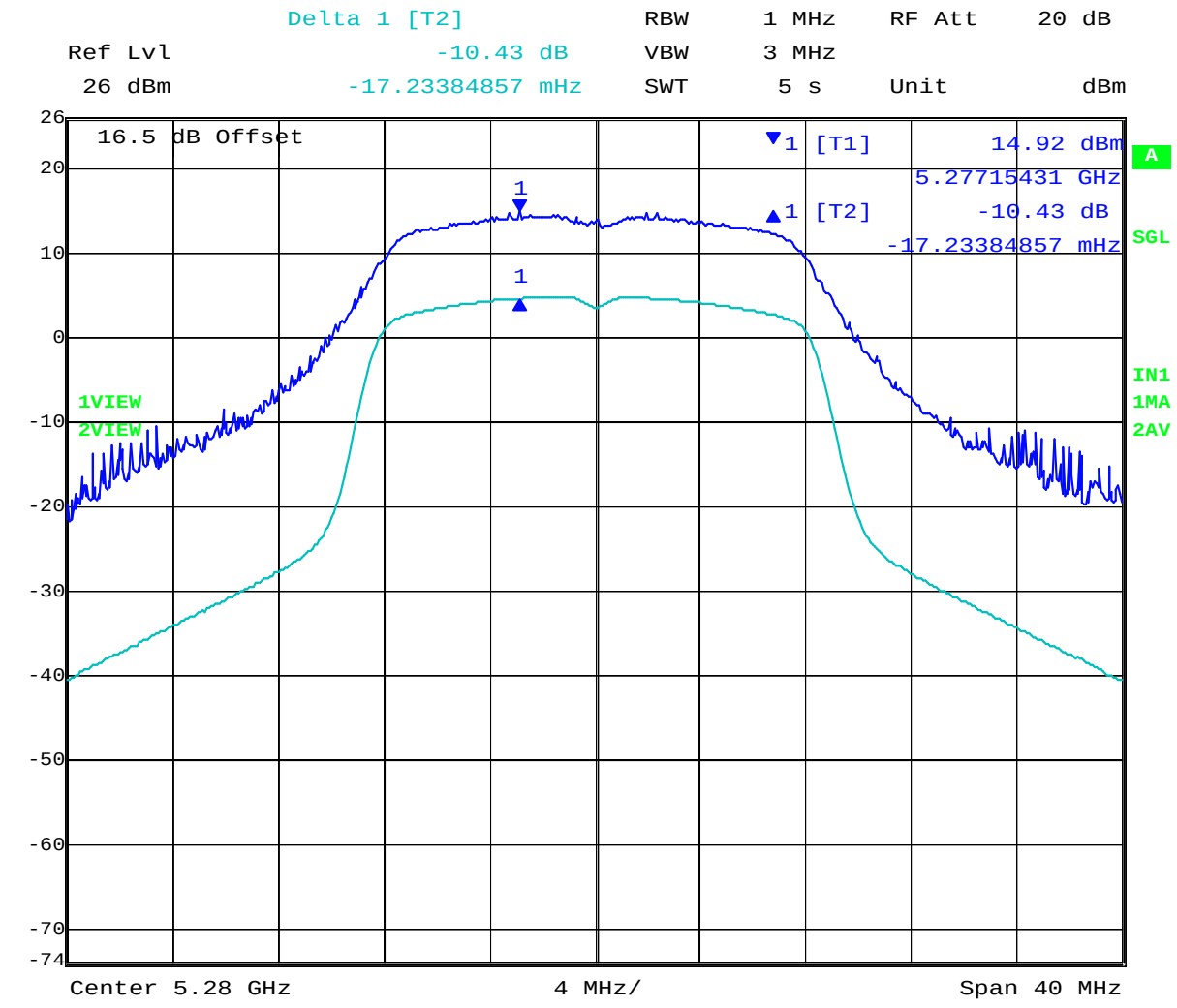
Measurement uncertainty:	±1.33 dB

Pk Excursion Ambient 5260MHz 4.20V 15.38dBm



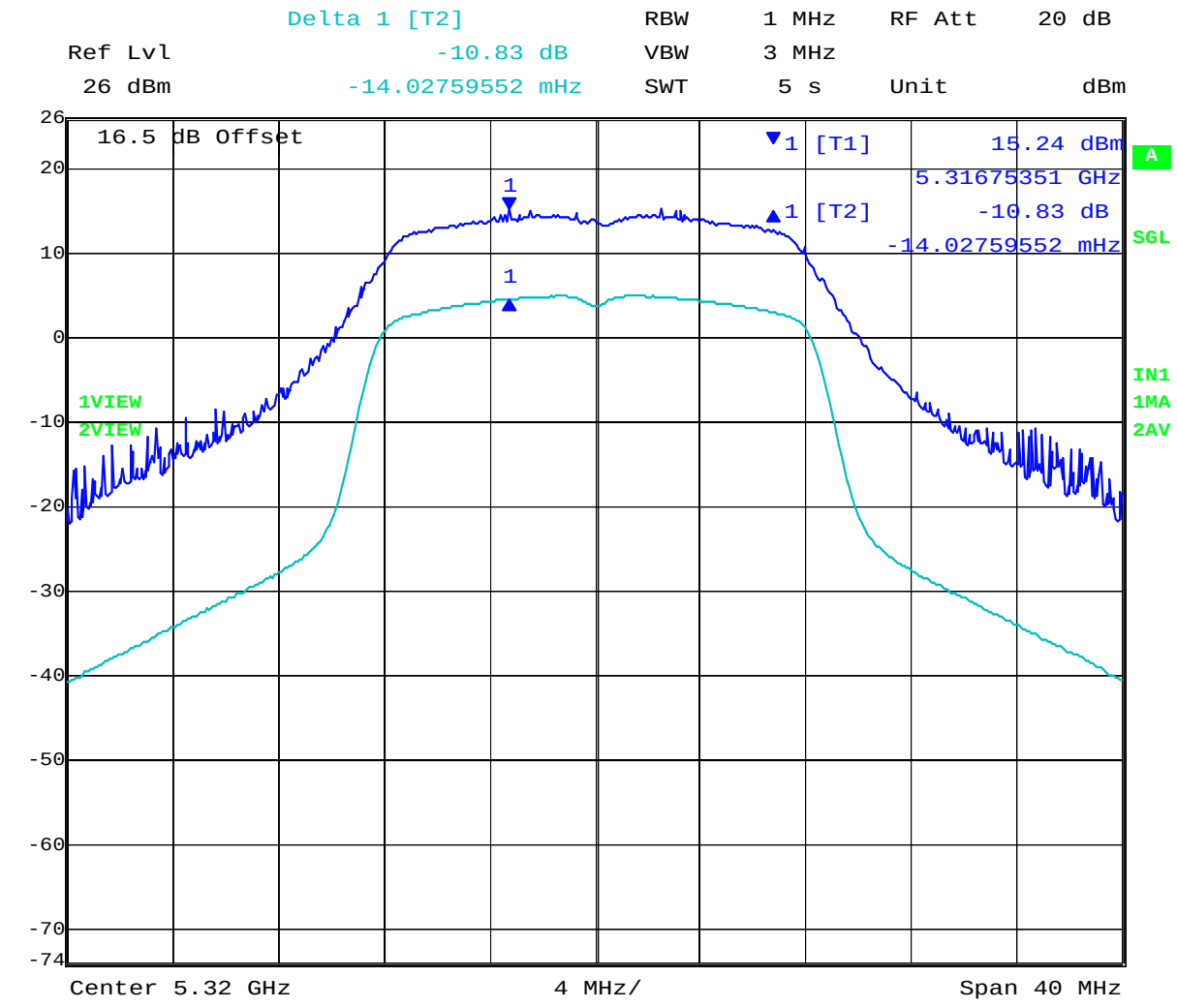
Date: 7.JAN.2011 13:51:22

Pk Excursion Ambient 5280MHz 4.20V 15.50dBm



Date: 7.JAN.2011 14:03:55

Pk Excursion Ambient 5320MHz 4.20V 15.37dBm



Date: 7.JAN.2011 14:23:01

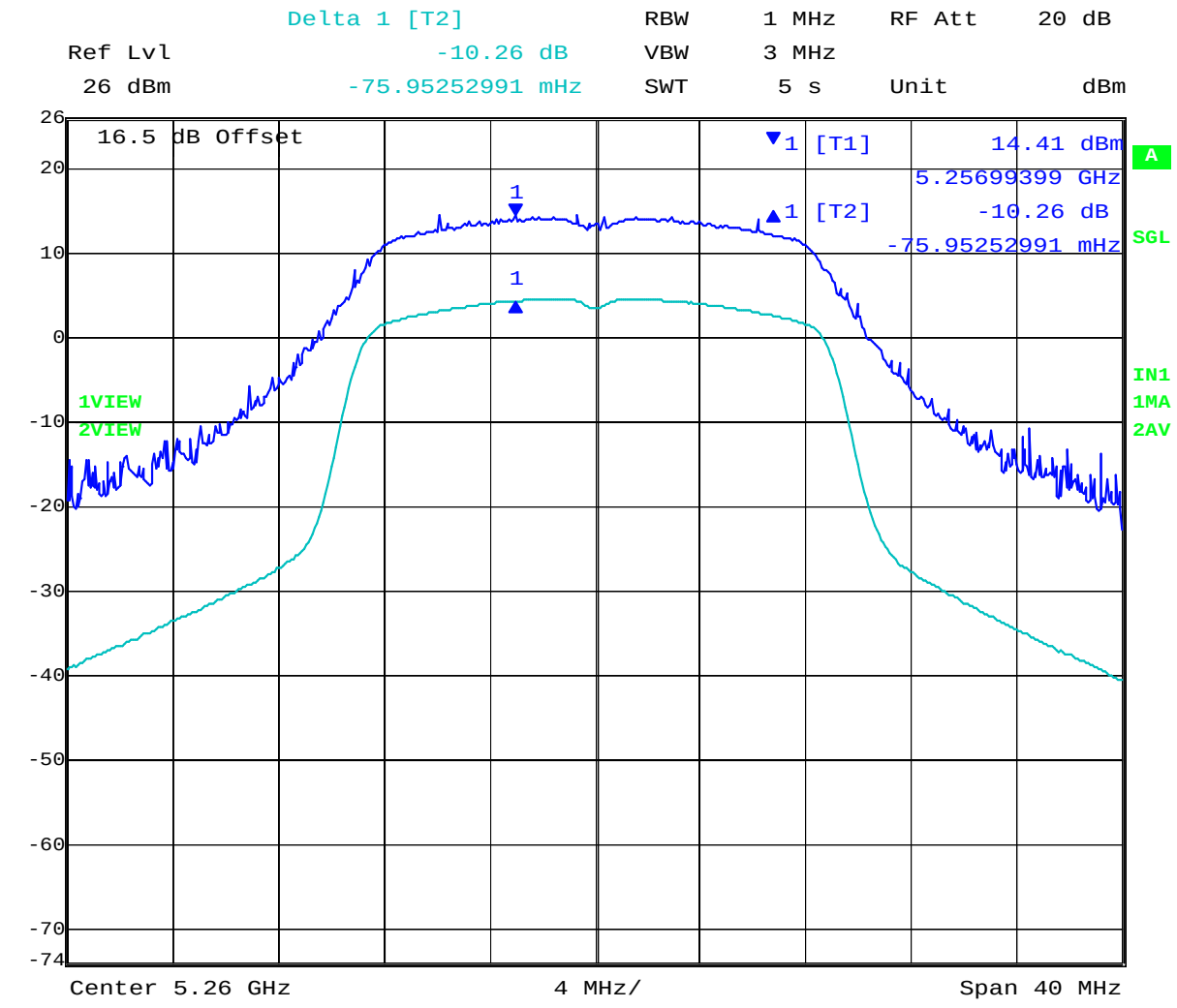
TABLE OF RESULTS – 802.11HT-20

Test Conditions:	15.407 (a)	**Rel. Humidity (%):**	35 to 42
Variant:	802.11n HT-20	**Ambient Temp. (ºC):**	19 to 22
TPC:	HIGH	**Pressure (mBars):**	998 to 1003
Modulation:	ON	**Duty Cycle (%):**	100
Beam Forming Gain (Y):	N/A dB	**Antenna Gain:**	5.51 dBi
Applied Voltage:	N/A Vdc		
Notes 1:			
Notes 2:			

Test Frequency	Trace Peak Power Markers		Δ Marker (Marker 1 – 2)	Limit	Margin
	1	2			
MHz	dBm	dBm	dB	dB	dB
5260	14.41	4.15	-10.26	13	-2.74
5280	14.77	2.90	-11.87	13	-1.13
5320	14.78	3.36	-11.42	13	-1.58

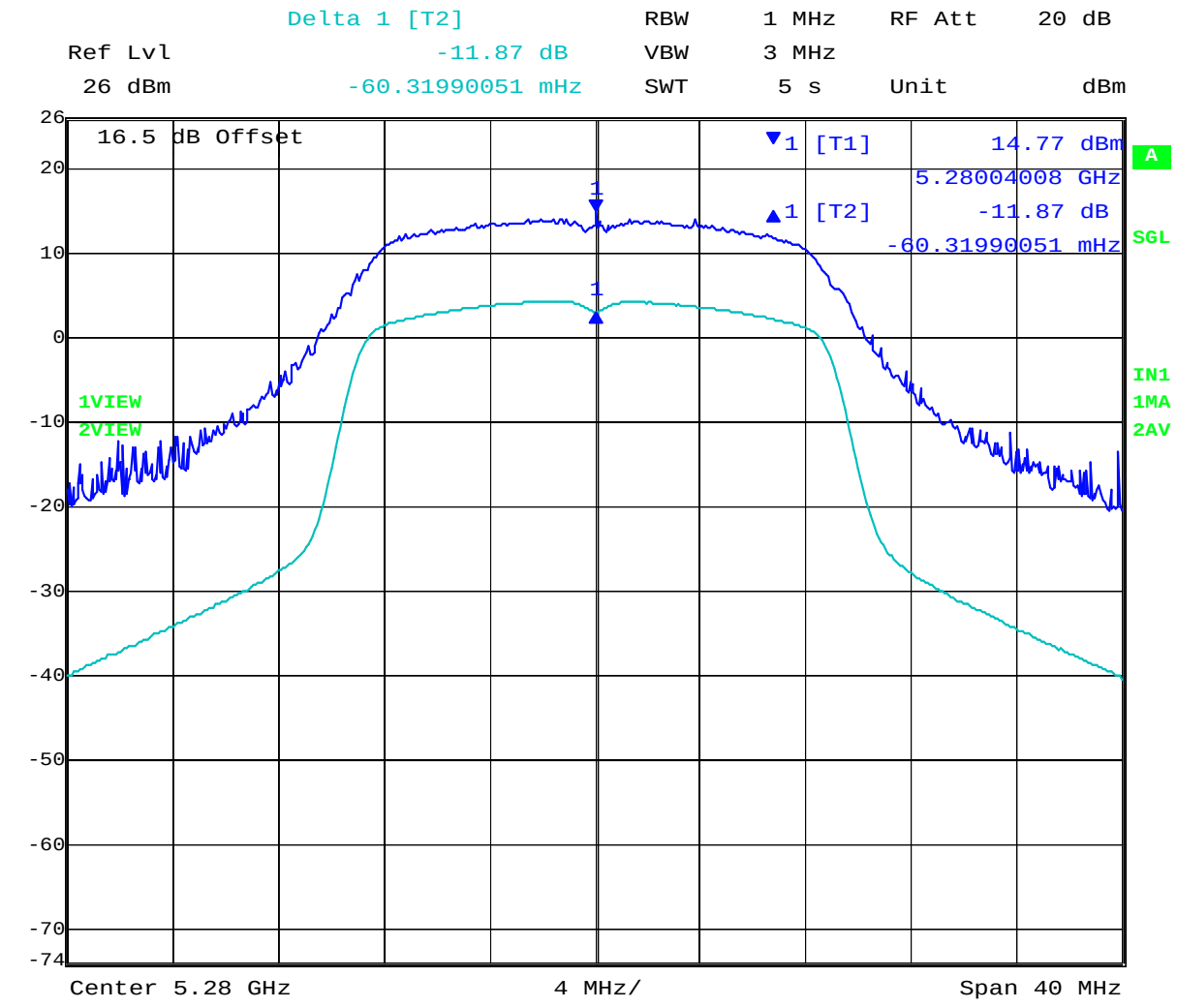
Measurement uncertainty:	±1.33 dB

Pk Excursion Ambient 5260MHz 4.20V 15.26dBm



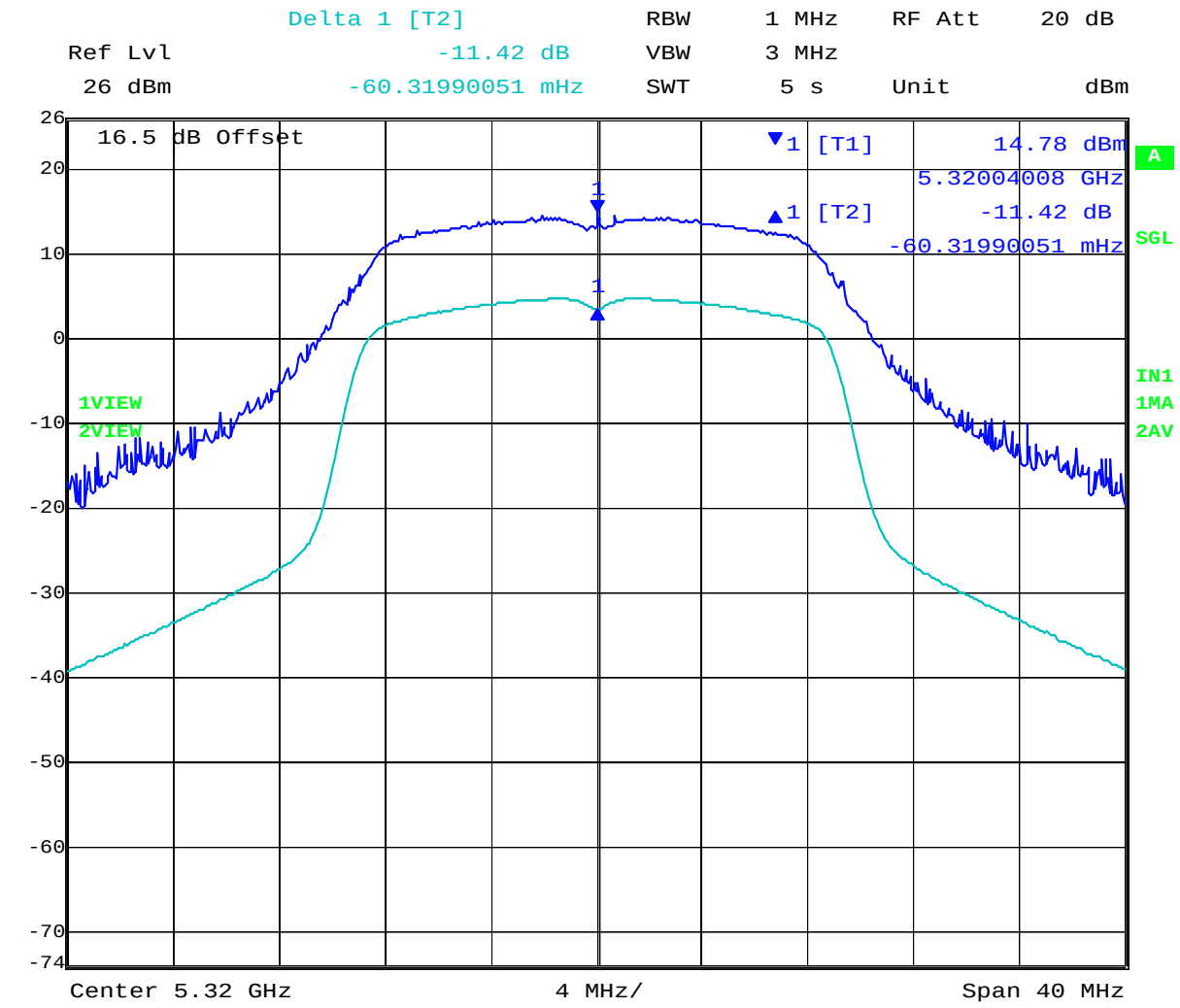
Date: 7.JAN.2011 14:41:18

Pk Excursion Ambient 5280MHz 4.20V 15.15dBm



Date: 7.JAN.2011 14:58:54

Pk Excursion Ambient 5320MHz 4.20V 15.34dBm



Date: 7.JAN.2011 15:13:43

7.3.3 5470 MHz - 5725 MHz; Peak Excursion Ratio

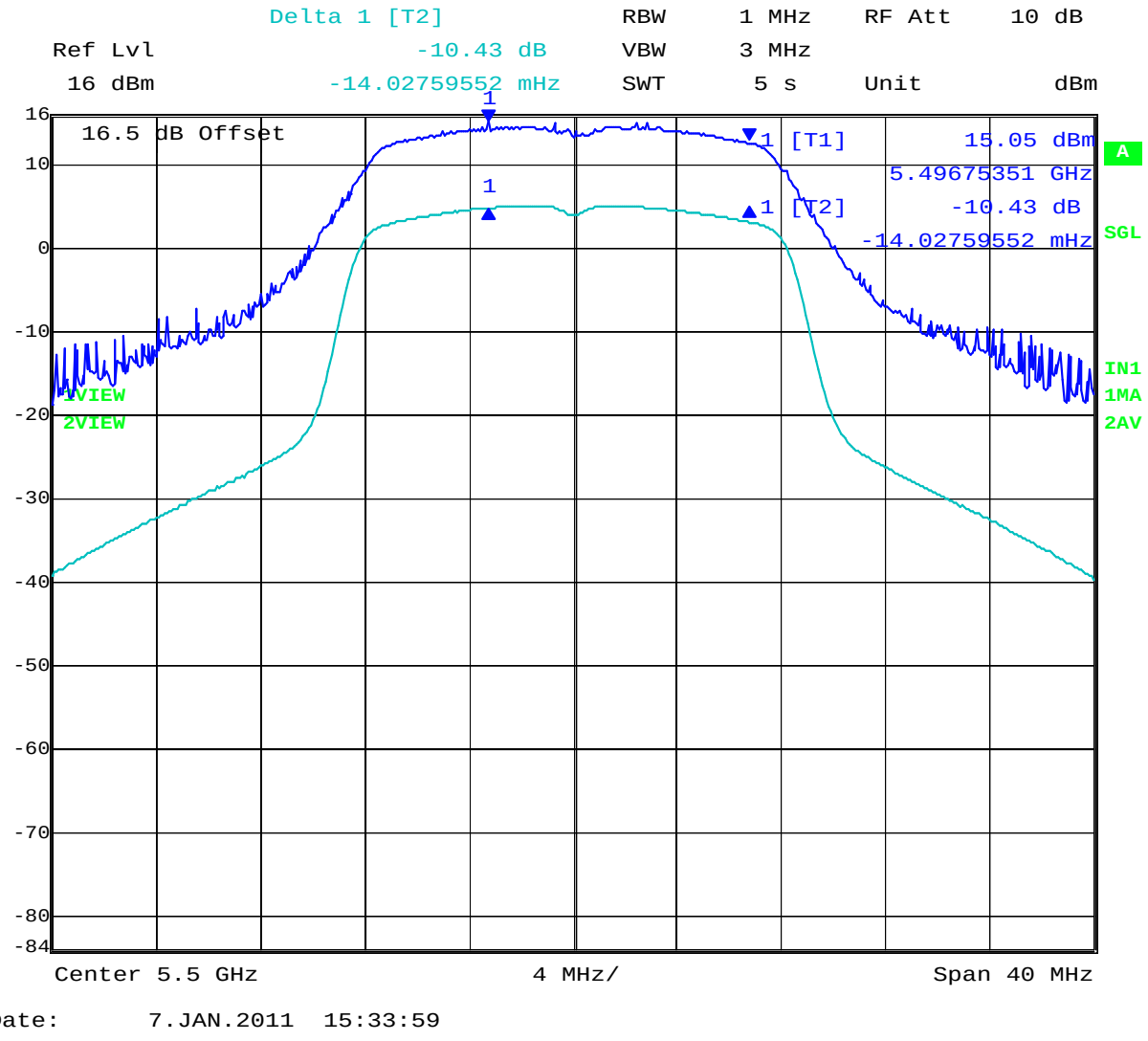
TABLE OF RESULTS – 802.11a

Test Conditions:	15.407 (a)		**Rel. Humidity (%):**	35 to 42	
Variant:	802.11a		**Ambient Temp. (ºC):**	19 to 22	
TPC:	HIGH		**Pressure (mBars):**	998 to 1003	
Modulation:	ON		**Duty Cycle (%):**	100	
Beam Forming Gain (Y):	N/A	dB	**Antenna Gain:**	5.51	dBi
Applied Voltage:	N/A	Vdc			
Notes 1:					
Notes 2:					

Test Frequency	Trace Peak Power Markers		Δ Marker (Marker 1 – 2)	Limit	Margin
	1	2			
MHz	dBm	dBm	dB	dB	dB
5500	15.05	4.62	-10.43	13	-2.57
5580	14.85	4.81	-10.04	13	-2.96
5700	14.92	4.60	-10.32	13	-2.68

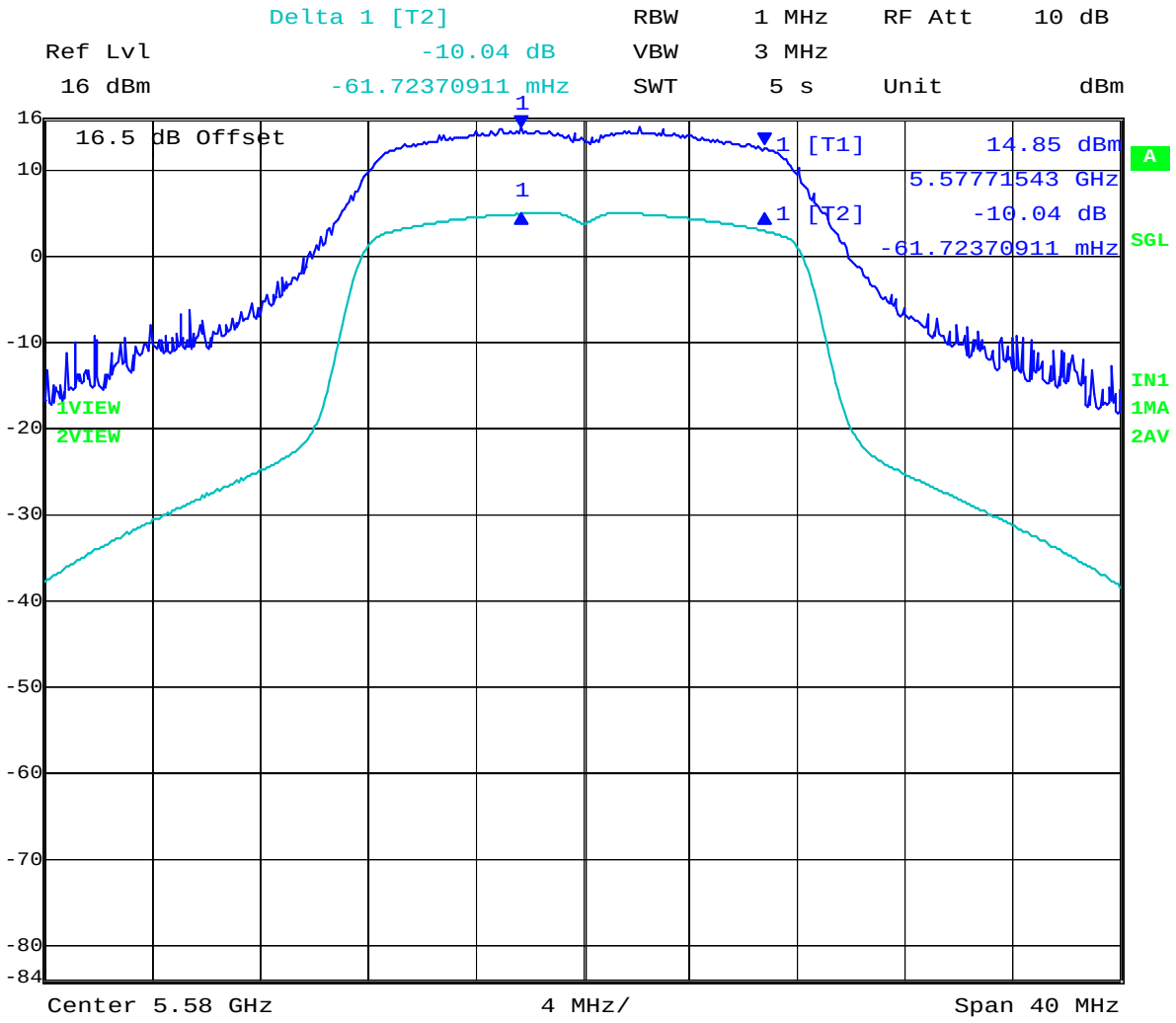
Measurement uncertainty:	±1.33 dB

Pk Excursion Ambient 5500MHz 4.20V 16.02dBm



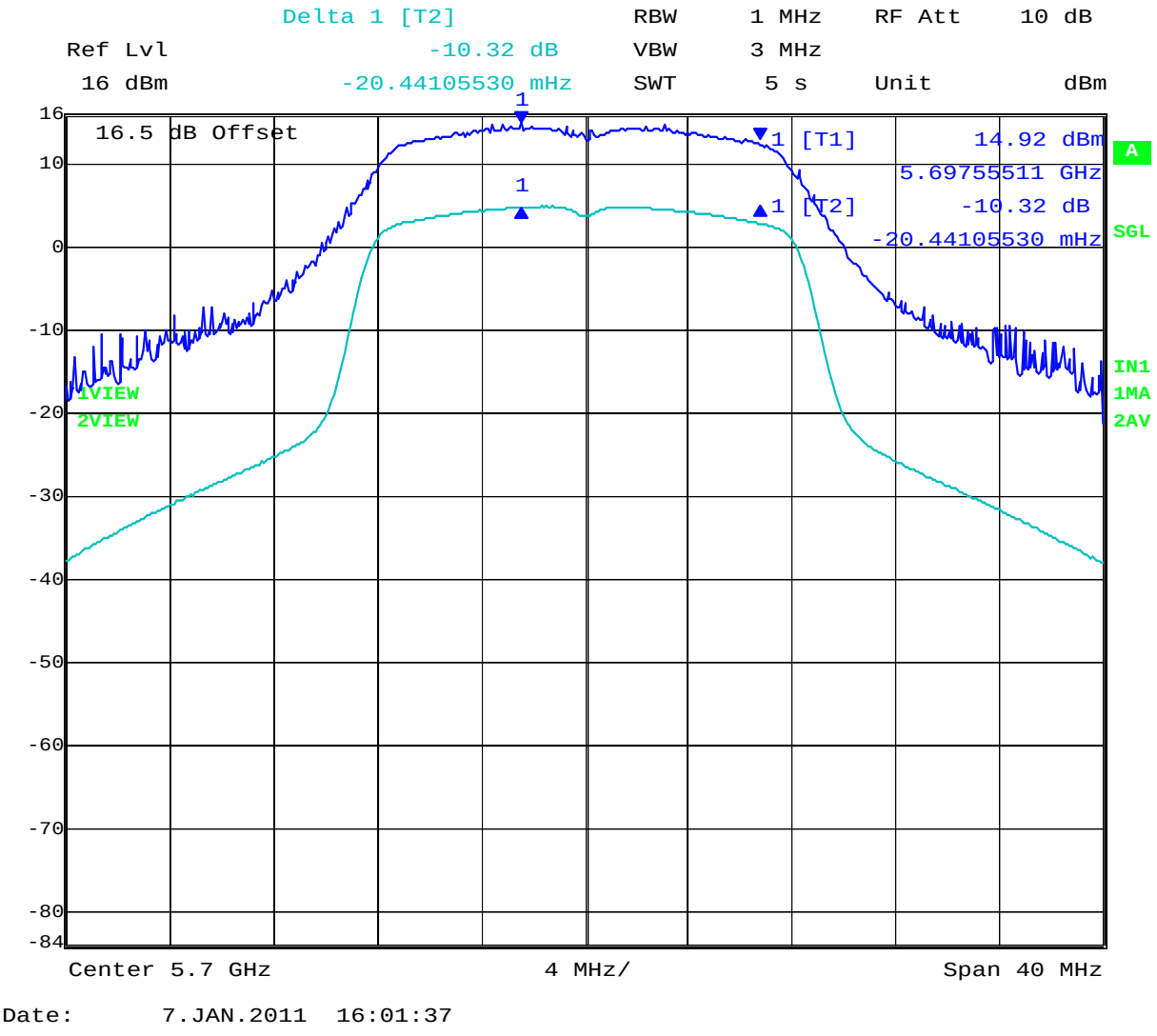
Date: 7.JAN.2011 15:33:59

Pk Excursion Ambient 5580MHz 4.20V 16.02dBm



Date: 7.JAN.2011 15:47:09

Pk Excursion Ambient 5700MHz 4.20V 16.43dBm



Date: 7.JAN.2011 16:01:37

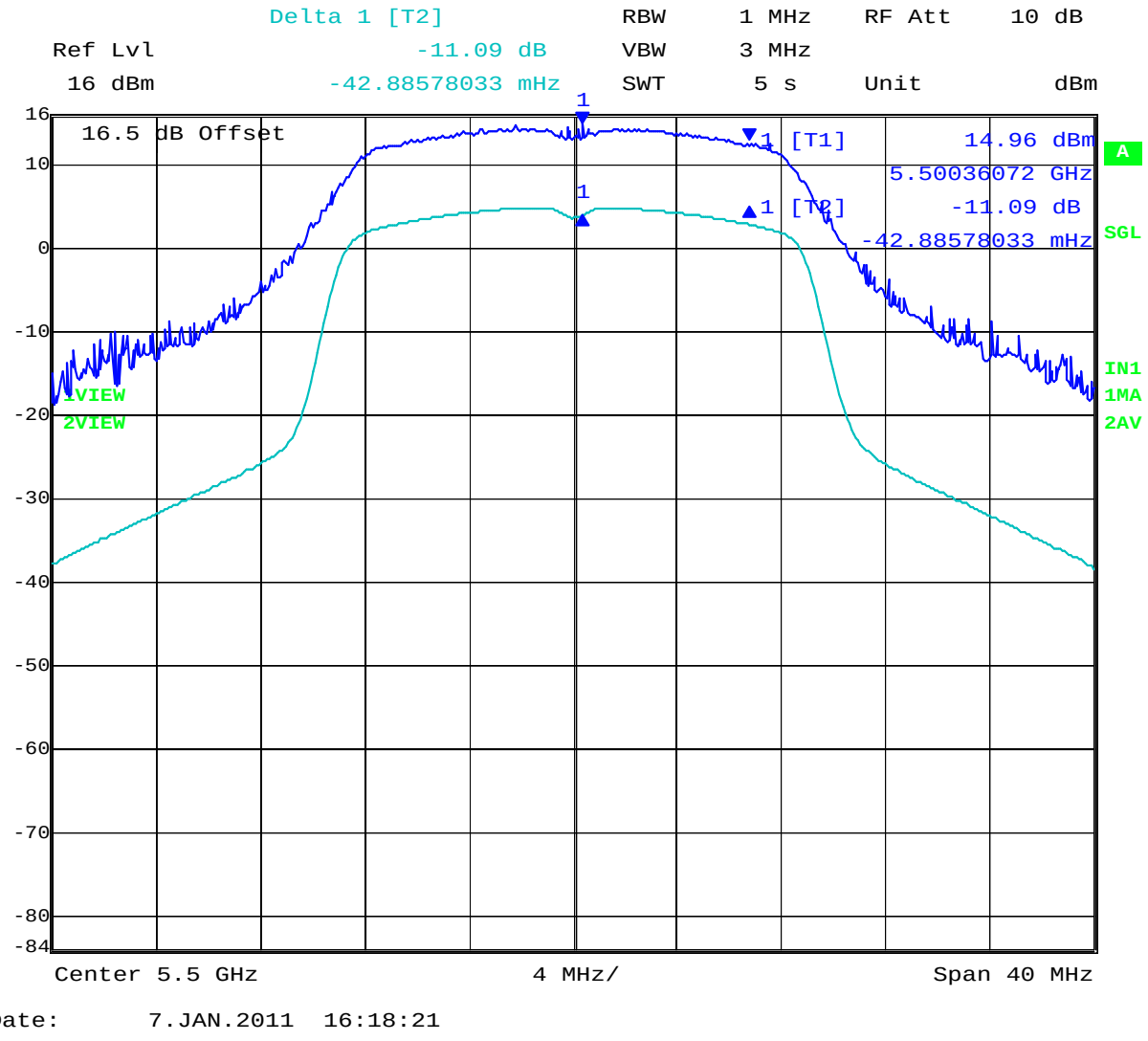
TABLE OF RESULTS – 802.11HT-20

Test Conditions:	15.407 (a)		**Rel. Humidity (%):**	35 to 42	
Variant:	802.11n HT-20		**Ambient Temp. (ºC):**	19 to 22	
TPC:	HIGH		**Pressure (mBars):**	998 to 1003	
Modulation:	ON		**Duty Cycle (%):**	100	
Beam Forming Gain (Y):	N/A	dB	**Antenna Gain:**	5.51	dBi
Applied Voltage:	N/A	Vdc			
Notes 1:					
Notes 2:					

Test Frequency	Trace Peak Power Markers		Δ Marker (Marker 1 – 2)	Limit	Margin
	1	2			
MHz	**dBm**	**dBm**	**dB**	**dB**	**dB**
5500	14.96	3.87	-11.09	13	-1.91
5580	14.38	4.00	-10.38	13	-2.62
5700	14.62	3.55	-11.07	13	-1.93

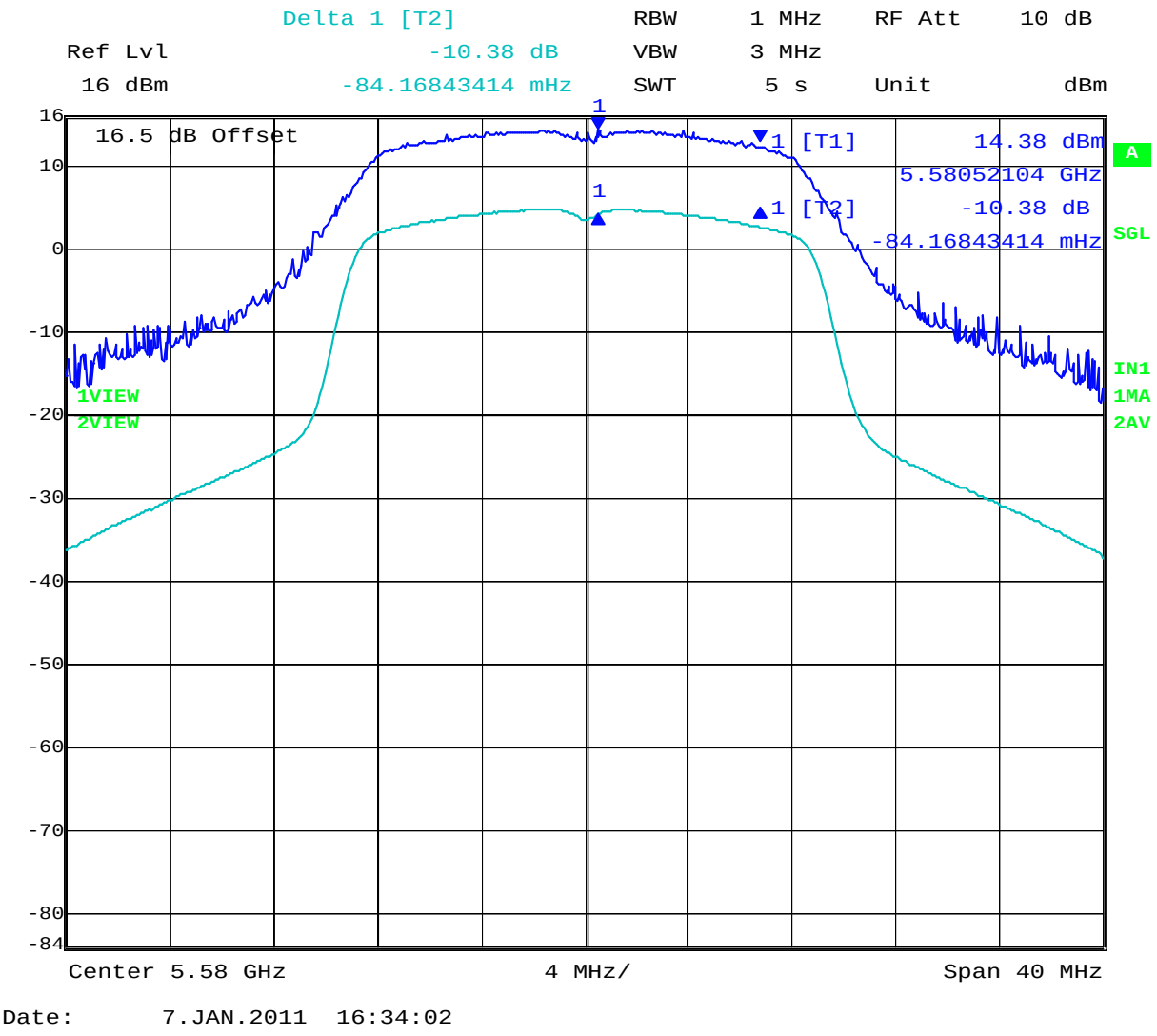
Measurement uncertainty:	±1.33 dB

Pk Excursion Ambient 5500MHz 4.20V 15.93dBm

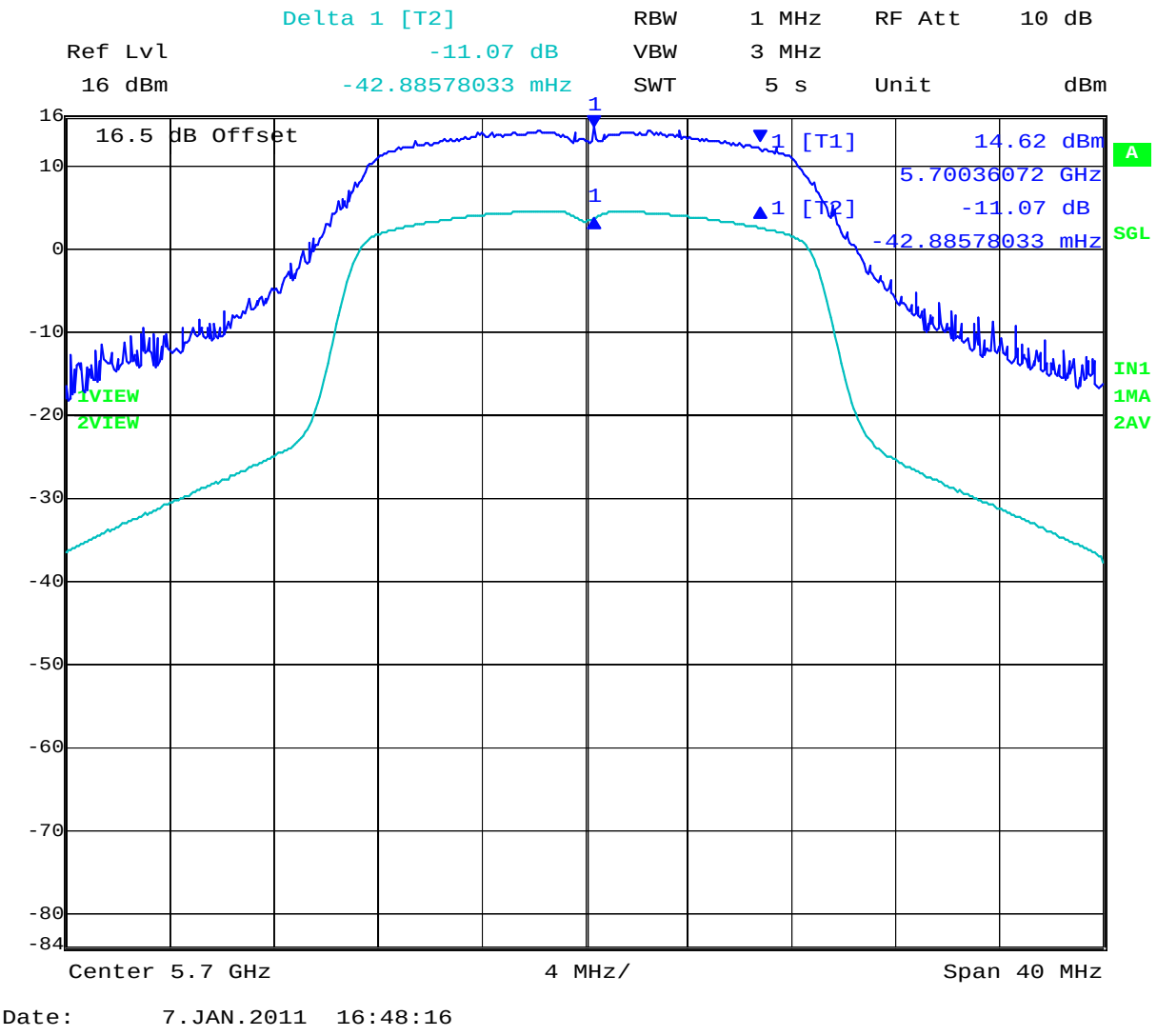


Date: 7.JAN.2011 16:18:21

Pk Excursion Ambient 5580MHz 4.20V 15.90dBm



Pk Excursion Ambient 5700MHz 4.20V 16.29dBm



Date: 7.JAN.2011 16:48:16

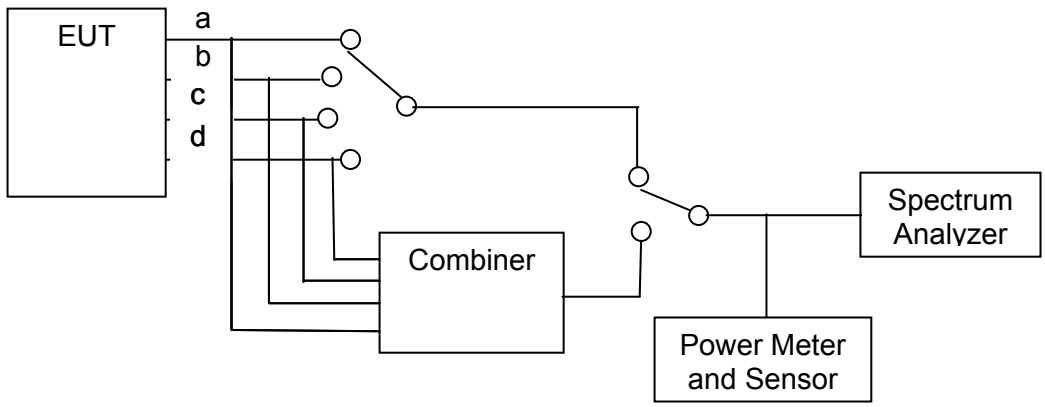
7.4 Peak Power Spectral Density

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



Measurement setup for Peak Power Spectral Density

Specification

FCC, Part 15 §15.407 (a)(1), (a)(2)
5150 – 5250 MHz

(a)(1) The peak power spectral density shall not exceed +4 dBm in any 1 megahertz band

5250 – 5350 MHz & 5470 – 5725 MHz

(a)(2) The peak power spectral density shall not exceed +11 dBm in any 1 megahertz band

Industry Canada RSS-210 § A9.2(1), A9.2(2)
5150 – 5250 MHz

§ A9.2(1) The e.i.r.p. spectral density shall not exceed +10 dBm in any 1 MHz band

5250 – 5350 MHz & 5470 – 5725 MHz

§ A9.2(2) The power spectral density shall not exceed +11 dBm in any 1 MHz band

Laboratory Measurement Uncertainty for Spectral Density

Measurement uncertainty	±1.33 dB

Traceability

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

Measurement Results for Peak Power Spectral Density

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

7.4.1 5150 MHz - 5250 MHz; Peak Power Spectral Density

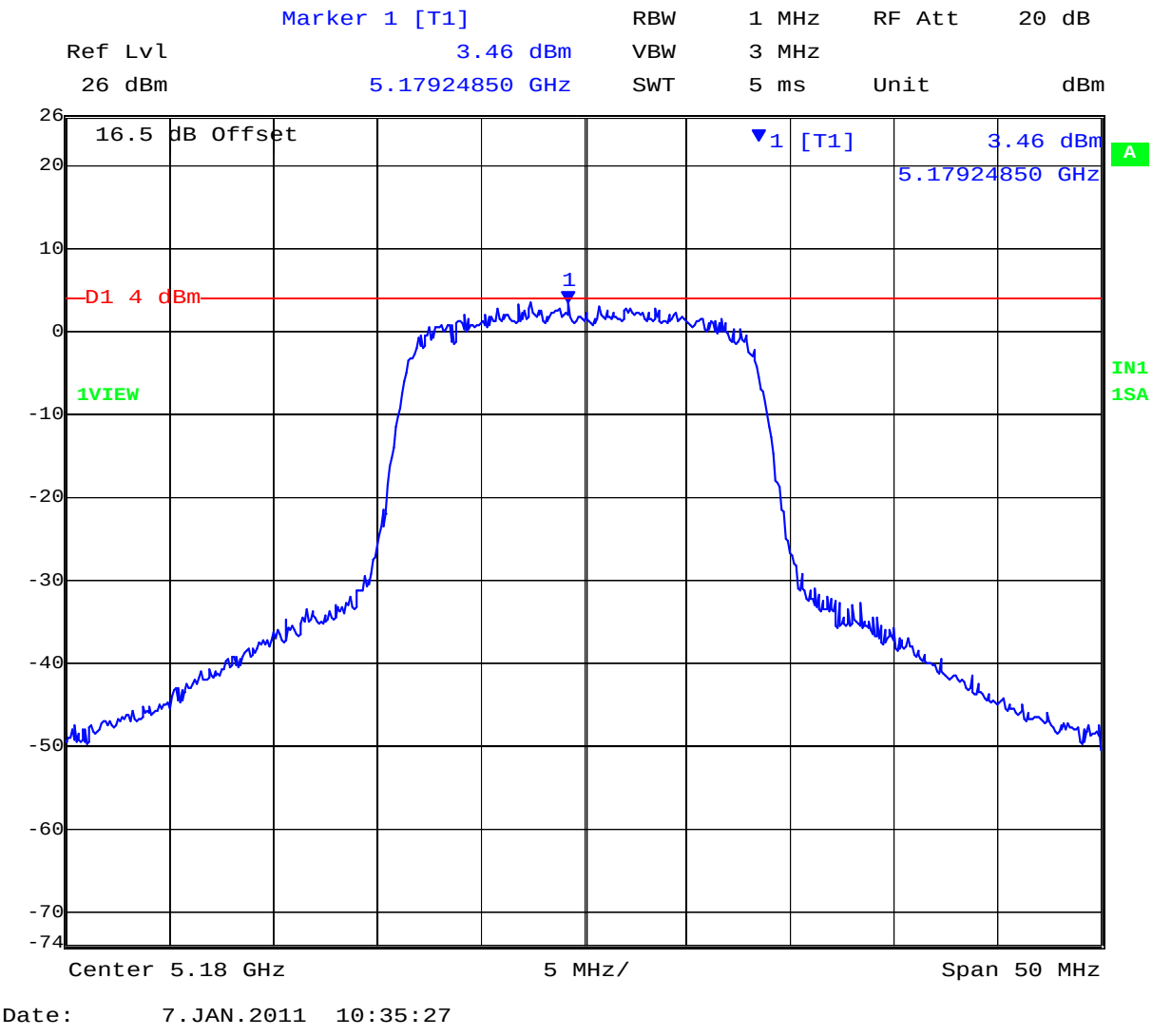
TABLE OF RESULTS – 802.11a

Test Conditions:	15.407 (a)				**Rel. Humidity (%):**	35	to	42
Variant:	802.11a				**Ambient Temp. (ºC):**	19	to	22
TPC:	HIGH				**Pressure (mBars):**	998	to	1003
Modulation:	ON				**Duty Cycle (%):**	100		
Beam Forming Gain (Y):	N/A	dB			**Antenna Gain:**	5.51	dBi	
Applied Voltage:	4.2	Vdc						
Notes 1:								
Notes 2:								

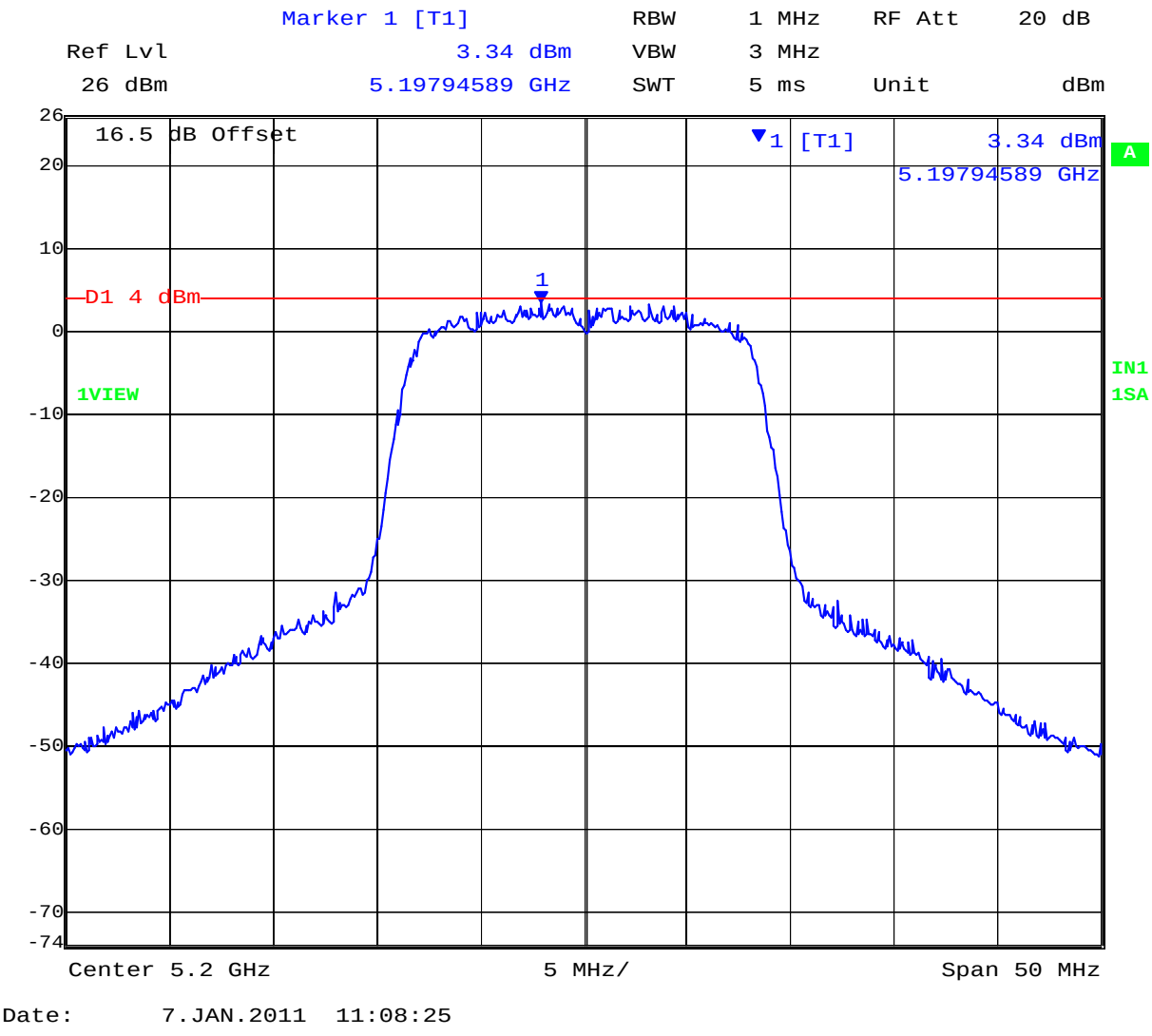
Test Frequency	**Measured Peak Power RF Port (dBm)**				**Total Power (dBm)**		**Limit**	**Margin**
MHz	**a**	**b**	**c**	**d**	**Combined**	**Calculated**	**dBm**	**dB**
5180	3.46				3.46		4.00	-0.54
5200	3.34				3.34		4.00	-0.66
5240	3.40				3.40		4.00	-0.60

Measurement uncertainty:	±1.33 dB

Power Density Ambient 5180MHz 4.20V 14.69dBm



Power Density Ambient 5200MHz 4.20V 14.63dBm



Power Density Ambient 5240MHz 4.20V 14.60dBm

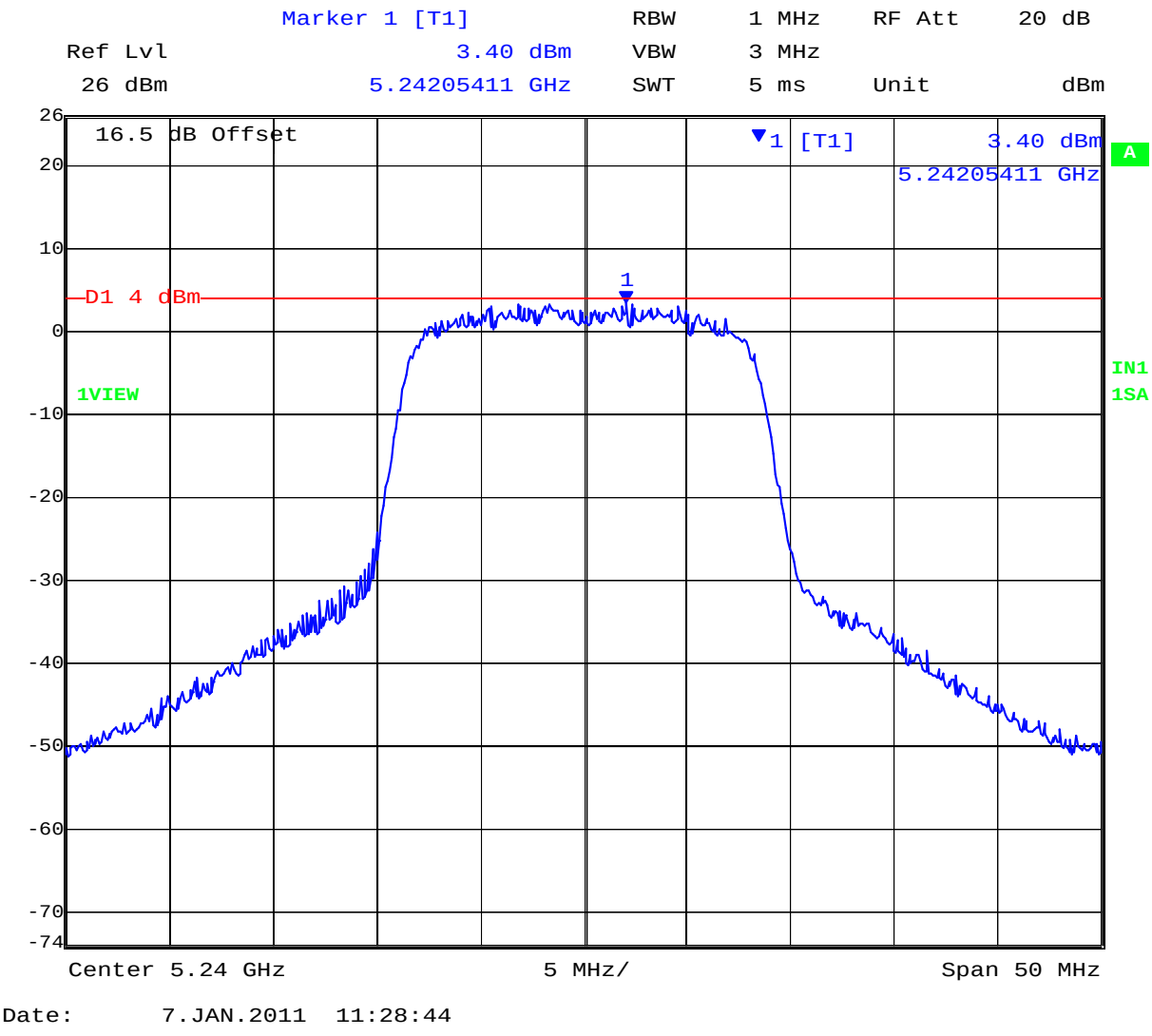


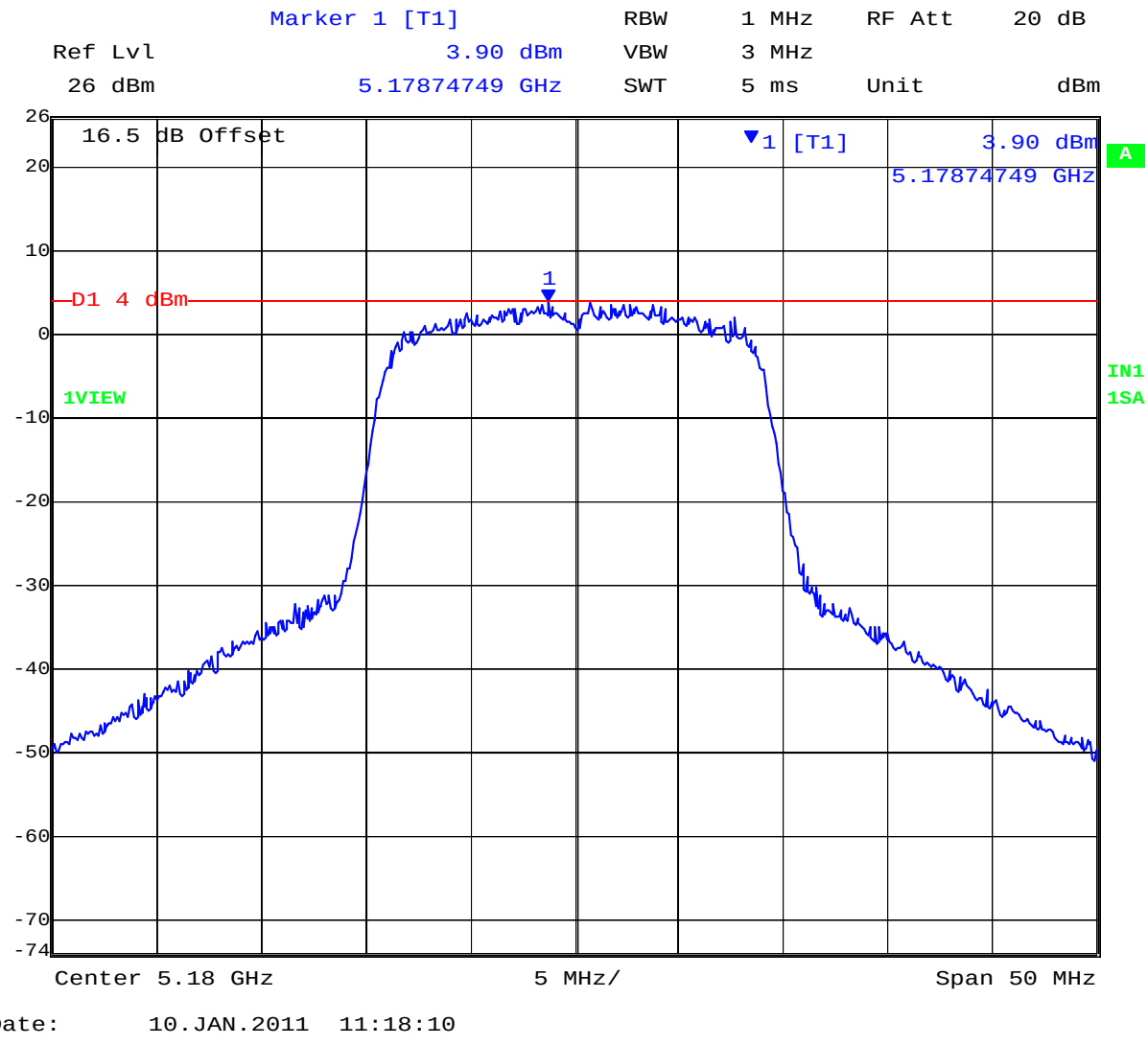
TABLE OF RESULTS – 802.11n HT-20

Test Conditions:	15.407 (a)		**Rel. Humidity (%):**	35 to 42	
Variant:	802.11n HT-20		**Ambient Temp. (ºC):**	19 to 22	
TPC:	HIGH		**Pressure (mBars):**	998 to 1003	
Modulation:	ON		**Duty Cycle (%):**	100	
Beam Forming Gain (Y):	N/A	dB	**Antenna Gain:**	5.51	dBi
Applied Voltage:	4.2	Vdc			
Notes 1:					
Notes 2:					

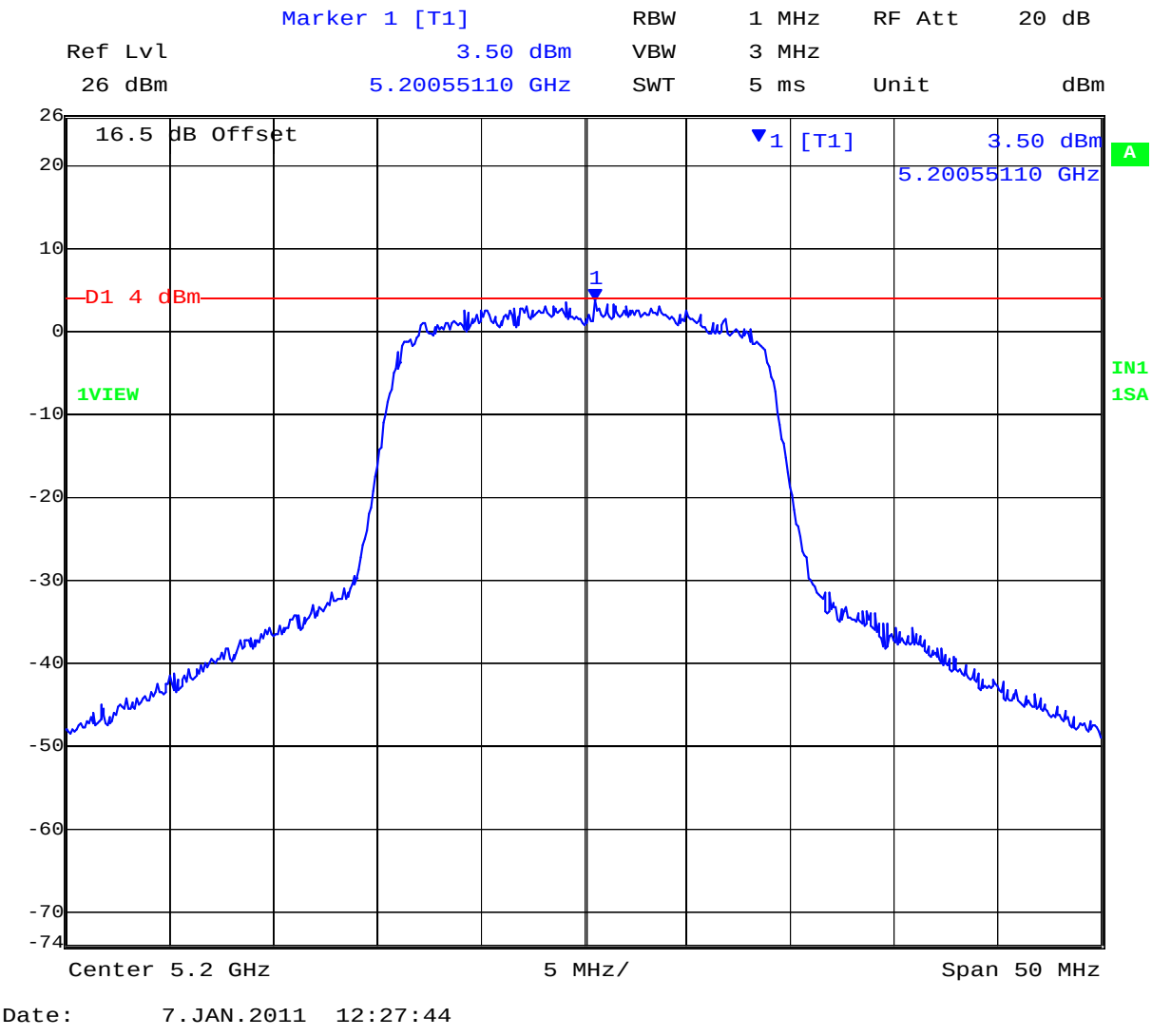
Test Frequency	Measured Peak Power RF Port (dBm)				Total Power (dBm)		Limit	Margin
MHz	**a**	**b**	**c**	**d**	**Combined**	**Calculated**	**dBm**	**dB**
5180	3.90				3.90		4.00	-0.10
5200	3.50				3.50		4.00	-0.50
5240	3.84				3.84		4.00	-0.16

Measurement uncertainty:	±1.33 dB

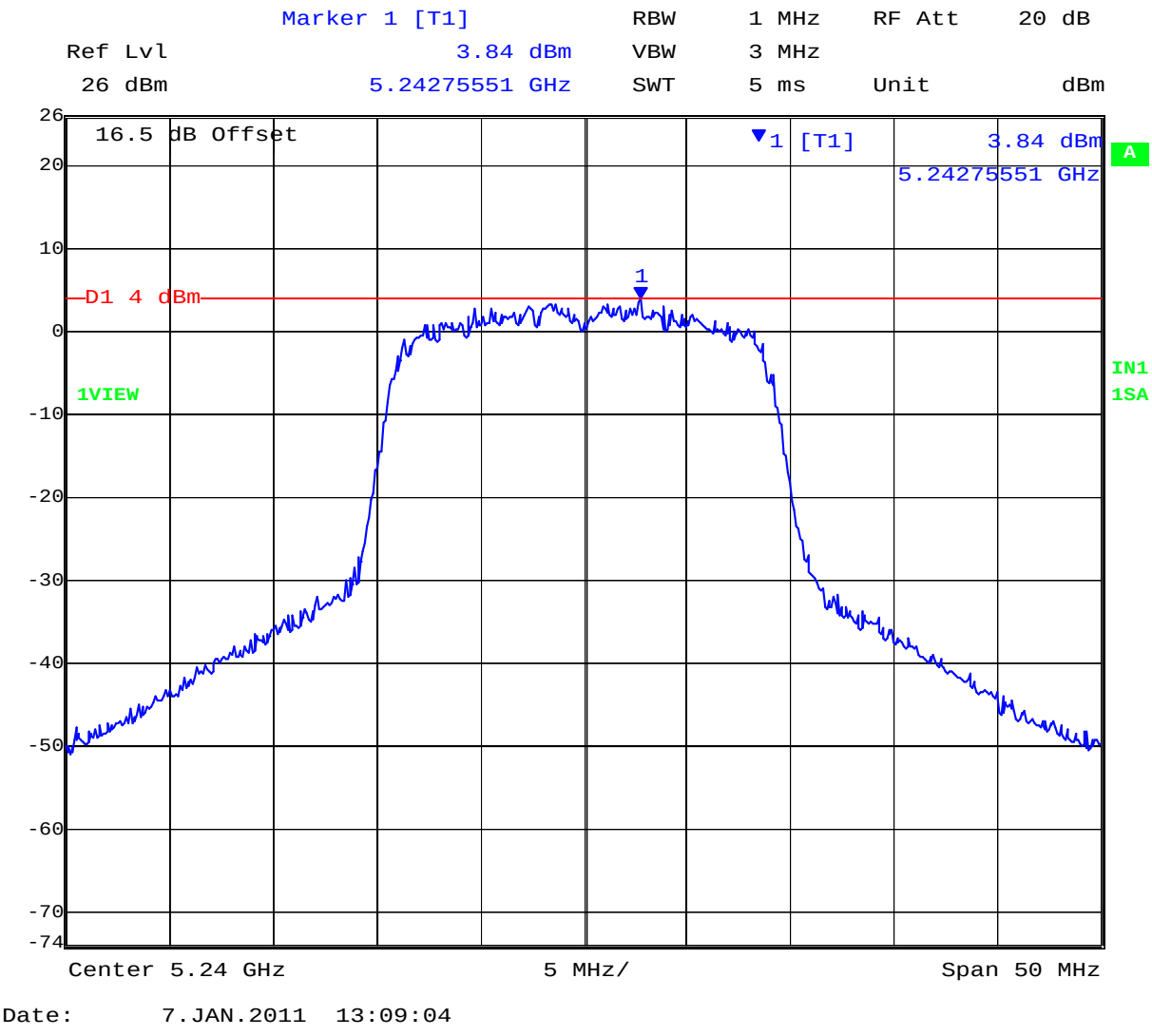
Power Density Ambient 5180MHz 4.20V 15.08dBm



Power Density Ambient 5200MHz 4.20V 14.91dBm



Power Density Ambient 5240MHz 4.20V 14.75dBm



7.4.2 5250 MHz - 5350 MHz; Peak Power Spectral Density

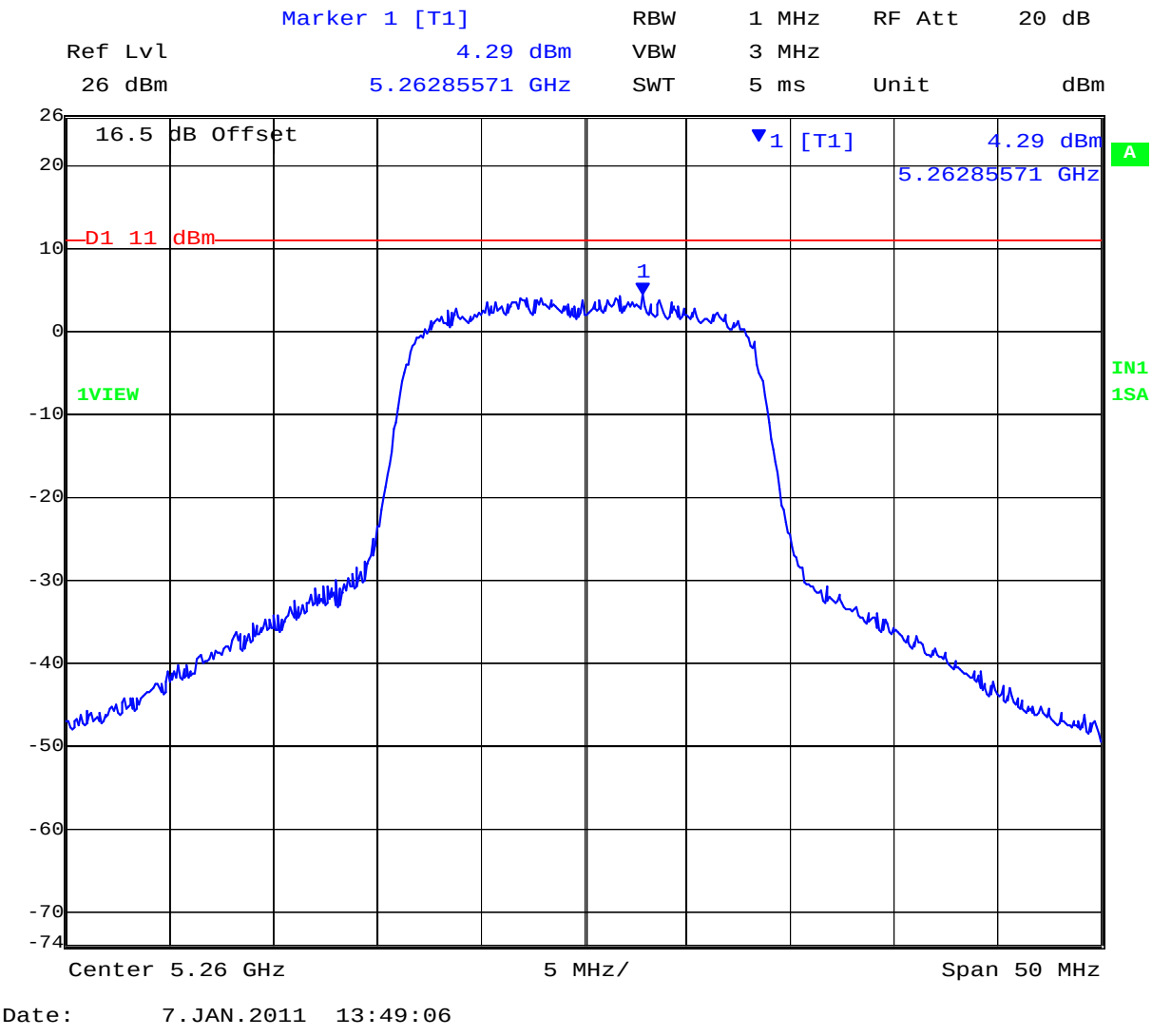
TABLE OF RESULTS – 802.11a

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:**	5.51	dBi
Applied Voltage:	4.2	Vdc			
Notes 1:					
Notes 2:					

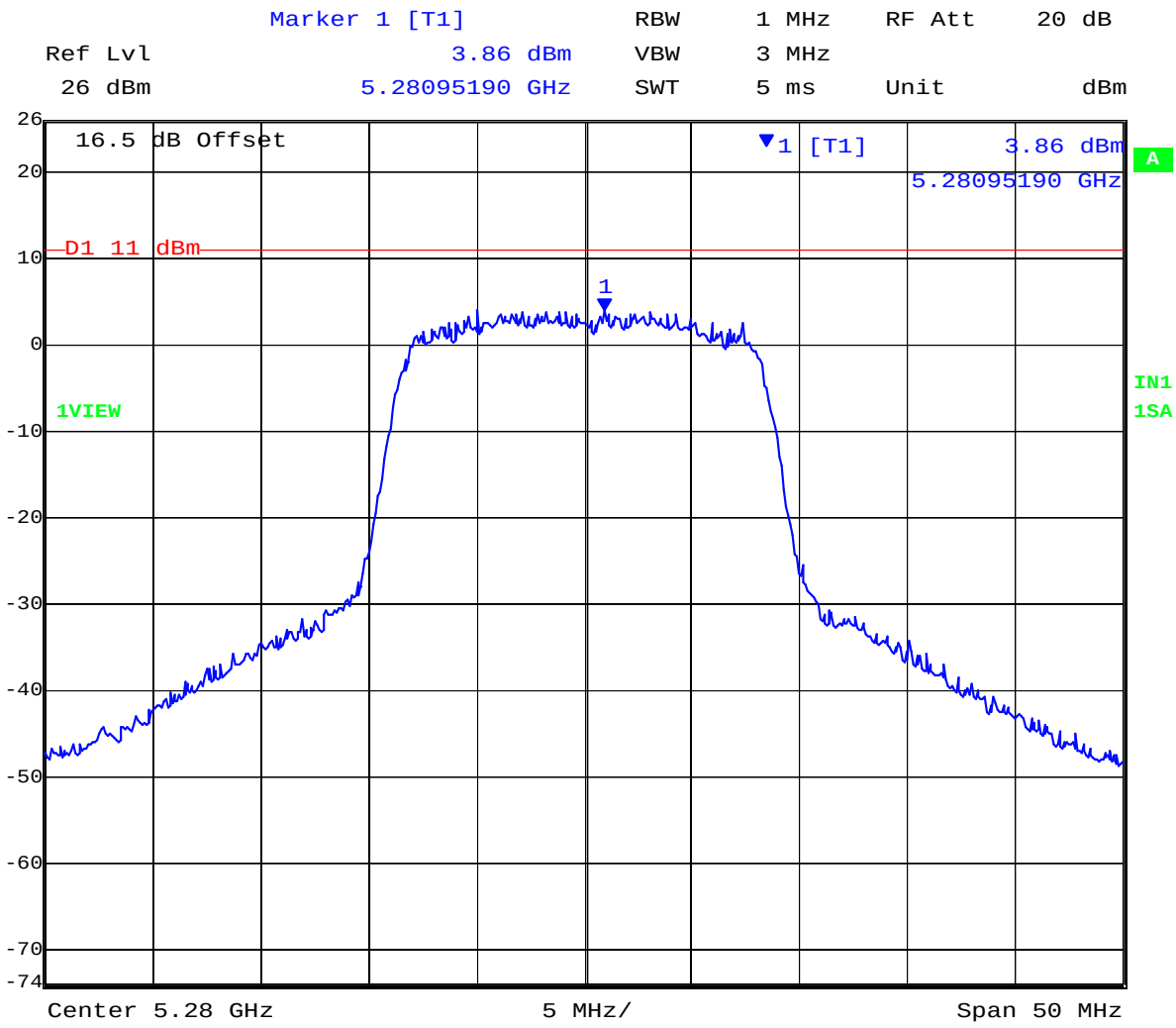
Test Frequency	Measured Peak Power RF Port (dBm)				Total Power (dBm)		Limit	Margin
MHz	**a**	**b**	**c**	**d**	**Combined**	**Calculated**	**dBm**	**dB**
5260	4.29				4.29		11.00	-6.71
5280	3.86				3.86		11.00	-7.14
5320	4.75				4.75		11.00	-6.25

Measurement uncertainty:	±1.33 dB

Power Density Ambient 5260MHz 4.20V 15.41dBm



Power Density Ambient 5280MHz 4.20V 15.41dBm



Power Density Ambient 5320MHz 4.20V 15.39dBm

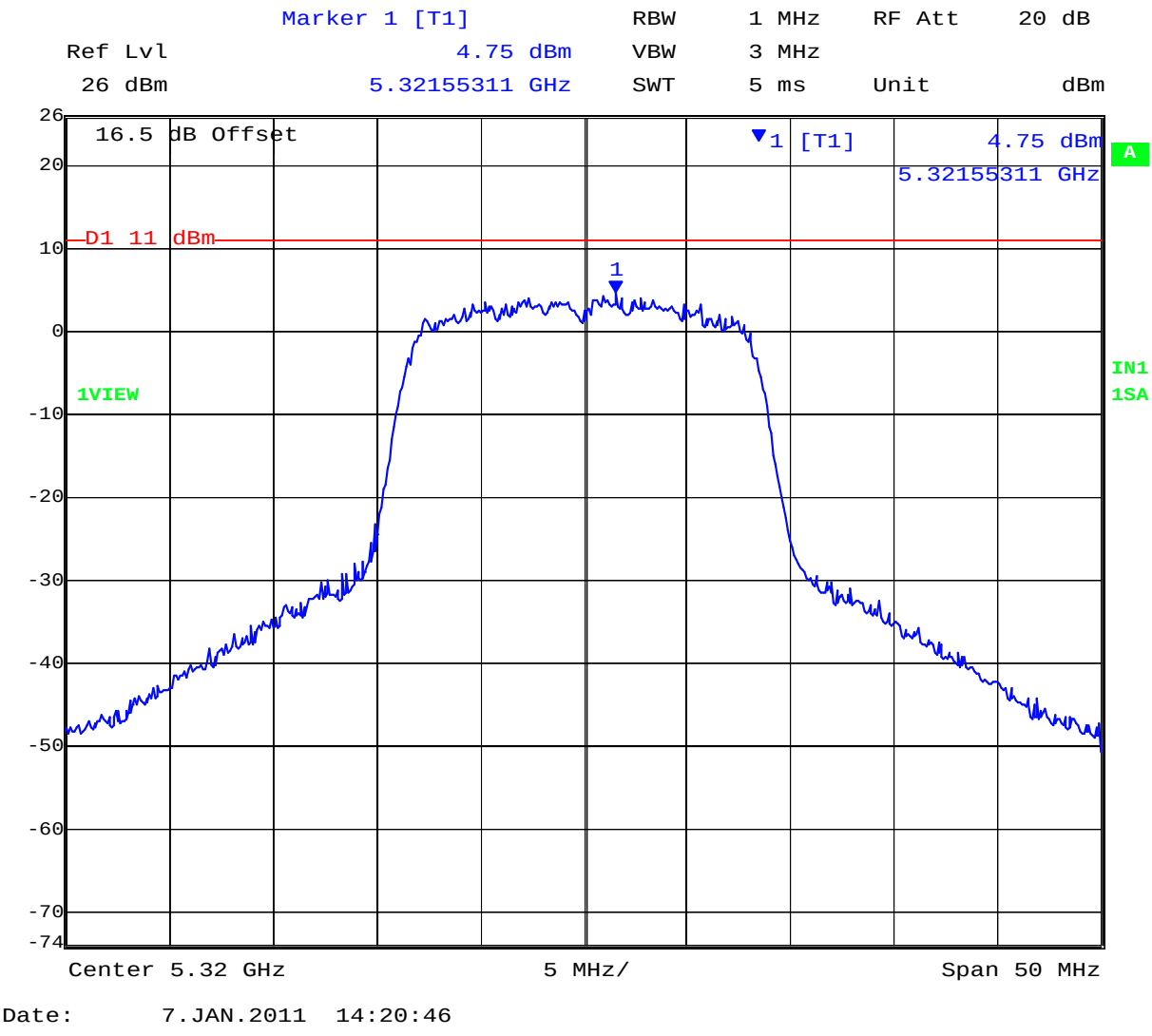


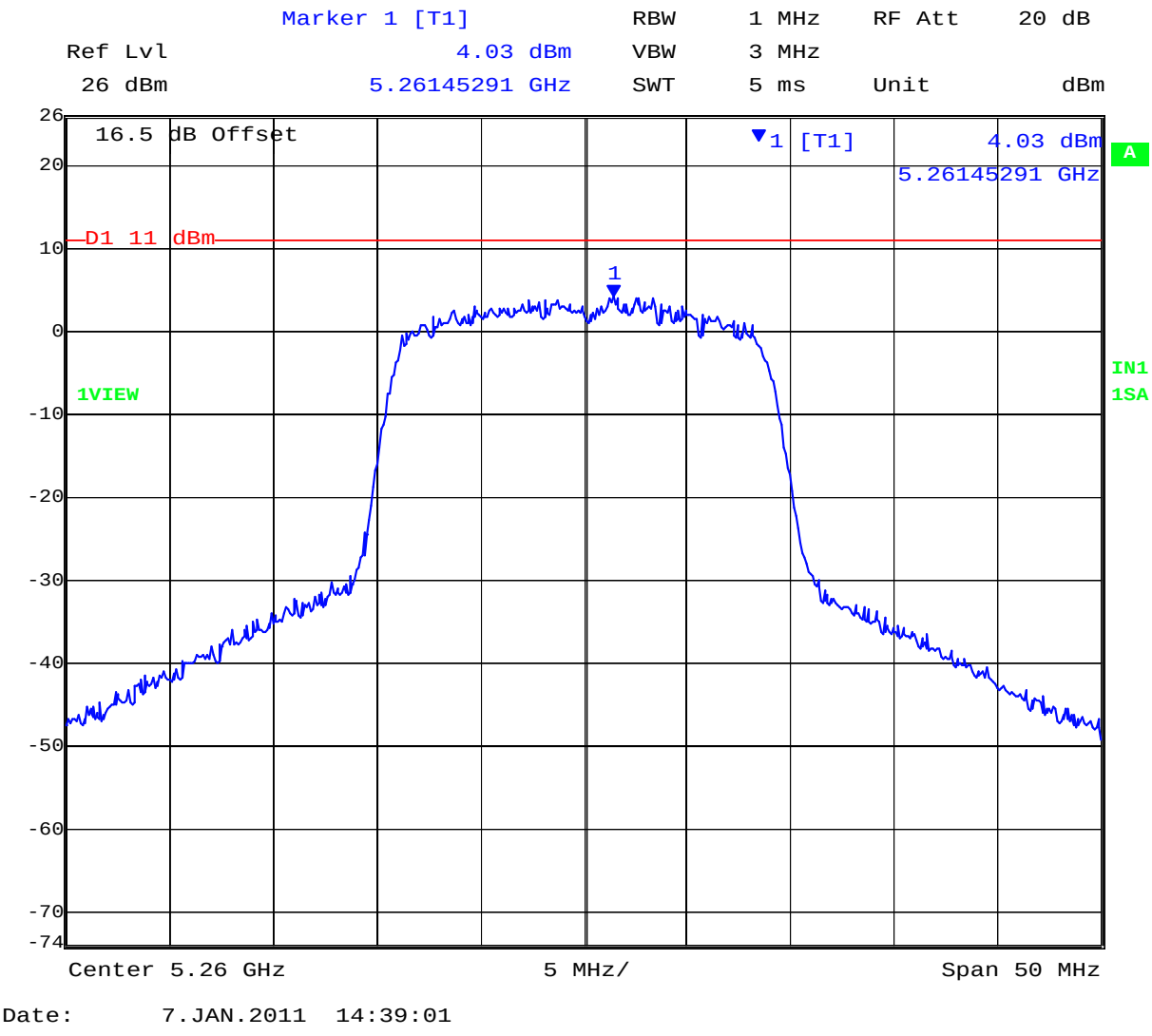
TABLE OF RESULTS – 802.11n HT-20

Test Conditions:	15.407 (a)		**Rel. Humidity (%):**	35 to 42	
Variant:	802.11n HT-20		**Ambient Temp. (ºC):**	19 to 22	
TPC:	HIGH		**Pressure (mBars):**	998 to 1003	
Modulation:	ON		**Duty Cycle (%):**	100	
Beam Forming Gain (Y):	N/A	dB	**Antenna Gain:**	5.51	dBi
Applied Voltage:	4.2	Vdc			
Notes 1:					
Notes 2:					

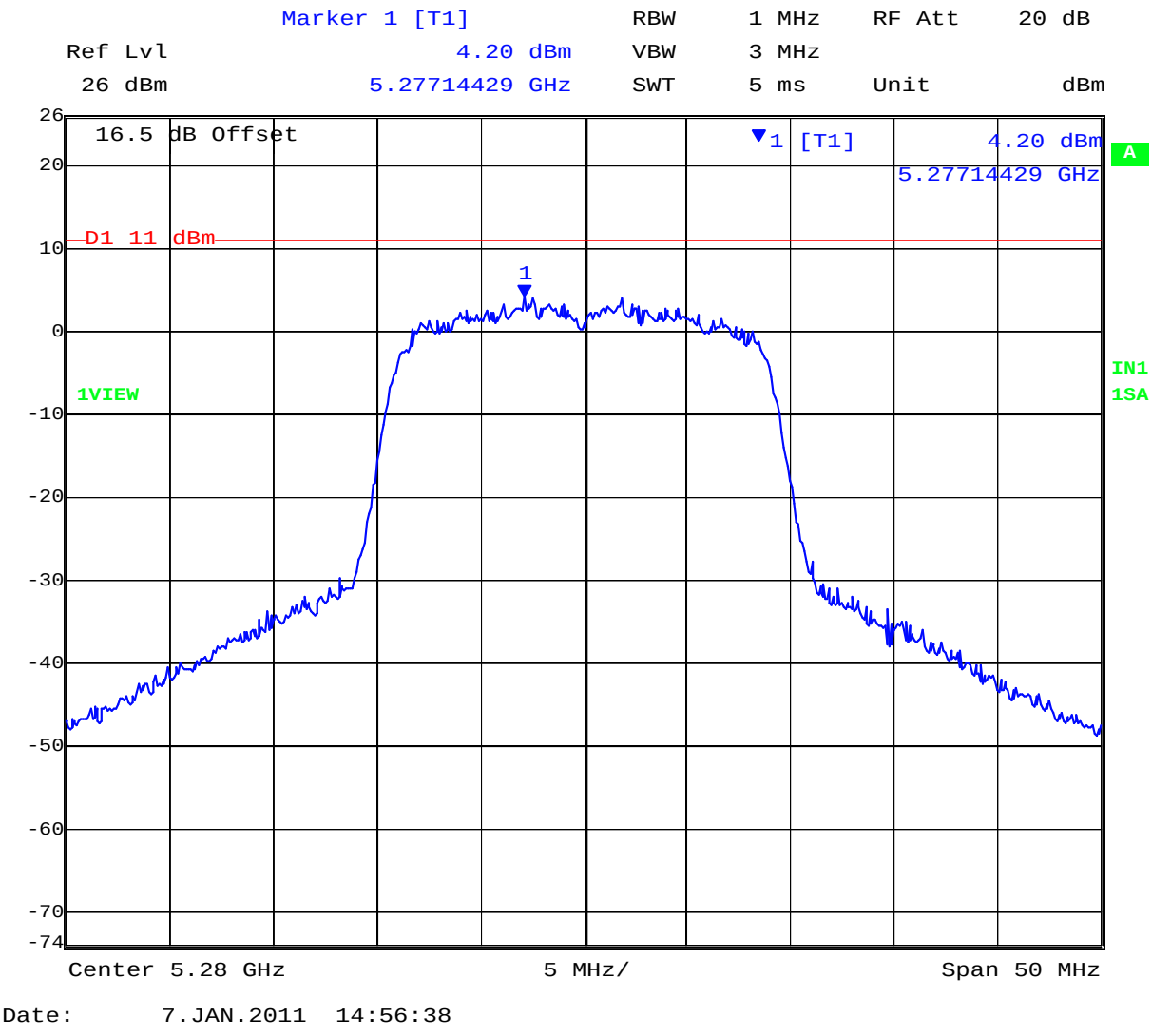
Test Frequency	Measured Peak Power RF Port (dBm)				Total Power (dBm)		Limit	Margin
MHz	**a**	**b**	**c**	**d**	**Combined**	**Calculated**	**dBm**	**dB**
5260	4.03				4.03		11.00	-6.97
5280	4.20				4.20		11.00	-6.80
5320	4.06				4.06		11.00	-6.94

Measurement uncertainty:	±1.33 dB

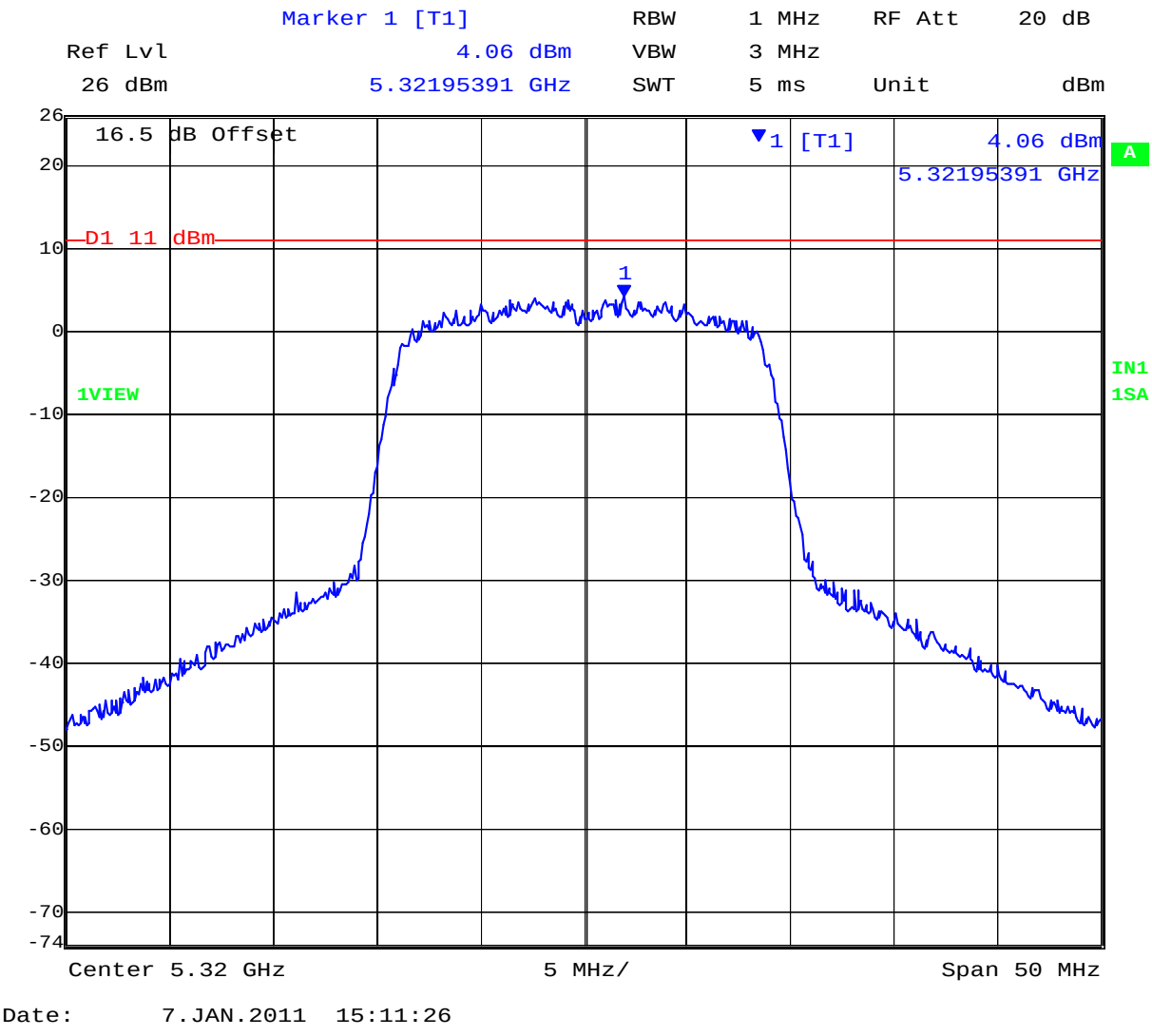
Power Density Ambient 5260MHz 4.20V 15.26dBm



Power Density Ambient 5280MHz 4.20V 15.18dBm



Power Density Ambient 5320MHz 4.20V 15.36dBm



7.4.3 5470 MHz - 5725 MHz; Peak Power Spectral Density

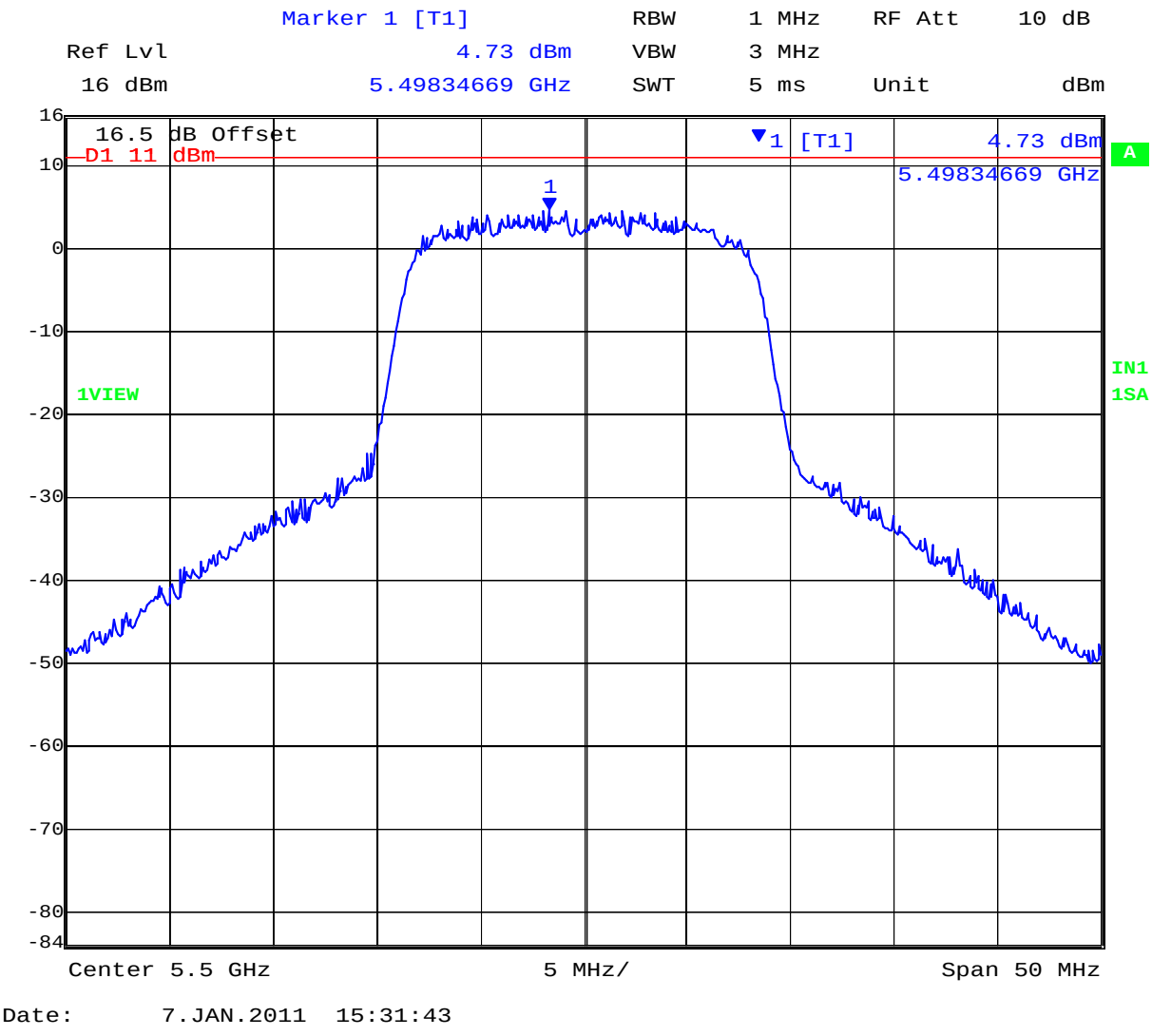
TABLE OF RESULTS – 802.11a

Test Conditions:	15.407 (a)	**Rel. Humidity (%):**	35 to 42
Variant:	802.11a	**Ambient Temp. (ºC):**	19 to 22
TPC:	HIGH	**Pressure (mBars):**	998 to 1003
Modulation:	ON	**Duty Cycle (%):**	100
Beam Forming Gain (Y):	N/A dB	**Antenna Gain:**	5.51 dBi
Applied Voltage:	4.2 Vdc		
Notes 1:			
Notes 2:			

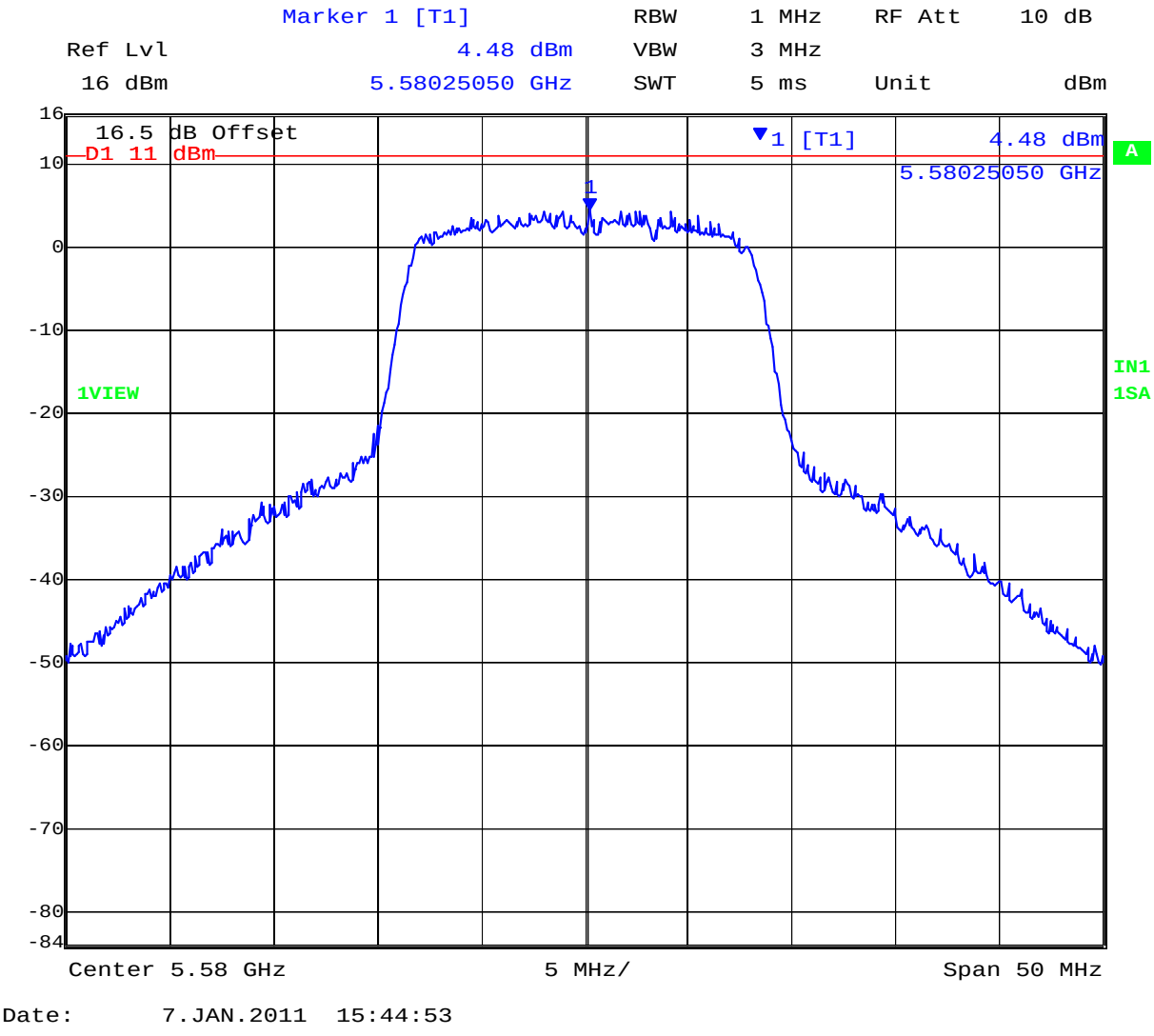
Test Frequency	Measured Peak Power RF Port (dBm)				Total Power (dBm)		Limit	Margin
MHz	a	b	c	d	Combined	Calculated	dBm	dB
5500	4.73				4.73		11.00	-6.27
5580	4.48				4.48		11.00	-6.52
5700	3.99				3.99		11.00	-7.01

Measurement uncertainty:	±1.33 dB

Power Density Ambient 5500MHz 4.20V 16.04dBm



Power Density Ambient 5580MHz 4.20V 16.03dBm



Power Density Ambient 5700MHz 4.20V 16.42dBm

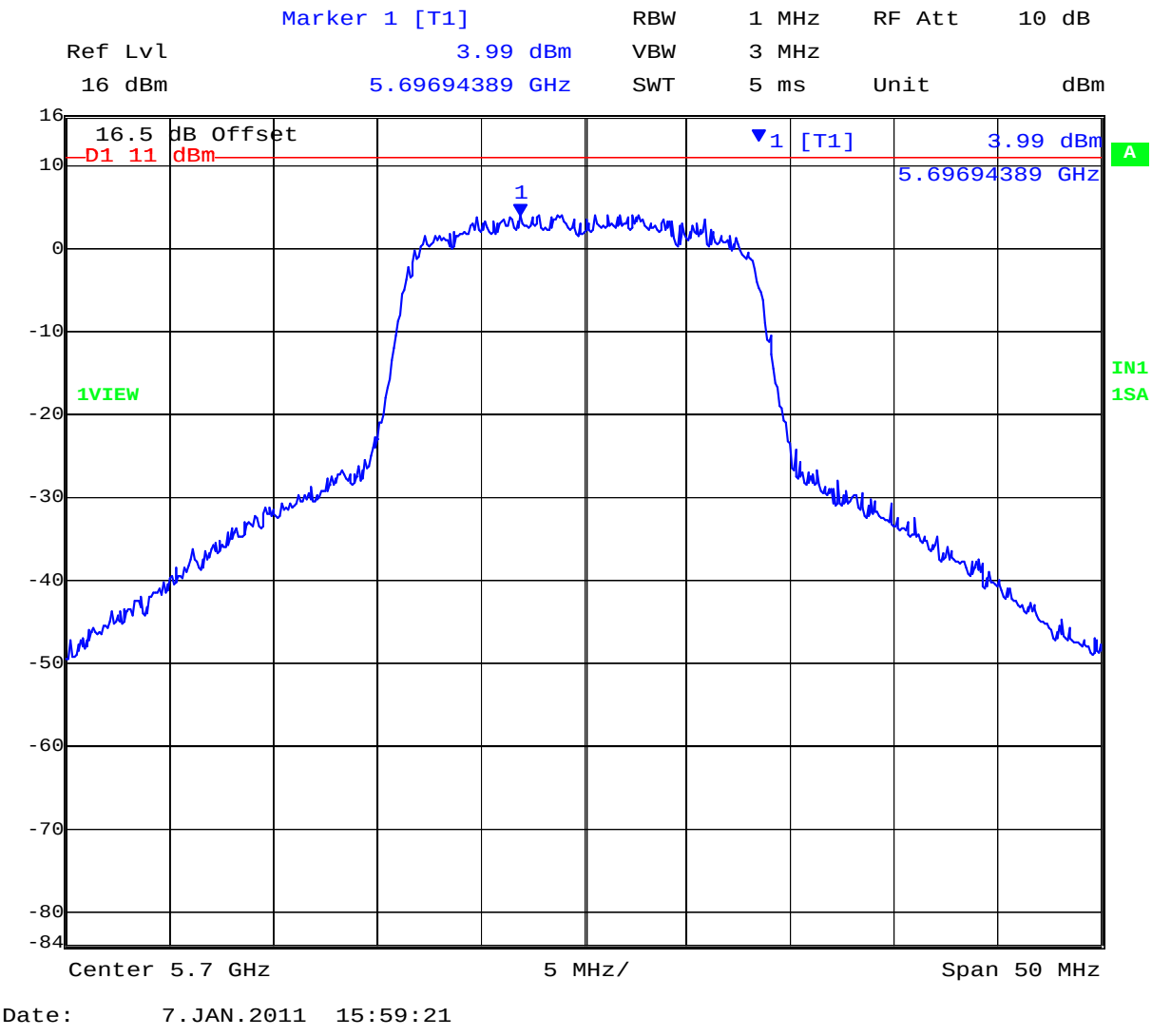


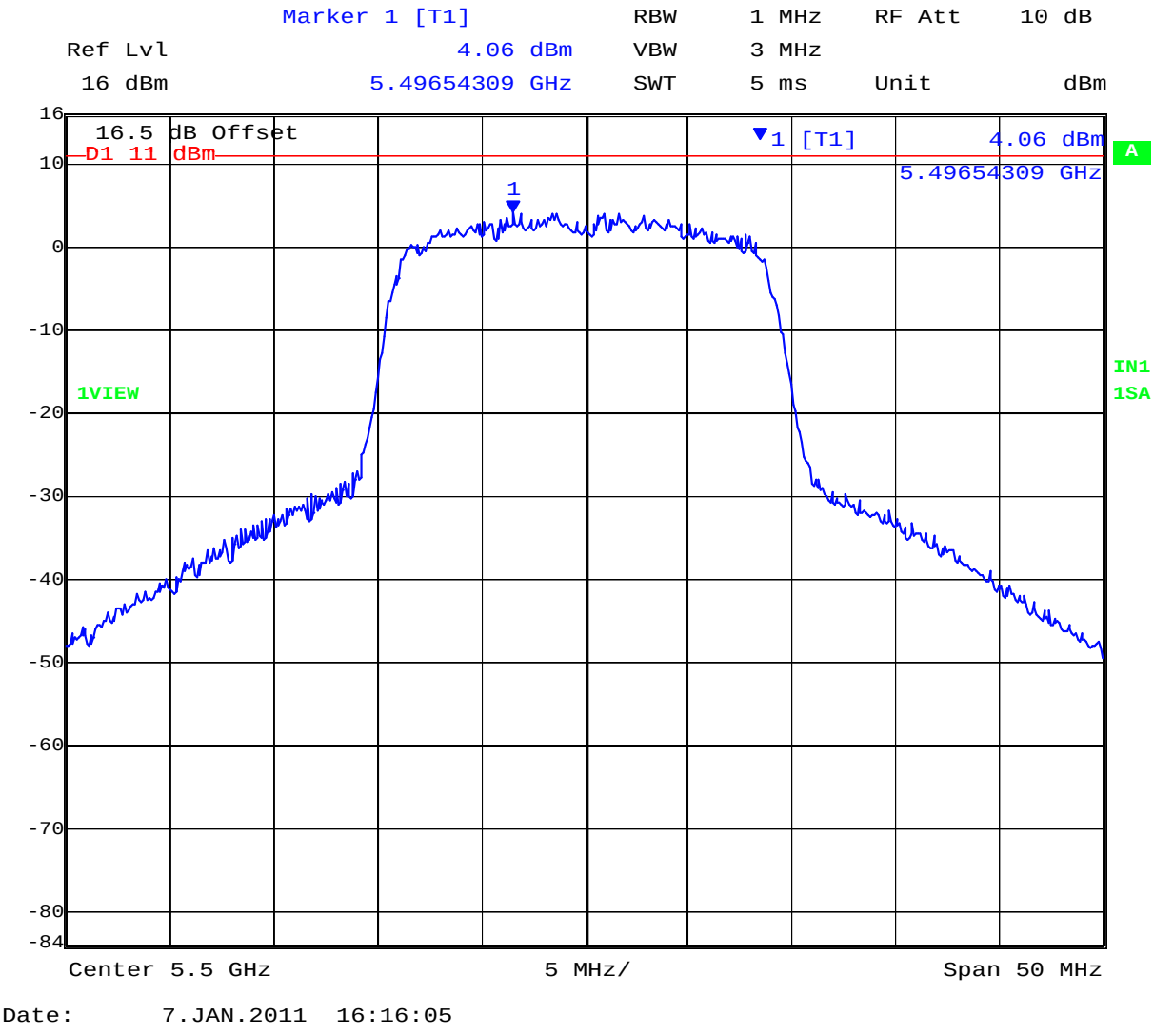
TABLE OF RESULTS – 802.11n HT-20

Test Conditions:	15.407 (a)		**Rel. Humidity (%):**	35 to 42	
Variant:	802.11n HT-20		**Ambient Temp. (ºC):**	19 to 22	
TPC:	HIGH		**Pressure (mBars):**	998 to 1003	
Modulation:	ON		**Duty Cycle (%):**	100	
Beam Forming Gain (Y):	N/A	dB	**Antenna Gain:**	5.51	dBi
Applied Voltage:	4.2	Vdc			
Notes 1:					
Notes 2:					

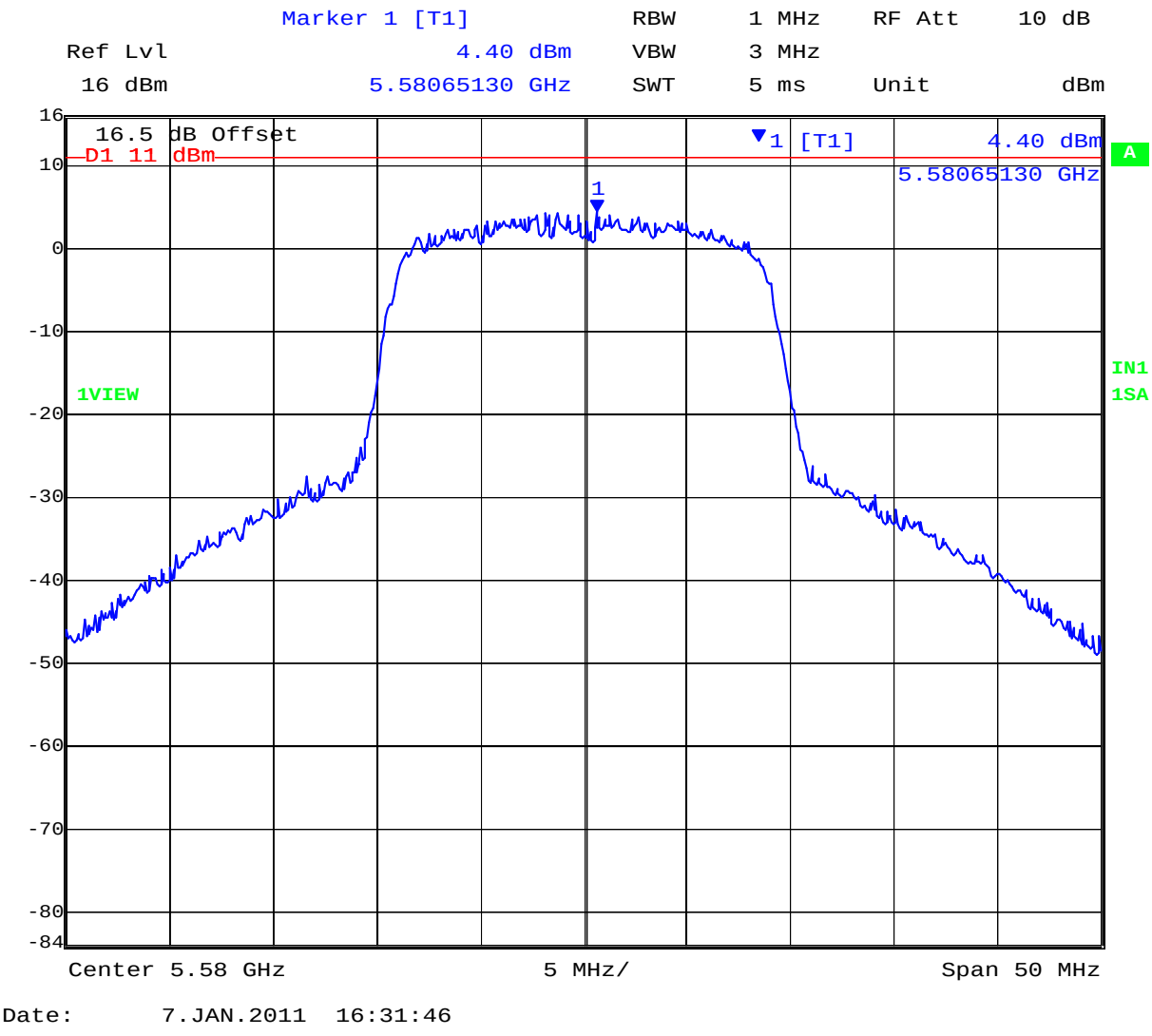
Test Frequency	Measured Peak Power RF Port (dBm)				Total Power (dBm)		Limit	Margin
MHz	**a**	**b**	**c**	**d**	**Combined**	**Calculated**	**dBm**	**dB**
5500	4.06				4.06		11.00	-6.94
5580	4.40				4.40		11.00	-6.60
5700	4.08				4.08		11.00	-6.92

Measurement uncertainty:	±1.33 dB

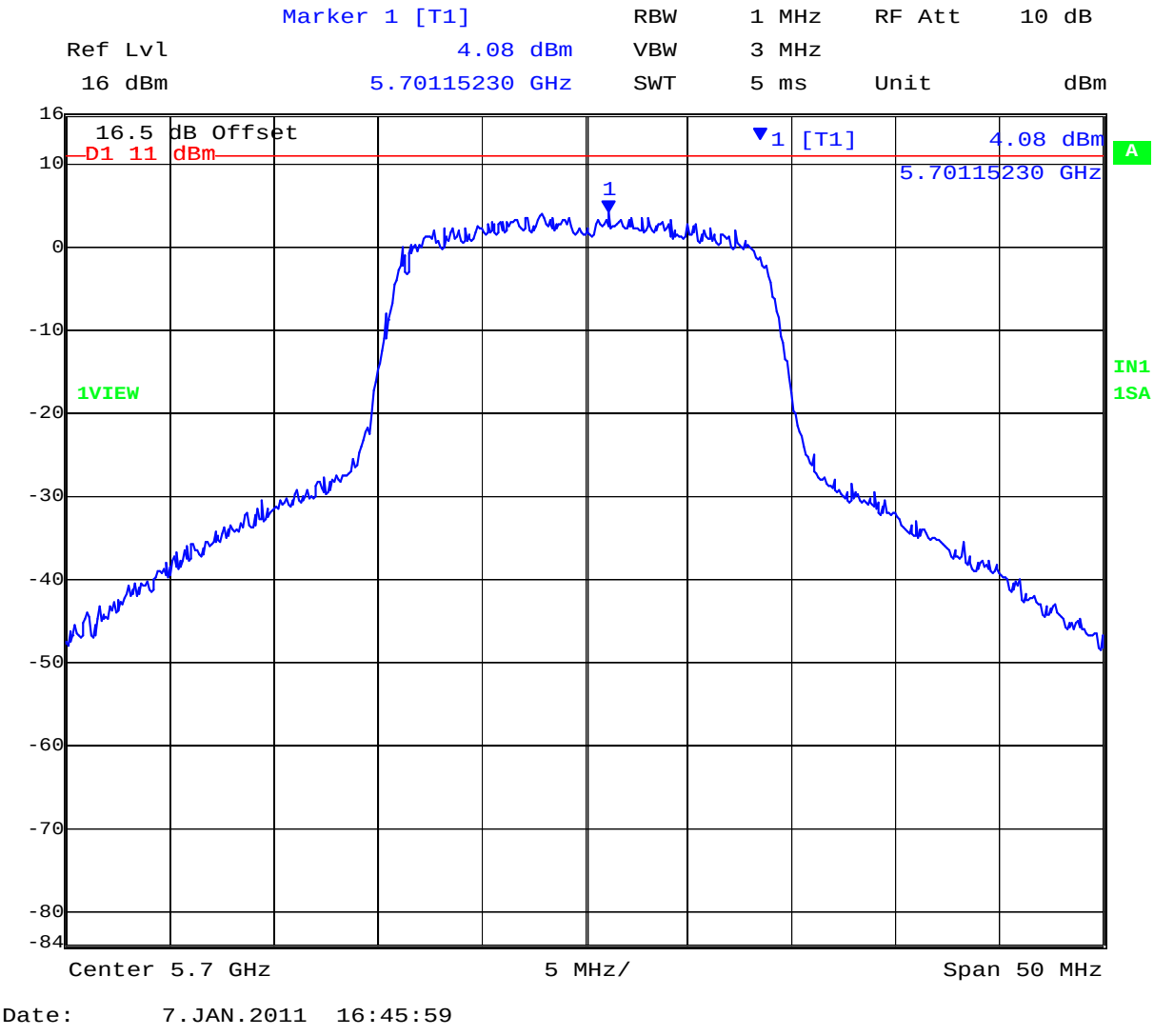
Power Density Ambient 5500MHz 4.20V 15.94dBm



Power Density Ambient 5580MHz 4.20V 15.90dBm



Power Density Ambient 5700MHz 4.20V 16.30dBm



7.5 Frequency Stability

FCC, Part 15 Subpart E §15.407(g)
Industry Canada RSS-Gen §7.2.6

Test Procedure

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

Manufacturer Declaration

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

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

Specification

Limits

FCC §15.407 (g)

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

Industry Canada RSS-Gen §7.2.6

7.6 Maximum Permissible Exposure

FCC §1.1310
Industry Canada RSS-Gen §5.6

Calculations for Maximum Permissible Exposure Levels

Power Density = Pd (mW/cm2) = EIRP/(4πd2)
EIRP = P * G
P = Peak output power (mW)
G = Antenna numeric gain (numeric)
d = Separation distance (cm)
Numeric Gain = 10 ^ (G (dBi)/10)

The Peak Power in mW is the highest transmitter power measured and summed across all transmitters. Because the EUT belongs to the General Population/Uncontrolled Exposure the limit of power density is 1.0 mW/cm2

Freq. Band (MHz)	Antenna Gain (dBi)	Peak Output Power (dBm)	Antenna Gain (numeric)	EIRP (mW)	Distance @ 1mW/cm2 Limit(cm)	Minimum Separation Distance (cm)
5150 - 5725	5.51	16.42	3.56	155.96	3.52	20

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

Specification

Maximum Permissible Exposure Limits

FCC §1.1310

Limit = 1mW / cm^2 from 1.310 Table 1

RSS-Gen §5.6

Exposure of Humans to RF Fields: Category I and Category II equipment shall comply with the applicable requirements of RSS-102.

Laboratory Measurement Uncertainty for Power Measurements

Measurement uncertainty	±1.33 dB

7.7 Dynamic Frequency Selection (DFS)

7.7.1 Test Procedure and Setup

FCC, Part 15 Subpart C §15.407(h)
FCC 06-96 Memorandum Opinion and Order
Industry Canada RSS-210 §A9.3

7.7.1.1 Interference Threshold values, Master or Client incorporating In-Service Monitoring

Maximum Transmit Power	Value (see note)
≥ 200 milliwatt	-64 dBm
< 200 milliwatt	-62 dBm
Note 1: This is the level at the input of the receiver assuming a 0 dBi receive antenna	

7.7.1.2 DFS Response requirement values

Parameter	Value
Non-occupancy period	Minimum 30 minutes
Channel Availability Check Time	60 seconds
Channel Move Time	10 seconds See Note 1.
Channel Closing Transmission Time	200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period. See Notes 1 and 2.
U-NII Detection Bandwidth	Minimum 80% of the 99% power bandwidth See Note 3.
Note 1: The instant that the Channel Move Time and the Channel Closing Transmission Time begins is as follows: For the Short pulse radar Test Signals this instant is the end of the Burst. For the Frequency Hopping radar Test Signal, this instant is the end of the last radar Burst generated. For the Long Pulse radar Test Signal this instant is the end of the 12 second period defining the radar transmission. Note 2: The Channel Closing Transmission Time is comprised of 200 milliseconds starting at the beginning of the Channel Move Time plus any additional intermittent control signals required to facilitate Channel changes (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions. Note 3: During the U-NII Detection Bandwidth detection test, radar type 1 is used and for each frequency step the minimum percentage of detection is 90%. Measurements are performed with no data traffic.	

7.7.1.3 Radar Test Waveforms

This section provides the parameters for required test waveforms, minimum percentage of successful detections, and the minimum number of trials that must be used for determining DFS conformance. Step intervals of 0.1 microsecond for Pulse Width, 1 microsecond for PRI, 1 MHz for chirp width and 1 for the number of pulses will be utilized for the random determination of specific test waveforms.

Short Pulse Radar Test Waveforms

Radar Type	Pulse Width (µsec)	PRI (µsec)	Number of Pulses	Minimum Percentage of Successful Detection	Minimum Trials
1	1	1428	18	60%	30
2	1-5	150-230	23-29	60%	30
3	6-10	200-500	16-18	60%	30
4	11-20	200-500	12-16	60%	30
Aggregate (Radar Types 1-4)				80%	120

A minimum of 30 unique waveforms are required for each of the short pulse radar types 2 through 4. For short pulse radar type 1, the same waveform is used a minimum of 30 times. If more than 30 waveforms are used for short pulse radar types 2 through 4, then each additional waveform must also be unique and not repeated from the previous waveforms. The aggregate is the average of the percentage of successful detections of short pulse radar types 1-4.

Long Pulse Radar Test Waveform

Radar Type	Pulse Width (µsec)	Chirp Width (MHz)	PRI (µsec)	Number of Pulses per *Burst*	Number of *Bursts*	Minimum Percentage of Successful Detection	Minimum Trials
5	50-100	5-20	1000-2000	1-3	8-20	80%	30

The parameters for this waveform are randomly chosen. Thirty unique waveforms are required for the Long Pulse radar test signal. If more than 30 waveforms are used for the Long Pulse radar test signal, then each additional waveform must also be unique and not repeated from the previous waveforms.

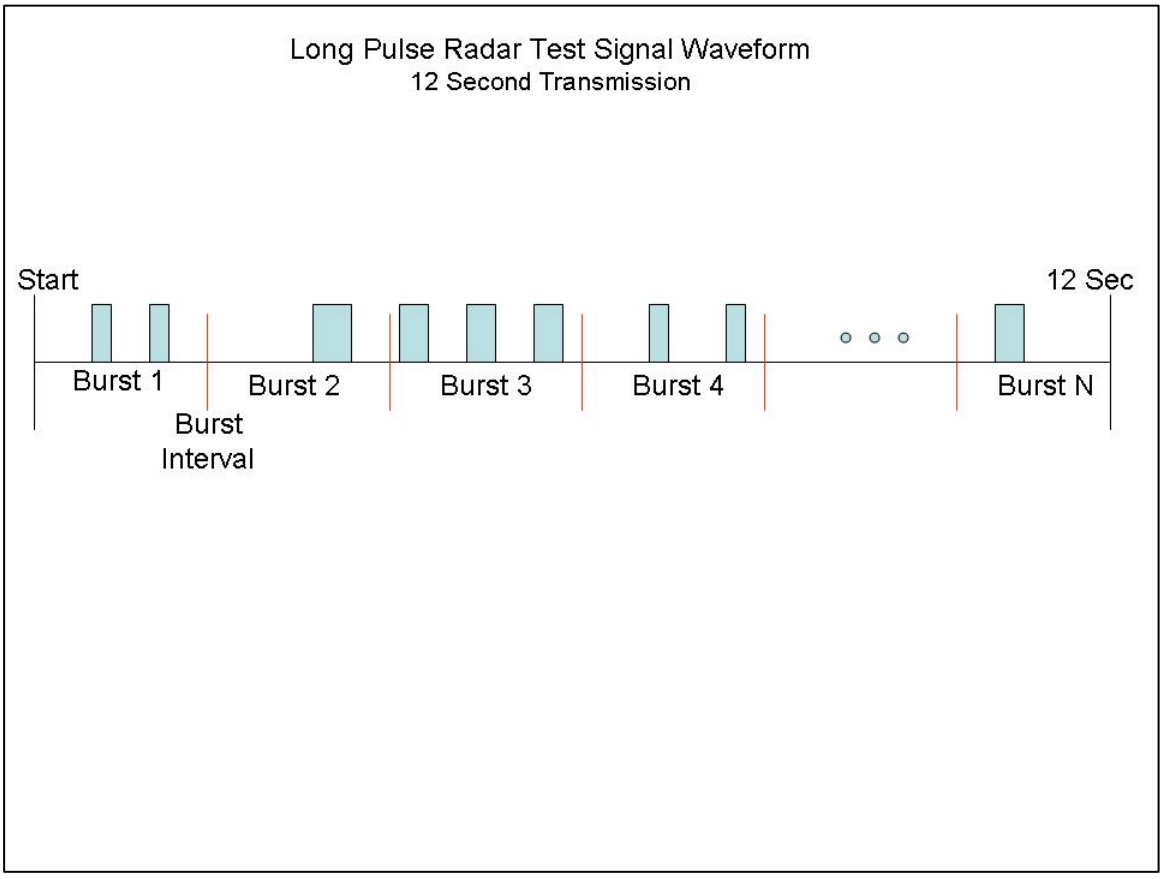
Each waveform is defined as follows:

1) The transmission period for the Long Pulse Radar test signal is 12 seconds.
2) There are a total of 8 to 20 *Bursts* in the 12 second period, with the number of *Bursts* being randomly chosen. This number is *Burst Count*.
3) Each *Burst* consists of 1 to 3 pulses, with the number of pulses being randomly chosen. Each *Burst* within the 12 second sequence may have a different number of pulses.
4) The pulse width is between 50 and 100 microseconds, with the pulse width being randomly chosen. Each pulse within a *Burst* will have the same pulse width. Pulses in different *Bursts* may have different pulse widths.
5) Each pulse has a linear FM chirp between 5 and 20 MHz, with the chirp width being randomly chosen. Each pulse within a *Burst* will have the same chirp width. Pulses in different *Bursts* may have different chirp widths. The chirp is centered on the pulse. For example, with a radar frequency of 5300 MHz and a 20 MHz chirped signal, the chirp starts at 5290 MHz and ends at 5310 MHz.
6) If more than one pulse is present in a *Burst*, the time between the pulses will be between 1000 and 2000 microseconds, with the time being randomly chosen. If three pulses are present in a *Burst*, the time between the first and second pulses is chosen independently of the time between the second and third pulses.
7) The 12 second transmission period is divided into even intervals. The number of intervals is equal to *Burst_Count*. Each interval is of length (12,000,000 / *Burst_Count*) microseconds. Each interval contains one *Burst*. The start time for the *Burst*, relative to the beginning of the interval, is between 1 and [(12,000,000 / *Burst_Count*) – (Total *Burst* Length) + (One Random PRI Interval)] microseconds, with the start time being randomly chosen. The step interval for the start time is 1 microsecond. The start time for each *Burst* is chosen independently.

A representative example of a Long Pulse radar test waveform:

1) The total test signal length is 12 seconds.
2) 8 *Bursts* are randomly generated for the *Burst_Count*.
3) *Burst* 1 has 2 randomly generated pulses.
4) The pulse width (for both pulses) is randomly selected to be 75 microseconds.
5) The PRI is randomly selected to be at 1213 microseconds.
6) *Bursts* 2 through 8 are generated using steps 3 – 5.
7) Each *Burst* is contained in even intervals of 1,500,000 microseconds. The starting location for Pulse 1, *Burst* 1 is randomly generated (1 to 1,500,000 minus the total *Burst* 1 length + 1 random PRI interval) at the 325,001 microsecond step. *Bursts* 2 through 8 randomly fall in successive 1,500,000 microsecond intervals (i.e. *Burst* 2 falls in the 1,500,001 – 3,000,000 microsecond range).

Graphical Representation of the Long Pulse Radar Test Waveform



7.7.1.4 Frequency Hopping Radar Test Waveform

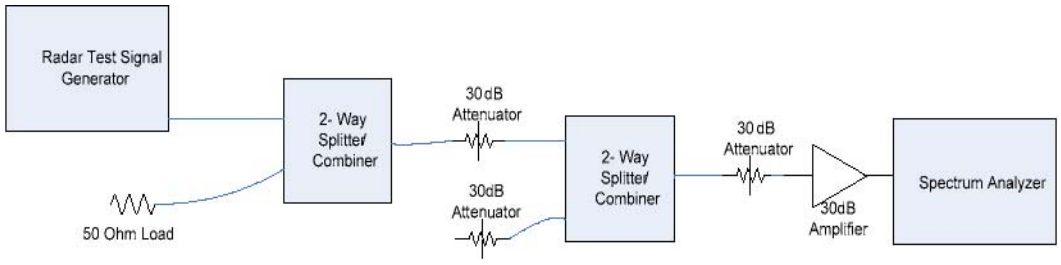
Frequency Hopping Radar Test Waveform

Radar Type	Pulse Width (µsec)	PRI (µsec)	Pulses per Hop	Hopping Rate (kHz)	Hopping Sequence Length (msec)	Minimum Percentage of Successful Detection	Minimum Trials
6	1	333	9	.333	300	70%	30

For the Frequency Hopping Radar Type, the same *Burst* parameters are used for each waveform. The hopping sequence is different for each waveform and a 100-length segment is selected from the hopping sequence defined by the following algorithm:

7.7.1.5 Radar Waveform Calibration

The following equipment setup was used to calibrate the conducted Radar Waveform. A spectrum analyzer was used to establish the test signal level for each radar type. During this process there were no transmissions by either the Master or Client Device. The spectrum analyzer was switched to the zero span (Time Domain) mode at the frequency of the Radar Waveform generator. Peak detection was utilized. The spectrum analyzer resolution bandwidth (RBW) and video bandwidth (VBW) were set to 3 MHz.
The signal generator amplitude was set so that the power level measured at the spectrum analyzer was -61dBm (Ref Section 5.1). The 30dB amplifier gain was entered as amplitude offset on the spectrum analyzer.



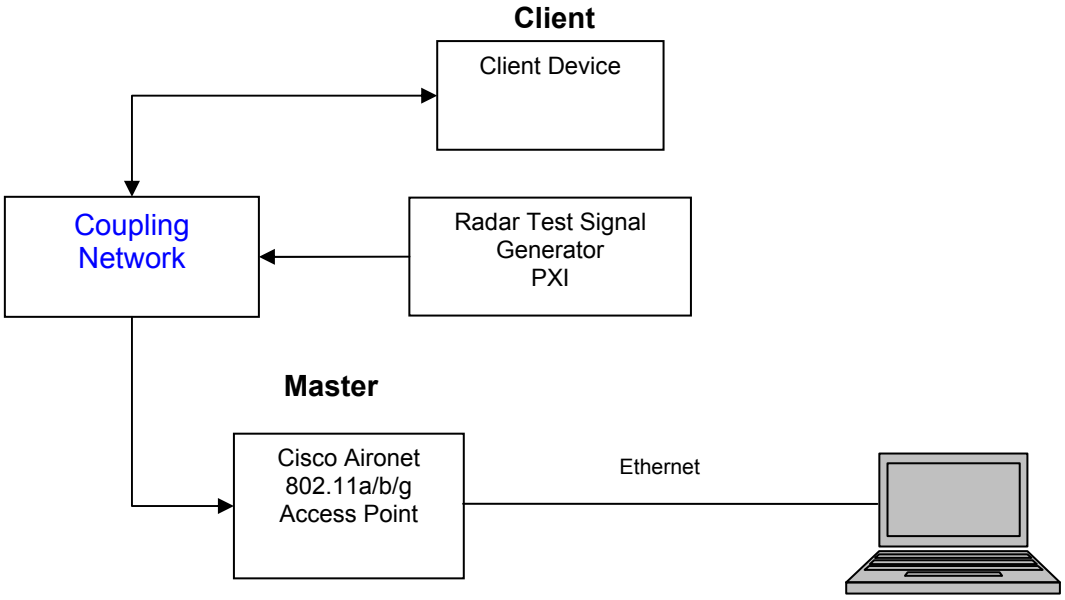
Conducted Calibration Setup

7.7.1.6 Test Setup

Block Diagram(s) of Test Setup

Setup for Conducted Measurements where the EUT is the Client with injection of Radar Test:

Support Equipment Configuration



Measurement Uncertainty Time/Power

Measurement uncertainty	Time - 4% Power - 1.33dB

Traceability

Test Equipment Used
0072, 0083, 0098, 0116, 0132, 0158, 0313, 0314, 0193, 0223, 0252, 0253, 0251, 0256, 0328, 0329

The EUT is a Client Device without radar detection.

Applicability of DFS Requirements Prior to Use of a Channel

(Ref Table 1 of FCC 06-96)

Requirement	Operational Mode		
	Master	Client Without Radar Detection	Client With Radar Detection
Non-Occupancy Period	Yes	Not required	Yes
DFS Detection Threshold	Yes	Not required	Yes
Channel Availability Check Time	Yes	Not required	Not required
Uniform Spreading	Yes	Not required	Not required
U-NII Detection Bandwidth	Yes	Not required	Yes

Applicability of DFS requirements during normal operation

(Ref Table 2 of FCC 06-96)

Requirement	Operational Mode		
	Master	Client Without Radar Detection	Client With Radar Detection
DFS Detection Threshold	Yes	Not required	Yes
Channel Closing Transmission Time	Yes	Yes	Yes
Channel Move Time	Yes	Yes	Yes
U-NII Detection Bandwidth	Yes	Not required	Yes

Declared minimum antenna gain 0 dBi.

Radar receive signal level = -62 dBm + minimum antenna gain + 1 dB = -61 dBm

= -62 + 0 + 1

Radar receive signal level = -61 dBm

Measurement Results - Dynamic Frequency Selection (DFS)

Radio parameters.
Test methodology: Conducted
Device Type: Client device without radar detection.
Transmit Power: Maximum

7.7.2 In-Service Monitoring for Channel Move Time, Channel Closing Transmission Time and Non-Occupancy Period

FCC §15.407(h)(2)(iii)

The steps below define the procedure to determine the above mentioned parameters when a radar Burst with a level equal to the DFS Detection Threshold is generated on the Operating Channel of the U-NII device.
A U-NII device operating as a Client Device will associate with the EUT (Master). The requisite MPEG video file ("TestFile.mpg" available on the NTIA website at the following link http://ntiacsd.ntia.doc.gov/dfs/) is streamed from the master device (AP) to the client.

Channel Closing Transmission Time - Measurement

A Type 1 waveform was introduced to the EUT, from which a 12 second transmission record was digitally captured, collecting nearly 250M samples of data, which included in excess of 600 ms of pre-trigger data. This Type 1 waveform had an integral marker built into its construction, marking the start of the radar waveform play, which directly triggered the PXI digitizer's data capture via the PXI backplane trigger bus.
The test system was set-up to capture all transmission data for access point events above a threshold level of -50 dBm. The test equipment time stamps all captured events with respect to T0 (zero time indicating the start of the measurements sequence) starting the 612.1 ms pre-trigger period followed by the radar type 1 burst period.

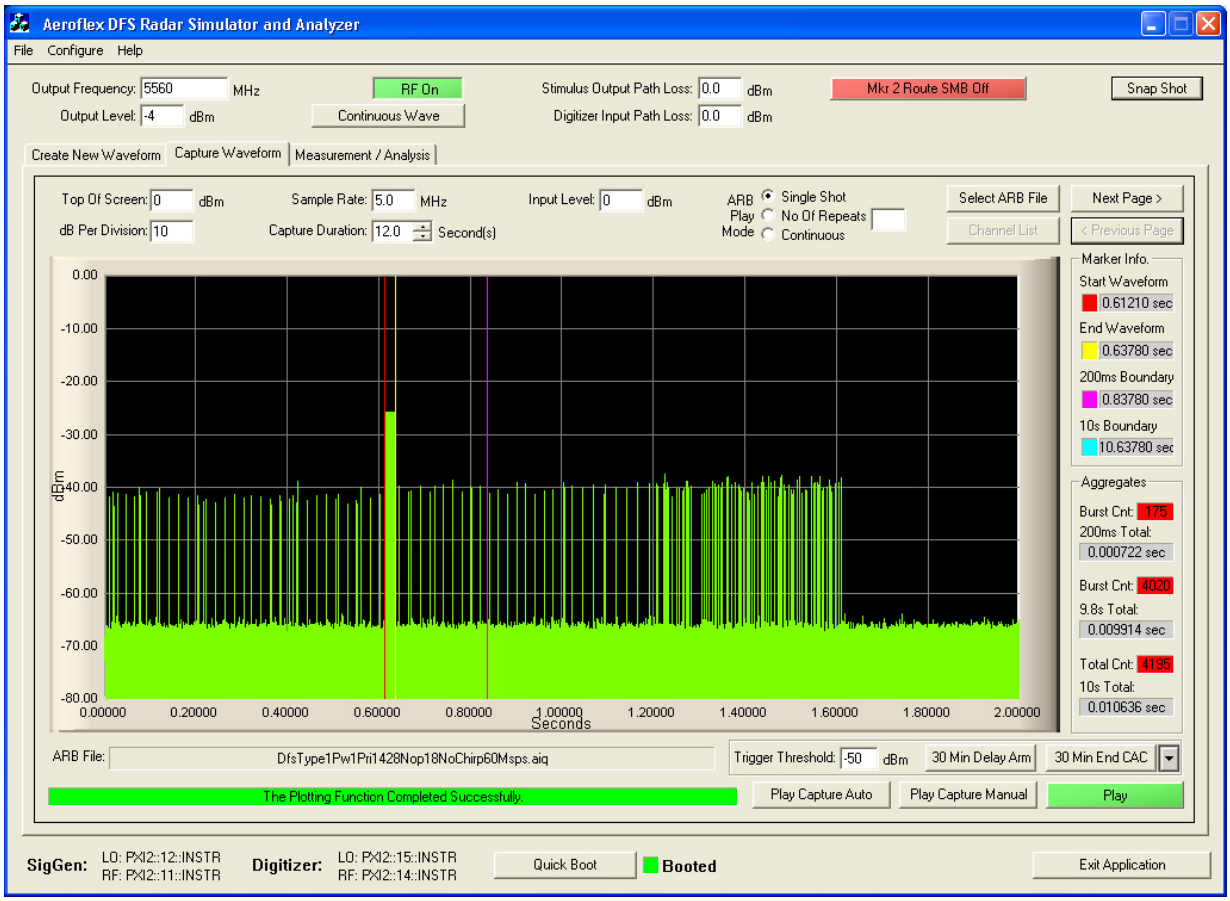
Radar (Type 1) Pre-trigger period =612.1 ms
Type 1 burst period =25.7 ms
Channel Closing Transmission Time starts immediately after the last radar pulse is transmitted i.e. 637.8 ms after the start of the trace capture period.

Therefore, pulses seen after this 637.8 ms boundary are identified and totaled to provide an aggregate total of transmissions in order to determine whether the EUT is compliant with the Channel Closing Transmission Time requirements as described in MO&O FCC 06-96. In this case, it was found that an aggregate total of 10.636 ms of transmission time accrued. This value is found at the right hand side at the foot of the following plot (10s Total).

Channel Closing Transmission Time = **10.636 mSecs (limit 260 mSecs)**

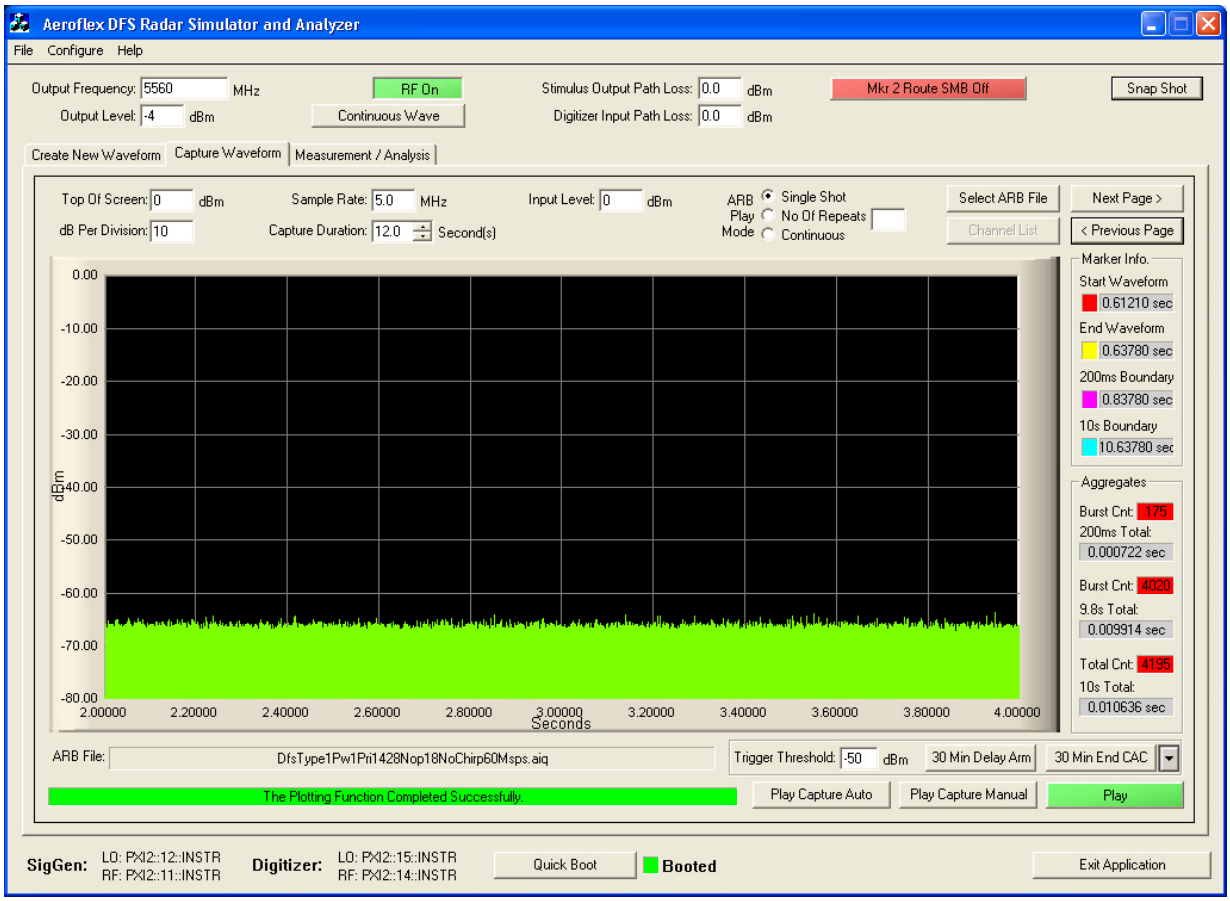
Channel Move Time = **0.9822 Secs (limit 10 Secs)**

Channel Move Time, Channel Closing Transmission Time for Type 1 Radar Captured by the Test System - Plot 1 of 6 (0-2 Seconds) Ch 112

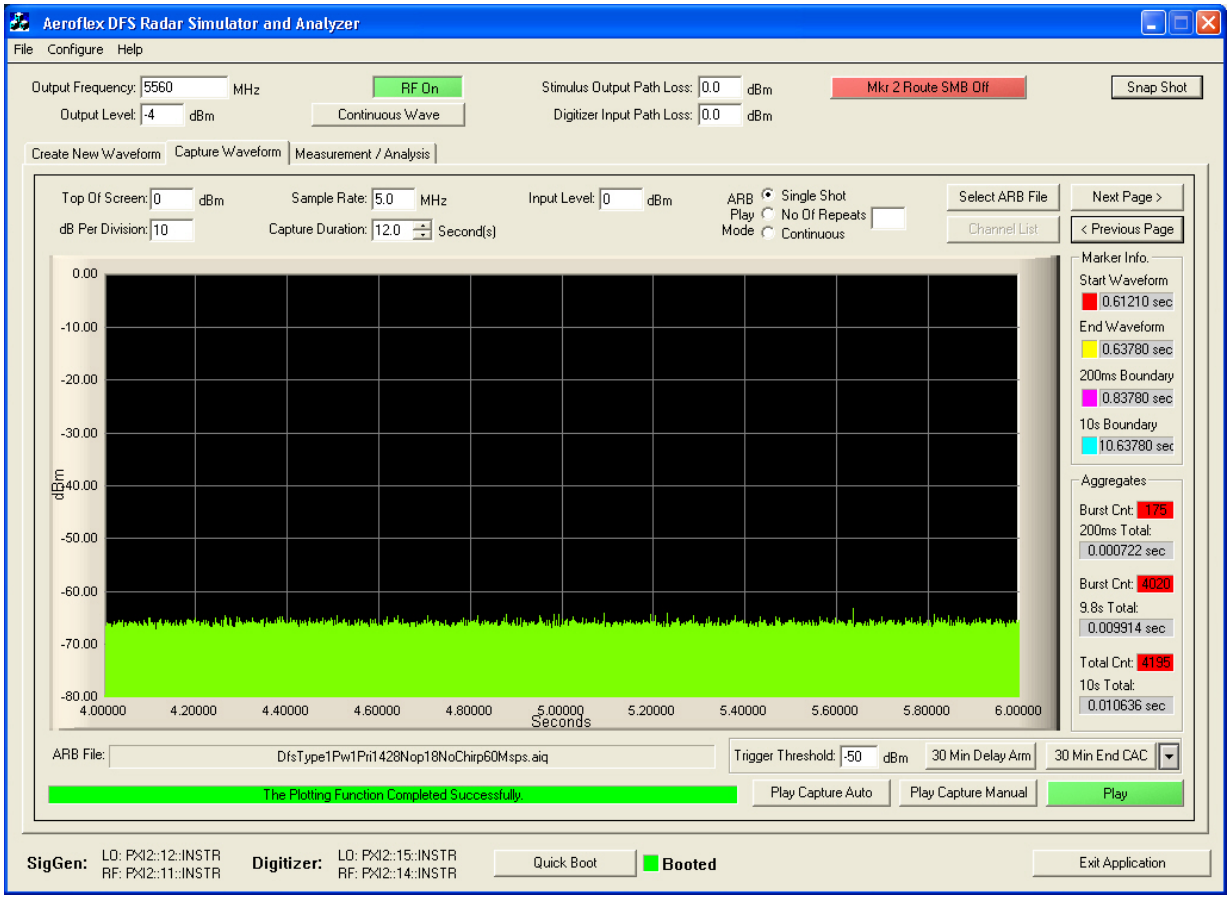


From the plot above it can be seen that the transmission activity within the 200 mS window is 0.722 mS (see 200 mS Total). From the following plots which shows all additional activity within the remained of the 10 sec measurement window it can be determined that the aggregate transmission within this period is 9.914 mS. This is less than the 60 mS limit.

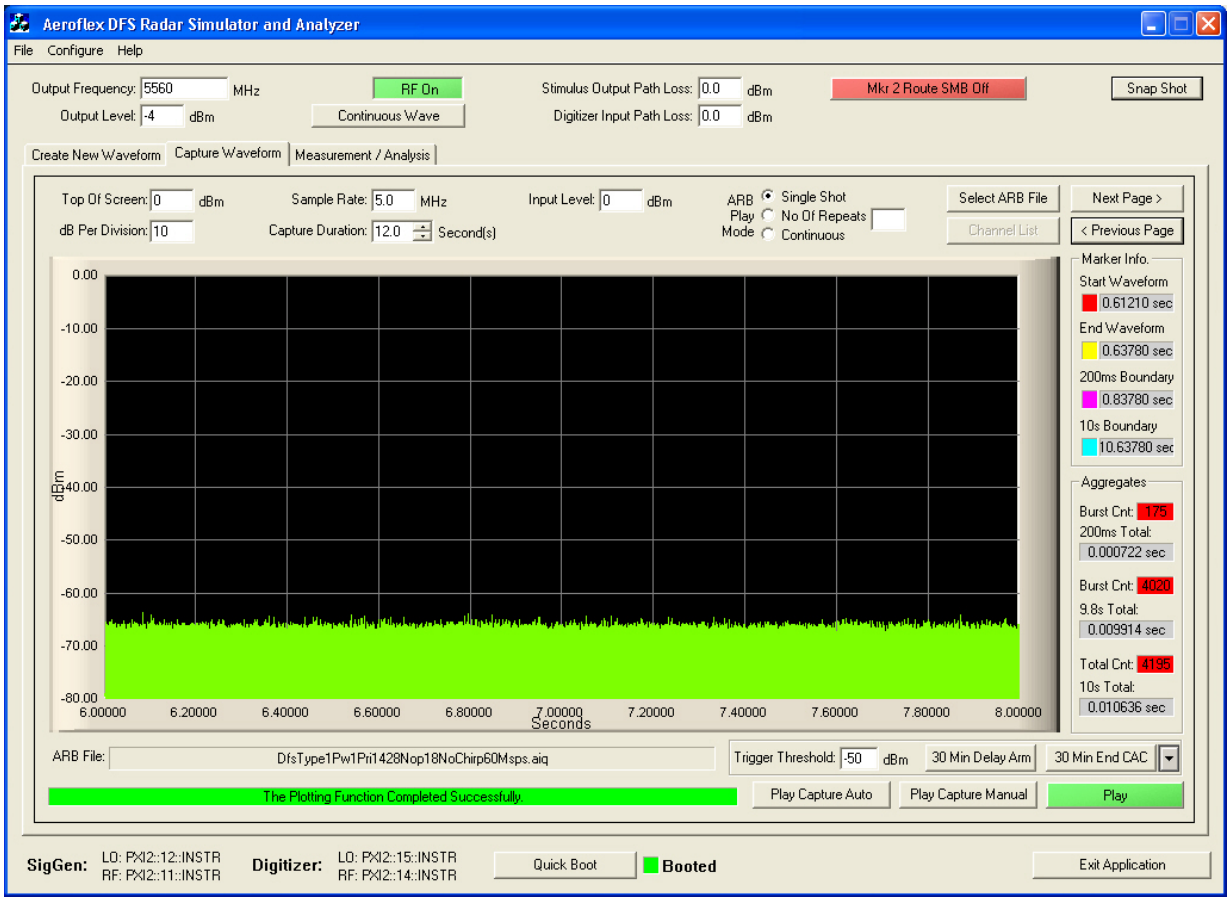
Channel Move Time, Channel Closing Transmission Time for Type 1 Radar Captured by the Test System - Plot 2 of 6 (2-4 Seconds) Ch 112



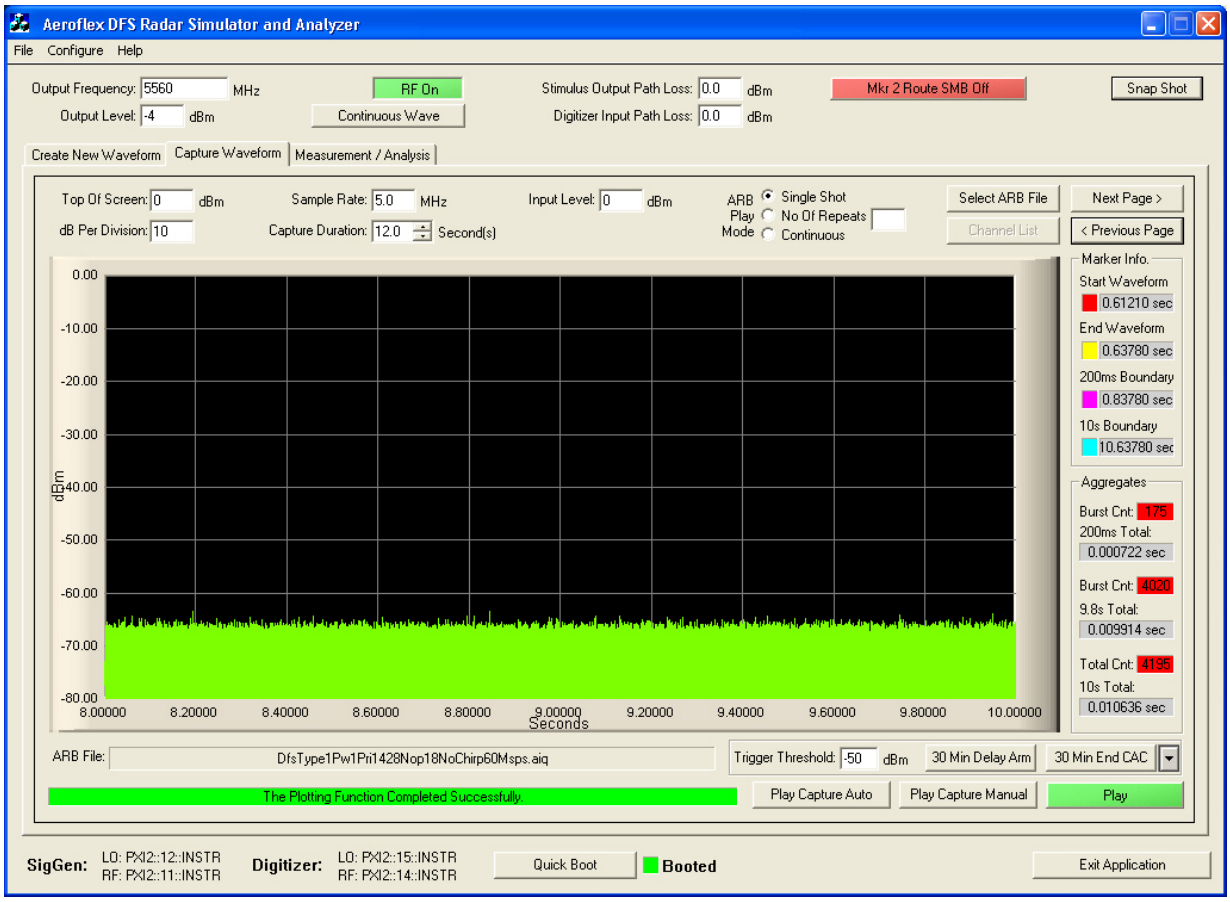
Channel Move Time, Channel Closing Transmission Time for Type 1 Radar Captured by the Test System - Plot 3 of 6 (4-6 Seconds) Ch 112



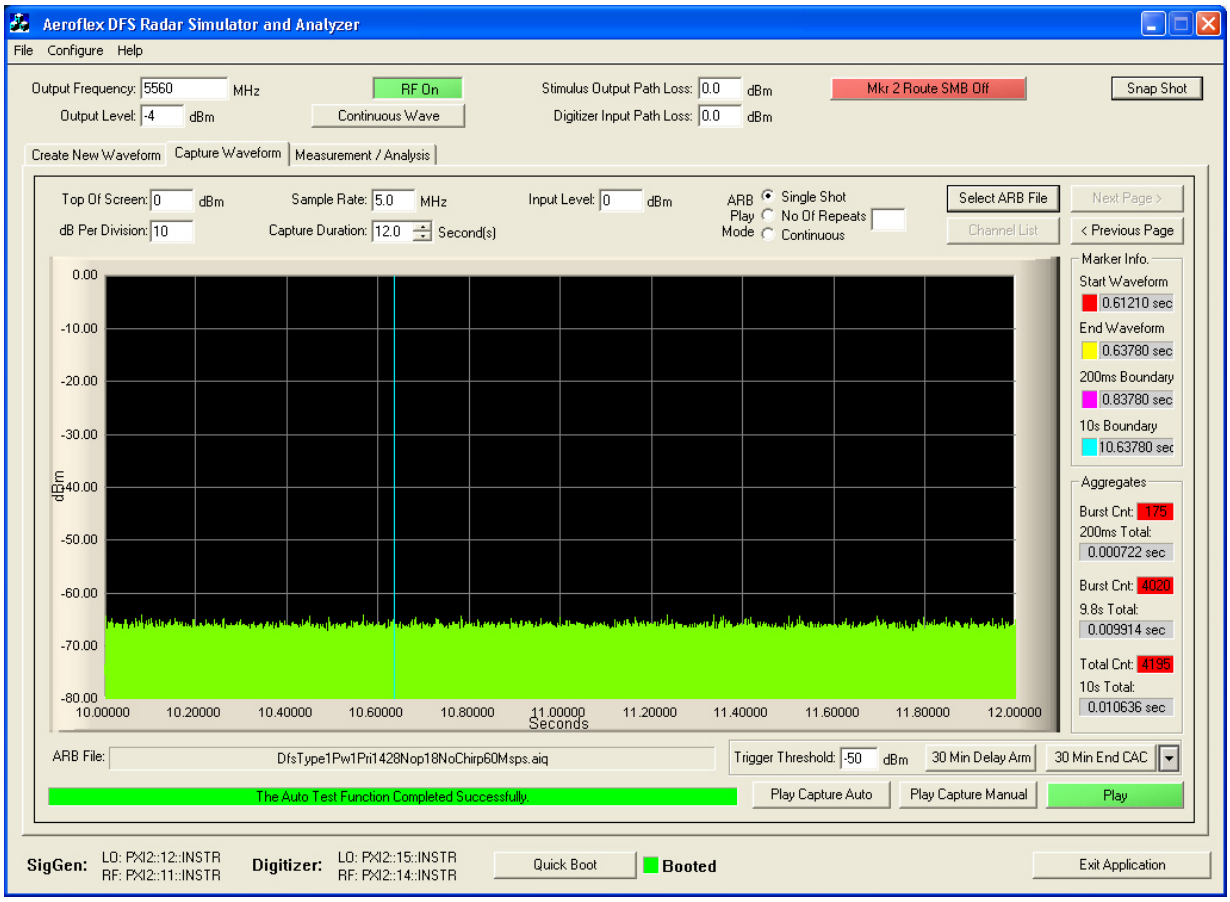
Channel Move Time, Channel Closing Transmission Time for Type 1 Radar Captured by the Test System - Plot 4 of 6 (6-8 Seconds) Ch 112



Channel Move Time, Channel Closing Transmission Time for Type 1 Radar Captured by the Test System - Plot 5 of 6 (8-10 Seconds) Ch 112



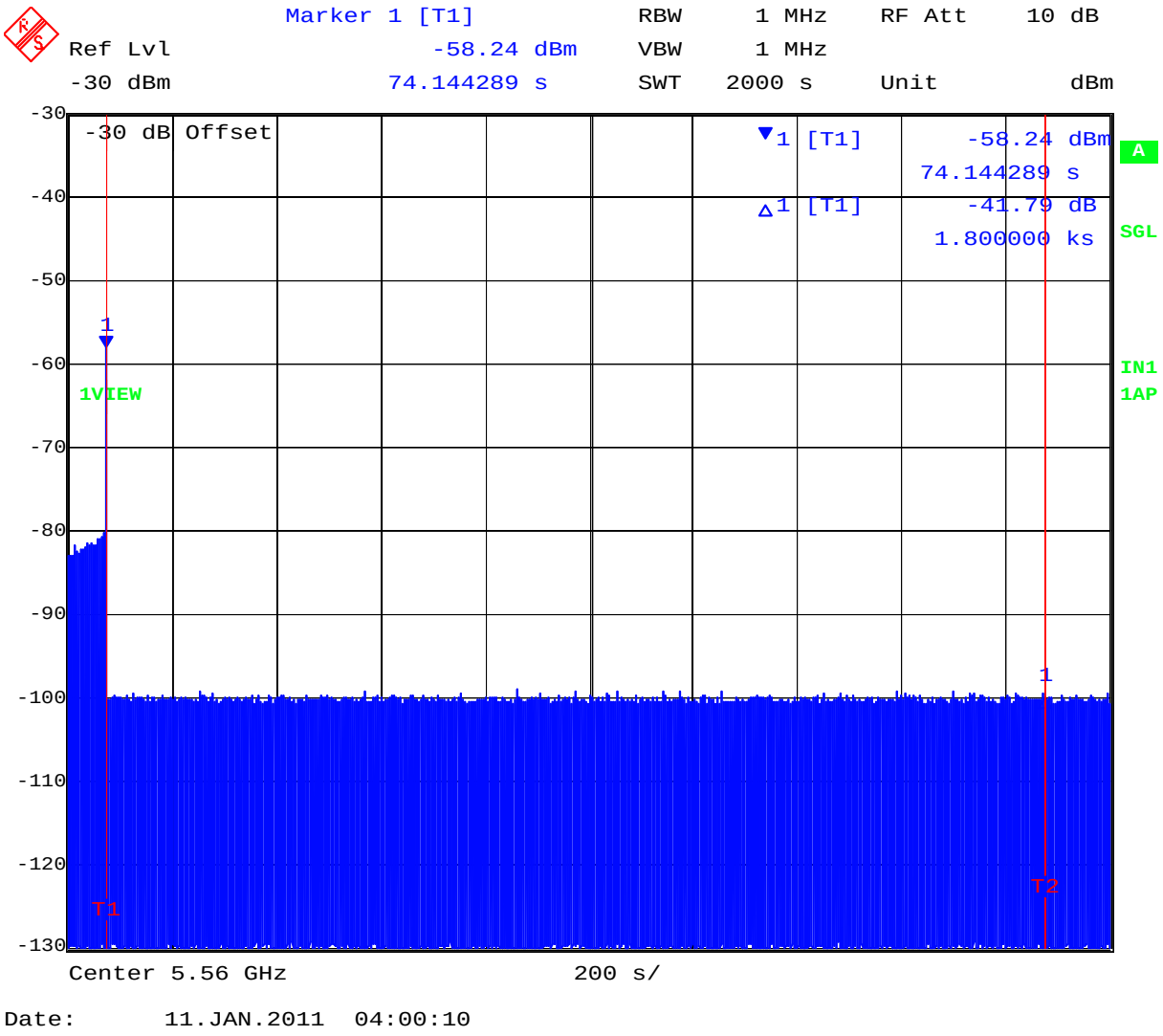
Channel Move Time, Channel Closing Transmission Time for Type 1 Radar Captured by the Test System - Plot 6 of 6 (10-12 Seconds) Ch 112



7.7.3 30 Minute Non-Occupancy Period

The EUT is monitored for more than 30 minutes following the channel close/move time to verify no transmissions resume on this Channel.

30 Minute Non-Occupancy Period Type 1 Radar Ch 112 - 5,560 MHz



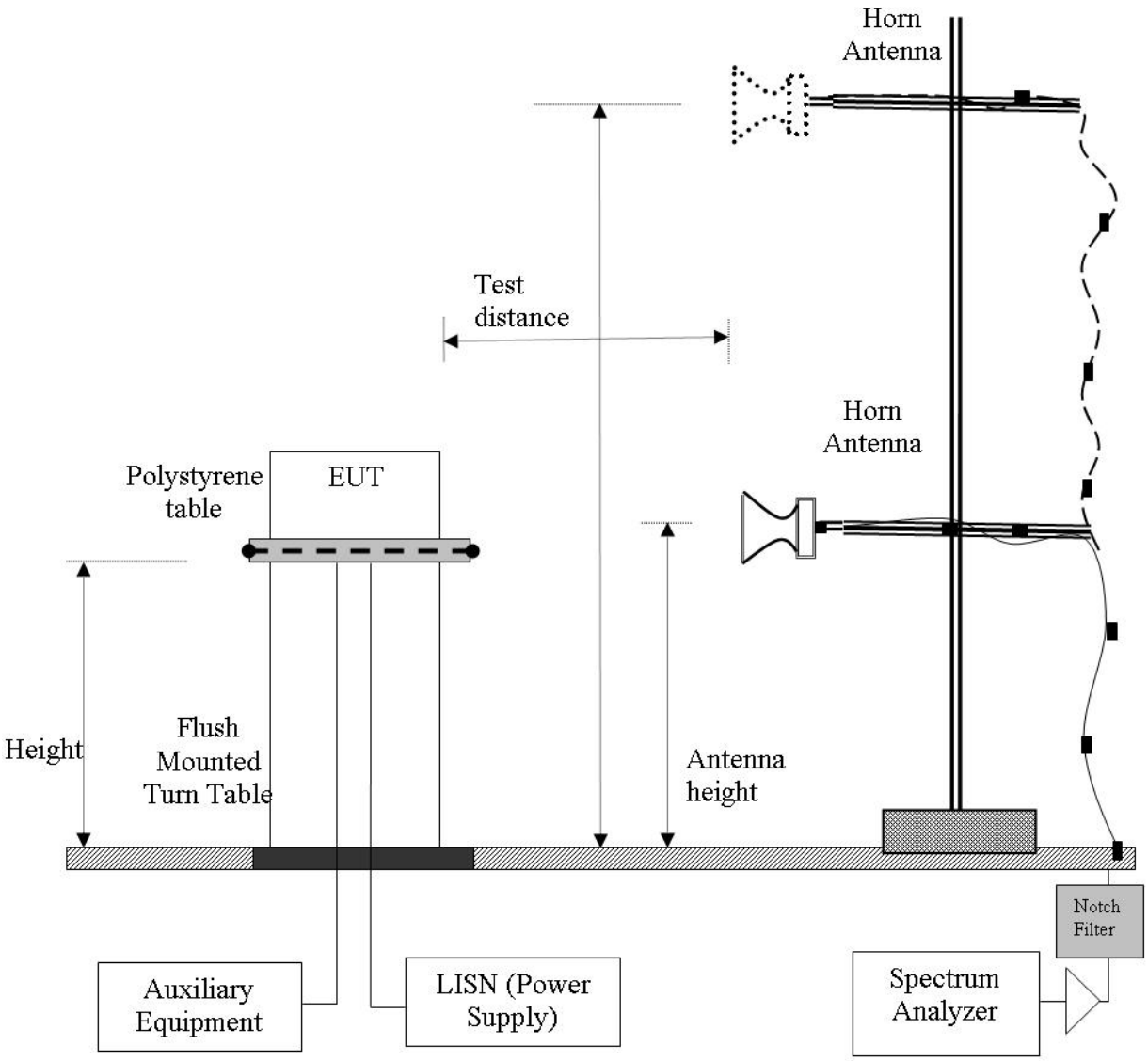
7.8 Radiated Spurious Emissions

Test Procedure

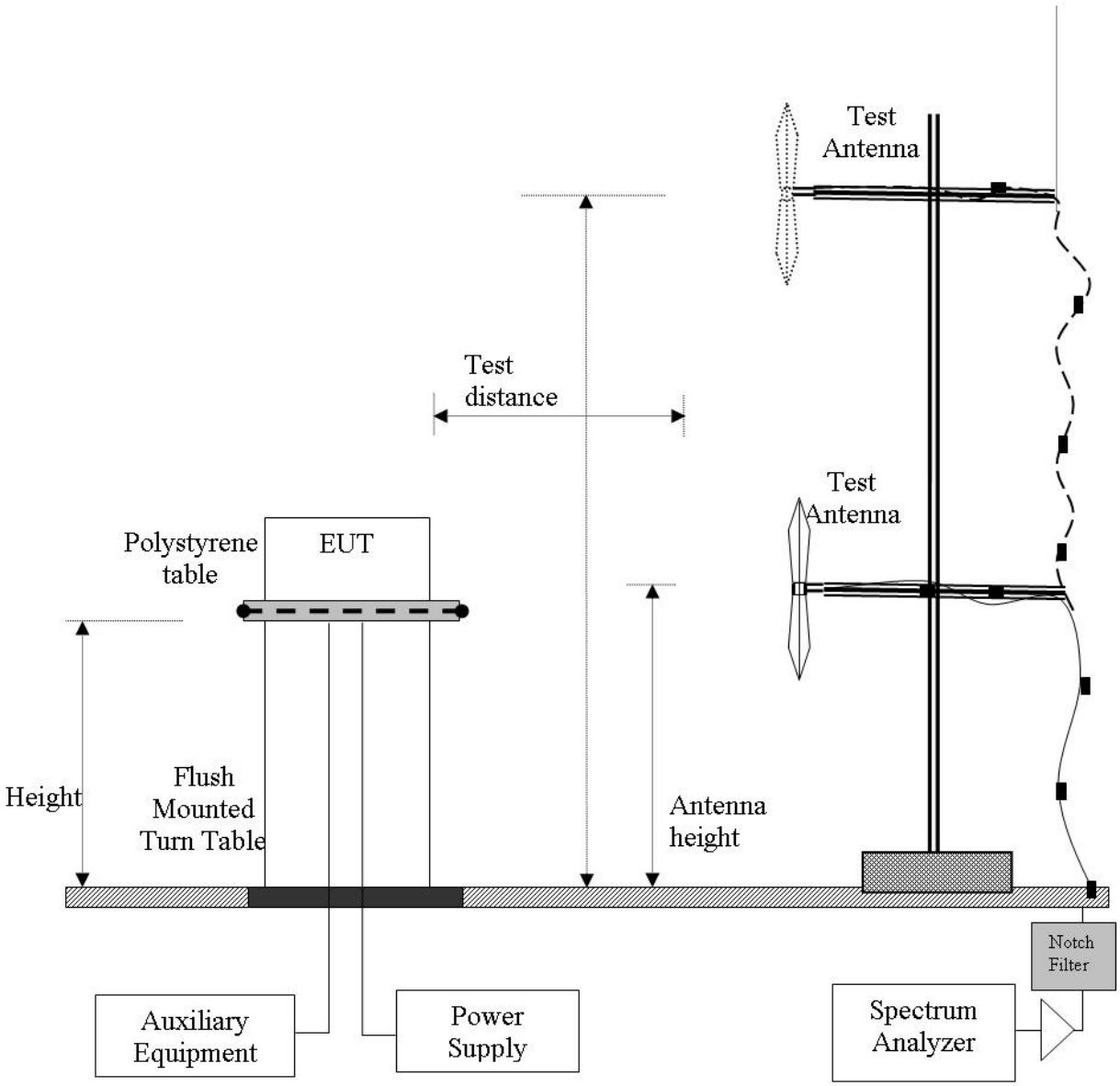
Testing was performed in a 3-meter anechoic chamber. Preliminary radiated emissions were measured on every azimuth and with the receiving antenna in both horizontal and vertical polarizations. Preliminary emissions were recorded with in Spectrum Analyzer mode, using a maximum peak detector while in peak hold mode.

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

Radiated Emission Measurement Setup – Above 1 GHz



Radiated Emission Measurement Setup – Below 1 GHz



Field Strength Calculation

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

FS = R + AF + CORR – FO

FS = Field Strength
R = Measured Spectrum analyzer Input Amplitude
AF = Antenna Factor
FO = Distance Falloff Factor

CORR = Correction Factor = CL – AG + NFL

CL = Cable Loss
AG = Amplifier Gain
NFL = Notch Filter Loss or Waveguide Loss

Field Strength Calculation Example:

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

FS = 51.5 + 8.5 + 1.3 - 26.0 +1 = 36.3 dBμV/m

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

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

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

Specification for FCC Part 15 Radiated Spurious Emissions

Limits

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

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

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

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

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

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

RSS-Gen §6
Receiver Spurious Emission Standard
If a radiated measurement is made, all spurious emissions shall comply with the limits of the following Table. The resolution bandwidth of the spectrum analyzer shall be 100 kHz for spurious emission measurements below 1.0 GHz and 1.0 MHz for measurements above 1.0 GHz

§15.209 (a) Limit Matrix

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

Specification for Industry Canada Receiver Spurious Emissions

RSS-Gen §4.8,
The search for spurious emissions shall be from the lowest frequency internally generated or used in the receiver (e.g. local oscillator, intermediate or carrier frequency), or 30 MHz, whichever is the higher, to at least 3 times the highest tunable or local oscillator frequency, whichever is the higher, without exceeding 40 GHz.

RSS-Gen §6
The following receiver spurious emission limits shall be complied with;
(a) If a radiated measurement is made, all spurious emissions shall comply with the limits of Table 1.

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

Laboratory Measurement Uncertainty for Spectrum Measurement

Measurement Uncertainty	+5.6/ -4.5 dB

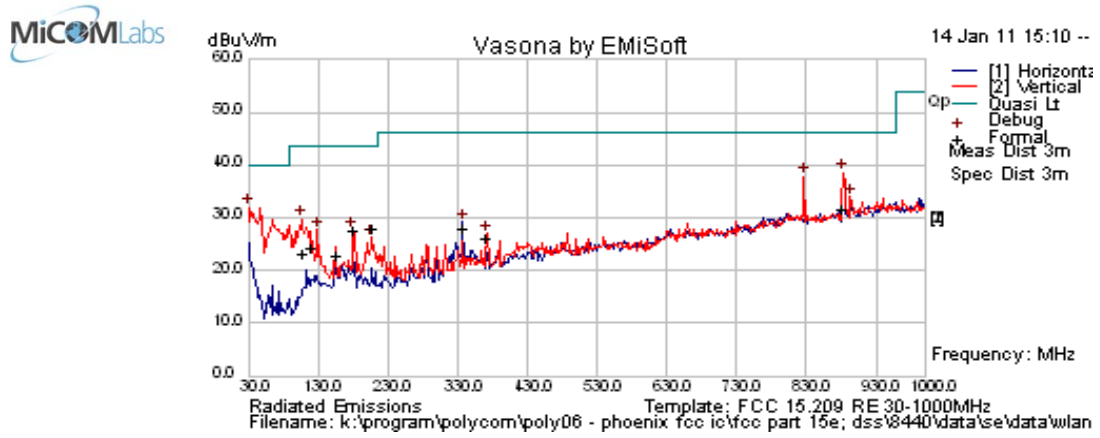
Traceability:

Method	Test Equipment Used
Work instruction WI-03	0287, 0193, 0342, 0158, 0303, 0304, 0134, 0310, 0312

7.8.1 Transmitter Radiated Spurious Emissions

All frequencies and modes were checked per section 15.407 for radio emissions below 1GHz.

Test Freq.	N/A	**Engineer**	EVF
Variant	WLAN: 802.11a, n HT-20	**Temp (ºC)**	20
Freq. Range	1000 - 18000 MHz	**Rel. Hum.(%)**	45
Power Setting	Maximum	**Press. (mBars)**	1013
Antenna	Integral	**Duty Cycle (%)**	10
Test Notes 1	Fundamental attenuated by band-stop filter. Handset (Model: 8440) with battery (SN: AC1010320232) , also connected to charger (Model: SA106B-05)		
Test Notes 2	Mode: WLAN Tx; WLAN=1, BT=0, BC=0, DK=0		

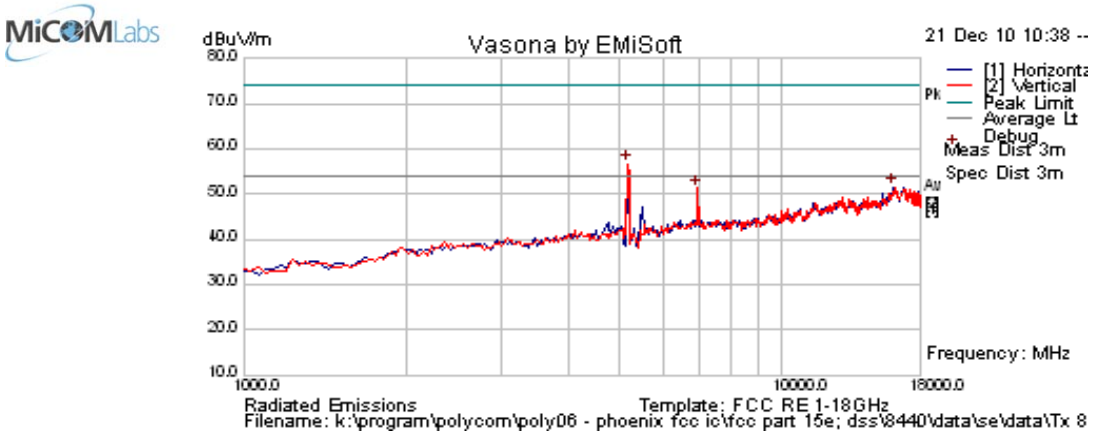


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
883.367	38.6	7.3	-7.3	38.5	Peak [Scan]	V	400	0	46.0	-7.5	Pass	AMB
826.993988	38.6	7.2	-7.9	37.9	Peak [Scan]	V	400	0	46.0	-8.2	Pass	TRNS
180.003	42.7	4.7	-19.7	27.6	Peak [Scan]	V	100	0	43.5	-15.9	Pass	DIG
107.752	44.2	4.2	-18.8	29.7	Peak [Scan]	V	100	0	43.5	-13.8	Pass	DIG
206.900	41.0	4.8	-19.5	26.3	Peak [Scan]	V	100	0	43.5	-17.2	Pass	DIG
30.309	37.9	3.4	-9.4	31.9	Peak [Scan]	V	100	0	40	-8.1	Pass	DIG
893.086	34.0	7.3	-7.3	34.0	Peak [Scan]	V	400	0	46	-12.0	Pass	AMB
130.013	40.6	4.4	-17.2	27.8	Peak [Scan]	V	100	0	43.5	-15.8	Pass	DIG
338.006	40.0	5.4	-16.2	29.2	Peak [Scan]	H	100	0	46	-16.8	Pass	DIG
372.269	36.7	5.6	-15.3	27.0	Peak [Scan]	V	400	0	46	-19.0	Pass	DIG

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; TRNS-Transient; AMB = Ambient
	NRB = Non-Restricted Band. RB = Restricted Band.

Test Freq.	5180 MHz	**Engineer**	EVF
Variant	802.11a; 6 Mbs	**Temp (ºC)**	20.5
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	36
Power Setting	24 in test utility (maximum)	**Press. (mBars)**	996
Antenna	integral	**Duty Cycle (%)**	10
Test Notes 1	Fundamental attenuated by band-stop filter. Handset (Model: 8440) with battery (SN: AC1010320232) , also connected to charger (Model: SA106B-05)		
Test Notes 2	Mode: WLAN Channel 36 Transmit; WLAN=1, BT=0, BC=0, DK=0		

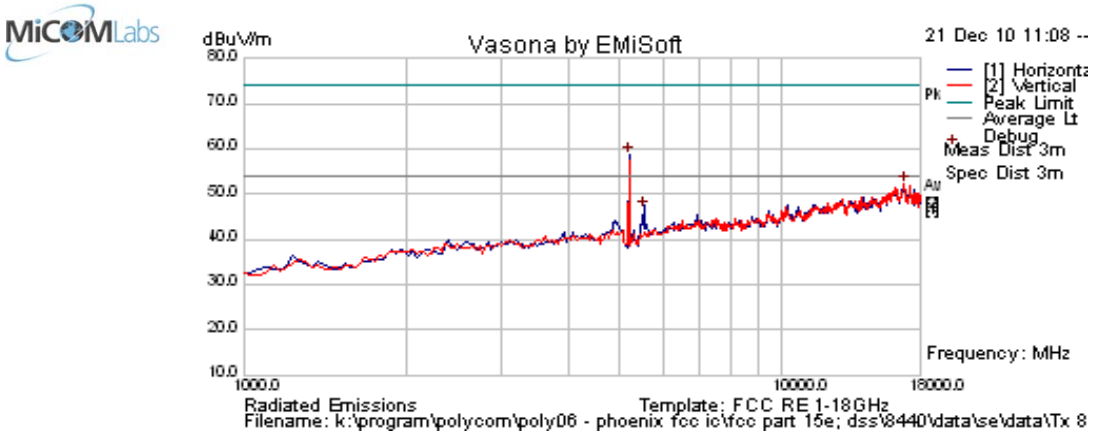


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5180.080	61.5	4.6	-9.5	56.6	Peak [Scan]	V	--	--	--	--	n/a	FUND
16058.116	41.8	9.0	0.8	51.5	Peak [Scan]	H	150	0	54.0	-2.5	Pass	noise floor
6961.924	51.5	5.4	-5.5	51.4	Peak [Scan]	V	150	0	68.2	-16.8	Pass	NRB
5503.802	50.8	4.6	-8.7	46.8	Peak [Scan]	H	201	0	68.2	-21.5	Pass	NRB

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

Test Freq.	5200 MHz	**Engineer**	EVF
Variant	802.11a; 6 Mbs	**Temp (ºC)**	20.5
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	36
Power Setting	24 in test utility (maximum)	**Press. (mBars)**	996
Antenna	integral	**Duty Cycle (%)**	10
Test Notes 1	Fundamental attenuated by band-stop filter. Handset (Model: 8440) with battery (SN: AC1010320232) , also connected to charger (Model: SA106B-05)		
Test Notes 2	Mode: WLAN Channel 40 Transmit; WLAN=1, BT=0, BC=0, DK=0		

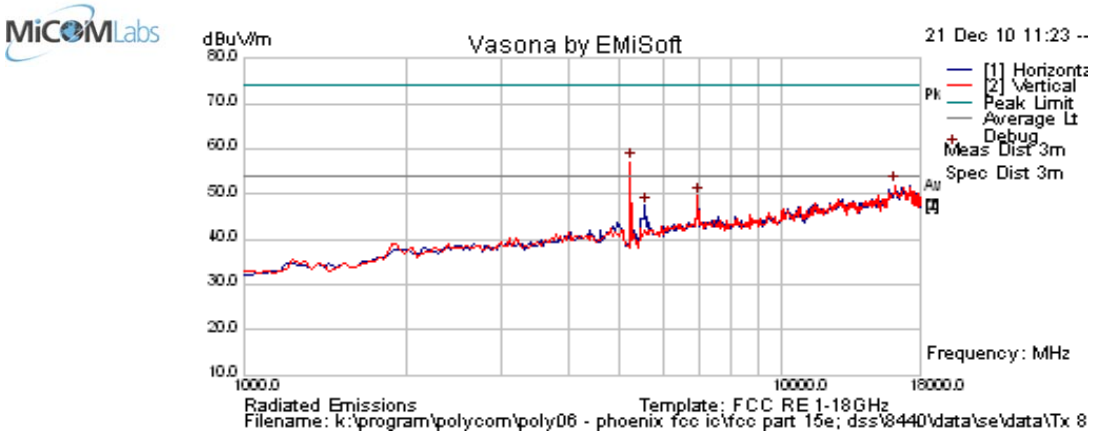


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5201.563	63.4	4.6	-9.4	58.5	Peak [Scan]	H	--	--	--	--	n/a	FUND
16841.683	41.9	8.6	1.8	52.2	Peak [Scan]	V	200	0	54.0	-1.8	Pass	noise floor
5525.079	50.4	4.6	-8.6	46.4	Peak [Scan]	H	98	0	68.2	-21.8	Pass	NRB

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

Test Freq.	5240 MHz	**Engineer**	EVF
Variant	802.11a; 6 Mbs	**Temp (ºC)**	20.5
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	36
Power Setting	24 in test utility (maximum)	**Press. (mBars)**	996
Antenna	integral	**Duty Cycle (%)**	10
Test Notes 1	Fundamental attenuated by band-stop filter. Handset (Model: 8440) with battery (SN: AC1010320232) , also connected to charger (Model: SA106B-05)		
Test Notes 2	Mode: WLAN Channel 48 Transmit; WLAN=1, BT=0, BC=0, DK=0		

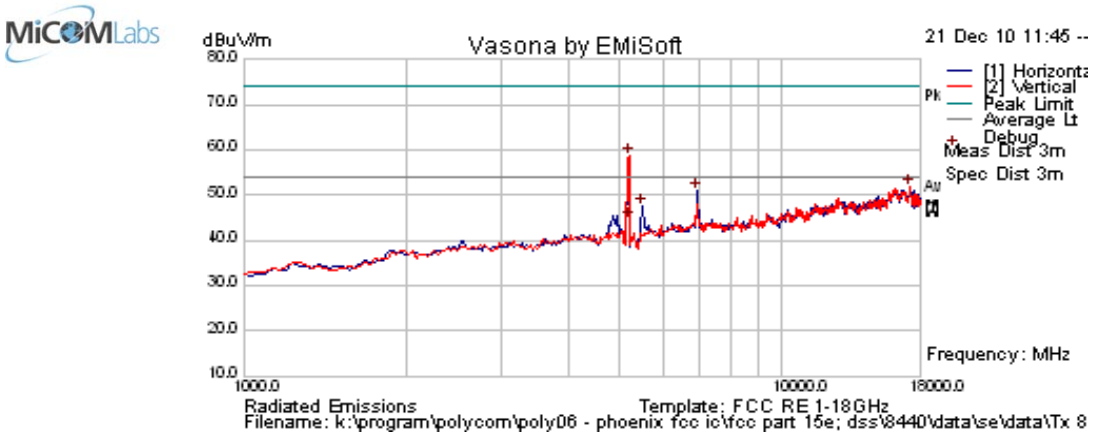


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5235.832	62.2	4.6	-9.6	57.2	Peak [Scan]	V	--	--	--	--	n/a	FUND
16228.457	42.0	8.9	1.1	52.0	Peak [Scan]	V	200	0	54.0	-2.0	Pass	noise floor
5566.038	51.1	4.7	-8.5	47.2	Peak [Scan]	H	98	0	68.2	-21.0	Pass	NRB
6963.701	49.6	5.4	-5.4	49.6	Peak [Scan]	V	98	0	68.2	-18.7	Pass	NRB

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

Test Freq.	5180 MHz	**Engineer**	EVF
Variant	802.11n HT-20; 6.5 MCS	**Temp (ºC)**	20.5
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	36
Power Setting	24 in test utility (maximum)	**Press. (mBars)**	996
Antenna	integral	**Duty Cycle (%)**	10
Test Notes 1	Fundamental attenuated by band-stop filter. Handset (Model: 8440) with battery (SN: AC1010320232) , also connected to charger (Model: SA106B-05)		
Test Notes 2	Mode: WLAN Channel 36 Transmit; WLAN=1, BT=0, BC=0, DK=0		

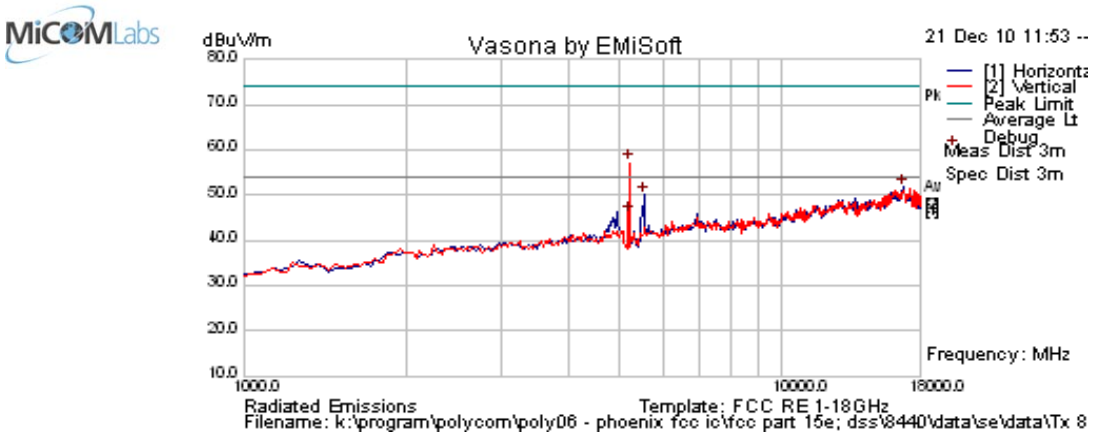


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5173.547	63.6	4.6	-9.6	58.6	Peak [Scan]	V	--	--	--	--	n/a	FUND
17250.501	41.5	8.6	1.6	51.8	Peak [Scan]	V	100	0	54.0	-2.3	Pass	noise floor
6957.034	51.1	5.4	-5.5	51.0	Peak [Scan]	H	100	0	68.2	-17.2	Pass	NRB
5503.805	51.6	4.6	-8.7	47.6	Peak [Scan]	H	98	0	68.2	-20.7	Pass	NRB
5173.709	49.2	4.6	-9.6	44.2	Peak [Scan]	H	98	0	68.2	-24.0	Pass	NRB

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

Test Freq.	5200 MHz	**Engineer**	EVF
Variant	802.11n HT-20; 6.5 MCS	**Temp (ºC)**	20.5
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	36
Power Setting	24 in test utility (maximum)	**Press. (mBars)**	996
Antenna	integral	**Duty Cycle (%)**	10
Test Notes 1	Fundamental attenuated by band-stop filter. Handset (Model: 8440) with battery (SN: AC1010320232) , also connected to charger (Model: SA106B-05)		
Test Notes 2	Mode: WLAN Channel 40 Transmit; WLAN=1, BT=0, BC=0, DK=0		

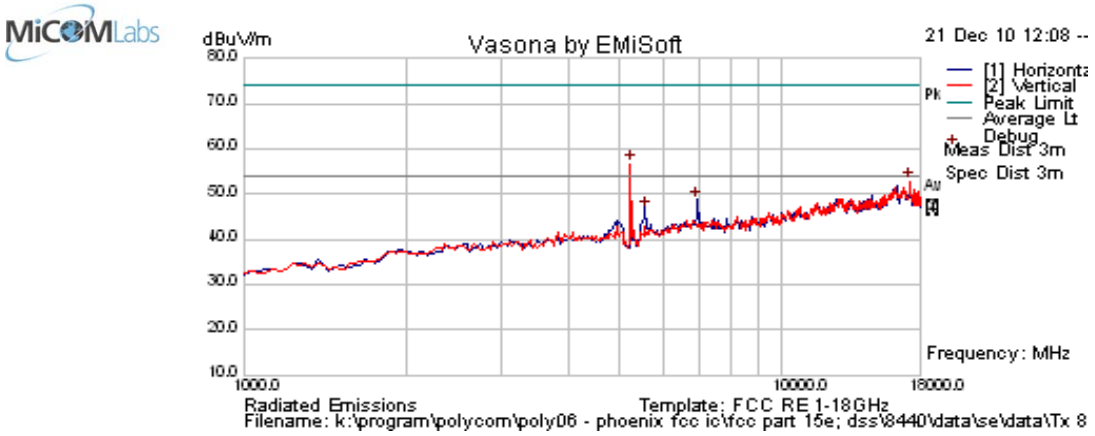


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5201.162	61.9	4.6	-9.4	57.1	Peak [Scan]	V	--	--	--	--	n/a	FUND
16739.479	41.5	8.7	1.5	51.7	Peak [Scan]	H	200	0	54.0	-2.4	Pass	noise floor
5525.050	54.1	4.6	-8.6	50.1	Peak [Scan]	H	100	0	68.2	-18.1	Pass	NRB
5200.113	50.3	4.6	-9.4	45.6	Peak [Scan]	H	98	0	68.2	-22.7	Pass	NRB

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

Test Freq.	5240 MHz	**Engineer**	EVF
Variant	802.11n HT-20; 6.5 MCS	**Temp (ºC)**	20.5
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	36
Power Setting	24 in test utility (maximum)	**Press. (mBars)**	996
Antenna	integral	**Duty Cycle (%)**	10
Test Notes 1	Fundamental attenuated by band-stop filter. Handset (Model: 8440) w ith battery (SN: AC1010320232) , also connected to charger (Model: SA106B-05)		
Test Notes 2	Mode: WLAN Channel 48 Transmit; WLAN=1, BT=0, BC=0, DK=0		

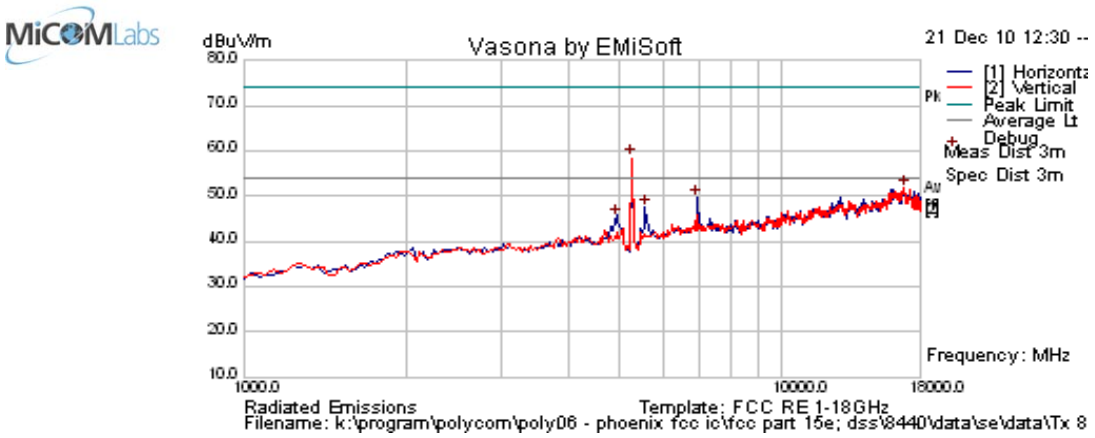


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5242.325	61.8	4.6	-9.7	56.7	Peak [Scan]	V	--	--	--	--	n/a	FUND
17250.501	42.7	8.6	1.6	52.9	Peak [Scan]	V	150	0	54.0	-1.1	Pass	noise floor
6966.894	48.8	5.4	-5.3	48.8	Peak [Scan]	H	150	0	68.2	-19.4	Pass	NRB
5568.324	50.4	4.7	-8.5	46.6	Peak [Scan]	H	98	0	68.2	-21.7	Pass	NRB

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

Test Freq.	5260 MHz	**Engineer**	EVF
Variant	802.11a; 6 Mbs	**Temp (ºC)**	20.5
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	36
Power Setting	24 in test utility (maximum)	**Press. (mBars)**	996
Antenna	integral	**Duty Cycle (%)**	10
Test Notes 1	Fundamental attenuated by band-stop filter. Handset (Model: 8440) with battery (SN: AC1010320232) , also connected to charger (Model: SA106B-05)		
Test Notes 2	Mode: WLAN Channel 52 Transmit; WLAN=1, BT=0, BC=0, DK=0		

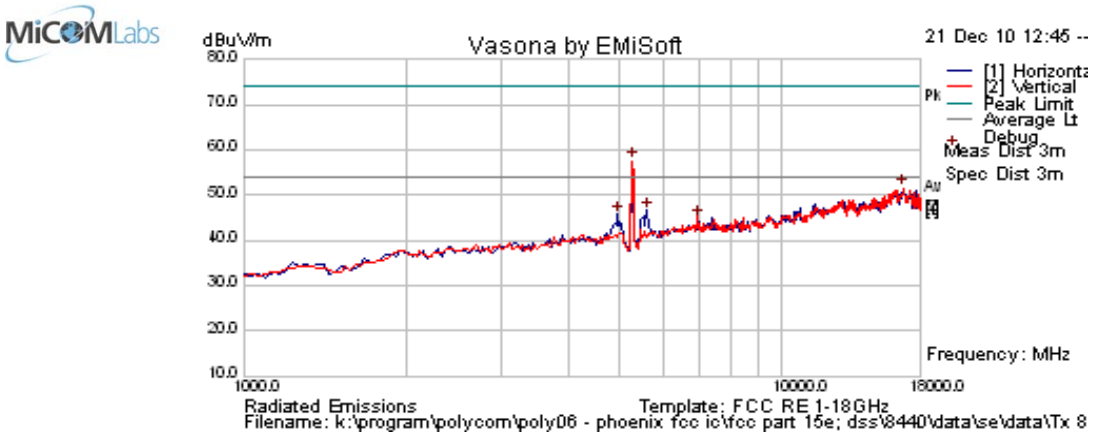


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5263.567	63.4	4.6	-9.6	58.4	Peak [Scan]	V	--	--	--	--	n/a	FUND
16841.683	41.3	8.6	1.8	51.7	Peak [Scan]	V	100	0	54.0	-2.4	Pass	noise floor
6949.098	49.5	5.4	-5.3	49.5	Peak [Scan]	H	100	0	68.2	-18.7	Pass	NRB
4931.241	49.8	4.6	-9.1	45.2	Peak [Scan]	H	98	0	54	-8.8	Pass	RB
5588.748	51.3	4.7	-8.6	47.4	Peak [Scan]	H	98	0	68.2	-20.8	Pass	NRB

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

Test Freq.	5280 MHz	**Engineer**	EVF
Variant	802.11a; 6 Mbs	**Temp (ºC)**	20.5
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	36
Power Setting	24 in test utility (maximum)	**Press. (mBars)**	996
Antenna	integral	**Duty Cycle (%)**	10
Test Notes 1	Fundamental attenuated by band-stop filter. Handset (Model: 8440) with battery (SN: AC1010320232) , also connected to charger (Model: SA106B-05)		
Test Notes 2	Mode: WLAN Channel 56 Transmit; WLAN=1, BT=0, BC=0, DK=0		

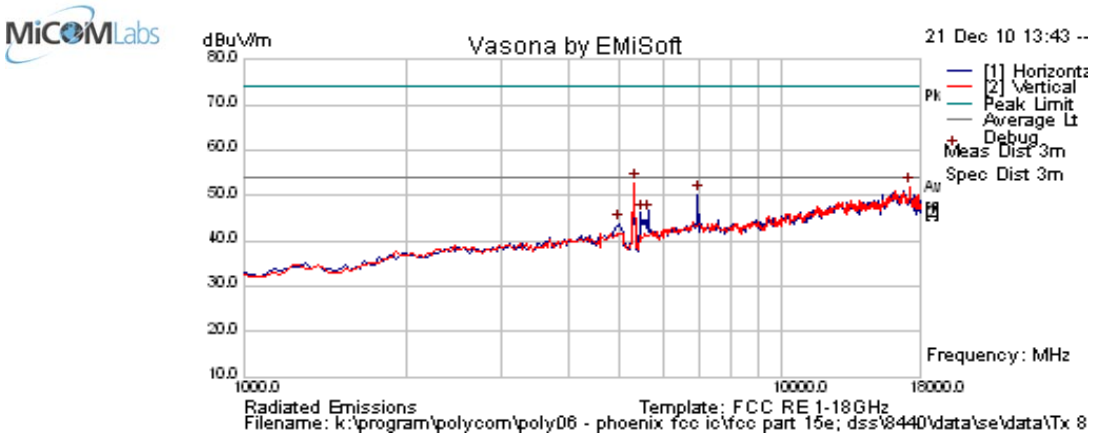


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5275.431	62.7	4.6	-9.8	57.6	Peak [Scan]	V	--	--	--	--	n/a	FUND
16773.547	41.2	8.6	1.7	51.6	Peak [Scan]	V	100	0	54.0	-2.5	Pass	noise floor
5609.909	50.2	4.7	-8.5	46.3	Peak [Scan]	H	98	0	68.2	-21.9	Pass	NRB
4950.032	50.2	4.6	-9.2	45.6	Peak [Scan]	H	98	0	54	-8.4	Pass	RB
6968.404	44.6	5.4	-5.3	44.7	Peak [Scan]	V	98	0	68.2	-23.5	Pass	NRB

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

Test Freq.	5320 MHz	**Engineer**	EVF
Variant	802.11a; 6 Mbs	**Temp (ºC)**	20.5
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	36
Power Setting	24 in test utility (maximum)	**Press. (mBars)**	996
Antenna	integral	**Duty Cycle (%)**	10
Test Notes 1	Fundamental attenuated by band-stop filter. Handset (Model: 8440) with battery (SN: AC1010320232) , also connected to charger (Model: SA106B-05)		
Test Notes 2	Mode: WLAN Channel 64 Transmit; WLAN=1, BT=0, BC=0, DK=0		

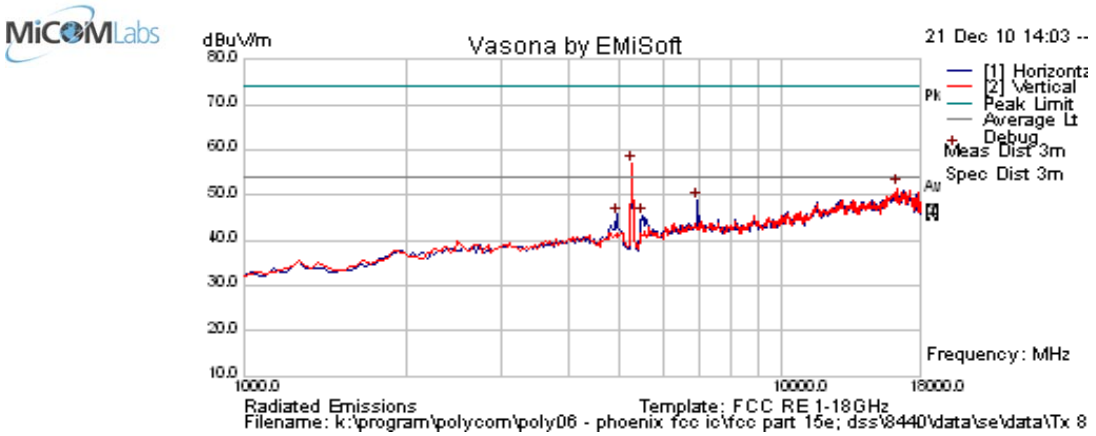


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5325.772	57.8	4.6	-9.6	52.9	Peak [Scan]	V	--	--	--	--	n/a	FUND
17216.433	42.4	8.6	1.0	52.0	Peak [Scan]	V	200	0	54.0	-2.0	Pass	noise floor
6964.509	50.3	5.4	-5.4	50.2	Peak [Scan]	H	100	0	68.2	-18.0	Pass	NRB
4987.511	48.4	4.6	-9.1	43.9	Peak [Scan]	H	98	0	54	-10.1	Pass	RB
5478.091	50.4	4.6	-9.0	46.1	Peak [Scan]	H	98	0	68.2	-22.2	Pass	NRB
5652.516	50.0	4.7	-8.4	46.3	Peak [Scan]	H	98	0	68.2	-21.9	Pass	NRB

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

Test Freq.	5260 MHz	**Engineer**	EVF
Variant	802.11n HT-20; 6.5 MCS	**Temp (ºC)**	20.5
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	36
Power Setting	24 in test utility (maximum)	**Press. (mBars)**	996
Antenna	integral	**Duty Cycle (%)**	10
Test Notes 1	Fundamental attenuated by band-stop filter. Handset (Model: 8440) with battery (SN: AC1010320232) , also connected to charger (Model: SA106B-05)		
Test Notes 2	Mode: WLAN Channel 52 Transmit; WLAN=1, BT=0, BC=0, DK=0		

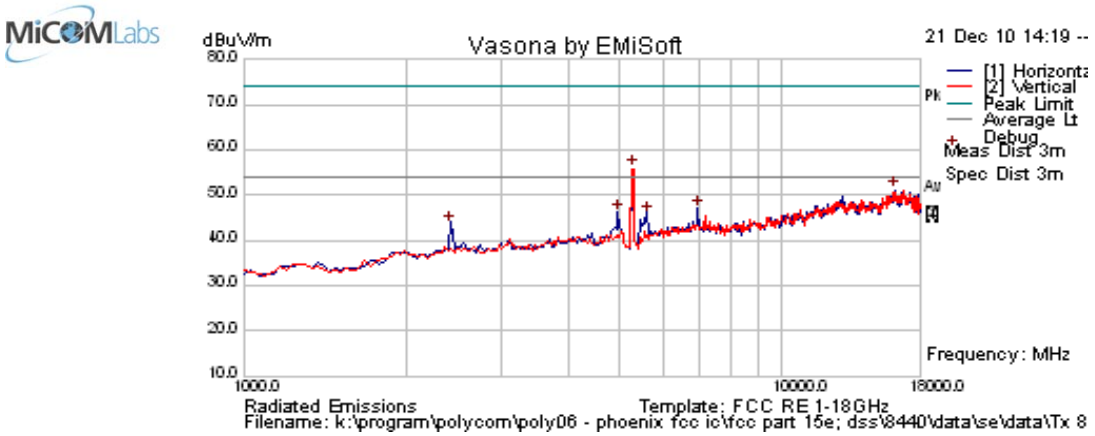


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5264.208	61.9	4.6	-9.6	56.9	Peak [Scan]	V	--	--	--	--	n/a	FUND
16296.593	42.0	8.9	0.7	51.6	Peak [Scan]	V	100	0	54.0	-2.5	Pass	noise floor
6964.529	48.7	5.4	-5.4	48.6	Peak [Scan]	H	100	0	68.2	-19.6	Pass	NRB
4931.153	49.7	4.6	-9.1	45.1	Peak [Scan]	H	98	0	54	-8.9	Pass	RB
5589.263	48.9	4.7	-8.6	45.0	Peak [Scan]	H	98	0	68.2	-23.2	Pass	NRB

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

Test Freq.	5280 MHz	**Engineer**	EVF
Variant	802.11n HT-20; 6.5 MCS	**Temp (ºC)**	20.5
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	36
Power Setting	24 in test utility (maximum)	**Press. (mBars)**	996
Antenna	integral	**Duty Cycle (%)**	10
Test Notes 1	Fundamental attenuated by band-stop filter. Handset (Model: 8440) w ith battery (SN: AC1010320232) , also connected to charger (Model: SA106B-05)		
Test Notes 2	Mode: WLAN Channel 56 Transmit; WLAN=1, BT=0, BC=0, DK=0		

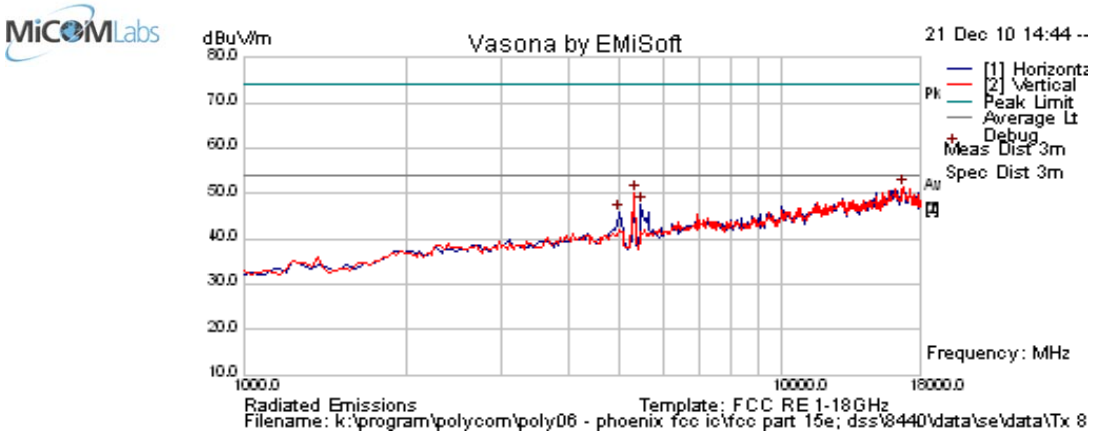


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5275.190	61.0	4.6	-9.8	55.8	Peak [Scan]	V	--	--	--	--	n/a	FUND
16228.457	41.1	8.9	1.1	51.1	Peak [Scan]	H	100	0	54.0	-2.9	Pass	noise floor
2426.093	51.5	3.0	-11.1	43.4	Peak [Scan]	H	98	0	68.2	-24.8	Pass	NRB
4949.926	50.6	4.6	-9.2	46.0	Peak [Scan]	H	98	0	54	-8.1	Pass	RB
5610.034	49.4	4.7	-8.5	45.5	Peak [Scan]	H	98	0	54	-8.5	Pass	NRB
6967.232	46.7	5.4	-5.3	46.8	Peak [Scan]	H	98	0	68.2	-21.4	Pass	NRB

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

Test Freq.	5320 MHz	**Engineer**	EVF
Variant	802.11n HT-20; 6.5 MCS	**Temp (ºC)**	20.5
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	36
Power Setting	24 in test utility (maximum)	**Press. (mBars)**	996
Antenna	integral	**Duty Cycle (%)**	10
Test Notes 1	Fundamental attenuated by band-stop filter. Handset (Model: 8440) w ith battery (SN: AC1010320232) , also connected to charger (Model: SA106B-05)		
Test Notes 2	Mode: WLAN Channel 64 Transmit; WLAN=1, BT=0, BC=0, DK=0		

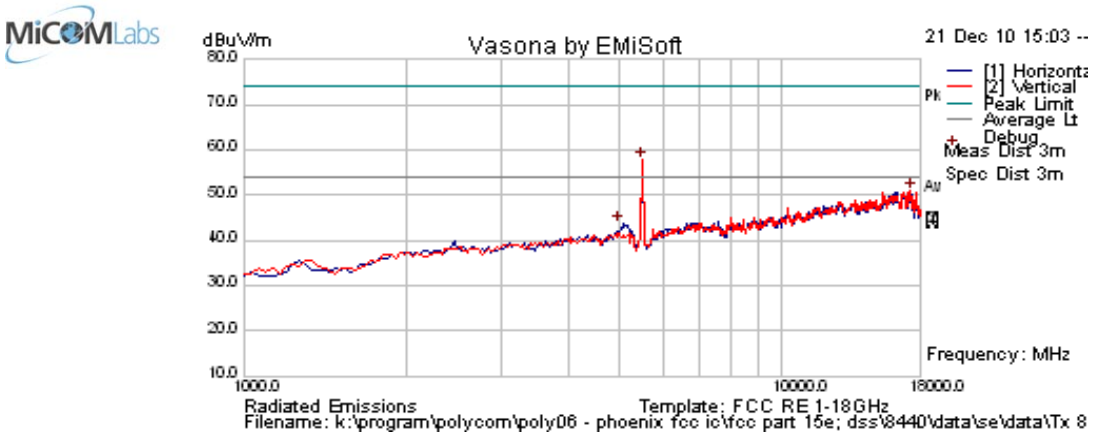


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
16807.615	41.0	8.6	1.6	51.3	Peak [Scan]	V	100	0	54.0	-2.7	Pass	noise floor
5325.611	54.9	4.6	-9.6	49.9	Peak [Scan]	V	--	--	--	--	n/a	FUND
4987.483	50.3	4.6	-9.1	45.8	Peak [Scan]	H	98	0	54	-8.2	Pass	RB
5440.939	52.0	4.6	-9.0	47.6	Peak [Scan]	H	98	0	54	-6.4	Pass	RB
5482.543	51.6	4.6	-8.9	47.3	Peak [Scan]	H	98	0	68.2	-20.9	Pass	NRB

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

Test Freq.	5500 MHz	**Engineer**	EVF
Variant	802.11a; 6 Mbs	**Temp (ºC)**	20.5
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	36
Power Setting	24 in test utility (maximum)	**Press. (mBars)**	996
Antenna	integral	**Duty Cycle (%)**	10
Test Notes 1	Fundamental attenuated by band-stop filter. Handset (Model: 8440) with battery (SN: AC1010320232) , also connected to charger (Model: SA106B-05)		
Test Notes 2	Mode: WLAN Channel 100 Transmit; WLAN=1, BT=0, BC=0, DK=0		

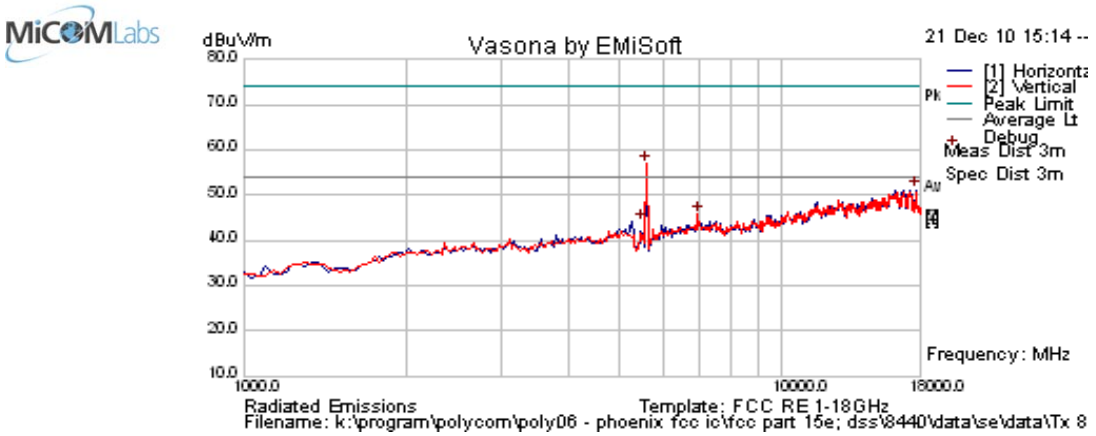


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5492.906	62.0	4.6	-8.8	57.8	Peak [Scan]	V	--	--	--	--	n/a	FUND
17284.569	40.6	8.6	1.6	50.8	Peak [Scan]	V	200	0	54.0	-3.2	Pass	noise floor
4990.098	47.8	4.6	-9.1	43.3	Peak [Scan]	H	98	0	54	-10.7	Pass	RB

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

Test Freq.	5600 MHz	**Engineer**	EVF
Variant	802.11a; 6 Mbs	**Temp (ºC)**	20.5
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	36
Power Setting	24 in test utility (maximum)	**Press. (mBars)**	996
Antenna	integral	**Duty Cycle (%)**	10
Test Notes 1	Fundamental attenuated by band-stop filter. Handset (Model: 8440) with battery (SN: AC1010320232) , also connected to charger (Model: SA106B-05)		
Test Notes 2	Mode: WLAN Channel 120 Transmit; WLAN=1, BT=0, BC=0, DK=0		

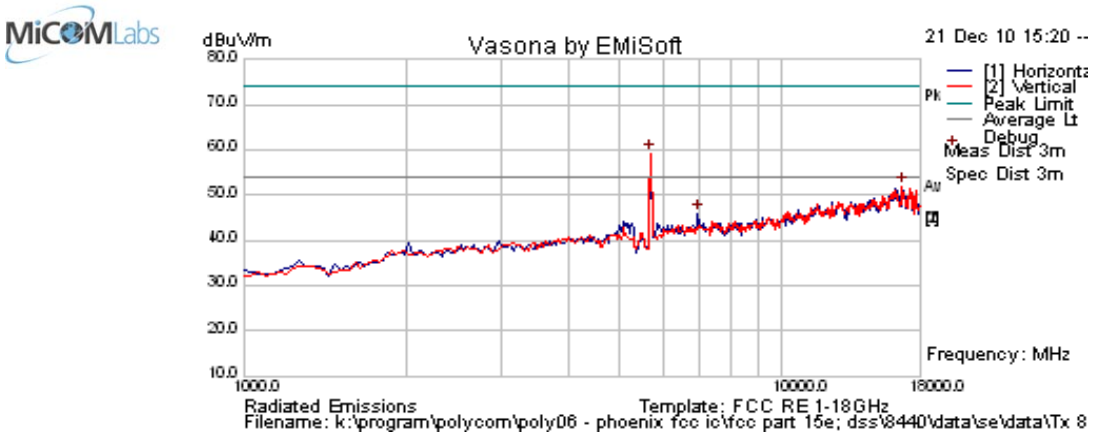


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5599.198	60.7	4.7	-8.6	56.8	Peak [Scan]	V	--	--	--	--	n/a	FUND
17693.387	41.6	8.8	0.8	51.2	Peak [Scan]	H	200	0	54.0	-2.9	Pass	noise floor
6965.355	45.8	5.4	-5.4	45.8	Peak [Scan]	V	98	0	68.2	-22.4	Pass	NRB
5492.271	48.0	4.6	-8.8	43.9	Peak [Scan]	H	98	0	68.2	-24.4	Pass	NRB

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

Test Freq.	5700 MHz	**Engineer**	EVF
Variant	802.11a; 6 Mbs	**Temp (ºC)**	20.5
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	36
Power Setting	24 in test utility (maximum)	**Press. (mBars)**	996
Antenna	integral	**Duty Cycle (%)**	10
Test Notes 1	Fundamental attenuated by band-stop filter. Handset (Model: 8440) with battery (SN: AC1010320232) , also connected to charger (Model: SA106B-05)		
Test Notes 2	Mode: WLAN Channel 140 Transmit; WLAN=1, BT=0, BC=0, DK=0		

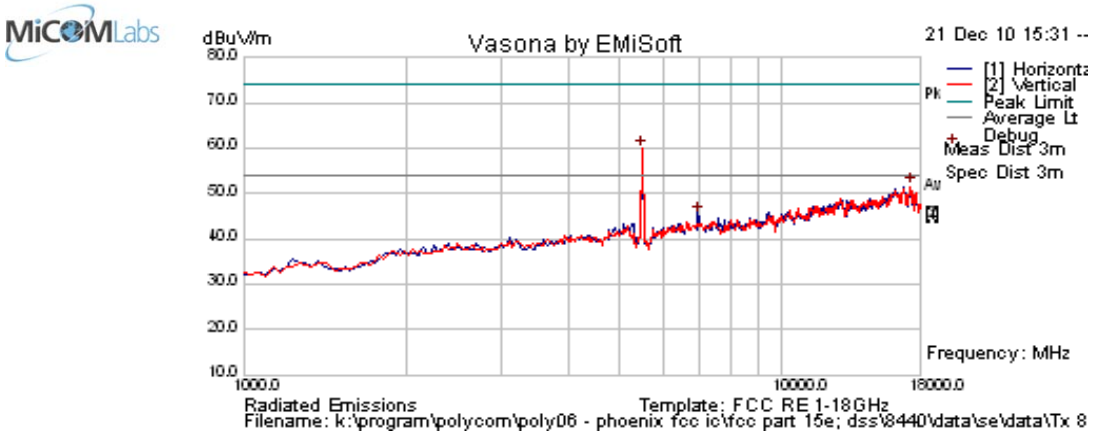


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5701.403	62.6	4.7	-8.1	59.3	Peak [Scan]	V	--	--	--	--	n/a	FUND
16705.411	42.0	8.7	1.4	52.1	Peak [Scan]	V	100	0	54.0	-2.0	Pass	noise floor
6966.384	45.9	5.4	-5.3	45.9	Peak [Scan]	H	98	0	68.2	-22.3	Pass	NRB

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

Test Freq.	5500 MHz	**Engineer**	EVF
Variant	802.11n HT-20; 6.5 MCS	**Temp (ºC)**	20.5
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	36
Power Setting	24 in test utility (maximum)	**Press. (mBars)**	996
Antenna	integral	**Duty Cycle (%)**	10
Test Notes 1	Fundamental attenuated by band-stop filter. Handset (Model: 8440) w ith battery (SN: AC1010320232) , also connected to charger (Model: SA106B-05)		
Test Notes 2	Mode: WLAN Channel 100 Transmit; WLAN=1, BT=0, BC=0, DK=0		

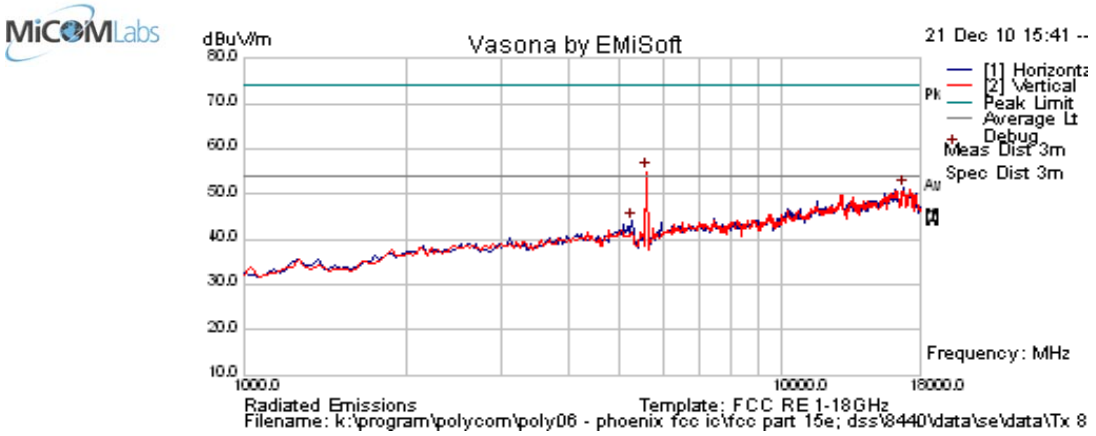


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5496.994	64.0	4.6	-8.7	59.8	Peak [Scan]	V	--	--	--	--	n/a	FUND
17284.569	41.4	8.6	1.6	51.6	Peak [Scan]	V	200	0	54.0	-2.4	Pass	noise floor
6958.185	45.6	5.4	-5.5	45.4	Peak [Scan]	H	98	0	68.2	-22.8	Pass	NRB

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

Test Freq.	5600 MHz	**Engineer**	EVF
Variant	802.11n HT-20; 6.5 MCS	**Temp (ºC)**	20.5
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	36
Power Setting	24 in test utility (maximum)	**Press. (mBars)**	996
Antenna	integral	**Duty Cycle (%)**	10
Test Notes 1	Fundamental attenuated by band-stop filter. Handset (Model: 8440) w ith battery (SN: AC1010320232) , also connected to charger (Model: SA106B-05)		
Test Notes 2	Mode: WLAN Channel 120 Transmit; WLAN=1, BT=0, BC=0, DK=0		

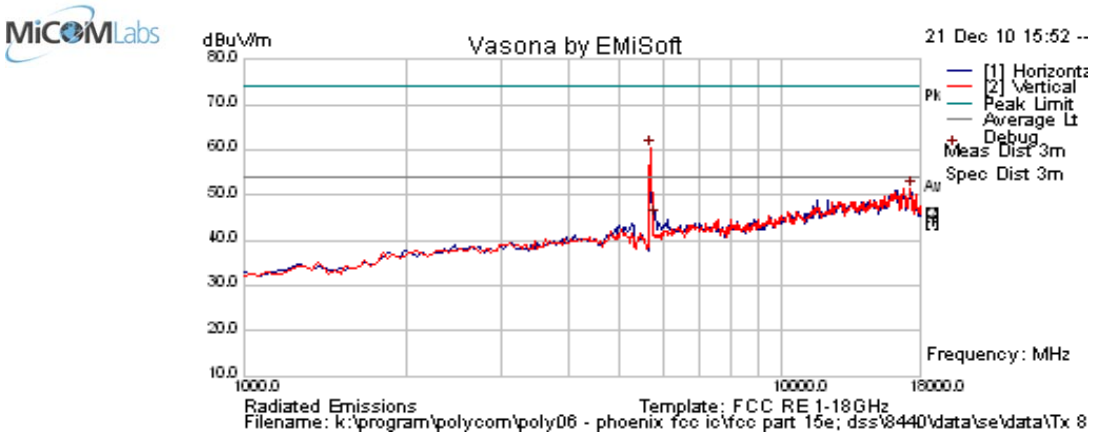


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5599.198	58.9	4.7	-8.6	55.0	Peak [Scan]	V	--	--	--	--	n/a	FUND
16739.479	41.2	8.7	1.5	51.4	Peak [Scan]	H	200	0	54.0	-2.6	Pass	noise floor
5471.872	48.5	4.6	-9.1	44.0	Peak [Scan]	H	98	0	68.2	-24.2	Pass	NRB

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

Test Freq.	5700 MHz	**Engineer**	EVF
Variant	802.11n HT-20; 6.5 MCS	**Temp (ºC)**	20.5
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	36
Power Setting	24 in test utility (maximum)	**Press. (mBars)**	996
Antenna	integral	**Duty Cycle (%)**	10
Test Notes 1	Fundamental attenuated by band-stop filter. Handset (Model: 8440) with battery (SN: AC1010320232) , also connected to charger (Model: SA106B-05)		
Test Notes 2	Mode: WLAN Channel 140 Transmit; WLAN=1, BT=0, BC=0, DK=0		



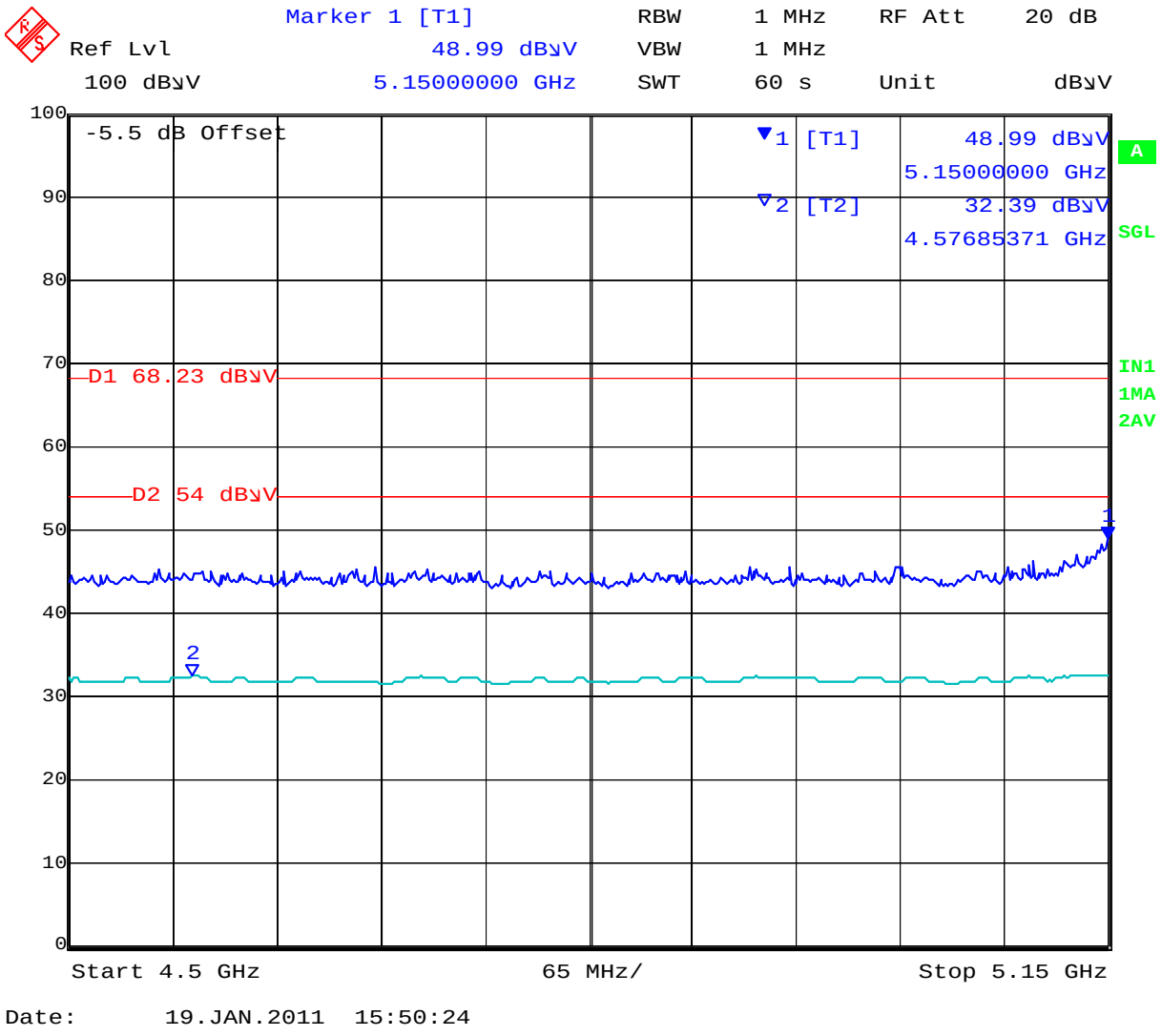
Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5701.403	63.8	4.7	-8.1	60.4	Peak [Scan]	V	--	--	--	--	n/a	FUND
17284.569	41.2	8.6	1.6	51.4	Peak [Scan]	V	100	0	54.0	-2.6	Pass	noise floor
5774.269	48.5	4.8	-8.3	44.9	Peak [Scan]	H	98	0	68.2	-23.3	Pass	NRB

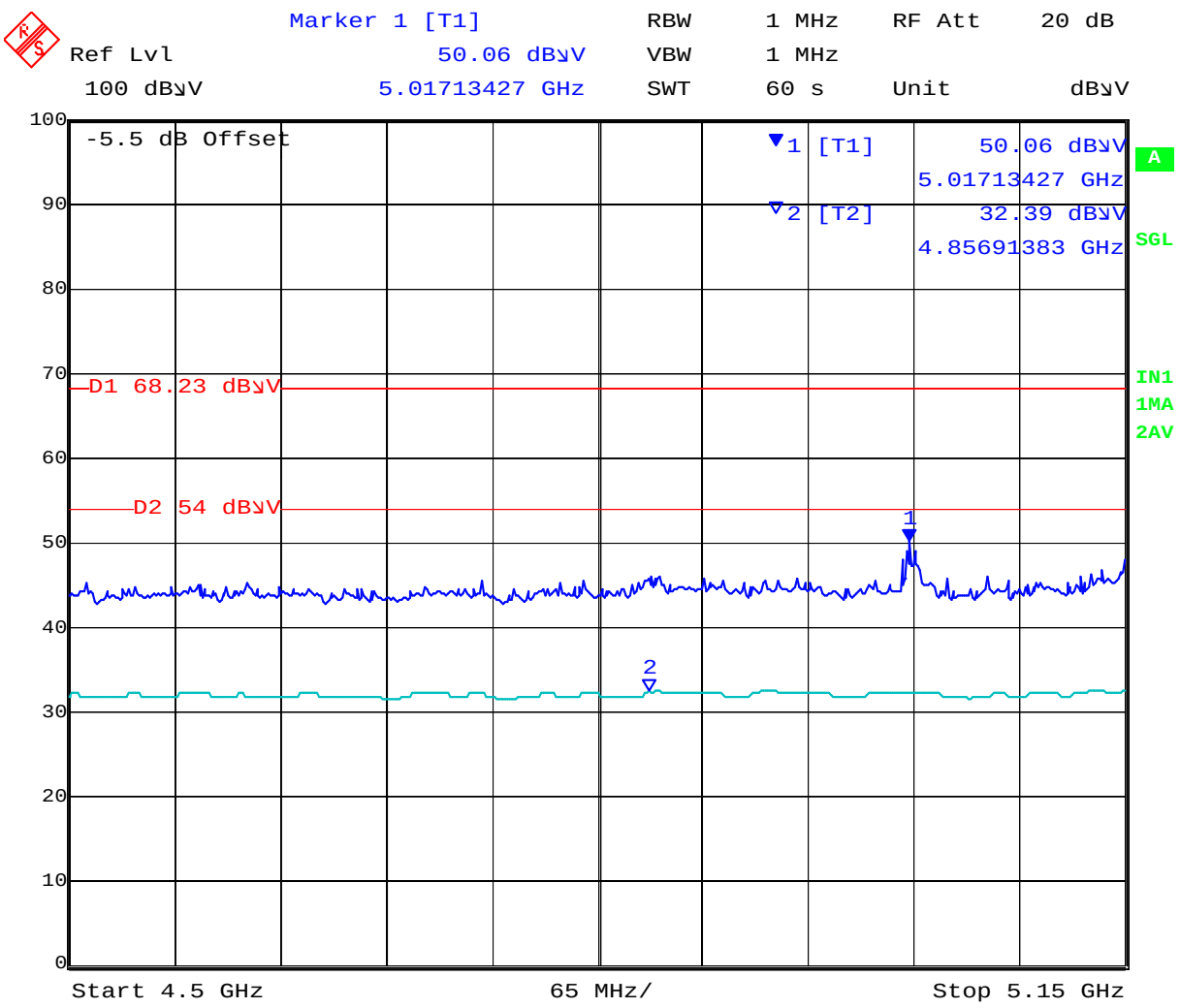
Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

7.8.2 Band-Edge Measurements

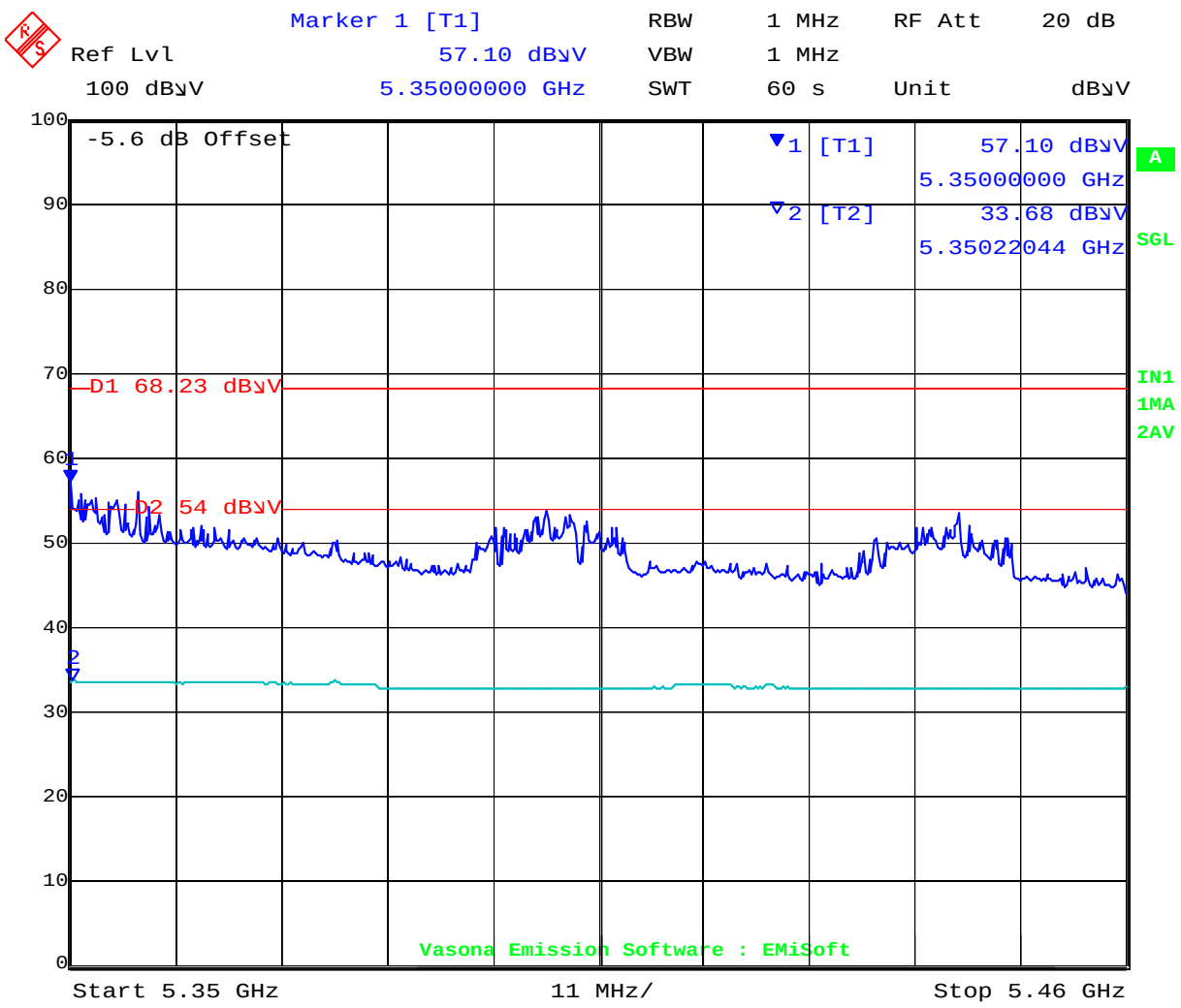
8440 Band Edge Channel 36 - 5180 MHz 802.11a 4500-5150 MHz Pwr=14 Hor Hght=98 Ang=353



8440 Band Edge Channel 36 - 5180 MHz 802.11n HT-20 4500-5150 MHz Pwr=14 Hor Hght=102 Ang=346

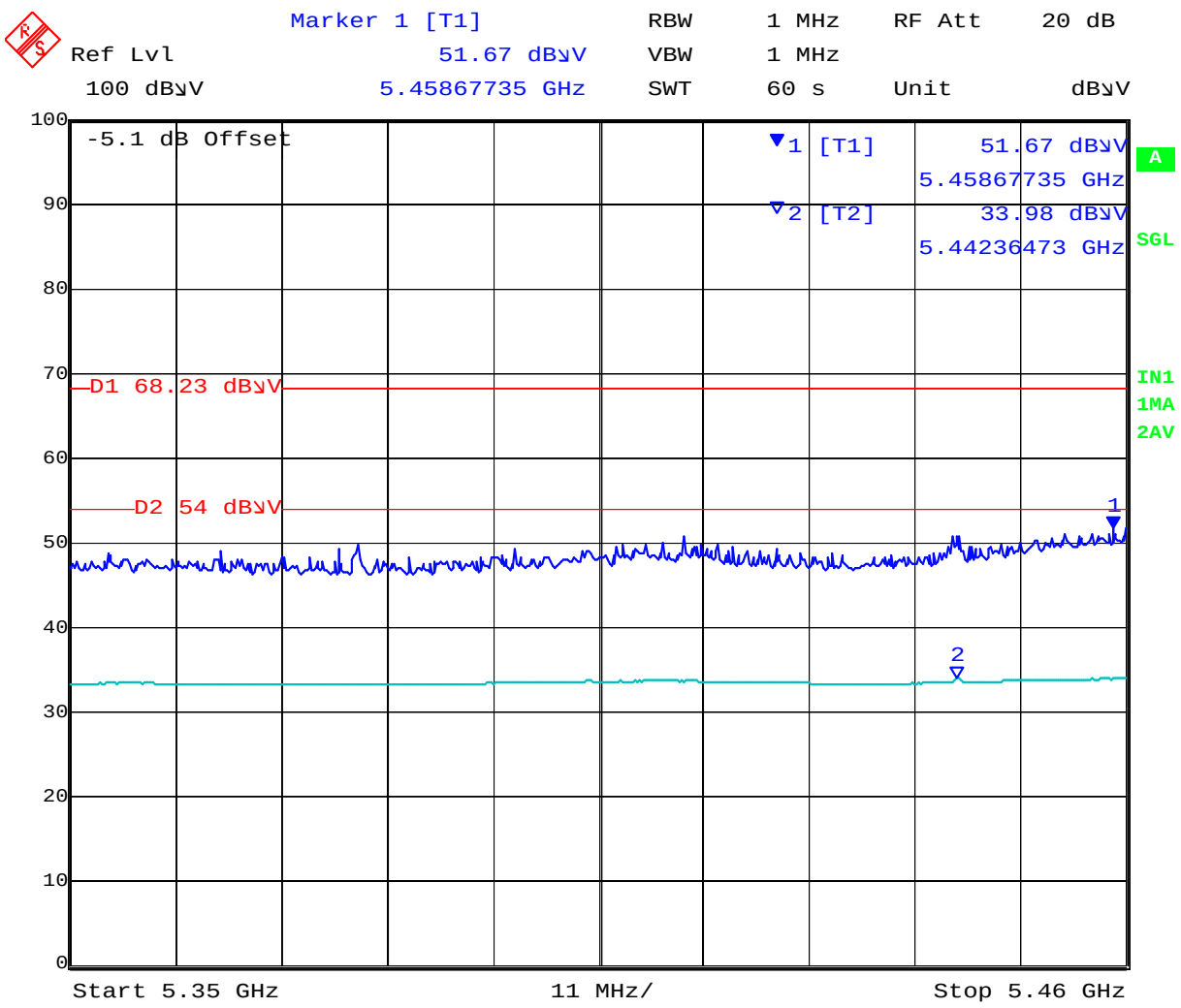


8440 Band Edge Channel 64 - 5320 MHz 802.11a 5350-5460 MHz Pwr=16 Hor Hght=100 Ang=193

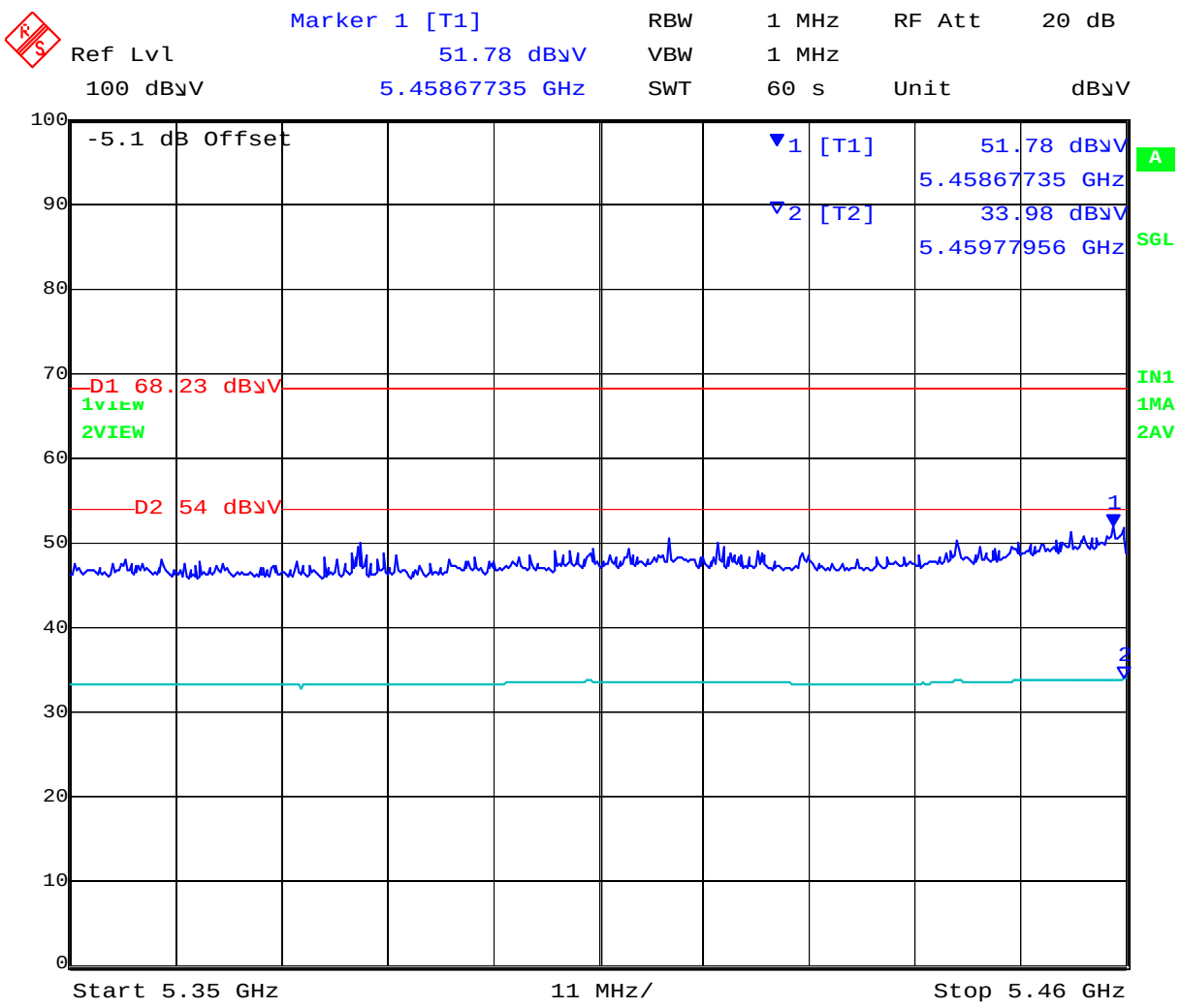


8440 Band Edge Channel 64 - 5320 MHz 802.11n HT-20 5350-5460 MHz Pwr=16 Hor Hght=98 Ang=188

8440 Band Edge Channel 100 - 5500 MHz 802.11a 5350-5460 MHz Pwr=16 Hor Hght=98 Ang=188



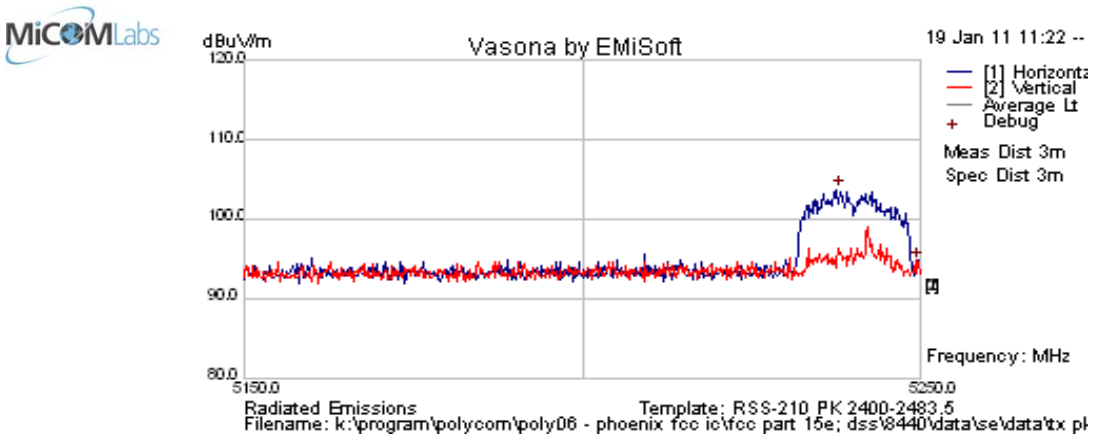
8440 Band Edge Channel 100 - 5500 MHz 802.11n HT-20 5350-5460 MHz Pwr=16 Hor Hght=98 Ang=188



7.8.3 Peak Emissions

Peak emissions are shown only for the highest levels observed for each mode in each band.

Test Freq.	5240 MHz	**Engineer**	EVF
Variant	802.11a; 6 Mbs	**Temp (ºC)**	17.5
Freq. Range	5150 - 5250 MHz	**Rel. Hum.(%)**	40
Power Setting	14 in test utility	**Press. (mBars)**	1006
Antenna	integral	**Duty Cycle (%)**	10
Test Notes 1	Handset (Model: 8440) w ith battery (SN: AC1010320232) , also connected to charger (Model: SA106B-05)		
Test Notes 2	Mode: WLAN Channel 48 Tx; WLAN=1, BT=0, BC=0, DK=0		

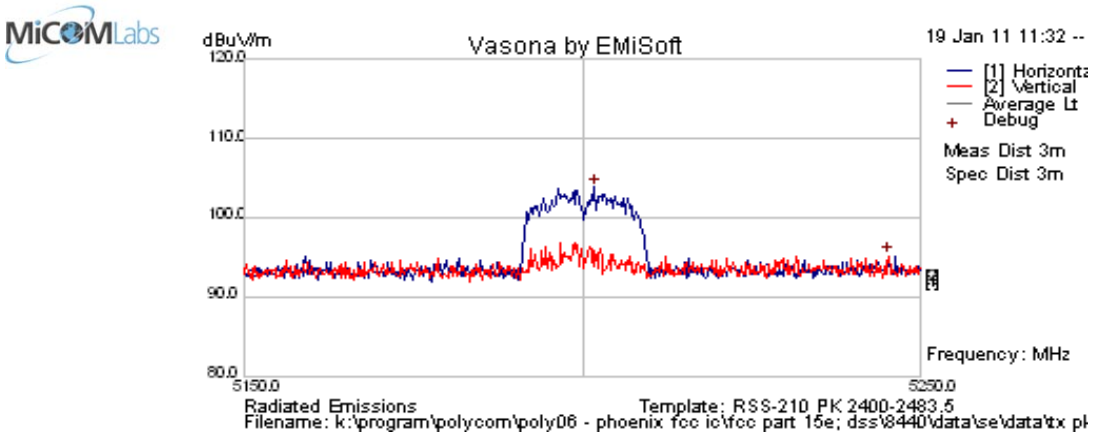


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5237.936	54.8	14.6	34.4	103.8	Peak [Scan]	H						FUND

Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission

Test Freq.	5200 MHz	**Engineer**	EVF
Variant	802.11n; HT-20; 6.5 MCS	**Temp (ºC)**	18
Freq. Range	5150 - 5250 MHz	**Rel. Hum.(%)**	39
Power Setting	14 in test utility	**Press. (mBars)**	1006
Antenna	integral	**Duty Cycle (%)**	10
Test Notes 1	Handset (Model: 8440) w ith battery (SN: AC1010320232) , also connected to charger (Model: SA106B-05)		
Test Notes 2	Mode: WLAN Channel 40 Tx; WLAN=1, BT=0, BC=0, DK=0		

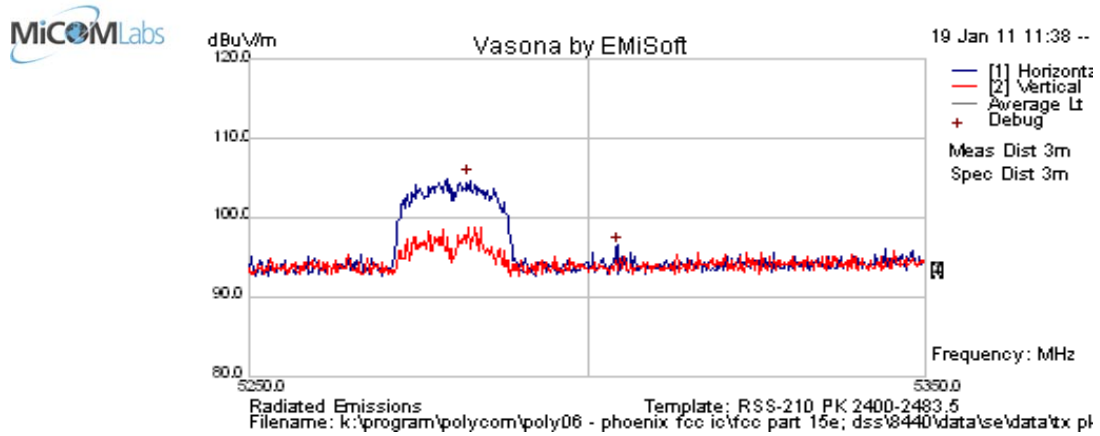


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5202.305	54.9	14.6	34.4	103.9	Peak [Scan]	H						FUND

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission

Test Freq.	5280 MHz	**Engineer**	EVF
Variant	802.11a; 6 Mbs	**Temp (ºC)**	18
Freq. Range	5250 - 5350 MHz	**Rel. Hum.(%)**	39
Power Setting	16 in test utility	**Press. (mBars)**	1006
Antenna	integral	**Duty Cycle (%)**	10
Test Notes 1	Handset (Model: 8440) with battery (SN: AC1010320232) , also connected to charger (Model: SA106B-05)		
Test Notes 2	Mode: WLAN Channel 56 Tx; WLAN=1, BT=0, BC=0, DK=0		

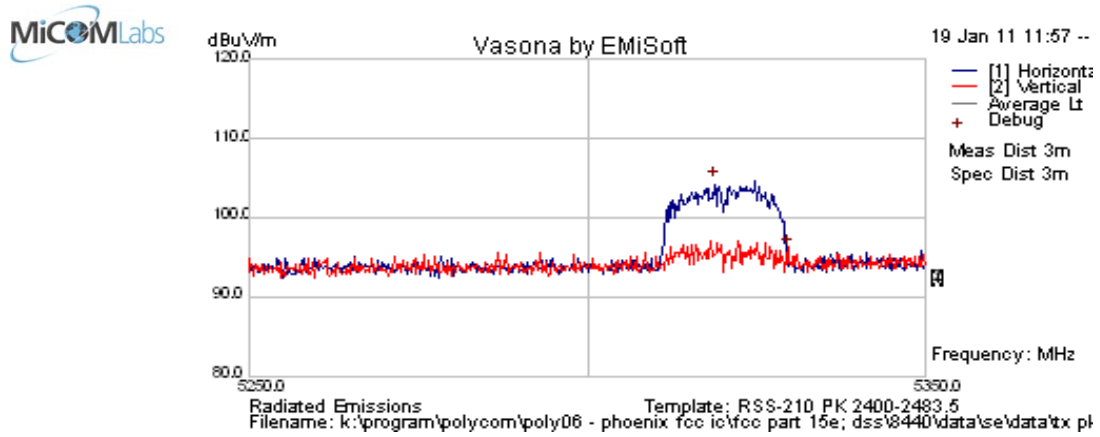


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5282.224	55.9	14.6	34.5	105.0	Peak [Scan]	H						FUND

Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission

Test Freq.	5320 MHz	**Engineer**	EVF
Variant	802.11n; HT-20; 6.5 MCS	**Temp (ºC)**	18
Freq. Range	5250 - 5350 MHz	**Rel. Hum.(%)**	39
Power Setting	16 in test utility	**Press. (mBars)**	1006
Antenna	integral	**Duty Cycle (%)**	10
Test Notes 1	Handset (Model: 8440) with battery (SN: AC1010320232) , also connected to charger (Model: SA10		
Test Notes 2	Mode: WLAN Channel 64 Tx; WLAN=1, BT=0, BC=0, DK=0		

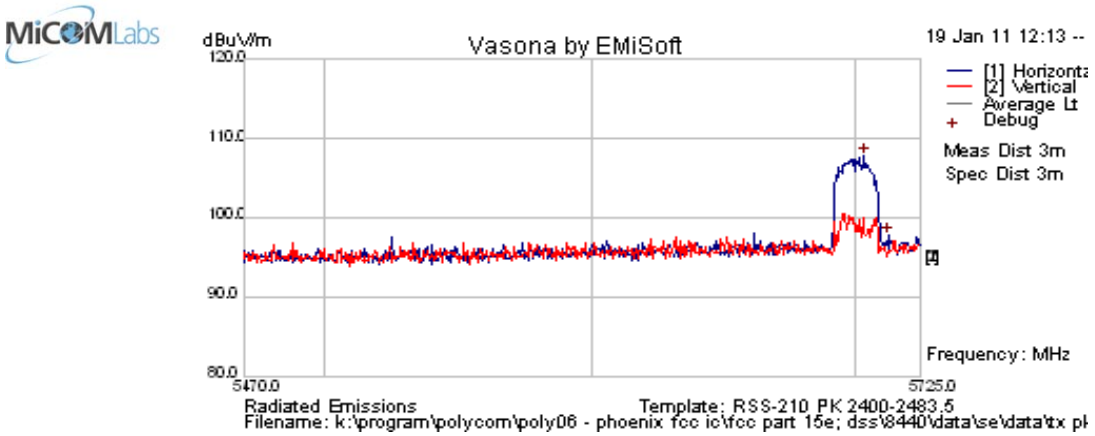


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5318.657	55.6	14.6	34.5	104.7	Peak [Scan]	H	100	0	54.0	50.7	Fail	FUND

Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission

Test Freq.	5700 MHz	**Engineer**	EVF
Variant	802.11a; 6 Mbs	**Temp (ºC)**	18
Freq. Range	5470 - 5725 MHz	**Rel. Hum.(%)**	39
Power Setting	16 in test utility	**Press. (mBars)**	1006
Antenna	integral	**Duty Cycle (%)**	10
Test Notes 1	Handset (Model: 8440) w ith battery (SN: AC1010320232) , also connected to charger (Model: SA106B-05)		
Test Notes 2	Mode: WLAN Channel 140 Tx; WLAN=1, BT=0, BC=0, DK=0		

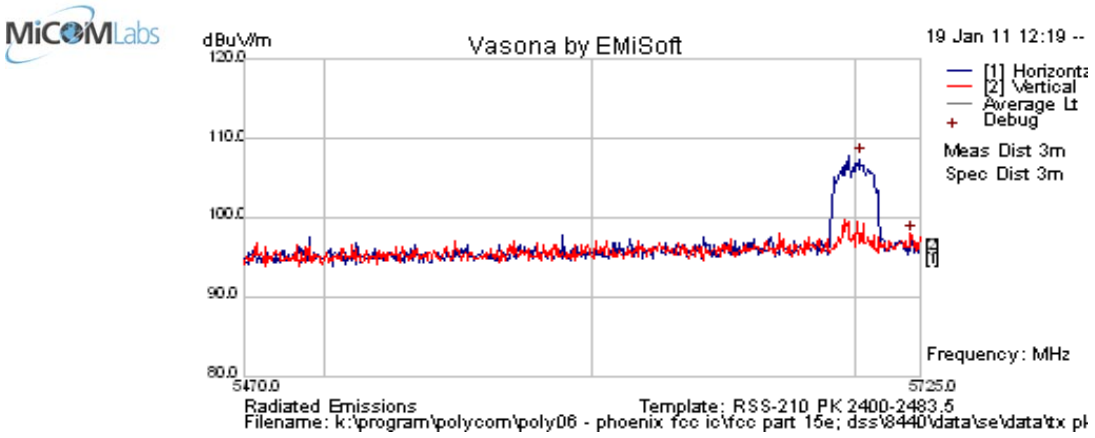


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5702.014	58.0	14.7	35.0	107.7	Peak [Scan]	H	100	0	54.0	53.7	Fail	FUND

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission

Test Freq.	5700 MHz	**Engineer**	EVF
Variant	802.11n HT-20; 6.5 MCS	**Temp (ºC)**	18
Freq. Range	5470 - 5725 MHz	**Rel. Hum.(%)**	39
Power Setting	16 in test utility	**Press. (mBars)**	1006
Antenna	integral	**Duty Cycle (%)**	10
Test Notes 1	Handset (Model: 8440) w ith battery (SN: AC1010320232) , also connected to charger (Model: SA106B-05)		
Test Notes 2	Mode: WLAN Channel 140 Tx; WLAN=1, BT=0, BC=0, DK=0		



Formally measured emission peaks

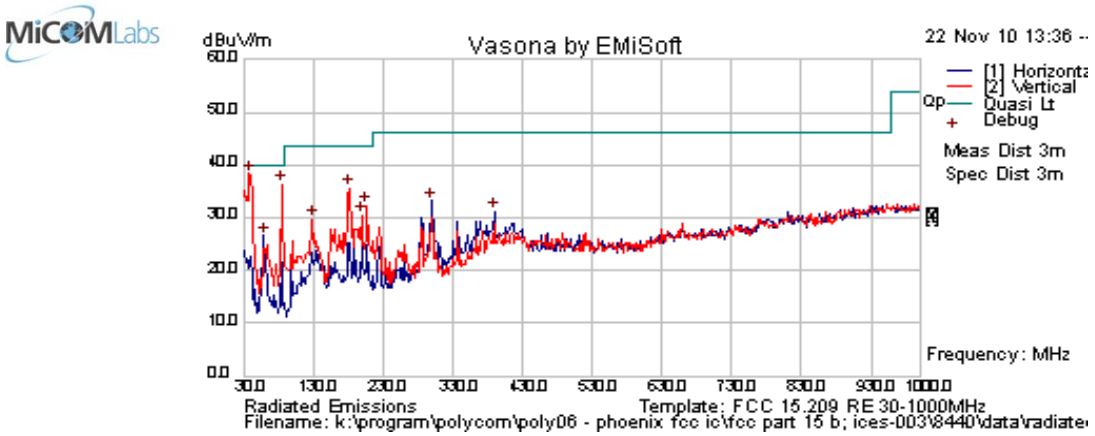
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5702.174	58.0	14.7	35.0	107.8	Peak [Scan]	H	100	0	54.0	53.8	Fail	FUND

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission

7.8.4 Receiver Radiated Emissions

Stand alone Charger (SA106B-05) - Measurement Results for Radiated Spurious Emissions – Receiver

Test Freq.	N/A	**Engineer**	EVF
Variant	Digital Emissions	**Temp (ºC)**	21
Freq. Range	30 MHz - 1000 MHz	**Rel. Hum. (%)**	34
Power Setting	Charger: 120VAC/ 60Hz	**Press. (mBars)**	1009
Antenna	Integral		
Test Notes 1	Handset (Model: 8440) w ith discharged battery (SN: AC101032008E) , headset connected, also connected to charger (Model: SA106B-05)		
Test Notes 2	Preliminary testing performed. EUT tested in vertical position/ Mode: BT Channel 39 Receive; WLAN Channel 06 Receive; WLAN=1, BT=1, BC=0, DK=1		

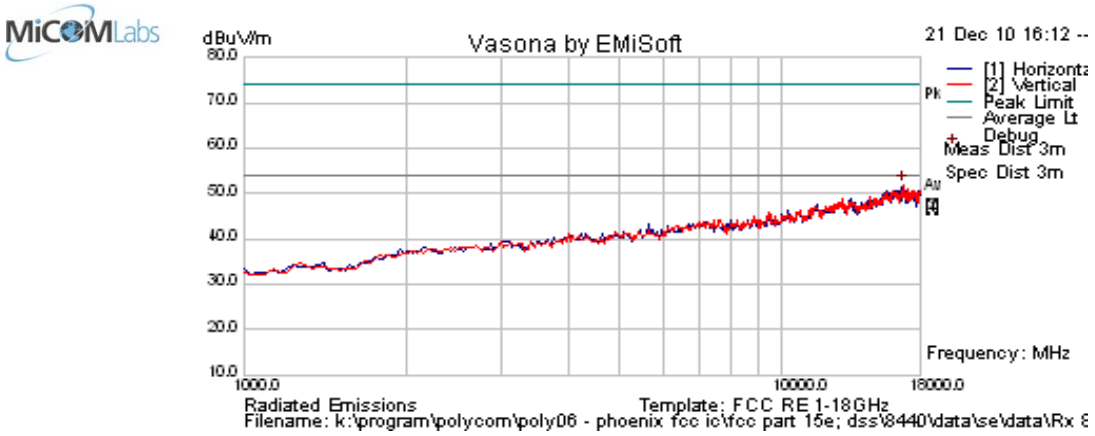


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
40.423	48.0	3.6	-17.1	34.5	Quasi Max	V	137	77	40	-5.5	Pass	DIG
85.932	47.4	4.0	-23.7	27.8	Quasi Max	V	98	246	40	-12.3	Pass	DIG
182.000	49.5	4.7	-19.6	34.5	Quasi Max	V	104	167	43.5	-9.0	Pass	DIG
207.999	46.1	4.8	-19.6	31.3	Quasi Max	V	102	171	43.5	-12.2	Pass	DIG
299.999	45.0	5.2	-16.9	33.4	Quasi Max	H	120	51	46	-12.6	Pass	DIG
200.461	45.0	4.8	-17.9	31.9	Quasi Max	V	98	0	43.5	-11.6	Pass	DIG

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

Test Freq.	5200 MHz	**Engineer**	EVF
Variant	Receive in Test Utility	**Temp (ºC)**	22
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	Not Applicable in Receive Mode	**Press. (mBars)**	993
Antenna	integral		
Test Notes 1	Fundamental attenuated by band-stop filter. Handset (Model: 8440) with battery (SN: AC1010320232) , also connected to charger (Model: SA106B-05)		
Test Notes 2	Mode: WLAN Channel 40 Receive; WLAN=1, BT=0, BC=0, DK=0		

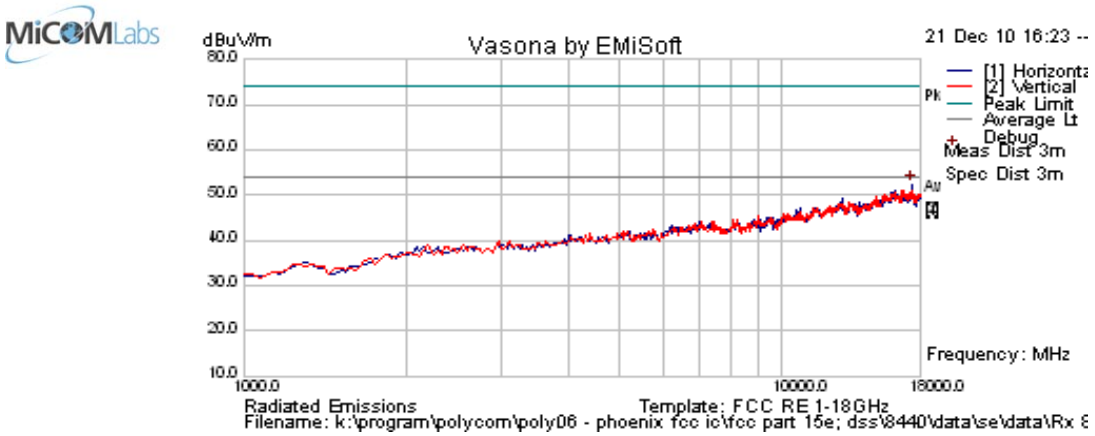


Formally measured emission peaks

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

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

Test Freq.	5280 MHz	**Engineer**	EVF
Variant	Receive in Test Utility	**Temp (ºC)**	22
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	Not Applicable in Receive Mode	**Press. (mBars)**	993
Antenna	integral		
Test Notes 1	Fundamental attenuated by band-stop filter. Handset (Model: 8440) with battery (SN: AC1010320232) , also connected to charger (Model: SA106B-05)		
Test Notes 2	Mode: WLAN Channel 56 Receive; WLAN=1, BT=0, BC=0, DK=0		

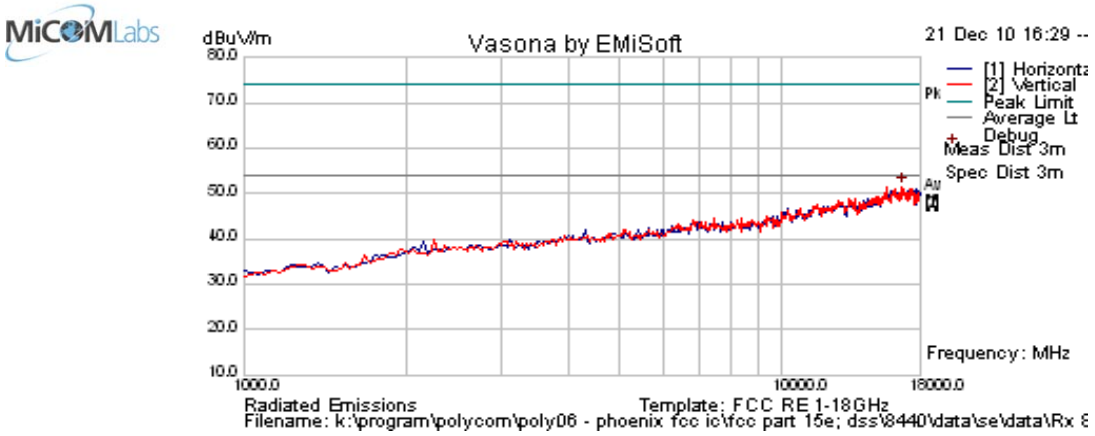


Formally measured emission peaks

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

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

Test Freq.	5600 MHz	**Engineer**	EVF
Variant	Receive in Test Utility	**Temp (ºC)**	22
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	Not Applicable in Receive Mode	**Press. (mBars)**	993
Antenna	integral		
Test Notes 1	Fundamental attenuated by band-stop filter. Handset (Model: 8440) w ith battery (SN: AC1010320232) , also connected to charger (Model: SA106B-05)		
Test Notes 2	Mode: WLAN Channel 120 Receive; WLAN=1, BT=0, BC=0, DK=0		



Formally measured emission peaks

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

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

7.9 Conducted Disturbance at Mains Terminal (150 kHz – 30 MHz)

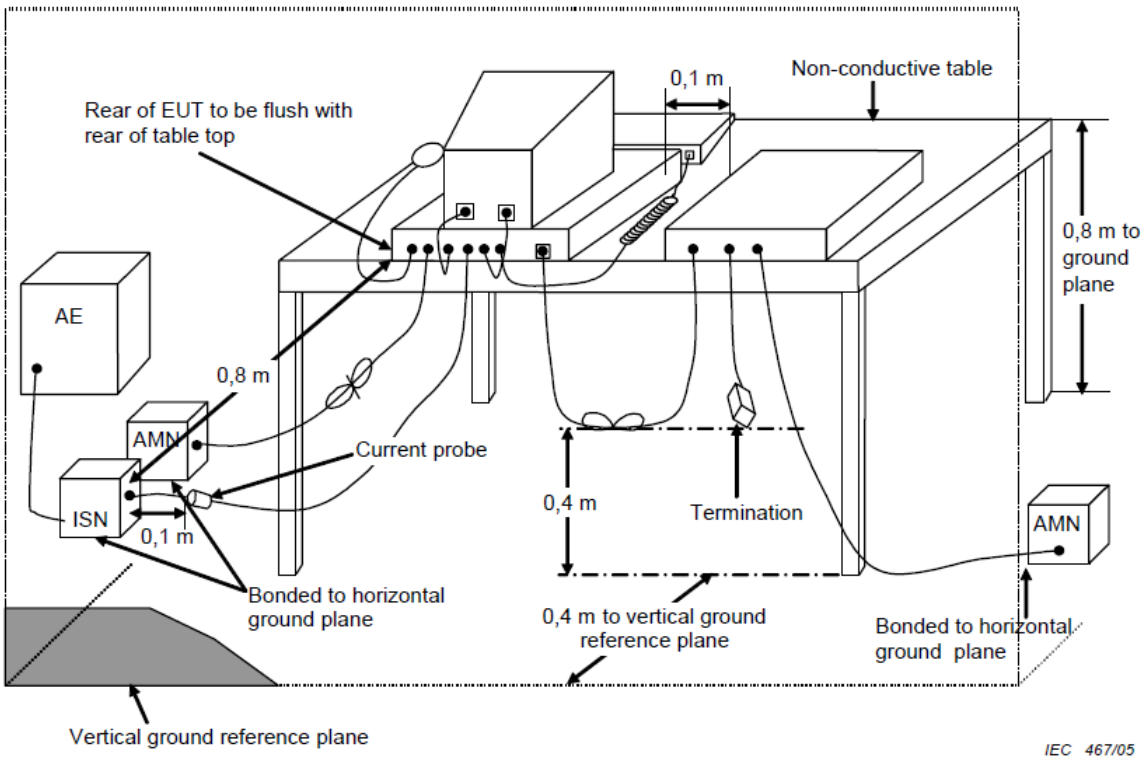
Test Procedure

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

If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.

If the reading of the measuring receiver shows fluctuations close to the limit, the reading shall be observed for at least 15 s at each measurement frequency; the higher reading shall be recorded with the exception of any brief isolated high reading which shall be ignored.

Test Measurement Setup



Measurement setup for Conducted Disturbance at Mains Terminals

Specification for Conducted Disturbance at Mains Terminal

§15.407 (b)(6)

Any U-NII devices using an AC power line are required to comply also with the limits set forth in Section 15.207.

§15.207 (a)

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

Limits

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

* Decreases with the logarithm of the frequency

Traceability

Laboratory Measurement Uncertainty for Conducted Emissions

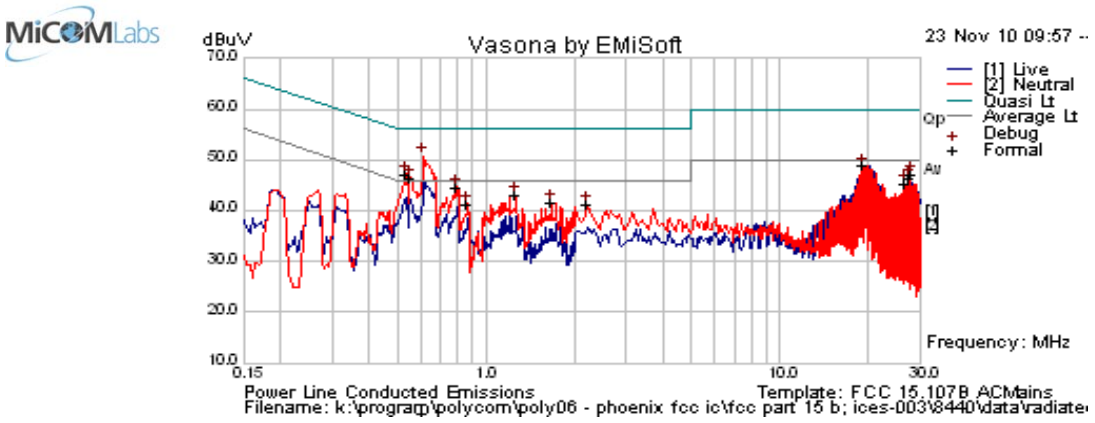
Measurement uncertainty	±2.64 dB

Traceability

Method	Test Equipment Used
Work instruction WI-EMC-01	0158, 0184, 0193, 0190, 0293, 0307

7.9.1 Stand Alone Charger - Conducted Disturbance at Mains Terminal (150 kHz – 30 MHz)

Test Freq.	N/A	**Engineer**	EVF
Variant	AC Line Emissions	**Temp (ºC)**	19.5
Freq. Range	0.150 MHz - 30 MHz	**Rel. Hum. (%)**	37
Power Setting	Charger: 120VAC/ 60Hz	**Press. (mBars)**	1002
Antenna	Integral		
Test Notes 1	Handset (Model: 8440) with discharged battery (SN: AC101032008E) , headset connected, also connected to charger (Model: SA106B-05)		
Test Notes 2	Mode: BT Channel 39 Receive; WLAN Channel 06 Receive; WLAN=1, BT=1, BC=0, DK=1		

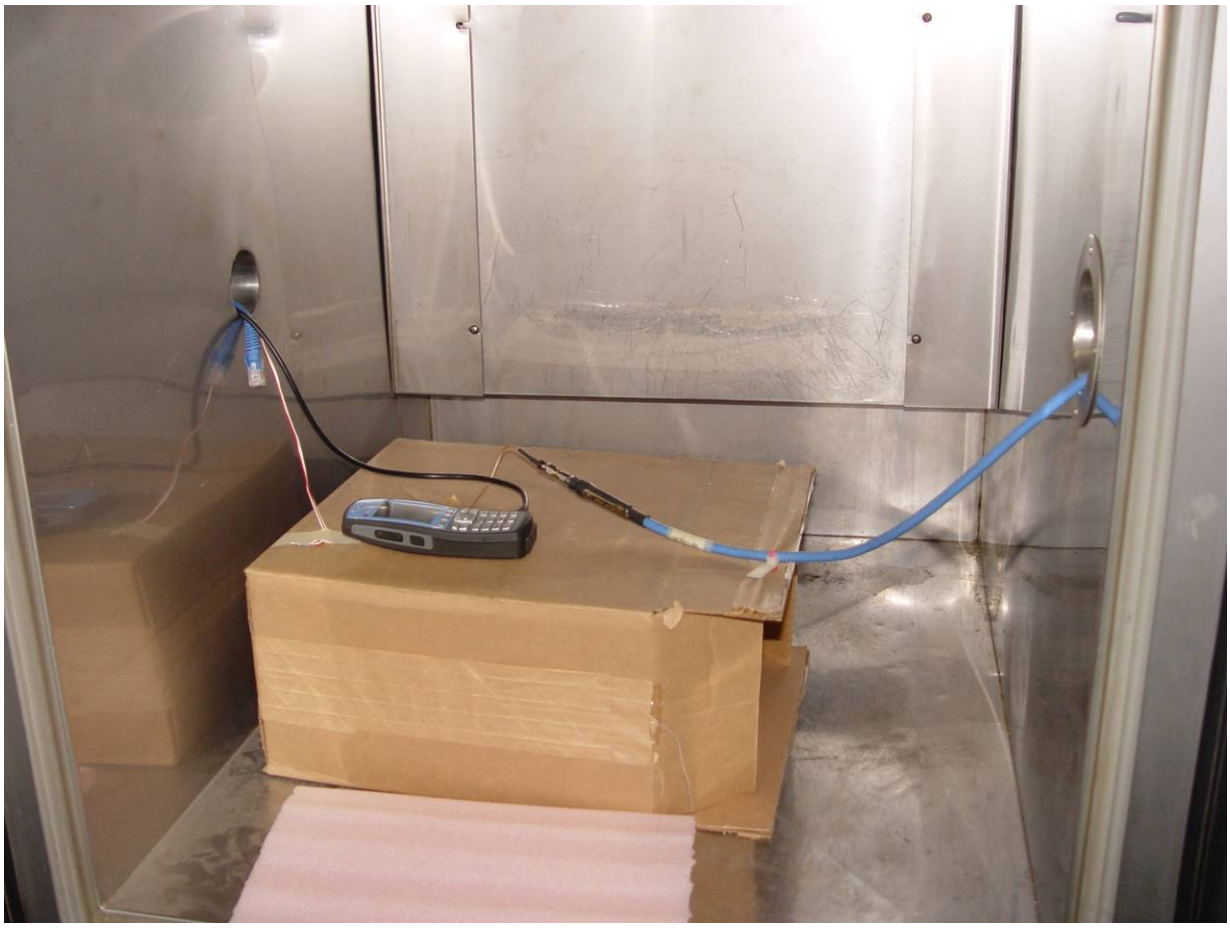


Formally measured emission peaks

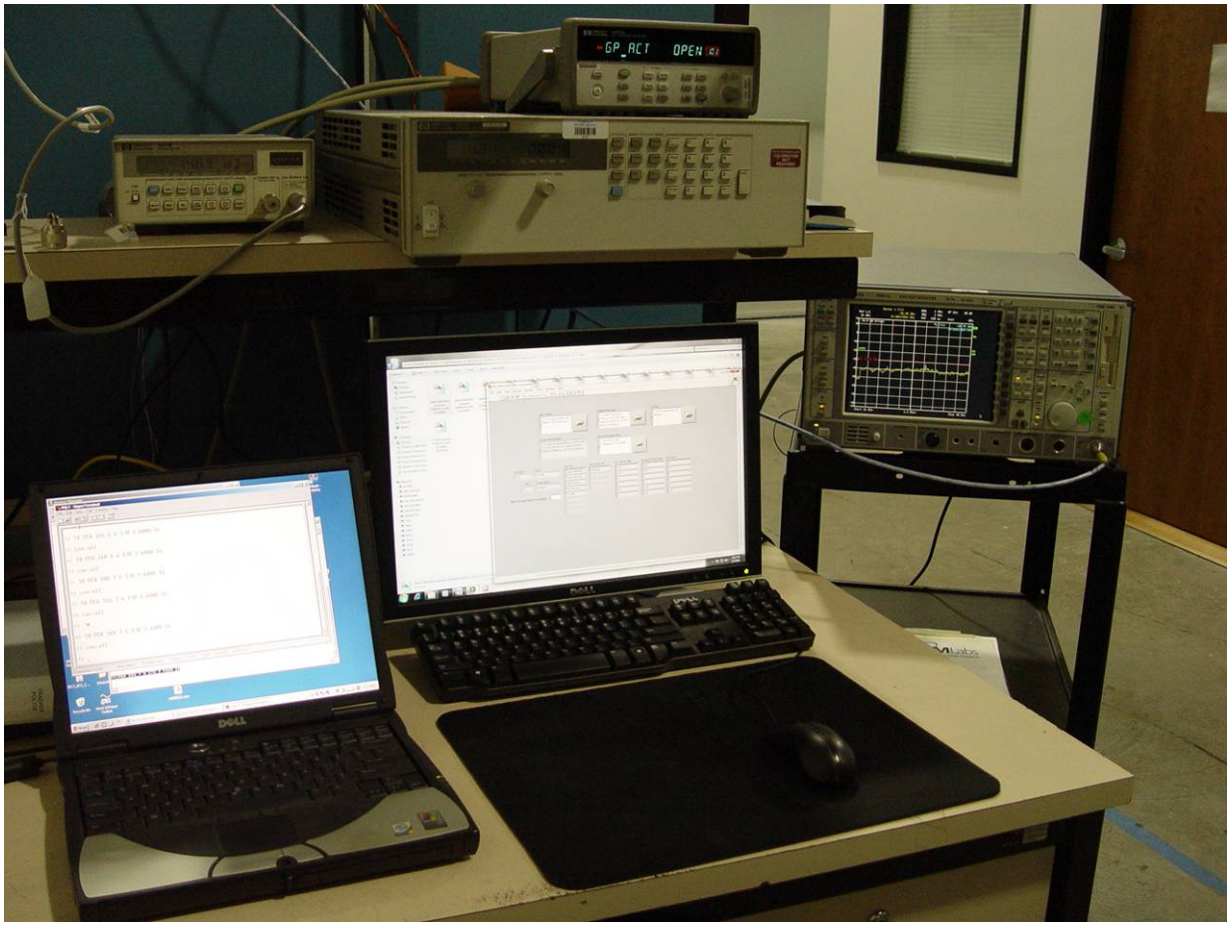
Frequency MHz	Raw dBuV	Cable Loss	Factors dB	Level dBuV	Measurement Type	Line	Limit dBuV	Margin dB	Pass /Fail	Comments
0.534	21.4	9.9	0.1	31.4	Average	Neutral	46.0	-14.6	Pass	
0.534	36.0	9.9	0.1	46.0	Quasi Peak	Neutral	56	-10.0	Pass	
0.553	22.5	9.9	0.1	32.5	Average	Neutral	46	-13.5	Pass	
0.553	35.9	9.9	0.1	45.9	Quasi Peak	Neutral	56	-10.1	Pass	
0.614	25.7	10.0	0.1	35.7	Average	Neutral	46.0	-10.3	Pass	
0.614	39.7	10.0	0.1	49.8	Quasi Peak	Neutral	56	-6.3	Pass	
0.801	22.5	10.0	0.1	32.5	Average	Neutral	46	-13.5	Pass	
0.801	33.3	10.0	0.1	43.3	Quasi Peak	Neutral	56	-12.7	Pass	
0.869	16.9	9.9	0.1	26.9	Average	Neutral	46.0	-19.1	Pass	
0.869	29.8	9.9	0.1	39.8	Quasi Peak	Neutral	56	-16.2	Pass	
1.269	20.4	10.0	0.1	30.4	Average	Neutral	46.0	-15.6	Pass	
1.269	30.2	10.0	0.1	40.3	Quasi Peak	Neutral	56	-15.7	Pass	

8 PHOTOGRAPHS

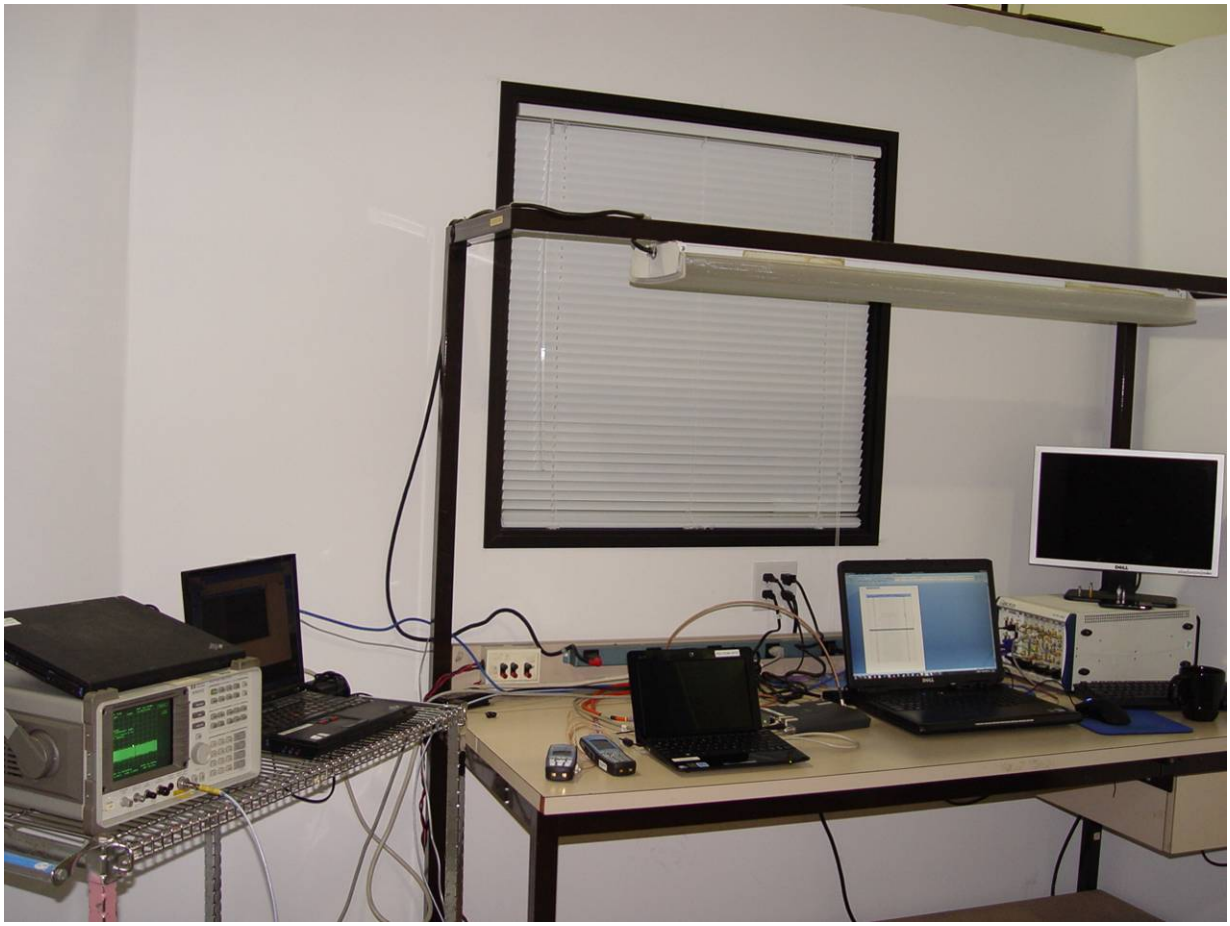
8.1 Conducted RF Emissions - EUT



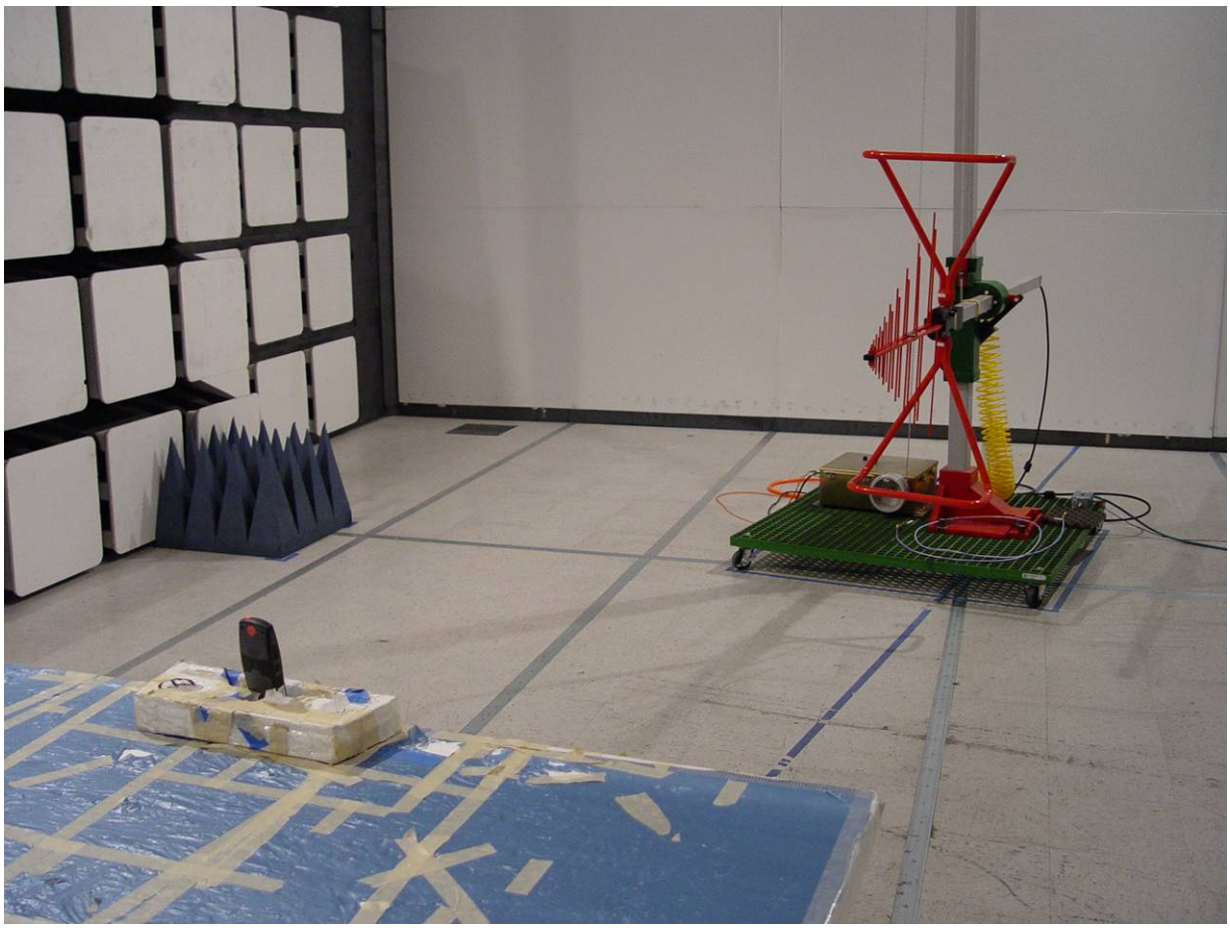
8.2 Conducted RF Emissions - Test Equipment



8.3 Dynamic Frequency Selection Test Set-Up



8.4 Transmitter Radiated Spurious Emission below 1 GHz with Charger



8.5 Transmitter Radiated Spurious Emission above 1 GHz with Charger

8.6 Receiver Radiated Emissions below 1 GHz with Charger

8.7 Receiver Radiated Emissions above 1 GHz with Charger

8.8 AC Mains Conducted Emissions with Charger

1. TEST EQUIPMENT DETAILS

Asset #	Instrument	Manufacturer	Part #	Serial #
0134	Amplifier	Com Power	PA 122	181910
0158	Barometer /Thermometer	Control Co.	4196	E2846
0287	EMI Receiver	Rhode & Schwartz	ESIB 40	100201
0252	SMA Cable	Megaphase	Sucoflex 104	None
0310	2m SMA Cable	Micro-Coax	UFA210A-0-0787-3G03G0	209089-001
0312	3m SMA Cable	Micro-Coax	UFA210A-1-1181-3G0300	209092-001
0313	Coupler	Hewlett Packard	86205A	3140A01285
0314	30dB N-Type Attenuator	ARRA	N9444-30	1623
0070	Power Meter	Hewlett Packard	437B	3125U11552
0116	Power Sensor	Hewlett Packard	8485A	3318A19694
0117	Power Sensor	Hewlett Packard	8487D	3318A00371
0184	Pulse Limiter	Rhode & Schwartz	ESH3Z2	357.8810.52
0190	LISN	Rhode & Schwartz	ESH3Z5	836679/006
0293	BNC Cable	Megaphase	1689 1GVT4	15F50B001
0301	5.6 GHz Notch Filter	Micro-Tronics	RBC50704	001
0302	5.25 GHz Notch Filter	Micro-Tronics	BRC50703	002
0303	5.8 GHz Notch Filter	Micro-Tronics	BRC50705	003
0304	2.4GHzHz Notch Filter	Micro-Tronics	--	001
0307	BNC Cable	Megaphase	1689 1GVT4	15F50B002
0335	1-18GHz Horn Antenna	ETS- Lindgren	3117	00066580
0337	Amplifier	MiCOM Labs	--	--
0338	Antenna	Sunol Sciences	JB-3	A052907

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