Test of Polycom Spectralink 8450 Wi-Fi handset with Bluetooth

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

Test Report Serial No.: POLY21-U2b Rev A

TEST REPORT

From

Test of: Polycom Spectralink 8450 Wi-Fi handset with Bluetooth

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

Test Report Serial No.: POLY21-U2b Rev A

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:** 6th June 2011

This Test Report is Issued Under the Authority of;

MiCOM Labs, Inc.
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Pleasanton, CA 94566 USA
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ACCREDITED
TESTING CERTIFICATE #2381.01

MiCOM Labs is an ISO 17025 Accredited Testing Laboratory

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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

ilac-MRA

The American Association for Laboratory Accreditation

World Class Accreditation

Accredited Laboratory

A2LA has accredited

MICOM LABS

Pleasanton, CA

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 *General Requirements for the Competence of Testing and Calibration Laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated 8 January 2009*).

American Association for Laboratory Accreditation Corporate Seal 1978 District of Columbia A2LA

Presented this 14th day of April 2010.

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

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

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

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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 – 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		
	28th February 2010	Initial Report Release: MiCOM Labs Report Number **POLY06-U13 Rev A**
Rev A	6th June 2011	Product Change: PCB layout (grounding) improved over Power Amplifier to attenuate 6.9 GHz spurious emission. Emission apparent only in the 5 GHz bands, does not effect 2.4 GHz operation. Testing performed to prove continued compliance; Section 7.8.1 (5150-5250, 5250-5350, 5470-5725 MHz): Radiated Spurious above 1 GHz Also verification performed that there was no change to Output Power and 26 dB & 99% Bandwidth (5150-5250, 5250-5350, 5470-5725 MHz): as part of the same program

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 8450 series Wi-Fi handsets with Bluetooth	Telephone:	+1 925 462 0304
Model No.:	Spectralink 8450	Fax:	+1 925 462 0306
S/No's:	610874629 (radiated) 610859571 (conducted)		
Date(s) Tested:	16th – 20th May 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.

Approved & Released for MiCOM Labs, Inc. by:

A2LA ACCREDITED

TESTING CERTIFICATE #2381.01

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 8450 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 8450 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.

Class II Permissive Change (CIIPC)

As a result of a 6.9 GHz spurious emission found during the original test program pcb layout was changed to improve grounding around the Power Amplifier (PA) which in turn attenuated the spurious emission. This problem was only apparent in all 5 GHz frequency bands. The following retesting was performed in order to prove continued compliance;

1. Radiated Spurious above 1 GHz (5150-5350 & 5470-5725 MHz)

The following parameters were verified as part of the CIIPC (5150-5350 & 5470-5725 MHz)

1. Output Power
2. 6 dB & 99% Bandwidth

Applicant: Polycom **Product:** Spectralink 8450 Wi-Fi handset Front

Applicant: Polycom **Product:** Spectralink 8450 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 8450 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 8450 series Wi-Fi handset
Manufacturers Trade Name:	Polycom Spectralink 8450 series Wi-Fi handsets
Model No.:	Spectralink 8450 handset with Bluetooth
Equipment Primary Function:	Wi-Fi handset with Bluetooth
Equipment Secondary Function(s):	Barcode Reader
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	14	14	14	14.69
5200	15.46	24	14	14.63	14		14	14.63
5240	15.46	24	14	14.72	14		14	14.72
802.11n HT-20	Preliminary Conditions		Conducted RF Emissions		Radiated RF Emissions		Final Results	
5180	15.46	24	14	14.81	14	14	14	14.81
5200	15.46	24	14	14.91	14		14	14.91
5240	15.46	24	14	14.75	14		14	14.75
802.11a	Preliminary Conditions		Conducted RF Emissions		Radiated RF Emissions		Final Results	
5260	22.46	24	16	15.38	16		16	15.38
5280	22.46	24	16	15.51	16		16	15.51
5320	22.46	24	16	15.39	16	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	16		16	15.27
5280	22.46	24	16	15.17	16		16	15.17
5320	22.46	24	16	15.36	16	16	16	15.36
802.11a	Preliminary Conditions		Conducted RF Emissions		Radiated RF Emissions		Final Results	
5500	22.46	24	16	16.04	16	16	16	16.04
5600	22.46	24	16	16.03	16		16	16.03
5700	22.46	24	16	16.42	16		16	16.42
802.11n HT-20	Preliminary Conditions		Conducted RF Emissions		Radiated RF Emissions		Final Results	
5500	22.46	24	16	15.93	16	16	16	15.93
5600	22.46	24	16	15.90	16		16	15.90
5700	22.46	24	16	16.30	16		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	Y
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

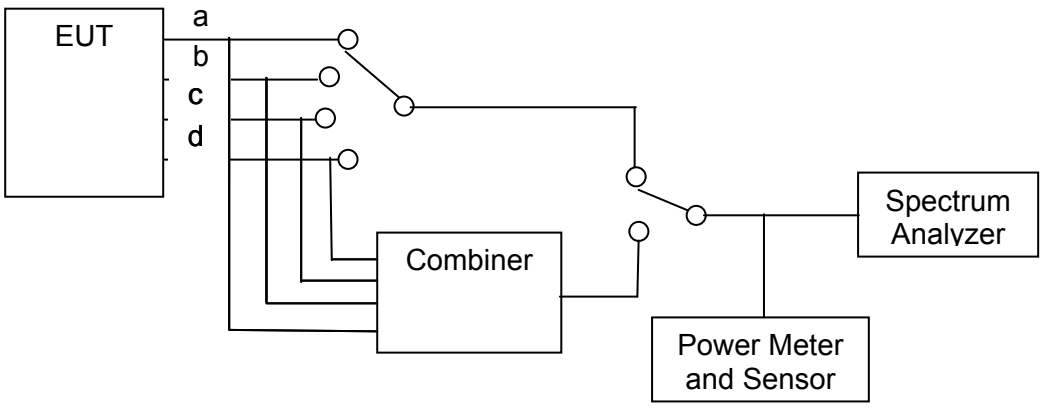
FCC, Part 15 Subpart E §15.407(a)(1)(2)
Industry Canada RSS-210 § A9.2(2)
Industry Canada RSS Gen § 4.4

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

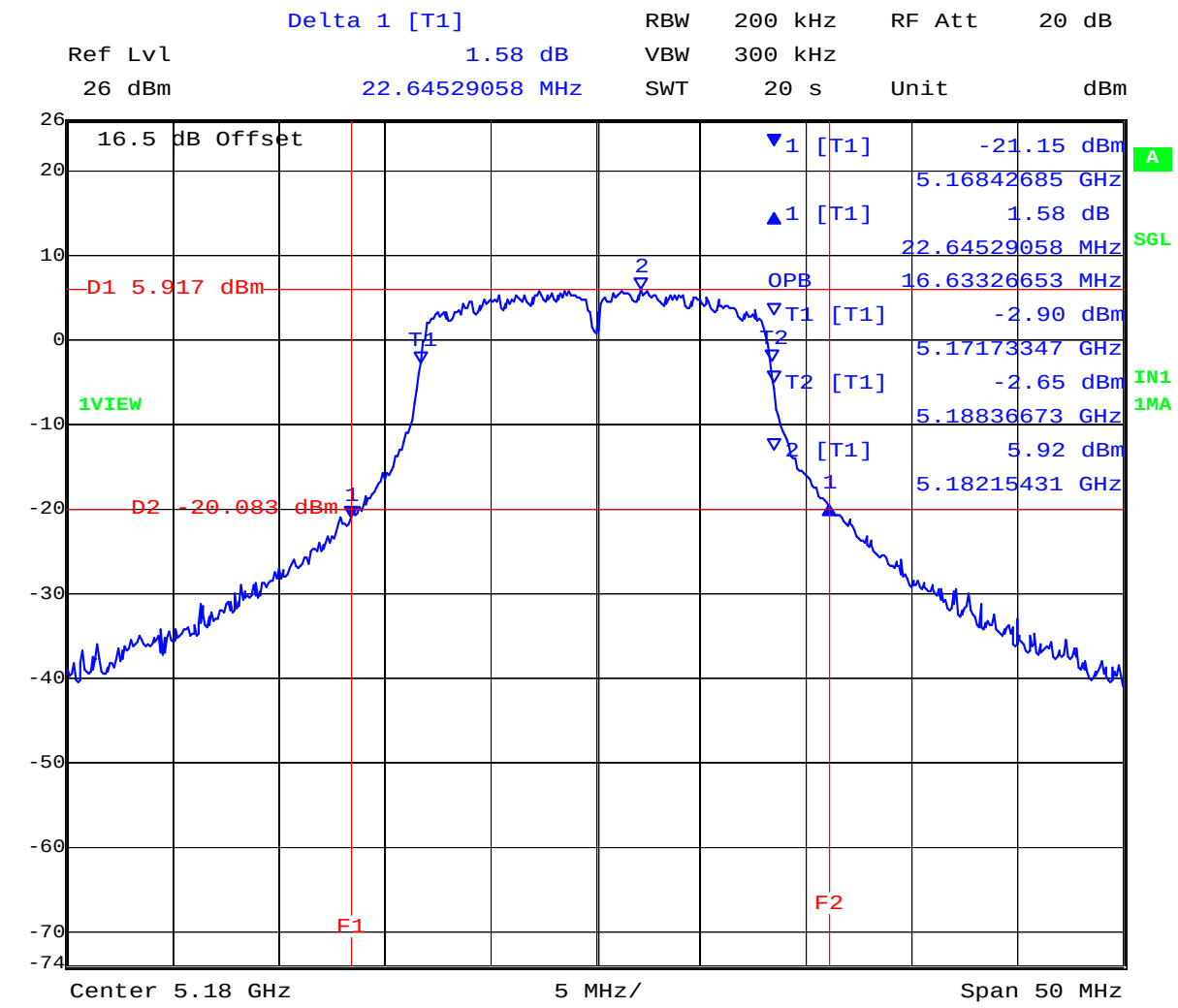
Test Frequency	26 dB Bandwidth				Minimum 6dB Bandwidth Limit		Margin
	MHz						
MHz	a	b	c	d	kHz	MHz	MHz
5180	22.645000				500	0.5	-22.145000
5200	22.244000						-21.744000
5240	21.844000						-21.344000

99% Bandwidth

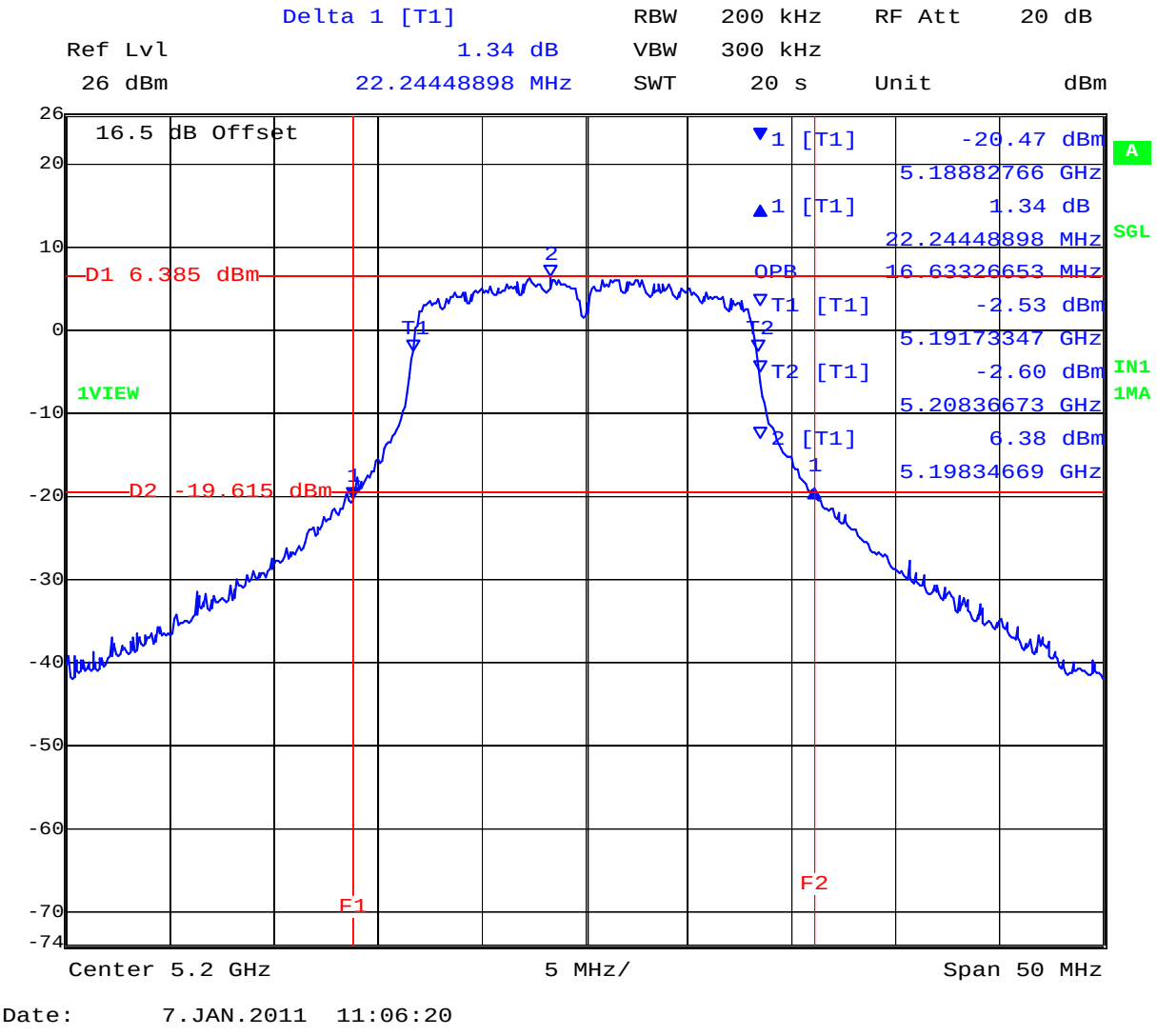
Test Frequency	99 % Bandwidth						
	MHz						
MHz	a	b	c	d			
5180	16.633000						
5200	16.633000						
5240	16.633000						

Measurement uncertainty:	±2.81 dB

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



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



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

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

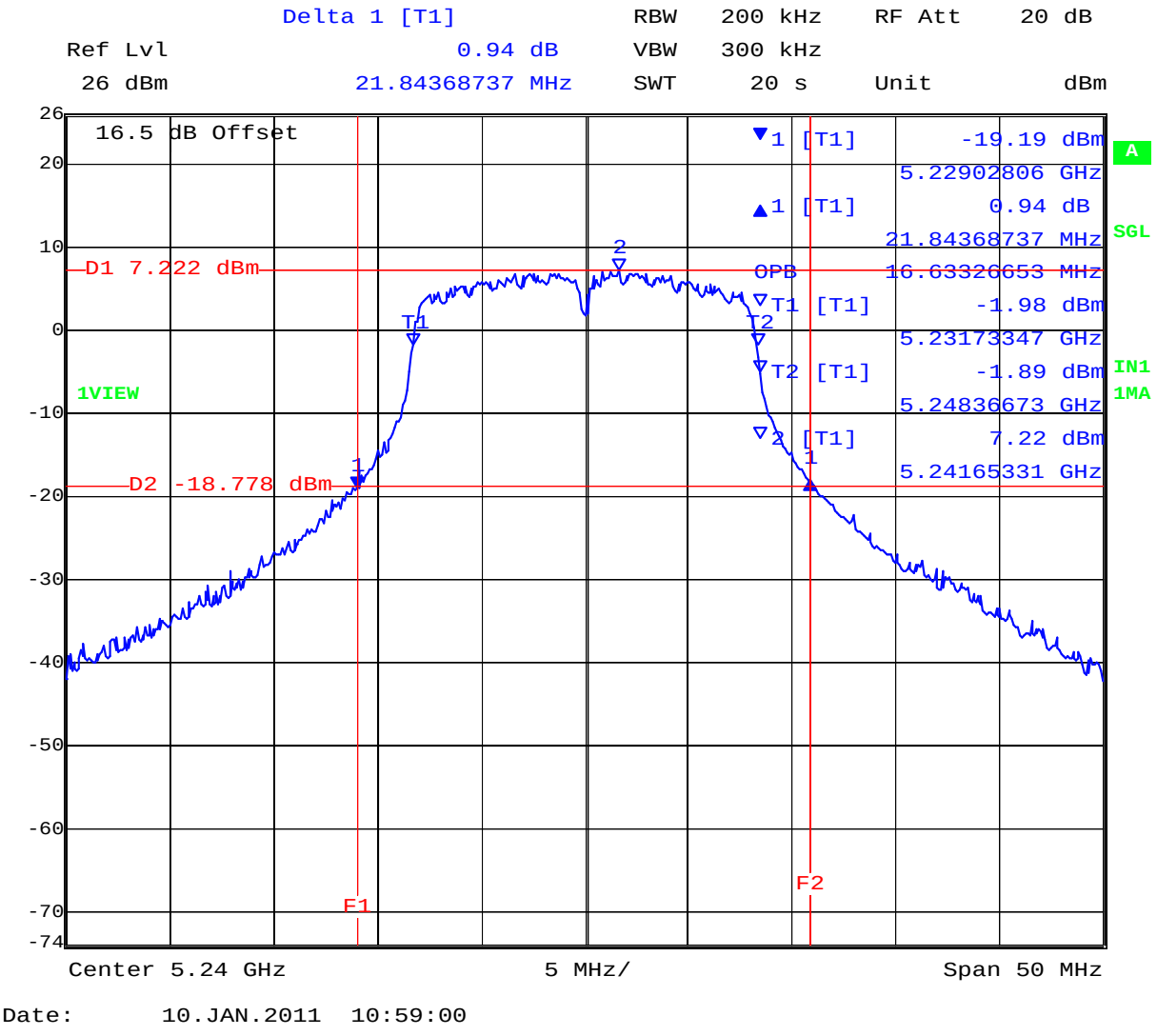


TABLE OF RESULTS – 802.11HT-20

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

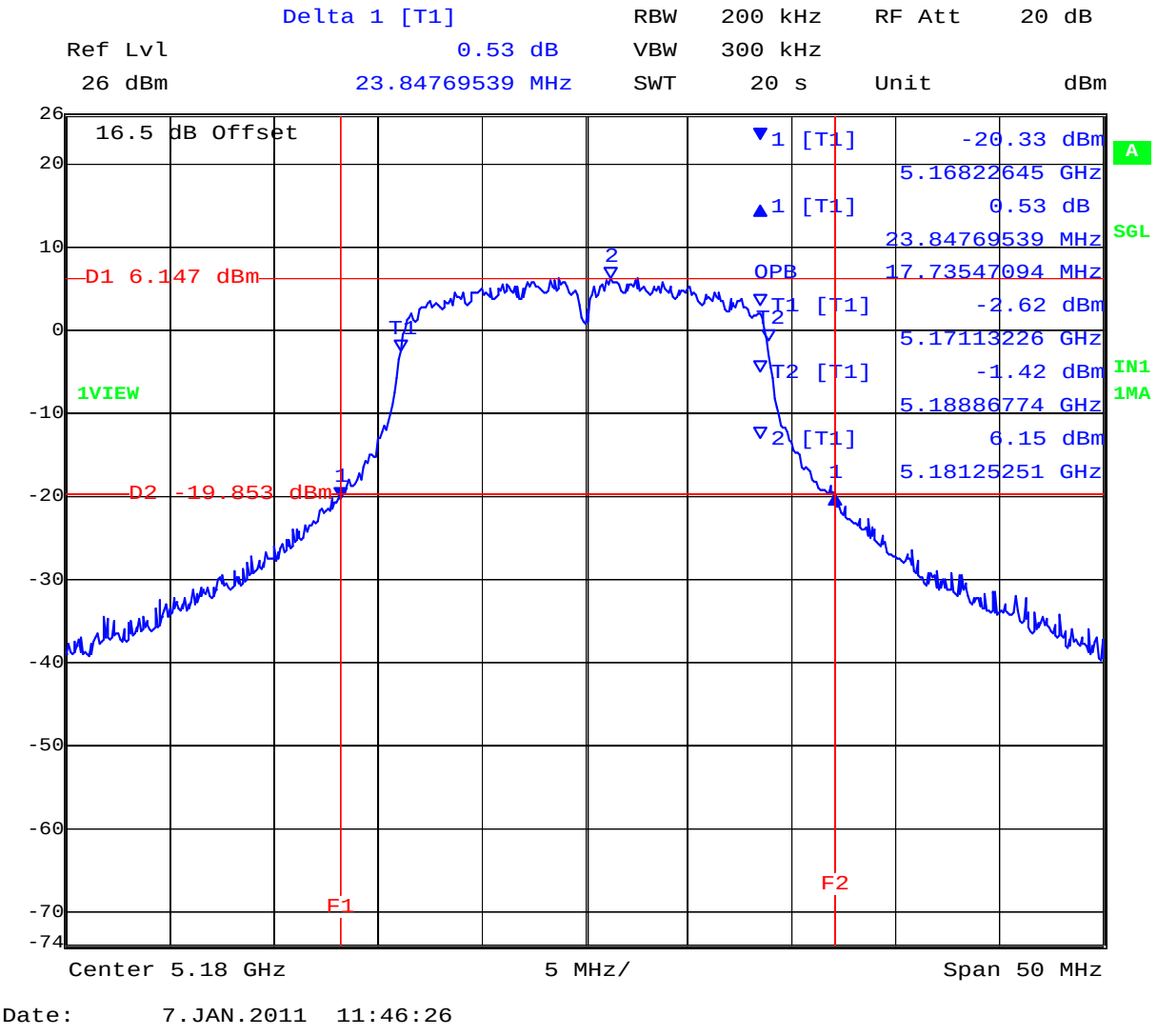
Test Frequency	26 dB Bandwidth MHz				Minimum 6dB Bandwidth Limit		Margin
MHz	**a**	**b**	**c**	**d**	**kHz**	**MHz**	**MHz**
5180	23.848000				500	0.5	-23.348000
5200	23.747000						-23.247000
5240	23.447000						-22.947000

99% Bandwidth

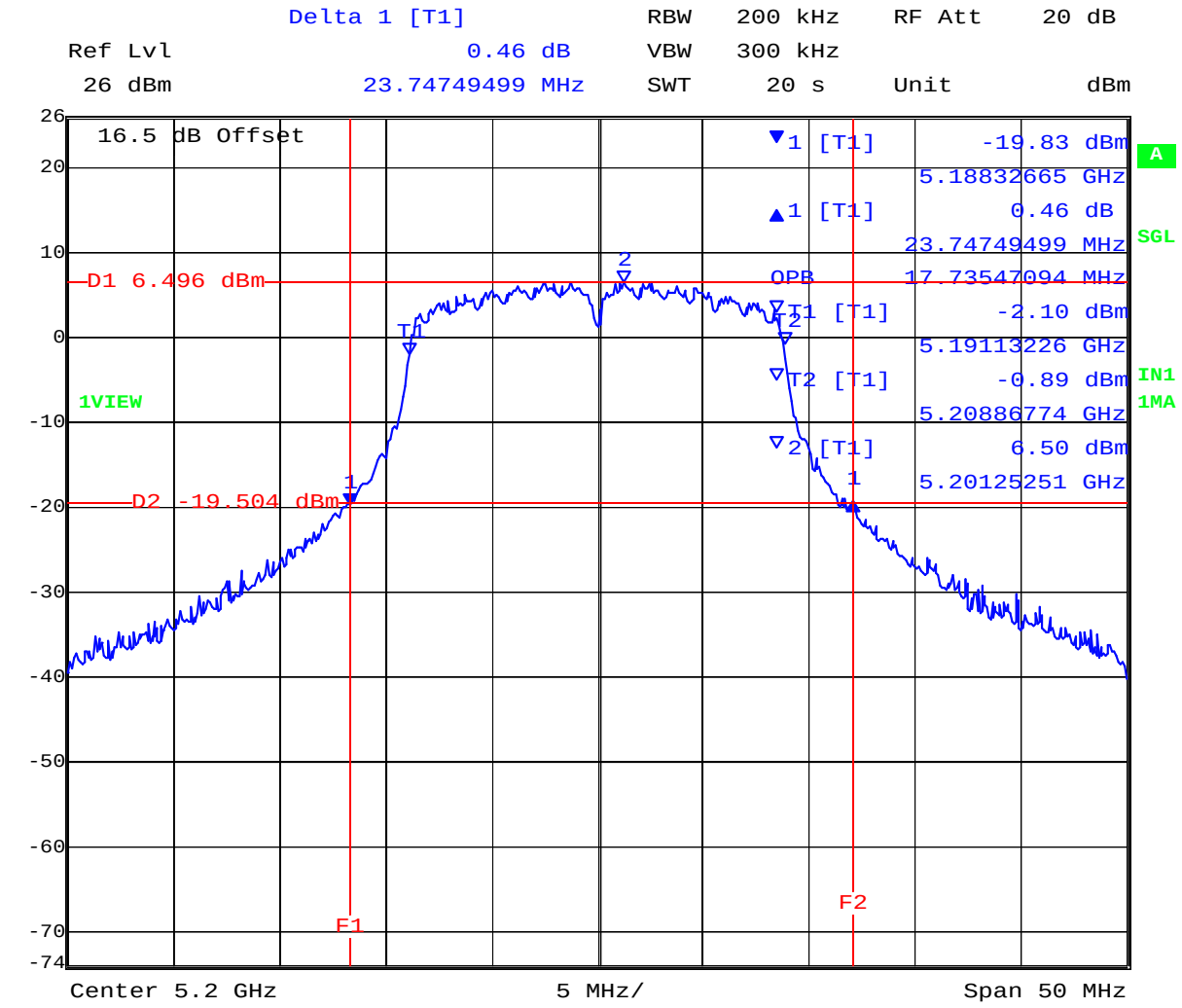
Test Frequency	99 % Bandwidth MHz						
MHz	**a**	**b**	**c**	**d**			
5180	17.735000						
5200	17.735000						
5240	17.735000						

Measurement uncertainty:	±2.81 dB

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

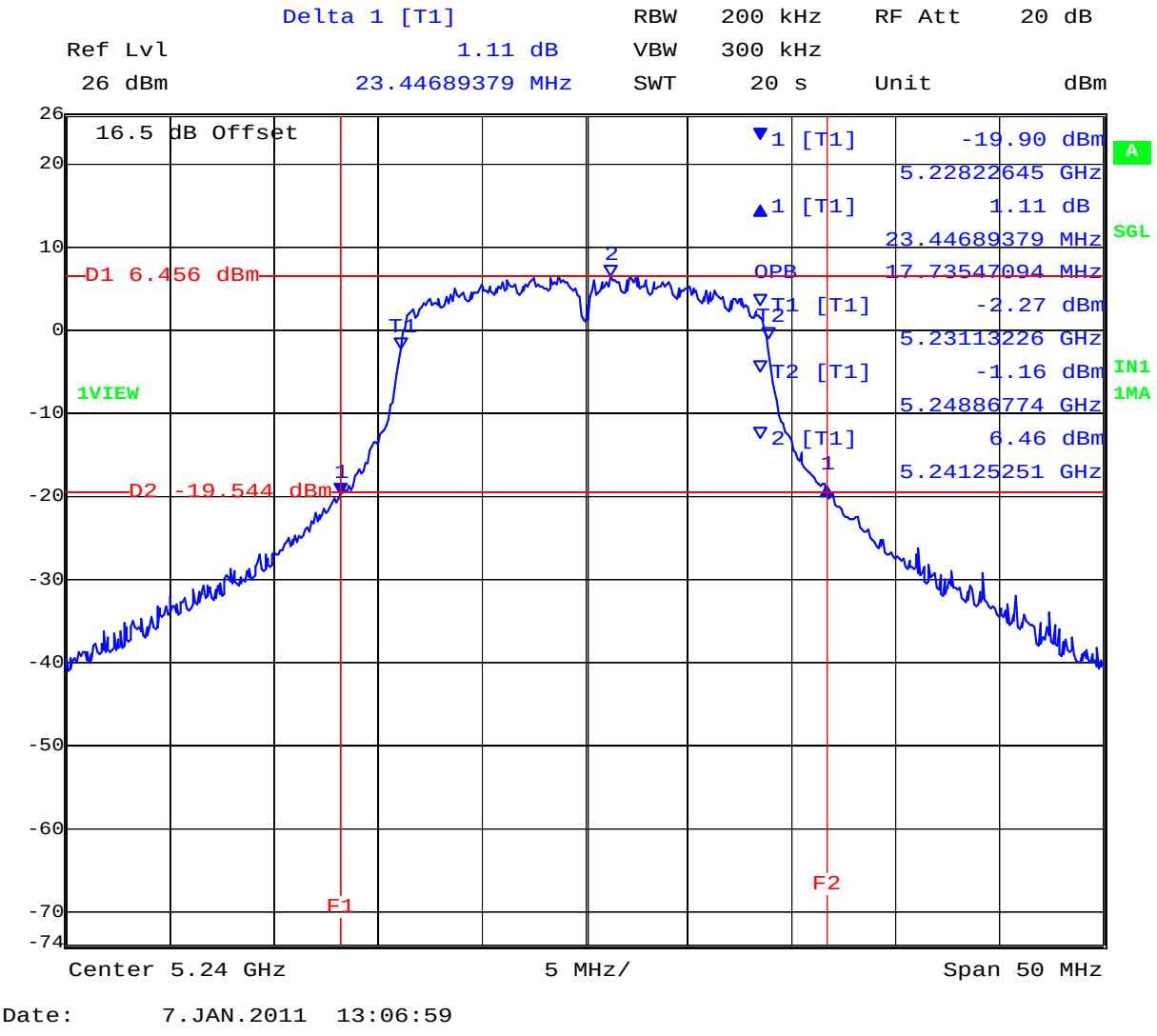


26dB OBW 99% Ambient 5200MHz 4.20V 14.95dBm



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

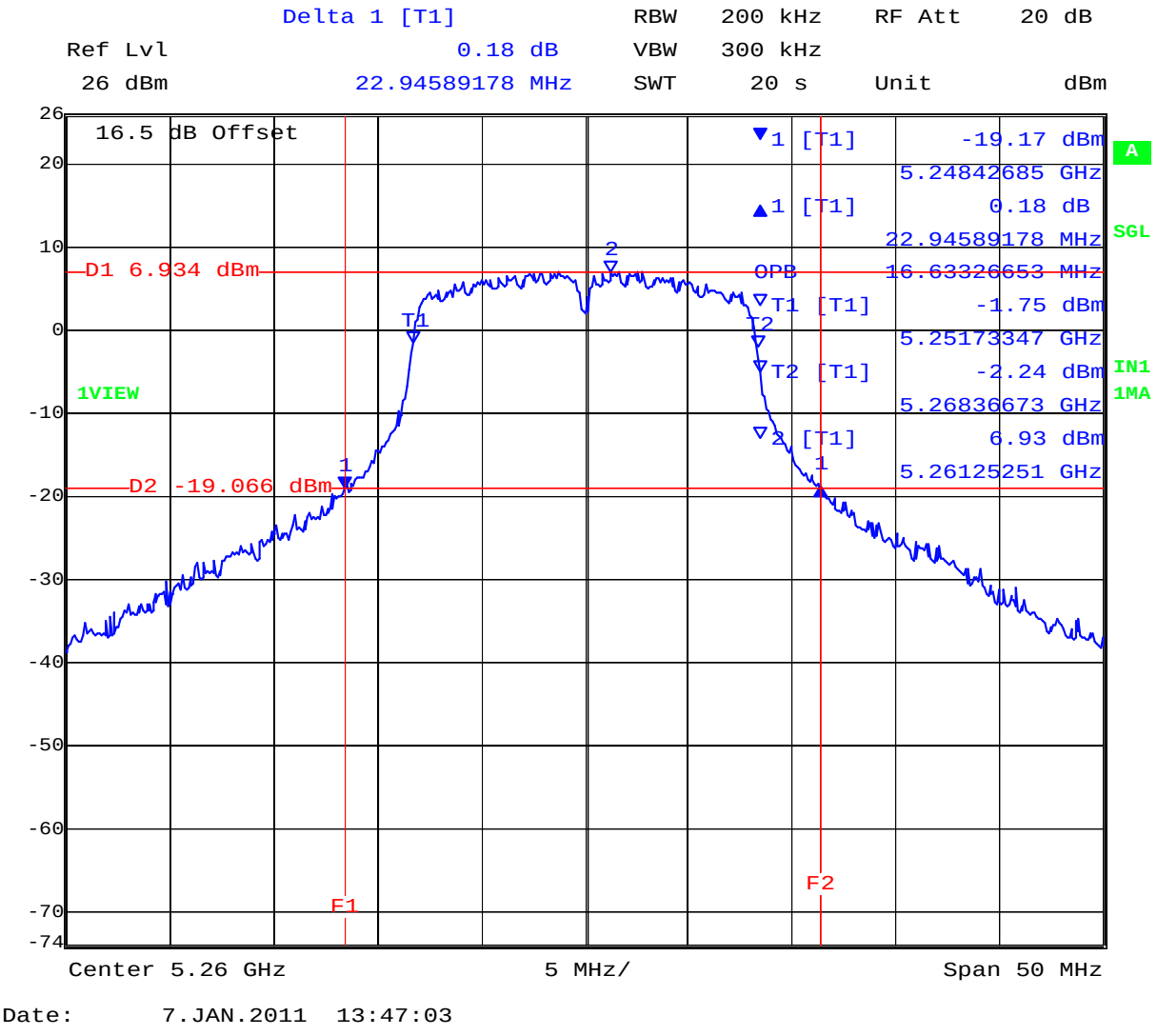
Test Frequency	26 dB Bandwidth				Minimum 6dB Bandwidth Limit		Margin
	MHz						
MHz	a	b	c	d	kHz	MHz	MHz
5260	22.946000				500	0.5	-22.446000
5280	22.946000						-22.446000
5320	23.046000						-22.546000

99% Bandwidth

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

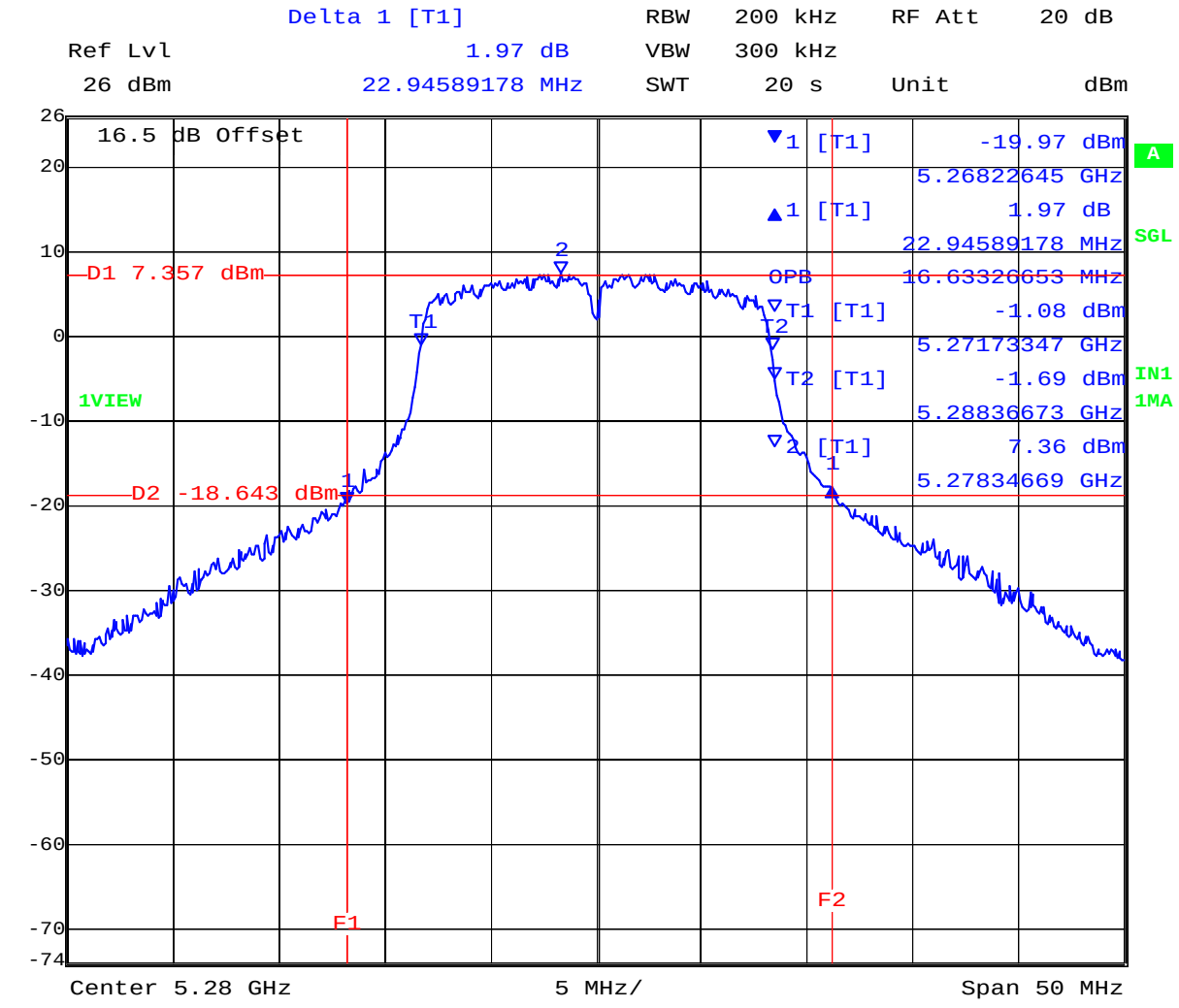
Measurement uncertainty:	±2.81 dB

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



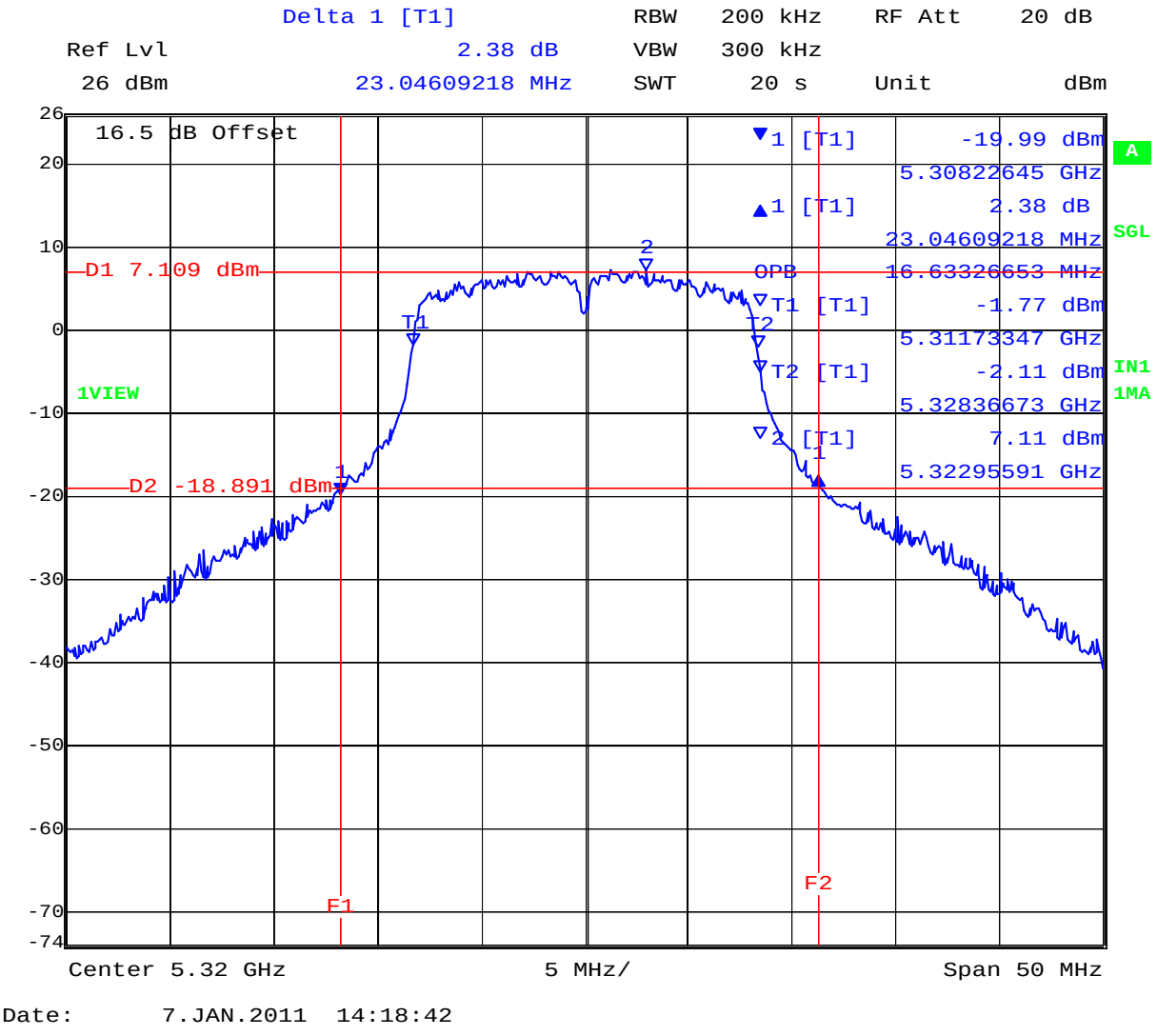
Date: 7.JAN.2011 13:47:03

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 – 802.11HT-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

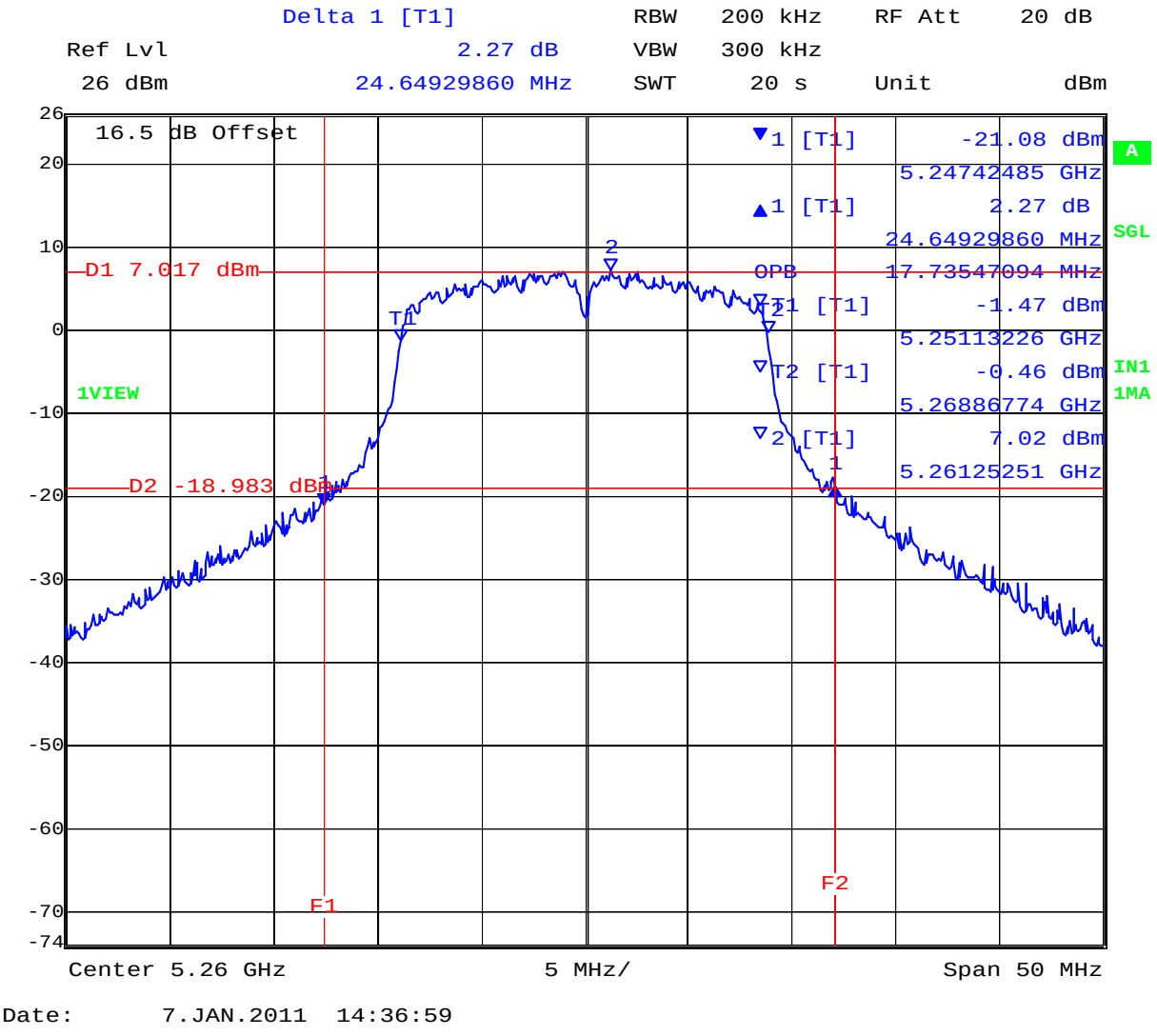
Test Frequency	26 dB Bandwidth				Minimum 6dB Bandwidth Limit		Margin
	MHz						
MHz	a	b	c	d	kHz	MHz	MHz
5260	24.649000				500	0.5	-24.149000
5280	24.549000						-24.049000
5320	24.148000						-23.648000

99% Bandwidth

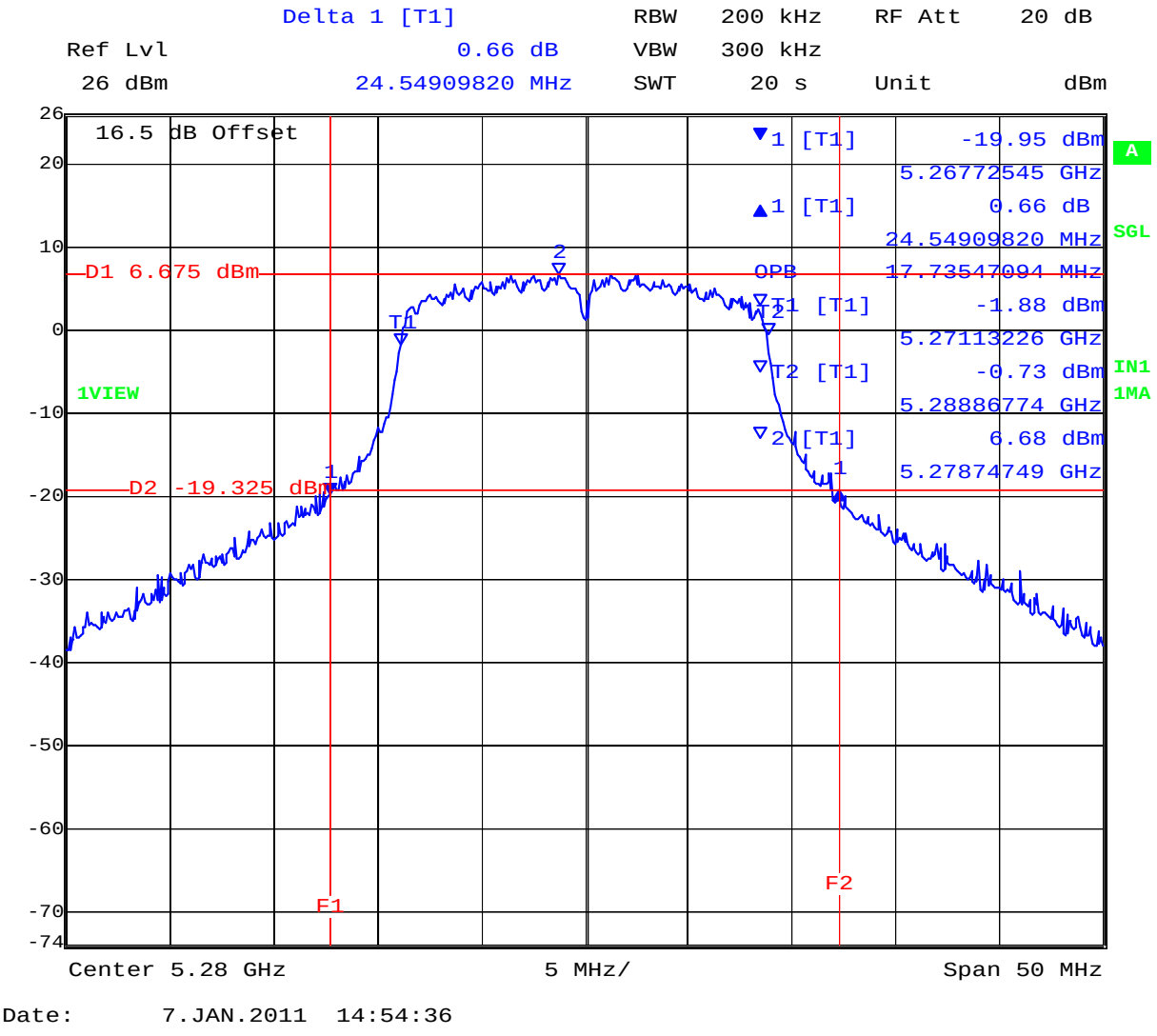
Test Frequency	99 % Bandwidth						
	MHz						
MHz	a	b	c	d			
5260	17.735000						
5280	17.735000						
5320	17.735000						

Measurement uncertainty:	±2.81 dB

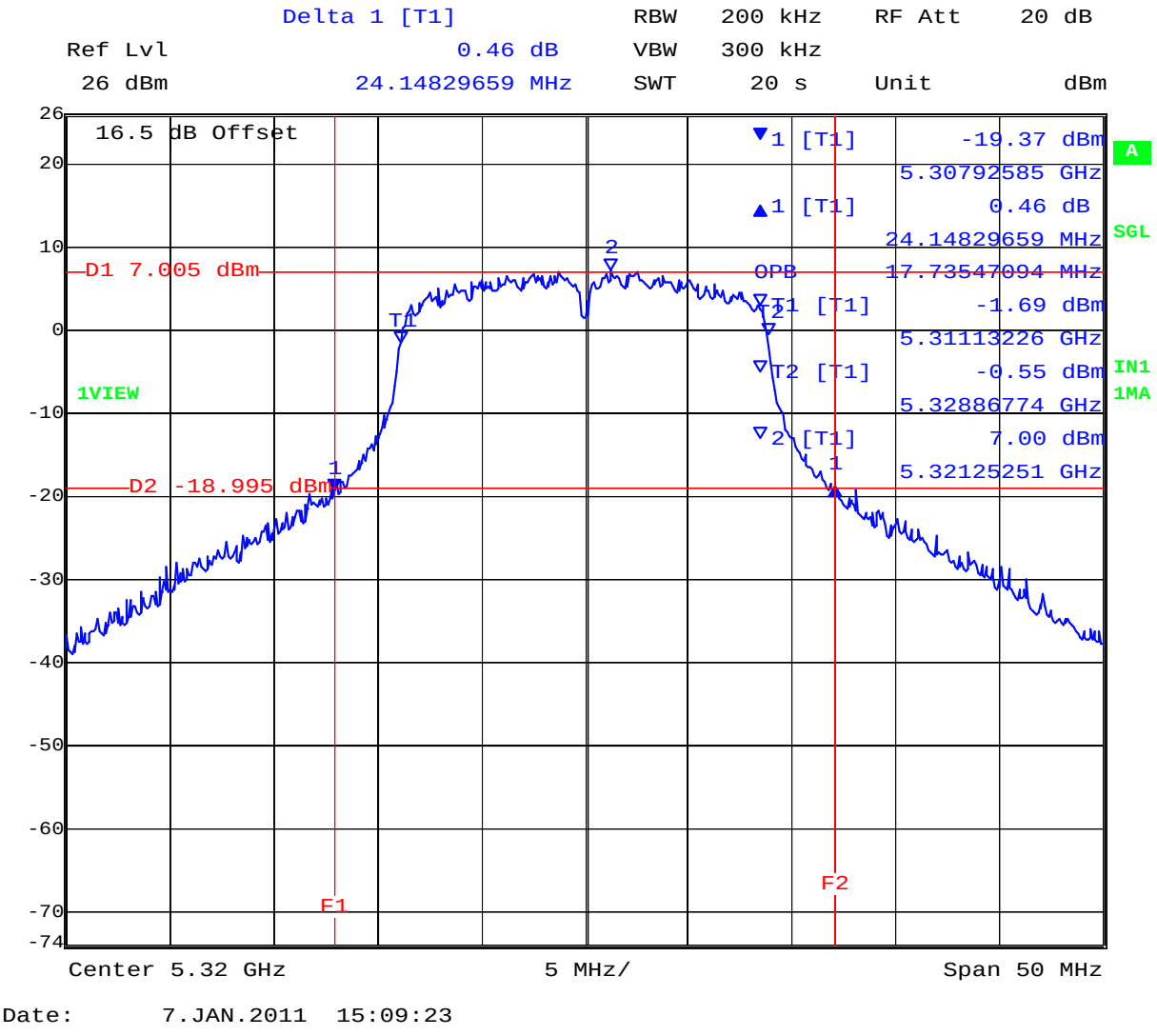
26dB OBW 99% Ambient 5260MHz 4.20V 15.30dBm



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

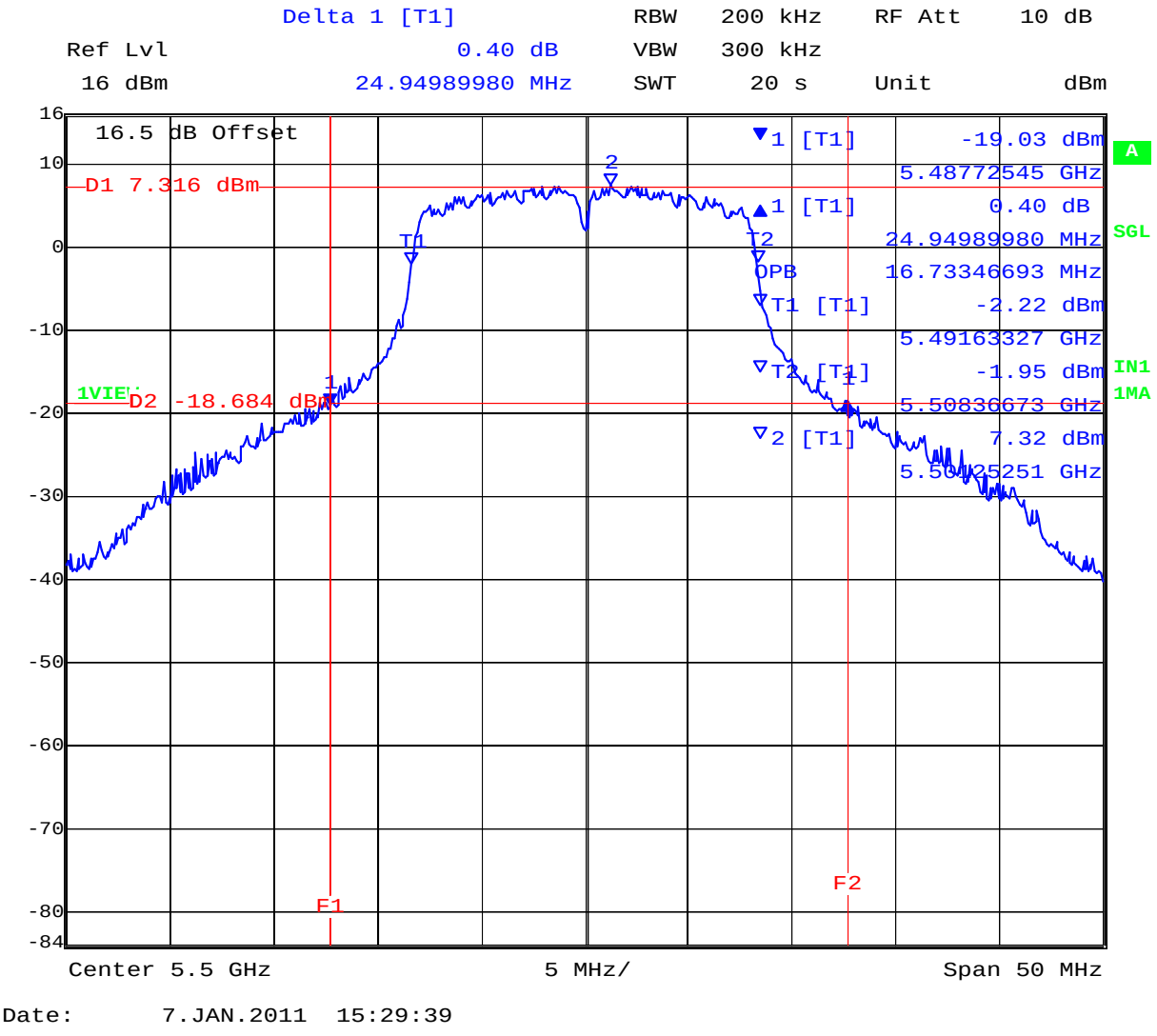
Test Frequency	26 dB Bandwidth MHz				Minimum 6dB Bandwidth Limit		Margin
MHz	**a**	**b**	**c**	**d**	**kHz**	**MHz**	**MHz**
5500	24.950000				500	0.5	-24.450000
5580	25.651000						-25.151000
5700	26.453000						-25.953000

99% Bandwidth

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

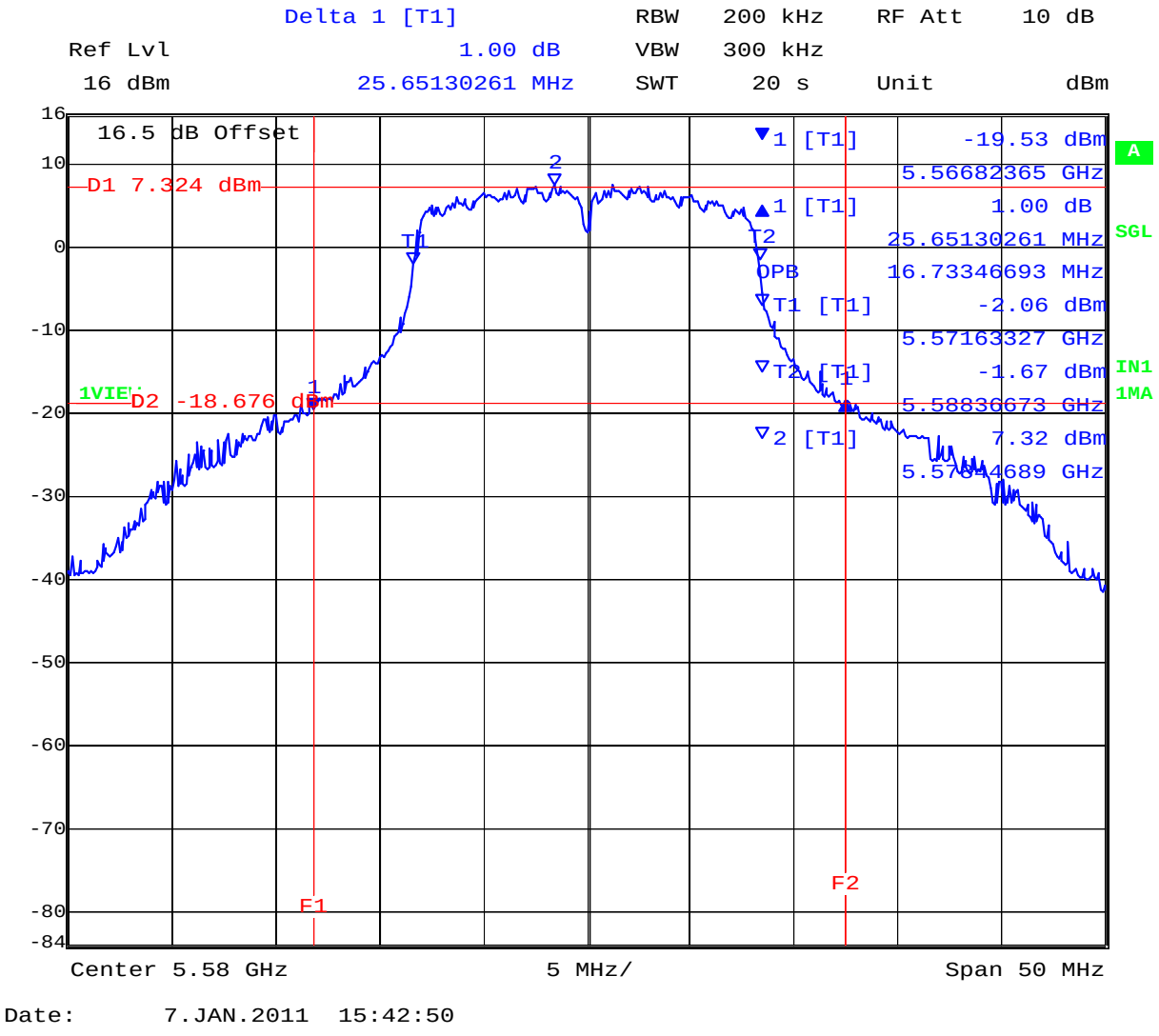
Measurement uncertainty:	±2.81 dB

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



Date: 7.JAN.2011 15:42:50

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

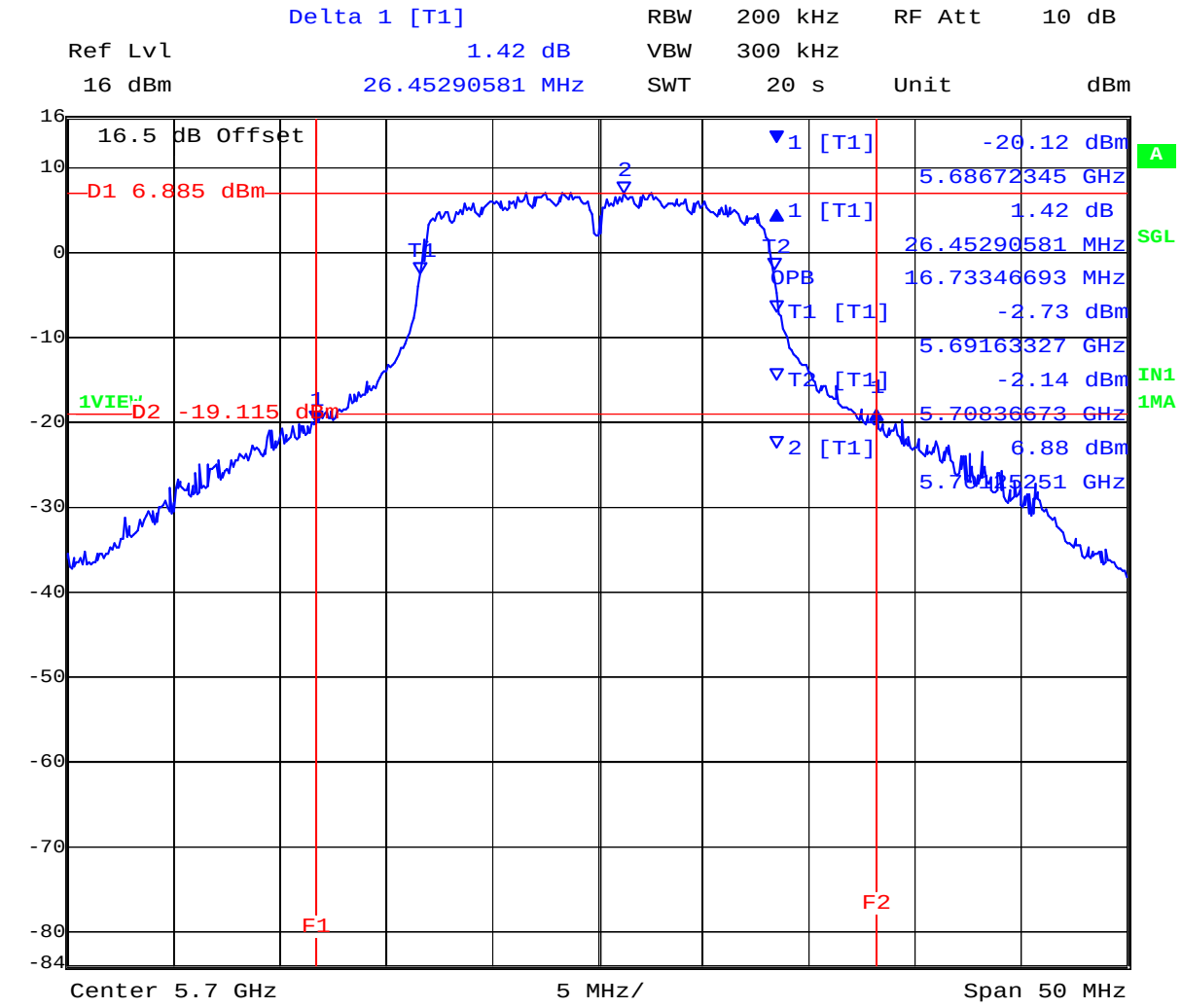


TABLE OF RESULTS – 802.11HT-20

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

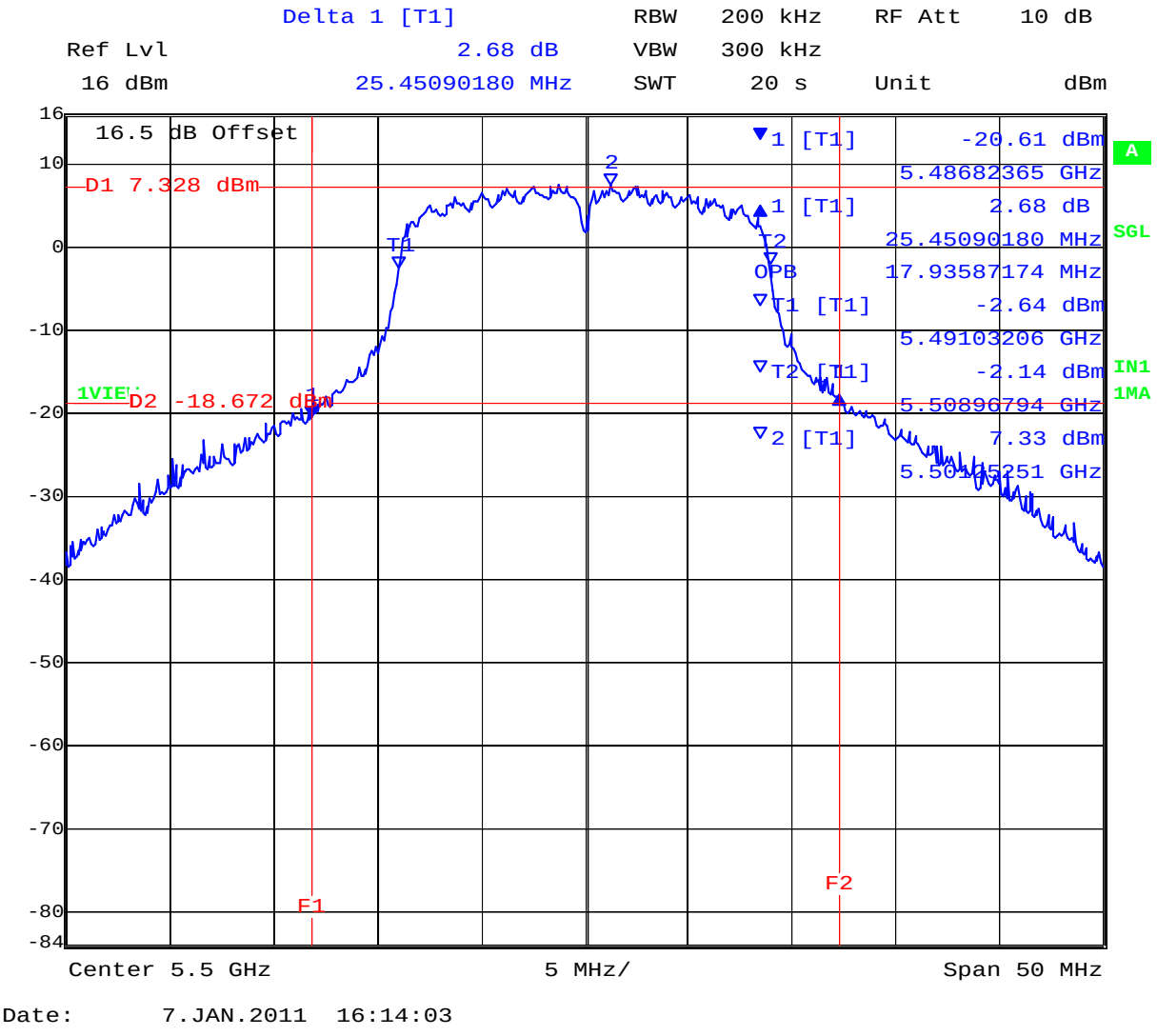
Test Frequency	26 dB Bandwidth MHz				Minimum 6dB Bandwidth Limit		Margin
MHz	**a**	**b**	**c**	**d**	**kHz**	**MHz**	**MHz**
5500	25.451000				500	0.5	-24.951000
5580	27.355000						-26.855000
5700	25.752000						-25.252000

99% Bandwidth

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

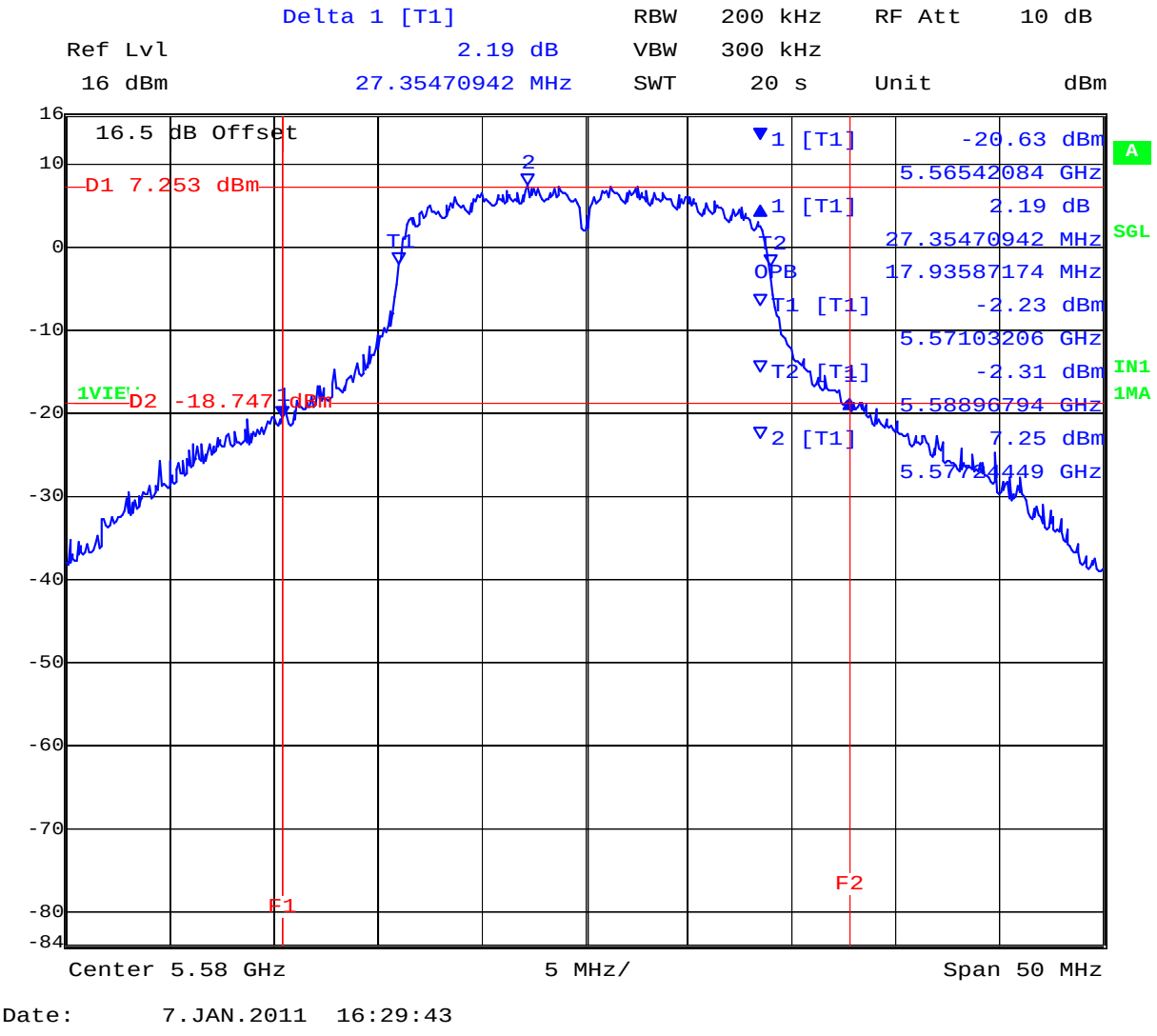
Measurement uncertainty:	±2.81 dB

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

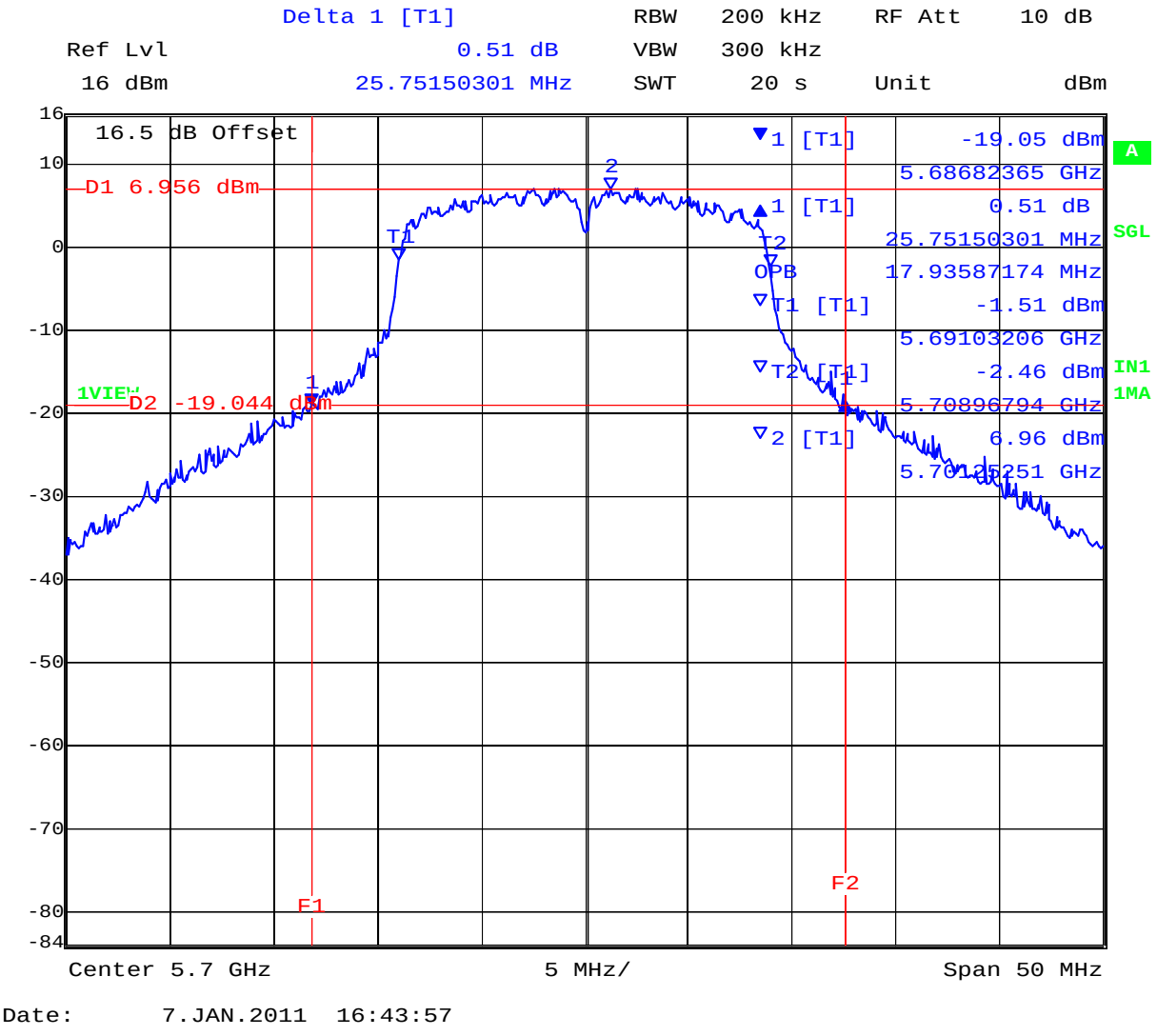


Date: 7.JAN.2011 16:14:03

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



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



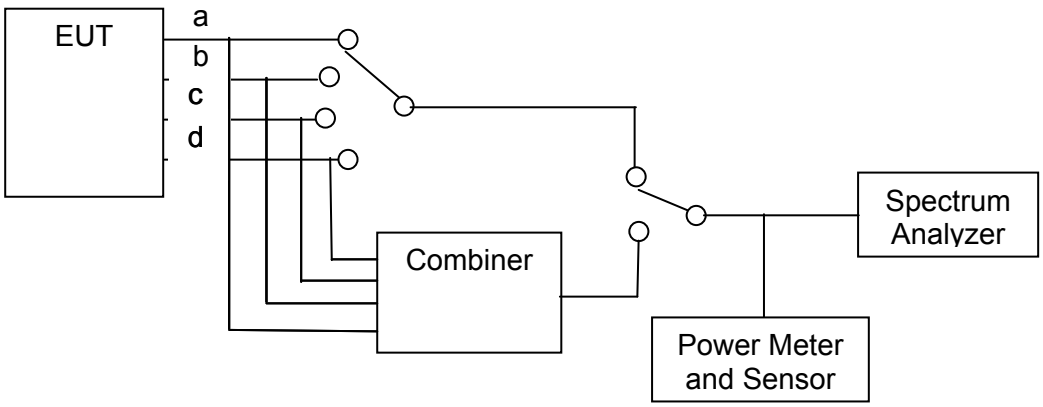
7.2 Transmit Output Power

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

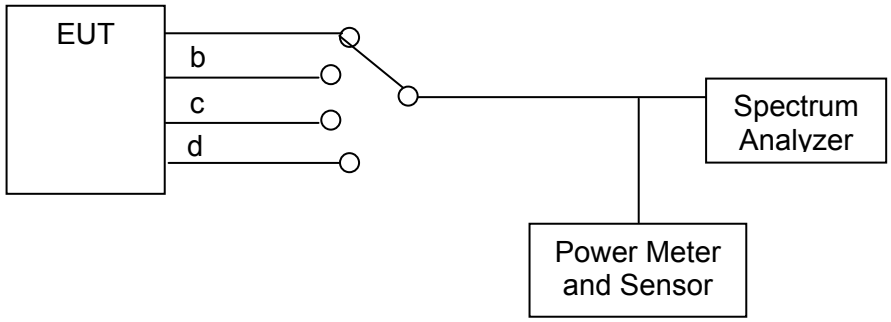
7.3 Peak Excursion Ratio

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

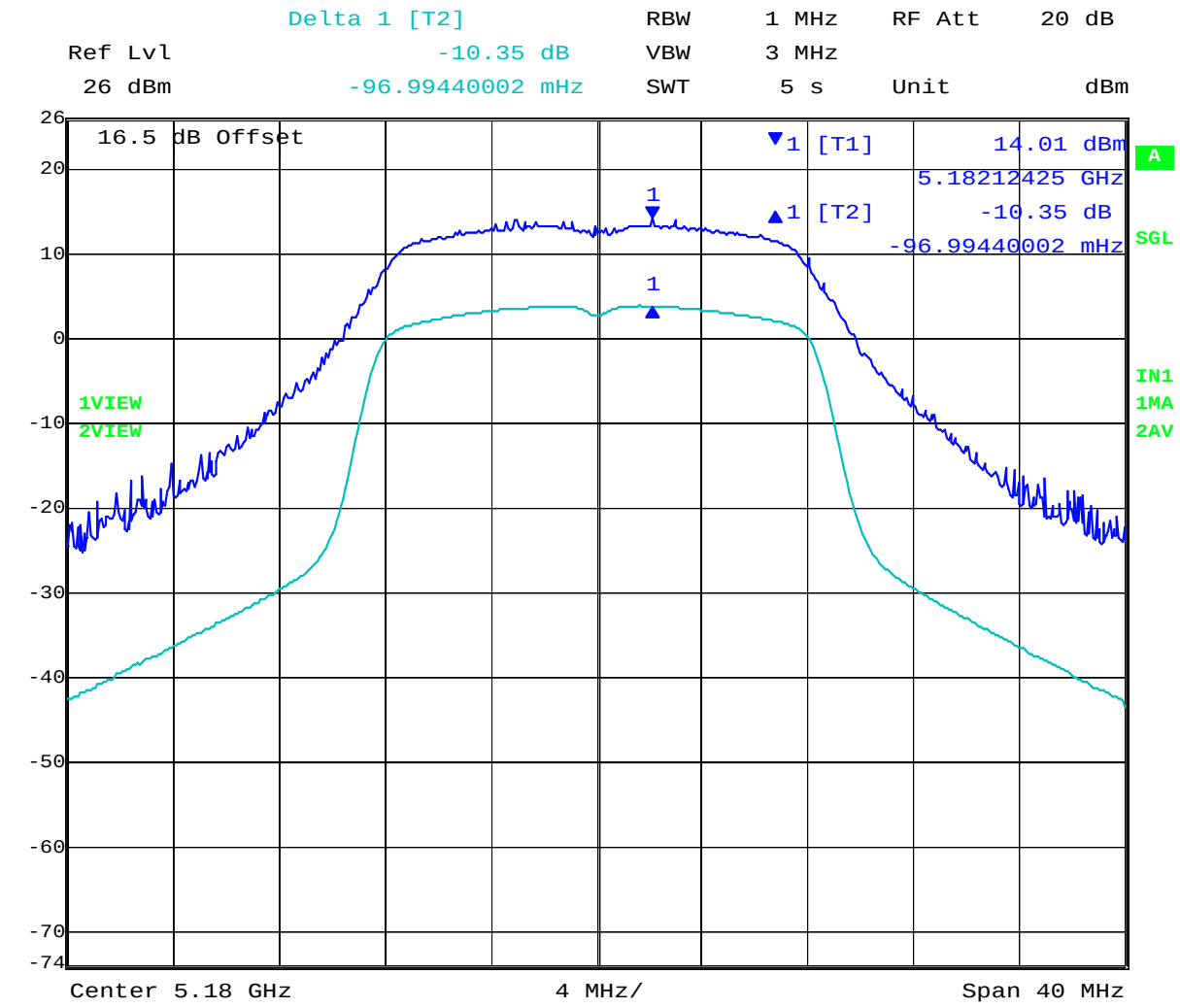
TABLE OF RESULTS – 802.11a

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

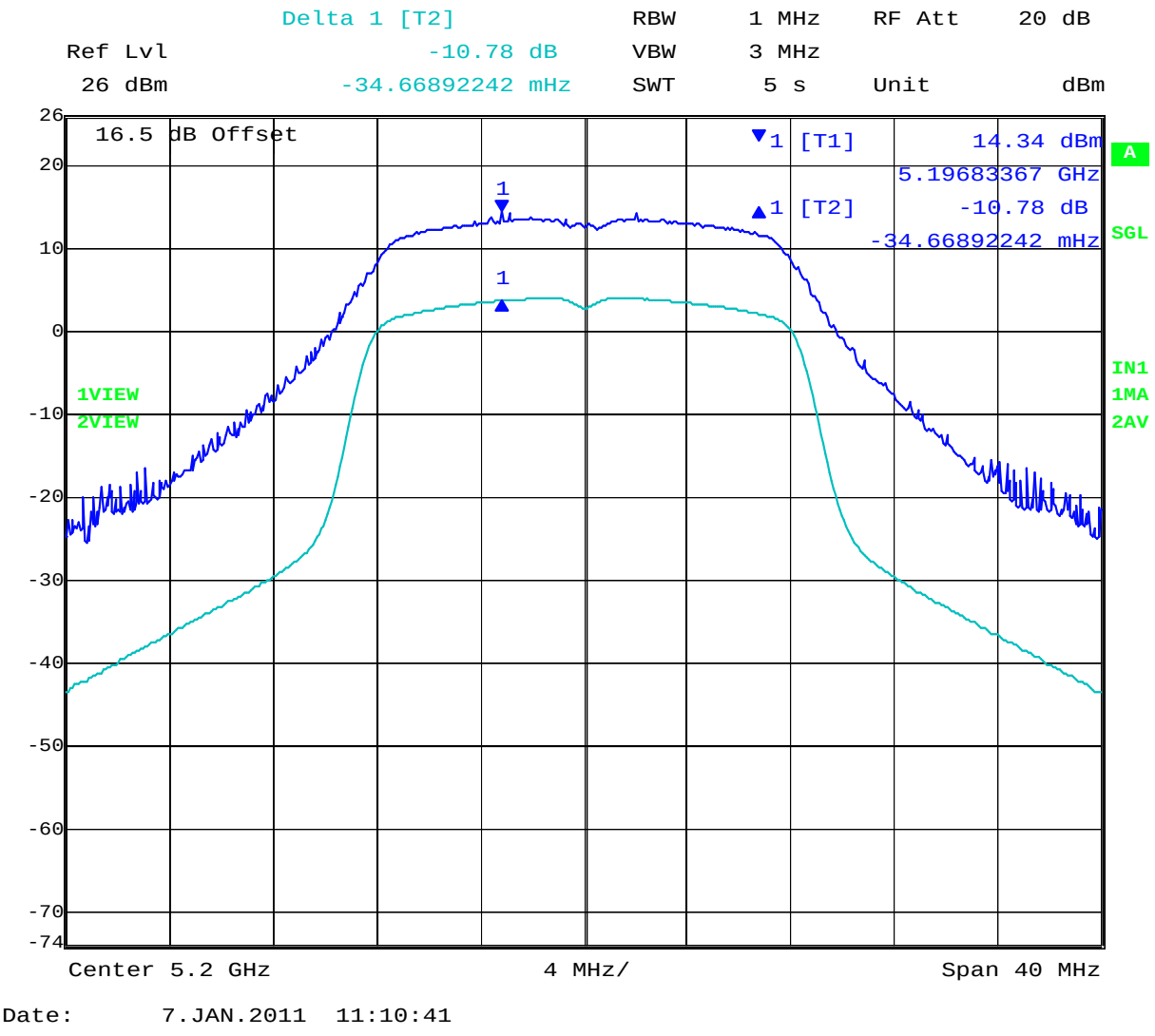
Measurement uncertainty:	±1.33 dB

Pk Excursion Ambient 5180MHz 4.20V 14.69dBm

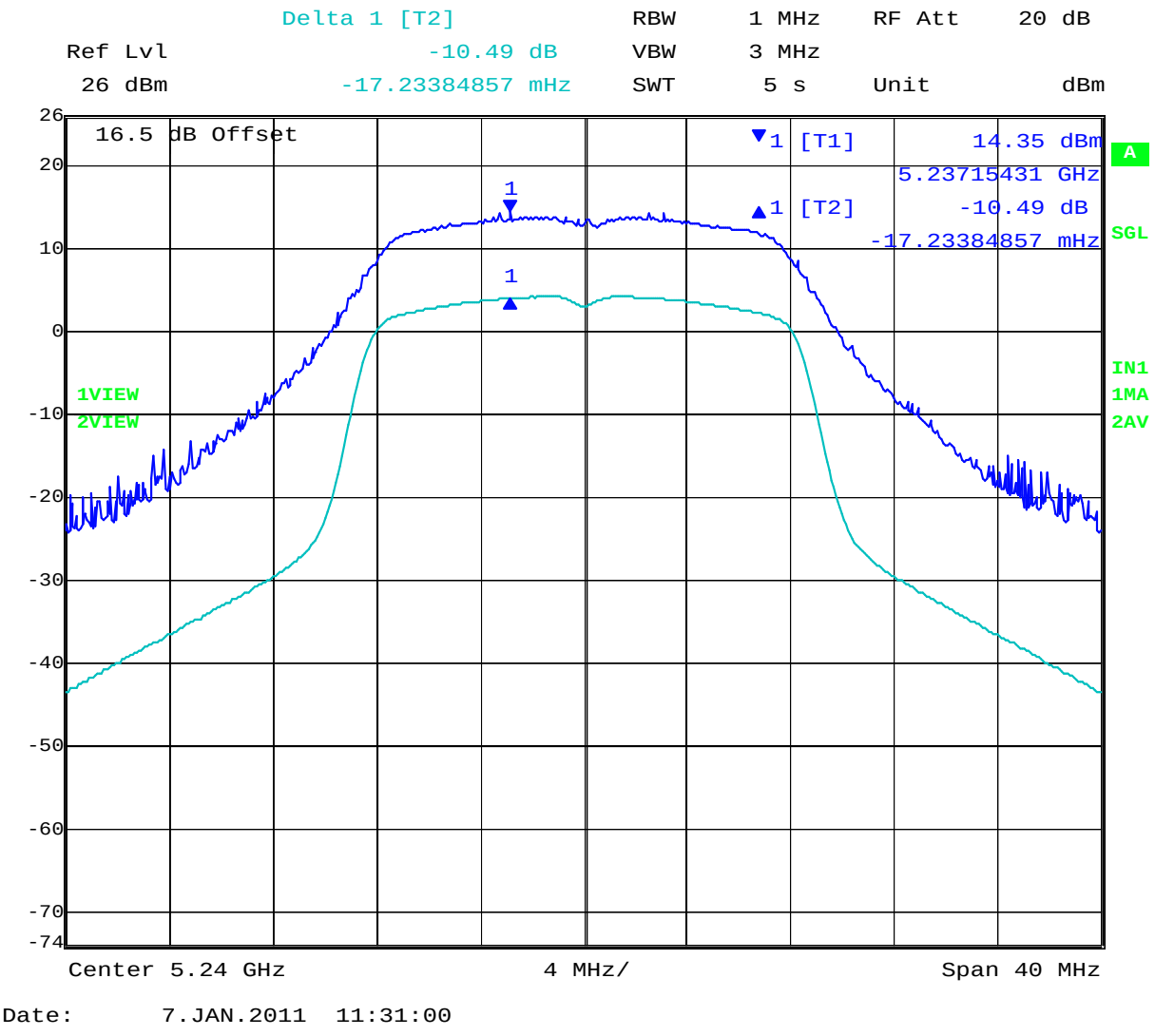


Date: 7.JAN.2011 10:37:43

Pk Excursion Ambient 5200MHz 4.20V 14.62dBm



Pk Excursion Ambient 5240MHz 4.20V 14.72dBm



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

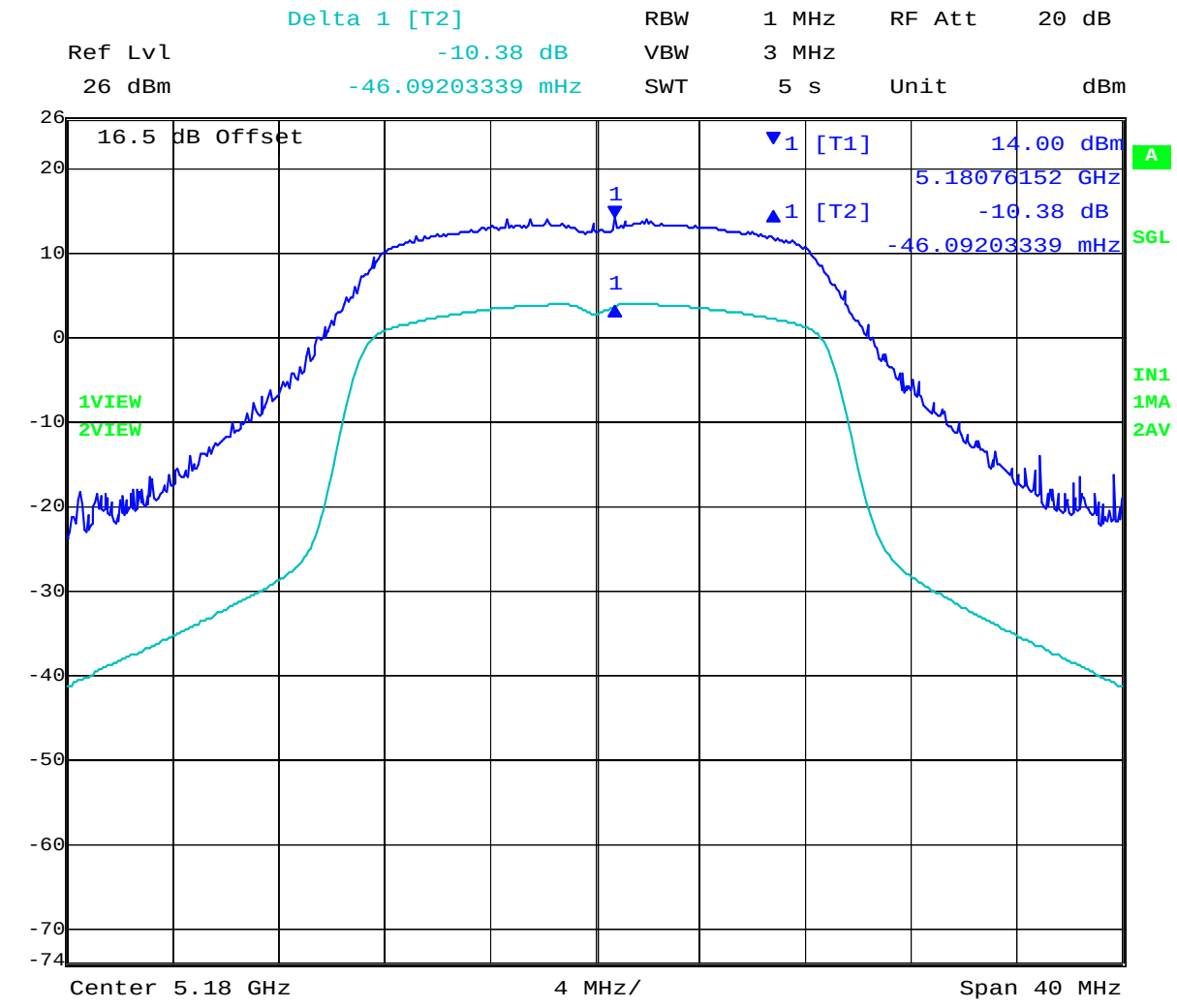
TABLE OF RESULTS – 802.11HT-20

Test Conditions:	15.407 (a)		**Rel. Humidity (%):**	35	to	42
Variant:	802.11n HT-20		**Ambient Temp. (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:						

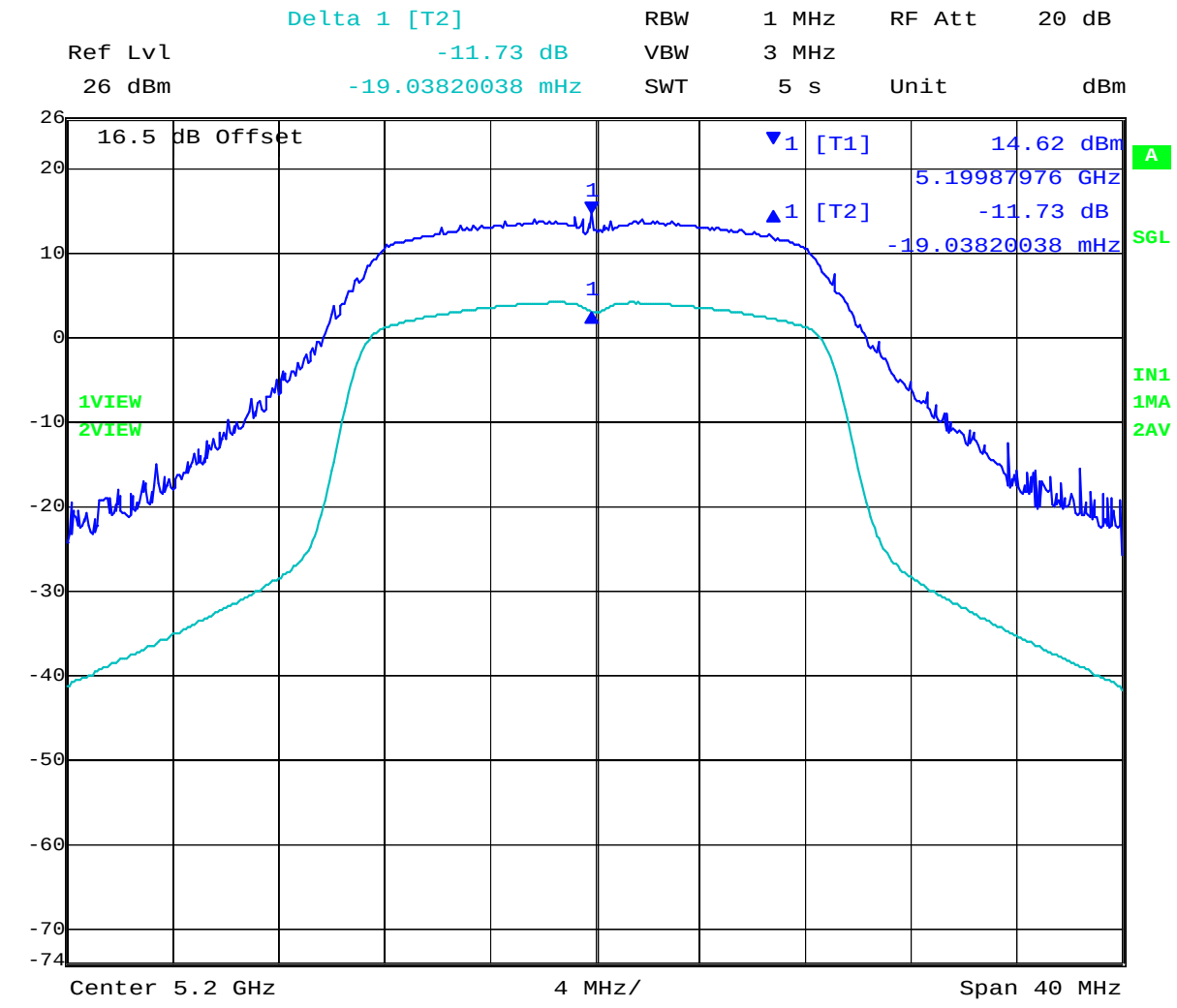
Test Frequency	Trace Peak Power Markers		Δ Marker (Marker 1 – 2)	Limit	Margin
	1	2			
MHz	dBm	dBm	dB	dB	dB
5180	14.00	3.62	-10.38	13	-2.62
5200	14.62	2.89	-11.73	13	-1.27
5240	13.75	3.76	-9.99	13	-3.01

Measurement uncertainty:	±1.33 dB

Pk Excursion Ambient 5180MHz 4.20V 14.83dBm

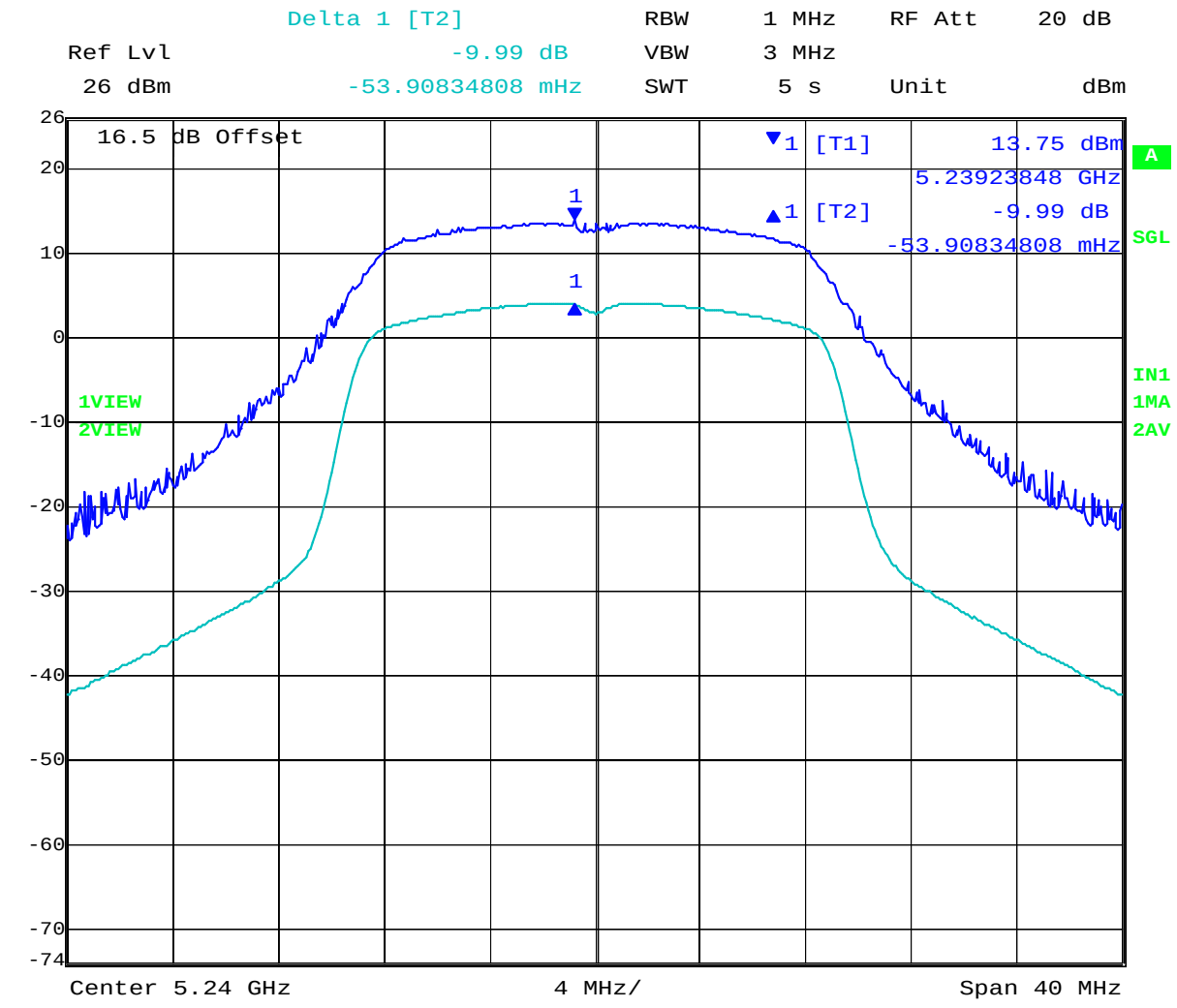


Pk Excursion Ambient 5200MHz 4.20V 14.91dBm



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

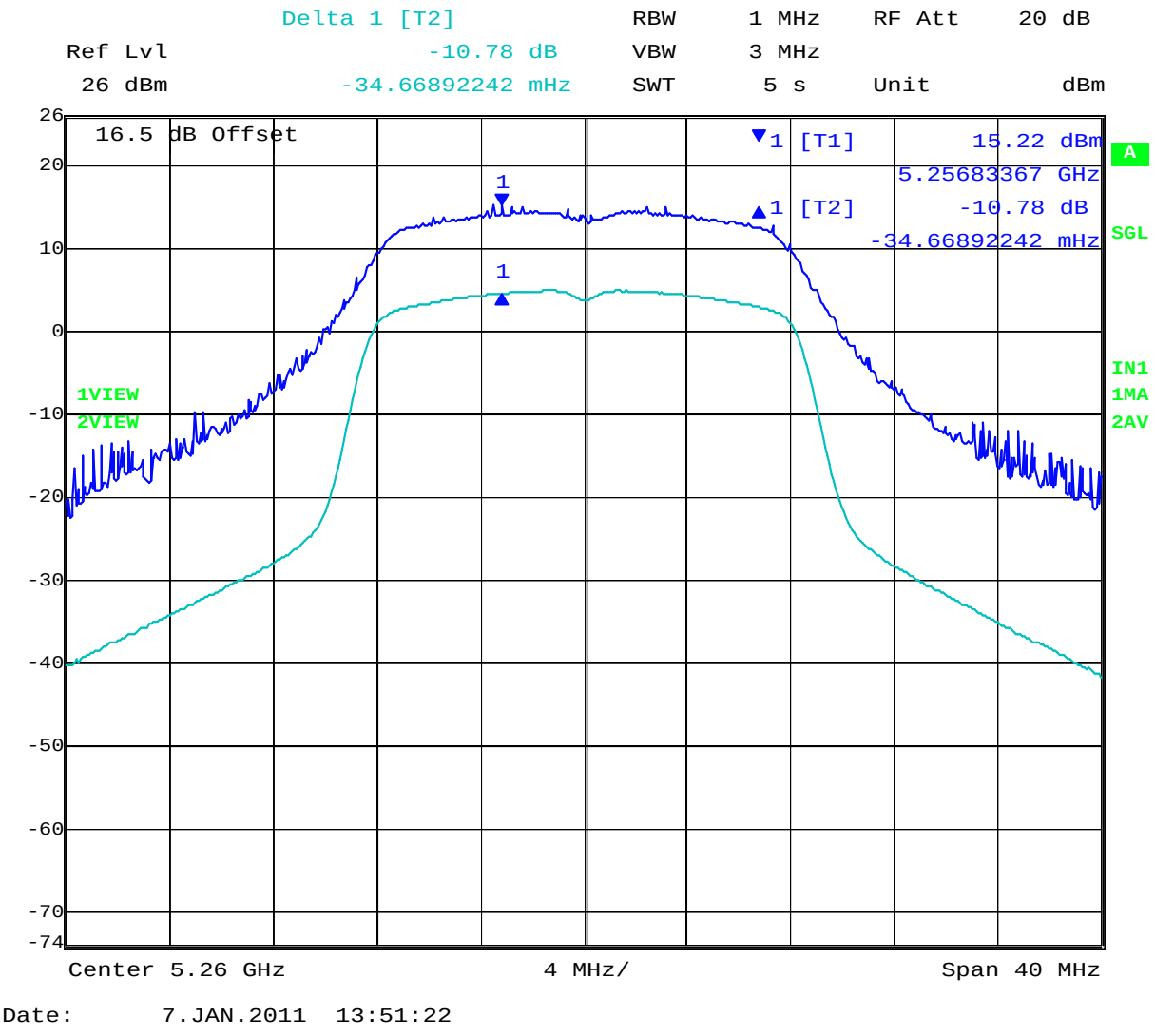
TABLE OF RESULTS – 802.11a

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

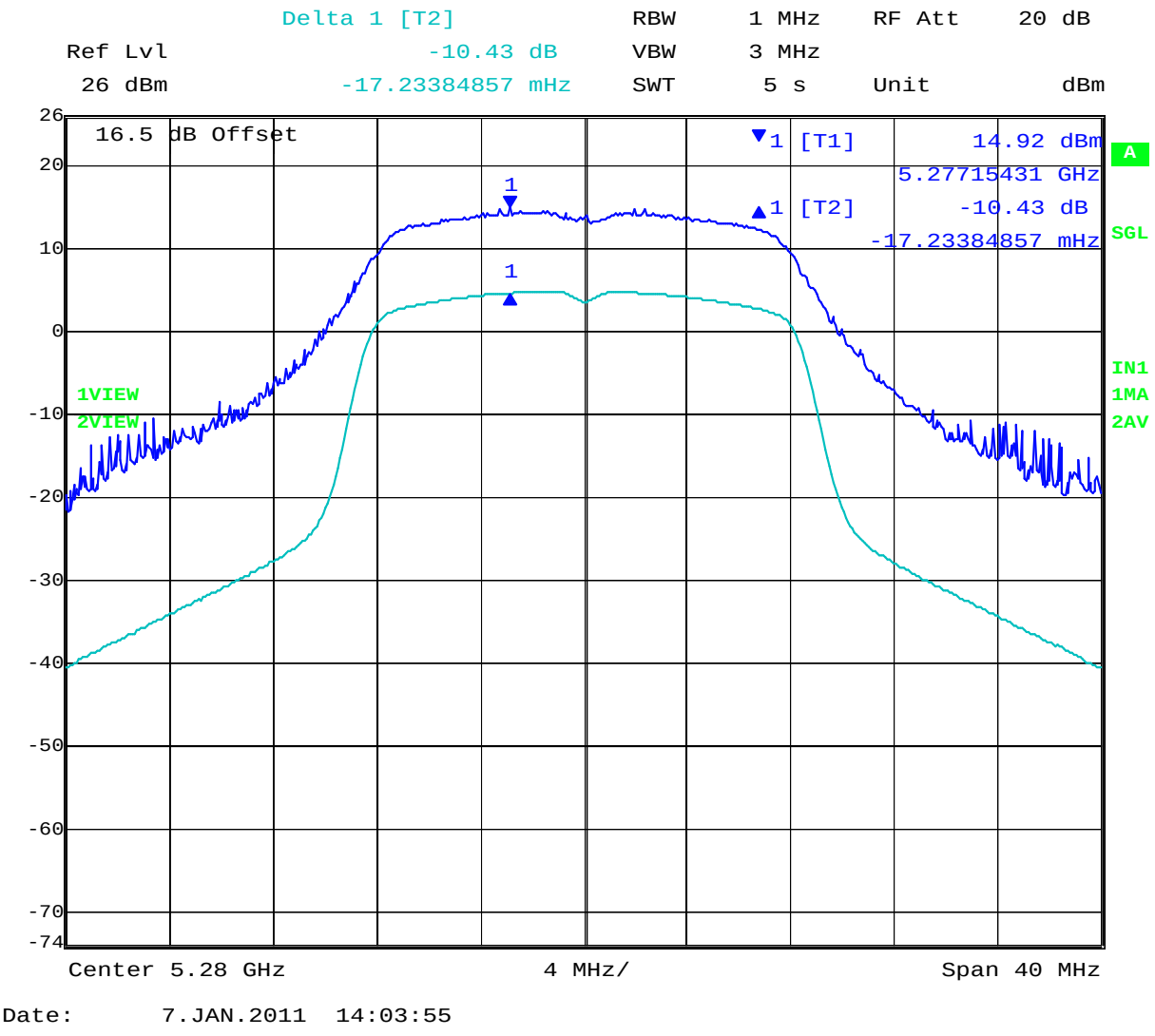
Measurement uncertainty:	±1.33 dB

Pk Excursion Ambient 5260MHz 4.20V 15.38dBm



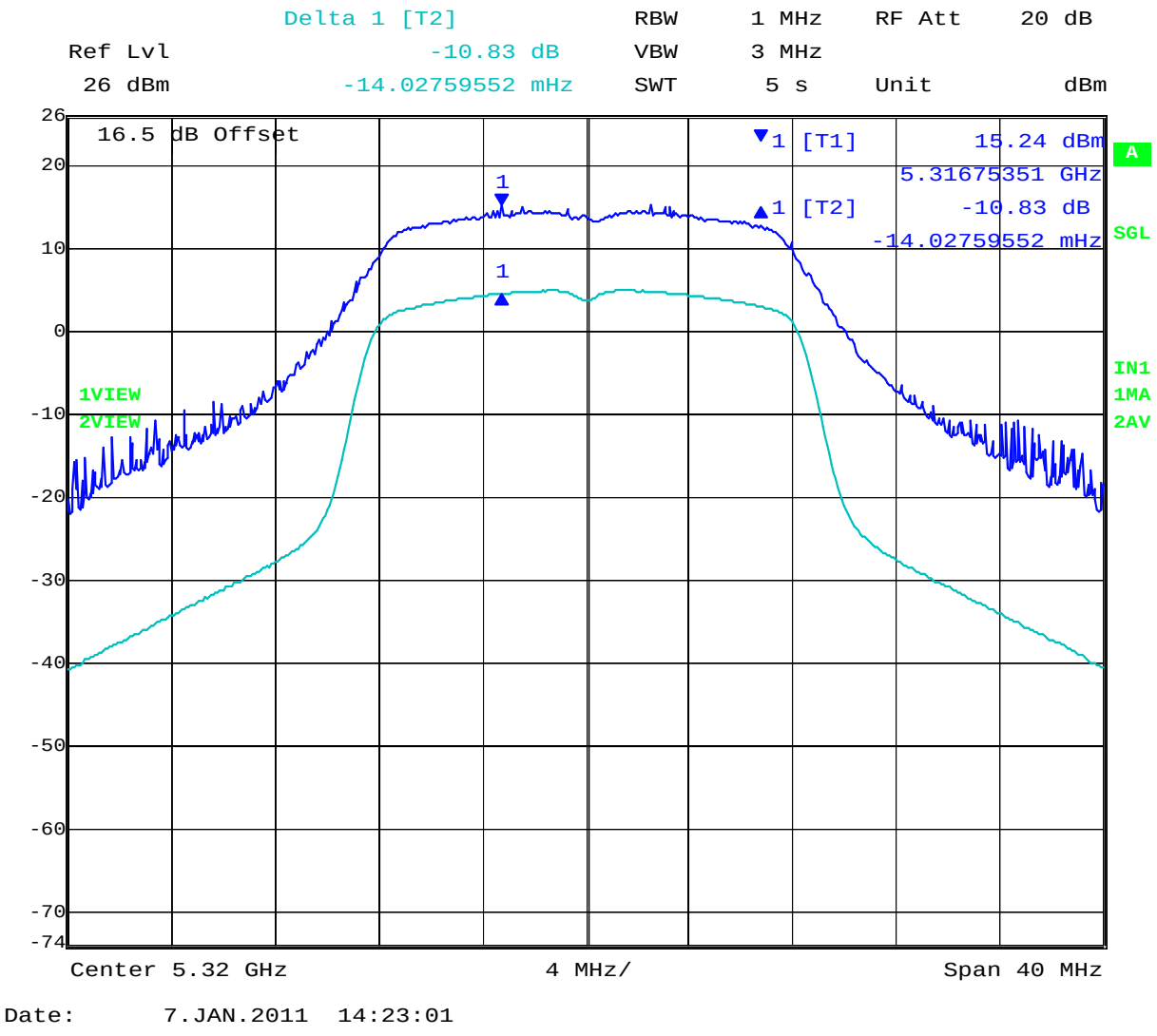
Date: 7.JAN.2011 13:51:22

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

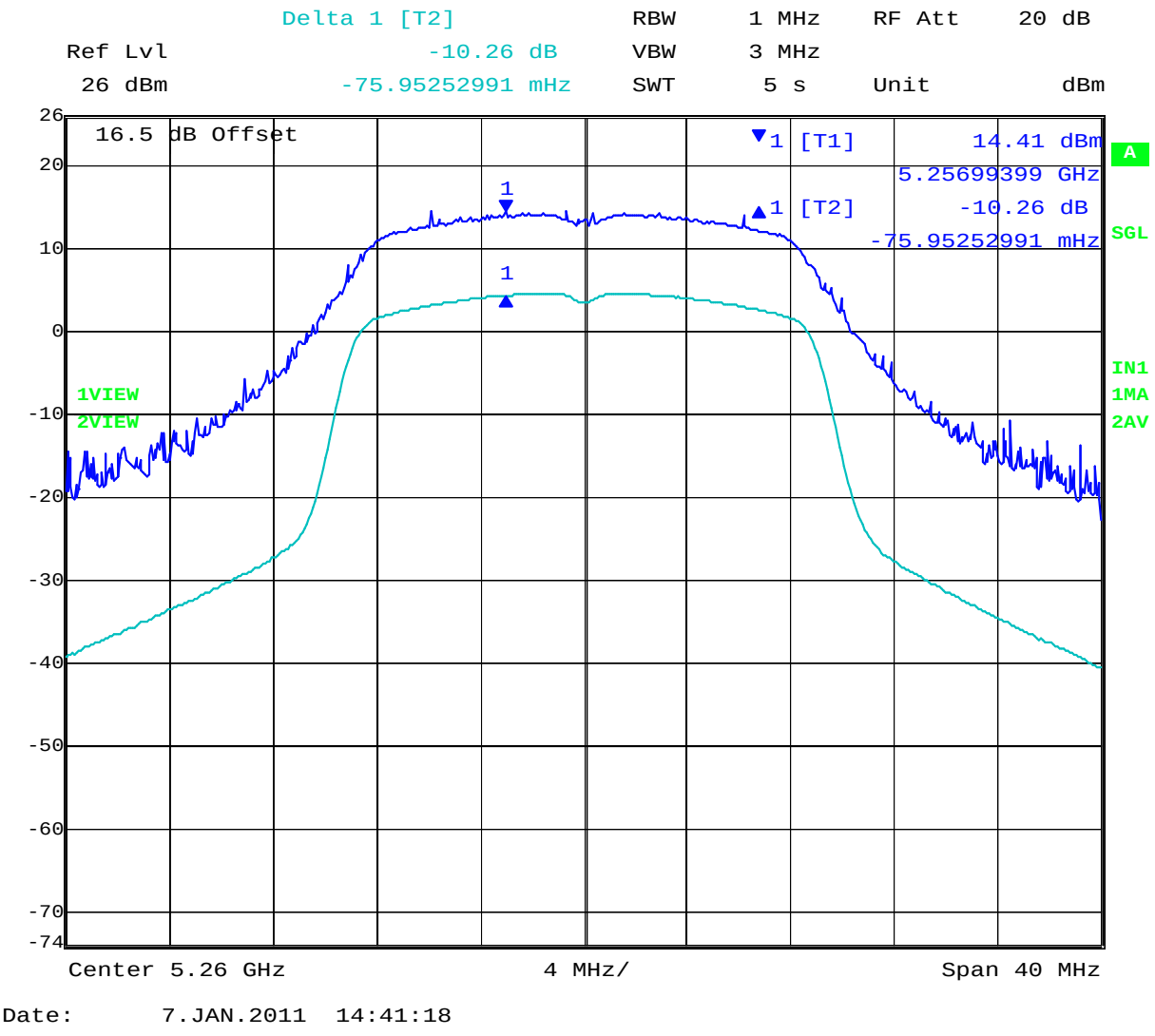
TABLE OF RESULTS – 802.11HT-20

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

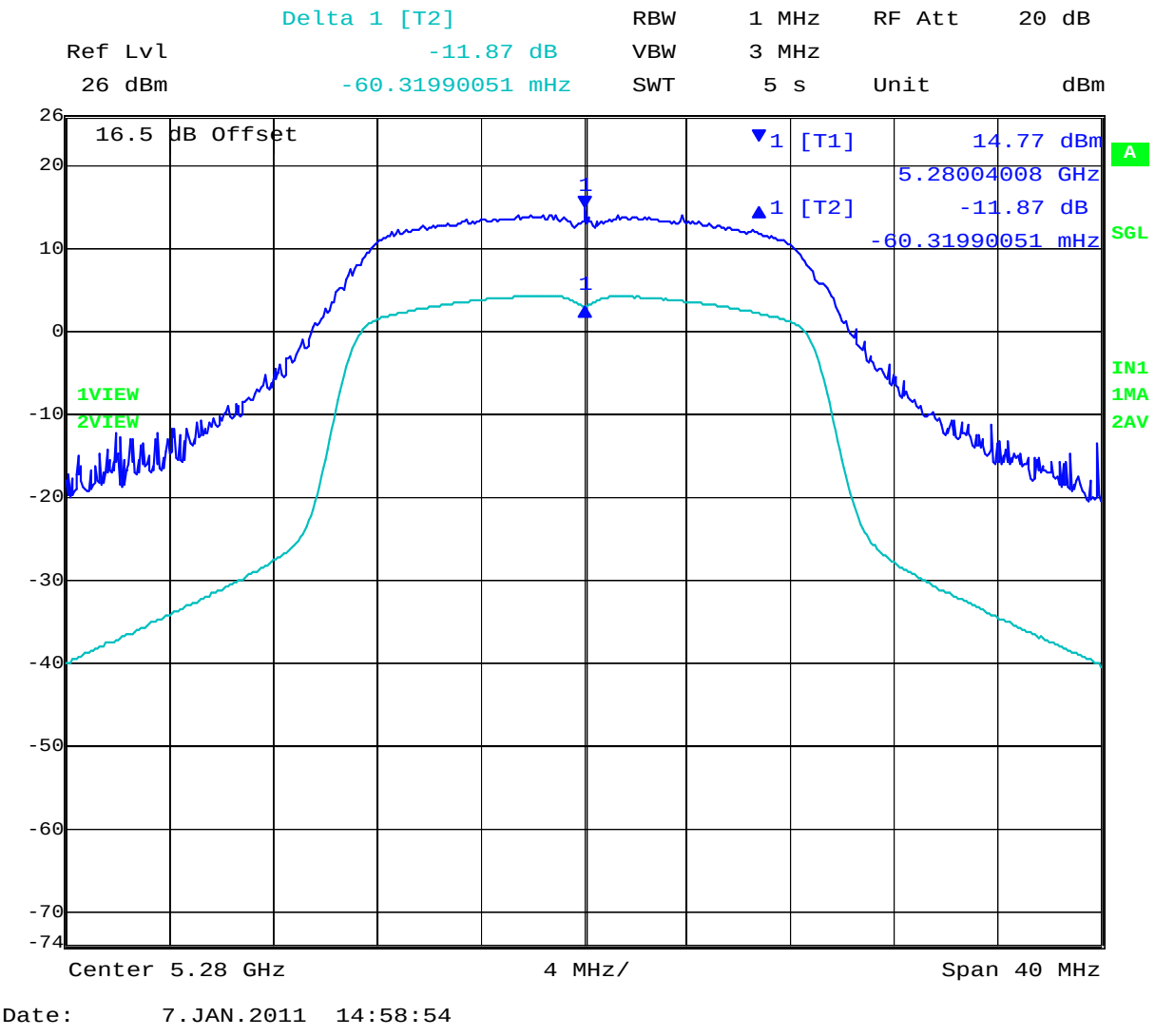
Measurement uncertainty:	±1.33 dB

Pk Excursion Ambient 5260MHz 4.20V 15.26dBm



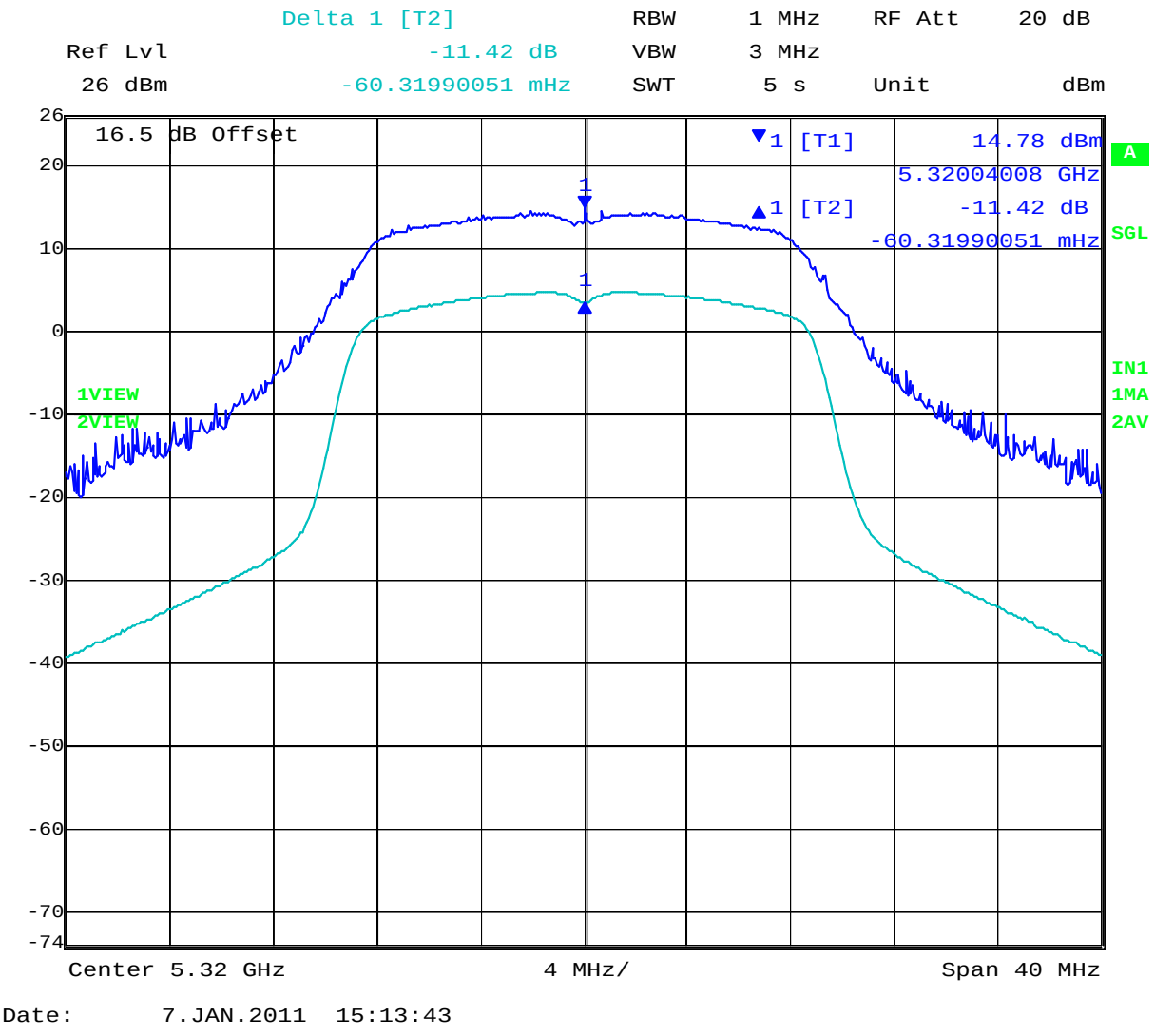
Date: 7.JAN.2011 14:41:18

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

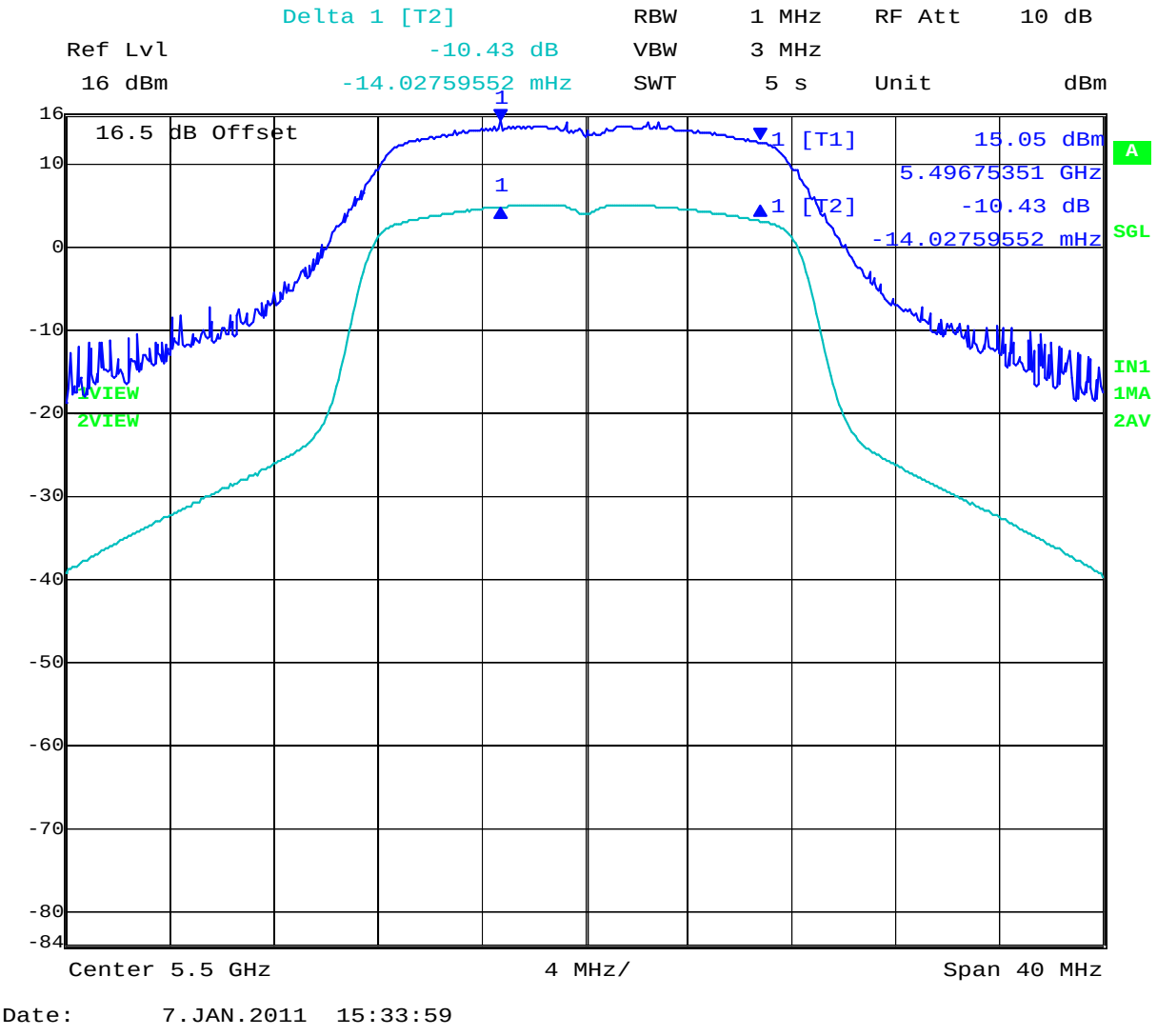
TABLE OF RESULTS – 802.11a

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

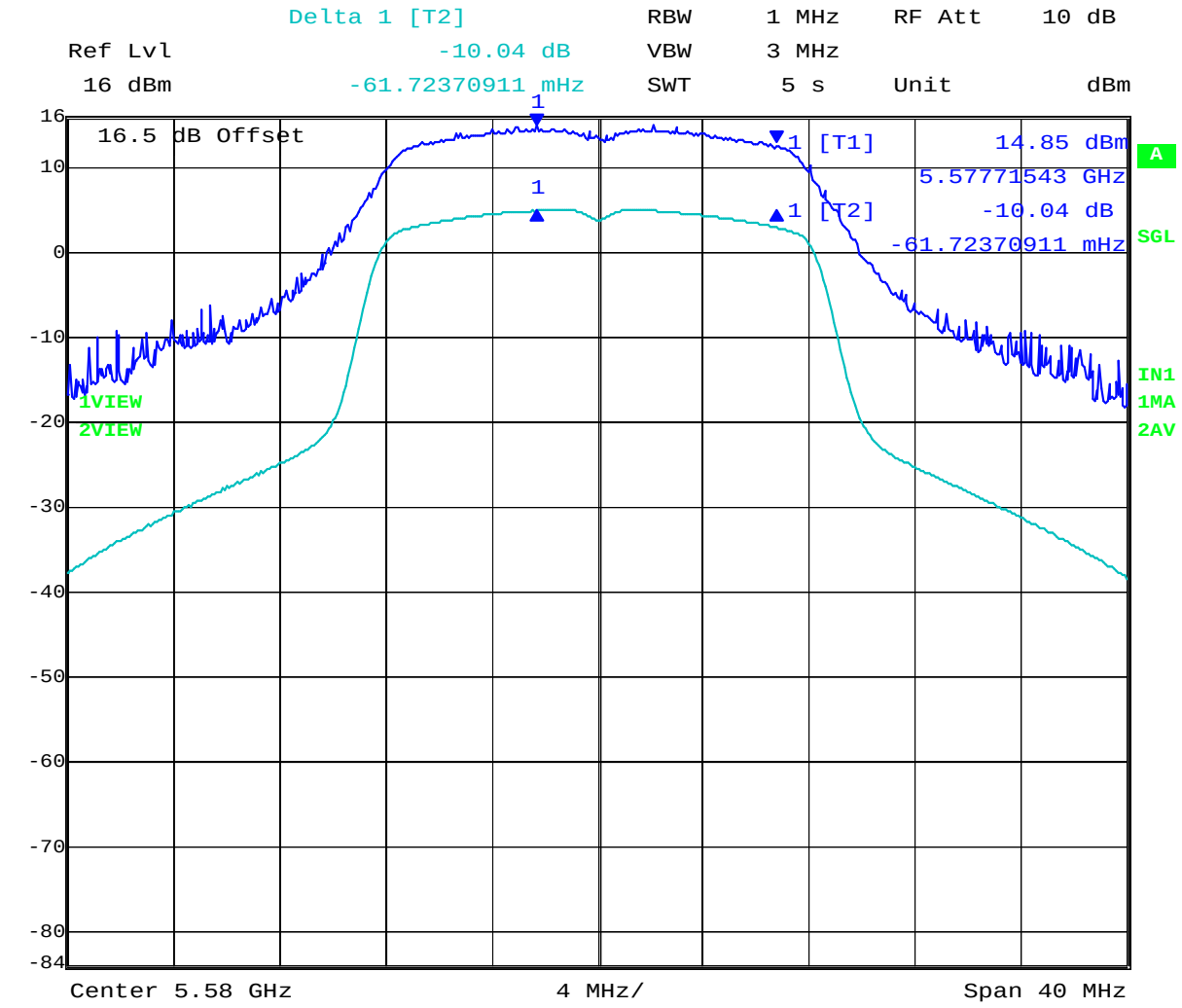
Measurement uncertainty:	±1.33 dB

Pk Excursion Ambient 5500MHz 4.20V 16.02dBm



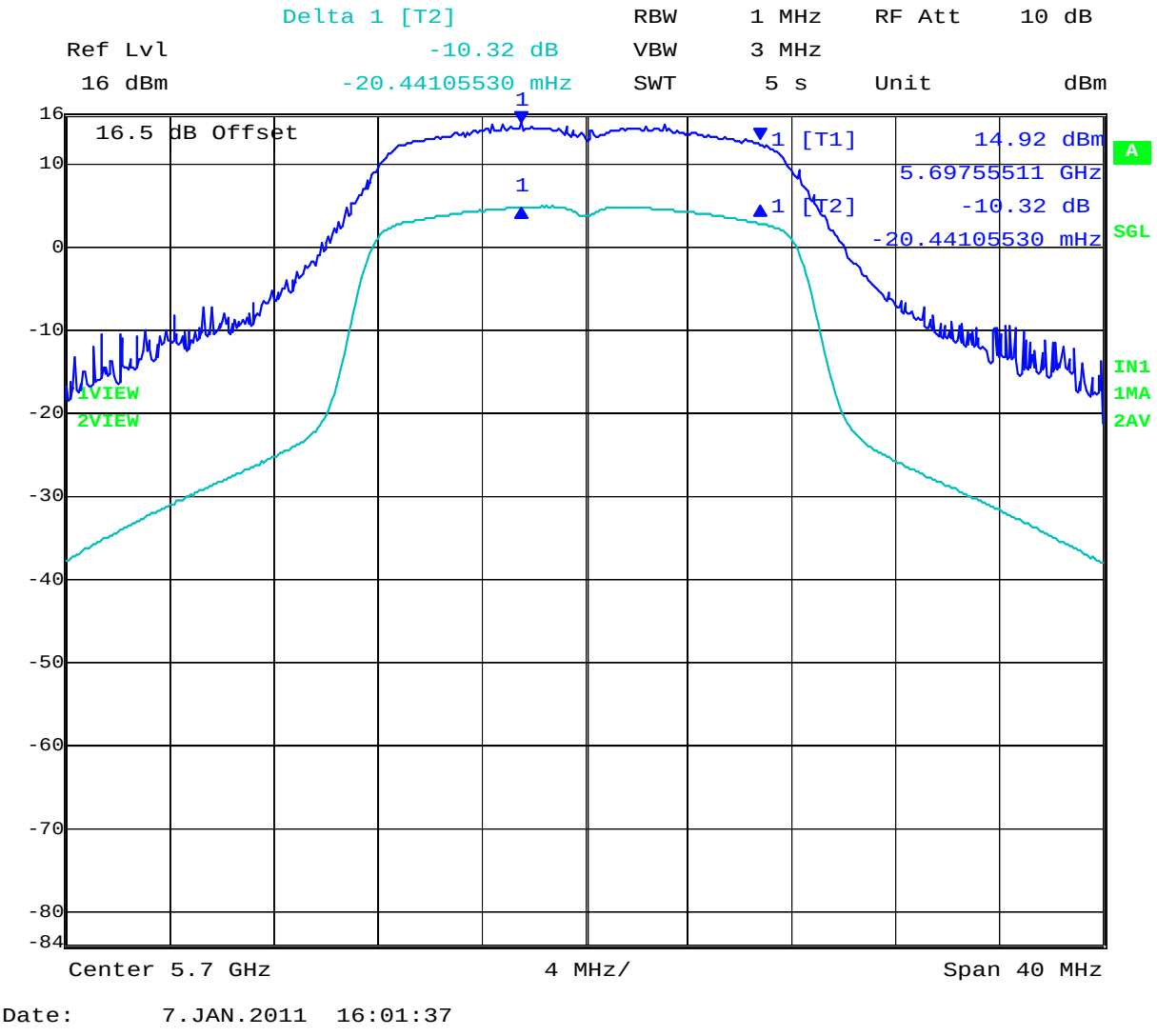
Date: 7.JAN.2011 15:33:59

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

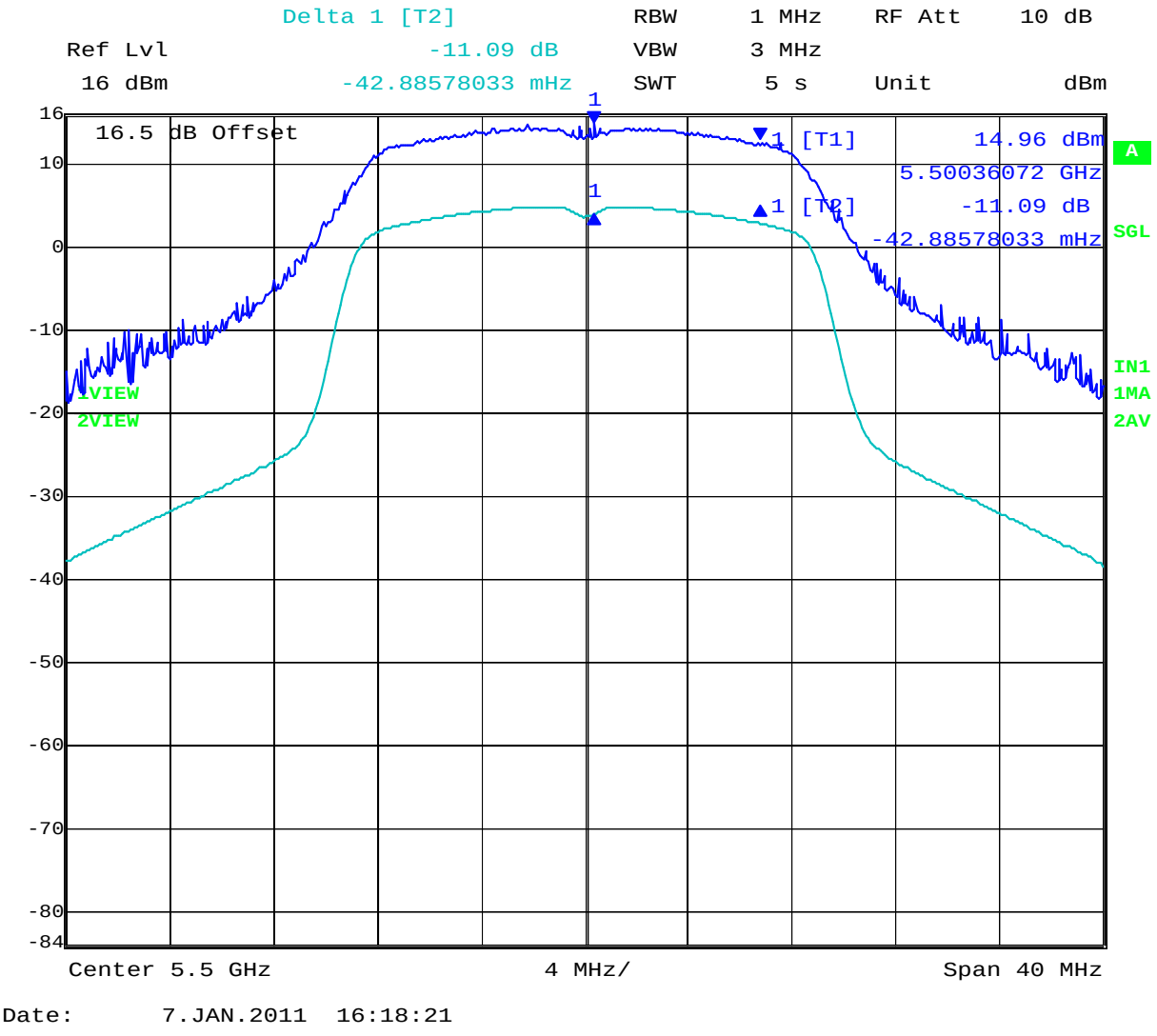
TABLE OF RESULTS – 802.11HT-20

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

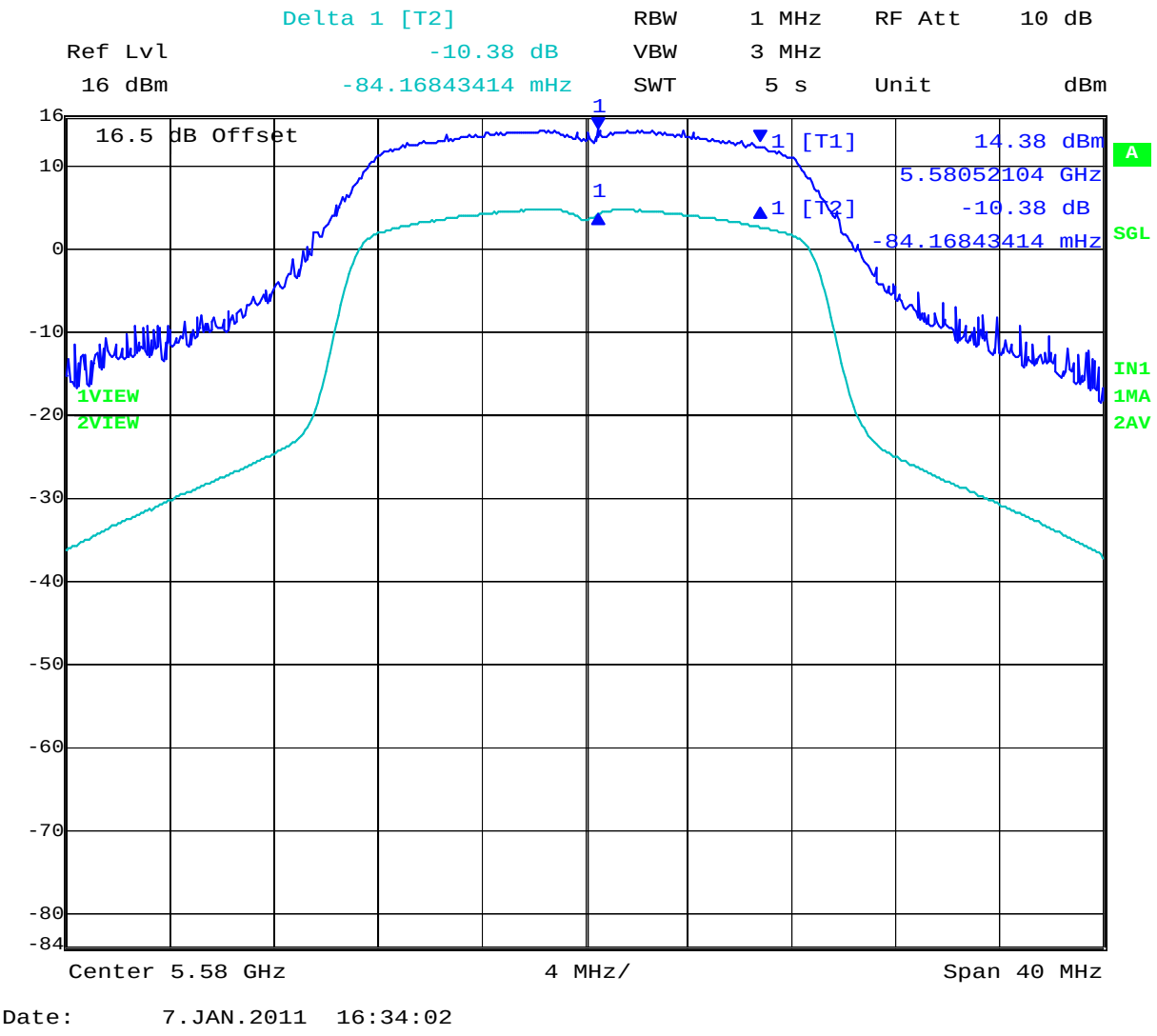
Measurement uncertainty:	±1.33 dB

Pk Excursion Ambient 5500MHz 4.20V 15.93dBm



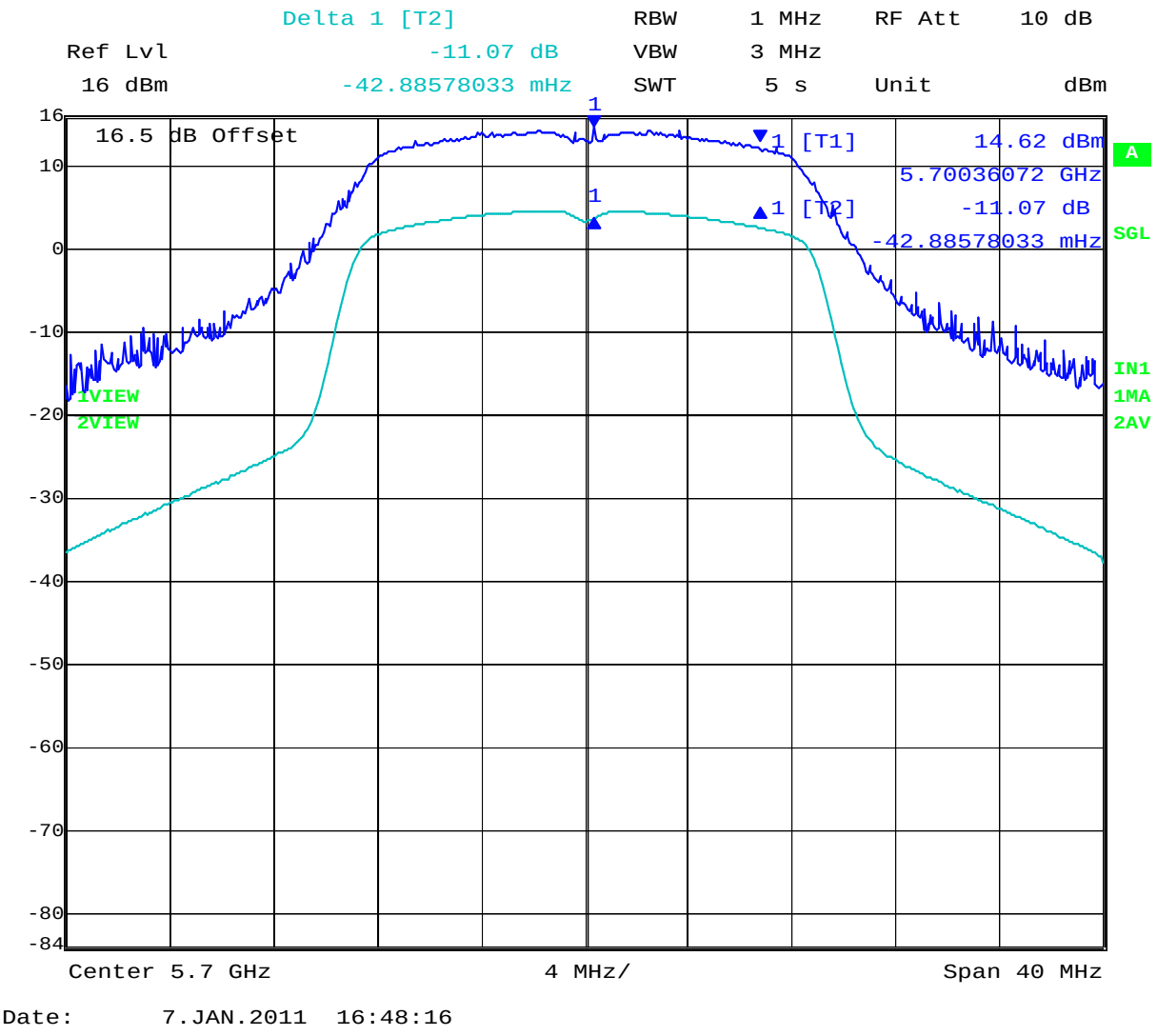
Date: 7.JAN.2011 16:18:21

Pk Excursion Ambient 5580MHz 4.20V 15.90dBm



Date: 7.JAN.2011 16:34:02

Pk Excursion Ambient 5700MHz 4.20V 16.29dBm



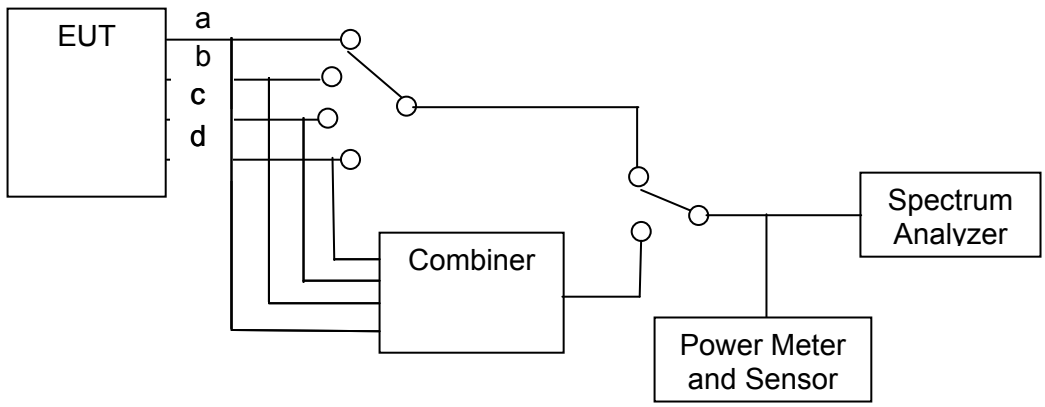
7.4 Peak Power Spectral Density

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

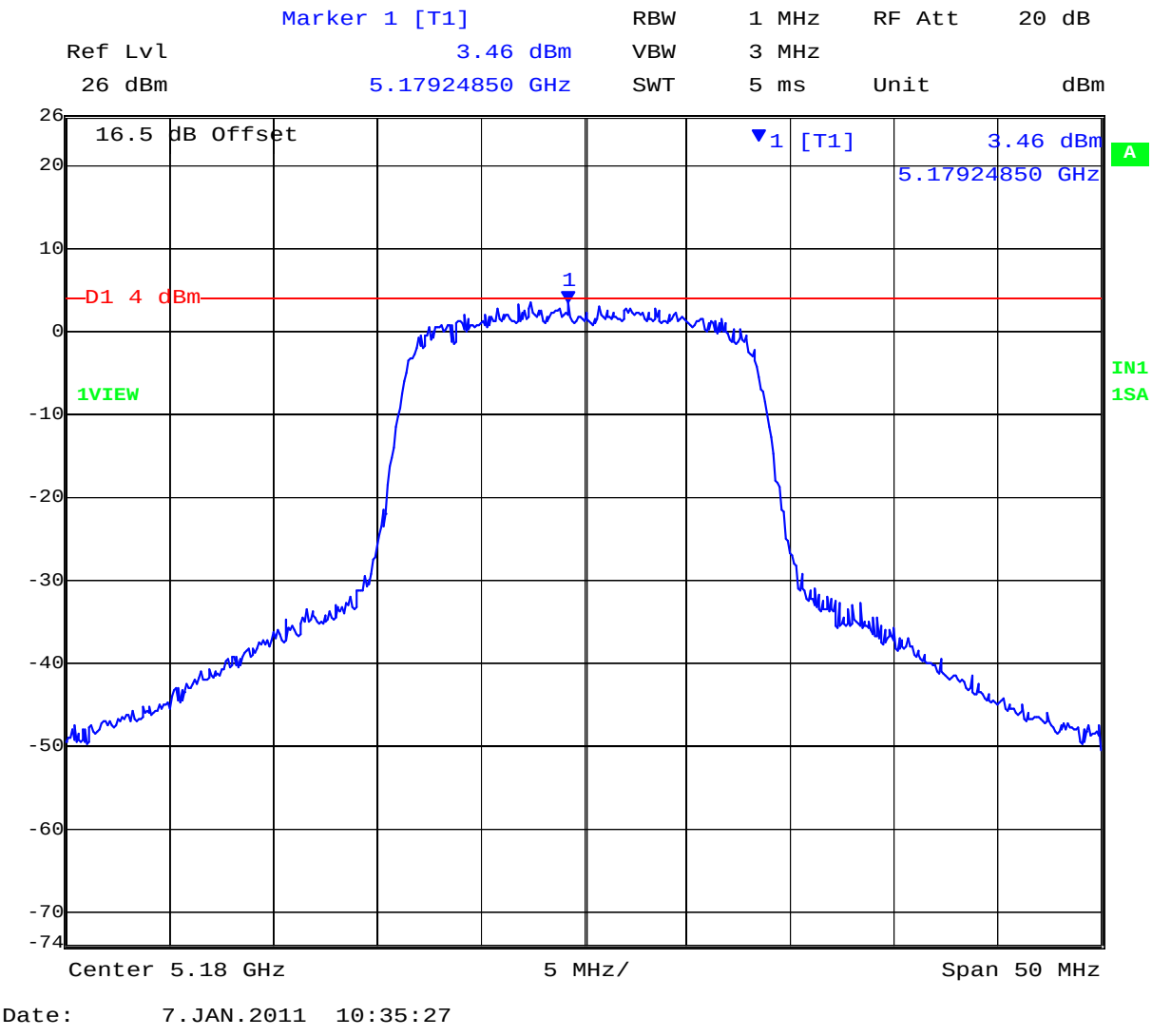
TABLE OF RESULTS – 802.11a

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:						

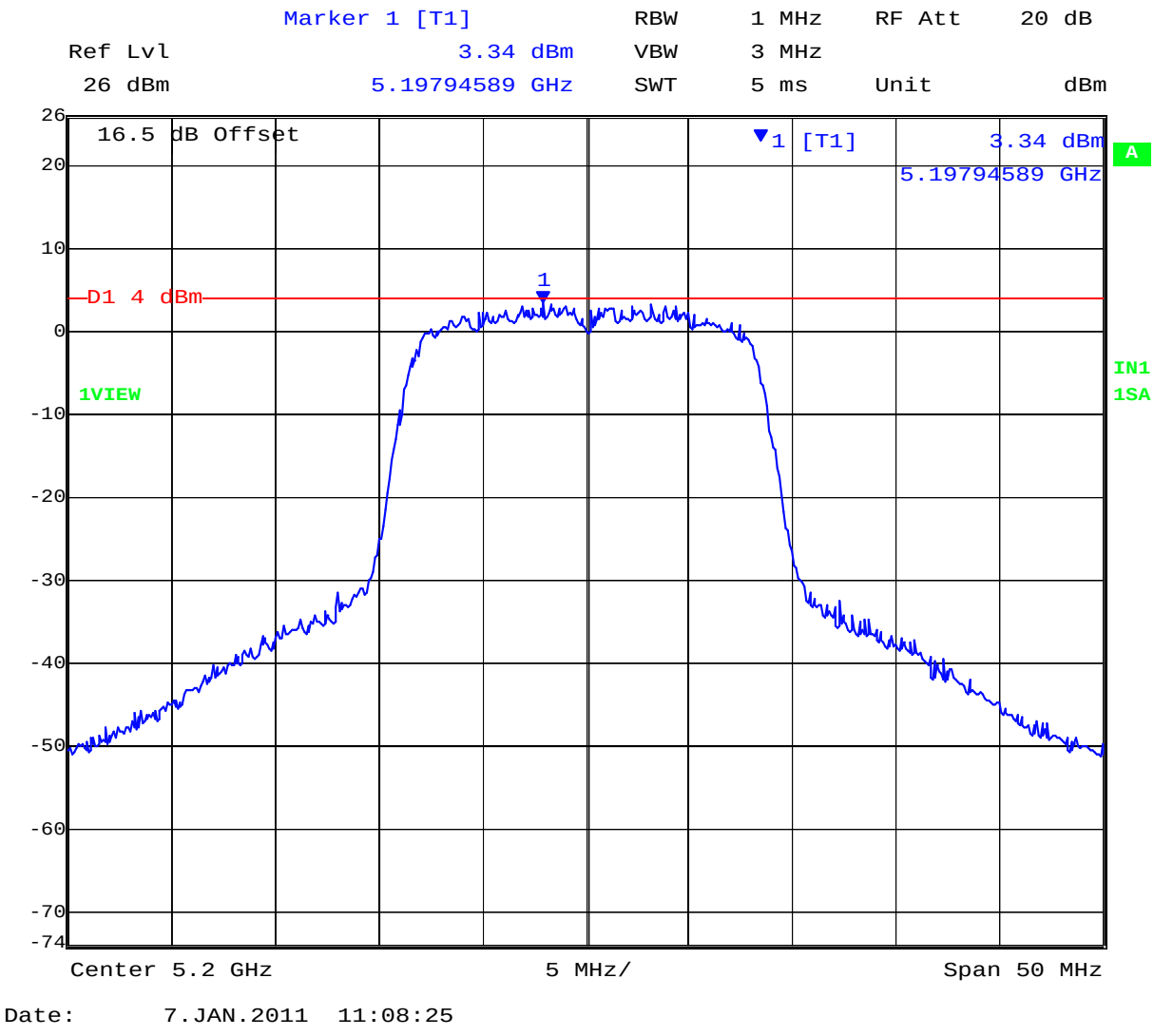
Test Frequency	Measured Peak Power RF Port (dBm)				Total Power (dBm)		Limit	Margin
MHz	a	b	c	d	Combined	Calculated	dBm	dB
5180	3.46				3.46		4.00	-0.54
5200	3.34				3.34		4.00	-0.66
5240	3.40				3.40		4.00	-0.60

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

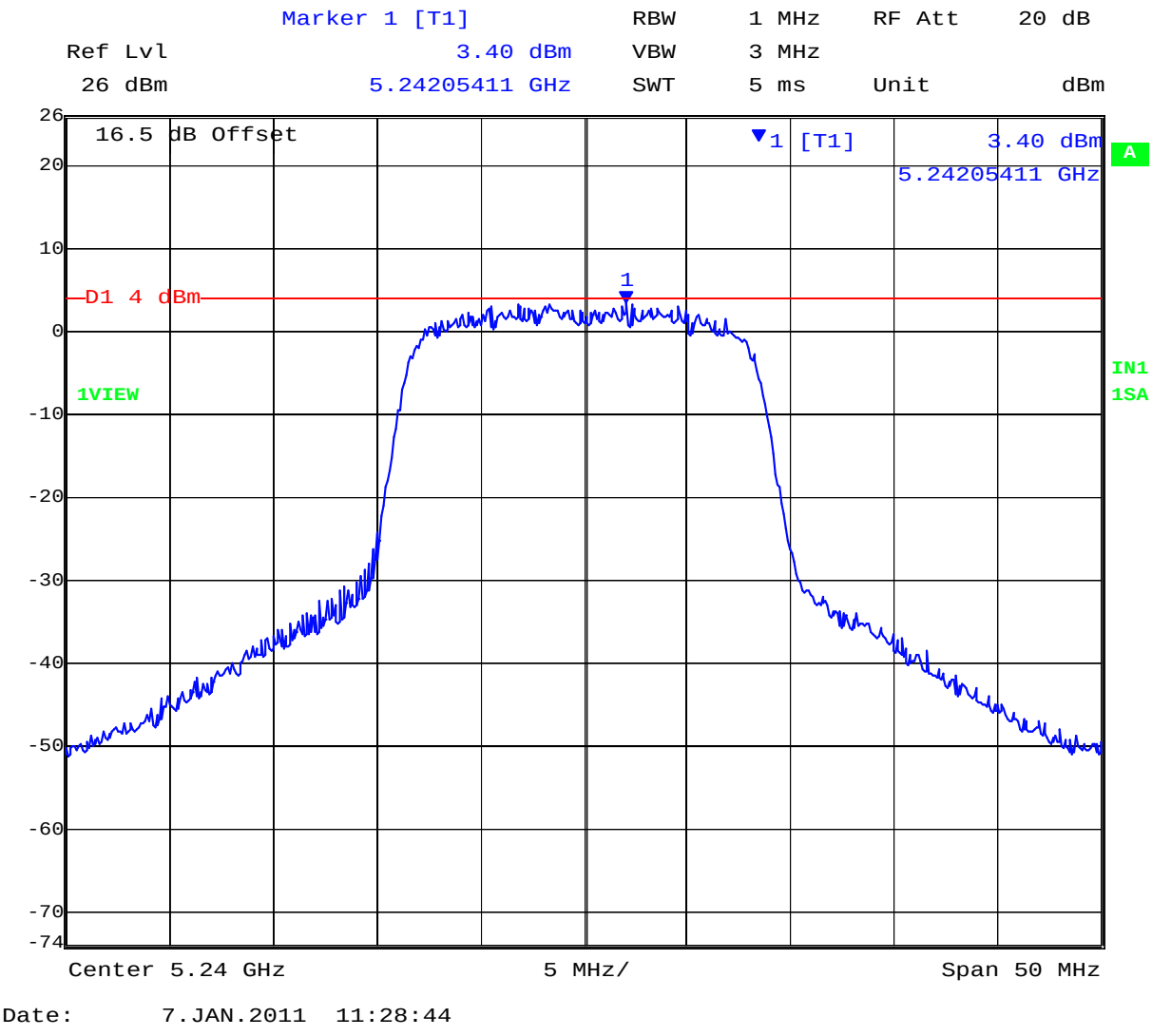


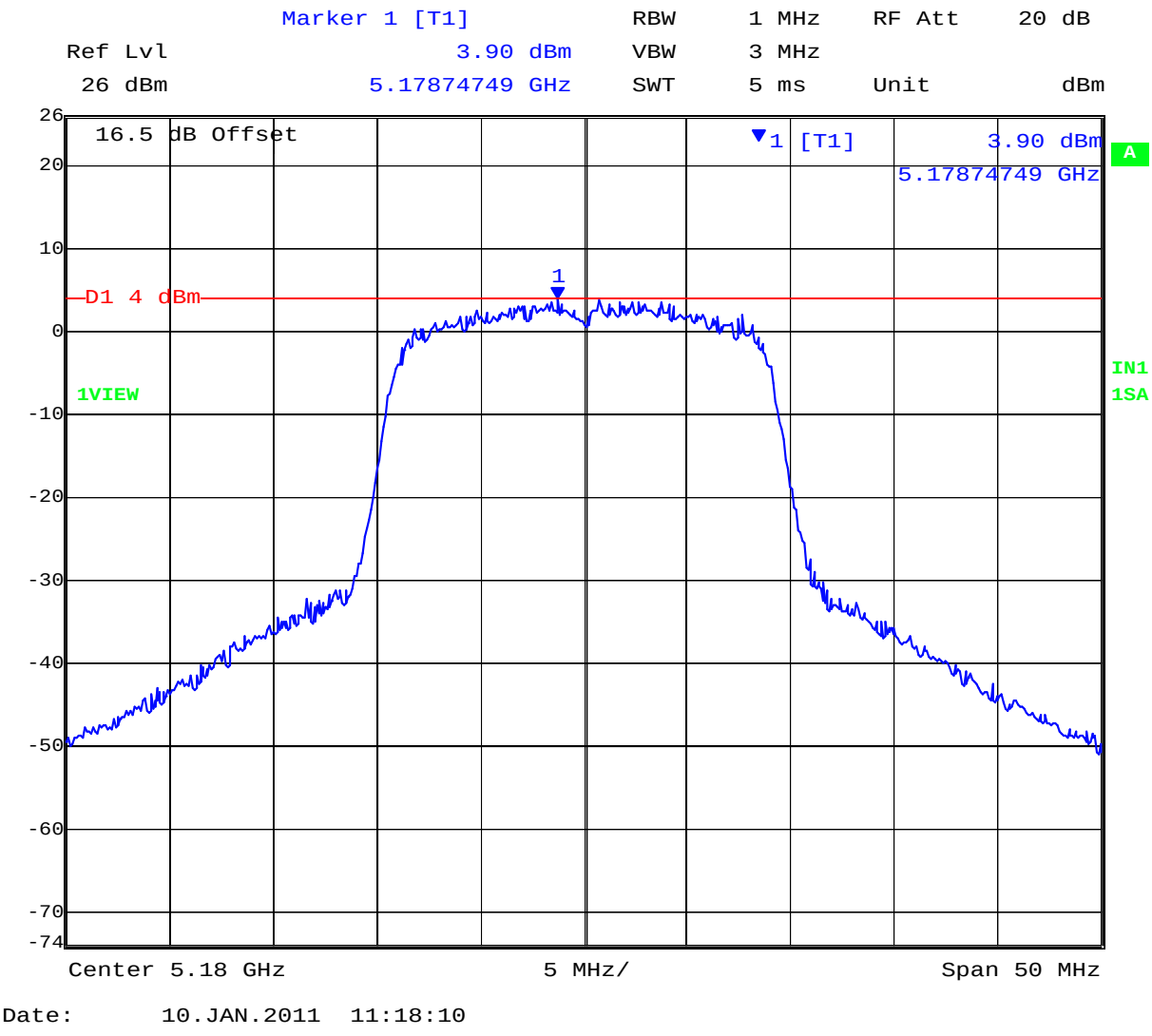
TABLE OF RESULTS – 802.11n HT-20

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:					

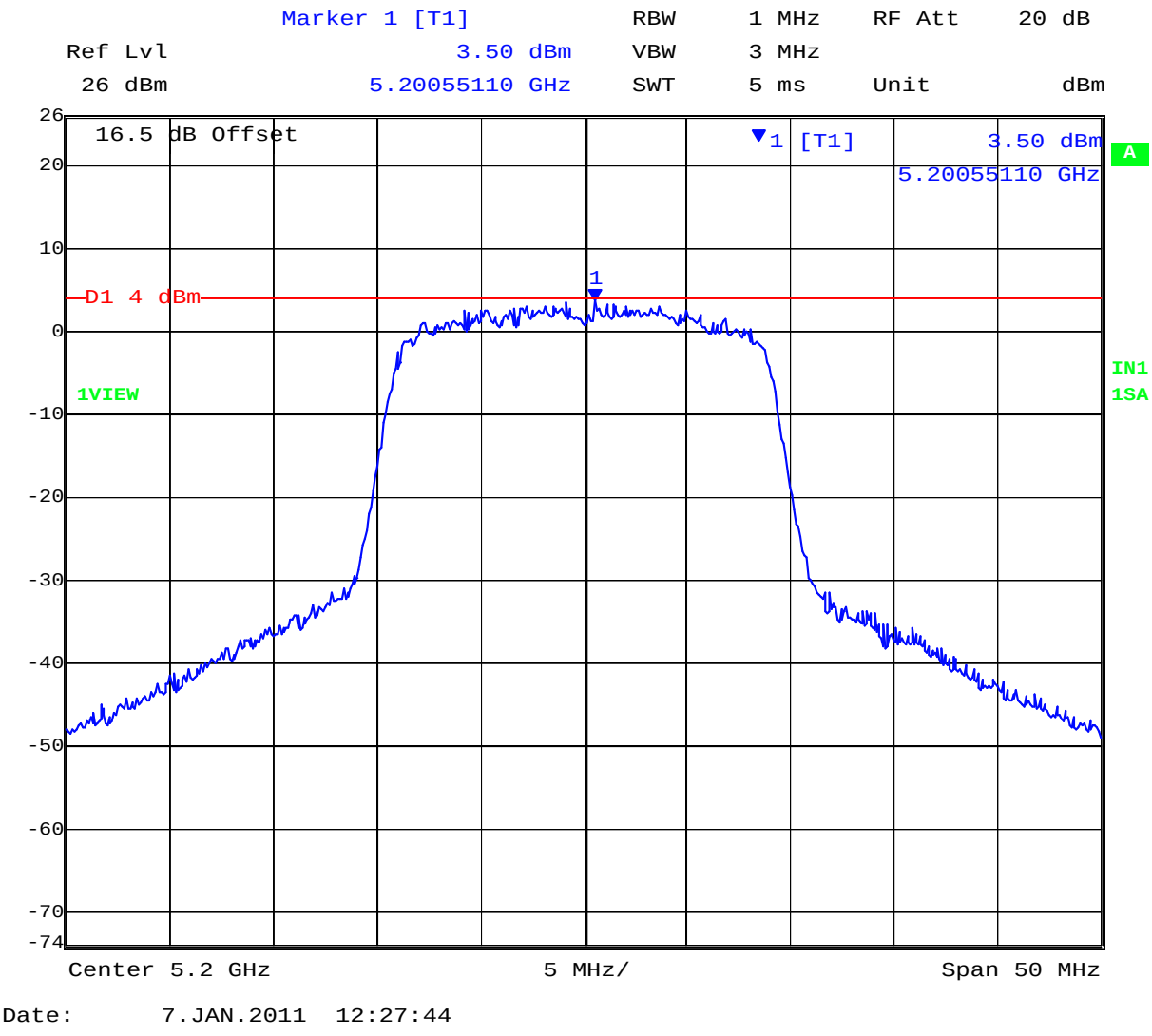
Test Frequency	Measured Peak Power RF Port (dBm)				Total Power (dBm)		Limit	Margin
MHz	**a**	**b**	**c**	**d**	**Combined**	**Calculated**	**dBm**	**dB**
5180	3.90				3.90		4.00	-0.10
5200	3.50				3.50		4.00	-0.50
5240	3.84				3.84		4.00	-0.16

Measurement uncertainty:	±1.33 dB

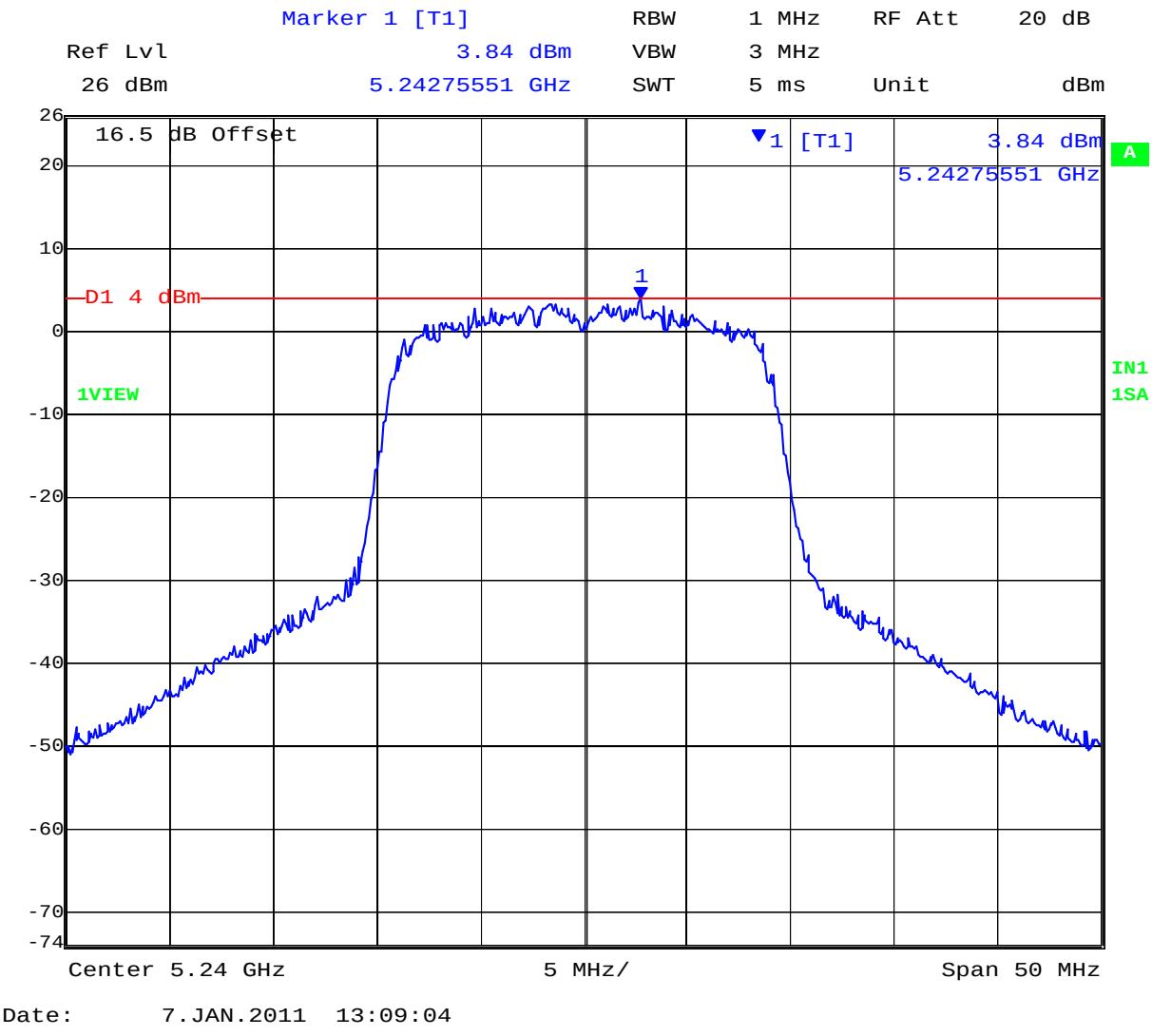
Power Density Ambient 5180MHz 4.20V 15.08dBm



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

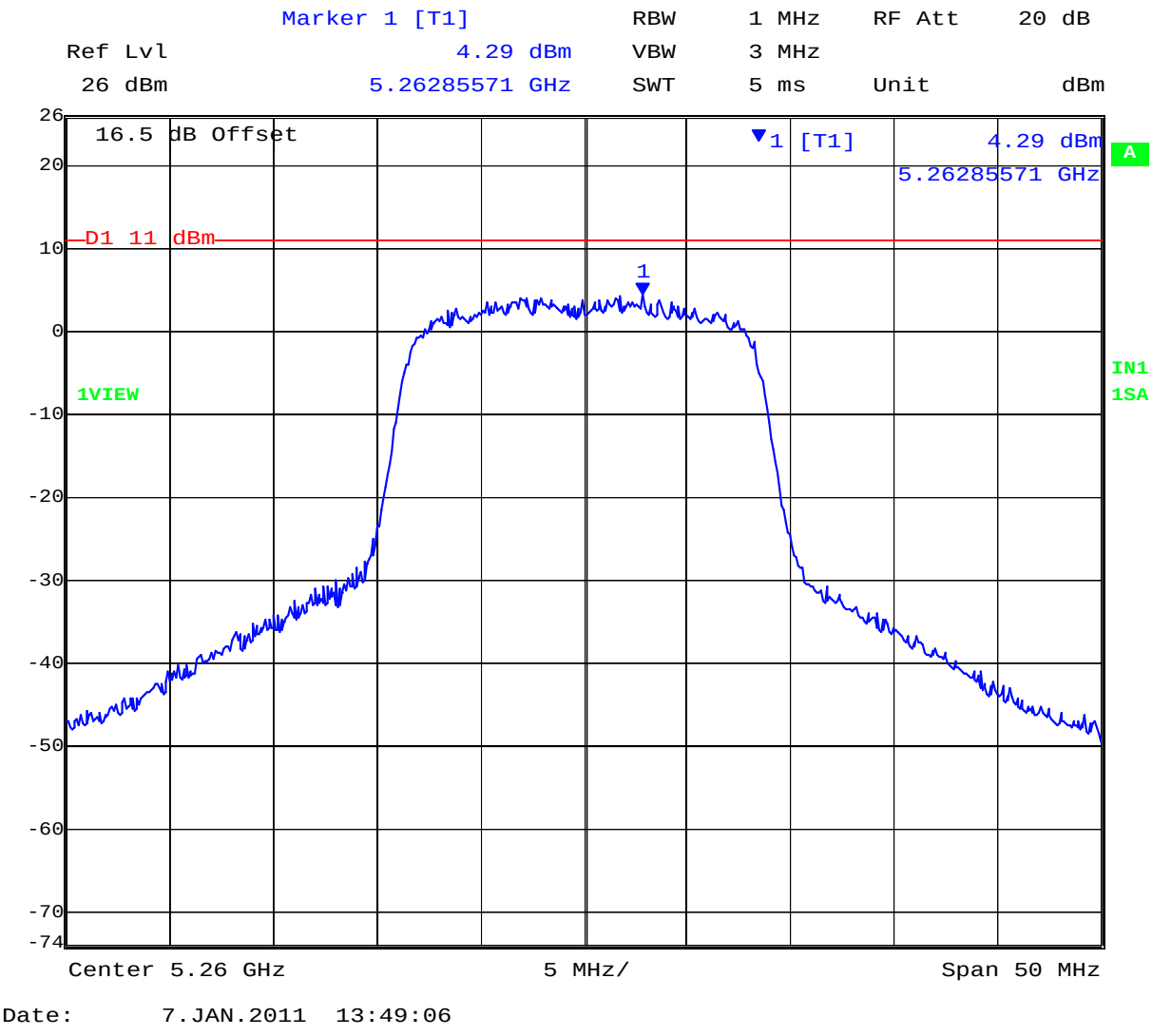
TABLE OF RESULTS – 802.11a

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:					

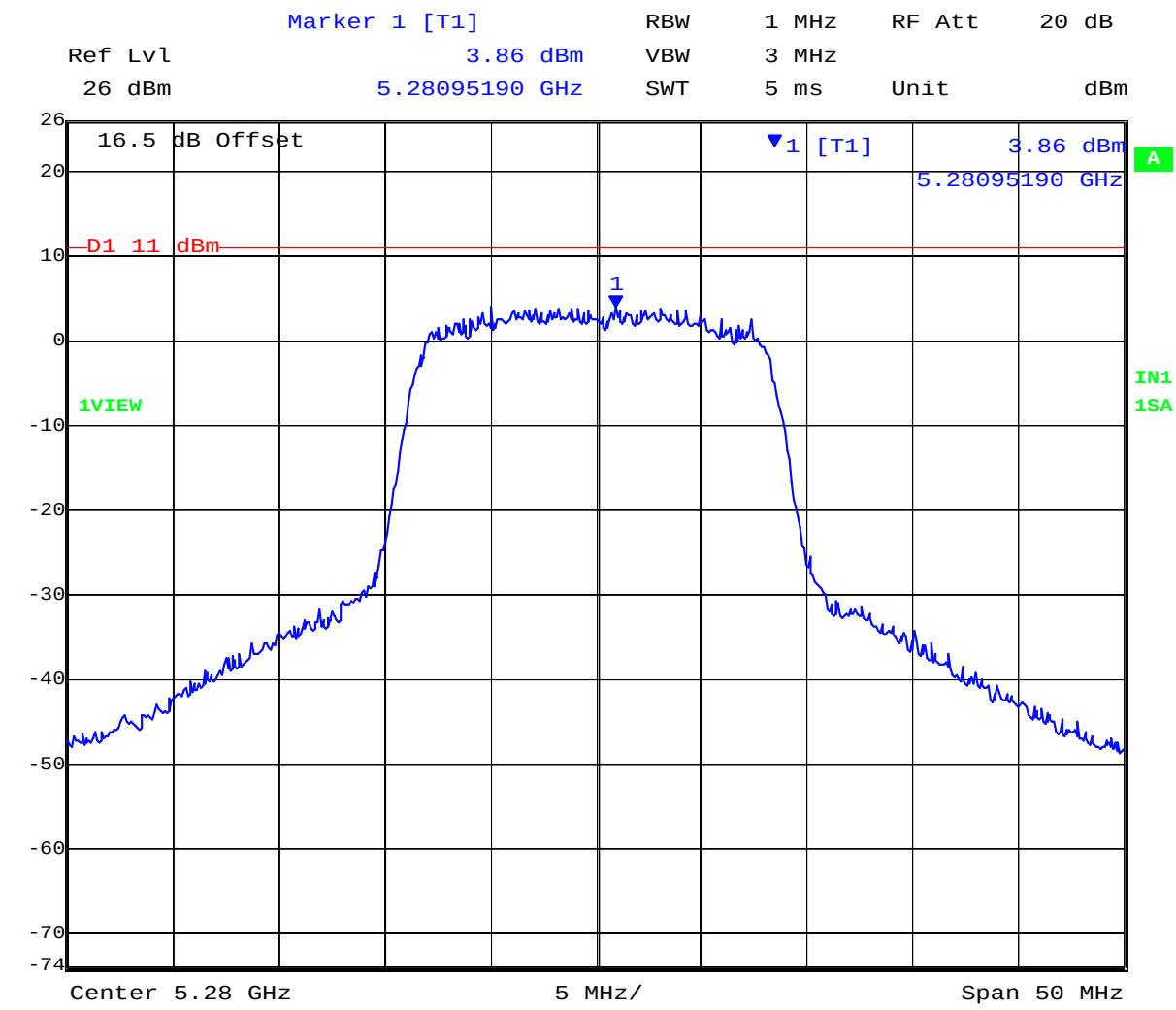
Test Frequency	Measured Peak Power RF Port (dBm)				Total Power (dBm)		Limit	Margin
MHz	**a**	**b**	**c**	**d**	**Combined**	**Calculated**	**dBm**	**dB**
5260	4.29				4.29		11.00	-6.71
5280	3.86				3.86		11.00	-7.14
5320	4.75				4.75		11.00	-6.25

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