166 South Carter, Genoa City, WI 53128

Company:	Cambium Networks
Models Tested:	C050900C032A & C058900P132A
Report Number:	19277
DLS Project:	5946

Industry Canada Spectrum Management and Telecommunications
Radio Standards Specification
RSS-210 Issue 8 December 2010

THE FOLLOWING **MEETS** THE ABOVE TEST SPECIFICATION
(DFS not tested by DLS Electronic Systems Inc.)

Formal Name:	Avenger Station 5.2GHz (or 5.4 GHz or 5.7GHz) Radio
Kind of Equipment:	Point-to-Point or Point-to-Multipoint Digital Transmission Transceiver
Frequency Range:	**5270 to 5330 MHz (5.2 GHz xcvr in this report)** or 5495 to 5705 MHz (5.4 GHz xcvr reported to Industry Canada in RSS-210 Issue 8 report # 19223) or 5740 to 5835 MHz (5.7 GHz xcvr reported to Industry Canada in RSS-210 Issue 8 report # 19077)
Test Configuration:	Stand-alone
Model Number(s):	Integrated model: C058900P132A Connectorized model: C050900C032A
Model(s) Tested:	Integrated model: C058900P132A Connectorized model: C050900C032A
Serial Number(s):	Integrated: 000456C00042 Connectorized: 000456C0000C
Date of Tests:	June, July, & August 2013
Test Conducted For:	Cambium Networks 3800 Golf Road, Suite 360 Rolling Meadows, IL 60008, USA

NOTICE: "This test report relates only to the items tested and must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government". Please see the "Description of Test Sample" page listed inside of this report.

SIGNATURE PAGE

Tested By:

Craig Brandt
Senior Test Engineer

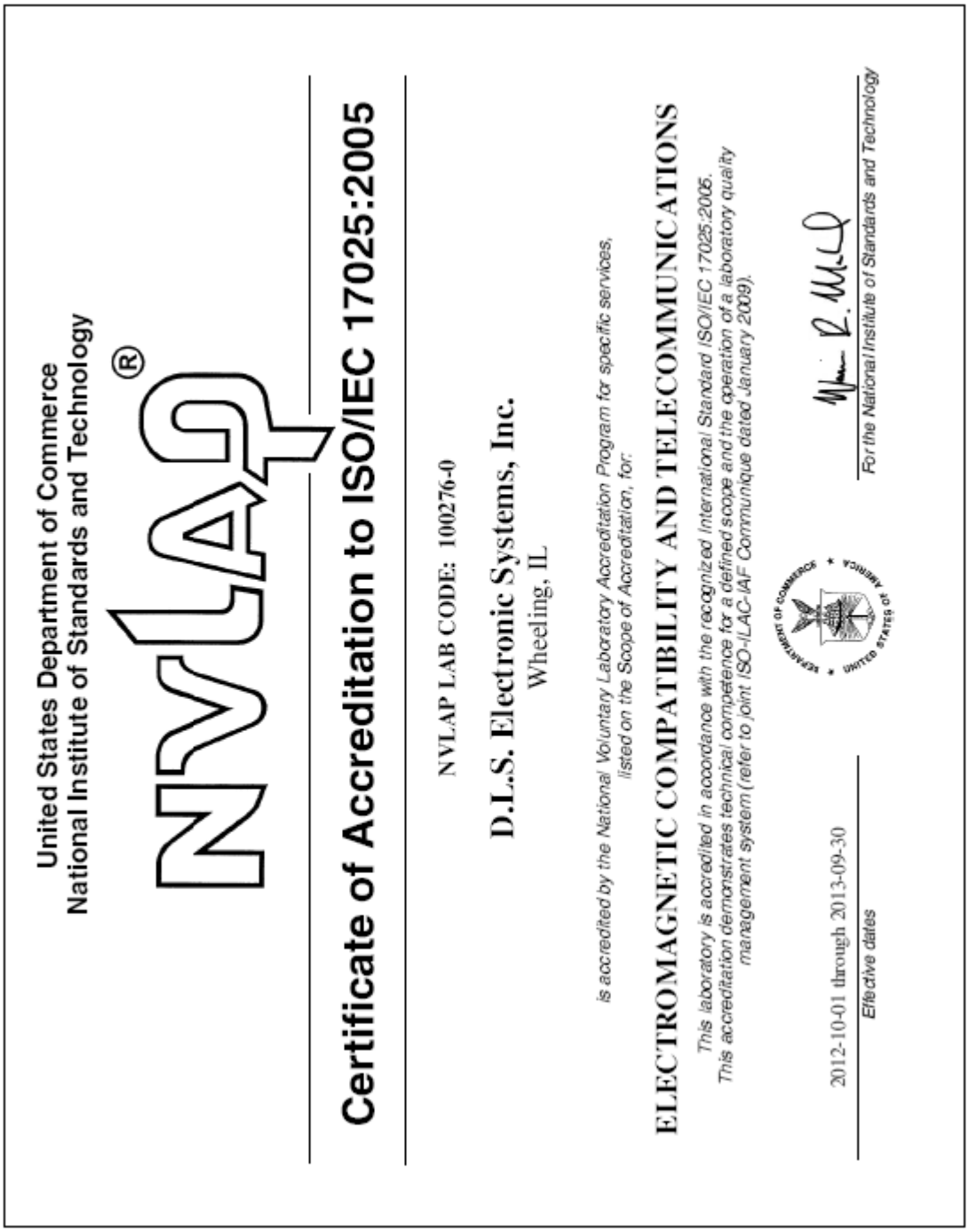
Reviewed By:

William Stumpf
OATS Manager

Approved By:

Brian Mattson
General Manager

Table of Contents



United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 100276-0

D.L.S. Electronic Systems, Inc.
Wheeling, IL

is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

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

2012-10-01 through 2013-09-30
Effective dates

For the National Institute of Standards and Technology

NVLAP-01C (REV. 2009-01-28)

1.0 Summary of Test Report

Technical Requirements Tested:

Section	Description	Procedure	Note	Compliant?
Informative	Duty Cycle	FCC KDB 789033 D01 General UNII Test Procedures v01r03 Section B(2)(b)	1	NA
Informative	Emission Bandwidth – 26 dB bandwidth	FCC KDB 789033 D01 General UNII Test Procedures v01r03 Section C	1	NA
Informative	99 Percent Occupied Bandwidth	FCC KDB 789033 D01 General UNII Test Procedures v01r03 Section D	1	NA
15.407(a)(2) **RSS-210, A9.2(2)**	Maximum Conducted Output Power	FCC KDB 789033 D01 General UNII Test Procedures v01r03 Section E(3)(a)	1	Yes
15.407(a)(2) **RSS-210, A9.2(2)**	Peak Power Spectral Density - Conducted	FCC KDB 789033 D01 General UNII Test Procedures v01r03 Sections F & E(2)(b)	1	Yes
15.407(a)(6) **RSS-210, A9.4(2)**	Peak Excursion - Conducted	FCC KDB 789033 D01 General UNII Test Procedures v01r03 Section G	1	Yes
15.407(b)(3) **RSS-210, A9.2(2)**	Unwanted Emission Levels – Radiated Band-Edge with integral antenna	FCC KDB 789033 D01 General UNII Test Procedures v01r03 Sections H(1), H(2), H(3), H(5), & H(6)	2	Yes
15.407(b)(3) & 15.407(b)(6) **RSS-210, A9.2(2)**	Unwanted Emission Levels – Radiated with integral antenna	FCC KDB 789033 D01 General UNII Test Procedures v01r03 Sections H(1), H(2), H(3), H(4), H(5), & H(6)	2	Yes
15.407(b)6) & 15.207(a) **RSS-Gen 7.2.4**	AC Line Conducted Emissions	ANSI C63.4-2009		Yes
15.407(h)(2) **RSS-210 A9.3**	Dynamic Frequency Selection (DFS)	Not tested by DLS		NA

Note 1: RF Conducted emission measurement.
Note 2: Radiated emission measurement.

1.0 Summary of Test Report - continued

It was determined that the Cambium Networks Avenger Station 5.2GHz Radio, Integrated model: C058900C00P132A, and Connectorized model: C050900C032A, complies with the requirements of Industry Canada RSS-210 Issue 8, Annex 9. The data demonstrating IC compliance of the 5.4GHz and 5.7GHz radio is found in D.L.S. Electronics, Inc. Reports #19223 and #19077.

2.0 Introduction

In June, July, & August 2013 the Avenger Station 5.2GHz Radio, Models C058900C00P132A & C050900C032A, as provided from Cambium Networks, was tested to the requirements of Industry Canada RSS-210 Issue 8, Annex 9. To meet these requirements, the procedures contained within this report were performed by personnel of D.L.S Electronic Systems, Inc.

3.0 Test Facilities

D.L.S. Electronic Systems, Inc. is a full service EMC/Safety Testing Laboratory accredited to ISO 17025. NVLAP Certificate and Scope can be viewed at http://www.dlsemc.com/certificate. Our facilities are registered with the FCC, Industry Canada, and VCCI.

Wisconsin Test Facility:
D.L.S. Electronic Systems, Inc.
166 S. Carter Street
Genoa City, Wisconsin 53128

Wheeling Test Facility:
D.L.S. Electronic Systems, Inc.
1250 Peterson Drive
Wheeling, IL 60090

4.0 Description of Test Sample

Description:

Point-to-Point or Point-to-Multipoint 5.2 GHz (or 5.4 GHz or 5.7GHz) 802.11 fixed outdoor transceiver with either 20 MHz or 40 MHz channel bandwidth. OFDM modulation. This is a software defined radio.

Type of Equipment / Frequency Range:

Stand-Alone / **5270 to 5330 MHz (20 MHz bandwidth) (in this report)**
5280 to 5320 MHz (40 MHz bandwidth) (in this report)

5495 to 5705 MHz (5.4 GHz xcvr) reported to IC in report # 19223
5740 to 5835 MHz (5.7 GHz xcvr) reported to IC in report # 19077

Physical Dimensions of Equipment Under Test:

Length: 4 in. Width: 2 in. Height: 10 in.

Power Source:

29 VDC (Power Over Ethernet to Radio)
120 Vac, 60 Hz using Phihong power supply model: 15R (for AC Line Conducted)

Internal Frequencies:

940 - 1000 kHz (Switching Power Supply Frequency)
40 MHz, 25 MHz, 4 MHz

Transmit / Receive Frequencies Used For Test Purpose:

20 MHz Channel Bandwidth:	Low channel: 5270 MHz, Middle channel: 5300 MHz, High channel: 5330 MHz
40 MHz Channel Bandwidth:	Low channel: 5280 MHz, Middle channel: 5310 MHz, High channel: 5320 MHz

Type of Modulation(s):

OFDM: 802.11n: MCS15

Description of Circuit Board(s) / Part Number:

SM PC Board	84009653001
Antenna PC Board	P005135

5.0 Test Equipment

A list of the equipment used can be found in the table below. All primary equipment was calibrated against known reference standards with a verified traceable path to NIST.

D.L.S. Wisconsin

Description	Manufacturer	Model Number	Serial Number	Frequency Range	Cal Dates	Cal Due Dates
Receiver	Rohde & Schwarz	ESI 40	837808/005	20 Hz – 40 GHz	7-23-13	7-23-14
LISN	Solar	9252-50-R-24-BNC	961019	9 kHz – 30 MHz	5-24-13	5-24-14
Filter- High-Pass	SOLAR	7930-120	090702	120 kHz – 30 MHz	1-7-13	1-7-14
Limiter	Electro-Metrics	EM-7600	706	9 kHz – 30 MHz	1-7-13	1-7-14
Preamp	Miteq	AMF-7D-01001800-22-10P	1809602	1GHz-18GHz	5-29-13	5-29-14
Horn Antenna	EMCO	3115	9502-4451	1-18GHz	3-18-13	3-18-15
High Pass Filter	Planar	HP8G-7G8-CD-SFF	PF1226/0728	7.5-18 GHz	8-14-13	8-14-14
Preamp	Miteq	AMF-8B-180265-40-10P-H/S	438727	18GHz-26GHz	8-12-13	8-12-14
Horn Antenna	ETS Lindgren	3116	00062917	18 – 40GHz	10-4-11	9-23-13
High Pass Filter	Planar	CL22500-9000-CD-SS	PF1229/0728	15-40 GHz	8-14-13	8-14-14
20 dB attenuator	Aeroflex/weinschel	75A-20-12	1071	DC – 40 GHz	8-14-13	8-14-14
10 dB attenuator	narda	4768-10	0702	DC – 40 GHz	8-13-13	8-13-14
Receiver	Rohde & Schwarz	ESI 26	837491/010	20 Hz – 26 GHz	1-3-13	1-3-14
Preamplifier	Rohde & Schwarz	TS-PR10	032001/005	9 kHz – 1 GHz	1-10-13	1-10-14
Antenna	EMCO	3104C	97014785	20 MHz – 200 MHz	8-22-12	8-22-14
Antenna	EMCO	3146	97024895	200 MHz – 1 GHz	9-6-12	9-6-14
Power Meter	Anritsu	ML2487A	6K00002069	N/A	3-8-13	3-8-14
Thermal Power Sensor	Anritsu	MA24002A	1204359	10MHz-18GHz	3-3-13	3-3-14

6.0 Test Arrangements

RF Conducted Emissions Measurement Arrangement:

All RF conducted emission measurements were performed at D.L.S. Electronic Systems, Inc. and set up according to FCC Publication KDB 789033 D01 General UNII test Procedures v01r03, unless otherwise noted. Description of procedures and measurements can be found in Appendix B – Measurement Data. See Appendix A for photos of the test set up.

Radiated Emissions Measurement Arrangement:

All radiated emission measurements were performed at D.L.S. Electronic Systems, Inc. and set up according to ANSI C63.4-2009, unless otherwise noted. Description of procedures and measurements can be found in Appendix B – Measurement Data. See Appendix A for photos of the test set up.

Unless otherwise noted, the bandwidth of the measuring receiver / analyzer used during testing is shown below.

Frequency Range	Bandwidth (-6 dB)
10 to 150 kHz	200 Hz
150 kHz to 30 MHz	9 kHz
30 MHz to 1 GHz	120 kHz
Above 1 GHz	1 MHz

7.0 Test Conditions

Normal Test Conditions:

Temperature and Humidity:

67°F at 56% RH (or noted on the test data)

Supply Voltage:

29 VDC (Power Over Ethernet to Radio)
120 Vac, 60 Hz using Phihong power supply for AC Line Conducted

8.0 Modifications Made To EUT For Compliance

No modifications were made to the EUT at the time of test.

9.0 Additional Descriptions

Testing was performed at low, mid, and high channels over 2 modulation bandwidths (20MHz & 40MHz). The antenna ports were tested (Channel 0 & 1). Worst case emissions were recorded. AC line conducted tested in transmit mode.

Emission Designators: 20M0x1D, 40M0x1D

Power Settings noted on the test data.

Please note that Cambium Networks requested a new model number for the Avenger Station 5.2GHz (or 5.4GHz or 5.7GHz) Radio on August 22, 2013. The model number for the 5.7GHz integrated radio was reported as C050900P032A in DLS Report # 19077. This number has been updated to C058900P132A. The same physical units were used to test the radio at all frequencies reported to Industry Canada.

10.0 Results

Measurements were performed in accordance with FCC Publication KDB 789033 D01 General UNII test Procedures v01r03 and ANSI C63.4-2009. Graphical and tabular data can be found in Appendix B at the end of this report.

11.0 Conclusion

Dynamic Frequency Selection (DFS) testing was not performed by DLS Electronic Systems,Inc. Otherwise, the Avenger Station 5.2GHz Radio, Models C058900P132A & C050900C032A, as provided from Cambium Networks tested in June, July, & August 2013 **meets** the requirements of Industry Canada RSS-210 Issue 8.

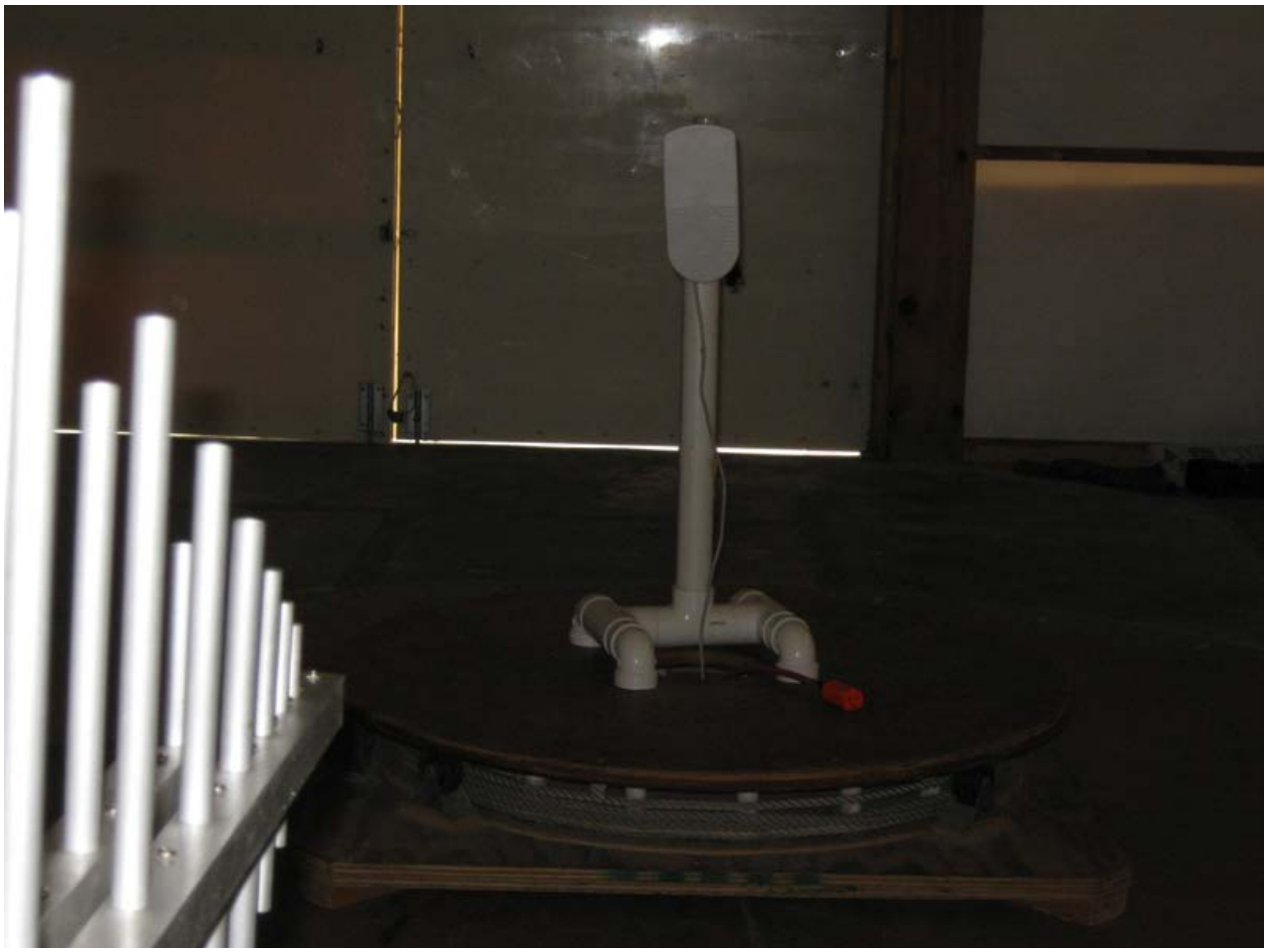
Note: FCC limits & procedures were used to show compliance with Industry Canada regulations.

Appendix A – Test Photos

Photo Information and Test Setup:

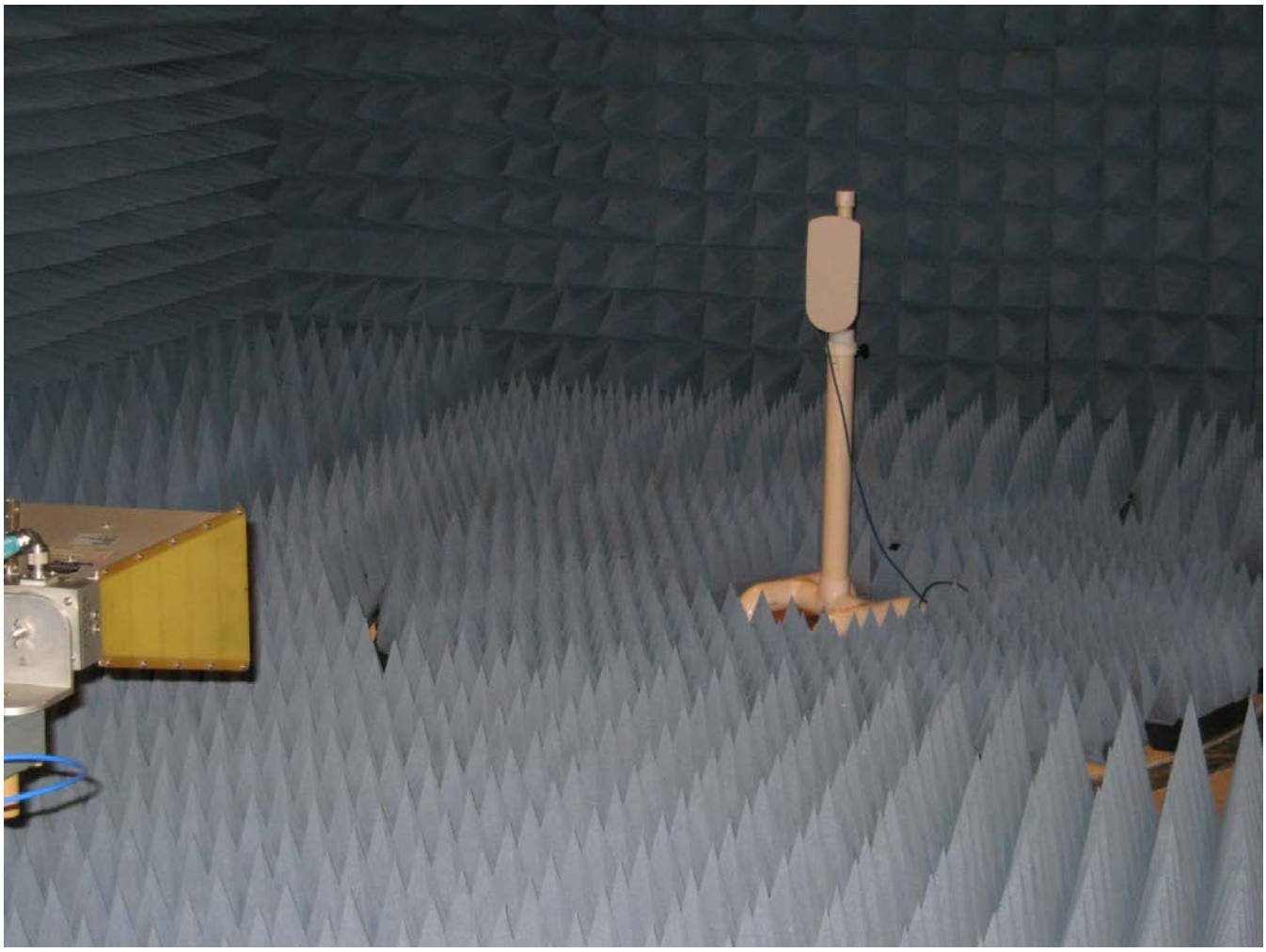
Avenger Station 5.2GHz Radio, Model C058900P132A or C050900C032A
Unshielded Ethernet Cable - 20 meters long

Radiated - Below 1 GHz



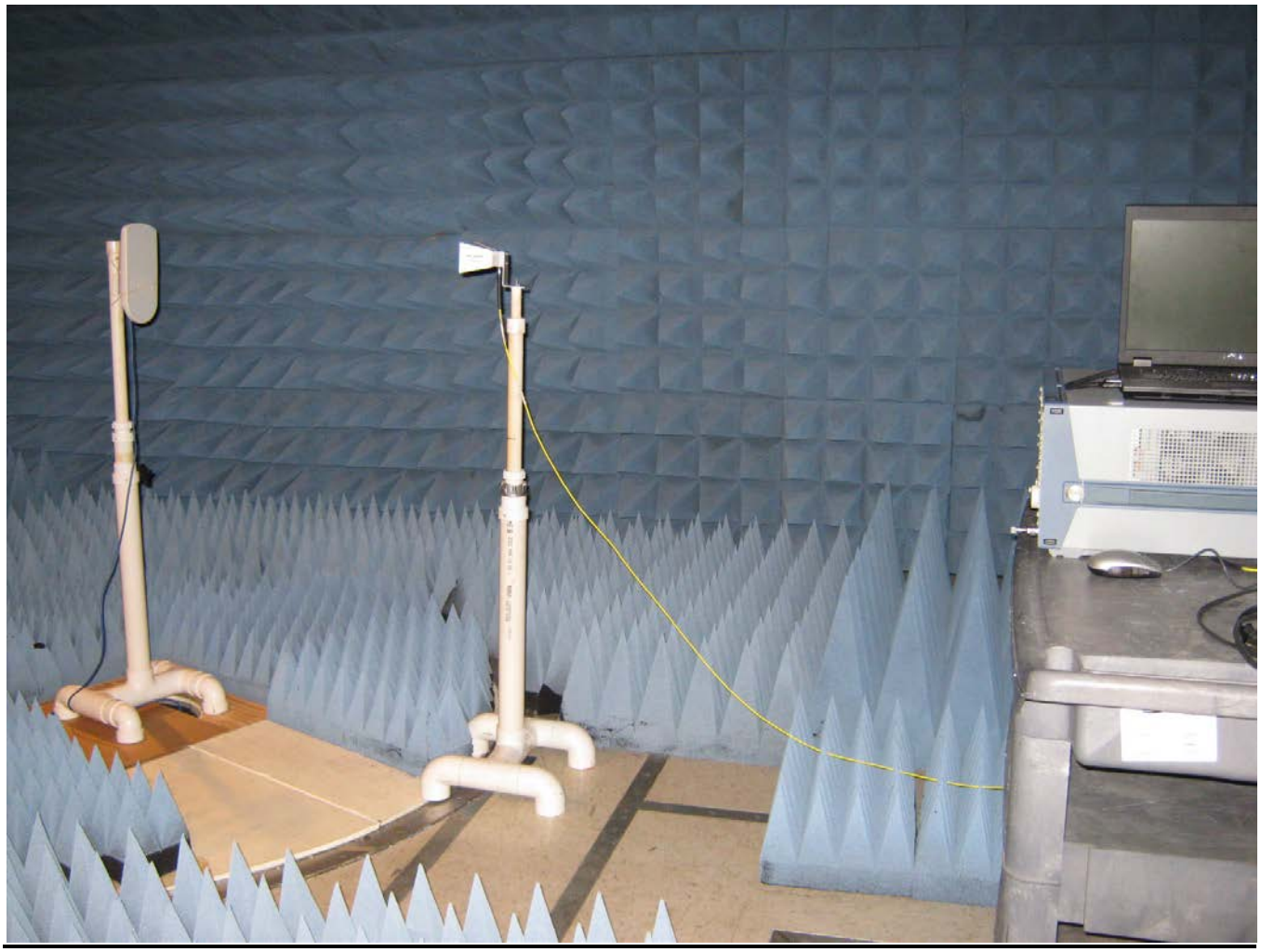
Appendix A – Test Photos

Radiated - 1 to 18 GHz



Appendix A – Test Photos

Radiated - Above 18 GHz

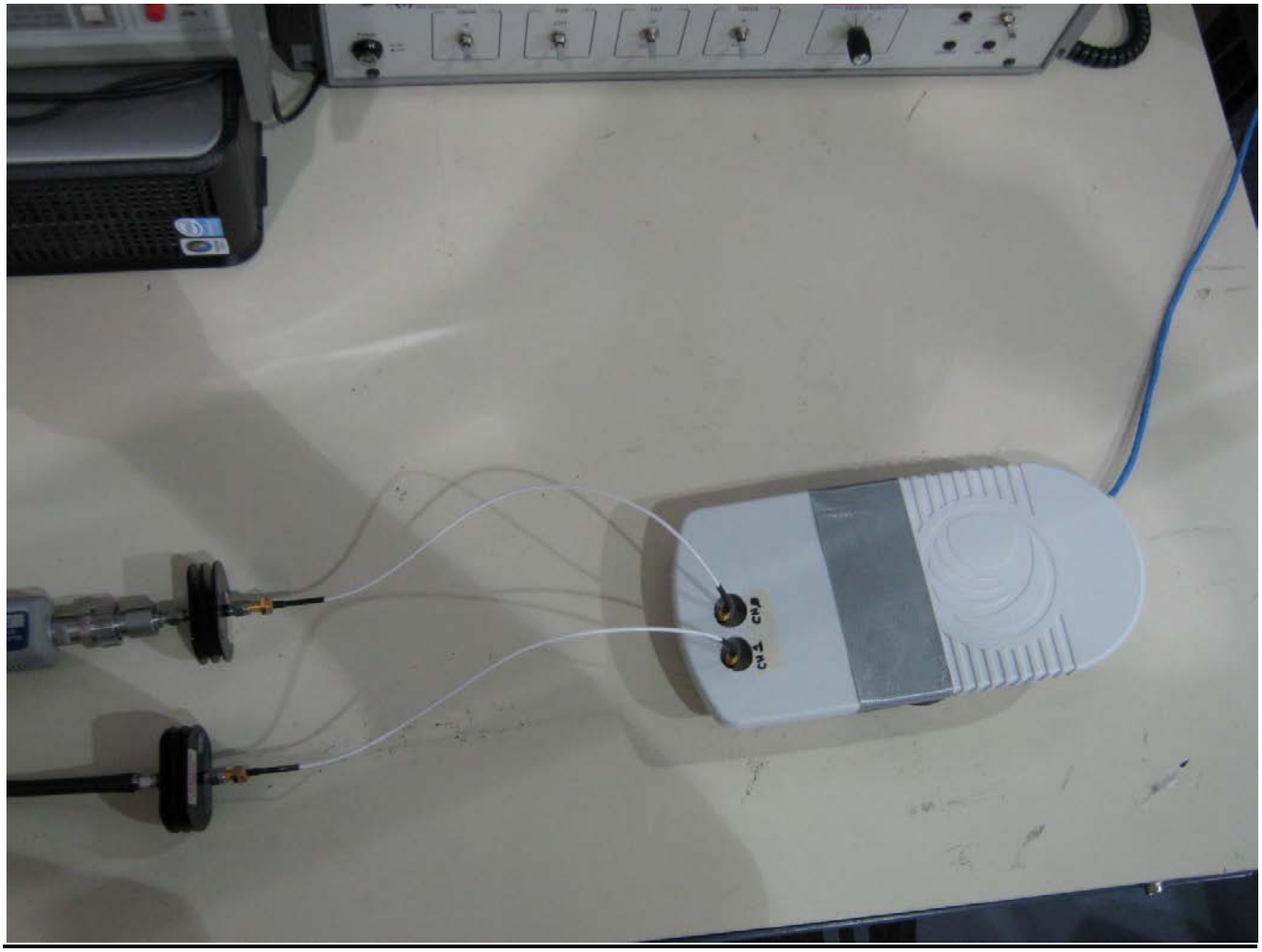


Appendix A – Test Photos

RF Conducted

Appendix A – Test Photos

RF Conducted - output power



Appendix A – Test Photos

AC Line Conducted

Appendix B – Measurement Data

B1.0 Duty Cycle of Test Unit

Rule Part: FCC Section 15.35(c)
RSS-Gen Section 4.5

Test Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r03 Section B(2)(b)

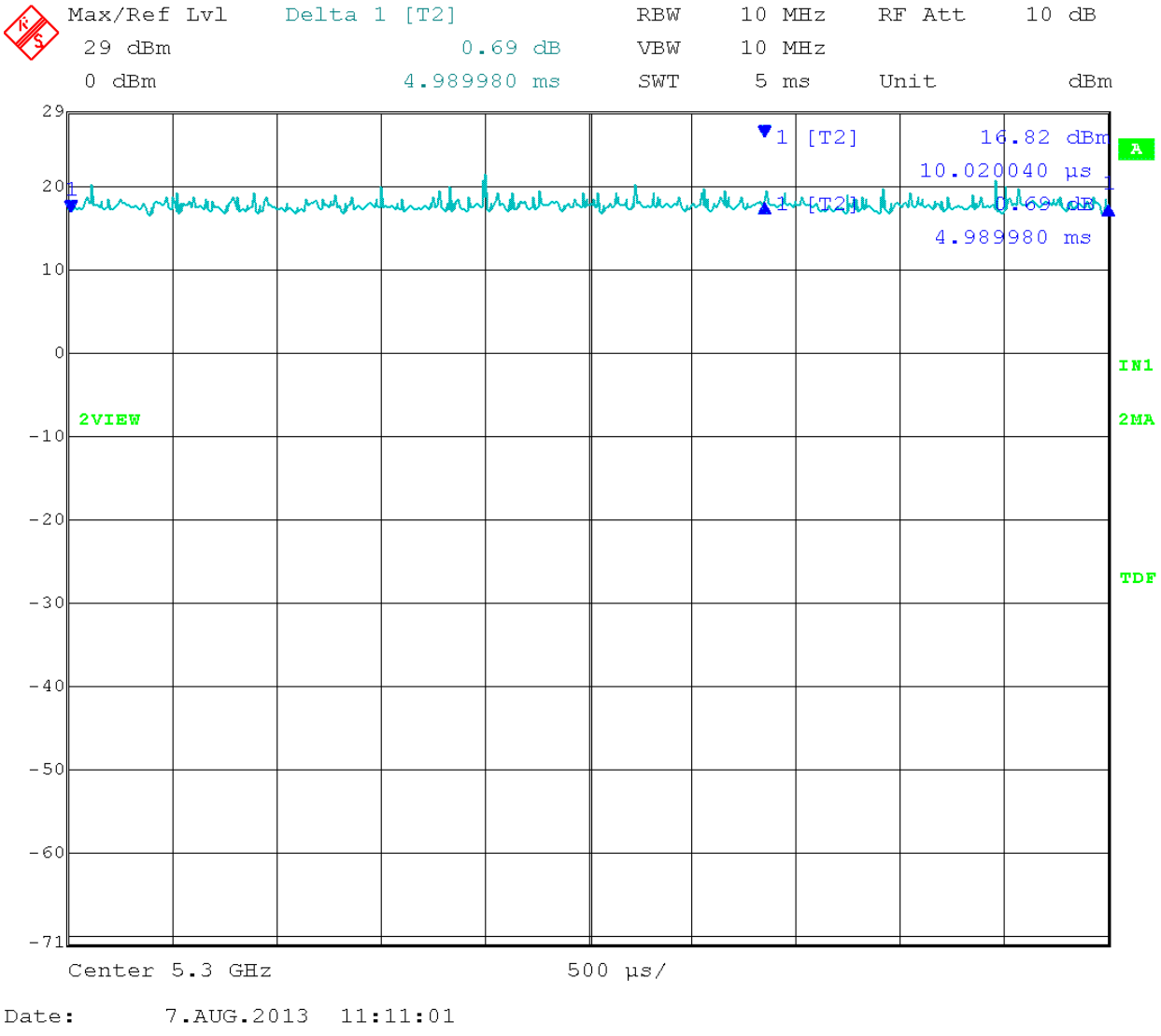
Limits: Informative

Results: EUT is continuously transmitting (duty cycle = 100%).

Sample Equations: None

Notes: No Duty cycle correction factor was applied to measurements for this device.

Test Date: 8-7-2013
Company: Cambium Networks
EUT: Avenger SM 5.2GHz OFD
Test: Duty Cycle during testing
Operator: Jim O
20 MHz channel bandwidth; OFDM
Comment: FCC UNII operating under 15.407 – OET 4/8/2013
B)2)b) Duty Cycle measurement: zero-span method - Page 3
EBW = 21.28 MHz Detector = PK
RBW = 10 MHz VBW = 10 MHz
Span = 0 Hz SWT = 5 ms
Mid Channel: Transmit = 5.300GHz 20MHz BW
Total on Time = Duration of one pulse = 4.989980 ms
X = 4.989980/ 5.0 =1
Duty cycle factor x = 1.00



Appendix B – Measurement Data

B2.0 Emission Bandwidth – 26 dB bandwidth – conducted

Rule Section: Informative

Test Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r03 – *Guidance for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E*

Section C – Emission bandwidth

Description: RBW = approximately 1% of EBW
VBW > RBW
Detector = Peak
Trace mode = max hold

Measure the maximum width of the emission between the lower and upper frequencies that measure 26 dB below the maximum level of the in-band emission.

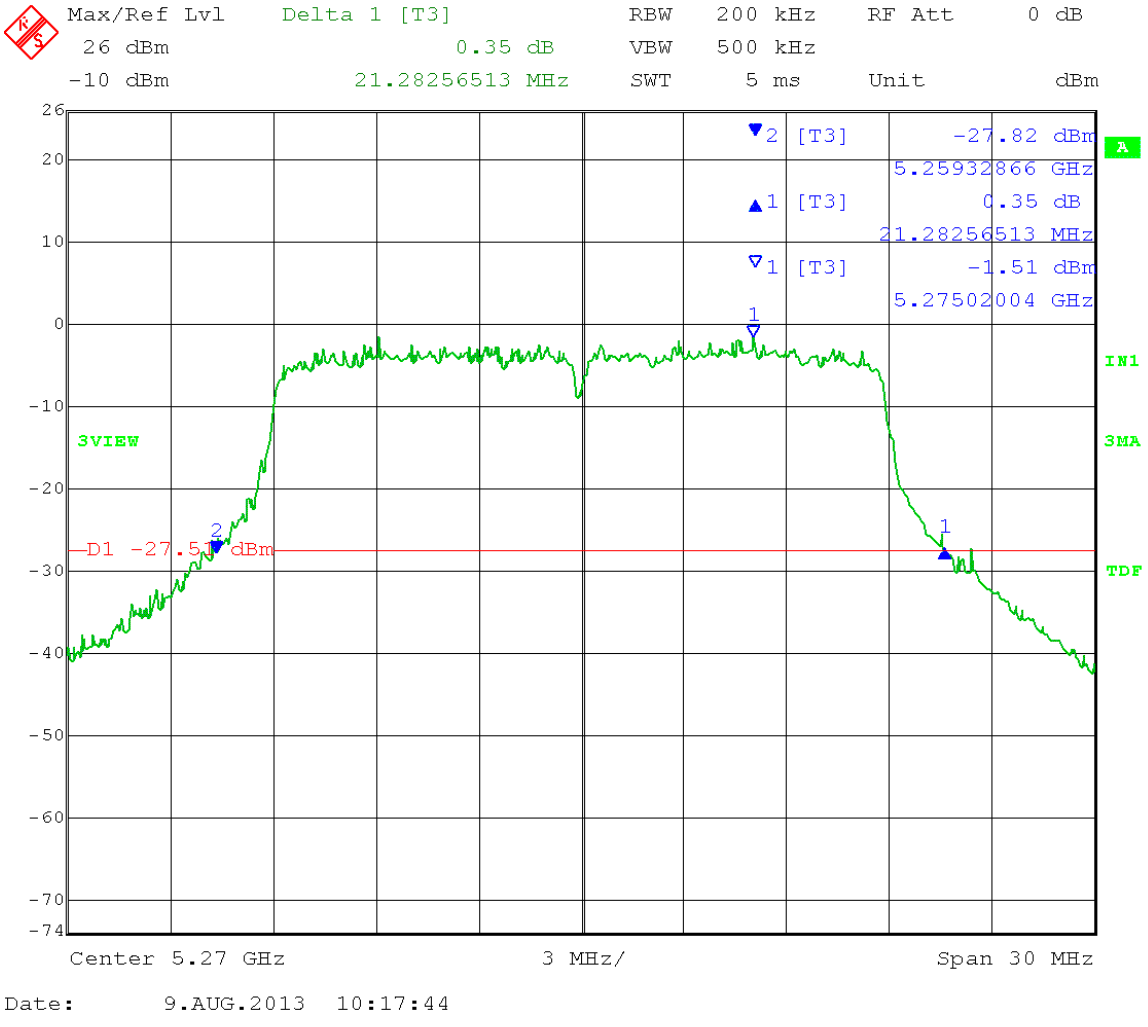
Limit: Informative

Notes: Measurements were taken for MCS15 OFDM modulation at the lowest, middle, and highest channels of operation. EUT was set to transmit continuously with 100% duty cycle.

Test Date: 7-26-2013
Company: Cambium Networks
EUT: Avenger Station 5.2GHz OFDM
Test: Emission Bandwidth (26 dB) - Conducted
Operator: Lillian Li
Comment: FCC UNII operating under 15.407 – OET 4/8/2013
C) Emission bandwidth: Page 3
RBW = 200 kHz VBW = 500 kHz
Low Channel: Transmit = 5.270 GHz 20MHz BW
Output power setting: 8

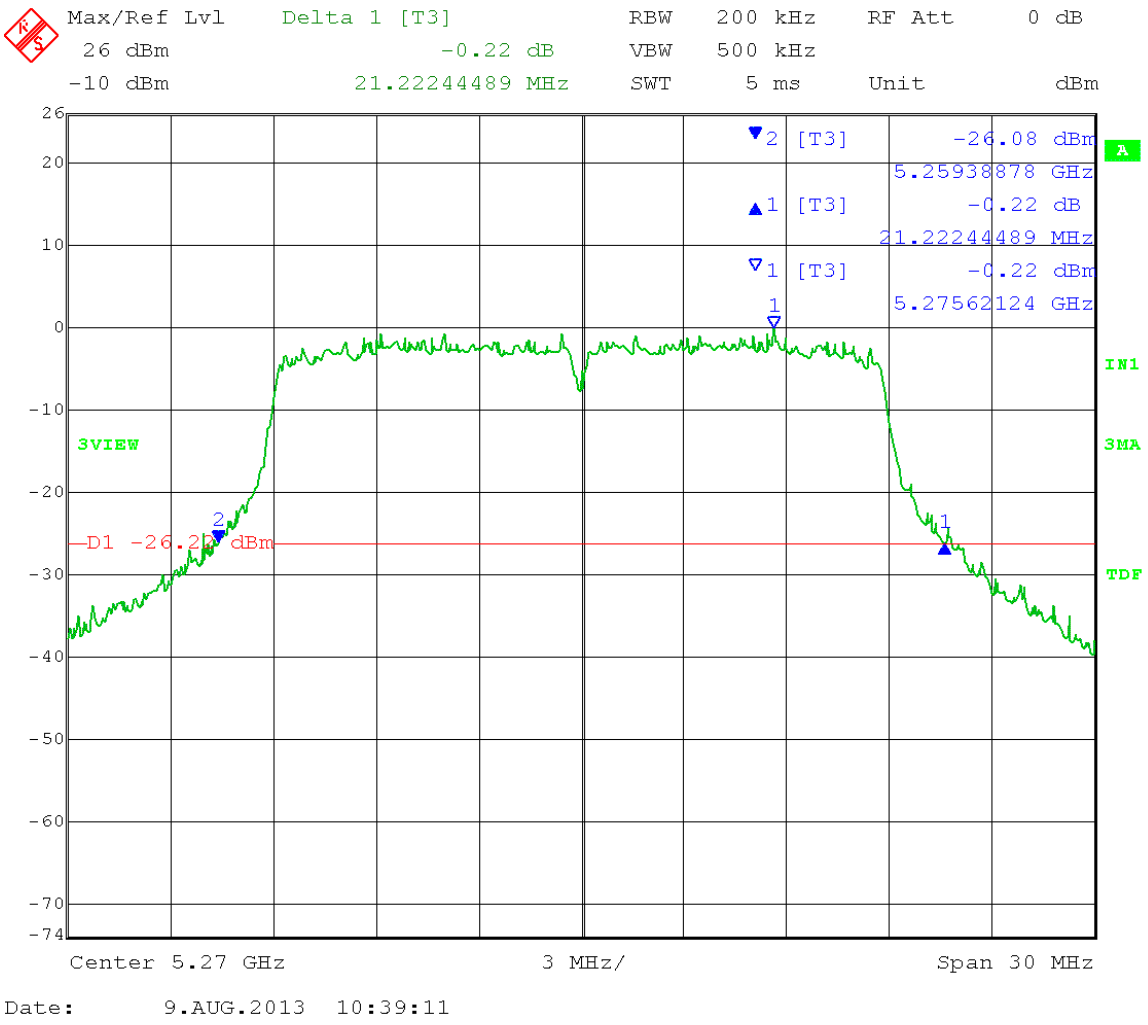
Channel 0:

26 dB (D1) Emission Bandwidth = 21.28MHz



Channel 1:

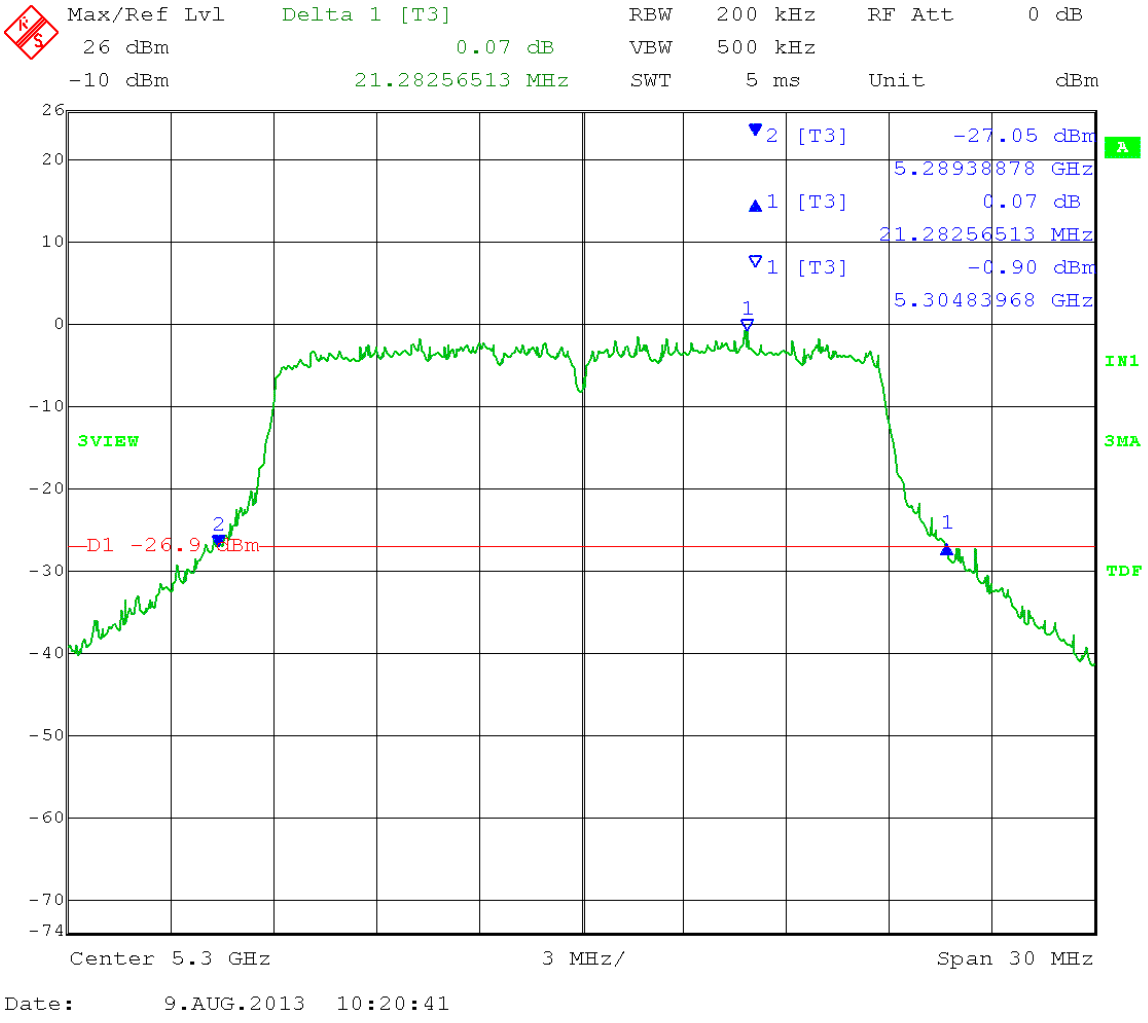
26 dB (D1) Emission Bandwidth = 21.22MHz



Test Date: 7-26-2013
Company: Cambium Networks
EUT: Avenger Station 5.2GHz OFDM
Test: Emission Bandwidth (26 dB) - Conducted
Operator: Lillian Li
Comment: FCC UNII operating under 15.407 – OET 4/8/2013
C) Emission bandwidth: Page 3
RBW = 200 kHz VBW = 500 kHz
Mid Channel: Transmit = 5.300 GHz 20MHz BW
Output power setting: 8

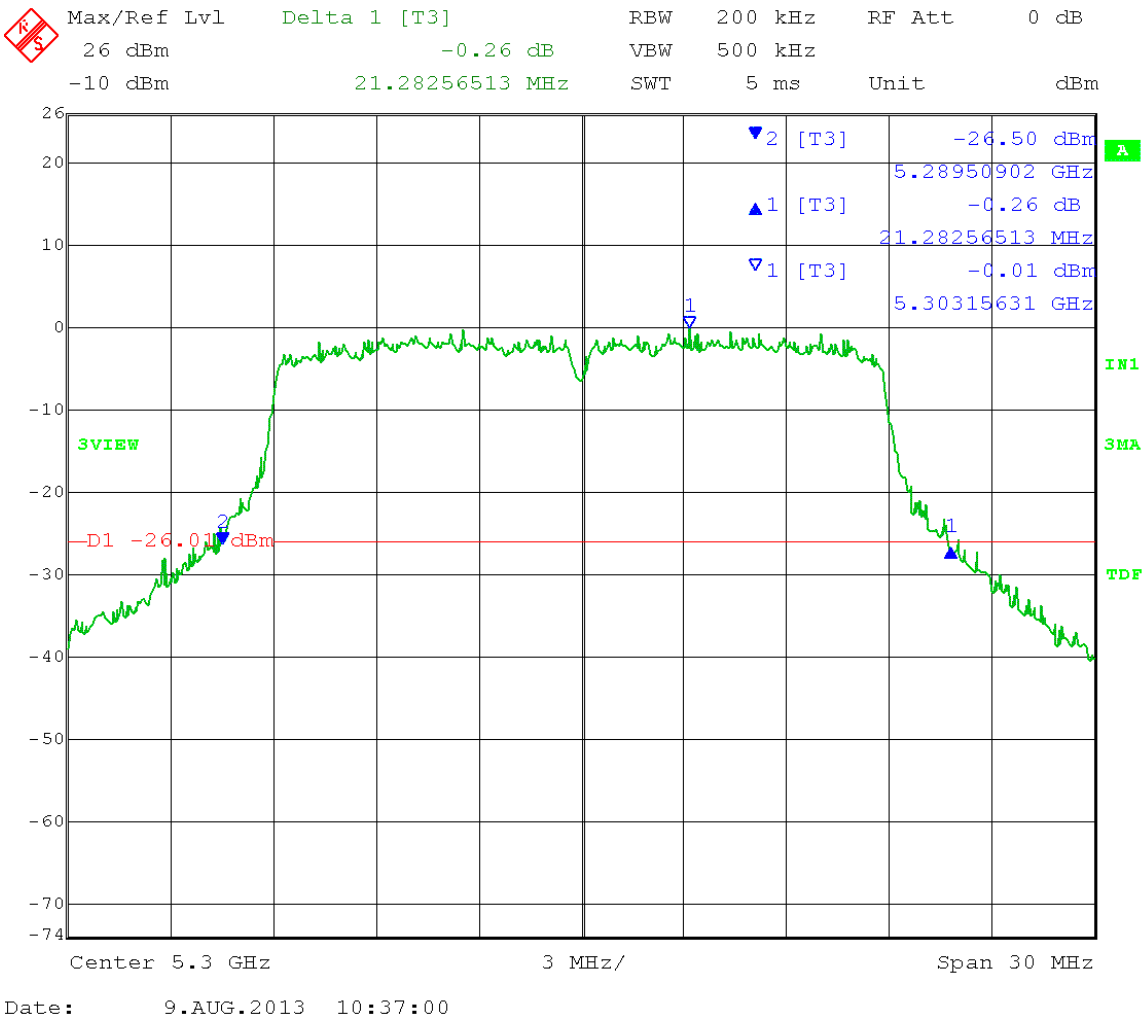
Channel 0:

26 dB (D1) Emission Bandwidth = 21.28MHz



Channel 1:

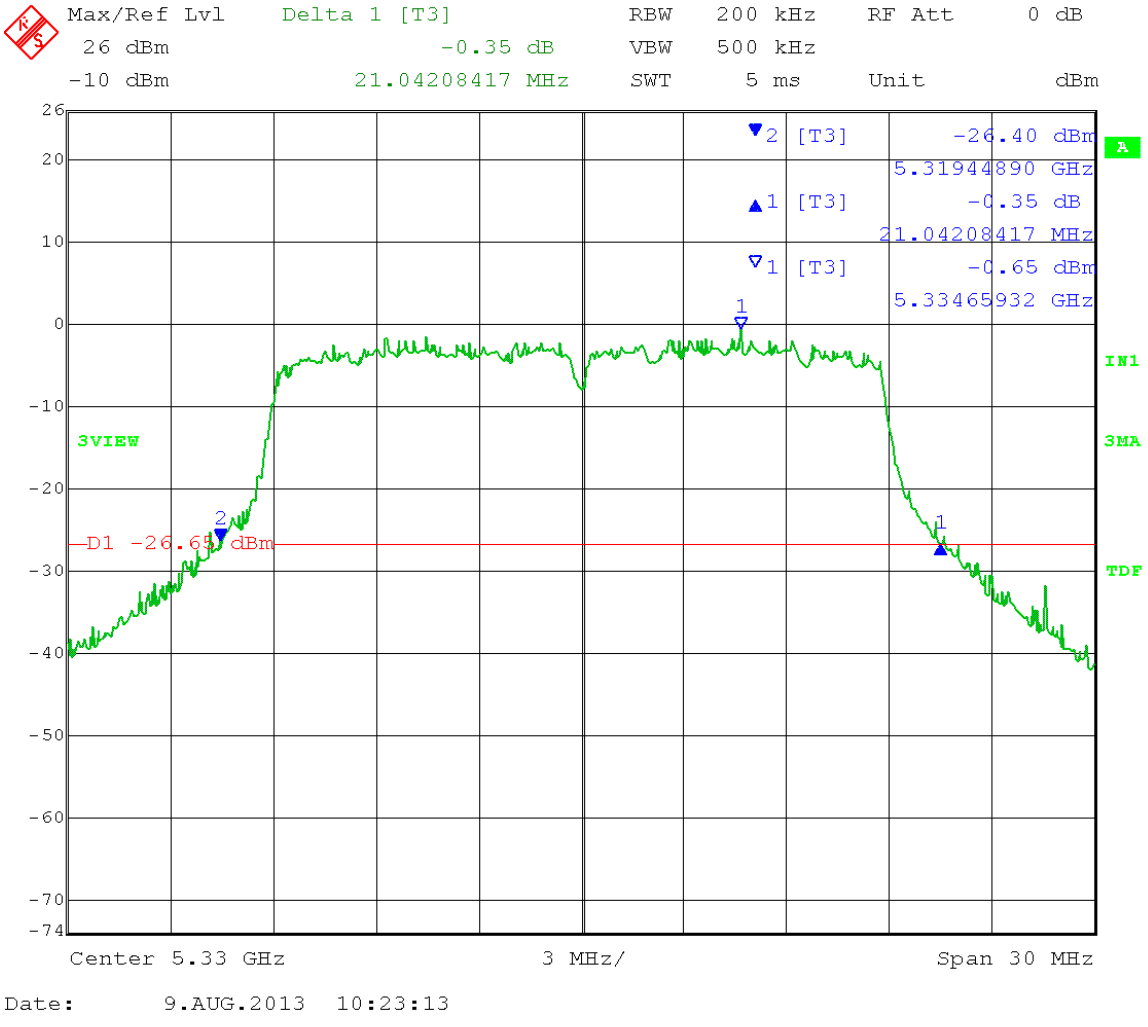
26 dB (D1) Emission Bandwidth = 21.28MHz



Test Date: 7-26-2013
Company: Cambium Networks
EUT: Avenger Station 5.2GHz OFDM
Test: Emission Bandwidth (26 dB) - Conducted
Operator: Lillian Li
Comment: FCC UNII operating under 15.407 – OET 4/8/2013
C) Emission bandwidth: Page 3
RBW = 200 kHz VBW = 500 kHz
High Channel: Transmit = 5.330 GHz 20MHz BW
Output power setting: 8

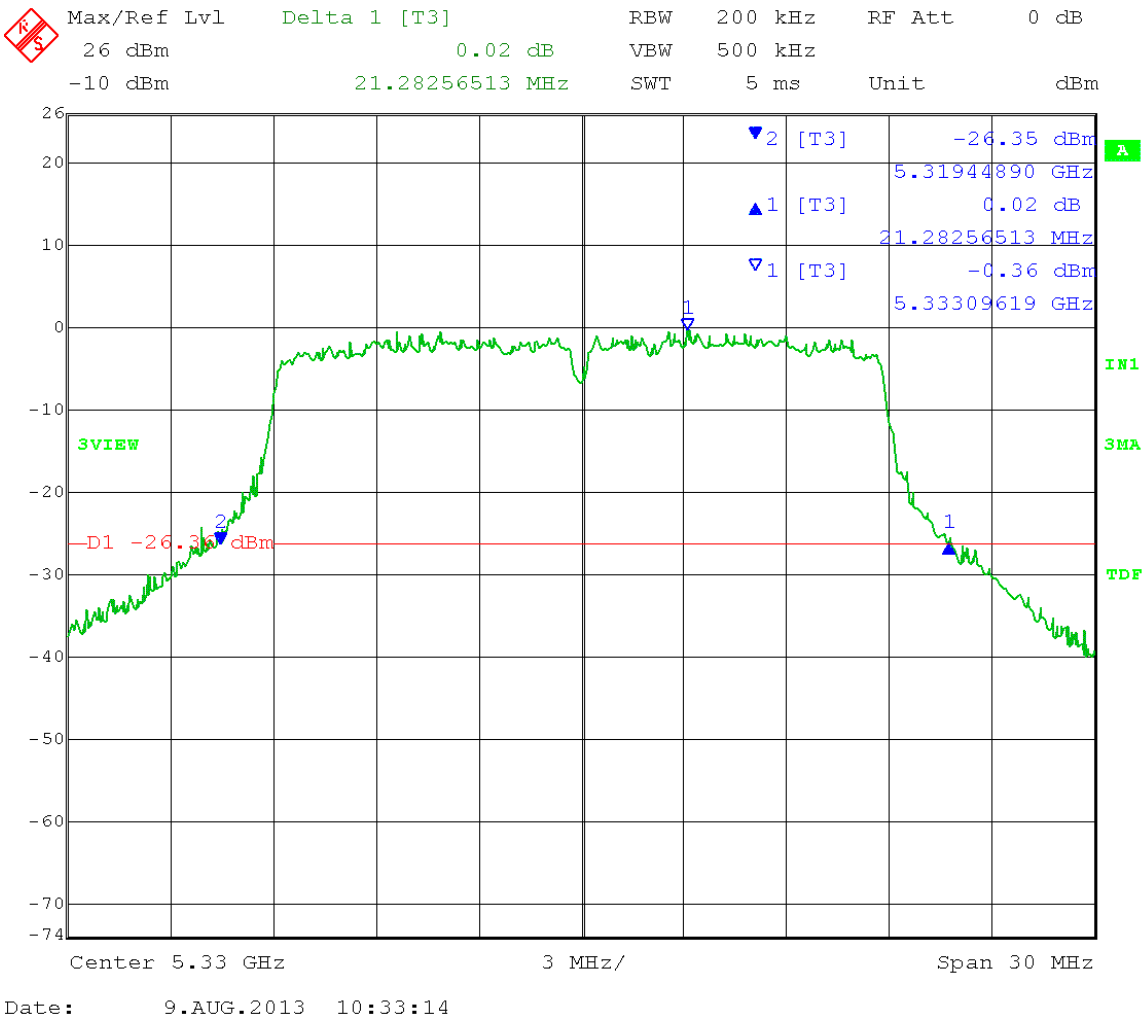
Channel 0:

26 dB (D1) Emission Bandwidth = 21.04MHz



Channel 1:

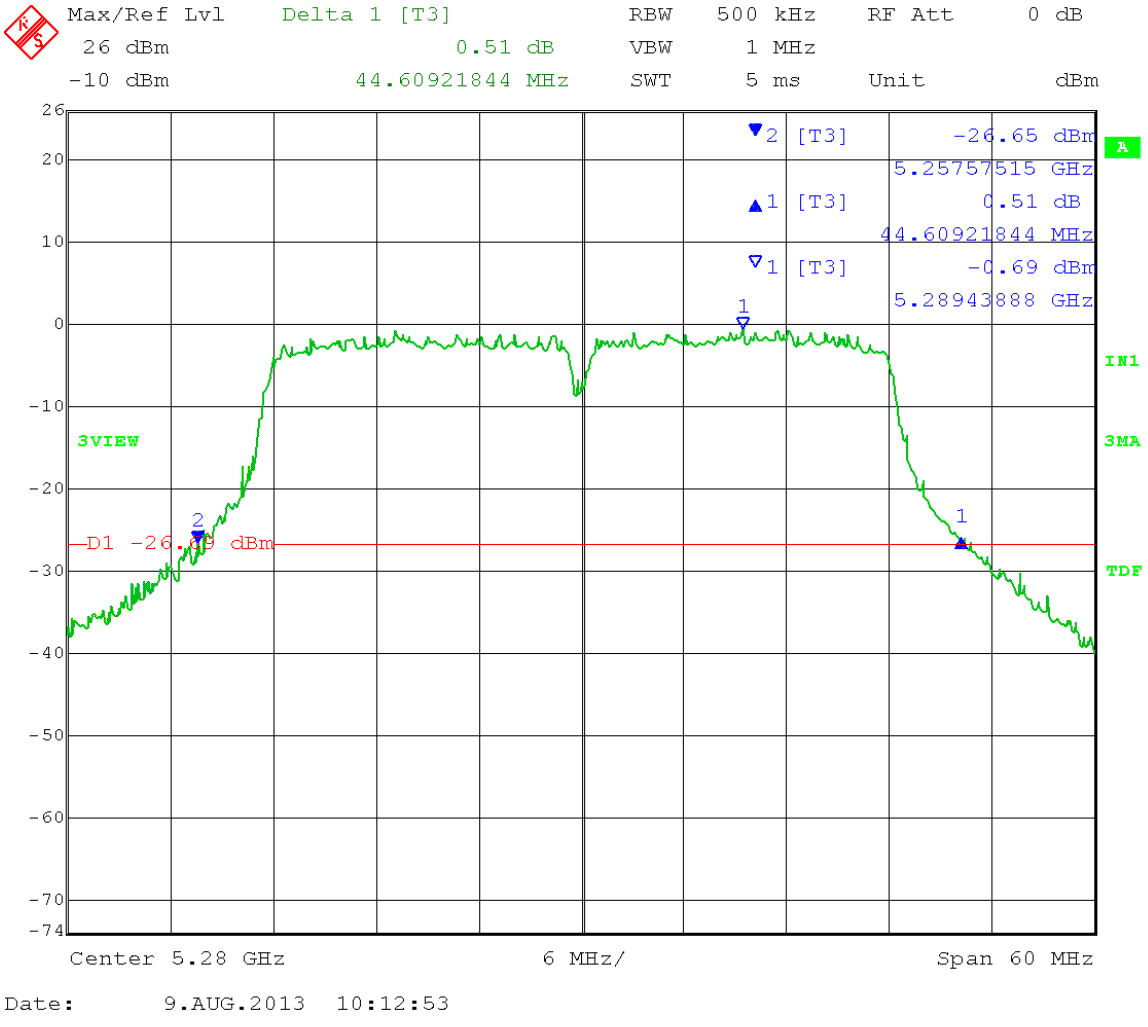
26 dB (D1) Emission Bandwidth = 21.28MHz



Test Date: 8-9-2013
Company: Cambium Networks
EUT: Avenger Station 5.2GHz OFDM
Test: Emission Bandwidth (26 dB) - Conducted
Operator: Lillian Li
Comment: FCC UNII operating under 15.407 – OET 4/8/2013
C) Emission bandwidth: Page 3
RBW = 500 kHz VBW = 1 MHz
Low Channel: Transmit = 5.280 GHz 40MHz BW
Output power setting: 8

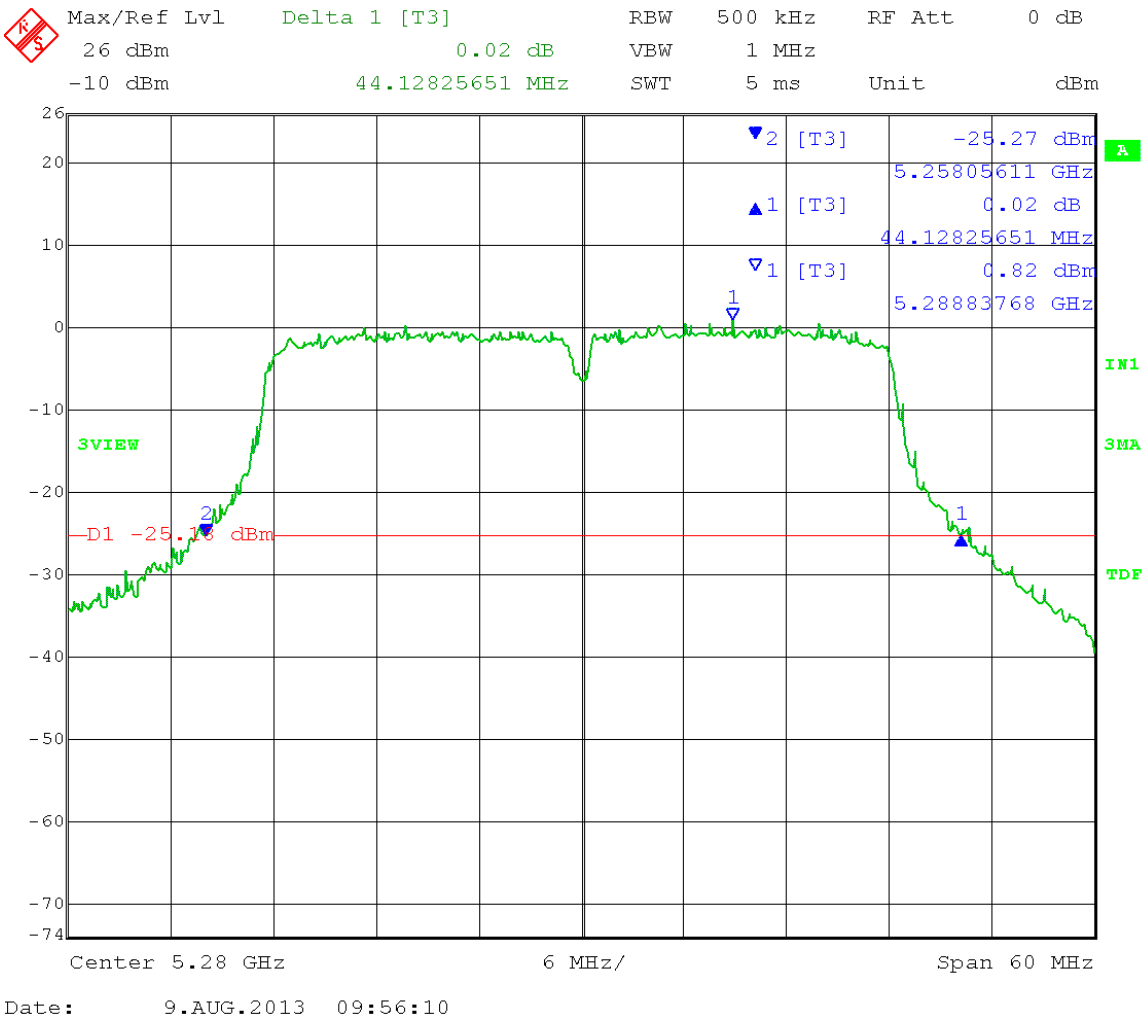
Channel 0:

26 dB (D1) Emission Bandwidth = 44.61MHz



Channel 1:

26 dB (D1) Emission Bandwidth = 44.13MHz

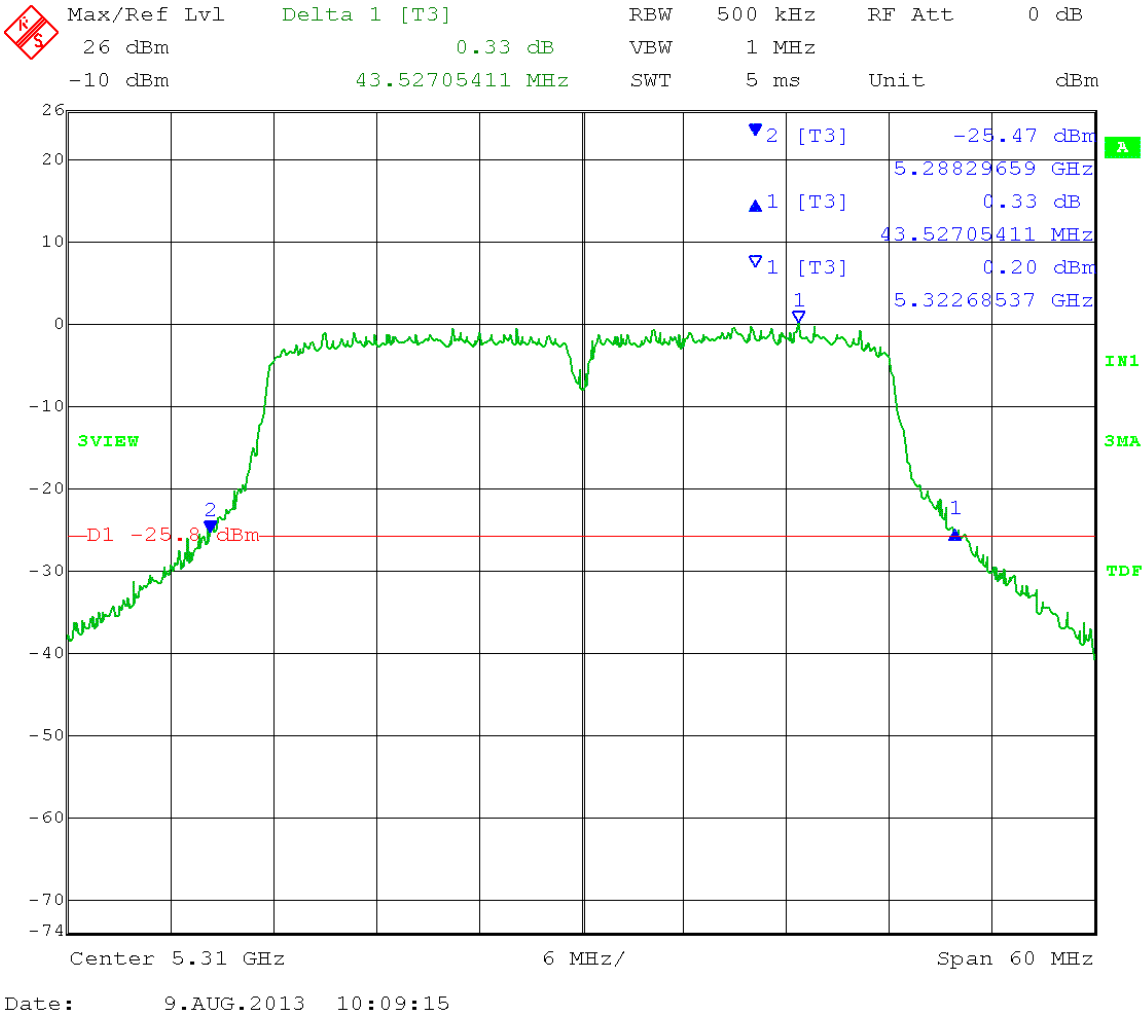


Date: 9.AUG.2013 09:56:10

Test Date: 8-9-2013
Company: Cambium Networks
EUT: Avenger Station 5.2GHz OFDM
Test: Emission Bandwidth (26 dB) - Conducted
Operator: Lillian Li
Comment: FCC UNII operating under 15.407 – OET 4/8/2013
C) Emission bandwidth: Page 3
RBW = 500 kHz VBW = 1 MHz
Mid Channel: Transmit = 5.310 GHz 40MHz BW
Output power setting: 8

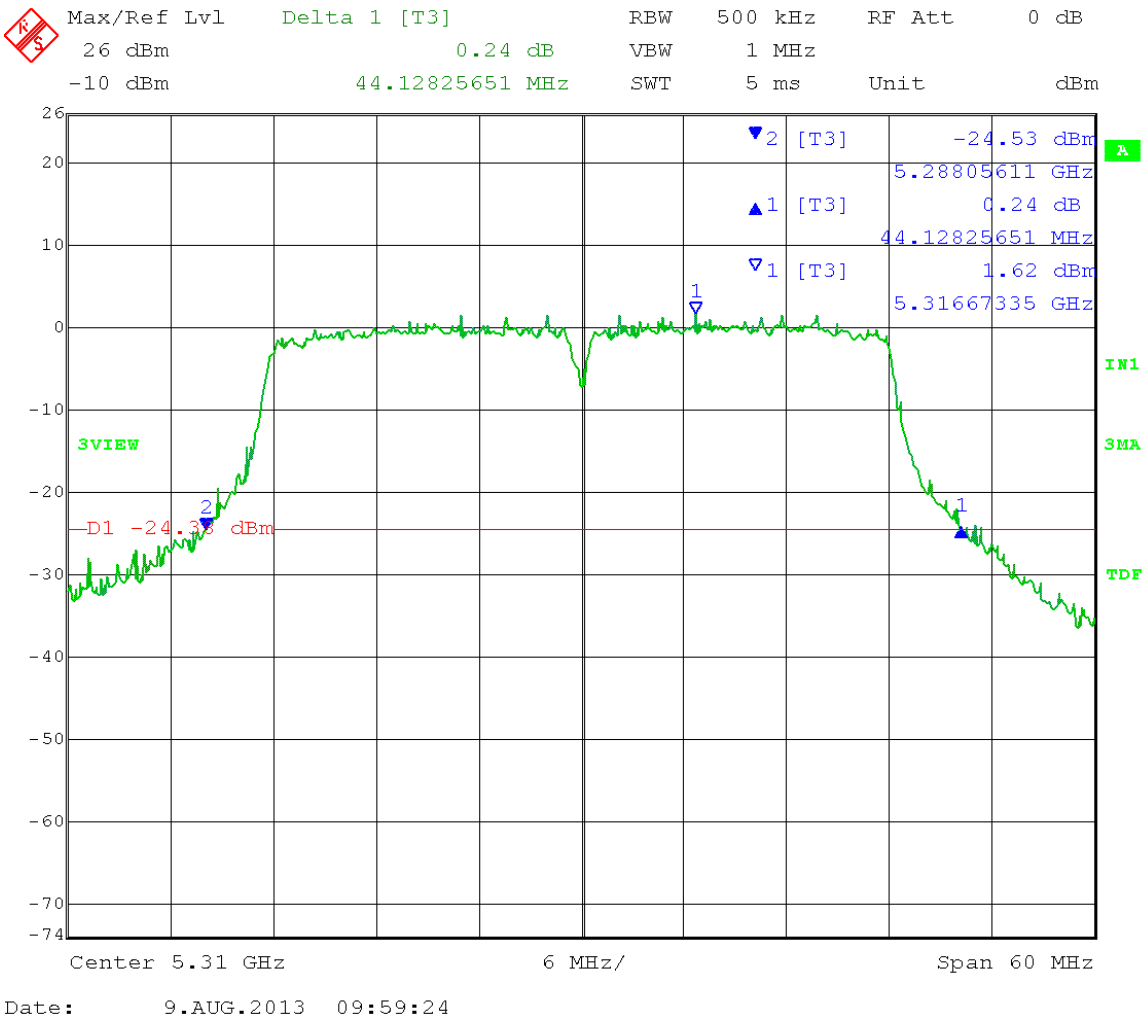
Channel 0:

26 dB (D1) Emission Bandwidth = 43.53MHz



Channel 1:

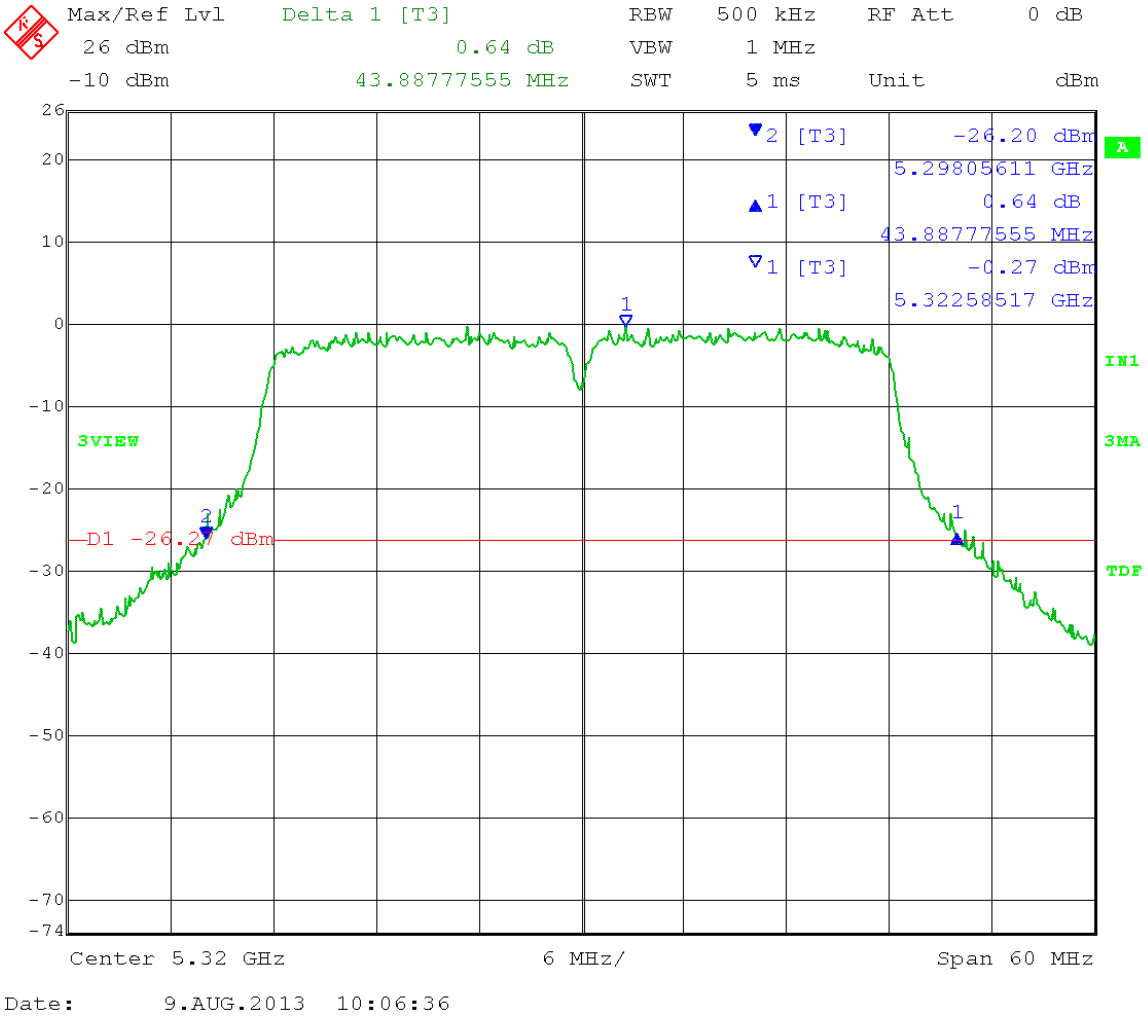
26 dB (D1) Emission Bandwidth = 44.13MHz



Test Date: 8-9-2013
Company: Cambium Networks
EUT: Avenger Station 5.2GHz OFDM
Test: Emission Bandwidth (26 dB) - Conducted
Operator: Lillian Li
Comment: FCC UNII operating under 15.407 – OET 4/8/2013
C) Emission bandwidth: Page 3
RBW = 500 kHz VBW = 1 MHz
High Channel: Transmit = 5.320 GHz 40MHz BW
Output power setting: 8

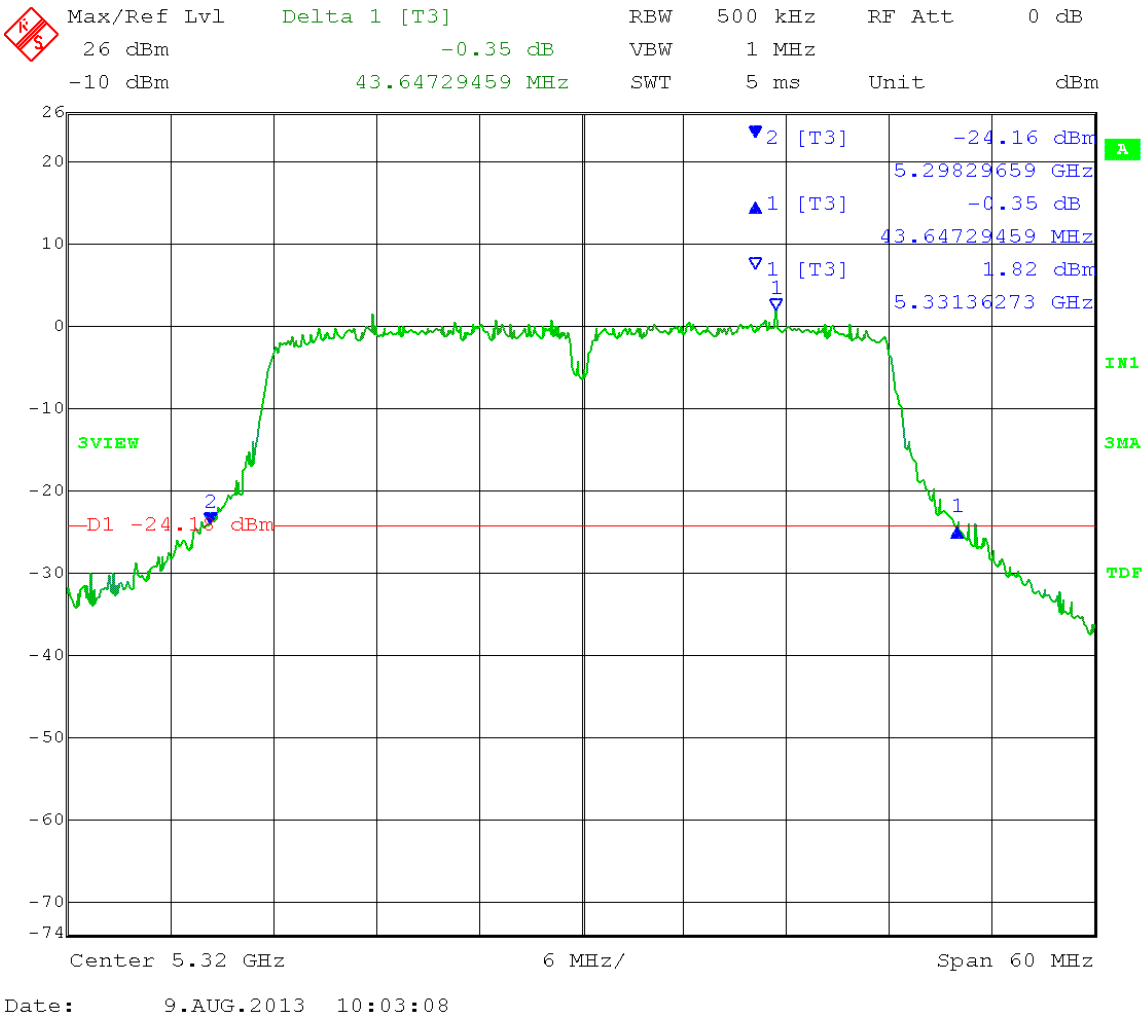
Channel 0:

26 dB (D1) Emission Bandwidth = 43.89MHz



Channel 1:

26 dB (D1) Emission Bandwidth = 43.65MHz



Appendix B – Measurement Data

B3.0 99 Percent Occupied Bandwidth

Rule Section: Informative

Test Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r03 – *Guidance for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E*

Section D – 99 Percent Occupied Bandwidth

Description: SPAN = 1.5 to 5 times the OBW
RBW = 1% to 5% of OBW
VBW ≥ RBW
Detector = Peak
Trace mode = max hold

Measure the width of the emission using the 99% power bandwidth function of the spectrum analyzer

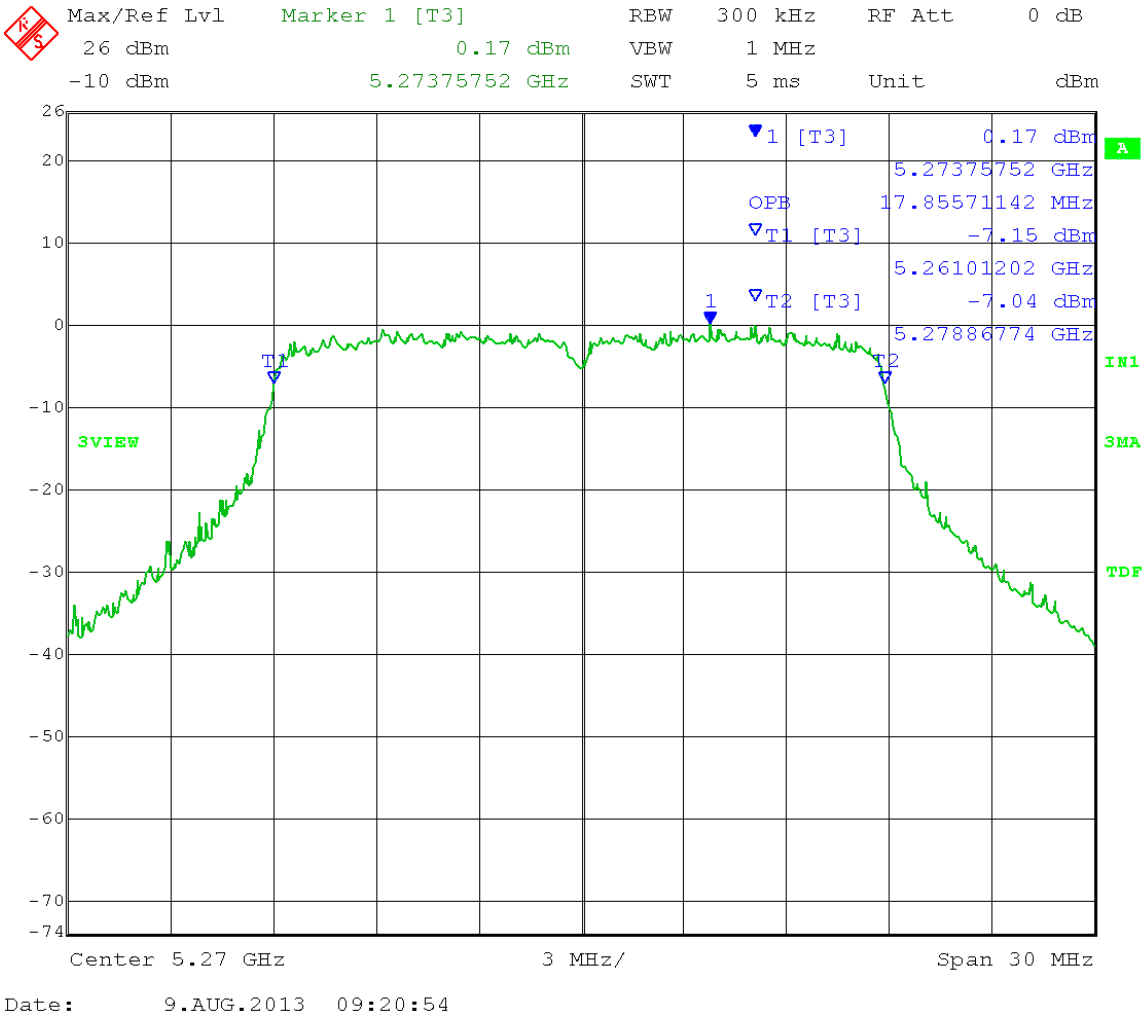
Limit: Informative

Notes: Measurements were taken for MCS15 OFDM modulation at the lowest, middle, and highest channels of operation. EUT was set to transmit continuously with 100% duty cycle.

Test Date: 08-9-2013
Company: Cambium Networks
EUT: Avenger SM 5.2GHz OFDM
Test: 99% Occupied Bandwidth - Conducted
Operator: Lillian Li
Comment: FCC UNII operating under 15.407 – OET 4/8/2013
D) 99% Occupied Bandwidth - Page 4
RBW = 300 kHz VBW = 1 MHz
Detector = Peak Trace = Max Hold
Low Channel: Transmit = 5.270 GHz 20MHz BW
Output power setting: 8

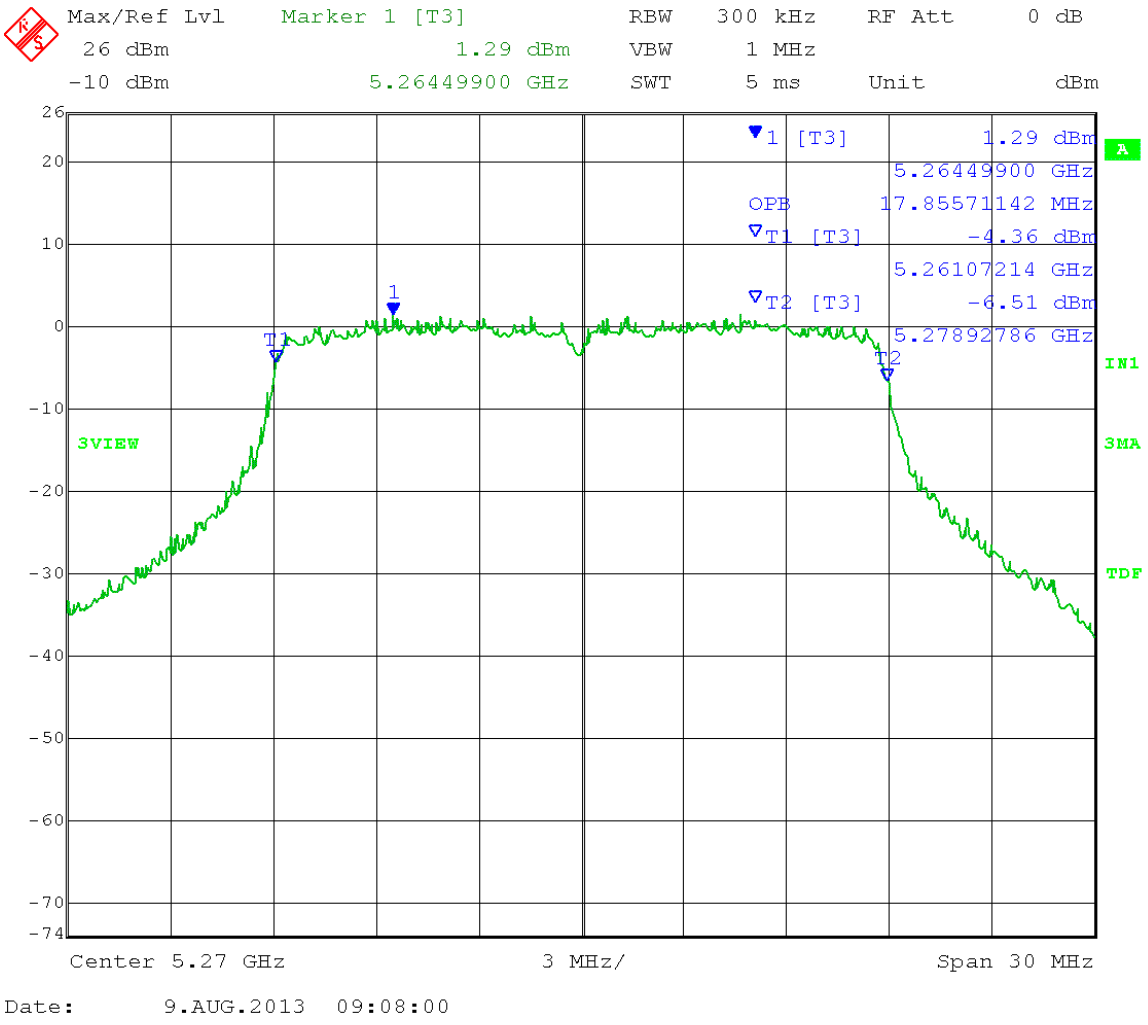
Channel 0:

99% OBW = 17.86MHz



Channel 1:

99% OBW = 17.86MHz

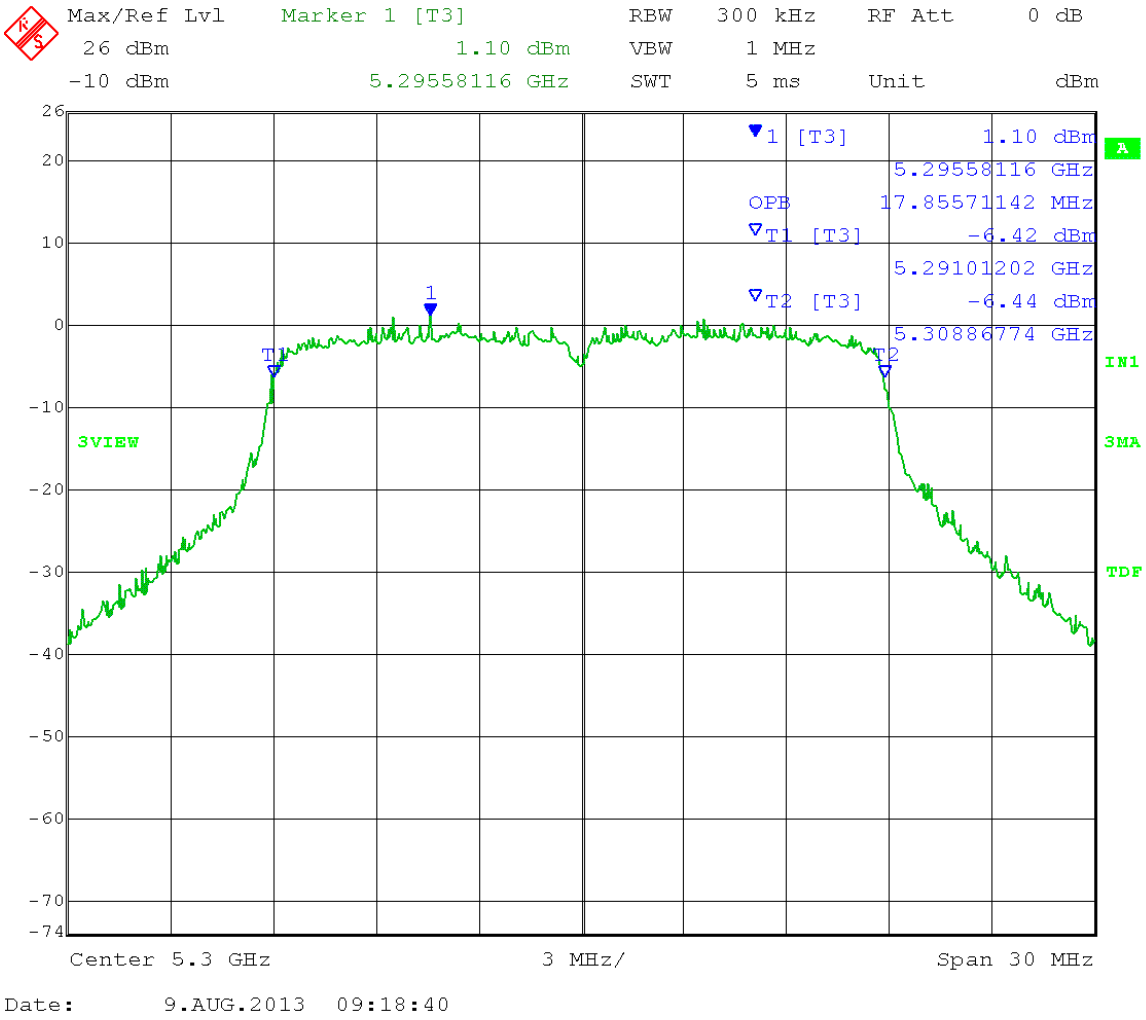


Date: 9.AUG.2013 09:08:00

Test Date: 08-9-2013
Company: Cambium Networks
EUT: Avenger SM 5.2GHz OFDM
Test: 99% Occupied Bandwidth - Conducted
Operator: Lillian Li
Comment: FCC UNII operating under 15.407 – OET 4/8/2013
D) 99% Occupied Bandwidth - Page 4
RBW = 300 kHz VBW = 1 MHz
Detector = Peak Trace = Max Hold
Mid Channel: Transmit = 5.300 GHz 20MHz BW
Output power setting: 8

Channel 0:

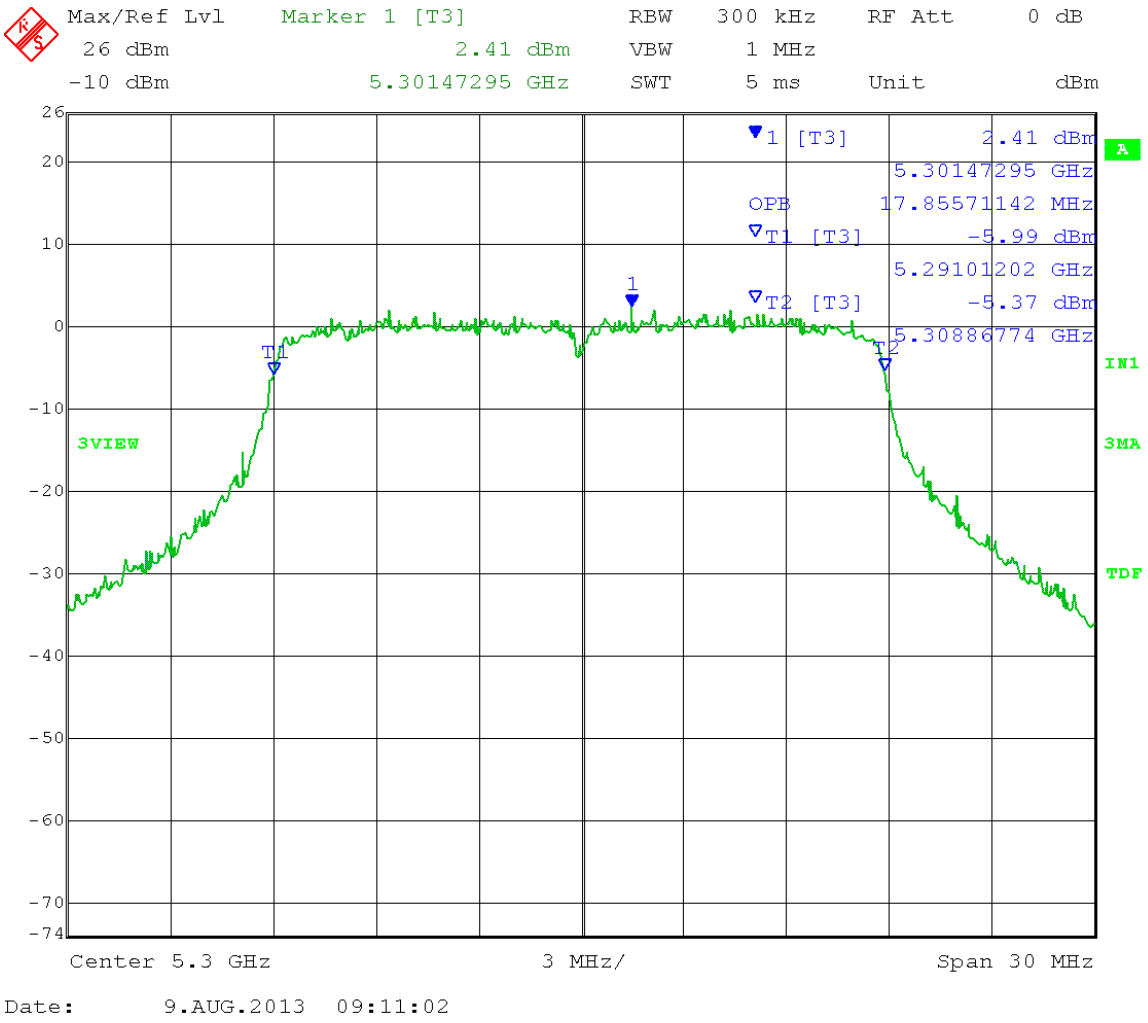
99% OBW = 17.86MHz



Date: 9.AUG.2013 09:18:40

Channel 1:

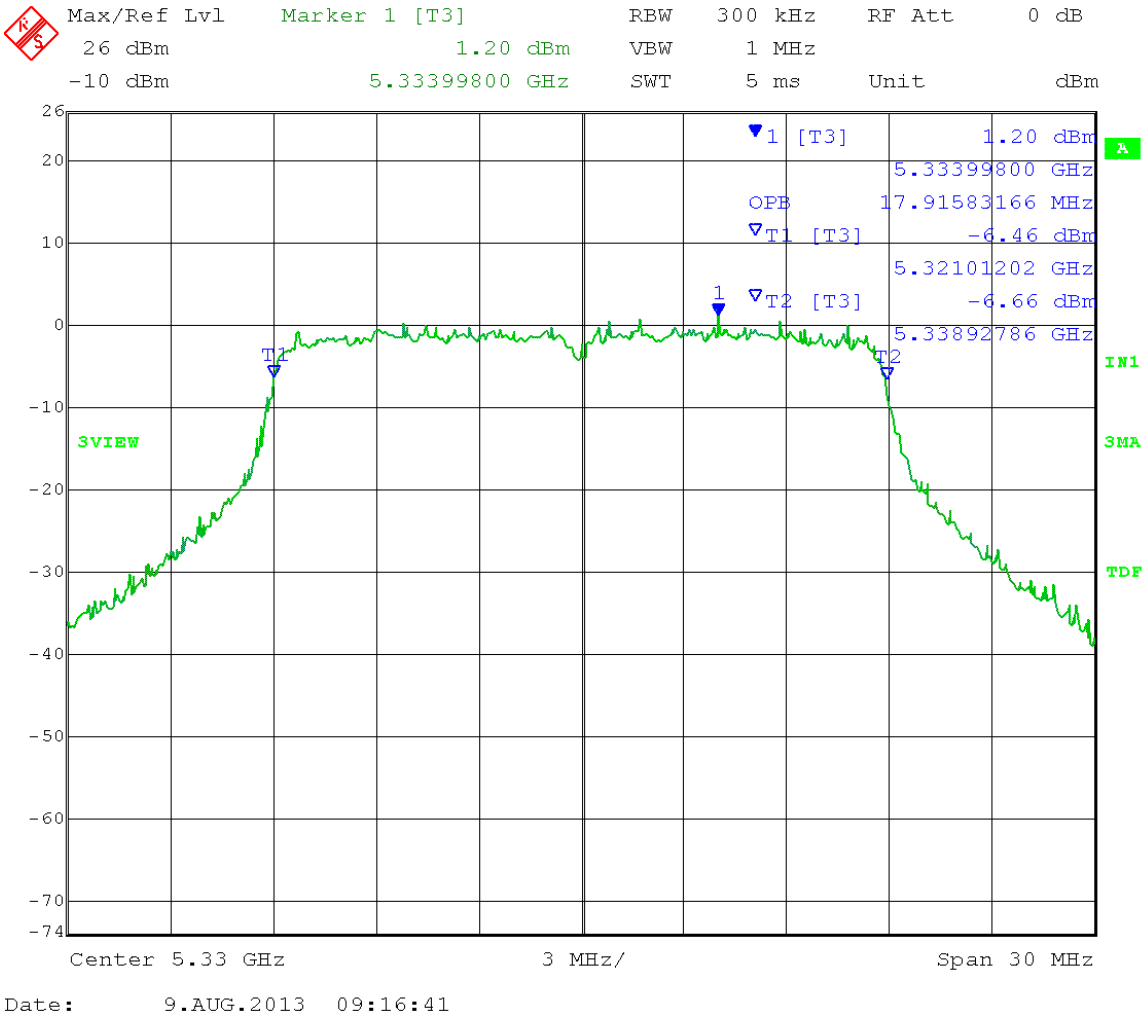
99% OBW = 17.86MHz



Test Date: 08-9-2013
Company: Cambium Networks
EUT: Avenger SM 5.2GHz OFDM
Test: 99% Occupied Bandwidth - Conducted
Operator: Lillian Li
Comment: FCC UNII operating under 15.407 – OET 4/8/2013
D) 99% Occupied Bandwidth - Page 4
RBW = 300 kHz VBW = 1 MHz
Detector = Peak Trace = Max Hold
High Channel: Transmit = 5.330 GHz 20MHz BW
Output power setting: 8

Channel 0:

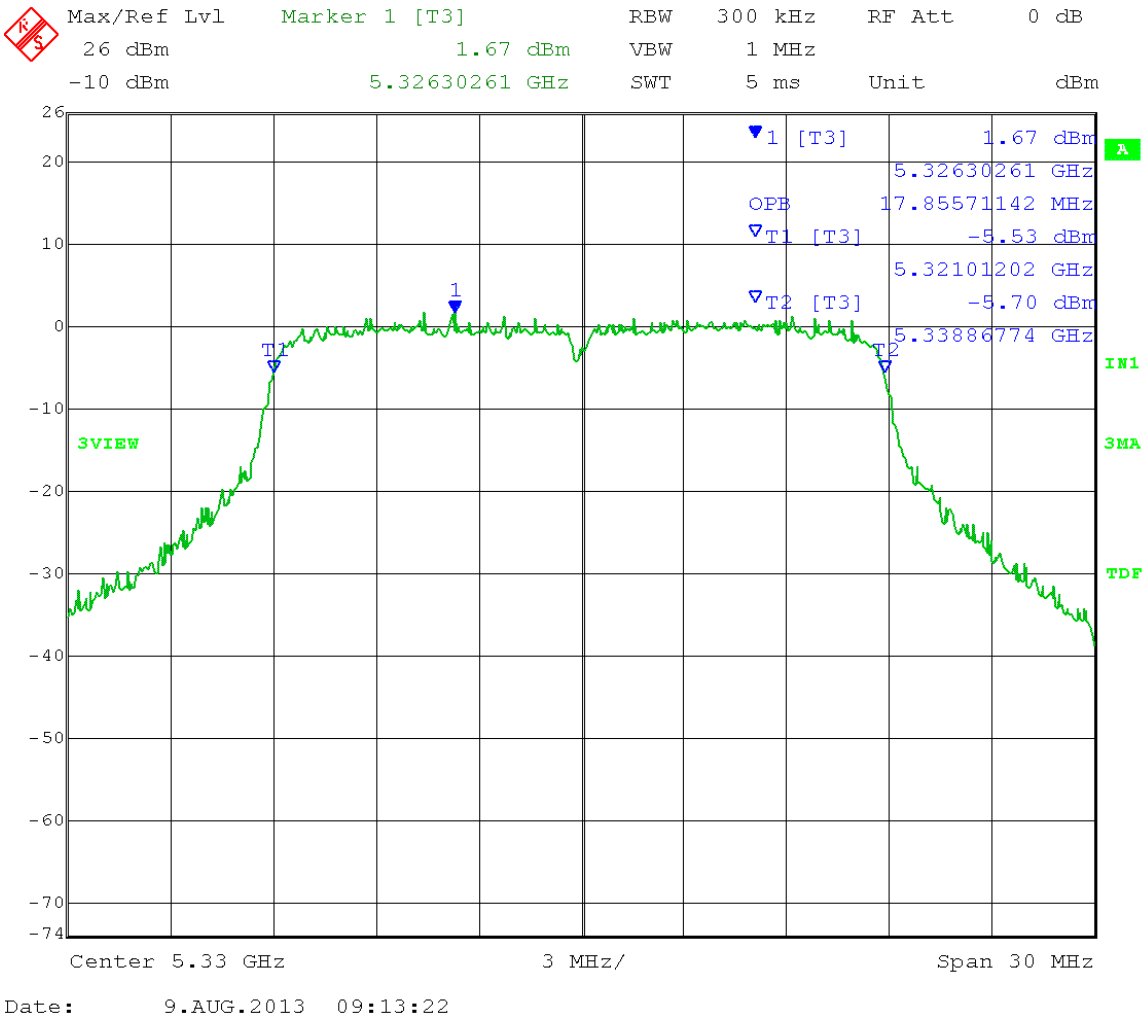
99% OBW = 17.92MHz



Date: 9.AUG.2013 09:16:41

Channel 1:

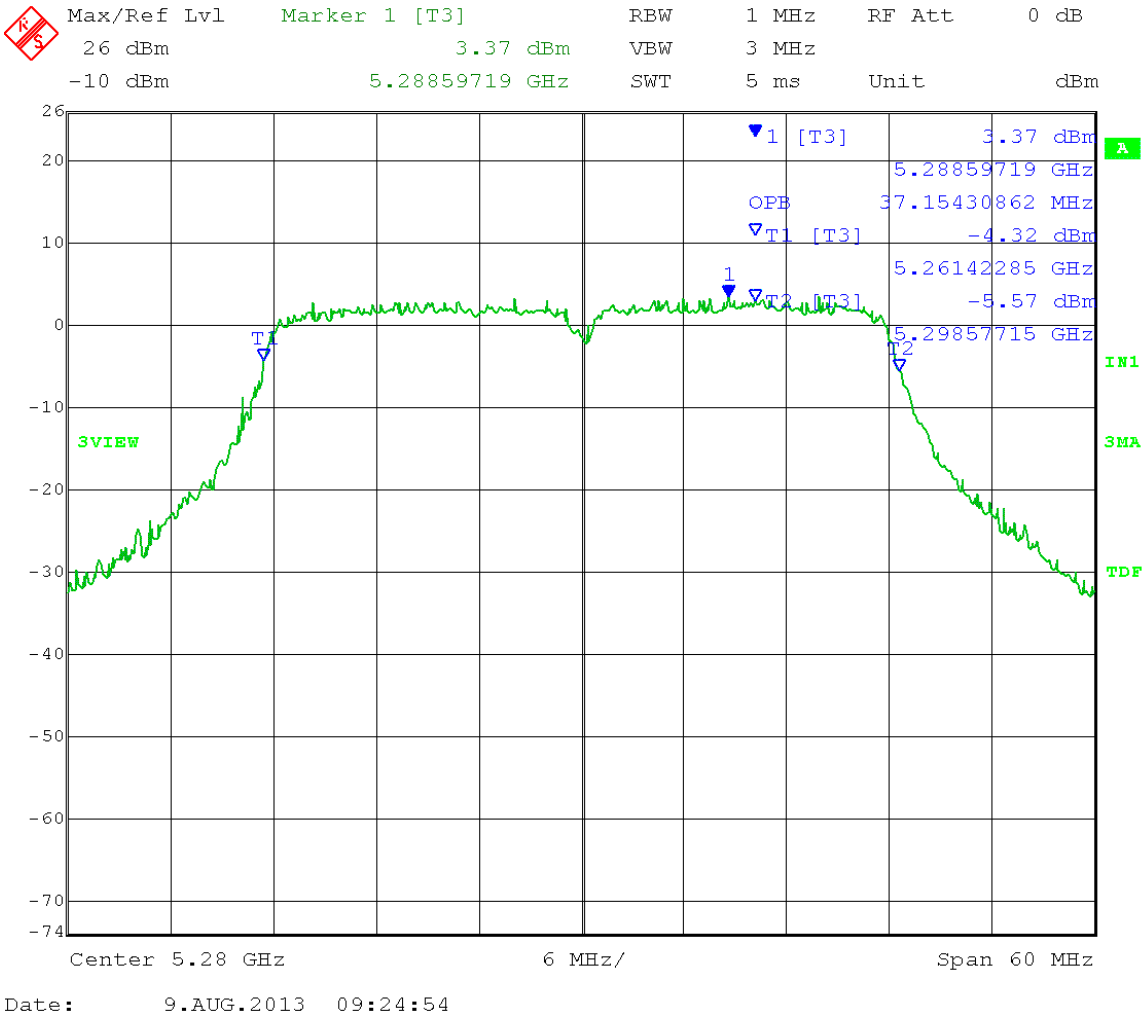
99% OBW = 17.86MHz



Test Date: 08-9-2013
Company: Cambium Networks
EUT: Avenger SM 5.2GHz OFDM
Test: 99% Occupied Bandwidth - Conducted
Operator: Lillian Li
Comment: FCC UNII operating under 15.407 – OET 4/8/2013
D) 99% Occupied Bandwidth - Page 4
RBW = 1 MHz VBW = 3 MHz
Detector = Peak Trace = Max Hold
Low Channel: Transmit = 5.280 GHz 40MHz BW
Output power setting: 8

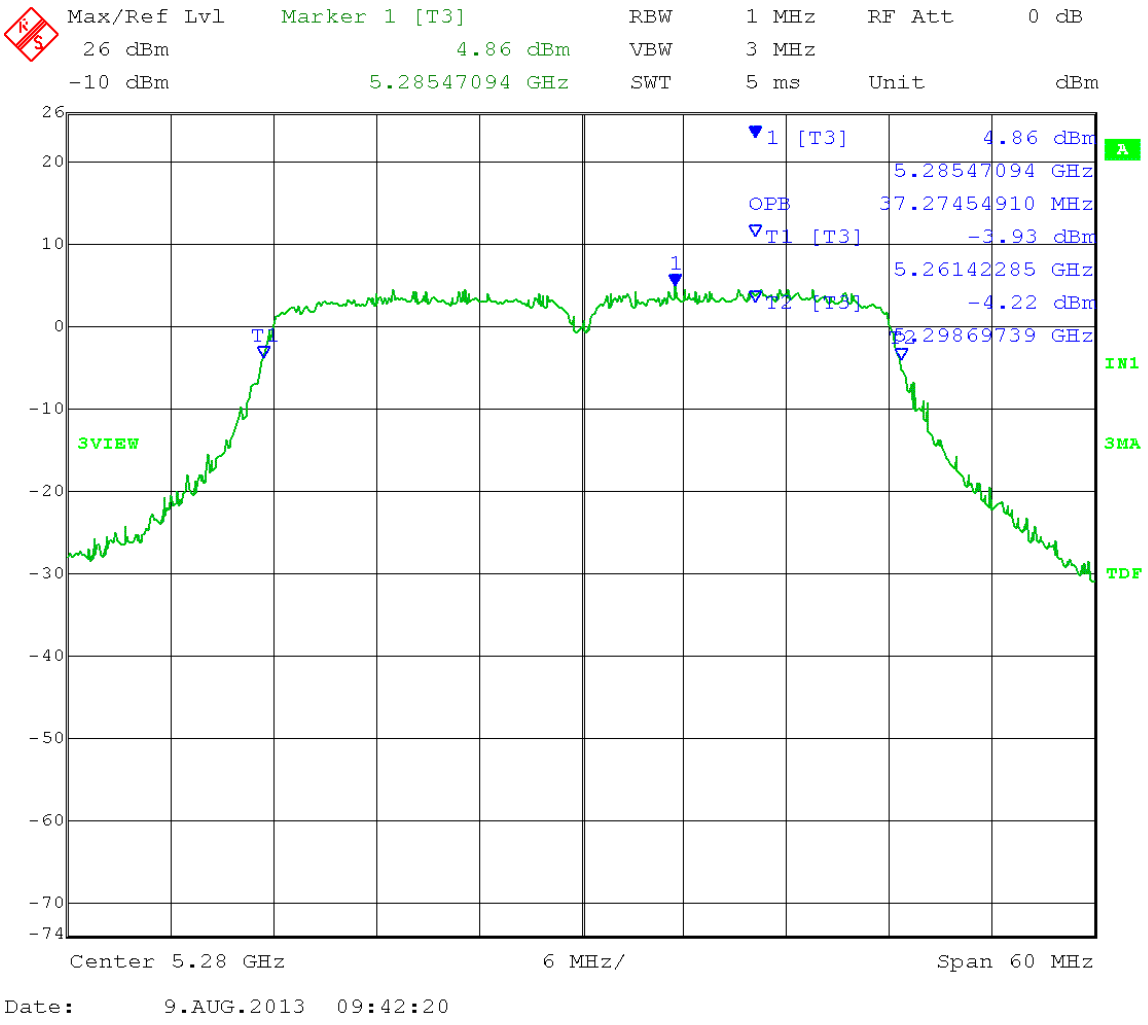
Channel 0:

99% OBW = 37.15MHz



Channel 1:

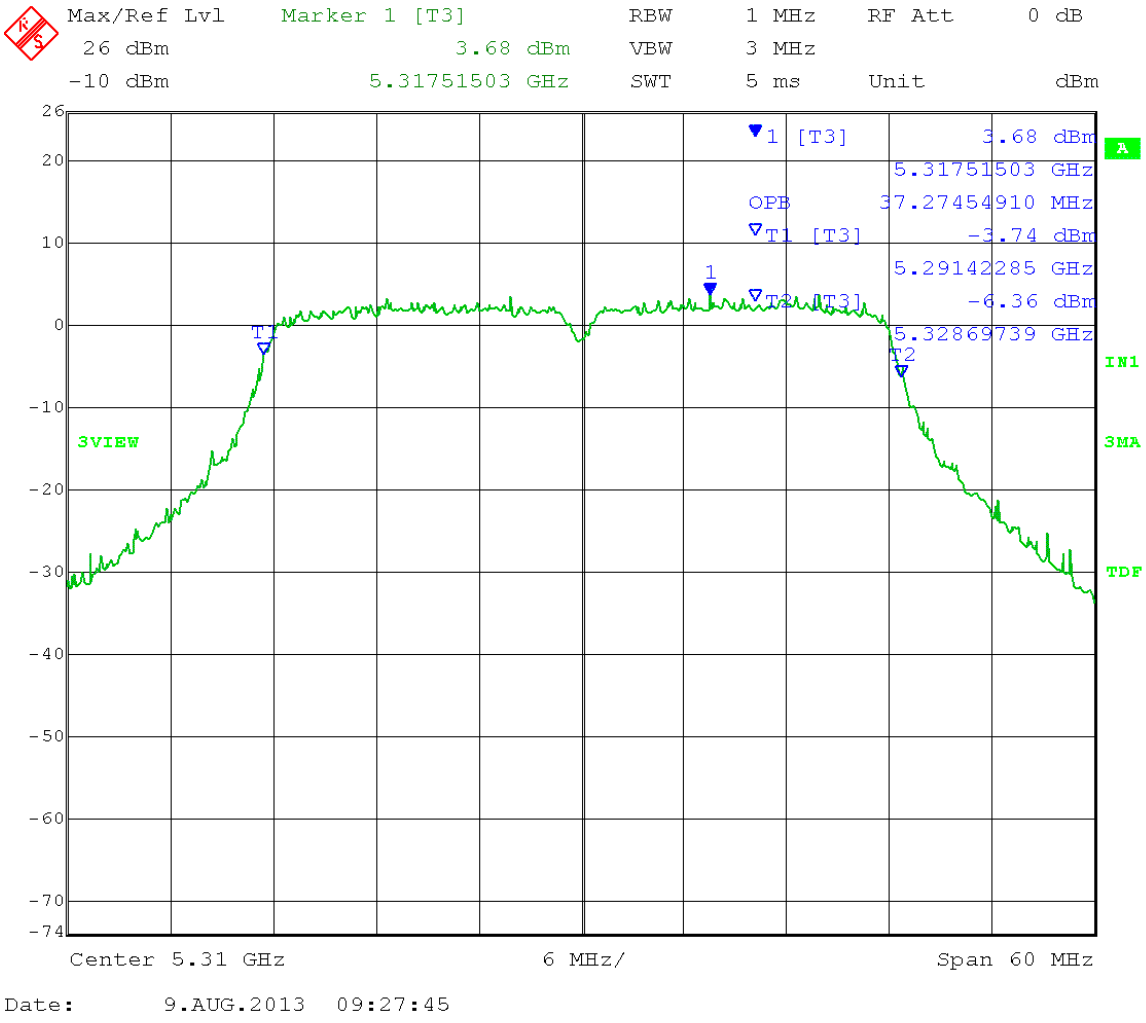
99% OBW = 37.27MHz



Test Date: 08-9-2013
Company: Cambium Networks
EUT: Avenger SM 5.2GHz OFDM
Test: 99% Occupied Bandwidth - Conducted
Operator: Lillian Li
Comment: FCC UNII operating under 15.407 – OET 4/8/2013
D) 99% Occupied Bandwidth - Page 4
RBW = 1 MHz VBW = 3 MHz
Detector = Peak Trace = Max Hold
Mid Channel: Transmit = 5.310 GHz 40MHz BW
Output power setting: 8

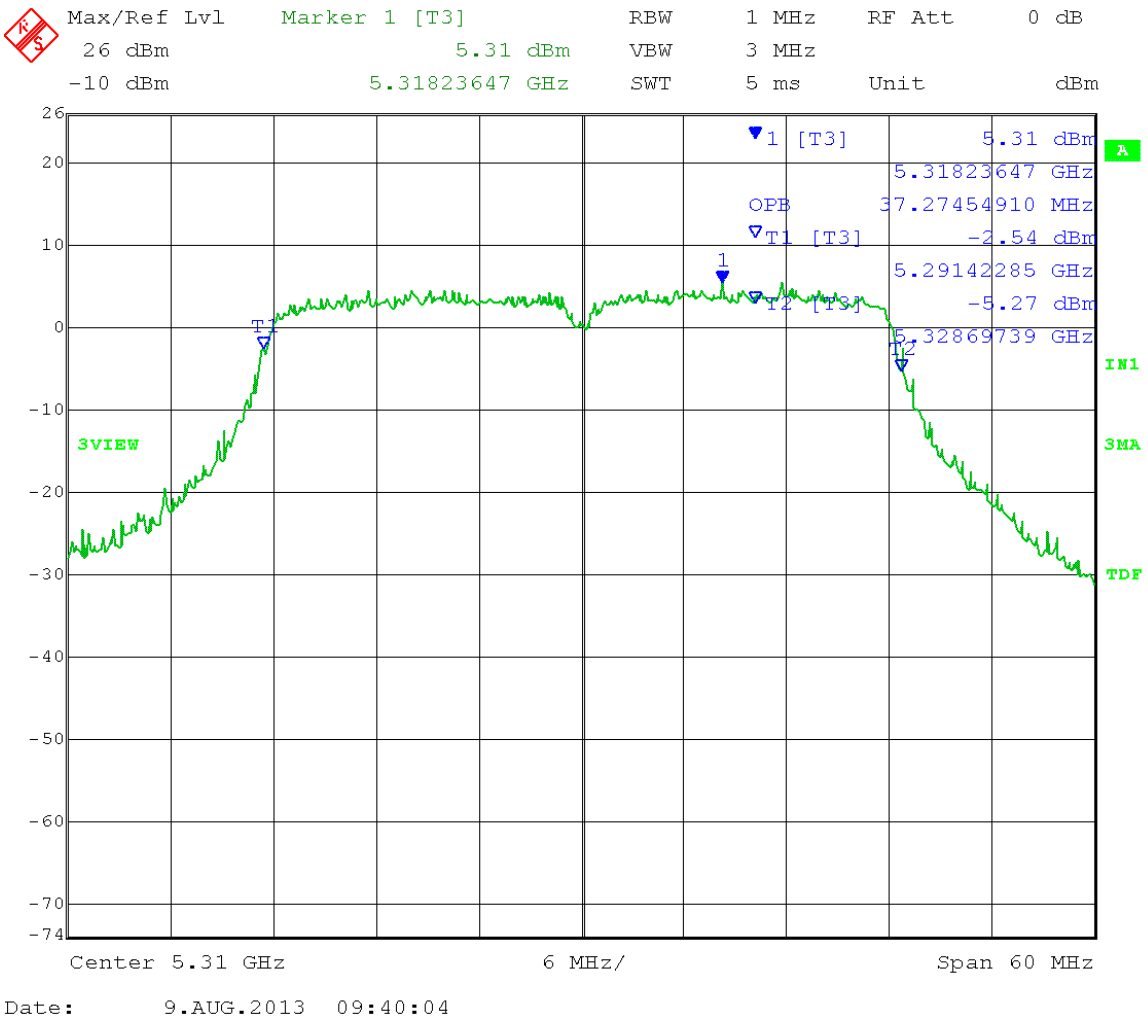
Channel 0:

99% OBW = 37.27MHz



Channel 1:

99% OBW = 37.27MHz

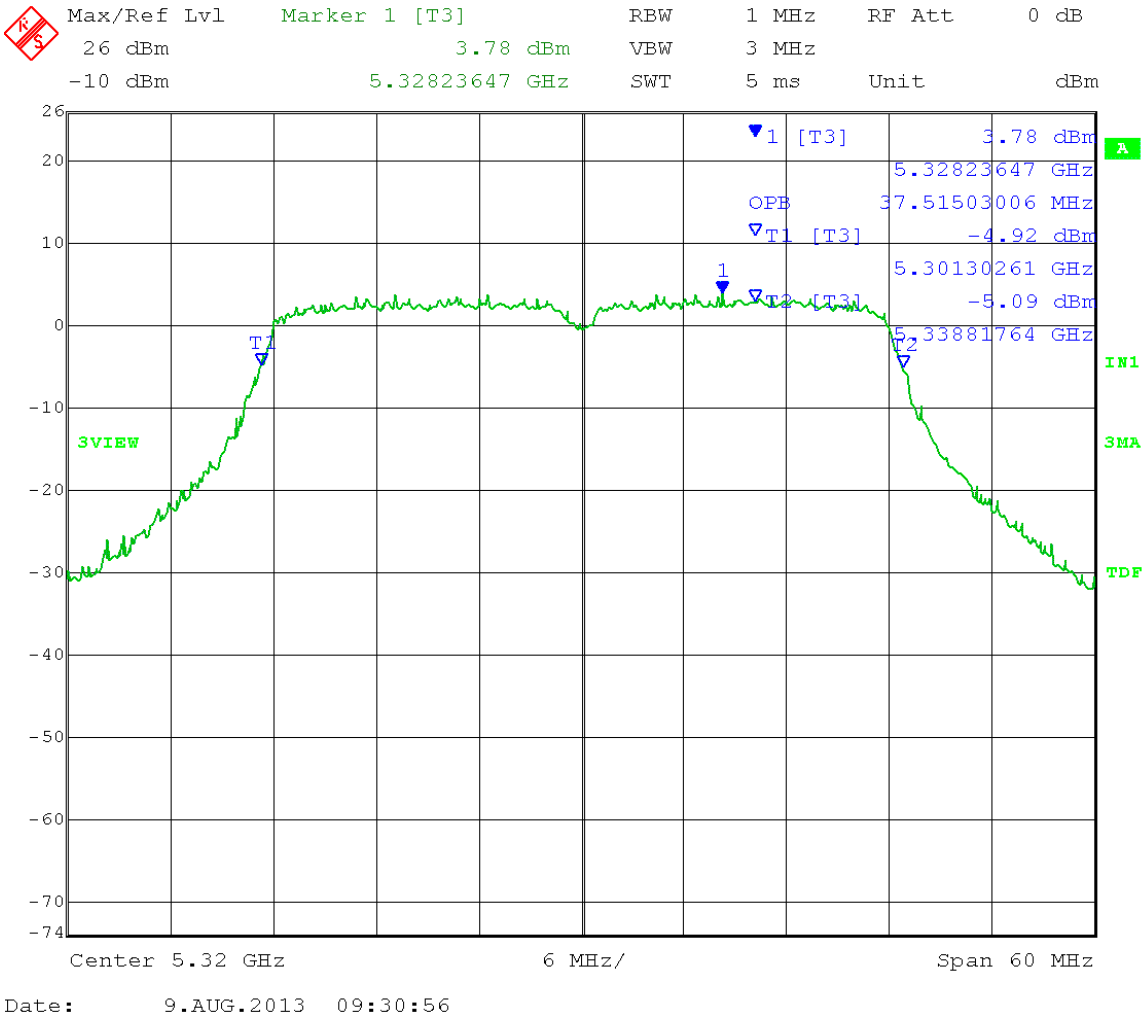


Date: 9.AUG.2013 09:40:04

Test Date: 08-9-2013
Company: Cambium Networks
EUT: Avenger SM 5.2GHz OFDM
Test: 99% Occupied Bandwidth - Conducted
Operator: Lillian Li
Comment: FCC UNII operating under 15.407 – OET 4/8/2013
D) 99% Occupied Bandwidth - Page 4
RBW = 1 MHz VBW = 3 MHz
Detector = Peak Trace = Max Hold
High Channel: Transmit = 5.320 GHz 40MHz BW
Output power setting: 8

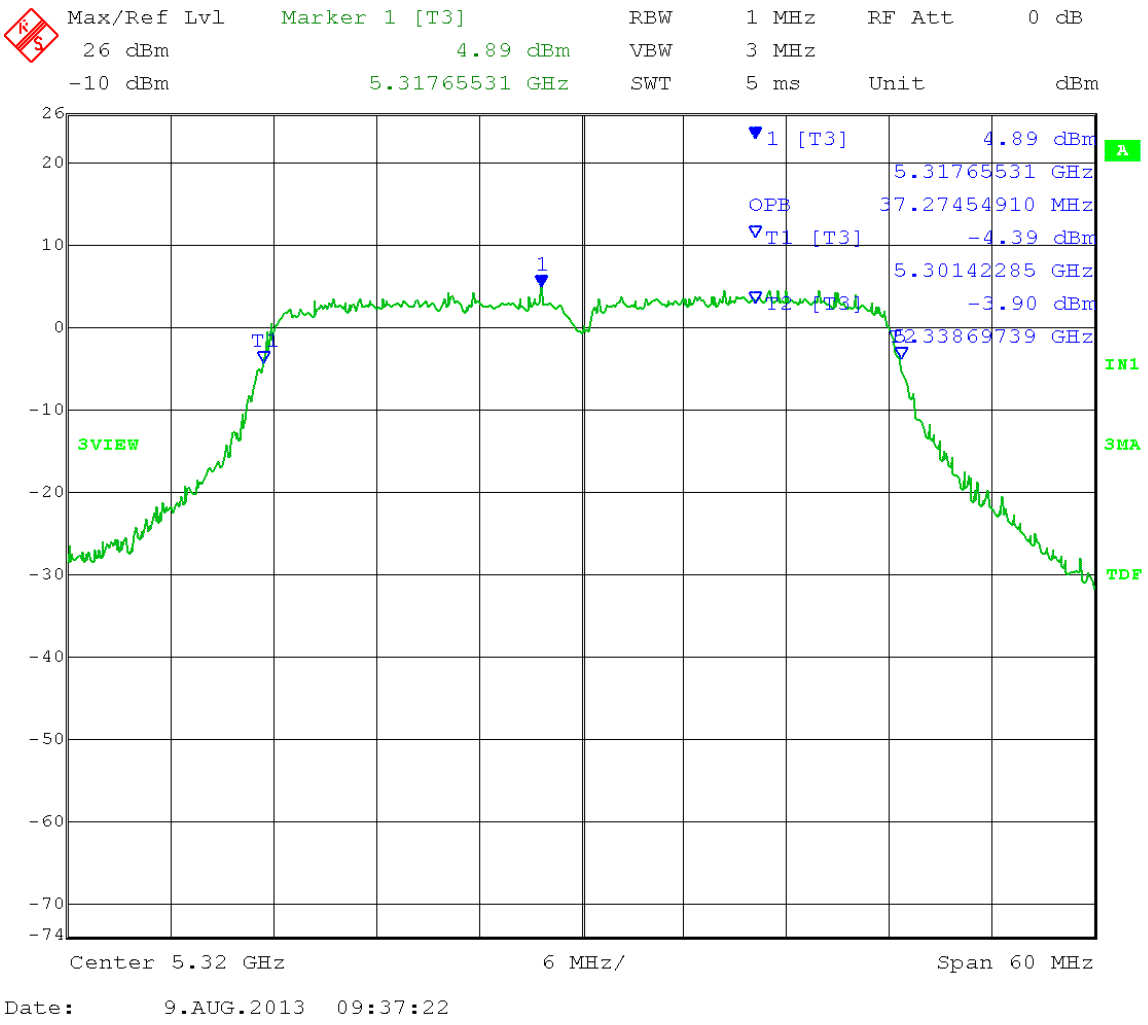
Channel 0:

99% OBW = 37.52MHz



Channel 1:

99% OBW = 37.27MHz



Appendix B – Measurement Data

B4.0 Maximum Conducted Output Power

Rule Section: FCC Section 15.407(a)(2)
RSS-210 A9.2(2)

Test Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r03 – *Guidance for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E*

Section E(3)(a) Method PM (Measurement using an RF average power meter): Measurements performed using a wideband RF power meter with a thermocouple detector

Description: Measure the average power of the transmitter
Add 10 log (1/x), where x is the duty cycle, to the measured power
Add 10 log(N), where N is the number of outputs, for MIMO operation (according to FCC KDB 662911)

Limit: RF conducted: Lesser of: 250 mW (24 dBm) or 11 dBm + 10 log B, where B is the 99% emission bandwidth in MHz.
e.i.r.p.: Lesser of: 1 W (30 dBm) or 17 dBm + 10 log B, where B is the 99% emission bandwidth in MHz.

Results: Passed

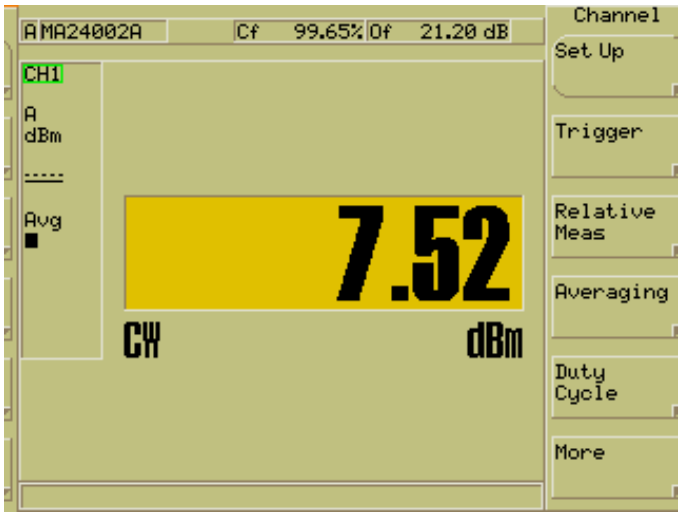
Notes: Measurements were taken for MCS15 OFDM modulation at the lowest, middle, and highest channels of operation. EUT was set to transmit continuously with 100% duty cycle.

Test Date: 8-9-2013
Company: Cambium Networks
EUT: Avenger SM 5.2 GHz OFDM
Test: Maximum conducted output power – Conducted
Operator: Lillian L
Comment: FCC UNII operating under 15.407 – OET 4/8/2013
E)3) Measurement using a power meter(PM) - Page 8
Operating Mode: Point-to-Multipoint; Antenna Gain = 15 dBi

Limit: [RSS-210,A9.2(3)]: 250 mW (24 dBm) or 11 + 10 log10 B, dBm, whichever power is less (e.i.r.p limit: 17 + 10 log10 B, dBm)
Conducted limit: 11 + 10 log10 (17.86 MHz) = **23.51 dBm**
e.i.r.p. limit: 17 + 10 log10 (17.86 MHz) = **29.51 dBm**

Low Channel: Transmit = 5.270 GHz 20MHz BW
Output power setting: 8; Ch 0:

Maximum conducted output power = 7.52 dBm + 3 dB (MIMO)
= 10.52 dBm < 23.51 dBm = Pass
Maximum e.i.r.p. = 7.52 dBm + 3 dB (MIMO) + 15 dBi antenna gain
= 25.52 dBm < 29.51 dBm = Pass

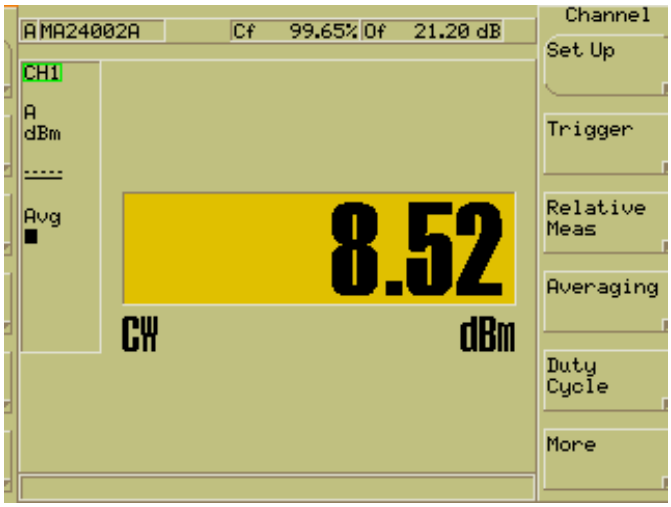


Test Date: 8-9-2013
Company: Cambium Networks
EUT: Avenger SM 5.2 GHz OFDM
Test: Maximum conducted output power – Conducted
Operator: Lillian L
Comment: FCC UNII operating under 15.407 – OET 4/8/2013
E)3) Measurement using a power meter(PM) - Page 8
Operating Mode: Point-to-Multipoint; Antenna Gain = 15 dBi

Limit: [RSS-210,A9.2(3)]: 250 mW (24 dBm) or 11 + 10 log10 B, dBm, whichever power is less (e.i.r.p limit: 17 + 10 log10 B, dBm)
Conducted limit: 11 + 10 log10 (17.86 MHz) = **23.51 dBm**
e.i.r.p. limit: 17 + 10 log10 (17.86 MHz) = **29.51 dBm**

Low Channel: Transmit = 5.270 GHz 20MHz BW
Output power setting: 8; Ch 1:

Maximum conducted output power = 8.52 dBm + 3 dB (MIMO)
= 10.52 dBm < 23.51 dBm = Pass
Maximum e.i.r.p. = 8.52 dBm + 3 dB (MIMO) + 15 dBi antenna gain
= 26.52 dBm < 29.51 dBm = Pass

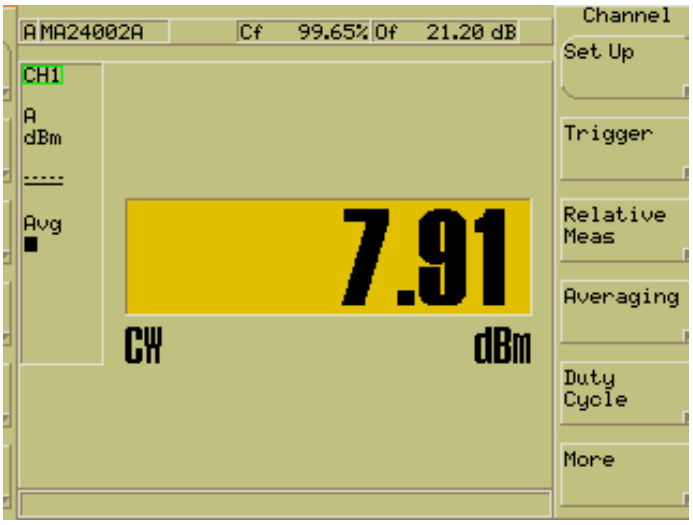


Test Date: 8-9-2013
Company: Cambium Networks
EUT: Avenger SM 5.2 GHz OFDM
Test: Maximum conducted output power – Conducted
Operator: Lillian L
Comment: FCC UNII operating under 15.407 – OET 4/8/2013
E)3) Measurement using a power meter(PM) - Page 8
Operating Mode: Point-to-Multipoint; Antenna Gain = 15 dBi

Limit: [RSS-210,A9.2(3)]: 250 mW (24 dBm) or 11 + 10 log10 B, dBm, whichever power is less (e.i.r.p limit: 17 + 10 log10 B, dBm)
Conducted limit: 11 + 10 log10 (17.86 MHz) = **23.51 dBm**
e.i.r.p. limit: 17 + 10 log10 (17.86 MHz) = **29.51 dBm**

Mid Channel: Transmit = 5.300 GHz 20MHz BW
Output power setting: 8; Ch 0:

Maximum conducted output power = 7.91 dBm + 3 dB (MIMO)
= 10.91 dBm < 23.51 dBm = Pass
Maximum e.i.r.p. = 7.91 dBm + 3 dB (MIMO) + 15 dBi antenna gain
= 25.91 dBm < 29.51 dBm = Pass

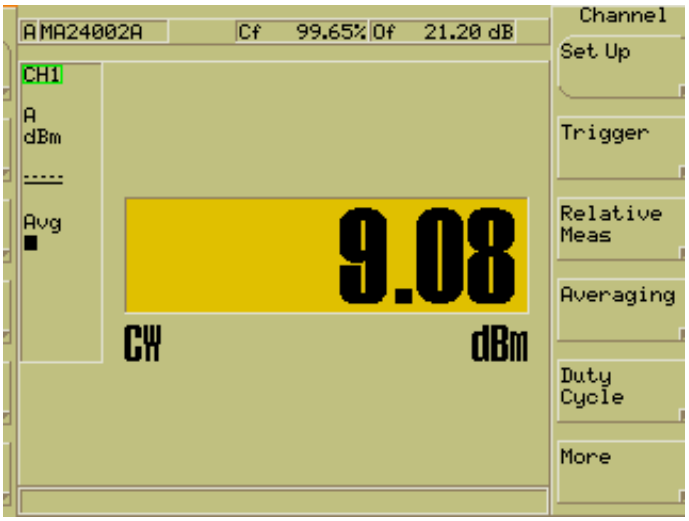


Test Date: 8-9-2013
Company: Cambium Networks
EUT: Avenger SM 5.2 GHz OFDM
Test: Maximum conducted output power – Conducted
Operator: Lillian L
Comment: FCC UNII operating under 15.407 – OET 4/8/2013
E)3) Measurement using a power meter(PM) - Page 8
Operating Mode: Point-to-Multipoint; Antenna Gain = 15 dBi

Limit: [RSS-210,A9.2(3)]: 250 mW (24 dBm) or 11 + 10 log10 B, dBm, whichever power is less (e.i.r.p limit: 17 + 10 log10 B, dBm)
Conducted limit: 11 + 10 log10 (17.86 MHz) = **23.51 dBm**
e.i.r.p. limit: 17 + 10 log10 (17.86 MHz) = **29.51 dBm**

Mid Channel: Transmit = 5.300 GHz 20MHz BW
Output power setting: 8; Ch 1:

Maximum conducted output power = 9.08 dBm + 3 dB (MIMO)
= 12.08 dBm < 23.51 dBm = Pass
Maximum e.i.r.p. = 9.08 dBm + 3 dB (MIMO) + 15 dBi antenna gain
= 27.08 dBm < 29.51 dBm = Pass

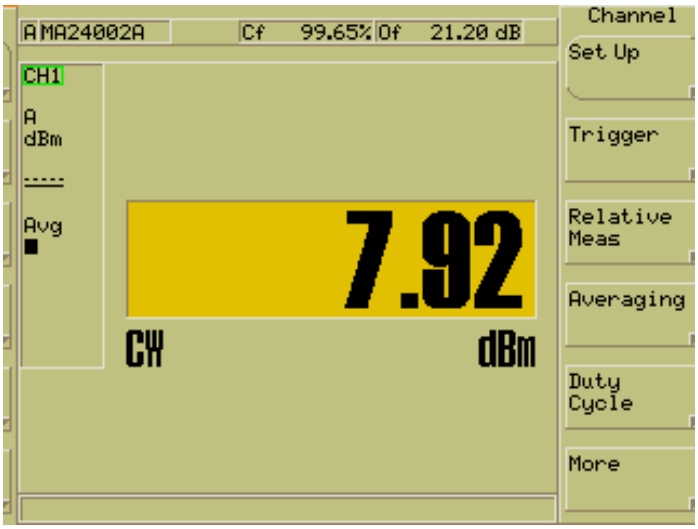


Test Date: 8-9-2013
Company: Cambium Networks
EUT: Avenger SM 5.2 GHz OFDM
Test: Maximum conducted output power – Conducted
Operator: Lillian L
Comment: FCC UNII operating under 15.407 – OET 4/8/2013
E)3) Measurement using a power meter(PM) - Page 8
Operating Mode: Point-to-Multipoint; Antenna Gain = 15 dBi

Limit: [RSS-210,A9.2(3)]: 250 mW (24 dBm) or 11 + 10 log10 B, dBm, whichever power is less (e.i.r.p limit: 17 + 10 log10 B, dBm)
Conducted limit: 11 + 10 log10 (17.92 MHz) = **23.53 dBm**
e.i.r.p. limit: 17 + 10 log10 (17.92 MHz) = **29.53 dBm**

High Channel: Transmit = 5.330 GHz 20MHz BW
Output power setting: 8; Ch 0:

Maximum conducted output power = 7.92 dBm + 3 dB (MIMO)
= 10.92 dBm < 23.53 dBm = Pass
Maximum e.i.r.p. = 7.92 dBm + 3 dB (MIMO) + 15 dBi antenna gain
= 25.92 dBm < 29.53 dBm = Pass

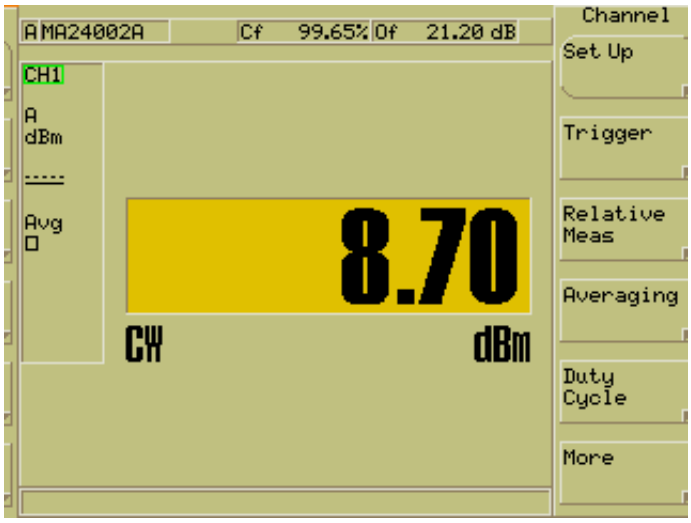


Test Date: 8-9-2013
Company: Cambium Networks
EUT: Avenger SM 5.2 GHz OFDM
Test: Maximum conducted output power – Conducted
Operator: Lillian L
Comment: FCC UNII operating under 15.407 – OET 4/8/2013
E)3) Measurement using a power meter(PM) - Page 8
Operating Mode: Point-to-Multipoint; Antenna Gain = 15 dBi

Limit: [RSS-210,A9.2(3)]: 250 mW (24 dBm) or 11 + 10 log10 B, dBm, whichever power is less (e.i.r.p limit: 17 + 10 log10 B, dBm)
Conducted limit: 11 + 10 log10 (17.86 MHz) = **23.51 dBm**
e.i.r.p. limit: 17 + 10 log10 (17.86 MHz) = **29.51 dBm**

High Channel: Transmit = 5.330 GHz 20MHz BW
Output power setting: 8; Ch 1:

Maximum conducted output power = 8.70 dBm + 3 dB (MIMO)
= 11.70 dBm < 23.51 dBm = Pass
Maximum e.i.r.p. = 8.70 dBm + 3 dB (MIMO) + 15 dBi antenna gain
= 26.70 dBm < 29.51 dBm = Pass

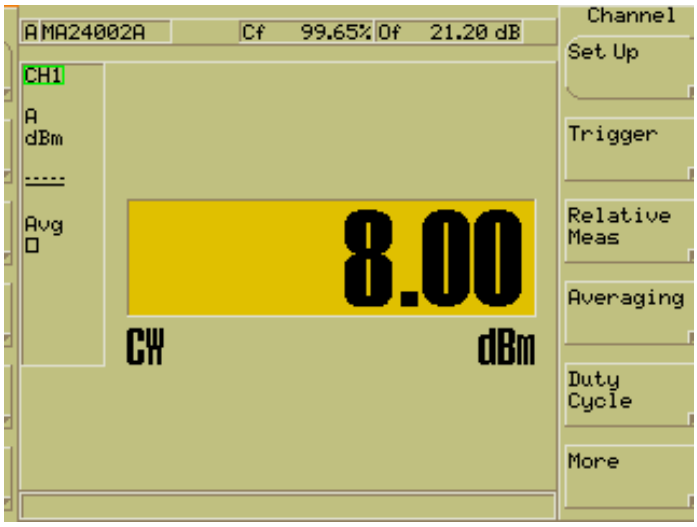


Test Date: 8-9-2013
Company: Cambium Networks
EUT: Avenger SM 5.2 GHz OFDM
Test: Maximum conducted output power – Conducted
Operator: Lillian L
Comment: FCC UNII operating under 15.407 – OET 4/8/2013
E)3) Measurement using a power meter(PM) - Page 8
Operating Mode: Point-to-Multipoint; Antenna Gain = 15 dBi

Limit: [RSS-210,A9.2(3)]: 250 mW (24 dBm) or 11 + 10 log10 B, dBm,
(e.i.r.p limit: 1 W (30 dBm) or 17 + 10 log10 B, dBm) whichever power is less
Conducted limit: **24 dBm**
e.i.r.p. limit: **30 dBm**

Low Channel: Transmit = 5.280 GHz 40MHz BW
Output power setting: 8; Ch 0:

Maximum conducted output power = 8.00 dBm + 3 dB (MIMO)
= 11.00 dBm < 24 dBm = Pass
Maximum e.i.r.p. = 8.00 dBm + 3 dB (MIMO) + 15 dBi antenna gain
= 26.00 dBm < 30 dBm = Pass

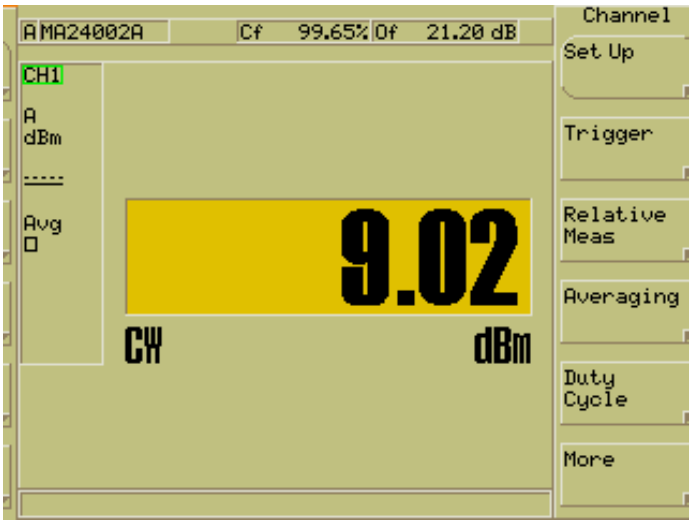


Test Date: 8-9-2013
Company: Cambium Networks
EUT: Avenger SM 5.2 GHz OFDM
Test: Maximum conducted output power – Conducted
Operator: Lillian L
Comment: FCC UNII operating under 15.407 – OET 4/8/2013
E)3) Measurement using a power meter(PM) - Page 8
Operating Mode: Point-to-Multipoint; Antenna Gain = 15 dBi

Limit: [RSS-210,A9.2(3)]: 250 mW (24 dBm) or 11 + 10 log10 B, dBm,
(e.i.r.p limit: 1 W (30 dBm) or 17 + 10 log10 B, dBm) whichever power is less
Conducted limit: **24 dBm**
e.i.r.p. limit: **30 dBm**

Low Channel: Transmit = 5.280 GHz 40MHz BW
Output power setting: 8; Ch 1:

Maximum conducted output power = 9.02 dBm + 3 dB (MIMO)
= 12.02 dBm < 24 dBm = Pass
Maximum e.i.r.p. = 9.02 dBm + 3 dB (MIMO) + 15 dBi antenna gain
= 27.02 dBm < 30 dBm = Pass

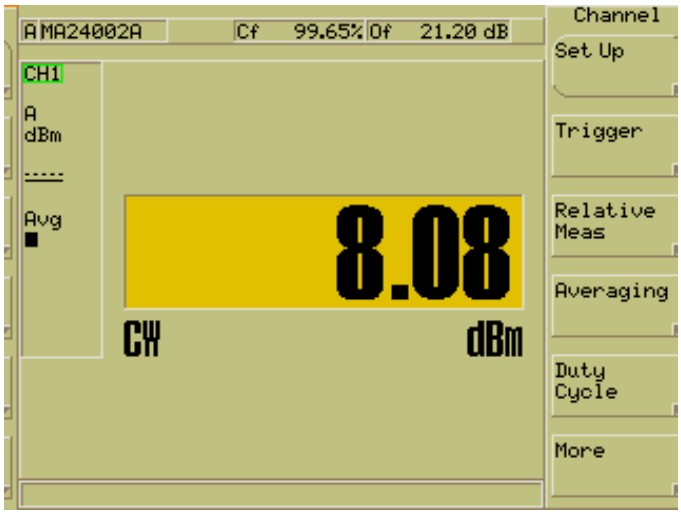


Test Date: 8-9-2013
Company: Cambium Networks
EUT: Avenger SM 5.2 GHz OFDM
Test: Maximum conducted output power – Conducted
Operator: Lillian L
Comment: FCC UNII operating under 15.407 – OET 4/8/2013
E)3) Measurement using a power meter(PM) - Page 8
Operating Mode: Point-to-Multipoint; Antenna Gain = 15 dBi

Limit: [RSS-210,A9.2(3)]: 250 mW (24 dBm) or 11 + 10 log10 B, dBm,
(e.i.r.p limit: 1 W (30 dBm) or 17 + 10 log10 B, dBm) whichever power is less
Conducted limit: **24 dBm**
e.i.r.p. limit: **30 dBm**

Mid Channel: Transmit = 5.310 GHz 40MHz BW
Output power setting: 8; Ch 0:

Maximum conducted output power = 8.08 dBm + 3 dB (MIMO)
= 11.08 dBm < 24 dBm = Pass
Maximum e.i.r.p. = 8.08 dBm + 3 dB (MIMO) + 15 dBi antenna gain
= 26.08 dBm < 30 dBm = Pass

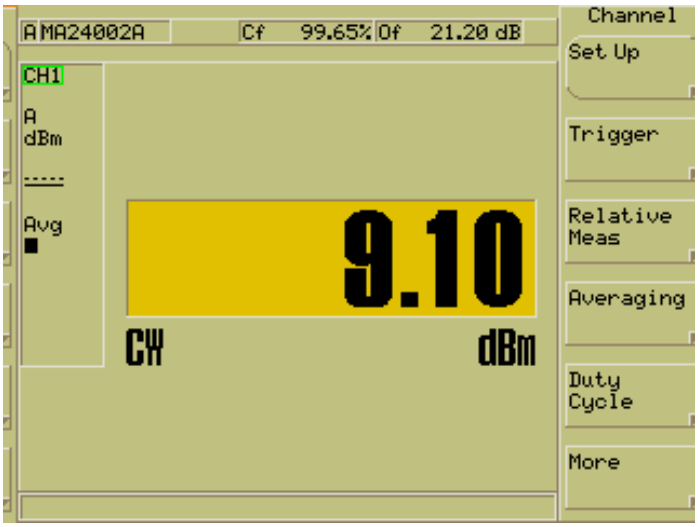


Test Date: 8-9-2013
Company: Cambium Networks
EUT: Avenger SM 5.2 GHz OFDM
Test: Maximum conducted output power – Conducted
Operator: Lillian L
Comment: FCC UNII operating under 15.407 – OET 4/8/2013
E)3) Measurement using a power meter(PM) - Page 8
Operating Mode: Point-to-Multipoint; Antenna Gain = 15 dBi

Limit: [RSS-210,A9.2(3)]: 250 mW (24 dBm) or 11 + 10 log10 B, dBm,
(e.i.r.p limit: 1 W (30 dBm) or 17 + 10 log10 B, dBm) whichever power is less
Conducted limit: **24 dBm**
e.i.r.p. limit: **30 dBm**

Mid Channel: Transmit = 5.310 GHz 40MHz BW
Output power setting: 8; Ch 1:

Maximum conducted output power = 9.01 dBm + 3 dB (MIMO)
= 12.10 dBm < 24 dBm = Pass
Maximum e.i.r.p. = 9.10 dBm + 3 dB (MIMO) + 15 dBi antenna gain
= 27.10 dBm < 30 dBm = Pass

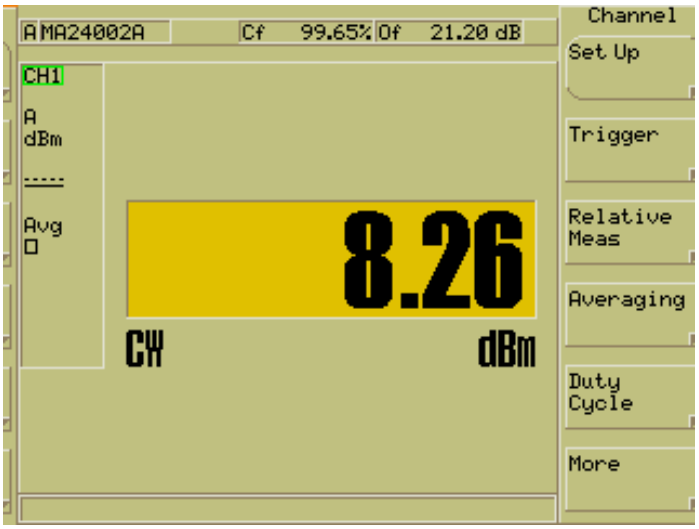


Test Date: 8-9-2013
Company: Cambium Networks
EUT: Avenger SM 5.2 GHz OFDM
Test: Maximum conducted output power – Conducted
Operator: Lillian L
Comment: FCC UNII operating under 15.407 – OET 4/8/2013
E)3) Measurement using a power meter(PM) - Page 8
Operating Mode: Point-to-Multipoint; Antenna Gain = 15 dBi

Limit: [RSS-210,A9.2(3)]: 250 mW (24 dBm) or 11 + 10 log10 B, dBm,
(e.i.r.p limit: 1 W (30 dBm) or 17 + 10 log10 B, dBm) whichever power is less
Conducted limit: **24 dBm**
e.i.r.p. limit: **30 dBm**

High Channel: Transmit = 5.320 GHz 40MHz BW
Output power setting: 8; Ch 0:

Maximum conducted output power = 8.26 dBm + 3 dB (MIMO)
= 11.26 dBm < 24 dBm = Pass
Maximum e.i.r.p. = 8.26 dBm + 3 dB (MIMO) + 15 dBi antenna gain
= 26.26 dBm < 30 dBm = Pass

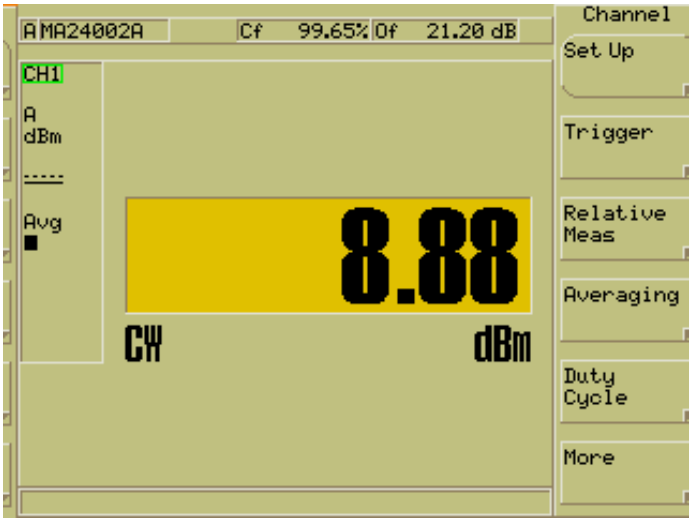


Test Date: 8-9-2013
Company: Cambium Networks
EUT: Avenger SM 5.2 GHz OFDM
Test: Maximum conducted output power – Conducted
Operator: Lillian L
Comment: FCC UNII operating under 15.407 – OET 4/8/2013
E)3) Measurement using a power meter(PM) - Page 8
Operating Mode: Point-to-Multipoint; Antenna Gain = 15 dBi

Limit: [RSS-210,A9.2(3)]: 250 mW (24 dBm) or 11 + 10 log10 B, dBm,
(e.i.r.p limit: 1 W (30 dBm) or 17 + 10 log10 B, dBm) whichever power is less
Conducted limit: **24 dBm**
e.i.r.p. limit: **30 dBm**

High Channel: Transmit = 5.320 GHz 40MHz BW
Output power setting: 8; Ch 1:

Maximum conducted output power = 8.88 dBm + 3 dB (MIMO)
= 11.88 dBm < 24 dBm = Pass
Maximum e.i.r.p. = 8.88 dBm + 3 dB (MIMO) + 15 dBi antenna gain
= 26.88 dBm < 30 dBm = Pass



Appendix B – Measurement Data

B5.0 Peak Power Spectral Density – Conducted

Rule Section: FCC Section 15.407(a)(2)
RSS-210 A9.2(2)

Test Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r03 – *Guidance for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E*

Section F – Peak power spectral density (PPSD)
Using method E(2)(b) SA-1 for power spectrum

Description: SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points ≥ 2 x Span/RBW
Sweep time: auto
Detector = RMS
Sweep: trace average 200 sweeps in RMS mode
Use peak search to find the peak of the spectrum

Limit: 11 dBm in any 1 MHz band
Limit shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi

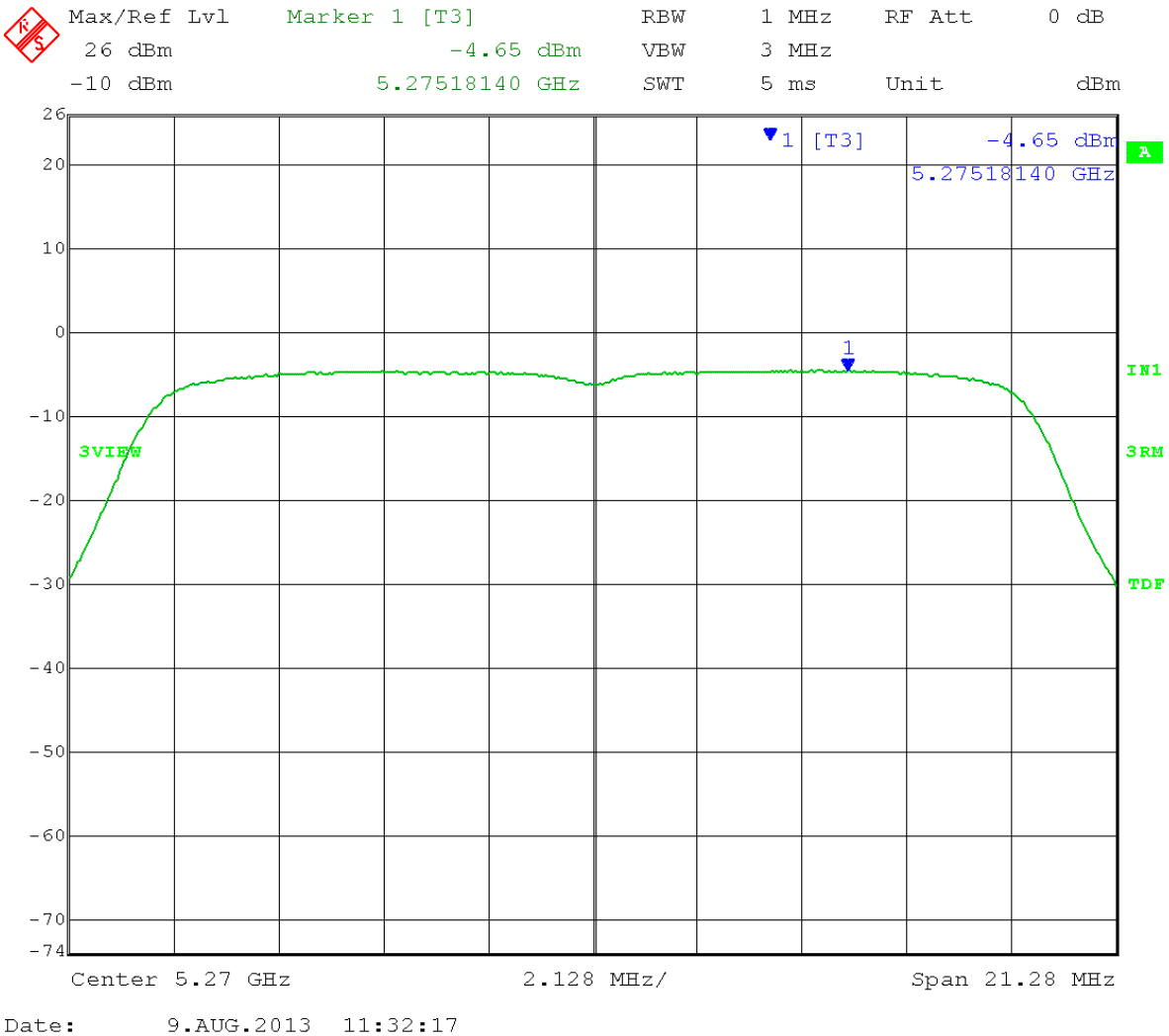
Results: Passed

Notes: Measurements were taken for MCS15 OFDM modulation at the lowest, middle, and highest channels of operation. EUT was set to transmit continuously with 100% duty cycle.

Test Date: 8-9-2013
Company: Cambium Networks
EUT: Avenger SM 5.2GHz: OFDM
Test: Peak Power Spectral Density - Conducted
Operator: Lillian L
Comment: FCC UNII operating under 15.407 – OET 4/8/2013
F) PPSD – Page 9
Limit:[15.407(a)(2)]: 11 – [15(antenna gain)+3(MIMO)-6]= -1dBm/1MHz
RBW = 1 MHz VBW = 3 MHz
Detector = RMS Trace = AVG
Sweep Time = Auto Sweep counts = 200
Low Channel: Transmit = 5.270GHz 20MHz BW
Output power setting: 8

Channel 0:

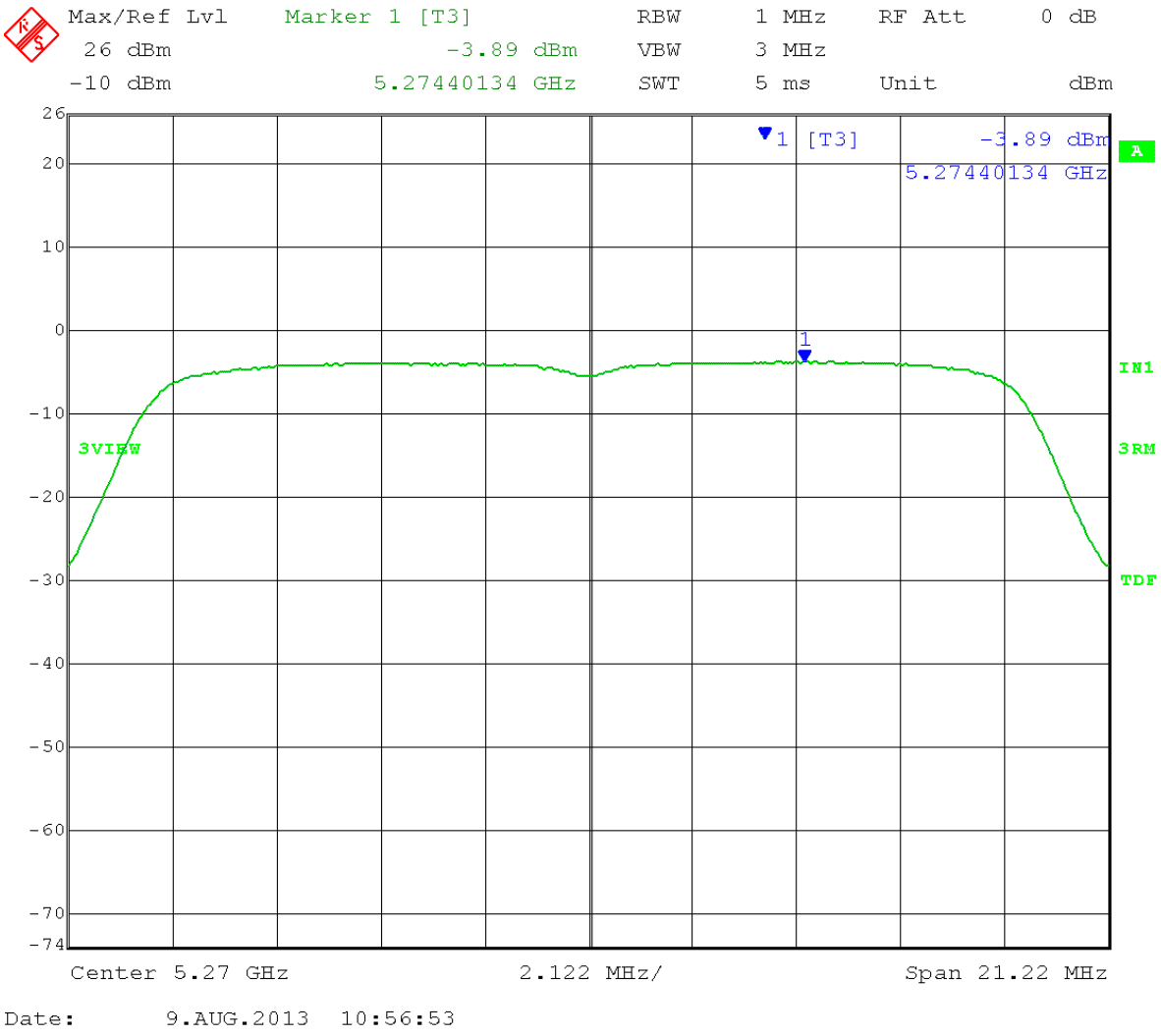
26 dB Emission Bandwidth = 21.28MHz
PPSD = -4.65dBm < -1 dBm = Pass



Date: 9.AUG.2013 11:32:17

Channel 1:

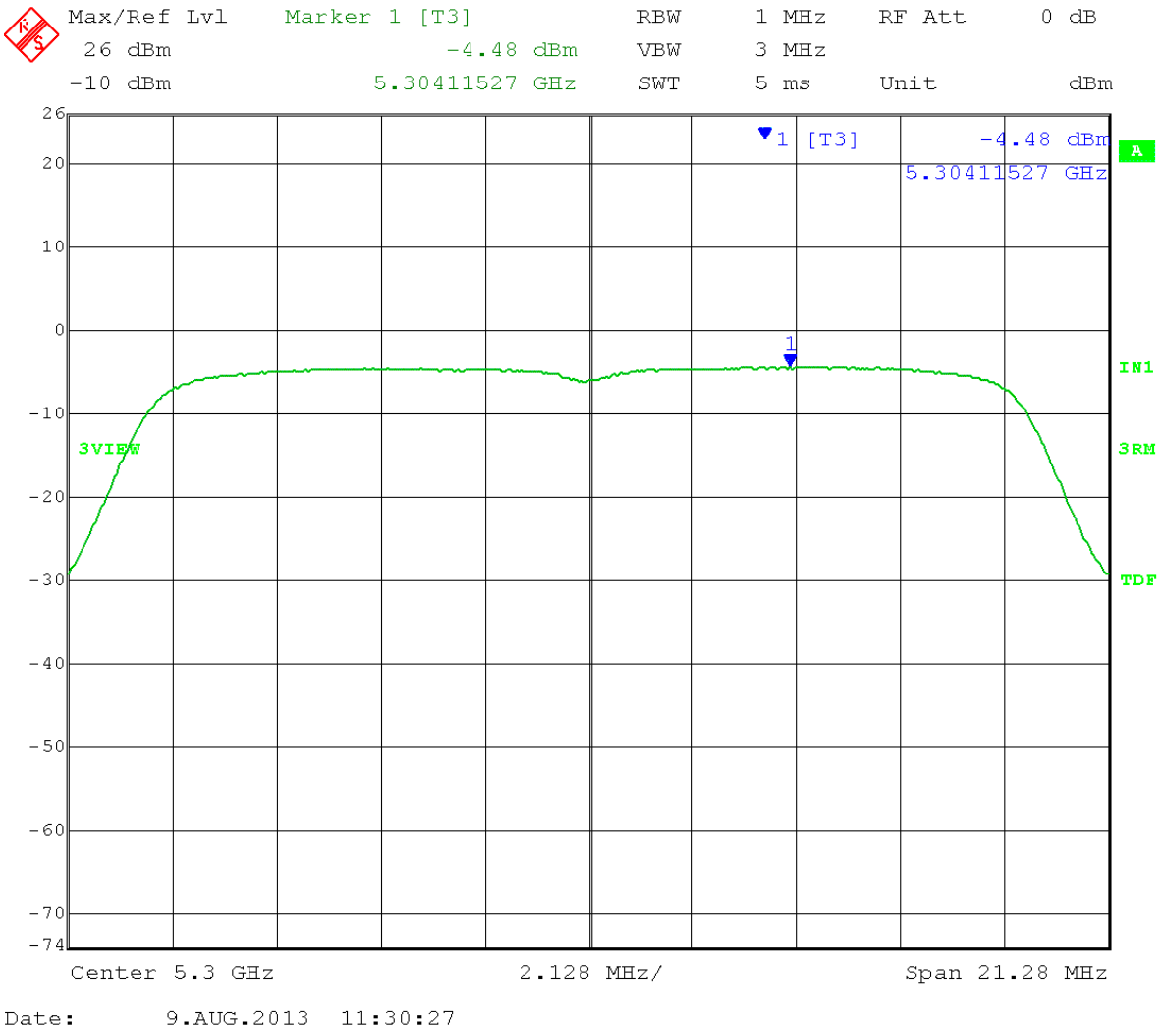
26 dB Emission Bandwidth = 21.22MHz
PPSD = -3.89 dBm < -1 dBm = Pass



Test Date: 8-9-2013
Company: Cambium Networks
EUT: Avenger SM 5.2GHz: OFDM
Test: Peak Power Spectral Density - Conducted
Operator: Lillian L
Comment: FCC UNII operating under 15.407 – OET 4/8/2013
F) PPSD – Page 9
Limit:[15.407(a)(2)]: 11 – [15(antenna gain)+3(MIMO)-6]= -1dBm/1MHz
RBW = 1 MHz VBW = 3 MHz
Detector = RMS Trace = AVG
Sweep Time = Auto Sweep counts = 200
Mid Channel: Transmit = 5.300GHz 20MHz BW
Output power setting: 8

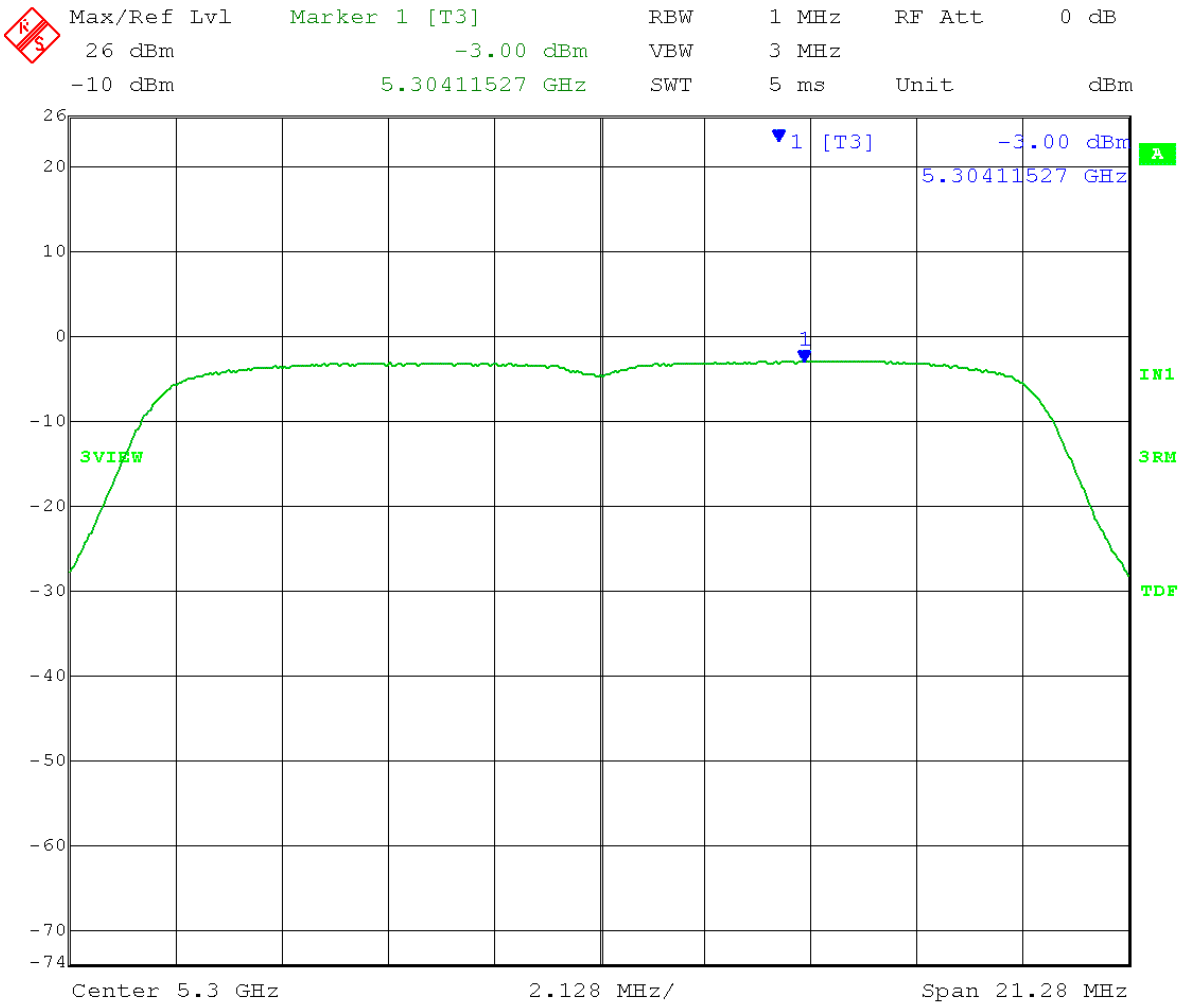
Channel 0:

26 dB Emission Bandwidth = 21.28MHz
PPSD = -4.48dBm < -1 dBm = Pass



Channel 1:

26 dB Emission Bandwidth = 21.28MHz
PPSD = -3.00 dBm < -1 dBm = Pass

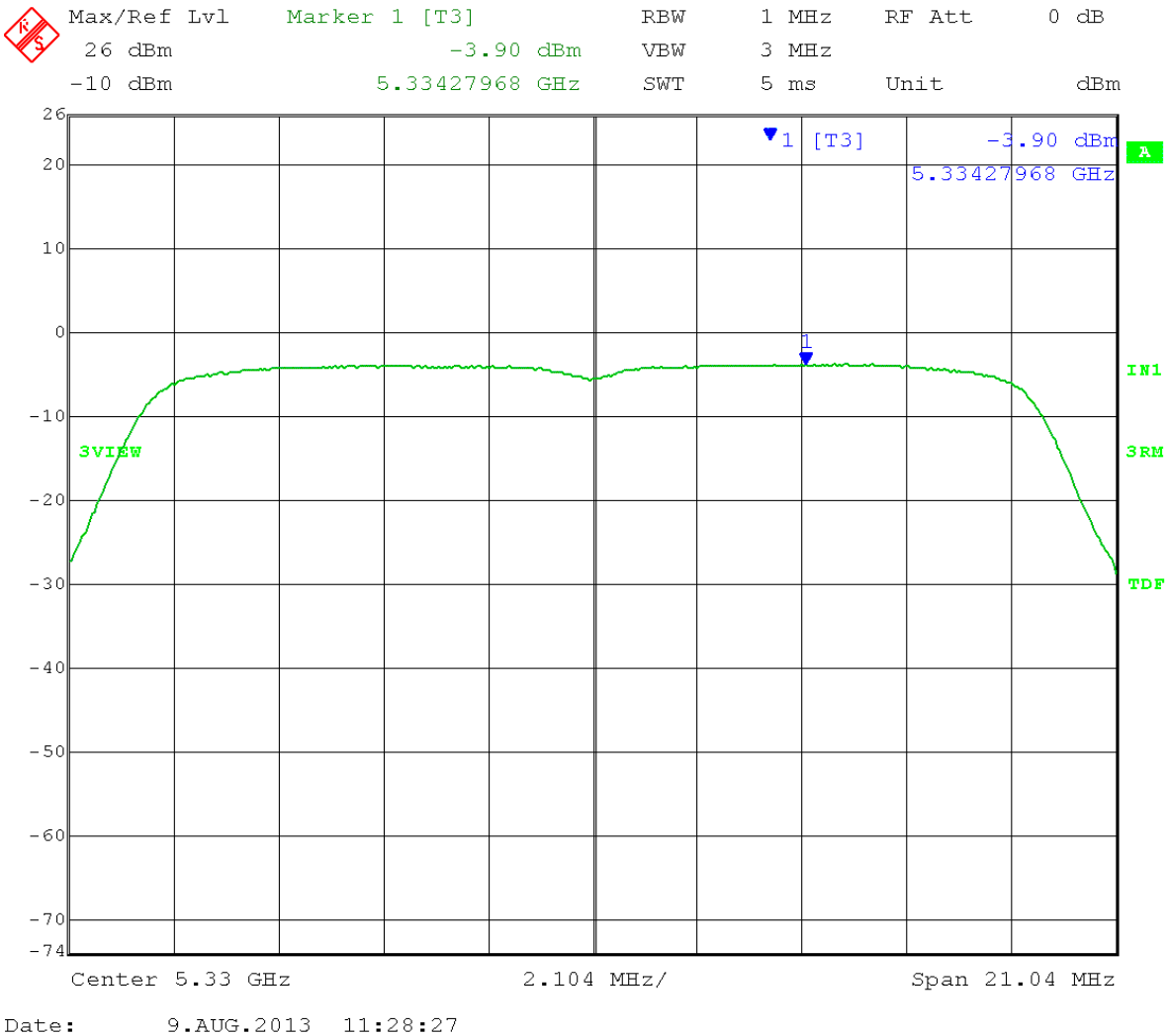


Date: 9.AUG.2013 10:59:41

Test Date: 8-9-2013
Company: Cambium Networks
EUT: Avenger SM 5.2GHz: OFDM
Test: Peak Power Spectral Density - Conducted
Operator: Lillian L
Comment: FCC UNII operating under 15.407 – OET 4/8/2013
F) PPSD – Page 9
Limit:[15.407(a)(2)]: 11 – [15(antenna gain)+3(MIMO)-6]= -1dBm/1MHz
RBW = 1 MHz VBW = 3 MHz
Detector = RMS Trace = AVG
Sweep Time = Auto Sweep counts = 200
High Channel: Transmit = 5.330GHz 20MHz BW
Output power setting: 8

Channel 0:

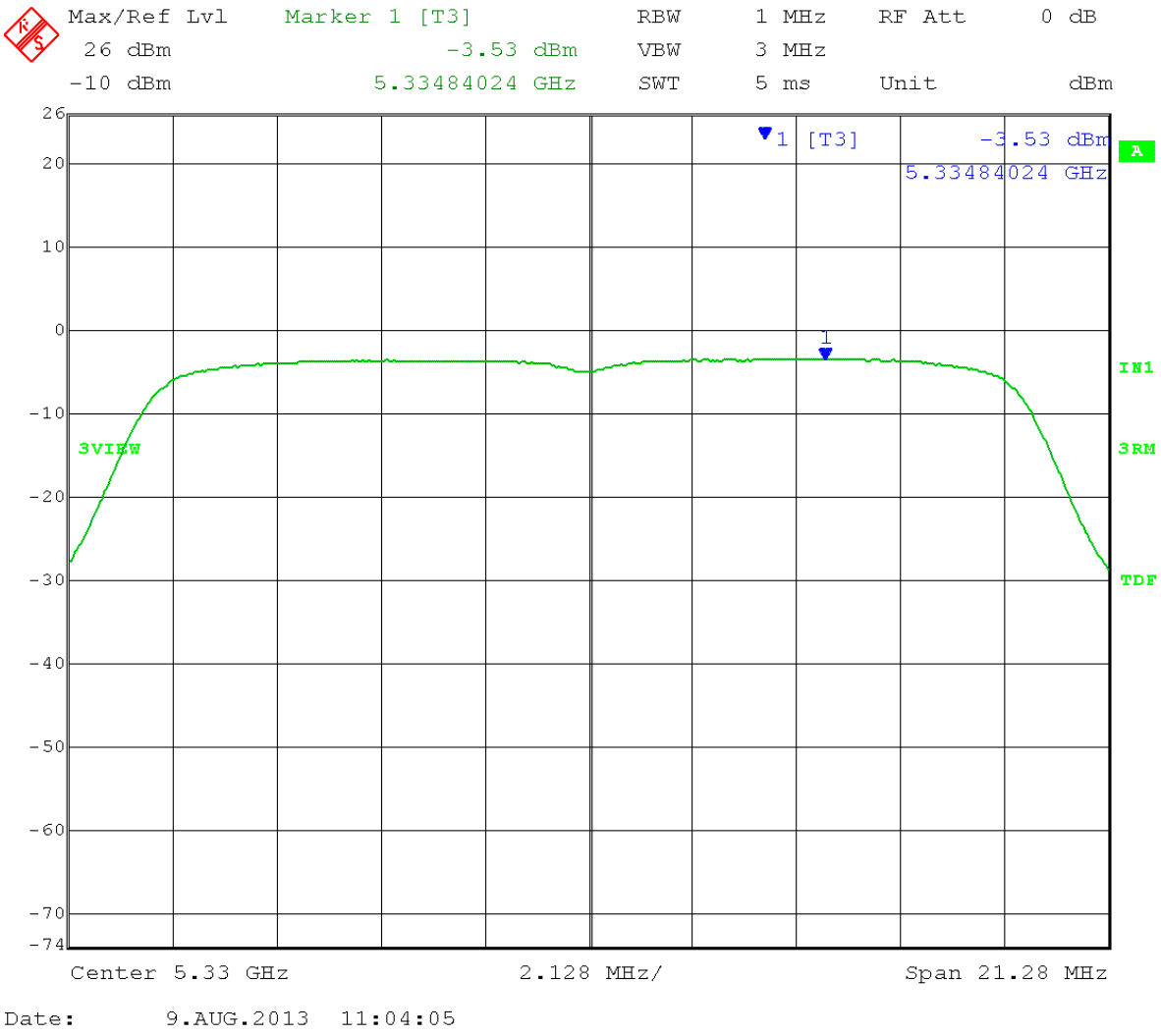
26 dB Emission Bandwidth = 21.04MHz
PPSD = -3.90dBm < -1 dBm = Pass



Date: 9.AUG.2013 11:28:27

Channel 1:

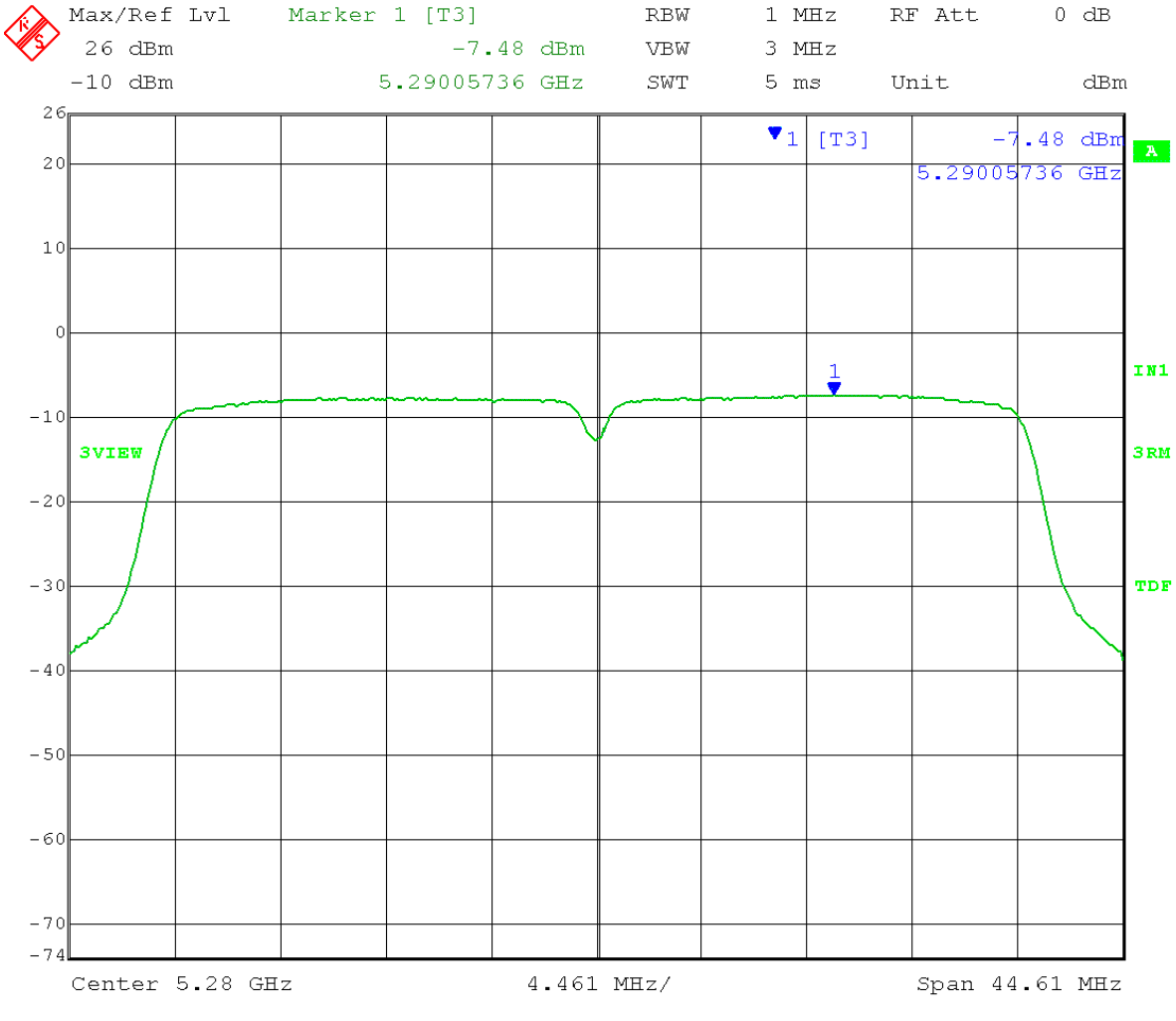
26 dB Emission Bandwidth = 21.28MHz
PPSD = -3.53 dBm < -1 dBm = Pass



Test Date: 8-9-2013
Company: Cambium Networks
EUT: Avenger SM 5.2GHz: OFDM
Test: Peak Power Spectral Density - Conducted
Operator: Lillian L
Comment: FCC UNII operating under 15.407 – OET 4/8/2013
F) PPSD – Page 9
Limit:[15.407(a)(2)]: 11 – [15(antenna gain)+3(MIMO)-6]= -1dBm/1MHz
RBW = 1 MHz VBW = 3 MHz
Detector = RMS Trace = AVG
Sweep Time = Auto Sweep counts = 200
Low Channel: Transmit = 5.280GHz 40MHz BW
Output power setting: 8

Channel 0:

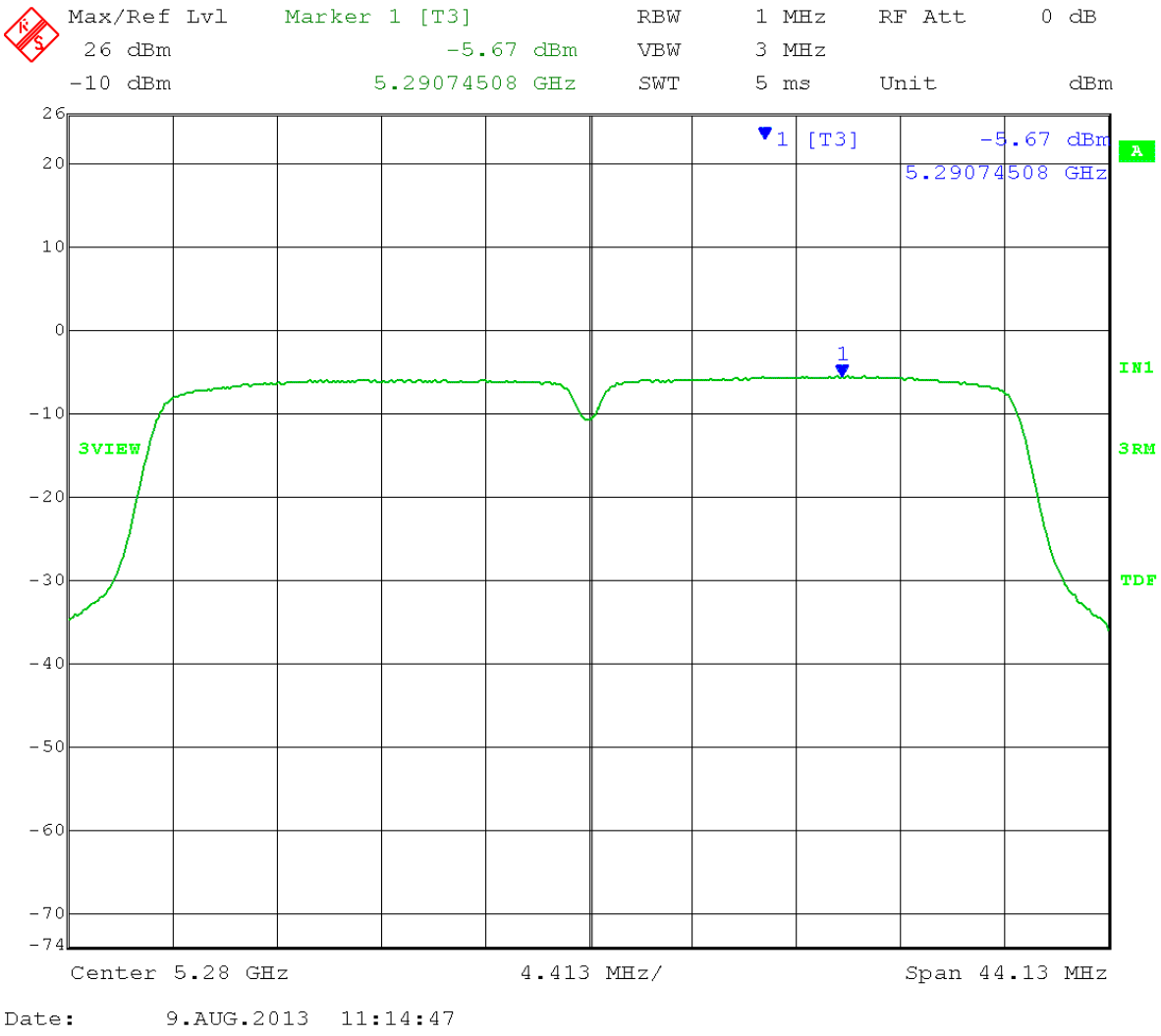
26 dB Emission Bandwidth = 44.61MHz
PPSD = -7.48dBm < -1 dBm = Pass



Date: 9.AUG.2013 11:20:52

Channel 1:

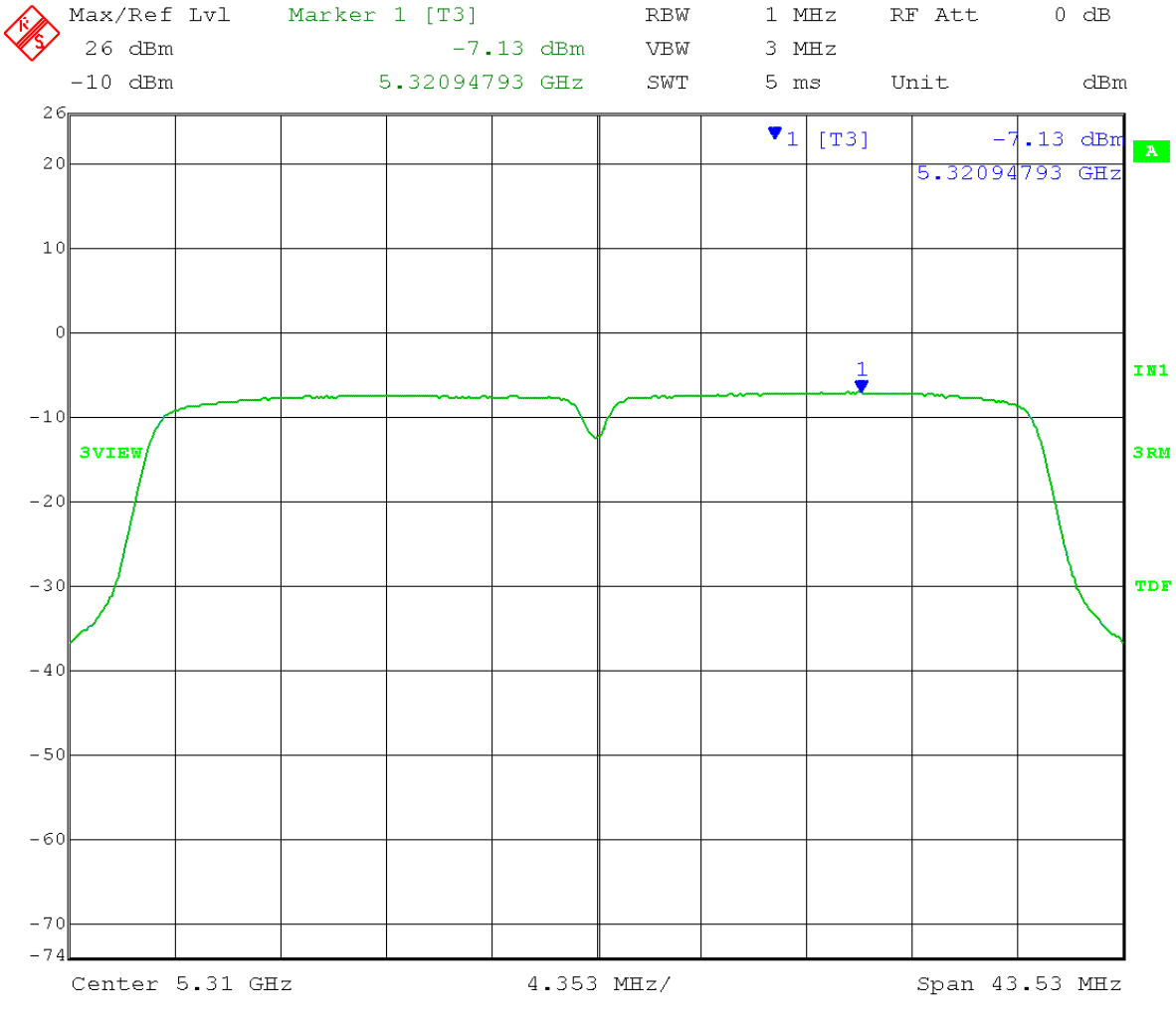
26 dB Emission Bandwidth = 44.13MHz
PPSD = -5.67 dBm < -1 dBm = Pass



Test Date: 8-9-2013
Company: Cambium Networks
EUT: Avenger SM 5.2GHz: OFDM
Test: Peak Power Spectral Density - Conducted
Operator: Lillian L
Comment: FCC UNII operating under 15.407 – OET 4/8/2013
F) PPSD – Page 9
Limit:[15.407(a)(2)]: 11 – [15(antenna gain)+3(MIMO)-6]= -1dBm/1MHz
RBW = 1 MHz VBW = 3 MHz
Detector = RMS Trace = AVG
Sweep Time = Auto Sweep counts = 200
Mid Channel: Transmit = 5.310GHz 40MHz BW
Output power setting: 8

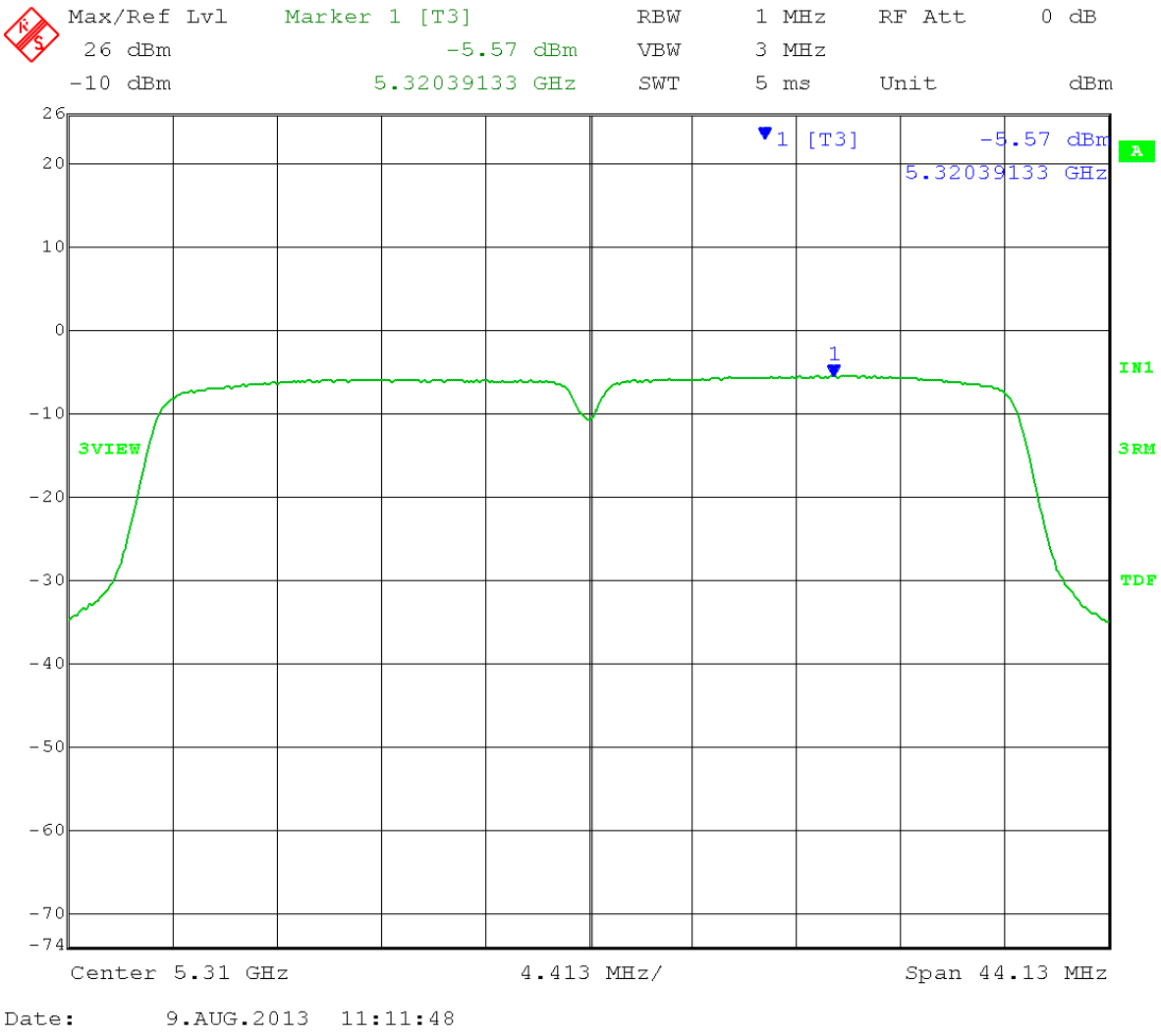
Channel 0:

26 dB Emission Bandwidth = 43.53MHz
PPSD = -7.13dBm < -1 dBm = Pass



Channel 1:

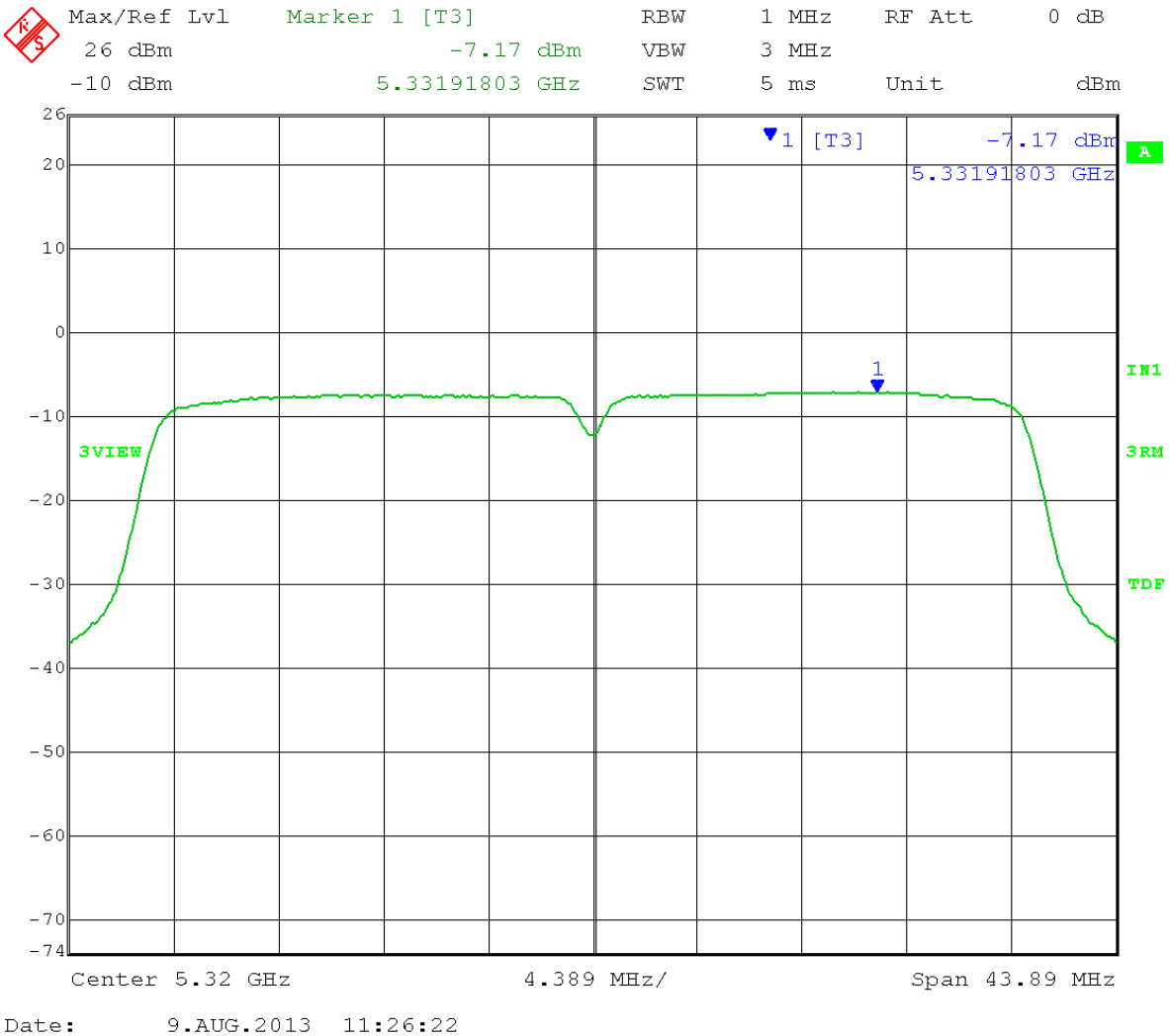
26 dB Emission Bandwidth = 44.13MHz
PPSD = -5.57 dBm < -1 dBm = Pass



Test Date: 8-9-2013
Company: Cambium Networks
EUT: Avenger SM 5.2GHz: OFDM
Test: Peak Power Spectral Density - Conducted
Operator: Lillian L
Comment: FCC UNII operating under 15.407 – OET 4/8/2013
F) PPSD – Page 9
Limit:[15.407(a)(2)]: 11 – [15(antenna gain)+3(MIMO)-6]= -1dBm/1MHz
RBW = 1 MHz VBW = 3 MHz
Detector = RMS Trace = AVG
Sweep Time = Auto Sweep counts = 200
High Channel: Transmit = 5.320GHz 40MHz BW
Output power setting: 8

Channel 0:

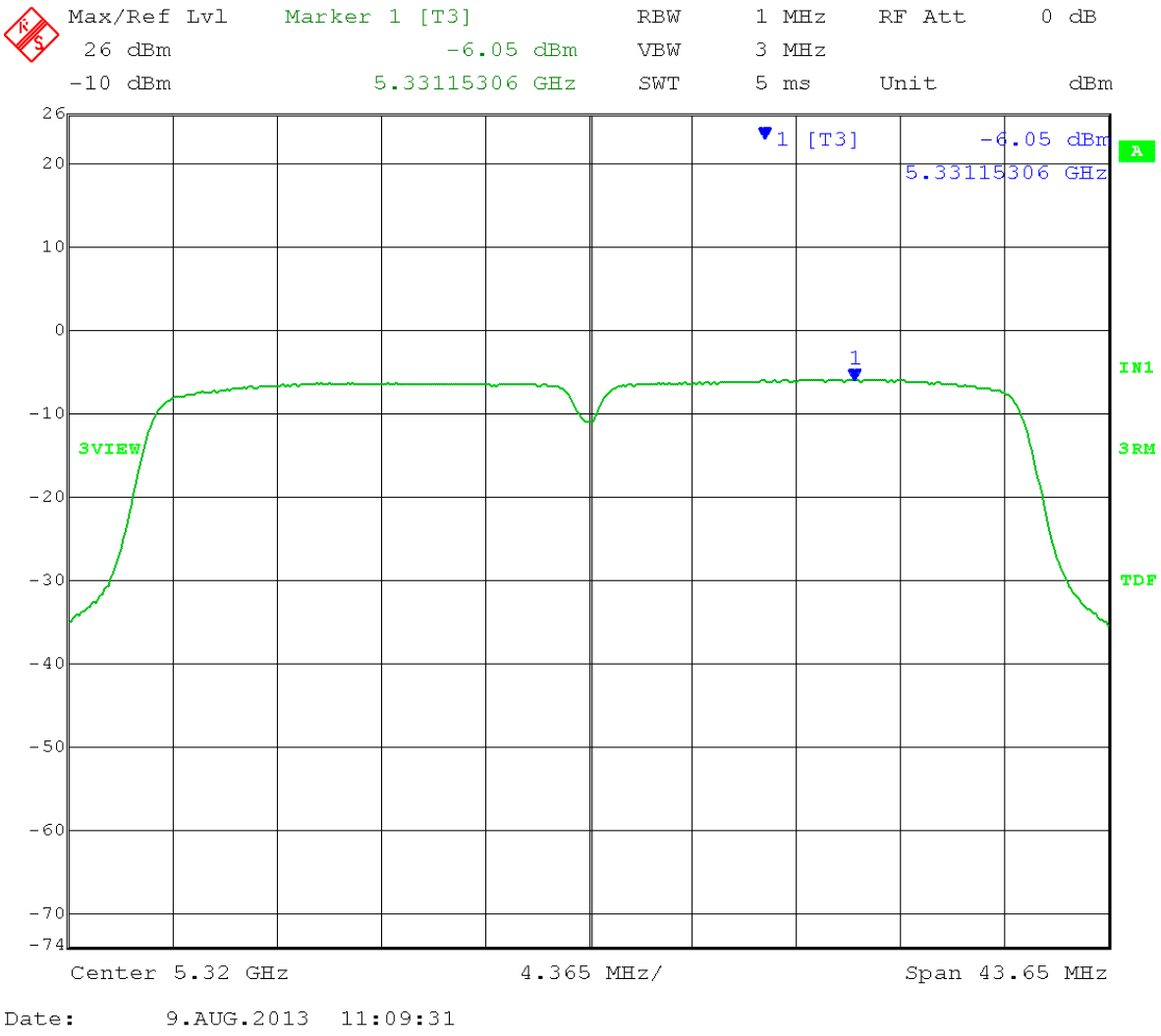
26 dB Emission Bandwidth = 43.89MHz
PPSD = -7.17dBm < -1 dBm = Pass



Date: 9.AUG.2013 11:26:22

Channel 1:

26 dB Emission Bandwidth = 43.65MHz
PPSD = -6.05 dBm < -1 dBm = Pass



Appendix B – Measurement Data

B6.0 Peak Excursion – Conducted

Rule Section: FCC Section 15.407(a)(6)
RSS-210 A9.4(2)

Test Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r03 – *Guidance for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E*

Section G – Peak excursion measurement

Description: SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz
VBW ≥ 3 MHz
Detector = Peak
Trace mod = max hold
Use peak search to find the peak of the spectrum
Compute the ratio of the maximum of the peak-max-hold spectrum to the PPSD

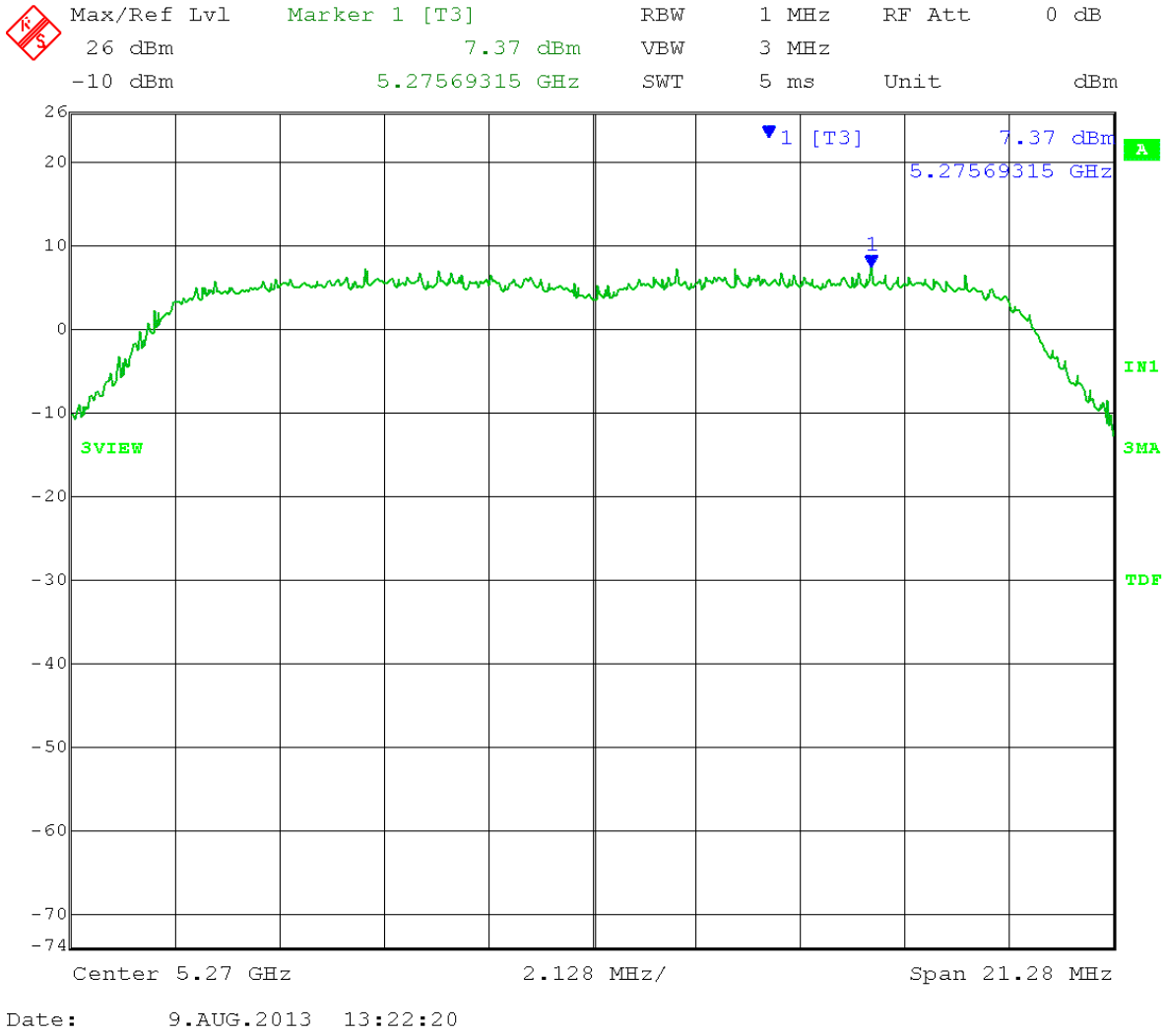
Limit: 13 dB peak-to-average ratio across any 1 MHz bandwidth

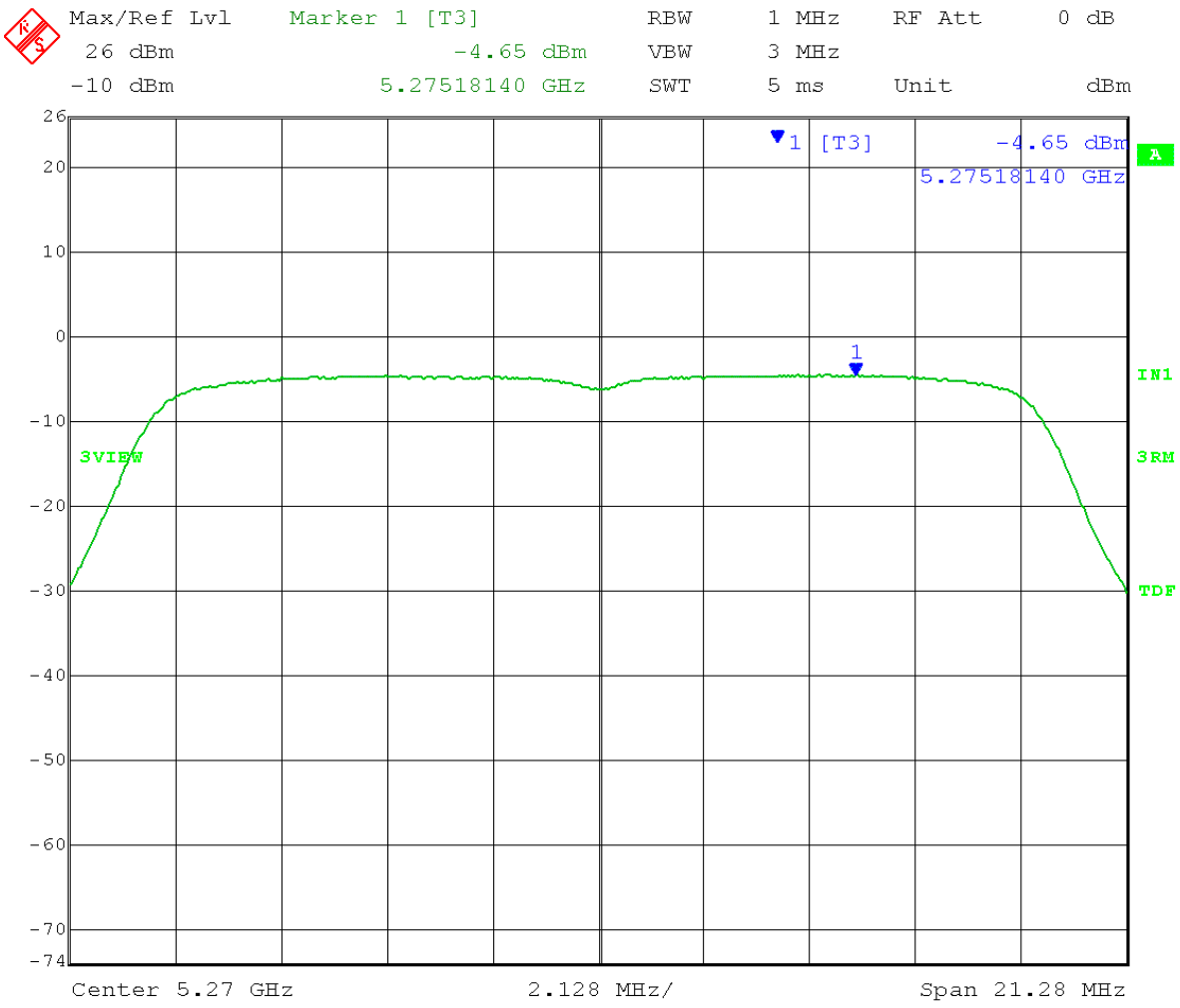
Results: Passed

Notes: Measurements were taken for MCS15 OFDM modulation at the lowest, middle, and highest channels of operation. EUT was set to transmit continuously with 100% duty cycle.

Test Date: 8-9-2013
Company: Cambium Networks
EUT: Avenger SM 5.2GHz: OFDM
Test: Peak Excursion - Conducted
Operator: Lillian L
Comment: FCC UNII operating under 15.407 – OET 4/8/2013
G) PK excursion measurement – Page 9
Limit:[15.407(a)(6)]: 13dBm/1MHz

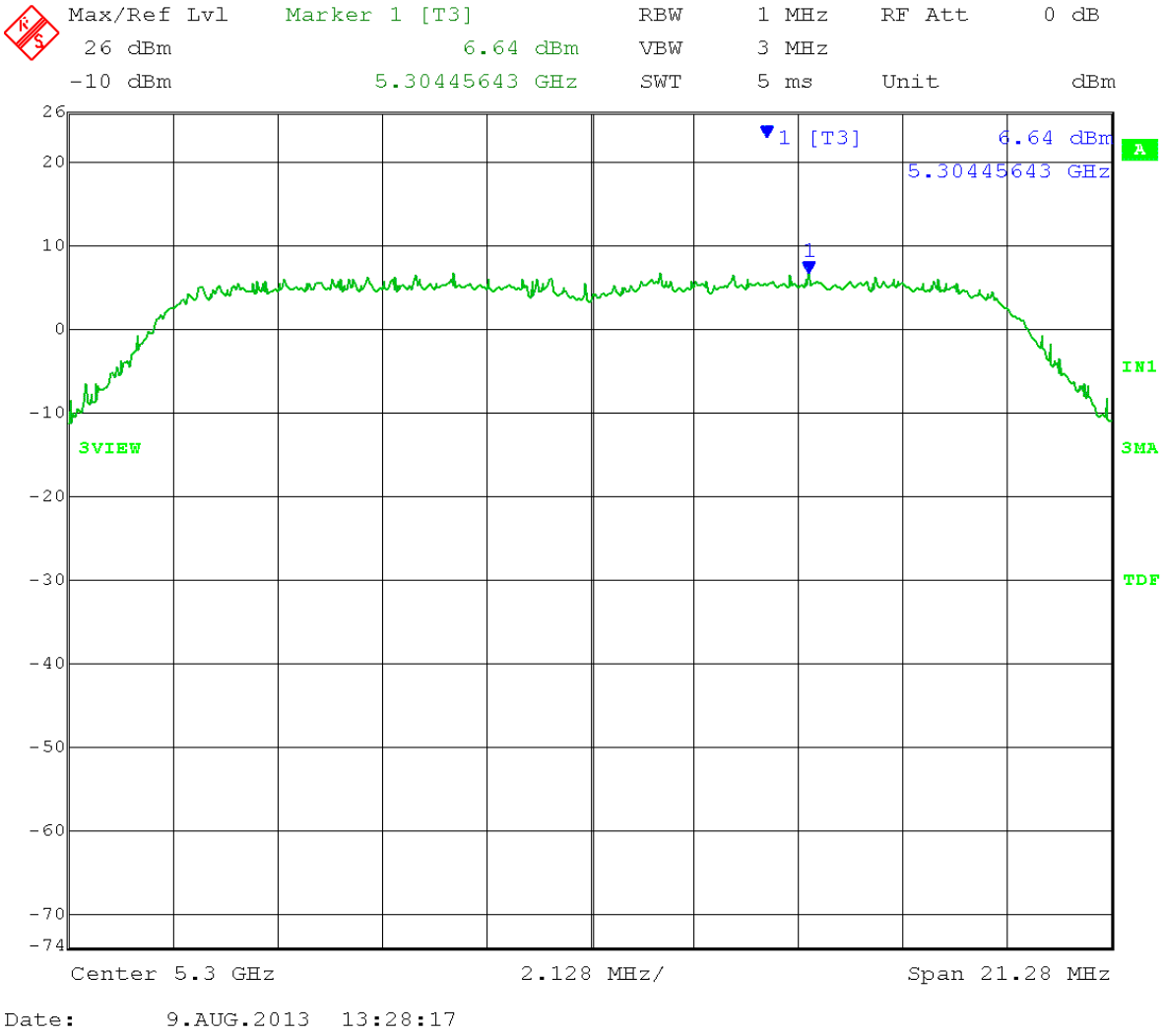
RBW = 1 MHz	VBW = 3 MHz
Detector = peak	Trace = max-hold
Sweep Time = Auto	Output power setting: 8
Low Channel: Transmit = 5.270GHz	20MHz BW
26 dB Emission Bandwidth = 21.28MHz	PPSD = -4.65dBm
Peak excursion = 7.37 - (-4.65) = 12.02dBm	<13 dBm = Pass

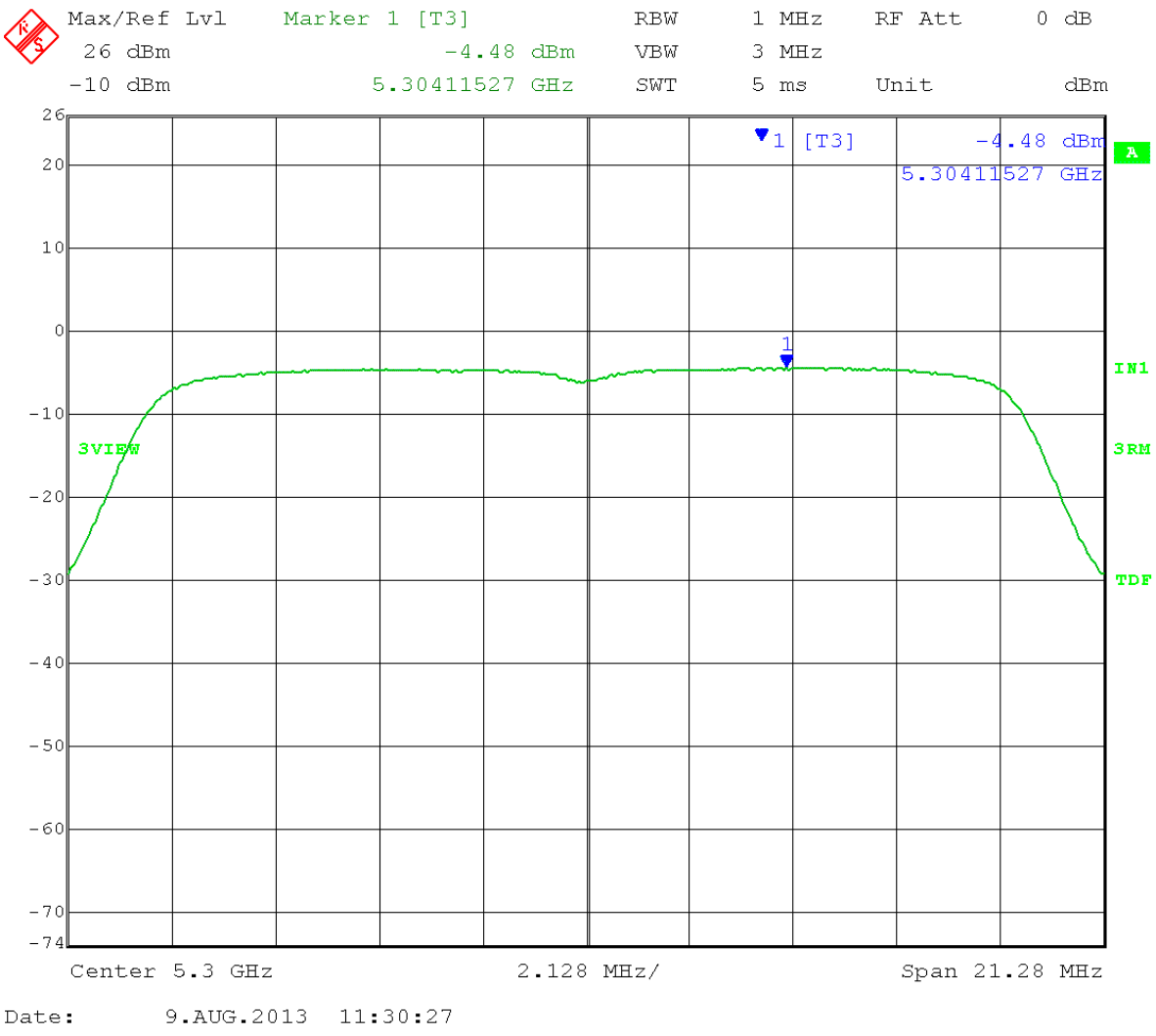




Date: 9.AUG.2013 11:32:17

Test Date:	8-9-2013
Company:	Cambium Networks
EUT:	Avenger SM 5.2GHz: OFDM
Test:	Peak Excursion - Conducted
Operator:	Lillian L
Comment:	FCC UNII operating under 15.407 – OET 4/8/2013
	G) PK excursion measurement – Page 9
	Limit:[15.407(a)(6)]: 13dBm/1MHz
	RBW = 1 MHz VBW = 3 MHz
	Detector = peak Trace = max-hold
	Sweep Time = Auto Output power setting: 8
	Mid Channel: Transmit = 5.300GHz 20MHz BW
	26 dB Emission Bandwidth = 21.28MHz PPSD = -4.48dBm
	Peak excursion = 6.64 - (-4.48) = 11.12dBm <13 dBm = Pass

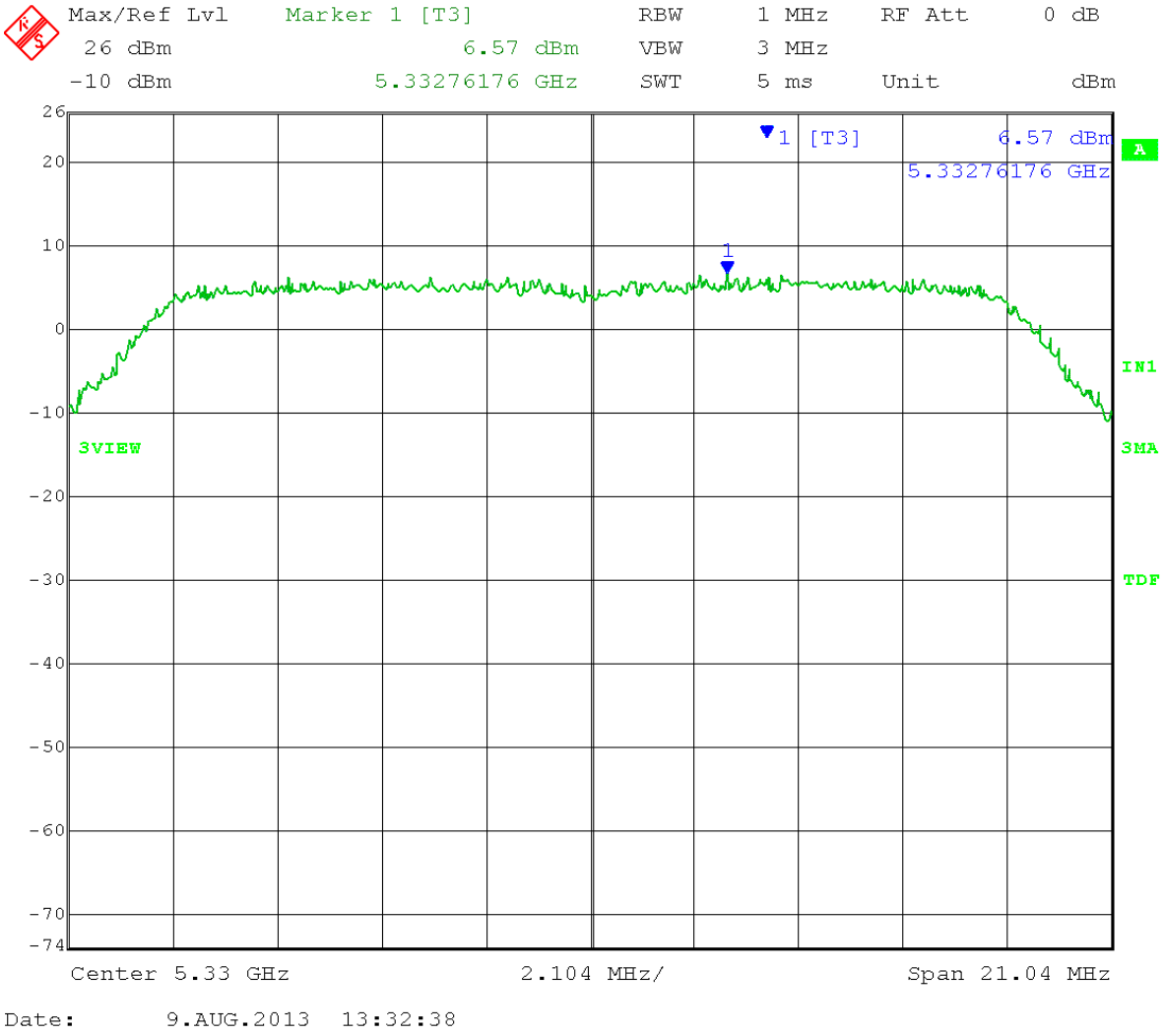


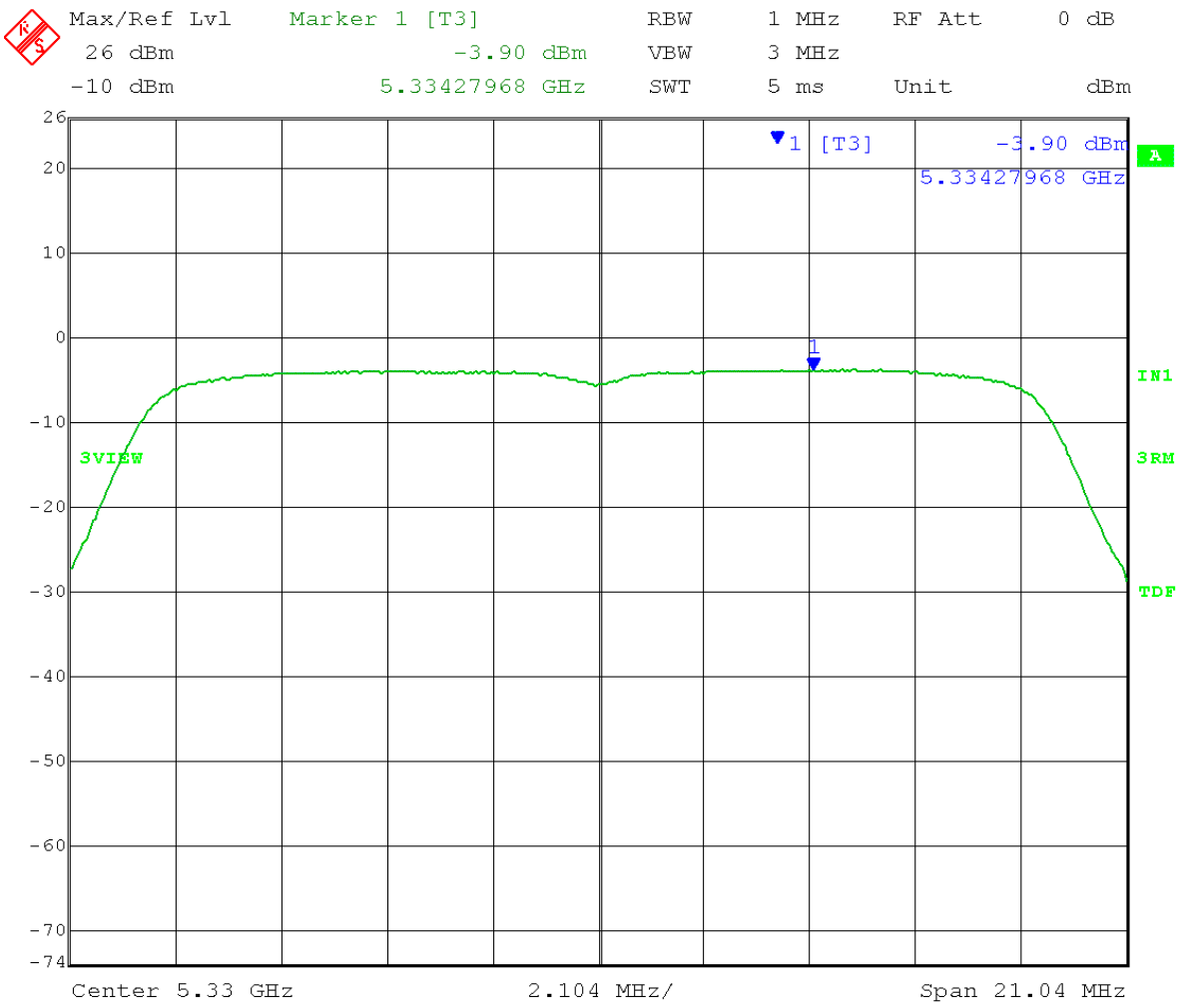


Date: 9.AUG.2013 11:30:27

Test Date: 8-9-2013
Company: Cambium Networks
EUT: Avenger SM 5.2GHz: OFDM
Test: Peak Excursion - Conducted
Operator: Lillian L
Comment: FCC UNII operating under 15.407 – OET 4/8/2013
G) PK excursion measurement – Page 9
Limit:[15.407(a)(6)]: 13dBm/1MHz

RBW = 1 MHz	VBW = 3 MHz
Detector = peak	Trace = max-hold
Sweep Time = Auto	Output power setting: 8
High Channel: Transmit = 5.330GHz	20MHz BW
26 dB Emission Bandwidth = 21.04MHz	PPSD = -3.90dBm
Peak excursion = 6.57 - (-3.90) = 10.47dBm	<13 dBm = Pass

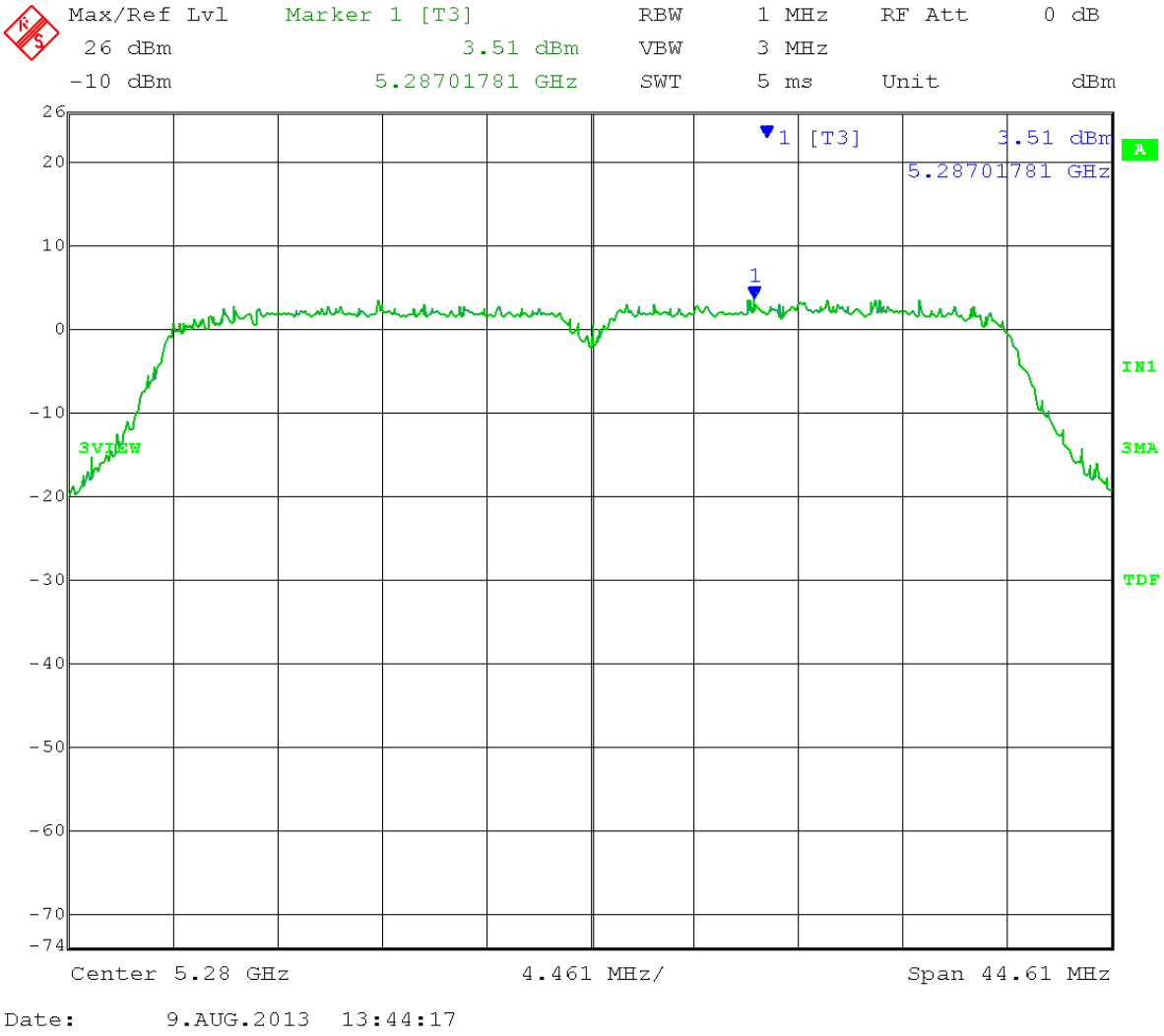


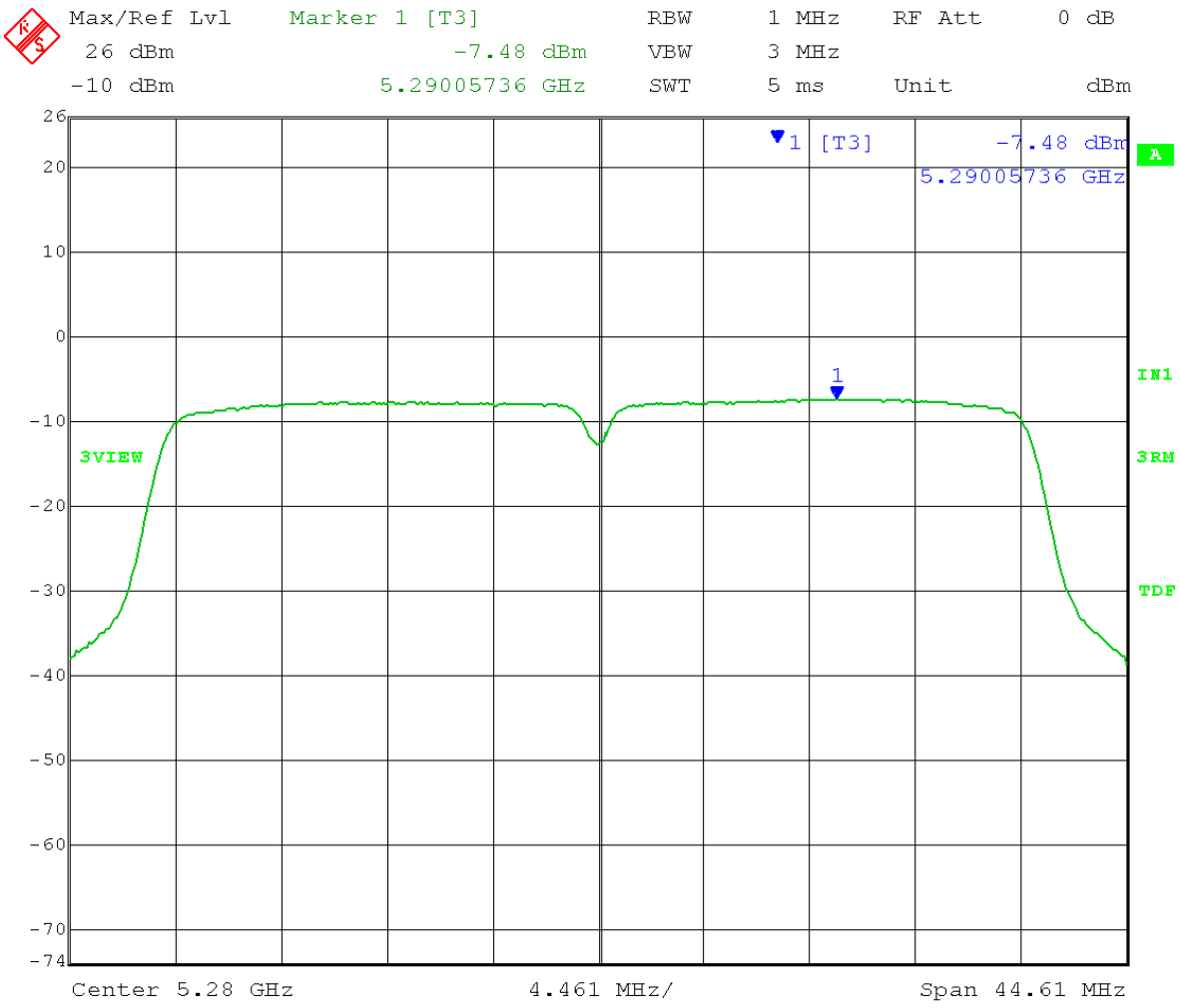


Date: 9.AUG.2013 11:28:27

Test Date: 8-9-2013
Company: Cambium Networks
EUT: Avenger SM 5.2GHz: OFDM
Test: Peak Excursion - Conducted
Operator: Lillian L
Comment: FCC UNII operating under 15.407 – OET 4/8/2013
G) PK excursion measurement – Page 9
Limit:[15.407(a)(6)]: 13dBm/1MHz

RBW = 1 MHz	VBW = 3 MHz
Detector = peak	Trace = max-hold
Sweep Time = Auto	Output power setting: 8
Low Channel: Transmit = 5.280GHz	40MHz BW
26 dB Emission Bandwidth = 44.61MHz	PPSD = -7.48dBm
Peak excursion = 3.51 - (-7.48) = 10.99dBm	<13 dBm = Pass

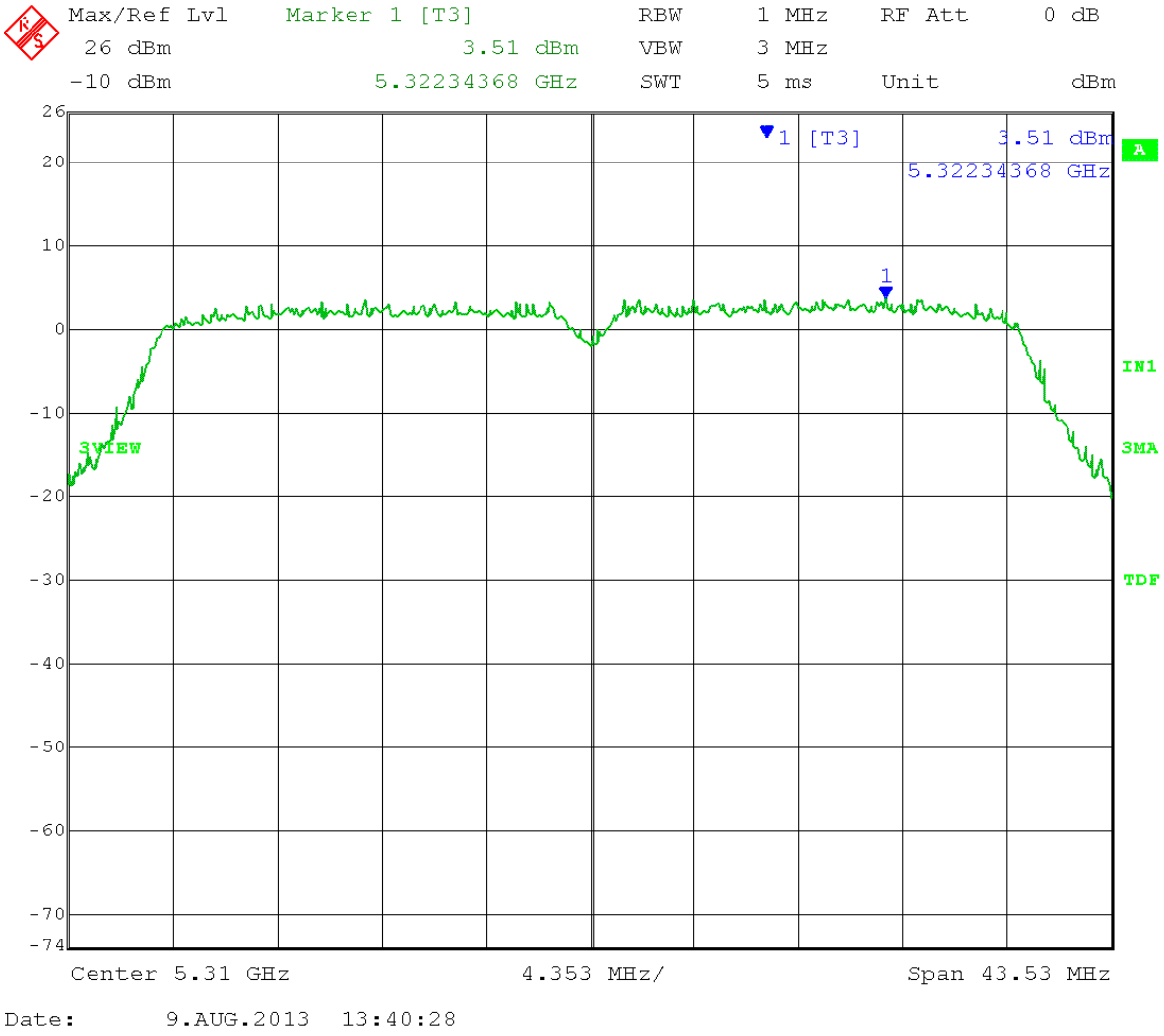


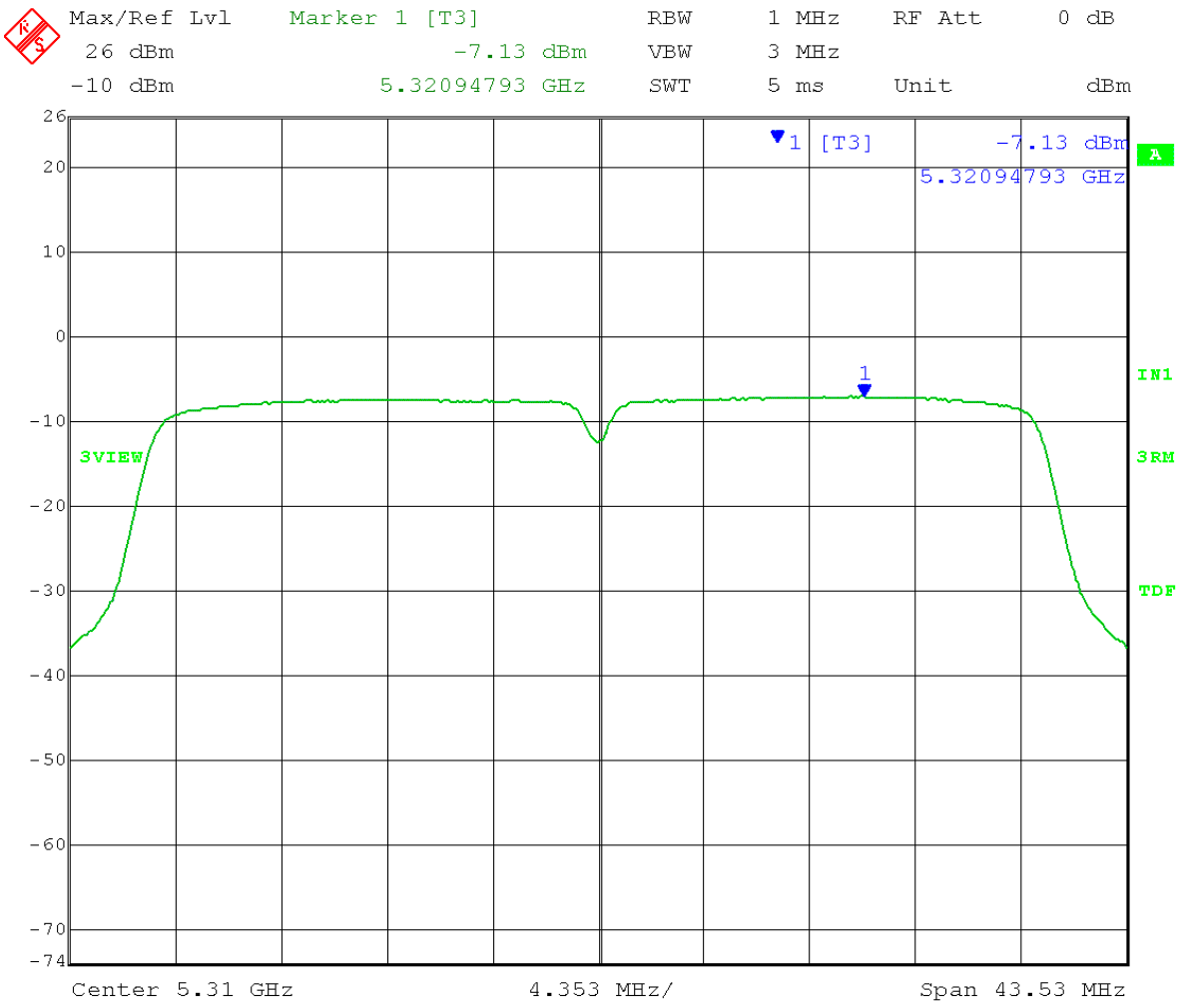


Date: 9.AUG.2013 11:20:52

Test Date: 8-9-2013
Company: Cambium Networks
EUT: Avenger SM 5.2GHz: OFDM
Test: Peak Excursion - Conducted
Operator: Lillian L
Comment: FCC UNII operating under 15.407 – OET 4/8/2013
G) PK excursion measurement – Page 9
Limit:[15.407(a)(6)]: 13dBm/1MHz

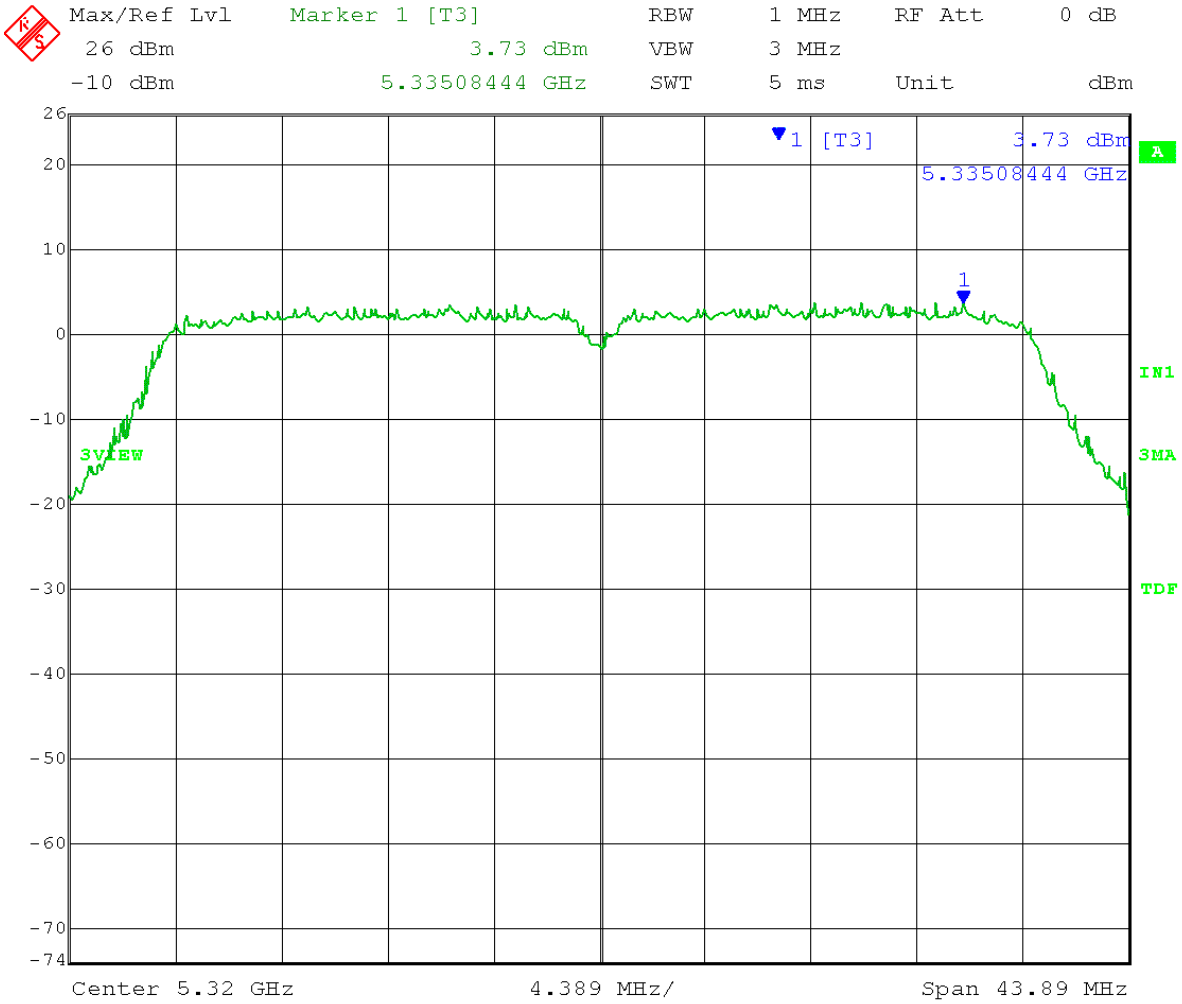
RBW = 1 MHz	VBW = 3 MHz
Detector = peak	Trace = max-hold
Sweep Time = Auto	Output power setting: 8
Mid Channel: Transmit = 5.310GHz	40MHz BW
26 dB Emission Bandwidth = 43.53MHz	PPSD = -7.13dBm
Peak excursion = 3.51 - (-7.13) = 10.64dBm	<13 dBm = Pass



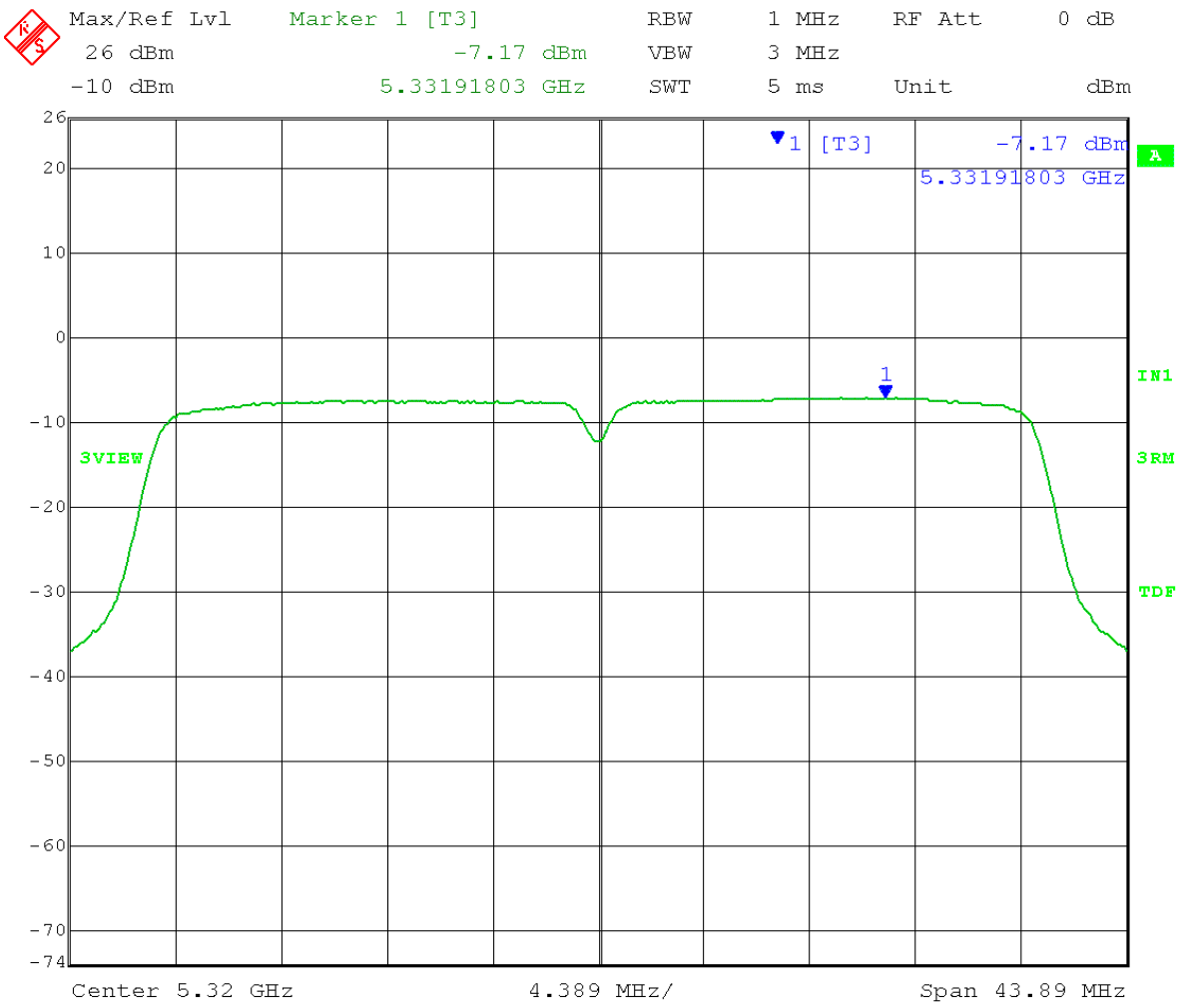

Max/Ref Lvl
26 dBm
-10 dBm
Marker 1 [T3]
-7.13 dBm
5.32094793 GHz
RBW 1 MHz
VBW 3 MHz
SWT 5 ms
RF Att 0 dB
Unit dBm
1 [T3] -7.13 dBm
5.32094793 GHz
A
IN1
3RM
TDF
3VIEW
Center 5.31 GHz
4.353 MHz/
Span 43.53 MHz
Date: 9.AUG.2013 11:23:31

Test Date: 8-9-2013
Company: Cambium Networks
EUT: Avenger SM 5.2GHz: OFDM
Test: Peak Excursion - Conducted
Operator: Lillian L
Comment: FCC UNII operating under 15.407 – OET 4/8/2013
G) PK excursion measurement – Page 9
Limit:[15.407(a)(6)]: 13dBm/1MHz

RBW = 1 MHz	VBW = 3 MHz
Detector = peak	Trace = max-hold
Sweep Time = Auto	Output power setting: 8
High Channel: Transmit = 5.320GHz	40MHz BW
26 dB Emission Bandwidth = 43.89MHz	PPSD = -7.17dBm
Peak excursion = 3.37 - (-7.17) = 10.54dBm	<13 dBm = Pass



Date: 9.AUG.2013 13:36:40


Max/Ref Lvl
26 dBm
-10 dBm
Marker 1 [T3]
-7.17 dBm
5.33191803 GHz
RBW 1 MHz
VBW 3 MHz
SWT 5 ms
RF Att 0 dB
Unit dBm
1 [T3] -7.17 dBm
5.33191803 GHz
A
IN1
3RM
TDF
3VIEW
Center 5.32 GHz
4.389 MHz/
Span 43.89 MHz
Date: 9.AUG.2013 11:26:22

Appendix B – Measurement Data

B7.0 Unwanted Emission Levels – Radiated Band-Edge
Radiated with antenna connected

Rule Section: Sections 15.407(b)(3) and 15.407(b)(5) / **RSS-210 A9.2(2)**

Test Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r03 – *Guidance for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E*

Section H – Unwanted emission levels
Section H(1) – Unwanted emissions in the restricted bands
Section H(2) – Unwanted emissions that fall outside of the restricted bands
Section H(3) – General Requirements for Unwanted Emissions Measurements
Section H(5) – Procedure for Peak Unwanted Emissions Measurements Above 1 GHz
Section H(6) – Procedure for Average Unwanted Emissions Measurements Above 1 GHz
Section H(6)(c) – Average Detection method

Description: Per 789033 D01 General UNII Test Procedures v01r03, section H(2)(c)(i): "an out-of-band emission that complies with both the average and peak limits of 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz peak emission limit."

Measure the band-edge emission level using the following settings

PEAK measurements:
- RBW = 1 MHz
- VBW ≥ 3 MHz
- Detector = peak
- Sweep time = auto
- Trace mode = max hold

AVERAGE measurements:
- RBW = 1 MHz
- VBW ≥ 3 MHz
- Detector = RMS
- Sweep time = auto
- Trace mode = trace average 200 traces

Limit: Peak and Average limits of 15.209/**RSS-Gen 7.2.5** were used instead of the -27 dBm/MHz limit of FCC Part 15.407(b)(3)/**RSS-210 A9.2(3)**.

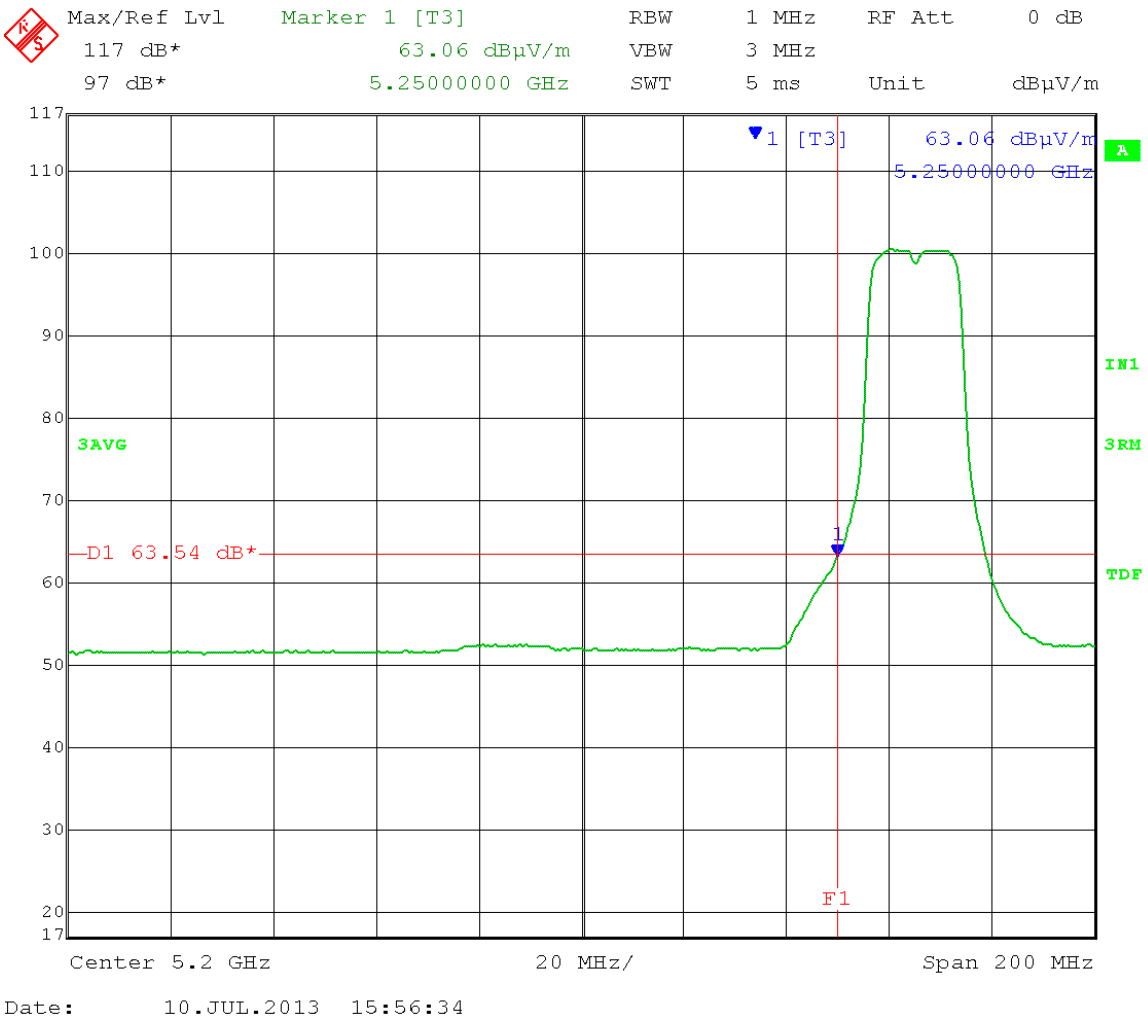
Results: Passed

Notes: Measurements were taken for MCS15 OFDM modulation at the lowest and highest channels of operation. EUT was set to transmit continuously with 100% duty cycle. Both transmit chains were active.

Test Date: 07-10-2013
Company: Cambium Networks
EUT: 5.2 GHz Avenger SM
Test: Lower Band-Edge Compliance - Radiated – AVG
(FCC 15.407(b)(3)) - With integrated antenna
Operator: Craig B
Comment: Low Channel: Frequency – 5265 MHz
Output power setting: 10.0 on both chains
Channel bandwidth: 20 MHz
Modulation: OFDM; MCS15
Polarization: Horizontal
Band-Edge Frequency: 5.25 GHz

Per 789033 D01 General UNII Test Procedures v01r03, section H(2)(c)(i): "an out-of-band emission that complies with both the average and peak limits of 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz peak emission limit."

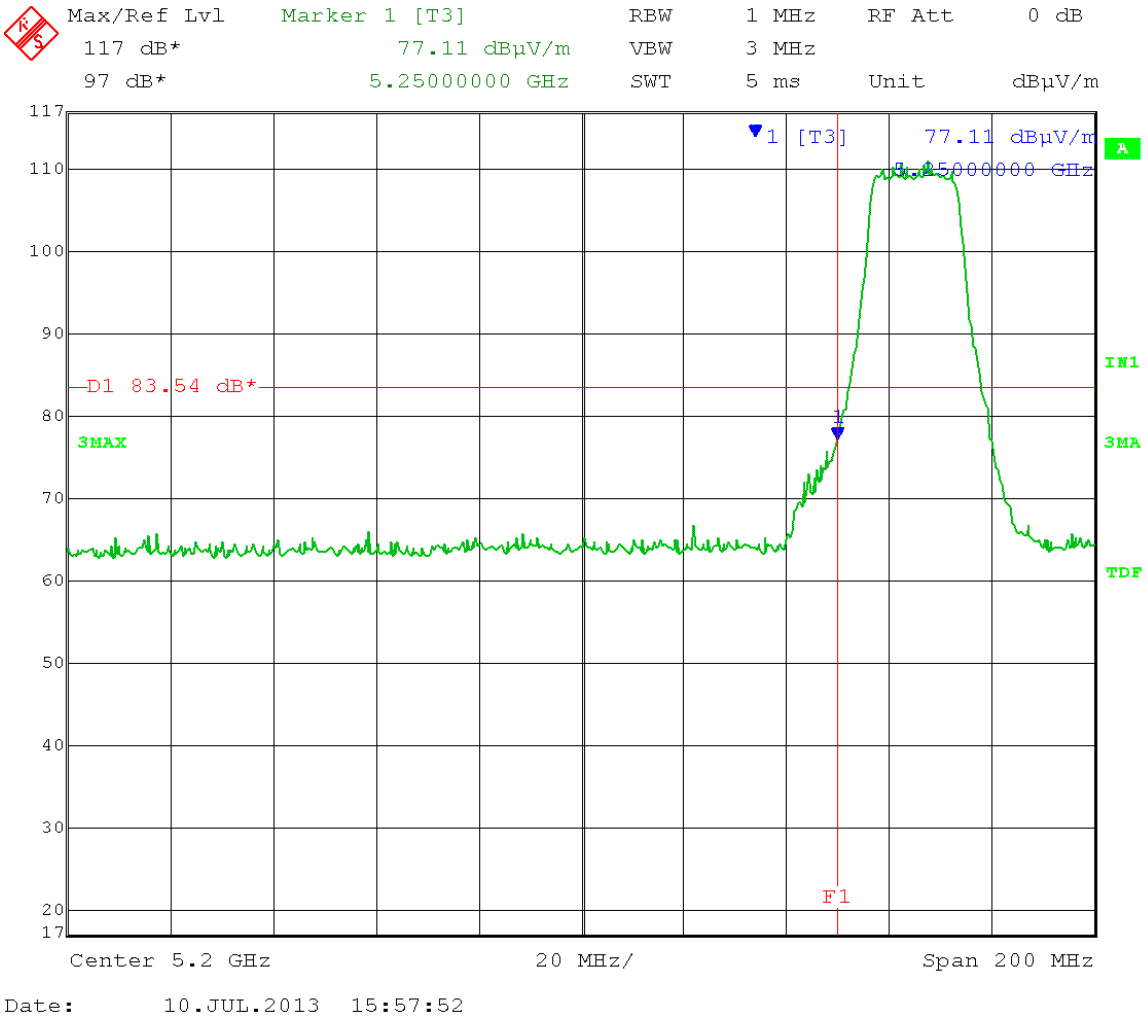
15.209 Limit: 63.54 dBµV/m AVERAGE at a test distance of 1 meter.



Test Date: 07-10-2013
Company: Cambium Networks
EUT: 5.2 GHz Avenger SM
Test: Lower Band-Edge Compliance - Radiated – PEAK (FCC 15.407(b)(3)) - With integrated antenna
Operator: Craig B
Comment: Low Channel: Frequency – 5265 MHz
Output power setting: 10.0 on both chains
Channel bandwidth: 20 MHz
Modulation: OFDM; MCS15
Polarization: Horizontal
Band-Edge Frequency: 5.25 GHz

Per 789033 D01 General UNII Test Procedures v01r03, section H(2)(c)(i): "an out-of-band emission that complies with both the average and peak limits of 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz peak emission limit."

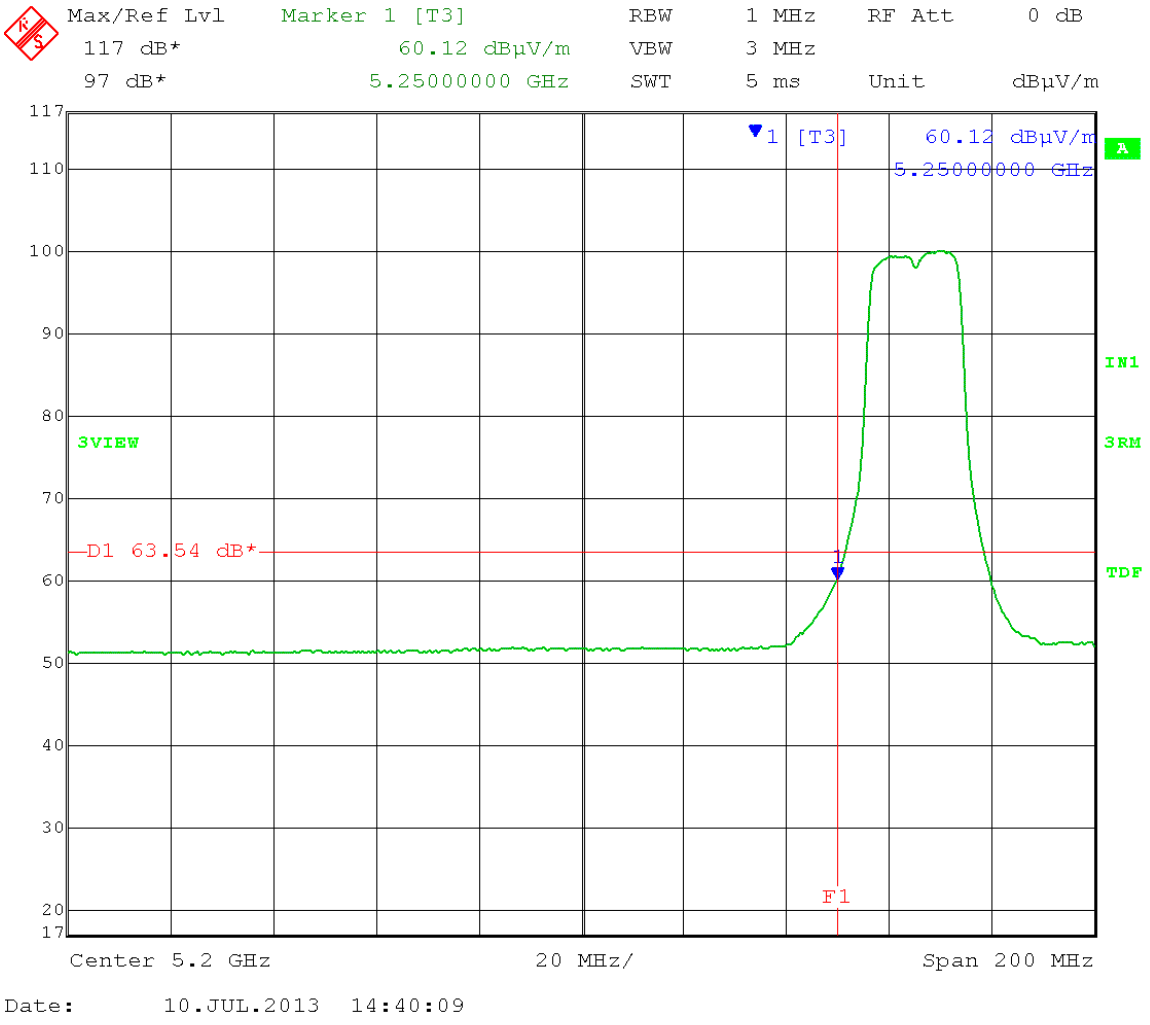
Band-Edge Limit: 83.54 dBµV/m PEAK at a test distance of 1 meter.



Test Date: 07-10-2013
Company: Cambium Networks
EUT: 5.2 GHz Avenger SM
Test: Lower Band-Edge Compliance - Radiated – AVG
(FCC 15.407(b)(3)) - With integrated antenna
Operator: Craig B/Lillian L
Comment: Low Channel: Frequency – 5265 MHz
Output power setting: 8.0 on both chains
Channel bandwidth: 20 MHz
Modulation: OFDM; MCS15
Polarization: Vertical
Band-Edge Frequency: 5.25 GHz

Per 789033 D01 General UNII Test Procedures v01r03, section H(2)(c)(i): "an out-of-band emission that complies with both the average and peak limits of 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz peak emission limit."

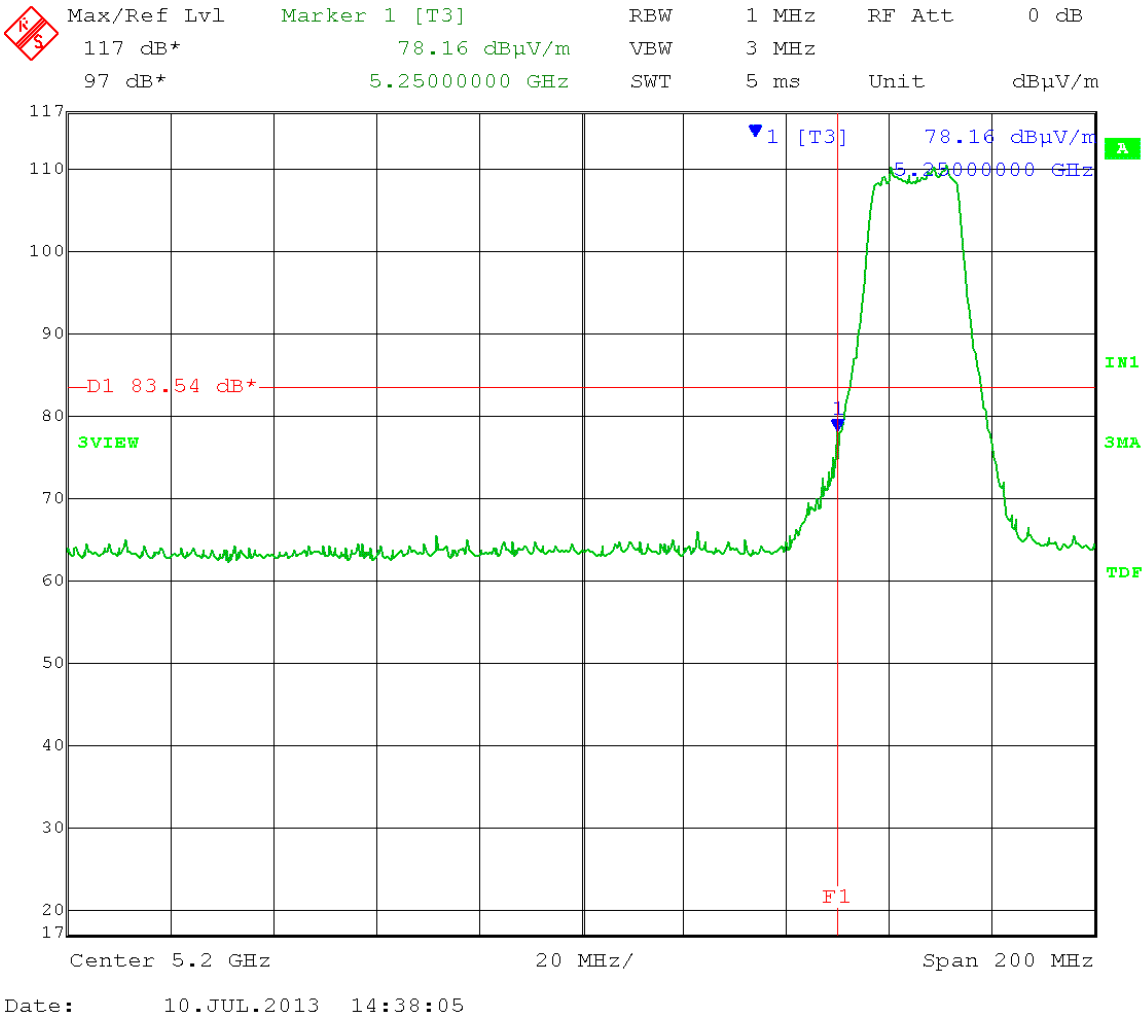
15.209 Limit: 63.54 dBµV/m AVERAGE at a test distance of 1 meter.



Test Date: 07-10-2013
Company: Cambium Networks
EUT: 5.2 GHz Avenger SM
Test: Lower Band-Edge Compliance - Radiated – PEAK
(FCC 15.407(b)(3)) - With integrated antenna
Operator: Craig B
Comment: Low Channel: Frequency – 5265 MHz
Output power setting: 8.0 on both chains
Channel bandwidth: 20 MHz
Modulation: OFDM; MCS15
Polarization: Vertical
Band-Edge Frequency: 5.25 GHz

Per 789033 D01 General UNII Test Procedures v01r03, section H(2)(c)(i): "an out-of-band emission that complies with both the average and peak limits of 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz peak emission limit."

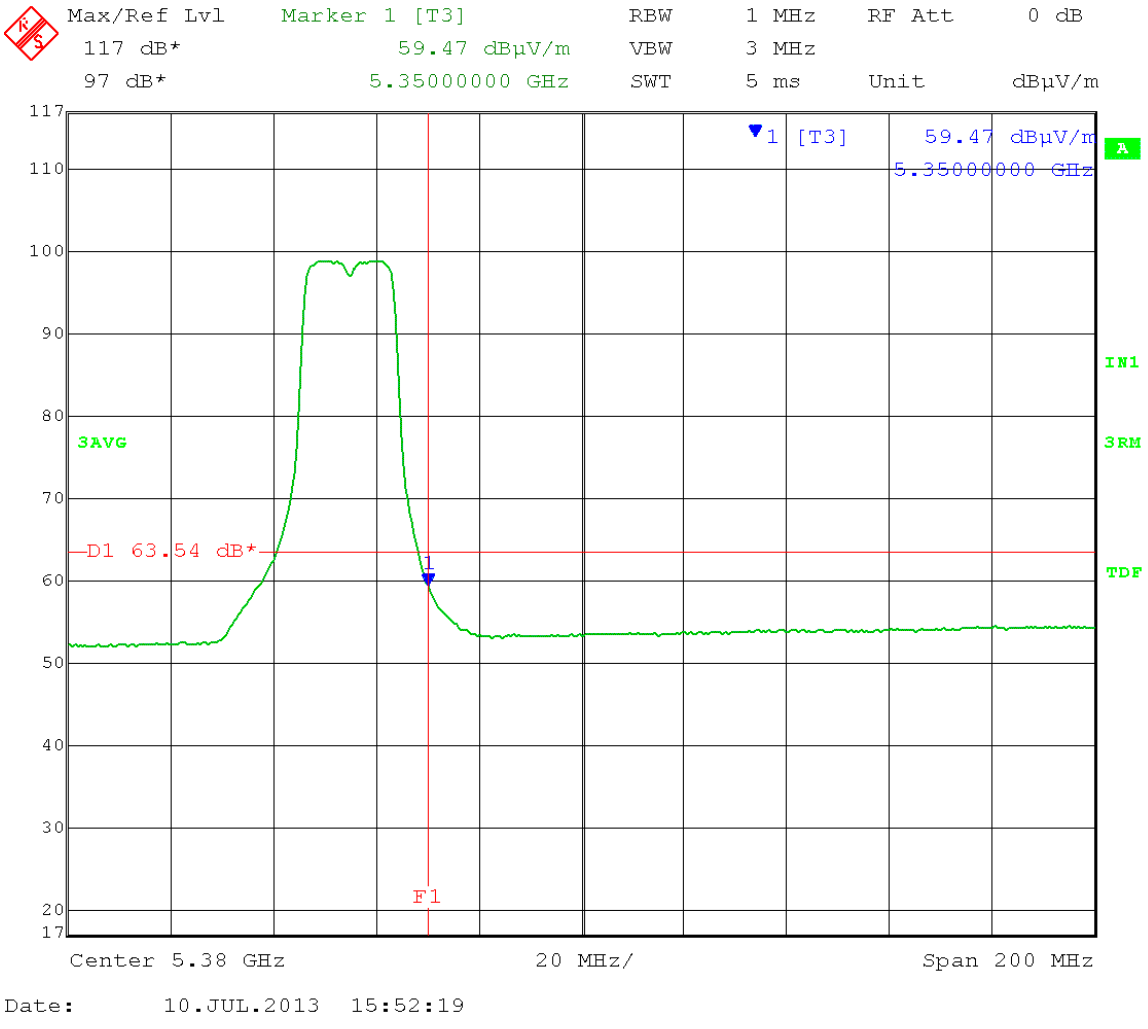
Band-Edge Limit: 83.54 dBµV/m PEAK at a test distance of 1 meter.



Test Date: 07-10-2013
Company: Cambium Networks
EUT: 5.2 GHz Avenger SM
Test: Upper Band-Edge Compliance - Radiated – AVG
(FCC 15.407(b)(3)) - With integrated antenna
Operator: Craig B/Lillian L
Comment: High Channel: Frequency – 5335 MHz
Output power setting: 10.0 on both chains
Channel bandwidth: 20 MHz
Modulation: OFDM; MCS15
Polarization: Horizontal
Operating Band-Edge Frequency: 5.35 GHz
Restricted Band-Edge Frequency: 5.35 GHz

Per 789033 D01 General UNII Test Procedures v01r03, section H(2)(c)(i): "an out-of-band emission that complies with both the average and peak limits of 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz peak emission limit."

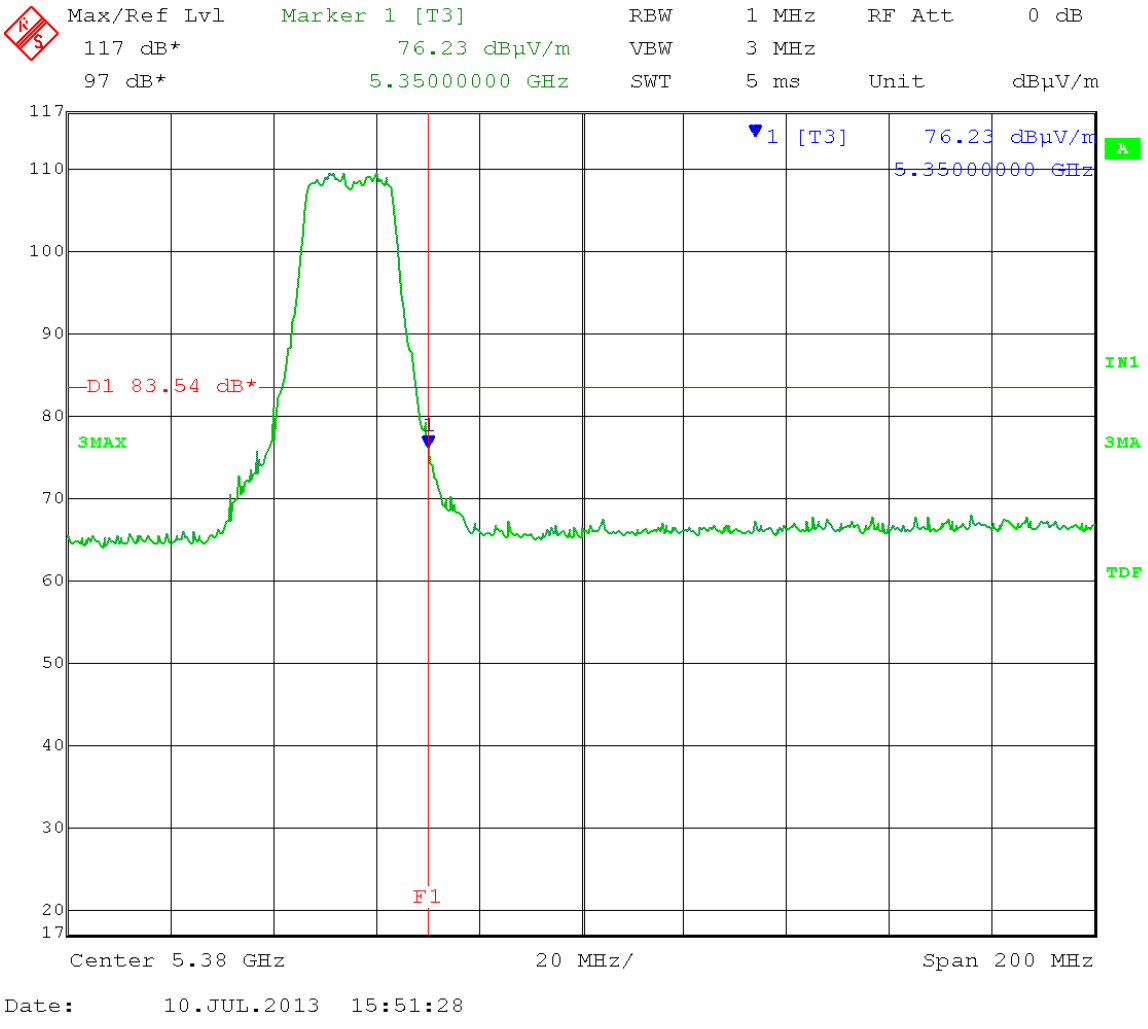
15.209 Limit: 63.54 dBµV/m AVERAGE at a test distance of 1 meter.



Test Date: 07-10-2013
Company: Cambium Networks
EUT: 5.2 GHz Avenger SM
Test: Upper Band-Edge Compliance - Radiated – PEAK
(FCC 15.407(b)(3)) - With integrated antenna
Operator: Craig B/Lillian L
Comment: High Channel: Frequency – 5335 MHz
Output power setting: 10.0 on both chains
Channel bandwidth: 20 MHz
Modulation: OFDM; MCS15
Polarization: Horizontal
Operating Band-Edge Frequency: 5.35 GHz
Restricted Band-Edge Frequency: 5.35 GHz

Per 789033 D01 General UNII Test Procedures v01r03, section H(2)(c)(i): "an out-of-band emission that complies with both the average and peak limits of 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz peak emission limit."

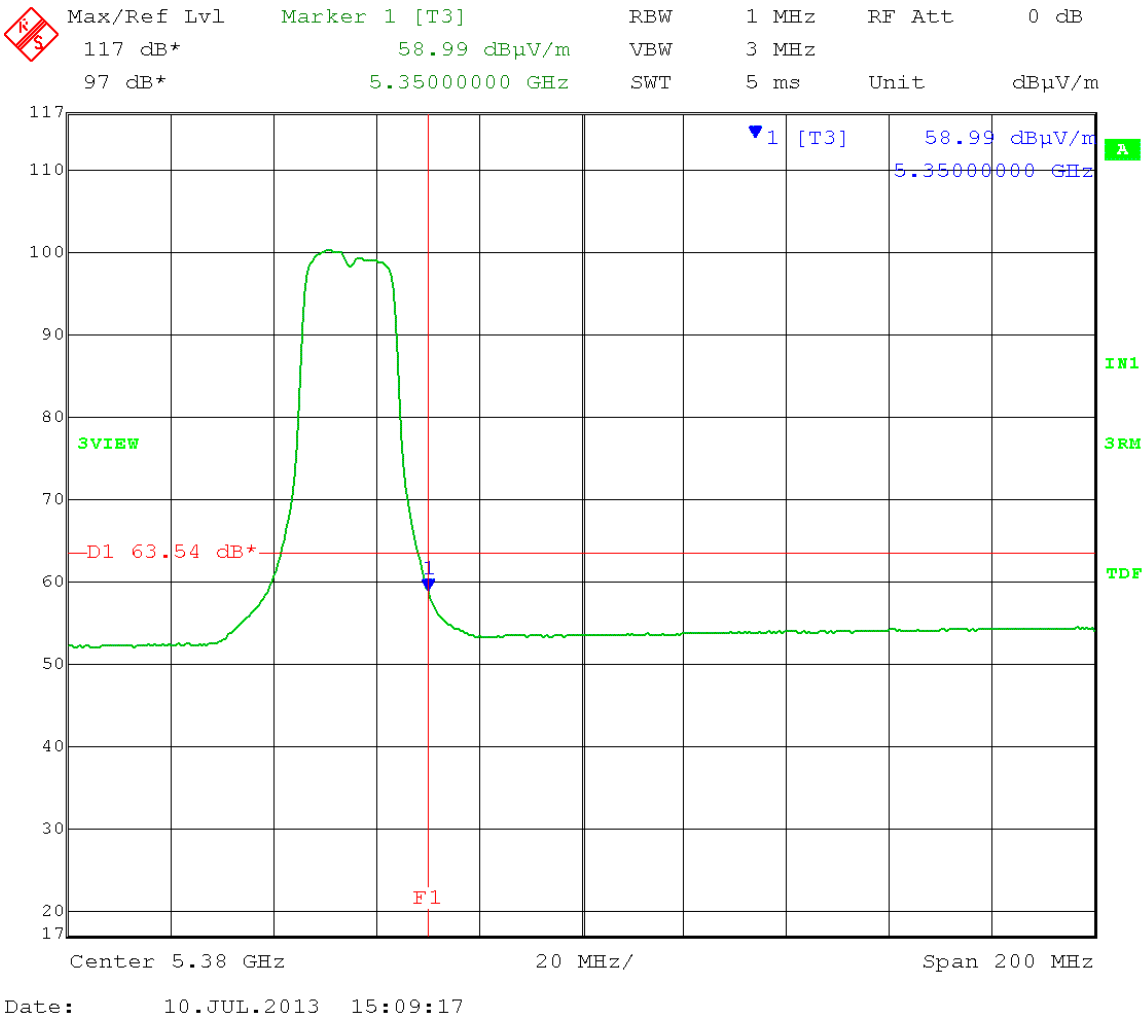
Band-Edge Limit: 83.54 dBµV/m PEAK at a test distance of 1 meter.



Test Date: 07-10-2013
Company: Cambium Networks
EUT: 5.2 GHz Avenger SM
Test: Upper Band-Edge Compliance - Radiated – AVG
(FCC 15.407(b)(3)) - With integrated antenna
Operator: Craig B/Lillian L
Comment: High Channel: Frequency – 5335 MHz
Output power setting: 8.0 on both chains
Channel bandwidth: 20 MHz
Modulation: OFDM; MCS15
Polarization: Vertical
Operating Band-Edge Frequency: 5.35 GHz
Restricted Band-Edge Frequency: 5.35 GHz

Per 789033 D01 General UNII Test Procedures v01r03, section H(2)(c)(i): "an out-of-band emission that complies with both the average and peak limits of 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz peak emission limit."

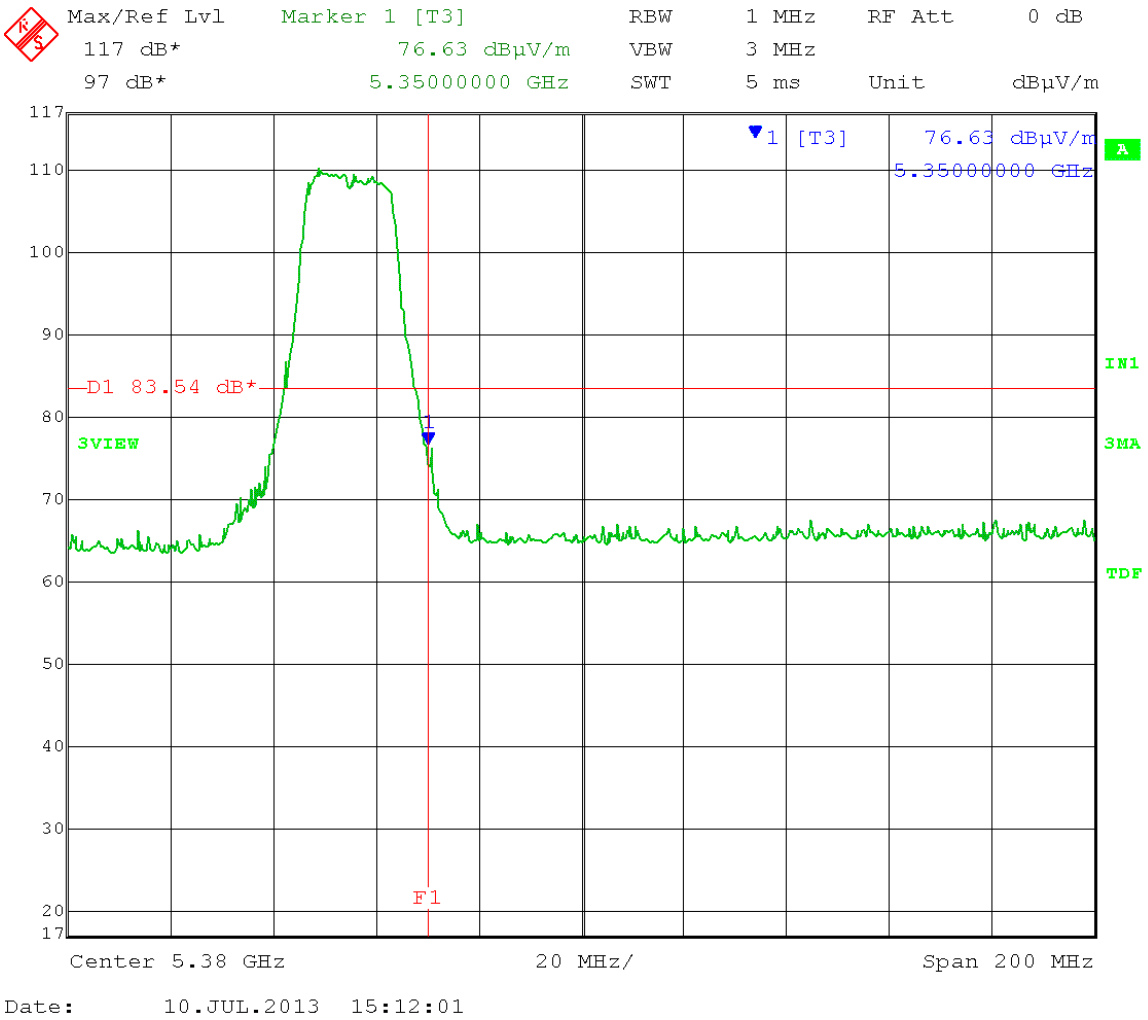
15.209 Limit: 63.54 dBµV/m AVERAGE at a test distance of 1 meter.



Test Date: 07-10-2013
Company: Cambium Networks
EUT: 5.2 GHz Avenger SM
Test: Upper Band-Edge Compliance - Radiated – PEAK
(FCC 15.407(b)(3)) - With integrated antenna
Operator: Craig B/Lillian L
Comment: High Channel: Frequency – 5335 MHz
Output power setting: 8.0 on both chains
Channel bandwidth: 20 MHz
Modulation: OFDM; MCS15
Polarization: Vertical
Operating Band-Edge Frequency: 5.35 GHz
Restricted Band-Edge Frequency: 5.35 GHz

Per 789033 D01 General UNII Test Procedures v01r03, section H(2)(c)(i): "an out-of-band emission that complies with both the average and peak limits of 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz peak emission limit."

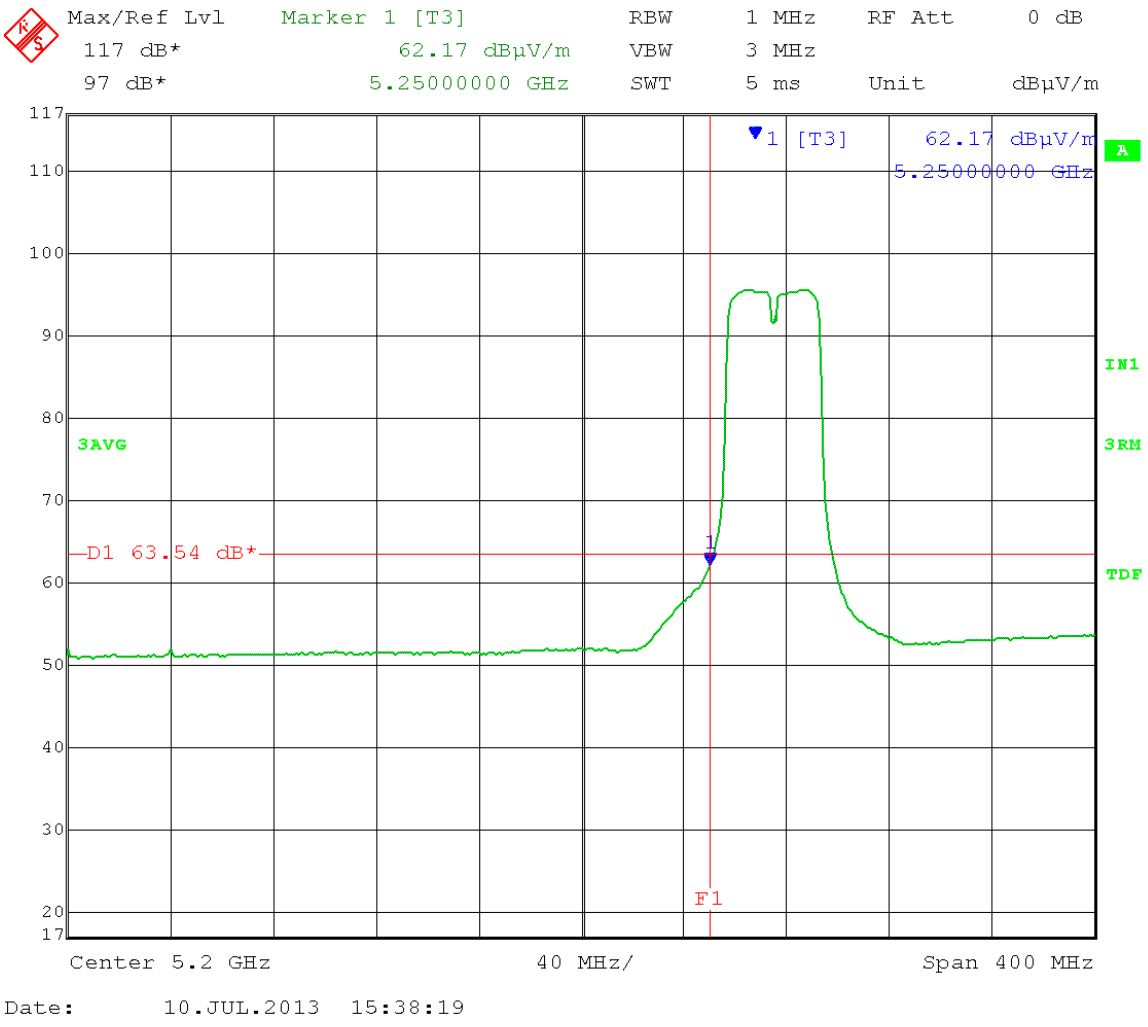
Band-Edge Limit: 83.54 dBµV/m PEAK at a test distance of 1 meter.



Test Date: 07-10-2013
Company: Cambium Networks
EUT: 5.2 GHz Avenger SM
Test: Lower Band-Edge Compliance - Radiated – AVG
(FCC 15.407(b)(3)) - With integrated antenna
Operator: Craig B/Lillian L
Comment: Low Channel: Frequency – 5275 MHz
Output power setting: 8.0 on both chains
Channel bandwidth: 40 MHz
Modulation: OFDM; MCS15
Polarization: Horizontal
Band-Edge Frequency: 5.25 GHz

Per 789033 D01 General UNII Test Procedures v01r03, section H(2)(c)(i): "an out-of-band emission that complies with both the average and peak limits of 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz peak emission limit."

15.209 Limit: 63.54 dBµV/m AVERAGE at a test distance of 1 meter.

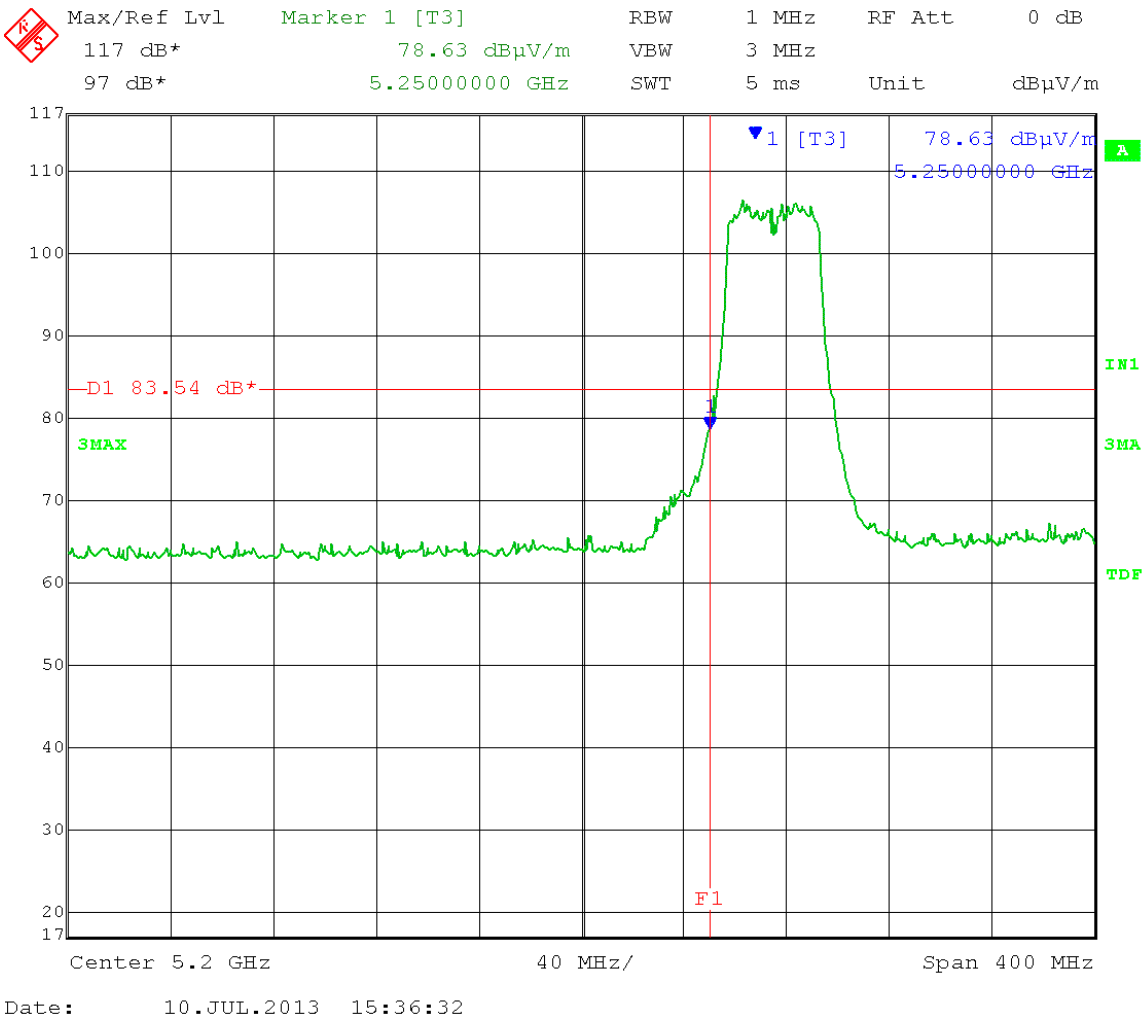


Date: 10.JUL.2013 15:38:19

Test Date: 07-10-2013
Company: Cambium Networks
EUT: 5.2 GHz Avenger SM
Test: Lower Band-Edge Compliance - Radiated – PEAK (FCC 15.407(b)(3)) - With integrated antenna
Operator: Craig B/Lillian L
Comment: Low Channel: Frequency – 5275 MHz
Output power setting: 8.0 on both chains
Channel bandwidth: 40 MHz
Modulation: OFDM; MCS15
Polarization: Horizontal
Band-Edge Frequency: 5.47 GHz

Per 789033 D01 General UNII Test Procedures v01r03, section H(2)(c)(i): "an out-of-band emission that complies with both the average and peak limits of 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz peak emission limit."

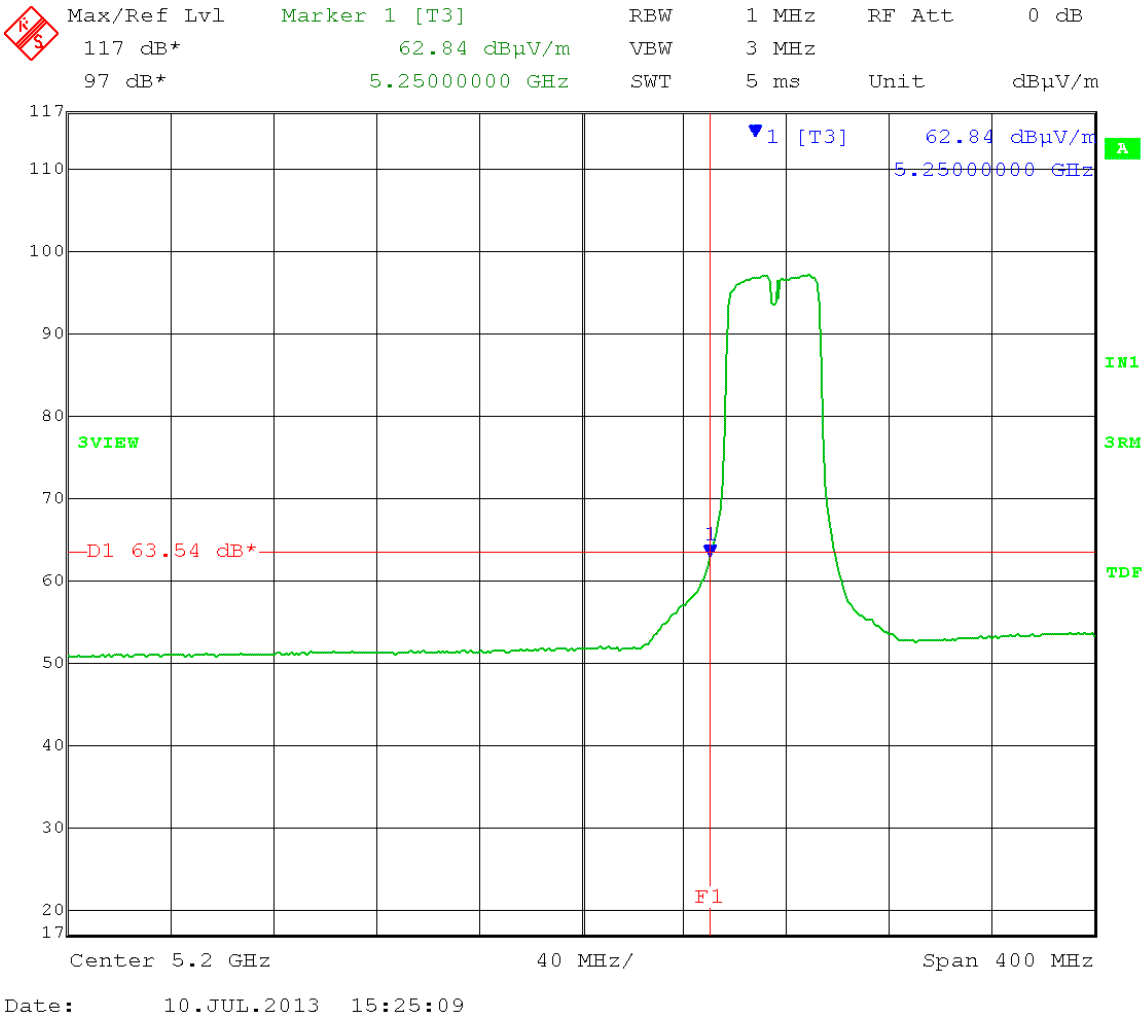
Band-Edge Limit: 83.54 dBµV/m PEAK at a test distance of 1 meter.



Test Date: 07-10-2013
Company: Cambium Networks
EUT: 5.2 GHz Avenger SM
Test: Lower Band-Edge Compliance - Radiated – AVG
(FCC 15.407(b)(3)) - With integrated antenna
Operator: Craig B/Lillian L
Comment: Low Channel: Frequency – 5275 MHz
Output power setting: 8.0 on both chains
Channel bandwidth: 40 MHz
Modulation: OFDM; MCS15
Polarization: Vertical
Band-Edge Frequency: 5.25 GHz

Per 789033 D01 General UNII Test Procedures v01r03, section H(2)(c)(i): "an out-of-band emission that complies with both the average and peak limits of 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz peak emission limit."

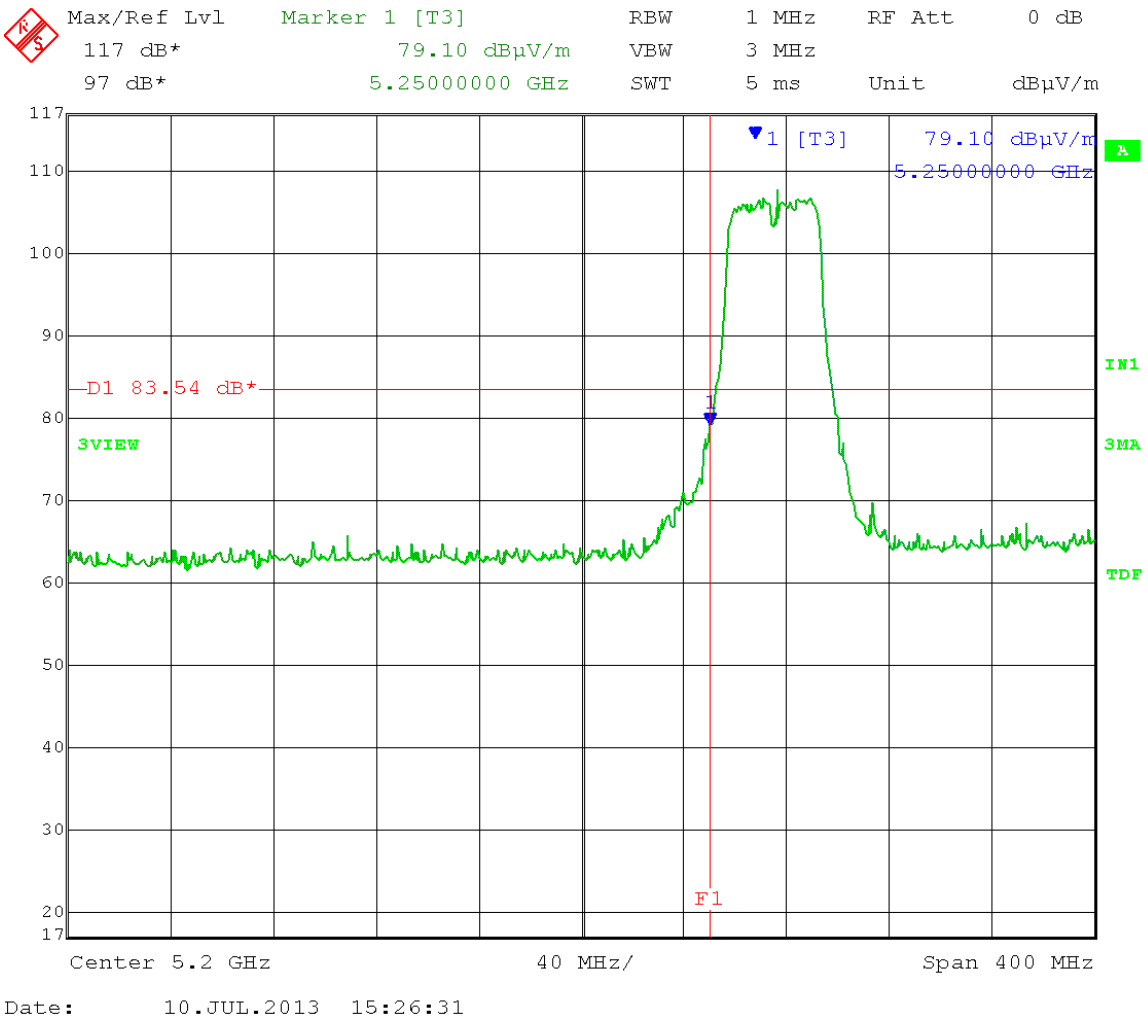
15.209 Limit: 63.54 dBµV/m AVERAGE at a test distance of 1 meter.



Test Date: 07-10-2013
Company: Cambium Networks
EUT: 5.2 GHz Avenger SM
Test: Lower Band-Edge Compliance - Radiated – PEAK (FCC 15.407(b)(3)) - With integrated antenna
Operator: Craig B/Lillian L
Comment: Low Channel: Frequency – 5275 MHz
Output power setting: 8.0 on both chains
Channel bandwidth: 40 MHz
Modulation: OFDM; MCS15
Polarization: Vertical
Band-Edge Frequency: 5.25 GHz

Per 789033 D01 General UNII Test Procedures v01r03, section H(2)(c)(i): "an out-of-band emission that complies with both the average and peak limits of 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz peak emission limit."

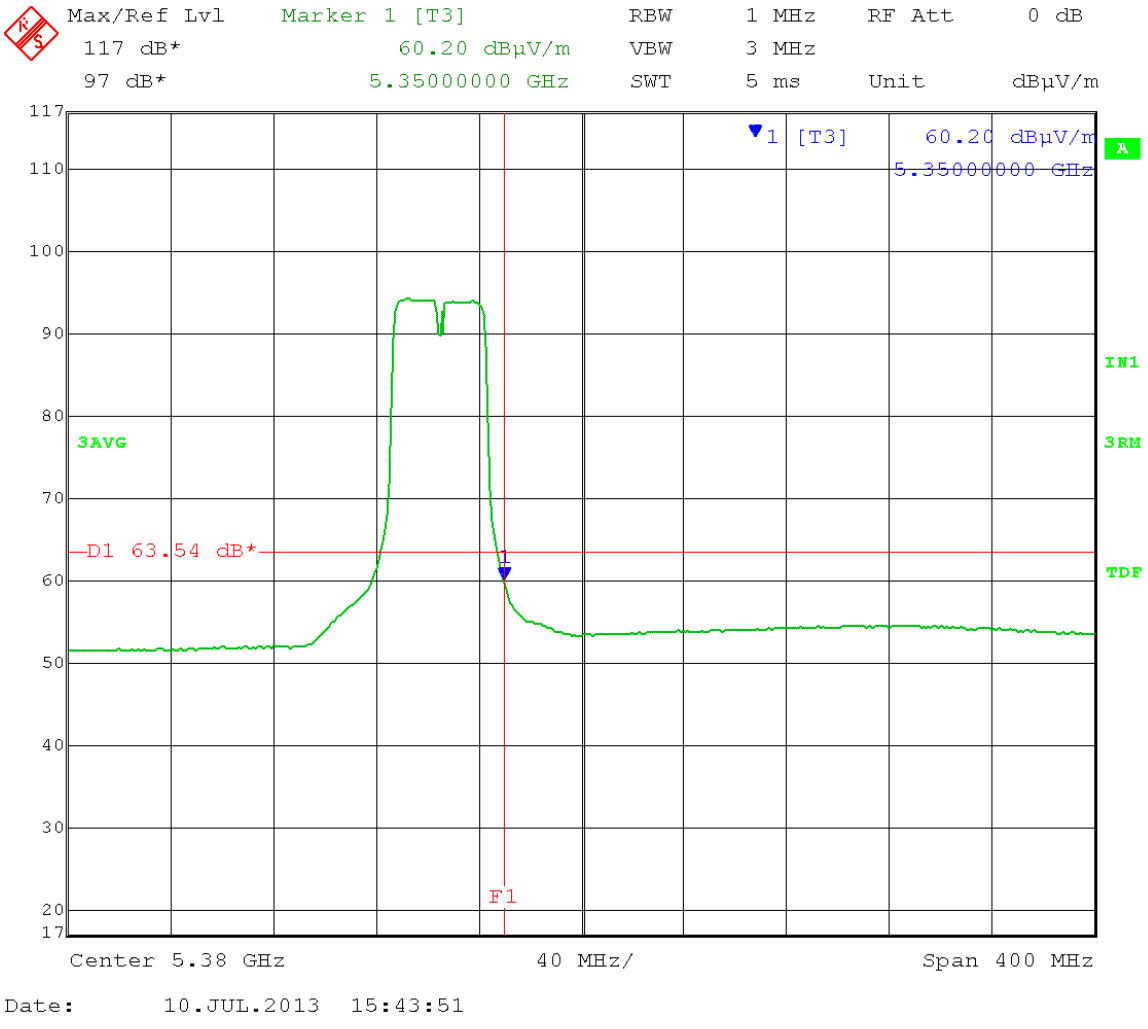
Band-Edge Limit: 83.54 dBµV/m PEAK at a test distance of 1 meter.



Test Date: 07-10-2013
Company: Cambium Networks
EUT: 5.2 GHz Avenger SM
Test: Upper Band-Edge Compliance - Radiated – AVG
(FCC 15.407(b)(3)) - With integrated antenna
Operator: Craig B/Lillian L
Comment: High Channel: Frequency – 5325 MHz
Output power setting: 8.0 on both chains
Channel bandwidth: 40 MHz
Modulation: OFDM; MCS15
Polarization: Horizontal
Operating Band-Edge Frequency: 5.35 GHz
Restricted Band-Edge Frequency: 5.35 GHz

Per 789033 D01 General UNII Test Procedures v01r03, section H(2)(c)(i): "an out-of-band emission that complies with both the average and peak limits of 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz peak emission limit."

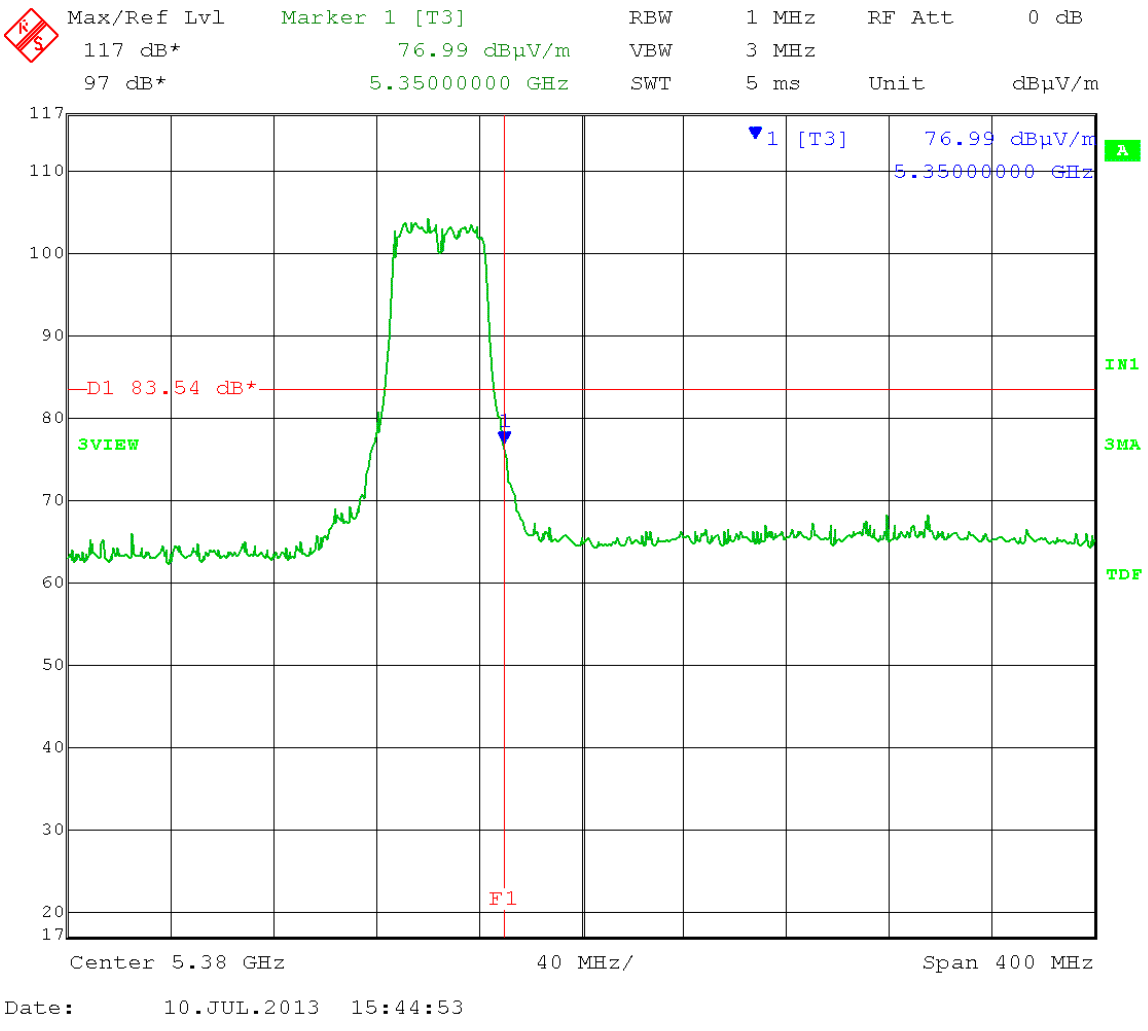
15.209 Limit: 63.54 dBµV/m AVERAGE at a test distance of 1 meter.



Test Date: 07-10-2013
Company: Cambium Networks
EUT: 5.2 GHz Avenger SM
Test: Upper Band-Edge Compliance - Radiated – PEAK
(FCC 15.407(b)(3)) - With integrated antenna
Operator: Craig B/Lillian L
Comment: High Channel: Frequency – 5325 MHz
Output power setting: 8.0 on both chains
Channel bandwidth: 40 MHz
Modulation: OFDM; MCS15
Polarization: Horizontal
Operating Band-Edge Frequency: 5.35 GHz
Restricted Band-Edge Frequency: 5.35 GHz

Per 789033 D01 General UNII Test Procedures v01r03, section H(2)(c)(i): "an out-of-band emission that complies with both the average and peak limits of 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz peak emission limit."

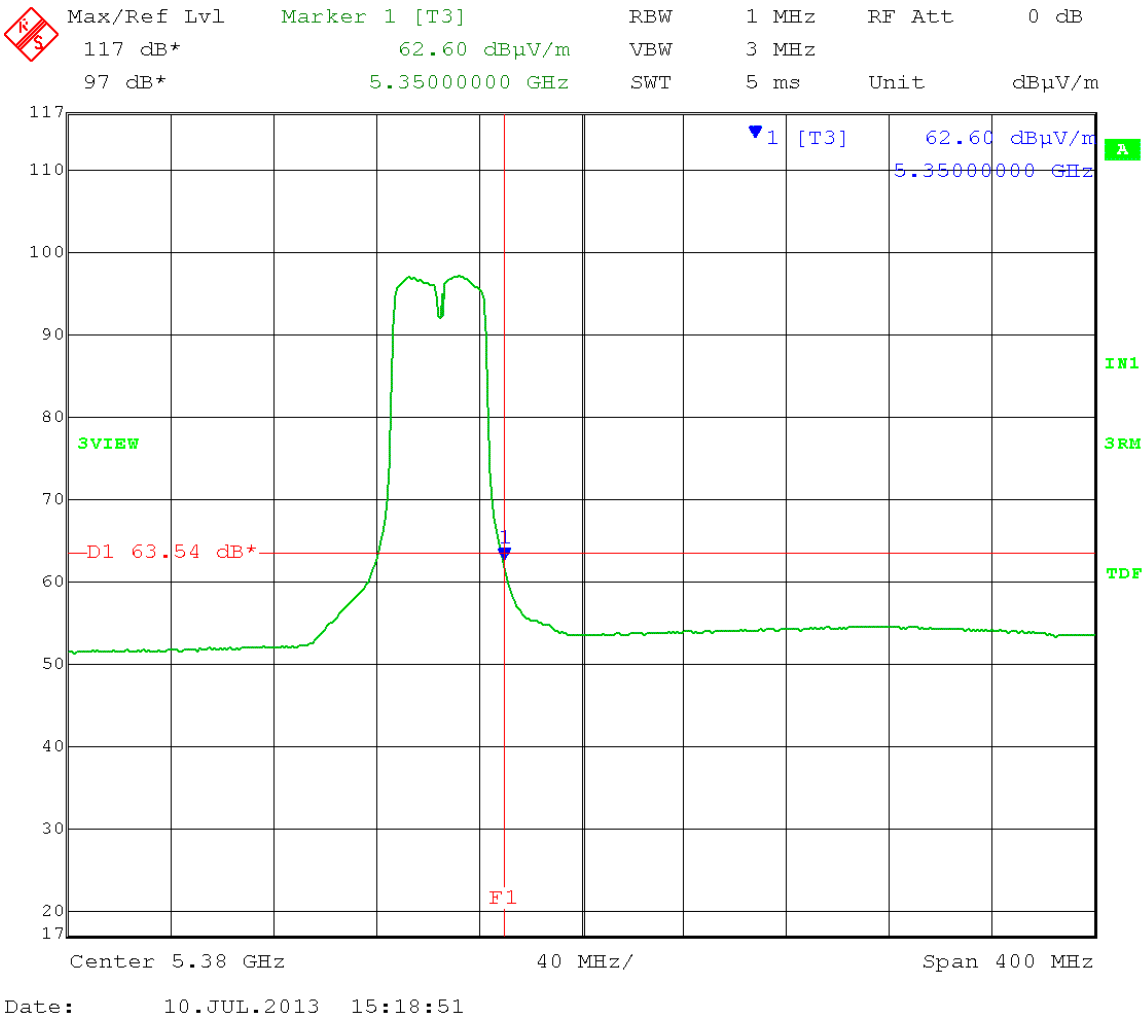
Band-Edge Limit: 83.54 dBµV/m PEAK at a test distance of 1 meter.



Test Date: 07-10-2013
Company: Cambium Networks
EUT: 5.2 GHz Avenger SM
Test: Upper Band-Edge Compliance - Radiated – AVG
(FCC 15.407(b)(3)) - With integrated antenna
Operator: Craig B/Lillian L
Comment: High Channel: Frequency – 5325 MHz
Output power setting: 8.0 on both chains
Channel bandwidth: 40 MHz
Modulation: OFDM; MCS15
Polarization: Vertical
Operating Band-Edge Frequency: 5.35 GHz
Restricted Band-Edge Frequency: 5.35 GHz

Per 789033 D01 General UNII Test Procedures v01r03, section H(2)(c)(i): "an out-of-band emission that complies with both the average and peak limits of 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz peak emission limit."

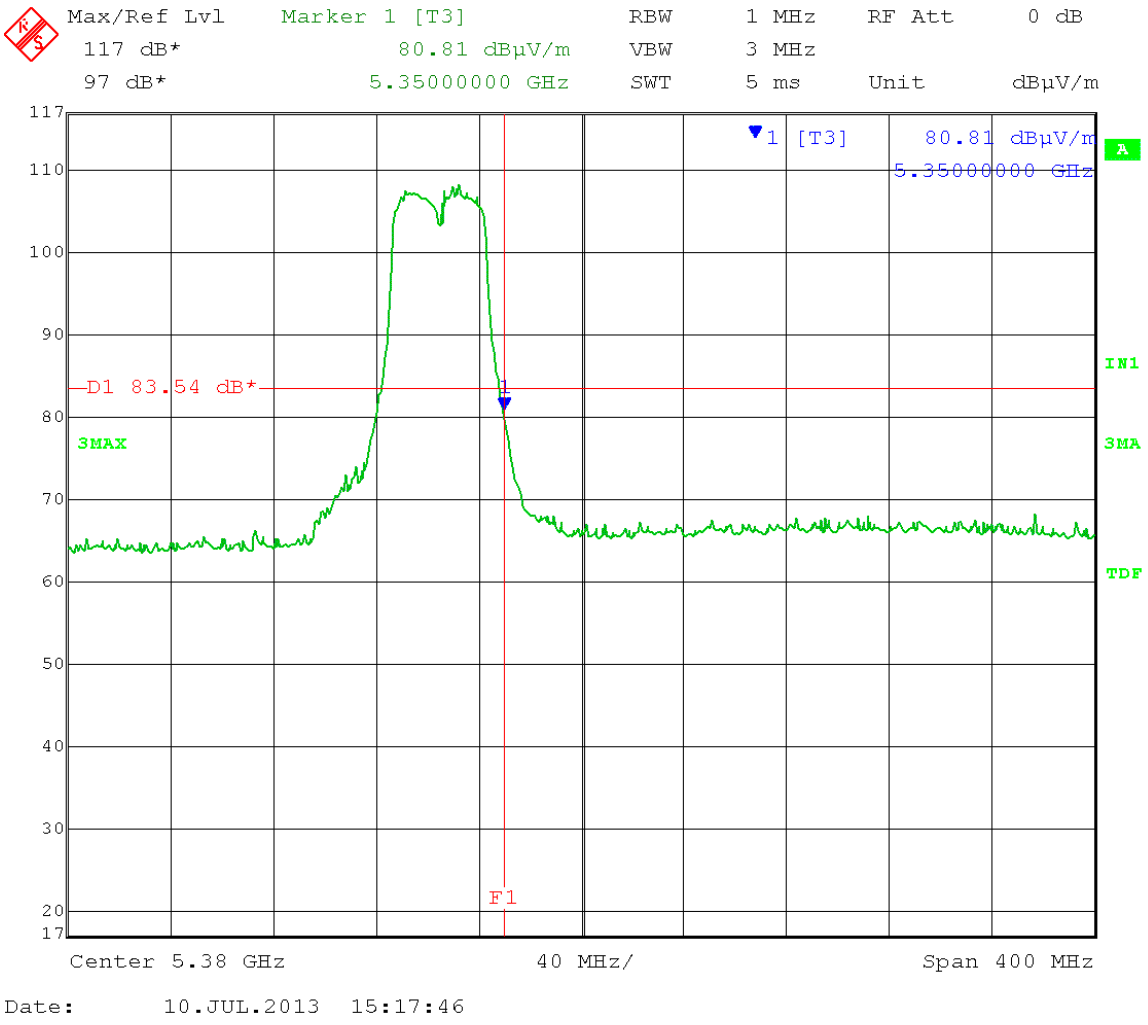
15.209 Limit: 63.54 dBµV/m AVERAGE at a test distance of 1 meter.



Test Date: 07-10-2013
Company: Cambium Networks
EUT: 5.2 GHz Avenger SM
Test: Upper Band-Edge Compliance - Radiated – PEAK
(FCC 15.407(b)(3)) - With integrated antenna
Operator: Craig B
Comment: High Channel: Frequency – 5325 MHz
Output power setting: 8.0 on both chains
Channel bandwidth: 40 MHz
Modulation: OFDM; MCS15
Polarization: Vertical
Operating Band-Edge Frequency: 5.35 GHz
Restricted Band-Edge Frequency: 5.35 GHz

Per 789033 D01 General UNII Test Procedures v01r03, section H(2)(c)(i): "an out-of-band emission that complies with both the average and peak limits of 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz peak emission limit."

Band-Edge Limit: 83.54 dBµV/m PEAK at a test distance of 1 meter.



Appendix B – Measurement Data

B8.0 Unwanted Emission Levels – Radiated with integral antenna

Rule Section: Sections 15.407(b)(3) and 15.407(b)(6) / **RSS-210 A9.2(2)**

Test Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r03 – *Guidance for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E*

Section H(1) – Unwanted emissions in the restricted bands
Section H(2) – Unwanted emissions that fall outside of the restricted bands
Section H(3) – General Requirements for Unwanted Emissions Measurements
Section H(4) – Procedure for Unwanted Emissions Measurements Below 1 GHz
Section H(5) – Procedure for Peak Unwanted Emissions Measurements Above 1 GHz
Section H(6) – Procedure for Average Unwanted Emissions Measurements Above 1 GHz
Section H(6)(c) – Average Detection method

Below 1000 MHz
Detector = quasi-peak
Alternately, peak detector is permitted

Peak measurements above 1000 MHz
RBW = 1 MHz
VBW ≥ 3 MHz
Detector = peak
Sweep time = auto; increased by a factor of (1 / duty cycle)
Trace mode = max hold

Average measurements above 1000 MHz (required for peak emissions that are above the average limits) – Method AD (Average Detection)
RBW = 1 MHz
VBW ≥ 3 MHz
Detector = RMS (span/(# of points in sweep) ≤ RBW/2)
Averaging type = power
Sweep time = auto; increased by a factor of (1 / duty cycle)
Trace mode = trace average 100 sweeps; increased by a factor of (1 / duty cycle)
For a duty cycle less than 98%, add 10 log (1/duty cycle)

Limits: Outside restricted bands: Peak EIRP shall not exceed -27 dBm/MHz
Inside restricted bands: Peak and Average limits of FCC Part 15.209/**RSS-Gen 7.2.5**
Per Section H(2)(c)(i): "an out-of-band emission that complies with both the average and peak limits of 15.209/ **RSS-Gen 7.2.5** is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz peak emission limit."

Results: Passed

Notes: Both transmit chains active and at maximum power during test.
Measurements were taken for MCS15 OFDM modulation at the lowest, middle, and highest channels of operation.
EUT was set to transmit continuously with 100% duty cycle.

RSS-210 A9.2(3)

Electric Field Strength

EUT:	Avenger Station 5.2GHz, 5.4GHz, 5.7GHz
Manufacturer:	Cambium Networks
Operating Condition:	67 deg. F; 56% R.H.
Test Site:	DLS O.F. Site 3
Operator:	Jim O
Test Specification:	120V 60Hz POE
Comment:	Continuous TX
	Date: 06-05-2013

TEXT: "Horz 3 meters"

Short Description: Test Set-up

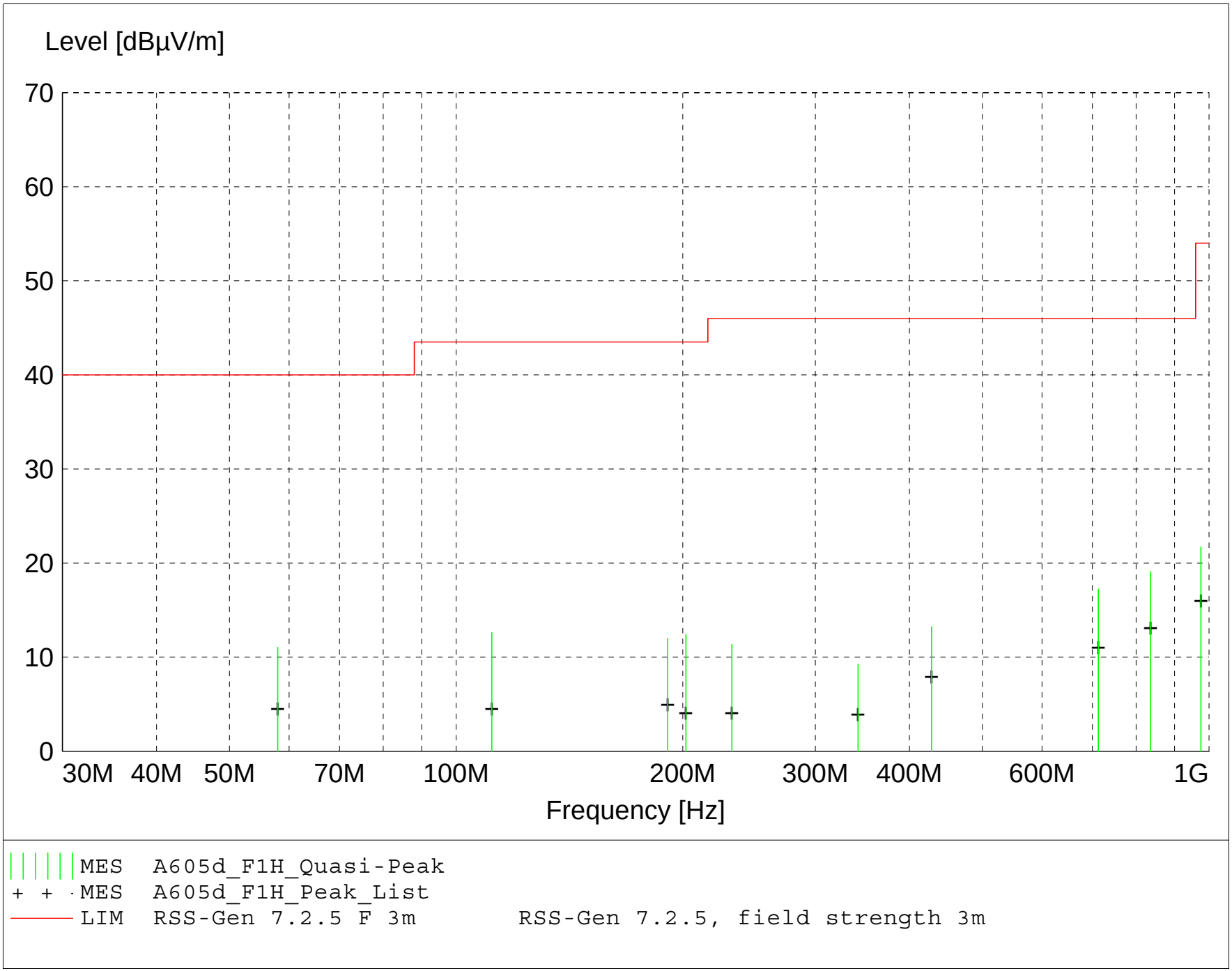
Test Set-up: EUT Measured at 3 Meters with HORIZONTAL Antenna Polarization

Equations: Total Level(dBµV/m) = Level(dBµV) + System Loss(dB) + Antenna Factor(dBµV/m)

Margin(dB) = Limit(dBµV/m) - Total Level(dBµV/m)

Graph Markers:

+	Frequency marker (Level of marker not related to final level)
|	Final maximized level using Quasi-Peak detector
X	Final maximized level using Average dector
#	Final maximized level using Peak detector


Level [dBµV/m]
70
60
50
40
30
20
10
0
30M
40M
50M
70M
100M
200M
300M
400M
600M
1G
Frequency [Hz]
MES A605d_F1H_Quasi-Peak
MES A605d_F1H_Peak_List
LIM RSS-Gen 7.2.5 F 3m
RSS-Gen 7.2.5, field strength 3m

MEASUREMENT RESULT: "A605d_F1H_Final"

6/5/2013 10:34AM

Frequency	Level	Antenna Factor	System Loss	Total Level	Limit	Margin	Height Ant.	EuT Angle	Final Detector	Comment
MHz	dBµV	dBµV/m	dB	dBµV/m	dBµV/m	dB	m	deg		
836.060000	15.49	22.42	-18.8	19.1	46.0	26.9	2.00	0	QUASI-PEAK	NF
712.940000	15.68	20.96	-19.4	17.2	46.0	28.8	2.00	0	QUASI-PEAK	NF
57.960000	24.37	10.61	-23.9	11.0	40.0	29.0	1.00	0	QUASI-PEAK	NF
111.540000	23.19	12.46	-23.0	12.6	43.5	30.9	1.00	350	QUASI-PEAK	None
201.920000	22.49	12.18	-22.2	12.4	43.5	31.1	2.00	90	QUASI-PEAK	None
190.980000	16.84	17.40	-22.3	12.0	43.5	31.5	1.00	0	QUASI-PEAK	NF
975.440000	14.80	24.11	-17.2	21.7	54.0	32.3	2.00	0	QUASI-PEAK	NF
428.000000	17.58	16.58	-20.9	13.2	46.0	32.8	2.00	200	QUASI-PEAK	None
232.340000	21.68	11.59	-21.9	11.4	46.0	34.6	2.00	170	QUASI-PEAK	None
341.840000	15.70	14.90	-21.3	9.3	46.0	36.7	2.00	0	QUASI-PEAK	NF

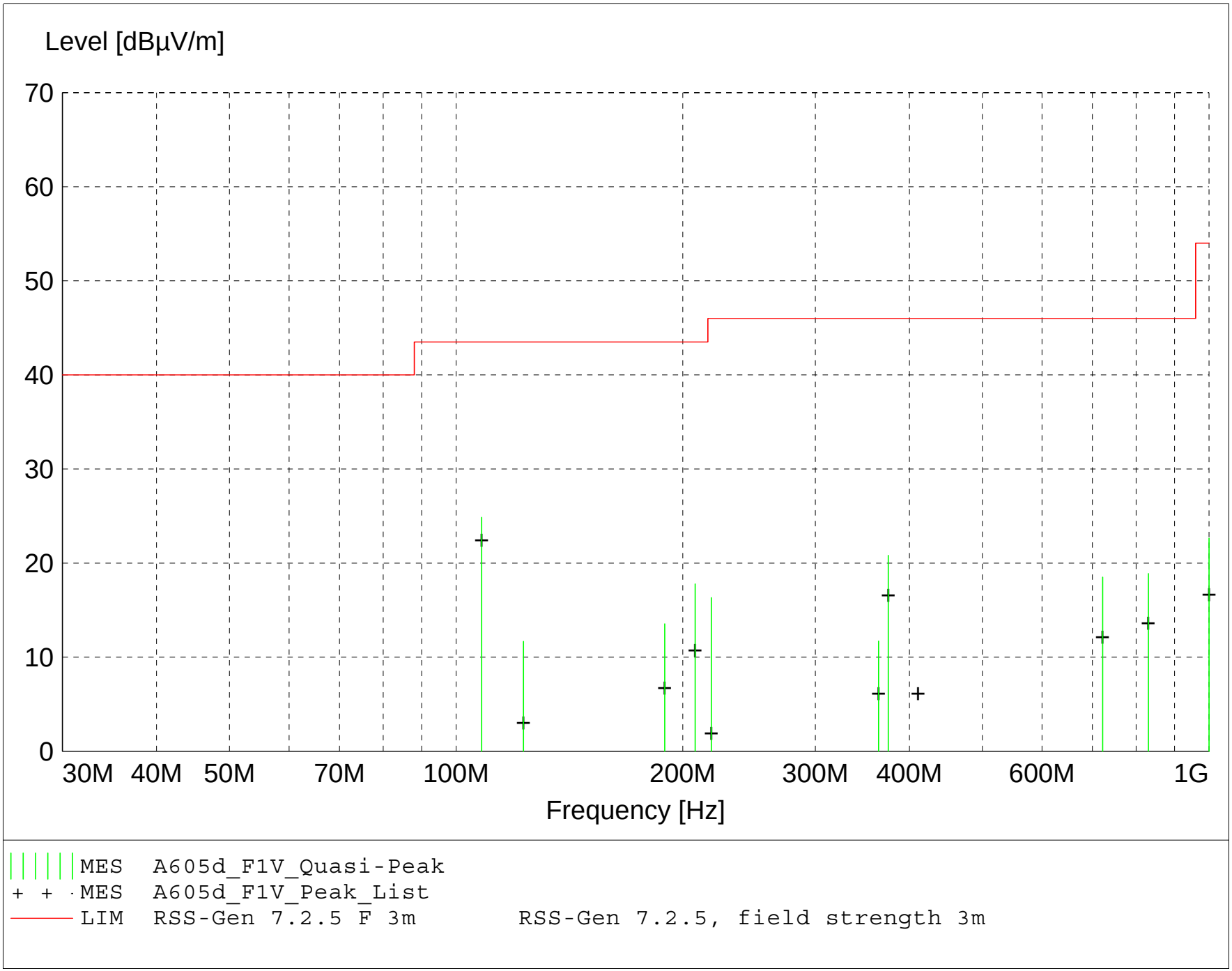
RSS-210 A9.2(3)

Electric Field Strength

```
EUT:                  Avenger Station 5.2GHz, 5.4GHz, 5.7GHz
Manufacturer:         Cambium Networks
Operating Condition:  67 deg. F; 56% R.H.
Test Site:            DLS O.F. Site 3
Operator:             Jim O
Test Specification:   120V 60Hz POE
Comment:              Continuous TX
                      Date:  06-05-2013
```

TEXT: "Vert 3 meters"

```
  Short Description:            Test Set-up


Test Set-up:    EUT Measured at 3 Meters with VERTICAL Antenna Polarization


Sample Equations:   Total Level(dBµV/m) = Level(dBµV) + System Loss(dB) + Antenna Factor(dBµV/m)
                    24.6                = 35.51       + (-22.1)         + 11.20

                    Margin(dB)  = Limit(dBµV/m) - Total Level(dBµV/m)
                    15.4        = 40            - 24.6


Graph Markers:  +       Frequency marker (Level of marker not related to final level)

                |       Final maximized level using Quasi-Peak detector

                X       Final maximized level using Average dector

                #       Final maximized level using Peak detector
```


Level [dBµV/m]
70
60
50
40
30
20
10
0
30M
40M
50M
70M
100M
200M
300M
400M
600M
1G
Frequency [Hz]
MES A605d_F1V_Quasi-Peak
MES A605d_F1V_Peak_List
LIM RSS-Gen 7.2.5 F 3m
RSS-Gen 7.2.5, field strength 3m

MEASUREMENT RESULT: "A605d_F1V_Final"

6/5/2013 10:23AM

Frequency	Level	Antenna Factor	System Loss	Total Level	Limit	Margin	Height Ant.	EuT Angle	Final Detector	Comment
MHz	dBµV	dBµV/m	dB	dBµV/m	dBµV/m	dB	m	deg		
108.120000	35.87	12.09	-23.1	24.9	43.5	18.6	1.00	350	QUASI-PEAK	None
374.960000	26.69	15.30	-21.2	20.8	46.0	25.2	1.00	0	QUASI-PEAK	NF
207.740000	28.10	11.89	-22.2	17.8	43.5	25.7	1.00	0	QUASI-PEAK	NF
830.780000	15.56	22.32	-19.0	18.9	46.0	27.1	1.00	0	QUASI-PEAK	NF
722.300000	16.52	21.20	-19.2	18.5	46.0	27.5	1.00	0	QUASI-PEAK	NF
218.300000	26.79	11.53	-22.0	16.3	46.0	29.7	1.00	180	QUASI-PEAK	None
189.240000	18.38	17.42	-22.3	13.5	43.5	30.0	1.00	0	QUASI-PEAK	NF
999.980000	14.96	24.70	-17.0	22.7	54.0	31.3	1.00	0	QUASI-PEAK	NF
122.880000	21.58	13.01	-22.9	11.7	43.5	31.8	1.00	0	QUASI-PEAK	NF
364.040000	17.91	15.06	-21.2	11.7	46.0	34.3	1.00	0	QUASI-PEAK	NF

No measurable emissions were detected from the EUT above 1GHz.

Radiated emissions testing was performed up to 40GHz.

Appendix B – Measurement Data

B9.0 AC Line Conducted Emissions

Rule Part: FCC Part 15.207
RSS-Gen 7.2.4

Test Procedure: ANSI C63.4-2009
RSS-Gen 7.2.4

Limit: FCC Part 15.207(a)
RSS-Gen 7.2.4, Table 4

Results: Compliant

Notes: This was an AC Conducted emissions measurement.
The EUT was powered from a representative AC Adapter with an input of 120 VAC 60 Hz.

RSS-Gen 7.2.4

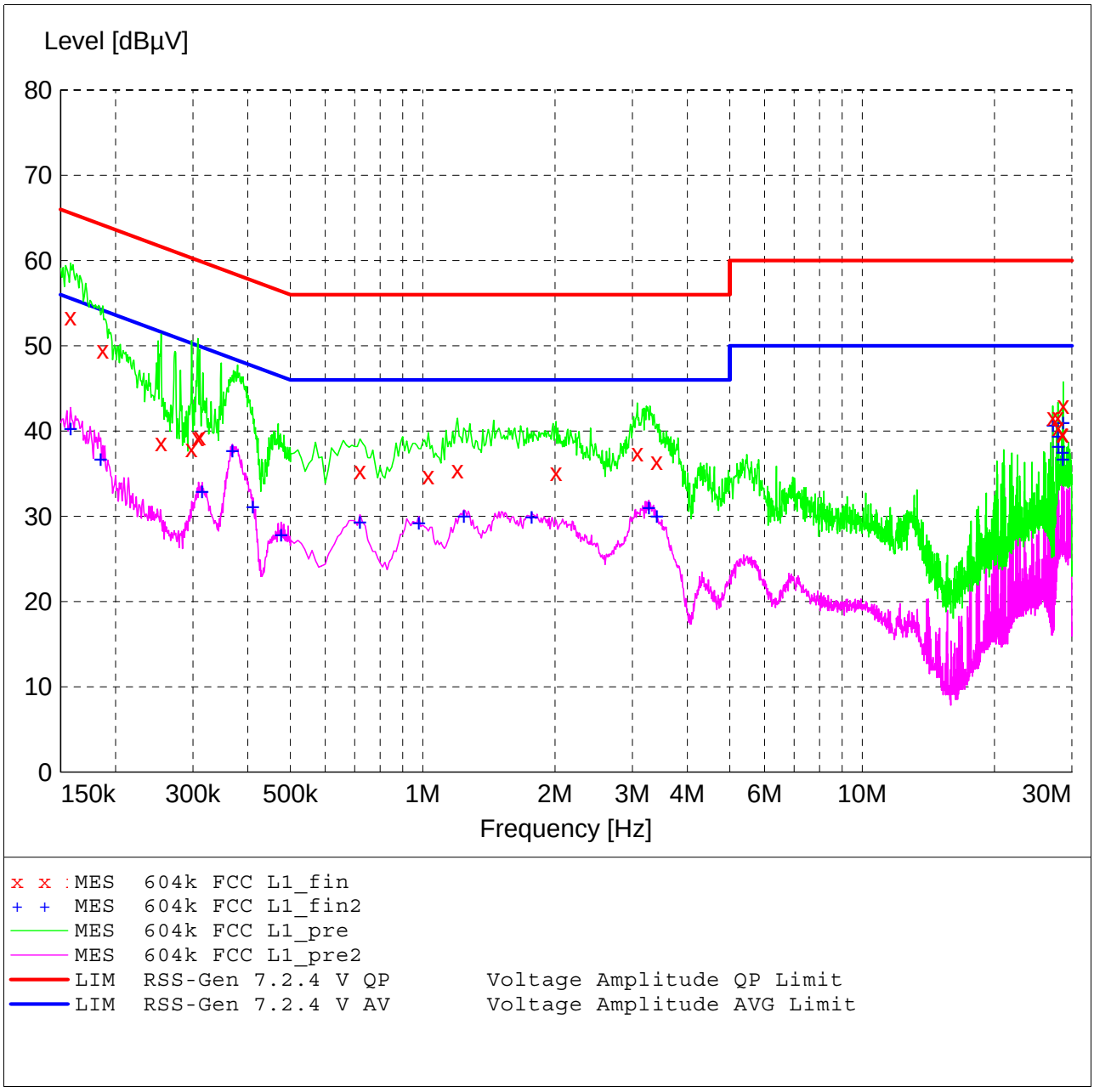
Voltage Mains Test

EUT:	Avenger Station Radio 5.2GHz, 5.4GHz, 5.7GHz
Manufacturer:	Cambium
Operating Condition:	70 deg. F, 34% R.H.
Test Site:	DLS O.F. Screen Room
Operator:	Jim O
Test Specification:	120V, 60Hz
Comment:	Continuous TX; Line 1
	6-04-2013

SCAN TABLE: "Line Cond SR Final"

Short Description: Line Conducted Emissions

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
150.0 kHz	30.0 MHz	4.0 kHz	QuasiPeak CISPR AV	5.0 s	9 kHz	LISN DLS#128



MEASUREMENT RESULT: "604k FCC L1_fin"

6/4/2013 2:23PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector
0.158000	53.40	13.6	66	12.2	QP
0.187000	49.50	12.9	64	14.7	QP
0.254000	38.70	12.1	62	22.9	QP
0.298000	38.00	11.9	60	22.3	QP
0.308000	39.20	11.8	60	20.8	QP
0.311000	39.40	11.8	60	20.5	QP
0.720000	35.40	10.8	56	20.6	QP
1.030000	34.80	10.7	56	21.2	QP
1.200000	35.50	10.6	56	20.5	QP
2.010000	35.20	10.6	56	20.8	QP
3.080000	37.50	10.7	56	18.5	QP
3.410000	36.50	10.7	56	19.5	QP
27.155000	41.70	11.5	60	18.3	QP
27.890000	41.70	11.6	60	18.3	QP
27.950000	40.50	11.6	60	19.5	QP
28.565000	39.80	11.7	60	20.2	QP
28.625000	39.60	11.7	60	20.4	QP
28.685000	43.00	11.7	60	17.0	QP

MEASUREMENT RESULT: "604k FCC L1_fin2"

6/4/2013 2:23PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector
0.158000	40.20	13.6	56	15.4	CAV
0.185000	36.70	12.9	54	17.6	CAV
0.315000	32.90	11.8	50	16.9	CAV
0.369000	37.70	11.5	49	10.8	CAV
0.411000	31.10	11.4	48	16.5	CAV
0.476000	27.80	11.3	46	18.6	CAV
0.720000	29.30	10.8	46	16.7	CAV
0.980000	29.20	10.7	46	16.8	CAV
1.240000	30.00	10.6	46	16.0	CAV
1.770000	29.90	10.6	46	16.1	CAV
3.270000	31.00	10.7	46	15.0	CAV
3.410000	30.00	10.7	46	16.0	CAV
27.155000	40.60	11.5	50	9.4	CAV
27.890000	39.30	11.6	50	10.7	CAV
27.950000	38.10	11.6	50	11.9	CAV
28.565000	37.50	11.7	50	12.5	CAV
28.625000	36.70	11.7	50	13.3	CAV
28.685000	41.00	11.7	50	9.0	CAV

RSS-Gen 7.2.4

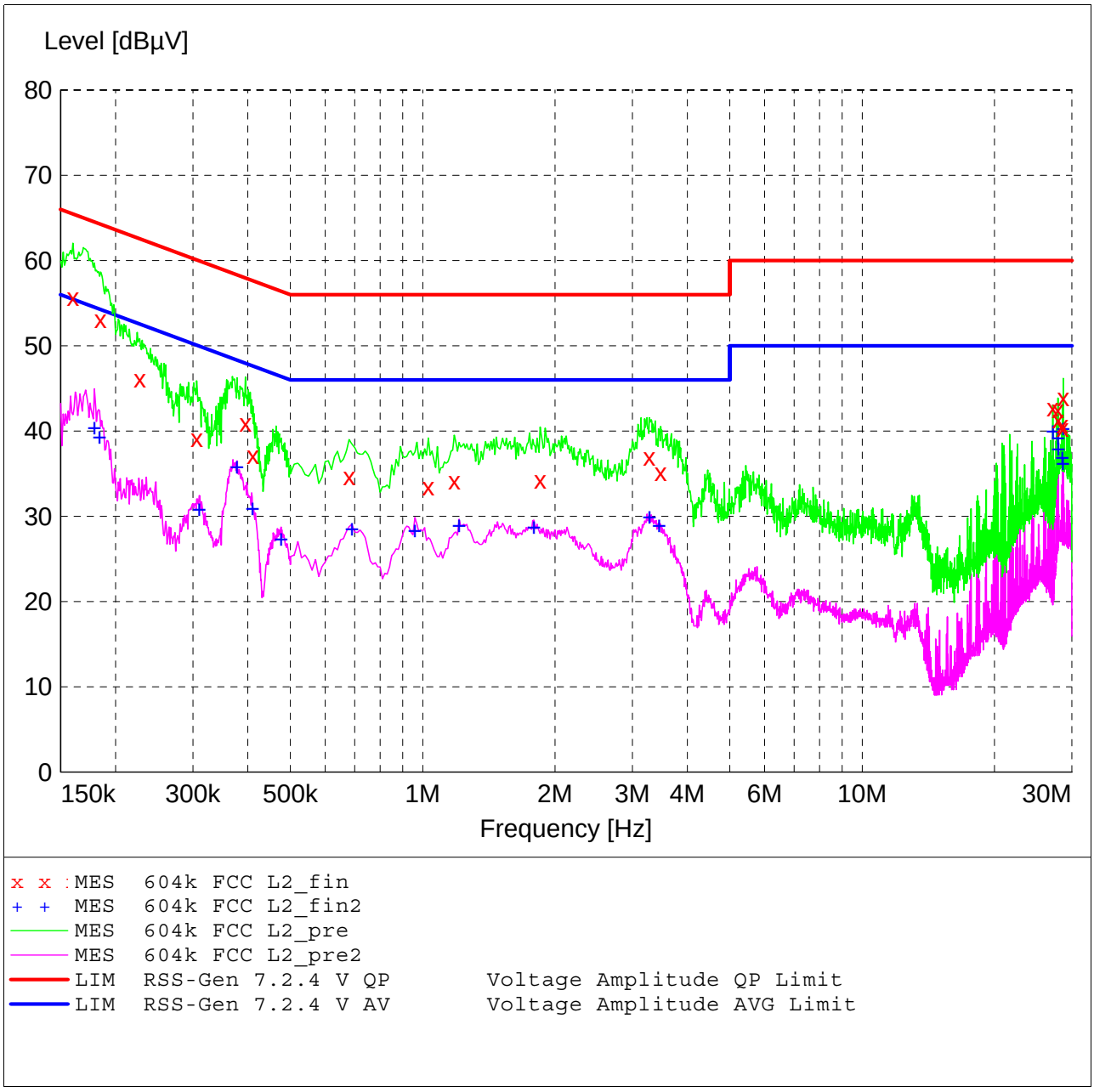
Voltage Mains Test

EUT:	Avenger Station Radio 5.2GHz, 5.4GHz, 5.7GHz
Manufacturer:	Cambium
Operating Condition:	70 deg. F, 34% R.H.
Test Site:	DLS O.F. Screen Room
Operator:	Jim O
Test Specification:	120V, 60Hz
Comment:	Continuous TX; Line 2
	6-04-2013

SCAN TABLE: "Line Cond SR Final"

Short Description: Line Conducted Emissions

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
150.0 kHz	30.0 MHz	4.0 kHz	QuasiPeak CISPR AV	5.0 s	9 kHz	LISN DLS#128



MEASUREMENT RESULT: "604k FCC L2_fin"

6/4/2013 2:12PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector
0.160000	55.70	13.5	66	9.8	QP
0.185000	53.10	12.9	64	11.2	QP
0.227000	46.10	12.4	63	16.5	QP
0.306000	39.20	11.8	60	20.9	QP
0.395000	41.00	11.4	58	17.0	QP
0.411000	37.20	11.4	58	20.4	QP
0.680000	34.70	10.8	56	21.3	QP
1.030000	33.50	10.7	56	22.5	QP
1.180000	34.20	10.6	56	21.8	QP
1.850000	34.30	10.6	56	21.7	QP
3.280000	37.00	10.7	56	19.0	QP
3.480000	35.20	10.7	56	20.8	QP
27.155000	42.70	11.5	60	17.3	QP
27.890000	42.50	11.6	60	17.5	QP
27.950000	41.30	11.6	60	18.7	QP
28.565000	40.80	11.7	60	19.2	QP
28.625000	40.40	11.7	60	19.6	QP
28.685000	43.90	11.7	60	16.1	QP

MEASUREMENT RESULT: "604k FCC L2_fin2"

6/4/2013 2:12PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector
0.179000	40.30	13.0	55	14.2	CAV
0.184000	39.30	12.9	54	15.0	CAV
0.310000	30.80	11.8	50	19.2	CAV
0.378000	35.80	11.5	48	12.5	CAV
0.410000	30.90	11.4	48	16.7	CAV
0.476000	27.30	11.3	46	19.1	CAV
0.690000	28.50	10.8	46	17.5	CAV
0.960000	28.30	10.7	46	17.7	CAV
1.210000	28.90	10.6	46	17.1	CAV
1.790000	28.70	10.6	46	17.3	CAV
3.280000	29.90	10.7	46	16.1	CAV
3.450000	28.90	10.7	46	17.1	CAV
27.155000	40.00	11.5	50	10.0	CAV
27.890000	39.20	11.6	50	10.8	CAV
27.950000	37.90	11.6	50	12.1	CAV
28.565000	36.90	11.7	50	13.1	CAV
28.625000	36.20	11.7	50	13.8	CAV
28.685000	40.20	11.7	50	9.8	CAV

END OF REPORT

Revision #	Date	Comments	By
1.0	8-28-2013	Preliminary Release	JS
1.1	9-4-2013	Corrected RSS-210 references	JS