166 South Carter, Genoa City, WI 53128

Company:	Cambium Networks
Model Tested:	C054045C004A
Report Number:	18193
DLS Project:	5270

Code of Federal Regulations 47 Part 15 – Radio Frequency Devices

Subpart E – Unlicensed National Information Infrastructure Devices
Section 15.407
General Technical Requirements.

THE FOLLOWING **MEETS** THE ABOVE TEST SPECIFICATION
FOR A **CLASS III** PERMISSIVE CHANGE
(DFS not tested by DLS Electronic Systems Inc.)

Formal Name:	PMP450SM 5.4 & 5.7 GHz OFDM Radio with cross-polarized antenna
Kind of Equipment:	Point-to-Point Digital Transmission Transceiver
Frequency Range:	**5475 to 5720 MHz (5.4 GHz xcvr in this report)** 5730 to 5845 MHz (5.7 GHz xcvr reported to the FCC in CFR 47 Part 15 Subpart C Section 15.247 reports # 17831 & 17833)
Test Configuration:	Stand-alone
Model Number(s):	C054045C001A, C054045C002A, C054045C003A, C054045C004A
Model(s) Tested:	C054045C004A
Serial Number(s):	0A003EA00037, 0A003EA000C4
Date of Tests:	July, August & October, 2012
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.

166 South Carter, Genoa City, WI 53128

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SIGNATURE PAGE

Report By:

Craig Brandt
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

It was determined that the Cambium Networks PMP450SM 5.4 & 5.7 GHz OFDM Radio with cross-polarized antenna, Model C054045C004A, complies with the requirements of CFR 47 Part 15 Subpart E Section 15.407. The purpose of this test was to show FCC compliance of the PMP450SM 5.4 & 5.7 GHz OFDM Radio with cross-polarized antenna, pursuant to a Class III Permissive Change to FCC ID: Z8H89FT0001. The original device was certified as a 5.7 GHz OFDM Radio with cross-polarized antenna, tested to CFR 47 Part 15 Subpart C, Section 15.247. This report is being generated to show compliance of the 5.4 GHz OFDM Radio with cross-polarized antenna being added to the software package of the device. The same test samples were supplied for the current testing and the original certification for FCC ID: Z8H89FT0001. Original testing of the PMP450SM 5.7 GHz OFDM Radio with cross-polarized antenna determined that QPSK is the worst case modulation of the OFDM transceiver. This modulation was tested to show compliance to CFR 47 Part 15 Subpart E Section 15.407 for the Class III Permissive Change.

Subpart E Section 15.407 Applicable Technical Requirements Tested:

Section	Description	Procedure	Note	Compliant?
Informative	Emission Bandwidth – 26 dB bandwidth	FCC KDB 789033 D01 General UNII Test Procedures v01r01 Section D	1	NA
15.407(a)(2)	Maximum Conducted Output Power	FCC KDB 789033 D01 General UNII Test Procedures v01r01 Section C(3)(e)	1	Yes
15.407(a)(2)	Peak Power Spectral Density - Conducted	FCC KDB 789033 D01 General UNII Test Procedures v01r01 Section E	1	Yes
15.407(a)(6)	Peak Excursion - Conducted	FCC KDB 789033 D01 General UNII Test Procedures v01r01 Section F	1	Yes
15.407(b)(3) & 15.407(b)(5)	Unwanted Emission Levels – Radiated Band-Edge	FCC KDB 789033 D01 General UNII Test Procedures v01r01 Sections G(3)(d) and G(5)	2	Yes
15.407(b)(3) & 15.407(b)(6)	Unwanted Emission Levels – RF Conducted	FCC KDB 789033 D01 General UNII Test Procedures v01r01 Sections G(1), G(2),G(3), G(4), G(5)	1	Yes

15.407(b)(3) & 15.407(b)(6)	Unwanted Emission Levels – Radiated from cabinet	FCC KDB 789033 D01 General UNII Test Procedures v01r01 Sections G(1), G(2),G(3), G(4), G(5)	2	Yes
15.407(h)(2)	Dynamic Frequency Selection (DFS)	Not tested by DLS		NA

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

2.0 Introduction

In July, August, & October 2012 the PMP450SM 5.4 & 5.7 GHz OFDM Radio with cross-polarized antenna, Model C054045C004A, as provided from Cambium Networks, was tested to the requirements of CFR 47 Part 15 Subpart E Section 15.407 to be added to FCC ID: Z8H89FT0001 as a Class III Permissive Change. 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 5.4 & 5.7 GHz DTS Transceiver with either integrated Patch (9 dBi) and external Cassegrain Lens (9 dBi) antennas or integrated Patch (9 dBi) and Reflector Dish (18 dBi) antennas with 10 MHz or 20 MHz channel bandwidth.

Type of Equipment / Frequency Range:

Stand-Alone / **5475 to 5720 MHz (10 MHz bandwidth) (in this report)**
5480 to 5715 MHz (20 MHz bandwidth) (in this report)

5730 to 5845 MHz (5.7 GHz xcvr reported to the FCC in reports # 17831 & 17833)

Physical Dimensions of Equipment Under Test:

Length: 10 in x Width: 3 in x Height: 1 in

Power Source:

29 VDC (Power Over Ethernet to Radio)
120 Vac, 60 Hz using Phihong power supply model: PSA15A-295 (MOT)

Internal Frequencies:

150 kHz (Switching Power Supply Frequencies)
25 MHz, 20 MHz

Transmit / Receive Frequencies Used For Test Purpose:

10 MHz Channel Bandwidth:	Low channel: 5475 MHz, Middle channel: 5575 MHz, High channel: 5720 MHz
20 MHz Channel Bandwidth:	Low channel: 5480 MHz, Middle channel: 5575 MHz, High channel: 5715 MHz

Type of Modulation(s):

OFDM: QPSK, 16-QAM, 64-QAM **(QPSK is worst case)**

Description of Circuit Board(s) / Part Number:

Cambium Networks PC Board	84010124001 P6
Patch Antenna	85015000001
2 x Connector (for test unit only)	0989419C01

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	7/12	7/13
Receiver	Rohde & Schwarz	ESI 40	837808/006	20 Hz – 40 GHz	4/12	4/13
Preamplifier	Rohde & Schwarz	TS-PR10	032001/004	9 kHz – 1 GHz	1/12	1/13
Antenna	EMCO	3104C	00054892	20 MHz – 200 MHz	9/10	9/12
Antenna	EMCO	3146	1205	200 MHz – 1 GHz	9/10	9/12
Preamp	Ciao	CA118-4010	101	1GHz-18GHz	2/12	2/13
Preamp	Planar	PTB-60-120-5RC-10-115VAC-SFF	P13291	1GHz-20GHz	8/11	8/12
Horn Antenna	EMCO	3115	9903-5731	1-18GHz	6/11	6/13
Horn Antenna	EMCO	3115	6204	1-18GHz	6/11	6/13
Low Pass Filter	Mini-Circuits	VLFX-1125	RUU926000920	DC-1125MHz	8/11	8/12
Preamp	Miteq	AMF-8B-180265-40-10P-H/S	438727	18GHz-26GHz	8/11	8/12
Horn Antenna	EMCO	3116	2549	18 – 40GHz	8/10	8/12
High Pass Filter	Planar Filter Co.	HP8G-7G8-CD-SFF	PF1225/0728	7.5 GHz – 18 GHz	8/11	8/12
High Pass Filter	Planar Filter Co.	CL22600-9000-CD-SS	PF1230/0728	16.2 GHz – 40 GHz	8/11	8/12
LISN	Solar	9252-50-R-24-BNC	971612	9 kHz – 30 MHz	3/12	3/13
Filter- High-Pass	Solar	7930-120	090701	120 kHz– 30 MHz	1/12	1/13
Limiter	Electro-Metrics	EM-7600	705	9 kHz – 30 MHz	1/12	1/13
10 dB attenuator	narda	4768-10	0702	DC – 40 GHz	8/11 8/13/12	8/12* 8/13/13
Preamp	Rohde & Schwarz	TS-PR40	052002/025	26 GHz – 40 GHz	5/12	5/13
50 Ohm Load	Pasternack	PE6039	DLS #527	DC – 18 GHz	NA	NA
50 Ohm Load	Pasternack	PE6095	NA	DC – 18 GHz	NA	NA

*calibrated 8/13/12.The device was properly calibrated for testing in July and in October.

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 v01r01 and ANSI C63.10-2009, unless otherwise noted. Description of procedures and measurements can be found in Appendix A – Measurement Data. **See the separate exhibit for additional 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 C63.10-2009, unless otherwise noted. Description of procedures and measurements can be found in Appendix A – Measurement Data. **See the separate exhibit 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:

70°F at 35% RH

Supply Voltage:

29 VDC (Power Over Ethernet to Radio)
120 Vac, 60 Hz using Phihong power supply model: PSA15A-295 (MOT)

8.0 Modifications Made To EUT For Compliance

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

9.0 Additional Descriptions

Test software was used to set the frequency, modulation, and output power of the EUT. Transmitter parameters are software controlled and set to Cambium Networks' specifications. Any new software will not enable any features/operations which would violate regulatory requirements.

10.0 Results

Measurements were performed in accordance with FCC Publication KDB 789033 D01 General UNII test Procedures v01r01 and ANSI C63.10-2009. Graphical and tabular data can be found in Appendix A at the end of this report.

11.0 Conclusion

Dynamic Frequency Selection (DFS) testing was not performed by DLS Electronic Systems,Inc. Otherwise, the PMP450SM 5.4 & 5.7 GHz OFDM Radio with cross-polarized antenna, Model C054045C004A, as provided from Cambium Networks tested in July, August, & October 2012 **meets** the requirements of CFR 47 Part 15 Subpart E Section 15.407, to be added to FCC ID: Z8H89FT0001 as a Class III Permissive Change.

Appendix A – Measurement Data

A1.0 Emission Bandwidth – 26 dB bandwidth – conducted

Rule Section: Informative

Test Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01 – *Guidance for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E*

Section D – 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

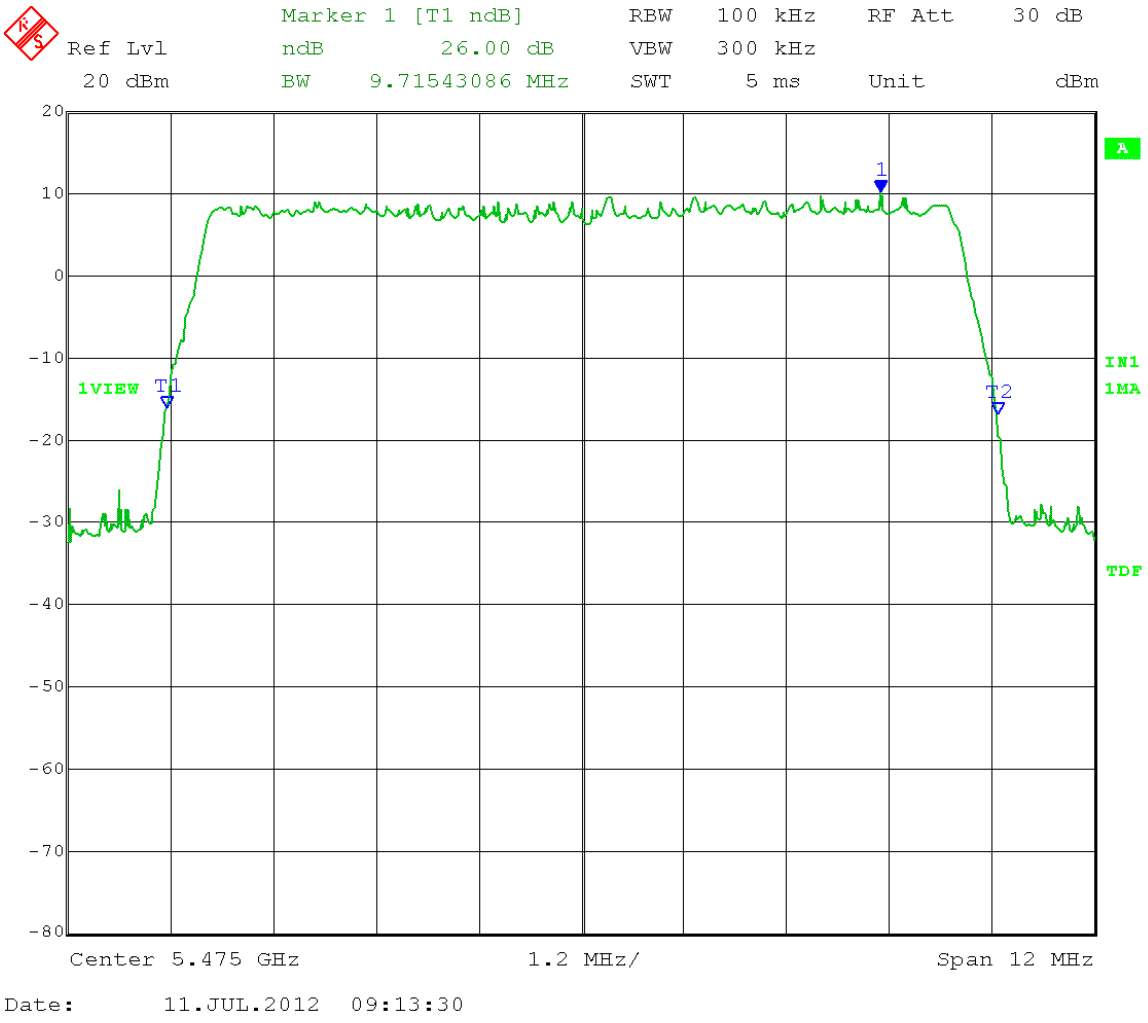
Notes: Measurements were taken for QPSK at the lowest, middle, and highest channels of operation. EUT was set to transmit continuously with 98% duty cycle.

Test Date: 07-11-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Emission Bandwidth – 26 dB bandwidth – conducted
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section D – Emission bandwidth
Operator: Craig B

RBW = 1% of EBW; VBW > RBW
Detector = Peak; Trace mode = max hold

EUT nominal channel bandwidth: 10 MHz adi reg 16
Output port: Channel A; Channel Frequency: 5.475 GHz
Output power setting: 19; Modulation Type: QPSK

26 dB Emission Bandwidth = 9.72 MHz

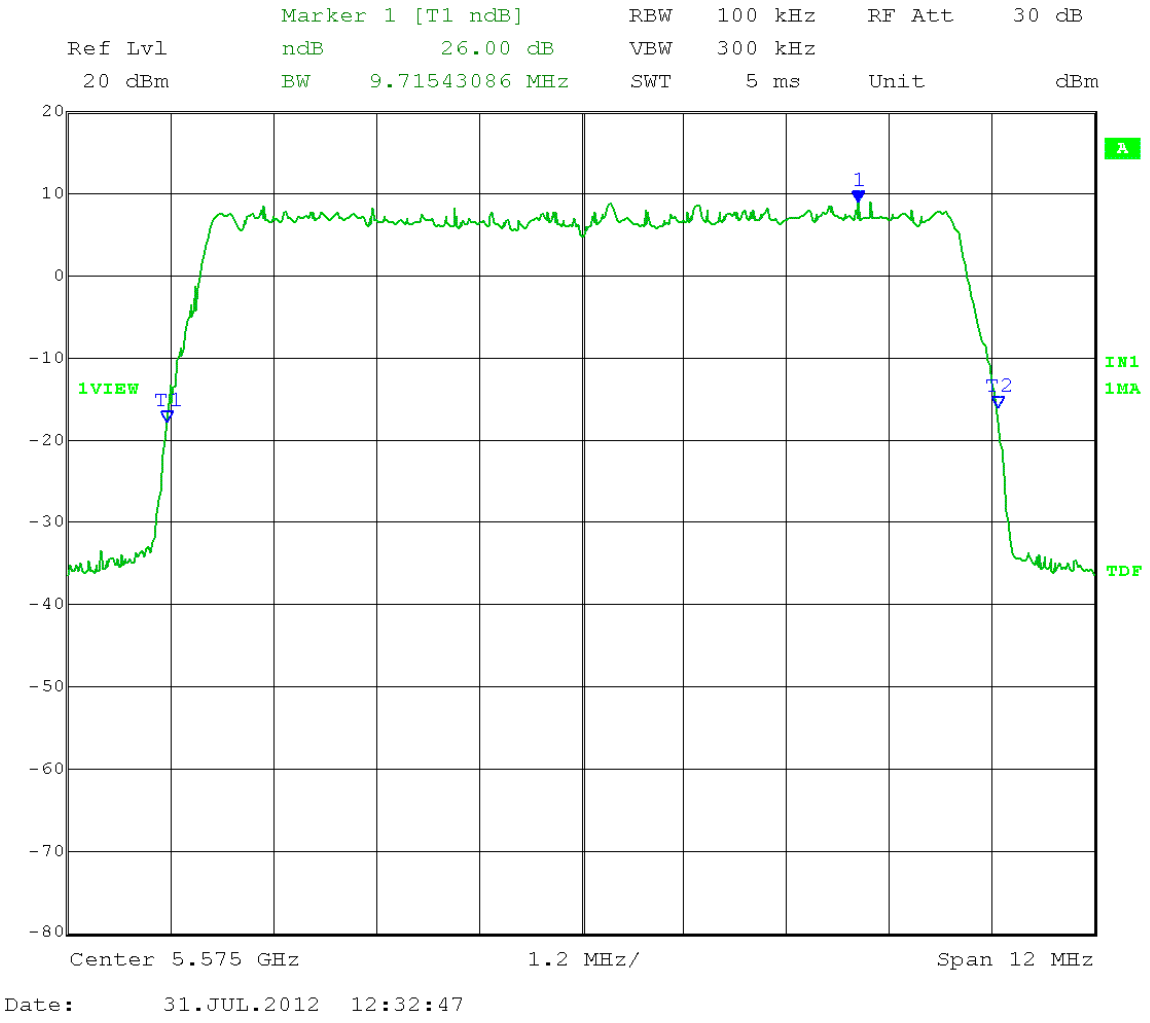


Test Date: 07-31-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Emission Bandwidth – 26 dB bandwidth – conducted
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section D – Emission bandwidth
Operator: Craig B

RBW = 1% of EBW; VBW > RBW
Detector = Peak; Trace mode = max hold

EUT nominal channel bandwidth: 10 MHz adi reg 21
Output port: Channel A; Channel Frequency: 5.575 GHz
Output power setting: 19; Modulation Type: QPSK

26 dB Emission Bandwidth = 9.72 MHz



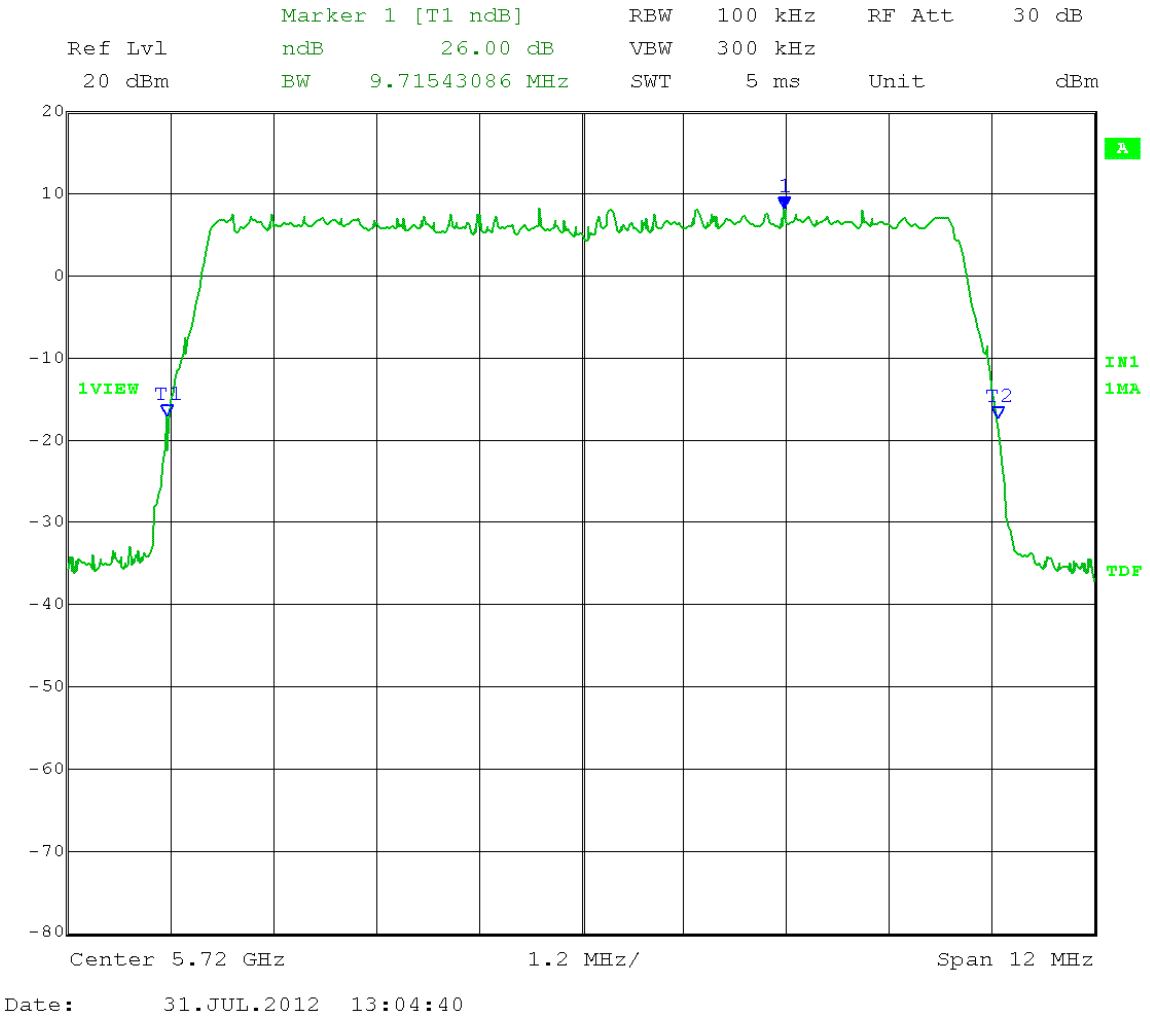
Date: 31.JUL.2012 12:32:47

Test Date: 07-31-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Emission Bandwidth – 26 dB bandwidth – conducted
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section D – Emission bandwidth
Operator: Craig B

RBW = 1% of EBW; VBW > RBW
Detector = Peak; Trace mode = max hold

EUT nominal channel bandwidth: 10 MHz adi reg 27
Output port: Channel A; Channel Frequency: 5.720 GHz
Output power setting: 19; Modulation Type: QPSK

26 dB Emission Bandwidth = 9.72 MHz

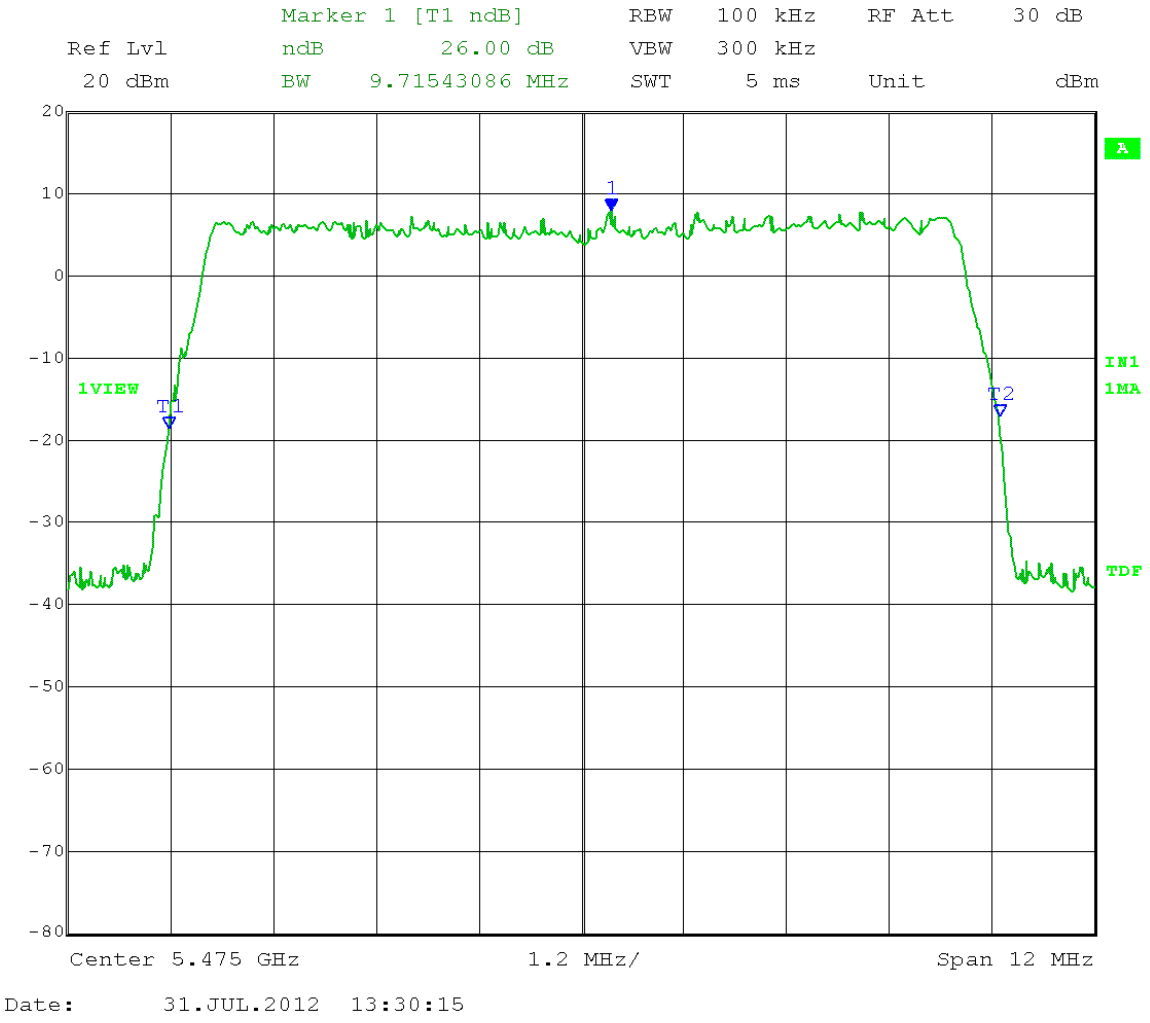


Test Date: 07-31-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Emission Bandwidth – 26 dB bandwidth – conducted
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section D – Emission bandwidth
Operator: Craig B

RBW = 1% of EBW; VBW > RBW
Detector = Peak; Trace mode = max hold

EUT nominal channel bandwidth: 10 MHz adi reg 1F
Output port: Channel B; Channel Frequency: 5.475 GHz
Output power setting: 19; Modulation Type: QPSK

26 dB Emission Bandwidth = 9.72 MHz

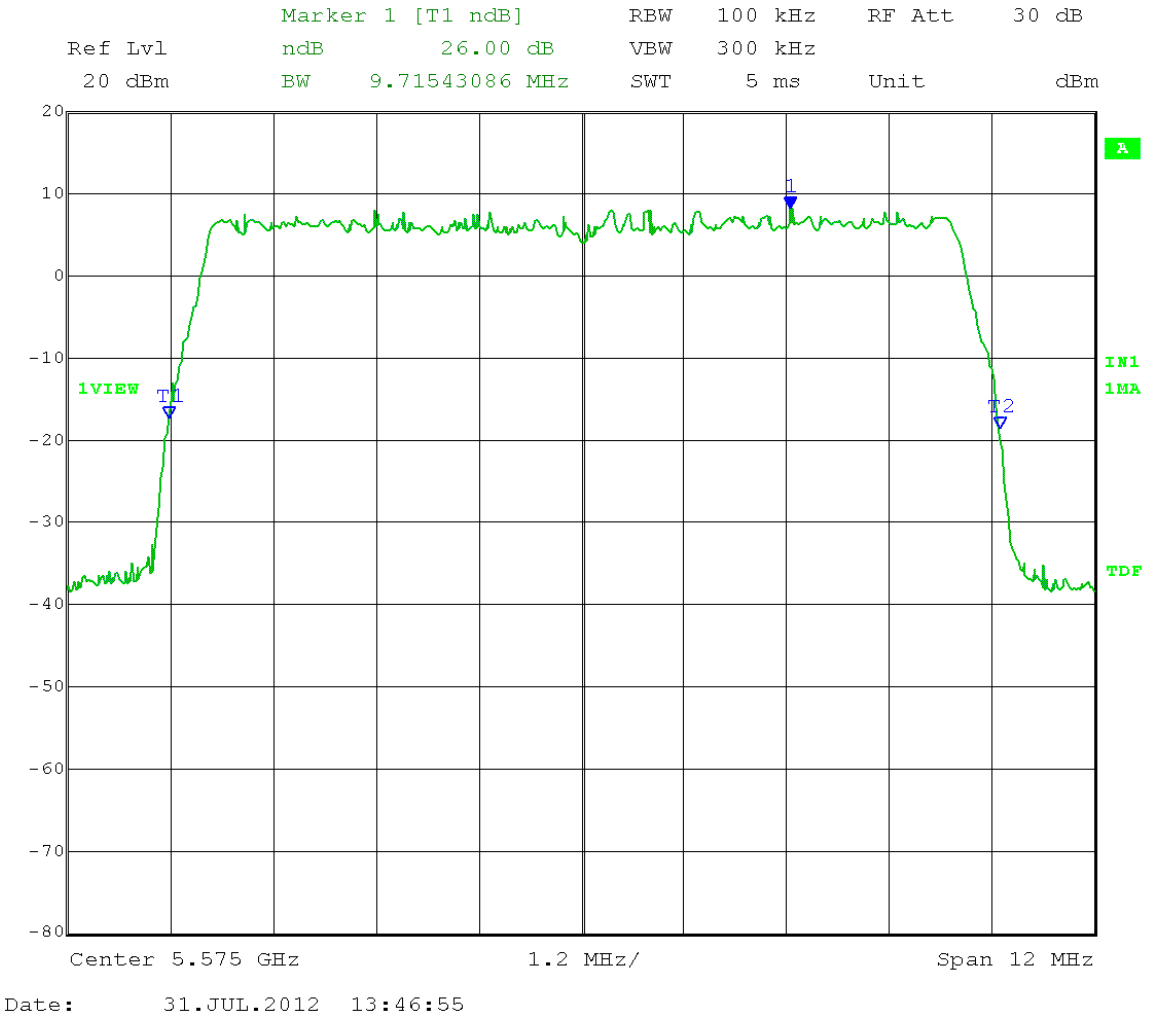


Test Date: 07-31-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Emission Bandwidth – 26 dB bandwidth – conducted
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section D – Emission bandwidth
Operator: Craig B

RBW = 1% of EBW; VBW > RBW
Detector = Peak; Trace mode = max hold

EUT nominal channel bandwidth: 10 MHz adi reg 25
Output port: Channel B; Channel Frequency: 5.575 GHz
Output power setting: 19; Modulation Type: QPSK

26 dB Emission Bandwidth = 9.72 MHz



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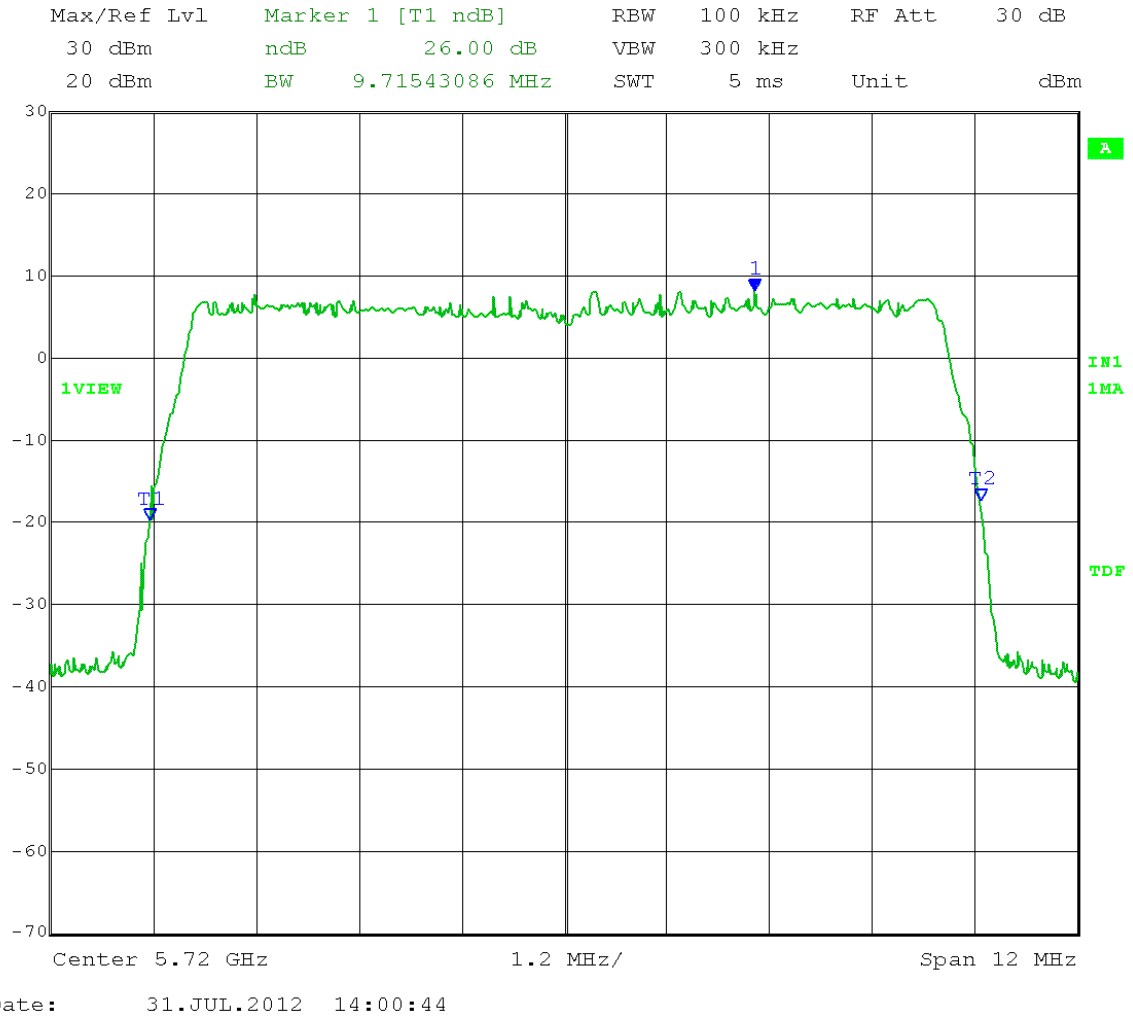
Test Date: 07-31-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Emission Bandwidth – 26 dB bandwidth – conducted
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section D – Emission bandwidth
Operator: Craig B

RBW = 1% of EBW; VBW > RBW
Detector = Peak; Trace mode = max hold

EUT nominal channel bandwidth: 10 MHz adi reg 26
Output port: Channel B; Channel Frequency: 5.720 GHz
Output power setting: 19; Modulation Type: QPSK

26 dB Emission Bandwidth = 9.72 MHz



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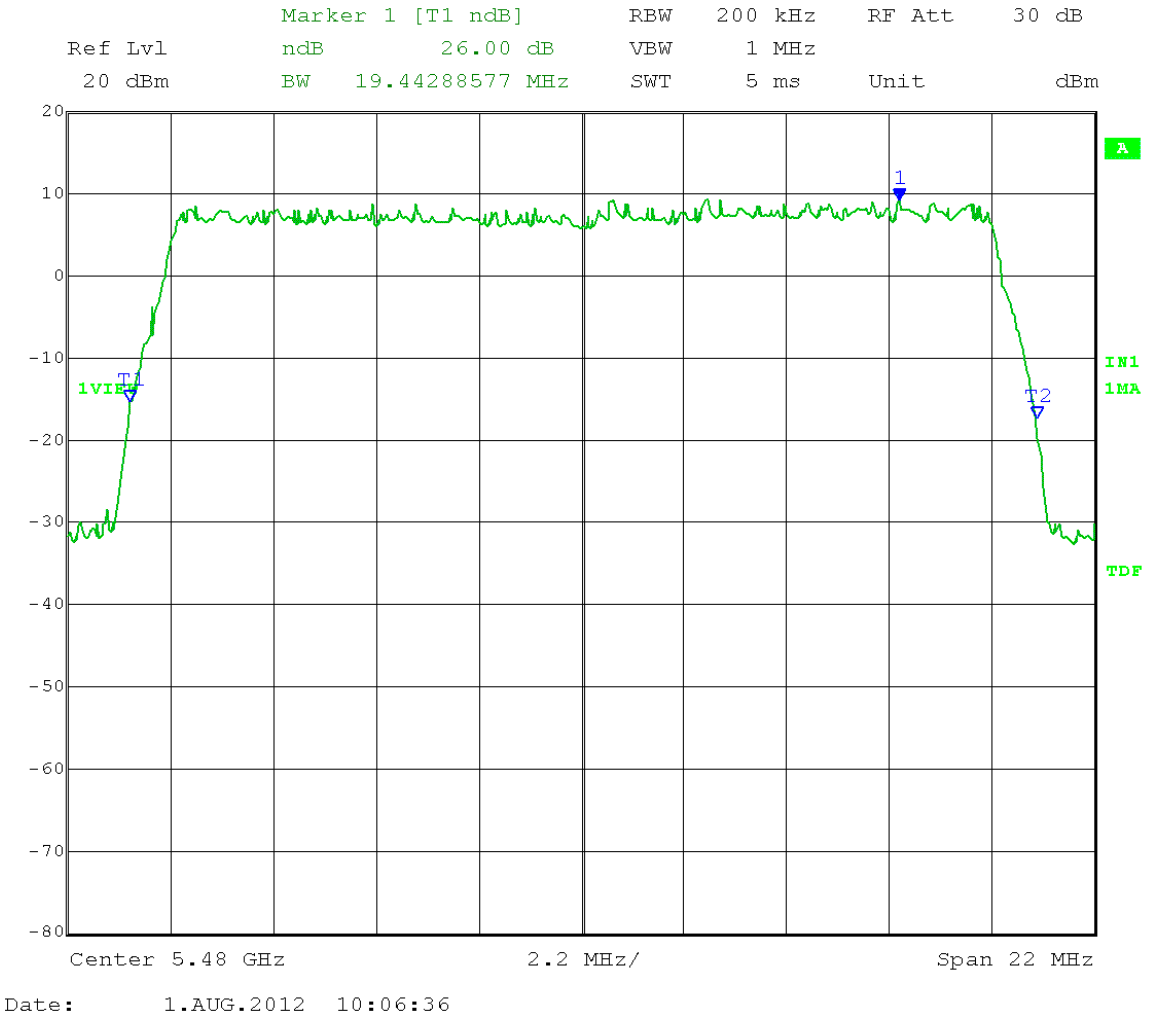
Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Emission Bandwidth – 26 dB bandwidth – conducted
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section D – Emission bandwidth
Operator: Craig B

RBW = 1% of EBW; VBW > RBW
Detector = Peak; Trace mode = max hold

EUT nominal channel bandwidth: 20 MHz adi reg 17
Output port: Channel A; Channel Frequency: 5.480 GHz
Output power setting: 19; Modulation Type: QPSK

26 dB Emission Bandwidth = 19.44 MHz



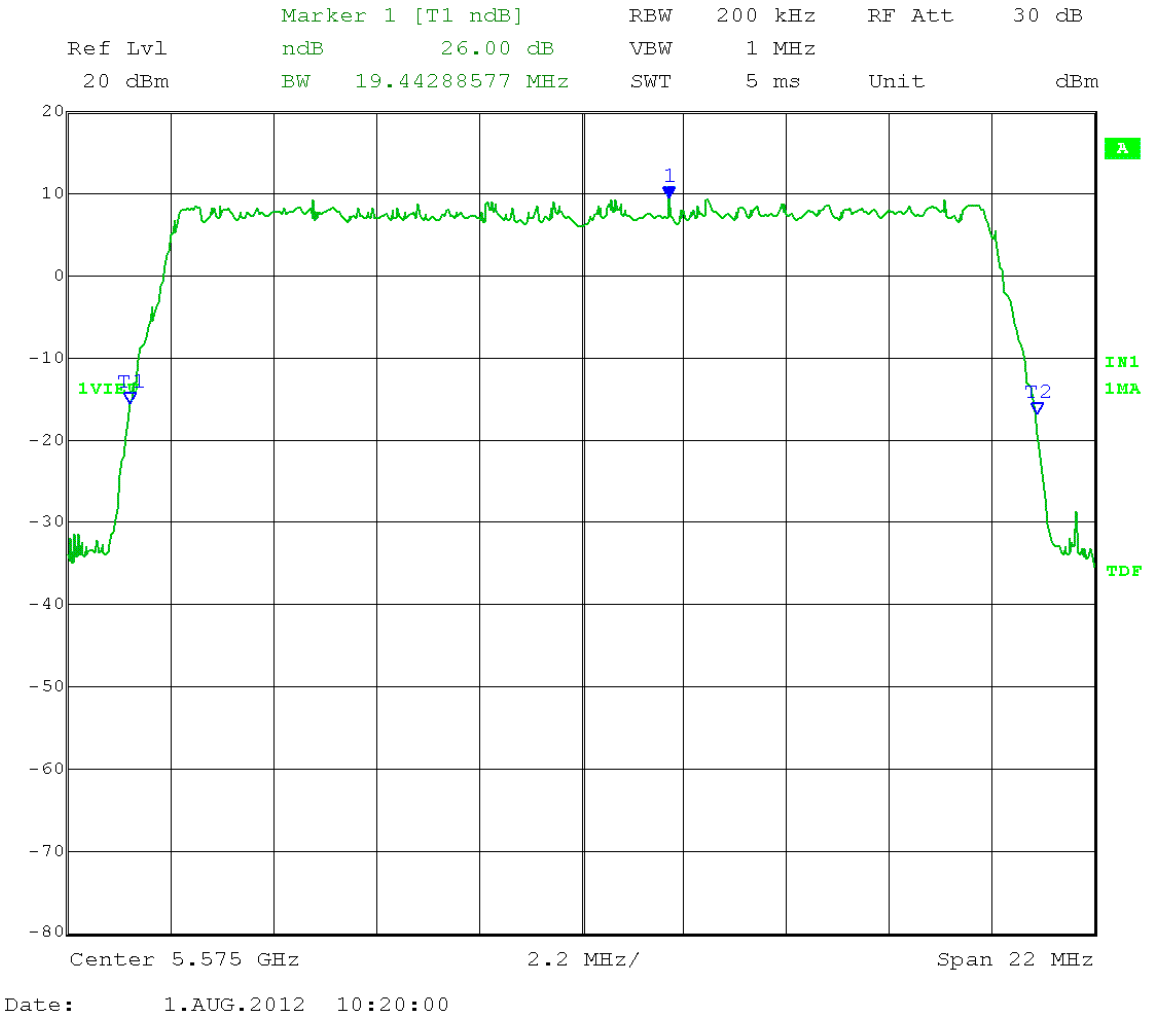
Date: 1.AUG.2012 10:06:36

Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Emission Bandwidth – 26 dB bandwidth – conducted
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section D – Emission bandwidth
Operator: Craig B

RBW = 1% of EBW; VBW > RBW
Detector = Peak; Trace mode = max hold

EUT nominal channel bandwidth: 20 MHz adi reg 1E
Output port: Channel A; Channel Frequency: 5.575 GHz
Output power setting: 19; Modulation Type: QPSK

26 dB Emission Bandwidth = 19.44 MHz



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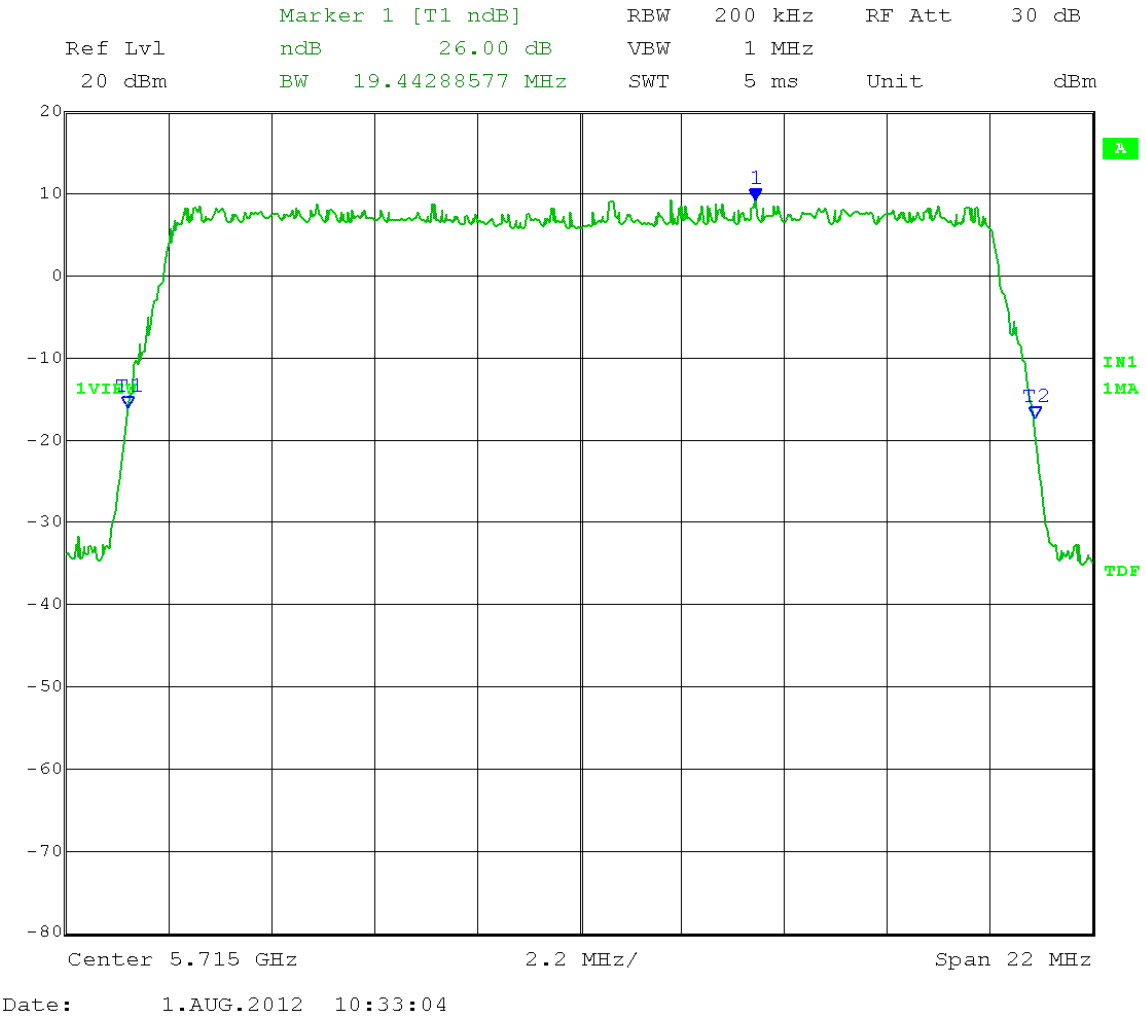
Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Emission Bandwidth – 26 dB bandwidth – conducted
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section D – Emission bandwidth
Operator: Craig B

RBW = 1% of EBW; VBW > RBW
Detector = Peak; Trace mode = max hold

EUT nominal channel bandwidth: 20 MHz adi reg 21
Output port: Channel A; Channel Frequency: 5.715 GHz
Output power setting: 19; Modulation Type: QPSK

26 dB Emission Bandwidth = 19.44 MHz



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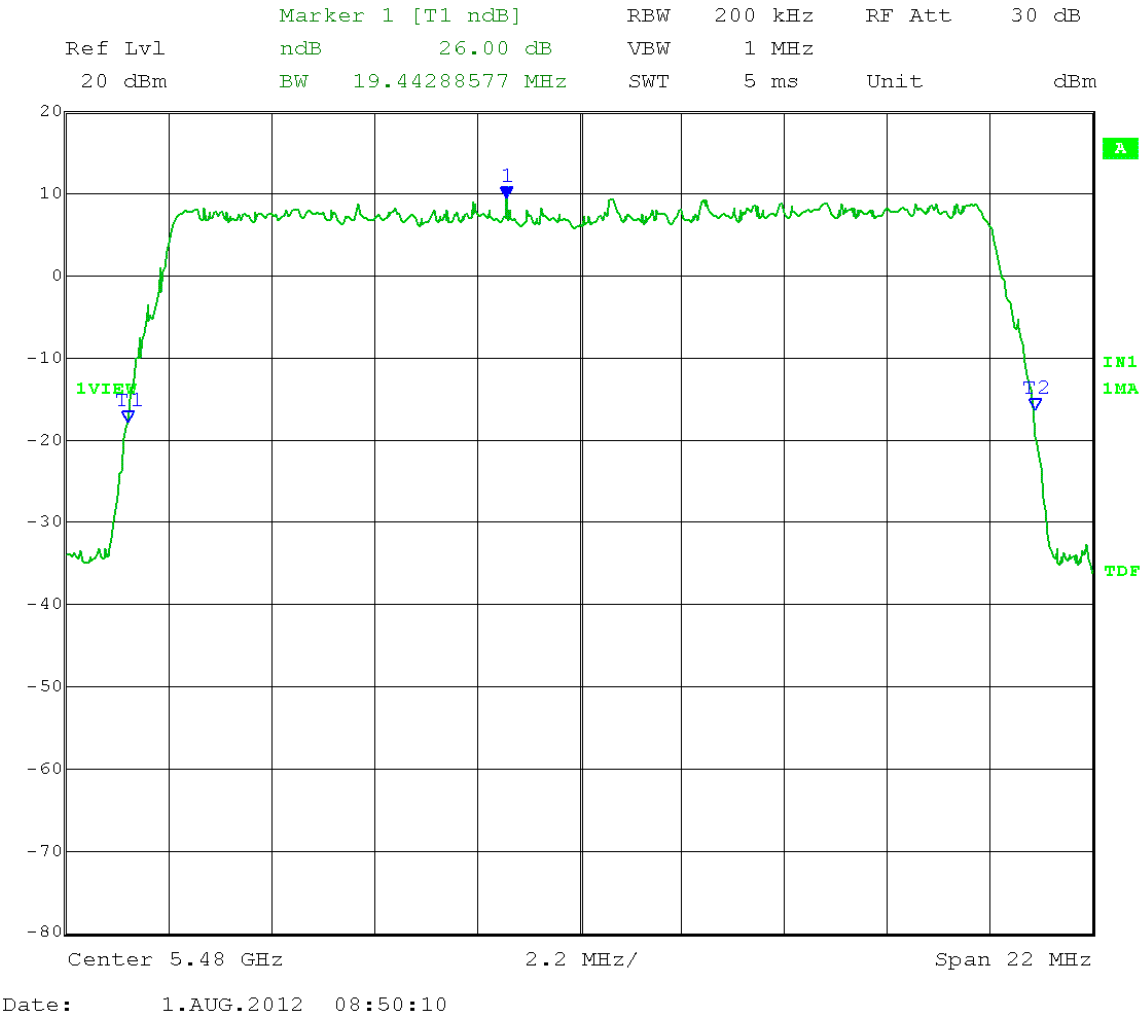
Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Emission Bandwidth – 26 dB bandwidth – conducted
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section D – Emission bandwidth
Operator: Craig B

RBW = 1% of EBW; VBW > RBW
Detector = Peak; Trace mode = max hold

EUT nominal channel bandwidth: 20 MHz adi reg 1A
Output port: Channel B; Channel Frequency: 5.480 GHz
Output power setting: 19; Modulation Type: QPSK

26 dB Emission Bandwidth = 19.44 MHz

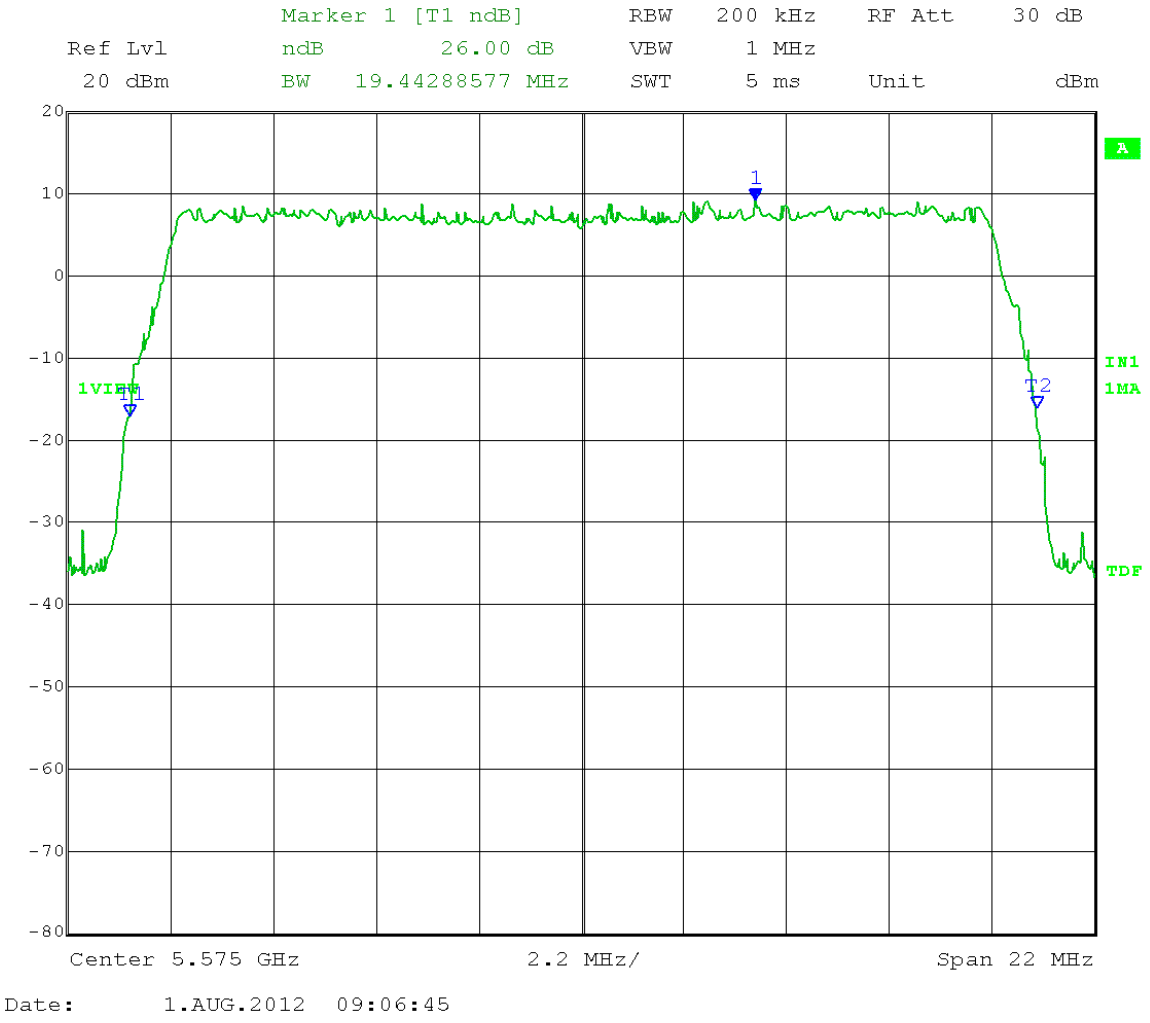


Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Emission Bandwidth – 26 dB bandwidth – conducted
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section D – Emission bandwidth
Operator: Craig B

RBW = 1% of EBW; VBW > RBW
Detector = Peak; Trace mode = max hold

EUT nominal channel bandwidth: 20 MHz adi reg 20
Output port: Channel B; Channel Frequency: 5.575 GHz
Output power setting: 19; Modulation Type: QPSK

26 dB Emission Bandwidth = 19.44 MHz



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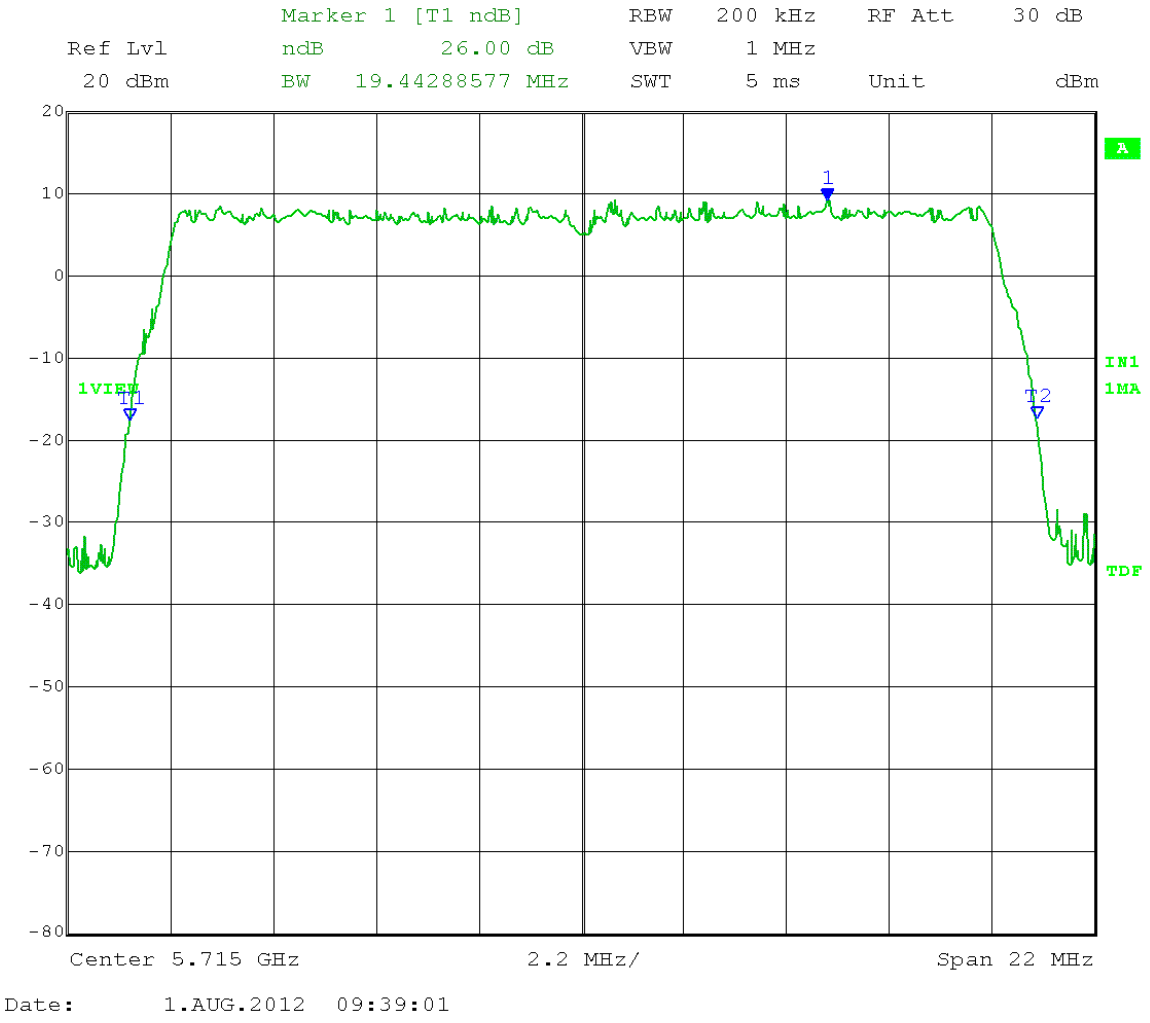
Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Emission Bandwidth – 26 dB bandwidth – conducted
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section D – Emission bandwidth
Operator: Craig B

RBW = 1% of EBW; VBW > RBW
Detector = Peak; Trace mode = max hold

EUT nominal channel bandwidth: 20 MHz adi reg 21
Output port: Channel B; Channel Frequency: 5.715 GHz
Output power setting: 19; Modulation Type: QPSK

26 dB Emission Bandwidth = 19.44 MHz



Date: 1.AUG.2012 09:39:01

Appendix A – Measurement Data

A2.0 Maximum Conducted Output Power

Rule Section: Section 15.407(a)(2)

Test Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01 – *Guidance for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E*

Section C(3)(e) Method SA-2 Alternative: RMS detection with slow sweep with each spectrum bin averaging across on and off times of the EUT transmissions, followed by duty cycle correction.

Description:
SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points ≥ 2 x Span/RBW
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal)
Detector = RMS
Sweep: single sweep
Use analyzer's band power function with the band limits set equal to the 26 dB EBW
Add 10 log (1/x), where x is the duty cycle, to the measured power

Limit:
Lesser of: 250 mW (24 dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz.
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 QPSK at the lowest, middle, and highest channels of operation. EUT was set to transmit continuously with 98% duty cycle.

Test Date: 07-11-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Maximum Conducted Output Power
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section C – Method SA-2 Alternative (RMS detection with slow sweep with each spectrum bin averaging across ON and OFF times of the EUT transmissions, followed by duty cycle correction)
Operator: Craig B

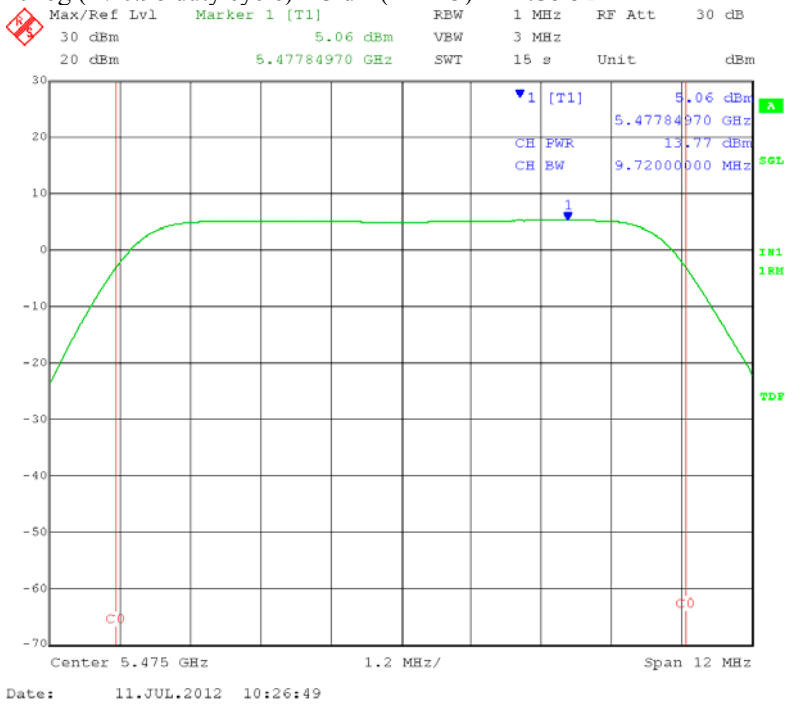
SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points ≥ 2 x (Span/RBW)
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal) = 10 x 500 x 28 µs = 0.14 sec
Detector = RMS
Sweep: single sweep
Use analyzer's band power function with the band limits set equal to the 26 dB EBW
Add 10 log (1/x), where x is the duty cycle, to the measured power

EUT nominal channel bandwidth:	10 MHz	adi reg 22	26 dB EBW: 9.72 MHz
Output port:	Channel A;	Low Channel Frequency:	5.475 GHz
Output power setting:	19;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: Lesser of: 250 mW (24 dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. 11 dBm + 10 log B = 20.877 dBm. Limit shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Antenna gain = 9 dBi. Limit = 20.877 dBm – 3 dBi = **17.877 dBm**

MIMO MATRIX A: MIMO with Cross-Polarized antenna (FCC KDB 662911 D02 v01):
Measure and add 10 log(N) dB, where N is the number of outputs.
= 10 log(2) = 3 dB

Maximum Conducted Output Power = 13.77 dBm + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) + 3 dB (MIMO) = **17.86 dBm**



Test Date: 07-31-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Maximum Conducted Output Power
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section C – Method SA-2 Alternative (RMS detection with slow sweep with each spectrum bin averaging across ON and OFF times of the EUT transmissions, followed by duty cycle correction)
Operator: Craig B

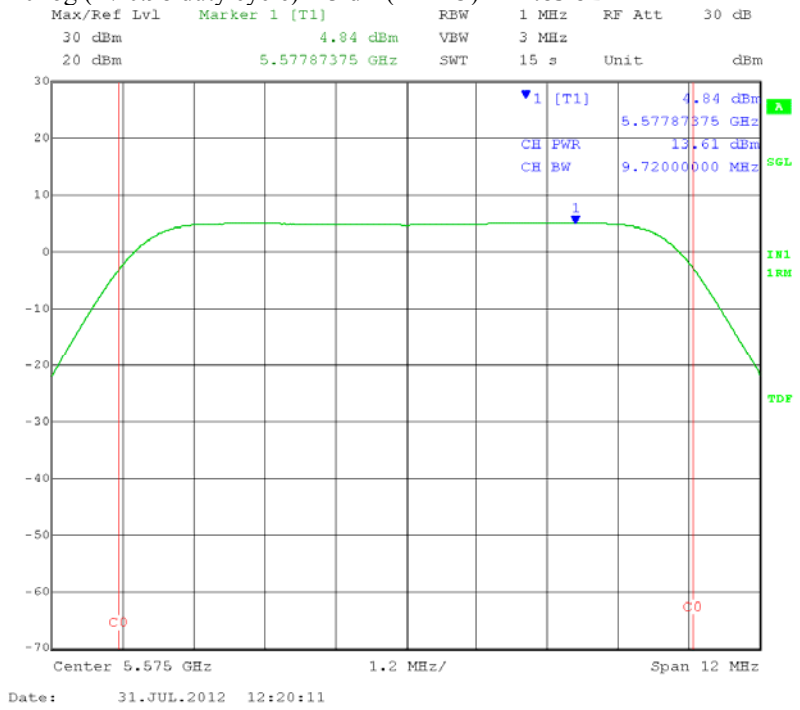
SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points ≥ 2 x (Span/RBW)
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal) = 10 x 500 x 28 µs = 0.14 sec
Detector = RMS
Sweep: single sweep
Use analyzer's band power function with the band limits set equal to the 26 dB EBW
Add 10 log (1/x), where x is the duty cycle, to the measured power

EUT nominal channel bandwidth:	10 MHz	adi reg 2F	26 dB EBW: 9.72 MHz
Output port:	Channel A;	Mid Channel Frequency:	5.575 GHz
Output power setting:	19;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: Lesser of: 250 mW (24 dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. 11 dBm + 10 log B = 20.877 dBm. Limit shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Antenna gain = 9 dBi. Limit = 20.877 dBm – 3 dBi = **17.877 dBm**

MIMO MATRIX A: MIMO with Cross-Polarized antenna (FCC KDB 662911 D02 v01):
Measure and add 10 log(N) dB, where N is the number of outputs.
= 10 log(2) = 3 dB

Maximum Conducted Output Power = 13.61 dBm + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) + 3 dB (MIMO) = **17.69 dBm**



Test Date: 07-31-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Maximum Conducted Output Power
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section C – Method SA-2 Alternative (RMS detection with slow sweep with each spectrum bin averaging across ON and OFF times of the EUT transmissions, followed by duty cycle correction)
Operator: Craig B

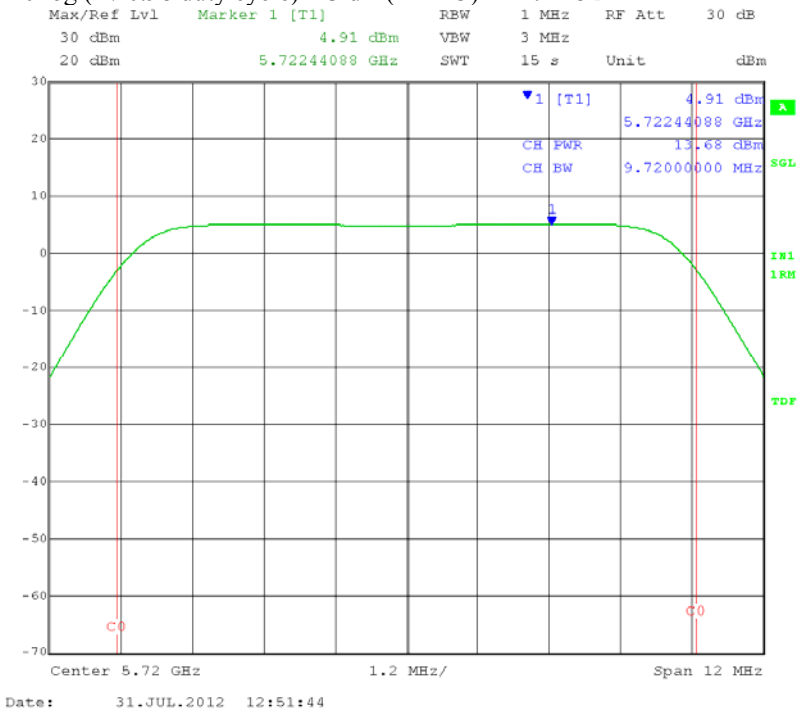
SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points ≥ 2 x (Span/RBW)
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal) = 10 x 500 x 28 μs = 0.14 sec
Detector = RMS
Sweep: single sweep
Use analyzer's band power function with the band limits set equal to the 26 dB EBW
Add 10 log (1/x), where x is the duty cycle, to the measured power

EUT nominal channel bandwidth:	10 MHz	adi reg 33	26 dB EBW: 9.72 MHz
Output port:	Channel A;	High Channel Frequency:	5.720 GHz
Output power setting:	19;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: Lesser of: 250 mW (24 dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. 11 dBm + 10 log B = 20.877 dBm. Limit shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Antenna gain = 9 dBi. Limit = 20.877 dBm – 3 dBi = **17.877 dBm**

MIMO MATRIX A: MIMO with Cross-Polarized antenna (FCC KDB 662911 D02 v01):
Measure and add 10 log(N) dB, where N is the number of outputs.
= 10 log(2) = 3 dB

Maximum Conducted Output Power = 13.68 dBm + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) + 3 dB (MIMO) = **17.77 dBm**



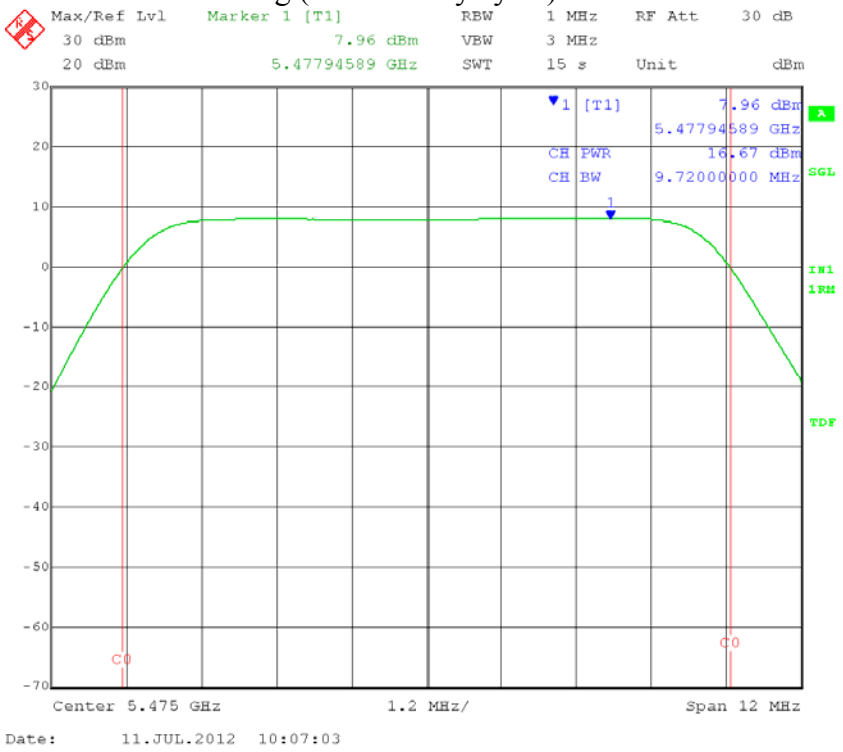
Test Date: 07-11-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Maximum Conducted Output Power
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section C – Method SA-2 Alternative (RMS detection with slow sweep with each spectrum bin averaging across ON and OFF times of the EUT transmissions, followed by duty cycle correction)
Operator: Craig B

SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points ≥ 2 x (Span/RBW)
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal) = 10 x 500 x 28 µs = 0.14 sec
Detector = RMS
Sweep: single sweep
Use analyzer's band power function with the band limits set equal to the 26 dB EBW
Add 10 log (1/x), where x is the duty cycle, to the measured power

EUT nominal channel bandwidth:	10 MHz	adi reg	16
Output port:	Channel A;	Low Channel Frequency:	5.475 GHz
Output power setting:	19;	Modulation Type:	QPSK
26 dB EBW:	9.72 MHz		

Limit: [15.407(a)(2)]: Lesser of: 250 mW (24 dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. 11 dBm + 10 log B = 20.877 dBm. Limit shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Antenna gain = 9 dBi. Limit = 20.877 dBm – 3 dBi = **17.877 dBm**

MIMO MATRIX B (completely uncorrelated signals):
Maximum Conducted Output Power = 16.67 dBm + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) = **17.76 dBm**



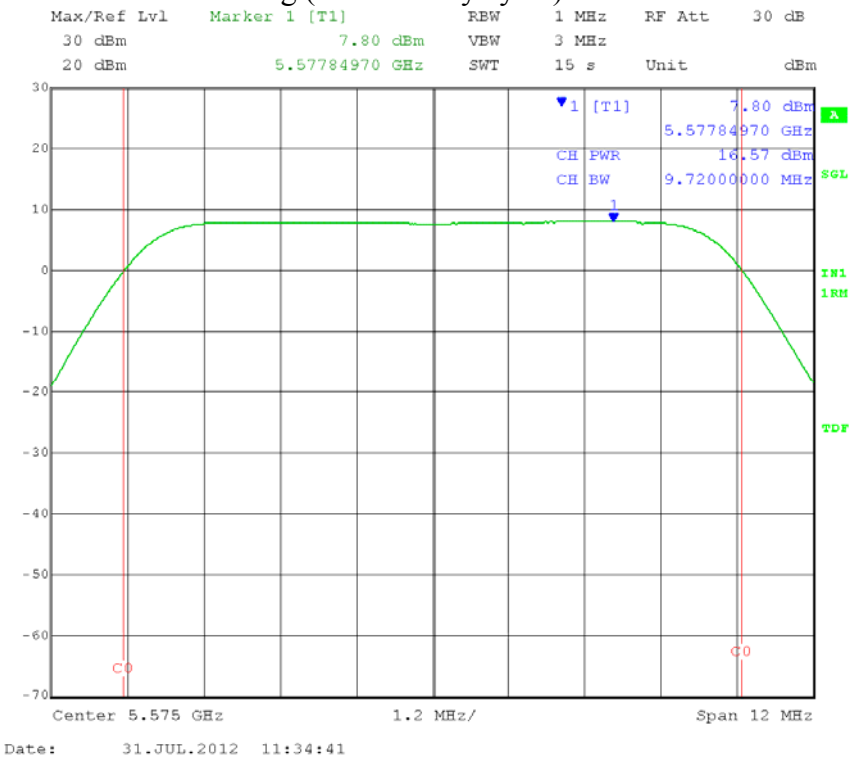
Test Date: 07-31-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Maximum Conducted Output Power
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section C – Method SA-2 Alternative (RMS detection with slow sweep with each spectrum bin averaging across ON and OFF times of the EUT transmissions, followed by duty cycle correction)
Operator: Craig B

SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points ≥ 2 x (Span/RBW)
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal) = 10 x 500 x 28 µs = 0.14 sec
Detector = RMS
Sweep: single sweep
Use analyzer's band power function with the band limits set equal to the 26 dB EBW
Add 10 log (1/x), where x is the duty cycle, to the measured power

EUT nominal channel bandwidth:	10 MHz	adi reg	21
Output port:	Channel A;	Mid Channel Frequency:	5.575 GHz
Output power setting:	19;	Modulation Type:	QPSK
26 dB EBW:	9.72 MHz		

Limit: [15.407(a)(2)]: Lesser of: 250 mW (24 dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. 11 dBm + 10 log B = 20.877 dBm. Limit shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Antenna gain = 9 dBi. Limit = 20.877 dBm – 3 dBi = **17.877 dBm**

MIMO MATRIX B (completely uncorrelated signals):
Maximum Conducted Output Power = 16.57 dBm + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) = **17.66 dBm**



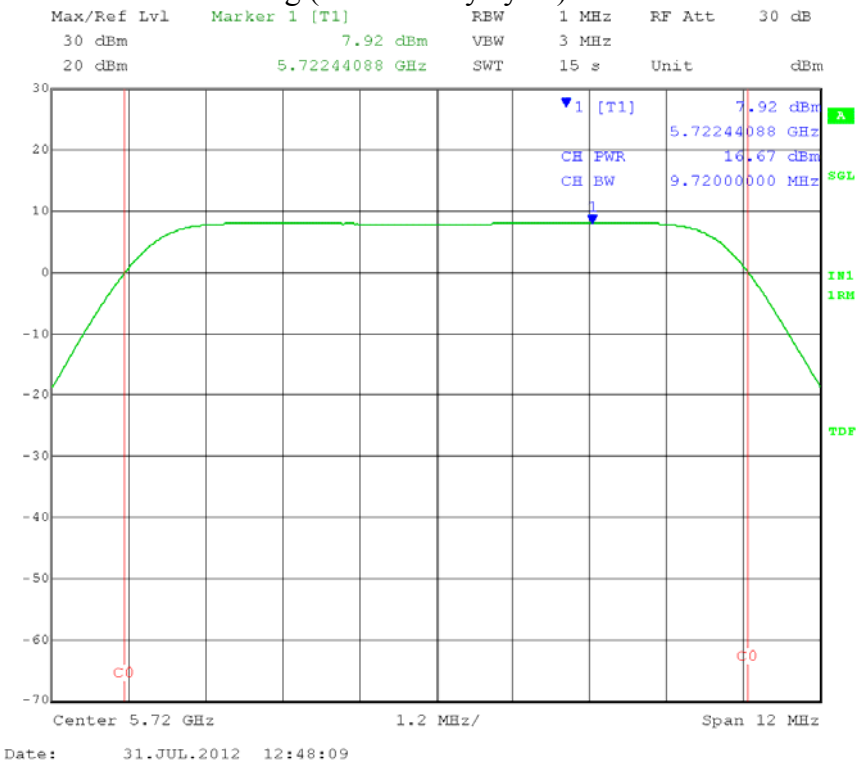
Test Date: 07-31-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Maximum Conducted Output Power
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section C – Method SA-2 Alternative (RMS detection with slow sweep with each spectrum bin averaging across ON and OFF times of the EUT transmissions, followed by duty cycle correction)
Operator: Craig B

SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points ≥ 2 x (Span/RBW)
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal) = 10 x 500 x 28 μs = 0.14 sec
Detector = RMS
Sweep: single sweep
Use analyzer's band power function with the band limits set equal to the 26 dB EBW
Add 10 log (1/x), where x is the duty cycle, to the measured power

EUT nominal channel bandwidth:	10 MHz	adi reg	27
Output port:	Channel A;	High Channel Frequency:	5.720 GHz
Output power setting:	19;	Modulation Type:	QPSK
26 dB EBW:	9.72 MHz		

Limit: [15.407(a)(2)]: Lesser of: 250 mW (24 dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. 11 dBm + 10 log B = 20.877 dBm. Limit shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Antenna gain = 9 dBi. Limit = 20.877 dBm – 3 dBi = **17.877 dBm**

MIMO MATRIX B (completely uncorrelated signals):
Maximum Conducted Output Power = 16.67 dBm + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) = **17.76 dBm**



Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Maximum Conducted Output Power
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section C – Method SA-2 Alternative (RMS detection with slow sweep with each spectrum bin averaging across ON and OFF times of the EUT transmissions, followed by duty cycle correction)
Operator: Craig B

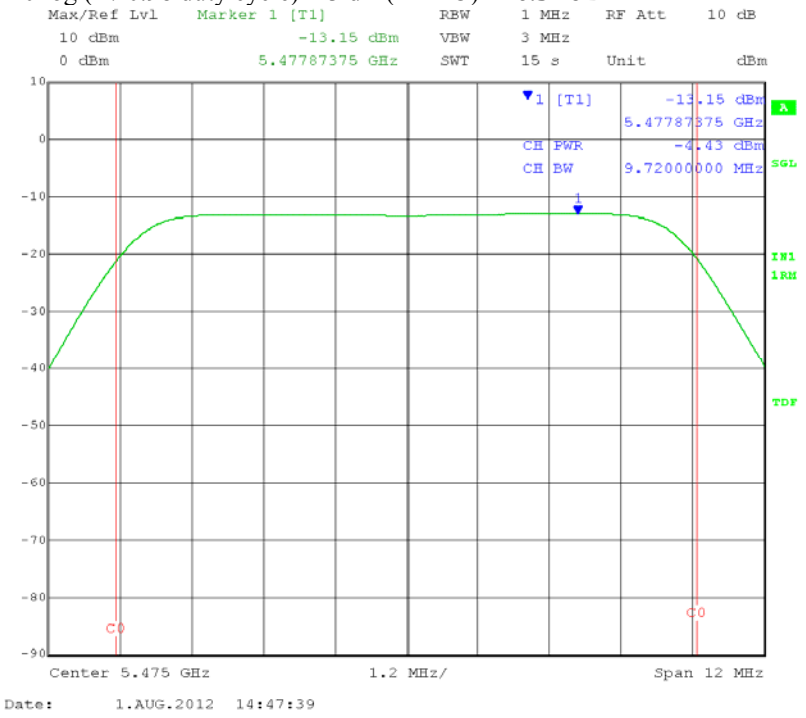
SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points ≥ 2 x (Span/RBW)
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal) = 10 x 500 x 28 µs = 0.14 sec
Detector = RMS
Sweep: single sweep
Use analyzer's band power function with the band limits set equal to the 26 dB EBW
Add 10 log (1/x), where x is the duty cycle, to the measured power

EUT nominal channel bandwidth:	10 MHz	adi reg 70	26 dB EBW: 9.72 MHz
Output port:	Channel A;	Low Channel Frequency:	5.475 GHz
Output power setting:	1;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: Lesser of: 250 mW (24 dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. 11 dBm + 10 log B = 20.877 dBm. Limit shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Antenna gain = 9 dBi + 18 dBi dish = 27 dBi. Limit = 20.877 dBm – 21 dBi = **-0.123 dBm**

MIMO MATRIX A: MIMO with Cross-Polarized antenna (FCC KDB 662911 D02 v01):
Measure and add 10 log(N) dB, where N is the number of outputs.
= 10 log(2) = 3 dB

Maximum Conducted Output Power = -4.43 dBm + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) + 3 dB (MIMO) = **-0.34 dBm**



Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Maximum Conducted Output Power
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section C – Method SA-2 Alternative (RMS detection with slow sweep with each spectrum bin averaging across ON and OFF times of the EUT transmissions, followed by duty cycle correction)
Operator: Craig B

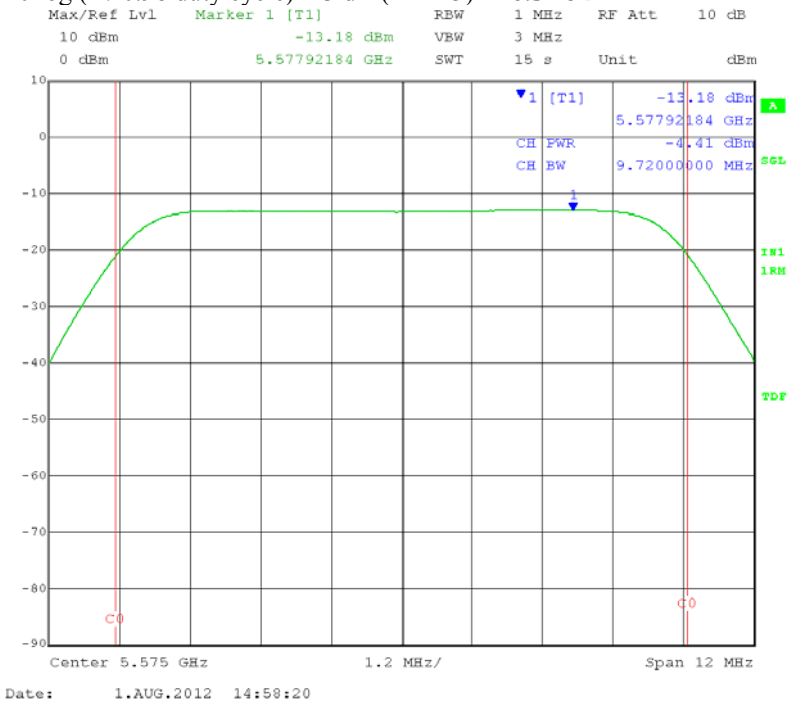
SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points ≥ 2 x (Span/RBW)
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal) = 10 x 500 x 28 µs = 0.14 sec
Detector = RMS
Sweep: single sweep
Use analyzer's band power function with the band limits set equal to the 26 dB EBW
Add 10 log (1/x), where x is the duty cycle, to the measured power

EUT nominal channel bandwidth:	10 MHz	adi reg 78	26 dB EBW: 9.72 MHz
Output port:	Channel A;	Mid Channel Frequency:	5.575 GHz
Output power setting:	1;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: Lesser of: 250 mW (24 dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. 11 dBm + 10 log B = 20.877 dBm. Limit shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Antenna gain = 9 dBi + 18 dBi dish = 27 dBi. Limit = 20.877 dBm – 21 dBi = **-0.123 dBm**

MIMO MATRIX A: MIMO with Cross-Polarized antenna (FCC KDB 662911 D02 v01):
Measure and add 10 log(N) dB, where N is the number of outputs.
= 10 log(2) = 3 dB

Maximum Conducted Output Power = -4.41 dBm + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) + 3 dB (MIMO) = **-0.32 dBm**



Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Maximum Conducted Output Power
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section C – Method SA-2 Alternative (RMS detection with slow sweep with each spectrum bin averaging across ON and OFF times of the EUT transmissions, followed by duty cycle correction)
Operator: Craig B

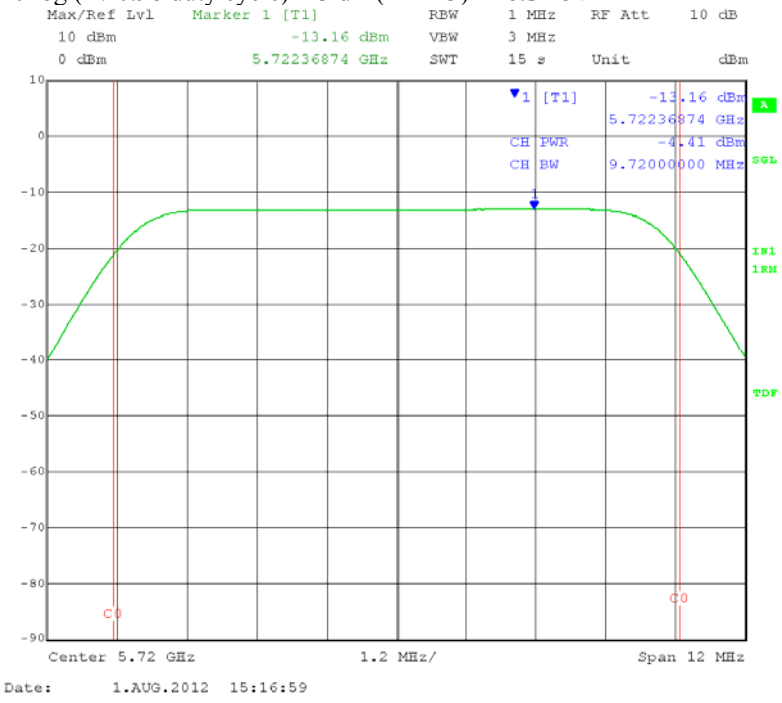
SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points ≥ 2 x (Span/RBW)
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal) = 10 x 500 x 28 µs = 0.14 sec
Detector = RMS
Sweep: single sweep
Use analyzer's band power function with the band limits set equal to the 26 dB EBW
Add 10 log (1/x), where x is the duty cycle, to the measured power

EUT nominal channel bandwidth:	10 MHz	adi reg 7B	26 dB EBW: 9.72 MHz
Output port:	Channel A;	High Channel Frequency:	5.720 GHz
Output power setting:	1;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: Lesser of: 250 mW (24 dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. 11 dBm + 10 log B = 20.877 dBm. Limit shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Antenna gain = 9 dBi + 18 dBi dish = 27 dBi. Limit = 20.877 dBm – 21 dBi = **-0.123 dBm**

MIMO MATRIX A: MIMO with Cross-Polarized antenna (FCC KDB 662911 D02 v01):
Measure and add 10 log(N) dB, where N is the number of outputs.
= 10 log(2) = 3 dB

Maximum Conducted Output Power = -4.41 dBm + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) + 3 dB (MIMO) = **-0.32 dBm**



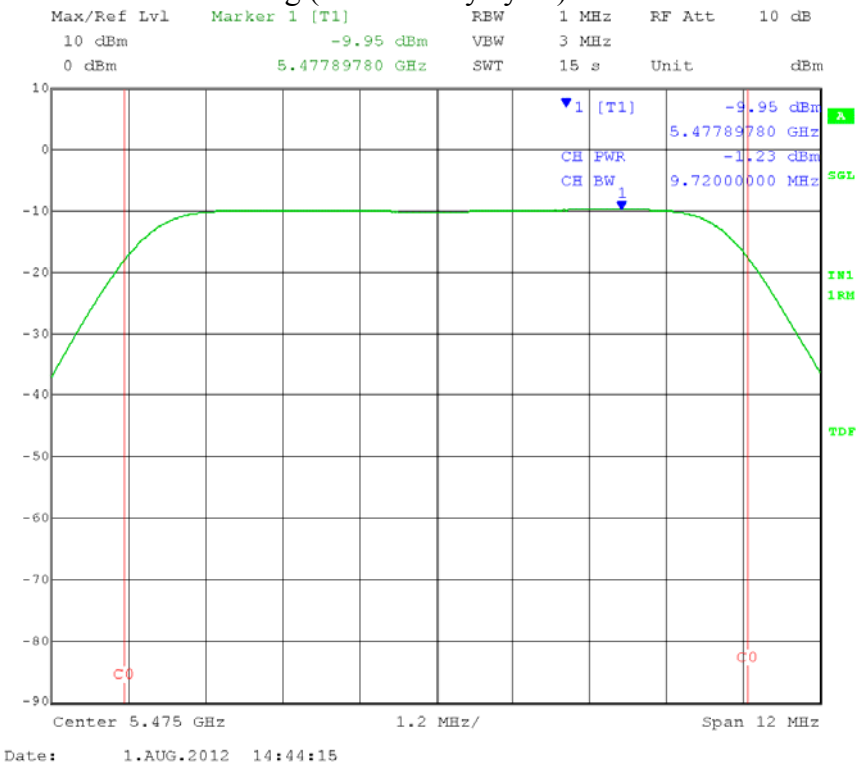
Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Maximum Conducted Output Power
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section C – Method SA-2 Alternative (RMS detection with slow sweep with each spectrum bin averaging across ON and OFF times of the EUT transmissions, followed by duty cycle correction)
Operator: Craig B

SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points ≥ 2 x (Span/RBW)
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal) = 10 x 500 x 28 µs = 0.14 sec
Detector = RMS
Sweep: single sweep
Use analyzer's band power function with the band limits set equal to the 26 dB EBW
Add 10 log (1/x), where x is the duty cycle, to the measured power

EUT nominal channel bandwidth:	10 MHz	adi reg 63	26 dB EBW: 9.72 MHz
Output port:	Channel A;	Low Channel Frequency:	5.475 GHz
Output power setting:	1;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: Lesser of: 250 mW (24 dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. 11 dBm + 10 log B = 20.877 dBm. Limit shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Antenna gain = 9 dBi + 18 dBi dish = 27 dBi. Limit = 20.877 dBm – 21 dBi = **-0.123 dBm**

MIMO MATRIX B (completely uncorrelated signals):
Maximum Conducted Output Power = -1.23 dBm + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) = **-0.14 dBm**



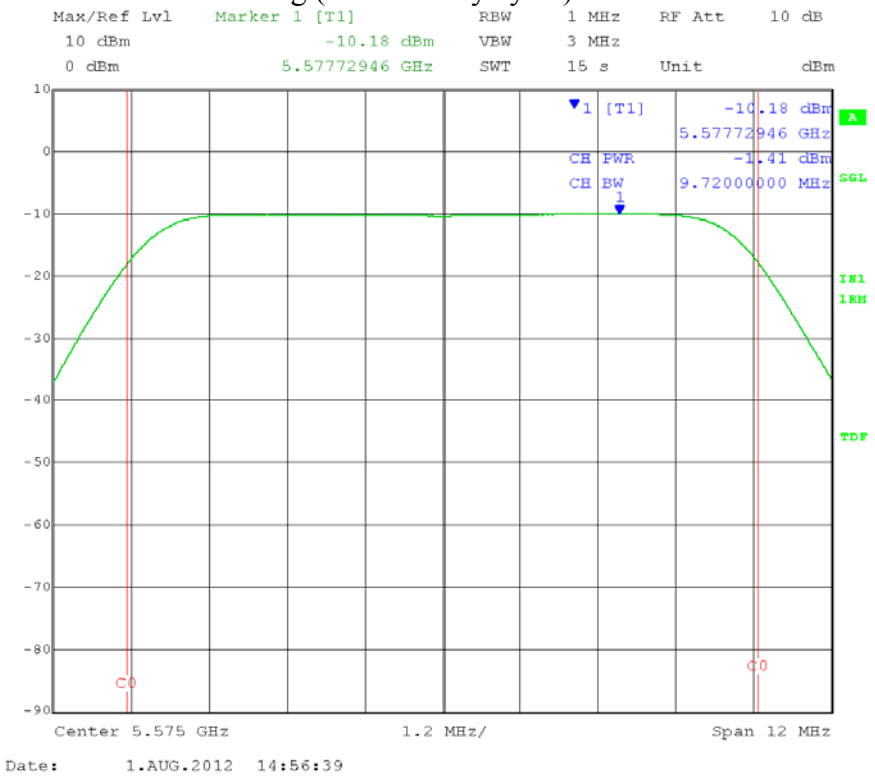
Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Maximum Conducted Output Power
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section C – Method SA-2 Alternative (RMS detection with slow sweep with each spectrum bin averaging across ON and OFF times of the EUT transmissions, followed by duty cycle correction)
Operator: Craig B

SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points ≥ 2 x (Span/RBW)
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal) = 10 x 500 x 28 µs = 0.14 sec
Detector = RMS
Sweep: single sweep
Use analyzer's band power function with the band limits set equal to the 26 dB EBW
Add 10 log (1/x), where x is the duty cycle, to the measured power

EUT nominal channel bandwidth:	10 MHz	adi reg 6C	26 dB EBW: 9.72 MHz
Output port:	Channel A;	Mid Channel Frequency:	5.575 GHz
Output power setting:	1;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: Lesser of: 250 mW (24 dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. 11 dBm + 10 log B = 20.877 dBm. Limit shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Antenna gain = 9 dBi + 18 dBi dish = 27 dBi. Limit = 20.877 dBm – 21 dBi = **-0.123 dBm**

MIMO MATRIX B (completely uncorrelated signals):
Maximum Conducted Output Power = -1.41 dBm + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) = **-0.32 dBm**



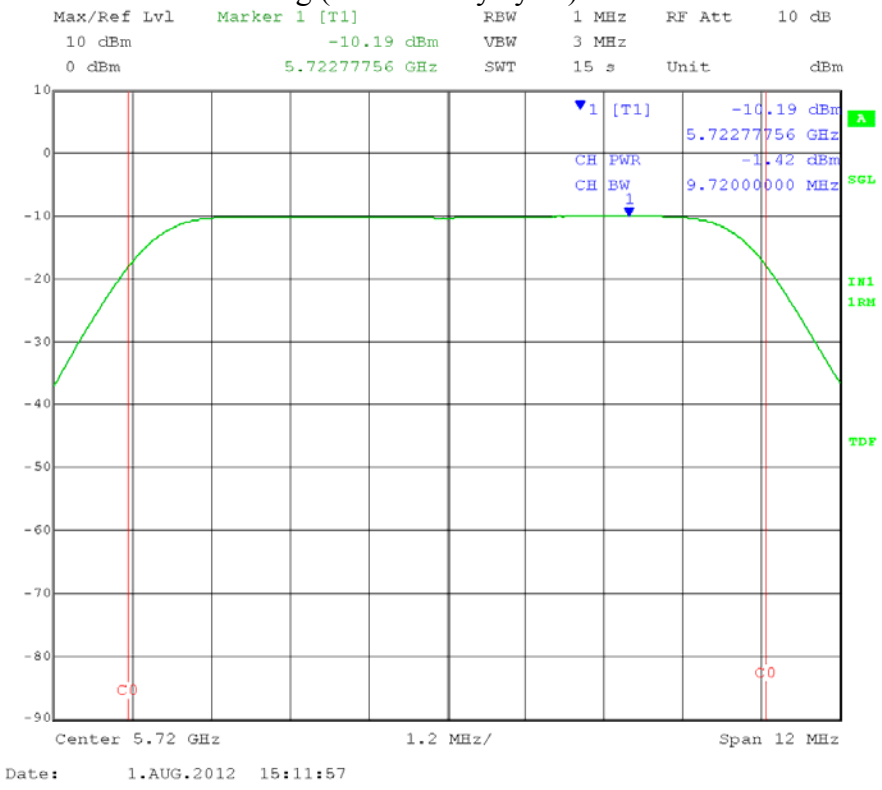
Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Maximum Conducted Output Power
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section C – Method SA-2 Alternative (RMS detection with slow sweep with each spectrum bin averaging across ON and OFF times of the EUT transmissions, followed by duty cycle correction)
Operator: Craig B

SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points ≥ 2 x (Span/RBW)
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal) = 10 x 500 x 28 μs = 0.14 sec
Detector = RMS
Sweep: single sweep
Use analyzer's band power function with the band limits set equal to the 26 dB EBW
Add 10 log (1/x), where x is the duty cycle, to the measured power

EUT nominal channel bandwidth:	10 MHz	adi reg 6F	26 dB EBW: 9.72 MHz
Output port:	Channel A;	High Channel Frequency:	5.720 GHz
Output power setting:	1;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: Lesser of: 250 mW (24 dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. 11 dBm + 10 log B = 20.877 dBm. Limit shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Antenna gain = 9 dBi + 18 dBi dish = 27 dBi. Limit = 20.877 dBm – 21 dBi = **-0.123 dBm**

MIMO MATRIX B (completely uncorrelated signals):
Maximum Conducted Output Power = -1.42 dBm + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) = **-0.33 dBm**



Test Date: 07-31-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Maximum Conducted Output Power
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section C – Method SA-2 Alternative (RMS detection with slow sweep with each spectrum bin averaging across ON and OFF times of the EUT transmissions, followed by duty cycle correction)
Operator: Craig B

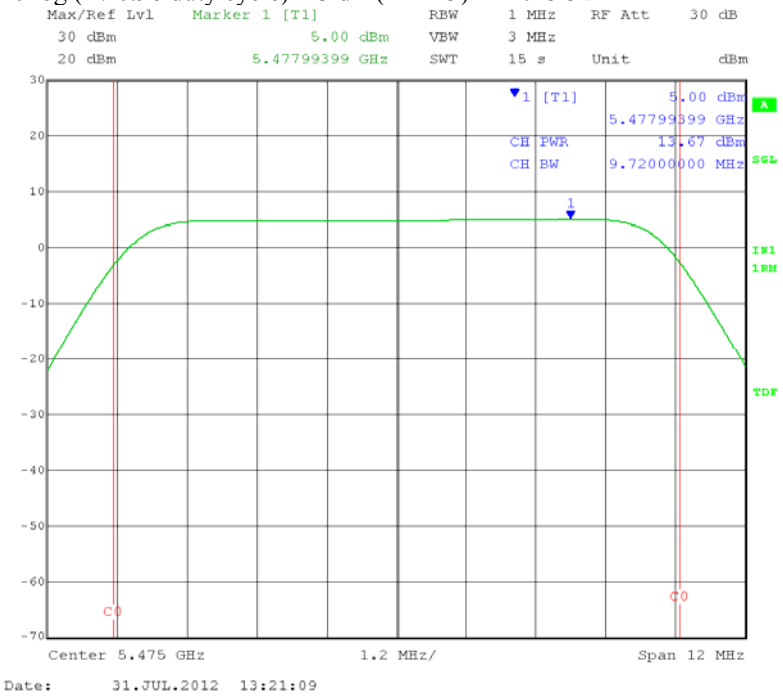
SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points ≥ 2 x (Span/RBW)
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal) = 10 x 500 x 28 µs = 0.14 sec
Detector = RMS
Sweep: single sweep
Use analyzer's band power function with the band limits set equal to the 26 dB EBW
Add 10 log (1/x), where x is the duty cycle, to the measured power

EUT nominal channel bandwidth:	10 MHz	adi reg 2B	26 dB EBW: 9.72 MHz
Output port:	Channel B;	Low Channel Frequency:	5.475 GHz
Output power setting:	19;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: Lesser of: 250 mW (24 dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. 11 dBm + 10 log B = 20.877 dBm. Limit shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Antenna gain = 9 dBi. Limit = 20.877 dBm – 3 dBi = **17.877 dBm**

MIMO MATRIX A: MIMO with Cross-Polarized antenna (FCC KDB 662911 D02 v01):
Measure and add 10 log(N) dB, where N is the number of outputs.
= 10 log(2) = 3 dB

Maximum Conducted Output Power = 13.67 dBm + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) + 3 dB (MIMO) = **17.76 dBm**



Test Date: 07-31-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Maximum Conducted Output Power
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section C – Method SA-2 Alternative (RMS detection with slow sweep with each spectrum bin averaging across ON and OFF times of the EUT transmissions, followed by duty cycle correction)
Operator: Craig B

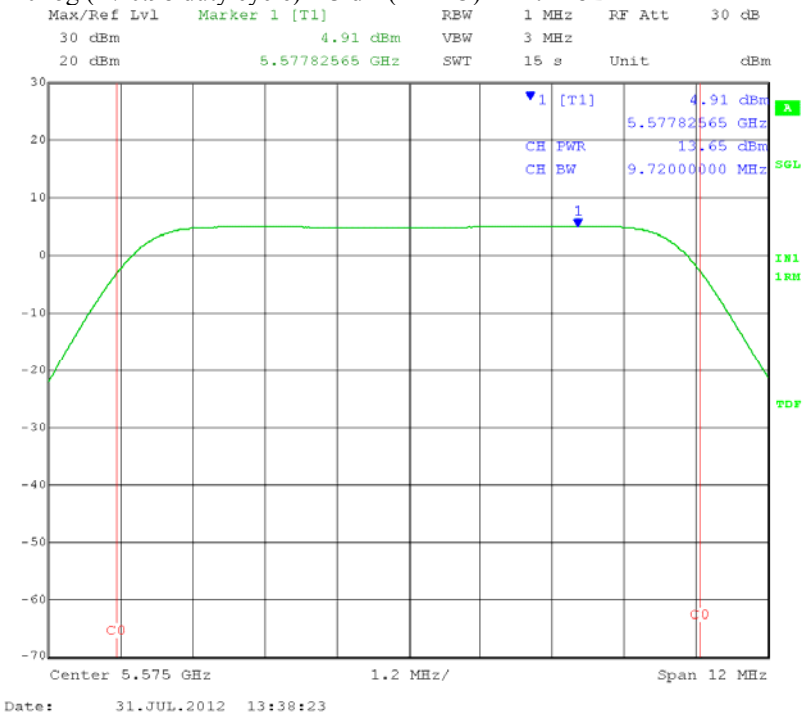
SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points ≥ 2 x (Span/RBW)
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal) = 10 x 500 x 28 µs = 0.14 sec
Detector = RMS
Sweep: single sweep
Use analyzer's band power function with the band limits set equal to the 26 dB EBW
Add 10 log (1/x), where x is the duty cycle, to the measured power

EUT nominal channel bandwidth:	10 MHz	adi reg 31	26 dB EBW: 9.72 MHz
Output port:	Channel B;	Mid Channel Frequency:	5.575 GHz
Output power setting:	19;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: Lesser of: 250 mW (24 dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. 11 dBm + 10 log B = 20.877 dBm. Limit shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Antenna gain = 9 dBi. Limit = 20.877 dBm – 3 dBi = **17.877 dBm**

MIMO MATRIX A: MIMO with Cross-Polarized antenna (FCC KDB 662911 D02 v01):
Measure and add 10 log(N) dB, where N is the number of outputs.
= 10 log(2) = 3 dB

Maximum Conducted Output Power = 13.65 dBm + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) + 3 dB (MIMO) = **17.74 dBm**



Test Date: 07-31-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Maximum Conducted Output Power
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section C – Method SA-2 Alternative (RMS detection with slow sweep with each spectrum bin averaging across ON and OFF times of the EUT transmissions, followed by duty cycle correction)
Operator: Craig B

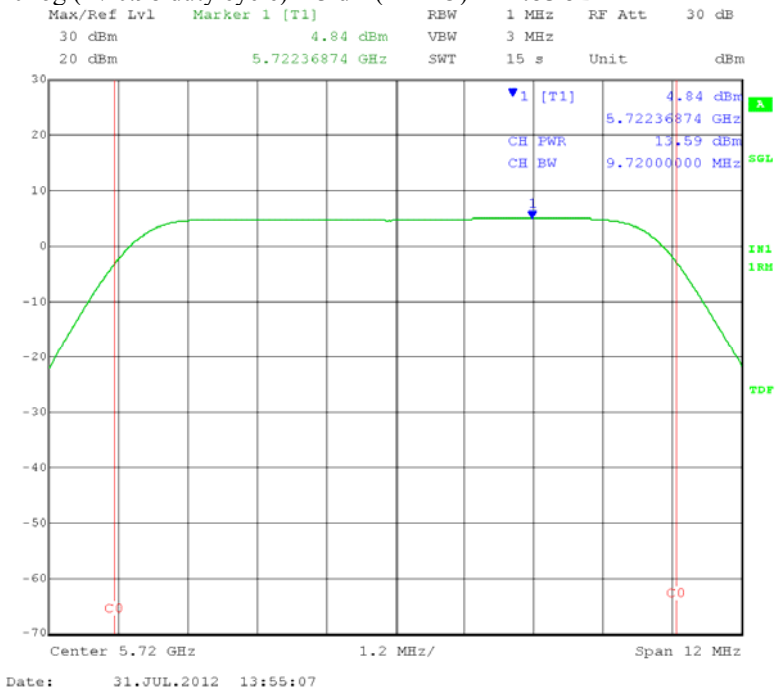
SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points ≥ 2 x (Span/RBW)
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal) = 10 x 500 x 28 µs = 0.14 sec
Detector = RMS
Sweep: single sweep
Use analyzer's band power function with the band limits set equal to the 26 dB EBW
Add 10 log (1/x), where x is the duty cycle, to the measured power

EUT nominal channel bandwidth:	10 MHz	adi reg 33	26 dB EBW: 9.72 MHz
Output port:	Channel B;	High Channel Frequency:	5.720 GHz
Output power setting:	19;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: Lesser of: 250 mW (24 dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. 11 dBm + 10 log B = 20.877 dBm. Limit shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Antenna gain = 9 dBi. Limit = 20.877 dBm – 3 dBi = **17.877 dBm**

MIMO MATRIX A: MIMO with Cross-Polarized antenna (FCC KDB 662911 D02 v01):
Measure and add 10 log(N) dB, where N is the number of outputs.
= 10 log(2) = 3 dB

Maximum Conducted Output Power = 13.59 dBm + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) + 3 dB (MIMO) = **17.68 dBm**



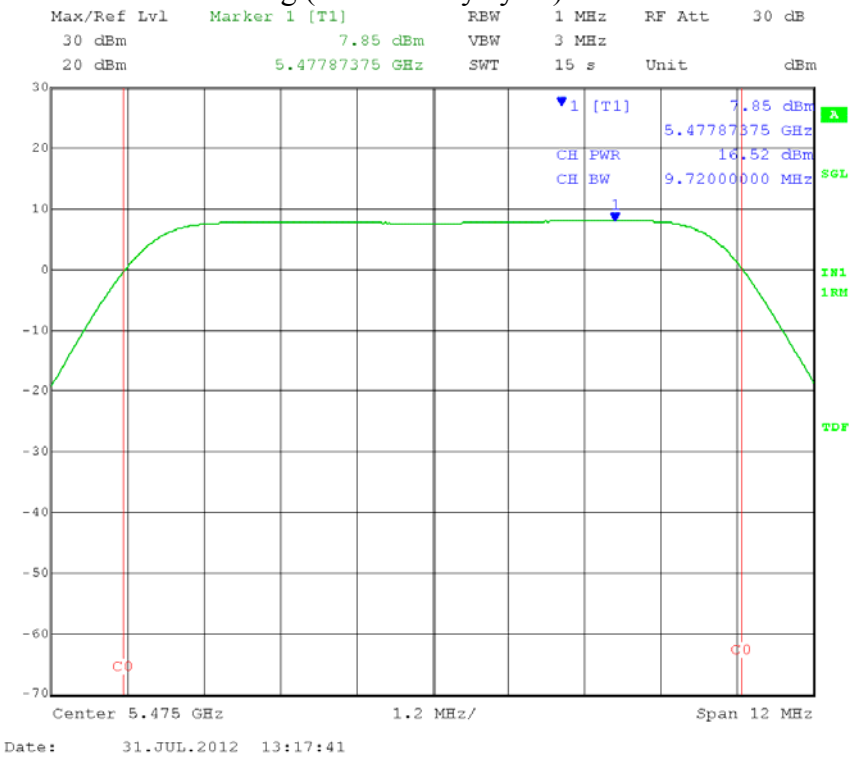
Test Date: 07-31-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Maximum Conducted Output Power
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section C – Method SA-2 Alternative (RMS detection with slow sweep with each spectrum bin averaging across ON and OFF times of the EUT transmissions, followed by duty cycle correction)
Operator: Craig B

SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points ≥ 2 x (Span/RBW)
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal) = 10 x 500 x 28 µs = 0.14 sec
Detector = RMS
Sweep: single sweep
Use analyzer's band power function with the band limits set equal to the 26 dB EBW
Add 10 log (1/x), where x is the duty cycle, to the measured power

EUT nominal channel bandwidth:	10 MHz	adi reg	1F
Output port:	Channel B;	Low Channel Frequency:	5.475 GHz
Output power setting:	19;	Modulation Type:	QPSK
26 dB EBW:	9.72 MHz		

Limit: [15.407(a)(2)]: Lesser of: 250 mW (24 dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. 11 dBm + 10 log B = 20.877 dBm. Limit shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Antenna gain = 9 dBi. Limit = 20.877 dBm – 3 dBi = **17.877 dBm**

MIMO MATRIX B (completely uncorrelated signals):
Maximum Conducted Output Power = 16.52 dBm + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) = **17.61 dBm**



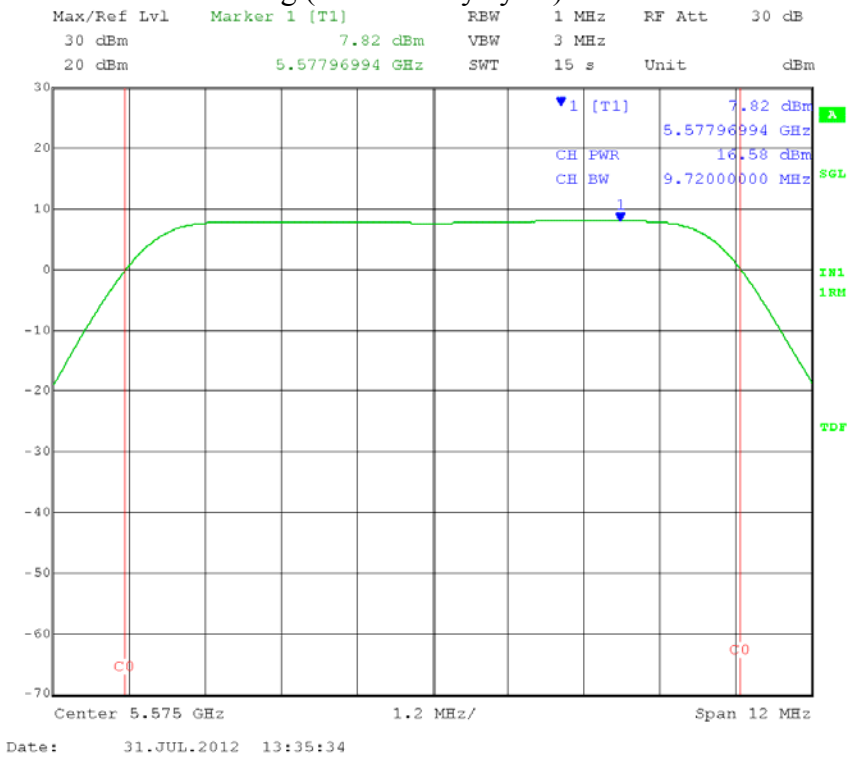
Test Date: 07-31-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Maximum Conducted Output Power
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section C – Method SA-2 Alternative (RMS detection with slow sweep with each spectrum bin averaging across ON and OFF times of the EUT transmissions, followed by duty cycle correction)
Operator: Craig B

SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points ≥ 2 x (Span/RBW)
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal) = 10 x 500 x 28 µs = 0.14 sec
Detector = RMS
Sweep: single sweep
Use analyzer's band power function with the band limits set equal to the 26 dB EBW
Add 10 log (1/x), where x is the duty cycle, to the measured power

EUT nominal channel bandwidth:	10 MHz	adi reg	25
Output port:	Channel B;	Mid Channel Frequency:	5.575 GHz
Output power setting:	19;	Modulation Type:	QPSK
26 dB EBW:	9.72 MHz		

Limit: [15.407(a)(2)]: Lesser of: 250 mW (24 dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. 11 dBm + 10 log B = 20.877 dBm. Limit shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Antenna gain = 9 dBi. Limit = 20.877 dBm – 3 dBi = **17.877 dBm**

MIMO MATRIX B (completely uncorrelated signals):
Maximum Conducted Output Power = 16.58 dBm + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) = **17.67 dBm**



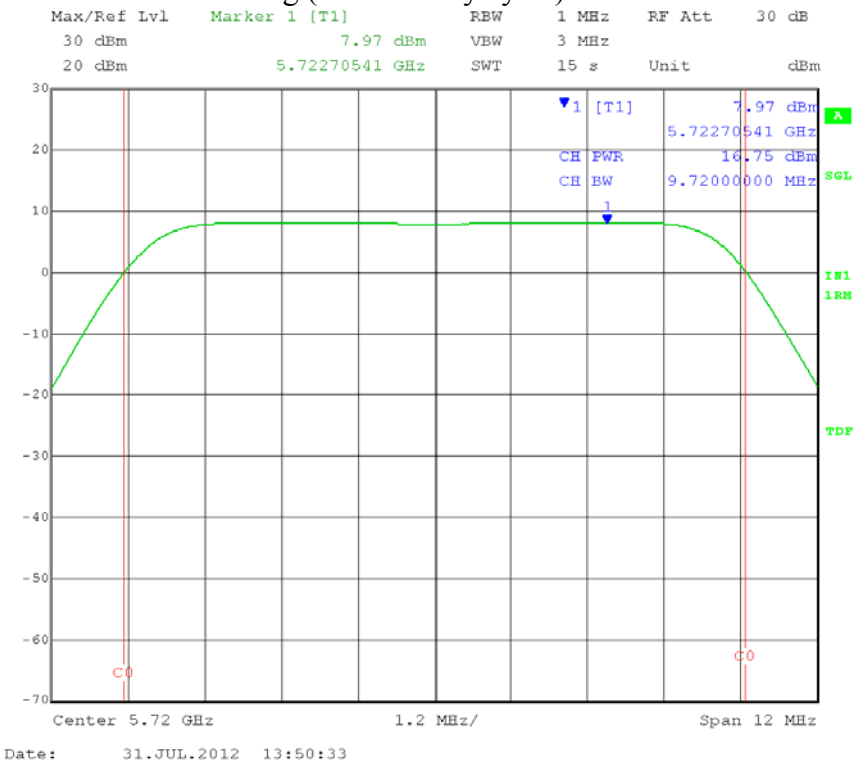
Test Date: 07-31-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Maximum Conducted Output Power
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section C – Method SA-2 Alternative (RMS detection with slow sweep with each spectrum bin averaging across ON and OFF times of the EUT transmissions, followed by duty cycle correction)
Operator: Craig B

SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points ≥ 2 x (Span/RBW)
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal) = 10 x 500 x 28 µs = 0.14 sec
Detector = RMS
Sweep: single sweep
Use analyzer's band power function with the band limits set equal to the 26 dB EBW
Add 10 log (1/x), where x is the duty cycle, to the measured power

EUT nominal channel bandwidth:	10 MHz	adi reg	26
Output port:	Channel B;	High Channel Frequency:	5.720 GHz
Output power setting:	19;	Modulation Type:	QPSK
26 dB EBW:	9.72 MHz		

Limit: [15.407(a)(2)]: Lesser of: 250 mW (24 dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. 11 dBm + 10 log B = 20.877 dBm. Limit shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Antenna gain = 9 dBi. Limit = 20.877 dBm – 3 dBi = **17.877 dBm**

MIMO MATRIX B (completely uncorrelated signals):
Maximum Conducted Output Power = 16.75 dBm + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) = **17.84 dBm**



Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Maximum Conducted Output Power
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section C – Method SA-2 Alternative (RMS detection with slow sweep with each spectrum bin averaging across ON and OFF times of the EUT transmissions, followed by duty cycle correction)
Operator: Craig B

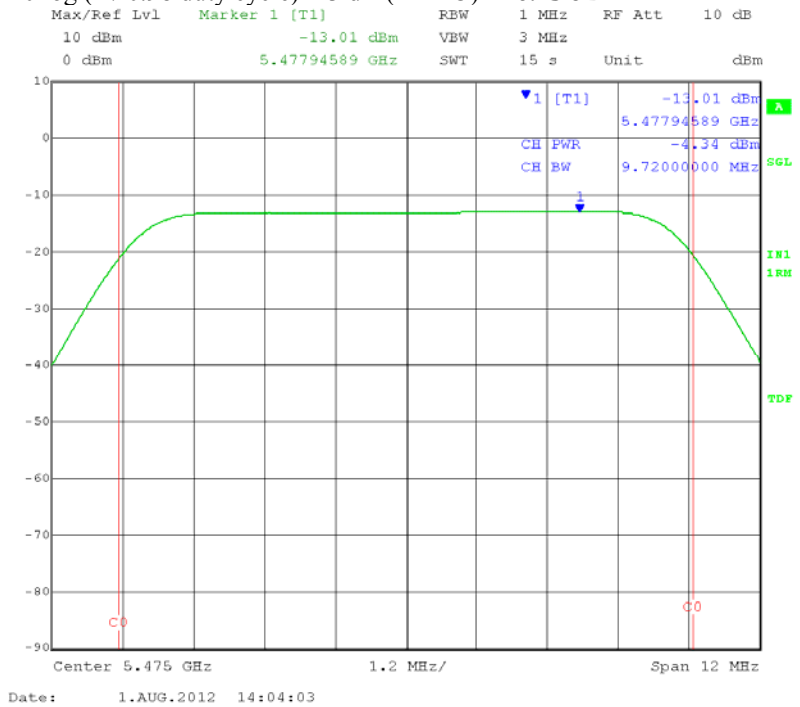
SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points ≥ 2 x (Span/RBW)
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal) = 10 x 500 x 28 µs = 0.14 sec
Detector = RMS
Sweep: single sweep
Use analyzer's band power function with the band limits set equal to the 26 dB EBW
Add 10 log (1/x), where x is the duty cycle, to the measured power

EUT nominal channel bandwidth:	10 MHz	adi reg 73	26 dB EBW: 9.72 MHz
Output port:	Channel B;	Low Channel Frequency:	5.475 GHz
Output power setting:	1;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: Lesser of: 250 mW (24 dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. 11 dBm + 10 log B = 20.877 dBm. Limit shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Antenna gain = 9 dBi + 18 dBi dish = 27 dBi. Limit = 20.877 dBm – 21 dBi = **-0.123 dBm**

MIMO MATRIX A: MIMO with Cross-Polarized antenna (FCC KDB 662911 D02 v01):
Measure and add 10 log(N) dB, where N is the number of outputs.
= 10 log(2) = 3 dB

Maximum Conducted Output Power = -4.34 dBm + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) + 3 dB (MIMO) = **-0.25 dBm**



Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Maximum Conducted Output Power
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section C – Method SA-2 Alternative (RMS detection with slow sweep with each spectrum bin averaging across ON and OFF times of the EUT transmissions, followed by duty cycle correction)
Operator: Craig B

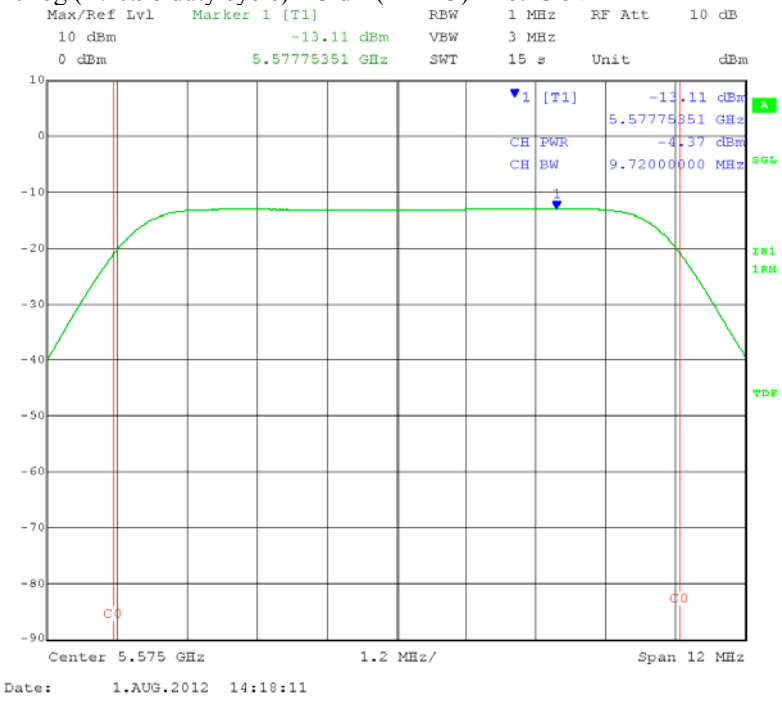
SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points ≥ 2 x (Span/RBW)
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal) = 10 x 500 x 28 µs = 0.14 sec
Detector = RMS
Sweep: single sweep
Use analyzer's band power function with the band limits set equal to the 26 dB EBW
Add 10 log (1/x), where x is the duty cycle, to the measured power

EUT nominal channel bandwidth:	10 MHz	adi reg 79	26 dB EBW: 9.72 MHz
Output port:	Channel B;	Mid Channel Frequency:	5.575 GHz
Output power setting:	1;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: Lesser of: 250 mW (24 dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. 11 dBm + 10 log B = 20.877 dBm. Limit shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Antenna gain = 9 dBi + 18 dBi dish = 27 dBi. Limit = 20.877 dBm – 21 dBi = **-0.123 dBm**

MIMO MATRIX A: MIMO with Cross-Polarized antenna (FCC KDB 662911 D02 v01):
Measure and add 10 log(N) dB, where N is the number of outputs.
= 10 log(2) = 3 dB

Maximum Conducted Output Power = -4.37 dBm + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) + 3 dB (MIMO) = **-0.28 dBm**



Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Maximum Conducted Output Power
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section C – Method SA-2 Alternative (RMS detection with slow sweep with each spectrum bin averaging across ON and OFF times of the EUT transmissions, followed by duty cycle correction)
Operator: Craig B

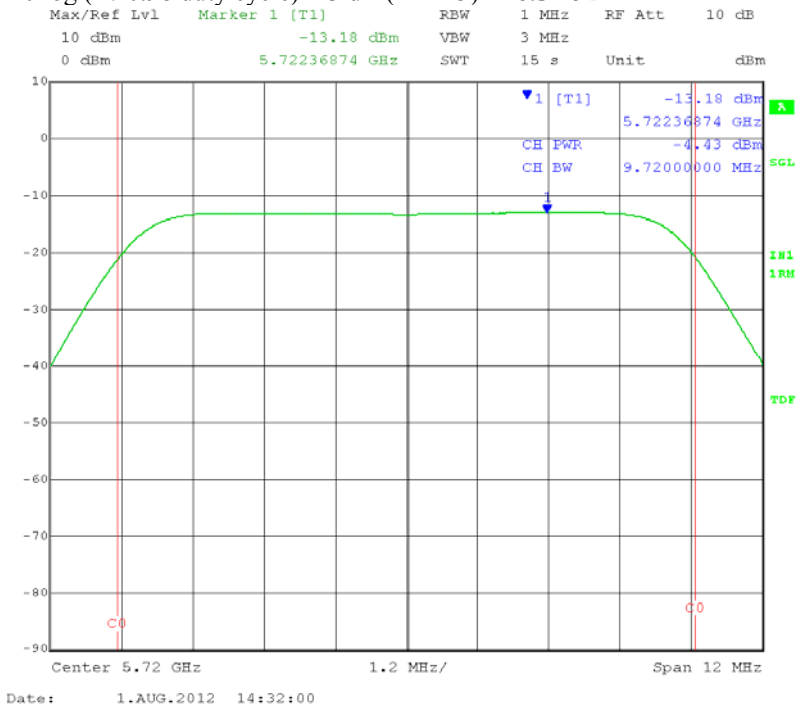
SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points ≥ 2 x (Span/RBW)
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal) = 10 x 500 x 28 µs = 0.14 sec
Detector = RMS
Sweep: single sweep
Use analyzer's band power function with the band limits set equal to the 26 dB EBW
Add 10 log (1/x), where x is the duty cycle, to the measured power

EUT nominal channel bandwidth:	10 MHz	adi reg 7B	26 dB EBW: 9.72 MHz
Output port:	Channel B;	High Channel Frequency:	5.720 GHz
Output power setting:	1;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: Lesser of: 250 mW (24 dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. 11 dBm + 10 log B = 20.877 dBm. Limit shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Antenna gain = 9 dBi + 18 dBi dish = 27 dBi. Limit = 20.877 dBm – 21 dBi = **-0.123 dBm**

MIMO MATRIX A: MIMO with Cross-Polarized antenna (FCC KDB 662911 D02 v01):
Measure and add 10 log(N) dB, where N is the number of outputs.
= 10 log(2) = 3 dB

Maximum Conducted Output Power = -4.43 dBm + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) + 3 dB (MIMO) = **-0.34 dBm**



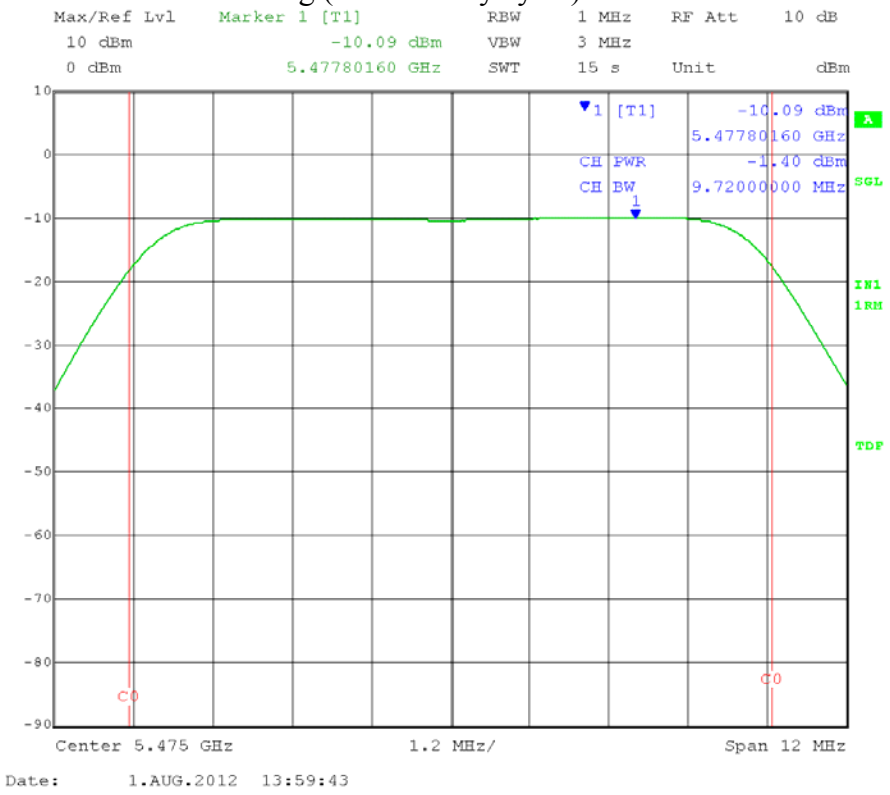
Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Maximum Conducted Output Power
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section C – Method SA-2 Alternative (RMS detection with slow sweep with each spectrum bin averaging across ON and OFF times of the EUT transmissions, followed by duty cycle correction)
Operator: Craig B

SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points ≥ 2 x (Span/RBW)
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal) = 10 x 500 x 28 μs = 0.14 sec
Detector = RMS
Sweep: single sweep
Use analyzer's band power function with the band limits set equal to the 26 dB EBW
Add 10 log (1/x), where x is the duty cycle, to the measured power

EUT nominal channel bandwidth:	10 MHz	adi reg 67	26 dB EBW: 9.72 MHz
Output port:	Channel B;	Low Channel Frequency:	5.475 GHz
Output power setting:	1;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: Lesser of: 250 mW (24 dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. 11 dBm + 10 log B = 20.877 dBm. Limit shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Antenna gain = 9 dBi + 18 dBi dish = 27 dBi. Limit = 20.877 dBm – 21 dBi = **-0.123 dBm**

MIMO MATRIX B (completely uncorrelated signals):
Maximum Conducted Output Power = -1.40 dBm + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) = **-0.312 dBm**



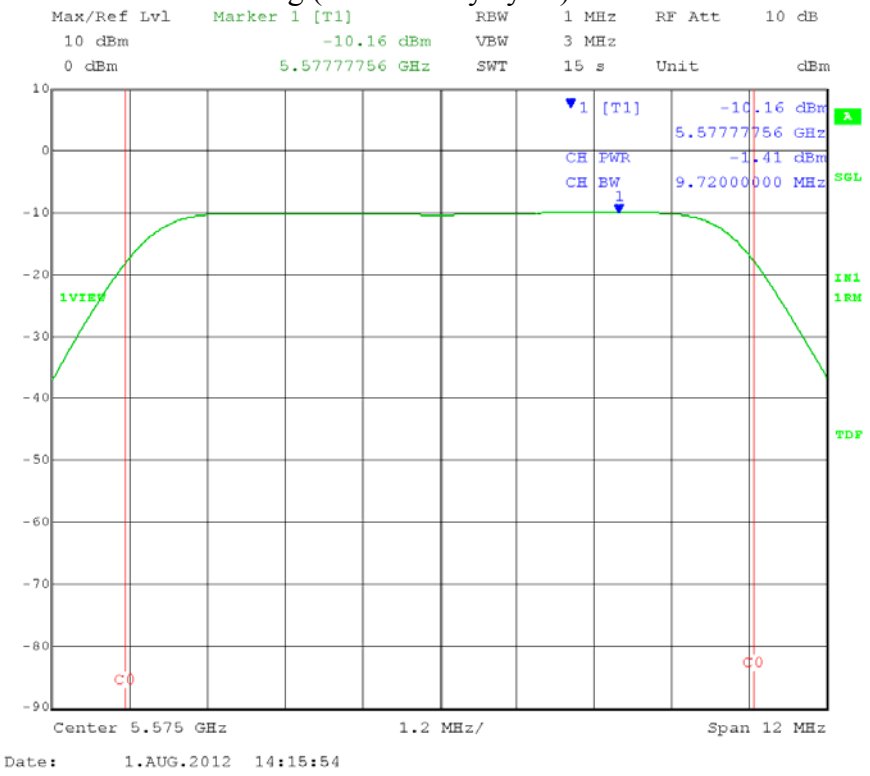
Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Maximum Conducted Output Power
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section C – Method SA-2 Alternative (RMS detection with slow sweep with each spectrum bin averaging across ON and OFF times of the EUT transmissions, followed by duty cycle correction)
Operator: Craig B

SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points ≥ 2 x (Span/RBW)
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal) = 10 x 500 x 28 µs = 0.14 sec
Detector = RMS
Sweep: single sweep
Use analyzer's band power function with the band limits set equal to the 26 dB EBW
Add 10 log (1/x), where x is the duty cycle, to the measured power

EUT nominal channel bandwidth:	10 MHz	adi reg 6D	26 dB EBW: 9.72 MHz
Output port:	Channel B;	Mid Channel Frequency:	5.575 GHz
Output power setting:	1;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: Lesser of: 250 mW (24 dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. 11 dBm + 10 log B = 20.877 dBm. Limit shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Antenna gain = 9 dBi + 18 dBi dish = 27 dBi. Limit = 20.877 dBm – 21 dBi = **-0.123 dBm**

MIMO MATRIX B (completely uncorrelated signals):
Maximum Conducted Output Power = -1.41 dBm + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) = **-0.32 dBm**



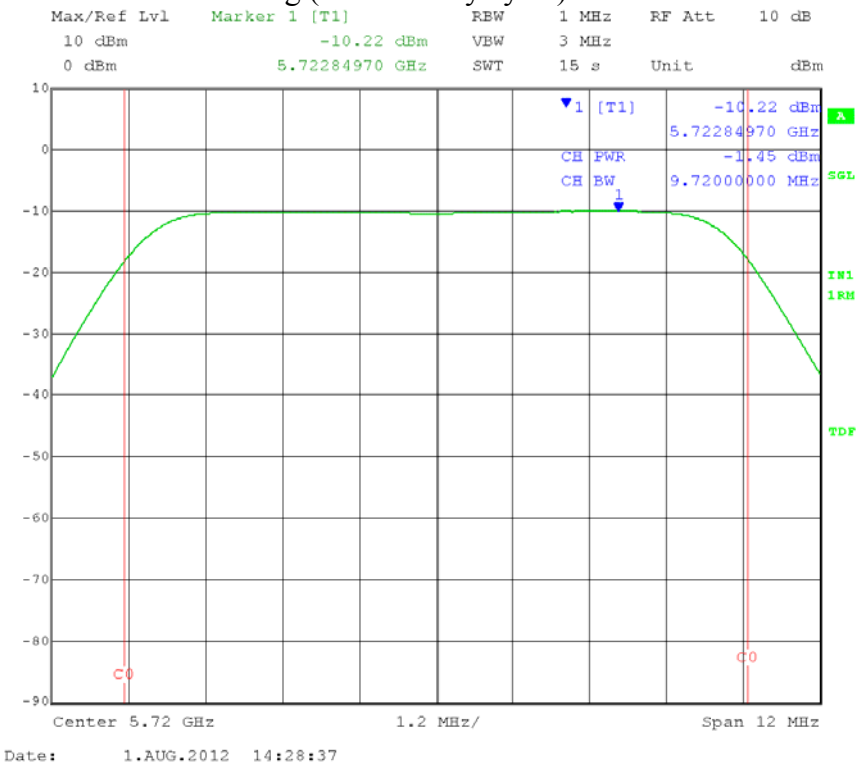
Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Maximum Conducted Output Power
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section C – Method SA-2 Alternative (RMS detection with slow sweep with each spectrum bin averaging across ON and OFF times of the EUT transmissions, followed by duty cycle correction)
Operator: Craig B

SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points ≥ 2 x (Span/RBW)
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal) = 10 x 500 x 28 µs = 0.14 sec
Detector = RMS
Sweep: single sweep
Use analyzer's band power function with the band limits set equal to the 26 dB EBW
Add 10 log (1/x), where x is the duty cycle, to the measured power

EUT nominal channel bandwidth:	10 MHz	adi reg 6F	26 dB EBW: 9.72 MHz
Output port:	Channel B;	High Channel Frequency:	5.720 GHz
Output power setting:	1;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: Lesser of: 250 mW (24 dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. 11 dBm + 10 log B = 20.877 dBm. Limit shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Antenna gain = 9 dBi + 18 dBi dish = 27 dBi. Limit = 20.877 dBm – 21 dBi = **-0.123 dBm**

MIMO MATRIX B (completely uncorrelated signals):
Maximum Conducted Output Power = -1.45 dBm + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) = **-0.36 dBm**



Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Maximum Conducted Output Power
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section C – Method SA-2 Alternative (RMS detection with slow sweep with each spectrum bin averaging across ON and OFF times of the EUT transmissions, followed by duty cycle correction)
Operator: Craig B

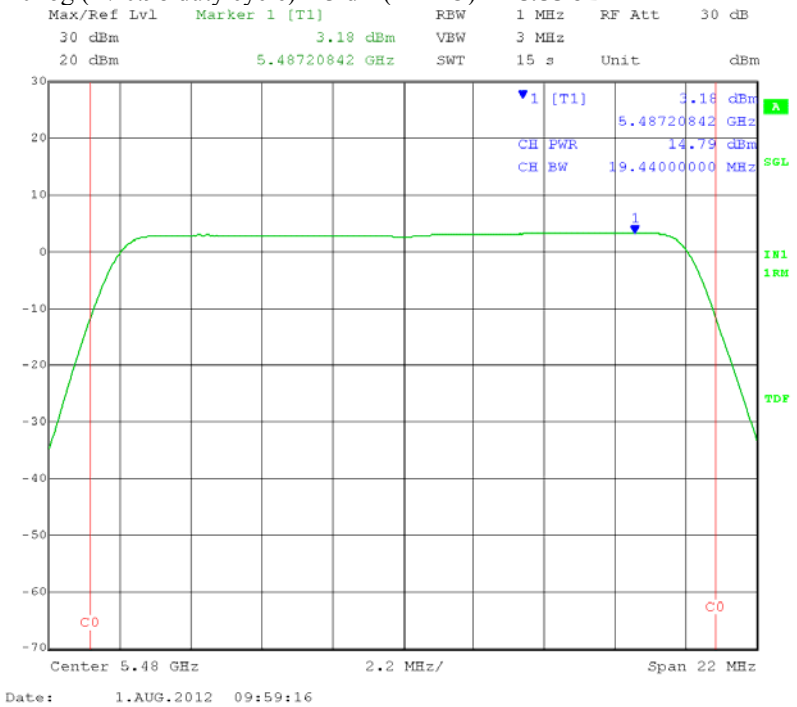
SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points ≥ 2 x (Span/RBW)
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal)
= 10 x 500 x 56 µs = 0.28 sec
Detector = RMS
Sweep: single sweep
Use analyzer's band power function with the band limits set equal to the 26 dB EBW
Add 10 log (1/x), where x is the duty cycle, to the measured power

EUT nominal channel bandwidth:	20 MHz	adi reg 24	26 dB EBW: 19.44 MHz
Output port:	Channel A;	Low Channel Frequency:	5.480 GHz
Output power setting:	19;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: Lesser of: 250 mW (24 dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. 11 dBm + 10 log B = 23.887 dBm. Limit shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Antenna gain = 9 dBi. Limit = 23.887 dBm – 3 dBi = **20.887 dBm**

MIMO MATRIX A: MIMO with Cross-Polarized antenna (FCC KDB 662911 D02 v01):
Measure and add 10 log(N) dB, where N is the number of outputs.
= 10 log(2) = 3 dB

Maximum Conducted Output Power = 14.79 dBm + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) + 3 dB (MIMO) = **18.88 dBm**



Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Maximum Conducted Output Power
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section C – Method SA-2 Alternative (RMS detection with slow sweep with each spectrum bin averaging across ON and OFF times of the EUT transmissions, followed by duty cycle correction)
Operator: Craig B

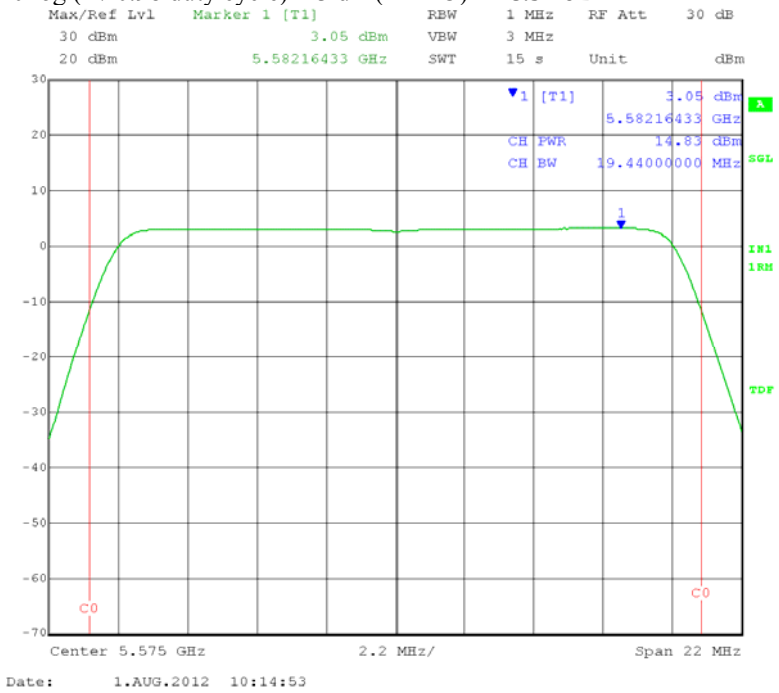
SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points ≥ 2 x (Span/RBW)
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal)
= 10 x 500 x 56 µs = 0.28 sec
Detector = RMS
Sweep: single sweep
Use analyzer's band power function with the band limits set equal to the 26 dB EBW
Add 10 log (1/x), where x is the duty cycle, to the measured power

EUT nominal channel bandwidth:	20 MHz	adi reg 2B	26 dB EBW: 19.44 MHz
Output port:	Channel A;	Mid Channel Frequency:	5.575 GHz
Output power setting:	19;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: Lesser of: 250 mW (24 dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. 11 dBm + 10 log B = 23.887 dBm. Limit shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Antenna gain = 9 dBi. Limit = 23.887 dBm – 3 dBi = **20.887 dBm**

MIMO MATRIX A: MIMO with Cross-Polarized antenna (FCC KDB 662911 D02 v01):
Measure and add 10 log(N) dB, where N is the number of outputs.
= 10 log(2) = 3 dB

Maximum Conducted Output Power = 14.83 dBm + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) + 3 dB (MIMO) = **18.92 dBm**



Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Maximum Conducted Output Power
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section C – Method SA-2 Alternative (RMS detection with slow sweep with each spectrum bin averaging across ON and OFF times of the EUT transmissions, followed by duty cycle correction)
Operator: Craig B

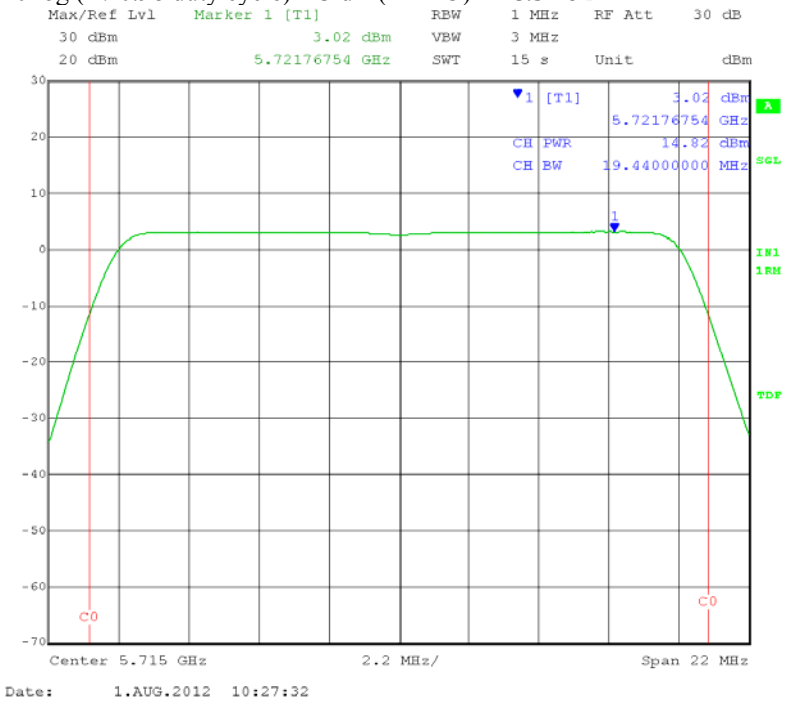
SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points ≥ 2 x (Span/RBW)
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal)
= 10 x 500 x 56 µs = 0.28 sec
Detector = RMS
Sweep: single sweep
Use analyzer's band power function with the band limits set equal to the 26 dB EBW
Add 10 log (1/x), where x is the duty cycle, to the measured power

EUT nominal channel bandwidth:	20 MHz	adi reg 2E	26 dB EBW: 19.44 MHz
Output port:	Channel A;	High Channel Frequency:	5.715 GHz
Output power setting:	19;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: Lesser of: 250 mW (24 dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. 11 dBm + 10 log B = 23.887 dBm. Limit shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Antenna gain = 9 dBi. Limit = 23.887 dBm – 3 dBi = **20.887 dBm**

MIMO MATRIX A: MIMO with Cross-Polarized antenna (FCC KDB 662911 D02 v01):
Measure and add 10 log(N) dB, where N is the number of outputs.
= 10 log(2) = 3 dB

Maximum Conducted Output Power = 14.82 dBm + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) + 3 dB (MIMO) = **18.91 dBm**



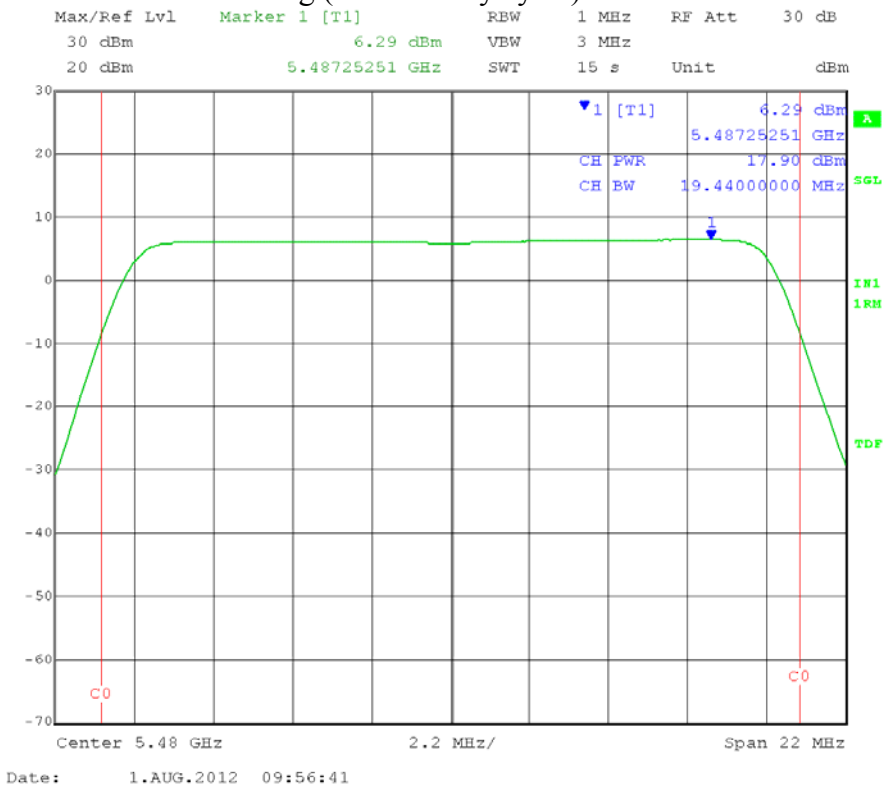
Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Maximum Conducted Output Power
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section C – Method SA-2 Alternative (RMS detection with slow sweep with each spectrum bin averaging across ON and OFF times of the EUT transmissions, followed by duty cycle correction)
Operator: Craig B

SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points ≥ 2 x (Span/RBW)
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal)
= 10 x 500 x 56 µs = 0.28 sec
Detector = RMS
Sweep: single sweep
Use analyzer's band power function with the band limits set equal to the 26 dB EBW
Add 10 log (1/x), where x is the duty cycle, to the measured power

EUT nominal channel bandwidth:	20 MHz	adi reg 17	26 dB EBW: 19.44 MHz
Output port:	Channel A;	Low Channel Frequency:	5.480 GHz
Output power setting:	19;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: Lesser of: 250 mW (24 dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. 11 dBm + 10 log B = 23.887 dBm. Limit shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Antenna gain = 9 dBi. Limit = 23.887 dBm – 3 dBi = **20.887 dBm**

MIMO MATRIX B (completely uncorrelated signals):
Maximum Conducted Output Power = 17.90 dBm + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) = **18.99 dBm**



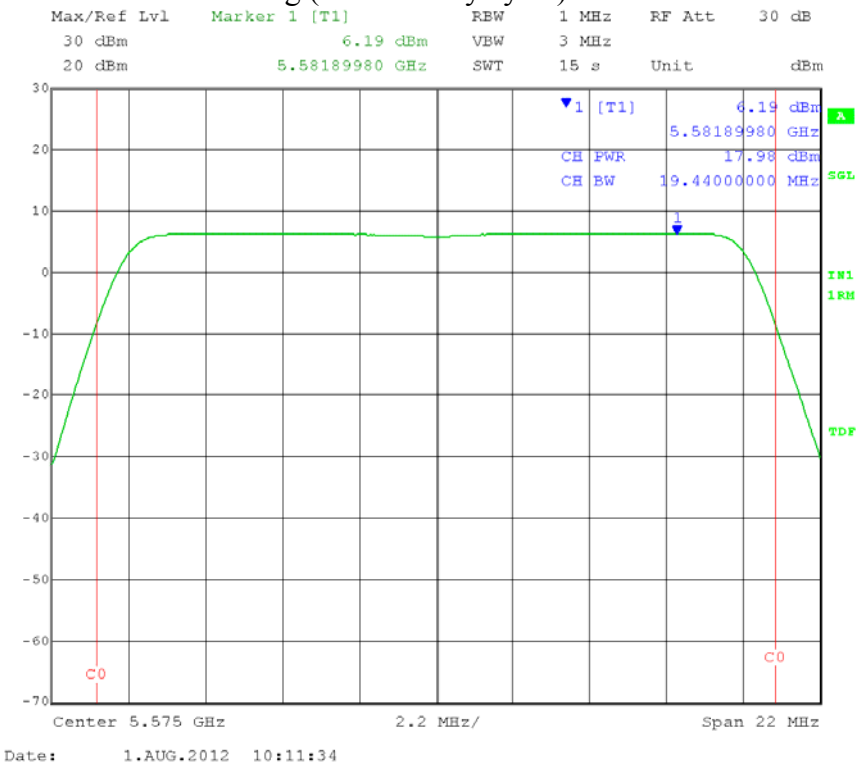
Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Maximum Conducted Output Power
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section C – Method SA-2 Alternative (RMS detection with slow sweep with each spectrum bin averaging across ON and OFF times of the EUT transmissions, followed by duty cycle correction)
Operator: Craig B

SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points ≥ 2 x (Span/RBW)
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal)
= 10 x 500 x 56 µs = 0.28 sec
Detector = RMS
Sweep: single sweep
Use analyzer's band power function with the band limits set equal to the 26 dB EBW
Add 10 log (1/x), where x is the duty cycle, to the measured power

EUT nominal channel bandwidth:	20 MHz	adi reg 1E	26 dB EBW: 19.44 MHz
Output port:	Channel A;	Mid Channel Frequency:	5.575 GHz
Output power setting:	19;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: Lesser of: 250 mW (24 dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. 11 dBm + 10 log B = 23.887 dBm. Limit shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Antenna gain = 9 dBi. Limit = 23.887 dBm – 3 dBi = **20.887 dBm**

MIMO MATRIX B (completely uncorrelated signals):
Maximum Conducted Output Power = 17.98 dBm + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) = **19.07 dBm**



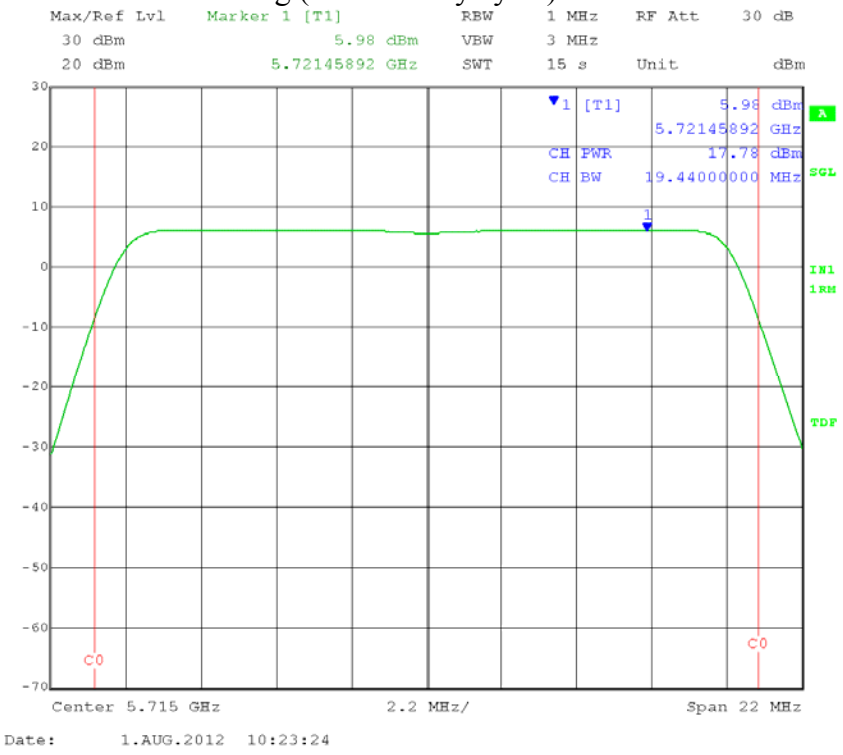
Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Maximum Conducted Output Power
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section C – Method SA-2 Alternative (RMS detection with slow sweep with each spectrum bin averaging across ON and OFF times of the EUT transmissions, followed by duty cycle correction)
Operator: Craig B

SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points ≥ 2 x (Span/RBW)
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal)
= 10 x 500 x 56 µs = 0.28 sec
Detector = RMS
Sweep: single sweep
Use analyzer's band power function with the band limits set equal to the 26 dB EBW
Add 10 log (1/x), where x is the duty cycle, to the measured power

EUT nominal channel bandwidth:	20 MHz	adi reg 21	26 dB EBW: 19.44 MHz
Output port:	Channel A;	High Channel Frequency:	5.715 GHz
Output power setting:	19;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: Lesser of: 250 mW (24 dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. 11 dBm + 10 log B = 23.887 dBm. Limit shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Antenna gain = 9 dBi. Limit = 23.887 dBm – 3 dBi = **20.887 dBm**

MIMO MATRIX B (completely uncorrelated signals):
Maximum Conducted Output Power = 17.78 dBm + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) = **18.87 dBm**



Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Maximum Conducted Output Power
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section C – Method SA-2 Alternative (RMS detection with slow sweep with each spectrum bin averaging across ON and OFF times of the EUT transmissions, followed by duty cycle correction)
Operator: Craig B

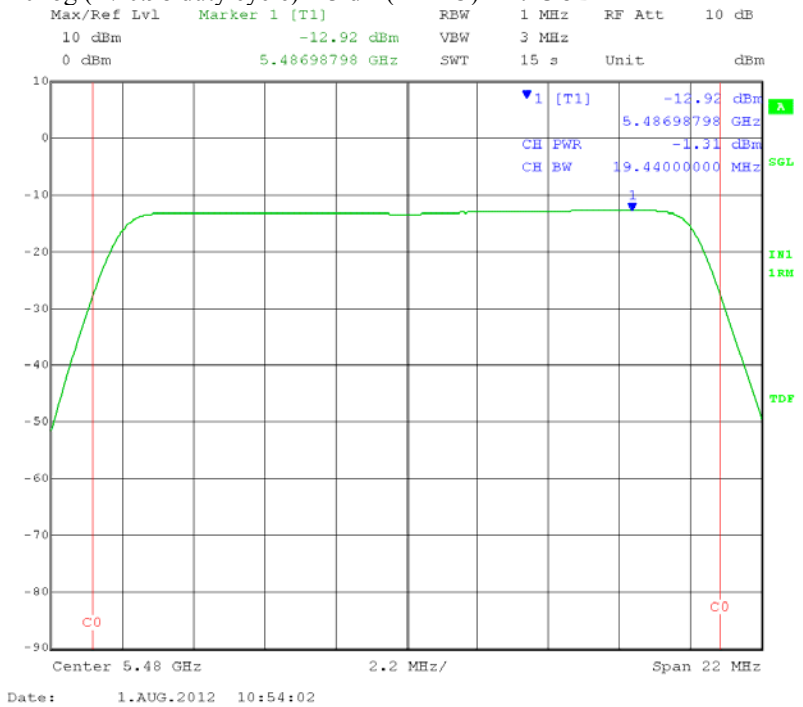
SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points ≥ 2 x (Span/RBW)
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal)
= 10 x 500 x 56 µs = 0.28 sec
Detector = RMS
Sweep: single sweep
Use analyzer's band power function with the band limits set equal to the 26 dB EBW
Add 10 log (1/x), where x is the duty cycle, to the measured power

EUT nominal channel bandwidth:	20 MHz	adi reg 65	26 dB EBW: 19.44 MHz
Output port:	Channel A;	Low Channel Frequency:	5.480 GHz
Output power setting:	1;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: Lesser of: 250 mW (24 dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. 11 dBm + 10 log B = 23.887 dBm. Limit shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Antenna gain = 9 dBi + 18 dBi dish = 27 dBi. Limit = 23.887 dBm – 21 dBi = **2.887 dBm**

MIMO MATRIX A: MIMO with Cross-Polarized antenna (FCC KDB 662911 D02 v01):
Measure and add 10 log(N) dB, where N is the number of outputs.
= 10 log(2) = 3 dB

Maximum Conducted Output Power = -1.31 dBm + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) + 3 dB (MIMO) = **2.78 dBm**



Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Maximum Conducted Output Power
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section C – Method SA-2 Alternative (RMS detection with slow sweep with each spectrum bin averaging across ON and OFF times of the EUT transmissions, followed by duty cycle correction)
Operator: Craig B

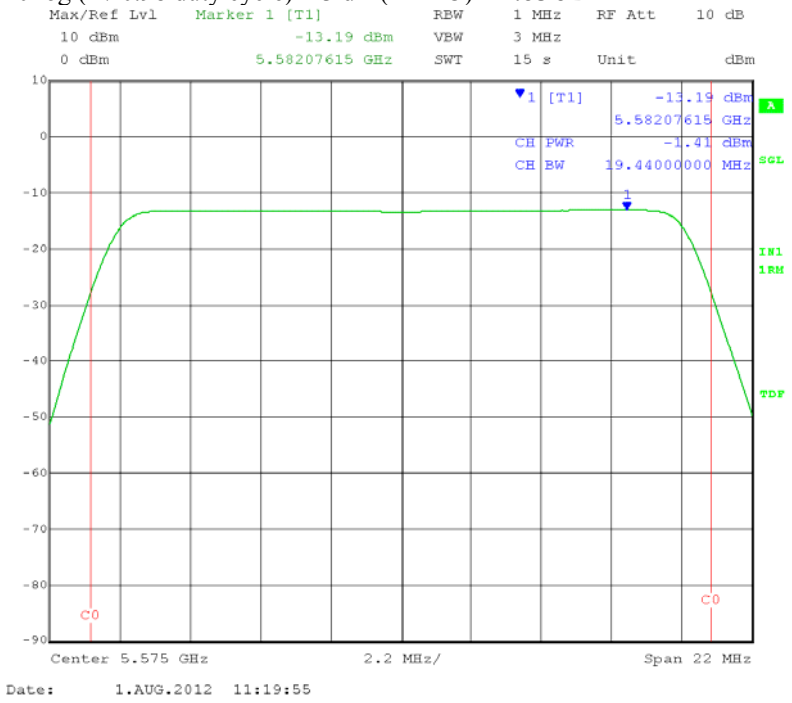
SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points ≥ 2 x (Span/RBW)
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal)
= 10 x 500 x 56 µs = 0.28 sec
Detector = RMS
Sweep: single sweep
Use analyzer's band power function with the band limits set equal to the 26 dB EBW
Add 10 log (1/x), where x is the duty cycle, to the measured power

EUT nominal channel bandwidth:	20 MHz	adi reg 6D	26 dB EBW: 19.44 MHz
Output port:	Channel A;	Mid Channel Frequency:	5.575 GHz
Output power setting:	1;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: Lesser of: 250 mW (24 dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. 11 dBm + 10 log B = 23.887 dBm. Limit shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Antenna gain = 9 dBi + 18 dBi dish = 27 dBi. Limit = 23.887 dBm – 21 dBi = **2.887 dBm**

MIMO MATRIX A: MIMO with Cross-Polarized antenna (FCC KDB 662911 D02 v01):
Measure and add 10 log(N) dB, where N is the number of outputs.
= 10 log(2) = 3 dB

Maximum Conducted Output Power = -1.41 dBm + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) + 3 dB (MIMO) = **2.68 dBm**



Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Maximum Conducted Output Power
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section C – Method SA-2 Alternative (RMS detection with slow sweep with each spectrum bin averaging across ON and OFF times of the EUT transmissions, followed by duty cycle correction)
Operator: Craig B

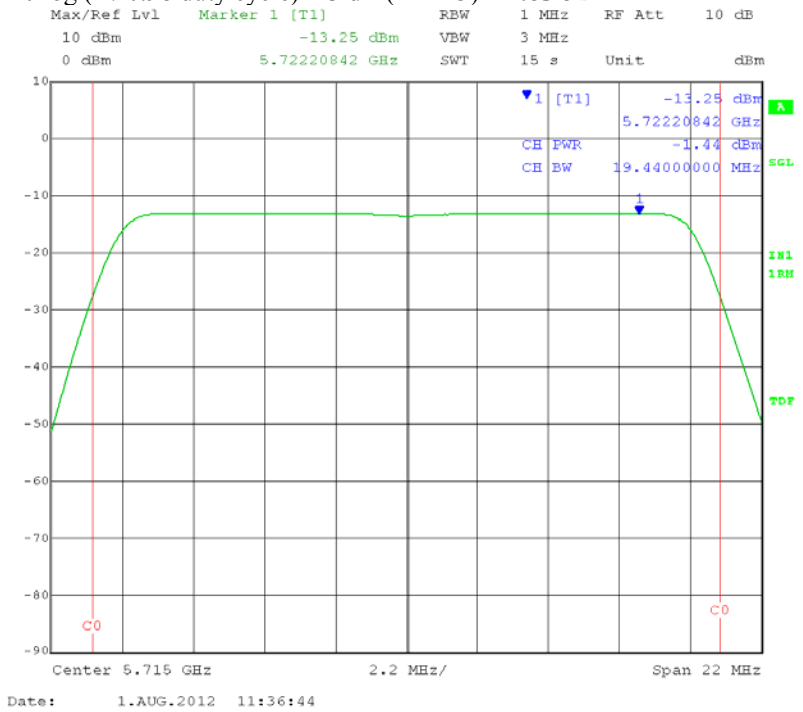
SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points ≥ 2 x (Span/RBW)
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal)
= 10 x 500 x 56 µs = 0.28 sec
Detector = RMS
Sweep: single sweep
Use analyzer's band power function with the band limits set equal to the 26 dB EBW
Add 10 log (1/x), where x is the duty cycle, to the measured power

EUT nominal channel bandwidth:	20 MHz	adi reg 70	26 dB EBW: 19.44 MHz
Output port:	Channel A;	High Channel Frequency:	5.715 GHz
Output power setting:	1;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: Lesser of: 250 mW (24 dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. 11 dBm + 10 log B = 23.887 dBm. Limit shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Antenna gain = 9 dBi + 18 dBi dish = 27 dBi. Limit = 23.887 dBm – 21 dBi = **2.887 dBm**

MIMO MATRIX A: MIMO with Cross-Polarized antenna (FCC KDB 662911 D02 v01):
Measure and add 10 log(N) dB, where N is the number of outputs.
= 10 log(2) = 3 dB

Maximum Conducted Output Power = -1.44 dBm + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) + 3 dB (MIMO) = **2.65 dBm**



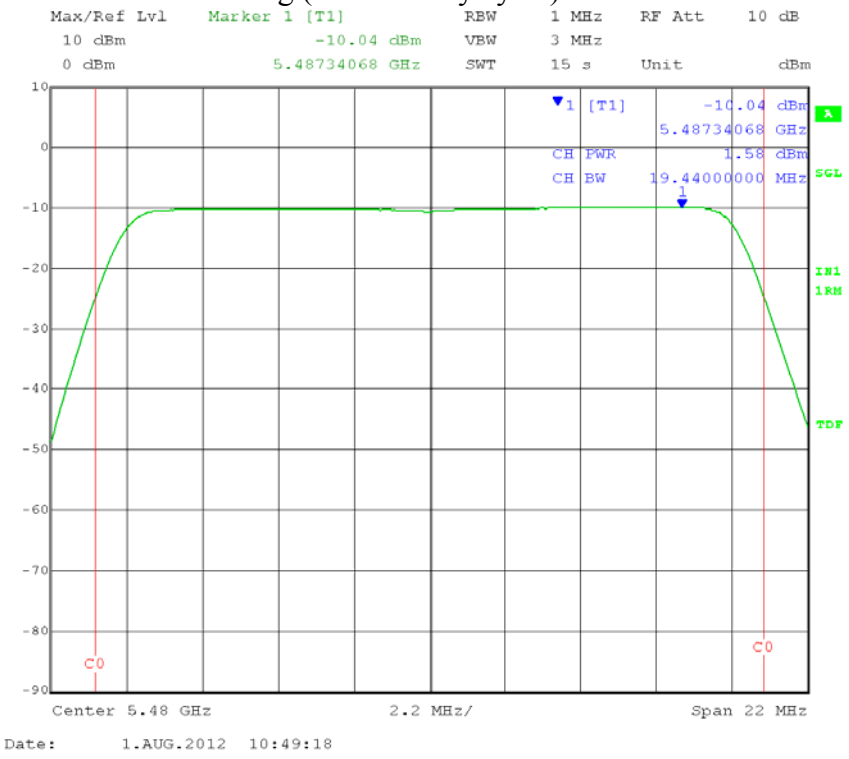
Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Maximum Conducted Output Power
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section C – Method SA-2 Alternative (RMS detection with slow sweep with each spectrum bin averaging across ON and OFF times of the EUT transmissions, followed by duty cycle correction)
Operator: Craig B

SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points ≥ 2 x (Span/RBW)
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal)
= 10 x 500 x 56 µs = 0.28 sec
Detector = RMS
Sweep: single sweep
Use analyzer's band power function with the band limits set equal to the 26 dB EBW
Add 10 log (1/x), where x is the duty cycle, to the measured power

EUT nominal channel bandwidth:	20 MHz	adi reg 5A	26 dB EBW: 19.44 MHz
Output port:	Channel A;	Low Channel Frequency:	5.480 GHz
Output power setting:	1;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: Lesser of: 250 mW (24 dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. 11 dBm + 10 log B = 23.887 dBm. Limit shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Antenna gain = 9 dBi + 18 dBi dish = 27 dBi. Limit = 23.887 dBm – 21 dBi = **2.887 dBm**

MIMO MATRIX B (completely uncorrelated signals):
Maximum Conducted Output Power = 1.58 dBm + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) = **2.67 dBm**



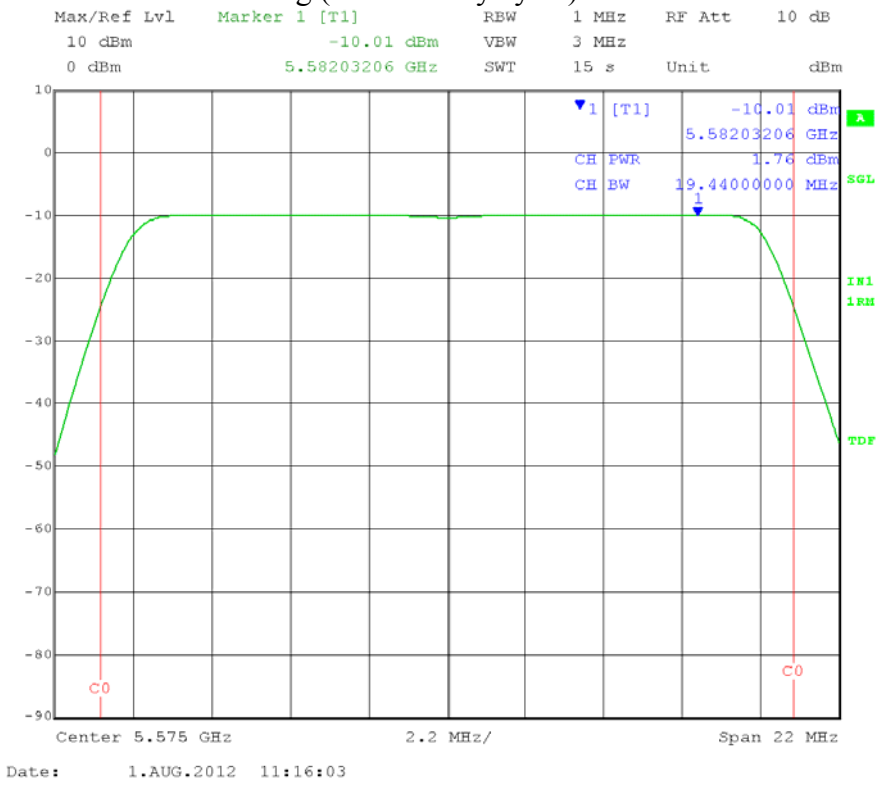
Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Maximum Conducted Output Power
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section C – Method SA-2 Alternative (RMS detection with slow sweep with each spectrum bin averaging across ON and OFF times of the EUT transmissions, followed by duty cycle correction)
Operator: Craig B

SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points ≥ 2 x (Span/RBW)
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal)
= 10 x 500 x 56 µs = 0.28 sec
Detector = RMS
Sweep: single sweep
Use analyzer's band power function with the band limits set equal to the 26 dB EBW
Add 10 log (1/x), where x is the duty cycle, to the measured power

EUT nominal channel bandwidth:	20 MHz	adi reg 60	26 dB EBW: 19.44 MHz
Output port:	Channel A;	Mid Channel Frequency:	5.575 GHz
Output power setting:	1;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: Lesser of: 250 mW (24 dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. 11 dBm + 10 log B = 23.887 dBm. Limit shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Antenna gain = 9 dBi + 18 dBi dish = 27 dBi. Limit = 23.887 dBm – 21 dBi = **2.887 dBm**

MIMO MATRIX B (completely uncorrelated signals):
Maximum Conducted Output Power = 1.76 dBm + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) = **2.85 dBm**



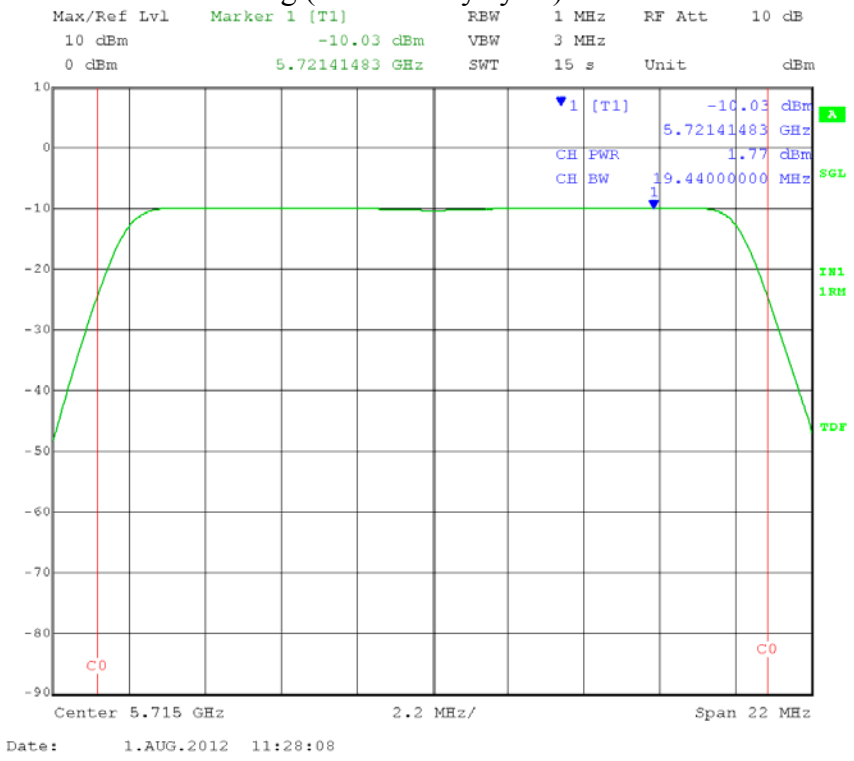
Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Maximum Conducted Output Power
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section C – Method SA-2 Alternative (RMS detection with slow sweep with each spectrum bin averaging across ON and OFF times of the EUT transmissions, followed by duty cycle correction)
Operator: Craig B

SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points ≥ 2 x (Span/RBW)
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal)
= 10 x 500 x 56 µs = 0.28 sec
Detector = RMS
Sweep: single sweep
Use analyzer's band power function with the band limits set equal to the 26 dB EBW
Add 10 log (1/x), where x is the duty cycle, to the measured power

EUT nominal channel bandwidth:	20 MHz	adi reg 63	26 dB EBW: 19.44 MHz
Output port:	Channel A;	High Channel Frequency:	5.715 GHz
Output power setting:	1;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: Lesser of: 250 mW (24 dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. 11 dBm + 10 log B = 23.887 dBm. Limit shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Antenna gain = 9 dBi + 18 dBi dish = 27 dBi. Limit = 23.887 dBm – 21 dBi = **2.887 dBm**

MIMO MATRIX B (completely uncorrelated signals):
Maximum Conducted Output Power = 1.77 dBm + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) = **2.86 dBm**



Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Maximum Conducted Output Power
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section C – Method SA-2 Alternative (RMS detection with slow sweep with each spectrum bin averaging across ON and OFF times of the EUT transmissions, followed by duty cycle correction)
Operator: Craig B

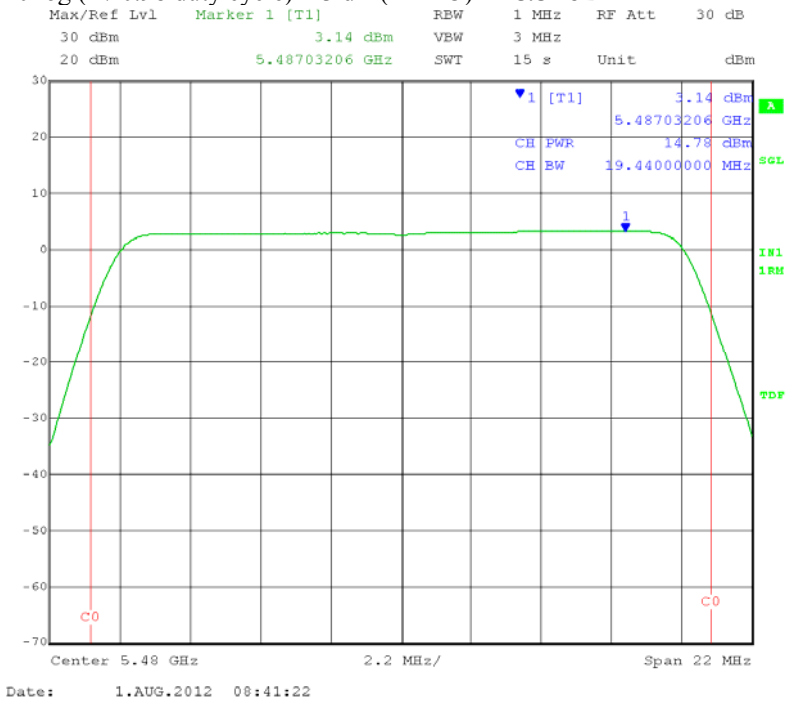
SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points ≥ 2 x (Span/RBW)
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal)
= 10 x 500 x 56 µs = 0.28 sec
Detector = RMS
Sweep: single sweep
Use analyzer's band power function with the band limits set equal to the 26 dB EBW
Add 10 log (1/x), where x is the duty cycle, to the measured power

EUT nominal channel bandwidth:	20 MHz	adi reg 28	26 dB EBW: 19.44 MHz
Output port:	Channel B;	Low Channel Frequency:	5.480 GHz
Output power setting:	19;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: Lesser of: 250 mW (24 dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. 11 dBm + 10 log B = 23.887 dBm. Limit shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Antenna gain = 9 dBi. Limit = 23.887 dBm – 3 dBi = **20.887 dBm**

MIMO MATRIX A: MIMO with Cross-Polarized antenna (FCC KDB 662911 D02 v01):
Measure and add 10 log(N) dB, where N is the number of outputs.
= 10 log(2) = 3 dB

Maximum Conducted Output Power = 14.78 dBm + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) + 3 dB (MIMO) = **18.87 dBm**



Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Maximum Conducted Output Power
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section C – Method SA-2 Alternative (RMS detection with slow sweep with each spectrum bin averaging across ON and OFF times of the EUT transmissions, followed by duty cycle correction)
Operator: Craig B

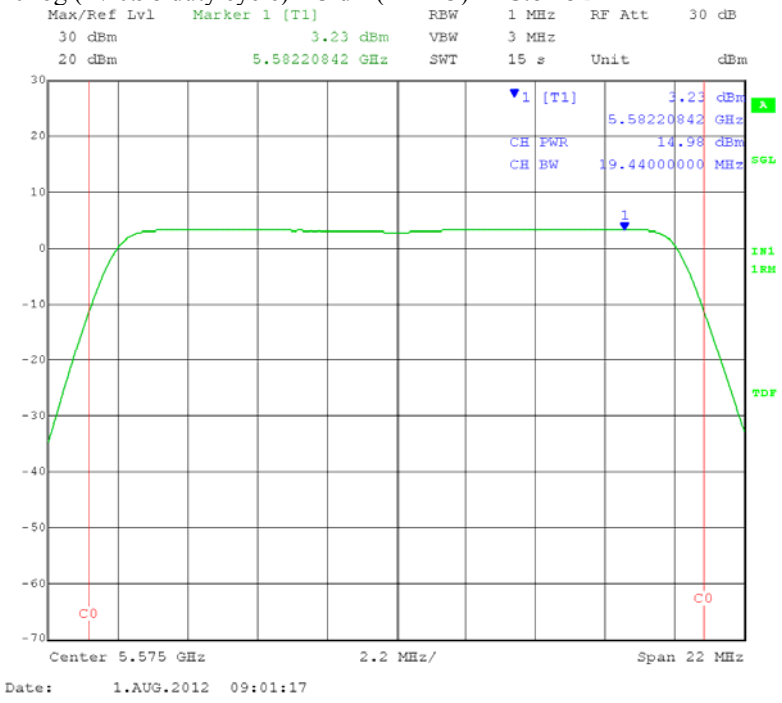
SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points ≥ 2 x (Span/RBW)
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal)
= 10 x 500 x 56 µs = 0.28 sec
Detector = RMS
Sweep: single sweep
Use analyzer's band power function with the band limits set equal to the 26 dB EBW
Add 10 log (1/x), where x is the duty cycle, to the measured power

EUT nominal channel bandwidth:	20 MHz	adi reg 2C	26 dB EBW: 19.44 MHz
Output port:	Channel B;	Mid Channel Frequency:	5.575 GHz
Output power setting:	19;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: Lesser of: 250 mW (24 dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. 11 dBm + 10 log B = 23.887 dBm. Limit shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Antenna gain = 9 dBi. Limit = 23.887 dBm – 3 dBi = **20.887 dBm**

MIMO MATRIX A: MIMO with Cross-Polarized antenna (FCC KDB 662911 D02 v01):
Measure and add 10 log(N) dB, where N is the number of outputs.
= 10 log(2) = 3 dB

Maximum Conducted Output Power = 14.98 dBm + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) + 3 dB (MIMO) = **19.07 dBm**



Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Maximum Conducted Output Power
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section C – Method SA-2 Alternative (RMS detection with slow sweep with each spectrum bin averaging across ON and OFF times of the EUT transmissions, followed by duty cycle correction)
Operator: Craig B

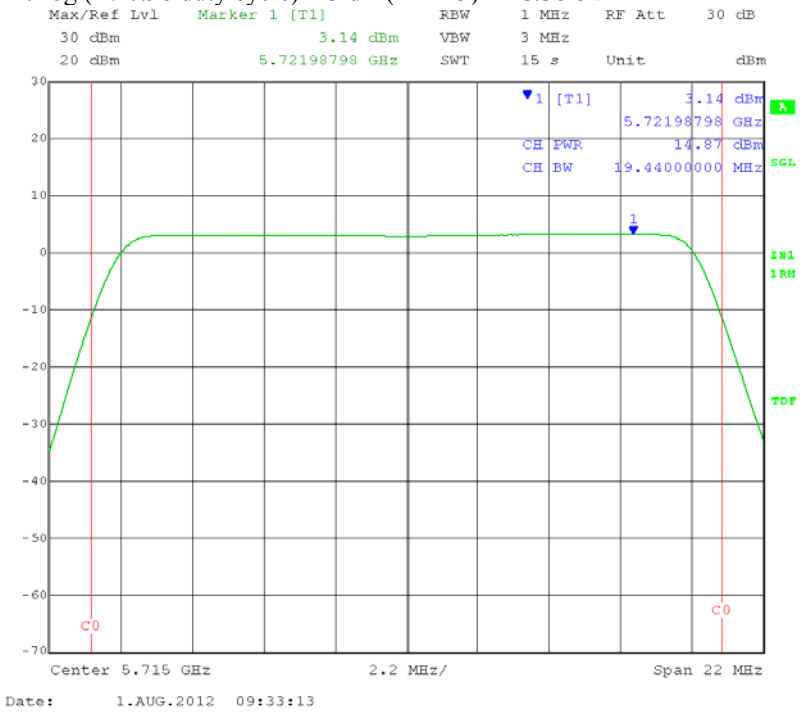
SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points ≥ 2 x (Span/RBW)
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal)
= 10 x 500 x 56 µs = 0.28 sec
Detector = RMS
Sweep: single sweep
Use analyzer's band power function with the band limits set equal to the 26 dB EBW
Add 10 log (1/x), where x is the duty cycle, to the measured power

EUT nominal channel bandwidth:	20 MHz	adi reg 2D	26 dB EBW: 19.44 MHz
Output port:	Channel B;	High Channel Frequency:	5.715 GHz
Output power setting:	19;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: Lesser of: 250 mW (24 dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. 11 dBm + 10 log B = 23.887 dBm. Limit shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Antenna gain = 9 dBi. Limit = 23.887 dBm – 3 dBi = **20.887 dBm**

MIMO MATRIX A: MIMO with Cross-Polarized antenna (FCC KDB 662911 D02 v01):
Measure and add 10 log(N) dB, where N is the number of outputs.
= 10 log(2) = 3 dB

Maximum Conducted Output Power = 14.87 dBm + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) + 3 dB (MIMO) = **18.96 dBm**



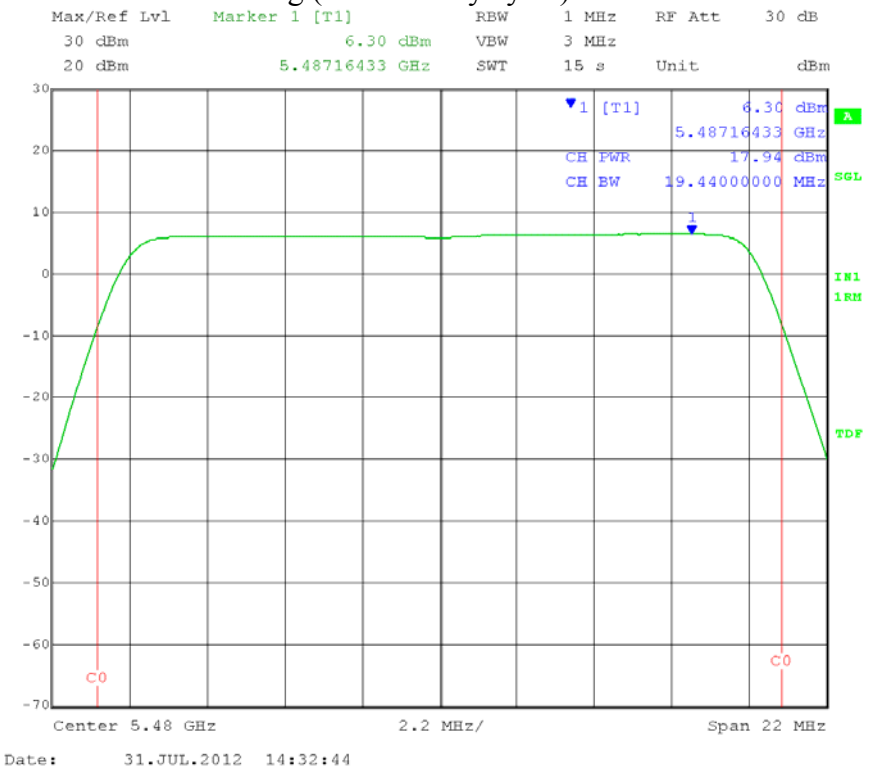
Test Date: 07-31-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Maximum Conducted Output Power
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section C – Method SA-2 Alternative (RMS detection with slow sweep with each spectrum bin averaging across ON and OFF times of the EUT transmissions, followed by duty cycle correction)
Operator: Craig B

SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points ≥ 2 x (Span/RBW)
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal)
= 10 x 500 x 56 µs = 0.28 sec
Detector = RMS
Sweep: single sweep
Use analyzer's band power function with the band limits set equal to the 26 dB EBW
Add 10 log (1/x), where x is the duty cycle, to the measured power

EUT nominal channel bandwidth:	20 MHz	adi reg 1A	26 dB EBW: 19.44 MHz
Output port:	Channel B;	Low Channel Frequency:	5.480 GHz
Output power setting:	19;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: Lesser of: 250 mW (24 dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. 11 dBm + 10 log B = 23.887 dBm. Limit shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Antenna gain = 9 dBi. Limit = 23.887 dBm – 3 dBi = **20.887 dBm**

MIMO MATRIX B (completely uncorrelated signals):
Maximum Conducted Output Power = 17.94 dBm + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) = **19.03 dBm**



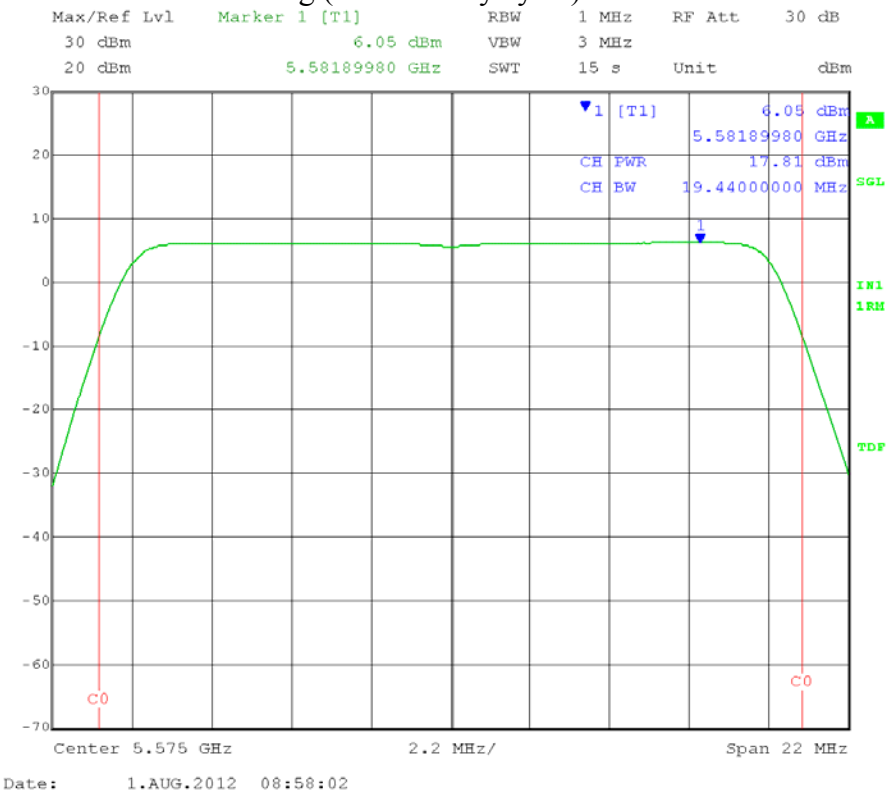
Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Maximum Conducted Output Power
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section C – Method SA-2 Alternative (RMS detection with slow sweep with each spectrum bin averaging across ON and OFF times of the EUT transmissions, followed by duty cycle correction)
Operator: Craig B

SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points ≥ 2 x (Span/RBW)
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal)
= 10 x 500 x 56 µs = 0.28 sec
Detector = RMS
Sweep: single sweep
Use analyzer's band power function with the band limits set equal to the 26 dB EBW
Add 10 log (1/x), where x is the duty cycle, to the measured power

EUT nominal channel bandwidth:	20 MHz	adi reg 20	26 dB EBW: 19.44 MHz
Output port:	Channel B;	Mid Channel Frequency:	5.575 GHz
Output power setting:	19;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: Lesser of: 250 mW (24 dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. 11 dBm + 10 log B = 23.887 dBm. Limit shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Antenna gain = 9 dBi. Limit = 23.887 dBm – 3 dBi = **20.887 dBm**

MIMO MATRIX B (completely uncorrelated signals):
Maximum Conducted Output Power = 17.81 dBm + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) = **18.90 dBm**



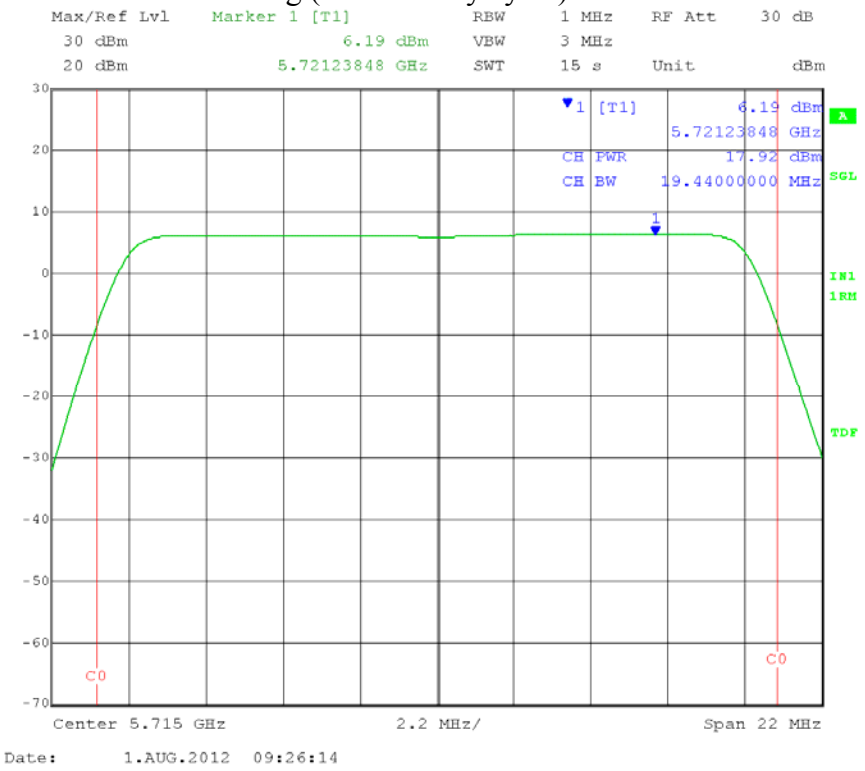
Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Maximum Conducted Output Power
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section C – Method SA-2 Alternative (RMS detection with slow sweep with each spectrum bin averaging across ON and OFF times of the EUT transmissions, followed by duty cycle correction)
Operator: Craig B

SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points ≥ 2 x (Span/RBW)
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal)
= 10 x 500 x 56 µs = 0.28 sec
Detector = RMS
Sweep: single sweep
Use analyzer's band power function with the band limits set equal to the 26 dB EBW
Add 10 log (1/x), where x is the duty cycle, to the measured power

EUT nominal channel bandwidth:	20 MHz	adi reg 21	26 dB EBW: 19.44 MHz
Output port:	Channel B;	High Channel Frequency:	5.715 GHz
Output power setting:	19;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: Lesser of: 250 mW (24 dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. 11 dBm + 10 log B = 23.887 dBm. Limit shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Antenna gain = 9 dBi. Limit = 23.887 dBm – 3 dBi = **20.887 dBm**

MIMO MATRIX B (completely uncorrelated signals):
Maximum Conducted Output Power = 17.92 dBm + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) = **19.01 dBm**



Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Maximum Conducted Output Power
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section C – Method SA-2 Alternative (RMS detection with slow sweep with each spectrum bin averaging across ON and OFF times of the EUT transmissions, followed by duty cycle correction)
Operator: Craig B

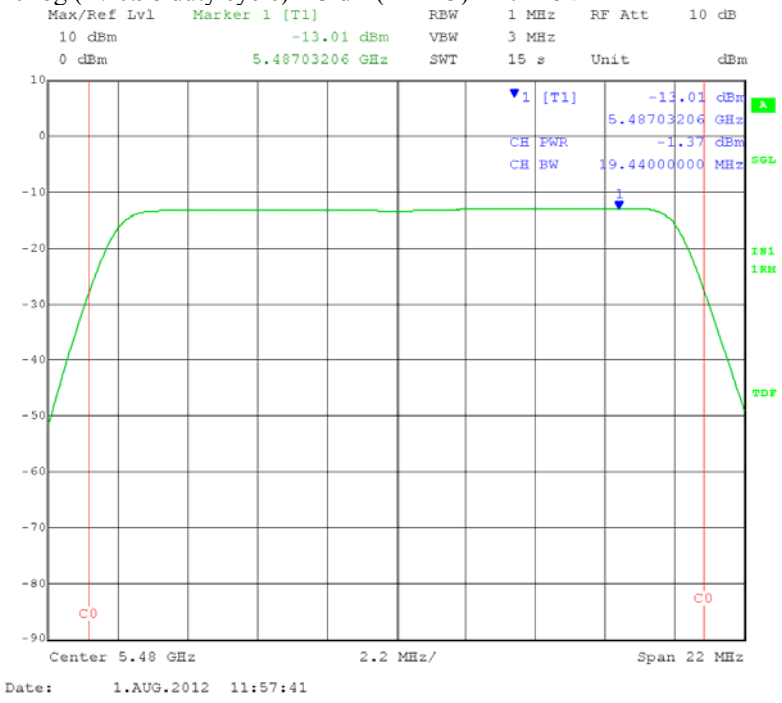
SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points ≥ 2 x (Span/RBW)
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal)
= 10 x 500 x 56 µs = 0.28 sec
Detector = RMS
Sweep: single sweep
Use analyzer's band power function with the band limits set equal to the 26 dB EBW
Add 10 log (1/x), where x is the duty cycle, to the measured power

EUT nominal channel bandwidth:	20 MHz	adi reg 68	26 dB EBW: 19.44 MHz
Output port:	Channel B;	Low Channel Frequency:	5.480 GHz
Output power setting:	1;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: Lesser of: 250 mW (24 dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. 11 dBm + 10 log B = 23.887 dBm. Limit shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Antenna gain = 9 dBi + 18 dBi dish = 27 dBi. Limit = 23.887 dBm – 21 dBi = **2.887 dBm**

MIMO MATRIX A: MIMO with Cross-Polarized antenna (FCC KDB 662911 D02 v01):
Measure and add 10 log(N) dB, where N is the number of outputs.
= 10 log(2) = 3 dB

Maximum Conducted Output Power = -1.37 dBm + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) + 3 dB (MIMO) = **2.72 dBm**



Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Maximum Conducted Output Power
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section C – Method SA-2 Alternative (RMS detection with slow sweep with each spectrum bin averaging across ON and OFF times of the EUT transmissions, followed by duty cycle correction)
Operator: Craig B

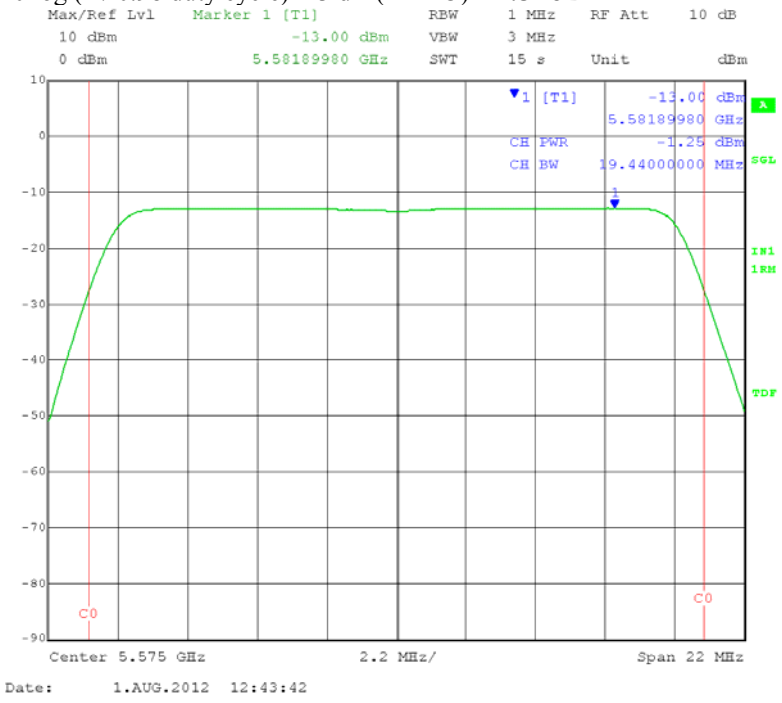
SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points ≥ 2 x (Span/RBW)
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal)
= 10 x 500 x 56 µs = 0.28 sec
Detector = RMS
Sweep: single sweep
Use analyzer's band power function with the band limits set equal to the 26 dB EBW
Add 10 log (1/x), where x is the duty cycle, to the measured power

EUT nominal channel bandwidth:	20 MHz	adi reg 6D	26 dB EBW: 19.44 MHz
Output port:	Channel B;	Mid Channel Frequency:	5.575 GHz
Output power setting:	1;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: Lesser of: 250 mW (24 dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. 11 dBm + 10 log B = 23.887 dBm. Limit shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Antenna gain = 9 dBi + 18 dBi dish = 27 dBi. Limit = 23.887 dBm – 21 dBi = **2.887 dBm**

MIMO MATRIX A: MIMO with Cross-Polarized antenna (FCC KDB 662911 D02 v01):
Measure and add 10 log(N) dB, where N is the number of outputs.
= 10 log(2) = 3 dB

Maximum Conducted Output Power = -1.25 dBm + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) + 3 dB (MIMO) = **2.84 dBm**



Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Maximum Conducted Output Power
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section C – Method SA-2 Alternative (RMS detection with slow sweep with each spectrum bin averaging across ON and OFF times of the EUT transmissions, followed by duty cycle correction)
Operator: Craig B

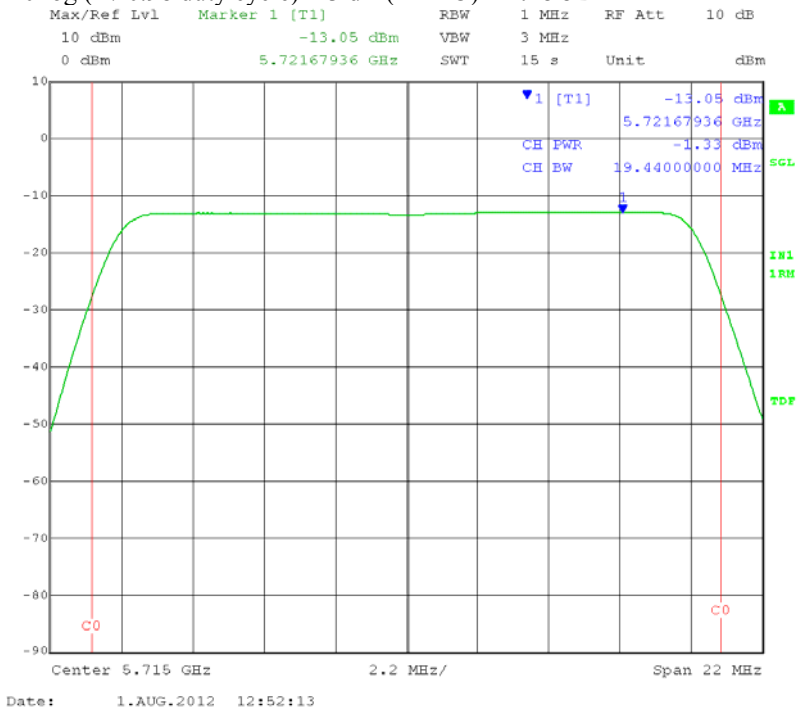
SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points ≥ 2 x (Span/RBW)
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal)
= 10 x 500 x 56 µs = 0.28 sec
Detector = RMS
Sweep: single sweep
Use analyzer's band power function with the band limits set equal to the 26 dB EBW
Add 10 log (1/x), where x is the duty cycle, to the measured power

EUT nominal channel bandwidth:	20 MHz	adi reg 6F	26 dB EBW: 19.44 MHz
Output port:	Channel B;	High Channel Frequency:	5.715 GHz
Output power setting:	1;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: Lesser of: 250 mW (24 dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. 11 dBm + 10 log B = 23.887 dBm. Limit shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Antenna gain = 9 dBi + 18 dBi dish = 27 dBi. Limit = 23.887 dBm – 21 dBi = **2.887 dBm**

MIMO MATRIX A: MIMO with Cross-Polarized antenna (FCC KDB 662911 D02 v01):
Measure and add 10 log(N) dB, where N is the number of outputs.
= 10 log(2) = 3 dB

Maximum Conducted Output Power = -1.33 dBm + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) + 3 dB (MIMO) = **2.76 dBm**



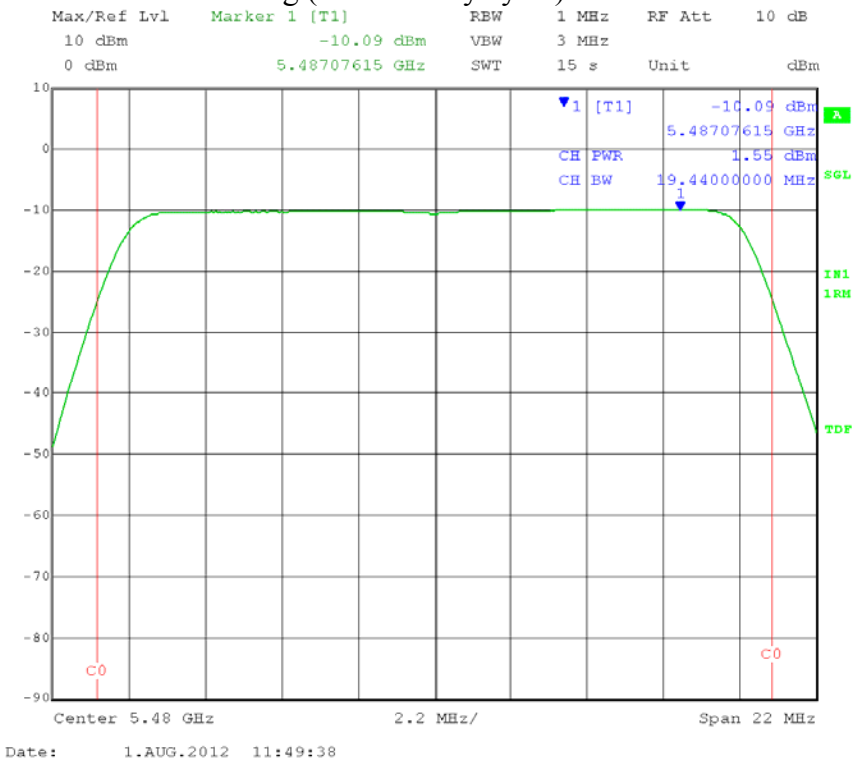
Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Maximum Conducted Output Power
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section C – Method SA-2 Alternative (RMS detection with slow sweep with each spectrum bin averaging across ON and OFF times of the EUT transmissions, followed by duty cycle correction)
Operator: Craig B

SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points ≥ 2 x (Span/RBW)
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal)
= 10 x 500 x 56 µs = 0.28 sec
Detector = RMS
Sweep: single sweep
Use analyzer's band power function with the band limits set equal to the 26 dB EBW
Add 10 log (1/x), where x is the duty cycle, to the measured power

EUT nominal channel bandwidth:	20 MHz	adi reg 5D	26 dB EBW: 19.44 MHz
Output port:	Channel B;	Low Channel Frequency:	5.480 GHz
Output power setting:	1;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: Lesser of: 250 mW (24 dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. 11 dBm + 10 log B = 23.887 dBm. Limit shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Antenna gain = 9 dBi + 18 dBi dish = 27 dBi. Limit = 23.887 dBm – 21 dBi = **2.887 dBm**

MIMO MATRIX B (completely uncorrelated signals):
Maximum Conducted Output Power = 1.55 dBm + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) = **2.64 dBm**



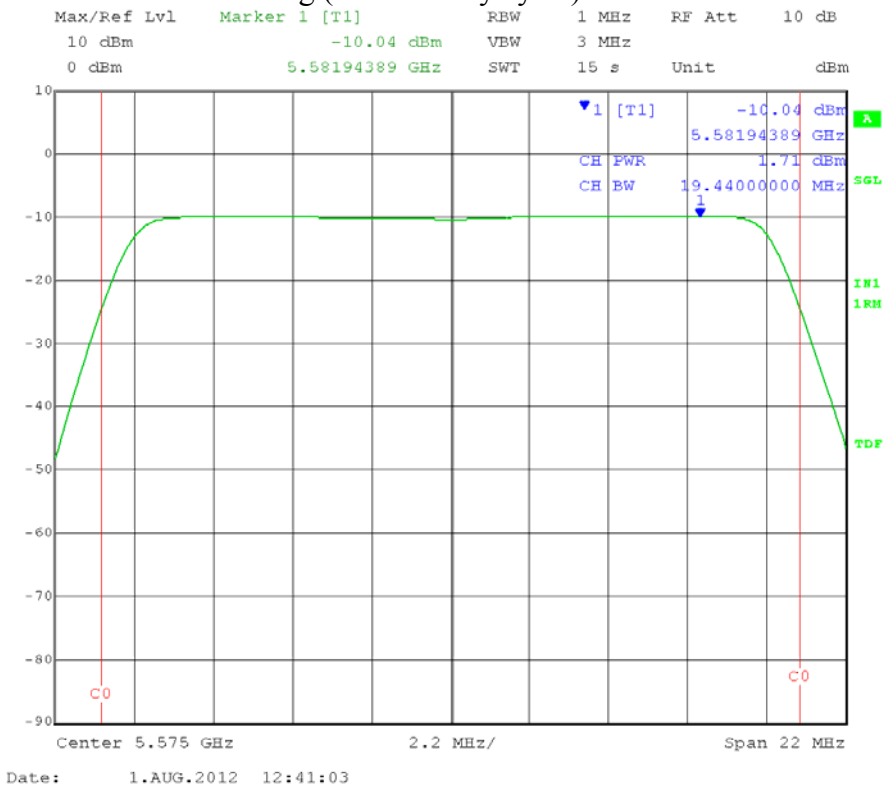
Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Maximum Conducted Output Power
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section C – Method SA-2 Alternative (RMS detection with slow sweep with each spectrum bin averaging across ON and OFF times of the EUT transmissions, followed by duty cycle correction)
Operator: Craig B

SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points ≥ 2 x (Span/RBW)
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal)
= 10 x 500 x 56 µs = 0.28 sec
Detector = RMS
Sweep: single sweep
Use analyzer's band power function with the band limits set equal to the 26 dB EBW
Add 10 log (1/x), where x is the duty cycle, to the measured power

EUT nominal channel bandwidth:	20 MHz	adi reg 61	26 dB EBW: 19.44 MHz
Output port:	Channel B;	Mid Channel Frequency:	5.575 GHz
Output power setting:	1;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: Lesser of: 250 mW (24 dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. 11 dBm + 10 log B = 23.887 dBm. Limit shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Antenna gain = 9 dBi + 18 dBi dish = 27 dBi. Limit = 23.887 dBm – 21 dBi = **2.887 dBm**

MIMO MATRIX B (completely uncorrelated signals):
Maximum Conducted Output Power = 1.71 dBm + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) = **2.80 dBm**



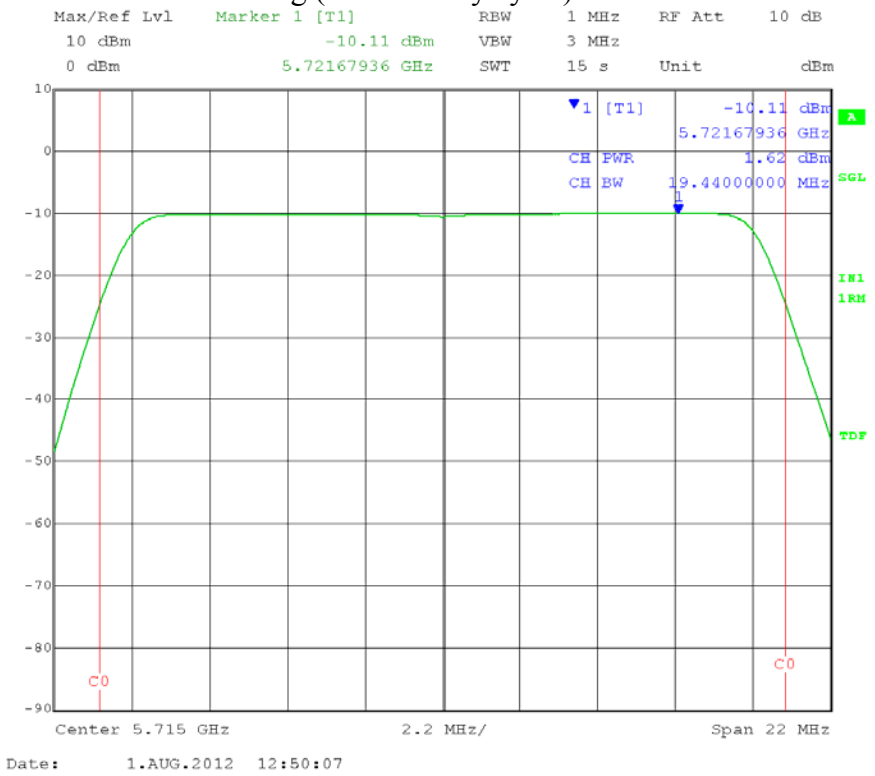
Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Maximum Conducted Output Power
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section C – Method SA-2 Alternative (RMS detection with slow sweep with each spectrum bin averaging across ON and OFF times of the EUT transmissions, followed by duty cycle correction)
Operator: Craig B

SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points ≥ 2 x (Span/RBW)
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal)
= 10 x 500 x 56 µs = 0.28 sec
Detector = RMS
Sweep: single sweep
Use analyzer's band power function with the band limits set equal to the 26 dB EBW
Add 10 log (1/x), where x is the duty cycle, to the measured power

EUT nominal channel bandwidth:	20 MHz	adi reg 63	26 dB EBW: 19.44 MHz
Output port:	Channel B;	High Channel Frequency:	5.715 GHz
Output power setting:	1;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: Lesser of: 250 mW (24 dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. 11 dBm + 10 log B = 23.887 dBm. Limit shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Antenna gain = 9 dBi + 18 dBi dish = 27 dBi. Limit = 23.887 dBm – 21 dBi = **2.887 dBm**

MIMO MATRIX B (completely uncorrelated signals):
Maximum Conducted Output Power = 1.62 dBm + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) = **2.71 dBm**



Appendix A – Measurement Data

A3.0 Peak Power Spectral Density – Conducted

Rule Section: Section 15.407(a)(2)

Test Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01 – *Guidance for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E*

Section E – Peak power spectral density (PPSD)

Description:
SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points ≥ 2 x Span/RBW
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal)
Detector = RMS
Sweep: single sweep
Use peak search to find the peak of the spectrum
Add 10 log (1/x), where x is the duty cycle, to 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 QPSK at the lowest, middle, and highest channels of operation. EUT was set to transmit continuously with 98% duty cycle.

Test Date: 07-11-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Peak Power Spectral Density (PPSD) – Conducted
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section E – Peak power spectral density (using Output Power method SA-2 Alternative)
Operator: Craig B

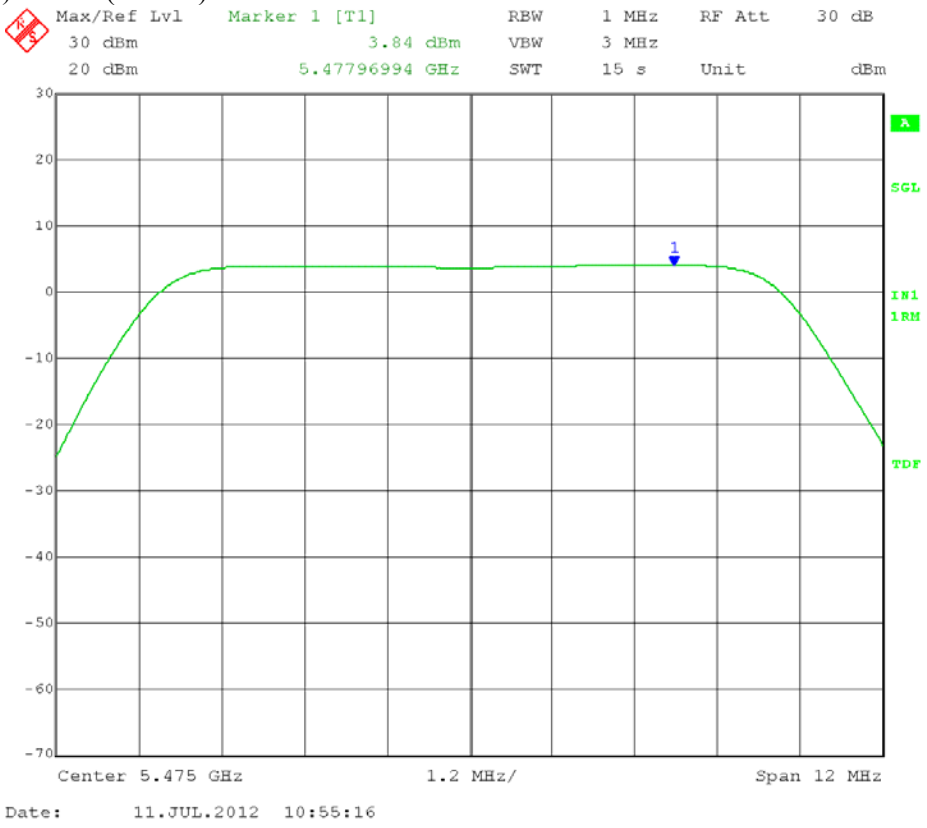
SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz; VBW ≥ 3 MHz
Number of points ≥ 2 x Span/RBW
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal)
Detector = RMS; Sweep: single sweep
Use peak search to find the peak of the spectrum
Add 10 log (1/x), where x is the duty cycle, to the peak of the spectrum

EUT nominal channel bandwidth:	10 MHz	adi reg 28	26 dB EBW: 9.72 MHz
Output port:	Channel A;	Low Channel Frequency:	5.475 GHz
Output power setting:	19;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: 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. Antenna gain = 9 dBi. Limit = 11 dBm/MHz – 3 dBi = **8 dBm/MHz**

MIMO MATRIX A: MIMO with Cross-Polarized antenna (FCC KDB 662911 D02 v01):
Measure and add 10 log(N) dB, where N is the number of outputs.
= 10 log(2) = 3 dB

PPSD = 3.84 dBm/MHz + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) + 3 dB (MIMO) = 7.93 dBm/MHz



Test Date: 07-31-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Peak Power Spectral Density (PPSD) – Conducted
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section E – Peak power spectral density (using Output Power method SA-2 Alternative)
Operator: Craig B

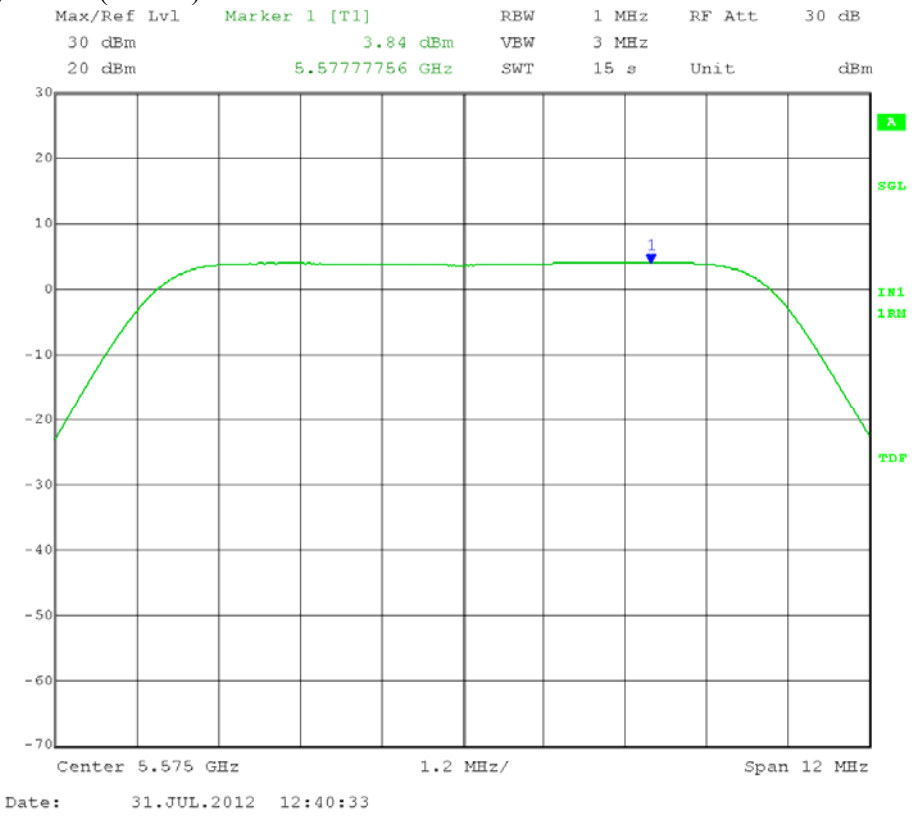
SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz; VBW ≥ 3 MHz
Number of points ≥ 2 x Span/RBW
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal)
Detector = RMS; Sweep: single sweep
Use peak search to find the peak of the spectrum
Add 10 log (1/x), where x is the duty cycle, to the peak of the spectrum

EUT nominal channel bandwidth:	10 MHz	adi reg 35	26 dB EBW: 9.72 MHz
Output port:	Channel A;	Mid Channel Frequency:	5.575 GHz
Output power setting:	19;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: 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. Antenna gain = 9 dBi. Limit = 11 dBm/MHz – 3 dBi = **8 dBm/MHz**

MIMO MATRIX A: MIMO with Cross-Polarized antenna (FCC KDB 662911 D02 v01):
Measure and add 10 log(N) dB, where N is the number of outputs.
= 10 log(2) = 3 dB

PPSD = 3.84 dBm/MHz + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) + 3 dB (MIMO) = 7.93 dBm/MHz



Test Date: 07-31-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Peak Power Spectral Density (PPSD) – Conducted
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section E – Peak power spectral density (using Output Power method SA-2 Alternative)
Operator: Craig B

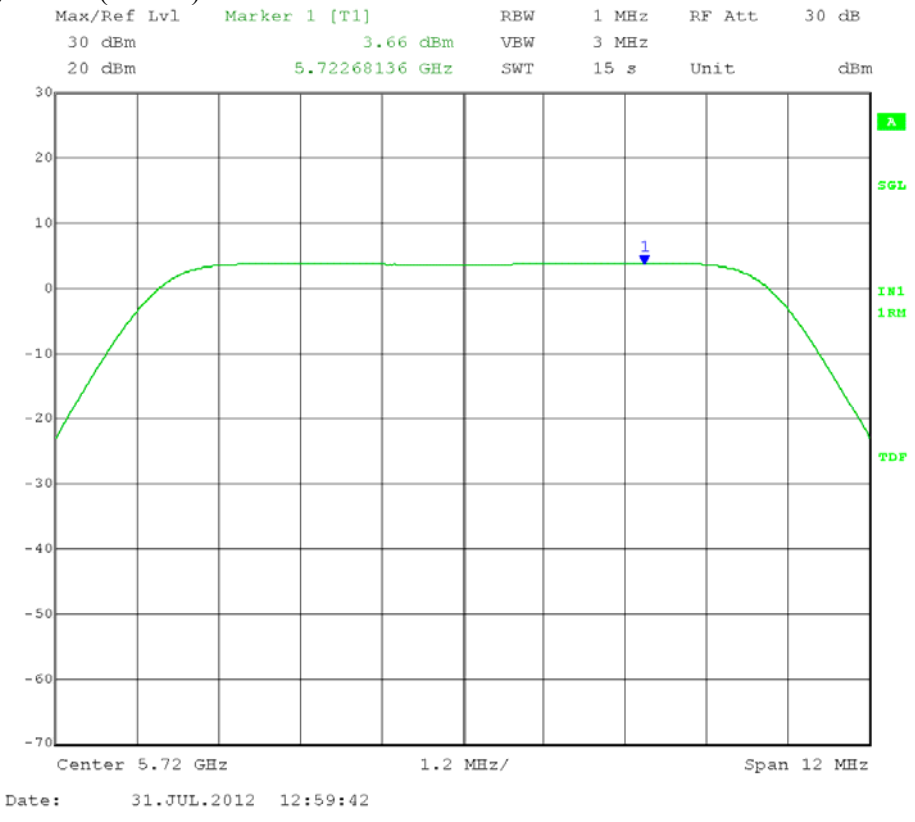
SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz; VBW ≥ 3 MHz
Number of points ≥ 2 x Span/RBW
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal)
Detector = RMS; Sweep: single sweep
Use peak search to find the peak of the spectrum
Add 10 log (1/x), where x is the duty cycle, to the peak of the spectrum

EUT nominal channel bandwidth: 10 MHz adi reg 38 26 dB EBW: 9.72 MHz
Output port: Channel A; High Channel Frequency: 5.720 GHz
Output power setting: 19; Modulation Type: QPSK

Limit: [15.407(a)(2)]: 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. Antenna gain = 9 dBi. Limit = 11 dBm/MHz – 3 dBi = **8 dBm/MHz**

MIMO MATRIX A: MIMO with Cross-Polarized antenna (FCC KDB 662911 D02 v01):
Measure and add 10 log(N) dB, where N is the number of outputs.
= 10 log(2) = 3 dB

PPSD = 3.66 dBm/MHz + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) + 3 dB (MIMO) = 7.75 dBm/MHz



Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Peak Power Spectral Density (PPSD) – Conducted
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section E – Peak power spectral density (using Output Power method SA-2 Alternative)
Operator: Craig B

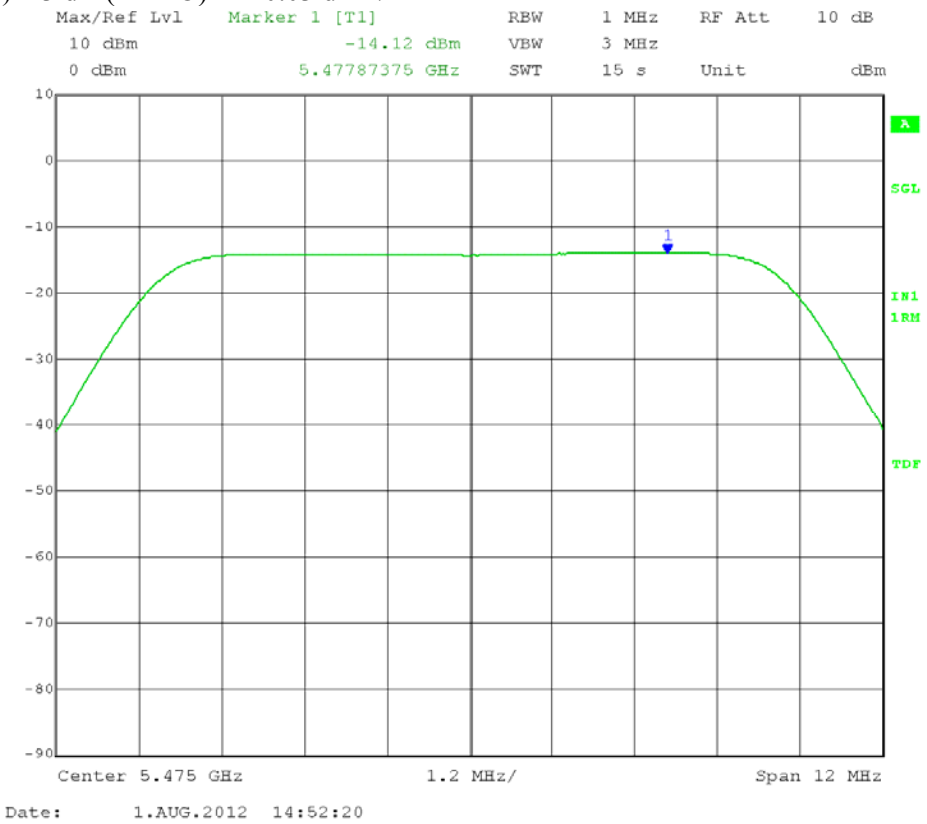
SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz; VBW ≥ 3 MHz
Number of points ≥ 2 x Span/RBW
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal) = 10 x 500 x 28 µs = 0.14 sec
Detector = RMS; Sweep: single sweep
Use peak search to find the peak of the spectrum
Add 10 log (1/x), where x is the duty cycle, to the peak of the spectrum

EUT nominal channel bandwidth:	10 MHz	adi reg 74	26 dB EBW: 9.72 MHz
Output port:	Channel A;	Low Channel Frequency:	5.475 GHz
Output power setting:	1;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: 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. Antenna gain = 9 dBi + 18 dBi dish = 27 dBi.
Limit = 11 dBm/MHz – 21 dBi = **-10 dBm/MHz**

MIMO MATRIX A: MIMO with Cross-Polarized antenna (FCC KDB 662911 D02 v01):
Measure and add 10 log(N) dB, where N is the number of outputs.
= 10 log(2) = 3 dB

PPSD = -14.12 dBm/MHz + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) + 3 dB (MIMO) = -10.03 dBm/MHz



Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Peak Power Spectral Density (PPSD) – Conducted
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section E – Peak power spectral density (using Output Power method SA-2 Alternative)
Operator: Craig B

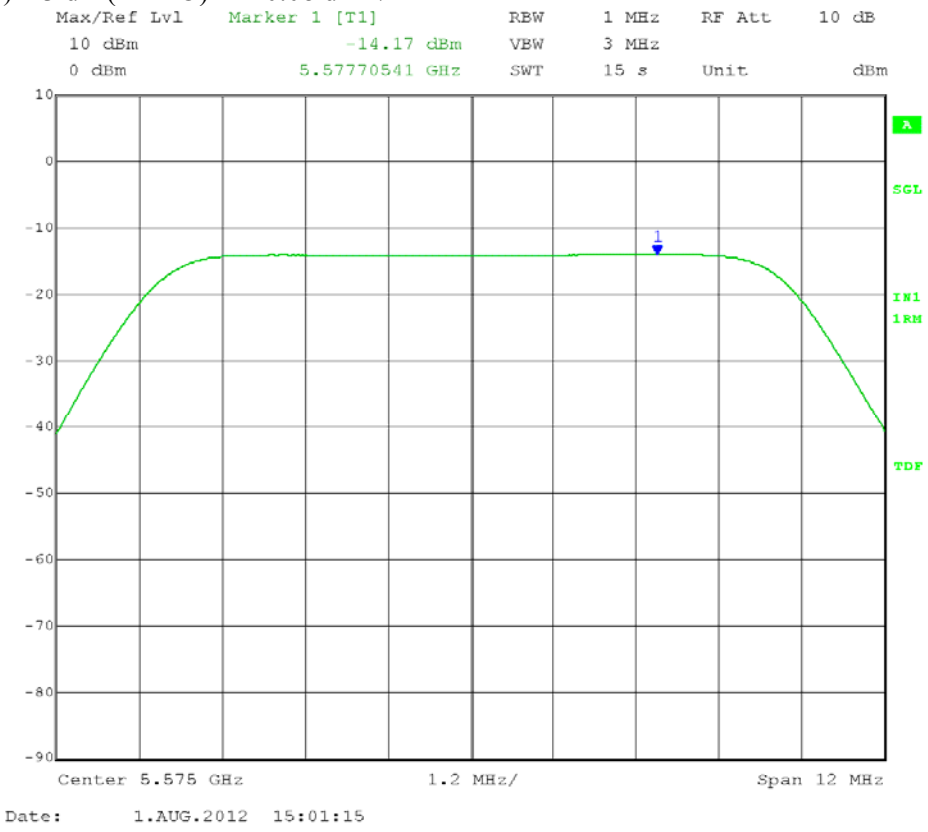
SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz; VBW ≥ 3 MHz
Number of points ≥ 2 x Span/RBW
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal) = 10 x 500 x 28 µs = 0.14 sec
Detector = RMS; Sweep: single sweep
Use peak search to find the peak of the spectrum
Add 10 log (1/x), where x is the duty cycle, to the peak of the spectrum

EUT nominal channel bandwidth:	10 MHz	adi reg 7C	26 dB EBW: 9.72 MHz
Output port:	Channel A;	Mid Channel Frequency:	5.575 GHz
Output power setting:	1;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: 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. Antenna gain = 9 dBi + 18 dBi dish = 27 dBi.
Limit = 11 dBm/MHz – 21 dBi = **-10 dBm/MHz**

MIMO MATRIX A: MIMO with Cross-Polarized antenna (FCC KDB 662911 D02 v01):
Measure and add 10 log(N) dB, where N is the number of outputs.
= 10 log(2) = 3 dB

PPSD = -14.17 dBm/MHz + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) + 3 dB (MIMO) = -10.08 dBm/MHz



Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Peak Power Spectral Density (PPSD) – Conducted
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section E – Peak power spectral density (using Output Power method SA-2 Alternative)
Operator: Craig B

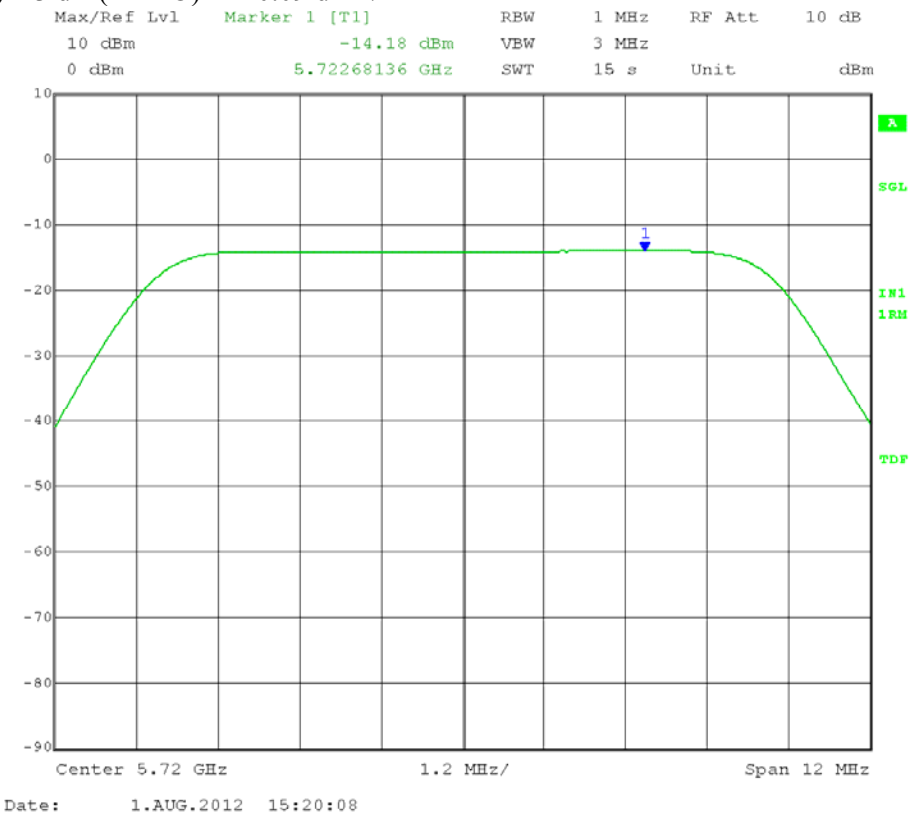
SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz; VBW ≥ 3 MHz
Number of points ≥ 2 x Span/RBW
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal) = 10 x 500 x 28 µs = 0.14 sec
Detector = RMS; Sweep: single sweep
Use peak search to find the peak of the spectrum
Add 10 log (1/x), where x is the duty cycle, to the peak of the spectrum

EUT nominal channel bandwidth:	10 MHz	adi reg 7F	26 dB EBW: 9.72 MHz
Output port:	Channel A;	High Channel Frequency:	5.720 GHz
Output power setting:	1;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: 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. Antenna gain = 9 dBi + 18 dBi dish = 27 dBi.
Limit = 11 dBm/MHz – 21 dBi = **-10 dBm/MHz**

MIMO MATRIX A: MIMO with Cross-Polarized antenna (FCC KDB 662911 D02 v01):
Measure and add 10 log(N) dB, where N is the number of outputs.
= 10 log(2) = 3 dB

PPSD = -14.18 dBm/MHz + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) + 3 dB (MIMO) = -10.09 dBm/MHz



Test Date: 07-31-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Peak Power Spectral Density (PPSD) – Conducted
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section E – Peak power spectral density (using Output Power method SA-2 Alternative)
Operator: Craig B

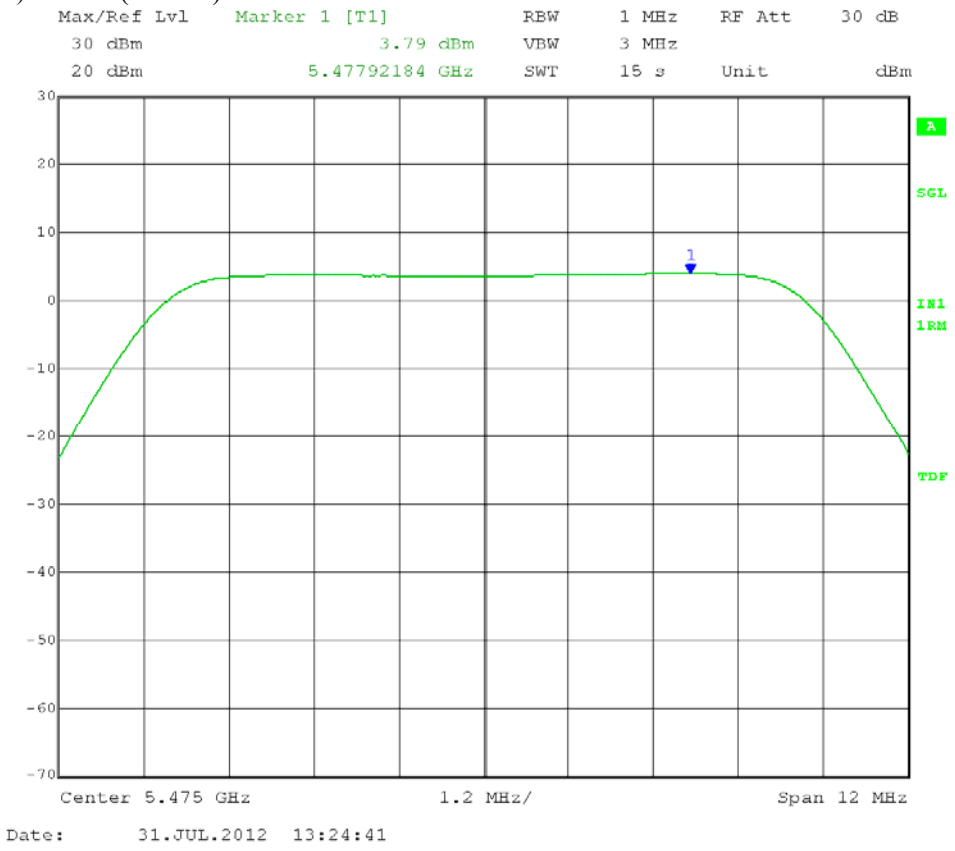
SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz; VBW ≥ 3 MHz
Number of points ≥ 2 x Span/RBW
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal)
Detector = RMS; Sweep: single sweep
Use peak search to find the peak of the spectrum
Add 10 log (1/x), where x is the duty cycle, to the peak of the spectrum

EUT nominal channel bandwidth:	10 MHz	adi reg 30	26 dB EBW: 9.72 MHz
Output port:	Channel B;	Low Channel Frequency:	5.475 GHz
Output power setting:	19;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: 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. Antenna gain = 9 dBi. Limit = 11 dBm/MHz – 3 dBi = **8 dBm/MHz**

MIMO MATRIX A: MIMO with Cross-Polarized antenna (FCC KDB 662911 D02 v01):
Measure and add 10 log(N) dB, where N is the number of outputs.
= 10 log(2) = 3 dB

PPSD = 3.79 dBm/MHz + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) + 3 dB (MIMO) = 7.88 dBm/MHz



Test Date: 07-31-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Peak Power Spectral Density (PPSD) – Conducted
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section E – Peak power spectral density (using Output Power method SA-2 Alternative)
Operator: Craig B

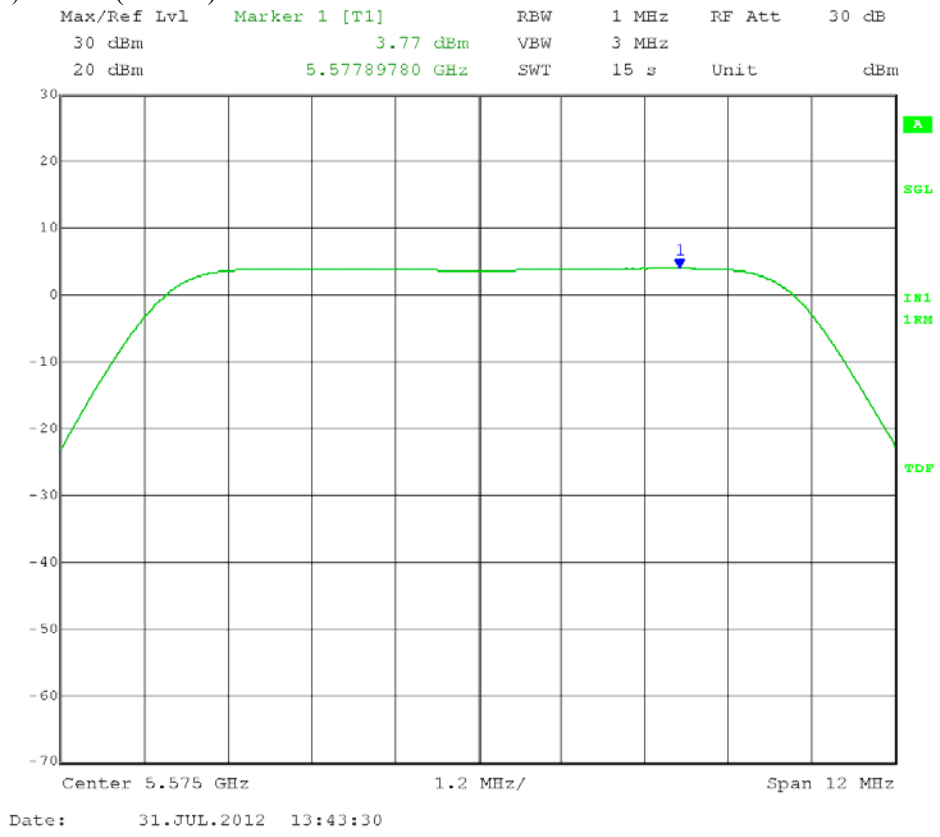
SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz; VBW ≥ 3 MHz
Number of points ≥ 2 x Span/RBW
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal)
Detector = RMS; Sweep: single sweep
Use peak search to find the peak of the spectrum
Add 10 log (1/x), where x is the duty cycle, to the peak of the spectrum

EUT nominal channel bandwidth: 10 MHz adi reg 36 26 dB EBW: 9.72 MHz
Output port: Channel B; Mid Channel Frequency: 5.575 GHz
Output power setting: 19; Modulation Type: QPSK

Limit: [15.407(a)(2)]: 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. Antenna gain = 9 dBi. Limit = 11 dBm/MHz – 3 dBi = **8 dBm/MHz**

MIMO MATRIX A: MIMO with Cross-Polarized antenna (FCC KDB 662911 D02 v01):
Measure and add 10 log(N) dB, where N is the number of outputs.
= 10 log(2) = 3 dB

PPSD = 3.77 dBm/MHz + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) + 3 dB (MIMO) = 7.86 dBm/MHz



Test Date: 07-31-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Peak Power Spectral Density (PPSD) – Conducted
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section E – Peak power spectral density (using Output Power method SA-2 Alternative)
Operator: Craig B

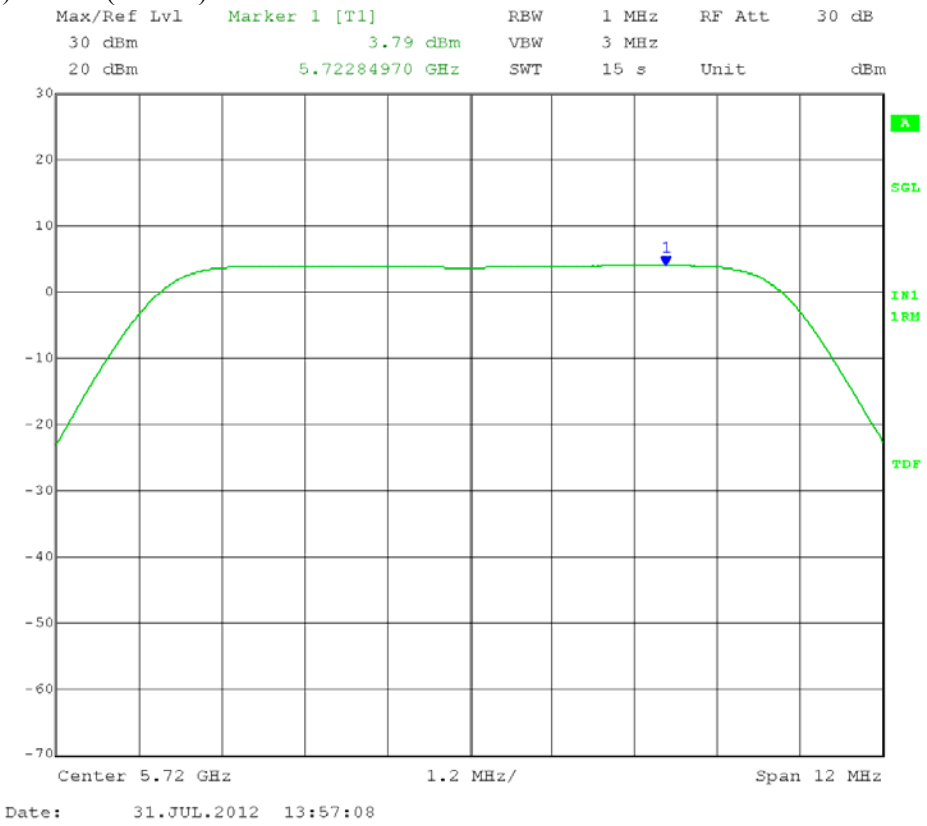
SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz; VBW ≥ 3 MHz
Number of points ≥ 2 x Span/RBW
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal)
Detector = RMS; Sweep: single sweep
Use peak search to find the peak of the spectrum
Add 10 log (1/x), where x is the duty cycle, to the peak of the spectrum

EUT nominal channel bandwidth: 10 MHz adi reg 37 26 dB EBW: 9.72 MHz
Output port: Channel B; High Channel Frequency: 5.720 GHz
Output power setting: 19; Modulation Type: QPSK

Limit: [15.407(a)(2)]: 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. Antenna gain = 9 dBi. Limit = 11 dBm/MHz – 3 dBi = **8 dBm/MHz**

MIMO MATRIX A: MIMO with Cross-Polarized antenna (FCC KDB 662911 D02 v01):
Measure and add 10 log(N) dB, where N is the number of outputs.
= 10 log(2) = 3 dB

PPSD = 3.79 dBm/MHz + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) + 3 dB (MIMO) = 7.88 dBm/MHz



Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Peak Power Spectral Density (PPSD) – Conducted
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section E – Peak power spectral density (using Output Power method SA-2 Alternative)
Operator: Craig B

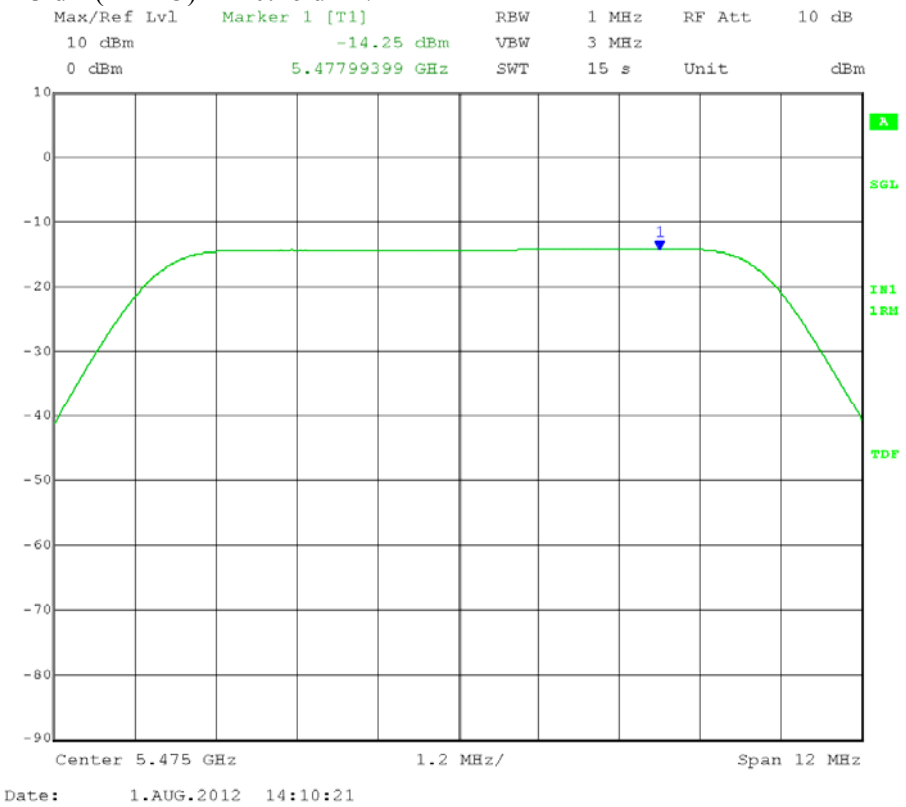
SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz; VBW ≥ 3 MHz
Number of points ≥ 2 x Span/RBW
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal) = 10 x 500 x 28 µs = 0.14 sec
Detector = RMS; Sweep: single sweep
Use peak search to find the peak of the spectrum
Add 10 log (1/x), where x is the duty cycle, to the peak of the spectrum

EUT nominal channel bandwidth:	10 MHz	adi reg 78	26 dB EBW: 9.72 MHz
Output port:	Channel B;	Low Channel Frequency:	5.475 GHz
Output power setting:	1;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: 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. Antenna gain = 9 dBi + 18 dBi dish = 27 dBi.
Limit = 11 dBm/MHz – 21 dBi = **-10 dBm/MHz**

MIMO MATRIX A: MIMO with Cross-Polarized antenna (FCC KDB 662911 D02 v01):
Measure and add 10 log(N) dB, where N is the number of outputs.
= 10 log(2) = 3 dB

PPSD = -14.25 dBm/MHz + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) + 3 dB (MIMO) = -10.16 dBm/MHz



Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Peak Power Spectral Density (PPSD) – Conducted
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section E – Peak power spectral density (using Output Power method SA-2 Alternative)
Operator: Craig B

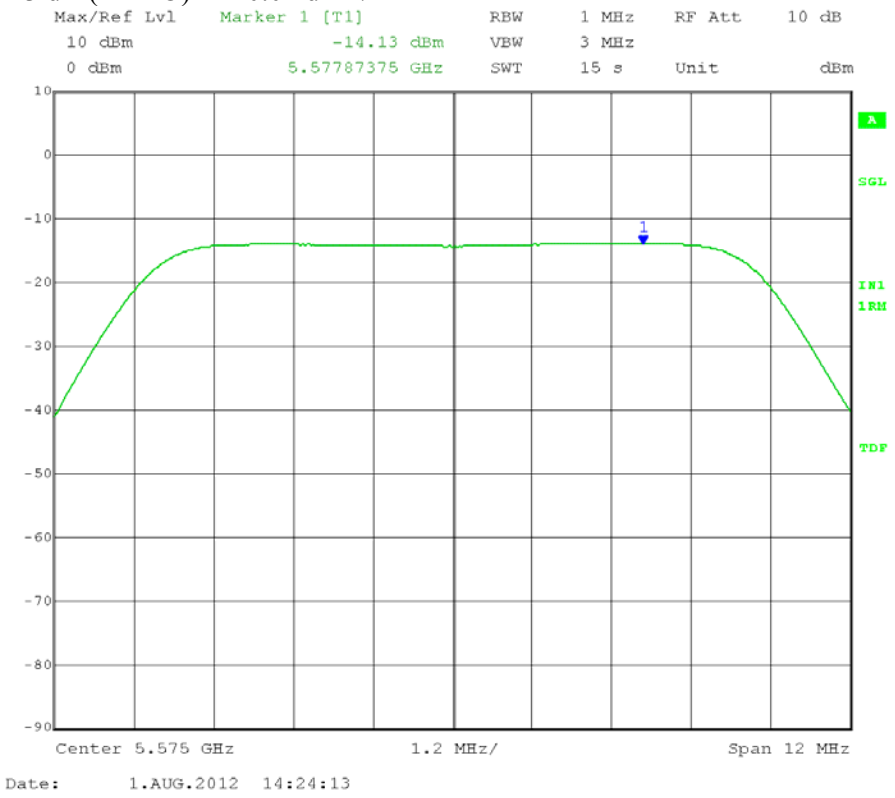
SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz; VBW ≥ 3 MHz
Number of points ≥ 2 x Span/RBW
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal) = 10 x 500 x 28 µs = 0.14 sec
Detector = RMS; Sweep: single sweep
Use peak search to find the peak of the spectrum
Add 10 log (1/x), where x is the duty cycle, to the peak of the spectrum

EUT nominal channel bandwidth:	10 MHz	adi reg 7D	26 dB EBW: 9.72 MHz
Output port:	Channel B;	Mid Channel Frequency:	5.575 GHz
Output power setting:	1;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: 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. Antenna gain = 9 dBi + 18 dBi dish = 27 dBi.
Limit = 11 dBm/MHz – 21 dBi = **-10 dBm/MHz**

MIMO MATRIX A: MIMO with Cross-Polarized antenna (FCC KDB 662911 D02 v01):
Measure and add 10 log(N) dB, where N is the number of outputs.
= 10 log(2) = 3 dB

PPSD = -14.13 dBm/MHz + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) + 3 dB (MIMO) = -10.04 dBm/MHz



Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Peak Power Spectral Density (PPSD) – Conducted
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section E – Peak power spectral density (using Output Power method SA-2 Alternative)
Operator: Craig B

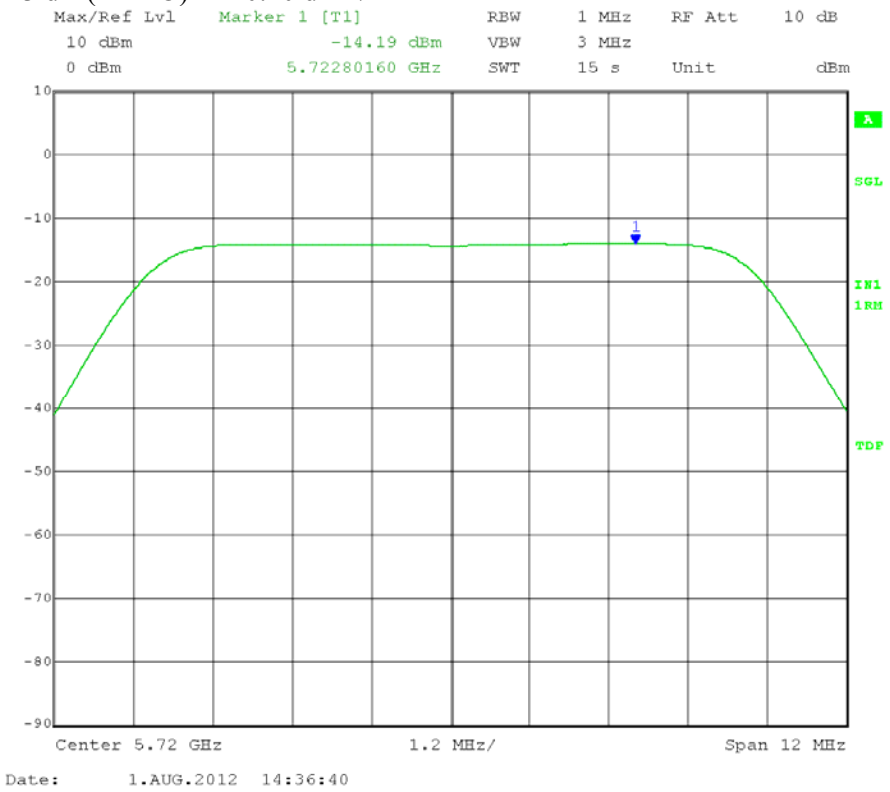
SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz; VBW ≥ 3 MHz
Number of points ≥ 2 x Span/RBW
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal) = 10 x 500 x 28 µs = 0.14 sec
Detector = RMS; Sweep: single sweep
Use peak search to find the peak of the spectrum
Add 10 log (1/x), where x is the duty cycle, to the peak of the spectrum

EUT nominal channel bandwidth:	10 MHz	adi reg 7F	26 dB EBW: 9.72 MHz
Output port:	Channel B;	High Channel Frequency:	5.720 GHz
Output power setting:	1;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: 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. Antenna gain = 9 dBi + 18 dBi dish = 27 dBi.
Limit = 11 dBm/MHz – 21 dBi = **-10 dBm/MHz**

MIMO MATRIX A: MIMO with Cross-Polarized antenna (FCC KDB 662911 D02 v01):
Measure and add 10 log(N) dB, where N is the number of outputs.
= 10 log(2) = 3 dB

PPSD = -14.19 dBm/MHz + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) + 3 dB (MIMO) = -10.10 dBm/MHz



Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Peak Power Spectral Density (PPSD) – Conducted
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section E – Peak power spectral density (using Output Power method SA-2 Alternative)
Operator: Craig B

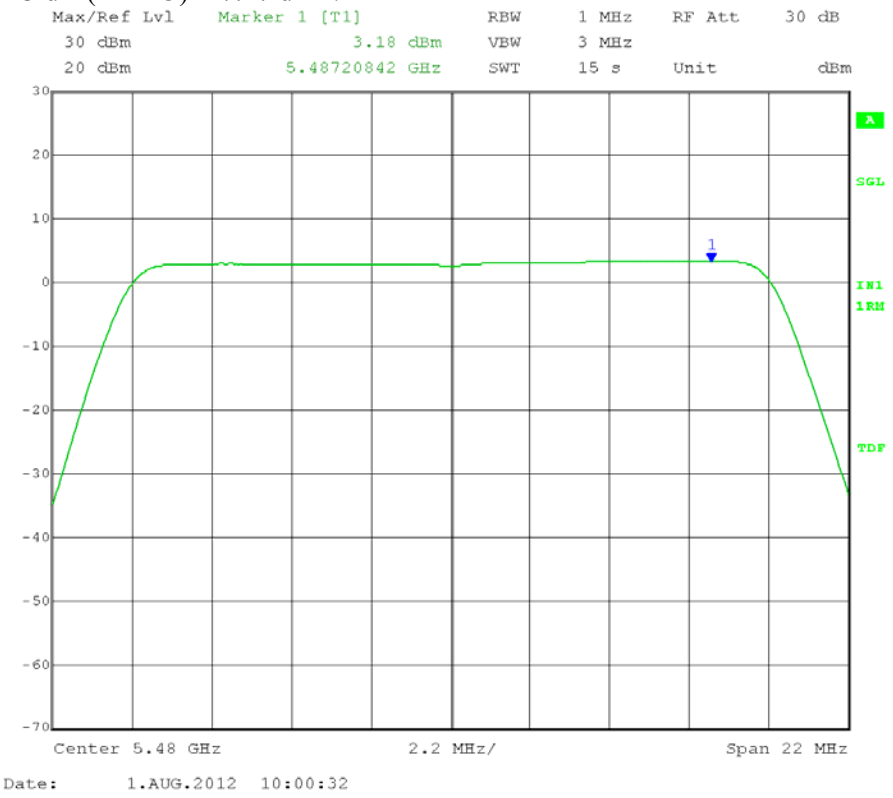
SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz; VBW ≥ 3 MHz
Number of points ≥ 2 x Span/RBW
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal)
= 10 x 500 x 56 µs = 0.28 sec
Detector = RMS; Sweep: single sweep
Use peak search to find the peak of the spectrum
Add 10 log (1/x), where x is the duty cycle, to the peak of the spectrum

EUT nominal channel bandwidth:	20 MHz	adi reg 24	26 dB EBW: 19.44 MHz
Output port:	Channel A;	Low Channel Frequency:	5.480 GHz
Output power setting:	19;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: 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. Antenna gain = 9 dBi. Limit = 11 dBm/MHz – 3 dBi
= **8 dBm/MHz**

MIMO MATRIX A: MIMO with Cross-Polarized antenna (FCC KDB 662911 D02 v01):
Measure and add 10 log(N) dB, where N is the number of outputs.
= 10 log(2) = 3 dB

PPSD = 3.18 dBm/MHz + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) + 3 dB (MIMO) = 7.27 dBm/MHz



Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Peak Power Spectral Density (PPSD) – Conducted
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section E – Peak power spectral density (using Output Power method SA-2 Alternative)
Operator: Craig B

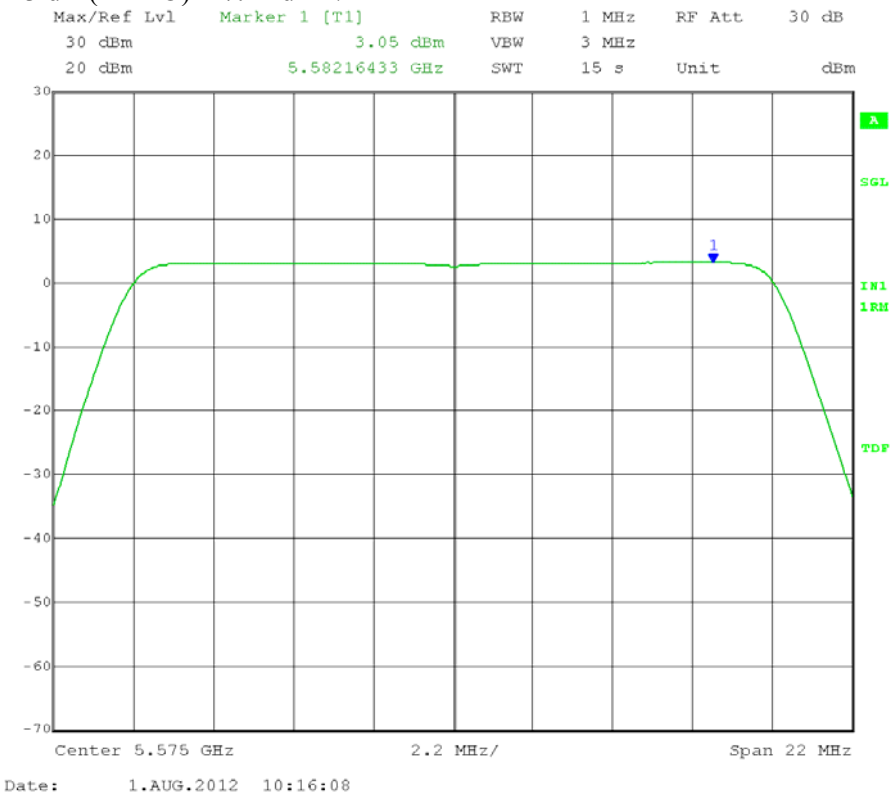
SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz; VBW ≥ 3 MHz
Number of points ≥ 2 x Span/RBW
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal)
= 10 x 500 x 56 µs = 0.28 sec
Detector = RMS; Sweep: single sweep
Use peak search to find the peak of the spectrum
Add 10 log (1/x), where x is the duty cycle, to the peak of the spectrum

EUT nominal channel bandwidth:	20 MHz	adi reg 2B	26 dB EBW: 19.44 MHz
Output port:	Channel A;	Mid Channel Frequency:	5.575 GHz
Output power setting:	19;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: 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. Antenna gain = 9 dBi. Limit = 11 dBm/MHz – 3 dBi
= **8 dBm/MHz**

MIMO MATRIX A: MIMO with Cross-Polarized antenna (FCC KDB 662911 D02 v01):
Measure and add 10 log(N) dB, where N is the number of outputs.
= 10 log(2) = 3 dB

PPSD = 3.05 dBm/MHz + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) + 3 dB (MIMO) = 7.14 dBm/MHz



Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Peak Power Spectral Density (PPSD) – Conducted
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section E – Peak power spectral density (using Output Power method SA-2 Alternative)
Operator: Craig B

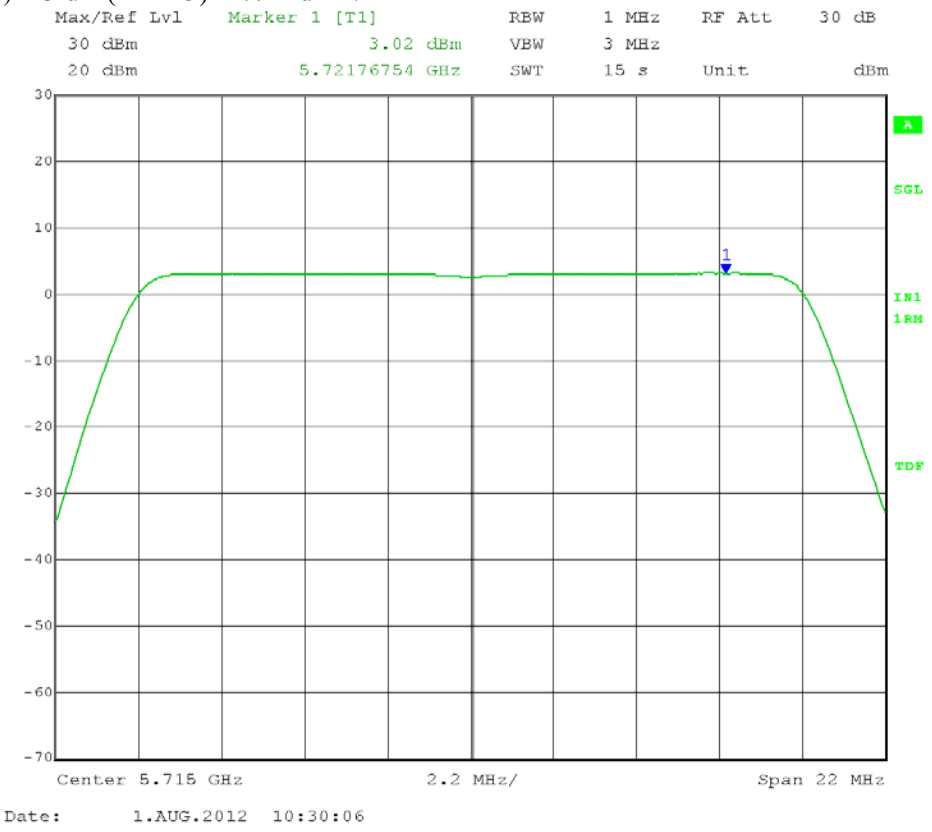
SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz; VBW ≥ 3 MHz
Number of points ≥ 2 x Span/RBW
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal)
= 10 x 500 x 56 µs = 0.28 sec
Detector = RMS; Sweep: single sweep
Use peak search to find the peak of the spectrum
Add 10 log (1/x), where x is the duty cycle, to the peak of the spectrum

EUT nominal channel bandwidth:	20 MHz	adi reg 2E	26 dB EBW: 19.44 MHz
Output port:	Channel A;	High Channel Frequency:	5.715 GHz
Output power setting:	19;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: 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. Antenna gain = 9 dBi. Limit = 11 dBm/MHz – 3 dBi
= **8 dBm/MHz**

MIMO MATRIX A: MIMO with Cross-Polarized antenna (FCC KDB 662911 D02 v01):
Measure and add 10 log(N) dB, where N is the number of outputs.
= 10 log(2) = 3 dB

PPSD = 3.02 dBm/MHz + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) + 3 dB (MIMO) = 7.11 dBm/MHz



Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Peak Power Spectral Density (PPSD) – Conducted
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section E – Peak power spectral density (using Output Power method SA-2 Alternative)
Operator: Craig B

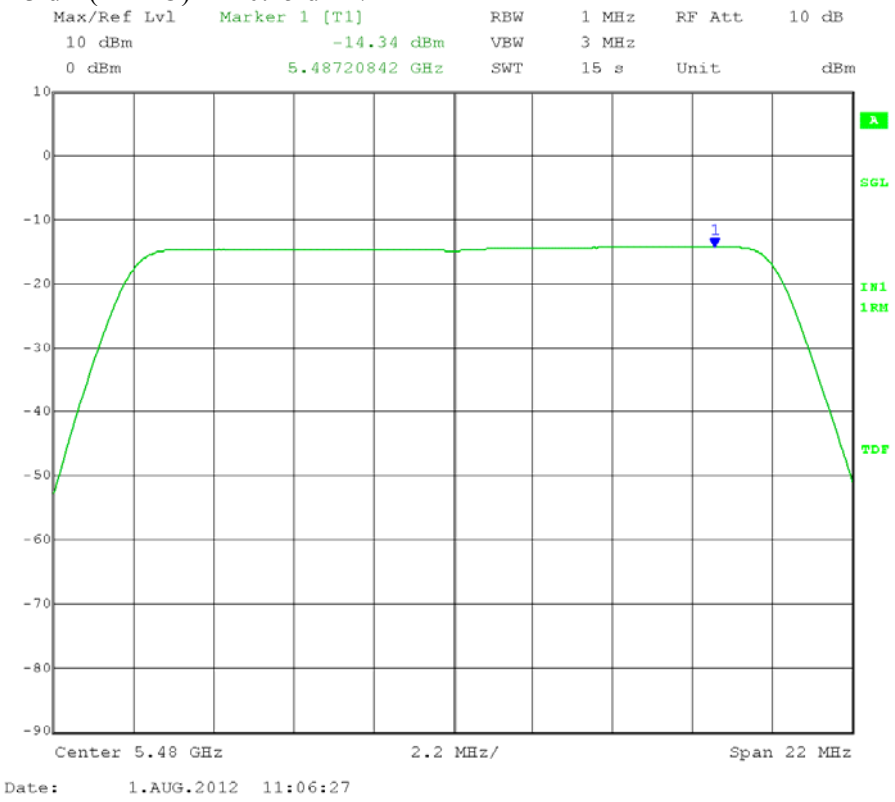
SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz; VBW ≥ 3 MHz
Number of points ≥ 2 x Span/RBW
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal)
= 10 x 500 x 56 µs = 0.28 sec
Detector = RMS; Sweep: single sweep
Use peak search to find the peak of the spectrum
Add 10 log (1/x), where x is the duty cycle, to the peak of the spectrum

EUT nominal channel bandwidth:	20 MHz	adi reg 6B	26 dB EBW: 19.44 MHz
Output port:	Channel A;	Low Channel Frequency:	5.480 GHz
Output power setting:	1;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: 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. Antenna gain = 9 dBi + 18 dBi dish = 27 dBi.
Limit = 11 dBm/MHz – 21 dBi = **-10 dBm/MHz**

MIMO MATRIX A: MIMO with Cross-Polarized antenna (FCC KDB 662911 D02 v01):
Measure and add 10 log(N) dB, where N is the number of outputs.
= 10 log(2) = 3 dB

PPSD = -14.34 dBm/MHz + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) + 3 dB (MIMO) = -10.25 dBm/MHz



Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Peak Power Spectral Density (PPSD) – Conducted
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section E – Peak power spectral density (using Output Power method SA-2 Alternative)
Operator: Craig B

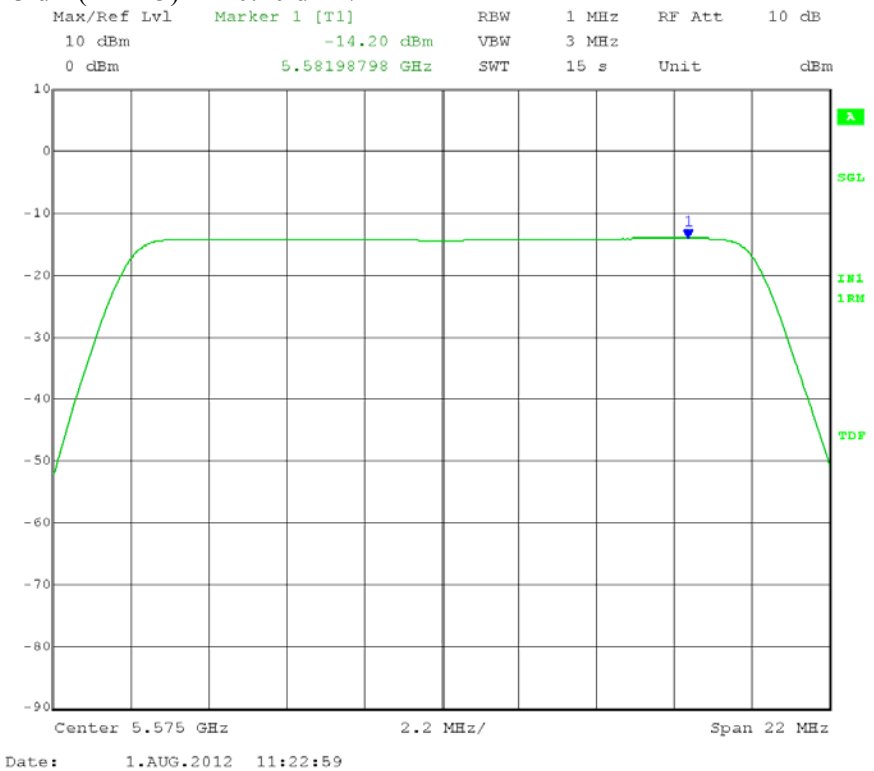
SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz; VBW ≥ 3 MHz
Number of points ≥ 2 x Span/RBW
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal)
= 10 x 500 x 56 µs = 0.28 sec
Detector = RMS; Sweep: single sweep
Use peak search to find the peak of the spectrum
Add 10 log (1/x), where x is the duty cycle, to the peak of the spectrum

EUT nominal channel bandwidth:	20 MHz	adi reg 71	26 dB EBW: 19.44 MHz
Output port:	Channel A;	Mid Channel Frequency:	5.575 GHz
Output power setting:	1;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: 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. Antenna gain = 9 dBi + 18 dBi dish = 27 dBi.
Limit = 11 dBm/MHz – 21 dBi = **-10 dBm/MHz**

MIMO MATRIX A: MIMO with Cross-Polarized antenna (FCC KDB 662911 D02 v01):
Measure and add 10 log(N) dB, where N is the number of outputs.
= 10 log(2) = 3 dB

PPSD = -14.20 dBm/MHz + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) + 3 dB (MIMO) = -10.20 dBm/MHz



Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Peak Power Spectral Density (PPSD) – Conducted
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section E – Peak power spectral density (using Output Power method SA-2 Alternative)
Operator: Craig B

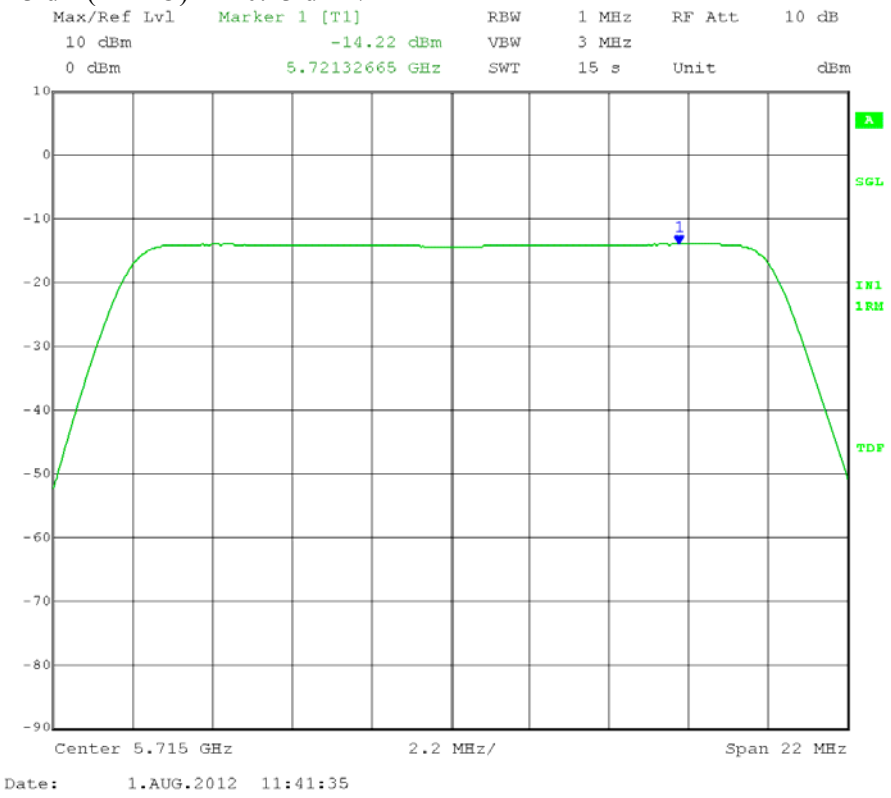
SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz; VBW ≥ 3 MHz
Number of points ≥ 2 x Span/RBW
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal)
= 10 x 500 x 56 µs = 0.28 sec
Detector = RMS; Sweep: single sweep
Use peak search to find the peak of the spectrum
Add 10 log (1/x), where x is the duty cycle, to the peak of the spectrum

EUT nominal channel bandwidth:	20 MHz	adi reg 74	26 dB EBW: 19.44 MHz
Output port:	Channel A;	High Channel Frequency:	5.715 GHz
Output power setting:	1;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: 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. Antenna gain = 9 dBi + 18 dBi dish = 27 dBi.
Limit = 11 dBm/MHz – 21 dBi = **-10 dBm/MHz**

MIMO MATRIX A: MIMO with Cross-Polarized antenna (FCC KDB 662911 D02 v01):
Measure and add 10 log(N) dB, where N is the number of outputs.
= 10 log(2) = 3 dB

PPSD = -14.22 dBm/MHz + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) + 3 dB (MIMO) = -10.13 dBm/MHz



Test Date: 07-31-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Peak Power Spectral Density (PPSD) – Conducted
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section E – Peak power spectral density (using Output Power method SA-2 Alternative)
Operator: Craig B

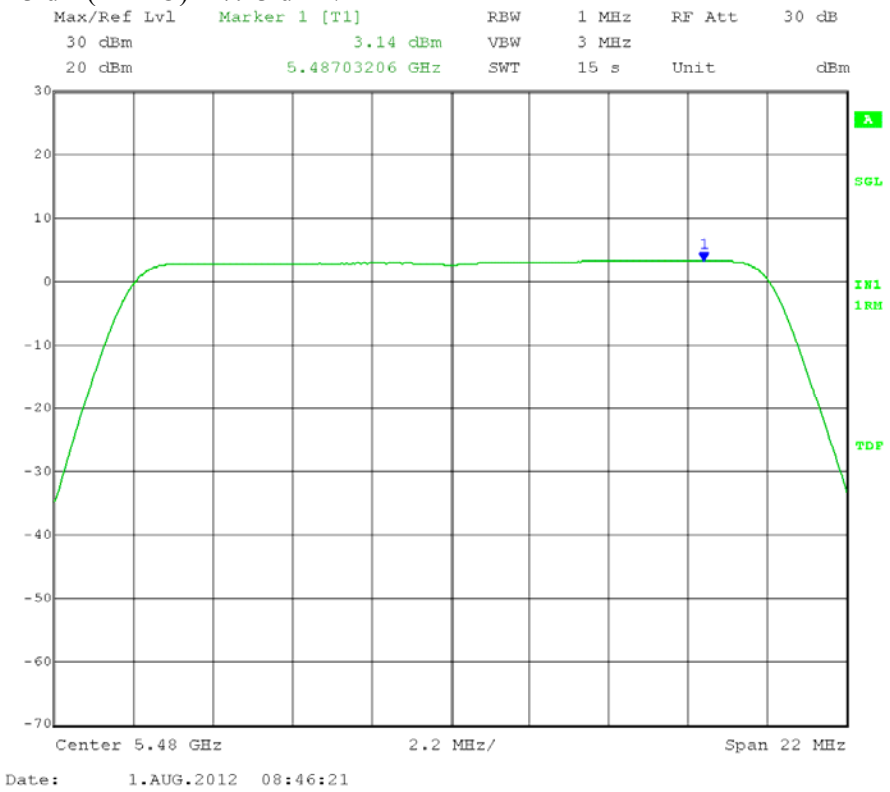
SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz; VBW ≥ 3 MHz
Number of points ≥ 2 x Span/RBW
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal)
= 10 x 500 x 56 µs = 0.28 sec
Detector = RMS; Sweep: single sweep
Use peak search to find the peak of the spectrum
Add 10 log (1/x), where x is the duty cycle, to the peak of the spectrum

EUT nominal channel bandwidth:	20 MHz	adi reg 28	26 dB EBW: 19.44 MHz
Output port:	Channel B;	Low Channel Frequency:	5.480 GHz
Output power setting:	19;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: 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. Antenna gain = 9 dBi. Limit = 11 dBm/MHz – 3 dBi = **8 dBm/MHz**

MIMO MATRIX A: MIMO with Cross-Polarized antenna (FCC KDB 662911 D02 v01):
Measure and add 10 log(N) dB, where N is the number of outputs.
= 10 log(2) = 3 dB

PPSD = 3.14 dBm/MHz + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) + 3 dB (MIMO) = 7.23 dBm/MHz



Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Peak Power Spectral Density (PPSD) – Conducted
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section E – Peak power spectral density (using Output Power method SA-2 Alternative)
Operator: Craig B

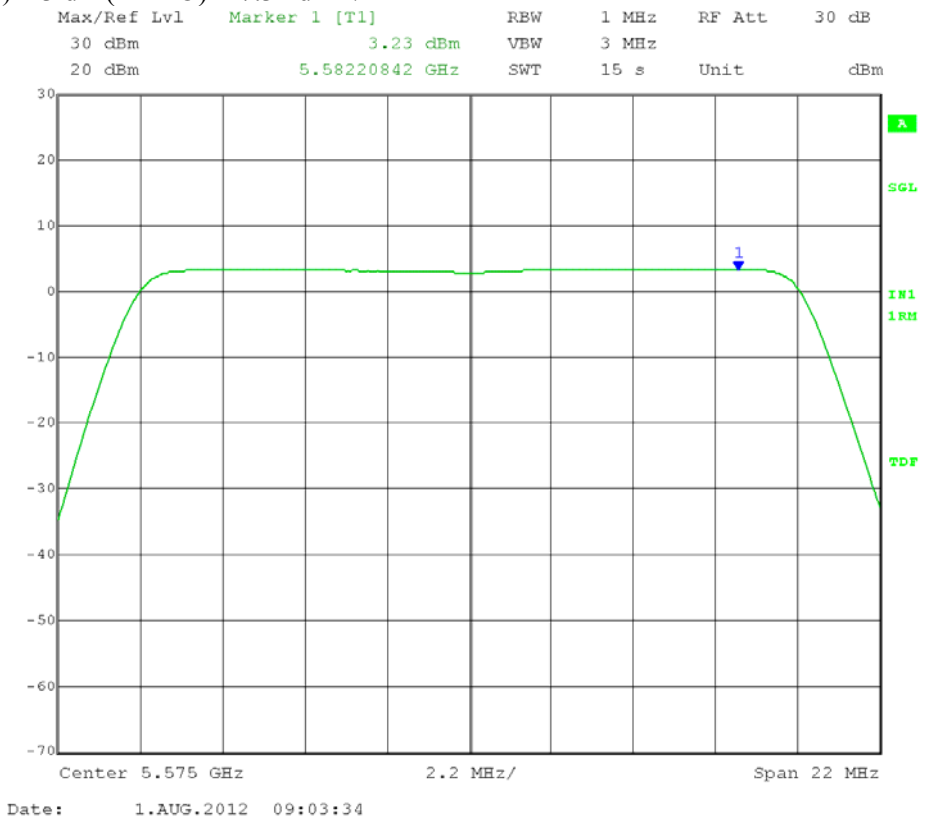
SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz; VBW ≥ 3 MHz
Number of points ≥ 2 x Span/RBW
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal)
= 10 x 500 x 56 µs = 0.28 sec
Detector = RMS; Sweep: single sweep
Use peak search to find the peak of the spectrum
Add 10 log (1/x), where x is the duty cycle, to the peak of the spectrum

EUT nominal channel bandwidth:	20 MHz	adi reg 2C	26 dB EBW: 19.44 MHz
Output port:	Channel B;	Mid Channel Frequency:	5.575 GHz
Output power setting:	19;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: 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. Antenna gain = 9 dBi. Limit = 11 dBm/MHz – 3 dBi
= **8 dBm/MHz**

MIMO MATRIX A: MIMO with Cross-Polarized antenna (FCC KDB 662911 D02 v01):
Measure and add 10 log(N) dB, where N is the number of outputs.
= 10 log(2) = 3 dB

PPSD = 3.23 dBm/MHz + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) + 3 dB (MIMO) = 7.32 dBm/MHz



Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Peak Power Spectral Density (PPSD) – Conducted
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section E – Peak power spectral density (using Output Power method SA-2 Alternative)
Operator: Craig B

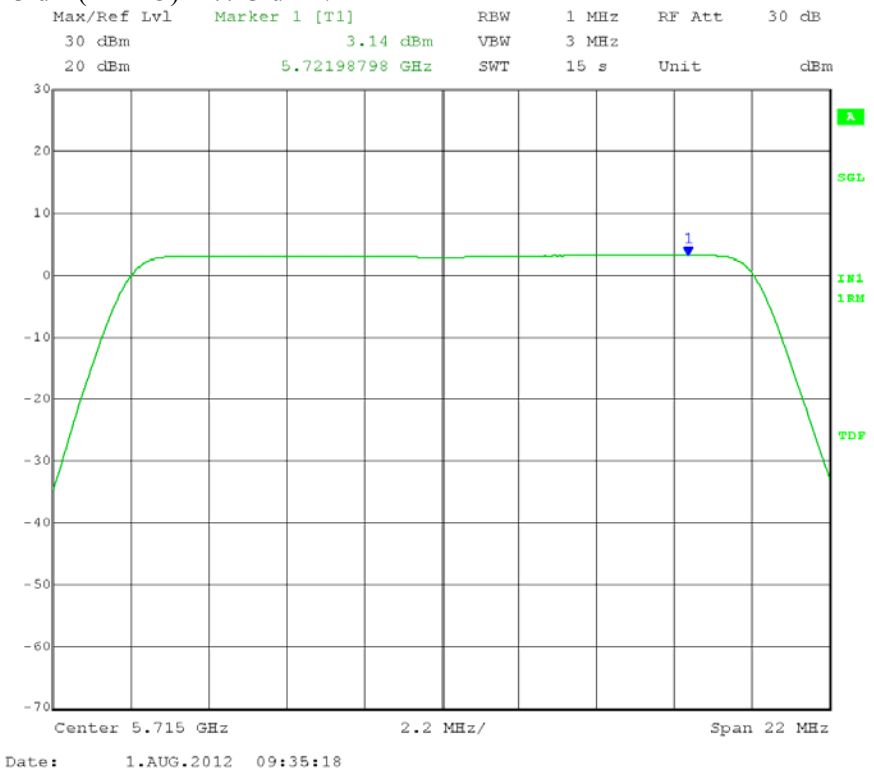
SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz; VBW ≥ 3 MHz
Number of points ≥ 2 x Span/RBW
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal)
= 10 x 500 x 56 µs = 0.28 sec
Detector = RMS; Sweep: single sweep
Use peak search to find the peak of the spectrum
Add 10 log (1/x), where x is the duty cycle, to the peak of the spectrum

EUT nominal channel bandwidth:	20 MHz	adi reg 2D	26 dB EBW: 19.44 MHz
Output port:	Channel B;	High Channel Frequency:	5.715 GHz
Output power setting:	19;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: 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. Antenna gain = 9 dBi. Limit = 11 dBm/MHz – 3 dBi
= **8 dBm/MHz**

MIMO MATRIX A: MIMO with Cross-Polarized antenna (FCC KDB 662911 D02 v01):
Measure and add 10 log(N) dB, where N is the number of outputs.
= 10 log(2) = 3 dB

PPSD = 3.14 dBm/MHz + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) + 3 dB (MIMO) = 7.23 dBm/MHz



Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Peak Power Spectral Density (PPSD) – Conducted
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section E – Peak power spectral density (using Output Power method SA-2 Alternative)
Operator: Craig B

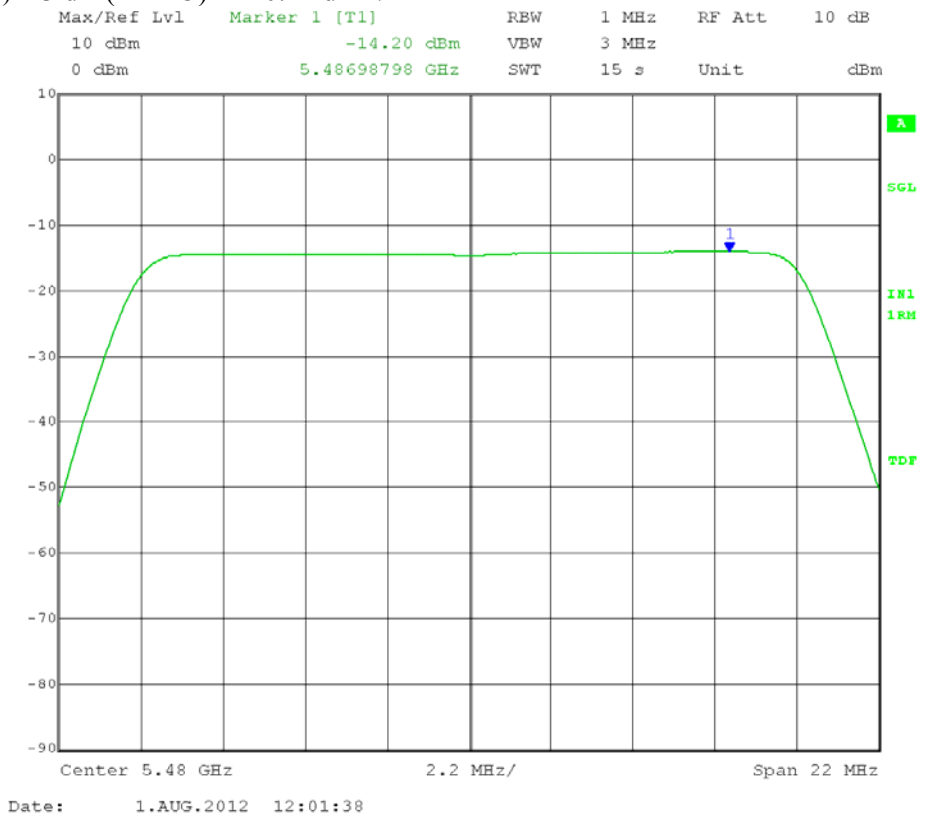
SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz; VBW ≥ 3 MHz
Number of points ≥ 2 x Span/RBW
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal)
= 10 x 500 x 56 µs = 0.28 sec
Detector = RMS; Sweep: single sweep
Use peak search to find the peak of the spectrum
Add 10 log (1/x), where x is the duty cycle, to the peak of the spectrum

EUT nominal channel bandwidth:	20 MHz	adi reg 6D	26 dB EBW: 19.44 MHz
Output port:	Channel B;	Low Channel Frequency:	5.480 GHz
Output power setting:	1;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: 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. Antenna gain = 9 dBi + 18 dBi dish = 27 dBi.
Limit = 11 dBm/MHz – 21 dBi = **-10 dBm/MHz**

MIMO MATRIX A: MIMO with Cross-Polarized antenna (FCC KDB 662911 D02 v01):
Measure and add 10 log(N) dB, where N is the number of outputs.
= 10 log(2) = 3 dB

PPSD = -14.20 dBm/MHz + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) + 3 dB (MIMO) = -10.11 dBm/MHz



Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Peak Power Spectral Density (PPSD) – Conducted
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section E – Peak power spectral density (using Output Power method SA-2 Alternative)
Operator: Craig B

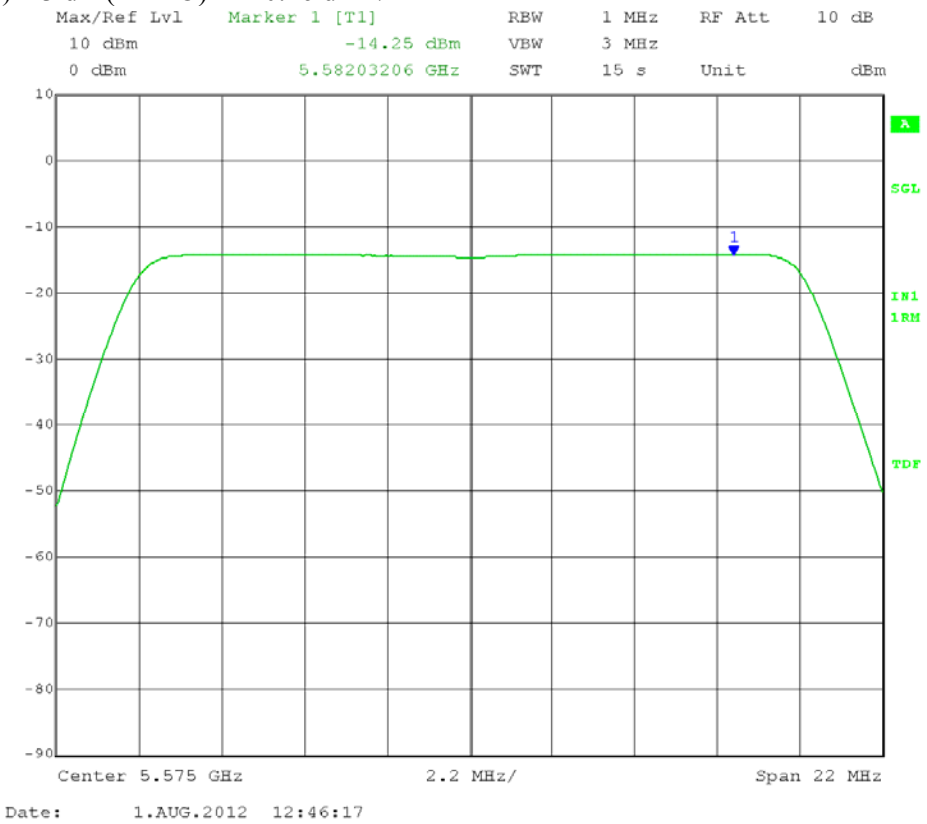
SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz; VBW ≥ 3 MHz
Number of points ≥ 2 x Span/RBW
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal)
= 10 x 500 x 56 µs = 0.28 sec
Detector = RMS; Sweep: single sweep
Use peak search to find the peak of the spectrum
Add 10 log (1/x), where x is the duty cycle, to the peak of the spectrum

EUT nominal channel bandwidth:	20 MHz	adi reg 72	26 dB EBW: 19.44 MHz
Output port:	Channel B;	Mid Channel Frequency:	5.575 GHz
Output power setting:	1;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: 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. Antenna gain = 9 dBi + 18 dBi dish = 27 dBi.
Limit = 11 dBm/MHz – 21 dBi = **-10 dBm/MHz**

MIMO MATRIX A: MIMO with Cross-Polarized antenna (FCC KDB 662911 D02 v01):
Measure and add 10 log(N) dB, where N is the number of outputs.
= 10 log(2) = 3 dB

PPSD = -14.25 dBm/MHz + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) + 3 dB (MIMO) = -10.16 dBm/MHz



Test Date: 08-01-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Peak Power Spectral Density (PPSD) – Conducted
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section E – Peak power spectral density (using Output Power method SA-2 Alternative)
Operator: Craig B

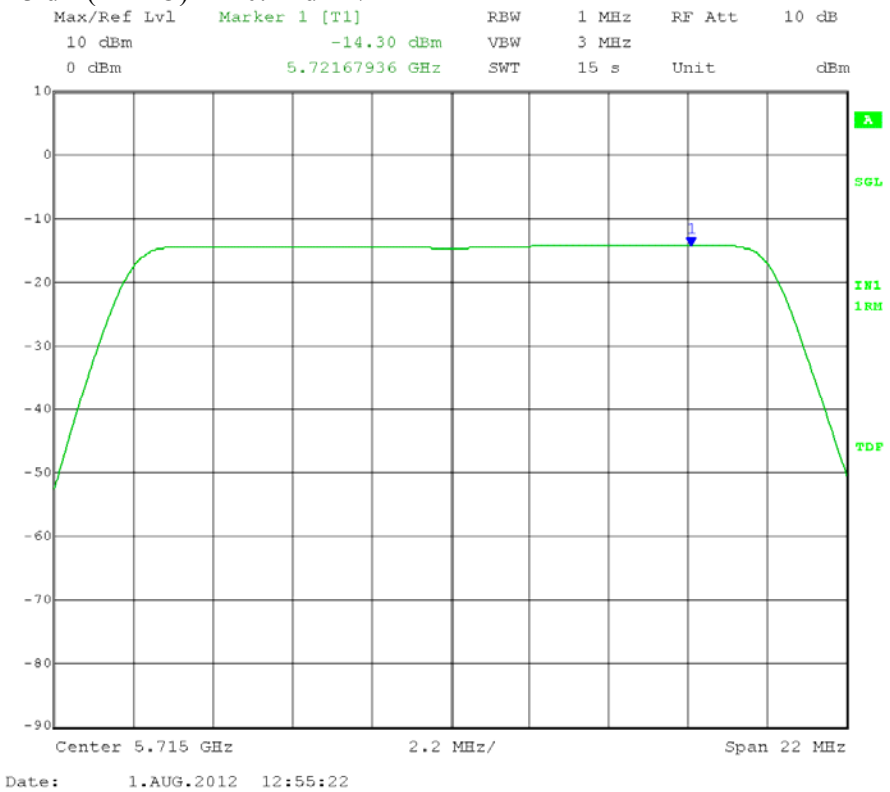
SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz; VBW ≥ 3 MHz
Number of points ≥ 2 x Span/RBW
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal)
= 10 x 500 x 56 µs = 0.28 sec
Detector = RMS; Sweep: single sweep
Use peak search to find the peak of the spectrum
Add 10 log (1/x), where x is the duty cycle, to the peak of the spectrum

EUT nominal channel bandwidth:	20 MHz	adi reg 74	26 dB EBW: 19.44 MHz
Output port:	Channel B;	High Channel Frequency:	5.715 GHz
Output power setting:	1;	Modulation Type:	QPSK

Limit: [15.407(a)(2)]: 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. Antenna gain = 9 dBi + 18 dBi dish = 27 dBi.
Limit = 11 dBm/MHz – 21 dBi = **-10 dBm/MHz**

MIMO MATRIX A: MIMO with Cross-Polarized antenna (FCC KDB 662911 D02 v01):
Measure and add 10 log(N) dB, where N is the number of outputs.
= 10 log(2) = 3 dB

PPSD = -14.30 dBm/MHz + 1.0 dB for Cambium Networks connectorized cable + 10 log (1 / 0.98 duty cycle) + 3 dB (MIMO) = -10.21 dBm/MHz



Appendix A – Measurement Data

A4.0 Peak Excursion - Conducted

Rule Section: Section 15.407(a)(6)

Test Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01 – *Guidance for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E*

Section F – Peak excursion measurement

Description:
SPAN: set to encompass entire emission bandwidth
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points ≥ 2 x Span/RBW
Sweep time: set ≥ 10 x (number of points in sweep) x (total on/off period of transmitted signal)
Detector = RMS
Sweep: single sweep
Use peak search to find the peak of the spectrum
Save trace

Turn on 2nd trace
Detector = peak
Trace mode = max-hold
Use peak search to find the peak of the spectrum
Compare the ratio of the maximum of the peak-max-hold trace to the maximum value of the RMS trace

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

Results: Passed

Notes: Measurements were taken for QPSK modulation, at the lowest, middle, and highest channels of operation. EUT was set to transmit continuously with 98% duty cycle.

Test Date: 10-04-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Peak Excursion – conducted
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section F – Peak excursion measurement
Operator: Craig B

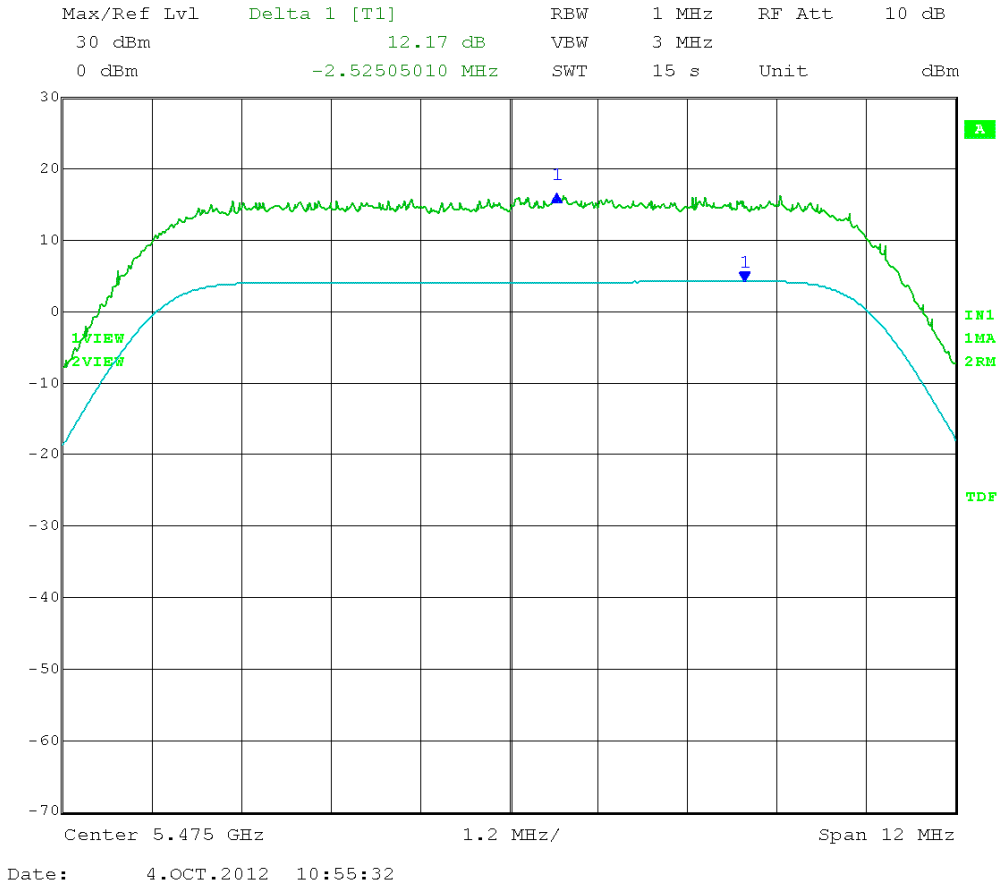
RBW = 1MHz; VBW ≥ RBW
Detector = Peak/Average; Trace mode = max hold

EUT nominal channel bandwidth: 10 MHz adi reg 3A
Output port: Channel A; Low Channel Frequency: 5.475 GHz
Output power setting: 19; Modulation Type: QPSK
FPGA reg: 10F8 0

Limit: [15.407(a)(6)]: Ratio of the peak excursion of the modulation envelope to the maximum conducted output power shall not exceed **13 dB** across any 1 MHz bandwidth.

Green trace = Peak
Blue trace = Average

Peak excursion = 12.17 dB



Test Date: 10-04-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Peak Excursion – conducted
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section F – Peak excursion measurement
Operator: Craig B

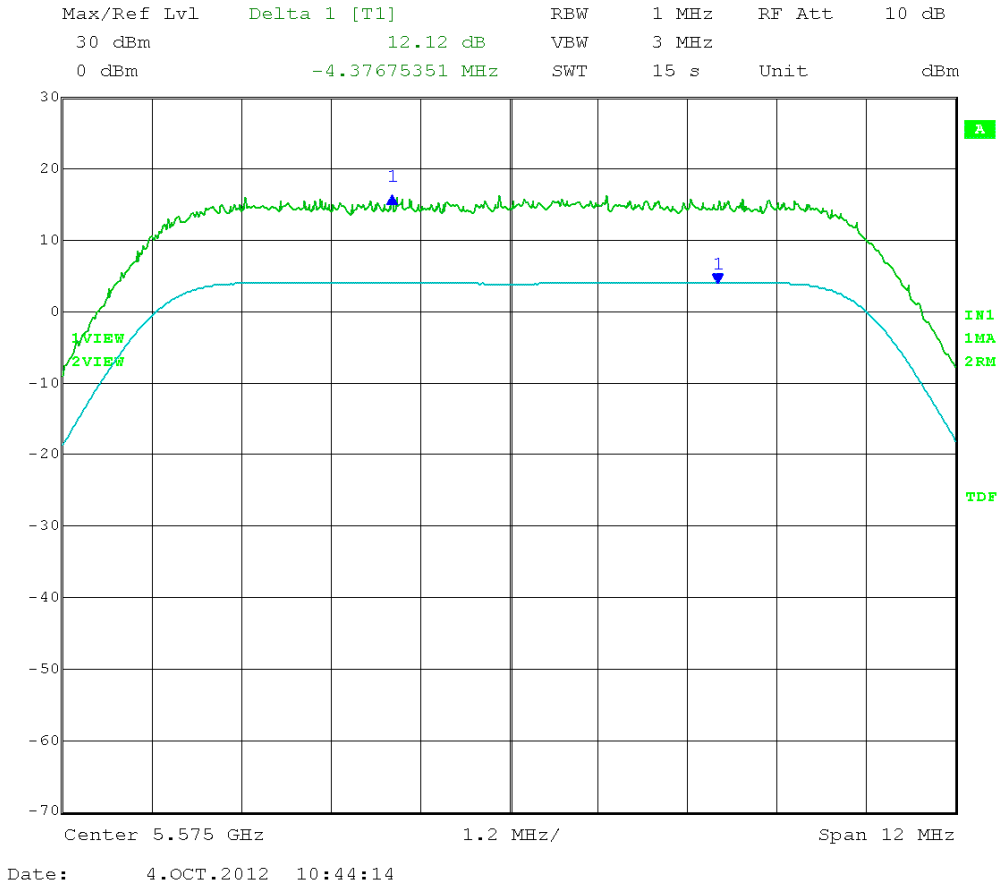
RBW = 1MHz; VBW ≥ RBW
Detector = Peak/Average; Trace mode = max hold

EUT nominal channel bandwidth: 10 MHz adi reg 42
Output port: Channel A; Mid Channel Frequency: 5.575 GHz
Output power setting: 19; Modulation Type: QPSK
FPGA reg: 10F8 0

Limit: [15.407(a)(6)]: Ratio of the peak excursion of the modulation envelope to the maximum conducted output power shall not exceed **13 dB** across any 1 MHz bandwidth.

Green trace = Peak
Blue trace = Average

Peak excursion = 12.12 dB



Test Date: 10-04-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Peak Excursion – conducted
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section F – Peak excursion measurement
Operator: Craig B

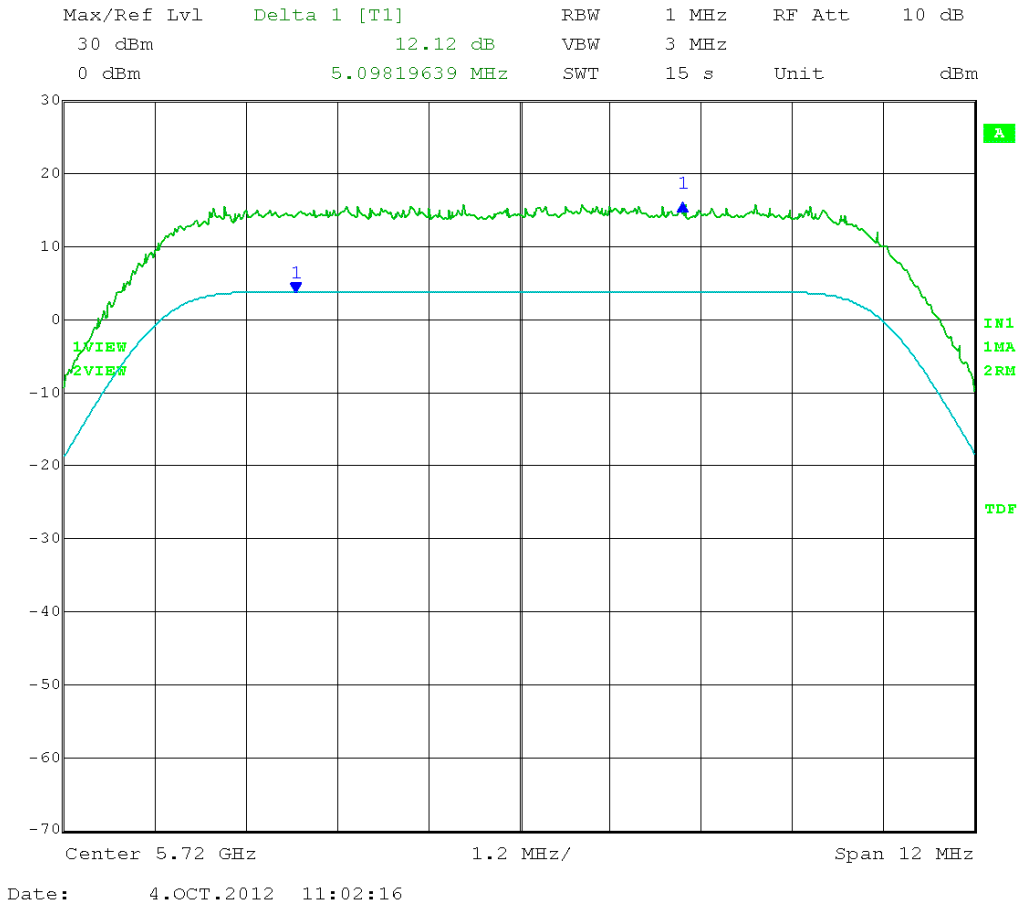
RBW = 1MHz; VBW ≥ RBW
Detector = Peak/Average; Trace mode = max hold

EUT nominal channel bandwidth: 10 MHz adi reg 46
Output port: Channel A; High Channel Frequency: 5.720 GHz
Output power setting: 19; Modulation Type: QPSK
FPGA reg: 10F8 0

Limit: [15.407(a)(6)]: Ratio of the peak excursion of the modulation envelope to the maximum conducted output power shall not exceed **13 dB** across any 1 MHz bandwidth.

Green trace = Peak
Blue trace = Average

Peak excursion = 12.12 dB



Test Date: 10-04-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Peak Excursion – conducted
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section F – Peak excursion measurement
Operator: Craig B

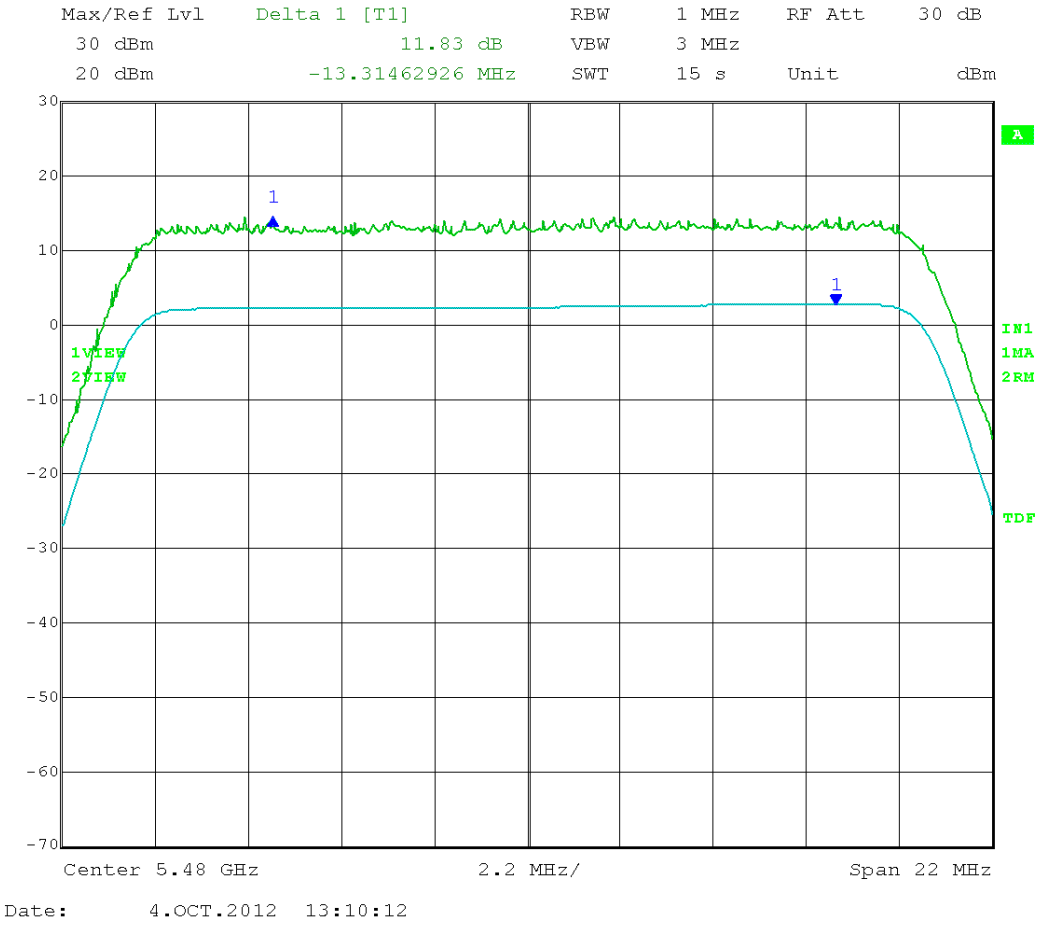
RBW = 1MHz; VBW ≥ RBW
Detector = Peak/Average; Trace mode = max hold

EUT nominal channel bandwidth: 20 MHz adi reg 36
Output port: Channel A; Low Channel Frequency: 5.480 GHz
Output power setting: 19; Modulation Type: QPSK
FPGA reg: 10F8 0

Limit: [15.407(a)(6)]: Ratio of the peak excursion of the modulation envelope to the maximum conducted output power shall not exceed **13 dB** across any 1 MHz bandwidth.

Green trace = Peak
Blue trace = Average

Peak excursion = 11.83 dB



Test Date: 10-04-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Peak Excursion – conducted
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section F – Peak excursion measurement
Operator: Craig B

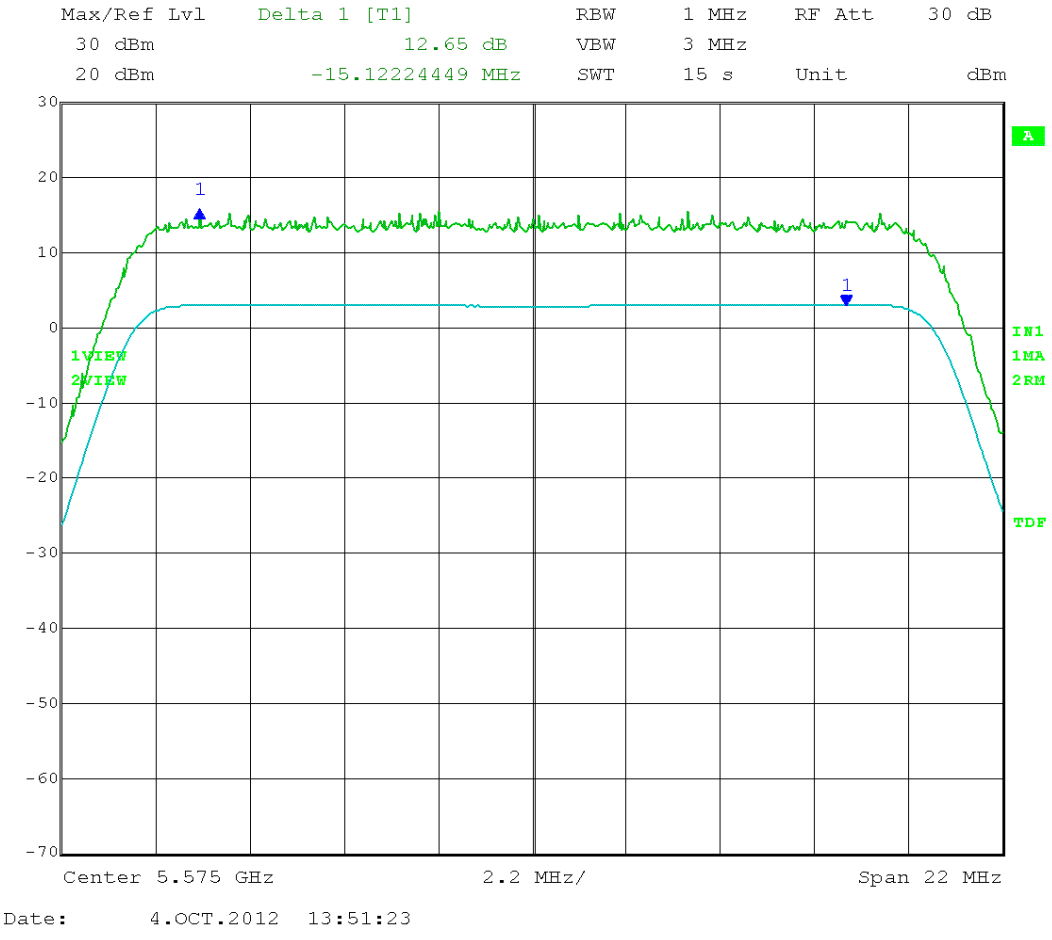
RBW = 1MHz; VBW ≥ RBW
Detector = Peak/Average; Trace mode = max hold

EUT nominal channel bandwidth: 20 MHz adi reg 3A
Output port: Channel A; Mid Channel Frequency: 5.575 GHz
Output power setting: 19; Modulation Type: QPSK
FPGA reg: 10F8 0

Limit: [15.407(a)(6)]: Ratio of the peak excursion of the modulation envelope to the maximum conducted output power shall not exceed **13 dB** across any 1 MHz bandwidth.

Green trace = Peak
Blue trace = Average

Peak excursion = 12.65 dB



Test Date: 10-04-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO SN: 0A003EA000C4
Test: Peak Excursion – conducted
Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01
Section F – Peak excursion measurement
Operator: Craig B

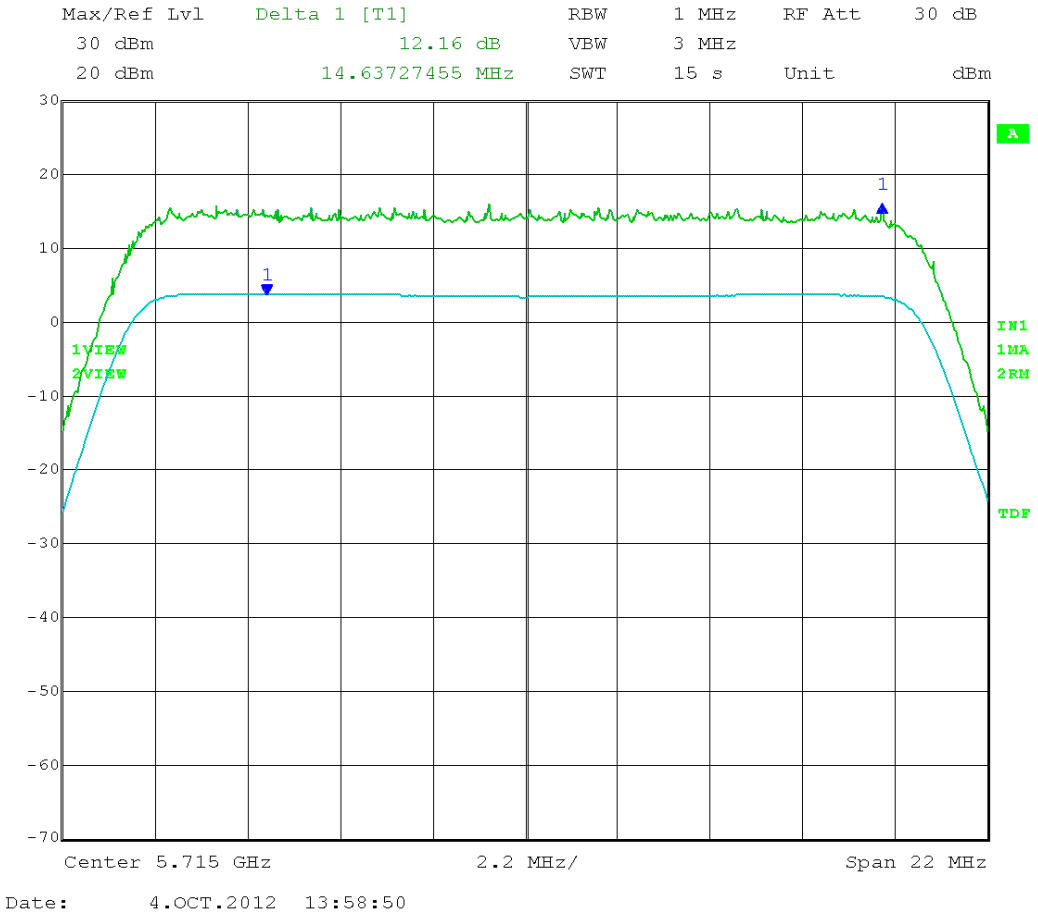
RBW = 1MHz; VBW ≥ RBW
Detector = Peak/Average; Trace mode = max hold

EUT nominal channel bandwidth: 20 MHz adi reg 3A
Output port: Channel A; High Channel Frequency: 5.715 GHz
Output power setting: 19; Modulation Type: QPSK
FPGA reg: 10F8 0

Limit: [15.407(a)(6)]: Ratio of the peak excursion of the modulation envelope to the maximum conducted output power shall not exceed **13 dB** across any 1 MHz bandwidth.

Green trace = Peak
Blue trace = Average

Peak excursion = 12.16 dB



Appendix A – Measurement Data

A5.0 Unwanted Emission Levels – Radiated Band-Edge

Radiated from Antenna and Cabinet

Rule Section: Sections 15.407(b)(3) and 15.407(b)(5)

Test Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01 – *Guidance for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E*

Section G(3)(d): Marker-delta method
Section G(5): Peak Unwanted Emissions Measurements Above 1000 MHz

Description: For emissions that fall within 2 MHz from the band edge

Measure the maximum in-band emission level as specified in G(5)
Measure the band-edge emission level using the following settings
Span set to encompass both peak in-band and band edge emission
RBW = 1% to 5% of span*
VBW ≥ RBW
Detector = peak
Trace mode = max hold
Sweep mode = auto
Measure the amplitude difference between the peak of the fundamental and the band-edge level
Subtract this difference from the maximum in-band field strength level

Limit: Lower band edge: EIRP of -27 dBm/MHz; FCC 15.407(b)(3)
Upper band edge: EIRP of -17 dBm/MHz; FCC 15.407(b)(4)**

**Per FCC KDB 644545 D01 Guidance for IEEE 802.11ac v01, Composite transmissions involving both rule parts must satisfy the higher of the out-of-band and spurious limits among the two rule sections.

Results: Passed

Notes: Measurements were taken for QPSK at the lowest and highest channels of operation. EUT was set to transmit continuously with 98% duty cycle.

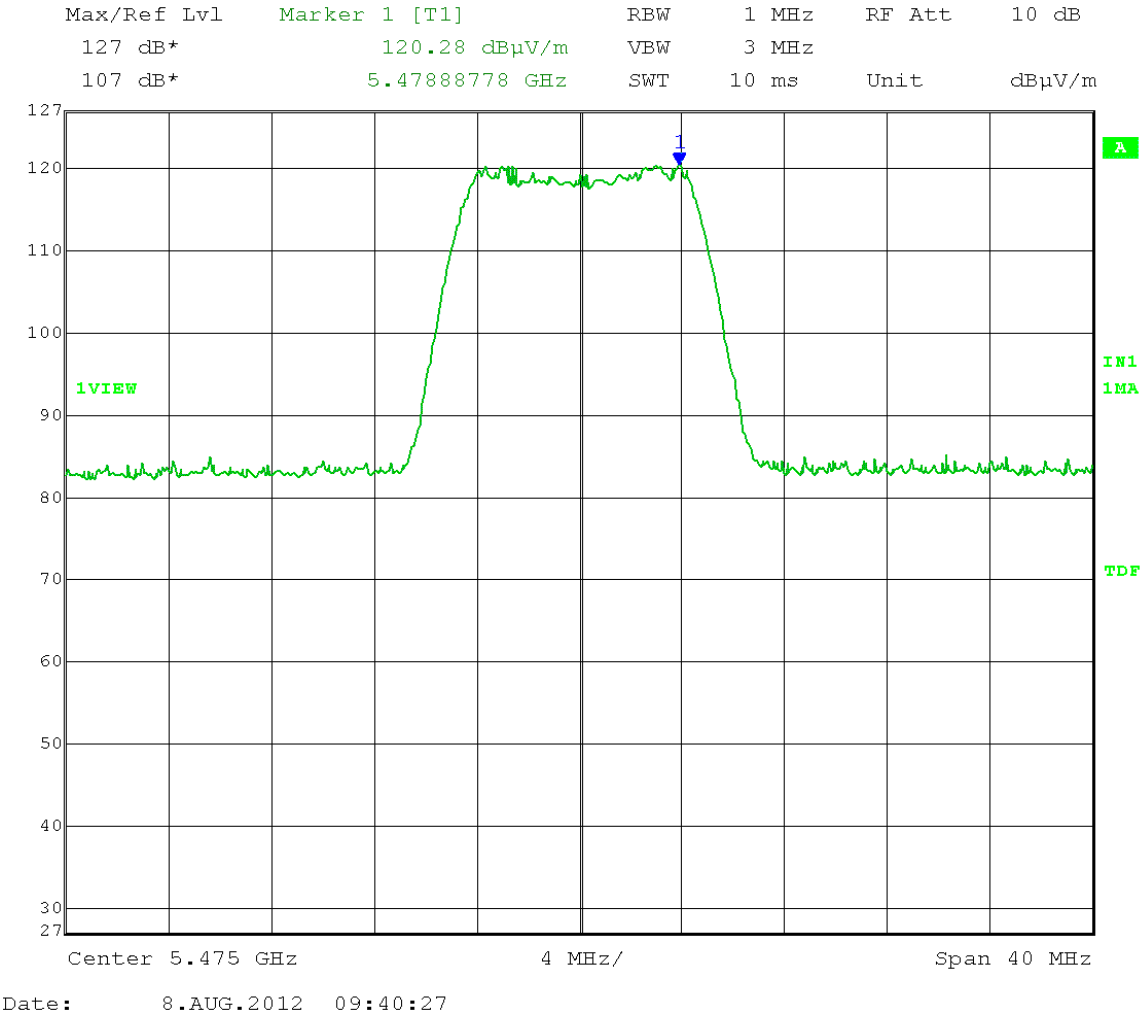
*It was necessary to set the RBW lower than 1% of span in order to achieve he noise floor and dynamic range required to take this measurement.

Test Date: 08-08-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter Band-Edge Emission – Radiated with patch antenna
Operator: Craig B

EUT nominal channel bandwidth:	10 MHz	adi reg Ch A 22	adi reg Ch B 2B
Output port:	Channel A and B;	Low Channel Frequency:	5.475 GHz
Output power setting:	19;	Modulation Type:	QPSK

Lower Band-edge frequency: 5470 MHz
Both transmit chains active.
Polarization: Horizontal
Test distance: 3 meters; receive antenna height: 1.50 meters; table rotation: 10 degrees
EIRP Limit: **-27** dBm/MHz (FCC 15.407(b)(3))

Measurement of Fundamental:



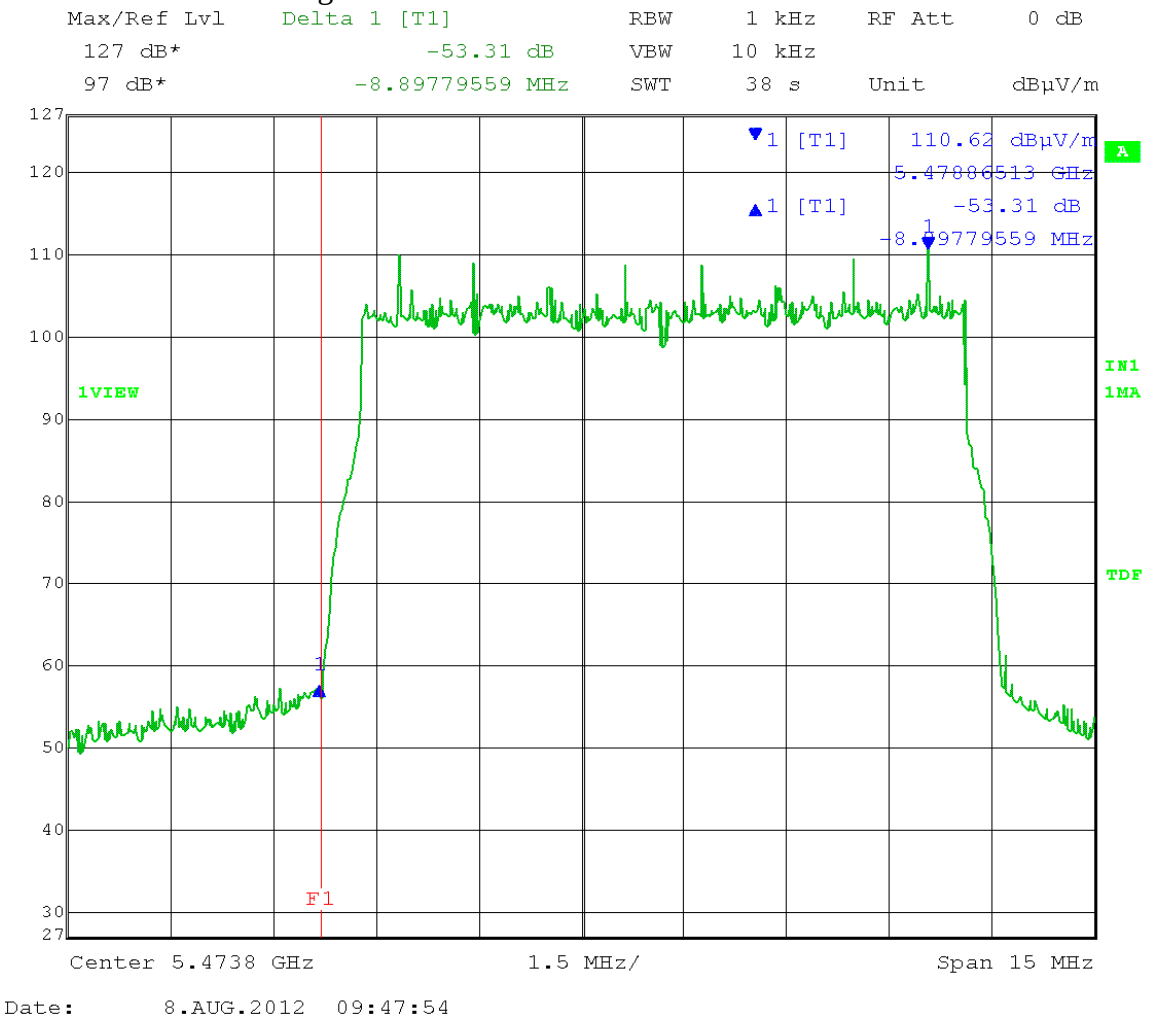
Calculated EIRP of fundamental = 120.28 dBµV/m + 20 log (3 meters) -104.77
= 25.05 dBm

Test Date: 08-08-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter Band-Edge Emission – Radiated with antenna
Operator: Craig B

EUT nominal channel bandwidth:	10 MHz	adi reg Ch A 22	adi reg Ch B 2B
Output port:	Channel A and B;	Low Channel Frequency:	5.475 GHz
Output power setting:	19;	Modulation Type:	QPSK

Lower Band-edge frequency: 5470 MHz
Both transmit chains active.
Polarization: Horizontal
Test distance: 3 meters; receive antenna height: 1.50 meters; table rotation: 10 degrees
EIRP Limit: **-27** dBm/MHz (FCC 15.407(b)(3))

Delta-Marker at band edge:



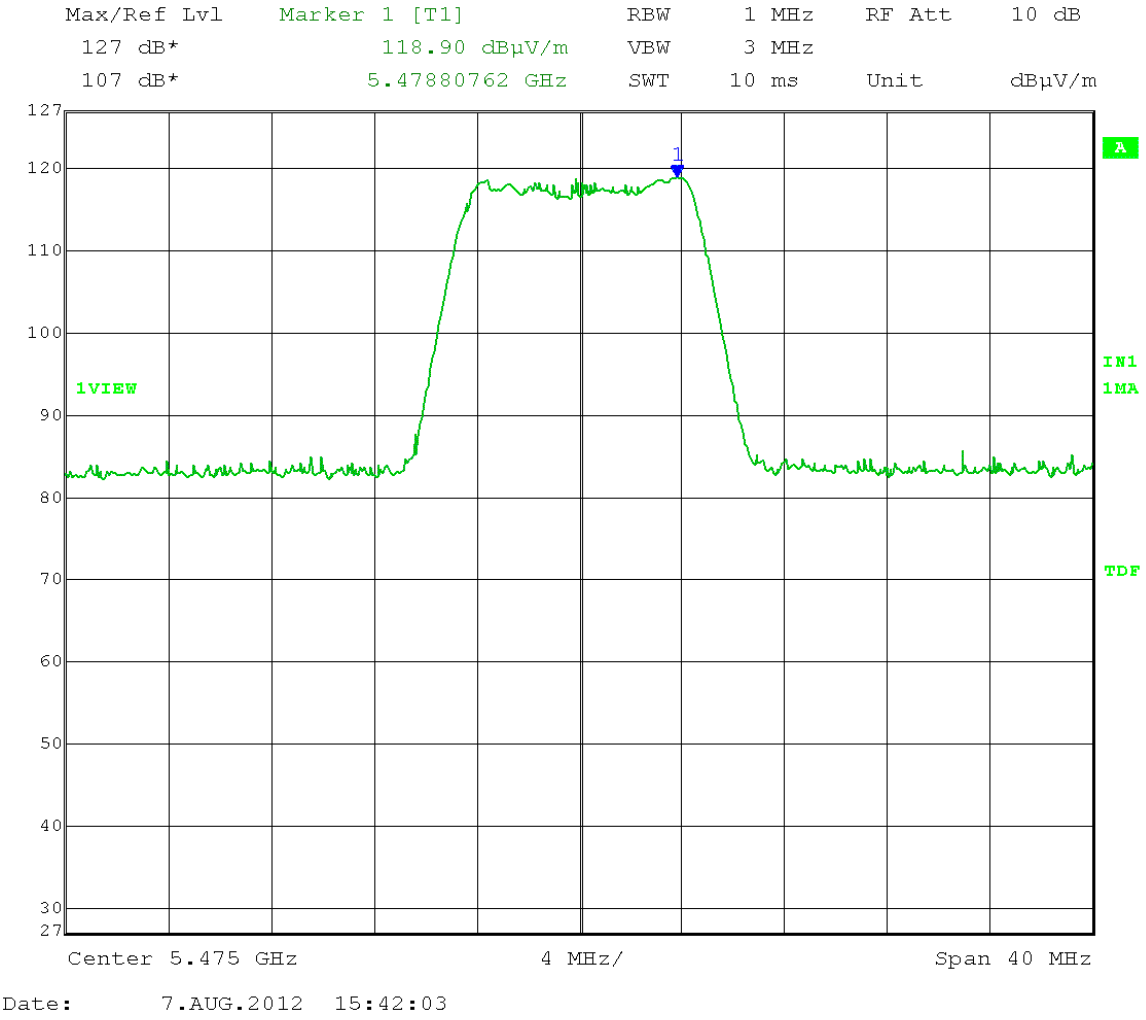
Calculated EIRP at the band edge = 25.05 dBm – 53.31 = **-28.26 dBm**

Test Date: 08-07-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter Band-Edge Emission – Radiated with patch antenna
Operator: Craig B

EUT nominal channel bandwidth:	10 MHz	adi reg Ch A 22	adi reg Ch B 2B
Output port:	Channel A and B;	Low Channel Frequency:	5.475 GHz
Output power setting:	19;	Modulation Type:	QPSK

Lower Band-edge frequency: 5470 MHz
Both transmit chains active.
Polarization: Vertical
Test distance: 3 meters; receive antenna height: 1.75 meters; table rotation: 0 degrees
EIRP Limit: **-27** dBm/MHz (FCC 15.407(b)(3))

Measurement of Fundamental:



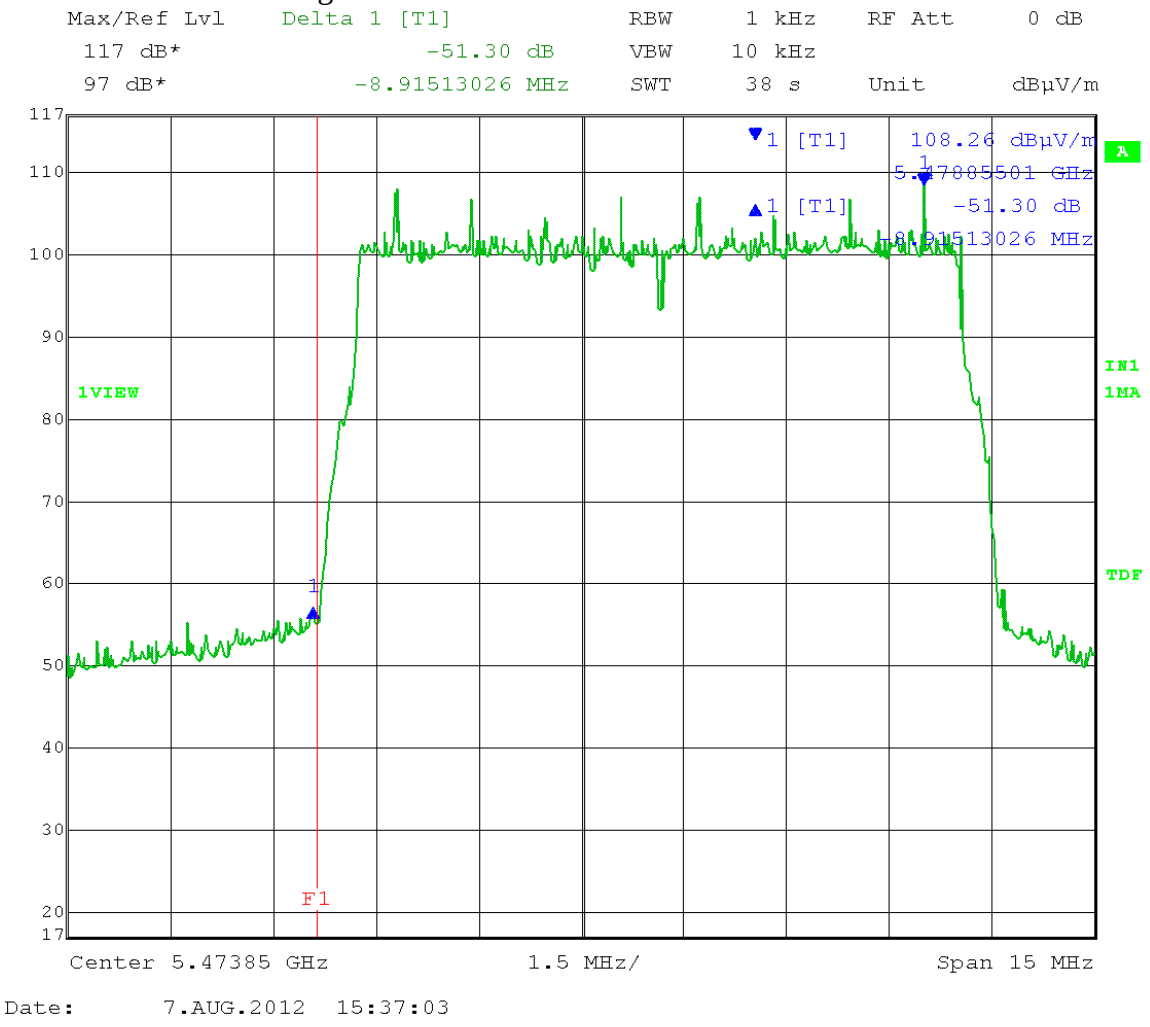
Calculated EIRP of fundamental = 118.90 dBµV/m + 20 log (3 meters) -104.77
= 23.67 dBm

Test Date: 08-07-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter Band-Edge Emission – Radiated with antenna
Operator: Craig B

EUT nominal channel bandwidth:	10 MHz	adi reg Ch A 22	adi reg Ch B 2B
Output port:	Channel A and B;	Low Channel Frequency:	5.475 GHz
Output power setting:	19;	Modulation Type:	QPSK

Lower Band-edge frequency: 5470 MHz
Both transmit chains active.
Polarization: Vertical
Test distance: 3 meters; receive antenna height: 1.75 meters; table rotation: 0 degrees
EIRP Limit: **-27** dBm/MHz (FCC 15.407(b)(3))

Delta-Marker at band edge:



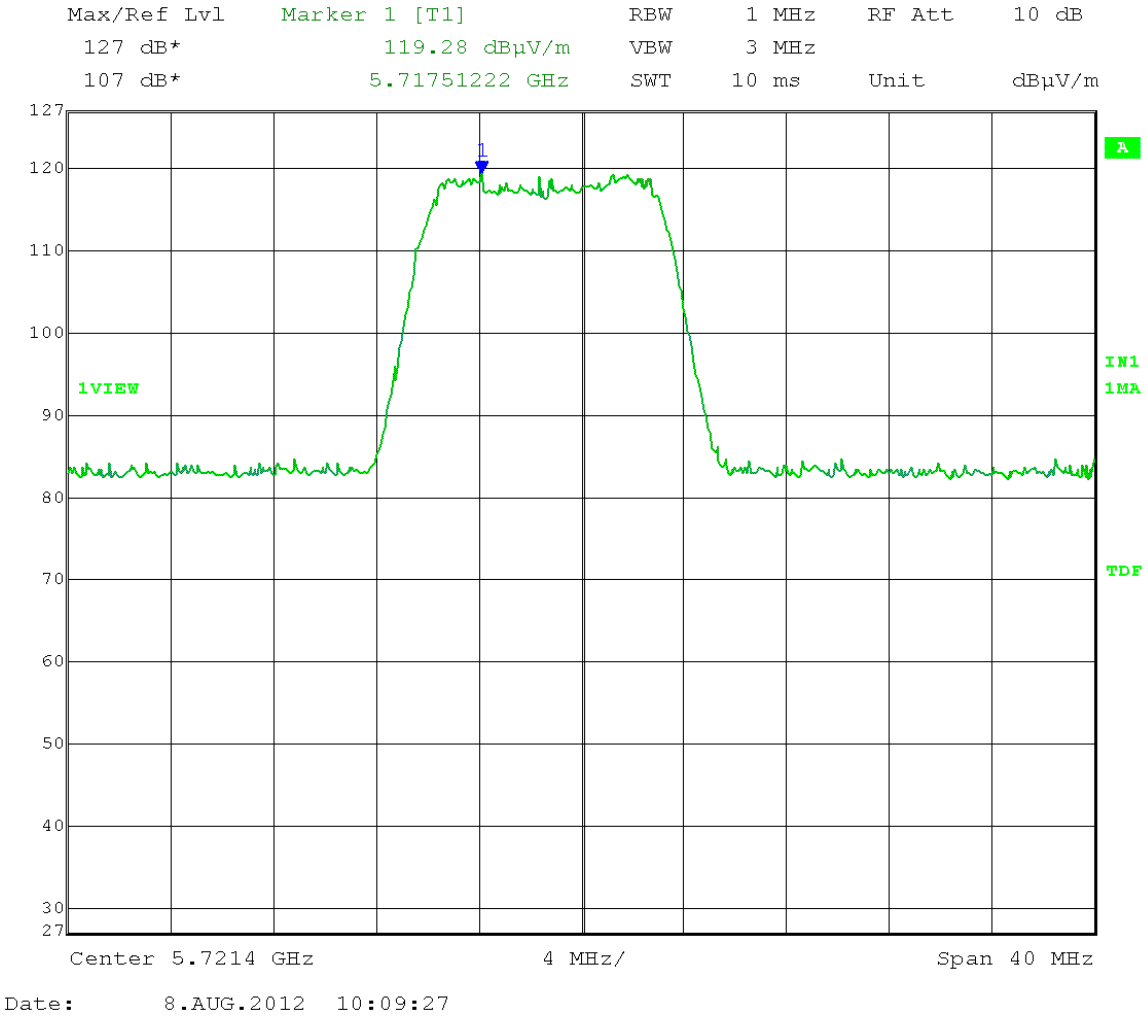
Calculated EIRP at the band edge = 23.67 dBm – 51.30 = **-27.63 dBm**

Test Date: 08-08-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter Band-Edge Emission – Radiated with patch antenna
Operator: Craig B

EUT nominal channel bandwidth:	10 MHz	adi reg Ch A 33	adi reg Ch B 33
Output port:	Channel A and B;	High Channel Frequency:	5.720 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper Band-edge frequency: 5725 MHz
Both transmit chains active.
Polarization: Horizontal
Test distance: 3 meters; receive antenna height: 1.91 meters; table rotation: 0 degrees
EIRP Limit: **-17** dBm/MHz (FCC 15.407(b)(4))

Measurement of Fundamental:



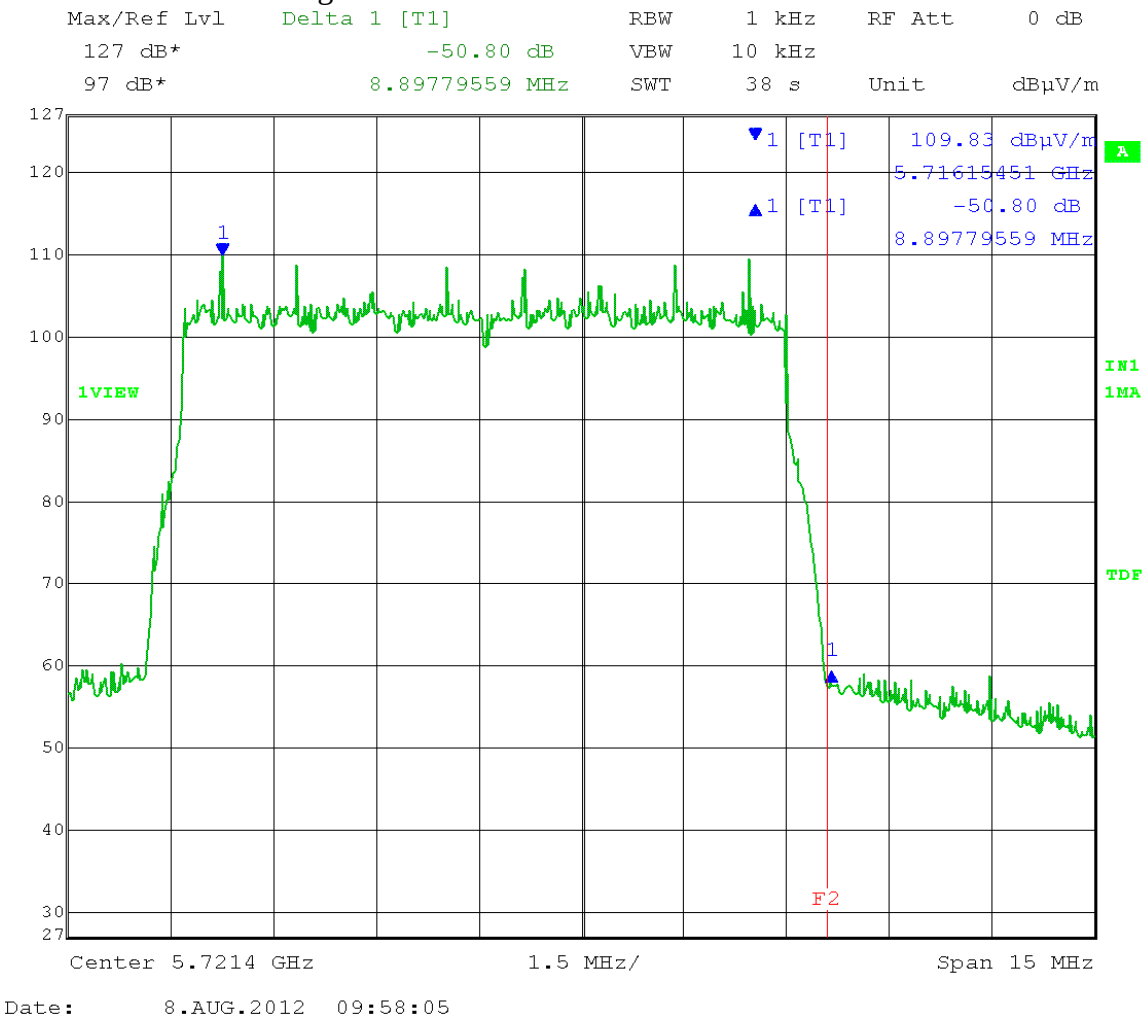
Calculated EIRP of fundamental = 119.28 dBµV/m + 20 log (3 meters) -104.77 = 24.05 dBm

Test Date: 08-08-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter Band-Edge Emission – Radiated with antenna
Operator: Craig B

EUT nominal channel bandwidth:	10 MHz	adi reg Ch A 33	adi reg Ch B 33
Output port:	Channel A and B;	High Channel Frequency:	5.720 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper Band-edge frequency: 5725 MHz
Both transmit chains active.
Polarization: Horizontal
Test distance: 3 meters; receive antenna height: 1.91 meters; table rotation: 0 degrees
EIRP Limit: **-17** dBm/MHz (FCC 15.407(b)(4))

Delta-Marker at band edge:



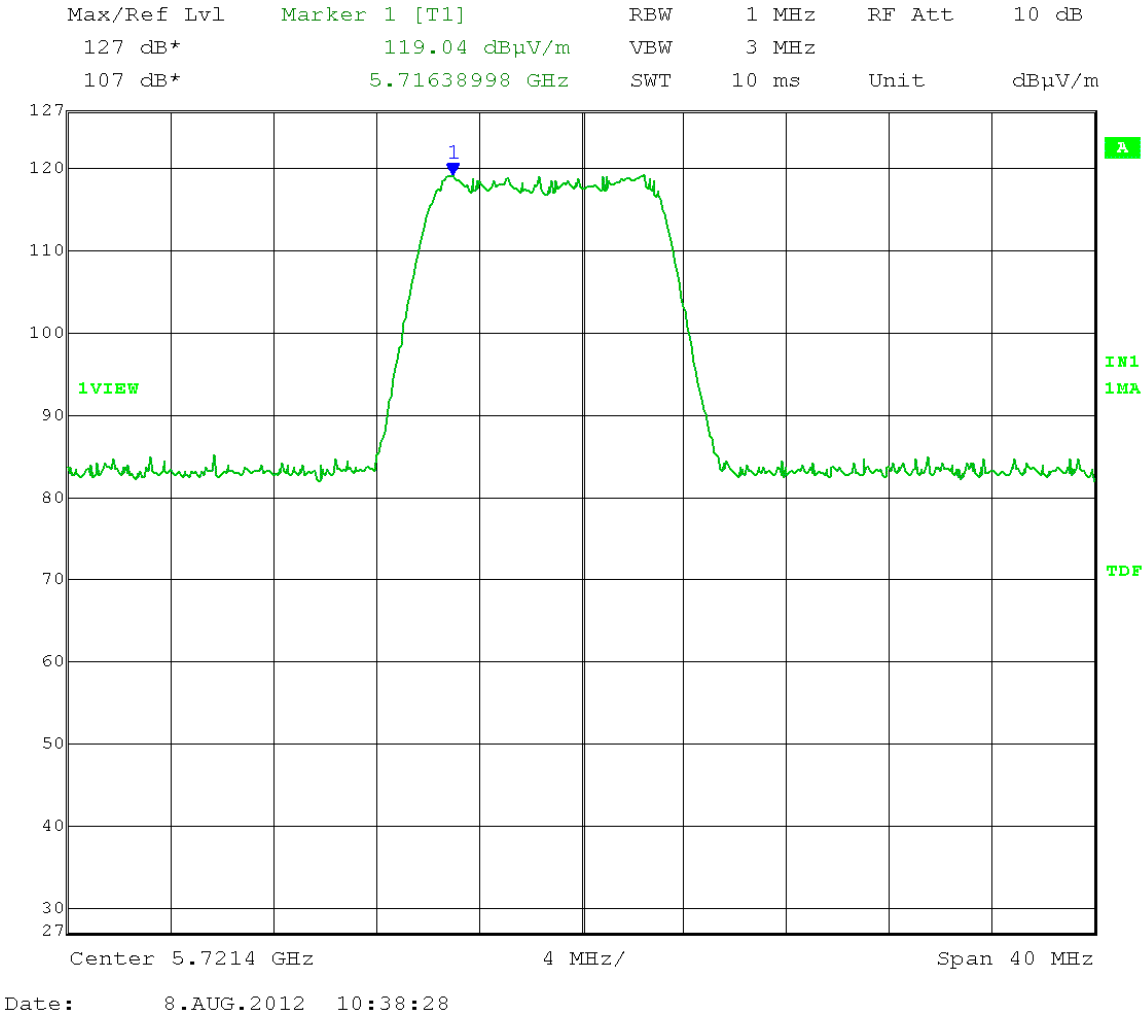
Calculated EIRP at the band edge = 24.05 dBm – 50.80 = **-26.75 dBm**

Test Date: 08-08-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter Band-Edge Emission – Radiated with patch antenna
Operator: Craig B

EUT nominal channel bandwidth:	10 MHz	adi reg Ch A 33	adi reg Ch B 33
Output port:	Channel A and B;	High Channel Frequency:	5.720 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper Band-edge frequency: 5725 MHz
Both transmit chains active.
Polarization: Vertical
Test distance: 3 meters; receive antenna height: 1.55 meters; table rotation: 0 degrees
EIRP Limit: **-17** dBm/MHz (FCC 15.407(b)(4))

Measurement of Fundamental:



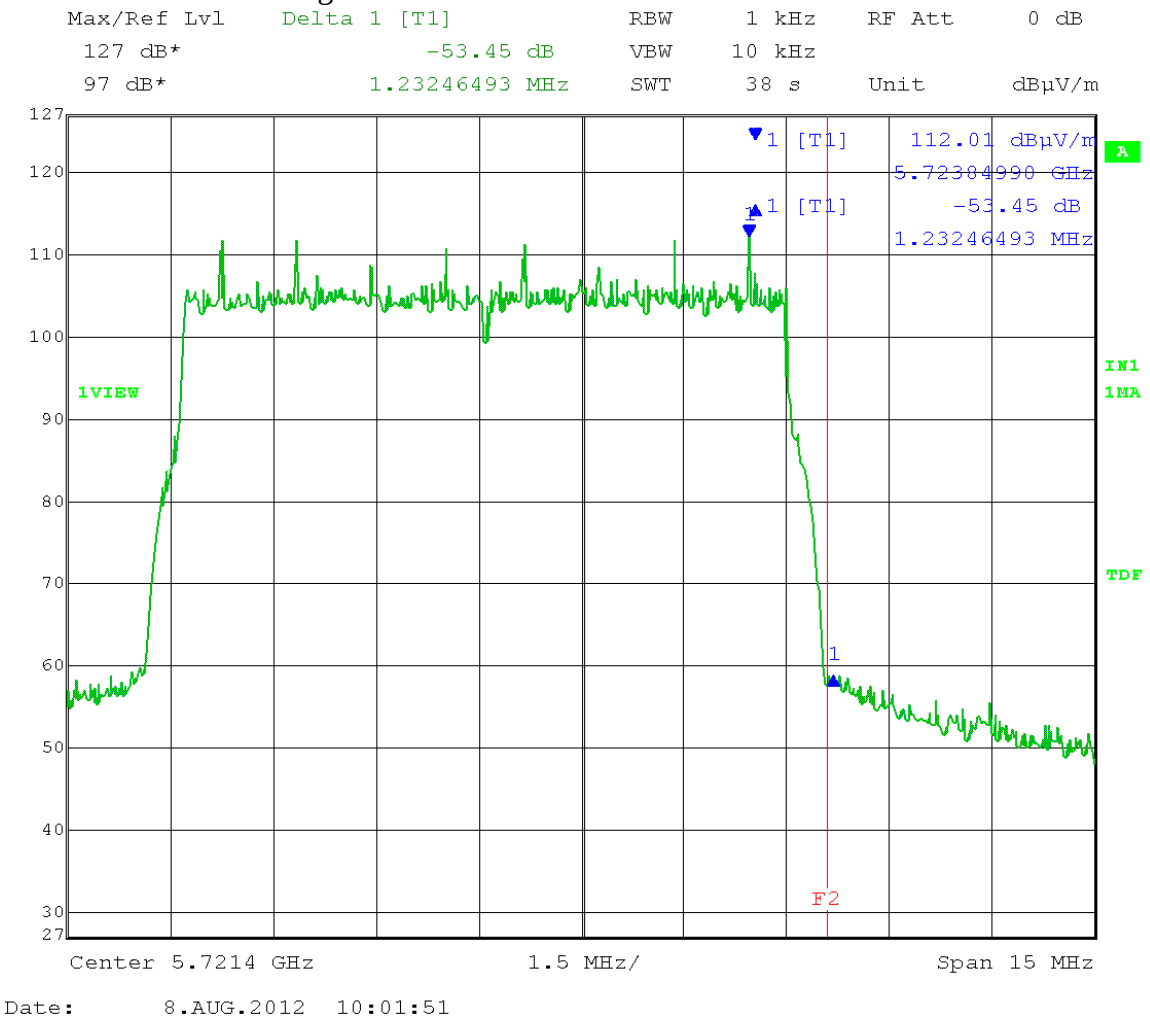
Calculated EIRP of fundamental = 119.04 dBµV/m + 20 log (3 meters) -104.77 = 23.81 dBm

Test Date: 08-08-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter Band-Edge Emission – Radiated with antenna
Operator: Craig B

EUT nominal channel bandwidth:	10 MHz	adi reg Ch A 33	adi reg Ch B 33
Output port:	Channel A and B;	High Channel Frequency:	5.720 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper Band-edge frequency: 5725 MHz
Both transmit chains active.
Polarization: Vertical
Test distance: 3 meters; receive antenna height: 1.55 meters; table rotation: 0 degrees
EIRP Limit: **-17** dBm/MHz (FCC 15.407(b)(4))

Delta-Marker at band edge:



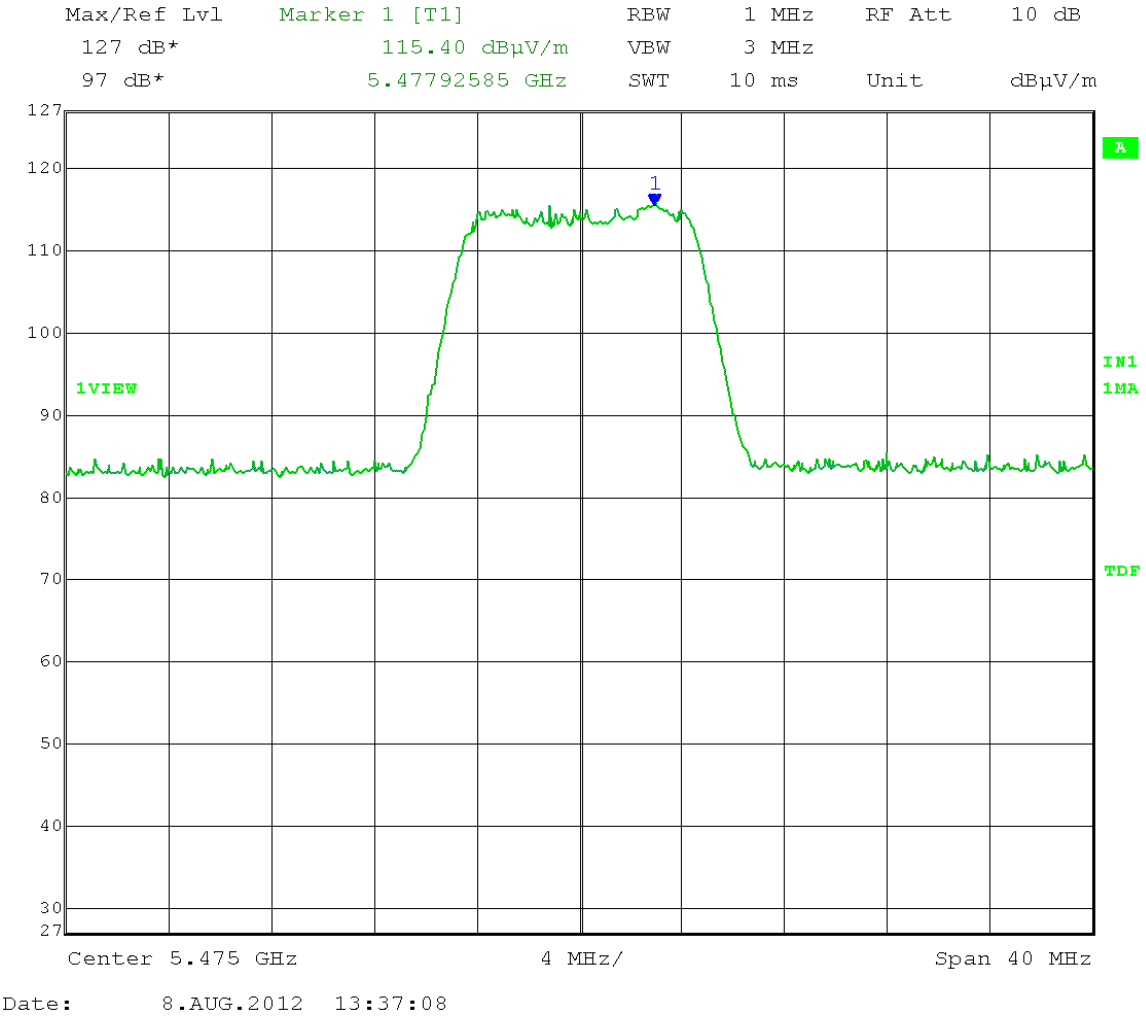
Calculated EIRP at the band edge = 23.81 dBm – 53.45 = **-29.64 dBm**

Test Date: 08-08-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter Band-Edge Emission – Radiated with patch and dish antenna
Operator: Craig B

EUT nominal channel bandwidth:	10 MHz	adi reg Ch A 70	adi reg Ch B 73
Output port:	Channel A and B;	Low Channel Frequency:	5.475 GHz
Output power setting:	19;	Modulation Type:	QPSK

Lower Band-edge frequency: 5470 MHz
Both transmit chains active.
Polarization: Horizontal
Test distance: 3 meters; receive antenna height: 1.51 meters; table rotation: 0 degrees
EIRP Limit: **-27** dBm/MHz (FCC 15.407(b)(3))

Measurement of Fundamental:



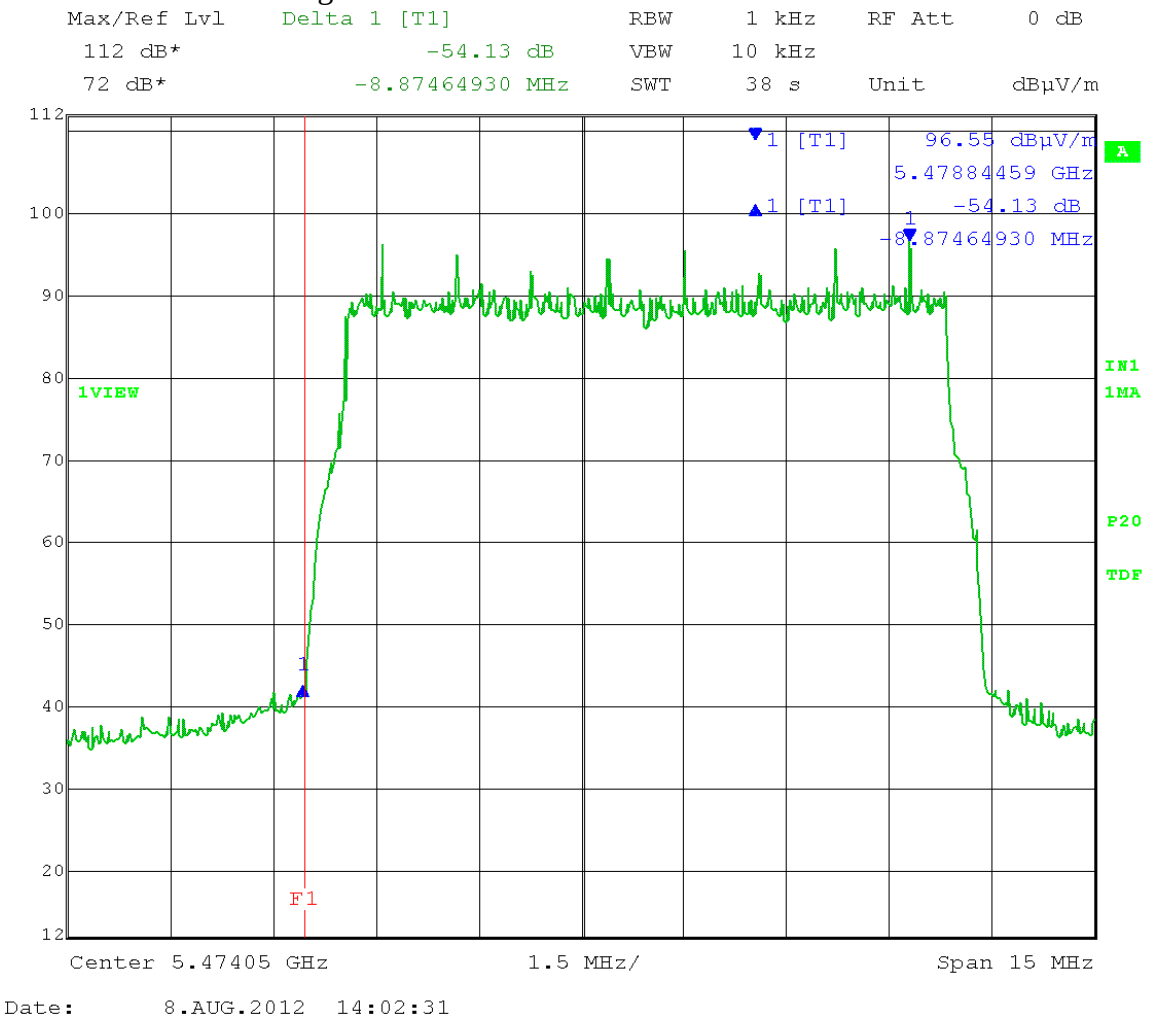
Calculated EIRP of fundamental = 115.40 dBµV/m + 20 log (3 meters) - 104.77
= 20.17 dBm

Test Date: 08-08-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter Band-Edge Emission – Radiated with patch and dish antenna
Operator: Craig B

EUT nominal channel bandwidth:	10 MHz	adi reg Ch A 70	adi reg Ch B 73
Output port:	Channel A and B;	Low Channel Frequency:	5.475 GHz
Output power setting:	19;	Modulation Type:	QPSK

Lower Band-edge frequency: 5470 MHz
Both transmit chains active.
Polarization: Horizontal
Test distance: 3 meters; receive antenna height: 1.51 meters; table rotation: 0 degrees
EIRP Limit: **-27** dBm/MHz (FCC 15.407(b)(3))

Delta-Marker at band edge:



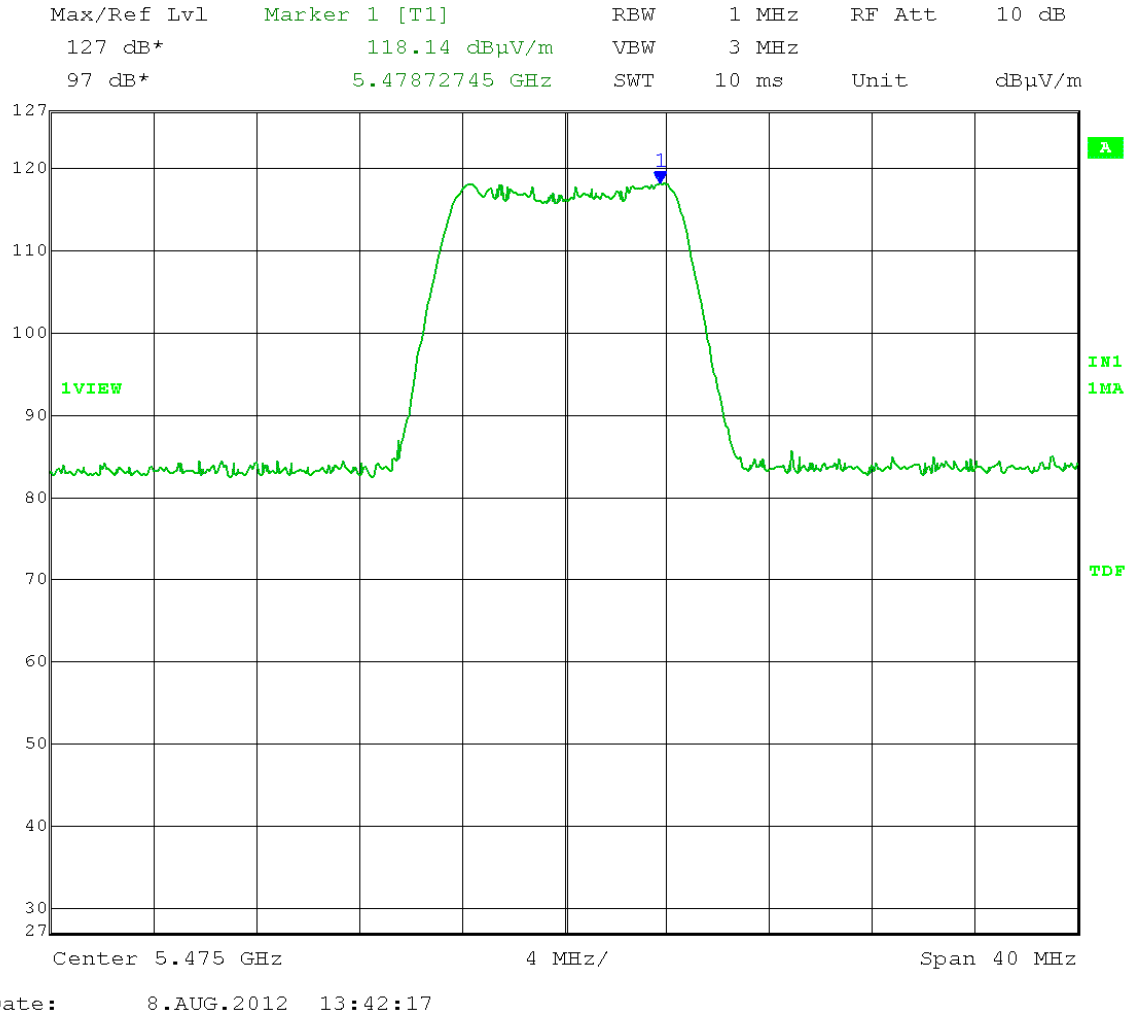
Calculated EIRP at the band edge = 20.17 dBm – 54.13 = **-33.96 dBm**

Test Date: 08-08-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter Band-Edge Emission – Radiated with patch and dish antenna
Operator: Craig B

EUT nominal channel bandwidth:	10 MHz	adi reg Ch A 70	adi reg Ch B 73
Output port:	Channel A and B;	Low Channel Frequency:	5.475 GHz
Output power setting:	19;	Modulation Type:	QPSK

Lower Band-edge frequency: 5470 MHz
Both transmit chains active.
Polarization: Vertical
Test distance: 3 meters; receive antenna height: 1.52 meters; table rotation: 0 degrees
EIRP Limit: **-27** dBm/MHz (FCC 15.407(b)(3))

Measurement of Fundamental:



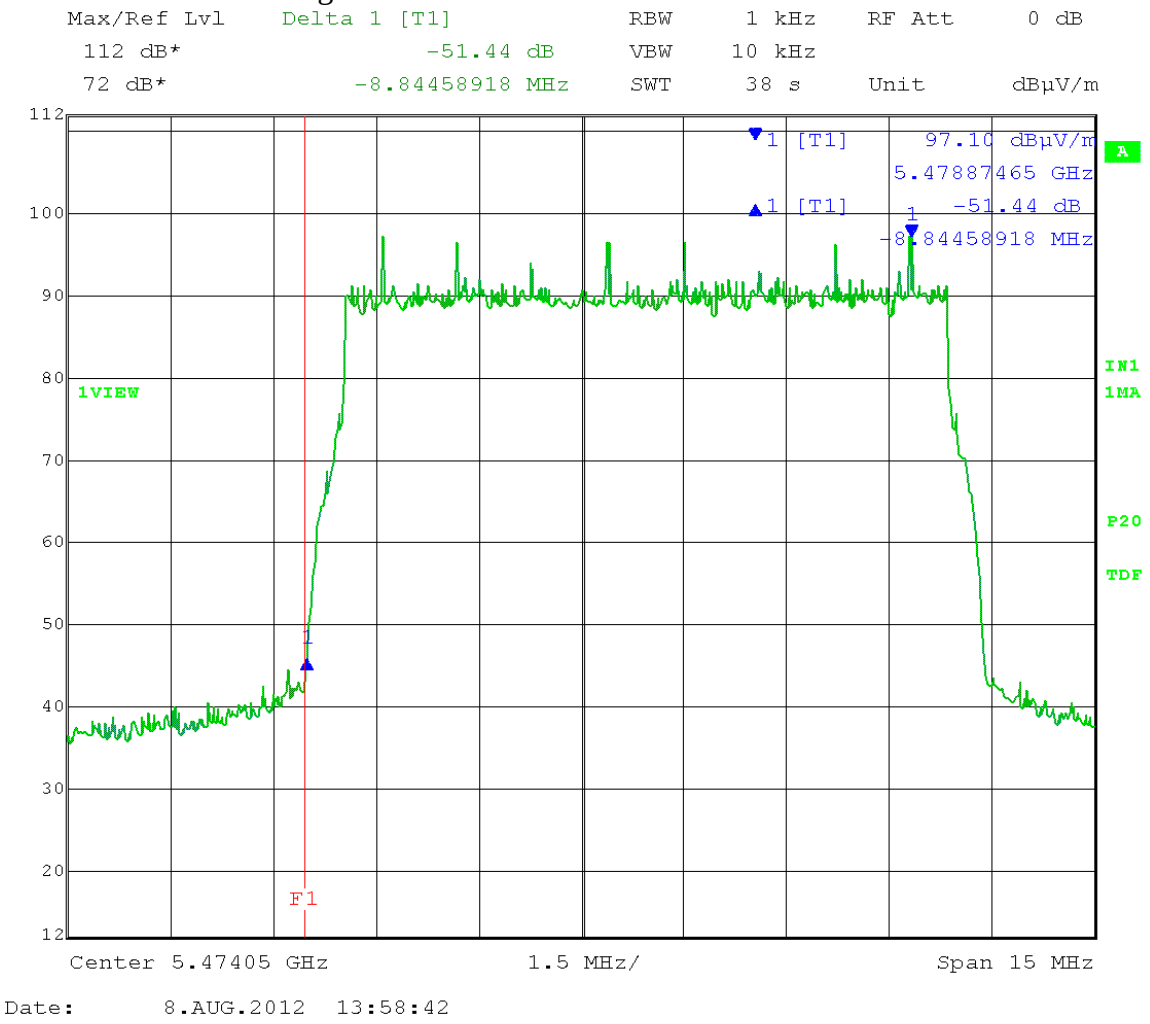
Calculated EIRP of fundamental = 118.14 dBµV/m + 20 log (3 meters) -104.77
= 22.91 dBm

Test Date: 08-08-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter Band-Edge Emission – Radiated with patch and dish antenna
Operator: Craig B

EUT nominal channel bandwidth:	10 MHz	adi reg Ch A 70	adi reg Ch B 73
Output port:	Channel A and B;	Low Channel Frequency:	5.475 GHz
Output power setting:	19;	Modulation Type:	QPSK

Lower Band-edge frequency: 5470 MHz
Both transmit chains active.
Polarization: Vertical
Test distance: 3 meters; receive antenna height: 1.52 meters; table rotation: 0 degrees
EIRP Limit: **-27** dBm/MHz (FCC 15.407(b)(3))

Delta-Marker at band edge:



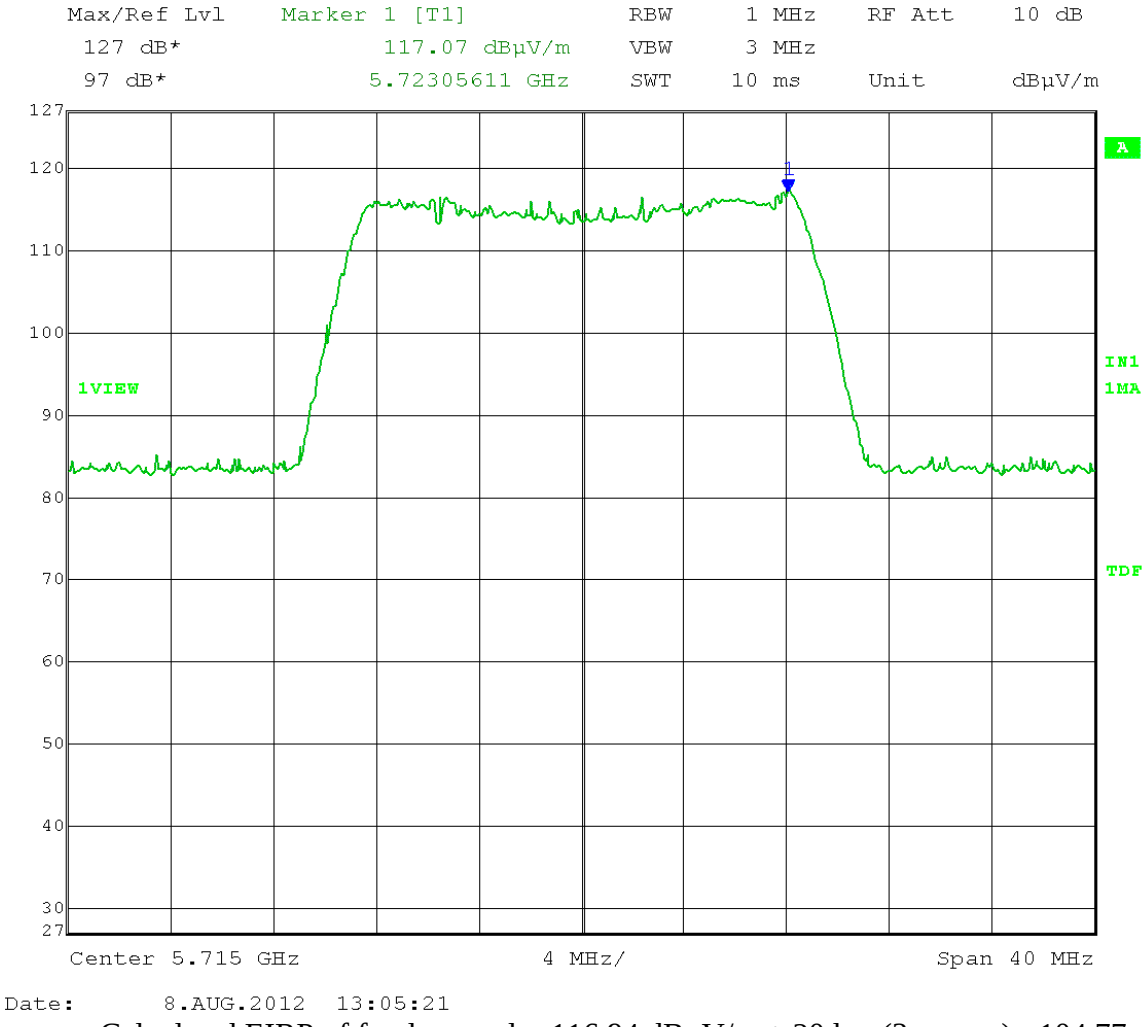
Calculated EIRP at the band edge = 22.91 dBm – 51.44 = **-28.53 dBm**

Test Date: 08-08-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter Band-Edge Emission – Radiated with patch and dish antenna
Operator: Craig B

EUT nominal channel bandwidth:	10 MHz	adi reg Ch A 7B	adi reg Ch B 7B
Output port:	Channel A and B;	High Channel Frequency:	5.720 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper Band-edge frequency: 5725 MHz
Both transmit chains active.
Polarization: Horizontal
Test distance: 3 meters; receive antenna height: 1.49 meters; table rotation: 0 degrees
EIRP Limit: **-17** dBm/MHz (FCC 15.407(b)(4))

Measurement of Fundamental:



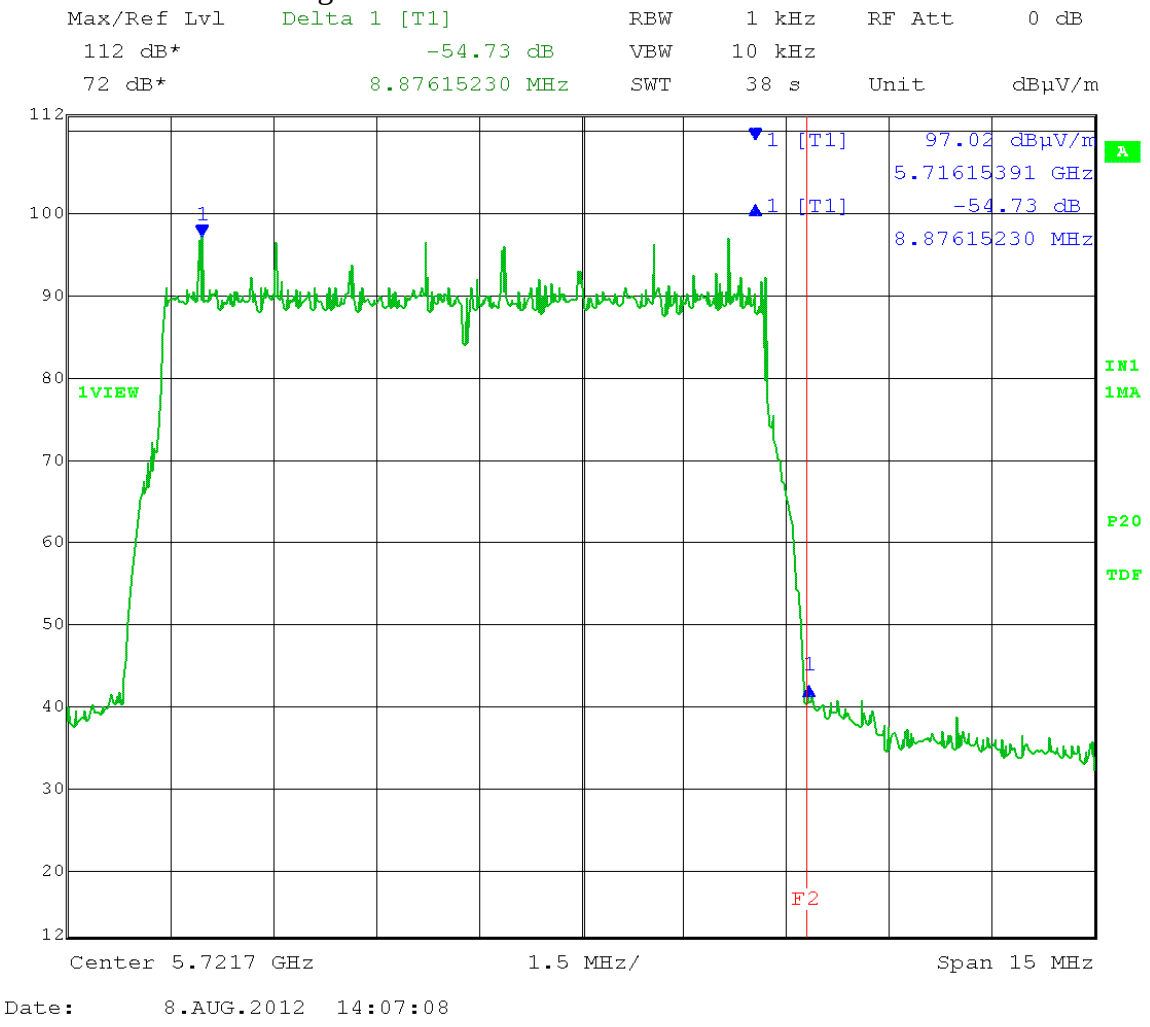
Calculated EIRP of fundamental = 116.94 dBµV/m + 20 log (3 meters) - 104.77 = 21.71 dBm

Test Date: 08-08-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter Band-Edge Emission – Radiated with patch and dish antenna
Operator: Craig B

EUT nominal channel bandwidth:	10 MHz	adi reg Ch A 7B	adi reg Ch B 7B
Output port:	Channel A and B;	High Channel Frequency:	5.720 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper Band-edge frequency: 5725 MHz
Both transmit chains active.
Polarization: Horizontal
Test distance: 3 meters; receive antenna height: 1.49 meters; table rotation: 0 degrees
EIRP Limit: **-17** dBm/MHz (FCC 15.407(b)(4))

Delta-Marker at band edge:



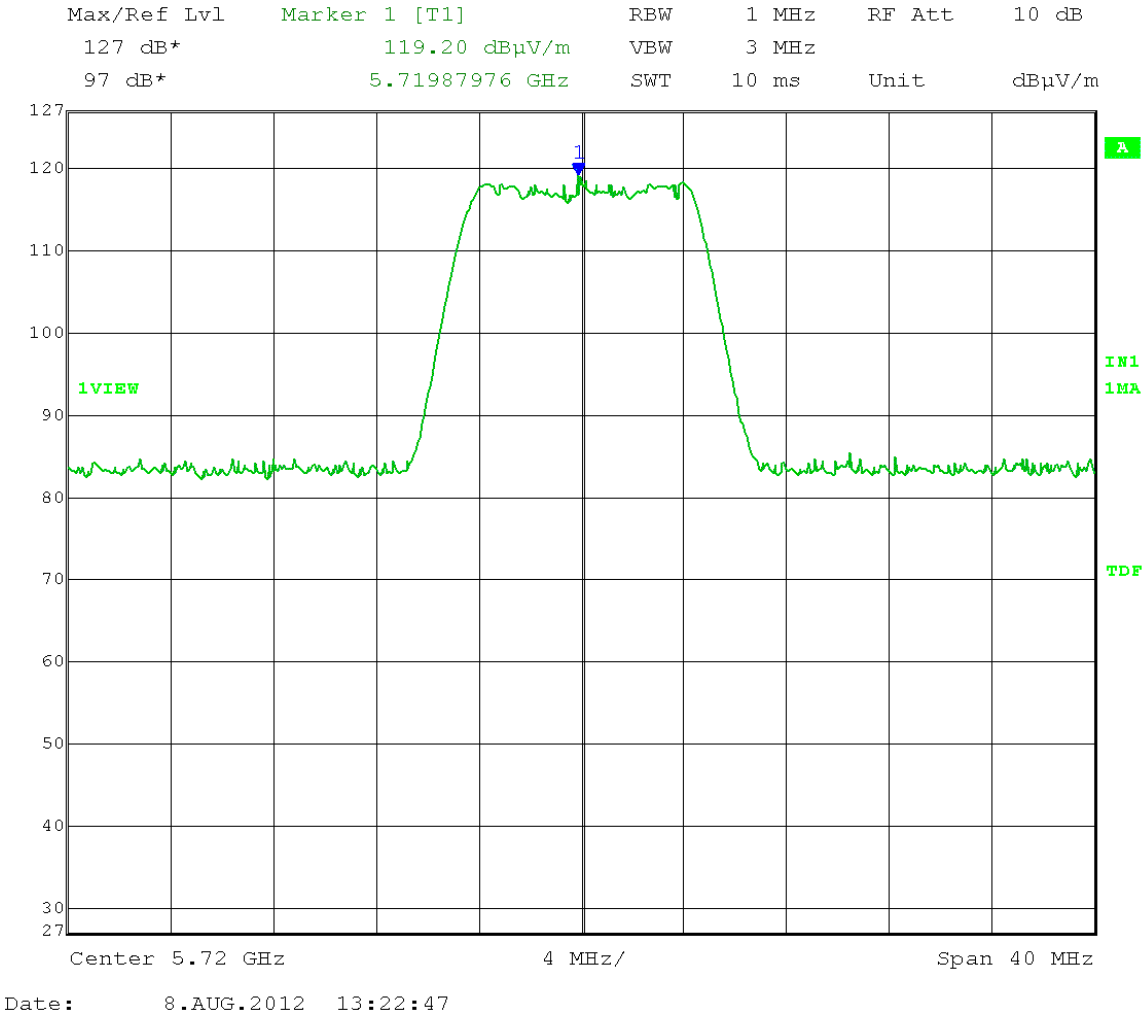
Calculated EIRP at the band edge = 21.71 dBm – 54.73 = **-33.02 dBm**

Test Date: 08-08-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter Band-Edge Emission – Radiated with patch and dish antenna
Operator: Craig B

EUT nominal channel bandwidth:	10 MHz	adi reg Ch A 7B	adi reg Ch B 7B
Output port:	Channel A and B;	High Channel Frequency:	5.720 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper Band-edge frequency: 5725 MHz
Both transmit chains active.
Polarization: Vertical
Test distance: 3 meters; receive antenna height: 1.42 meters; table rotation: 0 degrees
EIRP Limit: **-17** dBm/MHz (FCC 15.407(b)(4))

Measurement of Fundamental:



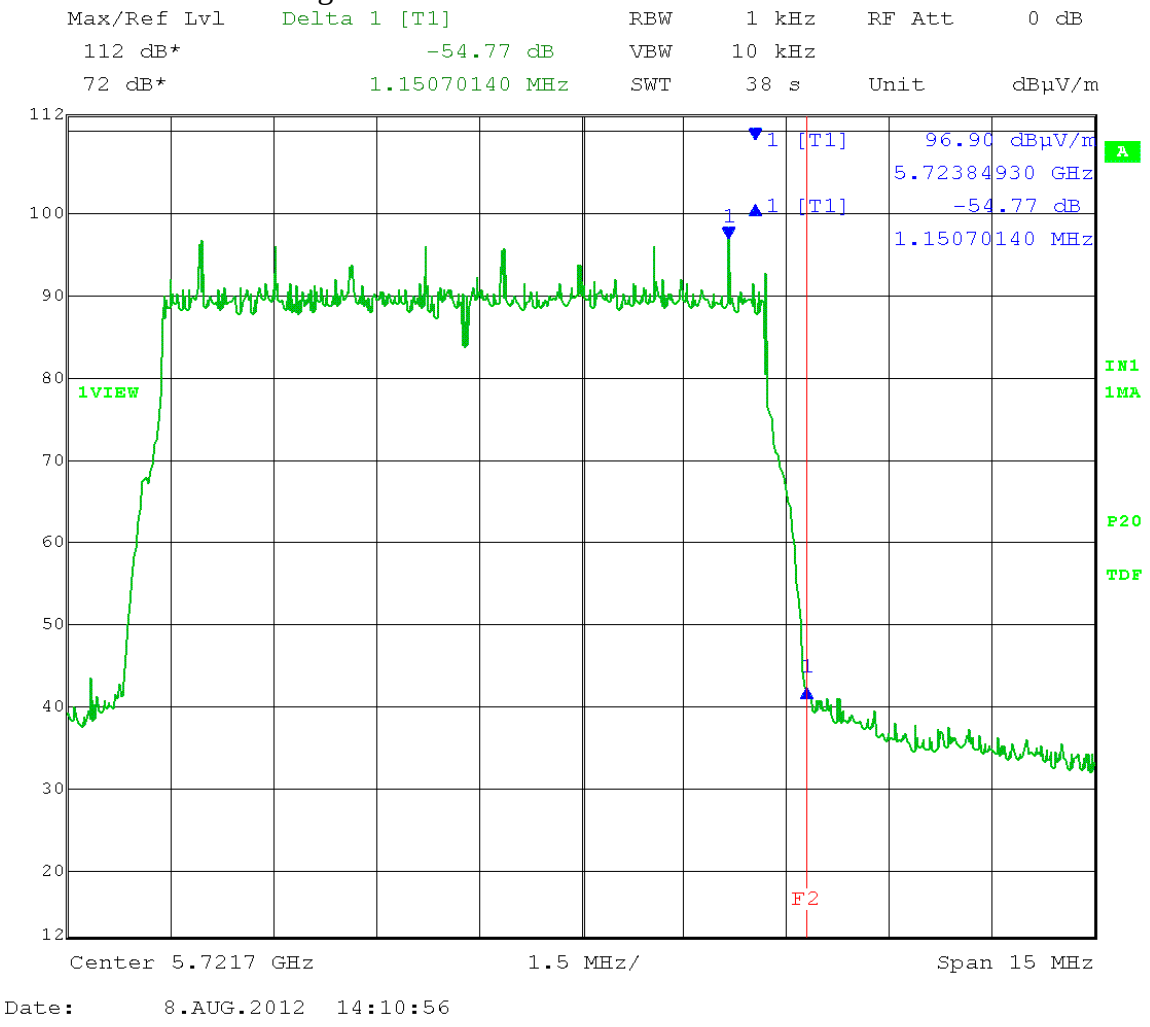
Calculated EIRP of fundamental = 119.20 dBµV/m + 20 log (3 meters) -104.77 = 23.97 dBm

Test Date: 08-08-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter Band-Edge Emission – Radiated with patch and dish antenna
Operator: Craig B

EUT nominal channel bandwidth:	10 MHz	adi reg Ch A 7B	adi reg Ch B 7B
Output port:	Channel A and B;	High Channel Frequency:	5.720 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper Band-edge frequency: 5725 MHz
Both transmit chains active.
Polarization: Vertical
Test distance: 3 meters; receive antenna height: 1.42 meters; table rotation: 0 degrees
EIRP Limit: **-17** dBm/MHz (FCC 15.407(b)(4))

Delta-Marker at band edge:



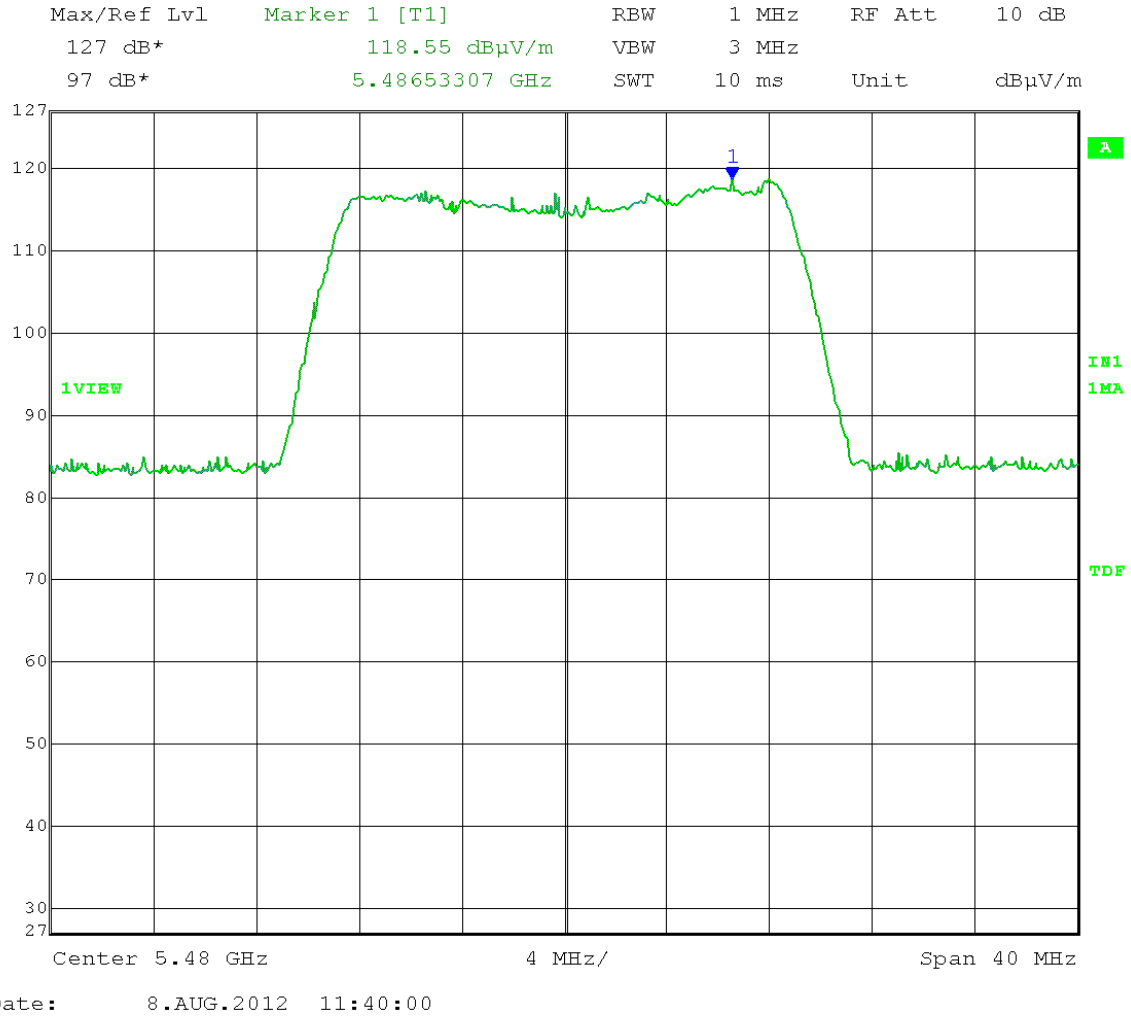
Calculated EIRP at the band edge = 23.97 dBm – 54.77 = **-30.80 dBm**

Test Date: 08-08-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter Band-Edge Emission – Radiated with patch antenna
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg Ch A 24	adi reg Ch B 28
Output port:	Channel A and B;	Low Channel Frequency:	5.480 GHz
Output power setting:	19;	Modulation Type:	QPSK

Lower Band-edge frequency: 5470 MHz
Both transmit chains active.
Polarization: Horizontal
Test distance: 3 meters; receive antenna height: 1.43 meters; table rotation: 10 degrees
EIRP Limit: **-27** dBm/MHz (FCC 15.407(b)(3))

Measurement of Fundamental:



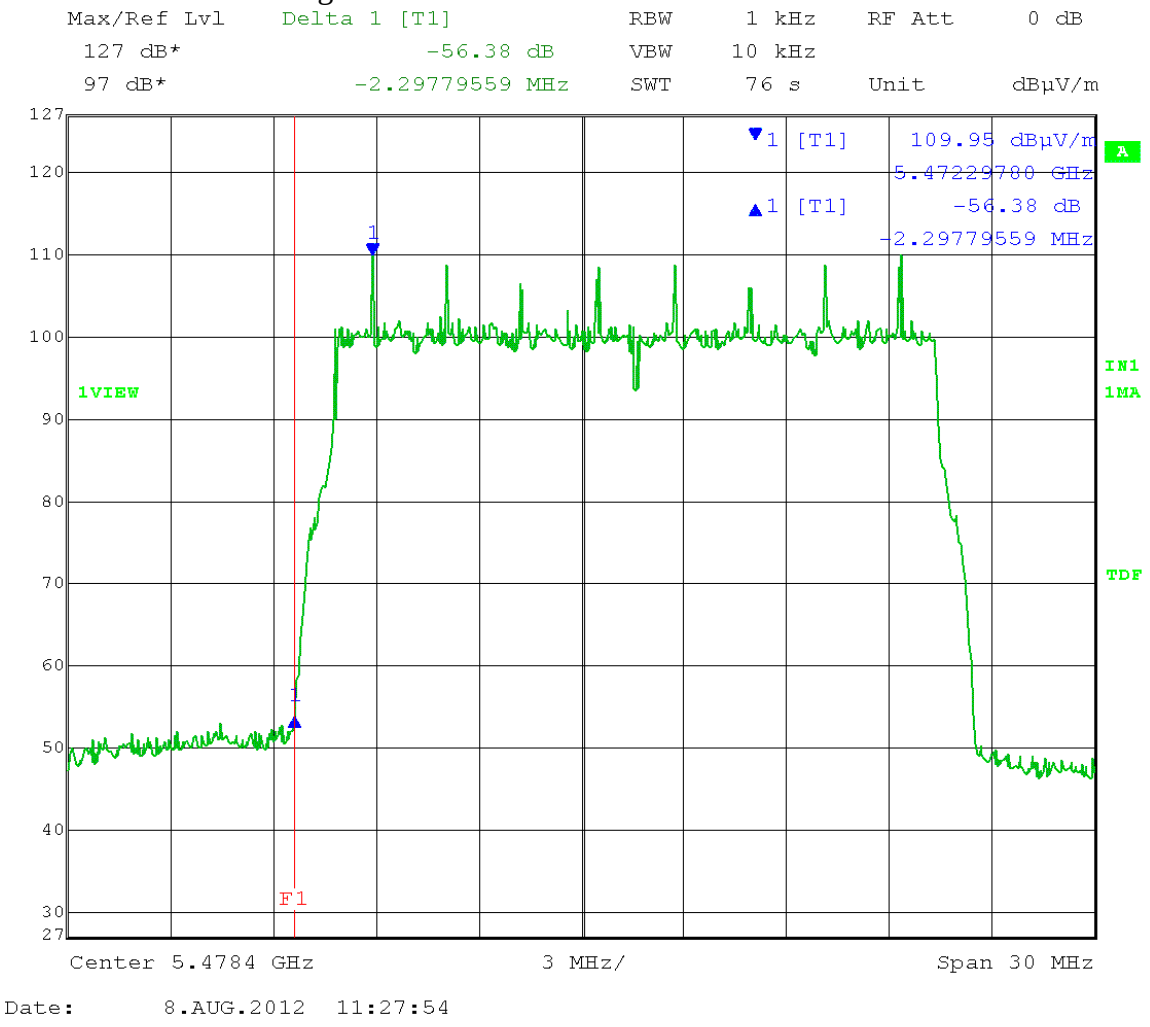
Calculated EIRP of fundamental = 118.55 dBµV/m + 20 log (3 meters) - 104.77
= 23.32 dBm

Test Date: 08-08-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter Band-Edge Emission – Radiated with patch antenna
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg Ch A 24	adi reg Ch B 28
Output port:	Channel A and B;	Low Channel Frequency:	5.480 GHz
Output power setting:	19;	Modulation Type:	QPSK

Lower Band-edge frequency: 5470 MHz
Both transmit chains active.
Polarization: Horizontal
Test distance: 3 meters; receive antenna height: 1.43 meters; table rotation: 10 degrees
EIRP Limit: **-27** dBm/MHz (FCC 15.407(b)(3))

Delta-Marker at band edge:



Date: 8.AUG.2012 11:27:54

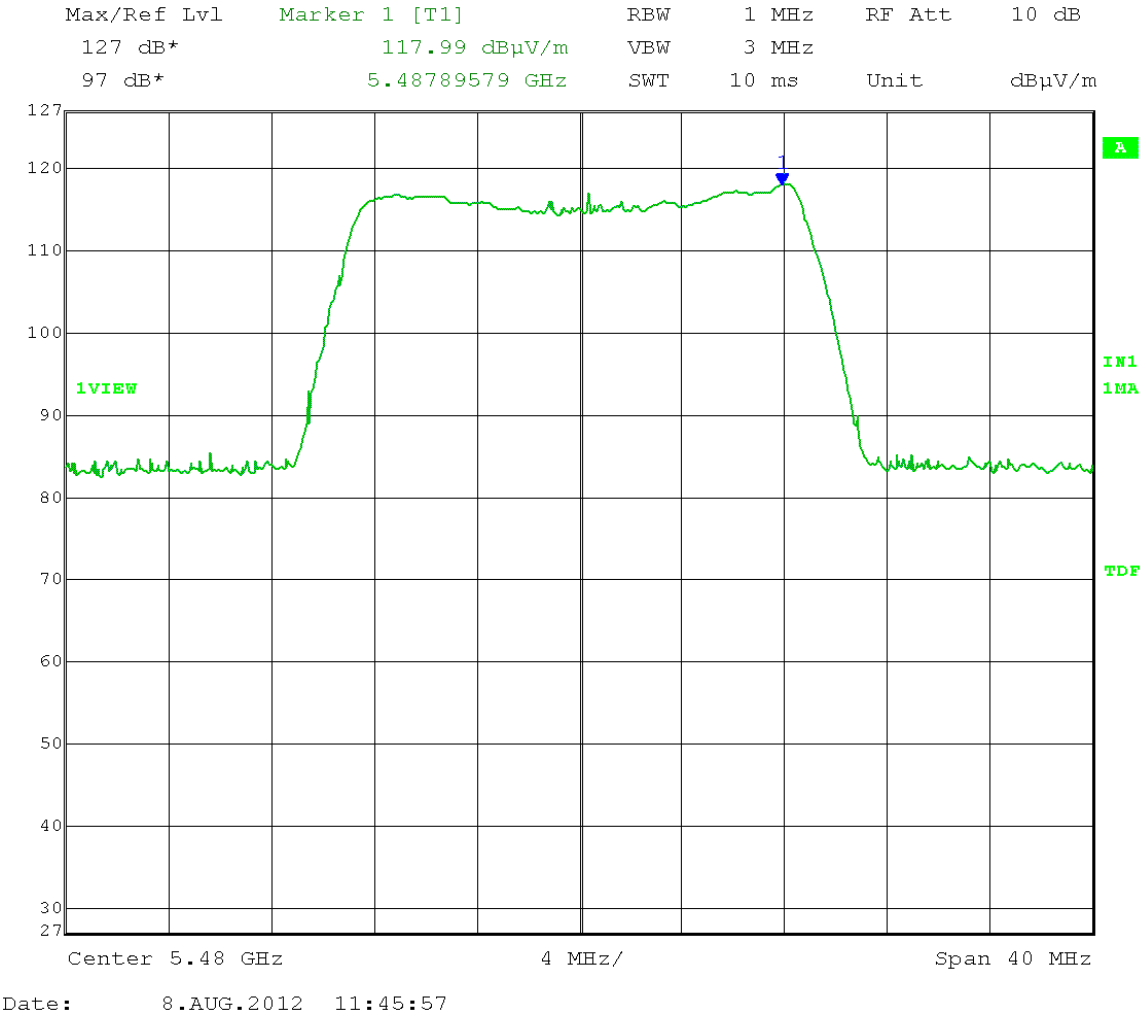
Calculated EIRP at the band edge = 23.32 dBm – 56.38 = **-33.06 dBm**

Test Date: 08-08-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter Band-Edge Emission – Radiated with patch antenna
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg Ch A 24	adi reg Ch B 28
Output port:	Channel A and B;	Low Channel Frequency:	5.480 GHz
Output power setting:	19;	Modulation Type:	QPSK

Lower Band-edge frequency: 5470 MHz
Both transmit chains active.
Polarization: Vertical
Test distance: 3 meters; receive antenna height: 1.65 meters; table rotation: 0 degrees
EIRP Limit: **-27** dBm/MHz (FCC 15.407(b)(3))

Measurement of Fundamental:



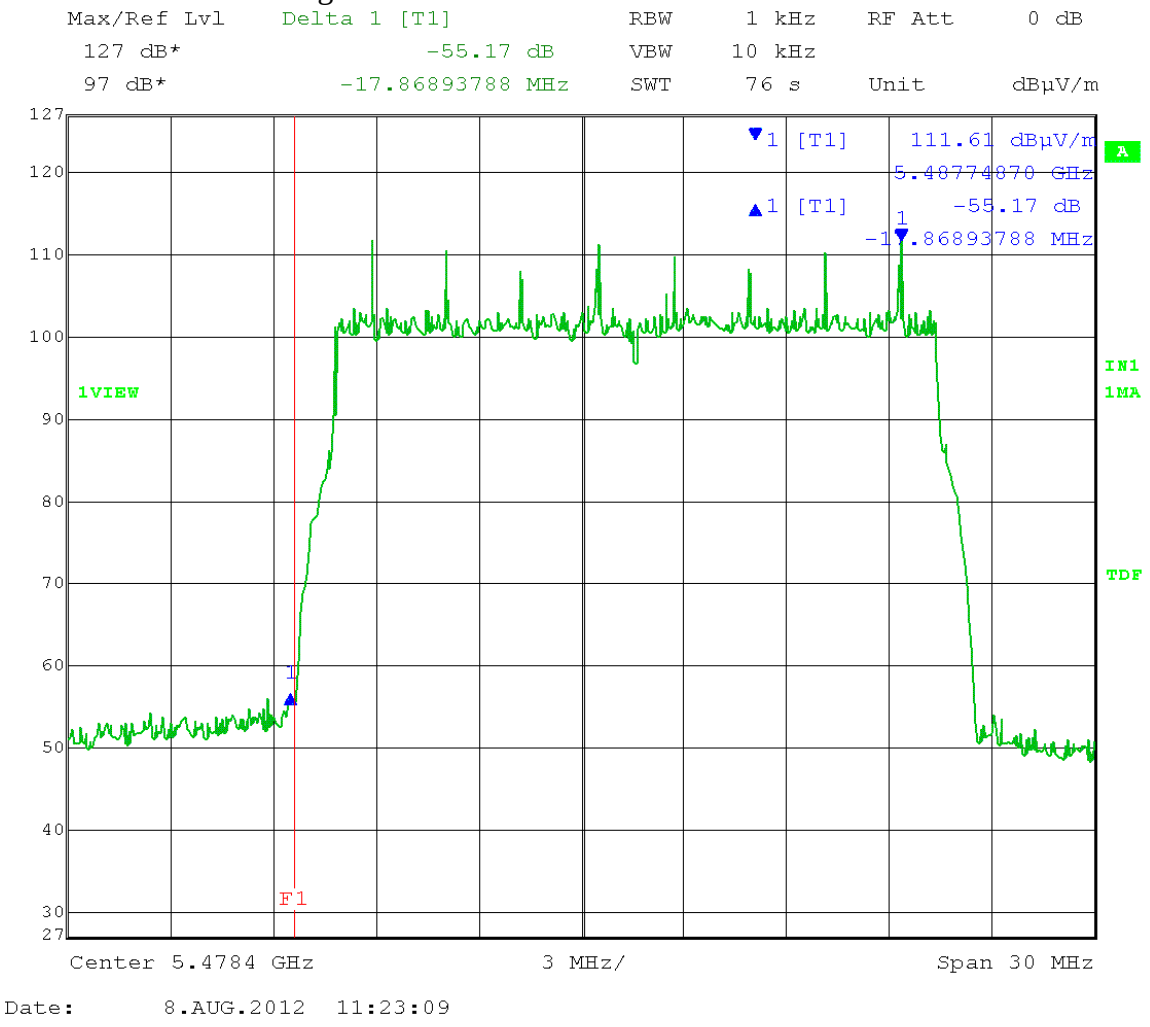
Calculated EIRP of fundamental = 117.99 dBµV/m + 20 log (3 meters) -104.77
= 22.76 dBm

Test Date: 08-08-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter Band-Edge Emission – Radiated with patch antenna
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg Ch A 24	adi reg Ch B 28
Output port:	Channel A and B;	Low Channel Frequency:	5.480 GHz
Output power setting:	19;	Modulation Type:	QPSK

Lower Band-edge frequency: 5470 MHz
Both transmit chains active.
Polarization: Vertical
Test distance: 3 meters; receive antenna height: 1.65 meters; table rotation: 0 degrees
EIRP Limit: **-27** dBm/MHz (FCC 15.407(b)(3))

Delta-Marker at band edge:



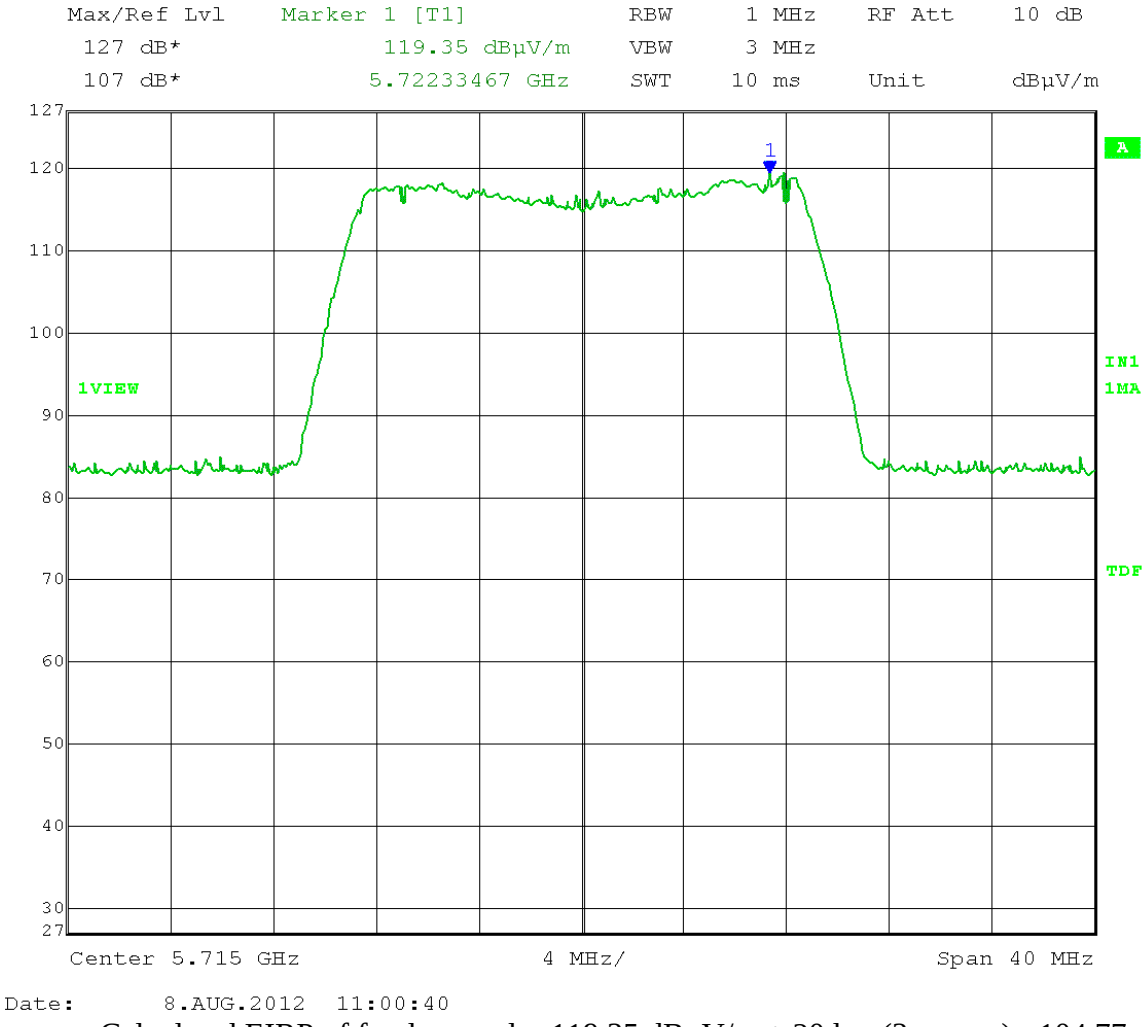
Calculated EIRP at the band edge = 22.76 dBm – 55.17 = **-32.41 dBm**

Test Date: 08-08-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter Band-Edge Emission – Radiated with patch antenna
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg Ch A 2E	adi reg Ch B 2D
Output port:	Channel A and B;	High Channel Frequency:	5.715 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper Band-edge frequency: 5725 MHz
Both transmit chains active.
Polarization: Horizontal
Test distance: 3 meters; receive antenna height: 1.27 meters; table rotation: 10 degrees
EIRP Limit: **-17** dBm/MHz (FCC 15.407(b)(4))

Measurement of Fundamental:



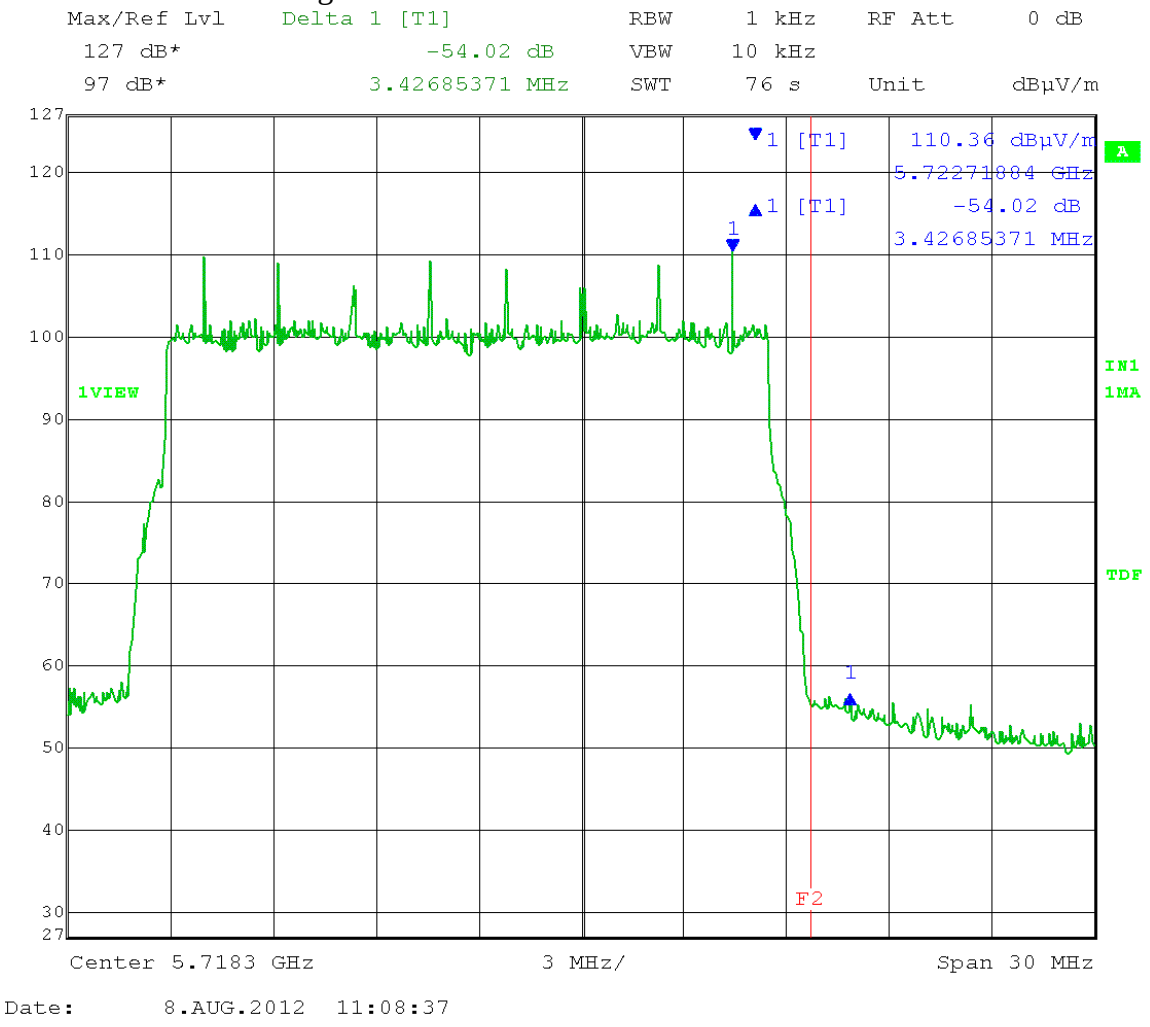
Calculated EIRP of fundamental = 119.35 dBµV/m + 20 log (3 meters) - 104.77 = 24.12 dBm

Test Date: 08-08-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter Band-Edge Emission – Radiated with patch antenna
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg Ch A 2E	adi reg Ch B 2D
Output port:	Channel A and B;	High Channel Frequency:	5.715 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper Band-edge frequency: 5725 MHz
Both transmit chains active.
Polarization: Horizontal
Test distance: 3 meters; receive antenna height: 1.27 meters; table rotation: 10 degrees
EIRP Limit: **-17** dBm/MHz (FCC 15.407(b)(4))

Delta-Marker at band edge:



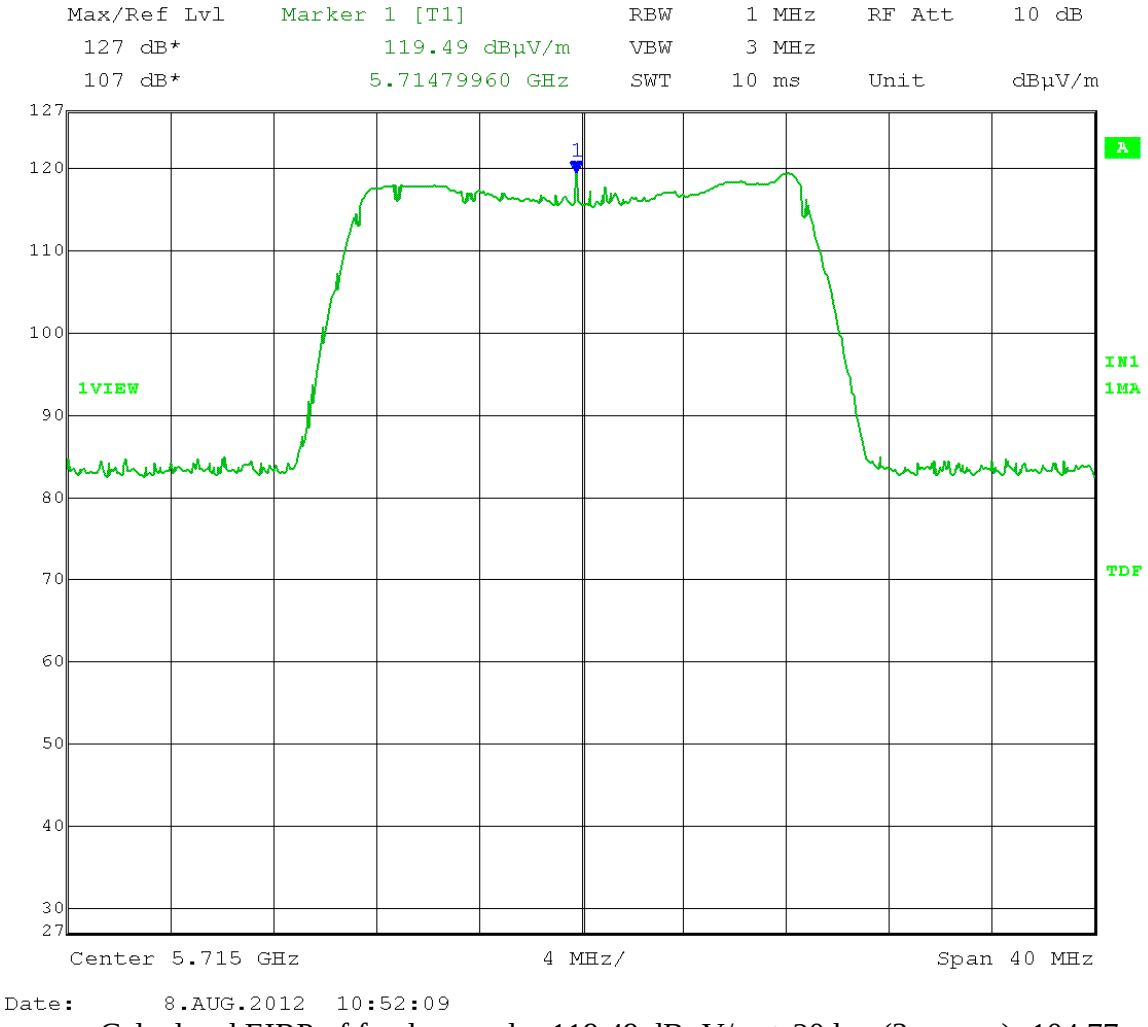
Calculated EIRP at the band edge = 24.12 dBm – 54.02 = **-29.90 dBm**

Test Date: 08-08-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter Band-Edge Emission – Radiated with patch antenna
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg Ch A 2E	adi reg Ch B 2D
Output port:	Channel A and B;	High Channel Frequency:	5.715 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper Band-edge frequency: 5725 MHz
Both transmit chains active.
Polarization: Vertical
Test distance: 3 meters; receive antenna height: 1.55 meters; table rotation: 0 degrees
EIRP Limit: **-17** dBm/MHz (FCC 15.407(b)(4))

Measurement of Fundamental:



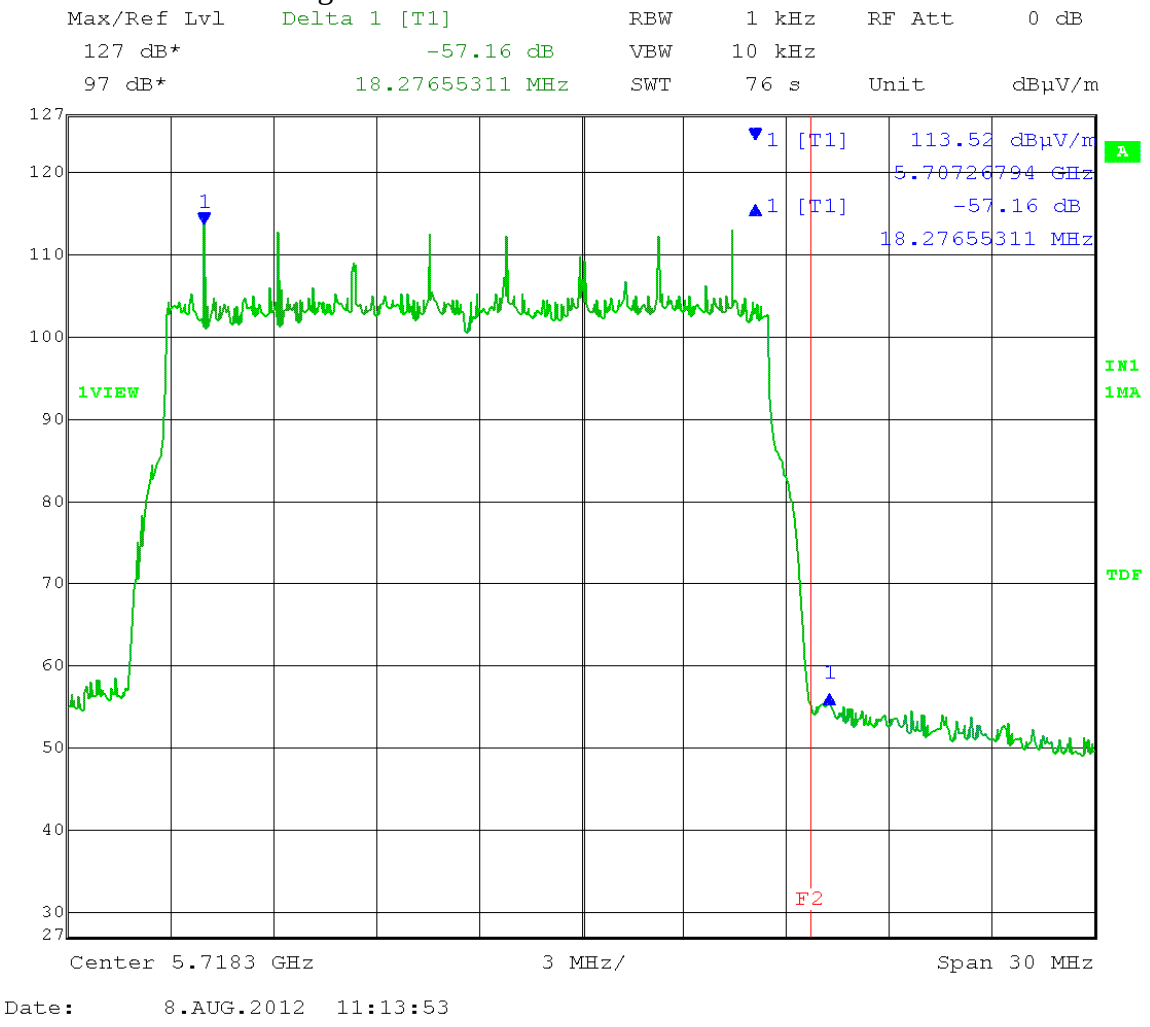
Calculated EIRP of fundamental = 119.49 dBµV/m + 20 log (3 meters) -104.77 = 24.26 dBm

Test Date: 08-08-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter Band-Edge Emission – Radiated with patch antenna
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg Ch A 2E	adi reg Ch B 2D
Output port:	Channel A and B;	High Channel Frequency:	5.715 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper Band-edge frequency: 5725 MHz
Both transmit chains active.
Polarization: Vertical
Test distance: 3 meters; receive antenna height: 1.55 meters; table rotation: 0 degrees
EIRP Limit: **-17** dBm/MHz (FCC 15.407(b)(4))

Delta-Marker at band edge:



Date: 8.AUG.2012 11:13:53

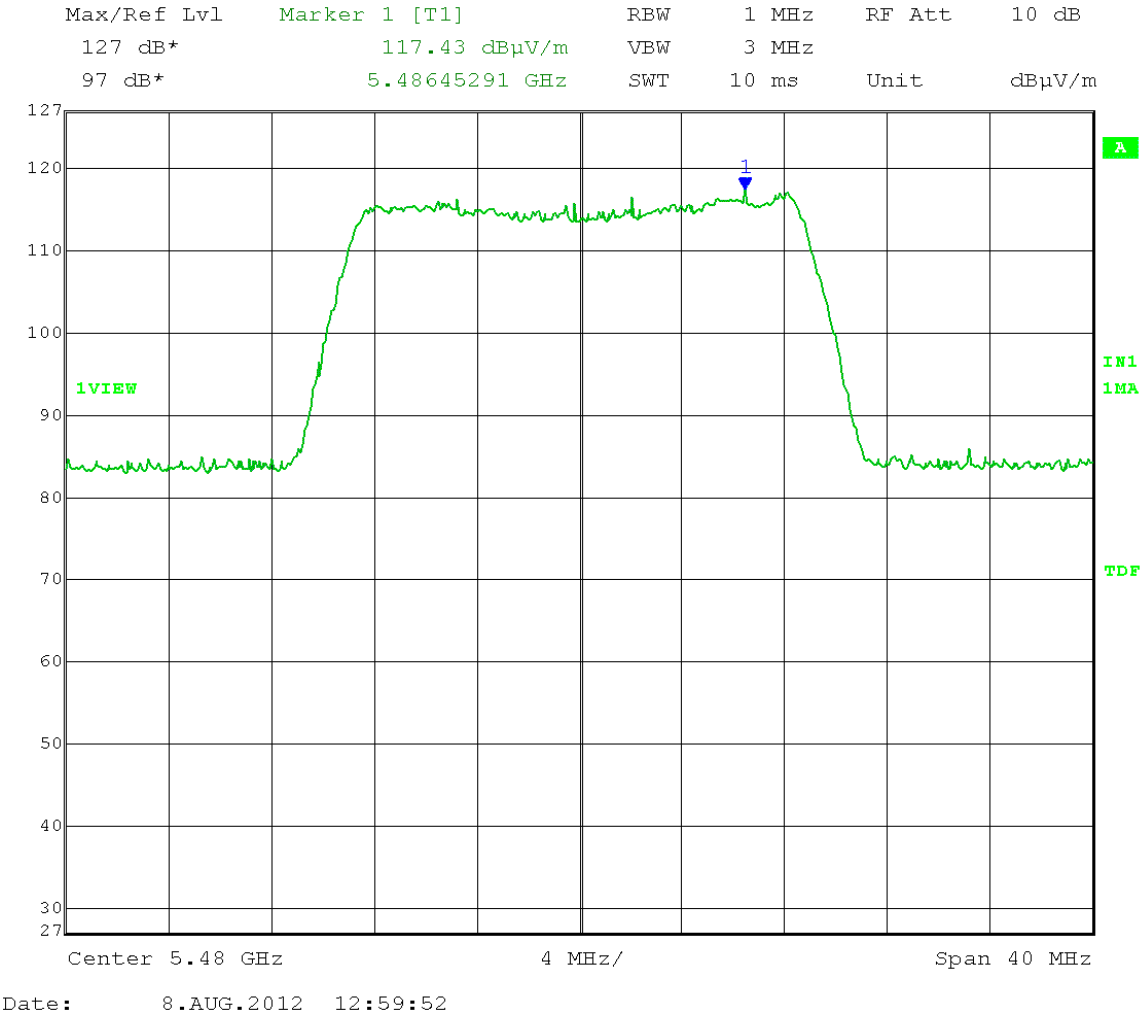
Calculated EIRP at the band edge = 24.26 dBm – 57.16 = **-32.90 dBm**

Test Date: 08-08-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter Band-Edge Emission – Radiated with patch and dish antenna
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg Ch A 65	adi reg Ch B 68
Output port:	Channel A and B;	Low Channel Frequency:	5.480 GHz
Output power setting:	19;	Modulation Type:	QPSK

Lower Band-edge frequency: 5470 MHz
Both transmit chains active.
Polarization: Horizontal
Test distance: 3 meters; receive antenna height: 1.53 meters; table rotation: 0 degrees
EIRP Limit: **-27** dBm/MHz (FCC 15.407(b)(3))

Measurement of Fundamental:



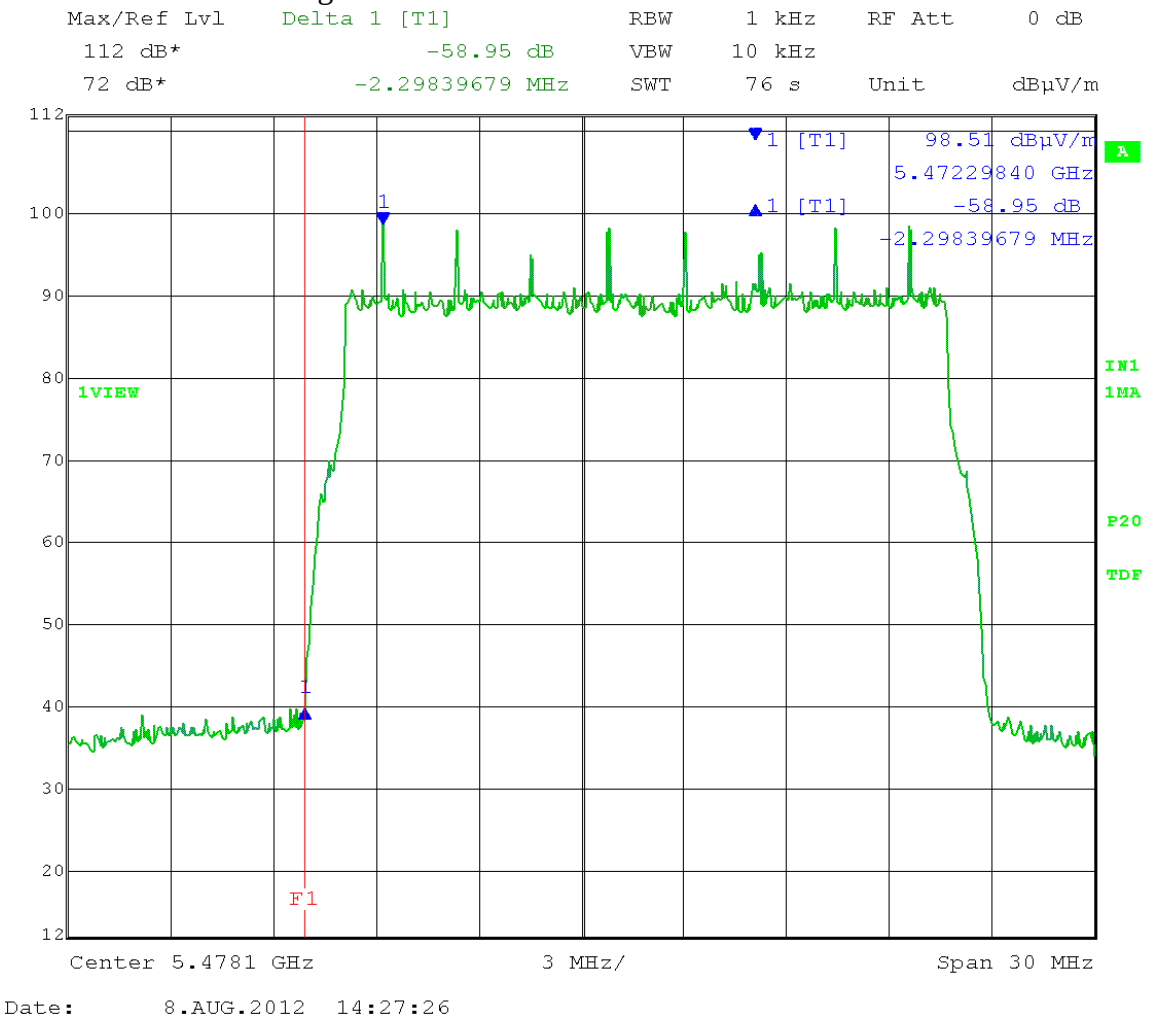
Calculated EIRP of fundamental = 117.43 dBµV/m + 20 log (3 meters) - 104.77
= 22.20 dBm

Test Date: 08-08-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter Band-Edge Emission – Radiated with patch and dish antenna
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg Ch A 65	adi reg Ch B 68
Output port:	Channel A and B;	Low Channel Frequency:	5.480 GHz
Output power setting:	19;	Modulation Type:	QPSK

Lower Band-edge frequency: 5470 MHz
Both transmit chains active.
Polarization: Horizontal
Test distance: 3 meters; receive antenna height: 1.53 meters; table rotation: 0 degrees
EIRP Limit: **-27** dBm/MHz (FCC 15.407(b)(3))

Delta-Marker at band edge:



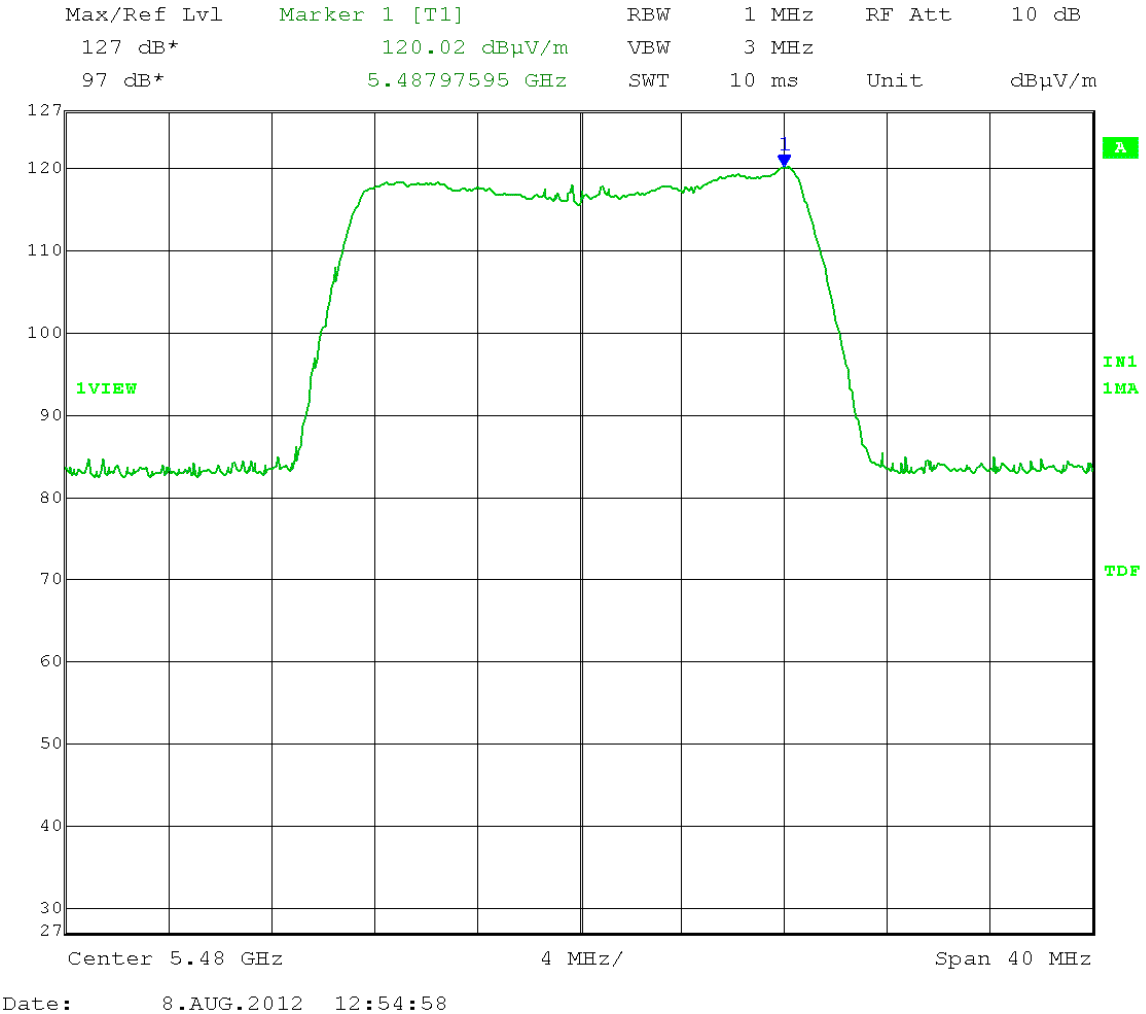
Calculated EIRP at the band edge = 22.20 dBm – 58.95 = **-36.75 dBm**

Test Date: 08-08-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter Band-Edge Emission – Radiated with patch and dish antenna
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg Ch A 65	adi reg Ch B 68
Output port:	Channel A and B;	Low Channel Frequency:	5.480 GHz
Output power setting:	19;	Modulation Type:	QPSK

Lower Band-edge frequency: 5470 MHz
Both transmit chains active.
Polarization: Vertical
Test distance: 3 meters; receive antenna height: 1.53 meters; table rotation: 0 degrees
EIRP Limit: **-27** dBm/MHz (FCC 15.407(b)(3))

Measurement of Fundamental:



Date: 8.AUG.2012 12:54:58

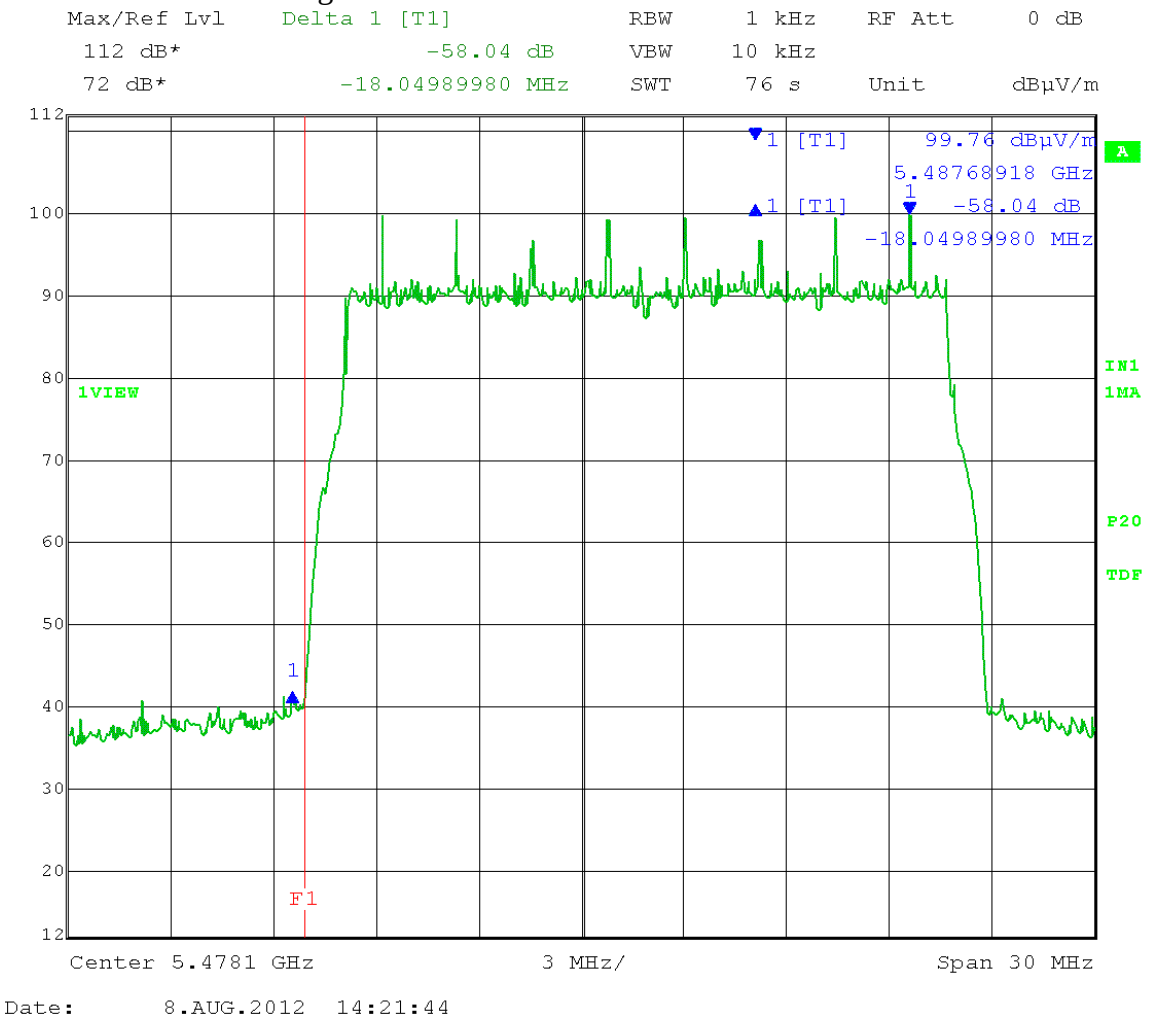
Calculated EIRP of fundamental = 120.02 dBµV/m + 20 log (3 meters) -104.77
= 24.79 dBm

Test Date: 08-08-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter Band-Edge Emission – Radiated with patch and dish antenna
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg Ch A 65	adi reg Ch B 68
Output port:	Channel A and B;	Low Channel Frequency:	5.480 GHz
Output power setting:	19;	Modulation Type:	QPSK

Lower Band-edge frequency: 5470 MHz
Both transmit chains active.
Polarization: Vertical
Test distance: 3 meters; receive antenna height: 1.53 meters; table rotation: 0 degrees
EIRP Limit: **-27** dBm/MHz (FCC 15.407(b)(3))

Delta-Marker at band edge:



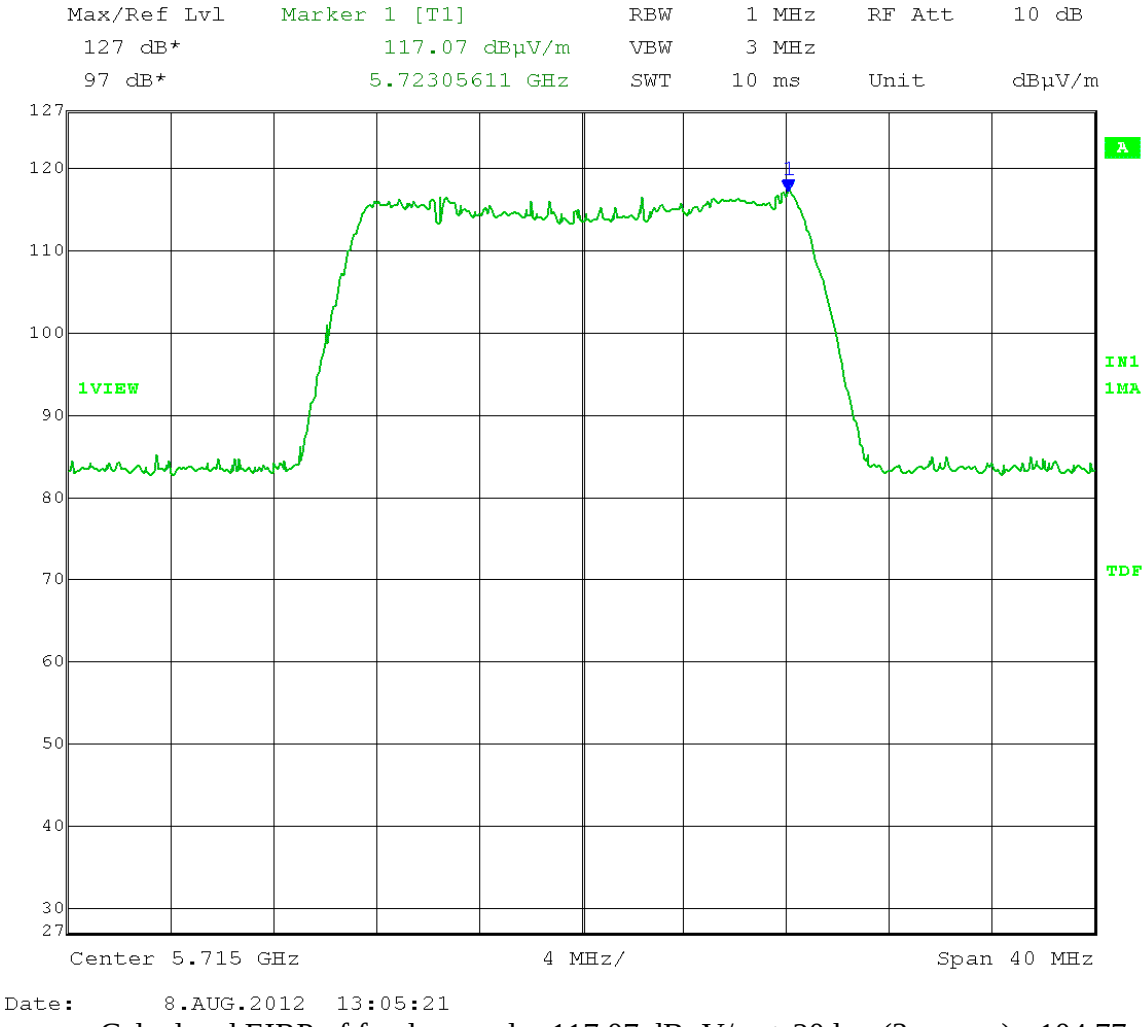
Calculated EIRP at the band edge = 24.79 dBm – 58.04 = **-33.25 dBm**

Test Date: 08-08-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter Band-Edge Emission – Radiated with patch and dish antenna
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg Ch A 70	adi reg Ch B 6F
Output port:	Channel A and B;	High Channel Frequency:	5.715 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper Band-edge frequency: 5725 MHz
Both transmit chains active.
Polarization: Horizontal
Test distance: 3 meters; receive antenna height: 1.53 meters; table rotation: 0 degrees
EIRP Limit: **-17** dBm/MHz (FCC 15.407(b)(4))

Measurement of Fundamental:



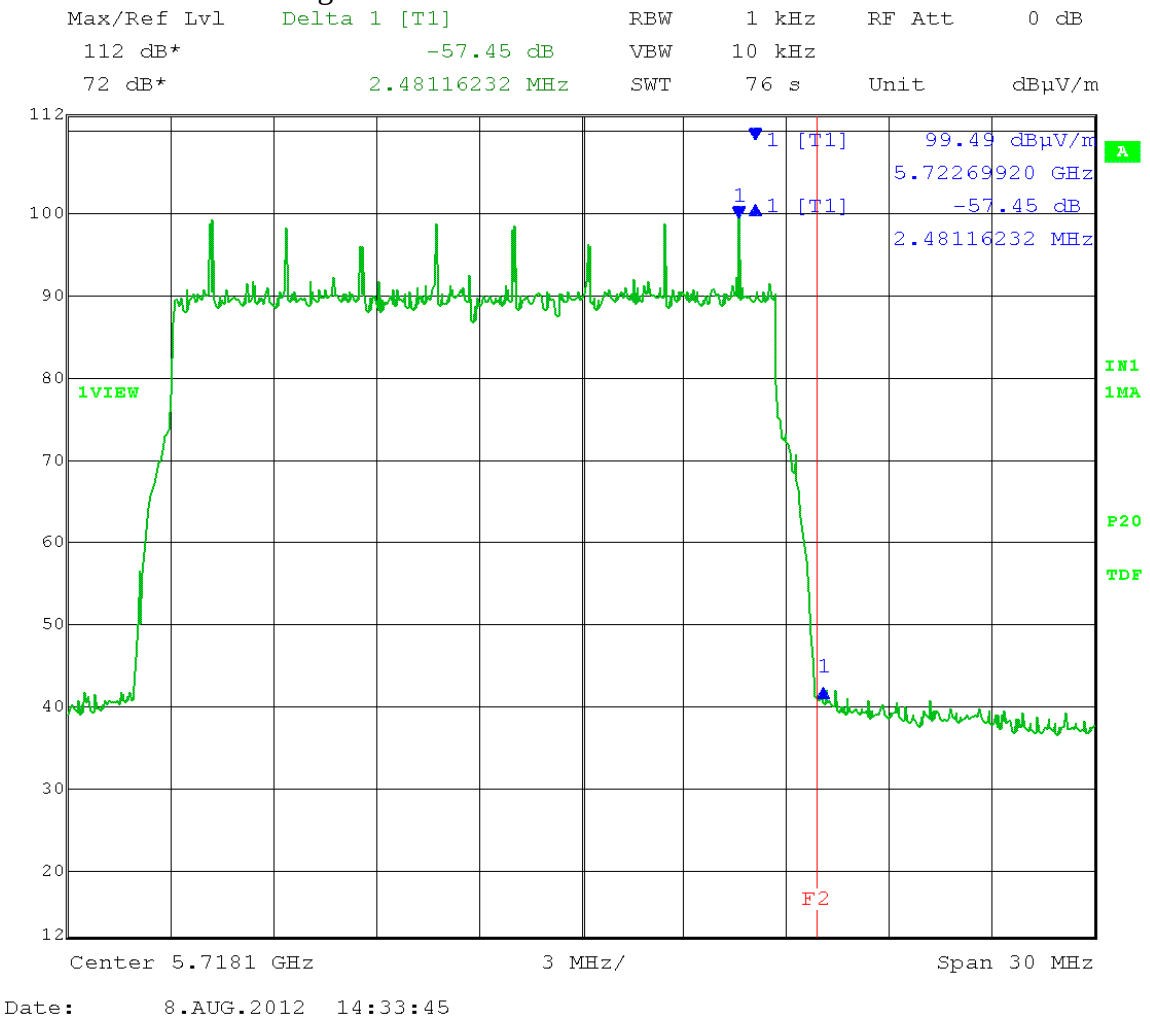
Calculated EIRP of fundamental = 117.07 dBµV/m + 20 log (3 meters) - 104.77 = 21.84 dBm

Test Date: 08-08-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter Band-Edge Emission – Radiated with patch and dish antenna
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg Ch A 70	adi reg Ch B 6F
Output port:	Channel A and B;	High Channel Frequency:	5.715 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper Band-edge frequency: 5725 MHz
Both transmit chains active.
Polarization: Horizontal
Test distance: 3 meters; receive antenna height: 1.53 meters; table rotation: 0 degrees
EIRP Limit: **-17** dBm/MHz (FCC 15.407(b)(4))

Delta-Marker at band edge:



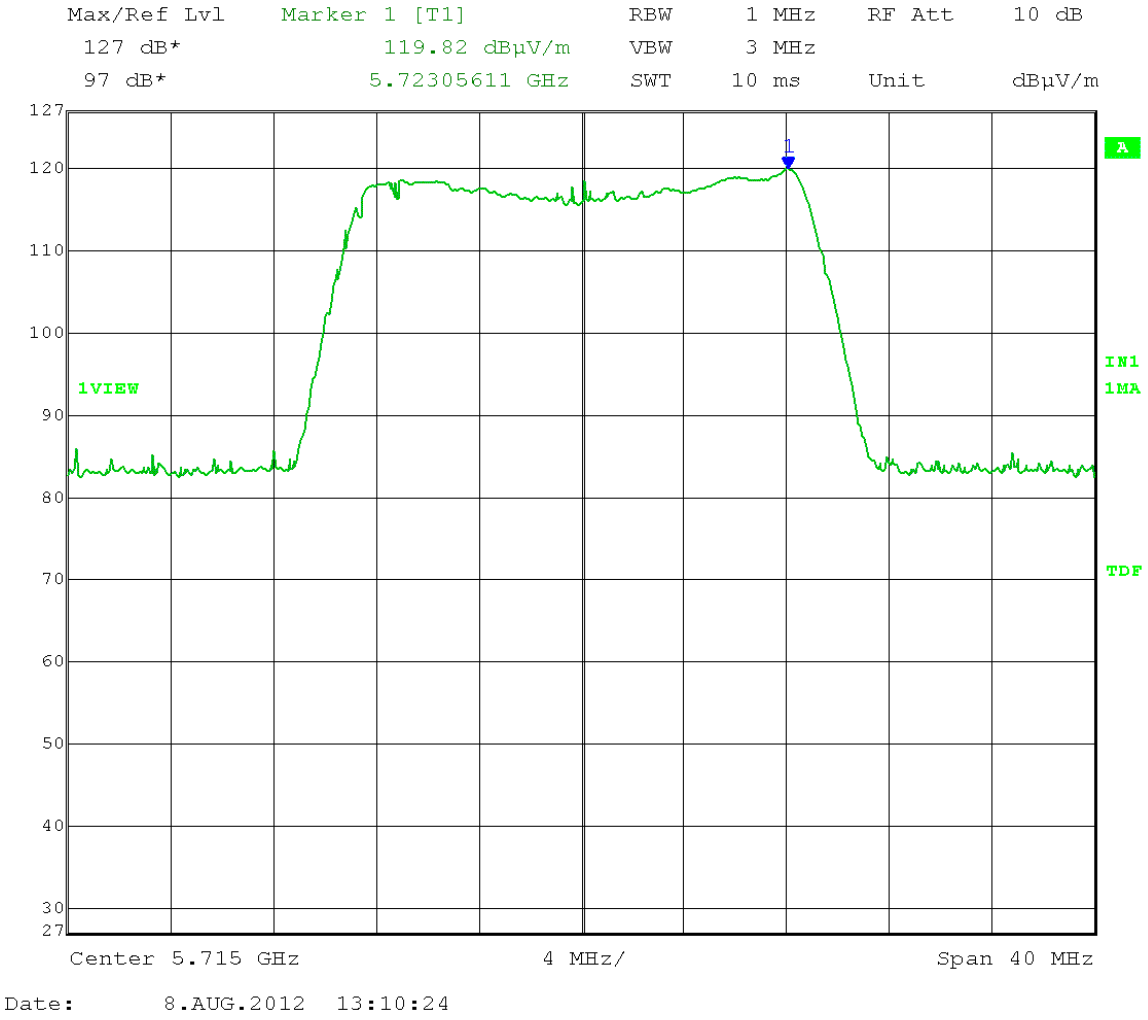
Calculated EIRP at the band edge = 21.84 dBm – 57.45 = **-35.61 dBm**

Test Date: 08-08-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter Band-Edge Emission – Radiated with patch and dish antenna
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg Ch A 70	adi reg Ch B 6F
Output port:	Channel A and B;	High Channel Frequency:	5.715 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper Band-edge frequency: 5725 MHz
Both transmit chains active.
Polarization: Vertical
Test distance: 3 meters; receive antenna height: 1.43 meters; table rotation: 0 degrees
EIRP Limit: **-17** dBm/MHz (FCC 15.407(b)(4))

Measurement of Fundamental:



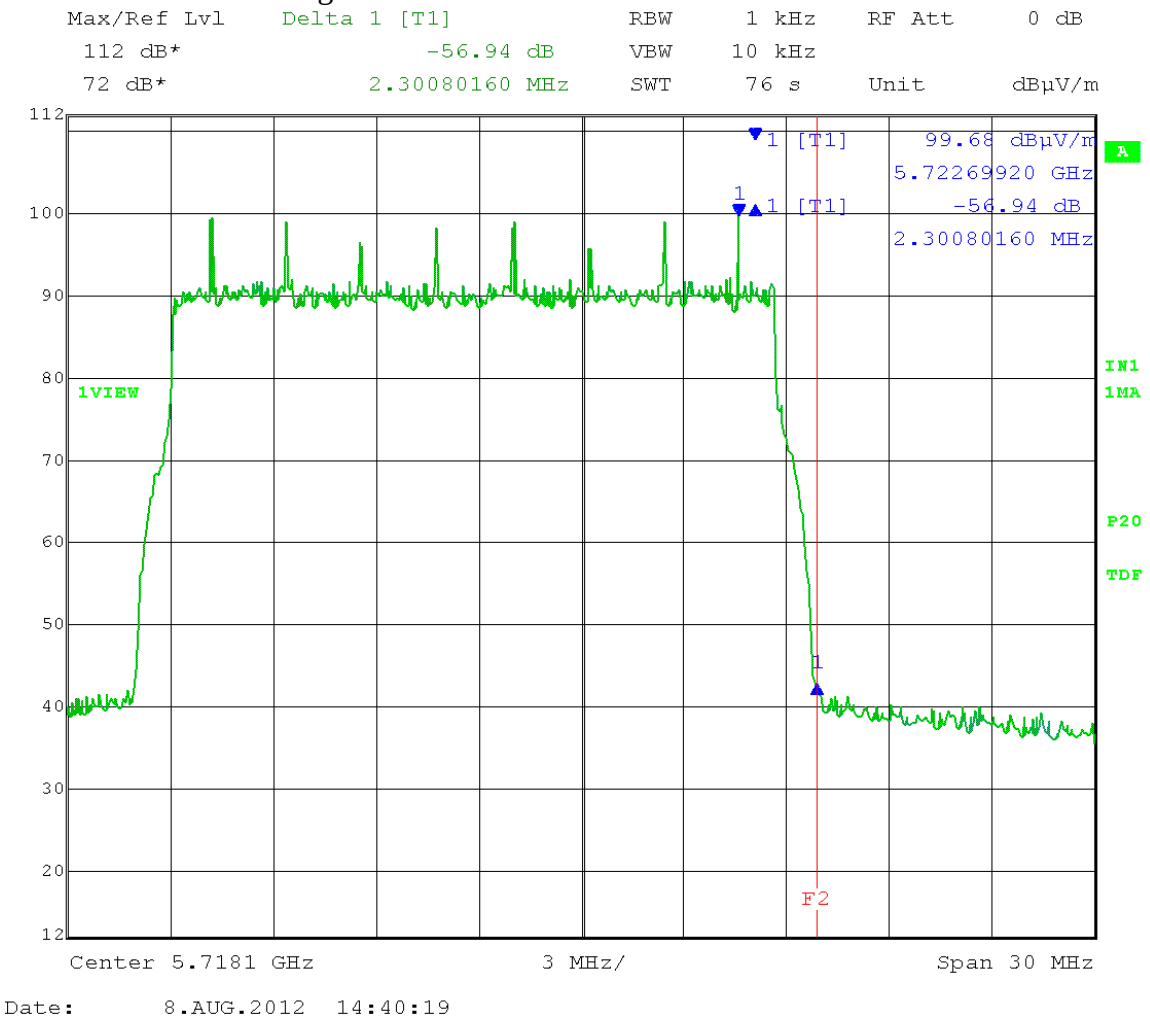
Calculated EIRP of fundamental = 119.82 dBµV/m + 20 log (3 meters) -104.77 = 24.59 dBm

Test Date: 08-08-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter Band-Edge Emission – Radiated with patch and dish antenna
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg Ch A 70	adi reg Ch B 6F
Output port:	Channel A and B;	High Channel Frequency:	5.715 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper Band-edge frequency: 5725 MHz
Both transmit chains active.
Polarization: Vertical
Test distance: 3 meters; receive antenna height: 1.43 meters; table rotation: 0 degrees
EIRP Limit: **-17** dBm/MHz (FCC 15.407(b)(4))

Delta-Marker at band edge:



Calculated EIRP at the band edge = 24.59 dBm – 56.94 = **-32.35 dBm**

A6.0 Unwanted Emission Levels – RF Conducted

Rule Section: Sections 15.407(b)(3) and 15.407(b)(6)

Test Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01 – *Guidance for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E*
Section G(1): Unwanted emissions in the restricted bands
Section G(2): Unwanted emissions outside the restricted bands
Sections G(3), G(4) and G(5): Unwanted emission levels

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)

EIRP calculation:
Add upper bound on out-of-band antenna gain to measured antenna port conducted emission power. (This is the maximum in-band gain or 2 dBi, whichever is greater)
Add 10 log(N), where N is the number of output, for MIMO operation
Add an additional 10 log(N), if the signals are correlated according to FCC KDB 662911, or if the unwanted emission is narrowband

Field strength calculation:
Above 1 GHz:
E (dBµV/m) = EIRP (dBm) – 20 log (d{meters}) + 104.77
Below 1 GHz:
E (dBµV/m) = EIRP (dBm) – 20 log (d{meters}) + 104.77 + 4.7 dB

Limits: Outside restricted bands: Peak EIRP shall not exceed -27 dBm/MHz
Inside restricted bands: Peak and Average limits of FCC Part 15.209

Notes: Measurements were taken for QPSK at the lowest, middle, and highest channels of operation. EUT was set to transmit continuously with 98% duty cycle.
Measurements for the SM were taken with the patch antenna. The patch antenna uses the highest transmitter output power setting.

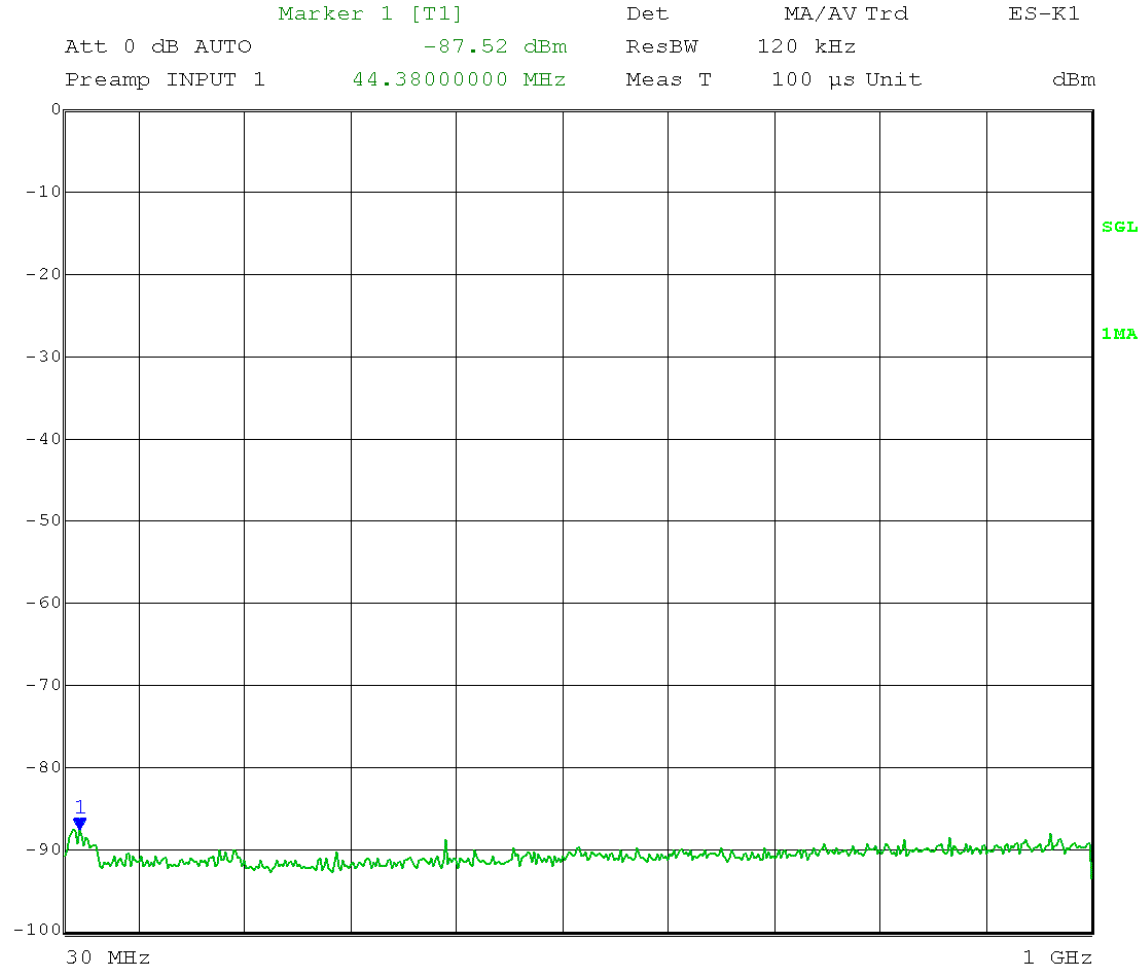
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	10 MHz	adi reg 28	26 dB EBW: 9.72 MHz
Output port:	Channel A;	Low Channel Frequency:	5.475 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
Field strength limit: FCC Sections 15.209 and 15.205 (emissions in restricted bands)

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 30 MHz to 1 GHz; Peak detector



Date: 3.AUG.2012 08:50:21

No emissions found from 30 MHz to 1 GHz

Calculated Field Strength at noise floor = -87.52 dBm + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 + 4.7 dB = 24.41 dBµV/m Peak

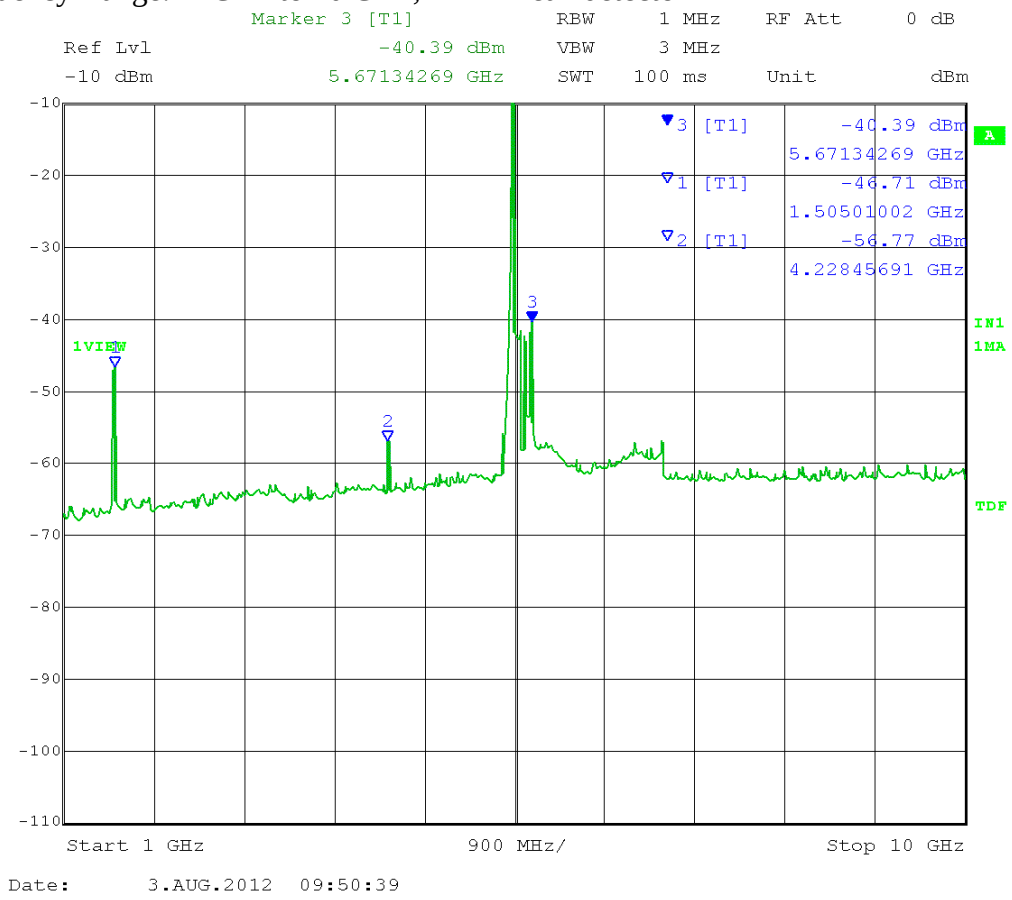
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	10 MHz	adi reg 28	26 dB EBW: 9.72 MHz
Output port:	Channel A;	Low Channel Frequency:	5.475 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 1 GHz to 10 GHz; Peak detector



Marker 1: Calculated Field Strength (Restricted Band) = -46.71 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 60.52 dBµV/m Peak
Marker 2: Calculated Field Strength (Restricted Band) = -56.77 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 50.46 dBµV/m Peak
Marker 3: Calculated EIRP = -40.39 dBm + 9 dBi antenna gain + 3 dB (MIMO) = -28.39 dBm

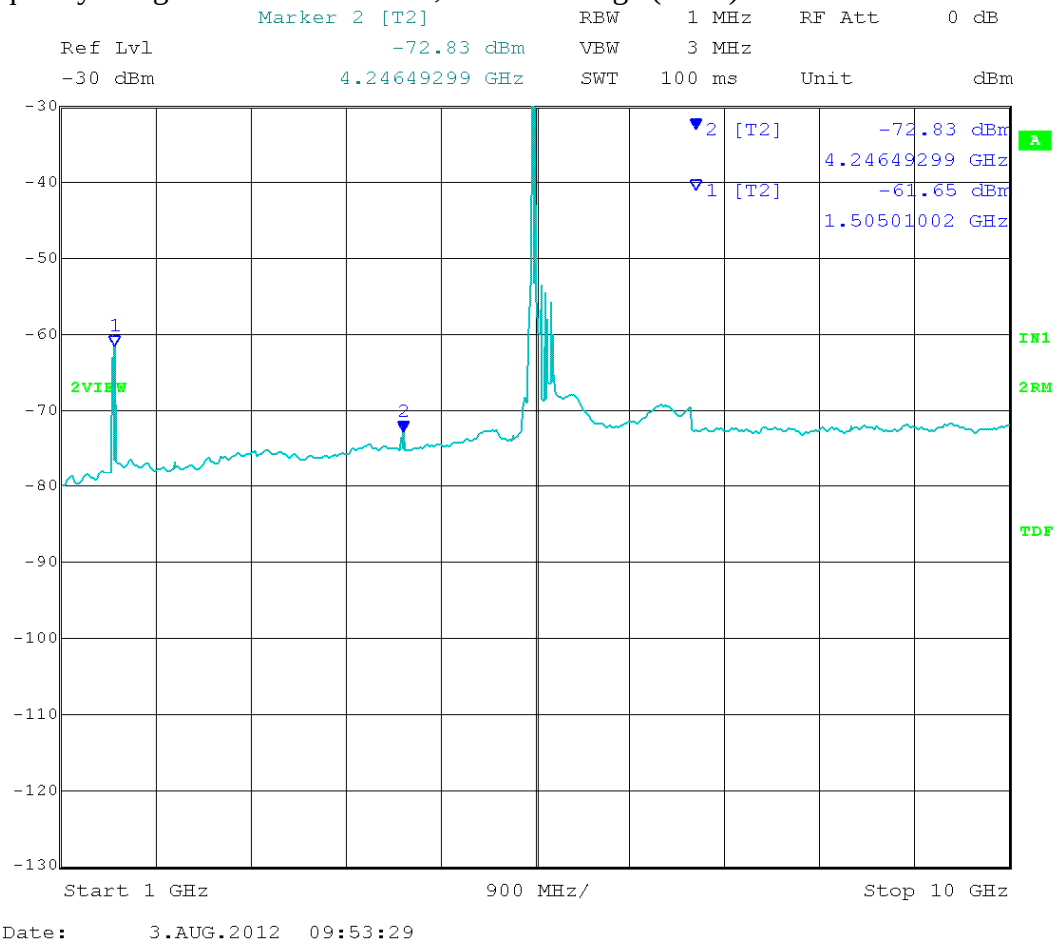
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	10 MHz	adi reg 28	26 dB EBW: 9.72 MHz
Output port:	Channel A;	Low Channel Frequency:	5.475 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 1 GHz to 10 GHz; Average (RMS) detector



Marker 1: Calculated Field Strength (Restricted Band) = -61.65 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 45.58 dBµV/m Average
Marker 2: Calculated Field Strength (Restricted Band) = -72.83 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 34.40 dBµV/m Average

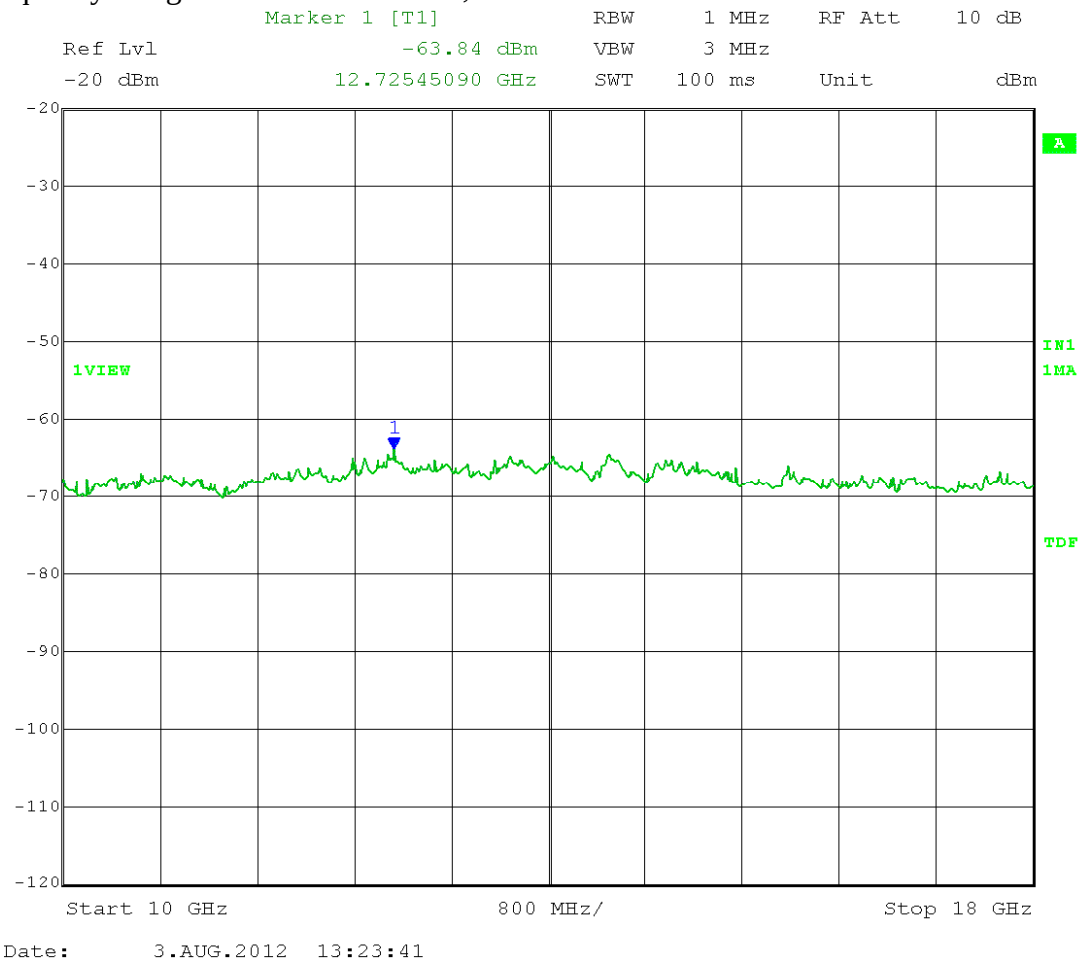
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	10 MHz	adi reg 28	26 dB EBW: 9.72 MHz
Output port:	Channel A;	Low Channel Frequency:	5.475 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 10 GHz to 18 GHz; Peak detector



Calculated EIRP at noise floor = -63.84 dBm + 9 dBi antenna gain + 3 dB (MIMO)
= -51.84 dBm
Calculated Field Strength at noise floor = -63.84 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 43.39 dBµV/m Peak

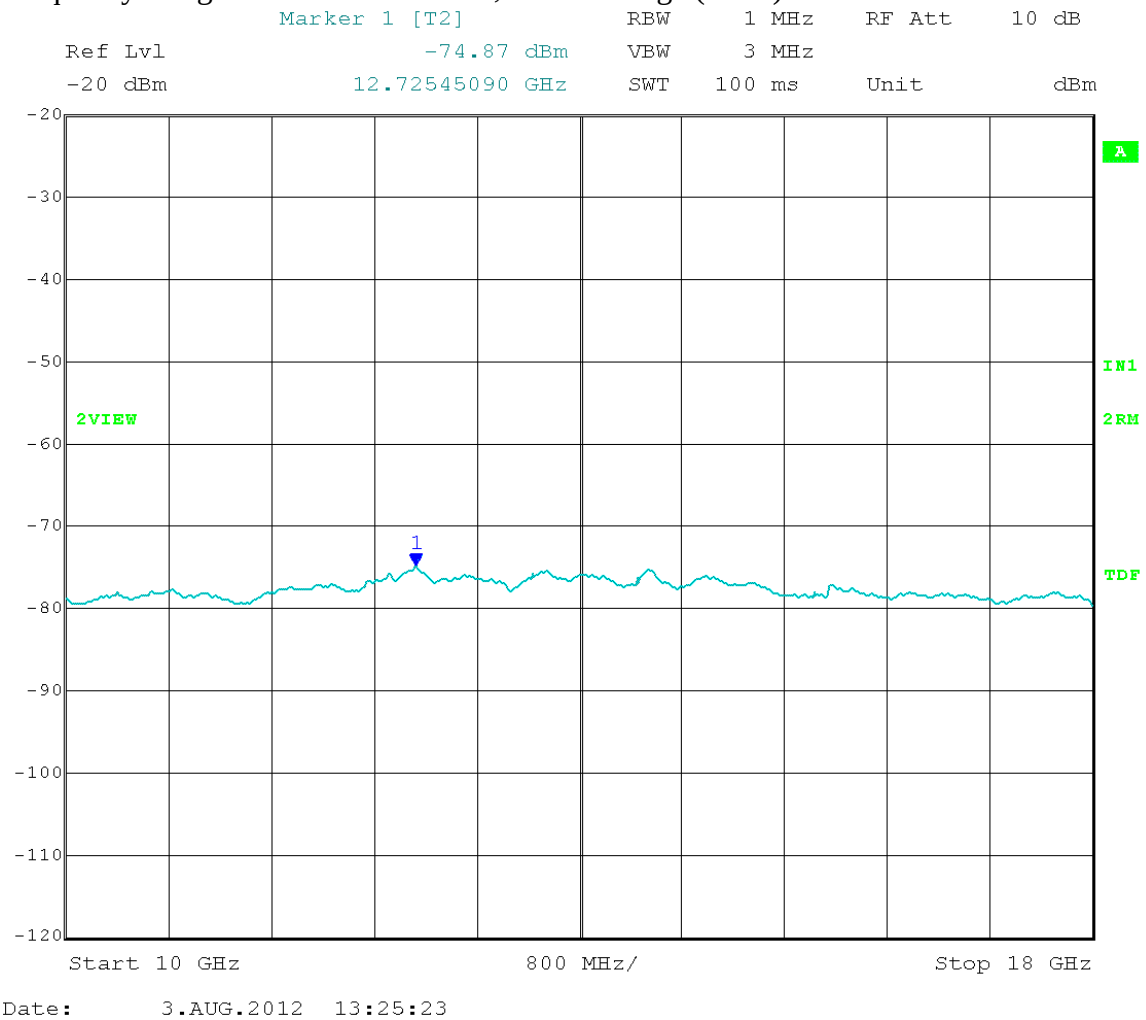
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	10 MHz	adi reg 28	26 dB EBW: 9.72 MHz
Output port:	Channel A;	Low Channel Frequency:	5.475 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 10 GHz to 18 GHz; Average (RMS) detector



Date: 3.AUG.2012 13:25:23

Calculated Field Strength at noise floor = -74.87 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 32.36 dBµV/m Average

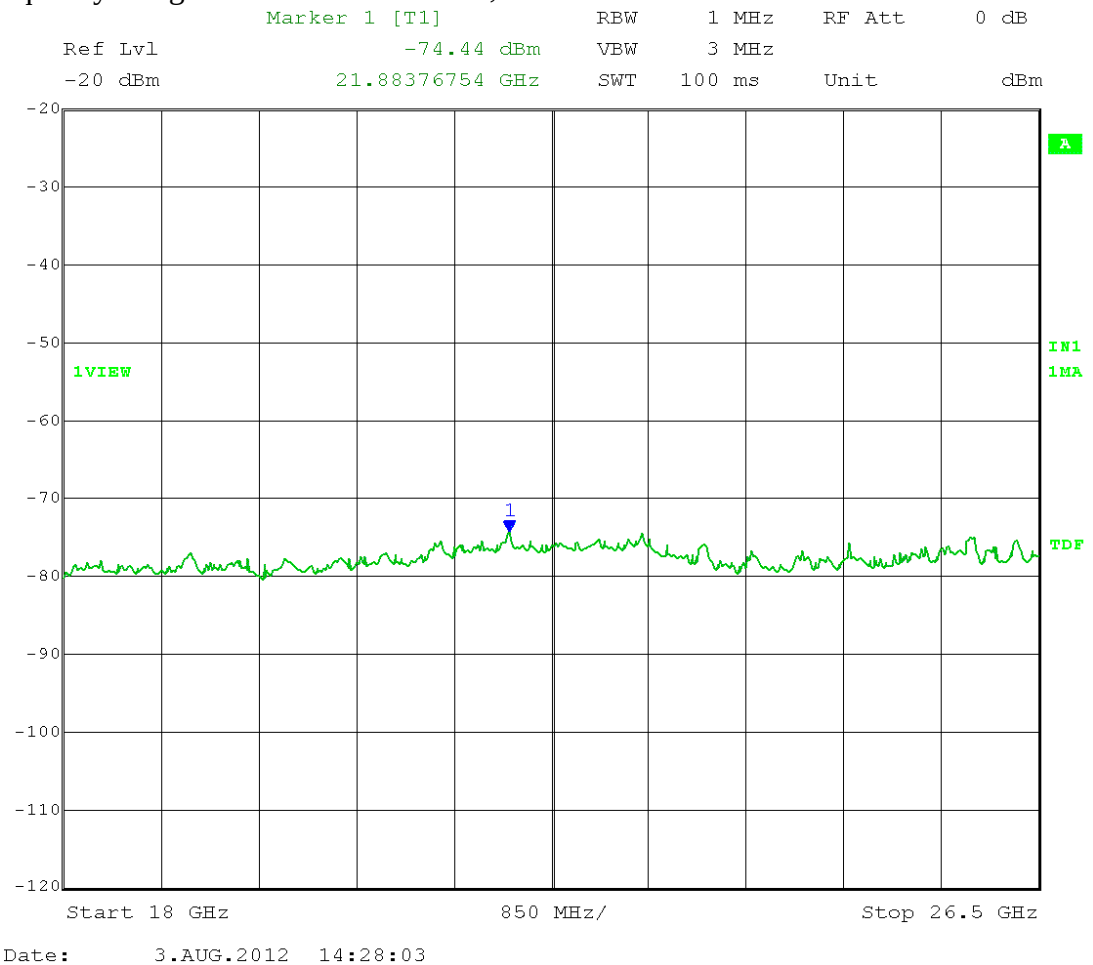
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	10 MHz	adi reg 28	26 dB EBW: 9.72 MHz
Output port:	Channel A;	Low Channel Frequency:	5.475 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 18 GHz to 26.5 GHz; Peak detector



Calculated EIRP at noise floor = -74.44 dBm + 9 dBi antenna gain + 3 dB (MIMO)
= -62.44 dBm
Calculated Field Strength at noise floor = -74.44 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 32.79 dBµV/m Peak

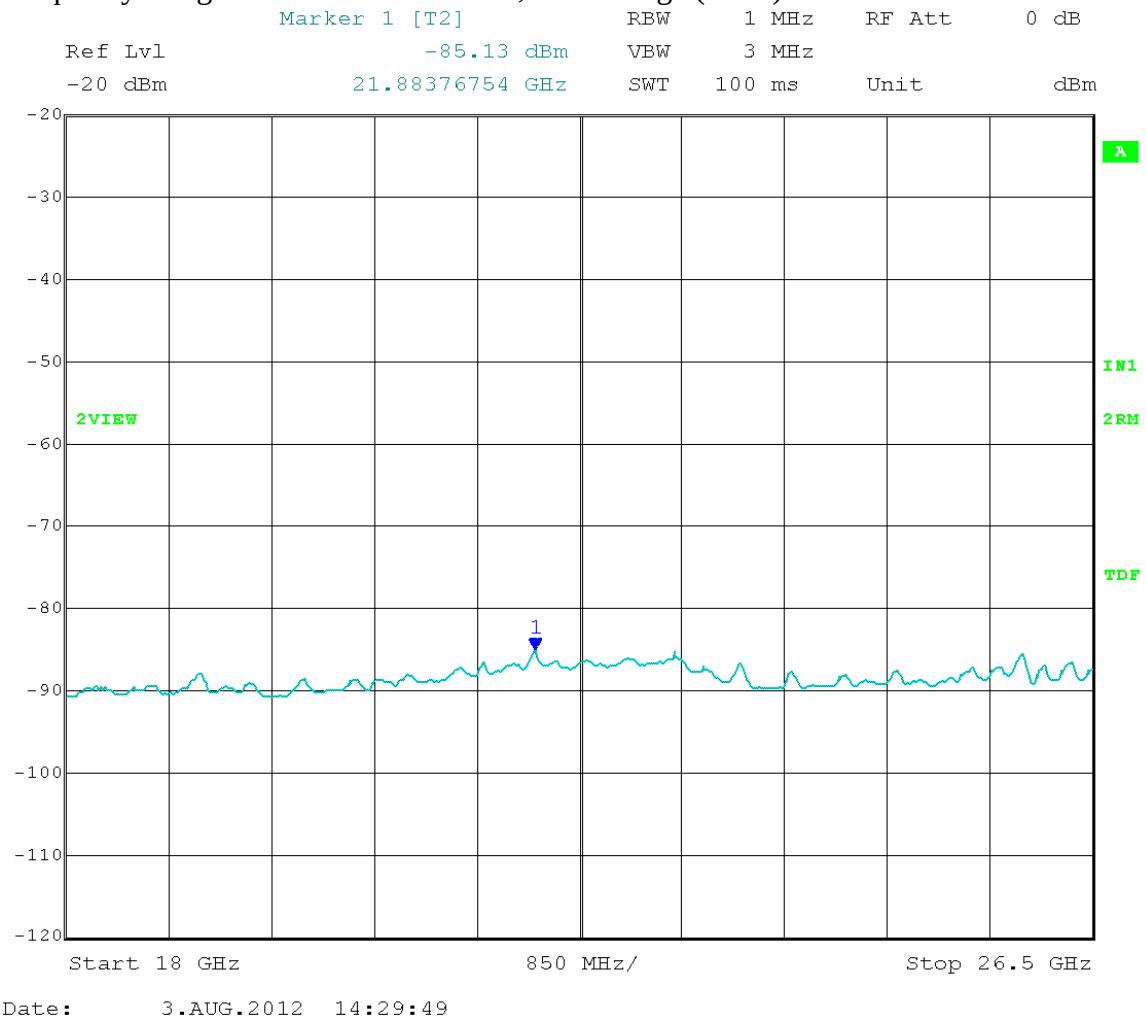
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	10 MHz	adi reg 28	26 dB EBW: 9.72 MHz
Output port:	Channel A;	Low Channel Frequency:	5.475 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 18 GHz to 26.5 GHz; Average (RMS) detector



Date: 3.AUG.2012 14:29:49

Calculated Field Strength at noise floor = -85.13 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 22.10 dBµV/m Average

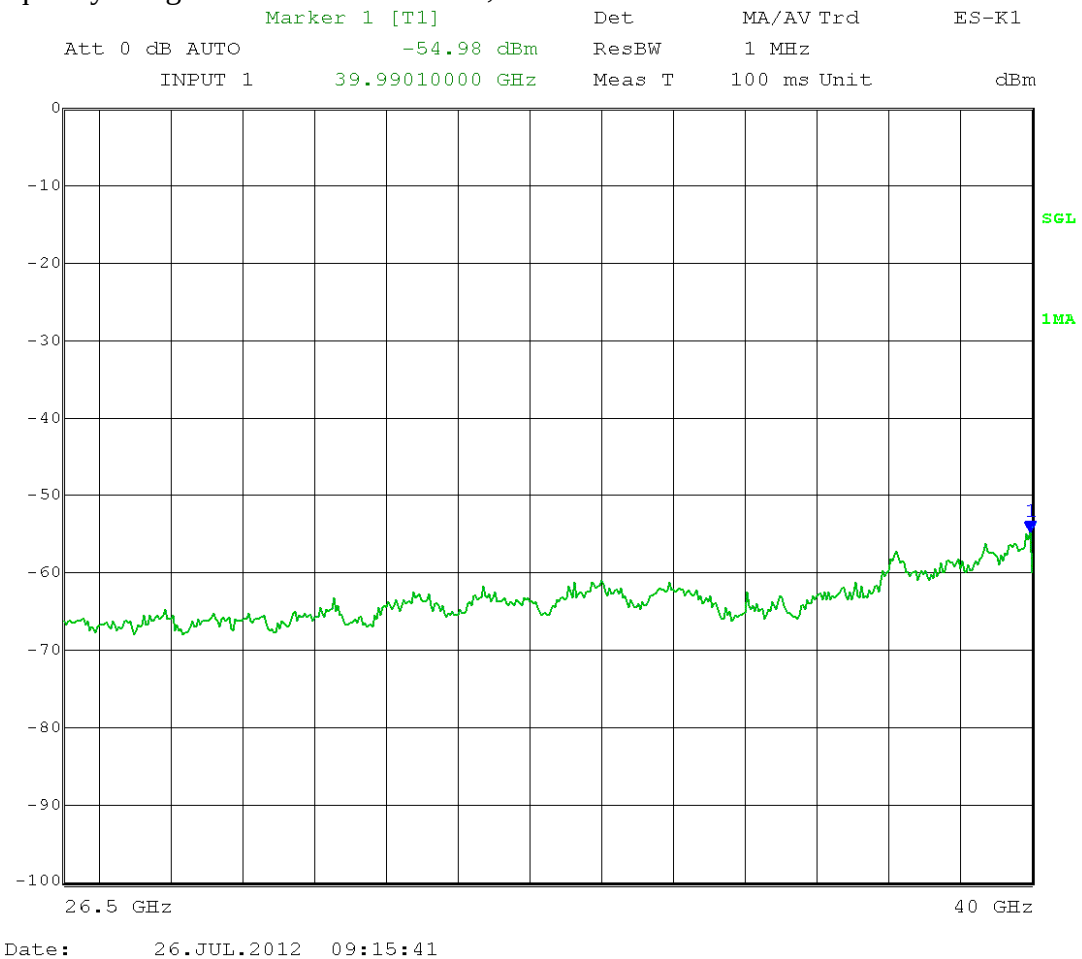
Test Date: 07-26-2012
Company: Cambium Networks
EUT: PMP450AP 5.4 GHz MIMO/COMBO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	10 MHz	adi reg 4C	26 dB EBW: 9.72 MHz
Output port:	Channel A;	Low Channel Frequency:	5.475 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 17 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 26.5 GHz to 40 GHz; Peak detector



Calculated EIRP at noise floor = -54.98 dBm + 17 dBi antenna gain + 3 dB (MIMO)
= -34.98 dBm
Calculated Field Strength at noise floor = -54.98 + 17 dBi antenna gain + 3 dB (MIMO)
– 20 log (3 meters) + 104.77 = 60.25 dBµV/m Peak

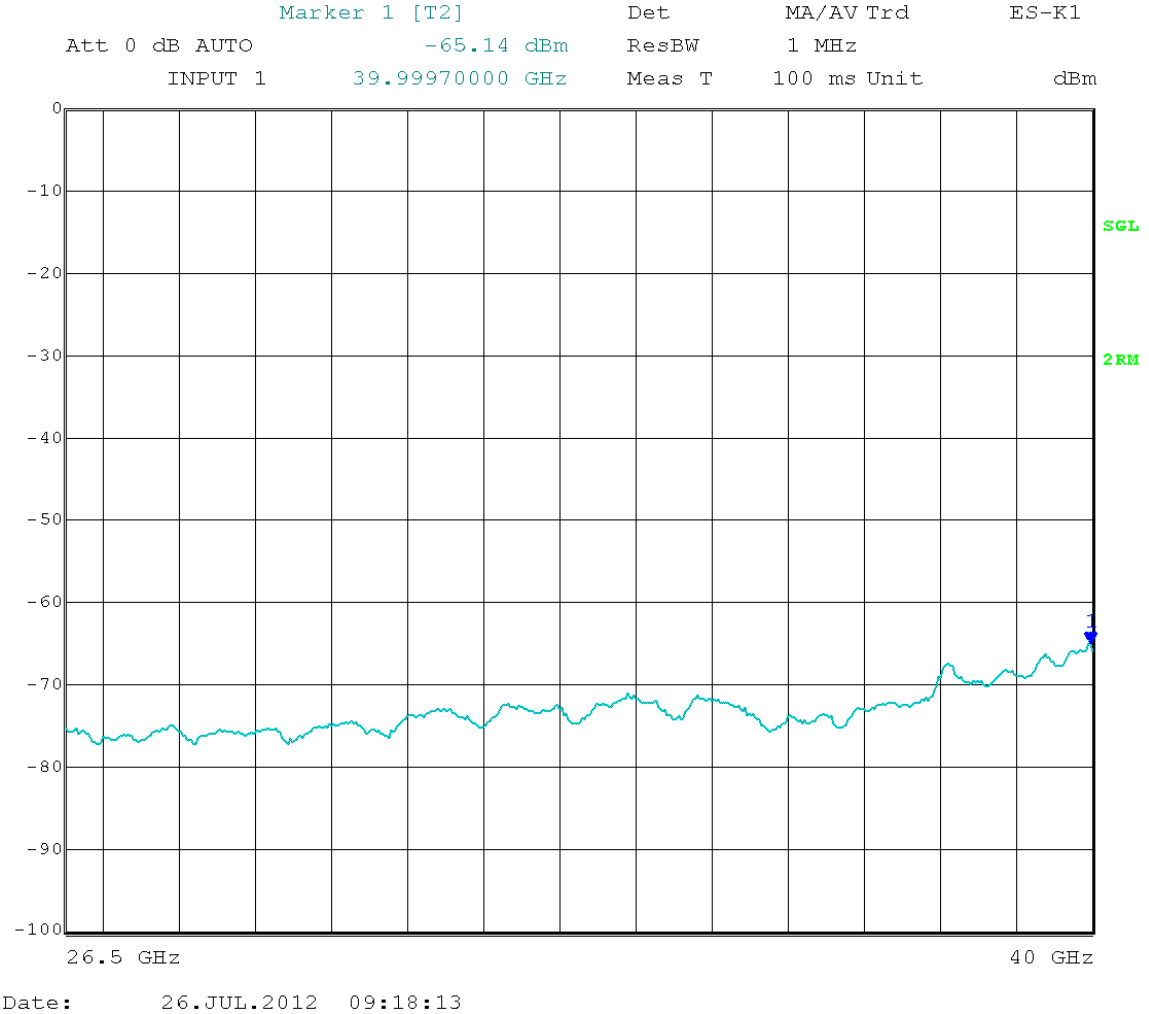
Test Date: 07-26-2012
Company: Cambium Networks
EUT: PMP450AP 5.4 GHz MIMO/COMBO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	10 MHz	adi reg 4C	26 dB EBW: 9.72 MHz
Output port:	Channel A;	Low Channel Frequency:	5.475 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 17 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 26.5 GHz to 40 GHz; Average (RMS) detector



Calculated Field Strength at noise floor = -65.14 + 17 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 50.09 dBµV/m Average

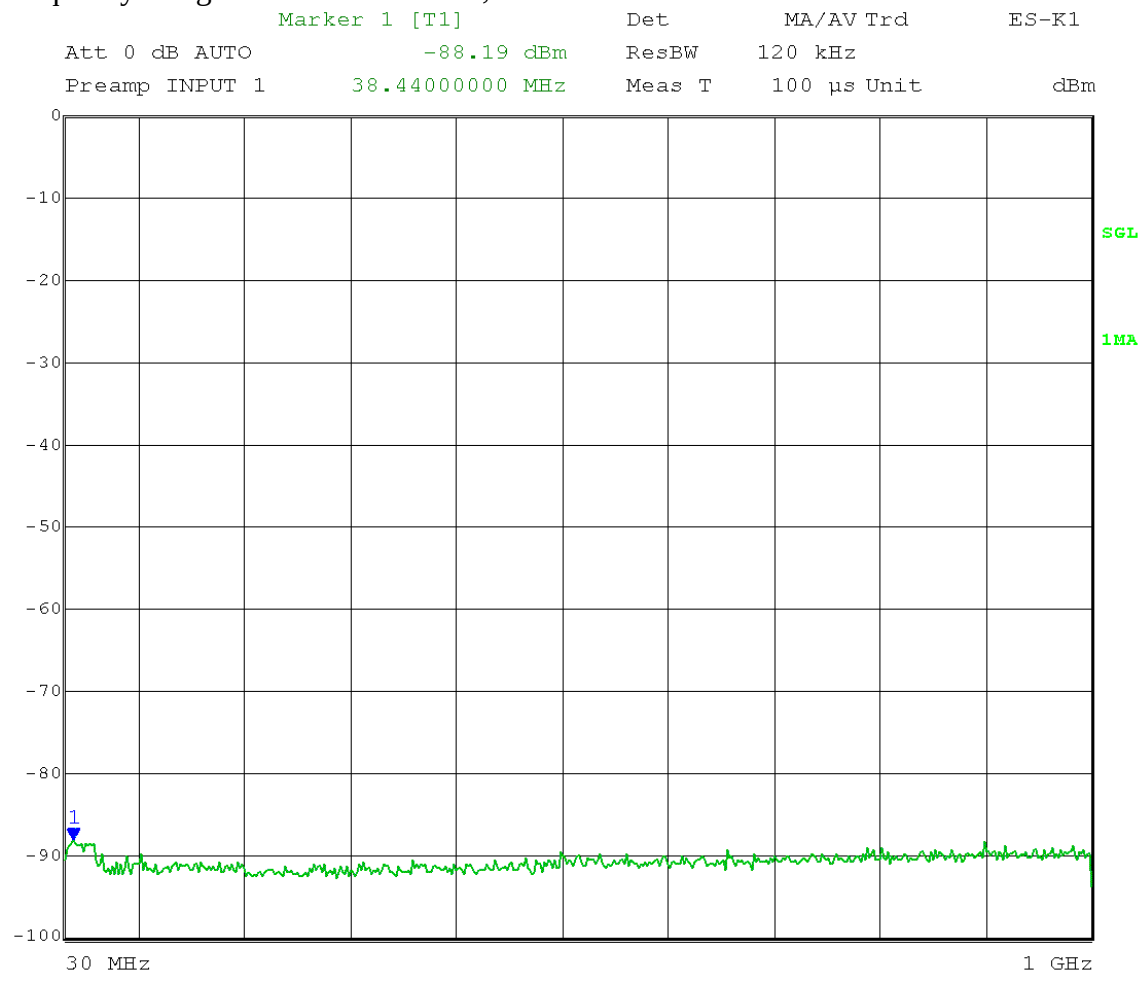
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	10 MHz	adi reg 35	26 dB EBW: 9.72 MHz
Output port:	Channel A;	Mid Channel Frequency:	5.575 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
Field strength limit: FCC Sections 15.209 and 15.205 (emissions in restricted bands)

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 30 MHz to 1 GHz; Peak detector



Date: 3.AUG.2012 08:57:39

No emissions found from 30 MHz to 1 GHz

Calculated Field Strength at noise floor = -88.19 dBm + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 + 4.7 dB = 23.74 dBµV/m Peak

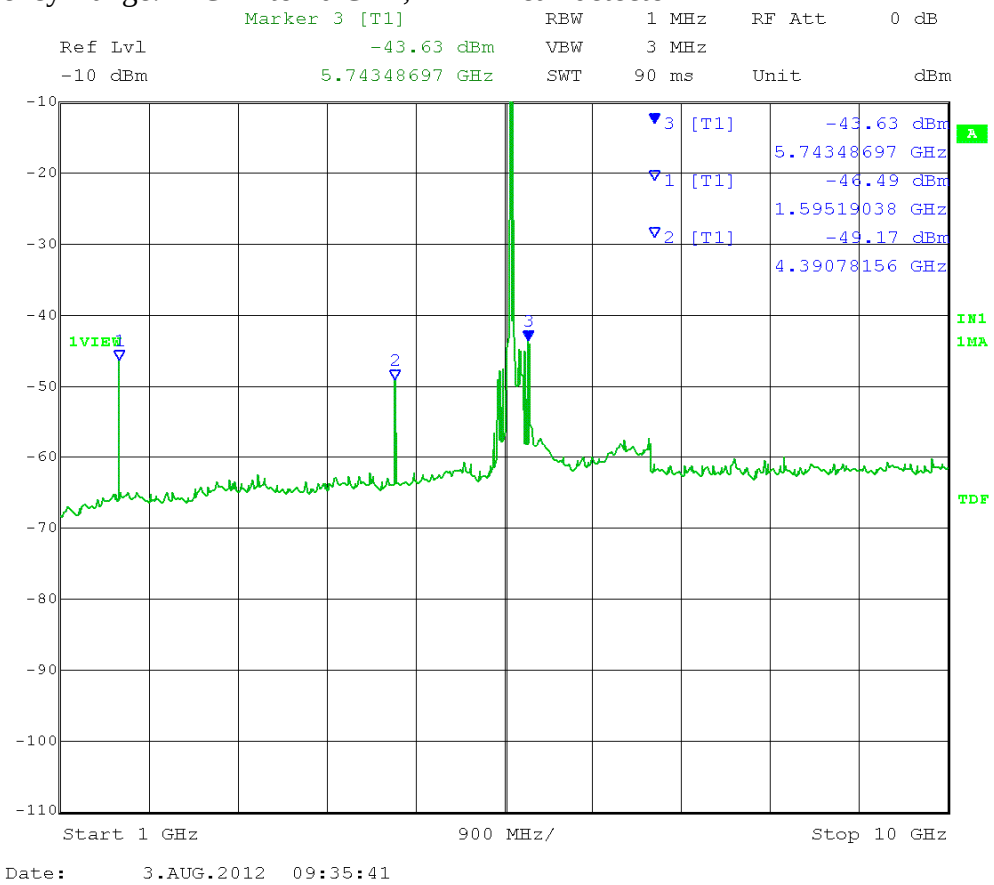
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	10 MHz	adi reg 35	26 dB EBW: 9.72 MHz
Output port:	Channel A;	Mid Channel Frequency:	5.575 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 1 GHz to 10 GHz; Peak detector



Marker 1: Calculated Field Strength (Restricted Band) = -46.49 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 60.74 dBµV/m Peak
Marker 2: Calculated Field Strength (Restricted Band) = -49.17 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 58.06 dBµV/m Peak
Marker 3: Calculated EIRP = -43.63 dBm + 9 dBi antenna gain + 3 dB (MIMO) = -31.63 dBm

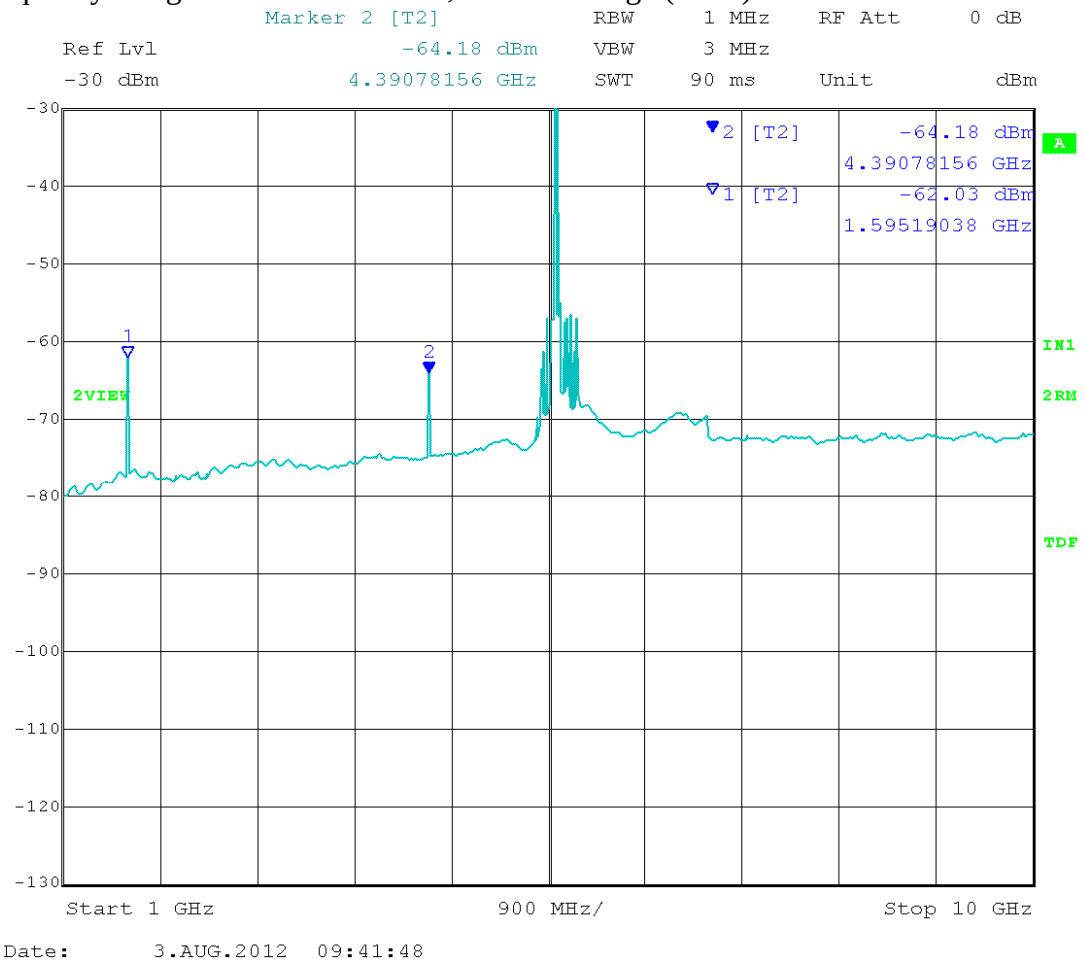
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	10 MHz	adi reg 35	26 dB EBW: 9.72 MHz
Output port:	Channel A;	Mid Channel Frequency:	5.575 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 1 GHz to 10 GHz; Average (RMS) detector



Marker 1: Calculated Field Strength (Restricted Band) = -62.03 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 45.20 dBµV/m Average
Marker 2: Calculated Field Strength (Restricted Band) = -64.18 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 43.05 dBµV/m Average

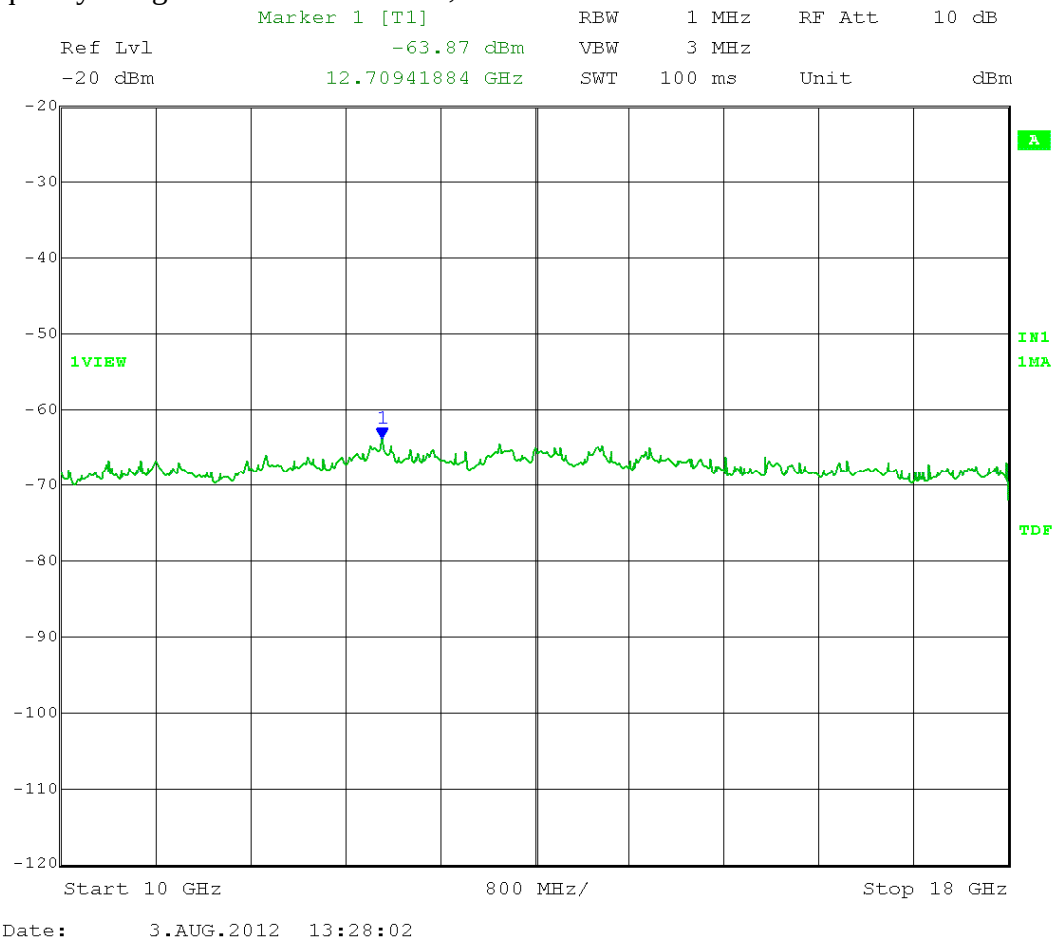
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	10 MHz	adi reg 35	26 dB EBW: 9.72 MHz
Output port:	Channel A;	Mid Channel Frequency:	5.575 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 10 GHz to 18 GHz; Peak detector



Calculated EIRP at noise floor = -63.87 dBm + 9 dBi antenna gain + 3 dB (MIMO)
= -51.87 dBm
Calculated Field Strength at noise floor = -63.87 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 43.36 dBµV/m Peak

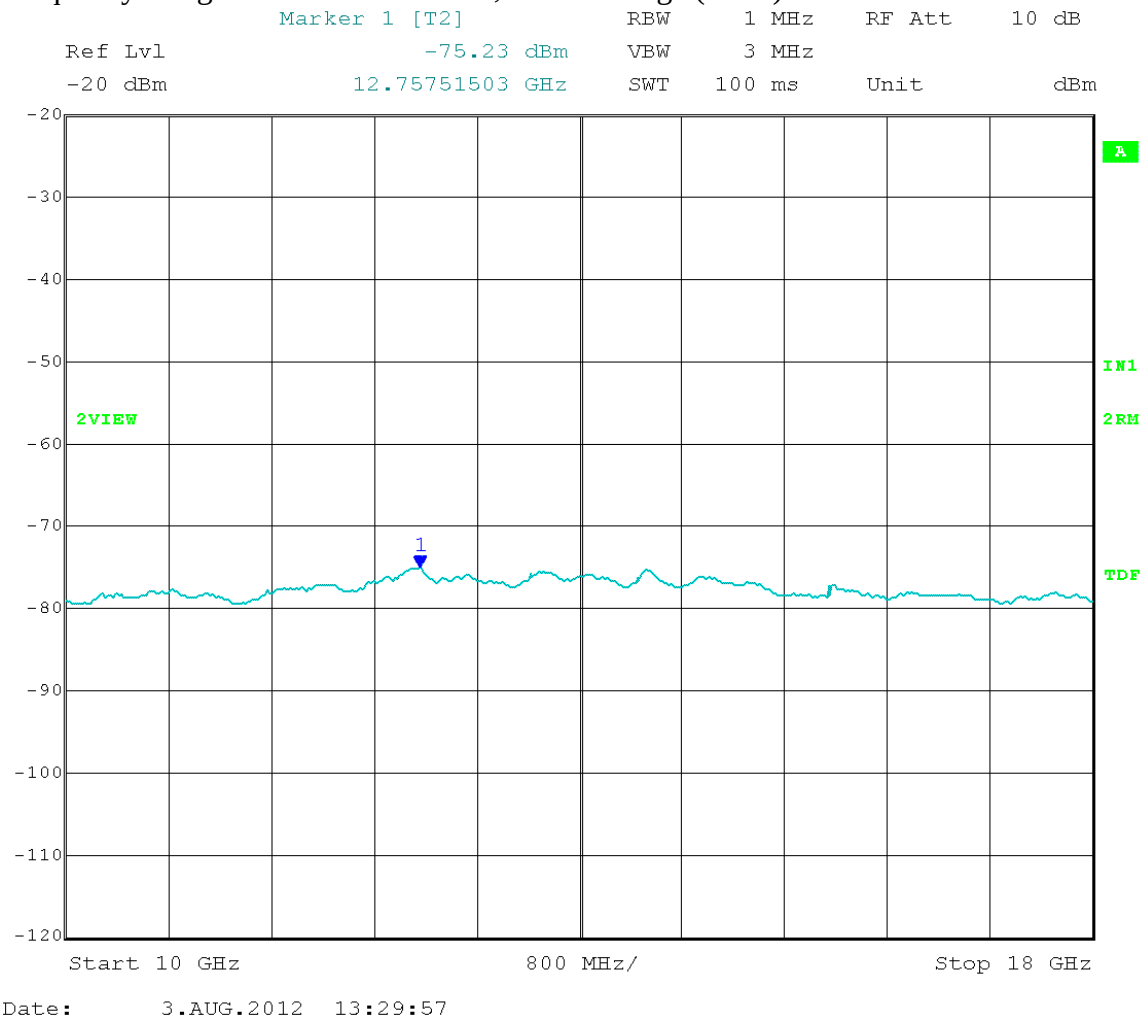
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	10 MHz	adi reg 35	26 dB EBW: 9.72 MHz
Output port:	Channel A;	Mid Channel Frequency:	5.575 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 10 GHz to 18 GHz; Average (RMS) detector



Date: 3.AUG.2012 13:29:57

Calculated Field Strength at noise floor = -75.23 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 32.00 dBµV/m Average

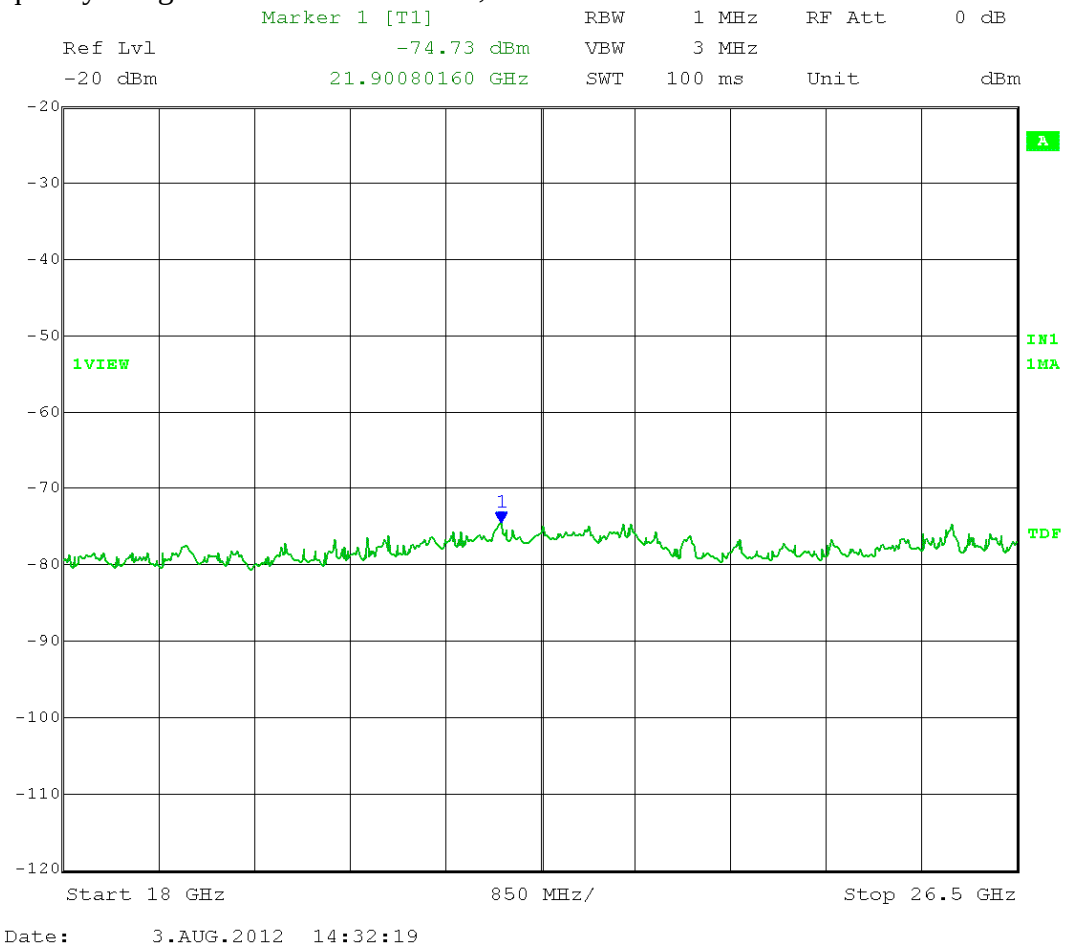
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	10 MHz	adi reg 35	26 dB EBW: 9.72 MHz
Output port:	Channel A;	Mid Channel Frequency:	5.575 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 18 GHz to 26.5 GHz; Peak detector



Calculated EIRP at noise floor = -74.73 dBm + 9 dBi antenna gain + 3 dB (MIMO)
= -62.73 dBm
Calculated Field Strength at noise floor = -74.73 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 32.50 dBµV/m Peak

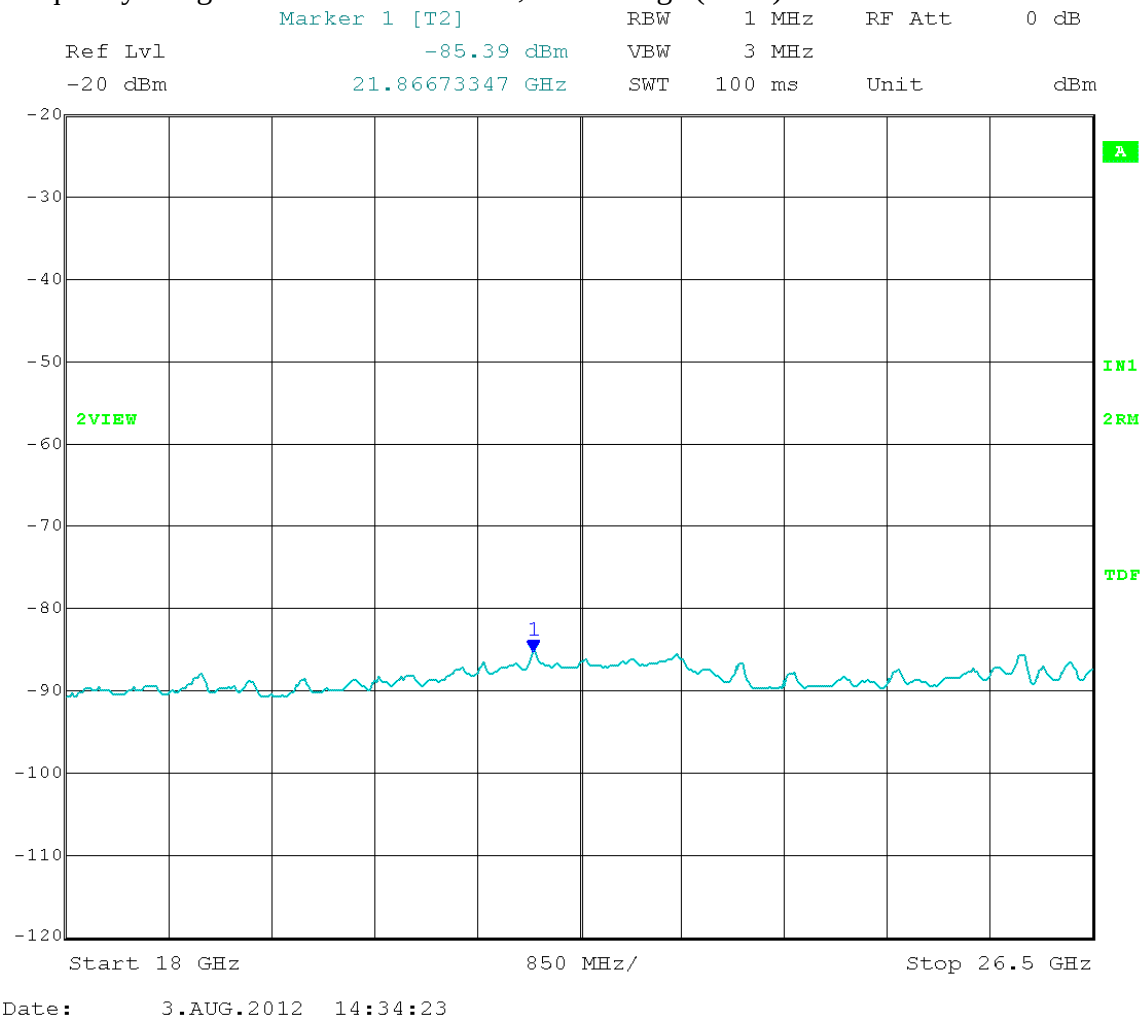
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	10 MHz	adi reg 35	26 dB EBW: 9.72 MHz
Output port:	Channel A;	Mid Channel Frequency:	5.575 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 18 GHz to 26.5 GHz; Average (RMS) detector



Date: 3.AUG.2012 14:34:23

Calculated Field Strength at noise floor = -85.39 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 21.84 dBµV/m Average

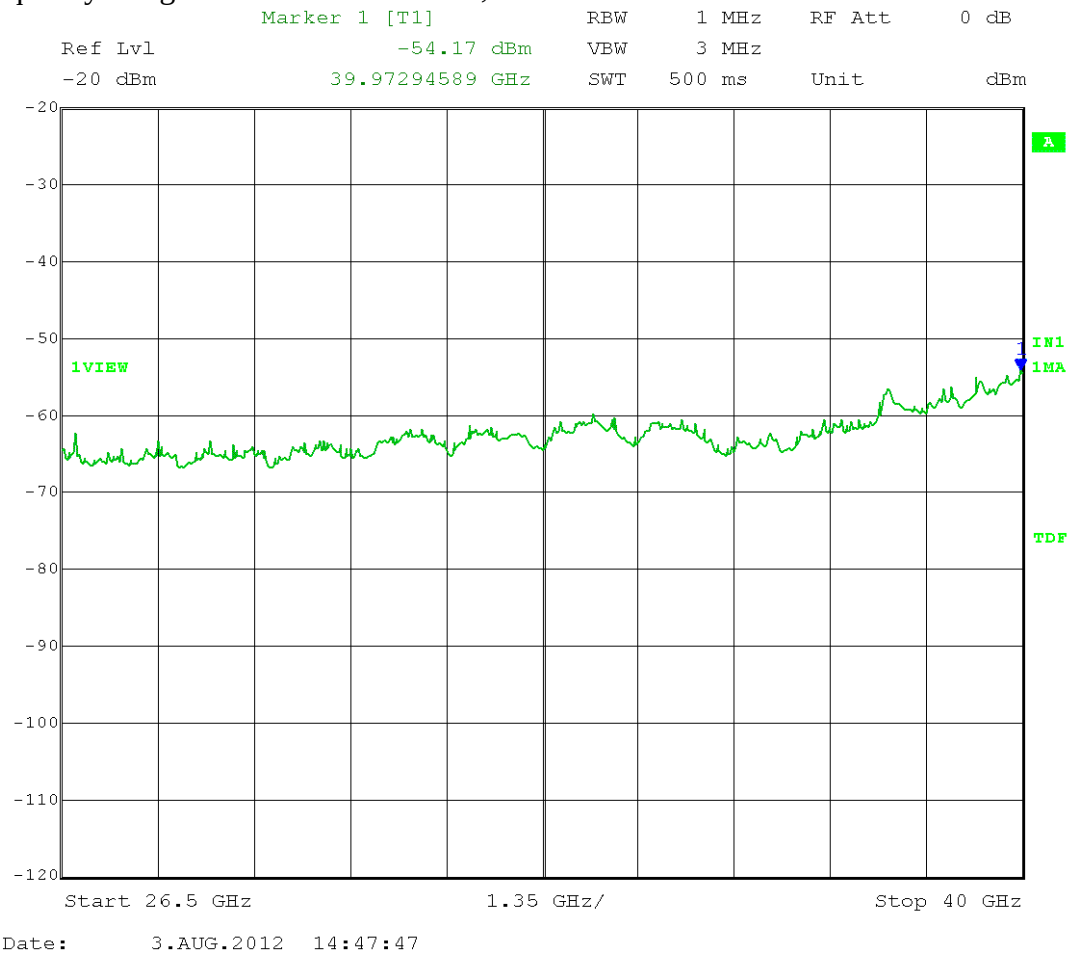
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	10 MHz	adi reg 35	26 dB EBW: 9.72 MHz
Output port:	Channel A;	Mid Channel Frequency:	5.575 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 26.5 GHz to 40 GHz; Peak detector



Calculated EIRP at noise floor = -54.17 dBm + 9 dBi antenna gain + 3 dB (MIMO)
= -42.17 dBm
Calculated Field Strength at noise floor = -54.17 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 53.06 dBµV/m Peak

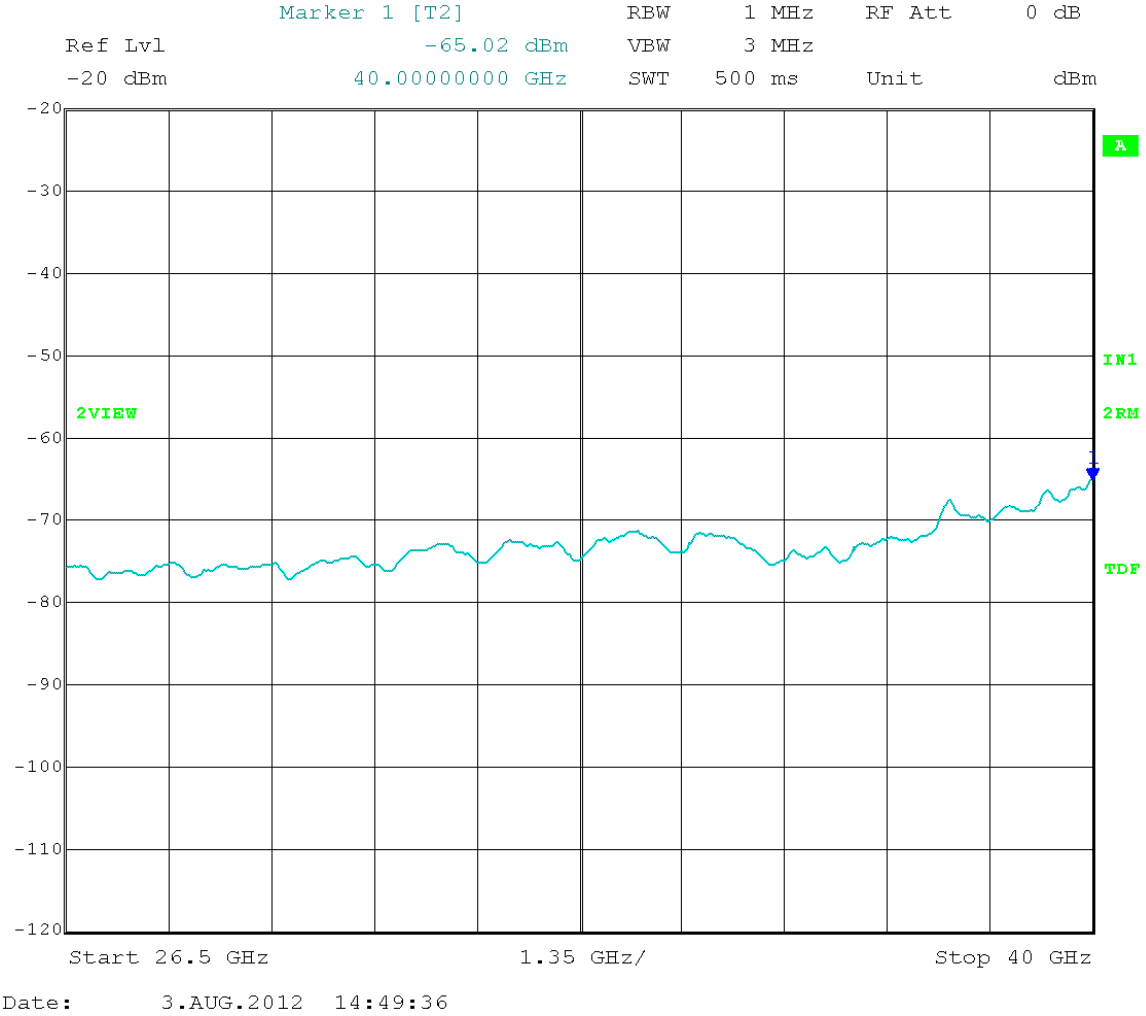
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	10 MHz	adi reg 35	26 dB EBW: 9.72 MHz
Output port:	Channel A;	Mid Channel Frequency:	5.575 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 26.5 GHz to 40 GHz; Average (RMS) detector



Date: 3.AUG.2012 14:49:36

Calculated Field Strength at noise floor = -65.02 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 42.21 dBµV/m Average

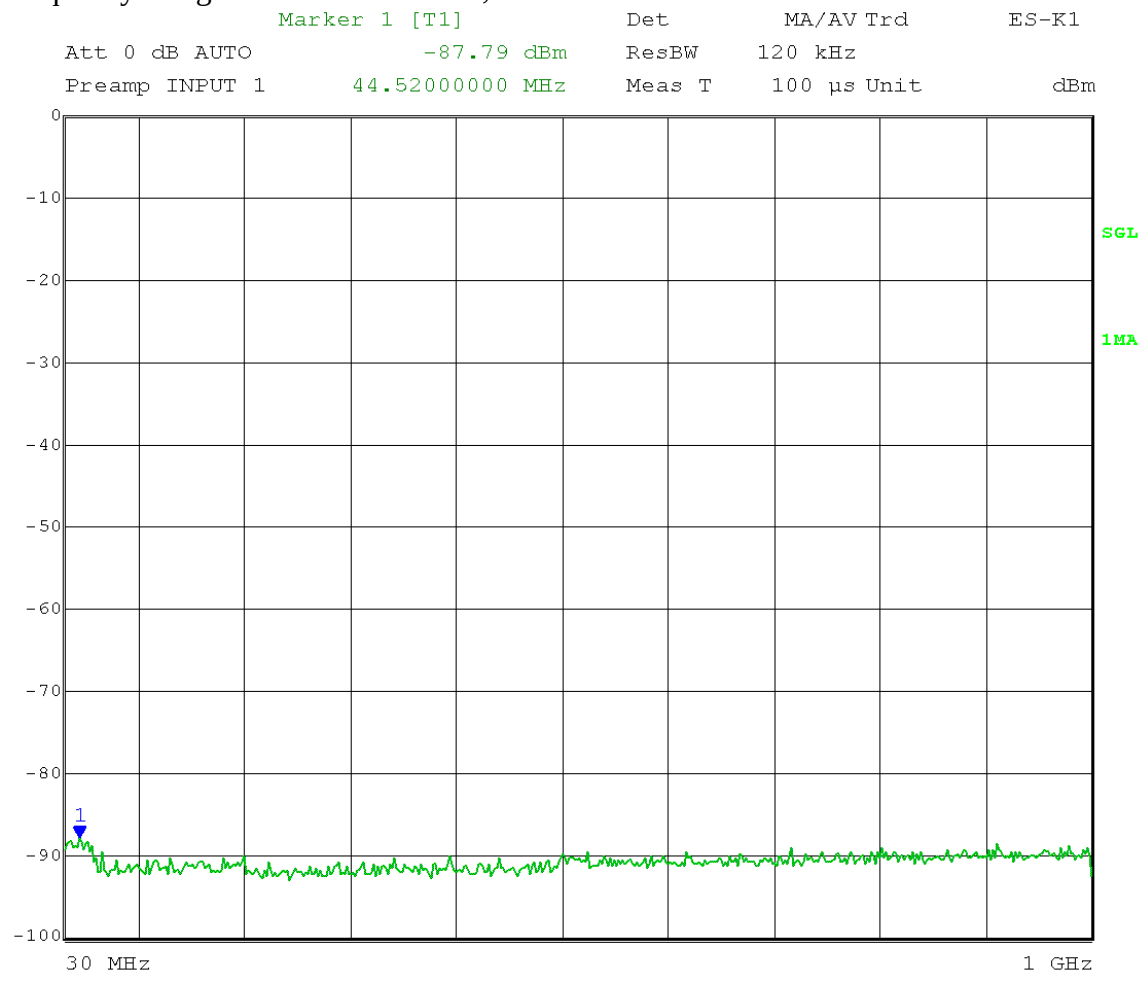
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth: 10 MHz adi reg 38 26 dB EBW: 9.72 MHz
Output port: Channel A; High Channel Frequency: 5.720 GHz
Output power setting: 19; Modulation Type: QPSK

Upper bound on out-of-band antenna gain: 9 dBi
Field strength limit: FCC Sections 15.209 and 15.205 (emissions in restricted bands)

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 30 MHz to 1 GHz; Peak detector



Date: 3.AUG.2012 09:02:06

No emissions found from 30 MHz to 1 GHz

Calculated Field Strength at noise floor = -87.79 dBm + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 + 4.7 dB = 24.14 dBµV/m Peak

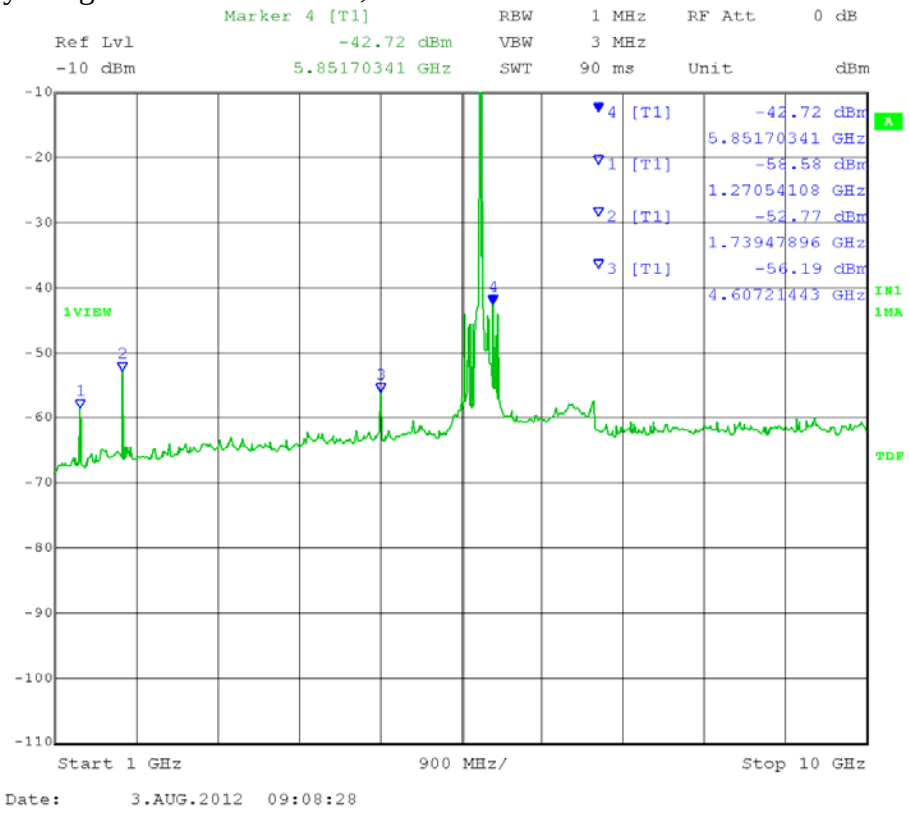
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	10 MHz	adi reg 38	26 dB EBW: 9.72 MHz
Output port:	Channel A;	High Channel Frequency:	5.720 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 1 GHz to 10 GHz; Peak detector



Marker 1: Calculated Field Strength (Restricted Band) = -58.58 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 48.65 dBµV/m Peak
Marker 2: Calculated EIRP = -52.77 dBm + 9 dBi antenna gain + 3 dB (MIMO) = -40.77 dBm
Marker 3: Calculated Field Strength (Restricted Band) = -56.19 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 51.04 dBµV/m Peak
Marker 4: Calculated EIRP = -42.72 dBm + 9 dBi antenna gain + 3 dB (MIMO) = -30.72 dBm

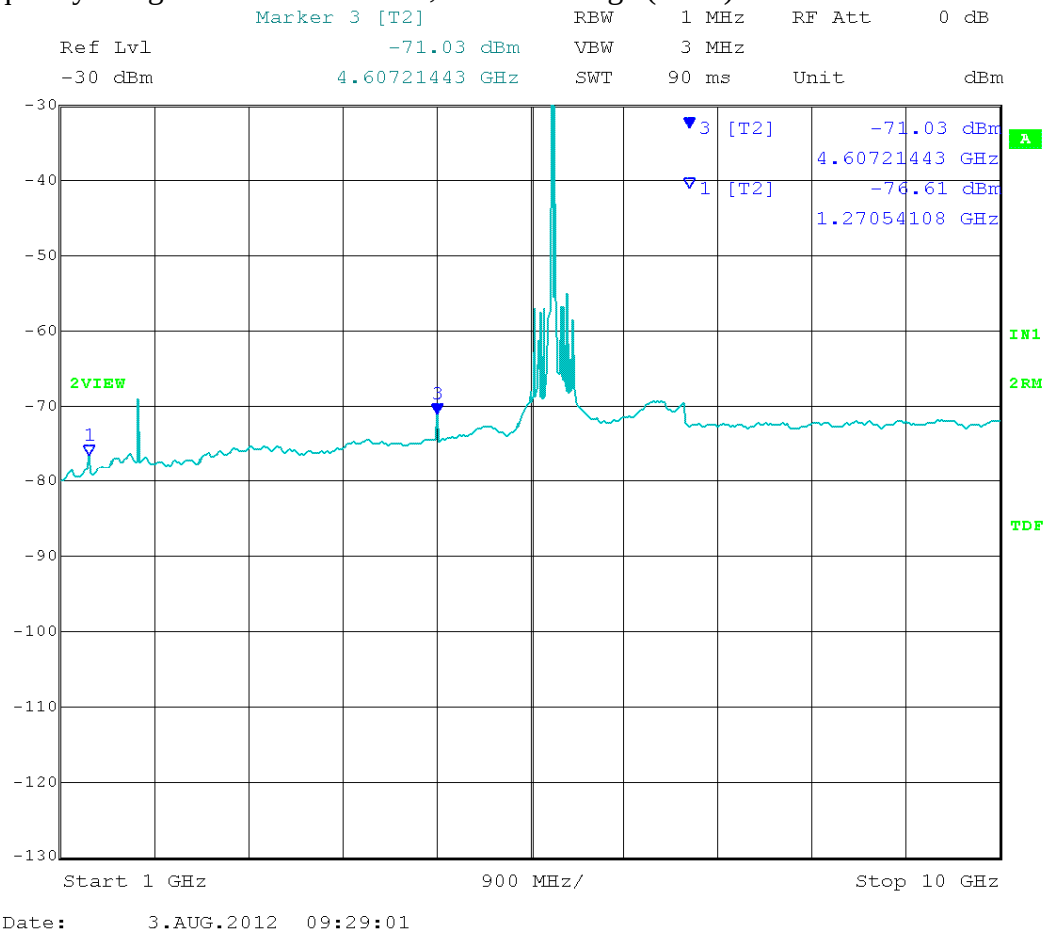
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	10 MHz	adi reg 38	26 dB EBW: 9.72 MHz
Output port:	Channel A;	High Channel Frequency:	5.720 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 1 GHz to 10 GHz; Average (RMS) detector



Marker 1: Calculated Field Strength (Restricted Band) = -76.61 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 30.62 dBµV/m Average
Marker 3: Calculated Field Strength (Restricted Band) = -71.03 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 36.20 dBµV/m Average

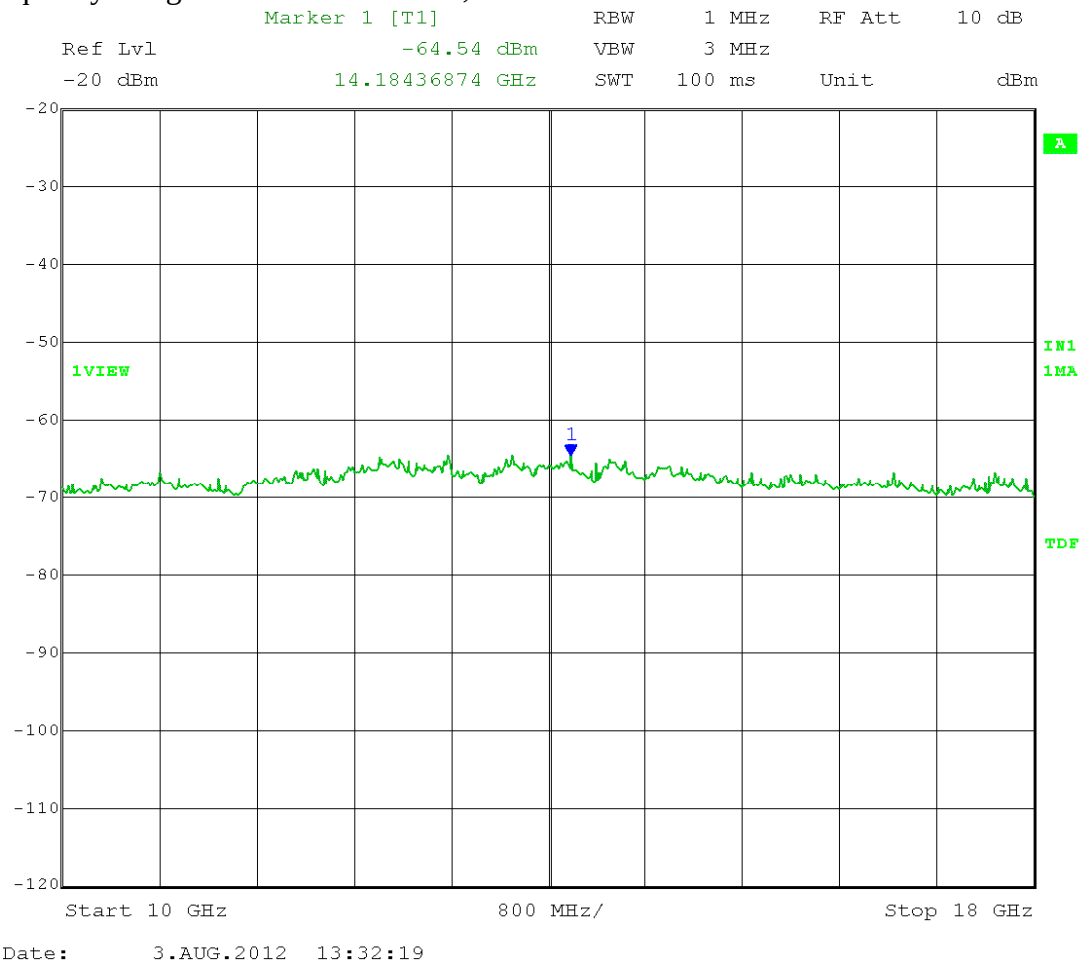
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	10 MHz	adi reg 38	26 dB EBW: 9.72 MHz
Output port:	Channel A;	High Channel Frequency:	5.720 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 10 GHz to 18 GHz; Peak detector



Calculated EIRP at noise floor = -64.54 dBm + 9 dBi antenna gain + 3 dB (MIMO)
= -52.54 dBm
Calculated Field Strength at noise floor = -64.54 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 42.69 dBµV/m Peak

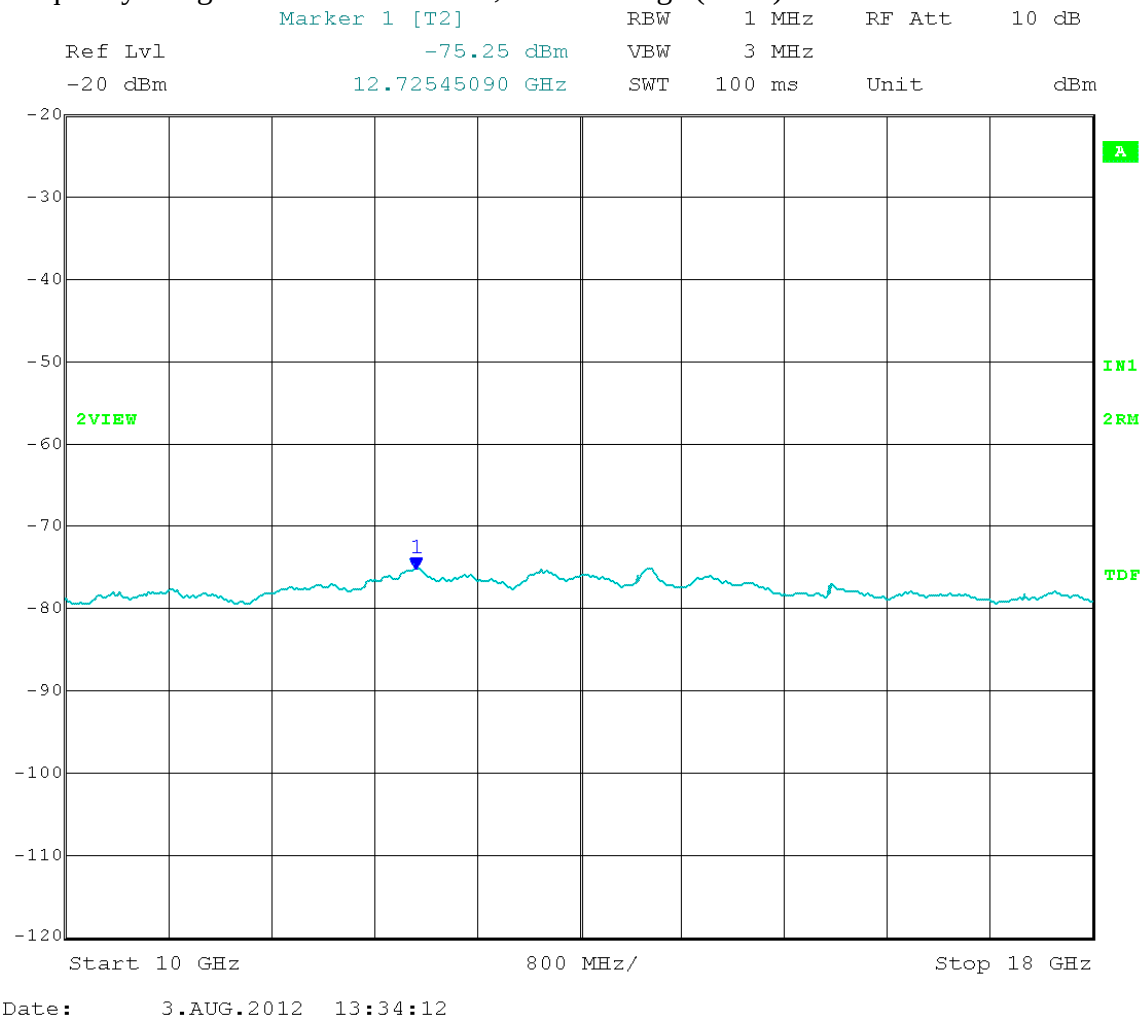
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	10 MHz	adi reg 38	26 dB EBW: 9.72 MHz
Output port:	Channel A;	High Channel Frequency:	5.720 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 10 GHz to 18 GHz; Average (RMS) detector



Date: 3.AUG.2012 13:34:12

Calculated Field Strength at noise floor = -75.25 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 31.98 dBµV/m Average

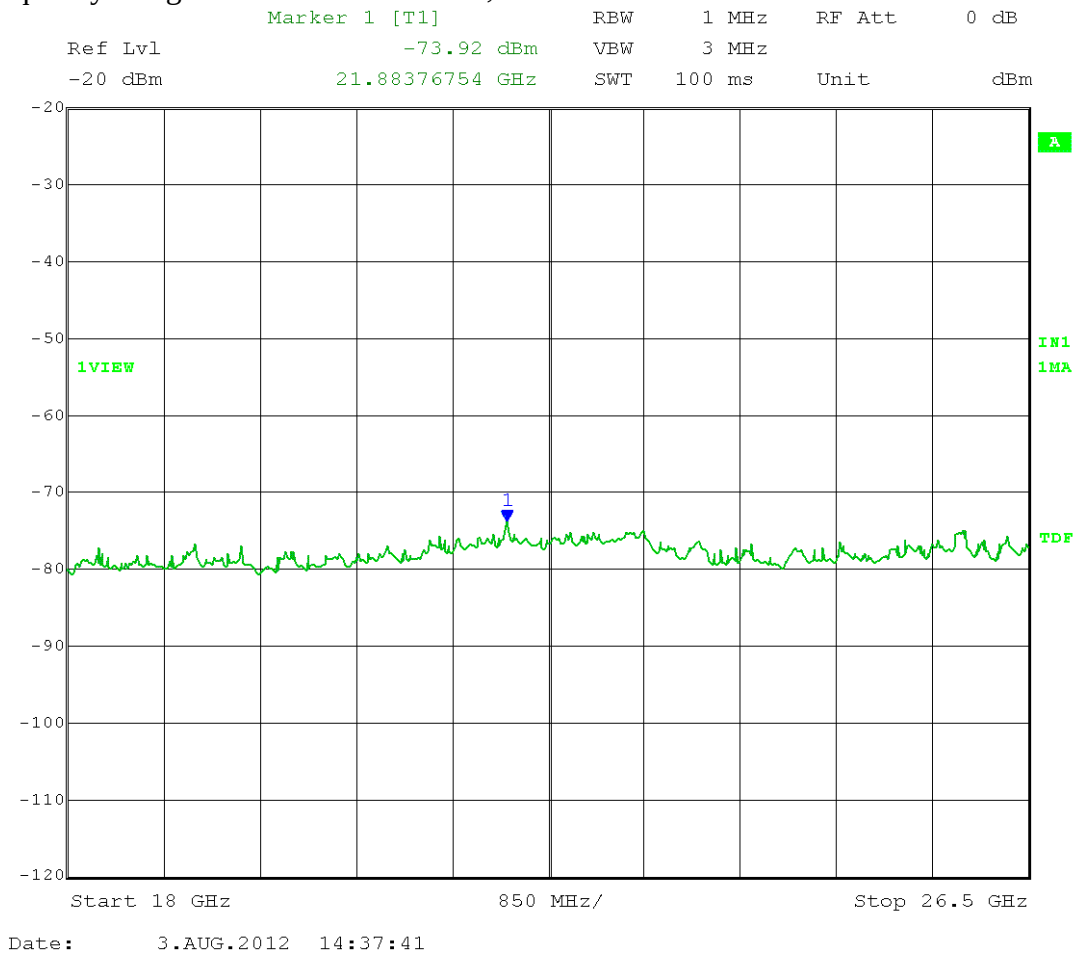
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	10 MHz	adi reg 38	26 dB EBW: 9.72 MHz
Output port:	Channel A;	High Channel Frequency:	5.720 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 18 GHz to 26.5 GHz; Peak detector



Calculated EIRP at noise floor = -73.92 dBm + 9 dBi antenna gain + 3 dB (MIMO)
= -61.92 dBm
Calculated Field Strength at noise floor = -73.92 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 33.31 dBµV/m Peak

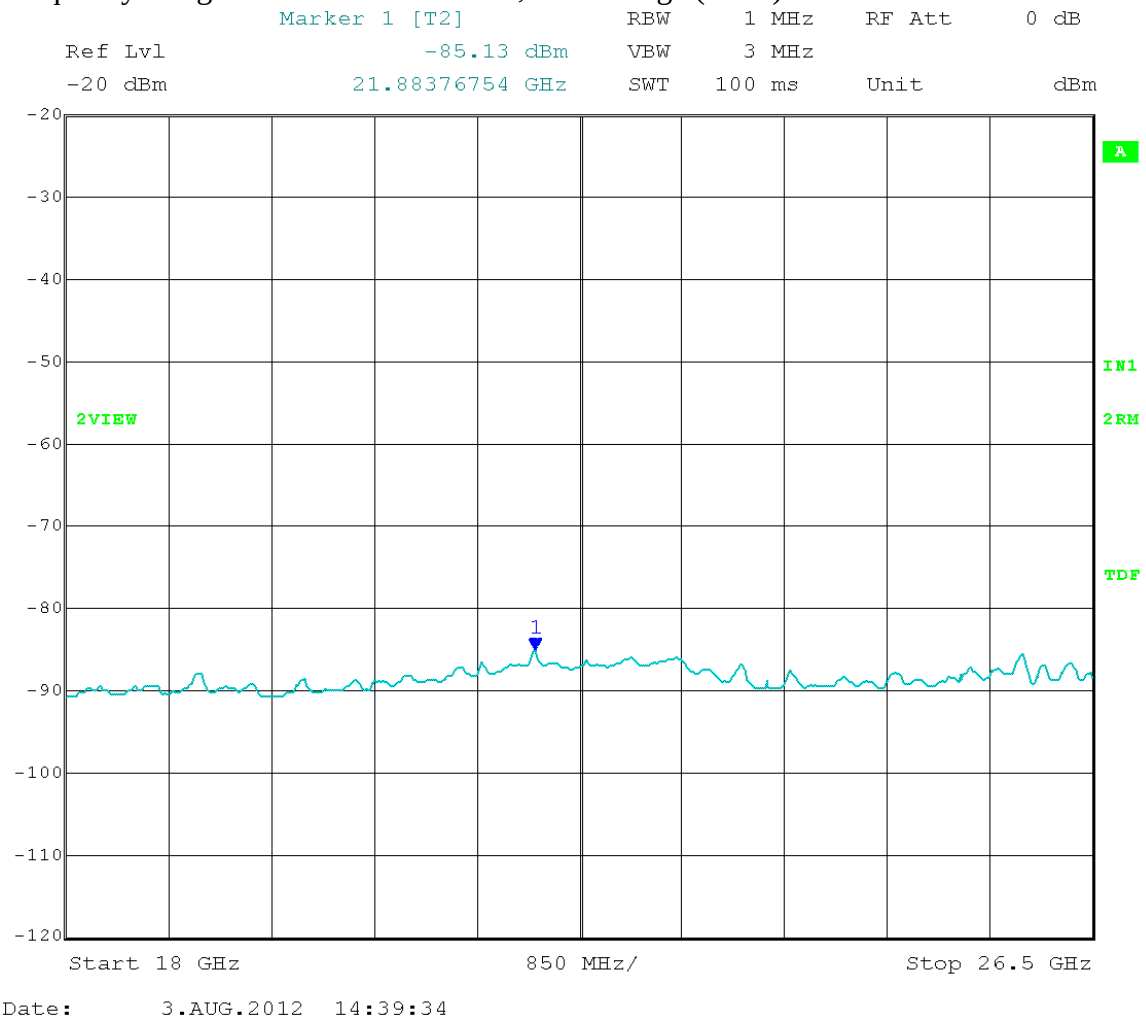
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	10 MHz	adi reg 38	26 dB EBW: 9.72 MHz
Output port:	Channel A;	High Channel Frequency:	5.720 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 18 GHz to 26.5 GHz; Average (RMS) detector



Date: 3.AUG.2012 14:39:34

Calculated Field Strength at noise floor = -85.13 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 22.10 dBµV/m Average

Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	10 MHz	adi reg 38	26 dB EBW: 9.72 MHz
Output port:	Channel A;	High Channel Frequency:	5.720 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 26.5 GHz to 40 GHz; Peak detector

Calculated EIRP at noise floor = -54.55 dBm + 9 dBi antenna gain + 3 dB (MIMO)
= -42.55 dBm
Calculated Field Strength at noise floor = -54.55 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 52.68 dBµV/m Peak

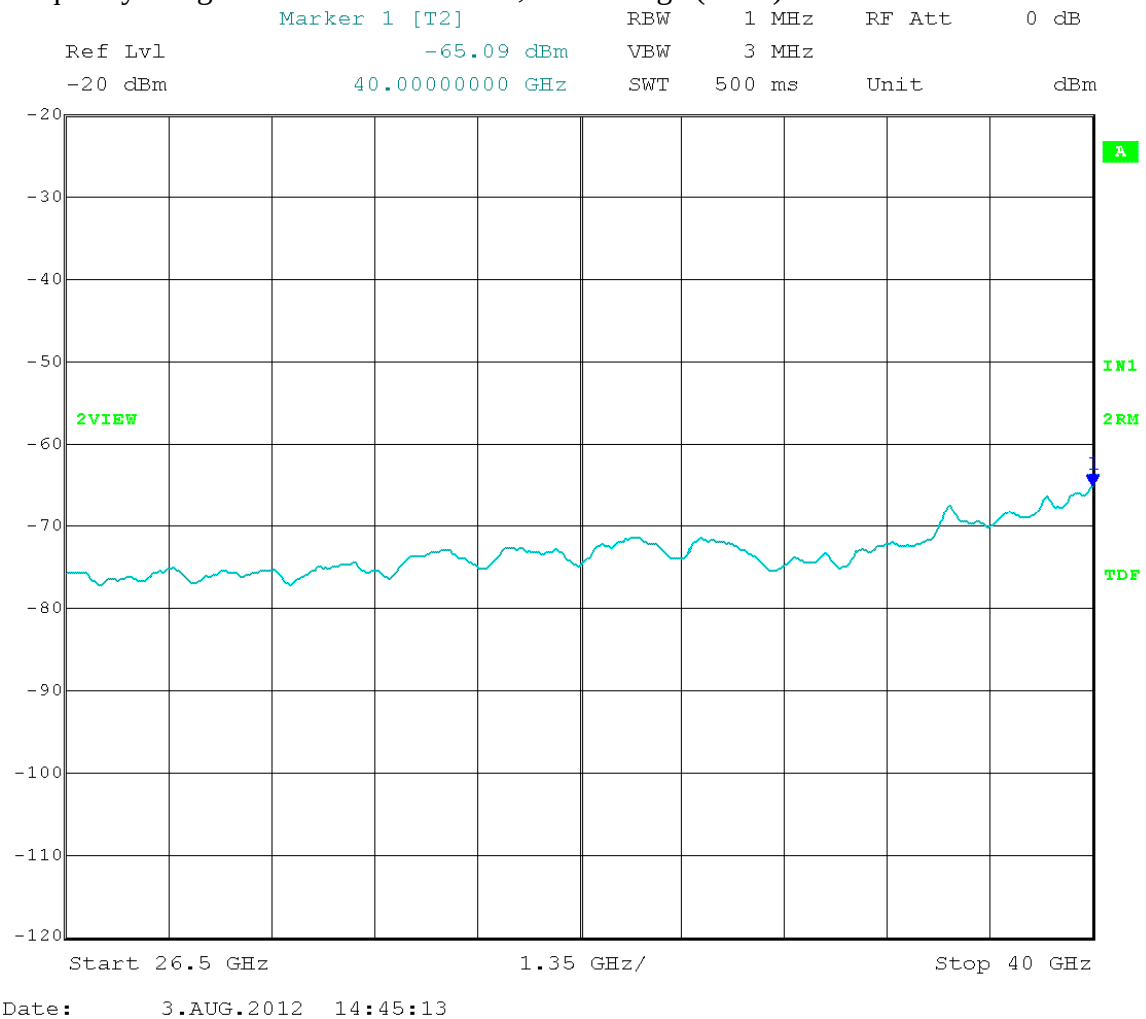
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	10 MHz	adi reg 38	26 dB EBW: 9.72 MHz
Output port:	Channel A;	High Channel Frequency:	5.720 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 26.5 GHz to 40 GHz; Average (RMS) detector



Date: 3.AUG.2012 14:45:13

Calculated Field Strength at noise floor = -65.09 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 42.14 dBµV/m Average

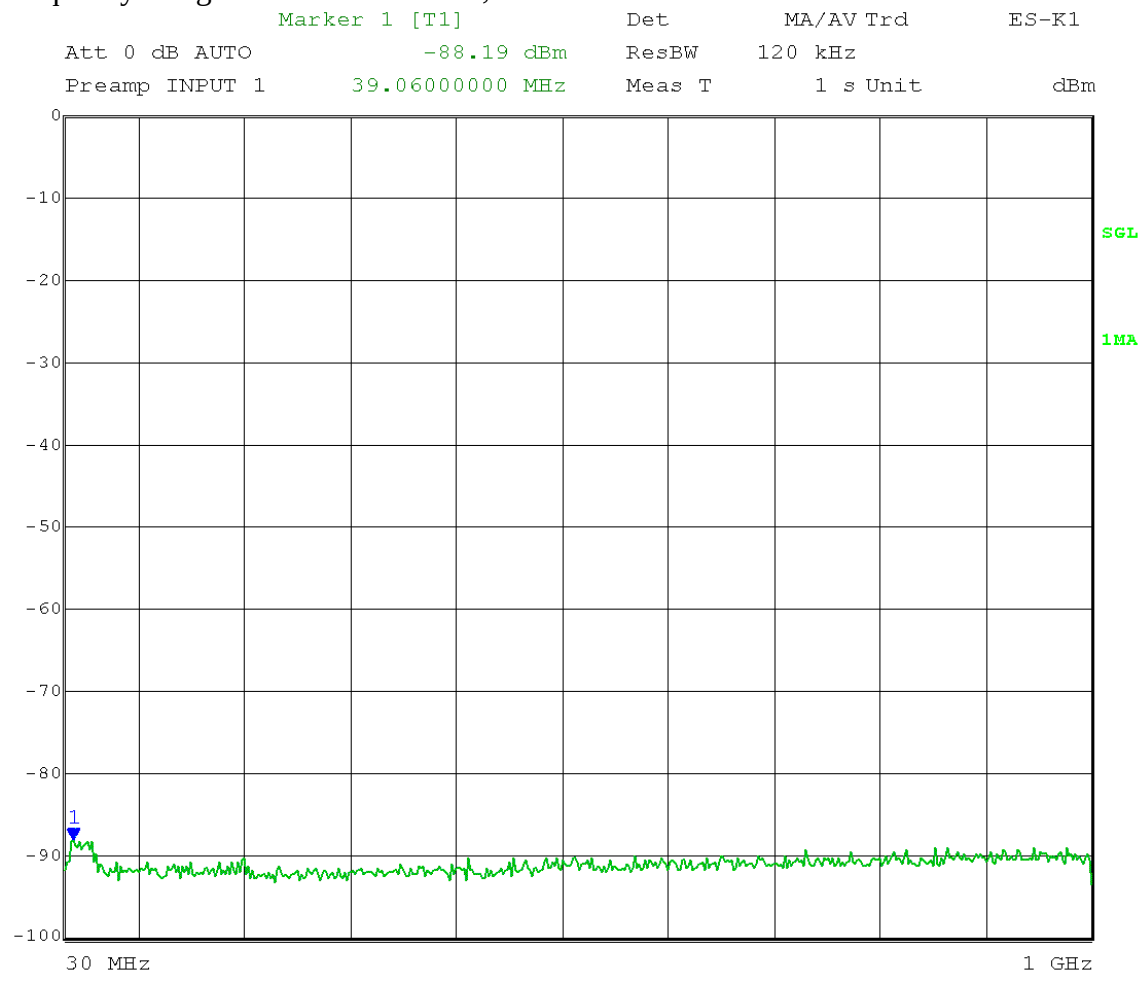
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	10 MHz	adi reg 30	26 dB EBW: 9.72 MHz
Output port:	Channel B;	Low Channel Frequency:	5.475 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
Field strength limit: FCC Sections 15.209 and 15.205 (emissions in restricted bands)

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 30 MHz to 1 GHz; Peak detector



Date: 3.AUG.2012 10:42:34

No emissions found from 30 MHz to 1 GHz

Calculated Field Strength at noise floor = -88.19 dBm + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 + 4.7 dB = 23.74 dBµV/m Peak

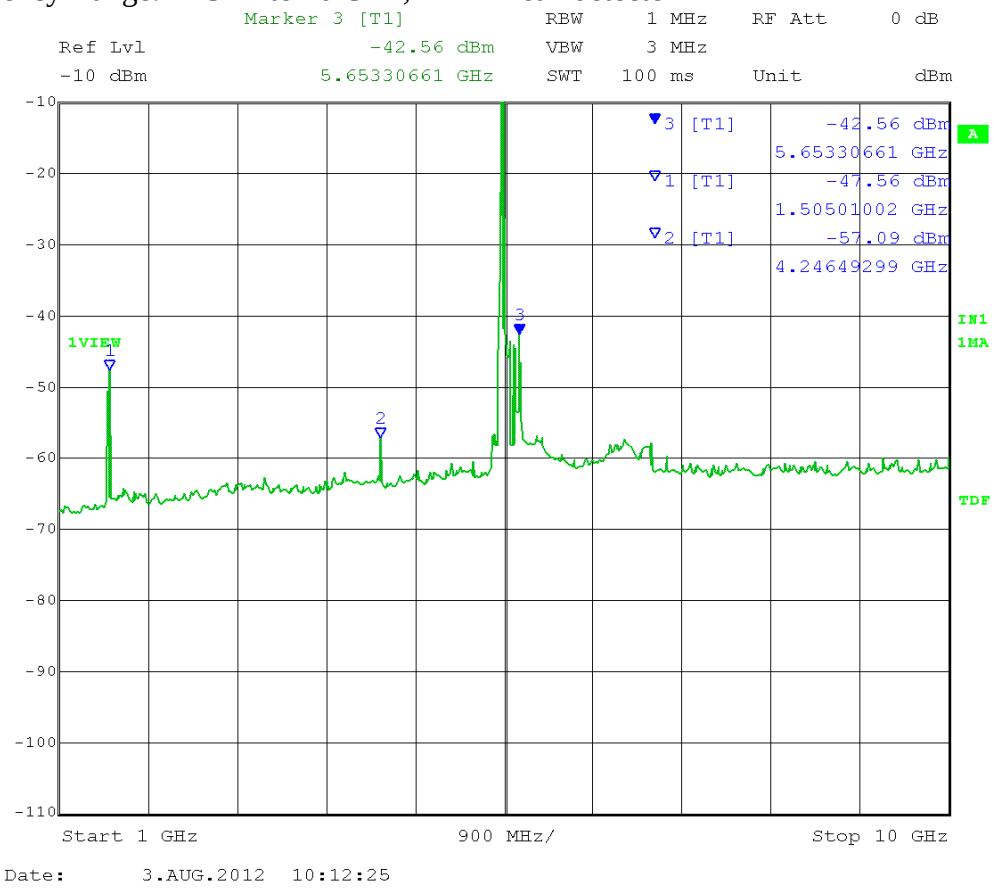
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	10 MHz	adi reg 30	26 dB EBW: 9.72 MHz
Output port:	Channel B;	Low Channel Frequency:	5.475 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 1 GHz to 10 GHz; Peak detector



Marker 1: Calculated Field Strength (Restricted Band) = -47.56 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 59.67 dBµV/m Peak
Marker 2: Calculated Field Strength (Restricted Band) = -57.09 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 50.14 dBµV/m Peak
Marker 3: Calculated EIRP = -42.56 dBm + 9 dBi antenna gain + 3 dB (MIMO) = -30.56 dBm

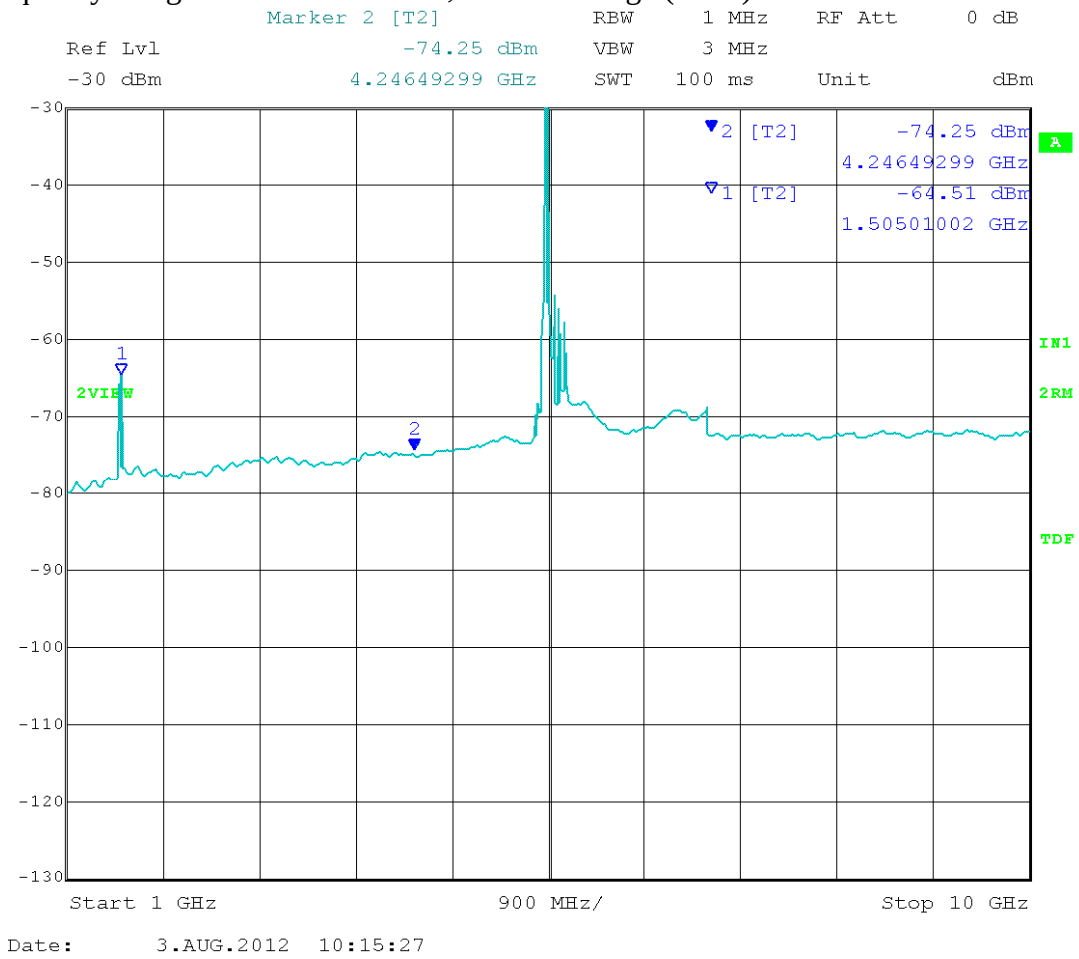
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	10 MHz	adi reg 30	26 dB EBW: 9.72 MHz
Output port:	Channel B;	Low Channel Frequency:	5.475 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 1 GHz to 10 GHz; Average (RMS) detector



Marker 1: Calculated Field Strength (Restricted Band) = -64.51 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 42.72 dBµV/m Average
Marker 2: Calculated Field Strength (Restricted Band) = -74.25 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 32.98 dBµV/m Average

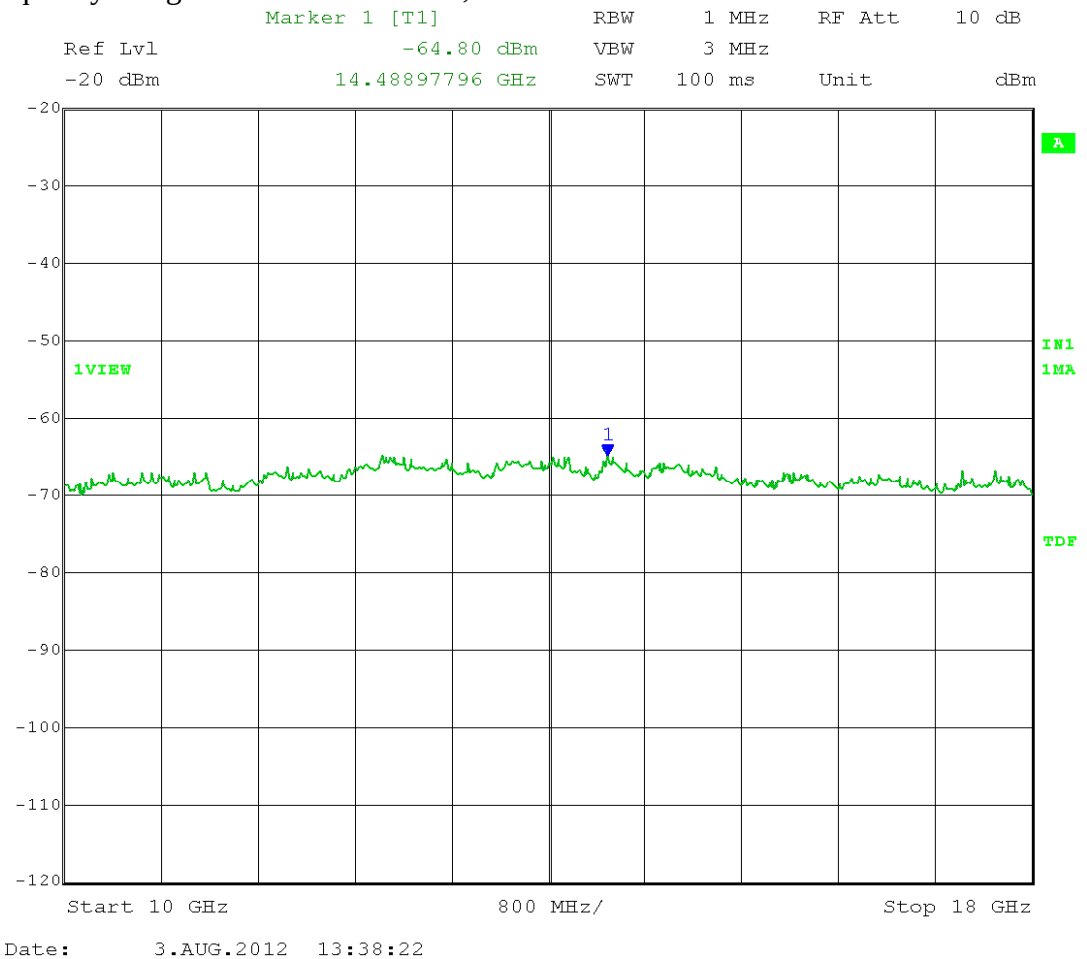
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	10 MHz	adi reg 30	26 dB EBW: 9.72 MHz
Output port:	Channel B;	Low Channel Frequency:	5.475 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 10 GHz to 18 GHz; Peak detector



Calculated EIRP at noise floor = -64.80 dBm + 9 dBi antenna gain + 3 dB (MIMO)
= -52.80 dBm
Calculated Field Strength at noise floor = -64.80 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 42.43 dBµV/m Peak

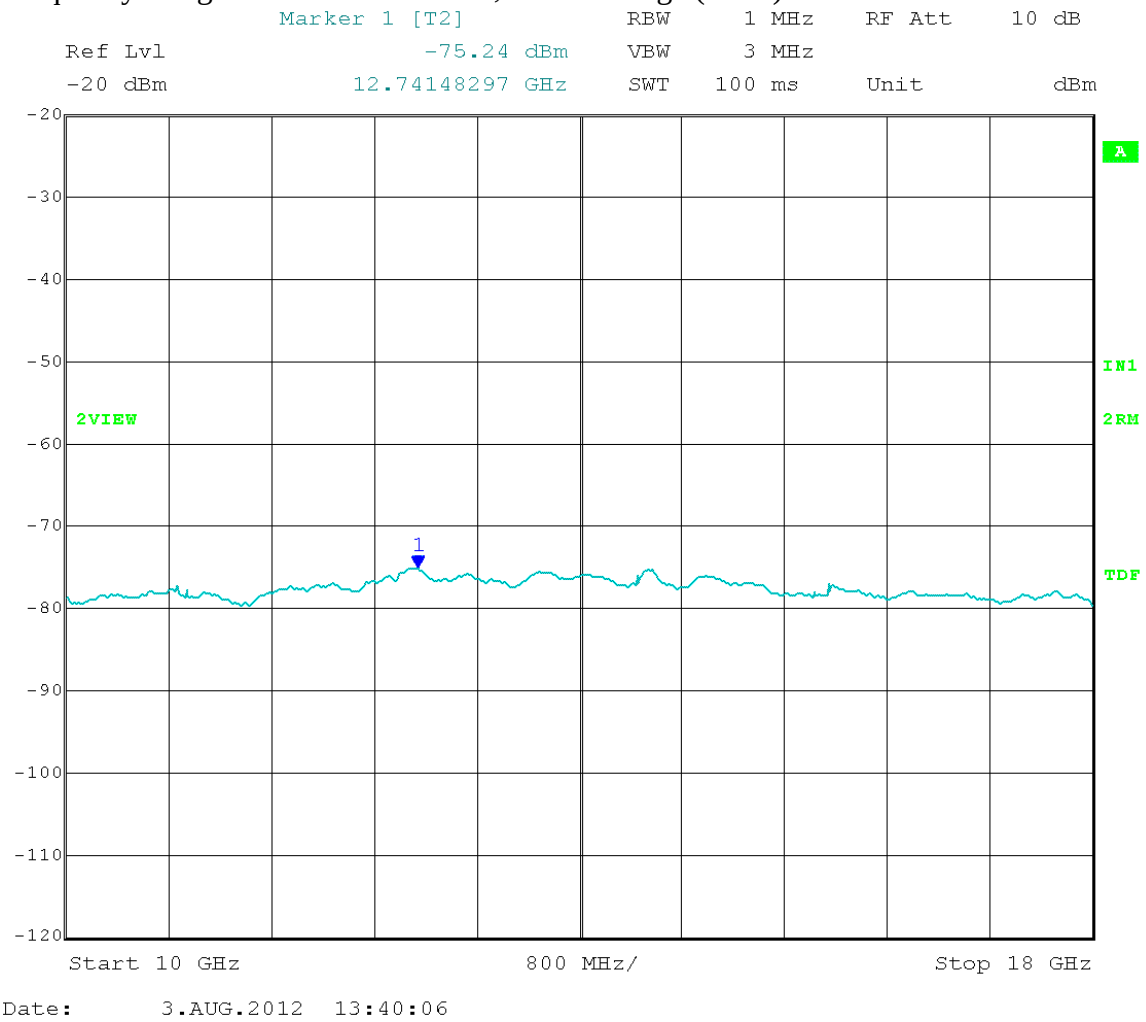
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	10 MHz	adi reg 30	26 dB EBW: 9.72 MHz
Output port:	Channel B;	Low Channel Frequency:	5.475 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 10 GHz to 18 GHz; Average (RMS) detector



Date: 3.AUG.2012 13:40:06

Calculated Field Strength at noise floor = -75.24 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 31.99 dBµV/m Average

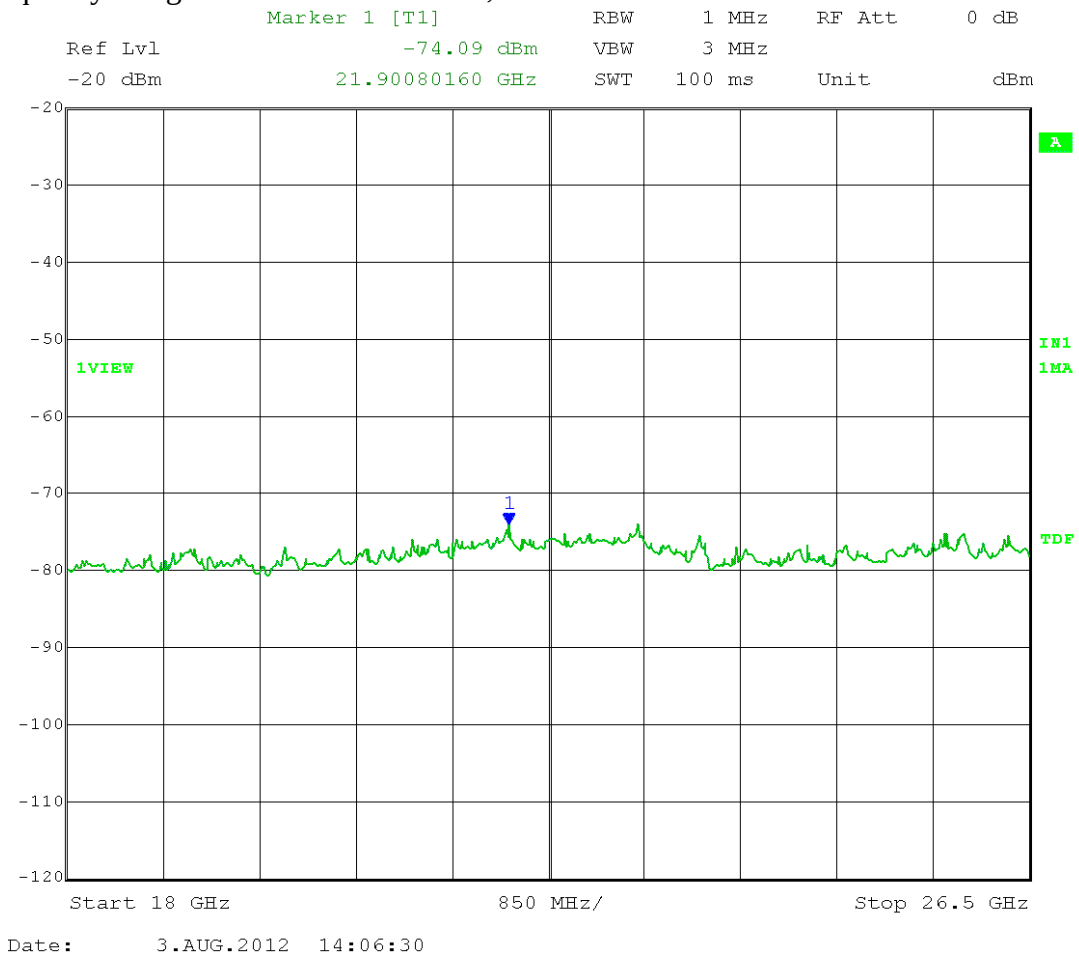
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	10 MHz	adi reg 30	26 dB EBW: 9.72 MHz
Output port:	Channel B;	Low Channel Frequency:	5.475 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 18 GHz to 26.5 GHz; Peak detector



Calculated EIRP at noise floor = -74.09 dBm + 9 dBi antenna gain + 3 dB (MIMO)
= -62.09 dBm
Calculated Field Strength at noise floor = -74.09 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 33.14 dBµV/m Peak

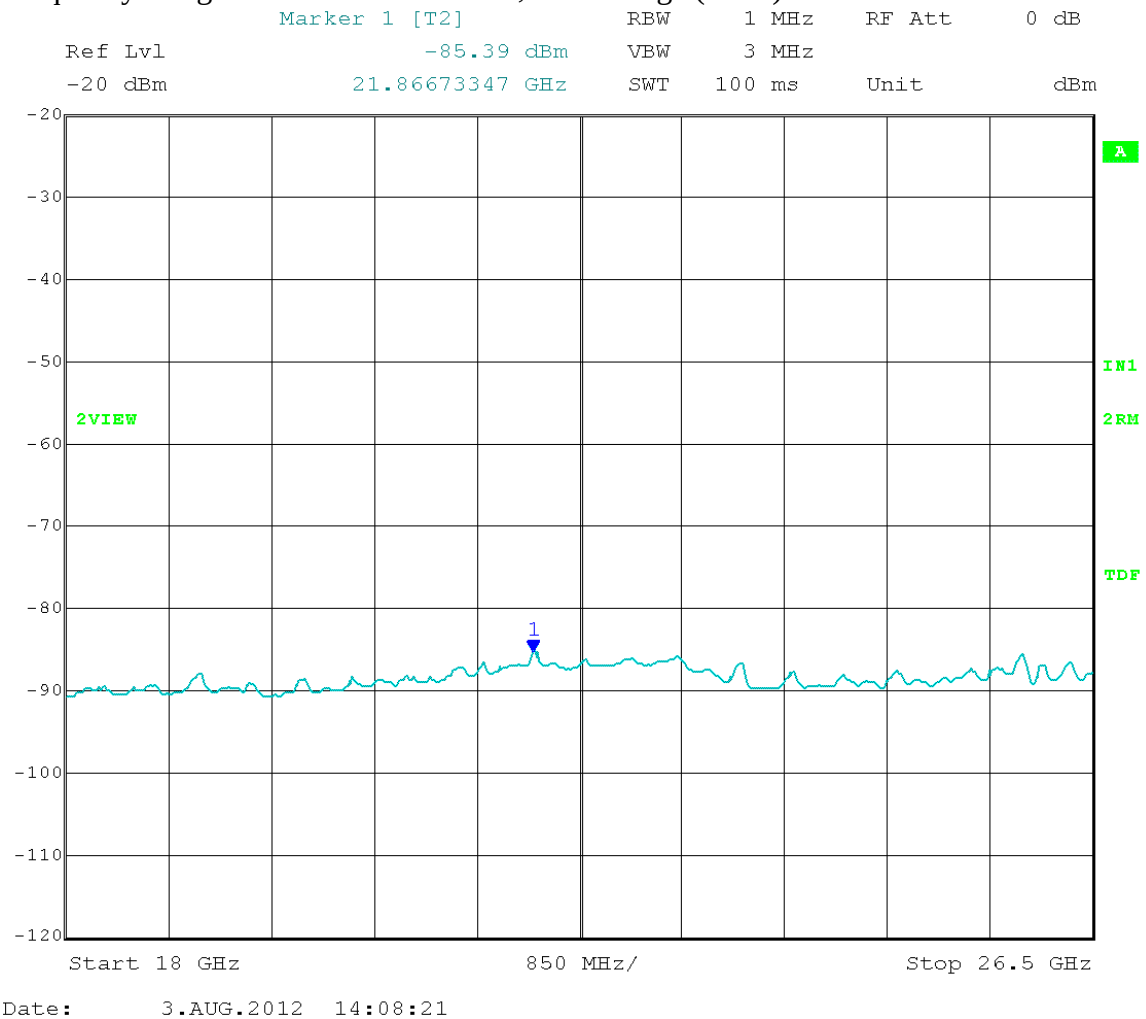
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	10 MHz	adi reg 30	26 dB EBW: 9.72 MHz
Output port:	Channel B;	Low Channel Frequency:	5.475 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 18 GHz to 26.5 GHz; Average (RMS) detector



Date: 3.AUG.2012 14:08:21

Calculated Field Strength at noise floor = -85.39 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 21.84 dBµV/m Average

Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	10 MHz	adi reg 30	26 dB EBW: 9.72 MHz
Output port:	Channel B;	Low Channel Frequency:	5.475 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 26.5 GHz to 40 GHz; Peak detector

Calculated EIRP at noise floor = -53.94 dBm + 9 dBi antenna gain + 3 dB (MIMO)
= -41.94 dBm
Calculated Field Strength at noise floor = -53.94 + 9 dBi antenna gain + 3 dB (MIMO)
– 20 log (3 meters) + 104.77 = 53.29 dBµV/m Peak

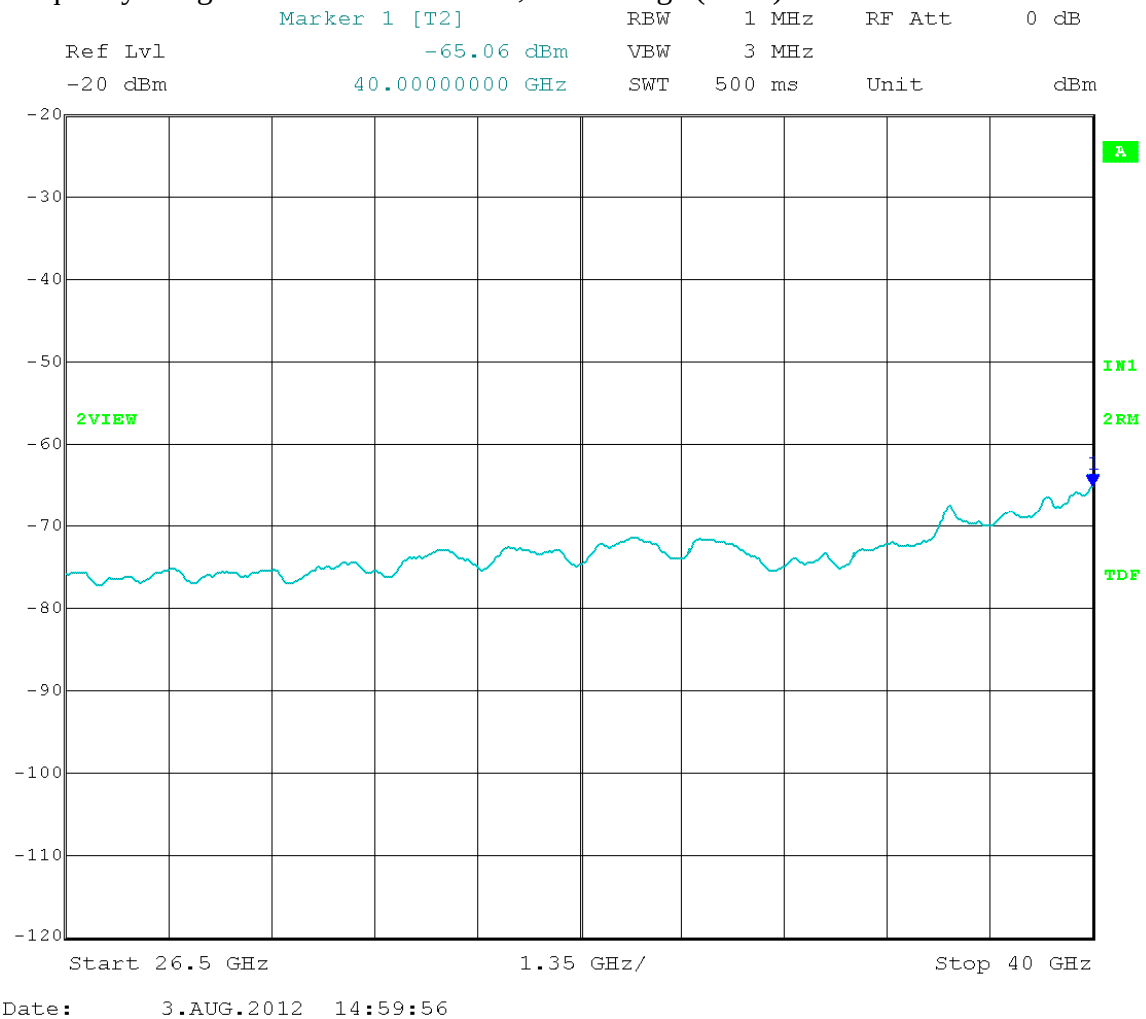
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	10 MHz	adi reg 30	26 dB EBW: 9.72 MHz
Output port:	Channel B;	Low Channel Frequency:	5.475 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 26.5 GHz to 40 GHz; Average (RMS) detector



Date: 3.AUG.2012 14:59:56

Calculated Field Strength at noise floor = -65.06 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 42.17 dBµV/m Average

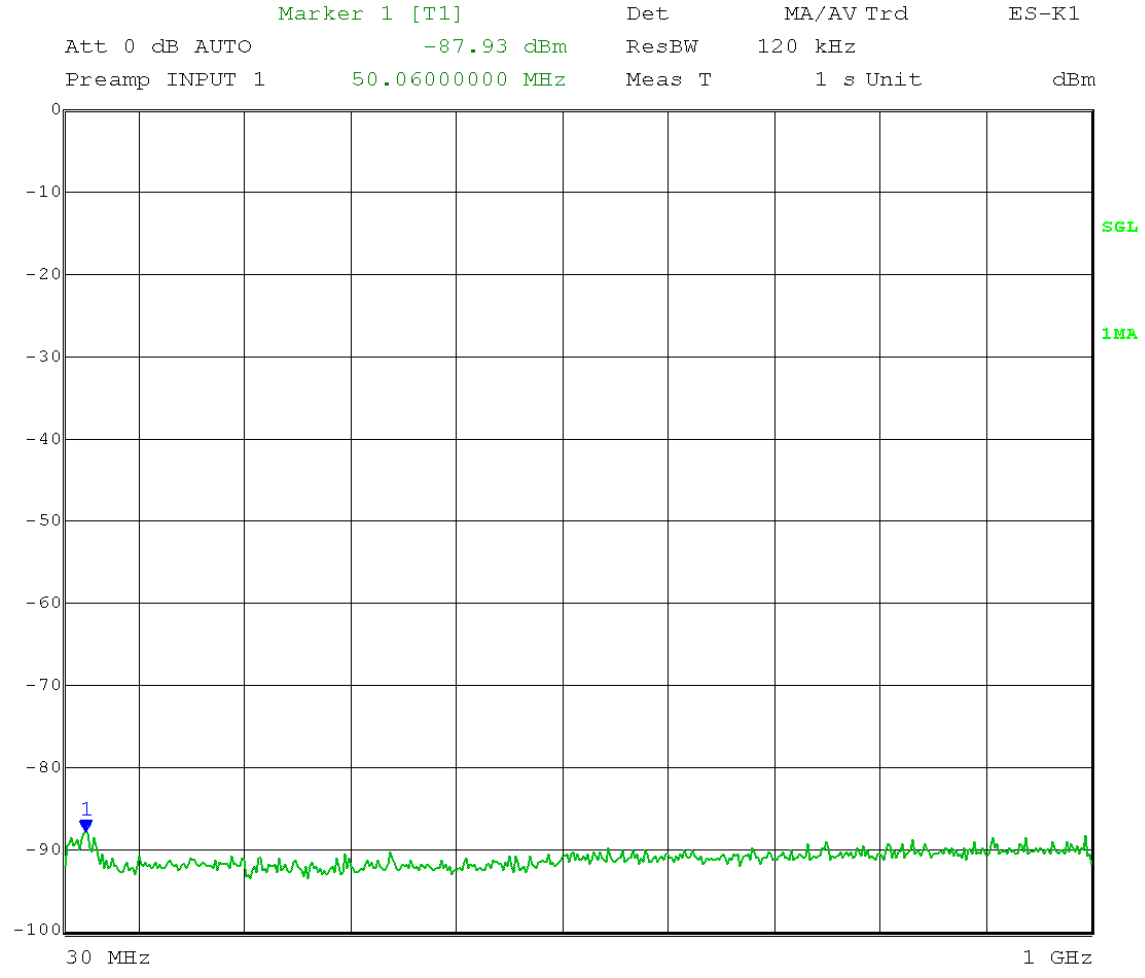
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth: 10 MHz adi reg 36 26 dB EBW: 9.72 MHz
Output port: Channel B; Mid Channel Frequency: 5.575 GHz
Output power setting: 19; Modulation Type: QPSK

Upper bound on out-of-band antenna gain: 9 dBi
Field strength limit: FCC Sections 15.209 and 15.205 (emissions in restricted bands)

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 30 MHz to 1 GHz; Peak detector



No emissions found from 30 MHz to 1 GHz

Calculated Field Strength at noise floor = -87.93 dBm + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 + 4.7 dB = 24.00 dBµV/m Peak

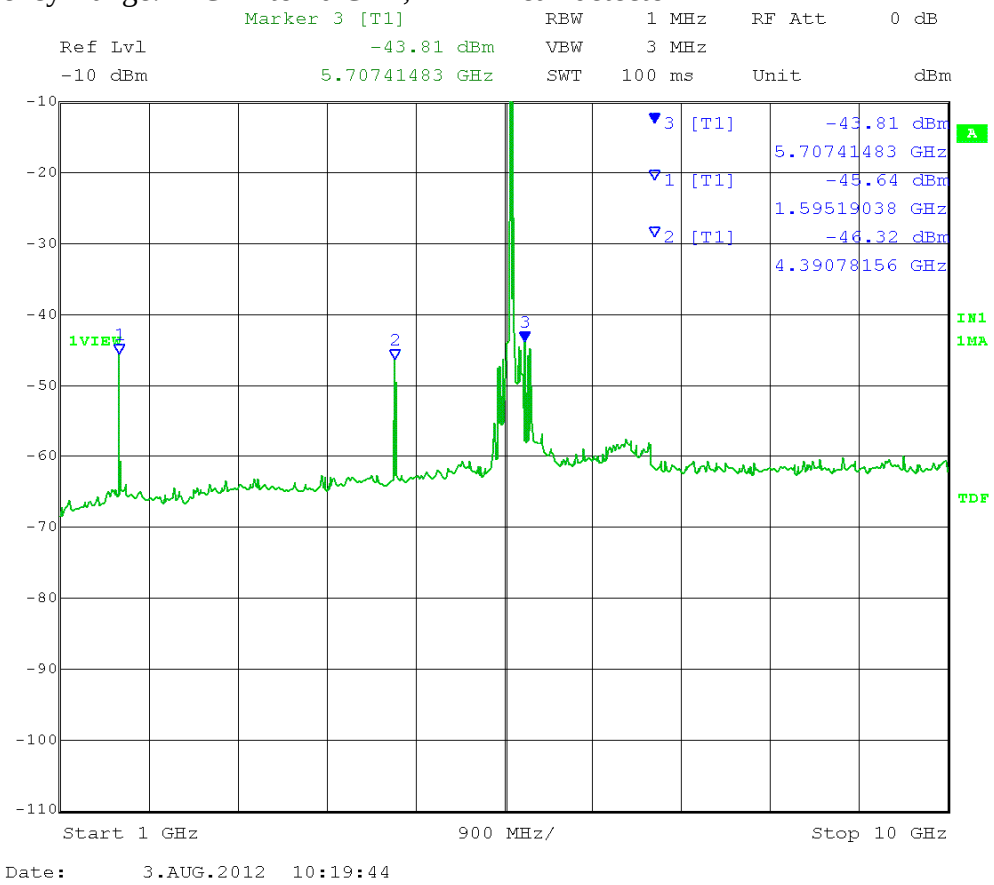
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth: 10 MHz adi reg 36 26 dB EBW: 9.72 MHz
Output port: Channel B; Mid Channel Frequency: 5.575 GHz
Output power setting: 19; Modulation Type: QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 1 GHz to 10 GHz; Peak detector



Marker 1: Calculated Field Strength (Restricted Band) = -45.64 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 61.59 dBµV/m Peak
Marker 2: Calculated Field Strength (Restricted Band) = -46.32 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 60.91 dBµV/m Peak
Marker 3: Calculated EIRP = -43.81 dBm + 9 dBi antenna gain + 3 dB (MIMO) = -31.81 dBm

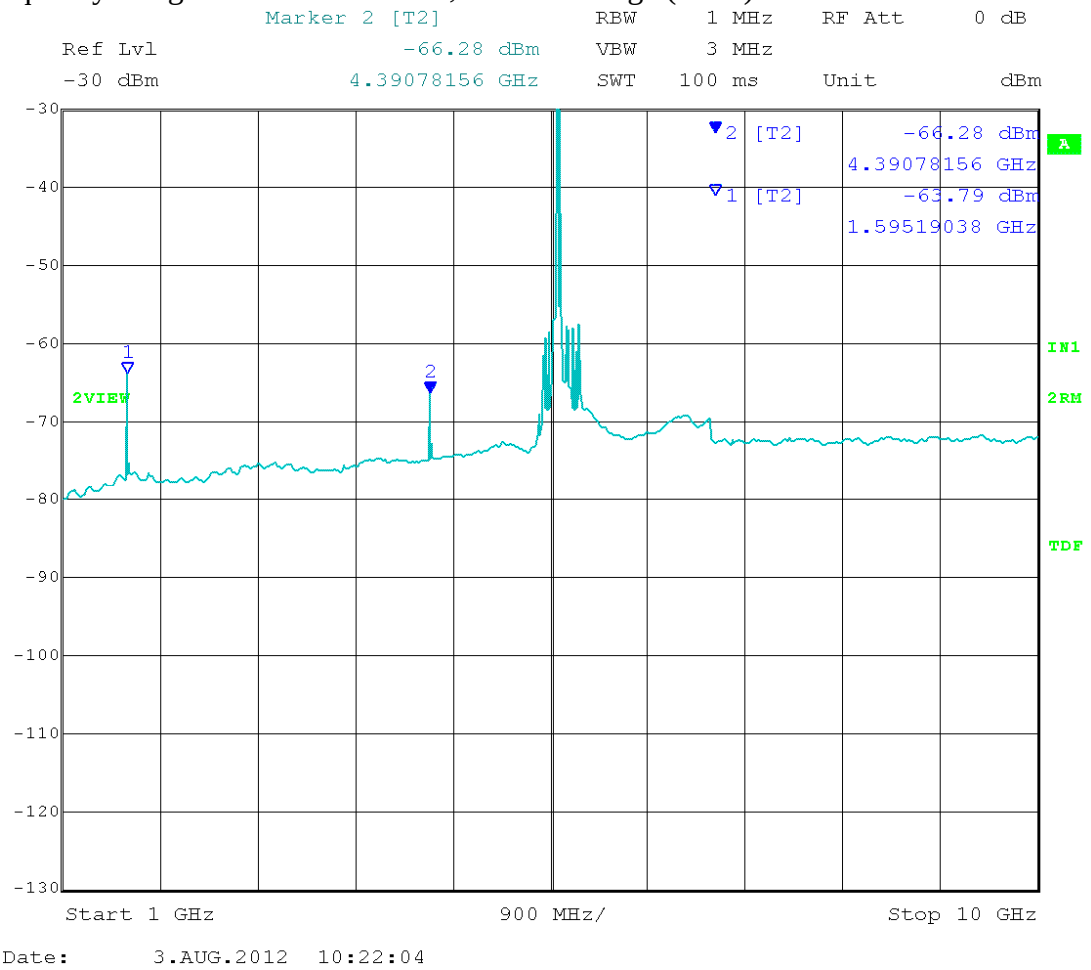
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth: 10 MHz adi reg 36 26 dB EBW: 9.72 MHz
Output port: Channel B; Mid Channel Frequency: 5.575 GHz
Output power setting: 19; Modulation Type: QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 1 GHz to 10 GHz; Average (RMS) detector



Marker 1: Calculated Field Strength (Restricted Band) = -63.79 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 43.44 dBµV/m Average
Marker 2: Calculated Field Strength (Restricted Band) = -66.28 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 40.95 dBµV/m Average

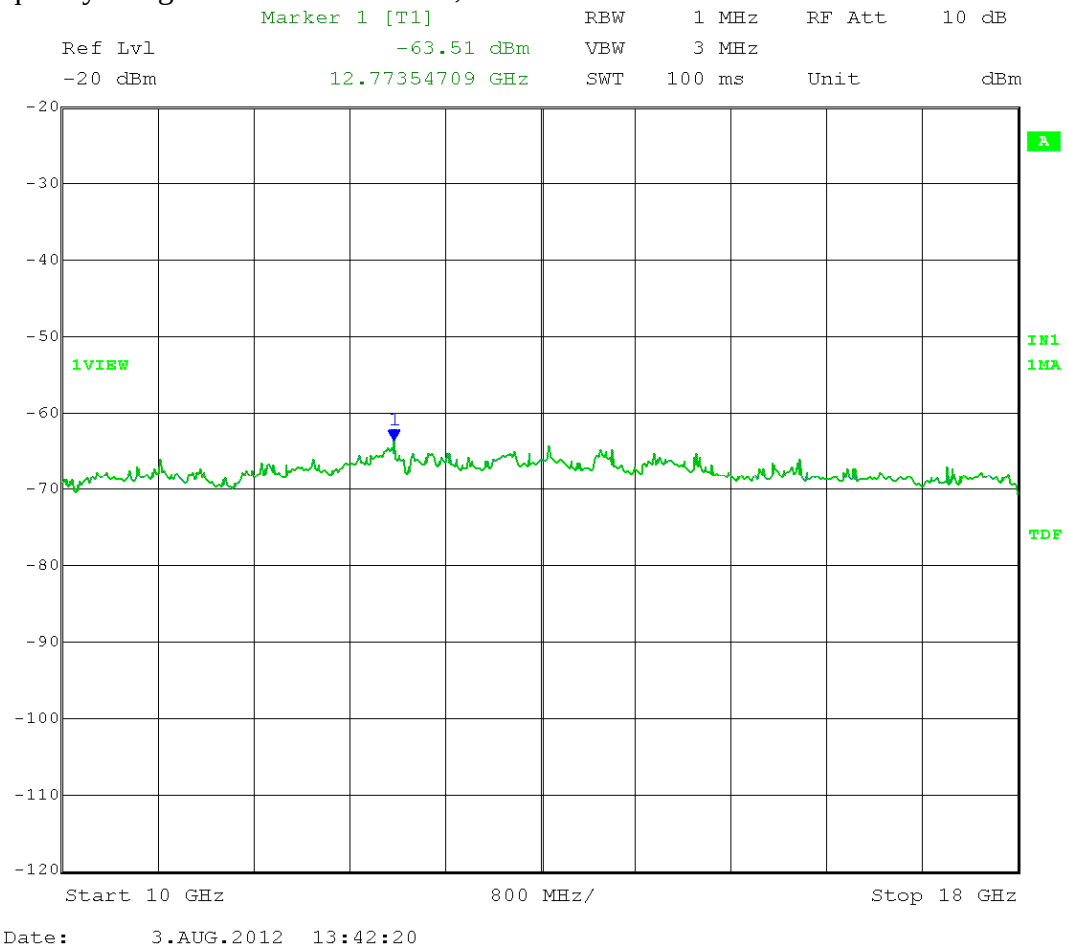
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth: 10 MHz adi reg 36 26 dB EBW: 9.72 MHz
Output port: Channel B; Mid Channel Frequency: 5.575 GHz
Output power setting: 19; Modulation Type: QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 10 GHz to 18 GHz; Peak detector



Calculated EIRP at noise floor = -63.51 dBm + 9 dBi antenna gain + 3 dB (MIMO)
= -51.51 dBm
Calculated Field Strength at noise floor = -63.51 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 43.72 dBµV/m Peak

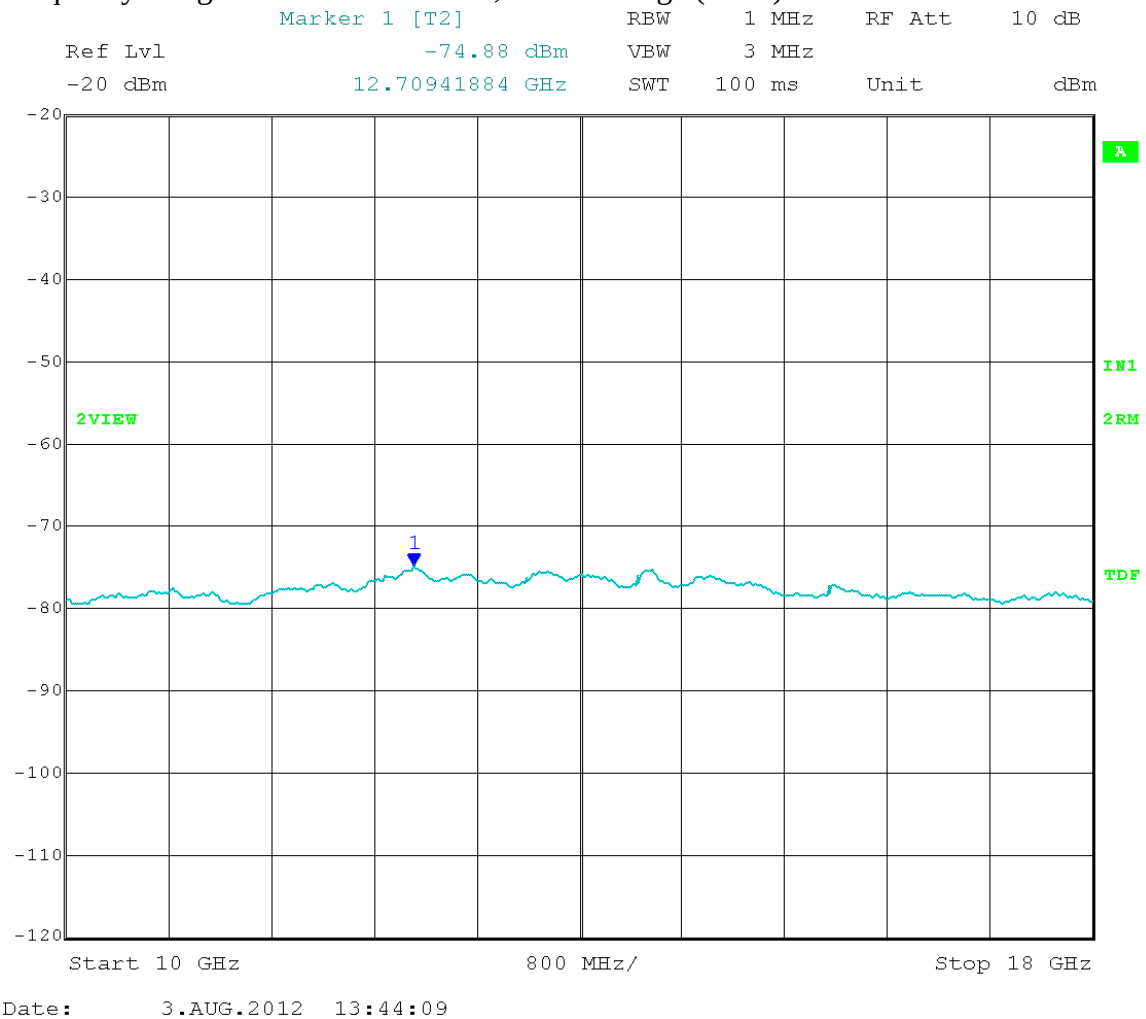
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth: 10 MHz adi reg 36 26 dB EBW: 9.72 MHz
Output port: Channel B; Mid Channel Frequency: 5.575 GHz
Output power setting: 19; Modulation Type: QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 10 GHz to 18 GHz; Average (RMS) detector



Date: 3.AUG.2012 13:44:09

Calculated Field Strength at noise floor = -74.88 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 32.35 dBµV/m Average

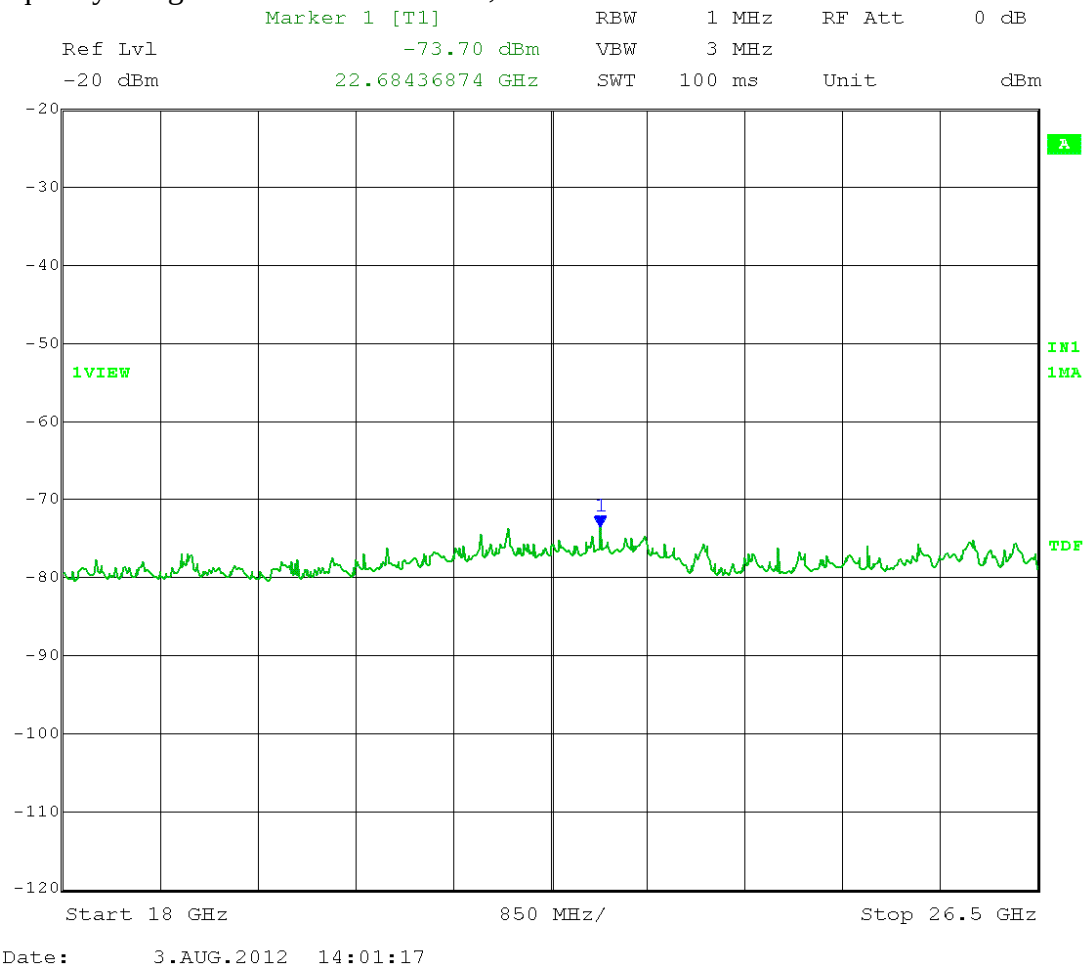
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth: 10 MHz adi reg 36 26 dB EBW: 9.72 MHz
Output port: Channel B; Mid Channel Frequency: 5.575 GHz
Output power setting: 19; Modulation Type: QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 18 GHz to 26.5 GHz; Peak detector



Calculated EIRP at noise floor = -73.70 dBm + 9 dBi antenna gain + 3 dB (MIMO)
= -61.70 dBm
Calculated Field Strength at noise floor = -73.70 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 33.53 dBµV/m Peak

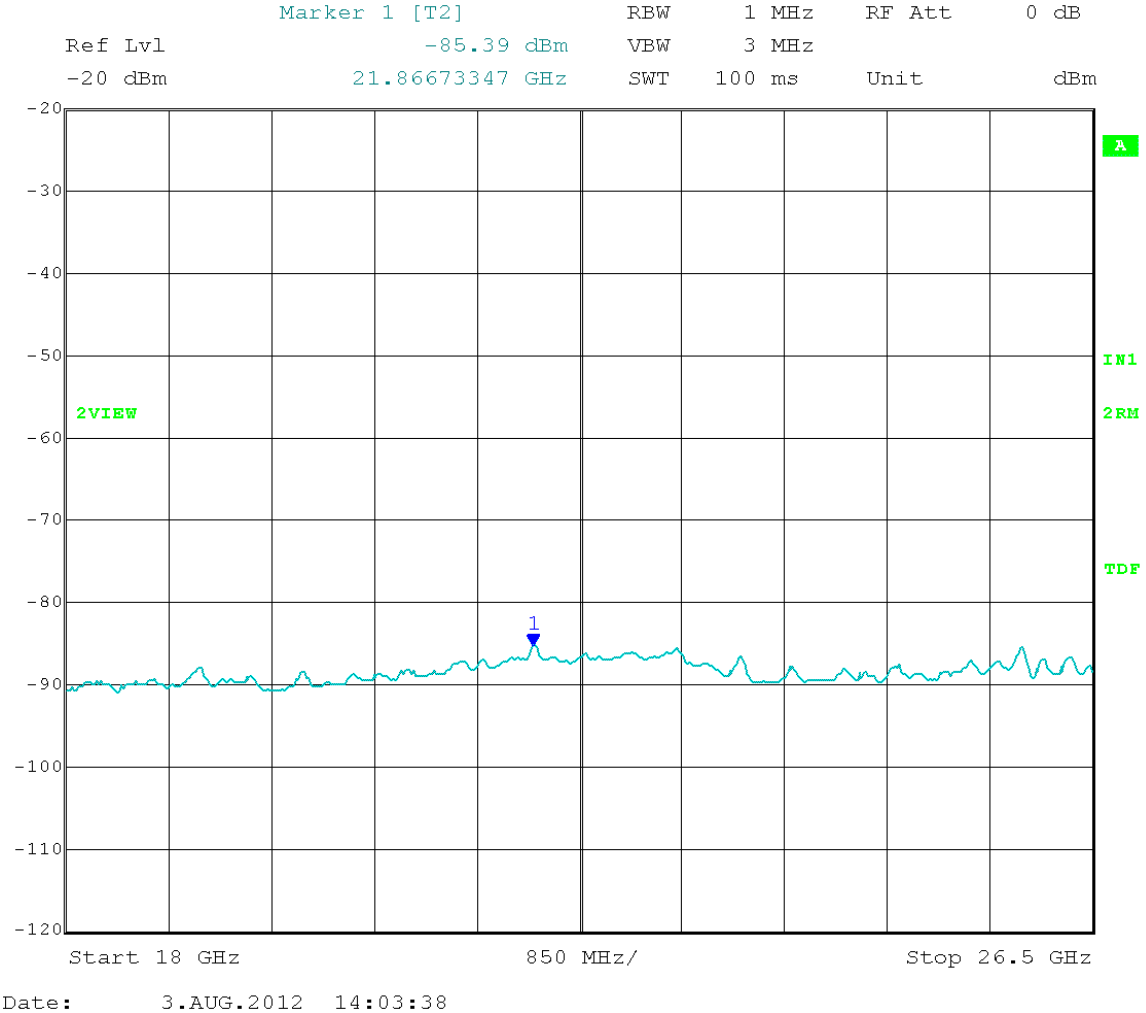
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth: 10 MHz adi reg 36 26 dB EBW: 9.72 MHz
Output port: Channel B; Mid Channel Frequency: 5.575 GHz
Output power setting: 19; Modulation Type: QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 18 GHz to 26.5 GHz; Average (RMS) detector



Date: 3.AUG.2012 14:03:38

Calculated Field Strength at noise floor = -85.39 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 21.84 dBµV/m Average

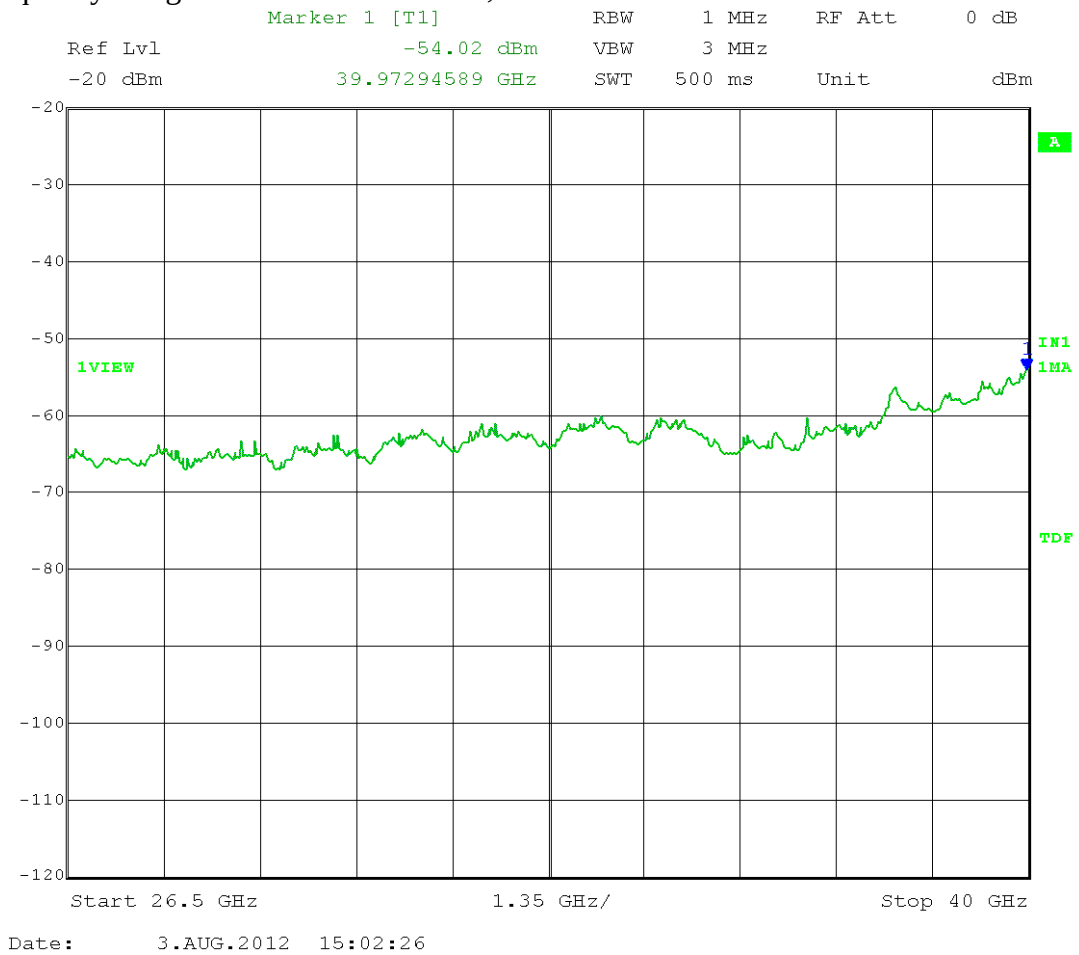
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth: 10 MHz adi reg 36 26 dB EBW: 9.72 MHz
Output port: Channel B; Mid Channel Frequency: 5.575 GHz
Output power setting: 19; Modulation Type: QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 26.5 GHz to 40 GHz; Peak detector



Calculated EIRP at noise floor = -54.02 dBm + 9 dBi antenna gain + 3 dB (MIMO)
= -42.02 dBm
Calculated Field Strength at noise floor = -54.02 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 53.21 dBµV/m Peak

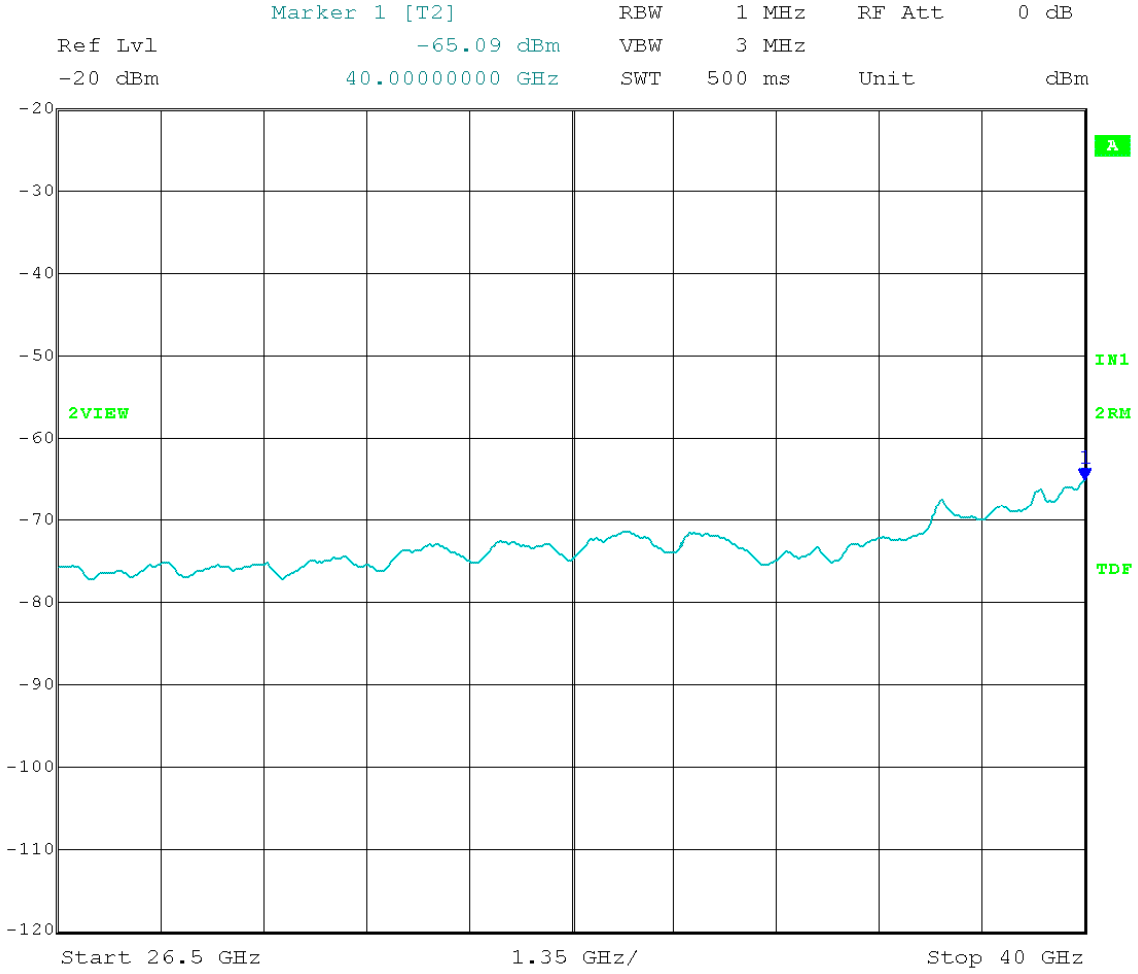
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth: 10 MHz adi reg 36 26 dB EBW: 9.72 MHz
Output port: Channel B; Mid Channel Frequency: 5.575 GHz
Output power setting: 19; Modulation Type: QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 26.5 GHz to 40 GHz; Average (RMS) detector



Date: 3.AUG.2012 15:04:13

Calculated Field Strength at noise floor = -65.09 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 42.14 dBµV/m Average

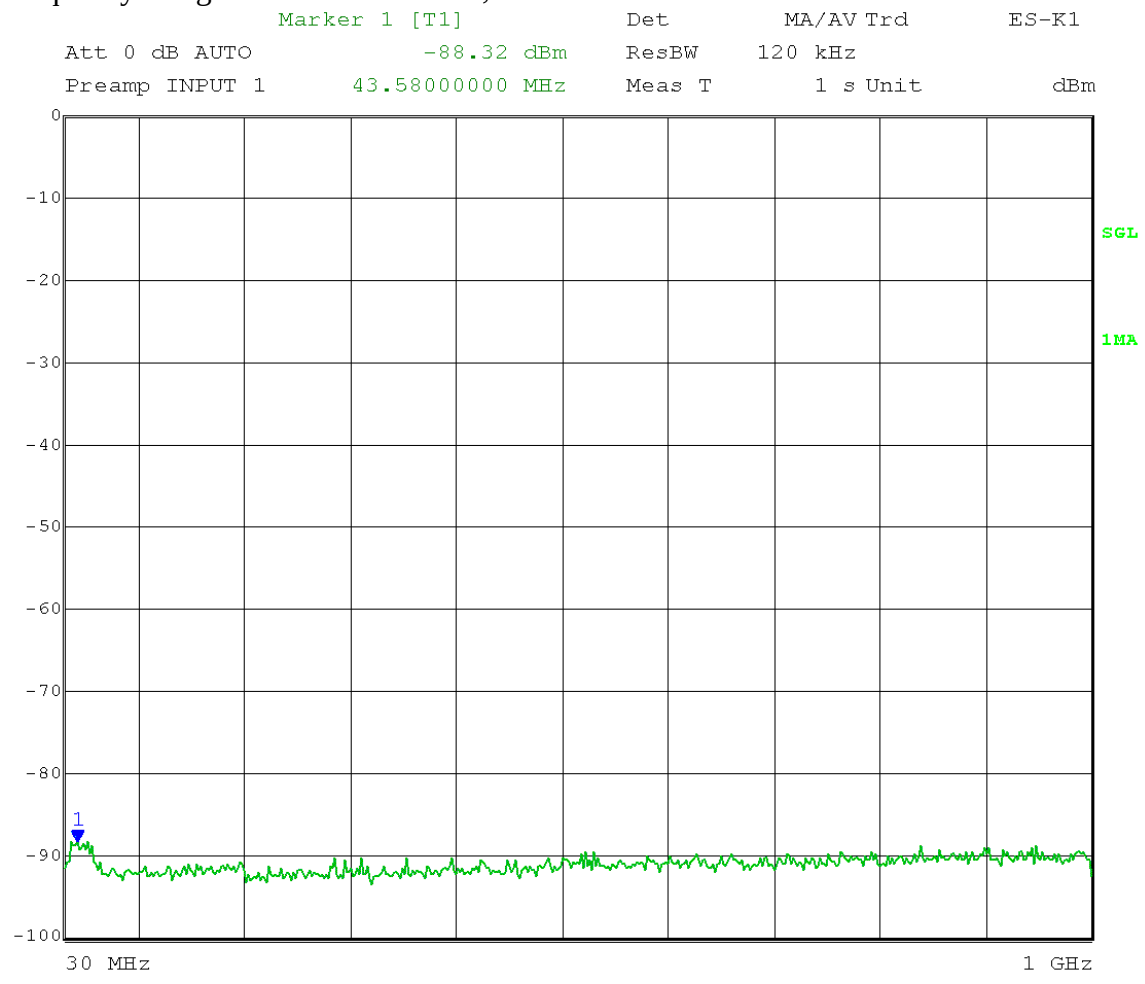
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth: 10 MHz adi reg 37 26 dB EBW: 9.72 MHz
Output port: Channel B; High Channel Frequency: 5.720 GHz
Output power setting: 19; Modulation Type: QPSK

Upper bound on out-of-band antenna gain: 9 dBi
Field strength limit: FCC Sections 15.209 and 15.205 (emissions in restricted bands)

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 30 MHz to 1 GHz; Peak detector



Date: 3.AUG.2012 10:36:09

No emissions found from 30 MHz to 1 GHz

Calculated Field Strength at noise floor = -88.32 dBm + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 + 4.7 dB = 23.61 dBµV/m Peak

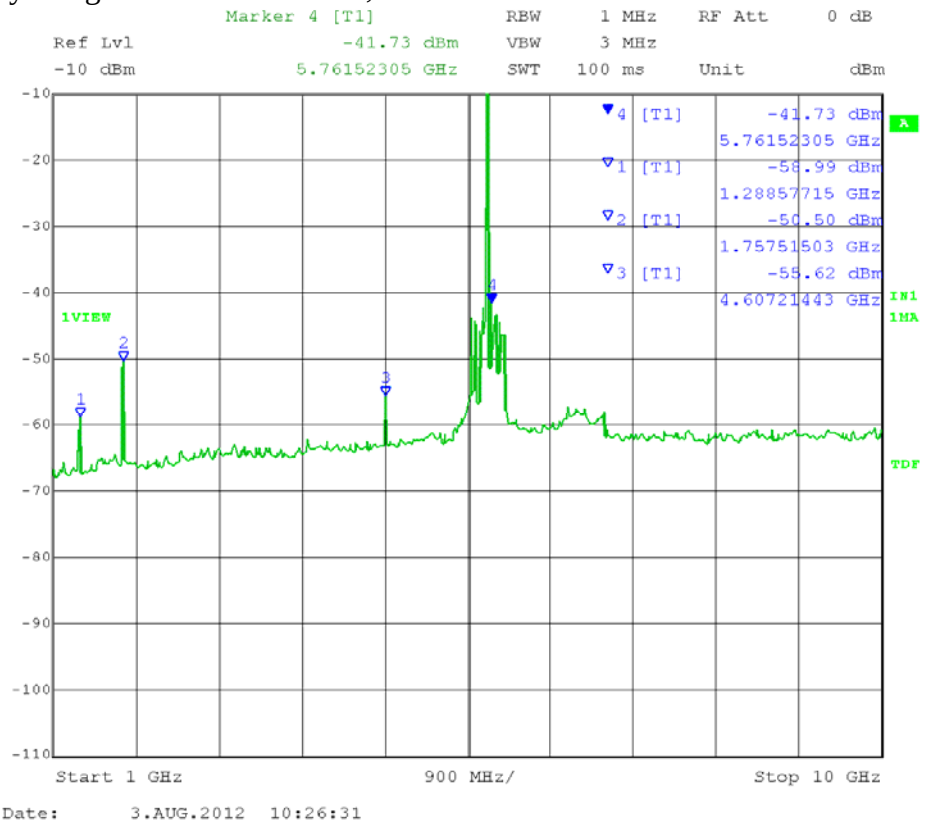
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth: 10 MHz adi reg 37 26 dB EBW: 9.72 MHz
Output port: Channel B; High Channel Frequency: 5.720 GHz
Output power setting: 19; Modulation Type: QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 1 GHz to 10 GHz; Peak detector



Marker 1: Calculated Field Strength (Restricted Band) = -58.99 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 48.24 dBµV/m Peak
Marker 2: Calculated EIRP = -50.50 dBm + 9 dBi antenna gain + 3 dB (MIMO) = -38.50 dBm
Marker 3: Calculated Field Strength (Restricted Band) = -55.62 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 51.61 dBµV/m Peak
Marker 4: Calculated EIRP = -41.73 dBm + 9 dBi antenna gain + 3 dB (MIMO) = -29.73 dBm

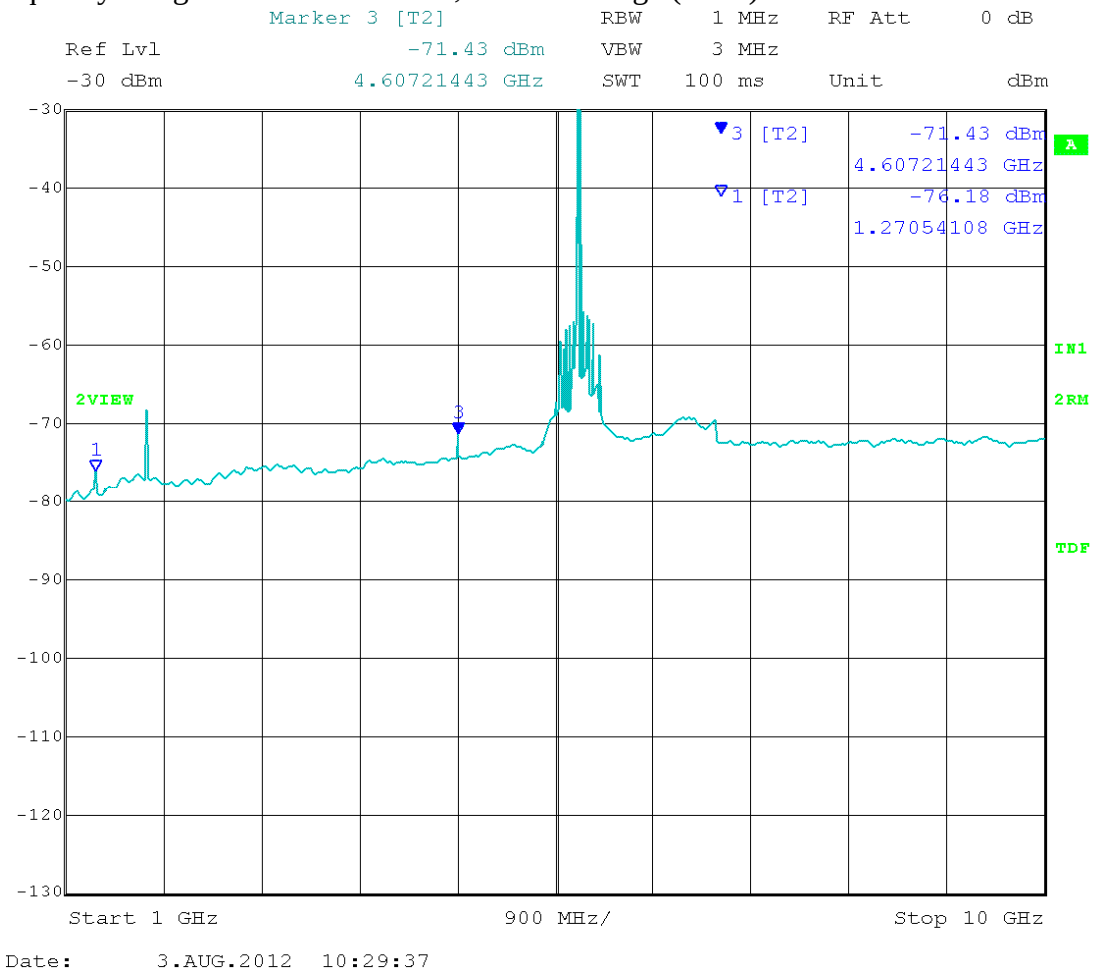
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth: 10 MHz adi reg 37 26 dB EBW: 9.72 MHz
Output port: Channel B; High Channel Frequency: 5.720 GHz
Output power setting: 19; Modulation Type: QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 1 GHz to 10 GHz; Average (RMS) detector



Marker 1: Calculated Field Strength (Restricted Band) = -76.18 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 31.05 dBµV/m Average
Marker 3: Calculated Field Strength (Restricted Band) = -71.43 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 35.80 dBµV/m Average

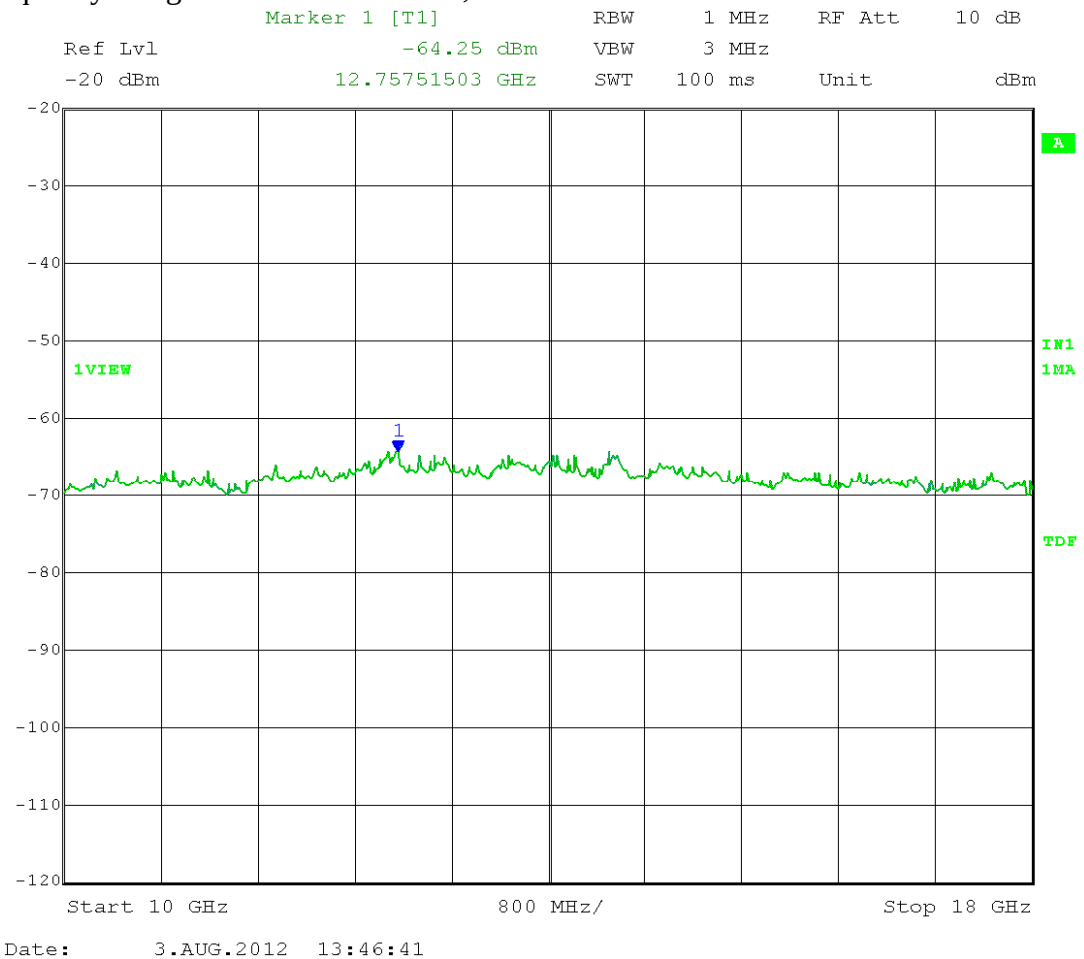
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth: 10 MHz adi reg 37 26 dB EBW: 9.72 MHz
Output port: Channel B; High Channel Frequency: 5.720 GHz
Output power setting: 19; Modulation Type: QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 10 GHz to 18 GHz; Peak detector



Calculated EIRP at noise floor = -64.25 dBm + 9 dBi antenna gain + 3 dB (MIMO)
= -52.25 dBm
Calculated Field Strength at noise floor = -64.25 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 42.98 dBµV/m Peak

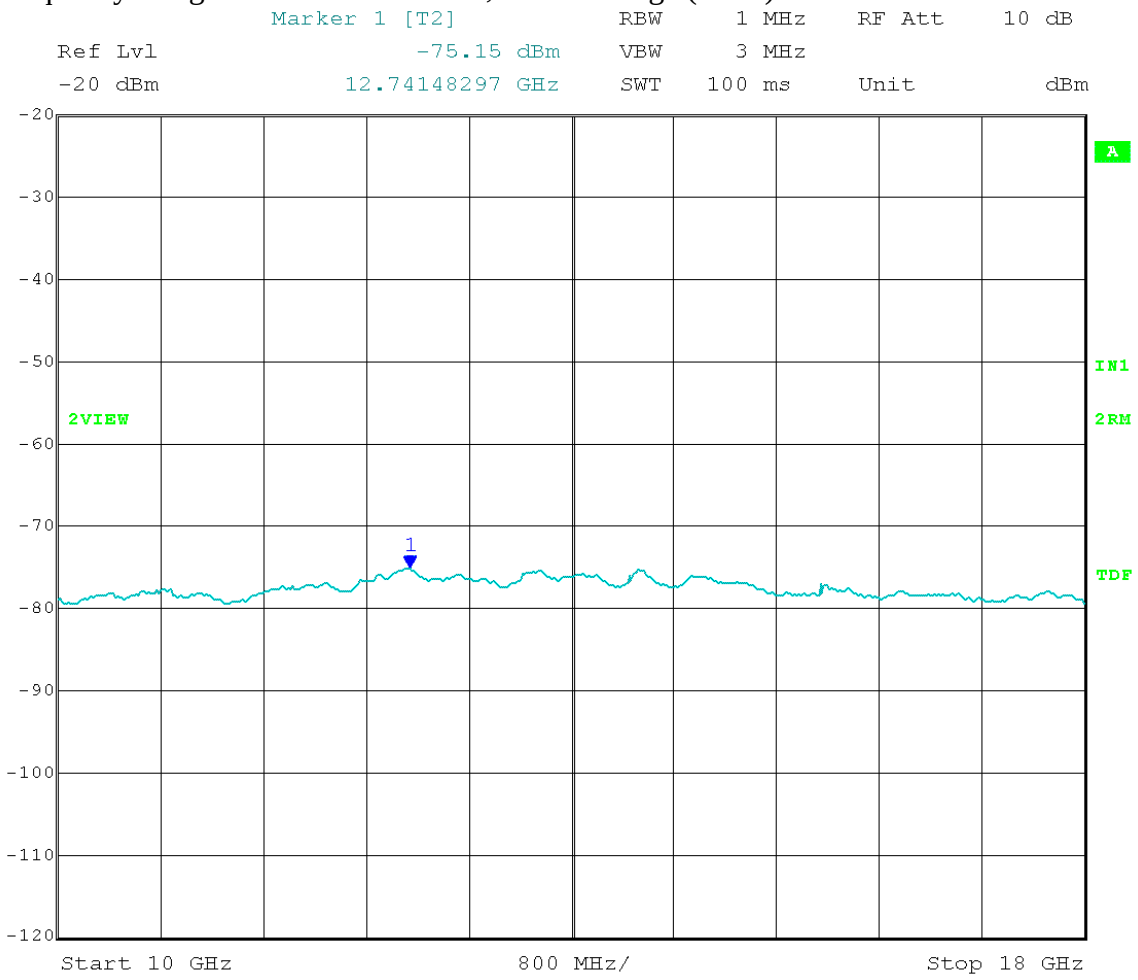
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth: 10 MHz adi reg 37 26 dB EBW: 9.72 MHz
Output port: Channel B; High Channel Frequency: 5.720 GHz
Output power setting: 19; Modulation Type: QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 10 GHz to 18 GHz; Average (RMS) detector



Date: 3.AUG.2012 13:48:32

Calculated Field Strength at noise floor = -75.15 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 32.08 dBµV/m Average

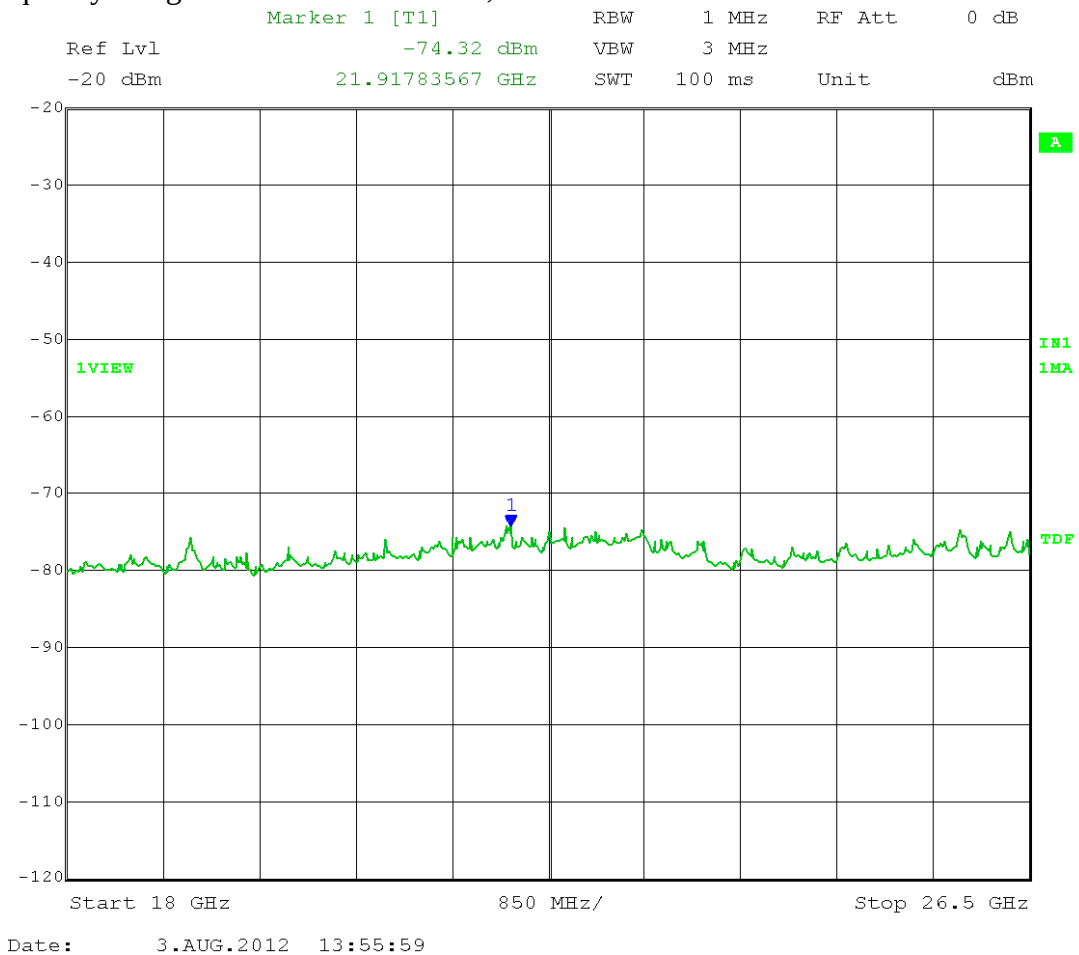
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth: 10 MHz adi reg 37 26 dB EBW: 9.72 MHz
Output port: Channel B; High Channel Frequency: 5.720 GHz
Output power setting: 19; Modulation Type: QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 18 GHz to 26.5 GHz; Peak detector



Calculated EIRP at noise floor = -74.32 dBm + 9 dBi antenna gain + 3 dB (MIMO)
= -62.32 dBm
Calculated Field Strength at noise floor = -74.32 + 9 dBi antenna gain + 3 dB (MIMO)
– 20 log (3 meters) + 104.77 = 32.91 dBµV/m Peak

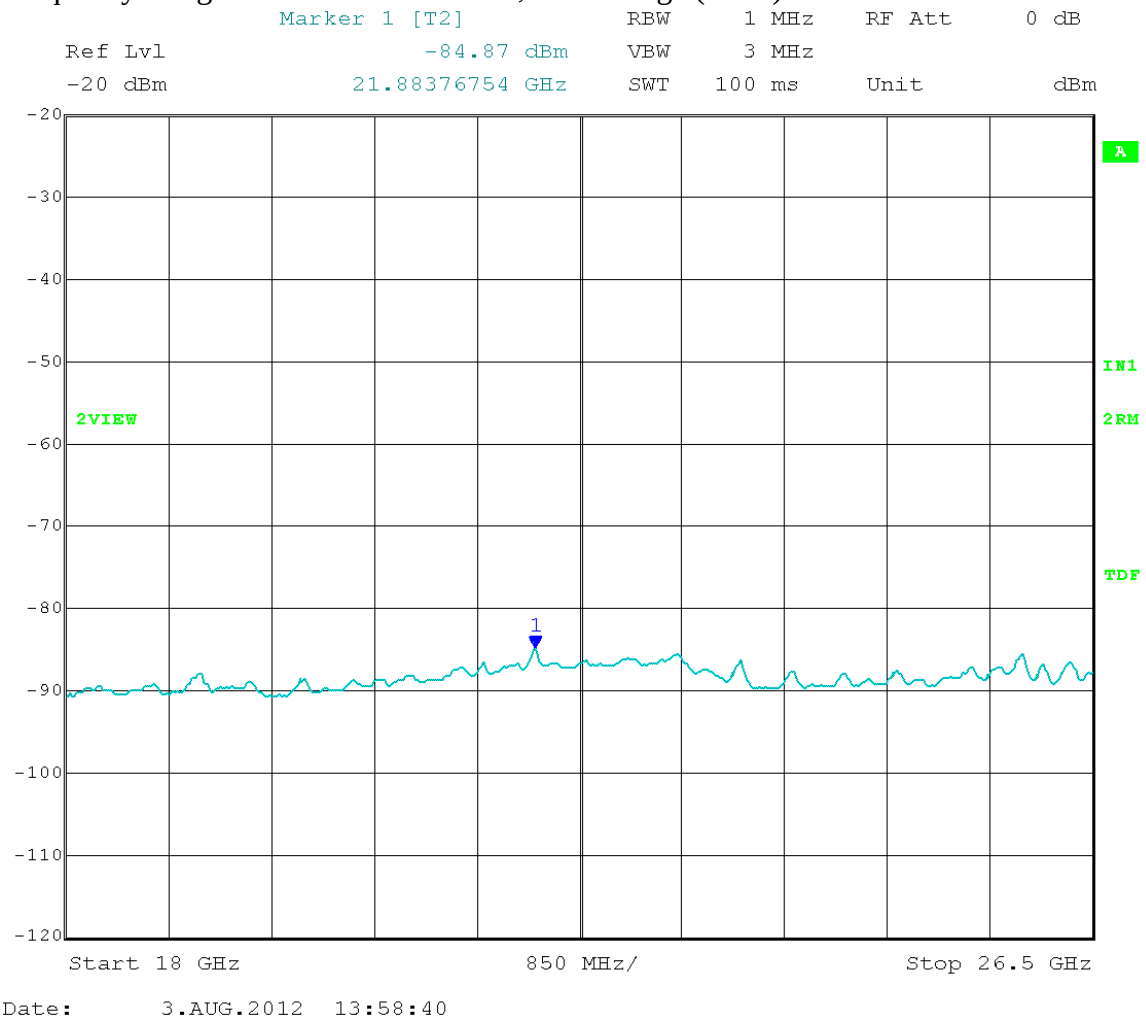
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth: 10 MHz adi reg 37 26 dB EBW: 9.72 MHz
Output port: Channel B; High Channel Frequency: 5.720 GHz
Output power setting: 19; Modulation Type: QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 18 GHz to 26.5 GHz; Average (RMS) detector



Date: 3.AUG.2012 13:58:40

Calculated Field Strength at noise floor = -84.87 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 22.36 dBµV/m Average

Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth: 10 MHz adi reg 37 26 dB EBW: 9.72 MHz
Output port: Channel B; High Channel Frequency: 5.720 GHz
Output power setting: 19; Modulation Type: QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 26.5 GHz to 40 GHz; Peak detector

Calculated EIRP at noise floor = -54.25 dBm + 9 dBi antenna gain + 3 dB (MIMO)
= -42.25 dBm
Calculated Field Strength at noise floor = -54.25 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 52.98 dBµV/m Peak

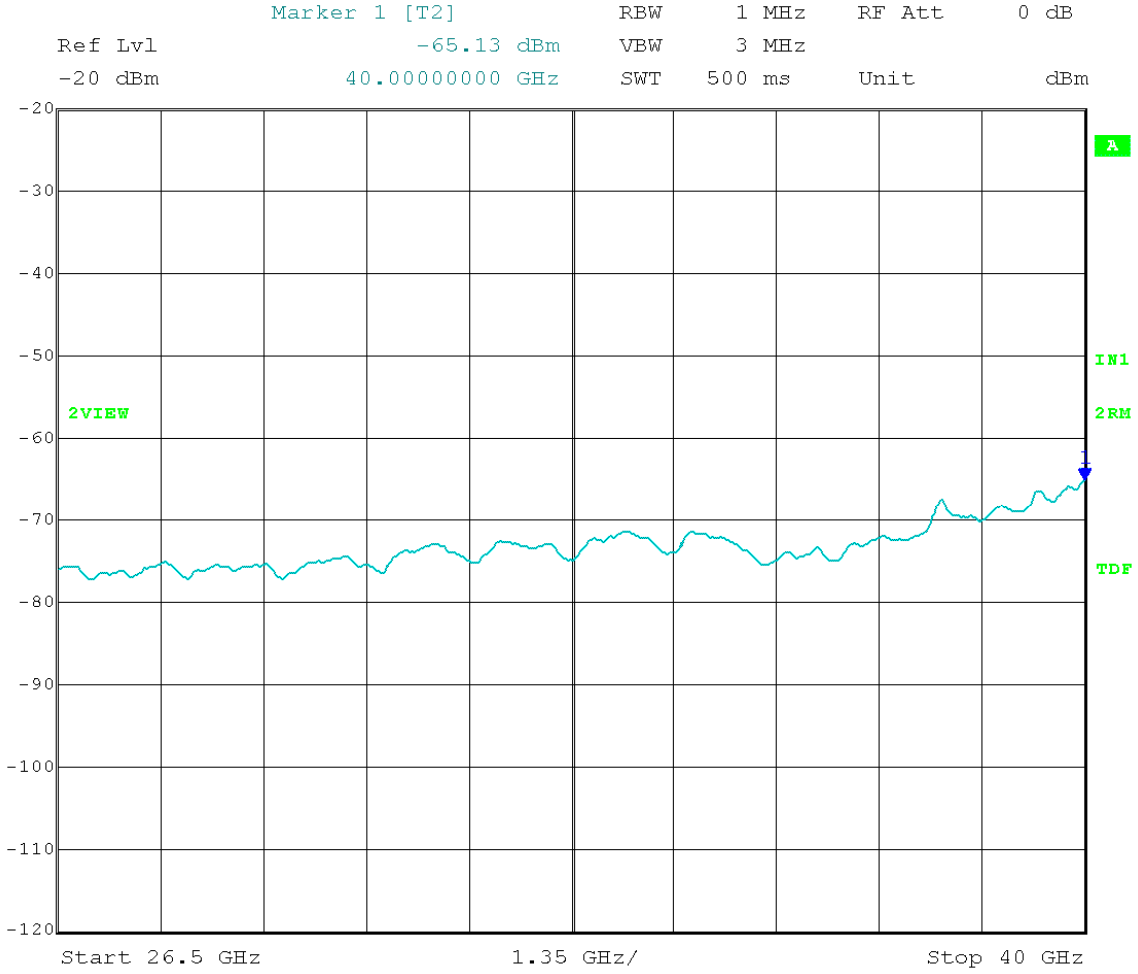
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth: 10 MHz adi reg 37 26 dB EBW: 9.72 MHz
Output port: Channel B; High Channel Frequency: 5.720 GHz
Output power setting: 19; Modulation Type: QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 26.5 GHz to 40 GHz; Average (RMS) detector



Date: 3.AUG.2012 15:08:54

Calculated Field Strength at noise floor = -65.13 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 42.10 dBµV/m Average

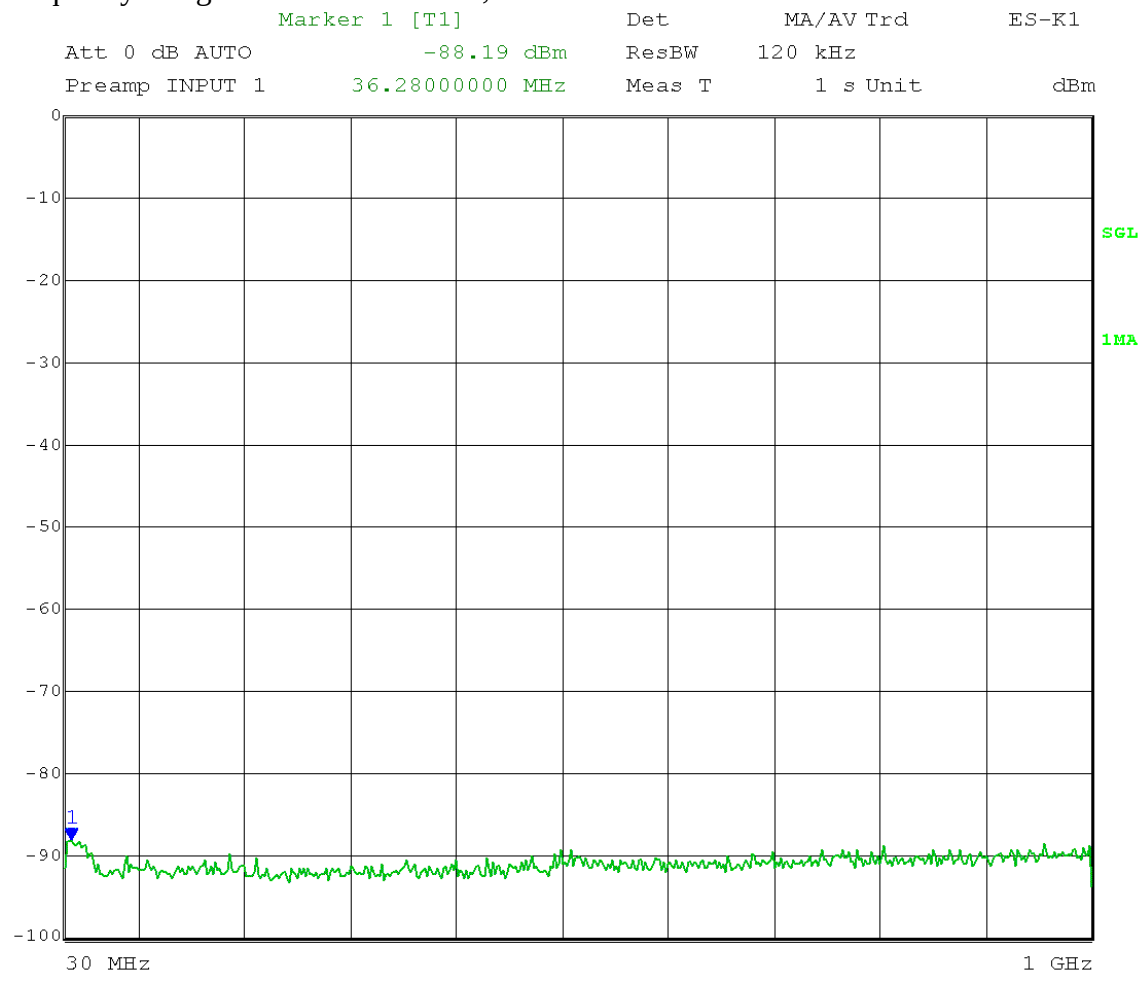
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg 24	26 dB EBW: 19.44 MHz
Output port:	Channel A;	Low Channel Frequency:	5.480 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
Field strength limit: FCC Sections 15.209 and 15.205 (emissions in restricted bands)

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 30 MHz to 1 GHz; Peak detector



Date: 3.AUG.2012 11:01:51

No emissions found from 30 MHz to 1 GHz

Calculated Field Strength at noise floor = -88.19 dBm + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 + 4.7 dB = 23.74 dBµV/m Peak

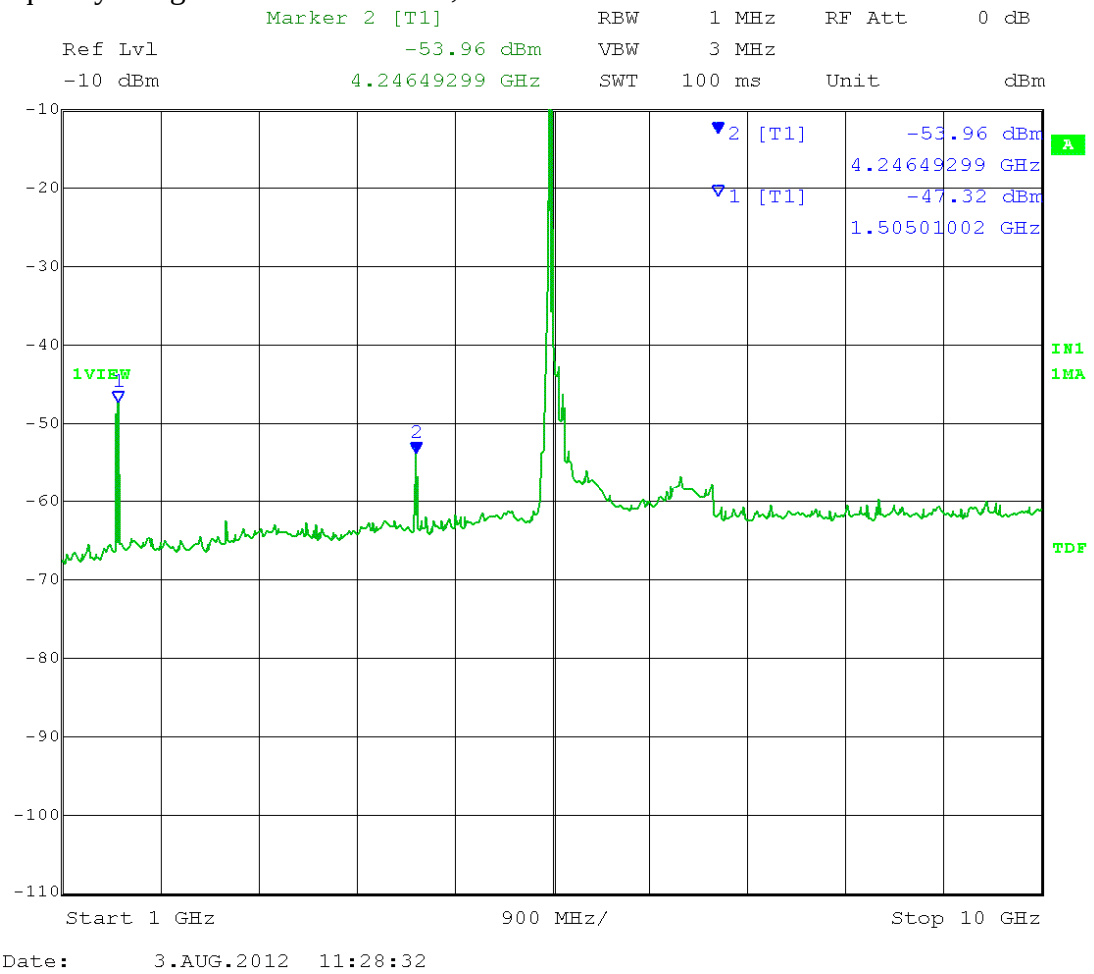
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg 24	26 dB EBW: 19.44 MHz
Output port:	Channel A;	Low Channel Frequency:	5.480 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 1 GHz to 10 GHz; Peak detector



Marker 1: Calculated Field Strength (Restricted Band) = -47.32 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 59.91 dBµV/m Peak
Marker 2: Calculated Field Strength (Restricted Band) = -53.96 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 53.27 dBµV/m Peak

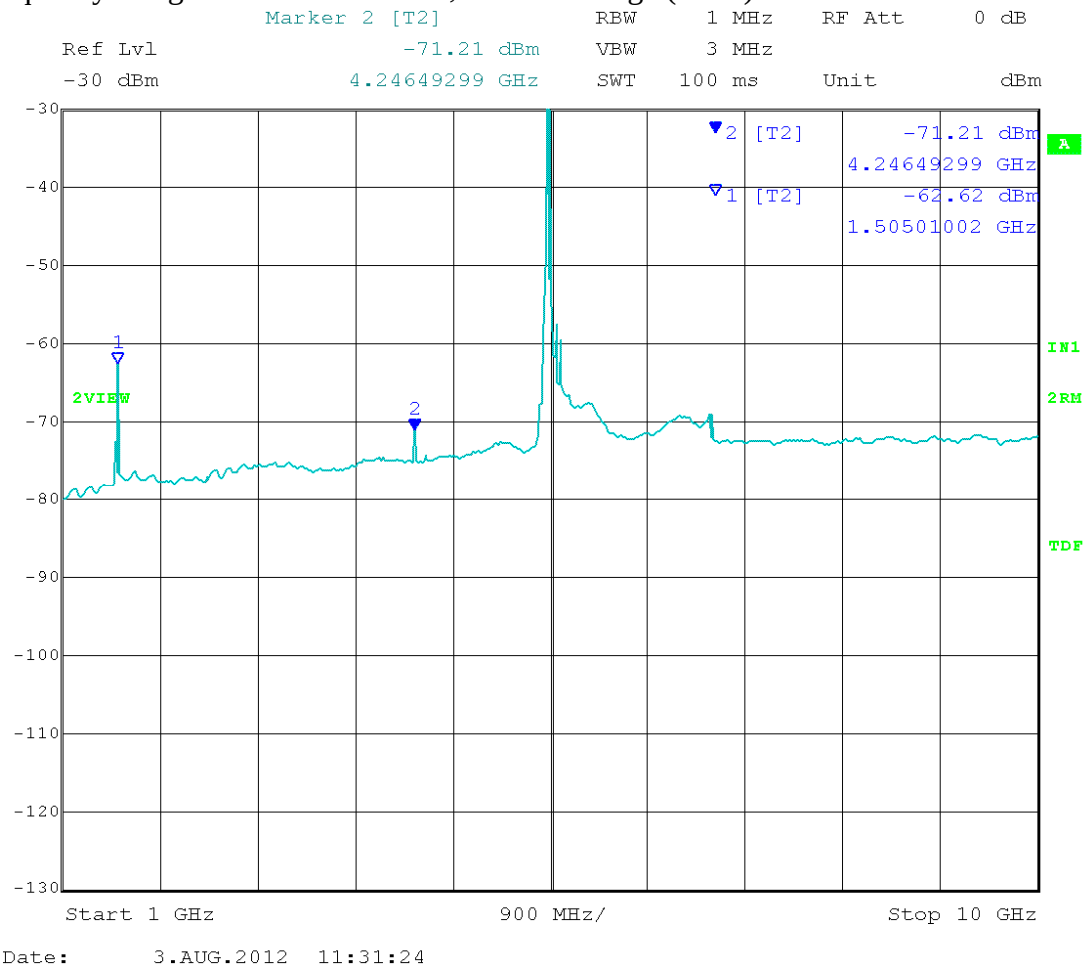
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg 24	26 dB EBW: 19.44 MHz
Output port:	Channel A;	Low Channel Frequency:	5.480 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 1 GHz to 10 GHz; Average (RMS) detector



Marker 1: Calculated Field Strength (Restricted Band) = -62.62 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 44.61 dBµV/m Average
Marker 2: Calculated Field Strength (Restricted Band) = -71.21 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 36.02 dBµV/m Average

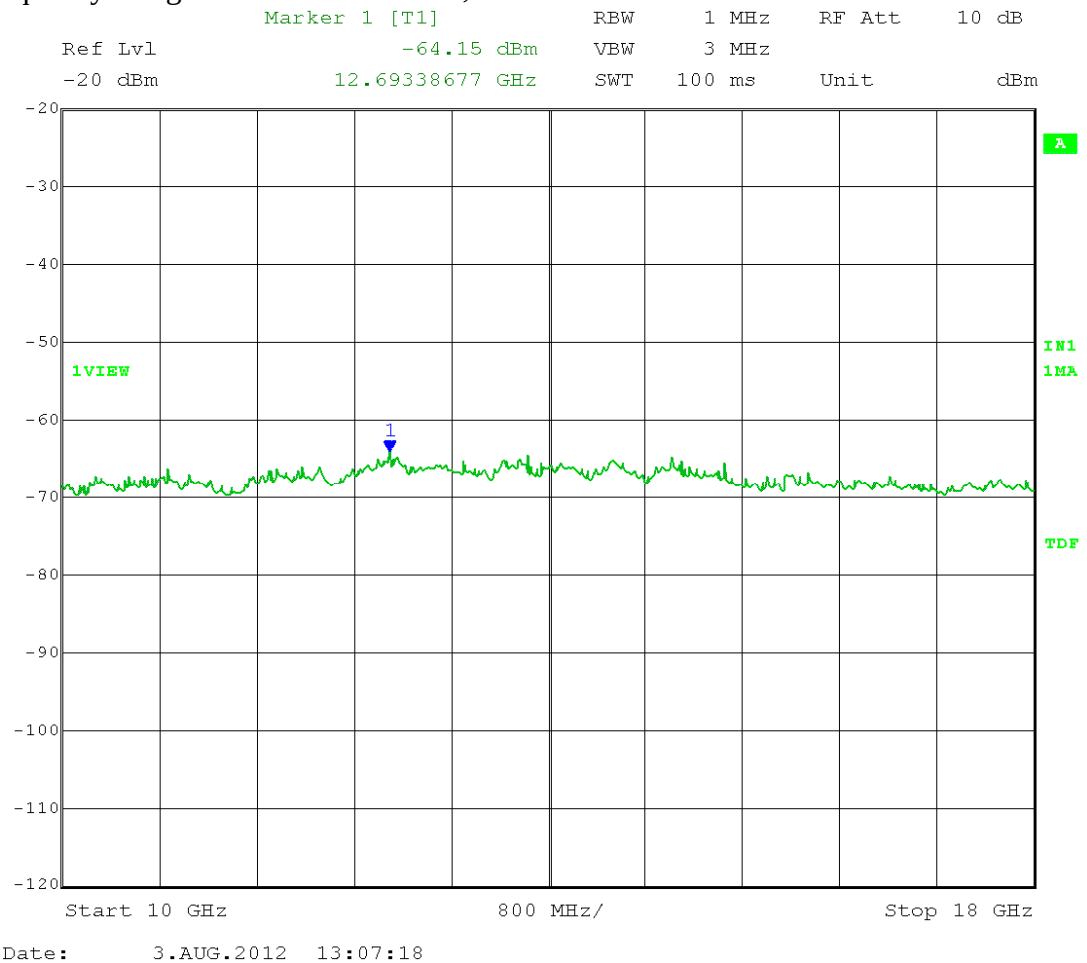
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg 24	26 dB EBW: 19.44 MHz
Output port:	Channel A;	Low Channel Frequency:	5.480 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 10 GHz to 18 GHz; Peak detector



Calculated EIRP at noise floor = -64.15 dBm + 9 dBi antenna gain + 3 dB (MIMO)
= -52.15 dBm
Calculated Field Strength at noise floor = -64.15 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 43.08 dBµV/m Peak

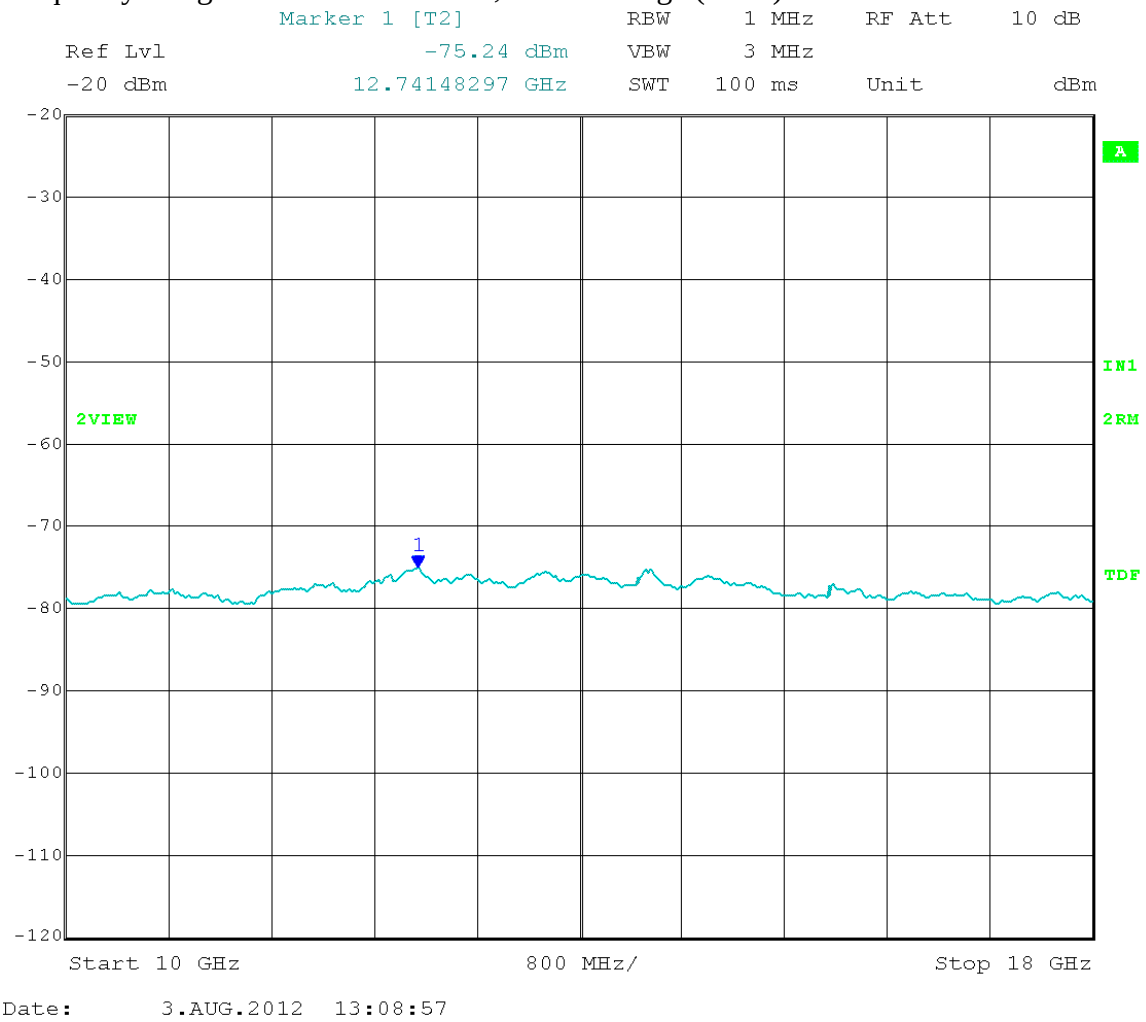
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg 24	26 dB EBW: 19.44 MHz
Output port:	Channel A;	Low Channel Frequency:	5.480 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 10 GHz to 18 GHz; Average (RMS) detector



Date: 3.AUG.2012 13:08:57

Calculated Field Strength at noise floor = -75.24 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 31.99 dBµV/m Average

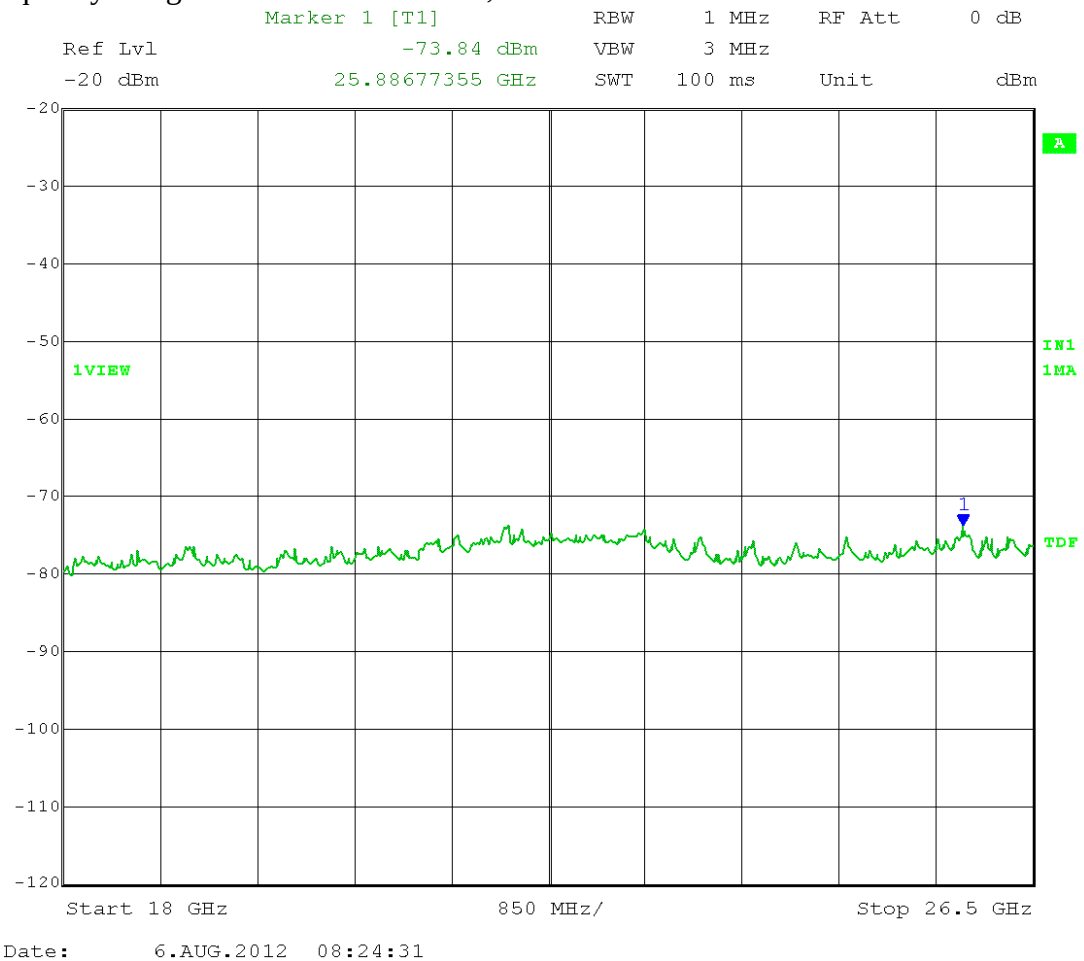
Test Date: 08-06-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg 24	26 dB EBW: 19.44 MHz
Output port:	Channel A;	Low Channel Frequency:	5.480 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 18 GHz to 26.5 GHz; Peak detector



Calculated EIRP at noise floor = -73.84 dBm + 9 dBi antenna gain + 3 dB (MIMO)
= -61.84 dBm
Calculated Field Strength at noise floor = -73.84 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 33.39 dBµV/m Peak

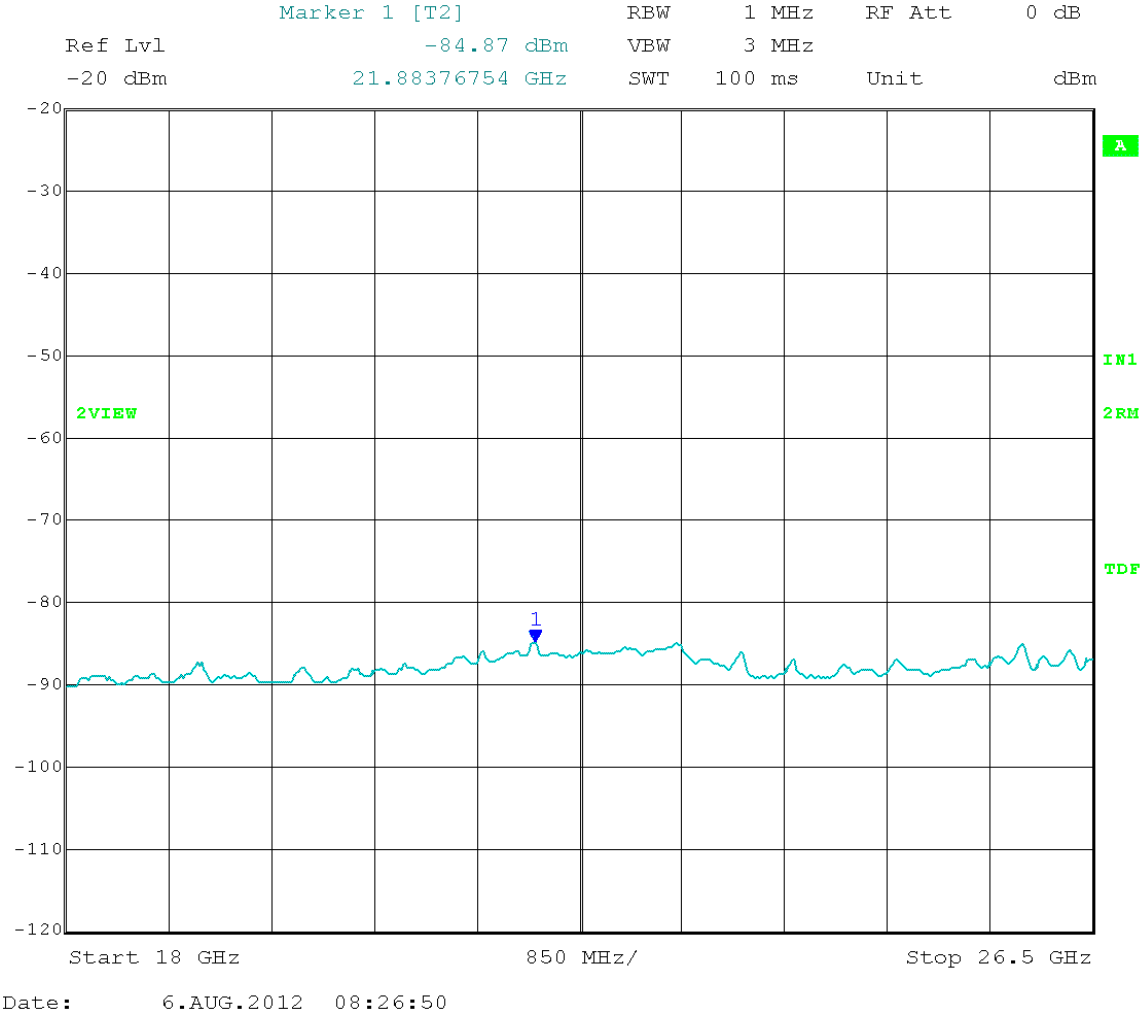
Test Date: 08-06-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg 24	26 dB EBW: 19.44 MHz
Output port:	Channel A;	Low Channel Frequency:	5.480 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 18 GHz to 26.5 GHz; Average (RMS) detector



Date: 6.AUG.2012 08:26:50

Calculated Field Strength at noise floor = -84.87 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 22.36 dBµV/m Average

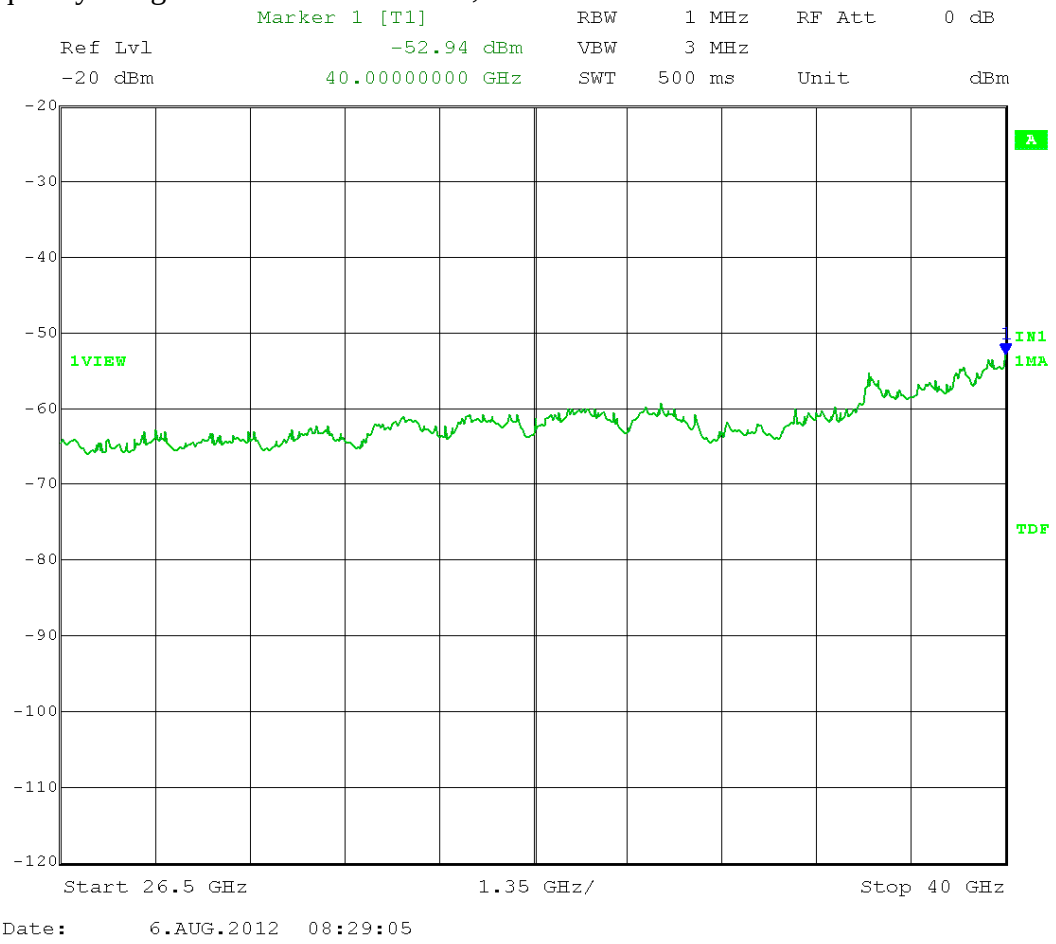
Test Date: 08-06-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg 24	26 dB EBW: 19.44 MHz
Output port:	Channel A;	Low Channel Frequency:	5.480 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 26.5 GHz to 40 GHz; Peak detector



Calculated EIRP at noise floor = -52.94 dBm + 9 dBi antenna gain + 3 dB (MIMO)
= -40.94 dBm
Calculated Field Strength at noise floor = -52.94 + 9 dBi antenna gain + 3 dB (MIMO)
– 20 log (3 meters) + 104.77 = 54.29 dBµV/m Peak

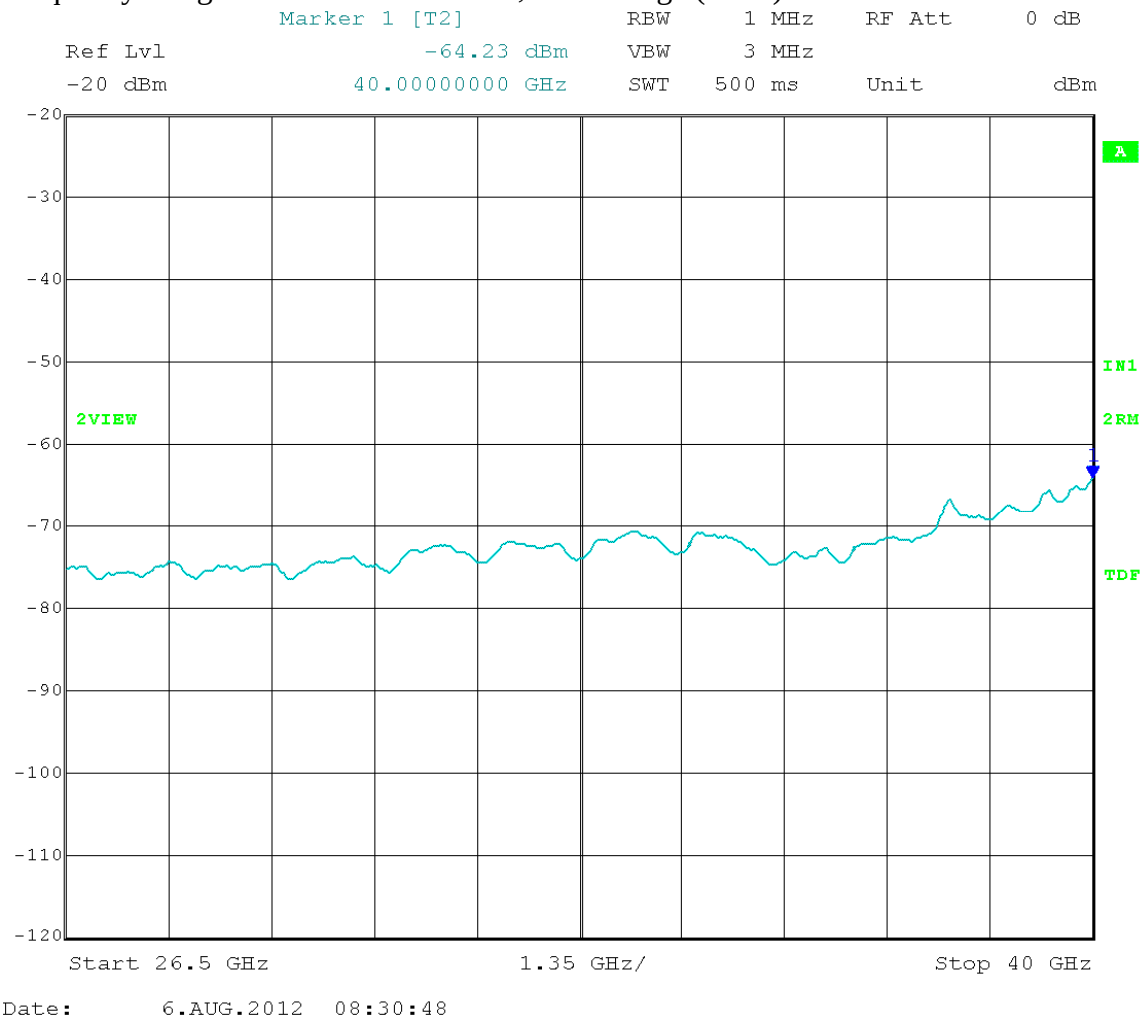
Test Date: 08-06-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg 24	26 dB EBW: 19.44 MHz
Output port:	Channel A;	Low Channel Frequency:	5.480 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 26.5 GHz to 40 GHz; Average (RMS) detector



Calculated Field Strength at noise floor = -64.23 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 43.00 dBµV/m Average

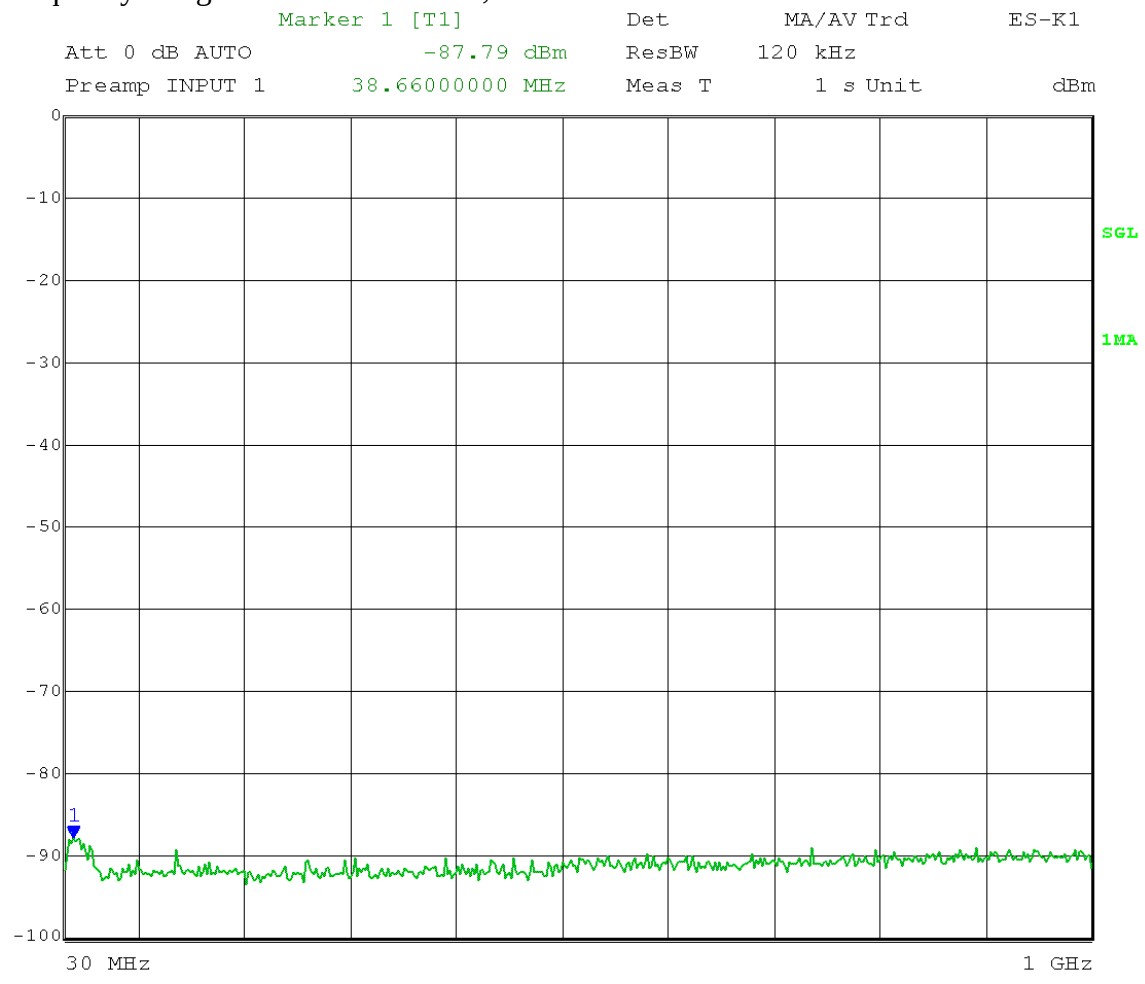
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg 2B	26 dB EBW: 19.44 MHz
Output port:	Channel A;	Mid Channel Frequency:	5.575 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
Field strength limit: FCC Sections 15.209 and 15.205 (emissions in restricted bands)

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 30 MHz to 1 GHz; Peak detector



Date: 3.AUG.2012 11:04:33

No emissions found from 30 MHz to 1 GHz

Calculated Field Strength at noise floor = -87.79 dBm + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 + 4.7 dB = 24.14 dBµV/m Peak

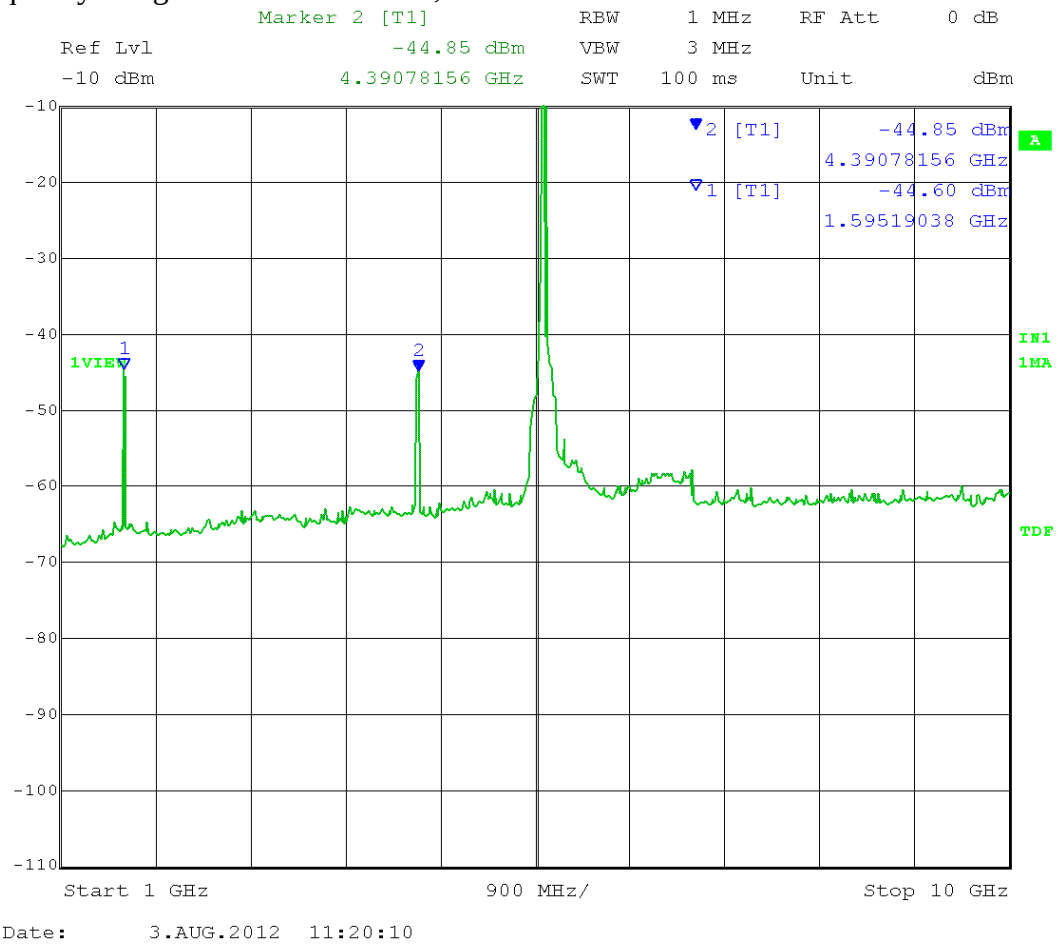
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg 2B	26 dB EBW: 19.44 MHz
Output port:	Channel A;	Mid Channel Frequency:	5.575 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 1 GHz to 10 GHz; Peak detector



Marker 1: Calculated Field Strength (Restricted Band) = -44.60 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 62.63 dBµV/m Peak
Marker 2: Calculated Field Strength (Restricted Band) = -44.85 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 62.38 dBµV/m Peak

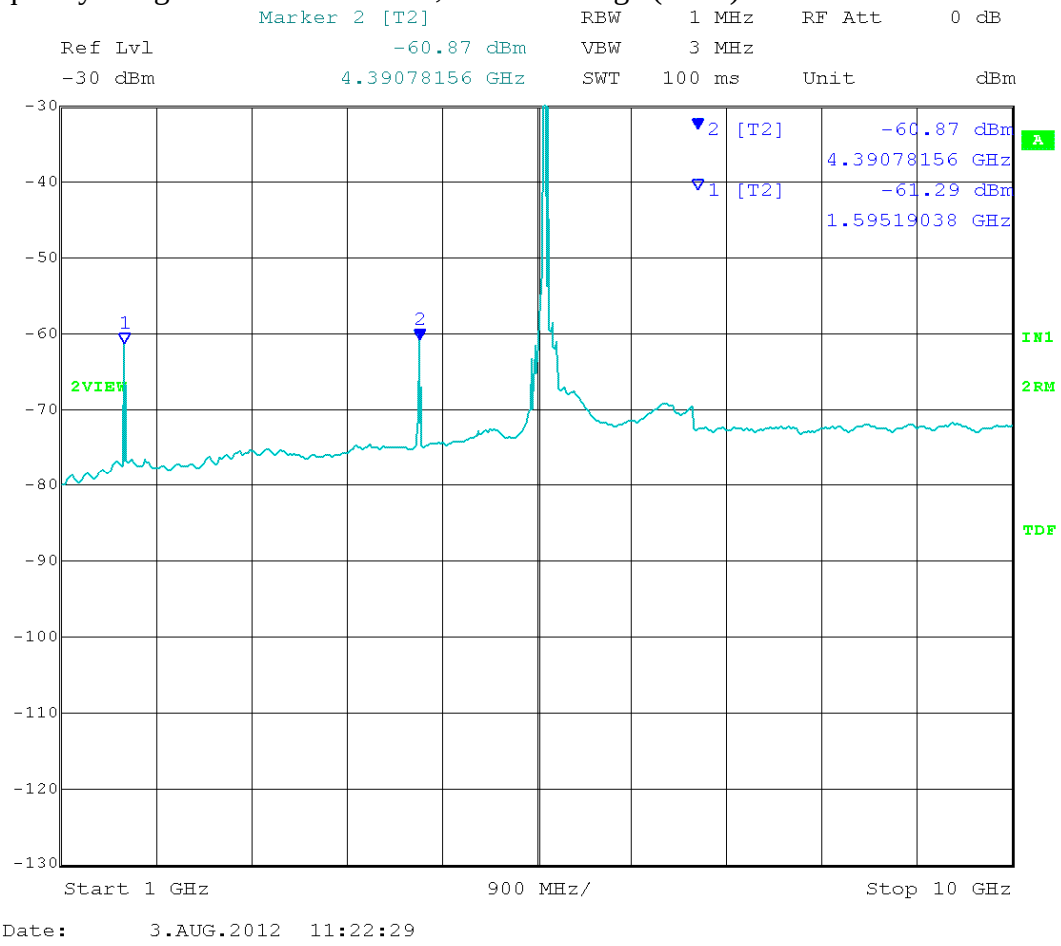
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg 2B	26 dB EBW: 19.44 MHz
Output port:	Channel A;	Mid Channel Frequency:	5.575 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 1 GHz to 10 GHz; Average (RMS) detector



Marker 1: Calculated Field Strength (Restricted Band) = -61.29 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 45.94 dBµV/m Average
Marker 2: Calculated Field Strength (Restricted Band) = -60.87 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 46.36 dBµV/m Average

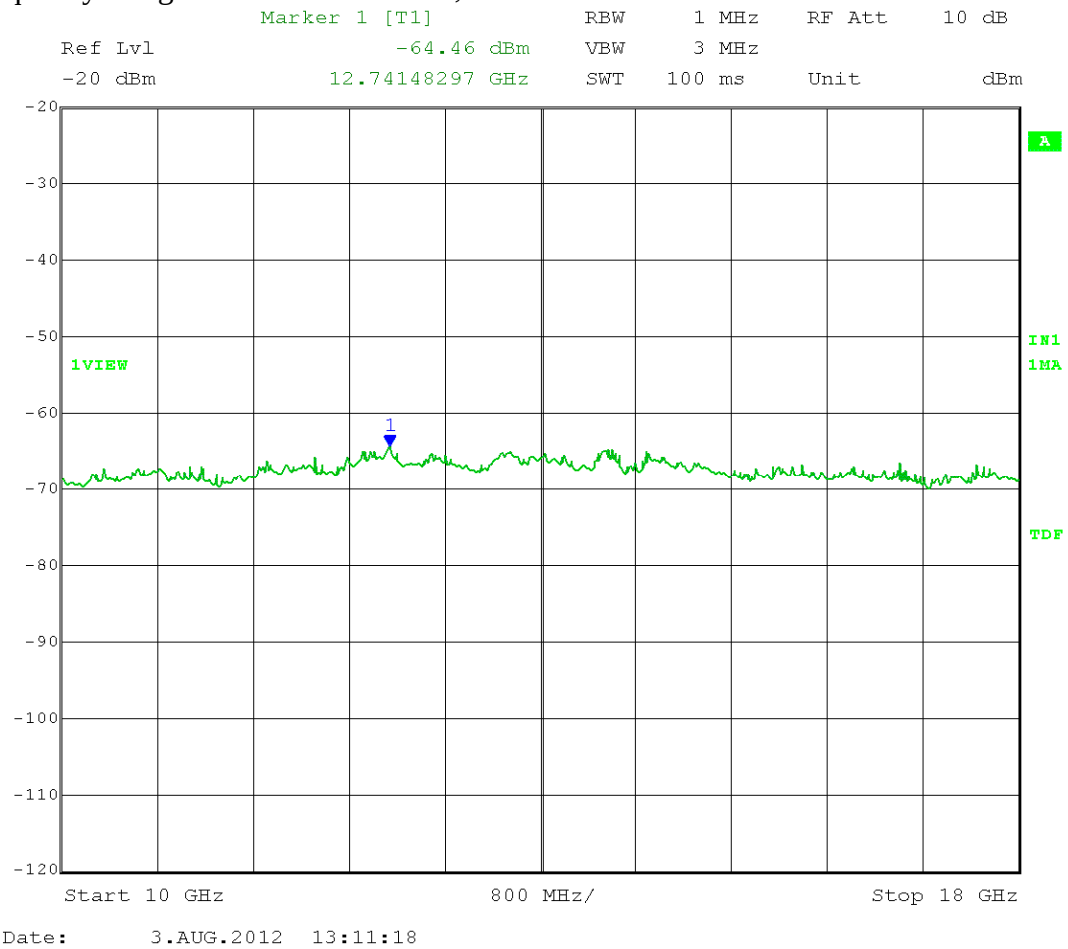
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg 2B	26 dB EBW: 19.44 MHz
Output port:	Channel A;	Mid Channel Frequency:	5.575 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 10 GHz to 18 GHz; Peak detector



Calculated EIRP at noise floor = -64.46 dBm + 9 dBi antenna gain + 3 dB (MIMO)
= -52.46 dBm
Calculated Field Strength at noise floor = -64.46 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 42.77 dBµV/m Peak

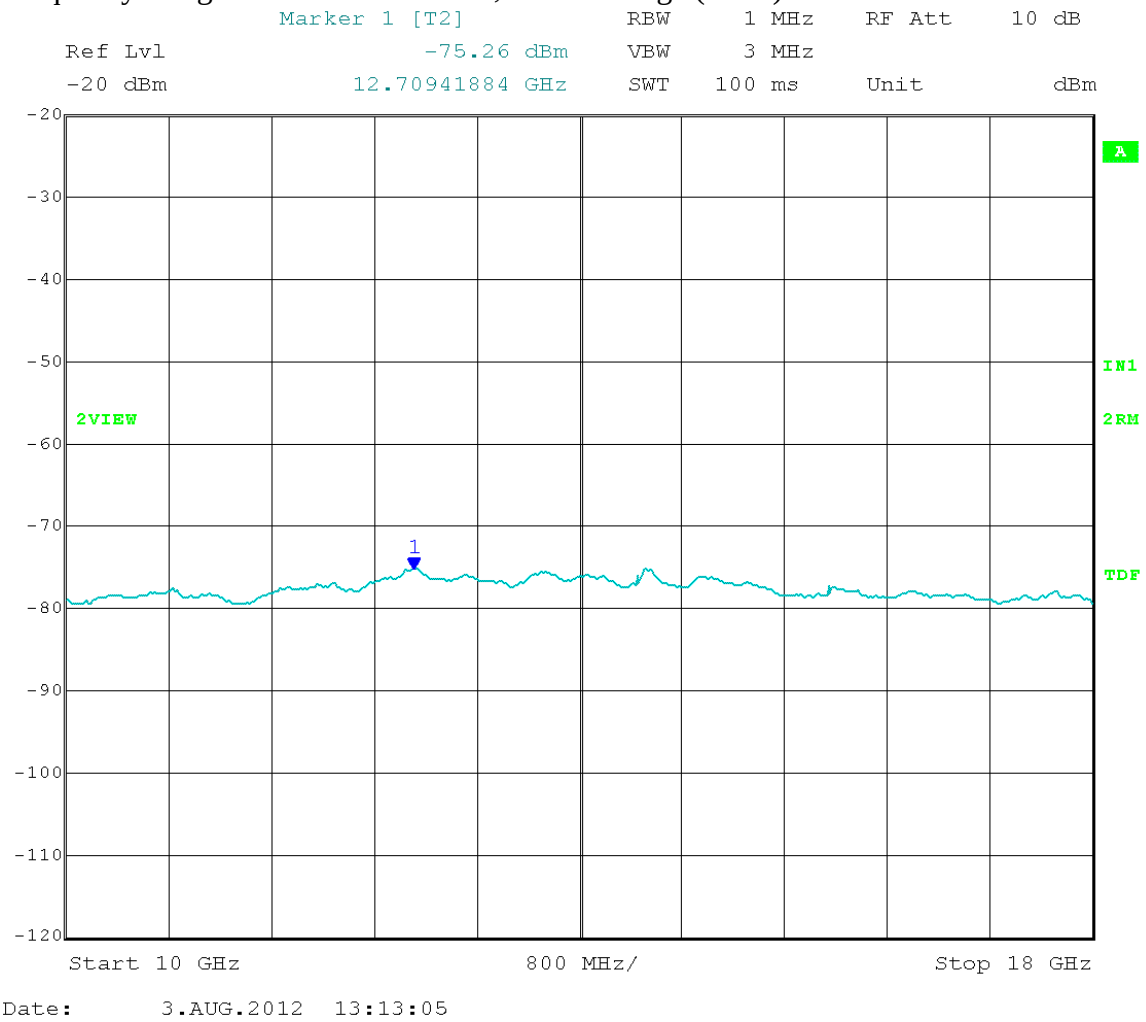
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg 2B	26 dB EBW: 19.44 MHz
Output port:	Channel A;	Mid Channel Frequency:	5.575 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 10 GHz to 18 GHz; Average (RMS) detector



Date: 3.AUG.2012 13:13:05

Calculated Field Strength at noise floor = -75.26 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 31.97 dBµV/m Average

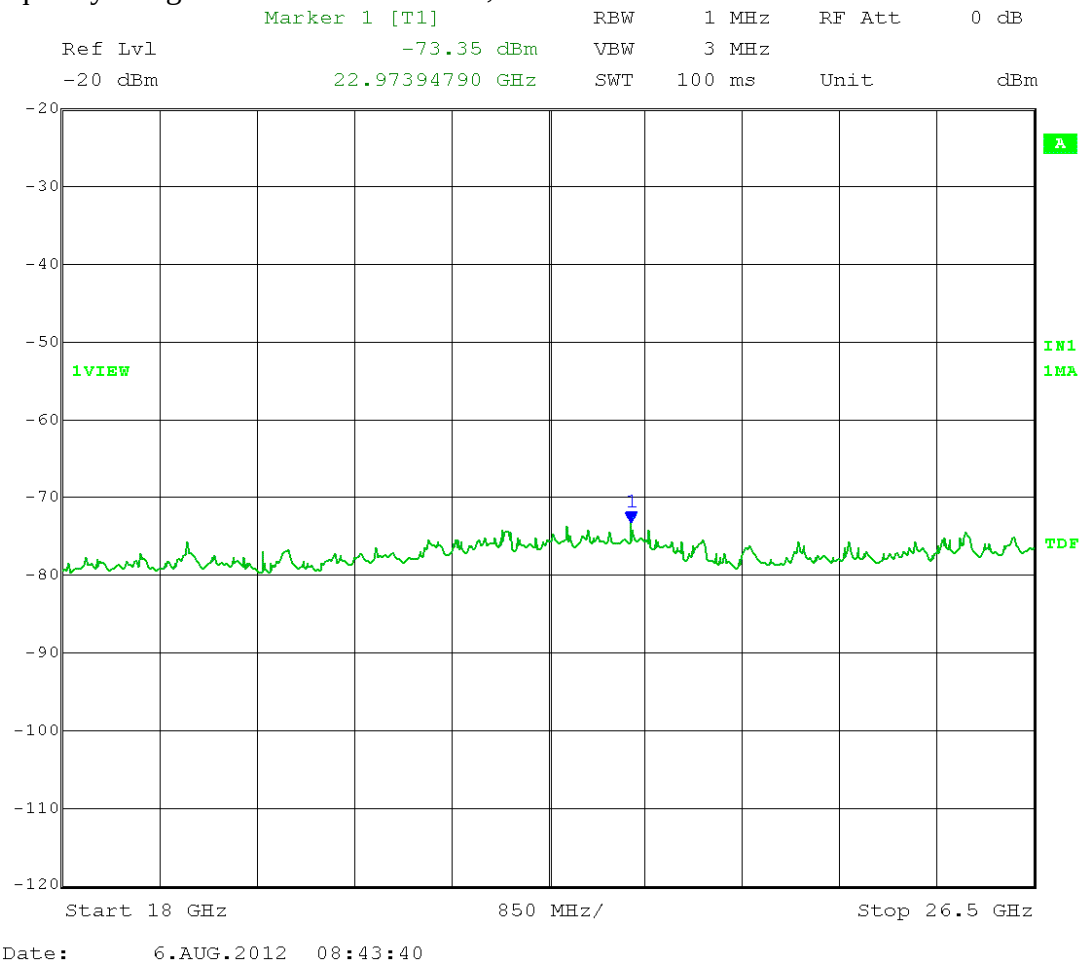
Test Date: 08-06-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg 2B	26 dB EBW: 19.44 MHz
Output port:	Channel A;	Mid Channel Frequency:	5.575 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 18 GHz to 26.5 GHz; Peak detector



Calculated EIRP at noise floor = -73.35 dBm + 9 dBi antenna gain + 3 dB (MIMO)
= -61.35 dBm
Calculated Field Strength at noise floor = -73.35 + 9 dBi antenna gain + 3 dB (MIMO)
– 20 log (3 meters) + 104.77 = 33.88 dBµV/m Peak

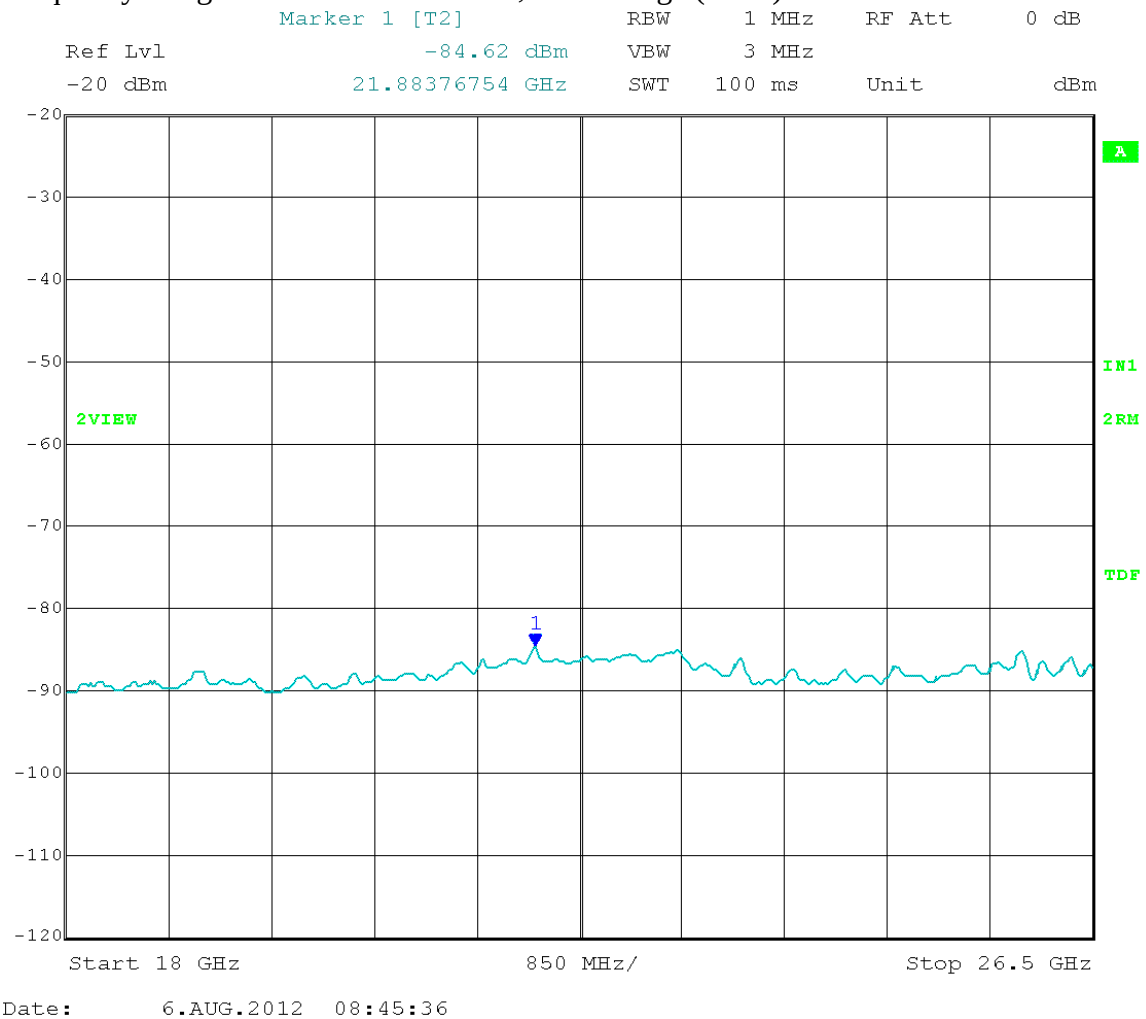
Test Date: 08-06-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg 2B	26 dB EBW: 19.44 MHz
Output port:	Channel A;	Mid Channel Frequency:	5.575 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 18 GHz to 26.5 GHz; Average (RMS) detector



Date: 6.AUG.2012 08:45:36

Calculated Field Strength at noise floor = -84.62 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 22.61 dBµV/m Average

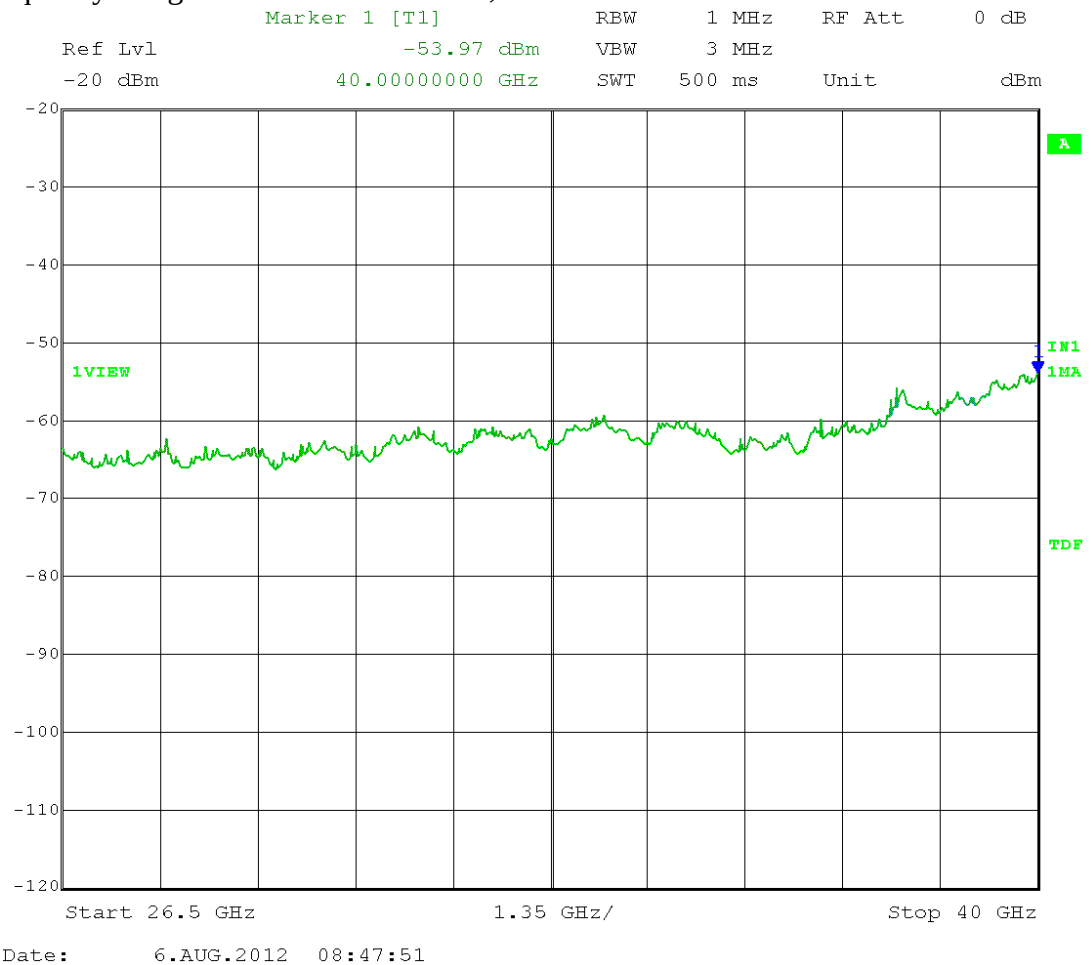
Test Date: 08-06-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg 2B	26 dB EBW: 19.44 MHz
Output port:	Channel A;	Mid Channel Frequency:	5.575 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 26.5 GHz to 40 GHz; Peak detector



Calculated EIRP at noise floor = -53.97 dBm + 9 dBi antenna gain + 3 dB (MIMO)
= -41.97 dBm
Calculated Field Strength at noise floor = -53.97 + 9 dBi antenna gain + 3 dB (MIMO)
– 20 log (3 meters) + 104.77 = 53.26 dBµV/m Peak

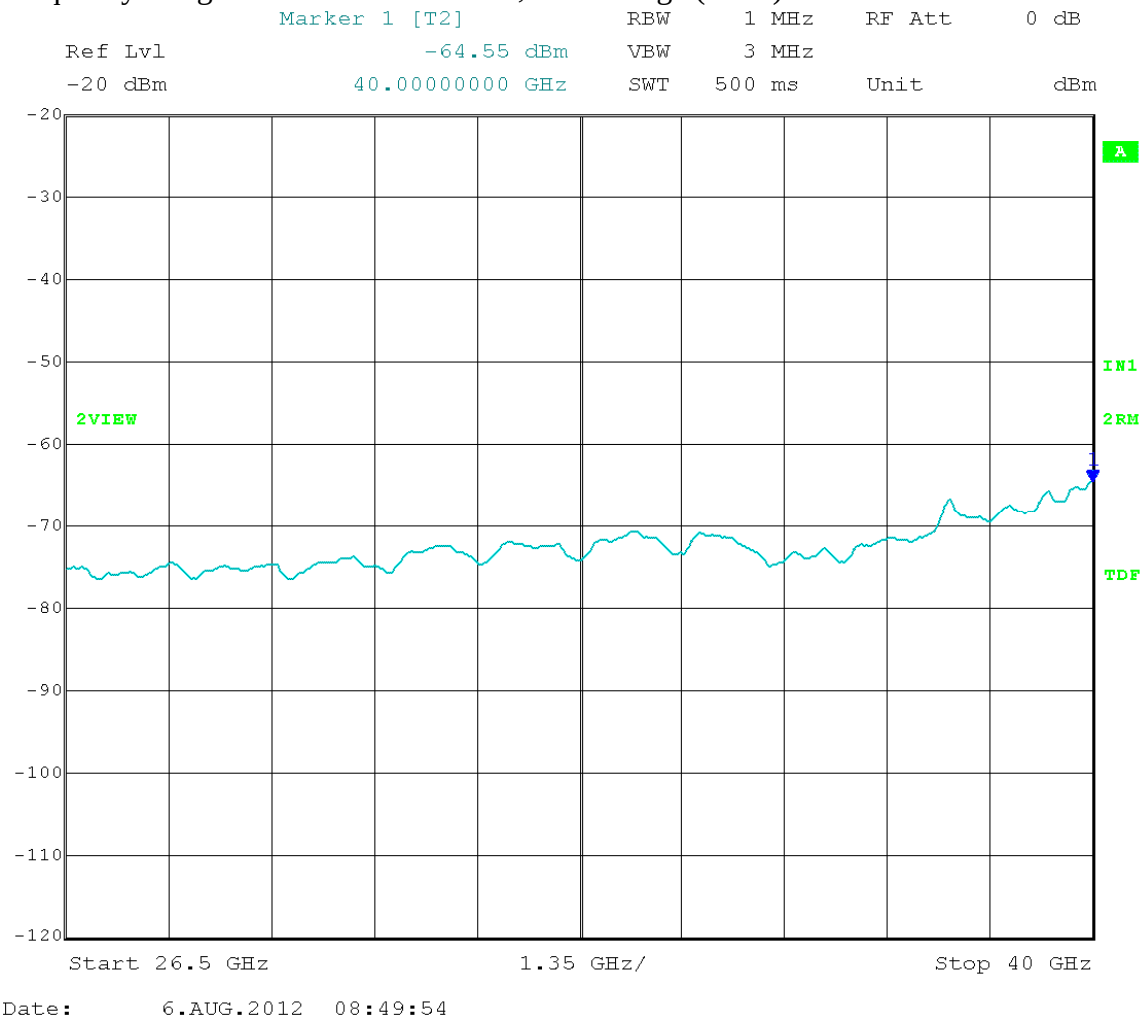
Test Date: 08-06-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg 2B	26 dB EBW: 19.44 MHz
Output port:	Channel A;	Mid Channel Frequency:	5.575 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 26.5 GHz to 40 GHz; Average (RMS) detector



Date: 6.AUG.2012 08:49:54

Calculated Field Strength at noise floor = -64.55 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 42.68 dBµV/m Average

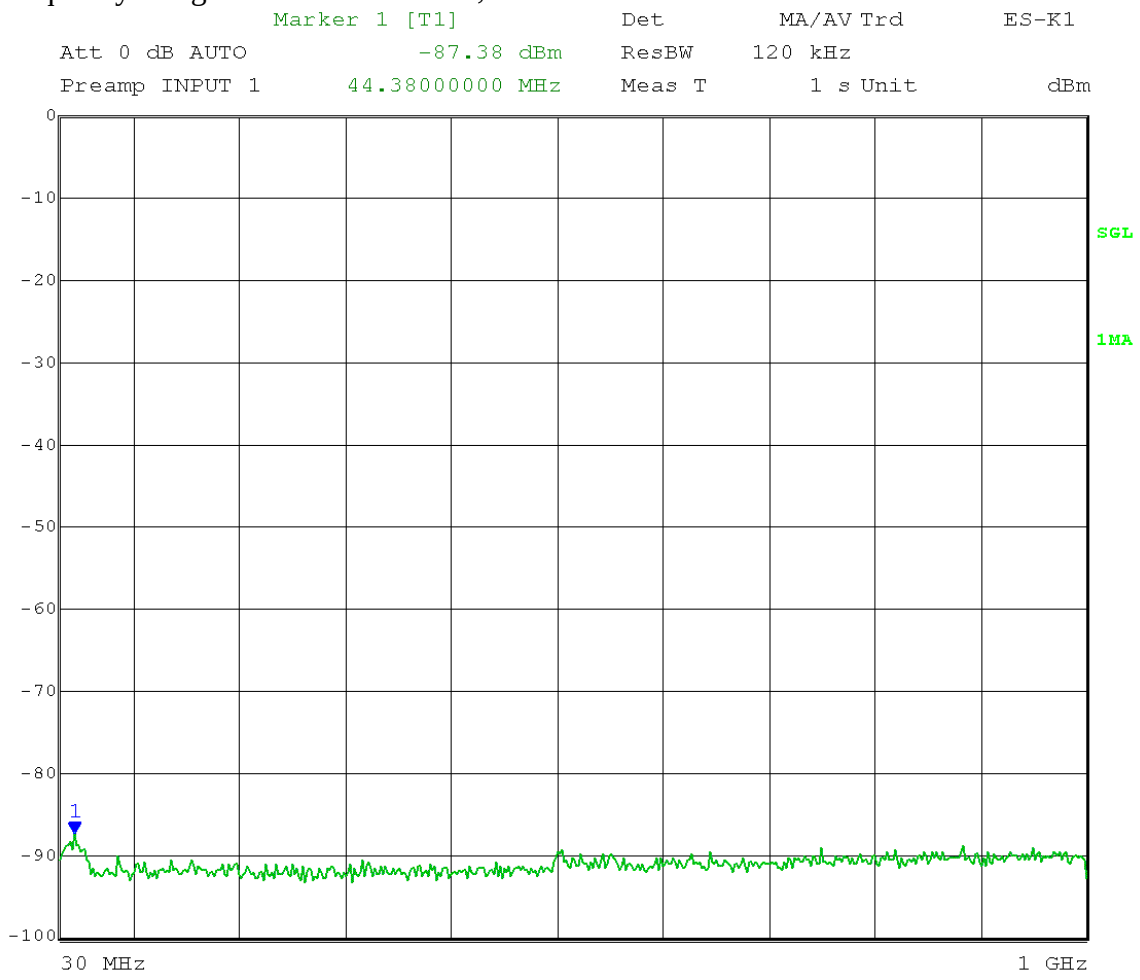
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg 2E	26 dB EBW: 19.44 MHz
Output port:	Channel A;	High Channel Frequency:	5.715 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
Field strength limit: FCC Sections 15.209 and 15.205 (emissions in restricted bands)

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 30 MHz to 1 GHz; Peak detector



Date: 3.AUG.2012 11:06:48

No emissions found from 30 MHz to 1 GHz

Calculated Field Strength at noise floor = -87.38 dBm + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 + 4.7 dB = 24.55 dBµV/m Peak

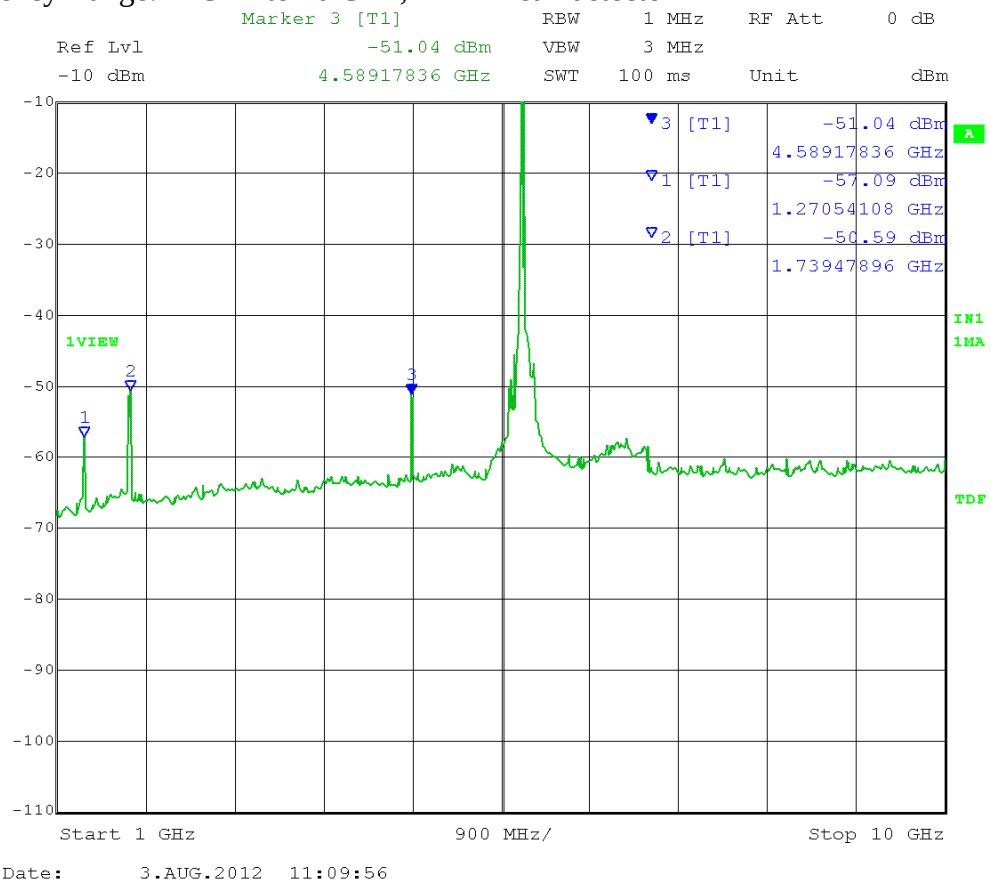
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg 2E	26 dB EBW: 19.44 MHz
Output port:	Channel A;	High Channel Frequency:	5.715 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 1 GHz to 10 GHz; Peak detector



Marker 1: Calculated Field Strength (Restricted Band) = -57.09 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 50.14 dBµV/m Peak
Marker 2: Calculated EIRP = -50.59 dBm + 9 dBi antenna gain + 3 dB (MIMO) = -38.59 dBm
Marker 3: Calculated Field Strength (Restricted Band) = -51.04 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 56.19 dBµV/m Peak

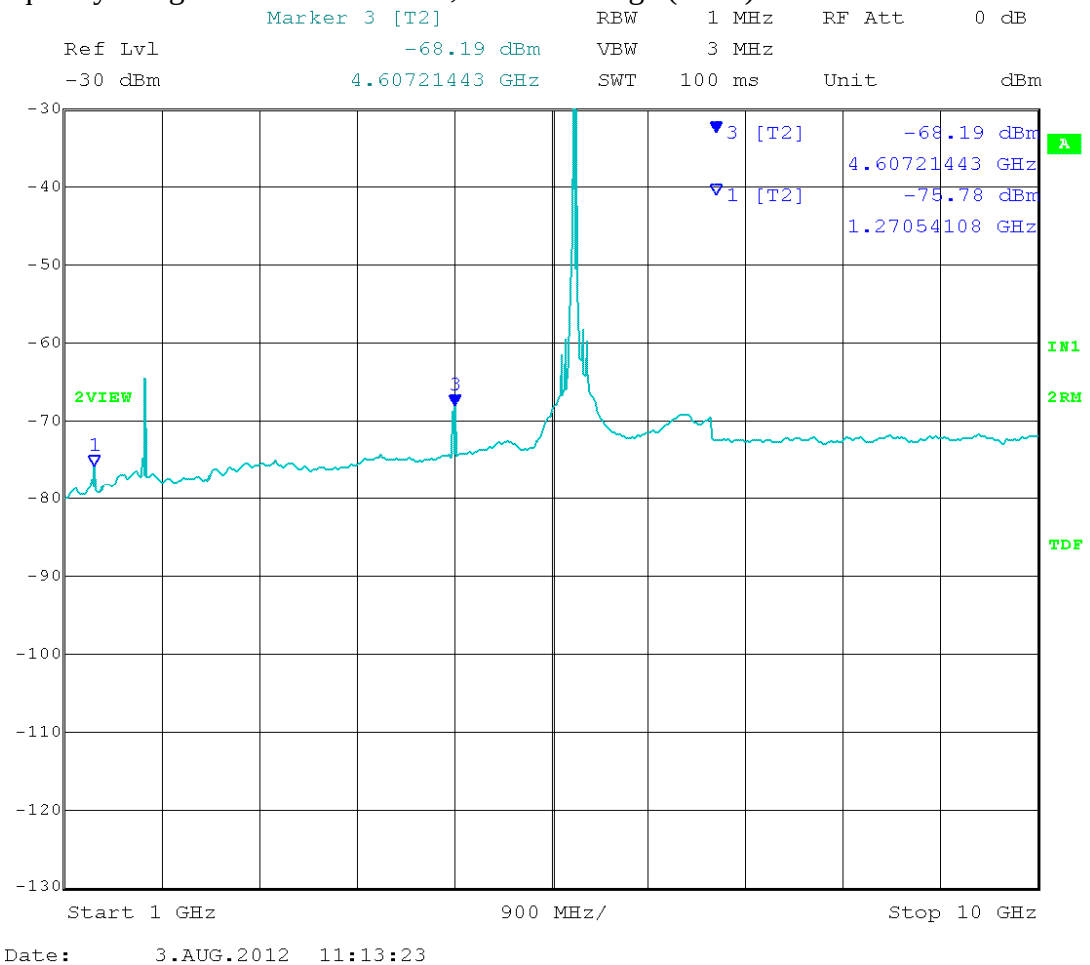
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg 2E	26 dB EBW: 19.44 MHz
Output port:	Channel A;	High Channel Frequency:	5.715 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 1 GHz to 10 GHz; Average (RMS) detector



Marker 1: Calculated Field Strength (Restricted Band) = -75.78 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 31.45 dBµV/m Average
Marker 3: Calculated Field Strength (Restricted Band) = -68.19 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 39.04 dBµV/m Average

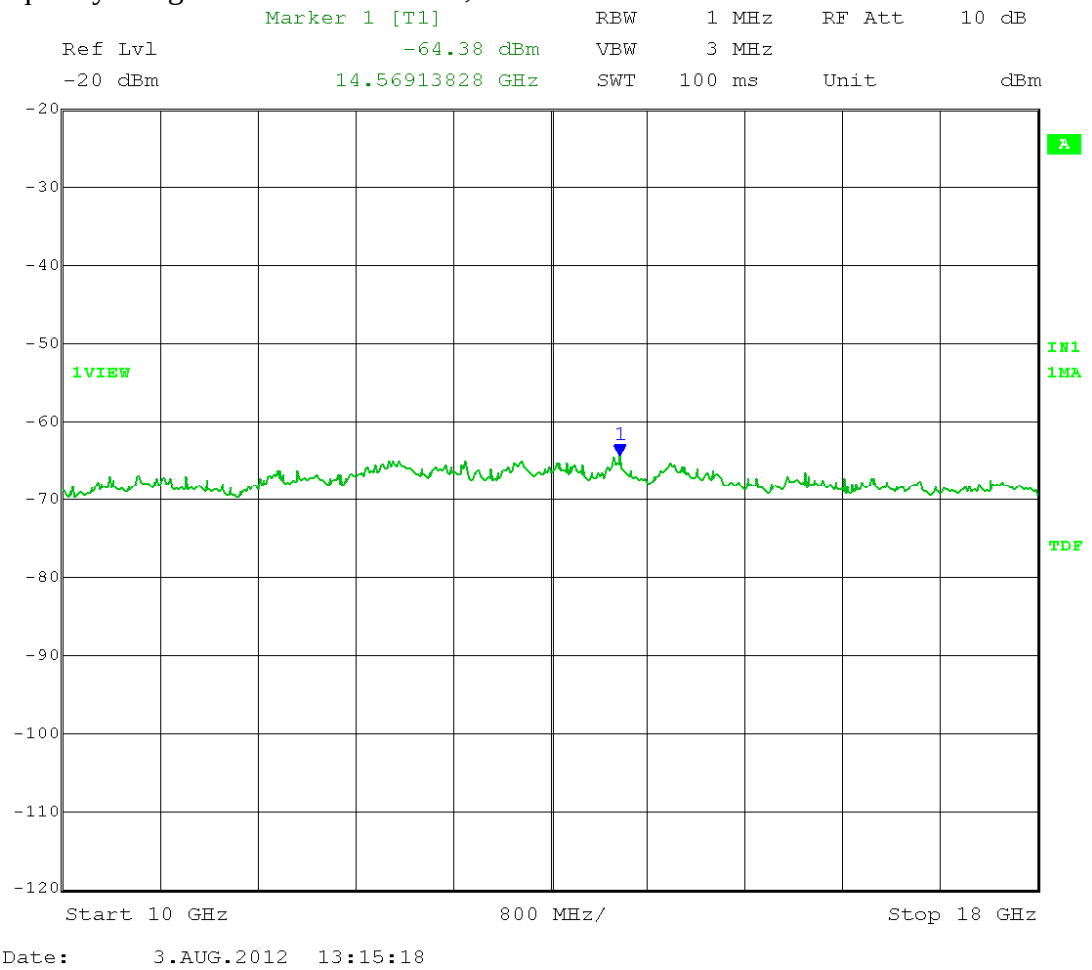
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg 2E	26 dB EBW: 19.44 MHz
Output port:	Channel A;	High Channel Frequency:	5.715 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 10 GHz to 18 GHz; Peak detector



Calculated EIRP at noise floor = -64.38 dBm + 9 dBi antenna gain + 3 dB (MIMO)
= -52.38 dBm
Calculated Field Strength at noise floor = -64.38 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 42.85 dBµV/m Peak

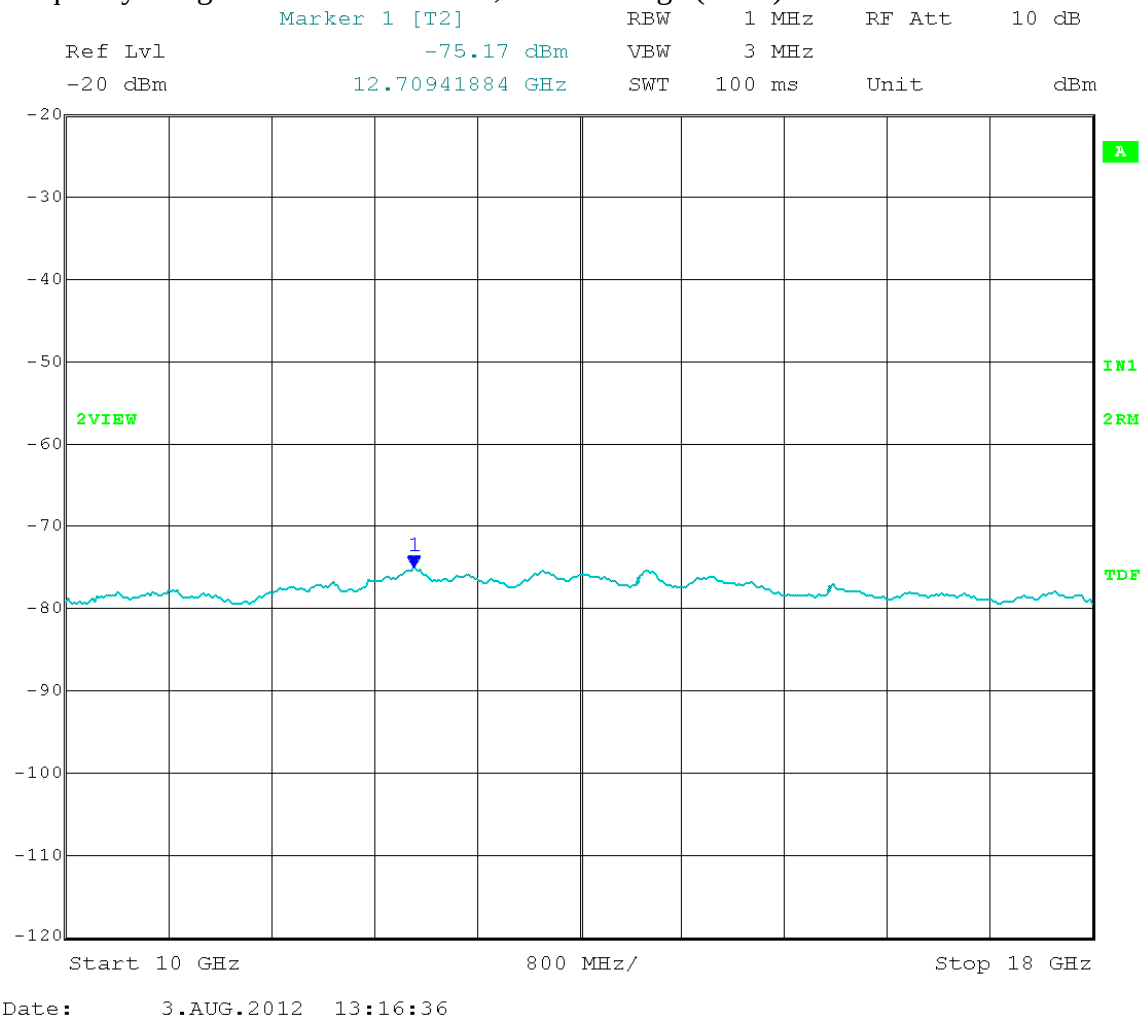
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg 2E	26 dB EBW: 19.44 MHz
Output port:	Channel A;	High Channel Frequency:	5.715 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 10 GHz to 18 GHz; Average (RMS) detector



Date: 3.AUG.2012 13:16:36

Calculated Field Strength at noise floor = -75.17 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 32.06 dBµV/m Average

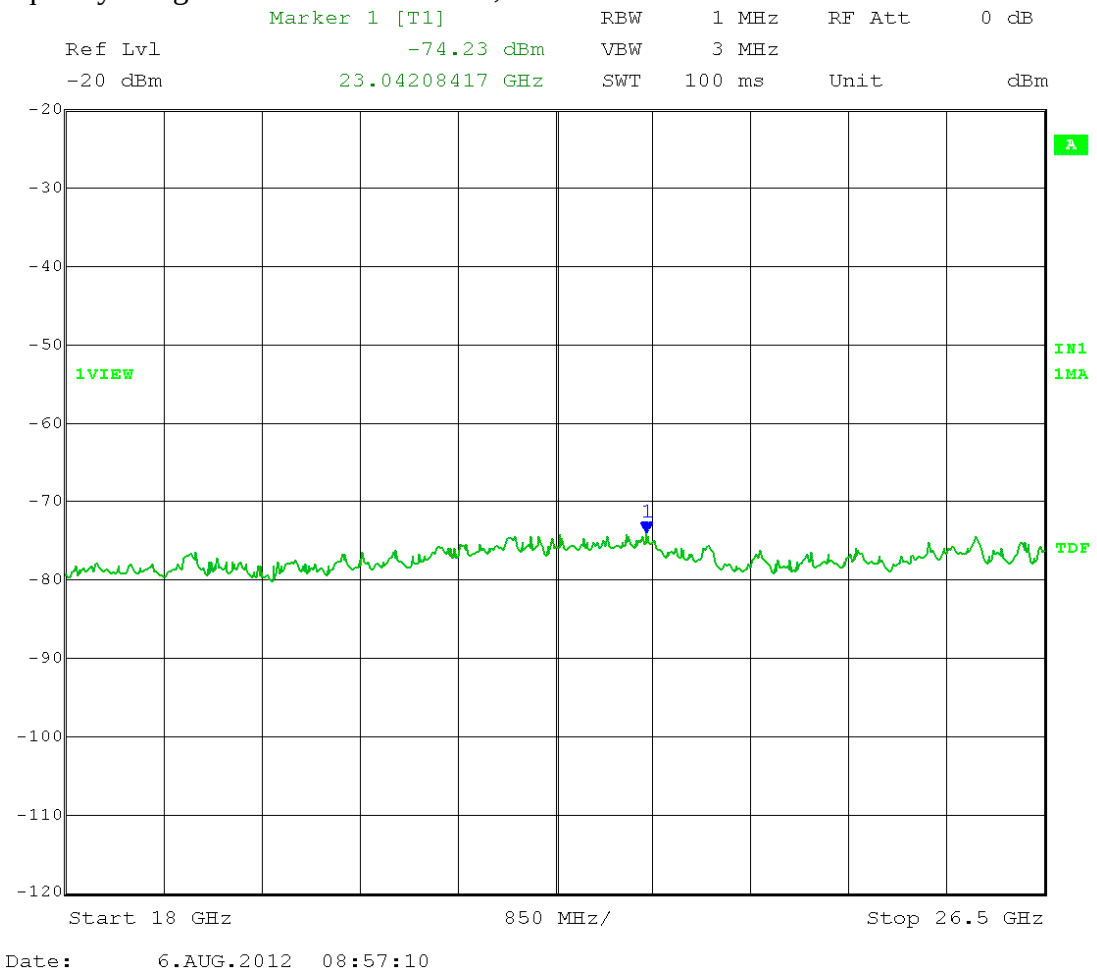
Test Date: 08-06-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg 2E	26 dB EBW: 19.44 MHz
Output port:	Channel A;	High Channel Frequency:	5.715 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 18 GHz to 26.5 GHz; Peak detector



Calculated EIRP at noise floor = -74.23 dBm + 9 dBi antenna gain + 3 dB (MIMO)
= -62.23 dBm
Calculated Field Strength at noise floor = -74.23 + 9 dBi antenna gain + 3 dB (MIMO)
– 20 log (3 meters) + 104.77 = 33.00 dBµV/m Peak

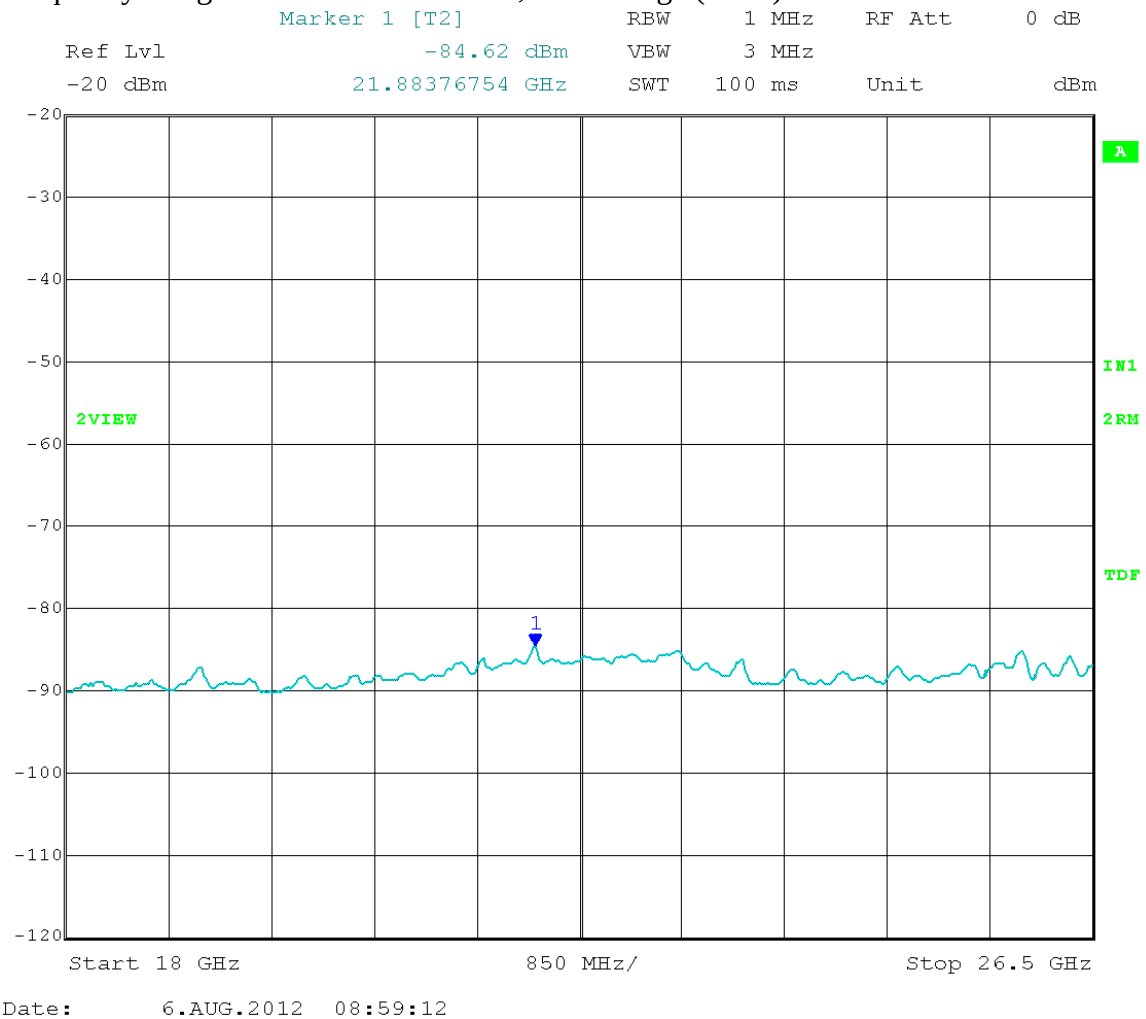
Test Date: 08-06-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg 2E	26 dB EBW: 19.44 MHz
Output port:	Channel A;	High Channel Frequency:	5.715 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 18 GHz to 26.5 GHz; Average (RMS) detector



Date: 6.AUG.2012 08:59:12

Calculated Field Strength at noise floor = -84.62 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 22.61 dBµV/m Average

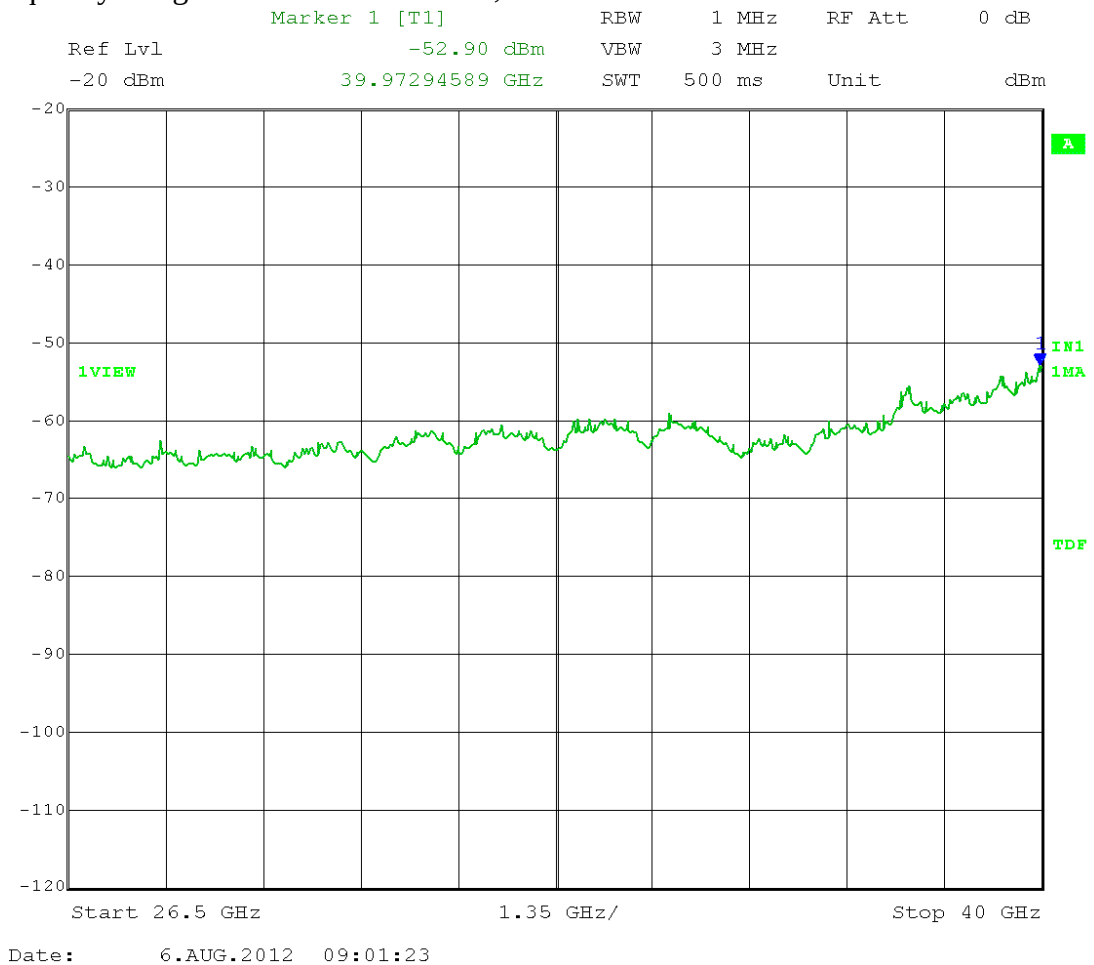
Test Date: 08-06-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg 2E	26 dB EBW: 19.44 MHz
Output port:	Channel A;	High Channel Frequency:	5.715 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 26.5 GHz to 40 GHz; Peak detector



Calculated EIRP at noise floor = -52.90 dBm + 9 dBi antenna gain + 3 dB (MIMO)
= -40.90 dBm
Calculated Field Strength at noise floor = -52.90 + 9 dBi antenna gain + 3 dB (MIMO)
– 20 log (3 meters) + 104.77 = 54.33 dBµV/m Peak

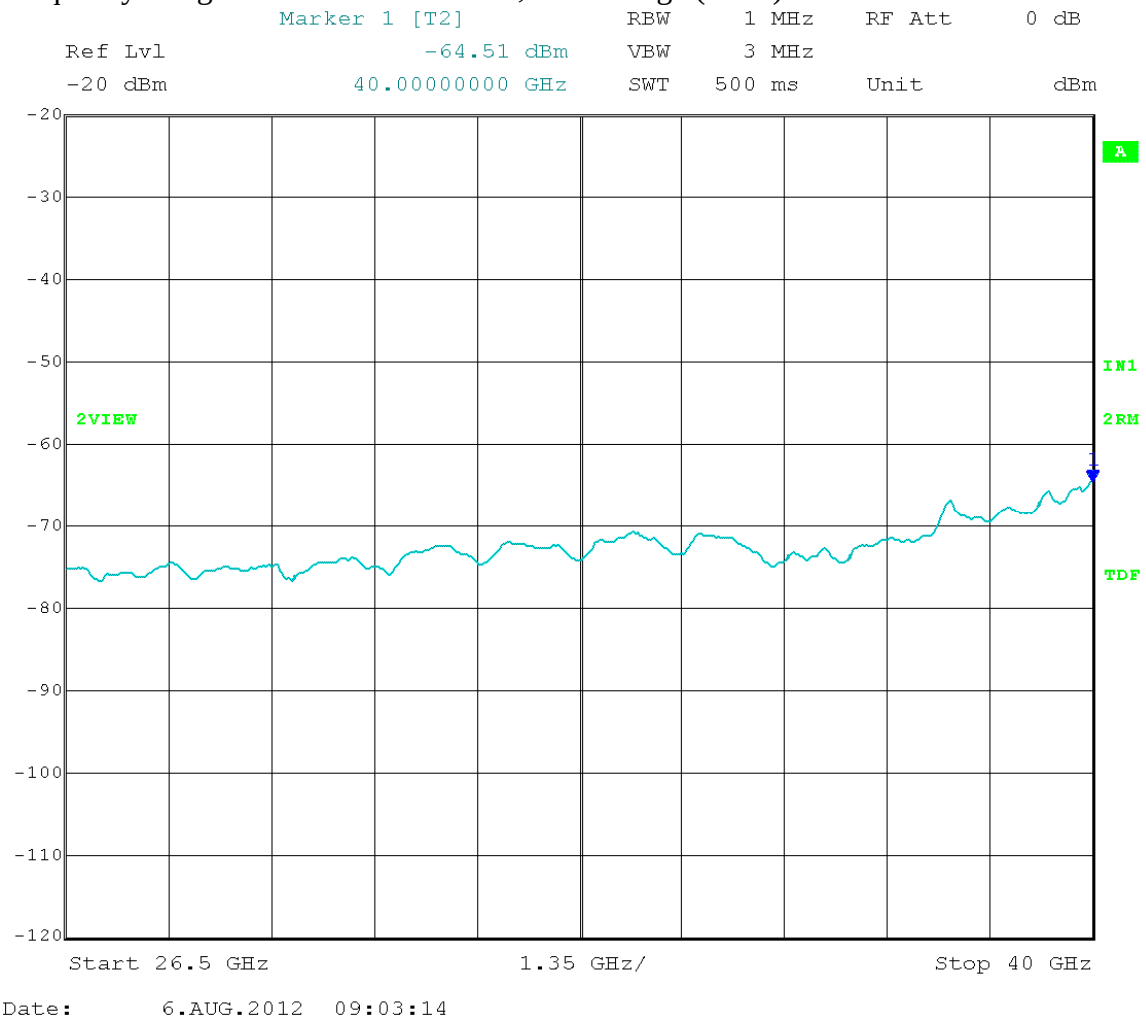
Test Date: 08-06-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg 2E	26 dB EBW: 19.44 MHz
Output port:	Channel A;	High Channel Frequency:	5.715 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 26.5 GHz to 40 GHz; Average (RMS) detector



Date: 6.AUG.2012 09:03:14

Calculated Field Strength at noise floor = -64.51 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 42.72 dBµV/m Average

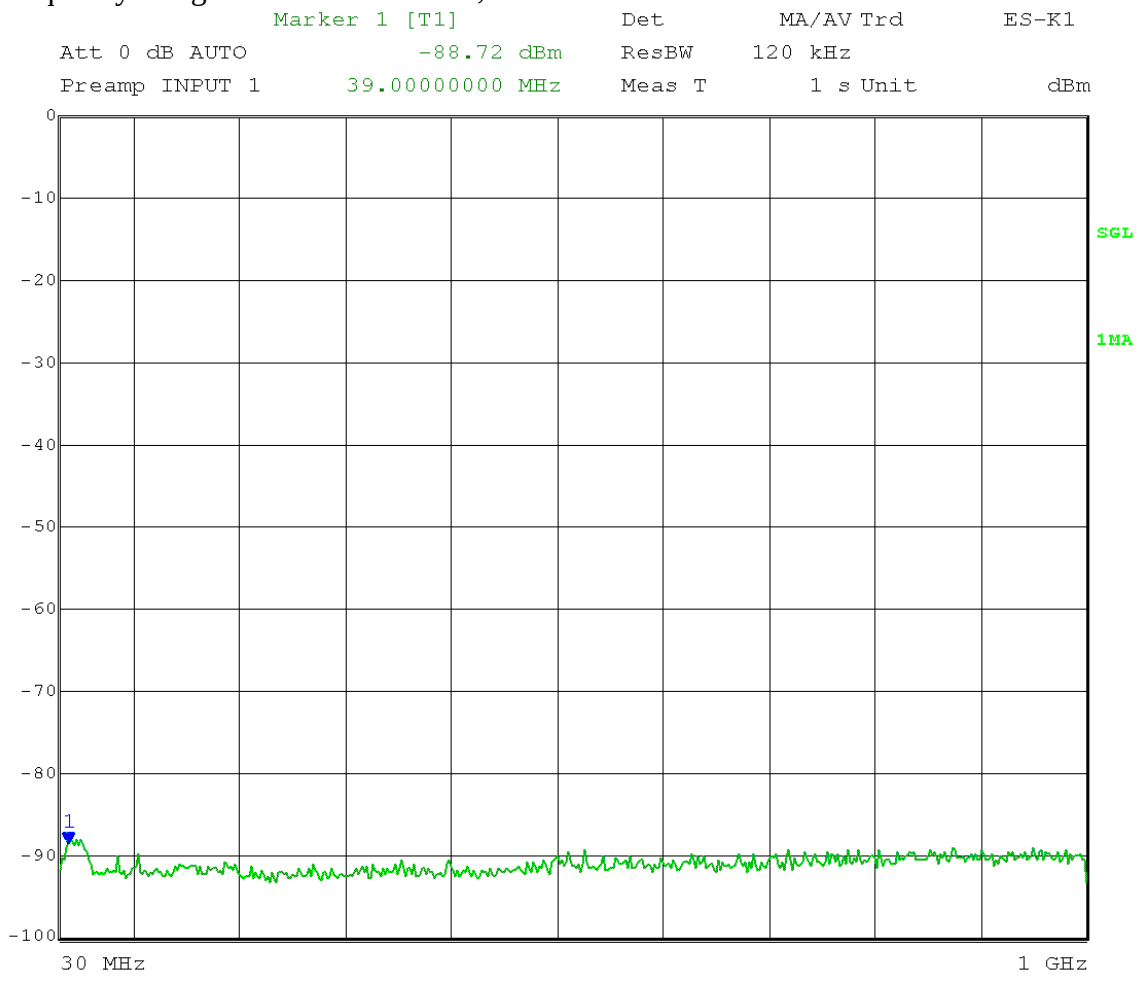
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg 28	26 dB EBW: 19.44 MHz
Output port:	Channel B;	Low Channel Frequency:	5.480 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
Field strength limit: FCC Sections 15.209 and 15.205 (emissions in restricted bands)

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 30 MHz to 1 GHz; Peak detector



Date: 3.AUG.2012 10:50:57

No emissions found from 30 MHz to 1 GHz

Calculated Field Strength at noise floor = -88.72 dBm + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 + 4.7 dB = 23.21 dBµV/m Peak

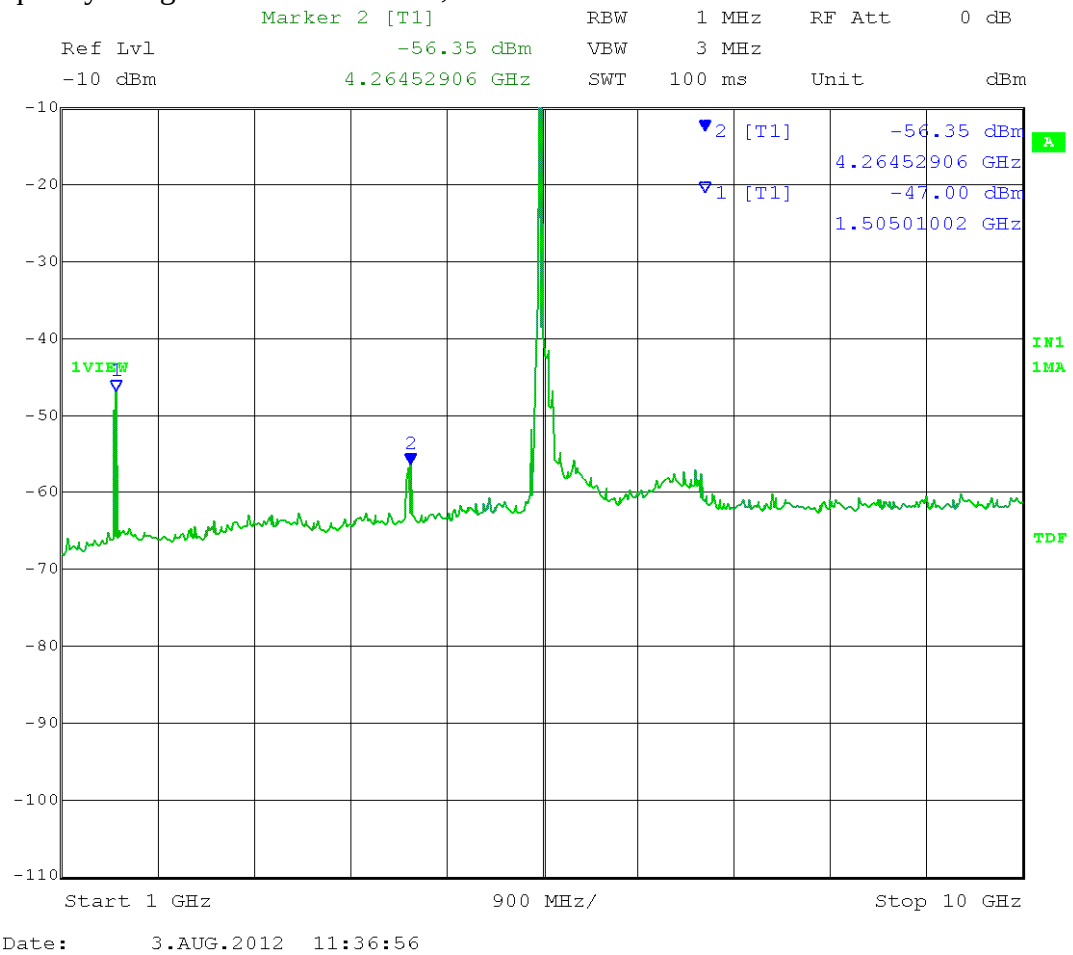
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg 28	26 dB EBW: 19.44 MHz
Output port:	Channel B;	Low Channel Frequency:	5.480 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 1 GHz to 10 GHz; Peak detector



Marker 1: Calculated Field Strength (Restricted Band) = -47.00 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 60.23 dBµV/m Peak
Marker 2: Calculated Field Strength (Restricted Band) = -56.35 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 50.88 dBµV/m Peak

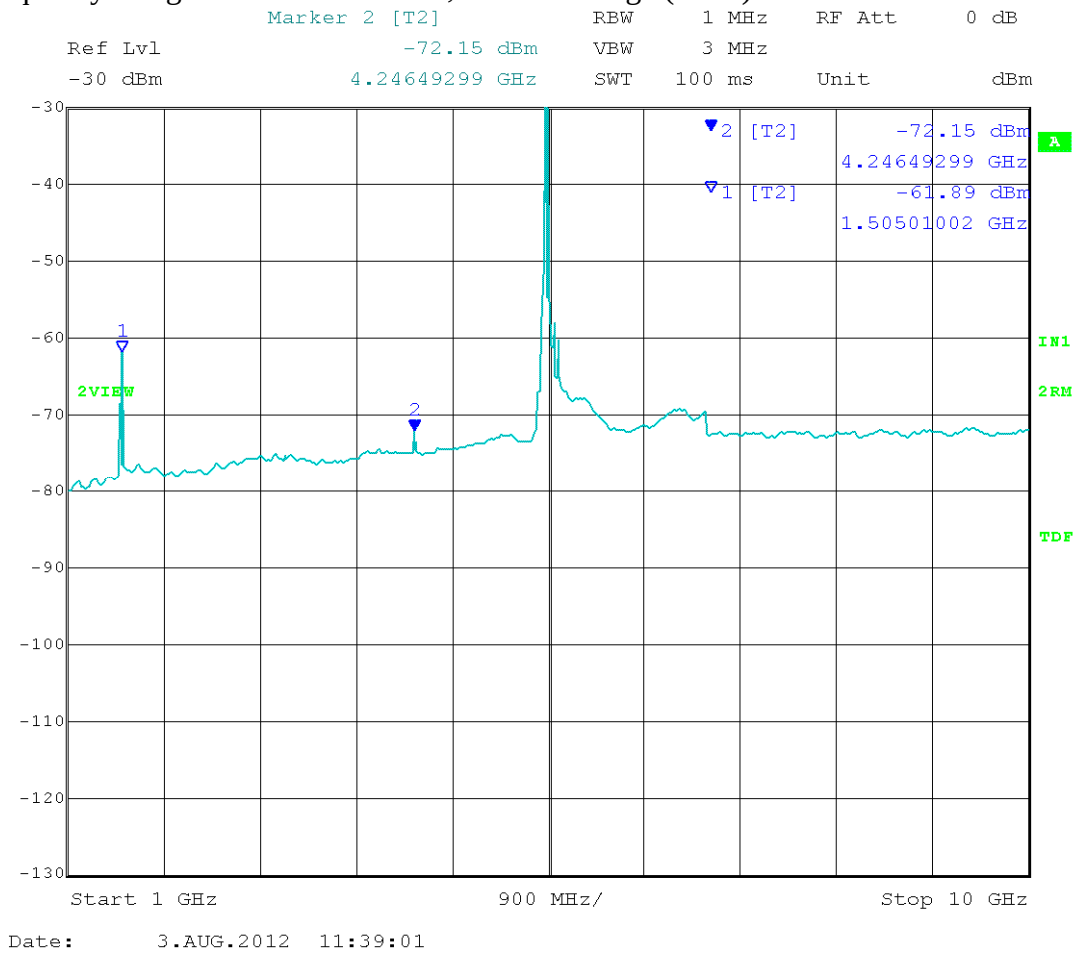
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg 28	26 dB EBW: 19.44 MHz
Output port:	Channel B;	Low Channel Frequency:	5.480 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 1 GHz to 10 GHz; Average (RMS) detector



Marker 1: Calculated Field Strength (Restricted Band) = -61.89 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 45.34 dBµV/m Average
Marker 2: Calculated Field Strength (Restricted Band) = -72.15 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 35.08 dBµV/m Average

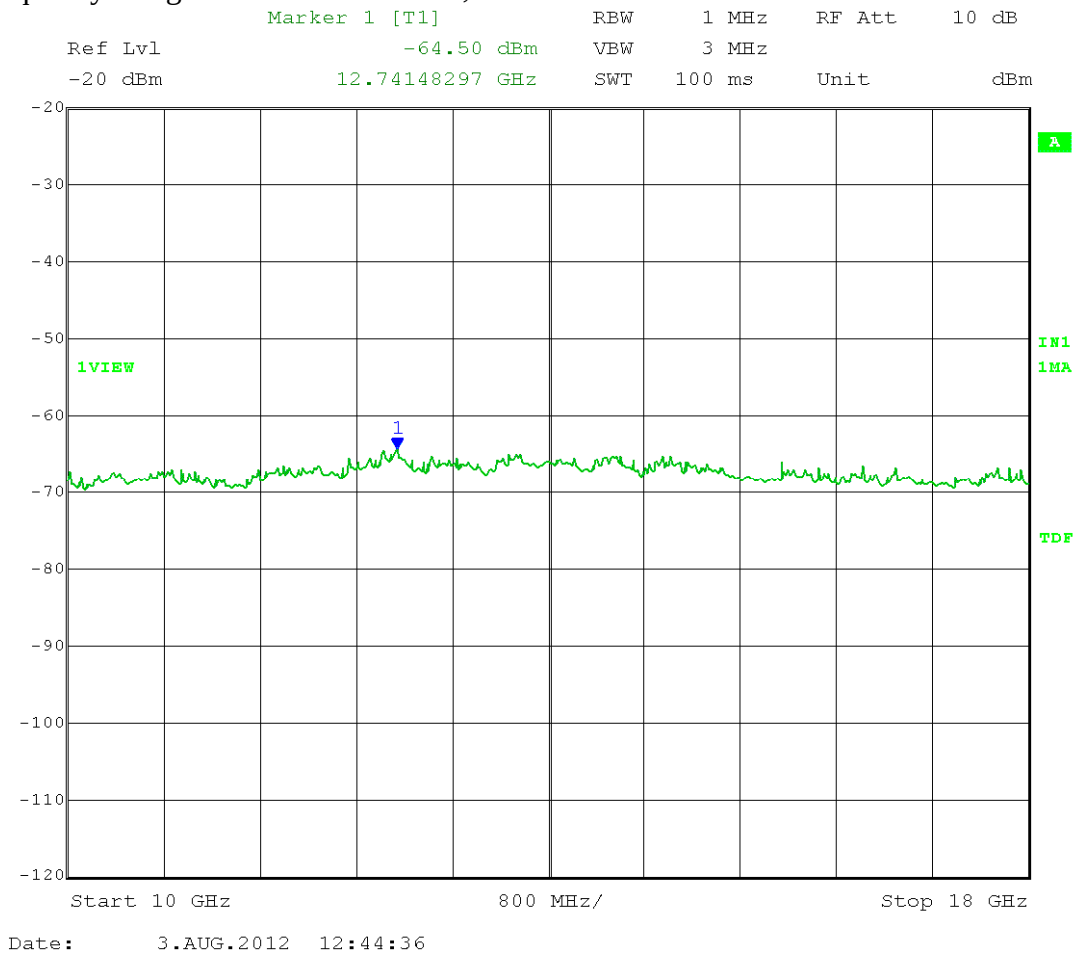
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg 28	26 dB EBW: 19.44 MHz
Output port:	Channel B;	Low Channel Frequency:	5.480 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 10 GHz to 18 GHz; Peak detector



Calculated EIRP at noise floor = -64.50 dBm + 9 dBi antenna gain + 3 dB (MIMO)
= -52.50 dBm
Calculated Field Strength at noise floor = -64.50 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 42.73 dBµV/m Peak

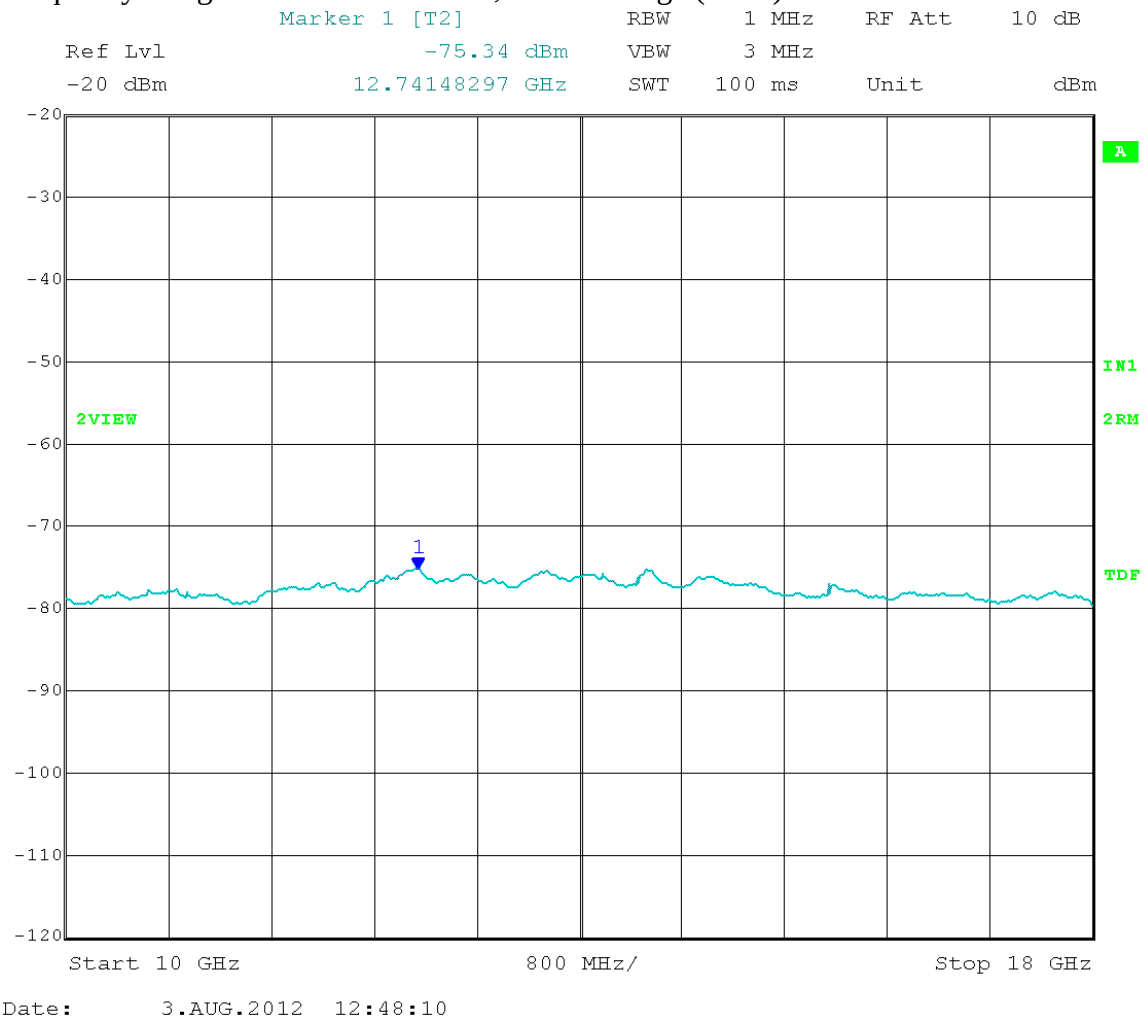
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg 28	26 dB EBW: 19.44 MHz
Output port:	Channel B;	Low Channel Frequency:	5.480 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 10 GHz to 18 GHz; Average (RMS) detector



Date: 3.AUG.2012 12:48:10

Calculated Field Strength at noise floor = -75.34 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 31.89 dBµV/m Average

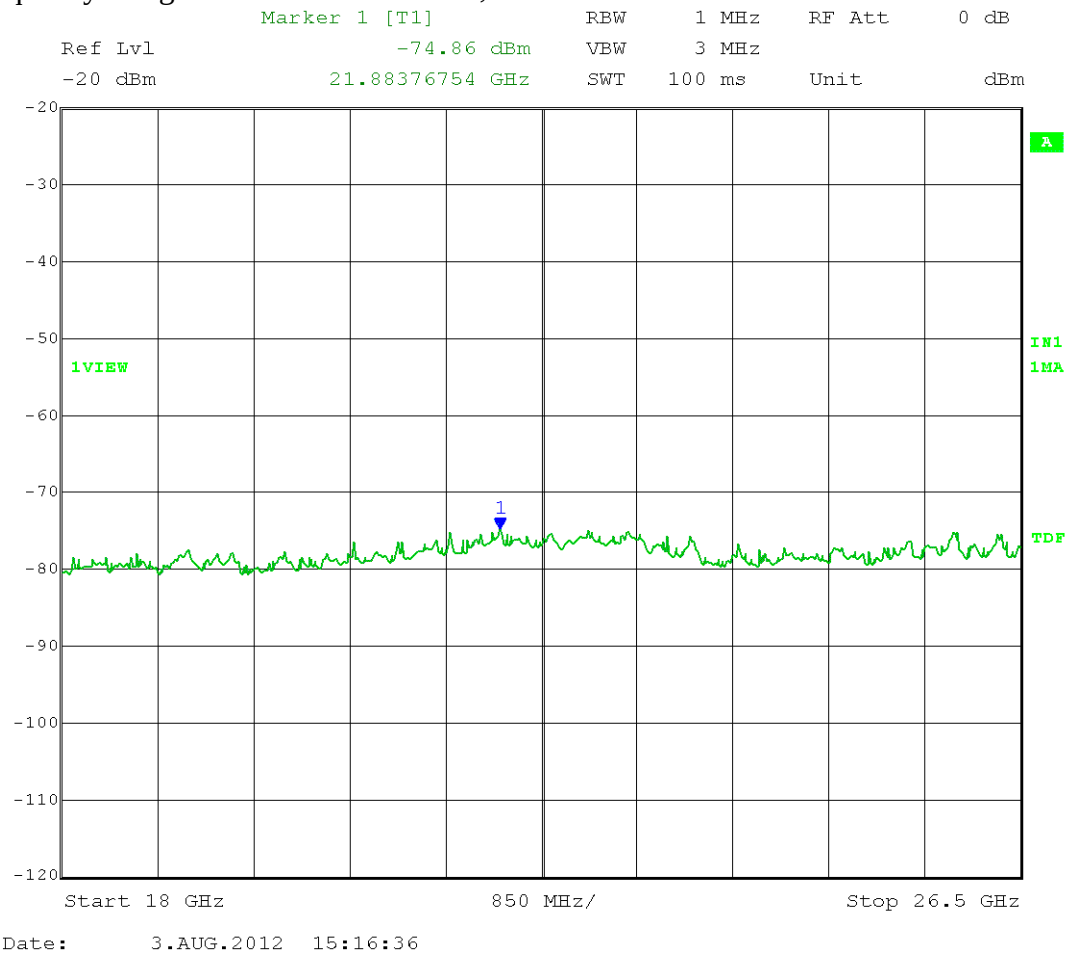
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg 28	26 dB EBW: 19.44 MHz
Output port:	Channel B;	Low Channel Frequency:	5.480 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 18 GHz to 26.5 GHz; Peak detector



Calculated EIRP at noise floor = -74.86 dBm + 9 dBi antenna gain + 3 dB (MIMO)
= -62.86 dBm
Calculated Field Strength at noise floor = -74.86 + 9 dBi antenna gain + 3 dB (MIMO)
– 20 log (3 meters) + 104.77 = 32.37 dBµV/m Peak

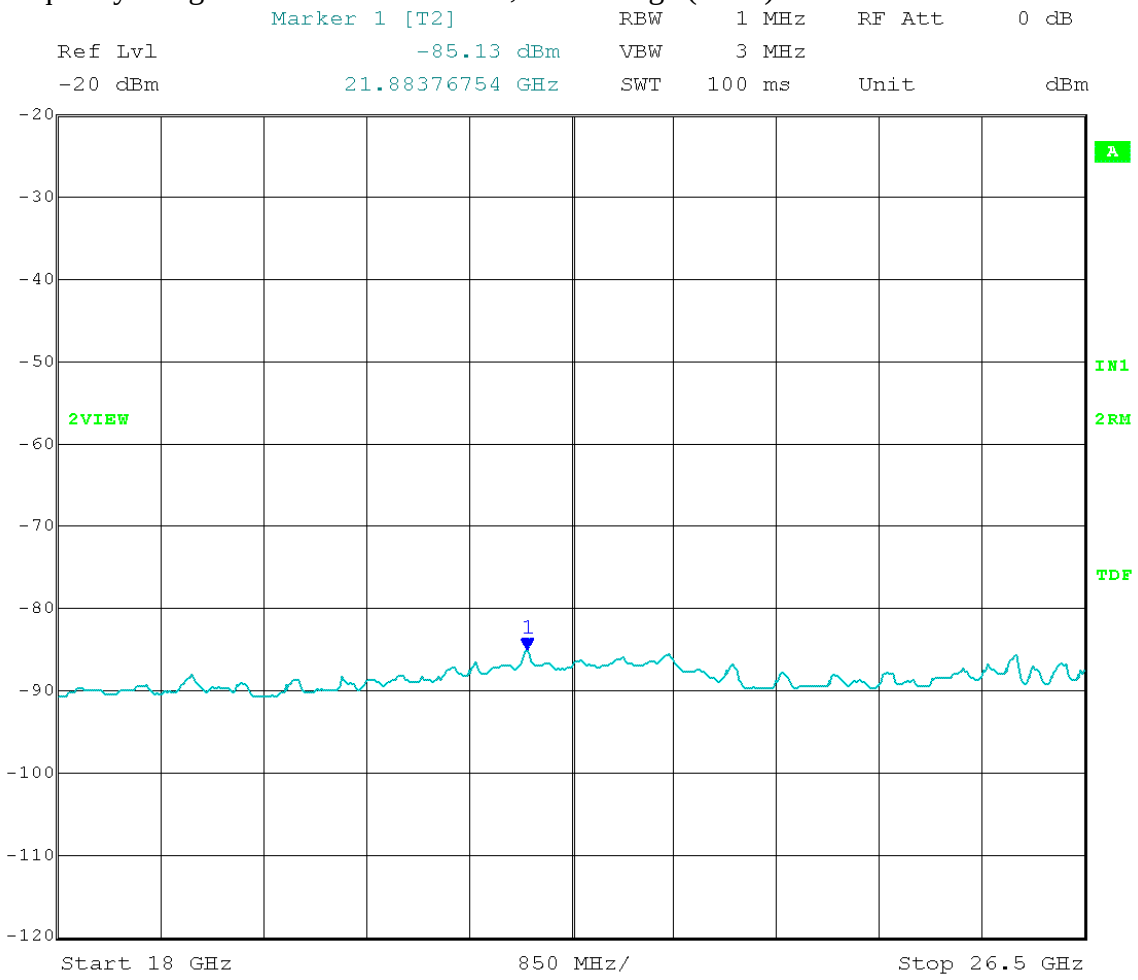
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg 28	26 dB EBW: 19.44 MHz
Output port:	Channel B;	Low Channel Frequency:	5.480 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 18 GHz to 26.5 GHz; Average (RMS) detector



Date: 3.AUG.2012 15:18:16

Calculated Field Strength at noise floor = -85.13 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 22.10 dBµV/m Average

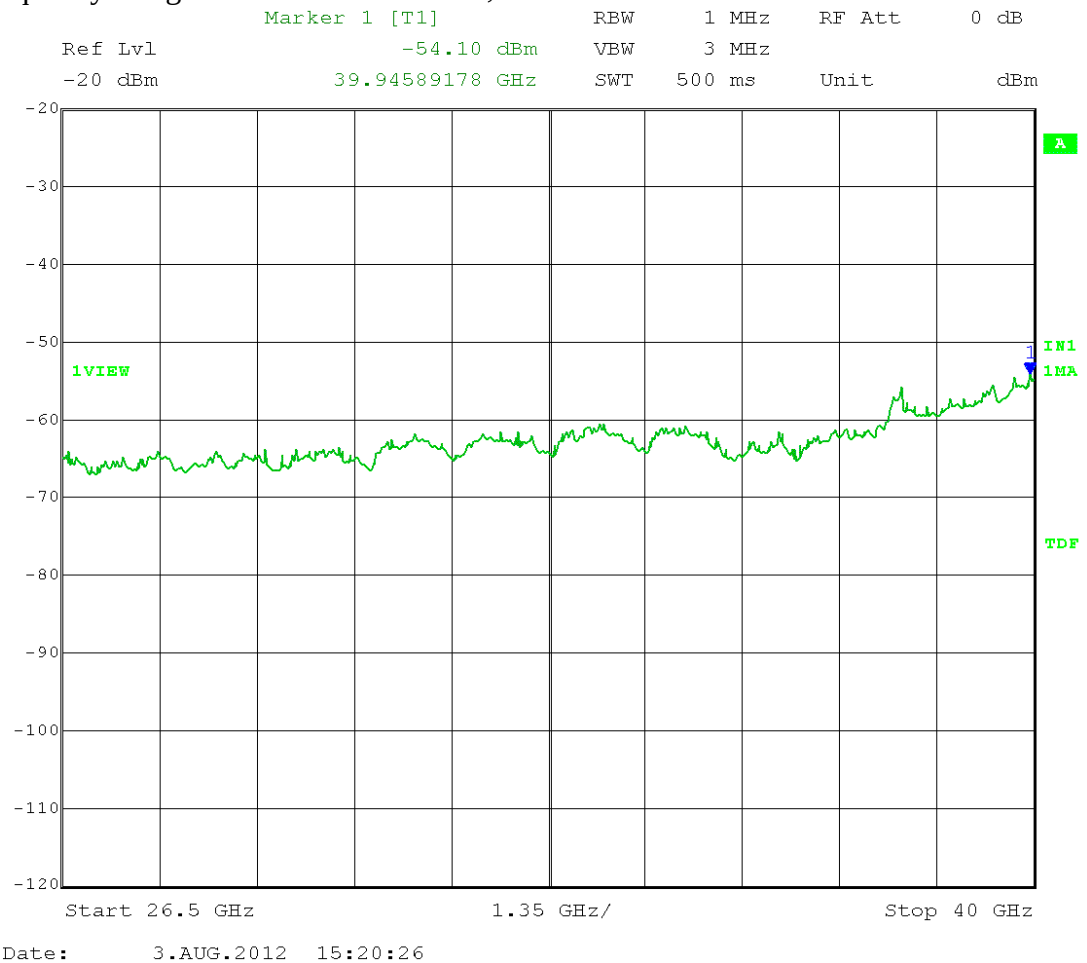
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg 28	26 dB EBW: 19.44 MHz
Output port:	Channel B;	Low Channel Frequency:	5.480 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 26.5 GHz to 40 GHz; Peak detector



Calculated EIRP at noise floor = -54.10 dBm + 9 dBi antenna gain + 3 dB (MIMO)
= -42.10 dBm
Calculated Field Strength at noise floor = -54.10 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 53.13 dBµV/m Peak

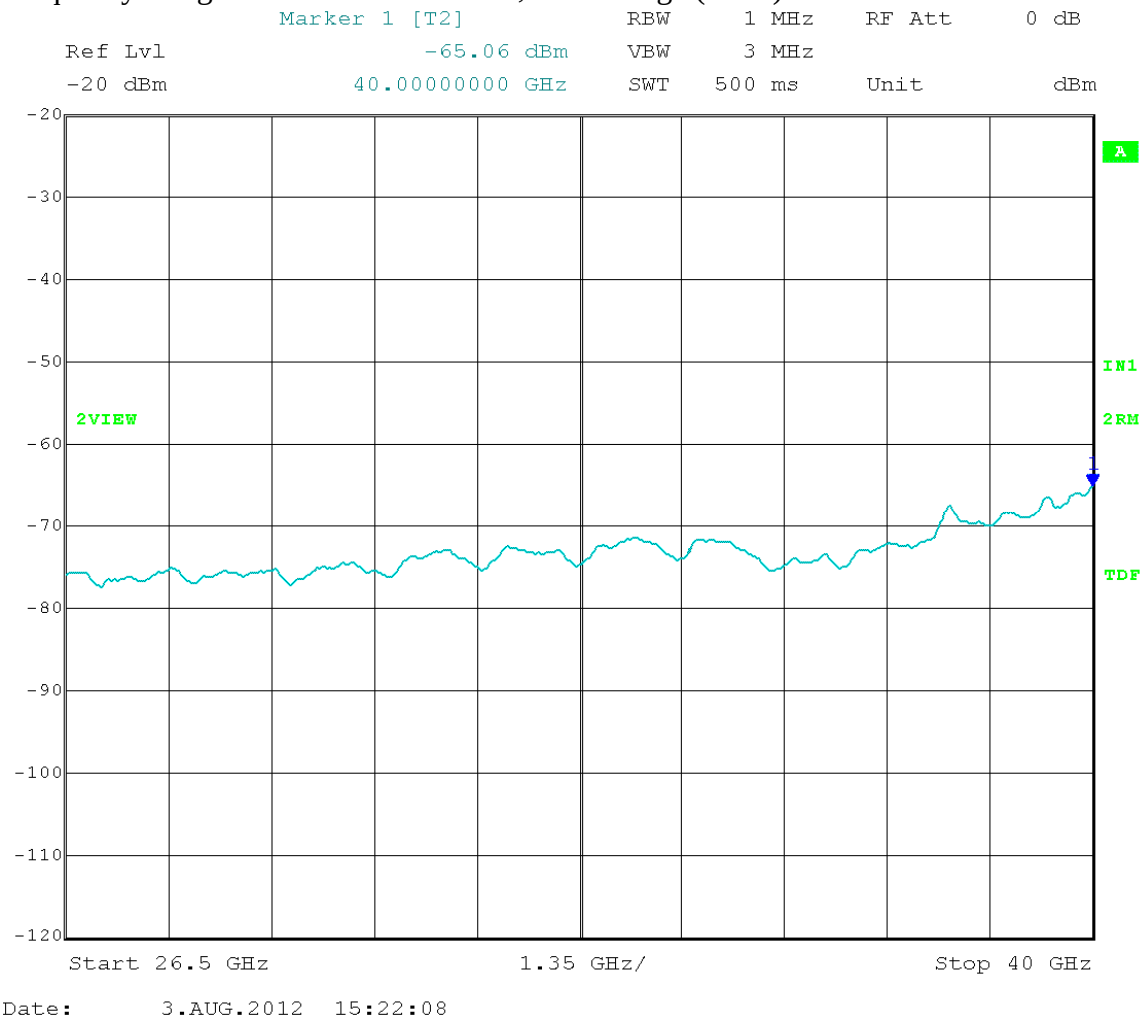
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg 28	26 dB EBW: 19.44 MHz
Output port:	Channel B;	Low Channel Frequency:	5.480 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 26.5 GHz to 40 GHz; Average (RMS) detector



Date: 3.AUG.2012 15:22:08

Calculated Field Strength at noise floor = -65.06 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 42.17 dBµV/m Average

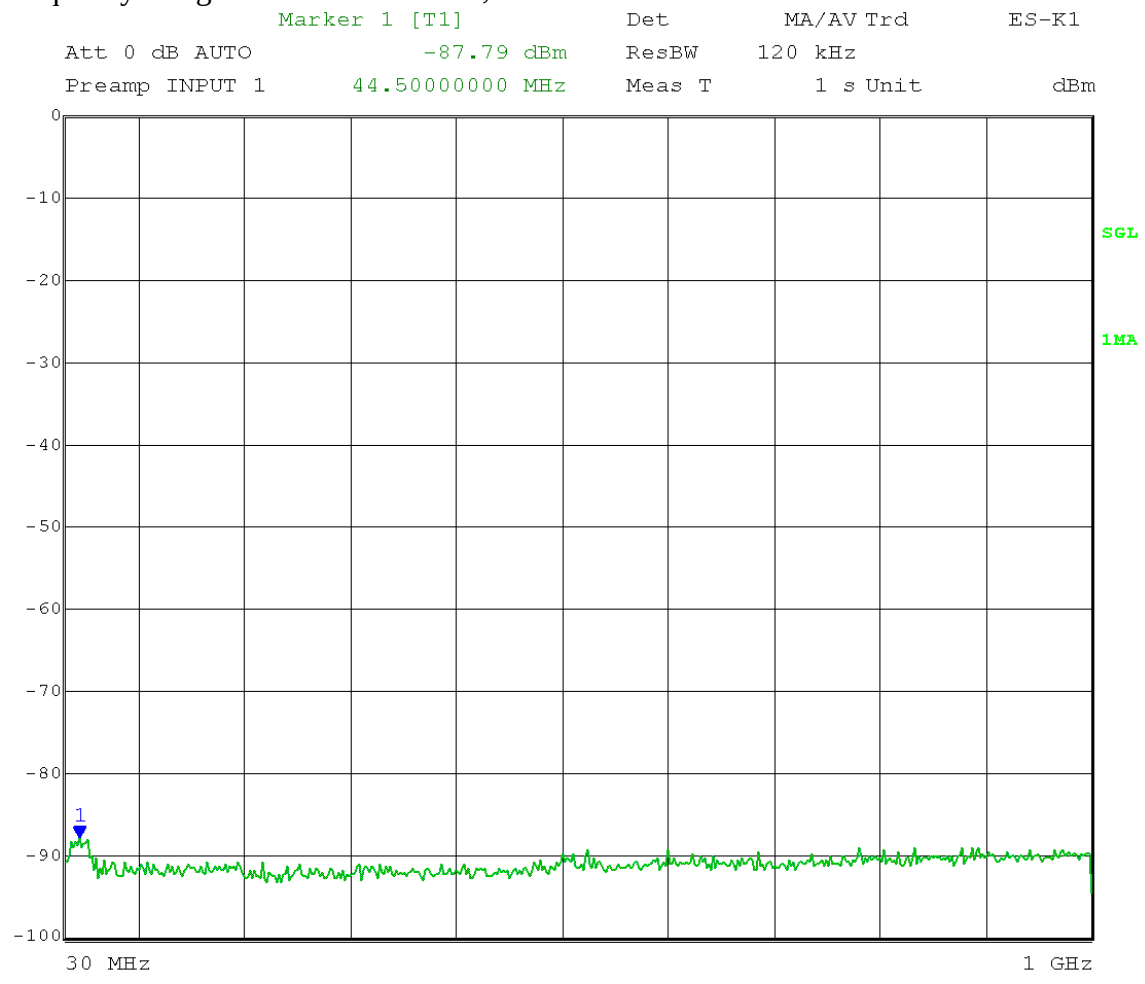
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg 2C	26 dB EBW: 19.44 MHz
Output port:	Channel B;	Mid Channel Frequency:	5.575 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
Field strength limit: FCC Sections 15.209 and 15.205 (emissions in restricted bands)

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 30 MHz to 1 GHz; Peak detector



Date: 3.AUG.2012 10:53:18

No emissions found from 30 MHz to 1 GHz

Calculated Field Strength at noise floor = -87.79 dBm + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 + 4.7 dB = 24.14 dBµV/m Peak

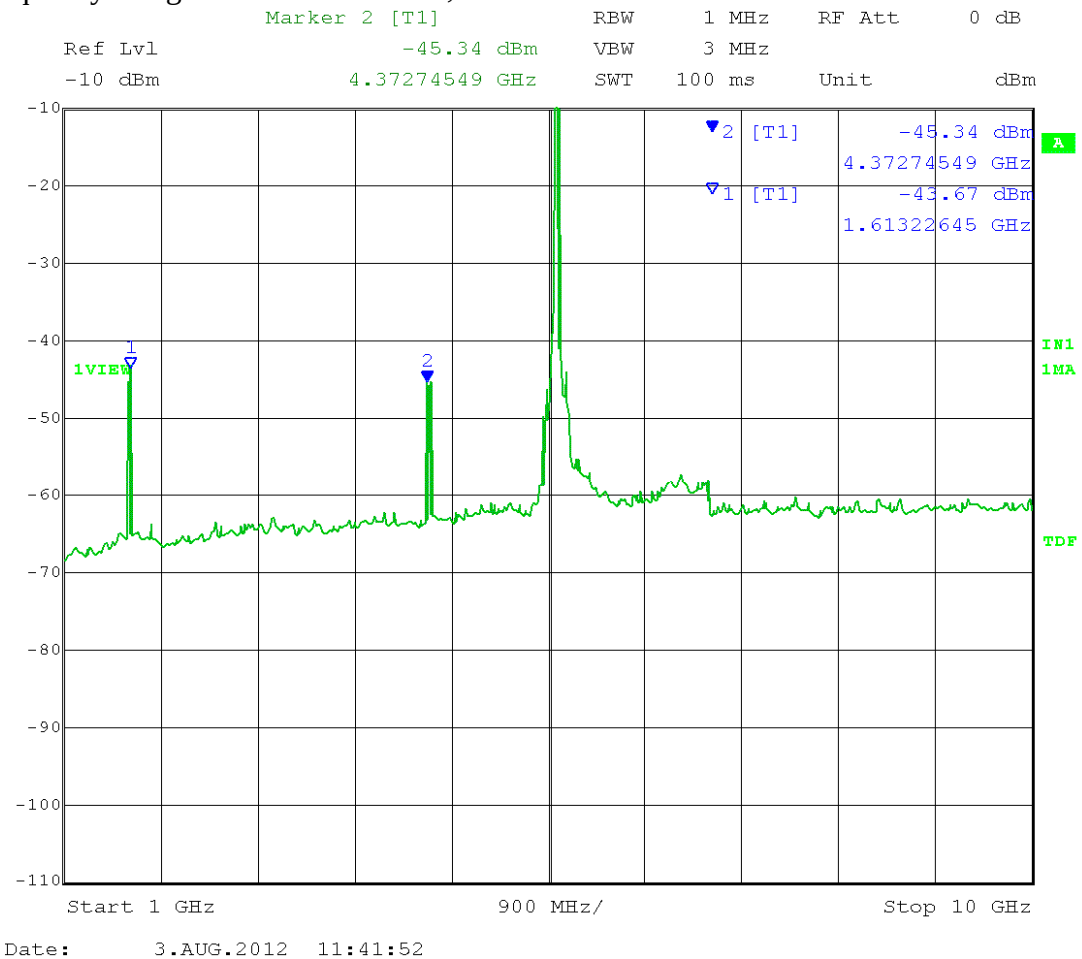
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg 2C	26 dB EBW: 19.44 MHz
Output port:	Channel B;	Mid Channel Frequency:	5.575 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 1 GHz to 10 GHz; Peak detector



Marker 1: Calculated Field Strength (Restricted Band) = -43.67 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 63.56 dBµV/m Peak
Marker 2: Calculated Field Strength (Restricted Band) = -45.34 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 61.89 dBµV/m Peak

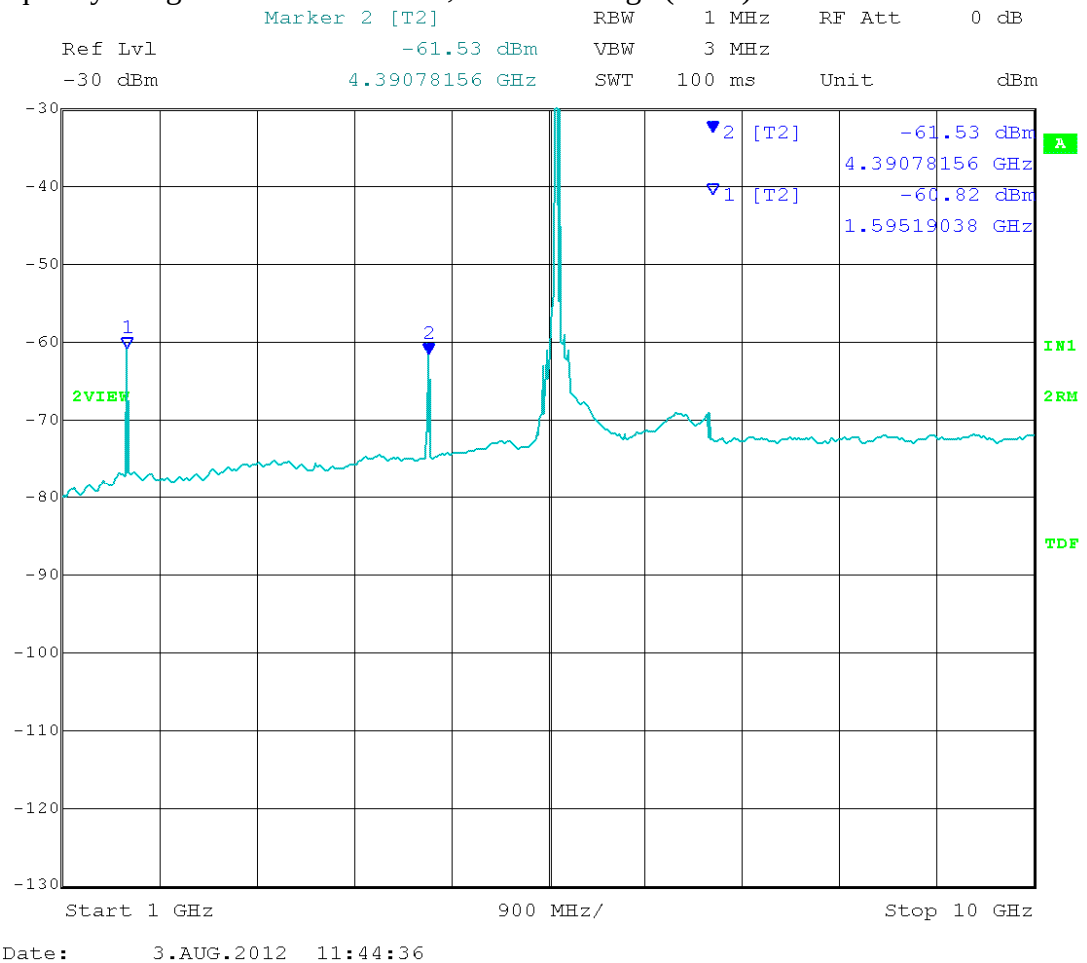
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg 2C	26 dB EBW: 19.44 MHz
Output port:	Channel B;	Mid Channel Frequency:	5.575 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 1 GHz to 10 GHz; Average (RMS) detector



Marker 1: Calculated Field Strength (Restricted Band) = -60.82 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 46.41 dBµV/m Average
Marker 2: Calculated Field Strength (Restricted Band) = -61.53 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 45.70 dBµV/m Average

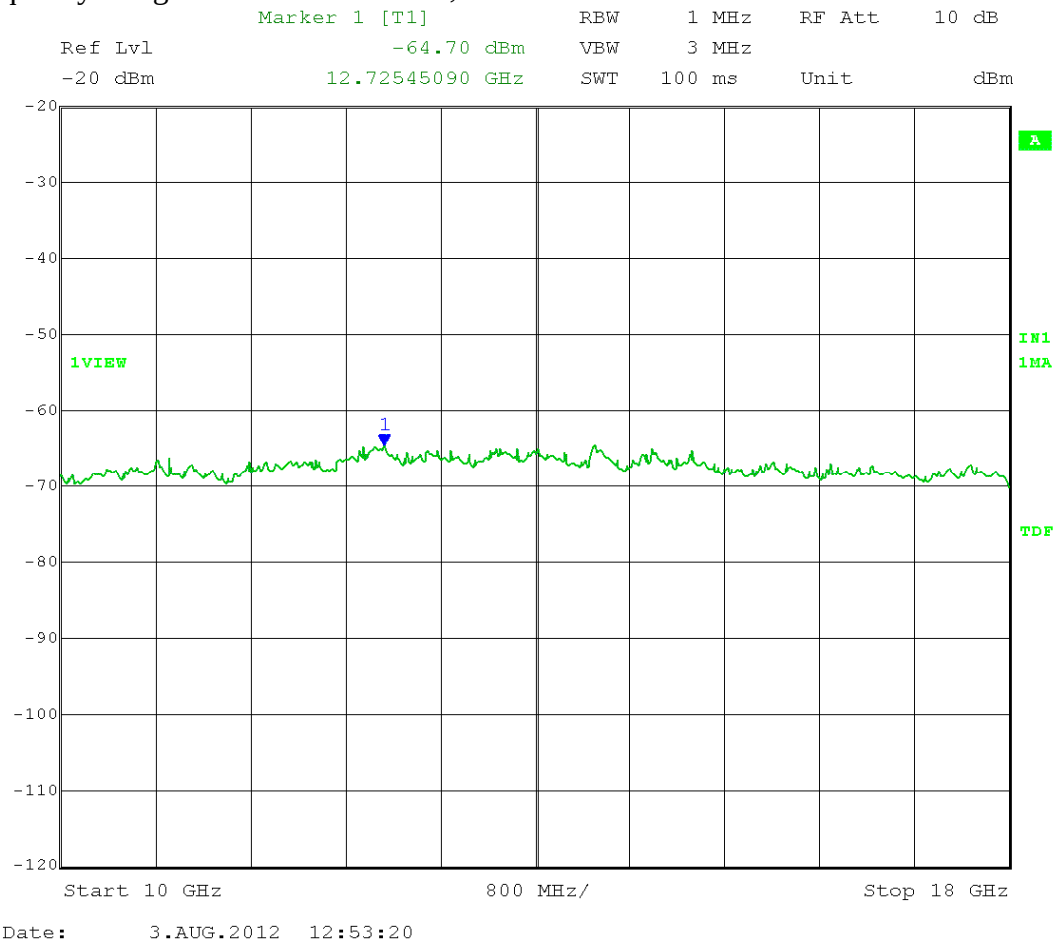
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg 2C	26 dB EBW: 19.44 MHz
Output port:	Channel B;	Mid Channel Frequency:	5.575 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 10 GHz to 18 GHz; Peak detector



Calculated EIRP at noise floor = -64.70 dBm + 9 dBi antenna gain + 3 dB (MIMO)
= -52.70 dBm
Calculated Field Strength at noise floor = -64.70 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 42.53 dBµV/m Peak

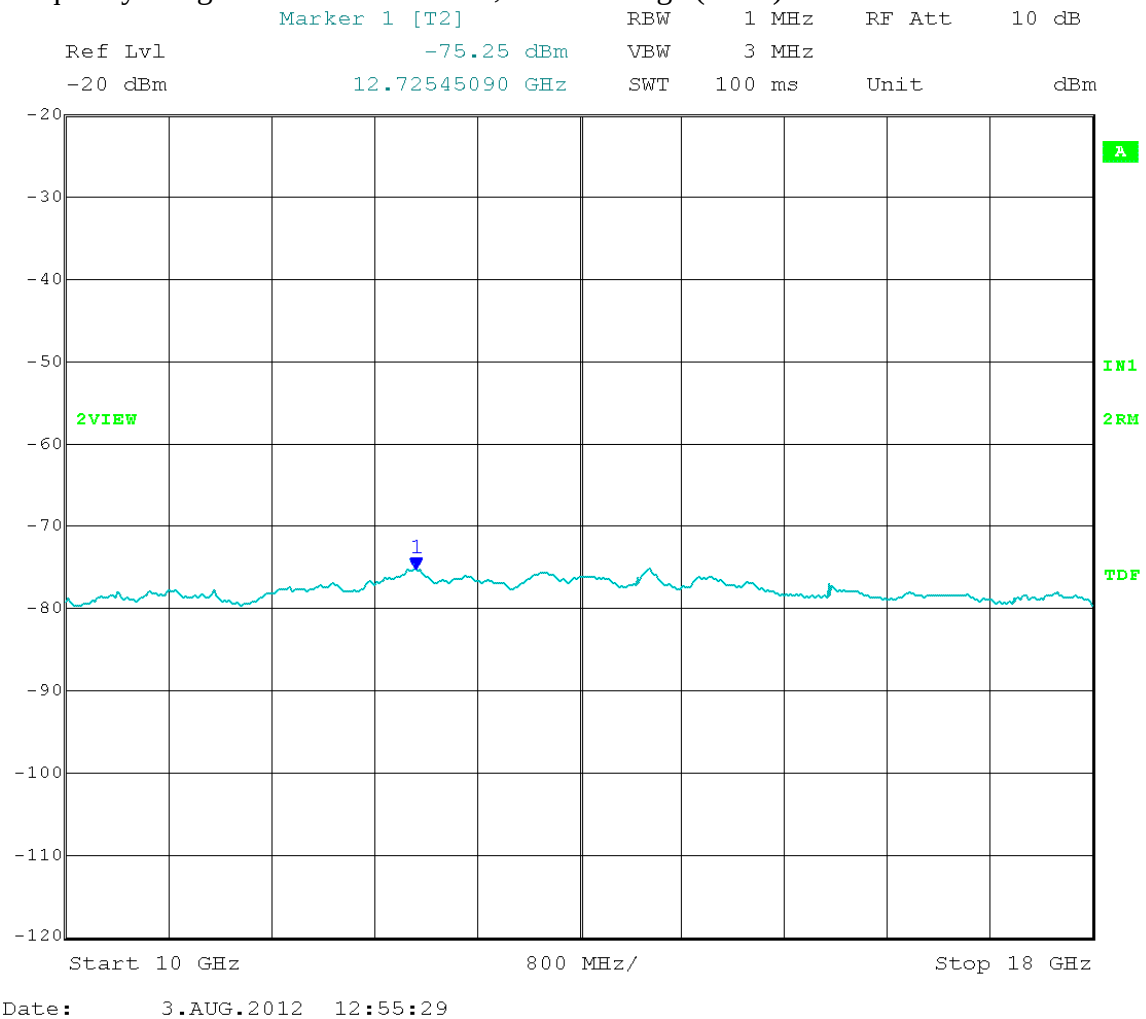
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg 2C	26 dB EBW: 19.44 MHz
Output port:	Channel B;	Mid Channel Frequency:	5.575 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 10 GHz to 18 GHz; Average (RMS) detector



Date: 3.AUG.2012 12:55:29

Calculated Field Strength at noise floor = -75.25 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 31.98 dBµV/m Average

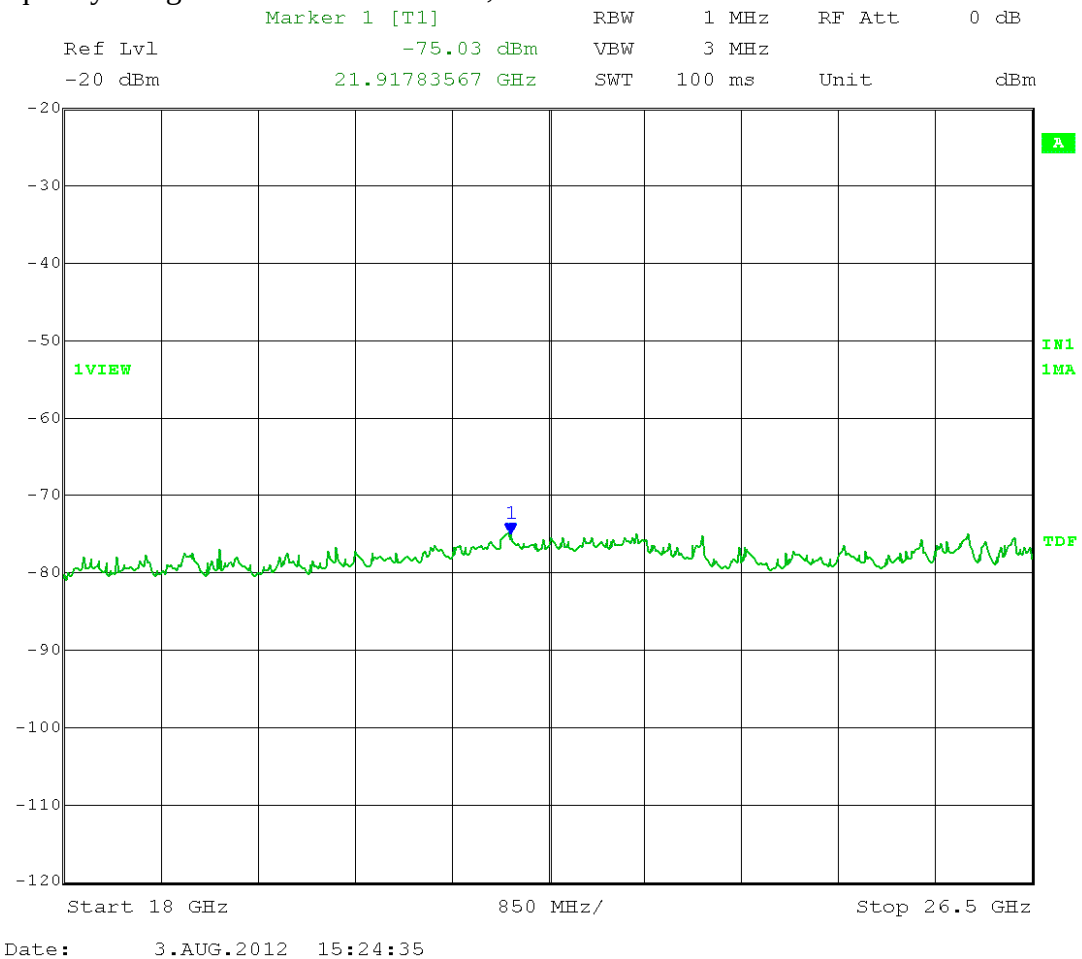
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg 2C	26 dB EBW: 19.44 MHz
Output port:	Channel B;	Mid Channel Frequency:	5.575 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 18 GHz to 26.5 GHz; Peak detector



Calculated EIRP at noise floor = -75.03 dBm + 9 dBi antenna gain + 3 dB (MIMO)
= -63.03 dBm
Calculated Field Strength at noise floor = -75.03 + 9 dBi antenna gain + 3 dB (MIMO)
– 20 log (3 meters) + 104.77 = 32.20 dBµV/m Peak

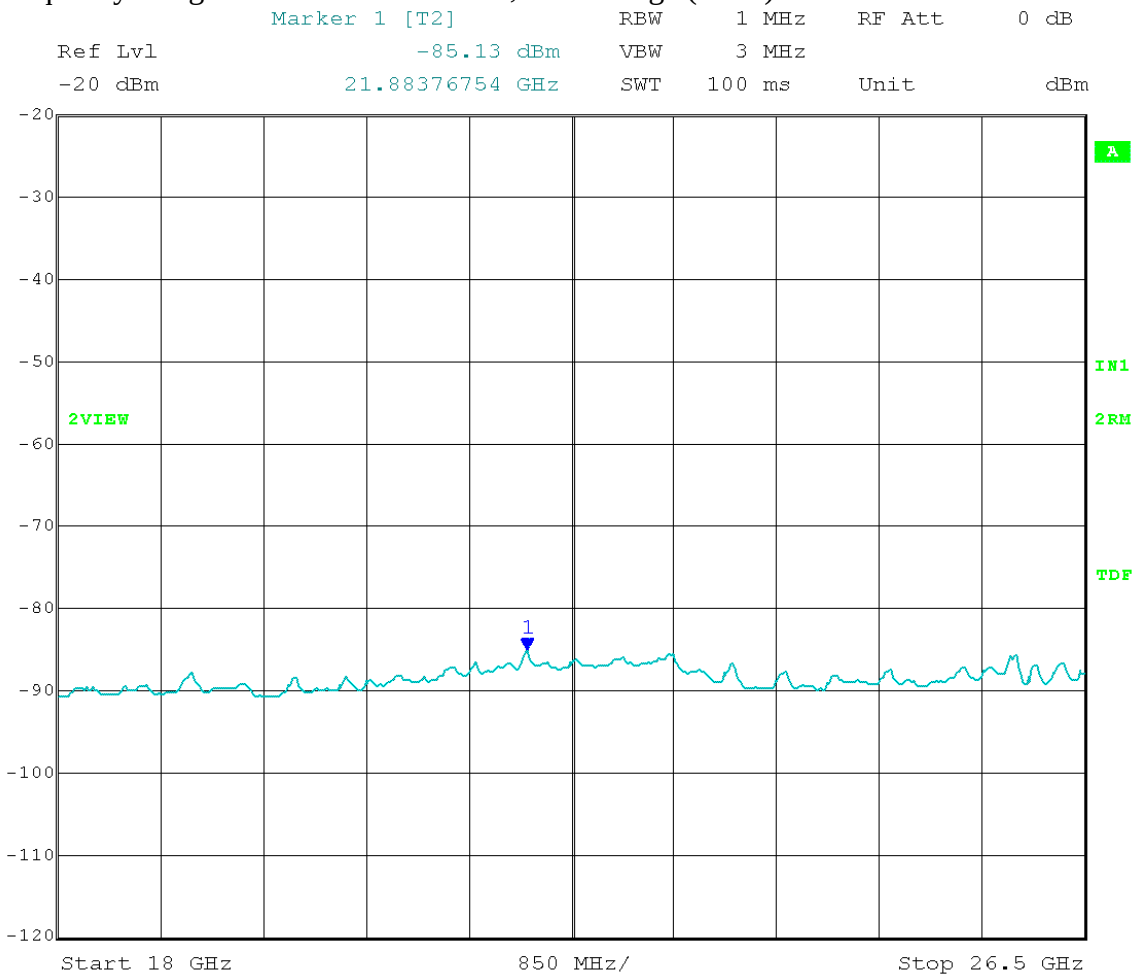
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg 2C	26 dB EBW: 19.44 MHz
Output port:	Channel B;	Mid Channel Frequency:	5.575 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 18 GHz to 26.5 GHz; Average (RMS) detector



Date: 3.AUG.2012 15:26:10

Calculated Field Strength at noise floor = -85.13 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 22.10 dBµV/m Average

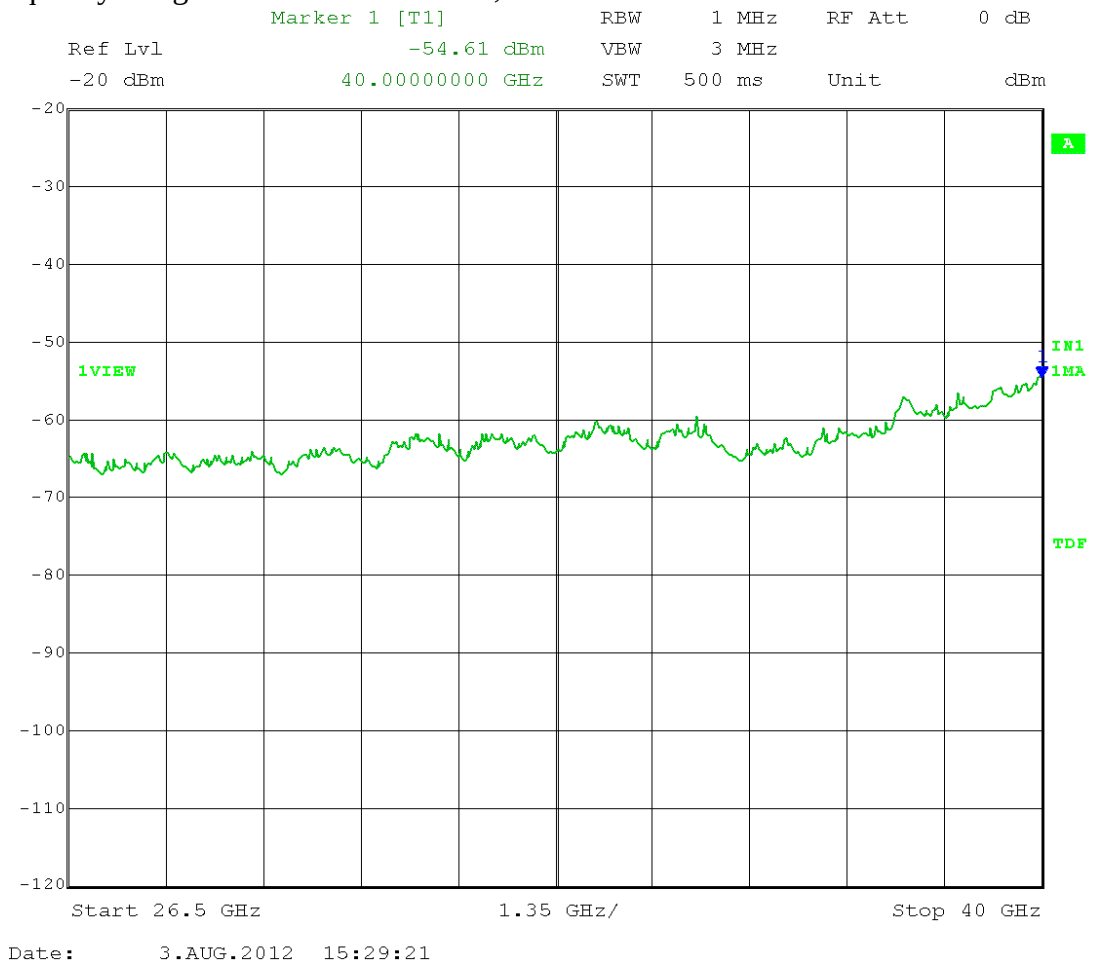
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg 2C	26 dB EBW: 19.44 MHz
Output port:	Channel B;	Mid Channel Frequency:	5.575 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 26.5 GHz to 40 GHz; Peak detector



Calculated EIRP at noise floor = -54.61 dBm + 9 dBi antenna gain + 3 dB (MIMO)
= -42.61 dBm
Calculated Field Strength at noise floor = -54.61 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 52.62 dBµV/m Peak

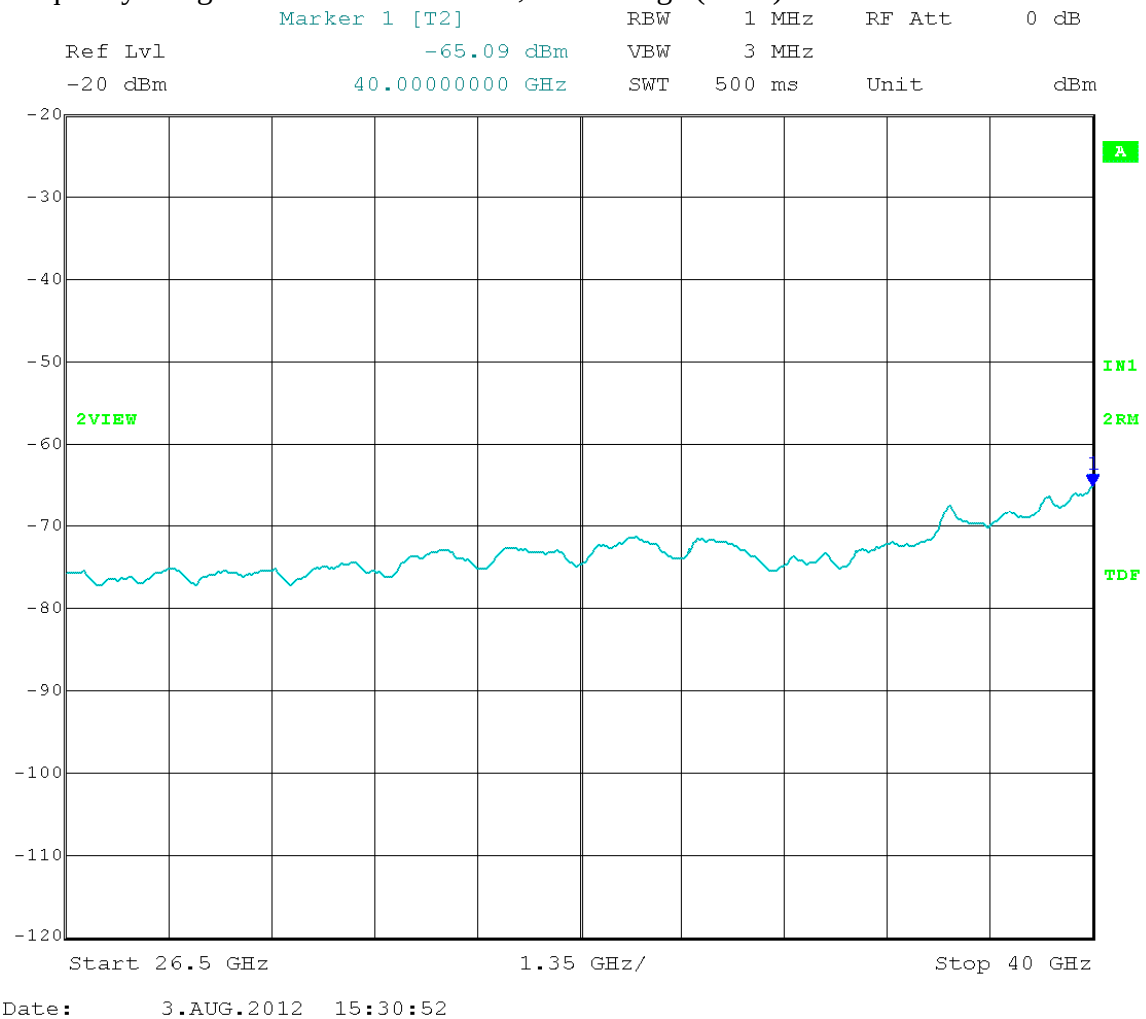
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg 2C	26 dB EBW: 19.44 MHz
Output port:	Channel B;	Mid Channel Frequency:	5.575 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 26.5 GHz to 40 GHz; Average (RMS) detector



Date: 3.AUG.2012 15:30:52

Calculated Field Strength at noise floor = -65.09 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 42.14 dBµV/m Average

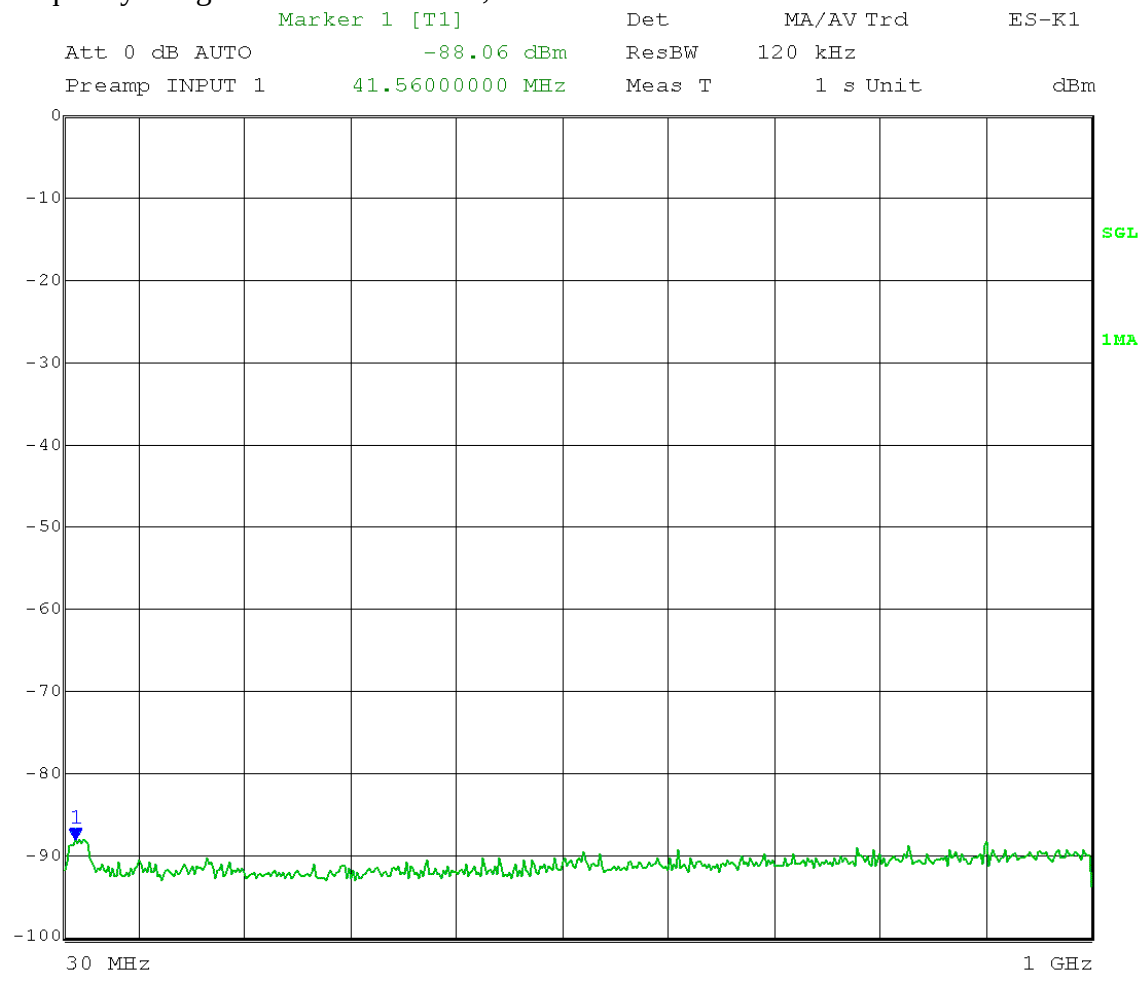
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg 2D	26 dB EBW: 19.44 MHz
Output port:	Channel B;	High Channel Frequency:	5.715 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
Field strength limit: FCC Sections 15.209 and 15.205 (emissions in restricted bands)

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 30 MHz to 1 GHz; Peak detector



Date: 3.AUG.2012 10:56:32

No emissions found from 30 MHz to 1 GHz

Calculated Field Strength at noise floor = -88.06 dBm + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 + 4.7 dB = 23.87 dBµV/m Peak

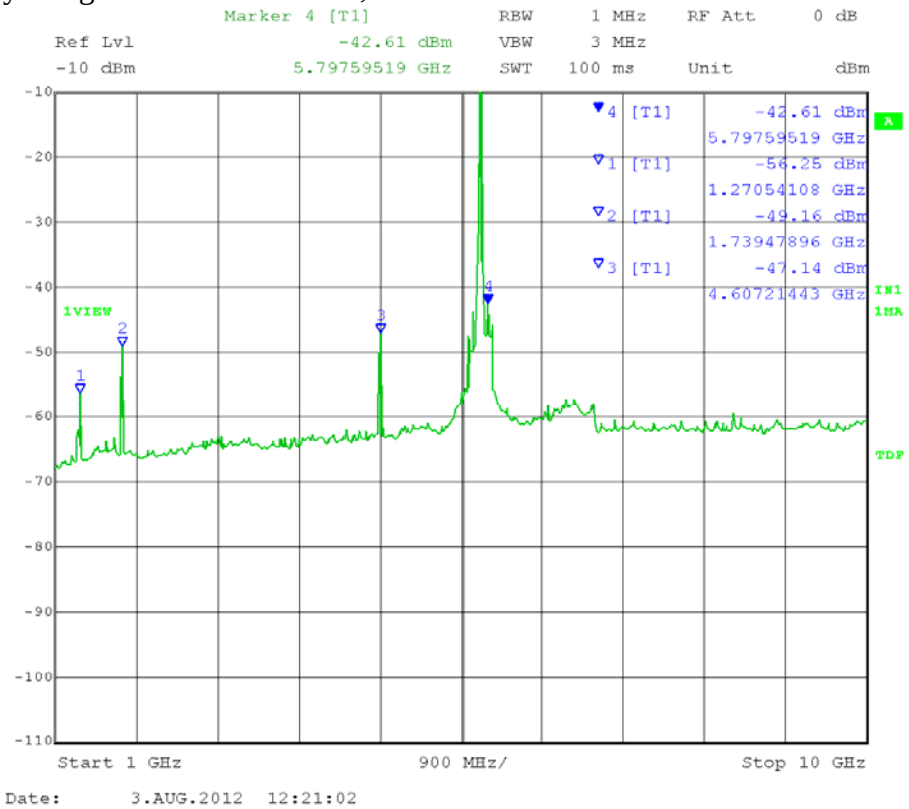
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg 2D	26 dB EBW: 19.44 MHz
Output port:	Channel B;	High Channel Frequency:	5.715 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 1 GHz to 10 GHz; Peak detector



Marker 1: Calculated Field Strength (Restricted Band) = -56.25 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 50.98 dBµV/m Peak
Marker 2: Calculated EIRP = -49.16 dBm + 9 dBi antenna gain + 3 dB (MIMO) = -37.16 dBm
Marker 3: Calculated Field Strength (Restricted Band) = -47.14 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 60.09 dBµV/m Peak
Marker 4: Calculated EIRP = -42.61 dBm + 9 dBi antenna gain + 3 dB (MIMO) = -30.61 dBm

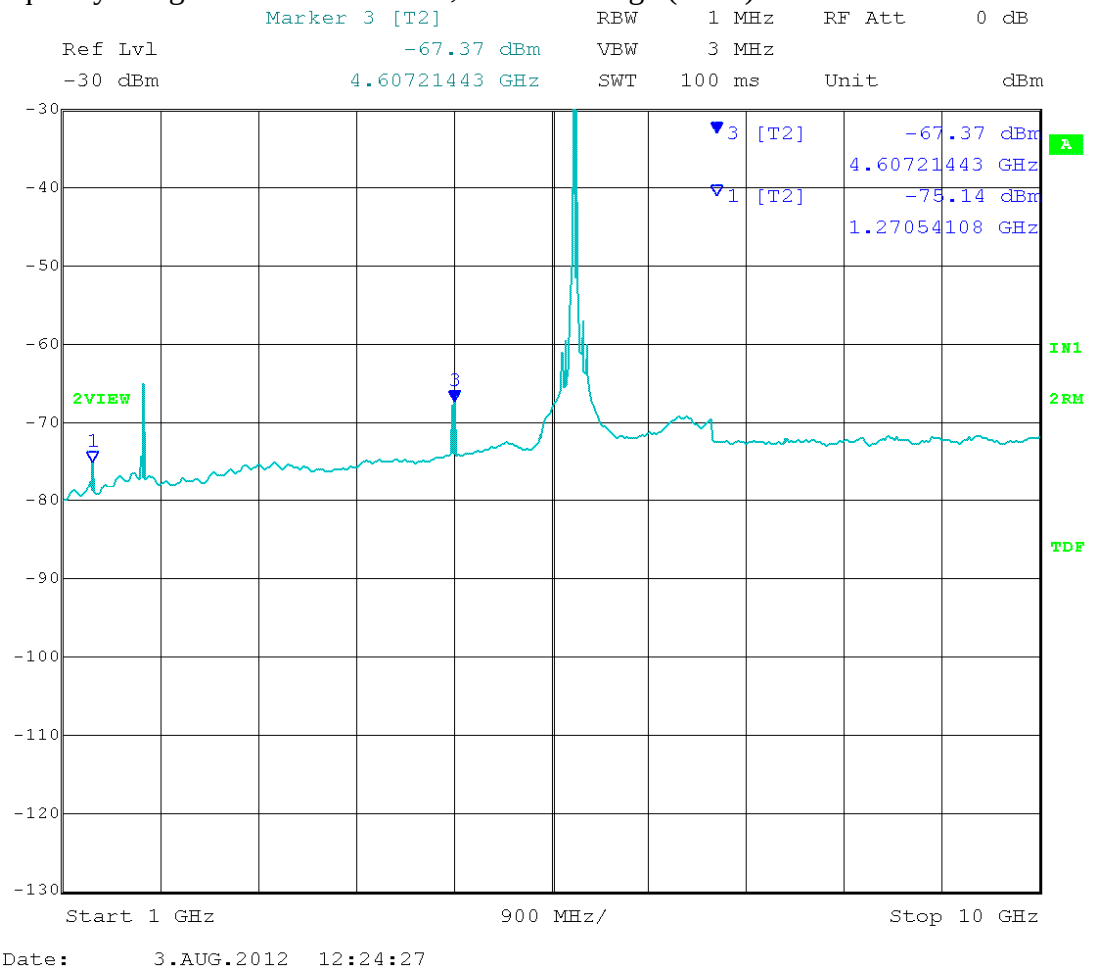
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg 2D	26 dB EBW: 19.44 MHz
Output port:	Channel B;	High Channel Frequency:	5.715 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 1 GHz to 10 GHz; Average (RMS) detector



Marker 1: Calculated Field Strength (Restricted Band) = -75.14 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 32.09 dBµV/m Average
Marker 3: Calculated Field Strength (Restricted Band) = -67.37 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 39.86 dBµV/m Average

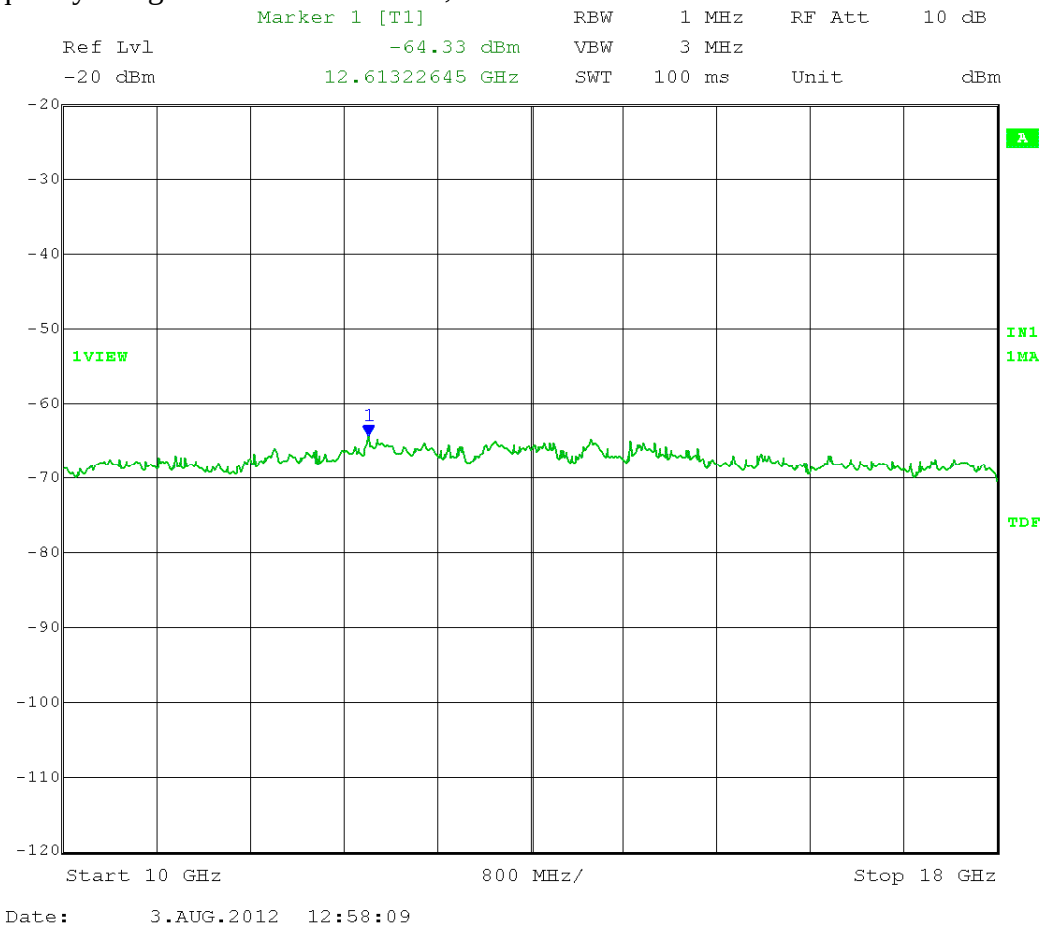
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg 2D	26 dB EBW: 19.44 MHz
Output port:	Channel B;	High Channel Frequency:	5.715 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 10 GHz to 18 GHz; Peak detector



Calculated EIRP at noise floor = -64.33 dBm + 9 dBi antenna gain + 3 dB (MIMO)
= -52.33 dBm
Calculated Field Strength at noise floor = -64.33 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 42.90 dBµV/m Peak

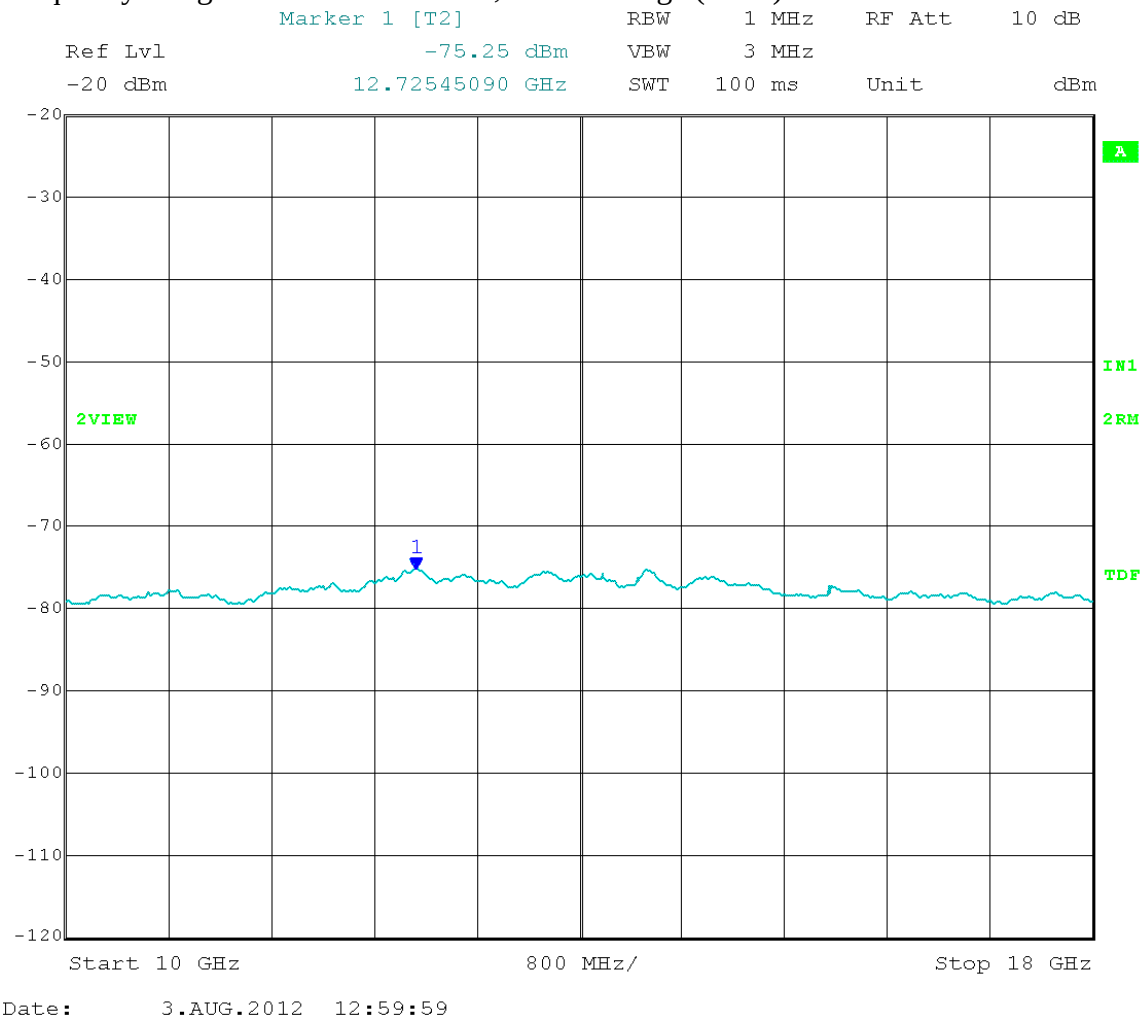
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg 2D	26 dB EBW: 19.44 MHz
Output port:	Channel B;	High Channel Frequency:	5.715 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 10 GHz to 18 GHz; Average (RMS) detector



Date: 3.AUG.2012 12:59:59

Calculated Field Strength at noise floor = -75.25 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 31.98 dBµV/m Average

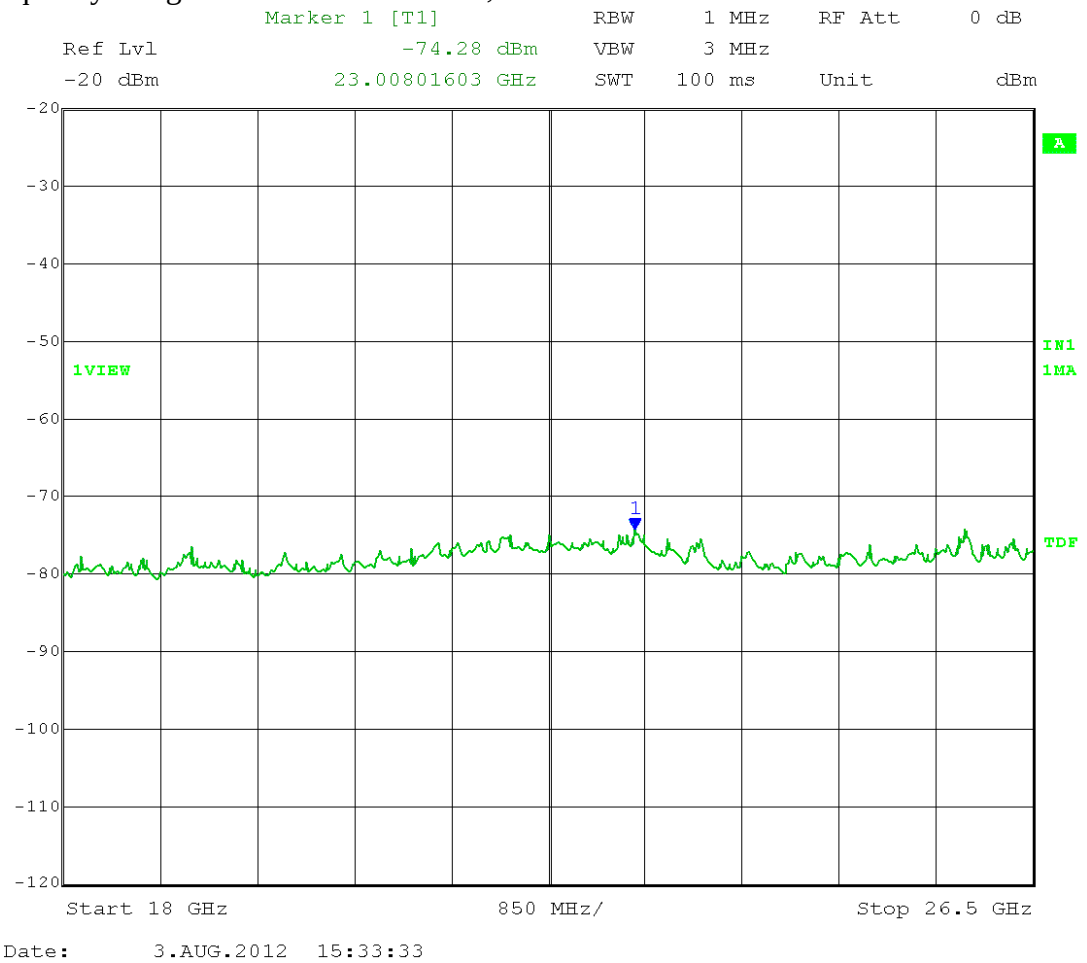
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg 2D	26 dB EBW: 19.44 MHz
Output port:	Channel B;	High Channel Frequency:	5.715 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 18 GHz to 26.5 GHz; Peak detector



Calculated EIRP at noise floor = -74.28 dBm + 9 dBi antenna gain + 3 dB (MIMO)
= -62.28 dBm
Calculated Field Strength at noise floor = -74.28 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 32.95 dBµV/m Peak

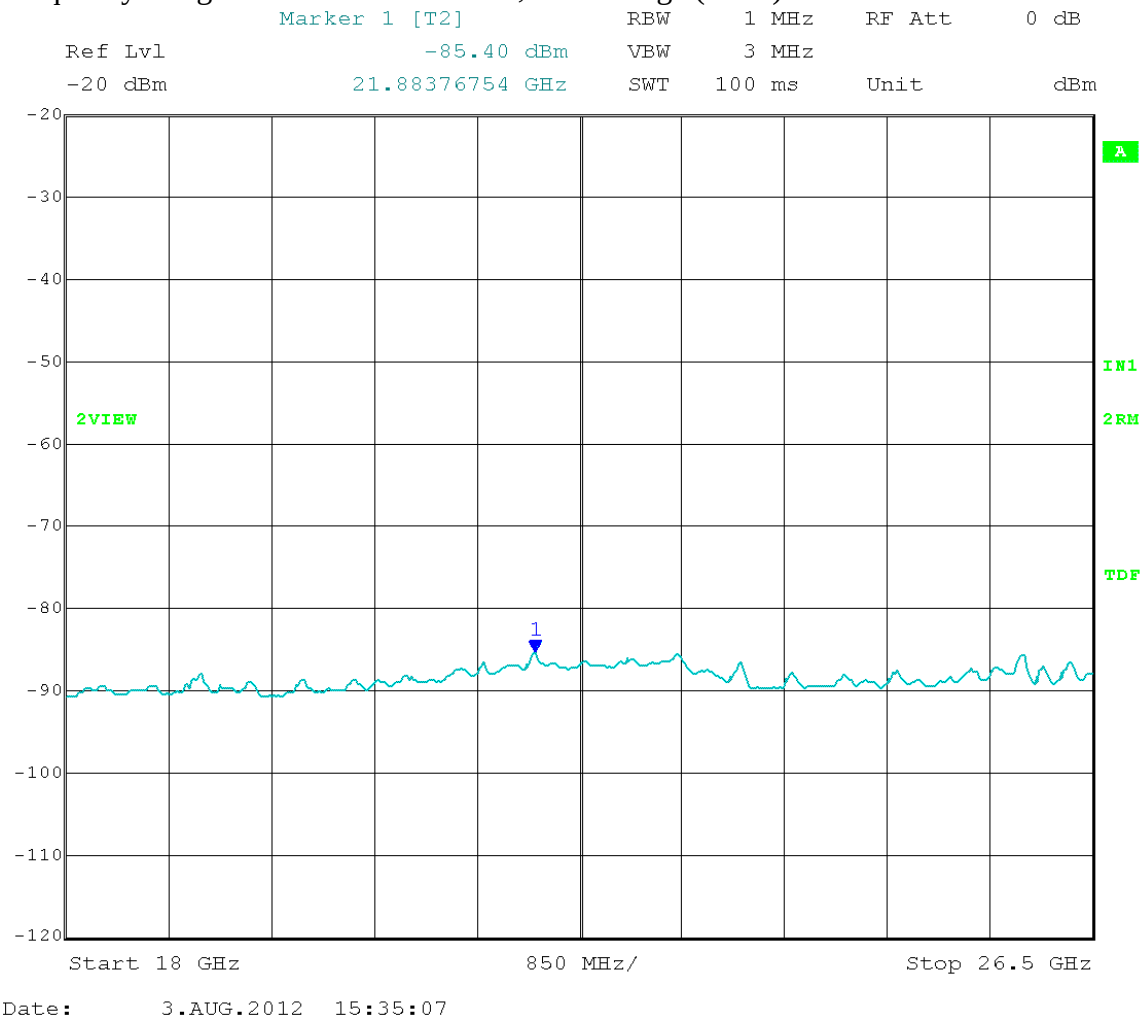
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg 2D	26 dB EBW: 19.44 MHz
Output port:	Channel B;	High Channel Frequency:	5.715 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 18 GHz to 26.5 GHz; Average (RMS) detector



Date: 3.AUG.2012 15:35:07

Calculated Field Strength at noise floor = -85.40 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 21.83 dBµV/m Average

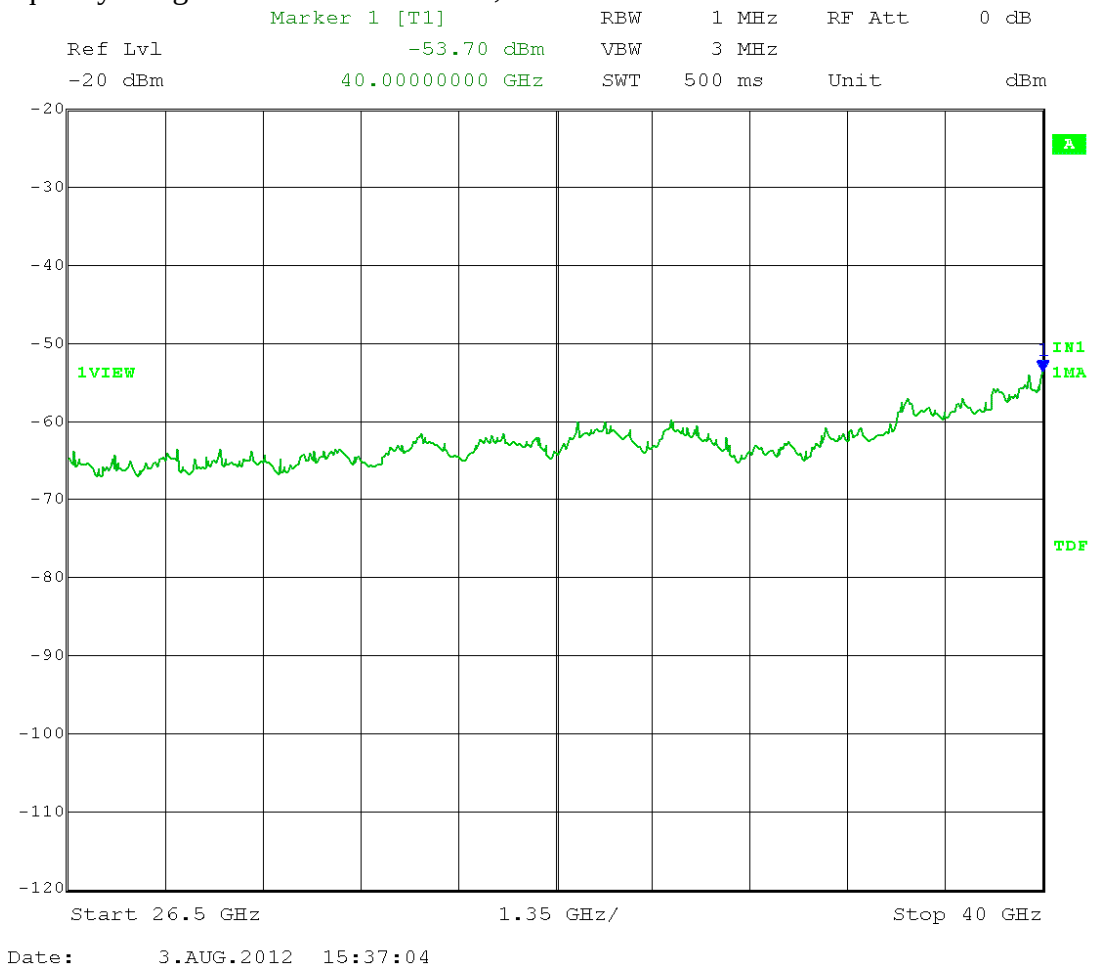
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg 2D	26 dB EBW: 19.44 MHz
Output port:	Channel B;	High Channel Frequency:	5.715 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 26.5 GHz to 40 GHz; Peak detector



Calculated EIRP at noise floor = -53.70 dBm + 9 dBi antenna gain + 3 dB (MIMO)
= -41.70 dBm
Calculated Field Strength at noise floor = -53.70 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 53.53 dBµV/m Peak

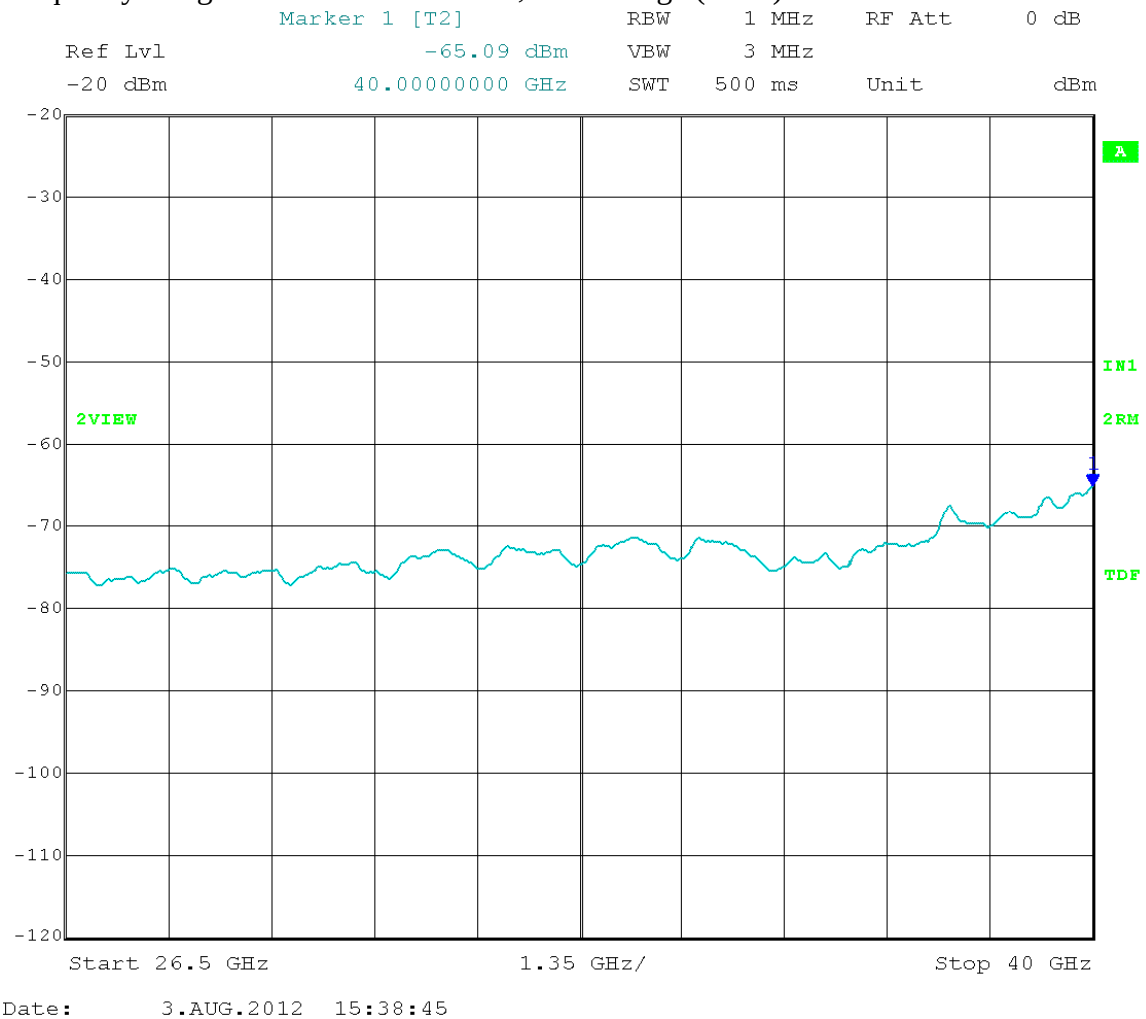
Test Date: 08-03-2012
Company: Cambium Networks
EUT: PMP450SM 5.4 GHz MIMO
Test: Transmitter unwanted emissions – RF conducted
Operator: Craig B

EUT nominal channel bandwidth:	20 MHz	adi reg 2D	26 dB EBW: 19.44 MHz
Output port:	Channel B;	High Channel Frequency:	5.715 GHz
Output power setting:	19;	Modulation Type:	QPSK

Upper bound on out-of-band antenna gain: 9 dBi
EIRP Limit: -27 dBm/MHz
Field strength limit (3 meters; Restricted Bands): 74 dBµV/m Peak, 54 dBµV/m Average

Corrected for external attenuation, cable and connector to antenna interface on radio.

Frequency Range: 26.5 GHz to 40 GHz; Average (RMS) detector



Date: 3.AUG.2012 15:38:45

Calculated Field Strength at noise floor = -65.09 + 9 dBi antenna gain + 3 dB (MIMO) – 20 log (3 meters) + 104.77 = 42.14 dBµV/m Average

Appendix A – Measurement Data

A7.0 Unwanted Emission Levels – Radiated from cabinet

Rule Section: Sections 15.407(b)(3) and 15.407(b)(6)

Test Procedure: FCC KDB 789033 D01 General UNII Test Procedures v01r01 – *Guidance for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E*

Section G(1): Unwanted emissions in the restricted bands
Section G(2): Unwanted emissions outside the restricted bands
Sections G(3), G(4) and G(5): Unwanted emission levels

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)

EIRP calculation:
EIRP (dBm) = E + 20 log (d) – 104.77
E = field strength in dBµV/m
d = the measurement distance in meters

Limits: Outside restricted bands: Peak EIRP shall not exceed -27 dBm/MHz
Inside restricted bands: Peak and Average limits of FCC Part 15.209

Results: Passed

Notes: Both transmit chains active and at maximum power during test.

Antenna ports were terminated with 50 Ohm terminations.

Measurements were taken for QPSK at the lowest, middle, and highest channels of operation. EUT was set to transmit continuously with 98% duty cycle.

166 South Carter, Genoa City, WI 53128

Company: Cambium Networks
Model Tested: C054045C004A
Report Number: 18193
DLS Project: 5270

DLS Electronic Systems, Inc.

Company: Cambium Networks
Operator: Jim O
Date of test: 7-13-12
Temperature: 77 deg. F
Humidity: 44% R.H.

Spurious Emissions - ERP (freq's<1GHz) - Substitution Method

Model: SM 5.4 **30M-1GHz Transmit mode**									
Channel: Low, Mid & High									
Frequency (MHz)	Polarization	Max. Field Strength of EUT (dBuV/m)	Output of Signal Generator when field strength equals that of EUT (dBm)	Correction factor for cable between Signal Gen. and subst. antenna (dB)	Gain of subst. antenna (dBi)	Strength of emission [ERP] (dBm)	Limit (dBm)	Margin (dB)	Notes
108.8	V	27.20	-62.00	2.10	2.15	-64.10	-54	10.10	Low, Mid, High
110.8	V	18.00	-70.10	2.13	2.15	-72.23	-54	18.23	Low, Mid, High
110.84	V	27.40	-60.10	2.14	2.15	-62.24	-54	8.24	Low, Mid, High
111.62	V	28.40	-59.10	2.15	2.15	-61.25	-54	7.25	Low, Mid, High
112.22	V	26.00	-61.80	2.15	2.15	-63.95	-36	27.95	Low, Mid, High
143.24	V	24.30	-65.40	2.60	2.15	-68.00	-36	32.00	Low, Mid, High
192	V	18.10	-61.70	3.05	2.15	-64.75	-36	28.75	Low, Mid, High
399.98	V	26.90	-49.70	4.50	2.15	-54.20	-36	18.20	Low, Mid, High
399.98	H	29.60	-54.60	4.50	2.15	-59.10	-54	5.10	Low, Mid, High
440	H	25.80	-58.20	4.70	2.15	-62.90	-54	8.90	Low, Mid, High
480.02	H	26.70	-58.20	4.80	2.15	-63.00	-54	9.00	Low, Mid, High

$ERP_{(ref.\ to\ \frac{1}{2}\lambda\ dipole)}$ = Signal generator output - cable loss + antenna gain - 2.15

166 South Carter, Genoa City, WI 53128

Company: Cambium Networks
Model Tested: C054045C004A
Report Number: 18193
DLS Project: 5270

DLS Electronic Systems, Inc.

Company: Cambium Networks

Date of test: 07-9-12 Operator: Jim O

Temperature: 70 deg. F Humidity: 35% R.H.

Spurious Emissions - EIRP (freq's>1GHz) - Substitution Method

Model: SM 5.4 **TX mode 1-6Ghz**

Channel: Low, Mid & High

Frequency (GHz)	Polarization	Max. Field Strength of EUT (dBuV/m)	Output of Signal Generator when field strength equals that of EUT (dBm)	Correction factor for cable between Signal Gen. and subst. antenna (dB)	Gain of subst. antenna (dBi)	Strength of emission [EIRP] (dBm)	Limit (dBm)	Margin (dB)	Notes
1.0000	H	49.68	-49.43	1.82	6.49	-44.76	-27	17.76	LO, MID, HI
1.1199	H	52.18	-46.93	1.85	6.50	-42.28	-27	15.28	LO, MID, HI
1.1200	V	49.68	-49.72	1.85	6.60	-44.97	-27	17.97	LO, MID, HI
1.1500	H	53.94	-45.17	1.88	6.66	-40.39	-27	13.39	LO, MID, HI
1.1600	H	49.55	-49.56	1.85	6.52	-44.89	-27	17.89	LO, MID, HI
1.1601	V	51.17	-48.23	1.90	6.60	-43.53	-27	16.53	LO, MID, HI
1.2545	H	54.00	-45.11	1.88	7.00	-39.99	-27	12.99	LO, MID, HI
1.2799	H	57.29	-41.82	1.95	7.00	-36.77	-27	9.77	LO, MID, HI
1.3199	V	51.29	-49.41	2.05	7.50	-43.96	-27	16.96	LO, MID, HI
1.3202	H	58.87	-40.24	1.99	7.40	-34.83	-27	7.83	LO, MID, HI
1.3717	H	59.14	-39.97	2.01	7.40	-34.58	-27	7.58	LO, MID, HI
1.3910	V	58.71	-40.40	2.00	7.96	-34.44	-27	7.44	LO, MID, HI
1.4000	H	55.74	-43.37	2.10	7.96	-37.51	-27	10.51	LO, MID, HI
1.4399	V	57.40	-43.30	2.10	8.30	-37.10	-27	10.10	LO, MID, HI
1.8400	V	52.68	-48.92	2.50	8.38	-43.04	-27	16.04	LO, MID, HI
1.8401	H	57.06	-43.74	2.50	8.30	-37.94	-27	10.94	LO, MID, HI
1.9200	V	53.06	-47.64	2.50	8.40	-41.74	-27	14.74	LO, MID, HI
2.0000	V	53.69	-47.91	2.60	8.92	-41.59	-27	14.59	LO, MID, HI
2.0001	H	53.81	-48.31	2.50	8.94	-41.87	-27	14.87	LO, MID, HI
2.1601	V	51.67	-49.93	2.72	9.40	-43.25	-27	16.25	LO, MID, HI
2.2401	H	53.56	-48.56	2.70	9.40	-41.86	-27	14.86	LO, MID, HI
2.3200	H	52.18	-49.94	2.89	9.55	-43.28	-27	16.28	LO, MID, HI
3.2800	V	50.18	-52.32	3.45	9.47	-46.30	-27	19.30	LO, MID, HI
3.3600	V	49.68	-52.82	3.52	9.50	-46.84	-27	19.84	LO, MID, HI

EIRP = Sig. Gen(output) - Cable loss + Ant gain (dBi)

166 South Carter, Genoa City, WI 53128

Company: Cambium Networks
Model Tested: C054045C004A
Report Number: 18193
DLS Project: 5270

DLS Electronic Systems, Inc.

Company: Cambium Networks
Operator: Jim O
Date of test: 07-20-12
Temperature: 79 deg. F
Humidity: 45% R.H.

Spurious Emissions - EIRP (freq's>1GHz) - Substitution Method

Model: SM 5.4 OFDM (**10 MHz)** **6-40GHz Transmit mode**

Channel: Low, Mid & High

Frequency (GHz)	Polarization	Max. Field Strength of EUT (dBuV/m)	Output of Signal Generator when field strength equals that of EUT (dBm)	Correction factor for cable between Signal Gen. and subst. antenna (dB)	Gain of subst. antenna (dBi)	Strength of emission [EIRP] (dBm)	Limit (dBm)	Margin (dB)	Notes
10.9500	H	54.10	-46.80	6.90	12.51	-41.19	-27	14.19	LO CH
10.9500	V	51.70	-49.70	6.90	12.51	-44.09	-27	17.09	LO CH
11.15	V	52.50	-48.90	6.90	12.47	-43.33	-27	16.33	MID CH
11.4400	H	52.80	-48.40	6.90	12.42	-42.88	-27	15.88	HI CH
11.4400	V	55.20	-46.20	6.90	12.42	-40.68	-27	13.68	HI CH
16.4250	H	51.20	-49.00	9.00	15.70	-42.30	-27	15.30	LO CH
16.4250	V	52.10	-49.10	9.00	15.70	-42.40	-27	15.40	LO CH
17.1600	H	55.20	-45.60	9.20	12.20	-42.60	-27	15.60	HI CH
17.1600	V	55.50	-45.50	9.20	12.20	-42.50	-27	15.50	HI CH

EIRP = Sig. Gen(output) - Cable loss + Ant gain (dBi)

166 South Carter, Genoa City, WI 53128

Company: Cambium Networks
Model Tested: C054045C004A
Report Number: 18193
DLS Project: 5270

DLS Electronic Systems, Inc.

Company: Cambium Networks
Operator: Jim O
Date of test: 07-19-12
Temperature: 77 deg. F
Humidity: 45% R.H.

Spurious Emissions - EIRP (freq's>1GHz) - Substitution Method

Model: SM 5.4 OFDM (**20 MHz**) **6-40GHz Transmit mode**									
Channel: Low, Mid & High									
Frequency (GHz)	Polarization	Max. Field Strength of EUT (dBuV/m)	Output of Signal Generator when field strength equals that of EUT (dBm)	Correction factor for cable between Signal Gen. and subst. antenna (dB)	Gain of subst. antenna (dBi)	Strength of emission [EIRP] (dBm)	Limit (dBm)	Margin (dB)	Notes
10.959	V	52.80	-46.80	6.94	12.51	-41.23	-27	14.23	LO CH
11.15	V	52.50	-48.90	6.94	12.47	-43.37	-27	16.37	MID CH
11.15	H	51.20	-49.90	6.94	12.47	-44.37	-27	17.37	MID CH
11.429	V	54.30	-47.10	6.88	12.44	-41.54	-27	14.54	HI CH
11430	H	54.50	-46.70	6.88	12.44	-41.14	-27	14.14	HI CH

EIRP = Sig. Gen(output) - Cable loss + Ant gain (dBi)

Data with Dish antenna

DLS Electronic Systems, Inc.

Company: Cambium Networks
Operator: Jim O
Date of test: 07-19-12
Temperature: 79 deg. F
Humidity: 45% R.H.

Spurious Emissions - EIRP (freq's>1GHz) - Substitution Method

Model: SM 5.4 OFDM (**10Mhz) 6-40GHz w/Dish Antenna Transmit mode**									
Channel: Low, Mid & High									
Frequency (GHz)	Polarization	Max. Field Strength of EUT (dBuV/m)	Output of Signal Generator when field strength equals that of EUT (dBm)	Correction factor for cable between Signal Gen. and subst. antenna (dB)	Gain of subst. antenna (dBi)	Strength of emission [EIRP] (dBm)	Limit (dBm)	Margin (dB)	Notes
10.949	V	55.20	-46.20	6.94	12.51	-40.63	-27	13.63	LO CH
10.950	H	55.90	-45.00	6.94	12.51	-39.43	-27	12.43	LO CH
11.440	H	56.30	-44.90	6.88	12.44	-39.34	-27	12.34	HI CH
11.440	V	57.40	-44.00	6.88	12.44	-38.44	-27	11.44	HI CH
16.420	H	50.4*	-49.80	8.98	15.80	-42.98	-27	15.98	LO CH
16.425	V	54.80	-45.10	8.98	15.80	-38.28	-27	11.28	LO CH
16.625	V	52.20	-47.90	9.07	15.23	-41.74	-27	14.74	MID CH
17.159	H	61.2*	-39.50	9.18	12.30	-36.38	-27	9.38	HI CH
17.159	V	54*	-46.60	9.18	12.30	-43.48	-27	16.48	HI CH
21.900	H	60.00	-35.90	10.70	10.35	-36.25	-27	6.25	LO CH
21.920	V	59.60	-35.70	10.70	10.35	-36.05	-27	6.05	LO CH
22.860	V	57.70	-37.20	11.20	10.65	-37.75	-27	7.75	HI CH

***** denotes RMS detector used

EIRP = Sig. Gen(output) - Cable loss + Ant gain (dBi)

Data with Dish antenna

DLS Electronic Systems, Inc.

Company: Cambium Networks
Operator: Jim O
Date of test: 07-20-12
Temperature: 79 deg. F
Humidity: 45% R.H.

Spurious Emissions - EIRP (freq's>1GHz) - Substitution Method

Model: SM 5.4 OFDM (**20Mhz) 6-40GHz w/Dish Antenna Transmit mode**

Channel: Low, Mid & High

Frequency (GHz)	Polarization	Max. Field Strength of EUT (dBuV/m)	Output of Signal Generator when field strength equals that of EUT (dBm)	Correction factor for cable between Signal Gen. and subst. antenna (dB)	Gain of subst. antenna (dBi)	Strength of emission [EIRP] (dBm)	Limit (dBm)	Margin (dB)	Notes
10.960	H	55.20	-45.70	6.95	12.50	-40.15	-27	13.15	LO CH
10.960	V	54.90	-46.50	6.95	12.50	-40.95	-27	13.95	LO CH
11.150	V	54.30	-47.10	6.93	12.47	-41.56	-27	14.56	MID CH
11.150	H	52.20	-48.70	6.93	12.47	-43.16	-27	16.16	MID CH
11.429	V	56.70	-44.70	6.88	12.43	-39.15	-27	12.15	HI CH
11.430	H	56.40	-44.60	6.88	12.43	-39.05	-27	12.05	HI CH
16.440	H	48.1*	-49.92	8.97	15.65	-43.24	-27	16.24	LO CH
16.440	V	51.90	-48.20	8.97	15.65	-41.52	-27	14.52	LO CH
16.625	V	52.20	-47.90	9.07	15.23	-41.74	-27	14.74	MID CH
17.115	H	55.30	-45.40	9.17	12.30	-42.27	-27	15.27	HI CH
17.145	V	57.5*	-43.00	9.17	12.30	-39.87	-27	12.87	HI CH
21.920	V	59.60	-35.70	10.70	10.35	-36.05	-27	6.05	LO CH
21.920	H	58.90	-37.00	10.70	10.35	-37.35	-27	7.35	LO CH
22.860	V	57.70	-37.20	11.22	10.65	-37.77	-27	7.77	HI CH

***** denotes RMS detector used

EIRP = Sig. Gen(output) - Cable loss + Ant gain (dBi)

END OF REPORT

Revision #	Date	Comments	By
1.0	08-16-2012	Preliminary Release	JS
1.1	08-23-2012	Added Section 7 tables to report	JS
1.2	09-05-2012	Editing	JS
1.3	10-10-2012	Peak Excursion data added	JS