



166 South Carter, Genoa City, WI 53128

Company:	Cambium Networks
Model Tested:	3082CHH
Report Number:	22288
DLS Project:	8420

## **Code of Federal Regulations 47**

### **PART 90—PRIVATE LAND MOBILE RADIO SERVICES**

#### **Subpart Z—Wireless Broadband Services in the 3650-3700 MHz Band**

THE FOLLOWING **MEETS** THE ABOVE TEST SPECIFICATION

Formal Names:	PMP450i 3GHz SM/BH MIMO Transceiver PTP450i 3GHz BH MIMO Transceiver
Kind of Equipment:	Transceiver
Frequency Range:	3652.5 to 3697.5 MHz (5 MHz channel bandwidth) 3660 to 3690 MHz (20 MHz channel bandwidth) 3670 to 3680 MHz (40 MHz channel bandwidth)
Test Configuration:	Stand-alone
Model Number(s):	3082HH, 3092HH, 3082CHH
Model(s) Tested:	3082CHH
Serial Number(s):	0A003E4511A5, 0A003E45116A, 0A003E45117F
Date of Tests:	September 2 <sup>nd</sup> to October 19 <sup>th</sup> , 2016
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.

© Copyright 1983 – 2016, D.L.S. Electronic Systems, Inc.

#### **COPYRIGHT NOTICE**

This report must not be reproduced (except in full), without the approval of D.L.S. Electronic Systems, Inc.



166 South Carter, Genoa City, WI 53128

Company:  
Model Tested:  
Report Number:  
DLS Project:

Cambium Networks  
3082CHH  
22288  
8420

## SIGNATURE PAGE

Report By:

A handwritten signature in black ink that reads "Craig Brandt". The signature is fluid and cursive, with a long horizontal stroke at the end.

Craig Brandt  
Test Engineer

Reviewed By:

A handwritten signature in black ink that reads "William Stumpf". The signature is cursive and somewhat stylized, with a large "W" and a long "f".

William Stumpf  
OATS Manager

Approved By:

A handwritten signature in black ink that reads "Brian J. Mattson". The signature is cursive and somewhat stylized, with a large "B" and a long "M".

Brian Mattson  
General Manager



166 South Carter, Genoa City, WI 53128

Company:	Cambium Networks
Model Tested:	3082CHH
Report Number:	22288
DLS Project:	8420

## Table of Contents

i. Cover Page .....	1
ii. Signature Page.....	2
iii. Table of Contents .....	3
iv. NVLAP Certificate of Accreditation.....	5
1.0 Summary of Test Report.....	6
2.0 Introduction.....	7
3.0 Test Facilities .....	7
4.0 Description of Test Sample.....	7
5.0 Test Equipment .....	9
6.0 Test Arrangements .....	11
7.0 Test Conditions .....	12
8.0 Modifications Made To EUT For Compliance.....	12
9.0 Additional Descriptions .....	12
10.0 Results.....	12
11.0 Conclusion .....	13
Appendix A – Test Photos .....	14
Appendix B – Measurement Data.....	16
B1.0 Duty Cycle of test unit .....	16
5 MHz channel bandwidth.....	17
20 MHz channel bandwidth.....	19
40 MHz channel bandwidth.....	21
B2.0 Transmitter Output Power and Power Density .....	23
5 MHz channel bandwidth.....	24
20 MHz channel bandwidth.....	25
20 MHz channel bandwidth – with optional 19 dBi panel antenna.....	26
40 MHz channel bandwidth.....	27
B3.0 Channel Bandwidth.....	28
5 MHz channel bandwidth.....	29
20 MHz channel bandwidth.....	32
40 MHz channel bandwidth.....	35



166 South Carter, Genoa City, WI 53128

Company:	Cambium Networks
Model Tested:	3082CHH
Report Number:	22288
DLS Project:	8420

## Table of Contents (continued)

B4.0	Band Edge compliance – RF Conducted .....	38
5 MHz	channel bandwidth .....	39
20 MHz	channel bandwidth .....	41
40 MHz	channel bandwidth .....	44
B5.0	Band Edge compliance - Radiated .....	47
5 MHz	channel bandwidth .....	48
20 MHz	channel bandwidth .....	52
40 MHz	channel bandwidth .....	56
B6.0	Transmitter Unwanted Emissions – RF conducted .....	60
5 MHz	channel bandwidth .....	61
20 MHz	channel bandwidth .....	76
40 MHz	channel bandwidth .....	91
B7.0	Transmitter Unwanted Emissions – Radiated .....	106
B8.0	Transmitter Frequency Stability .....	125
B9.0	AC Line Conducted Emissions .....	127
120 Volt	.....	128
230 Volt	.....	139
Appendix C	– Measurement Uncertainty .....	152



166 South Carter, Genoa City, WI 53128

Company: Cambium Networks  
Model Tested: 3082CHH  
Report Number: 22288  
DLS Project: 8420

United States Department of Commerce  
National Institute of Standards and Technology



**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 & 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).*

2016-08-16 through 2017-09-30  
*Effective Dates*



*For the National Voluntary Laboratory Accreditation Program*

**ELECTROMAGNETIC  
COMPATIBILITY &  
TELECOMMUNICATIONS**

**NVLAP LAB CODE 100276-0**

**Emissions**

**Designation**

Off-site test location

**Description**

D.L.S. Electronics performs radiated emissions testing at an additional location, 166 South Carter Street, Genoa City, WI 53128.



166 South Carter, Genoa City, WI 53128

Company: Cambium Networks  
Model Tested: 3082CHH  
Report Number: 22288  
DLS Project: 8420

## 1.0 Summary of Test Report

It was determined that the Cambium Networks PMP450i 3GHz SM/BH MIMO Transceiver, Model 3082CHH, complies with the requirements of CFR 47 Part 90 Subpart Z.

### Applicable Technical Requirements Tested:

Section	Description	Procedure	Note	Compliant?
Pt 90.1321 (a)	Duty Cycle of Test Unit - for RMS measurements	FCC KDB 971168 D01: Power Meas License Digital Systems v02r02	1	NA
Pt 90.1321 (a) Pt 2.1046	Transmitter Output Power and Power Density	FCC KDB 971168 D01: Power Meas License Digital Systems v02r02, Section 5.2.3	1	Yes
Pt 2.1049	Occupied Channel Bandwidth (99% power bandwidth)	FCC KDB 971168 D01: Power Meas License Digital Systems v02r02, Section 4.2	1	Yes
Pt 90.1323 Pt 2.1051	Band Edge compliance – RF Conducted	FCC KDB 971168 D01: Power Meas License Digital Systems v02r02, Section 6.0	1	Yes
Pt 90.1323 Pt 2.1053	Band Edge compliance – Radiated (cabinet radiation)	FCC KDB 971168 D01: Power Meas License Digital Systems v02r02, Section 5.8	2	Yes
Pt 90.1323 (a) Pt 2.1051	Transmitter Unwanted Emissions – RF conducted	FCC KDB 971168 D01: Power Meas License Digital Systems v02r02, Section 6.0	1	Yes
Pt 90.1323 Pt 2.1053	Transmitter Unwanted Emissions – Radiated (cabinet radiation)	FCC KDB 971168 D01: Power Meas License Digital Systems v02r02, Section 5.8	2	Yes
Pt 2.1055	Frequency Stability	FCC KDB 971168 D01: Power Meas License Digital Systems v02r02, Section 9	1	Yes
15.207(a)	AC Line Conducted Emissions	ANSI C63.10-2013 Section 6.2	3	Yes

Note 1: RF conducted measurement.

Note 2: Radiated emission measurement.

Note 3: Informative.



166 South Carter, Genoa City, WI 53128

Company:	Cambium Networks
Model Tested:	3082CHH
Report Number:	22288
DLS Project:	8420

## 2.0 Introduction

From September 2<sup>nd</sup> through October 19<sup>th</sup>, 2016 the PMP450i 3GHz SM/BH MIMO Transceiver, Model 3082CHH, as provided from Cambium Networks, was tested to the requirements of CFR 47 Part 90 Subpart Z. 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

**FCC Registration: 90531**

**ISED Registration: 2060A-1 & 2060A-3**

## 4.0 Description of Test Sample

### Description:

Cambium Networks fixed outdoor frame based wireless transceiver with 17 dBi sector antenna. Tested with worst case highest channel bandwidth of 40 MHz and lowest channel bandwidth of 5 MHz. The 20 MHz channel bandwidth mode is available with an optional 19 dBi panel antenna.

### Type of Equipment / Frequency Range:

Stand-Alone / 3652.5 to 3697.5 MHz (5 MHz channel bandwidth)  
3660 to 3690 MHz (20 MHz channel bandwidth)  
3670 to 3680 MHz (40 MHz channel bandwidth)

### Physical Dimensions of Equipment Under Test:

Length: 10 in. Width: 5.25 in. Height: 3.5 in.



166 South Carter, Genoa City, WI 53128

Company: Cambium Networks  
Model Tested: 3082CHH  
Report Number: 22288  
DLS Project: 8420

#### 4.0 Description of Test Sample (continued):

##### Power Source:

56 VDC (Power Over Ethernet to Radio)  
120 Vac, 60 Hz using Cambium Networks model NET-P30-56IN power supply

##### Internal Frequencies:

55 kHz (Switching Power Supply Frequency)  
80 MHz, 50 MHz, 40 MHz, 25 MHz, 20 MHz

##### Transmit / Receive Frequencies Used For Test Purpose:

5 MHz Channel Bandwidth: Low channel: 3652.5 MHz, Middle channel: 3675 MHz,  
High channel: 3697.5 MHz

20 MHz Channel Bandwidth: Low channel: 3630 MHz, Middle channel: 3675 MHz,  
High channel: 3690 MHz

40 MHz Channel Bandwidth: Low channel: 3670 MHz, Middle channel: 3675 MHz,  
High channel: 3680 MHz

##### Type of Modulation(s):

QPSK (worst case) used for testing, 16QAM, 64QAM, 256QAM

##### Description of Circuit Board(s) / Part Number:

Cambium Networks PC Board	P007172 P21 PXP455 3GHz
2 x LMR 1 dB Cables	P006967
2 x N Female Connectors	NA
17 dBi Sector Antenna	A005297
19 dBi Panel Antenna	P0056559





166 South Carter, Genoa City, WI 53128

Company: Cambium Networks  
Model Tested: 3082CHH  
Report Number: 22288  
DLS Project: 8420

## 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.

### RADIATED EMISSIONS 30 – 1000 MHz

Description	Manufacturer	Model Number	Serial Number	Frequency Range	Cal Dates	Cal Due Dates
Receiver	Rohde & Schwarz	ESI 40	837808/005	20 Hz – 40 GHz	6-23-16	6-23-17
Low Pass Filter	Mini-Circuits	VLFX-1125	RUU92600920	DC-1.88GHz	6-3-16	6-3-17
Preamplifier	Rohde & Schwarz	TS-PR10	032001/005	9 kHz – 1 GHz	12-3-15	12-3-16
Antenna	EMCO	3104C	9701-4785	20 MHz – 200 MHz	2-16-16	2-16-17
Antenna	EMCO	3146	9702-4895	200 MHz – 1 GHz	2-4-16	2-4-17
Test Software	Rohde & Schwarz	ESK-1	V1.7.1	N/A	N/A	N/A

### AC LINE CONDUCTED

Description	Manufacturer	Model Number	Serial Number	Frequency Range	Cal Dates	Cal Due Dates
Receiver	Narda PMM	9010F	020WW40102	10Hz-50MHz	6-23-16	6-23-17
LISN	Solar	9252-50-R-24-BNC	961019	9 kHz – 30 MHz	5-4-16	5-4-17
Filter- High-Pass	SOLAR	7930-120	090702	120 kHz – 30 MHz	12-3-15	12-3-16
Limiter	Electro-Metrics	EM-7600	705	9 kHz – 30 MHz	12-3-15	12-3-16
Test Software	Narda PMM	PMM Emission Suite	Rel.2.17	N/A	N/A	N/A

### TELECOM PORT CONDUCTED

Description	Manufacturer	Model Number	Serial Number	Frequency Range	Cal Dates	Cal Due Dates
Receiver	Narda PMM	9010F	020WW40102	10Hz-50MHz	6-23-16	6-23-17
Filter- High-Pass	Solar	7930-120	885577	120 kHz – 30 MHz	12-3-15	12-3-16
Limiter	Electro-Metrics	EM-7600	705	9 kHz – 30 MHz	12-3-15	12-3-16
TLISN	Fischer Custom Communications	FCC-TLISN-T8-02	20638	150 kHz – 30 MHz	9-1-16	9-1-17
Test Software	Narda PMM	PMM Emission Suite	Rel.2.17	N/A	N/A	N/A



166 South Carter, Genoa City, WI 53128

Company:  
Model Tested:  
Report Number:  
DLS Project:

Cambium Networks  
3082CHH  
22288  
8420

## 5.0 Test Equipment (continued)

### RADIATED EMISSIONS 1-18 GHz

Description	Manufacturer	Model Number	Serial Number	Frequency Range	Cal Dates	Cal Due Dates
Receiver	Rohde & Schwarz	ESI 40	837808/006	20 Hz – 40 GHz	6-23-16	6-23-17
High Pass Filter	Q-Microwave	100462	2	4.2GHz-18GHz	9-23-16	9-23-17
Preamp	Ciao	CA118-4010	101	1GHz-18GHz	1-20-16	1-20-17
Horn Antenna	EMCO	3115	9502-4451	1-18GHz	6-1-15	6-1-17
Test Software	Rohde & Schwarz	ESK-1	V1.7.1	N/A	N/A	N/A

### Additional 18-40 GHz

Description	Manufacturer	Model Number	Serial Number	Frequency Range	Cal Dates	Cal Due Dates
High Pass Filter	K & L	50140 11SH10-18000/T40000-K-K	8	18GHz-40GHz	1-27-16	1-27-17
Preamp	Planar	PTB-60-2040-5R0-10-115VAC-292FF	PL3292	18GHz-40GHz	6-6-16	6-6-17
Horn Antenna	A.H. Systems	SAS-574	222	18GHz-40GHz	3-14-16	3-14-18
Test Software	Rohde & Schwarz	ESK-1	V1.7.1	N/A	N/A	N/A

### Temperature Chamber

Description	Manufacturer	Model Number	Serial Number	Frequency Range	Cal Dates	Cal Due Dates
Temperature Chamber	Test Equity	1007C	R035716	-73° C to +175° C	N/A	N/A
Digital Thermometer	Tenma	72-2060	723662	-50° C to +200° C	9-1-16	9-1-17
Digital Multimeter	Fluke	115	18741295	N/A	6-10-16	6-10-17



166 South Carter, Genoa City, WI 53128

Company: Cambium Networks  
Model Tested: 3082CHH  
Report Number: 22288  
DLS Project: 8420

## 5.0 Test Equipment (continued)

### RF Conducted

Description	Manufacturer	Model Number	Serial Number	Frequency Range	Cal Dates	Cal Due Dates
Receiver	Rohde & Schwarz	ESI 40	837808/006	20 Hz – 40 GHz	6-23-16	6-23-17
Thermal Power Sensor	Rohde & Schwarz	NRP-Z51	104290	DC-18GHz	6-24-16	6-24-17
Low Pass Filter	Mini-Circuits	VLFX-1125	RUU92600920	DC-1.88GHz	6-3-16	6-3-17
Attenuator 20 dB	Anritsu	42N50-20	000451	DC-18GHz	5-11-16	5-11-17
Attenuator 20 dB	MCE/WEINSCHL	5955A-20	0256	DC-40GHz	6-5-16	6-5-17

## 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 971168 D01: Power Meas License Digital Systems v02r02, unless otherwise noted. Description of procedures and measurements can be found in Appendix B – Measurement Data. See Appendix A for additional photos of the test set up. See Appendix C for measurement uncertainty.

### Radiated Emissions Measurement Arrangement:

All radiated emission measurements were performed at D.L.S. Electronic Systems, Inc. and set up according to FCC Publication KDB 971168 D01: Power Meas License Digital Systems v02r02, unless otherwise noted. Description of procedures and measurements can be found in Appendix B – Measurement Data. See Appendix A for additional photos of the test set up. See Appendix C for measurement uncertainty.

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



166 South Carter, Genoa City, WI 53128

Company:	Cambium Networks
Model Tested:	3082CHH
Report Number:	22288
DLS Project:	8420

## 7.0 Test Conditions

### Temperature and Humidity:

72°F at 67% RH

### Supply Voltage:

56 VDC (Power Over Ethernet to Radio)

120 Vac, 60 Hz using Cambium Networks model NET-P30-56IN power supply

## 8.0 Modifications Made To EUT For Compliance

None.

## 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.

Mode of operation: Measurements were taken for QPSK modulation (as worst case) at the lowest, middle, and highest channels of operation. Port A was tested as representative of Port B. Port A was equal to/or worst case over Port B per Cambium Networks. 5, 20 and 40 MHz channel bandwidths were tested. Continuous Transmit, Continuous Receive, and Continuous Scan modes were tested.

Emission Designators: 5M00X1D, 20M0X1D, 40M0X1D

## 10.0 Results

Measurements were performed in accordance with FCC Publication KDB 971168 D01: Power Meas License Digital Systems v02r02. Graphical and tabular data can be found in Appendix B at the end of this report.



166 South Carter, Genoa City, WI 53128

Company:	Cambium Networks
Model Tested:	3082CHH
Report Number:	22288
DLS Project:	8420

## 11.0 Conclusion

The PMP450i 3GHz SM/BH MIMO Transceiver, Model 3082CHH, as provided from Cambium Networks tested from September 2<sup>nd</sup> through October 19<sup>th</sup>, 2016 **meets** the requirements of CFR 47 Part 90 Subpart Z.



166 South Carter, Genoa City, WI 53128

Company:  
Model Tested:  
Report Number:  
DLS Project:

Cambium Networks  
3082CHH  
22288  
8420

## Appendix A – Test Photos

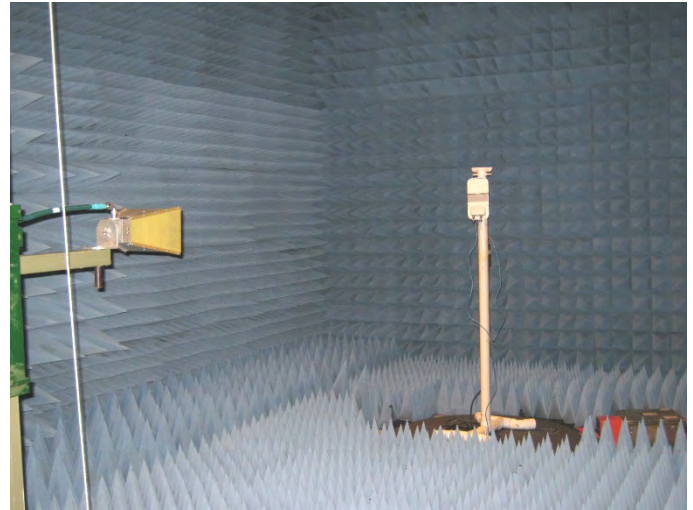
### Photo Information and Test Setup

- Item 0: PMP450i 3GHz SM/BH MIMO Transceiver
- Item 1: Cat 5e Power-Over-Ethernet cable. (2.2 meter un-shielded with plastic connectors)
- Item 2: Cat 5e Ethernet cable to remote computer. (10 meter un-shielded with plastic connectors)
- Item 3: Cambium Networks model NET-P30-56IN power supply

**RF Conducted**



**Radiated – above 1 GHz**



**Radiated – Below 1 GHz - front**



**Radiated – Below 1 GHz - back**





**Appendix A – Test Photos (continued)**

**AC line conducted**



**AC line conducted**



**AC line conducted**





166 South Carter, Genoa City, WI 53128

Company:	Cambium Networks
Model Tested:	3082CHH
Report Number:	22288
DLS Project:	8420

## Appendix B – Measurement Data

### B1.0 Duty Cycle of test unit

**Rule Part:** Informational

**Test Procedure:** FCC KDB 971168 D01: Power Meas License Digital Systems v02r02

**Limits:** Informational

**Results:** 5 MHz channel BW: Unit with SN: 0A003E45116A  
Duty cycle =  $(1.252505 \text{ ms}) / (2.494990 \text{ ms}) \times 100 = 50.2\%$   
Duty cycle correction for power measurements =  $10 \log (1/0.502) = \mathbf{3.00 \text{ dB}}$

20 MHz channel BW: Unit with SN: 0A003E45117F  
Duty cycle =  $(1.863727 \text{ ms}) / (2.505010 \text{ ms}) \times 100 = 74.4\%$   
Duty cycle correction for power measurements =  $10 \log (1/0.744) = \mathbf{1.28 \text{ dB}}$

40 MHz channel BW: Unit with SN: 0A003E45117F  
Duty cycle =  $(1.833667 \text{ ms}) / (2.515030 \text{ ms}) \times 100 = 72.9\%$   
Duty cycle correction for power measurements =  $10 \log (1/0.729) = \mathbf{1.37 \text{ dB}}$

**Notes:** None




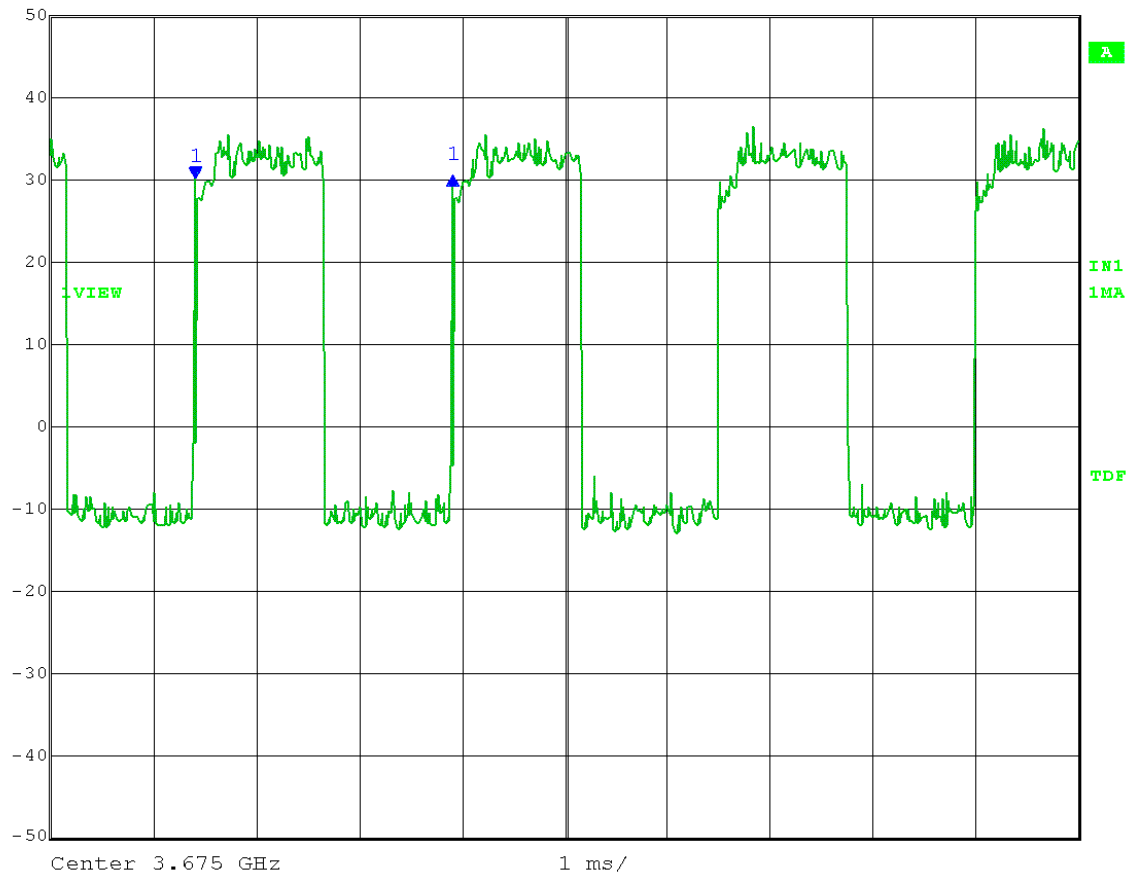
Test Date: 10-10-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45116A  
Test: Duty Cycle during testing  
Operator: Craig B

5 MHz channel bandwidth; QPSK

Comment: ON time = 1.252505 ms during 2.494990 ms cycle  
 $x = 1.252505 / 2.494990 = 0.5020080 = 50.2\%$   
**Duty cycle correction factor** =  $10\log(1/x) = 3.00 \text{ dB}$

ON + OFF time of 1 cycle = 2.494990 ms

	Max/Ref Lvl	Delta 1 [T1]	RBW	10 MHz	RF Att	40 dB
	50 dBm	0.25 dB	VBW	10 MHz		
	30 dBm	2.494990 ms	SWT	10 ms	Unit	dBm



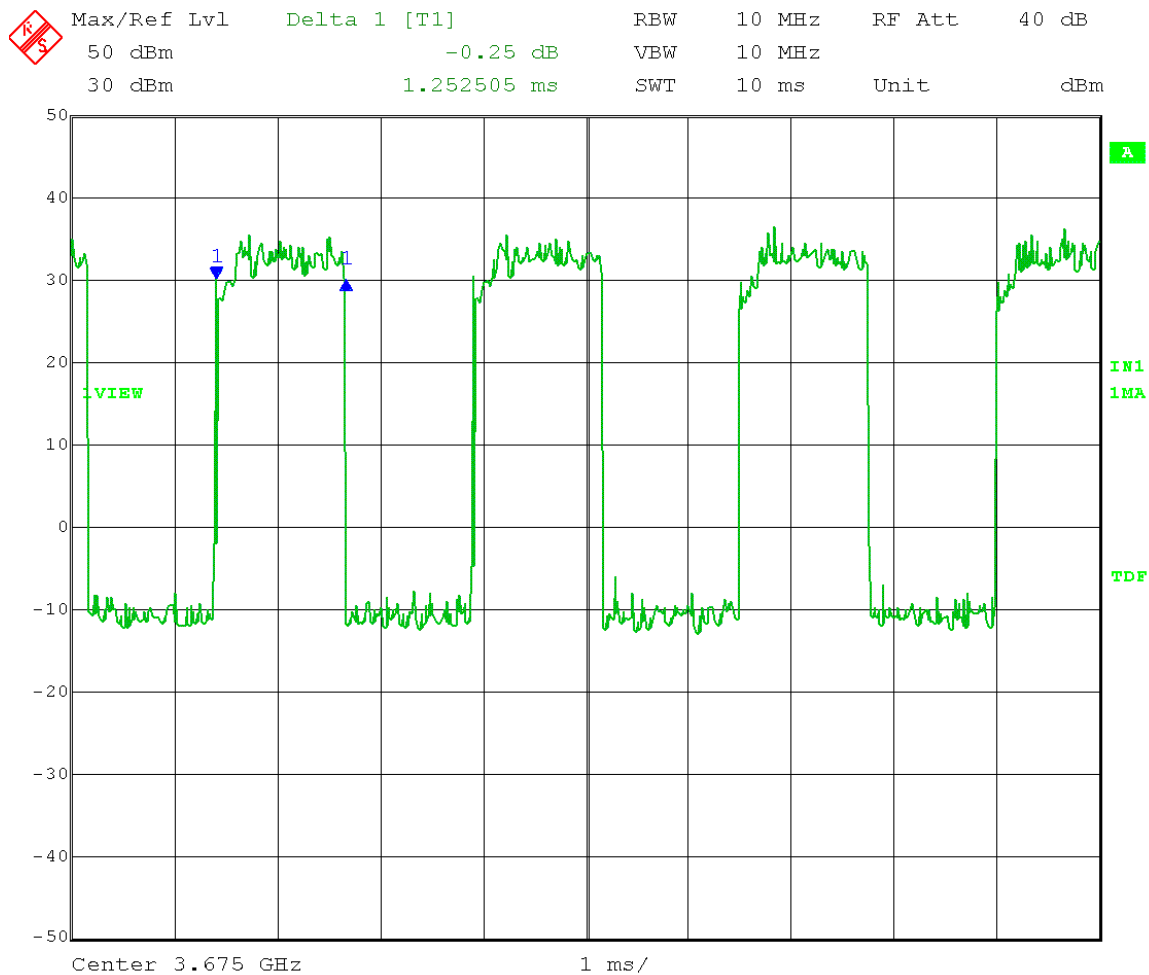
Date: 10.OCT.2016 14:28:03

Test Date: 10-10-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45116A  
Test: Duty Cycle during testing  
Operator: Craig B

5 MHz channel bandwidth; QPSK

Comment: ON time = 1.252505 ms during 2.494990 ms cycle  
 $x = 1.252505 / 2.494990 = 0.5020080 = 50.2\%$   
**Duty cycle correction factor =  $10\log(1/x) = 3.00$  dB**

ON time of 1 cycle = 1.252505 ms




Date: 10.OCT.2016 14:29:19

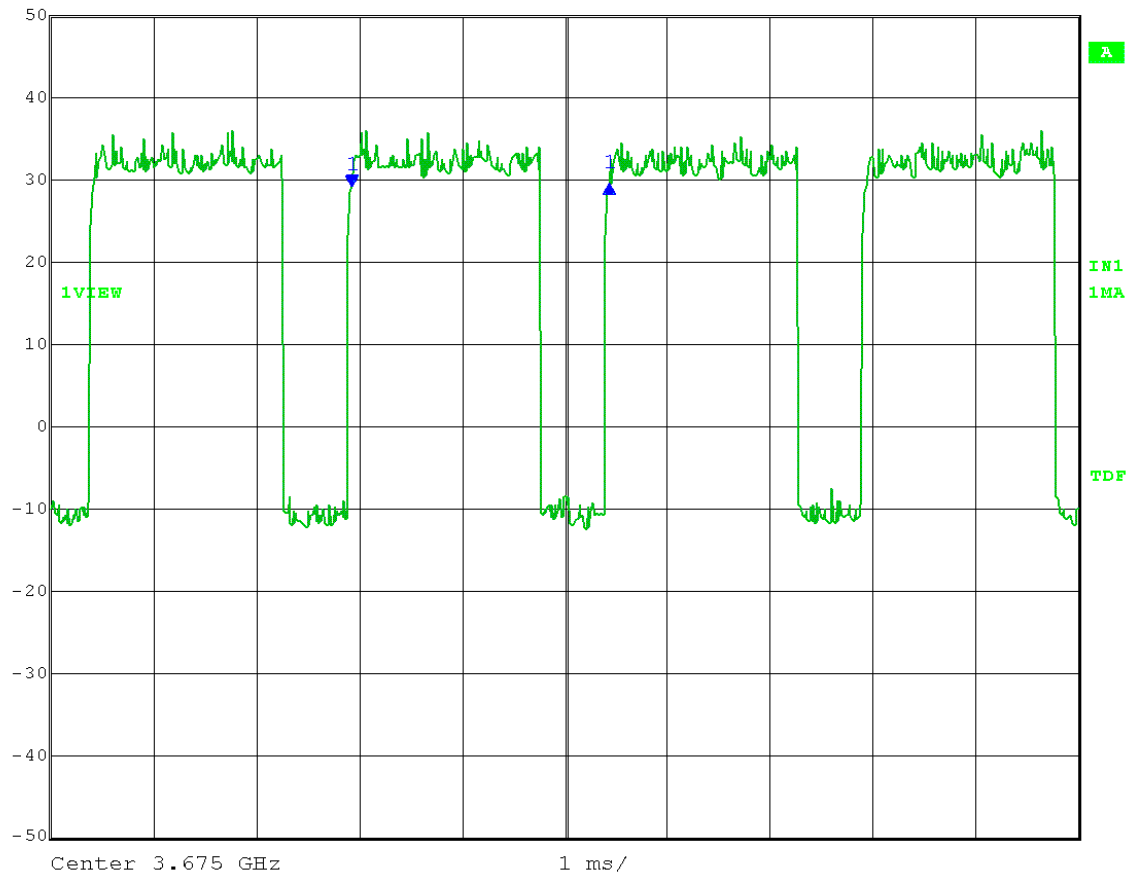
Test Date: 10-19-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45117F  
Test: Duty Cycle during testing  
Operator: Craig B

20 MHz channel bandwidth; QPSK

Comment: ON time = 1.843687 ms during 2.505010 ms cycle  
 $x = 1.843687 / 2.505010 = 0.7359999 = 73.6\%$   
**Duty cycle correction factor** =  $10\log(1/x) = 1.33 \text{ dB}$

ON + OFF time of 1 cycle = 2.505010 ms

	Max/Ref Lvl	Delta 1 [T1]	RBW	10 MHz	RF Att	40 dB
	50 dBm	0.12 dB	VBW	10 MHz		
	30 dBm	2.505010 ms	SWT	10 ms	Unit	dBm



Date: 19.OCT.2016 11:09:19

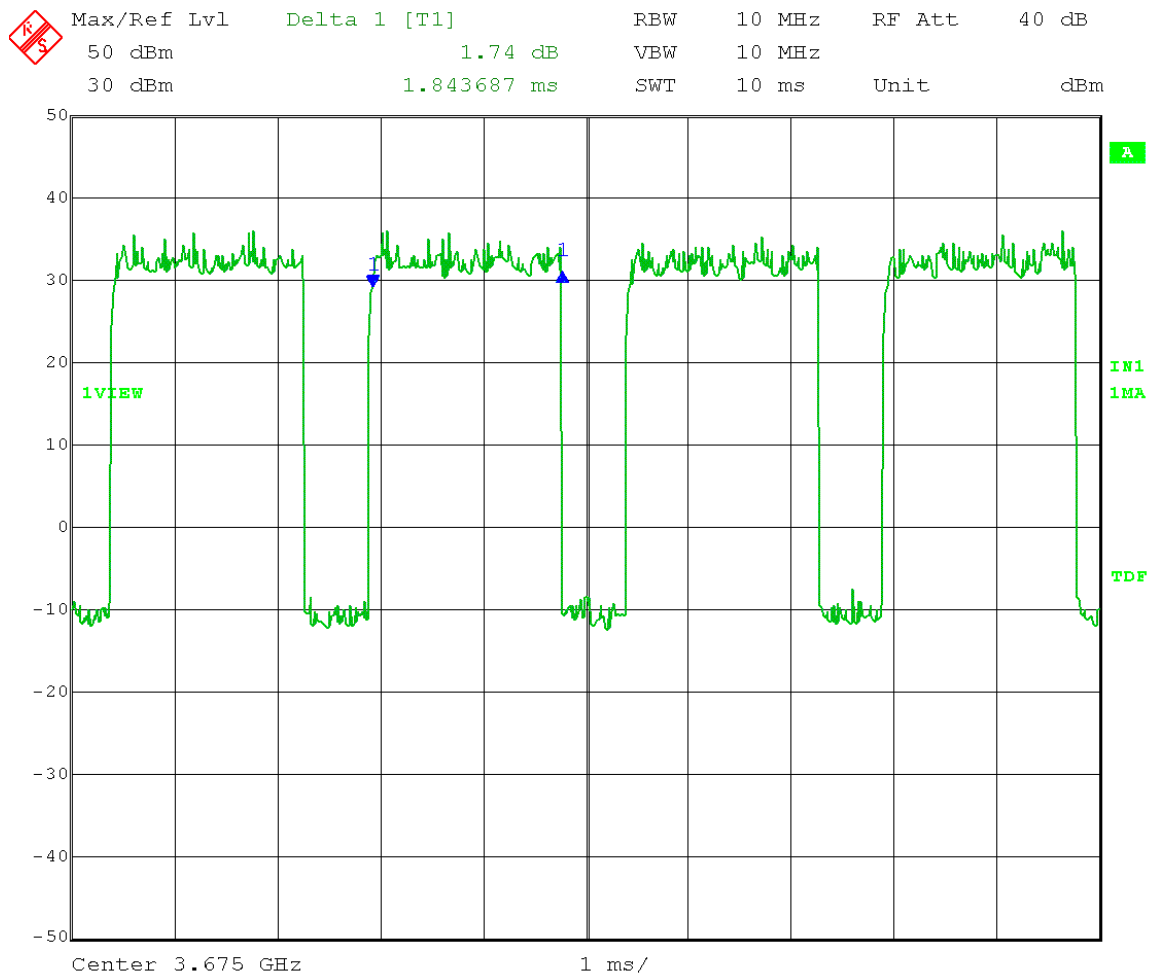
Test Date: 10-19-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45117F  
Test: Duty Cycle during testing  
Operator: Craig B

20 MHz channel bandwidth; QPSK

Comment: ON time = 1.843687 ms during 2.505010 ms cycle  
 $x = 1.843687 / 2.505010 = 0.7359999 = 73.6\%$

**Duty cycle correction factor** =  $10\log(1/x) = 1.33 \text{ dB}$

ON time of 1 cycle = 1.843687 ms

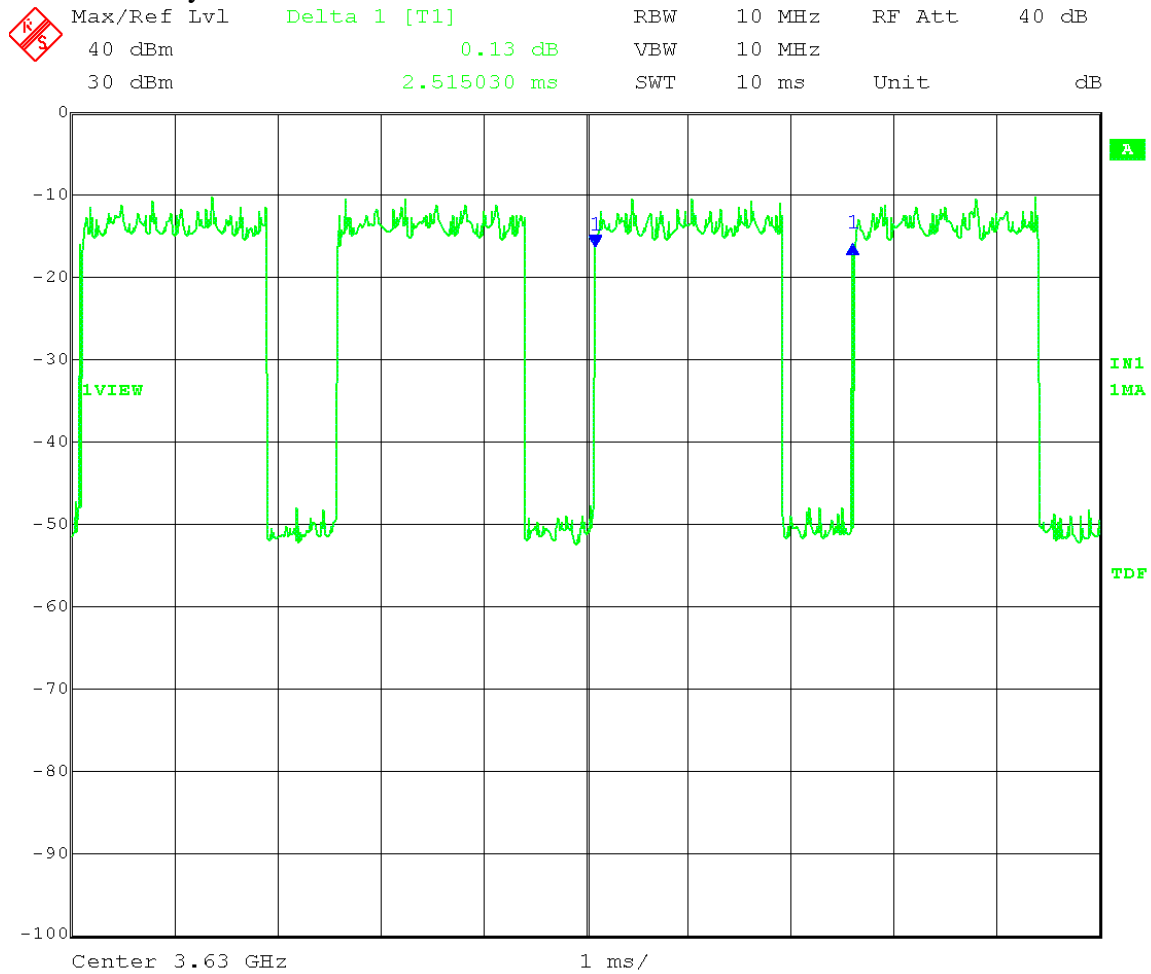


Date: 19.OCT.2016 11:10:23

Test Date: 10-18-2016  
 Company: Cambium Networks  
 EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45117F  
 Test: Duty Cycle during testing  
 Operator: Craig B  
 40 MHz channel bandwidth; QPSK  
 Comment: Duty cycle = (1.833667 ms) / (2.515030 ms) x 100 = 72.9%

Duty cycle correction for power measurements =  $10 \log (1/0.729) = 1.37 \text{ dB}$

Time of one cycle: 2.515030 ms

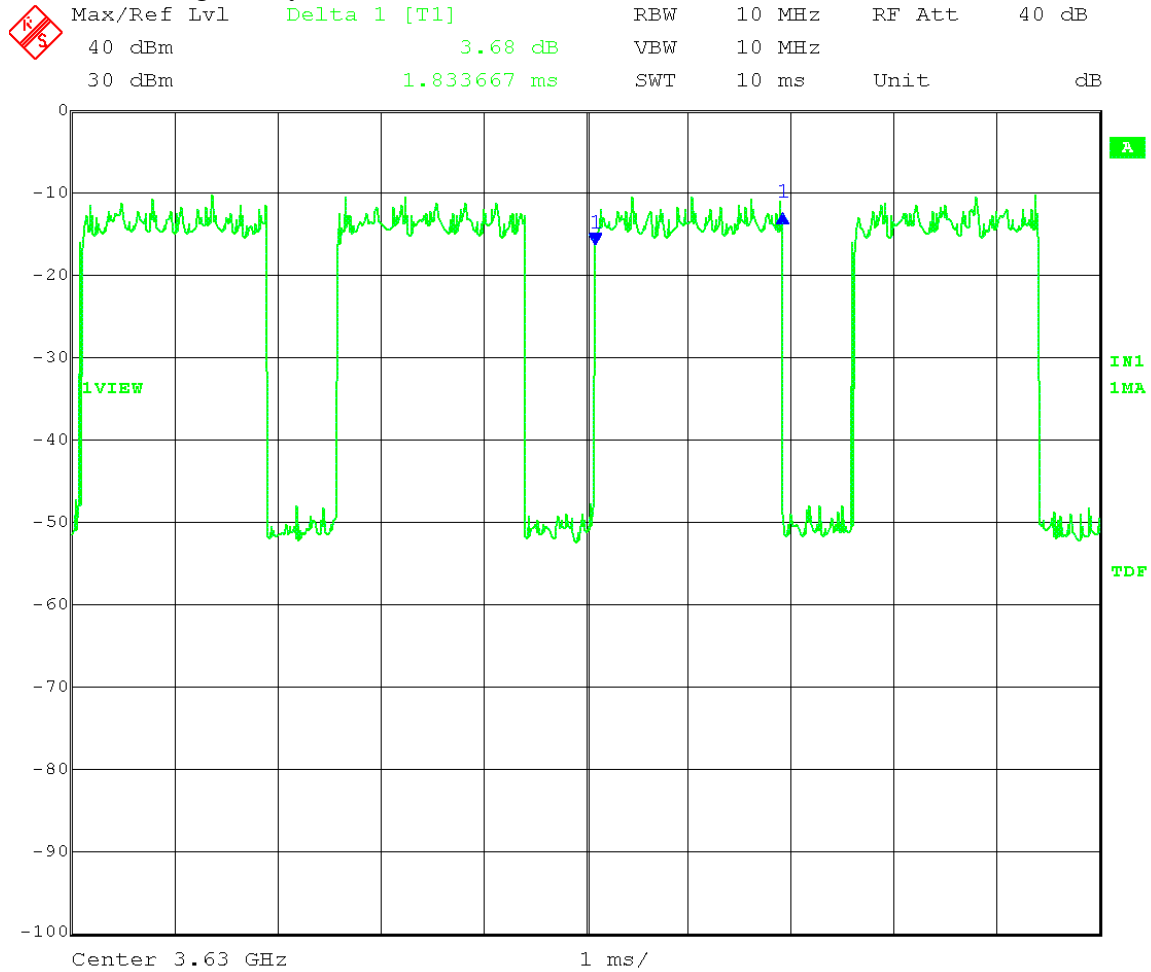


Date: 18.OCT.2016 09:21:50

Test Date: 10-18-2016  
 Company: Cambium Networks  
 EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45117F  
 Test: Duty Cycle during testing  
 Operator: Craig B  
 40 MHz channel bandwidth; QPSK  
 Comment: Duty cycle = (1.833667 ms) / (2.515030 ms) x 100 = 72.9%

Duty cycle correction for power measurements =  $10 \log (1/0.729) = 1.37 \text{ dB}$

ON time during one cycle: 1.833667 ms



Date: 18.OCT.2016 09:22:31



166 South Carter, Genoa City, WI 53128

Company:	Cambium Networks
Model Tested:	3082CHH
Report Number:	22288
DLS Project:	8420

## Appendix B – Measurement Data

### B2.0 Transmitter Output Power and Power Density

**Rule Part:** FCC Part 90.1321(a)  
FCC Part 2.1046

**Test Procedure:** FCC KDB 971168 D01: Power Meas License Digital Systems v02r02  
Section 5.2.3 – Average power meter

The EUT was connected to a broadband power meter with a thermal sensor through a cable and 20 dB attenuator. The output power was measured and recorded.  
An offset was used on the power meter to compensate for cables, connectors, and attenuator.

**Limit:** FCC Part 90.1321(a), base and fixed stations  
e.i.r.p.: 25 W (44 dBm) in any 25 MHz bandwidth  
e.i.r.p.: 1 W (30 dBm) in any 1 MHz bandwidth

**Results:** Compliant

**Notes:** Only tested QPSK modulation mode as determined worst case by Cambium Networks. Only tested output port A as determined worst case by Cambium Networks.

Test Date: 10-10-2016  
 Company: Cambium Networks  
 EUT: PMP450i 3.65 GHz SM/BH Transmitter SN: 0A003E45116A  
 Tests: Maximum E.I.R.P.  
 Operator: Craig B  
 Comment: 5 MHz channel BW mode; Port A  
 Antenna Gain = 17 dBi  
 Recorded levels are measured RF conducted levels + 17 dBi antenna gain  
 + 3 dB (2-port MIMO operation) + 3 dB (correction for duty cycle)

EIRP Limit: 25 W / 25 MHz; 1 W / 1 MHz  
 = 44 dBm / 25 MHz; 30 dBm / 1 MHz

RBW = 1 MHz; VBW = 3 MHz; **Detector = RMS**  
 Trace mode = max hold; **Sweep time = 10 seconds per Cambium Networks**  
 Span = 1.5 x nominal channel bandwidth  
 Measurement using peak-search function of spectrum analyzer

Band power integrated over a 25 MHz bandwidth for EIRP / 25 MHz measurement  
 (span = 30 MHz)

Peak EIRP Power (dBm): **Low channel (3652.5 MHz)**

Power setting **18** (15 per chain)

Modulation Type	120 V +20 °C	
QPSK	EIRP / 25 MHz	EIRP / 1 MHz
	35.95	29.92

Peak EIRP Power (dBm): **Mid channel (3675 MHz)**

Power setting **18** (15 per chain)

Modulation Type	120 V +20 °C	
QPSK	EIRP / 25 MHz	EIRP / 1 MHz
	35.95	29.95

Peak EIRP Power (dBm): **High channel (3697.5 MHz)**

Power setting **18** (15 per chain)

Modulation Type	120 V +20 °C	
QPSK	EIRP / 25 MHz	EIRP / 1 MHz
	35.91	29.88



Test Date: 10-19-2016  
 Company: Cambium Networks  
 EUT: PMP450i 3.65 GHz SM/BH Transmitter SN: 0A003E45117F  
 Tests: Maximum E.I.R.P.  
 Operator: Craig B  
 Comment: 20 MHz channel BW mode; Port A  
 Antenna Gain = 17 dBi  
 Recorded levels are measured RF conducted levels + 17 dBi antenna gain  
 + 3 dB (2-port MIMO operation) + 1.33 dB (correction for duty cycle)

EIRP Limit: 25 W / 25 MHz; 1 W / 1 MHz  
 = 44 dBm / 25 MHz; 30 dBm / 1 MHz

RBW = 1 MHz; VBW = 3 MHz; **Detector = RMS**  
 Trace mode = max hold; **Sweep time = 10 seconds per Cambium Networks**  
 Span = 1.5 x nominal channel bandwidth  
 Measurement using peak-search function of spectrum analyzer

Band power integrated over a 25 MHz bandwidth for EIRP / 25 MHz measurement  
 (span = 30 MHz)

Peak EIRP Power (dBm): **Low channel (3660 MHz)**

Power setting 22 (19 per chain)

Modulation Type	120 V +20 °C	
QPSK	EIRP / 25 MHz	EIRP / 1 MHz
	39.83	28.00

Peak EIRP Power (dBm): **Mid channel (3675 MHz)**

Power setting 25 (22 per chain)

Modulation Type	120 V +20 °C	
QPSK	EIRP / 25 MHz	EIRP / 1 MHz
	41.88	29.98

Peak EIRP Power (dBm): **High channel (3690 MHz)**

Power setting 25 (22 per chain)

Modulation Type	120 V +20 °C	
QPSK	EIRP / 25 MHz	EIRP / 1 MHz
	41.83	29.89

Test Date: 10-20-2016  
 Company: Cambium Networks  
 EUT: PMP450i 3.65 GHz SM/BH Transmitter SN: 0A003E45117F  
 Tests: Maximum E.I.R.P.  
 Operator: Craig B  
 Comment: 20 MHz channel BW mode; Port A  
**Antenna Gain = 19 dBi – 1 dB (Cambium cable from EUT to antenna) = 18 dBi**  
 Recorded levels are measured RF conducted levels + 19 dBi antenna gain – 1 dB (cable loss from EUT to antenna) + 3 dB (2-port MIMO operation) + 1.33 dB (correction for duty cycle)

EIRP Limit: 25 W / 25 MHz; 1 W / 1 MHz  
 = 44 dBm / 25 MHz; 30 dBm / 1 MHz

RBW = 1 MHz; VBW = 3 MHz; **Detector = RMS**  
 Trace mode = max hold; **Sweep time = 10 seconds per Cambium Networks**  
 Span = 1.5 x nominal channel bandwidth  
 Measurement using peak-search function of spectrum analyzer

Band power integrated over a 25 MHz bandwidth for EIRP / 25 MHz measurement (span = 30 MHz)

Peak EIRP Power (dBm): **Low channel (3660 MHz)**  
 Power setting 22 (19 per chain)

Modulation Type	120 V +20 °C	
QPSK	EIRP / 25 MHz	EIRP / 1 MHz
	40.83	29.00

Peak EIRP Power (dBm): **Mid channel (3675 MHz)**  
 Power setting 23 (20 per chain)

Modulation Type	120 V +20 °C	
QPSK	EIRP / 25 MHz	EIRP / 1 MHz
	41.54	29.87

Peak EIRP Power (dBm): **High channel (3690 MHz)**  
 Power setting 23 (20 per chain)

Modulation Type	120 V +20 °C	
QPSK	EIRP / 25 MHz	EIRP / 1 MHz
	41.57	29.75

Test Date: 10-19-2016  
 Company: Cambium Networks  
 EUT: PMP450i 3.65 GHz SM/BH Transmitter SN: 0A003E45117F  
 Tests: Maximum E.I.R.P.  
 Operator: Craig B  
 Comment: 40 MHz channel BW mode; Port A  
 Antenna Gain = 17 dBi  
 Recorded levels are measured RF conducted levels + 17 dBi antenna gain  
 + 3 dB (2-port MIMO operation) + 1.37 dB (correction for duty cycle)

EIRP Limit: 25 W / 25 MHz; 1 W / 1 MHz  
 = 44 dBm / 25 MHz; 30 dBm / 1 MHz

RBW = 1 MHz; VBW = 3 MHz; **Detector = RMS**  
 Trace mode = max hold; **Sweep time = 10 seconds per Cambium Networks**  
 Span = 1.5 x nominal channel bandwidth  
 Measurement using peak-search function of spectrum analyzer

Band power integrated over a 25 MHz bandwidth for EIRP / 25 MHz measurement  
 (span = 60 MHz)

Peak EIRP Power (dBm): **Low channel (3670 MHz)**

Power setting 11 (8 per chain)

Modulation Type	120 V +20 °C	
QPSK	EIRP / 25 MHz	EIRP / 1 MHz
	28.21	15.25

Peak EIRP Power (dBm): **Mid channel (3675 MHz)**

Power setting 24 (21 per chain)

Modulation Type	120 V +20 °C	
QPSK	EIRP / 25 MHz	EIRP / 1 MHz
	41.10	28.14

Peak EIRP Power (dBm): **High channel (3680 MHz)**

Power setting 13 (10 per chain)

Modulation Type	120 V +20 °C	
QPSK	EIRP / 25 MHz	EIRP / 1 MHz
	30.06	16.93



166 South Carter, Genoa City, WI 53128

Company:	Cambium Networks
Model Tested:	3082CHH
Report Number:	22288
DLS Project:	8420

## Appendix B – Measurement Data

### B3.0 Channel Bandwidth

**Rule Part:** FCC Part 2.1049

**Test Procedure:** FCC KDB 971168 D01: Power Meas License Digital Systems v02r02  
Section 4.2 – power bandwidth (99%)

**Limit:** Informational

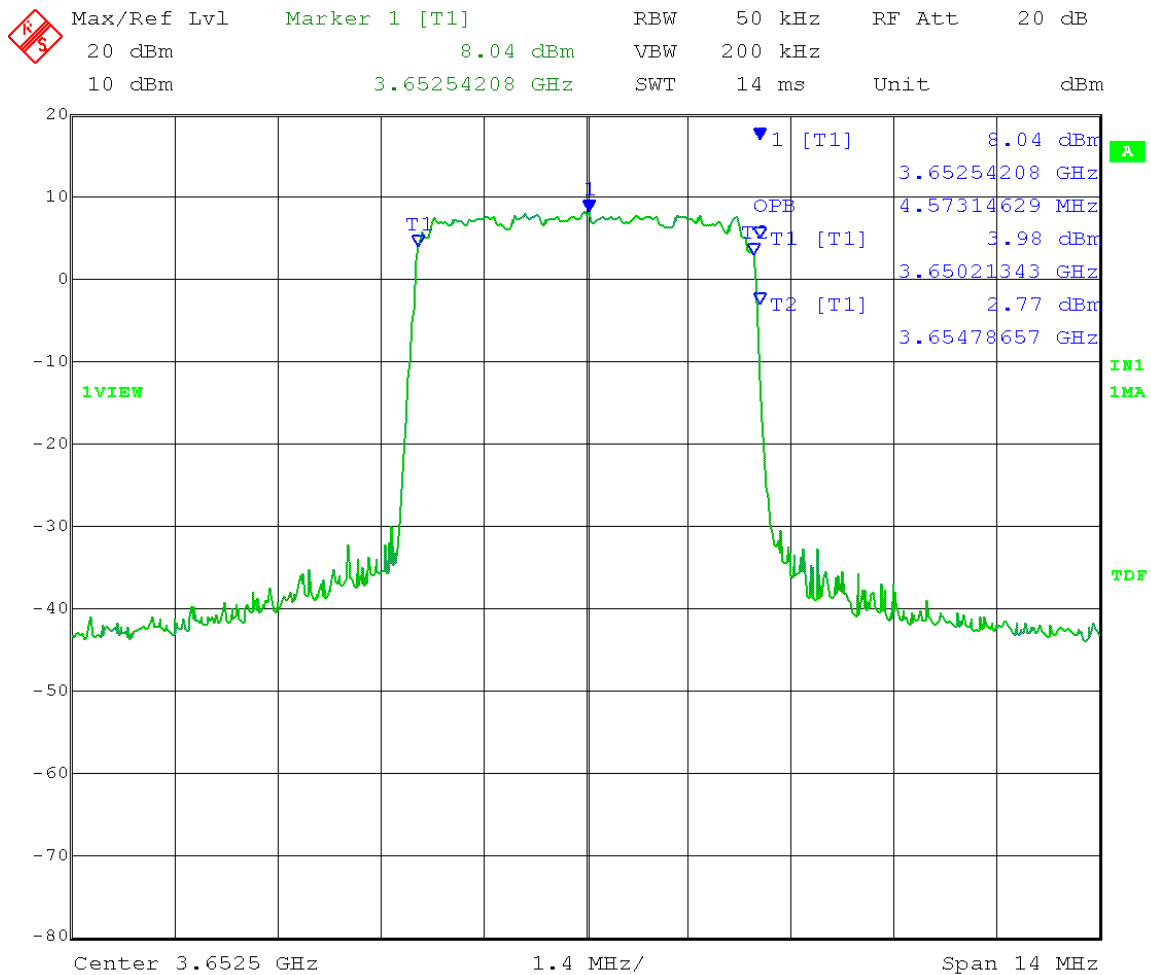
**Results:** 5 MHz channel measured 4.55 MHz  
20 MHz channel measured 18.22 MHz  
40 MHz channel measured 36.55 MHz

**Notes:** Only tested QPSK modulation mode as determined worst case by Cambium Networks. Only tested output port A as determined worst case by Cambium Networks.

Test Date: 10-10-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45116A  
Test: Occupied Bandwidth (99% power) - Conducted  
Operator: Craig B

Comment: **Low Channel: Transmit = 3652.5 MHz**  
Output power setting: 18 (15 per chain) 5 MHz channel BW  
Output port A Modulation: QPSK

Occupied Bandwidth = 4.57 MHz

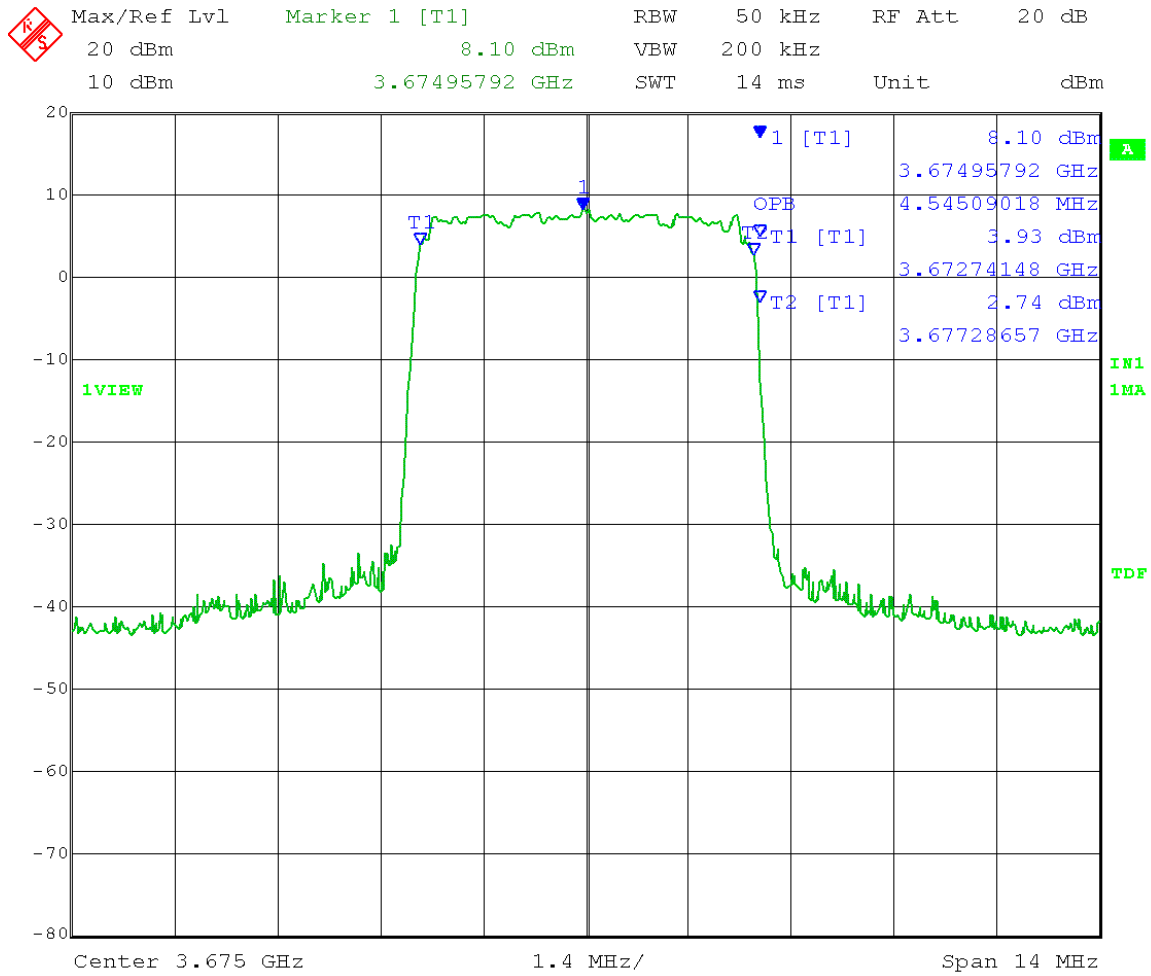


Date: 10.OCT.2016 15:27:28

Test Date: 10-10-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45116A  
Test: Occupied Bandwidth (99% power) - Conducted  
Operator: Craig B

Comment: **Mid Channel: Transmit = 3675 MHz**  
Output power setting: 18 (15 per chain) 5 MHz channel BW  
Output port A Modulation: QPSK

Occupied Bandwidth = 4.55 MHz

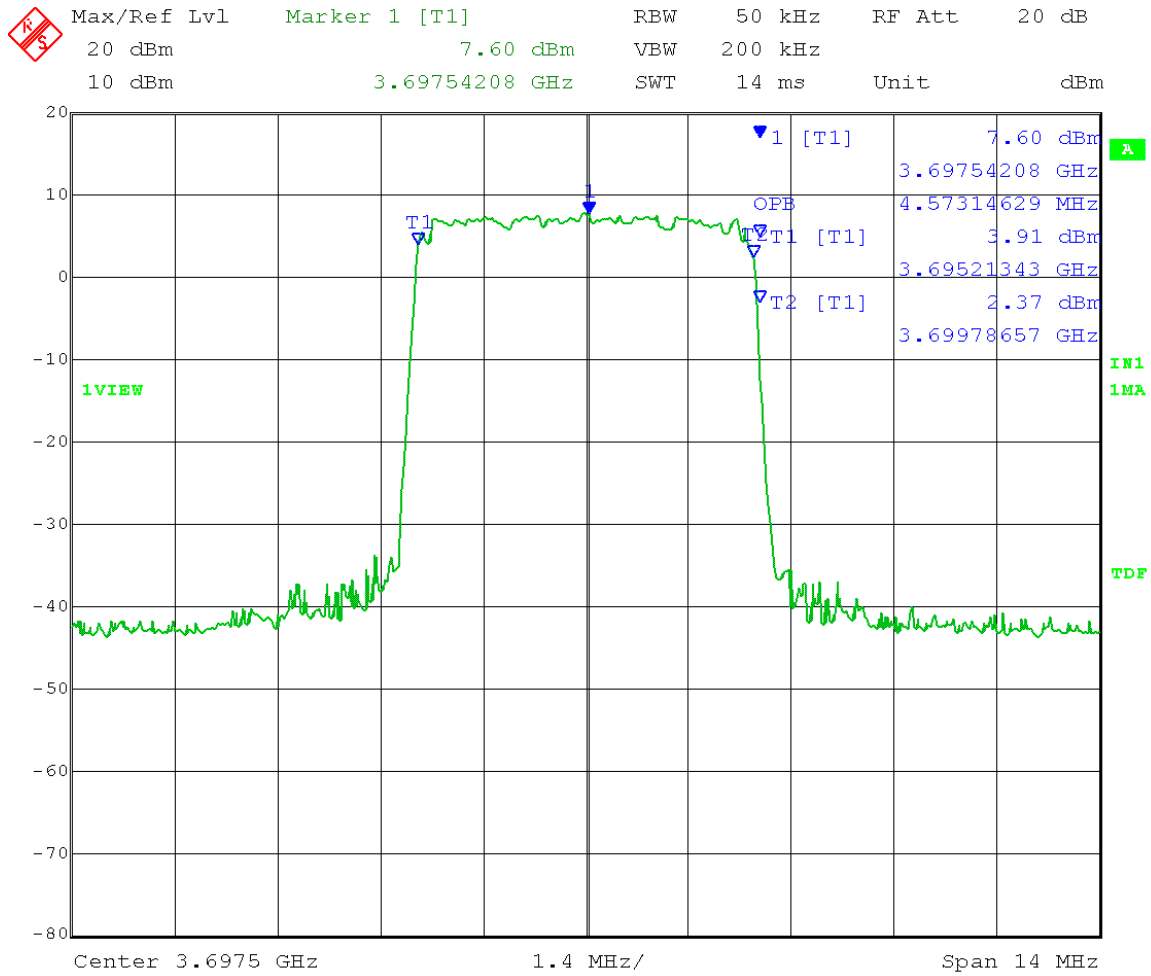


Date: 10.OCT.2016 15:31:15

Test Date: 10-10-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45116A  
Test: Occupied Bandwidth (99% power) - Conducted  
Operator: Craig B

Comment: High Channel: Transmit = 3697.5 MHz  
Output power setting: 18 (15 per chain) 5 MHz channel BW  
Output port A Modulation: QPSK

Occupied Bandwidth = 4.57 MHz

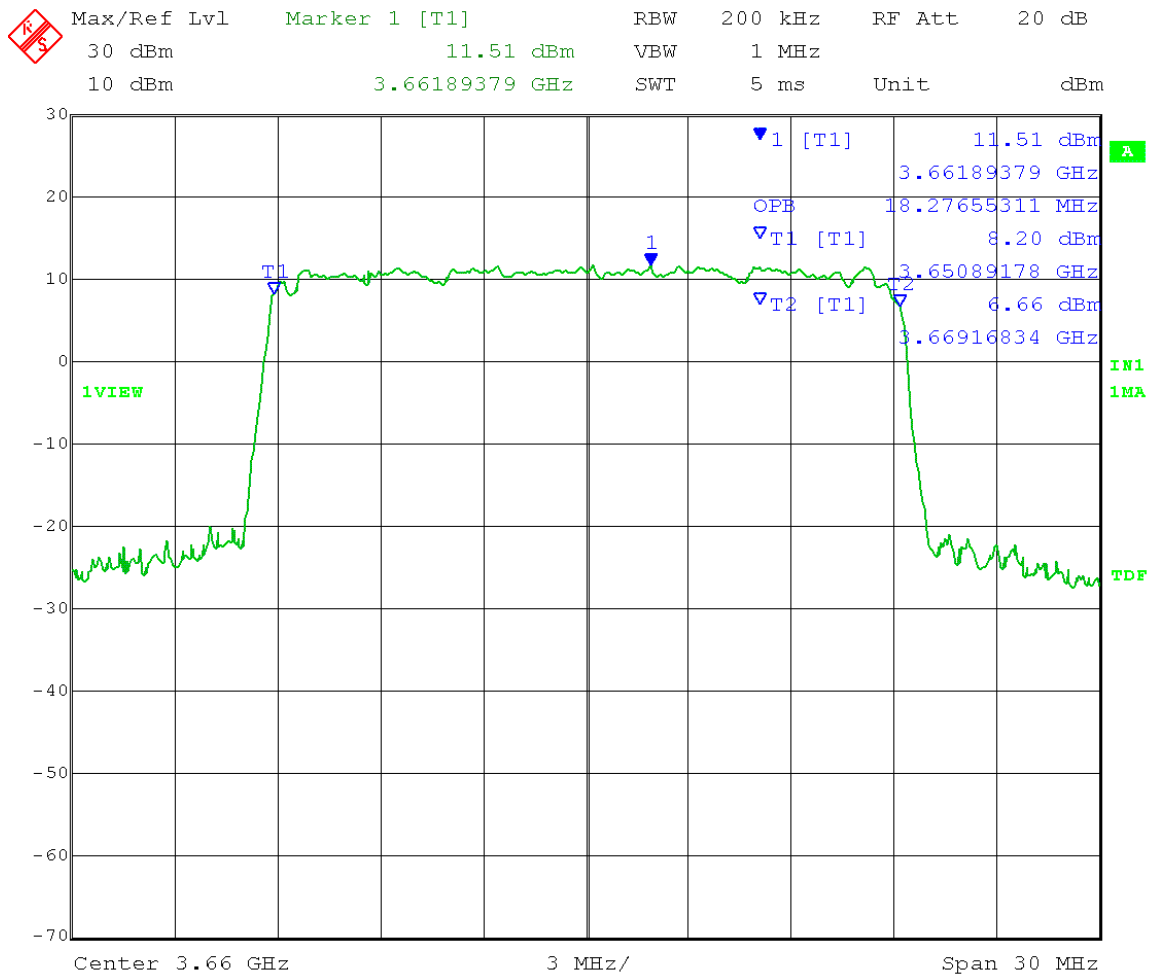


Date: 10.OCT.2016 15:22:29

Test Date: 10-19-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45117F  
Test: Occupied Bandwidth (99% power) - Conducted  
Operator: Craig B

Comment: **Low Channel: Transmit = 3660 MHz**  
Output power setting: 22 (19 per chain) 20 MHz channel BW  
Output port A Modulation: QPSK

Occupied Bandwidth = 18.28 MHz



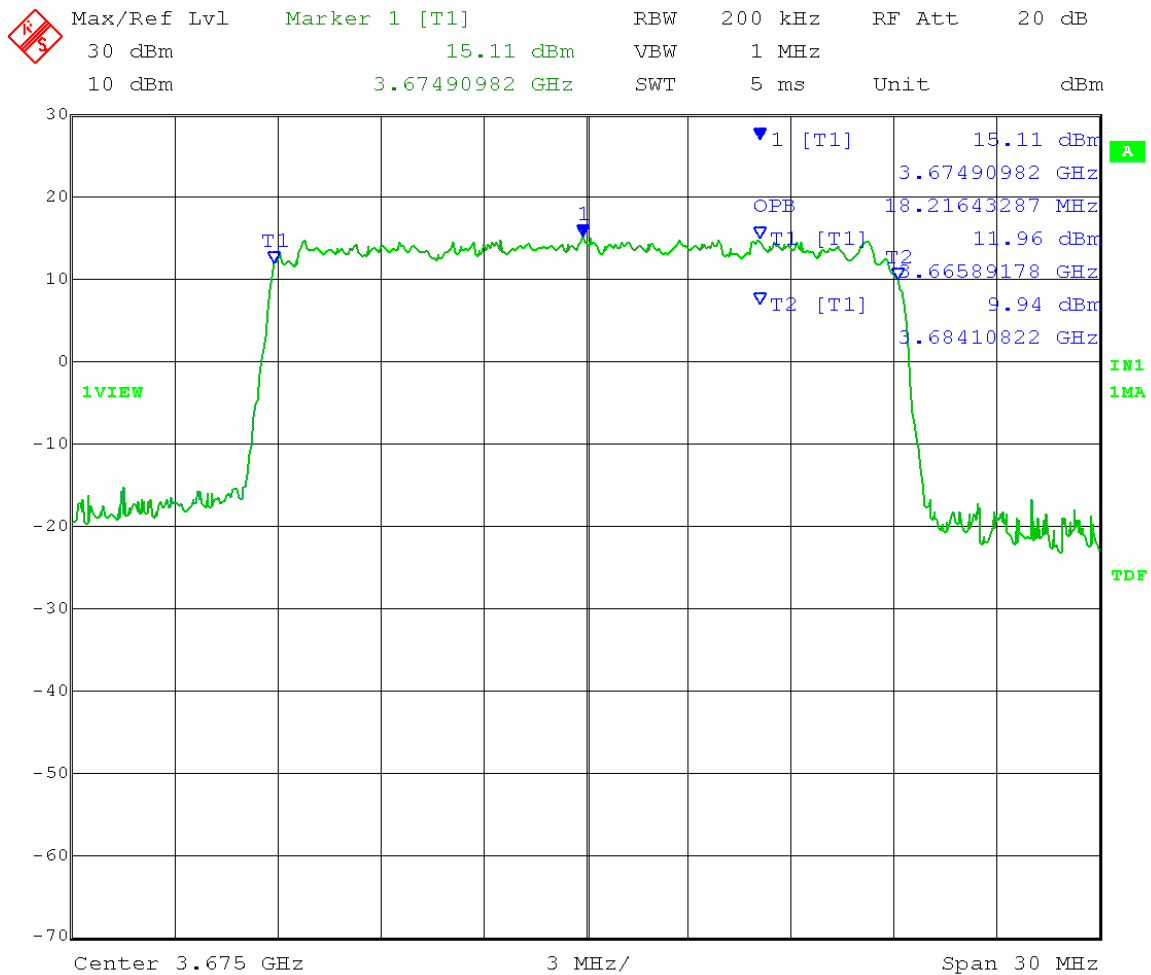
Date: 19.OCT.2016 13:58:20



Test Date: 10-19-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45117F  
Test: Occupied Bandwidth (99% power) - Conducted  
Operator: Craig B

Comment: **Mid Channel: Transmit = 3675 MHz**  
Output power setting: 25 (22 per chain) 20 MHz channel BW  
Output port A Modulation: QPSK

Occupied Bandwidth = 18.22 MHz

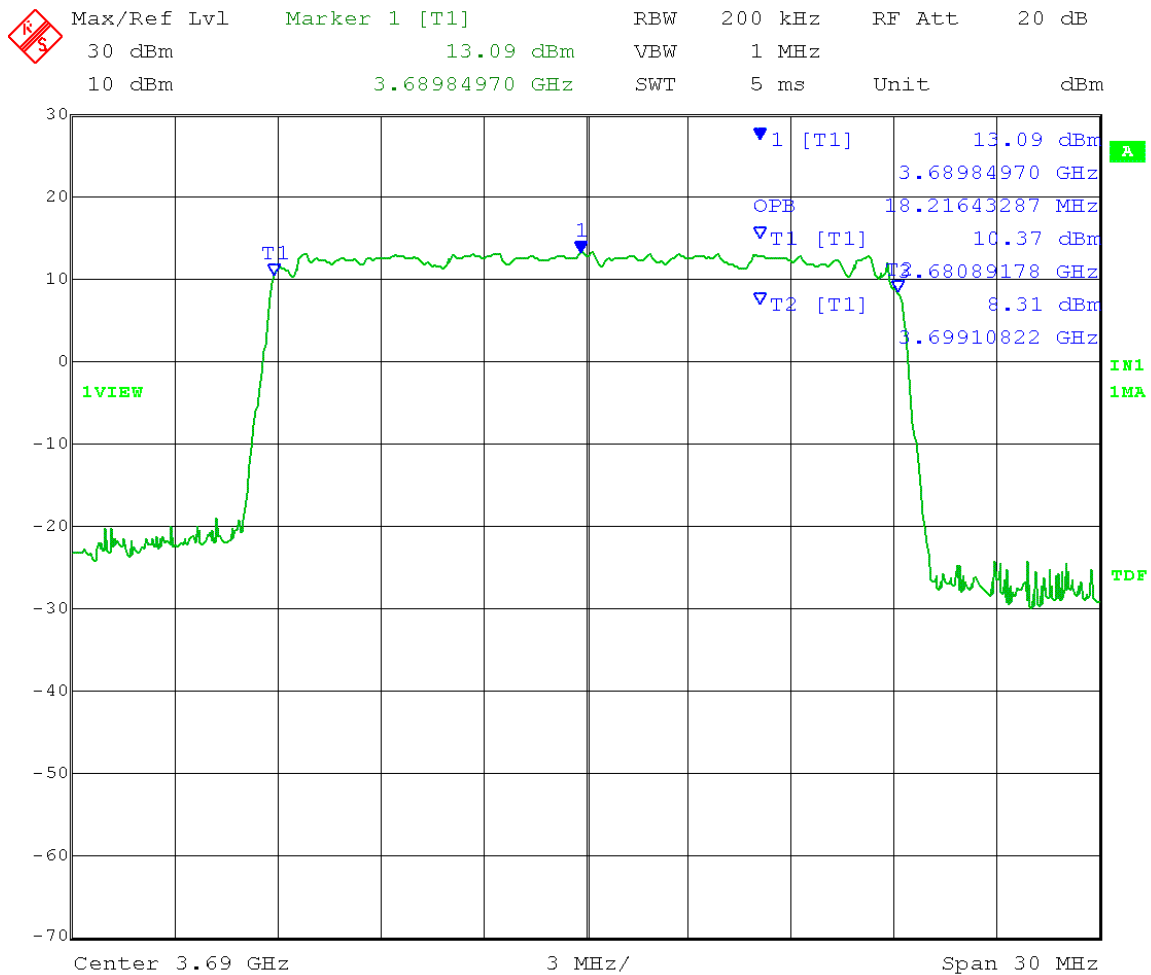


Date: 19.OCT.2016 13:54:11

Test Date: 10-19-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45117F  
Test: Occupied Bandwidth (99% power) - Conducted  
Operator: Craig B

Comment: High Channel: Transmit = 3690 MHz  
Output power setting: 25 (22 per chain) 20 MHz channel BW  
Output port A Modulation: QPSK

Occupied Bandwidth = 18.22 MHz

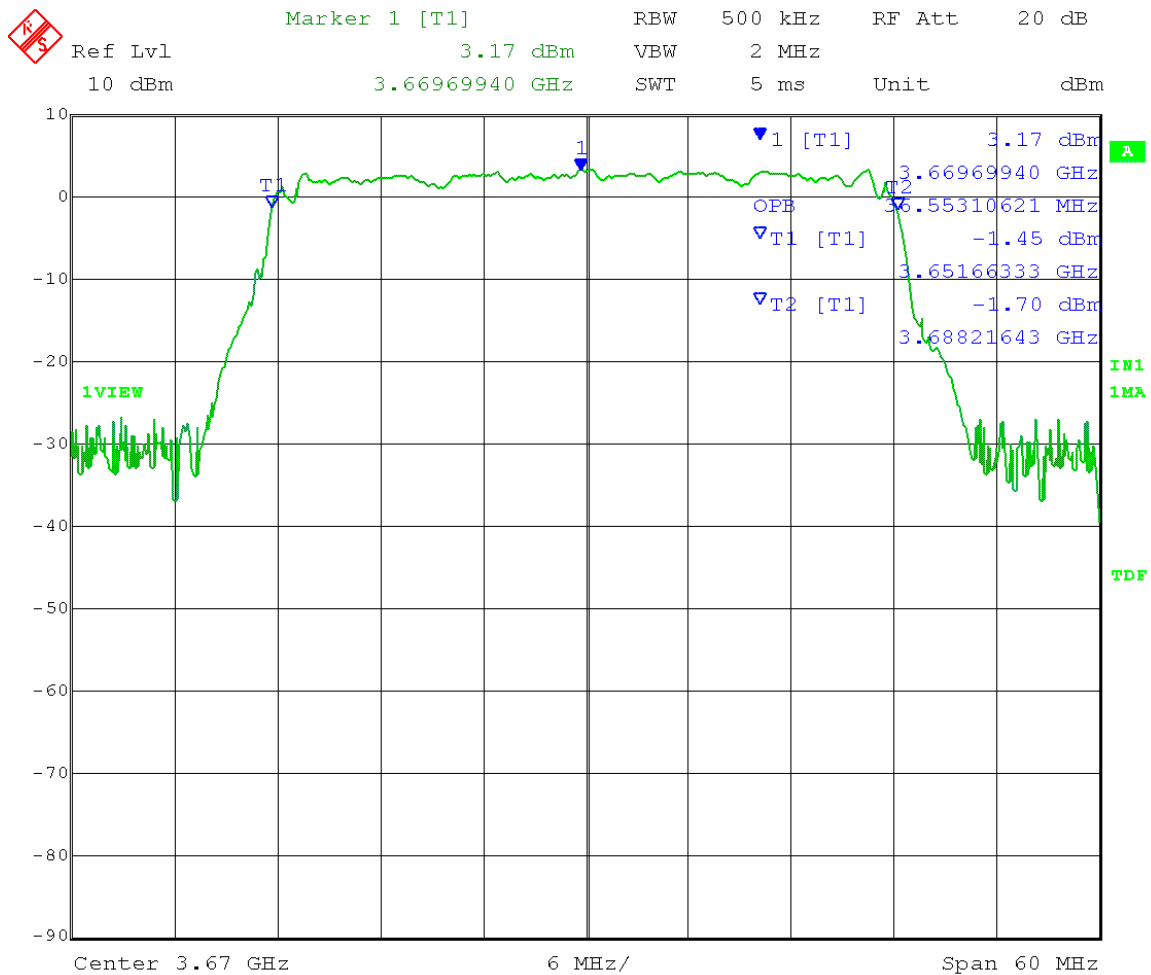


Date: 19.OCT.2016 13:50:02

Test Date: 10-19-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45117F  
Test: Occupied Bandwidth (99% power) - Conducted  
Operator: Craig B

Comment: **Low Channel: Transmit = 3670 MHz**  
Output power setting: 11 (8 per chain) 40 MHz channel BW  
Output port A Modulation: QPSK

Occupied Bandwidth = 36.55 MHz

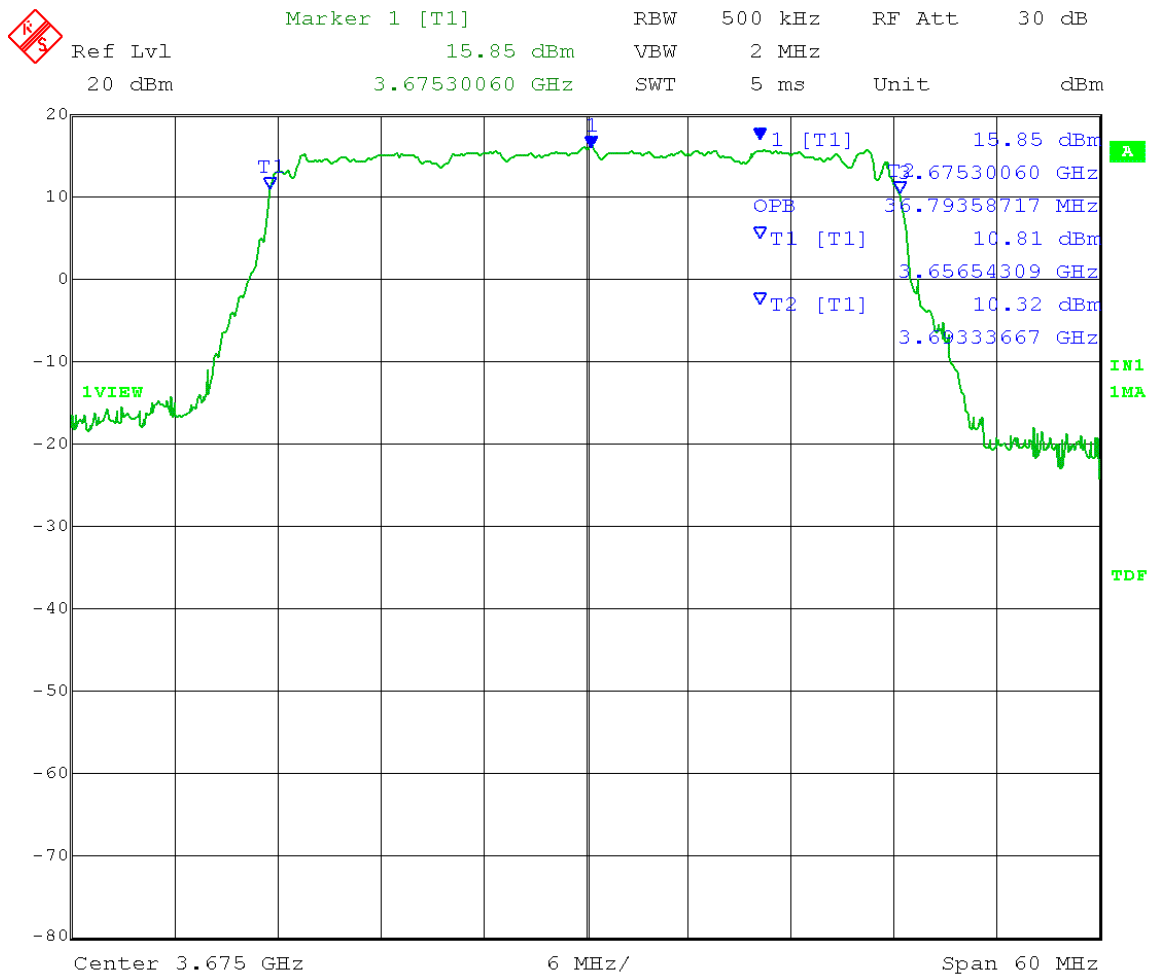


Date: 19.OCT.2016 09:18:28

Test Date: 10-19-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45117F  
Test: Occupied Bandwidth (99% power) - Conducted  
Operator: Craig B

Comment: **Mid Channel: Transmit = 3675 MHz**  
Output power setting: 24 (21 per chain) 40 MHz channel BW  
Output port A Modulation: QPSK

Occupied Bandwidth = 36.79 MHz

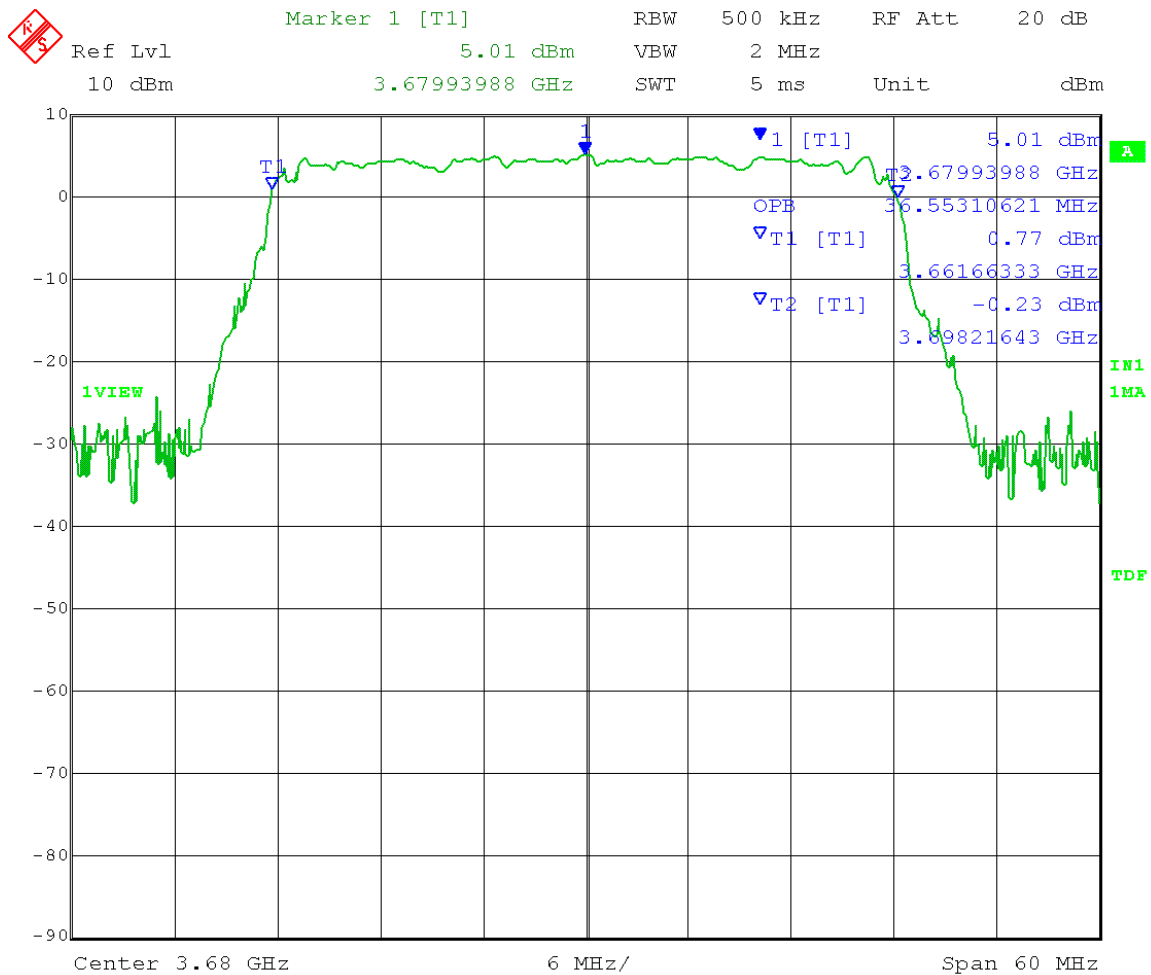


Date: 19.OCT.2016 09:22:45

Test Date: 10-19-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45117F  
Test: Occupied Bandwidth (99% power) - Conducted  
Operator: Craig B

Comment: High Channel: Transmit = 3680 MHz  
Output power setting: 13 (10 per chain) 40 MHz channel BW  
Output port A Modulation: QPSK

Occupied Bandwidth = 36.55 MHz



Date: 19.OCT.2016 09:26:34



166 South Carter, Genoa City, WI 53128

Company:	Cambium Networks
Model Tested:	3082CHH
Report Number:	22288
DLS Project:	8420

## Appendix B – Measurement Data

### B4.0 Band Edge compliance – RF Conducted

**Rule Part:** FCC Part 90.1323  
FCC Part 2.1051

**Test Procedure:** FCC KDB 971168 D01: Power Meas License Digital Systems v02r02  
Section 6.0 – at Antenna Terminals

The EUT was connected to a spectrum analyzer through a cable and 20 dB attenuator.  
The output power set to the same level as was used in the Transmitter Output Power test.

**Limit:** FCC Part 90.1323  
The power of any emission outside the frequency band 3650-3700 MHz shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log_{10} (P)$  dB, where P is measured in watts.

**Sample calculation:** Measured mean output power of one port = 22.04 dBm.  
 $22.04 \text{ dBm} + 17 \text{ dBi antenna gain} + 3 \text{ dB (because there are 2 output ports)}$   
 $= 42.04 \text{ dBm} = 15.996 \text{ Watts}$   
 $\text{Limit (dBc)} = 43 + 10 \log (15.996) = 55.04 \text{ dB}$   
 $42.04 \text{ dBm} - 55.04 \text{ dB} = \mathbf{-13 \text{ dBm}}$

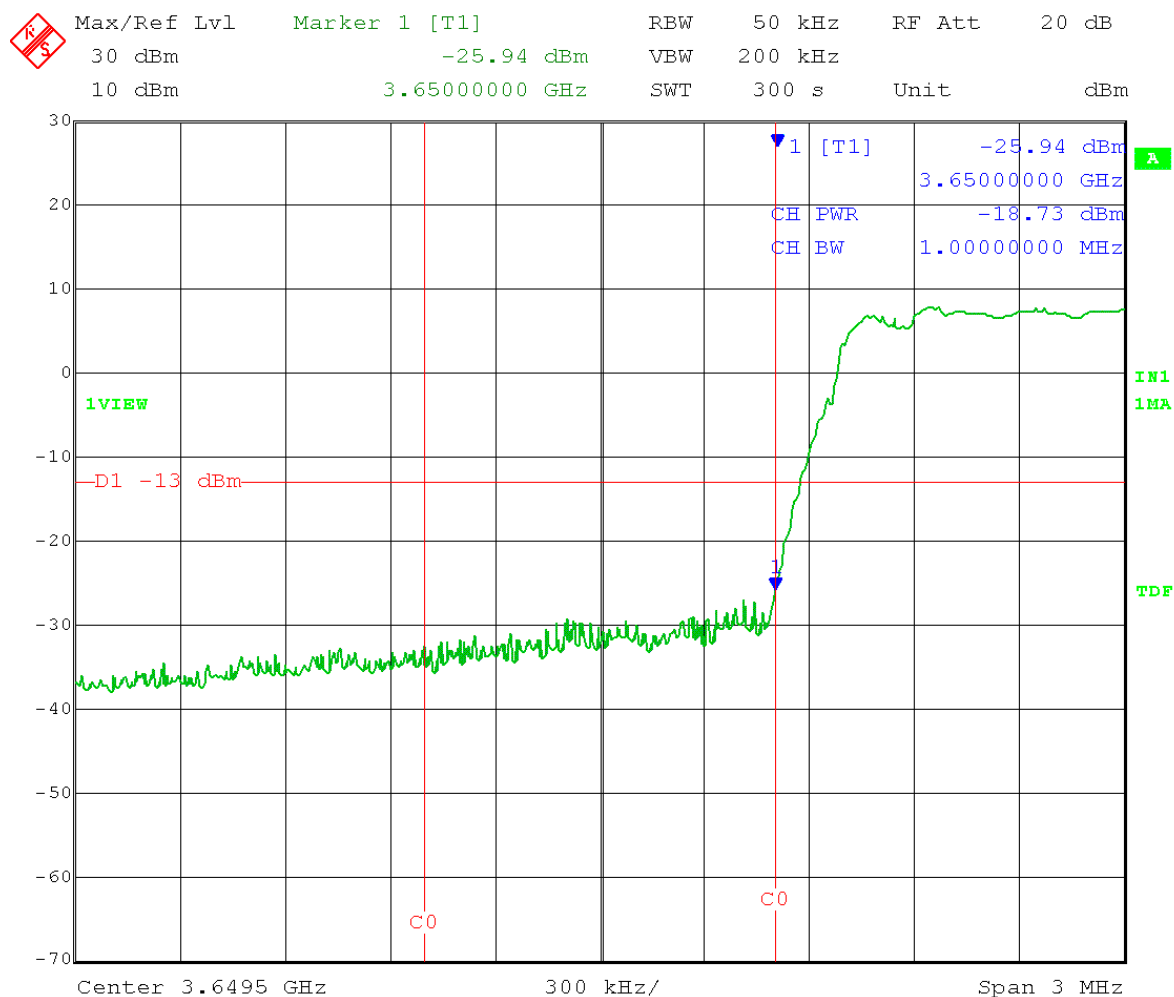
**Results:** Compliant

**Notes:** This test was done with 5, 20, and 40 MHz channel bandwidth settings.  
Only tested QPSK modulation mode as determined worst case by Cambium Networks. Only tested output port A as determined worst case by Cambium Networks.

Test Date: 10-11-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45116A  
Test: Lower Band-Edge Measurements - Conducted  
Operator: Craig B

Comment: RBW  $\geq$  1% OBW VBW  $\geq$  3 x RBW  
Detector = Peak Sweep = 300 s  
Trace = max hold  
Low Channel: Transmit = 3652.5 MHz Output power setting: 18  
Channel bandwidth: 5 MHz Output port: A  
Lower band edge frequency = 3650 MHz  
Limit:  $43 + 10\log(P)$  below the channel transmitter power = -13 dBm/MHz  
Measured power at band edge is integrated over a 1 MHz bandwidth

Power level at band edge = -18.73 dBm/MHz

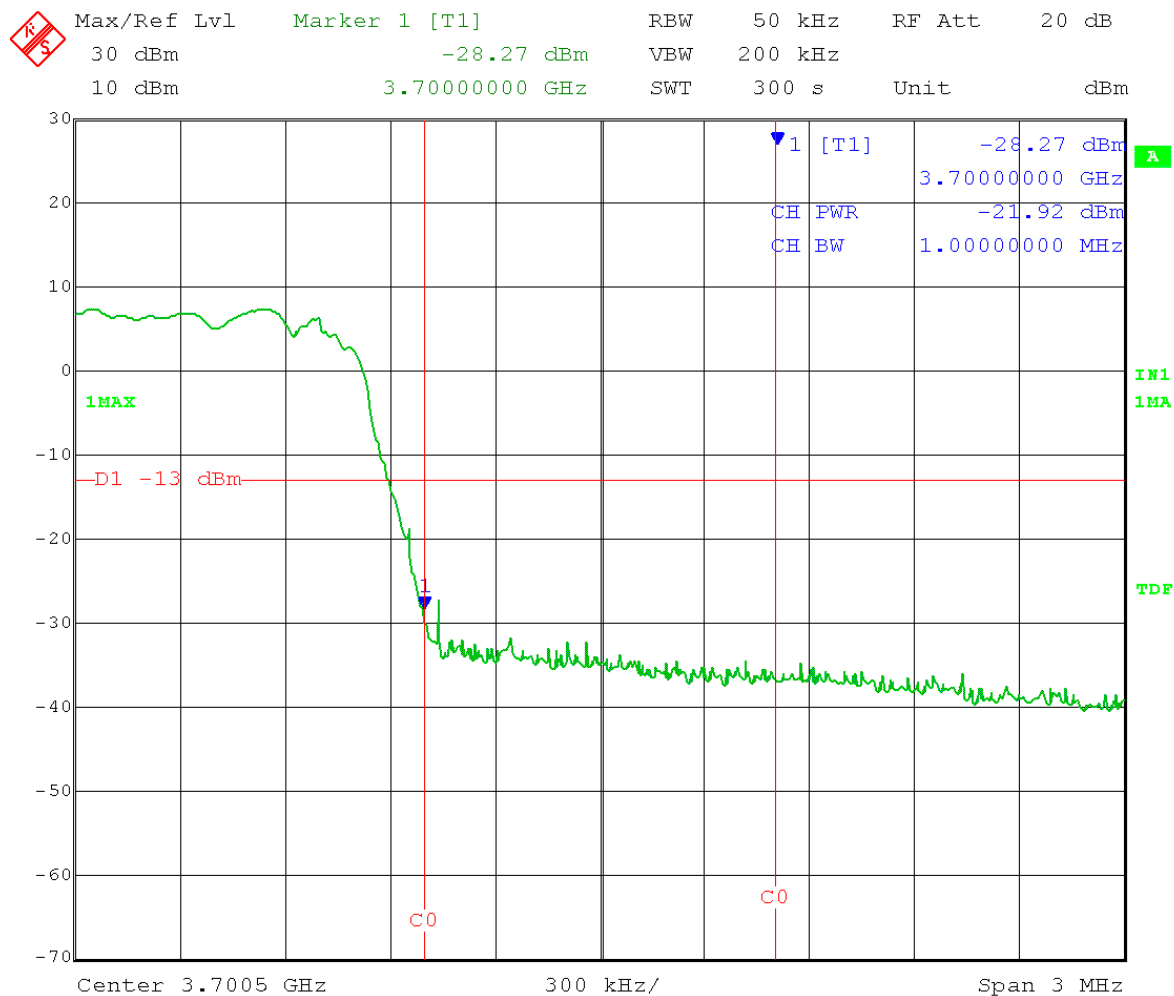


Date: 11.OCT.2016 08:48:51

Test Date: 10-11-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45116A  
Test: Upper Band-Edge Measurements - Conducted  
Operator: Craig B

Comment: RBW  $\geq$  1% OBW VBW  $\geq$  3 x RBW  
Detector = Peak Sweep = 300 s  
Trace = max hold  
High Channel: Transmit = 3697.5 MHz Output power setting: 18  
Channel bandwidth: 5 MHz Output port: A  
Upper band edge frequency = 3700 MHz  
Limit:  $43 + 10\log(P)$  below the channel transmitter power = -13 dBm/MHz  
Measured power at band edge is integrated over a 1 MHz bandwidth

Power level at band edge = -21.92 dBm/MHz



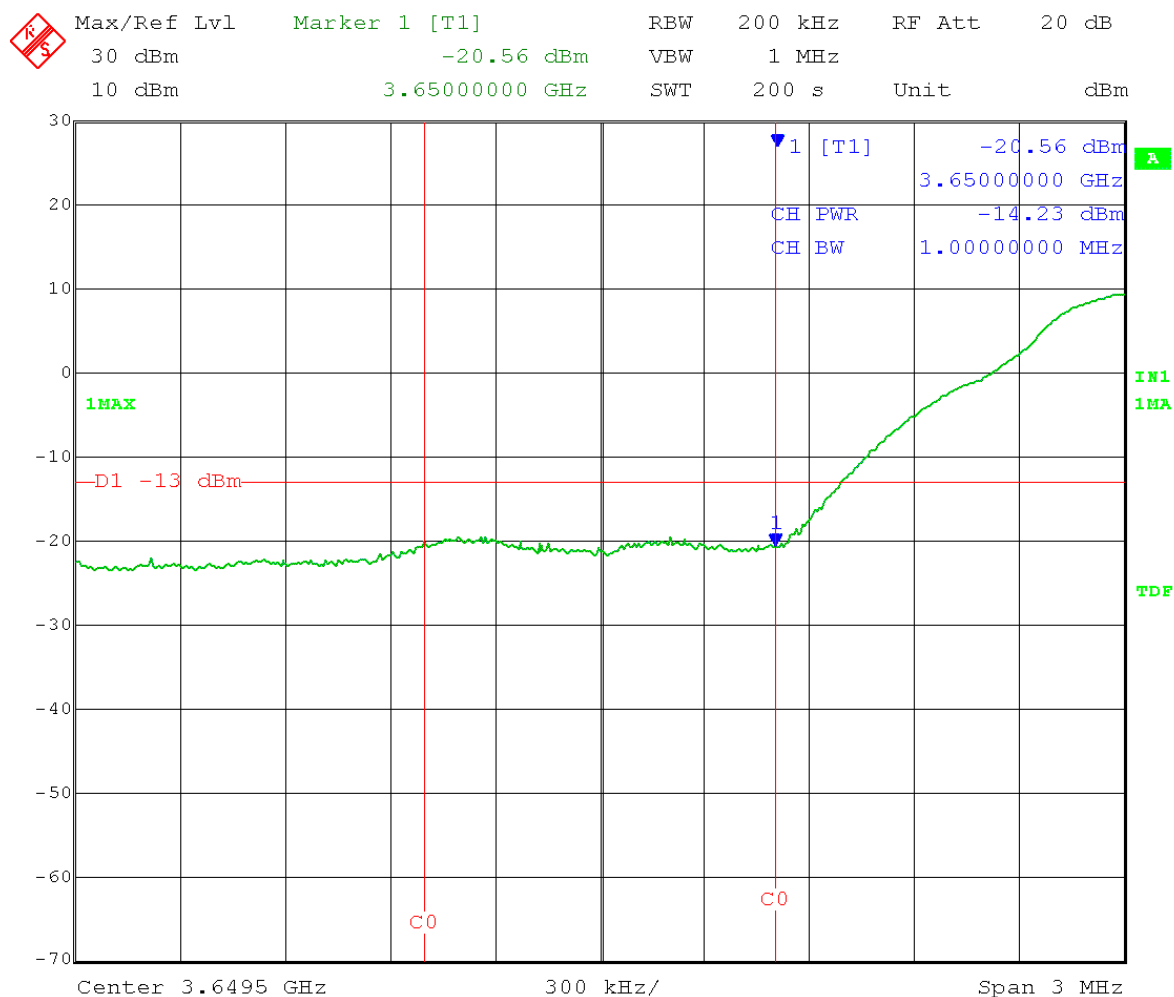
Date: 11.OCT.2016 09:04:12



Test Date: 10-19-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45117F  
Test: Lower Band-Edge Measurements - Conducted  
Operator: Craig B

Comment: RBW  $\geq$  1% OBW VBW  $\geq$  3 x RBW  
Detector = Peak Sweep = 200 s  
Trace = max hold  
Low Channel: Transmit = 3660 MHz Output power setting: 22  
Channel bandwidth: 20 MHz Output port: A  
Lower band edge frequency = 3650 MHz  
Limit:  $43 + 10\log(P)$  below the channel transmitter power = -13 dBm/MHz  
Measured power at band edge is integrated over a 1 MHz bandwidth

Power level at band edge = -14.23 dBm/MHz

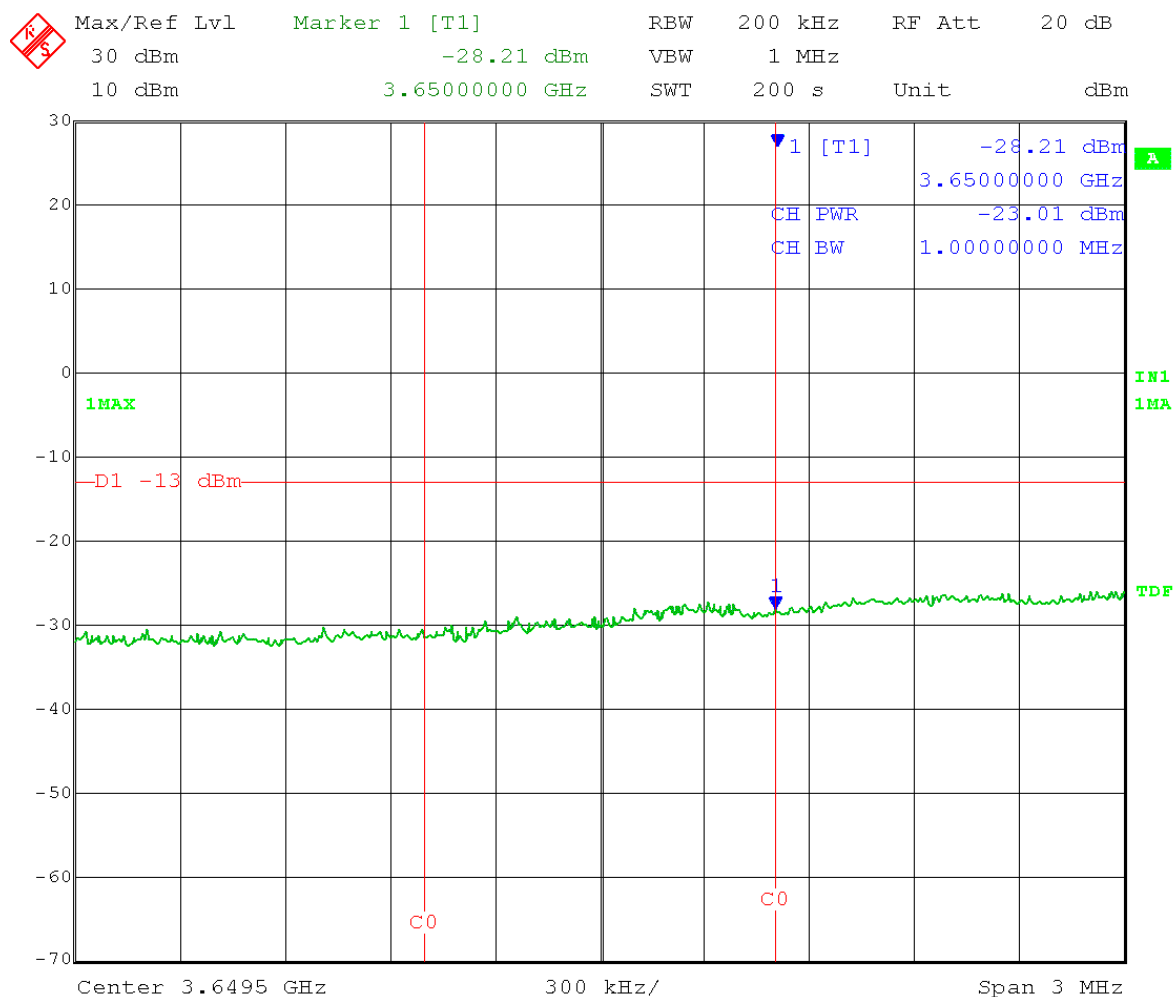


Date: 19.OCT.2016 12:43:56

Test Date: 10-19-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45117F  
Test: Lower Band-Edge Measurements - Conducted  
Operator: Craig B

Comment: RBW  $\geq$  1% OBW VBW  $\geq$  3 x RBW  
Detector = Peak Sweep = 200 s  
Trace = max hold  
Mid Channel: Transmit = 3675 MHz Output power setting: 25  
Channel bandwidth: 20 MHz Output port: A  
Lower band edge frequency = 3650 MHz  
Limit:  $43 + 10\log(P)$  below the channel transmitter power = -13 dBm/MHz  
Measured power at band edge is integrated over a 1 MHz bandwidth

Power level at band edge = -23.01 dBm/MHz

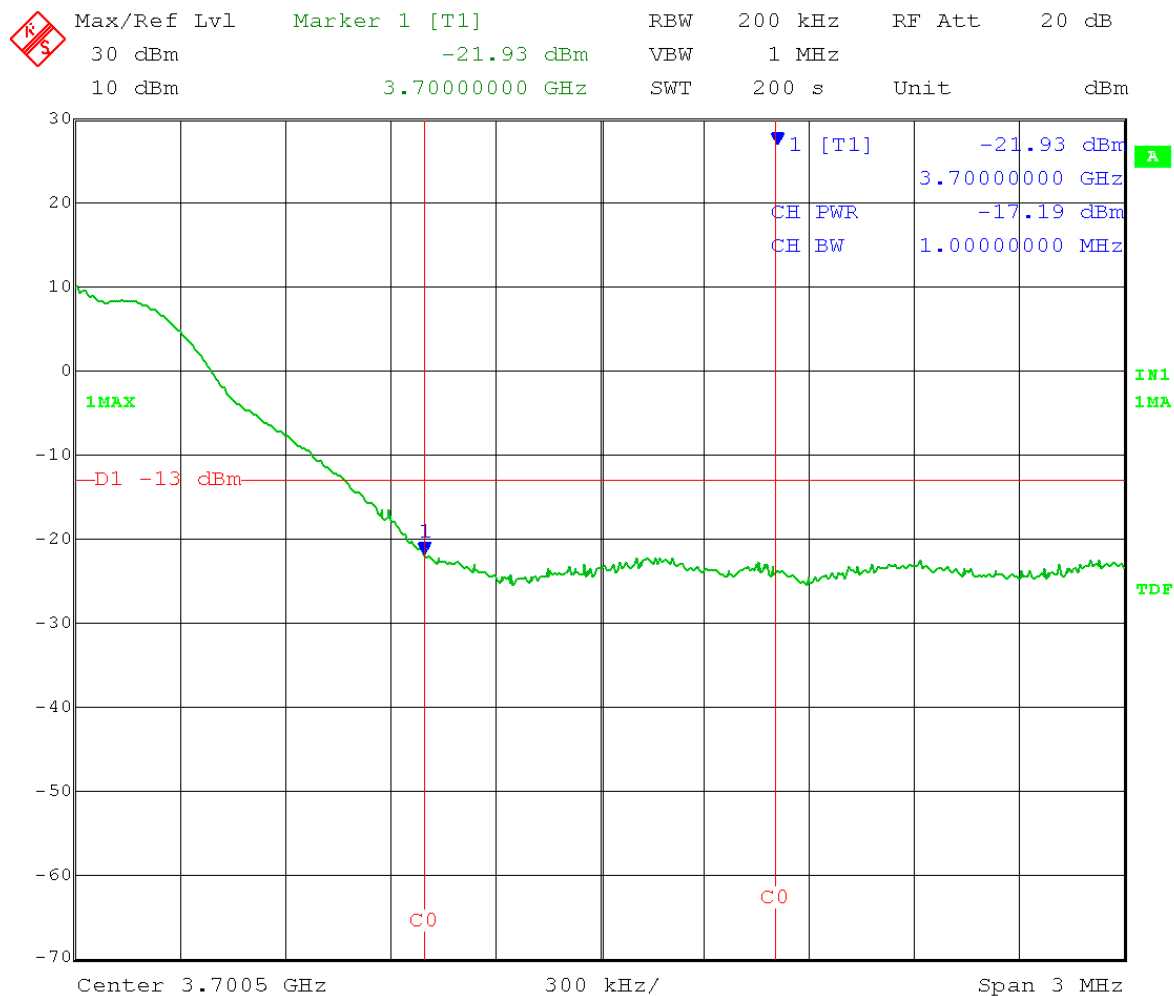


Date: 19.OCT.2016 13:37:32

Test Date: 10-19-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45117F  
Test: Upper Band-Edge Measurements - Conducted  
Operator: Craig B

Comment: RBW  $\geq$  1% OBW VBW  $\geq$  3 x RBW  
Detector = Peak Sweep = 200 s  
Trace = max hold  
High Channel: Transmit = 3690 MHz Output power setting: 25  
Channel bandwidth: 20 MHz Output port: A  
Upper band edge frequency = 3700 MHz  
Limit:  $43 + 10\log(P)$  below the channel transmitter power = -13 dBm/MHz  
Measured power at band edge is integrated over a 1 MHz bandwidth

Power level at band edge = -17.19 dBm/MHz

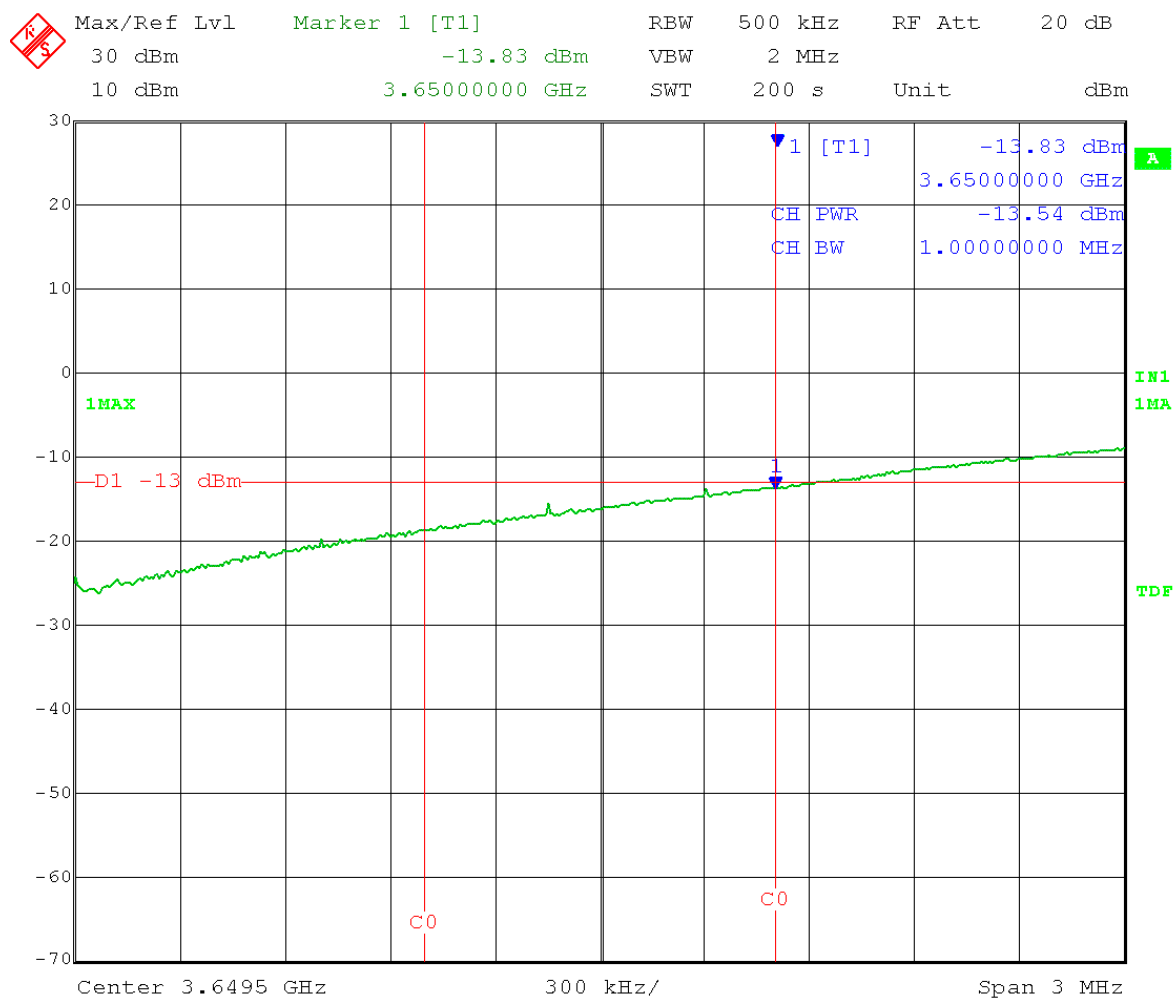


Date: 19.OCT.2016 13:44:42

Test Date: 10-18-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45117F  
Test: Lower Band-Edge Measurements - Conducted  
Operator: Craig B

Comment: RBW  $\geq$  1% OBW VBW  $\geq$  3 x RBW  
Detector = Peak Sweep = 200 s  
Trace = max hold  
Low Channel: Transmit = 3670 MHz Output power setting: 11  
Channel bandwidth: 40 MHz Output port: A  
Lower band edge frequency = 3650 MHz  
Limit:  $43 + 10\log(P)$  below the channel transmitter power = -13 dBm/MHz  
Measured power at band edge is integrated over a 1 MHz bandwidth

Power level at band edge = -13.54 dBm/MHz

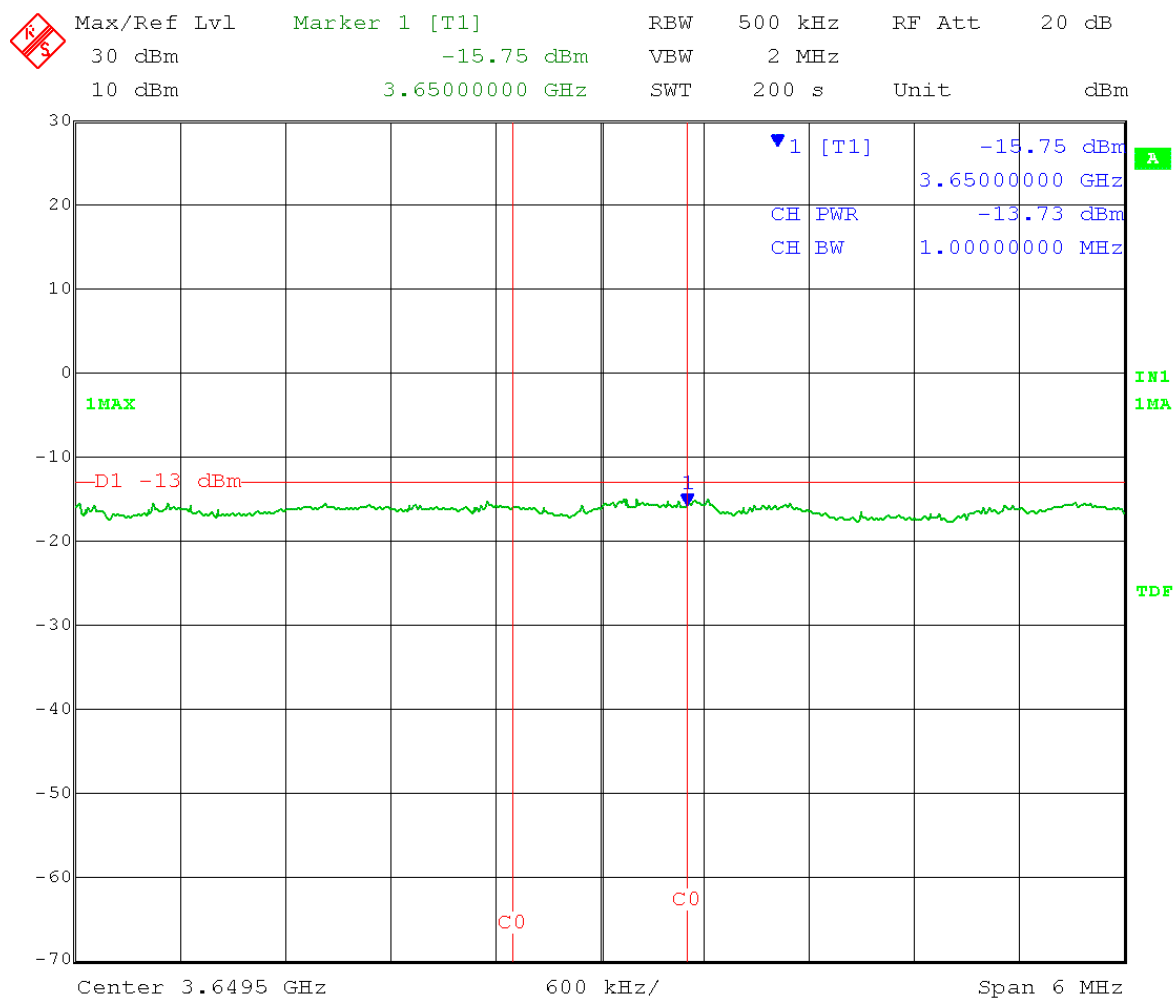


Date: 18.OCT.2016 14:40:41

Test Date: 10-18-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45117F  
Test: Lower Band-Edge Measurements - Conducted  
Operator: Craig B

Comment: RBW  $\geq$  1% OBW VBW  $\geq$  3 x RBW  
Detector = Peak Sweep = 200 s  
Trace = max hold  
Mid Channel: Transmit = 3675 MHz Output power setting: 24  
Channel bandwidth: 40 MHz Output port: A  
Lower band edge frequency = 3650 MHz  
Limit:  $43 + 10\log(P)$  below the channel transmitter power = -13 dBm/MHz  
Measured power at band edge is integrated over a 1 MHz bandwidth

Power level at band edge = -13.73 dBm/MHz

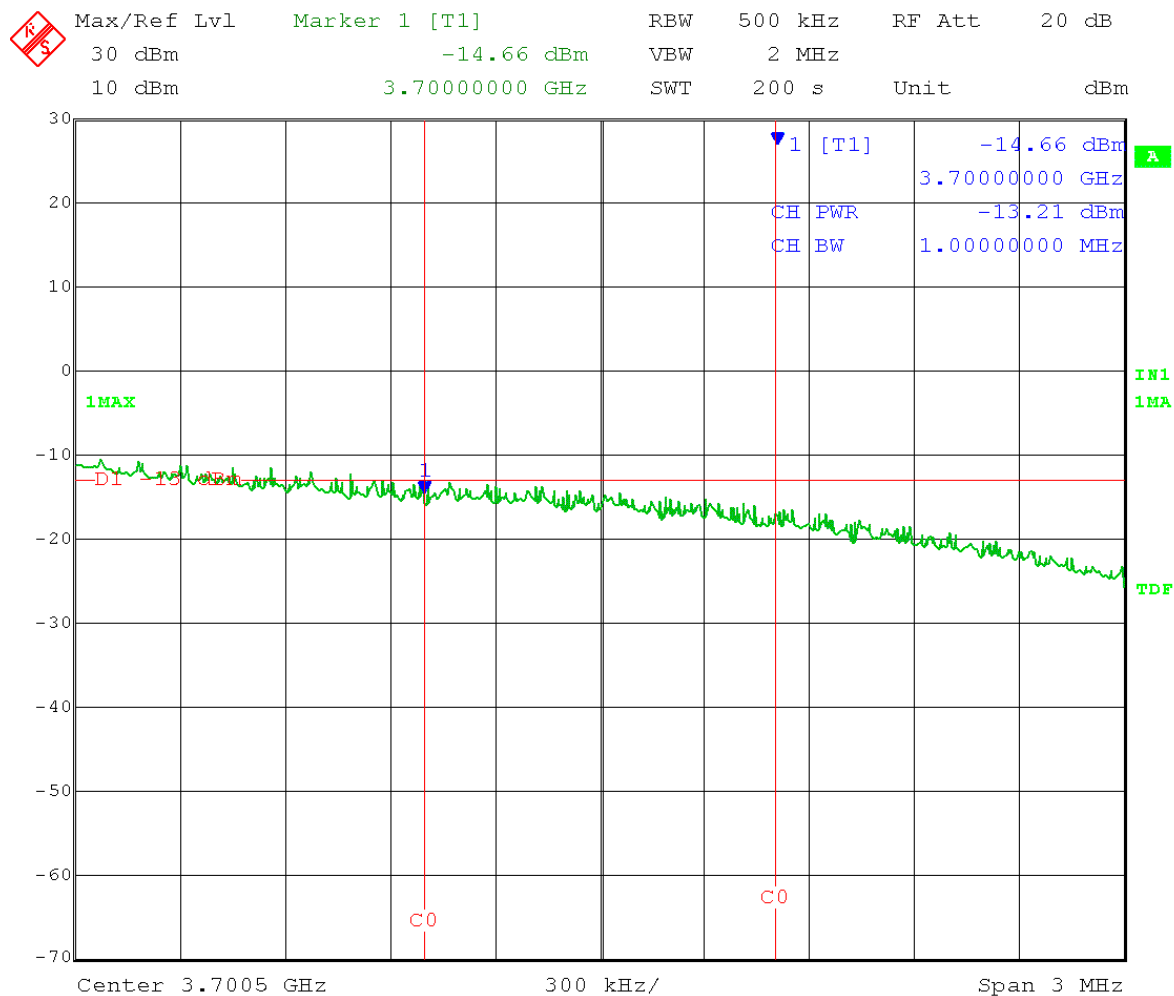


Date: 18.OCT.2016 14:18:20

Test Date: 10-18-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45117F  
Test: Upper Band-Edge Measurements - Conducted  
Operator: Craig B

Comment: RBW  $\geq$  1% OBW VBW  $\geq$  3 x RBW  
Detector = Peak Sweep = 200 s  
Trace = max hold  
High Channel: Transmit = 3680 MHz Output power setting: 13  
Channel bandwidth: 40 MHz Output port: A  
Upper band edge frequency = 3700 MHz  
Limit:  $43 + 10\log(P)$  below the channel transmitter power = -13 dBm/MHz  
Measured power at band edge is integrated over a 1 MHz bandwidth

Power level at band edge = -13.21 dBm/MHz



Date: 18.OCT.2016 15:22:35



166 South Carter, Genoa City, WI 53128

Company:	Cambium Networks
Model Tested:	3082CHH
Report Number:	22288
DLS Project:	8420

## Appendix B – Measurement Data

### B5.0 Band Edge compliance - Radiated With 50 Ohm terminations on antenna ports (cabinet radiation)

**Rule Part:** FCC Part 90.1323  
FCC Part 2.1053

**Test Procedure:** FCC KDB 971168 D01: Power Meas License Digital Systems v02r02  
Section 5.8 – Radiated measurements

**Limit:** FCC Part 90.1323  
The power of any emission outside the frequency band 3650-3700 MHz shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log_{10}(P)$  dB, where P is measured in watts.

**Sample calculation:** Measured mean output power of one port = 22.04 dBm.  
 $22.04 \text{ dBm} + 17 \text{ dBi antenna gain} + 3 \text{ dB (because there are 2 output ports)}$   
 $= 42.04 \text{ dBm} = 15.996 \text{ Watts}$   
 $\text{Limit (dBc)} = 43 + 10 \log(15.996) = 55.04 \text{ dB}$   
 $42.04 \text{ dBm} - 55.04 \text{ dB} = \mathbf{-13 \text{ dBm}}$

**Results:** Compliant

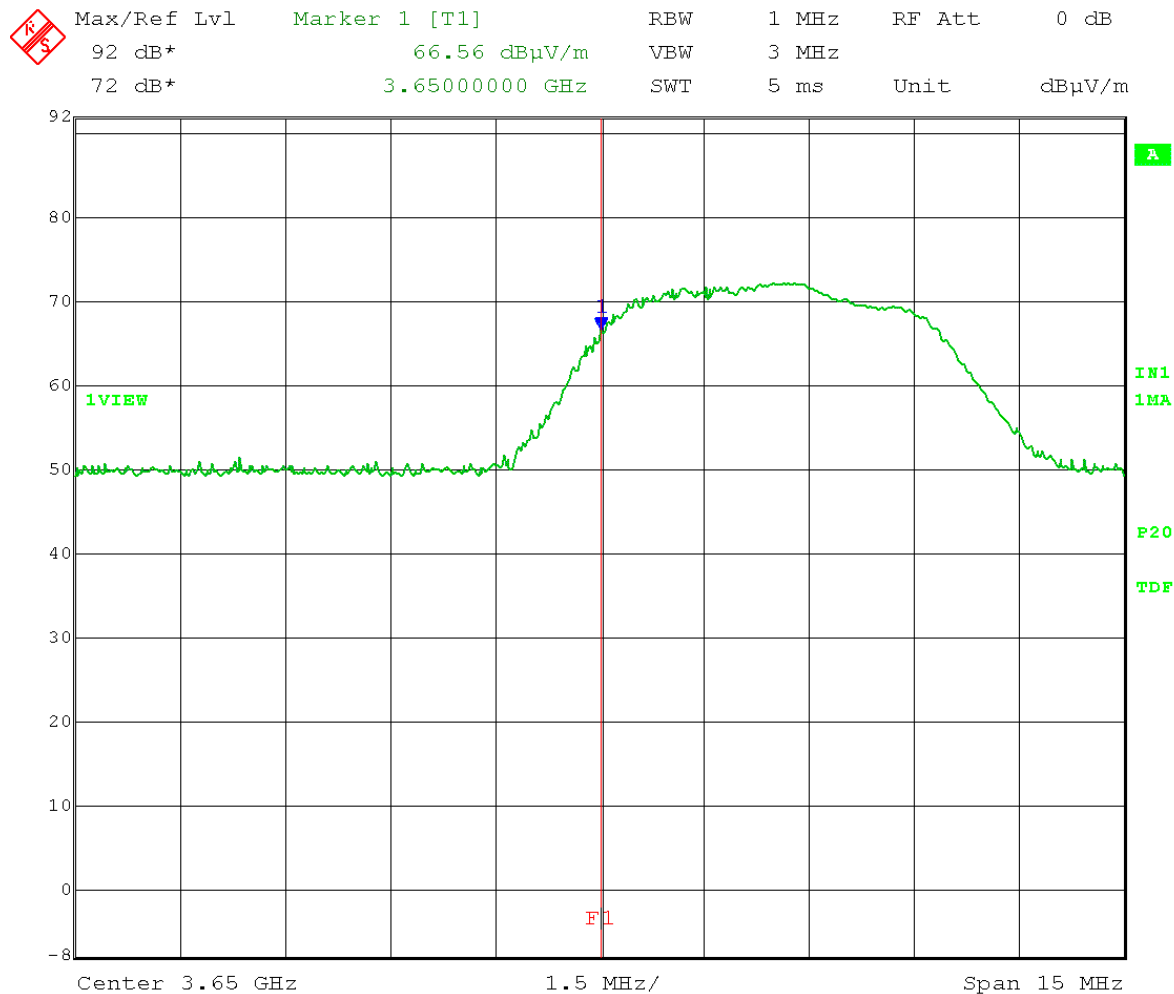
**Notes:** This test was done with 5, 20, and 40 MHz channel bandwidth settings. Only tested QPSK modulation mode as determined worst case by Cambium Networks. **Both ports were active during this test.**

Test Date: 10-11-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45116A  
Test: Lower Band-Edge Measurements – Radiated from cabinet  
Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
Detector = Peak Sweep = auto couple  
Trace = max hold  
Low Channel: Transmit = 3652.5 MHz Output power setting: 18  
Channel bandwidth: 5 MHz Both ports active and 50Ω terminated  
Lower band edge frequency = 3650 MHz  
Limit:  $43 + 10\log(P)$  below the channel transmitter power = -13 dBm/MHz  
 $EIRP(dBm) = E(dB\mu V/m) + 20\log(d) - 104.8$  where d is the measurement distance in meters.

Power level at band edge =  $66.56 + 20\log(3) - 104.8 = -28.69$  dBm/MHz

Vertical:



Date: 11.OCT.2016 11:12:38

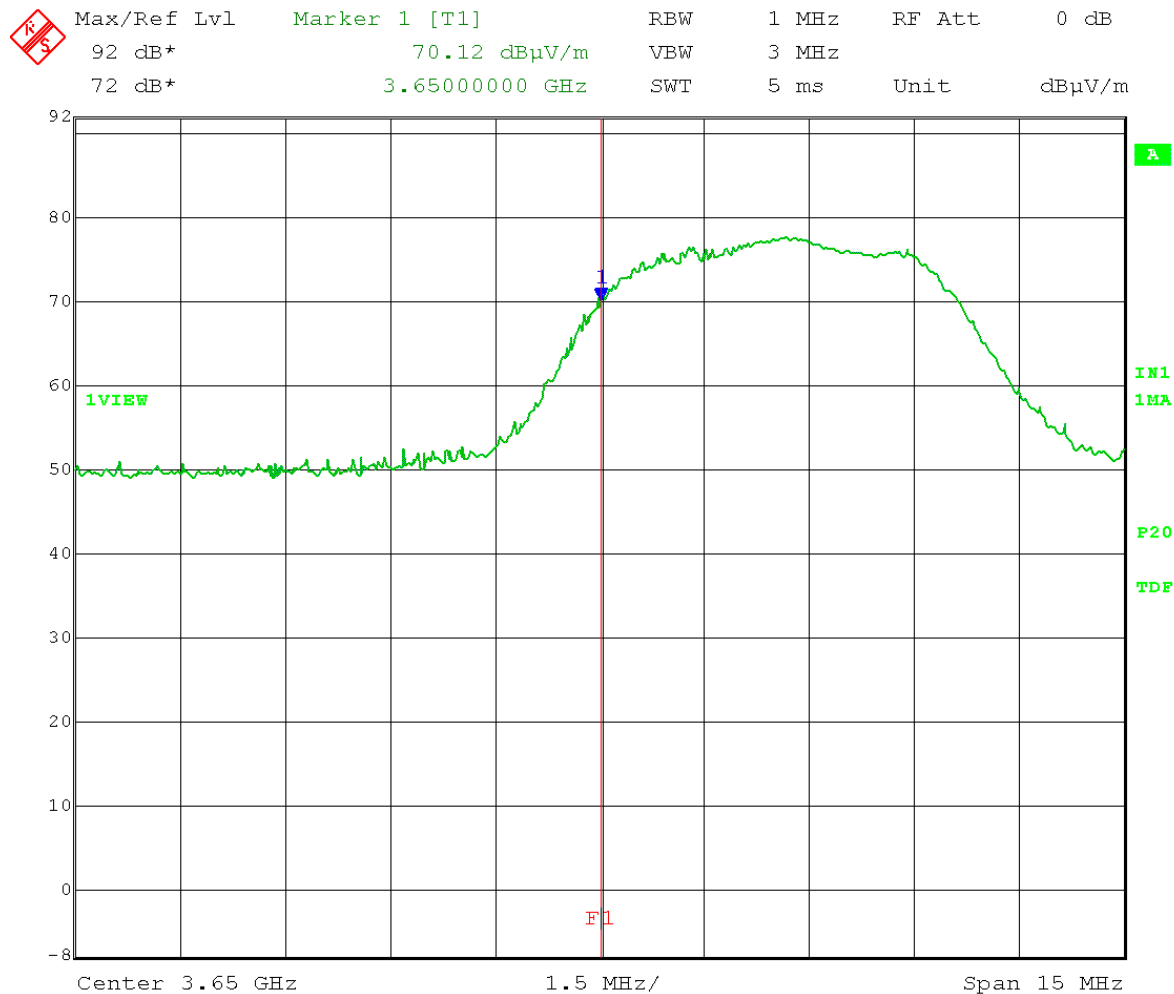


Test Date: 10-11-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45116A  
Test: Lower Band-Edge Measurements – Radiated from cabinet  
Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
Detector = Peak Sweep = auto couple  
Trace = max hold  
Low Channel: Transmit = 3652.5 MHz Output power setting: 18  
Channel bandwidth: 5 MHz Both ports active and 50Ω terminated  
Lower band edge frequency = 3650 MHz  
Limit:  $43 + 10\log(P)$  below the channel transmitter power = -13 dBm/MHz  
 $EIRP(dBm) = E(dB\mu V/m) + 20\log(d) - 104.8$  where d is the measurement distance in meters.

Power level at band edge =  $70.12 + 20\log(3) - 104.8 = -25.13$  dBm/MHz

Horizontal:



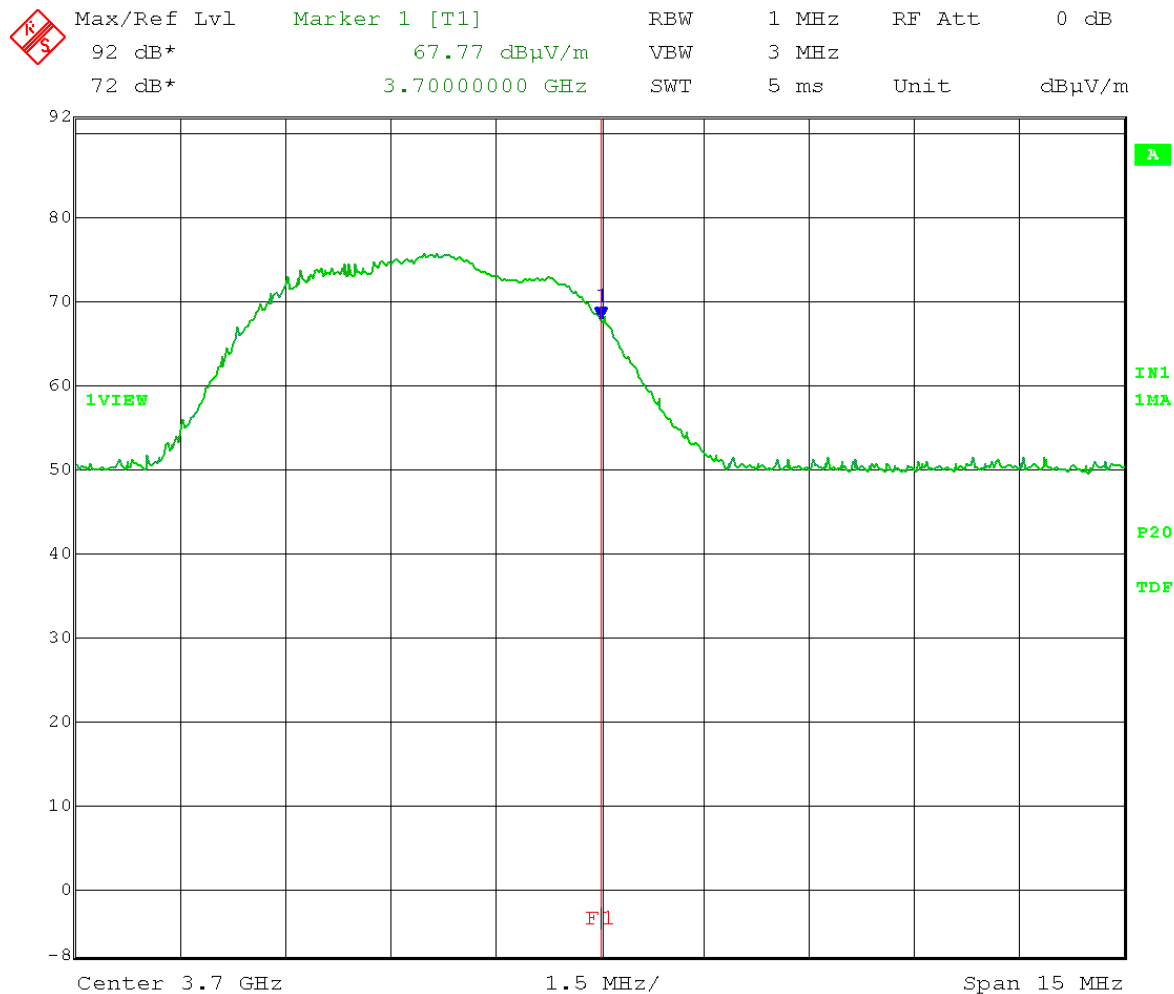
Date: 11.OCT.2016 11:04:55

Test Date: 10-11-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45116A  
Test: Upper Band-Edge Measurements – Radiated from cabinet  
Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
Detector = Peak Sweep = auto couple  
Trace = max hold  
High Channel: Transmit = 3697.5 MHz Output power setting: 18  
Channel bandwidth: 5 MHz Both ports active and 50Ω terminated  
Upper band edge frequency = 3700 MHz  
Limit:  $43 + 10\log(P)$  below the channel transmitter power = -13 dBm/MHz  
EIRP(dBm) =  $E(\text{dB}\mu\text{V/m}) + 20\log(d) - 104.8$  where d is the measurement distance in meters.

Power level at band edge =  $67.77 + 20\log(3) - 104.8 = -27.48 \text{ dBm/MHz}$

Vertical:



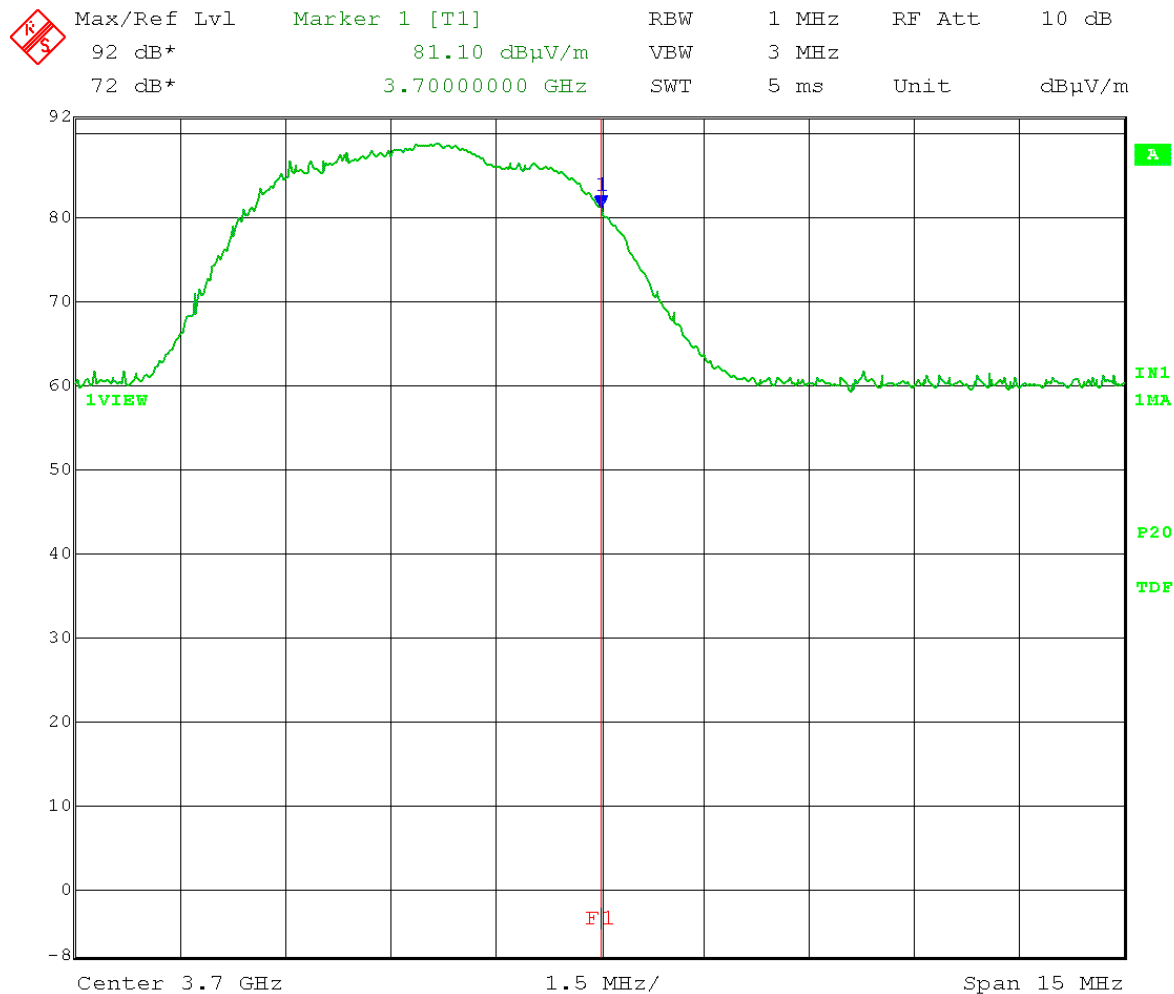
Date: 11.OCT.2016 11:22:32

Test Date: 10-11-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45116A  
Test: Upper Band-Edge Measurements – Radiated from cabinet  
Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
Detector = Peak Sweep = auto couple  
Trace = max hold  
High Channel: Transmit = 3697.5 MHz Output power setting: 18  
Channel bandwidth: 5 MHz Both ports active and 50Ω terminated  
Upper band edge frequency = 3700 MHz  
Limit:  $43 + 10\log(P)$  below the channel transmitter power = -13 dBm/MHz  
 $EIRP(dBm) = E(dB\mu V/m) + 20\log(d) - 104.8$  where d is the measurement distance in meters.

Power level at band edge =  $81.10 + 20\log(3) - 104.8 = -14.15$  dBm/MHz

Horizontal:



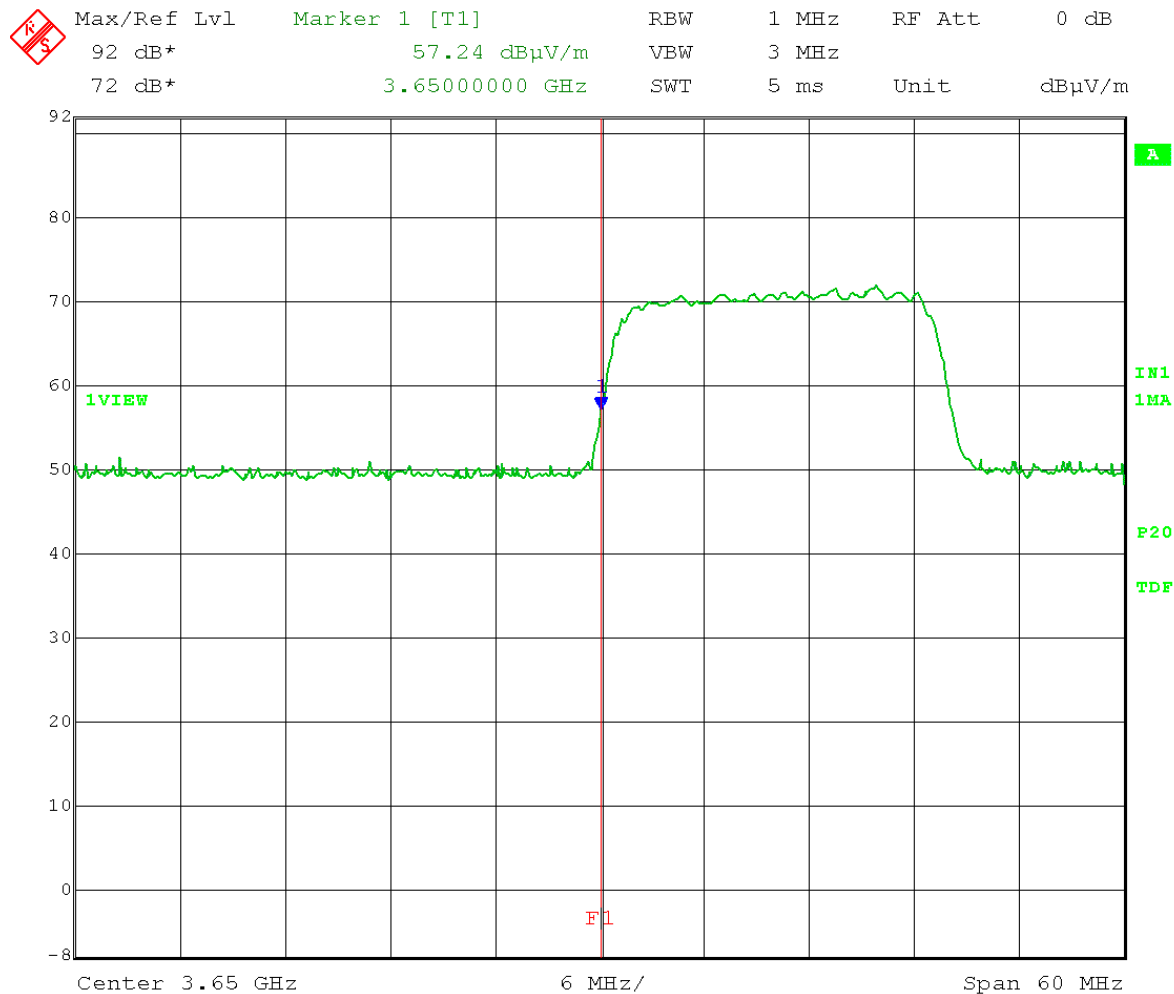
Date: 11.OCT.2016 11:27:52

Test Date: 10-20-2016  
 Company: Cambium Networks  
 EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45117F  
 Test: Lower Band-Edge Measurements – Radiated from cabinet  
 Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
 Detector = Peak Sweep = auto couple  
 Trace = max hold  
 Low Channel: Transmit = 3660 MHz Output power setting: 25  
 Channel bandwidth: 20 MHz Both ports active and 50Ω terminated  
 Lower band edge frequency = 3650 MHz  
 Limit:  $43 + 10\log(P)$  below the channel transmitter power = -13 dBm/MHz  
 $EIRP(dBm) = E(dB\mu V/m) + 20\log(d) - 104.8$  where d is the measurement distance in meters.

Power level at band edge =  $57.24 + 20\log(3) - 104.8 = -38.02$  dBm/MHz

Vertical:



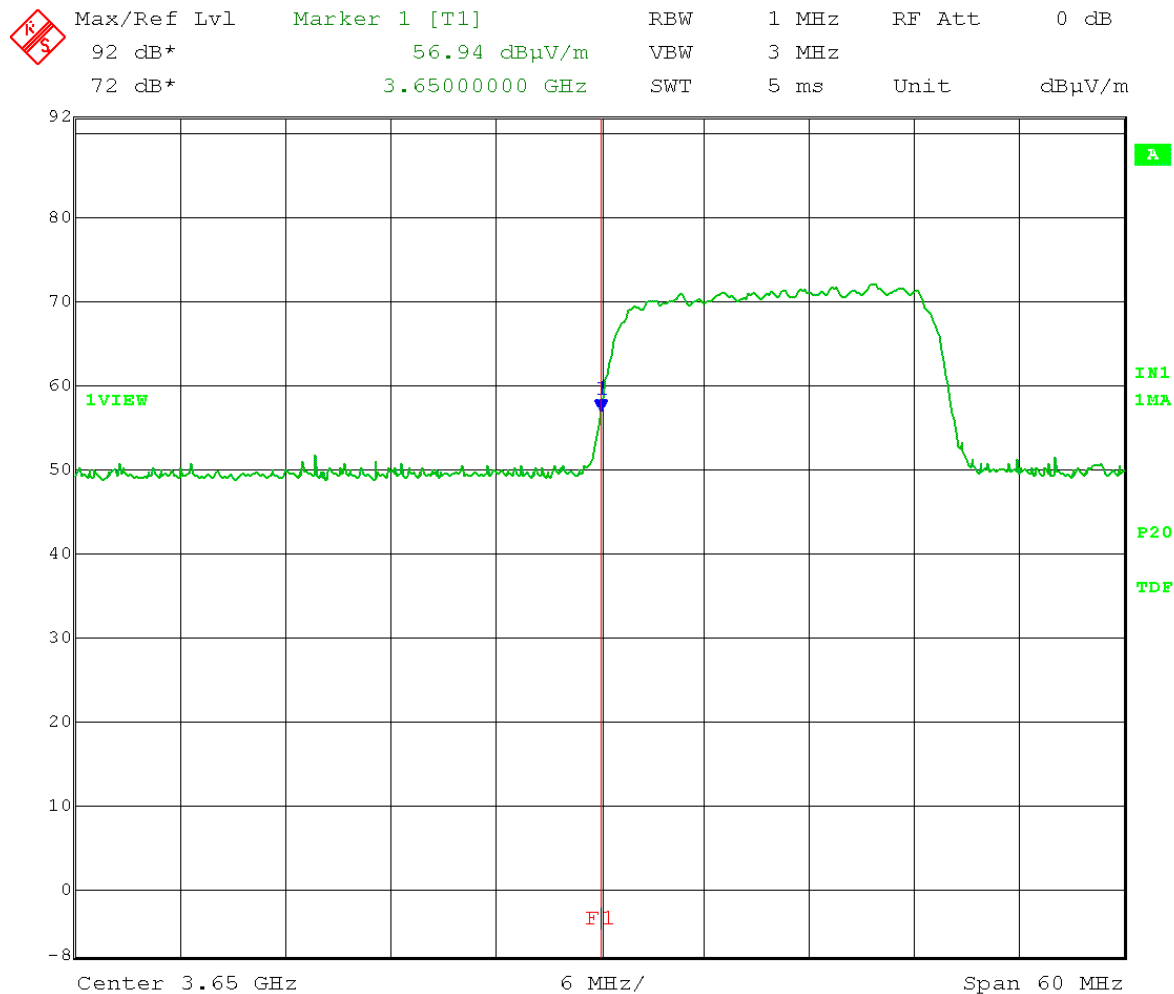
Date: 20.OCT.2016 08:54:38

Test Date: 10-20-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45117F  
Test: Lower Band-Edge Measurements – Radiated from cabinet  
Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
Detector = Peak Sweep = auto couple  
Trace = max hold  
Low Channel: Transmit = 3660 MHz Output power setting: 25  
Channel bandwidth: 20 MHz Both ports active and 50Ω terminated  
Lower band edge frequency = 3650 MHz  
Limit:  $43 + 10\log(P)$  below the channel transmitter power = -13 dBm/MHz  
 $EIRP(dBm) = E(dB\mu V/m) + 20\log(d) - 104.8$  where d is the measurement distance in meters.

Power level at band edge =  $56.94 + 20\log(3) - 104.8 = -38.32$  dBm/MHz

Horizontal:



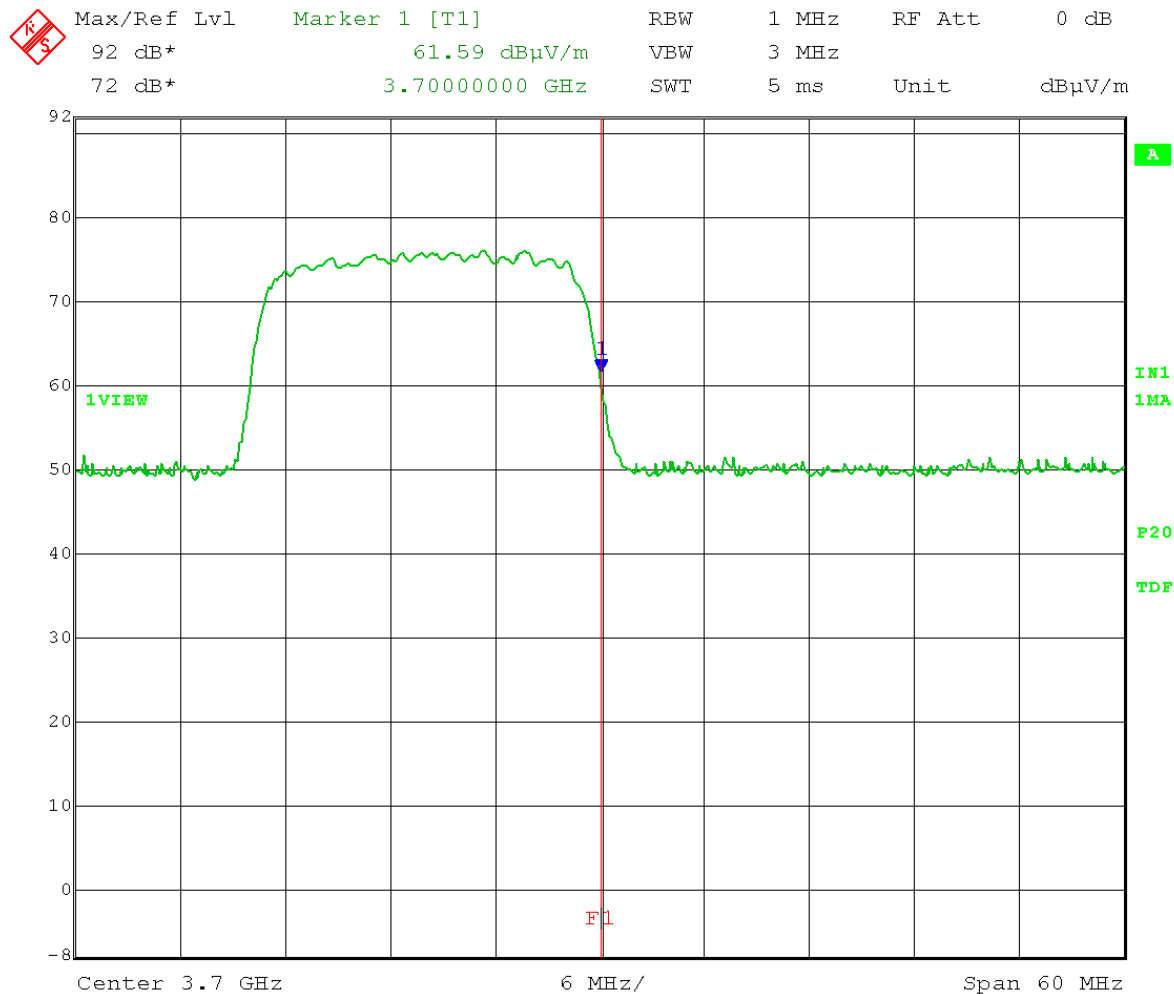
Date: 20.OCT.2016 08:50:15

Test Date: 10-20-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45117F  
Test: Upper Band-Edge Measurements – Radiated from cabinet  
Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
Detector = Peak Sweep = auto couple  
Trace = max hold  
High Channel: Transmit = 3690 MHz Output power setting: 25  
Channel bandwidth: 20 MHz Both ports active and 50Ω terminated  
Upper band edge frequency = 3700 MHz  
Limit:  $43 + 10\log(P)$  below the channel transmitter power = -13 dBm/MHz  
 $EIRP(dBm) = E(dB\mu V/m) + 20\log(d) - 104.8$  where d is the measurement distance in meters.

Power level at band edge =  $61.59 + 20\log(3) - 104.8 = -33.67$  dBm/MHz

Vertical:



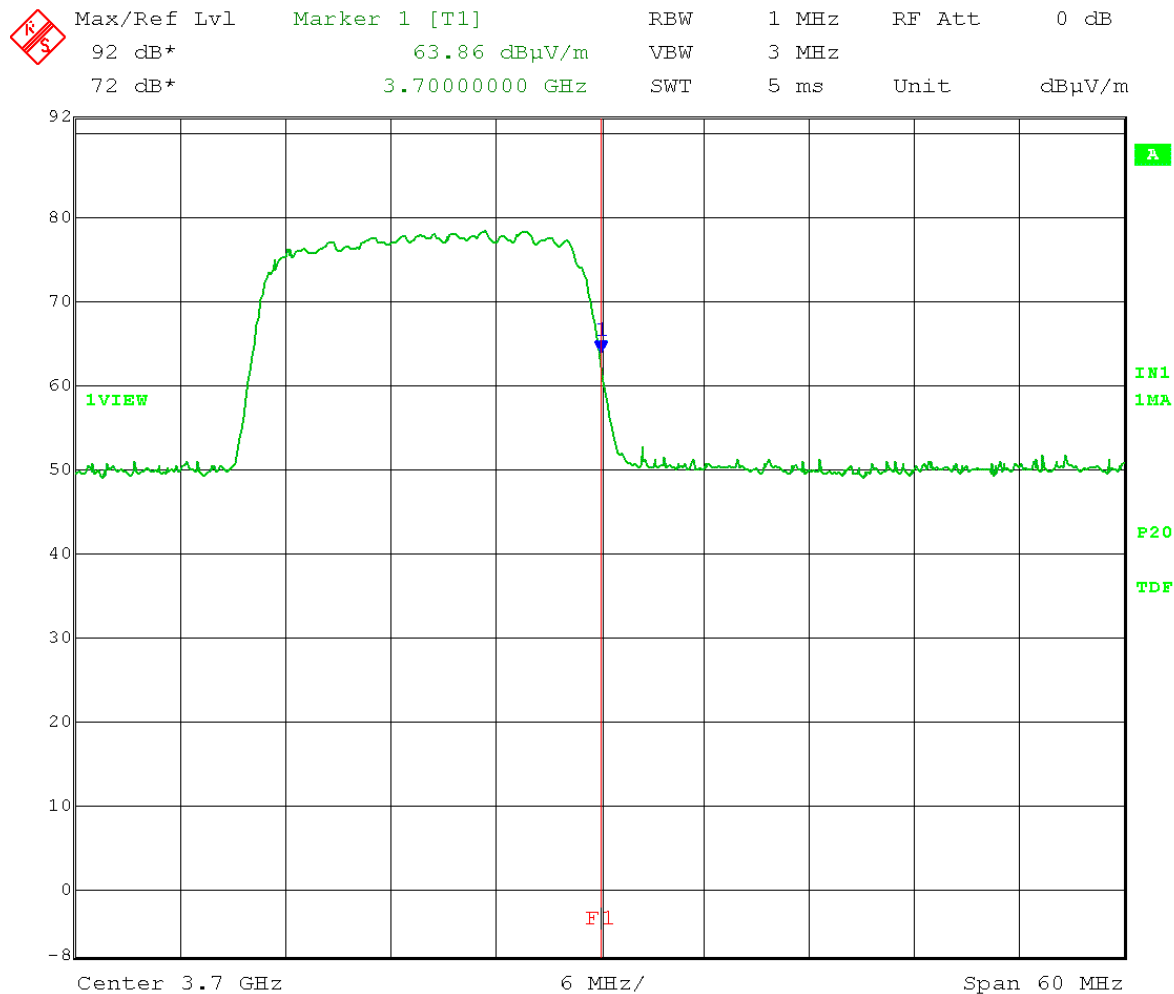
Date: 20.OCT.2016 09:02:15

Test Date: 10-20-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45117F  
Test: Upper Band-Edge Measurements – Radiated from cabinet  
Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
Detector = Peak Sweep = auto couple  
Trace = max hold  
High Channel: Transmit = 3690 MHz Output power setting: 25  
Channel bandwidth: 20 MHz Both ports active and 50Ω terminated  
Upper band edge frequency = 3700 MHz  
Limit:  $43 + 10\log(P)$  below the channel transmitter power = -13 dBm/MHz  
 $EIRP(dBm) = E(dB\mu V/m) + 20\log(d) - 104.8$  where d is the measurement distance in meters.

Power level at band edge =  $63.86 + 20\log(3) - 104.8 = -31.40$  dBm/MHz

Horizontal:



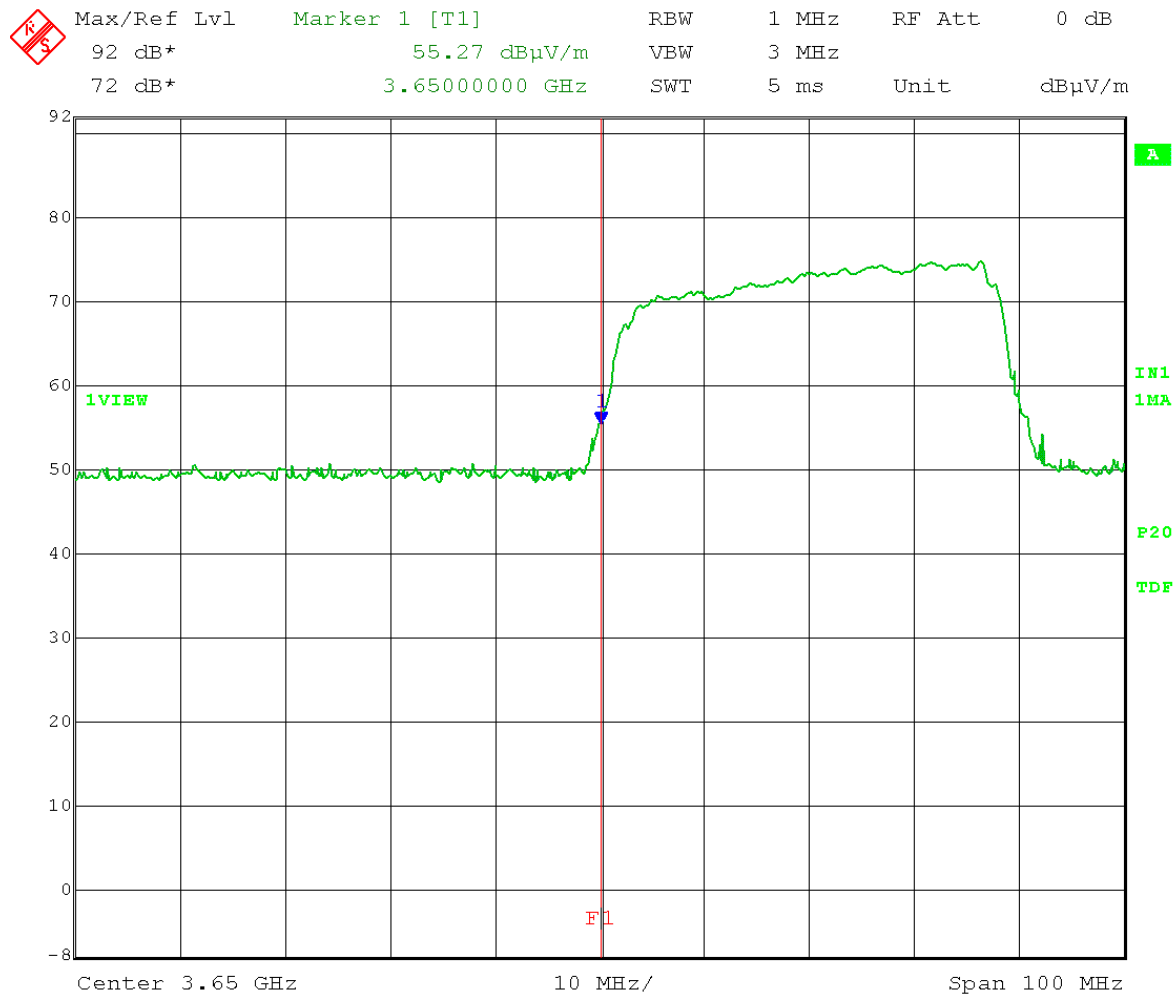
Date: 20.OCT.2016 09:08:16

Test Date: 10-19-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45117F  
Test: Lower Band-Edge Measurements – Radiated from cabinet  
Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
Detector = Peak Sweep = auto couple  
Trace = max hold  
Low Channel: Transmit = 3670 MHz Output power setting: 24  
Channel bandwidth: 40 MHz Both ports active and 50Ω terminated  
Lower band edge frequency = 3650 MHz  
Limit:  $43 + 10\log(P)$  below the channel transmitter power = -13 dBm/MHz  
 $EIRP(dBm) = E(dB\mu V/m) + 20\log(d) - 104.8$  where d is the measurement distance in meters.

Power level at band edge =  $55.27 + 20\log(3) - 104.8 = -39.99$  dBm/MHz

Vertical:



Date: 19.OCT.2016 10:42:53

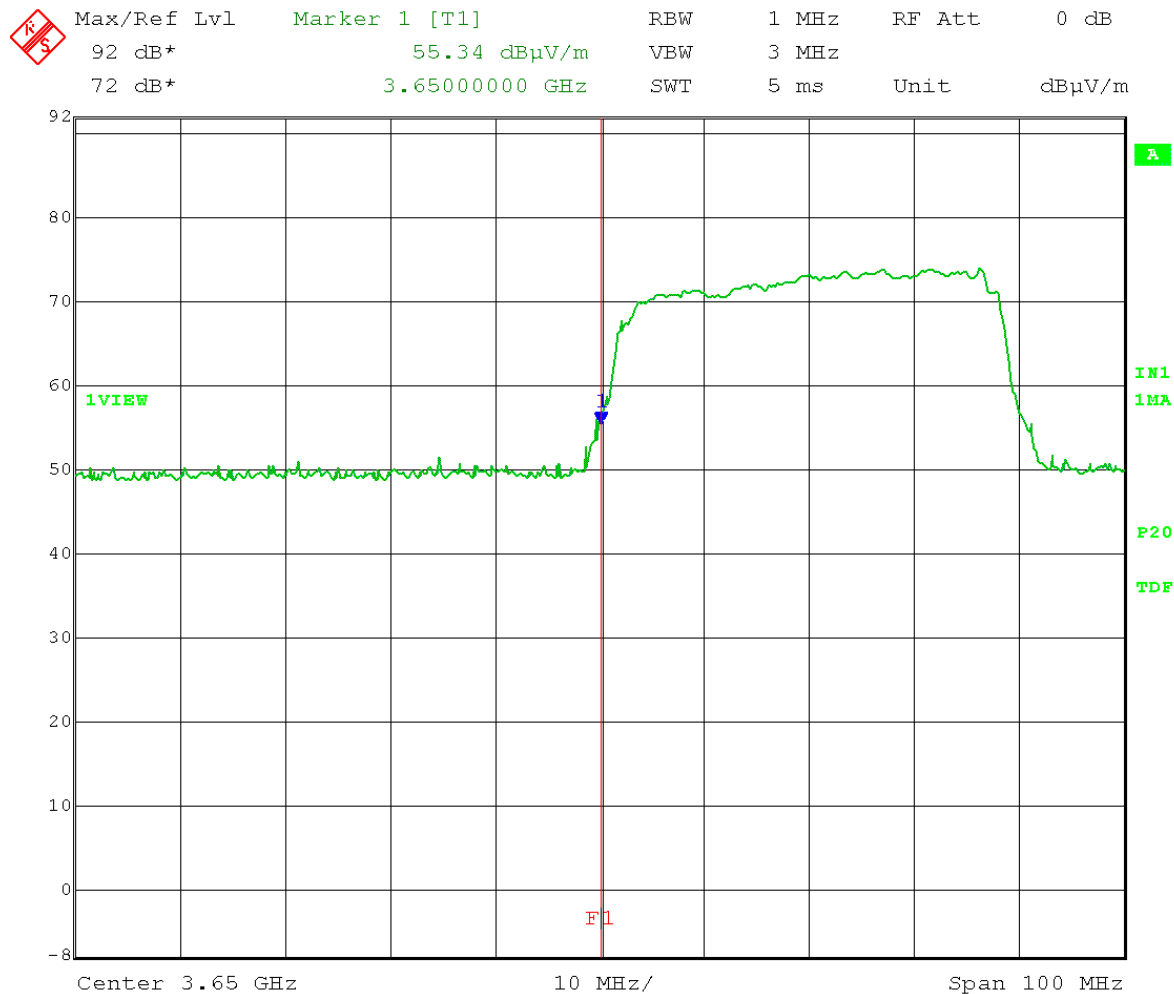


Test Date: 10-19-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45117F  
Test: Lower Band-Edge Measurements – Radiated from cabinet  
Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
Detector = Peak Sweep = auto couple  
Trace = max hold  
Low Channel: Transmit = 3670 MHz Output power setting: 24  
Channel bandwidth: 40 MHz Both ports active and 50Ω terminated  
Lower band edge frequency = 3650 MHz  
Limit:  $43 + 10\log(P)$  below the channel transmitter power = -13 dBm/MHz  
 $EIRP(dBm) = E(dB\mu V/m) + 20\log(d) - 104.8$  where d is the measurement distance in meters.

Power level at band edge =  $55.34 + 20\log(3) - 104.8 = -39.92$  dBm/MHz

Horizontal:



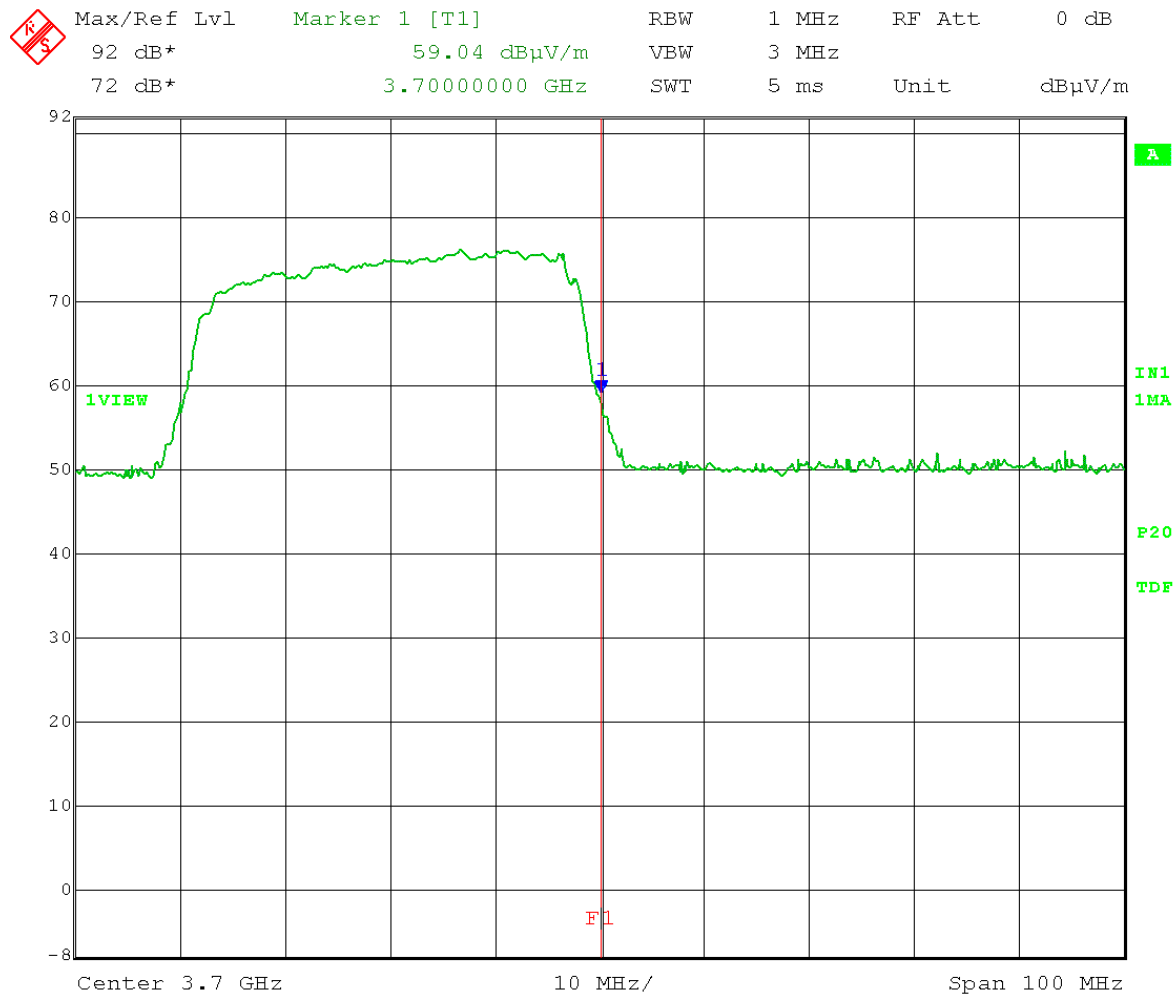
Date: 19.OCT.2016 10:37:46

Test Date: 10-19-2016  
 Company: Cambium Networks  
 EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45117F  
 Test: Upper Band-Edge Measurements – Radiated from cabinet  
 Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
 Detector = Peak Sweep = auto couple  
 Trace = max hold  
 High Channel: Transmit = 3680 MHz Output power setting: 24  
 Channel bandwidth: 40 MHz Both ports active and 50Ω terminated  
 Upper band edge frequency = 3700 MHz  
 Limit:  $43 + 10\log(P)$  below the channel transmitter power = -13 dBm/MHz  
 EIRP(dBm) =  $E(\text{dB}\mu\text{V/m}) + 20\log(d) - 104.8$  where d is the measurement distance in meters.

Power level at band edge =  $59.04 + 20\log(3) - 104.8 = -36.22 \text{ dBm/MHz}$

Vertical:



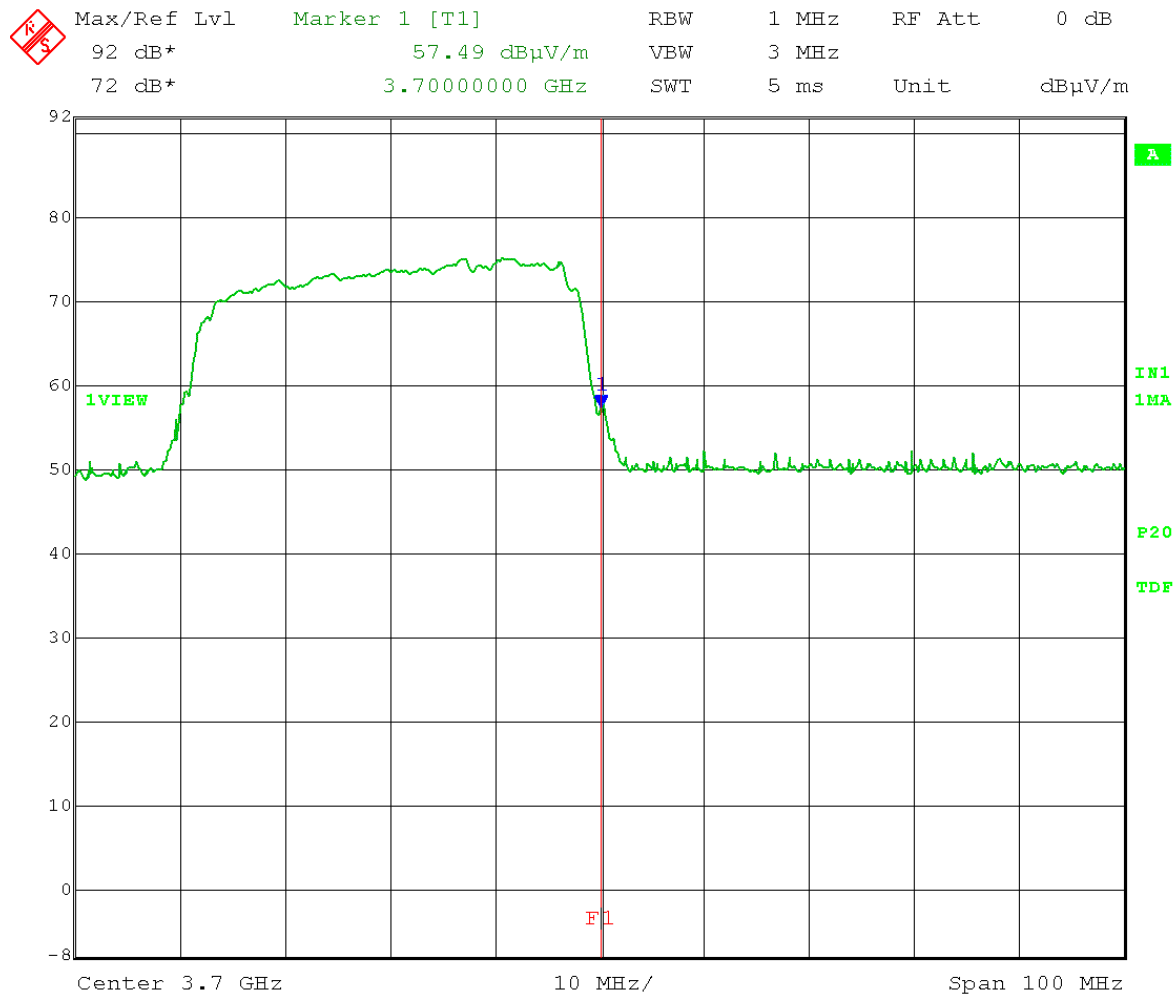
Date: 19.OCT.2016 10:50:09

Test Date: 10-19-2016  
 Company: Cambium Networks  
 EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45117F  
 Test: Upper Band-Edge Measurements – Radiated from cabinet  
 Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
 Detector = Peak Sweep = auto couple  
 Trace = max hold  
 High Channel: Transmit = 3680 MHz Output power setting: 24  
 Channel bandwidth: 40 MHz Both ports active and 50Ω terminated  
 Upper band edge frequency = 3700 MHz  
 Limit:  $43 + 10\log(P)$  below the channel transmitter power = -13 dBm/MHz  
 EIRP(dBm) =  $E(\text{dB}\mu\text{V/m}) + 20\log(d) - 104.8$  where d is the measurement distance in meters.

Power level at band edge =  $57.49 + 20\log(3) - 104.8 = -37.77 \text{ dBm/MHz}$

Horizontal:



Date: 19.OCT.2016 10:54:49



166 South Carter, Genoa City, WI 53128

Company:	Cambium Networks
Model Tested:	3082CHH
Report Number:	22288
DLS Project:	8420

## Appendix B – Measurement Data

### B6.0 Transmitter Unwanted Emissions – RF conducted

**Rule Part:** FCC Part 90.1323  
FCC Part 2.1051

**Test Procedure:** FCC KDB 971168 D01: Power Meas License Digital Systems v02r02  
Section 6.0 – at Antenna Terminals

The EUT was connected to a spectrum analyzer through a cable and 20 dB attenuator.  
The output power set to the same level as was used in the Transmitter Output Power test.

**Limit:** FCC Part 90.1323  
The power of any emission outside the frequency band 3650-3700 MHz shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log_{10}(P)$  dB, where P is measured in watts.

**Sample calculation:** Measured mean output power of one port = 22.04 dBm.  
 $22.04 \text{ dBm} + 17 \text{ dBi antenna gain} + 3 \text{ dB (because there are 2 output ports)}$   
 $= 42.04 \text{ dBm} = 15.996 \text{ Watts}$   
 $\text{Limit (dBc)} = 43 + 10 \log(15.996) = 55.04 \text{ dB}$   
 $42.04 \text{ dBm} - 55.04 \text{ dB} = \mathbf{-13 \text{ dBm}}$

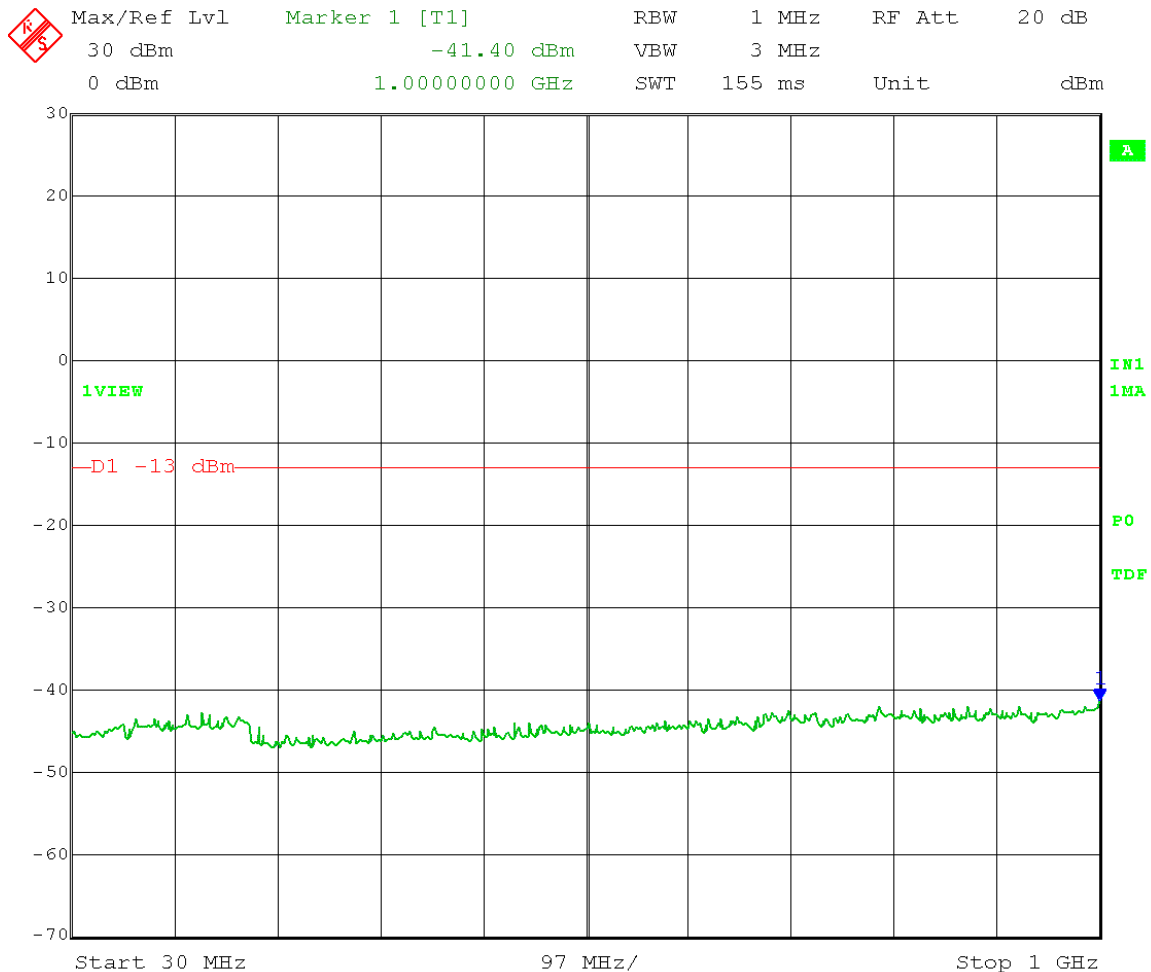
**Results:** Compliant

**Notes:** This test was done with 5, 20, and 40 MHz channel bandwidth settings.  
Only tested QPSK modulation mode as determined worst case by Cambium Networks. Only tested output port A as determined worst case by Cambium Networks.

Test Date: 10-11-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45116A  
Test: Transmitter Unwanted Emissions – RF Conducted  
Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
Detector = Peak Sweep = auto couple  
Trace = max hold  
Low Channel: 3652.5 MHz Output power setting: 18  
Channel bandwidth: 5 MHz Output port: A  
Limit:  $43 + 10\log(P)$  below the channel transmitter power  
= -13 dBm/MHz

Frequency Range: 30 – 1000 MHz

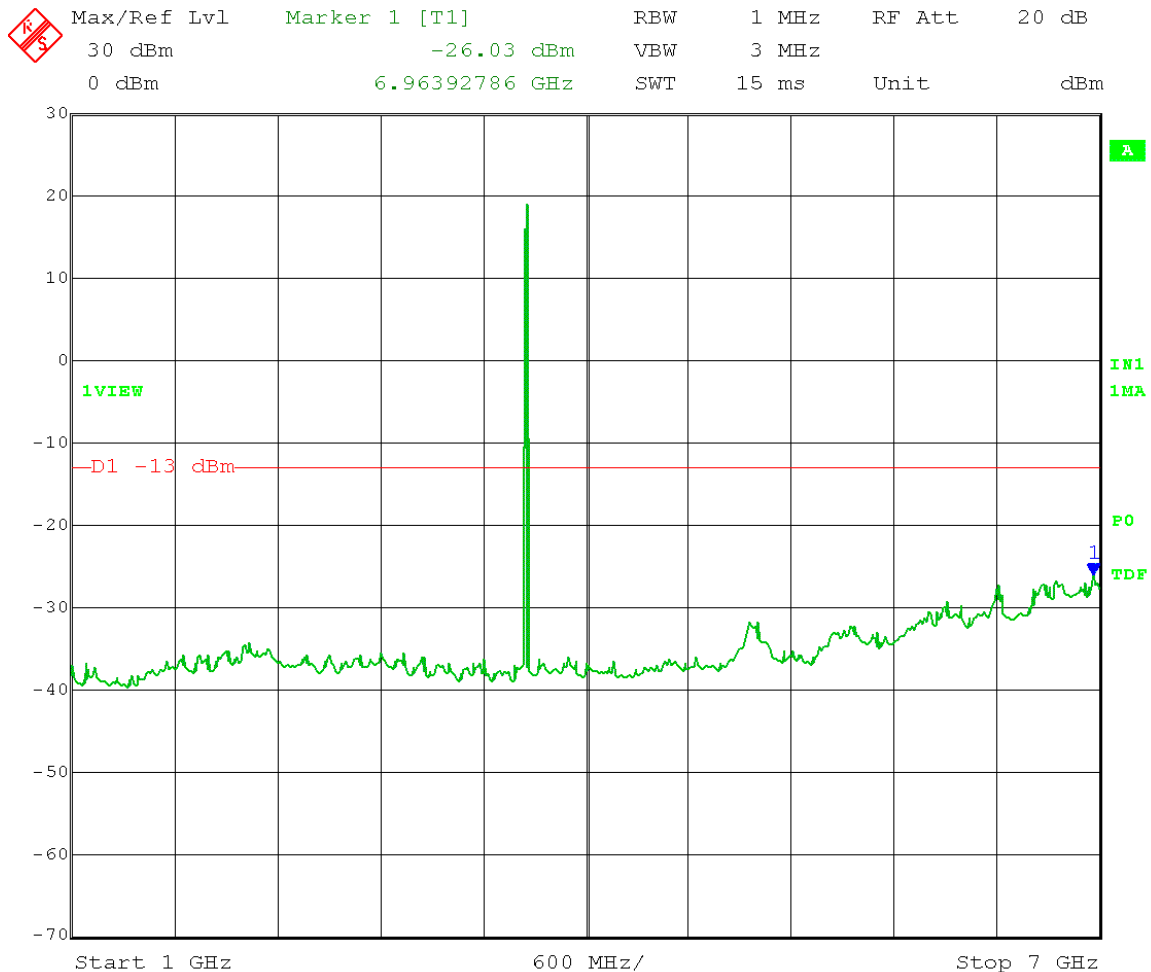


Date: 11.OCT.2016 09:23:34

Test Date: 10-11-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45116A  
Test: Transmitter Unwanted Emissions – RF Conducted  
Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
Detector = Peak Sweep = auto couple  
Trace = max hold  
Low Channel: 3652.5 MHz Output power setting: 18  
Channel bandwidth: 5 MHz Output port: A  
Limit:  $43 + 10\log(P)$  below the channel transmitter power  
= -13 dBm/MHz

Frequency Range: 1 – 7 GHz

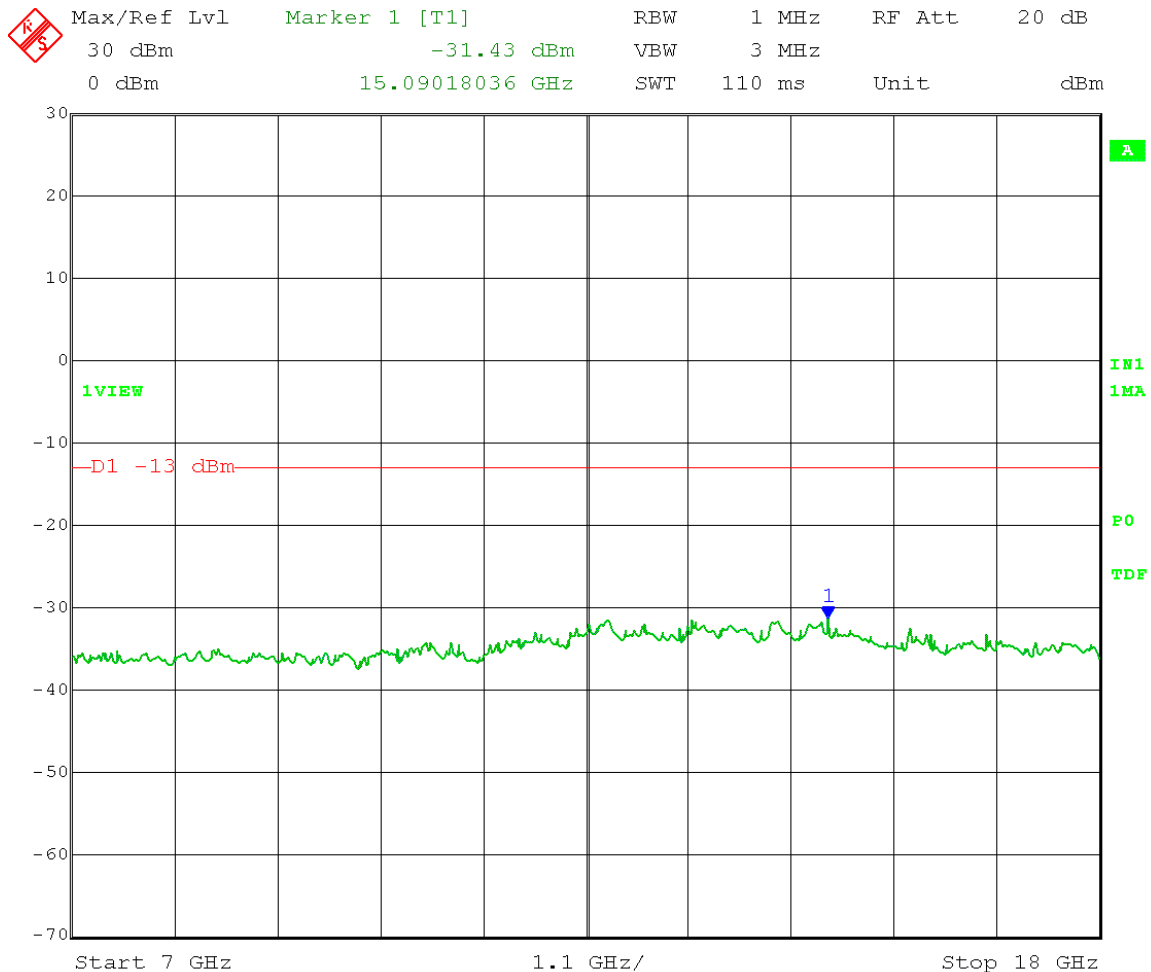


Date: 11.OCT.2016 09:15:38

Test Date: 10-11-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45116A  
Test: Transmitter Unwanted Emissions – RF Conducted  
Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
Detector = Peak Sweep = auto couple  
Trace = max hold  
Low Channel: 3652.5 MHz Output power setting: 18  
Channel bandwidth: 5 MHz Output port: A  
Limit:  $43 + 10\log(P)$  below the channel transmitter power  
= -13 dBm/MHz

Frequency Range: 7 – 18 GHz

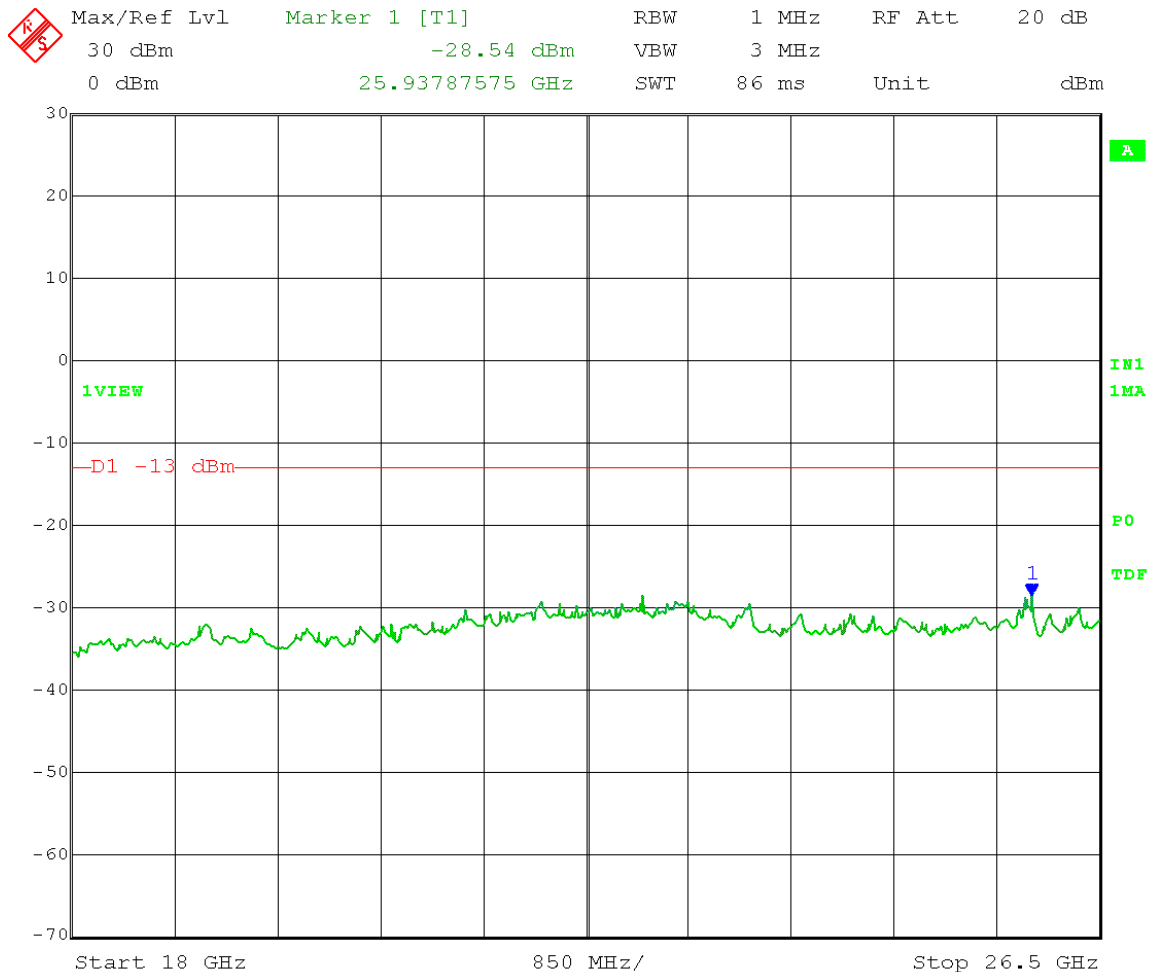


Date: 11.OCT.2016 09:18:39

Test Date: 10-11-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45116A  
Test: Transmitter Unwanted Emissions – RF Conducted  
Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
Detector = Peak Sweep = auto couple  
Trace = max hold  
Low Channel: 3652.5 MHz Output power setting: 18  
Channel bandwidth: 5 MHz Output port: A  
Limit:  $43 + 10\log(P)$  below the channel transmitter power  
= -13 dBm/MHz

Frequency Range: 18 – 26.5 GHz



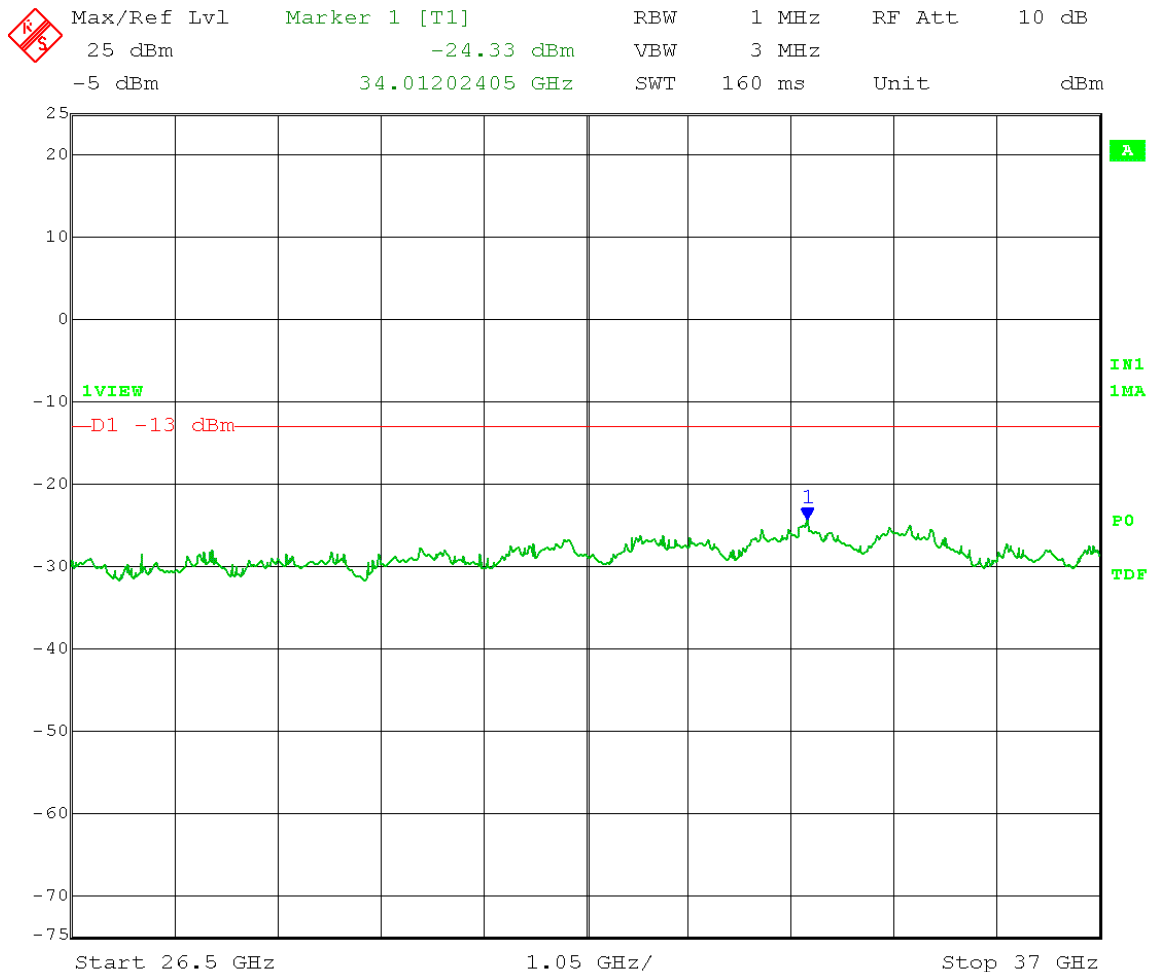
Date: 11.OCT.2016 09:20:31



Test Date: 10-11-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45116A  
Test: Transmitter Unwanted Emissions – RF Conducted  
Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
Detector = Peak Sweep = auto couple  
Trace = max hold  
Low Channel: 3652.5 MHz Output power setting: 18  
Channel bandwidth: 5 MHz Output port: A  
Limit:  $43 + 10\log(P)$  below the channel transmitter power  
= -13 dBm/MHz

Frequency Range: 26.5 – 37 GHz

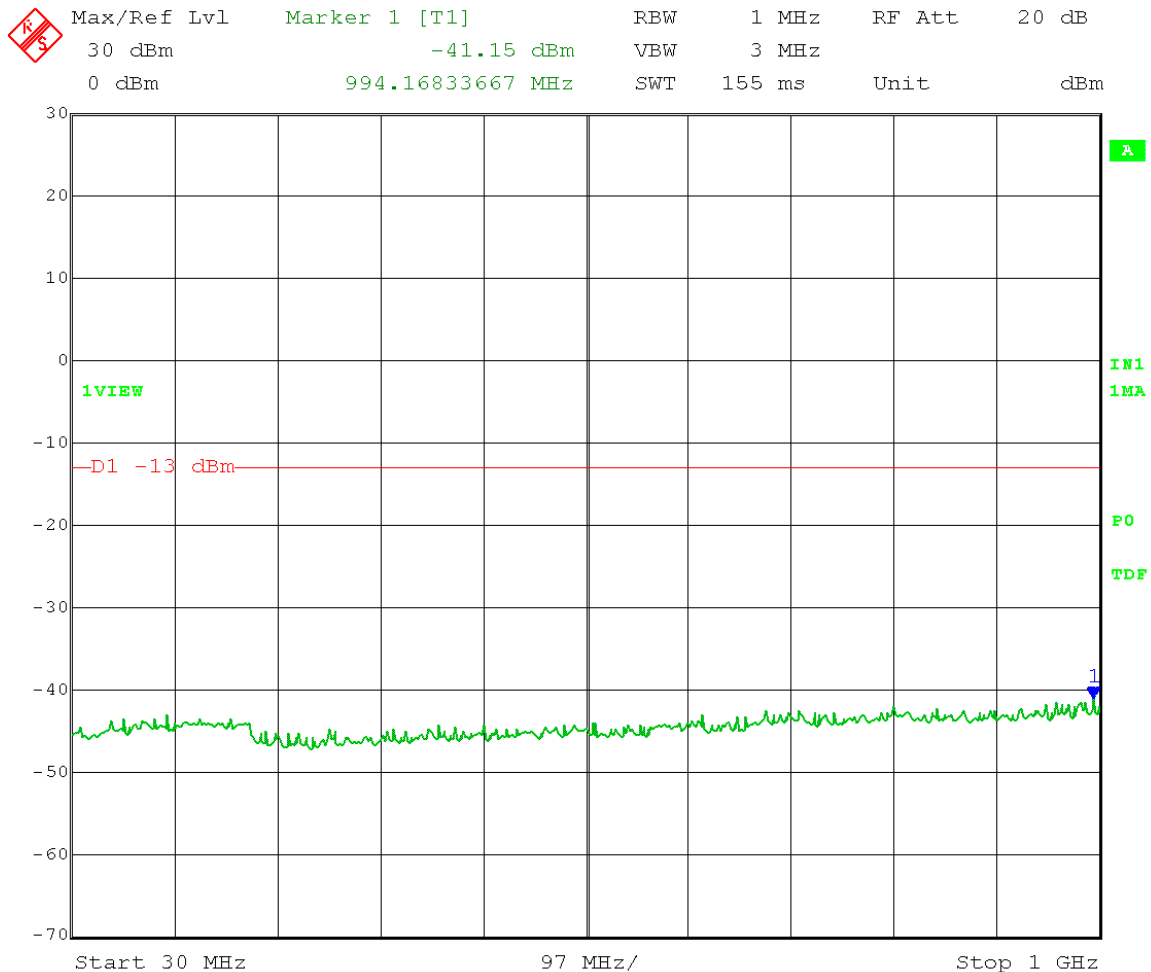


Date: 11.OCT.2016 09:22:06

Test Date: 10-11-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45116A  
Test: Transmitter Unwanted Emissions – RF Conducted  
Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
Detector = Peak Sweep = auto couple  
Trace = max hold  
Mid Channel: 3675 MHz Output power setting: 18  
Channel bandwidth: 5 MHz Output port: A  
Limit:  $43 + 10\log(P)$  below the channel transmitter power  
= -13 dBm/MHz

Frequency Range: 30 – 1000 MHz

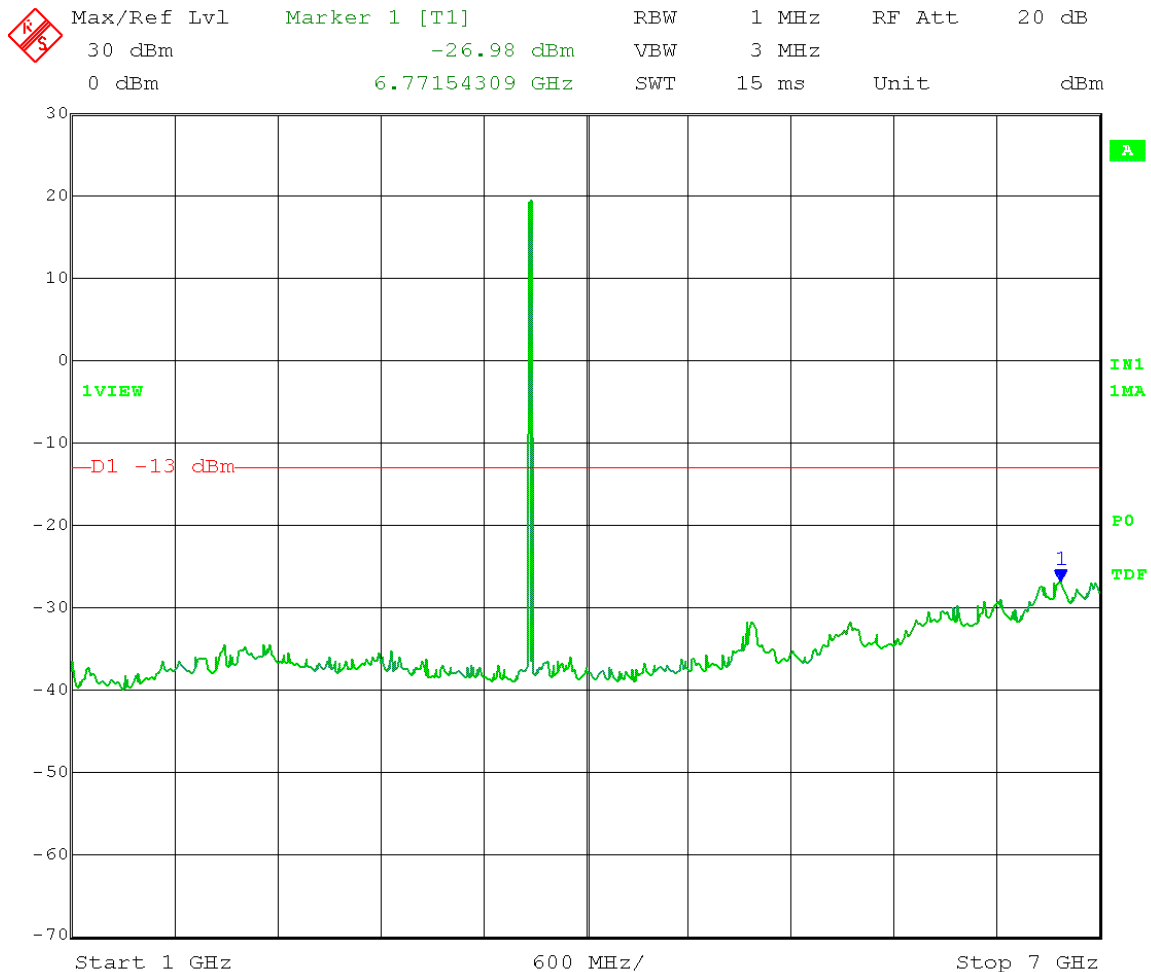


Date: 11.OCT.2016 09:37:59

Test Date: 10-11-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45116A  
Test: Transmitter Unwanted Emissions – RF Conducted  
Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
Detector = Peak Sweep = auto couple  
Trace = max hold  
Mid Channel: 3675 MHz Output power setting: 18  
Channel bandwidth: 5 MHz Output port: A  
Limit:  $43 + 10\log(P)$  below the channel transmitter power  
= -13 dBm/MHz

Frequency Range: 1 – 7 GHz

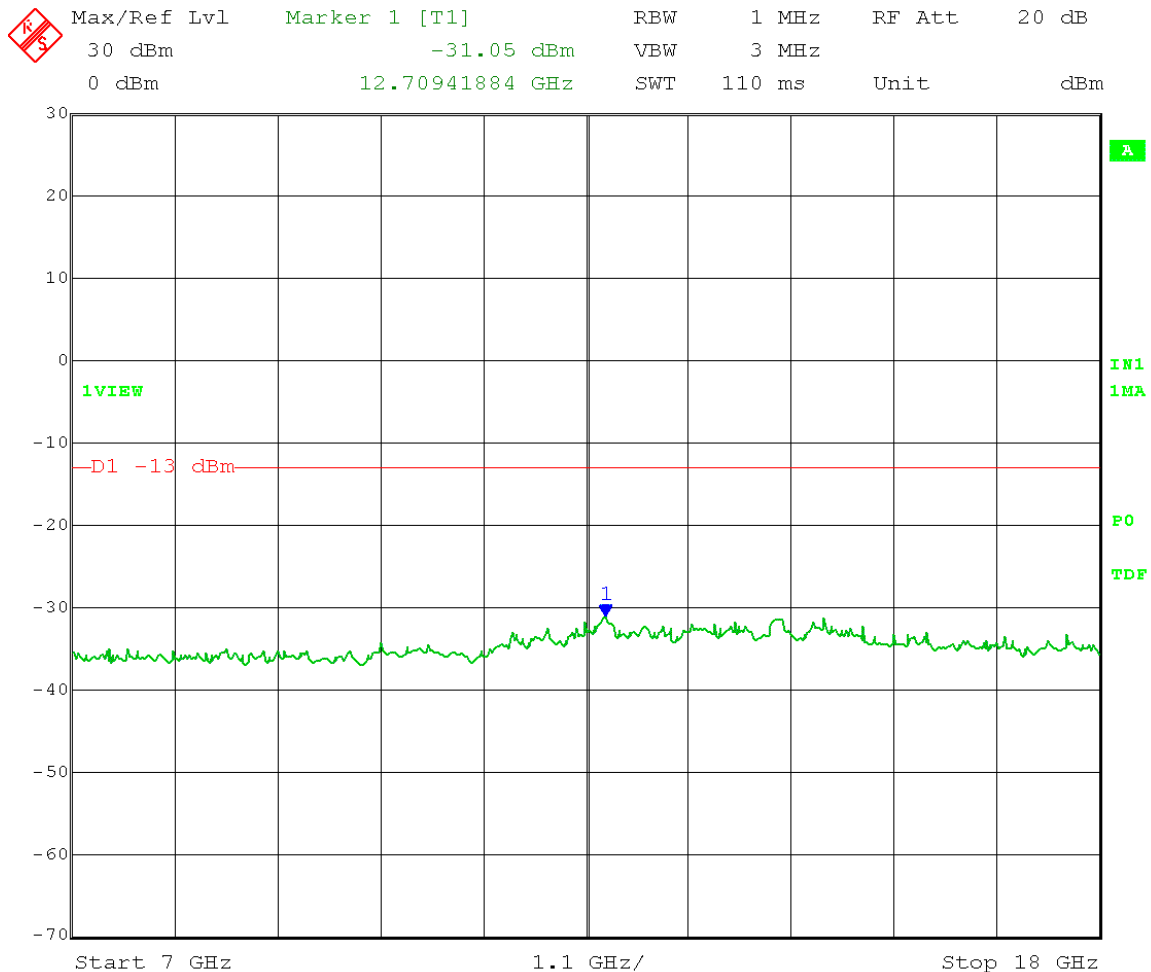


Date: 11.OCT.2016 09:27:03

Test Date: 10-11-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45116A  
Test: Transmitter Unwanted Emissions – RF Conducted  
Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
Detector = Peak Sweep = auto couple  
Trace = max hold  
Mid Channel: 3675 MHz Output power setting: 18  
Channel bandwidth: 5 MHz Output port: A  
Limit:  $43 + 10\log(P)$  below the channel transmitter power  
= -13 dBm/MHz

Frequency Range: 7 – 18 GHz

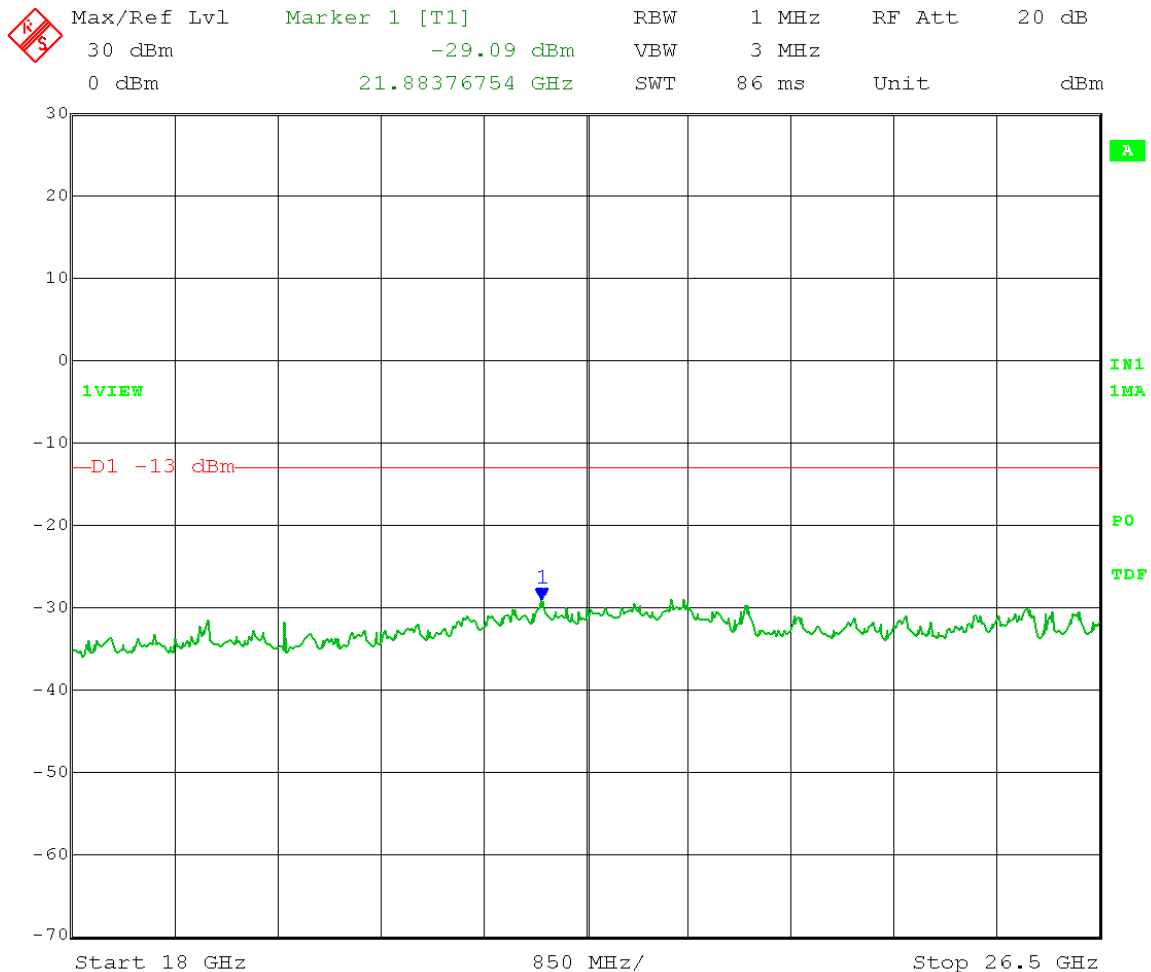


Date: 11.OCT.2016 09:29:02

Test Date: 10-11-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45116A  
Test: Transmitter Unwanted Emissions – RF Conducted  
Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
Detector = Peak Sweep = auto couple  
Trace = max hold  
Mid Channel: 3675 MHz Output power setting: 18  
Channel bandwidth: 5 MHz Output port: A  
Limit:  $43 + 10\log(P)$  below the channel transmitter power  
= -13 dBm/MHz

Frequency Range: 18 – 26.5 GHz

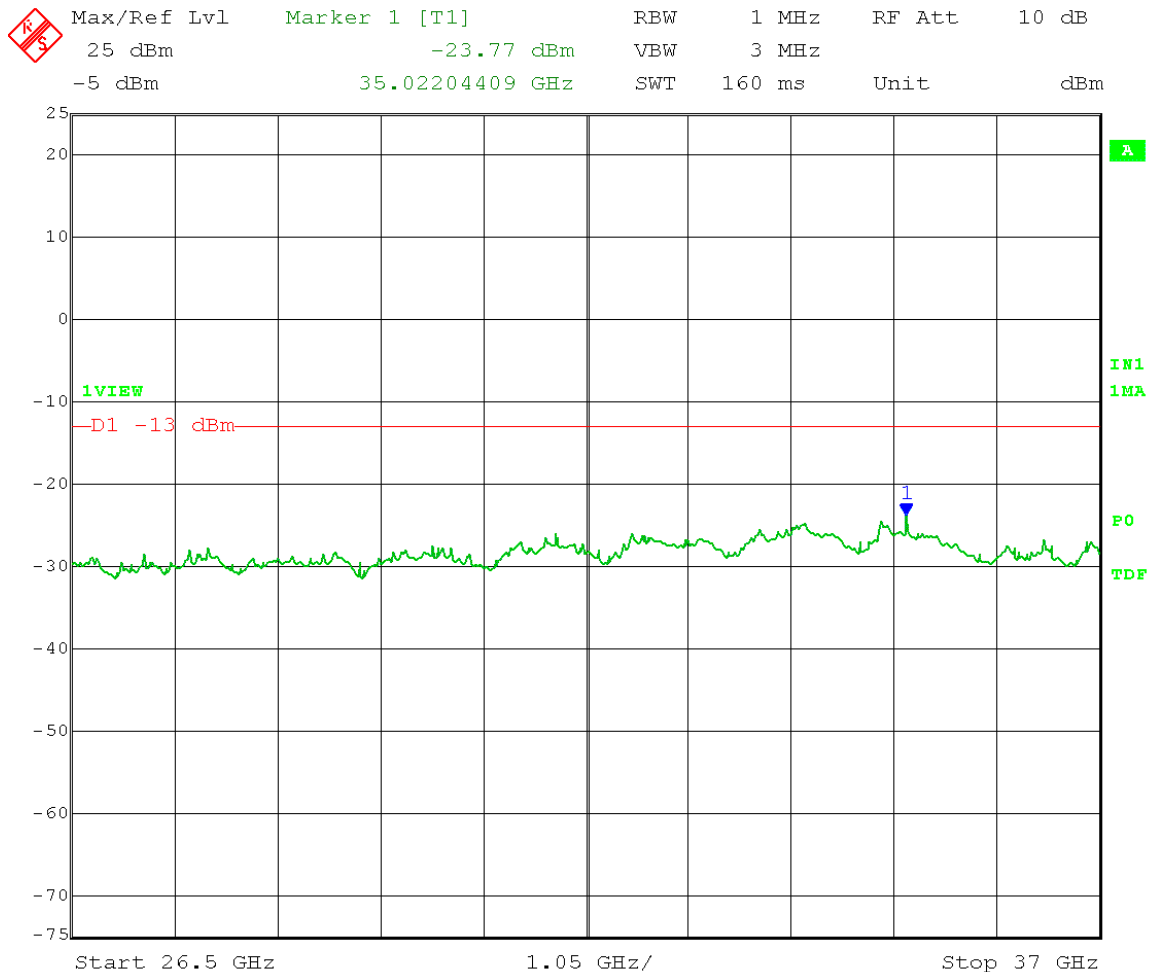


Date: 11.OCT.2016 09:34:33

Test Date: 10-11-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45116A  
Test: Transmitter Unwanted Emissions – RF Conducted  
Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
Detector = Peak Sweep = auto couple  
Trace = max hold  
Mid Channel: 3675 MHz Output power setting: 18  
Channel bandwidth: 5 MHz Output port: A  
Limit: 43 + 10log (P) below the channel transmitter power  
= -13 dBm/MHz

Frequency Range: 26.5 – 37 GHz

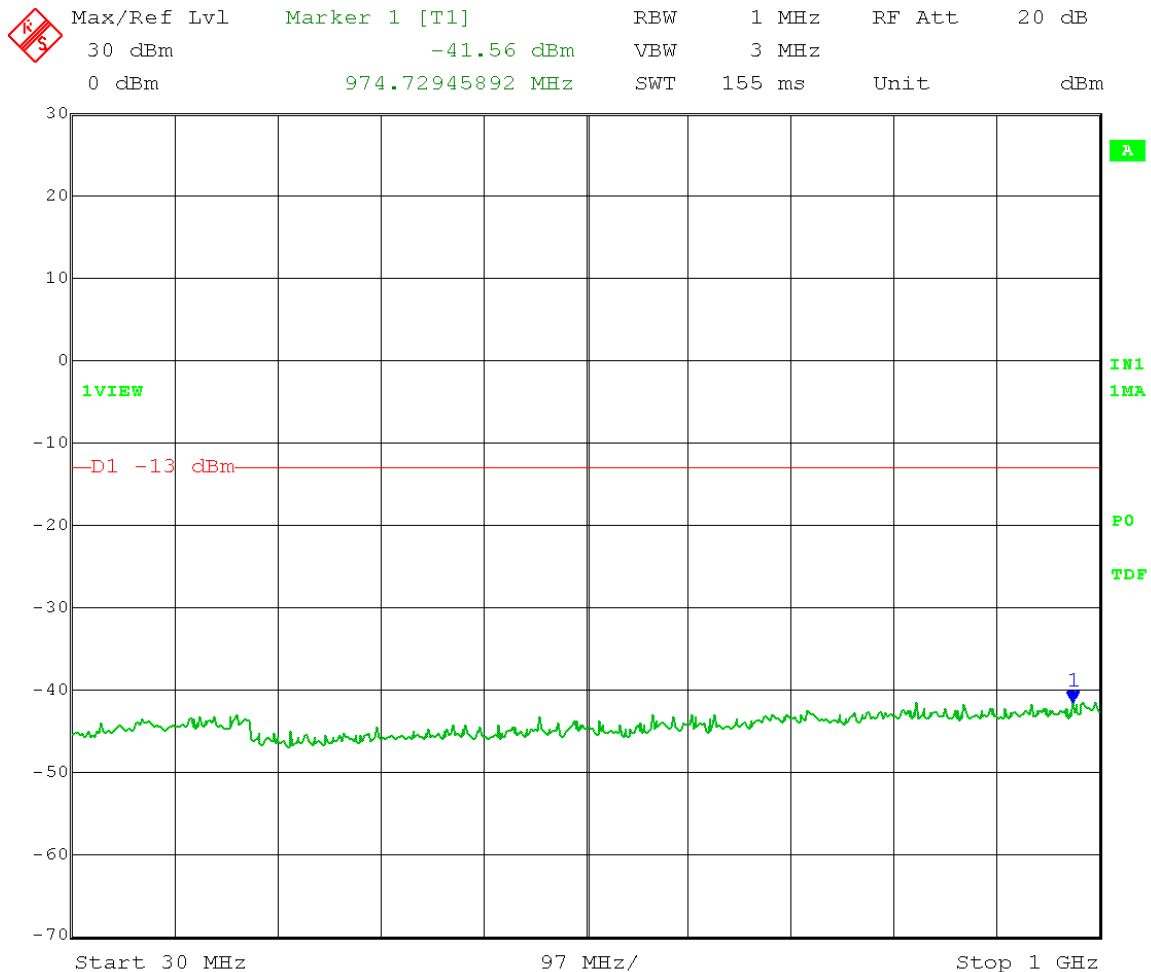


Date: 11.OCT.2016 09:36:48

Test Date: 10-11-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45116A  
Test: Transmitter Unwanted Emissions – RF Conducted  
Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
Detector = Peak Sweep = auto couple  
Trace = max hold  
High Channel: 3697.5 MHz Output power setting: 18  
Channel bandwidth: 5 MHz Output port: A  
Limit:  $43 + 10\log(P)$  below the channel transmitter power  
= -13 dBm/MHz

Frequency Range: 30 – 1000 MHz

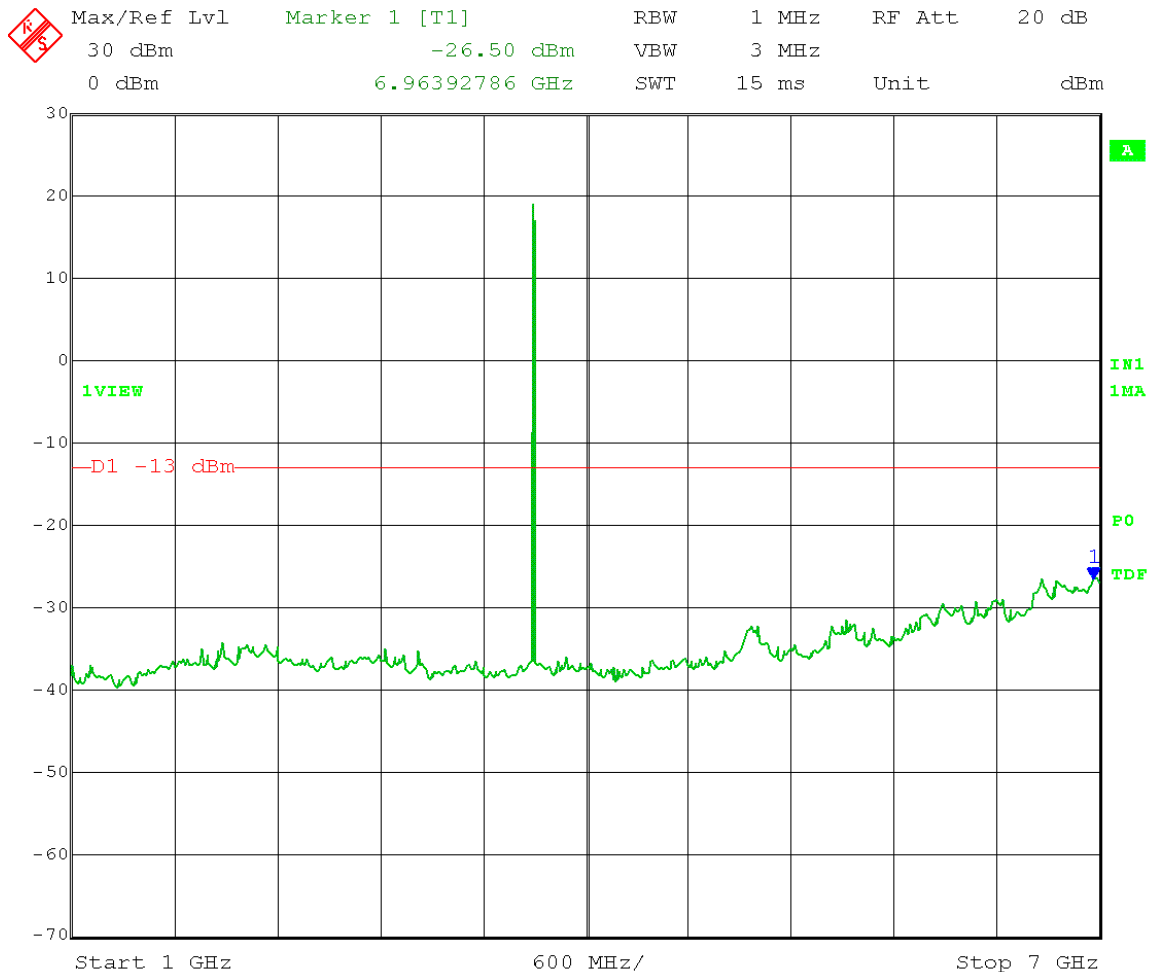


Date: 11.OCT.2016 10:38:20

Test Date: 10-11-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45116A  
Test: Transmitter Unwanted Emissions – RF Conducted  
Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
Detector = Peak Sweep = auto couple  
Trace = max hold  
High Channel: 3697.5 MHz Output power setting: 18  
Channel bandwidth: 5 MHz Output port: A  
Limit:  $43 + 10\log(P)$  below the channel transmitter power  
= -13 dBm/MHz

Frequency Range: 1 – 7 GHz



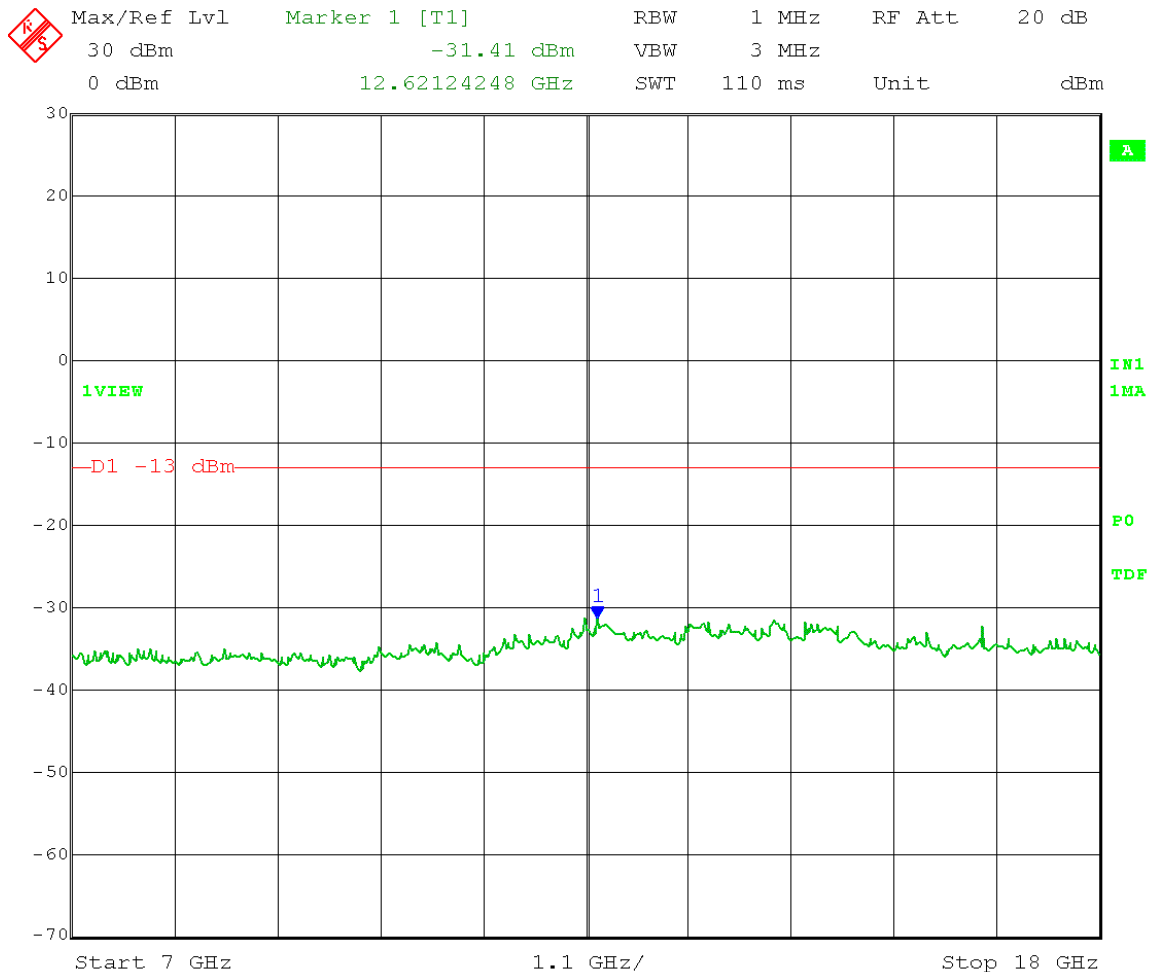
Date: 11.OCT.2016 10:32:02



Test Date: 10-11-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45116A  
Test: Transmitter Unwanted Emissions – RF Conducted  
Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
Detector = Peak Sweep = auto couple  
Trace = max hold  
High Channel: 3697.5 MHz Output power setting: 18  
Channel bandwidth: 5 MHz Output port: A  
Limit:  $43 + 10\log(P)$  below the channel transmitter power  
= -13 dBm/MHz

Frequency Range: 7 – 18 GHz

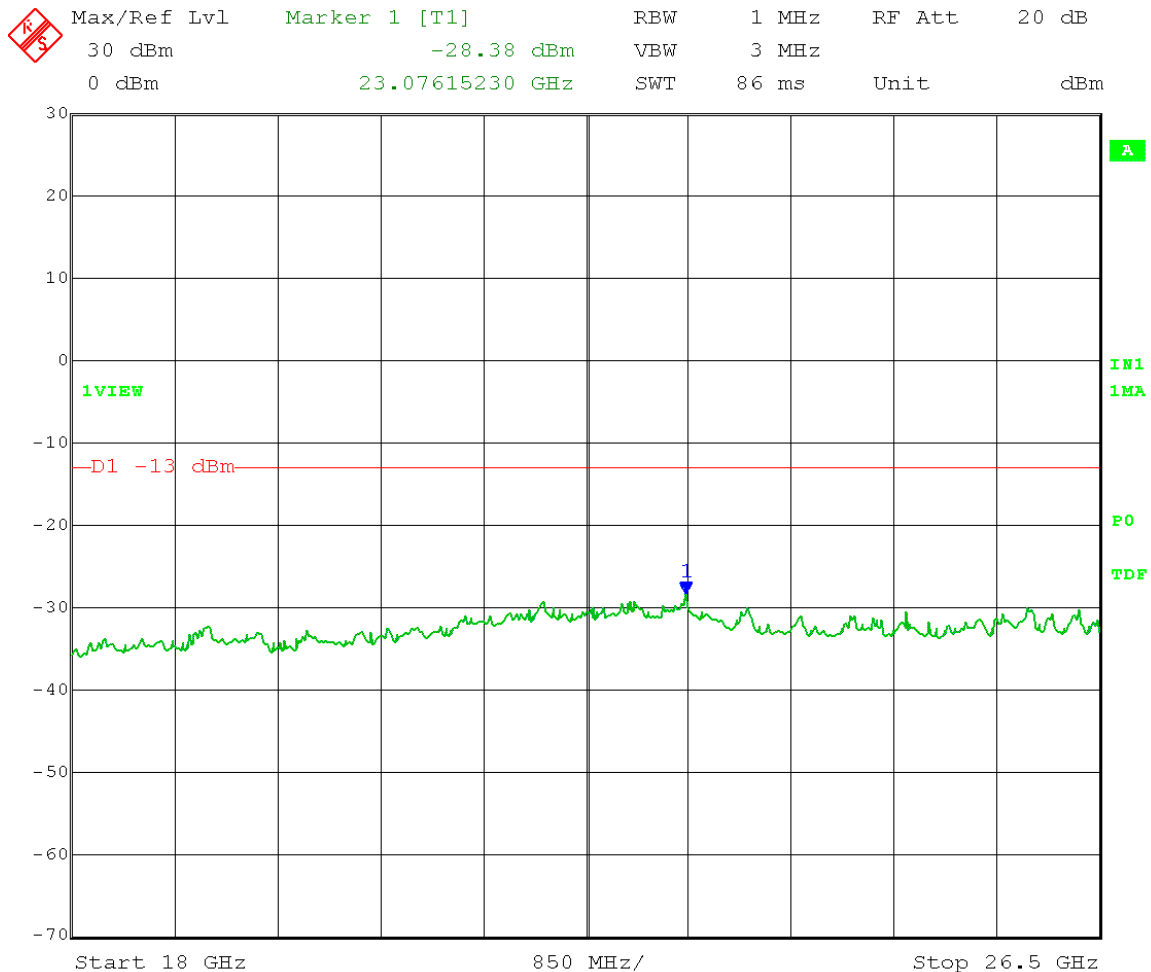


Date: 11.OCT.2016 10:33:34

Test Date: 10-11-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45116A  
Test: Transmitter Unwanted Emissions – RF Conducted  
Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
Detector = Peak Sweep = auto couple  
Trace = max hold  
High Channel: 3697.5 MHz Output power setting: 18  
Channel bandwidth: 5 MHz Output port: A  
Limit:  $43 + 10\log(P)$  below the channel transmitter power  
= -13 dBm/MHz

Frequency Range: 18 – 26.5 GHz

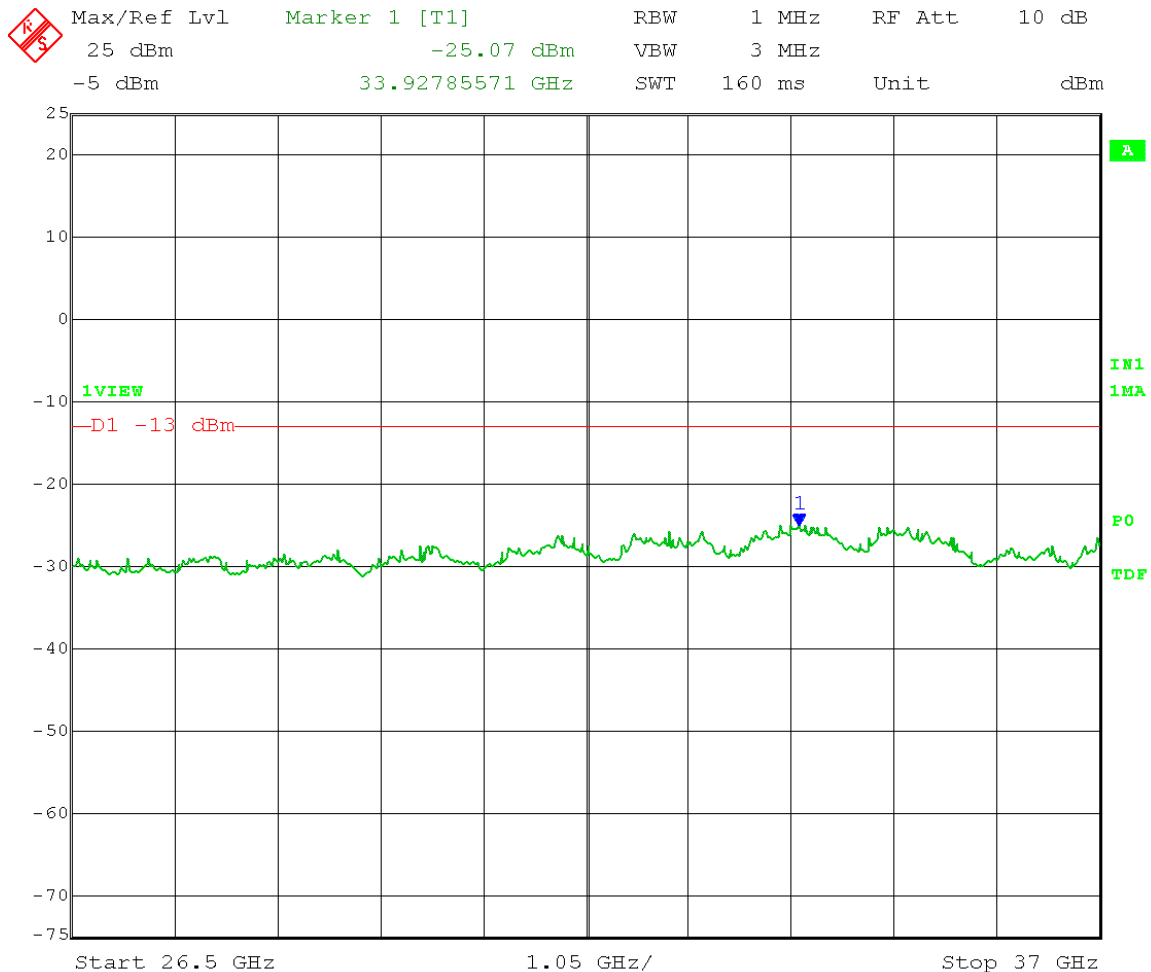


Date: 11.OCT.2016 10:34:55

Test Date: 10-11-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45116A  
Test: Transmitter Unwanted Emissions – RF Conducted  
Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
Detector = Peak Sweep = auto couple  
Trace = max hold  
High Channel: 3697.5 MHz Output power setting: 18  
Channel bandwidth: 5 MHz Output port: A  
Limit: 43 + 10log (P) below the channel transmitter power  
= -13 dBm/MHz

Frequency Range: 26.5 – 37 GHz

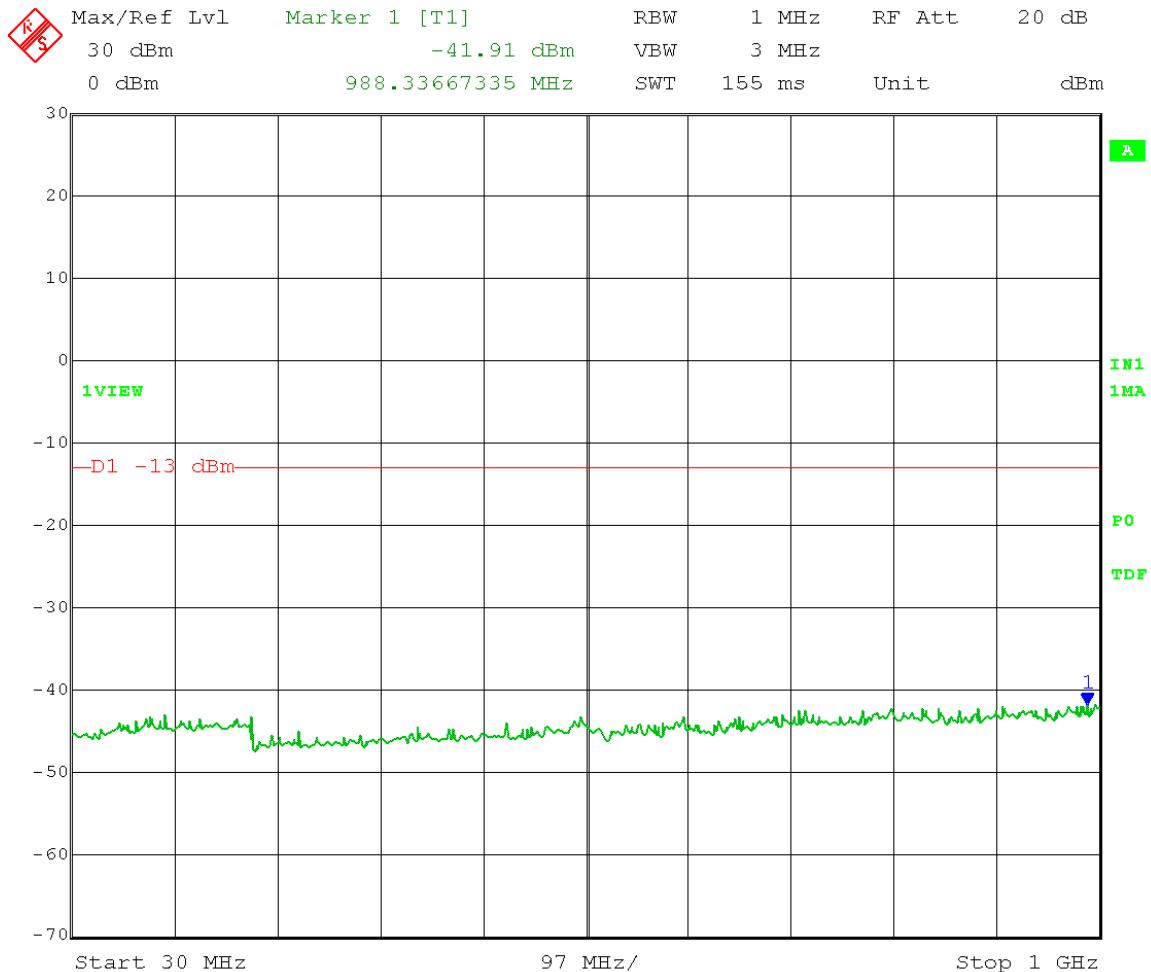


Date: 11.OCT.2016 10:36:33

Test Date: 10-19-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45117F  
Test: Transmitter Unwanted Emissions – RF Conducted  
Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
Detector = Peak Sweep = auto couple  
Trace = max hold  
Low Channel: 3660 MHz Output power setting: 22  
Channel bandwidth: 20 MHz Output port: A  
Limit:  $43 + 10\log(P)$  below the channel transmitter power  
= -13 dBm/MHz

Frequency Range: 30 – 1000 MHz

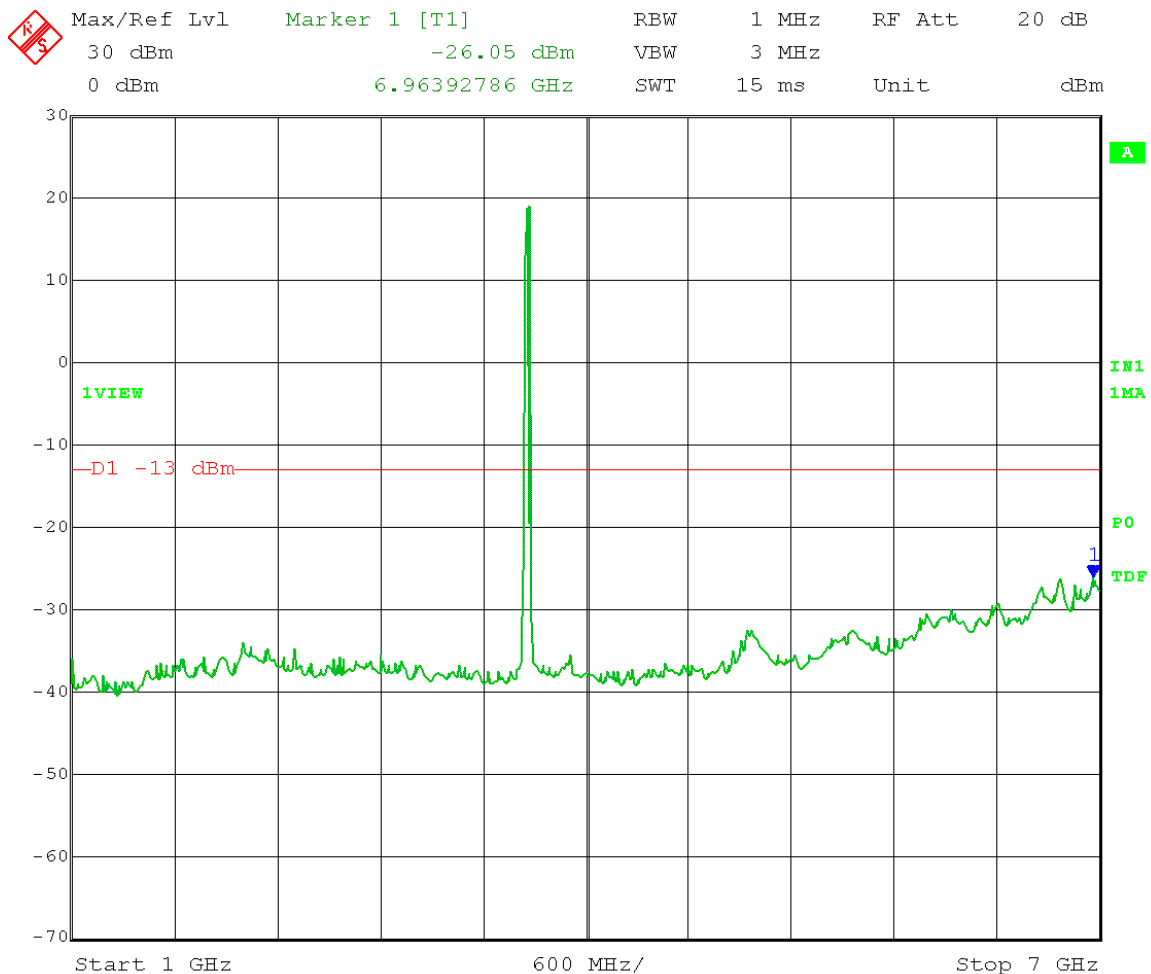


Date: 19.OCT.2016 14:19:19

Test Date: 10-19-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45117F  
Test: Transmitter Unwanted Emissions – RF Conducted  
Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
Detector = Peak Sweep = auto couple  
Trace = max hold  
Low Channel: 3660 MHz Output power setting: 22  
Channel bandwidth: 20 MHz Output port: A  
Limit:  $43 + 10\log(P)$  below the channel transmitter power  
= -13 dBm/MHz

Frequency Range: 1 – 7 GHz

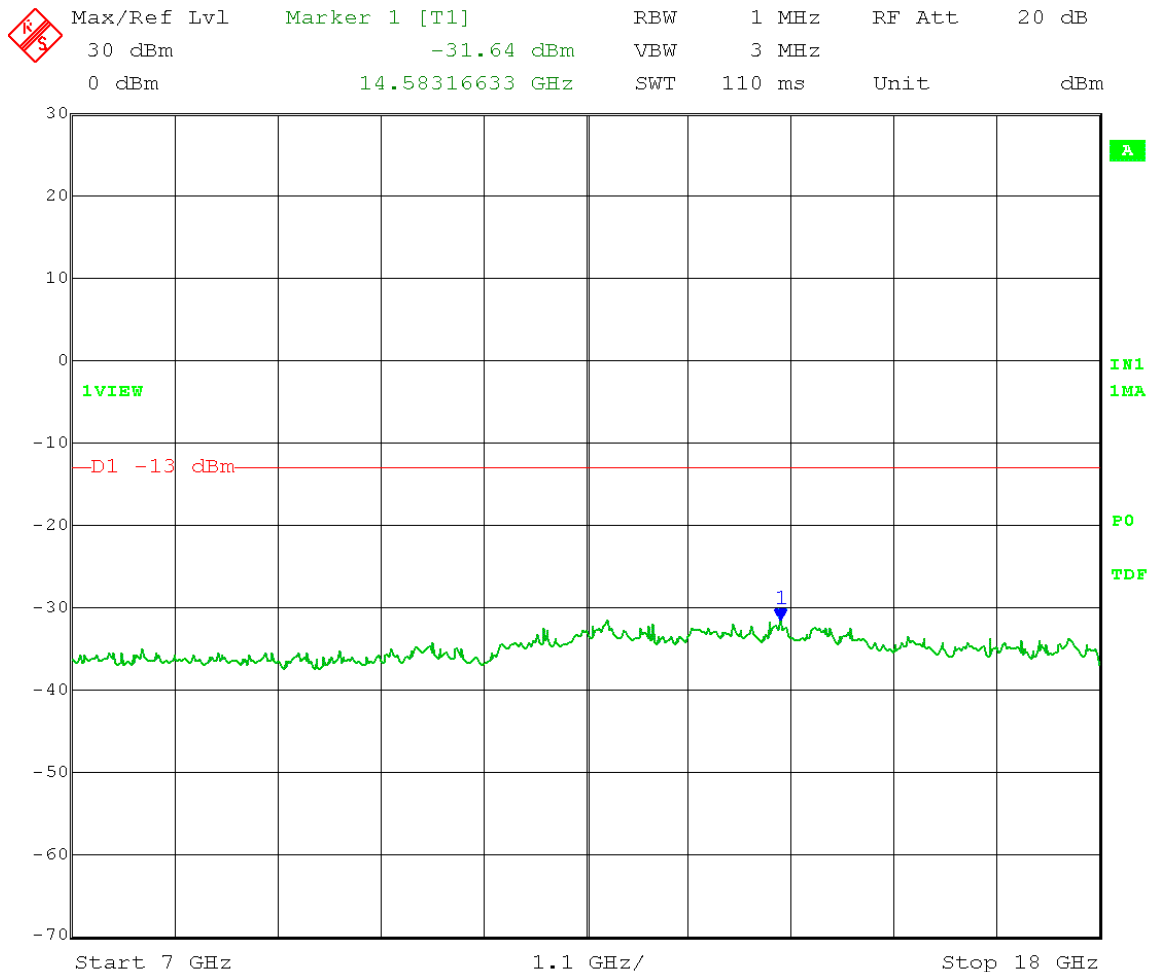


Date: 19.OCT.2016 14:17:54

Test Date: 10-19-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45117F  
Test: Transmitter Unwanted Emissions – RF Conducted  
Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
Detector = Peak Sweep = auto couple  
Trace = max hold  
Low Channel: 3660 MHz Output power setting: 22  
Channel bandwidth: 20 MHz Output port: A  
Limit:  $43 + 10\log(P)$  below the channel transmitter power  
= -13 dBm/MHz

Frequency Range: 7 – 18 GHz

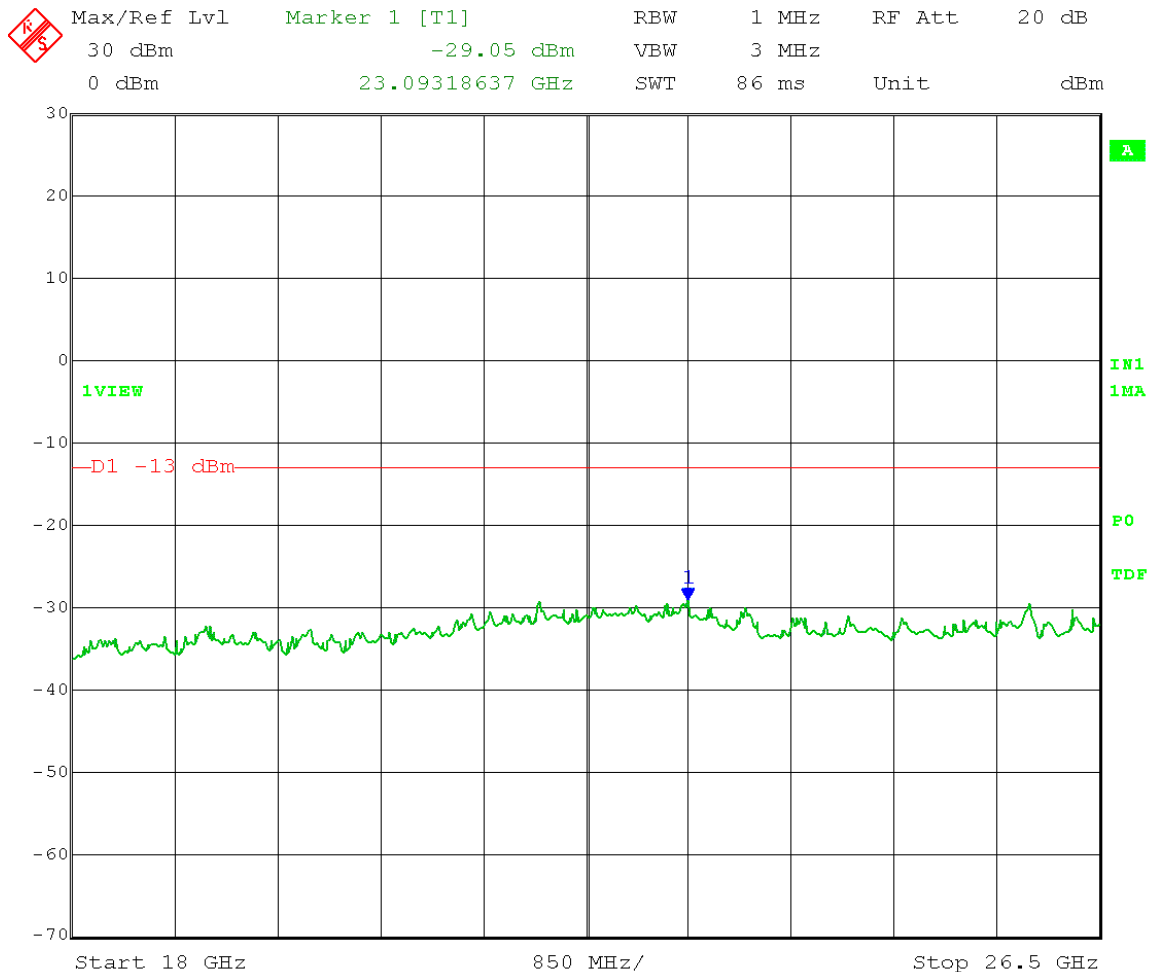


Date: 19.OCT.2016 14:20:58

Test Date: 10-19-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45117F  
Test: Transmitter Unwanted Emissions – RF Conducted  
Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
Detector = Peak Sweep = auto couple  
Trace = max hold  
Low Channel: 3660 MHz Output power setting: 22  
Channel bandwidth: 20 MHz Output port: A  
Limit:  $43 + 10\log(P)$  below the channel transmitter power  
= -13 dBm/MHz

Frequency Range: 18 – 26.5 GHz

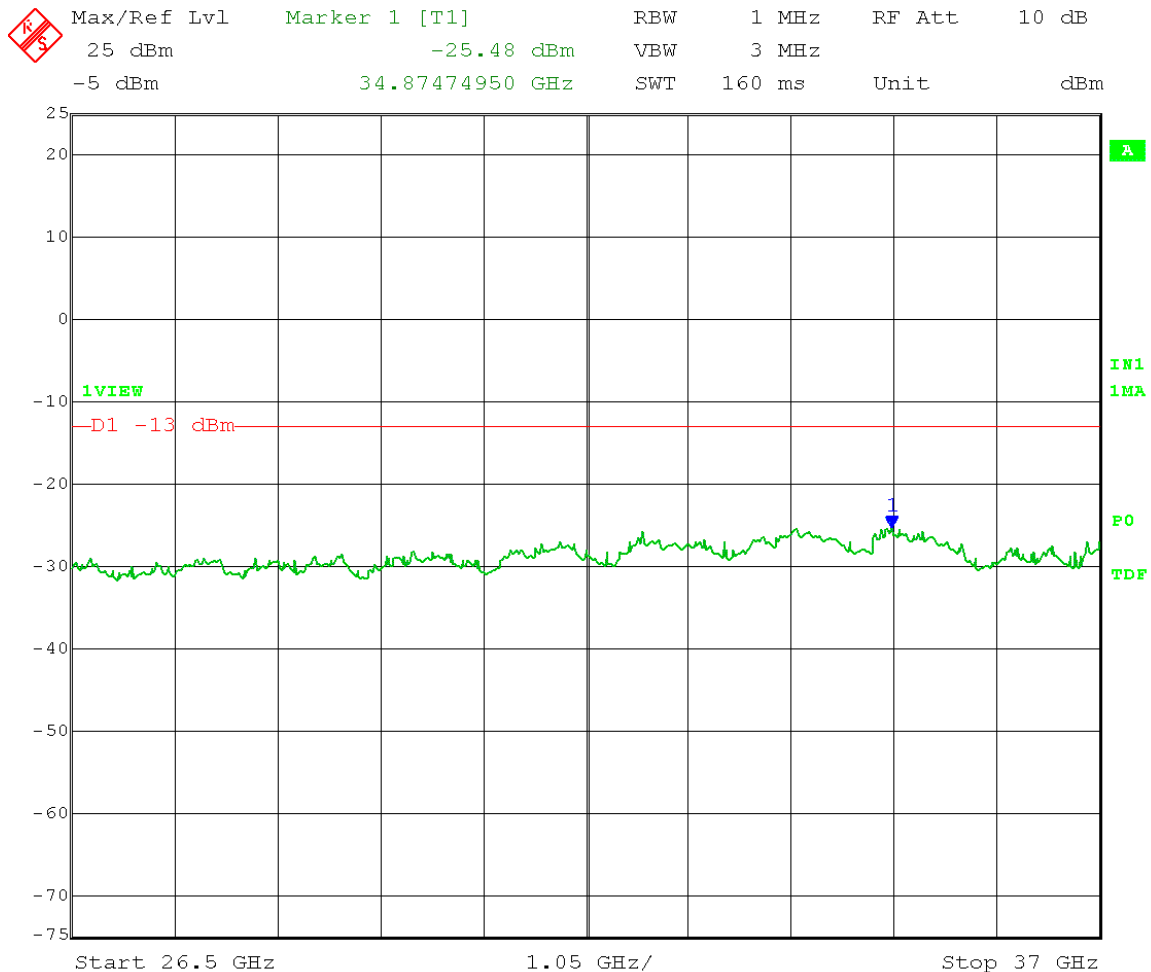


Date: 19.OCT.2016 14:22:24

Test Date: 10-19-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45117F  
Test: Transmitter Unwanted Emissions – RF Conducted  
Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
Detector = Peak Sweep = auto couple  
Trace = max hold  
Low Channel: 3660 MHz Output power setting: 22  
Channel bandwidth: 20 MHz Output port: A  
Limit:  $43 + 10\log(P)$  below the channel transmitter power  
= -13 dBm/MHz

Frequency Range: 26.5 – 37 GHz



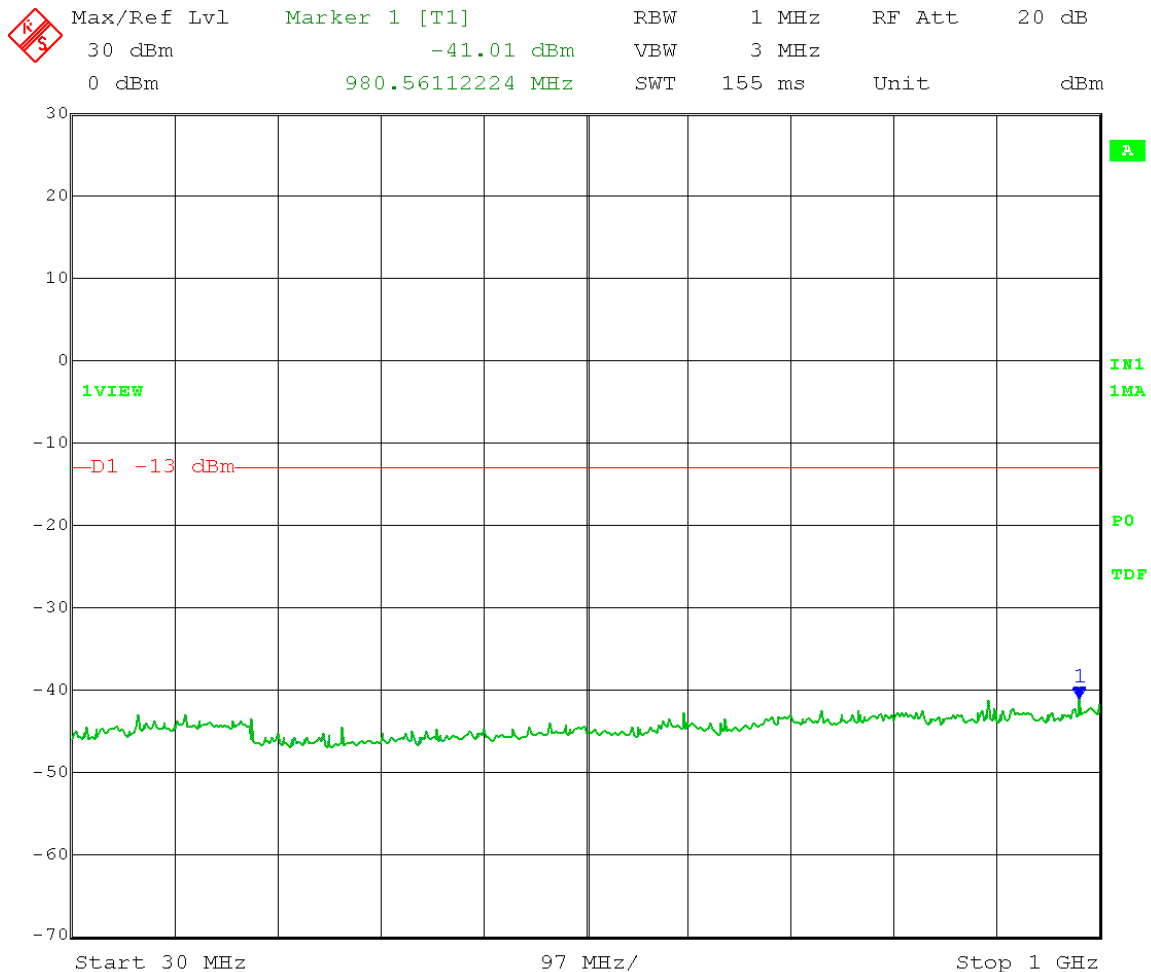
Date: 19.OCT.2016 14:28:41



Test Date: 10-19-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45117F  
Test: Transmitter Unwanted Emissions – RF Conducted  
Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
Detector = Peak Sweep = auto couple  
Trace = max hold  
Mid Channel: 3675 MHz Output power setting: 25  
Channel bandwidth: 20 MHz Output port: A  
Limit:  $43 + 10\log(P)$  below the channel transmitter power  
= -13 dBm/MHz

Frequency Range: 30 – 1000 MHz

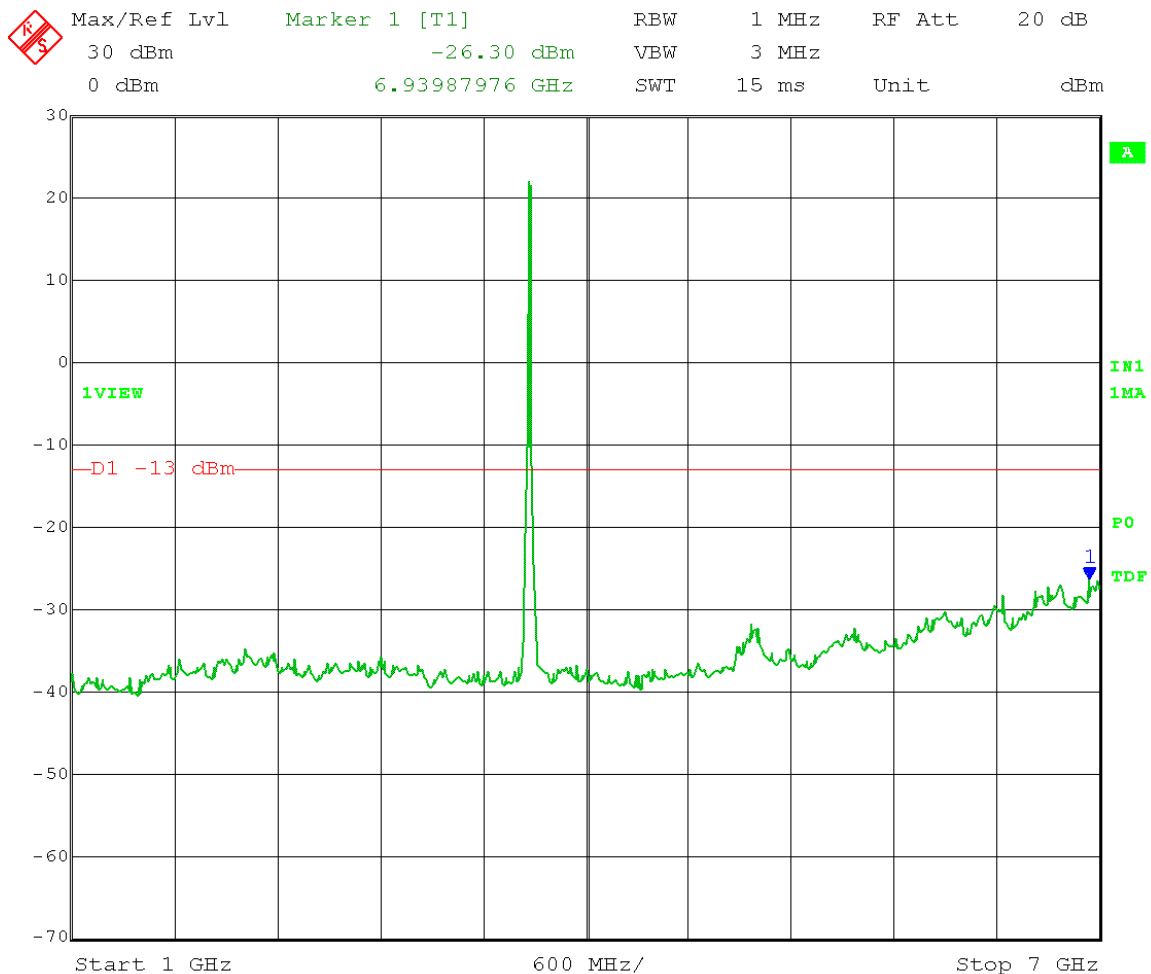


Date: 19.OCT.2016 14:33:59

Test Date: 10-19-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45117F  
Test: Transmitter Unwanted Emissions – RF Conducted  
Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
Detector = Peak Sweep = auto couple  
Trace = max hold  
Mid Channel: 3675 MHz Output power setting: 25  
Channel bandwidth: 20 MHz Output port: A  
Limit:  $43 + 10\log(P)$  below the channel transmitter power  
= -13 dBm/MHz

Frequency Range: 1 – 7 GHz

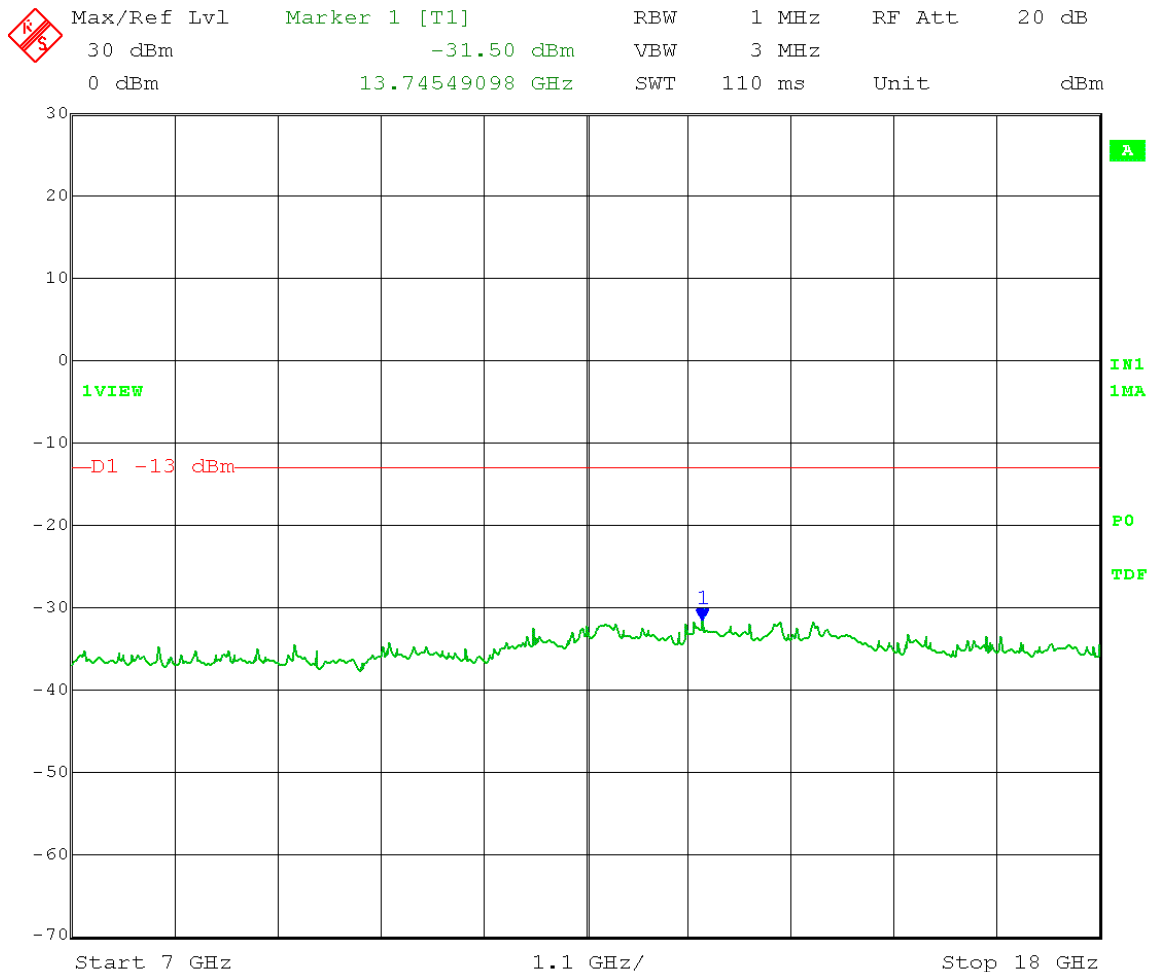


Date: 19.OCT.2016 14:32:30

Test Date: 10-19-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45117F  
Test: Transmitter Unwanted Emissions – RF Conducted  
Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
Detector = Peak Sweep = auto couple  
Trace = max hold  
Mid Channel: 3675 MHz Output power setting: 25  
Channel bandwidth: 20 MHz Output port: A  
Limit:  $43 + 10\log(P)$  below the channel transmitter power  
= -13 dBm/MHz

Frequency Range: 7 – 18 GHz

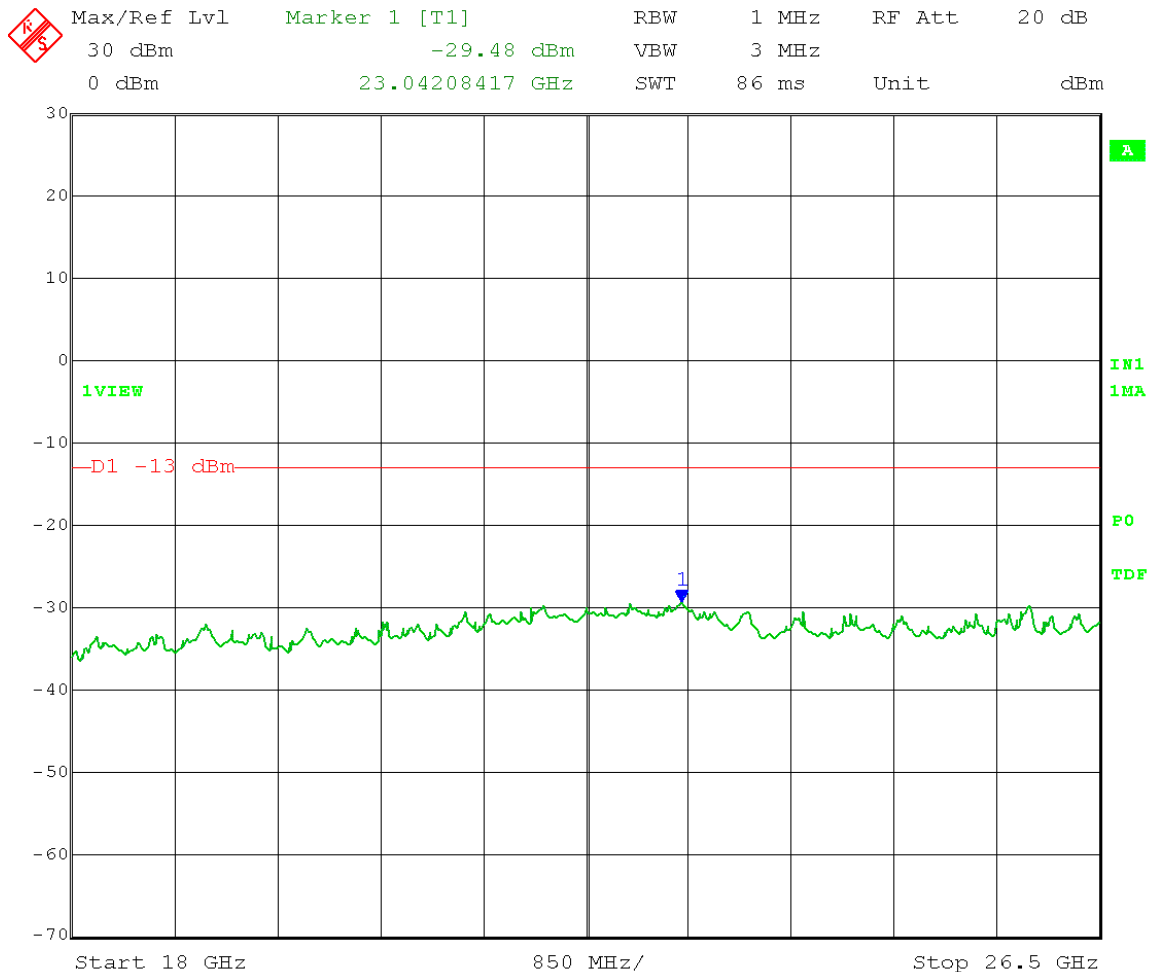


Date: 19.OCT.2016 14:35:30

Test Date: 10-19-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45117F  
Test: Transmitter Unwanted Emissions – RF Conducted  
Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
Detector = Peak Sweep = auto couple  
Trace = max hold  
Mid Channel: 3675 MHz Output power setting: 25  
Channel bandwidth: 20 MHz Output port: A  
Limit:  $43 + 10\log(P)$  below the channel transmitter power  
= -13 dBm/MHz

Frequency Range: 18 – 26.5 GHz

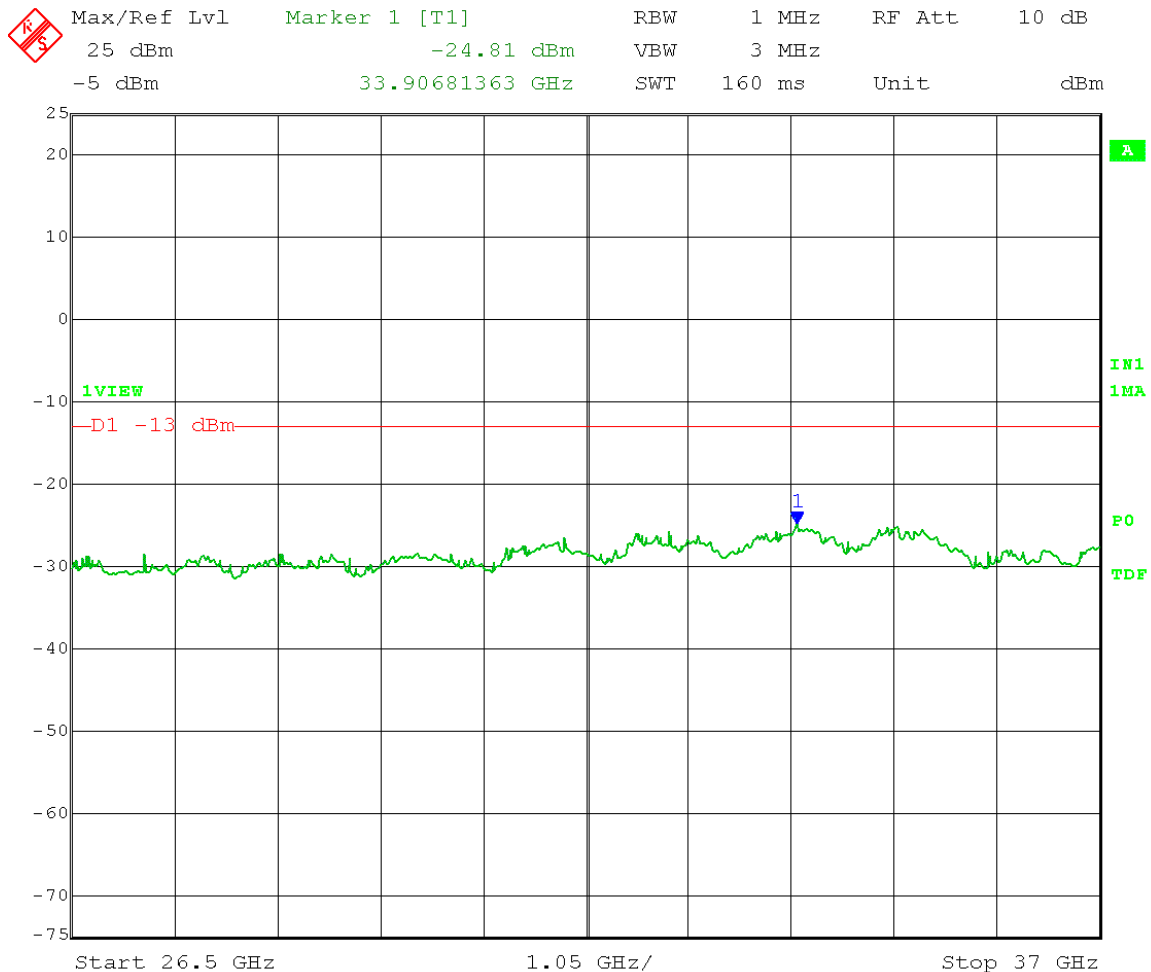


Date: 19.OCT.2016 14:37:06

Test Date: 10-19-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45117F  
Test: Transmitter Unwanted Emissions – RF Conducted  
Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
Detector = Peak Sweep = auto couple  
Trace = max hold  
Mid Channel: 3675 MHz Output power setting: 25  
Channel bandwidth: 20 MHz Output port: A  
Limit: 43 + 10log (P) below the channel transmitter power  
= -13 dBm/MHz

Frequency Range: 26.5 – 37 GHz

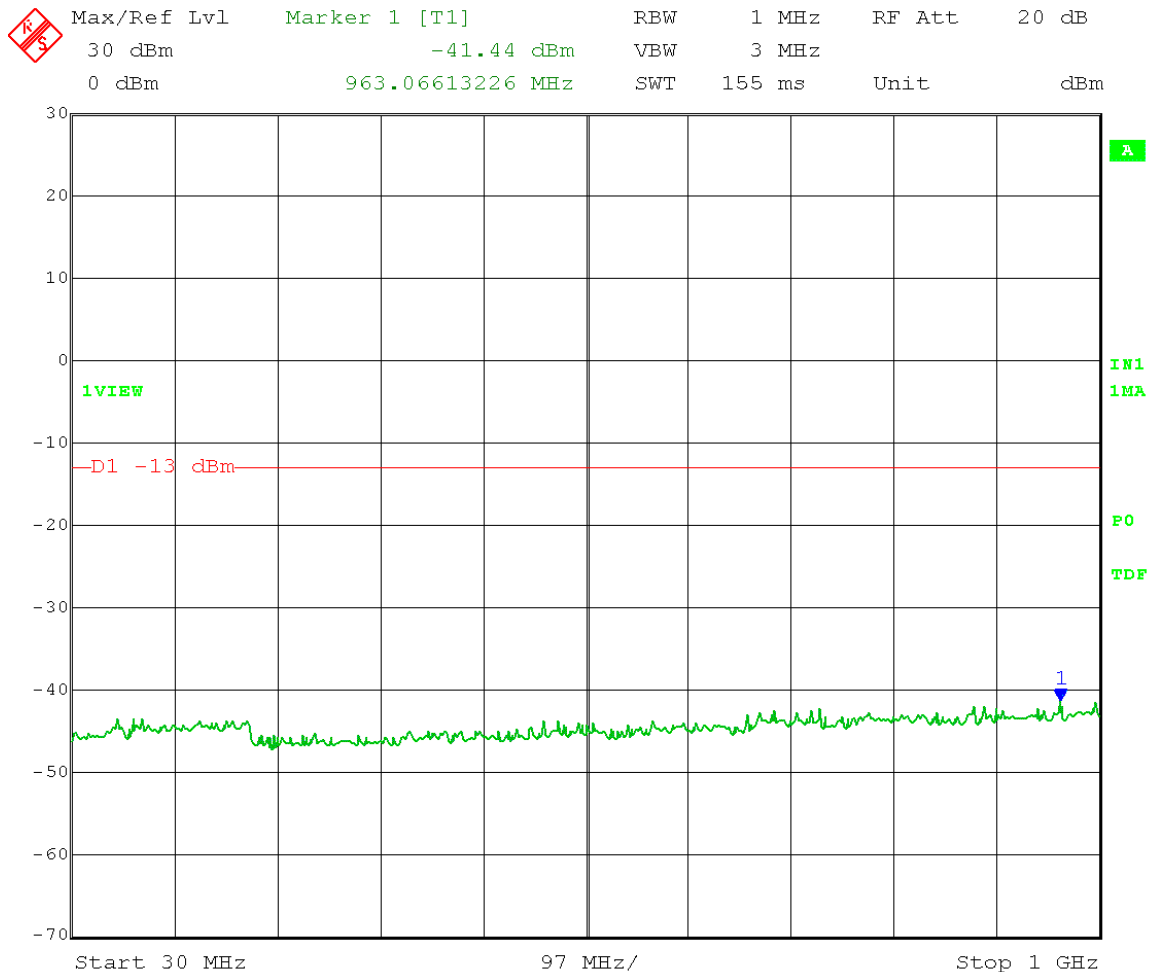


Date: 19.OCT.2016 14:38:43

Test Date: 10-19-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45117F  
Test: Transmitter Unwanted Emissions – RF Conducted  
Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
Detector = Peak Sweep = auto couple  
Trace = max hold  
High Channel: 3690 MHz Output power setting: 25  
Channel bandwidth: 20 MHz Output port: A  
Limit:  $43 + 10\log(P)$  below the channel transmitter power  
= -13 dBm/MHz

Frequency Range: 30 – 1000 MHz

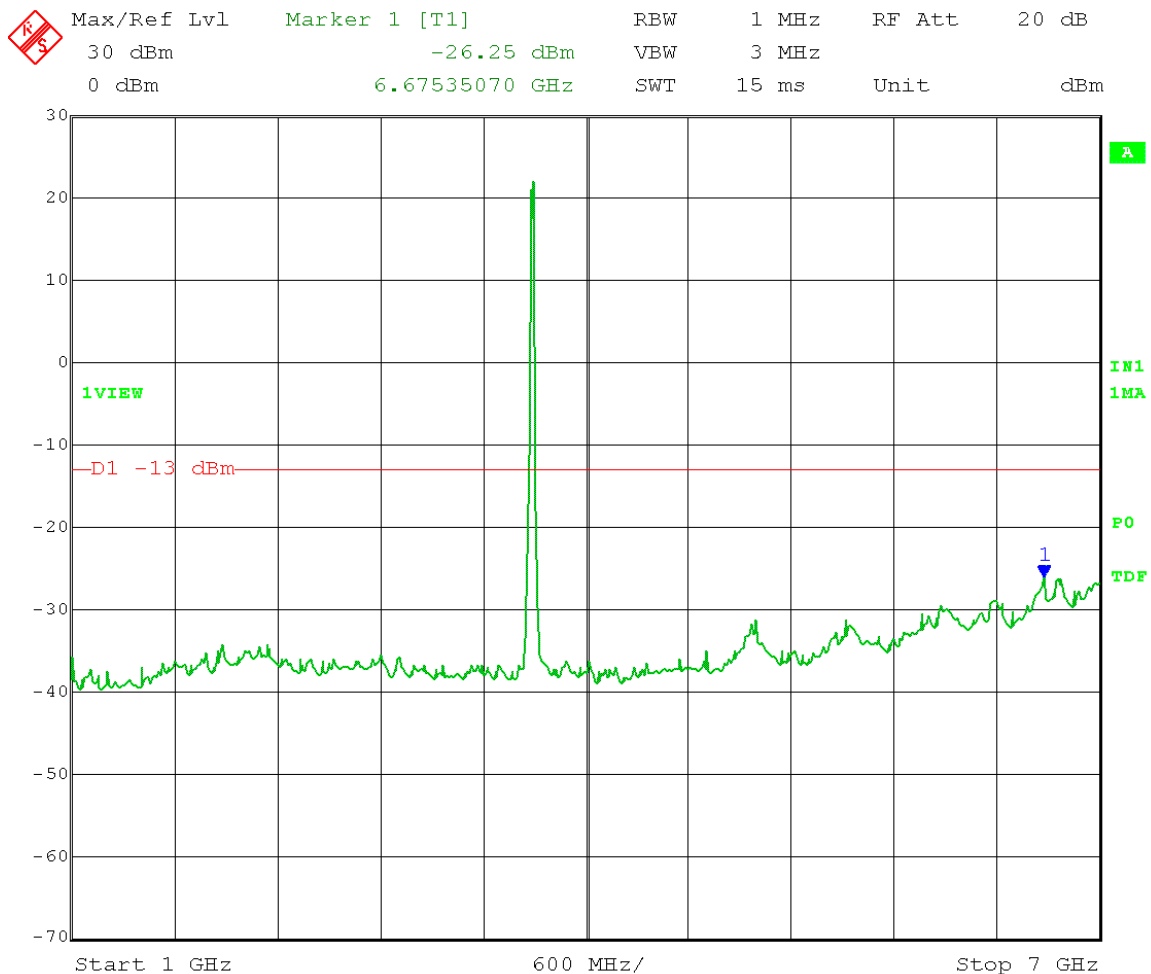


Date: 19.OCT.2016 14:43:28

Test Date: 10-19-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45117F  
Test: Transmitter Unwanted Emissions – RF Conducted  
Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
Detector = Peak Sweep = auto couple  
Trace = max hold  
High Channel: 3690 MHz Output power setting: 25  
Channel bandwidth: 20 MHz Output port: A  
Limit:  $43 + 10\log(P)$  below the channel transmitter power  
= -13 dBm/MHz

Frequency Range: 1 – 7 GHz

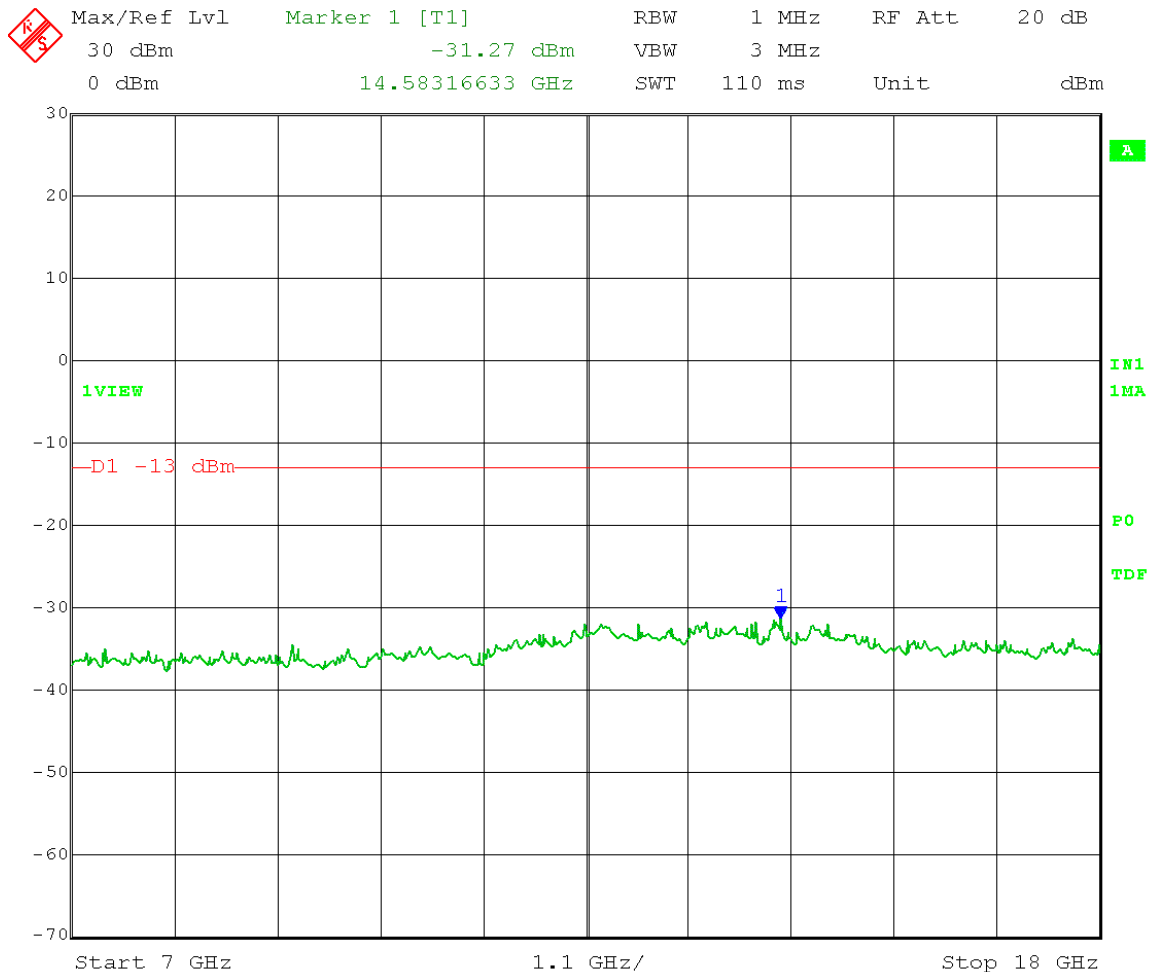


Date: 19.OCT.2016 14:42:12

Test Date: 10-19-2016  
 Company: Cambium Networks  
 EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45117F  
 Test: Transmitter Unwanted Emissions – RF Conducted  
 Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
 Detector = Peak Sweep = auto couple  
 Trace = max hold  
 High Channel: 3690 MHz Output power setting: 25  
 Channel bandwidth: 20 MHz Output port: A  
 Limit:  $43 + 10\log(P)$  below the channel transmitter power  
 = -13 dBm/MHz

Frequency Range: 7 – 18 GHz



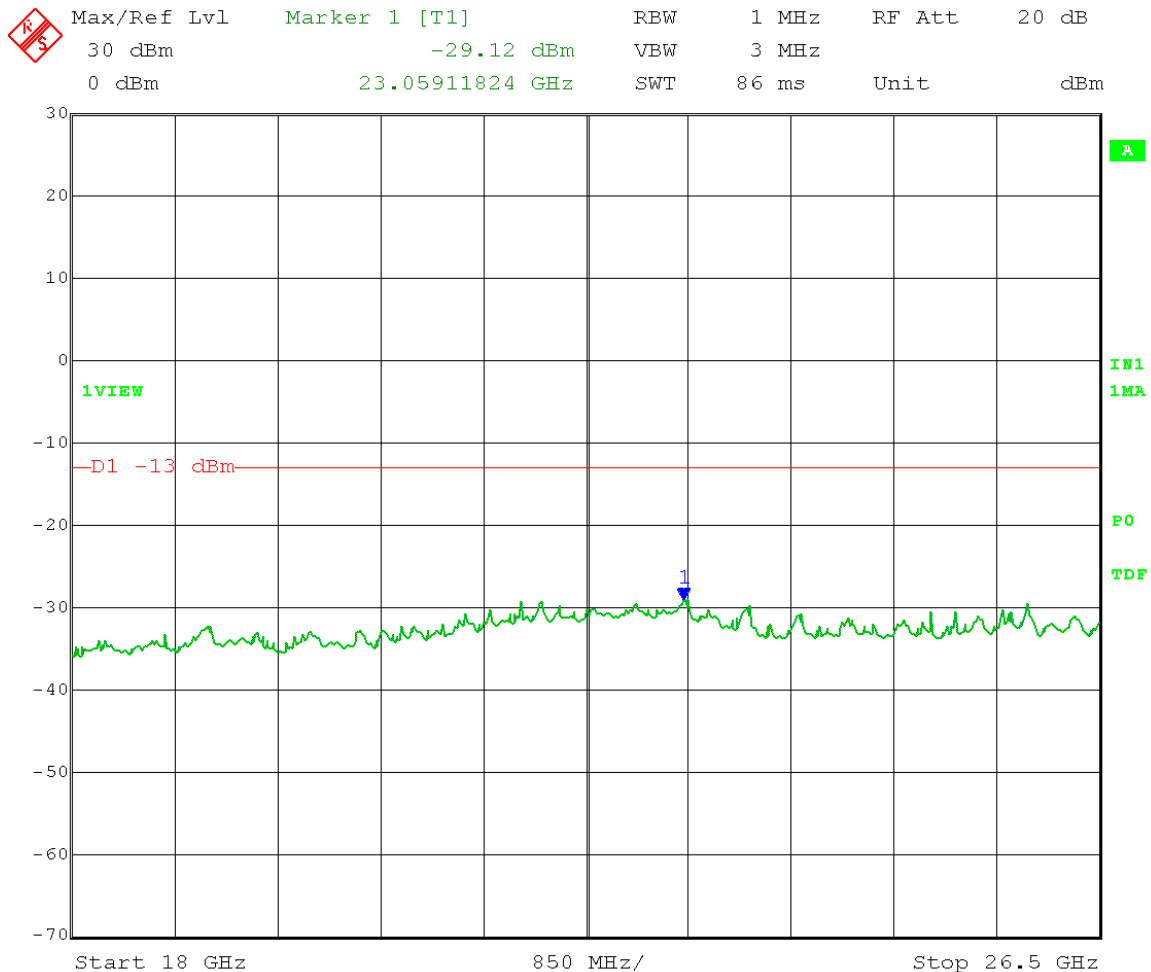
Date: 19.OCT.2016 14:44:47



Test Date: 10-19-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45117F  
Test: Transmitter Unwanted Emissions – RF Conducted  
Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
Detector = Peak Sweep = auto couple  
Trace = max hold  
High Channel: 3690 MHz Output power setting: 25  
Channel bandwidth: 20 MHz Output port: A  
Limit:  $43 + 10\log(P)$  below the channel transmitter power  
= -13 dBm/MHz

Frequency Range: 18 – 26.5 GHz

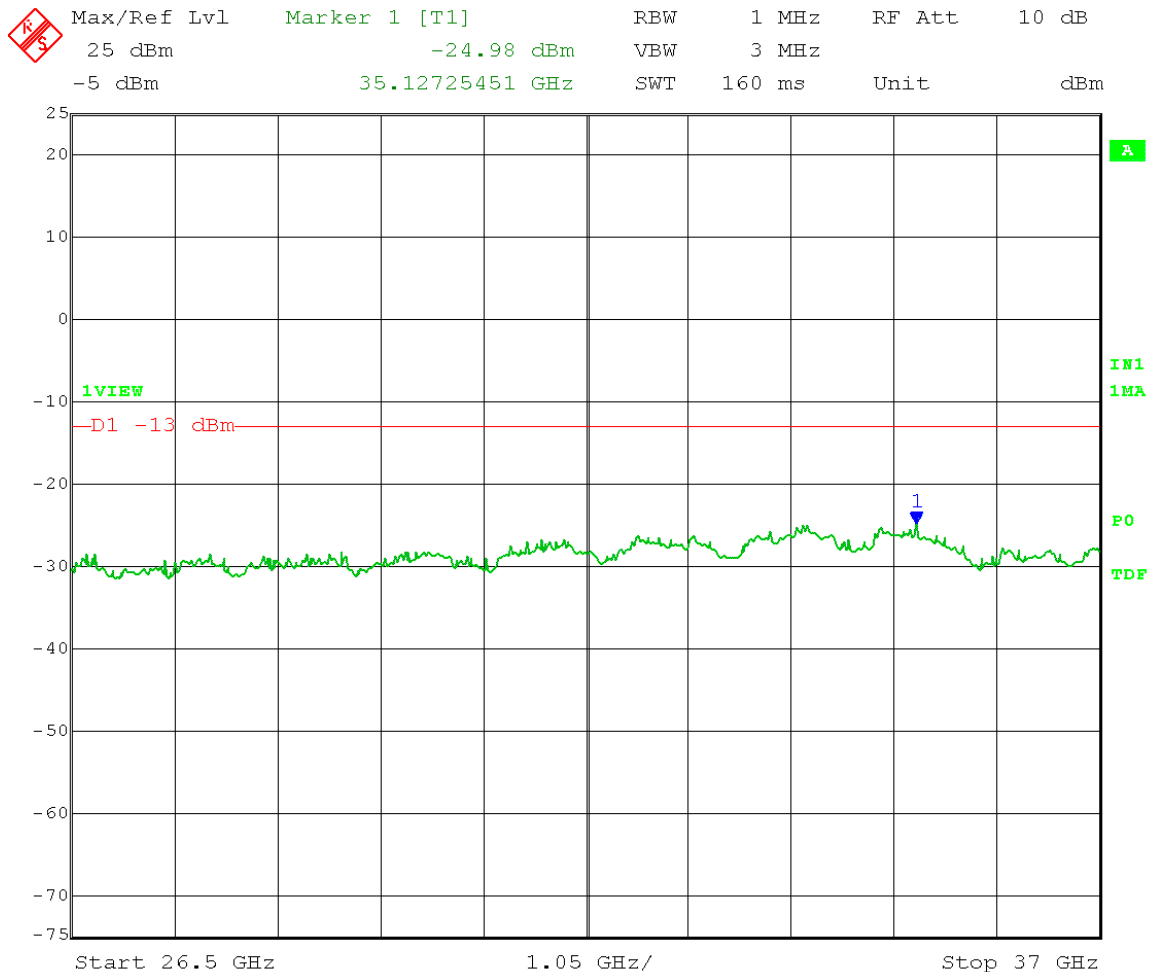


Date: 19.OCT.2016 14:46:09

Test Date: 10-19-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45117F  
Test: Transmitter Unwanted Emissions – RF Conducted  
Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
Detector = Peak Sweep = auto couple  
Trace = max hold  
High Channel: 3690 MHz Output power setting: 25  
Channel bandwidth: 20 MHz Output port: A  
Limit: 43 + 10log (P) below the channel transmitter power  
= -13 dBm/MHz

Frequency Range: 26.5 – 37 GHz

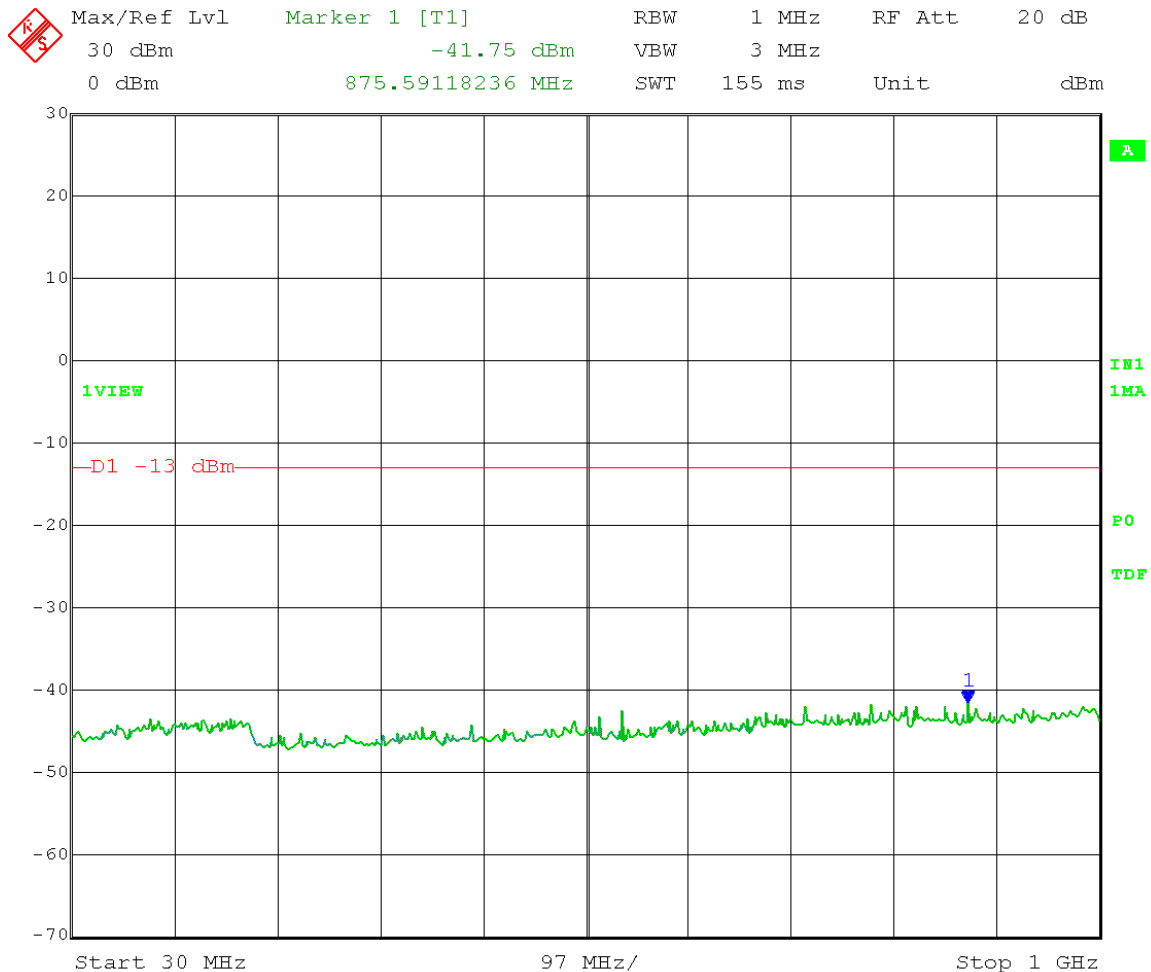


Date: 19.OCT.2016 14:47:41

Test Date: 10-18-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45117F  
Test: Transmitter Unwanted Emissions – RF Conducted  
Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
Detector = Peak Sweep = auto couple  
Trace = max hold  
Low Channel: 3670 MHz Output power setting: 11  
Channel bandwidth: 40 MHz Output port: A  
Limit:  $43 + 10\log(P)$  below the channel transmitter power  
= -13 dBm/MHz

Frequency Range: 30 – 1000 MHz

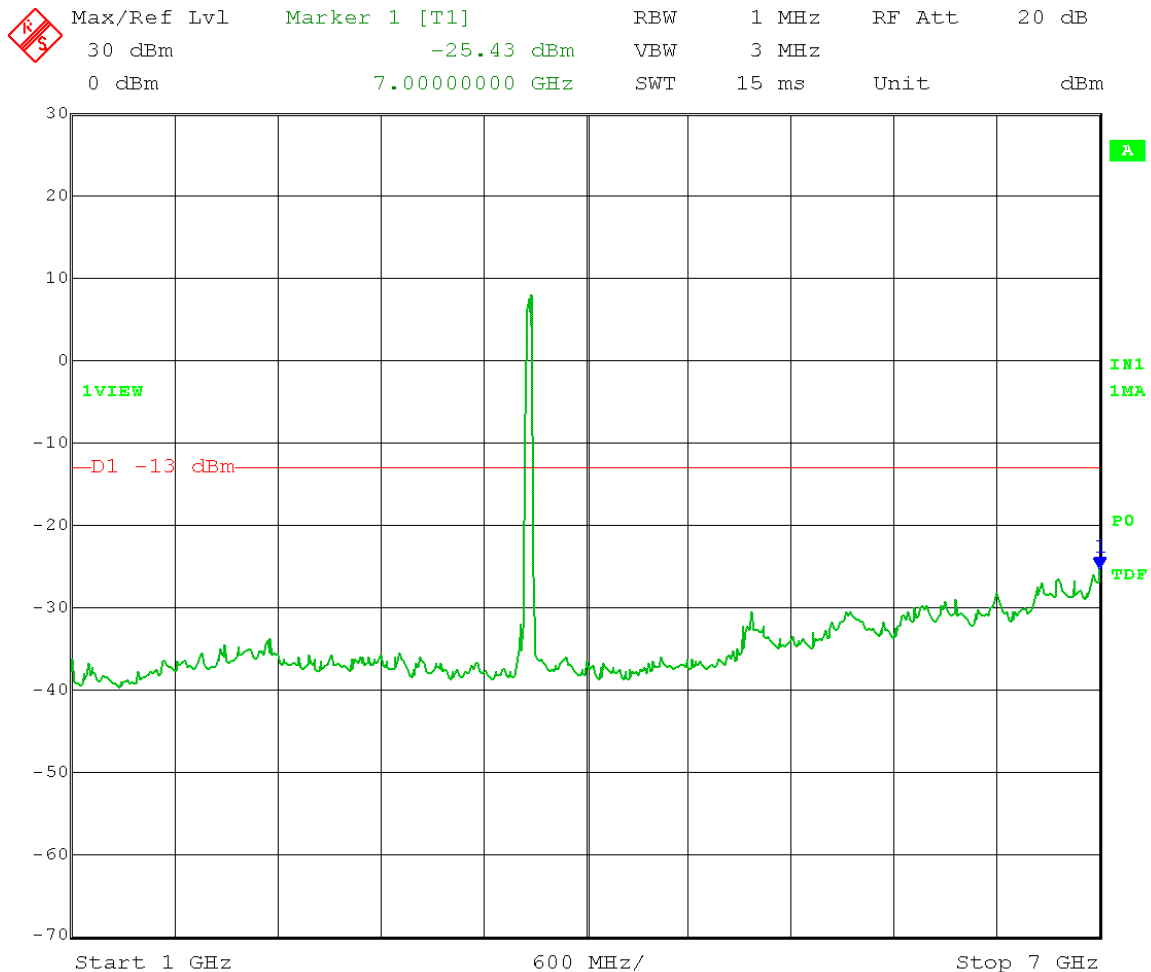


Date: 18.OCT.2016 13:34:17

Test Date: 10-18-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45117F  
Test: Transmitter Unwanted Emissions – RF Conducted  
Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
Detector = Peak Sweep = auto couple  
Trace = max hold  
Low Channel: 3670 MHz Output power setting: 11  
Channel bandwidth: 40 MHz Output port: A  
Limit:  $43 + 10\log(P)$  below the channel transmitter power  
= -13 dBm/MHz

Frequency Range: 1 – 7 GHz

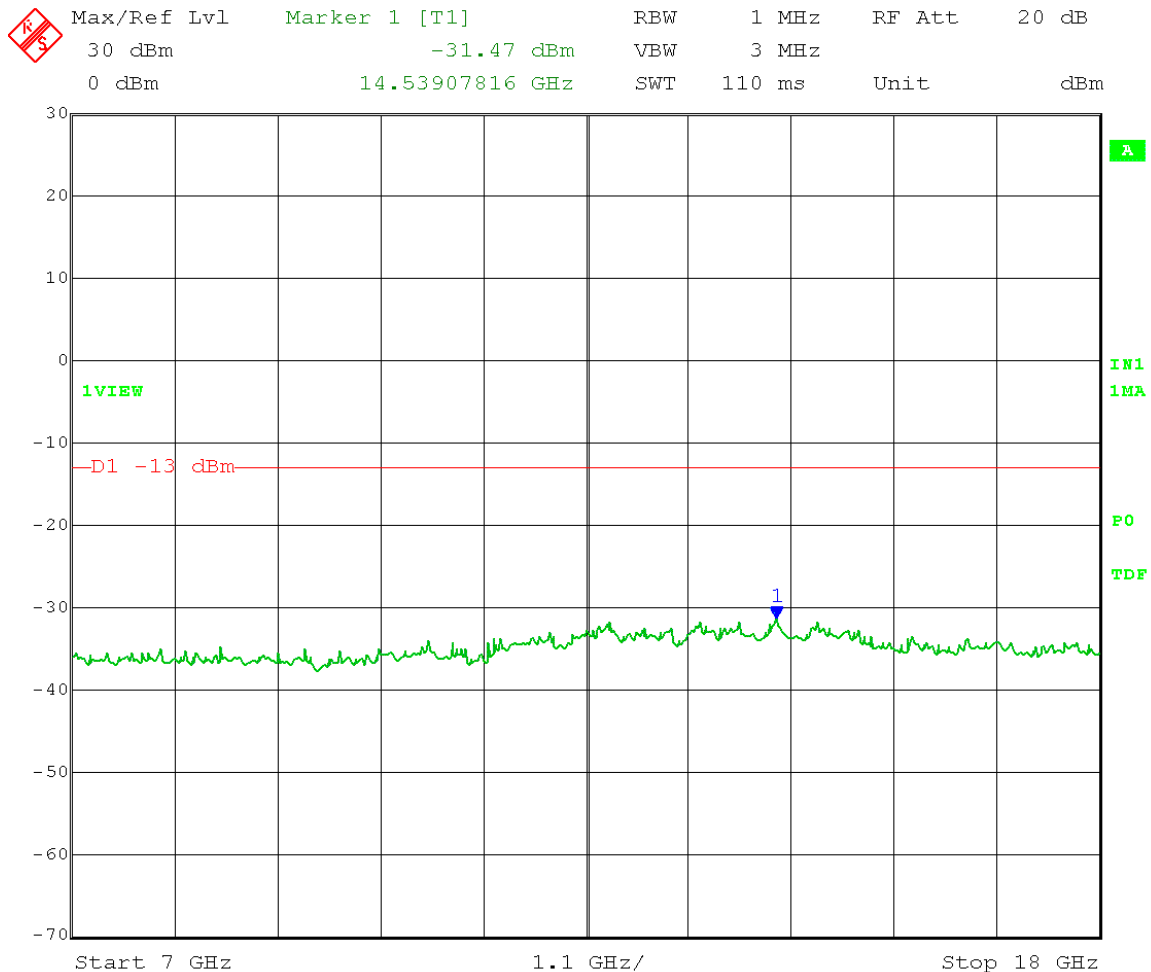


Date: 18.OCT.2016 13:33:18

Test Date: 10-18-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45117F  
Test: Transmitter Unwanted Emissions – RF Conducted  
Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
Detector = Peak Sweep = auto couple  
Trace = max hold  
Low Channel: 3670 MHz Output power setting: 11  
Channel bandwidth: 40 MHz Output port: A  
Limit:  $43 + 10\log(P)$  below the channel transmitter power  
= -13 dBm/MHz

Frequency Range: 7 – 18 GHz

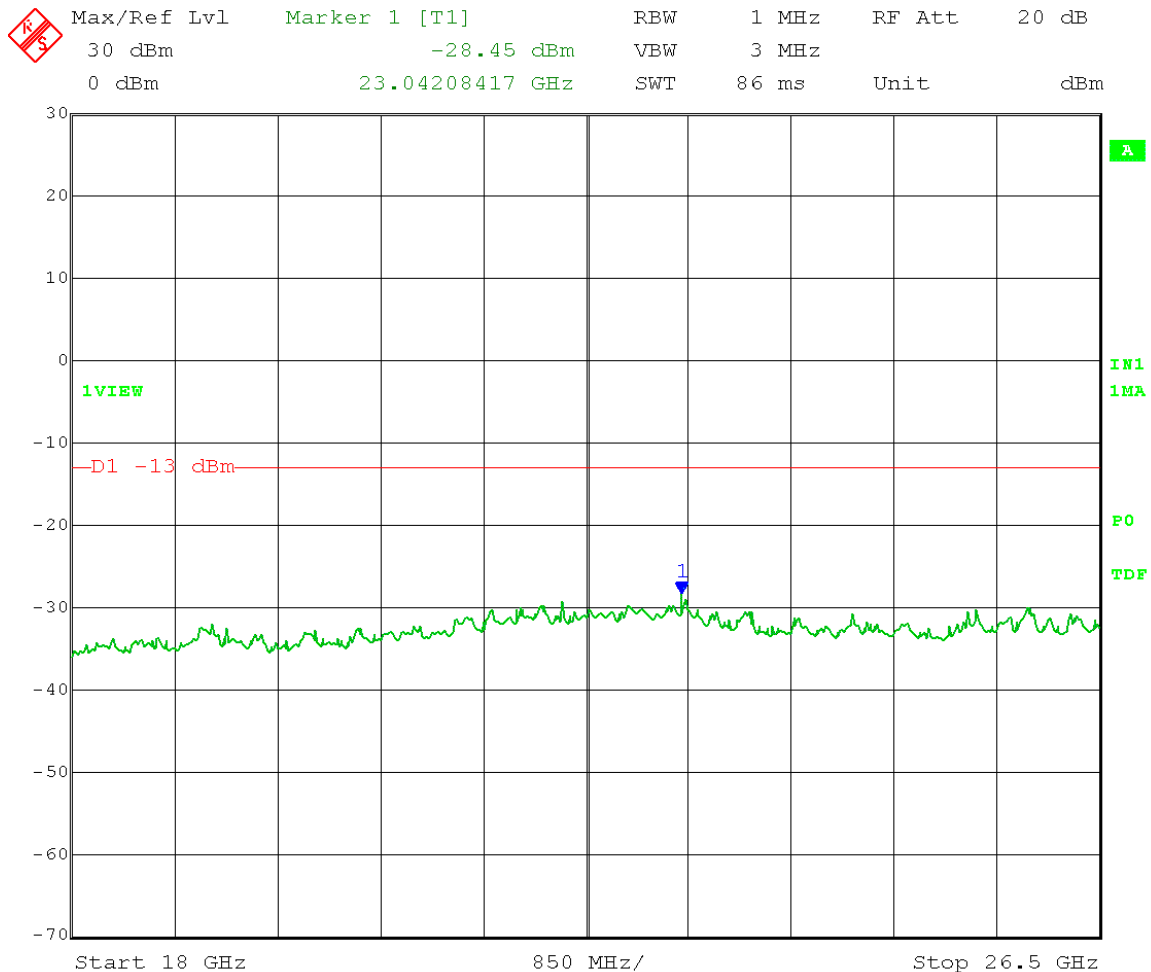


Date: 18.OCT.2016 13:35:22

Test Date: 10-18-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45117F  
Test: Transmitter Unwanted Emissions – RF Conducted  
Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
Detector = Peak Sweep = auto couple  
Trace = max hold  
Low Channel: 3670 MHz Output power setting: 11  
Channel bandwidth: 40 MHz Output port: A  
Limit:  $43 + 10\log(P)$  below the channel transmitter power  
= -13 dBm/MHz

Frequency Range: 18 – 26.5 GHz

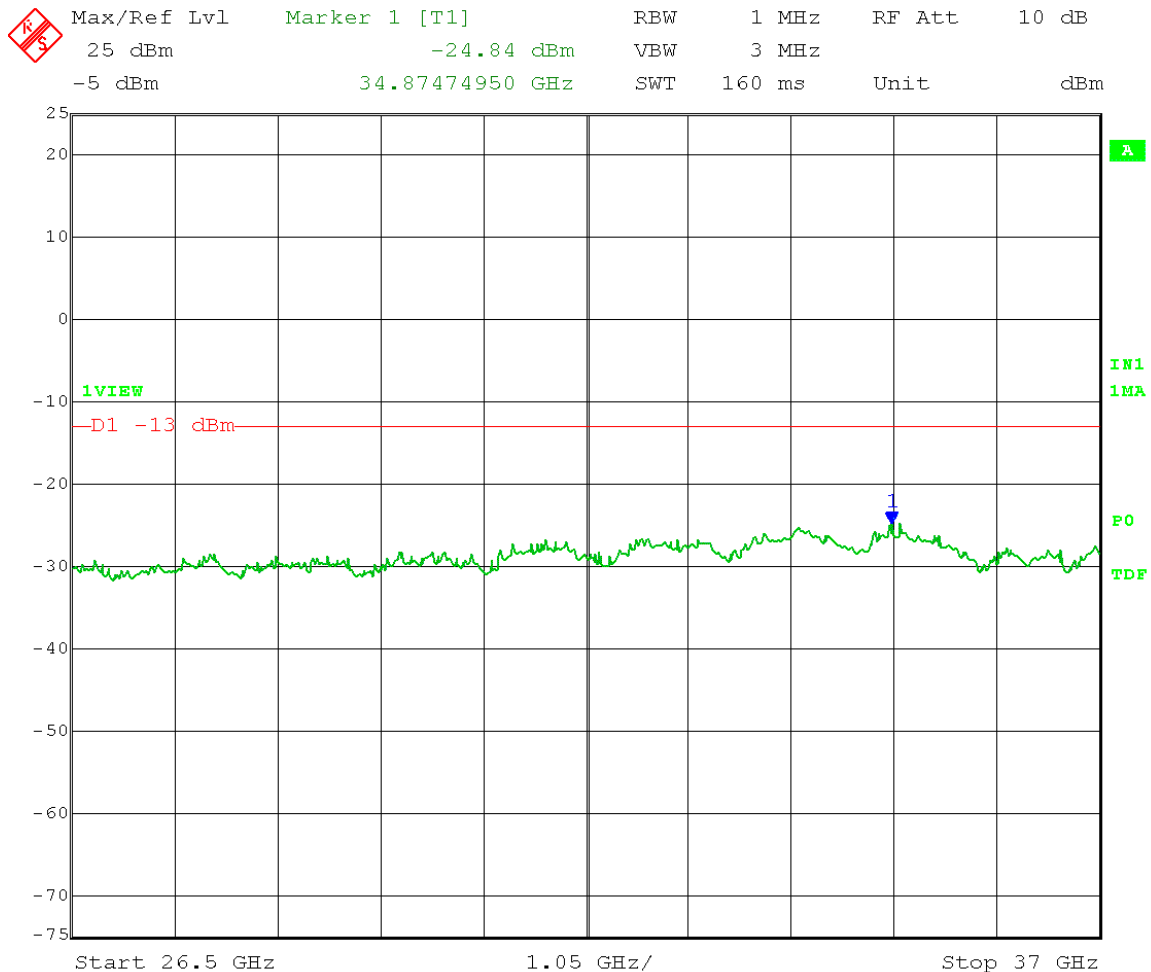


Date: 18.OCT.2016 13:36:19

Test Date: 10-18-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45117F  
Test: Transmitter Unwanted Emissions – RF Conducted  
Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
Detector = Peak Sweep = auto couple  
Trace = max hold  
Low Channel: 3670 MHz Output power setting: 11  
Channel bandwidth: 40 MHz Output port: A  
Limit: 43 + 10log (P) below the channel transmitter power  
= -13 dBm/MHz

Frequency Range: 26.5 – 37 GHz

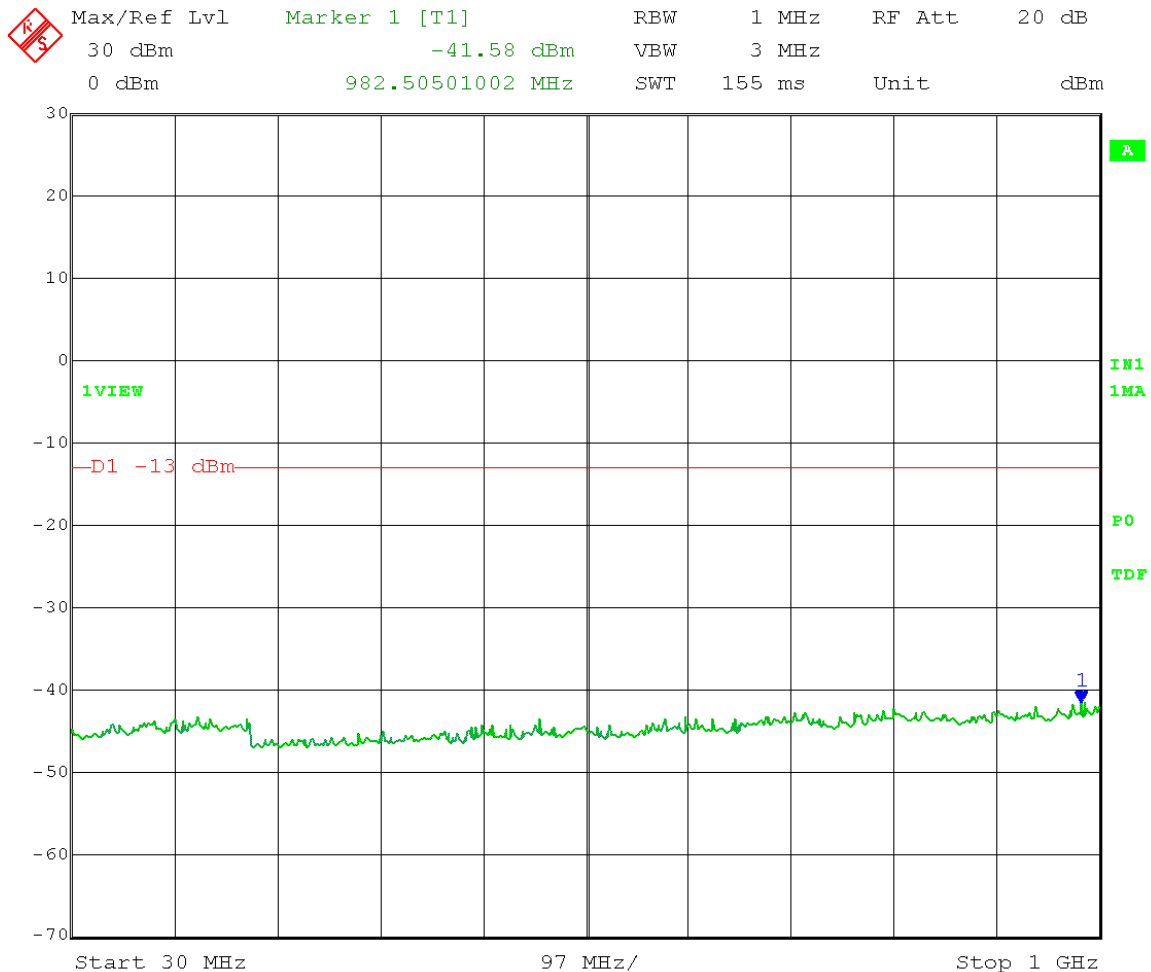


Date: 18.OCT.2016 13:37:14

Test Date: 10-18-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45117F  
Test: Transmitter Unwanted Emissions – RF Conducted  
Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
Detector = Peak Sweep = auto couple  
Trace = max hold  
Mid Channel: 3675 MHz Output power setting: 24  
Channel bandwidth: 40 MHz Output port: A  
Limit:  $43 + 10\log(P)$  below the channel transmitter power  
= -13 dBm/MHz

Frequency Range: 30 – 1000 MHz



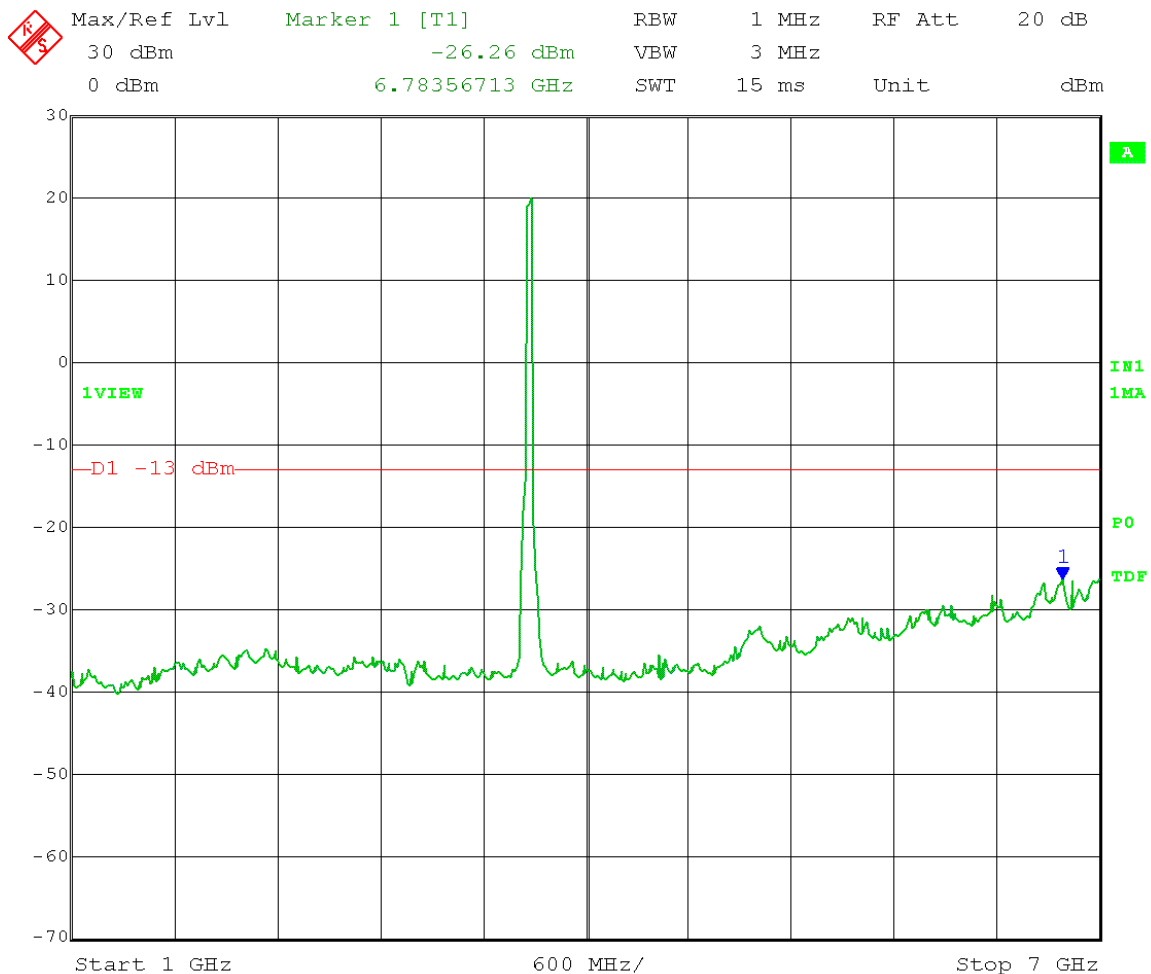
Date: 18.OCT.2016 13:41:01



Test Date: 10-18-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45117F  
Test: Transmitter Unwanted Emissions – RF Conducted  
Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
Detector = Peak Sweep = auto couple  
Trace = max hold  
Mid Channel: 3675 MHz Output power setting: 24  
Channel bandwidth: 40 MHz Output port: A  
Limit:  $43 + 10\log(P)$  below the channel transmitter power  
= -13 dBm/MHz

Frequency Range: 1 – 7 GHz

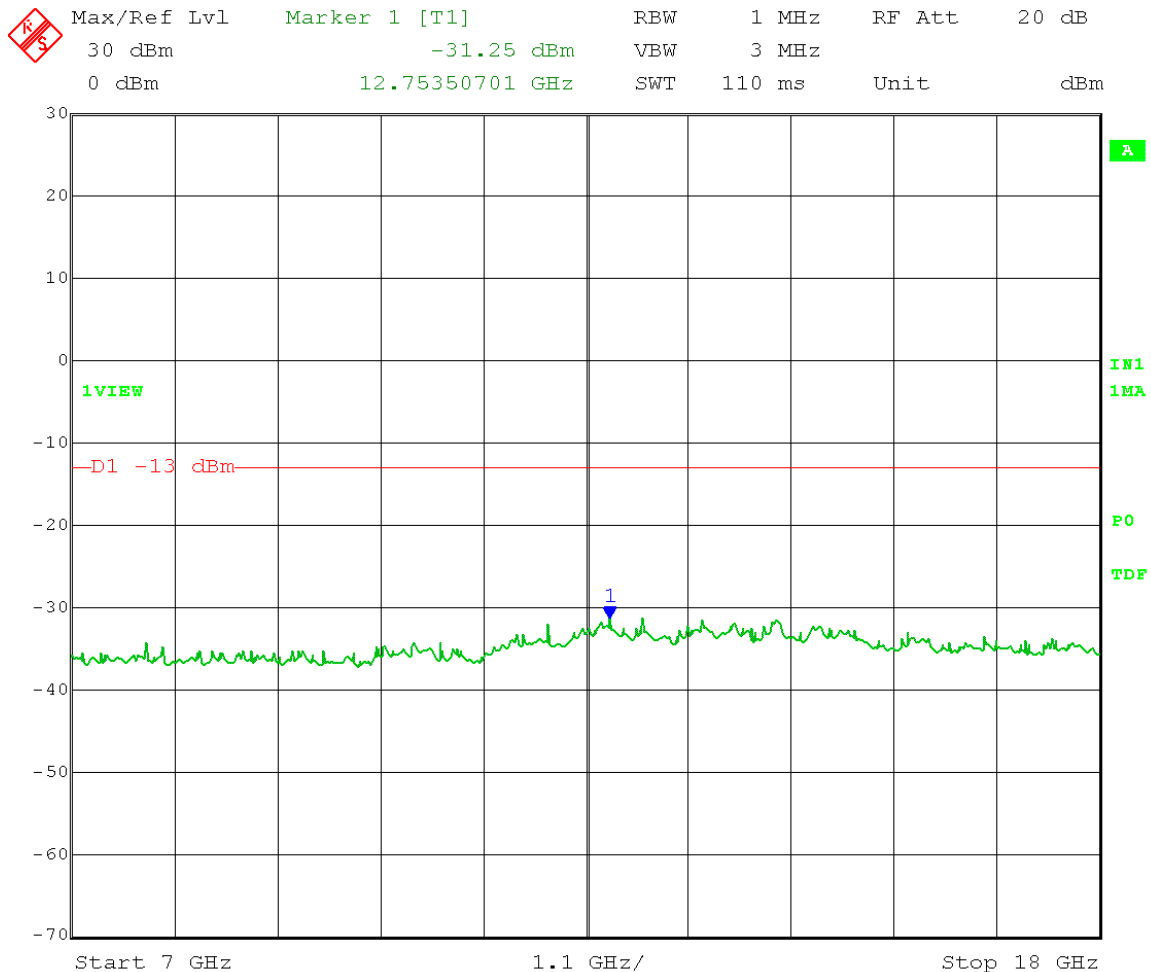


Date: 18.OCT.2016 13:42:20

Test Date: 10-18-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45117F  
Test: Transmitter Unwanted Emissions – RF Conducted  
Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
Detector = Peak Sweep = auto couple  
Trace = max hold  
Mid Channel: 3675 MHz Output power setting: 24  
Channel bandwidth: 40 MHz Output port: A  
Limit:  $43 + 10\log(P)$  below the channel transmitter power  
= -13 dBm/MHz

Frequency Range: 7 – 18 GHz

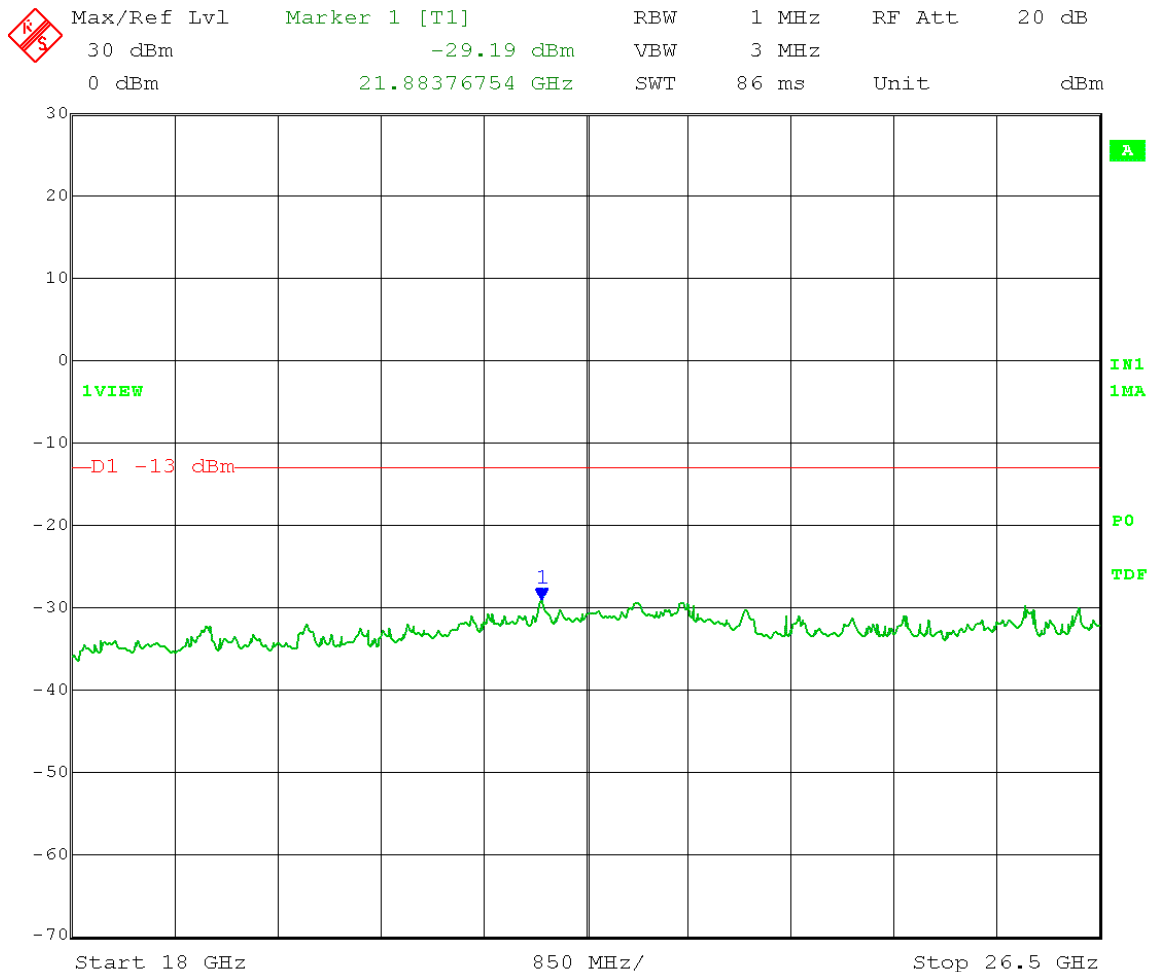


Date: 18.OCT.2016 13:43:35

Test Date: 10-18-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45117F  
Test: Transmitter Unwanted Emissions – RF Conducted  
Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
Detector = Peak Sweep = auto couple  
Trace = max hold  
Mid Channel: 3675 MHz Output power setting: 24  
Channel bandwidth: 40 MHz Output port: A  
Limit:  $43 + 10\log(P)$  below the channel transmitter power  
= -13 dBm/MHz

Frequency Range: 18 – 26.5 GHz

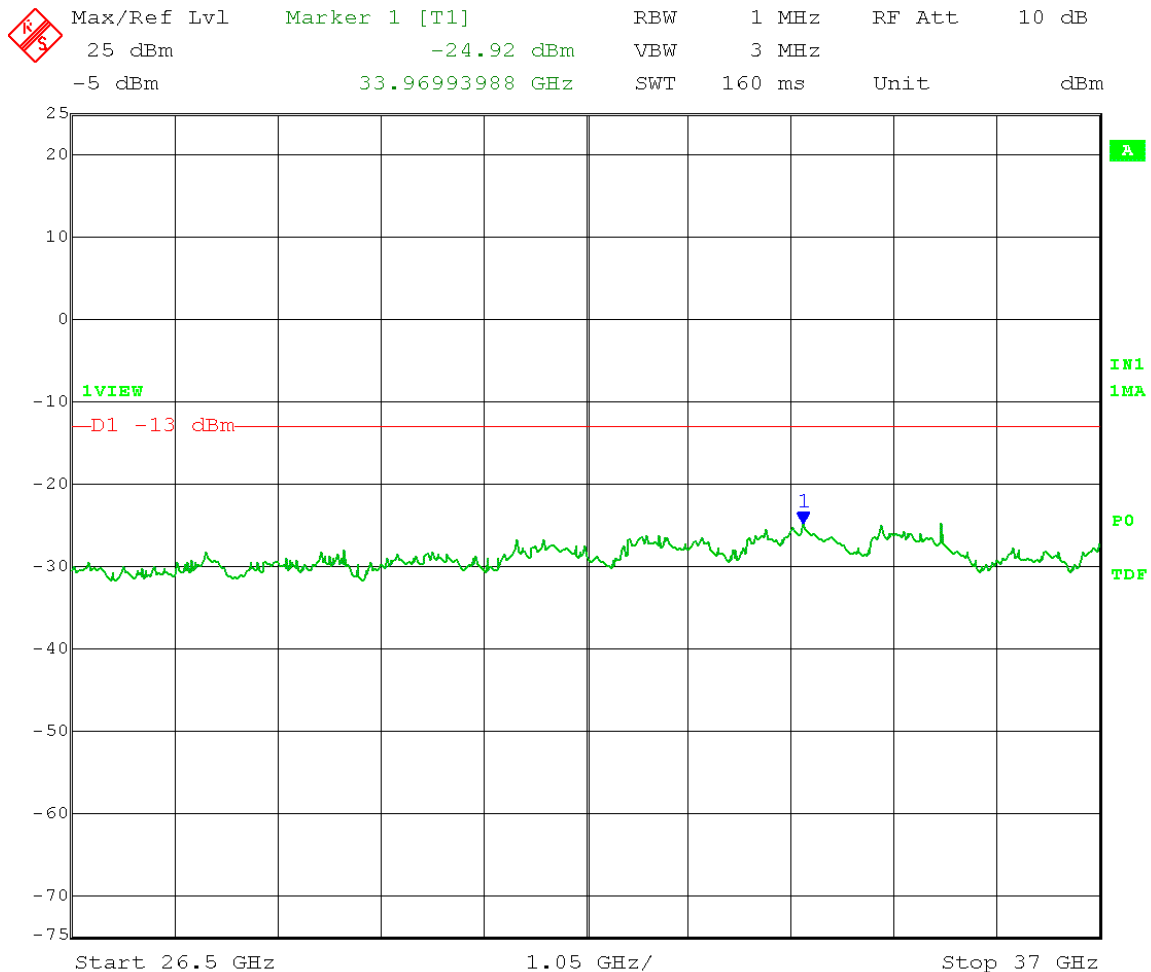


Date: 18.OCT.2016 13:44:41

Test Date: 10-18-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45117F  
Test: Transmitter Unwanted Emissions – RF Conducted  
Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
Detector = Peak Sweep = auto couple  
Trace = max hold  
Mid Channel: 3675 MHz Output power setting: 24  
Channel bandwidth: 40 MHz Output port: A  
Limit: 43 + 10log (P) below the channel transmitter power  
= -13 dBm/MHz

Frequency Range: 26.5 – 37 GHz

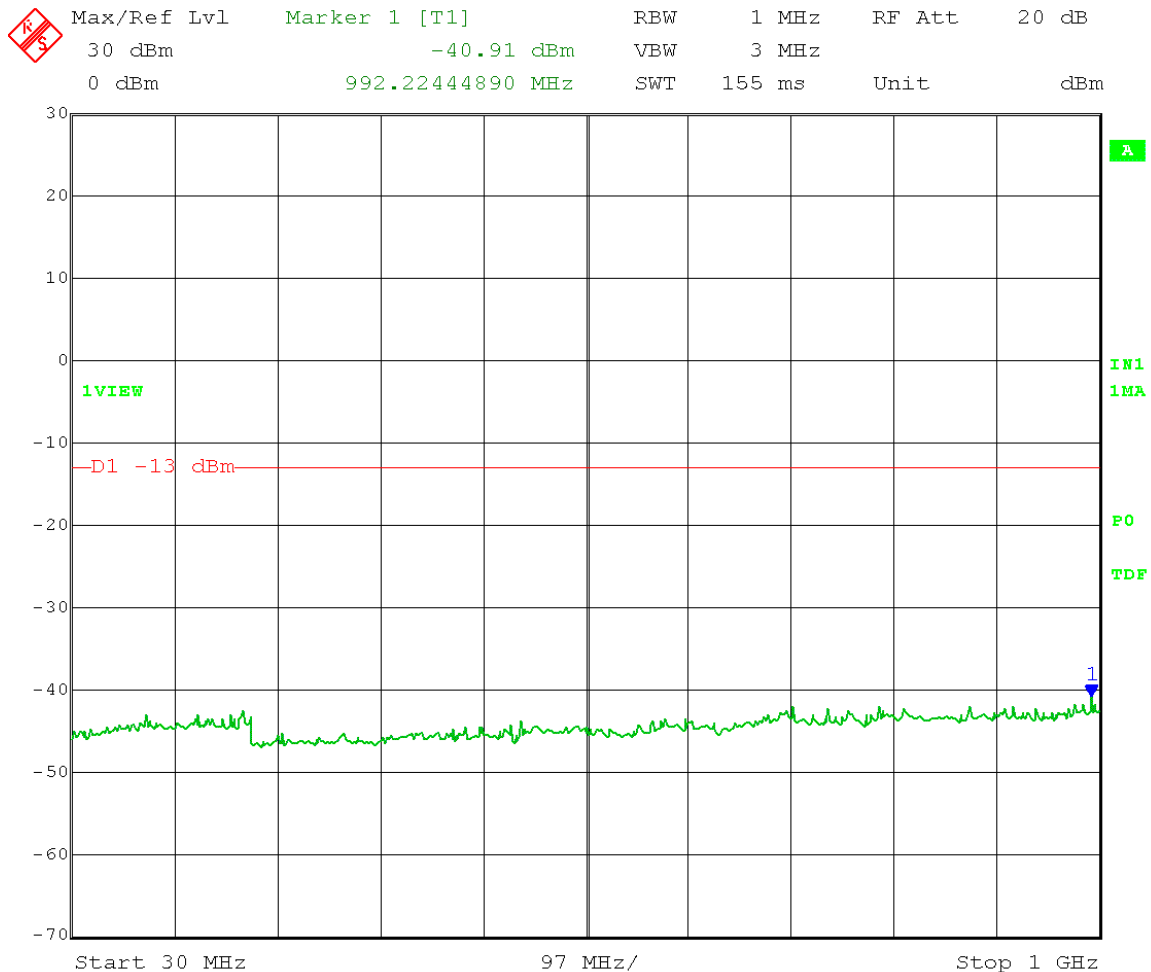


Date: 18.OCT.2016 13:40:02

Test Date: 10-18-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45117F  
Test: Transmitter Unwanted Emissions – RF Conducted  
Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
Detector = Peak Sweep = auto couple  
Trace = max hold  
High Channel: 3680 MHz Output power setting: 13  
Channel bandwidth: 40 MHz Output port: A  
Limit:  $43 + 10\log(P)$  below the channel transmitter power  
= -13 dBm/MHz

Frequency Range: 30 – 1000 MHz

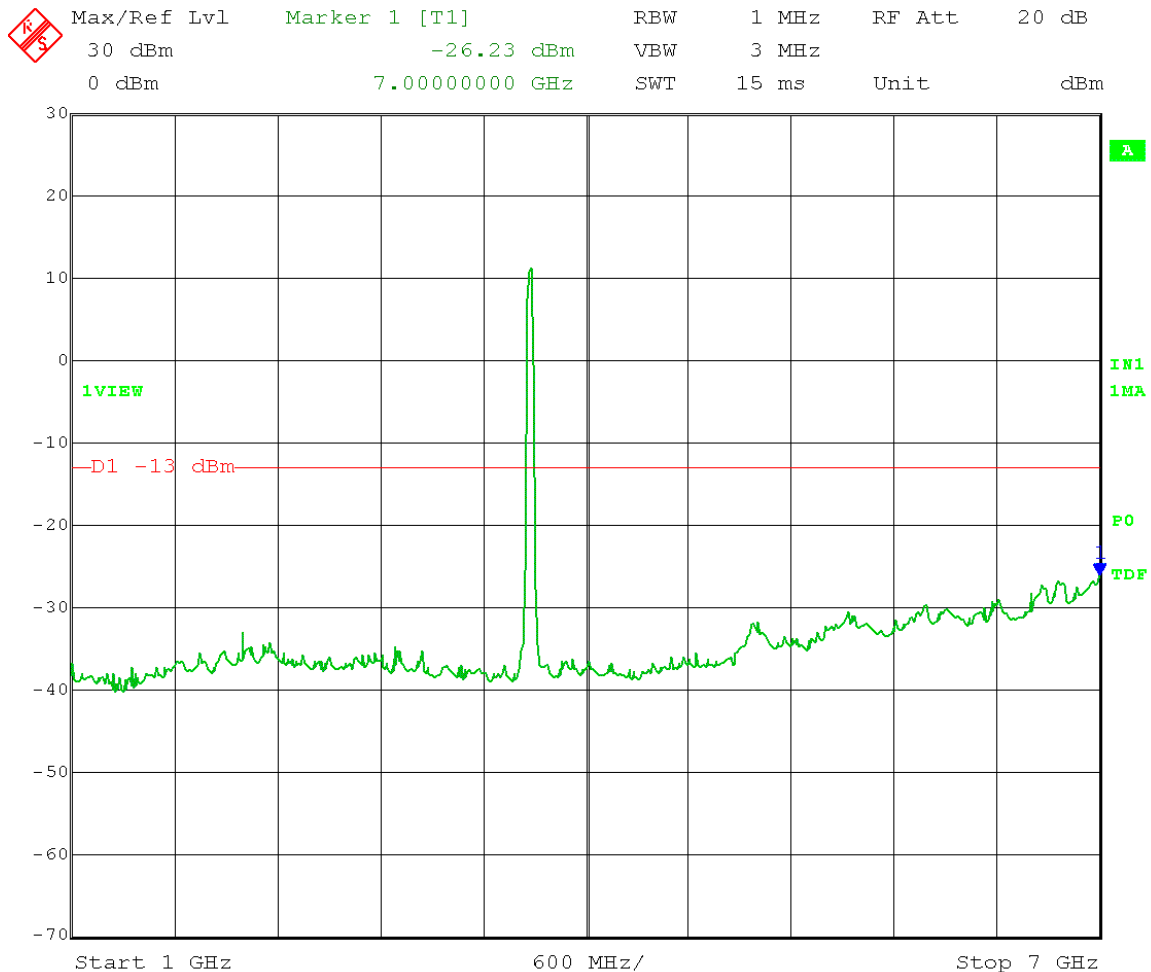


Date: 18.OCT.2016 13:02:11

Test Date: 10-18-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45117F  
Test: Transmitter Unwanted Emissions – RF Conducted  
Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
Detector = Peak Sweep = auto couple  
Trace = max hold  
High Channel: 3680 MHz Output power setting: 13  
Channel bandwidth: 40 MHz Output port: A  
Limit:  $43 + 10\log(P)$  below the channel transmitter power  
= -13 dBm/MHz

Frequency Range: 1 – 7 GHz

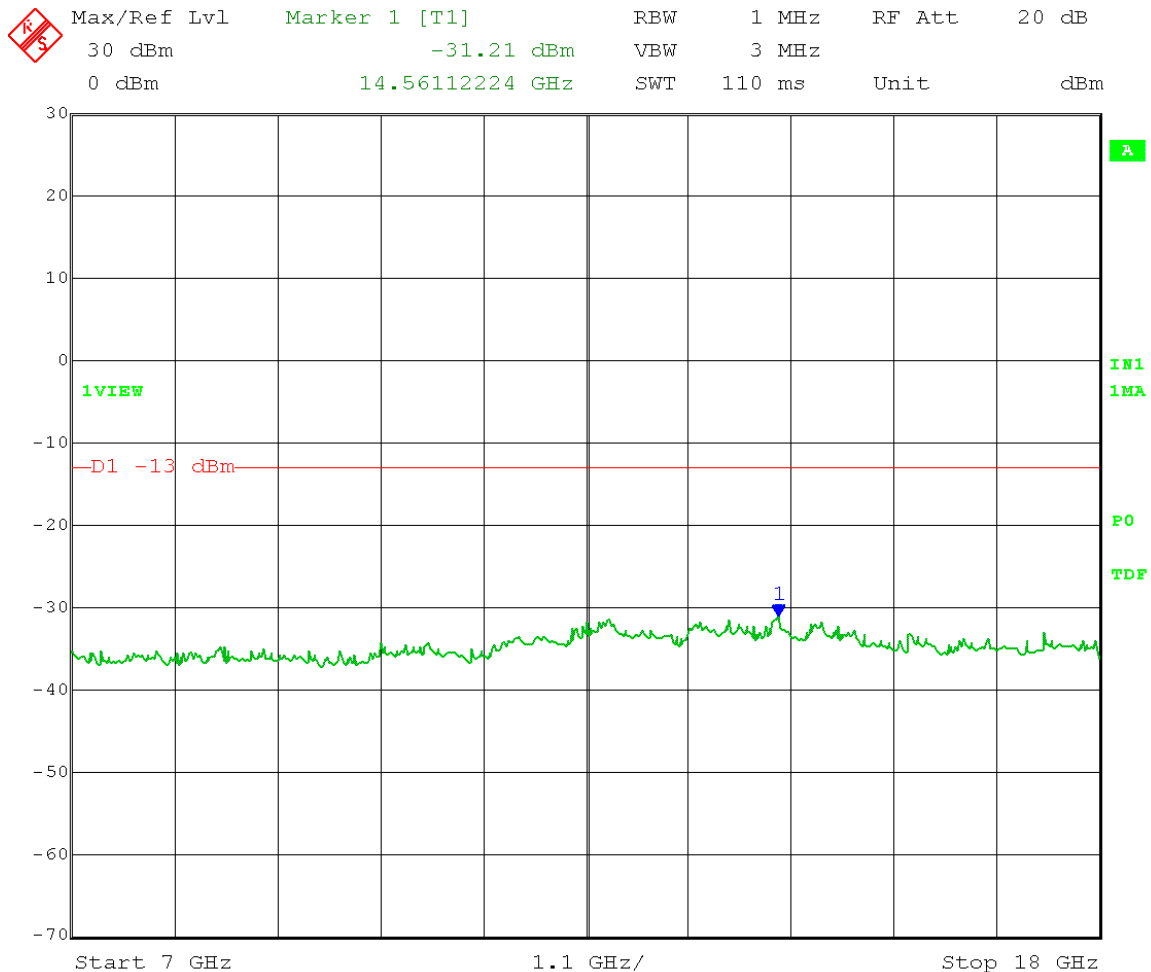


Date: 18.OCT.2016 13:00:48

Test Date: 10-18-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45117F  
Test: Transmitter Unwanted Emissions – RF Conducted  
Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
Detector = Peak Sweep = auto couple  
Trace = max hold  
High Channel: 3680 MHz Output power setting: 13  
Channel bandwidth: 40 MHz Output port: A  
Limit:  $43 + 10\log(P)$  below the channel transmitter power  
= -13 dBm/MHz

Frequency Range: 7 – 18 GHz

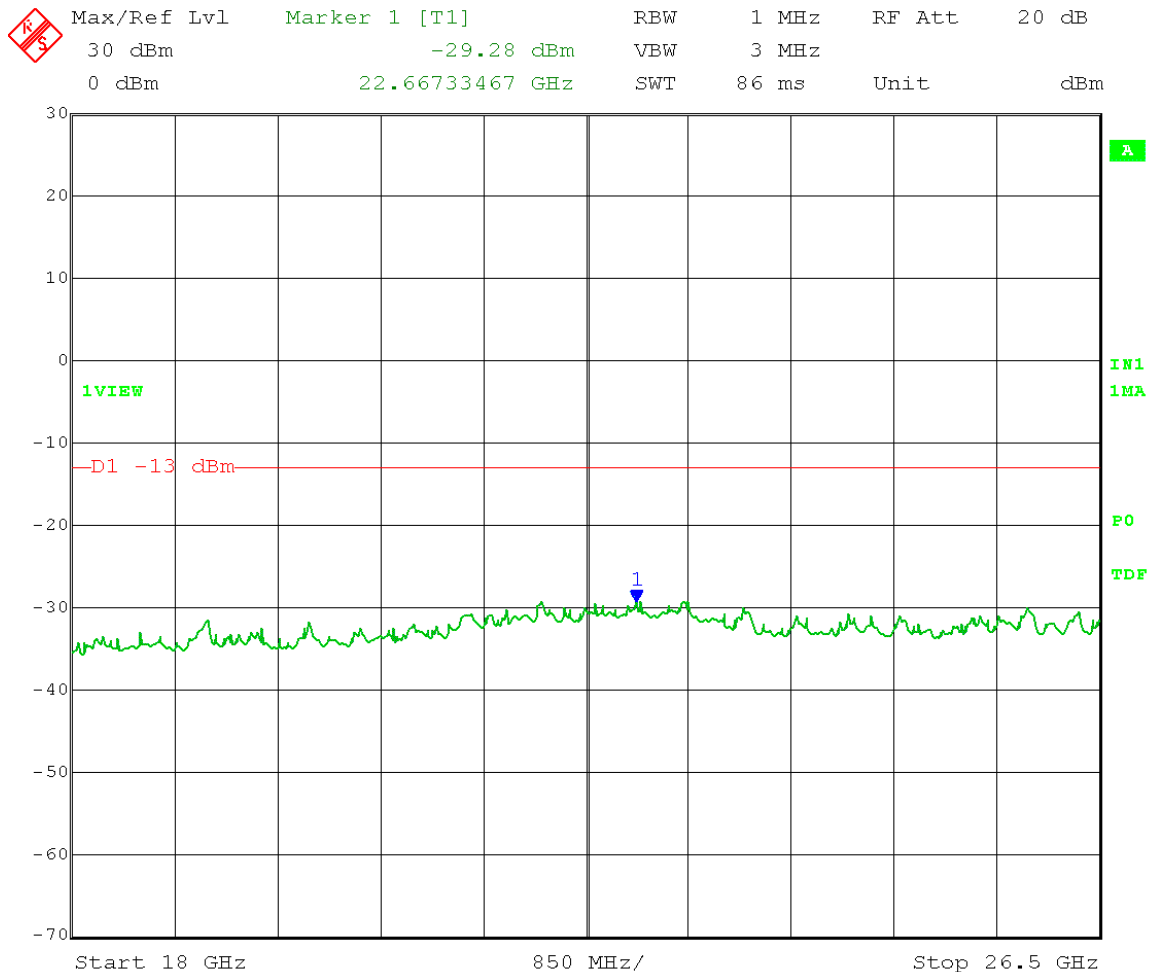


Date: 18.OCT.2016 13:03:45

Test Date: 10-18-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45117F  
Test: Transmitter Unwanted Emissions – RF Conducted  
Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
Detector = Peak Sweep = auto couple  
Trace = max hold  
High Channel: 3680 MHz Output power setting: 13  
Channel bandwidth: 40 MHz Output port: A  
Limit:  $43 + 10\log(P)$  below the channel transmitter power  
= -13 dBm/MHz

Frequency Range: 18 – 26.5 GHz



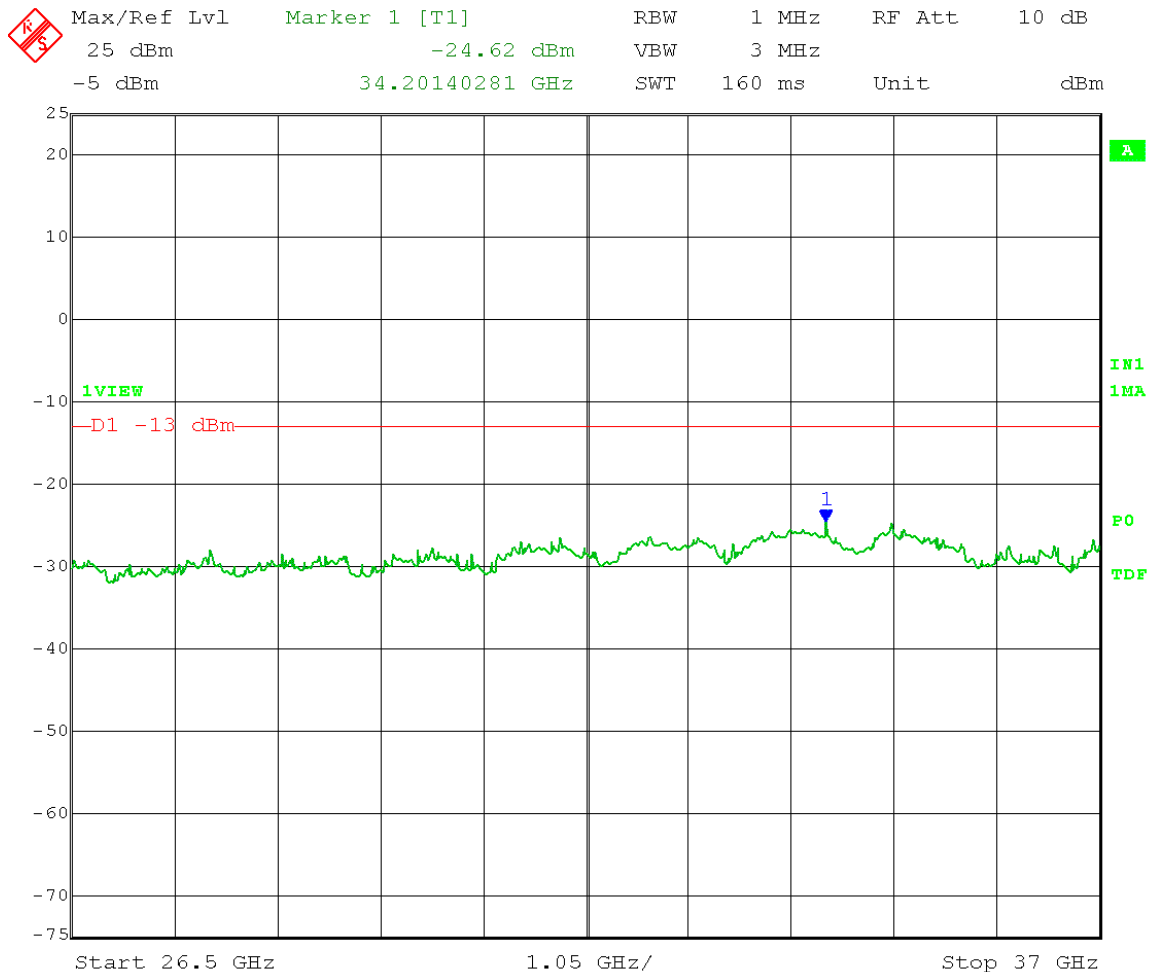
Date: 18.OCT.2016 13:05:08



Test Date: 10-18-2016  
Company: Cambium Networks  
EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45117F  
Test: Transmitter Unwanted Emissions – RF Conducted  
Operator: Craig B

Comment: RBW = 1 MHz VBW = 3 MHz  
Detector = Peak Sweep = auto couple  
Trace = max hold  
High Channel: 3680 MHz Output power setting: 13  
Channel bandwidth: 40 MHz Output port: A  
Limit: 43 + 10log (P) below the channel transmitter power  
= -13 dBm/MHz

Frequency Range: 26.5 – 37 GHz



Date: 18.OCT.2016 13:06:13



166 South Carter, Genoa City, WI 53128

Company:	Cambium Networks
Model Tested:	3082CHH
Report Number:	22288
DLS Project:	8420

## Appendix B – Measurement Data

### B7.0 Transmitter Unwanted Emissions – Radiated With 50 Ohm terminations on antenna ports (cabinet radiation)

**Rule Part:** FCC Part 90.1323  
FCC Part 2.1053

**Test Procedure:** FCC KDB 971168 D01: Power Meas License Digital Systems v02r02  
Section 5.8 – Radiated measurements

**Limit:** FCC Part 90.1323  
The power of any emission outside the frequency band 3650-3700 MHz shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log_{10}(P)$  dB, where P is measured in watts.

**Sample calculation:** Measured mean output power of one port = 22.04 dBm.  
 $22.04 \text{ dBm} + 17 \text{ dBi antenna gain} + 3 \text{ dB (because there are 2 output ports)}$   
 $= 42.04 \text{ dBm} = 15.996 \text{ Watts}$   
 $\text{Limit (dBc)} = 43 + 10 \log(15.996) = 55.04 \text{ dB}$   
 $42.04 \text{ dBm} - 55.04 \text{ dB} = \mathbf{-13 \text{ dBm}}$

**Results:** Compliant

**Notes:** This test was done with a 5 MHz channel bandwidth setting (worst-case).  
Only tested QPSK modulation mode as determined worst case by Cambium Networks. Both ports were active during this test.

## **FCC Part 90, Subpart Z**

### **Electric Field Strength**

EUT: PMP450i SM/BH 3.65 GHz  
Manufacturer: Cambium Networks  
Operating Condition: 72 deg. F; 67% R.H.  
Test Site: DLS O.F. Site 3  
Operator: Craig B  
Test Specification: Low, Mid, High channels  
Comment: Transmitter Emissions; 50 Ohm terminations on ant  
Date: 09-02-2016

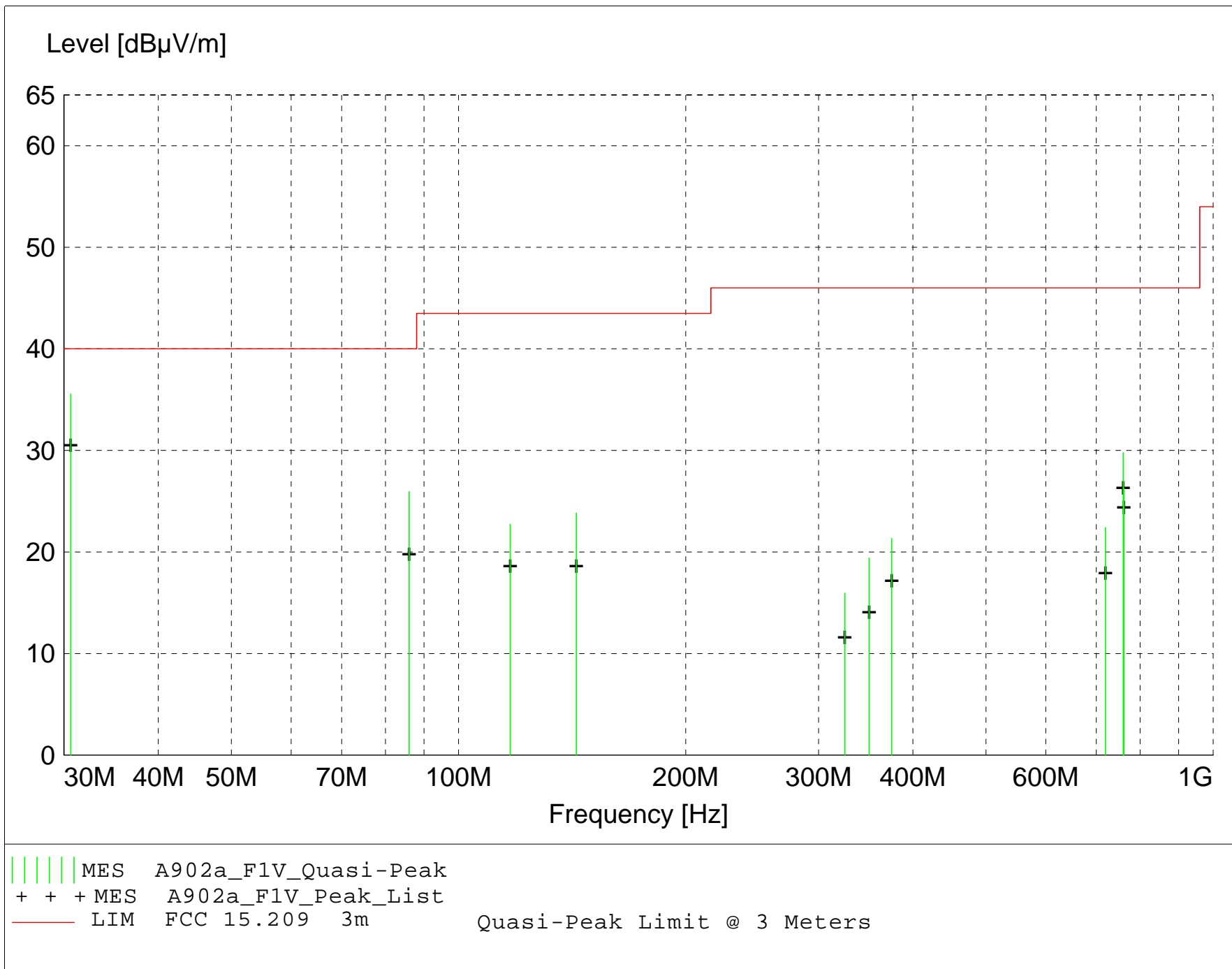
### **TEXT: "Vert 3 meters"**

Short Description: Test Set-up

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

Sample Equations: 
$$\begin{aligned} \text{Total Level(dB}\mu\text{V/m)} &= \text{Level(dB}\mu\text{V)} + \text{System Loss(dB)} + \text{Antenna Factor(dB}\mu\text{V/m)} \\ 24.6 &= 35.51 + (-22.1) + 11.20 \end{aligned}$$
$$\begin{aligned} \text{Margin(dB)} &= \text{Limit(dB}\mu\text{V/m)} - \text{Total Level(dB}\mu\text{V/m)} \\ 15.4 &= 40 - 24.6 \end{aligned}$$

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



**MEASUREMENT RESULT: "A902a\_F1V\_Final"**

9/2/2016 10:46AM

Frequency	Level	Antenna	System	Total	Limit	Margin	Height	EuT	Final	Comment
MHz	dBμV	Factor	Loss	Level			Ant.	Angle	Detector	
		dBμV/m	dB	dBμV/m	dBμV/m	dB	m	deg		
30.630000	48.42	11.97	-24.8	35.6	40.0	4.4	1.00	90	QUASI-PEAK	broadband
86.030000	42.35	7.41	-23.8	25.9	40.0	14.1	1.00	0	QUASI-PEAK	None
760.000000	28.65	21.30	-20.2	29.8	46.0	16.2	1.00	0	QUASI-PEAK	None
143.240000	35.09	12.00	-23.3	23.8	43.5	19.7	1.00	340	QUASI-PEAK	None
761.600000	25.11	21.30	-20.1	26.3	46.0	19.7	1.00	10	QUASI-PEAK	None
117.070000	33.22	12.90	-23.4	22.7	43.5	20.8	1.00	100	QUASI-PEAK	None
720.000000	21.25	21.30	-20.1	22.4	46.0	23.6	1.00	10	QUASI-PEAK	None
375.000000	27.99	15.00	-21.7	21.3	46.0	24.7	1.50	180	QUASI-PEAK	None
349.990000	26.73	14.70	-22.0	19.4	46.0	26.6	1.70	340	QUASI-PEAK	None
324.990000	23.56	14.40	-22.0	15.9	46.0	30.1	1.50	180	QUASI-PEAK	None

## **FCC Part 90, Subpart Z**

### **Electric Field Strength**

EUT: PMP450i SM/BH 3.65 GHz  
Manufacturer: Cambium Networks  
Operating Condition: 72 deg. F; 67% R.H.  
Test Site: DLS O.F. Site 3  
Operator: Craig B  
Test Specification: Low, Mid, High channels  
Comment: Transmitter Emissions; 50 Ohm terminations on ant  
Date: 09-02-2016

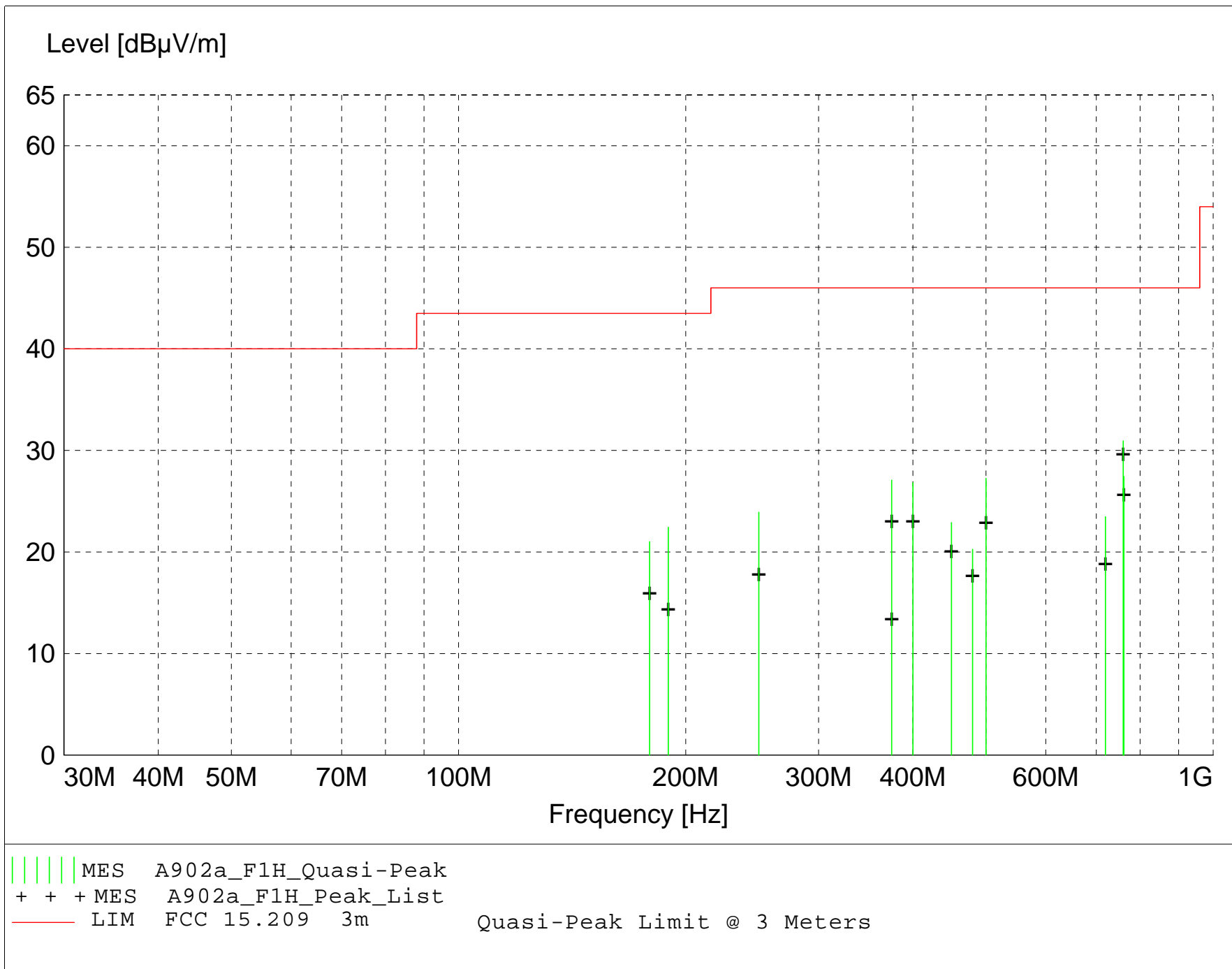
### **TEXT: "Horz 3 meters"**

Short Description: Test Set-up

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

Sample Equations: 
$$\begin{array}{rclclcl} \text{Total Level(dB}\mu\text{V/m)} & = & \text{Level(dB}\mu\text{V)} & + & \text{System Loss(dB)} & + & \text{Antenna Factor(dB}\mu\text{V/m)} \\ 24.6 & & = & 35.51 & + & (-22.1) & + & 11.20 \end{array}$$
$$\begin{array}{rclcl} \text{Margin(dB)} & = & \text{Limit(dB}\mu\text{V/m)} & - & \text{Total Level(dB}\mu\text{V/m)} \\ 15.4 & = & 40 & - & 24.6 \end{array}$$

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



**MEASUREMENT RESULT: "A902a\_F1H\_Final"**

9/2/2016 11:03AM

Frequency	Level	Antenna	System	Total	Limit	Margin	Height	EuT	Final	Comment
MHz	dBμV	Factor	Loss	Level			Ant.	Angle	Detector	
		dBμV/m	dB	dBμV/m	dBμV/m	dB	m	deg		
760.000000	29.81	21.30	-20.2	30.9	46.0	15.1	2.00	225	QUASI-PEAK	None
761.600000	26.27	21.30	-20.1	27.4	46.0	18.6	1.80	180	QUASI-PEAK	None
500.000000	30.65	17.80	-21.2	27.3	46.0	18.7	1.00	80	QUASI-PEAK	None
374.990000	33.73	15.00	-21.7	27.1	46.0	18.9	1.00	60	QUASI-PEAK	None
400.000000	32.46	15.90	-21.5	26.8	46.0	19.2	1.00	75	QUASI-PEAK	None
189.620000	27.65	17.52	-22.7	22.4	43.5	21.1	1.70	170	QUASI-PEAK	broadband
249.990000	34.21	12.10	-22.4	23.9	46.0	22.1	1.50	20	QUASI-PEAK	None
179.170000	27.81	16.12	-22.9	21.0	43.5	22.5	1.60	350	QUASI-PEAK	broadband
720.000000	22.32	21.30	-20.1	23.5	46.0	22.5	2.00	190	QUASI-PEAK	None
450.000000	27.33	16.80	-21.2	22.9	46.0	23.1	1.00	80	QUASI-PEAK	None
375.000000	28.60	15.00	-21.7	21.9	46.0	24.1	1.40	150	QUASI-PEAK	None
479.990000	24.57	17.10	-21.4	20.3	46.0	25.7	1.00	90	QUASI-PEAK	None



## ***RSS-197 & FCC Part 90, Subpart Z***

### ***Electric Field Strength***

EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45116A  
Manufacturer: Cambium Networks  
Operating Condition: 71 deg C 49% R.H.  
Test Site: DLS O.F. G1  
Operator: Craig B; #8420  
Test Specification: Transmitter Spurious; with 50 Ohm terminations on ant ports  
Comment: 5 MHz ch BW; Tx 50.2% @ pwr setting 18 L,M,H channels  
Date: 10-11-2016

### ***TEXT: "Vert 3 meters"***

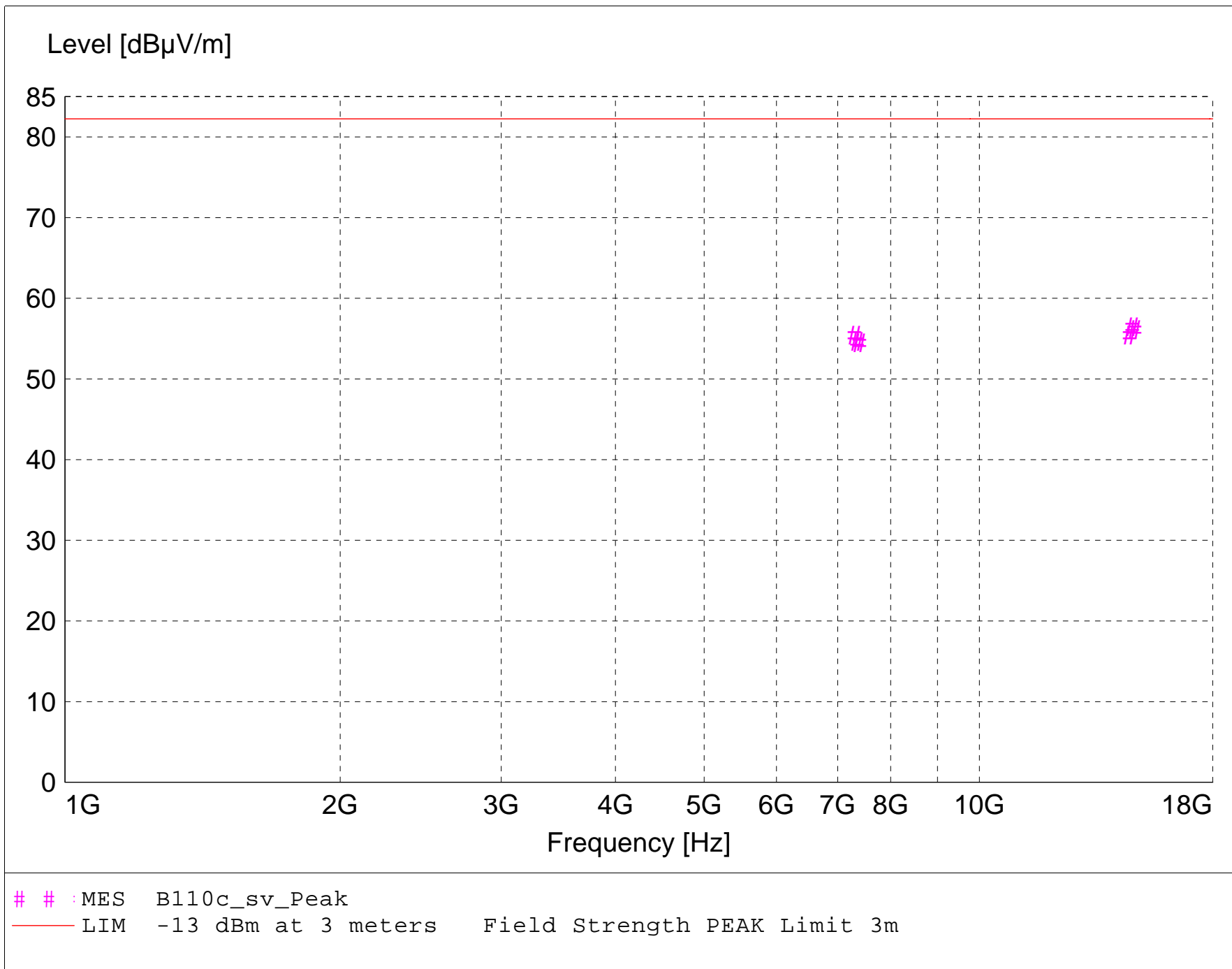
Short Description: Test Set-up

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

Sample Equations: 
$$\begin{array}{rclclcl} \text{Total Level(dB}\mu\text{V/m)} & = & \text{Level(dB}\mu\text{V)} & + & \text{System Loss(dB)} & + & \text{Antenna Factor(dB}\mu\text{V/m)} \\ 24.6 & & = 35.51 & & + (-22.1) & & + 11.20 \end{array}$$

$$\begin{array}{rclcl} \text{Margin(dB)} & = & \text{Limit(dB}\mu\text{V/m)} & - & \text{Total Level(dB}\mu\text{V/m)} \\ 15.4 & = & 40 & - & 24.6 \end{array}$$

Graph Markers: + Frequency marker (Level of marker not related to final level)  
| Final maximized level using Quasi-Peak detector  
X Final maximized level using Average detector  
# Final maximized level using Peak detector  
- Background Scan Peak Detector (Optional)  
- Background Scan Average Detector (Optional)



**MEASUREMENT RESULT: "B110c\_sv\_Final"**

10/11/2016 2:14PM

Frequency	Level	Antenna	System	Total	Limit	Margin	Height	EuT	Final		Comment
MHz	dBμV	Factor	Loss	Level			Ant.	Angle	Detector		
		dBμV/m	dB	dBμV/m	dBμV/m	dB	m	deg			
14700.020000	50.61	42.22	-36.3	56.5	82.3	25.8	2.16	312	MAX PEAK		Mid ch
14790.000000	51.13	41.35	-36.3	56.1	82.3	26.1	2.10	53	MAX PEAK		High ch
14610.040000	49.96	41.88	-36.4	55.5	82.3	26.8	2.15	307	MAX PEAK		Low ch
7305.010000	54.30	36.43	-35.3	55.4	82.3	26.8	2.21	0	MAX PEAK		Low ch
7350.020000	53.36	36.52	-35.2	54.7	82.3	27.6	2.05	9	MAX PEAK		Mid ch
7394.980000	52.96	36.61	-35.1	54.5	82.3	27.8	1.64	345	MAX PEAK		High ch

## ***RSS-197 & FCC Part 90, Subpart Z***

### ***Electric Field Strength***

EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45116A  
Manufacturer: Cambium Networks  
Operating Condition: 71 deg C 43% R.H.  
Test Site: DLS O.F. G1  
Operator: Craig B; #8420  
Test Specification: Transmitter Spurious; with 50 Ohm terminations on ant ports  
Comment: 5 MHz ch BW; Tx 50.2% @ pwr setting 18 L,M,H channels  
Date: 10-13-2016

### ***TEXT: "Vert 1 meters"***

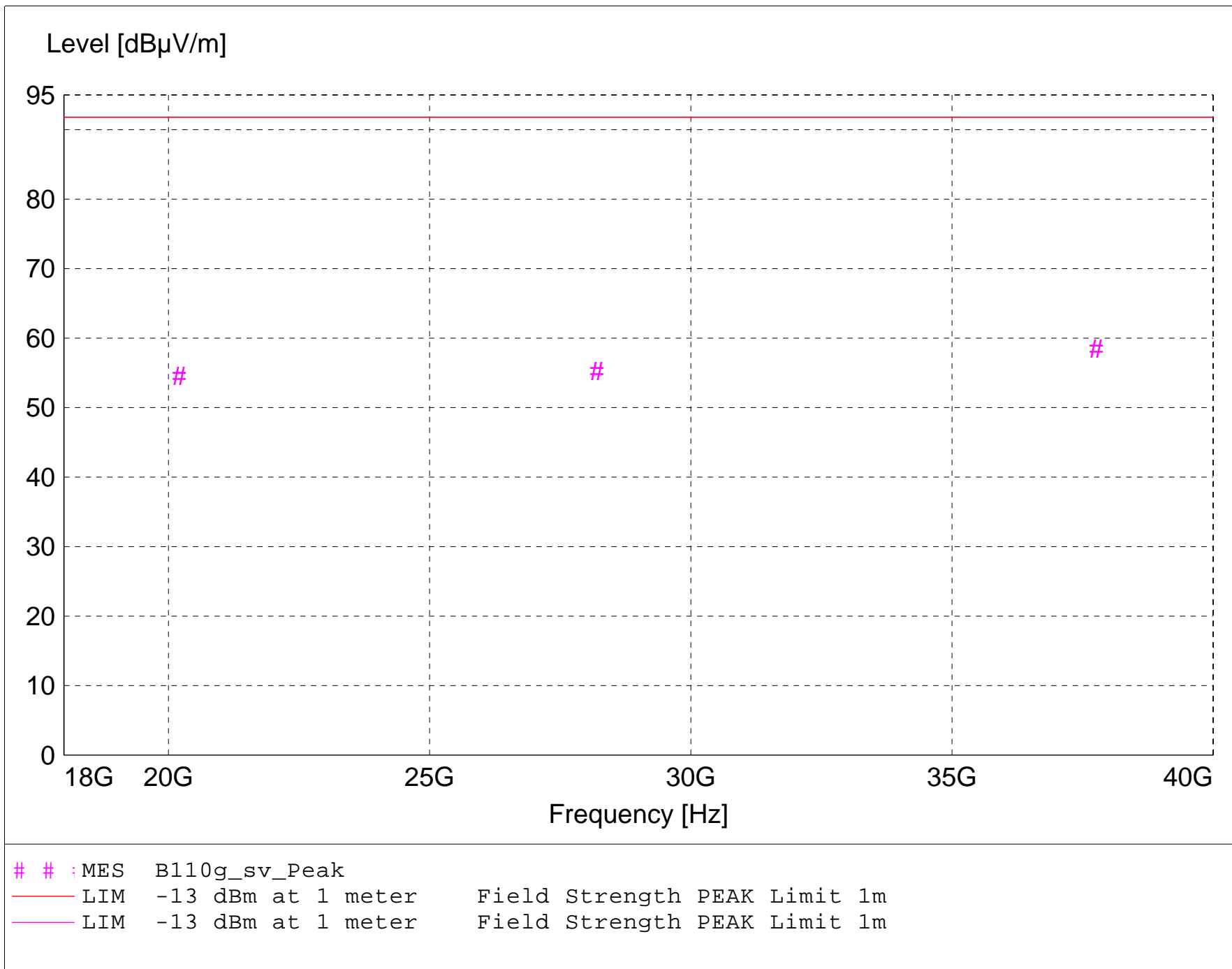
Short Description: Test Set-up

Test Set-up: EUT Measured at 1 Meters with VERTICAL Antenna Polarization

Sample Equations: 
$$\begin{array}{rclclcl} \text{Total Level(dB}\mu\text{V/m)} & = & \text{Level(dB}\mu\text{V)} & + & \text{System Loss(dB)} & + & \text{Antenna Factor(dB}\mu\text{V/m)} \\ 24.6 & & = & 35.51 & + & (-22.1) & + & 11.20 \end{array}$$

$$\begin{array}{rclcl} \text{Margin(dB)} & = & \text{Limit(dB}\mu\text{V/m)} & - & \text{Total Level(dB}\mu\text{V/m)} \\ 15.4 & = & 40 & - & 24.6 \end{array}$$

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



**MEASUREMENT RESULT: "B110g\_sv\_Final"**

10/13/2016 11:15AM

Frequency	Level	Antenna	System	Total	Limit	Margin	Height	EuT	Final	Comment
MHz	dBμV	Factor	Loss	Level			Ant.	Angle	Detector	
		dBμV/m	dB	dBμV/m	dBμV/m	dB	m	deg		
37761.600000	61.01	41.50	-44.0	58.5	91.8	33.3	1.50	90	MAX PEAK	noise floor
28201.200000	61.01	40.43	-46.2	55.3	91.8	36.5	1.50	180	MAX PEAK	noise floor
20205.200000	65.47	40.49	-51.4	54.6	91.8	37.2	1.50	135	MAX PEAK	noise floor

## **RSS-197 & FCC Part 90, Subpart Z**

### **Electric Field Strength**

EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45116A  
Manufacturer: Cambium Networks  
Operating Condition: 71 deg C 49% R.H.  
Test Site: DLS O.F. G1  
Operator: Craig B; #8420  
Test Specification: Transmitter Spurious; with 50 Ohm terminations on ant ports  
Comment: 5 MHz ch BW; Tx 50.2% @ pwr setting 18 L,M,H channels  
Date: 10-11-2016

### **TEXT: "Horz 3 meters"**

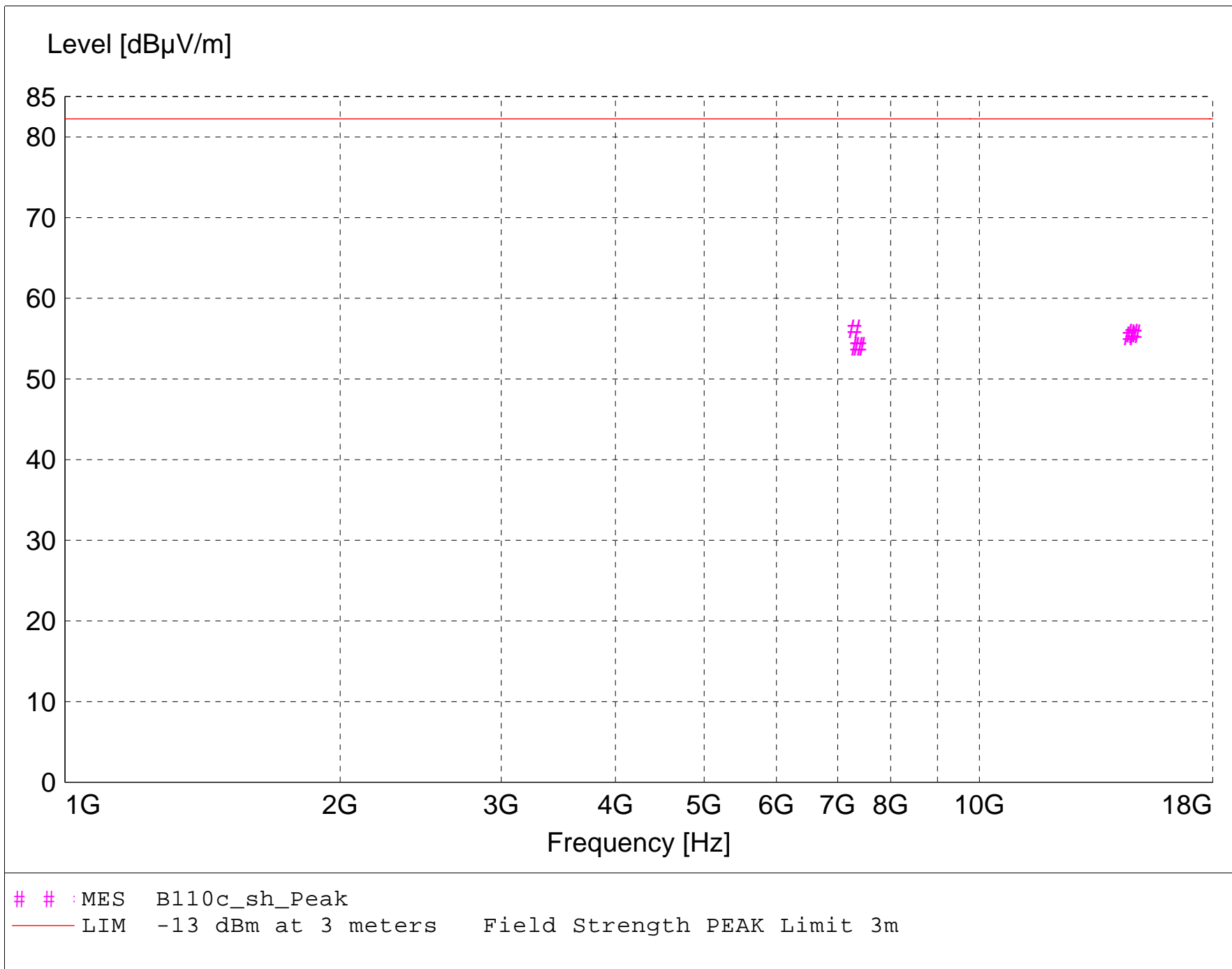
Short Description: Test Set-up

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

Sample Equations: 
$$\begin{array}{rclclcl} \text{Total Level(dB}\mu\text{V/m)} & = & \text{Level(dB}\mu\text{V)} & + & \text{System Loss(dB)} & + & \text{Antenna Factor(dB}\mu\text{V/m)} \\ 24.6 & & = 35.51 & & + (-22.1) & & + 11.20 \end{array}$$

$$\begin{array}{rclcl} \text{Margin(dB)} & = & \text{Limit(dB}\mu\text{V/m)} & - & \text{Total Level(dB}\mu\text{V/m)} \\ 15.4 & & = 40 & & - 24.6 \end{array}$$

Graph Markers: +      Frequency marker (Level of marker not related to final level)  
                 |      Final maximized level using Quasi-Peak detector  
                 X      Final maximized level using Average dector  
                 #      Final maximized level using Peak detector  
                 -      Background Scan Peak Detector (Optional)  
                 -      Background Scan Average Detector (Optional)





**MEASUREMENT RESULT: "B110c\_sh\_Final"**

10/11/2016 2:13PM

Frequency	Level	Antenna	System	Total	Limit	Margin	Height	EuT	Final	Comment
MHz	dBμV	Factor	Loss	Level			Ant.	Angle	Detector	
		dBμV/m	dB	dBμV/m	dBμV/m	dB	m	deg		
7305.000000	55.12	36.43	-35.3	56.2	82.3	26.0	1.93	136	MAX PEAK	Low ch
14700.010000	49.82	42.22	-36.3	55.7	82.3	26.6	1.71	139	MAX PEAK	Mid ch
14790.080000	50.61	41.35	-36.3	55.6	82.3	26.6	1.50	143	MAX PEAK	High ch
14610.020000	49.82	41.88	-36.4	55.3	82.3	26.9	1.48	134	MAX PEAK	Low ch
7395.000000	52.55	36.61	-35.1	54.1	82.3	28.2	1.49	235	MAX PEAK	High ch
7350.000000	52.69	36.52	-35.2	54.0	82.3	28.2	1.67	236	MAX PEAK	Mid ch

## ***RSS-197 & FCC Part 90, Subpart Z***

### ***Electric Field Strength***

EUT: PMP450i 3.65 GHz SM/BH SN: 0A003E45116A  
Manufacturer: Cambium Networks  
Operating Condition: 71 deg C 43% R.H.  
Test Site: DLS O.F. G1  
Operator: Craig B; #8420  
Test Specification: Transmitter Spurious; with 50 Ohm terminations on ant ports  
Comment: 5 MHz ch BW; Tx 50.2% @ pwr setting 18 L,M,H channels  
Date: 10-13-2016

### ***TEXT: "Horz 1 meters"***

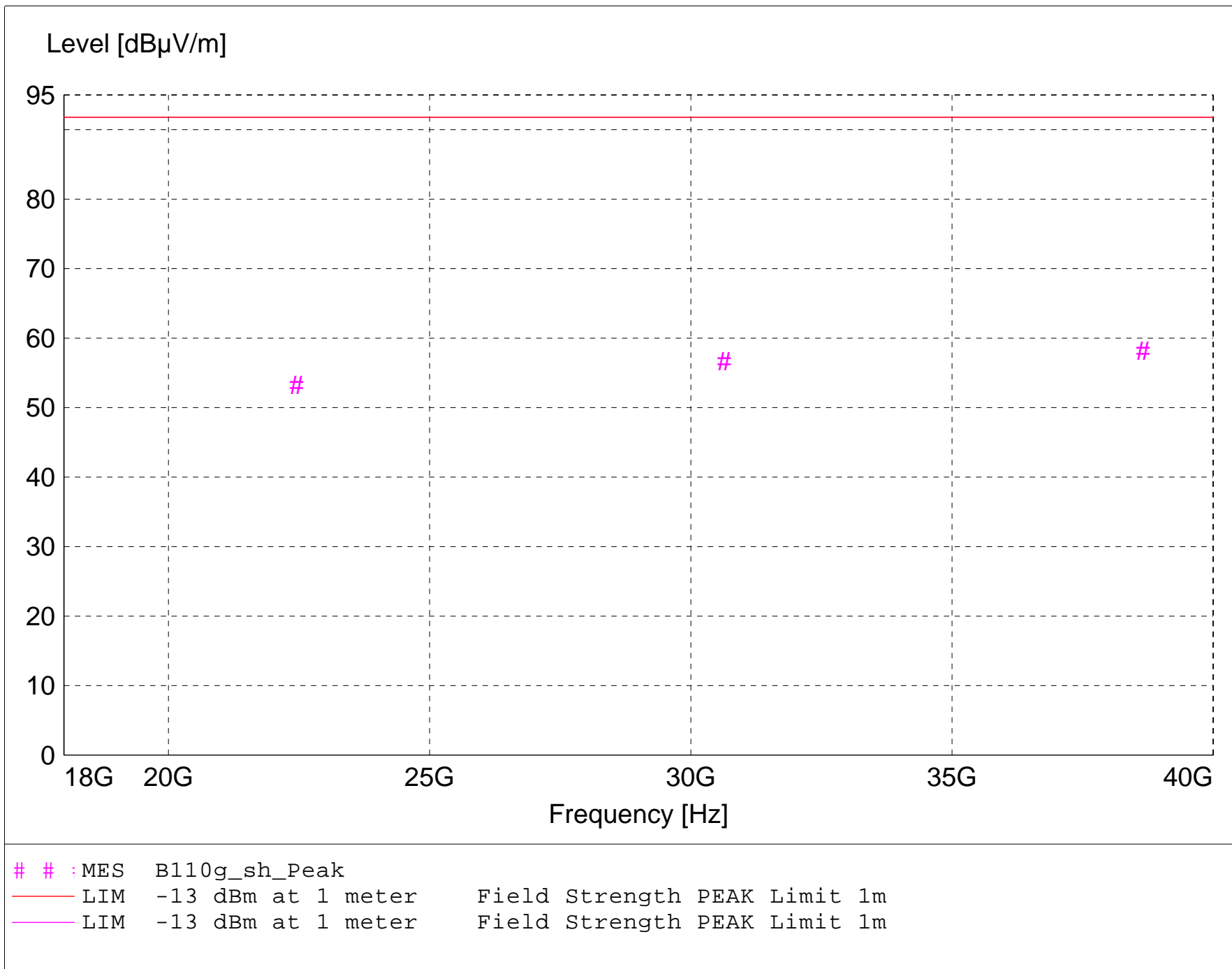
Short Description: Test Set-up

Test Set-up: EUT Measured at 1 Meters with HORIZONTAL Antenna Polarization

Sample Equations: 
$$\begin{array}{rclclcl} \text{Total Level(dB}\mu\text{V/m)} & = & \text{Level(dB}\mu\text{V)} & + & \text{System Loss(dB)} & + & \text{Antenna Factor(dB}\mu\text{V/m)} \\ 24.6 & & = & 35.51 & + & (-22.1) & + & 11.20 \end{array}$$

$$\begin{array}{rclcl} \text{Margin(dB)} & = & \text{Limit(dB}\mu\text{V/m)} & - & \text{Total Level(dB}\mu\text{V/m)} \\ 15.4 & = & 40 & - & 24.6 \end{array}$$

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



**MEASUREMENT RESULT: "B110g\_sh\_Final"**

10/13/2016 11:14AM

Frequency	Level	Antenna	System	Total	Limit	Margin	Height	EuT	Final	Comment
MHz	dBμV	Factor	Loss	Level			Ant.	Angle	Detector	
		dBμV/m	dB	dBμV/m	dBμV/m	dB	m	deg		
38657.600000	61.01	41.46	-44.3	58.2	91.8	33.6	1.50	270	MAX PEAK	noise floor
30641.600000	61.27	40.52	-45.1	56.7	91.8	35.1	1.50	45	MAX PEAK	noise floor
22451.200000	63.10	40.18	-50.1	53.2	91.8	38.6	1.50	315	MAX PEAK	noise floor



166 South Carter, Genoa City, WI 53128

Company:	Cambium Networks
Model Tested:	3082CHH
Report Number:	22288
DLS Project:	8420

## Appendix B – Measurement Data

### B8.0 Transmitter Frequency Stability

**Rule Part:** FCC Part 2.1055

#### Test Procedure:

The EUT was connected to a spectrum analyzer through a cable and 20 dB attenuator. Using a RBW of 1% of the occupied bandwidth, reference points  $F_L$  and  $F_H$  were recorded at the lower ( $F_L$ ) and upper ( $F_H$ ) frequencies where the transmit signal crossed the unwanted emission limit (-13 dBm). The frequency offset (drift/error) was then measured.

**Limit:** The wanted emission must stay within the 3650-3700 MHz band. Calculated signal edge measurements ( $F_L$  – frequency offset and  $F_H$  + frequency offset) show that the signal edges referenced to the unwanted emission (-13 dBm) fall within the 3650-3700 MHz band.

**Notes:** Since the EUT was not capable of operating in an un-modulated mode for testing, the following procedure was used to measure the frequency offset (drift/error):

The EUT was set to transmit at its lowest (5 MHz) channel bandwidth. The center frequency of the spectrum analyzer was set to the nominal center frequency of the channel being tested. The SPAN was set to 7 MHz. The RBW was set to 5 kHz. The VBW was set to 200 Hz. The detector was set to Peak. The trace was set to Max Hold. A marker  $f_{peak}$  was placed on the trace using the peak-search function of the analyzer. Another marker  $f_l$  was placed at the lower frequency edge of the signal where the level was 10 dB lower than  $f_{peak}$ . Another marker  $f_h$  was placed at the upper frequency edge of the signal where the level was 10 dB lower than  $f_{peak}$ . The center frequency was calculated as  $(f_l + f_h) / 2$ .

Only tested output port A as determined worst case by Cambium Networks.

DLS Electronic Systems, Inc.

Company: Cambium Networks

Operator: Craig B

Dates of test: 10-13-2016, 10-14-2016

Model: PMP450i 3.65 GHz SM/BH

$F_L$  = Lower frequency of Low channel where emission level is at -13 dBm (reference level)

$F_H$  = Upper frequency of High channel where emission level is at -13 dBm (reference level)

Limit =  $F_{L(\text{extreme})}$  and  $F_{H(\text{extreme})}$  must stay within the 3650 - 3700 MHz Band

Low channel reference center frequency (MHz): 3652.50702

High channel reference center frequency (MHz): 3697.50702

Frequency Stability

$F_L$ reference Frequency (MHz)	$F_H$ reference Frequency (MHz)	Extreme condition	Measured Center (MHz) Low ch	Measured Center (MHz) High ch	Offset Low channel (MHz)	Offset High channel (MHz)	Calculated $F_{L(\text{extreme})}$ (MHz)	Calculated $F_{H(\text{extreme})}$ (MHz)
3650.09646	3699.88552	-30°C	3652.50702	3697.50702	0.00000	0.00000	3650.09646	3699.88552
3650.09646	3699.88552	-20°C	3652.50702	3697.50702	0.00000	0.00000	3650.09646	3699.88552
3650.09646	3699.88552	-10°C	3652.50702	3697.50702	0.00000	0.00000	3650.09646	3699.88552
3650.09646	3699.88552	0°C	3652.50702	3697.50702	0.00000	0.00000	3650.09646	3699.88552
3650.09646	3699.88552	10°C	3652.50702	3697.50702	0.00000	0.00000	3650.09646	3699.88552
3650.09646	3699.88552	20°C	3652.50702	3697.50702	0.00000	0.00000	3650.09646	3699.88552
3650.09646	3699.88552	30°C	3652.50702	3697.50702	0.00000	0.00000	3650.09646	3699.88552
3650.09646	3699.88552	40°C	3652.50702	3697.50702	0.00000	0.00000	3650.09646	3699.88552
3650.09646	3699.88552	50°C	3652.50702	3697.50702	0.00000	0.00000	3650.09646	3699.88552
3650.09646	3699.88552	102 V	3652.50702	3697.50702	0.00000	0.00000	3650.09646	3699.88552
3650.09646	3699.88552	138 V	3652.50702	3697.50702	0.00000	0.00000	3650.09646	3699.88552



166 South Carter, Genoa City, WI 53128

Company:	Cambium Networks
Model Tested:	3082CHH
Report Number:	22288
DLS Project:	8420

## Appendix B – Measurement Data

### B9.0 AC Line Conducted Emissions

**Rule Part:** FCC Part 15.207 (a)

**Test Procedure:** ANSI C63.10-2013, Section 6.2

**Limit:** FCC Part 15.207 (a)

**Results:** Compliant

**Notes:** The EUT was powered with Cambium Networks model NET-P30-56IN power supply that was connected to a Line Impedance Stabilization Network.



Report issuing date : 09-06-2016

Standard : FCC 15.207  
Test Type : Voltage Mains  
Test Site : DLS O.F. Screen Room  
Temperature : 75°F  
Humidity : 47 %  
Test Specs : Line 1; Quasi-Peak  
Operator : Craig B  
DLS Project # : 8420  
Result : Pass  
EUT

-----  
Manufacturer : Cambium Networks  
Model : PMP450i 3.65 GHz SM/BH  
Product :  
Notes : 120 V 60 Hz  
-----

Testing Company : DLS Electronic Systems, Inc.  
Telephone : 262-279-0210  
Web site : <http://www.dlsemc.com>

#### Receiver Details

-----  
Model : PMM 9010F  
Brand : Narda  
S/N : 020WW40102  
Last Calibration : 06/23/2016

NOTE: The column in the table that is labeled "delta" shows the margin in dB with respect to the limit. A negative number indicates the level of the emission is under the limit by the given value, while a positive number indicates the emission level is above the limit by the given value.





Cambium Networks PMP450i 120v L1

	Start [MHz]	Stop [MHz]	Step	Detector	Hold Time	RBW	Min Att	Pre Amp	Pre Sel	Prompt start	Ancillary
1	0.15	30	AUTO (2.045 kHz)	P Q C	1500 ms	9 kHz	10	OFF	ON	...	...

Ancillary = General  
Nr. of Worst = Infinite (3)

Limits:  
Class B V QP

Factors:  
LISN DLS#128  
E-M L705  
DLS #592  
Cables 43 & 45

QPeak —

Cambium Networks PMP450i 120v L1 06/09/2016 14:51:22

Rel. SW 2.22 (August 2015)

Rel. FW 1.54 20/04/16

Margin: 15 dB

	Frequency	QPeak	Limit	Delta	Factor	Factor	Factor	Factor
	[MHz]	[dBµV]	Class B V..	[dB]	LISN DLS#..	E-M L705	DLS #592	Cables 43..
			[dBµV]		[dB]	[dB]	[dB]	[dB]
1	0.15818	51.25	65.56	-14.31	1.54	9.85	2.03	0.13
2	0.160225	53.09	65.45	-12.36	1.51	9.85	2.00	0.12
3	0.16227	53.51	65.35	-11.84	1.49	9.84	1.97	0.11
4	0.164315	53.30	65.24	-11.94	1.46	9.84	1.94	0.10
5	0.16636	52.77	65.14	-12.37	1.43	9.83	1.91	0.09
6	0.168405	51.50	65.04	-13.54	1.41	9.83	1.89	0.09
7	23.12762	47.12	60.00	-12.88	0.35	10.15	0.44	0.87
8	23.129665	47.74	60.00	-12.26	0.35	10.15	0.44	0.87
9	23.13171	47.56	60.00	-12.44	0.36	10.15	0.44	0.87
10	24.348485	46.11	60.00	-13.89	0.37	10.15	0.46	0.89
11	24.35053	47.52	60.00	-12.48	0.37	10.15	0.46	0.89
12	24.352575	47.43	60.00	-12.57	0.37	10.15	0.46	0.89
13	24.35462	45.91	60.00	-14.09	0.37	10.15	0.46	0.89
14	24.532535	46.04	60.00	-13.96	0.37	10.14	0.47	0.89
15	24.53458	46.49	60.00	-13.51	0.37	10.14	0.47	0.89
16	24.536625	46.17	60.00	-13.83	0.37	10.14	0.47	0.89
17	24.89859	45.07	60.00	-14.93	0.37	10.13	0.47	0.89
18	24.900635	45.82	60.00	-14.18	0.37	10.13	0.47	0.89
19	24.90268	45.73	60.00	-14.27	0.37	10.13	0.47	0.89
20	24.961985	45.35	60.00	-14.65	0.37	10.13	0.47	0.89
21	24.96403	45.08	60.00	-14.92	0.37	10.13	0.47	0.89
22	25.694095	45.26	60.00	-14.74	0.37	10.12	0.49	0.89
23	25.69614	45.29	60.00	-14.71	0.37	10.12	0.49	0.89



Report issuing date : 09-06-2016

Standard : FCC 15.207  
Test Type : Voltage Mains  
Test Site : DLS O.F. Screen Room  
Temperature : 75°F  
Humidity : 47 %  
Test Specs : Line 1; Average  
Operator : Craig B  
DLS Project # : 8420  
Result : Pass  
EUT

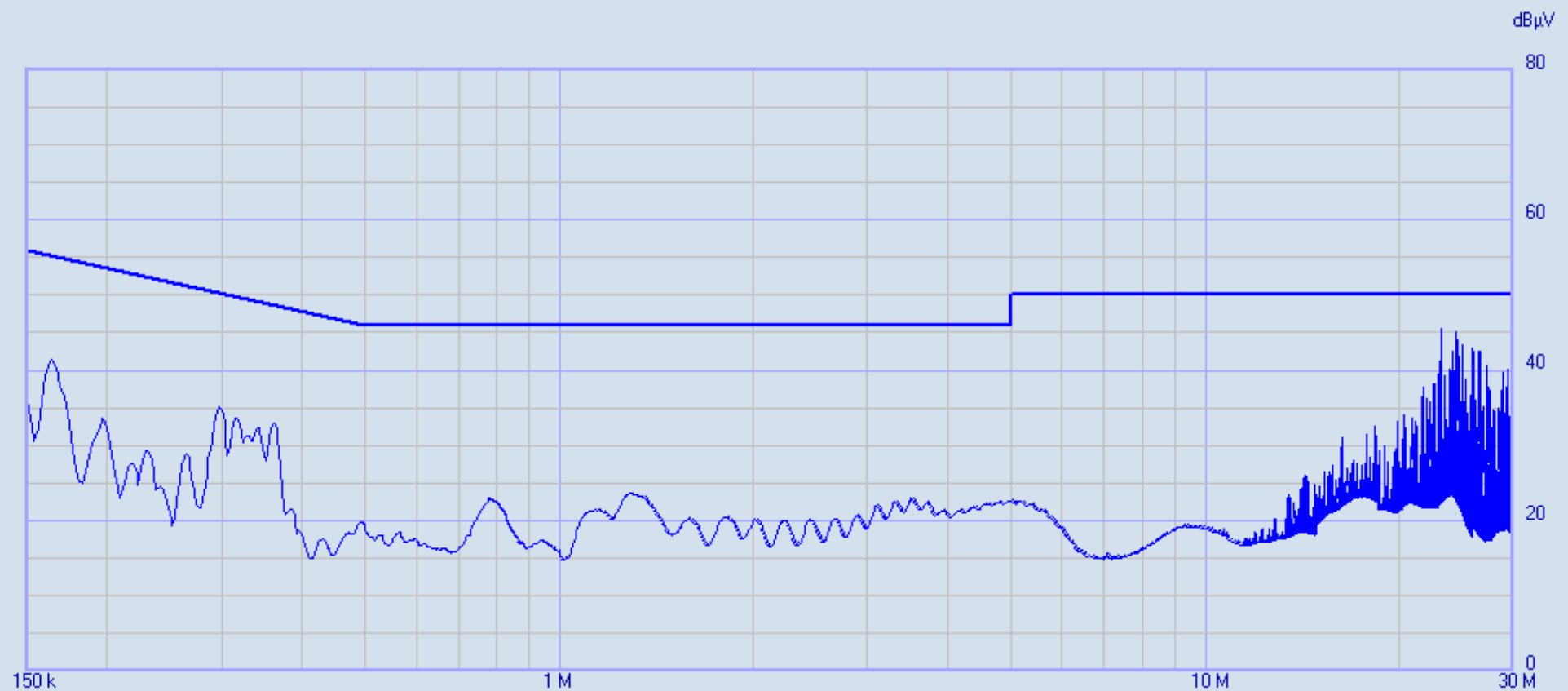
-----  
Manufacturer : Cambium Networks  
Model : PMP450i 3.65 GHz SM/BH  
Product :  
Notes : 120 V 60 Hz  
-----

Testing Company : DLS Electronic Systems, Inc.  
Telephone : 262-279-0210  
Web site : <http://www.dlsemc.com>

#### Receiver Details

-----  
Model : PMM 9010F  
Brand : Narda  
S/N : 020WW40102  
Last Calibration : 06/23/2016

NOTE: The column in the table that is labeled "delta" shows the margin in dB with respect to the limit. A negative number indicates the level of the emission is under the limit by the given value, while a positive number indicates the emission level is above the limit by the given value.



Cambium Networks PMP450i 120v L1

	Start [MHz]	Stop [MHz]	Step	Detector	Hold Time	RBW	Min Att	Pre Amp	Pre Sel	Prompt start	Ancillary
1	0.15	30	AUTO (2.045 kHz)	P Q C	1500 ms	9 kHz	10	OFF	ON	...	...

Ancillary = General  
Nr. of Worst = Infinite (3)

Limits:  
Class B VAV

Factors:  
LISN DLS#128  
E-M L705  
DLS #592  
Cables 43 & 45

C-Avg —

Cambium Networks PMP450i 120v L1 06/09/2016 14:51:22  
 Rel. SW 2.22 (August 2015)  
 Rel. FW 1.54 20/04/16  
 Margin: 7.5 dB

Frequency	C-Avg	Limit	Delta	Factor	Factor	Factor	Factor
[MHz]	[dBμV]	Class B V..	[dB]	LISN DLS#..	E-M L705	DLS #592	Cables 43..
		[dBμV]		[dB]	[dB]	[dB]	[dB]
1 23.12762	44.78	50.00	-5.22	0.35	10.15	0.44	0.87
2 23.129665	45.45	50.00	-4.55	0.35	10.15	0.44	0.87
3 23.13171	45.34	50.00	-4.66	0.36	10.15	0.44	0.87
4 23.133755	42.89	50.00	-7.11	0.36	10.15	0.44	0.87
5 24.045825	42.58	50.00	-7.42	0.36	10.15	0.46	0.89
6 24.348485	43.57	50.00	-6.43	0.37	10.15	0.46	0.89
7 24.35053	45.07	50.00	-4.93	0.37	10.15	0.46	0.89
8 24.352575	45.08	50.00	-4.92	0.37	10.15	0.46	0.89
9 24.35462	43.78	50.00	-6.22	0.37	10.15	0.46	0.89
10 24.532535	43.54	50.00	-6.46	0.37	10.14	0.47	0.89
11 24.53458	44.03	50.00	-5.97	0.37	10.14	0.47	0.89
12 24.536625	43.86	50.00	-6.14	0.37	10.14	0.47	0.89
13 24.89859	42.50	50.00	-7.50	0.37	10.13	0.47	0.89
14 24.900635	43.38	50.00	-6.62	0.37	10.13	0.47	0.89
15 24.90268	43.31	50.00	-6.69	0.37	10.13	0.47	0.89
16 24.961985	42.88	50.00	-7.12	0.37	10.13	0.47	0.89
17 24.96403	42.75	50.00	-7.25	0.37	10.13	0.47	0.89
18 25.694095	42.85	50.00	-7.15	0.37	10.12	0.49	0.89
19 25.69614	42.87	50.00	-7.13	0.37	10.12	0.49	0.89
20 25.878145	42.61	50.00	-7.39	0.37	10.11	0.49	0.89
21 26.4896	42.54	50.00	-7.46	0.38	10.10	0.50	0.89
22 26.6123	42.51	50.00	-7.49	0.38	10.10	0.50	0.89



Report issuing date : 09-06-2016

Standard : FCC 15.207  
Test Type : Voltage Mains  
Test Site : DLS O.F. Screen Room  
Temperature : 75°F  
Humidity : 47 %  
Test Specs : Line 2; Quasi-Peak  
Operator : Craig B  
DLS Project # : 8420  
Result : Pass  
EUT

-----  
Manufacturer : Cambium Networks  
Model : PMP450i 3.65 GHz SM/BH  
Product :  
Notes : 120 V 60 Hz  
-----

Testing Company : DLS Electronic Systems, Inc.  
Telephone : 262-279-0210  
Web site : <http://www.dlsemc.com>

#### Receiver Details

-----  
Model : PMM 9010F  
Brand : Narda  
S/N : 020WW40102  
Last Calibration : 06/23/2016

NOTE: The column in the table that is labeled "delta" shows the margin in dB with respect to the limit. A negative number indicates the level of the emission is under the limit by the given value, while a positive number indicates the emission level is above the limit by the given value.



Cambium Networks PMP450i 120v L2

	Start [MHz]	Stop [MHz]	Step	Detector	Hold Time	RBW	Min Att	Pre Amp	Pre Sel	Prompt start	Ancillary
1	0.15	30	AUTO (2.045 kHz)	P Q C	1500 ms	9 kHz	10	OFF	ON	...	...

Ancillary = General  
Nr. of Worst = Infinite (4)

Limits:  
Class B V QP

Factors:  
LISN DLS#128  
E-M L705  
DLS #592  
Cables 43 & 45

QPeak —

Cambium Networks PMP450i 120v L2 06/09/2016 15:05:57

Rel. SW 2.22 (August 2015)

Rel. FW 1.54 20/04/16

Margin: 14 dB

Frequency	QPeak	Limit	Delta	Factor	Factor	Factor	Factor
[MHz]	[dBμV]	Class B V..	[dB]	LISN DLS#..	E-M L705	DLS #592	Cables 43..
		[dBμV]		[dB]	[dB]	[dB]	[dB]
1 0.15	52.40	66.00	-13.60	1.66	9.87	2.16	0.17
2 0.160225	52.74	65.45	-12.71	1.51	9.85	2.00	0.12
3 0.16227	53.14	65.35	-12.21	1.49	9.84	1.97	0.11
4 0.164315	52.99	65.24	-12.25	1.46	9.84	1.94	0.10
5 0.16636	52.41	65.14	-12.73	1.43	9.83	1.91	0.09
6 23.12762	47.31	60.00	-12.69	0.35	10.15	0.44	0.87
7 23.129665	47.90	60.00	-12.10	0.35	10.15	0.44	0.87
8 23.13171	47.75	60.00	-12.25	0.36	10.15	0.44	0.87
9 24.348485	46.33	60.00	-13.67	0.37	10.15	0.46	0.89
10 24.35053	47.67	60.00	-12.33	0.37	10.15	0.46	0.89
11 24.352575	47.69	60.00	-12.31	0.37	10.15	0.46	0.89
12 24.35462	46.21	60.00	-13.79	0.37	10.15	0.46	0.89
13 24.532535	46.19	60.00	-13.81	0.37	10.14	0.47	0.89
14 24.53458	46.64	60.00	-13.36	0.37	10.14	0.47	0.89
15 24.536625	46.45	60.00	-13.55	0.37	10.14	0.47	0.89





Report issuing date : 09-06-2016

Standard : FCC 15.207  
Test Type : Voltage Mains  
Test Site : DLS O.F. Screen Room  
Temperature : 75°F  
Humidity : 47 %  
Test Specs : Line 2; Average  
Operator : Craig B  
DLS Project # : 8420  
Result : Pass  
EUT

-----  
Manufacturer : Cambium Networks  
Model : PMP450i 3.65 GHz SM/BH  
Product :  
Notes : 120 V 60 Hz  
-----

Testing Company : DLS Electronic Systems, Inc.  
Telephone : 262-279-0210  
Web site : <http://www.dlsemc.com>

#### Receiver Details

-----  
Model : PMM 9010F  
Brand : Narda  
S/N : 020WW40102  
Last Calibration : 06/23/2016

NOTE: The column in the table that is labeled "delta" shows the margin in dB with respect to the limit. A negative number indicates the level of the emission is under the limit by the given value, while a positive number indicates the emission level is above the limit by the given value.



Cambium Networks PMP450i 120v L2

	Start [MHz]	Stop [MHz]	Step	Detector	Hold Time	RBW	Min Att	Pre Amp	Pre Sel	Prompt start	Ancillary
1	0.15	30	AUTO (2.045 kHz)	P Q C	1500 ms	9 kHz	10	OFF	ON	...	...

Ancillary = General  
Nr. of Worst = Infinite (4)

Limits:  
Class B VAV

Factors:  
LISN DLS#128  
E-M L705  
DLS #592  
Cables 43 & 45

C-Avg

Cambium Networks PMP450i 120v L2 06/09/2016 15:05:57  
 Rel. SW 2.22 (August 2015)  
 Rel. FW 1.54 20/04/16  
 Margin: 7.3 dB

Frequency	C-Avg	Limit	Delta	Factor	Factor	Factor	Factor
[MHz]	[dBμV]	Class B V..	[dB]	LISN DLS#..	E-M L705	DLS #592	Cables 43..
		[dBμV]		[dB]	[dB]	[dB]	[dB]
1 23.12762	44.94	50.00	-5.06	0.35	10.15	0.44	0.87
2 23.129665	45.60	50.00	-4.40	0.35	10.15	0.44	0.87
3 23.13171	45.48	50.00	-4.52	0.36	10.15	0.44	0.87
4 23.133755	43.03	50.00	-6.97	0.36	10.15	0.44	0.87
5 24.045825	42.84	50.00	-7.16	0.36	10.15	0.46	0.89
6 24.04787	42.72	50.00	-7.28	0.36	10.15	0.46	0.89
7 24.348485	43.80	50.00	-6.20	0.37	10.15	0.46	0.89
8 24.35053	45.30	50.00	-4.70	0.37	10.15	0.46	0.89
9 24.352575	45.30	50.00	-4.70	0.37	10.15	0.46	0.89
10 24.35462	44.00	50.00	-6.00	0.37	10.15	0.46	0.89
11 24.532535	43.75	50.00	-6.25	0.37	10.14	0.47	0.89
12 24.53458	44.23	50.00	-5.77	0.37	10.14	0.47	0.89
13 24.536625	44.06	50.00	-5.94	0.37	10.14	0.47	0.89
14 24.900635	43.53	50.00	-6.47	0.37	10.13	0.47	0.89
15 24.90268	43.47	50.00	-6.53	0.37	10.13	0.47	0.89
16 24.961985	43.00	50.00	-7.00	0.37	10.13	0.47	0.89
17 24.96403	42.86	50.00	-7.14	0.37	10.13	0.47	0.89
18 25.694095	42.89	50.00	-7.11	0.37	10.12	0.49	0.89
19 25.69614	42.91	50.00	-7.09	0.37	10.12	0.49	0.89



Report issuing date : 09-06-2016

Standard : FCC 15.207  
Test Type : Voltage Mains  
Test Site : DLS O.F. Screen Room  
Temperature : 75°F  
Humidity : 47 %  
Test Specs : Line 1; Quasi-Peak  
Operator : Craig B  
DLS Project # : 8420  
Result : Pass  
EUT

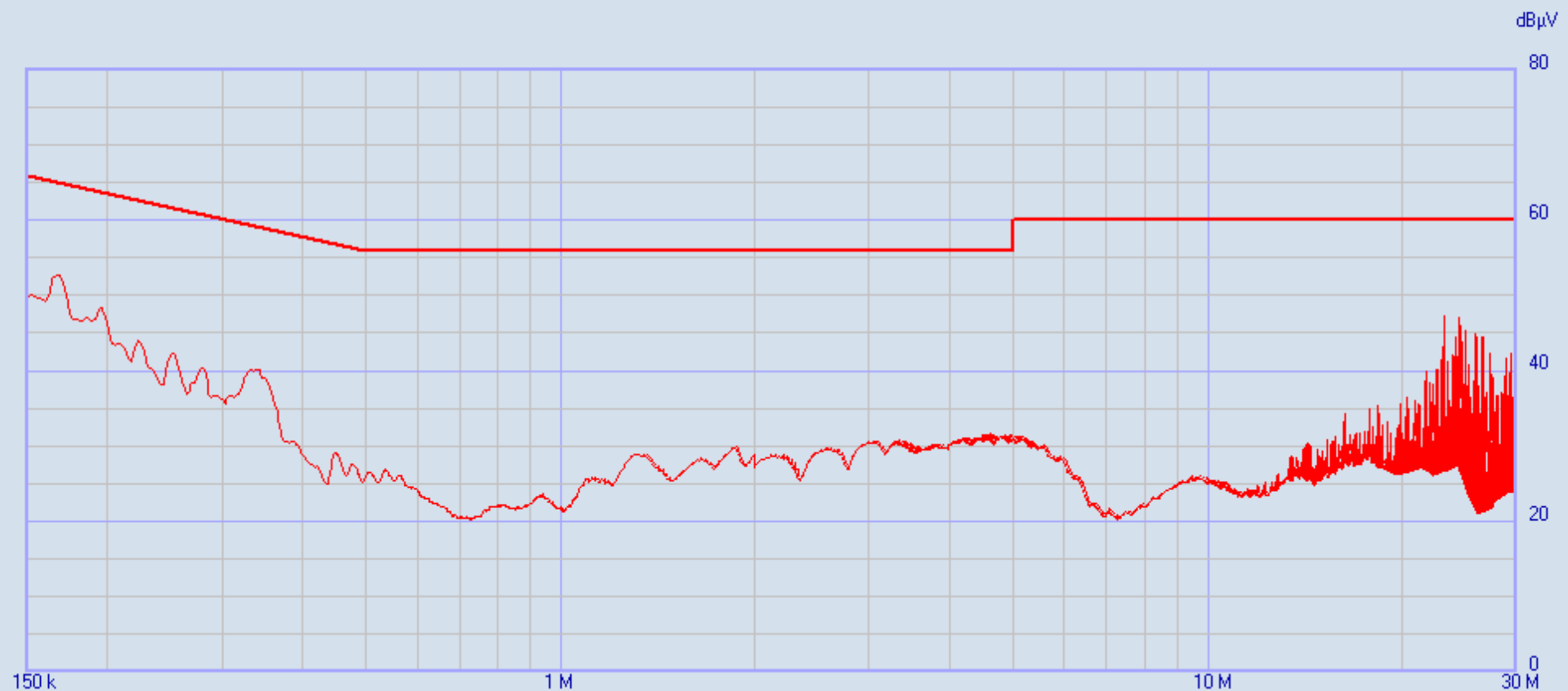
-----  
Manufacturer : Cambium Networks  
Model : PMP450i 3.65 GHz SM/BH  
Product :  
Notes : 230 V 50 Hz  
-----

Testing Company : DLS Electronic Systems, Inc.  
Telephone : 262-279-0210  
Web site : <http://www.dlsemc.com>

#### Receiver Details

-----  
Model : PMM 9010F  
Brand : Narda  
S/N : 020WW40102  
Last Calibration : 06/23/2016

NOTE: The column in the table that is labeled "delta" shows the margin in dB with respect to the limit. A negative number indicates the level of the emission is under the limit by the given value, while a positive number indicates the emission level is above the limit by the given value.



Cambium Networks PMP450i 230v L1

	Start [MHz]	Stop [MHz]	Step	Detector	Hold Time	RBW	Min Att	Pre Amp	Pre Sel	Prompt start	Ancillary
1	0.15	30	AUTO (2.045 kHz)	P Q C	1500 ms	9 kHz	10	OFF	ON	...	...

Ancillary = General  
Nr. of Worst = Infinite (4)

Limits:  
Class B V QP

Factors:  
LISN DLS#128  
E-M L705  
DLS #592  
Cables 43 & 45

QPeak —

Cambium Networks PMP450i 230v L1 06/09/2016 15:20:04

Rel. SW 2.22 (August 2015)

Rel. FW 1.54 20/04/16

Margin: 15 dB

Frequency	QPeak	Limit	Delta	Factor	Factor	Factor	Factor	
[MHz]	[dBμV]	Class B V..		LISN DLS#..	E-M L705	DLS #592	Cables 43..	
		[dBμV]	[dB]	[dB]	[dB]	[dB]	[dB]	
1	0.164315	52.22	65.24	-13.02	1.46	9.84	1.94	0.10
2	0.16636	52.81	65.14	-12.33	1.43	9.83	1.91	0.09
3	0.168405	52.64	65.04	-12.40	1.41	9.83	1.89	0.09
4	0.17045	51.90	64.94	-13.04	1.39	9.82	1.88	0.08
5	0.172495	50.07	64.84	-14.77	1.37	9.82	1.86	0.07
6	23.12762	46.70	60.00	-13.30	0.35	10.15	0.44	0.87
7	23.129665	47.33	60.00	-12.67	0.35	10.15	0.44	0.87
8	23.13171	47.13	60.00	-12.87	0.36	10.15	0.44	0.87
9	24.348485	45.73	60.00	-14.27	0.37	10.15	0.46	0.89
10	24.35053	47.02	60.00	-12.98	0.37	10.15	0.46	0.89
11	24.352575	47.05	60.00	-12.95	0.37	10.15	0.46	0.89
12	24.35462	45.58	60.00	-14.42	0.37	10.15	0.46	0.89
13	24.532535	45.58	60.00	-14.42	0.37	10.14	0.47	0.89
14	24.53458	46.07	60.00	-13.93	0.37	10.14	0.47	0.89
15	24.536625	45.82	60.00	-14.18	0.37	10.14	0.47	0.89
16	24.900635	45.35	60.00	-14.65	0.37	10.13	0.47	0.89
17	24.90268	45.26	60.00	-14.74	0.37	10.13	0.47	0.89



Report issuing date : 09-06-2016

Standard : FCC 15.207  
Test Type : Voltage Mains  
Test Site : DLS O.F. Screen Room  
Temperature : 75°F  
Humidity : 47 %  
Test Specs : Line 1; Average  
Operator : Craig B  
DLS Project # : 8420  
Result : Pass  
EUT

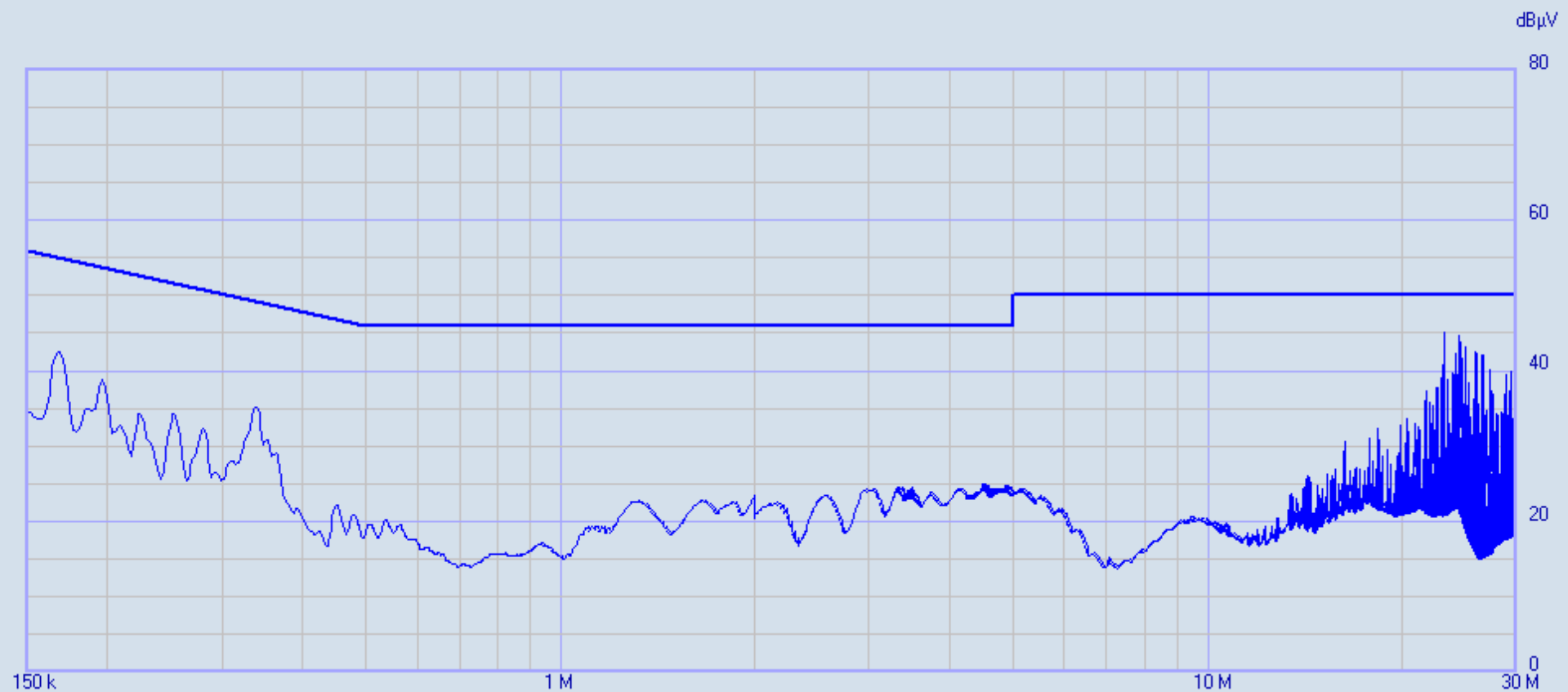
-----  
Manufacturer : Cambium Networks  
Model : PMP450i 3.65 GHz SM/BH  
Product :  
Notes : 230 V 50 Hz  
-----

Testing Company : DLS Electronic Systems, Inc.  
Telephone : 262-279-0210  
Web site : <http://www.dlsemc.com>

#### Receiver Details

-----  
Model : PMM 9010F  
Brand : Narda  
S/N : 020WW40102  
Last Calibration : 06/23/2016

NOTE: The column in the table that is labeled "delta" shows the margin in dB with respect to the limit. A negative number indicates the level of the emission is under the limit by the given value, while a positive number indicates the emission level is above the limit by the given value.



Cambium Networks PMP450i 230v L1

	Start [MHz]	Stop [MHz]	Step	Detector	Hold Time	RBW	Min Att	Pre Amp	Pre Sel	Prompt start	Ancillary
1	0.15	30	AUTO (2.045 kHz)	P Q C	1500 ms	9 kHz	10	OFF	ON	...	...

Ancillary = General  
Nr. of Worst = Infinite (4)

Limits:  
Class B VAV

Factors:  
LISN DLS#128  
E-M L705  
DLS #592  
Cables 43 & 45

C-Avg



Cambium Networks PMP450i 230v L1 06/09/2016 15:20:04  
 Rel. SW 2.22 (August 2015)  
 Rel. FW 1.54 20/04/16  
 Margin: 7.5 dB

Frequency	C-Avg	Limit	Delta	Factor	Factor	Factor	Factor
[MHz]	[dBμV]	Class B V..	[dB]	LISN DLS#..	E-M L705	DLS #592	Cables 43..
		[dBμV]		[dB]	[dB]	[dB]	[dB]
1 23.12762	44.37	50.00	-5.63	0.35	10.15	0.44	0.87
2 23.129665	45.04	50.00	-4.96	0.35	10.15	0.44	0.87
3 23.13171	44.93	50.00	-5.07	0.36	10.15	0.44	0.87
4 23.133755	42.50	50.00	-7.50	0.36	10.15	0.44	0.87
5 24.348485	43.24	50.00	-6.76	0.37	10.15	0.46	0.89
6 24.35053	44.76	50.00	-5.24	0.37	10.15	0.46	0.89
7 24.352575	44.75	50.00	-5.25	0.37	10.15	0.46	0.89
8 24.35462	43.47	50.00	-6.53	0.37	10.15	0.46	0.89
9 24.532535	43.23	50.00	-6.77	0.37	10.14	0.47	0.89
10 24.53458	43.73	50.00	-6.27	0.37	10.14	0.47	0.89
11 24.536625	43.56	50.00	-6.44	0.37	10.14	0.47	0.89
12 24.900635	43.08	50.00	-6.92	0.37	10.13	0.47	0.89
13 24.90268	43.02	50.00	-6.98	0.37	10.13	0.47	0.89
14 24.961985	42.54	50.00	-7.46	0.37	10.13	0.47	0.89



Report issuing date : 09-06-2016

Standard : FCC 15.207  
Test Type : Voltage Mains  
Test Site : DLS O.F. Screen Room  
Temperature : 75°F  
Humidity : 47 %  
Test Specs : Line 2; Quasi-Peak  
Operator : Craig B  
DLS Project # : 8420  
Result : Pass  
EUT

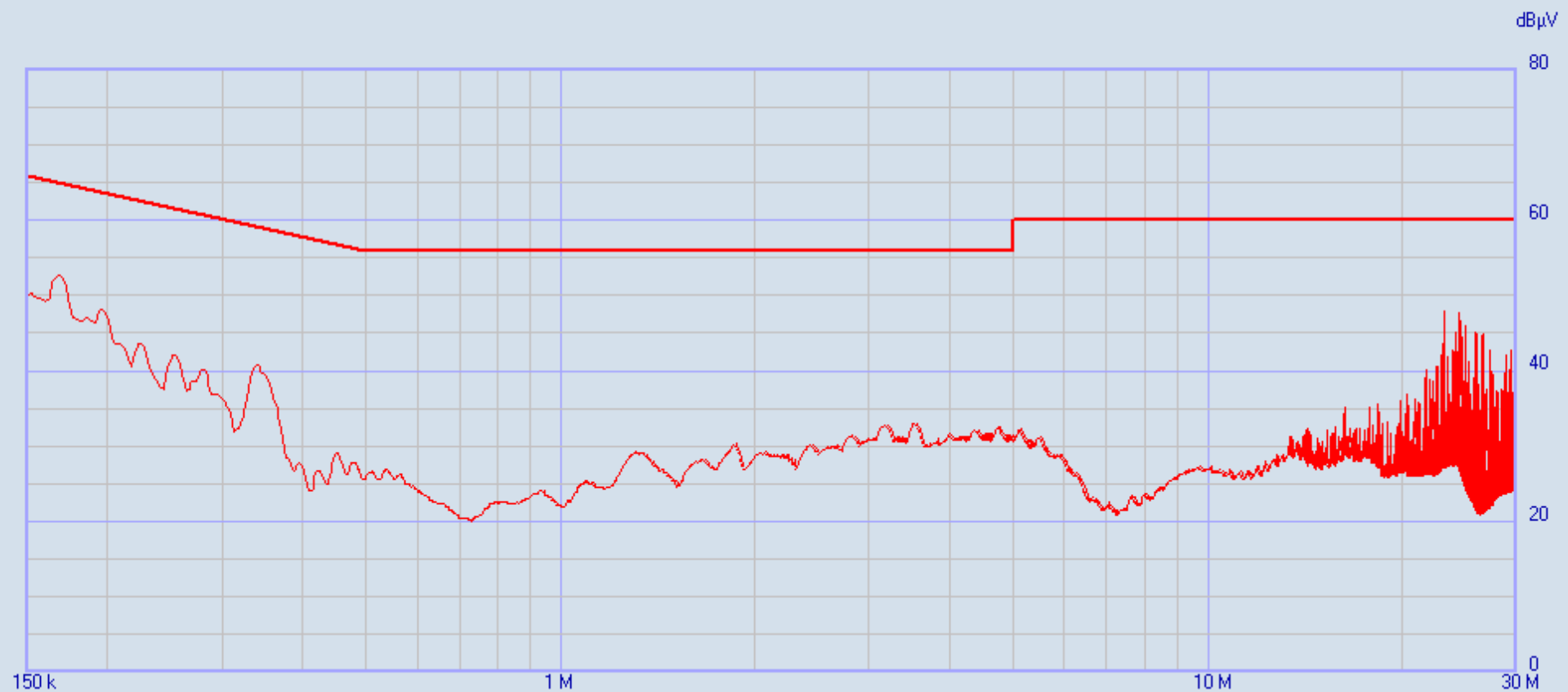
-----  
Manufacturer : Cambium Networks  
Model : PMP450i 3.65 GHz SM/BH  
Product :  
Notes : 230 V 50 Hz  
-----

Testing Company : DLS Electronic Systems, Inc.  
Telephone : 262-279-0210  
Web site : <http://www.dlsemc.com>

#### Receiver Details

-----  
Model : PMM 9010F  
Brand : Narda  
S/N : 020WW40102  
Last Calibration : 06/23/2016

NOTE: The column in the table that is labeled "delta" shows the margin in dB with respect to the limit. A negative number indicates the level of the emission is under the limit by the given value, while a positive number indicates the emission level is above the limit by the given value.



Cambium Networks PMP450i 230v L2

	Start [MHz]	Stop [MHz]	Step	Detector	Hold Time	RBW	Min Att	Pre Amp	Pre Sel	Prompt start	Ancillary
1	0.15	30	AUTO (2.045 kHz)	P Q C	1500 ms	9 kHz	10	OFF	ON	...	...

Ancillary = General  
Nr. of Worst = Infinite (4)

Limits:  
Class B V QP

Factors:  
LISN DLS#128  
E-M L705  
DLS #592  
Cables 43 & 45

QPeak —

Cambium Networks PMP450i 230v L2 06/09/2016 15:28:23  
 Rel. SW 2.22 (August 2015)  
 Rel. FW 1.54 20/04/16  
 Margin: 15 dB

	Frequency	QPeak	Limit	Delta	Factor	Factor	Factor	Factor
			Class B V..		LISN DLS#..	E-M L705	DLS #592	Cables 43..
	[MHz]	[dBμV]	[dBμV]	[dB]	[dB]	[dB]	[dB]	[dB]
1	0.164315	51.88	65.24	-13.36	1.46	9.84	1.94	0.10
2	0.16636	52.45	65.14	-12.69	1.43	9.83	1.91	0.09
3	0.168405	52.65	65.04	-12.39	1.41	9.83	1.89	0.09
4	0.17045	52.31	64.94	-12.63	1.39	9.82	1.88	0.08
5	0.172495	51.23	64.84	-13.61	1.37	9.82	1.86	0.07
6	23.12762	47.34	60.00	-12.66	0.35	10.15	0.44	0.87
7	23.129665	47.97	60.00	-12.03	0.35	10.15	0.44	0.87
8	23.13171	47.77	60.00	-12.23	0.36	10.15	0.44	0.87
9	23.133755	45.11	60.00	-14.89	0.36	10.15	0.44	0.87
10	24.045825	45.12	60.00	-14.88	0.36	10.15	0.46	0.89
11	24.348485	46.29	60.00	-13.71	0.37	10.15	0.46	0.89
12	24.35053	47.67	60.00	-12.33	0.37	10.15	0.46	0.89
13	24.352575	47.69	60.00	-12.31	0.37	10.15	0.46	0.89
14	24.35462	46.17	60.00	-13.83	0.37	10.15	0.46	0.89
15	24.532535	46.19	60.00	-13.81	0.37	10.14	0.47	0.89
16	24.53458	46.68	60.00	-13.32	0.37	10.14	0.47	0.89
17	24.536625	46.40	60.00	-13.60	0.37	10.14	0.47	0.89
18	24.89859	45.06	60.00	-14.94	0.37	10.13	0.47	0.89
19	24.900635	45.95	60.00	-14.05	0.37	10.13	0.47	0.89
20	24.90268	45.84	60.00	-14.16	0.37	10.13	0.47	0.89
21	24.961985	45.31	60.00	-14.69	0.37	10.13	0.47	0.89
22	24.96403	45.10	60.00	-14.90	0.37	10.13	0.47	0.89
23	25.694095	45.16	60.00	-14.84	0.37	10.12	0.49	0.89
24	25.69614	45.18	60.00	-14.82	0.37	10.12	0.49	0.89



Report issuing date : 09-06-2016

Standard : FCC 15.207  
Test Type : Voltage Mains  
Test Site : DLS O.F. Screen Room  
Temperature : 75°F  
Humidity : 47 %  
Test Specs : Line 2; Average  
Operator : Craig B  
DLS Project # : 8420  
Result : Pass  
EUT

-----  
Manufacturer : Cambium Networks  
Model : PMP450i 3.65 GHz SM/BH  
Product :  
Notes : 230 V 50 Hz  
-----

Testing Company : DLS Electronic Systems, Inc.  
Telephone : 262-279-0210  
Web site : <http://www.dlsemc.com>

#### Receiver Details

-----  
Model : PMM 9010F  
Brand : Narda  
S/N : 020WW40102  
Last Calibration : 06/23/2016

NOTE: The column in the table that is labeled "delta" shows the margin in dB with respect to the limit. A negative number indicates the level of the emission is under the limit by the given value, while a positive number indicates the emission level is above the limit by the given value.



Cambium Networks PMP450i 230v L2

	Start [MHz]	Stop [MHz]	Step	Detector	Hold Time	RBW	Min Att	Pre Amp	Pre Sel	Prompt start	Ancillary
1	0.15	30	AUTO (2.045 kHz)	P Q C	1500 ms	9 kHz	10	OFF	ON	...	...

Ancillary = General  
Nr. of Worst = Infinite (4)

Limits:  
Class B VAV

Factors:  
LISN DLS#128  
E-M L705  
DLS #592  
Cables 43 & 45

C-Avg

Cambium Networks PMP450i 230v L2 06/09/2016 15:28:23

Rel. SW 2.22 (August 2015)

Rel. FW 1.54 20/04/16

Margin: 7.5 dB

Frequency	C-Avg	Limit	Delta	Factor	Factor	Factor	Factor
[MHz]	[dBμV]	Class B V..	[dB]	LISN DLS#..	E-M L705	DLS #592	Cables 43..
		[dBμV]		[dB]	[dB]	[dB]	[dB]
1 23.12762	45.05	50.00	-4.95	0.35	10.15	0.44	0.87
2 23.129665	45.72	50.00	-4.28	0.35	10.15	0.44	0.87
3 23.13171	45.61	50.00	-4.39	0.36	10.15	0.44	0.87
4 23.133755	43.16	50.00	-6.84	0.36	10.15	0.44	0.87
5 24.045825	42.94	50.00	-7.06	0.36	10.15	0.46	0.89
6 24.04787	42.81	50.00	-7.19	0.36	10.15	0.46	0.89
7 24.348485	43.86	50.00	-6.14	0.37	10.15	0.46	0.89
8 24.35053	45.37	50.00	-4.63	0.37	10.15	0.46	0.89
9 24.352575	45.37	50.00	-4.63	0.37	10.15	0.46	0.89
10 24.35462	44.06	50.00	-5.94	0.37	10.15	0.46	0.89
11 24.532535	43.79	50.00	-6.21	0.37	10.14	0.47	0.89
12 24.53458	44.28	50.00	-5.72	0.37	10.14	0.47	0.89
13 24.536625	44.11	50.00	-5.89	0.37	10.14	0.47	0.89
14 24.89859	42.64	50.00	-7.36	0.37	10.13	0.47	0.89
15 24.900635	43.53	50.00	-6.47	0.37	10.13	0.47	0.89
16 24.90268	43.46	50.00	-6.54	0.37	10.13	0.47	0.89
17 24.961985	42.98	50.00	-7.02	0.37	10.13	0.47	0.89
18 24.96403	42.84	50.00	-7.16	0.37	10.13	0.47	0.89
19 25.694095	42.79	50.00	-7.21	0.37	10.12	0.49	0.89
20 25.69614	42.81	50.00	-7.19	0.37	10.12	0.49	0.89
21 25.878145	42.53	50.00	-7.47	0.37	10.11	0.49	0.89



166 South Carter, Genoa City, WI 53128

Company: Cambium Networks  
Model Tested: 3082CHH  
Report Number: 22288  
DLS Project: 8420

## Appendix C – Measurement Uncertainty

Compliance with the limits in this standard are based on the results of the compliance measurement. Our calculated measurement uncertainty including the measurement instrumentation, associated connections between the various instruments in the measurement chain, and other contributions, are provided in this section of the test report.

Parameter	Expanded Uncertainty (K=2)
Emission Bandwidth, Conducted	+/- 1.14%
RF Output Power, Conducted	+/- 1.36dB
Power Spectral Density, Conducted	+/- 1.26dB
All Emissions, Radiated	+/- 5.69dB
All Emissions, RF Conducted	+/- 3.31dB
AC Line Conducted	+/- 2.10 dB
Duty Cycle	+/- 0.05%





166 South Carter, Genoa City, WI 53128

Company: Cambium Networks  
Model Tested: 3082CHH  
Report Number: 22288  
DLS Project: 8420

## END OF REPORT

Revision #	Date	Comments	By
1.0	10-28-2016	Preliminary Release	CB