



SPORTON International Inc.

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Project No: CB10701042

Maximum Permissible Exposure Report

Applicant's company	Cambium Networks Inc.
Applicant Address	3800 Golf Road, Suite 360 Rolling Meadows, IL 60008, USA
FCC ID	Z8H89FT0038
Manufacturer's company	Cambium Networks Inc.
Manufacturer Address	3800 Golf Road, Suite 360 Rolling Meadows, IL 60008, USA

Product Name	PTP550
Brand Name	Cambium Networks
Model Name	PTP550
Ref. Standard(s)	47 CFR FCC Part 2 Subpart J, section 2.1091
Received Date	Sep. 28, 2017
Final Test Date	Oct. 20, 2017
Submission Type	Class III Change


Cliff Chang
SPORTON INTERNATIONAL INC.



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Photographs of EUT v01

History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA7O1623-01	Rev. 01	Initial issue of report	Jul. 26, 2018

1. GENERAL DESCRIPTION

1.1. EUT General Information

RF General Information				
Evaluation Mode	Frequency Range (MHz)	Operating Frequency (MHz)		Modulation Type
5GHz WLAN	5250-5350 5470-5725	20M Band 2	5250 / 5260 / 5265 / 5270 / 5275 / 5280 5285 / 5290 / 5295 5300 / 5305 / 5310 5315 / 5320	20M / 80M: QPSK
		20M Band 3	5500 / 5505 / 5510 5515 / 5520 / 5525 5530 / 5535 / 5540 5545 / 5550 / 5555 5560 / 5565 / 5570 5575 / 5580 / 5585 5590 / 5595 / 5600 5605 / 5610 / 5615 5620 / 5625 / 5630 5635 / 5640 / 5645 5650 / 5720	
		80M Band 2	5250 / 5290 / 5295 / 5300 / 5305 / 5310	
		80M Band 3	5510 / 5515 / 5520 / 5525 / 5530 / 5535 / 5540 / 5545 / 5550 / 5555 / 5560 / 5565 / 5570 / 5575 / 5580 / 5585 / 5590 / 5595 / 5600 / 5605 / 5610 / 5615 / 5620 / 5625 / 5630 / 5635 / 5640 / 5645 / 5650 / 5720	

Note: The antenna 2 doesn't support 5310MHz in 80MHz.

1.2. Table for Class III Change

This product is an extension of original one reported under Sporton project number: FA7O1623AA

Below is the table for the change of the product with respect to the original one.

Modifications	Performance Checking
Adding 5G Band 2 (5250/5260/5265/5270/5275/5280/5285/5290/5295/ 5300/5305/5310/5315/5320) and 5G Band 3 (5500/5505/5510/5515/5520/5525/5530/5535/5540/5545/5550/ 5555/5560/5565/5570/5575/5580/5585/5590/5595/5600/5605/ 5610/5615/5620/5625/5630/5635/5640/5645/5650/5720) only for 20M and 80M.	RF Exposure Evaluation

1.3. Testing Location

Testing Location		
☐	HWA YA	ADD : No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL : 886-3-327-3456 FAX : 886-3-327-0973
☒	JHUBEI	ADD : No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C. TEL : 886-3-656-9065 FAX : 886-3-656-9085

Test site Designation No. TW0006 with FCC.

Test site registered number IC 4086D with Industry Canada.

2. MAXIMUM PERMISSIBLE EXPOSURE

2.1. Limit of Maximum Permissible Exposure

(A) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842 / f	4.89 / f	(900 / f)*	6
30-300	61.4	0.163	1.0	6
300-1500			F/300	6
1500-100,000			5	6

(B) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-100,000			1.0	30

Note: f = frequency in MHz ; *Plane-wave equivalent power density

2.2. MPE Calculation Method

The MPE was calculated at 20 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

$$E \text{ (V/m)} = \frac{\sqrt{30 \times P \times G}}{d} \quad \text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

E = Electric field (V/m)

P = Peak RF output power (W)

G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to

$$Pd = \frac{30 \times P \times G}{377 \times d^2}$$

2.3. Calculated Result and Limit

Exposure Environment: General Population / Uncontrolled Exposure

For Antenna 1:

For 5GHz Band:

Conducted Power for QPSK, 20M

Distance (cm)	Test Freq. (MHz)	Antenna Gain (dBi)	Antenna Gain (numeric)	The maximum combined Average Output Power	Tolerance (dB)	Tune-up EIRP		Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
				(dBm)		(dBm)	(mW)			
20	5260 MHz	2.00	1.5849	23.61	0.39	26.00	398.1071	0.0792	1	Complies
20	5300 MHz	2.00	1.5849	23.68	0.32	26.00	398.1071	0.0792	1	Complies
20	5320 MHz	2.00	1.5849	15.38	0.12	17.50	56.2341	0.0111	1	Complies
20	5500 MHz	2.00	1.5849	21.85	0.15	24.00	251.1886	0.0499	1	Complies
20	5580 MHz	2.00	1.5849	23.78	0.22	26.00	398.1071	0.0792	1	Complies
20	5650 MHz	2.00	1.5849	23.75	0.25	26.00	398.1071	0.0792	1	Complies
20	5250 MHz (UNII 1 & UNII 2C)	2.00	1.5849	20.33	2.67	25.00	316.2278	0.0997	1	Complies
20	5270 MHz (UNII 1 & UNII 2C)	2.00	1.5849	22.67	0.33	25.00	316.2278	0.0997	1	Complies
20	5250 MHz (UNII 2A & UNII 3)	2.00	1.5849	19.90	3.10	25.00	316.2278	0.0997	1	Complies
20	5270 MHz (UNII 2A & UNII 3)	2.00	1.5849	16.54	6.46	25.00	316.2278	0.0997	1	Complies

Conducted Power for QPSK, 80M

Distance (cm)	Test Freq. (MHz)	Antenna Gain (dBi)	Antenna Gain (numeric)	The maximum combined Average Output Power	Tolerance (dB)	Tune-up EIRP		Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
				(dBm)		(dBm)	(mW)			
20	5290 MHz	2.00	1.5849	20.23	0.27	22.50	177.8279	0.0353	1	Complies
20	5300 MHz	2.00	1.5849	20.21	0.29	22.50	177.8279	0.0353	1	Complies
20	5310 MHz	2.00	1.5849	7.12	0.38	9.50	8.9125	0.0017	1	Complies
20	5310 MHz	2.00	1.5849	20.24	0.26	22.50	177.8279	0.0353	1	Complies
20	5610 MHz	2.00	1.5849	21.55	0.45	24.00	251.1886	0.0499	1	Complies
20	5650 MHz	2.00	1.5849	18.52	0.48	21.00	125.8925	0.0250	1	Complies
20	5250 MHz (UNII 1 & UNII 2C)	2.00	1.5849	17.76	3.24	23.00	199.5262	0.0629	1	Complies
20	5270 MHz (UNII 1 & UNII 2C)	2.00	1.5849	20.23	0.77	23.00	199.5262	0.0629	1	Complies
20	5250 MHz (UNII 2A & UNII 3)	2.00	1.5849	16.94	4.06	23.00	199.5262	0.0629	1	Complies
20	5270 MHz (UNII 2A & UNII 3)	2.00	1.5849	18.64	2.36	23.00	199.5262	0.0629	1	Complies

For Antenna 2:

For 5GHz Band:

Conducted Power for QPSK, 20M

Distance (cm)	Test Freq. (MHz)	Antenna Gain (dBi)	Antenna Gain (numeric)	The maximum combined Average Output Power	Tolerance (dB)	Tune-up EIRP		Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
				(dBm)		(dBm)	(mW)			
20	5260 MHz	22.00	158.4893	7.96	0.04	30	794.3282	0.1581	1	Complies
20	5300 MHz	22.00	158.4893	7.95	0.05	30	1000	0.1990	1	Complies
20	5320 MHz	22.00	158.4893	5.19	2.81	30	1000	0.1990	1	Complies
20	5500 MHz	22.00	158.4893	6.39	1.61	30	1000	0.1990	1	Complies
20	5580 MHz	22.00	158.4893	7.85	0.15	30	1000	0.1990	1	Complies
20	5650 MHz	22.00	158.4893	0.27	7.73	30	1000	0.1990	1	Complies
20	5250 MHz (UNII 1 & UNII 2C)	22.00	158.4893	4.92	1.68	28.6	724.4360	0.7101	1	Complies
20	5270 MHz (UNII 1 & UNII 2C)	22.00	158.4893	6.59	0.01	28.6	724.4360	0.9496	1	Complies
20	5250 MHz (UNII 2A & UNII 3)	22.00	158.4893	4.66	1.94	28.6	724.4360	0.6715	1	Complies
20	5270 MHz (UNII 2A & UNII 3)	22.00	158.4893	0.38	6.22	28.6	724.4360	0.0541	1	Complies

Conducted Power for QPSK, 80M

Distance (cm)	Test Freq. (MHz)	Antenna Gain (dBi)	Antenna Gain (numeric)	The maximum combined Average Output Power	Tolerance (dB)	Tune-up EIRP		Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
				(dBm)		(dBm)	(mW)			
20	5290 MHz	22.00	158.4893	7.94	0.06	30	1000	0.1990	1	Complies
20	5300 MHz	22.00	158.4893	7.96	0.04	30	1000	0.1990	1	Complies
20	5510 MHz	22.00	158.4893	7.01	0.99	30	1000	0.1990	1	Complies
20	5610 MHz	22.00	158.4893	7.91	0.09	30	1000	0.1990	1	Complies
20	5650 MHz	22.00	158.4893	1.23	6.77	30	1000	0.1990	1	Complies
20	5250 MHz (UNII 1 & UNII 2C)	22.00	158.4893	5.94	0.06	28	630.9573	0.7457	1	Complies
20	5270 MHz (UNII 1 & UNII 2C)	22.00	158.4893	-0.85	6.85	28	630.9573	-0.1063	1	Complies
20	5250 MHz (UNII 2A & UNII 3)	22.00	158.4893	4.77	1.23	28	630.9573	0.5995	1	Complies
20	5270 MHz (UNII 2A & UNII 3)	22.00	158.4893	-2.52	8.52	28	630.9573	-0.3168	1	Complies