Radio Exposure Evaluation Report

FCC ID	:	**RYK-WPEA-121N**
Equipment	:	**802.11n,Dual Band, Wireless LAN PCI Express Half Mini Card**
Brand Name	:	**Sparklan**
Model Name	:	**WPEA-121N**
Applicant	:	**SparkLAN Communications, Inc. 8F., No. 257, Sec. 2, Tiding Blvd., Neihu District, Taipei City 11493, Taiwan**
Manufacturer	:	**SparkLAN Communications, Inc. 8F., No. 257, Sec. 2, Tiding Blvd., Neihu District, Taipei City 11493, Taiwan**
Standard	:	**47 CFR Part 2.1091**

The product was received on Oct. 26, 2015, and testing was started from Nov. 13, 2015 and completed on Nov. 13, 2015. We, SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in 47 CFR Part 2.1091 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Approved by: Allen Lin

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory

No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)

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History of this test report

Report No.	Version	Description	Issued Date
FA0O1905	01	Initial issue of report	Dec. 07, 2020
FA0O1905	02	Revised typo (This report is the latest version replacing for the report issued on Dec. 07, 2020.)	Dec. 08, 2020

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
2	-	Exposure evaluation	PASS	-

Declaration of Conformity:
The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.
Comments and Explanations:
None.

Reviewed by: Sam Tsai
Report Producer: Debby Hung

1 General Description

1.1 EUT General Information

RF General Information			
Evaluation Mode	**Frequency Range (MHz)**	**Operating Frequency (MHz)**	**Modulation Type**
2.4GHz WLAN	2400-2483.5	2412-2462	802.11b: DSSS (DBPSK, DQPSK, CCK) 802.11g/n: OFDM (BPSK, QPSK, 16QAM, 64QAM)
5GHz WLAN	5150-5250 5250-5350 5470-5725 5725-5850	5180-5240 5260-5320 5500-5700 5745-5825	802.11a/n: OFDM (BPSK, QPSK, 16QAM, 64QAM)

1.2 Table for Permissive Change

This product is an extension of original one reported under Sporton project number: FA131667-20 & FA131667-16

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

Modifications	Performance Checking
Chip Antenna was added. (JOHANSON TECHNOLOGY/2450AD46A5400)	N/A

1.3 Testing Location

Testing Location			
☒	HWA YA	ADD : No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)	
		TEL : 886-3-327-3456	FAX : 886-3-327-0973
Test site Designation No. TW1190 with FCC.			
☐	JHUBEI	ADD : No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County, Taiwan (R.O.C.)	
		TEL : 886-3-656-9065	FAX : 886-3-656-9085
Test site Designation No. TW0006 with FCC.			

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/ cm²)	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^2)*	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/ cm²)	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^2)*	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 (V/m) = $\frac{\sqrt{30 \times P \times G}}{d}$ Power Density: *Pd* (W/m²) = $\frac{E^2}{377}$

E = Electric field (V/m)

P = 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

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	Tolerance (dB)	Tune-up EIRP (dBm)	Tune-up EIRP (W)	Distance (cm)	S (mW/cm^2)	S Limit (mW/cm^2)
2.4G;G1D	5.01	18.06	23.07	0.50	23.57	0.22751	20	0.04526	1.00000
2.4G;D1D	5.01	16.88	21.89	0.50	22.39	0.17338	20	0.03449	1.00000
5.2G;D1D	5.01	13.10	18.11	0.50	18.61	0.07261	20	0.01445	1.00000
5.3G;D1D	5.01	19.26	24.27	0.50	24.77	0.29992	20	0.05967	1.00000
5.6G;D1D	5.01	17.81	22.82	0.50	23.32	0.21478	20	0.04273	1.00000
5.8G;D1D	5.01	20.02	25.03	0.50	25.53	0.35727	20	0.04526	1.00000

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	Tolerance (dB)	Tune-up EIRP (dBm)	Tune-up EIRP (W)	Distance (cm)	S (mW/cm^2)	S Limit (mW/cm^2)
2.4G;G1D	1.00	18.06	19.06	0.50	19.56	0.09036	20	0.01798	1.00000
2.4G;D1D	1.00	16.88	17.88	0.50	18.38	0.06887	20	0.01370	1.00000
5.2G;D1D	-1.50	13.10	11.60	0.50	12.10	0.01622	20	0.00323	1.00000
5.3G;D1D	-1.50	19.26	17.76	0.50	18.26	0.06699	20	0.01333	1.00000
5.6G;D1D	-1.50	17.81	16.31	0.50	16.81	0.04797	20	0.00954	1.00000
5.8G;D1D	-1.50	20.02	18.52	0.50	19.02	0.07980	20	0.01588	1.00000

————THE END————