

RF Exposure Report

Report No.: SA190626E05

FCC ID: RYK-WPEA251ACNIBT

Test Model: WPEA-251ACNI(BT)

Received Date: June 26, 2019

Test Date: July 24, 2019

Issued Date: Nov. 06, 2019

Applicant: SparkLAN Communications, Inc.

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(R.O.C.)

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**FCC Registration /
Designation Number:** 723255 / TW2022

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Release Control Record

Issue No.	Description	Date Issued
SA190626E05	Original release.	Nov. 06, 2019

1 Certificate of Conformity

Product: 802.11ac/b/g/n Wi-Fi+BT Module

Brand: Sparklan

Test Model: WPEA-251ACNI(BT)

Sample Status: ENGINEERING SAMPLE

Applicant: SparkLAN Communications, Inc.

Test Date: July 24, 2019


Standards: FCC Part 2 (Section 2.1091)

KDB 447498 D01 General RF Exposure Guidance v06

IEEE C95.1-1992

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by :


Wendy Wu / Specialist

Date:

Nov. 06, 2019

Approved by :



Clark Lin / Technical Manager

Date:

Nov. 06, 2019

2 RF Exposure

2.1 Limits for Maximum Permissible Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Average Time (minutes)
Limits For General Population / Uncontrolled Exposure				
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

f = Frequency in MHz ; *Plane-wave equivalent power density

2.2 MPE Calculation Formula

$$P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot r^2)$$

where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

R = distance between observation point and center of the radiator in cm

2.3 Classification

The antenna of this product, under normal use condition, is at least 20cm away from the body of the user.

So, this device is classified as **Mobile Device**.

2.4 Antenna Gain

Ant. Set	Transmitter Circuit	Brand	Model	Ant. Type	2.4GHz Gain with cable loss (dBi)	5GHz Gain with cable loss (dBi)	Connector Type
1	Chain (0) Chain (1)	Sparklan	AD-300N	Dipole	3	5	RP-SMA
2	Chain (0) Chain (1)	Sparklan	AD-103AG	Dipole	2.02	2.03	
3	Chain (0) Chain (1)	Sparklan	AD-302N	Dipole	3	2	
4	Chain (0) Chain (1)	Sparklan	AD-303N	Dipole	3	3	

Note: Max. gain was selected for final test.

2.5 Calculation Result of Maximum Conducted Power

Operation Mode	Evaluation Frequency (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
WLAN 2.4GHz	2437	371.591	6.01	20	0.29498	1
WLAN U-NII-1	5240	45.406	8.01	20	0.05713	1
WLAN U-NII-2A	5260	43.668	8.01	20	0.05494	1
WLAN U-NII-2C	5580	46.392	8.01	20	0.05837	1
WLAN U-NII-3	5785	46.658	8.01	20	0.05870	1
Bluetooth (BT-EDR)	2480	4.932	3	20	0.00196	1
Bluetooth (BT-LE)	2440	1.816	3	20	0.00072	1

NOTE:

1. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
2. 2.4GHz: Directional gain = 3dBi + 10log(2) = 6.01dBi
5GHz: Directional gain = 5dBi + 10log(2) = 8.01dBi

Conclusion:

The formula of calculated the MPE is:

$CPD1 / LPD1 + CPD2 / LPD2 + \dots \text{etc.} < 1$

CPD = Calculation power density

LPD = Limit of power density

WLAN 5GHz + Bluetooth = $0.05870 / 1 + 0.00196 / 1 = 0.06066$

Therefore the maximum calculations of above situations are less than the “1” limit.

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