

Maximum Permissible Exposure

Equipment : 802.11n, Dual Band, Wireless LAN
PCI Express Half Mini Card

Brand Name : Sparklan

Model No. : WPEA-121N

FCC ID : RYK-WPEA-121N

Standard : ANSI/IEEE C95.1

Applicant : SparkLAN Communications, Inc.
Manufacturer : 8F., No. 257, Sec. 2, Tiding Blvd., Neihu District,
Taipei City 11493, Taiwan

The product sample received on Apr. 31, 2015 and completely tested on Oct. 06, 2015. We, SPORTON, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI/IEEE C95.1 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., the test report shall not be reproduced except in full.

Reviewed by:


Kevin Liang / Assistant Manager



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Revision History

[illegible]

1 Human Exposure Assessment

1.1 Maximum Permissible Exposure

1.1.1 Limit of Maximum Permissible Exposure

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 ²)*	6
30-300	61.4	0.163	1.0	6
300-1500	-	-	F/300	6
1500-100,000	-	-	5	6
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 ²)*	30
30-300	27.5	0.073	0.2	30
300-1500	-	-	F/1500	30
1500-100,000	-	-	1.0	30
Note 1: f = frequency in MHz ; *Plane-wave equivalent power density				
Note 2: For the applicable limit, see FCC 1.1310				

1.1.2 MPE Calculation Method

$$E \text{ (V/m)} = \frac{\sqrt{30 \times P \times G}}{d}$$

E = Electric field (V/m)

G = EUT Antenna numeric gain (numeric)

The formula can be changed to

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

$$\text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

P = RF output power (W)

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

1.1.3 Result of Maximum Permissible Exposure (2.4G)

RF General Information					
Frequency Range (MHz)	IEEE Std. 802.11 Protocol	Ch. Frequency (MHz)	Channel Number	Number of Transmit Chains (N _{TX})	RF Output Power (dBm)
2400-2483.5	b	2412-2462	1-11 [11]	2	18.39
				1	16.09
2400-2483.5	g	2412-2462	1-11 [11]	2	16.95
				1	14.30
2400-2483.5	n (HT20)	2412-2462	1-11 [11]	2	17.05
				1	14.19
2400-2483.5	n (HT40)	2422-2452	3-9 [7]	2	15.34
				1	12.94
Note 1: RF output power specifies that Maximum Conducted (Average) Output Power.					

Worst Maximum RF Output Power Result							
Exposure Environment		General Population / Uncontrolled Exposure					
Separation Distance (cm)		20					
Condition		RF Output Power (dBm)					
Modulation Mode	N _{TX}	Chain-Port 1	Chain-Port 2	Sum Chain	DG (dBi)	EIRP Power	PD (S) (mW/cm ²)
802.11b	2	15.53	15.23	18.39	7.01	25.40	0.06903
Maximum Permissible Exposure Limit (mW/cm ²)							1
Note 1: N _{TX} = Number of Transmit Chains							

1.1.4 Result of Maximum Permissible Exposure (5.2G)

RF General Information					
Frequency Range (MHz)	IEEE Std. 802.11 Protocol	Ch. Frequency (MHz)	Channel Number	Number of Transmit Chains (N _{TX})	RF Output Power (dBm)
5150-5250	a	5180-5240	36-48 [4]	2	12.44
				1	10.40
5150-5250	n (HT20)	5180-5240	36-48 [4]	2	12.97
				1	10.93
5150-5250	n (HT40)	5190-5230	38-46 [2]	2	13.42
				1	11.41
Note 1: RF output power specifies that Maximum Conducted (Average) Output Power.					

Worst Maximum RF Output Power Result							
Exposure Environment		General Population / Uncontrolled Exposure					
Separation Distance (cm)		20					
Condition		RF Output Power (dBm)					
Modulation Mode	N _{TX}	Chain-Port 1	Chain-Port 2	Sum Chain	DG (dBi)	EIRP Power	PD (S) (mW/cm ²)
802.11n (HT20)	2	10.63	10.19	13.42	7.01	20.43	0.02197
Maximum Permissible Exposure Limit (mW/cm ²)							1
Note 1: N _{TX} = Number of Transmit Chains							

1.1.5 Result of Maximum Permissible Exposure (5.3G)

RF General Information					
Frequency Range (MHz)	IEEE Std. 802.11 Protocol	Ch. Frequency (MHz)	Channel Number	Number of Transmit Chains (N _{TX})	RF Output Power (dBm)
5250-5350	a	5260-5320	52-64 [4]	2	19.54
				1	17.39
5250-5350	n (HT20)	5260-5320	52-64 [4]	2	17.78
				1	15.61
5250-5350	n (HT40)	5270-5310	54-62 [2]	2	19.10
				1	16.76
Note 1: RF output power specifies that Maximum Conducted (Average) Output Power..					

Worst Maximum RF Output Power Result							
Exposure Environment		General Population / Uncontrolled Exposure					
Separation Distance (cm)		20					
Condition		RF Output Power (dBm)					
Modulation Mode	N _{TX}	Chain-Port 1	Chain-Port 2	Sum Chain	DG (dBi)	EIRP Power	PD (S) (mW/cm ²)
802.11a	2	16.03	16.97	19.54	7.01	26.55	0.08991
Maximum Permissible Exposure Limit (mW/cm ²)							1
Note 1: N _{TX} = Number of Transmit Chains							

1.1.6 Result of Maximum Permissible Exposure (5.6G)

RF General Information					
Frequency Range (MHz)	IEEE Std. 802.11 Protocol	Ch. Frequency (MHz)	Channel Number	Number of Transmit Chains (N _{TX})	RF Output Power (dBm)
5470-5725	a	5500-5700	100-140 [8]	2	17.88
				1	14.72
5470-5725	n (HT20)	5500-5700	100-140 [8]	2	17.95
				1	14.73
5470-5725	n (HT40)	5510-5670	102-134 [3]	2	18.41
				1	16.66
Note 1: RF output power specifies that Maximum Conducted (Average) Output Power..					

Worst Maximum RF Output Power Result							
Exposure Environment		General Population / Uncontrolled Exposure					
Separation Distance (cm)		20					
Condition		RF Output Power (dBm)					
Modulation Mode	N _{TX}	Chain-Port 1	Chain-Port 2	Sum Chain	DG (dBi)	EIRP Power	PD (S) (mW/cm ²)
802.11n (HT40)	2	15.38	15.43	18.41	7.01	25.42	0.06932
Maximum Permissible Exposure Limit (mW/cm ²)							1
Note 1: N _{TX} = Number of Transmit Chains							

1.1.7 Result of Maximum Permissible Exposure (5.8G)

RF General Information					
Frequency Range (MHz)	IEEE Std. 802.11 Protocol	Ch. Frequency (MHz)	Channel Number	Number of Transmit Chains (N _{TX})	RF Output Power (dBm) Co-location
5725-5850	a	5745-5825	149-165 [5]	2	20.56
				1	17.47
5725-5850	n (HT20)	5745-5825	149-165 [5]	2	19.54
				1	17.47
5725-5850	n (HT40)	5755-5795	151-159 [2]	2	17.93
				1	15.45
Note 1: RF output power specifies that Maximum Conducted (Average) Output Power.					

Worst Maximum RF Output Power Result							
Exposure Environment		General Population / Uncontrolled Exposure					
Separation Distance (cm)		20					
Condition		RF Output Power (dBm)					
Modulation Mode	N _{TX}	Chain-Port 1	Chain-Port 2	Sum Chain	DG (dBi)	EIRP Power	PD (S) (mW/cm ²)
802.11a	2	17.53	17.56	20.56	7.01	27.57	0.11370
Maximum Permissible Exposure Limit (mW/cm ²)							1
Note 1: N _{TX} = Number of Transmit Chains							