



MPE ESTIMATION

**Test report
On Behalf of
Ralinwi Nanjing Electronic Technology Co., Ltd.
For
PCIe WIFI Network Card
Model No.: Hicon 3220, Hicon 3210-PE**

FCC ID: 2ADGH3220

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Date of Test: Mar. 12, 2019 ~ Mar. 28, 2019

Date of Report: Mar. 28, 2019

Report Number: HK1903210619-5E

**1, Limit for General Population/ Uncontrolled Exposures**

Frequency	Power density (mW/ cm ²)	Averaging time(minutes)
300MHz----1.5GHz	F/1500	30
1.5GHz---100GHz	1.0	30

Note: F= Frequency in MHz

2, Estimation Result**For antenna 1:****2.4G WIFI**

Mode	Max PK Output power(dBm)	Tune Up Power(dBm)	Max Tune Up power(mW)	Antenna Gain(dBi)	Antenna Gain (linear)	MPE (mW/cm ²)
11b	19.99	19±1(20)	100.00	1	1.2589	0.02506
11g	19.41	19±1(20)	100.00	1	1.2589	0.02506
11n/HT20	17.16	16.5±1(17.5)	56.23	1	1.2589	0.01409
11n/HT40	16.78	16±1(17)	50.12	1	1.2589	0.01256

$$Pd = \frac{Pout * G}{4\pi r^2};$$

Note:

Note: The estimation distance is 20cm

Note:

PK Output power= conducted power.

Conducted power see the test report HK1903210619-1E, antenna port 1 gain=1dBi, antenna port 2 gain=1dBi, MIMO gain=4.01dBi

**5.2G WIFI**

Mode	Max PK Output power(dBm)	Tune Up Power(dBm)	Max Tune Up power(mW)	Antenna Gain(dBi)	Antenna Gain (linear)	MPE (mW/cm ²)
11a	19.83	19±1(20)	100.00	1	1.2589	0.02506
11n(HT20)	15.44	15±1(16)	39.81	1	1.2589	0.00998
11n(HT40)	15.95	15±1(16)	39.81	1	1.2589	0.00998
11ac(HT20)	15.83	15±1(16)	39.81	1	1.2589	0.00998
11ac(HT40)	15.59	15±1(16)	39.81	1	1.2589	0.00998
11ac(HT80)	14.13	14±1(15)	31.62	1	1.2589	0.00792

$$Pd = \frac{Pout * G}{4\pi r^2};$$

Note:

Note: The estimation distance is 20cm

Note:

PK Output power= conducted power.

Conducted power see the test report HK1905130997-4E, antenna port 1 gain=1dBi, antenna port 2 gain=1dBi,MIMO gain=4.01dBi

5.3G WIFI

Mode	Max PK Output power(dBm)	Tune Up Power(dBm)	Max Tune Up power(mW)	Antenna Gain(dBi)	Antenna Gain (linear)	MPE (mW/cm ²)
11a	19.82	19±1(20)	100.00	1	1.2589	0.02506
11n(HT20)	15.95	15±1(16)	39.81	1	1.2589	0.00998
11n(HT40)	15.93	15±1(16)	39.81	1	1.2589	0.00998
11ac(HT20)	16.00	15±1(16)	39.81	1	1.2589	0.00998
11ac(HT40)	15.93	15±1(16)	39.81	1	1.2589	0.00998
11ac(HT80)	14.62	14±1(15)	31.62	1	1.2589	0.00792

$$Pd = \frac{Pout * G}{4\pi r^2};$$

Note:

Note: The estimation distance is 20cm

Note:

PK Output power= conducted power.

Conducted power see the test report HK1905130997-4E, antenna port 1 gain=1dBi, antenna port 2 gain=1dBi,MIMO gain=4.01dBi

**5.6G WIFI**

Mode	Max PK Output power(dBm)	Tune Up Power(dBm)	Max Tune Up power(mW)	Antenna Gain(dBi)	Antenna Gain (linear)	MPE (mW/cm ²)
11a	19.85	19±1(20)	100.00	1	1.2589	0.02506
11n(HT20)	15.80	15±1(16)	39.81	1	1.2589	0.00998
11n(HT40)	15.91	15±1(16)	39.81	1	1.2589	0.00998
11ac(HT20)	15.74	15±1(16)	39.81	1	1.2589	0.00998
11ac(HT40)	15.84	15±1(16)	39.81	1	1.2589	0.00998
11ac(HT80)	14.06	14±1(15)	31.62	1	1.2589	0.00792

$$Pd = \frac{Pout * G}{4\pi r^2};$$

Note:

Note: The estimation distance is 20cm

Note:

PK Output power= conducted power.

Conducted power see the test report HK1905130997-4E, antenna port 1 gain=1dBi, antenna port 2 gain=1dBi,MIMO gain=4.01dBi

5.8G WIFI

Mode	Max PK Output power(dBm)	Tune Up Power(dBm)	Max Tune Up power(mW)	Antenna Gain(dBi)	Antenna Gain (linear)	MPE (mW/cm ²)
11a	19.82	19±1(20)	100.00	1	1.2589	0.02506
11n(HT20)	16.94	16±1(17)	50.12	1	1.2589	0.01256
11n(HT40)	16.74	16±1(17)	50.12	1	1.2589	0.01256
11ac(HT20)	16.74	16±1(17)	50.12	1	1.2589	0.01256
11ac(HT40)	16.41	16±1(17)	50.12	1	1.2589	0.01256
11ac(HT80)	16.51	16±1(17)	50.12	1	1.2589	0.01256

$$Pd = \frac{Pout * G}{4\pi r^2};$$

Note:

Note: The estimation distance is 20cm

Note:

PK Output power= conducted power.

Conducted power see the test report HK1905130997-3E, antenna port 1 gain=1dBi, antenna port 2 gain=1dBi,MIMO gain=4.01dBi

**For antenna 2:****2.4G WIFI**

Mode	Max PK Output power(dBm)	Tune Up Power(dBm)	Max Tune Up power(mW)	Antenna Gain(dBi)	Antenna Gain (linear)	MPE (mW/cm ²)
11b	19.64	19±1(20)	100.00	1	1.2589	0.02506
11g	19.34	19±1(20)	100.00	1	1.2589	0.02506
11n/HT20	16.36	16±1(17)	50.12	1	1.2589	0.01256
11n/HT40	16.96	16±1(17)	50.12	1	1.2589	0.01256

$$Pd = \frac{P_{out} * G}{4\pi r^2};$$

Note:

Note: The estimation distance is 20cm

Note:

PK Output power= conducted power.

Conducted power see the test report HK1903210619-1E, antenna port 1 gain=1dBi, antenna port 2 gain=1dBi,MIMO gain=4.01dBi

5.2G WIFI

Mode	Max PK Output power(dBm)	Tune Up Power(dBm)	Max Tune Up power(mW)	Antenna Gain(dBi)	Antenna Gain (linear)	MPE (mW/cm ²)
11a	19.86	19±1(20)	100.00	1	1.2589	0.02506
11n(HT20)	15.81	15±1(16)	39.81	1	1.2589	0.00998
11n(HT40)	15.94	15±1(16)	39.81	1	1.2589	0.00998
11ac(HT20)	15.94	15±1(16)	39.81	1	1.2589	0.00998
11ac(HT40)	15.84	15±1(16)	39.81	1	1.2589	0.00998
11ac(HT80)	14.91	14±1(15)	31.62	1	1.2589	0.00792

$$Pd = \frac{P_{out} * G}{4\pi r^2};$$

Note:

Note: The estimation distance is 20cm

Note:

PK Output power= conducted power.

Conducted power see the test report HK1905130997-4E, antenna port 1 gain=1dBi, antenna port 2 gain=1dBi,MIMO gain=4.01dBi

**5.3G WIFI**

Mode	Max PK Output power(dBm)	Tune Up Power(dBm)	Max Tune Up power(mW)	Antenna Gain(dBi)	Antenna Gain (linear)	MPE (mW/cm ²)
11a	19.49	19±1(20)	100.00	1	1.2589	0.02506
11n(HT20)	16.08	16±1(17)	50.12	1	1.2589	0.01256
11n(HT40)	15.84	15±1(16)	39.81	1	1.2589	0.00998
11ac(HT20)	15.88	15±1(16)	39.81	1	1.2589	0.00998
11ac(HT40)	15.92	15±1(16)	39.81	1	1.2589	0.00998
11ac(HT80)	14.65	14±1(15)	31.62	1	1.2589	0.00792

$$Pd = \frac{P_{out} * G}{4\pi r^2};$$

Note:

Note: The estimation distance is 20cm

Note:

PK Output power= conducted power.

Conducted power see the test report HK1905130997-4E, antenna port 1 gain=1dBi, antenna port 2 gain=1dBi, MIMO gain=4.01dBi

5.6G WIFI

Mode	Max PK Output power(dBm)	Tune Up Power(dBm)	Max Tune Up power(mW)	Antenna Gain(dBi)	Antenna Gain (linear)	MPE (mW/cm ²)
11a	19.79	19±1(20)	100.00	1	1.2589	0.02506
11n(HT20)	15.75	15±1(16)	39.81	1	1.2589	0.00998
11n(HT40)	15.91	15±1(16)	39.81	1	1.2589	0.00998
11ac(HT20)	15.83	15±1(16)	39.81	1	1.2589	0.00998
11ac(HT40)	15.97	15±1(16)	39.81	1	1.2589	0.00998
11ac(HT80)	14.73	14±1(15)	31.62	1	1.2589	0.00792

$$Pd = \frac{P_{out} * G}{4\pi r^2};$$

Note:

Note: The estimation distance is 20cm

Note:

PK Output power= conducted power.

Conducted power see the test report HK1905130997-4E, antenna port 1 gain=1dBi, antenna port 2 gain=1dBi, MIMO gain=4.01dBi

**5.8G WIFI**

Mode	Max PK Output power(dBm)	Tune Up Power(dBm)	Max Tune Up power(mW)	Antenna Gain(dBi)	Antenna Gain (linear)	MPE (mW/cm ²)
11a	19.73	19±1(20)	100.00	1	1.2589	0.02506
11n(HT20)	16.41	16±1(17)	50.12	1	1.2589	0.01256
11n(HT40)	16.12	16±1(17)	50.12	1	1.2589	0.01256
11ac(HT20)	16.75	16±1(17)	50.12	1	1.2589	0.01256
11ac(HT40)	16.38	16±1(17)	50.12	1	1.2589	0.01256
11ac(HT80)	16.64	16±1(17)	50.12	1	1.2589	0.01256

$$Pd = \frac{P_{out} * G}{4\pi r^2};$$

Note:

Note: The estimation distance is 20cm

Note:

PK Output power= conducted power.

Conducted power see the test report HK1905130997-3E, antenna port 1 gain=1dBi, antenna port 2 gain=1dBi, MIMO gain=4.01dBi

**For MIMO:
2.4G WIFI**

Mode	Max PK Output power(dBm)	Tune Up Power(dBm)	Max Tune Up power(mW)	Antenna Gain(dBi)	Antenna Gain (linear)	MPE (mW/cm ²)
11b	--	--	--	--	--	--
11g	--	--	--	--	--	--
11n/HT20	19.65	19±1(20)	100	4.01	2.518	0.05000
11n/HT40	19.78	19±1(20)	100	4.01	2.518	0.05000

$$Pd = \frac{P_{out} * G}{4\pi r^2};$$

Note:

Note: The estimation distance is 20cm

Note:

PK Output power= conducted power.

Conducted power see the test report HK1903210619-1E, antenna port 1 gain=1dBi, antenna port 2 gain=1dBi, MIMO gain=4.01dBi

**5.2G WIFI**

Mode	Max PK Output power(dBm)	Tune Up Power(dBm)	Max Tune Up power(mW)	Antenna Gain(dBi)	Antenna Gain (linear)	MPE (mW/cm ²)
11a	--	--	--	--	--	--
11n(HT20)	18.60	18±1(19)	79.43	4.01	2.518	0.03971
11n(HT40)	18.96	18±1(19)	79.43	4.01	2.518	0.03971
11ac(HT20)	18.81	18±1(19)	79.43	4.01	2.518	0.03971
11ac(HT40)	18.53	18±1(19)	79.43	4.01	2.518	0.03971
11ac(HT80)	17.55	17±1(18)	63.10	4.01	2.518	0.03155

$$Pd = \frac{P_{out} * G}{4\pi r^2};$$

Note:

Note: The estimation distance is 20cm

Note:

PK Output power= conducted power.

Conducted power see the test report HK1905130997-4E, antenna port 1 gain=1dBi, antenna port 2 gain=1dBi, MIMO gain=4.01dBi

5.3G WIFI

Mode	Max PK Output power(dBm)	Tune Up Power(dBm)	Max Tune Up power(mW)	Antenna Gain(dBi)	Antenna Gain (linear)	MPE (mW/cm ²)
11a	--	--	--	--	--	--
11n(HT20)	18.88	18±1(19)	79.43	4.01	2.518	0.03971
11n(HT40)	18.90	18±1(19)	79.43	4.01	2.518	0.03971
11ac(HT20)	18.74	18±1(19)	79.43	4.01	2.518	0.03971
11ac(HT40)	18.94	18±1(19)	79.43	4.01	2.518	0.03971
11ac(HT80)	17.65	17±1(18)	63.10	4.01	2.518	0.03155

$$Pd = \frac{P_{out} * G}{4\pi r^2};$$

Note:

Note: The estimation distance is 20cm

Note:

PK Output power= conducted power.

Conducted power see the test report HK1905130997-4E, antenna port 1 gain=1dBi, antenna port 2 gain=1dBi, MIMO gain=4.01dBi

**5.6G WIFI**

Mode	Max PK Output power(dBm)	Tune Up Power(dBm)	Max Tune Up power(mW)	Antenna Gain(dBi)	Antenna Gain (linear)	MPE (mW/cm ²)
11a	--	--	--	--	--	--
11n(HT20)	18.67	18±1(19)	79.43	4.01	2.518	0.03971
11n(HT40)	18.91	18±1(19)	79.43	4.01	2.518	0.03971
11ac(HT20)	18.72	18±1(19)	79.43	4.01	2.518	0.03971
11ac(HT40)	18.87	18±1(19)	79.43	4.01	2.518	0.03971
11ac(HT80)	17.42	17±1(18)	63.10	4.01	2.518	0.03155

$$Pd = \frac{P_{out} * G}{4\pi r^2};$$

Note:

Note: The estimation distance is 20cm

Note:

PK Output power= conducted power.

Conducted power see the test report HK1905130997-4E, antenna port 1 gain=1dBi, antenna port 2 gain=1dBi, MIMO gain=4.01dBi

5.8G WIFI

Mode	Max PK Output power(dBm)	Tune Up Power(dBm)	Max Tune Up power(mW)	Antenna Gain(dBi)	Antenna Gain (linear)	MPE (mW/cm ²)
11b	--	--	--	--	--	--
11n(HT20)	19.466	19±1(20)	100	4.01	2.518	0.05000
11n(HT40)	19.437	19±1(20)	100	4.01	2.518	0.05000
11ac(HT20)	19.755	19±1(20)	100	4.01	2.518	0.05000
11ac(HT40)	19.405	19±1(20)	100	4.01	2.518	0.05000
11ac(HT80)	19.586	19±1(20)	100	4.01	2.518	0.05000

$$Pd = \frac{P_{out} * G}{4\pi r^2};$$

Note:

Note: The estimation distance is 20cm

Note:

PK Output power= conducted power.

Conducted power see the test report HK1905130997-3E, antenna port 1 gain=1dBi, antenna port 2 gain=1dBi, MIMO gain=4.01dBi



Note: the device could not transmit simultaneously in 2.4G and 5G.

when the minimum test separation distance is >20 cm, a distance of 20 cm is applied to determine SAR test exclusion. The test exclusion threshold is 0.05000 mW/cm^2 which is $< 1.0 \text{ mW/cm}^2$, SAR testing is not required.

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